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Wichtiger Hinweis – bitte beachten!

Von 1998 bis 2016 wertete Martin Schorr – unterstützt durch verschiedene Kollegen – zahllose odonatologische Publikationen (einschließlich "grauer Literatur", also unveröffentlichte Berichte, wissenschaftliche Abschlussarbeiten etc.) aus und stellte diese als Zitate, in den meisten Fällen mit Zusammenfassung, in Form des "ODONATOLOGICAL ABSTRACT SERVICE" (OAS) als Veröffentlichung des INTERNATIONAL DRAGONFLY FUND e.V. (IDF) in Kooperation mit der WORLDWIDE DRAGONFLY ASSOCIATION (WDA) zusammen. Nachdem mit der Doppelnummer 45/46 die letzte Ausgabe erschienen ist, stellt der IDF nun alle OAS in einem pdf zusammengefasst gratis zum Herunterladen zur Verfügung. Durch Suche nach Stichworten kann diese Datei sehr komfortabel für Literaturrecherchen genutzt werden.

Wenn Sie mit Hilfe von OAS odonatologische Literatur recherchieren, bitten wir Sie darum, dieses in Ihren eigenen Berichten oder Publikationen zu vermerken. Dieses kann beispielsweise in der Danksagung in folgender oder ähnlicher Form geschehen:

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Important information – please take notice!

From 1998 to 2016, Martin Schorr – supported by several colleagues – acquired and analysed countless odonatological papers (including "grey literature", i.e. unpublished reports, thesis papers etc.) and compiled them as citations, in most cases with abstracts, as "ODONATOLOGICAL ABSTRACT SERVICE" (OAS), a publication of INTERNATIONAL DRAGONFLY FUND e.V. (IDF) in cooperation with WORLDWIDE DRAGONFLY ASSOCIATION (WDA).

OAS edition 45/46 (May 2016) was the final one and OAS is discontinued. Now IDF offers a free compilation of all OAS editions. It offers great opportunities for odonatological literature research.

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Odonatological Abstract Service

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The ©ODONATOLOGICAL ABSTRACT SERVICE is a supplement to AGRION, the Newsletter of the Worldwide Dragonfly Association.

Anadu, D.I.; Anaso, H.U. and O.N.D. Onyeka 1996: Acute toxicity of the insect larvicide Abate (Temephos) on the fish *Tilapia melanopleura* and the dragonfly larvae *Neurocordulia virginensis*. *Journal of Environmental Science and Health, Part B: Pesticides, Food, Contaminants and Agricultural Wastes* 31(6): 1363-1375

[*"Acute bioassay tests on the toxic effects of the insect larvicide Abate(R) (temephos) on the mouth brooder cichlid fish Tilapia melanopleura and the dragonfly larvae (Odonata) Neurocordulia virginensis were conducted in static non renewal toxicity test set ups. ...The dragonfly larvae were 15 times more susceptible to the larvicide than the tilapia. ... The estimated 'safe' concentration of the pesticide to the fish was 3.0 mg/L and 0.2 mg/L for insect larvae. These figures are far above the concentrations approved for use in the control of mosquito larvae (0.0004-0.01 mg/L)."*]

Anholt, B.R.; Skelly, D.K. and E.E. Werner 1996: Factors modifying antipredator behavior in larval toads. *Herpetologica* 52(3): 301-313

[*"This study examines the behavioral responses of larvae of the American toad, Bufo americanus, to the presence of an invertebrate predator, larvae of the dragonfly Anax junius. ... Toad larvae did avoid predators, but the level of avoidance could not be shown to vary with predator density, food availability, or body size."*]

Arikawa, K.; Ozaki, K.; Tsuda, T.; Kitamoto, J. and Y. Mishina 1996: Two visual pigment opsins, one expressed in the dorsal region and another in the dorsal and the ventral regions, of the compound eye of a dragonfly, *Sympetrum frequens* (vol 1, pg 33, 1995). *Invertebrate neuroscience* 2(3): 209 (Correction/Addition)

Bayerisches Landesamt für Wasserwirtschaft (Hrsg.) (1996): *Ökologische Typisierung der aquatischen Makrofauna. Informationsberichte des bayerischen Landesamtes für Wasserwirtschaft* 4/96: 543 pp. DM 49,- + p. u. p.

Adress: Wasserwirtschaftsamt Deggendorf, PF 2060, D-94460 Deggendorf, Germany.

[*checklist of most of the German species of macrozoobenthos including Odonata; extensive species-wise descriptions of habitats and biology/ecology; well documented handbook*]

Debano, S.J. 1996: Male mate searching and female availability in the dragonfly, *Libellula saturata*: relationships in time and space. *Southwestern Naturalist* 41 (3): 293-298

[*"Sexual selection theory proposes that mate-locating tactics will be driven by the temporal and spatial patterns of receptive females. I tested this hypothesis in the libellulid dragonfly, Libellula saturata, by examining two predictions: 1) that male densities should be highest at times when the probability of encountering receptive females is the greatest, and*

2) that densities of males should be highest at places where females prefer to oviposit."]

Dieter, C.D.; Duffy, W.G. and L.D. Flake 1996: The effect of phorate on wetland macroinvertebrates. *Environmental Toxicology and Chemistry* 15(3): 308-312

[*"The effects of phorate, an organophosphorus insecticide, on aquatic macroinvertebrates was studied in littoral mesocosms in South Dakota wetlands. ...Macroinvertebrate taxa that were sensitive to phorate included: Odonata, Hemiptera, Culicidae, Heliidae, Ephemeroptera, Acarina, Coleoptera, Stratiomyidae, and Hydracarina. Taxa that were tolerant to phorate included: Hirudinea, Gastropoda, Oligochaeta, and Ostracoda."*]

Gasse, M.; Kröger, C. (1996): Schlüpfende Großlibelle (Anisoptera: Aeshnidae) als Beute der sozialen Faltenwespe *Vespula vulgaris* L. (Hymenoptera: Vespidae). *Libellula* 15(1/2): 45-55 (in German, with Engl. summary)

[*predation; Hymenoptera; Aeshna cyanea; emergence*]

Grether, G.F. and R.M. Grey 1996: Novel cost of a sexually selected trait in the rubyspot damselfly *Hetaerina americana*: Conspicuousness to prey. *Behavioral Ecology* 7(4): 465-473

[*"Conspicuousness to predators frequently has been invoked as a cost of sexually selected traits, but conspicuousness to prey has not. We tested for the latter using rubyspot damselflies (Hetaerina americana) as the predator."*]

Gustafson, K. 1996: Biological dynamical subsystems of hovering flight. *Mathematics and Computers in Simulation* 40(3-4): 397-410

[*Dragonfly, Hummingbird; Aerodynamics*]

Helsdingen, P. van; Willemsse, L.; Speight, M.C.D. (1996): Background information on invertebrates of the Habitat Directive and the Bern Convention. Part II - Mantodea, Odonata, Orthoptera and Arachnida (pp: 219-398). *Nature and environment* 80.

Adress: Council of Europe Publishing, Council of Europe, F-67075 Strasbourg Cedex, France

[*review; biology; range; status; threats; key sites; priority actions; future research efforts; Coenagrion hylas; C. mercuriale; Sympecma paedisca; Aeshna viridis; Gomphus graslini; Stylurus flavipes; Ophiogomphus cecilia; Lindenia tetrphylla; Cordulegaster trinacriae; Macromia splendens; Oxygastra curtisii; Leucorrhinia albifrons; L. caudalis; L. pectoralis*]

Jellyman, D.J. 1996: Diet of longfinned eels, *Anguilla dieffenbachii*, in Lake Rotoiti, Nelson Lakes, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 30(3): 365-369

[*"The diet of 72 longfinned eels, Anguilla dieffenbachii, from Lake Rotoiti, Nelson Lakes National Park,*

New Zealand, was numerically dominated by snails, especially *Lymnaea*. Larvae of the dragonfly, *Procordulia grayi*, were extensively eaten as they migrated towards the shore for emergence.”]

Johansson, F. 1996: The influence of cannibalism and prey density on growth in the damselfly *Coenagrion hastulatum*. *Archiv für Hydrobiologie* 137(4): 523-535

[“The effects of prey density and cannibalism on individual growth rate in similar sized *Coenagrion hastulatum* (Zygoptera) larvae were studied in a 66 day laboratory experiment. The frequency of cannibalism decreased with increasing alternative prey densities.”]

Jordan, F. and A.C. Mc Creary 1996: Effects of an odonate predator and habitat complexity on survival of the flagfish *Jordanella floridae*. *Wetlands* 16 (4): 583-586

[“Dragonfly larvae reduced survival of flagfish by 40% during a ten-day experiment. Survival rates did not differ between simple and complex habitats. These results suggest that predatory insects could play an important role in regulating populations of small fishes in marsh systems that lack larger predatory fishes.”]

Kielb, M.A. and M.F. O'Brien 1996: Discovery of an isolated population of *Anax longipes* in Michigan (Odonata, Aeshnidae). *Great Lakes Entomologist* 29(3): 161-164

Louton, J.; Gelhaus, J. and R. Bouchard 1996: The aquatic macrofauna of water-filled bamboo (Poaceae: Bambusoideae: *Guadua*) internodes in a Peruvian lowland tropical forest. *Biotropica* 28(2): 228-242

[“In the lowland tropical forest at Pakitza, Peru, bamboo (*Guadua weberbaueri* Pilger) internodes with lateral perforations contain a diverse aquatic fauna. We found a community of 29 species dominated by Diptera, primarily mosquitoes, and an undescribed helicopter damselfly (*Mecistogaster*).”]

Marchant, R. and C.M. Yule 1996: A method for estimating larval life spans of aseasonal aquatic insects from streams on Bougainville Island, Papua New Guinea. *Freshwater Biology* 35(1): 101-107 [Lieftinckia kimmins]

Marten, G.G.; Suarez, M.F. and R. Astaeza 1996: An ecological survey of *Anopheles albimanus* larval habitats in Colombia. *Journal of Vector Ecology* 21(2): 122-131

[“The flora and fauna of 69 aquatic sites in Colombia were surveyed to identify ecological conditions that favor production of *Anopheles albimanus*... *A. albimanus* production was negatively associated with a complete cover of *Lemna*, fish, hydrometrid nymphs, large species of cyclopoid copepods, and dragonfly or mayfly nymphs.”]

Martinet, S.C.G. and L.F.V. Diez 1996: The community of odonata and aquatic heteroptera (Gerronormorpha and Nepomorpha) in a rehabilitated wetland: The Laguna de la Nava (Palencia, Spain). *Archiv für Hydrobiologie* 136 (1): 89-104

McCollum, S.A. and J. Van Buskirk 1996: Costs and benefits of a predator-induced polyphenism in the gray treefrog *Hyla chrysoscelis*. *Evolution* 50(2): 583-593

[“The phenotypes of gray treefrog (*Hyla chrysoscelis*) tadpoles vary depending on whether predators are present in the pond. Tadpoles reared in ponds with predatory dragonfly larvae are relatively inactive compared with tadpoles in predator-free ponds,

and have relatively large, brightly colored tailfins with dark spots along the margins.”]

Mesterton-Gibbons, M.; Marden, J.H. and L.A. Dugatkin 1996: On wars of attrition without assessment. *Journal of Theoretical Biology* 181(1): 65-83 [Data from *Calopteryx maculata*]

Mogi, M. and T. Sota 1996: Physical and biological attributes of water channels utilized by *Culex pipiens pallens* immatures in Saga City, Southwest Japan. *Journal of the American Mosquito Control Association* 12(2 PART 1): 206-214

[“Physical and biological attributes of water channels utilized by immatures of *Culex pipiens pallens* were studied in Saga City, Japan. Water in mosquito-productive segments generally was stagnant or slowly running (mean < 5 cm/sec), with low and fluctuating dissolved oxygen concentrations and high electric conductivity. ... Adult Odonata were more diverse in segments with emergent vegetation irrespective of physical attribute's of channel water.”]

Nystrom, P.; Bronmark, C. and W. Graneli 1996: Patterns in benthic food webs: A role for omnivorous crayfish? *Freshwater Biology* 36(3): 631-646 [Fish Predation, Gastropoda, Odonata, Biomass]

Okamoto, M.; Yasuda, K. and A. Azuma 1996: Aerodynamic characteristics of the wings and body of a dragonfly. *Journal of Experimental Biology* 199 (2): 281-294

[“The aerodynamic characteristics of the wings and body of a dragonfly and of artificial wing models were studied by conducting two types of wind-tunnel tests and a number of free-flight tests of gliders made using dragonfly wings.”]

Phillips, E.C. 1996: Habitat preference of large predatory aquatic insects (Megaloptera and Odonata) in Ozark streams of Arkansas. *Texas Journal of Science* 48(4): 255-260

Pritchard, G. 1996: The life history of a tropical dragonfly: *Cora marina* (Odonata: Polythoridae) in Guanacaste, Costa Rica. *Journal of Tropical Ecology* 12(4): 573-581

[“The life history of *Cora marina* was followed for one year in two permanent streams at 600 m elevation in Guanacaste National Park, Costa Rica. In both streams, *C. marina* was univoltine. Adults first appeared at the beginning of May and the flight period coincided with the wet season. ... Oviposition in logs above the stream and the ability to live in the low oxygen conditions of the hyporheic zone probably allow eggs and small larvae to survive wet season spates.”]

Prot, J.M. (1996): Tératologie chez *Orthetrum albistylum* (Sélys, 1848) (Odonata, Anisoptera, Libellulidae). *Martinia* 12(1): 3-4 (in French) [teratology; France]

Reinhard, K.; Möller, S. (1996): Libellen als Beute von Eidechsen: eine Übersicht. *Libellula* 15(3/4): 93-101. [predation; reptils; food of lizards; stomach samples; faecal analysis]

Samways, M.J. and N.S. Steytler 1996: Dragonfly (odonata) distribution patterns in urban and forest landscapes, and recommendations for riparian management. *Biological Conservation* 78 (3): 279-288
Sanborn, A.F. 1996: The cicada *Diceroprocta delicata* (Homoptera: Cicadidae) as prey for the dragonfly *Erythemis simplicicollis* (Anisoptera: Libellulidae). *Florida Entomologist* 79(1): 69-70

- Schaefer, P.W.; Barth, S.E. and H.B. White 1996: Incidental capture of male *Epiaeschna heros* (Odonata: Aeshnidae) in traps designed for arboreal *Calosoma sycophanta* (Coleoptera: Carabidae). *Entomological News* 107(5): 261-266
 ["Ten male *Epiaeschna heros*, the largest dragonfly in the northeastern US, were caught unexpectedly in traps designed to catch *Calosoma sycophanta*, a carabid beetle that feeds on the larvae of the gypsy moth, *Lymantria dispar* (Lepidoptera: Lymantriidae), and other lepidopterans. ...Modification of the traps might enhance their selectivity for aeshnid dragonflies."]

 Schaefer, P.W.; Barth, S.E. and H.B. White 1996: Predation by *Enallagma civile* (Odonata: Coenagrionidae) on adult sweetpotato whitefly, *Bemisia tabaci* (Homoptera: Aleyrodidae). *Entomological News* 107(5): 275-276

 Snyder, S.D. and J. Janovy 1996: Behavioral basis of second intermediate host specificity among four species of *Haematoloechus* (Digenea: Haematoloecidae). *Journal of Parasitology* 82(1): 94-99
 ["Cercarial behavior patterns were examined in 4 species of frog lung flukes (*Haematoloechus* spp.). ...Cercariae of *H. longiplexus* attached to experimental hosts in approximately the same numbers as *H. complexus*, but *H. longiplexus* penetrated only damselfly naiads, and only at the base of the zygopteran caudal gills. Cercariae of *H. complexus*, a second intermediate host generalist, were able to penetrate and enter several arthropod species at the intersegmental membranes. ..."]

 Wagner, T.; Neinhuis, C. and W. Barthlott 1996: Wettability and contaminability of insect wings as a function of their surface sculptures. *Acta Zoologica (Stockholm)* 77(3): 213-225
 ["The wing surfaces of 97 insect species from virtually all relevant major groups were examined by high resolution scanning-electron-microscopy, in order to identify the relationships between the wing microstructures, their wettability with water and their behaviour under the influence of contamination. ... Some insects with very unwettable wings show a highly significant "self-cleaning" effect under the influence of rain or dew. Detailed analysis revealed that there is a correlation between the wettability and the "SM Index" (quotient of wing surface/body mass)(0.67) with values ranging from 2.42 to 57.0. Furthermore, there is a correlation between the "self-cleaning" effect and the SM Index, meaning that taxa with a high SM Index. e.g. "large-winged" Ephemeroptera, Odonata, Planipennia, and many Lepidoptera, have very unwettable wings and show high particle removal due to dripping water drops."]

 Wetzel, E.J. and G.W. Esch 1996: Influence of odonate intermediate host ecology on the infection dynamics of *Halipegus* spp., *Haematoloechus longiplexus*, and *Haematoloechus complexus* (Trematoda: Digenea). *Journal of the Helminthological Society of Washington* 63(1): 1-7
 ["The prevalences and relative densities of *Halipegus* spp., *Haematoloechus longiplexus*, and *Haematoloechus complexus* metacercarial infections in anisopteran (dragonfly) and zygopteran (damselfly) odonate intermediate hosts were examined."]

 Yule, C.M. and R.G. Pearson 1996: Aseasonality of benthic invertebrates in a tropical stream on Bougainville Island, Papua New Guinea. *Archiv für Hydrobiologie* 137(1): 95-117
 [*Lieftinckia kimmins*]

 Yule, C.M. 1996: Trophic relationships and food webs of the benthic invertebrate fauna of two aseasonal tropical streams on Bougainville Island, Papua New Guinea. *Journal of Tropical Ecology* 12(4): 517-534

 Zeng, L.J., Matsumoto, H. and K. Kawachi 1996: Two colour compensation method for measuring unsteady vertical force of an insect in a wind tunnel. *Measurement Science and Technology*, 7(4): 515-519

 Zeng, L.J., Matsumoto, H. and K. Kawachi 1996: A fringe shadow method for measuring flapping angle and torsional angle of a dragonfly wing. *Measurement Science and Technology*, 7(5): 776-781

 Zeng, L.J.; Matsumoto, H. and K. Kawachi 1996: Simultaneous measurement of the shape and thickness of a dragonfly wing. *Measurement Science and Technology* 7(12): 1728-1732.

 Zeng, L.J., Matsumoto, H. and K. Kawachi 1996: Angle compensation sensor for measuring the shape of a dragonfly wing. *Sensors and Actuators. A Physical.* (ISSN 0924-4247) 55(2-3): 87-90

 Zeng, L.J.; Matsumoto, H. and K. Kawachi 1996: Scanning beam collimation method for measuring dynamic angle variations using an acousto optic deflector. *Optical Engineering* 35(6): 1662-1667

 Zeng, L.J., Matsumoto, H.; Sunada, S. and K. Kawachi 1996: High resolution method for measuring the torsional deformation of a dragonfly wing by combining a displacement probe with an acousto optic deflector. *Optical Engineering* 35(2): 507-513

 Ali, D.W. 1997: The aminergic and peptidergic innervation of insect salivary glands. *Journal of Experimental Biology* 20(14): 1941-1949
 ["Insect salivary glands are glands associated with nutrient intake whose secretions are generally involved in the digestion and lubrication of food. They are under the control of neuroactive substances and may be innervated from several sources including the suboesophageal ganglion, the stomatogastric nervous system and the unpaired median nerves. ... Serotonin and dopamine appear to be the most prominent amines associated with insect salivary glands. Either one or both of these amines are found associated with the salivary glands of the locust, stick insect, cockroach, cricket, dragonfly, mosquito, adult moth and kissing bug."]

 Anders, U. and G. Ruppell 1997: Relationships of some European Calopteryx species suggested by time analysis of courtship flights (Odonata, Calopterygidae). *Entomologia Generalis* 21(4): 253-264
 ["The courtship flights of males of *Calopteryx virgo* (Linnaeus 1758), *C. splendens* (Harris 1782), *C. xanthostoma* (Charpentier 1825) and *C. haemorrhoidalis* (Vander Linden 1825) were filmed with a slow motion camera in N' Germany and S' France. ... With respect to the studied parameter, there is no difference between *C. splendens* and *C. xanthostoma*, in contrast to *C. haemorrhoidalis* and *C. virgo*, which are different to each other and to the first two."]

 Asahina, S. 1997: Records of the northern Vietnamese Odonata taken by the expedition members from the National Science Museum, Tokyo. 5. Coenagrionidae, Protoneuridae and Platycnemidae. *Bulletin of the National Science Museum Series A (Zoology)* 23(1): 17-34
 ["In total twenty-four species of northern Vietnamese damselflies referable to three zygopterid families are recorded in the fifth part of this series. Many of them seem to be rather common lowland species, but special attention is paid to the family Platycnemididae, of which three *Calicnemia* are illustrated"]

including one new species and six of the seven *Coelliccia* species are described as being new to science.”]

Asahina, S. 1997: Records of the northern Vietnamese odonata taken by the expedition members from the National Science Museum, Tokyo. 6. Platystictidae, Megapodagrionidae, Lestidae and Synlestidae. Bulletin of the National Science Museum Series A (Zoology) 23(2): 107-113

[“Seven species of northern Vietnamese damselflies are classified into four families, Platystictidae (1 new species and 1 new subspecies), Megapodagrionidae (1 new species and 1 species previously known from Lower Burma and Laos), Lestidae (1 common South Asiatic species), and Synlestidae (2 species previously known from Southwest China, etc.).”]

Baird, J.M. and M.L. May 1997: Foraging behavior of *Pachydiplax longipennis* (Odonata: Libellulidae). Journal of Insect Behavior 10 (5): 655-678

[“Food intake, prey availability, and prey capture behavior at feeding areas were quantified in the dragonfly *Pachydiplax longipennis* by observing focal individuals on artificial perches, where they exhibited marked short-term site fidelity.”]

Bland, K.P. 1997: A precisely timed case of nocturnal migration by *Aeshna cyanea* (Mueller) (Odonata: Aeshnidae). Entomologist's Record and Journal of Variation 109(5-6): 154-155

Brock, I.; Hoffmann, J.; Kühnast, O.; Piper, W.; Voß, K. (1997): Atlas der Libellen Schleswig-Holsteins. Landesamt für Natur und Umwelt Schleswig-Holstein (Hrsg.). ISBN 3-923339-39-9: 176 pp. (in German, with Engl. and Danish summaries)
Adress: Landesamt für Natur- und Umwelt SH, Hamburger Chaussee 25, D-24220 Flintbek, Germany
[distribution; biogeographical regions; UTM-squares; Schleswig-Holstein, north of Germany]

Bulankova, E. 1997: Dragonflies (Odonata) as bio-indicator of environment quality. Biologia (Bratislava) 52(2): 177-180
[Danube river, Morava river, Rudava river, Czech Republic]

Burbach, K.; Winterholler, M. (1997): Die Invasion von *Hemianax ephippiger* (Burmeister) in Mittel- und Nordeuropa 1995/1996 (Anisoptera: Aeshidae). Libellula 16(1/2): 33-59. (in German with Engl. summary)
[invasion; Central- and North Europe; previously unpublished records; Czech Republik; Poland; Austria; Switzerland]

Clauswalker, D.B.; Crowley, P.H. and F. Johansson 1997: Fish predation, cannibalism, and larval development in the dragonfly *Eitheca cynosura*. Canadian Journal of Zoology 75(5): 687-696
[“We manipulated the risk of fish predation and cannibalism in semi field and laboratory experiments with larvae of the dragonfly *Eitheca cynosura*.”]

Cordero, A.; Andres, J.A. (1996): Colour polymorphism in odonates: females that mimic males?. J. Br. Dragonfly soc. 12(2): 50 - 60.
[female colour polymorphism; polychromatic species]

Currie, R.S.; Fairchild, W.L. and D.C.G. Muir 1997: Remobilization and export of cadmium from lake sediments by emerging insects. Environmental Toxicology and Chemistry 16(11): 2333-2338

[“Emerging insects including, Diptera, Odonata, Ephemeroptera, and Trichoptera were collected from Lake 382 (L382) in 1991 and 1992 to estimate quantitatively the export of Cd by aquatic insects from a natural system having elevated Cd concentrations in the water and sediment. L382 is a Canadian Shield lake, located within the Experimental Lakes Area in northwestern Ontario, that received experimental additions of Cd from 1987 to 1992. ... Approximately 0.05 to 0.17% of the whole-lake Cd load in L382 sediments was exported annually or 0.12 to 0.39% of the epilimnion Cd sediment load.”]

Didion, A.; Trockur, B.; Schorr, M. (1997): Rote Liste der im Saarland gefährdeten Libellenarten (2. Fassung: 1997). Aus Natur und Landschaft im Saarland, Sonderband 7: 9-36. (in German, with French summary)
[red list; region in the south-west of Germany near the border to France and Luxembourg]

Dolmen, D. 1997: "Freshwater prawns" and other invertebrates: A faunistic report from the lakes Redalsvannet and Landvikvannet, Grimstad. Fauna (Oslo) 50(1): 36-42 (Norwegian, with English summary)

[“In June and July 1992 and June and August 1996, numerous "freshwater prawns" *Palaemonetes varians* were recorded in three brackish-water lakes at Grimstad, ... This is the first reliable record of the species in Norway, at least for many decades. The remaining fauna consisted of both limnic and marine animals, and included rare species like *Brachytron pratense* (Odonata) and *Gyrinus caspius* (Coleoptera).”]

Ferreras-Romero, M. 1997: The life history of *Boyeria irene* (Fonscolombe, 1838) (Odonata: Aeshnidae) in the Sierra Morena Mountains (southern Spain). Hydrobiologia 345(2-3): 109-116
[“The life history of *Boyeria irene* is inferred from size-frequency analyses of sweep-net samples taken during five years in a permanent stream in the Sierra Morena Mountains. There the species is apparently mainly semivoltine, although a few larvae require three years to complete development.”]

Fincke, O.M. 1997: Conflict resolution in the odonata: implications for understanding female mating patterns and female choice. Biological Journal of the Linnean Society 60(2): 201-220
[“With reference to the Odonata, a taxon in which mating requires cooperation of the female, the active role that females play in mating decisions is often ignored, leading to the premature conclusion that male coercion of Females is common. A critical review of the outcome of sexual conflict among odonates leads me to alternative explanations of female mating patterns that need to be refuted before concluding that males coerce matings.”]

Fincke, O.M.; Yanoviak, S.P. and R.D. Hanschu 1997: Predation by odonates depresses mosquito abundance in water-filled tree holes in Panama. Oecologia 112(2): 244-253
[“In the lowland moist forest of Barro Colorado Island, Panama, larvae of four common species of odonates, a mosquito, and a tadpole are the major predators in water-filled tree holes. Mosquito larvae are their most common prey. Holes colonized naturally by predators and prey had lower densities of mosquitoes if odonates were present than if they were absent. Using artificial tree holes placed in the field, we tested the effects of odonates on their mosquito prey while controlling for the quantity and species of predator, hole volume, and nutrient input. In large and small holes with low nutrient input, odonates depressed the number of mosquitoes pre-

sent and the number that survived to pupation. Increasing nutrient input (and consequently, mosquito abundance) to abnormally high levels dampened the effect of predation when odonates were relatively small."

Fitzhugh G.H. and J.H. Mardsen 1997: Maturation changes in troponin T expression, Ca²⁺-sensitivity and twitch contraction kinetics in dragonfly flight muscle. *Journal of Experimental Biology* 200 (10): 1473-1482

["Maximum lift production and the thermal sensitivity of lift production increase dramatically during adult maturation of *Libellula pulchella* dragonflies. Here, we report that the mechanistic basis for this transition appears to involve a developmental change in protein expression, which alters the Ca²⁺-sensitivity of muscle activation and twitch contraction kinetics."]

Fliedner, H. (1997): Die Bedeutung der wissenschaftlichen Namen europäischer Libellen. *Libellula*, Suppl. 1: 111 pp. (in German, with short Engl. summary)

Adress: GdO, Gelderner Str. 39; D-41189 Mönchengladbach, Germany. (DM 20,- + p. u. p.)

[meanings of the scientific names of the European dragonflies; etymology; elements of names; short histories of odonatists]

Forbes, M.R.; Schalk, G.; Miller, J.G. and J.M.L. Richardson 1997: Male-female morph interactions in the damselfly *Nehalennia irene* (Hagen). *Canadian Journal of Zoology* 75(2): 253-260

["Several hypotheses concerning factors that favour coexistence of female morphs in damselflies (Zygoptera: Odonata) invoke differential attraction to (or harassment of) female morphs from mate-searching males. We designed experiments to determine whether males were differentially attracted to either of two discrete female morphs in a damselfly, *Nehalennia irene* (Hagen)."]

Gorb, S.N. 1997: Porous channels in the cuticle of the head-arrester system in dragon/damselflies (Insecta: Odonata). *Microscopy Research and Technique* 37(5-6): 583-591

["The ultrastructure of the porous channels (PC) of the postcervical sclerite (SPC), which provides additional head fixation to the neck in adult odonates, was studied using TEM and high resolution SEM microscopy. ... The porous channel system of the odonate arrester is interpreted as a device transporting adhesive excretions from the epidermal cells to the cuticular surface."]

Goutner, V. and R.W. Furness 1997: Mercury in feathers of little egret *Egretta garzetta* and night heron *Nycticorax nycticorax* chicks and in their prey in the Axios delta, Greece. *Archives of Environmental Contamination and Toxicology* 32(2): 211-216

["Mercury concentrations were measured in feathers of little egret and night heron chicks and in their prey in the Aries Delta, Greece. ... Diets differed considerably between the two species due to use of different foraging habitats and this seems responsible for different mercury contents of feathers. Mercury concentrations in the pumpkinseed sunfish *Lepomis gibbosus*, goldfish *Carrasius auratus*, and in dragonfly Odonata larvae were the highest among the prey categories. ... Night heron chick feathers, freshwater fish and dragonfly larvae could be used to monitor mercury contamination in this region, but use of bird feathers alone could give misleading results if changes in diet occurred."]

Grand, D. (1997): *Somatochlora meridionalis* Nielsen, 1935 (Odonata, Anisoptera). Analyse bibliographique et compléments biologiques. *Martinia*

13(3): 67 - 86. (in French, with short Engl. summary) [review of published data; distribution; emergence; copulation; status; France]

Hämäläinen, M. (1997): Forgotten names in the nomenclature of European Calopteryx species (Odonata: Calopterygidae). *Opusc. zool. flumin.* 158: 1 - 5.

Hämäläinen, M.; Valtonen, P. (1997): Trollslänornas utbredning i de naturhistoriska provinserna i Finland. *Nordic Odonatological Society Newsletter* 3(1): 10 - 11. [biogeographical provinces; distribution; checklists]

Hawking, J.H. 1997: The conservation status of dragonflies (Odonata) from south-eastern Australia. *Memoirs of the Museum of Victoria* 56(2): 537-542 [One hundred and seven species are recorded from South Australia, Victoria, Tasmania and southern New South Wales. No species is considered endangered, but nine species have high conservation priority. These species are endemic to Australia and all have restricted distributions. The vulnerability of the larval habitats is discussed and suggestions for their conservation and management are made."]

Hooper, R.E. and M.T. Siva-Jothy 1997: "Flybys": A prereproductive remote assessment behavior of female *Calopteryx splendens xanthostoma* (Odonata: Calopterygidae). *Journal of Insect Behavior* 10(2): 165-175

["Before reproductive events, female *Calopteryx splendens xanthostoma* show a distinctive flight behavior over patches of oviposition substrate guarded by territorial males. We term such flights 'flybys.' ... The results suggest that one function of flybys is to allow females to assess remotely potential male interference at oviposition sites."]

Horwitz P 1997: Comparative endemism and richness of the aquatic invertebrate fauna in peatlands and shrublands of far south-western Australia. *Memoirs of the Museum of Victoria* 56(2): 313-321

["Samples of surface water, interstitial water and crayfish burrow water were analysed from about 45 sites and in each season over a twelve month period in 1993. Six groups of aquatic invertebrates were chosen for more detailed analyses (mites, oligochaetes, isopods, decapods, dipterans, and odonates) and resolved to species level."]

Jacob, J.; Raab, G. and U. Hoppe 1997: Surface lipids of the silverfish (*Lepisma saccharina* L.). *Zeitschrift für Naturforschung, Section C, Journal of Biosciences* 52(1-2): 109-113.

["The cuticular lipid composition of silverfish resembles that of other more primitive arthropod forms such as stoneflies and dragonflies."]

Kasuya, E.; Edanami, K. and I. Ohno 1997: Territorial conflicts in males of the dragonfly, *Orthetrum japonicum* (Odonata: Libellulidae): The role of body size. *Zoological Science* 14(3): 505-509

["The relationship between body size and the results of territorial conflicts was studied in males of the dragonfly, *Orthetrum japonicum japonicum*. ... The results of territorial conflicts were more strongly affected by the role of the opponents (resident or intruder) than by the difference in their body sizes."]

Laurila, A.; Kujasalo, J. and E. Ranta 1997: Different antipredator behaviour in two anuran tadpoles: effects of predator diet. *Behavioral Ecology and Sociobiology* 40 (5): 329-336

["Recent investigations have indicated that animals are able to use chemical cues of predators to as-

sess the magnitude of predation risk. ... Tadpoles of the common toad (*Bufo bufo*) are unpalatable to most vertebrate predators and have an alarm substance. Tadpoles of the common frog (*Rana temporaria*) lack both these characters. We experimentally studied how predator diet, previous experience of predators and body size affect antipredator behaviour in these two tadpole species. Late instar larvae of the dragonfly *Aeshna juncea* were used as predators. The dragonfly larvae were fed a diet exclusively of insects, *R. temporaria* tadpoles or *B. bufo* tadpoles. *R. temporaria* tadpoles modified their behaviour according to the perceived predation risk.”]

Legrand, J. 1996 (1997): The larva of *Idomacromia proavita* Karsch, 1896 (Odonata, Anisoptera, Corduliidae). *Revue Francaise d'Entomologie* (N.S.) 18(4): 134. (French, with English summary) [Gabon, Guinea, Africa]

Lelouarn, H. and A. Cloarec 1997: Insect predation on pike fry. *Journal of Fish Biology* 50(2): 366-370 [“Laboratory tests evaluated the predatory impact of the macroinvertebrates *Erythromma najas* larvae (Odonata: Coenagrionidae), *Notonecta glauca* (Heteroptera: Notonectidae), *Ilyocoris cimicoides* (Heteroptera: Naucoridae), *Libellula depressa* larvae (Odonata: Libellulidae), *Dytiscus marginalis* larvae (Coleoptera: Dytiscidae) and *Anax imperator* larvae (Odonata: Aeshnidae) on 3, 12, 21 and 30 day old pike fry *Esox lucius*.”]

Lempert, J. (1997): Die Einwanderung von *Symptetrum fonscolombii* (Selys) nach Mitteleuropa im Jahre 1996 (Anisoptera: Libellulidae). *Libellula* 16 (3/4): 143-168. (German, with Engl. summary) [invasion; migration; Central Europe; chronology of invasion; previously unpublished data for France, Belgium, Switzerland, Austria, Czech Republic]

Leung, B. and M.R. Forbes 1997: Fluctuating asymmetry in relation to indices of quality and fitness in the damselfly, *Enallagma ebrium* (Hagen). *Oecologia* (Berlin) 110(4): 472-477 [“We used wet mass of an individual as a measure of its quality and longevity as a measure of its fitness. Contrary to predictions, we found no relation between FA and quality or fitness, even after we controlled for possible confounding factors, such as measurement error and inadequate sample size.”]

Lindeboom, M. (1997): Die Libellenbeobachtungen des Fischers Leonhard Baldner (1612 - 1694). *International Dragonfly Fund - Report 2*: 18 - 24. [history of odonatology; early illustrations of dragonflies; metamorphosis; *Calopteryx splendens*; *Onychogomphus forcipatus*]

Madsen, H.O.R. and A. Nel 1997: Two new fossil species of *Gomphaeschna* Selys, 1871 in the paleocene/eocene of Denmark (Odonata: Aeshnoidea). *Annales de la Societe Entomologique de France* 33 (3): 285-293 [“*Gomphaeschna paleocenica*, sp. n.; *Gomphaeschna (?) danica*, sp. n.”]

May, M.L. 1997: The status of some species of *Enallagma* (Odonata, Zygoptera, Coenagrionidae). *Entomological News* 108 (2): 77-91. [“I have investigated the identity and generic placement of five little known species of coenagrionid damselflies usually assigned to *Enallagma*.”]-[*Enallagma camerunense*, *E. kauderni*, *E. melanotum*, *E. pseudalongatum*, *E. strouhalii*]

McPeck, M.A. 1997: Measuring phenotypic selection on an adaptation: Lamellae of damselflies experiencing dragonfly predation. *Evolution* 51(2): 459-466

[“Previous studies suggest that the evolution of increased caudal lamellae size to increase swimming speed was an adaptation of *Enallagma* damselflies for coexisting with large, predatory dragonflies in fishless lakes. ... In cages where dragonflies were free to forage on damselflies, surviving *E. boreale* larvae had lamellae that were larger in lateral surface area, and that were wider relative to their length, as compared with larvae recovered from treatments in which dragonflies were not permitted to forage on damselflies.”]

Mittelstaedt, H. 1997: Interaction of eye-, head-, and trunk-bound information in spatial perception and control. *J. Vestib. Res.* 7(4): 283-302

[“This article reviews the author's investigations on the perception and control of spatial relations if the carriers of the relevant sense organs are mobile and controlled independently of each other. In the dragonfly, head rotation is controlled by the head's inertia, as well as by cervicocollic, optokinetic, and dorsal light reflexes and, in turn, controls trunk rotation by means of neck reflexes on the wings. In humans, ...”]

Moore, N.W. (1997): Status survey and conservation action plan. Dragonflies. IUCN/SSC Odonata Specialist Group. Cambridge. 28 pp. £ 8,50 (p.p. incl.)

Address: IUCN Publ. Serv. Unit., 219c Huntingdon Road, Cambridge CB3 0DK, United Kingdom [strategy for conserving dragonflies; priorities; taxonomic isolation; species of monotypic genera; endemic species; red list; action plan]

Muzlanov, Y.A. 1997: Estimation of the state of natural populations by homeostasis of development as demonstrated by analysis of the distribution of wing venation anomalies in *Calopteryx splendens* Harr. *Russian Journal of Ecology* 28(6): 393-397

[“The applicability of morphological methods to the investigation of mechanisms responsible for the stability of ontogeny in intrapopulation groups is demonstrated by analyzing the distribution of anomalies in the structure of transverse wing veins in damselflies *Calopteryx splendens* Harr. It was shown that the distribution of the total number of anomalies follows the Poisson law of rare events.”]

Papazian, M. 1997: A morphological anomaly with gynandromorphic aspect in *Gynacantha kirbyi* Kruger, 1898 (Odonata, Aeshnidae). *Bulletin de la Societe Entomologique de France* 102(2): 103-109. (French, with English summary) [*Gynacantha kirbyi* female, Gynandromorphism, second abdominal segment with oreillets]

Papazin, M. (1997): *Onychogomphus forcipatus* unguiculatus (Vander Linden, 1820) victime du frelon (*Vespa crabro* L., 1758) (Odonata, Anisoptera, Gomphidae; Hymenoptera, Apocrita, Vespidae). *Martinia* 13(4): 123-125. (French, with Engl. summary) [predators; Hymenoptera; France]

Peacor, S.D. and E.E. Werner 1997: Trait-mediated indirect interactions in a simple aquatic food web. *Ecology* (Washington D C) 78(4): 1146-1156 [“We examined the survival and growth response of small bullfrog (*Rana catesbeiana*) and small green frog (*Rana clamitans*) tadpoles in the presence and absence of a competitor (large bullfrogs), the lethal presence of the larval odonate predator *Tamea lacerata*, and the nonlethal (caged) presence of the larval odonate predators *Anax junius* and *Anax longipes*.”]

Pritchard, G. and A. Kortello 1997: Roosting, perching, and habitat selection in *Argia vivida* Hagen

and *Amphiagrion abbreviatum* (Selys) (Odonata: Coenagrionidae), two damselflies inhabiting geothermal springs. *Canadian Entomologist* 129(4): 733-743

Ramirez, A. 1997: Checklist of Costa Rican Odonatan species (Insecta) for which the naiad is known. *Revista de Biología Tropical* 44(3): 225-232

[*"There are almost 280 species of Odonata in Costa Rica, of which 142 have their naiad described. ... A checklist of all those species with the description of the naiad is presented, along with the bibliographic reference."*]

Richardson, J.M.L. and R.L. Baker 1997: Effect of body size and feeding on fecundity in the damselfly *Ischnura verticalis* (Odonata: Coenagrionidae). *Oikos* 79(3): 477-483

[*"We looked for relationships between number of eggs and the independent factors of food availability and body size in lab-reared females of the damselfly Ischnura verticalis. ... There was no relationship between body size (wing length or head width) at maturity and number of eggs in the abdomen. ... Field data of gut weights suggest that animals in the field frequently have empty guts and we infer that food availability may be an important determinant of realized fecundity. ..."*]

Richter, B.D.; Braun, D.P.; Mendelson, M.A. and L.L. Master 1997: Threats to imperiled freshwater fauna. *Conservation Biology* 11(5): 1081-1093

[*"Threats to imperiled freshwater fauna in the U.S. were assessed through an experts survey addressing anthropogenic stressors and their sources. Specifically, causes of historic declines and current limits to recovery were identified for 135 imperiled freshwater species of fishes, crayfishes, dragonflies and damselflies, mussels, and amphibians."*]

Rolff, J. and A. Martens 1997: Completing the life cycle: detachment of an aquatic parasite (*Arrenurus cuspidator*, Hydrachnellae) from an aerial host (*Coenagrion puella*, Odonata). *Canadian Journal of Zoology* 75(4): 655-659

[*"Water mites are very important parasites of aerial stages of aquatic insects. Their larvae parasitize semiaquatic hosts and must detach while the host is in a suitable habitat for reproduction of parasite and host. ... Different stimuli were tested experimentally in the host-parasite system Coenagrion puella Arrenurus cuspidator in outdoor cages; this method provides exact data on the initial intensity of mite larvae per host."*]

Russell, R.W. and J.W. Wilson 1997: Radar observed fine lines in the optically clear boundary layer: reflectivity contributions from aerial plankton and its predators. *Boundary Layer Meteorology* 82(2): 235-262

[*"Sensitive Doppler radars regularly detect fine lines of enhanced reflectivity in mesoscale boundary layer convergence zones. Recent studies have concluded that these 'fine lines' are attributable primarily to backscatter from concentrations of small, weakly flying insects ('aerial plankton') entrained in the convergence zones. ... Visual counts of birds and dragonflies in convergence zones, together with simultaneous remote radar observations during the CAPE project in Florida, indicated that aerial predators usually contributed little to fine line reflectivity (median contribution approximate to 2%)."*]

Sarkar, N.K. 1997: Observations on three new and one known species of cephaline gregarines (Apicomplexa: Sporozoa: Eugregarinida: Septatina) from the Odonates of Mahananda Forest, West Bengal, India. *Archiv für Protistenkunde* 148(1-2): 209-213

[*"Three new species of actinocephalid gregarines (Apicomplexa: Sporozoa: Eugregarinida: Septatina), Actinocephalus longus sp. n., Mukundaella vannus sp. n., and Odonaticola truncatus sp. n. from the midguts of Enallagma pervum Selys, Onychogorgia atrociana Selys and Pseudagrion decorum Rambur respectively, are described."*]

Sato, M. and A. Azuma 1997: The flight performance of a damselfly *Ceriagrion melanurum* Selys. *Journal of Experimental Biology* 200(12): 1765-1779 [The local circulation method was applied to the free forward flight of the damselfly *Ceriagrion melanurum* Selys. ... However, the phase shift between the fore- and hindwings agreed with none of the previously reported patterns for damselflies: the forewings lead the hindwings by approximately a quarter-period. ... The muscle-mass-specific power was between 40 and 80 W kg⁻¹.]

Sauman, I. and F. Sehnal 1997: Immunohistochemistry of the products of male accessory glands in several hemimetabolous insects and the control of their secretion in *Pyrrhocoris apterus* (Heteroptera: Pyrrhocoridae). *European Journal of Entomology* 94(3): 349-360

[*"Three antibodies against secretions of the male accessory glands of Tenebrio molitor react with specific regions of the male reproductive system in a damselfly, cockroach, cricket and the bug Pyrrhocoris apterus. Immunoreactivity was used to assess maturation of the system in the reproducing and diapausing P. apterus."*]

Schiel, F.-J.; Rademacher, A.; Heitz, A.; Heitz, S. (1997): *Leucorrhinia caudalis* (Charpentier) (Anisoptera: Libellulidae) in der mittleren Oberrheinebene - Habitat, Bestandsentwicklung, Gefährdung. *Libellula* 16(3/4): 85-110 (in German with Engl. summary) [habitat analysis; relationship to fishes; population trends; threat; emergence]

Schneider, W. (1997): Die Libellensammlung Johann Jakob Kaups. Informationen aus dem Hessischen Landesmuseum Darmstadt 2/97: 21 - 23 (in German) [Short report about the whereabouts of the lost-believed collection of Kaup. Fig. of the holotype of *Neurobasis kaupi* Brauer, 1867]

Schneider, W.; Katbeh-Bader, A. (1997): Ein atypisches Weibchen von *Pseudagrion syriacum* Selys 1887 aus Jordanien (Odonata: Zygoptera: Coenagrionidae). *Ent. Zeits.* 107(9): 391-394 (in German with Engl. summary) [atypical pronotum; Jordan]

Schütte, C.; Suhling, F. (1997): Beobachtungen zum Fortpflanzungsverhalten von *Macromia splendens* (Pictet) (Anisoptera: Corduliidae). *Libellula* 16(1/2): 81 - 84. [reproductive behaviour; oviposition; patrol flight; France]

Soldan, T. (1997): Mayflies (Ephemeroptera): One of the earliest insect groups known to man. In: Landlot, P. & M. Sartori (Eds.): *Ephemeroptera & Plecoptera: Biology - Ecology - Systematics*. Mauron + Tinguely + Lachat SA. Fribourg. ISBN 2-940 187-01-0. pp. 511 - 513. [Mortongenesia mesopotamica (Morton, 1921) (Ephemeroptera) is identified as *buru.id.da* (Sumerian name). An earlier identification of the „river locust“ as a dragonfly is considered incorrect.]

Stoks, R.; Santens, M. (1997): Opwarmingstrategieën van teneale *Aeshna mixta*. *Gomphus* 13(1-2): 50 - 55.

[thermoregulation; warm-up]

Stoks, R. and L. De Bruyn 1997: Intensive feeding of the robberfly *Eutolmus rufibarbis* (Diptera Asilidae) on the damselflies *Enallagma cyathigerum* and *Lestes sponsa* (Odonata). *Bulletin & Annales de la Societe Royale Belge d'Entomologie* 132(4): 427-431

[*"During a population study of the damselfly Lestes sponsa at a fen in northern Belgium several predatory acts of Eutolmus rufibarbis on the damselfly species Enallagma cyathigerum and L. sponsa were reported. Despite the sporadic nature of our observations we noted 44 damselflies killed by this robber fly. All animals were caught in flight."*]

Stoks, R.; De Bruyn, L. and E. Matthysen 1997: The adaptiveness of intense contact mate guarding by males of the Emerald Damselfly, *Lestes sponsa* (Odonata, Lestidae): The male's perspective. *Journal of Insect Behavior* 10(2): 289-298

[*"Our findings support the predictions made by Alcock (1994) about the occurrence of intense mate guarding: (1) a high female receptivity after copulation, (2) a high male capacity to resist takeovers, (3) sperm precedence, (4) a high operational sex ratio, (5) a high male density, (6) high access by rivals to mated females, (7) low energy expenditure, (8) a low risk of guarding, and (9) a short interval between copula and oviposition."*]

Switzer, P.V. 1997: Factors affecting site fidelity in a territorial animal, *Perithemis tenera*. *Animal Behaviour* 53(4): 865-877

[*"This study investigated the factors affecting the site fidelity of the eastern amberwing dragonfly, Perithemis tenera (Odonata: Anisoptera), following the framework and testing the predictions of a theoretical model (Switzer 1993; Evol. Ecol, 7, 533-555)."*]

Switzer, P.V. 1997: Past reproductive success affects future habitat selection. *Behavioral Ecology and Sociobiology* 40 (5): 307-312

[*"Correlational studies have shown that an individual's past reproductive success often increases its breeding site fidelity (i.e., the tendency to return to a previously occupied location), suggesting that individuals use their reproductive experience to assess habitat quality. ... In a field experiment, the effect of mating success on site fidelity was isolated from potential confounding variables in a territorial dragonfly, the eastern amber wing (Perithemis tenera)."*]

Tennessen, K.J. 1997: The rate of species descriptions in Odonata. *Entomological News* 108(2): 122-126.

[*"The rate of new species descriptions of Odonata over the last 150 years yields an essentially straight line, indicating that many species are yet to be discovered within the Order. More than 5,300 species are now known, and the rates of description in the suborders Anisoptera and Zygoptera have been relatively equal. However, a decline in the number of new species appearing in the three largest families over the last six decades, despite an increasing number of authors, indicates that the Odonata are now at least half known and that fewer than 10,000 species exist worldwide."*]

Whiting, M.F.; Carpenter, J.C.; Wheeler Q.D. and W.C. Wheeler 1997: The strepsiptera problem: phylogeny of the holometabolous insect Orders inferred from 18s and 28s ribosomal dna sequences and Morphology. *Systematic Biology* 46(1): 1-68

[*"Phylogenetic relationships among the holometabolous insect orders were inferred from cladistic analysis of nucleotide sequences of 18S ribosomal DNA (rDNA) (85 exemplars) and 28S rDNA (52 ex-*

emplars) and morphological characters. Exemplar outgroup taxa were Collembola (1 sequence), Archaeognatha (1), Ephemera (1), Odonata (2), ..."]

Williamson, D.L.; Adams, J.R.; Whitcomb, R.F.; Tully, J.G.; Carle, P.; Konai, M.; Bove, J.M. and R. B. Henegar 1997: *Spiroplasma platyhelix* sp. nov., a new mollicute with unusual morphology and genome size from the dragonfly *Pachydiplax longipennis*. *International Journal of Systematic Bacteriology* 47(3): 763-766

[*"Spiroplasma strain PALS-1-T from the gut of the dragonfly Pachydiplax longipennis was shown to be distinct from other species, groups, and subgroups of the genus Spiroplasma as determined by reciprocal serological metabolism inhibition and deformation tests."*]

Wolf, L.L., Waltz, E.C., Klockowski, D. and K. Wakeley 1997: Influences on variation in territorial tenures of male white-faced dragonflies (*Leucorrhinia intacta*) (Odonata: Libellulidae). *Journal of Insect Behavior* 10(1): 31-47

[*"Length of occupancy of mating territories among males in a local population of white-faced dragonflies (Leucorrhinia intacta) varied from more than 6 h to 15 min or less. Males with short tenures often established territories in several locations on the pond during a day. Several hypotheses have been proposed to explain shifting territorial sites rather than remaining in a single site during one bout of territoriality."*]

Wudkevich, K.; Wisenden, B.D.; Chivers, D.P. and R.J.F. Smith 1997: Reactions of *Gammarus lacustris* to chemical stimuli from natural predators and injured conspecifics. *Journal of Chemical Ecology* 23 (4): 1163-1173

[*"We exposed the freshwater amphipod Gammarus lacustris, to chemical stimuli from injured conspecifics and to chemical stimuli from two types of natural predators: dragonfly larvae (Aeshna eremita) and northern pike (Esox lucius). Exposure to all three stimuli caused G. lacustris to reduce significantly its level of activity relative to activity recorded in response to a distilled water control."*]

Yoon, J.H.; Park, H.C. 1997: Amino acid composition of 13 odonatan species from Korea. *Korean Journal of Entomology* 27(1): 63-71. (Korean, with English summary)

Odonatological Abstract Service

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1997

1. **Abbott, J.C.; Stewart, K.W. & S.R. Moulton (1997):** Aquatic insects of the Big Thicket region of East Texas. *Texas Journal of Science* 49(3 SUPPL.): 35-50.
[*"A survey of the aquatic insect orders Ephemeroptera, Odonata, Plecoptera and Trichoptera from the Big Thicket National Preserve and surrounding region of south-east Texas is presented. This area exhibits a diverse fauna of at least 249 resident species which includes 18 mayflies, 77 dragonflies, 34 damselflies, 18 stoneflies and 102 caddisflies. The dragonfly Somatochlora margarita and the caddisfly Phylocentropus harrisi are listed by the U.S. Fish and Wildlife Service as "species of concern."*]
Address: Dep. Biol. Sci., Univ. N. Texas, Denton, TX 76203, USA
2. **Andrew, R.J. & D.B. Tembhare (1997):** The development and structure of the ovaries in the dragonfly, *Traema virginia* (Rambur) (Libellulidae: Odonata). *Journal of Advanced Zoology* 18 (2): 86-95.
[*Panoistic ovarioles, terminal filament, germarium, vitellarium, oviduct, mesodermal and ectodermal origin*]
Address: Tembhare, D.B., Nagpur Univ., Dept. Zool. Nagpur 440010, Maharashtra, India
3. **Baarspul, A.N. & J.-P. de Krijger (1997):** The role of damselflies and dragonflies and other insects in the chick-diet of Black tern (*Chilonias niger*) (in Dutch. with Engl. summary). *Brachytron* 1(1): 6-10.
Address: Baarspul, A., W.A. Scholtenstraat 10, NL-9712 KW Groningen, The Netherlands
4. **Bayerisches Landesamt für Umweltschutz (1997):** Gräben - Lebensadern der Kulturlandschaft - Lebensraum Graben - naturschonend erhalten und entwickeln. [Bavaria, general guidelines for the management of ditches]
Address: LfU, Postfach 810129, D-81901 München, Germany
5. **Bazzanti, M., Chiavarini, S., Cremisini C. & P. Soldati (1997):** Distribution of PCB congeners in aquatic ecosystems: A case study. *Environment International* 23 (6): 799-813.
[*"Polychlorinated biphenyls (PCB) congeners were determined in water samples, sediments and animal species in the frame of a survey of the River Arrone (Central Italy, near Rome) after a major contamination episode. ... Concentrations in macroinvertebrates (Calopteryx splendens and Anax imperator) ranged from 60 to 400 µg/kg dry weight, showing significantly different species to species patterns. ..."*]
Address: Dep. Human Animal Biol., Univ. "La Sapienza", 00185 Rome, Italy
6. **Bedê, L.C., Weber, M., Resende, S.R.O., Piper, W. & W. Schulte (1997):** Manual para mapeamento de biótopos no Brasil: base para um planejamento ambiental eficiente. 2. ed. rev.. Fundacao Alexander Brandt. Belo Horizonte. 146 pp.
7. **Bischof, A. (1997):** Libellenbeobachtungen im Domleschg und Heinzenberg, Graubünden, Schweiz (Odonata). *Mitt. ent. Ges. Basel* 47(4): 139-146.
[*29 (17 autochoneous) species of the region of the Domleschg and Heinzenberg in Switzerland including records from 1977 - 1996 are reported, a comparison with the Odonata-fauna of the man-made nature reserve Monté near Cazis (Graubünden) is made*]
Address: Bischof, A., Heckenweg 4, CH-7000 Chur, Switzerland
8. **Chovanec, A. & R. Raab (1997):** Dragonflies (Insecta, Odonata) and the ecological status of newly created wetlands - examples for long-term bioindication programmes. *Limnologica* 27(3-4): 381-392.
[*dragonflies as bioindicators of man-made waters in Austria (Tritonwasser, Marchfeldkanal), Odonata as long-term indicators to monitor the efficiency of planning and construction of artificial waters, documentation of the colonisation of those waters by dragonflies, trade-offs between development of structural habitat parameters and dragonfly fauna*]
Address: Chovanec, A., Umweltbundesamt, Abt. Aquatische Ökologie, Spittelauer Lände 5, A-1090 Wien, Austria
9. **Dauids, C. (1997):** Water-mites as parasites on dragonflies (in Dutch, with Engl. summary). *Brachytron* 1 (2): 51-55.
[*review, Ischnura elegans*]
Address: Dauids, K., Aquatische Oecotoxicologie, Univ. Amsterdam, Kruislaan 320, NL-1098 SM Amsterdam, The Netherlands
10. **De Knijf, G., Anselin, A. & H. Demolder (1997):** The odonatofauna of the Damvallei (East-Flanders, Belgium): past glory or still worthwhile? *Biol. Jaarb. Dodonaea* 64 (1996): 75-91.
Address: Inst. Nature Conserv., Kliniekstraat 25, B-1070 Brussels, Belgium
11. **De Marmels, J. (1997):** Hallazgo de Odonata nuevos para Venezuela o poco conocidos. 9. *Bol. entomol. Venez. N.S.* (12(2): 151-152.
[*new or little known Odonata of Venezuela, Phyllocycla sordida, Phyllogomphoides pedunculus, Zonophora nobilis, Aeshna nubigena, Coryphaeschna diapyra, Neuraeschna harpya, Micrathyria dictynna, Lestes bipupillatus, Palaemnema brevignoni, Junix elumbis, Inpabasis machadoi, Leptobasis yanomami, Mesoleptobasis inca*]
Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela
12. **Dijkstra, K.D. & M. van der Weide (1997):** The Red-veined Darter (*Symeptum fonscolombii* (Selys)) in the

Netherlands in 1996 (in Dutch, with Engl. summary). *Brachytron* 1(1): 16-21.

Address: Dijkstra, K.D., Oude Rijnsburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands

13. **Dingemans, N.L. & V.J. Kalkman (1997):** Separating adult *Aeshna subarctica* Walker from *Aeshna juncea* (L.) in The Netherlands. Review and evaluation of field characters. *Brachytron* 1(2): 35-39.

Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands

14. **Dobruskina, I.A., Ponomarenko, A.G. & A.P. Rasnitsyn (1997):** Fossil insects found in Israel. *Paleontologicheskii Zhurnal* 5: 91-95 (Russian with english summary).

[*"Fossil insects found in the Cretaceous of Israel are figured, discussed and, in part, described. Lower Cretaceous (Hauterivian-Barremian) Tayasir volcanites have yielded the beetle *Cretosperchus medievalis* Ponomarenko, sp. nov. related to species described from the Lower Cretaceous of Transbaikalia, a cockroach and a dragonfly nymph...."*]

Address: Heb. Univ. Jerus., Jerusalem, Israel

15. **Edelaar, P. (1997):** Flight recognition of Emperor dragonflies (*Anax* Leach). *Brachytron* 1(2): 56-59.

Address: Edelaar, P., In de Potvis, De Dageraad 3, NL-1797 SK Den Hoorn, The Netherlands

16. **Fischer, A. & U. Heink (1997):** Auswertung der libellenkundlichen Daten des Niedersächsischen Tierartenerfassungsprogramms und deren Verwendung im Rahmen eines regionalisierten Zielartenkonzeptes. Dipl. Arb. am Institut für Landschaftspflege und Naturschutz der Technischen Universität Hannover. 191 pp, XIV pp., Anhänge

[*A well documented thesis reorganising data from the Bundesland Lower Saxony species inventory (Odonata Recording Scheme) for conservation purposes. The authors present a method of pinpointing shelter (key) species among Odonata which will enable conservationists to focus action plans for dragonflies on a regional basis. The end product of the thesis is a map with hot spots essential for dragonfly conservation in Lower Saxony, particularly in the lowland region of the Aller and Weser river systems.*]

Address: Fischer, A., Türkstr. 7a; D-30167 Hannover, Germany

17. **Fischer, K. (1997):** Fauna und Flora des Westerwaldes. Zur naturschutzfachlichen Bedeutung einer Mittelgebirgsregion. *Pollichia*-Buch 35: 21-35.

[*short list of endangered Odonata of the Westerwald region in Rhineland-Palatinate*]

Address: Fischer, K., An der Hofwiese 6, D-56457 Westerbürg, Germany

18. **Grabow, K. Korb, J., Martens, A. & M.-O. Rödel (1997):** The use of termite mounds by the dragonfly *Crocothemis divisa* Karsch 1898 during the pre-reproductive period (Odonata Libellulidae). *Tropical zoology* 10: 1-10.

Address: K. Grabow, Univ. Würzburg, Lehrstuhl Zool. III, Am Hubland, D-97074 Würzburg, Germany

19. **Grysk, A.D. & W.A. Hubert (1997):** Observations on the reproduction, sources of mortality, and diet of the Kendall Warm Springs dace. *Great Basin Naturalist* 57(4): 338-342.

[*"The life history of the endangered Kendall Warm Springs dace (*Rhinichthys osculus thermalis*) is largely unknown.... We observed 2 sources of mortality: (1) emigration from the warm spring stream over a waterfall into the Green River and (2) predation on larvae by dragonfly (*Libellula saturata*) nymphs. ..."*]

Address: Wyo. Coop. Fish Wildl. Res. Unit, Univ. Wyo., Laramie, WY 82071-3166, USA

20. **Hermans, J.T. (1997):** Op weg naar een Atlas van de Limburgse Libellen. *Natuurhist. Maandbl.* 86: 61.

[*short report on the status of the scheduled atlas of the dragonfly fauna of the province Limburg (The Netherlands), 12 "white spots" in the province lacking dragonfly records are figured and listed, it is intended to finish work on the manuscript within two years*]

Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands;

21. **Heymer, A. (1997):** Réflexion sur la signification phylogénétique des stratégies reproductrices et de l'investissement mâle chez les libellules (Hexapodes, Palaeoptères). *Vie et milieu* 47(3): 229-246.

[*"...In the Calopterygidae and Chlorocyphidae this development (of territorial behaviour patterns) implies synchronization between males and females for mating. These behavioural strategies seem to mirror an evolutionary trend - at least in Zygoptera - which is in accordance with the morpho-phylogenesis. ... To ensure optimal reproductive success, males guard females during egg-laying, hence, egg-laying with male coupled to female in tandem position is the most secure proceeding. This behaviour may lead to non-contact guarding, a pattern generally found in the Calopterygidae and Chlorocyphidae, and a few territorial species of Anisoptera. The ancestral Lestes-Sympecma-Type seems to have developed independently in Zygoptera and Anisoptera: thus, this type must be seen as analogous; it does not allow a cladogenetic interpretation..."*]

Address: Heymer, A., Muséum National d'Histoire Naturelle, Laboratoire d'Ecologie Générale, 4 avenue du Petit Château, F-91800 Brunoy, France;

22. **Holusa, J. & O. Holusa (1997):** The results of a faunistic research of dragonflies (Odonata), grasshoppers (Caelifera), crickets (Ensifera) and cockroaches (Dictyoptera: Blattodea) of the Slavkovsky les Mts. *Klapalekiana* 33: 29-36.

[*checklist of 25 Odonata species including *Somatochlora alpestris* and *S. arctica**]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek

23. **Holusa, O. (1997):** New records of the genus *Somatochlora* in the territory of the former Czechoslovakia (Odonata: Corduliidae). *Klapalekiana* 33: 23-28.

[*"New faunistic records from the period 1995-1996 of dragonflies of the genus *Somatochlora* Sélys, 1871 in the territory of Bohemia, Moravia, Silesia and Slovakia are presented. Oviposition of *S. flavomaculata*... was observed. New localities of *S. alpestris*... and *S. arctica*... in mountainous areas are given." *S. metallica* was found at 9 new localities and confirmed at 4 localities.*]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek

24. **Holusa, O. (1997):** The occurrence of dragonfly *Hemianax ephippiger* (Odonata: Aeshnidae) in the Czech Republic. *Klapalekiana* 33: 17-21.

[*Faunistic records on occurrence in 1995 of *H. ephippiger* in Czech Republic are provided. "Some aspects of its biology are considered. At some localities a large number of specimens was observed in territorial dispersion, and the mating and egg-laying behaviour are also recorded", and described in some detail.*]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek

25. **Inden-Lohmar, C. (1997):** Sukzession, Struktur und Dynamik von Libellenpopulationen an Kleingewässern, unter besonderer Berücksichtigung der Ökologie von *Aeshna cyanea* (Müller, 1764). Dissertation Math.-naturwiss. Fakultät Rheinische Friedrich-Wilhelms-Universität Bonn. 310 pp.

[*study of the colonisation of 4 artificially created ponds in Nordrhein-Westfalen (Germany) by dragonflies in the period between 1989 and 1996, interchange between*

ponds, population dynamics, dominance of *Pyrrhosoma nymphula* and *Aeshna cyanea*, larvae of *A. cyanea* are the top predators in the ponds, effects of starvation on larval cohort-classes, interspecific competition of larval *A. cyanea*, co-existence of larval *P. nymphula* and *A. cyanea*, effects of Odonata on amphibians (*Rana temporaria* and *R. dalmatica*), emergence pattern, dispersal: passive drift in *P. nymphula* during maturation period, active dispersal in *A. cyanea* both in maturation period and after maturation, correlation between site fidelity, presence, biometric characters of males of *A. cyanea* and mating success, discussion on individual learning and mating success]

Address: Inden-Lohmar, C., Bachstr. 5., D-53797 Lohmar, Germany

26. **Jueg, U. (1997):** Die Entomofauna des LSG "Schloßpark Ludwigslust" Teil I (Insecta außer Coleoptera und Lepidoptera). Virgo, Mitt.bl. ent. Ver. Mecklenburg 1: 27-49.

[Mecklenburg-Vorpommern, list of 22 Odonata]

Address: Jueg, U., Johannes-Gillhoff-Str. 7, D-19288 Ludwigslust, Germany

27. **Ketelaar, R. & M. van der Weide (1997):** Monitoring of dragonflies in The Netherlands (in Dutch, with Engl. summary). Brachytron 1(2): 44-50.

Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands

28. **Kipping, J. (1997):** Zur Situation der Kleinen Königslibelle, *Anax parthenope*, (Insecta, Odonata) in Thüringen. Mauritiania 16(2): 462-464.

[*A. parthenope* in Thuringia, Germany, range extension, competition with *A. imperator*]

Address: Kipping, J., Ringstr. 5/6, D-04600 Altenburg, Germany

29. **Kognietzki, S. & S. Hielscher (1997):** Libellenkartierung im Landkreis Hildburghausen (Insecta: Odonata). Thüringer faunistische Abhandlungen 4: 64-79.

[Thuringia, district Hildburghausen, *Coenagrion mercuriale*, first record of *Gomphus pulchellus* in Thuringia, "... Referring to the whole area of Thuringia, the percentage of non-specialized species was higher in Hildburghausen district which is mainly due to the lack of natural habitats..."]

Address: Kognietzki, S., Betzensteiner Str. 8, D-90411 Nürnberg, Germany

30. **Land, M.F. (1997):** The resolution of insect compound eyes. Israel Journal of Plant Sciences 45(2-3): 79-91.

[*"The spatial resolution of compound eyes is determined by their interommatidial angles, by the optical quality and rhabdom dimensions of the ommatidia, and by illumination level. Among insects, interommatidial angles vary from tens of degrees in Apterygota, to as little as 0.24 degree in dragonflies. Resolution better than this is not attainable in compound eyes of realistic size, because of the limit imposed by diffraction. ..."*]

Address: Land, M.F., School Biol. Sci., Univ. Sussex, Brighton BN1 9QG, UK

31. **Legrand, J. (1997):** *Zygonyx geminunca* sp. n., new Zygonychinae from Nimba Mounts, Western Africa (Odonata, Anisoptera, Libellulidae). Revue Française d'Entomologie (Nouvelle Serie) 19(1-2): 73-76.

[French, with English summary. "A new *Zygonyx*, *Z. geminunca* sp. n., is described and illustrated on male and female specimens from Nimba Mounts in Guinea (West Africa), formerly collected by Professor Pierre Aguesse and more recently by the author. The main discriminant character of this species is the presence of two hooks on the anterior lamina of the male genitalia. ..."]

Address: Legrand, J., Lab. Entomol., Museum Natl. Hist. Nat., 45 rue Buffon, F-75005 Paris, France

32. **Liebherr, J.K. & D.A. Polhemus (1997):** Compari-

sons to the century before: The legacy of R. C. L. Perkins and Fauna Hawaiiensis as the basis for a long-term ecological monitoring program. Pacific Science 51(4): 490-504.

[*"As one means of assessing the impact of the past 100 yr of development and biological alteration in Hawai'i, the damselfly (Odonata: Coenagrionidae) and carabid beetle (Coleoptera: Carabidae) collections of R. C. L. Perkins made in the 1890s are compared with similar collections made one century later during the 1990s. Two islands that have experienced very different histories of development are compared: O'ahu and Moloka'i. Of eight native damselfly species originally inhabiting O'ahu, one has been extirpated from the island, another is now reduced to a single population, and three more are at risk. Of the eight species originally found on Moloka'i, by contrast, there is only one species that has not been rediscovered, although there is reasonable probability that it has simply eluded capture because of inherent rarity, whereas the remaining species retain large and stable populations. ..."*]

Address: Dep. Entomol., Comstock Hall, Cornell Univ., Ithaca, NY 14853-0901, USA

33. **Lins, L.V., Machado, A.B.M., Costa, C.M.R. & G. Herrmann (1997):** Roteiro metodológico para elaboração de listas de espécies Ameracadas de extincao (Contendo a lista Oficial da Fauna Ameacada de Extincao de Minas Gerais). Publicacoes avulsas da fundacao biodiversitas 1.

[*Manual for preparing lists of endangered species (fauna and flora) in Brazil, includes IUCN categories and detailed criteria for assessing the threats to species, very few dragonflies are listed as endangered in Minas Gerais: Heteragrion dorsale (proposed for official list), H. petiense, H. obsoletum, Aeshna eduardoi, Castoraeschna margarethae (official list of Minas Gerais)*]

Address: Fundacao Biodiversitas, Av. Cotorno, 9155 11° andar Prado, 30110-130 Belo Horizonte MG, Brasil, e-mail: cdcb@gold.horizontes.com.br

34. **Lockwood, J.L.; Fenn, K.H.; Curnutt, J.L.; Rosenthal, D.; Balent K.L. & A.L. Mayer (1997):** Life history of the endangered Cape Sable Seaside Sparrow. Wilson Bulletin 109(4): 720-731.

[*"Cape Sable Seaside Sparrows (Ammodramus maritimus mirabilis) breeding within eastern Everglades National Park were philopatric and moved only short distances between clutches. Nestlings were fed spiders and insects, primarily Orthoptera, Lepidoptera, and Odonata. ..."*]

Address: Lockwood, J.L., Univ. Tennessee, Dept. Ecol. and Evolutionary Biol., Knoxville, TN 37996, USA

35. **Lombardo, P. (1997):** Predation by *Enallagma* nymphs (Odonata, Zygoptera) under different conditions of spatial heterogeneity. Hydrobiologia 356: 1-9.

[*"... Enallagma significantly reduced the amphipod and the turbellarian populations and the prey assemblage as a whole, but did not have any statistically significant impact on the snail populations, which increased their absolute and relative abundance in the presence of the odonate. Numerical losses by Enallagma predation (if any) were not related to macrophyte architecture, suggesting that prey vulnerability to Enallagma predation is species-specific rather than habitat-determined. ..."*]

Address: Lombardo, P., Kent State Univ., Dept. Biol. Sci., Kent, OH 44242, USA

36. **Martens, A. & W. Wimmer (1997):** Die Pokaljungfer *Cercion lindenii* (Selys) im nördlichen Vorharz (Odonata: Coenagrionidae). Braunschw. naturkd. Schr. 5 (2): 343-352.

[*Between the years 1993 and 1996 *Cercion lindenii* was recorded from six localities north of the Harz Mountains, Lower Saxony. This is clearly a range extension for the species in that the region had been well covered in the previous years. The authors predict further dispersal of *C. lindenii* over the next few years. Most of the watery*

habitats are in gravel pits or in open-cast mining areals. Oviposition was concentrated in spots with submerged vegetation (e.g. *Ranunculus aquatilis*, *Myriophyllum heterophyllum*). Ovipositing tandems were regularly attacked by *Gerris paludum* Fabr. (Insecta: Heteroptera).] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

37. **Mauersberger, R. & F. Petzold (1997)**: Nachweise der Frühen Heidelibelle, *Sympetrum fonscolombi* (Selys), im östlichen Deutschland (Odonata, Libellulidae). Ent. Nachr. Ber. 41(3): 173-177. Address: Petzold, F., Pappelallee 69, D-10437 Berlin, Germany

38. **Menke, N. (1997)**: Untersuchungen zur Libellenfauna im östlichen Stadtgebiet von Münster. Diplomarbeit an der Westfälischen Wilhelms-Universität Münster: 103 pp. Address: Menke, Norbert, Stephansweg 15, D-48155 Münster, Germany

39. **Mursch, A. & A.W. Steffan (1997)**: Subfossile Gliederfüßer von Salzsee-Ufern im nördlichen Namibia (Arthropoda: Solifugae, Scorpiones, Chilopoda, Diplopoda, Insecta). Verh. Westd. Entom. Tag 1996: 197-211. [thanatocoenosis of subfossile arthropoda including *Anax tristis* in a saltlake in Namibia, Africa] Address: Seffan, Prof. Dr. A.W., Abt. Zool. & Ökol., Ruhr-Universität Bochum, D-44780 Bochum, Germany

40. **Naujeck, A. (1997)**: Untersuchung der Makrofauna des Scheubaches bei Nassau/Lahn. Flora Fauna Rheinland-Pfalz Beiheft 22: 199-208. [macrozoobenthos of the Scheubach in Rhineland-Palatinate including a record of *Thecagaster bidentata*] Address: Naujeck, Anja, Deepenstöcken 6, D-22529 Hamburg, Germany

41. **Nel, A., Arillo, A. & V.M. Ortuno (1997)**: New Western Palaearctic Cenozoic Odonata (Zygoptera and Anisoptera). Bulletin de la Societe Entomologique de France 102(3): 265-270. [Five new Cenozoic Odonata are described or revised from Spain and France, including a new *Coenagrionoides*, *Hispanocoenagrion inexpectum* n. gen., n. sp. ...] Address: Nel, A., Lab. Entomol., Mus. Natl. Hist. Nat., 45 rue Buffon, F-75005 Paris, France

42. **Nel, A.; Martinez Delclos, X.; Papier, F. and J. Oudard (1997)**: New tertiary fossil odonata from France (Sieblosiidae, Lestidae, Coenagrionidae, Megapodagrionidae, Libellulidae). Deutsche Entomologische Zeitschrift 44(2): 231-258. [Thanatophilosina menatensis gen. n., sp. n. (Zygoptera: Megapodagrionidae) is described from the Palaeocene of France. Two new species of *Stenolestes* (Zygoptera: Sieblosiidae) and a new specimen of *Stenolestes fischeri* Nel, 1986 are described from the Oligocene of France. Three unnamed new Coenagrionidae, a lestid, *Lestes brisaci* sp. n., and a libellulid, *Caussanelia papaziani* gen. n., sp. n. are described from the Upper Oligocene of south-east France. An unnamed new species of Coenagrionidae is described from the Upper Miocene of central France. ...] Address: Nel, A., Museum Natl. Hist. Nat., Entomol. Lab., 45 Rue Buffon, F-75005 Paris, France

43. **Orr, A.G. & P.S. Cranston (1997)**: Hitchhiker or parasite? A ceratopogonid midge and its odonate host. Journal of Natural History 31(12): 1849-1858. [The ceratopogonid genus *Forcipomyia* Meigen (Diptera: Ceratopogonidae) contains species with a wide range of adult biologies. Species of the subgenus *Pterobosca Macfie* are phoretic and apparently parasitic on the wing veins of other insects, notably odonates and sometimes lacewings. We describe *F. (Pterobosca) debenhamae* from Brunei as new to science, taking the authorship of Cranston, tabulate the morphological diversity of the subgenus, and speculate on the phylogeny. The behaviour of

adult female midges, which have been found only upon the thorax of hosts predominantly of *Libellago hyalina* (Odonata: Chlorocyphidae), appears to deleteriously impact on the quality and duration of territory holding of the host.] Address: Orr, A.G., Biol. Dep., Univ. Brunei Darussalam, Bandar Seri Begawan, Negara Brunei

44. **Petzold, F. (1997)**: Zur Libellenfauna (Insecta, Odonata) des Altkreises Schleiz - ein Arbeitsbericht. Thüringer faunistische Abhandlungen 4: 56-63. [survey of the former district of Schleiz (Thuringia), survey of 214 waterbodies, record of 37 species, ... "For every species the frequency on the examined waterbodies is specified. Fish ponds, which are not intensively used, are of great importance for the dragonfly fauna of the area."] Address: Petzold, F., Pappelallee 69, D-10437 Berlin, Germany

45. **Polhemus, D.A. (1997)**: Phylogenetic analysis of the Hawaiian damselfly genus *Megalagrion* (Odonata: Coenagrionidae): Implications for biogeography, ecology, and conservation biology. Pacific Science 51(4): 395-412. [A phylogeny of the 22 species currently recognized in the genus *Megalagrion*, endemic to the Hawaiian Islands, is presented based on an analysis of 23 morphological and ecological characters. ...] Address: Polhemus, D.A., Dep. Entomol., MRC 105, Natl. Mus. Nat. Hist., Smithsonian Inst., Washington, DC 20560, USA

46. **Raab, R. (1997)**: Die Besiedlung des Marchfeldkanals (Niederösterreich, Wien) durch Libellen (Insecta: Odonata). Diplomarbeit Naturwiss. Fak. Univ. Wien. 125 pp, 23 pp. [colonisation of a canal, Austria] Address: Rainer Raab, Anton-Brucknergasse 272, A-2232 Deutsch-Wagram, Austria

47. **Raab, R. & E. Chwala (1997)**: Rote Listen ausgewählter Tiergruppen Niederösterreichs - Libellen (Insecta: Odonata), 1. Fassung 1995. Amt der NÖ Landesregierung, Abteilung Naturschutz, Wien, 91 Seiten. (in German). [Red lists of selected groups of animal of Lower Austria - Odonata] Source of supply: Amt der Niederösterreichischen Landesregierung, Abt. Naturschutz, Herrngasse 13, 1014 Wien, Austria; (öS 120,-)

48. **Reinhardt, K. (1997)**: Buchbesprechung: Jödicke, R. (1997): Die Binsenjungfern und Winterlibellen Europas. Lestidae. Neue Brehm-Bücherei 631. Ent. Nachr. Ber. 41(3): 171-172. [book review] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany

49. **Renker, C. (1997)**: Faunistischer Jahresbericht 1995/96 für den Regierungsbezirk Koblenz. Flora Fauna Rheinland-Pfalz Beiheft 22: 115-168. [faunistic records, Rhineland-Palatinate] Address: Renker, C., Martin-Luther-Str. 91, D-56112 Lahnstein, Germany

50. **Rosemond, A.D., Pringle, C.M. & A. Ramirez (1998)**: Macroconsumer effects on insect detritivores and detritus processing in a tropical stream. Freshwater biology 39: 515-523.

[The authors used an underwater electric field to prevent macroconsumers such as fishes and shrimps from feeding in and on leaf packs in a lowland stream in Costa Rica and thus to determine their effects on the density of insects detritivores and decay rates of leaves. Exclusion of macroconsumers resulted in significantly higher densities of small invertebrates inhabiting leaf packs. Despite the increase in invertebrate density, decay rates of leaves were not statistically different. A passing reference on Odonata larvae which were always found in low abundance (<5 ind./leaf pack) is made.]

Address: Pringle, Catherine M., Inst. Ecol., Univ. Georgia, Athens, GA 30602, USA

51. **Rolff, J. (1997):** Better hosts dive: Detachment of ectoparasitic water mites (Hydrachnellae: Arrenuridae) from damselflies (Odonata: Coenagrionidae). *Journal of Insect Behavior* 10(6): 819-827.

["In this paper I present experimental data for the detachment rate of water mite larvae (*Arrenurus cuspidator*) from different host species, *Coenagrion hastulatum* and *C. puella*, in relation to the host's oviposition behavior. *C. hastulatum* oviposits submerged, whereas *C. puella* oviposits at the water surface and aggregates with conspecifics. It was found that mite larvae detach at a significantly higher ratio from hosts with submerged oviposition. Experimental tests showed that this is not a species-specific effect. It is caused mainly by the oviposition behavior. The results are discussed in the light of different oviposition systems in damselflies."]

Address: Rolff, J., Techn. Univ. Braunschweig, Inst. Zool., Fasanenstr. 3, D-38092 Braunschweig, Germany

52. **Sandberg, E. (1997):** Benthic predator-prey relationships and abiotic stress. The effects of physical disturbance and oxygen deficiency. *Acta Academiae Aboensis, Ser. B (Mathematica et Physica)* 56(2): 1-42.

["Potential competition for food between predators of different ecological origin in the Baltic Sea was evident as the marine isopod, *Saduria entomon* (L.), and the limnic dragonfly larva, *Libellula quadrimaculata* (L.), exhibited similar prey choice and similar predation efficiency in a series of aquarium experiments. ..."]

Address: Sandberg, E., Kaskisgatan 2 C 14, FIN-20700 Abo, Finland

53. **Schneider, W. & H.J. Dumont (1997):** The dragonflies and damselflies (Insecta: Odonata) of Oman. An updated and annotated checklist. *Fauna of Saudi Arabia* 16: 89-110.

["The results of two field trips to the Sultanate of Oman are put on record. In addition, all specimens in the holdings of the Oman Natural History Museum (Muscat) are listed. Two species, *Agriocnemis pygmaea* and *Anax tristis*, are new for Oman and the Arabian Peninsula. An annotated checklist is given for the 40 species so far recorded from Oman territory."]

Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany

54. **Shaw, M.R. & R.R. Askew (1997):** Obituary: Andrew Rodger Waterston O.B.E. (1912-1996). *J. Br. dragonfly soc.* 13(2): 48-50.

Address: Askew, R.R., 5 Beeston Hall Mews, Beeston, Tarporley, Cheshire CW6 9TZ, UK

55. **Skale, A. & A. Weigel (1997):** Die Insektenfauna (Coleoptera, Lepidoptera, Saltatoria, Odonata, Trichoptera et Heteroptera) des NSG "Tannbach-Klingelfelsen" (Saale-Orla-Kreis, Thüringen). *Thüringer faunistische Abhandlungen* 4: 139-172.

["Thuringia, list of 11 dragonfly species"]

Address: Skale, A., Blücher Str. 38., D-95030 Hof, Germany

56. **Slaats, J. & H. Ramackers (1997):** Observations of *Lestes barbarus* at the Meinweg and Groote Peel areas (in Dutch, with Engl. summary). *Natuurhist. Maandbl.* 86(3): 55-57.

["In 1995, *L. barbarus* was observed in small numbers ... The species had not been found there during the previous decades, despite extensive earlier census studies at the Meinweg." The authors suppose a migration from the south of Europe to the region. The article briefly discusses the specific habitat of *L. barbarus*, and the importance of the newly created ponds in the province Limburg for the species.]

Address: Slaats, J., Astenseweg 6, NL-5768 PD Meijel, The Netherlands

57. **Solimini, A.G.; Tarallo, G.A. & G. Carchini (1997):**

Life history and species composition of the damselfly assemblage along the urban tract of a river in central Italy. *Hydrobiologia* 356: 21-32.

["The species composition of the damselfly assemblage and the life history patterns of two *Coenagrionidae* (*Ischnura elegans* and *Cercion lindenii*) were investigated along the urban tract of a river characterized by increasing organic pollution.... A longer reproductive period, absence of diapause, and tolerance of low oxygen concentration appear to be key factors that allow generalist species *I. elegans* and *C. lindenii* to predominate at the polluted sites."]

Address: Solimini, A.G., Univ. Roma Tor Vergata, Dept. Biol., Via Ric Sci., I-00133 Rome, Italy

58. **Tennessen, K.J. (1997):** *Lestes jerrelli*, n. sp. (Zygoptera: Lestidae), a new damselfly from Ecuador. *Proceedings of the Entomological Society of Washington* 99(4): 661-665.

["*Lestes jerrelli*, n. sp., is described and illustrated from 13 males and 8 females (holotype male, allotype female, in copula: Ecuador, Napo Prov., pond 12.3 km W of Coca, elev. 250 m, 13 June 1995). It is related to *L. jurzitzi* Muzon and *L. poulistus* Calvert from Brazil, but is distinct in thoracic color pattern and shape of male paraprocts."]

Address: Tennessen, K.J., 1949 Hickory Ave., Florence, AL 35630, USA

59. **Trockur, B. (1997):** Libellenfauna der größeren Stillgewässer in der Gemeinde Rehlingen-Siersburg. Unveröffentlichtes Gutachten im Auftrag der Gemeinde Rehlingen-Siersburg. 34 pp., Anhang.

["Unpublished odonatological assessment of 12 water bodies in the federal state Saarland near the French-German border. In total 32 (8-30 per site) species were recorded. Of special regional interest are *Cercion lindenii*, *Erythromma najas*, *Anax parthenope*, *Epitheca bimaculata*, *Libellula fulva*, and *Crocothemis erythraea*. An action plan to conserve the dragonfly fauna is presented."]

Source of supply: Gemeinde Rehlingen-Siersburg, Umweltamt, Bahnhofstr. 23, D-66780 Rehlingen-Siersburg, Germany

60. **Van Buskirk, J., McCollum, S.A. & E.E. Werner (1997):** Natural selection for environmentally induced phenotypes in tadpoles. *Evolution* 51(6): 1983-1992.

["... We measured selection in the presence of predators by exposing groups of 10 *Pseudacris triseriata* tadpoles to *Anax* in overnight predation trials and regressing the average phenotype of survivors against the number of tadpoles killed. ... In the presence of *Anax*, tadpoles with shallow and narrow body, deep tail fin, and wide tail muscle survived best. In the absence of free predators, tadpoles with narrow tail muscle grew significantly faster, and those with shallow tail fin and deep body grew somewhat faster. ... These results suggest that phenotypic plasticity in some morphological traits, such as tail depth and tail muscle width, has evolved under intermittent selection by dragonflies. Other traits that undergo selection by dragonflies, such as body morphology, appear developmentally rigid, perhaps because of historically strong opposing selection in nature or other constraints."]

Address: Van Buskirk, J., Univ. Zürich, Inst. Zool., Winterthurerstr. 190, CH-8057 Zürich, Switzerland

61. **van Tol, J. (1997):** The genus *Procordulia* Martin in western Malesia (Odonata, Corduliidae). Descriptions and records of Malesian Odonata, 4. *Tijdschrift voor Entomologie* 140(1): 133-146.

["The species of the genus *Procordulia* occurring in Malaysia, the Philippines and Indonesia, excl. New Guinea, are discussed and a key to the species is provided. *P. papandayanensis* is described from Java, and *P. lompobatang* and *P. rantemario* from SW Sulawesi. These new species all belong to the *P. sambawana* group of species."]

Address: van Tol, J., Natl. Museum Natural History, P.O. Box 9517, 2300 RA Leiden, Netherlands

62. **Verbeek, P.J.M. & J.T. Hermans (1997):** Dragonflies of the Lilbosch area (in Dutch). *Natuurhist. Maandbl.* 86(4): 93-97.

[In the agricultural area around Lilbosch Abbey many ponds were created with the intention to increase the natural value of the area. The shallow ponds are not fenced against cattle, but grazing impact is very low (one cow or horse on 2 or 3 ha). Cattle grazings seems to have positive effects on the dragonfly fauna of at least 6 ponds. 29 species were recorded of which at least 20 species have colonized this area since construction of the ponds. The article discusses the management effects on ponds and compares the dragonfly fauna of ponds with relatively steep slopes and those with gentle slopes.]

Address: Hermans, J.T., Hertestraat 21, NL-6067 ER Linne, The Netherlands

63. **Wakkie, B. & J.T. Hermans (1997):** The Northern Emerald (*Somatochlora arctica*) in The Netherlands. *Brachytron* 1(2): 40-43.

Address: Hermans, J.T., Hertestraat 21, NL-6067 ER Linne, The Netherlands

64. **Weiber, B. & H. Komnick (1997):** Digestion of phosphatidylcholines, absorption, and esterification of lipolytic products by *Aeshna cyanea* larvae as studied in vivo and in vitro. *Archives of Insect Biochemistry and Physiology* 36(4): 273-293.

[Digestion and absorption of phosphatidylcholine by *A. cyanea* larvae were studied in vivo and in vitro with the isolated digestive juice and isolated midgut. ...]

Address: Komnick, Prof. Dr. H., Univ. Bonn, Inst. Cell Biol., Ulrich-Haberland-Str. 61a, 53121 Bonn, Germany

65. **Weipert, J. (1997):** Die Schutzgebiete der Landeshauptstadt Erfurt Teil II: Zur Fauna des GLB "Feuchtwiesen und Kleingewässer am Strohbergtümpel" und des oberen Peterbachtals (Stadt Erfurt und Landkreis Weimarer Land/Thüringen). *Thüringer faunistische Abhandlungen* 4: 173-196.

[list of 7 common dragonfly species]

Address: Weige, J., Mittelfeldstr. 17, D-98693 Ilmenau, Germany

66. **Wenz, I. (1997):** Schutzwürdigkeit der Naheae im Bereich "Mittelwörth-Woog". *Flora Fauna Rheinland-Pfalz Beiheft* 22: 209-226.

[assessment for conservation purposes of the floodplain of the River Nahe in Rhineland-Palatinate, short checklist of Odonata]

Address: Wenz, Iris, Breitzte Str. 2b, D-37077 Göttingen, Germany

67. **Wiedenbrug, S., Nolte, U., & N.L. Würdig (1997):** Macrozoobenthos of a coastal lake in southern Brazil. *Arch. Hydrobiol.* 140(4): 533-548.

[Odonata are treated family-wise]

Address: Wiedenbrug, S., Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany

68. **Zessin, W. (1997):** Die Libellenfauna des NSG "Warnowtal bei Karnin" in Mecklenburg-Vorpommern. *Virgo, Mitt.bl. ent. Ver. Mecklenburg* 1: 19-24.

[checklist of the Odonata and their abundance along the River Warnow, Mecklenburg-Vorpommern]

Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany

1998

69. **Abro, A. (1998):** Structure and development of sperm bundles in the dragonfly *Aeshna juncea* L. (Odonata). *Journal of Morphology* 235(3): 239-247.

[A re-examination of the origin and development of sperm bundles in aeshnid dragonflies (Odonata, Anisoptera) was carried out using light and electron microscopy....The spermatodesmata are large sperm aggregates that constitute efficient vehicles for transmission of amounts of filamentous sperm to the female.]

Address: Abro, A., Univ. Bergen, Inst. Anat., Arstadveien 19, N-5009 Bergen, Norway

70. **Askew, R.R., Prosser, R. & P.S. Corbet (1998):** Odonata of the Cayman Islands: a review. *Bulletin of American Odonatology* 5(2): 27-32.

[checklist, new records]

Address: Askew, R., 5 Beeston Hall Mews, Beeston, Tarporley, Cheshire CW6 9TZ, UK

71. **Batty, P. (1998):** *Brachytron pratense* (Müller) in Mid-Argyll. *J. Br. Dragonfly Soc.* 14(1): 21-28.

[emergence period between 1991 and 1996, "Generally over 50% of the population emerge in the first four days of emergence.", maturation period lasts 2-3 weeks, males are strongly territorial, oviposition predominantly takes place in rotten detritus of *Typha spec.*, *Equisetum spec.* and rotting wood, larvae "were near the surface amongst trapped detritus, often clinging upside down to the underside of it."]

Address: Batty, Patricia, Kirnan Farm, Kilmichael Glen, Lochgilphead, Argyll PA31 8QL, UK

72. **Beckemeyer, R. (1998):** A brief history of the Plains Emerald - *Somatochlora ensigera*. *Argia* 10(1): 17-20.

[up to date summary by literature data and personal communications of the little-known *Somatochlora ensigera*]

Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203, USA

73. **Beynon, T.G. (1998):** Behaviour of immigrant *Symptetrum flaveolum* (L.) at breeding sites in 1995 and subsequent proof of breeding in 1996. *J. Br. Dragonfly Soc.* 14(1): 6-11.

[Staffordshire, detailed description of oviposition behaviour in 1995, (poor) colonisation success in 1996 and 1997, this is explained by the fact that winter rain didn't flood the chosen oviposition sites in most cases]

Address: Beynon, T.G., 34 Church Lane, Checkley, Stokes-on-Trent, ST10 4NJ, UK

74. **Beynon, T.G. (1998):** Inverted emergence; a cautionary note. *J. Br. Dragonfly Soc.* 14(1): 20-21.

[emergence place of *Leucorrhinia dubia*; "Inversion was almost certainly caused by a severe thunderstorm..."]

Address: Beynon, T.G., 34 Church Lane, Checkley, Stokes-on-Trent ST10 4NJ, UK

75. **Bowen, K.L., Kaushik, N.K., & A.M. Gordon (1998):** Macroinvertebrate communities and biofilm chlorophyll on woody debris in two Canadian oligotrophic lakes. *Arch. Hydrobiol.* 141(3): 257-281.

[Submerged coarse woody debris may be a valuable contributor of littoral invertebrate production in the two Algonquin lakes, especially for those taxa which require high levels of dissolved oxygen and do not survive in loose detritus. Upon submerged, fresh woody debris was rapidly colonized by biofilm algae and invertebrates, particularly early instar chironomids. Although influenced by the emergence of dault insects, invertebrate density tended to increase over the one year duration of the experiment. Naturally occurring coarse woody debris, which was usually more decayed and lacked bark and small twigs, generally supported a smaller but more diverse invertebrate community. Invertebrate densities and taxa richness on both introduced and natural substrates tended to be greater on complex surfaces. Density of Odonata was very low: 0,01 and 0,11% (introduced substrates) and 0,15 and 0,41% (natural substrates) of the total biomass of macrobenthos. This represents only 1 or 2-5 individuals. Reference is made on *Cordulia*, *Neurocordulia*, *Aeshna* and *Boyeria* on the genus level, and on *Coenagrionidae*.]

Address: Kaushik, N.K., Dept Environ. Biol., Univ. of Gueph, Guelph, Ontario, N1G 2W1, Canada

76. **Brodersen, K.P., Dall, P.C. & C. Lindegaard (1998):** The fauna in the upper stony littoral of Danish lakes: macroinvertebrates as trophic indicators. *Freshwater biology* 39: 577-592.

[39 Danish lakes were examined by multivariate numerical methods. The data were derived from 125 semi-quantitative samples and a species list of 126 taxa. Coenagrionidae (16 ind. in total) were present on 7 lakes, Zygoptera (5 ind. in total) were present on 2 lakes.]

Address: Dall, P.C., Freshwater Biological Laboratory, University of Copenhagen, 51 Helsingorsgade, DK-3400 Hillerod, Denmark

77. **Brown, G.R. & G. Theischinger (1998):** *Huonia melvillensis* spec. nov., a new dragonfly from Australia (Anisoptera: Libellulidae). *Odonatologica* 27(1): 99-103.

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

78. **Butler, S.G. (1998):** The larvae of the European Aeshnidae (Anisoptera). *Odonatologica* 27(1): 1-23.

[final instar exuviae, field key]

Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, UK

79. **Caldwell, J.P. & M.C. de Araujo (1998):** Cannibalistic interactions resulting from indiscriminate predatory behavior in tadpoles of poison frogs (Anura: Dendrobatidae). *Biotropica* 30 (1) : 92-103.

[Poison frogs in the genus *Dendrobates* have very small clutch sizes (2-6 eggs among species for which there are data) and typically transport their tadpoles singly to small phytotelmata, such as bromeliad tanks, leaf axils, fallen fruit capsules, and treeholes. Tadpoles of many species are predaceous, consuming larvae of insects that use the same microhabitat for breeding, such as giant damselflies and mosquitoes. ...]

Address: Caldwell, J.P., Univ. Oklahoma, Dept. Zool., Norman, OK 73019, USA

80. **Catling, P.M. (1998):** Evidence for a recent northward spread of *Enallagma civile* in New York State. *Argia* 10(1): 16.

Address: Catling, P.M.; 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA

81. **Chovanec, A. (1998):** The composition of the dragonfly community (Insecta: Odonata) of a small artificial pond in Mödling (Lower Austria): seasonal variation and aspects of bioindication. *Lauterbornia* 32: 1-14.

[26 field trips were conducted to set up a complete species inventory and to investigate seasonal variations in the composition of the community of Odonata, comparison of the present species inventory to a "target list" established on the basis of historical data, classification of species in dragonfly associations]

Address: Chovanec, A., Umweltbundesamt, Abt. Aquatische Ökologie, Spittelauer Lände 5, A-1090 Wien, Austria

82. **Cordero, A.; Carbone, S.S. & C. Utzeri (1998):** Mating opportunities and mating costs are reduced in androchrome female damselflies, *Ischnura elegans* (Odonata). *Animal Behaviour* 55(1): 185-197.

[Female colour polymorphism is a perplexing characteristic of many damselfly species. In *Ischnura elegans* three female phenotypes occur, one of which has the same blue coloration as the male (androchromes) whilst the others are inconspicuous brown gynochromes (*infuscans* and *infuscans-obsoleta* morphs). By marking a natural population near Rome, Italy, we found that all female phenotypes have similar survivorship, but they differ in mating frequency. Androchromes represented 55% of females but were involved in 43% of matings, whereas *infuscans* females represented 27% of females and 40% of matings and the *infuscans-obsoleta* phenotype 18% of females and 17% of matings. Old androchromes stored significantly less sperm in their spermatheca than old gynochromes, suggesting that they had mated less often. ... Our results indicate that androchrome females mate less often than gynochromes, which could be a means of avoiding unnecessary and costly matings, but some androchrome females failed to reproduce (mate or oviposit) probably because they were unable to mate at all.]

Address: Cordero, A., Euet Forestal, Area Ecologia, Campus Univ., Pontevedra 36005, Spain

83. **d'Aguilar, J. & J.-L. Dommaget (1998):** Guide des libellules d'Europe et d'Afrique du nord. Delachaux et Niestlé. Lausanne. ISBN 2-603-00566-9. 463 pp.

[This book is the new and totally revised edition of the well known field guide from 1985. 20 plates present information on habitats, ecology or ethology, and 28 plates with figures and photos of most of the European species will help to identify most of the European or North-African Odonata. Compared with the 1985 edition, some of these plates are new, e.g. the plates with photographs of most of the European and North-African species or subspecies of the family Cordulegastridae. All species, including the species non figured, are described in detail, but not keyed. This remains a serious disadvantage of the book. Without consulting of the original figures and descriptions some of the species, e.g. in the genus *Cordulegaster*, identification will be extremely difficult. The quality of some of the plates, e.g. plate 2 with the *Lestidae* is not adequate in some species, as no details are to be recognized. In some of the plates colours are too intensive, and will mislead people not common with European Odonata (e.g. plate 21). Even compared with the first edition the printing quality of plates differs considerably: in some cases contrast is so intensive that details of coloration disappear (e.g. plate 18). The distribution maps are new; they contain a lot of interesting information, even on the distribution of most of the subspecies. Also new is a key of the European Odonata larvae or exuviae on genus level (prepared in cooperation with H. Heidemann, Bruchsal). This book is a supplement to Askew's "The Dragonflies of Europe" which will remain the standard book on European Odonata. Despite the abstractor's critical remarks the "Guide des libellules ..." is a very good tool to study European Odonata, and should not be missing in any odonatological library. (M. Sch.)]

84. **Davies, D.A.L. (1998):** *Rhipidolestes yangbingi* spec. nov., a new species with some unusual features, from Sichuan, China (Zygoptera: Megapodagrionidae). *Odonatologica* 27(1): 105-109.

Address: Davies, D.A.L., 23 Cedar Court, Hills Road, Cambridge, CB2 2QJ, UK

85. **Donnelly, N. (1998):** *Enallagma cyathigerum* and *vernale*: species, subspecies, hybrids, all of the above, or none of the above? You be the judge. *Argia* 10(1): 20-22.

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

86. **Donnelly, N. (1998):** Resting dragonflies eating crawling ants! *Argia* 10(1): 12-13.

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

87. **Dosdall, L.M. & D.W. Parker (1998):** First report of a symphoretic association between *Nanocladius branchicolus* Saether (Diptera: Chironomidae) and *Argia moesta* (Hagen) (Odonata: Coenagrionidae). *American Midland Naturalist* 139(1): 181-185.

[In Cartier Creek, a small stream in southeastern Ontario, larvae of the chironomid *Nanocladius branchicolus* Saether were found associated symphoretically with nymphs of the damselfly *Argia moesta* (Hagen). This is the first report of a symphoretic association involving *A. moesta*; however, *N. branchicolus* was previously found associated symphoretically with nymphs of stoneflies in the families Perlidae and Pteronarcyidae. ... Approximately 22% of the population of *A. moesta* harboured symphoretic chironomids. ...]

Address: Dosdall, L.M., Alberta Res. Council, POB 4000, Vegreville, AB T9C1T4, Canada

88. **Dunkle, S. (1998):** Another *Orthemis discolor* record from Texas. *Argia* 10(1): 7-8.

Address: Dunkle, S., Biol. Dept, Collin County Community College, 2800 E, Spring Creek Parkway, Plano, TX 75074, USA

89. **Feldmann, R.M.; Vega, F.J.; Applegate, S.P. & G.A. Bishop (1998):** Early Cretaceous arthropods from the Tlayua Formation at Tepexi de Rodriguez, Puebla, Mexico. *Journal of Paleontology* 72(1): 79-90
 ["The arthropod macrofauna from the Middle Member of the lithographic limestones of the Tlayua Formation, in quarries at Tepexi, Mexico, is comprised of marine and nonmarine components. ... Remains of an arachnid and an odonate nymph represent nonmarine constituents ..."]
 Address: Dep. Geol., Kent State Univ., Kent, OH 44242, USA
90. **Gambles, R.M., Moore, N.W., Hämäläinen, M. & E.D.C. Prendergast (1998):** Dragonflies from the Gambia: an annotated list of records up to the end of 1980. *Odonatologica* 27(1): 25-44.
 Address: Prendergast, E.D.V., Manor House, Bagber, Sturminster Newton, Dorset DT10 2EY, UK
91. **Garbutt, A. (1998):** Hornet predation on a dragonfly. *J. Br. Dragonfly Soc.* 14(1): 30-31.
 [predation of *Vespa crabro* L. (*Hymenoptera*) on a female *Aeshna cyanea*, process of devouring is described]
 Address: Garbutt, A., 9 The Causeway, Godmanchester, Huntingdon, Cambridgeshire PE18 8HA, UK;
92. **Geißler-Strobel, S., Bugner, J., Feldmann, R., Günther, K., Gras, J., Herbst, F. & K. Seluga (1998):** Bergbaufolgelandschaft in Ostdeutschland - durch Sanierung bedrohte Sekundärlebensräume. *Naturschutz und Landschaftsplanung* 30(4): 106-114.
 [restoration of former coal-mining landscapes in East-Germany, endangered secondary habitats, e.g. of *Odonata*]
 Address: Feldmann, Dr. R., Umweltforschungszentrum Leipzig-Halle, Permoserstr. 15, D-04318 Leipzig, Germany
93. **Hilfert-Rüppell, D. (1998):** Temperature dependence of flight activity of odonata by ponds. *Odonatologica* 27(1): 45-59.
 [onset and flight activity, warm-up strategies, thresholds for flight, influence of body colour on heat gain, energy-saving flight, thermoregulation through perch choice, thermal adaptations]
 Address: Hilfert-Rüppell, D., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany
94. **Hutchings, G. (1998):** New record of *Tramea lacerata* (Hagen), the Black-mantled Glider, in western Canada. *Argia* 10(1): 9-10.
 Address: Hutchings, G., Box 15, Saturna Island, BC, V0N 2Y0, Canada
95. **Iles, I.S. (1998):** An investigation into the affects of bank collapse and cattle trample on Odonata species at Okehurst on the River Arun, West Sussex. *J. Br. Dragonfly Soc.* 14(1): 14-20.
 ["It appears that those sections of the bank (of the River Arun) that have collapsed have a higher biomass of Odonata than those sections that have not." In the course of flood preservation measures the areas that flood (sections of collapsed river banks) are targeted for dredging and banking up. "By comparing Odonata numbers with the degree of trample only regardless of water body, a more convincing increase in activity at higher levels of disturbance at the water margins may be detected."]
 Address: Iles, I.S., 52 Cook Road, Horsham, West Sussex RH12 5GG, UK
96. **Ivarsson, T. (1998):** "*Sympetrum nigrescens*" found in Sweden (in Swed., with short Engl. summary). *Nordic Odonat. Soc. Newsletter* 4: 6.
 ["nigrescens-like" specimens of *Sympetrum striolatum* were found in Dalsland (west of Sweden) in August 1996. See also Hämäläinen (1985), *Notulae Entomol.* 65: 68.]
 Address: Ivarsson, T., Geografigränd 6A, S-90732 Umea, Sweden
97. **Ivarsson, T. (1998):** Note on the hot weather behaviour of darter dragonflies (*Sympetrum*) in Sweden (in Swed., with Engl. summary). *Nordic Odonat. Soc. Newsletter* 4: 7.
 [thermoregulation behaviour ("obelisk" posture on hot days, horizontally position on cooler days) of *Sympetrum flaveolum* and *S. danae* in Sweden is described.]
 Address: Ivarsson, T., Geografigränd 6A, S-90732 Umea, Sweden
98. **Ivarsson, T. (1998):** Some new distribution records of Swedish dragonflies (in Swed., with Engl. summary). *Nordic Odonat. Soc. Newsletter* 4: 5.
 [new county records of 12 species including *Coenagrion johanssoni*, *Epitheca bimaculata*, *Leucorrhinia caudalis*, *L. albifrons*, and *Sympetrum vulgatum*]
 Address: Ivarsson, T., Geografigränd 6A, S-90732 Umea, Sweden
99. **Jenkins, D.K. (1998):** A population study of *Coenagrion mercuriale* (Charpentier) in the New Forest. Part 7. Mark/recapture used to determine the extent of local movement. *J. Br. Dragonfly Soc.* 14(1): 1-4.
 ["... it extraordinarily reluctant to move from its home location, even across a short open area. However it has been observed on several occasions that numbers of male *C. mercuriale* can be found at 0.5 km or more from the nearest site after emergence and initial dispersal. Poor colonisation of nearby areas would therefore result only if females do not disperse far after emergence. The fact that none have been found well away from emergence site may support this, or simply reflect the difficulty of seeing them when not attached to males.]
 Address: Jenkins, D.K., 7 Lakewood Road, Ashurst, Hants S040 7 DH, UK;
100. **Koperski, P. (1998):** Predator-prey interactions between larval damselflies and mining larvae of *Glyptotendipes gripekoveni* (Chironomidae): reduction in feeding activity as an induced defence. *Freshwater biology* 39: 317-324.
 ["feeding methods and intensity of predation by larvae of *Erythromma najas* on *G. gripekoveni* were examined in artificial habitats... The experiments assessed the influence of chemical stimuli from the predator, light and the concentration of suspended food on the feeding activity of *G. grip.* inside and outside of the mine. *E. najas* preyed upon *G. grip.* as the latter grazed outside mines. When the food concentration for the chironomid was high, it significantly reduced both filtering activity and activity outside mines in response to the kairomone produced by *E. najas*. Feeding activity did not change when food was scarce... The predator can detect and catch mining prey in either the light (visually) or dark (mechanically). This may explain the lack of diel periodicity in the chemically induced differences in prey activity. Reduced feeding activity of the mining larvae in the chemically simulated presence of a larval damselfly can be explained as an induced antipredator behaviour ..."]
 Address: Kopersiki, P., Dept Hydrobiol., Univ. Warsaw, Banacha 2, PL-02 097 Warsaw, Poland
101. **Kossenko, S.M. & C.H. Fry (1998):** Competition and coexistence of the European bee-eater *Merops apiaster* and the blue-cheeked bee-eater *Merops persicus* in Asia. *Ibis* 140(1): 3-13.
 ["Studies were conducted over a 10-year period on the supposedly similar European Bee-eater *Merops apiaster* and Blue-cheeked Bee-eater *Merops persicus* breeding in mixed and separate colonies in four Asiatic countries.... Diets were qualitatively similar at insect family level but different at the species level, partly because of local variation in availability and partly because of distinct preferences of *M. apiaster* for small beetles, ants and termites and of *M. persicus* for large dragonflies and cicadas. ..."]
 Address: Kossenko, S.M., Nat. Reserve Bryanski Les., Stn. Nerussa, Suzemski Rayon 242180, Bryanskaya Obla, Russia

102. **Kullingsjö, O. (1998):** Trollslände-dikt (in Swed.). Nordic Odonat. Soc. Newsletter 4: 18.
[dragonfly poem in Swedish]
Address: authors address not stated
103. **Lofall, B.P. (1998):** On the dragonfly-season 1997 in Ostfold. (in Norw., with Engl. summary). Nordic Odonat. Soc. Newsletter 4: 14-15.
[A checklist of species for 18 localities in the region of Ostfold is presented. The data presented are prior and after 1960. In 1997, *Somatochlora flavomaculata* and *Leucorrhinia albifrons* were discovered in one new locality while *Sympetrum sanguineum* and *S. vulgatum* were recorded in several new localities]
Address: Lofall, B.P., Aslivn 18B, N-1890 Rakkestad, Norway
104. **Martinez, B., Velasco, J., Suaárez, L. & R. Vidal-Abarca (1998):** Benthic organic matter dynamics in an intermittent stream in South-East Spain. Arch. Hydrobiol. 141(3): 303-320.
["...Habitat-specific variables.. determined the production, retention and storage of the different benthic particulate organic matter - fractions in the streambed. Shredders were absent from the stream due to scarcity of their food. No significant correlations were found between the densities of the detritivorous feeding groups and their presumed food resources. This lack of correlation may reflect an over-abundance of detritus in the stream." At four sampling sites (2 pools, 2 runs) of the stream Chicamo the macrozoobenthos including 6 Odonata (*Coenagrion scitulum*, *Orthetrum brunneum*, *O. chrysostigma*, *Sympetrum fonscolombii*, *Crocothemis erythraea*, *Anax parthenope*) was collected. The mean density (ind/m²) for each species and collection site is presented in tab. 7.]
Address: Martinez, B., Dept Ecol. Hydrol., Fac. Biol., Univ. of Murcia, Campus de Espinardo, ES-30100, Spain
105. **May, M. (1998):** Another migration report, for those of you who came in late. Argia 10(1): 10-12.
Address: May, M.L., Dept Entom. & Econ. Zool., Cook College, Rutgers Univ., New Brunswick, NJ 08903
106. **McPeck, M. (1998):** Comments on *Enallagma cyathigerum* and *vernale*. Argia 10(1): 22-23.
[Mark McPeck regards *E. vernale* and *E. cyathigerum* as two distinct species. "My working hypothesis for the boreale/cyathigerum/vernale relationships are as follows: (1) Sometime very recently (probably <<350 000 year ago if the molecular clock is right), a lineage of an *Enallagma* species in the fish lake habitat was established in a dragonfly lake. This founder population quickly adapted to living with dragonfly predators instead of fish predators... This was the progenitor species of boreale, cyathigerum and vernale. (2) A subsequent speciation event occurred to give rise to boreale and cyathigerum somewhere in the northeastern part of North America (this is from considering the biogeography of species along with our phylogeny) (3) then another speciation event associated with a habitat shift from dragonfly lakes back into fish lakes occurred in the cyathigerum lineage to form *E. vernale*." Mark McPeck reports on a project of Jenifer Mitchell, who compared the larval morphology and behaviour of boreale and vernale. Both species are indistinguishable in the size and shape of caudal lamellae, abdomen and labium. However, they are very different in behaviour.]
Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA
107. **McPeck, M. (1998):** The consequences of changing the top predator in a food web: a comparative experimental approach. Ecological monographs 68(1): 1-23.
[*Enallagma*, *Ischnura*, coexistence, community structure, density dependence, food limitation, food web predation, resource competition, trade-offs, trophic structure]
Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA
108. **Müller, J.M. (1998):** *Nehalennia irene* in Alaska. Argia 10(1): 9.
Address: authors address not stated
109. **Murdoch, D. (1998):** The size of the 1995 influx of *Sympetrum flaveolum* (L.). J. Br. Dragonfly Soc. 14(1): 11-12.
[discussion of the minimum numbers of immigrating *S. flaveolum* into the British Isles in summer 1995]
Address: Murdoch, D., Dept. Medical Microbiology, Southmead Hospital, Bristol BS10 5NB, UK
110. **Nielsen, O.F. (1998):** Dragonfly-news from Denmark 1997 (in Danish, with Engl. summary). Nordic Odonat. Soc. Newsletter 4: 4.
[*Anax imperator* seems to be established in southwestern Jylland, *Somatochlora arctica* was discovered near Ry (this is the second Danish record of the species), *Aeshna viridis* was found in southwestern Denmark, *Nehalennia speciosa* was confirmed at its only known locality in Denmark, further remarks are made referring *Aeshna mixta*, *Lestes dryas*, and *Sympetrum flaveolum*.]
Address: Nielsen, O.F., Sokildevej 87, DK-8680 Ry, Denmark
111. **Olsvik, H. (1998):** *Calopteryx virgo* and *Leucorrhinia rubicunda* in More and Romsdal, western Norway. (in Norw., with Engl. summary). Nordic Odonat. Soc. Newsletter 4: 8.
[new records from July 1997 for the western Norwegian counties More and Romsdal]
Address: Olsvik, H., N-6598 Foldfjorden, Norway
112. **Olsvik, H. (1998):** Dragonflies in More and Romsdal, status per 1997, with a red list. (in Norw., with Engl. summary). Nordic Odonat. Soc. Newsletter 4: 16-17.
[The red list of the region of both More and Romsdal based on 542 investigated localities during the last 25 years. *Calopteryx virgo* and *Erythromma najas* seem to be endangered, *Coenagrion armatum*, *Aeshna subarctica* and *Cordulegaster boltonii* vulnerable, *C. johanssoni* concerning demanding, *Somatochlora flaveolum* and *Leucorrhinia rubicunda* indeterminate, and the status of *Sympetrum striolatum* is insufficiently known. *Sympetrum nigrescens* is treated as common, but its occurrence "possibly could be of special responsibility in western Norway".]
Address: Olsvik, H., N-6598 Foldfjorden, Norway
113. **Olsvik, H. (1998):** Nye norske insekt-frimerker (in Norw.). Nordic Odonat. Soc. Newsletter 4: 18.
[A stamp with a picture of *Aeshna cyanea*, released on 2 Jan., 1998 in Norway is reproduced. Annotation of M. Sch.: I believe Hans Olsvik's identification of the species is not correct; the species is a little bit "free styled" *Aeshna juncea*.]
Address: Olsvik, H., N-6598 Foldfjorden, Norway
114. **Olsvik, H. (1998):** Nytt fra Norge og Sverige 1997. (in Norw.). Nordic Odonat. Soc. Newsletter 4: 13.
[*Orthetrum cancellatum* was found 1997 in Norway. *Hemianax ephippiger* and *Sympetrum fonscolombii* were recorded in Öland (Sweden). The notice is illustrated by two pictures of *O. cancellatum* and *S. fonscolombii* taken May 1996 in Thassos (Greece).]
Address: Olsvik, H., N-6598 Foldfjorden, Norway
115. **Olsvik, H. (1998):** Smastykker (in Norw.). Nordic Odonat. Soc. Newsletter 4: 13.
[The deformation of the abdomen of *Pyrrhosoma nymphula* is pictured; the photograph was taken near Ry in Denmark on 16 June, 1996.]
Address: Olsvik, H., N-6598 Foldfjorden, Norway
116. **Olsvik, H. (1998):** *Sympetrum "nigrescens"*. Nordic Odonat. Soc. Newsletter 4: 18.

[two photographs of the typical thorax of *Sympetrum "nigrescens"* are reproduced showing specimens from Norway]

Address: Olsvik, H., N-6598 Foldfjorden, Norway

117. **Olsvik, H. (1998):** The distribution of Odonata in Finmark. (in Norw., with Engl. summary). Nordic Odonat. Soc. Newsletter 4: 10-13.

[The distribution of the 16 species of dragonflies in Finmark, northern Norway, is shown by 50x50 km EIS-squares. The distribution maps include published and unpublished records provided by different odonatists. *Coenagrion hastulatum*, *C. armatum*, *C. johanssonii*, *Aeshna subarctica*, and *A. grandis* are new to Finmark.]

Address: Olsvik, H., N-6598 Foldfjorden, Norway

118. **Orr, R. (1998):** A bit of 1997 migratory *Anax junius* data from Maryland. *Argia* 10(1): 13-14.

Address: Orr, R.L., 5215 Durham Road East, Columbia, MD 21044-4444

119. **Orr, R. (1998):** The odonata of Sideling Hill Creek. *Argia* 10(1): 14-15.

Address: Orr, R.L., 5215 Durham Road East, Columbia, MD 21044-4444

120. **Paine, A. (1998):** Notes and observations. *J. Br. Dragonfly Soc.* 14(1): 31-32.

[items: mistaken identity? (*Libellula depressa*, *Vespa crabro*), Food for a Sparrowhawk?, Emergence from hard mud (*Sympetrum striolatum*), Feeding whilst mating (*Cordulegaster boltonii*), Range extension of *Cordulegaster boltonii* and *Brachytron pratense*, Unusual markings (*Calopteryx virgo*, *Libellula quadrimaculata* var. *praenubiola*)]

Address: Paine, A., 3a Burnham Close, Trimley St. Mary, Suffolk IO11 0XJ, United Kingdom

121. **Painter, D. (1998):** Effects of ditch management patterns on Odonata at Wicken Fen, Cambridgeshire, UK. *Biol. Conservation* 84: 189-195.

[Patterns of adult and larval Odonata distribution in relation to ditch management cycles were studied... Newley excavated sites with little shading from bankside vegetation are favoured by territorial males and ovipositing females; densely reeded sites are rarely used by adults. However, ditches with abundant submerged and floating macrophytic growth support more larvae than newley excavated or deeply shaded sites with poor plant development. Rotational clearance of ditches allows good displays of adult Odonata and breeding success to be achieved simultaneously on a reserve. Management implications for the conservation of Odonata are discussed.] (Personal note of M. Sch.: It is quite astonishing to see that e.g. the extensive German literature on effects of ditch management on Odonata has been ignored totally in the discussion.)

Address: Painter, D., Consultants in Environmental Sciences, Sackville, Place, Magdalen Street, Norwich NR3 1JU, UK

122. **Paulson, D. (1998):** An early record of *Neoneura amella* (Amelia's Threadtail) from Texas. *Argia* 10(1): 8.

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

123. **Paulson, D. (1998):** *Orthemis discolor* (Orange-bellied Skimmer), a new species for the U.S.. *Argia* 10(1): 7.

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

124. **Peters, G. (1998):** Taxonomic and population studies of British Columbia *Aeshna* species. *Bulletin of American Odonatology* 5(2): 33-42.

[mass emergence, transfer of matter and energy from aquatic to terrestrial ecosystems, larval competition, confirmation of species rank, both of *A. septentrionalis* and *A. caerulea*, identification by wing characters]

Address: Peters, Prof. Dr. G., Museum für Naturkunde; Inst. Syst. Zool., Invalidenstr. 43, D-10115 Berlin, Germany

125. **Pilon, J.-G., Pilon, S.; Pilon, L. & D. Lagacé (1998):** Structure des communautés odonatologiques adultes de la zone subarctique du Québec, Canada. *Odonatologica* 27(1): 61-70.

[species composition, species diversity, dendrogram of species association]

Address: Pilon J.-G., Département des Sciences biologiques, Université de Montréal, C.P.6128, Montréal, Québec, H3C 3J7, Canada

126. **Pringle, C.M. & A. Ramirez (1998):** Use of both benthic and drift sampling techniques to assess tropical stream invertebrate communities along an altitudinal gradient, Costa Rica. *Freshwater biology* 39: 359-373.

["... Diptera (*Chironomidae*) and *Ephemeroptera* were the dominant insect groups in all sites. Disturbed streams draining banana plantations were dominated by *Chironomidae* and had lower taxon richness and diversity than other sites. While data from benthic samples indicated that insects were the major faunal component (>90%) at all sites, drift samples were dominated by larval shrimps (>50%) at the 30 m and 50 m sites... ", short list of Odonata on different systematic levels]

Address: Pringle, Catherine M., Inst. Ecol., Univ. Georgia, Athens, GA 30602, USA

127. **Rebhahn, H. & S. Albrecht (1998):** Kleingewässer in einer Karstlandschaft und ihre Bedeutung für den Naturschutz. *Berichte der Akademie für Naturschutz Laufen* 20(1996): 229-238.

[small (temporal) water bodies in the karst of the "Nördliche Frankenalb", Bavaria, *Lestes dryas*, *Sympetrum flavolum*, *Coenagrion hastulatum*]

Address: Rebhahn, H., Regierung von Oberfranken, Ludwigstr. 20, D-95444 Bayreuth, Germany

128. **Reder, G. (1998):** Adulte Molche (Urodela: Salamandridae) und Wolfsspinnen (Araneida: Lycosidae) als Unterwasser-Ansitzjäger mit dem Beutespektrum eierlegende Kleinlibellen (Odonata: Zygoptera). *Fauna Flora Rheinland-Pfalz* 8(4): 1207-1216.

[adult newts and spiders as underwater predators of ovipositing female Zygoptera]

Address: Reder, Gerd, Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany

129. **Samways, M.J., Carchini, G., Di Domenico, M. & G. Whiteley (1998):** Description of the last instar larva of *Rhyothemis semihyalina* (Desjardins, 1832) (Anisoptera: Libellulidae). *Odonatologica* 27(1): 111-116.

Address: Carchini, Prof. Dr. G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy

130. **Saugestad, T. (1998):** *Leucorrhinia pectoralis* (Charpentier, 1825) found in Hordaland, West Norway. (in Norw., with Engl. summary). *Nordic Odonat. Soc. Newsletter* 4: 9.

[The odonata mapping project in Hordaland results in the westernmost record of *L. pectoralis* in Norway. In addition a map of the actual distribution of the species in western and southwestern Norway is presented. Further species briefly are mentioned include *nigrescens*-like specimens of *Sympetrum striolatum*.]

Address: Saugestad, T., Gamle Kalvedalsvei 12B, N-5019 Bergen, Norway

131. **Schöll, F. & I. Balzer (1998):** Das Makrozoobenthos der deutschen Elbe 1992-1997. *Lauterbornia* 32: 113-129.

[checklist of 370 macroinvertebrate species or higher taxa of the River Elbe from collections between 1992 and 1997, including the rare species *Stylurus flavipes* and *Ophiogomphus cecilia*]

Address: Schöll, F., Bundesanstalt für Gewässerkunde, Kaiserin-Augusta-Anlagen 15-17, D-56068 Koblenz, Germany

132. **Schütte, C., Schridde, P. & F. Suhling (1998):** Life history patterns of *Onychogomphus uncatus* (Charpentier) (Anisoptera: Gomphidae). *Odonatologica* 27 (1): 71-86.

[4-year study, surber-samples of 3 running waters in southern France, field enclosure experiments, egg development, emergence, hight mortality of final instar larvae during winter]

Address: Schütte C., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

133. **Seki, T. & K. Vogt (1998):** Evolutionary aspects of the diversity of visual pigment chromophores in the class Insecta. *Comparative Biochemistry and Physiology B (Biochemistry and Molecular Biology)* 119(1): 53-64.

[In the class Insecta, three retinal congeners are used as the chromophore of visual pigments: retinal, (3R)-3-hydroxyretinal and (3S)-3-hydroxyretinal. The distribution of retinal and 3-hydroxyretinal superimposed on the phyletic tree of insects indicates that the original chromophore of visual pigments was retinal, and that some insects arose around the end of the Carboniferous period acquired the ability to use 3-hydroxyretinal. ... On investigating the absolute structure of 3-hydroxyretinal in insect compound eyes, using a chiral column, the orders Odonata, Hemiptera, Neuroptera, Coleoptera, and Lepidoptera, and suborders Nematocera and Brachycera of the Diptera were found to have only (3R)-3-hydroxyretinal. ...]

Address: Seki, T., Osaka Kyoiku Univ., Div. Health Science, 4-698-1 Asahigaoka, Osaka 582, Japan

134. **Smith, P.H. (1998):** Dispersion or migration of *Symptetrus danae* (Sulzer) in South Lancashire. *J. Br. Dragonfly Soc.* 14(1): 12-14.

Address: Smith, P.H., 2 Highfield Grove, Lostock Hall Preston, Lancashire PR5 5YB, UK

135. **Steinwarz, D. (1998):** Beiträge zur Ökologie und Faunistik ausgewählter Insektengruppen (Insecta: Hymenoptera [Formicidae], Lepidoptera, Orthoptera, Odonata) des Eulenbergs bei Hennef. *Decheniana, Beih.* 34: 54-69.

[Odonata of a quarry in Nordrhein-Westfalen, Germany]

Address: Steinwarz, D., Apolloniaweg 6, D-53773 Hennef, Germany

136. **Stephan, U. (1998):** Untersuchungen zur Habitatbindung der Quelljungferarten *Cordulegaster boltoni* (Donovan 1897) und *Cordulegaster bidentata* (Selys 1843) in Waldbächen des Mittleren Schwarzwaldes unter besonderer Berücksichtigung der Larvalökologie. Diplomarbeit am Lehrstuhl für Geobotanik, Fakultät für Biologie der Albert-Ludwigs-Universität Freiburg/Breisgau. 110 pp, Anhänge.

[comprehensive and detailed study of the larval ecology of *Cordulegaster boltonii* and *Thecagaster bidentata* with regard to allopatric and sympatric populations in the Black Forest region, southwestern Germany. Special emphasis is given to the influence of water chemistry on larval habitat selection (no influence), the influence of light and tree cover on larval habitats (insignificant), the influence of colour of substrate (significant, very important cue factor for oviposition site-selection by females), distance from spring (significant factor in separating the species), temperature of water (insignificant), drought resistance of *C. boltonii* (minimum: 24 days, maximum 57 days), larval interactions (cannibalism in *C. boltonii*), mean larval density (7 - 172 larvae / m² in dependence of age of the larvae), mean range of larvae (*T. bidentata*: 2,3 m², *C. boltonii*: 1,4 m²), emergence, difference in habitats of male and female imagines]

Address: Stephan, Ulrike, Unterer Mühlenweg 73, D-79114 Freiburg, Germany

137. **Stolzenwald, T. & R. Schmidt-Brücken (1998):**

Das Makrozoobenthos des Schwabach und Trubach (Regnitz/Main). *Lauterbornia* 32: 131-149.

[Investigation of water quality of both rivers between Sept. 1994 and Sept. 1995, Bavaria, chemical and physical parameters, list of macrozoobenthos includes 16 species of Odonata, e.g. *Ophiogomphus cecilia*]

Address: Stolzenwald, Tatjana, Marktplatz 10a, D-90542 Eckental, Germany

138. **Stone, M.K. & J.B. Wallace (1998):** Long-term recovery of a mountain stream from clearcut logging: the effects of forest succession on benthic invertebrate community structure. *Freshwater biology* 39: 151-169.

[Odonata (*Lanthis*, *Cordulegaster*) are briefly mentioned, USA, North Carolina]

Address: Stone, M.K., Dept Entomol., Univ. Georgia, Athens, Georgia 30602, USA

139. **Swisher, B.J., Soluk, D.A. & D.H. Wahl (1998):** Non-additive predation in littoral habitats: influences of habitat complexity. *Oikos* 81(1): 30-37.

[... We examined the combined consumption of a common prey by two predators across a gradient of three habitat complexities. In microcosm experiments consumption of larval mayfly prey (*Cloeon cognatum*) by juvenile bluegill sunfish (*Lepomis macrochirus*) and libellulid dragonfly larvae (*Erythemis simplicicollis*) exceeded additivity at low habitat complexity, but were additive at higher levels of complexity. ...]

Address: Swisher, B.J., Illinois Nat. Hist Survey, Ctr. Aquat. Ecol., 607 E Peabody Dr., Champaign, IL 61820, USA

140. **Terzani, F. & B. Carletti (1998):** *Enallagma captuavis* spec. nov. and other odonate records from Ethiopia (Zygoptera: Coenagrionidae). *Odonatologica* 27 (1): 117-120.

Address: Terzani, F., Mus. Nat. Hist. of the University of Florence, Zool. Sect. "La Specola", Via Romana 17, I-50125 Florence, Italy

141. **Thomas, M. (1998):** *Somatochlora williamsoni* in Connecticut. *Argia* 10(1): 8-9.

Address: Thomas, M.C., 206 Skyview Drive, Cromwell, CT 06416, USA

142. **Vick, G.S. (1998):** Notes on some damselfly larvae from Cameroon (Zygoptera: Perilestidae, Amphipterygidae, Platynemididae). *Odonatologica* 27(1): 87-98.

[description of the larvae of *Nubiolestes diotima*, *Stenocnemis pachystigma*, *Pentaplebia stahli*]

Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, UK

143. **Waring, E. (1998):** Further sites for *Coenagrion pulchellum* (Vander Linden). *J. Br. Dragonfly Soc.* 14(1): 4-5.

[additional records from Great Britain (period 1991-1997): Wales and Shropshire, Southwest Scotland, East Anglia, Southern England]

Address: Waring, E., 7 Amberlands Close, Blackwell, Bristol BS48 3 LW, UK

144. **Wong, A.H.K., Williams, D.D., McQueen, D.J., Demers, E. & C.W. Ramcharan (1998):** Macroinvertebrate abundance in two lakes with contrasting fish communities. *Arch. Hydrobiol.* 141(3): 283-302.

[Can fish abundance influence benthic macroinvertebrate numbers, biomasses and species composition? Two lakes with similar physical and chemical characteristics in south-central Ontario (Canada) but contrasting fish communities were studied from June to August 1992. Ranger Lake was dominated by piscivorous bass and had low populations of small-bodied planktivore-benthivores (e.g. yellow perch, golden shiners). Mouse Lake had no obligate piscivores and very large populations of small-bodied planktivore-benthivores. The two lakes had similar populations of large-bodied, benthivorous white suckers. Comparison of depth-stratified samples of benthic macroinvertebrates collected monthly suggested that in the

shallow water zone (<1 depth) Ranger Lake supported significantly higher benthic densities, biomasses, and taxon richness. In these shallow water zones, consumption of benthic invertebrates by fish, revealed that the small-bodied planktivore-benthivores in Mouse Lake exerted more than twice as much predation pressure on the benthos as they did in the lake with fish. In the deeper water (>1m depth) there were no between-lake differences in the macroinvertebrate communities." Prey consumption by white suckers (generally distributed in >1m depth) was similar in the two lakes. The authors conclude that high rates of prey consumption by the small-bodied planktivores-benthivores could have accounted for the lower inshore biomasses found in Mouse Lake. 13 Odonata are listed on the species (*Gomphus exilis*, *Hagenius brevistylus*, *Celithemis eponina*, *Didymops transversa*, *Basiaeschna janata*, *Libellula julia*, *Pachydiplax longipennis* and *Cordulia shurtelffi*) or genus level (*Ischnura*, *Somatochlora*, *Cordulia*, *Leucorrhinia*, *Sympetrum*). Odonata are analyzed on the order level with reference to their density, biomass, wet weight, and preference as fish diet.]

Address: McQueen, D.J., Dept Biology, York Univ., 4700 Keele Street, Toronto, Ontario, M3J 1P3, Canada

145. **Zhu, H.-q. & Z.-d. Yang (1998):** *Rhipidolestes bastiaani* spec. nov., a new damselfly from Shaanxi, China (Zygoptera: Megapodagrionidae). *Odonatologica* 27(1): 121-123.

Address: Zhu H.-q., Dept Biol., Shanxi University 42-38, Taiyuan 030006, Shanxi, China

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146. **Abbingh, G. (1997):** Op zoek naar de Noordse glazemaker in Drenthe. Nieuwsbrief, Mededelingen van de Nederlandse Vereniging voor Libellenstudie 1(3): 3. (in Dutch).

[rediscovery of *Aeshna subarctica elisabethae* in the province of Drenthe (The Netherlands)]

Address: Abbingh, G., Muddegoorn 78, NL-9403 NK Assen, The Netherlands.

147. **Anderson, C.; Wilson, R. (1997):** Reports from Coastal stations: Minsmere RSPB Reserve, Suffolk. *Atropos* 2: 76-77. (in English).

[14 species were observed in 1996; *Sympetrum flaveolum*, *S. sanguineum*, *S. striolatum*, *Pyrrhosoma nymphula*, *Brachytron pratense*, *Aeshna cyanea*, *Orthetrum cancellatum* are dealt with]

Address: not stated.

148. **Attridge, W. (1997):** The dragonflies of the Dungeness Bird Observation recording area - 1996. *Atropos* 2: 49-51. (in English).

[commented list of 14 Odonata species including *Sympetrum fonscolombei* and *Erythromma najas*]

Address: Attridge, W., Dungeness, Bird Observatory, Dungeness, Romney Marsh, Kent TN29 9NA, UK.

149. **Bechly, G. (1997):** New fossil odonates from the Upper Triassic of Italy with a redescription of *Italophlebia gervasuttii* Whalley, and a reclassification of triassic dragonflies. *Riv. Mus. civ. Nat. "E. Caffi" Bergamo* 19: 31-70. (in English with Italian summary).

["The odonate fauna of the Upper Triassic of Bergamo is revised. *Italomyrmeleon bergomensis* gen. et spec. nov. is described as first Protomyrmeleontidae from the Triassic of Europe. A tiny fossil odonate which belongs to a new genus and species is described but not named because it is a poorly preserved specimen. *Italophlebia gervasuttii* is redescribed and a new species of the same genus, *Italophlebia paganoniae* spec. nov., is described. The phylogenetic position of *Italophlebia* is discussed and the genus is shown to be one of the oldest known stem-group representatives of Anisoptera, and is therefore transferred from Zygoptera - Hemiphlebioidea to "Anisozygoptera" - Isophlebioptera. Within Isophlebioptera a new clade Parazygoptera is proposed and a phylogenetic system of its subgroups is introduced. *Italophlebiidae* is regarded as junior subjective synonym of *Triassothemistini* stat. nov., and *Progonophlebiidae* is regarded as junior subjective synonym of *Mesophlebiinae*. *Triassoneuridae* is regarded as junior subjective synonym of *Triassoletidae*, and *Oreopteridae* is regarded as junior sub-

jective synonym of *Asiopteridae*. A new genus *Pseudotriassothemis* gen. nov. (type genus of *Pseudotriassothemistinae* subfam. nov.) is erected for the three Japanese Triassic species "*Triassoneura*" *okafujii*, "*Triassothemis nipponensis*" and "*Triassothemis*" *minensis*. *Afrotriassothemis* subgen. nov. is proposed as new subgenus in *Triassothemis* for the two South African Triassic species *T. heidia* and *T. regularis*, that were previously classified in the genus *Triassoneura*. "*Triassoneura*" *primitiva* is transferred from *Triassoneuridae* to *Archizygoptera* - *Batkeniidae* in a new genus *Paratriassoneura* gen. nov.. "*Sogdopteron*" *legibile* is transferred from *Asiopteridae* to *Triassoletini*. *Sogjutella mollis* is transferred from *Asiopteridae* to *Cyclothemistidae*. *Sphenophlebia*, *Mesoepiophlebia* and *Ensphingophlebia* are transferred from *Euthemistidae* and *Epiophlebiidae* to a new family *Sphenophlebiidae* fam. nov. which is regarded as most basal group of *Parazygoptera*. *Proeuthemis pritykinae* is preliminarily transferred from *Euthemistidae* to the new family *Sphenophlebiidae* too, although it might also be the sister-group of *Asiopteridae*. "*Sphenophlebia*" *pommerana* is transferred to the genus *Turanopteron* in *Asiopteridae*. *Triadotypus guillaumei* is recognised as junior subjective synonym of *Reisia gelasii* and *Reisia nana* spec. nov. is described from the Triassic of France. Consequently *Triadotypus sogdianus* is changed to *Reisia sogdianus* comb. nov.. *Reisia* (= *Triadotypus*) and *Triassologus* are both transferred from "*Protodonata*" to *Triadophlebioptera*, so that there are no Triassic protodonates known any longer. *Thuringopteryx gimmi* is transferred from "*Protodonata*" to *Palaeodictyoptera*, as the first known Triassic representative of this group.]"

Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany.

150. **Böhmer, J.; Rahmann, H. (1997):** Steinbrüche und Naturschutz Teil II. Faunistische Aspekte der Sukzession, der Rekultivierung und des Naturschutzes in Steinbrüchen Südwestdeutschlands. 4.2.6 Libellen. *ecomod. Landsberg*. ISBN 3-609-69370-3: 407-412. (in German). [commented checklist of 10 Odonata species in three quarries in southwestern Germany (Baden-Württemberg), the occurrence of *Coenagrion pulchellum* is of some interest]

Address: not stated.

151. **Bößneck, U.; Weipert, J. (1997):** Die Schutzgebiete der Landeshauptstadt Erfurt (Thüringen). Teil I: Flora und Fauna des GLB "Kalkhügel und Fasanenjagdgebiet".

Veröffentlichungen des Naturkundemuseum Erfurt 17: 37-70. (in German).

[Thuringia, Germany; checklist of 22 species of Odonata; the records of *Lestes virens* and *Anaciaeschna isosceles* are of special interest]

Address: Bößneck, A., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Stauffenbergallee 18, D-99084 Erfurt, Germany

152. **Bouma, H.; Witte, R. (1997):** Een libel uit de oude doos. Nieuwsbrief, Mededelingen van de Nederlandse Vereniging voor Libellenstudie 1(3): 3. (in Dutch).

[report on an old record of *Cordulgeaster boltonii* in The Netherlands]

Address: not stated.

153. **Breinl, K.; Coburger, K.; Leo, F. (1997):** Zum Kenntnisstand der Verbreitung von Libellen (Odonata) und Heuschrecken (Saltatoria) im Landkreis Greiz und der Stadt Gera. Veröff. Museum Naturkunde Stadt Gera, Naturwiss. Reihe 24: 5-93. (in Germany with short English summary).

[extensively commented checklist of the Odonata of eastern Thuringia, Germany; colour photo, distribution map, and detailed documentation of frequency of each species; attempt to assess population trends of all species and recent status of the populations; short chapter on dispersal and metapopulation of *Calopteryx virgo* and *C. splendens*]

Address: Coburger, Dr. Karli, Am Kleinen Zieger 23, D-07973 Gera, Germany.

154. **Brunelle, P. (1997):** Distribution of dragonflies and damselflies of the Atlantic Provinces, Canada. *North-eastern naturalis* 4(2): 61-82. (in English with French summary).

[commented checklist of the Odonata of 6 regions (in the provinces of Nova Scotia, Prince Edward Island, New Brunswick, Newfoundland) in eastern Canada; *Aeshna tuberculifera*, *Dorocordulia libera*, *Lestes viligax*, *Libellula pulchella*, and an unnamed *Conagrionidae* are illustrated with colour pictures]

Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada.

155. **Buchwald, R. (1997):** Artenhilfsprogramm für die Große Moosjungfer (*Leucorrhinia pectoralis*) ins Leben gerufen! Naturschutzinformation der Schutzgemeinschaft Libellen in Baden-Württemberg 2: 1. (in German).

[Report on a conservation action plan for *L. pectoralis* in Baden-Württemberg, Germany, supported for the period of 1997-2000 by the European Community.]

Address: Buchwald, R., INU, Hochschule Vechta, Driverstr. 22, D-49377 Vechta, Germany.

156. **Buczynski, P. (1997):** Wazki (Odonata) terenów źródłowych Polski - stan poznania i perspektywy dalszych badan. Wyzsza Szkola Pedagogiczna w Olsztynie, Instytut Biologii i Ochrony Srodowiska, Zaklad Ekologii i Ochrony Srodowiska. Zrodla Polski. Stan Badan, Monitoring i ochrona. Olsztyn, 10-12 pazdziernika 1997: 10-11. (in Polish).

[Dragonflies of spring-habitats in Poland: status of exploration and perspectives for future work; *Thecagaster bidentata*]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland

157. **Buczynski, P.; Tonczyk, G. (1997):** Analiza zgrupowan wazek (Odonata) Wód Biezacych Polski. Materiały zjazdowe. 17zjazd hydrobiologów Polskich. Polskie Towarzystwo Hydrobiologiczne. Oddzial w Poznaniu. Poznan, 8-11. wrzesnia 1995 : 95. (in Polish).

[Analysis of the dragonfly communities of the running waters in Poland]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland.

158. **Bulletin of the Hokkaido Odonatological Society** Vol. 9 (July 31, 1997) (1997): 1-27.

[Contents:1. Hiratuka, K.: Two dragonfly species new to Shiribeshi District. pp.: 1; 2. Anzai, M.: A record of *Aeshna mixta soneharai* in Kamikawa District. pp.: 2; 3. Akaishi, S.: Dragonflies of Asahikawa city. pp.: 3-6; 4. Yokoyama, T.: Records of *Sympetrum parvulum* in Tomakomai city and Chitose city. pp. 7; 5. Harauchiand, Y. & Y. Joh: Emergence process of *Epiophlebia superstes* in laboratory. pp.: 8-9; 6. Hirose, Y.: A record of *Coenagrion ecornutum* representing its southern limit. pp.: 10; 7. Yokoyama, T. & Y. Hirose: Habitat and ecology of *Planaeschna milnei* in Kikonai town. pp. 11; 8. Sato, M.: Phenology of *Sympetrum frequens* in Obihiro city. pp.: 16; 9. Wataji, M., Maruyama, F., Taguchi, M., Kano, M. & T. Yoshinuma Species composition and collection records of the dragonflies inhabiting Tonneusu Pond. pp.: 20-23; 10. Hori, S.: *Aeschnophlebia longistigma* recorded from Lake Utona. pp.: 24; 11 Ubukata, H.: Review of Odonatological literature (articles). pp.: 25-26; 12 Ubukata, H.: Internet home pages authored by members of H.O.S. pp.: 27; 13 Wataji, M.: *Somatochlora japonica* (a photograph): front cover]

Address: Ubukata, H., Hokkaido University of Education at Kushiro, Kushiro, 085 Japan.

159. **Collingwood, N. (1997):** The Dragonflies of Staffordshire. ISBN 1 874414 22 X. 79 pp. (in English).

[A guide to the 26 species of Odonata that are found in Staffordshire; how to identify them; where to find them; when to go and look; how to catch or photograph them and what the future may hold for them. (J. Silsby)]

Address: Staffordshire Local Record Centre, Stoke-on-Trent City Museum & Art Gallery, Stoke-on-Trents, Staffordshire, UK.

160. **Deliry, C. (1997):** Atlas des libellules de la region Rhône-Alpes. Premier volet: Les espèces rares et menacées des départements des Alpes du Nord Francais I-sère-Savoie-Haute Savoie. Deuxième partie: Les zygoptères. *Sympetrum* 13: without pagination. (in French).

[species sheets and distribution maps]

Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France.

161. **Deliry, C. (1997):** Atlas des libellules de la region Rhône-Alpes. Premier volet: Les espèces rares et menacées des départements des Alpes du Nord Francais I-sère-Savoie-Haute Savoie. Troisième partie: Les Anisoptères. *Sympetrum* 14: without pagination. (in French).

[species sheets and distribution maps]

Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France.

162. **Deliry, C. (1997):** Nouveaux articles ou études concernant les libellules dans la region Rhône-Alpes. *Sympetrum piémontais* 35: 5-10. (in French).

Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France

163. **Deliry, C. (1997):** Nouveaux articles ou études concernant des libellules dans la région Rhône-Alpes. *Symptetrum piémontais* 36: 4-6. (in French).
Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France.

164. **Deliry, C. (1997):** Nouveaux articles ou études concernant les libellules dans la région Rhône-Alpes. *Symptetrum piémontais* 37: 2-3. (in French).
Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France.

165. **Dijkstra, K.-D.; Edelaar, P.; Goudsmits, K.; Kalkman, V.; Ketelaar, R.; Wasscher, M. (1997):** Van heros naar hylas. Libellen in Slovenie en Oostenrijk. Nieuwsbrief, Mededelingen van de Nederlandse Vereniging voor Libellenstudie 1(3): 8-9. (in Dutch).
[report on some dragonfly excursions in Slovenia and Austria; of special interest are *Ophiogomphus cecilia*, *Somatochlora metallica*, *Coenagrion scitulum*, *Cordulegaster heros* and *Leucorrhinia pectoralis* (Slovenia), and the extremely rare European damselfly *Coenagrion hylas*, and *Nehalennia speciosa* (Austria)]
Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands.

166. **Donnelly, N. (1997):** Farangpo 96. Thailand revisited and Vietnam added to our list. *Malangpo* 14: 117-122. (in English).
[reports on records of dragonflies of the *Siriphium* waterfall near Chieng Mai (Thailand) including e.g. *Leptogomphus gestroi*, *Amphigomphus somnuki* and an undescribed *Chlorogomphus*; the locality in Vietnam is Tam Dao "which is a few hours drive north of Hanoi"; among other *Devadatta ducatrix*, *Chlorogomphus nastus satoi*, *Indoncemis n.sp.* and *Rhidolestes sp.* are of special interest; a checklist of all species caught in 1996 is given]
Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

167. **Donnelly, N. (1997):** Through darkest Borneo (and Malaysia) with net and camera. *Malangpo* 14: 123-128. (in English).
[see *Argia* 9(3), the contribution in Malangpo is broadened by a commented checklist of all species caught during the trip]
Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

168. **Edelaar, P. (1997):** Het Internationale Libellensymposium Maribor, Slovenie, juli 1997. Nieuwsbrief, Mededelingen van de Nederlandse Vereniging voor Libellenstudie 1(3): 7. (in Dutch).
[report and Dutch view of the International Odonatological Symposium in Maribor, July 1997]
Address: Edelaar, P., In de Potvis, De Dageraad 3, NL-1797 SK Den Hoorn, The Netherlands, e-mail: edelaar@nioz.nl.

169. **Fairhurst, J. (1997):** Vagrant Emperor Hemianax ephippiger on the Calf of Man, July 1995. *Atropos* 2: 61. (in English).
[record of *Anax ephippiger* on the Isle of Man, UK on 13 July 1995]
Address: not stated.

170. **Federschmidt, A. (1997):** Die Libellen des Kühnauer Sees. *Naturwiss. Beitr. Museum Dessau, Sonderheft* 1997: 78-84. (in German).
[Sachsen-Anhalt, Germany; checklist of 26 species; of some regional interest are the records of *Anax parthenope* and *Aeshna affinis*]
Address: Federschmidt, A., LPR Landschaftsplanung Dr. Reichhoff GmbH, Außenstelle Magdeburg, Am Vogelgesang 2a, D-39124 Magdeburg, Germany.

171. **Fitzhugh, G.H.; Marden, J.H. (1997):** Maturational changes in troponin T expression, Ca^{2+} -sensitivity and twitch contraction kinetics in dragonfly flight muscle. *Jour. exp. biol.* 200(10): 1473-1482. (in English).
["Maximum lift production and the thermal sensitivity of lift production increase dramatically during adult maturation of *Libellula pulchella* dragonflies. Here, we report that the mechanistic basis for this transition appears to involve a developmental change in protein expression, which alters the Ca^{2+} -sensitivity of muscle activation and twitch contraction kinetics. The alternatively spliced Ca^{2+} regulatory protein troponin T (TnT) undergoes an isoform shift during adult maturation. Skinned (demembrated) fibers of mature flight muscle are up to 13 times more sensitive to activation by Ca^{2+} than skinned fibers from teneral (newly emerged adult) flight muscle, and their Ca^{2+} -sensitivity is more strongly affected by temperature. Intact muscle from mature individuals has a shorter time to peak tension and longer time to half-relaxation during twitch contractions, which is consistent with a greater Ca^{2+} -sensitivity of mature muscle. Because it becomes activated more quickly and relaxes more slowly, mature flight muscle is able to generate, with each twitch, more force per unit area than teneral muscle; this difference in force becomes greater at high temperatures. There do not appear to be any age-related differences in actomyosin crossbridge properties, since teneral and mature flight muscles do not differ in shortening velocity, tetanic tension or instantaneous power output during isotonic contraction. Thus, variation in TnT expression appears to affect the temperature-dependent Ca^{2+} -sensitivity of muscle activation, which in turn affects the kinetics and force production of the twitch contractions used by dragonflies during flight. This cascade of effects suggests that maturational changes in the expression of TnT isoforms may be a key determinant of overall muscle and organismal performance." (Authors)]
Address: Marden, J.H., Dept Biol., Pennsylvania St. University, University Park, PA 16802, USA.

172. **Follet, P. (1997):** Dragonflies of Surrey. Surrey Wildlife Trust. ISBN 0 9526065 1 8. 87 pp. (in English).
Address: source of supply: Surrey Wildlife Trust, School Lane, Pirbright, Woking, Surrey GU24 0JN, UK.

173. **Gatter, W. (1997):** Birds of Liberia. Aula-Verlag. Wiesbaden. ISBN 3-89104-615-4. 320 pp. (in English).
[colour picture of Little Bee-eater *Merops pusillus* with a nisopteran prey]
Address: not stated

174. **Geissen, H.-P. (1997):** Die Asiatische Keiljungfer *Gomphus flavipes* Charpentier - Larvenfund im Mittelrhein bei Koblenz (*Insecta: Odonata*). *Flora Fauna Rheinland-Pfalz Beiheft* 22: 171-176. (in German with English summary).
[third recent record of (a larval) *Stylurus flavipes* in 1997 in the River Rhine near Koblenz, Rhineland-Palatinate]

Address: Geissen, H.-P., Brunnenstr. 34, D-56075 Koblenz, Germany.

175. **Gladwin, T.W. (1997):** A review of the species of dragonflies (Odonata) recorded as having been observed in Hertfordshire. Transactions of the Hertfordshire Natural History Society 33: 56-61. (in English).

[up to date checklist of the Hertfordshire Odonata; discussion and critical comments on published records; for addition to this paper see: Sage, B. (1998); A Hertfordshire record of the Small Red Damselfly *Ceragrion tenellum* (Villers). J. Br. Dragonfly Soc. 14(2): 60]
Address: Gladwin, T., Wingletang, 99 Warren Way, Digswell, Welyn, Hertfordshire AL6 0DL, UK.

176. **Goffart, P. (1997):** Compte-rendu de l'excursion dans la Fagne de Spa-Machamps, le samedi 6 septembre 1997. Gomphus 13(4): 102-104. (in French).

[report on a trip to a peat bog near Spa-Machamps, Belgium on 6 September, 1997; records of birds, grasshoppers, butterflies, spiders, and a few common dragonflies species]

Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. e-mail: goffart@ecol.ucl.ac.be.

177. **Goffart, P. (1997):** Recenser les libellules dans le cadre du programme d'Inventaire et Surveillance de la biodiversité (ISB) en Wallonie. Gomphus 13(4): 95-98. (in French).

[short status report on the Odonata-Atlas-Project; see also: <http://www.rw.be/mrw/-dgrne/sibw/>]

Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. e-mail: goffart@ecol.ucl.ac.be.

178. **Griffioen, R.; Uilhoorn, K. (1997):** Herontdekking van een populatie Noordse winterjuffers in de Weerribben. Nieuwsbrief, Mededelingen van de Nederlandse Vereniging voor Libellenstudie 1(3): 4-5. (in Dutch).

[report on the population of *Sympetma paedisca* in the Weerribben-region (The Netherlands)]

Address: Griffioen, Rolf & Karin Uilhoorn, Trekker 82, NL-8447 BZ Heerenveen, The Netherlands.

179. **Hämäläinen, M. (1997):** Phu Kradung - a marvelous dragonfly site. Malango 14: 111-115. (in English).

[report on a survey made in 1996 in the sandstone mountain of Phu Kradung in north-eastern Thailand; brief history of dragonfly records in the region; special evidence is given to *Rhinocypha arguta* Hämäläinen & Divasiri, 1997; checklist of the Odonata known to occur at Phu Kradung]

Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland.

180. **Hibberd, G. (1997):** Red-veined Darter *Sympetrum fonscolombei* (Selys) at Holme Dunes NNR, Norfolk. Atropos 2: 48-49. (in English).

Address: Hibberd, G., The Firs, Broadwater Road, Holme-next-the-Sea, Hunstanton, Norfolk, PE36 6LQ, UK.

181. **Hill, P. (1997):** Migrant Hawker *Aeshna mixta* in Cheshire. Atropos 3: 66. (in English).

[list of the known records in Cheshire after the first discovery of *A. mixta* in 1993]

Address: Hill, P., 1 Clive Cottage, London Road, Allostock, Cheshire WA16 9LT, UK.

182. **Holusa, O. (1997):** Faunistic records from the Slovak Republic: Odonata, Libellulidae. Entomofauna carpathica 9: 60. (in Czech/English).

[second published record of *Libellula fulva* in Slovakia]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké námestí 1264, CZ-738 01 Frydek-Mistekl.

183. **Holusa, O. (1997):** Scarce chaser (*Libellula fulva*), a rare species in the Czech Republic and Slovak Republic. Ochrana Prirody 52(8): 240-241. (in Czech with English summary).

[record of two males of *L. fulva* on a pond near the village Brzotin, Slovakia; it is the third record for the Slovak Republic, all of which are documented; figures of the species are provided; photograph of the biotope; another 9 Odonata species are recorded from the habitat including *Erythromma viridulum*, *Anax parthenope*, and *Crocothemis erythraea*.]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké námestí 1264, CZ-738 01 Frydek-Mistekl.

184. **Holusa, O. (1997):** The dragonflies (Odonata) of the broad surroundings of Lednice in Moravia. Sbornik Prirodovedneho klubu v Uh. Hradisti 2: 93-108. (in Czech with English summary).

[In the broad surroundings of Lednice on Moravia (Czech Republic. Moravia, geomorphological unit Dolnomoravsky úval, elevation 152-168 m above sea level) 30 species of dragonflies were found, i.e. 41 % of the number of species on the check list according to Teyrovský (1977) for the former Czechoslovakia. Some species were found for the first time: *Aeshna grandis*, *Anax parthenope*, *Somatochlora metallica*, *Orthetrum albistylum*, *Crocothemis erythraea*. The total number of species established in the surroundings of Lednice is 34. According to the zoogeographical characteristics the species diversity is represented by: Holopalaeartic (7 species, i.e. 20,59 %), European-Siberian (7 species, i.e. 20,59 %) and Holomediterranean (7 species, i.e. 20,59 %) elements. 6 European-Mediterranean species form 17,65 %, Holarctic. European and Mediterranean-Afrotropical species occur rarely, each of this group has up to 2 species (i.e. 5,88 %). 1 species represents the Afrotropical-Mediterranean group (i.e. 2,94 %). On this territory stagnicolous species are dominant (76,47 %), reophilous species are represented by 2 species (i.e. 5,88 %) and among erythroecious species 6 species (i.e. 17,65 %) can be found. The superiority of stagnicolous species is a consequence of the character of the investigated territory, the number of reophilic biotopes is limited, therefore the number of reophilous species will not increase in the future. The most diverse localities according to the author's records are small ponds and remain of oxbows of the river Dyje without dense trees vegetation on the shore, which are not very deep and with a thick water vegetation. The highest number of species was found on Pouzdrany pond (together 17 species), Allah I. pond and near pools at Podivín. Few species occurred on big ponds with Typha, Phragmites vegetation zone on shallow places. The difference in the number of species between the author's and Perutik's (1955) records on these ponds is probably the consequence of stagnation of the water column and water vegetation on shallow places. At the time of the research the water reached to the basin of the vertical shore and there were not any shallow places with other water vegetation suitable for the occurrence of dragonflies. Most of species have permanent populations in

this territory, but some species which migrate from the south - *Hemianax ephippiger* and *Crocothemis erythraea*. *H. ephippiger* can reproduce here (PERUTIK 1955). The existence of permanent populations of *C. erythraea* is possible. The species diversity of the surroundings of Lednice is relatively stable as is evident from the comparison of the author's and Perutik's (PERUTIK 1955) records (tab. 2). The absence of some species of the genera *Sympetma* and *Lestes* is probably caused by the low population density of these species. The situation with new species is similar - *Aeshna grandis*, *Somatochlora metallica*. More specimens of *Anax parthenope* were found only in one locality where a permanent population of this species is supposed. So far no research on dragonflies was carried out in this locality and that might be the reason of missing records. *Orthetrum albistylum* was probably penetrated into this territory not long ago, according to the first record by WERNEROVÁ (1958) of its occurrence in Moravia from the lower part of the river Morava. *C. erythraea* specimens were considered migratory." (Author)]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddelení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek.

185. **Holusa, O.** (1997): The occurrence of dragonfly *Aeshna subarctica* Walker, 1908 (Odonata: Aeshnidae) in the Hrubý Jeseník Mts. (Czech Republic). *Cas. Slez. Muz. Opava (A)*. 46: 287-288. (in Czech with English summary).

[Altogether 5 males, 1 female and 2 exuviae of *Aeshna subarctica* Walker, 1908 were collected by the author on 8. IX. 1997 at peaty lake Malé mechové jezírko on the moorland Rejvíz (745 m above sea level, Hrubý Jeseník Mrs., north-western Silesia in Czech Republic). One oviposition in *Eriophorum* sp. along the margin of the lake and frequent hunting by *Aeshna subarctica* of tandems of *Sympetrum*-species were observed. There is only one old record of a male in August 1956 in the Rejvíz peat-bog (Teyrovský & Perutik 1958). Thus Rejvíz is the only known locality of *Aeshna subarctica* within the territory of Moravia and Silesia." Note in prove: *A. subarctica* Walker does not occur in (Central) Europe; *A. subarctica* elisabethae Djakonov, 1922 is the correct name for western Palearctic populations. (M. Sch.)]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddelení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek.

186. **Hudoklin, A.; Sovinc, A.** (1997): New life for deserted clay pits. *Proteus*, Ljubljana 60(3): 104 - 110. (In Slovene with English summary).

[brief outline on the usual fate of clay and gravel pits; report on the action plan to restore the gravel pits at Zalog near Nova Mesto, Slovenia for nature conservation purposes; *Lestes sponsa*, *L. dryas*, *L. virens*, *Aeshna mixta*, *S. fonscolombi*, *S. striolatum*, and *S. sanguineum* are mentioned]

Address: Sovinc, A., Vodnogospodarski institut, PP 3401, Hajdrihova 28, SI-1115 Ljubljana, Slovenia

187. **Lombardo, P.** (1997): Predation by *Enallagma* nymphs (Odonata, Zygoptera) under different conditions of spatial heterogeneity. *Hydrobiologia* 356: 1-9. (in English).

["Odonate nymphs are sometimes associated with complex leaf macrophytes. Because of their wide prey spectrum, colonization of spatially heterogeneous macrophyte habitats may be due to a higher predation suc-

cess in such a habitat rather than to the presence of particular prey species. Odonate (*Enallagma* sp.) nymph predation success was tested under conditions of high (complex leaf *Ceratophyllum demersum* L. leaf packs) and low (simple leaf *Potamogeton illinoensis* Morong leaf packs) spatial heterogeneity. Prey species included two pulmonate gastropods, an amphipod, and a turbellarian that were common in the natural habitat of *Enallagma*. *Enallagma* significantly reduced the amphipod and the turbellarian populations and the prey assemblage as a whole, but did not have any statistically significant impact on the snail populations, which increased their absolute and relative abundance in the presence of the odonate. Numerical losses by *Enallagma* predation (if any) were not related to macrophyte architecture, suggesting that prey vulnerability to *Enallagma* predation is species-specific rather than habitat-determined. *Enallagma*'s preferential distribution in spatially heterogeneous macrophyte habitats, when occurring, may be due to other factors such as a refuge from fish predation and/or a generally greater prey availability and diversity in complex leaf than in simple leaf macrophyte habitats." (Author)]

Address: Lombardo, Paola, Dept Biol. Sci. & Water Res. Research Inst., Kent State University, Kent, OH 44242, USA. e-mail: plombard@kent.edu.

188. **Maile, W.** (1997): Bewertung von Fließgewässer-Biozönosen im Bereich von Ausleitungskraftwerken (Schwerpunkt Makrozoobenthos). *Berichte des Lehrstuhls für Wasserbau und Wasserwirtschaft und der Versuchsanstalt für Wasserbau in Oberrach, Oskar v. Miller-Institut der Technischen Universität München* 80: 1-245. (in German with English summary).

["Assessment of biotic communities in running water at diversion-type hydropower plant sites (main emphasis: benthic macroinvertebrates): The biotic community in watercourses is governed by extremely complex interactions between numerous factors. An insufficient flow of water along the river bed of a diversion-type hydropower plant thus has a noticeable effect on the ecology of the river courses concerned. In order to represent the effects of a reduced discharge in the residual flow reaches of hydropower plants, existing relationships between the benthic macroinvertebrates present in a watercourse and the abiotic factors were investigated. The present paper arose from the research project "Residual flow" at the Technische Universität München (Chair of Hydraulic Structures and Water Resources under Dr.-Ing. Theodor Strobl). Extensive investigations of biological, hydraulic, morphological, chemical and physical parameters were carried out at 20 hydroelectric power-plant sites on 10 Bavarian rivers (design capacity of the plants: < 1300 kW). The studies were carried out at representative cross-sections of residual flow reaches and also of virtually unaffected reference reaches. To record the maximum impact, the samplings were carried out during summer weather and at existing discharge levels. The benthic organisms were collected in a quantitative and qualitative manner by means of a Surber-sampler. For the purpose of describing the flow behaviour, flow velocities were measured using a micro-flowmeter with a vane diameter of 9,7 mm, and using FST hemispheres. A horizontoscope was employed to determine the exposition of the water courses to solar radiation during the course of the day (reference point: 21st June). In order to take account of different radiation intensities at different times of the day, the measurements were weighted and processed to the parameter "effective irradiation EI". The total taxa count of the benthic macroinvertebrates ($Taxa_{ges}$) was split (ac-

cording to their dependence on water flow-rate) into the classes R (rheotypical: $Taxa_{rheo}$), L- (limno-typical; $Taxa_{lim}$) and U (ubiquitous or unknown preference; $Taxa_{au}$). From these, the parameters $Taxa_{rheo \geq 2}$ and $Taxa_{lim \geq 2}$ were derived which indicate the taxa counts without coincidental collection. The results indicate that the impacts of different discharge levels are far better represented by analyzing cross-sections of the watercourse than by individual sampling areas. For the purpose of describing the near-bed flow characteristics, the hydraulic flowmeter proved to be more suitable than the FST hemispheres. The correlations between the near-bed flow conditions and various parameters of the benthic macroinvertebrates (total and specific density of organisms, diversity, evenness, turnover of species, rhithron feeding-type index) showed very different levels of significance. In many cases these parameters were affected by further factors (mostly by the food situation and the extent of debris transport). The rhithron feeding-type index (RETI) was improved by a modified $RETI_m$. The parameters $Taxa_{ges}$ and $Taxa_{rheo \geq 2}$ also showed variable correlations with the near-bed flow conditions. The saprobic index (= measure of organic pollution) and the limnotypical variety of species ($Taxa_{lim}$ and $Taxa_{lim \geq 2}$) were not found to be suitable methods for describing the ecological impacts of power plants. At all rivers studied, the rheotypical variety of species ($Taxa_{rheo}$, concerning cross-sections) proved to be a meaningful parameter to quantify the ecological effects of different discharge levels. The value of $Taxa_{rheo}$ increases with rising near-bed velocities up to a saturation value, which was attained at mean near-bed velocities (v_{sohl} of 0,15 to 0,30 m/s). As the relationships between $Taxa_{rheo}$ and v_{sohl} are mainly determined by the discharge level, these correlations were taken as the basis for a model for determining the ecologically-required minimum discharge level. With the aid of the newly-developed MEFI-model (Munich ecological flow investigations), the individual situations at the different power plant sites can be taken into account. The results indicate that the rheotypical variety of species is limited by the residual discharge level; the limnotypical variety, however, is affected by the high-water events. Studies of fish biology, the ecosystems of gravel banks and the situation in winter round off this thesis. The statements of this report are mainly valid for upper and middle reaches of mountain and low mountain rivers. Further studies are needed to examine whether these results can be extrapolated to other types of stretches of water." (Author)]

Address: Maile, W., Lehrstuhl für Wasserbau und Wasserwirtschaft im Institut für Wasserwesen der Tech. Univ. München, Arcisstr. 21, D-80290 München, Germany.

189. **Malkmus, R. (1997):** Zur Verbreitung der Amphibien, Reptilien und Libellen (Odonata) in den Ostalpen. Nachr. naturwiss. Ver. Aschaffenburg 104: 109-120. [eastern Alps in Austria (Schobergruppe, Kreuzeckgruppe, Reißeckgruppe); *Somatochlora alpestris*, *Aeshna juncea*, *A. caerulea*, *Coenagrion puella*]
Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany.

190. **Martin, R. (1997):** Contribución al conocimiento de la fauna de libélulas (Insecta: Odonata) del Alto Ampurdán (Gerona). Boln Asoc. esp. ent. 21(3/4): 269-274. (in Spanish with English summary). [checklist of the Odonata of Alto Ampurdán, Gerona, Spain; presentation of data obtained during 1993 - 96; compilation of data from literature]

Address: Martin, R., Avda Martí Pujol 250, 3' 4a, ES-08911 Badalona, Barcelona, Spain.

191. **Martin-Casacuberta, R.M. (1997):** Presencia de *Coenagrion hastulatum* (Charpentier, 1825) en la Península Ibérica (Odonata: Coenagrionidae). Boln Asoc. esp. ent. 21(1/2): 101. (in Spanish).

[discovery of *C. hastulatum* on the southern range of its distribution in the Pyreneans of Gerona, Spain (UTM 31TDH00); the record is considered the 5th on the Iberian peninsula; additional information on the community of Odonata of the locality are given]

Address: Martin-Casacuberta, R.M., Avda Martí Pujol 250, 3' 4a, ES-08911 Badalona, Barcelona, Spain.

192. **Muzón, J.; von Ellenrieder, N. (1997):** Description of the last instar *Sympetrum villosum* Ris (Odonata: Libellulidae). Neotropica 43(109/110): 43-45. (in English with Spanish summary).

["The last larval instar of *S. villosum* Ris is described for the first time, based on south Chilean specimens. A brief diagnosis, including a comparison with its allies, is given. *S. villosum* can be distinguished from *S. gilvum*, the geographically closest species of the genus, by the presence of lateral spines in abdominal segments VIII and IX and minor differences on the number of setae of prementum and color pattern." (Author)]

Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina.

193. **Muzón, J.; Ellenrieder, N. von (1997):** Estadios larvales de Odonata de la Patagonia. 1. Descripción de *Aeshna variegata* (Odonata: Aeshnidae). Revta soc. ent. argent. 56: 143-146. (in Spanish with English summary).

[Larvae of *A. variegata* (reared from specimens from Patagonia) are described and compared with larvae of *A. diffinis*, *A. absoluta*, *A. bonariensis* and *A. elsia*; in addition the specific status of the larva of *A. peralta* is reviewed and its morphology is compared with that of *A. variegata*]

Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina.

194. **Muzón, J. (1997):** Odonata (Insecta) from Patagonia: species richness and distributional patterns. Biogeographica 73(3): 123-133. (in English with French summary).

["The order Odonata is represented in Patagonia by at least 35 species, almost 50% of which are endemics. Based on its distribution they can be divided into two groups: subantarctic and widespread neotropical. Patagonia exhibits two main biomes: temperate forest, which shows the highest diversity and species richness, and the large shrub steppe. The steppe displays remarkable levels of species richness at two localities, Choele Choel and Somuncurá plateau, which presumably represent an ecotonal zone and a relict of pre-quaternary subtropical biota respectively. The Andean mountains do not seem to represent an effective geographic barrier for Odonata; however these mountains strongly influence precipitation patterns which, in turn, affect the distribution of Odonata." (Author)]

Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina.

195. **Muzón, J. (1997):** Redescrípción de *Lestes auritus* y *L. paulistus* y descripción del último estadio larval de *L. undulatus* (Odonata: Lestidae). Revta soc. ent. argent. 56: 159-166. (in Spanish with English summary).

[Rediscription of the male *Lestes auritus* and designation of the specimen as lectotypus; description of female *L. auritus*, *L. paulistus*, and the last larval instar of *L. undulatus*; *L. auritus* and *L. paulistus* are recorded for the first time in Argentina and Uruguay]

Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina.

196. **Ott, J. (1997):** Erster Bodenständigkeitsnachweis der Südlichen Mosaikjungfer - *Aeshna affinis* Vander Linden, 1823 - (Insecta: Odonata) für Rheinland-Pfalz. *Fauna Flora Rheinland-Pfalz* 8: 863-871. (in German with Engl. summary).

[development of the Mediterranean *A. affinis* in Rheinland-Palatinate (Germany)]

Address: Ott, J., Am Moosberg 10, D-67705 Stelzenberg, Germany.

197. **Parr, A. (1997):** Migrant dragonflies in 1996. *Atropos* 2: 15-17. (in English).

[*Anax parthenope*, *Anax ephippiger*, *Sympetrum flaveolum*, and others]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

198. **Parr, A. (1997):** Migrant dragonflies in 1997. *Atropos* 4: 69-72. (in English).

[report on the immigrants and (possible) range extensions of British species are compiled for 1997; the following species are treated: *Aeshna mixta*, *A. isosceles*, *Anax parthenope*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. fonscolombei*, *S. flaveolum*, *S. sanguineum*, and *S. danae*.]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

199. **Parr, A. (1997):** Migrant dragonfly field guide: a request for help. *Atropos* 3: 51-52. (in English).

[request for good colour pictures of possible migrant dragonflies in Britain]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

200. **Parr, A. (1997):** The 1996 Red-veined Darter *Sympetrum fonscolombei* (Selys) influx into Britain. *Atropos* 2: 44-46. (in English).

[detailed presentation with phenological diagram of observation dates and map with localities of observation]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

201. **Phillips, J. (1997):** Lesser Emperor Dragonfly *Anax parthenope* (Selys) in Gloucestershire; the first British record. *Atropos* 2: 40-41. (in English).

Address: Phillips, J., Yorkleigh Cottage, Pope's Hill, Newnham-on-Severn, Gloucester GL1 4LD.

202. **Raab, R.; Chwala, E. (1997):** Rote Liste ausgewählter Tiergruppen Niederösterreichs - Libellen (Insecta: Odonata), 1. Fass. 1995. Hrsg.: Amt der Niederösterreichischen Landesregierung, Abteilung Naturschutz, Wien. ISBN 3-901542-07-8. 91 pp. (in German).

[red list of the endangered Odonata of the federal state 'Niederösterreich' (NÖ), Austria; dragonflies as bioindicators; history of dragonfly research in NÖ; altitudinal distribution of Odonata in NÖ; checklist; red list - categories and criteria; species wise treatment according to the categories of the red list: distribution, recent situation, habitat, risk, action plan, literature, in most cases colour pho-

tographs and distribution map of the species; extensive bibliography of the NÖ Odonata; index; this booklet is a very sound fundament for dragonfly research and conservation in Austria]

Source of supply: Amt der NÖ Landesregierung, Abteilung Naturschutz, Landhausplatz 1; Haus 16, A-3109 St. Pölten, Austria. öS 120,-; approx. 10 US\$.

203. **Reeve, K.; Reeve, P. (1997):** County focus - Odonata in Warwickshire (V.C.68). *Atropos* 3: 22-28. (in English).

[commented checklist of the Warwickshire Odonata (10 Zygoptera, 15 Anisoptera including the new regional discovery *Gomphus vulgatissimus*); some remarks on the factors responsible for the present distribution of Odonata in the region as loss of ancient fish and stock ponds, runoff from urban areas, rarity of acid water habitats etc.]

Address: Reeve, P., The Outspan, Leamington Hastings, Near Rugby CV23 8DZ, UK.

204. **Reinhart, U.; Orendt, C. (1997):** 3.3.8 Waldbäche in der Dübener Heide. In: Feldmann, R., K. Henle, H. Auge, J. Flachowsky, S. Klotz & R. Krönert (Eds.): *Regeneration und nachhaltige Landnutzung. Konzepte für belastete Regionen*. Springer. ISBN 3-540-62876-2. 130-136. (in German).

[survey of the macroinvertebrates of 6 brooks in the Dübener Heide-region (Sachsen, Sachsen-Anhalt; Germany); relationships between water chemistry and macrozobenthos incl. *Cordulegaster boltonii* are outlined]

Address: not stated.

205. **Röske, W.; Stephan, U. (1997):** EU-Projekt genehmigt! Naturschutzinformation der Schutzgemeinschaft Libellen in Baden-Württemberg 1: 1. (in German).

[Report on a conservation action plan for *Coenagrion mercuriale* in Baden-Württemberg, Germany, supported for the period of 1997-2000 by the European Community.]

Address: Röske, W., Kandelstr. 26, D-79106 Freiburg, Germany.

206. **Rolff, J. (1997):** Better hosts dive: Detachment of ectoparasitic water mites (Hydrachnellae: Arrenuridae) from damselflies (Odonata: Coenagrionidae). *Jour. insect behav.* 10(6): 819-827. (in English).

["... In this paper I present experimental data for the detachment rate of water mite larvae (*Arrenurus cuspidator*) from different host species, *Coenagrion hastulatum* and *C. puella*, in relation to the host's oviposition behaviour. ... It was found that mite larvae detach at a significant higher ratio from hosts with submerged oviposition (*C. hastulatum*). Experimental tests showed that this is not a species-species effect. It is caused mainly by the oviposition behaviour. The results are discussed in the light of different oviposition systems in damselflies." (Author). study site: 15 km east of Braunschweig, Lower-Saxony, Germany, 52°18'20" N, 10°46'20"E.]

Address: Rolff, J., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany.

207. **Sato, M.; Azuma, A. (1997):** The flight performance of a damselfly *Ceriagrion melanurum* Selys. *Jour. exp. biol.* 200: 1765-1779. (in English).

["The local circulation method was applied to the free forward flight of the damselfly *Ceriagrion melanurum* Selys. The kinematic data used in the calculations were obtained by analyzing video-taped images of damselflies in free flight in a transparent container. The inclination of the

stroke plane was smaller and the flapping amplitude was larger than those of dragonflies reported in other studies on odonate flight. However, the phase shift between the fore- and hindwings agreed with none of the previously reported patterns for damselflies: the forewings lead the hindwings by approximately a quarter-period. The calculated forces were within the expected range of error. The muscle-mass-specific power was between 40 and 80 W kg⁻¹. The vorticity distribution of trailing and shed vortices in the wake was also analyzed. Strong trailing vortices were observed at the wing tips, whereas shed vortices were concentrated near the wing root as the stroke switched direction." (Authors)]

Address: Machiko Sato, Tokyo Institute of Polytechnics, 1583 Iiyama, Atsugi 243-02, Japan;- Akira Azuma University of Tokyo, 37-3 Miyako-cho, Saiwai-ku, Kawasaki 210, Japan.

208. **Schrack, M. (1997):** Moorwälder und Waldmoore am Pechfluß in der Laußnitzer Heide. Veröff. Mus. Westlausitz Kamenz Sonderheft: 112 pp. (in German).

[monograph on the forests and peatbogs of the Laußnitzer Heide (Sachsen, Germany); geology, hydrology, vegetation, mammals, birds, reptils, amphibs, dragonflies, other insects, action plan for conservation; numerous good maps and colour pictures including some dragonflies; in the period 1994-1994, 29 species of Odonata were recorded, including *Anax ephippiger*]

Address: Schrack, M., Eugen-Hoffmann-Str. 7, D-01219 Dresden, Germany.

209. **Spuris, Z. (1997):** Some observations on the water insect fauna in Latvia 1996 (Insecta, Odonata, Trichoptera, Heteroptera). Acta hydroentomologica latvica 4: 21-28. (in Latvian with English summary).

[23 species of Odonata including *Ophiogomphus ceclia*, *Aeshna viridis*, and *Sympetma paedisca* are recorded from several localities in Latvia;]

Address: Spuris, Z., Miera iela 19-6, LV-2169 Salaspils, Latvija.

210. **Stoks, R. (1997):** Verslag van de excursie naar het Groot Schietveld de Brecht op 25 mei 1997. Gomphus 13(4): 99-101. (in Dutch).

[report on a trip to the "Groot Schietveld" near Brecht, Belgium on 25 May, 1997; records of birds, plants, reptiles, butterflies, and dragonflies; among these, the records of *Coenagrion lunulatum* and *Leucorrhinia rubicunda* are of some interest]

Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), B-2020 Antwerpen, Belgium.

211. **Sutibut, S. (1997):** 'Malaeng por' wating for beginner. You don't even need to leave town to find these colourful creatures. Malangpo 14: 129. (in English).

[contribution in a popular style to motivate people to watch dragonflies near around their homes; the Thai names of some of the very common species as *Crocotermis servillia*, *Neurobasis chinensis*, and *Tholymis tillarga* are dealt with; published in the Newspaper Bangkok Post, Outlook section, Sept. 11, 1997]

Address: not stated.

212. **Thapa, V.K. (1997):** An inventory of Nepal's insects. Volume I (Protura-Odonata). IUCN Nepal Biodiversity Publication Series 1: 98 pp. (in English).

[The Odonata are dealt with on pages 67-88. The aim of the book is "to generate proper knowledge and infor-

mation on insects in order to enable the government and people of Nepal to provide protection to Nepalese insects". "This work is aimed to provide a comprehensive record of insects occurring in Nepal". 17 insect orders are treated as commented checklists, the latter mainly based on published records. The data are organized as follows: name of species, localities in Nepal and surrounding countries, altitudinal distribution, abundance in Nepal, flight season. The chapter closes with selected references on Nepalese dragonflies, but the list of references lacks e.g. in the very important publication of 'Vick, G.S. (1989): List of the dragonflies from Nepal with a summary of their altitudinal distribution (Odonata). Opusc. zool. flumin. 43:1-21'. It is also very regrettable that some of the newly described species of Nepal as *Macromia sombui* Vick, 1988 are missing in the checklist. Altogether V.K. Thapa considers 147 species autochthonous in Nepal while Vick lists 172 species for Nepal; Clausnitzer & Wesche added another three species to this list (Opusc. zool. flumin. 147, 1996). There is also a remarkable discrepancy between the two lists. Of course everybody interested in Nepalese Odonata should use the publication of G.S. Vick as fundament of odonatological research. (M. Sch.)]

Source of supply: IUCN Nepal, P.O. Box 3923, Kathmandu, Nepal, 15 US \$.

213. **Theischinger, G. (1997):** A new species of *Austrosticta* Tillyard from Australia (Insecta: Odonata: Zygoptera: Isostictidae). Linzer biol. Beitr. 29(2): 807-810. (in English).

[The description of *Austrosticta frater* sp. n. is based on 2 males from Queensland, Australia, and compared with *A. fieldi* Tillyard and *A. soror* Sjöstedt.]

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.

214. **Theischinger, G. (1997):** The *Pseudagrion ignifer* complex from Australia (Odonata: Zygoptera: Coenagrionidae). Linzer biol. Beitr. 29(2): 799-805. (in English).

["*Pseudagrion ignifer* is found to be complex. It includes three morphologically distinct groups of populations. These groups of populations are considered as two species with one of them comprising two subspecies. One species, *Pseudagrion lucifer*, and one subspecies, *Pseudagrion ignifer aureum*, are described as new." (Author)]

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.

215. **Thomas, R. (1997):** Lesser Emperor Dragonfly *Anax parthenope* (Selys) in Cambridgeshire. The third British record. Atropos 3: 55-56. (in English).

[record of *A. parthenope* on 21 July 1997 on a small lake in the Cambridge Science Park, UK]

Address: Thomas, R., 59 Coolidge Gardens, Cottenham, Cambridge CB4 4RQ, UK.

216. **Wakeling, J.M.; Ellington, C.P. (1997):** Dragonfly flight. 1. Gliding flight and steady state aerodynamic forces. J. exp. biol. 200(3): 543-556. (in English).

["The free gliding flight of the dragonfly *Sympetrum sanguineum* was filmed in a large flight enclosure. Reconstruction of the glide paths showed the flights to involve accelerations. Where the acceleration could be considered constant, the lift and drag forces acting on the dragonfly were calculated. The maximum lift coefficient (C_L) recorded from these glides was 0.93; however, this is not necessarily the maximum possible from the wings. Lift and drag forces were additionally measured from isolated

wings and bodies of *S. sanguineum* and the damselfly *Calopteryx splendens* in a steady air flow at Reynolds numbers of 700-2400 for the wings and 2500-15 000 for the bodies. The maximum lift coefficients ($C_{L, max}$) were 1.07 for *S. sanguineum* and 1.15 for *C. splendens*, which are greater than those recorded for all other insects except the locust. The drag coefficient at zero angle of attack ranged between 0.07 and 0.14, being little more than the *Blassius* value predicted for flat plates. Dragonfly wings thus show exceptional steady-state aerodynamic properties in comparison with the wings of other insects. A resolved-flow model was tested on the body drag data. The parasite drag is significantly affected by viscous forces normal to the longitudinal body axis. The linear dependence of drag on velocity must thus be included in models to predict the parasite drag on dragonflies at non-zero body angles." (Authors)]
Address: Wakeling, J.M., Dept Zoology, Univ. Cambridge, Downing Street, Cambridge, CB2 3EJ, UK.

217. **Wakeling, J.M.; Ellington, C.P. (1997):** Dragonfly flight. 2. Velocities, accelerations and kinematics of flapping flight. *J. exp. biol.* 200(3): 557-582. (in English).
["The free flapping flight of the dragonfly *Sympetrum sanguineum* and the damselfly *Calopteryx splendens* was filmed in a large flight enclosure at 3000 frames s⁻¹. The wingtip kinematics are described for these flights. Despite the two species being similar in size, the damselfly flew with wingbeat frequencies half those of the dragonfly. The damselfly could perform a clap and fling, and the proximity to which the wings approached each other during this manoeuvre correlated with the total force produced during the wingstroke. The dragonfly beat its wings with a set inclination of the stroke planes with respect to the longitudinal body axis; the damselfly, in contrast, showed a greater variation in this angle. Both species aligned their stroke planes to be nearly normal to the direction of the resultant force, the thrust. In order to achieve this, the dragonfly body alignment correlated with the direction of thrust. However, the damselfly body alignment was independent of the thrust direction. Velocities and accelerations were greater for the dragonfly than for the damselfly. However, non-dimensional velocities and accelerations normalised by the wingbeat periods were greater for the damselfly." (Authors)]
Address: Wakeling, J.M., Dept Zoology, Univ. Cambridge, Downing Street, Cambridge, CB2 3EJ, UK

218. **Wakeling, J.M.; Ellington, C.P. (1997):** Dragonfly flight. 3. Lift and power requirements. *J. exp. biol.* 200(3): 583-600. (in English).
["A mean lift coefficient quasi-steady analysis has been applied to the free flight of the dragonfly *Sympetrum sanguineum* and the damselfly *Calopteryx splendens*. The analysis accommodated the yaw and accelerations involved in free flight. For any given velocity or resultant aerodynamic force (thrust), the damselfly mean lift coefficient was higher than that for the dragonfly because of its clap and fling. For both species, the maximum mean lift coefficient C_L was higher than the steady $C_{L, max}$. Both species aligned their stroke planes to be nearly normal to the thrust, a strategy that reduces the C_L required for flight and which is different from the previously published hovering and slow dragonfly flights with stroke planes steeply inclined to the horizontal. Owing to the relatively low costs of accelerating the wing, the aerodynamic power required for flight represents the mechanical power output from the muscles. The maximum muscle mass-specific power was estimated at 156 and 166Wkg⁻¹ for *S.*

sanguineum and *C. splendens*, respectively. Measurements of heat production immediately after flight resulted in mechanical efficiency estimates of 13 % and 9 % for *S. sanguineum* and *C. splendens* muscles, respectively." (Authors)]
Address: Wakeling, J.M., Dept Zoology, Univ. Cambridge, Downing Street, Cambridge, CB2 3EJ, UK.

219. **Wilson, K. (1997):** Reports from Coastal stations: Gibraltar Point NNR, Lincolnshire. *Atropos* 2: 78-79. (in English).
[14 species were recorded in 1996; most of them are commented in short with special evidence on *Sympetrum flaveolum*]
Address: not stated.

220. **Xylander, W.; Stephan, R. (1997):** Zur Generationsfolge von *Sympetrum fonscolombei* und *Ischnura pumilio* (Odonata) in einem Braunkohletagebauegebiet in der Oberlausitz (Ostsachsen). *Verh. dt. zool. Ges.* 90(1): 401. (in German).
[generation sequence of *S. fonscolombei* and *I. pumilio* in a brown coal mining site in Upper Lusatia (eastern Saxonia, Germany); the observations seem to indicate that the 2 species have two generations per annum]
Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany.

221. **Zahn, A, Schirlitz, F.; Schirlitz, T. (1997):** Galloways als Landschaftspfleger. *Deutsches Galloway-Journal* 6: 109-111. (in German).
[Bavaria (Germany); assessment of grazing impact of Galloway cattle on vegetation and fauna; Galloways seem to have a positive effect on the dragonfly fauna; trampling and grazing of Galloways caused some gentle slopes in a small, heavily vegetated book which enabled *Orthetrum brunneum* and *Ischnura pumilio* to oviposit]
Address: Zahn, A., Hermann-Löns-Str. 4, D-84478 Waldkraiburg, Germany.

222. **Zollhöfer, J.M. (1997):** Quellen, die unbekanntes Biotop im Schweizer Jura und Mittelland. *Bristol-Schriftenreihe* 6. ISBN 3-905209-05-5. 150 pp. (in German).
[very detailed study of the fauna of springs in two regions in Switzerland; *Cordulegaster boltonii* and *Thecagaster bidentata* were used as bioindicators to assess the ecological situation of springs]
Source of supply: Internationale Buchhandlung, CH-9053 Teufen, Switzerland.

1998

223. **Abbott, J.C.; Stewart, K.W. (1998):** Odonata of the south central Nearctic region, including northeastern Mexico. *Entomological News* 109(3): 201-212. (in English).
[There has not been a concerted effort to document the extent of biodiversity, distribution and geographic affinities of the Odonata of the south central United States and northeastern Mexico. The area is an important boundary for some species representing eastern Nearctic and subtropical faunas, and a mixing zone or dispersal corridor for other species. ... Here we list 228 species for this region (196 in Texas), indicate their distributions by biotic province, and discuss the regional biogeography and importance of rare species.]
Address: Abbott J.C., Univ. N. Texas, Dept. Biol. Sci., Denton; TX 76203, USA.

224. **Anderson, C.; Wilson, R. (1998):** Minsmere RSPB reserve, Suffolk. *Atropos* 4: 59-60. (in English).
[16 Odonata species were recorded in 1997, some of which are discussed very briefly]
Address: not stated.
225. **Andres, J.A.; Cordero, A. (1998):** Effects of water mites on the damselfly *Ceriagrion tenellum*. *Ecological Entomology* 23(2): 103-109. (in English).
[1. Water mite parasitism is expected to have an important effect on damselfly survivorship and reproductive success, because mites drain considerable amounts of body fluids from their hosts. This study tests the effect of water mite parasitism in a marked population of the damselfly *Ceriagrion tenellum* during 1995 (individuals marked as mature adults) and 1996 (individuals marked as teneral). ... 5. These results indicate that water mite parasitism does not reduce damselfly survivorship, but it could reduce male mating success in some circumstances. Further long-term studies are needed, especially in populations with a lower incidence of parasitism.]
Address: Andres, J.A., Univ. Vigo; Dept. Ecol. and Biol. Anim., Euet Forestal, Campus Univ.; Pontevedra 36005; Spain.
226. **Andress, R. (1998):** Description of the larva of *Petalura ingentissima* Tillyard, 1907 (Anisoptera: Petaluridae). *Odonatologica* 27(3): 353-359. (in English).
[description of a female exuviae from Australia, Queensland, Bluewater Range, 45 km WNW of Townsville]
Address: Andress, R., 38 Capel Close, Whetstone, London, N20 0QU, United Kingdom.
227. **Anholt B.R.; Werner, E.E. (1998):** Predictable changes in predation mortality as a consequence of changes in food availability and predation risk. *Evolutionary Ecology* 12(6): 729-738. (in English).
["Theory predicts that animals will have lower activity levels when either the risk of predation is high or the availability of resources in the environment is high. ... In a factorial experiment, we tested whether predation mortality of larval wood frogs, *Rana sylvatica*, caused by a single larval dragonfly, *Anax junius*, was affected by the presence of additional caged predators and elevated resource levels. Observations were consistent with predictions."]
Address: Anholt, B.R.; Univ. Victoria, Dept. Biol., POB 3020, Victoria, BC V8W 3N5, Canada.
228. **Arnquist, G.; Johansson, F. (1998):** Ontogenetic reaction norms of predator-induced defensive morphology in dragonfly larvae. *Ecology* 79(6): 1847-1858. (in English).
["The study of phenotypic plasticity, one of the most important mechanisms of phenotypic adaptation, is by tradition focused on differences in ontogenetically static phenotypic expression in different environments. Ontogenetic reaction norms, in contrast, describe how phenotypes unfold during growth in different environments. We studied the ontogenetic reaction norms of the morphological shape of a series of defensive abdominal spines in dragonfly larvae, both in the laboratory and in a number of natural populations. In a laboratory rearing experiment, we demonstrated that these spines grew more solid and elongated when waterborne environmental cues of fish predators were present: this is evidence of phenotypic plasticity in defensive spine morphology. The ontogenetic reaction norms of defensive spines were also found to differ in natural populations with and without fish. A detailed analysis of the growth trajectories showed that this differentiation
- was primarily due to ontogenetic acceleration in environments with fish, leading to relatively exaggerated spine shape in these environments. However, while the ontogenetic trajectories of shape in some spines diverged at the onset of ontogeny in the two environments, those of others remained parallel until a given phase of ontogeny. Hence, the timing of the developmental divergence of these phenotypically integrated traits differed, suggesting differences in the underlying regulatory mechanisms. Our results illustrate that a conceptual integration of environmental and ontogenetic approaches to the study of phenotypic differentiation can significantly promote our understanding of the ecology and evolution of adaptive phenotypic plasticity." (Authors)]
Address: Johansson, F., Dept Animal Ecology, University of Umea, S-90187 Umea, Sweden.
229. **Asahina, S. (1998):** Further notes on Odonata from Northern Vietnam 1. *Cordulegasteridae*. *Bulletin of the National Science Museum (Series A, Zoology)* 24(1): 11-16. (in English).
[On the basis of the collection made by the expeditions by the National Science Museum in 1997, collecting records are given for three northern Vietnamese dragonflies of the family Cordulegasteridae, *Anotogaster klossi* Fraser, *Chlorogomphus auratus* Martin and *Ch. takakuwai* Karube.]
Address: Asahina, S., Takadanobaba 4-4-24, Shinjuku-ku, Tokyo 169-0075, Japan.
230. **Bal, B. (1998):** Prospections odonatologiques en Haute-Savoie. *Bilan du debut de l'année 1996*. *Symptetrum* 11: 3-5. (in French).
[new records or confirmations for the Departement Haute-Savoie of e.g. the following species: *Brachytron pratense*, *Ophiogomphus cecilia*, *Boyeria irene*, *Aeshna affinis*, *Coenagrion mercuriale*]
Address: Bal, B., APEGE, Cité Administrative, F-74040 Annecy cedex, France.
231. **Bal, D. (1998):** De rol van libellen in het Nederlandse natuurbeleid. *Brachytron* 2(1): 10-15. (in Dutch).
[The role of dragonflies in the Dutch nature policy: "The Dutch nature policy is based on general nature conservation in defined areas and concrete policy for 'target-species'. Those target-species are selected with the criteria 'international importance of the Dutch population', 'negative trend in occurrence' and 'rarity'. In 1995 the first target-species list of dragonflies was published. Because of the extended information received through the Atlas-project, it was possible to make a Red List of endangered dragonflies in the The Netherlands. This list will be published in 1998. With this information a new target-species list will be made, which probably will be published in 1999. In this article those three lists are given and compared. A discussion is started in what way the target species can be used in the (practical) policy."]
Address: Bal, D., Informatie- en KennisCentrum Natuurbeheer van het Ministerie van Landbouw, Natuurbeheer en Visserij, Postbus 30, NL-6700 AA Wageningen, The Netherlands. E-mail: d.bal@ikcn.agro.nl.
232. **Barthold, K.; Colln, K. (1998):** Untersuchungen zur Libellenfauna ausgewählter Stillgewässer in der Verbandsgemeinde Obere Kyll (Landkreis Daun, Eifel). *Dendrocopos* 25: 110-140. (in German with short English summary).
[survey of the dragonfly fauna of 7 water bodies in the Eifel-region (northern low mountain range in Rhineland-

Palatinat, Germany); 23 species are reported, and discussed species-wise with reference to their habitat choice (mostly compiled from the literature) and the regional rarity of the species; the most interesting species are *Coenagrion hastulatum*, *Erythromma najas*, *Aeshna juncea* and *Leucorrhinia dubia*]

Address: Barthold, Katja, Zoologisches Institut, Universität Köln, Albertus-Magnus-Platz, D-50923 Köln, Germany.

233. Bechly, G.; Nel, A.; Martínez-Delclòs, X.; Fleck, G. (1998): Four new dragonflies from the Upper Jurassic of Germany and the Lower Cretaceous of Mongolia (Anisoptera: Hemeroscopidae, Sonidae, and Proterogomphidae fam. nov.). *Odonatologica* 27(2): 149-187. (in English).

["*Prohemeroscopus jurassicus* gen. et sp. nov. and *P. kuehnepfeli* sp. nov. are described as first Hemeroscopidae from the Upper Jurassic of Germany (Solnhofen Lithographic Limestone). The monophyly of Hemeroscopidae is discussed and preliminarily advocated. The Mesozoic Hemeroscopidae are recognized as potential stem-group representatives of extant Chlorogomphoidea within Anisoptera - Cavilabiata. The status of the alleged hemeroscopid larvae is discussed and they are preliminarily transferred as new (unnamed) species to Sonidae. The family Sonidae is restricted to the referring larvae. The adult fossil dragonflies from the Lower Cretaceous of Mongolia that were previously attributed to *Sona nectes* (Sonidae) are ... classified as a new taxon, *Proterogomphus krauseorum* gen. et sp. nov. (Proterogomphidae fam. nov.) within the monophylum Gomphides, as sister-group of Hageniidae. A new species, *Proterogomphus renatae* sp. nov. is described from the Upper Jurassic of Germany. [...] A numerical cladistic analysis of Anisoptera could neither convincingly resolve the phylogenetic relationships within Hemeroscopidae, nor the phylogenetic positions of Gomphides and Proterogomphidae fam. nov., because of their lack of wing venational apomorphies, but otherwise confirmed the phylogenetic reclassification of dragonflies by BECHLY (1996, *Pelalura* [Special Vol.] 2: 342-402)." (Authors)]

Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany.

234. Bechly, G. (1998): New fossil damselflies from Baltic amber with description of a new species, a redescription of *Litheuphaea carpenteri* Fraser, and a discussion on the phylogeny of Epallagidae (Zygoptera: Caloptera). *International Journal of Odonatology* 1(1): 33-63. (in English).

["*Litheuphaea ludwigi* sp. n. is described as first representative of Epallagidae from Baltic amber. The holotype of *Litheuphaea carpenteri* Fraser, 1955 is redescribed, the phylogenetic position of all fossil Epallagidae is discussed, and a new phylogenetic classification is proposed. The authorship of Selys (1853) for the family-group name Euphaeidae is rejected, since the "legion Euphaea" proposed by Selys is neither a noun in the nominative plural, nor ending in a latinized suffix. Consequently, the correct family name must be Epallagidae Needham, 1903, since Euphaeidae were first established by Jacobson & Bianchi (1905) and thus have to be considered as a junior subjective synonym. Similarly, all the other "legions" proposed by Selys are rejected as available family-group taxa, so that the next available family-group name has to be used, e.g. *Heliocharitidae* Tillyard & Fraser,

1939 instead of *Dicteriadidae* Montgomery, 1959 (nec Selys, 1853). *Parazacallitinae* Nel, 1988 is considered as junior subjective synonym of *Eodichromatinae* Cockerell, 1923 which is regarded as an extinct subfamily of Epallagidae, comprising the sister-tribes *Litheuphaeini* Bechly, 1996 and *Eodichromatini* stat. nov. for the sister-genera *Eodichroma* Cockerell, 1923 and *Parazacallites* Nel, 1988. *Zacallitidae* Cockerell, 1928 is restored as a distinct family and preliminarily regarded as the sister-group of Epallagidae. A unique fossil odonate is briefly described, which represents a damselfly in Baltic amber that is just emerging from the exuvia (probably *Platystictidae* or *Megapodagrionidae*). An annotated new catalogue of all known odonates in amber is provided, including 46 specimens from Lebanon, Dominican, Baltic and Saxonian amber, of which 3 specimens are adult Anisoptera and 5 specimens are exuviae. A lectotype for *Plutyenemis? antiqua* (Pictet & Hagen, 1856) is designated and illustrated." (Author)]

Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany.

235. Beckemeyer, R. (1998): 1998 Dragonfly Society of the Americas Annual collecting meeting in Valentine, Nebraska. *Argia* 10(1): 4-5. (in English).

Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

236. Beckemeyer, R.; Hummel, S. (1998): Could Valentine, Nebraska be Odonata heaven? The 1998 DSA annual meeting. *Argia* 10(3): 4-6. (in English).

[report on the 1998 annual meeting of DSA. In the framework of the meeting 76 species were caught including 7 new for Nebraska, USA.]

Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA.

237. Bernard, R. (1998): The present knowledge about the distribution and ecology of *Nehalennia speciosa* (Charpentier, 1840) (Odonata: Coenagrionidae) in Poland. *Roczniki naukowe Polskiego towarzystwa ochrony przyrody "Salamandra"* 2: 67-93. (in Polish with extensive English summary).

["Literature data on *Nehalennia speciosa* (Charpentier) in Poland are summarized and reviewed. New localities are described with special emphasis to the zone inhabited by the species. Distribution in Poland and Europe is given and characterized and its strong regressive tendencies are stressed. The habitat of *N. speciosa* in central Europe is analysed and its probably the most important (critical) conditions are suggested with focus on vegetation. The extreme stenotopy and strong relations to preferred vegetation are emphasized" (Author)]

Address: Bernard, R., Zakład Zoologii Ogólnej, Uniwersytet im. A. Mickiewicza, ul. Fredry 10, PL-61-702 Poznań, Poland; e-mail: rbernard@main.amu.edu.pl.

238. Beukema, J.J. (1998): Wat is de functie van de monstrenen van het achter lichtje door mannetjes van beekjuffers (Calopteryx)? *Brachytron* 2(1): 18-22. (in Dutch).

[The possible functions of the tail-tip display in male *Calopteryx*: "Suggested functions of the "tail-tip" or "water" display in males of the European species of *Calopteryx* are discussed, using literature data on various species and own observations on *C. haemorrhoidalis*. Courting males show the light-coloured ventral side of the last

three abdominal segments ... in a conspicuous way by curling up the tip of the abdomen and spreading the dark-coloured wings as a contrasting background while hovering just above or floating on the water surface. This display is shown in the centre of the territory, both during initial courtship and after copulation. As a signal to the female, the display might indicate both the ownership and location of an oviposition site as well as its quality... Moreover, it might give some indication of the quality of the male. In the present paper, it is argued that indication of the exact oviposition site appears to be the most important among these possible functions."]

Address: Beukema, J.J., Linieweg 19, NL-1783 BA Den Helder, The Netherlands, E-mail: jsr@nioz.nl.

239. **Beynon, T.G. (1998):** *Leucorrhinia dubia* (Vander Linden) at Chartley Moss NNR, Staffordshire, in 1997: a postscript. *J. Br. Dragonfly Soc.* 14(2): 61-62. (in English).

[comments on phenology, emergence, maiden flight, copulation, oviposition, and predation]

Address: Beynon, T.G.; 34 Church Lane, Checkley, Stoke-on-Trent ST10 4NJ, United Kingdom.

240. **Biggs, K. (1998):** More on rearing dragonflies in ponds. *Argia* 10(3): 17. (in English).

[listing of Odonata in a pond]

Address: not stated.

241. **Borcherding, J.; Barthold, K.; Becker, J. (1998):** Entwicklungsnachweis für *Brachytron pratense*, *Epitheca bimaculata*, *Libellula fulva* und *L. quadrimaculata* (Odonata) in der Stopfenreuther Donauaue (Niederösterreich). *Lauterbornia* 33: 13-18. (in German with English summary).

[In May 1997 14 Odonata species were recorded from the Roßkopf oxbow lake in the Danube floodplains near Stopfenreuth (Austria). The records of many exuviae of *B. pratense*, *E. bimaculata*, *L. fulva*, and *L. quadrimaculata* prove the autochthony of this species.]

Address: Borcherding, J., Zool. Institut, Universität Köln, 50923 Köln, Germany.

242. **Brinkmann, R. (1998):** Berücksichtigung faunistisch-tierökologischer Belange in der Landschaftsplanung. *Informationsdienst Naturschutz Niedersachsen* 4/98: 58-127. (in German).

[the potential of Odonata for landscape planning is dealt with on pages 102-103]

Source of supply: Niedersächsisches Landesamt für Ökologie, Abt. Naturschutz, Postfach 101062, D-31110 Hildesheim, Germany. e-mail: poststelle@hi.nloe.landni.dbp.de. (free of charge)

243. **Brockhaus, T. (1998):** *Aeshna juncea* (L.) and *A. subarctica elisabethae* Djak. in the Rokytecka Slat, Sumava, Czech Republic (Anisoptera: Aeshnidae). *Notul. odonat.* 5(2): 19. (in English).

Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany.

244. **Brockhaus, T. (1998):** Terrestrische Eiablage durch *Sympetrum vulgatum* (Linnaeus) (Anisoptera: Libellulidae). *Libellula* 17(1/2): 103-105. (in German with English summary).

[A tandem deposited eggs 1,5 m away from the water into the grass for more than 3 minutes. This terrestrial oviposition will be initiated by hydrotactil stimuli of the female.]

Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany.

245. **Brownett, A. (1998):** Predation of adult *Anax imperator* Leach by the Hobby (*Falco subbuteo* L.) - how frequently does this occur? *J. Br. Dragonfly Soc.* 14(2): 45-52. (in English).

246. [compilation and listing of Hobby predation on Odonata; discussion of distribution patterns in UK of Hobby and *A. imperator*; discussion of the low frequency predation of Hobby on *A. imperator*: (1) nocturnal emergence and pre-sunrise maiden-flight as a predator-avoidance strategie, (2) territorial behaviour which causes low density of *A. imperator* on a pond: "A low steady density must be less likely to attract predators than a free-for-all.", (3) phenological reasons: the peak period of territorial/ sexual activity of *A. imperator* coincides with the nesting period of the Hobby, when the diet switches from insect to bird.]

Address: Brownett, A.; 28 Colesbourne Road, Brookside, Bloxham, Banbury, Oxfordshire OX15 4TB, UK.

247. **Brunelle, P. (1998):** 1998 DSA northeastern group meeting in southern Maine. *Argia* 10(1): 3-4.

Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada.

248. **Brunelle, P. (1998):** Idyll on Cape Breton Island. *Argia* 10(3): 8-10. (in English).

[Report on a collecting trip to Cape Breton Island, Nova Scotia, Canada with some stress on the Somatochloras including *S. septentrionalis*, *S. minor*, *S. cingulata*, and *S. albicincta* (new to Nova Scotia).]

Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada.

249. **Brunelle, P. (1998):** Odonata seminar at Humboldt Field Research Institute, Steuben, Maine. *Argia* 10(3): 18-20. (in English).

[Report on a 5-day introductory seminar on Odonata with some usefull information and advise how to teach beginners in dragonflies.]

Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada.

250. **Buck, K. (1998):** Odonatological notes from three trips to New South Wales, Australia. *Notul. odonatol.* 5(1): 7-8. (in English).

Address: Buck, K., Johann-Meyer-Str. 3A, D-25554 Wilster, Germany.

251. **Buczynski, P. (1998):** Dragonflies (Odonata) of the "Peatbog at Czarne Lake" nature reserve and environs (Leczna-Wlodawa lake District). *Parki Narodowe i Rezerwaty Przyrody* 17(2): 87-96. (in Polish with English summary).

[34 species were collected in 1995 and 1997 including *Sympetrum pedemontanum* which was new for the Podlasie region (Poland); discussion of the present fauna of the reserve and its changes in the past thirty years; "The region underwent significant changes in the past thirty years. The allochthonous water from the Wieprz-Krzna Canal was moved into Czame Lake; the trophy of this lake has changed (from dystrophy to eutrophy), the peatbog in the reserve has been overgrown by trees and has partly changed its character. These changes have reduced and modified the dragonfly fauna. No peat species exist in the lake. Dragonflies don't develop in the greater part of the peatbog. In the remaining biotops with dra-

gongfly populations, fauna typical for fens dominate among peat dragonflies. The constancy of the changes and the possibility of restoring the previous character of the reserve's environment are also discussed." (Author)]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland.

252. **Buczynski, P.; Staniec, B. (1998):** Environmental evaluation of the conservation worth Krugle Bagno peatbog (the Leczynsko-Włodawski Lake District) based on the selected elements of its fauna. Roczn. Tow. Ochr. Przyr. "Salamandra" 2: 95-107. (in Polish with English summary).

[This paper presents an environmental evaluation of the Krugle Bagno peatbog (the Leczynsko-Włodawskie Lake District, buffer-zone of the Poleski National Park) on the grounds of selected elements of its fauna. The topographical, hydrological and floristic preliminary descriptions are also provided. Collected 121 species represent the following higher taxa: Aranei, Chilopoda, Insecta (Odonata; Orthoptera; Heteroptera aquatica; Coleoptera: Hydrophiloidea, Dytiscidae, Haliplidae, Gyrinidae, Staphylinidae, Scarabaeidae, Chrysomelidae, Curculionidae; Lepidoptera), Pisces, Amphibia and Reptilia. The studies focused on Odonata and Staphylinidae. The recorded taxa are divided according to their environmental preferences. Particular attention was paid to (specific) indicator species for the examined biotope: tyrphobionts, tyrphophiles (Heteroptera aquatica, Odonata, Coleoptera aquatica), sphagnophilous stenotopic species (Staphylinidae). Their significant predominance in respect of number of species and individuals collected (among Odonata - 39.3% of all species. 56.4% of all larvae and exuviae; among Staphylinidae - about 75% of all individuals collected) attests to high environmental quality of the peatbog. It is connected with high and stable water-level. Such a situation is favourable for the existence of many rare species, which are sensitive to overdrying of environment, as well as instability of water-level and humidity. Due to this situation, species rare in Poland occur here, such as: *Nehalennia speciosa*, *Aeshna subarctica* (Odonata), *Acylophorus wagenschieberi* (57% of all rove beetles collected) and *Atanygnathus terminalis* (Staphylinidae). Out of recorded taxa, 8 are protected by law, among them noteworthy is the lake minnow (Morocco percunus). Regarding the above data, it has been suggested that Krugle Bagno should be protected as a partial reserve. It is also proposed to use good account of the obtained data as a point of reference in evaluation of the state of the natural environment of other lowland peatbogs in south-eastern Poland." (Authors). 28 Odonata species are listed; of special Central European faunistic interest are in addition to the above mentioned species *Coenagrion armatum*, *Sympecma paedisca*, *Leucorrhinia albifrons*, and *L. pectoralis*.]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland.

253. **Buczynski, P. (1998):** *Somatochlora arctica* (Zett.) in the Janowski Forests (Lasy Janowskie), SE Poland (Anisoptera: Corduliidae). Notul. odonatol. 5(1): 8-9. (in English).

[second confirmed Polish lowland breeding locality of *S. arctica*; characterization of the larval habitat; short notice to the drought resistance of larvae]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland.

254. **Butler, A.; Butler, E. (1998):** Scarlet Darter *Crocothemis erythraea* (Brullé) on the Isle of Wight - The second British record. Atropos 4: 13-14. (in English).

Address: Butler, A., Downside, Down Lane, Ventnor, Isle of Wight PO38 1AH, UK.

255. **Buttstedt, L.; Jentzsch, M. (1998):** Zur Flora, Fauna und Gebietsausstattung des Naturschutzgebietes "Hackpüffler See" und seiner Umgebung. Naturschutz im Land Sachsen-Anhalt: 3-8. (in German).

[general review on the Odonata of the Nature Reserve "Hackpüffler See" and its environments in Sachsen-Anhalt, Germany; 19 species are listed; *Anaciaeschna isosceles* is of regional interest]

Address: Jentzsch, M., Stollenweg 21, D-06179 Langenbogen, Germany.

256. **Carletti, B.; Terzani, F. (1998):** Dragonflies from Zomea Forest, Central African Republic. Notul. odonatol. 5(2): 13-24. (in English).

[15 spp. are listed. *Pseudagrion serrulatum*, *P. coeruleiceps*, *P. kibalense*, *Agrionemis exilis*, *Chlorocypha vicioriae*, *C. aphrodite*, *Sapho puella*, *Tetrathemis sulci*, *Notiothemis robertsi*, *Hadrothemis versuta*, *Trithemis nuptialis* are new to the Central African Republic. Some structural details of *T. sulci* and *N. robertsi* are illustrated." (Authors)]

Address: Terzani, F., Mus. Nat. Hist. of the University of Florence, Zool. Sect. "La Specola", Via Romana 17, I-50125 Florence, Italy.

257. **Carpenter, G. (1998):** *Nehalennia integracollis* in Rhode Island. Argia 10(3): 20. (in English).

[description of the habitat of *N. integracollis* in Rhode Island, USA; additional information on some *Enallagma* spp. including a notice on *Enallagma pictum*.]

Address: Carpenter, V.A., 504 Pinewood Drive, Esmond, RI 02917, USA. e-mail:vcarpenter@tnc.org.

258. **Carpenter, G. (1998):** Notes from Rhode Island. Argia 10(2): 8. (in English).

259. Address: Carpenter, V.A., 504 Pinewood Drive, Esmond, RI 02917, USA. e-mail:vcarpenter@tnc.org.

260. **Caspers, N. (1998):** Biologische Effekte von Hexachlorbenzol (HCB) in aquatischen Modellökosystemen. Zeitschrift für Umweltchemie und Ökotoxikologie 19(4): 205-213. (in German with English summary).

[A long-term study [sic!] (08.05 - 14.11.1995) was performed on the fate and effects of hexachlorobenzene (HCB) in aquatic mesocosms. Discontinuous dosing of the sparingly soluble test substance up to the limit of its water solubility (5 µg/l at 20°C) did not cause any significant effects on the aquatic communities. From this point of view, a quality objective of 5 µg/l is considered to maintain the structures and functions of aquatic communities on a long-term scale." (Author) The experimental ponds are located on the properties of the Bayer AG plant in Leverkusen, Germany. Dragonflies considered not be affected by HCB were the common *Sympetrum striolatum* and *Libellula* sp., the only species occurring in the experimental ponds.]

Address: Caspers, N., Bayer AG, Institut für Umweltanalyse, Gebäude W 15, D-51368 Leverkusen, Germany.

261. **Cattaneo, A.; Galanti, G.; Gentinetta, S.; Romo, S. (1998):** Epiphytic algae and macroinvertebrates on submerged and floating-leaved macrophytes in an Italian lake. *Freshwater biology* 39: 725-740. (in English).

[test of effects of different host architecture of submerged and floated-leaved vegetation on epiphytic algae and invertebrates; epiphyton development was significantly higher on submerged plants than on floating-leaved; "The taxonomic composition of epiphytic algae and invertebrates was similar on the different plants. The more varied morphology of the floating-leaved *Trapa natans* resulted in a higher diversity of epiphytic algae, however, but not of macroinvertebrates." Replacement of floating-leaved by submerged plants would increase the total biomass of epiphytic algae and invertebrates; *Lestes* sp. and *Orthetrum* sp. are listed in Appendix 2]

Address: Galanti, G.; CNR, Istituto Italiano di Idrobiologia, Largo Tonolli 50, I-28048 Pallanza, Italy.

262. **Cerff, D. (1998):** Die Pokal-Azurjungfer (*Cercion lindenii*) – eine neue Libellenart in Thüringen. *Landchaftspflege und Naturschutz in Thüringen* 35(3): 92-93. (in German)

[record of *C. lindenii* on August 5, 1997, near Aschenhaus, Thuringia, Germany; brief discussion of the recent range extension of the species in Central Europe]

Address: Cerff, D., Naturschutzzentrum Mittelmühle, Ortsstr. 5, D-98593 Kleinschmalkalden, Germany.

263. **Charvet, St.; Kosmala, A.; Statzner, B. (1998):** Biomonitoring through biological traits of benthic macroinvertebrates: perspectives for a general tool in stream management. *Arch. Hydrobiol.* 142(4): 415-432. (in English).

["Although benthic stream macroinvertebrates have been widely used in bio-monitoring, further developments towards more general biomonitoring tools are timely. Therefore, we compared traditional ways of biomonitoring such as diversity, biotic indices and community structure with a new approach using biological traits such as reproduction, life duration, and feeding habits. These approaches were applied to a typical biomonitoring scenario, i.e. for two sites being upstream and downstream of the effluent from a waste water treatment plant. Physico-chemical variables did not discriminate between upstream and downstream site. Among eight tested biological indices, only Margalefs and Shannon's index and the French Biotic Index "indice biologique global normalise" (IBGN) significantly separated the upstream from the downstream site. However, biomonitoring through these three indices depended significantly on the sampling effort, which was not the case for the community structure or biological traits. Community structure in terms of taxa abundances separated the upstream from the downstream site (17.9 % of discrimination). Biological traits weighted by taxa abundances better separated the upstream from the downstream site (23.1 % of discrimination). The biological traits showed that the functional structure at the upstream site was characteristic for organisms using the strategy of resilience in more variable but less adverse environments. In contrast, the functional structure observed at the downstream site was characteristic for organisms using the strategy of resistance in less variable but more adverse environments. Thus, the functional approach to indicate pollution effects in streams through biological traits may provide a tool for future stream management which is robust, general and based on current concepts of ecological theory." (Authors) Odonata recorded in the River Chalaronne

(France) were *Platynemis* spec., *Calopteryx splendens*, and *C. virgo*.]

Address: Statzner, B., CNR, Ecologie des Eaux Douces et des Grands Fleuves, Université Lyon I, F-69622 Villeurbanne Cedex, France.

264. **Chippendale, P.T.; Whitemore, D.H.; Davé, V.K.; Valencia, T.G.; Robison, J.V. (1998):** Effective procedures for the extraction, amplification and sequencing of Odonata DNA. *Odonatologica* 27(4): 415-424. (in English).

["The methods of specimen preservation, DNA extraction, DNA amplification, choice of primers, and DNA sequencing are described. These are primarily adaptations of those developed by other workers, but the Authors describe modifications that they have found to be optimal when working with odonates. It is likely that some of the described protocols will have more general applications to other arthropods as well." (Authors)]

Address: Chippendale, P.T., Department of Biology, Box 19498, University of Texas at Arlington, Arlington, TX 76019, United States.

265. **Clausnitzer, V. (1998):** Territorial behaviour of a rainforest dragonfly *Notiothemis robertsi* (Odonata: Libellulidae): proposed functions of specific behavioural patterns. *J. Zool., London* 245: 121-127. (in English).

["The behaviour of this rainforest dragonfly was studied in the Kakamega Forest, West Kenya. Seven different activities were distinguished: perching, sun-flights, patrolling, inspection, interspecific, intra-specific, and sexual flights. Two-act sequences of these behaviours were analysed and quantified to determine significant transition probabilities. Sun-flights into the tree canopies were the most common flight activity and followed any other behaviour significantly more often than expected. Coming back from a sun-flight, the males preferentially perched or patrolled; after patrolling males typically perched. Most of the time the males spent perching in their territory (32% of total time in territory). Proposed functions of these territorial behavioural activities in *Notiothemis roberisi* are deduced from these results."]

Address: Clausnitzer, Viola, Zum Lahnweg 14, D-35032 Marburg, Germany.

266. **Clausnitzer, V.; Lempert, J. (1998):** Preliminary comparative approach of the reproductive behaviour of African Tetratheminae (Anisoptera: Libellulidae). *J. Afr. zool.* 112: 103-107. (in English with French summary).

["Ecological and ethological aspects of a selection of African Tetratheminae dragonflies (14) are compared. Species belonging to this subfamily mainly inhabit tropical rainforests, where they breed in small pools and running waters. In every species observed for that behaviour males are localized and territorial over long periods. Mode of oviposition differs strongly between genera."]

Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany.

267. **Conniff, R. (1998):** Juwelen im Anflug. *Geo* 6/1998: 82-96. (in German).

[popular account on dragonflies with some focus on dragonfly hunting techniques, based on mainly US-dragonfly literature, illustrated with first class colour pictures from Gilles Martin (France)]

Source of supply: Gruner + Jahr AG & Co, Am Baumwall 11, D-20459 Hamburg, Germany.

268. **Cuveland, J. de (1998):** Libellen lassen die Hüllen fallen. Hamburger Abendblatt Nr. 151/1998: 8. (in German).

[report on the ecdysis of *Aeshna cyanea* in a German newspaper]

Address: not stated.

269. **Czachorowski, S; Buczynski, P.; Alexandrovitch, O; Stryjecki, R.; Kurzatowska, A (1998):** Material required for knowledge of insects and arachnids of the "Warminski Forest" nature reserve (The Olsztyn Lake District). *Parki Narodowe i Rezerваты Przyrody* 17(2): 75-86. (in Polish with English summary).

["The Lyna River, various streams, springs, 4 lakes and small pools were investigated in 1995, and 1996 in the "Wannifski Forest" nature reserve with particular stress on caddisflies (Trichoptera). 112 species of water invertebrates (Insecta: Odonata) ... (19 species including *Ophiogomphus cecilia* and *Leucorrhinia pectoralis*) ... Trichoptera; Heteroptera; Arachnida: Hydracarina) and also 24 species of inland beetles (Coleoptera: Carabidae, Staphylinidae, Lucanidae, Elateridae, Notidulidae, Ciidae, Erotylidae) were caught, including three species protected by law. The Lyna River valley and Jelgun and Gaik lakes are the most valuable for biodiversity protection. The reserve area is also proposed as one for continuous research."]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland.

270. **Czachorowski, S.; Buczynski, P. (1998):** Preliminary evaluation of the specificity of aquatic insects of Polesie based on dragonflies (Odonata) and caddis flies (Trichoptera). *Tezisy dokladov. Mezhdunarodnoy nauchnoy konferentsii. "Souremennye proylemy izucheniya, ispol'zovani' i okhrany prirodnykh kompleksov polesya". Sektsiya 3: Sokhranie landshchaftnogo i biologicheskogo razanoobraziya poles'ya.* 22-25 September 1998, Minsk, Respublika Belarus'. Belszns. Minsk: 204. (in English).

[Polesie is an extremely interesting region in Europe because of its unique water and wetlands habitats. Among areas in Eastern Europe, it has one of the highest numbers of wetlands. Specificity of aquatic fauna originating from various geographical regions probably occurs there and is likely the meeting of fauna from Siberia and Eastern Europe with west-European fauna, as well as northern and southern elements. Extensive drainage in recent years has caused great changes in swamp and water habitats and has probably affected the distribution of insects. The effect on aquatic insects is interesting. Additionally, it is significant that peat-bog habitats are deteriorating in western and central Europe, causing fauna living in these habitats to approach extinction. Polesie is probably the last sizable place where these species occur and where they may be protected. The aquatic insects of Polesie, a region occurring partially in Poland, Belarus and the Ukraine, are very poorly known. There are only a few data about caddis flies from Polish and Belarusian Polesie, and no information from the Ukrainian part of the region. Dragonflies are known only from the Polish and Ukrainian part of Polesie. Odonata and Trichoptera were collected in Lublin Polesie (western Polesie) in lakes, pools, rivers, ponds and ditches. Trichoptera were collected in three places of Polesie in Belarus: in the vicinity of Brzesc, the vicinity of Olmany (mid-Polesie) and in the Chernobyl region. Fifty-one species of caddis flies are known in the region, including 36 in Poland and 23 in Belarus. The total number of Trichoptera of Polesie will prob-

ably be about 70-100. Twenty-seven species were found in lakes, nine in peat-bog ponds, 13 in ditches, 14 in old river beds and 16 in rivers. Fifty-eight species of Odonata (79% of the species occurring in Poland) were found in the Polish part of Polesie. and 31 in Ukrainian part. These species probably also occur in all of Polesie. The species *Gomphus flavipes*, *Orthetrum coerulescens* and *Sympetrum striolatum* also occur in Polesie. Twenty-nine species of dragon flies were caught in rivers, 35 in ditches, 41 in dystrophic lakes, 35 in eutrophic lakes, and 49 in peatbogs. In Polesie, fauna typical for swampy and peat-bog habitats is very common. Some of the interesting species occurring there are rare or rare in Europe. Polesie may be a very important area for the protection of these species. It is very interesting that river fauna is relatively poor. Earlier investigations of aquatic insects in the Biebrza River, which has acidic and dystrophic waters from adjacent swamps and peat-bogs in the Biebrza Valley, have also shown very poor fauna. So. it is also a possibility that rivers in Polesie have specific and poor aquatic-insect fauna. This possibility strongly needs to be checked by field investigations. Many species that are rare in Europe (tyrphobionts and tyrphophilous) occur in Polesie, but these species are in danger of extinction. The specific and unique insect fauna of Polesie strongly need active protection, may be through the creation of a national park or euroregion. Aquatic insects are very poorly known and more investigations are needed. We are currently looking for interesting parts from Belarus and the Ukraine for common field investigations (expeditions) and for scientific co-operation. (Verbatim)]

Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland.

271. **Czaplak, D. (1998):** *Leucorrhinia glacialis* in West Virginia. *Argia* 10(3): 23. (in English).

Address: not stated.

272. **Czaplak, D. (1998):** *Orthemis ferruginea* in Washington D.C.? *Argia* 10(3): 23-24. (in English).

Address: not stated.

273. **Daigle, J. (1998):** The use of odonates to assess lake quality in Florida. *Argia* 10(2): 4. (in English).

Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. e-mail: daiglej@dep.state.fl.us.

274. **Daigle, J.J. (1998):** *Megalagrion* and *Heteragrion* - two notes. *Argia* 10(2): 14-15. (in English).

Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. e-mail: daiglej@dep.state.fl.us.

275. **D'Antonio, C. (1998):** *Lindenia* 28: 117-122. (in Italian).

[LINDENIA. Notiziario dell'Ufficio Nazionale Italiano della Società Odonatologica Internazionale, Napoli, n° 28: 117-122 (21 June 1998). - (c/o Dr. Costantino D'Antonio, Via A. Falcone 386/b, 1-80127 Napoli). Contents: Utzeri, C.: LINDENIA cambia redattore (pp. 117-118). ["LINDENIA changes editor"; Dr. Costantino D'Antonio becomes new editor of LINDENIA] -D'Antonio, C.: LINDENIA cambia data di uscita (p. 118). ["LINDENIA changes date of issue"; in the future, LINDENIA will be issued on 21 June and 22 December each year.]. - Kiauta, B.: ODONATOLOGICA nei Current Contents (pp. 118-119). ["ODONATOLOGICA in Current Contents"; as of vol. 27(1), 1998 ODONATOLOGICA will be indexed in Current Contents.]. - D'Antonio, C.: Archivio Hemianax (p. 119). ["Hemianax

archive"; four recent observations of *Hemianax ephippiger* in Italy (Roma, Portovenere, Anacapri, Capri, all 1998) are communicated, and a map with all records since 1867 is provided.]. - D'Antonio, C. ' Distribuzione regionale degli Odonati in Italia: aggiornamento (pp. 119-120). ["Regional distribution of Odonata in Italy: an update"; 23 (nos 109-131) titles are added to the latest (1994) list of regional records.]. - D'Antonio, C.: Elenco aggiornato dei soci di LINDENIA (pp. 121-122). ["Updated list of LINDENIA members"; the Addresses of the 30 members of the Italian regional group are given.] - D'Antonio, C.: La S.I.O. sul WEB (p. 122). ["The S.I.O. on the Web"; introduction to and information on the S.I.O. home page.] (W. Schneider)]
Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindeniam@freemail.it.

276. **D'Antonio, C. (1998):** Contribution à la connaissance des odonates de L'île de Ponza, Mer Tyrrhénienne, Italie. *Notul. odonatol.* 5(1): 9. (in French).
[short commented list of Odonata from 3 localities at the volcanic Island of Ponza, Tyrrhenian Sea; short notice to predation of *Argiope bruennichi* and *A. lobata* (Araneae) on *Sympetrum fonscolombi* and *Anax ephippiger*]
Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy.

277. **Davies, D.A.L. (1998):** The genus *Petalura*: Field observations, habits and conservation status (Anisoptera: *Petaluridae*). *Odonatologica* 27(3): 287-305. (in English).
[compilation from the literature including all historical notes of the knowledge of the Australian species of the genus *Petalura*; report on and assessment of the authors surveys in the 90th with special emphasize on the actual distribution, habitats, and conservation status of *Petalura gigantea*, *P. ingentissima*, *P. pulcherrima*, and *P. hesperia*.]
Address: Davies, D.A.L., 23 Cedar Court, Hills Road, Cambridge, CB2 2QJ, United Kingdom.

278. **De Marco, P. (1998):** The amazonian Campina dragonfly assemblage: patterns in microhabitat use and behaviour in a foraging habitat (Anisoptera). *Odonatologica* 27(2): 239-248. (in English).
["The Amazonian Campina is a woodland with emergent trees of about 10 m found in patches in the Amazonian rain forest. It usually has open areas with a white sand soil directly exposed to sun, and shaded areas with a more dense vegetation. I sampled the dragonfly assemblage in this system counting every dragonfly at pre-determined points, at 5 min intervals, between 7:00 and 18:00 h. *Erythrodiplax lativittata*, *Miathyria marcella* and *Erythemis vesiculosa* were the most abundant spp. The frequency data by point revealed an association of *E. lativittata* (percher) with shaded habitats, and *M. marcella* and *E. vesiculosa* (fliers) with open habitats. The characteristics of thermoregulation of fliers and perchers seem to explain this microhabitat selection. Due to high productivity and density of small insects, the Campina is probably an excellent habitat for foraging. It is suggested that in these foraging habitats the spatial species arrangement is mostly determined by behavioural-physiological traits, which may help to explain the community faunal composition." (Author) study area: Suframa-INPA reserve, Brazil; 15 Libellulidae and 1 Corduliidae were observed; mean front wing size of 11 species is given; figure with mean perch or flight height]
Address: De Marco, P., Departamento de Biologia Geral, Universidade Federal de Viçosa, Minas Gerais, Brazil.

279. **De Marmels, J. (1998):** A five year survey of an odonate community inhabiting a north Venezuelan mountain stream. *Odonatologica* 27(2): 189-199. (in English).
["Monthly counts of adult Odonata were carried out along a transect following a forested mountain stream, "Quebrada Pasaquire". 17 of the 41 spp. recorded were considered for evaluation. The average monthly abundance curve of spp. such as *Euthore fasciata* Sel., *Archilestes grandis* (Ramb.), *Philogenia cassandra* Sel., *Progomphus abbreviatus* Belle, *Brechmorhoga rapax* Calv. and *Libellula herculea* Karsch matches the climogram of the study area, e.g. these spp. are markedly seasonal with high adult abundances in the wet season, and low numbers in the dry season. On the other hand the presence of adult *Hetaerina capitalis* Sel. and *H. cruentata* (Ramb.) did not seem to be correlated with season. *Macrothemis pseudimitans* Calv. and *Micrathyria venezuelae* De Marmels appeared to be more common in the dryer months, but their population sizes were always low. Based upon the data of this survey it can be stated that the odon. community studied has a persistent structure, relatively low variabilities of population densities, and is stable. The evidence includes persistence of the dominant taxa over at least 5 generations, typical standard deviations of the logarithm of population sizes, as well as high and significant year-to-year rank concordance. *Cannaphila vibex* (Hag.) and *Progomphus abbreviatus* became more common during this survey, while *Andaeschna rufipes* (Ris) shifted towards local extinction. However, 5 yr may not be sufficient to show such trends to be irreversible: in almost all species at least one trend reversal occurred during the survey. Some of the potential ecological mechanisms underlying the constancy and stability of this odonate community are discussed and it is suggested that abiotic factors, such as periodical floods in this lotic habitat, may be of some concern." (Author)]
Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela.

280. **Dees, A. (1998):** Excursieverslag Encigroeven. NVL-Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(2): 8. (in Dutch).
[Report on the trip to Encigroeven: Records of some southern elements in the Netherlands dragonfly fauna from a locality near Maastricht including species as *Cercion lindenii*, *Orthetrum brunneum*, *Ischnura pumilio*, *Crocothemis erythraea*, and *Anax parthenope*.]
Address: not stated.

281. **Delft, J.J.C.W. van (1998):** De Bandheidelibel *Sympetrum pedemontanum* (Allioni) in Nederland. *Brachytron* 2(1): 3-9. (in Dutch with English summary).
["... In the Netherlands it now has one proven reproduction site and one site at which reproduction is assumed. Both are situated in the south of the country. At other localities it is encountered in variable densities, but reproduction is either uncertain or absent. The sites where larger numbers have been seen, are discussed in detail. It appears that *S. pedemontanum* is continuing to extend its range in The Netherlands and it may soon establish populations in the north. It is stated that, in the north-western part of its range, this dragonfly is a pioneer of bare, running waters."]
Address: Delft, J. van, Gladuluslaan 22, NL-5582 CD Waalre, The Netherlands. E-mail: jvdelft@sci.kun.nl.

282. **Deliry, C. (1998):** Nouveaux articles ou études concernant des libellules dans la région Rhône-Alpes. *Sympetrum piémontais* 38: 2-3. (in French).
Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France.
283. **Deliry, C. (1998):** Compte-rendu d'étude: les libellules de la chute de Brégnier-Cordon (Isère, Ain et Savoie). *Sympetrum* 11: 47-75. (in French).
[data from 1972 to 1995 of 40 localities are locally-wise presented, 39 species are dealt with]
Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France.
284. **Deliry, C. (1998):** Matériel pour une liste rouge des libellules du Département de l'Ain. *Sympetrum* 11: 25-33. (in French).
[Red data list of Odonata of the Département Ain, France, including an odonatological bibliography of the département]
Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France
285. **DeMarco, P.; Santos-DeMarco, T. (1998):** Anax concolor Brauer predation on dragonfly aggregations at a Restinga habitat in southeastern Brazil (Anisoptera: Aeshnidae). *Notul. odonotol.* 5(1): 2-3. (in English).
["2 attacks of *A. concolor* were observed in large groups, mainly composed of *Pantala flavescens* and *Miathyria marcella*. *P. flavescens* responded to these attacks by pursuing *A. concolor*. The behaviour of *P. flavescens* in the aggregations under attack suggests that due to a decrease in the chance of predation, the smaller spp. could gain an extra advantage in these groups."]
Address: DeMarco, P., Departamento de Biologia Geral, Universidade Federal de Vicosa, BR-39571-000 Vicosa, MG, Brazil.
286. **Dijkstra, K.-D. (1998):** Invasie Zuidelijke keizerlibel (*Anax parthenope*)? NVL-Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(2): 3. (in Dutch).
[Invasion of *Anax parthenope*?: short notice on some records of *A. parthenope* in The Netherlands and France]
Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands.
287. **Dijkstra, K.-D.; Kalkman, V. (1998):** Kleine kansen op grootse daden. Nieuwsbrief, Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 2(2): 5-6. (in Dutch).
[short assessment of the recent status of rare Dutch dragonflies and in the adjoining regions in Belgium and Germany; special attention is given to *Coenagrion armatum*, *C. mercuriale*, *C. ornatum*, *C. scitulum*, *Stylurus flavipes*, and *Onychogomphus forcipatus*]
Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands.
288. **Dijkstra, K.-D. (1998):** Langs Franse stromen. Deel 1. NVL-Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(2): 4-5. (in Dutch).
[Following French rivers. Part 1: Report on the Odonata of Loire, Indre, Changeon, and Alzo observed in June/July 1997]
Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands.
289. **Dijkstra, K.-D. (1998):** Opvallende waarnemingen. NVL-Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(2): 3-4. (in Dutch).
[Noteworthy records: *Ischnura pumilio*, *Lestes barbarus*, *L. viridis*, *Sympetrum vulgatum*, and *Erythromma viridulum*]
Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands.
290. **Dijkstra, K.-D.B.; Groenendijk, D.; Kalkman, V.J. (1998):** Voorpost van het zuiden: De libellen van de Nederlandse St. Pietersberg. *Brachytron* 2(1): 23-27. (in Dutch with English summary).
["Odonata of the Dutch St. Pietersberg: 33 species recorded from ... St. Pietersberg (Limburg) are listed. Suitable breeding habitats are present in the Encigroeve, a marlquarry which is still in production. Two distinct habitat types can be distinguished here; seepage areas with shallow ponds and small streams and clear well-vegetated lakes. The fauna has remarkable southern affinities with reproduction of *Sympetma fusca*, *Cercion lindenii* and *Crocothemis erythraea* in the lakes and *Ischnura pumilio*, *Orthetrum brunneum*, *O. coerulescens* and *Sympetrum fonscolombi* in the seepages. *Sympetrum striolatum* is particularly abundant. The exploitation of the quarry and its physical features provide the continuing presence of pioneer habitats for the seepage species whilst most of the lakes will be conserved."]
Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands.
291. **Dole-Olivier, M.-J. (1998):** Surface water-groundwater exchanges in three dimensions on a backwater of the Rhône River. *Freshwater biology* 40: 93-109. (in English).
["1. Hydrological exchange between the surface stream and the hyporheic zone is well documented in the main channel of rivers, especially at the reach scale. Hydrological processes of advection/convection occur at different scales, and in secondary channels of large rivers little is known about these exchanges in the hyporheic zone on a broad scale (i.e. kilometres). This work studied exchanges of water and biota in a secondary channel on a large scale (4 km), using a three-dimensional framework. 2. The exchanges of water were described using physicochemical indicators of surface and groundwaters. Samples of water and biota were taken in three dimensions: (i) vertically from benthic (i.e. 0.20 m below the surface of the substratum) to hyporheic (0.50 m) and deep interstitial (1.0 m) zones; (ii) laterally from the right to the left bank (i.e. right, middle and left positions); and (iii) longitudinally from upstream to downstream (seven stations regularly distributed along the channel). 3. The physicochemical indicators clearly revealed hydrological heterogeneity in the longitudinal and vertical dimensions, whereas lateral variability was not significant. 4. Spatial distribution of biota exhibited strong longitudinal variations that were not gradual as predicted by an upstream/downstream continuum, but patchy and discontinuous. No significant differences were found between the three positions across the channel. 5. Analyses, of both physicochemical and faunal data sets produced matched ordination of samples and stations, indicating that interstitial-surface flow relationships appear to be an important governing factor in the distribution of interstitial biota at this broad scale. 6. Results are discussed in relation to the hypothetical three-dimensional models of the hyporheic zone in rivers. Contrasting with other observations on the

main channel (where advection/convection patterns are dominated by morphological changes of the river-bed morphology), it is proposed that water exchanges in backwaters are more likely to be related to local modifications of stream-bed porosity." (Author) "Coenagrionidae (young stages)" were used in the faunal analysis.]

Address: Dole-Oliver, M.-J., Freshwater and River Ecology Unit, Université Claude Bernard Lyon, 1-43 Bd du 11 Novembre 1918, F-69622 Villeurbanne cedex, France.

292. **Dommanget, J.-L. (1998):** Analyse et commentaire relatifs au "Catalogue des libellulidées des environs de Besançon" de M. Léandre Pidancet (1856). *Martinia* 14 (1): 31-36. (in French with English summary).

[The author analyzes and comments on the difficulties to work with old odonatological papers. In the example used, the publication of Pidancet (1856) is documented as annex: Some of the taxa occurring at that time in the Département Doubs, France were not still described, and the odonatological "must" of that time Selys-Longchamps & Hagen's "Revue des Odonates ou Libellules d'Europe" (1850) and Charpentier's "Libellulidae europaeae. Descriptae ac depictae" (1840) were unknown to resp. not used by Pidancet. Dommanget presents a very useful checklist for checking old publications in relation to verify them and make them comparable to modern papers. Two new taxa were introduced by Pidancet to science. Dommanget considers *Aeshna justii* Pidancet (1856), a synonym unknown to most of the odontists incl. Bridges, for *Aeshna juncea* (Linnaeus, 1758). The identity of the likewise obscure *Libellula bruandi* Pidancet (1856), probable a *Orthetrum* (*coerulescens?*), remains unsolved.]

Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France.

293. **Dommanget, J.-L. (1998):** Les libellules et leurs habitats. Caractéristiques générales, éléments de gestion et de restauration. Société Française d'Odonatologie. ISBN 2-9507291-2-6. 20 pp. (in French).

Address: Société Française d'Odonatologie, 7, rue Lamartine, F-78390 Bois-d'Arcy, France.

294. **Dommanget, J.-L. (1998):** Microhabitats refuges pour les larves d'*Aeshna cyanea* (Müller, 1764) lors de l'assèchement du milieu (Odonata, Anisoptera, Aeshnidae). *Martinia* 14(2): 56. (in French).

[short notice on the habitat conditions of larval communities of *Aeshna cyanea* (and *Thecagaster bidentata*) in French rivers before drying out, and the strategies to survive under this conditions]

Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France.

295. **Dommanget, J.-L.; Kohn, A.; Verbeck, B. (1998):** Trois nouvelles espèces d'Odonates pour le Bois de Bajonet (Commune de Forges-les-Bains, département de l'Essonne). *Martinia* 14(1): 31-32. (in French).

[additions to the paper published in *Martinia* 13(1): 23-43; *Lestes barbarus*, *Ceriaton tenellum*, *Coenagrion scitulum*; *Leucorrhinia caudalis* starts its emergence in 1997 in mid April, and in 1998 in the beginning of May]

Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France.

296. **Donnelly, N. (1998):** 1999 Annual meeting - The Adirondacks. *Argia* 10(3): 2-3. (in English).

[announcement of the DSA annual meeting scheduled for 8 - 11 July 1999]

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

297. **Donnelly, N. (1998):** Back to Thailand and Malaysia - Farangpo 98. *Malangpo* 15: 137-142. (in English).

[report on a trip in May 1998 to Thailand and Malaysia; locally wise check lists of the species; 9 localities in Thailand and 15 localities in Malaysia with exact geographic coordinates (longitude/latitude)]

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

298. **Donnelly, N. (1998):** Back to Thailand and Malaysia - Farangpo 98. *Argia* 10(2): 10-13. (in English).

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

299. **Donnelly, N. (1998):** Face colors of *Sympetrum internum* - and wing colors of *rubicundulum*. *Argia* 10(3): 13-14. (in English).

[N. Donnelly takes *Sympetrum janae* Carle 1993 for a (colour) form of *S. internum*; he distinguishes the forms according to the colour of their faces, and asks for further information deriving from collections etc. to get insight in the overlapping zone of the forms. He also is interested in the cline of the orange wing bases of *S. rubicundulum*.]

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

300. **Donnelly, N. (1998):** History of Odonata study: E.B. Williamson. *Argia* 10(3): 10-13. (in English).

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

301. **Donnelly, N. (1998):** Northeastern meeting in Maine - Good bugs in spite of the weather! *Argia* 10(2): 2-3. (in English).

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

302. **Donnelly, N. (1998):** The history of Odonata: The fourth phase. *Argia* 10(2): 5-8. (in English).

[William Forest Kirby (1754-1850) ([sic]) (the correct data should be read: 1844-1912), Robert McLachlan (1837-1904), Philip P. Calvert (1871-1961), Friedrich Ris (1867-1931)]

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA.

303. **Dosdall, L.M.; Parker, D.W. (1998):** First Report of a symphoretic association between *Nanocladius branchicolus* Saether (Diptera: Chironomidae) and *Argia moesta* (Hagen) (Odonata: Coenagrionidae). *Am. Midl. Nat.* 139: 181-185. (in English).

[In Carrier Creek, a small stream in southeastern Ontario, larvae of the chironomid *Nanocladius branchicolus* Saether were found associated symphoretically with nymphs of *A. moesta*. The attachment site of the chironomid was most frequently along the abdomen and metathorax of the host. Approximately 22% of the population of *A. moesta* harbored symphoretic chironomids.]

Address: Dosdall, L.M., Alberta Research Council, P.O. Bag 4000, Vegreville, Alberta T9C 1T4, Canada.

304. **Dudley, S. (1998):** Large numbers of Common Darter *Sympetrum striolatum* in Great Yarmouth Cemetery, Norfolk. *Atropos* 4: 37. (in English).

[immigration of approximately 800 - 1000 specimens of *S. striolatum* on 6 September 1997 in UK]

Address: Dudley, S., PO Box 17, Thetford, Norfolk IP24 3ES, UK.

305. **Dudley, S. (1998):** My best day. *Atropos* 4: 33-34. (in English).

[report on a trip in 1997 to the Scottish Highlands with special emphasize to *Somatochlora arctica*, *Sympetrum nigrescens*, and *Aeshna caerulea*]

Address: Dudley, S., PO Box 17, Thetford, Norfolk IP24 3ES, UK.

306. **Dunkle, S. (1998):** DSA 1998 business meeting minutes. *Argia* 10(3): 6-8. (in English).

Address: Dunkle, S., Biol. Dept, Collin County Community College, 2800 E, Spring Creek Parkway, Plano, TX 75074, USA.

307. **Edelaar, P. (1988):** Het beoordelen van waarnemingen van zeldsame libellen. *Nieuwsbrief, Mededelingenorgan van de Nederlandse Vereniging voor Libellenstudie* 2(2): 4. (in Dutch).

[short report of the Dutch Commission for the valuation of records of rare Dragonflies]

Address: Edelaar, P., In de Potvis, De Dageraad 3, NL-1797 SK Den Hoorn, The Netherlands, e-mail: edelaar@nioz.nl.

308. **Edelaar, P. (1998):** Oproep tot bevestiging van mogelijke populaties van zeldsame libellen. *Nieuwsbrief, Mededelingenorgan van de Nederlandse Vereniging voor Libellenstudie* 2(2): 3. (in Dutch).

[appeal for confirmation of populations of rare dragonflies on special Netherlands localities; of special interest are *Sympetma fusca*, *S. paedisca*, *Cercion lindenii*, *Aeshna affinis*, *A. viridis*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Leucorrhinia albifrons*, *L. pectoralis*, *Orthetrum coerulescens*, *Sympetrum depressiusculum*, *S. fonscolombii*, *S. pedemontanum*]

Address: Edelaar, P., In de Potvis, De Dageraad 3, NL-1797 SK Den Hoorn, The Netherlands, e-mail: edelaar@nioz.nl.

309. **Elder, J.-F.; Fouillet, P. (1998):** Inventaire des odonates du département de la Manche. *Martinia* 14(2): 57-74. (in French with English summary).

[survey of the Odonata of the Département Manche, northwestern France; commented checklist of 49 species] Address: Elder, J.-F., Réserve Naturelle de Beauguillot, F-50480 Sainte-Marie-du-Mont, France.

310. **Elsby, K. (1998):** My best day. *Atropos* 5: 33-35. (in English).

[report on observations on dragonflies, butterflies, and birds in the New Forest region, UK]

Address: Elsby, K., Chapel House, Bridge Road, Colby, Norfolk NR11 7EA, UK.

311. **Engel, M.S. (1998):** *Megatypus parvus* spec. nov., a new giant dragonfly from the Lower Permian of Kansas (Protodonata: Meganeuridae). *Odonatologica* 27(3): 361-364. (in English).

[The new species from the Lower Permian (Wellington Shales, Elmo, Kansas, United States) is described and figured (holotype in MCZ, Harvard Univ., Cambridge, MS). It is differentiated from other *Megatypus* species by the termination of ScP before the wing apex, the smaller wing length, and the relative positions of SCP, RA and RP. A key is presented for the meganeurid genera (n = 3)

of North America and for the known species (n = 4) of the genus *Megatypus*.]

Address: Engel, M.S., Dept of Entomology, Comstock Hall, Cornell University, Ithaca, New York 14853, United States.

312. **Englund, R (1998):** Response of the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*), a candidate threatened species, to increases in stream flow. *Bishop Museum Occasional Papers* 56: 19-24. (in English).

Address: Englund, R., Hawaii Biol. Survey, Bishop Mus., 1525 Bernice St., Honolulu, HI 96817, USA.

313. **Evans, M.; Preddy, S. (1998):** County focus - The Bristol District. *Atropos* 5: 45-54. (in English).

[general description of the region with special emphasize on butterflies, moth, dragonflies, habitats, and distribution of the species]

Address: Preddy, S., 32 Raphael Court, Somerset St, Redcliffe, Bristol, BS1 6FF. e-mail: Steve.Preddy@cableinet.co.uk.

314. **Eversham, B.C.; Cooper, J.M. (1998):** Dragonfly species-richness and temperature: National patterns and latitude trends in Britain. *Odonatologica* 27(3): 307-316. (in English).

["The pattern of Odonata species-richness in Britain is mapped at 10 km resolution. This is strongly correlated with mean air temperatures. The relationship with seasonal and monthly mean temperatures is explored: summer temperatures are better predictors, of overall dragonfly richness than are winter temperatures. However, there appears to be some latitude variation in the relationship. Thus, in northern Britain, increasing Odonata richness is correlated with increasing summer temperatures for non-boreal species, and with decreasing winter temperatures for predominantly-boreal species; physiological adaptations of individual species are proposed as a possible explanation."]

Address: Eversham, B.C., Biological Records Centre, NERC Institute of Terrestrial Ecology, Monks Wood, Abbots Ripton, Huntingdon, Cambs PE17 2LS, United Kingdom.

315. **Faton, J.-M. (1998):** Les libellules (Odonata) de la Réserve naturelle des Ramières du Val de Drôme. *Inventaire et suivi des peuplements. Sympetrum* 11: 35-45. (in French).

[commented checklist of 36 Odonata known to occur in the Natural Biological Reserve of Val de Ramières, France]

Address: Faton, J.-M., Réserve Naturelle des Ramières, Maison des Ramières, F-26400 Alex, France.

316. **Faton, J.-M.; Villaret, J.-C., Deliry, C. (1998):** Observations complémentaires dans le Hautes-Alpes découverte de *Coenagrion caerulescens* (Fonscolombe, 1838) sur ce Département. *Sympetrum* 11: 11-16. (in French).

[checklist of the Odonata of 17 localities in the Département Hautes-Alpes, France, 2 males of *C. caerulescens* were discovered at an altitude of 1070m]

Address: Faton, J.-M., Réserve Naturelle des Ramières, Maison des Ramières, F-26400 Alex, France.

317. **Finck, P. (1998):** Der Einfluß von Probenahmezeitpunkt und -häufigkeit auf die Erfassung der Makroinver-

tebraten in Mittelgebirgsbächen. *Lauterbornia* 34: 245-254. (in German with English summary).

[The influence of sample timing and frequency on the recording of the macroinvertebrates in mountain brooks: The extent of recording of macroinvertebrates was studied in two brooks in the Eifel mountains in Northrhine-Westfalia, Germany, with timing and frequency of sampling varying. Additionally, the dominance structures of the biocoenosis indicating different habitat requirements were analysed. Recommendations are given for a minimum standard to guarantee the relevance and validity of the results for physical planning: not less than 4 samples per annum, obligatory in March, May, June, and September. *Calopteryx virgo* and *C. splendens* are recorded for the watercourses of Ahbach and Klausenbach.]

Address: Finck, P., Bundesamt für Naturschutz, Abt. Biotopschutz und Landschaftsökologie, Konstantinstr. 110, D-53179 Bonn, Germany.

318. **Fliedner, H. (1998):** Johann Franz Christian Heyer (1777-1864) und sein Beitrag zur Kenntnis der Libellen. 1. Teil. *Libellula* 17(1/2): 71-90. (in German with summaries in Latin and English).

["Recently, letters have turned up which Heyer, a low rank town officer of the city of Lüneburg, Germany, wrote to H.A. Hagen. Based on those letters a chapter of history of odonatology will be presented concerning that period in which more than half of the European Odonata taxa was described. Trading extensively with insects amateur entomologist, Heyer came into contact with many important entomologists. He discovered 4 species of Zygoptera; he gave reliable information about the regional odonate fauna of Lüneburg to scientists; due to his connections to certain scientists he was able to contribute to the enodation of the intricat synonymy of dragonflies; furthermore, he observed the behaviour of some species of dragonflies. The results of his observations were published by Hagen. The paper is completed by some notes on Heyers trade with insects."]

Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany.

319. **Förster, S. (1998):** Oviposition high above water in *Micrathyrta dictynna* Ris (Anisoptera: Libellulidae). *Odonatologica* 27(3): 365-369. (in English).

[A female of *Micrathyrta dictynna* was observed to attach eggs onto the underside of a leaf hanging more than 2 m above the water level of a small rainforest stream in Costa Rica (La Selva Biological Station, Puerto Viejo de Sarapiquí). "It was found that the eggs usually remain in this position until the larvae hatch. This type of oviposition, the first recorded in a member of the subfamily Brachydiplactinae, is similar to that of some Old World Tetratheminae and it is suggested to be a case of convergence due to similar environmental conditions. Its adaptive significance is discussed briefly." The author takes the minimizing of predation risk by fishes for the relevant factor for the reproductive strategy of *M. dictynna*. "This hypothesis is supported by the occurrence of many small fishes in the stream which were observed to react quickly to all objects dropping onto the water surface. Under this high potential predatory pressure the multi-layered egg mass of *M. dictynna* could be advantageous because of different developmental stages of the eggs and their different hatching times."]

Address: Förster, S., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany.

320. **Fossati, O.; Vallier, P.; Mosseron, M. (1998):** Macroinvertebrate assemblages in rivers of Nuku-Hiva, French Polynesia, before and after antisimulid treatments. *Arch. Hydrobiol.* 142(2): 229-240. (in English).

["Macroinvertebrate communities were observed in the rivers of Nuku-Hiva (Marquesas Islands, French Polynesia). Two sampling excursions were undertaken during hydrologically stable periods: April-May 1991 (before treatments) and March 1994 (one year after antisimulid applications using Abate to all the running waters on the island). Results from 55 hand-net samples (10 min each) revealed an altitudinal continuum and the effects of eutrophication. Effects of antisimulid treatments were not perceptible at this scale of observation." Odonata are treated on the family level. "Lestidae" were more abundant during 1991, and Coenagrionidae had similar abundances during 1991 and 1994.]

Address: Fossati, Odile, Museum National d'Histoire Naturelle, Antenne ORSTOM/Laboratoire d'Ichtyologie, 43, rue Cuvier, F-75231 Paris Cedex 05, France.

321. **Gaston, K.J.; Quinn, R.M.; Blackburn, T.M.; Eversham, B.C. (1998):** Species-range size distributions in Britain. *Ecography* 21(4): 361-370.

[The detailed forms of species-range size distributions in Britain are determined and contrasted for ten taxonomic assemblages (liverworts, vascular plants, molluscs [aquatic and terrestrial], dragonflies, macro-moths, butterflies, birds [breeding and wintering], mammals).]

Address: Gaston, K.J., Univ. Sheffield, Dept. Anim. and Plant Sci., Sheffield S10 2TN; Yorkshire, England.

322. **Gavory, L.; Dommanget, J.-L. (1998):** Redécouverte de *Leucorrhinia rubicunda* (L., 1758) en France (Odonata, Anisoptera, Libellulidae). *Martinia* 14(2): 47-52. (in French with English summary).

[(1) report on the discovery of a specimen in the Picardie region (Département Somme) in May 1998; a reproduction of the species at the discovery site is very unlikely because of unsuitable habitat; (2) discussion of possible records of *L. rubicunda* in 19. century in France]

Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France.

323. **Gerken, R. (1998):** Reproduktionsnachweis der Grünen Keiljungfer (*Ophiogomphus cecilia* Fourcroy 1785) am Unterlauf der Aller. *Beiträge zur Naturkunde Niedersachsens* 51: 155-157. (in German).

[report on the occurrence of *O. cecilia* in the River Aller (Administration district Verden, Lower Saxony, Germany); exuviae were found in 1992 and 1996]

Address: Gerken, R., Birkenweg 4, D-38678 Clausthal-Zellerfeld, Germany.

324. **Gibbins, C.N.; Moxon, J.B. (1998):** *Calopteryx splendens* (Harris) at edge of range sites in North-East England. *J. Br. Dragonfly Soc.* 14(2): 33-45. (in English).

[A survey of adult *Calopteryx splendens* (Harris) in the middle section of the River Wear, County Durham, UK was undertaken over the summers of 1994-96. The species was found in one new 10km square in the county and the survey confirmed its regular presence in another two. Flows in the Wear are regulated by inter-basin water transfers and pumped minewater releases, both of which result in considerable short-term flow change. Several sites occupied by *C. splendens* were also found to suffer water quality problems associated with sewage treatment works and contamination from minewaters. *C. splendens* may be more widespread in Durham than previously

thought and there is increasing evidence that it is present on many suitably slow-flowing rivers in north-east England. However, the species' presence at some sites on the Wear with relatively poor water quality and variable daily flow patterns remains puzzling. Detailed results are presented to water quality (physico-chemical characteristics, metals and nutrients) and sediment contamination, and its effects on *C. splendens*.]

Address: Division of Geography and Environmental Management, University of Northumbria, Newcastle upon Tyne NE1 8ST, UK.

325. **Glotzhober, R.C.; Riggs, D. (1998):** Adapting the Townes Malaise trap for collecting live Odonata. *Bull. American Odonat.* 5(3): 43-48. (in English).

Address: Glotzhober, R., Ohio Natural history society, 1982 Velma Ave., Columbus OH 43211-2497, USA.

326. **Görner, M. (1998):** Das Flächennaturdenkmal "Hautsee" in Thüringen. *Artenschutzreport* 7(1997): 63-64. (in German).

[preliminary checklist (11 Odonata) of the peat bog on the swimming island of the Lake Haut, Thuringia, Germany; a systematic survey of the lake started in 1998]

Address: Görner, M., Thymianweg 25, D-07745 Jena, Germany.

327. **Gorb, S.N. (1998):** Visual cues in mate recognition by males of the damselfly, *Coenagrion puella* (L) (Odonata: Coenagrionidae). *Journal of Insect Behavior* 11(1): 73-92. (in English).

[*Coenagrion puella* males search actively for mates and are not aggressive to other males. To study the role of visual cues in male-female discrimination, four types of models were used: (1) bodies of intact insects, (2) models of painted males, (3) models of male-female chimeras, and (4) models of female body parts. Abdomen coloration pattern and presence of wings were the most important cues for sexual recognition by males. Step-by-step elimination of male coloration pattern leads to an increase in the tandem response rate. ... The results indicate that *C. puella* males can distinguish males from females visually by morphological structures and coloration pattern. This study was financially supported by the International Dragonfly Fund.]

Address: Gorb, S.N., Inst. spez. Zool. und Evolutionsbiol., Univ. Jena, Erbertstr. 1, D-07743 Jena, Germany - E-mail: b6gost@pan.zoo.uni-jena.de.

328. **Goudsmits, K. (1998):** De Rivierrombout (*Gomphus flavipes*) terug in Nederland. *NVL-Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie* 3(2): 2. (in Dutch).

[Return of *Gomphus flavipes* to the Netherlands: report on the 1998 discovery of *Gomphus flavipes* in the surrounding of Nijmegen]

Address: Goudsmits, K., Eerste Dorpstraat 7a, NL-3701 HA Zeist, The Netherlands.

329. **Grand, D. (1998):** *Calopteryx haemorrhoidalis* & *Oxygastra curtisii* dans Le Rhône suite d'autres observations sur ce département. *Sympetrum* 11: 7-10. (in French).

[comments to, or new records in the Département Rhône, France of *Calopteryx haemorrhoidalis*, *Oxygastra curtisii*, *Gomphus vulgatissimus*, *Coenagrion mercuriale*, *C. scitulum* and *Sympetrum fonscolombei*]

Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mt d'or, France.

330. **Grand, D. (1998):** Confirmation de la reproduction de *Trithemis annulata* en France & observations odonotologiques diverses. *Sympetrum* 11: 17-23. (in French).

[interspecific copulations; high altitude records of *Gomphus pulchellus* and *Lestes barbarus*; emergence distance of larval *Aeshna cyanea*; *O. cancellatum*; confirmation of reproduction of *Trithemis annulata* in the Département Pyrénées-Orientales]

Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mt d'or, France.

331. **Grimm, K. (1998):** Eine kleine Libellen-Sammlung vom südlichen Bodenseegebiet, Kt. Thurgau, Schweiz. *Notul. odonatol.* 5(1): 9-10. (in German).

[list of 16 species, *Sympeca paedisca*, Switzerland]

Address: Grimm, K., Fruthwilerstr. 65d, CH-8272 Ermatingen, Switzerland.

332. **Günzel, W. R. (1998):** Akrobaten über dem Wasser. *Stadt Gottes* 6/98: 36-38. (in German).

[popular account on dragonflies in a well known German religious monthly, some nice colour photographs]

Address: not stated.

333. **Hämäläinen, M. (1998):** Additions to the Thai gomphid fauna. *Malangpo* 15: 133-136. (in English).

[16 species of Gomphidae which were not listed in Dr. S. Asahina's compilation on Thai Odonata (A list of the Odonata from Thailand. 1993. Bangkok) are treated. *Burmagomphus arthuri*, *Heliogomphus* sp. and *Nihonogomphus pulcherrima* are recorded from Thailand for the first time.]

Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; e-mail: matti.hamalainen@helsinki.fi.

334. **Hämäläinen, M.; Yeh, W.C. (1998):** *Aristocypha baibarana* (Matsumura, 1931), a good endemic species of Taiwan (Zygoptera: Chlorocyphidae). *Odonatologica* 27(3): 371-374. (in English).

[The taxon is considered clearly distinct from *Aristocypha* (*Rhinocypha*) *fenestrella* (Rambur, 1842). It is endemic to Taiwan and apparently restricted to the lower mountain zone in the central part of the island. A detailed description of the female, and additional remarks on distribution and habitat are given.]

Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; e-mail: matti.hamalainen@helsinki.fi.

335. **Hämäläinen, M. (1998):** *Rhinocypha pelops* and other gems of the Thai Caloptera fauna. *Malangpo* 15: 132-133. (in English).

[*Rhinocypha pelops*, *Libellago stigmatizans*, *Anisopleura subplatystyla* and *Philoganga montana* are recorded as new to Thailand.]

Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; e-mail: matti.hamalainen@helsinki.fi.

336. **Haritonov, A.YU.; Malikova, E.I. (1998):** Odonata of the Russian far East: A summary. *Odonatologica* 27(3): 375-381. (in English).

[The history of dragonfly research in the Russian Far East is traced from 1856, and an annotated checklist is given of the 92 hitherto recorded regional species. The biogeographical affinities of the Far-Eastern Odonata - differentiated for 10 regions and 5 subregions - are briefly pointed out.]

Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia.

337. **Heijden, A. van der (1998)**: Verslag van de lezingen van de Libellenstudiedag 1998 te Utrecht. Nieuwsbrief, Mededelingenorgan van de Nederlandse Vereniging voor Libellenstudie 2(2): 6-7. (in Dutch).

[report of the meeting of the Dutch odonatologists in Utrecht March 14, 1998; report on the dragonflies of Zeeland; turn-over of the dragonfly fauna of the bog of Fochteloeren; report on rare dragonflies near the Dutch - German border]

Address: not stated.

338. **Heise, S.; Schrack, M. (1998)**: Nachweis der Arktischen Smaragdlibelle (*Somatochlora arctica*) in der Radeburger Heide nördlich Dresden. Artenschutzreport 7 (1997): 37-39. (in German).

[status quo report on the distribution of *Somatochlora arctica* in the eastern Bundesländer of Germany; detailed description of the larval and imaginal habitat in the Radeburger Heide (Sachsen, Germany)]

Address: Heise, S., Bahnhofstr. 10, D-01471 Bärnsdorf, Germany.

339. **Held, J. (1998)**: Peregrines eating dragonflies. *Argia* 10(3): 16. (in English).

[At Montauk Point (Federal State?), USA, 18 *Falco peregrinus* (Aves) were observed eating - perched in trees - *Anax junius*.]

Address: Held, J.R., 639 West End Ave., New York, NY 10025, USA.

340. **Hermans, J. (1998)**: Oprichting Libellenstudiegroep van het Natuurhistorisch Genootschap. Nieuwsbrief, Mededelingenorgan van de Nederlandse Vereniging voor Libellenstudie 2(2): 1. (in Dutch).

[short report - illustrated with a map of the distribution of *Ichnura elegans* - on the status of the dragonfly record scheme in the province of Limburg (The Netherlands)]

Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands.

341. **Hill, P. (1998)**: Insects reported during January - June 1998. *Atropos* 5: 62-65. (in English).

[comments on observation dates of 10 Odonata species including *Sympetrum fonscolombeii* and *Anax parthenope* from UK]

Address: Hill, P.M.; 1 Clive Cottage, London Road, Allostock, Knutsford, Cheshire WA16 9LT, UK.

342. **Hill, P.M. (1998)**: Migrant Hawker *Aeshna mixta* in Cheshire. *Atropos* 4: 37. (in English).

[range extension of *A. mixta* in Cheshire, UK]

Address: Hill, P.M.; 1 Clive Cottage, London Road, Allostock, Knutsford, Cheshire WA16 9LT, UK.

343. **Hoefnagel, W.-J. (1998)**: Libellenfenologie in 1998. NVL-Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(2): 6-7. (in Dutch).

[Phenology of Odonata in 1998: listing of first records, recorder, and locality of specimens in The Netherlands in 1998]

Address: Hoefnagel, W.-J., Kreekelmeent 72, NL 1218 ED Hilversum, The Netherlands.

344. **Holusa, O. (1998)**: An interesting gleaning behaviour by *Lestes virens* (Charp.) (Zygoptera: Lestidae). *Notul. odonat.* 5(2): 19-20.

[observation of taking a leafhopper (Homoptera) from a spider's net]

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Mistek.

345. **Holusa, O. (1998)**: The occurrence of groups of *Hemianax ephippiger* (Burm.) on the eastern coast of continental Greece (Anisoptera: Aeshnidae). *Notul. odonatol.* 5(1): 10. (in English).

Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Mistek.

346. **Hong, S.J.; Ahn, J.H.; Woo, H.C. (1998)**: *Plagiorchis muris*: recovery, growth and development in albino rats. *Journal of Helminthology* 72(3): 251-256. (in English).

[*Metacercariae* of *Plagiorchis muris* (Plathelminthes: Digenea) were obtained from naturally infected dragonflies, *Sympetrum eroticum* (= second intermediate host)]

Address: Hong, S.J., Chung Ang Univ., Coll. Med., Dept. Parasitol., TONGJAK GU; Seoul 156756; South Korea.

347. **Horvath, G.; Bernath, B.; Molnar, G. (1998)**: Dragonflies find crude oil visually more attractive than water: Multiple-choice experiments on dragonfly polarotaxis. *Naturwissenschaften* 85(6): 292-297. (in English).

Address: Horvath, G., Dept. Biol. Phys., Eotvos Univ., Puskin U. 5-7, H-1088 Budapest, Hungary.

348. **Hunger, H.; Schiel, F.-J.; Röske, W. (1998)**: Die Gebänderte Heidelibelle - der Schmetterling unter unseren Libellen! *Naturschutzinformation der Schutzgemeinschaft Libellen in Baden-Württemberg* 4: 1. (in German).

[Compilation of data on the distribution of *S. pedemontanum* in Baden-Württemberg, Germany with notes on the habitat.]

Address: Röske, W., Kandelstr. 26, D-79106 Freiburg, Germany.

349. **Ishizawa, N. (1998)**: Thermoregulation in *Sympetrum frequens* (Selys) with notes on other *Sympetrum* species (Anisoptera: Libellulidae). *Odonatologica* 27(3): 317-334. (in English).

[Thermoregulation in *S. frequens* was investigated throughout its adult life, from emergence to reproduction. Data were analyzed by the least squares method. Body temperature was highly correlated to ambient temperature in the sun in the teneral stage and as the life stage advanced the correlation of body temperature to ambient temperature was lowered. Sexual differences were confirmed on thermoregulation; in the male the correlation decreased, whereas, in the female it decreased less. Males have lower body temperatures at high ambient temperatures than the females, and when ambient temperatures were low at the reproductive period in autumn, they maintained high body temperatures. The sexual difference of body temperatures ranged 2.5-3.4°C. This seems to be due to the sexual difference in body size. Females have smaller thorax and are likely to be influenced by ambient temperature. Because of the small thorax, females seem to be tolerant of high ambient temperature. High body temperature in ovipositing males were not caused by metabolic heat production at the tandem flight, but by the elevation of it during copulation. At low ambient tem-

peratures males were seen warming up at the last stage of copulation. Body temperature in non-contact ovipositing females approximated to that of ovipositing males in tandem and the duration of the former was shorter than that of the latter. *S. frequens*, in spite of small size and disadvantage for warm-up, is a periodic endotherm." Additional data are presented for *S. darwinianum*, *S. parvulum*, *S. eroticum*, *S. infuscatum*, and *Anotogaster sieboldii*.]

Address: Ischizawa, N., Yamaguchi 1644-15, Tokorozawa, Saitama 359-1145, Japan.

350. **Jacobsen, D.; Encalada, A. (1998):** The macroinvertebrate fauna of Ecuadorian highland streams in the wet and dry season. *Arch. Hydrobiol.* 142(1): 53-70. (in English).

[examination of the community structure and functional feeding groups of the macroinvertebrate fauna; "The abiotic environment of the streams was highly unstable with great variability in discharge during the wet season, but relatively constant during the short dry season. Overall, the number of individuals and species were significantly higher in the dry season than in the wet season. In all streams the composition of the fauna differed markedly between the two seasons, but no consistent change in the community structure and proportions of functional feeding groups was found ... Collector-browsers were the most numerous organisms while filterers, predators and shredders were much less important. Maximum stream temperature was the single environmental parameter that best explained the variability in community structure among the streams ... The instability of these tropical Andes streams is probably the main feature structuring the invertebrate fauna. The streams may be alternating between a stochastic community structure during the wet season and early successional stages dominated by organisms with a fast growth and high colonisation capacity during the dry season." 'Aeshnidae' are reported for 3 streams.]

Address: Jacobson, D.; Freshwater Biological Laboratory, University of Copenhagen, 51 Helsingorsgade, DK-3400 Hillerød, Denmark.

351. **Jarzembowski, E.A.; Martinez Delclos X.; Bechly, G.; Nel, A.; Coram R.; Escullie, F. (1998):** The Mesozoic non-calopterygoid Zygoptera: description of new genera and species from the Lower Cretaceous of England and Brazil and their phylogenetic significance (Odonata, Zygoptera, Coenagrionoidea, Hemiphlebioidea, Lestoidea). *Cretaceous Research* 19 (3-4): 403-444. (in English).

[The earliest fossils which belong to the Coenagrionoidea (or Hemiphlebioidea), *Parahemiphlebia cretacea* gen. nov., sp. nov., and *P. allendaviesi* sp. nov., from the Lower Cretaceous of Brazil and southern England respectively, have non-petiolated wings. Consequently, a long wing petiolation may result from evolutionary convergence between different superfamilies of Zygoptera: Calopterygoidea, Lestoidea, Coenagrionoidea and (to a lesser degree) ... The phylogenetic position of the Lower Cretaceous genus *Cretacoenagrion* Jarzembowski 1990 from the Wealden of the Weald is discussed and several new genera and species of Wealden Zygoptera are described from southern England, viz. *Cretarchistigma greenwoodi* gen. nov., sp. nov. (questionably placed in the subfamily Euarchistigmatinae), *Cretahemiphlebia rossi* gen. nov., sp. nov. (family undetermined) and *Cretalestes martinae* gen. nov., sp. nov. (lestoid?)]

Address: Jarzembowski, E.A., Maidstone Museum and Art Gallery, Maidstone ME14 1IH, Kent, England.

352. **Jennions, M.D. (1998):** Tibial coloration, fluctuating asymmetry and female choice behaviour in the damselfly *Platycypha caligata*. *Animal Behaviour* 55(6): 1517-1528. (in English).

[The territorial damselfly *Platycypha caligata* (Odonata: Chlorocyphidae) has a courtship behaviour where males wave the white anterior surface of all six laterally enlarged tibiae at females. I experimentally altered this white tibial surface using black paint to determine the effect on male behaviour of a 25% reduction in area, or an increase in asymmetry between the left and right side of the body. I collected behavioural data on courtship, mating and fighting for males already holding territories. Neither a reduction in the area nor an increase in asymmetry of tibial whiteness affected male mating rate, courtship rate or fighting behaviour. ... However, the natural area of tibial whiteness was significantly positively related to both mean male mating rate and copulation duration for territorial males. This result suggests that a phenotypic correlate of area of tibial whiteness, probably body size, is sexually selected through female choice among males that already hold territories.]

Address: Jennions, M.D., Smithsonian Tropical Res. Inst., Unit 0948, APO AA 34002-0948, USA.

353. **Jödicke, R. (1998):** Autumnal dragonfly records from the Alanya region, Turkey. *Notul. odonatol.* 5(1): 10-11. (in English).

[6 localities in the foothills of the Taurus Mts were visited in second half of September; a list of 12 species including *Pantala flavescens* which is considered the westernmost record in Turkey, is presented]

Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany.

354. **Jödicke, R. (1998):** Extraordinary flight dates of *Ceragrion tenellum* (De Vill.) in NW Germany (Zygoptera: Coenagrionoidea). *Notul. odonat.* 5(2): 20-21. (in English).

[phenologic data mostly from Lower Saxony, Germany]

Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany.

355. **Jödicke, R. (1998):** Indizien für gelegentliches Abtauchen weiblicher *Lestes virens vestalis* Rambur bei der Eiablage (Zygoptera: Lestidae). *Libellula* 17(1/2): 107-108. (in German with English summary).

[Indication of occasionally submerged oviposition in female *L. virens* is evidenced by the fact that body and wings were completely coated with thin layer of damp mud, while the tandem males indicated no trace of mud.]

Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany.

356. **Johnson, J. (1998):** *Stylurus olivaceus* in Washington and Oregon. *Argia* 10(3): 20-22. (in English).

["During late summer of 1997, the known distribution of *S. olivaceus* in the Pacific Northwest changed significantly with discoveries of healthy populations along the lower Columbia River in Clark and Cowlitz Counties, Washington, and Multnomah County, Oregon", USA. (Author)]

Address: not stated.

357. **Johnson, J., Paulson, D. (1998):** *Enallagma civile* recorded in Oregon. *Argia* 10(3): 22-23. (in English).

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA.

358. **Jurzitza, G. (1998):** Obituary: Luis Peña Guzman. *Notul. odonat.* 5(2): 22-23. (in English).
Address: Jurzitza, G., Reimuthstr. 27, D-76187 Karlsruhe, Germany.

359. **Kalkman, V. (1998):** Nieuwe voortplantingsplaats Bandheidelibel (*Sympetrum pedemontanum*). NVL-Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(2): 3. (in Dutch).
[New reproduction locality of *S. pedemontanum*: report on the record of the species in the Netherlands region of Kempen]
Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands.

360. **Kiauta, B. (1998):** An interesting old observation on dragonfly behaviour at the seaside, Indonesia. *Notul. odonat.* 5(2): 21. (in English).
[note on behaviour of undetermined dragonflies of Pulu Panggang Island (Pulau Seribu Island, Java Sea, NW of Jakarta) from the beginning of the 20th century]
Address: Kiauta, B., P.O. Box 256, NL-3720 AG Bilthoven, The Netherlands.

361. **Klass, K.D. (1998):** The proventriculus of the Dicondylia with comments on evolution and phylogeny in Dictyoptera and Odonata (Insecta). *Zoologischer Anzeiger* 237(1): 15-42. (in English).
[Striking similarities in the proventriculi (gizzards) of Lepismatidae (*Zygentoma*), Blattellidae (Dictyoptera), and nymphal Corduliidae (Odonata) permit the reconstruction of the ground-plan of Dicondylia: Six major plicae, each with a large denticle-bearing sclerite anteriorly and a smaller pulvillus posteriorly, are present in a hexaradial arrangement. ... Within Odonata, Corduliidae are closest to the ground-plan, but the unpaired plicae are reduced. In the derived condition the proventriculus of Odonata has a tetradial symmetry with the bilateral symmetry lost. ... This study gives also insights into the evolution of symmetry relations and reveals some unusual aspects of serial homology. Many homoplasies were found in the evolution of the proventriculus of Dictyoptera and Odonata.]
Address: Klass, K.D., Ludwigs Maximilian Univ., Inst Zool., Karlstr 23, D-80333 Munich; Germany.

362. **Klein, J.-P.; Berchtold, J.-P. (1998):** Les odonates des réserves naturelle rhénanes d'Erstein, d'Offendorf et de Rhinau (Bas-Rhin, France): statute et menaces. *Martinia* 14(1): 3-18. (in French with English summary).
[commented checklist of the dragonfly fauna from 3 localities in the north-eastern most Département in France; between 1993 and 1996 44 species were recorded; 24 species listed in red data lists document the importance of the Rhine floodplain for dragonflies; the discovery of a population of *Leucorrhinia caudalis*, one of the most threatened dragonfly species in Europe, is of very special interest]
Address: Klein, J.-P., Centre d'Analyses et de Recherches, Département d'Hydrologie et d'Environnement, Université Louis Pasteur, 76, route du Rhin, F-67400 Illkirch-Graffenstaden.

363. **Kleine-Büning, J.; Sander, U.; Koch-Siepe, M. (1998):** Naturschutzgroßprojekt Hammeniederung, Niedersachsen. *Natur und Landschaft* 73(7/8): 312-319. (in German with English summary).

["As part of the Teufelsmoor the 'Hammeniederung' is one of the last large-scale wetlands of northwest Germany. Due to extensive flooding in winter the area is important for northern migrating birds. In spring it provides an important breeding site for rare grassland birds. Since 1995, 2715 ha of the 'Hammeniederung' have been included in the Federal program for the establishment and protection of valuable natural areas and landscapes of national importance..."] *Aeshna viridis* is one of the 33 species of Odonata in this region.]
Address: Kleine-Büning, J., c/o Landkreis Osterholz, Planungs- und Naturschutzamt, Osterholzer Str. 23, D-27711 Osterholz-Scharmbeck, Germany.

364. **Knitter, H. (1998):** In situ fixation of intact tandem linkages of Zygoptera in the field. *Odonatologica* 27(3): 383-390. (in English).
["By means of the fixation of different copulation stages of 17 European species (16 Zygoptera, 1 Anisoptera) the possible use and limitation of a new fixation method, using chloroethane, is described. Only in 2 spp. did the fixation attempts fail. In 15 cases the contact points of the tandem linkage could be analysed. The best phase for fixation is the wheel position; only in *Lestes* and some *Coenagrionidae* is the postcopulatory tandem suitable as well. If both the inferior and superior male appendages act like forceps, as in *Calopteryx*, only a few attempts are necessary to yield fixations of high quality. In other species up to ten pairs are required to achieve satisfactory results to evaluate the contact points of the tandem linkage." (Author) Tandem linkages of *Platycnemis latipes*, *Lestes barbarus*, *Lestes virens* and *Coenagrion mercuriale* are pictured.]
Address: Knitter, H., Institut für Ökologie und Evolutionsbiologie, Universität Bremen, Postfach 330440, D-28334 Bremen, Germany.

365. **Koperski, P. (1998):** Feeding in epiphytic, carnivorous insects: resource partitioning and the avoidance of intraguild predation. *Arch. Hydrobiol.* 142(4): 467-483. (in English).
["The gut contents of larval *Enallagma cyathigerum* (Zygoptera: Odonata), *Cymus flavidus* (Polycentropodidae: Trichoptera) and *Ablabesmyia monilis* (Tanyptodinae: Chironomidae) feeding in nature and in experimental aquaria, were analysed. The diet of *C. flavidus* overlapped greater with the diet of *A. monilis* than with the diet of *E. cyathigerum*. Feeding intensity and diet composition in *C. flavidus* and *A. monilis* were different in experimental aquaria with and without *E. cyathigerum*. Weights of their food and mean weights of their prey were lower in the presence of the latter when compared with the control, while the number of prey items was not. The proportions of active prey items in diets of *C. flavidus* and *A. monilis* were higher in the presence of *E. cyathigerum* but the numbers of such prey items were higher in the diet of *C. flavidus* only. These differences are probably caused by reduced predator mobility during feeding, not by a behavioural response from prey. Induced changes in feeding activity are considered an effect of a behavioural defence mechanism reducing the risk of intraguild predation." (Author) Study site: Lake Ros in northern Poland]
Address: Koperski, P., Dept Hydrobiol., Univ. Warsaw, Banacha 2, PL-02 097 Warsaw, Poland.

366. **Kuhn, J. (1998):** Ein neuer Fund von *Lestes macrostigma* (Eversmann) in Bayern (Zygoptera: Lestidae). *Libellula* 17(1/2): 97-101. (in German).

["A mature male was found in the Nature Reserve 'Murnauer Moos' in southern Bavaria on 14 August 1997, which is the first record in Germany since 1954. The site is characterized ecologically and its dragonfly fauna is listed. The Murnau-Garmisch-Mittenwald-Weilheim region is particularly rich in records of southern and eastern dragonfly species. Possible migration routes are briefly discussed."]

Address: Kuhn, Joachim, Umweltforschungszentrum Leizig-Halle, Permoser Str. 15, D-04318 Leipzig, Germany.

367. **Lasswell, J.L.; Mitchell, F.L.; Bjork, C. (1998):** Historical collection of Odonata from the Navasota river drainage in southeast Texas. *Southwestern-Entomologist* 23(2): 189-198.

[List of 46 dragonfly (Odonata: Anisoptera) and 22 damselfly (Odonata: Zygoptera) species collected from 65 sites throughout the Navasota River Drainage (8 families, 33 genera, and 68 species of Odonata).]

Address: Lasswell, J.L., Texas A and M Univ., Agric. Res. Extension Cent., Rt. 2 Box 00, Stephenville, TX 76402, USA.

368. **Laurent, S.; Papazian, M. (1998):** Les odonates de lagunes de l'île de Porquerolles (Département du Var). *Martinia* 14(2): 53-55. (in French with English summary).

[Due to the creation of water clearing basins in 1980 on the Island of Porquerolles in the Mediterranean Sea southeast of Toulon (France), 12 species of Odonata could be observed in the meantime. 11 of them are considered to find suitable breeding conditions in these basins, while prior the creation of the basins only one species was known (one record dated in 1977).]

Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France.

369. **Le Calvez, V.; Bernier, C. (1998):** Observation d'Odonates lors des VIIèmes rencontres internationales des clubs CPN (Frouville, département du Cal-d'Oise). *Martinia* 14(1): 22. (in French).

[report of the meeting with more than 400 participants of the French youth society "Connaître et Protéger la Nature"; between 21 and 25 August 1997; 14 species were recorded of which *Aeshna grandis*, *Cordulegaster boltonii*, and *Sympetrum danae* are considered of special interest for the region Île de France]

Address: Le Calvez, V., 3, allée Bullant, F-93290 Tremblay-en-France, France.

370. **Lederer, P. (1998):** New dragonfly records for New York. *Argia* 10(1): 10. (in English).

[*Erythrodiplax minuscula*, *Pantala hymenaea*, *Tramea abdominalis*]

Address: not stated.

371. **Leeper, D.A.; Taylor, B.E. (1998):** Insect emergence from a South Carolina (USA) temporary wetland pond with emphasis on the Chironomidae (Diptera). *Journal of the North American Benthological Society* 17 (1): 54-72. (in English).

[At Rainbow Bay, a 1.5 ha temporary wetland pond in South Carolina, 115 taxa of aquatic and semi-aquatic insects from 29 families representing 7 orders (Diptera, Coleoptera, Hemiptera, Trichoptera, Megaloptera, Odonata, Ephemeroptera) were collected using emergence traps from March 1992 through June 1993, a period including 2 hydroperiod cycles.]

Address: Leeper, D.A., Southwest Fla. Water Management District, 2379 Broad Street, Brooksville, FL 34609-6899, USA.

372. **Lempert, J. (1998):** *Erythromma viridulum* (Charpentier) und *Sympetrum fonscolombii* (Selys) auf Helgoland (Zygoptera: Coenagrionidae; Anisoptera: Libellulidae). *Libellula* 17(1/2): 109-112. (in German).

[northmost record of *E. viridulum*; northmost breeding record of *S. fonscolombii*; roosting behaviour (dormitories) of *E. viridulum*; checklist of 10 species based on a short visit from 31 July to 1 August 1997 on Helgoland (North Sea)]

Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany.

373. **Lempert, J. (1998):** Zum Fortpflanzungsverhalten von Libellen (Odonata) im Tropischen Regenwald von Liberia. In: Gaida, K.G. (Ed.): *Zeitvertreib. Wo sind WIR stehengeblieben*. Band II. Salon Verlag, ISBN 3-932189-63-9: 71-79. (in German).

[16 black and white photographs (mostly) demonstrating reproductive behaviour of Odonata from the tropical cloud forest in Liberia (Africa): *Prodasineura villersi*, *Chlorocnemis elongata*, *Chlorocypha glauca*, *C. selysi*, *C. dispar*, *Allorrhizucha klingi*, *Porpax bipunctulatus*, *Tetrathemis godiardi*, *Malgassophlebia bispina*]

Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany.

374. **Macklin, R. (1998):** Numbers of Yellow-winged Darter *Sympetrum flaveolum* at North Warren and Aldringham Walks RSPB reserve, Suffolk in 1995-1997. *Atropos* 4: 37-38. (in English).

Address: Macklin, R., Race Walk, Priory Road, Snape, Saxmundham, Suffolk IP17 1SD, UK.

375. **Male-Malherbe, E. (1998):** Confirmation de la présence d'une population d'*Epithea bimaculata* (Charpentier, 1825) dans le département de l'Indre (Odonata, Anisoptera, Corduliidae). *Martinia* 14(1): 30. (in French).

Address: Male-Malherbe, E., 38, La Gabrière, F-36220 Lingé, France.

376. **Malkmus, R. (1998):** Frühjahrsbeobachtungen von Libellen in Portugal. *Libellula* 17(1/2): 91-96. (in German).

[checklist of 26 species observed between 24 March and 15 April 1997 at 30 localities in southern and central Portugal; records of *Lestes macrostigma* or *Macromia splendens* are of some biogeographical resp. faunistic interest]

Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany.

377. **Manteifel, Y.B.; Zhushev, A.V. (1998):** Behavioural reactions of the tadpoles of four anuran species to chemical stimuli from predators. *Zhurnal Obshchei Biologii* 59(2): 192-208. (in Russian).

[Behavioural reactions of single tadpoles of 4 anuran species inhabiting Moscow region (*Bufo bufo* L., *Rana arvalis* Nilss., *R. lessonae* Cameron and *R. temporaria* L.) to 11 natural chemical stimuli were studied using the choice between test-stimulus and clean water (the control). These stimuli were excretions of potential predators (fish *Rutilus rutilus*, *Perca fluviatilis*, *Gymnocephalus cernuus*, *Percocottus glenii*, larvae of dragonfly *Aeshna grandis* or crayfish *Astacus astacus*), on alarm signal (extract of crushed conspecific tadpole), excretions of nonpredatory mollusc *Limnaea stagnalis* and conspecific tadpoles,

tadpoles, or, for comparison, potentially food stimuli (extract of the silt from native pool and extract of boiled nettle *Urtica dioica*). It was shown that tadpoles avoided most of stimuli, especially excretions produced by potentially predators (fish *R. rutilus*, *P. fluviatilis* and *P. glenii*, dragonfly larvae) as well as an alarm signal.]

Address: Manteifel, Y.B., Russian Acad. Sci., An. Severtsov Inst. Ecol. and Evolut., Leninsky Pr. 33, Moscow 117071, Russia.

378. Marden, J.H.; Fitzhugh, G.H.; Wolf, M.R. (1998): From molecules to mating success: Integrative biology of muscle maturation in a dragonfly. *American Zoologist* 38 (3): 528-544.

[Here we present an overview of a wide-ranging study of dragonfly muscle maturation that reveals i) ecological changes in the need for efficient versus high-performance flight, ii) organism-level changes in performance, thermal physiology, locomotor mechanics, and energy efficiency, iii) tissue-level changes in muscle ultrastructure and sensitivity to activation by calcium, and iv) molecular-level changes in the isoform composition of a calcium regulatory protein in flight muscle (troponin-T).]

Address: Marden, J.H., Dept. Biology, 208 Mueller Laboratory, Pa. State Univ., University Park, PA 16802, USA.

379. Matura, T.; Nomura, K.; Kamatsu, K. (1998): Ecological studies of odonate larvae living in artificial ponds in an urban area: Occurrence of larval *Sympetrum striolatum imitoides* and its life history in primary school swimming pools. *Japanese Journal of Ecology (Tokyo)* 48(1): 27-36. (in Japanese with English Summary).

[As a part of a research program on the ecology of odonate larvae inhabiting artificial ponds, we surveyed outdoor swimming pools of primary schools in Kyoto City every late spring. During a 4 year period, 11 species of odonate larvae (Libellulidae, Aeshnidae, Gomphidae and Coenagrionidae : 7, 1, 1 and 2 species, respectively) were collected. ...]

Address: Matura, T.; Nomura, K.: Dept. Biol., Kyoto Univ. Educ., Fushimi-ku, Kyoto 612-0863, Japan.

380. Mauersberger, R. (1998): Naturschutzprojekt Uckermärkische Seen, Brandenburg. *Natur und Landschaft* 73(7/8): 320-326. (in German with English summary).

["The central feature of the nature conservation project 'Uckermärkische Seen' in NE Germany is a glacially formed landscape containing many lakes, bogs and swamps of various types and several endangered Europe species of plants and animals ... The strategy of the project is to purchase areas which include ecosystems and habitats of national importance or these regions which have a bearing on it. One of the main problems for the project has been that state-owned properties have been sold to private persons or corporations in the eastern part of Germany with no regard for state-controlled and financed nature conservation projects." Among the most noteworthy Odonata of the region are *Nehalennia speciosa*, *Aeshna viridis*, *Gomphus vulgatissimus*, *Leucorrhinia pectoralis*, *L. albifrons* and *L. caudalis*.]

Address: Mauersberger, R., c/o Förderverein Feldberg-Uckermärkische Seenlandschaft e.V., Am Markt 12, D-17268 Templin, Germany.

381. Mauffray, B. (1998): Another new record for the U.S. from Arizona. *Argia* 10(3): 24. (in English).

[*Brechmorhoga pertinax*]

Address: Mauffray, B., 3906 N.W. 32nd Pl., Gainesville, FL 32606, USA. e-mail: iori@afn.org.

382. Mauffray, B. (1998): Some new Georgia Odonata records. *Argia* 10(3): 24. (in English).

[Additions to the Georgia Odonata list in prep.; 8 previously unrecorded species are listed: *Gomphus apoymius*, *G. diminutus*, *Ophiogomphus edmodo*, *O. mainensis*, *Helocordulia uhleri*, *Neurocordulia obsoleta*, and *Soma-tochlora tenebrosa*]

Address: Mauffray, B., 3906 N.W. 32nd Pl., Gainesville, FL 32606, USA. e-mail: iori@afn.org.

383. May, M. (1998): Comments on *Enallagma* problems. *Argia* 10(1): 24. (in English).

Address: May, M.L., Dept Entom. & Econ. Zool., Cook College, Rutgers Univ., New Brunswick, NJ 08903.

384. May, M. (1998): Erratum: New Jersey list. *Argia* 10(1): 26. (in English).

Address: May, M.L., Dept Entom. & Econ. Zool., Cook College, Rutgers Univ., New Brunswick, NJ 08903.

385. May, M.L. (1998): Body temperature regulation in a late-season dragonfly, *Sympetrum vicinum* (Odonata: Libellulidae). *International Journal of Odonatology* 1(1): 1-13. (in English).

["Body temperature regulation and behavioral responses to temperature variation in the field were investigated in *Sympetrum vicinum*, a common North American libellulid that is most abundant as a mature adult in autumn. Because of its late flight season, this species is faced regularly with cooler environmental temperatures than most dragonflies investigated heretofore. By virtue of postural adjustments and perch selection, individuals are able to maintain both thoracic and head temperatures within a relatively narrow range even at ambient temperature as low as 10 °C. Physiological adaptations, including relatively low minimum temperature for effective flight and relatively rapid digestive function at low temperature, also enhance their ability to cope with cool conditions. Copulation and tandem oviposition and mate guarding interfere with the ability to regulate body temperature, although oviposition was observed at air temperature as low as 14°C." (Author) study sites: various locations in Middlesex County, New Jersey, USA]

Address: May, M.L., Dept Entom. & Econ. Zool., Cook College, Rutgers Univ., New Brunswick, NJ 08903.

386. Mayhew, P.J. (1998): Daily activity rhythms in adult Odonata examined with a dynamic programming model. *Netherlands Journal of Zoology* 48(2): 101-119. (in English).

[I parameterize for adult male Odonata a published dynamic programming model which solves for optimal diurnal activity rhythms. ... The model makes explicit some general principles about the factors governing odonate activities and illustrates how some dynamic models may be applicable to a variety of biological systems.]

Address: Mayhew, P.J., Inst. Evol. Ecol. Sci., Kaiserstr. 63, P.O. Box 9516, 2300 RA Leiden, Netherlands.

387. McLean, I.F.G. (1998): Changes to the list of Protected Invertebrates in Britain. *Atropos* 5: 72-73. (in English).

[species included in lists of protected invertebrates in Britain are *Coenagrion mercuriale*, and - as addition by the Editors of *Atropos* - *Aeshna isosceles*. "It is illegal to collect, harm or disturb them in any of their stages"]

Address: McLean, I.F.G., JNCC, Monkstone House, City Road, Peterborough PE1 1JY. e-mail: mcleani@jncc.gov.uk.

388. **McPeck, M.A.; Peckarsky, B.L. (1998):** Life histories and the strengths of species interactions: Combining mortality, growth and fecundity effects. *Ecology* 79(3): 867-879. (in English).

[Here we develop a demographic model describing the life history of a hemimetabolous insect to evaluate the relative importance of predator effects on mortality and growth of damselflies (*Enallagma boreale*) in fishless ponds and mayflies (*Baetis bicaudatus*) in trout streams. Previous experiments have shown that dragonfly predators in fishless ponds inflict direct mortality and cause reduced growth rates in *Enallagma* damselflies.]

Address: McPeck, M.A. Dept. Biol. Sci., Dartmouth Coll., Hanover, NH 03755, USA.

389. **Mielewcyk, S. (1998):** Materials to the knowledge of the water entomofauna (Odonata, Heteroptera, Coleoptera) of the fishponds near Siedlce as the proposed nature reserve "Rybakówka". *Rocznik naukowy Polskiego towarzystwa ochrony przyrody "Salamandra"* 2: 109-118. (in Polish with English summary).

[The studies were carried out in the late spring and early autumn of 1997 in the fish ponds "Rybakówka" bordering the Siedlce town (eastern Poland). 15 species of Odonata, 15 of Heteroptera, and 30 of Coleoptera (water A-dephaga and Hydrophilidae) were recorded. A numerous occurrence of *Sympetma braueri* and larvae of *Orthetrum albistylum* is a characteristic feature of odonate fauna of these ponds. For *Orthetrum albistylum* is the northernmost locality in Europe. Predominating species among Coleoptera - *Haliphus flavicollis* and *Laccophilus hyalinus* show cleanness of water and a low degree of eutrophy. From a quantitative point of view, entomofauna is fairly poor because it stays under feeding pressure from fish and water birds. Besides, because shore waters are densely overgrown with *Typha angustifolia* and *Phragmites communis*, unfavourable conditions for water insects are created. However, despite these elements, fauna of these ponds is interesting and needs further studies. The richness of flora and avifauna as well as species composition of water insects under study are the main arguments for postulating, a setting, up of a floristic-faunistic reserve of didactic nature." (Author)]

Address: Mielewcyk, S., Polska Akademia Nauk, Zakład Badan Środowiska Rolniczego i Lesnego, ul. Bukowska 19, PL-60-809 Poznan, Poland.

390. **Mitchell, R. (1998):** The behavior of *Arrenurus* larvae (Acari: Hydrachnidea) parasitizing diptera. *Acarologia* 39(1): 49-55. (in English).

[In order to parasitize an adult fly, larval water mites must be pulled through the surface film of the water by the fly as it emerges from the pupal skin. ... *Arrenurus* larvae attacking Odonata show a very different set of traits because they do not have to penetrate the surface of the water, and have minutes, rather than seconds, to selectively attach to hosts that can support hundreds, rather than tens of larval mites.]

Address: Mitchell, R., Acarol. Lab., Museum Biodiversity, 1315 Kinnear Road, Columbus, OH 43212, USA.

391. **Mochizuki, A. (1998):** Characteristics of digestive proteases in the gut of some insect orders. *Applied Entomology and Zoology* 33(3): 401-407.

[Gut proteases of 20 species from 13 insect orders were characterized by activity staining after polyacrylamide gel electrophoresis and the effect of class-specific protease inhibitors on their zymogram. Species in Orthoptera, Dictyoptera, Lepidoptera and Hymenoptera mainly had serine proteases in their gut. Those in Ephemeroptera, Odonata, Plecoptera and Hemiptera had cysteine proteases. Those in Coleoptera, Neuroptera, Mecoptera and Diptera had both serine and cysteine proteases in their gut. The protease class of each species tended to reflect phylogenetic relationship rather than feeding habit.]

Address: Mochizuki, A, Tohoku Natl. Agr. Exptl. Stn., Aki-ta 0140102; Japan.

392. **Mochizuki H.; Masuda, K.; Komaki, H. (1998):** Flow measurement around flapping dragonflies. *Memoirs of the Faculty of Agriculture (Kagoshima University)* 34 (43): 123-134.

[Flow patterns generated by the flapping of dragonflies (*Sympetrum frequens* and *Pantala flavescens*) were investigated in the wind tunnel]

Address: Mochizuki H.; Masuda, K.: Lab. Agric. Phys., Fac. Agric., Kagoshima Univ., Kagoshima, Japan.

393. **Moulton, K. (1998):** Dragonflies observed during hawk watch - Kestrels reveal how they catch them! *Argia* 10(3): 15-16. (in English).

[(1) Report on a dragonfly migration 15 miles north of Doylestone and in North Wales, Pennsylvania, USA. (2) Observation of a Kestrel who picked off 20 dragonflies within 15 minutes. "The capture technique was to come in front of rear, swoop underneath the dragonfly, flip upside down, talons up and extended, and capture the dragonfly from the belly side."]

Address: only e-mail stated: kirk.moulton@unisys.com.

394. **Müller, F.; Kolb, K.-H. (1998):** Das Birkhuhn (*Tetrao tetrix*) - Leitart der offenen Kulturlandschaft in der Hohen Rhön. *Artenschutzreport* 7(1997): 29-37. (in German).

[description of the habitat of *Tetrao tetrix* (Aves); documentation of the bioindication value of *T. tetrix* as shelter species for many highly endangered species including some Odonata; short checklist of Odonata including *Somatochlora arctica* and *Leucorrhinia pectoralis* from the nature protection reserve "Rotes Moor" (Bayern, Hessen, Germany)]

Address: Kolb, K.-H., Biosphärenreservat Rhön, Marktstr. 41, D-97656 Oberelsbach, Germany.

395. **Muzón, J.; Ellenrieder, N. von (1998):** Odonata. In Morrone, J.-J. & S. Coscarón (Eds.): *Biodiversidad de Artrópodos Argentinos. Una perspectiva Biotaxonómica*. Ediciones SUR: 14-25. (in Spanish with short English summary).

[This chapter on Odonata presents short but most recent information on current research on Odonata with special reference to the Argentine Odonata. In a more general part it documents current phylogenetic discussion on the Order Odonata, gives a general introduction in morphology and biology, and the economic and aesthetic importance of dragonflies. In the special Argentine part a short overview on odonatological history including surveys and collections is given. Some emphasis is given to systematics including a commented checklist of the 261 species so far known to Argentina (Appendix). Some remarks are made to biogeography, cytogenetics, and ecology of the Argentine Odonata. An extensive bibliography, including

the main literature closes this contribution on Argentine dragonflies.]

Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina.

396. **Nel, A.; Jarzembowski, E.A. (1998):** New protomyrmeleontid dragonflies from the Lower Cretaceous of southern England (Insecta, Odonata, Archizygoptera). *Cretaceous Research* 19 (3-4): 393-402. (in English).

[*Protomyrmeleon cretacicus* sp. nov.; *Saxomyrmeleon keatingei* gen. et sp. nov.; and a *Protomyrmeleontidae* gen. et sp. Indet.]

Address: Nel, A, Museum Natl. Hist. Nat., Entomol. Lab., 45 Rue de Buffon, F-75005 Paris, France.

397. **Nelson, S. (1998):** Dragonfly attacks Goldfinch! *Argia* 10(3): 15. (in English).

[Observation of an attack of (probably) *Libellula saturata* on two American Goldfinches (*Aves*) in a desert oasis in Harney County, Oregon, USA.]

Address: only e-mail of Sally Nelson stated: nelson4245@worldnet.att.net.

398. **Niedringhaus, R.; Zander, B. (1998):** Die Kleingewässer der Ostfriesischen Inseln. Zustandsanalyse und ökologische Bewertung anhand der Flora/Vegetation und der Wirbellosenfauna. Schriftenreihe Nationalpark Niedersächsisches Wattenmeer 3: 270 pp. (in German).

[detailed and extensively documented study on the Mollusca, Odonata, Coleoptera and Heteroptera of the pools in the Lower-saxony waddensea - Islands; Odonata are mentioned throughout the book, but mainly dealt with in chapter 6.12 (37 species)]

Source of supply: Bezirksregierung Weser-Ems, Nationalparkverwaltung, Virchowstr. 1, 26382 Wilhelmshaven, Germany.

399. **Nielsen, O.F. (1998):** De danske guldsmede. Danmarks Dyreliv 8. ISBN 87-88757-21-8. 279 pp. (in Danish).

[monographic book on the Danish Odonata throughout with colour pictures; introduction with brief historical notes on the investigation of Danish dragonflies, evolution of the order and notes on the systematic of Odonata including two pictures of fossil Danish Odonata, general notes on life cycle, short chapters on larvae, ecology (habitats), predation on dragonflies, and how to study and photograph dragonflies; the 53 (54) Danish species are treated as following: introductory remarks, morphology, habitat, biology, phenology, distribution in Denmark, southern Scandinavia and northern Germany; each monographic chapter provides pictures of male and female, of the habitat, and a distribution map; the monographic treatments follow a systematically ordered checklist including the vernacular names of the Danish dragonflies, an identification key for imagines and larvae, a short bibliography, Latin nomenclature of the mentioned vernacular names of plants, some addresses of regional dragonfly societies, and the register; the book on Danish dragonflies is in any sense up to date, for you can find a chapter on the most recent discovery of *Sympetrum fonscolombei* dated 3 September 1998; Abstracter's note: This book is a very sound and amazing one which should not be missing in the library of European odonatologists; there is only one disadvantage: it is written throughout in Danish, but the pictures are as intrusive as possible, so everyone at least may profit from this book from an aesthetic point of view. This makes it also very interesting for "the rest of the

world". The price is less than 50 EURO (< 100,- DM, < 60 \$, < 40 £. (M. Sch.).]

Address: Source of supply: Apollo books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark.

400. **Nikula, B. (1998):** *Sympetrum corruptum* on Cape Cod. *Argia* 10(3): 20. (in English).

["This is the first Massachusetts (and New England?) record in at least a couple of decades."]

Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. e-mail: odenews@capecod.net.

401. **O'Brien, M. (1998):** Notes from Michigan. *Argia* 10(2): 8-9. (in English).

[*Somatochlora walshi*, *Nannothemis bella*, *Cordulegaster maculata*, *C. diastatops*, *Epitheca canis*]

Address: not stated.

402. **Osborn, R. (1998):** Odonata of Arlington, Texas. *Argia* 10(3): 16-17. (in English).

[Description of effects of algae and the aquatic macrophyte *Ludwigia peploides* on dominance and abundance of Odonata in the Trading Horse Creek.]

Address: not stated.

403. **Ott, J; Piper, W. (1998):** Rote Liste der Libellen (Odonata). Schriftenreihe für Landschaftspflege und Naturschutz 55: 260-263. (in German).

[Red list of the German dragonflies]

Address: Ott, J., Am Moosberg 10, D-67705 Stelzenberg, Germany.

404. **Ott, J. (1998):** Feuerlibelle erobert die Pfalz. Die Rheinpfalz 218/1998 (19. Sept. 1998): (in German).

[report in a regional newspaper on the successive invasion of *Crocothemis erythraea* to Rhineland-Palatinate which is attributed to climatic change; 1967 *C. erythraea* was for the first time recorded in the region, but can now be observed in many parts of Rhineland-Palatinate]

Address: Ott, J., Am Moosberg 10, D-67705 Stelzenberg, Germany.

405. **Papazian, M. (1998):** Chronique de l'insolite: (1 ère note) *Crocothemis erythraea* (Brullé, 1832) et la chenille, *Sympetrum striolatum* (Charpentier, 1840) et la pluie. *Martinia* 14(2): 75-76. (in French with English summary).

[*C. erythraea* caught a caterpillar of *Scrobipalpa salinella* (Zeller, 1847) (Lepidoptera: Gelechiidae); *S. striolatum* oviposited into a hole of a road after a sudden shower]

Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France.

406. **Papazian, M.(1998):** Unusual refusal behavior of a female of *Platycnemis pennipes* (Pallas, 1771) (Odonata, Platycnemididae). *Entomologiste* 54(1): 27-32. (in French with English summary).

Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France.

407. **Parr, A. (1998):** Lesser Emperor *Anax parthenope* in Britain during early 1998. *Atropos* 5: 66. (in English).

[1998 discoveries from Cornwall and Suffolk, and the Netherlands are dealt with]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

408. **Parr, A. (1998):** New Odonata Records Committee. *Atropos* 5: 72. (in English).

[information on the establishment of the British Odonata Rarities Committee, its task is to check and verify observations of immigrants to UK]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

409. **Parr, A. (1998):** Potential new dragonflies for the British list: 1. The possible occurrence of nearctic species in western Europe. *Atropos* 4: 18-21. (in English).

[descriptions and colour pictures of possible transatlantic immigrants from the North American continent to western Europe; detailed comparison of morphological key features of the European *Anax imperator* and the North American *Anax junius*]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

410. **Parr, A. (1998):** Red-veined Darter *Sympetrum fonscolombei* in Britain during early 1998. *Atropos* 5: 67. (in English).

[reports of sightings from Cornwall, London, Dorset, Norfolk, and Isle of Man; short information on autochthonous populations of *S. fonscolombei* in UK]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

411. **Parr, A. (1998):** Winter dragonfly sightings in Britain during early 1998. *Atropos* 5: 13-16. (in English).

[compilation of the winter dragonfly sightings in 1998: 10 January - 18 March; due to unexperience of recorders or unsuitable observation conditions it was in most cases impossible to identify the specimens; it is speculated that the identity in most cases will be that of *Anax ephippiger*, but other species should also have been involved in this immigration; a list of records with the known observations of *Anax ephippiger* is attached]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

412. **Parr, A.J. (1998):** Migrant and dispersive dragonflies in Britain during 1997. *J. Br. Dragonfly Soc.* 14(2): 52-58. (in English).

[reports are made to the following species: *Aeshna mixta*, *Aeshna* (*Anaciaeschna*) *isosceles*, *Anax parthenope*, *Libellula depressa*, *L. quadrimaculata*, *Orthetrum cancellatum*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. vulgatum*, *S. fonscolombei*, *S. flaveolum*, *S. sanguineum*, *S. danae*]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK.

413. **Paulson, D. (1998):** Blue eye color and acetone. *Argia* 10(1): 25. (in English).

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA.

414. **Paulson, D. (1998):** New common names for U.S. Odonata. *Argia* 10(1): 8. (in English).

[*Orthemis discolor* is named "Orange-bellied Skimmer"]
Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA.

415. **Paulson, D. (1998):** The distribution and relative abundance of the sibling species *Orthemis ferruginea* (Fabricius, 1775) and *O. discolor* (Burmeister, 1839) in North and Middle America (Anisoptera: Libellulidae). *International Journal of Odonatology* 1(1): 89-93. (in English).

[discussion of the morphological differences between the two sibling species; detailed examination by locality of the specimens in the D.R. Paulson collection with emphasis on Mexico and Costa Rica; figure of seasonal distribution of both species in the Guanacaste Province, Costa Rica based on the specimens in the D.R. Paulson collection; the author points out the importance of collections for solving zoogeographical problems concerning the two species]

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA.

416. **Paulson, D. (1998):** What a difference a depth makes. *Argia* 10(3): 14-15. (in English).

[The different abundance and species richness on two different water bodies (shallow storm-water retention pond and Square Lake) in Kitsap County, Washington, USA is explained by absence of fish predators and water temperature in the shallow pond. The cold water in the lake hampered development of larvae.]

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA.

417. **Paulson, D.R. (1998):** Possible morphological and behavioral male mimicry in a libellulid dragonfly *Erythrodiplax umbrata* (L.) (Anisoptera: Libellulidae). *Odonatologica* 27(2): 249-252. (in English).

[study site: Cancún, Quintana Roo, Mexico, on 17 November 1983]

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA.

418. **Paulson, D.R. (1998):** Variation in head spines in female *Ophiogomphus* with a possible example of reproductive character displacement (Anisoptera: Gomphidae). *Bull. American Odonat.* 5(3): 55-58. (in English).

["Females of at least 8 of the 19 species of *Ophiogomphus* in North America vary in presence or absence, as well as size and shape, of spines on the occiput or rear of the head. In most cases spines that may be absent are only poorly developed when present, but in *O. morrisoni* Selys, females are either spineless or have welldeveloped occipital spines. At one locality intermediate specimens occur, but at another the population is dimorphic, either spineless or spined. The presence of both continuous variation and discrete polymorphism in different populations of a species has not been reported in dragonflies and is considered quite unusual in animals. The spined females occur only in the part of the range of *morrisoni* that overlaps that of *O. severus* Hagen, the only consistently spineless species of the genus, and they may represent an example of reproductive character displacement, also rarely reported for dragonflies and other animals." (Author)]

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA.

419. **Pinratana, A. (1998):** *Malangpo* 15, Editorial. *Malangpo* 15: 131. (in English).

[The present number of members of the Thai National Office of the Societas Internationalis Odonatologica is eight. Bro. A. Pinratana lists the foreign odonatologists who contributed to the newsletter *Malangpo* in the past years; without their help "we would not have sufficient materials for the publication of our newsletter". He also invites odonatologists to visit Thailand especially in the rainy season for many new Thai records, and even new species are still to be expected.]

Address: Pinratana, Bro Amnuay, Saint Gabriel's College, Bangkok 10300, Thailand.

420. **Pither J.; Taylor, P.D. (1998):** An experimental assessment of landscape connectivity. *Oikos* 83(1): 166-174. (in English).

[We experimentally assess the relative movement abilities of two sympatric, ecologically similar species of damselfly, *Calopteryx maculata* and *Calopteryx aequabilis* (Odonata: Calopterygidae) within two structurally dissimilar habitat types, forest and pasture]

Address: Taylor, PD, Acadia Univ., Atlantic Cooperat. Wildlife Ecol. Res. Network, Dept. Biol, Wolfville, NS B0P 1X0, Canada.

421. **Plomer, W. (1998):** Dragonfly love. *Argia* 10(1): 29-30.

[see: Corbet, P. (1998): Correction: authorship of poem in previous issue. *Argia* 10(2): 15]

422. **Prendergast, E.D.V. (1998):** A few Odonata from Ethiopia. *International Journal of Odonatology* 1(1): 94-96. (in English).

[A few specimens of Odonata were caught in the framework of a scientific expedition with bats as research objects. Most interesting are two records of *Anaciaeschna triangulifera* and *Brachythemis leucosticta* in mist nets which indicate a crepuscular behaviour of the species. Aberrant ante-nodal crossveins of forewings of the rare Ethiopian *Orthetrum kristensi* are figured.]

Address: Prendergast E.D.V., Manor House, Bagber, Sturminster Newton, Dorset DT10 2EY, United Kingdom.

423. **Proess, R.; Baden, R. (1998):** Die Libellen der Fließgewässer Luxemburgs. Teil 2: Süden und Osten des Landes (Insecta, Odonata). *Bull. soc. nat. luxemb.* 99: 119-132. (in German with English summary).

[In 1996 the northern part of Luxembourg was investigated from Odonata of running waters. In 1997 this investigation was completed in the south of the country. 28 localities in 10 brooks were surveyed. Habitat parameter of *Calopteryx virgo*, *Platycnemis pennipes*, and *Pyrrhosoma nympha* are treated with some detail.]

Address: Proess, R., 1, rue du Moulin, L-7423 Dondelange, Luxembourg.

424. **Proess, R. (1998):** Erstnachweis von *Leucorrhinia caudalis* (Charpentier, 1840) (Zierliche Moosjungfer) in Luxemburg (Insecta, Odonata). *Bull. soc. nat. luxemb.* 99: 133-135. (in German with English summary).

[9 June 1997 the very rare dragonfly species *Leucorrhinia caudalis* has been reported for the first time in Luxembourg: Goepsweier (6°60'E, 49°39' N).]

Address: Proess, R., 1, rue du Moulin, L-7423 Dondelange, Luxembourg.

425. **Proess, R.; Gerend, R. (1998):** Rote Liste der Libellen Luxemburgs (2. Fassung: Stand 1998) (Insecta, Odonata). *Bull. soc. nat. luxemb.* 99: 137-148. (in German with English summary).

["A Red Data List considering 61 species is elaborated for the dragonfly fauna of Luxembourg. Each species is attributed to one of 8 categories according to the criteria defined by Schnittler & Ludwig (1996)", *Schriftenreihe für Vegetationskunde* 28: 709-739." The actual status is compared to that of the nineteen-fifties (Hoffmann 1960), although 11 species had not previously been mentioned by this author. 13 species (21 %) are considered to be extinct and only 17 (28 %) may be considered safe (un-

threatened). Further more a list of the 10 most important dragonfly sites of Luxembourg is presented along with an account of their odonate fauna." (Authors)]

Address: Proess, R., 1, rue du Moulin, L-7423 Dondelange, Luxembourg.

426. **Prot, J.-M. (1998):** Reproduction d'*Hemianax ephippiger* (Burmeister, 1839) dans le département du Jura (Odonata, Anisoptera, Aeshnidae). *Martinia* 14(1): 19-22. (in French with English summary).

Address: Prot, J.-M., 10, rue du Binveau, F-70210 Vauvilliers, France.

427. **Pudwill, R. (1998):** Fluß- und Quelljungfern (Anisoptera: Gomphidae und Cordulegastridae) im Raum Gifhorn (Ost-Niedersachsen). *Braunschweiger naturkundliche Schriften* 5(3): 541-549. (in German with English summary).

[The distribution of Gomphidae and Cordulegastridae was mapped along the streams in the area of Gifhorn in Lower Saxony, Germany. *Gomphus vulgatissimus*, *Gomphus pulchellus*, *Ophiogomphus cecilia* and *Cordulegaster boltonii* are present in the investigated streams. The emergence and effects of stream maintenance are discussed. Highest abundance of species was in brooks without stream maintenance.]

Address: Pudwill, R., Böttcherstr. 3, D-38518 Gifhorn, Germany.

428. **Reder, G. (1998):** Herbstfunde von *Somatochlora metallica* (Vander Linden) (Anisoptera: Corduliidae). *Libellula* 17(1/2): 113-115. (in German).

[phenology, extended flight period in October, Rhineland-Palatinate]

Address: Reder, Gerd, Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany.

429. **Reinhardt, K. (1998):** Reproductive behaviour of *Leucorrhinia albifrons* (Burmeister) in a non-territorial situation (Anisoptera: Libellulidae). *Odonatologica* 27(2): 201-211. (in English).

["The reproductive behaviour in a high-density situation of the sp. was investigated in northern Poland in 1993 and 1995. Because of their high density, males were non-territorial. After a very brief tandem flight copulations took place either on the ground or in the surrounding pine trees and lasted, on average, 640 s. Afterwards the male guarded the female while she was on post-copulatory rest (PCR). During PCR [...] the male bent his abdomen tip up to the basal segments after a mean time of 81 s. This behaviour was interpreted as intra-male sperm translocation. Oviposition took place over open water. During the time of mating, from 10:00 h to about 17:00 CEST, almost none of the observed ovipositions was completed undisturbed. Outside this time, half of the ovipositions observed were completed undisturbed. The latter lasted 34 s, in which the female had an average frequency of 0.6 to 1.9 dips per s. Eleven hand-held ovipositions revealed a mean egg number of 327 eggs per female and a mean egg flow rate of 4.6 eggs s⁻¹. It is concluded that the mating system of *L. albifrons* is best described as a combination of resource limitation and female control. Some known effects of high male density on the reproductive behaviour of the Libellulidae are discussed." (Author)]

Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany.

430. **Rith-Najarian, J.C. (1998):** The influence of forest vegetation variables on the distribution and diversity of dragonflies in a northern Minnesota forest landscape: a preliminary study (Anisoptera). *Odonatologica* 27(3): 335-351. (in English).

["Dragonfly communities were surveyed at 24 sites in 2 adjacent study regions, during the summer of 1994. In each of the 2 regions, 12 sites were grouped into 3 different study areas based on forest status. Forest status was determined by stand age and time since last logging disturbance, resulting in study areas defined as old-growth forest, mature second-growth forest, or recently clear-cut areas. Study sites within each forest-status study area included stream, pond, lake, and bog/swamp habitats. Recently-cleared forest areas exhibited the lowest species number and species diversity, while the greatest species number and diversity were found in the old-growth study areas. These differences were correlated with different vegetation structure variables characteristic of each forest-status study area. Furthermore, Beta-diversity, indicating changes in species composition across the forest-status gradient in each study area, was greater between the sites adjacent to the smallest old-growth forest "habitat island". These findings may be of importance in understanding dragonfly response to forest disturbance in the northern Minnesota landscape mosaic."]

Address: Rith-Najarian, J.C., River's Edge Geographics, P.O. Box 453, Bemidji, MN 56619, United States.

431. **Röske, W. (1998):** Das Artenhilfsprogramm Helm-Azurjungfer. Schutzgemeinschaft Libellen in Baden-Württemberg (Hrsg.): Wiesenbäche und -gräben - Ökologie, Bedeutung und Unterhaltung. Referate und Ergebnisse der Tagung der Schutzgemeinschaft Libellen in Baden-Württemberg am 28. und 29. April 1998 in Umkirch: 5-6. (in German).

[summary of the results of an action plan to protect *Coenagrion mercuriale* and their habitats in Baden-Württemberg (Germany), special emphasize is given to the importance of ditch management on the populations of *C. mercuriale*]

Address: Röske, W., IFÖ, Kandelstr. 26, D-79106 Freiburg, Germany.

432. **Ruddek, J. (1998):** 17. Jahrestagung der GdO in Bremen. 20.-22. März 1988. Tagungsband. Hefte der Bremer Libellengruppe 5: 1. (in German or English).

[Booklet with the abstracts of posters and papers read at the 17th meeting of the Association of the German-speaking odonatologists: H. Fliedner: Die Lüneburger Libellenfauna vor 150 Jahren; - J. Müller: Neuigkeiten zum Vorkommen von *Gomphus flavipes* und *Ophiogomphus cecilia* in Elbe und Weser; - C. Schütte: Diapause bei *Gomphus flavipes* und *Ophiogomphus cecilia* im Eistadium; - J. Adena & K. Handke: Zur Libellenfauna neu angelegter Gewässer im Bereich des Niedervielandes in Bremen; - H. Wildermuth: Wie finden Vierfleck und Plattbauch zum Rendezvous?; - F. Perl: Eine ehemalige Sandgrube im Kreis Celle: Lebensraum für die Späte Adonislibelle *Ceriatagrion tenellum*; - K.G. Leipelt & M. Gasse: Das Verhalten von *Aeshna affinis* in Norddeutschland; - C. Zeiss: Was kann der Mann? *Coenagrion puella* Männchen als Prädationsschutz für die Weibchen bei der Eiablage; - M. Lindeboom: Territorialverhalten der Gebärderten Prachlibelle *Calopteryx splendens*; - R. Buchwald, N. Böhler & A. Schmidt: Welche Faktoren bestimmen die allo- und syntopen Vorkommen der Prachlibellen am Oberrhein (Baden-Württemberg, Elsaß)? - S.

Klostermann: Ethoökologische Untersuchungen an *Oncygomphus forcipatus*; - S. Werzinger: Biotoppräferenzen von Imagines der Grünen Keiljungfer *Ophiogomphus cecilia* im engeren und weiteren Umfeld kleiner Flüsse und Bäche des NW Mittelfranken; - R. Stoks: Long-term costs of lamellae loss in a damselfly; - B. Trockur: Stand der Libellenerfassung im Saarland; - F. Weihrach: Die Emergenz von *Orthetrum coerulescens* an einem Entwässerungsgraben des Flughafens München im Frühsommer 1997; - H. Klugkist: Ergebnisse mehrjähriger Emergenzuntersuchungen an *Aeshna viridis* und *Aeshna grandis* im Hollerland (Bremen); - E. Schmidt: Invasionsarten (*Sympetrum* [*Tarnetrum*] *fonscolombii*, *S. flaveolum*, *Lestes barbarus*) auf Amrum 1996/97; - H. Knitter: Der Zangengriff als Merkmal der Systematik und Phylogenie von Kleinlibellen; - H. van Gossum, R. Stoks & L. de Bruyn: Colour poly-morphismus to the females of the damselfly *Ischnura elegans*; - C. Willigalla: Beitrag zur Ökologie von *Lestes dryas*; - J. Kuhn: Libellen im Mauermauer Moos (Oberbayern): Lebensräume und Naturschutzprobleme; - F.J. Schiel: Aktuelle Verbreitung, ökologische Ansprüche und Artenschutzprogramm von *Leucorrhinia pectoralis* im baden-württembergischen Alpenvorland; - M. Winterholler: Bestandsentwicklung ausgewählter, südlicher Libellenarten in Bayern; - R. Stephan: Untersuchungen im Tagebau Berzdorf; - Mauersberger, R.: Versuch zur anthropogenen Populationsgründung bei *Nehalennia speciosa*; - Martens, A.: Schließt sich die große Lücke? - Die derzeitigen Verbreitungsgrenzen von *Cercion lindenii* in Deutschland; Martens, A. & M. Gasse: *Aeshna affinis* in Deutschland - Wie soll man die Funde interpretieren?; - Greenen, S., K. Jordaens, - R. Stoks & L. De Bruyn: Morphological and genetical differences between populations of *Lestes viridis*; - Vlack, F., R. Stoks & L. De Bruyn: A mark-recapture study of imaginal *Sympetrum striolatum*]

Address: Ruddek, J., Butendiek 34, D-28865 Lilienthal, Germany.

433. **Ruddek, J. (1998):** Dragonflies exhibited in the Zoological Museum, St. Petersburg, Russia. *Notul. odonat.* 5(2): 21-22. (in English).

Address: Ruddek, J., Butendiek 34, D-28865 Lilienthal, Germany.

434. **Ruddek, J. (1998):** *Leucorrhinia albifrons* (Burm.) in coastal W France (Anisoptera: Libellulidae). *Notul. odonatol.* 5(1): 11. (in English).

[record from the westernmost limit of the known range of *L. albifrons* 25 km S of the Gironde mouth (18 July 1993)]
Address: Ruddek, J., Butendiek 34, D-28865 Lilienthal, Germany.

435. **Ruddek, J. (1998):** *Macrodiplax cora* (Br.) new for Lombok, Indonesia (Anisoptera: Libellulidae). *Notul. odonatol.* 5(1): 11. (in English).

Address: Ruddek, J., Butendiek 34, D-28865 Lilienthal, Germany.

436. **Ryazanova, G.I.; Mazokhin-Porshnyakov, G.A. (1998):** Cannibalism of predatory insects: Selecting conspecific prey in Odonata larvae. *Zoologicheskoy Zhurnal* 77(2): 191-195. (in Russian).

Address: Ryazanova, G.I., Dept. Entomol., Fac. Biol., Mosc. State Univ., Moscow, Russia.

437. **Ryazanova, G.I. (1998):** Territorial competition as the cannibalism suppression mechanism in larval odona-

tes. Vestnik Moskovskogo Universiteta (Seriya XVI Biologiya) 1998 (2): 30-35. (in Russian with English summary). [Laboratory experiments with larvae of *Calopteryx splendens*]

Address: Ryazanova, G.I., Dept. Entomol., Fac. Biol., Mosc. State Univ., Moscow, Russia.

438. **Sage, B. (1998)**: A Herfordshire record of the Small Red Damselfly *Ceragrion tenellum* (Villers). J. Br. Dragonfly Soc. 14(2): 60. (in English).

[correction of a wrong interpretation of the Hertfordshire record of *C. tenellum* from 1959 done by Gladwine (1997), Trans. Hertfordshire nat. hist. soc. 33: 56-61]

Address: Sage, B., Waverney House, Waverney Close, Wells-next-the-Sea, Norfolk NR23 1HU, UK.

439. **Samu, S. (1998)**: Zum Habitatschema der Mond-Azurjungfer (*Coenagrion lunulatum*) in Nordwest-Mecklenburg. Artenschutzreport 7(1997): 15-20. (in German).

[very detailed and well documented description of the habitat of *Coenagrion lunulatum* in northwestern Mecklenburg-Vorpommern, Germany; special emphasize is given on oviposition and the importance of vegetation in the (oviposition-) habitat of *C. lunulatum*; checklist of co-occurring Odonata (25 specimens); protection measures are proposed for this rare species]

Address: Samu, S., Gärtner Str. 5, 10245 Berlin, Germany.

440. **Samways, M.J. (1998)**: Establishment of resident Odonata populations on the formerly waterless Cousine Island, Seychelles: an island biogeography theory (IBT) perspective. *Odonatologica* 27(2): 253-258. (in English).

Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa.

441. **Sawada, K. (1998)**: Sperm precedence in the damselfly *Ischnura senegalensis* (Rambur): is prolonged copulation advantageous to sperm precedence? (*Zygoptera*: *Coenagrionidae*). *Odonatologica* 27(4): 425-431. (in English).

[To understand the relationship between copulation duration and sperm precedence in *I. senegalensis*, which mate for several hours, laboratory experiments and field observation were conducted. By irradiated male techniques, P2 value (sperm precedence of the last male to mate) was measured. P2 value was almost 100 % until 2 days after copulations regardless of the copulation duration. The interval between copulations in a female was about 2.3 days in the field. It is suggested that the last male to mate gains advantages in sperm precedence regardless of the copulation duration in the field. And complete sperm mixing (the point when the P2 value was 50 %) occurred 6 days after copulation." (Author)]

Address: Sawada, K.; Kashii High School, 2-9-1, Kashii, Hiagashi-ku, Fukuoka, 813-0011, Japan.

442. **Schiel, F.-J.; Buchwald, R. (1998)**: Aktuelle Verbreitung, ökologische Ansprüche und Artenschutzprogramm von *Leucorrhinia pectoralis* (Charpentier) (Anisoptera: Libellulidae) im baden-württembergischen Alpenvorland. *Libellula* 17(1/2): 25-44. (in German with English summary).

[Survey of *L. pectoralis* in the prealpine zone of the Federal State Baden-Württemberg (Germany) with special emphasize on distribution, habitat, threats, and conservation measures, "With one exception, all larval habitats are

meso- to slightly eutrophic peat diggings. The open water surface of the larval habitats is covered by various vertical and horizontal vegetation structures to an extent of 10-80%, that of 'optimal' habitats to an extent of 20-60%." The main threat-factor is "natural succession of vegetation" in the larval habitats, predominantly caused by wash-out of fertilizers from adjacent meadows.]

Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Friesenheimer Hauptstr. 20, 77948 Friesenheim, Germany.

443. **Schiel, F.-J.; Hunger, H.; Röske, W. (1998)**: Die Frühe Heidelibelle - eine bodenständige Art in Baden-Württemberg? *Naturschutzinformation der Schutzgemeinschaft Libellen in Baden-Württemberg* 5: 1. (in German).

[Compilation of data on the distribution of *S. fonscolombei* in Baden-Württemberg, Germany with notes on the habitat. It is likely that the population is dependent from sources south(west) of Baden-Württemberg.]

Address: Röske, W., Kandelstr. 26, D-79106 Freiburg, Germany.

444. **Schnack, J.A., Muzón, J.; Perez Goodwyn, P. J. (1998)**: Belostomatidae (Heteroptera) en el área de influencia de la Central Nuclear Atucha. *Inventario y estudio poblacional*. *Aquatec* 5: 53-57. (in Spanish with English summary).

[Belostomatidae (Heteroptera) in the area influenced by the Atucha Nuclear Plant. Inventory and population study. "The present work is a preliminary inform about population dynamics and species inventory of Belostomatidae (Heteroptera) and [...] Odonata present in the influence area of the Nuclear Power Plant Atucha. The studies were carried out from 12/1994 to 11/1995 at three different sites. The Belostomatidae and Odonata taxocenosis were composed of 10 (2 genera) and 17 species (3 families, 12 genera) respectively. Reproductive trends and structure of a population of *Belostoma oxyurum* were analyzed based primarily on the recorded values of potential (mean number of mature eggs per female) and actual (mean number of fertilized eggs per carrier male) fecundities, sex ratio and life cycle." (Authors). 17 species of Odonata, in most cases identified to species level, are listed.]

Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina.

445. **Schneider, W.; Dumont, H.J. (1998)**: Checklist of the dragonflies and damselflies of Soqotra Island (Insecta: Odonata). *Proceedings of the First International Symposium on Soqotra Island: Present and Future*, Aden 1996. Dumont, H.J. (Ed.): *Conservation and Sustainable Use of Biodiversity of Soqotra Archipelago*, Technical Series, Vol. 1: 219-231. (in English).

["So far, 18 species of Odonata (four Zygoptera, 14 Anisoptera) have been recorded from Soqotra Island. All but one (*Enallagma granti*) are known from Yemen and/or from E-Africa (Somalia, Eritrea, Ethiopia). The predominance of Afrotropical species (11) indicates a strong African influence on the dragonfly fauna of Soqotra. Due to its geographical position, its physiography, and the number of species recorded from neighbouring countries (Somalia: 55, Yemen: 33) it can be expected that intensive collecting will increase the list of Soqotran Odonata. The odonatological results of a short field trip to Soqotra in March 1996 are put on record."]

Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany.

446. **Schorr, M.; Schneider, W.; Dumont, H. (1998):** Ecology and distribution of *Lindenia tetraphylla* (Insecta, Odonata, Gomphidae): a review. *International Journal of Odonatology* 1(1): 65-88. (in English).
[review of published and unpublished information on ecology, phenology, and geographical distribution of *L. tetraphylla*; all available records are listed in a table and mapped; the species is considered endangered because of increasing tourism, irrigation and oil/gas exploitation]
Address: Schorr, M., Waldfrieden 25, D-54314 Zerf, Germany. e-mail: foeatrier@aol.com.
447. **Schütte, C. (1998):** Überwinterung der Eier von *Gomphus flavipes* (Charpentier) und *Ophiogomphus cecilia* (Fourcroy) (Anisoptera: Gomphidae). *Libellula* 17 (1/2): 59-70. (in German with English summary).
["Egg development of both species was monitored at different temperatures and daylight regimes in the laboratory and under field conditions from August 1996 to June 1997. The eggs of *O. cecilia* developed directly and hatched throughout the winter whereas in *G. flavipes* diapause lasted from November to at least February at temperatures below 16°C, no matter what daylength was employed. This is interpreted as an oligopause. The differences in life-styles of both species are discussed."]
Address: Schütte C., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany.
448. **Silsby, J. (1998):** *Tetrathemis polleni*, its reproductive behaviour and preferred habitat. *International Journal of Odonatology* 1(1): 96-97. (in English).
[report on the diel periodicity of *T. polleni* with stress on oviposition; study site: pond at the Sabie River at Hazyview in Eastern Transvaal, South Africa]
Address: Silsby, J., 1, Haydn Avenue, Purley, Surrey, CR8 4AG, UK. e-mail: jsilsby1@aol.com.
449. **Siva-Jothy, M.T.; Tsubaki, Y.; Hooper, R.E. (1998):** Decreased immune response as a proximate cost of copulation and oviposition in a damselfly. *Physiological Entomology* 23 (3): 274-277. (in English).
[Males and females of *Matrona basilaris japonica* showed a reduction in immune system function (encapsulation response) after reproductive activity (copulation or oviposition).]
Address: Siva-Jothy, MT, Dept. of Animal & Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. e-mail: M.Siva-Jothy@sheffield.ac.uk.
450. **Smentowski, J. (1998):** In response to your question in *Argia* "Stocking ponds with Odonata". *Argia* 10(3): 17. (in English).
[Report on gardenponds and dragonflies in St. Louis, Missouri, USA. Some advice is given on size and depth of ponds, and the importance of fishes in the ecosystem of ponds, and on dragonflies is outlined.]
Address: not stated.
451. **Smiley, E.S.; Tessier, A.J. (1998):** Environmental gradients and the horizontal distribution of microcrustaceans in lakes. *Freshwater biology* 39: 397-409. (in English).
["1. The assemblage of suspension-feeding microcrustaceans in lakes changes along a habitat gradient from nearshore to offshore. This gradient of microcrustaceans was explored in relation to differences in macrophytes and the associated changes in water chemistry, food resources and types of predators. 2. Some microcrustacean species were littoral or limnetic specialists, while others changed their distribution along this horizontal habitat gradient on a diel or seasonal basis. Distribution patterns were similar in a lake and a pond which differed in extent of macrophyte habitat. 3. There was a large shift in the composition of sestonic food, indicating heterotrophic seston nearshore and more autotrophic seston offshore. Sit-and-wait predators of microcrustaceans (e.g. *Enallagma* spp.) dominated nearshore and cruising predators (e.g. *Leptodora kindtii* Focke) were more common offshore. 4. A reciprocal transplant experiment revealed that littoral specialists could survive equally well when fed littoral or limnetic seston, while limnetic specialists performed poorly when fed littoral seston. Food resources may be important in determining where some microcrustacean species live along this horizontal habitat gradient." (Authors). Other invertebrate predators in low numbers include dragonfly larvae (Libellulidae) and damselfly larvae (*Lestes* spp.). The study site was Lower Crooked lake in south-west Michigan, US.]
Address: Smiley, Elizabeth, W.K. Kellogg Biological Station, Department of Zoology, Michigan State University, Hickory Corners, MI 49060, USA.
452. **Smith, E.M.; Smith, R.W.J.; Batty, P.M. (1998):** Breeding of Southern Hawker *Aeshna cyanea* (Müller) in rock pools. *J. Br. Dragonfly Soc.* 14(2): 58-59. (in English).
[discovery of a larva of *A. cyanea* from a rock pool on the Island of Mull, Scotland, UK]
Address: Smith, E.M., 33 Hunter Terrace, Loanhead, Midlothian EH20 9SJ, UK.
453. **Spence, B. (1998):** Spurn Bird Observatory, East Yorkshire. *Atropos* 4: 62-63. (in English).
[records of e.g. *Sympetrum fonscolombei* and *S. flaveolum*; an influx of at least 350 *S. striolatum* was observed on 7 September 1997]
Address: not stated.
454. **Sternberg, K. (1998):** The postglacial colonization of Central Europe by dragonflies with special reference to southwestern Germany (Insecta, Odonata). *Journal of Biogeography* 25(2): 319-337. (in German with English summary).
[The migratory routes along which the Central European species of dragonflies probably immigrated from their periglacial refuges into Central Europe are reconstructed. ... The very different recent distribution patterns of the Central European dragonflies can only be understood if all the climate history, landscape morphology, the thermal requirements of the species, their origin (refugial areas) and history of colonization are considered.]
Address: Sternberg, K., Schillerstr 15, D-76297 Stutensee, Germany.
455. **Stewart, D.A.B.; Samways, M.J. (1998):** Conserving dragonfly (Odonata) assemblages relative to river dynamics in an African Savanna Game Reserve. *Conservation Biology* 12(3): 683-692. (in English).
[Adult male dragonflies were sampled from 42 sites on four variously disturbed rivers and three reservoirs in Kruger National Park, South Africa. Fifty-one species and 2671 individuals were recorded]
Address: Samways, M.J., Invertebrate Conservation Res. Centre, Dept. Zool. Entomol., Univ. Natal, P/Bag X01, Scottsville 3209, South Africa.
456. **Stoks, R. (1998):** Indirect monitoring of agonistic encounters in larvae of *Lestes viridis* (Odonata: Lestidae)

- using exuviae lamellae status. *Aquatic Insects* 20(3): 173-180. (in English).
 [Differences in interference competition between larvae of the damselfly *Lestes viridis* (Vander Linden) were examined using caudal lamellae status of exuviae. Exuviae from a small temporary fishless pond near Antwerp (Belgium) where *L. viridis* was the only odonate present were studied. No lamellae loss during emergence was seen. Therefore, the lamellae status of the exuviae reflects the lamellae status of the final instar larvae. The deviations of the distribution of the number of missing lamellae per individual from a binomial distribution suggested that lamellae are not always lost separately or that some animals are more prone to agonistic encounters]
 Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium.
457. **Stoks, R.; De Bruyn, L. (1998):** Unusual reproductive associations of *Ischnura elegans* (Vander Linden) males (Zygoptera: Coenagrionidae). *Notul. odonatol.* 5 (1): 3-7. (in English).
 [Belgium, tripple connection, mixed tandems, male-female association with genital contact only, male-male conspecific tandem; "The reduced discrimination by males which leads to these associations may be adaptive to low density populations. This may invalidate the sexual cannibalism hypothes of C. Utzeri (1980, *Notul. odonatol.* 1: 100-102). It is suggested that sex-biased cannibalism within the genus *Ischnura* is mainly the result of a combination of a female's higher energy demand combined with a high level of female aggregation."]
 Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), B-2020 Antwerpen, Belgium.
458. **Storck, F. (1998):** Étude odonatologique de l'espace naturel de la plaine de Sorques: saison 1997 (Département de la Seine-et-Marne). *Martinia* 14(1): 23-29. (in French with English summary).
 [commented checklist of the dragonfly fauna (32 species) in the Nature reserve "La Plaine de Sorques"; the author considers *Coenagrion scitulum*, *Aeshna grandis* and *Sympetrum flaveolum* as the most remarkable species]
 Address: Storck, F., 36 bis, route de Gandelles, F-77167 Bagneaux-sur-Loing, France.
459. **Sunada, S.; Zeng, L.; Kawachi, K. (1998):** The relationship between dragonfly wing structure and torsional deformation. *Journal of Theoretical Biology* 193 (1): 39-45. (in English).
 [The effect of wing corrugation on torsional deformation was investigated for dragonfly wings. Wing corrugation dramatically increases the warping rigidity without significantly increasing the torsional rigidity. ... The corrugation prevents unusually large deformation induced by resonance of the wing]
 Address: Sunada, S., Kawachi Millibioflight Project, Exploratory Res. Advanced Technol., JST, Park Build. 3F, 4-7-6 Komaba, Meguro, Tokyo 153, Japan.
460. **Suri Babu, B. (1998):** Description of the larva of *Pseudagrion decorum* (Rambur, 1842) from central India (Zygoptera: Coenagrionidae). *Odonatologica* 27(4): 473-477. (in English).
 Address: Suri Babu, B., Forensic Science Laboratory, Police Control Room, Jagdalpur-494001 (M.P.), India.
461. **Tenessen, K.; Krotzer, S. (1998):** Georgia meeting: SE meeting in Chatsworth. *Argia* 10(1): 2-3. (in English).
 Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA.
462. **Tenessen, K. (1998):** Results of the southeastern DSA meeting in Georgia, May 15-17, 1998. *Argia* 10(2): 1-2. (in English).
 Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA.
463. **Tenessen, K. (1998):** When is an ovipositor not an ovipositor? *Argia* 10(3): 14. (in English).
 [Observation on a female *Calopteryx maculata* devouring an Ephemeroptera. "The mayfly was fairly large and strong, and when it shook virgously trying to free itself, the female *C. maculata* arched its abdomen upward at the middle and pressed the tip against the leaf."]
 Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA.
464. **Tenessen, K. (1998):** Will the real *Enallagma vernale* please stand out? *Argia* 10(1): 23-24. (in English).
 Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA.
465. **Terzani, F.; Carletti, B. (1998):** *Protosticta damacornu* spec. nov. and other odonate records from north-eastern India (Zygoptera: Platystictidae). *Odonatologica* 27(4): 479-485. (in English).
 ["The new sp. is described from 1 male (holotype male: NE India. Meghalaya, East Khasi Hills, Umrang, 33 km N of Shillong, alt. 800 m; 29-VI/2-VII-1995; deposited at "La Specola"). Also provided is a list of 27 spp., collected in 1995 with notes on *Ceriagrion fallax* Ris, 1914. *Copera vittata assamensis* Laidaw, 1914, *Dysphaea gloriosa* (Fraser, 1938), and *Burmagomphus* sp." (Authors)]
 Address: Terzani, F.; Zoological Section "La Specola", Museum of Natural History of the University of Florence, Via Romana 17, I-50125 Florence, Italy.
466. **Theischinger, G. (1998):** A new species of *Eusynthemis* Förster from Australia (Odonata: Synthemiidae). *Linzer biol. Beitr.* 30(1): 143-146. (in English).
 [*Eusynthemis ursula* sp. n. (male holotype: Chichester State Forest, springs of Telegraphy River, New South Wales, Australia) is described, illustrated and compared with the other Australian species of *Eusynthemis* Förster: *E. barbarae*, *E. guttata*, *E. tillyardi*, *E. brevistyla*, *E. deniseae*, *E. aurolineata*, *E. nigra*, and *E. virgula* (figures of male anal appendages).]
 Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.
467. **Theischinger, G. (1998):** A new species of *Griseargiolestes* Theischinger from Australia (Odonata: Zygoptera: Megapodagrionidae). *Stapfia* 55: 623-627. (in English).
 [*Griseargiolestes bucki* sp. n. is described from New South Wales, Australia, and compared with its congeners *G. fontanus*, *G. metallicus*, *G. griseus*, *G. eboracus*, *G. albescens*, and *G. intermedius* (figures of thorax, lateral aspect, and anal appendages, dorsal aspect).]
 Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.
468. **Theischinger, G. (1998):** Obituary: Professor A.F. O'Farrell. *Notul. odonat.* 5(2): 23-24. (in English).

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.

469. **Theischinger, G. (1998)**: Supra-specific diversity in Australian "Argiolestes" (Odonata: Zygoptera: Megapodagrionidae). *Stapfia* 55: 613-621. (in English).

["What was hitherto referred to as Argiolestes Selys from Australia is divided into three genera. They are Archiargiolestes Kennedy, formerly considered as a junior synonym of Argiolestes Selys, and Griseargiolestes and Miniargiolestes, both described as new. Revised diagnoses including adult and larval characters are presented for those genera and for Austroargiolestes Kennedy. A key is given to the final instar larvae of the megapodagrionid genera known from Australia." (Author)]

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.

470. **Theischinger, G. (1998)**: The *Eusynthemis guttata* (Selys) group of species from Australia (Odonata, Synthemistidae) - Part 2. *Linzer biol. Beitr.* 30(1): 147-153. (in English).

[*Eusynthemis rentziana* sp. n. is described (both sexes of adult and larva) and compared with other species of the *Eusynthemis guttata* group (*E. tillyardi*, *E. guttata*, *E. aurilineata*).]

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.

471. **Theischinger, G. (1998)**: The larvae of the Australian Gomphidae (Anisoptera). *Odonatologica* 27(4): 433-465. (in English).

["The descriptive information available on the larvae of the Australian Gomphidae is summarized. On the evidence of larval characters it is suggested that *Odontogomphus longipositor* Watson should provisionally be placed in the subgenus *Zephyrogomphus* of the genus *Austrogomphus*. The larvae of *Ictinogomphus dobsoni*, *Hemigomphus comitatus*, *H. coloola*, *H. theischingeri*, *Antipodogomphus hodgkini*, *Austrogomphus arbustorum*, *A. melaleuca*, *A. amphiclitus*, *A. bifurcatus* and *A. longipositor* are described, most of them also figured, for the first time; the larvae of the remaining spp. are redescribed and illustrated in similar detail." (Author) A key to the genera, subgenera and species of the known final instar gomphid larvae and exuviae of Australia is given.]

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.

472. **Theischinger, G. (1998)**: *Tonyosynthemis*, a new dragonfly genus from Australia (Insecta: Odonata: Synthemistidae). *Linzer biol. Beitr.* 30(1): 139-142. (in English).

[*Tonyosynthemis* (type species: *Synthemis claviculata* Tillyard) is established on characters of adults and larvae. The author considers *Choristhemis-Eusynthemis* pair and *Austrosynthemis-Tonyosynthemis* pair as each others sister groups.]

Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia.

473. **Thomas, R.; Thomas, S. (1998)**: Late Northern Emerald *Somatochlora arctica*. *Atropos* 4: 36-37. (in English).

[observation of *S. arctica* on 28 and 29 August 1997 in north-west Scotland]

Address: Thomas, R., 59 Coolidge Gardens, Cottenham, Cambridge CB4 4RQ, UK.

474. **Thompson, D.J. (1998)**: On the biology of the damselfly *Euphaea ameeke* van Tol & Norma-Rashid in Borneo (Zygoptera: Euphaeidae). *Odonatologica* 27(2): 259-265. (in English).

["The habitat and the territorial and reproductive behaviours of this [...] euphaeid damselfly are described. It breeds in narrow shady streams in lowland forest in northern Borneo. Territories are defended vigorously against conspecific males. Some flights take the form of head to head contests during which the combatants can fly high into the forest canopy. Males show considerable site tenacity and return day after day to the same small section of stream. Females climb underwater down protruding branches to oviposit into decaying twigs or leaves. Males remain perched above the oviposition site during the early part of the oviposition bout, but increasingly towards the end, return regularly to their preferred territorial perches." (Author) study site: Brunei, upper Belait river (4°9'21"N, 114°42'56"E)]

Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK.

475. **Tingley, S. (1998)**: ADIP meeting in New Brunswick. *Argia* 10(3): 8. (in English).

[9 members of the Atlantic Dragonfly Inventory Project met on August 8-10 in northern New Brunswick to explore some localities. In all about 40 species of odonata were recorded, including the very rare *Somatochlora brevicincta*.]

Address: Tingley, S., General Delivery, Shediac Bridge, NB, Canada E0A 3H0. e-mail: tingley@nbnet.nb.ca.

476. **Tingley, S. (1998)**: More *Somatochlora brevicincta*. *Argia* 10(2): 8. (in English).

Address: Tingley, S., General Delivery, Shediac Bridge, NB, Canada E0A 3H0. e-mail: tingley@nbnet.nb.ca.

477. **Tonczyk, G. (1998) (Ed.)**: I. Krajowe Seminarium Odonatologiczne. Materiały zjazdowe. Bromierzyk, 17. - 19. kwietnia 1998. Lodz. 23 pp. (in Polish).

[The following lectures and posters are documented in the booklet of the I. Krajowe Seminarium Odonatologiczne. With one exception all papers are written in Polish without English summaries or translation of the titles. *Lectures*: R. Bernard: Changes in the knowledge on Odonata of Poland as a result of studies carried out in the years 1990-1997. Key words: odonatologists, publications, new faunistical records, rare species, migrants, exploration of regions, exploration of habitats, life cycles; P. Buczynski: The dragonflies (Odonata) of the middle-eastern Poland: the state of research, specify and threats. Key words: middle-eastern Poland, faunistical analysis, diversity of fauna, human impact, the most valuable areas, *Sympecma paedisca*, *Orthetrum albistylum*; S. Mielewczyk: History of Odonatological studies in Poland. Key words: Poland, history of studies, scientists, research trends; G. Torczyk: Occurrence of rare dragonfly species (Odonata) in Central Poland. Key words: habitat diversity, state of research, faunistical review, northern -, southern -, eastern -, migrant -, rare species, human impact; *Posters*: J. Szymanski: Analysis of a zonal distribution of dragonflies (Odonata) in the „Krzywie” ponds near Lodz; G. Tonczyk, M. Klukowska, K. Goddyn: Dragonflies (Odonata) of small pools and canals in the south-western part of the Kampinoski National Park. Key words: Poland, Kampinoski National Park, small pools, canals, wood-

land, rare species, faunistics, species diversity. (P. Buczynski).

Address: Tonczyk, G., Department of Limnology, University of Lodz, Ba-nacha 12/16, PO-90-237 Lodz. Poland.

478. **Truscott, L. (1998)**: Lesser Emporor Dragonfly *Anax parthenope* (Sélys) in East Cornwall in July 1998. *J. Br. Dragonfly Soc.* 14(2): 63. (in English).

[report on 18 July 1998 discovery in UK of the extremely rare *A. parthenope*]

Address: Truscott, L., 59 Cremyll Road, Torpoint, Cornwall PL11 2DZ, UK.

479. **Valley, S. (1998)**: Notes from Oregon. *Argia* 10(2): 9. (in English).

[*Libellula lydia*; "hot spring dragonflies": *Libellula subornata*, *L. composita*, *L. nodisticta*; global warming/range extension: *Libellula luctuosa*, *L. saturata*]
Address: not stated.

480. **Vetter, J.; Schulze, T.; Alf, A. (1998)**: Untersuchungen zur Wiederbesiedlung eines renaturierten Flußabschnittes des Mains. *Lauterbornia* 33: 109-119. (in German with English summary).

[Bavaria, Germany; "In connection with the reconstruction and extension of the shipping lane of the River Main several types of bays and groyne were established between the kilometres 241.81 and 243.17, situated NNW of Würzburg. The development of these compensatory measures is monitored in this study. The results show that already after two years, from an ecological point of view, the newly established biotopes are in a significantly better state than the untreated areas of the river bank. However, after merely two years of development the newly established biotopes are not yet ecologically stable and, therefore, no conclusions with regard to the final impact of these compensatory measures can yet be drawn." The following Odonata are listed: *Platycnemis pennipes*, *Calopteryx splendens*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Orthetrum brunneum*.]
Address: Alf, Prof. Dr. Axel, Fachhochschule Weihenstephan, Abt. Triesdorf (Umweltsicherung), D-91746 Triesdorf, Germany.

481. **Viessmann, R. (1998)**: Libellen - Odonata. Pflanzen und Tiere in Rheinland-Pfalz 8: 167-179. (in German).

[species-wise enumeration of records in Rhineland-Palatinate from the year 1997; of some interest are the records of *Coenagrion pulchellum*, *Brachytron pratense*, *Aeshna affinis*, *Anax parthenope*, *Crocothemis erythraea*, *Orthetrum brunneum*, and *Sympetrum flaveolum*]
Address: Viessmann, R., Gängelstockweg 8, D-67295 Bolanden, Germany.

482. **Walter, S. (1998)**: *Enallagma weewa* in Long Island. *Argia* 10(3): 23. (in English).

[addition to the New York State Odonata list]

Address: www.members aol.com/nyodes.

483. **Wasscher, M.T. (1998)**: *Metaleptobasis cyanolineata* spec. nov., a new damselfly from Surinam (Zygoptera: Coenagrionidae). *Odonatologica* 27(4): 487-490. (in English).

[The new sp. (holotype male, allotype female: Surinam, Mungotapoe, Marowijne distr., 20-IX-1948, D.C. Geijskes leg., deposited at RMNH, Leiden, The Netherlands) is described and compared with its congeners. It can easily be distinguished by light blue antehumeral stripes and by

the presence of 2 horns, in the middle of the posterior pronotal margin.]

Address: Wasscher, M.T., Minstraat 15 bis, NL-3582 CA Utrecht, The Netherlands

484. **Wasscher, M.; Goutbeek, E. (1998)**: *Tropische Neurothemis fluctuans* (Fabricius) in Nederlandse plantenkas. *Brachytron* 2(1): 16-17. (in Dutch).

[Tropical *Neurothemis fluctuans* in a Dutch greenhouse: "In September 1997 two adults of the Southeast Asiatic *N. fluctuans* were collected in a greenhouse in Emmen Zoo, The Netherlands. The greenhouse is part of a permanent exhibition of tropical flora, including waterplants which had recently imported from Thailand. The individuals have undoubtedly been transported with these plants as larvae. A short review of records of exotic dragonflies in the Netherlands, Europe and elsewhere is given."]

Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: wasscher@xs-4all.nl.

485. **Watanabe, M.; Taguchi, M.; Ohsawa, N. (1998)**: Population structure of the damselfly *Calopteryx japonica* Selys in an isolated small habitat in a cool temperate zone of Japan (Zygoptera: Calopterygidae). *Odonatologica* 27(2): 213-324. (in English).

["The population structure was studied in a small stream in a cool temperate zone of Japan in 1989 and 1990. using a mark-release-recapture method. The estimated daily number of males was 500 (1989) and 150 (1990), while that of females was 450 (1989) and 100 (1990). The operational sex ratio in each year was probably unity. The daily estimate number of immigrants in each year was ca. 10% of the population, and the daily survival rate was more than 80%. Therefore, the populations in both years were considered to be closed. The distribution of each individual perching was surveyed. The perching site of the damselfly depended upon the sunlit area on the bank of the stream. Accordingly, they concentrated on the west bank during the morning, and the east bank during the afternoon. However, along the bank the perching sites of males was shown to be a regular distribution, due to territorial behaviour. There were many small insects that could be prey for the damselflies along the stream and the edge of the paddy fields nearby. Dipteran insects were dominant the potential prey in this habitat. Since the habitat of the damselfly is surrounded by paddy fields and lakes, the maintenance of the population probably depends on the abundance of substrate for oviposition and the larval habitat." (Authors)]

Address: Watanabe, M., Dept of Biology, Fac. of Education, Mie University, Tsu 514-8507, Japan.

486. **Westfall, M.J. (1998)**: Description of the true larva of *Tauriphila australis* (Hagen, 1867) from Limoncocha, Ecuador (Anisoptera: Libellulidae). *Odonatologica* 27(4): 491-494. (in English).

["The final instar is described from reared material. The photograph in figure 335 of J.G. Needham & M.J. Westfall (1955, A manual of the dragonflies of North America, Univ. Calif. Press, Berkeley) is said to be of a *Dythemis* species, probably *nigrescens* Calvert, 1899, not of *Tauriphila australis*." (Author)]

Address: Westfall, M.J., 2235 Old Hamilton Place, 600A, Gainesville, Georgia 30507, United States.

487. **Wieland, A. (1998)**: Ei-afzet van Bloedrode heidelibel (*Sympetrum sanguineum*) in buitendijks brakwater. *Nieuwsbrief, Mededelingenorgan van de Nederlandse Vereniging voor Libellenstudie* 2(2): 8. (in Dutch).

[oviposition of *Sympetrum sanguineum* in brackish water in the waddensea of The Netherlands]

Address: Wieland, A., IJsbanaanstraat 9, NL-4573 PH Terneuzen, The Netherlands.

488. **Wildermuth, H.; Knapp, E. (1998):** Die Libellen der Alp Flix (GR); ein Beitrag zur Odonatenfauna an der Waldgrenze. Mitt. ent. Ges. Basel 48(1): 2-24. (in German with English summary).

["The dragonflies of Alp Flix (Graubünden, Switzerland). The dragonflies ... of a small alpine plateau at the tree line in the Central Alps were surveyed from 1989 to 1997 and their habitat characterized. Of the 18 recorded species 5 spp. were permanently and 4 spp. temporarily indigenous. The remaining 9 spp. are considered migrants. 19 larval habitats differing in structure and ecology are described. The upper limit of the vertical distribution of all recorded dragonflies, especially of the alpine spp., is discussed with respect to climatic conditions and habitat availability. *Lestes dryas* and *Sympetrum flavolum* are of special interest because of their habitat requirements, and so are three *Somatochlora* spp. in respect to their co-existence at the tree line."]

Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. e-mail: wildermuth@swissonline.ch.

489. **Wildermuth, H. (1998):** Dragonflies recognize the water of rendezvous and oviposition sites by horizontally polarized light: A behavioural field test. *Naturwissenschaften* 85 (6): 297-302. (in English).

Address: Wildermuth, H.: Haltbergstr. 43, CH-8630 Rüti, Switzerland.

490. **Wildermuth, H. (1998):** Ethologische und ökologische Beobachtungen an Larven von *Cordulia aenea* (Linnaeus) (Anisoptera: Corduliidae). *Libellula* 17(1/2): 1-24. (in German with English summary).

[Environmental adaption of larval *Cordulia aenea* is presented in a combined field and laboratory study; description of macro- and microhabitats, success of emergence at water bodies of different localities; "Behavioural details on walking, swimming, digging, feeding, cleaning, reaction towards disturbance and emergence were studied in an aquarium.", *C. aenea* is characterized as "sit-and-wait"-species with a "slow lifestyle" according Johnson (1991), *Trends in Ecology and Evolution* 6: 8-13. "... their antipredator behaviour is less perfect than in other syntopic cordulid species". The results are discussed with regard to conservation measures.]

Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. e-mail: wildermuth@swissonline.ch.

491. **Wildermuth, H. (1998):** Terrestrial and aquatic mating territories in *Somatochlora flavomaculata* (Vander Linden) (Anisoptera: Corduliidae). *Odonatologica* 27(2): 225-237. (in English).

["In search of receptive females, the males of many cordulid species patrol over open water. Additionally, some species exhibit localized patrol flights also over terrestrial sites. In open fen habitats, *Somatochlora flavomaculata* may be an extreme case in this respect, as it conspicuously patrols often away from water. In consideration of its possible function, the terrestrial patrol flights were investigated in a descriptive and experimental field study and compared with those at aquatic sites. Typically, the males patrolled close to vertical structures such as trees and bushes or over footpaths in glades of reedbeds. No relevant differences between the patrol flights at aquatic and terrestrial localities were found. Both types of flight

were territorial in function as conspecific males were vigorously driven away. It is speculated that the males establish territories away from ponds because the occurrence of females is unpredictable, the preferred oviposition sites (shallow and largely overgrown puddles) being scattered over large areas. Hence, the best strategy for males for intercepting mates would be to patrol near vertical structures serving as landmarks and guidelines for arriving females." (Author) Further information is given e.g. to "flight altitude", "flight velocity", "feeding during patrol flights", "reactions towards flying non-prey objects", "conspecific encounters", and "sperm vesicle contents".] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. e-mail: wildermuth@swissonline.ch.

492. **Wildermuth, H. (1998):** Verlängerte Flugzeiten von *Somatochlora flavomaculata* (Vander Linden) und *S. arctica* (Zetterstedt): Folge ungewöhnlicher Wetterverhältnisse? (Anisoptera: Corduliidae). *Libellula* 17(1/2): 45-58. (in German).

["A systematic field study near Zürich (Switzerland) showed that in 1997 the flight periods of either spp. ended in the first decade of October, thus lasting ca 3 weeks longer than usual. The findings are based on more than 200 data for a period from August to October in *S. flavomaculata* and a single record of *S. arctica* in early October respectively. The extension of the flight periods are connected with the special weather conditions from spring to autumn of the year: wet and few sunshine in June and July; dry, sunny and warm late summer and autumn." Fig 2 demonstrates flight periods of *S. flavomaculata* and *S. arctica* according to general literature and regional or local faunistic studies from regions comparably close situated to Wildermuth's study area. Some remarks on longevity of *S. flavomaculata* are made.]

Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. e-mail: wildermuth@swissonline.ch.

493. **Wilson, K. (1998):** Gibraltar Point NNR, Lincolnshire. *Atropos* 4: 61-62. (in English).

[16 Odonata species were recorded in 1997; 12 of them are considered autochthonous; On 9 September 1997 an influx of approximately 2000 *Sympetrum striolatum* was observed]

Address: not stated.

494. **Wilson, K.D.P. (1998):** *Macromias* from Guangxi Province, China with description of *M. fulgidifrons* spec. nov. (Anisoptera: Corduliidae). *Odonatologica* 27(4): 467-472. (in English).

[*Macromia fulgidifrons* sp. n. is described from Guangxi (holotype male, Shi Wan Da Shan, Guangxi, 10-V-1997). The female of *M. hamifera* Lieftinck is described and figured for the first time. *M. moorei* malayana Laidlaw and *M. hamifera* Lieftinck are new records for Guangxi.] Address: Wilson, K.D.P., 6F, 25 Borrett Rd, Mid Levels, Hong Kong, China.

495. **Winsland, D. (?) (1998):** White-faced Darter *Leucorrhinia dubia* hanging on at Thursley. *Atropos* 4: 36. (in English).

[discussion of a record of *L. dubia* on its most southern British locality]

Address: Winsland, D., 2 Stourfield Road, Bournemouth BH5 2AR, UK.

496. **Wootton, R.J.; Kukalova-Peck, J.; Newman, D.J.S.; Muzon, J. (1998):** Smart engineering in the mid-

Carboniferous: How well could Palaeozoic dragonflies fly? *Science* 282 (5389): 749-751. (in English).

[The wings of archaic Odonatoidea from the mid-Carboniferous of Argentina show features analogous to "smart" mechanisms in modern dragonflies that are associated with the agile, versatile flight necessary to catch prey in flight. ... The presence of similar features suggests that the earliest known, odonatoids were already becoming adapted for high-performance flight in association with a predatory habit.]

Address: Wootton, R.J.: Univ. Exeter; Dept. Biol. Sci., Exeter EX4 4PS; Devon, England.

497. **Wranik, W. (1998):** Faunistic notes on Soqotra Island. *Proc. First Internat. Symp. on Soqotra Island: Present and Future*. 1. ISBN 90-804341-1-6: 135-198. (in English).

[brief overview on the natural history of Soqotra Island (Yemen) with special consideration of its fauna; colour picture of the endemic *Enallagma granti*]

Address: Wranik, W., Universität Rostock/FB Biologie, Freiligrathstr. 7/8, D-18051 Rostock, Germany.

498. **Xylander, W.; Stephan, R.; Franke, R. (1998):** Erstnachweise und Wiedernachweise von Libellen (Odonata) für den Freistaat Sachsen und die Oberlausitz. *Abh. Ber. Naturkundemus. Görlitz* 70(1): 33-42. (in German).

[Between 1992 und 1997 the dragonfly fauna of the Görlitz-region (Sachsen, Germany) was surveyed. *Crocothemis erythraea* was recorded for the first time in Sachsen. *Erythromma viridulum*, *Brachytron pratense*, *Hemianax ephippiger*, *Libellula fulva*, *Orthetrum brunneum*, *Sympetrum fonscolombei* are new for the region of Upper Lusatia. In addition *Lestes barbarus*, *Coenagrion lunulatum*, *Ophiogomphus ceclia*, *Anaciaeschna isosceles*, *Aeshna affinis*, and *Sympetrum striolatum* are of some faunistic relevance.]

Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany.

499. **Xylander, W.E.; Stephan, R. (1998):** Age dependence of habitat selection and behaviour in *Aeshna mixta* (Odonata, Aeshnidae). *Zoology* 101 (Suppl. 1): 86. (in English).

[*A. mixta* was surveyed in the former brown coal mining area at Berzdorf, southern Saxonia, Germany in 1996 and 1997. "During July and early August, the specimens were observed only on sunny SW or SE exposed pathways and meadows in reforested areas. The places ("mid-summer habitats") were at least 400 m away from the ponds where they later mated and reproduced. Mid-summer habitats are rather small areas (e.g. 15 x 400 m) in which large numbers of specimens aggregated (up to 250) without interspecific aggression, whereas interspecific reactions with *Aeshna cyanea* were observed. At this time *A. mixta* could not be found at its later reproduction sites. All specimens showed a premature colouration and

the groups consisted of both sexes in rather aequivalent proportion.... From mid-August until the end of the life span of the imaginal phase *A. mixta* was found in these localities only in low numbers, few significant lower and rested on vegetation closer to the ground (mainly < 2 m). At this time ... the vast majority of the specimens was observed at open ponds either without or with only few trees in their periphery ("reproduction habitat"). About 80% of the specimens observed at these sites were males..." (Authors)]

Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany.

500. **Yousuf, M.; Khaliq, A.; Najam, M.A. (1998):** Population and feeding capacity of dragonflies on insect pests of rice in Pakistan (Anisoptera: Libellulidae). *Notul. odonatol.* 5(2): 17-19. (in English).

["The quantity of rice pests consumed by 4 spp. in a day (12 h) was determined by forced feeding. Adult *Orthetrum sabina* devoured, on an average, 4.8, 4.2, 5.1, 3.8, 32.1 and 68.0, *Crocothemis s. servilia* 3.9, 3.4, 4.0, 3.0, 20.3 and 39.0, *C. erythraea* 3.5, 3.0, 3.8, 2.7, 15.2 and 22.8 while *Pantala flavescens* 2.9, 2.6, 3.3, 2.2, 9.1 and 15.2 white stem-borers (*Scirpophaga innotata*), yellow stem-borers (*S. incertulas*), leaf-folders (*Cnaphalocrocis medinalis*), white leafhoppers (*Cofana spectra*), green leafhoppers (*Nephotettix* spp.) and white-backed planthoppers (*Sogatella furcifera*), respectively. The females of all the species consumed higher number of pests as compared with their males. The number of insect pests taken by each sp. ranked in the following order according to the size of insects: *C. spectra* < *S. incertulas* < *S. innotata* < *C. medinalis* < *Nephotettix* sp. < *S. furcifera*." (Authors)]

Address: Yousuf, M., Department of Agricultural Entomology, University of Agriculture, Faisalabad, Pakistan.

501. **Zessin, W. (1998):** Beobachtungen an Baumfalken und Vierflecklibellen im Donau-Delta, Rumänien. *Virgo* 2(1): 36-38. (in German).

[report on the feeding of the Hobby (*Falco subbuteo*) on dragonflies (*Libellula quadrimaculata*) in May 1979 in Romania]

Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany.

502. **Zessin, W. (1998):** Gartenteiche und Libellen. *Virgo* 2(1): 43-49. (in German).

[checklist of the 24 Odonata of a garden pond in Jasnitz, Mecklenburg-Vorpommern, Germany; comparison with the Odonata of garden ponds in Bonn (Nordrhein-Westfalen) and Luckau (Brandenburg)]

Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany.

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503. **Abbott, J.C.; Stewart, K.W.; Moulton, S.R. (1997):** Aquatic insects of the Big Thicket region of East Texas. *Texas Journal of Sciences* 49(3/Suppl.): 35-50. (in English)

[111 species of Odonata are listed. *Somatochlora margarita* is listed by the U.S. Fish and Wildlife Service as "species of concern". Distribution maps of *S. margarita*, *Gomphus exilis*, and *Celithemis amanda* in eastern Texas, USA are given.]

Address: Abbott, J.C., Dept Biol. Sciences, University of North Texas, Denton, Texas 76203, USA

504. **Bankuti, K.; Devai, G.; Miskolczi, M. (1997):** Faunistical data on dragonfly (Odonata) exuvia from the active floodplain of River Tisza between Tiszabercel and Gávavencsellő (NE-Hungary). *Studia odonatologica Hungarica* 3: 43-47. (in Hungarian, with English summary).

Address: Bankuti, M., Gyöngyös, Kossuth u. 40, 3200, Hungary

505. **Bulánková, E. (1997):** Dragonflies (Odonata) as bioindicators of environment quality. *Biologia, Bratislava* 52(3): 177-180. (in English).

[In 1993-1994, larvae and imagines of Odonata were collected in 10 branches of the river Danube. Odonata larvae were also collected during the hydrobiological research of the Morava river basin in 1990-1993. Following the method of hierarchical classification, based on the presence of dragonfly species at selected localities, we distinguished the characteristic biotopes, as follows: 1) lentic biotopes renewed and newly formed, with undercurrents and rippling inhabited by rheophilous dragonflies, *Calopteryx splendens*, *Platycnemis pennipes* and the pioneer species, *Anax imperator*; 2) drying, unstable, eutrophic biotopes are inhabited by the coenosis *Lestes-Sympetrum* sp.; 3) original stagnant waters inhabited by the coenosis *Orthetrum-Libellula depressa* and *Erythromma-Anax imperator*; 4) original localities with larger areas inhabited by the coenosis *Lestes-Sympetrum-Aeshna* sp.; 5) lotic biotopes of the river Rudava with the coenosis *Cordulegaster-Ophiogomphus cecilia*, comprising the rare species, *Ophiogomphus cecilia*." (Author)]

Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; tel.+ 421-7-728 922, e-mail: uzoo@fns.uniba.sk

506. **Bulánková, E.; Halgos, J. (1997):** The influence of flowing water on the occurring of dragonflies and blackflies in the Danube and the Morava River basin. 32. Konferenz der IAD, Wien - Österreich. Wissenschaftliche Referate: 293-295. (in English).

[results of a long-term study in the Danubian lowland after damming of the Danube River and in the course of the revitalisation of the Morava River and its branches with special reference to the rate of water flow and its influence to Odonata and Diptera [...] *Gomphus vulgaticornis* and *Stylurus flavipes* were recorded in the Morava River only; according to the authors the extremely low water quality of Danube River is responsible for the absence of the two Odonata species. *Calopteryx splendens* and *Platycnemis pennipes* were "dominant elements in places with stagnant water [...] resp.] in places with the underflow and in branches [of Morava River] ..."]

Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; tel.+ 421-7-728 922, e-mail: Bulankova@nic.fns.uniba.sk

507. **Cannings, S.G.; Cannings, R.A. (1997):** Dragonflies (Odonata) of the Yukon. In: Danks, H.V. & Downes, J.A. (Eds.): *Insects of the Yukon. Biol. Surv. Can. Monogr. 2.* 1034 pp: 169-200. (in English).

[The paper covers The Yukon as a dragonfly habitat; describes the faunal elements (nearctic, holarctic, Palearctic); gives a checklist of Yukon Odonata; a very comprehensive annotated list of species (33 species known from the Yukon); and extremely useful distribution maps. (Jill Silsby)]

Address: Cannings, S., A68, BC Cons. Data Ctr., Resource Inven. Branch, P.P. Box 9344, Stn Prov. Govt, Victoria BC V8W 9M1, Canada

508. **Catling, P.M.; Brownell, V.R. (1997):** Damselflies (Zygoptera) in Ontario from 1900 to 1952: An atlas of E.M. Walker's distributional data for monitoring, and biodiversity and biogeography studies. 53 pp.

[Available for \$10 CDN from the authors at: 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario, CANADA K0A 2P0.]

509. **Chang, Y.-J.; Wang, L.-j. (1997):** [Dragonflies of Yangminshan National Park]. Yangminshan National Park Administration Office, Taiwan. *Illustrated Series of Books on Yangminshan National Park* 6. ISBN 957-00-9368-4: 263 pp. (in Chinese).

[“An attractive, well organised and nicely produced field guide [...] Out of the 142 (known Taiwanese spp., 90 are treated here. - In the introductory chapters (pp. 12-59), the adult morphology is briefly outlined, but the main emphasis is given to the ecology and behaviour (pp. 18-55). A simple pictorial key is introducing the reader to the concise species narratives, which constitute the main part of the book (pp. 60-243). These are richly illustrated with col. field phot. (adults & larvae). The family (species) coverage is as follows: Calopterygidae (4 spp.), Chlorocyphidae (2), Euphaeidae (2), Synlestidae (1), Lestidae (1), Megapodagrionidae (1), Platyneuridae (4), Protoneuridae (1), Coenagrionidae (10), Cordulegastridae (3), Gomphidae (12), Aeshnidae (10), Corduliidae (2) and Libellulidae (37). A chapter on dragonfly conservation is added. [...] Two minor errors should be corrected: the bottom phot. on p. 130 shows a *Chlorogomphus brevistigma* rather than *C. risi* and, according to the information from the second Author, the phot. on p. 159 is probably referable to an undescribed *Oligoaeschna* sp.. (OA 11559).]

Address: Wang, L.-J., Lab. Insect Conserv., Dept Plant Pathol. & Ent., Natn. Taiwan Univ., Taipei, Taiwan, ROC
Source of supply: Natur in Buch und Kunst, Dieter Prestel, Hammerather Str. 9, D-53819 Neunkirchen-Seelscheid, Germany; DM 48,-

510. **Collingwood, N. (1997)**: The dragonflies of Staffordshire. Staffordshire Biological Scheme Publication 18. ISBN 1 874414 22 X: 79 pp. (in English). [price £5.95 + 50 pence p+p]

Source of supply: Potteries Museum & Art Gallery, Hanley, Stoke-on-Trent ST1 3 DW. e-mail: museums@stoke01.stoke-cc.gov.uk

511. **Devai, G.; Miskolczi, M. (1997)**: Ecological state assessment and qualification of the active floodplain of River Tisza between Tiszabercel and Gávavencsellő (NE-Hungary) on the basis of dragonfly (Odonata) fauna. *Studia odonologica Hungarica* 3: 63-81. (in Hungarian, with English summary).

Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

512. **Devai, G.; Miskolczi, M.; Katai, J. (1997)**: Faunistic data on adult dragonflies (Odonata) from the active floodplain of River Tisza between Tiszabercel and Gávavencsellő (NE-Hungary). *Studia odonologica Hungarica* 3: 39-61. (in Hungarian, with English summary).

Address: Miskolczi, Margit, Department of Ecology, Kossuth L. University, P.O. Box 71, H-4010 Debrecen, Hungary

513. **Devai, G.; Devai, I.; Tothmeresz, B.; Miskolczi, M. (1997)**: Methodological problems in the evaluation of faunistic data taking dragonflies (Odonata) as an illustrative example. Part 2: Collection and evaluation of basic reference. *Studia odonologica Hungarica* 3: 5-20. (in Hungarian, with extensive English summary).

Address: Devai, G., Department of Ecology, Kossuth L. University, P.O. Box 71, H-4010 Debrecen, Hungary

514. **Devai, G. (1997)**: Proposal for the quantitative surveying of dragonfly adults (Odonata). *Studia odonologica Hungarica* 3: 21-33. (in Hungarian, with extensive English summary).

Address: Devai, G., Department of Ecology, Kossuth L. University, P.O. Box 71, H-4010 Debrecen, Hungary

515. **Donath, H. (1997)**: Erstnachweis der Südlichen Mosaikjungfer (*Aeshna affinis* Vander Linden, 1823) in der nordwestdeutschen Niederlausitz. *Biol. Studien Luckau* 26: 73-74. (in German).

[record of a single male on 10 August 1996 in a brown coal mining site (NSG Wanninchen) in the Federal state Brandenburg, Germany]

Address: Donath, H., Hauptstr. 36, D-15926 Luckau, Germany

516. **Egyed, M.; Krupinskzi, L. (1997)**: Faunistic data on adult dragonflies (Odonata) from the active and ancient floodplain of River Tisza between Tiszabercel and Gávavencsellő (NE-Hungary). *Studia odonologica Hungarica* 3: 35-41. (in Hungarian, with English summary).

Address: Egyed, M., Laktanya u. 10, H-4028 Debrecen, Hungary

517. **Holder, M. (1997)**: Searching for underwater Odonata. *Ontario Insects*. 2(3): 54-55.

[not available for abstracting]

518. **Janský, V.; David, S. (1997)**: The dragonflies (Insecta: Odonata) from Orava and Orava's peat bogs (northwestern Slovakia). *Entomofauna carpathica* 9: 48-53. (in Slovak, with English summary).

[19 species were recorded from 7 localities between 1993 and 1995. Among the characteristic peatbog-species of higher altitudes as *Coenagrion hastulatum*, *Aeshna juncea*, and *Leucorrhinia dubia*, of special interest are *Aeshna subarctica elisabethae*, and *Leucorrhinia rubicunda*. The latter was recorded in Slovakia for the first time in June 1993 and confirmed in July 1994.]

Address: David, S., Tekovske Muz., P.O. Box 69, SK-93469 Levice, Slovakia

519. **Krach, J.E.; Wilms, W. (1997)**: Die Libellen des Schuttereinzugsgebietes. *Sammelblatt des Historischen Vereins Ingolstadt* 106: 21-121. (in German).

[detailed survey of the catchment of the Schutter, left tributary of the River Danube in the Ingolstadt region (Bavaria, Germany); the distribution of the species is mapped, and discussed in some detail; several tabs with checklists of 48 species or different habitats as ditches, temporary waters, heavily polluted waters etc. are provided; the importance of these waters for Odonata is discussed in most cases on the species level; several colour photos]

Address: Wilms, Walburga, Schulweg 4a, 85139 Wettstetten, Germany

520. **Laister, G. (1997)**: Leitbild-Libellen, Donau-Traun-Krems-Auen. *Naturk. Jahrbuch Stadt Linz* 42/43: 181-196. (in German, with English summary).

[on the basis of old maps (Franziscäisches Kataster, 1826), the potential dragonfly fauna of the floodplains of the river system of Donau, Traun and Krems is reconstructed. The recent dragonfly fauna is compared with an assumed dragonfly fauna for unregulated rivers in the past century. The missing of species is explained by the absence of special habitats or the loss of special structures of vegetation (zonation). Abstracters note: This is a very remarkable publication with reference to dragonfly conservation, and building up guidelines for habitat development focussing on landscape ecology. A very similar attempt was exemplified for the River Mosel, Rhineland-Palatinate, and prepared by M. Schorr in 1996 for the German Bundesanstalt für Gewässerun-

de, Koblenz: Schorr, M. (1996): Flußauenlibellen der Mosel und ihre Indikatorfunktion. Teil I: Aut- und Etho-ökologie ausgewählter Arten. Teil II: Möglichkeiten ihrer Förderung im Rahmen von Kompensationsmaßnahmen. Unveröffentlichtes Gutachten der Faunistisch-Ökologischen Arbeitsgemeinschaft im Auftrag der Bundesanstalt für Gewässerkunde / Ref. U3 (Tierökologie), Koblenz. 119 pp, Anhang. + 40 pp, Anhang.]
Address: Laister, G., Naturkundliche Station, Neues Rathaus, Hauptstr. 1-5, A-4041 Linz, Austria

521. **Nilsson, A. (1997):** Aquatic insects of North Europe, Vol. 2, Introduction. In: Nilsson, A. (Ed.): Aquatic insects of North Europe, a taxonomic handbook. Vol. 2. Apollo Books. Stenstrup: 9-12. (in English).
[corrections and additions to Vol. 1 of the Aquatic insects of North Europe; tab. with the number of taxa on the family level including Odonata known from Denmark, Norway, Sweden, Finland, Fennoscandian parts of Russia (Karelia), Iceland (1 species), Faroes (no species), and North Europe]
Address: Apollo books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark

522. **Norling, U.; Sahlén, G. (1997):** Odonata, Dragonflies and Damselflies. In: Nilsson, A. (Ed.): Aquatic insects of North Europe, a taxonomic handbook. Vol. 2. Apollo Books. Stenstrup: 13-65. (in English).
[detailed keys to the Skandinavian larvae and imagos of Odonata with original black and white illustrations; introductory chapter with information on life cycles and phenology, habitats, trophic relationships within the food chain, state of knowledge of Odonata, morphology (eggs, larvae, adults, methods (collecting, rearing, and preparation and conservation for / in collections). Most of the illustrations are made by Ulf Norling (larvae) and Göran Sahlén (imagos) from Skandinavian material. This is a very interesting aspect of this key: due to geographic variation in the morphology of some species, some of the keys to larvae or exuviae (e.g. Heidemann/Seidenbusch) in some cases do not match the material to be identified because the illustrations are based on specimens from regions far away from the actual collecting side. This is - in my opinion - the best reason to use the book resp. the publication of Norling/Sahlen if you have to deal with Skandinavian Odonata: It works with autochthonous Skandinavian specimens, and it provides illustrations of species as *Somatochlora sahlbergi* or *Aeshna ossiliensis* you will hardly find in any other book of such quality. (M. Schorr)]
Address: Apollo Books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark

523. **Rapeau, A. (1997):** Contribution à la connaissance des odonates du Mazou. Nature Nièvre 5: 21-27. (in French).
[survey of the Odonata from the River Mazou (river system of Loire), France; records of 22 species with classification of their abundance; *Coenagrion mercuriale*, *Ceragrion tenellum*, *Ophiogomphus cecilia*, *Onychogomphus uncutus*, and *O. forcipatus* are discussed]
Address: Rapeau, A., Congy, F-58150 Sainte-Andelain, France

524. **Solimini, A.G.; Tarallo, G.A.; Carchini, G. (1997):** Life history and species composition of the damselfly assemblage along the urban tract of a river in central Italy. *Hydrobiologia* 356: 21-32. (in English).

["The species composition of the damselfly assemblage and the life history patterns of two *Coenagrionidae* (*Ischnura elegans* and *Cercion lindenii*) were investigated along the urban tract of a river (Tiber, Roma, Italy) characterized by increasing organic pollution. The assemblage was dominated by generalist species, usually recorded in lentic habitats, rather than by typical riverine species and the proportion of the latter decrease at the most polluted sites. At the end of winter, the mean size and instar distribution were different between the sampling sites showing that the life history of both species examined were influenced by a degradation of the environmental quality. A longer reproductive period, absence of diapause, and tolerance of low oxygen concentration appear to be key factors that allow generalist species *I. elegans* and *C. lindenii* to predominate at the polluted sites." (Authors)]
Address: Carchini, G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. e-mail: carchini@utovrm.it

525. **Stoks, R.; De Block, M. (1997):** Successful reproduction in Belgium of the damselfly *Lestes barbarus* (Fabricius, 1798) (Odonata: Lestidae). *Bull. annls r. belge ent.* 133: 303-308. (in English).
["*L. barbarus* (Odonata: Zygoptera) completes its life cycle in Belgium. Formerly, this species was thought to wander from Southern France to Belgium every year. For three consecutive years small populations were present at Merchtem and Wilrijk. The species was found ovipositing in *Juncus effusus*. During a larval survey in June 1996 several ultimate and penultimate instars were found at both sites. These observations raise the number of Lestidae reproducing successfully in Belgium to five. Although *Lestes* larvae seem unable to coexist with fish, our results show that coexistence with newts is possible. A limiting factor in the larval distribution of *L. barbarus* may be competition with *L. sponsa*. The emergence pattern suggests a latitudinal temporal gradient in emergence, as in *L. sponsa* where emergence begins earlier in warmer southern areas." (Authors)]
Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), B-2020 Antwerpen, Belgium

526. **Stoks, R.; De Bruyn, L. de; Matthysen, E. (1997):** The adaptiveness of intense contact mate guarding by males of the Emerald damselfly, *Lestes sponsa* (Odonata: Lestidae): the male's perspective. *J. Insect Behav.* 10(2): 289-298. (in English).
["We studied the mating system of the emerald damselfly *Lestes sponsa*. All males showed intense contact mate guarding by holding the female in tandem during the entire oviposition period. Our findings support the predictions made by Alcock (1994) about the occurrence of intense mate guarding: (1) a high female receptivity after copulation, (2) a high male capacity to resist takeovers, (3) sperm precedence, (4) a high operational sex ratio, (5) a high male density, (6) high access by rivals to mated females, (7) low energy expenditure, (8) a low risk of guarding, and (9) a short interval between copula and oviposition. This indicates a positive cost-benefit balance for this behavior, at least in males. A comparison within the genus *Lestes* suggests that the male-biased sex ratios and the ease with which mated females are detected have been strong selection pressures in the evolution of intense contact mate guarding." (Authors)]

Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium

527. **Tappenbeck, L. (1997):** Die Entwicklung der aquatischen Lebensgemeinschaft in der Bode nach industrieller und natürlicher Aufsalzung im Bereich der Ortschaft Staßfurt 1992-1995 im Landkreis Aschersleben - Staßfurt / Sachsen-Anhalt (Deutschland). *Limnologica* 27(1): 129-142. (in German, with English summary).

[the development of the aquatic biotopes in the River Bode after industrial and natural salinization in the area of the community of Staßfurt from 1992 till 1995 - District Aschersleben - Staßfurt/Federal State Sachsen-Anhalt (Germany); detailed documentation of species composition and process of restoration of fauna after reduction of chlorid emission in the Bode river system; *Calopteryx splendens* and *Ischnura elegans* seem to be more tolerable against chlorid concentration, and resettled the river quite early after reduction of chlorid concentration; *Calopteryx virgo*, *Coenagrion puella*, and *Chalolestes viridis* seem to be less tolerant against chlorid concentration; these species reestablished later than the former species did.]

Address: Tappenbeck, L., Staatliches Amt für Umweltschutz Magdeburg, Umweltlabor, Dez. Biologie, Gouernmentsberg 1, D-39104 Magdeburg, Germany

528. **Tol, J. van (1997):** The genus *Procordulia* Martin in western Malesia (Odonata, Corduliidae). Descriptions and records of Malesian Odonata, 4. *Tijdschrift voor Entomologie* 140: 133-146. (in English).

["The species of the genus *Procordulia* occurring in Malaysia, the Philippines and Indonesia, excl. New Guinea, are discussed and a key to the species is provided. *P. papandayanensis* is described from Java, and *P. lompobatang* and *P. rantemario* from SW Sulawesi. These new species all belong to the *P. sambawana* group of species." (Author)]

Address: Tol, J. van, National Museum of Natural History, P. O. Box 9517, 2300 RA Leiden, The Netherlands.

529. **Walton, D. (1997(?)):** Common dragonflies of the northeast. VHS-Video. 30 min.

[Common Dragonflies of the Northeast presents stunning footage of our region's common species. This unique video covers the identification, behavior, and habitats of adult dragonflies. Because this group has received limited coverage in traditional field guides, even common dragonflies remain virtually unknown to many naturalists. Now, this video provides the means to recognize and appreciate these fascinating insects. Over 40 species are presented including males and females. Species list: American Emerald, *Cordulia shurtleffi*; Beaverpond Baskettail, *Epiheca canis*; Black Saddlebags, *Tramea lacerata*; Black-shouldered Spinyleg, *Dromogomphus spinosus*; Blue Dasher, *Pachydiplax longipennis*; Calico Pennant; *Celithemis elisa*; Canada Darner, *Aeshna canadensis*; Carolina Saddlebags, *Tramea carolina*; Cerry-faced Meadowhawk; *Sympetrum internum?*; Chalk-fronted Corporal; *Libellula julia*; Common Baskettail, *Epiheca cynosura*; Common Green Darner, *Anax junius*; Common Whitetail, *Libellula lydia*; Delta-spotted Spiketail, *Cordulegaster diastatops*; Dot-tailed Whiteface, *Leucorrhinia intacta*; Dragonhunter, *Hagenius brevistylus*; Eastern Amberwing, *Perithemis tenera*; Eastern Pondhawk, *Erythemis simplicicollis*; Elf Skimmer, *Nannothemis bella*; Fawn Darner, *Boye-*

ria vinosa; Four-spotted Skimmer, *Libellula quadrimaculata*; Frosted Whiteface, *Leucorrhinia frigida*; Halloween Pennant, *Celithemis eponina*; Harlequin Darner, *Gomphaeschna furcillata*; Lance-tipped Darner, *Aeshna constricta*; Lancet Clubtail, *Gomphis exilis*; Least Clubtail, *Stylogomphus albistylus*; Mottled Darner, *Aeshna clepsydra*; Petite Emerald, *Dorocordulia lepida*; Prince Baskettail, *Epiheca princeps*; Racket-tailed Emerald, *Dorocordulia libera*; Ringed Boghaunter, *Williamsonia lintneri*; Seaside Dragonlet; *Erythrodiplax berenice*; Shadow Darner, *Aeshna umbrosa*; Slaty Skimmer, *Libellula incesta*; Spangled Skimmer, *Libellula cyanea*; Spot-winged Glider, *Pantala hymenaea*; Springtime Darner, *Basiaeschna janata*; Stream Cruiser, *Didymops tansversa*; Twelve-spotted Skimmer, *Libellula pulchella*; Twin-spotted Spiketail, *Cordulegaster maculata*; Unicorn Clubtail, *Ariogomphus villosipes*; Widow Skimmer, *Libellula luctuosa*; Yellow-legged Meadowhawk, *Sympetrum vicinum*.

Orders: \$24.95 plus \$5.00 S & H. Checks to NHS; mail to NHS, 7 Concord Greene #8, Concord, MA 01742. MA residents add 5% tax. For more information, e-mail Dick Walton at dick@concord.org Wholesale lots available in quantities of 6 or more (\$12.95/copy) (Bill Mauffrey, taken from Internet)]

530. **Willigalla, C. (1997):** Untersuchungen zur Libellenfauna ausgewählter Artenschutzgewässer der Gemeinde Ostbevern / Kreis Warendorf - mit einem Beitrag zur Ökologie von *Lestes dryas* Kirby, 1849. Diplomarbeit, Universität Münster: 70 pp. (in German).

[survey of the odonate fauna (31 species) of 19 water bodies created early in the 90's of this century (Ostbevern, Nordrhein-Westfalen, Germany); special attention is given to *Lestes dryas*]

Address: Willigalla, Chr., Brock 45, D-48346 Ostbevern, Germany

531. **Wilson, K.D.P. (1997):** An annotated checklist of the Hong Kong dragonflies with recommendations for their conservation. *Mem. Hong Kong nat. hist. soc.* 21: 1-68. (in English).

["One hundred and seven odonates from Hong Kong are listed with synonymic notes of relevant published records and new material detailed. The origins and distribution pattern of the Hong Kong species are discussed. Twenty-three wetland areas are identified for their odonate conservation importance and recommendations are made for the protection of key sites and species vulnerable to collection." (Author) Of some special interest is tab. IV which lists the Hong Kong endemic Odonata (7 species; 1 subspecies), and the number of localities for these taxa presently known. E.g. *Rhipidolestes janetae* is known from a single locality (this species is documented in both sexes with colour pictures together with another five species)]

Address: Wilson, K.D.P., 6F, 25 Borrett Rd, Mid Levels, Hong Kong, China

1998

532. **Anholt, B.R.; Werner, E.E. (1998):** Predictable changes in predation mortality as a consequence of changes in food availability and predation risk. *Evolutionary Ecology* 12(6): 729-738.

[Theory predicts that animals will have lower activity levels when either the risk of predation is high or the availability of resources in the environment is high. If en-

counter rates with predators are proportional to activity level, then we might expect predation mortality to be affected by resource availability and predator density independent of the number of effective predators. In a factorial experiment, we tested whether predation mortality of larval wood frogs, *Rana sylvatica*, caused by a single larval dragonfly, *Anax junius*, was affected by the presence of additional caged predators and elevated resource levels. Observations were consistent with predictions. The survival rate of the tadpoles increased when additional caged predators were present and when additional resources were provided. ...]

Address: Anholt, B.R., Univ. Victoria, Dept. Biol., POB 3020, Victoria, BC V8W 3N5, Canada

533. **Anselin, A. (1998)**: Compte-rendu de la réunion Gomphus du 18 novembre 1998 à Bruxelles (résumé). *Gomphus* 14(1): 37-38. (in French).
[documentation of the results of the meeting of the Belgian Dragonfly recorders: main subjects of the report are the status of the distribution atlas of Belgian Odonata and the scheduled contributions in the coming issues of the journal *Gomphus*]

Address: Anselin, Anny, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussels, Belgium

534. **Arnaboldi, F. (1998)**: Les odonates d'une mare de platière nouvellement restaurée. *Martinia* 14(3): 103-114. (in French, with English summary).
[the colonisation of dragonfly species following a restoration of a pond is described]

Address: Arnaboldi, F., ONF-Sylvétude, Cellule d'Appui Ecologique, Boulevard de Constance, F-77300 Fontainebleau, France

535. **Beamish, F.W.H.; Noakes, D.L.G.; Rossiter, A. (1998)**: Feeding ecology of juvenile Lake Sturgeon, *Acipenser fulvescens*, in Northern Ontario. *Canadian Field Naturalist* 112 (3): 459-468.
["Dietary analyses of juvenile Lake Sturgeon in a resource-poor habitat showed them to be a general predator. Cladocera dominated numerically the prey taxa, but were recorded in only four of the individual sturgeon examined and therefore excluded from stomach content analyses. Mayfly larvae (Ephemeroptera), primarily *Hexagenia*, were numerically the next most abundant (34% of all prey items) and the most widely taken (75% of all sturgeon) of the 10 prey categories. Others were Odonata, Annelida, Mollusca, Diptera and Trichoptera, each at 5-8% of all prey items. ..."]

Address: Noakes, D.L.G., Univ. Guelph; Dept. Zool.; Guelph; ON N1G 2W1; Canada

536. **Beckemeyer, R. (1998)**: Nebraska and South Dakota Odonata - a compilation of collecting reports related to the July, 1998 Valentine, Nebraska Annual Meeting of the Dragonfly Society of the Americas. *Argia* 10 (4): 27-28. (in English).
Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

537. **Beckemeyer, R. (1998)**: Some Kansas State and County Odonata records for 1998. *Argia* 10(4): 26. (in English).
[State records: *Argia immunda*, *Erythrodiplax umbrata*]
Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

538. **Beckemeyer, R. (1998)**: Some miscellaneous Odonata collected in the Midwest in 1998. *Argia* 10(4): 26-27. (in English).
Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

539. **Beckemeyer, R. (1998)**: *Tramea*. *Argia* 10(4): 33-44. (in English).
[news and notes from internet; e-mail addresses of members of Dragonfly society of the Americas (DSA); snail mail addresses of members of DSA]
Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

540. **Beckemeyer, R. (1998)**: *Tramea calverti* collected in Missouri. *Argia* 10(4): 13. (in English).
Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

541. **Beckemeyer, R.; Hummel, S. (1998)**: Two notes on *Somatochlora ensigera*, the Plains Emerald. *Argia* 10(4): 28-30. (in English).
[county dot map depicting distribution of *S. ensigera*: <http://www2.southwind.net/~royb/somens.jpg>; note on the impact of intensive collecting pressure on *S. ensigera*: "... the fairly heavy collecting pressure that occurred during the period of the meeting harmed neither the habitat nor the breeding behaviour of this species."]
Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

542. **Bedjanic, M. (1998)**: [Bloke Plateau, the moor pearl of Inner Carniola]. *Slovene Odonatol. soc.*, Ljubljana: 8 pp. (in Slovene).
[folding brochure with colour pictures of characteristic members of the fauna (including *Aeshna juncea* and *Calopteryx virgo*) and the flora of the area.]
Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. e-mail: matjaz-bedjanic@guest.arnes.si

543. **Bedjanic, M. (1998)**: Poskus analize favne kacijh pastirjev Sri Lanke (Insecta: Odonata). *Diplomska Naloga*: 90 pp. (in Slovene, with English summary).
["An attempt of the analysis of the dragonfly fauna of Sri Lanka (Insecta: Odonata)": M.s. thesis. "In the introduction an overview of research into odonate fauna of Sri Lanka is presented. All published information on each particular dragonfly taxon are systematically gathered in the Synopsis of the odonate fauna of Sri Lanka and a list of 115 species and subspecies which occur on the island is compiled. The results of the author's research of dragonfly fauna of Sri Lanka in January and February 1995 are also presented. Altogether 52 taxa, 17 endemic ones, were recorded at 22 localities between 15.I.1995 and 08.II.1995. Of special interest are the records of *Elatoneura bigemmata*, with first description of the female, and of *Epopthalmia vittata cyanocephala*, with description of the larval skin. For all dragonfly species listed for the island phenology of occurrence of adult animals is presented and a comparison to the author's research is made. Zoogeographical analysis of the odonate fauna of Sri Lanka shows similarity with that of South India, however 53 or 46,5% of taxa are confined to the island. An overview and analysis of the present knowledge on the odonate fauna of Sri Lanka show that it is still very incomplete. The odonate fauna of Sri Lanka is endangered and the main reasons for this are given. In addition, the significance of dragonflies for Sri Lanka biodiversity is discussed."]

(Author). M. Bedjanic made available an extended German summary resp. comments to different chapters or tabs. With the help of this, there is no problem to study and understand the thesis in its central aspects.]

Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. e-mail: matjaz-bedjanic@guest.arnes.si

544. **Behrstock, R.A. (1998)**: Notes on the first record of Turquoise-tipped Darner (*Aeshna psilus*) in Arizona. *Argia* 10(4): 11-12. (in English).

Address: Behrstock, R.A., 9707 S. Gessner #3506, Houston, TX, 77071-1032

545. **Biggs, K. (1998)**: A productive first year in California. *Argia* 10(4): 23-24. (in English).

[confirm <http://www.sonic.net/~bigsnest/Pond/Lists/dragons.html>]

Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol, CA, 95472, USA

546. **Blank, M.; Diehl, D.; Kolmet, C. (1998)**: *Gomphus flavipes* (Charpentier) am Rhein bei Köln (Anisoptera: Gomphidae). *Libellula* 17(3/4): 239-242. (in German, with English summary).

["*Gomphus flavipes* (Charpentier) at the Rhine near Cologne, Germany (Anisoptera: Gomphidae). - On 25-VI-1998, near Cologne-Porz a freshly emerged male was recorded. This is the first record in North Rhine-Westphalia after more than 89 years." (Authors)]

Address: Blank, M., Dierath 157b, D-51399 Burscheid, Germany

547. **Blischke, H.; Brauns, C.; Kuck, K. (1998)**: Die Libellenfauna unterschiedlicher Gewässertypen des mittleren Allier im LIFE-Gebiet Joze-Maringues, Frankreich. *Libellula* 17(3/4): 117-147. (in German with English summary).

["The dragonfly fauna of different water habitats in the middle reaches of the River Allier in the LIFE-area Joze-Maringues, France - From 1993 to 1995, in a section of the Allier near Clermont-Ferrand in central France, a total of 45 Odonata species were recorded. According to their spatial patterns the spp. were grouped into 9 dragonfly assemblages. Being a largely intact and unaltered area with a great variety of habitats, this river section is invaluable for the dragonfly fauna." (Authors); documentation of the dragonfly assemblages in relation to main biotope parameters of a river as, velocity, vegetation, sedimentation, and insolation]

Address: Blischke, H., Im Krümmen Sieke 54, D-30419 Hannover, Germany

548. **Bonte, D. (1998)**: Een populatie van *Sympecma fusca* (Vander Linden, 1820) in de Franse kustduinen te Bray-Dunes: een mogelijke verklaring voor de waarnemingen langs de Vlaamse Westkust? *Gomphus* 14(1): 32-34. (in Dutch, with English and French summaries).

["A vital population of *Sympecma fusca* was discovered in the coastal dunes of Bray Dunes (France), at approximately 500 m from the Belgian border. The habitat can be described as a shallow dune-lake with a dominance of *Chara* species in the water vegetation. The possible function of this population as a source for the observations in the Belgian dune area is briefly discussed." (Author)]

Address: Bonte, D., Leopold-II-laan 44a, B-9000 Gent, Belgium

549. **Boudot, J.-P. (1998)**: Differences in male colour patterns between *Boyeria cretensis* Peters, 1991 and *B. irene* (Fonscolombe, 1838) (Odonata: Aeshnidae). *O-pusc. zool. flumin.* 161: 1-3. (in English).

[colour patterns support and reinforce the species rank of *Boyeria cretensis*]

Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Note-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. e-mail: boudot@cpb.cnrs-nancy.fr

550. **Boudot, J.-P.; Prot, J.-M.; Dommanget, J.-L. (1998)**: Rectification à l'article intitulé: Analyse et commentaires relatifs au "Catalogue des Libellulidées des environs de Besançon" de M. Léandre Pidancet (1856) par Jean-Louis Dommanget (*Martinia* 14(1): 31-36). *Martinia* 14(4): 136-

[The contribution contains some corrections and additions to the paper mentioned. The synonymy of *Aechna justii* (sic) with *Aeshna juncea* is confirmed on the basis of further historical sources (Barbiche: *Bull. soc. hist. nat. Metz* 1887), and the synonymy of *Libellula bruandi* Pidancet, 1856 is cleared: it is *Orthetrum brunneum* (after Barbiche 1887)]

Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Note-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. e-mail: boudot@cpb.cnrs-nancy.fr

551. **British Dragonfly Association (1998)**: Members Code of Practice on collecting dragonflies. 4 pp. (in English).

[BDS's viewpoint on collecting dragonflies; appendix with IUCN Red List of threatened animals, and the British Red Data Book]

Address: BDS, c/o Bill Wain, The Haywain, Hollywater Road, Bordon, Hants GU35 0AD, UK

552. **Brockhaus, T. (1998)**: Die Winterlibelle *Sympecma fusca* (Vander Linden, 1820) in der Region Chemnitz-Erzgebirge (Odonata). *Ent. Nachr. Ber.* 42(4): 231-234. (in German, with English summary).

[compilation of own and unpublished data on distribution and occurrence of *S. fusca* in the Chemnitz-region, Saxony (Germany); there is an obvious correlation between winter temperatures and population density (number of records); survival of populations is highest after warm winters; temperature in winter is discussed as an ultimate factor in survival of populations; habitat quality seem to be less important; but it is mandatory for long term survival of populations to have good habitats in climatically favourable regions such as floodplains]

Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. e-mail: T.Brockhaus@t-online.de

553. **Brockhaus, T. (1998)**: Gemeinsame Vorkommen der Smaragdlibellen *Somatochlora alpestris* (Selys, 1840) und *Somatochlora arctica* (Zetterstedt, 1840) im Erzgebirge (Odonata: Corduliidae). *Veröff. Museum für Naturkunde Chemnitz* 21: 79-82. (in German).

[documentation of records, and discussion of syntopic localities of both species in the "Große Kranichsee" and "Mothäuser Heide" in Saxonia, Germany near the Czech border]

Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. e-mail: T.Brockhaus@t-online.de

554. **Brockhaus, T. (1998):** Libellenbeobachtungen in der Dahlemer Heide (Insecta: Odonata). Mitteilungen Sächsischer Entomologen 42: 17. (in German).

[results of a short excursion on 26 July 1998 to the odonatological unexplored Dahlemer Heide in Saxonia, Germany; of some faunistic interest is the record of *Orthetrum coerulescens* on a small iron water.]

Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. e-mail: T.Brockhaus@t-online.de

555. **Buczynski, P.; Czachorowski, S. (1998):** Contribution to the cognition of dragonflies (Insecta: Odonata) of lake districts in the north-eastern Poland. *Przeglad Przyrodniczy* 9(3): 45-55. (in Polish, with English summary).

[new records of the odonate fauna of the Masurian Lake District and the eastern part of the Pomerian Lake District (NE Poland); *Chalcolestes viridis* is new for the region; the rare *Sympecma paedisca*, *Ophiogomphus cecilia*, and *Aeshna viridis* are confirmed; a total of 41 species (historical and recent records) are listed in tabs, and classified according to their habitat requirements]

Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland

556. **Buczynski, P. (1998):** Drying out of Sphagnum fens and the occurrence of dragonfly larvae (Odonata): observations from Lasy Janowskie (SE Poland). *Wiad entomol.* 17 (Suppl.): 160-161. (in Polish, with German translation of the paper (available from M. Schorr).

[result of instable hydrological fens is a loss of species diversity: compared with undisturbed fens the odonate fauna is quite poor; depending on the duration of a stable water situation, *Somatochlora arctica* was the only larval Odonata found in fens drying out in June of a year; fens drying out in July had a richer odonate fauna composed of species of the genera *Lestes* and *Sympetrum*; in years with stable water levels the odonate fauna of drying out fens resembles the fauna of undisturbed fens; the author stresses the importance of core populations in the metapopulation of fen dragonfly communities]

Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland

557. **Bulletin of the Hokkaido Odonatological Society** Vol. 10 (March 31, 1998) (1998): 1. (in Japanese).

558. [Contents: 1. Hiratuka, K.: Behaviour of some dragonflies of genus *Sympetrum* at Lake Harutori. pp. 1-9; 2. Fujibayahsi, T.: *Aeshna mixta soneharai* collected from Goryo-ike (Hamamasu-mura, Ishikari District) and Nishioka water reservoir (Sapporo). p.: 10; 3. Fujibayahsi, T.: *Aeschnophlebia longistigma* collected from Nishinopporo, Ebetsu city. pp.: 11; 4. Yokoyama, T. & T. Fujibayahsi: Dragonflies of Ebetsu city (I): Mizubashouen park at Nishinopporo. pp.: 12-15; 5. Hirata, M.: Some dragonflies collected from Hong Kong in the spring of 1997. pp.: 16-17; 6. Ubukata, H.: Distribution table of dragonflies in each district of Hokkaido (11). pp.: 18-20; 7. Ubukata, H.: Distribution table of dragonflies in the neighbouring islets of Hokkaido (11). pp.: 21-23; 8. Nishihara, S.: About Annual Meeting of "Hyogo Odonatological Society". p.: 24; 9. Yokoyama, T.: Review of Odonatological literature (articles). p.: 25; 10. Harauchi, Y.: *Epiproplebia superstes* (a photograph): front cover]

Address: Ubukata, H., Hokkaido University of Education at Kushiro, Kushiro, 085 Japan

559. **Burbach, K.; Werzinger, J. (1998):** Fortpflanzungsnachweise der Schabrackenlibelle (*Hemianax ephippiger*) und Herbstschlupf von Kleiner Königslibelle (*Anax parthenope*) und Becher-Azurjungfer (*Enallagma cyathigerum*) in Bayern. *Hagenia* 16: 15. (in German).

[observation of emergence of *Anax ephippiger* in Bavaria, Germany in September 1998: this is the first record of autochthony in Bavaria; records of a probably second generation of *Anax parthenope* and *Enallagma cyathigerum*]

Address: Werzinger, J., Zwernberger Weg 29, D-90449 Nürnberg, Germany

560. **Burbach, K. (1998):** Sibirische Azurjungfer (*Coenagrion hylas*). *Hagenia* 16: 15-16. (in German).

[report on the current situation of *C. hylas* on its most important European locality]

Address: Burbach, K., Griesfeldstr. 5a, D-85354 Freising, Germany

561. **Busetto, A. (1998):** Disegno: *Stylurus flavipes* (Charpentier, 1825). *Lindenia* 29: 125. (in Italian).

[*S. flavipes* was discovered in August 1995 near Collecchio (Province of Parma) near the River Taro]

Address: not stated

562. **Cannings, S. (1998):** Dragonflying in the mountains. *Argia* 10(4): 13-14. (in English).

[records from British Columbia, Canada; of special interest are *Somatochlora forcipata*, *Lestes forcipatus*, and *Gomphus graslinellus*]

Address: Cannings, S., A68, BC Cons. Data Ctr., Resource Inven. Branch, P.P. Box 9344, Stn Prov. Govt, Victoria BC V8W 9M1, Canada

563. **Cannon, R.J.C. (1998):** The implications of predicted climate change for insect pests in the UK, with emphasis on non-indigenous species. *Global Change Biology* 4(7): 785-796. (in English).

["Recent estimates for global warming predict increases in global mean surface air temperatures (relative to 1990) of between 1 and 3.5 degrees C, by 2100. [...] Climate change is also considered from the perspective of changes in the distribution and abundance of species and communities. Marked changes in the distribution of well-documented species - including Odonata, Orthoptera and Lepidoptera - in northwestern Europe, in response to unusually hot summers, provide useful indications of the potential effects of climate change. ..."] (Author)]

Address: Cannon, R.J.C., MAFF, Cent. Sci. Lab., York YO41 1LZ, N Yorkshire, UK

564. **Carbone, J.; Keller, W.; Griffiths, R.W. (1998):** Effects of changes in acidity on aquatic insects in rocky littoral habitats of lakes near Sudbury, Ontario. *Restoration Ecology* 6(4): 376-389. (in English).

["Benthic aquatic insects were collected from rocky nearshore areas (<1 m deep) of 17 lakes near Sudbury, Ontario, with a pH range of 4.7-7.3 and a size range of less than 10 ha to over 10,000 ha. ... Declines in abundances of several taxa of Ephemeroptera at pH below 5.5 were attributable to acid toxicity, while increases in the abundances of Odonata and Diptera at pH below 5.5 were associated with the absence of fish predators and other indirect effects of acidity. The communities of

two experimentally neutralized lakes restructured rapidly within 5 years, approaching but not achieving community structures typical of our near-neutral survey lakes. Neutralization led to recolonization or increased abundance of the acid-sensitive mayfly, *Stenacron interpunctatum*, and the dragonfly, *Boyeria grafiana*; [...] Consistent with results for the survey lakes, declines in the abundances of the dragonflies *Aeshna interrupta*, *Aeshna eremita*, and *Leucorrhinia glacialis* in the neutralized lakes were associated with reintroductions of *Salvelinus fontinalis* (aurora trout) and increased fish predation pressure, ..."]

Address: Carbone, J., Ontario Minist. Environm., Suite 1101, 199 Larch St, Sudbury; ON P3E 5P9, Canada

565. **Carpenter, G.; Legler, K. (1998):** *Williamsonia lintneri* in Wisconsin! and with flechter! *Argia* 10(4): 11. (in English).

Address: not stated

566. **Catling, P.M.; Brownell, V.R. (1998):** Migratory concentrations of dragonflies on the north shore of Lake Ontario, and northward extension of migratory species. *Argia* 10(4): 19-22. (in English).

["Aggregations of several thousand dragonflies within an area of 5 acres have been noted at several sites along the north shore of Lake Ontario in late August and early September. The larger species of dragonflies in these aggregations are usually in the late teneral or early adult stage and the aggregations are believed to be a result of an arrested movement in a southerly direction, and are thus migratory. In 1998 at Sandbanks Provincial Park, eastern Lake Ontario, *Anax junius* was the most abundant species but other species including *Tramea lacerata*, *Pantala flavescens*, and *P. hymenaea* were also recorded. Tandem pairs of *Sympetrum vicinum* were also observed moving in a southerly direction. *Tramea lacerata* has been reported north of the Carolinian zone only once, and observations by the authors of 12 individuals at the northeastern end of Lake Ontario indicate the possibility of a recent expansion of range northward. Both a gradual warming trend and the unusually warm spring and summer of 1998 may have been contributing factors. Northward expansion of migratory species may make migratory stopover areas along Lake Ontario increasingly important for dragonflies." (Authors)]

Address: Catling, P.M. & Brownell, V.R., 2326 Scrivens Drive, R.R. 3; Metcalfe, Ontario K0A 2P0, Canada; e-mail: Brownell@achilles.net

567. **Chessman, B.C.; McEvoy, P.K. (1998):** Towards diagnostic biotic indices for river macroinvertebrates. *Hydrobiologia* 364(2): 169-182. (in English).

["The construction of biotic indices that use macroinvertebrates to assess pollution and other anthropogenic disturbances of rivers and streams often requires that each taxon be assigned a number indicating its level of sensitivity. ... Gastropod molluscs (family Thiaridae) were tolerant of dam effects but sensitive to sewage and metals, whereas coenagrionid damselfly nymphs, elmids beetles and ostracods were most tolerant of sewage. Corydalid alderfly larvae, leptophlebiid mayfly nymphs, lepid damselfly nymphs, libellulid dragonfly nymphs and scirtid beetle larvae were most tolerant of metals. [...] We conclude that the approach has merit but requires considerable further development and testing, as well as consideration of the levels of specificity and di-

agnostic strength that are appropriate or achievable." (Author)]

Address: Chessman, B.C., Dept. Land and Water Conservat., POB 3720, Parramatta, NSW 2124, Australia

568. **Corbet, P.S.; Hoess, R. (1998):** Sex ratio of Odonata at emergence. *International Journal of Odonatology* 1(2): 99-118. (in English).

["Final-instar exuviae left at the emergence site by Odonata can provide information of high quality for measuring sex ratio, especially of Anisoptera. Criteria are listed according to which counts of such exuviae are acceptable for this purpose. Records of sex ratio of Odonata, published and unpublished, are critically reviewed, and 194 that meet the listed criteria are presented and analysed. Variability of sex ratio differs widely among taxa but is less in large (N >299) than in small (N = 100-199) collections. Large collections indicate that the proportion of males is greater in Zygoptera than in Anisoptera (respectively 65 and 21% of records featuring >50% males). Because the sex-determination mechanism in Odonata predicts a sex ratio of unity in the zygote, variability and imbalance of sex ratio detected at emergence can plausibly be attributed to differential mortality of eggs and/or larvae and therefore, probably, to differential predation on larvae. The effect, if any, of sex ratio at emergence on reproductive potential of the adult population is unlikely to be significant, except perhaps when, rarely, the number of females is unusually low, thus reducing the size of the next generation." (Authors)]

Address: Hoess, R., University of Berne, Institute of Zoology, Division of Population Biology, Baltzerstrasse 3, 3012 Berne, Switzerland

569. **Cruden, R.W.; Gode, O.J. (1998):** Iowa's Odonata: declining and/or changing? *J. Iowa acad. sci.* 105(2): 67-81. (in English).

["We undertook a comprehensive survey of the Order Odonata in Iowa. ... We collected throughout the state (more than 500 sites in 94 counties), throughout the flight season (late May-early October), and tried to visit several habitats in each county. ... A comparison of our data with that collected early in the century suggests considerable change in the odonate fauna. ... Our study of Iowa's dragonflies and damselflies was initiated to document what species presently occur in the state, their distributional ranges, habitats, and flight periods. Two likely results would be the identification of imperiled species and species-rich habitats." (Authors)]

Address: Cruden, R.W., Dep. Biol. Sci., Univ. Iowa, Iowa City, IA 52242, USA

570. **Czech, T.; Irmiler, U.; Kassebeer, C.; Pichinot, V. (1998):** 10.14 Libellen (Odonata), Heuschrecken (Saltatoria), Schnabelkerfen (Rhynchota) und Schmetterlinge (Lepidoptera). In: Irmiler, U., K. Müller & J. Eigner (Hrsg.): *Das Dosenmoor. Ökologie eines regenerierten Hochmoores*. ISBN 3-00-003517-6. 283 pp.

[shortly commented list of 15 species of Odonata recorded in the Dosenmoor, N of Neumünster, Schleswig-Holstein, Germany. No reference is made to: Blancke, C.; Stöckl, H.; Schlorf, M.; Lutz, K. (1981): *Dosenmoor 1981. Naturkundliche Beiträge des Deutschen Jugendbund für Naturbeobachtung* 8: 25-32. The common *Ischnura elegans* will have to be added to the list of Czech et al.]

571. **Daigle, J.J. (1998):** Membership donates to Corbet book. *Argia* 10(4): 32-33. (in English).
Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. e-mail: daiglej@dep.state.fl.us
572. **Daigle, J.J. (1998):** Visit to Sabino Canyon. *Argia* 10(4): 22-23. (in English).
[short report of a trip to Sabino Canyon, Arizona, USA with records of *Argia sabino*, *A. munda*, *A. pima*, and others]
Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. e-mail: daiglej@dep.state.fl.us
573. **D'Antonio, C. (1998):** Archivio Hemianax. *Lindenia* 29: 124. (in Italian).
[additions to the Italian Hemianax ephippiger archives]
Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. e-mail: lindenia@freemail.it
574. **D'Antonio, C. (1998):** Checklist delle "Libellule" nella ... Letteratura Italiana. *Lindenia* 29: 127-128. (in Italian).
[documentation of poems in Italian language with dragonflies as subject]
Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. e-mail: lindenia@freemail.it
575. **D'Antonio, C. (1998):** Distribuzione regionale degli odonati in Italia: aggiornamento. *Lindenia* 29: 124-125. (in Italian).
[additions to the regional Italian bibliography of Odonata]
Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. e-mail: lindenia@freemail.it
576. **D'Antonio, C. (1998):** La famiglia Cordulegasteridae Banks, 1892 in Italia. *Lindenia* 29: 125-127. (in Italian).
[distributional notes and maps of the Italian taxa of the family Cordulegasteridae: *Cordulegaster boltonii*, *C. trinacriae*, *C. picta*, *Thecagaster bidentata*]
Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. e-mail: lindenia@freemail.it
577. **David, S; Jansky, V. (1998):** The dragonflies (Insecta: Odonata) from Východoslovenská rovina plain (southeastern Slovakia). *Entomofauna carpatica* 10: 10-21. (in Slovak, with English summary).
[Between 1987 and 1995 the dragonfly fauna of 28 localities in the Východoslovenská rovina plain with special emphasize to the protected area "Preserved Landscape Area Latorica" was studied. 35 species were recorded including the rare Slovakian species *Anaciaeschna isosceles*, *Brachytron pratense*, *Epiheca bimaculata*, *Erythromma najas*, *E. viridulum*, and *Stylurus flavipes*. 10 species were new for the region mentioned above. The species composition of the localities was analysed according their community structure: 'Gomphus-Calopteryx splendens', 'Erythromma najas-Anax-Aeshna', 'Lestes-Sympetrum-Aeshna', and 'Orthetrum-Libellula depressa' dragonfly communities could be identified.]
Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. e-mail: david@pribina.savba.sk
578. **David, S. (1998):** Record of *Libellula fulva* larva (Odonata: Libellulidae) from Slovakia. *Entomofauna carpatica* 10: 91-95. (in Slovak, with English summary).
[Report on the discovery of larval *Libellula fulva* in Slovakia; discussion of distribution, ecology, and threat in Central Europe; key to the larval stages of *L. fulva*, *L. depressa*, and *L. quadrimaculata*]
Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. e-mail: david@pribina.savba.sk
579. **Diehl, U.; Linder, S.; Güttinger, H.-R. (1998):** Das Wassergrabensystem des Landstuhler Bruchs, ein Lebensraum für Insekten. *Pfälzer Heimat* 49(4): 138-140. (in German).
[*Ischnura elegans*, *Chalcolestes viridis*, *Pyrrhosoma nymphula*, and *Libellula depressa* are recorded in the system of ditches and peaty waters of the Landstuhl Bruch-region (Rhineland-Palatinate, Germany).]
Address: Güttinger, H.-R., Universität Kaiserslautern, Abt. Biologie, D-67663 kaiserslautern, Germany
580. **Dierschke, V. (1998):** Zum Vorkommen von Libellen auf der Ostseeinsel Hiddensee. *Libellula* 17(3/4): 229-235. (in German with English summary).
["Odonata on the island of Hiddensee, Baltic Sea, Germany - In 1997, 19 species were recorded, with *Lestes barbarus*, *Coenagrion hastulatum*, and *Erythromma najas* observed for the first time. The occurrence at a total of 36 ponds was analysed. Out of 13 species reproducing on the island nearly all needed ponds with reeds. At least 6 species proved to reproduce in ponds with contact to brackish water of the Baltic Sea [...]."
(Author)]
Address: Dierschke, V., Institut für Vogelforschung "Vogelwarte Helgoland", Inselstation Helgoland, Postfach 1220, D-27494 Helgoland, Germany
581. **Dommanget, J.-L.; Chalmel, R. (1998):** Rubrique bibliographique. *Martinia* 14(4): 145-150. (in French).
[French odonatological bibliography covering 1994 to 1998]
Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
582. **Donnelly, N. (1998):** *Anax junius* in England? *Argia* 10(4): 6. (in English).
[short notice on a newspaper report (The Independent) on the "Giant bird-eating dragonflies cross the Atlantic"]
Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA
583. **Donnelly, N. (1998):** Common name for *Gomphus adephus* emended. *Argia* 10(4): 32. (in English).
[amendment of common name from "Moustached Clubtail" to "Mustached Clubtail"]
Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA
584. **Donnelly, N. (1998):** Documenting rare odonates - a nice problem to have but a problem none the less. *Argia* 10(4): 10-11. (in English).
[reflections about the scientific value of sightings or photos of unexpected species; the author appeals to odonatists to net specimens, and to examine them with a hand lens. "Even a close look followed by releasing the specimen is better than an observation or even an excellent photo."
Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA
585. **Donnelly, N. (1998):** More about *Anax junius* crossing the ocean. *Argia* 10(4): 6-7. (in English).

[short outline of observations of *Anax guttatus* and *Anax junius* over the open sea; report from a catch of a couple of *A. junius* in Hawaii with "abnormal" morphological proportions: "the abdomens were too short (or perhaps the wings were too long)". Measuring abdomen and hind wings from Hawaiian collections, it is suggested that *A. junius* must have reached Hawaii a long time ago from the North-American continent because there is some likelihood for a little genetically drift of Hawaiian *A. junius* which are a little distinct from continental *A. junius*.]

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

586. **Donnelly, N. (1998):** New name for *Zoniagrion exclamatoris*. *Argia* 10(4): 32. (in English).

[the common name of *Z. exclamatoris* was changed from "Sierra Damsel" to "Exclamation Damsel"]

Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

587. **Dumont, H.; Heidari, H. (1998):** The genus *Pseudagrion* (Odonata: Zygoptera) in Iran. *International Journal of Odonatology* 1(2): 159-163. (in English).

[two species of *Pseudagrion* are reported from Baluchistan-Seistan, South-East Iran. *P. decorum* is an Oriental, and *P. cf. laidlawi* a south-east Palaearctic species with Oriental affinities. The species are figured, and compared with *P. spencei*.]

Address: Dumont, H., Laboratory of Animal Ecology, University of Gent, Ledeganckstraat, 35, B-9000 Gent. Heidari, H., Plant Pests and Diseases Research Institute, Chamran Park Way, Tehran 19395, Iran.

588. **Englund, R. (1998):** Response of the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*), a candidate threatened species, to increases in stream flow. *Bishop Museum Occasional Papers* 56: 19-24. (in English).

Address: Englund, R., Hawaii Biol. Survey, Bishop Mus., 1525 Bernice St., Honolulu, HI 96817, USA

589. **Fischer, U. (1998):** Der Dobrabach nordöstlich Kalkreuth - ein weiteres Vorkommensgebiet der Gemeinen Keiljungfer (*Gomphus vulgatissimus* Linnaeus, 1758) in Sachsen. *Mitteilungen Sächsischer Entomologen* 42: 7. (in German).

[observations in 1997 and 1998 of the very rare *G. vulgatissimus*; this seems to be the second record in Saxonia, Germany]

Address: Fischer, U., Anton-Günther-Str. 12, D-08340 Schwarzberg, Germany

590. **Fliedner, H. (1998):** Die Namengeber der europäischen Libellen. *Hefte der Bremer Libellengruppe* 6: 56 pp. (in German).

[the authors of the names of European dragonflies: Biographical information are supplied concerning the authors of the names of European Odonata taxa. In addition a list of the scientific names of European dragonflies in chronological order is given.]

Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany

591. **Fliedner, H. (1998):** Johann Franz Christian Heyer (1777-1864) und sein Beitrag zur Kenntnis der Libellen. 2. Teil. *Libellula* 17(3/4): 195-228. (in German).

[for part 1 see OAS 3 no. 318]

Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany

592. **Freyhof, J.; Steinmann, I.; Krause, T. (1998):** Weitere Funde von *Gomphus flavipes* (Charpentier) im Rhein (Anisoptera: Gomphidae). *Libellula* 17(3/4): 247-252. (in German with English summary).

["Additional records of *Gomphus flavipes* (Charpentier) in the River Rhine, Germany (Anisoptera: Gomphidae).

- In 1998, larvae and exuviae of *G. flavipes* were recorded at 15 different localities of the Middle and Lower Rhine between Cologne and Bingen and at the coolwater intake of the nuclear power plant of Mülheim-Kärlich. These records suggest an established population and a wide distribution along the Rhine. *G. flavipes* seems to be dependent on fine sediment habitats" a habitat also for other endangered potamal species. Larval habitats are highly endangered by intensive shipping." (Authors)]

Address: Freyhof, J., Zool. Forschungsinst. und Museum Alexander König, Adenauerallee 160, D-53113 Bonn, Germany

593. **Futter, S.; Futter, K. (1998):** The status of the Highland/Common Darter *Sympetrum nigrescens/striolatum* in Dunbartonshire. *Glasgow Naturalist* 23(3): 63. (in English).

Address: Futter, S. and K., 81 Oxhill Place, Dumbarton G82 4EX, UK

594. **Giles, G.B. (1998):** An illustrated checklist of the damselflies and dragonflies of the United Arab Emirates. *Tribulus, Bulletin of the Emirates Natural History Group* 8(2): 9-15.

[all 20 confirmed species present in the United Arab Emirates are illustrated by 30 colour photographs of somewhat variable quality. In most species both male and female are depicted. The accompanying brief notes give status, behaviour and preferred habitat, together with some useful distinguishing features. A further nine species found in northern Oman, which could occur in the UAE, are also briefly described. (Jill Silsby)]

595. **Gorb, S.N. (1998):** Origin and pathway of the epidermal secretion in the damselfly head-arresting system (Insecta: Odonata). *Journal of Insect Physiology* 44 (11): 1053-1061. (in English).

["In damselflies, the arrester system is responsible for an additional attachment of the head to the neck. It consists of a pair of mobile postcervical sclerites (SPC) covered by microtrichia. In their lateral position, SPCs can fixate the head on fields of microtrichia on the back surface of the head. The intact surface of microtrichia of die SPC is usually covered by a lipid-containing secretion. The present study provides ultrastructural data on the secretory epidermis and pore channels adapted to transport the secretion to the cuticle surface. ... It seems that the secretion reaches the epicuticle through terminal channels and diffuses through the epicuticle without any channel structures.]

Address: Stanislav Gorb, Max-Planck-Institut fuer Entwicklungsbiologie, Spemannstr. 35, D-72076 Tuebingen, Germany. e-Mail: stas.gorb@tuebingen.mpg.de

596. **Grand, D. (1998):** Les odonates de Lyon (département du Rhône). *Martinia* 14(3): 85-93. (in French, with English summary).

[compilation of historical and actual odonatological sources to list the Odonata fauna of the city of Lyon

(410 000 habitants, 8962 habitants / km²) including its 9 arrondissements; in total 42 species could be listed of which 27 can be observed regularly or occasionally in the 90th of this century.]

Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mt d'or, France

597. **Gubbels, R. (1998):** Waarneming van een bronlibel (*Cordulegaster boltonii*) langs de Grensmaas. *Natuurhistorisch Maandblad* 87: 212. (in Dutch).

[record of the rare Netherlands *C. boltonii* in 1998 flying along the Netherland-Belgian border river Maas]

Address: not stated

598. **Hall, B.D.; Rosenberg, D.M.; Wiens, A.P. (1998):** Methyl mercury in aquatic insects from an experimental reservoir. *Canadian Journal of Fisheries and Aquatic Sciences* 55(9): 2036-2047.

["Our objective was to study the effects of experimental flooding of a small wetland lake on the methyl mercury (MeHg) concentrations in aquatic insects and to compare MeHg concentrations in insects with those in water and fish from the same system. [...] Odonata, Corixidae, Gerridae, Gyrinidae, and Phryganeidae/Polycentropodidae exhibited increases in MeHg concentrations in response to flooding. ..."] (Author)]

Address: Hall, B.D., Univ. Alberta, Dept. Biol. Sci., Edmonton, AB T6G 2E9, Canada

599. **Hampe, A. (1998):** Libellen an Ober- und Mittellauf eines südspanischen Flusses: ein ökologischer Vergleich. *Libellula* 17(3/4): 163-172. (in German with English summary).

["Odonata of the upper and middle reach of a southern Spanish river: an ecological comparison - The odonates of the upper and middle reach of the Rio Barbate, approximately 40 km north of Gibraltar (Andalusia, Spain), were surveyed between May and September 1997, and their flight phenology and larval development were compared. Faunistic similarity was very low. No sp. reproduced at both upper and middle reach. More spp. were recorded at the middle reach. The flight phenologies showed similar patterns. Semi-voltine spp. occurred only at the upper reach whereas bi- and polyvoltine spp. formed an important fraction of 77 % at the middle reach." (Authors)]

Address: Hampe, A., Institut für Vogelforschung "Vogelwarte Helgoland", An der Vogelwarte 21, D-26386 Wilhelmshaven, Germany

600. **Harrison, J.F.; Lighton, J.R.B. (1998):** Oxygen-sensitive flight metabolism in the dragonfly *Erythemis simplicicollis*. *Journal of Experimental Biology* 201(11): 1739-1744. (in English).

["Insect flight metabolism is completely aerobic, and insect resting metabolism is quite insensitive to atmospheric oxygen level, suggesting a large safety margin in the capacity of the tracheal system to deliver oxygen during flight. We tested the sensitivity of flight initiation and metabolism to atmospheric oxygen level in the libellulid dragonfly *Erythemis (Mesothemis) simplicicollis* using flow-through respirometric measurements of the rate of CO₂ emission (VCO₂). ... These are the first data to show oxygen-limitation of flight metabolism in a free-flying insect. A low safety margin for oxygen delivery during dragonfly flight is consistent with a previous hypothesis that atmospheric hyperoxia facilitated gigantism in Paleozoic protodonates." (Author)]

Address: Harrison, J.F., Dept. Biol., Arizona State Univ., Tempe, AZ 85287-1501, USA

601. **Hermans, J.; Ketelaar, R. (1998):** De Libellenstudiegroep: een nieuwe studiegroep in oprichting van het Natuurhistorisch Genootschap. *Natuurhistorisch Maandblad* 87: 74-76. (in Dutch).

[report on the installation of a Odonata study task group in the province of Limburg/The Netherlands; some examples (*Libellula depressa*, *Pyrrhosoma nymphula*, records after 1990) of the present knowledge of the distribution of Odonata in the province are presented]

Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands

602. **Hero, J.-M.; Gascon, C.; Magnusson, W.E. (1998):** Direct and indirect effects of predation on tadpole community structure in the Amazon rainforest. *Australian Journal of Ecology* 23(5): 474-482. (in English).

["The relationship between the distribution of predators (fish, odonates and water beetles) and prey assemblages (amphibian larvae) was investigated in the tropical rainforest of central Amazonas, Brasil. [...] Predators in this system include fish in streams and streamside ponds, and invertebrates (primarily odonate naiads and beetles) in forest ponds. ..."] (Author)]

Address: Hero, J.-M., Sch. Applied Sci., Cooperative Res. Centre Tropical Rainforest Ecol. and Management, Griffith Univ. Gold Coast, PMB 50 Gold Coast MC, Queensland 9726, Australia

603. **Hill, B. (1998):** Die Huteweiden der Save-Auen im Naturpark Lonjsko Polje, Kroatien, als Lebensraum für Libellen (Odonata). Diplomarbeit am Fachbereich Biologie der Philipps-Universität Marburg - Fachgebiet Naturschutz: 119 pp, Anhang. (in German).

[survey of the importance of pastures and temporary waters in the floodplain of the River Save (Croatia) as a habitat for dragonflies; special emphasize is given to *Lestes barbarus* (*Ischnura pumilio*, and *Aeshna affinis*); drought resistance of larvae]

Address: Hill, B., Höhlsgasse 3, D-35039 Marburg. e-mail: bioplan.marburg@t-online.de

604. **Hinkelmann, C.; Schröder, W. (1998):** Arabuko-Sokoke-Wald und Mida Creek. Ein naturkundlicher Führer. NABU-Deutschland: 61 pp. (in German).

[German version of the "Arabuko-Sokoke-Forest and Mida Creek - Official Guide" published by the Kenya Indigenous Forest Conservation Programme; on pages 33/34 there are a few, general notes on the Odonata of the reserve; the guide is produced throughout with colour photos and fine black-and-white drawings; birds are the main content of the guide]

Address: Source of supply: Schröder, W., Flachskamp 47, D-33824 Werther, Germany (DM 15,-)

605. **Hoffmann, J. (1998):** Pantala und der Taxifahrer. *Hagenia* 16: 17-19. (in German).

[short story from a trip to Peru: how to use a taxi-driver for detecting promising dragonfly-localities, or how does a good locality smell?]

Address: Hoffmann, J., Eidelstedter Weg 15, D-20255 Hamburg, Germany

606. **Hogerwerf, G.; Ovaa, A.; Gerats, R. (1998):** Heidebeheer of de Hamert: de rol van fauna in het verle-

den en in the toekomst. *Natuurhistorisch Maandblad* 87: 194-201. (in Dutch, with English summary).

["Moorland management at "De Hamert" National Park: The role of fauna in past, present and future: "In the mid-1980s, very high nitrogen depositions had led to the disappearance of 255 of the original 300 hectares of heath vegetation. Of the remaining 45 hectares, only 12 had vital heath. The remaining area had become overgrown by Wavy hair-grass, Purple moor-grass and Bramble. In the mid-1980s, large parts of the area's topsoil were mechanically removed in order to restore the heath vegetation. In addition, the area was fairly intensively grazed by sheep, goats, cattle and horses. As a result, the heath coverage has grown considerably. The importance of moorland as a biotope is mainly due to its rich fauna. De Hamert has always housed large numbers of species specifically associated with moorland biotopes. Unfortunately, the large-scale management measures at De Hamert have not restored the habitat of the typical moorland fauna; in fact, the fauna seems to have deteriorated in many places. The reason is that much of the structural variation in the vegetation cover, which is a key aspect of the habitat, has been lost. The article discusses a number of prominent moorland species to illustrate the importance of the fauna in moorland management. On the basis of biotope preference, the moorland fauna can be classified into a number of groups. A few representatives of each group are discussed (Sand lizard, *Lacerta agilis*; Small red damselfly, *Ceriongia tenellum*; Moorfrog, *Rana arvalis*; Silver-studded blue, *Plebejus argus*; Nightjar, *Caprimulgus europaeus*), indicating the management measures which would preserve and develop the habitat for the fauna. Finally, the article discusses some moorland management options which could restore the lost structural variation to the vegetation at De Hamert; these include extensive grazing, small-scale management and expanding and linking the isolated moorland patches." (Authors)]

Address: Ovaa, A., Stichting Het Limburgs Landchap, Postbus 4301, NL-5944 ZG Arcen, The Netherlands

607. **Honig, B. (1998):** Sight and photo records for odonates from Houston, Texas. *Argia* 10(4): 25-26.

[*Libellula saturata*, *Libellula croceipennis*, *Brachymesia furcata*, *Anax longipes*]

Address: Honig, R., 3803 Purdue, Houston, TX, 77005-1129, USA

608. **Jacobsen, D. (1998):** The effect of organic pollution on the macroinvertebrate fauna of Ecuadorian highland streams. *Arch. Hydrobiol.* 143(2): 179-195. (in English).

["The effect of organic pollution on macroinvertebrate communities was studied in five small streams located at 2600 to 3100 meters above sea level in the Andes of Ecuador. Sampling of invertebrates and measurements of physico-chemical parameters were performed at the end of the rainy season and at the end of the dry season at upstream unpolluted sites and at adjacent downstream polluted sites. At all upstream sites, more taxa were collected in the dry season, while at the polluted downstream sites, more taxa were collected in the wet season. Also values of two biotic indices (BMWP and ASPT) tended to increase at the upstream sites and decrease at the downstream sites in the dry season. Thus, the effect of organic pollution was most pronounced during the dry season. In addition, both biotic indices were highly correlated to minimum oxygen satu-

ration and phosphate concentration in the dry season, while correlations were much weaker in the wet season. Overall, the shift in faunal composition with organic pollution resembled that described from temperate streams at higher latitudes. However, the main shift in the tropical highland fauna occurred abruptly at about 80 % oxygen air saturation, but because of the low partial pressure of oxygen at an altitude of 3000 meters, this corresponds to no more than 56 % of the oxygen partial pressure of air saturated water at sea level. I propose that tropical highland streams are more sensitive to further lowering of oxygen levels through organic pollution than their temperate counterparts." (Author). "Aeshnidae" are listed for two localities.]

Address: Jacobsen, D., Freshwater Biological Laboratory, University of Copenhagen, 51 Helsingorsgade, DK-3400 Hillerod, Denmark

609. **Jacquemin, G. (1998):** Hemianx ephippiger (Burmeister, 1839) dans le Roussillon en août 1997 (Odonata, Anisoptera, Aeshnidae). *Martinia* 14(3): 93. (in French).

Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandœuvre-lès-Nancy, France

610. **Joest, R. (1998):** Libellen in der Klostermersch. *ABU-Info* 22(1) (Arbeitsgemeinschaft Biologischer Umweltschutz im Kreis Soest): 12-15. (in German).

[report from a monitoring project in the floodplain of River Lippe near the town Lippstadt, Nordrhein-Westfalen, Germany; the vegetation is grazed by aurochs (re-breed cattle "Heckrind"); between 1991 and 1997, 25 species were recorded]

Address: not stated

611. **Johnson, J. (1998):** *Somatochlora walshii* recorded in Oregon. *Argia* 10(4): 25. (in English).

Address: Johnson, J., 6303 SE Ramona Street, Portland, OR, 97206-5930, USA

612. **Jolivet, S.; Vaillant, F. (1998):** Inventaire préliminaire des odonates du département des Deux-Sèvres. *Martinia* 14(4): 119-136. (in French, with English summary).

[49 species are shortly discussed, and their distribution in the Département Deux-Sèvres is mapped]

Address: Jolivet, S., 8, Parc Vatonne, F-91190 Gif sur Yvette, France

613. **Jourde, P. (1998):** Inventaire des espèces animales de la directive habitats présentes en Charente-Maritime. *Annales de la société des sciences naturelles de la Charente-Maritime* 8(7): 841-854(?). (in French).

[compilation of the presence in the French Département Charente-Maritime of the species listed in the annex to the European Fauna-Flora-Habitat Directive: *Coenagrion mercuriale*, *Gomphus graslini*, *Oxygastra curtisii*]

Address: Jourde, P., LPO, La Corderie Royale, BP 263, F-17305 Rochefort Cedex, France

614. **Kappes, W.; Kappes, E. (1998):** 1.) Neusiedler See. Frühling im Seewinkel. 15. - 23.5.1998. Reisetagebuch; Artenlisten: Säugetiere, Vögel, Libellen, Tagfalter, Farbfotos. 2.) Winter im Seewinkel. 27.12.1995 - 6.1.1996. Reisetagebuch; Artenliste: Vögel, Farbfotos. *Naturkundliche Reiseberichte* 12: 49 pp. (in German).

[Odonata: pp 20-26; checklists of 18 species (incl. *Epi-theca bimaculata* and *Leucorrhinia pectoralis*) with in-

formation on abundance of species, dates and localities; colour pictures of *Anaciaeschna isosceles* and *L. pectoralis*.]

Address: Kappes, W., Winsbergring 5, D-22525 Hamburg, Germany (DM 20,-)

615. **Kappes, W. (Hrsg.) (1998):** Äthiopien. Naturkundliche Reisenotizen 20.12.1997 - 4.1.1998. Reisetagebuch; Artenlisten: Säugetiere, Vögel, Libellen, Tagfalter, Pflanzen; Gedanken zur Artbildung; Farbfototeil. Naturkundliche Reiseberichte 11: 125 pp. (in German).

[extensively and well documented diary of a journey to Ethiopia, including an odonatological part on pages 109-114; 17 species are listed; further specimens are documented on 4 plates with colour pictures waiting - in some cases - for identification]

Address: Kappes, W., Winsbergring, D-22525 Hamburg, Germany. (DM 48,-)

616. **Kesel, A.B.; Philippi, U.; Nachtigall, W. (1998):** Biomechanical aspects of the insect wing: an analysis using the finite element method. *Computers in Biology and Medicine* 28(4): 423-437. (in English).

["Insect wings appear as highly functional and largely optimized mechanical constructions. A series of stabilizing constructional elements have been 'designed' to cope with loading during flight. ... To quantify the quality of material distribution, models of a dragonfly wing and of a fly wing were calculated using the finite element method (FEM)."] (Authors)]

Address: Kesel, A.B., Univ. Saarland, Dept. Zool., D-66041 Saarbrücken, Germany

617. **Kettruo, M. (1998):** Effizienzkontrolle im Gewässerrenaturierungsprogramm Nordrhein-Westfalen. *Berichte der Niedersächsischen Naturschutz Akademie* 11(1): 71-75. (in German).

[Odonata as monitoring organisms for assessment of river restoration]

Address: Kettrup, M., LÖLB NRW, Leibnitzstr. 10, D-45659 Recklinghausen, Germany

618. **Kipping, J. (1998):** Ein Beitrag zur Libellenfauna (Odonata) Rumäniens. *Mauritiana* 16(3): 527-538. (in German, with short English summary).

[a survey of 33 localities in the River Mures-system (Central Roumainia) between 1994 and 1997 resulted in records of 46 species. All species are classified according to their biogeographical position, and treated species-wise with exact data to the records. Of special interest are the records of *Cordulegaster heros*, *Anax ephippiger*, *Cercion lindenii*, and *Coenagrion ornatum*.]

Address: Kipping, J., Ringstr. 5/6, D-04600 Altenburg, Germany

Klima, M.; Klima, F. (1998): Aquatische Wirbellose (Makrozoobenthos) im Gebiet der Krummen Lake/Grünau unter besonderer Berücksichtigung der Trichoptera (Köcherfliegen). *Novius* 24: 591-597. (in German).

[6 common species of Odonata are listed; Berlin, Germany]

Address: Klima, Martina, Bauernheideweg 40, D-12589 Berlin, Germany

619. **Knjif, G. de; Anselin, A. (1998):** Beschrijving en evaluatie van de natuur in Vlaanderen: de rol van libellen in het natuurbehoud. *Gomphus* 14(1): 3-31. (in Dutch, with English and French summaries).

["This article gives a review of the status of the Odonatofauna in Flanders based on data collected by the Odonata Working Group 'Gomphus'. The review has been written in the framework of the 'Nature Report' drawn up by the Institute of Nature Conservation by order of the Flemish government. First data sources are given and the method described used to identify hot spots (5x5 km squares rich in species). The next chapter deals with species richness and historical changes in distribution status. For the various Flemish ecoregions a summary is given of total species number and number of Red List Species. In the Campine ecoregion all Flemish species (58) are present, as well as all Red List species (29). On the other hand, the Dune and Polder regions count the lowest number of species (res. 23 and 25) and possess only one Red List species. An analysis of Red List species hot spots shows that with the exception of the Damvallei near Gent, the most important hotspots can be found in the Campine ecoregion. Characteristic species for each ecoregion are described in detail. Legal conservation of dragonflies and the international value of certain species are dealt with. Finally, characteristic species of three important biotopes (running water, oligotrophic fens and mesotrophic waterbodies) are described and the various causes of changes in the Odonatofauna discussed."] (Authors)]

Address: Knjif, Geert de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium

620. **Krach, J.E. (1998):** Die Libellen des Naturparks Altmühltal und der angrenzenden Donauniederung. *Weihnachtsschrift 1998 der Vereinigung der Freunde des Willibald-Gymnasiums Eichstätt*: 160 pp. (in German).

[comprehensive study of the Odonata of the valley of the River Altmühl and the adjacent floodplain of the River Danube (Bavaria, Germany); monographic treatment of the 54 species; colour pictures and distribution maps of all species; note: the colour picture on p. 56 shows a *Lestes dryas* rather than a female of *Calopteryx virgo*; the book is available from the author for DM 10,- + pp]

Address: Krach, E., Katholische Universität Eichstätt, Biologie und Chemie, Ostenstr. 26, D-85071 Eichstätt, Germany

621. **Kretzschmar, W.; Pimpl, F. (1998):** Libellen (Odonata) - Vorläufige Verbreitungskarten des gemeldeten Erfassungsstandes von 1996 für die Zeit 1990 bis 1996. *Mitteilungen Sächsischer Entomologen* 40: 3-32. (in German).

[distribution maps of the Saxonian Odonata (55 species)]

Address: Kretzschmar, W., Hauptstr. 28, D-01640 Coswig, Germany; Pimpl, F., Niederzwönitzer Str. 83, D-08297 Zwönitz, Germany. e-mail: arctica@aol.com

622. **Kuhn, J. (1998):** Life-history-Analysen, Verhaltens- und Populationsökologie im Naturschutz: die Notwendigkeit von Langzeitstudien. *Schriftenreihe für Landschaftspflege und Naturschutz* 58: 93-113. (in German, with English summary).

[Life history analyses, behavioural and population ecology as a basis for conservation: the necessity of long-term studies: Some examples are presented that demonstrate the necessity of long-term studies for behavioural and population ecology as well as analyses of life histories to make up reliable foundations for conser-

vation. The following propositions are illustrated: • Long-term studies may avoid misinterpretations of phenomena in the field of evolutionary ecology. (Example: *Bufo bufo*, Amphibia) • Long-term studies may avoid underestimation of reproductive flexibility as well as plasticity in habitat selection, and may preclude misjudgement of habitat quality. (Examples *Bufo bufo*, Amphibia; *Acrocephalus scirpaceus*, Aves) • Conservation measures run the risk of being inefficient or even counter-productive unless based on a sound comprehension of species' life history and population ecology - which normally requires long term studies (especially in perennial species). (Example: *Bufo bufo*, Amphibia) • Only continuous long-term monitoring allows of separating fluctuations from real trends. • Monitoring in intervals of several years often is misleading. • Long-term studies help to identify stock size determinants as well as the influence of phenological factors on stock development. • Long-term data sets may be reminiscent of experiments. • Short-term knowledge of an area may cause false estimations of its conservation potential. (Examples: *Rana dalmatica*, *Hyla arborea*, Amphibia; *Sympetrum flaveolum*, Odonata; 'Vegetation') (Author)] Address: Kuhn, J., Max-Planck-Institut für Verhaltensphysiologie, Abt. Wickler, D-82319 Seewiesen, Germany

623. **Kuhn, K.; Burbach, K. (1998):** Libellen in Bayern. 333 pp. Ulmer. Stuttgart. ISBN 3-8001-3495-0.

This is really a well organized and extremely informative book on the dragonflies of Bavaria, Germany. Introductory information is given on natural history situation, and the history of dragonfly research in Bavaria. The main topic of the book is the publication of the results of the Bavarian species mapping programme, started in the late 80's (92000 records from 14500 localities). These results are presented in a monographic way: Colour photographs of each species, distribution and status, habitat and habits, distribution maps (Europe, Bavaria), altitudinal distribution, and phenology.

In Chapter 7, 20 different habitat types characterised from the are odonatological point of view. For each of these habitats the main regional resp. geographic distribution in Bavaria is outlined, the Odonata characteristic of these habitats are listed, black and white drawings illustrate characteristic features of the habitat and the microhabitats of key species, the main threats are analysed, and measures for species conservation are proposed.

In Chapter 8, 13 ecoregions ('Naturräume') are odonatologically characterised. The reader will find comparisons between older and new data on the odonate fauna of these ecoregions, and the development of their odonate fauna in this century.

Chapter 9 outlines the possibilities for the conservation of Odonata in Bavaria, including legal, and the variety of Bavarian action programmes for habitat and species conservation. These actions programmes are assessed for dragonfly conservation purposes, and action plans for threatened Odonata in Bavaria are outlined.

The book ends with general information on dragonfly research from the conservationist's point of view, and with a remarkably comprehensive bibliography on odonatological literature in Bavaria.

For people not familiar with the German language it might be a disadvantage that the entire text is written in German. But there is a way to solve this problem: This

excellent book on Bavarian Odonata could give the reason to fresh up or even to learn German.

I consider the book of Klaus Kuhn and Klaus Burbach, and their numerous contributors (!) the most informative book on German Odonata, especially in the conservationist's point of view, you can purchase at present. It also is an excellent example how to present a regional dragonfly fauna in book form.

Please note a small mistake on page 110: The colour photograph depicts *Gomphus simillimus* (not *G. pulchellus*), a species not found in Bavaria. (M. Schorr)

624. **Laurent, S. (1998):** Chronologie du peuplement odonatologique d'une ripisylve du Rhône. *Martinia* 14(3): 79-84. (in French, with English summary).

[survey of Odonata north of Arles (Département Bouches-du-Rhône, France); 17 species were recorded; their diversity was compared using different indexes as Shannon and Menhinick]

Address: Laurent, S., 14, rue Edmond Michelet, F-84000 Avignon, France

625. **Le Calvez, V. (1998):** Les odonates de la forêt domaniale de Notre-Dame (Départements du Val-de-Marne et de Seine-et-Marne). *Martinia* 14(4): 137-145. (in French, with English summary).

[Notre-Dame forest is situated in an urban area approximately 20 km from Paris. This forest is scattered with hundreds of small ponds. 31 Odonata species could be recorded between 1993 and 1998. They are shortly commented on.]

Address: Le Calvez, V., 3, allée Bullant, F-93290 Tremblay-en-France

626. **Lefort, F.; Catling, P.M. (1998):** A survey of damselfly adults at urban and non-urban strams at Ottawa, Ontario. *Argia* 10(4): 17-19. (in English).

["Sixteen species of adult damselflies were recorded at 23 stream sites, but only 9 were found at 3 or more sites. The most frequent species were *Enallagma exsulans* and *Ischnura verticalis*. Numbers of species and numbers of individuals were significantly less at streams inside the city than at streams outside, which are probably less polluted, suggesting that the numbers of species and individuals may prove useful in assessing water quality. Species with over 75% of their sites, and over 95% of their numbers on non-urban streams, including *Argia moesta*, *Calopteryx aequabilis*, *Enallagma antennatum*, and *E. exsulans*, may serve as useful specific indicators of good water quality. The relatively rare species, *Chromagrion conditum*, may also prove to be a useful indicator of good water quality."] (Authors)]

Address: Lefort, F., 6415 Wellington Avenue, West Vancouver, British Columbia, V7W 2H7, Canada

627. **Legler, K.; Legler, D.; Westover, D. (1998):** Color guide to common dragonflies of Wisconsin. Revised Edition 1998.

[Table of contents: Introduction, Life History of dragonflies, About this guide, Key to text frames, Identification of families, Summary of the dragonfly families, The dragonfly guide (Species 1-106), Summary of the dragonfly families, Part of a dragonfly, Sex differences, Bibliography, Wisconsin dragonfly checklist, Photo credits, Indexes of scientific and English names. 103 species of Anisoptera and 3 species of Zygoptera (Chalopterygidae) are covered with - in most cases - good photographs. Information on how to spot a species are very

convenient for the beginners, or e.g. for an European visiting Wisconsin for collecting dragonflies. The price of the book is US \$ 18.95 plus p+p.]
Address: Legler, Karl, 429 Franklin St., Sauk City, WI 53583. e-mail: karlindot@bankpds.com

628. **Lett, J.-M. (1998):** Synopsis des odonates de la Sologne de Loir-et-Cher et de ses environs. (in French). [commented synopsis of the 61 species of Odonata known to occur in the Sologne (Département Loir-et-Cher, France)]
Address: Lett, J.-M., 1, les Cosses, F-41320 Saint-Loup-sur-Cher, France

629. **Lindeboom, M. (1998):** Post-copulatory behaviour in Calopteryx females (Insecta, Odonata, Calopterygidae). International Journal of Odonatology 1(2): 175-184. (in English).
[The post-copulatory behaviour of Calopteryx splendens females was studied under field and laboratory conditions. After termination of copulation females usually perch and bend the abdomen so that its apex touches the ground (post-copulatory posture). The post-copulatory posture is a consequence of sperm removal by males. Male and female microstructures (spines and scales) interact to move previous sperm from the female sperm storage organs to the outside during copulation stage I, after which moved sperm is located on the ovipositor. After termination of copulation females require an average of 45 seconds to brush off this sperm (N=21). The post-copulatory behaviour of females may also allow males to chase rival males before the females start to oviposit (prevention of disturbances). The present study shows no evidence of cryptic female choice in *C. splendens*." (Author)]
Address: Lindeboom, M., Wolfstr. 6, D-72119 Ammerbuch, Germany

630. **Manach, A. (1998):** Prolifération de *Sympetrum danae* (Sulzer, 1776) dans une tourbière du Finistère (Odonata, Anisoptera, Libellulidae). Martinia 14(3): 94. (in French).
[the abundance of *S. danae* in the bog which covered 25 ha, was estimated with 250 - 500000 individuals]
Address: Manach, A., 11, rue d'Ouessant, F-29200 Brest, France

631. **Manolis, T.; Rehn, A. (1998):** First records of *Leucorrhinia proxima*, *Aeshna canadensis*, and *Sympetrum vicinum* for California. Argia 10(4): 24. (in English).
Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

632. **Maridet, L.; Wasson, J.-G.; Philippe, M.; Amoros, C.; Naiman, R.J. (1998):** Trophic structure of three streams with contrasting riparian vegetation and geomorphology. Arch. Hydrobiol. 144(1): 61-85. (in English).
[The relative influence of riparian vegetation and geomorphology on trophic structure was examined at three streams in adjacent catchments of the French Massif Central mountains. The study sites differed mainly by the degree of anthropogenic alteration of riparian and watershed vegetation, and by valley geomorphology. Fishes, benthic macroinvertebrates (grouped into functional feeding groups), macrophytes and periphyton were sampled seasonally between July 1991 and April 1992. At the riffle-pool (10 m) scale, instream morpho-

logical units appear to control the spatial partitioning of trophic resources and their consumers. [...] At the reach-segment scale (10 to 100 m), valley morphology was the primary factor controlling the stream ecosystem, but anthropogenic alteration of riparian vegetation seems to override geomorphological controls on the trophic structure. [...] Overall, the results emphasize the importance of riparian vegetation on the trophic structure of streams, especially when anthropogenic alteration of riparian vegetation is severe. We conclude that there is a need to better integrate riparian vegetation into European stream management practices in order to maintain the vitality of these systems over the long-term." (Authors). "Calopterygidae" and "Cordulegasteridae" are listed in tab. 2.]
Address: Wasson, J.-G., Mission OSTROM en Bolivie, Institute de Ecologia, CP 9214, La Paz, Bolivia

633. **Marie, A. (1998):** Les odonates des Hautes-Alpes et du Haut-Dauphiné. Martinia 14(3): 95-102. (in French, with English summary).
[54 species of Odonata derived from different sources are listed for the region in southeastern France.]
Address: Marie, A., Parc national des Ecrins, F-05290 Vallouise, France

634. **May, M.L. (1998):** *Macrothemis fallax*, a new species of dragonfly from Central America (Anisoptera: Libellulidae), with a key to male *Macrothemis*. International Journal of Odonatology 1(2): 137-153. (in English).
[*M. fallax* sp. n. is described and figured from males collected in Belize and Panama]
Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA

635. **Mitra, A. (1998):** Notes on the emergence behaviour of *Trithemis festiva* (Rambur) (Odonata: Anisoptera) under laboratory condition. Annales of foresty, Dehra Dun (India) 6(1): 72-78. (in English).
[The behaviour of emergence of *Trithemis festiva* under the laboratory condition was studied during January to March, 1997. Time of emergence, sex-ratio, average height of the exuviae from the water level, average length of the exuviae, the length of their rapturing area, substrate utilization for emergence and percentage of emergence were also recorded. The different stages of ecdysis were carefully observed." (Author)]
Address: Mitra, A., Northern Regional Station, Zoological Survey of India, 218 Kaulagarh Roads, Dehra Dun - 248195, India

636. **Moravec, F.; Skorikova, B. (1998):** Amphibians and larvae of aquatic insects as new paratenic hosts of *Anguillicola crassus* (Nematoda: Dracunculoidea), a swimbladder parasite of eels. Diseases of Aquatic Organisms 34 (3): 217-222. (in English).
[Amphibians (tadpoles of the frog *Bombina orientalis* (L.) and the newt *Triturus vulgaris* (L.) and aquatic insects (larvae of the alder fly *Sialis lutaria* (L.) [Megalo- ptera], dragonflies *Sympetrum sanguineum* (Müller) and *Coenagrion puella* (L.) [Odonata], and the caddisfly *Oligotrichia striati* (L.) [Trichoptera]) were found to serve as paratenic hosts for the third-stage larvae (L-3) of the nematode *Anguillicola crassus* Kuwahara, Niimi et Itagaki, 1974, a pathogenic swimbladder parasite of the eel *Anguilla anguilla* (L.) in Europe and elsewhere. This is the first evidence that, in addition to prey fishes and some aquatic snails, amphibians and aquatic insects

can serve as paratenic hosts for this nematode parasite. *A. crassus* third-stage larvae were found, largely unencapsulated (encapsulated only in *S. lutaria*), mostly in the body cavity, on the gut surface and, less often, in the liver and in the subcutaneous tissue of legs in amphibians, and in the body cavity and on the gut surface in insect larvae ..."]

Address: Moravec, F., Acad. Sci. Czech. Republ., Inst. Parasitol., Branisovska 31, CR-37005 Ceske Budejovice; Czech Republic. e-Mail: Moravec, F.: moravec@paru.cas.cz

637. **Müller, J.; Steglich, R. (1998):** Neues von der Elbe bzw. aus dem Elbetal 1998. - 2. Gemeine Keiljungfer *Gomphus vulgatissimus* nun auch in der Elbe. Halophila, Staßfurt 36: 2-3. (in German).

[record of *G. vulgatissimus* on the River Elbe near the mouth of River Saale (Federal State of Sachsen-Anhalt, Germany)]

Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany

638. **Novelo-Gutierrez, R. (1998):** Description of the larva of *Remartinia secreta* and notes on the larva of *Remartinia luteipennis florida* (Odonata: Aeshnidae). Canadian entomologist 130(6): 893-897.

Address: Novelo-Gutierrez, R., Instituto de Ecologia A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico

639. **O'Brien, M. (1998):** 1998 Season summary for the Michigan Odonata Survey. *Argia* 10(4): 15-17. (in English).

[report from current activities of the MOS; additions to the checklist of Michigan Odonata]

Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA

640. **O'Brien, M.F. (1998):** *Enallagma basidens* (Odonata: Coenagrionidae) expands its range into Michigan. Great Lakes Entomol. 30(4): 181-183. (in English).

Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA

641. **Orendt, C. (1998):** Macroinvertebrates and diatoms as indicators of acidification in forest spring brooks in a region of eastern Germany (Leipzig-Halle-Bitterfeld) highly impacted by industrial activities. Arch. Hydrobiol. 143(4): 435-467. (in English).

[“Benthic macroinvertebrates and epilithic diatoms were surveyed in six forest spring brooks of Saxonia-Anhalt and Saxonia (eastern Germany). The aquatic communities changed from acid-sensitive to acid-tolerant along a gradient of acidity within the sampling area. The acidity states of the brooks were assessed by indicator species and pH values measured weekly. Waters close to industrial emitters showed lower acidity states than those farther from them. The different assessment methods used tended to yield corresponding results. In some cases, however, the results were not congruent, particularly when macroinvertebrates were used. Possible modifications of acidity-indication evaluation systems are discussed which may lead to improved assessments.” (Author). 6 species of Odonata are listed. *Cordulegaster boltonii* is the most dominant species and represented at most localities independent of pH average.]

Address: 1. Hildegardstr. 13, D-80539 Munich. 2. Technical University of Brandenburg Cottbus, Chair of Water Conservation, Research Station Bad Saarow, Seestr. 45, D-15526 Bad Saarow

642. **Orr, R. (1998):** *Anax junius* 1998 spring migration data from Maryland's PWRC. *Argia* 10(4): 7-8. (in English).

[first migrating *A. junius* were seen on 27 March 1998. "By April 16, the migration was in full swing ..."]

Address: Orr, R.L., 5215 Durham Road East, Columbia, MD 21044-4444, USA

643. **Orr, R. (1998):** Gomphid emergence times along the Little Patuxent River, Maryland. *Argia* 10(4): 8. (in English).

[exuviae of the following species were collected: *Gomphus exilis*, *G. lividus*, *G. rogersi*, *Ophiogomphus incurvatus*, *Hagenius brevistylus*, *Progomphus obscurus*, *Stylogomphus albistylus*, *Stylurus laurae*, and *S. spiniceps*]

Address: Orr, R.L., 5215 Durham Road East, Columbia, MD 21044-4444, USA

644. **Parr, A. (1998):** Dragonflies. *British wildlife* 10(2): 123-124. (in English).

[short report on some spectacular findings of Odonata in United Kingdom in 1998, among them the first record of *Anax junius* in Europe (September 1998) and a winter influx of *Anax ephippiger* (January - March 1998). Additional notes are made to further migrant species, the influence of global warming on the dragonfly fauna of UK, and the possible range extensions of e.g. *Erythromma viridulum*.]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

645. **Perepelov, E.A.; Bugrov, A.G.; Warchalowska-Sliwa, E. (1998):** C-banded karyotypes of some dragonfly species from Russia. *Folia biologica*, Krakow 46 (3/4): 137-142.

[“The C-stained karyotypes of *Calopteryx splendens* (Harris, 1782) (2n male=25, X0, m), *Aeshna viridis* Eversmann, 1836 (2n male=26, neo-XY, m), *Ophiogomphus cecilia* (Fourcroy, 1785) (2n male=23, X0), *Cordulia aenea* (Linnaeus, 1758) (2n male=25, X0), *Libellula depressa* Linnaeus, 1758 (2n male=25, X0, m), *Libellula quadrimaculata* Linnaeus, 1758 (2n male=25, X0, m), *Orthetrum albistylum* Selys, 1848 (2n male=25, X0, m), *Orthetrum brunneum* (Fonscolombe, 1837) (2n male=25, X0, m) and *Sympetrum pedemontanum* (Allioni, 1766) (2n male=25, X0, m) from Siberia and the Northern Caucasus have been analysed. ...”]

Address: Perepelov, E.A., Novosibirsk State Univ., Dept Nat. Sci., 2 Pirogov St, Novosibirsk 630090, Russia. e-mail: Bugrov, A.G.: bugrov@fen.nsu.ru; Warchalowska-Sliwa, E.: warchalowska@isez.pan.krakow.pl

646. **Phoenix, J. (1998):** Nachweis der Gemeinen Keiljungfer *Gomphus vulgatissimus* (Linnaeus, 1758) an der Oberelbe (Odonata). *Mitt. Sächsischer Entomol.* 43: 15. (in German).

[record of an exuvia of the in Saxonia very rare *G. vulgatissimus* in River Elbe near Krippen (Landkreis Sächsische Schweiz)]

Address: Phoenix, J., Schandauer Str. 28, D-01924 Königstein, Germany

647. **Pilon, J.-G.; Lagace, D. (1998):** Les Odonates du Québec. Entomofaune du Québec Inc., 637, Boulevard Talbot, Suite 108, Chicoutimi, Québec G7H 6A4 CANADA: 367 pp. (in French).

[LES ODONATES DU QUÉBEC by Jean-Guy Pilon and Denise Lagace, reviewed by Nick Donnelly: Verbatim, taken from *Argia* 10(4): 31-32: "This long awaited book fills a substantial gap in our knowledge of the odonate fauna of northeastern North America. It makes available the extensive collecting results and careful studies (including extensive larval studies) of Jean-Guy Pilon, who has been studying Odonates for several decades from his base in Montreal and his many students. This book is in French and attempts, in the words of the authors, to make the subject available to a large francophone audience of "beginning naturalists and amateurs". The book fills a large need, because the excellent book by Fr. Adrien Robert (*Les Libellules du Québec*, 1963) has been sadly unavailable for many years. The book begins a recapitulation of the history of Odonata study in Québec (which began with Abbé Léon Provancher in the late 1800's). A discussion of species which should be sought in Quebec is especially useful; all too often regional guides omit this essential information. There is a discussion of Odonata biology, morphology, and conservation. The main part of the first half of the book is an extensively illustrated key to adult odonates, which follows the useful earlier format of Robert's book rather closely. Neither book, unfortunately, keys or even illustrates the larval forms. Because a large number of the "beginning naturalists" may be associated with fresh-water studies related to problems of conservation of streams and other wetlands, this seems an unfortunate omission. The second half of the book begins with a discussion of Odonata habitats in Québec, arranging them into biologic zones. The main part of this half is a recapitulation of the distribution for each species. Happily there are dot maps for each species, because the long text references (a locality and a bibliographic reference is included for each and every occurrence!) are very exhausting to follow. The dot map scheme is wisely not based on political subdivisions of the Province, which are irregular in shape and quite variable in size, but by arranging them in blocks of about 27 km in the north-south direction, and 37 km in the east-west direction. This is a very sensible scheme which makes the distribution very clear at a glance. The dot maps merit careful inspection. I was very interested to find that there are more than twice as many blocks in which *Somatochlora franklini* occurs, for example, than for *Libellula luctuosa*. And nearly as many for *Somatochlora brevicincta* and *Aeshna septentrionalis*. All readers will be impressed also by the very sparse dots for the entire northern three quarters of the province. This is a very difficult province to survey, and Pilon and his students deserve high praise for their results. One departure from Robert's book is the absence of any discussion of habitat for individual species. There is also no discussion of taxonomic problems, although these are hinted at in the key by assigning some taxa to "formes" pending further revisionary study. The book will be an important work for all northeastern Odonata workers to include in their libraries. Even a glance at the extensive locality information that this book makes available will impress even the most devoted worker with the major effort that Pilon and his many students have devoted to finding and understanding Odonata in this province. I expect that this book will reach its intended audience, and that there will be a resurgence of interest among younger

people in eastern Canada. It certainly stands as a monument to Pilon's vast labors."]

Address: Pilon J.-G., Département des Sciences biologiques, Université de Montréal, C.P.6128, Montréal, Québec, H3C 3J7, Canada

648. **Pimpl, F.; Kretzschmar, W. (1998):** Projekt Entomofauna Saxonica II. Stand der Bearbeitung: Odonata. Mitt. Sächsischer Entomol. 39: 16-17. (in German).

[status of the Odonata record scheme in Saxonia, Germany in 1996]

Address: Pimpl, F., Niederzönitzer Str. 83, D-08297 Zwönitz, Germany

649. **Postler, E.; Postler, W. (1998):** Entwicklung von *Gomphus vulgatissimus* (L.) im Dortmund-Ems-Kanal (Anisoptera: Gomphidae). *Libellula* 17(3/4): 254. (in German).

[emergence of *G. vulgatissimus* in May 1998 at a canal in Nordrhein-Westfalen, Germany]

Address: Postler, E. u. W.; Hammerstr. 39, D-59174 Kamen, Germany

650. **Prendergast, E.D.V. (1998):** The Gambia: additions to the list of Odonata, and further distribution records. *International Journal of Odonatology* 1(2): 165-174. (in English).

[commented list (new records, distribution in each of the 162 10 km square in Gambia) of species of Odonata collected during the British Dragonfly Society expedition to Gambia in Oct/Nov 1996; 13 species were added to the 62 previously recorded]

Address: Prendergast E.D.V., Manor House, Bagber, Sturminster Newton, Dorset DT10 2EY, UK

651. **Prevost, O. (1998):** Découverte de *Gomphus flavipes* (Charpentier, 1825) dans le département de la Vienne (Odonata, Anisoptera, Gomphidae). *Martinia* 14 (3): 115-116. (in French, with English summary).

[discovery of exuviae of *Stylurus flavipes* at the confluence of River Creuse and River Vienne]

Address: Prevost, O., 28, rue de Poitiers, F-86130 Jau-nay-Clan, France

652. **Purger, J.J. (1998):** Diet of Red-footed Falcon *Falco vespertinus* nestlings from hatching to fledging. *Ornis Fennica* 75 (4): 185-191.

["The diet of Red-footed Falcon *Falco vespertinus* nestlings was studied continually from their hatching to fledging in four nests during 1991, near the village Melenci in the province of Voivodina, Yugoslavia. [...] Remains of an average of 2.72 prey items per day were found, from which 302 prey items were identified. These included 17 (6%) vertebrate items, while the remaining 285 (94%) were insects. Sixty percent of the insect food were orthopteran species (Orthoptera), 36% were beetles (Coleoptera), and 4% were dragonflies (Odonata). [...] Orthopterans and beetles dominated the diet. The role of dragonflies in the feeding of the nestlings grew as a function of nestling age, while vertebrates played a role in the feeding of nestlings only in the downy and pin feathered stages.]

Address: Purger, J.J., Univ. Pecs, Dept. Ecol. & Zoogeog., Ifjusag Utja 6; H-7061 Pecs, Hungary

653. **Rothmund, D.; Hahn, U. (1998):** Beitrag zur Kenntnis der Libellenfauna eines Hochwasserrückhaltebeckens im Landkreis Göppingen (Baden-Württem-

berg). Mitt. entomol. Ver. Stuttgart 33: 124-130. (in German).

[13 species of Odonata were observed in 1997; the odonatological importance of the water is assessed as quite low]

Address: Rothmund, D., Rupert-Mayer-Str. 20, D-73765 Neuhausen, Germany

654. **Ruddek, J. (1998):** Gomphus flavipes (Charpentier) neu fur Bremen (Anisoptera: Gomphidae). Libellula 17(3/4): 237-238. (in German with English summary).

["First record of Gomphus flavipes (Charpentier) for Bremen, Germany (Anisoptera: Gomphidae) - One exuvia was recorded at the river Weser in Bremen on 21-VI-1998. The number of Odonata species recorded in Bremen increased to 46 species." (Author)]

Address: Ruddek, J., Butendiek 34, D-28865 Lilienthal, Germany

655. **SaintOurs, F. (1998):** North River, Massachusetts Odonata survey. Argia 10(4): 14. (in English).

[including a notice on the discovery of the crepuscular Neurocordulia obsoleta]

Address: <http://mothra.bio.umb.edu/Fred.html>

656. **Samraoui, B.; Bouzid, S.; Boulahbal, R.; Corbet, P.S. (1998):** Postponed reproductive maturation in upland refuges maintains life-cycle continuity during the hot, dry season in Algerian dragonflies (Anisoptera). International Journal of Odonatology 1(2): 118-135. (in English).

["Anisoptera were monitored or sampled regularly at lowland and nearby upland sites in northeastern Algeria during 1992 and 1993. After emerging in lowlands at about sea level in May and June, adults disappeared from lowlands and were then soon encountered in nearby hills at ca 500-1000 m a.s.l. where they aestivated in woodland for about three and a half months (Sympetrum meridionale) or more than four months (Aeshna mixta, Sympetrum striolatum). During aestivation adults foraged, gradually changed colour and achieved reproductive maturity. Aestivation ended with the onset of heavy rain in late September or early October when mature adults reappeared at lowland sites where they promptly exhibited reproductive behaviour. Although no adults marked in lowlands were recaptured in uplands, the inference that individual adults made two-way flights between lowlands and uplands is compelling. Postponed reproductive maturation in upland refuges maintains continuity of the life cycle in habitats inimical to survival of the aquatic stages during the protracted hot, dry season. This type of life cycle can be expected to occur in populations of European Odonata near the southern limit of their geographic distribution where they encounter a Mediterranean climate. The implications of such a life cycle for habitat conservation are discussed." (Authors)]

Address: Samraoui, B., University of Annaba, 4 rue Hassi-Beida, Annaba, Algeria

657. **Samu, S. (1998):** Zur Populations- und Verhaltensökologie von Coenagrion lunulatum (Charpentier) (Zygoptera: Coenagrionidae). Libellula 17(3/4): 173-193. (in German with English summary).

["On the population and behavioural ecology of Coenagrion lunulatum (Charpentier) (Zygoptera: Coenagrionidae) - At a small field-pond close to Schwerin, NE Germany, the emergence period started on 5-V-1995 and lasted 35 days. The EM50 of 11 days was quite low

but the emergence curve shows two approximately similar sized peaks. So, C. lunulatum can not be described as a typical spring species, because the emergence curve missed the typical course of a mass emergence. - Exuviae were found on an average of 5.2 cm above waterlevel. Most of the individuals emerged in shallow areas with a water depth between 6 to 25 cm. - The reproductive period lasted 23 days, though the main flight period with high numbers of adult damselflies covered only 9 days. The maturation period was estimated to be 9-10 days. The average adult life-span was 8.3 days. - For oviposition the tandem pair submerged for a mean of 13.03 min. Oviposition above the waterlevel was not observed. The tandem pairs did not aggregate." (Author)]

Address: Samu, S., Gärtnerstr. 22, D-10245 Berlin, Germany

658. **Samways, M.J.; Osborn, R. (1998):** Divergence in a transoceanic circumtropical dragonfly on a remote island. Journal of Biogeography 25 (5): 935-946. (in English).

["One terrestrial invertebrate that naturally spans the globe and travels vast distances is the dragonfly Pantala flavescens (Fabricius) (Odonata: Libellulidae). [...] The variation and differences in morphology and behaviour of an African continental (Pietermaritzburg, South Africa) and a remote island population (Easter Island) of P. flavescens was investigated to determine whether the island population was panmictic with the migrant population, or whether it was a founder population. [...] The fact that P. flavescens is the only species of dragonfly on Easter Island, and the great distance of the island from any mainland, suggests infrequent arrival of migrants arriving on the island, with resultant reduced genetic variation. The morphological and behavioural differences between the two populations suggests divergence is occurring."]

Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. e-mail: samways@zoology.unp.ac.za

659. **Savage, A.A.; Mathews, J.H.; Beaumont, D.L. (1998):** Community development in the benthic macroinvertebrate fauna of a lowland lake, Oak Mere, from 1994 to 1996. Arch. Hydrobiol. 143(3): 295-05362. (in English).

["Data are given on the morphometry, substrata of the littoral zone, water quality, vegetation and benthic macroinvertebrate assemblages of Oak Mere ... In 1994, vegetation was confined to a sparse marginal zone containing very few individuals of macroinvertebrates with a community structure characterised by high diversity and maximum equitability. By 1996, this marginal zone had increased in area and a new submerged vegetation zone had developed. The new and substantial macroinvertebrate assemblages of these two 1996 zones were closely similar in species composition, species richness, diversity and equitability. In both sampling years the macroinvertebrate assemblages of a niche provided by the undersides of stones remained similar in all respects. The development of marginal and submerged vegetation zones, providing niches for macroinvertebrates, is attributed to a stable water level between the two sampling years." (Authors). Coenagrion puella was sampled in 1996 both in the marginal and submerged vegetation.]

Address: Department of Biological Sciences, Keele University, Staffordshire, ST5 5BG, U.K

660. **Schneider, W.; Parr, M.J. (1998):** *Orthetrum julia* falsum Longfield 1955, new to the dragonfly fauna of Yemen and the Arabian Peninsula (Anisoptera: Libellulidae). *International Journal of Odonatology* 1(2): 155-158. (in English).

["*Orthetrum julia* (Kirby 1900), subspecies falsum Longfield 1955, is reported for the first time from Yemen and the Arabian Peninsula (1 male, Wadi al-Ahjar, 15°27'53"N 43°52'32"E). The specimen is described and compared with specimens from Africa; taxonomically relevant structures are figured. The total number of species known from Yemen is raised to 37, from the Arabian Peninsula to 61." (Authors)]

Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany; Parr, M.J., Little Island House, Stembidge, Martock, Somerset TA12 6BW, United Kingdom

661. **Seidenbusch, R. (1998):** Annotations on the structure of the valvifer and the postocellar ridge in females of *Gomphus* and its importance for determination. *Sulzbach-Rosenberger Libellenrundbriefe* 7: 5-7. (in English).

[*Gomphus schneideri*, *G. pulchellus*, *G. vulgatissimus*, *G. epoptalmus*, *G. schneideri transcaspicus*, *G. similimus*, *G. similimus marocanus*, *G. davidi*, *G. graslini*, *G. lucasi*, *Stylurus flavipes*]

Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

662. **Seidenbusch, R. (1998):** Manifestierte Degeneration von Fließgewässergräben, Aussickerungsarealen und Waldkleinstbiotopen in der Region Sulzbach-Rosenberg. *Sulzbach-Rosenberger Libellenrundbriefe* 8: 1-17. (in German).

[survey and discussion of the dragonfly fauna of ditches in the Rosenberg-Sulzbach-region, and the environmental impacts on the habitats from a historical view; of special interest are - now extinct - species as *Leucorhinia albifrons*, *L. pectoralis*, *Coenagrion mercuriale*, *C. ornatum*, and *Ceriagrion tenellum*]

Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

663. **Seidenbusch, R. (1998):** The importance of ratios within larval descriptions. *Sulzbach-Rosenberger Libellenrundbriefe* 7: 1-4. (in English).

[descriptions and comparison of larval *Aeshna juncea* / *A. subarctica* and *Coenagrion lunulatum* / *C. armatum* / *C. hastulatum*]

Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

664. **Sobczyk, T.; Schnabel, H. (1998):** Bemerkenswerte Libellenfunde aus der nordwestlichen Oberlausitz. *Veröff. Mus. Westlausitz Kamenz* 20: 107-110. (in German).

[new records of *Ophiogomphus cecilia* and *Gomphus vulgatissimus* in Saxony, Germany]

Address: Sobczyk, T., Am Bahndamm 13, D-02977 Hoyerswerda, Germany

665. **Sobczyk, T. (1998):** Zur Entomofauna einer Gasstrasse in der Knappenroder Heide südöstlich von Hoyerswerda. *Mitt. Sächs. Entomol.* 43: 11-12. (in German). [*Ophiogomphus cecilia*; Saxonia, Germany]

Address: Sobczyk, T., Am Bahndamm 13, D-02977 Hoyerswerda, Germany

665. **Soriano, E.G.; Gutierrez, R.N. (1998):** *Oplonaeschna magna* sp. nov. (Odonata : Aeshnidae), from Mexico with a description of its larva. *Revista de Biología Tropical* 46(3): 705-715. (in English).

["*Oplonaeschna magna* sp. nov. (Odonata: Aeshnidae) (holotype male and allotype female deposited at CNIN UNAM-MEX., Mexico, D. F) is described and illustrated from specimens collected in the states of Estado de Mexico, Guerrero, Hidalgo, and Morelos, Mexico. This is the second species of the genus *Oplonaeschna*. ..."]

Address: Soriano, E.G., Univ. Nacl. Autonoma Mexico, Dept. Zool., Apdo Postal 70-153, Mexico City 04510, DF, Mexico. E-Mail: Soriano, E.G.: esoriano@mail.ibiologia.unam.mx; Gutierrez, R.N.: novelor@sun.ienco.conacyt.mx

666. **Spedding, G.R.; Lissaman, P.B.S. (1998):** Technical aspects of microscale flight systems. *Journal of Avian Biology* 29 (4): 458-468. (in English).

["Micro Air Vehicles (MAVs) have excellent potential utility as flight platforms for optical, acoustic, electronic and chemical sensors for operation in hazardous sites with aerial access. The dimensions and performance specifications call for a 100 g take-off mass with 100-200 mm wingspan ... The ThrustWing is a configuration derivative of the dragonfly, with characteristics lying between a helicopter and an ornithopter. ..."]

Address: Spedding, GR; Univ So Calif; Dept Aerosp Engr; Los Angeles; CA 90089; USA. e-Mail: Spedding, G.R.: Geoff@ostrich.usc.edu

667. **Steele, M. (1998):** Beginner strikes it rich! *Argia* 10(4): 30-31. (in English).

[records from Stewart County, Tennessee, and Trigg County, Kentucky]

Address: not stated

668. **Steffens, W.P. (1998):** New distribution records of *Somatochlora hineana* (Odonata: Corduliidae). *Great Lakes Entomologist* 31(1): 25-26. (in English).

Address: Steffens, W.P., P.O. Box 16593, Duluth, MN 55816, USA.

669. **Stoks, R. (1998):** Effect of lamellae autotomy on survival and foraging success of the damselfly *Lestes sponsa* (Odonata: Lestidae). *Oecologia* 117: 443-448. (in English).

["Damselfly larvae can autotomize their caudal lamellae to escape predation. Costs of caudal lamellae autotomy were investigated by directly manipulating lamellae condition of *Lestes sponsa* in laboratory experiments. Larvae without lamellae had higher predation mortality in the presence of *Notonecta*. Both lamellae loss and larval density increased the probability of being cannibalized. The results suggest that the increased vulnerability after lamellae loss resulted from a reduced escape performance. Larvae were less mobile after lamellae loss or in the presence of a predator, but the decrease was no longer significant when both factors were combined. This indicates that larvae compensate for the increased predation risk with a fixed response. Both lamellae loss and predator presence reduced hunting success, but the decrease after lamellae loss was only significant in the absence of a predator. The fitness consequences of these effects for both the larval and adult stages are discussed. In general, the data strongly suggest that

lamellae autotomy plays a role in population regulation of damselflies." (Author)]

Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. e-mail: stoks@ruca.ua.ac.be

670. **Suhling, F.; Schütte, C.; Leipelt, K.-G. (1998):** Erneute Schlupfnachweise von *Aeshna affinis* Vander Linden im niedersächsischen Drömling (Anisoptera: Aeshnidae). *Libellula* 17(3/4): 253. (in German).

[new breeding records (June 1998) of *A. affinis* in Lower Saxony, Germany]

Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

671. **Tennessen, K. (1998):** The return of Butch Cassidy and the Sundance Kid. *Argia* 10(4): 3-6. (in English).

[collecting report from a travel to Bolivia in November 1998]

Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA

672. **Thoß, S. (1998):** Vorkommen der Alpen-Smaragdlibelle (*Somatochlora alpestris* Selys, 1840) im NSG "Jägersgrüner Hochmoor" (Region VL). *Mitt. Sächsischer Entomol.* 43: 14. (in German).

[one of the most recent recoveries of the species in Saxonia, Germany]

Address: Thoß, S., Ellefelder Weg 2, D-08209 Auerbach / V., Germany

673. **Tol, J. van (1998):** The Odonata of Sulawesi and adjacent islands. Part 4. A new genus and species of Chlorocyphidae from South-East Sulawesi. *Zool. Verh. Leiden* 323: 441-448. (in English).

["A new genus and species of Chlorocyphidae (Insecta: Odonata: Zygoptera), *Watuwila* vervoorti, from SE Sulawesi (Indonesia) is described. A preliminary phylogenetic analysis of the genera of the family indicates that the genus represents a relatively old lineage." (Author)]

Address: Tol, J. van, National Museum of Natural History, Dept. of Entomology, P.O. Box 9517, 2300 RA Leiden, The Netherlands.

674. **Van Buskirk, J.; Yurewicz, K.L. (1998):** Effects of predators on prey growth rate: Relative contributions of thinning and reduced activity. *Oikos* 82(1): 20-28. (in English).

[1100 litre outdoor artificial ponds; prey: *Rana sylvatica* tadpoles; predator: caged *Anax* dragonfly larvae]

Address: Van Buskirk, J., Univ. Zürich, Inst. Zool., Winterthurerstr 190., CH-8057 Zürich, Switzerland. e-mail: Van Buskirk, J.: jvb@zool.unizh.ch

675. **Vanderhaeghe, F. (1998):** Victorie! *Coenagrion scitulum* (Rambur, 1842) is Belgie binnengedrongen. *Gomphus* 14(1): 35-36. (in Dutch, with French summary).

[in 1998 *C. scitulum* was rediscovered in southern Belgium near the French border. All known records are documented.]

Address: Vanderhaeghe, F., Lijsterstraat 20, B-8800 Roeselare, Belgium

676. **Waltz, R.D. (1998):** Gleaning on Coreidae (Heteroptera) by *Tachopteryx thoreyi* (Odonata : Petaluridae).

Great Lakes Entomologist 31(3-4): 209-210. (in English).

Address: Waltz, RD, IDNR, Div. Entomol. & Plant Pathol., 402 W Washington, Room W-290, Indianapolis, IN 46204, USA.

677. **Weide, M. van der; Ketelaar, R.; Kleukers, R. (1998):** Stuur libellenwaarnemingen naar de NVL! NVL Nieuwsbrief, Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie: 3-4. (in Dutch).

[appeal to report the 1998 dragonfly records for the mapping project of the Dutch society of odonatology; figure depicting the increase of records between 1990 and 1997; map of dragonfly records in 1997 in the Netherlands on the basis of squares with records and "white areas" to survey in the future; figure with population trends of *Erythromma viridulum* and *Calopteryx virgo* between 1950 and 1995]

Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands

678. **Weihrauch, F. (1998):** Die Entwicklung von *Gomphus vulgatissimus* (L.) in Kiesgrubengewässern: seltene Ausnahme oder lediglich übersehen? (Anisoptera: Gomphidae). *Libellula* 17(3/4): 149-161. (in German with English summary).

["The development of *G. vulgatissimus* (L.) in gravel pit waters: rare exception or simply overlooked? (Anisoptera: Gomphidae) - Based on the collection of 47 exuviae of *G. vulgatissimus* in May 1997 from a small, wind-sheltered gravel pit lake near Geisenfeld, Upper Bavaria, Germany, the paper discusses the conditions regarding the development of this running-water species in stagnant waters. It is stated that the successful development of *G. vulgatissimus* in man-made ponds or lakes devoid of wave-beaten shores occurs more frequently than so far published, provided a certain influence of ground water and good water quality is given. This lack of information is possibly only due to a recording gap." (Author)]

Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany

679. **Werzinger, S.; Werzinger, J. (1998):** *Gomphus flavipes* (Charpentier) zurück in Bayern (Anisoptera: Gomphidae). *Libellula* 17(3/4): 243-245. (in German with English summary).

["*G. flavipes* (Charpentier) back to Bavaria, Germany (Anisoptera: Gomphidae) - On 18-VII-1998 a male exuvia of *G. flavipes* was collected at the River Regnitz near Hausen, Bavaria. This is the first record in Bavaria for more than 100 years." (Authors)]

Address: Werzinger, J. u. S., Zwernberger Weg 29, D-90449 Nürnberg, Germany

680. **White, H. (1998):** DSA meeting in Valentine - reflections on odonate conservation. *Argia* 10(4): 9-10. (in English).

[reflections on impact of amateur collectors on dragonfly populations; "From the ethical and aesthetic point of view, shouldn't we use nets and acetone less and binoculars and cameras more?"]

Address: halwhite@udel.edu

681. **Witten, J.L.; Truman, J.W. (1998):** Distribution of GABA-like immunoreactive neurons in insects suggests lineage homology. *Journal of Comparative Neurology* 398(4): 515-528. (in English).

[Gamma-Aminobutyric acid (GABA) = important inhibitory neurotransmitter in vertebrates and invertebrates; 9 orders of insects were surveyed and compared: Thysanura, Odonata, Orthoptera, Isoptera, Hemiptera, Coleoptera, Diptera, Lepidoptera, and Hymenoptera]
Address: Witten, J.L., Dept. Biol. Sci., P.O. Box 413, Univ. Wis.-Milwaukee, Milwaukee, WI 53201, USA

682. **Zelmer, D.A.; Esch, G.W. 1998:** Bridging the GAP: The odonate NAIAD as a paratenic host for *Halipegus occidentalis* (Trematoda: Hemiuridae). *Journal of Parasitology* 84(1): 94-96. (in English).

["The temporal and spatial dynamics of the recruitment of *Halipegus occidentalis* by the green frog, *Rana clamitans*, suggest that infections are acquired through predation on odonates, which become infected by feeding on ostracods. Discrepancies in the literature regarding the life cycle of *H. occidentalis* prompted the investigation of the status of the odonate naiad as an obligate third intermediate host. ..."]

Address: Zelmer, D.A., Dep. Biol., Wake Forest Univ., Winston-Salem, NC 27109, USA

1999

683. **Anderson, C. (1999):** Reports from Coastal Stations - 1998: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 6: 58-59. (in English).

[transect count of *Coenagrion pulchellum*; phenological dates (first and latest record) of some species]

Address: not stated

684. **Andjus, L. (1999):** Obituary: Zivko R. Adamovic. *Odonatologica* 28(1): 87-91. (in English).

Address: Andjus, L., Natural History Museum of Serbia, Njegosheva 51, P.O. Box 401, YU-11000 Beograd, Serbia/Yugoslavia

685. **Andres, C. (1999):** Entwicklung der Libellenfauna nach den Renaturierungsmaßnahmen an der Liese bei Wadersloh-Diestedde. *Flora und Fauna im Kreis Warendorf - Beiträge zur Naturkunde* 9: 16-24. (in German).

[documentation of the development of the dragonfly fauna before and after the renaturation of the brook Liese (Nordrhein-Westfalen, Germany). 1992 (before renaturation) 4 species including one species autochthonous in the Liese could be observed. After renaturation in 1996, 12 (9 autochthonous), and in 1997, 20 (14 autochthonous) species could be observed. Of special interest is the discovery in 1997 of a male of *Coenagrion mercuriale*: The next known localities are situated in distances of 45 km and 25 km as the crow flies! In 1998 6 males of *C. mercuriale* could be observed; there should have established an autochthonous population of the very rare German damselfly after renaturation of the brook.]

Address: Andres, C., Vor der Laakenbreite 24a, D-37075 Göttingen, Germany

686. **Andrews, S.J. (1999):** Observations on the use of Yellow Flag (*Iris pseudacorus*) as a support for emerging zygopteran larvae. *Journal of the British Dragonfly Society* 15(1): 12-17. (in English).

["A total of 60 exuviae of *E. cyathigerum* was examined, 34 during 1996. It is noteworthy that a small but significant number of larvae appeared to bypass the irises and emerge on other vegetation including the nettles

behind the mud/shingle bank. These alternative supports for emergence appeared to be used more often during the early part of the emergence period (data not shown). [...] The average height climbed by larvae in this study for emergence was 42cm (range 10-100cm). Together with additional data collected during the emergence periods for 1994 and 1996, it can be seen that most larvae climb at least two-thirds of the total height of the Iris for emergence but not necessarily right up to the very top (Fig. 1). [...] As a general observation, the average width of any single iris leaf does not vary considerably throughout most of its length, the overall width tending to increase with increasing length (age) of the leaf. The average leaf width at the position of emergence was 14mm (range 5 to 25mm). [...] An equal number of exuviae were recovered from both sides of the Iris leaves. 41 % of larvae chose a position whereby both sets of legs could clasp both edges of the leaf whilst 53 % chose an alternative position utilizing the mid-rib vein as an alternative to one of the leaf edges (Table 2)."] (Author) study site: Wraysburg, UK

Address: Andrews, S.J., 39 Guildford Street, Staines, Middlesex TW18 2EQ, UK

687. **Arensberger, G.; Peitzner, P. (1999):** Libellendias ausgewählter europäischer Arten. *Anax, Wien* 2(1): 45-46. (in German).

[summary of a slide show with some spectacular pictures e.g. of *Aeshna mixta*]

Address: Arensberger, G., Habermannstr. 6, D-21031 Hamburg, Germany

688. **Artiss, T. (1999):** Molecular systematics and the evolution of genitalia in libellulid dragonflies. *IDF-Report* 2(1): 33-36. (in English).

[Request for funding of a study: "Toward this end, my research provides one of the few, rigorous phylogenetic surveys of an odonate genus using molecular data. Moreover, my research will provide one of the first studies in odonatology to use a phylogeny to test hypotheses regarding the evolution and possible coevolution of the male and female genitalia. The funds requested herein will enable me to use scanning electron microscopy to identify and quantify characters associated with the genitalia of male and female dragonflies in the genus *Libellula*."]

Address: Artiss, T., Department of Biology, Clark University, 950 Main Street, Worcester, MA 01610-1477, USA

689. **Bedjanic, M. (1999):** The "Dry season" aspect of the odonate fauna of Sri Lanka. *Anax, Wien* 2(1): 45. (in English).

[see OAS 543]

Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. e-mail: matjaz-bedjanic@guest.arnes.si

690. **Beynon, T.G. (1999):** An unusual mismatch. *Journal of the British Dragonfly Society* 15(1): 17. (in English).

[A female *Anax imperator* "was perched on a horizontal leaf of Hare's-tail Cottongrass (*Eriophorum vaginatum*) lying along the surface in the marginals on the northern edge, and ovipositing into it. A male [...] *Enallagma cyathigerum* [...] approached and settled on the *Anax* at the wing bases on the thorax. It curled its abdomen round and under and attempted to grasp the *Anax*. It lifted off briefly, settled again, and tried once more to grasp the *Anax*. The *Anax* paid no attention to the *Enal-*

lagma, but then flew off a little way, dislodging the Enalagma, and began ovipositing near the original site." (Author)]

Address: Beynon, T.G., 34 Church Lane, Checkley, Stoke-on-Trent ST10 4NJ, UK

691. **Brockhaus, T. (1999):** Populationsökologische Untersuchungen an der Federlibelle *Platycnemis pennipes* (Pallas, 1771) an einer regionalen Verbreitungsgrenze (Odonata: Platycnemididae). Dissertation, Fakultät für Biowissenschaften, Pharmazie und Psychologie der Universität Leipzig. ISBN 3-00-004013-7: 134 pp, Anhang. (in German).

[study site: River Zschopau, north of Chemnitz, Saxonia, Germany; mark-recapture study, habitat selection, population density, larval cohorts, dispersion, migration, maturation, reproductive behaviour]

Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. e-mail: T.Brockhaus@t-online.de

692. **Buczynski, P. (1999):** New record of *Sympetrum fonscolombii* (Sélys, 1840) (Odonata: Libellulidae) from the Pomeranian Lakeland. *Wiad. entomol.* 18(1): 56. (in Polish, German translation of the paper is available from the author).

[new larval record of *S. fonscolombii* near the village Zalom (53°06N 16°01E), Poland; discussion of the known Polish records, and the range extension in Poland]

Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland

693. **Burbach, K.; Winterholler, M. (1999):** The Bavarian Dragonfly-Atlas: Conception, database and stand of working. *Anax, Wien* 2(1): 44. (in English).

[status quo report on the Bavarian Odonata mapping project in 1996; the results of this project are published in the meantime: See OAS 623]

Address: Burbach, K., Griesfeldstr. 5a, D-85354 Freising, Germany

694. **Burbach, K.; Winterholler, M. (1999):** The occurrence of the Vagrant Emperor (*Hemianax ephippiger*) in Middle Europe 1995. *Anax, Wien* 2(1): 43. (in English).

[compilation of records from the 1995 invasion of *Anax ephippiger* to the central part of Europe with special emphasize to Bavaria, Germany]

Address: Winterholler, M., Bayerisches Landesamt für Umweltschutz, Rosenkavalierplatz 10, 81925 München, Germany

695. **Che Salmah, M.R.; Hassan, S.T.S.; Ali, A.; Abu Hassan, A. (1999):** Life history of *Neurothemis tullia* (Drury) in a tropical rainfed rice field (Anisoptera: Libellulidae). *Odonatologica* 28(1): 1-11. (in English).

[The study was performed from June 1993 through April 1995 in a rainfed rice field of Bandar Baru District in Kedah, Peninsular Malaysia. "Larval growth was more uniform during early instars. Increasing variations of growth were obvious during the later instars, especially in the final instar. [...] Larval development was asynchronous and a maximum of 8 larval instars was found on one sampling occasion. 4 emergences were observed in 1994, in March, May, July and October. In general emergence was relatively synchronized. The E50 values were achieved within the first 38%, 9% and 16% of the total duration of emergences 2, 3, and 4 respective-

ly. A relatively short life cycle, continual breeding and oviposition, synchronous emergence and immediate reproduction after a dry period ensure survival of *N. tullia* in the unpredictable rainfed rice ecosystem." (Authors)]

Address: Hassan, S.T.S., Department of Biology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

696. **Chippindale, P.T.; Dave, V.K.; Whitmore, D.H.; Robinson, J.V. (1999):** Phylogenetic relationships of North American damselflies of the genus *Ischnura* (Odonata: Zygoptera: Coenagrionidae) based on sequences of three mitochondrial genes. *Molecular Phylogenetics and Evolution* 11(1): 110-121. (in English).

["Relationships of North American damselflies of the genus *Ischnura* (Odonata: Zygoptera: Coenagrionidae) were investigated using a total of 1205 bp from portions of three mitochondrial genes: cytochrome b, cytochrome oxidase II, and 12S ribosomal DNA. Parsimony and neighbour joining analyses reveal a monophyletic group consisting of *I. damula*, *I. demorsa*, *I. perparva*, *I. posita posita*, *I. posita atezca*, *I. verticalis*, and probably *I. denticollis*, likely reflecting a recent radiation in North America. *Ischnura kelicotti*, *I. barberi*, *I. prognata*, *I. hastata*, *I. ramburri*, and *I. capreola* appear to represent much earlier divergences in the group. Many previous hypotheses of relationships among North American species of *Ischnura* are not supported by the molecular-based analyses. However, there is agreement in many respects between the results of the molecular phylogenetic analyses and the morphologically based conclusions of Kennedy (1919, 'The Phylogeny of the Zygoptera', Ph.D. Dissertation, Cornell University, Ithaca)."] (Authors)]

Address: Chippindale, P.T., Univ. Texas, SW Med. Sch., 5323 Harry Hines Blvd, Dallas, TX 75235, USA

697. **Chovanec, A. (1999):** Libellenkundliche (Insecta: Odonata) Erhebungen als Grundlage für die Bewertung eines Niedermoores in Niederösterreich. *Lauterbornia* 35: 13-19. (in German, with English summary).

["Investigation of the dragonfly fauna (Insecta: Odonata) as a basis for the assessment of a fen in Lower Austria: Permanent and temporary waters of a wetland area in Lower Austria were characterised and evaluated by investigations of the dragonfly fauna in 1997. 36 species were found, which corresponds to 46 % of the species known from Austria. The results show the ecological importance of even small wetland areas with high structural heterogeneity within an agriculturally intensively used region as refuge for a dragonfly fauna rich in species and characterised by a high portion of endangered species." (Author)]

Address: Chovanec, A., Umweltbundesamt, Abt. Aquatische Ökologie, Spittelauer Lände 5, A-1090 Wien, Austria

698. **Chovanec, A. (1999):** Methoden für die Erhebung und Bewertung der Libellenfauna (Insecta: Odonata) - eine Arbeitsanleitung. *Anax, Wien* 2(1): 1-22. (in German, with English summary).

["This paper provides an overview of methods for the sampling of dragonfly imagines and exuviae. Approaches for the assessment of water bodies based on dragonfly surveys are also presented. Thus, the paper should contribute to a harmonisation of methods and help make results obtained by the investigation of the dragonfly fauna more comparable." (Author)]

Address: Chovanec, A., Umweltbundesamt Wien, Spittelauer Lände 5, A-1090 Wien, Austria

699. **Chovanec, A. (1999):** Nachweis von *Lestes barbarus* (Fabricius) (Odonata; Zygoptera) in der Ost-Steiermark (Österreich). *Anax*, Wien 2(1): 23-26. (in German, with English summary).

[in 1996 a population of the rare Austrian *L. barbarus* was observed near Pöllau (eastern Styria)]

Address: Chovanec, A., Umweltbundesamt Wien, Spittelauer Lände 5, A-1090 Wien, Austria

700. **Clancy, S.; Walker, D. (1999):** Reports from Coastal Stations - 1998: Dungeness area. Kent. *Atropos* 6: 53-54. (in English).

[*Sympetrum fonscolombei*; *Anax parthenope* was caught in a Helgioland trap]

Address: not stated

701. **Clements, D.K. (1999):** The Hornet Roberfly *Asilus crabroniformis* L. (Diptera, Asilidae): interactions with Odonata. *Journal of the British Dragonfly Society* 15(1): 18-19. (in English).

Address: Clements, D.K.; 7 Vista Rise, Llandaff, Cardiff CF5 2SD, UK

702. **Collinson, M. (1999):** Highland Darters *Sympetrum nigrescens* in south-east Scotland. *Atropos* 6: 33. (in English).

["It is possible, of course, that no expansion of established *nigrescens* populations has occurred, and that the observed Highland Darters represent a colour aberration of *S. striolatum* in response to northern microhabitats. However, I believe this to be less likely than the alternative explanation that *S. nigrescens* populations have expanded eastwards and contacted a small but increasing population of *S. striolatum* in the Lothians. West Lothian in particular may therefore be a new contact zone between the two forms/species and this must be of interest to anyone who studies the interactions between the two and their consequent specific status." (Author)]

Address: Collinson, M., 22 Tippet Knowes Park, Winchburgh, West Lothian EH52 6UJ, UK

703. **Colston, A. (1999):** Site guide: Wicken Fen National Nature Reserve, Cambridgeshire. *Atropos* 7: 3-6. (in English).

[commented checklist of the Odonata of Wicken Fen, UK]

Address: Colston, A., Property Manager, The National Trust, Wicken Fen, Lode Lane, Wicken, Ely, Cambs, CB7 5XP, UK

704. **Costa, J.M.; Santos, T.C.; Telles, A.M. (1999):** *Phyllogomphoides annectens* (Selys): description of the last instar with a key to the South American species (Anisoptera: Gomphidae). *Odonatologica* 28(1): 79-82.

Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, BR-20942-040 Rio de Janeiro, Brazil. e-mail: jcosta@unisys.com.br

705. **Craine, G.D.; Wormwell, C.J. (1999):** Reports from Coastal Stations - 1998: Isle of Man. *Atropos* 6: 64-65. (in English).

[*Lestes sponsa*, *Sympetrum fonscolombei*, *Aeshna mixta*]

Address: not stated

706. **Davey, P. (1999):** Weather conditions leading to the 1998 Green Darner *Anax junius* (Drury) influx. *Atropos* 6: 8-12. (in English).

Address: Davey, P., The Cottage, 2 Woodcuts Lane, Gaunts Common, nr Wimborne, Dorset BH21 4JL, UK

707. **De Bock, M.; Stoks, R. (1999):** De libellenfauna van een geïsoleerde amfibieenpoel te Merchtem. *Gomphus* 15(1): 3-11. (in Dutch, with English and French summaries).

["The dragonfly fauna of an isolated pond in Merchtem (Vlaams-Brabant). We report on the monitoring of dragonflies of a newly excavated, isolated pool for amphibians at Merchtem. The pool is situated in an agricultural landscape, and rather small and shallow. During the first year, six species were seen at the pool. Over the first four years, a total of 13 species has been observed. Compared to the adjacent 10 x 10 km squares, this is a reasonable number. Striking is the absence of local populations of *Lestes sponsa* and *L. viridis* despite their occurrence in nearby squares and the suitability of the habitat. Interesting is the yearly occurrence of a local population of *L. barbarus* (the first proof of successful reproduction for Belgium) and occasional sightings of *L. dryas* and *Aeshna affinis*. Despite the absence of any populations of species listed in the Red List of Flanders, the observations show the importance of such pools for local odonata richness." (Authors)]

Address: Marjan De Block & Robby Stoks, Universiteit Antwerpen (RUCA) Departement Biologie, Evolutionaire Biologie, Groenenborgerlaan 171, B-2020 Antwerpen, Belgium

708. **De Knijf, G. (1999):** Verslag van de excursie naar de moerassen in de omgeving van Laôn (Frankrijk) op zondag 13 juni 1998. *Gomphus* 15(1): 36-38. (in Dutch, with French summary).

[report from an excursion to the marshes in the surrounding of Laôn (France) (Camp militaire de Sisonne) on Sunday 13 June 1998: 17 species were observed, among them *Leucorrhinia caudalis* (!) and *L. pectoralis*; the list of species includes also some very rare European butterflies]

Address: Knijf, Geert de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. e-mail: geert.de.knijf@instnat.be

709. **De Knijf, G. (1999):** Verslag van de excursie naar Gaume op zaterdag 4 juli 1998. *Gomphus* 15(1): 33-36. (in Dutch, with French summary).

[report of an excursion to Gaume (Belgium) on Saturday 4 July, 1998: 20 species could be observed, among them *Ischnura pumilio*, *Onychogomphus forcipatus*, *Somatochlora flavomaculata*, *Crocothemis erythraea*, and *Orthetrum brunneum*]

Address: Knijf, Geert de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. e-mail: geert.de.knijf@instnat.be

710. **De Schoot, P. van; De Knijf, G. (1999):** Verslag van de excursie naar de Visbeek-Kindernouw te Lille-Wechelderzande op zaterdag 1 augustus 1998. *Gomphus* 15(1): 31-33. (in Dutch, with French summary).

[report of an excursion to the valley of Visbeek-Kindernouw near Lille-Wechelderzande (Belgium) on Saturday 1 August, 1998: Despite of unfavourable weather conditions 21 species could be observed, among them

Lestes barbarus, *Ceriagrion tenellum*, *Cercion lindenii*, and *Aeshna juncea*]

Address: Knijf, Geert de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. e-mail: geert.de.knijf@instnat.be

711. **Dell'Anna, L.; Utzeri, C.; De Matthaeis, E.; Colli, M. (1999):** Biological differentiation and reproductive isolation of syntopic central Italian populations of *Chalcolestes viridis* (Vander L.) and *C. parvidens* (Artobol.) (Zygoptera: Lestidae). *Anax*, Wien 2(1): 41-46. (in English).

[specific status of the two taxa recognized on the basis of electrophoretic assays; difference in emergence period; sex-ratios; duration of prereproductive period (8 weeks in *C. parvidens*, and 5 in *C. viridis*)]

Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma, Italy

Demolder, H. (1999): Verslag van de excursie naar de moerassen naar Vloetenveld op zaterdag 28 juni 1998. *Gomphus* 15(1): 38-41. (in Dutch, with French summary).

[report on an excursion to Vloetenveld on Saturday 28 June 1998: records were made in the military training area Vloetenveld near Brugge, and include *Cercion lindenii*, *Erythromma najas*, and *Cordulia aenea* (very rare in Flanders)]

Address: not stated

712. **Dewick, S. (1999):** Reports from Coastal Stations - 1998: Curry Farm, Bradwell-on-Sea, Essex. *Atropos* 6: 56-57. (in English).

[short assessment of the dragonfly season 1998]

Address: not stated

713. **Dudgeon, D. (1999):** Patterns of variation in secondary production in a tropical stream. *Arch. Hydrobiol.* 144(3): 271-281. (in English).

["Secondary production of insects in a Hong Kong stream was measured over two years when the intensity of monsoonal rains (influencing stream discharge) showed marked inter-year variation. Data for 19 species (Ephemeroptera, Odonata Trichoptera and Coleoptera) revealed considerable variation in production between years by some species. A hypothesis that these fluctuations reflected microhabitat occupancy was tested and supported by the data. Production by rheophilic species living in coarse substrates increased during the year with higher stream discharge while that of species living in depositional habitats declined. The opposite trend was observed during the year with low rainfall. Despite variation in annual production of individual species, where data were available for an entire functional feeding group (e.g. filter-feeders), production estimates were rather constant between years." (Author). Secondary production of: *Euphaea decorata* was relatively consistent between the years 1977-1978 and 1978-1979.]

Address: Dudgeon, D., Department of Ecology & Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong SAR

714. **Fauth, J.E. (1999):** Identifying potential keystone species from field data - an example from temporary ponds. *Ecology Letters* 2(1): 36-43. (in English).

["Identifying keystone species is essential for understanding community dynamics and preserving spe-

cies richness. ...Larval dragonflies (*Tamea carolina*, ...) were identified as weak, context-dependent keystones in South Carolina, supporting anuran richness in isolated ponds with very low pH. The results suggest that the identity of keystone species varies, even in similar habitats within a physiographic region."]

Address: Fauth, J.E.; Coll. Univ. Charleston; Dept. Biol., 66 George St, Charleston; SC 29424; USA. e-mail: Fauth, JE: fauthj@cofc.edu

715. **Ferreras-Romero, M.; Atienzar, M.D.; Corbet, P.S. (1999):** The life cycle of *Onychogomphus uncatatus* (Charpentier, 1840) (Odonata: Gomphidae) in the Sierra Morena Mountains (southern Spain): an example of protracted larval development in the Mediterranean basin. *Arch. Hydrobiol.* 144(2): 215-228. (in English).

["The life cycle of the dragonfly *Onychogomphus uncatatus* was studied for three consecutive years, mainly by systematic sampling of larvae, in a permanent upland stream in southern Spain, towards the southern part of this species' range. During larval development a hatching cohort divides into 'fast' and 'slow' components which respectively complete development in two and three years and correspond in their mode of seasonal regulation to summer and spring species (sensu CORBET 1954). In these respects the life cycle resembles closely that of certain other Odonata near the northern limit of their distribution in the United Kingdom and Sweden. Advanced metamorphosis (in the last larval instar) and emergence were confined to spring and summer respectively, but unusually low autumn temperatures correlated with the appearance in autumn, rather than in winter or spring, of intrastadial changes foreshadowing metamorphosis." (Authors)]

Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, ES-14004 Córdoba, Spain

716. **Fincke, O.M. (1999):** Organization of predator assemblages in Neotropical tree holes: effects of abiotic factors and priority. *Ecological Entomology* 24(1): 13-23. (in English).

["Water-filled tree holes in a lowland forest in Panama harbour an assemblage of large predators consisting of the larvae of five common species of Odonata, the mosquito *Toxorhynchites theobaldi*, and tadpoles of *Dendrobates auratus*."; odonate genera: *Gynacantha*; *Mecistogaster*; *Megaloprepus*; *Triacanthagyna*]

Address: Fincke, O.M., Univ. Oklahoma, Dept. Zool.; Norman, OK 73019, USA. e-mail: fincke@ou.edu

717. **Gade, G.; Kellner, R. (1999):** Dragonfly *Erythemis simplicicollis* contains a novel adipokinetic neuropeptide. *Archives of Insect Biochemistry and Physiology* 40 (2): 99-106.

["We have isolated a novel member of the adipokinetic hormone family of peptides from a methanolic extract of corpora cardiaca of the libellulid dragonfly *Erythemis simplicicollis* by using a single-step reversed-phase high performance liquid chromatography method and monitoring biological activity in various heterologous bioassays and a homologous one. The sequence, as determined by Edman degradation and mass spectrometry, was of an uncharged blocked octapeptide: pGlu-Leu-Asn-Phe-Thr-Pro-Ser-Trp amide. ... Since lipids are apparently used as substrate for muscle contraction during flight of *Erythemis simplicicollis* and the native pep-

tide induces lipid mobilization, this novel peptide is denoted Ers-AKH."]

Address: Gade, G.; Univ. Cape Town; Dept. Zool., ZA-7701 Rondebosch, South Africa. e-mail: ggade@bot-zoo.uct.ac.za

718. **Geeson, J.; Geeson, J. (1999):** Our Mid-Norfolk garden. *Atropos* 7: 35-38. (in English).

[report on the dragonflies of a garden pond created five years ago]

Address: Geeson, J.+J., 22 Hillside, Barnham Broom, Norfolk NR9 4 DF, UK

719. **Gerken, B.; Sternberg, K. (1999):** Die Exuvien europäischer Libellen. - The Exuviae of European Dragonflies. ISBN 3-9805700-4-4. 354 pp. (in German/English).

[bilingual (German/English) key for identification of exuvia of the European Odonata; chapters on "Collection, preparation and preservation of exuviae", "Where to find exuviae", general introduction in "Characteristics for the identification of odonate exuviae", "Glossary" of morphological features, "Technical terms German-English", "List of (European) species"]

Source of supply: Gerken, B., Universität/Gesamthochschule Paderborn, Abt. Höxter, Fachbereich 7, Landespflanze, Tierökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. e-mail: gerken.bernd@hx.uni-paderborn.de. DM 38,50 + pp

720. **Göcking, C. (1999):** Zum Vorkommen der Helm-Azurjungfer (*Coenagrion mercuriale*) in der Emsaue bei Warendorf. *Flora und Fauna im Kreis Warendorf - Beiträge zur Naturkunde* 9: 69-70. (in German).

[confirmation of an old locality of *Coenagrion mercuriale*, and detection of new localities in River Ems with annotations to abundance at all localities on 20 July 1998. Nordrhein-Westfalen (Landkreise Warendorf and Gütersloh).]

Address: Göcking, C., Zum Hiltruper See 9, D-48165 Münster, Germany

721. **Goffart, P. (1999):** Un premier cas de reproduction effective de *Sympetrum fonscolombei* Selys, 1840 en Wallonie. *Gomphus* 15(1): 12-17. (in French, with Dutch and English summaries).

["A successful reproduction of the Red-veined Darter (*Sympetrum fonscolombei* Selys, 1840) in Walloon Region (Southern Belgium). This note account for the observation of a minimum of four males and two females of *Sympetrum fonscolombei*, all tenerals, at the end of September 1998, near a pond in Southern Belgium, in Gaume. It is the first reported case of successful reproduction of this southern species in Walloon Region. These recently emerged adults had descended probably from the development of eggs laid by migrants during spring 1998. Observations of that species seem more and more regular in Southern Belgium, from 1993 (at least) till now. Since that date, indeed, several data were recorded each year, relating sometimes to little groups (up to about twenty individuals) and egg-laying has sometimes been observed. Occasional effective reproduction was therefore expected." (Authors)]

Address: Goffart, P., Unite d'Ecologie et de Biogéographie (UCL) 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. e-mail: goffart@ecol.ucl.ac.be

722. **Gonzalez-Soriano, E. (1999):** *Brechmohoga latialata* spec. nov. from Mexico (Anisoptera: Libellulidae). *Odonatologica* 28(1): 83-86.

Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico

723. **Gorb, S.N. (1999):** Evolution of the dragonfly head-arresting system. *Proceedings of the Royal Society of London, Series B - Biological Sciences* 266 (1418): 525-535. (in English).

["The arrester or fixation system of the head in adult Odonata is unique among arthropods. This system involves the organs of two body segments: the head and the neck. It consists of a skeleton-muscle apparatus that sets the arrester parts in motion. The parts comprise formations covered with complicated microstructures-fields of microtrichia on the rear surface of the head and post-cervical sclerites of the neck. The arrester immobilizes the head during feeding or when the dragonfly is in tandem flight. Thus, it may serve as an adaptation to save the head from violent mechanical disturbance and to stabilize gaze in a variety of behavioural situations. This study shows the evolutionary trend of the arrester in the order Odonata by using scanning electron microscopy and measurements of arrester structures in 227 species from 26 odonate families. The arrester design occurring in the Epiophlebiidae, Gomphidae, Neopetaliidae, Petaluridae and Chlorogomphinae is suggested to be the basic one. Two convergent pathways of head-arrester evolution among Zygoptera and Anisoptera are proposed. The possible functional significance of the arrester system is discussed." (Author)]

Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. e-mail: stas.gorb@tuebingen.mpg.de

724. **Gorb, S.N. (1999):** The role of visual cues in mate recognition in the damselfly *Coenagrion puella* (L.). *IDF-Report* 2(1): 3-8. (in English).

["Abdomen coloration pattern and presence of wings were the most important cues for sexual recognition by males. Step-by-step elimination of male coloration pattern leads to an increase of the tandem response rate [...] A female model painted as a male repelled males like the intact male model. Absence of either the head or thorax slightly decreased the number of tandem responses, but models without both the head and thorax were not recognized as a mate [...]. Using Principal Component Analysis it is shown that models repelling males usually were those containing intact male abdomen or female abdomen painted with blue. The results indicate that *C. puella* males can distinguish males from females visually by morphological structures and coloration pattern."(Author)]

Address: Gorb, S.N., Institut für Spezielle Zoologie und Evolutionsbiologie, Universität Jena, Erberstr. 1, D-07743 Jena, Germany

725. **Gossum, H. van.; Stoks, R.; De Bruyn, L. (1999):** Small outdoor insectaries as a tool for lifetime studies on damselflies. *Belg. J. Zool.* 129: 317-324. (in English).

["Damselflies are suitable subjects for examination of a variety of biological questions, but most research has been carried out in the field. Several questions are hard to test because of the uncontrolled conditions inherent in field studies. This can be circumvented by studying

populations in semi-natural outdoor insectaries. We assessed the suitability of such insectaries by comparing the survival and adult behaviour of *Ischnura elegans* (Vander Linden) in insectaries and in the field. Our results showed that damselflies behaved differently under experimental conditions. Nevertheless, outdoor insectaries can be regarded as a valuable tool to elucidate questions concerning life history traits since they offer the possibility to eliminate predation, emi- and immigration and hidden life." (Authors)]

Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. e-mail: hvgoossum@ruca.ua.ac.be

726. **Hale, J.; Hicks, M. (1999):** Reports from Coastal Stations - 1998: St. Agnes, Isles of Scilly. *Atropos* 6: 46-47. (in English).

[record of *Anax junius* on 10 September 1998]

Address: not stated

727. **Henson, S. (1999):** First & last dates for 1998. *Newsletter of the British Dragonfly Society* 35: 12-14. (in English).

[some phenological data from UK's 1998 Odonata]

Address: Henson, S., 10 Shotesham Road, Poringland, Norwich NR14 7LE, UK

728. **Jakob, C.; Suhling, F. (1999):** Risky times? Mortality during emergence in two species of dragonflies (Odonata: Gomphidae, Libellulidae). *Aquatic Insects* 21 (1): 1-10. (in English).

["Mortality during emergence in two species of dragonfly, *Onychogomphus uncutus* and *Orthetrum coerulescens*, was studied at a mediterranean irrigation canal in France. Overall mortality was 5.2% (n=1901) and 5.7% (n=611), respectively. ... Besides data on mortality the emergence curves of both species are provided." (Authors)]

Address: Suhling, F., Techn. Univ. Braunschweig, Inst. Zool., Fasanenstr. 3, D-38092 Braunschweig, Germany. e-mail: f.suhling@tu-bs.de

729. **Jödicke, R. (1999):** Im Reich der *Macromia sibirica*. *Libellennachrichten* 1: 10-12. (in German).

[report on a journey to Dr. A. Haritonov, USSR, with interesting information on *Sympetrum "decoloratum"*, and other species; some remarks on the current situation of odonatologists in former USSR are of special interest]

Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany

730. **Kalkman, V.; Ketelaar, R. (1999):** Interessante Libellenwaarnemingen in 1998 (Odonata). *Nederlandse faunistische mededelingen* 8: 85-88. (in Dutch, with English summary).

[interesting new records of Odonata in the Netherlands in 1998: Records of the following species in are dealt with: *Calopteryx virgo*, *Sympetma paedisca*, *Coenagrion hastulatum*, *Stylurus flavipes*, *Gomphus vulgatisimus*, *Anax parthenope*, *Cordulegaster boltonii*, *Sympetrum pedemontanum*, *Sympetrum depressiusculum*]

Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands

731. **Kay, W.R.; Smith, M.J.; Finder, A.M.; McRae, J.M.; Davis, J.A.; Halse, S.A. (1999):** Patterns of distribution of macroinvertebrate families in rivers of north-

western Australia. *Freshwater biology* 41: 299-316. (in English).

["1. The northern half of Western Australia is a large, sparsely populated area with a climate that ranges from monsoonal in the Kimberley to arid in the Gascoyne and Pilbara regions. The aquatic invertebrate fauna is poorly known. 2. Fifty-one sites located on 14 river systems were sampled three times between August 1994 and October 1995. A total of 90 taxa, most identified to family level, were collected. The fauna was dominated by insects, which constituted 74% of the total number of taxa collected. 3. Major habitats at each site were sampled separately and sites with more habitats tended to have a richer fauna. All habitats showed significant differences in taxonomic richness between regions. Family richness decreased with increasing latitude, being highest in the Kimberley region and lowest in the Gascoyne. 4. Despite the differences in taxon richness between regions, community composition of the aquatic invertebrate fauna at the family level did not differ greatly. Four major groups of sites were identified by cluster analysis, based on the invertebrate families present at each site, but differences between groups were small. 5. Significant temporal variation in taxon richness was found in channel habitat but not the three other habitats sampled (riffle, macrophyte, pool-rocks). Community composition in channel habitat varied temporally among groups of sites identified by cluster analysis but the pattern was not consistent." (Authors) The Odonata (8 families) are listed for the sampled 51 river sites in appendix 1.]

Address: Kay, W.R., Department of Conservation and Land Management, Wildlife Research Centre, PO Box 51, Wanneroo, WA 6065, Australia. e-mail: winston@calm.wa.gov.au

732. **Knaus, P. (1999):** Untersuchungen zur Emergenz, zur Mobilität und zum Paarungssystem an einer Metapopulation von *Somatochlora alpestris* (Selys, 1840) in den Zentralalpen (Anisoptera: Corduliidae). *Diplomarbeit, Zool. Inst., Wildforschung und Naturschutzökologie, Universität Zürich*: 65 pp. (in German).

[very detailed mark-recapture study of the ecology of *Somatochlora alpestris* with emphasize on locality and phenology of emergence, maturation, population ecology, reproductive behaviour, feeding behaviour, diel periodicity, side fidelity, mobility, metapopulation structure; study localities: 27 water bodies, subalpine zone, Bärenseewen, Prätigau, Switzerland.]

Address: Knauss, P., Pflanzschulstr. 49, CH-8004 Zürich, Switzerland. e-mail: pknkaus@hotmail.com

733. **Kofler, A. (1999):** Nachtrag zur Libellenfauna Osttirols (Odonata). *Anax, Wien* 2(1): 27-31. (in German, with English summary).

[additions to the list of the Odonata of East Tyrolia, Austria from 1973 - 1993; new for the region are *Chalcolestes viridis*, *Aeshna grandis*, *Sympetrum striolatum*, *S. fonscolombeii*, and *S. sanguineum*.]

Address: Kofler, A., Meranerstr. 3, A-9900 Lienz/Osttirol, Austria

734. **Kuhn, J. (1999):** Die Libellen des Murnauer Moores und der Loisachmoore (Oberbayern): Fauna - Lebensräume - Naturschutz. *Berichte der Akademie für Naturschutz Laufen* 21 (1997): 111-147. (in German).

[comprehensive and well documented study on the dragonflies of two bogs in Bavaria; distribution map of selected species; (commented) checklist of 55 species

with annotations to the status between 1993 and 1997, Red Data Book information, assessment of the present importance of the populations from the local to the European scale; discussion of problems as hydrologic impacts on the bogs, fishing in water bodies, hunting, and further recreational activities on vegetation, and habitats of Odonata, importance of litter meadows as habitats of Odonata; detailed characterisation of water bodies; appendix with (1) characterisation of all water bodies surveyed in this study, and (2) general characterisation of habitats of all species]
Address: Kuhn, J., Marktstr. 26, D-89143 Blaubeuren, Germany

735. **Lehmann, G. (1999):** Gomphiden im Bergland - Zum Vorkommen von Gomphus vulgatissimus und Oryctogomphus forcipatus im Bezirk Kufstein, N-Tirol. *Anax*, Wien 28(1): 43-44. (in German).
[discussion on factors responsible for the rarity of Gomphidae in the high range mountains in N-Tyrolia, Austria]
Address: Lehmann, G., Haunfeldstr. 14, A-6330 Kufstein, Austria

736. **Leung, B.; Baker, R.L.; Forbes, M.R. (1999):** Grooming decisions by damselflies, age-specific colonisation by water mites, and the probability of successful parasitism. *International Journal for Parasitology* 29(3): 397-402. (in English).
["We examined whether host damselflies (*Ischnura verticalis*) in different stages of development were differentially susceptible to parasitism by larval water mites (*Arrenurus pseudosuperior*). We found that mites were successful in reaching the parasitic phase more often if they colonised hosts closer to emergence." (Authors)]
Address: Baker, R.L., Univ. Toronto, Dept. Zool., Mississauga, ON L5L 1C6, Canada. e-mail: rbaker@credit.erin.utoronto.ca

737. **Leyshon, O. (1999):** An influx of red-veined darters at Dungeness RSPB reserve in 1998. *Newsletter of the British Dragonfly Society* 35: 14. (in English).
[Dungeness, Kent, UK]
Address: Leyshon, O., Romney Resource Centre, Mountfield Road, New Romney, Romney Marsh, Kent TN28 8LH, UK

738. **Lindeboom, M. (1999):** Supported projects 1997 - 1999. *IDF-Report* 2(1): 1-2. (in English).
[List of odonatological projects supported by the International Dragonfly Fund between 1997 and early 1999]
Address: Lindeboom, M., Wolfstr. 6, D-72119 Ammerbuch, Germany

739. **Lüderitz, V.; Hentschel, P. (1999):** Umgestaltung des Landeskulturgrabens bei Dessau. Ein Beispiel für den Umgang mit anthropogenen Fließgewässern. *Naturschutz und Landschaftsplanung* 31(1): 18-23. (in German with English summary).
["Recultivation of the 'Landeskulturgraben' in Dessau as an example of the treatment of anthropogenic water bodies. The 'Landeskulturgraben' is a small canal in the Biosphere Reserve 'Mittlere Elbe', the ecology of which had been severely disturbed. In 1994 the canal bed structures were ecologically enhanced by different measures. By creating meanders, stillwater coves, course widenings, separated ponds and shallow banks the eco-morphological grade increased from 4.5 to 2.5. Water quality improved from class II-III (critically loaded) in

1994 to class II (moderately loaded) in 1995/1996. The number of macroinvertebrate species increased from 38 to 85. the number of water and amphibic plant species grew by 27." (Authors). 13 species of Odonata are listed: 4 species in 1993, and 13 in 1996/97. Most of the (regional) typical Odonata of ditches could be recorded, a good indication of the success of the measures.]
Address: Hentschel, P., Rosenburger Str. 103, D-06846 Dessau, Germany; Lüderitz, V., Fachhochschule Magdeburg, Fachbereich Wasserwirtschaft, Am Krökentor 8, D-39104 Magdeburg, Germany

740. **Marchant, R.; Hirst, A.; Norris, R.; Metzeling, L. (1999):** Classification of macroinvertebrate communities across drainage basins in Victoria, Australia: consequences of sampling on a broad spatial scale for predictive modelling. *Freshwater biology* 41: 253-268. (in English).
["Spatial scale may influence the interpretation of environmental gradients that underlie classification and ordination analyses of lotic macroinvertebrate communities. This could have important consequences for the spatial scale over which predictive models derived from these multivariate analyses can be applied. 2. Macroinvertebrate community data (identified to genus or species) from edge and main-channel habitats were obtained for sites on rivers from 25 of the 29 drainage basins in Victoria. Trends in community similarity were analysed by carrying out separate multivariate analyses on data from the edge habitats (199 sites) and the main-channel habitats (163 sites). 3. Hierarchical classification (UPGMA) showed that the edge data could be placed into 11 site groups and the main-channel data into 12 site groups. 4. Ordination analysis (hybrid multidimensional scaling) showed no sharp disjunctions between site groups in either habitat; overlap was frequent. Correlation of the ordination patterns with environmental variables showed that edge communities varied, longitudinally within a drainage basin and from the east to the west of Victoria. These two trends were superimposed on one another to form a single gradient on the ordination. The taxon richness of edge communities was also related to the species richness of macrophytes at a site. Main-channel communities also displayed a longitudinal and a geographic gradient, but these two gradients were uncorrelated on the ordination. 5. Community similarity only weakly reflected geographic proximity in either habitat. A preliminary subdivision of Victoria into a series of biogeographic regions did not match the pattern of distribution of site groups for the edge habitat, illustrating the difficulties of applying to lotic communities a priori regionalizations based on terrestrial features of the landscape. 6. The longitudinal gradients in the two data sets were commonly observed in data gathered at smaller spatial scales in Victoria. The other gradients (geographic, macrophyte), however, were either not consistently repeated or not evident at smaller spatial scales. At small spatial scales (i.e. within a single drainage basin) gradients were related to variables that varied over restricted ranges, e.g. mean particle size of the substratum. 7. Species richness was very variable when plotted against river slope or distance of site from source; both of these are measures of position on the longitudinal gradients. In contrast to suggestions in the literature, species richness did not show a unimodal trend on these gradients, or any other trend. 8. Environmental gradients (apart from longitudinal gradients) that underlie predictive models of macroinvertebrate distribution are reflections of the spatial

scale on which the model has been constructed and cannot be extrapolated to different scales. Models must be suited to the spatial scale over which predictions are required." (Authors). At the species level *Ischnura heterosticta* was classified as edge taxon, and *Austroaeschna pulchra* and *Notoaeschna sagittata* als main-channel taxa.]

Address: Marchant, R. Museum of Victoria, 71 Victoria Crescent, Abbotsford, VIC 3067, Australia. e-mail: rmarch@mov.vic.gov.au

741. **Meuris, L. (1999):** Libellenmonitoring in Vlaanderen: de eerste resultaten van een proefproject op de Kalmthoutse Heide (Antwerpen) in 1998. *Gomphus* 15 (1): 18-28. (in Dutch, with English and French summaries).

["Dragonfly census in Flanders: the first results of a pilot project in the "Kalmthoutse Heide" (Antwerp) in 1998. In order to follow and evaluate the long-term evolution of the odonatofauna in Flanders, a monitoring scheme is necessary. In Flanders, such a project has not yet started, but it has been decided to start a pilot project at several sites, e.g. in the 'Kalmthoutse Heide' (province of Antwerp). The first results are given here. Seven fens have been visited regularly during the flying season. The same transect has been followed and adults and exuviae have been counted over a strip of 3 meters wide. A total of 24 species have been detected, 6 of them 'Red List' species: *Coenagrion lunulatum*, *Cordulia aenea*, *Leucorrhinia dubia*, *Lestes virens*, *Ceragrion tenellum*, and *Aeshna juncea*. For next year, it has been proposed to count two transects of 5 fens each instead of one transect of 7 fens." (Author)]

Address: Meuris, L., A Van Bockstaelestraat, B-9050 Gent, Belgium

742. **Müller, R. (1999):** Die Odonaten von Micronesien (Pazifik). *Anax*, Wien 2(1): 46. (in German).

[very short summary on the dragonfly fauna of Micronesia]

Address: Müller, R., Rehetobelstr. 99, CH-9016 St. Gallen, Switzerland

743. **Müller, R.; Hämäläinen, M. (1999):** Philippinen, odonatologische Feldforschung im Tropenwald. *Anax*, Wien 2(1): 45. (in German).

[general introduction to the Philippines, its landscapes, climates, seasonality, the distribution of Odonata, conservation aspects, problems of odonatological research in tropical countries, methods, how to protect your specimens from getting prey of ants etc.]

Address: Müller, R., Rehetobelstr. 99, CH-9016 St. Gallen, Switzerland

744. **Mungenast, F. (1999):** Über das gehäufte Vorkommen von *Sympetrum fonscolombii* (Selys, 1840) bei Imst, Nordtirol, im Frühsommer 1996. *Anax*, Wien 2(1): 32-36. (in German).

[in early summer 1996 *S. fonscolombii* reached high abundances in North Tyrol, Austria]

Address: Mungenast, F., Stadtplatz 12, A-6460 Imst/Tirol, Austria

745. **Nasrollahzadeh, A. (1999):** Zur Süßwasserfauna des Gilan (Iran). *Zoology in the Middle East* 17: 91-98. (in German).

["A report is presented on freshwater animals collected in 1993 in the Sefid Rud catchment area and the basin of Anzali (Gilan, Iran). Some species are recorded for

the first time for Iran. There is a considerable number of species of North American origin (neophytes, neozans), e.g. *Gambusia holbrooki*, *Rhithropanopeus harrisi*, and *Azolla* sp." (Author) "Odonata gen sp." larvae are mentioned for Ciah Derwish-an (49°30'E 37°30'N).] Address: Nasrollahzadeh, Akbar, Institut Pardis Anzali, University Gilan, Pasdaranstr., Anzali, Iran

746. **Nel, A.; Gand, G.; Garric, J. (1999):** A new family of Odonatoptera from the continental Upper Permian: The Lapeyriidae (Lodeve Basin, France). *Geobios* 32 (1): 63-72. (in English).

["The new family Lapeyriidae of Odonatoptera, based on a new genus and species from the Upper Permian of Lodevois (France) is the sister group of Nodialata. ..."] (Authors)]

Address: Nel, A., Museum Natl. Hist. Nat., Entomol. Lab., 45 Rue Buffon, F-75005 Paris, France. e-mail: anel@mnhn.fr

747. **Odin, N. (1999):** Reports from Coastal Stations - 1998: Landguard Bird Observatory, Suffolk. *Atropos* 6: 58. (in English).

[documentation of three first records (*Coenagrion puella*, *Libellula depressa*, *Sympetrum danae*) for the locality of the observatory]

Address: not stated

748. **O'Neill, G. (1999):** Studies of a dragonfly biodiversity gradient in Ghana, West Africa. *IDF-Report* 2(1): 13-32. (in English).

["Collections were made at 8 localities throughout Ghana during the summer of 1997. Seventy-one species were collected, 25 of which are new species for the country. This brings the national list to 118 species. Three main regions were sampled: coastal savanna, wooded savanna and rainforest. *Trithemis dejouxi* Pinhey 1978 is raised to specific rank. Detailed records are given for this collection as well as the following others: FRASER, 1947; NEVILLE, 1960; LINDLEY, 1974; MARSHALL & GAMBLES, 1977. Aspects of Odonata biodiversity and biogeography of these regions are discussed." (Author)]

Address: O'Neill, G., University of Puget Sound, Tacoma, WA 98416, United States

749. **Painter, D. (1999):** Macroinvertebrate distributions and the conservation value of aquatic Coleoptera, Mollusca and Odonata in the ditches of traditionally managed and grazing fen at Wicken Fen, UK. *Journal of applied ecology* 36: 33-48. (in English).

["1. Water-filled ditches are an important ecological feature of lowland Britain. Originally dug to facilitate wetland drainage, ditches often provide refuges for aquatic flora and fauna of high conservation value. 2. The ditches, ponds and major waterways of a traditionally managed undrained fen and the ditches of a previously drained cattle-grazed fen meadow were sampled at Wicken Fen National Nature Reserve for Coleoptera, Mollusca and Odonata, and for physical, chemical and biological variables. 3. Multivariate analysis showed a clear division between ditches on the two fens, and between larger and smaller waterbodies. 4. Individual ditches possessed distinctive faunas. Ditch age and bank profile were important factors influencing faunal species composition. 5. Invertebrate distributions were shown to be significantly correlated with macrophyte distribution. 6. Waterbodies were ranked in terms of their species quality, using a point-scoring system; there was no cor-

relation between rankings for the three invertebrate groups; only ditch age and detritus levels were correlated with species quality score (for Coleoptera). 7. Ditch management recommendations are discussed in the light of these results." (Author); 14 odonate taxa are listed]

Address: Painter, D., Land Use Consultants, 43 Chalton Street, London NW1 1JD, UK

750. **Parr, A. (1999):** Late season records of Emperor Dragonfly *Anax imperator*. *Atropos* 6: 33-34. (in English).

[in 1998 in the UK, *A. imperator* was on the wing late in September and early in October, and fresh exuviae were found in September. "The autumn records described above, and in particular the fresh exuviae found in September, clearly do not fit this pattern (of *A. imperator* as a 'spring species'). It is possible that some individuals encounter conditions which overcome their diapause and allow an autumn emergence. A more likely explanation is that autumn Emperors are the progeny of immigrants from Mediterranean Europe or North Africa, where the species may be adapted to conditions which favour more rapid development, or where no larval diapause is necessary. The Green Darner *Anax junius*, which is the commonest *Anax* species in North America, is known to have a migrant form which produces an autumn generation of adults from eggs laid by migrants in early summer (Trottier 1971), and perhaps immigrant Emperors can also follow this strategy. It is of interest that the September exuviae of the Emperor that have been found in recent years have all come from areas where Red-veined Darter *Sympetrum fonscolombei* were also breeding at the time. This supports the immigrant hypothesis, and may give some hints as to the possible origins of any incoming spring adults. It is of course possible that some of the autumn Emperors may themselves be primary immigrants." (Author)]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

751. **Parr, A. (1999):** Migrant dragonflies in 1998 including recent decisions and comments by the Odonata Records Committee. *Atropos* 6: 69-72. (in English).

[detailed documentation and listing of immigrant species (including some colour plates of *Anax junius*): *Aeshna mixta*, *Anax imperator*, *A. parthenope*, *A. junius*, *A. ephippiger*, *Libellula quadrimaculata*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. fonscolombei*, and *S. flaveolum*]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

752. **Parr, A. (1999):** Odonata Records Committee news. *Atropos* 7: 51. (in English).

[report on the formal acceptance (and rejections) of records of *Anax parthenope* and *Anax junius* in UK]

Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

753. **Parslow, R. (1999):** Colour change in the Tresco Green Darner *Anax junius*. *Atropos* 7: 54. (in English).

["On 1 October 1998, my husband and I observed the homeochromic female Green Darner *Anax junius* on Tresco, Isles of Scilly, for a period of 40-45 minutes. It was discovered the previous day and had remained perched in the same position since discovery. Notes taken at the time describe an interesting sequence of events. My initial observations describe an insect with

pale blue either side of the brown central line on the abdomen. The impression of a pale grey-blue and dull dragonfly was disappointing as I had seen [a colour picture in the periodical; M. Sch.] *Atropos* and was expecting something more spectacular! Notes on a later sketch indicate brown eyes, leaf green thorax, brown wing-base and blue-green on the abdomen as opposed to the pale grey-blue noted earlier. There were blue/green spots on the last segments above the anal appendages. In the last few seconds before it flew, the blue suddenly became a brighter turquoise colour, contrasting with the chocolate-brown central line. With a flash of metallic blue/green it was gone. The impression was that earlier colour changes had been subtle as the day became warmer, and the final changes were very sudden and marked. We watched the insect for a long time and if I hadn't been watching the whole time, I would have been adamant that there were two insects." (Verbatim)]

Address: Rosemary Parslow 15 Lode Lane, Wicken, Ely, Cambs CB7 5XP

754. **Pedersen, H. (1999):** Cannibalism in dragonflies exemplified by the species *Anax imperator* Leach and *A. parthenope* (Sélys). *Journal of the British Dragonfly Society* 15(1): 20. (in English).

[observations on predation of *Anax* spp. on *Crocothemis erythraea* and *Sympetrum pedemontanum* in a clay pit in Hungary from 23 July 1991. *C. erythraea* was the preferred prey, but flight velocity seems not to be the factor responsible for being prey or not.]

Address: Pedersen, H., Mellemvej 15, DK-8800 Viborg, Denmark. e-mail: henning-pedersen@post12.tele.dk

755. **Pellow, K. (1999):** An influx of Green Darner *Anax junius* (Drury) into Cornwall and the Isles of Scilly - The first European records. *Atropos* 6: 3-7. (in English).

[detailed report on the *Anax junius* influx into UK; detailed description of identification features of *A. junius*]

Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Cornwall PL12 6NQ, UK

756. **Pellow, K. (1999):** Common Green Darner *Anax junius* (Drury) in Cornwall and Isles of Scilly - The first British and European records. *Journal of the British Dragonfly Society* 15(1): 21-22. (in English).

[detailed documentation of the British records from the influx of *A. junius* in September 1998]

Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Saltash, Cornwall PL12 6NQ, UK

757. **Pellow, K. (1999):** Red-veined Darter *Sympetrum fonscolombei* breeding in large numbers in south-east Cornwall during 1998. *Atropos* 6: 35. (in English).

Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Cornwall PL12 6NQ, UK

758. **Pellow, K. (1999):** Some observations of a breeding population of Red-veined Darter *Sympetrum fonscolombei* (Sélys) in Cornwall during 1998. *Journal of the British Dragonfly Society* 15(1): 23-30. (in English).

[main topics: emergence, temperature during emergence, factors of mortality during emergence, maiden flight, absolute population size, predation by birds (*Falco subbuteo*), wasps and spiders, dispersal]

Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Saltash, Cornwall PL12 6NQ, UK

759. **Pennington, M.; Rogers, T. (1999):** Reports from Coastal Stations - 1998: Shetland. *Atropos* 6: 62-63. (in English).

[second Shetland record of *Libellula quadrimaculata*]

Address: not stated

760. **Philips, J.; Philips, V. (1999):** A sighting of *Coenagrion pulchellum* (Vander Linden) in Gloucestershire. *Journal of the British Dragonfly Society* 15(1): 10-11. (in English).

Address: Phillips, J. & V., Yorkleigh Cottage, Pope's Hill, Newham-on-Severn, Gloucestershire GL14 1LD, UK

761. **Raab, R.; Chwala, E. (1999):** The Red List of dragonflies in Lower Austria. *Anax*, Wien 2(1): 46. (in English).

Address: Raab, R., Anton Bruckner-Gasse 2/2, A-2232 Deutsch-Wagram, Austria

762. **Reeve, K.; Reeve, P. (1999):** Club-tailed dragonfly *Gomphus vulgatissimus* breeding in Warwickshire. *Atropos* 7: 55-56. (in English).

Address: Reeve, K. + P., The Outspan, Leamington Hastings, Near Rugby CV23 8DZ, UK

763. **Röske, W. (1999):** Pflege- und Entwicklungsplan Weberalten. IDF-Report 2(1): 9-12. (in German).

[abstract of a conservation action plan for the odonate fauna of a gravel pit near the Swiss/German border (Rheinfeld, Baden-Württemberg); the habitat is of special interest for pioneer-species among Odonata: The ecological conditions of the habitat are characterised by a permanent (!) pioneer-stadium of waters and vegetation; it is further worth to note from the faunistic point of view that four species of the genus *Orthetrum* (*albistylum*, *brunneum*, *cancellatum*, *coerulescens*) are co-occurring at this locality.]

Address: Röske, W., Kandelstr. 26, D-79106 Freiburg, Germany

764. **Rudolph, R. (Hrsg.) (1999):** 18. Jahrestagung der GdO in Münster. 19.-21. März 1999. Tagungsband. 28 pp. (in German).

[abstracts of the following lectures: A. Fronck: Die Libellenfauna Münsters. • K.-J. Conz: Arbeitskreis zum Schutz und zur Kartierung der Libellen in Nordrhein-Westfalen - AK Libellen NRW. • C. Artmeyer: Zur Entwicklungsdauer von *Gomphus vulgatissimus* an der Ems. • R. Mauersberger: Die Abrenzung des Teilareals der Sibirischen Winterlibelle (*Sympecma paedisca* (Brauer)) im Nordosten Deutschlands. • J. Kuhn: Langzeitbeobachtungen zur Ökologie von *Lestes dryas* und *Sympetrum flaveolum*. • R. Jödicke: Rätselraten um *Sympetrum "decoloratum"* - Stationen einer taxonomischen Recherche. • H. Wildermuth: Die Paarung von *Somatochlora alpestris* - Spermienkonkurrenz bei *Corduliiden*. • A. Martens: Fortpflanzungsverhalten von *Zygonyx torridus*. • G. Rüppell und D. Rüppell-Hilfert: Alternative Paarungsstrategien bei Prachtlibellen. • T. Benken: Anmerkungen zum Paarungssystem von *Lestes macrostigma*. • M. Lindeboom: Was Sie schon immer über Libellensex wissen wollten, aber nie zu fragen wagten. • W. Zessin: Neue Befunde zur Morphologie der ältesten Libellen. • P. Jahn: Aspekte der Ontogenese und Variation der Abdominaldornen und Kopfhöcker von Libellenlarven. • P. Buczynski: Libellen von Sandgrubengewässern im südöstlichen Polen. • E. Schmidt: Zur Odonatenfauna eines Ton-Flachweihers im West-

münsterland (NSG Plümerfeld Süd bei Lüdinghausen). • F. Suhling: Libellen-Lebensgemeinschaften in südeuropäischen Reisfeldern: Lebenszyklen und Einflußfaktoren. • M. Häusler: Präditionseffekte der Larven von *Anax parthenope*, *Sympetrum fonscolombii* und *Orthetrum cancellatum*. • K. Burbach und J. Werzinger: Fortpflanzungserfolge "mediterraner" Libellen in Bayern. • P. Knaus: Populationsbiologie von *Somatochlora alpestris* in den Zentralalpen. • J. Müller & R. Steglich: Weitere Gomphiden-Nachweise in großen mitteleuropäischen Flüssen. • Poster: J. Ruddek: Gomphidenfunde an der Weser bei Bremen. • G. Devai & M. Miskolczi: Ein Beitrag zu den Charakterisierungsmöglichkeiten der Libellenfauna. • B. Hill, B. Beinlich & H. Plachter: Der Einfluß traditioneller Hütehaltung auf die Habitatnutzung von *Lestes barbarus* (Fabricius, 1798) (Odonata, Lestidae) im Naturpark Lonjsko Polje (Kroatien). • D. Kempke & K. Reinhardt: Libellenbeobachtungen in Nordostpolen. • F. Eislöffel: Das Atlasprojekt "Die Libellen in Rheinland-Pfalz".]

Address: Rudolph, R., Zum Emstal 12 B, D-48231 Warendorf, Germany

765. **Samways, M. (1999):** Diversity and conservation status of South African dragonflies (Odonata). *Odonatologica* 28(1): 13-62. (in English).

["To date, 155 spp. have been recorded in South Africa; 29 spp. (18.7%) are endemic. *Metacnemis angusta* and *Paragomphus dicksoni* are only known from female specimens and are of doubtful taxonomic status. *Chlorolestes apricans*, *C. draconica*, *Ecchlorolestes nylephtha*, *E. peringueyi*, *Metacnemis valida*, *Pseudagrion inopinatum*, *P. unsingaziense*, *Enallagma polychromaticum*, *Ceratogomphus triceraticus*, *Syncordulia gracilis*, *S. venator*, *Orthetrum rubens* and *Urothemis luciana* are ecologically threatened. *Chlorolestes apricans* and *U. luciana* are of particular concern. *C. apricans*, whose populations have declined in recent years, appears not to occur in any protected area. [...] Not all anthropogenic disturbance is harmful to Odonata. Small dams play an important role in geographically increasing the overall density of many lentic spp. Similarly, the aquatic weed *Pistia* enhances local species richness in the Krüger National Park. Most major human disturbances however, are harmful to population levels. Exotic tree plantations within 30m of the river's edge reduce species richness. The rainbow trout is implicated in causing range retraction of the very rare and threatened *E. peringueyi*, while removal of natural forest in the southern Cape has eliminated populations of the equally rare *E. nylephtha*. Cattle grazing, resulting in bank vegetation destruction, and black wattle infestations along Eastern Cape river banks have had a major adverse impact on *C. apricans*. These factors are synergistic with lowered water levels in causing population fragmentation. [...] Presence of rare species in nature reserves does not necessarily guarantee their survival." (Author)]

Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. e-mail: samways@zoology.unp.ac.za

766. **Sawabe, K.; Higashi, K.; Kanda, K.; Nagase, K. (1999):** Genetic variability and differentiation in isozymes in *Mnais damselflies* of Fukuoka in Japan (Zygoptera: Calopterygidae). *Odonatologica* 28(1): 63-78. (in English).

["To analyze the genetic differences, *M. pruinosa* and *M. nawai* were collected in 2 localities of Fukuoka Pref. Kyushu, Japan. In the Hisayama area, 2 forms of *M. pruinosa* males occur, viz. orange winged f. *esakii* and clear winged f. *strigata*, and one female form with clear wings f. *sieboldi*. In the Kami-ishigama area, *M. pruinosa* and *M. nawai* both occur and the forms of *M. pruinosa* also f. *esakii*, f. *strigata* and f. *sieboldi*. 2 forms of *M. nawai* males are also found, the orange winged f. *nawai* and the pale-orange winged f. *sahoi*, and one female form with pale-orange wings f. female *-nawai*. The genetic differences among the samples collected in the areas were assessed by electrophoretic analysis. 21 protein loci of 10 proteins were analyzed by 5 % polyacrylamide gel electrophoresis; 2 of the 21 loci were monomorphic. [...] Conclusion: (1) For the male strains, two polymorphic forms of *M. pruinosa*, f. *esakii* and f. *strigata*, and also two forms of *M. nawai*, f. *nawai* and f. *sahoi*, belong to single species, respectively. (2) The males of *M. pruinosa* and *M. nawai* belong to separate species. (3) All the females are genetically close to each other, though they include those of two different species, *M. pruinosa* and *M. nawai*." (Authors)]
 Address: Higashi, K., Department of Applied Biological Sciences, Faculty of Agriculture, Saga University, Saga 840, Japan. Fax: +81-952-28-8792. e-mail: higashik@cc.saga-u.ac.jp

767. **Schweighofer, W. (1999):** Hochgelegene Libellennachweise (Odonata) aus Niederösterreich. *Anax*, Wien 2(1): 37-40. (in German).
 [high altitudinal records of 11 odonate taxa from the Hochstadelberg (1281m NN) and Feldwies (1400 m NN) are presented]
 Address: Schweighofer, W., Schulstr. 20/8, A-3253 Erlauf, Austria

768. **Seidenbusch, R. (1999):** Choosing best ratios. *Sulzbach-Rosenberger Libellenrundbriefe* 10: 12-13. (in English).
 [An example is given how to interpret and handle "absolute measures in view of choosing out for ratios" between morphological structures in odonate larvae.]
 Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

769. **Seidenbusch, R. (1999):** Description of three last instar larvae of the south Turkish area: *Brachythemis fuscopallata* Selys, 1887 (Anisoptera: Libellulidae), *Sympetrum haritonovi* Borisov, 1983 (Anisoptera: Libellulidae), *Onychogomphus assimilis* Schneider, 1845 (Anisoptera: Gomphidae). *Sulzbach-Rosenberger Libellenrundbriefe* 10: 1-11. (in English).
 Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

Seidenbusch, R. (1999): Verfall zweier seltener Biotope im Gemeindebereich Hahnbach (Lks Amberg-Sulzbach) als Folgeerscheinung menschlicher Eingriffe. *Sulzbach-Rosenberger Libellenrundbriefe* 9: 1-16. (in German).
 [discussion of necessary measures from the hydrological and odonatological points of view to renature a bog in the community of Hahnbach (Bavaria)]
 Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

770. **Shardlow, M.E.A. (1999):** The RSPB and Odonata conservation. *Atropos* 7: 10-15. (in English).

[some topics: causes of threats to the British dragonfly fauna as afforestation in Scotland or wetland loss; dragonflies occurring on RSPB Reserves; actions for Odonata on RSPB Nature Reserves (planning, monitoring, management; where to see dragonflies on RSPB Reserves]
 Address: Shardlow, M., RSPB, Stalham House, 65 Thorpe Road, Norwich NR1 1UD, UK

771. **Smith, E.M.; Smith, R.W.J. (1999):** The status of *Coenagrion hastulatum* (Charpentier) in Scotland, with notes on larval sampling. *Journal of the British Dragonfly Society* 15(1): 1-9. (in English).
 [results are presented for the following subjects: distribution, habitat, breeding behaviour, oviposition, flying period, larval identification, larval measurements of last four instars, status and conservation. The authors take *C. hastulatum* for a "boreo-alpine species" (and probably a relict one in Scotland) what definitely is not correct for continental Europe.]
 Address: Smith, E.M. + R.W.J., 33 Hunter Terrace, Loanhead, Midlothian EH20 9SJ, UK

772. **Soors, J. (1999):** Verslag Gaume-driedaagse van 4 tot 6 juli 1998. *Gomphus* 15(1): 41-45. (in Dutch, with French summary).
 [3 day trip to Gaume (4-6 July 1998): the list of species includes *Coenagrion scitulum* (!)]
 Address: not stated

773. **Spence, B. (1999):** Reports from Coastal Stations - 1998: Spurn Bird Observatory, East Yorkshire. *Atropos* 6: 61-62. (in English).
 [emergence of *Sympetrum fonscolombi* on 22 May 1998]
 Address: not stated

774. **Stoks, R. (1999):** The effect of lamellae autotomy and sexual size dimorphism on startle-response performance in larvae of a leetid damselfly (Odonata). *Journal of Zoology* 247: 269-273. (in English).
 ["Swimming is the most important escape mechanism in leetid damselflies. The effect of lamellae autotomy and sexual size dimorphism on startle-response performance was studied experimentally in larvae of the leetid damselfly *Lestes sponsa*. In contrast with the prediction of McNeill (1960) that lamellae loss would not affect swimming speed in fast swimmers such as *Lestes* larvae, swimming performance decreased in a quadratic way with the removal of subsequent lamellae. Lamellae autotomy therefore will considerably reduce the probability of escape from a predator. Larger larvae swim faster than smaller ones of the same instar. This may contribute to a higher survival of larger larvae compared with smaller ones when confronted with both conspecific and heterospecific predators. Despite larvae showing sexual size dimorphism, with females being larger, no difference in swimming speed between the sexes was found." (Author)]
 Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. e-mail: stoks@ruca.ua.ac.be

775. **Suhling, F. (1999):** Effects of fish on the micro-distribution of different larval size groups of *Onychogomphus uncatus* (Odonata: Gomphidae). *Arch. Hydrobiol.* 144(2): 229-244.

["Four types of field experiments were carried out in order to study the effects of fish predation on different size groups of burrowing larval dragonflies *Onychogomphus uncatatus* (CHARP.). (1) The effects of the bottom feeding fish *Barbatula* (*Nemacheilus*) *barbatula* (L.) on three size groups of *O. uncatatus* in three types of substrate: sand, gravel and stones, were recorded using field enclosure cages. The densities of small sized larvae inhabiting cages with stones and gravel were reduced in the presence of fish compared with fish-free controls. No effects due to fish presence were found in larger larvae. (2) The colonisation of sand, gravel and stones in the field by different size groups of *O. uncatatus* was studied using frames filled with substrates. Substrate as well as size specific effects were found. The low density of small larvae in coarse substrates is interpreted mainly as a direct effect of predation by *B. barbatula* which exclusively colonised these substrates. (3) To test the effect of exclusion of all fish on colonisation of *O. uncatatus*, frames filled with stones were exposed in a running water and half of these were protected by cages. The densities of very small and medium sized larvae in the protected substrates were higher than in those without cages. (4) In cages with a wide mesh size, which allowed a free exchange of dragonfly larvae and *B. barbatula* but prevented predation by large fish, the density of small larvae of *O. uncatatus* was reduced. *B. barbatula* were found exclusively inside the cages. It is suggested that predation by *B. barbatula* using the cages as a shelter against predation by large fish was responsible for this reduction." (Author)]
Address: Suhling, F., Zool. Institut, Technische Universität Braunschweig, Fasanenstraße 3, 38092 Braunschweig, Germany, E-mail: f.suhling@tu-bs.de

776. **Temaat, T. (1999):** Ontdekking van een populatie van *Coenagrion mercuriale* (Charpentier, 1840) nabij Virton. *Gomphus* 15(1): 29-30. (in Dutch, with English and French summaries).
["Discovery of a population of *Coenagrion mercuriale* (Charpentier, 1840) near Virton: In June 1998, a small population of *C. mercuriale* has been discovered in the Gaume, near the village of Villers-la-Loue (province of Luxembourg). A total of three males and one female were captured near a small, fast running brook with a sandy floor. This is the second population for Belgium known after 1980 and the first observation of *C. mercuriale* in the Gaume." (Author)]
Address: Temaat, T., Rijnsteeg 8 10-A, NI-6708 PP Wageningen, The Netherlands

777. **Tockner, K.; Schiemer, F.; Baumgartner, C.; Kum, G.; Weigand, E.; Zweimüller, I.; Ward, J.V. (1999):** The Danube restoration project: Species diversity patterns across connectivity gradients in the floodplain system. *Regulated Rivers Research and Management* 15(1-3): 245-258. (in English).
["The relationship between hydrological connectivity and species diversity patterns (alpha and beta diversity) of macrophytes, molluscs, odonates and amphibians was investigated in a semi-natural floodplain segment in the 'Alluvial Zone National Park' of the Danube River in Austria. ..." (Authors)]
Address: Tockner, K., ETH Zurich, Swiss Inst. Environm. Sci. & Technol., Überlandstr 133, CH-8600 Dübendorf, Switzerland

778. **Troake, P. (1999):** Reports from Coastal Stations - 1998: Rye Harbour, East Sussex. *Atropos* 6: 51-53. (in English).
[*Sympetrum fonscolombeii*, *Anax parthenope*]
Address: not stated

779. **Tunmore, M. (1999):** Late Broad-bodied Chaser *Libellula depressa*. *Atropos* 6: 34-35. (in English).
[on 21 September 1998 (an immigrant) *L. depressa* was observed in Cornwall, UK.]
Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

780. **Tunmore, M. (1999):** Norfolk Hawker *Aeshna isosceles* record from the Breck district. *Atropos* 6: 33. (in English).
[it is not clear if the specimen observed was an immigrant, or was translocated with live stems of Common Reed (*Phragmites australis*) from a reedbed creation project.]
Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

781. **Tunmore, M. (1999):** Reports from Coastal Stations - 1998: The Lizard peninsula, Cornwall. *Atropos* 6: 48-49. (in English).
[remarkable immigrants are *Anax parthenope*, *A. ephippiger*, *A. junius*, and *Sympetrum fonscolombeii*]
Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

782. **Wasscher, M. (1999):** Identification of small Red-eyed damselfly *Erythromma viridulum* (Charp.). *Atropos* 7: 7-9. (in English).
["During the past few decades, numbers of Small Red-eyed Damselfly *Erythromma viridulum* have been increasing over large parts of continental north-western Europe. Perhaps this species has not yet crossed the channel, but it is possible that it has been overlooked in Britain. In this article some physical and behavioural characters are described which should help to separate this species from its close relative, the Red-eyed Damselfly *E. najas*. The spread of *E. viridulum* across The Netherlands is also examined." (Author)]
Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: wasscher@xs-4all.nl

783. **Whitehouse, S.M. (1999):** Red-veined darter *Sympetrum fonscolombeii* breeding in the Midlands. *Atropos* 6: 35-36. (in English).
[documentation of records in 1998 in the Midlands, UK]
Address: Whitehouse, S.M., 6 Skipton Crescent, Berkeley Pendlesham, Worcester WR4 0LG, UK

784. **Wildermuth, H. (1999):** Niche overlap, niche segregation and habitat selection in *Somatochlora arctica* (Zett.) and *S. alpestris* (Sel.) in Switzerland (Anisoptera: Corduliidae). *Anax*, Wien 2(1): 42. (in English).
[summary of a study from 90 localities with populations of *S. arctica*, and more than 300 localities with populations of *S. alpestris*]
Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland

785. **Willigalla, C. (1999):** Die Libellen im Kreis Warendorf - eine vorläufige Zusammenstellung. *Flora und Fauna im Kreis Warendorf - Beiträge zur Naturkunde* 9: 31-41. (in German).

[commented checklist of the dragonfly fauna of the county (Landkreis) Warendorf, Nordrhein-Westfalen, Germany]
Address: Willigalla, C., Brock 45, D-48346 Ostbevern, Germany

Odonatological Abstract Service

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786. **Andretzke, H.; Zöckler, C. (1997):** Reaktionen ausgewählter Faunengruppen (Libellen, Laufkäfer, Heuschrecken und Tagfalter) auf Flußrenaturierungsmaßnahmen an der Wümme. Bremer Beiträge für Naturkunde und Naturschutz 3: 129-142. (in German). [discussion of the positive effects of River (Wümme) restoration on Odonata; the abundance of the rare *Ophiogomphus cecilia* increased with the creation of suitable habitats, especially submerged sand-bars] Address: BIOS, Lindenstr. 40, D-27711 Osterholz-Scharmbeck, Germany
787. **Bechly, G. (1997):** Dragonflies from the Lower Cretaceous of Brazil. *Meganeura* 1: 27-28. Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany. E-mail: GBechly@aol.com
788. **Belle, J. (1997):** The genus *Lestes* (Odonata: Lestidae) Leach, 1815, in Surinam. *Zool. Meded.* 71 (11): 89-103. (in English). ["The species of *Lestes* from Surinam are treated. *L. basidens* spec. nov. (male holotype: Distr. Nickerie, Sipaliwini, near airstrip), *L. curvatus* spec. nov. (male holotype: Distr. Suriname, Coropina creek, Republiek), *L. edentatus* spec. nov. (male holotype: Distr. Marowijne, Nassau mountain range) and *L. trichonus* spec. nov. (female holotype: Distr. Nickerie, Sipaliwini, near airstrip) are described and illustrated. The types are deposited in the National Museum of Natural History, Leiden. *L. mediorufus* Calvert and *L. tenuatus* Rambur are illustrated and a lectotype for the latter species is designated. The holotype of *L. sublatus* Hagen in Selys is redescribed and illustrated. *L. forficula* Rambur, known from the surrounding countries of Surinam, is also illustrated. A key to the Surinam species of *Lestes* is provided." (Author)] Address: Belle, J., Onder de Beumkes 35, NL-6883 HC Velp, The Netherlands
789. **Hawking, J.H.; Smith, F.J. (1997):** Colour guide to invertebrates of Australian inland waters. Identification guide No. 8. Cooperative Research Centre for Freshwater Ecology, Ellis Street, Thurgoona, Albury, NSW 2640, Australia: 213 pp. (in English). [Odonata are exemplified on pages 88 to 106. The larvae of the following species are shown: *Ischnura aurora* Brauer 1865, *Rhadinosticta simplex* (Martin, 1901), *Austroargiolestes icteromelas* (Selys 1862), *Diphlebia lestoides* (Selys 1853), *Antipodogomphus neophytus* Fraser, 1958, *Austrogomphus ochraceus* (Selys, 1869), *Hemigomphus gouldii* (Selys 1854), *Ictinogomphus australis* (Selys 1873), *Hemianax papuensis* (Burmeister 1839), *Notoaeschna sagittata* (Martin 1901), *Austroaeschna inermis* Martin 1901, *Austrocordulia territoria* Theischinger & Watson, 1978, *Synthemis eustalacta* (Burmeister 1839), *Hemicordulia tau* Selys 1871, *Pentathemis membranulata* Karsch, 1890, *Austrothemis nigrescens* (Martin 1901), *Orthetrum caledonicum* (Brauer 1865), *Crocothemis nigrifrons* (Kirby 1894), *Pantala flavescens* (Fabricius 1798), *Austropetalia tonyana* Theischinger 1995] Address: Hawking, J.H., Murray-Darling Freshwater Research Centre, Cooperative Research Centre for Freshwater Ecology, P.O. Box 921, Albury, NSW 2640, Australia
790. **Karube, H. (1997):** A new record of *Agrionoptera sanguinolenta* Lieftinck from Japan. *Aeschna* 34: 1-4. (in Japanese, with English summary). ["An Eastern Carolinese dragonfly, *A. sanguinolenta*, was recorded from Haha-jima Island of Bonin Islands in 1989. This species is new to Japanese dragonfly fauna. Bonin Islands are about 2600 km far from Eastern Caroline Islands." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan
791. **Karube, H. (1997):** A new species of the genus *Oligoaeschna* (Odonata, Aeschnidae) from Sumatra. *Bull. Kanagawa prefect. Mus. (Nat. Sci.)* 26: 47-49. (in English, with Japanese summary). [*Oligoaeschna pseudosumatrana* n.sp. is described from Pini Island (west coast of Sumatra). It is closely related to *O. sumatrana* Lieftinck, 1953.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan
792. **Karube, H. (1997):** Research data of the dragonflies from Nakanoshima Island, Tokara Group, in 1989 and 1993. *Aeschna* 34: 25-28. (in Japanese, with English summary). [In 1989 and 1993, 12 species of Odonata were recorded. Prior 1981 23 Odonata were known from the Island (see Asahina, S., 1956, Odonata of the Ryukyu Archipelago, part II. Odonata from the island of the Tokara group. Publ. Osaka munic. Mus. nat. hist. 9: 23-26). Aquatic fauna including Odonata was heavily damaged by application of antisimulid and anticeratopogonid (anti Diptera) insecticides after 1981.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

793. **Krechel, R.; Scholz-Lambotte, S.A. (1997):** Beitrag zur Libellenfauna des Kreises Mettmann. Jber. naturwiss. Ver. Wuppertal 50: 133-148. (in German, with English summary). [Between 1993-1994 the dragonfly fauna from 46 representative biotopes within the district of Mettmann (Northrhine-Westphalia, Germany) has been investigated. In addition, a critical evaluation of scientific papers by others is provided. The list includes a total number of 44 species found in this century which can be attributed to the high diversity of suitable dragonfly habitats in the district. From the 44 species, 23 are listed as endangered within Northrhine-Westphalia. There were 4 species which were last seen prior to 1915 and therefore should be considered extinct in the district, due to the destruction of their preferred habitats. The frequency and distribution of the other dragonfly species of the district are discussed. According to an appendix to the paper, *Anaciaeschna isoceles* should be added to the list of the Odonata of district of Mettmann.] Address: Krechel, R., IVÖR, Volmerswerther Str. 80, D-4021 Düsseldorf, Germany
794. **Kucklentz, V.; von Brandt, I.; Bohl, E.; Singer, D. (1997):** Entwicklung von Biozönosen in einem neu-geschaffenen Stillgewässer bei Gut Deixfurt (Gemeinde Tutzing). Umwelt & Entwicklung Bayern, Materialien 133: 117 pp. (in German). [Documentation of the succession resp. colonisation of the fauna including Odonata in a waterbody created in 1989 for conservation purposes; 22 taxa (as imago or exuvia) are listed for the 1991-1994.] Source of supply: Bayerisches Staatsministerium für Landesentwicklung und Umweltfragen, Rosenkavalierplatz 2, D-81925 München, Germany
795. **Meyer, S.; Rahmel, U. (1997):** Flachwassersee "Polder Bramel" als Beitrag zur Revitalisierung der Geestniederung (Landkreis Cuxhaven). Bremer Beiträge für Naturkunde und Naturschutz 3: 93-101. (in German). [checklist of 9 Odonata from a newly flooded artificial lake (polder) along the course of the brook Geeste (Niedersachsen, Germany)] Address: Meyer & Rahmel GbR, Hasberger Dorfstr. 50, D-27751 Delmenhorst, Germany
796. **Mocek, B. (1997):** Dragonflies (Odonata) in the locality Hradec Králové, "Na Plachte" (eastern Bohemia, Czech Republic). Acta musei reginaehradecensis (A)25: 79-88. (in Czech, with English summary). [32 species are recorded including *Lestes barbarus*, *Somatochlora flavomaculata*, *Aeshna affinis*, *Ophiogomphus cecilia*, *Leucorrhinia dubia*, and *L. pectoralis*. The habitat is described and figured in detail in Mocek (1997): Results of the botanical and zoological researches in the locality Hradec Králové, "Na Plachte" (eastern Bohemia, Czech Republic), Acta musei reginaehradecensis (A)25: 3-20.] Address: Mocek, B., Regional Museum of Eastern Bohemia, Dept Natural History, Eliscino Nábřeží 465, CZ-50001 Hradec Králové, Czech Republic. E-mail: mvc@mvc.anet.cz
797. **Möckel, R. (1997):** Die Libellen der Calauer Schweiz mit "angeschlossenen Teichlandschaften". Natur und Landschaft in der Niederlausitz 18: 16-36. (in German). [commented checklist of Odonata of a brown coal mining region (Brandenburg, Germany) including habitats als high bogs, standing waters and brooks; 1993 and 1994 34 species could be recorded.] Address: Möckel, R., Buchwalder Str. 13, D-01968 Klein koschen, Germany
798. **Polhemus, D.A. (1997):** Phylogenetic Analysis of the Hawaiian Damselfly Genus *Megalagrion* (Odonata: Coenagrionidae): Implications for Biogeography, Ecology, and Conservation Biology. Pacific Science 51 (4): 395-412. (in English). ["A phylogeny of the 22 species currently recognized in the genus *Megalagrion*, endemic to the Hawaiian Islands, is presented based on an analysis of 23 morphological and ecological characters. After the exclusion of *M. williamsoni*, known from only a single male, and inclusion of subspecies within their nominate taxa, a single resolved tree of length 85 was obtained; this tree has a consistency index of 0.56 and a retention index of 0.72. Based on this phylogeny, it appears that the major clades within *Megalagrion* differentiated on Kaua'i or an antecedent high island. These clades subsequently colonized the younger islands in the chain in an independent and sequential fashion. The phylogeny also implies an ecological progression from ancestral breeding sites in ponds or slow stream pools to breeding on seeps, with the latter habitat having given rise on one hand to a clade of species breeding in phytotelmata or terrestrially, and on the other hand to a clade breeding in rushing midstream waters. The latter ecological progression also indicates a transformation series in larval gill structure from foliate to saccate and eventually to lanceolate. Most species of current conservation concern are shown to be clustered in particular clades, indicating an inherent phylogenetic vulnerability of certain taxon clusters to novel ecological perturbations; the additional species at risk not present in the above clades are endemics confined to the island of O'ahu and have declined because of their geographic provenance." (Author)] Address: Polhemus, D.A., Department of Entomology, MRC 105, National Museum of Natural History, Smithsonian Institution, Washington, D.C.20560, USA
799. **Samways, M.J.; Whiteley, G. (1997):** Dragonflies of the Natal Drakensberg. Univ. of Natal Press. ISBN 0 86980 476 6: 78 pp. (in English). [This is a field guide to the Odonata of the South African Drakensberg: Introduction, Odonate species of the Drakensberg, Guidelines for rapid identification of adult males, Key to adult males, Descriptions of adult males, Identification of larvae, Key to larvae, Descriptions of larvae, Plates. All species are treated in a monographic way. The reader will find a description of the adult, information on habitat, behaviour, distribution in the Drakensberg, remarks on species easily be misidentified, and a plate with a colour photo of each species.] Address: University of Natal Press, Private Bag Xo1, Scottsville, 3209 Natal, South Africa
800. **Scholle, J. (1997):** Die Makrozoobenthon-Entwicklung in einem neuangelegten Nebenarm der Wümme. Bremer Beiträge für Naturkunde und Naturschutz 3: 117-127. (in German). [development of the macrozoobenthos in a newly created tributary of the River Wümme (Bremen, Niedersachsen, Germany) between 1989 and 1994. 5 odonate taxa are listed; dominant species is *Calopteryx splendens*] Address: Scholle, J., Bioconsult Umweltplanung und Gewässerkunde, Lesumstr. 10, D-28759 Bremen, Germany
801. **Scholle, J.; Schuchardt, B. (1997):** Übersicht über die Benthon-Taxozönosen im limnischen Abschnitt der Unterweser und in seinen Zuflüssen. Bremer Beiträge für Naturkunde und Naturschutz 3: 7-24. (in German). [characterisation of the hydroecological situation,

and checklists of 18 Odonata from the lower course of the River Weser and its tributaries (Federal states Bremen and Niedersachsen, Germany)] Address: Scholle, J.; Schuchardt, B., Bioconsult Umweltplanung und Gewässerkunde, Lesumstr. 10, D-28759 Bremen, Germany

802. **Schoppenhorst, A.; Handke, U.; Carius, W.; Hellbernd, L. (1997):** Huchtinger Ochtum: Zwischenbilanz einer fünfjährigen Untersuchung über die Ansiedlungserfolge verschiedener Tiergruppen an einem neu angelegten Flußlauf in Bremen. Bremer Beiträge für Naturkunde und Naturschutz 3: 165-176. (in German). [documentation of the colonisation success of the odonate fauna along a new created river; tab, with records of 1990, 1992, and 1994 (species, abundance, habitat / locality); dominance of quite ubiquitous species as *Ischnura elegans*, *Orthetrum cancellatum*, *Sympetrum vulgatum*, and the taxa *Coenagrion puella/pulchellum*] Address: Schoppenhorst, A., ÖKOLOGIS, Ostertorsteinweg 25-26, D-28209 Bremen, Germany

803. **Siebeneicher, H.-W. (1997):** Labor- und Freilanduntersuchungen zur Biologie von *Libellula fulva* (Odonata: Libellulidae). Diplomarbeit. Heinrich-Heine-Universität Düsseldorf, Fachbereich Biologie: 62 pp. (in German). [survey of *L. fulva* in the Littardkuhle (Mittlere Niederheinische Tiefland, Nordrhein-Westfalen, Germany) in 1996; short description of the larval biotope and the emergence habitats; maturation period: approx. 15 days; documentation of the result of a mark-recapture-study; activity patterns along the shores of the Littardkuhle are documented for June 17, 1996; dispersal of the species is shortly outlined on page 28f; roosting sites of *L. fulva*; predation; copulation; oviposition; structure of eggshell; histology of eggs; structure of female and male genitalia.] Address: To obtain copies of this M. Sc. thesis, please contact Edgar Bairl, Neisser Str. 3, D-40880 Ratingen, Germany

804. **Trueman, J.W.H. (1997):** Wings over Wingecaribee. National Parks Journal, August 1997: 10, 11. (in English). [report on efforts for conservation of *Petalura gigantea* in Australia] Address: Trueman, J., Research School of Biol. Sciences, Australian National University, Canberra, ACT 0200, Australia. E-mail: trueman@rsbs.anu.edu.au

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805. **Bechly, G. (1998):** A revision of the fossil dragonfly genus *Urogomphus*, with description of a new species (Insecta: Odonata: Pananisoptera: Aeschniidae). Stuttgarter Beiträge zur Naturkunde Ser. B., 270: 1-47. (in English, with German summary). ["The dragonfly genus *Urogomphus* from the Upper Jurassic of Germany is revised and its position in Aeschniidae is confirmed. *Urogomphus giganteus* and *U. eximius* are redescribed, and a lectotype for *U. eximius* is designated. *Lithoaeschnidium viohli* is considered as a synonym of *U. eximius*. A new species *Urogomphus nusplingensis* n. sp. is described from the Upper Jurassic Lithographic Limestone of Nusplingen, while the 20 other known specimens of this genus have been found in the Solnhofen Lithographic Limestone. *Urogomphus abscissus* is considered as conspecific with *Bergeriaeschnidia inexpectata*, and the holotype of the latter species is designated as neotype of *U. abscissus*, so

that its valid name is now *Bergeriaeschnidia abscissa* comb. nov. The phylogenetic position of *Urogomphus* and Aeschniidae is discussed, a new taxon *Neoanisoptera* is introduced, and an explanation for the extinction of Aeschniidae is proposed." (Author)] Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany. E-mail: GBechly@aol.com

806. **Bechly, G. (1998):** *Juracordulia schiemenzi* gen. et sp. nov., Eine neue Libelle aus den Solnhofener Plattenkalken (Insecta: Odonata: Anisoptera). *Archaeopteryx* 16: 29-36. (in German, with English summary). [*J. schiemenzi* gen. et sp. nov. is described from the Solnhofen limestone (Upper Jurassic, Southern Germany). The analysis of the wing venation reveals that this new species belongs to the stem-group of *Eurypalpida* (Libelluloidea auct.). It is the first certain record of *Eurypalpida* from this locality and the first Jurassic and thus oldest record of this taxon at all.] Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany. E-mail: Gbechly@aol.com

807. **Bechly, G. (1998):** New fossil dragonflies from the Lower Cretaceous Crato Formation of north-east Brazil (Insecta: Odonata). *Stuttgarter Beiträge zur Naturkunde Ser. B*, 264: 1-66. (in English, with German summary). ["An overview of the fossil odonate fauna of the Crato Formation from the Lower Cretaceous of Brazil is given. Currently 351 specimens (241 adults and 110 larvae) in 12 families and 32 species are known to science. More than half of the adult and larval fossil odonates belong to the gomphid clade (= Gomphides), especially to the Cordulagomphinae which supports the hypothesis of an allochthonous origin of the aquatic insects. Six new species are described: *Araripegomphus andreli* n. sp. (Araripegomphidae), *Cordulagomphus (Procordulagomphus) stat. nov.* *senckenbergi* n. sp. (Proterogomphidae - Cordulagomphinae), *Araripephlebia mirabilis* n. gen. et n. sp. (Araripephlebiidae n. fam.), *Cratocordulia borschukewitzi* n. gen. et n. sp. (Araripephlebiidae), *Cretarchistigma (?) essweini* n. sp. (Zygoptera incertae sedis), and *Parahemiphlebia mickoleiti* n. sp. (Hemiphlebidae). With a wing length of only 9 mm the latter new species represents one of the smallest odonates of all times. *Araripephlebia mirabilis* n. gen. et n. sp. is classified in a new family Araripephlebiidae n. fam. which probably represents the sister-group of extant Chlorogomphoidea. A still unnamed new genus and species represents the first fossil record and the first New World record for Chlorogomphoidea s. str. Four further new species are illustrated, but not yet described. The phylogenetic relationship of several known species is discussed, and some diagnoses are amended or corrected. Giant dragonfly larvae of up to 70 mm length are described, regarded as older stages of *Nothomacromia sensibilis* (CARLE & WIGHTON, 1990), and considered as larval Aeschniidae. Consequently, the family-group taxa Sonidae PRITYKINA, 1986 and Nothomacromiidae CARLE, 1995 (= "Pseudomacromiidae" sensu CARLE & WIGHTON, 1990) are here regarded as junior subjective synonyms of Aeschniidae NEEDHAM, 1903. The position of Araripegomphidae in the stem-group of Gomphides rather than *Eurypalpida* (= Libelluloidea auct.) is advocated (contra LOHMANN 1996). The former genus *Procordu-*

lagomphus NEL & ESCUILLIÉ, 1994 is down-ranked to a subgenus of *Cordulagomphus*. "*Cordulagomphus*" *santanensis* CARLE & WIGHTON, 1990 is recognized as earwig and thus transferred from Odonata - *Cordulagomphinae* to *Dermaptera incertae sedis*. A comparison with the odonate fauna of the Upper Jurassic Solnhofen limestones reveals several remarkable differences. Because of the absence of typical Mesozoic odonate groups, such as "anisozygopteres", Archizygoptera and Steleopteridae, as well as the presence of extant families of Zygoptera, the odonate fauna of the Crato Formation appears to be significantly more advanced." (Author)] Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany. E-mail: GBechly@aol.com

808. **Bechly, G. (1998):** Santana - Die Schatzkammer fossiler Insekten aus der Unterkreide Brasiliens. Fossilien 2: 95-99. Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany. E-mail: GBechly@aol.com

809. **Bechly, G. (1998):** Santana - Die Schatzkammer fossiler Insekten aus der Unterkreide Brasiliens (2). Fossilien 3: 148-156. Address: Bechly, G., Institut und Museum für Geologie und Paläontologie, Geowissenschaftliche Fakultät der Eberhard-Karls-Universität, Sigwartstr. 10, D-72076 Tübingen, Germany. E-mail: GBechly@aol.com

810. **Bedjanic, M. (1998):** Pisanti svet kacjih pastirjev. GEA 7(2): 42-45, Poster in the middle of the issue. (in Slovene). [These is a popular account on the Slovene dragonfly fauna with many very intrusive, and first class colour pictures of some common and several rare European species. Of special interest for many odonatologists is the picture of *Cordulegaster heros*, a species obviously restricted to Slovenia, Greece and Austria. The Kushiro Appeal for protection of World Odonata is documented in Slovene language.] Address: GEA, Zivljenje sveta, Mladinska knjiga Založba, d.d. Slovenska 29, Ljubljana, Slovenia; Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

811. **Belle, J. (1998):** Synopsis of the neotropical genus *Rhodopygia* Kirby, 1889 (Odonata, Libellulidae). Zool. Meded., Leiden 72(1): 1-13. (in English). ["A synopsis of the genus *Rhodopygia* Kirby is given. Its species are discussed and their diagnostic morphological characters elucidated by figures. The hitherto unknown females of *R. hinei* Calvert and *R. pruinosa* Buchholz are described. A key to the species is provided." (Author)] Address: Belle, J., Onder de Beumkes 35, NL-6883 HC Velp, The Netherlands

812. **Brunelle, P.-M. (1998):** The status of *Somatochlora brevicincta* Robert 1954 (Odonata, Anisoptera, Cordulidae) in Nova Scotia. Report on study under a 1998 Nova Scotia Museum Research Grant. Unpubl. Report November 1998: 27 pp. (in English). ["*Somatochlora brevicincta*, the Quebec Emerald, is a rare Dragonfly of international conservation concern, IUCN 1996 Red List included, which had previously been known from a very limited range in mid-northern Quebec. Pilon and Lagace (1998) show 7 sites in Quebec for the species [...]. It

for the species [...]. It had recently been discovered to have been collected in the Cape Breton Island Highlands in the early 1980's, and in 1997 was taken in New Brunswick. The CBI range extension is approximately 1050 km, indicating both that the species has a substantially greater range than previously thought, and that it is very elusive throughout much of that range. In June of 1998 an abundant population of the species was found by Stuart Tingley at a small quaking bog on Highway 108 in mid-northern New Brunswick. This unexpected discovery indicated that our assumptions of habitat type and flight period, based upon knowledge of the species in Quebec, do not necessarily hold true for the Maritime Provinces. As a result, the sampling program undertaken by Brunelle in the summer of 1998 did not serve to address the habitat-specific characteristics of the species during what is now thought to be the appropriate season (June-July), although appropriate habitat was located which will assist in the search for breeding populations during 1999. Notwithstanding this, a female of the species was taken in Cumberland County in August. This collection is the furthest to the south that the species has yet been taken and the first record for the Nova Scotian mainland. In addition to its principal objective, the sampling program was intended to increase our knowledge of peatlands Dragonflies and Damselflies, and of general Odonate distribution in rarely-sampled areas of the province. A number of significant range extensions of species rare in the Province were discovered during the course of the work [...]. Due to the relatively low specific return of the survey, I have decided to present in this report detailed information on the overall distribution of the order in the Province. Such a review has not been done since Walker (1942), although general distribution was presented in Brunelle (1997). [...]. The report [...] is comprised of Section 1: Highlights of 1998 Survey Discoveries (*Somatochlora brevicincta*, *Aeshna subarctica*, *Enallagma aspersum*, *Aeshna sitchensis*, *Ophiogomphus aspersus*, *Somatochlora albicincta*, *S. incurvata*, *S. septentrionalis*, *S. tenebrosa*, *Nannothemis bella*, and *Pantala hymenaea* are treated in detail with colour picture of the species and habitats, and distribution maps), Section 2: Synthesis of Existing Knowledge: Figure 1: 186 Distribution Maps of Regional Odonata; Table 1: Distribution by County of Nova Scotian Odonata, and Table 2: Flight Periods of Nova Scotian Odonata." (Author). The study of P.-M. Brunelle was also funded by the INTERNATIONAL DRAGONFLY FUND.] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada

813. **Buczynski, P.; Kseniak, M.; Martysiuk, B.; Piotrowski, W.; Rózycki, A.; Słtys, M. (1998):** Poleski Park Narodowy. Przewodnik. Historia-Przyroda-Turystyka. ISBN 83-908003-7-3. To be ordered from: Wydawnictwo "Promotor", Ul. Zarnowiecka 7/42, Lublin, Poland: 64 pp. (in Polish). [booklet on the Narodow Park in eastern Poland; detailed information on flora and vegetation, and an overview on the fauna with some remarks on Odonata; many fine colour pictures of landscape, flora, fauna, and some typical buildings; information on the culture and traditional life of people in the region] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland

814. **Carbone, J.; Keller, W.; Griffiths, R.W. (1998):** Effects of changes in acidity on aquatic insects in rocky littoral habitats of lakes near Sudbury, Ontario. Resto-

ration ecology 6(4): 376-389. (in English). ["Benthic aquatic insects were collected from rocky nearshore areas (<1 m deep) of 17 lakes near Sudbury, Ontario, with a pH range of 4.7-7.3 and a size range of less than 10 ha to over 10,000 ha. These insect communities were composed of taxa common to lake soft-sediments and streams. Direct and indirect effects of lake acidity appeared to be major controls on the structure of these communities, implying that several factors may be involved in restructuring during acidification or recovery. Declines in abundances of several taxa of Ephemeroptera at pH below 5.5 were attributable to acid toxicity, while increases in the abundances of Odonata and Diptera at pH below 5.5 were associated with the absence of fish predators and other indirect effects of acidity. The communities of two experimentally neutralized lakes restructured rapidly within 5 years, approaching but not achieving community structures typical of our near-neutral survey lakes. Neutralization led to recolonization or increased abundance of the acid-sensitive mayfly, *Stenacron interpunctatum*, and the dragonfly, *Boyeria grafiana*; however, recolonization by other taxa expected to be present in near-neutral lakes (*Stenonema femoratum*, *Eurylophella*, and *Basiaesha janata*) was not observed. Consistent with results for the survey lakes, declines in the abundances of the dragonflies *Aeshna interrupta*, *Aeshna eremita*, and *Leucorrhinia glacialis* in the neutralized lakes were associated with reintroductions of *Salvelinus fontinalis* (aurora trout) and increased fish predation pressure, while reduced abundances of the dipterans *Ceratopogonidae*, *Psectrocladius*, and *Stackelbergina* may be related to indirect effects of acidity other than fish predation. Although community composition varied greatly across the acidity gradient, total species richness and abundance were not correlated with lake chemistry or number of fish species." (Authors)] Address: Carbone, J; Ontario Minist. Environm., Suite 1101,199 Larch St; Sudbury ON P3E 5P9; Canada

815. **Erjavcevic 6 (1998)**: Newsletter of the Slovene Odonatological Society, Ljubljana. ISSN 1409-8185: 36 pp. (in Slovene). [The issue contains a facsimile reproduction of the section "Odonata" and plates from I. A. Scopoli's 1763 *Entomologia carniolica*, 2 ethnographic notes (I. Geister, A. Saluinun), various reports, announcements and detailed descriptions of the 1999 research projects of the Society. Also included are the obituary-cum-bibliography for Dr Z.R. Adamovic, and an update of the Slovene odonatol. bibliography (Nos 233-246). (translation of the Slovene contents taken from OA 12261)] Address: Bedjanic, M., Fram 117/a, SI-2313 Fram

816. **Gorb, S. (1998)**: Functional morphology of the head arrester system in Odonata. *Zoologica* 148; ISBN 3-510-55035-8: 132 pp. [The arrester, a functional system which includes co-opted organs of neck and head, is an autapomorphy of Odonata. The publication contains the following topics: 1. Fixation systems in Arthropoda; 2. Neck-head articulation in Odonata and nomenclature of the neck sclerites; 3. Skeleton-muscle organization of the arrester system; 4. Inner morphology of the arrester; 5. Flight reflexes connected to the arrester system; 6. Sensory equipment of the arrester system; 7. Comparative morphology of characters of the arrester system (26 families); 8. Evolution of the arrester system. 132 pages, with 92 figures, 9 tables, and 2 appendices.] Address: Gorb, S., Max-Planck-Institut

für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

817. **Griffioen, R.H.W.; Uilhoorn, H.M.G. (1998)**: *Sympecma paedisca* (Brauer) in the Weerribben and the Kuinderplas. *Brachytron* 2(2): 35-43. (in Dutch, with English summary). ["Two populations of *Sympecma paedisca* [...] were discovered in 1997 and 1998 in the Weerribben (province of Overijssel) and the Kuinderplas (Flevoland). It was the first time in more than 20 years that populations of this species were found in the Netherlands. The populations are present in a lake created by sanding (Kuinderplas) and a lowland mire (the Weerribben). Similarities between the two Dutch locations are a forested environment and non-acidic, clear water with reed-beds. The reed-beds are characterised by an open vegetation structure and locally dead floating plant material. The fact that the species only survived here is somewhat surprising as both habitat-types were not mentioned in the Dutch literature as favoured habitats. In both areas neither groundwater nor water-level fluctuations play a major role. This is also in contrast with habitat information in foreign literature. The last two years *S. paedisca* was found from half August onwards into autumn. In the spring of 1998 the species was observed from the beginning of May until the beginning of June. Most reproductive activity took place during a warm spell in the beginning of May. The flight period in spring was later than expected on account of historical observations. The choice of substrate for oviposition was restricted, in both areas nearly only dead floating plant material was used (especially stalks of reed and reed-mace). The question why *S. paedisca* only survived here and its habitat requirements are discussed. The answer on the first question is rather speculative. Perhaps the acidification of the balks ('legakkers') and the intensity of haymaking during the summer are important factors. The habitat requirements are largely unclear. The Dutch populations survived under conditions which lacked elements that were thought to be essential. Minimal requirements for reproduction are non-acidic water which is available during the summer and is partly overgrown with water vegetation. For adult survival certain structural conditions must be met." (Authors)] Address: Griffioen, R., Uilhoorn, Karin, Trekker 82, NL-8447 BZ Heerenveen, The Netherlands. E-mail: uilhoorn@tip.nl

818. **Hardersen, S.; Wratten, S.D. (1998)**: The effects of carbaryl exposure of the penultimate larval instar of *Xanthocnemis zealandica* (Odonata: Zygoptera) on emergence and fluctuating asymmetry. *Ecotoxicology* 7: 1-8. (in English). ["The occurrence of pesticide residues in freshwater systems has become a concern in recent decades. In order to establish biomonitoring programs it is vital to investigate the response of organisms to varying concentrations of pesticides. Levels of pollutants fluctuate in freshwater systems and thus only some instars of aquatic insects may be exposed to pollution stress. Therefore it is important to investigate the effects of exposing selected instars of potential bioindicator species. In a laboratory experiment damselfly larvae of the penultimate instar were exposed to three concentrations of carbaryl (100 ppb, 10 ppb, 1 ppb) plus controls until the adult damselflies emerged. Carbaryl at 100 ppb reduced emergence by more than 90%. The lower carbaryl concentrations did not affect emergence success but increased the developmental speed slightly. The adult damselflies from the highest

concentration which did not affect emergence success (10 ppb) were analyzed for their level of fluctuating asymmetry (FA), deviation from bilateral symmetry, and compared with those from controls. The level of FA in cell patterns in wings was increased whereas the level of FA for wing length did not show any differences." (Authors)] Address: Hardersen, S., Lincoln Univ., Div. Plant Soil & Ecol. Sci., POB 84; Canterbury; New Zealand. E-mail: Framptoc@lincoln.ac.nz

819. **Kalkman, V.J.; Ketelaar, R.; Reemer, M. (1998):** Libellen van de Rode lijst in Gelderland. Rapportnummer VS98.23: 51 pp. (in Dutch). [detailed study of the dragonfly fauna of the Province Gelderland, The Netherlands. Each of the species listed in the Red list of extinct or endangered Odonata of the The Netherlands is outlined in detail. 24 species are mapped, their biotops are characterised, and the distribution in the The Netherlands and in the Province of Gelderland is discussed. In figure 2. the responsibility of the Province for the protection of 16 odonate species is shown. For example 100% of all Netherlands records of *Stylurus flavipes* or more than 25% of *Gomphus vulgatissimus* are resulting from Gelderland. In chapter 5 trends of population development of selected species are outlined. Chapter 6 presents the odonatological core habitats in the Province of Gelderland.] Address: De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen. E-mail: Vlinders@bos.nl

820. **Kannegieser, B. (1998):** Erhalt und Wiederherstellung wertvoller Landschaftsteile in den von Tagebaubetrieben beeinflussten Randbereichen und ihre Bedeutung für die Wiedernutzbarmachung. In: Pflug, W. (Hrsg.): Braunkohletagebau und Rekultivierung. Landschaftsökologie - Folgenutzung - Naturschutz. Springer. Berlin. Heidelberg. New York. ISBN 3-540-60092-2: 748-760. (in German). [report on problems and solutions of protection and restauration of natural and cultural heritage in the brown coal mining area in the region of Cottbus, Brandenburg, Germany. Some ubiquitous dragonflies are mentioned.] Address: not stated

821. **Karube, H. (1998):** A new species of the genus *Oligoaeschna* (Odonata, Aeschnidae) from northern India. Bull. Kanagawa prefect. Mus. (Nat. Sci.) 27: 81-83. (in English, with Japanese summary). [*Oligoaeschna speciosa* n. sp. is described from a male collected in Darjeeling, NE India on 20. VI.1993. It resembles to *O. martini* (Laidlaw, 1921)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

822. **Karube, H. (1998):** A new species of the genus *Oligoaeschna* (Odonata, Aeshnidae) from northern Vietnam. Gekkan-Mushi 330: 2-5. (in Japanese and English). [*Oligoaeschna niisatoi* n.sp. is described from a male collected on Mt. Piaoac, Cao Bang Province, North Vietnam in May 1998. It is considered related to *O. kashiana* from Khasia hills, NE India.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

823. **Karube, H. (1998):** [*Lestes japonicus* in Kanagawa Prefecture]. Kanagawa-Chūhō 122: 1-5. (in Japanese). Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

824. **Ketelaar, R.; & Wal, B.G. van der (1998):** Return and habitat preference of *Gomphus vulgatissimus* in the eastern part of The Netherlands. *Brachytron* 2(2): 44-51. (in Dutch, with English summary). ["At the beginning of the 20th century, *G. vulgatissimus* was a moderately common species in The Netherlands. A sudden decrease occurred and the last specimen in the eastern part of The Netherlands was seen in 1925. In 1994, *G. vulgatissimus* was rediscovered along the Buurserbeek. More new localities were found in subsequent years (Overijsselse Vecht, Dinkel, Berkel and Slinge). The population of the Buurserbeek is probably the largest in The Netherlands. *G. vulgatissimus* inhabits larger streams and rivers, with a relatively high temperature and low water velocity. Most populated streams are canalised. Previous conclusions of *G. vulgatissimus* being a species of natural streams must be rejected. It is concluded that the recent improvement of the water quality positively influenced the expansion, of the species. Furthermore, the possible but largely unknown influence of the recent warm summers is discussed." (Authors)] Address: Ketelaar, P., p/a De Vlinderstichting, Postb. 506, NL-6700 AM Wageningen, The Netherlands. E-mail: whydah@wxs.nl

825. **Kettrup, M. (1998):** Effizienzkontrolle im Gewässerrenaturierungsprogramm Nordrhein-Westfalen. *Berichte der Niedersächsischen Naturschutz Akademie* 11(1): 71-75. (in German). [In 1990 in Nordrhein-Westfalen, Germany a program was started to renature some watercourses and their floodplains. A monitoring program was also set up, to control the effects on biotic restoration of the measures undertaken. The improvement of habitat resp. substrate diversity had significant and positive effects on macrozoobenthos including Odonata. The abundance of *Calopteryx splendens*, *Platycnemis pennipes*, and *Gomphus vulgatissimus* in dependence of some habitat parameters is presented in a tab.] Address: Kettrup, M., LÖLB NRW, Leibnitzstr. 10, 45659 Recklinghausen, Germany

826. **Klaus, D. (1998):** Spezielle naturschutzfachliche Aspekte. In: Pflug, W. (Hrsg.): Braunkohletagebau und Rekultivierung. Landschaftsökologie - Folgenutzung - Naturschutz. Springer. Berlin. Heidelberg. New York. ISBN 3-540-60092-2: 900-915. (in German). [General outline on the importance of brown coal mining areas for nature conservation purposes. Odonatological data derived from literature are compiled in tab. 2.] Address: not stated

827. **Kleukers, R. M. J. C.; Reemer, M. (1998):** The return of the Yellow-legged Dragonfly [*Gomphus flavipes* (Charpentier)] to the Netherlands. *Brachytron* 2(2): 52-59. (in Dutch, with English summary). ["Until a few years ago *G. flavipes* was thought to be extinct in the Netherlands. The last records dated from 1902. The discovery of a larva of this species in the cooling-water filters of a powerstation in 1996 indicated that *G. flavipes* might have returned to the Netherlands. In 1998 more larvae were found at the powerstation and several fieldtrips were undertaken to confirm the return of the species. At eight localities along the river Waal (lower course of the Rhine) near Nijmegen in the eastern part of the Netherlands, teneral adults and/or exuviae were found. This proves that *G. flavipes* has returned as a breeding species in the Dutch riversystem. The recent return of *G. flavipes* corresponds with the expansion in Germany. The causes of the expansion are not clear. In

search for *G. flavipes* along the river Waal, several e-xuviae of *G. vulgatissimus* were found as well. This species had also not been recorded in large Dutch rivers for a long time." (Authors)] Address: R. Kleukers & M. Reemer, p/a European Invertebrate Survey - Nederland Postbus 9517 2300 RA Leiden. E-mail: kleukers@naturalis.nnm.nl

828. **Krummsdorf, A.; Höser, N.; Sykora, W. (1998):** Naturschutzgebiet Tagebau Zechau im Kreis Altenburg in Thüringen. In: Pflug, W. (Hrsg.): Braunkohletagebau und Rekultivierung. Landschaftsökologie - Folgenutzung - Naturschutz. Springer. Berlin. Heidelberg. New York. ISBN 3-540-60092-2: 916-925. (in German). [Historical account of the development of a brown coal mining field to a nature conservation reserve near Altenburg, Thuringia, Germany. The development of the odonate fauna (31 species) according to the status of succession of vegetation is documented in a tab. comprising the years 1980 (2 species recorded) to 1993 (25 species recorded).] Address: not stated

829. **Lackmann, A. (1998):** Vergleichende limnologische Untersuchungen dreier Tagebauseen unter Berücksichtigung des Artenschutzaspektes. In: Pflug, W. (Hrsg.): Braunkohletagebau und Rekultivierung. Landschaftsökologie - Folgenutzung - Naturschutz. Springer. Berlin. Heidelberg. New York. ISBN 3-540-60092-2: 379-396. (in German). [Between March 1990 and March 1991 three brown coal mining areas southwest of Cologne, Germany were limnologically surveyed. Task of the study was to assess the nature conservation value of the waters. 26 species of Odonata were recorded and arranged in a tab. according to their relationships to different types of vegetation. Of some faunistic interest are *Cercion lindenii*, *Ischnura pumilio*, *Brachytron pratense*, and *Somatochlora flavomaculata*.] Address: not stated

830. **Laurila, A.; Kujasalo, J.; Ranta, E. (1998):** Predator-induced changes in life history in two anuran tadpoles: effects of predator diet. *Oikos* 83(2): 307-317. (in English). ["We studied effects of the non-lethal presence of a predator on behaviour and larval life history of two species of anuran tadpoles, common frog, *Rana temporaria*, and common toad, *Bufo bufo*. ... Tadpoles of both species were raised at two food levels either in the absence of the predator or in the presence of an insect-, frog- or toad-fed larval dragonfly *Aeshna juncea*." (Authors)] Address: Laurila, A., Univ. Helsinki, Dept. Ecol. and Systemat., Div. Populat. Biol., POB 17, FIN-00014 Helsinki, Finland

831. **Maine damselfly and dragonfly survey (Brunelle, P.) (1998):** The Maine damselfly and dragonfly survey. Leaflet/poster: (in English). [This is a poster with colour illustrations throughout with the aim to help with the identification of some major groups of Maine Odonata.] Address: MDDS, Endangered Species Group, Maine Inland Fisheries and Wildlife, 650 State Street, Bangor, Maine 04401, USA

832. **Marin, S.L.; Grant, W.E.; Dronen, N.O. (1998):** Simulation of population dynamics of the parasite *Haematoloechus coloradensis* in its three host species: effects of environmental temperature and precipitation. *Ecological Modelling* 105(2-3): 185-211. (in English). [We describe the development and evaluation of a simulation model representing the life cycle of the parasite

Haematoloechus coloradensis, and use this model to examine effects of variation in temperature and precipitation on parasite population dynamics. The model consists of four submodels representing: (1) dynamics of parasite eggs in the environment; and infection, parasite development within, and resulting population dynamics of (2) snail, (3) odonate, and (4) frog hosts.] Address: Grant, W.E., Texas A&M Univ., Dept. Wildlife and Fisheries Sci., College STN, TX 77843, USA

833. **Mocek, B. (1998):** Contribution to the knowledge of the dragonflies (Odonata) in Eastern Bohemia with the finding of the species *Crocothemis erythraea* (Brullé). *Acta Musei Reginaeairadecensis* (A) 26: 27-37. (in Czech, with English summary). [16 rare Bohemian species (*Lestes barbarus*, *L. virens*, *Coenagrion hastulatum*, *Erythromma viridulum*, *Aeshna affinis*, *Anax ephippiger*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Thecagaster bidentata*, *Somatochlora alpestris*, *S. flavomaculata*, *Crocothemis erythraea*, *Sympetrum striolatum*, *Leucorrhinia dubia*, *L. pectoralis*) are treated in detail. *C. erythraea* is recorded for the second time in Bohemia.] Address: Mocek, B., Regional Museum of Eastern Bohemia, Dept Natural History, Eliscino Nábřeží 465, CZ-50001 Hradec Králové, Czech Republic. E-mail: mvc@mvc.anet.cz

834. **Moravec, F.; Skorikova, B. (1998):** Amphibians and larvae of aquatic insects as new paratenic hosts of *Anguillicola crassus* (Nematoda: Dracunculoidea), a swimbladder parasite of eels. *Diseases of aquatic organisms* 34(3): 217-222. (in English). ["Amphibians (tadpoles of the frog *Bombina orientalis* [L.] and the new *Triturus vulgaris* [L.]) and aquatic insects (larvae of the alderfly *Sialis lutaria* [L.] [Megaloptera], dragonflies *Sympetrum sanguineum* [Muller] and *Coenagrion puella* [L.] [Odonata], and the caddisfly *Oligotrichia striati* [L.] [Trichoptera]) were found to serve as paratenic hosts for the third-stage larvae (L-3) Of the nematode *Anguillicola crassus* Kuwahara, Niimi et Itagaki, 1974, a pathogenic swimbladder parasite of the eel *Anguilla anguilla* (L.) in Europe and elsewhere. This is the first evidence that, in addition to prey fishes and some aquatic snails, amphibians and aquatic insects can serve as paratenic hosts for this nematode parasite. A. crassus third-stage larvae were found, largely unencapsulated (encapsulated only in *S. lutaria*), mostly in the body cavity, on the gut surface and, less often, in the liver and in the subcutaneous tissue of legs in amphibians, and in the body cavity and on the gut surface in insect larvae; they could survive for at least 49 d in *T. vulgaris* and 69 d in *S. lutaria*. The capability of these larvae from *S. lutaria* (69 d post-infection) to infect the definitive host (eel) was confirmed by experimental infection of an eel." (Authors)] Address: Moravec, F., Acad. Sci. Czech Republic, Inst. Parasitol., Branisovska 31, CR-37005 Ceske Budejovice; Czech Republic. E-mail: moravec@paru.cas.cz

835. **Mostert, K. (1998):** Dragonflies (Odonata) in the agricultural landscape of South Holland. *Levende Natuur* 99(4): 142-149. (in Dutch, with English summary). ["Between 1994-1997 information on numbers and distribution of dragonflies was systematically collected in the province South Holland. Dragonflies were counted throughout summer in linear transects with a length of 50 m along various water bodies, after which numbers were extrapolated to the number of individuals per kilometer (table 2); all flying and resting dragonflies a-

long the neighbouring half of the water were included. Habitats were divided in meadows, arable land, nature reserves, recreational areas and urban areas (table 3). Water transparency was noted in six classes (varying from very turbid to very clear), width of the water was noted in four classes (table 1). Transects were randomly selected and are representative of the area. Only eight species made up 98% of the total number of individuals sighted. In 40% of the transects with Dragonflies the Blue-tailed Damselfly (*Ischnura elegans*) was the only species recorded. Numbers and densities of dragonflies in nature reserves were five times higher than those in areas with arable land and meadows; species variety was also much higher in nature areas than anywhere else. Furthermore, numbers near watercourses in urban areas were higher on average than those in agricultural areas. Numbers as well as densities are higher above water with high transparency. Moreover wide edge of vegetation and numbers of dragonflies are strongly correlated. Lowest densities were found near water with duck-weed (*Lemnaceae* and *Azolla filiculoides*) and, although less obvious, with sheetpiling. Numbers at eutrophic water are comparably low. It is concluded that small nature reserves created in agricultural areas will be beneficial for numbers and densities of dragonflies as well as for species diversity, as preliminary results have already shown." (Author)] Address: Mostert, K., Palamedesstraat 74, 2612 XS Delft, The Netherlands

836. **Nachtigall, W.; Kesel, A.; Kreuz, P. (1998):** The dragonfly wing as a static construction: bending by aerodynamic forces (Odonata: Anisoptera). *Entomologia Generalis* 23(1-2): 139-148. ["Using a high speed shutter camcorder changes of shape (twisting, camber and especially bending) of the wings of *Aeshna cyanea* [Müller 1764] and *Sympetrum vulgatum* [Linné 1758] were recorded in a natural environment during hovering, acceleration from hovering and fast vertical starting from a watching position. ... The nodus is an element that allows for a certain local bending between the distal and basal wing part. It is working even at lower aerodynamical loading. Its morphology is functionally interpreted. Wing bending is simulated with Finite Element calculations and compared to the field observations."] Address: Nachtigall, W., Univ. Saarland, Inst. Zool., D-66041 Saarbrücken, Germany

837. **Novelo-Gutiérrez, R.; Ramírez, A. (1998):** The larva of *Macrothemis inacuta* (Odonata: Libellulidae). *Entomol. news* 109(5): 301-306. (in English). ["A detailed description and illustrations of the larva of *Macrothemis inacuta* are provided. Larva is similar to *M. celeno* but can be distinguished by stouter movable hook, and larger lateral spines and dorsal protuberances on abdominal segments 8-9. Larvae were found living in lentic environments, in muddy areas close to the shore, where emerging and floating vegetation was present." (Authors)] Address: Ramírez, A., Inst. of Ecol., Univ. Georgia, Athens GA 30602, USA. E-mail: aramirez@arches.uga.cc.uga.edu

838. **Nowak, H. (1998):** Nach Sülldorf ins Sülzetal. Wanderungen in ein salziges Land. Available free of charge from: Bördekreis, Postfach 1229, D-39382 Oschersleben. 57 pp. (in German). [Detailed account on the natural history of a region in Sachsen-Anhalt, Germany with a halophile flora and fauna. *Lestes barbarus*

is the only Odonata mentioned in the booklet, said to be characteristic for the habitats with halophile vegetation.]

839. **O'Brien, M.F.; Pratt, P.D (1998):** *Enallagma anna*, a damselfly new to the Great Lakes region (Odonata: Coenagrionidae). *Great Lakes Entomologist* 31(3-4): 211-213. (in English). ["*E. anna*, a predominantly western North America damselfly, is now recorded from southwestern Michigan and southwestern Ontario for the first time." (Authors)] Address: O'Brien, M.F., Univ Michigan, Museum Zool, Ann Arbor, MI 48109, USA . E-mail: O'Brien: mfobrien@umich.edu; Pratt: prairie@net-core.ca

840. **Olias, M.; Serbedija, M. (1998):** Zur Faunistik und Ökologie der Libellen der Kvarner-Insel Krk (Kroatien). Diplomarbeit am Fachbereich 2 "Landschaftsnutzung und Naturschutz" der Fachhochschule Eberswalde: 148 pp, 2 Anhänge. (in German). [This is a very sound M.Sc.-thesis on the Odonata of the Island of Krk, Croatia. In 1997 and 1998, 45 water bodies were surveyed for Odonata. Each of these water bodies is described and mapped in detail (Annex 1). Prior to 1997, 27 taxa were known from published or personally communicated data (documented in tab. 3). 14 species could be traced for the first time after March 1997. Three species (*Coenagrion ornatum*, *Orthetrum albistylum*, *Selysiotthemis nigra*) remain without present-day record. Expressed as presence on a water body, the rarity of the species is shown in fig. 12. In Chapter 7 dragonfly zoenoses are worked out. Chapter 8 (species monographs) contains very interesting details on the odonate fauna of Krk: Distribution in Croatia and on the Island of Krk, phenology, ecology/biology, and in the cases of *Calopteryx splendens*, *Chalcolestes viridis* / *C. parvidens*, *Onychogomphus forcipatus*, *Somatochlora meridionalis*, and *Orthetrum coerulescens* / *O. anceps* remarks on taxonomic and morphological problems. Of special interest is the documentation of hybrids between *C. viridis* and *C. parvidens*. In a final chapter the water bodies are assessed for nature conservation purposes. Annex 2 provides distribution maps of all species on the Island of Krk.] Address: Olias, M., Schönberger Str. 51, D-08393 Meerane, Germany

841. **Pathak, S.C. (1998):** Insect trappings in Arabian Sea with special reference to west coast of India. *Indian Journal of Marine Sciences* 27(3-4): 482-485. (in English). ["Live and dead insects were collected during cruise # 238 of Research Vessel Gaveshani during October-November 1993. ... Odonata was represented by 11 specimens of a single species *Pantala flavescens* Fabr. which not only remained hovering over the Ship throughout the cruise, it also showed the peculiar behaviour of flying along side the country boats that ferried the scientists between various islands in the Lakshadweep group and the mother ship."] Address: Pathak, S.C., Rani Durgavati Univ, Dept Biol Sci, Jabalpur 482001, India

842. **Pavey, C.R.; Burwell, C.J. (1998):** Predation on diurnal insects by the eastern horseshoe bat, *Rhinolophus megaphyllus* Gray (Chiroptera: Rhinolophidae). *Memoirs of the Queensland Museum* 42(2): 555-558. (in English). ["Insectivorous bats exhibit crepuscular activity despite being very vulnerable to predation by diurnal birds at such times. ... This study established that the Eastern Horseshoe Bat, *Rhinolophus megaphyllus*, captured diurnal insects from three orders; butterflies

(Lepidoptera), dragonflies (Odonata) and cicadas (Hemiptera), during crepuscular activity." Address: Pavey, C.R. 64 Arafura Street, Upper Mt. Gravatt, Queensland 4122, Australia

843. **Pavlyuk, R. (1998):** Eine Bestandsaufnahme der Parasitenfauna der Odonaten in der Ukraine (Odonata; - Sporozoa, Trematoda, Cestoda, Nematoda, Acari). Opusc. zool. flumin. 164: 1-23. (in German, with English summary). ["An annotated review is presented of the parasite fauna, identified during 1965-1992 in 18160 adult and 500 immature Zygoptera and Anisoptera individuals. The extent, the average and the maximal intensity of infestation are stilled, and host specificity is tentatively indicated, where appropriate. The endoparasitic Gregarinidae (Sporozoa) and the ectoparasitic Arrenuridae (Acari) seem to be rather peculiar to certain odonate groups, while the host-parasite specificity appears poorly developed in the 5 evidenced families of the endoparasitic Trematoda." (Author)] Address: Pavlyuk, R., Zoologisches Museum, Biologische Fakultät, Staatsuniversität Lwow, ul. Grushevskogo 4, UKR-290005 Lwow, Ukraine

844. **Petranka, J.; Hayes, L. (1998):** Chemically mediated avoidance of a predatory odonate (*Anax junius*) by American toad (*Bufo americanus*) and wood frog (*Rana sylvatica*) tadpoles. Behavioral Ecology and Sociobiology 42(4): 263-271. ["We examined behavioural responses of wood frog (*Rana sylvatica*) and American toad (*Bufo americanus*) tadpoles to both direct and indirect chemical signals associated with a predatory odonate (*Anax junius*). In laboratory trials, tadpoles of both species responded strongly to water conditioned with *Anax* nymphs by decreasing foraging rates, becoming immobile, and moving away from the stimulus. ... In a field experiment, the responses of *R. sylvatica* tadpoles to *Anax* chemicals were similar to those of tadpoles observed in the laboratory. Collectively, our data indicate that tadpoles of both species use chemical cues to assess predation risk from other community members."] Address: Petranka, J.: Dept. Biol., Univ. N.C., Asheville, NC 28804-3299, USA

845. **Pratt, P.D.; Catling, P.M. (1998):** Distribution of *Hetaerina titia* (Odonata: Calopterygidae) in the eastern Great Lakes region. Great Lakes Entomologist 31(3-4): 205-208. (in English). ["The lower Thames and Sydenham Rivers in southwestern Ontario have well established populations of *Hetaerina titia* that represent the northern range limit of the species. Although first discovered in 1985, these populations are not necessarily recently established. Adults appear from mid-August to early September and are most often seen around trees and shrubs overhanging moving water." (Authors)] Address: Pratt, P.D., 7100 Matchette Rd, LaSalle, ON N9J 2S3, Canada

846. **Robert, V.; Awono Ambene, H.P.; Thioulouse, J. (1998):** Ecology of larval mosquitoes, with special reference to *Anopheles arabiensis* (Diptera: Culicidae) in market-garden wells in urban Dakar, Senegal. Journal of Medical Entomology 35(6): 948-955. (in English). ["The urban area of Dakar, Senegal, contains >5,000 market-garden wells that provide permanent sites for mosquito larvae, in particular *Anopheles arabiensis* Patton, the major vector of malaria. ... To identify factors that determine the abundance of larvae in these wells, a co-inertia (multivariate) analysis was carried out. ...

The conditions associated with abundant *An. arabiensis* were warm temperature (28 - 30°C), clear and not too deep water (<0.5 m), elevated concentrations of HCO₃⁻ and CO₃²⁻, low concentrations of NO₃⁻ and NaCl low populations of larvivorous fish and invertebrate predators (notably odonates), the presence of water lettuce, and an absence of *Lemna*."] Address: Robert, V., O.R.S.T.O.M., Lab. Paludol, POB 1386, Dakar, Senegal

847. **Rothmund, D.; Hahn, U.; Zintz, K. (1998):** Untersuchungen der Libellenfauna eines württembergischen Hochwasserrückhaltebeckens (Herrenbachsee, Landkreis Göppingen). Wasserwirtschaft 88(6): 290-296. (in German, with English summary). [Between 1992 and 1996, 20 dragonfly species were observed at Lake Herrenbach (near Göppingen, Baden-Württemberg, SW-Germany). Twelve species are autochthonous, including two species listed in the regional "Red Data Book". Six of the species are classified as common species, four as pioneer species, and two prefer lakes with surrounding bushes and trees. Only seven of the 20 species observed between 1992 and 1996 could be observed in every year. Only one species reproduces every year. The odonate fauna was not negatively affected by draining and mud clearing of the reservoir. "Lake Herrenbach is not very important for the conservation of the dragonfly fauna, but it may serve as a resting place or a stepping stone habitat."] Address: Rothmund, D., R.-Mayer-Str. 20, D-73765 Neuhausen Germany

848. **Roush, S.A.; Bumbarger, D.J. (1998):** Odonata of the Beaver Creek Wetlands, Greene County, Ohio: A preliminary survey. Ohio Journal of Science 98(3): 59-60. (in English). ["A species list for the wetlands was built and data were entered into the Ohio Odonate Survey database. Thirty-six species (22 Anisoptera; 15 Zygoptera) were collected including 11 new county records bringing the Greene county list from 43 to 54."] Address: Roush, S.A., Wright State Univ., Dept Biol. Sci. Dayton, OH 45435, USA

849. Rudolph, R. (1998): Südliche Libellenarten in Westfalen. Natur- und Landschaftskunde 34: 114-116. (in German). [generell discussion of range extensions of southern species; detailed discussion of distribution patterns in Westphalia, and range extensions of *Erythromma viridulum*, *Anax parthenope*, *Cercion lindenii*, *Gomphus pulchellus*, *Aeshna affinis*, *Crocothemis erythraea*, *Sympetrum pedemontanum*, and others.] Address: Rudolph, R., Zum Emstal 12b, D-48231 Warendorf, Germany

850. **Russell, R.W.; May, M.L.; Soltesz, K.L.; Fitzpatrick, J.W. (1998):** Massive swarm migrations of dragonflies (Odonata) in eastern North America. American Midland Naturalist 140(2): 325-342. ["We describe massive autumn migrations of dragonflies (Odonata) which occurred at Chicago, Illinois (14 September 1978), Cape May, New Jersey (11 September 1992), and Crescent Beach, Florida (3-5 September 1993). Estimated numbers of migrant dragonflies involved in these flights were approximately 1.2 million, >400,000, and 200,000, respectively. ..."] Address: Russell, R.W., Louisiana State Univ., Museum Nat. Sci., 119 Foster Hall, Baton Rouge, LA 70803, USA

851. **Salmah, M.R.C.; Hassan, S.T.S.; Abu-Hassan, A.; Ali, A.B. (1998):** Influence of physical and chemical factors on the larval abundance of *Neurothemis tullia* (Drury) (Odonata : Libellulidae) in a rain fed rice field. *Hydrobiologia* 389: 193-202. (in English). ["The influence of physical and chemical factors such as pH, temperature, conductivity, dissolved oxygen, nitrate, phosphate and chlorophyll a on larval populations of *Neurothemis tullia* (Drury) (Odonata:Libellulidae) were studied in a rain-fed rice field by collecting larvae and water samples weekly over two seasons of rice planting. Water availability was the main factor determining the presence or absence of larvae in the rice field. The larvae were most abundant during extended periods of continuously plentiful water supply except during flooding. Rapid larval population build-ups were observed soon after chemical applications or spells of dry periods reflecting continual oviposition and hatching of eggs. Pesticides and fertilizer applications resulted in low population densities due to direct or indirect mortality. A stepwise multiple regression showed that within its range, none of the physical and chemical factors measured in this study affected the abundance of *N. tullia*." (Authors)] Address: Salmah, M.R.C., Univ. Sains Malaysia; School Biol. Sci., Minden 11800; Penang; Malaysia

852. **Schorr, M. (1998):** Flußauenlibellen der Mosel und ihre Indikatorfunktion. Aut- und Ethoökologie ausgewählter Arten. Gutachten der Faunistisch-Ökologischen Arbeitsgemeinschaft, Trier im Auftrag der Bundesanstalt für Gewässerkunde / Ref. U3 (Tierökologie), Koblenz. 132 pp. (in German). [detailed compilation of literature data on *Ophiogomphus cecilia*, *Gomphus vulgatissimus*, *Stylurus flavipes*, *Calopteryx splendens*, *Cercion lindenii*, *Erythromma najas*, *Coenagrion mercuriale*, *Orthetrum brunneum*, and *Leucorrhinia caudalis* (larvae and imago); all species are treated according to the following items: Regional Distribution, (potential) occurrence in the River Mosel (Rheinland-Pfalz, Germany), general characterisation of the habitat, aut- and ethoecology of the species, threats, quite extensive bibliography; this compilation is based in most cases on unpublished theses, and provides detailed and unpublished observations; the bibliography comprises 1759 titles; available for DM 30,- plus shipping from the author] Address: IDF, c/o Martin Schorr, Waldfrieden 25, D-54314 Zerf, Germany

853. **Sonnenburg, H.; Dense, C. (1998):** Die Gebänderte Heidelibelle *Sympetrum pedemontanum* (ALLIONI, 1766) in Nordwest-Deutschland - Stand der Ausbreitung und Beschreibung neuer Fortpflanzungsgewässer (Odonata, Libellulidae). *Mitt. ArbGem. ostwestf.-lipp. Ent.* 14(3): 63-80. (in German, with English summary). ["The present distribution of *Sympetrum pedemontanum* (ALLIONI) in western Lower Saxony and the adjacent parts of Westphalia is described and mapped. The spatial and temporal process of the species' spreading is analysed. It is pointed out that the new records in the western part of the discussed area can obviously be traced back to populations in eastern Lower Saxony and the northern part of Westphalia, which were established in the seventies and eighties." The northwesternmost records are from Zeeland (The Netherlands).] Address: Dense, C., Süsterstr. 20, D-49074 Osnabrück, Germany

854. **Spedding, G.R.; Lissaman, P.B.S. (1998):** Technical aspects of microscale flight systems. *Journal*

of avian biology 29(4): 458-468. (in English). ["Micro Air Vehicles (MAVs) have excellent potential utility as flight platforms for optical, acoustic, electronic and chemical sensors for operation in hazardous sites with aerial access. The dimensions and performance specifications call for a 100 g take-off mass with 100-200 mm wingspan that must fly at 5-20 m/s for approximately 30 minutes. Owing to the low operating Reynolds number (Re), the aerodynamic performance of all lifting surfaces is degraded. The small scales and speeds also mean that atmospheric turbulence has a severe effect, and small thermal cycle engines that could profit from the high energy densities of fossil fuels are unavailable. It is thus difficult to obtain good performance. Studies have been made of vying plus propeller systems, rotor systems and napping wing systems. In all cases, L/D is in the range of 5-10. Flapping is about as efficient as propeller motion at this Re , but more complicated mechanically. The ThrustWing is a configuration derivative of the dragonfly, with characteristics lying between a helicopter and an ornithopter. It has both zero and forward flight capabilities, and appears to have good potential as a MAV configuration. Finally, the effects of atmospheric turbulence are described and shown to fall into four qualitatively different categories as turbulence intensity increases. Due to favourable scaling, the stresses in MAVs will be very low, and although turbulence will cause large G loads on the MAV, no structural damage will result." (Authors)] Address: Spedding, G.R., Univ. So. Calif., Dept Aerosp. Engrg, Los Angeles CA 90089 USA. E-mail: Geoff@ostrich.usc.edu

855. **Tani, J.; Qiu, J.; Yamaguchi, E (1998):** Emergence of the rhythmic movement of a dragonfly wing model. *ISME international journal series (C), Mechanical systems, machine elements and manufacturing* 41(4): 689-694. (in English). ["Living things have the ability to adapt themselves to various environmental conditions and keep the whole system functioning even if a part of it is out of order. Recently, biological systems of living things which can be modeled as autonomous distributed systems have become the focus of attention. In this paper the modeling of the rhythmic movement generating mechanism of dragonfly wings using nonlinear oscillators is described. A wing is approximately modeled as a 1-DOF or 2-DOF beam and the equations of motion are derived. The central pattern generators (CPG) which generate the rhythmic movement of wings are modeled as a set of Van der Pol nonlinear oscillators. By solving the equations of motion of the wing and the equations of oscillators simultaneously, the rhythmic movement of a dragonfly wing model is obtained. The synchronization of multiple wings is obtained by the interconnection of oscillators. It is found that various autonomous vibrations of dragonfly wings can be reproduced using this model." (Authors)] Address: Tani, J., Tohoku Univ., Inst. Fluid Sci., Katahira 2-1-1; Sendai; Miyagi 9808577; Japan

856. **Van Buskirk, J.; Relyea, R.A (1998):** Selection for phenotypic plasticity in *Rana sylvatica* tadpoles. *Biological Journal of the Linnean Society* 65(3): 301-328. (in English). ["First we reared tadpoles in artificial ponds for 18 days, in either the presence or absence of *Anax* dragonfly larvae (confined within cages to prevent them from killing the tadpoles). These conditioning treatments produced dramatic differences in size and shape: tadpoles from ponds with predators were smaller and had relatively short bodies and deep tail fins. We

estimated selection by *Anax* on the two kinds of tadpoles by testing for non-random mortality in overnight predation trials. Dragonflies imposed strong selection by preferentially killing individuals with relatively shallow and short tail fins, and narrow tail muscles. ... These results indicate that selection is currently promoting morphological plasticity in *R. sylvatica*, and support the hypothesis that plasticity represents an adaptation to variable predator environments."] Address: Van Buskirk, J., Univ. Zürich, Inst. Zool., Winterthurerstr 190., CH-8057 Zürich, Switzerland. E-mail: Van Buskirk, J.: jvb@zool.unizh.ch

857. **Wasscher M. (1998):** The Green Darner (*Anax junius*) in England; a new dragonfly species for Europe. *Brachytron* 2(2): 60-62. (in Dutch, with English summary). ["The sightings of *A. junius* in southwestern Great Britain in September 1998 are discussed in the light of weather influences, earlier sightings of Nearctic Odonata in Europe and the prospects for the species in The Netherlands. For this purpose the identification of *A. junius* in comparison with *A. imperator* is clarified and illustrated." (Author)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

858. **Yoshida, M.; Yagi, T; Odonatological Society of Osaka (1998):** Dragonflies and Damselflies (Insecta: Odonata) of Shiga Prefecture, Honshu, Japan. Research Report of the Lake Biwa Museum 10: 284 pp. [Verbatim: Summary Outline of the study: Dragonflies and damselflies (Insecta: Odonata) were collected from Shiga Prefecture, western Honshu, Japan, at ca. 3,000 stations on ca. 700 days from 1985 through 1997 (total: ca. 30,000 occurrence records), mostly by the members of the Odonatological Society of Osaka. Number of species: From Shiga Prefecture 98 species of Odonata are recorded. This figure is one of the highest among Japanese prefectures. The mean number of species found in each of the 50 "Shi-Cho-Son" (city, town or village) districts in Shiga Prefecture is 70. This figure is higher than in any other Japanese prefecture. The number of Odonata species recorded from Otsu-shi is 96, the highest figure in all the Japanese Shi-Cho-Son districts. The reasons for the high species diversity: The great range of freshwater environments including Lake Biwa, rivers flowing into the lake, lakeside ponds etc. is certainly the most important reason for the high species diversity of Odonata in Shiga Prefecture. Another factor may be the low density of human population in Shiga in comparison with the Kyoto-Osaka-Kobe District. Distribution pattern: Distribution patterns of Odonata species in Shiga Prefecture may be classified into five types: a1) inhabiting all or most areas of Shiga, a2) inhabiting Lake Biwa and the lakeside, b1) temporary occurrence by overseas dispersal from the south, b2) temporary occurrence by overseas dispersal from the north and b3) other patterns of temporary occurrence. Distribution of rare species: Rare species of Odonata in lentic habitats of Shiga Prefecture are *Ceriagrion nipponicum*, *Aeschnophlebia anisoptera*, *Somatochlora clavata*, *Libellula angelina*, *Sympetrum maculatum* and *S. uniforme*. They also exhibit restricted distributions in neighboring prefectures, whereas *Sympetrum baccha matutinum* is common in the latter prefectures, but rare in Shiga. In lotic habitats of Shiga Prefecture, rare species of Odonata, *Calopteryx japonica*, *Platycnemis foliacea sasakii*, *Sinogomphus flavolimbatus*, *Davidius moiwanus taruii* and *Macromia daimoji*, tend to occur in the

western part of the prefecture and never occur in the eastern part. This may be attributed to the frequent lack of surface flow in the lower reaches of most rivers in the east. Odonata Fauna of Lake Biwa: The origin of the Odonata fauna of Lake Biwa may be compared with that of the freshwater fishes. A large part of the freshwater fish fauna of Japan is said to have originated in the fishes that inhabited the Second Setouchi Lakes (from Pliocene to middle Pleistocene) including Paleolake Biwa. The same history may also apply to the origin of the Odonata species with weak dispersal ability, such as *Trigomphus citimus tabei*, *T. interruptus*, *T. ogumai*, *Sympetrum gracile* etc. A group of freshwater fishes adapted to large rivers and large shallow lakes (Cyprinidae: Xenocyprinae and Cultrinae) were once (Pliocene) common in Japan, but are now almost extinct there. The history of the dragonfly genus *Stylurus* may be similar to that of these fishes. *Onychogomphus viridicostus* usually occurs in rivers with a gravel bottom, but it is also found on the rocky shore of Lake Biwa, where a characteristic fish fauna is known. Description of each species (pp. 21-118): The distribution, range of adult dispersal, habitat, life cycle, ecology-behavior and other characteristics of all 98 species are described. Two graphs showing the seasons of occurrence of the nymph (top of the respective page) and the adult (middle), and a map of the distribution in Shiga Prefecture (bottom), are presented for each species. Environment destruction: Means of destroying the habitats of Odonata through human modification of the environment are reviewed. Several examples of such destruction observed in the course of this field study are described. Original occurrence records (pp. 136-248): All of the occurrence records obtained in this study are listed. For each, the date is written in the order of "year-month-day", the locality includes the name of the Shi-Cho-Son and the name of the smaller "Ô-aza" district involved, and the seven-digit number refers to the distribution map's grid. Occurrence records from literature (pp. 249-281): Records of Odonata from Shiga Prefecture were compiled from ca. 100 papers, excluding those with doubtful identifications. Because of this exclusion, *Cordulia aenea amurensis* and *Stylogomphus ryukyuanus ryukyuanus* are no longer listed among the Odonata fauna of Shiga Prefecture. (Authors: pp.7-20, Masazumi YOSHIDA; pp.21-120, Takahiko YAGI; the other pages, the Odonatological Society of Osaka) (Translated by Shigekazu UCHIDA with linguistic help of Mark J. GRYGIER, Lake Biwa Museum)] Address: Published by the Lake Biwa Museum Oroshimo 1091, Kusatsu Shiga 525-0001. Japan Phone: +81-77-568-4811 Fax.: +81-77-568-4850

1999

859. **Ábro, A. (1999):** Reactions to leg excision in larvae of *Enallagma cyathigerum* (Charpentier) (Zygoptera: Coenagrionidae). *Odonatologica* 28(2): 117-125. (in English). ["Soon after amputation of a leg from a final instar larva, granular haemocytes, supported by strands of clotted haemolymph plasma, form a thin cap over the wound, providing the initial wound closure. Cut nerves also appear to attract granular haemocytes and promote organization of a cell sheet covering the wound. Gradually, congregating cells transform the original sheet of cells into a sealing haemocytic plug. Within and across the plug, granular cells form a densely-packed, primary layer like a diaphragm that soon becomes melanized.

This is followed later by one or more deeper, secondary layers which also melanize, but to a lesser extent. The primary, melanized layer serves as a pseudocuticle. Its position appears to be determined by the reorganizing epidermis at the wound edge. Presumably the melanized cell layers reduce leakage of haemolymph plasma from the wound and establish barriers against intruding microbes and other foreign bodies. It is suggested that the sequence of cellular events is similar in all kinds of lesions caused to the zygopteran integument, whether by ectoparasitic invasion or physical damage. It is likely that a resultant alteration in the properties of the subepidermal basement membrane will elicit the haemocytic response." (Author)] Address: Åbro, A., Department of Anatomy, University of Bergen, Årstadveien 19, N-5009 Bergen, Norway

860. **Åbro, A. (1999):** The size range of sperm bundles in aeshnid dragonflies (Anisoptera: Aeshnidae). *Odonatologica* 28(3): 273-277. (in English). [Aeshna cyanea, A. grandis, A. juncea; "Sperm bundles of alternative size and number of sperm cells are regularly found in the spermiducts of aeshnid dragonflies. This arrangement can be traced to earlier stages of spermatogenesis, where the number of generations of spermatogonia does not appear strictly determined. This is considered an archaic feature of the order Odonata. Dragonfly spermatogenesis is discussed." (Author)] Address: Åbro, A., Inst. Anat., Univ. Bergen, Årstadveien 19, N-5009 Bergen, Norway

861. **Achterkamp, G. (1999):** Populatieschatting van de Bandheidlibel *Sympetrum pedemontanum* in De Maat (Belgie). NVL Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3 (3): 6-7. (in Dutch). [estimation of population number of *Sympetrum pedemontanum* in De Maat (Belgium)] Address: E-mail: 97007147@st.hhs.na

862. **Aguero-Pelegrin, M.; Ferreras-Romero, M.; Corbet, P.S. (1999):** The life cycle of *Lestes viridis* (Odonata : Lestidae) in two seasonal streams of the Sierra Morena Mountains (southern Spain). *Aquatic insects* 21(3): 187-196. (in English). ["The life cycle of the zygopteran odonate *Lestes viridis* in two seasonal streams in the Sierra Morena Mountains is inferred from size-frequency analyses of handnet samples of larvae and records of presence and reproductive activity of adults during three consecutive years. The egg stage (duration 5-6 months) overwinters, larval development is brief (6-8 weeks) and adults undergo a protracted, prereproductive, summer diapause (up to 3 months) before mating and ovipositing in late September, about one week after the first appreciable fall of rain, but before surface water reappears in the streams after having been absent for about four months during the hot, dry summer. Comparison between this life cycle and those of more northerly populations reveals a latitude-correlated difference in phenology resembling that found in some other northern hemisphere odonates that, like *L. viridis*, maintain an obligatorily univoltine life cycle at different latitudes." (Authors)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, ES-14004 Córdoba, Spain

863. **Allen, P. (1999):** Gomphids near Georgetown, Gambia. *W.D.A.'s Agrion* 3(1): 14. (in English). [Report on the discovering of *Neurogomphus featheri* with short

outline on the importance to have taken it as a voucher specimen, and to have photographed it!] Address: Allen, P., Little Tatch, North Gorley, Fordingbridge, Hants SP6 2PE, UK

864. **Alzmann, N.; Kohler, B.; Maier, G. (1999):** Spatial distribution, food and activity of *Gomphus pulchellus* SELYS 1840 (Insecta; Odonata; Gomphidae) from a still water habitat. *Int. Revue für Hydrobiologie* 84(3): 299-313. (in English). ["Distribution patterns of *Gomphus pulchellus* larvae in different sediments with different density of prey organisms were studied in the field in a small gravel pit lake in the south of Germany. Larval burrowing behaviour at different temperatures as well as food preference, consumption rates and activity were studied in laboratory experiments. In the study lake *G. pulchellus* larvae lived exclusively in places where macrophytes were present and in fine sediments (mean grain size <3 mm) with detritus cover. There was a significant positive correlation between larval density and density of food organisms suggesting that abundance of food is one of the determinants of larval distribution. In late autumn larvae migrated to deeper places probably to survive the winter. Low temperatures simulated in laboratory experiments did not induce larvae to burrow deeper. Larvae were always found in a sediment depth of 0.59-0.74 cm. Experiments with mixed prey showed that *G. pulchellus* larvae preferred tubificid worms and chironomid larvae over gammarids and ephemeropterid larvae. However, chironomid larvae which stayed in their tubes had a higher survival rate than those outside of tubes. Single-prey experiments showed that *G. pulchellus* larvae can prey not only on benthic species but also on *Daphnia* from the open water. Functional-response experiments showed that one *G. pulchellus* larva consumes a maximum of 2 to 3 tubificid worms or chironomid larvae per day, which corresponds to a maximum biomass (freshweight) of 5 to 30 mg per day. Video recordings of activity showed that *G. pulchellus* larvae cover long distances of up to 52 m per night on the substrate surface and that activity on the substrate surface started after midnight and ceased before sunrise. Consumption of zooplankton prey and high activity above the substrate is interpreted as an adaptation of *G. pulchellus* larvae to the life in still water habitats." (Authors)] Address: Maier, G; Univ Ulm; Dept Biol Ecol & Morphol Anim 3; Albert Einstein Allee 11; D-89069 Ulm; Germany

865. **Andjus, L. (1999):** Obituary: Dr. Zivko R. Adamovic, 1923-1998. *W.D.A.'s Agrion* 3(1): 18. (in English). Address: Dr. Ljiljana Andjus, Natural History Museum, Njegoseva 51, 11000 Beograd, Yugoslavia - Serbia

866. **Andres, J.A.; Cordero, A. (1999):** The inheritance of female colour morphs in the damselfly *Ceragrion tenellum* (Odonata, Coenagrionidae). *Heredity* 82(3): 328-335. (in English). ["Female-limited polychromatism is found in many species of Odonata. In *Ceragrion tenellum* (Coenagrionidae) one of the morphs is red-coloured, like the conspecific male (androchrome, erythrogastrum morph), whereas most females are red and black (typica morph) or black (melanogastrum morph). Virgin females of this species were mated in the laboratory and their progeny reared (13 crosses). Results of these crosses indicate that colour morphs are controlled by one autosomal locus with female-limited expression. A second laboratory generation (two

crosses) confirmed this inheritance system. This locus has three alleles (one per phenotype) and a hierarchy of dominance: *typica* > *melanogastrum* > *erythrogastrum*. The dominance relationships of andro/gynochrome alleles in polymorphic damselflies so far studied are discussed. The frequencies of female morphs in natural populations are highly variable, but in all cases *typica* females are the commonest." (Authors)] Address: Andres, J.A., Univ Vigo; EUET Forestal; Campus Univ; Dept Ecol & Biol Anim, Pontevedra 36005; Spain. E-mail: jaandres@uvigo.es

867. **Anonymus (1999):** List of publications by Philip S. Corbet including observations on Odonata. *International Journal of Odonatology* 2(1): 5-15. (in English). [compilation of P.S. Corbet's odonatological publications; contrary to the compilers list, P.S. Corbet started his odonatological career in 1949: The publication date of the publication listed for 1946 is 1986.] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

868. **Aoki, T. (1999):** Larval development, emergence and seasonal regulation in *Asiagomphus pryeri* (Selys) (Odonata: Gomphidae). *Hydrobiologia* 394: 179-192. (in English). ["Larval development and seasonal regulation in a spring-emerging gomphid dragonfly, *Asiagomphus pryeri* (Selys), was investigated mainly by repeated sampling in the field and also by laboratory experiments. Eggs exhibited direct development. Larval duration was usually 3 or 4 years. Larvae in the penultimate instar (i.e. F-1) that entered the final instar (F-0) synchronously in their third autumn emerged in the following spring but F-1 of the same age-cohort that failed to enter F-0 in the autumn did not emerge in the following spring (i.e. cohort splitting); they had a smaller head width, underwent a supernumerary ecdysis and entered F-0 in the following autumn together with a cohort one year younger. Reduction of temporal variation in emergence, which lasted about 3 weeks, from late May to mid June, was achieved by synchronized entry to F-0 in the previous autumn. No additional synchronisation was detected in the overwintering F-0 population. Long-day photoperiod (LD 15:9; corresponding to the summer solstice) induced in F-1 intense diapause which was terminated by intermediate photoperiod (LD 13:11; the equinox). In nature, such photoperiodic responses apparently mediate the synchronous entry to F-0 in autumn. Discussion on the mechanisms of seasonal regulation is made." (Author)] Address: Aoki, T; Rokko Island High School, Higashinada Ku., Naka 4 Chome, Koyo Cho; Kobe; 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp

869. **Aoki, T.; Kondoh, S. (1999):** A note on reproductive behaviour of *Sympetrum striolatum imitoides* BARTENEF in Kobe. *Aeschna* 35: 37-40. (Japanese, with English summary). ["Reproductive behaviour of *Sympetrum striolatum imitoides* Bart. was observed at an artificial pond for birdwatching in Kobe [...] 4 times from 12 October to 16 November, 1997. It was similar to those which were reported by Matsura et. al. (1995) in *S. s. imitoides* and by Ottolenghi (1987) in *S. s. striolatum* in Italy. A characteristic precopulatory behaviour of the male, which is hardly seen in other Japanese *Sympetrum* species except *S. uniforme*, was a continuous hovering flight above the water. It began just before females coming to the water for oviposition (about

10:30 J.S.T.), and lasted for about an hour. There is, however, another group of males which waited for females by perching around the pond. Depending on their situation or other conditions, two tactics might be used for mating." (Authors)]. Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinadaku, Kobe, 658-0032, Japan. E-mail: t_aoki@ma3.justnet.ne.jp

870. **Arlt, J.; Ruddek, J. (1999):** Bestimmungsschlüssel für Exuvien der Libellen Griechenlands. *Libellula Suppl.* 2: 3-15. (in German, with short English summary). ["The key included the quintessential indications for the whole dragonfly fauna of Greece. In short cues and figures the important characters were described." (Authors). This key is a didactically very interesting attempt to allow an easy determination of exuviae.] Address: Ruddek, J., Butendiek 34, D-28865 Lilienthal, Germany

871. **Arlt, J. (1999):** Entwicklungsnachweis von *Pantala flavescens* (Fabricius) in der Türkei (Anisoptera: Libellulidae). *Libellula* 18(1/2): 95-96. (in German, with English summary). ["One exuviae as well as freshly emerged specimens were recorded in the Göksu Delta and at a watertank near Gözcü in southern Turkey in June 1998. This seems to be the first breeding record in Turkey. The localities are described and notes to co-occurring species are given." (Author)] Address: Arlt, J., Braker Str. 4, D-27751 Delmenhorst, Germany

872. **Aspöck, H. (1999):** Beschreibung und Abbildung von Mantispiden in der frühen entomologischen Literatur und Österreichs Beitrag zur Erforschung der Fanghafte (Neuropterida: Neuroptera: Mantispidae). *Stapfia* 60: 209-244. (in German). [facsimile of a plate from de Villiers (1789) with two Odonata; pictures of the famous Austrian odonatologist Friedrich Moritz Brauer (1832-1904)] Address: Aspöck, H., Abt. Med. Parasitologie, Klinisches Institut für Hygiene der Universität, Kinderspitalstr. 15, A-1095 Wien, Austria

873. **Azevedo-Ramos, C.; Magnusson, W.E. (1999):** Tropical tadpole vulnerability to predation: Association between laboratory results and prey distribution in an Amazonian savanna. *Copeia* 1999(1): 58-67. (in English). ["We tested concordance between patterns of tadpole assemblage structure seen in the field and in laboratory experiments to infer causal relationships. Based on a previous study that showed predators as the main proximal factor associated with tadpole distributions in an Amazonian savanna, we investigated interspecific patterns of vulnerability of six common tadpole species in relation to the distribution of predators in the field. The predators used were hydrophilid larvae (Coleoptera), libellulid naiads (Odonata), and adult *Gophagus* gr. *altifrons* (Cichlidae). Forty riverside aquatic sites were searched for predators and tadpoles during 28 months in a savanna area at the border of the Tapajos River, Central Amazonia. Tadpole species were tested for their vulnerability to predators in individual and choice tests. Prey unpalatable to fishes (*Bufo marinus*, *B. granulatus*, and *Hyla wavnini*) were palatable to invertebrates, *Leptodactylus macrosternum* and *Scinax rubra* were vulnerable to fish and invertebrate predators. *Lysapsus limellus* was not tested with fish, but it was vulnerable to naiads. Eggs had low vulnerability to predation, but there was generally little ontogenetic change in tadpole vulnerability. The vulnerability of tad-

poles in choice tests was significantly related to vulnerability in individual tests. A tadpole vulnerability index based on tadpole survivorship with different predators was significantly related to the distribution of predators in the field, indicating that it is possible to predict the coexistence of prey and predators in the field by screening species with simple laboratory predation experiments. In this study area, both vertebrate and invertebrate predators may potentially limit the distribution and the relative abundance of tadpole species through differential predation." (Authors)] Address: Azevedo-Ramos, C; UNICAMP, Inst Ciencias Biol, Dept Zool, ; Inst Pesquisas Amazonia, Coordenacao Pesquisas & Ecol, BR-69011970 Manaus, Amazonas, Brazil. E-mail: cramos@amazon.com.br

874. **Baker, L.; Elkin, C.M.; Brennan, H.A. (1999):** Aggressive interactions and risk of fish predation for larval damselflies. *Jour. Insect behav.* 12(2): 213-223. (in English). ["Larval damselflies frequently engage in aggressive interactions that may increase their risk of fish predation. To test this we analyzed the behavior of larval *Ischnura verticalis* exposed to both conspecifics and fish predators. Larvae in the presence of conspecifics oriented, struck, and swam more but crawled less compared to solitary larvae; the presence of fish reduced, or tended to reduce, all behaviors. Fish struck more at interacting larvae compared to noninteracting larvae. Increased attack rate by fish likely reflects the increase in the very active swimming behavior by larvae and suggests a conflict between antipredator behaviors. Swimming is an appropriate response to avoid predation by odonate larvae which normally ambush prey but is clearly dangerous when fast-swimming fish that cue in on movement are nearby." (Authors)] Address: Baker, RL; Univ Toronto; Dept Zool; Mississauga; ON L5L 1C6; Canada

875. **Baumgärtner, D. (1999):** Bibliographie der DJN-Jahrbücher und der Naturkundlichen Beiträge Heft 1 (1978) bis Heft 33 (1999). *Naturkundliche Beiträge des Deutschen Jugendbund für Naturbeobachtung* 33: 39-71. (in German). [bibliography of the contributions in publications of the German Youth Association for nature observation including the odonological papers; this organisation was of central importance for the development of odonatology in Germany in the past thirty years] Address: Baumgärtner, D., Cherysstr. 16, 78467 Konstanz, Germany

876. **Baumgärtner, M. (1999):** Meilenstein für Schutz: Südbaden ist die deutsche Region mit den meisten bedrohten Arten bei Heuschrecken und Libellen. *Dreiland-Zeitung* vom 8. Oktober 1999: 6. (in German). [report on the new books "The grasshoppers of Baden-Württemberg" and "The dragonflies of Baden-Württemberg", published by Ulmer, Stuttgart; some faunistic "high-lights" of the odonate and the orthoptera fauna are presented, including an interview with Dr. Klaus Sternberg, the editor of the Book on Odonata.] Address: not stated

877. **Beamish, F.W.H.; Noakes, D.L.G.; Rossiter, A. (1999):** Feeding ecology of juvenile Lake Sturgeon, *Acipenser fulvescens*, in Northern Ontario. *Canadian field naturalist* 112(3): 459-468. (in English). ["Dietary analyses of juvenile Lake Sturgeon in a resource-poor habitat showed them to be a general predator. Cladocera dominated numerically the prey taxa, but were recor-

ded in only four of the individual sturgeon examined and therefore excluded from stomach content analyses. Mayfly larvae (Ephemeroptera), primarily *Hexagenia*, were numerically the next most abundant (34% of all prey items) and the most widely taken (75% of all sturgeon) of the 10 prey categories. Others were Odonata, Annelida, Mollusca, Diptera and Trichoptera, each at 5-8% of all prey items. The remaining dietary categories represented < 3% of all prey items. No dietary partitioning was found over the length range of juvenile sturgeon, suggesting that fish throughout this size range are almost certainly competing for food. Lake Sturgeon diet did not differ from that for suckers, Lake Whitefish and, to some extent, Burbot, but was different from that for Northern Pike and Walleye. Extremely low invertebrate densities (95 individuals x m⁻²) and occurrence of all benthic species in the diet of juvenile Lake Sturgeon and several of the other dominant fishes suggests niche breadth to be wide and thus competition for food to be severe. The low food abundance is reflected in the comparatively slow growth rate of sturgeon in our study area. Apparently sturgeon are at survival threshold in this area. Further depletion of their food base likely would have serious repercussions for their growth and survival." (Authors)] Address: Noakes, D.L.G., Univ Guelph; Dept Zool., Guelph; ON N1G 2W1; Canada

878. **Beckemeyer, R. (1999):** 1999 DSA meeting in the Adirondacks at Paul Smith's College and environs. *Argia* 11(3): 2-3. (in English). [personal report from the July 1999 DSA meeting at Paul Smith's College, New York, USA] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

879. **Beckemeyer, R. (1999):** Dragonflies, lice, and "Schwartz's law of Odonatology". *Argia* 11(1): 30. (in English). [Mann, M. (1920): The occurrence of Mallophaga on a dragonfly (Odon.): *Ent. news* 31: 252. Reference to a paper referring to Mallophaga on the Colombian *Ischnogomphus jessei* (= *Agriogomphus jessei* (Williamson 1918)).] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

880. **Beckemeyer, R. (1999):** *Ischnura barberi* Currie, 1903 - "A Salty Fork-Tale". *Argia* 11(1): 22-23. (in English). [discussion on records from Kansas and Nebraska, USA; discussion on tolerance of salinity and brackish water habitats by *Ischnura barberi* and *Erythrodiplax berenice*.] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

881. **Becnel, J.J.; Johnson, M.A. (1999):** Pathogenicity tests on nine mosquito species and several non-target organisms with *Strelkovimermis spiculatus* (Nematoda mermithidae). *Journal of Nematology* 30(4): 411-414. (in English). ["Nine species of mosquitoes and several species of non-target aquatic organisms were tested for susceptibility to the mermithid nematode, *Strelkovimermis spiculatus*. All species of *Anopheles*, *Aedes*, *Culex*, and *Toxorhynchites* exposed to *S. spiculatus* were susceptible. Of the nine mosquito species tested, *C. pipiens quinquefasciatus* had the greatest tolerance to initial invasion and the highest percent infection of those that survived. High levels of infection were also achieved with *Aedes taeniorhynchus* and *A. albopictus*, but these mosquitoes were significantly less tolerant to parasitism than *C. pipiens quinquefasciatus*. *Strelkovimermis spiculatus* did not infect or develop in any of the non-target hosts tested" (incl. Odonata).

(Authors)] Address: Becnel, J.J., USDA ARS; Ctr Med. Agr. & Vet. Entomol., POB 14565; Gainesville; FL 32604. E-mail: jbecnel@gainesville.usda.ufl.edu

882. **Bedell, P.; Chazal, A. (1999):** *Dythemis velox*, a new species for Virginia. *Argia* 11(3): 4-5. (in English). Address: Bedell, P., 10120 Silverleaf Terrace, Richmond, VA, 23236, USA. E-mail: pbedell@aeols.com

883. **Bedjanic, M.; Salamun, A. (1999):** Contribution to the knowledge of the odonate fauna of Sicily, with some additional data from Basilicata, southern Italy. *Opusc. zool. flum.* 169: 1-14. (in English). ["An annotated list is presented of 26 spp. collected between 7/18-VIII-1996 at 16 localities in Sicily and Basilicata. The records of *Lestes v. virens* (Charp.), *Aeshna mixta* Latr., *A. cyanea* (Müll.), *Onychogomphus uncatus* (Charp.) and *Orthetrum trinacria* (Sel.) from Sicily and *O. f. forcipatus* (L.) from Basilicata are of special regional interest. The breeding of *O. uncatus* and *A. cyanea* in Sicily could be confirmed for the first time. A list of 45 taxa known from the island with certainty is compiled and the late summer aspect of the fauna is briefly discussed." (Authors)] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

884. **Behrstock, R.A.; Eubanks, T.L.; Miliotis, P. (1999):** Bar-sided Darner (*Gynacantha mexicana*) Selys, 1868 (Odonata: Aeshnidae), a new dragonfly for the U.S.. *Argia* 11(2): 12-14. (in English). [On 25 October 1998, photographers at two locations documented male darners of the species - confirmed by Sid Dunkle - at Santa Ana National Wildlife Refuge, Hidalgo County, Texas, USA. The authors discuss the question of the origin of the specimens: hurricane Mitch, or a northward dispersal in response to Mexico's drought conditions during the early summer in 1998.] Address: Behrstock, R.A., 9707 S. Gessner #3506, Houston, TX, 77071-1032, USA

885. **Behrstock, R.A. (1999):** First Texas record of the Bar-winged Skimmer (*Libellula axilenia*, Westwood). *Argia* 11(3): 5-6. (in English). [record of 20 June 1999, Tyler County, Texas, USA] Address: Behrstock, R.A., 9707 S. Gessner # 3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@aol.com

886. **Bertram, G.; Haacks, M. (1999):** Beobachtungen von windverdrifteten Libellen auf der Kurischen Nehrung im September 1998. *Libellula* 18(1/2): 89-94. (in German, with English summary). ["At the Biological Station Rybachy on the Curonian Spit (Russia) during nine days 14 dragonfly species were recorded in birdtraps. The record of two specimens of *Anax parthenope* Selys is of special interest. The dominance of individuals of the genus *Sympetrum*, compared to those of the genus *Aeshna*, increased as eastwind conditions became prevailing. In *Sympetrum* the adult sex ratio was male biased. There was a close relationship between the number of specimens and the increasing NE winds." (Authors)] Address: Bertram, Gisela, Herderstr. 6, D-22085 Hamburg, Germany

887. **Beynon, T. (1999):** First emergence for White-faced darter *Leucorrhinia dubia* and Four-spotted Chaser *Libellula quadrimaculata* 1994-1999 at Chartley Moss NNR, Staffordshire. *Atropos* 8: 52-53. (in Eng-

lish). Address: Beynon, T.G.; 34 Church Lane, Checkley, Stoke-on-Trent ST10 4NJ, United Kingdom

888. **Blessing, J.; Randler, C. (1999):** Vorkommen der Kleinen Zangenlibelle *Onychogomphus forcipatus* (Linnaeus, 1758) bei Mühlhausen/Enz. *Fachdienst Naturschutz - Naturschutz und Landschaftspflege Baden-Württemberg* 73: 271-275. (in German). [generalised distribution map of *O. forcipatus* in Baden-Württemberg, Germany; report on some new localities for the rare species; discussion on some conservation measures] Address: Blessing, J., Vaihinger, Str. 7, D-71665 Vaihingen-Enzweihingen, Germany

889. **Blischke, H. (1999):** Schlupf von *Lestes viridis* (Vander Linden) abseits vom Gewässer (Zygoptera: Lestidae). *Libellula* 18(1/2): 55-58. (in German, with English summary). ["In July 1997 several exuviae of *L. viridis* were recorded in a lawn adjacent to a ditch in the marsh west of the Jade bay near Sande (Friesland, Germany). One specimen emerge 5.60 m distant from the shore." (Author)] Address: Blischke, H., Sanderahm 6, D-26452 Sande, Germany

890. **Borchers, R. (1999):** Untersuchungen zur Autoökologie von *Aeshna subarctica elisabethae* Djakonov, 1922. Diplomarbeit am Zoologischen Institut der Universität Hamburg: 86 pp, Annex 1-12. (in German). [A Calluna-bog (Schwarzes Moor) near Schneverdingen, Niedersachsen, Germany was surveyed for the species. The habitat (*Sphagnum-Eriophorum*-quagmire) is described in some detail (climatic conditions, vegetation, water chemistry, [dragonfly] fauna). Differences in the morphological structures between *A. subarctica elisabethae* and *A. juncea* are presented in detail. Many of original observations on larval habitat and emergence of the species are documented. Predation behaviour of larvae was observed under laboratory conditions. The population ecology of *A. subarctica* is studied, with some emphasis on its competition with *A. juncea*. This very interesting M.Sc. thesis can be obtained from the author for DM 40,-.] Address: Borchers, R., Rotdornallee 18, D-29640 Schneverdingen, Germany

891. **Botschuyver, A. (1999):** Blijde Duin berichten: Steeds meer witsnuitlibellen in de Hollandse duinen. *NVL Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie* 3(3): 10. (in Dutch). [More and more *Leucorrhinia*'s in the dutch dunes; records from the end of the 90ies of *Leucorrhinia dubia*, *L. rubicunda*, and *L. pectoralis*] Address: Botschuyver, Annelies, E-mail: a.botschuyver@gw.amsterdam.nl

892. **Boudot, J.-P. (1999):** Rectification à l'article intitulé: Redécouverte de *Leucorrhinia rubicunda* (L., 1758) en France (Odonata, Anisoptera, Libellulidae). Par Laurent Gavory et Jean-Louis Dommangeat (*Martinia* 1998, tome 14, fascicule 2 (juin): 47-52). *Martinia* 15(2): 54. (in French). [Jean-Pierre Boudot states more precisely his personal comment in the above mentioned paper: there are no other extant localities for *L. rubicunda* known in France. The most nearest localities (observations) are near the French/Swiss and the Luxembourg/French borders.] Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Note-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. E-mail: boudot@cpb.cnrs-nancy.fr

893. **Bouguessa, S.; Bouguessa, L.; Bouneb, H.; Khelifa, F. Z. (1999):** Les odonates zygoptères de l'Oued de la Meskiana (Algérie). *Martinia* 15(2): 22. (in French). [list of 9 taxa including *Coenagrion hastulatum* and *C. pulchellum*; abstracter's note: both species should be confirmed by experienced odonatologists, because it is doubtful that the range of these species reaches North-Africa. The identity of other taxa listed is doubtful as well.] Address: Bouguessa, S., Centre Universitaire de Tebessa, Département de Biologie, Route de Constantine, 12000 Tebessa, Algeria
894. **Brewer, S.K.; Atchison, G.J. (1999):** The effects of chlorpyrifos on cholinesterase activity and foraging behavior in the dragonfly, *Anax junius* (Odonata). *Hydrobiologia* 394: 201-208. (in English). ["We examined head capsule cholinesterase (ChE) and foraging behavior in nymphs of the dragonfly, *Anax junius*, exposed for 24 h to 0.2, 0.6 and 1.0 $\mu\text{g l}^{-1}$ of the organophosphorus (OP) insecticide, chlorpyrifos [O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate]. The invertebrate community is an important component of the structure and function of wetland ecosystems, yet the potential effects of insecticides on wetland ecosystems are largely unknown. Our objectives were to determine if exposure to environmentally realistic concentrations of chlorpyrifos affected foraging behavior and ChE activity in head capsules of dragonfly nymphs. Nymphs were exposed to different concentrations of chlorpyrifos and different prey densities in a factorial design. ChE activities and foraging behaviors of treated nymphs were not statistically different (p greater than or equal to 0.05) from control groups. Prey density effects exerted a greater effect on dragonfly foraging than toxicant exposures. Nymphs offered higher prey densities exhibited more foraging behaviors but also missed their prey more often. High variability in ChE activities within the control group and across treated groups precluded determination of relationships between ChE and foraging behaviors. It appears that *A. junius* is relatively tolerant of chlorpyrifos, although the concentrations we tested have been shown in other work to adversely affect the prey base; therefore the introduction of this insecticide may have indirect adverse effects on top invertebrate predators such as Odonata." (Authors)] Address: Brewer, S.K., US Geol. Survey; Columbia Environm. Res. Ctr; Columbia; MO 65201; USA
895. **Bright, E. (1999):** An interesting new larval morphology of *Argia*. *Argia* 11(1): 11-13. (in English). [detailed description of an unidentified member of the *Argia extranea - vivida* group from Nevada, USA] Address: Bright, E., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA
896. **Brockhaus, T.; Kretzschmar, W. (1999):** Weitere Bearbeitung der Libellen in Sachsen. *Mitt. Sächs. Entomol.* 45: 31. (in German). [announcement of a meeting of the Saxonian dragonfly workers on 5./6 Nov. 1999 in Bad Schandau, Germany, to discuss further work on the dragonfly fauna of Saxonia] Address: Brockhaus, T., An der Morgensterne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de
897. **Brugière, D. (1999):** Pré-inventaire des odonates du département de la Loire. *Martinia* 15(2): 47-53. (in French, with English summary). [shortly commented checklist of the Odonata of the French Département Loire] Address: Brugière, D., 39, rue Sidi-Brahim, F-03200 Vichy, France
898. **Brunelle, P.-M. (1999):** A course on larval damselflies and dragonflies of the northeast. *Argia* 11(2): 11. (in English). [may 16-22, 1999 at Humboldt Field Research Institute in Steuben, Maine, USA] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada
899. **Buczynski, P. (1999):** 18. Zjazd Towarzystwa Odonatologów Niemieckojezycznych, Münster (Niemcy), 19-21 III 1999. *Wiad. entomol.* 18(2): 129-130. (in Polish, a German translation of the paper is available from IDF). [detailed report on the 18. Annual Meeting of the Society of the German Speaking Odonatologists] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland
900. **Buczynski, P.; Labeledzki, A.; Tonczyk, G. (1999):** Libellen (Odonata) der Moore Polens: Gefährdungen und Schutzmaßnahmen. In: *Polski Towarzystwo Entomologiczne & Instytut Ochrony Przyrody PAN (Eds.): Konferencja Naukowa. "Ochrona owadów w Polsce u progu integracji z Unia Europejska"*, Kraków, 23-24 wrzesnia 1999. ISBN 83-01-08125-2. [Conservation of insects on the threshold of the integration of Poland into the European Community] (German translations of the odonatological papers are available from P. Buczynski or IDF): 24. (in Polish). [General outline on the importance of Polish bogs and the importance of bogs for (specialised) Odonata. The situation of Polish odonate fauna of the bogs is assessed as quite good compared with other central European countries. But there is an increasing pressure on some bogs, and some have been destroyed irreversibly. Of special interest are the populations of the extremely rare *Nehalennia speciosa*. Some observations indicate that collectors have caused serious impact on the populations of this species.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl
901. **Buczynski, P. (1999):** Recenzje - Reviews: Jödicke, R., 1997: Die Binsenjungfern und Winterlibellen Europas. *Lestidae*. Westarp Wissenschaften, Magdeburg. 227 ss. (Die Neue Brehm-Bücherei; Bd. 631): ISBN 3-89432-460-0. *Wiadomosci entomologiczne* 18 (1): 51-52. (in Polish; a German translation of the review is available from the author or IDF). [detailed book review; some criticism on the distribution maps with special reference to the situation of the species in the central-eastern part of Europe] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland
902. **Bulánková, E. (1999):** Changes in the dragonfly fauna of the Danubian lowland in the last thirty years. *Entomofauna carpathica* 11: 1-5. (in Slovakian, with English summary). [comparison of data obtained in the period 1938-1968 with data from 1990-1997; in the first period 50, and in the second period 37 Odonata species were recorded; rheophilous species are the group of Odonata most affected by the environmental changes in the last years; some of these species have to be considered as locally extinct; a further group with species preferring reed vegetation and other vegetation-

- rich water bodies are also affected negatively; species as *Epithea bimaculata*, *Orthetrum brunneum*, *Somatochlora metallica*, and *Sympetrum pedemontanum* were observed for the first time since 1990; *Crocothemis erythraea* is expanding its range in the Danubian lowlands] Address: Bulankova, Eva, Institute of Ecology, Fac. of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; tel.+ 421-7-728 922, E-mail: Bulankova@nic.fns.uniba.sk
903. **Caldwell, B.A. (1999):** *Archilestes grandis* (Odonata: Lestidae) from Georgia: new state record. *Argia* 11(2): 9-10. (in English). [detailed documentation of a record of a single larva of *A. grandis* from Hall county, Georgia (34.29N 83.42.34W)] Address: Caldwell, B.A., 1035 Lewis Ridge Circle, Lawrenceville, GA 30045-8899, USA
904. **Carpenter, G. (1999):** Big news from Rhode Island. *Argia* 11(3): 7. (in English). [*Epithea canis*, *Gomphus spicatus*, *Lanthus vernalis*, *Cordulegaster obliqua*, *Nasiaeschna pentacantha*, *Somatochlora georgiana*, and *Enallagma pictum*] Address: Carpenter, V.A., The Nature Conservancy, 159 Waterman Avenue, Providence, RI 02906, USA. E-mail: vcarpenter@tnc.org
905. **Carvalho, A.L. (1999):** Dragonflies in Origami. *Odonatologica* 28(2): 151-157. (in English). ["16 origami projects (folding paper instructions) representing dragonflies are registered and studied. Both technical and representational aspects are described for each folded model. A basic geometric outline of a dragonfly is defined based on these sculptures." (Author)] Address: Carvalho, A.L. Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista s/n°, Sao Cristóvão, BR-20940-040 Rio de Janeiro, RJ, Brazil
906. **Cashett, T. (1999):** New Hine's Emerald (*Somatochlora hineana*) dragonfly sites found in 1999. *Argia* 11(3): 3-4. (in English). [new localities of *S. hineana* in Missouri, Wisconsin, Michigan, Illinois, USA] Address: Cashett, E.D., Illinois State Museum, 1920 10 1/2 St., Springfield, IL 62703, USA. E-mail: cashett@museum.state.il.us
907. **Cating, P.; Cating, C.H. (1999):** Laura's Clubtail (*Stylurus laurae*) new to Canada. *Argia* 11(3): 10-11. (in English). [Record of *S. laurae* on Big Otter Creek, Elgin County, Ontario, Canada; description of the habitat; morphological comparison of *Stylurus laurae* and *S. amnicola*] Address: Catling, P.M.; 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net
908. **Cating, P.; Brownell, V. (1999):** Maine Snake-tail (*Ophiogomphus mainensis*), new to Ontario. *Argia* 11 (3): 9. (in English). [Larval *O. mainensis* were discovered on 18 July 1999 in Pautois Creek and Aumond Creek near Mattawa, Ontario, Canada] Address: Catling, P.M.; 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA
909. **Cating, P.; Brownell, V. (1999):** Riverine Club-tail (*Stylurus amnicola*) new to Ontario. *Argia* 11(3): 9-10. (in English). [record of *S. amnicola* on Big Otter Creek, Elgin County, Ontario, Canada; detailed description of the habitat] Address: Catling, P.M.; 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net
910. **Catling, P.M. (1999):** Notes on *Enallagma travium* westfalli in Ontario. *Argia* 11(1): 26-27. (in English). Address: Catling, P.M.; 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA
911. **Cham, S. (1999):** Roosting behaviour of some British Odonata with notes on the Scarce Chaser *Libellula fulva* Müller. *J. Br. Dragonfly Soc.* 15(2): 58-60. (in English). [summary of observations made over a twenty-year period; "By roosting low down in relatively dense vegetation, *L. fulva* avoids potential predation and disturbance but is also sheltered from adverse weather conditions."] Address: Cham, S., 45 Weltmore Road, Luton, Bedfordshire LU3 2TN, UK
912. **Chelmick, D.G. (1999):** Larvae of the genus *Anax* in Africa (Anisoptera: Aeshnidae). *Odonatologica* 28(3): 209-218. (in English). [11 spp. of the genus *Anax* have been recorded from Africa and its offshore islands. The larvae of 7 of these are compared in this paper, and *A. chloramelas* Ris and *A. congoliath* Fraser are believed to be described for the first time. A simplified key is provided to assist in the identification of the known African species.] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK
913. **Chippindale, P.T.; Dave, V.K.; Whitmore, D.H.; Robinson, J.V. (1999):** Phylogenetic relationships of North American damselflies of the genus *Ischnura* (Odonata: Zygoptera: Coenagrionidae) based on sequences of three mitochondrial genes. *Molecular phylogenetics and evolution* 11(1): 110-121. (in English). ["Relationships of North American damselflies of the genus *Ischnura* (Odonata: Zygoptera: Coenagrionidae) were investigated using a total of 1205 bp from portions of three mitochondrial genes: cytochrome b, cytochrome oxidase II, and 12S ribosomal DNA, Parsimony and neighbor joining analyses reveal a monophyletic group consisting of *I. damula*, *I. demorsa*, *I. parva*, *I. posita posita*, *I. posita atezca*, *I. verticalis*, and probably *I. denticollis*, likely reflecting a recent radiation in North America. *Ischnura kellicotti*, *I. barberi*, *I. prognata*, *I. hastata*, *I. ramburi*, and *I. capreola* appear to represent much earlier divergences in the group. Many previous hypotheses of relationships among North American species of *Ischnura* are not supported by the molecular-based analyses. However, there is agreement in many respects between the results of the molecular phylogenetic analyses and the morphologically based conclusions of Kennedy (1919, "The Phylogeny of the Zygoptera," Ph.D. Dissertation, Cornell University, Ithaca). Although results of single-gene phylogenetic analyses often differ, there are very few cases in which there is strong support for conflicting relationships using different partitions of the data. Combined analysis of all three genes yields trees with stronger support overall than the single-gene analyses, and the combined data trees that result from diverse data treatments are congruent with one another in most respects." (Authors)] Address: Chippindale, P.T., Univ. Texas, SW Med. Sch., 5323 Harry Hines Blvd, Dallas TX 75235; USA

914. **Clarke, D. (1999):** The outpost populations of the Banded Demoiselle *Calopteryx splendens* (Harris) in the Solway Firth area, Cumbria: historical perspective and recent developments. *J. Br. Dragonfly Soc.* 15(2): 33-38. (in English). ["The Solway plain of Cumbria holds the most north-westerly populations of this species in Britain [...]. These occupy an extremely isolated position and, strangely, the species seems never to have been recorded in more southerly parts of the county. [...] The nearest colonies on the west of the Pennines are some 120km to the south of the Solway [...]. 1996, individuals were noted up to 20 km east of the known breeding areas on the river Waver. The following years yielded new records, and populations settled by the 1996 dispersal got strong populations of *C. splendens*.] Address: David Clarke, Tullie House Museum & Art Gallery, Carlisle CA3 8TP
915. **Clausnitzer, H.-J. (1999):** Bedeutung von Primärhabitaten für die mitteleuropäische Fauna. Schutz von Primär- oder Sekundärhabitaten?. *Naturschutz und Landschaftsplanung* 31(9): 261-266. (in German, with English summary). ["Importance of Primary Habitats for the Central-European Fauna - Conservation of Primary or Secondary Habitats? In the cultural landscape many animal species occur in secondary habitats and therefore depend on regular management measures. Some species develop a very high abundance rate, with these anthropogenic habitats being their optimum habitat. On the other hand, if land-use and hence the type of impact change, many of these species disappear. With specific management measures nature conservation imitates the former land-use in order to conserve the biodiversity of these secondary habitats. Some animal species still occur in primary habitats without human intervention, although these primary habitats may not necessarily be optimum habitats. Only if known primary habitats exist in sufficient size and number can management measures be reduced. It is therefore necessary that nature conservation should manage both optimum secondary habitats and protect primary habitats where they are of sufficient size." (Author) The requirements of *Orthetrum coerulescens* and *Ceragrion tenellum* on primary habitats are outlined in short.] Address: Clausnitzer, H.-J., Eichenstr. 11, D-29348 Eschede, Germany
916. **Clausnitzer, H.-J.; Clausnitzer, V. (1999):** Dragonflies of the Meru National Park (Kenya). *W.D.A.'s Agrion* 3(1): 7-9. (in English). [ecological and odonatological characterization of the Meru National Park with special emphasis on the riverine Odonata; checklist of 47 species from six localities] Address: Clausnitzer, Viola, Zum Lahnverg 14, D-35032 Marburg, Germany
917. **Clausnitzer, V. (1999):** Description of the final-instar larva of *Notiothemis robertsi* Fraser, 1944 (Anisoptera: Libellulidae). *International Journal of Odonatology* 2(1): 72-82. (in English). ["The final-instar larva is described from exuviae collected in the Kakamega Forest/West Kenya, and is compared with that of *Notiothemis jonesi*. A short description of one exuviae of *Tetrathemis corduliformis* collected at the same locality is given. The genus *Notiothemis* is compared with three other African *Tetrathemistinae*: *Tetrathemis corduliformis*, *T. longfieldae*, *Malgassophlebia aequatoris*. Notes on the habitat of *Notiothemis* and *Tetrathemis corduliformis* are added." (Author)] Address: Clausnitzer, Viola, Zum Lahnverg 14, D-35032 Marburg, Germany
918. **Corbet, P.S. (1999):** An afro-tropical marvel: *Zygonyx natalensis* (R. Martin). *W.D.A.'s Agrion* 3(1): 10. (in English). [This is a wonderful tessera of African odonatology; Philip Corbet describes his personal adventures in the torrential parts of watercourses with *Z. natalensis*. Can Nile crocodiles affect the collection of exuviae?] Address: Corbet, P.S., Crean Mill, St. Buryan, Penzance, Cornwall, UK
919. **Corbet, P.S. (1999):** Dragonflies. Behaviour and Ecology of Odonata. Harley Books. Colchester. ISBN 0 946589 64 X: 829 pp. (in English). [This outstanding book complements and updates "A Biology of Dragonflies", Philip Corbet's highly acclaimed work of over thirty years ago. In the present work, the author provides a critical review of information, both published and unpublished, worldwide, on the behaviour and ecology of Odonata in all stages of the life cycle for both physical and biotic environments. The author integrates information about tropical and temperate species in functional and evolutionary contexts, and reviews facts and ideas in the perspective of current biological thinking. The treatment emphasizes diversity as well as broad patterns of behaviour and should help focus attention on potentially fruitful lines of future enquiry, within and beyond the Odonata. The book can be expected to be uniquely authoritative for decades and an invaluable resource for anyone working in this field.]
920. **Cordero, A. (1999):** Forced copulations and female contact guarding at a high male density in a calopterygid damselfly. *Jour. Insect Behav.* 12(1): 27-37. (in English). ["Territorial males of *Calopteryx damselfly* court females on territories that contain oviposition substrates. Nonterritorial males try to mate without courtship but very rarely obtain matings because females fail to bring up their abdomen to engage genitalia. Here I report the results of observations made on a very high-density population of *Calopteryx haemorrhoidalis* in central Italy. Mating activity was intense, and during 40 h of observation in an 8 m section of the stream, 209 matings were recorded (a maximum of 17 matings h⁻¹). Males were continuously disturbing ovipositing females and tried to achieve tandem forcibly. Of 84 cases, males achieved forced tandem in 53, and 49 ended with copulation. Forced tandems were the most common method to obtain a mating in this population (55% of 65 matings). Males guarded females after forced or courtship copulations and, in some cases, maintained physical contact with their mate, by perching on her wings. Confusion was common and males guarded nonmates frequently, which suggests that they were unable to recognize their mate individually." (Author)] Address: Cordero, A., Univ. Vigo, Dept Ecol. & Biol. Anim., Campus Univ., Pontevedra 36005; Spain. E-mail: acordero@u-vigo.es
921. **Cordero Rivera, A.; Andrés Abad, J.A. (1999):** Lifetime mating success, survivorship and synchronized reproduction in the damselfly *Ischnura pumilio* (Odonata: Coenagrionidae). *International Journal of Odonatology* 2(1): 105-114. (in English). ["A small population of *I. pumilio* in NW Spain was studied by marking and resighting in August-September 1996. A total of 142 males and 100 females were captured. Adults of *I. pumilio* appeared in two clear groups, starting on 31 August and 10 September. Population size was estimated about 1-2 individuals from 14 to 30 August but suddenly increased to 30-50 males and 40-120 females from 31

August to 13 September. A large fraction of males (43.6%) were never seen to mate, but only 13 females were never seen in copula. Androchrome females were rare (14 females) and did not differ from gynochrome females in fitness correlates. Copulation duration ranged from 1 to 5 h, and was dependent on time of day. The analysis of survival and recapture rates indicates that males and females have similar survivorship, but sex had a significant effect on recapture probability." (Authors)] Address: Adolfo Cordero Rivera; Jose Angel Andrés Abad, Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, ES-36005 Pontevedra, Spain. E-mail: acordero@uvigo.es; jaandres@uvigo.es

922. **Cordero-Rivera, A.; Utzeri, C.; Santolamazza Carbone, S. (1999):** Emergence and adult behaviour of *Macromia splendens* (Pictet) in Galicia, northwestern Spain (Anisoptera: Corduliidae). *Odonatologica* 28(4): 333-342. (in English). ["Exuviae were found in sheltered places, most commonly in small cavities under the river banks. The species is able to breed in hydroelectric reservoirs that show marked changes in water level and where riverine vegetation is completely absent. At these places exuviae were found on dead trunks and big rocks, usually in a horizontal up-side-down position. In the laboratory, emergence followed the typical aeshnid sequence. Adult, full coloured males showed no yellow spots on abdominal segments 5 and 6, while the spots on segments 4 and 7 were widely variable. 37 adult males of a natural population at the river Lérez were marked. Of these, 12 were resighted 1 to 14 days after marking. Males patrolled over 50-150 m of the river, usually flying straight about 30 cm above the water. Females were observed at the river on 21 occasions, and in 19 cases oviposited as soon as they arrived at water. However, mating was recorded only once during 52 h of observation over 18 days. Two more matings were obtained with a tethered female. Since matings at the Oviposition sites seem to be rare, it is suggested that copulation is performed mainly at the feeding places. Eggs were scattered by the unaccompanied female by dipping the abdomen 3-10 times for no more than 2 min, in spots of the river as far as 1 m from each other. The importance of forested areas for conservation of this species is discussed." (Authors)]. Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università "La Sapienza", Viale dell'Università 32, I-00185 Roma. Italy.

923. **Cordoba-Aguilar, A. (1999):** Male copulatory sensory stimulation induces female ejection of rival sperm in a damselfly. *Proc. Roy. Soc. London, Ser. B, Biol. Sci.* 266(1421): 779-784. (in English). ["Male damselflies possess very specialized genitalia. Females mate multiply and store sperm in two sperm storage organs, the bursa copulatrix and the spermatheca. During copulation, males physically remove the sperm stored in these organs using their genitalia. I document a novel mechanism by which males gain access to the spermatheca in *Calopteryx haemorrhoidalis asturica*. The mechanism is based on male stimulation of the female sensory system that controls egg fertilization and laying. During copulation, the aedeagus (a male genitalic structure indirectly involved in sperm transfer) distorts the cuticular plates in the female genital tract that bear mechanoreceptive sensilla. This stimulation results in sperm ejection from the spermatheca. Aedeagus width is positively correlated with the amount of sperm ejection.

I propose that males have exploited a pre-existing female sensory bias to gain access to otherwise physically unreachable sperm. These results shed light on the issue of the origin of female preferences in current models of sexual selection and on the evolution of genitalia via sexual selection. It is postulated that females might use this process as a form of post-copulatory sexual selection on the basis of males' genitalia." (Author)] Address: Cordoba-Aguilar, A., Univ. Sheffield; Dept Anim. & Plant Sci., Sheffield S10 2TN; S Yorkshire, UK. E-mail: sclab@sheffield.ac.uk

924. **Czachorowski, S.; Buczynski, P. (1999):** Gefährdungen und die Notwendigkeit eines Schutzes der Wasserinsekten in Polen. In: *Polski Towarzystwo Entomologiczne & Instytut Ochrony Przyrody PAN (Eds.): Konferencja Naukowa. "Ochrona owadów w Polsce u progu integracji z Unia Europejska"*, Kraków, 23-24 wrzesnia 1999. ISBN 83-01-08125-2. [Conservation of insects on the threshold of the integration of Poland into the European Community]: 9-10. (in Polish). [German translation of the Polish paper: An assessment is quite difficult due to the lack of up-to-date information on Polish insects. The authors tried to compile all available data from different sources. Compared with the situation in more industrialized countries there seem to be less danger for insects in aquatic habitats. On the basis of the species lists some key stone species for nature (species) conservation purposes were derived (but not presented in the paper).] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczynski@biotop.umcs.lublin.pl

925. **Czachorowski, S.; Buczynski, P. (1999):** [Koeffizient der Biozönosenatürlichkeit - ein potentielles Instrument zur Bewertung des ökologischen Zustandes der Moore in Polen, am Beispiel der Odonata und Trichoptera]. *Akademia Polnicza w Lublinie, Pleski Park Narodowy, Polski Towarzystwo Hydrobiologiczne: Problemy aktywnej ochrony ekosystemów wodnych i forowiskowych w polskich parkach narodowych (materiały międzynarodowej konferencji)*. 8-9 października 1999 roku. Okuninka n/Jeziorem Białym Włodawskim. ISBN 83-7259-008-7: 16-17. (in Polish). [To assess bog habitats in Poland the authors developed an coefficient of naturality. It intends to provide information on the situation of bogs for nature conservation purposes with special emphasis on Odonata and Trichoptera. A German translation of the paper is available from the author or IDF (address see above).] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczynski@biotop.umcs.lublin.pl

926. **Czaplak, D. (1999):** *Ophiogomphus colubrinus* on the Ausable River. *Argia* 11(3): 11. (in English). [report on discovery of *O. colubrinus* in the framework of the 1999 DSA meeting] Address: Czaplak, D.S., 13641 Ambassador Drive, Germantown, MD 20874, USA. E-mail: dma3@aol.com

927. **Dahl, J.; Greenberg, L. (1999):** Effects of prey dispersal on predator-prey interactions in streams. *Freshwater biology* 41(4): 771-780. (in English). ["1. We studied the effect of mesh size (6 and 3 mm) on interactions between brown trout (*Salmo trutta*) and benthic invertebrates in enclosures placed in a stream in southern Sweden. We also compared how different prey

exchange rates affected interactions between trout and invertebrates. 2. Trout had strong impacts on some benthic taxa, and different mesh sizes produced different patterns. Trout affected the abundance of 10 of the 21 taxa examined, six in enclosures with 3 mm mesh and six in enclosures with 6 mm mesh. The abundance of nine of the prey taxa was lower in the presence of trout, only leptocerids were more numerous in the presence of trout. 3. Our measurements of prey immigration/emigration, together with trout diet data, suggest that direct consumption by trout, rather than avoidance behaviour by prey, explains most decreases in prey abundance. There was avoidance behaviour by only two of the twenty-one prey taxa, with trout inducing emigration of the mayflies *Baetis rhodani* and *Paraleptophlebia* sp. 4. Trout indirectly increased periphyton biomass in both 3 and 6 mm enclosures. The effect of trout on periphyton was probably due to strong effects of trout on the grazer, *Baetis rhodani*, *Heptagenia* sp. and *Paraleptophlebia* sp. 5. Our results suggest that mesh size, through its effects on exchange rates of prey, may affect interactions between predators and prey in running waters, but that the effects of dispersal and predation on invertebrates are taxon specific." (Authors) A few remarks are made on *Calopteryx* sp. consumed by the trout, and the effects of mesh size on the immigration of invertebrates including *Calopteryx* sp. into enclosures.] Address: Dahl, J., Department of Entomology, Cornell University, Ithaca, NY, 14853, USA. E-mail: jd76@cornell.edu

928. **Daigle, J.J. (1999):** Say's Spiketail from Florida. *Argia* 11(2): 14. (in English). [records from two localities in Florida of the rare American *Cordulegaster sayi*] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: daiglej@dep.state.fl.us

929. **Damme, K. van; Dumont, H. (1999):** A drought-resistant larva of *Pantala flavescens* (Fabricius, 1798) (Odonata: Libellulidae) in the Lençóis Maranhenses NE-Brazil. *International Journal of Odonatology* 2(1): 69-76. (in English). ["A single male of *Pantala flavescens* was collected by chance with dry mud in the bed of a pond in the Lençóis Maranhenses (N-E Brazil) which had been dry for several months. It was noticed as a larva in an aquarium about seven days after the mud first had been wetted and it was then reared to the imaginal stage. Fifteen measurements were taken on three larval skins that could be recovered. These were fitted to literature data on larval development that had first been converted to exponential growth curves, in an effort to determine whether the drought-resistant stage had been an egg or a larva. It was found that that a drought-resistant egg was improbable, and that the larva had probably survived drought as an early instar (2-4). It is argued that early larval tolerance to drought may be common in *Pantala*, and may contribute as much to its success in semiarid environments as its rapid larval development." (Author)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

930. **D'Aquilar, J. (1999):** Les description originales des Odonates d'Europe 1. Les espèces linnéennes. *Martinia* 15(1): 30-40. (in French, with English summary). [the original descriptions of Odonata done by C. Linné are documented as facsimile] Address: d'Aquilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France

931. **D'Aquilar, J. (1999):** Les description originales des Odonates d'Europe 2. Les espèces et les genres de Fabricius. *Martinia* 15(2): 55-68. (in French, with English summary). [the original descriptions are documented as facsimile; explanations are given about terminology or the written form of the genera *Agrion* and *Aeshna*] Address: d'Aquilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France

932. **d'Aquilar, J. (1999):** Les description originales des Odonates d'Europe. 3. Fourcroy, Antoine François de (1755-1809). *Martinia* 15(3): 99-103. (in French, with English summary). [documentation of the original description of *Ophiogomphus cecilia*; some biographic information on Fourcroy] Address: d'Aquilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France

933. **David, S. (1999):** Structure of the communities of dragonflies (Insecta: Odonata) and their biotops in the inundation of the Hron river potamal (SW Slovakia). *Krajinnöekologické plánovanie na Prahu. 3. tisícročia. 10.-11. maj 1999, Smolenice.* (Hrnciarová, T. & Z. Izakovicová (Eds.): 161-170. (in Slovakian, with English summary). ["Odonatological investigations were carried out in the Hron river basin in the lower part, a 75 km long section. We selected 26 stationary sites in the inundation of the study area (river, dead channels, gravel pits). The investigations were based on a total of 1564 individuals belonging to 33 species, which represents 48.83% of the dragonfly fauna of the Slovak Republic. The structure of the communities was analysed on the basis of the coenological characteristics established in view of the method used. These characteristics were in particular: species composition, species dominance and frequency, diversity and equitability. The degree of similarity of the aquatic biotopes similarity was estimated by Wishart's induce. The data were evaluated by cluster analysis (using the NCLAS programme with the complete linkage method). The structure of dragonfly communities was discriminated on the basis of their species composition. 4 groups of biotopes were separated on the first level of division. The same method was used to classify the odonate communities. Three cenoses could be separated: *Gomphus* - *Calopteryx splendens*, *Orthetrum* - *Libellula depressa*, and *Lestes* - *Sympetrum* - *Aeshna* (affinis, mixta) - cenosis." (Author)] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: david@pribina.savba.sk

934. **De Marco, P.; Latini, A.O.; Reis A.P. (1999):** Environmental determination of dragonfly assemblage in aquaculture ponds. *Aquaculture Research* 30(5): 357-364. (in English). ["Odonate larvae are important components of aquatic environments in tropical areas. They also develop in aquaculture ponds, where they can cause economic losses. In this study, we have tried to describe the general community patterns in aquaculture ponds in Vicosá, south-eastern Brazil. Our aim is to evaluate how environmental and bionomic factors can determine their composition and species richness. We identified two groups of species (plants and bottom-dwellers) based on larval microhabitat preferences. Vegetation determines the occurrence of some species whose adults select certain plants for oviposition. The ponds with more extreme conditions (extensive cover of plants or vegetation absent) showed lower species richness than those with intermediate conditions, *Coryph-*

aeshna adnexa and Brachymesia furcata were of larger size but had low abundance or were only collected accidentally. Species of intermediate size (Tramea cophysa, Micrathyria spp., Orthemis discolor and Erythrodiplax fusca) were more abundant and are considered as potential predators of fish fry." (Authors)] Address: De Marco, P., Univ Fed. Vicosa, Dept Biol. Geral., BR-36571000 Vicosa; MG; Brazil

935. **De Marmels, J. (1999):** Rare Venezuelan dragonflies (Odonata) evaluated for their possible inclusion in the national Red Data Book. International Journal of Odonatology 2(1): 55-67. (in English). ["Of the 480 species and subspecies listed from Venezuela up to December 1996, 113 are "rare", i.e. with three or less individual records, or are known from three or less localities. Thirty-eight of them are distributed north and northwest of the Orinoco where 90% of the human population lives and, hence, negative impact on the ecosystems is more evident. The status of conservation of these species was assessed by applying the criteria published by the World Conservation Union (IUCN), in 1994. Sixteen species and subspecies are proposed for inclusion in the Venezuelan Red Data Book, viz. four Polythoridae, four Megapodagrionidae, one Lestidae, one Pseudostigmatidae, four Gomphidae, one Aeshnidae and one Libellulidae. Of the evaluated taxa, one genus and seven species are Venezuelan endemics. Forest fires, deforestation, pollution, water catchment constructions and human invasion of protected areas are some of the main factors which threaten these taxa." (Author) The following species are commented: Heteragrion macilentum Hagen in Selys, 1862; Palaemnema nathalia Selys 1886; Leptagrion siqueirai Santos 1968; Progomphus polygonus Selys, 1879; Brechmorhoga innupta Racenis 1954; Cora inca Selys 1873; Cora xanthostoma Ris 1918; Euthore fastigiata (Selys 1859); Polythore terminata Fraser 1946; Phyllogomphoides brunneus Belle 1981; Andaeschna timotocuica De Marmels, 1994; Sympetrum evanescens De Marmels, 1992; Mecistogaster modesta Selys 1860; Agriogomphus jessei (Williamson 1918); Erpetogomphus sabaeticus Williamson 1918; Phyllogomphoides semicircularis (Selys, 1854); Archilestes tuberalatus (Williamson, 1921); Philogenia ferox Racenis 1959; Philogenia polyxena Calvert 1924; Sciotropis cyclanthorum Racenis 1959; Sciotropis lattkei De Marmels 1994] Address: De Marmels, J., Instituto de Zoologia Agricola, Facultad de Agronomia, Universidad Central de Venezuela, Apartado 4579, Maracay 2101-A, Venezuela.

936. **Decocq, O.; Pieron, J. (1999):** Des larves de Cordulegaster boltoni (Insecta: Odonata) sous épicéa (Picea abies) dans le Parc naturel Viroin-Hermeton. Gomphus 15(2): 63-68. (in French, with English and Flemish summary). ["In three different small streams of the Belgian Ardennes (Viroinval, Namur province), larvae of C. boltoni were found between small plantations of spruce (Picea abies) surrounded by deciduous woodland. So, the question of larval development of that species under conifers is renewed; they might have a greater influence on imagines (egg laying, hunting, "patrolling" flights), or for emergence [...] Some favourable management measures in forest areas are proposed." (Authors)] Address: Decocq, O., Centre Marie-Victorin, rue des Ecoles 21, B - 5670 Vierves-sur-Viroin, Belgium; Pieron, J., rue Vandervelde 74, B - 6182 Souvret, Belgium

937. **Delft, J. van; Goudsmits, K. (1999):** Gomphus vulgatissimus in the basin of the Dommel in 1998. Brachytron 3(1): 12-14. (in Dutch, with English summary). ["The status and habitat of a poorly known population of G. vulgatissimus south of Eindhoven in the province of Noord-Brabant is discussed. It is found in a typical lowland stream with clear, unpolluted water and with a characteristic assembly of brook inhabiting plants, insects and fish. The population appears to have grown, possibly as a result of a structural restoration of the stream in 1994. An unequal sex-ratio, 58% of 102 collected exuviae was male, is possibly explained by the early search dates (10 to 23 May 1998)." (Authors)] Address: Goudsmits, K., Eerste Dorpstraat 7a, NL-3701 HA Zeist, The Netherlands

938. **Dijkstra, K.-D.; Dingemanse, N.L. (1999):** Flying Goldfish - An impression from Kibale Forest, Uganda. W.D.A.'s Agrion 3(1): 13. (in English). ["...impression of how two European dragonflywatchers introduced themselves to an odonatological new world."] Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands

939. **Dijkstra, K.-D. (1999):** Langs Franse stromen (2). NVL Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(1): 7-8. (in Dutch). [second part of a report from a odonatological trip to French rivers (Gardon, Vidourle, Tarn); special emphasize was given to Oxygastra curtisii, Gomphus graslinii, and Thecagaster bidentata] Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands

940. **Dijkstra, K.-D.B.; Mostert, K.; Velzen, J.-W. van; Witte, R.H. (1999):** Recent developments in the dragonfly fauna of the dunes of Holland and Zeeland. Brachytron 3(1): 15-29. (in Dutch, with English summary). ["The coastal dunes are isolated from the species-rich habitats on sandy soils inland by a belt of relatively inhospitable polders with peaty and clay soils. They also form an almost unbroken natural corridor through which dragonfly migration is possible, whilst the sea is a barrier that forces migrants from the east to settle. Remarkable invasions, colonizations and vagrancies by Odonata during the last five years along the Dutch coast, excluding the Wadden Sea islands, are listed. There were large invasions of Lestes barbarus, Aeshna affinis, Sympetrum danae, S. flaveolum and S. fonscolombii, all of which reproduced in the area subsequently. Sympecma fusca, Lestes dryas, Ischnura pumilio, Pyrrhosoma nymphula, Brachytron pratense, Aeshna isocetes, Libellula depressa, Crocothemis erythraea and Leucorrhinia rubicunda bred successfully. All of these species were either new in this sense, or had been absent for many years. Calopteryx splendens, Lestes virens, Hemianax ephippiger, Gomphus vulgatissimus, Somatochlora metallica and Leucorrhinia pectoralis reached the region as vagrants, thus proving they are capable of reaching new habitats when these are created. Habitat restoration, increasing observation intensity, prevailing weather and expanding ranges are discussed as factors to explain the new records. Most of the treated species appear to have reached the area with the help of easterly winds and fine weather. Habitat restoration has principally created opportunities for pioneer species and those adapted to fluctuating water levels. It is suggested that permanent, mesotrophic lakes should be restored in order to bring back species that

are extinct in the dunes, like *Cordulia aenea* and *L. pectoralis*." (Authors)] Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands

941. **Dommanget, J.-L. (1999):** 3ième séminaire: Inventaire et cartographie des invertébrés comme contribution à la gestion des milieux naturels français, Besançon, juillet 1999. Aspects généraux et odonatologiques. *Martinia* 15(3): 89-98. (in French, with English summary). [134 people gathered the meeting in Besançon, France to discuss about mapping and management of invertebrates. The Société Française d'Odonatologie presented itself as society, and four posters with the following items: "Rémi Chalmel: Les basins de rétention: des milieux aquatiques complémentaires?", "Samuel Jolivet: Intérêt de l'échantillonnage des exuvies pour l'étude et la gestion conservatoire des odonates", "Thomas Williamson: La micro-gestion, une solution pour la préservation des invertébrés aquatiques", and "Jean-Louis Dommanget: L'inventaire cartographique des odonates de France: situation actuelle".] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

942. **Dommanget, J.-L.; Williamson, T. (1999):** Réactions de quelques odonates en forêt de Rambouillet lors de l'éclipse de soleil due 11 août 1999 (Département des Yvelines). *Martinia* 15(3): 79-82. (in French, with English summary). [The behaviour of *Ceragrion tenellum* (1m, 1f), *Orthetrum coerulescens* (2f), and *Sympetrum sanguineum* (1f, imm.) was observed before, during, and after the eclipse.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

943. **Donnelly, N. (1999):** 1999 has been a bumper year in New York. *Argia* 11(3): 13-14. (in English). [New York, (Wyoming), USA, *Somatochlora kennedyi* Walker 1918, *Neurocordulia yamaskanensis* (Provancher, 1875), *Somatochlora tenebrosa* (Say 1839), *Somatochlora walshii* (Scudder, 1866), *Somatochlora williamsoni* Walker 1907, *Argia apicalis* (Say 1839), *Enallagma basidens* Calvert 1902, *Boyeria grafiana* Williamson, 1907, *Cordulegaster erronea* Selys 1878, *Gomphus fraternus* (Say 1839), *Gomphus vastus* Walsh, 1862, *Ophiogomphus anomalus* Harvey, 1898, *Ophiogomphus howei* Bromley 1924] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

944. **Donnelly, N. (1999):** A short Texas collecting trip. *Argia* 11(2): 10- [report on a trip in April 1999 including records of *Pseudoleon superbus*, *Erythemis pleja*, *Macromia costalis*, and *Epithea costalis*; special notice is given to the problem for distinguishing *E. costalis* and *E. semiaquea*] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

945. **Donnelly, N. (1999):** *Argia* 11(1). *Argia* 11(1): 40 pp. (in English). [a lot of additional information, not reviewed separately in this issue of OAS on meetings, book announcements, etc.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

946. **Donnelly, N. (1999):** Back to Borneo. *Argia* 11(1): 8-11. (in English). [rainy season trip to Borneo with annotations to *Macromia euterpe* Laidlaw 1915, *Neurobasis cyaneipennis* (Förster 1897), *Rhinoneura*

villosipes Laidlaw 1915, *Vestalis beryllae* Laidlaw 1915, *Euphaea* spp., *Rhinagrion elopuræ* (McLachlan in Selys, 1886), *Rhinocypha humeralis* Selys 1873, *Rhinocypha cucullata* Selys 1873, *Rhinocypha biseriata* Selys 1859, *Stenagrion dubium* (Laidlaw 1912)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

947. **Donnelly, N. (1999):** Dot-map project update. *Argia* 11(1): 30-31. (in English). [compilation of current work on dot-maps for USA Odonata, and Canada] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

948. **Donnelly, N. (1999):** History of Odonata study in north America - James G. Needham. *Argia* 11(1): 24-26. (in English). [many interesting information on Needham and American odonatology. Enjoy the paragraphs on the 'Dragonets': "These stalwart ladies didn't hesitate to collect the more elusive gomphids with a shotgun!", and early females in odonatology.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA

949. **Donnelly, N. (1999):** Migration of dragonflies: a moving topic in 1999. *Argia* 11(3): 17-19. (in English). [compilation of E-mails with notices on migrating Odonata in USA; in most cases referring to *Sympetrum corruptum*] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu

950. **Donnelly, N. (1999):** Odonatists in the news. *Argia* 11(3): 20. (in English). [brief compilation of two reports in Canadian Geographic on Paul Brunelle, and in the Hartford (Connecticut) Courant on Dave Wagner] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu

951. **Dortel, F. (1999):** Étude odonatologique et floristique de la vallée de la Chézine (Nantes, St. Herblain, département de la Loire-Atlantique). *Martinia* 15(3): 104. (in French). [In 1998, 23 species could be observed, of which *Calopteryx virgo meridionalis*, *Orthetrum brunneum*, and *O. albistylum* are mentioned. The latter is very rare in the Département.] Address: Dortel, F., 5, Avenue du Docteur Touaille, F-44100 Nantes, France

952. **Dortel, F.; Branger, F. (1999):** Nouvelles observations d'*Epithea bimaculata* (Charpentier, 1825) dans le département de l'Indre. *Martinia* 15(3): 88. (in French). [discovery of an exuvia and an imago on May 23, 1999 of *E. bimaculata* on the Étang de la Gabrière, municipality of Lingé.] Address: Dortel, F., 5, avenue du Docteur Touaille, F-44100 Nantes, France

953. **Dudgeon, D. (1999):** Tropical Asian streams. Zoobenthos, ecology and Conservation. Hong Kong University Press. ISBN 962 209 469 4: 830 pp. (in English). [Everyone interested in Asian (macro-) zoobenthos, and stream ecology should be enthusiastic about this book. It is a compendium of the current knowledge on the subject. The compilation of a 160 pages - bibliography make the book to a cornerstone in the world freshwater biology. 8 chapters will give you an overview on the ecological conditions in Asia, provides introductory chapters on the orders of (macro-)zoobenthos including Odonata on pages 291-310, will enable you to key out the zoobenthos on the family le-

vel, and will give you good drawings of some larvae on the species level. You will get excellent information on anthropogenic threats on the Asian rivers, will get advice on experimental design and detection of anthropogenic impacts in streams, and process-oriented studies in stream ecology. Some concluding remarks are followed by an excessive bibliography, and indexes to subjects and organisms. The Odonata larvae pictured are: *Euphaea decorata*, *Protosticta taipokauensis*, *Philoganga velusta*, *Rhinocypha perforata*, *Mnais mnome*, *Tetracanthagyna* sp., *Ophiogomphus sinicus*, *Helio gomphus scorio*, *Ictinogomphus pertinax*, and *Zygonyx iris*.] Address: Hong Kong University Press, 14/F Hing Wai Centre, 7 Tin Wan Praya Road, Aberdeen, Hong Kong

954. **Dunkle, S. (1999):** Odonata of Pyramid Lake, Nevada. *Argia* 11(1): 23-24. (in English). [documentation of a list of Odonata from a book on fishes and fishery of Nevada from 1962] Address: Dunkle, S., Biol. Dept, Collin County Community College, 2800 E, Spring Creek Parkway, Plano, TX 75074, USA

955. **Edelaar, P.; Niesen, H. (1999):** De Maanwaterjuffer *Coenagrion lunulatum* in de Noord-Hollandse duinen. NVL Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(3): 3-4. (in Dutch). [Coenagrion lunulatum in the dunes of northern Netherland; detailed documentation of the 1999 records] Address: Edelaar, P., In de Potvis, De Dageraad 3, NL-1797 SK Den Hoorn (Texel), The Netherlands. E-mail: edelaar@nioz.nl

956. **Ellenrieder, N. von; Muzón, J. (1999):** The Argentinean species of the genus *Perithemis* Hagen (Anisoptera: Libellulidae). *Odonatologica* 28(4): 385-398. (in English). ["The present work has two aims: to give an updated revision of the genus in Argentina, including a key, and to propose specific characters not included in previous revisions. *Perithemis waltheri* Ris is considered as a junior synonym of *P. icteroptera* (Selys). The first description of the last larval instar of *P. icteroptera*, and a redescription of the last larval instar of *P. mooma* from Argentina are included." (Authors) *Perithemis* *lais*, *P. thais*] Address: Muzon, J., Instituto de Limnología "Dr. Raul A. Ringuelet", C.C. 712, 1900 La Plata. Argentina E-mail: muzon@ilpla.edu.ar

957. **Endersby, I. (1999):** Disturbing news from "Downunder". *W.D.A.'s Agrion* 3(2): 23. (in English). [reports on the damage of Wingecarribee Swamp in New South Wales, the southmost locality for *Petalura gigantea*, on 8th August 1998, and the habitats of *Hemiphysalia mirabilis* at Wilson's Promontory suffered by a serious drought. "Over the centuries the species must have survived many periods of drought and we must hope it will survive the present one"] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

958. **Ewers, M. (1999):** Die Libellen zwischen Weser und Ems. Schriftenreihe des Staatlichen Museums für Naturkunde und Vorgeschichte Oldenburg 12: 112 pp. (in German). [detailed account on the odonate fauna of the northwestern part of Germany; all species (61) were treated monographically with information on diagnostic morphological structures, phenology, habitat, threat, map of distribution, and colour picture. On pages 8 to 38 some introductory information on general biology

of Odonata, and on typical dragonflies of different habitat types are given.] Address: Isensee Verlag, Haarenstr. 20, D-26122 Oldenburg, Germany

959. **Ezenwaji, H.M.G. (1999):** The abundance and trophic biology of *Clarias albopunctatus* Nichols and LaMonte, 1953 (Osteichthyes: Clariidae) in a tropical floodriver basin. *Hydrobiologia* 392(2): 159-168. (in English). ["The abundance, food and feeding biology of *Clarias albopunctatus* was studied over a period of 17 months in the lower River Anambra, Nigeria. The catfish was more abundant in late dry season (January-March) and early rainy season (April-June) than in other periods of the year in the small-sized Akwu pond than in other habitats. Feeding intensity was higher at night and at dawn (20.00-05.00 h) than during the day (08.00-17.00 h) in the 151-200 mm TL size class and during the rainy season (April-September). There was no sex-dependent variation in feeding intensity. Insects were the predominant food, followed by crustaceans. Of primary importance were Chironomidae (mainly *Chironomus* spp. and *Tanytus* sp.), Odonata nymphs, *Dytiscus* sp., mosquito larvae and pupae, *Gyrinus* sp., *Daphnia* sp., Ostracoda and *Tilapia* fry. Qualitative food composition and food richness were size, but not sex- or season-dependent. Diet breadth increased with catfish size and during the rainy season. The feeding behaviour of the catfish include foraging, shovelling and surface feeding. Abundant food and ability to switch to more available items enable *C. albopunctatus* to maintain its abundance in the River Anambra." (Author)] Address: Ezenwaji, H.M.G., Univ. Nigeria; Dept Zool., Fisheries & Hydrobiol Res Unit, POB 3140; Nsukka; Nigeria

960. **Ferreras-Romero, M. (1999):** Biodiversity of rheophilous Odonata in southern Spain. *Odonatologica* 28(4): 417-420. (in English). ["Biodiversity is a complex issue, frequently simplified by equating it with species richness. In this paper an assessment of river systems biodiversity in southern Spain is carried out. Four systems here analysed run through mountains of medium altitude and they are remarkable for their acceptable species richness, high proportion of spp. with a restricted western Mediterranean distribution and low ratio of spp. per genus. Species distinctness was estimated according the schemes of R.I. Vane-Wright et al. (1991, *Biol. Conserv.* 55: 235-254) and R.M. May (1990, *Nature*. Lund. 347: 129-130), based on the information content of the topology of a hierarchical classification. (Author)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, ES-14004 Córdoba, Spain

961. **Förster, S. (1999):** The Dragonflies of Central America, exclusive of Mexico and West Indies. A guide to their identification. *Odonatological monographs* 2 (ISBN 3-9804366-0-8): 141 pp. (in English). ["This is a collection of up to date identification keys to the more than 370 species of dragonflies known to occur on the mainland of Central America. The keys are supplemented with drawings as well as brief descriptions of general appearance, behavior, and ecology of most of the genera. Plates introducing to dragonfly morphology, a checklist of species, glossary, bibliography, and an index are also included." (Author). The printing of this key was promoted by the INTERNATIONAL DRAGONFLY FUND.]

Address: Orders should be directed to: Steffen Förster, c/o Marina Cords, PO Box 2579, Kakamega, Kenya

962. **Forbes, M.R.; Muma, K.E.; Smith, B.P. (1999):** Parasitism of *Sympetrum* dragonflies by *Arrenurus planus* mites: maintenance of resistance particular to one species. *Int. jour. parasitology* 29(7): 991-999. (in English). ["Using field surveys and histological methods, we show that a dragonfly species (*Sympetrum internum*) has an effective resistance, not seen previously in other odonates, to a mite parasite (*Arrenurus planus*). This mite is a generalist parasite known to effectively engorge on several other odonate species. We argue that selection is likely weak, favouring counter adaptations of *Arrenurus planus* to *Sympetrum internum*, in part because other host species are available. We further argue that this pattern is possibly linked to the fact that the mode of resistance is relatively novel, and because *Sympetrum internum* is rare compared to another host species, *Sympetrum obtusum* at our study site. Although resistance of *Sympetrum internum* is quite effective against *Arrenurus planus*, *Arrenurus planus* larvae still attach to this species, but less often than they attach to *Sympetrum obtusum*. Attachment to unsuitable hosts may reflect constraints operating on *Arrenurus planus* larvae during host discovery. Such factors influencing the evolution of resistance, when several potential host species exist, have not received much attention." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

963. **Fuhrmann, K. (1999):** Libellenbeobachtungen in Nordvorpommern und angrenzenden Gebieten. *Libellula* 18(1/2): 49-53. (in German, with English summary). ["From 1994 to 1996, 39 dragonfly species were recorded at 28 different localities in the northeastern part of Mecklenburg-Vorpommern, Germany. Emphasis is given to the northernmost occurrence of *Erythromma viridulum* in Europe, *Anax imperator* and *Sympecma fusca* on Baltic islands, as well as a locality with a large population of *Leucorrhinia albifrons*." (Author)] Address: Fuhrmann, K., Elritzenweg 23a, D-26127 Oldenburg, Germany. E-mail: kay.fuhrmann@t-online.de

964. **Garrison, R.W. (1999):** The genus *Neoneura*, with keys and description of a new species, *Neoneura jurzitzi* spec. nov. (Zygoptera: Protoneuridae). *Odonatologica* 28(4): 343-375. (in English). ["A synopsis of all 23 spp. includes keys to both sexes, based primarily on caudal appendage morphology in males and morphology of the hind lobe of the prothorax in females, diagnoses, distributional notes and diagnostic illustrations. *N. jurzitzi* sp.n. (holotype male: Brazil, Santa Catarina state. Nova Teutonia, 5-XI-1942, in UMMZ) is described, and the male and female of *N. rufithorax* Selys are described based on specimens from Peru." (Author)]. Address: Garrison, R.W., Research Associate, Natural History Museum of Los Angeles County. 900 Exposition Blvd., Los Angeles, CA 90007, United States

965. **Godreau, V.; Bornette, G.; Frochot, B.; Amoros, C.; Castella, E.; Oertli, B.; Chambaud, F.; Obersti, D.; Craney, E. (1999):** Biodiversity in the floodplain of Saone: a global approach. *Biodiversity and Conservation* 8(6): 839-864. (in English). ["Biodiversity of European floodplains is seriously threatened mainly due to

(1) modifications of river courses such as channelisation or embankments, and (2) changes in traditional agricultural practices (i.e. usually pastures), into intensive production using drainage and fertilisation. An upstream-downstream survey of the Saone floodplain (France) has been done to identify the contribution of habitats to the floodplain biodiversity. Selected taxa were aquatic and terrestrial vegetation, Odonata, Coleoptera, Amphibians, and birds. The taxa were sampled in different habitat types that were: forests, grasslands and aquatic habitats. Tributary confluences with the river and cut-off channels contributed greatly to the floodplain diversity according to their invertebrates and aquatic vegetation communities. The abundance of rare species (benefitting of a national or regional protection status) was the highest in hygrophilous grasslands. Moreover, we demonstrated that diversity of breeding bird communities was correlated with the size of these habitats. We demonstrated also that alluvial forests contributed to maintain some particular species as Middle-spotted Woodpecker (*Dendrocopus medius*), while new plantations were colonized by openland bird communities sensible to the edge effect. Grassland fragmentation for agriculture appeared to be a major cause in biodiversity loss. Any alteration of the floodplain dynamics must be avoided to preserve the present diversity of riverine wetlands." (Authors)] Address: Godreau, V., Univ Bourgogne; Lab. Ecol. Evolut., Batiment Gabriel; F-21000 Dijon; France. E-mail: vgodreau@u-bourgogne.fr

966. **Goffart, P. (1999):** Compte-rendu de la Journée de rencontre et d'étude sur le thème "Libellules de Belgique", du dimanche 14 mars 1999, à Louvain-la-Neuve. *Gomphus* 15(2): 96-98. (in French). [report on the meeting of the Belgian odonatologists; the lectures are shortly summarized: • Do Zygoptera behave like lizards (Autotomie among Odonata) (Marijan de Block & Robby Stoks) • The dragonflies of the swamps of Harchies-Hensies-Pommeroeul (Thierry Paternoster) • Sexual selection in *Sympetrum striolatum* (Famke Valck & Robby Stoks) • Actual situation of the Odonata of the bogs of Wallonia (Phillip Goffart) • One year of monitoring Odonata in the Kalmthoutse Heide (Luk Meuris) • Dragonflies of the valley of the River Samme and the River Senette: results of the inventarisation and measures for conservation (Roland de Schaetzen) • Sperm competition in *Lestes sponsa*: will be the final the first? (Kris Lauwers) • Slide show: The stars among the dragonflies, and the attraction for photographers (Geert De Knijf & Phillip Goffart)] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvai-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

967. **Goffart, P. (1999):** Compte-rendu de l'excursion aux mares de Ben-Ahin (vallée de la Meuse) du 28 juin 1997. *Gomphus* 15(2): 98-99. [report on a trip to the lakes of Ben-Ahin (Wallonia, Belgium) with checklist of the species observed, e.g. *Coenagrion pulchellum*, *Ceragrion tenellum*, *Libellula fulva*, and *Brachytron pratense*] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvai-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

968. **Goffart, P. (1999):** Compte-rendu des observations d'espèces prioritaires d'Odonates en Wallonie durant la saison 1998, dans le cadre du programme d'Inventaire et Surveillance de la Biodiversité (ISB). *Gomphus* 15(2): 86-95. (in French, with English and

Flemish summary). ["This report gives an account of observations made in 1998 by the Gomphus Working Group collaborators on Odonata priority species, pointed out in the "Biodiversity Survey and Monitoring" programme in Wallonia because of their great rarity and/or decline. It also presents collected information dealing with rare southern species, expanding to the north, during the same flight-season. New reproductive populations were discovered for the following species: *Coenagrion mercuriale*, *Onychogomphus forcipatus*, *Aeshna subarctica*, *Oxygastra curtisii*, and *Orthetrum coerulescens*." (Author). In addition, *Sympecma fusca*, *Lestes dryas*, *L. barbarus*, *Coenagrion hastulatum*, *C. scitulum*, *C. pullchellum*, *Gomphus vulgatissimus*, *Brachytron pratense*, *Anax parthenope*, *Thecagaster bidentata*, *Somatochlora arctica*, *S. flavomaculata*, *Libellula fulva*, *Crocothemis erythraea*, *Orthetrum brunneum*, and *Sympetrum fonscolombii* are treated in some detail.] Address: Goffart, P., Unité d'Ecologie et de Biogéographie (UCL) 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

969. **Goffart, P. (1999):** Participer au programme d'Inventaire et de Surveillance de la Biodiversité (ISB) en Wallonie. *Gomphus* 15(2): 100-104. (in French). [the possibilities to contribute to the inventarisation of biodiversity in Wallonia (Belgium) are outlined in detail; a list of habitats (zones humides de grand intérêt biologique) and of special odonatological value, is annexed] Address: Goffart, P., Unité d'Ecologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

970. **Goodwin, F. (1999):** An on-going study of the relationships between ants, birds, and dragonflies during the phenomenon of swarms at Massachusetts Audubon Society's Ipswich River Wildlife Sanctuary. *Argia* 11(2): 14-15. (in English). ["In the summer of 1997 I was given the challenge to identify and to photograph species of birds and dragonflies involved in swarm feeding on small flying insects emerging from the soil. [...] The area of activity was on grass fields and lawns near the top of the drumlin at the Ipswich River Wildlife Sanctuary (IRWS) from mid-afternoon to dusk. The swarms mainly consisted of 30 to over 200 dragonflies with the swallows and swifts mixing in. [...] The first swarm of 1998 was observed on August 6 at 16:00 hrs. with over 100 dragonflies mixing in with swallows and swifts, feeding about 150 feet over a field forming the edge of the drumlin. [...] The swarm phenomenon at IRWS occurs only when certain weather conditions exist; heat, fairly high humidity, and moist soil. These are the conditions needed for the ants to leave the nest for their mating flights. The moist soil seems to be the main key. The queens need the soil to be softened for re-entry. The males (if they make it back to the ground) die. Two species of ants involved as prey in the feeding swarms have been identified as *Lasius neoniger*, the Labor Day Ant and, *Solenopsis molesta*, a species of fire ant. Two different species of subterranean ants were also caught. [...] The last swarm was observed on September 27, 1998. 30 to 50 dragonflies were flying just above our front lawn feeding on a flight of ants. I was able to net ten: 5 were *Aeshna umbrosa*, (all males); 4 were *A. clepsydra*, (3 males 1 female), and 1 was *A. verticalis*, (male). All were in rough shape with torn wings and missing body parts. During the 1998 season I recorded 16 swarms and netted 223 dragonflies: *Aeshna canadensis*, *A. clepsydra*, *A. constricta*, *A. tu-*

berculifera, *A. umbrosa*, *A. verticalis*, *A. junius*, *Somatochlora williamsoni*. Also I observed 2 *Pantallas* within the swarms, no species identification was made. Although the *Pantallas* feed with the other species they are not readily accepted. Several times one of the other species made a pass as if to attack. The *Pantallas* would turn on their afterburner and loop away, but did not leave the area of the swarm. The intensity of the dragonflies while feeding is hard to believe. Neither weather or several people swinging a net can deter them. One evening while working a large swarm, a cold front arrived with rain, thunder, and lightning. The dragonflies flew well into the storm until all the ants were either caught or had ceased flying. The time period from mid-August to Labor Day seems to be the peak of the ant mating season. If conditions are right several flights can erupt during the same evening. During this period the dragonfly numbers also peak. After Labor Day the numbers start to decrease and soon the swifts and swallows migrate south. [...]"] (Author)] Address: Goodwin, F., Massachusetts Audubon Society, Ipswich River Wildlife Sanctuary, 87 Perldns Row, Topsfield, MA 01983, USA. E-mail fgoodwin@massed.net

971. **Goodwin, F. (1999):** Massachusetts *Tremea calverti*. *Argia* 11(3): 8. (in English). [record without dates from Appleton Farm, Ipswich, Massachusetts, USA] Address: Goodwin, F.P., 87 Perkins Row, Topsfield, MA 01983, USA.

972. **Gorb, S.N. (1999):** Visual cues in mate recognition in the damselfly *Ischnura elegans* Vander Linden (Zygoptera: Coenagrionidae). *International Journal of Odonatology* 2(1): 83-93. (in English). ["Of the three recognised female morphs of *I. elegans*, only two occurred in Jagotin, Kiev Province, Ukraine. Andromorphs and infuscans together constituted 99.8% of females in the population, and only 0.2 % were infuscans-*obsoleta*. The present paper is an experimental study testing male responses to female and male models. Three questions were asked: (1) Is the colour of the model an important cue in mate recognition by males? (2) What is the area of male field of view, responsible for mate recognition? (3) Which is the preferred direction, from which each model elicits the maximal rate of copulatory responses? All colour forms of females regularly occurred in copula with males throughout the day. The violacea and andromorph female models were preferred by males. However, the manner of model presentation strongly influenced male response: copulatory responses were rare when models were presented above the male. Copulatory behaviour with a male model resulted in nearly 70% of cases when the approach was from behind, which was significantly more frequent than with female models. Among female models, the andromorph and grey-green females of the form *infuscans* were recognised as a female more frequently from behind than the violacea and brown females of *infuscans*. The role of different visual cues in mate recognition is discussed." (Author)] Address: Gorb, S.N., Max-Planck-Institut fuer Entwicklungsbiologie, Spemannstr. 35, D-72076 Tuebingen, Germany. e-Mail: stas.gorb@tuebingen.mpg.de

973. **Graves, T. (1999):** East African Odonata. *W.D.A.'s Agrion* 3(1): 15-16. [report on Ugandan Odonata including the waterfall dweller *Zygonyx regisalberti*; some notes on Odonata from Shenelle River (Afgoye, Somalia)] Address: Graves, T., Thopson Rigg

Farm, Langdale End, Scarborough, N. Yorks YO13 0LN, UK.

974. **Günther, A.; Mauersberger, R. (1999):** Verhaltensbeobachtungen an *Anax ephippiger* (Burmeister) 1995/1996 in Brandenburg (Anisoptera: Aeshnidae). *Libellula* 18(1/2): 1-14. (in German, with English summary). ["During the large invasion of *Anax ephippiger* to Northern and Central Europe the sp. was firstly recorded from Brandenburg. Reproductive behaviour was studied in a gravel pit near Cottbus, where *A. ephippiger* was abundant. Males patrolled and fed in corridors above emergent vegetation. They searched for females in the dense vegetation with a slow flight and many hovering phases. In the evening individuals formed feeding aggregations. Oviposition was always performed in tandem. In some cases tandem-males took an upright tandem-position without using their legs which is unusual in Anisoptera." (Authors)] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstr. 10, D-09599 Freiberg, Germany

975. **Hacker, F. (1999):** Beobachtungen zur Lebensweise von *Caliaeschna microstigma* (Schneider) an einem Bach in Nordost-Griechenland (Anisoptera: Aeshnidae). *Libellula Suppl.* 2: 17-31. (in German, with English summary). ["Males performed patrol flight in the afternoon and crepuscular feeding flight during sunset. Females appeared at the brook for copulation and oviposition exclusively. One male was recaptured after 30 days. Larvae live in dense tufts of water moss. Based on analysis of larval length in April and August 1993 it is suggested that a part of the eggs hatches before hibernation. The life cycle most probably is finished within one year." (Author)] Address: Hacker, F., An der Korkmühle 4, D-23896 Panten-Hammer, Germany

976. **Hämäläinen, M. (1999):** *Drepanosticta jurzitzi* spec. nov., a new damselfly from southeastern Thailand (Zygoptera: Platystictidae). *Odonatologica* 28(4): 421-423. (in English). ["The new species (holotype male: Thailand, Chanthaburi prov., Krathin waterfall, 4-V-1993) is described and illustrated. From its closest regional congeners it is readily distinguished by its pale-coloured pterostigma." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

977. **Hämäläinen, M.; Pinratana, A. (1999):** Atlas of the dragonflies of Thailand. Distribution maps by provinces. Publisher: Brothers of St. Gabriel in Thailand, 565 Samsen Road, Bangkok 10300. ISBN 974-87004-5-3: VI, 176 pp, incl. 28 pages of colour photographs- ["The book provides an up-dated checklist and distribution maps by provinces (76 provinces in Thailand) of the 315 dragonfly species known from Thailand up to 1st April 1999. In the connection of each specific map (3 maps / page), some references and brief comments on the distribution, frequency and flight season are given. In addition, of 47 species additional taxonomic and faunistic notes are given in a separate chapter. A brief history of dragonfly studies in Thailand is presented. Reference list contains 125 titles. Index of scientific names is provided. In the 28 colour pages (printed on high quality paper) a total of 153 dragonfly photographs are presented. Most of them have been taken in natural conditions. They illustrate 124 species (69 Zygoptera and 55 Anisoptera); many of which have not been pho-

tographed earlier. Besides photos taken by the authors, also those by Thomas W. Donnelly, Pisuth Ek-Amnuay, Rosser W. Garrison, Jarujin Nabhitabhata, Hans Olsvik and Ken-ichi Watanabe are included. Price: 30 US\$ (+ postage). Please send orders to: Bro. Amnuay Pinratana, St. Gabriel's College, Samsen Road, Bangkok 10300, Thailand. Fax: + 66 2 2432150, E-mail: thani@sg.ac.th The invoice will be sent with the book. Payments (by International Postal Money Order only) are due within 30 days (airmail) or 70 days (surface mail) after date of invoice. Goods supplied remains the property of Brothers of St. Gabriel until paid in full. Please, specify whether you want the book to be sent by airmail or by surface." (Hans Olsvik, taken from the Nord. Odonat. Soc., Newsl. 5(1))]

978. **Halloway, L.G. (1999):** The dragonflies and damselflies of Pagham Harbour Local Nature Reserve. Available from the author at Wigeon Cottage, 30 Fernhurst Gardens, Aldwick, Bognor Regis PO21 4AZ, UK: 44 pp. (in English).

979. **Handke, U.; Kock, B.; Kundel, W.; Riesner-Kabus, M.; Schreiber, K.-F. (1999):** Grabenräumprogramm in der Bremer Flussmarsch. Ergebnisse vegetationskundlicher und faunistischer Begleituntersuchungen. *Naturschutz und Landschaftsplanung* 31(9): 267-274. ["Ditch Clearance Programme in the River Marsh in Bremen - Results of Floristic and Faunistic Investigations. Regular ditch clearance in areas of extensively cultivated meadows is a prerequisite for the preservation of species diversity and for the existence of rare species in the 'ditch' biotope type. The ditch system in the River Marshlands in Bremen ('Niedervieland') extends to approximately 200 km and is of high value for nature conservation. The ecologically orientated ditch clearance programme was implemented for five years and was accompanied by floristic and faunistic investigations. Generally, vegetation recovered very quickly after clearance. However, the Water Soldier (*Stratiodes aloides*), which is of particular significance for highly endangered species of dragonflies and damselflies in the area, did not readily regenerate. The transplantation of individuals, on the other hand, was successful. Fauna of low mobility, such as snails, were able to reach the original density quickly compared with species which have a development cycle of several years, such as dragonflies. From the survey results conclusions were drawn for future ditch maintenance." (Author) Special emphasize is given to *Aeshna viridis* and *Anaciaeschna isoceles*. A graph shows the effects of the ditch clearance technique on emergence rate of *A. viridis*, *A. isoceles*, and *Brachytron pratense*.] Address: Handke, K., Dehnestr. 28, D-27777 Ganderkesse, Germany

980. **Hardersen, S.; Wratten, S.D.; Frampton, C.M. (1999):** Does carbaryl increase fluctuating asymmetry in damselflies under field conditions? A mesocosm experiment with *Xanthocnemis zealandica* (Odonata: Zygoptera). *Journal of applied ecology* 36: 534-543. (in English). ["1. Previous laboratory experiments have shown that the insecticide carbaryl reduces emergence success and increases fluctuating asymmetry in cell patterns of damselfly wings. These effects were validated using mesocosms. Twenty artificial ponds, each containing *Xanthocnemis zealandica*, were exposed to three replicated (n = 5) concentrations of carbaryl contamination plus controls. Emergence success, level of fluctuating asymmetry in meristic and metric traits of the

wings, and average size of the damselflies were measured. 2. The degradation of carbaryl was relatively constant for the first 5 weeks but later increased considerably, probably because of enhanced biodegradation. 3. Carbaryl at 100 p.p.b. (nominal concentration) reduced emergence success 10 days after application, whereas carbaryl at 10 p.p.b. and 1 p.p.b. had no effect. 4. To investigate how the level of fluctuating asymmetry and size were affected by carbaryl, damselflies from ponds with the highest concentration where emergence success was not affected (10 p.p.b.) were analysed over four time periods. Fluctuating asymmetry of the wings increased during the season but was not affected by carbaryl at 10 p.p.b. 5. Size, measured as average length of the front wings, was affected by date of emergence but not by exposure to carbaryl at 10 p.p.b. 6. Three main reasons for the absence of increased levels of fluctuating asymmetry as a result of carbaryl exposure are suggested." (Authors)] Address: Hardersen, S. Ecology and Entomology Group, Division of Plant, Soil and Ecological Sciences. PO Box 84, Lincoln University, Canterbury, New Zealand

981. **Hardersen, S.; Frampton, C.M. (1999):** Effects of short term pollution on the level of fluctuating asymmetry - a case study using damselflies. *Entomologia experimentalis et applicata* 92(1): 1-7. (in English). ["Fluctuating asymmetry (FA), a measure of developmental stability, has been suggested as a monitoring tool for environmental pollution. However, there have been few investigations into the effects of short term pollution on the level of FA. This paper explores effects of exposing late instar larvae to short term pollution on the level of FA in the wings of adult damselflies. In these insects FA in wing length and in cell patterns have different 'windows of opportunity' in relation to environmental stress. If increased environmental stress is applied after the 'window of opportunity' of one trait had closed, while the window of the other trait was still open then the level of FA of the first trait should not be altered whereas that of the latter should increase. If short term pollution killed part of a population, symmetrical individuals (low FA) should survive better than highly asymmetrical ones, because FA reflects the overall ability of an individual to cope with stress. If the pollution event occurred at a time when the level of FA was already fixed, the level of FA of the remaining population should be lower than that in controls. An experiment was carried out, using 10 artificial ponds, each holding a population of larvae of the damselfly *Xanthocnemis zealandica* (McLachlan). Damselfly larvae were exposed to carbaryl at a nominal concentration of 100 $\mu\text{g l}^{-1}$, which reduced emergence success after 10-20 days by ca. 50%. Based on laboratory experiments, it was assumed that despite the high mortality, the short exposure to carbaryl late in the last instar would ensure that the wing cell patterns of the damselflies were not altered by the increased stress. The level of FA in wing length increased in the damselflies surviving the exposure to carbaryl but the level of FA in cell patterns did not differ significantly between the treatment and the control. The effects of differential mortality, as well as the effects of pollution, on the level of FA in traits with different 'windows of opportunity' need further investigation." (Authors)] Address: Hardersen, S., Lincoln Univ., Div. Plant Soil & Ecol. Sci., POB 84; Canterbury; New Zealand. E-mail: Frampton@lincoln.ac.nz

982. **Hawking, J.; Theischinger, G. (1999):** Dragonfly larvae (Odonata). A guide to the identification of larvae of Australian families and to the identification and ecology of larvae from New South Wales. AWT Identification Guide No. 4, CRCFE Guide No. 24 (Australian Water Technologies Pty Ltd, West Ryde, Cooperative Research Centre for Freshwater Ecology, Thurgoona: I-IV-218 pp. (in English). [general information: Terminology, Distribution and Glossary; keys to the families (larvae); checklist; monography presentation of the species of 20 odonate families: each species is treated the following way: Previous description information, Dimensions, Diagnostic description, Remarks, Notes on ecology, Distribution in Australia, and dot map of distribution in New South Wales. You will find a lot of black and white illustrations and some colour plates with larvae or adults]

983. **Hawking, J.H. (1999):** An evaluation of the current conservation status of Australian dragonflies (Odonata). In: Ponder, W. & D. Lunney (Eds.): *The Other 99%: The conservation and biodiversity of invertebrates*. Transactions of the Royal zoological society of New South Wales. Mosman 2088: 354-360. (in English). ["The conservation status of the Australian dragonfly fauna was evaluated against the 1996 IUCN Red List categories. Each species was assigned to one of six categories as follows: one species as Critically Endangered, 12 species as Endangered, 24 species as Vulnerable, 39 species as Near Threatened, 84 species as Data Deficient and the remaining 154 species as Least Concern. This highlights three major conservation concerns: (1) the high proportion of species which satisfy the IUCN guidelines as being of conservation concern, (2) the large number of priority species and (3) the lack of available information on which to adequately evaluate the status of many species. The unique Australian dragonfly fauna, with its high proportion of endemics, Gondwanan species and species with unusual biological characteristics is rightly deserving of formal protection." (Author)] Address: Hawking, J.H., Co-operative Research Centre for Freshwater Ecology, Murray-Darling Freshwater Research Centre, P.O. Box 921, Albury, New South Wales 2640

984. **Hawking, J.H.; New, T.R. (1999):** The distribution patterns of dragonflies (Insecta: Odonata) along the Kiewa River, Australia, and their relevance in conservation assessment. *Hydrobiologia* 392: 249-260. ["Sampling of larval and adult Odonata from 16 sites along the Kiewa River, Victoria, yielded 34 species: 10 Zygoptera, 24 Anisoptera. Patterns of larval and adult incidence were appraised, and showed that most species were restricted in incidence to several consecutive sites along the river, and that there is clear distinction also between the faunas of the potamon, rhithron and eucrenon regions. Different species of some genera of Anisoptera displayed different zonal distributions, and patterns of incidence and relative abundance of larvae and adults confirmed zonal occupancy. For larvae, these distribution patterns transcended the mode of collection, although many species were found most abundantly in one microhabitat or by one of several sampling methods employed at each site. Sampling of the two stages separately showed considerable concurrence of distributional patterns, so that either stage alone may provide data of value in faunal and conservation assessment." (Authors)] Address: New, T.R.,

Department of Zoology, La Trobe University, Bundoora, Vic. 3083, Australia

985. **Heath, P. (1999):** The past and present status of Norfolk Hawker *Aeshna isosceles* Müll. in Britain. *Atropos* 8: 13-21. (in English). [very detailed compilation of the status of *A. isosceles* including a lot of unpublished studies; discussion on the records of the Dale collection; detailed discussion on the trade off between *Stratiodes aloides* (Water Soldier) (ultimate egg-laying substratum of *A. isosceles*), the clearance of ditches and its effects on population of *S. aloides*, and the effects of modern drainage systems to keep dry grazing marshes on the possibilities of Water Soldier recolonising recently cleared dykes; a modern population increase, and dispersal of the species are described: "it probably has a wider distribution now than at any time over the last couple of hundred years". But the amount of suitable breeding habitats has been significantly reduced. Some fundamentals for reintroduction and population management of *A. isosceles* are discussed.] Address: Heath, P., The Broads Authority, 18 Colegate, Norwich NR3 1BQ, UK

986. **Heidemann, H. (1999):** Professor Dr Gerhard Jurzitza: A short biographic sketch and bibliography. *Odonatologica* 28(4): 321-332. (in English). ["A brief biography and appreciation of the work of Dr G. Jurzitza (born 30 Nov. 1929), Professor Emeritus of the University of Karlsruhe, Charter Member of *Societas Internationalis Odonatologica* and one of the leading European odonatologists, is followed by his Odonatological bibliography (1959-1998; 139 titles). Most of his works are related to the European and South American fauna, mostly in the fields of faunistics, taxonomy, ecology and behaviour. The list of taxa he has introduced in Odonata, and a bibliography of his odonatological photographic work are also included." (Author)]. Address: Heidemann, H., Au in den Buchen 66, D-76645 Bruchsal, Germany

987. **Heise, S.; Schrack, M. (1999):** Nachweis der Östlichen Moosjungfer (*Leucorrhinia albifrons* [Burmeister, 1839]) in der Radeburger Heide nördlich von Dresden (Insecta: Odonata: Libellulidae). *Faun. Abh. Staatl. Mus. Tierkunde Dresden* 21(13): 215-220. (in German, with English summary). [1995 and 1996 *L. albifrons* was first recorded in the district of Dresden, Saxonia, Germany; review of the distribution in Germany with special reference to Saxonia, and documentation of some further unpublished Saxonian records; characterisation in detail of the habitat (water chemistry, vegetation); detailed documentation of the phenology of emergence (records of exuviae).] Address: Schrack, M., Hauptstr. 48a, D-01471 Radeburg-Großdittmannsdorf, Germany

988. **Henson, S. (1999):** The newsletter of the British Dragonfly Society No. 35. 20 pp. (in English). [newsletter of BDS with a wealth of information on society business, activities of members, book reviews, "First and last dates for 1998"] Address: Henson, S., 10 Shotesham Road, Poringland, Norwich NR14 7LE, UK

989. **Hill, B.T.; Beinlich, B.; Plachter, H. (1999):** Habitat preference of *Lestes barbarus* (FABRICIUS, 1798) (Odonata, Lestidae) on a low-intensity cattle pasture in the Sava floodplain (Croatia). *Verhandlungen der Gesellschaft für Ökologie* 29: 539-545. (in English).

["In the European Community large-scale grazing schemes are being discussed as an alternative to conventional agriculture in those areas that are at risk of being abandoned. However, in Central Europe the data base regarding the effects of large-scale grazing systems is scarce, since this land use practice has almost vanished. Especially in traditionally used floodplains grazing systems are the predominant land use. Due to inundation or high groundwater level they also provide patches of limnic habitats. There are indications that low-intensity grazing may prove beneficial for species communities of these limnic and semi-terrestrial habitats. We investigated a communal pasture of 78 ha (»Allmende«) in the Sava floodplain (Croatia) to test this hypothesis using the example of the damselfly *L. barbarus*. Based on mark-recapture data, we studied the habitat preference and movement of the life-history stages of *L. barbarus*. After emergence, most damselflies quickly move to hedges surrounding the pasture. They stay close to these hedges for the entire maturation period. Damselflies have to cover distances of up to 880 m to reach the hedges. Some mature *L. barbarus* directly returned to the pond where they had emerged. However, many females turned to ungrazed areas and fallows, before engaging in reproductive activity. Suitability of hedges as maturation habitat significantly depends on their width and the width of adjacent margins. Densely vegetated pond habitats with vegetation heights between 20 and 50 cm are preferred reproduction sites for *L. barbarus*." (Authors)] Address: Hill, B., Fakultät für Biologie, Naturschutz, Phillips Universität Marburg, D-35032 Marburg, Germany

990. **Hill, P.M. (1999):** Early emergence of White-faced Darter *Leucorrhinia dubia* in Cheshire in 1999. *Atropos* 8: 53. (in English). Address: Hill, P.M.; 1 Clive Cottage, London Road, Allstock, Knutsford, Cheshire WA16 9LT, UK

991. **Hill, P.M. (1999):** Migrant insects reported during the first half of 1999. *Atropos* 8: 35-36. (in English). [*Anax parthenope* in Cornwall and Kent, *Anaciaeschna isosceles* "in the Broads", *Gomphus vulgatissimus* on the Thames] Address: Hill, P.M.; 1 Clive Cottage, London Road, Allstock, Knutsford, Cheshire WA16 9LT, UK

992. **Hirvonen, H. (1999):** Shifts in foraging tactics of larval damselflies: effects of prey density. *Oikos* 86(3): 443-452. (in English). ["I studied search activity and attack tactics of larval damselflies, *Lestes sponsa*, feeding on cladocerans, *Daphnia magna*, at nine densities ranging from 2 to 640 per 1.5 l. Search activity increased from low to intermediate densities (40 *Daphnia*) and declined again at higher prey densities, as has been predicted by theories on optimal tactics for energy maximising foragers. Similarly, frequency of pursuit attacks first increased and then decreased as prey density increased. Frequency of ambush attacks increased with a decelerating rate with prey availability. Thus the proportion of pursuit attacks decreased linearly as prey density increased. Profitability of pursuing increased faster than ambush profitability at low prey densities and remained higher up to 40 prey. At higher prey densities the profitabilities reversed. Relative profitability of pursuits proportioned to prey density peaked with 5 *Daphnia*. At other prey densities than 5, frequency of pursuit attacks decreased towards the end of the trials. This change in foraging mode accounted for accelerating proportional prey mortality to an intermediate D.

magna density and thus the potential for a dampening effect on the prey population. Adjusting foraging tactics in response to prey availability may be adaptive for the predator, and may also contribute to density dependence in the predator-prey relationship through effects on functional response." (Authors)] Address: Hirvonen, H.; Univ. Helsinki; Integrat. Ecol. Unit; Div. Populat Biol., Dept Systemativ & Ecology, POB 17; FIN-00014 Helsinki; Finland. E-mail: heikki.hirvonen@helsinki.fi

993. **Hoess, R. (1999):** Erstnachweis einer zweiten Jahresgeneration von *Ischnura elegans* (Vander Linden) in der Schweiz (Zygoptera: Coenagrionidae). *Libellula* 18(1/2): 63-68. (in German, with English summary). ["On 17 July, 1997 four immature adults and seven exuviae were found at a newly set up pool near Bern. The pool was created on 17 March, 1997. From several possibilities of import or colonization only oviposition into the vegetation of the pool by allochthonous female(s) in spring 1997 proved to be probable." (Author)] Address: Hoess, R., University of Bern, Institute of Zoology, Division of Population Biology, Baltzerstr. 3, 3012 Bern, Switzerland

994. **Hoess, R.; Kohler, H.-U.; Berger, H.; Bieri, G. (1999):** Libellenbeobachtungen auf Rhodos, Griechenland, 1990 bis 1993. *Libellula Suppl.* 2: 33-40. (in German, with English summary). ["19 spp. were recorded from 15 localities in May 1990, May 1992, June and July 1993. Oldest records are evidenced for seven taxa, viz. *Ischnura elegans elegans*, *Anax imperator*, *A. parthenope*, *Orthetrum cancellatum*, *O. chrysostigma*, *Sympetrum fonscolombii*, and *Selysiothemis nigra*." (Authors)] Address: Hoess, R., University of Bern, Institute of Zoology, Division of Population Biology, Baltzerstr. 3, 3012 Bern, Switzerland

995. **Homes, V.; Hering, D.; Reich, M. (1999):** The distribution and macrofauna of ponds in stretches of an alpine floodplain differently impacted by hydrological engineering. *Regulated rivers research and management* 15(5): 405-417. (in English). ["The purpose of this study was to describe the impact of hydrological engineering on distribution, morphology and macrofaunal community composition of ponds in an alpine floodplain. The study was conducted in 1995 with the study sites being located on the Isar floodplain (Bavaria, Germany). The density of ponds was highest in a bypassed section of the floodplain with a residual flow regime and unrestricted peak floods (up to 40 ponds per river kilometre). In a channelized section and downstream of a reservoir, density was much lower. In 1995, about one third of the ponds were removed by floods or dried out in summer. About the same fraction was generated as a result of flood events. The composition of the macroinvertebrate and vertebrate faunas of 59 ponds was investigated. Cluster analysis classified the ponds into four groups. One of the faunal types was limited to ponds generated by the 1995 floods, where only a few predominantly rheophilic species occurred. The other types represented older successional stages and were inhabited by more species-rich faunas composed mainly of Odonata, Heteroptera and Coleoptera. In the channelized stretch of the Isar floodplain, and downstream of the reservoir only a single pond was generated by the 1995 floods; this caused a lower abundance and diversity of pond types." (Authors)] Address: Hering, D; Univ Essen; Inst Ecol; D-45117 Essen; Germany. E-mail: daniel.hering@uni-essen.de

996. **Horstkotte, J. (1999):** Bibliographie der Naturkundlichen Mitteilungen des DJN-Distrikts Hamburg - 1960-77 und 1987-88. *Naturkundliche Beiträge des Deutschen Jugendbund für Naturbeobachtung* 33: 72-76. (in German). [bibliography of the contributions of the German youth association for nature observation published in the *Naturkundliche Mitteilungen*, DJN-Distrikt Hamburg; the Hamburg-district was and is one of the most active parts of the DJN, and has contributed very important papers to the knowledge of Odonata around the world (see the journal *Naturkundliche Reiseberichte*), and especially in Germany and Austria] Address: Horstkotte, J., Am Schulwald 21, 22415 Hamburg, Germany

997. **Hospers, M.; Hospers, A. (1999):** Opnieuw Beekrumbout Gomphus vulgatissimus langs de Overijssels Vecht. *NVL Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie* 3(3): 4-5. (in Dutch). [detailed documentation of the records of *Gomphus vulgatissimus* on five localities along the brook Vecht for 1997 and 1999 (4 localities in The Netherlands, 1 in Nordrhein-Westfalen, Germany)] Address: mhospers@dds.nl

998. **Hubert, S. (1999):** Présence de *Gomphus graslinii* (Rambur, 1842) dans le département de la Sarthe. *Martinia* 15(3): 79-80. (in French, with English summary). [In 1963 on the river Loir, *G. graslinii* could be recorded in the Département for the last time. Now, the species was rediscovered in 1998 near the same river, and near the municipality of Luché-Pringé. This record is of some interest because M.P. Rambur described 1842 this species after a male specimen caught by Adolphe Graslin in the forest of Bercé in the environments of Château-du-Loir. This locality is situated 30 km as the crow flies from the new locality.] Address: Hubert, S., 8 ter, rue de Monaco, F-72000 Le Mans, France

999. **Hummel, S. (1999):** A twenty-six year old record for *Tramea calverti* in Iowa. *Argia* 11(1): 29. (in English). [Hummel on August 15, 1972 discovered a specimen - at that time - the farthest north of the species.] Address: Hummel, S., P.O. Box 121, Lake View, IA, 51450, USA

1000. **Hummel, S. (1999):** *Argia lugens* from South Dakota. *Argia* 11(1): 27-28. (in English). Address: Hummel, S., P.O. Box 121, Lake View, IA, 51450, USA

1001. **Hutchinson, R.; Ménard, B. (1999):** Odonatological news from Québec, Canada: the marvelous world of Québec dragonflies. 1. Searing for signs of *Stylurus notatus*, *Gomphus fraternus* and *Gomphus vastus* in the Ottawa River. *Argia* 11(2): 3-4. (in English). [records of the above mentioned species (imagos and exuviae) at Luskville, Québec, Canada in 1996 and 1997; a further 20 odonate species were taken including *Ophiogomphus rupinsulensis* and *O. colubrinus* in a small tributary of the Ottawa river] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1002. **Hutchinson, R.; Ménard, B. (1999):** Odonatological news from Québec, Canada: the marvelous world of Québec dragonflies. 2. Two new Québec localities for *Williamsonia fletcheri*. *Argia* 11(2): 4-5. (in English). [records from and description of habitats from two

two sites from the "fen-bog-marsh-swamp complex of Alfred in eastern Ontario and a small section of a swamp-marsh area covered with sphagnum north of Ste-Cecile-de-Masham in Québec", and two new localities: fen near lake Danford, an a fen near the village of Poltimore (both Québec)] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1003. **Hutchinson, R.; Ménard, B. (1999):** Random odonatological observations from Québec, Canada. 1. Protecting emerging *Stylurus notatus* from ant attacks (1996-1997). *Argia* 11(2): 5-6. (in English). [the authors protected the rare *S. notatus* from the Ottawa river from being prey of ants] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1004. **Hutchinson, R.; Ménard, B. (1999):** Random odonatological observations from Québec, Canada. 2. An unusual observation: a *Cicindela longilabris* (Coleoptera) larva trying to drag a male *Leucorrhinia glacialis* into its burrow. *Argia* 11(2): 6. [additional information are given on *C. longilabris* preying *L. intacta* in the 1980s in the same locality (lake Port-au-Saumon); see also: Laroche, A. (1976): *Odonata* as prey and predators of Tiger beetles. *Cordulia* 2(4): 157 - 158] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1005. **Hutchinson, R.; Ménard, B. (1999):** Random odonatological observations from Québec, Canada. 3. Adult *Leucorrhinia* captured by the insectivorous plant, *Drosera rotundifolia*. *Argia* 11(2): 6. (in English). [records from three sites with (serious) trapping of *Leucorrhinia* and *Enallagma* by *Drosera*. Abstracters note: a small bibliography of *Odonata* captured from insectivorous *Drosera* is available from IDF; anybody interested should send us 2 US\$ in cash to receive the bibliography.] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1006. **Hutchinson, R.; Ménard, B. (1999):** Random odonatological observations from Québec, Canada. 4. Feeding *Williamsonia* larvae in the lab. *Argia* 11(2): 6. (in English). [request for information on the prey of larval *W. fletcheri*] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1007. **Hutchinson, R.; Ménard, B. (1999):** Random odonatological observations from Québec, Canada. 5. A tiny spider subduing a *Leucorrhinia glacialis* many times its size. *Argia* 11(2): 6-7. (in English). [*L. glacialis* was preyed by *Misumena vatia*] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1008. **Hutchinson, R.; Ménard, B. (1999):** Random odonatological observations from Québec, Canada. 6. *Aeshna umbrosa* larvae found in extremely shallow water. *Argia* 11(2): 7. (in English). [ditches as habitat of *A. umbrosa*, *Cordulegaster maculata*, and *Amphiagrion saucium*; drought resistance of larvae] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1009. **Hutchinson, R.; Ménard, B. (1999):** Random odonatological observations from Québec, Canada. 7. The *Lanthus parvulus* enigma at Port-au-Saumon. *Argia* 11(2): 7-8. (in English). [emergence and larval habitats are described; the phenomenon of the drifting system of the Port-au-Saumon river including *L. parvulus* is said to be worth to be studied in detail] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7

1010. **International Odonatological Foundation (1999?):** International Odonatological Foundation S.I.O. Leaflet. 4 pp. (in English). [presentation of scope and aims of the Int. Odonat. Found.] Address: Kiauta, M., P.O. Box 256, NL-3720 AG Bilthoven, The Netherlands

1011. **Irineu de Souza, L.O.; Costa, J.M.; Santos, T.C. (1999):** Description of the larva of *Planiplax phoenicura* Ris, from Pantanal Sul-Matogrossense, Brazil (Anisoptera: Libellulidae). *Odonatologica* 28(2): 159-163. ["The ultimate instar larva is for the first time described and illustrated. A key to the larvae of Libellulidae with dorsal hooks on abdominal segments III - IX and lateral spines on abdominal segments VIII - IX is appended." (Author)] Address: Irineu de Souza, L.O., Departamento de Biologia, Universidade Federal de Mato Grosso do Sul, MS, Brazil. Costa, J.M. & Santos, T.C.; Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro Quinta da Boa Vista, BR - 20.940-040, Rio de Janeiro, Brazil

1012. **Jacquemin, G. (1999):** Three years watching *Odonata* in Morocco. *W.D.A.'s Agrion* 3(1): 5-6. (in English). [short report on discovering dragonflies in Morocco; very interesting (for European odonatologists) is the record of *Oxygastra curtisii*; the results of the research will be published as Supplement to *Martinia*. (see also Erratum: *W.D.A.'s Agrion* 3(2): 29)] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

1013. **Jödicke, R. (1999):** isoceles oder isosceles?. *Libellennachrichten* 2: 15-16. (in German). [According to the rules of the International Code of zoological nomenclature, the correct name should read *A. isoceles*.] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany

1014. **Jödicke, R. (1999):** Libellenbeobachtungen in Podlasie, Nordost-Polen. *Libellula* 18(1/2): 31-48. (in German, with English summary). [In June/July 1998, 46 species were evidenced at 36 "localities in the lowlands of Biebrza and Narew as well in the surroundings of the Biatowieza Forest. Our records of *Orthetrum albistylum* and *O. brunneum* mark the hitherto northernmost records within their ranges of distribution. Also the sightings of *Erythromma viridulum*, *Nehalennia speciosa*, *Aeshna isoceles*, *Somatochlora arctica*, *Libellula fulva*, and *Sympetrum depressiusculum* are noteworthy. The subspecific status of *Calopteryx splendens* from this region is discussed." (Author)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany

1015. **Jödicke, R. (1999):** Paul Münchberg verstorben. *Libellennachrichten* 2: 14-15. (in German). [short notice on the death of the well known German odonatologist who died July 23, 1999] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany

1016. **Johansson, F.; Rowe, L. (1999):** Life history and behavioral responses to time constraints in a damselfly. *Ecology* 80(4): 1242-1252. (in English). [Time constraints, imposed by seasonality, are common to life histories. Recent theory in evolutionary ecology predicts independent behavioral and life history responses to such constraints, but this theory remains largely untested. In our two experiments on the damselfly *Lestes congener* we experimentally alter individual's perception of their proximity to a time constraint and ask whether their behavior and life history respond in the directions predicted by theory. We altered larval perception of their position in the season with light regime. In one group, we hatched larvae from winter diapausing eggs in a light regime that mimics a relatively early time in the season. In the other group we hatched larvae in a light regime that mimics a late time in the season. In the late (time constrained) group, larvae would have very little time to complete development and reach a large size so that they could attain their full reproductive potential prior to winter. In the first experiment, the behaviors we assess are activity rate, which is an indicator of foraging effort and willingness to take risks, and cannibalism, which is a component of the mortality risk of foraging. As predicted, time-constrained larvae increased their activity rates, perhaps in an attempt to increase weight gain, and as a result they suffered higher rates of cannibalism. In the second experiment, we measured development rate as the rate of molting and age at maturity. As predicted, time-constrained larvae accelerated development rate and thereby matured at a significantly earlier age and smaller size. Our analysis demonstrates that the behavioral and life history responses of these larvae were independent, in the sense that the life history responses did not result from the behavioral responses." (Authors)] Address: Rowe, L., Univ. Toronto; Dept Zool., 25 Harbord St; Toronto; ON M5S 1A1; Canada

1017. **Johansson, F.; Ivarsson, T. (1999):** The Distribution of Darter dragonflies (*Sympetrum*: Odonata) in central Norrland, Sweden. *Nord. Odonat. Soc. Newsl.* 5 (1): 4-5. [The occurrence and distribution of the *Sympetrum* dragonflies in central Norrland, Sweden is presented in 25x25 km square maps (*S. danae*, *S. vulgatum*, *S. flaveolum*), or discussed (*S. striolatum*, *S. sanguineum*).] Address: Johansson, Frank & Tobias Ivarsson, Ekologisk Zoologi, Umea Universitet, S-90187 Umea, Sweden

1018. **Johnson, J.; Paulson, D. (1999):** Spineless *E-pitheca spinigera*: a cautionary note. *Argia* 11(1): 30. (in English). [discussion of the value of the spine as a determination cue for *E. spinigera*] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

1019. **Johnston, T.A.; Cunjak, R.A. (1999):** Dry mass-length relationships for benthic insects: a review with new data from Catamaran Brook, New Brunswick, Canada. *Freshwater biology* 41(4): 653-674. (in English). ["1. We summarized previously published mass-length relationships for aquatic insects, and determined the relationship between dry body mass and body length for eight genera and seven families of benthic insects from Catamaran Brook, New Brunswick, Canada." In appendix 1 the relations between mass and linear measurements for 8 odonate species published

hed by Pavlov & Zubina (1990), *Hydrobiological Journal* 26: 99-103, and for *Pyrrhosoma nymphula* (Lawton, 1971, *Jour. anim. ecol.* 40: 385-423) are listed. "2. A power function was the most commonly used model in the earlier studies and best described the observed mass-length relationship for taxa from Catamaran Brook. 3. Predicted mass at length was highly variable (coefficient of variation > 25%) among models developed in different studies for the same family group. This variability presumably resulted from both variation in the methods used to construct the models, and in the natural spatio-temporal and taxonomic variation in mass at length, although the relative contributions of these two sources cannot be determined from existing data. 4. Several recommendations are made for the development and application of mass-length equations in future studies." (Authors)] Address: Johnston, T.A., Department of Fisheries and Oceans, Central and Arctic Region, Freshwater Institute, 501 University Cr., Winnipeg, Manitoba R3T 2N6, Canada; Cunjak, R.A., Department of Biology, University of New Brunswick, Bag Service 45111, Fredericton, New Brunswick E3B 6E1, Canada

1020. **Jolivet, S.; Vaillant, F.; Gruwier, X. (1999):** Développement larvaire de *Sympetrum fonscolombii* (Sélys, 1840) constaté en Île-de-France (Réserve Naturelle de Saint-Quentin-en-Yvelines) (Odonata, Anisoptera, Libellulidae). *Martinia* 15(1): 15. (in French). [possible development of *S. fonscolombii* in a muddy pool created by a wild pig (*Sus scrofa*)] Address: Jolivet, S., 8 parc Vatonne, F-91190 Gif-sur-Yvette, France

1021. **Jourde, P.; Allenou, Caupenne, M.; Thirion, J.-M. (1999):** Inventaire des odonates de Charente-Maritime. *Martinia* 15(3): 71-78. (in French, with English summary). [In the framework of the French Odonate mapping scheme, 59 odonate species could be recorded in the Département Charente-Maritime. Compared with literature data, five species were found for the first time: *Calopteryx haemorrhoidalis*, *Anax parthenope*, *Anax ephippiger*, *Gomphus graslinii*, and *Leucorrhinia albifrons*. *Onychogomphus forcipatus*, *Somatochlora flavomaculata*, *S. metallica*, *Cordulia aenea*, and *Orthetrum brunneum* could not be recorded after 1959, and were now rediscovered.] Address: Jourde, P. La Grande Métairie, 20 rue de Charnay, F-17250 Pont-L'Abbé-D'Arnoult, France

1022. **Jourde, P.; Thirion, J.-M. (1999):** Nouvelles mentions d'*Hemianax ephippiger* (Burmeister, 1839) et données précoces pour quelques odonates en Charente-Maritime. *Martinia* 15(2): 46. (in French). [discovery of a fragment of *Anax ephippiger* on 31 January 1999; short notice on the discovery of *A. ephippiger*, *A. parthenope*, *Aeshna affinis*, and *Lestes macrostigma* in May 1999; phenological data from several species in the spring of 1999] Address: Jourde, P., 20 rue de Charnay, F-17250 Pont l'Abbé d'Arout, France

1023. **Jung (1999):** Excursieverslag Zuid-Limburg. Een eerste keer op stap met de NVL. NVL Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie 3(3): 5-6. [report of an excursion to Zuid-Limburg, The Netherlands on 26/27 June, 1999; notices on some Odonata e.g. *Crocothemis erythraea*, *Anax parthenope*, *Orthetrum brunneum*, and *Cercion lindenii*]. Address: not stated.

1024. **Kambhampati, S.; Charlton, R.E. (1999):** Phylogenetic relationship among *Libellula*, *Ladona* and *Plathemis* (Odonata: Libellulidae) based on DNA sequence of mitochondrial 16S rRNA gene. *Systematic entomology* 24(1): 37-49. (in English). ["The type genus for the dragonfly family Libellulidae is *Libellula*. At present, *Libellula* s.l. includes twenty-nine species, whose distribution is largely Nearctic. Whether two other libellulid taxa, *Ladona* and *Plathemis*, should be considered synonyms of *Libellula*, subgenera of *Libellula*, or separate genera, has been a subject of intermittent debate for over a century. Earlier proposals concerning *Ladona* and *Plathemis* were based on a limited number of morphological characters and lacked rigorous phylogenetic analyses. Therefore, we used the DNA sequence of a portion of the mitochondrial 16S rRNA gene and parsimony, maximum likelihood and neighbour-joining analyses to explore whether *Ladona* and *Plathemis* are monophyletic lineages distinct from *Libellula*. We obtained approximately 415 bp of DNA sequence from twenty-three taxa including thirteen species of *Libellula* s.s., all three recognized species of *Ladona*, the two species of *Plathemis* and representatives of four other libellulid genera. *Tetragoneuria williamsoni* (Odonata: Corduliidae) was included as the outgroup. Parsimony analysis suggested that *Ladona* and *Plathemis* are monophyletic lineages distinct from *Libellula* s.s. with a sister group relationship between *Libellula* and *Ladona*. The monophyly of *Ladona*, *Plathemis* and *Libellula* was supported in > 90% of bootstrap replications and in trees five to ten steps longer than the most parsimonious trees. Relationships inferred from maximum likelihood and neighbour-joining analyses also supported the monophyly of *Ladona* and *Plathemis*. The four other libellulid genera included in the study formed a monophyletic clade distinct from *Libellula*, *Ladona* and *Plathemis*. Based on our analysis, we propose that *Ladona* and *Plathemis* be considered either genera or subgenera within Libellulidae." (Authors)] Address: Kambhampati, S., Kansas State Univ; Dept Entomol. Manhattan KS 66506; USA. E-mail: srini@ksu.edu

1025. **Karube, H. (1999):** A new species of the genus *Petaliaeschna* (Odonata, Aeshnidae) from Northern Vietnam. *Gekkan-Mushi* 338: 6-7. (in Japanese and English). [*Petaliaeschna flavipes* n. sp. is described from a male from Mt. Piaoac, Cao Bang Province, Northern Vietnam (May 1998). The new species is closely related to *P. corneliae* Asahina, 1982.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

1026. **Karube, H. (1999):** *Planaeschna cucphuongensis* spec. nov., a new dragonfly from northern Vietnam (Anisoptera: Aeshnidae). *Odonatologica* 28(3): 279-282. (in English). ["The new sp. is described and illustrated from a single male (holotype: Hoa Binh prov., Cue Phuong National Park, 2-VI-1998; deposited at Kanagawa Prefectural Mus. Nat. Hist., Odawara, Japan). It is similar to *P. chiengmaiensis* Asahina, from Thailand, from which it is distinguished by more slender and strongly bent superior appendages and by a different shape of the inferior appendages." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

1027. **Kirfel, G.; Komnick, H. (1999):** Differential absorption and esterification of dietary long-chain fatty acids by larvae of the dragonfly, *Aeshna cyanea*. *Archives of insect biochemistry and physiology* 40(4): 183-193. (in English). ["In order to evaluate whether dietary long-chain fatty acids were differentially absorbed, *Aeshna cyanea* larvae received 5 μ l oral doses containing combinations of two radiolabeled fatty acids at nearly equal radioactive and nmolar concentrations: (1) H-3-oleic and C-14-palmitic acids; (2) H-3-oleic and C-14-stearic acids; and (3) H-3-palmitic and C-14-stearic acids. After 3 h or 1 day, hemolymph samples, midgut tissue, midgut contents and fat body tissue were collected and assayed for labeled fatty acids. The H-3/C-14 ratios indicated that there was a preference for absorption of the monounsaturated oleic acid over both saturated palmitic and stearic acids and that the shorter palmitic acid was absorbed at a higher rate than the longer stearic acid. There were also differences in the H-3/C-14 ratios of the various lipid classes of the midgut wall, hemolymph, and fat body that reflected differential esterifications and transport of these fatty acids. *Arch. Insect Biochem, Physiol*, 40:183-193, 1999." (Authors)] Address: Komnick, H.; Univ. Bonn; Inst. Cell Biol., Ulrich Haberland Str 61A; D-53121 Bonn; Germany. E-mail: komnick@uni-bonn.de

1028. **Klapkarek, N.; Beutler, H. (1999):** Die Libellenfauna (Odonata) des NSG "Lieberoser Endmoräne" (Brandenburg). *Märkische entomologische Nachrichten* 1: 21-38. (in German, with English summary). [55 odonate species could be recorded in one of the most important German dragonfly habitats; some of the habitats are undisturbed by any anthropogenic influence. The extraordinary odonate conservationary value e.g. of Lake Drusche can be exemplified by the sympatric occurrence of all European species of the genus *Leucorrhinia*. Of special interest are *Nehalennia speciosa*, *Epithea bimaculata*, *Leucorrhinia albifrons*, *L. caudalis*, *Onychogomphus forcipatus*, *Gomphus vulgatissimus* (lake-population of these species of running waters), and *Cercion lindenii*. Some more species are discussed in some detail.] Address: Beutler, H., Kirschallee 3b, 15848 Stemmen, Germany; Klapkarek, N., Inst. Ökol. und Naturschutz, Coppistr. 1-3, 16227 Eberswalde, Germany. E-mail: q4961625@bonsai.fernuni-hagen.de

1029. **Klein, J.-P.; Vanderpoorten, A. (1999):** Étude écosystématique d'une gravière de l'ancien lit majeur du Rhin (Krafft-Erstein, Bas-Rhin, France). *Martinia* 15 (1): 3-13. (in French, with English summary). ["An integrated survey of a gravel pit located in the former alluvial floodplain of the Rhine was carried out between 1994 and 1997. The gravel pit is fed by groundwater and its water level is controlled by the floodpulse of the Rhine. The quality of the water was monitored monthly between 1995 and 1997 and was found to be alkaline, oligomesotrophic, moderately mineralised, calcareous and chloridic. Data dealing with adults and exuviae were compared with the quality of the water and the aquatic and riverine phytocenosis. In this man-made biotope, 24 species of Odonata were recorded. *Enallagma cyathigerum*, *Libellula fulva*, *Crocothemis erythraea*, *Ischnura elegans*, *Orthetrum cancellatum*, *Anax imperator*, and *A. parthenope* are the most common ones. Two species are protected at the national level, 3 are included within the French red list and 11 within the Baden-Württemberg red list, 3 within the red list of the European Council and 2 within the European list for Habitat directive. The dragonfly diversity in this recent gravel pit is similar to that of the oldest ones in this region and is not depressed as a cause of large populations of fish

and the low diversity of the phytocenosis. Nevertheless, the latter caused a low density in species such as *Platynemis pennipes* and *Cercion lindenii*. The diversity of the dragonfly assemblage in this gravel pit is linked to water quality, and also to its status of pioneer area acting as a refuge resembling the former side channels of the Rhine river before canalisation. This study can be used for future surveys to compare and evaluate the impact and consequences of the artificial flooding of the riverine landscape of the Erstein area owing to the later retention of the Rhine highflow." (Author)] Address: Klein, J.-P., Laboratoire d'Analyses et de Biologie Médicales Aubert, 22, rue des Carmes, F-54063 Nancy, France

1030. **Klein, J.-P. (1999)**: Les odonates des forêts rhénanes de Strasbourg, Bas-Rhin, France. *Opusc. zool. flumin* 168: 1-28. (in French, with English summary). ["During 1995-1996, 34 spp. were evidenced, including the locally rare *Calopteryx virgo*, *Coenagrion mercuriale*, *C. pulchellum*, *Aeshna grandis*, *Gomphus pulchellus*, *G. vulgatissimus* and *Onychogomphus forcipatus*. The habitats are briefly described in terms of their respective vegetation, and the odonate applicability in the wetland biological assessment is demonstrated. A comparison of the current status with the records of the early 1960s indicates the vulnerability of various spp. The present work renders a contribution towards the setting up of guidelines for the conservation and ecological management of aquatic habitats of the Strasbourg alluvial forests." (Author)] Address: Klein, J.-P., Laboratoire Aubert, Analyses médicales et biologiques, Département environnement et santé, 22, rue des Carmes, B.P. 664, F-54063 Nancy, France

1031. **Kohl, S. (1999)**: Libellenbeobachtungen auf der griechischen Insel Samos. *Libellula Suppl.* 2: 41-42. (in German, with English summary). ["In September 1996, 14 species were recorded. *Anax ephippiger* is new for the fauna of Samos." (Author)] Address: Kohl, S., Seestr. 107, CH-8610 Uster, Switzerland

1032. **Kopij, G. (1999)**: Food of the Cattle Egret (*Bubulcus ibis*) in South African grassland. *Vogelwarte* 40: 98-109. (in English). ["The study is based on stomach content and boli analyses originated from chicks and adult birds living in South African grassland. Most of the Cattle Egrets' diet consisted of insects (69% of total dry mass), other arthropods constitute 2% and vertebrates 28%. Insect prey consisted mainly of Orthoptera (47%, mainly Acrididae) and Isoptera (12%, exclusively *Hodotermes mossambicus*). Coleoptera, Lepidoptera and Diptera constituted only a supplementary insect ingredient. In the diet of the chicks, a two-fold higher proportion of vertebrates and a lower proportion of insects was shown in comparison with the adult diet. In the same colony, during the 1976/1977 breeding season (with higher rainfall) the proportion of invertebrates and vertebrates was similar, while during the 1993/1994 breeding season (lower rainfall), the proportion of invertebrates was much higher than that of vertebrates. In summer (September - March) most of the adult diet consisted of insects, whereas in winter (June - August) it consisted mainly of vertebrates. The proportion of invertebrates increased and that of vertebrates decreased in the diet of chicks, as they grow." (Author). The food composition is expressed as "percentage of food samples in which the category was recorded". For Odonata in total the frequency (sample size: n = 330) is 7,3 in the chicks: Aeshnidae: 3.0; Coenagrionidae: 4.2;

Libellulidae: 6.7. Odonata could be recorded 31 times in the boli of chicks of Cattle Egret (dry mass: 1.4%) in 1976/1977, and only once in 1993/1994.] Address: Kopij, G., Department of Biology, National University of Lesotho. P. O. Roma 180, Lesotho

1033. **Kornijów, R.; Scibior, R. (1999)**: Seasonal changes in macrofaunal feeding groups associated with *Nuphar lutea* (L.) Sm. leaves in a small eutrophic lake. *Polish journal of ecology* 47(2): 135-143. (in English). ["The epiphytic invertebrates associated with leaves of *Nuphar lutea* in a shallow small eutrophic Lake Glebokie (Lecznawodawa Lake District, eastern Poland) were pooled into one of three feeding groups: 1. algae-detritus feeders (25 taxa, average density 111 ind x 100 cm⁻²), 2. vascular plant feeders (3 taxa, average density 64 ind. x 100 cm⁻²), 3. predators (10 taxa, 4 ind.x 100 cm⁻²). The fauna feeding assemblages underwent clearly marked seasonal changes in their relative abundance, dominance structure and densities. The discussed mechanisms responsible for these changes included trophic conditions (development of periphytic and planktonic algae, nutritive value of the macrophytic tissue, amount of detritus originating from decomposing leaves), so called "dilution effect" (caused by fast increase in the colonizable leaf surface during summer), and the interactions between algae-detritus feeders and predatory invertebrates." (Authors) Odonate predators are: *Enallagma cyathigerum*, *Ischnura elegans*, *Coenagrion puella*, and *Coenagrionidae* n. det.] Address: Kornijów, R., Department of Hydrobiology and Ichthyobiology, E-mail: rkorn@ursus.ar.lublin.pl; Scibior, R., Department of Zoology, E-mail: radeks@ursus.ar.lublin.pl. University of Agriculture, Akademicka 13, 20-950 Lublin, Poland

1034. **Kovachev, S.; Stoichev, S. (1999)**: Hydrofaunistic investigations of the Karla Lake, Central Greece. *Lauterbornia* 36: 71-73. (in English). [Hydrofaunistic research of Karla Lake (south-east part of the Thessalia plain); the frequency on 6 sites, and dominance of the 27 zoobenthos species including *Calopteryx virgo* and *Ischnura pumilio* is given] Address: Kovachev, S., Sofia University, Biological Faculty, Boul. Dragan Tsankov 8, BG-1421 Sofia, Bulgaria

1035. **Krawutschke, A.; Kruse, M. (1999)**: *Gomphus flavipes* (Charpentier) an der Unteren Havel (Anisoptera: Gomphidae). *Libellula* 18(1/2): 71-77. (in German, with English summary). ["In 1996 and 1997, *G. flavipes* was recorded along the river Havel between Pritzerbe and the mouth of the Alte Dosse (Brandenburg, Germany). The species lives at sandy bights, eroded banks and shallow berths of fishing boats. Details on emergence and location of exuviae are given." (Author) A few remarks on dormitories of *G. flavipes* are made.] Address: Krawutschke, Anne, Zool. Mus. Univ. Hamburg, AG Prof. J. Parzefall, Naturschutz, Martin-Luther-King-Platz 3, D-20146 Hamburg, Germany. E-mail: fb7y082@public.uni-hamburg.de

1036. **Krawutschke, A. (1999)**: Zur Ökologie und Biologie ausgewählter Aeshniden-Arten (Odonata: Anisoptera) im Naturpark Westhavelland. Diplomarbeit am Fachbereich Biologie, Zoologisches Institut und Museum der Universität Hamburg: 120 pp., Anhänge. (in German). [*Brachytron pratense*, *Anaciaeschna isoceles*, *Aeshna viridis*, *A. grandis*, *A. mixta*, *Anax imperator*, and *A. parthenope* were surveyed in 1998 in the

Nature park Westhavelland, Federal State Brandenburg, Germany. Results are obtained on development of larvae, emergence, intra- and interspecific competition, coexistence, phenology, and habitats. A final chapter deals with conservation measures with special emphasize on the *Statiodes aloides* ditches. There is a bundle of primary, highly interesting results on ecology and coexistence of the Aeshnidae in Central Europe.] Address: Krawutschke, Anne, Timm-Kröger-Weg 26a, D-22926 Ahrensburg, Germany

1037. **Krotzer, R.S.; Krotzer, M.J. (1999):** Dragonflies and damselflies (Odonata) of the National Forests in Alabama. *Ent. news* 110(3): 153-161. (in English). ["Odonate surveys were conducted on National Forest lands in Alabama between 1994 and 1997. We collected 124 species representing all ten families and 71% of the species known to occur in the state. The number of species collected in any one National Forest ranged from 62 to 88. Seventy new county records were documented during this survey. National Forest lands in Alabama may serve as a refugium for odonate species with specialized larval habitat requirements or that are sensitive to habitat disturbances." (Authors)] Address: Krotzer, S., 6010 Woodvale Drive, Helena, AL 35080, USA.

1038. **Kunsthau - Barlachhalle K. Hamburg (1999):** Jochen Lempert: 365 Tafeln zur Naturgeschichte: 1.6.-11.7.1999. triennale der photographie. hamburg 1999: leaflet. (in German). [announcement of an exhibition of the well known German odonatologist and artist Jochen Lempert] Address: Kunsthau. Barlach HALLE K, Klosterwall 14, D-20095 Hamburg, Germany

1039. **Labeledzki, A.; Buczynski, P.; Tonczyk, G. (1999):** Gefährdung und Schutz der Libellen (Odonata) in Polen. In: Polski Towarzystwo Entomologiczne & Instytut Ochrony Przyrody PAN (Eds.): Konferncja Naukowa. "Ochrona owadów w Polsce u progę integracji z Unia Europejska", Kraków, 23-24 wrzesnia 1999. ISBN 83-01-08125-2. [Conservation of insects on the treshold of the integration of Poland into the European Community]: 21-23. (in Polish). [Poster presentation on the threat und conservation measures of Polish Odonata. Compared with the Red lists of countries of the European Community, the situation in Poland ist much better: 31% of the Polish Odonata species are listed in the Red List, compared with e.g. Germany, were 66% or Luxembourg with 59%. Key species for some habitat types are defined. The Polish colleagues assess the influence of colleting of dragonflies as a quite serious problem or dragonfly conservation. The necessity of further and detailed studies on the Polish odonate fauna is stressed.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1040. **Lecomte, T. (1999):** Les Odonates du Marais Vernier (Département de l'Eure). *Martinia* 15(2): 15-22. (in French, with English summary). ["The Vernier marsh is an extended peaty area situated in the Eure department, in Normandy. The analysis of the three existing publications concerning High-Normandy region, as well as the observations by the author, sum up to 39 species whose today presence or absence is commented. Since a few years the management in the «Courtils de Bouquelon» Voluntary Nature Reserve has significantly

favoured the development of the odonatological fauna of this site." (Author)] Address: Lecomte, T., R.N.V. des Courtils Bouquelon, « La Courtilière » La Vallée, F-27500 Bouquelon, France

1041. **Leipelt, K.G. (1999):** *Cordulegaster bidentata* SELYS und *Cordulegaster boltonii* (DONOVAN) (Odonata: Cordulegastridae) im nördlichen Harzvorland. *Braunschw. naturkd. Schr.* 5(4): 849-856. (in German, with English summary). [Niedersachsen, Germany; "In 1997 and 1998, in headwaters north of the Harz Mountains *Cordulegaster bidentata* SELYS, 1843 was recorded at eight sites. The distribution pattern at the edge of the range is discussed. Besides, at three running waters which belong to the systems of the river Innerste and the river Fuhse, *C. boltonii* (DONOVAN, 1807) was recorded. During intense surveys at the river Innerste in 1980 the species was not observed. Therefore this population seems to be newly established." (Author)] Address: Leipelt, K.G., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1042. **Leipelt, K.G.; Jökel, I.; Schrimpf, T.; Schütte, C.; Suhling, F. (1999):** Untersuchungen zur Habitatwahl der Larven von *Macromia splendens* (Pictet) (Anisoptera: Macromiidae). *Libellula* 18(1/2): 15-30. (in German, with English summary). ["In July 1998 we studied larval habitats and behaviour of *Macromia splendens* at the Garden de Mialet (France). Penultimate instar larvae were found in deep, calm sections of the river close to large rocks. In each case the bottom substratum was sand sometimes covered with leaf debris. Despite of intensive search, the habitats of smaller instars remained unknown to us. In substratum selection experiments the larvae preferred leaf detritus on sand rather than bare sand or stones on sand, and shaded substrata rather than those exposed to the sun. In the experiments the larvae were inactive during the day whereas they changed their places during the night. Substratum selection, low activity and burrowing behaviour are interpreted as anti-predator behaviour." (Authors)] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1043. **Lempert, J. (1999):** *Gynacantha corbeti* spec. nov., a new dragonfly from West Malaysia (Anisoptera: Aeshnidae). *International Journal of Odonatology* 2(1): 17-21. (in English). Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany

1044. **Lencioni, F.A.A. (1999):** The genus *Phasmoneura*, with description of *Forcepsioneura* gen. nov. and two new species (Zygoptera: Protoneuridae). *Odonatologica* 28(2): 127-137. (in English). ["The genus *Phasmoneura* is reviewed with the description of *Phasmoneura janirae* sp. n. (holotype male, allotype female: Brazil: Mato Grosso, Sinop, X-1976: in MNRJ). *Forcepsioneura* gen. n. is established for *Forcepsioneura garrisoni* sp. n. (generotype and holotype male: Brasil, Sao Paulo, Iguape. 22-IV-1995, in coll. Lencioni) and includes three previously described spp., viz. *Phasmoneura ephippigera* (Selys, 1886), *P. ciganae* Santos, 1968 and *P. itatiaiae* Santos, 1970. Keys and illustrations are given for all members of both genera." (Author)] Address: Lencioni, F.A.A., Rua dos Ferroviarios 55, Jardim Mesquilha, BR-12300-000 Jacarei, S.P. Brazil. E-mail: odonata@iconet.com.br

1045. **Leung, B.; Baker, R.L.; Forbes, M.R. (1999):** Grooming decisions by damselflies, age-specific colonisation by water mites, and the probability of successful parasitism. *Int. Jour. Parsitology* 29(3): 397-402. (in English). ["We examined whether host damselflies (*Ischnura verticalis*) in different stages of development were differentially susceptible to parasitism by larval water mites (*Arrenurus pseudosuperior*). We found that mites were successful in reaching the parasitic phase more often if they colonised hosts closer to emergence. Thus, we predicted that more mites should colonise damselflies closer to emergence and damselflies closer to emergence should spend more time defending against mites. We found that mites colonised damselflies closer to emergence in one of two experiments, but that damselflies in different stages of development did not differ in time spent defending against mites." (Authors)] Address: Baker, R.L., Dept Zoo], Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6. Canada. E-mail: rbaker@credit.erin.utoronto.ca

1046. **Leysjon, O. (1999):** An influx of red-veined darters at Dungeness RSPB reserve in 1998. The newsletter of the British Dragonfly Society No. 35: 14. (in English). [Short documentation of the occurrence of *Sympetrum fonscolombii* in the Dungeness Reserve, Kent, UK in July and August 1998] Address: Leyshon, O., Romney Marsh Countyside Project, Romney Resource Centre, Mountfield Road, New Romney, Romney Marsh, Kent TN28 8LH, UK

1047. **Logan, J.A. (1999):** Extraction, polymerase chain reaction, and sequencing of a 440 base pair region of the mitochondrial cytochrome oxidase I gene from two species of acetone-preserved damselflies (Odonata: Coenagrionidae). *Environmental entomology* 28(2): 143-147. (in English). ["Preserved insects are an important data source for many molecular systematics projects. This study investigates the use of acetone-preserved specimens in molecular DNA research. Two species of damselflies, *Enallagma civile* (Hagen) and *Hetaerina americana* (F.), were soaked in acetone before drying. Total genomic DNA was successfully extracted, amplified, and sequenced from the acetone-preserved damselflies with no noticeable effect from either the acetone or preservation time. Nucleotide sequences of a 440 bp region of the mitochondrial cytochrome oxidase I gene are presented for *E. civile* and *H. americana*. These 2 species have reached a saturated divergence level and it seems that the COI gene will not be useful for developing phylogenies at this taxonomic level." (Authors)] Address: Logan, J.A., Univ. Calif. Davis; Dept Ecol. & Evolut., Davis CA 95616; USA

1048. **Lopau, W. (1999):** Bemerkenswerte Libellenfunde aus Griechenland. *Libellula Suppl.* 2: 63-66. (in German, with English summary). ["In 1997, the first reliable Greek record of *Lestes sponsa* was made at the river Strimonas. *Pyrrhosma nymphula elisabethae* was rediscovered on the Peloponnese. *Lindenia tetraphylla* was recorded breeding in a river. *Coenagrion ornatum* is new for the Peloponnese and *Cordulegaster bidentata* is new for Thracia." (Author)] Address: Lopau, W., Kuhstedtermoor 26, D-27442 Gnarrenburg, Germany

1049. **Lopau, W. (1999):** Die Libellenfauna der griechischen Inseln Thásos, Samothráki und Límnos. *Libellula Suppl.* 2: 43-61. (in German, with English summary). ["Records in 1996 and 1997 have been combi-

ned with published and unpublished data known from the islands. Altogether, 30 spp. have been recorded. The checklist is discussed in terms of taxonomy, behaviour and habitat preferences." (Author) Remarks on the drought resistance of larvae of *Epallage fatime*, estimation of the population density of *Lestes macrostigma* on lake Chortárolimni (100.000.000 individuals!), the ranges of *Onychogomphus forcipatus forcipatus* and *O. f. albotibialis* are more precisely defined, description of morphological details of *Cordulegaster picta*, details of the colour of the eyes of *Cordulegaster insignis*, description of the differences of emerging substrate of *Cordulegaster insignis* (green leaves) and *Sonjagaster helladica* (rocks)] Address: Lopau, W., Kuhstedtermoor 26, D-27442 Gnarrenburg, Germany

1050. **Lopau, W. (1999):** Die Libellenfauna der Insel Évia (Euböa), Griechenland. *Libellula Suppl.* 2: 67-76. (in German, with English summary). ["Based on field trips in 1996, 1997, and 1998, and on literature data a review of the dragonfly fauna of Évia is given. At 41 localities 28 species were observed, 12 of them are new for the island. Altogether 31 species are recorded for Évia." (Author)] Address: Lopau, W., Kuhstedtermoor 26, D-27442 Gnarrenburg, Germany

1051. **Lutz, H. (1999):** Die unteroligozäne Insekten-Taphozönose von Sieblos/Rhön - ein Schlüssel für die Rekonstruktion des aquatischen Paläoenvironments. *Geol. Abhandl. Hessen* 104: 101-114. (in German, with English summary). ["This is an up to date summary of the insect taphocoenosis from Sieblos/Rhön. The specimens belong to two different facies types, 1) dysodils and 2) laminated carbonates. The present paper focuses on aspects of taphonomy. An analysis based on the terrestrial insect component of the taphocoenoses from 36 other aquatic paleoenvironments is of fundamental importance for an interpretation of the taphonomical phenomena from Sieblos. The effects of post-mortem surface drifting and sinking, i.e. the length of transport and the water-density affect the composition of local taphocoenoses within a single lagerstätte. This allows for horizons of the same age at the same lagerstätte to differentiate between near-shore and off-shore sites. In addition, the average contents of electrolytes can be determined by correlating the specific density with the sodium-chloridic salinity of marine paleoenvironments. It should be kept in mind however, that both low water-temperatures and contents of suspended matter may also raise the water-density. Nevertheless, the analysis allows for the recognition of normal (non-saline) lakes on the one hand, and brackish-marine to hyperhaline paleoenvironments on the other. Locally restricted lagerstätten of volcanic and/or tectonic origin like Sieblos and Maar-lakes, where many components of the aquatic flora and fauna indicate the predominance of freshwater, while others seem to point to an input of saline water, have been meromictic (salinity stratified) lakes with a high content of electrolytes in the monimolimnion. In these lakes storms or other events episodically caused partial turnovers that led to a more or less intensive increase of the contents of electrolytes within the lacustrine to oligohaline mixolimnion. Especially after periods of more intensive evaporation these partial turnovers may have caused mass mortalities among the stenohaline freshwater organisms. The comparison of the taphocoenoses of different facies or of single horizons within a lagerstätte makes changes of the specific density during the sedimentation of these facies or horizons obvious. Finally, on the basis of these tapho-

nomical informations, a dynamic model is given for the Sieblos-lake, that takes into account hydrological mid paleoclimatological changes during the sedimentation of the fossil bearing facies." (Author). Odonata dominate the insect-taphocoenosis of Sieblos (57,14% of all taxa in the facies of laminated carbonates; 0% in the facies of dysolids; 41,24% of both the facies). The Odonata of Sieblos are treated e.g. by Hagen, H.A. (1858): Zwei Libellen aus der Braunkohle von Sieblos. Palaeontographica 5, or Martini, E. (1971): Neue Insektenfunde aus dem Unter-Oligozän von Sieblos/Rhön. Senckenbergiana lethaea 52(4).] Address: Lutz, H., Naturhistorisches Museum / Landessammlung für Naturkunde Rheinland-Pfalz, Reichklaraste. 10., D-55116 Mainz, Germany.

1052. **Mader, D. (1999):** Geologische und biologische Entomöökologie der rezenten Seidenbiene *Colletes* - Entomöökologie der Nestbauten und Nistsubstrate der Seidenbiene *Colletes daviesanus* und anderer rezenter solitärer Wildbienen und Wespen in Buntsandstein, Rotliegend, Keuper, Lias, Dogger, Tertiär und Quartär. 2.8.11 Die Libellen Orthetrum und Anotogaster (Odonata). Bd 1. Logabook. Köln: 807 pp. (in German). [predation of Odonata on *Colletes* species (Hymenoptera)]

1053. **Mauffray, B. (1999):** *Aphylla angustifolia* Garri-son from Mississippi. *Argia* 11(1): 27. (in English). [range extension of *A. angustifolia*] Address: Mauffray, B., 3906 N.W. 32nd Pl., Gainesville, FL 32606, USA. E-mail: iori@afn.org

1054. **Mauffray, B. (1999):** Georgia Odonata update. *Argia* 11(1): 29. (in English). [list of contributors to the Georgia Odonata check list] Address: Mauffray, B., 3906 N.W. 32nd Pl., Gainesville, FL 32606, USA. E-mail: iori@afn.org

1055. **Mauffray, B. (1999):** Louisiana Odonata update (1998). *Argia* 11(1): 29. (in English). [additions to the Louisiana Odonata checklist] Address: Mauffray, B., 3906 N.W. 32nd Pl., Gainesville, FL 32606, USA. E-mail: iori@afn.org

1056. **Mauffray, W.F. (1999):** *Oxyagrion tennesse* spec. nov from Ecuador (Zygoptera: Coenagrionidae). *Odonatologica* 28(2): 165-170. (in English). ["The new sp. is described and illustrated from the Ecuadorian Andes (holotype male, allotype female: Napo prov., Baeza, 26-V11-1996; deposited at FSCA, Gainesville). It is similar to *O. terminale* Sel. and *O. bruchi* Navas, from which it is differentiated by the shape of the cerci and the coloration on abdominal segments 8-10." (Author)] Address: Mauffray, W.F. International Odonata Research Institute, D.P.I., P.O. Box 147100, Gainesville FL 32614-7100, USA

1057. **McCarty, J.P.; Winkler, D.W. (1999):** Foraging ecology and diet selectivity of tree swallows feeding nestlings. *Condor* 101(2): 246-254. (in English). ["We studied the foraging ecology of a population of Tree Swallows (*Tachycineta bicolor*) breeding in New York State over a period of 5 years. While feeding nestlings, adult Tree Swallows tended to spend most of their time within sight of their nest box and less than 12 m above the ground. Major insect taxa captured include Diptera, Hemiptera and Odonata, ranging in length from mainly 0-10 mm, with some individuals up to 60 mm. The sex of the parent delivering the food had no significant effect on diet composition. Selection for or against food

categories was determined by comparing the proportion of insects of different types in the diet of Tree Swallows to the proportions available in the air column. Tree Swallows showed consistent selection for insects larger than 3 mm and against smaller insects, especially Diptera in the suborder Nematocera. Only minor differences in diet were observed among years, and the effects of the abundance of food available were generally small. The patterns of selectivity found in this population were consistent with those found in previous studies on this species carried out in other locations, and these patterns are likely the result of differences in the profitability or visibility of prey types." (Authors)] Address: McCarty, J.P., Univ. Maryland; Dept Biol., College Pk, MD 20742; USA. E-mail: jm395@umail.umd.edu

1058. **Ménard, B.; Hutchinson, R. (1999):** *Williamsonia fletcheri* Williamson (Odonata: Corduliidae) au Québec: nouvelles récoltes, habitats et notes biologiques. *Faberies* 24(2/3): 25-32. (in French, with English summary). ["The authors report two new records of *W. fletcheri* Williamson for the province of Québec. This species remains rarely found everywhere in its range. They present their observations on the habitats and the unique microhabitat of this odonate. They also summarize available natural history data and illustrate the larva." (Authors)]. Address: Ménard, B., 56, rue Smith, Gati-neau (Québec) J8T 3A1, Canada

1059. **Meskin, I. (1999):** A farm in Africa. *W.D.A.'s Agrion* 3(1): 12. (in English). [Personal account on the dragonflies of a favourite spot in the northern part of South Africa.] Address: Meskin, I., 14 Frederick Street, Observatory, Johannesburg 2198, Gauteng, South Africa

1060. **Meurgey, F. (1999):** Quelques observation sur les émergences d'odonates sur les ponts d'une rivière (Département de Charente-Maritime). *Martinia* 15(2): 23-29. (in French, with English summary). [*Boyeria irene*, *Onychogomphus uncatus*, *Cordulegaster boltonii*.] Address: Meurgey, F., 19, rue Miséricorde, F-44000 Nantes, France

1061. **Misof, B.; Rickert, A. (1999):** Molekulare Untersuchungen zur phylogenetischen Position der Odonata. Leaflet. 1pp. (in German). Address: ari-ckert@evolution.uni-bonn.de

1062. **Mocek, B.; Rejl, J. (1999):** Dragonfly *Aeshna isosceles* (Müller, 1767) (Odonata) in Eastern Bohemia. *Acta Musei Reginaeiradecensis (A)* 27: 121-124. (in Czech, with English summary). [Three records of *Anaciaeschna isosceles* are documented: one road kill, and two records from the floodplain of River Labe. The habitats are pictured and the odonate fauna of the localities is listed in a tab.] Address: Mocek, B., Regional Museum of Eastern Bohemia, Dept Natural History, Eliscino Nábřezí 465, CZ-50001 Hradec Králové, Czech Republic. E-mail: mvc@mvc.anet.cz

1063. **Müller, J. (1999):** *Ophiogomphus cecilia* (Fourcroy) in der Donau bei Deggendorf, Niederbayern (Anisoptera: Gomphidae). *Libellula* 18(1/2): 69-70. (in German, with English summary). [record of an emerging female from 18 July, 1998] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmuel-ler@MU.LSA-NET.dbp.de

1064. **Nel, A.; Gand, G.; Garric, J. (1999):** A new family of Odonoptera from the continental Upper Permian: The Lapeyriidae (Lodeve Basin, France). *Geobis* 32(1): 63-72. (in English). ["The new family Lapeyriidae of Odonoptera, based on a new genus and species from the Upper Permian of Lodevois (France) is the sister group of Nodialata. It represents an evolutionary link between the venation type of the Paleozoic Meganisoptera and that of Odonata. Even if the present discovery demonstrates that the fossil record of the Odonoptera remains imperfectly known, the present state of knowledge shows that this super order survived the mass extinction at the Permo-Triassic boundary." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr
1065. **Nel, A.; Jarzembowski, E.A. (1999):** Fossil damselflies and dragonflies (Insecta: Odonata) from the late Upper Eocene of southern England. *Proc. geologist's ass.* 111(3): 193-201. (in English). ["Fossil dragonflies (sensu late) from the Bembridge Marls are discussed and five additional species are described: *Lestes* aff. *regina* Theobald, 1937 (Zygoptera: Lestidae); two new coenagrionoids; a corduliid and an enigmatic form of uncertain affinity. The palaeoenvironmental implications are considered." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@mnhn.fr
1066. **Nielsen, D.L.; Hillman, T.J.; Smith, F.J. (1999):** Effects of hydrological variation and planktivorous competition on macroinvertebrate community structure in experimental billabongs. *Freshwater biology* 42: 427-444. (in English). ["1. To study two factors which are predicted as causing changes to community structure in cut-off meanders (colloquially known in Australia as billabongs, a term of aboriginal origin), 16 experimental billabongs were constructed. These were designed to test two hypotheses: (a) that the structure of macrophyte and invertebrate communities within billabongs is altered by changing the pattern of flooding; and (b) that the presence of small planktivorous fish alters invertebrate community structure and diversity within billabongs. 2. An increase in the duration of flooding seems to favour animals better adapted to a greater availability of macrophyte habitat. Changing the seasonality of flooding resulted in prolonging of the time water was available over the summer months. 3. The presence of a planktivorous fish appears to affect macroinvertebrate communities through competition with other planktivores. Variable top-down pressure may create differing successional patterns and ultimately different communities at lower trophic levels." (Authors) Odonate taxa mentioned as follows: "immature damselflies", "*Ischnura* sp.", and "*Diplacodes* sp.". *Ischnura* sp. "may reflect duration of flooding and macrophyte availability.", and "Increasing numbers in the absence of fish. Effect increasing over duration of experiment.". *Diplacodes* sp.: "Seasonal effect. Numbers increase in the absence of fish during summer month, decreases in the winter month."] Address: Nielsen, D.L., Cooperative Research Centre for Freshwater Ecology, (Murray-Darling Freshwater Research Centre), PO Box 921, Albury 2640, New South Wales, Australia. E-mail: dazza@mdfrc.canberra.edu.au
1067. **Nielsen, O.F. (1999):** Dragonfly-news from Denmark 1998. *Nord. Odonat.Soc., Newsl.* 5 (1): 3. (in Danish, with English summary). ["Because of the bad weather in Denmark, 1998 became one of the poorest dragonfly-seasons for years. Still, many interesting records were made. Two new species were found, a female of *Sympetrum pedemontanum* at Langeland, and a female of *Sympetrum fonscolombei* at Bornholm. *Anax imperator* was discovered at Fyn, and successful breeding in Denmark was proved, as exuviae were found both here and at southern Jylland. *Somatochlora arctica* was present in good numbers at the locality at central Jylland. Near Ry, Jylland, two localities with the rare *Ischnura pumilio* were discovered. *Aeshna mixta* was found scattered at Jylland, but not as numerous as in the two previous seasons. In particular the species of *Lestes*, *Aeshna* and *Sympetrum* appeared in very low numbers this year." (Author)] Address: Nielsen, O.F., Sokildevej 87, DK-8680 Ry, Denmark
1068. **Nikula, B. (1999):** Another *Somatochlora georgiana* record of Massachusetts. *Argia* 11(3): 7-8. (in English). [Essex County, Massachusetts, USA] Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. E-mail: odenews@capecod.net
1069. **Nikula, B. (1999):** The *Somatochlora* swat team visits Maine. *Argia* 11(3): 11-12. (in English). [first record of *Somatochlora brevicincta* in USA; some more species of Corduliidae and Gomphidae are also mentioned including a "yet-to-be-described *Neurocordulia*"] Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. E-mail: odenews@capecod.net
1070. **Nikula, B. (1999):** The Swat Team goes canoeing. *Argia* 11(3): 12-13. (in English). [Maine, USA; *Neurocordulia yamaskanensis* (Provancher, 1875), *Gomphus ventricosus* Walsh, 1863, *Lanthus vernalis* Carle 1980, *Gomphus abbreviatus* Hagen in Selys, 1878, *Gomphus vastus* Walsh, 1862] Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. E-mail: odenews@capecod.net
1071. **Norma-Rashid, Y. (1999):** Behavioural ecology of *Tyriobapta torrida* Kirby at the breeding and resting sites (Anisoptera: Libellulidae). *Odonatologica* 28(2): 139-150. (in English). ["*T. torrida* showed territoriality at the water bodies where breeding occurs and also site fidelity at the resting sites on tree trunks away from the water. At the latter, residentiality is very localised not only to a specific tree but to a narrow range of height on the tree. Activity patterns at the breeding sites commenced with the male arrival. The density and activity reached an initial peak during mid-morning which coincided with the high day temperature. Aggression peaked at this time although pursued only for brief periods. The duration for perching behaviour was low during reproductive periods which otherwise had longer bouts." (Author)] Address: Norma-Rashid, Y., Department of Zoology, Faculty of Science, University of Malaya, 59100 Kuala Lumpur, Malaysia
1072. **Novelo-Gutiérrez, R.; Garrison, R.W. (1999):** *Erpetogomphus erici* spec. nov. from Mexico, and a description of the male of *E. agkistrodon* Garrison (Anisoptera: Gomphidae). *Odonatologica* 28(2): 171-179. (in English). ["*E. erici* is described and figured from: El Muro, km 16 Rte 131, Altotonga-Tiapacoyan, Veracruz State, Mexico, and from Pemuxtitia, Rio Zacuala, and Molango, Laguna de Atezca (stream), both in Hidalgo State, Mexico. The allotype male of *E. agkistrodon* is described and illustrated from: Coatepec, Rio La Marina, Veracruz State, Mexico. Both are most closely rela-

ted to *E. schausi* Calvert, but differ in details of the appendages and occiput." (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Institute de Ecología, A.C., Apartado Postal 63. MX-91000 Xalapa, Veracruz, Mexico; Garrison, R.W., Research Associate, Natural History Museum of Los Angeles County, 900 Exposition Blvd. Los Angeles, California, 90007, USA

1073. **O'Brien, M. (1999):** *Williamsonia* wandering. *Argia* 11(2): 3. (in English). [W. lintneri was found in May 1999 in Mecosta Co., Michigan, USA in a bog; additional records of *W. flechteri* are recorded too] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: O'Brien: mfobrien@umich.edu

1074. **Oehme, H. (1999):** Jagderfolg und Jagdtaktik bei *Sympetrum striolatum* (Charpentier) (Anisoptera: Libellulidae). *Libellula* 18(1/2): 79-87. (in German, with English summary). ["Flight activities starting from several perches around a small artificial pond and foraging success of an individually recognizable male *S. striolatum* were observed during 14 days between 8 July, and 5 September, 1998. The results are discussed in comparison with other libellulid species. Remarkable deviations of hunting behaviour from wide-spread views are ascertained and discussed." (Author)] Address: Oehme, H., Marzahner Chausee 161, D-12681 Berlin, Germany

1075. **Olsvik, H. (1999):** Bokanmeldelse: Ole Fogh Nielsen. De danske guldsmede. Apollo books. ISBN 87-88757-21-8. *Nord. Odonat. Soc., Newsletter* 5(1): 9. (in Norwegian). [review of Nielsen's book on the Danish dragonflies] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1076. **Olsvik, H. (1999):** From the 4th nordic Odonatological meeting at Konnevesi, Finland 26-28 June 1998. *Nord. Odonat. Soc. Newsl.* 5 (1): 6. (in Norwegian, with very short English summary). [brief report from the meeting, including a species list from the fieldtrip in Konnevesi, Finland] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1077. **Olsvik, H. (1999):** Odonata in Aure. *Nord. Odonat. Soc. Newsl.* 5 (1): 16. (in Norwegian, with English summary). ["18 species are found in Aure municipality, central Norway during the last 24 years, 19 if *Sympetrum nigrescens*" is considered as a separate species." (Author). *Aeshna juncea* is the most frequent, and *Coenagrion armatum* and *Sympetrum striolatum* (excl. *S. nigrescens*) are the most rare species.] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1078. **Olsvik, H. (1999):** Odonata-impressions from Minnesota. *Nord. Odonat. Soc. Newsl.* 5 (1): 18-19. (in Norwegian, with English summary). ["44 odonate species were collected at a dozen localities, mostly in the "North Shore"-area of Minnesota, in July - August 1991 and May 1992. Three species seem to be new to the state, *Enallagma vesperum*, *Chromagrion conditum* and *Somatochlora cingulata*, and also nineteen new county records." (Author)] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1079. **Olsvik, H. (1999):** Om larve- / exuvia-kjenne-tegn på *Somatochlora arctica*. *Nord. Odonat. Soc., Newsletter* 5(1): 8. (in Norwegian, with English summary). ["Two asymmetrical larvae of *Somatochlora arctica*

were found among a total of 28 larvae found 4 May 1998 in Aure, Norway. The recognizing mark or sclerite at the underside of segment 7 was present at one side, lacking on the other." (Author); 1 fig.] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1080. **Olsvik, H. (1999):** Proposed regional red lists for Odonata. *Nord. Odonat. Soc., Newsletter* 5(1): 10-11. (in Norwegian, with English summary). ["This is the first draft of a complete set of regional red lists for Odonata in Norway, a tool for the environmental authorities both local and national." (Author)] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1081. **Olsvik, H. (1999):** Småstykker. *Nord. Odonat. Soc., Newsletter* 5(1): 12-13. (in Norwegian). [news and short accounts on several odonatological subjects such as • Odonatological news from More and Romsdal, 1998 with records of *Coenagrion armatum* and *Calopteryx virgo* • *Anax junius* in England • Odonatological symposium in Siberia, USSR, 2001 • Water skiing as a tool to catch fast flying dragonflies • Catching dragonflies using pump guns • Odonatological activities in the internet • New dragonfly books on Thai and Danish Odonata] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1082. **Olsvik, H.; Nielsen, O.F. (1999):** *Sympetrum nigrescens* Lucas, 1912 in Denmark. *Nord. Odonat. Soc. Newsl.* 5 (1): 7. (in Danish, with English summary). ["The specimens of "*Sympetrum striolatum*" (Charp., 1840) found in Jylland, Denmark have appeared very dark, very similar to Norwegian material that shows the signs of Lucas' and Gardner's *S. nigrescens*." (Authors)] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1083. **Olsvik, H. (1999):** Welcome to the 5th annual summer meeting of the nordic Odonatological society, at Aure, Nordmoere, central Norway 6-8. August 1999. *Nord. Odonat. Soc. Newsl.* 5 (1): 17. (in Norwegian and English). [announcement of the 5th annual meeting of the nordic odonatological society] Address: Olsvik, H., N-6598 Foldfjorden, Norway

1084. **Orr, A.G. (1999):** *Sundacypha striata* spec. nov., a new damselfly from Borneo (Zygoptera: Chlorocyphidae). *Odonatologica* 28(2): 181-185. (in English). ["Both sexes of *S. striata* sp. n. are described from Brunei (holotype male: Belait distr., Sungei Lumut, 16-XII-1995; deposited in RMNH, Leiden), and notes on its ecology and behaviour are provided. This is the second species of the hitherto monobasic genus, widespread in Sundaland." (Author)] Address: Orr, A.G., CRC-TREM, Griffith University, Nathan, Q4111, Australia

1085. **Papazian, M. (1999):** Odonates nouveaux pour la Guyane Française (Odonata, Libellulidae). *Martinia* 15(2): 43-45. (in French, with English summary). [15 new species are added to the list of Odonata of French Guyana] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

1086. **Papendieck, M. (1999):** Die Pokaljungfer *Cercion lindenii* (SELYS) an ihrer östlichen Verbreitungsgrenze in Niedersachsen (Odonata: Coenagrionidae). *Braunschw. naturkd. Schr.* 5(4): 959-963. (in German, with English summary). ["In August 1998, for the first time the damselfly *Cercion lindenii* (SELYS, 1840) was recorded at the nature reserve "Okeraue", close to the

borderline of Lower Saxony and Saxony-Anhalt, 30 km south of Braunschweig. It was found at one of four ponds, which were formerly used as gravel mines. They are located nearby the eastern banks of the Oker river." (Author) These records are the most eastern one's in Niedersachsen, Germany.] Address: Papendieck, M., Schmidekamp 19, D-38690 Vienenburg, Germany

1087. **Parr, A. (1999):** Norfolk Damselfly *Coenagrion armatum* rediscovered in The Netherlands. *Atropos* 8: 52. (in English). [record from May 9, 1999 in the "boggy Weerribben region", the same region in which *C. armatum* was seen for the last time in 1956 in The Netherlands; it therefore is supposed that the species never disappeared from The Netherlands, but simply was overlooked; the habitat is described in short] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

1088. **Parr, A. (1999):** Odonata Records Committee News. *Atropos* 8: 53. (in English). [two new acceptations of *A. parthenope* by the Committee for May 1997, and August 1998 ; up to date status of accepted records of *Anax parthenope* in UK: eleven records with 12 individuals.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

1089. **Parr, A. (1999):** Potential new Odonata for the British list: 2. The possibility of vagrant or colonist damselflies. *Atropos* 8: 21-25. (in English). [Four further candidates to enlarge the number of British dragonfly fauna are *Sympetma fusca*, *Chalcolestes viridis*, *Lestes barbarus*, and *L. virens*. These species are described, compared with other species easily to confused, and presented on colour plates.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

1090. **Parr, A.J. (1999):** Migrant and dispersive dragonflies in Britain and Ireland during 1998. *J. Br. Dragonfly Soc.* 15(2): 51-57. (in English). [Information on the following species is provided: *Aeshna cyanea*, *A. mixta*, *Anax ephippiger*, *A. imperator*, *A. parthenope*, *A. junius*, *Libellula quadrimaculata*, *Crocothemis erythraea*, *Sympetrum striolatum*, *Sympetrum fonscolombii*, *Sympetrum flaveolum*, and *Sympetrum sanguineum*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

1091. **Parr, M. (1999):** "And then I arrive home and find the very Lady waiting for me". *W.D.A.'s Agrion* 3(1): 7. (in English). [Report on a personal contact with Robert Gambles, the discovery of the female of *Nesiothemis farinosa*, the synonymy of *Limnetothemis erythra* with *N. forinosa*, and some additional information on the latter species.] Address: Parr, M., Little Island, Stembridge, Martock, Somerset TA12 6BW, UK. E-mail: mmc@parr37.freeseerve.co.uk

1092. **Parr, M. (1999):** Dragonfly enthusiasts in Madagascar. *W.D.A.'s Agrion* 3(2): 26. (in English). [report on an expedition in April 1999 to Madagascar; this paper seems to be an appetizer for a forthcoming paper on the results of the trip.] Address: Parr, M., Little Island, Stembridge, Martock, Somerset TA12 6BW, UK. E-mail: mmc@parr37.freeseerve.co.uk

1093. **Parr, M.J. (1999):** Philip Steven Corbet, b 21 May, 1929. *International Journal of Odonatology* 2(1):

1-4. (in English). [biographical appreciation of Prof. Dr. P.S. Corbet in recognition of his 70th birthday] Address: Parr, M., Little Island, Stembridge, Martock, Somerset TA12 6BW, UK. E-mail: mmc@parr37.freeseerve.co.uk

1094. **Parr, M.J. (1999):** The terminology of female polymorphs of *Ischnura* (Zygoptera: Coenagrionidae). *International Journal of Odonatology* 2(1): 95-99. (in English). ["It is suggested that the current range of terminology employed to name the polymorphs of *Ischnura elegans* (Vander Linden) should be simplified and standardised in order to avoid confusion. [...] It is proposed that the plethora of inaccurate, complex and confusing names for female polymorphs of *I. elegans* should be reduced in accordance with the following: Adult forms: andromorph, infuscans and rufescens-obsolata (previously infuscans-obsolata). Immature stages: violacea and rufescens. Rejected names and terms used to describe polymorphs of *I. elegans* and closely related species include: type, typica, androchrome, androchromatypic, homeochrome, heterochrome, heteromorphic, gynochrome, gynochromatypic, infuscans-obsolata, usual, normal." (Author)] Address: Parr, M., Little Island, Stembridge, Martock, Somerset TA12 6BW, UK. E-mail: mmc@parr37.freeseerve.co.uk

1095. **Paulson, D. (1999):** Dragonflies down under. *Argia* 11(1): 5-8. (in English). [report from an odonatological trip to Australia from Dec. 1998 to Jan. 1999; you will find notes on the following species: *Austropetalia patricia* (Tillyard 1910), *Eusynthemis tillyardi* Theischinger 1995, *Choristhemis flavoterminalata* Martin, 1901, *Hemigomphus comitatus* (Tillyard 1909), *Pseudagrion aureofrons* Tillyard 1906, *Pseudagrion ignifer* Tillyard 1906, *Pseudagrion microcephalum* (Rambur 1842), *Nososticta solida* Hagen in Selys 1860, *Diphebia nymphoides* Tillyard 1912, *Diphebia euphaeoides* Tillyard 1907, *Austrolestes minjerriba* Watson 1979, *Orthetrum boumiera* Watson & Arhington, 1978, *Traema eurybia* Selys 1878, *Ischnura aurora* Brauer 1865, *Petalura gigantea* Leach 1815, *Petalura ingentissima* Tillyard 1908, *Nannophya australis* Brauer 1865, *Agriocnemis argentea* Tillyard 1906, *Choristhemis olivei* (Tillyard 1909), *Eusynthemis netta* n.sp. (see OAS 1158) *Tonyosynthemis ofarrelli* (Theischinger & Watson, 1986), *Camacinia othello* Tillyard, 1908] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

1096. **Paulson, D. (1999):** Dragonfly questions out of Africa. *W.D.A.'s Agrion* 3(1): 14-15. (in English). [a lot of very interesting subjects for people who don't know what about to write their M.Sc.- or Ph.D.-thesis] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

1097. **Paulson, D.; Hukari, M.; Krotzer, S.; Krotzer, M.J. (1999):** New county records of South Dakota Odonata, with five new species for the state. *Argia* 11(1): 28-29. (in English). [new to South Dakota are *Argomphus cornutus* (Tough 1900), *Stylurus amnicola* (Walsh 1862), *Stylurus notatus* (Rambur 1842), *Leucorrhinia hudsonica* (Selys 1850), and *Sympetrum rubicundulum* (Say 1839).] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

1098. **Paulson, D. (1999):** Odonata gleanings - dragons eating dragons. *Argia* 11(2): 15-16. (in English).

[discussion, and list of Anisoptera recorded preying on Odonata] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

1099. **Paulson, D. (1999):** Odonata gleanings - phylogeny and perching behaviour. *Argia* 11(3): 14-15. (in English). [discussion on perching behaviour and its potential importance in constructing a phylogeny of the Libellula group] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

1100. **Paulson, D. (1999):** Photo files for odonate records. *Argia* 11(3): 19-20. (in English). [state of art report on building up a photo record documentation of US Odonata] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA

1101. **Pedersen, H. (1999):** Records of rare and new dragonfly species in Denmark 1997 - 1998. Contribution No. 1 from "Gomphus - the Danish mapping project". *Nord.Odonat.Soc.Newsl.* 5 (1): 14-15. (in Danish). ["The Danish mapping project - Gomphus, has now put together all Odonata-records from Denmark since 1887, altogether more than 100.000 records. Both museum collections and hundreds of private contributions are recorded in a database linked to electronic distribution maps. *Sympecma fusca* was found new to Denmark in south Jylland in 1998. A second locality for *Nehalennia speciosa* is also noteworthy. *Epitheca bimaculata* and *Leucorrhinia albifrons* were rediscovered in 1998 after 30-40 years without records." Records of other rare species (*Platynemesis pennipes*, *Ischnura pumilio*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Aeshna viridis*, *Anaciaeschna isocetes*, *Cordulegaster boltonii*, *Somatochlora arctica*, *Orthetrum coerulescens*, and *Leucorrhinia pectoralis*) are referred to. "A critical review of the new Danish Odonata book "De danske guldsmede" (O. F. Nielsen 1998) is also included." (Author)] Address: Pedersen, H., Møllevej 15, DK - 8800 Viborg, Danmark, E-mail: henning.pedersen@post12.tele.dk

1102. **Pelt, G.J. van (1999):** On dragonflies from Greece in the RMNH collection, Leiden, The Netherlands. *Libellula Suppl.* 2: 77-90. (in English, with German summary). ["Material of 41 species from 99 localities on the mainland of Greece (1984, 1995), and the islands of Samos and Icaria (1996, 1997) is reported upon. *Somatochlora metallica meridionalis* is reported from the Pelopónissos for the first time. From the island of Icaria 16 species are reported, among which *Calopteryx splendens*, *Enallagma cyathigerum*, *Anax immaculifrons* and *Cordulegaster insignis* are of particular interest." (Author)] Address: Pelt, G.J. van, Naturalis, P.O. 9517, NL-2300 RA Leiden, The Netherlands

1103. **Perrin, V.L. (1999):** Mixed pairing of *Libellula* species. *J. Br. Dragonfly Soc.* 15(2): 61. (in English). [mixed pair of a male *L. fulva* and a female *L. quadrimaculata*] Address: Perrin, V.L., 13 Pettits Lane, Dry Drayton, Cambridgeshire CB3 8BT, UK

1104. **Perrin, V.L. (1999):** Observations on the distribution, ecology and behaviour of the Hairy Dragonfly *Brachytron pratense* (Müller). *J. Br. Dragonfly Soc.* 15 (2): 39-45. (in English). ["This paper draws together information from many sources on the Hairy Dragonfly *Brachytron pratense*, collected as part of the recent Collective Knowledge Project of the British Dragonfly Society (BDS). Many of the observations have not been

published previously. It is intended to act as an overview of the species and to serve as a baseline of current knowledge. Additionally it is hoped that the paper may stimulate comment and further research work on this species which has as yet not been systematically studied over an extended period." (Author) Territorial and feeding behaviour, mating, oviposition aquatic habitat of larva and larval development, emergence, phenology.] Address: V. L. Perrin, 13 Pettits Lane, Dry Drayton, Cambridgeshire CB3 8BT, UK

1105. **Petrulevicius, J.F.; Nel, A.; Muzon, J. (1999):** A new libelluloid family from the upper Paleocene of Argentina. *Palaeontology* 42(4): 677-682. (in English). ["A new family of dragonflies, Palaeomacromiidae, based on *Palaeomacromia multicellulata* gen. et sp. nov., is described from the Late Paleocene Maiz Gordo Formation of north-western Argentina. The present discovery demonstrates that the present knowledge of the Early Cenozoic insect fauna of the Neotropical region remains very poor." (Authors)] Address: Petrulevicius, J.F.; Museo La Plata; Dept Cient Paleozool Invertebrados; Paseo Bosque S-N; RA-1900 La Plata; Argentina. E-mail: levicius@netverk.com.ar

1106. **Piper, W.; Krüner, U. (Eds.) (1999):** Libellen-nachrichten 2. 20 pp. (in German). [Newsletter of the Society of the German speaking Odonatologists with reports of its 18. meeting in Münster, (book) reviews, requests for cooperation, a report of the International Congress of Odonatology in Hamilton/USA in 1999, presentation of WDA, and some additions to "Dragonflies and literature"] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany

1107. **Plaistow, S.; Siva-Jothy, M.T. (1999):** The ontogenetic switch between odonate life history stages: effects on fitness when time and food are limited. *Animal behaviour* 58(3): 659-667. (in English). ["During the course of ontogeny, odonates switch from being aquatic larvae to being terrestrial adults. Ontogenetic niche shift theory proposes that such shifts are adaptive and have evolved to maximize a growth rate (size) to mortality rate ratio. Individuals should therefore switch from one niche to the other at an optimal size or state. Since the majority of odonates are seasonal breeders, the extent to which the switch is optimal will depend upon the time and the resources available during postembryonic development. We collected a cohort of larvae that varied in how close they were to eclosion and reared them on either a high-nutrition or a low-nutrition diet. We then determined the relative influence of both time and nutritional constraints on survival and development rate, as well as the body size, size-corrected flight muscle mass and fat reserves of individuals at eclosion. Damselflies in both high- and low-nutrition treatments responded to a short development period by developing faster and reducing their body size, but did not change their proportional investment in fat reserves and flight muscle. Reduced larval nutrition resulted in decreased body size, flight muscle mass and fat reserves at eclosion. However, it had no effect on survival to eclosion, or development rate. We discuss these results in terms of the influence that time and nutritional constraints have on odonate development patterns and fitness." (Authors)] Address: Plaistow, S., Univ Sheffield, Dept Anim. & Plant Sci., Sheffield S10 2TN, S Yorkshire, England

1108. **Powell, D. (1999):** A guide to the dragonflies of Great Britain. Arlequin Press. Chelmsford. ISBN 1 900159 01 5: 127 pp. (in English). [To me, this is a really outstanding book. Throughout with (water) colour pictures, you will find a lot of information in a somewhat free style, but nonetheless with exact scientific information. There is hardly any picture which don't express a very special mood: often the dragonfly within its habitat is portrayed - a very intrusive example for this is the chapter on *Aeshna caerulea*. In a monographic style, on finds information on morphological details useful for identification, on species which could be confused, on special behaviour, on conditions favourable to observe to see the species you want to see, what habitat is promising... One may say, this book is one for the beginner, but it equally is one for the advanced or professional odonatologist, because the pictures are directed to your soul. Hardly any book with photographs of dragonflies can express this wonderful harmony between landscape, dragonfly, and observer as is done by the colour pictures of Dan Powell. (M. Sch.)] Address: Arlequin Press, 26 Broomfield Road, Chelmsford, Essex CM1 1SW, UK

1109. **Pratt, P.D. (1999):** 1998 summary for southwestern Ontario. *Argia* 11(1): 26. (in English). [Information on *Stylurus notatus* (Rambur 1842), *Sympetrum vicinum* (Hagen 1861), *Enallagma anna* Williamson 1900, *Enallagma traviatum* Selys 1876, *Lestes eurinus* Say 1839, and *Enallagma basidens* Calvert 1902 are presented.] Address: Pratt, P.D., 7100 Matchette Rd, La Salle, ON, Canada, N9C 2S3. E-mail: prairie@netcore.ca

1110. **Prendergast, E. (1999):** Tanzania calling. *W.D.A.'s Agrion* 3(1): 16. (in English). [short report on some dragonflies of the Rufiji River, some 80 km by air from Dar es Salaam] Address: Prendergast E.D.V., Manor House, Bagber, Sturminster Newton, Dorset DT10 2EY, United Kingdom

1111. **Pryce, D.J. (1999):** The 1998 Cameroon dragonfly project expedition. *W.D.A.'s Agrion* 3(2): 24-25. (in English). [report of a 1998 trip to Cameroun, Africa with notes on the dragonfly fauna of some localities in the WWF-Mount Kupe Forest Project; *Aeshna scotias* Pinhey 1952, *Olpogastra lugubris* Karsch 1895, and *Phyllomacromia caneri* (Gauthier 1987) are some species among others mentioned] Address: Pryce, D.J., Moneybrook Lodge, Herford Rd, Meole Brace, Shrewsbury, SY3 9LB, UK

1112. **Radford, A.P. (1999):** Prolonged partial immersion of abdomen by male *Anax imperator* Leach. *J. Br. Dragonfly Soc.* 15(2): 60. (in English). [discussion on an *A. imperator* inserting the posterior third of the abdomen into the water] Address: Radford, A.P., Crossways Cottage, West Bagborough, Taunton, Somerset TA4 3EG, UK

1113. **Ramirez, A.; Paaby, P.; Pringle, C.M.; Aguero, G. (1999):** Effect of habitat type on benthic macroinvertebrates in two lowland tropical streams, Costa Rica. *Revista de biologia tropical* 46(Suppl. 6): 201-213. (in English). ["Benthic macroinvertebrate community structure was studied with respect to stream habitat type in two lowland tropical streams. Three reaches along the Carbon river and two within the Gandoca stream were chosen as study sites in Talamanca, Costa Rica. Ma-

croinvertebrates were collected from four habitat types: leaf packs in riffles, cobble in rimes, areas of sand in pools, and areas of gravel in pools. Communities were dominated by insects in the orders Ephemeroptera (*Thraulodes*, *Baetis*?), Diptera (*Chironomidae*, *Tipulidae*), Trichoptera (*Hydropsychidae*, *Glossosomatidae*, *Hydroptilidae*, *Calamoceratidae*), and Odonata (*Progomphus*, *Hetaerina*). Noninsect macroinvertebrates were dominated by shrimps (*Macrobrachium*) and snails (*Gastropoda*). Functional feeding group composition was dominated by collector-gatherers. In most reaches, both habitat types in rimes supported higher macroinvertebrate abundance and biomass than did habitats in pools. Leaf packs in rimes represent an important habitat that is present year-round in these aseasonal tropical systems. Community composition and diversity were similar to that reported for other areas of Central America." (Authors)] Address: Ramirez, A., Univ Georgia; Inst. Ecol., Athens; GA 30602; USA. E-mail: aramirez@arches.uga.edu

1114. **Ramirez, A.; Novelo-Gutierrez, R. (1999):** The Neotropical dragonfly genus *Macrothemis*: new larval descriptions and an evaluation of its generic status based on larval stages (Odonata: Libellulidae). *Jour. North-American benthol. soc.* 18(1): 67-73. (in English). ["The larvae of *Macrothemis aurimaculata* and *M. inequinguis* are described and illustrated. A redescription of *M. celeno* is also provided. *Macrothemis aurimaculata* can be separated from other species in the genus because it has reduced or vestigial dorsal protuberances on abdominal segments VII-IX. *Macrothemis inequinguis* can be differentiated by the presence of 7 setae on the labial palp, in contrast to less than or equal to 6 in other species. Both species inhabit streams in areas with slow-moving water. *Macrothemis celeno* closely resembles *M. inacuta* and *M. pseudimitans*. Some features to separate larvae of *Macrothemis* from its close relative *Brechmorhoga* are given. A key for identification of all the described larvae of *Macrothemis* is provided." (Authors)] Address: Ramirez, A., Univ Georgia; Inst. Ecol., Athens; GA 30602; USA. E-mail: aramirez@arches.uga.edu

1115. **Ramos Hernandez, J.M. (1999):** List of the Odonata (Insects; Odonata) from Cayo Caguanes and Cayo Palma, Sancti-Spiritus Province, central Cuba. *Argia* 11(3): 15-17. (in English). [checklist of 23 taxa] Address: Ramos Hernandez, J.M., Ap. Post. 2204, Sancti-Spiritus, CUBA Cp. 60100

1116. **Reder, G. (1999):** Wolfsspinnen (Araneae: Lycosidae) als Beutegreifer einer schlüpfenden Großlibelle (Anisoptera: Gomphidae). *Libellula* 18(1/2): 59-62. (in German, with English summary). ["Three individuals of *Pardosa amentata* (Clerck) attacked an emerging female of *Gomphus pulchellus* Selys successfully. The observation is briefly discussed." (Author)] Address: Reder, G., Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany

1117. **Rehfeldt, G. (1999):** Massenentwicklung von *Sympetrum fonscolombii* (Selys) in Südfrankreich 1996 (Anisoptera: Libellulidae). *Libellula* 18(1/2): 103-106. (in German, with English summary). ["At the beginning of July 1996 *S. fonscolombii* showed mass development at rice fields of the Camargue. Relations with the immigration of the species in Central Europe are discussed." (Author)] Address: Rehfeldt, G., Zool. Inst. TU

Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: G.Rehfeldt@tu-bs.de

1118. **Reinhardt, K.; Seidenbusch, R. (1999):** Zur Libellenfauna des Ili-Gebietes, Kasachstan (Insecta: Odonata). Faunistische Abhandlungen, Staatliches Museum für Tierkunde Dresden 21(14): 221-228. (in German, with English summary). ["A field trip into the basin of the river Ili, SE Kazakhstan, yielded a total of 19 dragonfly species including new records for *Ischnura aralensis*, *Erythromma najas* and *Selysiothemis nigra*. The dragonfly fauna of the region between Lake Balkhash and the Tien Shan mountains as derived from a literature review now comprises 44 species, at least five of which appear doubtful. *Sympetrum tibiale* has not been recorded for nearly 100 years. Factors contributing to the probable underestimation of dragonfly species richness in that area are discussed." (Authors) Short remarks on the daily activities of *Sympecma paedisca*, predation by *Falco subbuteo*, *Merops superciliosus*, and missing of predation by *Motacilla flava feldegg* (Aves) on Odonata, the description of aggregations of *Libellula quadrimaculata* on dormitories, and notes on the morphology of *L. quadrimaculata* are of some interest.] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1119. **Reinhardt, R. (1999):** Kurzfassung und Auszüge aus dem Abschlußbericht des F/E-Projektes: Landesweit repräsentative, ortsgenaue Erfassung ausgewählter, Naturschutzrelevanter Insektengruppen sowie Benennung von Gebieten mit besonderer Bedeutung für die Entomofauna in Sachsen (Entomofauna Saxonica II). Mitt. Sächs. Entomol. 45: 2-29. (in German). [Status quo - report on the distribution of the Odonata of the federal state Sachsen, Germany (dot map of records on the basis of TK 25); check list with record resp. locality frequency of each of the 60 species presently known from Sachsen; further 7 species are assumed to be extinct; after 1990 four species (*Sympecma paedisca*, *Stylurus flavipes*, *Anax ephippiger*, and *Crocothemis erythraea*) were reported new for Sachsen; *Aeshna affinis*, and *Sympetrum fonscolombii* have been rediscovered in the 90th; 15 species can only be observed at less than 15 localities in the federal state] Address: Reinhardt, R., Burgstädter Str. 80a, D-09648 Mittweida, Germany

1120. **Relyea, R.A.; Werner, E.E. (1999):** Quantifying the relation between predator-induced behavior and growth performance in larval anurans. *Ecology* 80(6): 2117-2124. (in English). ["Because the nature and magnitude of species interactions are functions of the traits that species possess, understanding how individual traits affect performance is important to our understanding of community structure. To examine the relation between species traits and performance, we first assessed behavioral responses of two larval anurans to three predator species in the laboratory. We then correlated these responses with growth performance of the two anurans when they competed in the field. In the laboratory experiment, larval bullfrogs (*Rana catesbeiana*) and green frogs (*R. clamitans*) exhibited no reduction in activity or spatial avoidance to bluegill sunfish (*Lepomis macrochirus*), moderate reductions in activity and spatial avoidance of mudminnows (*Umbra limi*), and large reductions in activity and spatial avoidance of larval dragonflies (*Anax* spp.). In the field experiment,

these behavioral responses were directly related to corresponding reductions in growth of the anuran larvae. Thus, for both species, changes in growth in the field could be correlated to the behavioral responses observed in the laboratory. Further, proportional changes in behavior in the presence of the different predators appeared to be related to changes in competitive relations in the field." (Authors)] Address: Werner, E.E., Department of Biology, University of Michigan, Ann Arbor, Michigan 48109, USA

1121. **Rith, J. (1999):** Minnesota dragonfly survey project. *Argia* 11(1): 31-32. (in English). [report on the project, and discussion of some open questions on *Aeshna eremita*, *Pachydiplax longipennis*, *Cordulegaster obliqua*, *Aeshna subarctica*, and *Ophiogomphus susbecha*.] Address: Rith-Najarian, J.C., River's Edge Geographics, P.O. Box 453, Bemidji, MN 56619, United States

1122. **Roberts, S.P.; Harrison, J.F. (1999):** Mechanisms of thermal stability during flight in the honeybee *Apis mellifera*. *Jour. exp. biol.* 202(11): 1523-1533. (in English). ["Thermoregulation of the thorax allows honeybees (*Apis mellifera*) to maintain the flight muscle temperatures necessary to meet the power requirements for flight and to remain active outside the hive across a wide range of air temperatures (T-a). To determine the heat-exchange pathways through which flying honeybees achieve thermal stability, we measured body temperatures and rates of carbon dioxide production and water vapor loss between T-a values of 21 and 45 degrees C for honeybees flying in a respirometry chamber. Body temperatures were not significantly affected by continuous flight duration in the respirometer, indicating that flying bees were at thermal equilibrium. Thorax temperatures (T-th) during flight were relatively stable, with a slope of T-th on T-a of 0.39. Metabolic heat production, calculated from rates of carbon dioxide production, decreased linearly by 43 % as T-a rose from 21 to 45 degrees C. Evaporative heat loss increased nonlinearly by over 50%, with evaporation rising rapidly at T-a values above 33 degrees C. At T-a values above 43 degrees C, head temperature dropped below T-a by approximately 1-2 degrees C, indicating that substantial evaporation from the head was occurring at very high T-a values. The water flux of flying honeybees was positive at T-a values below 31 degrees C, but increasingly negative at higher T-a values. At all T-a values, flying honeybees experienced a net radiative heat loss. Since the honeybees were in thermal equilibrium, convective heat loss was calculated as the amount of heat necessary to balance metabolic heat gain against evaporative and radiative heat loss. Convective heat loss decreased strongly as T-a rose because of the decrease in the elevation of body temperature above T-a rather than the variation in the convection coefficient. In conclusion, variation in metabolic heat production is the dominant mechanism of maintaining thermal stability during flight between T-a values of 21 and 33 degrees C, but variations in metabolic heat production and evaporative heat loss are equally important to the prevention of overheating during flight at T-a values between 33 and 45 degrees C." (Authors)] Address: Roberts, SP; Univ. Chicago; Dept Organismal. Biol. & Anat., 1027 E 57Th St; Chicago IL 60637; USA. E-mail: sroberts@midway.uchicago.edu

1123. **Rödel, M.O. (1999):** Predation on tadpoles by hatchlings of the freshwater turtle *Pelomedusa subrufa*. *Amphibia-Reptilia* 20(2): 173-183. (in English). ["Experiments with *Pelomedusa subrufa*, a widespread African freshwater turtle, showed that this species consumed large quantities of tadpoles. Tadpoles preyed upon, comprised between 0.05 and 21.55% of the turtle's biomass. This demonstrated that *Pelomedusa subrufa* was neither gape limited nor did it ignore very small prey. Tadpoles with an ovoid body shape (*Hemismus marmoratus*, *Hyperolius nitidulus*, *Ptychadena macrathyensis*), which shared, under natural conditions, the pond bottom microhabitat with the turtles, were more threatened than the robust tall-finned *Kassina* tadpoles that lived in the middle of the water column. The translucent, slow swimming *Phrynomantis microps* tadpole occurred in larger ponds and preferred the upper water column in deeper parts of the pond. This species was especially at risk in ponds with reduced water levels. Turtles, in contrast to fish or dragonfly larvae, are capable of migrating to other ponds. They therefore might have a profound regional influence on tadpole communities in ephemeral savanna ponds." (Authors)] Address: Rödel, M.O., Lehrstuhl Tierökologie & Tropenbiologie, Theodor Boveri Inst., Am Hubland, D-97074 Würzburg; Germany. E-mail: roedel@biozentrum.uni-wuerzburg.de
1124. **Röske, W. (1999):** Gräben - ein Lebensraum der Helm-Azurjungfer. Faltblatt. Schutzgemeinschaft Libellen in Baden-Württemberg (SGL) (Hrsg.). Freiburg: 2 pp. (in German). [leaflet with detailed description of ditch-management measures for *Coenagrion mercuriale*] Address: Röske, W., Kandelstr. 26, D-79106 Freiburg, Germany
1125. **Ruffini, I. (1999):** Wo sich die Südliche Mosaikjungfer gerne niederlässt. *Pollichia-Kurier* 15(4): 29-30. (in German). [report from an excursion to several odonate habitats in the Donnersbergkreis, Rheinland-Pfalz, Germany] Address: not stated
1126. **Rutten, A.; Kalkman, V. (1999):** Eerste bewezen voortplanting van de Kempense heidelibel (*Sympetrum depressiusculum* (Selys)) in Nederland. *Brachytron* 3(1): 29-30. (in Dutch). [First proof of a reproduction of *Sympetrum depressiusculum* in The Netherlands: On August 14, 1998 in the province of Noord-Brabant freshly emerged females, and exuviae were discovered. The habitat is described in short. Additional records from Belgium are documented.] Address: Rutten, Anne & Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands
1127. **Sahlén, G.; Olsvik, H. (1999):** Det andre WDA (World Dragonfly Association) internasjonale symposium i odonatologi i Svergie i 2001. *Nord. Odonat. Soc., Newsletter* 5(1): 8. (in Norwegian). [announcement of the WDA International Odonatological Symposium in Sweden in 2001] Address: Olsvik, H., N-6598 Foldfjorden, Norway
1128. **Samraoui, B. (1999):** A short trip to Senegal and Mauritania. *W.D.A.'s Agrion* 3(1): 15. (in English). [report on some common, nonetheless fascinating African dragonflies] Address: Samraoui, B., University of Annaba, 4 rue Hassi-Beida, Annaba, Algeria
1129. **Schaffner, A.K.; Anholt, B.R. (1999):** Influence of predator presence and prey density on behavior and growth of damselfly larvae (*Ischnura elegans*) (Odonata: Zygoptera). *Jour. insect behav.* 11(6): 793-809. (in English). ["Foraging behavior is often determined by the conflicting benefits of energy gain and the risk of mortality from predation or other causes. Theory predicts that animals should have lower activity levels when either the risk of predation or the availability of resources in the environment is high. We investigated the adjustment of the behavior of *I. elegans* larvae to predator presence (*Anax imperator*) and prey density (*Daphnia* sp.) and their interaction in a completely crossed factorial experiment in the lab and the effect of behavior oil growth. The foraging activity of the *I. elegans* larvae was significantly reduced in the presence of a free-swimming predator but not a caged predator. Abdominal movements were significantly reduced at a low prey density, Growth was significantly reduced by the presence of a free swimming predator and low prey densities. These results provide evidence that these damselfly larvae adjust their behavior to the presence of predators to increase their survival at the expense of reduced growth and development." (Authors)] Address: Anholt, B.R., Univ Victoria, Dept Biol., POB 1700; Victoria; BC V8W 3N5; Canada
1130. **Santos, T.C.; Costa, J.M. (1999):** Description of the last instar larva of *Brechmorhoga travassosi* Santos and comparison with other *Brechmorhoga* species (Anisoptera: Libellulidae). *Odonatologica* 28(4): 425-428. (in English). ["The ultimate instar larva from streams of Ilha da Marambaia, Rio de Janeiro, is described, illustrated and compared with other known *Brechmorhoga* larvae, from which it is separated by the presence of erect dorsal abdominal spines on segments 2-9. A key to *Brechmorhoga* larvae is appended." (Author)] Address: Santos, T.C. & J.C. Costa, Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br
1131. **Scharf, R.; Braasch, D. (1999):** Die sensiblen Fließgewässer des Landes Brandenburg - 4. Beitrag zu ihrer Erfassung und Bewertung - Die Landkreise Potsdam-Mittelmark und Teltow-Fläming, Landeshauptstadt Potsdam und kreisfreie Stadt Brandenburg. *Naturschutz und Landschaftspflege in Brandenburg* 8(2): 44-53. (in German). [assessment of the importance of nature conservation for the running waters in the Federal state Brandenburg, Germany on the basis of an inventarisation of the macrozoobenthos; criteria of sensibility are (1) the diversity of rheophilous species and (2) occurrence of endangered species; odonatologically of special interest are records of *Ophiogomphus cecilia*, and *Coenagrion mercuriale*.] Address: Scharf, R.; Herzberger Str. 14, D-03048 Cottbus, Germany
1132. **Schneider, W. (1999):** Soqotra - The island of dragon's blood. *W.D.A.'s Agrion* 3(2): 27-28. (in English). [detailed report on a trip to Yemen and the island of Soqotra; information is given on the discovery of the endemic *Aeshna yemenensis* in Yemen, and the endemic *Enallaga granti* on Soqotra; some detailed information is given on the general and natural history of Soqotra including anotations on some habitats and their odonate fauna.] Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darm-

stadt, Germany. E-mail: w.schneider@hlmd.tu-darmstadt.de

1133. **Schrack, M.; Heise, S. (1999):** Zoogeographische und ökologische Analyse der Libellenfauna der Waldmoore in der Radeburger und Laußnitzer Heide bei Großdittmannsdorf und Medingen. Veröff. Mus. Westlausitz, Kamenz, Tagungsband: 95-113. (in German). [32 species are grouped according to their zoogeographical ranges: 15 species have an Euro-Siberian, eight a Mediterranean, and nine an intermediate range; in Tab. 2 the species are clustered according to their habitat preferences; the importance of mesotrophic waters with Sphagnum-vegetation is outlined in the light of the importance of the habitat for dragonfly conservation in Sachsen, Germany; a lot of colour pictures underline the nature conservation value of the habitat] Address: Schrack, M., Hauptstr. 48a, D-01471 Radeburg-Großdittmannsdorf, Germany

1134. **Schütte, C.; Ott, C.; Hünken, A. (1999):** Vergleich der Larvalentwicklung von *Calopteryx splendens* (HARRIS, 1782) und *Calopteryx virgo* (L., 1758) (Odonata: Calopterygidae) in zwei Fließgewässern in Niedersachsen. Braunschweiger naturkl. Schr. 5(4): 857-867. (in German, with English summary). [Niedersachsen, Germany; "The larval development of *Calopteryx splendens* was monitored from 1995 to 1998 in the river Oker and compared to that of *Calopteryx virgo* in the stream Lutter. Numbers and sizes of larval instars are given for both species. Larval development of *C. splendens* took one year, whereas *C. virgo* needed two years. Differences were discussed in terms of temperature, food and specific activity levels." (Authors)] Address: Schütte, C., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1135. **Shieh, S.-H. B.; Kondratieff, C.; Ward, J. V.; Rice, D. A. (1999):** The relationship of macroinvertebrate assemblages to water chemistry in a polluted Colorado plains stream. Arch. Hydrobiol. 145(4): 405-432. (in English). ["Macroinvertebrate assemblages and 27 water chemistry variables were investigated at 8 sampling sites over a 4-year period (1992-1995) in the plains section of the Cache la Poudre River, north central Colorado, USA, influenced by urbanization and agricultural activities. Relationships between macroinvertebrate assemblages and water chemistry variables were examined along a longitudinal chemical gradient using ordination techniques [...]. Principal component analysis ordination diagrams provide a reasonable two-dimensional representation of both the macroinvertebrate and environmental data. Concentrations of cations (e.g. Ca, Mg, Na, and K ions) exhibited the strongest relationship with macroinvertebrate assemblages along the river section. The inorganic nutrients (e.g. ammonia, total Kjeldahl nitrogen, and total phosphorus), suspended solids, and turbidity were also associated with macroinvertebrate assemblage structure. Temporal trends of macroinvertebrate assemblages, investigated using Detrended Canonical Correspondance Analysis, showed that interannual and seasonal variations of macro-invertebrate assemblages were related to increases in concentrations of heavy metals and to decreases in concentrations of inorganic nutrients, suspended solids, and turbidity. Interannual variations were less important than seasonal changes in explaining temporal patterns of macroinvertebrate assemblages [...]."] (Authors). Appendix 1 lists the taxa collected at

the sampling sites. Coenagrionidae and Ophiogomphus severus are the only Odonata mentioned.] Address: Shieh, S.-H., Department of Biology, Colorado State University, Fort Collins, CO 80523, USA

1136. **Sibley, F. (1999):** A beginners random observations on winter dragonflies. Argia 11(1): 13-15. (in English). [observations on late October egg-laying *Sympetrum vicinum*(?); individuals in Naugatuck, Connecticut till December 16.] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA

1137. **Sibley, F. (1999):** Further comments on collecting limits. Argia 11(1): 33. (in English). Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA

1138. **Sibley, F. (1999):** List of dragonflies from Gadeloupe, West Indies. Argia 11(1): 21-22. (in English). [12 species (14 taxa) could be observed from 23-30 July, 1998] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA

1139. **Sibley, F. (1999):** Unusual invasion of dragonflies on Guana Island, British Virgin Islands. Argia 11(1): 16-19. (in English). [*Orthemis ferruginea* (Fabricius 1775), *Erythrodiplax umbrata* (Linnaeus 1758), and *Ischnura ramburii* (Selys 1850), which were recorded in 1997 and 1998, were taken for the "normal residents" on Guana Island, a habitat quite unsuitable for Odonata. The abundance of species was quite low. On October 12, 1997 the wind shifted to the SW as part of a major storm system bringing moisture out of the Pacific across Panama to the Caribbean. Successively the number of species increased on Guan; the number of specimens from *Tramea abdominalis*, *T. calverti*, and *Pantala hymenaea* shot up dramatically on 16th and 17th Oct. The total of observed Odonata in 1997 was ten species. Sibley discusses the phenomenon of mass invasion of Odonata in the Lesser Antilles, and compiles some other examples for (a)periodic colonisation of other Islands such as the Galapagos Islands.] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA

1140. **Silsby, J. (1999):** In search of *Anax tristis*. W.D.A.'s Agrion 3(1): 10-12. (in English). [some personal adventures of Jill and Ronnie Silsby with the "Sad Emperor" *Anax tristis* in South Africa, and the circumstances of Peter Allen's catch of *A. tristis* in Gambia on the occasion of the BDS tour to this country in October 1996] Address: Silsby, J., 1, Haydn Avenue, Purley, Surrey, CR8 4AG, UK. E-mail: jsilsby1@aol.com

1141. **Silsby, J. (1999):** The newsletter of the Worldwide Dragonfly Association. W.D.A.'s Agrion 3(1): 20 pp. (in English). [news from WDA, and WDA-member's activities, minutes of the WDA board meeting, announcements of upcoming meetings, new members, and numerous contributions on African dragonflies] Address: Silsby, J., 1, Haydn Avenue, Purley, Surrey, CR8 4AG, UK. E-mail: jsilsby1@aol.com

1142. **Silsby, J. (Ed.) (1999):** W.D.A.'s Agrion 3(2). The newsletter of the Worldwide Dragonfly Association. W.D.A.'s Agrion 3(2): 21-32. (in English). [The reader find many small papers (see this issue of OAS) and news from the WDA including membership activities, Changes in Constitution and Bylaws etc.] Address:

Silsby, J., 1, Haydn Avenue, Purley, Surrey, CR8 4AG, UK. E-mail: jsilsby1@aol.com

Address: Solem, R.P., 10617 Graeloch Rd., Laurel, MD 20723, USA. E-mail: odenata@msn.com

1143. **Smith, G.R.; Rettig, J.W.; Mittelbach, G.G.; Valiulis, J.L.; Schaack, S.R. (1999):** The effects of fish on assemblages of amphibians in ponds: a field experiment. *Freshwater biology* 41(4): 829-837. (in English). ["1. Bluegill sunfish (*Lepomis macrochirus*) dominate fish assemblages of small lakes and ponds throughout the eastern United States and may play a major role in structuring aquatic communities. We examined the impact of adult bluegill on amphibian density by stocking bluegill at a range of densities into partitions of an experimental pond in which amphibians were free to colonize. 2. Adult bluegill had a major impact on the amphibian assemblage. By the end of the experiment, gray treefrog (*Hyla versicolor*) tadpoles were nine times less abundant, and red-spotted newt (*Notophthalmus viridescens*) adults were three times less abundant in the presence of adult bluegill than in their absence. In contrast, bullfrog (*Rana catesbeiana*) tadpoles tended to increase in the presence of adult bluegill. Adult bluegill also had a negative effect on the abundance of predaceous aquatic insects. [... Larval odonates (Aeshnidae and Libellulidae) were the most common insect predators in the pond, accounting for > 90% of all predaceous insects collected. The abundance of both of these odonate groups declined significantly with adult bluegill density ...] 3. There was no indication that interactions among amphibians were significant in determining the above patterns. We suggest that the strong impact of adult bluegill resulted from a combination of direct and indirect effects on amphibian larvae and predaceous aquatic insects." (Authors)] Address: Smith, G.R.; Dept Zool., University of Florida, Gainesville, FL 32611, USA. E-mail: smith@william.jewell.edu

1144. **Smolka, G.E.; Stewart, P.M.; Swinford, T.O. (1999):** Distribution of odonates (dragonflies and damselflies) in the Indiana Dunes National Lakeshore and nearby lands. *Natural areas journal* 19(2): 132-141. (in English). ["From 1993 to 1997, 60 species of Anisoptera (dragonflies) and Zygoptera (damselflies) were found in Lake and Porter Counties, Indiana, including Indiana Dunes National Lakeshore, in contrast to 34 species that were recorded historically from this region. We added 17 new species to Lake County's odonate records and 39 new species to the 5 previously recorded in Porter County. Several regionally rare species were collected: *Aeshna clepsydra*, *Enallagma cyathigerum*, and *Leucorrhina frigida*. Nine species listed in the historical records were missing from our collections: *Hetaerina americana*, *Calopteryx aequabilis*, *Nehalennia irene*, *Arigomphus furcifer*, *Argia fumipennis violacea*, *Gomphus spicatus*, *Epithea princeps*, *Libellula exusta*, and *Sympetrum semicinctum*. These nine species have either declined in the area or they may be found in other habitats after further study. Because few odonate surveys were conducted in northwest Indiana in the past, a poor baseline exists for comparisons of temporal trends in odonate diversity." (Authors)] Address: Stewart, P.M., US Geol. Survey, Biol. Resources Div., 1100 N Mineral Springs Rd, Porter IN 46304, USA

1145. **Solem, P.P.; Solem, J.K. (1999):** First Maryland record of *Orthemis ferruginea* (Odonata: Libellulidae). *Argia* 11(3): 6-7. (in English). [record of *O. ferruginea* on 18 July, 1999 in Howard County, Maryland, USA]

1146. **stc (1999):** Tümpel im Soonwald sind ein wahres Eldorado für Libellen. *Allgemeine Zeitung* (Bad Kreuznach) vom 23. Juli 1999. (in German). [report on the odonatological work of the well known odonatologist Frank Eislöffel in the eastern part of the middle range mountain Hunsrück, Rheinland-Pfalz, Germany] Address: not stated

1147. **Steffens, W. (1999):** Deformed dragonflies: a clarification. *Argia* 11(2): 12. (in English). [response on reports (not known to the abstracter) on abnormalities found in Odonata from polluted rivers (Mississippi, Rainy River, USA): "Most of the abnormalities that we saw were of a relatively "minor", yet easily noticeable nature. There were no extra limbs or eyes, or legs and organs hideously growing out of places that they shouldn't be growing ..."] Address: not stated

1148. **Steiner, W.E.; Flint, O.S. (1999):** Dragonflies on Navassa Island. *Argia* 11(1): 19-21. (in English). [Navassa Island is situated between Hispaniola, Jamaica and Cuba. In 1998 *Erythrodiplax umbrata*, *Pantala flavescens*, and *Orthemis* sp. cf. *ferruginea* were recorded.] Address: Steiner, W.E., Dept Entomology, NHB-165, Smithsonian Institution, Washington DC 20560, USA. E-mail: steiner.warren@nmnh.si.edu

1149. **Sternberg, K. & R. Buchwald (Eds) (1999):** Die Libellen Baden-Württembergs. Band 1. Verlag Eugen Ulmer, Stuttgart. ISBN 8001-3508-6. (approx. 50,- Euro): 468 pp. (in German). [This is the first part of a two-volume work on the Odonata of the region in the southwestern part of Germany. It presents a general but detailed account of the Odonata (Checklist, Fossile Odonata in Baden-Württemberg, Regional faunistics, Field methods, Threats and legal protection, Regionalised Red List, "Umbrella Species Concept", Habitats and management of waters, Systematics and evolution of Odonata, Functional morphology, Some aspects of biology of Odonata, Population ecology and dispersal, Reproduction behaviour, Man and dragonfly, Odonata as bioindicators, and Glossarium). The general introduction on Odonata is followed by a monographic treatment of the 26 species of Zygoptera recorded from Baden-Württemberg. The bibliography will appear in volume two, which also will cover 49 species of Anisoptera. For each zygopteran, there is a very detailed account encompassing global range of the species, distribution within Baden-Württemberg (including a distribution map), annual and diurnal phenology, larval habitat (including vegetation and physical and chemical properties of the water), the biotypes occupied by the adult at various stages of its life (feeding, breeding, roosting), a comprehensive section on the biology of the larva and adult and, finally, records of parasitism. The editors obviously intended to produce more than a standard regional study of dragonflies. It is a beautifully produced book, illustrated by marvellous photography. A more detailed critical review will be prepared after publication of volume two. This high quality book should not be missing in any odonatological library. (Martin Schorr, partly on the basis of R. Askew's review in the *J. Br. Dragonfly Soc.* 15: 64)]

1150. **Stoks, R.; De Block, M.; Van Gossun, H.; Valck, F.; Lauwers, K.; Verhagen, R; Matthysen, E;**

De Bruyn, (1999): Lethal and sublethal costs of autotomy and predator presence in damselfly larvae. *Oecologia* 120(1): 87-91. (in English). ["We studied the costs of lamellae autotomy with respect to growth and survival of *Lestes sponsa* damselfly larvae in field experiments. We manipulated predation risk by *Aeshna cyanea* dragonfly larvae and lamellae status of *L. sponsa* larvae in field enclosures and compared differences in numbers, size and mass of survivors among treatments. In the absence of a free-ranging *A. cyanea* larva, about 29% of the *L. sponsa* larvae died. This was probably due to cannibalism. The presence of a free-ranging *A. cyanea* reduced larval survival by 68% compared to treatments in which it was absent or not permitted to forage on *L. sponsa* damselflies. Across all predator treatments, lamellae autotomy reduced survival by about 20%. The mean head width and mass of survivors was lower in the enclosures with a free-ranging *A. cyanea* compared to the other two predator treatments. This suggested that larvae grew less in the presence of a free-ranging predator, indicating that increased antipredator behaviours were more important in shaping growth responses than reduced population density. Mass, but not head width, of survivors was also reduced after autotomy. The fitness consequences of these effects for the adults may be pronounced. In general, these field data strongly suggest that lamellae autotomy affects population regulation of damselflies." (Authors)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. E-mail: stoks@ruca.ua.ac.be

1151. **Strub-Siegenthaler, I. (1999):** Kind und Libelle: Rückschau auf meine Arbeit in der Schule. *Odonatologica* 28(4): 429-432. (in German, with English summary). ["In canton Berne, Switzerland, the primary school children, aged 6-8, are conscious of dragonflies even before the subject is treated in school. At this age, the child's imaginative faculty attributes to the dragonfly certain physical features, behavioural propensities, and an imaginary role in nature, which all are to be utilized by the teacher in the process of creating a realistic, simple and to the child comprehensible biological image of the insect. In the Berne school program, dragonflies are dealt with in the framework of the broader instructional topic, "Water". The steps in the instruction program, as developed by the Author during her 40 yr of teaching experience, are briefly outlined, and the scope and depth of the child's final knowledge on the dragonfly world are stated." (Author)] Address: Strub-Siegenthaler, I., Seestrasse 26J, CH-3600 Thun, Switzerland.

1152. **Summers, K. (1999):** The effects of cannibalism on Amazonian poison frog egg and tadpole deposition and survivorship in *Heliconia* axil pools. *Oecologia* 119: 557-564. (in English). ["This study investigated the influence of cannibalism on egg and larval mortality, and on the deposition strategies of adults, in a tropical anuran breeding in very small leaf axil pools. Patterns of egg and tadpole deposition and mortality in the Amazonian poison frog, *Dendrobates ventrimaculatus*, were monitored in rainforest near Pompeya in Sucumbios Province, Ecuador. Oviposition and tadpole deposition typically occurred in leaf axils of *Heliconia* plants. Pools typically received more than one oviposition. Egg survivorship was low, and significantly lower when eggs were deposited in pools with large tadpoles, indicating that cannibalism is an important source of mortality. Tadpole

survivorship was also associated with the presence of other tadpoles: most pools ended with only one surviving tadpole, regardless of the number of tadpoles deposited in the pool. Egg deposition was significantly less likely for pools that had a tadpole in them, suggesting that adults can detect the presence of tadpoles and avoid ovipositing in pools that contain them. This hypothesis was tested with a series of pool choice experiments, which revealed that *D. ventrimaculatus* avoid placing either eggs or tadpoles into a pool which contains a large tadpole. Several hypotheses which could explain multiple deposition in this species are discussed. [...] A diverse community of adult and larval vertebrates and invertebrates inhabits the *Heliconia* pools, and yet predators on *D. ventrimaculatus* eggs or tadpoles seem to be rare. since there was no association between egg or tadpole mortality and the presence of any of the other pool denizens. Perhaps most surprising was the absence of any odonate larvae, which are known predators of poison frog tadpoles (Fincke 1994). One dead odonate larva was found in an axil pool during the course of the study, whereas well over 500 pools were searched on and off the study site. The reason for this low prevalence is unknown, although it may be associated with the small size and generally low nutrient quality of the *Heliconia* pools." (Author)] Address: Summers, kyle, Department of Biology, East Carolina University, Greenville, NC 27858, USA. E-mail: summersk@mail.ecu.edu; Tel.: +1-919-3286725

1153. **Switzer, P.V.; Walters, W. (1999):** Choice of lookout posts by territorial amberwing dragonflies, *Perithemis tenera* (Anisoptera: Libellulidae). *Jour. insect behav.* 12(3): 385-398. (in English). ["Many territorial insects use specific perches, or lookout posts, from which they perceive and react to conspecific males and females. We investigated the lookout post choice of territorial male amberwing dragonflies (*Perithemis tenera*). An observational study indicated that males rarely perched directly at their oviposition site; rather they perched farther out from shore than, and within 2 m from, their oviposition site. In an experimental study, we provided an array of perches at different distances from the shore and oviposition site to eliminate perch limitation as a factor in perch choice. The results of the experimental study confirmed the patterns evident in the observational study; males perched farther from shore than their oviposition site was located. interestingly, in both the observational and the experimental study, when neighbors were close, a male perched away from his closest neighbor; which usually resulted in his oviposition site being closer to his neighbor than he was. Thus, male amberwings apparently alter their perch choice within their territories in response to the location of other males. These lookout post locations may provide the best opportunity for the territorial male to perceive passing females and intruding males, while minimizing conflict with their neighbors." (Authors)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol. Sci., Charleston IL 61920; USA. E-mail: cfpsv@eiu.edu

1154. **Tennessee, K. (1999):** Hagenius *brevistylus* perching. *Argia* 11(3): 15. (in English). ["Perhaps the ability to utilize a wider variety of perches allows males of *H. brevistylus* to occupy areas away from other males and to use them as vantage points to scan for approaching females" (Author)] Address: Tennessee, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennessen@aol.com

1155. **Tenessen, K. (1999):** West Tennessee Regional meeting: a success. *Argia* 11(3): 1-2. (in English). [short report on the meeting held in mid May, 1999; new state record of *Ischnura kellicotti*, and confirmation of *Gomphus apomyius*; spectacular catch of *Arigomphus villosipes*] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA
1156. **Theischinger, G. (1999):** A new gomphid species from the Kimberleys in north-western Australia (Insecta: Odonata). *Linzer biol. Beitr.* 31(1): 369-372. (in English). ["*Austrogomphus mouldsorum* sp. n. (female holotype: Western Australia, E Kimberley, Emma Gorge, El Questro Station) is described, illustrated, diagnosed and discussed." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia
1157. **Theischinger, G. (1999):** A new species of *Petalura* LEACH from south-eastern Queensland (Odonata: Petaluridae). *Linzer biol. Beitr.* 31(1): 159-166. (in English). ["*Petalura litorea* sp. n. (male holotype: Queensland, North Stradbroke Island, Brown Lake, S end) is described, illustrated and compared with *Petalura gigantea* LEACH." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia
1158. **Theischinger, G. (1999):** New and little-known Synthemiidae from Australia (Insecta: Odonata). *Linzer biol. Beitr.* 31(1): 373-379. (in English). ["Two new species of Australian Synthemiidae, *Eusynthemis netta* (holotype male: Queensland, streams on Mt Lewis, NW Julatten, 3000 ft) and *Eusynthemis ursa* (holotype male: New South Wales, Barrington Tops, Dilgry River), are described. Also presented are illustrations of *Choristhemis olivei* (TILLYARD) and illustrated descriptions of the hitherto unknown females of *Eusynthemis ursula* THEISCHINGER and *Tonyosynthemis ofarrelli* (THEISCHINGER & WATSON). (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia
1159. **Theischinger, G. (1999):** Regions of taxonomic disjunction in Australian Odonata and other freshwater insects: first addendum, with description of *Austrocordulia refracta jurzitizai* ssp. nov. (Anisoptera: Corduliidae). *Odonatologica* 28(4): 377-384. (in English). [The information on taxonomic disjunction along the Hunter Valley (New South Wales) of mostly species-pairs of Odonata is updated and discussed. The taxa involved are: *Argiolestes alpinus*, *Argiolestes calcaris*, *Synlestes tillyardi*, *Diphlebia lestoides*, *Austroaeschna sigma* vs *A. obscura*, *Austroaeschna subapicalis*, *Notoaeschna geminata* vs *N. sagittata*, *Eusynthemis guttata*, *Eusynthemis brevistyla*, and *Austrocordulia refracta*. The holotype male of *A. refracta jurzitizai* ssp. n. comes from New South Wales, Heathcote (bred 21-XI-1916), deposited in ANIC, Canberra.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia
1160. **Thompson, D.J.; Purse, B.V. (1999):** A search for long-distance dispersal in the Southern damselfly *Coenagrion mercuriale* (Charpentier). *J. Br. Dragonfly Soc.* 15(2): 46-50. (in English). [A total of 1245 individuals of *C. mercuriale* were marked in 11 days in 1998 on Crockford stream, New Forest, Hampshire, UK. To spott dispersing individuals 27 volunteers were stationed on all known sites for *C. mercuriale* in distances between 200 m and 3.3 km. "One marked animal had clearly moved from a site at which it was searching for mates to another over 1km away at which it found one. The extent of its movement was similar to the one long-distance disperser reported by Hopkins & Day (1997). Indeed, it ended up in the same place. In order to get there it must either have crossed a considerable expanse of dry heath and a road, or followed the stream downstream through unsuitable habitat, including woodland or some combination of the two. Jenkins (1998) reported that *C. mercuriale* was extraordinarily reluctant to move from its home location even across a short open area. The absence of marked individuals at the sites closest to the marking site supports this view. However, *C. mercuriale* clearly has some potential to make relatively long movements after reaching maturity." (Author)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK
1161. **Thüringer Ministerium für Landwirtschaft, Naturschutz und Umwelt (1999):** Umsetzung der FFH-Richtlinie in Thüringen. Available free of charge from: Thüringer Ministerium für Landwirtschaft, Naturschutz und Umwelt, Öffentlichkeitsarbeit, Beethovenplatz 3, D-99096 Erfurt, Germany: 130 pp. (in German). [This is a handbook for the application of the European Fauna-Flora-Habitats-Directive in action plans (e.g. the coherent European network Natura 2000), and the impact assessment pursuant to the EU Habitats Directive. All Thuringian habitats and species of the Directive are characterized, by text and pictures, including the Odonata *Coenagrion mercuriale*, *Leucorrhinia pectoralis*, and *Ophiogomphus cecilia*.]
1162. **Tingley, S. (1999):** *Leucorrhinia patricia* in New Brunswick. *Argia* 11(3): 8. (in English). [discovery of the species on 31 May 1999 in a bog in Restigouche County, New Brunswick, USA] Address: Tingley, S., General Delivery, Shediac Bridge, NB, Canada E0A 3H0. E-mail: tingley@nbnet.nb.ca
1163. **Tonczyk, G.; Buczynski, P.; Labedzki, A. (1999):** Gefährdung und Schutznotwendigkeit der polnischen Fließwasserlibellen. In: *Polski Towarzystwo Entomologiczne & Instytut Ochrony Przyrody PAN* (Eds.): *Konferencja Naukowa. "Ochrona owadów w Polsce u progu integracji z Unia Europejska"*, Kraków, 23-24 wrzesnia 1999. ISBN 83-01-08125-2. [Conservation of insects on the threshold of the integration of Poland into the European Community]: 23. (in Polish). [The threat and the necessity for protection of the habitats of the odonate species of running waters in Poland is outlined. Two antagonistic amendments of the situation of the Odonata are described: the populations of the formerly rare species of streams and rivers as *Stylurus flavipes* are getting stronger in the last years, whereas the situation of the species of brooks and ditches is getting worse more and more. Reasons for that are the improvement of water quality in the streams and rivers on the one side, and the regulation of brooks, heavy environmental impacts on the running waters, and lowering of groundwater table on the other.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1164. **Trueman, J. (1999):** An update on the above situation. *W.D.A.'s Agrion* 3(2): 23-24. (in English). [With reference to Ian Endersby's contribution "Disturbing news from "Downunder", the author outlines, that the habitat of *Petalura gigantea* was not affected by the 1998 collapse of Wingecarribee Swamp, Australia. A few individuals including an ovipositing female could be observed in January 1999. Now, a management plan is developed, e.g. to prevent the lasting rests of the swamp from drying out and getting invaded by "nasty foreign weeds".] Address: Trueman, J., Research School of Biol. Sciences, Australian National University, Canberra, ACT 0200, Australia. E-mail: trueman@rsbs.anu.edu.au
1165. **Truscott, L. (1999):** The Hornet Robberfly *Asilus crabroniformis* L. (Diptera, Asilidae): Odonata as prey. *J. Br. Dragonfly Soc.* 15(2): 50. (in English). [new observations from UK on *Enallagma cyathigerum* as prey of *A. crabroniformis*] Address: Truscott, L., 59 Cremyll Road, Torpoint, Cornwall PL11 2DZ, UK
1166. **Tunmore, M. (1999):** Atropos 8: From the editor's trap. *Atropos* 8: 1-2. (in English). ["Once again there was the seemingly annual occurrence of several *Anax parthenope* [in UK], and *Sympetrum fonscolombii* maintained their position in at least some breeding colonies": (Author)] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK
1167. **Van Buskirk, J.; McCollum, S.A. (1999):** Plasticity and selection explain variation in tadpole phenotype between ponds with different predator composition. *Oikos* 85(1): 31-39. (in English). ["Experiments demonstrate the existence of phenotypic plasticity in many organisms, and suggest that it can affect interactions among species. Put rarely do we know whether naturally occurring phenotypic variation results primarily from plasticity, as assumed by the experiments, or also from processes such as local adaptation and viability selection. The data on predator-induced plasticity in amphibians are virtually all from artificial pond or laboratory experiments, so we sampled tadpoles of *Hyla versicolor* in two ponds with different numbers of predators, in southern Michigan, USA. Cornfield Pond had few predators, while Tinkle's Marsh (300 m away) had many predatory insects (11.4/m²) and *Ambystoma* salamanders (1.0/m²). Tadpoles from Tinkle's Marsh had shorter and shallower bodies than those from Cornfield Pond. and relatively long, deep, and brightly colored tails. We then asked whether the phenotypic difference could be predicted from experimental studies of plastic responses to the presence or absence of caged *Anax* dragonflies in cattle tanks, and of selection imposed by feeding *Anax* and in predator-free ponds. Plasticity accurately predicted observed population differences in traits such as tail color, tail depth, and body length. However, for some other traits, such as tail length and body depth, naturally occurring phenotypic variation was more likely produced by selection for divergent traits in the two ponds. We also collected tadpoles from both ponds and subjected them to free-ranging *Anax* in a short-term predation trial. Tadpoles from Tinkle's Marsh, where predators were common, survived 16% better, suggesting that naturally occurring phenotypic variation is associated with changing vulnerability to predation: as has been found for experimentally reared tadpoles. Our results show how experimental studies of plasticity and selection can be combined to predict phenotypic variation in nature, and phenotypic variation in nature, and suggest that such variation can modify species interactions." (Authors)] Address: Van Buskirk, J., Univ Michigan, Dept Biol, Ann Arbor, MI 48109 USA
1168. **Van Gossum, H.; Stoks, R.; Matthysen, E.; Valck, F.; De Bruyn, L. (1999):** Male choice for female colour morphs in *Ischnura elegans* (Odonata, Coenagrionidae): testing the hypotheses. *Animal behaviour* 57(6): 1229-1232. (in English). ["The occurrence of different conspecific female colour morphs, with one of the morphs resembling the male, is supposed to have consequences for mate choice. There are two hypotheses linking mate choice and female colour polymorphism. First, males may mate predominantly with female morphs that differ from the male because they do not recognize androchrome females as females (male mimic hypothesis). Second, males may be more attracted to the most common morph in the population (habituation hypothesis). We tested these hypotheses in five populations of the same species, *Ischnura elegans*, with a range of androchrome frequencies. In each population we performed binary choice experiments in small cages. Males did not consistently prefer gynochrome females but mated predominantly with the most common morph in the population. Moreover, a reanalysis of the available damselfly data in the literature also supported the habituation hypothesis" (Authors)] Address: Van Gossum, H., Evolut Biol Grp, Univ. Antwerpen Ruca, Groenenborgerlaan 175, B-2020 Antwerpen, Belgium. E-mail: hvgossum@ruca.ua.ac.be
1169. **van Konijnenburg-van Cittert, J.H.A.; Schmeissner, S (1999):** Fossil insect eggs on Lower Jurassic plant remains from Bavaria (Germany) . *Palaeography - Palaeoclimatology - Palaeoecology* 152 (3-4): 215-223. (in English). ["Imprints of fossil insect eggs (oviposition slits of endophytic eggs) on Lower Jurassic plants from Franconia (Bavaria, Germany) are described. Two forms can be distinguished. Form A (2.5-3 mm long, 0.5-0.7 mm wide) is comparable to *Hysterites friesii* Nathorst 1876, who described it on *Podozamites* leaves (Coniferales) and considered it to be fungal remains. The present oviposition slits are, however, all on *Schmeissneria microstachys* leaves (Ginkgoales), and are therefore not considered to be conspecific with Nathorst's species. Form B (ca. 2 mm long, 0.7 mm wide) is more rare, and has only been found on *Podozamites distans* leaves but cannot be identical with Nathorst's material because they demonstrate a different shape. Form A has been deposited by dragonflies (Odonata); the insects that deposited form B may also have belonged to this group but this cannot be said with certainty. Comparison with other fossil insect egg/plant relationships are made, e.g. with comparable eggs on Triassic material of *Equisetites arenaceus*. The parent plants must have lived in an aquatic, or more probably semi-aquatic environment." (Authors)] Address: van Konijnenburg-van Cittert, J.H.A.; Palaeobot. & Palynol. Lab., Budapestlaan 4; NL-3584 CD Utrecht; Netherlands . E-mail: j.ha.vanKonijnenburg@bio.uu.nl
1170. **Vanderhaeghe, F. (1999):** Een beknopt overzicht van de huidige verspreiding en status van *Coenagrion scitulum* (Rambur, 1842) in België en Noord-Frankrijk. *Gomphus* 15(2): 69-85. (in Flemish, with English and French summaries). ["Present distribution and status of *C. scitulum* in Belgium and Northern France.

France. In 1998 *C. scitulum* was observed for the first time in Belgium since 1973. This article gives an overview of these recent Belgian findings together with an account of recent data from the North of France. Data are interpreted for Belgium together with a discussion about habitat. Conclusion is that the species will probably penetrate Belgium in other regions, although likely the species will not be common. It proves to be clear that at least some individuals do show vagrant behaviour. These might be seen in any habitat. Therefore it seems convenient to watch out for this species everywhere. The most likely regions are cited." (Author)] Address: Vanderhaeghe, Floris, Lijsterstraat 20, B-8800 Roeselare, Belgium; E-mail: Floris.Vanderhaeghe@rug.ac.be

1171. **Verbeek, P.J.M. (1999):** The habitat of *Symptetrum depressiusculum* in North-western Europe and its future in The Netherlands. *Brachytron* 3(1): 3-11. (in Dutch, with English summary). ["The habitat preferences of *S. depressiusculum* in the north-west of its range are discussed on the basis of the literature and personal observations. The most important characteristics are listed. An extensive zone of shallow water must be present. This zone should be vegetated, but not too densely. The water level must be stable or lowered between the time of oviposition and emergence of the larvae. The zone may even be completely dry during winter. The waters generally are not very eutrophic or acidic. The presence of a well-structured imaginal habitat is also important. The principal factor appears to be the stable or lowered water level in winter. [...] Most waters in the region have a raised water level in winter and are therefore unsuitable for the species. Most localities where the species occurs therefore have an artificially controlled water level. The reason why this winter drought is so important remains unclear. Freezing of the eggs, as suggested by earlier authors, appears to be of no importance as the species occurs in Mediterranean rice-fields and cooling-water ponds of factories in Belgium. The absence of dragonflies with multi-annual life cycles (that could be caused by drought or freezing) as competitors for food seems unimportant too, as they have been found with *S. depressiusculum*. The described hydrological factors result in high water temperatures in spring. This, and the resulting high availability of prey, might speed up larval and egg development to the level required for survival. It is suggested that the species evolved in conditions with relatively high water temperatures in spring. The high habitat specificity makes *S. depressiusculum* a rare and vulnerable species in the north-west of its range. Changed management and eutrophication forms a direct threat to populations, which are dependent of the maintenance of artificial conditions for their survival. Besides this vulnerability the species disperses rather weakly, as compared to its relatives. Individuals are generally not found more than 20 km away from source populations. Almost all recent Dutch records are probably the result of dispersal from populations in Belgium, not far from the border. Although reproduction was proven for the first time in The Netherlands (RUTTEN & KALKMAN, 1999) in 1998 (in atypical habitat) it is expected that the only chance for the species would be if suitable habitat is created or restored by man." (Author)] Address: Verbeek, P.J.M., Zeelandse straat 56, NL-6566 DJ Millingen aan de Rijn, The Netherlands

1172. **Vick, G.S. (1999):** A checklist of the Odonata of the south-west province of Cameroon, with description of *Phyllogomphus corbetae* spec. nov. (Anisoptera: Gomphidae). *Odonatologica* 28(3): 219-256. (in English). ["A checklist of the dragonflies of the South-West Province of Cameroon, based upon field work undertaken between 1995 and 1998, and a survey of historical records, is given. Notes on seasonal occurrence, habitat requirements and taxonomy are provided. As new is described: *P. corbetae* sp.n. (holotype male. Kumba, outlet stream from Barombi Mbo, 20-IX-1997; allotype female: Limbe, Bimbia, Elephant River, 4-VII-1996)." (Author)] Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, United Kingdom

1173. **Viessmann, R. (1999):** Berichtsjahr 1998. Libellen - Odonata. Pflanzen und Tiere in Rheinland-Pfalz 9: 176-188. (in German). [documentation of faunistic odonate records in 1998 in Rheinland-Pfalz, Germany; *Lestes barbarus*, *Aeshna affinis*, *Crocothemis erythraea*, *Orthetrum brunneum*, and *Coenagrion pulchellum* are of some interest] Address: Viessmann, R., Gängelstockweg 8, D-67295 Bolanden, Germany

1174. **Vos, R.; Werven, D. van (1999):** *Bonslibel Oxygastra curtisii* bij de Our op de Luxemburg - Duitse grens. *NVL Nieuwsbrief. Mededelingenorgaan van de Nederlandse Vereniging voor Libellenstudie* 3(3): 7-8. (in Dutch). [spectacular rediscovery of *Oxygastra curtisii* in Germany (believed extinct since the 40th), and first record of the species in Luxembourg in July 1999 in the border river Our.] Address: Vos, R., F-Zernikestraat 209, NL-7553 EC Hengelo, The Netherlands, E-mail: rudolf.vos@student.utwente.nl

1175. **Wagner, D.L.; Thomas, M.C. (1999):** The Odonata fauna of Connecticut. *Bulletin of American Odonatology* 5(4): 59-85. [35 species and 471 county records are added to Garman's inventory "The Odonata or dragonflies of Connecticut. *Geol. and Nat. Hist. Surv. Bull.* 39: 331 pp., 1927, bringing the total number of Odonata documented from Connecticut to 147 species (48 damselflies, 99 dragonflies). An annotated checklist of this fauna - based on a database of over 6000 occurrence records is presented: Each species account includes county records, the range of observation dates, an assessment of the species' conservation status, and brief biological notes. A State Heritage Program rank is proposed for each taxon; we estimate that 21.7% of Connecticut's odonate fauna can be regarded as rare. Issues pertinent to the conservation of dragonflies and damselflies in Connecticut are discussed briefly.] Address: Thomas, M.C., 206 Skyview Drive, Cromwell, CT 06416, USA. E-mail: gomphid@compuserve.com

1176. **Walter, S. (1999):** North American late date. *Argia* 11(1): 35. (in English). [Telebasis byersi was recorded at Loxahatchee National Wildlife Refuge in Palm Beach county, Florida, USA on 22 November 1998.] Address: Walter, S., 69-21 Springfield Boulevard, Bay-side, NY, 11364-2616, USA

1177. **Walter, S. (1999):** Which falcon catches dragonflies? *Argia* 11(1): 35. (in English). [with reference to Held, J. (1998): Peregrines eating dragonflies. *Argia* 10(3): 16, Steve Walter outlines that it is quite unlikely to have dragonfly-eating Peregrin falcons. Likely is that Merlins have caught dragonflies.] Address: Walter, S.,

69-21 Springfield Boulevard, Bayside NY, 11364-2616, USA.

1178. **Waltz, R.D. (1999):** Gleaning on Coreidae (Heteroptera) by *Tachopteryx thoreyi* (Odonata: Petaluridae). Great lakes entomologist 31(3-4): 209-210. (in English). Address: Waltz, R.D., IDNR, Div. Entomol. & Plant Pathol., 402 W Washington, Room W-290, Indianapolis IN 46204; USA

1179. **Wazalwar, S.M.; Tembhare, D.B. (1999):** Mouthpart sensilla in the dragonfly, *Brachythemis contaminata* (Fabricius) (Anisoptera: Libellulidae). Odonatologica 28(3): 257-271. (in English). ["The mouthpart sensilla in *B. contaminata* comprise trichoid sensilla, acanthae, basiconic sensilla, campaniform sensilla, microtrichia, papillae, sensory pegs and spines. There are various types of trichoid sensilla: 8 labral, 7 mandibular, 14 hypopharyngeal, 8 maxillary and 17 labial. They differ in size and distribution from one another. The acanthae are of 2 types, the labral in the adult and the mandibular in the larva. The basiconic sensilla are found on the labrum of the adult only. The campaniform sensilla are present on the maxillae and labium of the adult and are lacking in the larva. There are 7 types of microtrichia evident on the labrum, hypopharynx and maxillae of the larva and on the hypopharynx and maxillae of the adult. The papillae are present on the inner surface of the labrum in both the larva and the adult. The sensory pegs are confined to the labium of the adult. The spines are located on the labium of the larva and are lacking in the adult. This study is based on SHM and neuro-anatomical staining techniques." (Authors)] Address: Tembhare, D.B., Dept of Zoology, Nagpur University Campus, Amaravati Road, Nagpur 440 010, India.

1180. **Weihrauch, F. (1999):** Larven von *Gomphus vulgatissimus* (L.) als Substrat der Wandermuschel *Dreissena polymorpha* (Pallas) (Anisoptera: Gomphidae; Bivalvia: Dreissenidae). Libellula 18(1/2): 97-102. (in German, with English summary). ["In May 1998, three exuviae of *G. vulgatissimus*, each carrying a specimen of *D. polymorpha* tightly attached to the dorsum of the abdomen, were collected at a small gravel pit lake near Geisenfeld, Upper Bavaria, Germany." (Author)] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Weihrauch@lbp.bayern.de

1181. **Westover, D. (1999):** Observations on the possibility of overwintering larvae of *Anax junius* in Wisconsin. Argia 11(1): 15-16. (in English). [records from Rocky Run Creek State Fishery Area, western Columbia County, southern Wisconsin, USA; emerging *A. junius* on 25 May 1998, which "could hardly be the offspring of a pair of migrants, as the 3 months of larval development would take it back to late February"] Address: Westover, D., 324 B North Monroe Street, Waterloo, WI, 53594, USA

1182. **White, H. (1999):** "What do you do with 'EM'?" Argia 11(1): 33-34. (in English). [further contribution to the USA discussion on collecting Odonata] Address: White, H., 103 Radcliffe Drive, Newark, DE, 19711, USA. E-mail: halwhite@udel.edu

1183. **Whiteley, G.; Samways, M.J.; Di Domenico, M.; Carchini, G. (1999):** Description of the last instar larva of *Hemistigma albipuncta* (Rambur, 1842) and comparison with other Brachyidplactinae (Anisoptera:

Libellulidae). Odonatologica 28(4): 433-437. (in English). ["The morphology of the last instar larva of the African *H. albipuncta* is illustrated and described. A comparison is then made with the South American *Elga leptostyla* and *Nephepeltia phryne*. (Authors)] Address: Whiteley, G., Conservation Research Centre, School of Botany and Zoology, University of Natal, Private Bag X01, Scottsville 3209, South Africa.

1184. **Wildermuth, H. (1999):** Verbreitung und Habitate von *Aeshna caerulea* (Ström, 1783) in den Schweizer Alpen (Odonata, Anisoptera: Aeshnidae). Opus. zool. flumin. 166: 1-18. (in German, with English summary). ["44 localities with occurrence of *A. caerulea* were surveyed in the alpine region of Switzerland and new records integrated in an actualized distribution map. Imaginal and larval habitats of the sp. are described incl. structural, phytosociological and hydrochemical characteristics of the breeding sites. The ecological factors limiting the upper and lower vertical distribution are discussed and conservation measures for the endangered sp. are suggested." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland

1185. **Wildermuth, H. (1999):** *Somatochlora alpestris* (Selys, 1840) in den Schweizer Alpen: Eine Verbreitungs- und Habitatanalyse (Anisoptera: Corduliidae). Odonatologica 28(4): 399-416. (German, with English summary). ["150 sites with occurrence of *S. alpestris* were surveyed in Switzerland and new records integrated in an actualized distribution map comprising 322 localities. The sp. only occurs in the alpine region and is not found in the Jura mountains. The data on the vertical distribution are summarized in altitude and climatic categories, differentiated with respect to records of adults and findings of exuviae. Imaginal and larval habitats of the sp. are described incl. structural, phytosociological and hydrochemical characteristics of the breeding sites. Possible ecological factors limiting the upper and lower vertical distribution are discussed. The status of the sp. in Switzerland is assessed and conservation measures are suggested." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland

1186. **Williamson, S. (1999):** Bittern catches dragonfly. Argia 11(2): 14. (in English). [record of a North American Bittern (*Botaurus lentiginosus*) catching *Anax junius* (?) at Blue Ridge Parkway, southwest Virginia, USA] Address: not stated

1187. **Williamson, T. (1999):** *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785) et *Gomphus flavipes* (Charpentier): espèces nouvelles pour la Loire-Atlantique (Odonata, Anisoptera, Gomphidae). Martinia 15(3): 85-87. (in French, with English summary). [In 1998, both species were recorded new for the Département near Oudon at the river Loire. An additional record of *O. cecilia* is given for Champtoceaux (Département Maine-et-Loire).] Address: Williamson, T., 13, impasse du Moulin, F-49270 Champtoceaux, France

1188. **Wilson, K.D.P. (1999):** Dragonflies (Odonata) of Dinghu Shan Biosphere Reserve, Guangdong Province, China. International Journal of Odonatology 2(1): 23-53. (in English). [76 species of Odonata are recorded from Dinghu Shan Biosphere Reserve, Guangdong Province, China, following surveys completed during 1992-1998. *Cephalaeschna dinghuensis* spec. nov. (Aeshnidae) and *Philosina alba* spec. nov. (Megapo-

dagrionidae) are described and illustrated. "The previously unknown female of *Stylurus nanningensis* Liu (Gomphidae) is also described. *Asiagomphus septimus* (not of Needham) from Hong Kong is synonymised with *Asiagomphus hainanensis* Chao. *Aciagrion tillyardi* Laidlaw (Coenagrionidae) is recorded from Chinese territory for the first time. *Zygonyx takasago* Asahina (Libellulidae) previously considered a Taiwanese endemic, is recorded from continental China. A key is provided to separate the three Chinese species of *Zygonyx*. A total of twenty-eight taxa are recorded from Guangdong Province for the first time. The odonate fauna of Dinghu Shan is compared with neighbouring Hong Kong and Taiwan." (Author)] Address: Wilson, K.D.P., Agriculture and Fisheries Department, 6F, 25 Borrett Rd, Mid Levels, Hong Kong, China. E-mail: wislonhk@hk.super.net

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1189. **Ali, D.W. (1997):** The aminergic and peptidergic innervation of insect salivary glands. *Journal of Experimental Biology* 20(14): 1941-1949. (in English). ["Insect salivary glands are glands associated with nutrient intake whose secretions are generally involved in the digestion and lubrication of food. They are under the control of neuroactive substances and may be innervated from several sources including the suboesophageal ganglion, the stomatogastric nervous system and the unpaired median nerves. Both amines and peptides have been suggested to play roles in the control of insect salivation, as indicated by their association with terminals on salivary glands, their effects in salivary gland bioassays and their ability to alter second messenger levels and ion channel conformations. Serotonin and dopamine appear to be the most prominent amines associated with insect salivary glands. Either one or both of these amines are found associated with the salivary glands of the locust, stick insect, cockroach, cricket, dragonfly, mosquito, adult moth and kissing bug. Their roles, although not fully elucidated, appear to be in the control of salivary secretion. Several peptides, including members of the FMRFamide-related family of peptides, are also found associated with insect salivary glands. Sources of peptidergic innervation are as varied as those for aminergic innervation, but information regarding the physiological role of these peptides is lacking. The relevance of the different levels of complexity of salivary gland innervation, which range from the absence of innervation in some species (blowfly) to the presence of several distinct sources in others (locust, cockroach), is not well understood. This review serves to consolidate what is known of the phenotype of salivary neurones in relation to the control of salivation." (Author)] Address: Ali, D.W., Institution Montreal Gen. Hosp. Res. Inst., 1650 Cedar Ave., Montreal, PQ H3G 1A4, Canada

1190. **Andrew, R.J.; Tembhare, D.B. (1997):** The development and structure of the ovaries in the dragonfly *Tramea virginia* (Rambur) (Libellulidae: Odonata). *Journal of Advanced Zoology* 18(2): 86-95. (in English). ["In *Tramea virginia*, the ovary is composed of numerous strings of panoistic ovarioles. Each ovariole is differentiated into four regions the apical terminal filament, germarium, vitellarium and the distal pedicel. In the ultimate nymph, the terminal filament comprises a thick strand of germinal tissue. The germarium is filled with the primary and secondary oogonia and primary oocytes. The vitellarium is filled with pre-vitellogenic oocytes

while the pedicel is in the form of compact mass of mesodermal cells. Vitellogenesis is evident in mature adults and it passes through the successive early vitellogenic, midvitellogenic, late-vitellogenic and maturation stages. The lateral oviducts are mesodermal in origin and initially run along the outer margin of the ovaries. The median oviduct is short and its anterior region is mesodermal while posterior region is ectodermal in origin." (Authors)] Address: Tembhare, D.B., Post-Grad. Dep. Zool., Nagpur Univ. Campus, Nagpur 440 010, India

1191. **Anselin, A.; Knijf, G. de (1997):** The Belgian Dragonfly Working Group. *Levende Natuur* 98(5): 184-188. (in Dutch). ["The Belgian Dragonfly Working Group Gomphus, a volunteer organization, was founded in 1983. The main goal was to promote studies in dragonfly faunistics and increase protection measures. One major activity from the start was the organization of an atlas project of Odonata distribution in Belgium. This project is now in its last phase. A special effort has been made to achieve a good coverage of the territory during the last five years. These data will form a base for future comparison. As a result of the atlas project, an increasing number of people have carried out detailed faunistical surveys in smaller regions. The Gomphus database has been used for the composition of the Red list of Dragonflies in Flanders, a project of the Institute of Nature Conservation. Gomphus is also active in the field of nature protection and gives advice for dragonfly-friendly management of wetlands. It takes part in a monitoring project in Wallonia and is currently examining the possibilities of setting up a similar scheme in the Flemish part of the country." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussels, Belgium. E-mail: geert.de.knijf@institnat.be

1192. **Bazzanti, M.; Chiavarini, S.; Cremisini, C.; Soldati, P. (1997):** Distribution of PCB congeners in aquatic ecosystems: A case study. *Environment International* 23(6): 799-813. (in English). ["Polychlorinated biphenyls (PCB) congeners were determined in water samples, sediments and animal species in the frame of a survey of the River Arrone (Central Italy, near Rome) after a major contamination episode. Animal species were selected on the basis of their living and feeding habits and evaluated as candidate bioindicators of PCB pollution in this lotic ecosystem. Total PCB concentrations in water were found to be low (ng/L level), and in sediments, ranged from about 10 to 200 mug/kg dry weight, depending on the distance from the contamina-

tion source. PCB patterns in sediments showed a prevalence of higher chlorinated congeners over time. Concentrations in macroinvertebrates (*Calopteryx splendens* and *Anax imperator*) ranged from 60 to 400 µg/kg dry weight, showing significantly different species to species patterns. PCB concentrations were almost parallel in sediments for different sampling stations, while differences in patterns among species can be explained in terms of bioaccumulation/excretion mechanisms. Freshwater shrimps (*Palaemonetes antennarius*) were not found close to the contamination source, as a consequence of their extreme sensitivity to chemicals, and showed a peculiar pattern (almost exclusively determined by congeners 153, 138, and 180) probably originating from biodegradation mechanisms. Fish samples (*Rutilus erythrophthalmus*) showed the highest concentrations, as a combination of feeding habit, lipid content and, probably, less effective biodegradation/excretion pathways. Congener patterns closely match those of Aroclor 1260, which originates from the contamination source. This study confirms that congener physical and chemical parameters, different degradation rates, feeding habits, and mobility of the analysed aquatic organisms, metabolism, and excretion mechanisms, are to be considered to explain the distinctive PCB patterns of different samples." (Authors)] Address: Bazzanti, M., Dep. Human Animal Biol., Univ. "La Sapienza", 00185 Rome, Italy

1193. **Beccaloni, G.W. (1997):** Ecology, natural history and behaviour of ithomiine butterflies and their mimics in Ecuador (Lepidoptera: Nymphalidae: Ithomiinae). *Tropical Lepidoptera* 8(2): 103-124. (in English). ["The ithomiine butterfly species (Nymphalidae: Ithomiinae) which occur at Jatun Sacha Biological Station, Napo Province, Ecuador were found to participate in eight discrete mimicry complexes. These complexes involve a total of 124 insect species: 55 ithomiine species, 34 species which belong to other butterfly families or subfamilies, 34 moth species, and 1 species of damselfly. All species are illustrated and identified, and aspects of their behaviour are discussed. Literature on the chemical defences of the species is reviewed and a study of their ultraviolet reflectance patterns is presented. Data from a mark-release-recapture study show that the majority of individuals in the mimicry complexes studied were ithomiines. Hypotheses to explain polymorphism in Batesian and Mullerian mimics are discussed, in view of the finding that seven species of ithomiines, five other butterfly species, and the single damselfly species were polymorphic at Jatun Sacha." (Author)] Address: Beccaloni, G.W., Dep. Entomol., Natural History Museum, Cromwell Road, London SW7 5BD UK

1194. **Chung, M.G.; Kang, S.S.; Yeeh, Y. (1997):** Genetic diversity and structure in Korean populations of *Sympetrum darwinianum* and *S. eroticum eroticum* (Odonata: Libellulidae). *Jap. J. Ent.* 65(2): 427-435. (in English). ["The levels of genetic diversity and structure in Korean populations of *Sympetrum darwinianum* (Selys, 1883) and *S. eroticum eroticum* (Selys, 1883) were examined. Starch gel electrophoresis was conducted on 343 individuals in eight populations of the two species. Electrophoretic data revealed that the two species exhibit considerably higher levels of genetic variation than those of most other insects. Expected mean population heterozygosity (He, 0.361 vs. 0.333) and percent polymorphic loci (P, 81.5% vs. 87.2%) found in *S. dar-*

winianum were very comparable to those for *S. eroticum eroticum*. Analyses of WRIGHT's fixation indices, calculated for all polymorphic loci across populations in each species, indicated that, overall, a near conformance of genotype frequencies to Hardy-Weinberg expectations, suggesting that mating was nearly panmictic. The results indicated that the two species might have very similar phylogenetic histories, and/or ecological and life history traits." (Authors)] Address: Chung Myong Gi Institution Dep. Biol., Gyeongsang Natl. Univ., Chinju 660-701, South Korea

1195. **Clarke, D.; Hewitt, S. (1997):** Vagrant Emperor Dragonfly, *Hemianax ephippiger* (Burmeister) at Caerlaverock, Dumfriesshire. *Glasgow Naturalist* 23(2): 58. (in English). [1 male was observed on 3 November 1996] Address: Clarke, D., Institution Tullie House Mus., Castle St., Carlisle CA3 8TP, UK.

1196. **Currie, R.S.; Fairchild, W.L.; Muir, D.C. (1997):** Remobilization and export of cadmium from lake sediments by emerging insects. *Environmental Toxicology & Chemistry* 16(11): 2333-2338. (in English). ["Emerging insects including, Diptera, Odonata, Ephemeroptera, and Trichoptera were collected from Lake 382 (L382) in 1991 and 1992 to estimate quantitatively the export of Cd by aquatic insects from a natural system having elevated Cd concentrations in the water and sediment. L382 is a Canadian Shield lake, located within the Experimental Lakes Area in northwestern Ontario, that received experimental additions of Cd from 1987 to 1992. Emerging Diptera (mostly Chironomidae), Odonata, and Ephemeroptera had mean Cd concentrations of 1.41, 0.11, and 0.30 µg/g wet weight, respectively. An estimated 1.32 to 3.90 g of Cd per year were exported from the sediments of L382 depending on the estimate of production rates used for these groups of insects. Approximately 0.05 to 0.17% of the whole-lake Cd load in L382 sediments was exported annually or 0.12 to 0.39% of the epilimnion Cd sediment load. Insect emergence may have resulted in greater Cd export from L382 relative to losses via the outflow. Cadmium exported from the sediments by insects may be remobilized and become more available to aquatic organisms or enter the terrestrial ecosystem and become available to insectivores." (Authors)] Address: Fairchild, W.L., Gulf Fisheries Centre, Fisheries Ocean Canada, P.O. Box 5030, Moncton, NB E1C 9B6, Canada

1197. **Dobruskina, I.A.; Ponomarenko, A.G.; Rasnitsyn, A. P. (1997):** Fossil insects found in Israel. *Paleontologicheskii Zhurnal* 5: 91-95. (in Russian). ["Fossil insects found in the Cretaceous of Israel are figured, discussed and, in part, described. Lower Cretaceous (Hauterivian-Barremian) Tayasir volcanites have yielded the beetle *Cretosperchus medievalis* Ponomarenko, sp. nov. related to species described from the Lower Cretaceous of Transbaikalia, a cockroach and a dragonfly nymph. In the Upper Cretaceous (Turonian) Ora Formation there are found the ant-lion *Samsonileon fragmentatus* Ponomarenko, sp. nov., a beetle elytra possibly belonging to *Dytiscidae*, two roach elytra (one assignable to *Blattellidae*), and not identifiable wing. The insects found show Laurasian rather than Gondwanian affinities." (Authors)] Address: Dobruskina, I. A., Heb. Univ. Jerus., Jerusalem, Israel

1198. **Dörfler, G.; Hartmann, G. (1997):** Zur Kenntnis der Libellenfauna des Harzes und seines näheren nörd-

lichen Vorlandes: Fundortliste, Korrekturen und Ergänzungen. Mitt. naturwiss. Verein Goslar 5: 151-154. (in German). [Harz Mountains region, Niedersachsen and Sachsen-Anhalt, Germany; records of 13 species previously unpublished are listed and shortly commented] Address: Hartmann, G., Werenbergstr. 26, D-38640 Goslar, Germany

1199. **Dolmen, D. (1997):** "Freshwater prawns" and other invertebrates: A faunistic report from the lakes Reddalsvannet and Landvikvannet, Grimstad. Fauna (Oslo) 50(1): 36-42. (in Norwegian). ["In June and July 1992 and June and August 1996, numerous "freshwater prawns" *Palaemonetes varians* were recorded in three brackish-water lakes at Grimstad, Aust-Agder county: Reddalsvannet, Landvikvannet, and lakelet north of Inntjore. This is the first reliable record of the species in Norway, at least for many decades. The remaining fauna consisted of both limnic and marine animals, and included rare species like *Brachytron pratense* (Odonata) and *Gyrinus caspius* (Coleoptera)."] (Author)] Address: Dolmen, D., Institution NTNU Vitenskapsmuseet, N-7004 Trondheim, Norway

1200. **Ferreras-Romero, M. (1997):** The life history of *Boyeria irene* (Fonscolombe, 1838) (Odonata: Aeshnidae) in the Sierra Morena mountains (southern Spain). Hydrobiologia 345: 109-116. (in English). ["The life history of *Boyeria irene* is inferred from size-frequency analyses of sweep-net samples taken during five years in a permanent stream in the Sierra Morena Mountains. There the species is apparently mainly semivoltine, although a few larvae require three years to complete development. The instar distribution during winter is that of a 'summer species' (sensu Corbet, 1954). Metamorphosis is confined to spring and there is a long flying season. Similarities between *B. irene* and congeneric species in North America are discussed."] (Author)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain

1201. **Fincke, O. (1997):** Conflict resolution in the Odonata: implications for understanding female mating patterns and female choice. Biological Journal of the Linnean Society 60(2): 201-220. (in English). ["Predictions of mating patterns in animals have focused on males and how they compete for fertilizations by controlling females. With reference to the Odonata, a taxon in which mating requires cooperation of the female, the active role that females play in mating decisions is often ignored, leading to the premature conclusion that male coercion of females is common. A critical review of the outcome of sexual conflict among odonates leads me to alternative explanations of female mating patterns that need, to be refuted before concluding that males coerce matings. Because Anisoptera males have greater control over tandem formation, they have a greater potential for coercion than Zygoptera males. However, Anisoptera females may simply be willing to remate more often if they receive insufficient sperm to fertilize an entire egg clutch. Contrary to prior assumptions, in both suborders, male defence of oviposition sites does not preclude females from choosing among sites or among males. I find that the evolution of non-aggressive sexual signals by males is a reliable indication that sexual conflict has been resolved in favour of female interests. Although I predict that the benefits to females of choice of male phenotype should rarely exceed the cost of such

such discrimination in Odonata, female choice is most likely to evolve in territorial species whose males must endure high physiological stress in order to mate, and when site quality is not a reliable predictor of the genetic quality of a potential mate."] (Author)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA

1202. **Fincke, O.M.; Waage, J.K.; Koenig, W.D. (1997):** Natural and sexual selection components of odonate mating patterns. In: Choe, J.C. & B.J. Crespi (Eds.): The evolution of mating systems in insects and arachnids. Cambridge Univ. Press. Cambridge: 58-74. (in English). ["Traditionally, students of odonate reproductive behavior have focussed on how males compete for access to mates and fertilizations. This tendency has yielded considerable information on male reproductive strategies and on the proximate and ultimate mechanisms involved in male-male competition, but has left numerous gaps in our knowledge of other aspects of odonate mating systems. We review relevant aspects of odonate biology and examine the extent to which current data on mating patterns support predictions arising from sexual selection theory. Although long-term studies offer some such support, they also indicate that natural selection for longevity and stochastic factors such as weather play critical roles in influencing reproductive success. Relatively little of the variance in male reproductive success in odonates has been traced to variance in male phenotype. We emphasize the role of females as determinants of odonate mating patterns and discuss sexual conflicts of interest over mating, fertilization, and oviposition decisions. Finally, we explore ways in which natural selection underlies female mating decisions and how larval and adult ecology interact to influence adult reproductive behavior."] (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA

1203. **Gee, J.; Smith, B.D.; Lee, K.M.; Griffiths, S. W. (1997):** The ecological basis of freshwater pond management for biodiversity. Aquatic Conservation 7(2): 91-104. (in English). ["1. Macrophyte and macroinvertebrate species richness, and the extent of aquatic vegetation, were surveyed in 51 newly created or renovated ponds in mid and west Wales, together with a range of environmental variables. These data are analysed in relation to management issues including pond size, rate of development, planting for oxygenation, stocking with fish and shading by riparian trees. 2. Richness of both plants and invertebrates increases with vegetated area, but the relationships are weak. Similarities among assemblages in ponds are low and not related to the proximity of the ponds. It is likely that two small ponds would together support more species than a single large pond. 3. New ponds are colonized rapidly by plants and invertebrates. There is no relationship between age and the number of species in ponds that were at least one year old, except for invertebrates in ponds that were isolated from other wetland. As expected, the extent of aquatic vegetation increases with age. 4. Minimum dissolved oxygen levels decrease with the cover of floating plants and with extent of vegetation in relation to pond size. 5. There is no evidence that stocking with fish (mainly salmonids at low densities) influences the total number of species of either macrophytes or macroinvertebrates. However, the number of anisopteran (Insecta: Odonata) species is lower in stocked ponds and the number of trichopteran (Insecta) species is high-

her. 6. Macrophyte species richness increases with the percentage of the margin shaded by trees to a peak between 22% (emergent species) and 30% (submerged and floating species), and then declines. The number of species of invertebrates with short-lived flying adults (Odonata, Ephemeroptera, Trichoptera) decreases with the extent of riparian trees. Other invertebrates are unaffected. 7. The relationship between the survey results and existing management recommendations is discussed, emphasizing the need for field experiments to provide empirical support." (Authors)] Address: Gee, J., Inst. Biol. Sci., Univ. Wales, Aberystwyth, Ceredigion SY23 3DA, UK

1204. **Gorb, S.N. (1997):** Ultrastructural architecture of the microtrichia of the insect cuticle. *Journal of Morphology* 234(1): 1-10. (in English). ["The ultrastructure of the microtrichia (MT) of the insect cuticle was studied using scanning electron microscopy (SEM). After dissolving the protein matrix of chitin-protein microfibrils with NaOH, the orientation of the axial chitin fibers was three-dimensionally demonstrated. Microfibrils of the outermost exocuticular lamella lie parallel to the slope of the cone surface of the MT and rotate slightly on the top of the MT. Microfibrils of the external lamella of the transitional area between planar cuticle and conical cuticle of the MT corresponded to the shape of the surface within one lamella and preferred directions of MT's microfibrils in the successive lamella rotated. In the deeper layers of the cuticle, the rotation of both the microfibrils and successive lamella results in the twisted straw architecture of the microfibrils' composition within the MT. The deepest microfibrils that are located close to the axis of the MT form compact clusters of fibrils (1.0-1.5 μ -m length). The twisted-straw architecture of microfibrils in the MT is derived from principles of development of extracellular fibrous composites. It is suggested, however, that this architecture has an additional functional significance as a strategic design with particular mechanical properties." (Author)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

1205. **Gryska, A.D.; Hubert, W.A. (1997):** Observations on the reproduction, sources of mortality, and diet of the Kendall Warm Springs dace. *Great Basin Naturalist* 57(4): 338-342. (in English). [Wyoming, USA; life history study of the endangered Kendall Warm Springs dace (*Rhinichthys osculus thermalis*); "We observed 2 sources of mortality: (1) emigration from the warm spring stream over a waterfall into the Green River and (2) predation on larvae by dragonfly (*Libellula saturata*) nymphs." (Authors)] Address: Gryska, A., Institution Wyo. Coop. Fish Wildl. Res. Unit, Univ. Wyo., Laramie, WY 82071-3166, USA.

1206. **Habdija, I.; Radanovic, I.; Primc-Habdija, B. (1997):** Longitudinal distribution of predatory benthic macroinvertebrates in a karstic river. *Archiv für Hydrobiologie* 139(4): 527-546. (in English). ["The longitudinal distribution of predatory macroinvertebrates and their diversity were investigated on boulder, cobble and gravel substrates along the River Kupa, a karstic river in the NW Dinarid area (Croatia). Depending on substrate type and river section, the predator biomass constituted 6.9% to 20.2% of the total macroinvertebrate biomass. In the headwater streams more than 80% of predator biomass was represented by rhyacophilid, perlid and perlodid larvae. In the upper river section Hirudinea

species, rhyacophilids and the dipteran larva, *Atherix ibis*, constituted approximately equal percentages of total predators. In the lower river section Hirudinea species, Odonata larvae, tanipod and ceratopogonid larvae were the most dominant predators. Along the river gradient the increase of predator biomass corresponded with the increase of scraper, collector-gatherer and filterer biomass. The Shannon index of diversity showed that the diversity of predators increased from the area to the downstream reaches. A significant and positive association was found between diversity of predators and diversity of collector-gatherers. This positive relationship between predators and collector-gatherers may be interpreted as the diversity response of predators to the diversity of prey." (Authors) In tab. 2 the mean annual biomass (mg wet biomass m^2) of *Platycnemis* sp., *Cordulidae* not det., *Gomphus vulgatissimus*, and *Onychogomphus* sp. is listed.] Address: Habdija, I., Department of Zoology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, CRO-10000 Zagreb, Croatia

1207. **Hassan, S.T. (1997):** Action thresholds of wet rice arthropods for pest management decision-making in Malaysia. *Pertanika Journal of Tropical Agricultural Science* 20(1): 65-74. (in English). ["Action thresholds to aid pest population management decision-making of 11 categories of wet rice arthropods are suggested in terms of mean population density per hill (x) and proportion of infestation ($P(I)$) of the field sampling units. The thresholds are the (x) and $P(I)$ values at the point of saturation of a polynomial regression curve obtained by plotting (x) against $P(I)$ for each arthropod category. The respective values for pests are: 3.38, 0.92 (*Nephotettix* spp.), 6.28, 1.00 (*Nilaparvata lugens*), 1.37, 0.72 (*Cnaphalocrocis medinalis*-*Pyralidae*), 2.42, 0.90 (*Recilia dorsalis*), 3.81, 0.97 (*Sogatella furcifera*), and for predators are: 3.89, 0.98 (*Cyrtorhinus lividipennis*), 2.39, 0.85 (*Anatrichus pygmaeus*-*Diptera*), 2.02, 0.82 (Odonata), 1.65, 0.81 (*Casnoidea* spp), 1.61, 0.64 (*Paederus fuscipes*), and 1.60, 0.69 (spiders). $P(I)$ is significantly ($P < 0.001$) affected by arthropod category and growth stage of the crop. The observed $P(I)$ indicated high fits (most $r^2 > 0.90$) to clumped- and Poisson-based distribution models." (Authors)] Address: Hassan, S.T.S., Dep. Biol., Fac. Sci. Environ. Studies, Univ. Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

1208. **Hassan, S.T.; Rashid, M.M. (1997):** Presence/absence sequential plans for pest management decision-making for arthropods of wet rice ecosystem in Malaysia. *Pertanika Journal of Tropical Agricultural Science* 20(1): 51-63. (in English). ["Presence-absence sequential sampling plans are presented for 11 arthropod categories to assist in management of their populations in the multipest-infested rice crop in Malaysia. Data from visual inspection of 204 samples with 40 and 100 hills per sample, were used to develop the plans. Action threshold for each of the 11 (5 pests 6 predators) arthropod categories was obtained through a fourth-order polynomial regression of proportion of infestation against mean population densities, at the point of saturation of infestation. The pest species are: *Nephotettix* spp., *Nilaparvata lugens*, *Recilia dorsalis*, *Sogatella furcifera* and *Cnaphalocrocis medinalis* (*Pyralidae*), and the predators: *Cyrtorhinus lividipennis*, *Anatrichus pygmaeus* (*Diptera*), spiders, Odonata, *Paederus fuscipes* and *Casnoidea* spp. Risk levels of Type I (α) and Type II error (β) were prefixed at 0.3, since lower levels

entail taking a larger number of samples. The sequential plans were then generated using the SEQUAN computer program of Talerico and Chapman (1970). During field operation on not more than 50 ha at a time, it is suggested that at least ten hills should be examined visually before recommending any pest management action. Simultaneous sampling of pests and predators enables status of predators' populations to be considered before recommending any decision." (Authors)] Address: Hassan, S.T.S., Dep. Biol., Fac. Sci. Environ. Studies, Univ. Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

1209. **Hawking, J.H. (1997):** The conservation status of dragonflies (Odonata) from south-eastern Australia. Mem. mus. Victoria 56(2): 537-542. (in English). ["The conservation status of the dragonflies from south-eastern Australia is documented and the species with limited distributions and/or larval habitats which are vulnerable are discussed. One hundred and seven species are recorded from South Australia, Victoria, Tasmania and southern New South Wales. No species is considered endangered, but nine species have high conservation priority. These species are endemic to Australia and all have restricted distributions. The vulnerability of the larval habitats is discussed and suggestions for their conservation and management are made." (Author)] Address: Hawking, J.H., Murray-Darling Freshwater Research Centre, Cooperative Research Centre for Freshwater Ecology, P.O. Box 921, Albury, NSW 2640, Australia

1210. **Hooper, R.E.; Siva-Jothy, M.T. (1997):** "Flybys": A prereproductive remote assessment behavior of female *Calopteryx splendens xanthostoma* (Odonata: Calopterygidae). Journal of Insect Behavior 10(2): 165-175. (in English). ["Before reproductive events, female *Calopteryx splendens xanthostoma* show a distinctive flight behavior over patches of oviposition substrate guarded by territorial males. We term such flights 'flybys.' Since females fly most frequently (and nonrandomly) over the site which they eventually utilize, the flight type appears to be related to the female's selection of a reproduction site. When males were experimentally excluded females made flybys over more sites than when males were present. We manipulated the levels of agonistic interactions between males to determine the effect of fighting on flybys. The frequency of flybys by females over each patch did not change with different levels of male agonistic activity, but females landed and copulated on patches where fighting between males was lowest. Moreover, when females secured access to an oviposition site without copulating with the reholding male, they made flybys over more sites than when they secured access to a site by copulating with the territorial male. The results suggest that one function of flybys is to allow females to assess remotely potential male interference at oviposition sites." (Authors)] Address: Hooper, R.E., Lab. Wildlife Conservation, National Inst. Environmental Studies, Tsukuba 305, Japan

1211. **Horwitz, P. (1997):** Comparative endemism and richness of the aquatic invertebrate fauna in peatlands and shrublands of far south-western Australia. Mem. Mus. Victoria 56(2): 313-321. (in English). ["A study of the peatlands and shrublands in far south-western Australia was undertaken to examine patterns of endemism and richness in aquatic invertebrate faunas. Samples of surface water, interstitial water and

crayfish burrow water were analysed from about 45 sites and in each season over a twelve month period in 1993. Six groups of aquatic invertebrates were chosen for more detailed analyses (mites, oligochaetes, isopods, decapods, dipterans, and odonats) and resolved to species level. For each species an assessment was made of its distributional status as either widespread and common, regionally endemic (to the southwest), or locally restricted to within the study region. Sites with high levels of local endemism were plotted geographically and their characteristics compared to other sites. The data are related to existing hypotheses concerning the depauperate nature of the freshwater fauna of the south-western part of the continent. It was found that such hypotheses need to be tempered by the role of salt in flowing systems, and the occurrence of hot spots of local endemism for freshwater fauna in the extreme south-west in non-flowing waters (and often subterranean habitats) where groups of non-insect invertebrate fauna show apparently elevated species richness." (Author) *Miniargiolestes minimus* (Tillyard, 1908), *Austrogomphus collaris* Hagen in Selys, 1854, *Austroaeschna anacantha* Tillyard 1908, *Procordulia affinis* (Selys 1871), *Austrosynthemis cyanitincta* (Tillyard, 1908)] Address: Horwitz, P., Institution Dep. Environmental Management, Edith Cowan Univ., Joondalup Drive, Joondalup, WA 6027, Australia

1212. **Hudoklin, A.; Sovinc, A. (1997):** New life for deserted clay pits. *Proteus*, Ljubljana 60(3): 104-110. (in Slovene with English summary). ["The life of man-made biotopes, such as clay and gravel pits, is usually brief. Most frequently they end as waste dumps, eventually to be buried; under the best of circumstances they become ponds for intensive aquaculture. Only rarely are secondary biotopes returned to nature. Just this is now happening at Zalog by Novo Mesto, where re-introduction of plants and animals is leading to an exceptional site. We are attempting to maintain it as a secondary biotope after restoration." (Authors) *Lestes sponsa*, *L. dryas*, *L. virens*, *Aeshna mixta*, *Sympetrum fonscolombii*, *S. striolatum*, and *S. sanguineum* are listed for the locality.] Address: Solvinc, A., Vodnogospodarski institut, PP 3401, Hajdrihova 28, SI-1115 Ljubljana, Slovenia

1213. **Iwasaki, K.; Otsuka, T.; Nakayama, K. (1997):** Middle- and large-sized aquatic animal assemblages associated with submerged riparian plants in the Kamo River, Kyoto. *Japanese Journal of Limnology*. 58(3): 277-291. (in Japanese with English summary). ["Middle- and large-sized aquatic animal assemblages associated with the submersed leaves, stems and roots of the reed *Phragmites japonica* and other riparian plants were studied in the Kamo River, Kyoto with a focus on the faunal differences in both longitudinal and seasonal distribution. At the upper and middle sites, mayfly larvae inhabiting slow riffles and shallow pools were dominant in winter and spring. Several lentic hemipteran insect species such as water scorpions and back swimmers associated chiefly with hydrophytes in ponds and marshes were also found in summer or autumn within the stands of monocotyledonous plants on the wide gravel bar of the middle site. At the lower site within the Kyoto city limits, water slaters, leeches and snails were abundant from spring through autumn. In addition, many larvae of calopterygid and coenagrionid dragonflies were collected in spring and summer, respectively. Juvenile fishes of dark chub and lizard go-

by were abundant in summer and autumn at all three sites. Riparian plants were thus suggested to increase species diversity of lotic fauna, providing habitats not only for lotic invertebrates but also for lentic insects and juvenile fishes." (Authors)] Address: Iwasaki, K., Inst. Natural Sci., Nara Univ., 1500 Misasagi-chou, Nara 631, Japan

1214. **Jacob, J.; Raab, G.; Hoppe, U. (1997):** Surface lipids of the silverfish (*Lepisma saccharina* L.). *Zeitschrift für Naturforschung (C)* 52(1-2): 109-113. (in English). ["Surface lipids obtained from the silverfish by short-term solvent extraction contain aliphatic hydrocarbons, monoester waxes, cholesteryl esters, triglycerides, free cholesterol, and free fatty acids. [...] The cuticular lipid composition of silverfish resembles that of other more primitive arthropod forms such as stoneflies and dragonflies." (Authors)] Address: Jacob, J., Biochemisches Institut Umweltcarcinogene, Lurup 4, D-22927 Grosshansdorf, Germany

1215. **Kasuya, E.; Edanami, K.; Ohno, I. (1997):** Selection and reproductive success in males of the dragonfly *Orthetrum japonicum* (Odonata: Libellulidae). *Res. popul. ecol.* 39(2): 113-119. (in English). ["Reproductive success, copulation success, and mating success were measured for a population of male dragonflies, *Orthetrum japonicum*. Copulation success explained the greatest variation in reproductive success. The proportion of copulations followed by oviposition was positively correlated with the number of oviposited eggs per mating. Directional selection on four morphological characters was estimated. The effect of selection on correlated traits was comparable to that of direct selection. Directional selection varied between traits and between episodes in a single trait. The probability that the observed directional selection on the four morphological traits was expected under the condition of the selective neutrality of traits was not smaller than 5%." (Authors)] Address: Kasuya, E., Dep. Biol., Fac. Sci., Kyushu Univ., 812-81 Fukuoka Japan

1216. **Kim, T. H. (1997):** A proposal for protection of *Nannophya pygmaea* Rambur (Odonata) and its habitat in Korea. *Korean Journal of Applied Entomology* 36(3): 283-285. (in Korean). [*N. pygmaea* was found breeding at an altitude of 940m, Mt. Chiri, Republic of Korea. The species is strictly limited to bogs at high altitudes, therefore necessary protection measures for the species and its habitat are proposed.] Address: Kim Tae Heung, Fac. Biol. Resources Sci., Coll. Agric., KIBIO, Chonbuk Natl. Univ., Chonju 561-756, Chonbuk, South Korea

1217. **Land, M.F. (1997):** The resolution of insect compound eyes. *Israel Journal of Plant Sciences* 45(2): 79-91. (in English). ["The spatial resolution of compound eyes is determined by their interommatidial angles, by the optical quality and rhabdom dimensions of the ommatidia, and by illumination level. Among insects, interommatidial angles vary from tens of degrees in Apterygota, to as little as 0.24 degree in dragonflies. Resolution better than this is not attainable in compound eyes of realistic size, because of the limit imposed by diffraction. The smaller the interommatidial angle, the greater the distance at which objects-prey, predators, foliage, or flowers-can be resolved. Insects with different lifestyles have contrasting patterns of interommatidial angle distribution, related to forward flight, capture on the wing, and predation on horizontal surfa-

ces." (Author)] Address: Land, M.F., School Biol. Sci., Univ. Sussex, Brighton BN1 9QG, UK

1218. **Larson, D. (1997):** Habitat and community patterns of tropical Australian hydradephagan water beetles (Coleoptera: Dytiscidae, Gyrinidae, Noteridae). *Australian Journal of Entomology* 36(3): 269-285. (in English). [A study was undertaken to describe patterns of water beetle co-occurrence in a tropical environment and to compare these with water beetle community structure in temperate regions. Dytiscidae, Noteridae, and Gyrinidae were sampled quantitatively and qualitatively from a variety of habitats in the Atherton Tableland region of tropical Queensland from September 1990 to February 1991. [...] Quantitative samples from rice fields and a temporary pond demonstrated that a suite of species were quick to colonize and breed in newly formed habitat. Many of these species breed before other predators such as fish or Odonata become established."] Address: Larson, D., Institution Dep. Biol., Memorial Univ., St. John's, Newfoundland A1B 3X9, Canada

1219. **Lasswell, J.L.; Mitchell, F.L. (1997):** Survey of dragonflies (Odonata: Anisoptera) in ponds of central Texas. *Journal of the Kansas Entomological Society* 70 (1): 52-63. (in English). [Anisoptera "were collected for five quarters, from October 1994 through December 1995, from 12 ponds located in Erath County, Texas. Nymphs were collected from each of the ponds quarterly, while adults were taken whenever possible. Other collection records from Erath County are also noted. A total of 38 dragonfly species were identified. Nymphs of 28 species were collected from the ponds, while the remaining 10 species were determined from adult collections. Thirty-six species of adults were collected. Two species were found as nymphs, but not collected as adults. Peak dragonfly abundance in ponds occurred during the third quarter - July through September." (Authors)] Address: Lasswell, J.L., Institution Texas Agric. Exp. Stn., Route 2 Box 00, Stephenville, TX 76401, USA.

1220. **Laurila, A.; Kujasalo, J.; Ranta, E. (1997):** Different antipredator behaviour in two anuran tadpoles: effects of predator diet. *Behav. Ecol. Sociobiol.* 40(5): 329-336. (in English). ["Recent investigations have indicated that animals are able to use chemical cues of predators to assess the magnitude of predation risk. One possible of such cues is predator diet. Chemical cues may also be important in the development of antipredator behaviour, especially in animals that possess chemical alarm substances. Tadpoles of the common toad (*Bufo bufo*) are unpalatable to most vertebrate predators and have an alarm substance. Tadpoles of the common frog (*Rana temporaria*) lack both these characters. We experimentally studied how predator diet, previous experience of predators and body size affect antipredator behaviour in these two tadpole species. Late-instar larvae of the dragonfly *Aeshna juncea* were used as predators. The dragonfly larvae were fed a diet exclusively of insects, *R. temporaria* tadpoles or *B. bufo* tadpoles. *R. temporaria* tadpoles modified their behaviour according to the perceived predation risk. Depending on predator diet, the tadpoles responded with weak antipredatory behaviour (triggered by insect-fed predators) or strong behaviour (triggered by tadpole-fed predators) with distinct spatial avoidance and lowered activity level. The behaviour of *B. bufo* in predator diet treatments was indistinguishable from that in the control

treatment. This lack of antipredator behaviour is probably related to the effective post-encounter defenses and more intense competitive regime experienced by *B. bufo*. The behaviour of both tadpole species was dependent on body size, but this was not related to predator treatments. Our results also indicate that antipredator behaviour is largely innate in tadpoles of both species and is not modified by a brief exposure to predators." (Authors)] Address: Laurila, A., Integrative Ecol. Unit, Div. Population Biol., Dep. Ecol. Systematics, P.O. Box 17, FIN-00014 Univ. Helsinki, Finland

1221. **Liebherr, J.K.; Polhemus, D.A. (1997):** Comparison to the century before: the legacy of R.C.L. Perkins and Fauna hawaiiensis as the basis for a long-term ecological monitoring program. *Pacif. Sci.* 51(4): 490-504. (in English). ["As one means of assessing the impact of the past 100 yr of development and biological alteration in Hawai'i, the damselfly (Odonata: Coenagrionidae) and carabid beetle (Coleoptera: Carabidae) collections of R. C. L. Perkins made in the 1890s are compared with similar collections made one century later during the 1990s. Two islands that have experienced very different histories of development are compared: O'ahu and Moloka'i. Of eight native damselfly species originally inhabiting O'ahu, one has been extirpated from the island, another is now reduced to a single population, and three more are at risk. Of the eight species originally found on Moloka'i, by contrast, there is only one species that has not been rediscovered, although there is reasonable probability that it has simply eluded capture because of inherent rarity, whereas the remaining species retain large and stable populations. Capture frequencies (based on specimens collected per decade) are lower now than in the preceding century for most species on O'ahu, even allowing for modern collectors retaining fewer specimens. The only species on O'ahu for which captures have increased between the 1890s and the 1990s are those that breed away from lotic and lentic habitats, indicating a severe negative impact from introduced aquatic biota for species that breed in such freshwater situations. On Moloka'i, all damselfly species except one have higher capture rates now than in the 1890s, explainable in large part to improved access to previously remote terrain. [...]. "(Authors)] Address: Liebherr, J.K., Dep. Entomol., Comstock Hall, Cornell Univ., Ithaca, NY 14853-0901, USA

1222. **Limbert, M. (1997):** The white-faced dragonfly *Leucorrhinia dubia* (Vander L.) on Thorne Moors. *Naturalist* (Doncaster). 122(1022): 88-92. (in English). Address: Limbert, M., Mus. and Art Gallery, Chequer Road, Doncaster DN1 2AE, UK

1223. **Lockwood, J.L.; Fenn, K.H.; Curnutt, J.L.; Rosenthal, D.; Balent, K.L.; Mayer, A.L. (1997):** A Life history of the endangered Cape Sable Seaside Sparrow. *Wilson Bulletin* 109(4): 720-731. (in English). ["Cape Sable Seaside Sparrows (*Ammodramus maritimus mirabilis*) breeding within eastern Everglades National Park were philopatric and moved only short distances between clutches. Incubation required 12 days, nestlings fledged at 9.2 days, and fledgling care ranged from eight to 20 days. The total nest cycle encompassed 34-44 days. Nestlings were fed spiders and insects, primarily Orthoptera, Lepidoptera, and Odonata. Diet varied between years and study sites. With the onset of summer rains, predation rate increased, and nest success decreased. Breeding activity diminished through-

hout June, coinciding with rising water in nest areas. Our results indicated that the lack of breeding habitat and the onset of summer flooding limit the breeding potential of Cape Sable Seaside Sparrows."(Authors)] Address: Lockwood, Julie, Dep. Ecol. and Evol. Biol., Univ. Tenn., Knoxville, TN 37996, USA

1224. **Martin, R.; Pibernat, J. (1997):** Dos nuevas citas de *Ischnura graellsii* (Rambur 1842) en la provincia de Gerona. *Navasia* 6: 3-5. (in Spanish). [*I. graellsii* - rare in the Province Gerona, Spain - was sympatric with *I. elegans* in 1994 and 1995.] Address: Martin, R., Avda Martí Pujol 250, 3' 4a, ES-08911 Badalona, Barcelona, Spain

1225. **Müller, J. (1997):** "FFH-Libellen". *Pedemontanum*, Magdeburg 1: 2-3. (in German). [The odonate species of the FFH-Directive of the European Union occurring in Sachsen-Anhalt are listed; these species should be surveyed with priority] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1226. **Müller, J. (1997):** Asiatische Keiljungfer *Stylurus flavipes* (Needham, 1897) oder *Gomphus flavipes* (Charpentier, 1825)?. *Pedemontanum*, Magdeburg 1: 2. (in German). [Some taxonomic annotations to *S. flavipes*] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1227. **Müller, J. (1997):** Editorial zum Mitteilungsblatt der AG Odonatenfauna Sachsen-Anhalt der Entomologen-Vereinigung Sachsen-Anhalt e.V. "pedemontanum". *Pedemontanum*, Magdeburg 1: 1. (in German). [Outline of the development and the tasks of the working group Odonata within the Association to the Entomologists of Sachsen-Anhalt, and some remarks on the name of the leaflet "pedemontanum"] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1228. **Müller, J. (1997):** Kleine Königslibelle *Anax parthenope* (Selys, 1839). *Pedemontanum*, Magdeburg 1: 2. (in German). [Short note on the most recent distribution patterns of *A. parthenope* in Sachsen-Anhalt and the bordering Federal State Niedersachsen, Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1229. **Müller, J. (1997):** Literatur: Odonatenfauna Sachsens-Anhalts. *Pedemontanum*, Magdeburg 1: 3-4. (in German). [27 odonatological titles covering 1993-1996 are listed] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1230. **Müller, J. (1997):** Südliche Mosaikjungfer *Aeshna affinis* Vander Linden, 1820. *Pedemontanum*, Magdeburg 1: 2. (in German). [The 1995 invasion of *A. affinis* to Sachsen-Anhalt, Germany seems to have been successful; in 1996 the species could be observed on several habitats discovered in 1995] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1231. **Nel, A.; Arillo, A.; Ortuno, V.M. (1997):** New Western Palaearctic Cenozoic Odonata (Zygoptera and Anisoptera). *Bull. soc. ent. Fr.* 102(3): 265-270. (in French with English summary). [Five new Cenozoic Odonata are described or revised from Spain and France, including a new *Coenagrionoidea*, *Hispanocoenagrion inexpectum* n. gen., n. sp.] Address: Nel, A.,

Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

1232. **Niedringhaus, R. (1997):** Die Limnofauna (Mollusken, Libellen, Köcherfliegen, Wasserkäfer, Wasserranzen) eines durch Ausbau und Agrarnutzung stark gestörten Gewässersystems in Nordwestdeutschland. Abh. westf. Mus. Naturkunde 59(4): 209-236. (in German). [In the framework of a project to restore an intensively used agricultural landscape situated near the town of Lingen, Niedersachsen, Germany, the limnofauna - including Odonata - of a system of ditches and further water bodies was studied. Between 1989 and 1994 24 odonate species were recorded. The abundance and reproductive status of the species for each of the water bodies is presented in a tab. Most characteristic species are Calopteryx splendens, Lestes sponsa, Chaloclestes viridis, Coenagrion puella, Aeshna cyanea, and Libellula depressa. Pyrrhosoma nymphula and Ischnura elegans are the dominant species of the periodic water bodies.] Address: Niedringhaus, R., Carl-von-Ossietzky-Universität Oldenburg, Fachbereich Biologie, Postfach 2503, D-26111 Oldenburg, Germany

1233. **Novelo Gutiérrez, R. (1997):** Clave para la determinación de familias y géneros de las náyades de odonata de Mexico. Parte I. Zygoptera. Dugesiana 4(1): 1-10. (in Spanish). [Illustrated key to the families and genera of the larval stages of the Mexican zygopteran Odonata] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@sun.ieco.conacyt.mx

1234. **Novelo-Gutiérrez, R. (1997):** Clave para la determinación de familias y géneros de las náyades de odonata de Mexico. Parte II. Anisoptera. Dugesiana 4(2): 31-40. (in Spanish). [Illustrated key to the families and genera of the larval stages of the Mexican anisopteran Odonata] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@sun.ieco.conacyt.mx

1235. **Novelo-Gutierrez, R. (1997):** Primer registro de la familia Pseudostigmatitae (Odonata: Zygoptera) para el estado de Morelos, Mexico. Folia ent. mex. 96 (1996): 109-110. (in Spanish). [On 24-10-1996 Mecistogaster ornata was caught along Río Sabinos in the Jardins de Xochitepec, town of Xochitepec, Mexico] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico

1236. **Orr, A.G.; Cranston, P.S. (1997):** Hitchhiker or parasite? A ceratopogonid midge and its odonate host. J. nat. hist. 31: 1849-1858. (in English). ["The ceratopogonid genus Forcipomyia Meijyen (Diptera: Ceratopogonidae) contains species with a wide range of adult biologies. Species of the subgenus Pterobosca Macfie are phoretic and apparently parasitic on the wing veins of other insects, notably odonates and sometimes lacewings. We describe F. (Pterobosca) debenhamae from Brunei as new to science, taking the authorship of Cranston, tabulate the morphological diversity of the subgenus, and speculate on the phylogeny. The behaviour of adult female midges, which have been found only upon the thorax of hosts predominantly of Libella-

go hyalina (Odonata: Chlorocyphidae), appears to deleteriously impact on the quality and duration of territory holding of the host. The lack of any confirmation of host feeding leads us to speculate on the nature of the association." (Authors)] Address: Cranston, P.S., Biol. Dep., Univ. Brunei Darussalam, Bandar Seri Begawan, Negara, Brunei

1237. **Ottvall, R. (1997):** The dragonflies Hemianax ephippiger and Sympetrum fonscolombei (Odonata: Aeshnidae and Libellulidae) found on the Baltic island of Oland. Entomologisk Tidskrift, Stockholm 118(4): 193-196. (in Swedish with English summary). [The first Swedish records of the dragonflies Anax ephippiger and Sympetrum fonscolombii are reported. Three males and 3 females of A. ephippiger "were accidentally caught in a trap designed for migrating birds at Ottenby Bird Observatory at the southern point of the Baltic island of Oland, June 25 and 26 1995. This record of several individuals, and reports of unusual occurrences in central Europe, suggests an "invasion" reaching at least as far north as the Baltic Sea region. Warm, easterly winds in late May probably carried the dragonflies to Sweden. It is probable that during the unusually hot summer, the species was breeding in Sweden and larval development may have succeeded to emergence. In the same trap 3 males and 1 female of S. fonscolombii were trapped between July 7 and 21 1997. Extremely warm and moist air with high temperatures in southern Sweden in early July could explain the occurrence which is the first record of this species in Scandinavia."] Address: Ottvall, R., Ottoson, Dag Hammarskjolds vag 5G, S-224 64, Lund, Sweden

1238. **Papazin, M. (1997):** Anomalie morphologique à caractère gyandromorphique chez Gynacantha kirbyi Krüger, 1898 (Odonata, Aeshnidae). Bull. soc. ent. Fr. 102(2): 103-108. (in French with English summary). [Some general annotations of gynandromorphism on Odonata are presented; the female specimen of G. kirbyi has oreillets on the second abdominal segment similar to the male ones.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

1239. **Peacor, S.D.; Werner, E.E. (1997):** Trait-mediated indirect interactions in a simple aquatic food web. Ecology 78(4): 1146-1156. (in English). ["This investigation examines the role of trait-mediated indirect interactions in a simple aquatic food web. We conducted the experiments in cattle watering tanks in order to establish whether competitive and predator-prey interactions between two species are affected by other species in the system; i.e., are pairwise interaction strengths affected by the background species assemblage? We examined the survival and growth response of small bullfrog (Rana catesbeiana) and small green frog (Rana clamitans) tadpoles in the presence and absence of a competitor (large bullfrogs), the lethal presence of the larval odonate predator Tramea lacerata, and the nonlethal (caged) presence of the larval odonate predators Anax junius and Anax longipes. We demonstrate that large bullfrog competitors and caged Anax affect traits (foraging activity level) of small bullfrog and small green frog tadpoles and that these changes in traits, in turn, affect interactions of the small tadpole species with each other and with the other species. In particular, the following four trait-mediated indirect interactions were evident: (1) Presence of large bullfrog competitors increased the predation rate of

Traumea on small green frogs and small bullfrogs. (2) Presence of nonlethal Anax reduced the predation rate of Traumea on small green frogs. (3) Presence of nonlethal Anax increased the competitive advantage of bullfrogs over green frogs. (4) Presence of nonlethal Anax facilitated midge invasion of the experimental units. The proposed mechanisms (changes in small tadpole activity) involved in these trait-mediated indirect interactions were supported by observational data on tadpole activity and relevels in the experimental units, and in laboratory experiments examining tadpole activity responses to predators. The occurrence of strong trait-mediated indirect interactions in this simple food web underscores the potential importance of such interactions in animal communities." (Authors)] Address: Werner, E.E., Dep. Biol., Univ. Michigan, Ann Arbor, MI 48109, USA

1240. **Richter, B.D.; Braun, D.P.; Mendelson, M.A.; Master, L.L. (1997):** Threats to imperiled freshwater fauna. *Conservation Biology* 11(5): 1081-1093. (in English). ["Threats to imperiled freshwater fauna in the U.S. were assessed through an experts survey addressing anthropogenic stressors and their sources. Specifically, causes of historic declines and current limits to recovery were identified for 135 imperiled freshwater species of fishes, crayfishes, dragonflies and damselflies, mussels, and amphibians. The survey was designed to identify threats with sufficient specificity to inform remanagers and regulators faced with translating information about predominant biological threats into specific, responsive actions. The findings point to altered sediment loads and nutrient inputs from agricultural nonpoint pollution; interference from exotic species; and altered hydrologic regimes associated with impoundment operations as the three leading threats nationwide, accompanied by many lesser but still significant threats. Variations in threats among regions and among taxa were also evident. Eastern species are most commonly affected by altered sediment loads from agricultural activities, exotic species, habitat removal/damage, and altered hydrologic regimes predominate in the West. Altered sediment loading from agricultural activities and exotic species are dominant problems for both eastern mussels and fishes. However, eastern fishes also appear to be suffering from municipal nonpoint pollution (nutrients and sediments), whereas eastern mussels appear to be more severely affected by altered nutrient impacts from hydroelectric impoundments and agricultural runoff. Our findings suggest that control of nonpoint pollution associated with agriculture activities should be a very high priority for agricultural producers and governmental support programs. Additionally, the large number of hydropower dams in the US. subject to federal re-licensing in coming years suggests a significant opportunity to restore natural hydrologic regimes in the affected rivers." (Authors)] Address: Richter, B.D., Biohydrology Program, Nature Conservancy, P.O. Box 430, Hayden, CO 816399, USA

1241. **Rödel, M.-O.; Lensenmair, K.E. (1997):** Predator-induced swarms in the tadpoles of an African savanna frog, *Phrynomantis microps*. *Ethology* 103(11): 902-914. ["Aggregations in tadpoles of the West African savanna frog *Phrynomantis microps* were often observed in their breeding ponds in our study area, situated in Comoe National Park, Ivory Coast. Experiments under seminatural conditions demonstrated that this be-

haviour was only shown while predators were present. The tadpoles reacted differently to different predators. Factors inducing swarm behaviour were optical (the predator) and/or chemical (liquid from injured tadpoles). Alarm substances are not species-specific. Kinship seems not to play a role in swarm formation." (Author). Odonate predators tested are *Traumea basilaris*, *Pantala flavescens*, and *Anax imperator*. Swarm formation was induced solely via visual stimuli, for odonate larvae with their labium amputated induced swarm formation as well. "... Our results showed that swarms considerably outlived the removal of predators (*Traumea*). In 160 controls during 50 h following the removal of the predator we found 41 swarms in those containers where the dragonfly larvae had successfully hunted and 19 swarms in those with dragonfly larvae with amputated labium. Median duration of swarm persistence was 6 h when predation had really happened and 1 h in those trials with manipulated dragonfly larvae. In both cases however, the range of swarm persistence duration was 1-48h after the removal of the predators. Thus differences between the two experiments were not significant. After 50 h all swarms had dissolved."] Address: Rödel, M.-O., Lehrstuhl Tierökologie, Theodor-Boveri-Inst. Biowissenschaften, Am Hubland, D-97074 Würzburg, Germany. E-mail: roedel@biozentrum.uni-wuerzburg.de

1242. **Rogelio, D.-L.; Rodriguez, M.H.; Arrendondo-Jimenez, J.I.; Hernandez-Avila, M.; Mallorca, C. (1997):** Aquatic insects associated with *Anopheles albimanus* (Diptera: Culicidae) breeding sites in southern Mexico. *Environmental Entomology* 26(4): 828-838. (in English). ["Aquatic Coleoptera, Hemiptera, and Odonata associated with *Anopheles albimanus* Wiedemann larval habitats (defined by dominant plant vegetation) were investigated in various hydrological types along the coastal plain of southern Chiapas, Mexico. Aquatic insects were sampled by manual dragging nets, and mosquito larvae were sampled with standard dippers. Aquatic Coleoptera were the most abundant and diverse group, represented by 20 genera, followed by Hemiptera and Odonata, each with 16 genera. Aquatic insects were more abundant in permanent and temporary lagoons in *Hymenachne amplexicaulis* (Rudge) Nees and *Lippia nodosa* (L.) Michx. habitats, whereas mosquito larvae were most abundant in *Ceratophyllum demersum* L. and *Crinum erubescens* Soland. habitats, where aquatic insects were moderately abundant. Significant association in regression models with the addition of quadratic terms were found in aquatic Coleoptera and Odonata with respect to mosquito larvae. However, adjusted models that included environmental parameters proved these associations to be nonsignificant." (Authors)] Address: Danis-Lozano, R., Centro Investigacion Paludismo, Inst. Nac. Salud Publica, P.O. Box 537, Tapachula, Chiapas 30700, Mexico

1243. **Rolff, J.; Martens, A. (1997):** Completing the life cycle detachment of an aquatic parasite (*Arrenurus cuspidator*, Hydrachnellae) from an aerial host (*Coenagrion puella*, Odonata). *Canadian Journal of Zoology* 75(4): 655-659. (in English). ["Water mites are very important parasites of aerial stages of aquatic insects. Their larvae parasitize semiaquatic hosts and must detach while the host is in a suitable habitat for reproduction of parasite and host. Therefore, water mites should respond to stimuli indicating this situation. Different stimuli were tested experimentally in the host-parasite

system *Coenagrion puella* - *Arrenurus cuspidator* in outdoor cages; this method provides exact data on the initial intensity of mite larvae per host. It was found that mites detach during tandem oviposition by the host. The detachment rate does not correlate with the host's sex or with the intensity of mite larvae per host. Ectoparasitic water mites are apparently influenced by the host's condition because mites did not detach from dead hosts even in water. Proximity to water also seems to have an impact: mites exposed at a height of 10 mm above water detached, whereas mites exposed at 25 mm or higher did not. We suggest that detachment of mite larvae is triggered by a group of stimuli associated with the egg-deposition behaviour of the host." (Authors)] Address: Rolff, J., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1244. **Sandberg, E. (1997):** Benthic predator-prey relationships and abiotic stress. The effects of physical disturbance and oxygen deficiency. *Acta Academiae Aboensis Ser. B Mathematica et Physica - Matematik Naturvetenskaper Teknik* 56(2): 1-42. (in English). ["Potential competition for food between predators of different ecological origin in the Baltic Sea was evident as the marine isopod, *Saduria entomon* (L.), and the limnic dragonfly larva, *Libellula quadrimaculata* (L.), exhibited similar prey choice and similar predation efficiency in a series of aquarium experiments. Despite the potential for the predators to affect a specific prey population no effect on the total community was seen in a field enclosure experiment. To examine these contradictory results from aquarium and field experiments the relative importance of direct predation, sediment stability (sediment resuspension) and sediment quality (sand and mud) was studied separately and combined using *S. entomon* as predator and juvenile bivalves, *Macoma balthica* (L.) as prey. Direct predation, sediment stability and quality had little effect on the survival of juvenile clams. The combined effect of these factors significantly increased the mortality of the clams as the combination of predation and sediment resuspension demonstrated synergistic negative effects on *M. balthica* survival. [...] As a secondary effect of eutrophication, the risk for exposure to oxygen deficiency (hypoxia) of benthic communities is increasing and important biotic couplings might be altered. [...] These results show that important structuring functions, such as predator-prey interactions, are altered already at sublethal oxygen levels, which consequently affect the benthic community structure before the system shows numerical signs of changes beyond background variation." (Author)] Address: Sandberg, Eva, Kaskisgatan 2 C 14, FIN-20700 Abo Finland

1245. **Sandhu, R.; Walia, G.K. (1997):** Chromosome analysis of *Ischnura inarmata* (Coenagrionidae: Zygoptera: Odonata). *Chromosome Science* 1(2-3): 115-116. (in English). ["The results of chromosomal studies on a cytogenetically new species *Ischnura inarmata* have been described and illustrated. These include behaviour of chromosomes in cell cycle, chromosome number, karyotype and m: X ratio. The karyological description of this species is $2n = 27$ m with XO sex determining mechanism." (Author)] Address: Sandhu, R., Dep. Zool., Punjabi Univ., Patiala-147 002, Punjab, India

1246. **Sarkar, N.K. (1997):** Observations of three new and one known species of cephaline gregarines (Apicomplexa: Sporozoa: Eugregarinida: Septatina) from

the odonates of Mahananda Forest, West Bengal, India. *Archiv für Protistenkunde* 148(1-2): 209-213. (in English). ["Three new species of actinogregarid gregarines (Apicomplexa: Sporozoa: Eugregarinida: Septatina), *Actinocephalus longus* sp. n., *Mukundaella vananus* sp. n. and *Odonaticola truncatus* sp.n. from the midguts of *Enallagma pervum* Selys [???], *Onychargia atrocyana* Selys, and *Pseudagrion decorum* Rambur respectively, are described. One known species, *Hoshidea polyhamatus* (Hoshide, 1977) Sarkar, 1995 is reported from a new locality, i.e. the Mahananda Forest of West Bengal, India." (Author)] Address: Sarkar, N.K., Institution Dep. Zool., Rishi Bankim Chandra Coll., Naihati 743165, West Bengal, India

1247. **Sauman, V.F.S. (1997):** Immunohistochemistry of the products of male accessory glands in several hemimetabolous insects and the control of their secretion in *Pyrrhocoris apterus* (Heteroptera: Pyrrhocoridae). *European Journal of Entomology* 94(3): 349-360. (in English). ["Three antibodies against secretions of the male accessory glands of *Tenebrio molitor* react with specific regions of the male reproductive system in a damselfly, cockroach, cricket and the bug *Pyrrhocoris apterus*. [...]"] (Author)] Address: Sauman, V., Inst. Entomol., Acad. Sci., Fac. Biol. Sci., Univ. South Bohemia, Branisovska 31, 370 05 Ceske Budejovice, Czech Republic

1248. **Scheuhammer, A.M.; McNicol, D.K.; Mallory, M.L.; Kerekes, J J. (1997):** Relationships between lake chemistry and calcium and trace metal concentrations of aquatic invertebrates eaten by breeding insectivorous waterfowl. *Environmental Pollution* 96(2): 235-247. (in English). ["Ca, P, Al, and trace metal (Cu, Ni, Zn, Cd, and Pb) concentrations were measured in several aquatic invertebrate taxa used as food by breeding insectivorous waterfowl, sampled from three sites in eastern Canada with widely varying water chemistry. Ca concentrations were highest in molluscs (snails and clams), averaging 200-300mg g⁻¹ (shells included). Aquatic insects of varying sizes, life stages and habits (caddisfly larvae, dragonfly larvae, adult backswimmers, waterstriders, and whirligig beetles) had much lower mean Ca concentrations, ranging from about 0.6 mg g⁻¹ (beetles) to 1.8 mg g⁻¹ (caddisflies). Invertebrate-Ca concentrations decreased with increasing body mass for several taxa with smaller and larger individuals providing similar absolute amounts of Ca. Ca concentrations in most aquatic insects (but not molluscs) were reduced under acidic, low Ca, high Al, low dissolved organic carbon (DOC) and/or low total phosphorus (TP) conditions. In stepwise multiple regressions, pH was consistently the main factor explaining variability in invertebrate-Ca, after controlling for the negative relationship between invertebrate-Ca and body mass for some taxa. Molluscs were absent from lakes below pH 5.3. In general, concentrations of P and metals in invertebrate taxa were not significantly correlated with lake pH. Levels of Al, Cd, or Pb were not sufficiently high to be considered toxic to potential consumers of these organisms. For waterfowl and other birds breeding in acid-stressed habitats and relying on aquatic invertebrates as a of food, a reduced availability of dietary Ca is more likely than an increased exposure to toxic metals to negatively affect reproductive success, especially when other adverse effects of acidification (lower diversity of prey) are considered." (Authors)] Address: Scheuhammer, A.M., Canadian Wildlife Serv., Natl.

Wildlife Res. Cent., 100 Gamelin Blvd., Hull, Quebec K1A 0H3 Canada

1249. **Skevington, J.; Carmichael, I. (1997):** Dragonflies and damselflies (Odonata) of Bosanquet (North Lambton County, Ontario). *Proceedings of the Entomological Society of Ontario* 128: 3-12. (in English). ["The odonate fauna of Bosanquet (North Lambton County, Ontario) is surveyed. Sixty-two species of Odonata are recorded for Bosanquet, bringing the Lambton County odonate total to 66 species. Thirty-five species are added as new to Lambton County. *Enallagma travium* is new to Canada and the record of *Enallagma basidens* signifies that this species is continuing to expand its range northward. *Pachydiplax longipennis* is discovered on the Lake Huron shoreline for the first time, away from its regular haunts along Lakes Erie and Ontario. *Libellula quadrimaculata* and *Nannothemis bella* were recorded in Lambton County by Walker and Corbet (1973) but were not discovered in our study. They are presumed to be extirpated." (Authors)] Address: Skevington, J.; Dep. Entomol., Univ. Queensland, Brisbane, QLD 4072, Australia

1250. **Switzer, P.V. (1997):** Past reproductive success affects future habitat selection. *Behavioral Ecology & Sociobiology* 40(5): 307-312. (in English). ["Correlational studies have shown that an individual's past reproductive success often increases its breeding site fidelity (i.e., the tendency to return to a previously occupied location), suggesting that individuals use their reproductive experience to assess habitat quality. However, the causality of the relationship between reproductive success and site fidelity is still uncertain. In a field experiment, the effect of mating success on site fidelity was isolated from potential confounding variables in a territorial dragonfly, the eastern amberwing (*Perithemis tenera*). The experiment controlled for site quality, intrinsic characteristics of males, previous territorial experience at the site, arrival order, and territorial evictions. Males that were prevented from mating were much more likely to change sites the following day than control males that were allowed to mate. This result was not affected by age, the amount of time a male spent on the site, or mortality. These results imply that individuals use their own reproductive success to assess the quality of the habitat. The benefit to an individual of using its reproductive success to determine habitat quality is discussed relative to other sources of information." (Author)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; Usa. E-mail: cfpvs@eiu.edu

1251. **Thorp, A.G.; Jones, R.C.; Kelso, D.P. (1997):** A comparison of water-column macroinvertebrate communities in beds of differing submersed aquatic vegetation in the tidal freshwater Potomac River. *Estuaries* 20(1): 86-95. (in English). ["Macroinvertebrates are a major food for fish species and macrophyte beds are hypothesized to harbor a rich community of these organisms. Macroinvertebrates inhabiting the water column in two macrophyte beds and an adjacent open area were sampled in a small embayment of the tidal freshwater Potomac River. One macrophyte bed consisted of an almost complete monoculture of *Hydrilla verticillata*, while the second community was a more diverse mixture of plant species. In samples with substantial amounts of submersed aquatic vegetation (SAV), macroinvertebrate density was two orders of magnitude higher than and substantially more taxa were found than at the

open water site. Total macroinvertebrate abundance was significantly greater at the *H. verticillata* site than at the mixed site in July, but no significant difference was observed in August. Taxa richness did not vary between the two vegetated sites in July but was higher in the mixed bed in August. While the two vegetated sites shared similar taxa, they differed in their abundance. The *H. verticillata* site harbored more hydrobiid snails, and the mixed site was characterized by more chironomids and hydroptilid caddisflies. Differences between July and August collections were even greater than between sites. Numbers of hydroptilid caddisflies, baetid mayflies, and coenagrionid damselflies were substantially higher in August, while oligochaetes, hydrobiids, and chironomids were reduced. Results support the hypothesis that water-column macroinvertebrates are greatly enhanced in the presence of macrophytes. The ecological significance of the less substantial differences in macroinvertebrates between macrophyte beds requires further study." (Authors)] Address: Jones, R.C., Dep. Biol., George Mason Univ., 4400 University Dr., Fairfax, VA 22030, USA

1252. **Tsubaki, Y.; Hooper, R.E.; Siva-Jothy, M.T. (1997):** Differences in adult and reproductive lifespan in two male forms of *Mnais pruinosa costalis* Selys (Odonata: Calopterygidae). *Researches on Population Ecology* 39(2): 149-155. (in English). [Males of *Mnais pruinosa costalis* are dimorphic, existing as clear-winged - non-territorial 'sneakers'- and orange-winged territorial 'fighters'. "Here we report the results of population census data and behavioural observations in the field and laboratory, and present estimates of emergence period, reproductive period, total lifespan, and reproductive success of each morph. Clear-winged males are smaller and have lower daily reproductive success than orange-winged males, but live for longer in the field and laboratory. We accounted for the difference in the 'operational reproductive life' of the two morphs and estimated lifetime reproductive success: there was no difference between clear-winged and orange-winged males. We discuss possible mechanisms for the maintenance of the two forms." (Authors)] Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK

1253. **Van Buskirk, J.; McCollum, S.A.; Werner, E.E. (1997):** Natural selection for environmentally induced phenotypes in tadpoles. *Evolution* 51(6): 1983-1992. (in English). ["Models suggest that phenotypic plasticity is maintained in situations where the optimal phenotype differs through time or space, so that selection acts in different directions in different environments. Some empirical work supports the general premise of this prediction because phenotypes induced by a particular environment sometimes perform better than other phenotypes when tested in that environment. We have extended these results by estimating the targets of selection in *Pseudacris triseriata* tadpoles in environments without predators and with larval *Anax* dragonflies. Tadpoles displayed significant behavioral and morphological plasticity when reared in the presence and absence of nonlethal dragonflies for 32 days in cattle tanks. We measured selection in the absence of free predators by regressing growth and survival in the tanks against activity and several measures of tail and body shape. We measured selection in the presence of predators by exposing groups of 10 tadpoles to *Anax* in overnight predation trials and regressing the average

phenotype of survivors against the number of tadpoles killed. Selection in the two environments acted in opposite directions on both tail and body shape, although the affected fitness components were different. In the presence of *Anax*, tadpoles with shallow and narrow body, deep tail fin, and wide tail muscle survived best. In the absence of free predators, tadpoles with narrow tail muscle grew significantly faster, and those with shallow tail fin and deep body grew somewhat faster. Activity was unrelated to survival or growth in either environment. Developmental plasticity in tail shape closely paralleled selection, because tail fin depth increased after long-term exposure to *Anax* and tail muscle width tended to increase. In contrast, there was no plasticity in body shape in spite of strong selection for decreasing body depth. Thus, when confronted with a dragonfly predator, *P. triseriata* tadpoles adjusted their tail shape (but not body shape) almost exactly in the direction of selection imposed by *Anax*. These results suggest that phenotypic plasticity in some morphological traits, such as tail depth and tail muscle width, has evolved under intermittent selection by dragonflies. Other traits that undergo selection by dragonflies, such as body morphology, appear developmentally rigid, perhaps because of historically strong opposing selection in nature or other constraints." (Authors)] Address: Van Buskirk, J., Inst. Zool., Univ. Zürich, CH-8057 Zürich Switzerland

1254. **Weiherr, B.; Komnick, H. (1997):** Digestion of phosphatidylcholines, absorption and esterification of lipolytic products by *Aeshna cyanea* larvae as studied in vivo and in vitro. *Arch. Insect Biochem. Physiol.* 36(4): 273-293. (in English). ["Digestion and absorption of phosphatidylcholine by *Aeshna cyanea* larvae were studied in vivo and in vitro with the isolated digestive juice and isolated midgut. The experiments were performed with stable ether analogues (1-alkyl-2-acyl-1,2-dialkyl phosphatidylcholine, and 1-monoalkyl-lysophosphatidylcholine) with radioactive 1,2-diacylphosphatidylcholine alternatively labelled in the acyl- and choline moieties, and with several phosphatidylcholine derivatives (1-(1-¹⁴C)acyl- and 1-(3H)alkyl-lysophosphatidylcholine, (1-¹⁴C)oleic acid, (2-¹⁴C)glycerol, phosphoryl (methyl-¹⁴C)choline, and (methyl-¹⁴C)choline). Chromatographic analyses of the digestion products revealed that phosphatidylcholine was degraded via two interconnected hydrolytic pathways involving phospholipase C, phospholipase A2, lipase, and alkaline phosphatase. Complete hydrolysis by these pathways yielded the same four end products: free fatty acid, glycerol, choline, and Pi, which were absorbed by the midgut enterocytes. Of the intermediate hydrolysates, lysophosphatidylcholine, monoacylglycerol, and possibly phosphorylcholine were also absorbed. Radiolabelled oleic acid, glycerol, lysophosphatidylcholine and monoacylglycerol (as judged from monoalkylglycerol absorption) were incorporated into phospholipids and acylglycerols of the midgut enterocytes and were released into the haemolymph primarily in the form of diacylglycerols. In the case of glycerol ingestion, a small fraction of haemolymph radioactivity was associated with free glycerol and glycerolphosphate. After absorption by the enterocytes, radiolabelled choline was partly oxidized to betaine, partly phosphorylated, and partly incorporated into lyso- and phosphatidylcholine. It was recovered from the haemolymph predominantly as free choline, phosphorylcholine, and betaine." (Authors)] Address: Komnick, H., Univ. Bonn, Inst. Cell Biol., Ulrich-Haberland-Str. 61a, 53121 Bonn, Germany

1255. **Whiting, M.F.; Carpenter, J.C.; Wheeler, Q.D.; Wheeler, W.C. (1997):** The strepsiptera problem: Phylogeny of the holometabolous insect orders inferred from 18S and 28S ribosomal DNA sequences and morphology. *Systematic Biology* 46(1): 1-68. (in English). [Phylogenetic relationships among the holometabolous insect orders were inferred from cladistic analysis of nucleotide sequences of 18S ribosomal DNA (rDNA) (85 exemplars) and 28S rDNA (52 exemplars) and morphological characters. Odonata were used as out-group taxa.] Address: Whiting, M.F., Dep. Zool., M.L. Bean Life Sci. Museum, Brigham Young Univ., Provo, UT 84602 USA.

1256. **Wolf, L.L.; Waltz, E.C.; Klockowski, D.; Wakeley, K. (1997):** Influence on variation in territorial tenures of male white-faced dragonflies (*Leucorrhinia intacta*) (Odonata: Libellulidae). *Journal of Insect Behavior* 10(1): 31-47. (in English). ["Some individuals in species with extended periods of territorial occupancy may change territory locations within a single bout of territorial activity. Length of occupancy of mating territories among males in a local population of white-faced dragonflies (*Leucorrhinia intacta*) varied from more than 6 h to 15 min or less. Males with short tenures often established territories in several locations on the pond during a day. Several hypotheses have been proposed to explain shifting territorial sites rather than remaining in a single site during one bout of territoriality. We attempted to test the hypothesis that males shift to leave low-quality sites. Site quality may be affected by costs of defense in relation to intruder rate and the mating benefits of holding the territory. To test whether variation in these possible effects of benefits and costs of territoriality influenced tenure, we manipulated local quality of oviposition substrate and perch density. The quality of oviposition substrate, but not perch density, influenced both potential benefits and costs of territoriality. Female density was higher in areas with good substrate, but so were rates of males intruding into the territories, rates of chasing by territorial males, and local density of territorial males. More matings occurred in areas with good substrate, but among males with tenures of 15 min or more, mating success per male and tenure lengths did not differ statistically among treatments. Defense costs were low for all treatments and perhaps were not an important influence on tenure duration. Territorial males in this population probably adjusted local density to expected mating success by initial choice of site rather than by varying tenure length. Variation in tenure length at a site resulted, in part, from stochastic external factors, such as predation attempts." (Authors)] Address: Wolf, L., Institution Dep. Biol., Syracuse Univ., Syracuse, New York 13244-1270, USA

1998

1257. **Abro, A. (1998):** Structure and development of sperm bundles in the dragonfly *Aeshna juncea* L. (Odonata). *J. Morphol.* 235: 239-247. (in English). ["A re-examination of the origin and development of sperm bundles in aeshnid dragonflies (Odonata, Anisoptera) was carried out using light and electron microscopy. During their elongation, intracyst spermatids of the testis of the dragonfly *A. juncea* form a slender cytoplasmic protrusion, the acrosomal conicoid, beyond the nucleus and acrosome rodlet. Gathering and paral-

lel alignment of the transforming spermatids into a tight bundle take place inside the cyst. The original, rigid spermatid foreparts eventually associate, initially by becoming adhesive and swelling progressively to intertwine, and thus come to constitute a cap that binds together all sperm heads within a cyst in a spermatodesma. The development of the spermatodesma seems to occur disjunct from somatic cyst cells. Bundled in this form, the sperms are transferred to the intratestis canal and moved down the spermiduct to the seminal vesicle. They are then forwarded to the male copulatory apparatus, from which they are transmitted to the female. Individual, fully formed sperms are seen to be liberated from the bundle when in the female receptaculum seminis. The remnant of the cytoplasmic acrosomal conicoid, which is considered an envelope of the acrosome rodlet, is then dissolved. The spermatodesmata are large sperm aggregates that constitute efficient vehicles for transmission of amounts of filamentous sperm to the female." (Author)] Address: Åbro, A., Inst. Anat., Univ. Bergen, Årstadveien 19, N-5009 Bergen, Norway

1258. **Adelman, T.L ; Oliver, T.A.; Olberg, R.M. (1998):** Multiunit recordings of descending visual interneurons in dragonflies. Society for Neuroscience Abstracts 24(1-2): 2113. (in English). [Cervical nerve cord: nervous system; visual interneurons: nervous system, receptive field] Address: Adelman, T., Cornell Univ., Ithaca, NY 14850, USA

1259. **Agüero-Peagrín, M.; Herrera-Grao, A.F.; Ferreras-Romero, M. (1998):** Plecópteros y odonatos de la parte superior de la cuenca del río Hozgarganta. Almoraima 19: 241-248. (in Spanish with English summary). [24 Odonate species from the headwater region of the Rio Hozgarganta catchment (Spain, north of Gibraltar) are listed and commented. The records of *Oxygastra curtisii* and *Macromia splendens* are of special interest.] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, ES-14004 Córdoba, Spain

1260. **Ambrus, A.; Bánkuti, K.; Kovács, T. (1998):** Data to the Odonata fauna of the Kisalföld and the West-Hungarian marginal zone II. Odonata - stadium larvale 2: 9-16. (in English). [87 localities were odonatologically surveyed between 03.05.1997 and 25.08.1998. 48 species (34 as larva and exuvium, 45 as imago) were recorded. *Coenagrion ornatum*, *C. scitulum*, *C. pulchellum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Cordulegaster heros*, *Epitheca bimaculata*, and *Leucorrhinia pectoralis* are of some faunistical interest] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1261. **Ambrus, A.; Bánkuti, K.; Csóka, G.; Kovács, T. (1998):** Faunistical data to the Odonata fauna of the Körös-Maros National Park. Odonata - stadium larvale 2: 53-60. (in English). [45 odonate species of 43 sites visited between 03.07.1987 and 23.07.1996 are documented. *Erythromma najas*, *Coenagrion scitulum*, *Anax ephippiger*, *Ophiogomphus cecilia*, *Cordulia aenea*, and *Sympetrum pedemontanum* are new to the fauna of the National Park.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1262. **Ambrus, A.; Bánkuti, K.; Kovács, T. (1998):** Larval and adult data on the Odonata fauna of Burgenland (Austria) II. Odonata - stadium larvale 2: 5-8. (in English). [17 localities in Burgenland, Austria were surveyed for the Odonata between 13.05.1998 and 21.09.1998. 22 species were recorded, 19 of these as larvae and exuvia, and 12 species as imago. *Chalcolestes viridis*, *Coenagrion scitulum*, *Enallagma cyathigerum*, *Ischnura pumilio*, *Libellula quadrimaculata*, *Orthetrum albistylum*, and *Orthetrum coerulescens* were recorded for the first time in the larval stage or as exuvia.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1263. **Ambrus, A.; Bánkuti, K.; Csányi, B.; Juhász, P.; Kovács, T. (1998):** Larval data to the Odonata fauna of Hungary. Odonata - stadium larvale 2: 41-52. (in English). [The authors publish the data of Odonata collected between 07.09.1987 and 28.11.1997 for the Water Resources Research Centre, Budapest, Hungary. The material comprises the major Hungarian geographical regions (147 UTM squares). 38 species (1026 larval and 10 exuvial data) were gathered from 284 sites, in most cases running waters. This results in a considerable addition to the knowledge of the distribution of Gomphid species in Hungary.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1264. **Ambrus, A.; Bánkuti, K.; Kovács, T. (1998):** The Odonata fauna of the Szigetköz. Odonata - stadium larvale 2: 17-39. (in English). [65 localities in the Szigetköz region resulted in 51 odonate, of which 5 (*Lestes macrostigma*, *Coenagrion ornatum*, *Anax ephippiger*, *Orthetrum coerulescens*, *Leucorrhinia pectoralis*) are new compared with previous studies. A total of 55 species is known in this region, 54 as imago and 48 as larva and exuvium.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

1265. **Banning, M. (1998):** Auswirkungen des Aufstaus größerer Flüsse auf das Makrozoobenthos - dargestellt am Beispiel der Donau. Essener Ökologische Schriften 9: 285 pp, Appendices. (in German). [Impact of dams on macrozoobenthos of the River Danube, Bavaria, Germany; Odonata are quite rare in the Danube; the following species are listed: *Calopteryx splendens*, *Platycnemis pennipes*, *Somatochlora metallica*, *Orthetrum cancellatum*, *Ophiogomphus cecilia*, and *Gomphus vulgatissimus*; the population development of *G. vulgatissimus* is said - due to improved water quality - to be positive.] Address: Banning, Mechtild, c/o Bundesanstalt für Gewässerkunde, Postfach 309, D-56003 Koblenz, Germany

1266. **Barrett, M.D.; Williams, M.R. (1998):** Distribution of the Western Petalura dragonfly *Petalura hesperia* Watson in Western Australia. Pacific Conservation Biology 4(2): 149-154. (in English). ["A comprehensive survey of the Western Petalura dragonfly *Petalura hesperia* Watson was conducted in December 1995 and January 1996 during the annual flight period. This represents the first systematic survey of the distribution of this dragonfly, which is restricted to the south-west of Western Australia. Survey effort was concentrated a-

round the headwaters of permanent streams with the aim of identifying those habitats most important for the long-term survival of the species. Twelve individuals representing six isolated populations were recorded, raising the total number of recorded localities to 19, although one population (at the type locality) is believed extinct and a further four are under threat from urbanization. The populations are scattered along the eastern fringe of the Darling scarp, between 31 degree and 32 degree S latitude and 115 degree and 116 degree E longitude." (Authors)] Address: Barrett, Michelle Diane, P.O. Box 395, Werribee, Victoria 3030, Australia

1267. **Bauer, S. (1998):** Libellenbeobachtungen im westlichen Allgäu. Mitteilungen der Arbeitsgemeinschaft Naturschutz Wangen Allgäu 5: 104-112. (in German). [Baden-Württemberg, Germany; 32 habitats were odonatologically surveyed in the early 90th. 41 species could be observed including *Sympecma paedisca*, *Coenagrion pulchellum*, *Nehalennia speciosa*, *Anaciaeschna isosceles*, *Anax parthenope*, *Brachytron pratense*, *Epitheca bimaculata*, *Somatochlora arctica*, *Crocothemis erythraea*, *Leucorrhinia pectoralis*, and *Symptetrum fonscolombii*.] Address: not stated

1268. **Becnel, J.J.; Johnson, M.A. (1998):** Pathogenicity tests on nine mosquito species and several non-target organisms with *Strelkovimermis spiculatus* (Nematoda Mermithidae). *Journal of Nematology* 30(4): 411-414. (in English). ["Nine species of mosquitoes and several species of non-target aquatic organisms were tested for susceptibility to the mermithid nematode, *Strelkovimermis spiculatus*. All species of *Anopheles*, *Aedes*, *Culex*, and *Toxorhynchites* exposed to *S. spiculatus* were susceptible. Of the nine mosquito species tested, *C. pipiens quinquefasciatus* had the greatest tolerance to initial invasion and the highest percent infection of those that survived. High levels of infection were also achieved with *Aedes taeniorhynchus* and *A. albopictus*, but these mosquitoes were significantly less tolerant to parasitism than *C. pipiens quinquefasciatus*. *Strelkovimermis spiculatus* did not infect or develop in any of the non-target hosts tested." (Authors) Target species: "damselfly and dragonfly larvae"] Address: Becnel, J.J., Center for Medical, Agricultural and Veterinary Entomology, USDA ARS, Gainesville, FL, 32604 USA

1269. **Buschendorf, J. (1998):** Zur Bedeutung von UVP für die Odonaten-Faunistik. *Pedemontanum*, Magdeburg 2: 5-6. (in German). [The relevance of odonatological data in environment impact studies for a regional faunistic record scheme is discussed; Sachsen-Anhalt, Germany] Address: Buschendorf, J., Ahornring 61, 06184 Zwintschöna, Germany

1270. **Caldwell, J.P.; De Araujo, M.C. (1998):** Cannibalistic interactions resulting from indiscriminate predatory behavior in tadpoles in poison frogs (Anura: Dendrobatidae). *Biotropica* 30(1): 92-103. (in English). ["Poison frogs in the genus *Dendrobates* have very small clutch sizes (2-6 eggs among species for which there are data) and typically transport their tadpoles singly to small phytotelmata [...]. Tadpoles of many species are predaceous, consuming larvae of insects that use the same microhabitat for breeding, such as giant damselflies and mosquitoes. Previous studies and observations on the behavior of poison frog tadpoles led us to question whether tadpoles might be cannibalistic. We studied a population of *Dendrobates castane-*

oticus in lowland rainforest in Para, Brazil; additional data were collected on *Dendrobates auratus* in Nicaragua. At the study site in Brazil, we established a grid of 40 Brazil nut capsules, the microhabitat used by *D. castaneoticus* for tadpole deposition. Of 42 tadpoles deposited during the 55 days of the study, 20 were killed or died; 16 of these were presumably killed by conspecific tadpoles. Growth rate and time to metamorphosis was higher among tadpoles that consumed three or more tadpoles or relatively large larvae of the mosquito *Trichoprosopon digitatum*, a colonist of newly opened Brazil nut capsules. We propose that selection has favored the development of predatory behavior in poison frog tadpoles primarily as a mechanism to eliminate predators from the small phytotelmata in which they develop and that cannibalism is a secondary outcome of this behavior. Predatory behavior also provides tadpoles with food, which is frequently limited in these microhabitats. Additional studies of the biology of tadpoles of other species of *Dendrobates* are needed to determine the evolution of predatory and cannibalistic behavior in the clade." (Authors)] Address: Caldwell, Janalee, Dep. Zool., Oklahoma Mus. Natural History, Univ. Oklahoma, Norman, OK 73019 USA

1271. **Dannelid, E.; Berglund, H. (1998):** Scarce Chaser *Libellula fulva* found in Botkyrka kommun, new provincial record for Södermanland. *Entomologisk Tidskrift* 119(3-4): 149-150. (in Swedish). [*Libellula fulva* is rare in Sweden, in recent years thought to be limited to Eman in Småland in SE Sweden. It has now been observed and collected on a locality in Botkyrka kommun S of Stockholm, where it was recorded both in 1997 and 1998 and appears to be rather common. This is the northernmost locality for the species in Sweden.] Address: Dannelid, E., Zoologiska Institutionen, Stockholms Universitet, 106 91, Stockholm Sweden

1272. **Eda, S. (1998):** A review on the migration of *Anax guttatus* to the main-lands of Japan. *Tombo* 41: 4. (in Japanese with English translation of the title). [List of published records of *A. guttatus* in Japan] Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1273. **Eda, S. (1998):** Welcome visitors of a southern species, *Anax guttatus*, to Nagano Pref. in autumn of 1998. *Tombo* 41: 2-3. (in Japanese with English summary). [Between September 19 and 26, 1998, *A. guttatus* was captured at a small pond in Miasa in Nagano Pref., Japan at 800 m above sea-level. Average length of 23 males and one female was measured. Tandem oviposition took place on October 3.] Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1274. **Feldmann, R.M.; Vega, F.J.; Applegate, S.P.; Bishop, G.A. (1998):** Early Cretaceous arthropods from the Tlayua Formation at Tepexi de Rodriguez, Puebla, Mexico. *Journal of Paleontology* 72(1): 79-90. (in English). ["The arthropod macrofauna from the Middle Member of the lithographic limestones of the Tlayua Formation, in quarries at Tepexi, Mexico, is comprised of marine and nonmarine components. [...]. Remains of an arachnid and an odonate nymph represent nonmarine constituents. [...]" Address: Feldmann, R.M., Dep. Geol., Kent State Univ., Kent, OH 44242 USA.

1275. **France, R.L. (1998):** Density-weighted delta¹³C analysis of detritivory and algivory in littoral macroinvertebrate communities of boreal headwater lakes.

Annales Zoologici Fennici 35(3): 187-193. (in English). ["Investigations of the incorporation of terrestrial detritus into aquatic macroinvertebrates through delta13C analysis are becoming frequent for streams and wetlands, but comparatively little information exists for forest-fringed oligotrophic lakes. Although the most accurate assessment of community patterns in carbon dependency will be made through an organism density-weighted analysis of delta13C, this has never previously been undertaken for any freshwater system. Littoral macroinvertebrates (predominantly amphipods, ephemeropterans and dipterans, as well as odonates and trichopteran) from boreal lakes in northwestern Ontario, Canada displayed ranges of 6 per mill to 9 per mill in delta13C, all centred about -26 per mill. The closer agreement between the density-weighted delta13C distribution for these macroinvertebrates to tree rather than epilithon values, suggests that these organisms may be relying more substantially upon allochthonous detritivory than upon autochthonous algalivory for energy sustenance. This finding therefore challenges the precept in some timber management guidelines that dismisses riparian trees as an important energy for lake foodwebs." (Author)] Address: France, R.L., Harvard Univ., Graduate Sch. Design, 48 Quincy St., Cambridge, MA 02138, USA

1276. **Fuhrmann, M. (1998):** Untersuchungen zur Libellenfauna (Odonata) der Neyetalsperre im Oberbergischen Kreis (NRW). *Bucklige Welt*, Wiehl 2: 48-60. (in German). [Transect study of the Odonata of the damed brook Neye, Nordrhein-Westfalen, Germany; 19 species were recorded; dominance of species is presented for each of the four transects] Address: Fuhrmann, M., Zum Großen Wald 19, D-57223 Kreuztal, Germany

1277. **Fuller, R.M.; Groom, G.B.; Mugisha, S.; Ipulet, P.; Pomeroy, D.; Katende, A.; Bailey, R.; Ogotu-Ohwayo, R. (1998):** The integration of field survey and remote sensing for biodiversity assessment: A case study in the tropical forests and wetlands of Sango Bay, Uganda. *Biological Conservation* 86(3): 379-391. (in English). ["Field surveys of plants and animals were combined with satellite remote sensing of broad vegetation types to map biodiversity and thereby help plan conservation in the Sango Bay area, some 30 by 100 km bordering Lake Victoria in Uganda. A statistical classifier applied to satellite images identified 14 land-cover classes including water, swamp, dry grasslands, degraded woody vegetation, semi-natural forest classes and intensive land uses. Validation, using 240 sample sites, recorded 86% correspondence between field and map data. Intensive land use makes up 23% of the area, water and swamps 27%, dry grasslands 29%, woody vegetation 21% with semi-natural forests covering 15% of the area. The species data from sample-based field surveys included flowering plant species, dragonflies, butterflies, fish, amphibians, reptiles, birds and mammals. The species data were used to generate biodiversity ratings, based on species 'richness' and 'rarity', which could be related to the vegetation cover. This inter-relation helped to generate a biodiversity map of the Sango Bay area which has since been used to aid conservation planning." (Authors)] Address: Fuller, R.M., Inst. Terrestrial Ecol., Monks Wood, Huntingdon, Cambridgeshire PE17 2LS, UK

1278. **Futahashi, R.; Araki, Y. (1998):** New records of *Anax guttatus* from Toyama Pref. *Tombo* 41: 6-8. (in Japanese with English summary). [At 76 areas in Toy-

ama Pref., Japan between August and November 1998 many adult of the species were collected.] Address: not stated

1279. **Geister, I. (1998):** A list of Slovene dragonfly names. *Exuviae* 5(1): 1-5. (in Slovenian with English summary). ["The Slovene standard nomenclature is presented for the families, genera and species known or expected to occur in Slovenia and adjacent regions. The names are artificial rather than based on the available folk appellations. They were constructed with reference to the peculiarities in general appearance, colour, behaviour, habitat and phenology of the taxa concerned. Family and generic names are uninominal, species-group names are binominal, the infraspecific taxa are not considered. This nomenclature was in experimental use since 1992, and becomes compulsory with the present publication." (Author)] Address: Geister, I., Kocjancici 18, SI-6276 Pobegi, Slovenia

1280. **Glaser, B. (1998):** Besiedlung von neugeschaffenen Gewässern in der Chemnitzau bei Heinersdorf durch Libellen, Fische und Lurche. *Veröffentlichungen des Museums für Naturkunde Chemnitz* 21: 131-138. (in German). [Documentation of colonisation by Odonata, Amphibia, and Pisces of six newly created water bodies near Chemnitz, Saxonia, Germany; 27 odonate species could be recorded three years after finishing work on the water bodies; of some regional faunistic interest are *Erythromma viridulum*, *Ischnura pumilio*, *Lestes barbarus*, *L. dryas*, *Sympecma fusca*, and *Sympetrum pedemontanum*.] Address: Glaser, E., Alfred-Neubert-Str. 8, D-09123 Chemnitz, Germany

1281. **González Soriano, E.; Novelo-Gutiérrez, R. (1998):** *Oplonaeschna magna* sp. nov. (Odonata: Aeshnidae), from Mexico with a description of its larva. *Rev. biol. trop.* 46(3): 705-715. (in English). ["*Oplonaeschna magna* sp. nov. (Odonata: Aeshnidae) (holotype male and allotype female deposited at CNIN UNAM-MEX., Mexico, D. F.) is described and illustrated from specimens collected in the states of Estado de Mexico, Guerrero, Hidalgo, and Morelos, Mexico. This is the second species of the genus *Oplonaeschna*. Adults of *O. magna* can be separated from those of *O. armata* (Hagen, 1861) by their larger size and broader thoracic stripes. The larva of the new species is also easily distinguished from that of *O. armata* by its larger size and longer prementum, and by structural differences of palpal lobes and epiproct. The larva of *O. armata* is briefly redescribed, illustrated and compared to that of *O. magna*. Notes on the biology of the new species are provided." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@sun.ieco.conacyt.mx

1282. **Hutchinson, R. (1998):** Observations de quelques émergences de *Lanthus parvulus* (Sélys) (Odonata: Gomphidae) à Port-au-Saumon (Charlevoix-Est) et les environs. *Fabriques* 23: 117-119. (in French with English summary). ["The author reports the discovery of twenty emergences of individuals of *Lanthus parvulus* (Sélys) at Port-au-Saumon (Quebec) on June 6 and 7, 1998. He compares his observations with data from the literature and records these emergences as the earliest to date for the species in Quebec." (Author)] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gati-neau (Québec), Canada, J8T 1P7

1283. **Huth, J.; Oelerich, H.-M.; Reuter, M. (1998):** Zur faunistischen Charakterisierung der Biotoptypen in der Braunkohlefolgelandschaft Sachsen-Anhalts. Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt, Sonderheft 1: 32-41. (in German). [The presentation of the results of the odonatological survey is quite identical to Al Hussein, I. et al (1999) (see OAS 1325)] Address: Huth, J., OEKOKART GmbH, Georg-Cantor-Str. 31, D-06108 Halle/Saale, Germany
1284. **Inoue, K.; Piper, W.; Tabata, O. (1998):** Small observation records of *Zygomma obtusum* in Iriomote Island, Okinawa Prefecture. Tombo 41: 37-40. (in Japanese with English summary). [Crepuscular behaviour of *Z. obtusum* in the afternoon and in the morning hours, and the reproductive flight are described. "Females oviposited beating their tips of abdomens against the surface of floating dead branch, then immediately turn round, beat, turn round. A female continued this [beat-turn round] sequence 80 times in 40 seconds. The oviposition surface of dead branch was covered layer by layer by red brown eggs forming a hard rubber like mass (Fig. 1). Males flew rapidly circulating around the floating branch in search of females (Fig. 2), and they form tandems when finding females. Soon they copulate, fly about above water for some seconds, then separate and females start oviposition."] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany
1285. **Jiang, Y.-H. (1998):** A new species of the genus *Epopthalmia* (Odonata: Corduliidae) from China. Chinese Journal of Entomology 18: 231-234. (in English). [*Epopthalmia kuani* n. sp. (Corduliidae), Yuntai Mountain, northern Jiangsu Province, China.] Address: Jiang, Yao-Hua, Lianyungang City Yuntaixiang Diversified Management Office, Jiangsu, 222064 China
1286. **Lange, L. (1998):** Beitrag zur Libellenfauna des einstweilig sichergestellten NSG "Plauer Stadtwald". Naturschutzarbeit in Mecklenburg-Vorpommern 41(1/2): 72-74. (in German). [Mecklenburg-Vorpommern, Germany; documentation of an odonatological survey in 1996 and 1997; 33 (including 24 reproducing) species could be recorded in different habitats (high bogs, meadows, lakes)] Address: Lange, L., Deichreihe 21, D-25599 Wewelsfleth, Germany
1287. **Lepori, F.; Maddalena, T.; Moretti, M.; Patocchi, N.; Maibach, A. (1998):** Inventario odonatologico delle zone umide di importanza nazionale del canton Ticino (Svizzera): stato della banca-dati e primi risultati. Boll. soc. tician. sci. nat. 86: 43-46. (in Italian with English summary). [De Marmels & Schiess (1977) surveyed more than 600 sites throughout the canton Ticino (Southern part of Switzerland) in the 70th. Since then, only a few local studies have been carried out there. Therefore an up date of the odontological data is considered necessary. The Gruppo di lavoro "Libellule Ticino" started in 1996 to collect the available data concerning Odonata with the purpose to set up a new data base which would be the first step of a new inventory of the odonate fauna in the south of the Swiss Alps. This paper presents an check-list of the odonate fauna of the canton Ticino and gives an outlook on the inventory for the period 1997-1999.] Address: Maibach Sàrl, A., Études en environnement, La Croix Rte de Moudon, CH-1610 Oron-la-Ville, Switzerland
1288. **Lotzing, K. (1998):** Kurzübersicht einiger Odonatenfunde im ehemaligen Landkreis Staßfurt für den Zeitraum 1980 bis 1996. Pedemontanum, Magdeburg 2: 2-3. (in German). [Checklist of Odonata of the Landkreis (County) Staßfurt, Sachsen-Anhalt, Germany; the frequency of settled localities for each species is given] Address: Lotzing, K., Straße der Deutschen Einheit 7, D-39418 Staßfurt, Germany
1289. **Martens, A. (1998):** Aktuelle Funde von *Cercion lindenii* in Salzgitter - nur 15 km von der Landesgrenze Sachsen-Anhalts entfernt. Pedemontanum, Magdeburg 2: 1. (in German). [Short summary of the results published in Martens, A. & W. Wimmer, 1997, Braunsch. naturk. Schr. 5(2): 343-352.] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany
1290. **Matsuda, I. (1998):** *Anax guttatus* collected at Oizumi-Ryokuchi, Sakai City, Osaka Pref.. Tombo 41: 12. (in Japanese with English summary). [Two specimens were caught on 12 July and 1 August, 1998, prior a typhoon.] Address: not stated
1291. **Merceron, E. (1998):** Observations sur la Riviera française (Coleoptera, Lepidoptera, Odonata, Hymenoptera, Homoptera, Heteroptera, Diptera). Entomologiste 54(2): 55. (in French). [*Calopteryx haemorrhoidalis*; "Sur le Paillon de la Grave, avant Blausasc"; France] Address: Merceron, E., les Glaieuls, 16 Avenue Scuderi, F-06100 Nice, France
1292. **Ministerium für Landwirtschaft, Naturschutz und Umwelt Thüringen (1998):** Besonders geschützte Biotope in Thüringen. 2., unveränderte Auflage: 84 pp. (free of charge). (in German). [§ 18 of the "Vorläufige Thüringer Gesetz über Naturschutz und Landschaftspflege" defines habitats of special protection purposes. In this book, each of the habitats is characterized with a short text contribution and colour photographs of the habitat, some typical plants, and typical animals including Odonata.] Address: Ministerium für Landwirtschaft, Naturschutz und Umwelt Thüringen, Öffentlichkeitsarbeit, Beethovenplatz 3, 99096 Erfurt, Germany
1293. **Müller, J.; Steglich, R. (1998):** *Aeshna affinis* hat 1996 / 1997 erfolgreich überwintert. Pedemontanum, Magdeburg 2: 4-5. (in German). [Confirmation of the autochthonous status of *A. affinis* in the floodplains of River Elbe, Sachsen-Anhalt, Germany, in 1997] Address: Müller, J., Frankfelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de
1294. **Müller, J. (1998):** Aufruf zur Mitarbeit: *Anax parthenope* in Sachsen-Anhalt. Pedemontanum, Magdeburg 2: 5. (in German). [Data on the distribution of *A. parthenope* in Sachsen-Anhalt, Germany are required for a compilation of all records of the species for the mid-eastern part of Germany] Address: Müller, J., Frankfelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de
1295. **Müller, J.; Steglich, R. (1998):** Die Flußjungfern *Gomphus flavipes* und *Ophiogomphus cecilia* in Donau und Nebenflüssen 1998. Halophila 36: 3. (in German). [Records of the species from different localities along the River Danube in Hungaria, Slovakia, Austria, and Germany (Bayern)] Address: Müller, J., Frankfelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de
1296. **Müller, J. (1998):** Editorial. Pedemontanum, Magdeburg 2: 1. (in German). [Special attention should given to species with range extension due to global warming, and species which could re-establish itself in

waters with improved water quality] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1297. **Müller, J.; Steglich, R. (1998):** Ergebnis der "Aktion flavipes 1997". Pedemontanum, Magdeburg 2: 3-4. (in German). [In 1996 and 1997 the River Elbe systematically was surveyed for *Stylurus flavipes*; numerous autochthonous subpopulations along the river could be traced; the threat for River Elbe and its bio-coenosis by the scheduled impoundment and removal of the groynes, and the importance of *S. flavipes* as bioindicator are outlined] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1298. **Müller, J.; Steglich, R. (1998):** Libellen- und Heuschrecken-Funde im NSG "Untere Mulde". Halophila 36: 3. (in German). [Ophiogomphus cecilia] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1299. **Müller, J. (1998):** Literatur. Pedemontanum, Magdeburg 2: 6-8. (in German). [Titles No. 28-50 of the bibliography of Odonata of Sachsen-Anhalt, Germany are listed] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1300. **Müller, J.; Steglich, R. (1998):** Neues von der Elbe bzw. aus dem Elbetal 1998. 2. Gemeine Keiljungfer Gomphus vulgatissimus nun auch an der Elbe. Halophila 36: 2. (in German). [*G. vulgatissimus* was traced between several groynes in River Elbe in May 1998; Sachsen-Anhalt, Germany] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1301. **Müller, J.; Steglich, R. (1998):** Neues von der Elbe bzw. aus dem Elbetal 1998. 3. Weitere Nachweise von Ophiogomphus cecilia und Gomphus flavipes. Halophila 36: 2. (in German). [Records of the species between several groynes in River Elbe in May 1998; Sachsen-Anhalt, Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1302. **Olajos, P.; Kiss, B.; Juhász, P. (1998):** Faunistical research on the dragonfly (Odonata) fauna of the Körös-Maros National Park. Odonata - stadium larvae 2: 61-70. (in Hungarian with English summary). [Odonata were collected in the South-East-Plain of Hungary, Körös-Maros National Park. A total of 41 species, 29 species as larva, 19 species as exuvia and 36 as adult, was recorded at 61 localities. The species frequency plotted against the localities is as follows: 1 species is very frequent, 18 are frequent, 11 are less frequent, 6 are rare, and 5 are sporadic. *Leucorrhinia pectoralis* is new to the region. It is stressed that *Epi-theca bimaculata* is of special regional importance.] Address: Olajos, P., Hortobágy Nemzeti Park, Igazgatóság, H-4024 Debrecen, Sumen u.2, Hungary

1303. **Onore, G.; Cevallos, V. (1998):** Massive movement in *Panoquina sylvicola* in southern Ecuador (Lepidoptera: Hesperidae). Tropical Lepidoptera 9(1): 28. (in English). ["A large mass of *Panoquina sylvicola* (*Herrich-Schäffer*) (Lepidoptera: Hesperidae), accompanied by limited numbers of *Siproeta epaphus* Latreille (Nymphalidae) and an unidentified species of Aeshnidae [...], were observed moving west to east near Loja,

Ecuador, on 18 April 1992. Approximately 100-150 butterflies per minute were counted over a road at 3100 m, flying about 18 km per hour against a wind speed of 12 km per hour." (Authors)] Address: Onore, G., Dep. Biol., Pontificia Univ. Catol. Ecuador, 12 de Octubre y Roca, Quito Ecuador

1304. **Papazian, M. (1998):** Les odonates et les plantes épizochores. Entomologiste 54(5): 193-196. (in French with English summary). [In Camargue, France, *Orthetrum cancellatum*, *Crocothemis erythraea*, and *Sympetrum fonscolombii* are potential victims of the epizochoric plant *Setaria verticillata*, which is used as perch when the wind blows strong. In this situation the wings of specimens are immobilized by the numerous spikelets.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

1305. **Perron, J.-M.; Ruel, Y. (1998):** Deux gomphides rares, *Stylurus amnicola* (Walsh) et *Stylurus spiniceps* (Walsh) (Odonata, Gomphidae) à l'anse du Moulin Banal, Saint-Augustin-de-Desmaures, Québec. Fabries 23(374): 131-133. (in French with English summary). [New data on the geographical distribution in Quebec of *S. amnicola* and *S. spiniceps*. The species have been discovered recently at Anse du Moulin Banal, Saint-Augustin-de-Desmaures.] Address: Perron, J.-M., 963, rue Grandjean, app. 506, Sainte-Foy, Québec G1X 4P9, Canada. E-mail: collections@coll.ulaval.ca

1306. **Polyanovskii, A.D. (1998):** Phototransduction in insects: Two strategies of calcium homeostasis? Sensornye Sistemy 12(3): 245-254. (in Russian). ["In rhabdomeral photoreceptors of arthropods, light causes steep elevation of cytosolic free calcium concentration. The consensus model of the phosphoinositide signaling cascade attributes this phenomenon to the inositol 1,4,5-trisphosphate (InsP3)-mediated calcium release from the intracellular stores, submicrovillar endoplasmic cisternae (SMC). It is generally accepted that the depletion of SMC is an indispensable step in photoexcitation. This paradigm appears to fit most of insects with a fused-type rhabdom (Hymenoptera, Orthoptera, Odonata, Blattodea), whose photoreceptors contain large SMC able to actively accumulate calcium and release it upon illumination through the InsP3- and ryanodine-sensitive mechanisms. However those with an open-type rhabdoms (Diptera, some Hemiptera and Coleoptera) conflict with the paradigm. Studies on *Drosophila* suggest that in open-rhabdom eyes the calcium homeostasis is mediated via a co-operation of at least three distinct mechanisms: (1) extracellular ommatidial cavity represents a principal calcium store responsible for a light-induced calcium influx; (2) specialized cytosolic domain containing a novel calcium-binding protein, calphotin, might function as a calcium-buffering "sponge"; (3) heavily reduced SMC do not express an InsP3-sensitive calcium release mechanism and do not participate in phototransduction directly. Hence the same task of the transformation of light into a receptor signal seems to be resolved in insects." (Authors)] Address: Polyakovskii, A.D., I. M. Sechenov Inst. Evol. Physiol. Biochem., Russ. Acad. Sci., pr. M. Toreza 44, St. Petersburg 194223, Russia

1307. **Ramirez, J.; Vogt, R.C.; Villarreal-Benitez, J.-L. (1998):** Population biology of a neotropical frog (*Rana vaillanti*). Journal of Herpetology 32(3): 338-344. (in English). ["We studied the population dynamics, food habits, and growth of a population of *Rana vaillanti* in a

permanent lake in Southern Veracruz, Mexico from April 1984 through March 1985. [...] *Rana vaillanti* is a sit and wait predator with a diverse diet including birds, fish, and conpecifics. They consume a higher proportion of invertebrates than vertebrates, principally insects (Coleoptera and Odonata) and spiders." (Authors)] Address: Vogt, R.C., Estacion Biol. Tropical "Los Tuxtlas", Inst. Biol.-U.N.A.M., A.P. 91, San Andres Tuxtla, Veracruz, C.P. 95700 Mexico

1308. **Roehrdanz, R.L.; Degrugillier, M.E. (1998):** Long sections of mitochondrial DNA amplified from fourteen orders of insects using conserved polymerase chain reaction primers. *Annals of the Entomological Society of America* 91(6): 771-778. (in English). ["The combination of highly conserved or universal polymerase chain reaction (PCR) primers with techniques that allow for the amplification of PCR products greater than a few thousand base pairs (long PCR) makes it possible to amplify the complete mitochondrial genome of virtually any insect as a small number of overlapping segments. Twelve conserved primers from 7 mitochondrial genes were used in 17 pair combinations. The size of the amplified segments ranged from 3.3 to 14.1 kb. Total genomic DNA from 33 insect species representing 14 orders served as the template. In most instances, 2 fragments sufficed to include the whole mitochondrial DNA (mtDNA). Less frequently 3 or more fragments were required to cover the complete mtDNA. Fragments that combined contain all of the mtDNA were amplified from 26 of 33 species. For the remaining species, >67% of the mtDNA was amplified. Any of the large amplicons are convenient for restriction fragment comparisons and they are also suitable as a template for nucleotide sequencing of either small mtDNA regions or the complete mtDNA of diverse taxa in conjunction with population or phylogenetic investigations. The procedures described here can be used to amplify the A+T or control region as part of a larger fragment and provides an opportunity for a more detailed analysis of this region." (Authors)] Address: Roehrdanz, R.L., Institution Biosci. Res. Lab., USDA-ARS, P.O. Box 5674, Fargo, ND 58105, USA

1309. **Schaffner, A.K.; Anholt, B.R. (1998):** Influence of predator presence and prey density on behavior and growth of damselfly larvae (*Ischnura elegans*) (Odonata: Zygoptera). *Journal of Insect Behavior* 11(6): 793-809. (in English). ["Foraging behaviour is often determined by the conflicting benefits of energy gain and the risk of mortality from predation or other causes. Theory predicts that animals should have lower activity levels when either the risk of predation or the availability of resources in the environment is high. We investigated the adjustment of the behaviour of *I. elegans* larvae to predator presence (*Anax imperator*) and prey density (*Daphnia* sp.) and their interaction in a completely crossed factorial experiment in the lab and the effect of behaviour on growth. The foraging activity of the *I. elegans* larvae was significantly reduced in the presence of a free-swimming predator but not a caged predator. Abdominal movements were significantly reduced at a low prey density. Growth was significantly reduced by the presence of a free swimming predator and low prey densities. These results provide evidence that these damselfly larvae adjust their behaviour to the presence of predators to increase their survival at the expense of reduced growth and development." (Authors)] Address: Anholt, B.R., Dept Biology, Univer-

sity of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada; E-mail: banholt@uvic.ca

1310. **Schmidt, E. (1998):** Aphorismen zur Odonatenfauna der Ruhraue bei Mühlheim. *Verh. West. Entomol. Tag 1997*: 205-212. (in German). [Checklist of the odonate fauna of the alluvion of Ruhr, Nordrhein-Westfalen, Germany; detailed discussion of factors determining the odonate habitat suitability in the region incl. interesting observations on the (negative) influence of *Branta canadensis* (Aves) on habitat of *Cercion lindenii* and *Erythromma viridulum*; of special faunistic interest are records of *Libellula fulva*, *Sympetrum pedemontanum*, and *Coenagrion pulchellum*] Address: Schmidt, E., Biologie und ihre Didaktik, FB9/S05, Universität GH Essen, D-45117 Essen, Germany

1311. **Schmidt, E. (1998):** Die ökologische Nische von *Sympetrum flaveolum* (L., 1758) und die Problematik von Artenschutz und Einstufung in Rote Listen bei Odonaten mit temporärer Habitat-Besiedlung (Odonata: Libellulidae). *Entomologia Generalis* 23(1-2): 129-138. (in German). ["[...] The ecological niche of *Sympetrum flaveolum* has the following key stone factors: • Water regime, which fits only in certain years, thus breeding only temporarily can be successful and dispersal is necessary for a new colonisation. • Good weather conditions during spring for the larval development and during the flying season as well for reproductive behaviour as for dispersal. • Microclimate: The microhabitats have a more continental microclimate compared with the surroundings. This fits to the rather northern distribution across the Euro-Siberian continent and preference of mountain regions in the southern parts of the distribution area. In NW-Germany temporarily floated areas at running waters, lakes and swamps decreased strongly. So the species lost most breeding habitats except some few places (mainly under nature conservancy or in sand dune valleys on the wadden sea islands). The vegetation structure preferred under natural conditions is favoured by poor soil, and so it suffered very much from fertilization everywhere. Special water and vegetation management in swamps may help for saving breeding habitats. [...] Red Data Books do not have an adequate category for species like *S. flaveolum* confined to only temporarily fitting breeding microhabitats." (Author)] Address: Schmidt, E.G., Univ. Essen (GHS), FB 9 S05, D-45117 Essen, Germany

1312. **Schmude, K.L.; Jennings, M.J.; Otis, K.J.; Piette, R.R. (1998):** Effects of habitat complexity on macroinvertebrate colonization of artificial substrates in north temperate lakes. *Journal of the North American Benthological Society* 17(1): 73-80. (in English). ["The purpose of this study was to determine the effects of substrate complexity on community structure of macroinvertebrates in littoral zones of lakes. Artificial substrates were used to simulate characteristics of structures commonly placed on the lake bed along shorelines. Cement balls in a wire basket simulated rock riprap, whereas concrete patio blocks simulated retaining walls; the samplers had nearly equal surface areas. Samplers were placed in the littoral zones of 3 dissimilar lakes in Wisconsin, and in front of 3 types of shorelines: rock riprap, vertical retaining wall, and natural shorelines. Colonization periods were 40-45 d starting immediately after ice-out. Significantly greater numbers of organisms colonized basket samplers ($1947 \pm 155/m^2$, mean ± 1 SE) than block samplers ($951 \pm 73/m^2$). Taxa richness was significantly higher on baskets (31 ± 1)

versus blocks (22 ± 1). Hydra, Turbellaria, Oligochaeta, Crustacea, Ephemeroptera, and Odonata were significantly more abundant on baskets than on blocks. [...] Neither abundance nor richness differed significantly among shoreline types, but a trend of higher values for both variables was observed along rock riprap. The results were consistent with the hypothesis that the more complex, 3-dimensional artificial substrate with its greater substrate heterogeneity, surface complexity, and interstitial space, will support a more diverse and abundant macroinvertebrate community in lakes compared to the less complex, 2-dimensional artificial substrate. Shoreline management practices that reduce habitat complexity may reduce local invertebrate diversity." (Authors)] Address: Schmude, K.L., Lake Superior Res. Inst., Univ. Wis.-Superior, Superior, WI 54880, USA

1313. **Seki, T.; Vogt, K. (1998):** Evolutionary aspects of the diversity of visual pigment chromophores in the class insecta. *Comparative Biochemistry & Physiology - B: Comparative Biochemistry* 119(1): 53-64. (in English). ["In the class Insecta, three retinal congeners are used as the chromophore of visual pigments: retinal, (3R)-3-hydroxyretinal and (3S)-3-hydroxyretinal. The distribution of retinal and 3-hydroxyretinal superimposed on the phyletic tree of insects indicates that the original chromophore of visual pigments was retinal, and that some insects arose around the end of the Carboniferous period acquired the ability to use 3-hydroxyretinal. Xanthophylls possessing 3-hydroxy-beta-ring have been considered to be precursors of 3-hydroxyretinal, and the "oxygen pulse" in the late Paleozoic era is discussed as a possible contributory factor in obtaining the ability to use 3-hydroxyretinal as the visual pigment chromophore. Xanthophylls possessing 3-hydroxy-beta-ring produced by plants and bacteria have only the (3R)-beta-ring, so the 3-hydroxyretinal produced directly from such xanthophylls is expected to be (3R)-3-hydroxyretinal. On investigating the absolute structure of 3-hydroxyretinal in insect compound eyes, using a chiral column, the orders Odonata, Hemiptera, Neuroptera, Coleoptera, and Lepidoptera, and suborders Nematocera and Brachycera of the Diptera were found to have only (3R)-3-hydroxyretinal. The members of the dipteran suborder Cyclorrhapha, however, were found to contain a mixture of both the (3R)- and (3S)-enantiomers of all-trans 3-hydroxyretinal and (3S)-11-cis 3-hydroxyretinal. The Cyclorrhapha, which arose in the Jurassic period, have obtained the ability to produce (3S)-3-hydroxyretinal, but the metabolic pathway by which these "higher flies" form (3S)-3-hydroxyretinal has yet to be clarified." (Authors)] Address: Seki T., Div. Health Sci., Osaka Kyoiku Univ., 4-698-1, Asahigaoka, Kashiwara, Osaka 582 Japan

1314. **Swisher, B.J.; Soluk, D.A.; Wahl, D.H. (1998):** Non-additive predation in littoral habitats: influence of habitat complexity. *Oikos* 81(1): 30-37. (in English). ["The combined effects of predators on prey in structurally complex habitats may not always be described by additive models. Changes in habitat complexity can affect the rates of consumption by individual predators as well as alter the interactive, combined effects of predators with contrasting foraging styles. We examined the combined consumption of a common prey by two predators across a gradient of three habitat complexities. In microcosm experiments, consumption of larval mayfly prey (*Cloeon cognatum*) by juvenile bluegill sunfish (*Lepomis macrochirus*) and libellulid dragonfly larvae

(*Erythemis simplicicollis*) exceeded additivity at low habitat complexity, but were additive at higher levels of complexity. Prey capture by odonates was unaffected by fish presence during both day and night. At low stem density, fish capture more mayfly larvae than expected in the presence of dragonflies than in their absence, while consumption by dragonflies is unchanged in the presence of fish. Both the behavioral attributes of predators and prey as well as structural complexity of their habitat affect encounter rates, and thus their net interaction." (Authors)] Address: Swisher, B., Institution Cent. Aquatic Ecol., Ill. Natural History Survey, 607 E. Peabody Dr., Champaign, IL 61820, USA

1315. **Tóth, S. (1998):** Data to the dragonfly fauna of the Duna-Dráva National Park, South Hungary (Odonata). *Dunántúli Dolg. Term. tud. Sorozat* 9: 135-150. (in Hungarian with English and German summaries). [55 species were traced between 1992 and 1997 in the Duna-Dráva NP. Of special faunistic interest are according to the author *Calopteryx virgo virgo*, *Pyrrhosoma nymphula interposita* Varga, *Aeshna grandis*, *A. viridis*, *Epitheca bimaculata*, *Stylurus flavipes*, *Leucorrhinia caudalis*, and *L. pectoralis*. In addition the following species should be mentioned: *Coenagrion ornatum*, *C. scitulum*, *Brachytron pratense*, and *Sympetrum pedemontanum*.] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

1316. **Velasco, J.; Millan, A. (1998):** Feeding habits of two large insects from a desert stream: *Abedus herberti* (Hemiptera: Belostomatidae) and *Thermonectus marmoratus* (Coleoptera: Dytiscidae). *Aquatic Insects* 20(2): 85-96. (in English). ["Feeding preference experiments were conducted to determine the feeding habits of *Abedus herberti* (Heteroptera, Belostomatidae) and *Thermonectus marmoratus* (Coleoptera, Dytiscidae), two large insects in Sycamore Creek, an intermittent Sonoran desert stream, Arizona, U.S.A. Numbers of live versus dead prey consumed were tested between and across three prey sizes. Five prey species were offered simultaneously (5 live and 5 dead specimens) in each size class. We found that *A. herberti* preferred live prey of small and medium size, but it chose mainly dead prey in the large size class. These results fitted the model of size-selective predation (Zaret, 1980). Size dependent predators selected prey of increased size, according to their visibility, but only up to where difficulty in handling and probability of escape affect successful consumption. Snails were the most preferred prey of *A. herberti*. By contrast, *T. marmoratus* consumed only dead prey of all sizes, but it preferred soft organisms with thin cuticle, such as immature larvae of some mayflies, beetles, dragonflies or fishes." (Authors)] Address: Velasco, J., Institution Dep. Ecol. Hidrol., Univ. Murcia, Campus Univ. Espinardo, E-30100 Murcia, Spain

1317. **Wada, S. (1998):** Observation on *Anax guttatus* in Fukui Pref., 1998. *Tombo* 41: 9-11. (in Japanese with English translation of the title). Address: not stated

1318. **Williams, D.D.; Williams, N.E. (1998):** Freshwater invertebrates from the Bermuda Islands and their zoogeographical affinities. *Tropical Zoology* 11(2): 353-369. (in English). ["The Bermuda Islands lie in the western Atlantic Ocean with the closest mainland being North Carolina, some 965 km to the west. [...] Because of the proximity of many sites to the coast, this survey reports some species with brackishwater tolerance, and

also, as in the case of the mites, species that were riparian in distribution. The samples revealed a total of 51 fresh/brackish water species with 24 of these being recorded from the islands for the first time. Predominant amongst this fauna were oligochaetes, gastropods, microcrustaceans, peracarids, odonates, corixids, hydrophilid beetles, and chironomid, ceratopogonid and ephydrid dipterans. ..." (Authors)] Address: Williams, D.D., Univ. Toronto, Div. Life Sci., 1265 Mil Trail, Scarborough; ON M1C 1A4; Canada

1319. **Williams, P.H.; Gaston, K.J. (1998):** Biodiversity indicators: Graphical techniques, smoothing and searching for what makes relationships work. *Ecography* 21(5): 551-560. (in English). ["Knowledge of the distribution of biodiversity remains poor. This situation might more readily be resolved if the species richness of certain groups of organisms indicated the richness of other, less well known groups. A spatially explicit exploration of the pattern in the predictive power that one taxon (a potential 'indicator group') might have for the diversity of another has been performed previously. In this paper we respond to three important points that have been raised. First, we describe an additional graphical technique for visualizing spatial aspects of indicator relationships. Second, we examine some of the consequences of smoothing species richness data on observed indicator relationships. Third, we consider some of the factors that may contribute to strong indicator relationships." (Authors)] Address: Williams, P.H., Biogeography Conservation Lab., Natural Hist. Museum, London SW7 5BD, UK

1320. **Yokoyama, T.; Hirose, Y. (1998):** Records of *Somatochlora alpestris* from the lowest altitude at Dai-setsu Mts. Tombo 41: 40. (in Japanese). Address: not stated

1321. **Zhou, W. (1998):** A new species of the genus *Anotogaster* from China (Odonata: Cordulegastridae). *Wuyi Sci. Jour.* 14: 16-17. (in Chinese with English summary). [*Anotogaster chaoi* n.sp.; holotype: male, Ruili, Yunnan Prov. 6 May 1984; the species is allied to *Anotogaster gregoryi* Fraser 1924] Address: Zhou Wen-bao, Department of Entomology, Zhejiang Museum of Natural History, Jiaokonglou 10, Hang Zhou - 310012, China

1322. **Zhou, W. (1998):** A report on *Petaliaeschna corneliae*. *Wuyi Sci. Jour.* 14: 1-2. (in Chinese with English translation of the title). [A female *P. corneliae* is figured] Address: Zhou Wen-bao, Department of Entomology, Zhejiang Museum of Natural History, Jiaokonglou 10, Hang Zhou - 310012, China

1999

1323. **Abbingh, G. (1999):** Larvenhuidjesdag "gevoorderden" 6 februari 1999. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 3(4): 5. (in Dutch). [Meeting of some experienced experts to identify dragonfly exuviae; new identification characters of genitalia of *Aeshna subarctica elisabethae* and *A. juncea* are figured and outlined] Address: Abbingh, G., Muddegoorn 78, NL-9403 NK Assen, The Netherlands. E-mail: G.Abbingh@SoftHome.net

1324. **Abbingh, G. (1999):** Verslag NVL-Excursie Appelscha, na 2 jaar dan toch *Mededelingen van de*

Nederlandse Vereniging voor Libellenstudie 3(4): 5-6. (in Dutch). [Report on a trip to Appelscha/Smilde (Drenthe, The Netherlands) on 28 August 1999; 17 species were recorded including *Lestes barbarus*, *Ceragrion tenellum*, and *Aeshna subarctica elisabethae*] Address: Abbingh, G., Muddegoorn 78, NL-9403 NK Assen, The Netherlands. E-mail: G.Abbingh@SoftHome.net

1325. **Al Hussein, I.; Bergmann, S.; Funke, T.; Huth, J.; Oelerich, H.-M.; Reuter, M.; Tietze, F.; Witsack, W. (1999):** Die Tierwelt der Bergbaufolgelandschaften. *Naturschutz im Land Sachsen-Anhalt* 36 (Sonderheft): 23-40. (in German). [The former brown coal mining regions in Germany developed to important regions for nature conservation purposes. In Sachsen-Anhalt (and further regions) the ecology of these habitats is surveyed intensively. The odonate fauna of 75 water bodies was studied by Jörg Huth. He traced 46 species. In this publication only the key stone species are listed according to the main habitat types. The succession of the vegetation and odonate fauna in brown coal mining water bodies is outlined in short. *Leucorrhinia pectoralis*, a species of the appendix of the FFH Directive, settles on 7 water bodies.] Address: not stated

1326. **Altmoos, M. (1999):** Netzwerke von Vorrangflächen - Ein methodischer Rahmen zur Planung und Optimierung von Gebietssystemen für den Naturschutz. *Naturschutz und Landschaftsplanung* 31(12): 357-367. (in German with English summary). ["Networks of Priority Areas - A Methodological Framework for Planning and Optimisation of Areal systems for Nature Conservation: A network (i.e. area system) for nature conservation includes a minimum number of priority areas which in their entity secure nature conservation aims in a larger context. This makes it necessary to integrate flexibility, different categories of areas, minimum sizes and a habitat network. A methodological framework has been worked out to implement these requirements. [...] *Ischnura pumilio*, *Orthetrum brunneum*, *O. coerulescens*, and *Sympetrum pedemontanum* are used as keystone species to assess brown coal mining regions near Leipzig, Sachsen, Germany for nature conservation needs.] Address: Altmoos, M., Umweltforschungszentrum Leipzig-Halle, Projektbereich Naturnahe Landschaften und Ländliche Räume, Permoserstr. 15, D-04318 Leipzig, Germany. E-mail: altmoos@pro.ufz.de

1327. **Anonymus (1999):** Ergebnisse der Insektenaufnahme während der 9. Landesoffenen Entomologentagung 3.9. - 5.9.1999 in Ronney (Anhalt-Zerbst). *Entomol. Mitt. Sachsen-Anhalt* 7(2): 42-43. (in German). [*Aeshna mixta*, *Stylurus flavipes*, and *Sympetrum sanguineum* are recorded from the floodplains of the near River Elbe (51.92N 11.94)] Address: not stated

1328. **Ansorge, J. (1999):** *Heterophlebia buckmani* (Brodie 1845) (Odonata: "Anisozygoptera") - das erste Insekt aus dem untertoarcischen Posidonienschiefer von Holzmaden (Württemberg, SW Deutschland). *Stuttgarter Beiträge zur Naturkunde Serie B (Geologie und Paläontologie)*. 275: 1-9. (in German with English summary). ["The first insect from the Lower Toarcian Posidonienschiefer ("Posidonia Shale") of Holzmaden (Württemberg, SW Germany), a fore wing of *Heterophlebia buckmani* (BRODIE 1845) (Odonata: "Anisozygoptera"), is described from the "Unterer Stein" ("Lower Stone"), a concretion-like carbonate layer. The holotypes of the Upper Liassic *Heterophlebia dobertinensis*

Handlirsch 1939, *Heterophlebia gracilis* Handlirsch 1939, *Systellothemis reticulata* Handlirsch 1939 from Dobbertin (Mecklenburg), and *Heterophlebia proxima* Bode 1905 from the Brunswick area (Lower Saxony) are revised and considered younger synonyms of *H. buckmani*. Besides a collecting bias, the rarity of insects in the Posidonia Shale of Holzmaden probably results from a larger distance of the sedimentation area to the Vindelician mainland." (Author)] Address: Ansorge, J., Institut für Geologische Wissenschaften der Ernst-Moritz-Arndt-Universität, Friedrich-Ludwig-Jahn-Straße 17a, D-17489, Greifswald Germany

1329. **Artmeyer, C. (1999):** Aktuelle Verbreitung, Habitatansprüche und Entwicklungsdauer von *Gomphus vulgatissimus* (Linnaeus) in der Ems im Kreis Steinfurt, Nordrhein-Westfalen (Anisoptera: Gomphidae). *Libellula* 18(3/4): 133-146. (in German with English summary). ["In 1997, the sp. was recorded emerging in 95 % of the one-kilometer-sections along approximately 58 km of the course of the river. In most cases the species occurred in sections with an unnatural regulated profile. Almost 50 % of the emergence sites were characterized by a high or very high cover of stones in the river bed. The question of the exact habitat of the larvae in the river Ems as well as the reason for the recent expansion of the species in this river are discussed. From regularly taken size measurements of the larvae it is suggested that larval development takes two years." (Author)] Address: Artmeyer, C., Philippstraße 16, 48149 Münster, Germany. E-mail: artmeyc@uni-muenster.de

1330. **Austin, A.D. (1999):** Use of Odonata as prey by sand wasps, *Bembix* spp. (Hymenoptera: Sphecidae). *Australian Entomologist* 26(3.): 77-82. (in English). ["The sphecid wasp *Bembix minya* Evans & Matthews from southern South Australia is recorded for the first time as preying on damselflies (Odonata). Details of its nest structure and prey range are presented, as is a discussion of the evolutionary transition within the genus to utilising prey other than Diptera." (Author)] Address: Austin, A.D., Department of Applied and Molecular Ecology, Waite Campus, The University of Adelaide, PO Glen Osmond, SA 5064, Australia; E-mail: aaustin@waite.adelaide.edu.au

1331. **Bechly, G. (1999):** Epallagidae versus Euphaeidae revisited. *International Journal of Odonatology* 2(2): 137-139. (in English). ["The author's previous rejection of Selys' legions as available family-group taxa is restated and elaborated, strictly based on the provisions of the International Rules of Zoological Nomenclature (4th ed.)." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

1332. **Bedjanic, M.; Pirnat, A.; Salamun, A. (1999):** A contribution to the knowledge of dragonfly fauna of broader area along Drava River between Ptuj and Sfrdiscne ob Dravi, northeastern Slovenia (Insecta: Odonata). *Natura Sloveniae* 1(1): 45-70. (in Slovene with extensive English summary). ["The results of the work of the Odonatological group on the Student Biology Research Camp Sredisce ob Dravi '97 are presented. Between 24-31 July 1997 a total of 40 dragonfly species were recorded at 97 localities. A review of all known published and unpublished dragonfly records for the investigated area has shown that in the 1992-1998 period 128 localities were investigated and a list of 49 dragonfly species was compiled. Altogether 12 species

viz. *Lestes virens vestalis* (Ramb.), *Lestes dryas* Kirb., *Sympecma fusca* (Vander Lind.), *Anaciaeschna isosceles* (Mull.), *Brachytron pratense* (Mull.), *Gomphus vulgatissimus* (L.), *Cordulia aenea* (L.), *Somatochlora flavomaculata* (Vander Lind.), *Epitheca bimaculata* (Charp.), *Libellula fulva* Müll., *Sympetrum fonscolombii* (Sel.), and *Sympetrum depressiusculum* (Sel.) are new for the investigated area. The records of endangered species *Ophiogomphus cecilia* (Fourc.) in Drava R. and of *Leucorrhinia pectoralis* (Charp.) in fishponds near Ptuj deserve special interest from the nature conservation point of view. The inclusion of *Anaciaeschna isosceles* in the Red data list of endangered dragonflies (Odonata) of Slovenia as a vulnerable species is suggested." (Authors)] Address: Pirnat, Alja, Vosnjakova 4/a, SI-1000 Ljubljana, Slovenia. E-mail: alja.pirnat@guest.arnes.si

1333. **Bedjanic, M. (1999):** *Aeshna subarctica elisabethae* Djakonov 1922, new for the odonate fauna of Slovenia (Anisoptera: Aeshnidae). *Exuviae* 6: 7-10. (in English with Slovenian summary). ["Several exuviae and a teneral female of the species were collected at the Sijec peat-bog (Pokljuka plateau, NW Slovenia) on 25-VI-1999 and 27-VI-1999. New record lies on the southern border of the species range in Europe and is zoogeographically interesting. The species is declared as critically endangered. Therefore, detailed population studies and its inclusion in the Red list of the dragonflies of Slovenia are proposed." (Author)] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1334. **Bedjanic, M. (1999):** Dragonflies - A colorful life between the water and the sky. *Proteus* 62(1): 8-17. (in Slovene with English summary). [General account on the 73 Slovene dragonflies; some of the typical or rare species of Slovenia as *Cordulegaster heros* and *Leucorrhinia caudalis* and their habits are documented with brilliant colour pictures. In addition, information is given to the author, the Slovene Dragonfly Association, and Bastiaan Kiauta, one of the leading odonatologists in the 70th and 80th of the past century.] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1335. **Bedjanic, M. (1999):** New records of *Hemianax ephippiger* (Burmeister, 1839) in Slovenia (Anisoptera: Aeshnidae). *Exuviae* 6: 14-18. (in English with Slovenian summary). ["The development of the species was confirmed at two localities in the vicinity of Maribor, northeastern Slovenia. Known records for Slovenia are mapped and a short discussion on the threat status of the species in Slovenia is added." (Author)] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1336. **Bedjanic, M. (1999):** The creature of the month in September: the dragonfly *Sympetrum depressiusculum*. *Proteus* 62(1): 36-38. (in Slovene). [Presentation of *S. depressiusculum* as the Animal of the Month including three colour pictures and a determination key of the Slovene *Sympetrum*-species] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1337. **Benke, A.C.; Huryn, A.D.; Smock, L.A.; Wallace, J. B.. (1999):** Length-mass relationships for freshwater macroinvertebrates in North America with particular reference to the southeastern United States. *Journal of the North American Benthological Society*.

18(3): 308-343. (in English). ["Estimation of invertebrate biomass is a critical step in addressing many ecological questions in aquatic environments. Length-dry mass regressions are the most widely used approach for estimating benthic invertebrate biomass because they are faster and more precise than other methods. A compilation and analysis of length-mass regressions using the power model, M (mass) = $a L$ (length) b , are presented from 30 y of data collected by the authors, primarily from the southeastern USA, along with published regressions from the rest of North America. A total of 442 new and published regressions are presented, mostly for genus or species, based on total body length or other linear measurements. The regressions include 64 families of aquatic insects and 12 families of other invertebrate groups (mostly molluscs and crustaceans). Regressions were obtained for 134 insect genera (155 species) and 153 total invertebrate genera (184 species). Regressions are provided for both body length and head width for some taxa. In some cases, regressions are provided from multiple localities for single taxa. When using body length in the equations, there were no significant differences in the mean value of the exponent b among 8 insect orders or Amphipoda. The mean value of b for insects was 2.79, ranging from only 2.69 to 2.91 among orders. The mean value of b for Decapoda (3.63), however, was significantly higher than all insects orders and amphipods. Mean values of a were not significantly different among the 8 insect orders and Amphipoda, reflecting considerable variability within orders. Reasons for potential differences in b among taxa are explained with hypothetical examples showing how b responds to changes in linear dimensions and specific gravity. When using head width as the linear dimension in the power model, the mean value of b was higher (3.11) than for body length and more variable among orders (2.8-3.3). Values of b for Ephemeroptera (3.3) were significantly higher than those for Odonata, Megaloptera, and Diptera. For those equations in which ash-free dry mass was used, % ash varied considerably among functional feeding groups (3.3-12.4%). Percent ash varied from 4.0% to 8.5% among major insect orders, but was 18.9% for snails (without shells). Family-level regressions also are presented so that they can be used when generic equations are unavailable or when organisms are only identified to the family level. It is our intention that these regressions be used by others in estimating mass from linear dimensions, but potential errors must be recognized." (Authors)] Address: Benke, A., Aquatic Biology Program, Department of Biological Sciences, University of Alabama, Tuscaloosa, AL, USA

1338. **Bönsel, A. (1999):** Der Einfluss von Rothirsch (*Cervus elaphus*) und Wildschwein (*Sus scrofa*) auf die Entwicklung der Habitate von *Aeshna subarctica* Walker in wiedervernässten Regenmooren (Anisoptera: Aeshnidae). *Libellula* 18(3/4): 163-168. (in German with English summary). ["In two rewetted bogs in Mecklenburg-Vorpommern, Germany, vegetation has developed so fast that after already 4 years areas of *Sphagnum cuspidatum* have been replaced by the next stadium of succession swing grass areas. Because of this the potential breeding places of *A. subarctica* disappeared. But those are constantly being recreated by red deer and wild pig. Therefore these mammals play an important role for the survival of *A. subarctica* in these areas." (Author)] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany

1339. **Bohonak, A.J. (1999):** Effect of insect-mediated dispersal on the genetic structure of postglacial water mite populations. *Heredity* 82(4): 451-461. (in English). ["Assaying population structure in species that differ in dispersal ability can help to determine whether population differentiation is dependent on the movement of individuals between populations. Here, allozyme variation is analysed in over 1100 individuals from nine species and two species complexes of *Arrenurus* water mites collected throughout north-eastern North America. As larvae, eight taxa are obligate parasites of winged adult insects that provide the primary opportunity for dispersal. Three additional species have lost the ability to parasitize insects and do not disperse in this manner. Consistent with the glaciated history of the region, very low allozyme heterozygosity was found in these taxa ($H_o = 0.00-0.12$), near panmixia in five out of seven species for which population differentiation was calculated and no patterns of isolation by distance over spatial scales up to several hundred kilometres. Nonetheless, in two out of three comparisons between sister species with and without parasitic larvae, parasitism was significantly associated with higher heterozygosity. Population differentiation could also be contrasted for two of these sister pairs; in each case, lower estimates of F_{ST} were found in the mites able to disperse on insects. The statistical significance of these contrasts was dependent on the method used to estimate variance. At the scale of the genus, behavioural differences among insect vectors allows for broader hypothesis that relate water mite genetic diversity to dispersal ability. For the genus, rank correlations of dispersal ability with direct count heterozygosity ($n = 11$) and population differentiation ($n = 7$) were not significantly different from zero. These results are consistent with the hypothesis that allozyme population structure is primarily the result of historical patterns in these regions. However, comparisons between sister species suggest a limited role for dispersal in homogenizing populations genetically, even when drift-gene flow equilibrium has not been achieved." (Author)] Address: Bohonak, A., Center for Conservation Research and Training, University of Hawaii, Honolulu, HI, 96822, USA

1340. **Brockhaus, T. (1999):** 2. Sächsische Libellentagung in Bad Schandau. *Mitt. Sächsischer Entomol.* 48: 28-29. (in German). [Report on the meeting held on 5/6 November 1999; main topic was the present status of the survey of the Saxonian odonate fauna and the scheduled distribution atlas] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1341. **Brockhaus, T. (1999):** Die Libellenfauna des unteren Zschopautals. *Mitt. Sächs. Entomologen* 47: 26-28. (in German). [The odonate fauna before and after the closing of a system of ditches used by a drinking water plant is analysed. The drying out of the ditches caused a large decline of the fauna from 17 reproductive species to 6 species. The loss of habitats for ditch specialists as *Sympetrum pedemontanum* is of serious importance for nature conservation.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1342. **Brockhaus, T. (1999):** Ein Nachweis von *Aeshna subarctica elisabethae* Djakonov, 1922 und *Somatochlora alpestris* (Selys, 1840) im Hochmoor Sijec auf der Pokljuka, NW Slowenien (Anisoptera: Aeshnidae, Corduliidae). *Exuviae* 6: 11-13. (in German with English

and Slovenian summaries). ["Single males of both species were found at the locality on 30-VII-1999. For *A. subarctica elisabethae*, which has only recently been discovered as new for the odonate fauna of Slovenia, the Sijec peat-bog represents the only known locality in the country. During last years *S. alpestris* was thought to be extinct in Slovenia, however with present record it has been rediscovered after more than 35 years." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1343. **Brunelle, P. (1999):** Distribution of damselflies and dragonflies of Maine, United States. *Northeastern Naturalist* 6(2): 95-118. ["This paper provides details of the distribution and study of Odonata in the state of Maine, based on a comprehensive review of literature, public collections, private holdings, and the results of recent surveys. It is the first summary of the subject in over fifty years, and its data provide the baseline for the planned 5-year volunteer field survey of odonates in Maine. As a result of the review 11 species are added to the state list: the damselfly *Enallagma recurvatum*, and the dragonflies *Aeshna mutata*, *Nasiaesha pentacantha*, *Argomphus furcifer*, *Gomphus descriptus*, *G. quadricolor*, *G. vastus*, *Stylurus amnicola*, *S. notatus*, *Neurocordulia* sp. nov. (= *N. michaeli* Brunelle, 2000; see OAS 1478) and *Perithemis tenera*, bringing that list up to 155 species. Distribution to township level and flight periods for all species, and geographical and seasonal distribution of past survey effort in the state are reviewed. Illustrations and notes on 26 currently state-listed species are appended." (Author)] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada

1344. **Brunelle, P.-M. (1999):** Additions to the lists of dragonflies (Odonata: Anisoptera) of the Atlantic Provinces, Canada. *Northeastern Naturalist* 6(1): 35-38. (in English). ["*Somatochlora brevicincta* is added to the Atlantic Provinces list; *Aeshna juncea* and *S. brevicincta* to the Maritime Provinces; *A. juncea*, *A. subarctica*, *S. brevicincta* and *S. septentrionalis* to New Brunswick; *S. albicincta*, *S. brevicincta* and *Pantala flavescens* to Nova Scotia; *A. subarctica*, *Epithea spinigera*, *S. cingulata*, *S. franklini*, *Leucorrhinia frigida* and *P. flavescens* to Prince Edward Island." (Author)] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada

1345. **Buczynski, P. (1999):** The checklist and the "Red list" of the dragonflies (Insecta: Odonata) of the Lublin Province. In: *Instytut Ochrony Przyrody Polskiej Akademii Nauk* (Ed.): *Chronmy Przyrody Ojczyzna*. *Dwumiesięcznik*. R. LV (55) - 1999 - Zeszyt 6 (Listopad-Grudzien). Kraków: 23-39. (in Polish with extensive English summary). [Checklist of the Odonata of the southeastern part of Poland including vernacular and Latin names and an assessment of the threat of the species according to the IUCN categories] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1346. **Buczynski, P. (1999):** Dragonflies (Odonata) of spring areas in Poland - state of research and proposes of further study. *Zródła Polski*. Stan badan, monitoring i ochrona. *Wyzsza Szkola Pedagogiczna*. Olsztyn: 31-36. (in Polish with English summary). [List of odonate species known to develop in Polish mountain regions

(n=5) and lowland regions (n=3) spring habitats; additional information is given on the species of flush systems (natural drainage systems) of the peat bogs (*Somatochlora arctica*, *Leucorrhinia albifrons*); the author stresses the lack of data on the odonate fauna of springs in Poland] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1347. **Buttstedt, L.; Zimmermann, W. (1999):** Die Vogel-Azurjungfer (*Coenagrion ornatum*) im Grenzraum von Sachsen-Anhalt und Thüringen. *Pedemontanum* 3: 6-9. (in German). [In 1995 *C. ornatum* was recorded at some ditches near Wallhausen, Sachsen-Anhalt, Germany. In 1998 in subsequent ditches of the Helme floodplain (Thüringen) some more local, in most cases small, populations of the species could be detected. 10 populations are known now. In all cases *C. mercuriale* co-occurs.] Address: Zimmermann, W., von-Hoff-Str. 31, D-99867 Gotha, Germany

1348. **Calil, E.R.; Carvalho, A.L. do (1999):** Descriptions of the last instar larvae and the adult of *Triacanthagyna septima* (Selys, 1857) (Odonata, Aeshnidae) with notes about the biology of the species. *Revista Brasileira de Entomologia* 43(1-2): 73-83. (in Portuguese). [The last instar larva and the adult of *T. septima* are described and illustrated. The rarely being collected larvae develop occasionally in temporary and unstable ponds, and marshes. A key to the larvae of the four hitherto described larvae of the genus is provided. The last instar larva of *T. septima* can be distinguished by the length of the cerci, distinctly shorter than the e-piproct. The adults of *T. septima* occur during all the year in the southeastern Brazil, being more common in the winter. They are crepuscular in activity and sometimes assemble in collective flights adopting migratory behaviour.] Address: Calil, E.R., Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ Brazil

1349. **Chalmel, R.; Dommanget, J.-L. (1999):** Rubrique bibliographique. *Martinia* 15(4): 131-135. (in French). [Additions to the French odontological bibliography] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

1350. **Clausen, W. (1999):** *Gomphus flavipes* (Charpentier) in der Aller, Niedersachsen (Anisoptera: Gomphidae). *Libellula* 18(3/4): 187-188. (in German with English summary). ["On 14-VII-1999, one exuvia was recorded at the Aller near Eilte 12 km SSW Walsrode, Germany" (Author).] Address: Clausen, W., Zur Bockwindmühle 60, D-32351 Stemwede-Oppenwehe, Germany

1351. **Clausnitzer, V. (1999):** A checklist of the dragonflies (Odonata) of Kenya. *African Journal of Ecology* 37: 400-418. (in English). ["A checklist of Odonata has been compiled for Kenya. It is based on an inventory of museum material, publications and personal observations made between 1978 and 1997. Changes of scientific names and synonyms are documented. The list contains 194 valid dragonfly species recorded for Kenya." (Author)] Address: Clausnitzer, Viola, Zum Lahnverg 14, D-35032 Marburg, Germany

1352. **Conrad, K.F.; Willson, K.H.; Harvey, I.F.; Thomas, C.J.; Sherratt, T.N. (1999):** Dispersal characteristics of seven odonate species in an agricultural

landscape. *Ecography* 22(5): 524-531. (in English). ["Dispersal is an ecological phenomenon which is of fundamental importance to population biology. While dispersal behaviour of many orders of winged insects has received a great deal of attention, the dispersal characteristics of odonates have been poorly documented. We used capture-mark-recapture techniques to study dispersal behaviour of seven species of odonates breeding on a network of 11 small ponds in Cheshire, U.K. The ponds ranged in size from 615 to 1300 m² and varied from 30 to 860 m apart. We found surprisingly high rates of dispersal between ponds with 10-47% per species of recaptured individuals moving from their natal pond. The mean probability of dispersal differed significantly among species but the relationship between the probability of dispersal and distance moved consistently followed a simple negative exponential curve for all species. Most individuals stayed at their natal pond, but a few moved long distances. Neither the age at which an individual was marked (teneral vs sexually mature) nor its sex significantly affected its tendency to disperse. The negative exponential relationship suggests that dispersal should be relatively easy to incorporate in more complex models of odonate spatio-temporal dynamics. To our knowledge, this is the first large-scale, multi-species study to assess dispersal behaviour of odonates by direct observation." (Authors) The following species were surveyed: *Ischnura elegans*, *Coenagrion puella*, *C. pulchellum*, *Lestes sponsa*, *E-nallagma cyathigerum*, *Pyrrhosoma nymphula*, and *Sympetrum sanguineum*] Address: Thomas, C.J., Dept of Biological Sciences, Durham University, Durham, DH1 3LE, UK

1353. **Czachorowski, S.; Buczynski, P. (1999):** Biocenosis naturalness index - a prospective instrument in the evaluation of the ecological state of Polish peat-bogs, as exemplified by Odonata and Trichoptera. In: Radwana, S. & R. Kornijowa (Rds.): *Problemy aktywnej ochrony ekosystemów wodnych i torfowiskowych w Polskich Parkach Narodowych*. Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej. Lublin: 153-158. (in Polish with English summary. A German translation of the paper is available from the author or IDF). [Fischer's (1996) "biocenosis naturalness indexes" (Fischer, J.: *Beurteilungsverfahren zur Quellfauna*. *Crunoecia* 5: 227-240), in the modification of Czachorowski (1998), are proposed for assessing and biomonitoring peat-bogs. Index values for 26 Polish peat-bogs and fens in mountain and lowland ranges are calculated, analysed and discussed. In Tab. 1 the indices are developed on a cline of typical to a-typical species for each peat bog and fens. Some sphagnum peat-bog indexes calculated for dragonfly species are higher for fen species than for sphagnum peat-bog species. In the case of caddisflies some fens are characterised by a sphagnophilous fauna. These results are interpreted as follows: (1) The biotops are impacted by factors not yet visible. (2) Fen-fauna is very dispersive and able to settle in peat-bogs too, which may be suboptimal habitats (3) The classification of species based on their known habitat requirements is not precise yet. The "biocenosis naturalness indexes" are considered to be a good tool for assessment conservation priorities for the specific fauna of bogs.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1354. **Czczuga, B.; Godlewska, A.; Mrozek, E. (1999):** Zoosporic fungi growing on dead dragonflies (Odonata). *International Journal of Odonatology* 2(2): 187-197. (in English). ["The mycoflora developing on dead specimens of 11 species of dragonfly, collected while floating on the water surface, was investigated under laboratory conditions. Sixty-six zoosporic fungus species were found to grow on the fragments of dragonfly investigated, including 15 Chytridiomycetes and 51 Oomycetes. Of these 66 species, 18 are known as parasites or necrotrophs of fish. Three fungus species were recorded for the first time from Poland." (Authors)] Address: Bazyli Czczuga, Anna Godlewska & Edyta Mrozek, Department of General Biology, Medical University, Kilinskiego 1, 15-230 Białystok 8, Poland. E-mail: Dzia/Nau@AMB.AC.Bialystok.PL

1355. **Czerniawska-Kusza, I. (1999):** Macroinvertebrate communities of streams in the Glubczycki plateau. *Zródła Polski. Stan badan, monitoring i ochrona*. *Wyzsza Szkola Pedagogiczna. Olsztyn*: 73-80. (in Polish with English summary). [In 1997, the fauna of seven rivers in the Odra catchment SW of Opole was surveyed. 37 taxa were recorded including "Corduliidae" in the river Psina.] Address: Czerniawska-Kusza, Izabela, Instytut Biologii i Ochrony Srodowiska, Uniwersytet O-polski, ul. Oleska 48, 45-052 Opole, Poland

1356. **Dantart, J.; Martín, R. (1999):** *Somatochlora metallica* (Vander Linden, 1825) (Odonata: Corduliidae) y *Leucorrhinia pectoralis* (Charpentier, 1825) (Odonata: Libellulidae), dos nuevas especies de libélulas para la Península Ibérica. *Boln asoc. esp. ent.* 23(1-2): 147. (in Spanish). [*Somatochlora metallica*: Pleta de Saboredo, Valle del Ruda (Valle de Arán, Lérida), UTM 31TCH3221, 2.100 m; 1 male, 2 female; 19-VII-86. (J. Dantart leg., det) and Lago Carlit (Pirineo francés), UTM 31TDH11, 2.200 m; 1 male; 8-IX-84. (J. Dantart leg., det.). *Leucorrhinia pectoralis*: Lago Bassiver, m-cizo de Beret (Lérida), UTM 31TCH3429, 2.120 m; 1 female; 10-VII-92. (J. Dantart leg., det.).] Address: Martín, R., Avda. Martí Pijol, 250, 3°, 4a, E-08911 Badalona (Barcelona), Spain

1357. **D'Antonio, C. (1999):** *Lindenia*. *Lindenia* 31: 133-134. (in Italian). [Announcements of the WDA meetings in Darmstadt, Germany (7-9 July 2000) and Gällivare, Sweden (22-27 Juli, 2001), and the SIO meeting in Novosibirsk, Russia (10-14 July, 2001); addition of 3 titles to the bibliography of Italian odonatological literature] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindenia@freemail.it

1358. **Donath, H. (1999):** Die Kleine Königslibelle (*Anax parthenope* (Selys 1839)) in der Schlabendorfer Bergfolgelandschaft. *Biologische Studien, Luckau* 28: 100-104. [Detailed documentation of records of *A. parthenope* after 1995 in the Schlabendorf brown coal mining restoration region (51.81N 13.82E). On 26/6/1999 for the first time exuviae of the species could be detected; the habitat and the succession of the odonate fauna of the habitat (lake Stoßendorf) is described] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

1359. **Duscoulier, F.; Paillisson, J.-M.; Bernier, C. (1999):** Étude faunistique des odonates du lac de Grand-Lieu (Département de Loire-Atlantique). *Martinia* 15(4): 107-120. (in French with English summary). [Detailed account (1985-1998) on the dragonfly fauna of the Grand-Lieu lake with commented list of 42 species.]

Address: Duscoulier, F., Club C.P.N. des Sittelles, 8, rue des Martins, F-44230 Saint-Sébastien-sur-Loire, France

1360. **Eigenhuis, K.J.; Groenendijk, D. (1999):** De betekenis van de insectennaam Rombout. *Brachytron* 3(2): 28-30. (in Dutch). [The Dutch name of the genus *Gomphus* "Rombout" is analysed. The authors suppose that the element "rom" of the name came from ronken (snoring). The element "bout" is explained as an expression of a metall pole or stick.] Address: Eigenhuis, K.J., Rietgorsstraat 1, NL 1431 VT Aalsmeer, The Netherlands

1361. **Englund, R.A. (1999):** The impacts of introduced poeciliid fish and Odonata on the endemic Megalagrion (Odonata) damselflies of Oahu Island, Hawaii. *Journal of Insect Conservation* 3(3): 225-243. (in English). ["Since the beginning of this century there have been substantial declines in the distribution and abundance of native Megalagrion damselies on the Hawaiian Island of Oahu. Native damselies have also vanished from most low elevation areas on other Hawaiian Islands, although historically, lotic and wetland dwelling damselfly species were once common throughout the archipelago. It is hypothesized that poeciliid fish introduced for biological control have caused the decline of four stream-breeding damselfly species on Oahu, and the extinction or near-extinction of two other species in Hawaii. This study documents the presence of remnant Megalagrion populations in Oahu streams, wetlands and estuaries, and records the elevational distributions of introduced sh in each waterbody surveyed. The distributions of introduced Odonata are also recorded, because the seven species of damselflies and dragonflies introduced to Oahu since 1936 present another potential threat to native Hawaiian damselies. Native damselfly and introduced poeciliid fish distributions were mutually exclusive on Oahu, and it is concluded that this is probably due to predation by the introduced fish. By contrast, even the rarest native Megalagrion damselflies were found in areas containing introduced damselflies and dragonflies." (Author)] Address: Englund, R.A., Natural Sciences Department, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817 USA.

1362. **Ezenwaji, H. (1999):** The abundance and trophic biology of *Clarias albopunctatus* Nichols & La-Monte, 1953 (Osteichthyes: Clariidae) in a tropical floodriver basin. *Hydrobiologia* 392: 159-168. (in English). [The abundance, food and feeding biology of *Clarias albopunctatus* was studied over a period of 17 months in the lower River Anambra, Nigeria. Insects were the predominant food, followed by crustaceans. Of primary importance were Chironomidae (mainly *Chironomus* spp. and *Tanytus* sp.), Odonata nymphs, *Dytiscus* sp., mosquito larvae and pupae, *Gyrinus* sp., *Daphnia* sp., Ostracoda and *Tilapia fry*.] Address: Ezenwaji, H., Fisheries and Hydrobiology Research Unit, Department of Zoology, University of Nigeria, Nsukka Nigeria

1363. **Fromhage, L. (1999):** Erstnachweis der Arktischen Smaragdlibelle *Somatochlora arctica* (Zetterstedt, 1840) im Regierungsbezirk Koblenz. *Fauna Flora Rheinland-Pfalz* 9: 341-345. (in German with short English summary). [First record of *S. arctica* in the Hunsrück mountains in Rheinland-Pfalz, Germany; the larva was collected (1997 and 1998) in a hollow of a

Sphagnum layer developend on a swampy trail.] Address: Fromhage, L., St. Sebastiansstr. 6, D-55128 Mainz, Germany

1364. **Gaino, E.; Rebor, M. (1999):** Larval antennal sensilla in water-living insects. *Microscopy research and technique* 47: 440-457. (in English). ["An overview of larval antennal sensilla in hemimetabolous and holometabolous water-living insects is given by updating current knowledge on the fine structure of these, sensory systems. In the absence of successful electrophysiological studies, the possible function of sensilla is deduced from their architecture. Various kinds of sensilla are described in hemimetabolous insects such as "Odonata (*Libellula depressa*) and "holometabolous insects [...]. Their possible function in responding to stimuli from the freshwater environment is illustrated and discussed. The importance of sensilla as taxonomic and phylogenetic traits is reported in Baetidae (Ephemeroptera) and in Diptera Nematocera. [...]. Particular features, such as cuticle without pores in chemosensory sensilla and naked perikarya, are so far found exclusively in some water-living arthropods, thus reflecting a possible adaptation to the aquatic habitat. The structure of sensilla and chloride cells, which have a similar external morphology, is presented and discussed in various insect groups, considering the possible derivation of the chloride cells from sensilla." (Authors)] Address: Gaino, El-da & Manuela Rebor, University of Perugia, Dipartimento di Biologia Animata ed Ecologia, Via Elce di Sotto, I-06123 Perugia, Italy. E-mail: gaino@unipg.it

1365. **Göcking, C. (1999):** Lebenszyklus von *Platycnemis pennipes* (Pallas) und *Calopteryx splendens* (Harris) in zwei Fließgewässern Brandenburgs (Zygoptera: Platycnemididae, Calopterygidae). *Libellula* 18 (3/4): 147-162. (in German with English summary). ["The larval development of both spp. was monitored in two different running waters in Brandenburg, Germany from Mai to September 1995. For *C. splendens* a two-year life cycle is suggested, *P. pennipes* seems to be univoltine." (Author)] Address: Christian Göcking, Zum Hiltruper See 9, D-48165 Münster, E-mail: gockinc@uni-muenster.de

1366. **Grandstaff, E.D.; Bulow, F.J (1999):** The claw sampler - A macroinvertebrate sampler for scuba divers. *North American Journal of Fisheries Management* 19(1): 219-220. (in English). ["A device is described that can be used by scuba divers to obtain quantitative macroinvertebrate samples from flat surfaces. Called the "claw sampler," it was designed to collect macroinvertebrates colonizing spawning benches in Tennessee reservoirs. The spawning benches, 3.0-m X 25-cm wood slabs attached to 30-cm concrete blocks, were used to simulate logs under which smallmouth bass *Micropterus dolomieu* spawn. The claw sampler effectively collected quantitative samples of coleopterans, dipterans, ephemeropterans, odonates, trichopterans, cladocerans, and gastropods that colonized the spawning benches and provided a readily available food supply for age-0 smallmouth bass other fishes." (Authors)] Address: not available

1367. **Groot, T. de; Wasscher, M. (1999):** Has *Leucorrhinia pectoralis* shifted its habitat in The Netherlands? *Brachytron* 3(2): 18-25. (in Dutch with English summary). ["At the moment *L. pectoralis* is a rare and declining species in the Netherlands. The species is listed as "threatened" in the Dutch Red List. During the

first half of the century large numbers were found in several kinds of habitats, such as marshland near rivers, and also coastal dune lakes. Usually these habitats were mesotrophic with a well-developed riparian vegetation. Nowadays there are two main habitats: small mesotrophic waters on sandy soils and peat marshes. Numbers on sandy soils have decreased dramatically and the species is now only recorded sporadically there. On the other hand, large numbers (up to 40 individuals on a 150 m stretch of ditch) have been found in De Wieden and Weerribben, two peat marsh areas in the northwestern part of the province of Overijssel, in the last few years. It is not clear whether these populations had been overlooked in the past, or whether this species has only recently developed higher numbers here. Currently, the region supports one of the largest populations in northwestern Europe." (Authors)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1368. **Groot, T. de (1999):** The dragonflies of five peat mires. *Levende Natuur* 100(4): 112-117. (in Dutch). ["In The Netherlands the presence of dragonflies in five large peat mires of Natuurmonumenten has been studied. The study is focussed on characteristic peat mire species and one peat mire specialist and includes five species of the Red List. This paper deals with differences and similarities between the dragonfly populations in these five areas. All known peat mire dragonflies can be found in two of the areas (De Wieden and De Vechtplassen). Moreover large numbers of *Aeshna viridis* and *Leucorrhinia pectoralis* have been found in De Wieden. In great parts of Western-Europe six out of seven peat mire dragonflies are being threatened. This paper stresses the importance of the Dutch populations of these dragonflies and also their habitats in peat mires. Protection of habitats is needed, specifically for the threatened dragonflies which are dependant on certain stages of succession in peat mires. In order to start new succession of the vegetation new peat holes are being dugged the last few years. This can be of great importance for the dragonflies." (Author)] Address: Groot, T. de, Simon Bolivarstraat 89, NL 3573 ZK Utrecht, The Netherlands

1369. **Haden, G.A.; Blinn, D.W.; Shannon, J.P.; Wilson, K.P. (1999):** Driftwood: An alternative habitat for macroinvertebrates in a large desert river. *Hydrobiologia* 397: 179-186. (in English). ["*Argia* sp." was represented in the July sampling period, and "Odonata" in the October sampling period.] Address: Haden, G.A., Northern Arizona University, Dept Biology, P.P. Box 5640, Flagstaff, AZ 86011, USA

1370. **Heidemann, H. (1999):** Analyse d'ouvrages. *Martinia* 15(4): 136-144. (in French). [extensive review of the books abstracted in OAS 623 and 1149] Address: Heidemann, H., Au in den Buchen 66, D-76646 Bruchsal, Germany

1371. **Heijden, A. van der (1999):** Donkere waterjuffer herontdekt tijdens Weerribbenexcursie. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 3(4): 4-5. (in Dutch). [A trip (8 May 1999) of some Dutch odonatologists to the Weerribbe region (The Netherlands) resulted in the rediscovery of *Coenagrion armatum* which for the last time was seen in 1956 in the Netherlands; additional interesting species in the region are *Coenagrion pulchellum*, *Sympetma paedisca*, *Cor-*

ulia aenea, *Leucorrhinia rubicunda*, and *L. pectoralis*] Address: Heijden, Antoine van der. io335601@student.io.tudelft.nl

1372. **Hennig, R. (1999):** Zur Odonatenfauna des Landkreises Wittenberg. *Pedemontanum* 3: 1-6. (in German). [51 odonate species are known from the Landkreis Wittenberg, Sachsen-Anhalt, Germany in 1998; the records are listed in a tab; characteristic species of different habitat types are outlined. The listing of *Aeshna viridis* remains a little bit obscure.] Address: Hennig, R., Neustr. 10a, D-06886 Wittenberg-Lutherstadt, Germany

1373. **Hilfert-Rüppel, D.; Rüppel, G.; Suhling, F. (1999):** *Onychogomphus uncatatus* (Charp.) and *Oxygastra curtisii* (Dale) in southern Morocco in April (Anisoptera: Gomphidae, Corduliidae). *Notul. odonatol.* 5(4): 50. (in English). [Observations from the stream Tamrhakht, 50 km NE of Agadir situated in the western foothills of the Haut Atlas on 8 April 1999; additional information on *Gomphus simillimus maroccanus* is given] Address: Suhling, F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1374. **Hilfert-Rüppel, D. (1999):** To stay or not to stay: decision-making during territorial behaviour of *Calopteryx haemorrhoidalis* and *Calopteryx splendens splendens* (Zygoptera: Calopterygidae). *International Journal of Odonatology* 2(2): 167-175. (in English). ["The effect of copulation and presence of predators on territorial behaviour of male *Calopteryx haemorrhoidalis* (in southern France) and of male *C. splendens splendens* (in northern Germany) was studied in nature. A male obtaining a copulation early in the day often secured more copulations later that day than did males not obtaining an early copulation. Predators such as Green frogs, *Rana esculenta*, and water spiders, *Dolomedes* sp., affected subsequent behaviour of male *Calopteryx* that they attacked but failed to catch. A male *C. haemorrhoidalis* that had only recently occupied a territory when attacked by a spider, vacated the territory immediately, whereas a male first attacked after having occupied a territory for more than three hours and that had already courted females there remained, while avoiding the predator's immediate location. Results are discussed in the context of the value of the territory as a resource."(Author)] Address: Hilfert-Rüppel D., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

1375. **Holusa, O. (1999):** The first record of *Orthemtrum coerulescens anceps* (Schneider, 1845) in Slovenia (Anisoptera: Libellulidae). *Exuviae* 5(1): 13-16. (in English with Slovene summary). [On 16-VII-1997 a tandem of the taxa was caught near the village of Boreci, NE Slovenia] Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

1376. **Hong Sung-Jong; Woo Ho-Chun; Lee Soo-Ung; Huh Sun (1999):** Infection status of dragonflies with *Plagiorchis muris* metacercariae in Korea. *Korean Journal of Parasitology* 37(2): 65-70. (in English). ["*Plagiorchis muris* has been found in both house and field rats as well as in humans. The infection status of the second intermediate hosts of *P. muris* is prerequisite in understanding their biological features in an ecosystem. Six species of dragonflies were caught in a wide range of areas in Korea; and they were *Sympetrum darwinianum*, *S. eroticum*, *S. pedomontanum*, *S. infuscatum*,

Pantala flavescens, *Calopteryx atrata*, and *Orthetrum albistylum speciosum*. The occurrence of *P. muris* metacercariae in dragonflies was nationwide with various infection rates. The metacercarial burden of *P. muris* in the surveyed areas was the highest in *S. eroticum* followed by *S. darwinianum*, *S. pedomontanum*, and *C. atrata*. The highest infection rate by *P. muris* metacercariae was found in *S. darwinianum* followed by *S. eroticum*. The metacercarial burden was particularly heavy in the dragonflies found in Hamyang-gun and Kosong-gun, Kyongsangnam-do. It is, therefore, likely that dragonflies play a significant role as the second intermediate host in the life cycle of *P. muris* in Korea." (Authors)] Address: not available

1377. **Hooper, R.E.; Tsubaki, Y.; Siva-Jothy, M.T. (1999):** Expression of a costly, plastic secondary sexual trait is correlated with age and condition in a damselfly with two male morphs. *Physiological Entomology* 24(4): 364-369. (in English). ["Males of the damselfly *Mnais costalis* Selys [...] are morphologically and behaviourally polymorphic, typically existing as clear-winged non-territorial 'sneaks' and orange-winged territorial 'fighters'. The amount of orange pigment in the wing, as measured with a chromameter, varied between individuals, and decreased as the reproductive season progressed. Young individuals maintained in the laboratory on high or low nutrient diets differed in the amount of pigment that developed in the wing. Males in the high nutrient group developed darker wings faster than those in the low nutrient group. Young adults of both sexes and morphs were fed ¹⁴C-radiolabelled tryptophan or tyrosine (precursors of the pigments ommochrome and melanin, respectively). Ommochrome was restricted to the pseudoptero stigma of the males of both morphs and was not present in females. The presence of tyrosine in the wing cells of orange males, but not of clear males, indicated that the orange pigment is at least partly constituted from melanin. These data show that at least some pigment levels must be maintained continuously in the wings of orange males, and that maintenance is costly as it is compromised at low nutrient levels." (Authors)] Address: Hooper, R.E., Laboratory for Wildlife Conservation, National Institute for Environmental Studies, Tsukuba, 305-0053 Japan

1378. **Hornig, U. (1999):** Bericht über die Tagung Sächsischer Entomologen am 18. September 1999 in Königswartha/OL. *Mitt. Sächsischer Entomol.* 48: 25-26. (in German). [Report on a meeting of Saxonian entomologists including a short notice on a lecture of Thomas Brockhaus on dispersal in Odonata] Address: Hornig, U., Lindenberger Str. 24, D-02736 Oppach/OL, Germany

1379. **Hunger, H.; Schiel, F.-J. (1999):** Massenentwicklung von *Sympetrum fonscolombii* (Selys) und Entwicklungsnachweis von *Anax ephippiger* (Burmeister) in Überschwemmungsflächen am südlichen Oberrhein (Anisoptera: Libellulidae, Aeshnidae). *Libellula* 18(3/4): 189-195. (in German with English summary). ["In 1999, *Sympetrum fonscolombii* emerged in four and *Anax ephippiger* in two gravel pits. In one area that was inundated for 10 to 12 weeks between middle of May and end of July 1999, a mass reproduction with several 100,000 individuals of *S. fonscolombii* occurred. In years without exceptionally high and prolonged ground water level, this area is completely dry. It was observed that larvae of *S. fonscolombii* are able to survive for at least two weeks after their larval habitat has dried up. In the

dried up. In the same area, a summer generation of *Ischnura pumilio* developed successfully." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Am Pfahlgraben 8, D-79276 Reute, Germany

1380. **Jacquemin, G.; Boudot, J.-P. (1999):** Les libellules (Odonates) du Maroc. Société Française d'Odonatologie. ISBN 2-9507291-3-4: 150 pp. (in French with English summary). ["This work synthesise all the available faunistic data already published, dealing with Moroccan Damselflies and Dragonflies, and adds a lot of new unpublished data. It can be used within the limits of Morocco, Algeria and Tunisia, and is the first modern book dealing with the Odonata of the Maghreb. A general part gives the most useful informations about the past faunistic research in Morocco and on the biology and ecology of the Dragonflies in the Maghreb. A detailed and illustrated key allows the identification of all species of Odonata known from Morocco, Algeria and Tunisia. A commented list provides for each Moroccan Dragonfly: its local status, the previously and newly known localities where it has been observed, the most useful information on its distribution (including a map), as well as biological and ecological notes (particularly the flight period), and, when necessary, a taxonomic discussion. Chorological considerations and a discussion on nature preservation are also approached. A detailed bibliographic section with more than 150 references ends the text part of this book. A number of high quality colour photographic plates illustrate the most representative habitats and all species of dragonflies living in Morocco (males and many of the females). The plates are complemented by pterographies showing the precise wing venation of each species." (taken from the announcing leaflet)] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

1381. **Jödicke, R. (1999):** Nachweis einjähriger Entwicklung bei *Aeshna cyanea* (Müller) (Anisoptera: Aeshnidae). *Libellula* 18(3/4): 169-174. (in German with English summary). ["At a newly setup garden pond near Cloppenburg, NW Germany, a part of the larval population emerged in the year after oviposition. Another part started a hibernation dormancy in the last four stages. Next year the emergence started in late May." (Author)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

1382. **Jong, T.H. de (1999):** Aantal vleugelcellen tegenover het pterostigma bij de Houtpantserjuffer (*Lestes viridis*). *Brachytron* 3(2): 26-27. (in Dutch). [In June 1998 near Beziers, France, specimens of *Chalcolestes viridis* were traced with more than two cells behind the pterostigma. To avoid confusion with *Lestes macrostigma*, which has 3-4 cells behind the pterostigma, the frequency distribution of cells behind the pterostigma of *C. viridis* was studied: In more than 30% at least one of the wings of *C. viridis* has more than 2 cells behind the pterostigma.] Address: Jong, T.H. de, Rijnlaan 25, NL-4105 GS Culemborg, The Netherlands. E-mail: theo.marijke@wxs.nl

1383. **Jong, T.H. de (1999):** *Aeshna viridis* in the province of Utrecht (NL). *Brachytron* 3(2): 11-17. (in Dutch with English summary). ["In 1998 localities with *Stratiotes aloides* (mostly ditches in agricultural land) in the province of Utrecht were surveyed for *A. viridis*. The species was found at 29 of the 56 visited sites. Oviposi-

tion was recorded at nineteen locations. The total number of individuals seen was 75. The maximum number of specimens found at a single locality was eleven. Vegetations with *A. viridis* were on average more extensive, the water was deeper and the cover of *Azolla filiculoides*, *Elodea nutallii* and green algae was less. Homogeneous *Stratiotes* vegetations with a surface of 400 m² or more and only a slight cover of *Lemna spec.*, *Azolla filiculoides* and *Etoda nutallii*, were preferred for oviposition. At such sites, the density of *Stratiotes* is about 20 plants per m² with leaves protruding at least 15 cm above the water surface. It was observed that females oviposit in all accessible leaves of a single plant before moving on to another plant. They seemed to prefer plants with withered, brown leaf tips. It is suggested that such plants have narrower leaves, which makes them easier to grasp for the female. Besides *A. viridis* twelve other species of Odonata were seen at the *Stratiotes* vegetations. *Lestes sponsa* and *Coenagrion pulchellum* appear to show a similar habitat preference to *A. viridis*. In contrast however *Erythromma viridulum* and *Orthetrum cancellatum* seem to avoid such localities. Although the leaves of *Stratiotes* are thought to protect the larvae against predators, fish larger than 10 cm were often found in open spots in the vegetations and fish smaller than 10 cm were even seen between the plants." (Author)] Address: Jong, T.H. de, Rijnlaan 25, NL-4105 GS Culemborg, The Netherlands. E-mail: theo.marijke@wxs.nl

1384. **Julka, J.M.; Vasisht, H.S.; Bala, B. (1999):** Distribution of aquatic insects in a small stream in northwest Himalaya, India. *Journal of the Bombay Natural History Society* 96(1): 55-63. (in English). [species composition, annual variability, microhabitat preference and species diversity index of aquatic insects in a perennial stream in northwest Himalaya, during 1989-91. A total of 62 morphospecies belonging to Ephemeroptera, Odonata, Plecoptera, Hemiptera, Megaloptera, Coleoptera, Trichoptera, and Diptera were caught in the samples] Address: Julka, J.M., Zoological Survey of India, Solan, HP, 173212, India

1385. **Kalkman, V. (1999):** Recensies: De danske guldsmede. Apollo books. 280 pp. ISBN: 87-88757-21-8. *Brachytron* 3(2): 30. (in Dutch). [Review of the book of Ole Fogh Nielsen; see OAS 399] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands

1386. **Kern, D. (1999):** Langzeituntersuchungen zur Populationsentwicklung und zum Lebenszyklus von *Gomphus vulgatissimus* (Linnaeus) an einem nordwestdeutschen Fließgewässer (Anisoptera: Gomphidae). *Libellula* 18(3/4): 107-132. (in German with English summary). ["From 1989 to 1999 larvae were collected in a draining ditch in the Kreis Diepholz (Germany) and quantitative investigations of emergence were made. Based on biometric data of more than 8000 larvae, a three to four years development is suggested. The annual collections of exuviae featured an average emergence periode of 21 days and an EM50 of 6-7 days. A mean of 467 exuviae per year was collected in a 800 m section. Generally, the females were predominant with a mean of 52.7 %. The time of emergence seemed to be dependent on the actual lowest and highest daily water temperature. Some aspects of the larval development and the emergence are discussed in comparison to the results on *G. vulgatissimus* from the large ri-

ver Oder." (Author)] Address: Kern, D., Taxusweg 2, D-27232 Sulingen, Germany

1387. **Kido, M.H.; Heacock, D.E.; Asquith, A. (1999):** Alien rainbow trout (*Oncorhynchus mykiss*) (Salmoniformes: Salmonidae) diet in Hawaiian streams. *Pacific Science* 53(3): 242-251. (in English). ["Diet of rainbow trout, *Oncorhynchus mykiss* (Walbaum), introduced by the State of Hawai'i into tropical headwater streams of the Waimea River in the Koke'e area of the Hawaiian island of Kaua'i, was examined in this study through gut content analysis. In Wai'alae Stream, rainbow trout were found to be opportunistic general predators efficient at feeding on invertebrate drift. Foods eaten ranged from juvenile trout, to terrestrial and aquatic arthropods, to algae and aquatic mosses. Native aquatic species, particularly dragonfly (*Anax strennus*) and damselfly (*Megalagrion heterogamias*) naiads, lymnaeid snails (*Erinna aulacospira*), and atyid shrimp (*Atyoida bisulcata*), were determined to be major foods for alien trout. Terrestrial invertebrates (primarily arthropods), however, provided a substantial (albeit unpredictable) additional food supply. Based on results of the study, it is cautioned that large numbers of rainbow trout indiscriminantly released into lower- to middle-elevation reaches of Hawaiian streams could do substantial damage to populations of native aquatic species through predation, competition, and/or habitat alteration." (Authors)] Address: Kido, M.H., Hawai'i Stream Research Center, University of Hawai'i, 7370A Kuamo'o Road, Kapa'a, HI, 96746, USA

1388. **Kotarac, M. (1999):** Additional note about androchrome females in *Crocothemis erythraea* (Brulle, 1832). *Exuviae* 6: 19-20. (in English with Slovenian summary). [Kotarac (1996) reported bright red coloured females of *C. erythraea*. "Since then additional information on the subject has been collected and is presented here. On 31-VII-1996 three red females were observed [...] S of the village Skofije near port of Koper at the Slovenian Littoral (UTM VL04, alt. 5m). All individuals were mature, but in no way old. The red colour was nearly as bright as in males. [...] Mr U. Cervek (Maribor, Slovenia; pers. comm.) reported sightings of red *C. erythraea* females at a gravelpit near Sredisce ob Dravi (NE Slovenia) in August 1996. Additionally Dr M. Pavesi (Milano, Italy; pers. comm.) provided information about red coloured females observed in SE Italy (Puglia, Gallipoli) and E Turkey (area of Diyarbakir). He stated, however, that in his opinion they were older individuals and that red coloration was a sign of maturation. [...] In July and August 1997 a good population of *C. erythraea* with red coloured females was discovered at Blato, 3 kilometers S of town Korcula on the island Korcula, S Croatia. [...]"] (Author)] Address: Kotarac, M., Centre for Cartography of Fauna and Flora, Antoliceva 1, SI-2204 Miklavz na Dravskem polju, Slovenia. E-mail: mladen.kotarac@ckff.si

1389. **Krno, I.; Sporka, F.; Matis, D.; Tirjakova, E.; Halgos, J.; Kosel, V.; Bulankova, E.; Illesova, D. (1999):** Development of zoobenthos in the Slovak Danube inundation area after the Gabčíkovo hydropower structures began operating. Gabčíkovo part of the Hydroelectric Power Projekt - Environmental impact review. Faculty of natural Sciences, Comenius University, Bratislava, Slovakia: 175-200. (in English). [Tab. 4 documents the odonate fauna of the Slovakian part of the River Danube.] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius Uni-

versity, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; tel.+ 421-7-728 922, E-mail: Bulankova@nic.fns.uniba.sk

1390. **Küttner, R.; Brockhaus, T.; Lässig, A. (1999):** Spezialistenlager Insektenkunde 1999 in der Naturschutzstation Weidnitz bei Rochlitz. Mitt. Sächsischer Entomol. 48: 29-30. (in German). [*Aeshna cyanea*, and *A. mixta* were observed in the framework of the meeting; the publication of the complete species lists is in preparation] Address: Küttner, R., Dorfstr. 26a, 09326 Schweikershain, Germany

1391. **Laurent, S. (1999):** Discussion sur la variabilité morphométrique de *Cercion lindenii* (Odonata, Coenagrionidae). *Martinia* 15(4): 125-130. (in French with English summary). [The emergence patterns of *Cercion lindenii* were monitored at a pond near Barbentane (Bouches du Rhône, France) and on the banks of the Rhône river at Aramon (Gard, France). Size and color patterns of abdomen, thorax, and wings of the emerging population depend on temperature factors and bivoltinism phenomena.] Address: Laurent, S., 14, Rue Edmond Michelet, F-84000 Avignon, France

1392. **Laurila, A.; Kujasalo, J. (1999):** Habitat duration, predation risk and phenotypic plasticity in common frog (*Rana temporaria*) tadpoles. *Journal of Animal Ecology* 68(6): 1123-1132. (in English). [1. Common frogs (*Rana temporaria*) breed readily in small pools and thus expose their offspring to catastrophic mortality by desiccation. Amphibian larvae exhibit considerable phenotypic plasticity in metamorphic traits, and some species respond to environmental uncertainty by metamorphosing earlier and at smaller size. In a factorial laboratory experiment, we studied whether common frog tadpoles possess this ability. 2. We also studied the interaction between pool drying and predation risk, because in a previous study the presence of a predatory dragonfly larva delayed metamorphosis of the tadpoles. 3. We gradually removed water from half the experimental containers, while in the other half the water volume was kept constant. In the laboratory it was possible to remove the effect of increased water temperature in the decreasing volume treatment by using fluorescent lights. Tadpoles responded to decreasing volume by metamorphosing earlier and at smaller size. A greater proportion of the tadpoles metamorphosed in the decreasing volume treatment. 4. Tadpoles were less active at decreasing water level and there were significant positive correlations between activity late in the experiment and metamorphic size. This suggests that the metamorphic response to habitat drying is behaviourally mediated. 6. Early in the experiment, tadpoles developed slower in the presence of predators. At metamorphosis presence of a dragonfly larva had no effect in the whole data set, but when the constant volume treatment was analysed separately, larval period was longer in the presence of a predator. 7. Our results indicate that common frog larvae are able to respond to pond-drying adaptively by speeding up their development, and that temperature advantage is not needed to induce this adaptive plasticity. Furthermore, pond-drying seems to be a more important determinant of development rate than the presence of odonate predators." (Authors)] Address: Laurila, A., Department of Population Biology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18d, S-752 36, Uppsala, Sweden

1393. **Logan, J.A. (1999):** Extraction, polymerase chain reaction, and sequencing of a 440 base pair region of the mitochondrial cytochrome oxidase I gene from two species of acetone-preserved damselflies (Odonata: Coenagrionidae, Agrionidae). *Environmental Entomology* 28(2): 143-147. (in English). ["Preserved insects are an important data for many molecular systematics projects. This study investigates the use of acetone-preserved specimens in molecular DNA research. Two species of damselflies, *Enallagma civile* (Hagen) and *Hetaerina americana* (F.), were soaked in acetone before drying. Total genomic DNA was successfully extracted, amplified, and sequenced from the acetone-preserved damselflies with no noticeable effect from either the acetone or preservation time. Nucleotide sequences of a 440 bp region of the mitochondrial cytochrome oxidase I gene are presented for *E. civile* and *H. americana*. These 2 species have reached a saturated divergence level and it seems that the COI gene will not be useful for developing phylogenies at this taxonomic level." (Author)] Address: not available

1394. **Manneville, O. et al. (1999):** Le monde des tourbières et des marais - France, Suisse, Belgique et Luxembourg. Delachaux et Niestlé. Lausanne. Paris: 320 pp-Odonata: 152-154. (in French). [A general outline to the dragonflies of peat-bogs, fens and marshes can be found on pages 152-154. Some remarks to the biology and ecology of Odonata are exemplified with characteristic species of bogs and marshes. The geographic and altitudinal distribution of some species is shortly mentioned. 29 species are listed in Appendix 6 with information on their status and the preferred habitat. (We are very grateful to Werner Clausen who provided a German translation of the Chapter with information on Odonata. Persons interested in this translation may contact W. Clausen, Zur Bockwindmühle 60, Oppenwehe, D-32351 Stemwede, Germany)]

1395. **Martens, A. (1999):** Buchbesprechungen: Corbet, P.S. (1999): *Dragonflies: Behaviour and Ecology of Odonata*. *Lauterbornia* 37: 247. (in German). [Review of P.S. Corbet's book, see OAS 1566] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1396. **Martín, R. (1999):** La Odonatofauna (Insecta: Odonata) del Parque Natural del Montseny (Cataluña, NE Península Ibérica). *Boln asoc. esp. ent.* 23(1-2): 171-193. (in Spanish with English summary). [Based on published data and own records taken from 1993 to 1998, 42 odonate species are known to occur in the Nature Reserve of Montseny, Spain. 12 species are only known from prior 1930. 7 species including *Oxygastra curtisii* were traced as new after 1987.] Address: Martín, R., Avda Martí Pujol 250, 3^a 4a, E-08911 Badalona, Barcelona, Spain

1397. **Martins-Neto, R.G. (1999):** Present knowledge of the Brazilian paleontological fauna. *Revista de la Sociedad Entomológica Argentina* 58(1-2): 71-85. (in Spanish). ["[...] The first mention about fossil insects was made by the Brazilian researcher Eusebio Oliveira, in the beginning of the century. Later, was described the first Brazilian form, *Phylloblatta oliveirai* Carpenter, a paleozoic Blattoptera from Parana Basin, named in honour to E. Oliveira. The insect record is well documented in Paleozoic Era, being the Parana Basin the responsible by the greater number of references, principally of Blattoptera, but including the orders Neuroptera

ra, Coleoptera, Ensifera, Grylloblattida, Plecoptera, Auchenorrhyncha, Hemiptera, Megasecoptera and Mecoptera. In the Triassic Period the record is poor: just the orders Auchenorrhyncha and Blattoptera are represented until now. In the Cenozoic Era, Blattoptera, Hemiptera, Auchenorrhyncha, Coleoptera, Trichoptera, Lepidoptera, Diptera, Isoptera and Hymenoptera are represented. The greater diversification, however, are present in the Araripe Basin (Lower Cretaceous, Northeast Brazilian) with the following orders: Ephemeroptera, Odonata, Ensifera, Caelifera, Phasmatoptera, Blattoptera, Isoptera, Dermaptera, Hemiptera, Auchenorrhyncha, Neuroptera, Megaloptera, Raphidioptera, Coleoptera, Trichoptera, Lepidoptera, Mecoptera, Diptera and Hymenoptera." (Author)] Address: not available

1398. **Mauersberger, R. (1999):** Wiederfunde von *Anax parthenope* Selys und *Leucorrhinia caudalis* (Charpentier) in Mecklenburg-Vorpommern (Anisoptera: Aeshnidae, Libellulidae). *Libellula* 18(3/4): 197-199. (in German with English summary). ["In 1999, single adults of *A. parthenope* were observed at 2 clear-water lakes in the Müritzer National Park. A number of *L. caudalis* was recorded at a small shallow lake near Feldberg. Both species are well established in adjacent regions of Brandenburg." (Author)] Address: Mauersberger, R., Waldstraße 4, D-16278 Steinhofel

1399. **Mochizuki, H.; Morita, M.; Masuda, K; Kusamichi, I. (1999):** Flow mechanism around a dragonfly. *Memoirs of the Faculty of Agriculture Kagoshima University*. 35(43): 17-24. ["The flapping of the wing of the dragonfly and the flow generated by the flapping at full speed were observed by the high-speed video camera and the film camera. As the result, the relation between the movement of the wing and the flow was analyzed and clarified. The wings of the dragonfly move one cycle drawing a letter of "8" from the beginning of the downstroke to the end of the upstroke. Moreover, the gradient of the downstroke becomes larger than that of the upstroke, fetching larger velocity of the wing tip for the downstroke in comparison with the upstroke. The wakes generated by such flappings let their flow states the horizontal-, downward- and upward downstream directions depending on the horizontal-, upward- and downward flights. Almost all the amount of the air which enters into the region around the body and the wing is sucked from the upper side of the wing to compensate the air which has been exhausted by flapping. The edge of the wake generated by the flapping proceeds more downstream at faster velocity than that of the uniform flow. In this way, it can be confirmed that the thrust and the lift are generated by the flappings of the wings." (Authors)] Address: Masuda, K., Lab. Agric. Phys., Fac. Agric., Kagoshima Univ., Kagoshima, Japan

1400. **Mogi, M.; Sunahara, T.; Selomo, M. (1999):** Mosquito and aquatic predator communities in ground pools on lands deforested for rice field development in Central Sulawesi, Indonesia. *Journal of the American Mosquito Control Association*. 15(2): 92-97. (in English). [study area: Toili, Kabupaten Luwu-Banggai, eastern peninsula of Central Sulawesi; "Aquatic habitats, mosquitoes, and larvivorous predators were studied on deforested lands in Central Sulawesi, Indonesia. Open ground pools, mainly in depressions made by the treads of bulldozers and other heavy equipment, were numerous but because of their small size, comprised ca. 1% or less of the total area of the deforested

lands studied. The dominant mosquitoes in these pools were *Anopheles vagus*, *Culex vishnui*, *Culex tritaeniorhynchus*, and *Culex gelidus*. The 1st 2 species were dominant in clear pools, whereas the latter 2 species were dominant in turbid pools. The dominant metazoans other than mosquitoes were Crustacea, Ephemeroptera, and Chironomidae. Both aquatic and surface predators were abundant. Dominant among aquatic predators were Anisoptera and Zygoptera nymphs, Dytiscidae, and Notonectidae. These results are discussed in relation to mosquito control on deforested lands that transitionally but inevitably appear during the course of rice field development projects in Indonesia." (Authors)] Address: Mogi, M., Division of Parasitology, Department of Microbiology, Saga Medical School, Nabeshima 5-1-1, Saga 849-8501, Japan

1401. **Müller, J. (1999):** Editorial: *Pedemontanum* 3. *Pedemontanum* 3: 1. (in German). [Some critical remarks on the validity of odonatological research resulting from expertises of persons not specialized in Odonata and the regional odonate fauna; readers of *Pedemontanum* are urged to use the nomenclatorially updated checklist of Odonata occurring in Germany prepared by R. Jödicke (1992)] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1402. **Müller, J. (1999):** Literatur. *Pedemontanum* 3: 10-12. (in German). [Compilation of the titles No. 51 - 81 of odonatological publications with relevance to the Federal State Sachsen-Anhalt, Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1403. **Müller, J.; Steglich, R. (1999):** Neues von der Elbe bzw. aus dem Elbetal 1998. 1. UNESCO-Biosphärenreservat Flußlandschaft Elbe anerkannt. 2. *Aeshna affinis*-Reproduktionsgewässer fast ausgetrocknet. 3. Weitere Gomphidenfunde in der Elbe. *Pedemontanum* 3: 10. (in German). [22 April 1998 the Floodplain of River Elbe was recognized as Biosphere-reserve by UNESCO. 2 September 1998 *A. affinis* was recorded north of Magdeburg; new records of *Stylurus flavipes*, *Ophiogomphus cecilia*, and *Gomphus vulgatissimus* along the River Elbe] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1404. **Müller, J.; Steglich, R. (1999):** Weitere Gompiden-Nachweise in großen mitteleuropäischen Flüssen. *Pedemontanum* 3: 9. (in German). [Records of *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Stylurus flavipes* from Germany (Sachsen-Anhalt, Bayern), Hungaria, and Slovakia] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1405. **Müller, J. (1999):** Zur Naturschutz-Bedeutung der Elbe und ihrer Retentionsflächen auf der Grundlage stenöker lebensraumtypischer Libellenarten (Insecta, Odonata). *Abhandlungen und Berichte für Naturkunde, Magdeburg* 21: 3-24. (in German with English summary). [Based on detailed surveys of the author and a comprehensive study of literature and unpublished expertises, 52 odonate species are recognized as indigenous for the flood plain of River Elbe, Sachsen-Anhalt, Germany. This represents 65 % of the German Odonata fauna and 82,5 % of that of Sachsen-Anhalt. 31 of this species are of Mediterranean origin. This is caused by the specific climatic conditions in the Elbe valley with

higher summer-temperatures than in the surrounding area. The occurrences of *Gomphus vulgatissimus*, *Stylurus flavipes* and *Ophiogomphus cecilia* in the river and of *Lestes barbarus*, *Erythromma viridulum*, *Aeshna affinis*, *A. viridis*, *Anax parthenope*, and *Epitheca bimaculata* in the oxbow lakes and the temporary waters of the flood plain are of superregional importance. The responsibility of Sachsen-Anhalt for the protection of these species in Germany is stressed.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de

1406. **Murphy, D.H. (1999):** Odonata biodiversity in the Nature Reserves of Singapore. *Gardens' Bulletin (Singapore)* 49(2) (1997): 333-352. (in English). ["An account is given of Odonata collected during the survey of the Nature Reserves. Most of the species described from Singapore material in A.R. Wallace's collection in 1856 still occur. A total of 79 species have been recorded within the Nature Reserves, including an endemic damselfly, *Drepanosticta quadrata*. Eight species are known only from Nee Soon Swamp Forest." (Author)] Address: Murphy, D.H., Department of Biological Sciences, National University of Singapore, Kent Ridge, Singapore, 119260, Singapore

1407. **Muzon, J.; Ellenrieder, N. von (1999):** Status and distribution of Odonata (Insecta) within natural protected areas in Argentina. *Biogeographica* 75(3): 119-128. (in English). ["This paper is an initial study of Odonata occurring in protected areas of Argentina. Of the 264 species reported in the country 189 (71.59%) have been recorded from at least one natural protected area in the last three years. Information gathered from surveys of 16 protected areas is presented in relation to biogeography and taxonomy (to family level). Species recorded only from Argentina are indicated." (Authors)] Address: von Ellenrieder, Natalia, Instituto de Limnología "Dr. Raul A. Ringuelet", 1900, La Plata, Argentina

1408. **Nelson, B. (1999):** The status and habitat of the Irish damselfly *Coenagrion lunulatum* (Charpentier) (Odonata) in Northern Ireland. *Entomologist's Monthly Magazine* 135: 59-68. (in English). ["The N. Ireland population of *Coenagrion lunulatum* was surveyed in 1996. The main findings were: 1, the species was thought to be present at 23 sites in N. Ireland. Of these only 17 can now be regarded as definite. Albeit that 6 colonies were presumed on insubstantial evidence, 6 have disappeared. In other words a quarter of the known UK colonies have disappeared. 2, the size of individual colonies is smaller than previously suggested; only two colonies support large numbers. 3, the colonies are found on mesotrophic lakes and large bog pools. Habitat change caused by eutrophication is seen as the major threat to the species." (Author)] Address: Nelson, B.; Zoology Department, Ulster Museum, Botanic Gardens, Belfast, BT9 5AB, UK

1409. **Nessimian, J.L.; Sanseverino, A.M.; Oliveira, A.L.H. de (1999):** Trophic relationships of Chironomidae larvae (Diptera) and its importance on the food-webs in a sand dune marsh on the littoral of Rio de Janeiro State. *Revista Brasileira de Entomologia* 43(1-2): 47-53. (in Portuguese). ["A Food web study was carried out, based on direct observations and gut content analysis of macroinvertebrates sampled from Jan. 1987 to Feb. 1988, in Brejo-canal de Itaipuacu marsh, Marica, whose structure and composition have changed seasonally. Chironomid larvae and microcrustaceans were

the main taxa among the macroinvertebrates, being keystone prey groups in the trophic system. [...] The whole group showed an approximated mean of 14 trophic links per species against the medium value of 9 links per species for all macroinvertebrates sampled. The main alimentary items observed for chironomid larvae were chlorophytes, desmids diatoms, cladocerans, copepods, oligochaetes and chironomid larvae, besides poriferans, mites and vegetal fibers. On the other hand, chironomid larvae were constant items in Odonata, Hemiptera and Coleoptera diets. The variation in the number of interactions was due to the water column, the macrophyte and algae life cycles. Spring and summer observations showed the biggest number of links. The consequent changes in the availability of alimentary items was reflected, at least relatively, on the diversity of chironomid diet." (Authors)] Address: Nessimian, J. L. , Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil

1410. **Palmer, M.A. (1999):** The application of biogeographical zonation and biodiversity assessment to the conservation of freshwater habitats in Great Britain. *Aquatic Conservation: Marine and freshwater ecosystems* 9(2): 179-208. (in English). ["1. Twelve biogeographical zones for freshwater habitats in Great Britain were derived, using detrended canonical correspondence analysis of data on climate, relief, geology, soils and land use, in conjunction with occurrence data for more than 300 native freshwater species. 2. The taxonomic groups used were aquatic macrophytes, dragonflies (Tab. 6), freshwater molluscs, amphibians and selected leeches, water beetles and crustaceans. The computer database of the Institute of Terrestrial Ecology's Biological Records Centre was used as the principal of species data. 3. Within each of the 12 biogeographical zones, 10 X 10 km square 'hotspots' for species richness and rarity were identified. 4. The significance of this work for the conservation of freshwater habitats and species in Great Britain is discussed." (Author)] Address: Palmer, Margaret, Apple Barn Cottage, Fotheringhay, Peterborough, PE8 5JB, UK.

1411. **Paoletti, M.G.; Dunxiao, H.; Patrik, M.; Ningxing, H.; Wenliang, W.; Chunru, H.; Jiahai, H.; Liwan, C. (1999):** Arthropods as bioindicators in agroecosystems of Jiang Han Plain, Qianjiang City, Hubei China. *Critical Reviews in Plant Sciences*. 18(3): 457-465. (in English). [Arthropods on the soil surface and on vegetation were periodically surveyed in two villages on the Jiang Han Plain from April to September 1994. Odonata are mentioned in Tab. 4 without further discussion.] Address: Hu Dunxiao, China Agricultural University, Beijing, P.R. China

1412. **Parker, A.R. (1999):** Reflected glory: the key to insect colours. *Biologist* 46(5): 206-210. (in English). ["There are basically three categories of structures that cause colour in insects: (i) elements which cause scattering, (ii) diffraction gratings and (iii) single- and multi-layer reflectors. The last two mechanisms cause specular (directional) reflections, and therefore often appear relatively bright and 'metallic', whereas the first provides on omnidirectional reflectance. Generally within all of the categories, only transparent materials are involved in producing colour. [...] Scattering - blue: [...] A gradation from blue to white scattering ('small' to 'large' particles) occurs on the wings of the dragonfly *Libellula pulchella* (Mason, 1926). Blues resulting from this 'Ray-

leigh' scattering can also be found in other dragonflies and damselflies [...] In some, the epidermal cells contain minute colourless granules, which scatter the short wavelengths, and a dark base. These granules are absent in the females of the species. The males of some other species produce a waxy secretion that scatters light over their dark cuticle. The green of the female *Aeshna cyanea* is the combined result of Rayleigh scattering and a yellow pigment, both within the epidermal cells (degradation of the yellow pigment turns a dead dragonfly blue) [...] (Fox and Vevers, 1960)." (Author)] Address: Parker, A., Dept Zoology, University of Oxford, South Parks Road, Oxford OX1 3PS, UK

1413. **Petrulevicius, J.F. (1999):** Cenozoic insects from Argentina. *Revista de la Sociedad Entomologica Argentina* 58(1-2): 95-103. (in Spanish with English summary). ["A review of the information about cenozoic insects is presented. Paleogene insects are mentioned from different regions and formations. The *Siricinae Urocerus patagonicus* Fidalgo & Smith, 1987 is the unique nominated species from Laguna del Hunco Formation (Paleocene-Eocene; Chubut Province). This subfamily has at present a North Hemisphere distribution. The *Formicidae Polanskiella smekali* Rossi de Garcia, 1983 and the *Myrmecinae Ameghinoia piatnitzkyi* Viana & Haedo Rossi, 1957 are the two nominated species from Ventana Formation (Eocene-early Oligocene; Chubut Province), together with other (aquatic and terrestrial) insects. The *Myrmecinae* have at present an Australian distribution. Insects (*Curculionoidea*, *Elate-roidea* and *Formicidae*) are cited for the first time from Canadon Hondo Formation (Eocene; Chubut Province), as well as isolated elitra of *Coleoptera* from Olmedo Formation (lower Paleocene; Jujuy Province). Maiz Gordo Formation (upper Paleocene; northwestern Argentina) provided 37 species of *Orthoptera*, *Dermaptera*, *Hemiptera* (*Homoptera* and *Heteroptera*), *Trichoptera* and *Coleoptera*. Since 1993, new findings were carried out by the author in these insect layers. Thus far, representatives of six orders and several families have been found, including *Blattaria*, *Odonata*, *Mecoptera*, *Neuroptera*, *Diptera*, *Hymenoptera*, *Tettigoniidae* and *Lygaeidae*. Isolated tegmina of *Grylloidea* and elitra of *Coleoptera* (*Curculionoidea*) are known from *Lumbrera* Formation (lower Eocene; northwestern Argentina). Pleistocene insects are cited from two outcrops in Buenos Aires Province: puparia moulds of *Calliphoridae* in association with an articulated skeleton of *Carnivora* from the "Ensenadense", and an insect assemblage from Santa Clara Formation. The migratory subspecies *Schistocerca cancellata paranensis* (Burmeister, 1861) was found in an archaeological Holocene site in Tucuman Province." (Author)] Address: Petrulevicius, JF; Museo La Plata; Dept Cient Paleozool Invertebrados; Paseo Bosque S-N; RA-1900 La Plata; Argentina. E-mail: levicius@netverk.com.ar

1414. **Pirnat, A. (1999):** Study of emergence in *Pyrrosoma nymphula* (Sulzer) (*Zygoptera*: *Coenagrionidae*). *Exuviae* 5(1): 6-12. (in English with Slovene summary). ["From 21-IV to 12-V-1994 the emergence of *Pyrrosoma nymphula* was studied at a small forest pond in Ljubljana, central Slovenia. A total of 798 exuviae were collected and the daily emergence rate, synchronization of emergence and sex ratio were studied. A short note on mortality and predation [by Spiders, ants, lizards, and birds] during emergence is also appended." (Author)] Address: Pirnat, Alja, Biological Insti-

tute ZRC SAZU, Novi trg 5, SI-1000 Ljubljana, Slovenia. E-mail: alja.pirnat@guest.arnes.si

1415. **Polyanovskii, A.D. (1999):** Phototransduction in insects: Two strategies for calcium homeostasis? *Sensory Systems* 12(3): 181-187. (in English). [This is the English version of the paper abstracted as OAS 1306] Address: Polyanovskii, A.D., I. M. Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, 44 M Torez Prospekt, 194223 St. Petersburg

1416. **Reinhardt, K. (1999):** The reproductive activity of two *Pseudagrion* species in the same habitat (*Odonata*: *Coenagrionidae*). *African Entomology* 7(2): 225-232. (in English). ["The reproductive activity of two closely related species, *Pseudagrion massaicum* Sjöstedt and *P. salisburyense* Ris was examined relative to environmental factors. The abundance of both species was positively correlated, suggesting a weak influence of interspecific competition. The most important abiotic factor influencing the activity of the two species was cloud cover. Males of the two species showed a strong spatial separation in perching position relative to vegetation type, perch height and distance to the banks. The proportion of males actively engaged in reproduction rose significantly with time of day but was independent of total male density and the relative importance of either patrolling or perching behaviour. Males of both species were found to be non-territorial, which is exceptional for the genus *Pseudagrion*. This is discussed relative to high territory retention costs at high dragonfly densities." (Author)] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1417. **Reinhardt, K.; Kempke, D. (1999):** Thoracic temperatures in four libellulid dragonflies (*Anisoptera*: *Libellulidae*). *Notul. odonatol.* 5(4): 41-43. (in English). ["The thoracic temperatures in *Orthetrum cf. caffrum*, *Trithemis arteriosa*, *T. dorsalis* and *Palpopleura lucia* were measured in the field. All spp. belong to the percher type. Their thoracic temperatures were between 0.7 and 10.5°C above ambient temperature. The pale blue *O. cf. caffrum* had a higher body temperature than the dark blue *T. dorsalis*. The thorax temperature was positively correlated to abdomen length but not forewing length between species with a similar trend within *T. dorsalis*." (Authors)] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1418. **Reinhardt, R.; Pimpl, F. (1999):** Beitrag zur Insektenfauna des Landkreises Mittweida. *Mitt. Sächs. Entomologen* 47: 8-17. (in German). [Checklist of 11 odonate species of the county Mittweida, Saxony, Germany] Address: Reinhardt, R., Burgstädter Str. 80a, D-09648 Mittweida, Germany

1419. **Rolff, J. (1999):** Parasitism increases offspring size in a damselfly: Experimental evidence for parasite-mediated maternal effects. *Animal Behaviour* 58(5): 1105-1108. (in English). ["The effects of parasites on host fitness and the fitness effects of maternal effects are widely discussed. In this study, I conducted an experiment linking both aspects. I manipulated the ectoparasite load (*Acari*: *Arrenurus cuspidator*) of damselflies, *Coenagrion puella*, and found that larvae from mothers with high parasite loads were larger (assessed by head width) than larvae from mothers with low parasite loads. Furthermore, there was a negative correlati-

on between the number of eggs laid and parasite load. Parasitized mothers thus seemed to have fewer, but probably better, offspring. The ecological significance of these parasite-mediated maternal effects remains to be tested. However, size-dependent cannibalism almost certainly has important consequences for population dynamics." (Author)] Address: Rolff, J., Zoologisches Institut, AG Ökologie, Technische Universität Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1420. **Ruddek, J. (1999):** *Gomphus vulgatissimus* (Linnaeus) in der Weser bei Bremen (Anisoptera: Gomphidae). *Libellula* 18(3/4): 201-203. (in German with English summary). ["Exuviae and adults of *G. vulgatissimus* were found in May and June 1999. The number of Odonata species recorded in the federal state of Bremen increased to 47 species." (Author)] Address: Ruddek, R., Butendiek 34, D-28865 Lilienthal, Germany. E-mail: juergen.ruddek@telekom.de

1421. **Ruiter, E. (1999):** Een Aeshna'tje meer of minder Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 9. (in Dutch). [In the estate of De Horte near Zwolle, The Netherlands, more than 70 exuviae of *Aeshna cyanea* and 1 of *Sympetrum vulgatum* were collected. The abundance was calculated with 5 ind./m²] Address: Ruiter, E., Cornelis Houtmanstraat 10, NL-8023 EA Zwolle, the Netherlands

1422. **Ruiter, E. (1999):** Late waarneming van een Gewone oeverlibel *Orthetrum cancellatum*. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 9. (in Dutch). [Phenological date from a late record of *O. cancellatum*, and *Sympetrum vulgatum* and *Aeshna mixta* (Zwolle, The Netherlands)] Address: Ruiter, E., Cornelis Houtmanstraat 10, NL-8023 EA Zwolle, the Netherlands

1423. **Sahlén, G. (1999):** The impact of forestry on dragonfly diversity in central Sweden. *International Journal of Odonatology* 2(2): 177-186. (in English). ["A survey of 32 lakes for dragonfly larvae, aquatic plants and forestry regime in the surrounding boreal forests was performed. The highest diversity was found in undisturbed forests. Lakes rich in aquatic plants were shown also to be rich in dragonflies. A rich plant community is proposed to provide a wider range of microhabitats thereby increasing dragonfly biodiversity. If the forest surrounding a lake has been logged, a decrease in the species-richness of dragonflies with partivoltine life-cycles can be observed after a 5 year "lag phase." Increased fluctuations in water temperature and leakage of nutrients into the water are two possible causes. Univoltine species are not affected and appear to be less dependent on constant water conditions. The water plant community is only moderately affected, but a slight decrease in the number of species can be observed. A return to more species-rich conditions can be observed after more than 15 years, but whether the original community is restored or replaced with more "trivial" species is an open question." (Author)] Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@zoologi.uu.se

1424. **Samraoui, B.; Menai, R. (1999):** A contribution to the study of Algerian Odonata. *International Journal of Odonatology* 2(2): 145-165. (in English). ["A survey of the dragonflies of Algeria, spanning nine years, has yielded 53 species. Past records of another 10 species

are believed to be genuine, making up a total of 63 species for the country. We try to clarify the status of these supplementary species and also provide information on the current distribution and present status of all recorded species." (Authors)] Address: Boudjema Samraoui & Rachid Menai' Laboratoire de Recherche des Zones Humides, Université d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@hotmail.com

1425. **Samraoui, B.; Jödicke, R. (1999):** Mise au point concernait l'article "Les Odonates Zygoptères de l'oued de la Meskiana (Algérie). Premier bilan des observations" (*Martinia*, 15 (1): 22). *Martinia* 15(4): 121-123. (in French with English summary). ["The authors rectify the check-list reported by Bouguessa et al., in a short note (*Martinia*, 15(1): 22). Out of the nine listed species, only two, *Cercion lindenii* and *Coenagrion mercuriale*, may have been correctly identified. The present communication provides a list of the Zygoptera recorded so far, in Oued Meskiana and the surroundings."] Address: Samraoui, B., Laboratoire de Recherche des Zones Humides, 4, rue Hassi-BeTda, Annaba, Algeria; Jödicke, R., Grossenging 14, D-49699 Lindern, Germany

1426. **Sanders, M.D. (1999):** Common aquatic invertebrate taxa vary in susceptibility to capture by Black Stilt chicks. *Notornis* 46(2): 311-318. (in English). ["I tested the ability of captive Black Stilt chicks (*Himantopus novaezelandiae*) to capture and consume common aquatic invertebrates. Waterboatmen (*Sigara* sp.), segmented worms (*Oligochaeta*), and larvae of a damselfly (*Xanthocnemis zealandica*), midge (*Chironomus zealandicus*), mayfly (*Deleatidium* spp.), and caddisfly (*Aoteapsyche colonica*) were captured and consumed quickly and easily by chicks of all ages (2 - 30 days). They were also consumed in the greatest contrast, two aquatic snails (*Physa acuta* and *Lymnaea tomentosa*), and larvae of two cased caddisflies (*Triplectides* sp. and *Hudsonema amabilis*) were captured and consumed with difficulty and in low numbers by young chicks (< 7 days). Young chicks appeared to take longer than older chicks to capture prey, to spend more time manipulating prey in their bills before swallowing, and to drop prey frequently. In contrast, 21 - 30 day old chicks appeared to capture, manipulate and swallow most types of prey efficiently and quickly. These results augmented biomass as a measure of the value of aquatic invertebrate food supplies in wetlands." (Author). Most *Xanthocnemis zealandica* were consumed in most trials, and it was pecked at more rapidly than oligochaetes, molluscs and cased caddisflies. "Larvae of *X. zealandica* struggled vigorously when captured, and were sometimes able to escape from 2-3 day old chicks, by 'flicking' their abdomens while the chicks were manipulating them in their bills. [...] *X. zealandica* is likely to be easily captured and consumed in the wild, as it was in the experiment." (Author)] Address: Sanders, M., Department of Conservation, Private Bag, Twizel, New Zealand

1427. **Sandhu, R.; Walia, G.K. (1999):** Karyology of male and female *Pseudoagrion rubriceps* (Zygoptera : Coenagrionidae). *Bionature* 19(1): 1-5. (in English). ["Chromosomal analysis has been carried out on male and female individuals of *Pseudoagrion rubriceps* collected from the states of Jammu and Kashmir, Punjab, Assam and Meghalaya in India. Majority of mitotic and meiotic stages possess the diploid numbers 27 in males and 28 in females with XO - XX sex determining me-

chanism. The autosomes include a tiny pair of m chromosome in both sexes. Numerous plates showing autosomal fragmentations in different meiotic stages of the same individual have been observed. In these, diploid numbers vary from 27 to more than 45. Female karyotype and autosomal fragmentations have been reported for the first time in this damselfly." (Authors)] Address: Sandhu, R., Dep. Zool., Punjabi Univ., Patiala-147 002, Punjab, India

1428. **Sawada, K. (1999):** Female sexual receptivity and male copula guarding during prolonged copulations in the damselfly *Ischnura senegalensis* (Odonata: Coenagrionidae). *Journal of Ethology* 17(1): 25-31. (in English). ["Laboratory experiments were conducted to clarify the relationship between female sexual receptivity and male copula guarding in *I. senegalensis*, a species that copulates for several hours. In insectaries, most copulations were initiated early in the morning, and terminated relatively synchronously between 11 00 and 13 00. Females refused males with wing-flutter display and oviposited alone in the afternoon regardless of copulation events of that morning. Females could sexually receive males only in the morning. Males copulated for several hours until 12 00 after which females could oviposit. To determine whether copulations that last for hours function as male copula guarding or only of sperm displacement, emerged males were kept at various densities and permitted to copulate with virgin and mated females in insectaries. Both with virgin and mated females, "social" (not solitary; 2-4 males / insectary) males initiated copulations early in the morning and always terminated at around 12 00. However, both with virgin and mated females, solitary (one male / insectary) males terminated copulations in the morning. In both cases, duration of copulations did not significantly differ for virgin females and mated females. Therefore, long (several hour) copulation is more likely to function as male copula guarding than as sperm displacement, and duration of copulations is predicted to be shortened when male density is very low." (Author)] Address: Sawada, K., Kashii High School, 2-9-1, Kashii, Higashi-ku, Fukuoka, 813-0011, Japan

1429. **Schiel, F.-J.; Rademacher, M. (1999):** Wiederfunde von *Gomphus flavipes* (Charpentier) am Oberrhein in Baden-Württemberg (Anisoptera: Gomphidae). *Libellula* 18(3/4): 181-185. (in German with English summary). ["As a result of a systematic survey between 20 and 29-VII-1999, two exuviae of *G. flavipes* were found at two sites at the Upper Rhine south of Karlsruhe and south of Kehl, respectively. The habitat is briefly described and the circumstances of the records are shortly discussed. Remarkable is the record of one exuviae of *Ophiogomphus cecilia* at the main course of the Upper Rhine north of Karlsruhe." (Authors)] Address: Schiel, F.-J., Rademacher, M., Institut für Naturschutz und Landschaftsanalyse (INULA), Friesenheimer Hauptstraße 20, D-77948 Friesenheim, Germany. E-mail: michael.rademacher@t-online.de

1430. **Schiller, R. (1999):** Der Leipziger Auwald - ein Gebiet mit besonderer Bedeutung für die Entomofauna Sachsens. *Mitt. Sächs. Entomologen* 47: 3-7. (in German). [Reference to some odonatological studies with reference to the floodplain forests of Leipzig, Saxony, Germany; the following species are listed: *Lestes barbarus*, *Anaciaeschna isosceles*, *Anax parthenope*, and *Brachytron pratense*] Address: Schiller, R., Naturkun-

demuseum Leipzig, Lortzingstr. 3, D-04105 Leipzig, Germany

1431. **Schmid, U. (1999):** Unser Neuzugang in Sachen Bernstein: Dr. Günter Bechly. *Museum - Naturkundemuseum Stuttgart* 6/99: without pagination. (in German). [The famous amber collection in the Naturkundemuseum Stuttgart will be managed in the future by Dr. G. Bechly, a well known German odonatologist with special interest in odonate palaeontology and phylogeny. Bechly's odonatological vitae is shortly outlined, and some annotations on highlights of the amber collection and its doyen Dr. Dieter Schlee are made.] Address: Staatliches Museum für Naturkunde Stuttgart, Rosenstein 1, D-70191 Stuttgart, Germany

1432. **Schulz, R.; Berenzen, N.; Hünken, A.; Wendt, H. (1999):** Auswirkungen von Unterhaltungsmaßnahmen an Gewässern der Uckerniederung nördlich von Prenzlau und ihre Bedeutung aus Naturschutzsicht. *Naturschutz und Landschaftspflege in Brandenburg* 8(4): 148-154. (in German). [Brandenburg, Germany; effects of ditch management patterns on fauna are studied in detail; rotational clearance of ditches allows best displays of fauna; *Ischnura elegans* is the single odonate species mentioned] Address: Schulz, R., Zool. Inst. TU Braunschweig, Fasanenstr. 3, 38092 Braunschweig, Germany. E-mail: r.schulz@tu-bs.de

1433. **Shieh, Sen-Her; Yang, Ping-Shih (1999):** Colonization patterns of aquatic insects on artificial substrates in a Taiwan stream. *Zhonghua Kunchong* 19(1): 27-50. (in English). ["Experiments on colonization patterns of artificial substrates by aquatic insects were conducted in the upper Chingmei Stream, Taiwan. Artificial substrates were colonized by aquatic insects for periods of 3, 6, 12, 21, 30, and 42 days from 15 Dec. 1990 to 26 Jan. 1991 at 2 sites: a polluted site caused by coal mining activities (Site 1) and a recovery site further downstream of the polluted site (Site 2). Total numbers of individuals and taxa were significantly affected by exposure period of experimental substrates and sites, indicating the occurrence of succession and the detrimental effect of coal mining activities on aquatic insect communities. At Site 1, only *Caenis* sp., *Euphaea* sp., and Chironomidae occurred on all sampling dates and were abundant. The other taxa may have just continued to drift away from the site. The chironomid larvae were most abundant. They accounted for over 90% of the colonizing individuals from day 12 to day 42. At Site 2, *Baetis* spp. and Chironomidae were most abundant. They accounted for over 80% of individuals during the experiment, except on day 21. The relative abundance shifted from *Baetis* spp. to Chironomidae with an increase in colonization time. A large number of positive correlation was found within the functional groups of filter-feeders and predators at Site 2. Taxa within the two groups tended to overlap in their distribution among baskets. The lognormal distribution was a better fit at Site 1 than at Site 2, suggesting that it is easier for a community to attain a state of equilibrium in a stressed environment than in a less-polluted environment. Mechanisms determining the colonization patterns of aquatic insects were reflected by the susceptibility of organisms to mining activities at Site 1, and the influence of biological interactions and disturbance caused by high discharges at Site 2 during the experimental period." (Authors)] Address: Shieh, Sen-Her, department of Entomology, National Taiwan University, Taipei, 106, Taiwan

1434. **Southcott, R.V. (1999):** Larvae of *Leptus* (Acarina: Erythraeidae), free-living or ectoparasitic on arachnids and lower insects of Australia and Papua New Guinea with descriptions of reared post-larval instars. *Zoological Journal of the Linnean Society* 127(2): 113-276. (in English). [*Leptus* larvae (Acarina: Erythraeidae) of Australia and New Guinea, collected either free-living or ectoparasitic on Arachnida or lower Insecta, are comprehensively reviewed. For Australia new species are described from Scorpionida: 8, from Araneae:1, from Insecta (Archaeognatha: 1, Blattodea: 1, Phasmatodea: 1, Orthoptera, Acridoidea: 7, Hemiptera: 5), and free-living only: 2. From Papua New Guinea new species are described parasiting on Acridoidea: 1, Orthoptera: 1, and free-living: 3. Additional host and other records are given for previously described species, originally described as ectoparasites of Insecta (from Australia) and from Papua New Guinea including *L. draco* Southcott (Odonata, Acridoidea, Tettigoniodea, Phasmatodea, Hemiptera).] Address: Southcott, R.V., 2 Taylors Road, Mitcham, SA, 5062 Australia.

1435. **Sovinc, A. (1999):** Restoration ecology. *Proteus, Ljubljana* 62(4): 152-160. (in Slovene with English summary). ["Restoration Ecology is an emerging profession within the Ecology; it is an attempt to reverse the human induced ecological changes and to stimulate the natural or semi-natural processes in habitats, ecosystems, and landscapes. The article discusses different terms in the restoration processes, such as habitat rehabilitation, reconstruction, enhancement, re-creation, transplantation and creation, mitigation, and others, and provides a set of basic considerations when planning and implementing restoration measures. These include: a) the line up to which nature should be 'helped' has to be carefully considered; restoration should, in principle, only encourage, accelerate, allow or imitate natural processes; b) nature restoration projects should never be undertaken in indigenous areas with a high conservation or biodiversity value; c) nature restoration projects should never be used to justify environmentally damaging developments. Examples of already implemented wetland restoration projects include the creation of substitute habitats along the Ljubljanica river during the construction of a new motorway, including habitat creation for amphibians, the construction of small ponds, revitalisation of oxbows and floodplains. Other examples include the creation of wetland habitats during the dredging of the Zbilje reservoir, the construction of a pond at Trzin and a restoration of a section of the Bicje river near Grosuplje." (Author). *Orthetrum brunneum* is the single odonate species mentioned in the article.] Address: Sovinc, A., Pod Kostanji 44, SI-1000 Ljubljana, Slovenia

1436. **Stav, G.; Blaustein, L.; Margalith, J. (1999):** Experimental evidence for predation risk sensitive oviposition by a mosquito, *Culiseta longiareolata*. *Ecological Entomology* 24(2): 202-207. (in English). ["1. Females should choose to oviposit in habitats where risk of predation and competition are low. The ovipositional responses of a mosquito, *Culiseta longiareolata*, to a predator and to species sharing the same trophic level as this mosquito (controphic species) were assessed experimentally in outdoor artificial pools. 2. The predator, larval *Anax imperator*, which strongly reduced larval *C. longiareolata* survival, resulted in a 52% reduction of *C. longiareolata* egg rafts. The controphic species (primarily *Daphnia magna*), which had a small but statisti-

cally significant negative effect on the survival of *C. longiareolata* larvae, did not have a statistically significant influence on the number of egg rafts. 3. Laboratory trials indicated that only a small fraction of the reduced number of egg rafts seen in predator pools may be due to consumption of the egg rafts by *A. imperator*. 4. The experimental evidence indicates that the reduced number of *C. longiareolata* egg rafts found in the presence of *A. imperator* is due largely to oviposition habitat selection, i.e. *C. longiareolata* females choose pools with low risk of predation for their offspring." (Authors)] Address: Blaustein, L., Laboratory for Community Ecology, Institute of Evolution, University of Haifa, Haifa, 31905, Israel

1437. **Steenis, W. van (1999):** Vondst Gewone bronlibel *Cordulegaster boltonii* in de stad Utrecht. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 3(4): 7-9. (in Dutch). [On 8 August 1999 *C. boltonii* was discovered in Utrecht, the Netherlands. On the occasion of the discovery the known Dutch records are compiled, mapped and discussed] Address: Wouter van Steenis, W.vanSteenis@Natuurmonumenten.nl

1438. **Steglich, R.; Müller, J. (1999):** Artenliste der Funde von Heuschrecken (Saltatoria) und Libellen (Odonata) in ausgewählten Biotopen am Neusiedler See und Umgebung sowie der Donau-Niederung in Ungarn, Österreich und der Slowakei 1997 und 1998. *Halophila* 38: 3-5. (in German). [Shortly commented compilation of faunistic data of Odonata from Austria, Hungaria, and Slovakia. *Thecagaster bidentata*, *Stylurus flavipes*, and *Ophiogomphus cecilia* are of some interest] Address: Steglich, Rosmarie, Quittenweg 53, 39118 Magdeburg, Germany

1439. **Stoks, R. (1999):** Autotomy shapes the trade-off between seeking cover and foraging in larval damselflies. *Behavioral Ecology and Sociobiology* 47(1/2): 70-75. (in English). ["Animals commonly choose between microhabitats that differ in foraging return and mortality hazard. I studied the influence of autotomy, the amputation of a body part, on the way larvae of the damselfly *Lestes sponsa* deal with the trade-off between foraging or seeking cover. Survival of *Lestes* larvae when confronted with the odonate predator *Aeshna cyanea* was higher in a complex than in a simple microhabitat, indicating that this more complex microhabitat was safer. Within the simple microhabitat, larvae without lamellae had a higher risk for mortality by predation than larvae with lamellae, showing a long-term cost of autotomy. When varying the foraging value (food present or absent) and predation risk (encaged predator or no predator) in the simple microhabitat, larvae with and without lamellae responded differentially to the imposed trade-off. All larvae spent more time in the simple microhabitat when food was present than when food was absent. Larvae without lamellae, however, only sporadically left the safe microhabitat, irrespective of the presence of the predator. In contrast, larvae with lamellae shifted more frequently towards the risky microhabitat than those without lamellae, and more often in the absence than in the presence of the predator. These decisions affected the foraging rates of the animals. I show for the first time that refuge use is higher after autotomy and that this is associated with the cost of reduced foraging success. The different microhabitat preferences for larvae with and without lamellae are consistent with their different vulnerabilities to predation and demonstrate the importance of intrinsic fac-

tors in establishing trade-offs." (Author)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. E-mail: stoks@ruca.ua.ac.be

1440. **Suhling, F. (1999):** Dragonfly records from El Valle, Republic of Panama. *Notul. odonatol.* 5(4): 51. (in English). [List of 13 odonate species collected in March 1998 in the surroundings of El Valle (8.35N 80.7W), Panama.] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1441. **Suhling, F.; Schütte, C. (1999):** Sternberg, K.; Buchwald, R. (Eds.) (1999): Die Libellen Baden-Württembergs. Band 1. *Lauterbornia* 37: 248-249. (in German). [Review of the book, see OAS 1149] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1442. **Tembhare, D.B. (1999):** The 5th South Asian Symposium of Odonatology, Nagpur, India; 20-21 December 1998: A report. *Notul. odonatol.* 5(4): 51-52. (in English). [Short report on the South Asian Sym. Odonat.] Address: Tembhare, D.B., Dept Zool., Nagpur Univ. Campus, Amravati Road, Nagpur-440010, Maharashtra, India

1443. **Terzani, F. (1999):** Odonati dell'alto Appennino Mutino-Pistoiese, Emilia-Romagna e Toscana Italia centrosettentrionale (Odonata). *Opuscula Zoologica Fluminensia* 170: 1-7. (in Italian with English summary). ["11 spp. are listed from 13 localities. *Chalcolestes viridis*, *Lestes dryas*, *Platycnemis pennipes*, *Pyrrosoma nymphula*, *Coenagrion puella*, *Enallagma cyathigerum*, *Aeshna cyanea*, *Cordulegaster b. boltonii*, *Libellula quadrimaculata*, and *Platetrum depressum* were collected for the first time in this geographic area." (Author)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, FI, Italy. E-mail: terzani@www.specola.unifi.it

1444. **Terzani, F.; Carfi, S. (1999):** Ricerche odonologiche in Toscana, Italia centrale. 6. *Padule di fucechio* (Odonata). *Opuscula Zoologica Fluminensia* 170: 9-23. (in Italian with English summary). ["Some 27 spp. are listed from 23 localities, *Fucechio Marsh*, lower *Valdarno*. *Calopteryx haemorrhoidalis*, *Lestes barbarus*, *Erythromma viridulum*, *Coenagrion pulchellum mediterraneum* Schmidt, *Aeshna mixta*, *Anaciaeschna isosceles*, *Libellula quadrimaculata*, *Orthetrum b. brunneum*, *O. c. coerulescens*, *Crocothemis erythraea*, *Sympetrum sanguineum*, and *Trithemis annulata* were collected for the first time in this geographic area." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, FI, Italy. E-mail: terzani@www.specola.unifi.it

1445. **Trilar, T.; Bedjanic, M. (1999):** Contribution to the knowledge of the dragonfly fauna of Lastovo island, Dalmatia, southern Croatia. *Exuviae* 6: 1-6. (in English with Slovenian summary). ["A list of 7 dragonfly species recorded on the island in June and July 1998 is given. *Cordulia aenea* (L.) is new for the odonate fauna of Dalmatia. Its distribution in southern Europe is outlined and commented." (Authors) The rare *Coenagrion scitulum* is listed from two localities.] Address: Trilar, T., Slovenian Museum of Natural History, Presernova 20, P. O.

Box 290, SI-1000 Ljubljana, Slovenia. E-mail: trilar@pms-lj.si

1446. **Trockur, B.; Didion, A. (1999):** Fortpflanzungsnachweise der Zierlichen Moosjungfer, *Leucorrhinia caudalis* CHARPENTIER, 1840 im Moseltal. *Abhandlungen der Delattinia* 25: 57-66. (in German with English summary). [Adult males of *L. caudalis* were recorded in gravel pits in the Mosel valley near Nennig (Saarland, Germany) and near Remich (Haff Remich, Luxembourg) between 1996 and 1999. Reproduction could be recorded in May 1999 (3 exuviae with one freshly emerged female). High transparency of the water is as typical for the localities as rich submerged or gloating vegetation. All localities in the gravel pit area of Nennig and Remich with records of *L. caudalis* are described in some detail with emphasize to the vegetation and the associated odonate species. The regional status in France (Lorraine), Luxembourg and Saarland is discussed with reference to the core habitats of the regional metapopulation of *L. caudalis*.] Address: Trockur, B., Schulstr. 4, 66636 Tholey-Scheuern, Germany

1447. **Trueman, J.W.H. (1999):** The family-group names based on Selys's Légions. *International Journal of Odonatology* 2(2): 141-144. (in English). ["It recently was suggested that family-group names derived from the names of Selys' legions are not valid. I state why I believe this view is mistaken and I argue that, even if it were not, nomenclatural stability in Odonata can be better served by the preservation of these names than by their overturn." (Author)] Address: Trueman, J., Research School of Biol. Sciences, Australian National University, Canberra, ACT 0200, Australia. E-mail: trueman@rsbs.anu.edu.au

1448. **Unruh, M. (1999):** Zum Vorkommen von *Anax parthenope* (Selys, 1839) im südlichen Sachsen-Anhalt (BRD) und Gedanken zum Schutz der Kleinen Königslibelle (Anisoptera: Aeshnidae). *Entomol. Mitt. Sachsen-Anhalt* 7(2): 29-34. (in German with English summary). [List of known habitats of the species in Sachsen-Anhalt, Germany; discussion of habitat factors necessary for establishing populations; the author assumes that only so-called "Klarwasserseen" (oligotrophic lakes with Chara-vegetation) in succession to dymesotrophic waterbodies with little floating plants (hydrophyts), but Phragmites-reed beds along the shore side are optimal habitats for the species in Sachsen-Anhalt. In addition some muddy parts on the lake bed und few fish predators are favourable.] Address: Unruh, M., Schmale Str. 29, D-06712 Großsosa, Germany

1449. **Utzeri, C.; Di Giovanna, M.V.; Goretti, E.; Terzani, F.; Speziale, A.; Mei, M.; Santolamazza Carbone, S.; Cordero, A. (1999):** Updated information on the distribution of *Somatochlora meridionalis* Nielsen, 1935, in central Italy (Anisoptera: Corduliidae). *Notul. odonatol.* 5(4): 43-47. (in English). ["A list and a map are given of the central Italian sites in which the presence of *S. meridionalis* has been verified in the past and recent years. Information on the 24-26 odonate spp. associated with *S. meridionalis* is provided for each site. Water parameters are also given for some Umbrian sites in which larvae were found. The latter are the first on record for the region of Umbria." (Authors)] Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma, Italy

1450. **Vines, G. (1999):** Local heroes. *New Scientist* 161(2175): 34-39. (in English). [A more general account on the importance of ponds for biodiversity of landscapes; British Isles] Address: not stated
1451. **Wain, W.H.; Wain, C.B.; Lambert, T. (1999):** Odonata of North Island, Seychelles archipelago. *Notul. odonatol.* 5(4): 47-50. (in English). ["A 6-hr visit in November 1997 established the presence of 9 spp., all of which showed some evidence of breeding. The paucity of previous Odonata records from North Island undoubtedly reflects the dearth of observers and it is probable that the present visit was the first entomological one since Vesey-Fitzgerald in November 1952." (Authors)] The following species are listed and discussed: *Ceragrion glabrum*, *Ischnura senegalensis*, *Anax guttatus*, *Diplacodes trivialis*, *Orthetrum stemmale wrightii*, *Pantala flavescens*, *Rhyothemis semihyalina*, *Tholymis tillarga*, and *Tramea limbata*.] Address: Wain, W.H. & C.B., The Haywain, Hollywater Road, Bordon, Hants, GU35 OAD, United Kingdom
1452. **Wasscher, M. (Ed.) (1999):** NVL Nieuwsbrief. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 10 pp. (in Dutch). [Newsletter of the Dutch Society of Odonatology; some technical papers as announcements of meetings, and faunistical papers (see this issue of OAS)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl
1453. **Weipert, J.; Bößneck, U. (1999):** Die Schutzgebiete der Landeshauptstadt Erfurt (Thüringen) Teil IV.: Flora und Fauna des GLB "Lohfinkensee" und dessen Umgebung. Veröffentlichungen des Naturkundemuseum Erfurt 19: 93-108. (in German). [*Libellula depressa* is the only dragonfly species mentioned] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Staffenbergallee 18, D-99085 Erfurt, Germany
1454. **Werzinger, S.; Werzinger, J. (1999):** *Gomphus flavipes* (Charpentier) in Bayern: 1999 erstmals am Main, weitere Funde an der Regnitz (Anisoptera: Gomphidae). *Libellula* 18(3/4): 205-208. (in German with English summary). ["On 6-VII-1999 an exuvia of a male was collected at the river Main near Kreuzwertheim, Germany. At the river Regnitz, a tributary of the Main, five exuviae were recorded at a study section 3,000 m in length between 29-VI-1999 and 25-VH-1999." (Authors)] Address: Sabine und Joachim Werzinger, Zwernberger Weg 29, D-90449 Nürnberg, Germany
1455. **Westhus, W.; Klaus, S.; Fritzlar, F. (1999):** Schutz und Pflege Thüringer Hochmoore durch gemeinsames Handeln von Forst- und Naturschutzverwaltung. Landschaftspflege und Naturschutz in Thüringen 36(3): 98-100. (in German). [Picture of the rare Thuringian *Somatochlora alpestris*; some accounts on present activities of well known Thuringian odonatologist Dr. Wolfgang Zimmermann] Address: Westhus, W., Thüringer Landesanstalt für Umwelt, Abt. Ökologie und Naturschutz, Prüssingstr. 25, D-07745 Jena, Germany
1456. **Willigalla, C. (1999):** Zur Tagesaktivität von *Lestes dryas* Kirby (Zygoptera: Lestidae). *Libellula* 18(3/4): 175-180. (in German with English summary). ["At a pond near Ostbevern in Westfalia, Germany, the flight activity of *Lestes dryas* was recorded on one sunny day in August 1997. The activity started at 9:00 h (summer time) with only a few individuals, had the maximum at 13:30 h (approx. solar noon) and stopped in the evening at 20:00 h. The influence of light intensity, position of the sun and temperature is discussed." (Author)] Address: Willigalla, C., Brock 45, D-48346 Ostbevern, E-mail: c.willigalla@t-online.de
1457. **Wilson, K. (1999):** Reports from Coastal Stations - 1998: Gibraltar Point, Lincolnshire. *Atropos* 6: 61. (in English). [Some dragonfly records including *Brachytron pratense*] Address: not stated
1458. **Winterholler, M.; Leinsinger, H. (1999):** *Gomphus flavipes* (Charpentier) bodenständig am Oberrhein in Hessen und Rheinland-Pfalz (Anisoptera: Gomphidae). *Libellula* 18(3/4): 209-211. (in German with English summary). ["In July 1999, exuviae were collected near Worms. These are the first breeding records for the Upper Rhine of Hessen and Rheinland-Pfalz, Germany." (Authors)] Address: Herwig Leinsinger, Oderweg 2, D-69226 Nußloch, Germany
1459. **Witte, R.H.; Groenendijk, D. (1999):** The occurrence of dragonfly larvae in the Dutch Delta in relation to salinity. *Brachytron* 3(2): 3-10. (in Dutch with English summary). [(Promille-Zeichen fehlt im Lidos) "[...] At about 225 localities in the mostly brackish Dutch Delta area dragonfly larvae were caught (or exuviae were collected) and salinity values were measured simultaneously. [...] Results showed that only *Ischnura elegans* was found to be able to breed successfully in polyhaline waters. However, numbers decreased strongly when ion concentrations exceeded 4.5 . *Aeshna mixta* (larvae) was found regularly in mesohaline waters with an average ion content of 4.3 , temporarily increasing during summer to a maximum value of 6.8 . A maximum of only 2 was formerly known for this species in The Netherlands. *Aeshna cyanea* larvae were found in oligohaline waters, in which the salt concentration increased up to 18 during a short period in summer. This observation is highly congruent with results from Denmark, where larvae of *Orthetrum cancellatum* occurred in brackish waters with an ion content of 13 . It seems that larvae of several dragonfly species can survive during short periods of high salinity. However, it is highly likely that larval development will be inhibited during these temporary situations. Oviposition in mesohaline waters was recorded for *Erythromma viridulum* and *Enallagma cyathigerum*. However, no successful reproduction could be proven. In Canada *E. cyathigerum* larvae have been found in brackish waters, as well as *Sympetrum danae* larvae. Several *Sympetrum* species are known to be tolerant for brackish water conditions and in the Delta area egg-laying behaviour was even recorded in polyhaline waters during some occasions. In addition, exuviae of *Lestes sponsa* and *L. barbarus* were found in oligohaline waters. Larvae of several *Sympetrum* species and *E. viridulum* were recorded here also. No other dragonfly species in the Delta area could be traced in brackish waters, although some other species were found in brackish waters elsewhere in Europe." (Authors)] Address: Witte, R., Parelplein 36, NL-4337 MS Middelburg, The Netherlands. E-mail: Richard.Phoenix@planet.nl
1460. **Witte, R.H. (1999):** Voorkomen van Libellen in Zeeland, met de nadruk op de periode 1995-1998. *De Zeeuwse Prikkebeen* 7(2): 5-12. (in Dutch). [List of the

Odonata (n=36) of the province Zeeland, The Netherlands differed for 6 areas; *Lestes barbarus*, *Sympetma fusca*, *Erythromma viridulum*, *Aeshna affinis*, *Crocothemis erythraea*, and *Sympetrum fonscolombii* are discussed in some detail] Address: Witte, R., Parelplein 36, NL-4337 MS Middelburg, The Netherlands. E-mail: Richard.Phoenix@planet.nl

1461. **Yeh, W.-C. (1999):** Description of *Petaliaeschna pinratana* spec. nov. from northern Thailand (Anisoptera: Aeshnidae). *Odonatologica* 28(3): 283-288. (in English). ["The new species (holotype male: Doi Inthanon, Chiang Mai prov., 5-V-1988; deposited in Coll. Pinratana, St Gabriel's College, Bangkok) is described and compared with its congeners. Considering the male paddle-shaped cerci, it appears closely related to the Chinese rather than to the Himalayan congeners." (Author)] Address: Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nanhai Road, Taipei, Taiwan, R.O.C. E-mail: wcyeh@serv.ffri.gov.tw

1462. **Zeiss, C.; Martens, A.; Rolff, J. (1999):** Male mate guarding increases females' predation risk? A case study on tandem oviposition in the damselfly *Coenagrion puella* (Insecta: Odonata). *Canadian Journal of Zoology* 77(6): 1013-1016. (in English). ["To estimate whether male mate guarding alters the predation risk for females, we conducted experiments in field cages with the damselfly *Coenagrion puella*. We experimentally compared the risk for females ovipositing solitarily versus in tandem with the male. The backswimmer *Notonecta glauca* was used as a predator. Owing to the oviposition behaviour of the damselflies, *N. glauca* only preys on females, therefore it was possible to determine whether the presence of males decreases or increases females' predation risk. Females in tandem were more frequently touched and grasped by *N. glauca* than solitary females. In most tandem pairs, the female showed the first reaction to the attack and the male responded subsequently. After an attack, most solitary females left the oviposition site but most tandem females stayed. Once grasped by the predator, more solitary females were killed." (Authors)] Address: Zeiss, C., Zool. Institut der Technischen Universität Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

1463. **Zhu, H.-q.; Zhang, X.x. (1999):** *Somatochlora shanxiensis* spec. nov., a new dragonfly from Shanxi, China (Anisoptera: Cordulidae). *Odonatologica* 28(3): 289-292. ["The new species (holotype male and allotype female: Mang-he river bank, Yangcheng Co., Shanxi, China. 27/28-VIII-1991; deposited at Shanxi University, Taiyuan, Shanxi, China) is described and illustrated. It is compared with *S. graeseri* and *S. uchidai*." (Authors)] Address: Zhu, H.-q., 42-38. Shanxi University, Taiyuan 030006. Shanxi. China Zhang, X.x., Shanxi Academy of Agricultural Science. Taiyuan 030006. Shanxi, China

1464. **Zipfel, C. (1999):** Zoogeographie und Verbreitungsmuster der Pokal-Azurjungfer *Cercion lindenii* (Odonata, Coenagrionidae). - Vergleichende Untersuchungen mit morphologischen und Isoenzym-PAGE-Methoden. Diplomarbeit. Fakultät für Biowissenschaften, Pharmazie und Psychologie, Inst. für Zoologie, Universität Leipzig: 93 pp. (in German). [*C. lindenii* occurs in Germany with at least two isolated populations that are considered to represent different subspecies.

C. lindenii has been increasing its geographical distribution significantly since the early eighties and the isolation may be overcome within the next years. In this investigation, therefore, 117 adult specimens from five localities have been investigated regarding their wing morphometry and protein differences in electrophoresis: two each from southwestern (Giessen, Hessen; St. Leon, Baden-Württemberg) and central (Rheine, Nordrhein-Westfalen; Hameln, Niedersachsen), and one from eastern Germany (Großer Schwansee, Brandenburg). Wing morphometry showed significant differences (euclidian distance and UPGMA) between the eastern and all other populations. The males of the eastern population had larger wings whereas there was no significant difference between the females. This corresponds to earlier results (Beutler, H., 1985, Faun. Abh. Staatl. Mus. Tierk. Dresden 49, 82) but may, however, not definitively indicate the occurrence of an eastern subspecies, whereas odonate populations from colder regions tend to have larger wings (Carius, W., 1993, Dissertation, Univ. Bremen). 5 of 21 enzymes tested were polymorphic (IDH, esterases, PGM, GPD, diaphorase); in all cases but one the less frequent allele(s) occurred only in heterozygotes. Specimens from central Germany showed the highest heterozygosity (up to half of the population in IDH) whereas all other locations tested showed very high frequencies of one allele and low frequencies of all others or were homozygote. Also similarities between distant populations are often higher than to those from nearer locations. Regarding the isoenzyme patterns found, the German *C. lindenii* populations appear to be biochemically rather uniform and the variability is too low for postulating two subspecies. The evaluation of the total protein spectrum, however, showed that two groups can be differentiated: one group comprising all western populations investigated (Hameln, Rheine, Giessen, St. Leon) showed a homogeneous pattern of protein bands (within and between populations). The protein samples from the Schwansee population, however, differed significantly. The similarity between the Schwansee and the other populations decreased continuously from north to south. (Slightly modified from the Abstract submitted to *Zoology* 103, Suppl. II; Proc. of the 93 th Annual Meeting of the Deutsche Zoologische Gesellschaft, Abstract 92.1, 2000; Zipfel, A. & W.E.R. Xylander)] Address: Xylander, W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany

1465. **Zwick, P. (1999):** Historische Dokumente zur Fauna der Elbe bei Dresden vor hundert Jahren. *Lauterbornia* 37: 97-112. (in German with English summary). [35 plates with drawings and water colour paintings by Karl G. Schiller (author of the plates in Rostock & Kolbe, 1888: *Neuroptera germanica*. Die Netzflügler Deutschlands. Zwickau.) left by the late Joachim Illies show various invertebrates, including Odonata. The following species are documented on colour plates: *Lestes dryas*, *Erythromma najas*, and *Sympetrum sanguineum*. Not documented are the plates with *Ischnura elegans*, *Enallagma cyathigerum*, *Coenagrion hastulatum*, *C. puella*, *Ophiogomphus cecilia*, and *Aeshna* (cf. mixta). The plates provide evidence for the past occurrence of several species of water insects in the river Elbe at Dresden between 1883 and 1906, some that are today no longer found in Saxony. This refers not to Odonata. P. Zwick outlines the circumstances on the discovery of the colour plates, the evaluation of the identifications of the species, and the entomological "life

history" of Karl Schiller.] Address: Zwick, P., Limnologische Fluß-Station des Max-Planck-Instituts für Limnologie, PF 260, D-36105 Schlitz. E-mail: pzwick@mpil-schlitz.mpg.de

2000

1466. **Åbro, A. (2000):** Sperm clusters in Zygoptera (Coenagrionidae, Lestidae, Calopterygidae). *Odonatologica* 29(1): 51-56. (in English). ["When within the testicular cyst, individual, immature sperm of *Lestes sponsa* acquire a cap of periacrosomal material. During passage through the spermiducts and vas deferens, the caps of individual sperm coalesce, producing clusters of sperm under a common cap. In *Calopteryx virgo*, entire sperm cells become embedded in an extracellular homogeneous substance. The joining substance in both species appear to be derived from decomposed surplus cytoplasm sloughed off from developing spermatids. The epithelial lining of the spermiducts adds secretions to this. Clustering of sperm cells was not demonstrated in species of the Coenagrionidae." (Author) Species examined are: *Calopteryx virgo*, *Lestes sponsa*, *Coenagrion hastulatum*, *Enallagma cyathigerum*, and *Pyrrhosoma nymphula*.] Address: Åbro, A., Inst. Anat., Univ. Bergen, Årstadveien 19, N-5009 Bergen, Norway

1467. **Anonymus (2000):** Gummigelenske machen Libellen zu wendigen Jägern. *National Geographic, Deutschland* 4/2000: 189. (in German). [Short summary on the work of S. Gorb on functional morphology of dragonfly wings] Address: NG, Deutschland, Stadthausbrücke 1-3, D-20355 Hamburg, Germany

1468. **Assis, J.C.F.; Carvalho, A.L.; Dorvillé, L.F.M. (2000):** Aspects of larval development of *Limntron debile* (Karsch), in a mountain stream of Rio de Janeiro State, Brazil (Anisoptera: Aeshnidae). *Odonatologica* 29(2): 151-155. (in English). ["Quantitative and qualitative samplings performed in a first order mountain stream [...] provided 121 larval specimens in the 6 last instars. The total number of larval instars estimated, using Dyar's rule, is 13, based on head width measurements. There was no significant difference between the number of males and females." (Authors)] Address: Assis, J.C.F., Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. E-mail: juassis@aol.com.br

1469. **Beckemeyer, R. (2000):** Kids & Dragonflies. *W.D.A.'s Agrion* 4(1): 10-11. (in English). [Narrative on the use of a high speed video camera for filming insects in flight, and the opportunity to introduce and inspire children for dragonflies] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA

1470. **Bedê, L.C.; Piper, W. (2000):** A new record of *Remartinia restricta* Carvalho and the southernmost record of *Gynacantha nervosa* Rambur in South America (Anisoptera: Aeshnidae). *Notul. odonatol.* 5(5): 63-64. (in English). [*G. nervosa* is recorded from 3 localities in Minas Gerais, Brazil. A male *R. restricta* was collected at Conselheiro Mata, Serra do Espinhaço, Minas Gerais, Brazil, 23/4/1998.] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany. E-mail: werner.piper@t-online.de

1471. **Bedjanic, M. (2000):** Description of the last larval instar of *Epophthalmia vittata cyanocephala* Hagen,

1867 (Anisoptera: Corduliidae). *Odonatologica* 29(1): 57-61. (in English). [The specimen was collected near Anuradhapura, Sri Lanka. The present knowledge of the larval forms of the genus is briefly discussed.] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

1472. **Bernard, R.; Samol, J. (2000):** An interesting record of *Crocothemis erythraea* (Brullé) in mid-western Poland (Anisoptera: Libellulidae). *Notul. odonatol.* 5(5): 64-65. (in English). [On 26/8/1999 the species was recorded in a gravel pit near Bielice (52.21N 14.58E). The habitat is characterized, and all hitherto Polish records are discussed in brief.] Address: Bernard, R., Zakład Zoologii Ogólnej, Uniwersytet im. A. Mickiewicza, ul. Fredry 10, PL-61-702 Poznan, Poland. E-mail: rbernard@main.amu.edu.pl

1473. **Bernard, R. (2000):** On the occurrence of *Cercion lindenii* (Sélys, 1840) in Poland (Odonata: Coenagrionidae). *Opusc. zool. flumin.* 177: 1-11. (in English). [The known Polish localities (30) - restricted to the midwestern part of the country - are listed, and the strength of the respective local populations is estimated. It is suggested that the variation in the latter is due to the weather conditions prevailing in particular years. The Polish (i.e. the northeastern-most) part of the species range is described and defined in terms of the local climatology (early spring, long summer, short and mild winter, relatively small annual air temperature amplitudes, wind sheltered - lake - biotops) and topography (larger and medium-sized rivers) and against the species situation in central Europe.] Address: Bernard, R., Zakład Zoologii Ogólnej, Uniwersytet im. A. Mickiewicza, ul. Fredry 10, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

1474. **Bos, F. (2000):** Mogelijke Nederlandse namen voor Zuid- en Oosteuropese libellen. Inclusief Rhodos en de Canarische Eilanden. *Mededelingen van de Nederlandse Vereniging voor Libellenstudie* 4(1): 13. (in Dutch). [Proposal for a Dutch name of the Odonata of South- and East-Europe including the Greek Island Rhodos and the Canarian Islands.] Address: Bos, F., Havenstraat 17, NL-6701 CK Wageningen, The Netherlands. E-mail: frank@bos.nl

1475. **Brockhaus, T. (2000):** Aktualisierte und korrigierte Fassung des kommentierten Verzeichnisses der Libellen (Odonata) des Freistaates Sachsen. *Mitteilungen Sächsischer Entomologen* 49: 8-14. (in German). [Up dated and commented checklist of the Odonata of Saxonia, Germany incl. an extensive regional bibliography; very useful are comments on species which are in need for conservation action plans] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1476. **Brockhaus, T. (2000):** Zur Geschichte der sächsischen Libellenkunde. *Mitteilungen Sächsischer Entomologen* 49: 15-21. (in German). [Detailed contribution to the origins and the development of the odonatalogical activities in Saxonia, Germany; nice maps with information on the historical hot spots of odonatalogical work; interesting search for traces of *Thecagaster bidentata* in old Saxonian publications on the opportunity of the so called first record in 1994: we have to suppose that it was known to Saxonian entomologists already 140 years ago!] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1477. **Brunelle, P.M. (2000):** A new species of *Neurocordulia* (Odonata: Anisoptera: Corduliidae) from eastern North America. *Canadian Entomologist* 132(1): 39-48. (in English with French summary). [*Neurocordulia michaeli* sp. nov. from New Brunswick (Canada) and Maine (USA) differs from other northeastern species in the genus (*Neurocordulia molesta* (Walsh 1863), *Neurocordulia obsoleta* (Say 1839), and *Neurocordulia yamaskanensis* (Provancher, 1875)) in its short mesotibial keel and from all congeners in the great width of its abdomen. "The species is obligate crepuscular and can be locally abundant at its riverine habitat. Larvae of the species have the lowest dorsal spines in the genus and cling to the underside of rocks in rapids."] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada
1478. **Buczynski, P. (2000):** On the occurrence of *Coenagrion armatum* (Charpentier, 1840) in Poland (Odonata: Coenagrionidae). *Opusc. zool. flumin.* 179: 1-10. (in English). ["All Polish localities (38, incl. 6 new) are listed, their grid references are stated whenever possible, and the respective habitats are briefly characterized. The distribution of the sp. in Poland is mapped, and its occurrence and habitat choice are briefly discussed and compared with those in other regions of central and eastern Europe." (Author)] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PO-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl
1479. **Cham, S. (2000):** Discovery of a 'new' population of the Scarce Chaser *Libellula fulva* Müller on the River Stour in the Dedham Vale. *J. Br. Dragonfly Society* 16(1): 17-19. (in English). [In July 1997 (near Nayland) and July 1998 (near Burnes) males of *L. fulva* were observed along the River Stour. During July 1999, further reconnaissance along much of the river revealed a sizeable population between Bures and Nayland. In addition, adult *L. fulva* were observed at Earls Colne on the nearby River Colne in North Essex during 1999. Such observations suggest that the River Stour population may have already started to colonize the River Colne. These records are discussed with emphasize to improvement of water quality in the past years. Additional notes are made to the strong increase of the populations of *Platycnemis pennipes* and *Erythromma najas* in the same area.] Address: Cham, S., 45 Weltmore Road, Luton, Bedfordshire LU3 2TN
1480. **Chovanec, A.; Schiemer, F.; Cabela, A.; Gressler, S.; Grotzer, C.; Pascher, K.; Raab, R.; Teufel, H.; Wimmer, R. (2000):** Constructed inshore zones as river corridors through urban areas - The Danube in Vienna: Preliminary results. *Regulated rivers research and management* 16(2): 175-187. (in English). ["Over the last 125 years, river regulation has considerably changed the ecological conditions of the Austrian Danube and its floodplains such that the system is now very fragmented. Within the municipal area of Vienna, these changes have been particularly severe: river embankments and a bypass channel (the 'New Danube'), separated from the main river by an artificial island ('Danube Island'), are the key elements of flood control, and river levels are controlled by the Vienna hydroelectric power plant ('Freudenau'). During construction of the hydroelectric power plant, the previously straight shoreline of the 21 km long Danube island with its steep embankments, was restructured by creating shallow water areas, gravel banks, small permanent backwaters and temporary waters. This paper describes the scheme and the results from the first year of a 4-year monitoring programme ('Danube Island Monitoring Programme', DIMP) investigating the colonization and successional processes of these areas by monitoring relevant indicator groups (vegetation, dragonflies, amphibians, reptiles, waterfowl)." (Authors)] Address: Chovanec, A; Univ. Wien, Inst. Zool., Dept Limnologie, Althanstr 14; A-1090 Wien Austria
1481. **Clancy, S. (2000):** Reports from Coastal Stations - 1999: Dungeness area, Kent. *Atropos* 9: 65-67. (in English). [*Sympetrum fonscolombii*; *Anax parthenope*, "poor year"] Address: not stated
1482. **Corbet, P.S. (2000):** Book review: A Guide to the Dragonflies of Great Britain, Arlequin Press, Chelmsford, Essex CM1 1SW, England (1999) 21 x 15cm, 128pp.; £15.95 incl. post and packing (softback). ISBN 1 900159 01 5. Illustrated by Dan Powell; with text by Dan Powell and Colin Twist; edited by Colin Twist. *J. Br. Dragonfly Society* 16(1): 31-32. (in English). Address: Corbet, P.S., Crean Mill, St. Buryan, Penzance, Cornwall, UK
1483. **Costa, J.M.; Irineu de Souza, L.O.; Santos, T.C. (2000):** Two new species of *Oxyagrion* Selys, 1876 with a description of five new larvae (Zygoptera: Coenagrionidae). *Odonatologica* 29(1): 1-15. (in English). ["*O. pseudocardinale* sp. n. (holotype male: Brazil. Minas Gerais, Fazenda da Cachoeira F.F. de Souza. 13-11-1990) and *O. sulmatogrossense* sp. n. (holotype male: Brazil, Mato Grosso do Sul, Campo Grande, Campus UFMS. 24-XII-1997) are described and illustrated. The larvae of *O. basale* Selys, 1876, *O. haematinum* Selys, 1876, *O. pavidum* Selys, 1876, *O. santosi* Murtins, 1967, and *O. sulinum* Costa, 1978 are described and illustrated for the first time. Keys are provided for the known *Oxyagrion* spp. and for the known larvae." (Author)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br
1484. **Costa, J.M.; Santos, T.C. (2000):** Two new species of *Santosia* Costa & Santos, 1992 with a description of five new corduliid larvae (Anisoptera: Corduliidae). *Odonatologica* 29(2): 95-111. (in English). ["*S. machadoi* sp.n. (holotype male: Parque Nacional da Serra da Bocaina, Sao Paulo, Brazil; 25-11-1977) and *S. newtoni* sp.n. (holotype male: Brejo da Lapa, Itatiaia, Rio de Janeiro, Brazil; 19-II-1974) are described and illustrated along with their exuviae. The exuviae of *Aeschnosoma marizae* Santos, *Neocordulia androgynis* (Sel.) and *N. setifera* (Hag.) are also described and illustrated for the first time. The known *Santosia* spp. and the neotropical corduliid larvae are keyed." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br
1485. **Craine, G.D. (2000):** Reports from Coastal Stations - 1999: Isle of Man. *Atropos* 9: 77-78. (in English). [First *Libellula depressa* for the Isle of Man, *Lestes sponsa*, *Sympetrum striolatum*] Address: not stated
1486. **Daigle, J.J. (2000):** The distribution of the Odonata of Hawaii. *Bulletin of American Odonatology*

6(1): 1-5. (in English). [The distribution of 37 species is recorded by island for the 6 main islands in the State of Hawaii, USA. Each of the species is shortly commented with reference to habitat, recent status, and in some cases to circumstances of (re)-discovery.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: daiglej@dep.state.fl.us

1487. **De Marmels, J. (2000):** The larva of *Allopetalia pustulosa* Selys, 1873 (Anisoptera: Aeshnidae) with notes on aeshnoid evolution and biogeography. *Odonatologica* 29(2): 113-128. (in English). ["The larva is described and illustrated from four ultimate instar exuviae (2 males reared) and from a younger larva, all from Venezuela. Main characters are a pointed epiproct and spinous mesial carinae of paraprocts. There is some general similarity with larvae of *Boyeria* McL., but the latter have angled occipital lobes, longer labium and, in some species, a bifid epiproct. Penis is strikingly similar in *Allopetalia* and *Boyeria*, the "comua" coming closer to those found in *Gomphaeschna* Sel. than to the "flagella" as found in the brachytrine *Spinaeschna* Theisch. and in the austropetaline *Rheopetalia* Carle. - The "pyeri-group" of *Oligoaeschna* Sel. is ascribed to *Gomphaeschna* Lohmann (1996, *Enl. Z.*, Essen 106: 209-252), while the "poeciloptera-group" is considered a representative of the archaic *Gynacanthini* (Aeshnata). Biogeographical problems of Anisoptera, especially those of *Gomphaeschnini* and *Gynacanthini*, and of *Euphaeida* (Zygoptera) are discussed, considering the Pangaea-model and panbiogeographic criteria. Maps and a glossary of some panbiogeographic terms are added." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuelae

1488. **Dewick, S. (2000):** Reports from Coastal Stations - 1999: Curry Farm, Bradwell-on-Sea, Essex. *Atropos* 9: 68-70. (in English). [Assessment of the dragonfly season 1999 including records of 15 species; it was an average year for *Sympetrum striolatum* and a good season for *S. sanguineum*, but "with an interesting clustering of [19] night-time records indicating periods of migration."] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

1489. **Dewick, S.; Gerussi, R. (2000):** Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier) found breeding in Essex - The first British records. *Atropos* 9: 3-4. (in English). [On 17 July 1999 the first specimen of *E. viridulum* and a colony of the species were detected in "an area of unspoilt countryside in Essex", UK. Nearby situated a second - strong - population was discovered on 15 August.] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

1490. **Dey, D. (2000):** County focus: The Odonata of Sussex. *Atropos* 10: 15-18. (in English). [Odonatological facts referring landscape and habitats of Sussex, UK are shortly outlined; recent records of 32 species are commented with special emphasize on the migrant species] Address: Dey, D., 26 Manor Avenue, Hassocks, West Sussex, BN9 8NG, UK

1491. **Diesel, R.; Schubart, C.D. (2000):** Die außergewöhnliche Evolutionsgeschichte jamaikanischer Felskrabben. *Biologie in unserer Zeit* 30(3): 136-147. (in German with English summary). [The exiting evolution of the life history of Jamaican crabs: The Decapoda are

among the animal groups that most recently colonised land. This important evolutionary step occurred several times independently in the tropics and subtropics and produced convergent adaptations in the life history [...] With a further advancement into terrestrial habitats, the crabs colonised habitats with small aggregations of water that became nurseries for larvae and juveniles, for example the shells of large land snails and leaf axils of bromeliad plants filled with rainwater. The larvae thereby develop in the vicinity of the mother. High predation risk, scarce food resources, and unfavourable abiotic conditions for the larvae and the young triggered in species like [...] the bromeliad crab, *Metopaulias depressus*, the evolution of an outstanding parental care. The bromeliad crab mother, for example, does control and manipulate the acidity and calcium content of the water in the leaf axil with the brood. Bromeliad crabs live most of their life on a single bromeliad plant, and the characteristics of such a life supported a remarkable social organisation, comparable with cooperative breeding vertebrates." (Author) On page 143 a short notice on the maternal care from odonate predation is made. This refers to the results of a study published in *Animal Behaviour* 43: 803-812: Diesel, R. (1992): Maternal care in the bromeliad crab, *Metopaulias depressus*: protection of larvae from predation by damselfly nymphs: "*Metopaulias depressus* (Decapoda, Grapsidae) is a crab that breeds in water-storing leaf axils of large Jamaican bromeliads. This study examined whether and how maternal care protects crab larvae from predation by damselfly nymphs. The nymph of the bromeliad-breeding damselfly, *Diceratobasis macrogaster*, is the major predator on bromeliad crab larvae. Laboratory tests revealed that a nymph kills on average five larvae per day. Both the damselfly and the bromeliad crabs prefer the bromeliad *Aechmea paniculigera* as a breeding site. Nymphs were abundant: 87% of the *A. paniculigera* held 1-16 nymphs. Bromeliad crabs release on average 50 larvae into a prepared nursery axil where they develop for 9-10 days into young crabs. In field experiments maternal care reduced larval mortality from predation by 60%. A calculation based on predator abundance and killing potential suggests that female brood desertion would lead to 54-100% loss of their reproductive investment, depending on the female's body size and age (egg number is positively correlated with body size). Protected broods showed on average only 22% mortality during the larval period. In the bromeliad crab, predation on larvae exerts strong selection on the maintenance of maternal care for larvae." Address: Diesel, R., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82305 Seewiesen, Germany

1492. **Dieterich, M.; Anderson, N.H. (2000):** The invertebrate fauna of summer-dry streams in western Oregon. *Archiv für Hydrobiologie* 147(3): 273-295. (in English). [Report on invertebrate communities and habitat associations of species in summer-dry streams of western Oregon, USA: 202 aquatic and semi-aquatic species, including at least 13 previously undescribed taxa. "Species richness in temporary forest streams (>125 species) exceeded that in a permanent headwater (100 species). Richness in ephemeral streams was 35 species or less. Duration of flow. exposure (shaded or open), riffle-pool structure and summer-drought conditions were key factors shaping community composition between and within stream types. We conclude that the potential of summer-dry streams with respect to habitat function is still widely underestimated." (Authors).

In Appendix 1 *Cordulegaster dorsalis* is characterised as a species obligate - facultative for permanent streams and obligate for forest streams.] Address: Dieterich, M., Philipps-Universität-Marburg, Fachbereich Biologie, AG Tieröko-logie, D-35032 Marburg, Germany

1493. **Dijkstra, K.-D. (2000):** Libellen in Wit-Rusland. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 4(1): 11-12. (in Dutch). [In 1999 Netherlands and Belo-russian hydrobiologists surveyd the Odonata of the Svinavod region and the Hvojensk region in the southern part of the floodplains / marshes of the river Pripjat, Belo-Russia. 43 species including species of the EU Habitat Directive as *Sympecma paedisca*, *Leucorrhinia pectoralis*, *L. albifrons*, and *Aeshna viridis* could be recorded. *Coenagrion armatum*, *C. pulchellum*, *Erythromma najas*, *Nehalennia speciosa*, *Anaciaeschna isosceles*, *Aeshna subarctica elisabethae*, *Epitheca bimaculata*, *Somatochlora flavomaculata*, and *S. arctica* should be mentioned too.] Address: Dijkstra, K.D., Oude Rijnburgerweg 38, NL-2342 BC Oegstgeest, The Netherlands

1494. **Dunkle, S. (2000):** The many joys of dragonfly-ing. *American Butterflies* 8(2): 26-32. (in English). [Sid Dunkle particularly contrasts dragonflies with butterflies. The paper contains 10 colour photos of North American odonates.] Address: American Butterfly Association, 4 Delaware Rd., Morristown, NJ, USA 07960

1495. **Āervek, U.; Sameja, M. (2000):** *Orthetrum coerulescens anceps* (Schneider) as a prey of larval Mantis religiosa (L.) Anisoptera: Libellulidae; Dictyoptera: Mantodea. *Notul. odonatol.* 5(5): 65. (in English). [Near Zadar, Croatia on 23 July, 1998 *M. religiosa* was observed devouring an adult *O. coerulescens anceps*.] Address: Āervek, U., Ul. Veljka Vlahovića 35, SI-2000 Maribor, Slovenia

1496. **Ellenrieder, N. van (2000):** Additions to the description of *Gomphomacromia nodisticta* Ris, 1928 (Anisoptera: Corduliidae). *Bulletin of American Odonatology* 6(1): 7-11. (in English). [*Gomphomacromia nodisticta* Ris 1928, not found since its original description, was recorded in an Andean locality of NW Argentina. The structure of the penis is described, and some additional measurements and illustrations of diagnostic value are provided, as well as a comparison with the other species of the genus *G. paradoxa*, *G. etcheveryi*, *G. chilensis*, *G. fallax*, and *G. mexicana*.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

1497. **Ellenrieder, N. von (2000):** Species composition and temporal variation of odonate assemblages in the subtropical-pampasic ecotone, Buenos Aires, Argentina. *Odonatologica* 29(1): 17-30. (in English). ["Odonata assemblages present in the ecotone between subtropical forest and pampasic grassland in Punta Lara were characterized and compared. Four pools, one in the forest, two in grassland (one within a protected area) and one at the limit of both environments, were sampled during July 1996-June 1998. For each sampling station species richness and diversity were calculated, and were compared through two similarity coefficients (Jaccard and Winer). The highest species richness and diversity were registered in the forest, and the lowest in the protected grassland. Cluster analysis showed different schemes according to the similarity coefficient considered; a greater similarity between the

forest and intermediate pools (Jaccard coefficient), or a greater similarity between grassland areas (Winer coefficient). Some biogeographical implications are discussed." (Author)] Address: Ellenrieder, N. von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

1498. **Gennard, D. (2000):** Post-symposium tour to the Adirondacks, 17-20 July 1999. *WDA's Agrion* 4(1): 7. (in English). [Personal report on the WDA Post-symposium Tour to the famous Adirondacks, New York, USA] Address: Gennard, Dorothy, 3 West End Rd., Ulceby, N. Lincs., DN39 6TC, UK

1499. **Goudsmits, K.; Wasscher, M. (2000):** Is er voorkeur bij de eiafzetplek van de Houtpantserjuffer *Lestes viridis*? Mededelingen van de Nederlandse Vereniging voor Libellenstudie 4(1): 8. (in Dutch). [Is there any preference in oviposition substrat in *Lestes viridis*? *Fraxinus excelsior* and *Alnus glutinosa* are preferred oviposition substrates for *C. viridis* near the estate Rijwijk, The Netherlands. In general, trees with smooth bark seems to be preferred for oviposition.] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1500. **Hämäläinen, M. (2000):** Ten species added to the list of Peninsular Malaysian Odonata. *Notul. odonatol.* 5(5): 53-55. (in English). [First records are the following species: *Amphicnemis ecornuta*, *A. sp.*, *A. gracilis*, *Lestes praecellens*, *Podolestes buwaldai*, *Oligoaeschna foliacea*, *Burmagomphus arthuri*, *Orchithemis pruinans*, *Tyriobapta kuekenhali*, and *Zyxomma obtusum*.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

1501. **Hill, P.M. (2000):** Migrant Hawker *Aeshna mixta* using Buddleia Bush as a Feeding Station. *Atropos* 10: 57. (in English). [In early September 1999 *Aeshna mixta* was patrolling around a Buddleia and "periodically attempting to prey upon the various butterflies present, mainly Peacock *Inachis io* and Red Admiral *Vanessa atalanta*. Although the dragonfly was present for two or three days, I never actually saw it take a butterfly. Presumably it was successful otherwise it would have given up its vigil. Interestingly, a Robin (*Erithacus rubecula*, Aves) was also in attendance on several evenings, feeding on moths attracted to the Buddleia bush, flycatcher-fashion."] Address: Hill, P.M., 1 Clive Cottage, London Road, Allostock, Kniitsford, Cheshire WA16 9LT, UK

1502. **Jödicke, R. (2000):** Reiseberichte: Tunesien. *Libellennachrichten* 3: 18-19. (in German). [Report on the more recent activities in surveying the Odonata of Tunisia with some remarks on new additions to the checklist of the Tunesian Odonata, and voltinism of some species.] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

1503. **Johansson, F. (2000):** The slow-fast life style characteristics in a suite of six species of odonate larvae. *Freshwater Biology* 43: 149-159. (in English). ["1. The validity of the slow-fast lifestyle dichotomy proposed by Sih (1987) was tested in a suite of six odonate species from a restricted geographical area. Data on activity and microhabitat use were obtained in a laboratory study. Further necessary information on life history, macrohabitat (ephemeral-permanent) use and vulnera-

bility to fish predation was provided by a literature survey. 2. Activity was estimated as number of moves and distance moved for the six odonate larvae. *Aeshna juncea*, *Lestes sponsa* and *Sympetrum danae* were categorised as high-active species, whereas *Coenagrion hastulatum*, *Cordulia aenea* and *Leucorhinia dubia* were categorised as low-active species. 3. *C. hastulatum* and *L. sponsa* exploited microhabitats close to the water surface, *C. aenea* and *L. dubia* close to the bottom, and *A. juncea* and *S. danae* were intermediate in their water depth utilisation. 4. A principal component analysis of the data from the laboratory experiment and the literature survey supported the slow-fast life style dichotomy since the variables activity, macrohabitat use, life cycle length and sensitivity to fish predators were highly correlated." (Author)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

1504. **Jones, S.P. (2000):** First proof of successful breeding by the Lesser Emperor *Anax parthenope* (Sélys) in Britain. *J. Br. Dragonfly Society* 16(1): 20-23. (in English). ["*A. parthenope* has been proven to breed successfully in Britain for the first time by the discovery of a male exuvia on the Lizard peninsula on 31 July 1999. Additional exuviae discovered approximately 75 km to the northeast at Bake Farm Pools shortly afterwards allow the possibility that the species may have established itself over a wide area of Cornwall, especially as adults were noted at two other sites in the county during 1999. Current knowledge of the larval development time for *A. parthenope* indicates that, in Europe, larval development is likely to take two years (Robert, 1958), suggesting that the original oviposition would have occurred during the summer of 1997. However it is not inconceivable that in the right conditions, such as the shallow pools of the Lizard site where there is a high degree of exposure to sunshine, *A. parthenope* could complete its larval development in one year (P.S. Corbet, pers. comm.). If so, it is possible that oviposition could have occurred during the summer of 1998, when there were numerous sightings of adult *A. parthenope* in Cornwall." (Author) Morphological characters of male exuviae of *A. parthenope* and *A. imperator* for separating the species are discussed in detail.] Address: Jones, S., Hyfield, Chapel Hill, Brea, Cornwall TR14 9BP, UK

1505. **Jonsen, I. D.; Taylor, P. D. (2000):** Fine-scale movement behaviors of calopterygid damselflies are influenced by landscape structure: an experimental manipulation. *Oikos* 88: 553-562. (in English). ["We explore the effect of differences in landscape structure, arising from habitat loss, on the fine-scale movement behaviors of two congeneric damselflies - *Calopteryx aequabilis* and *C. maculata*. Both species require streams for breeding and naiad development and both often use forest for foraging. We compare movement behaviors across three types of landscape: forested landscapes, where stream and forest habitat are adjacent; partially forested landscapes, where streams and forest habitat are disjunct, and non-forested landscapes, where little to no forest habitat is available. We employ a reciprocal transplant experiment to determine the extent to which movement along and away from streams is influenced by landscape structure and historical behavior or morphological adaptations. For both species, we show that both the propensity to move away from streams and

and rates of net displacement differ among landscape types. Both species move away from streams on landscapes with high or moderate levels of forest cover but neither moves away from streams on landscapes with little or no forest. Furthermore, *C. maculata* native to predominantly forested landscapes are more likely to move away from streams, regardless of the landscape structure they encounter, than are individuals native to moderately forested or non-forested landscapes. There was no effect of natal landscape on *C. aequabilis*. Comparisons with microlandscape studies suggest that there may be some general similarities among the different systems but these are clouded by uncertainty regarding the similarity of the underlying processes responsible for observed behavioral responses to landscape structure. Despite this uncertainty, animal movement behaviors are contingent upon the structure of the broader landscape, regardless of the absolute scale of the landscape." (Authors)] Address: Jonsen, D.I., Lethbridge Research Centre, Agriculture & Agri-Food Canada, P.O. Box 3000, Lethbridge, AB, Canada T1J 4B1. E-mail: jonseni@em.agr.ca

1506. **Jurzitza, G. (2000):** Obituary: Dr. Paul Münchberg (1905-1999). *Notul. odonatol.* 5(5): 66. (in German). [P. Münchberg born on 16 September 1905 in Trebisch near Landsberg (Warthe), Poland departed on 23 July 1999. His odonatological vita is credited in *Odonatologica* 4(3): 125-128.] Address: Jurzitza, G., Reimuthstr. 27, D-76187 Karlsruhe, Germany

1507. **Karube, H. (2000):** *Microgomphus jurzitzae* spec. nov., a new dragonfly from southern Vietnam (Anisoptera: Gomphidae). *Odonatologica* 29(1): 63-65. (in English). ["The new sp. is described and illustrated from 2 males. Holotype male: Lamdong prov., Bao Lok to Ho-Chi-minh Rd, 15-VI-1996; deposited in Author's institution. It is similar to *M. loogali* Fraser, from northern Burma, from which it is easily distinguished by the longer inner superior appendages, and by strongly bent, bifid inferior appendages. This is the first member of the genus recorded from Vietnam." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

1508. **Ketelaar, R. (2000):** European Reports 1999: The Netherlands: Odonata. *Atropos* 10: 47-49. (in English). [Compilation of new records from the Netherlands and recent range extension of *Coenagrion lunulatum*, *Erythromma viridulum*, *Lestes barbarus*, *L. virens*, *Sympetma fusca*, *Stylurus flavipes*, *Aeshna affinis*, *A. mixta*, *Anax parthenope*, *Sympetrum fonsolombii*, *S. flaveolum*, and *S. danae*] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands

1509. **Klärner, D. (2000):** Technische Biologie: Kopffixierung bei Libellen. *Naturwissenschaftliche Rundschau* 53(1): 35-36. (in German). [Review of the paper abstracted as OAS 723] Address: not stated

1510. **Knill-Jones, S. (2000):** Reports from Coastal Station - 1999: Isle of Wight. *Atropos* 9: 62. (in English). [First record of *Cordulia aenea* on the Island, *Anax parthenope* on 4 September] Address: not stated

1511. **Kosterin, O. E. (2000):** Observation on an intergeneric copulation between a male *Cordulia aenea* (L.) and a female *Epitheca bimaculata* (Charp.) (Anisoptera: Corduliidae). *Notul. odonatol.* 5(5): 55-56. (in English). [The copula is briefly described and documen-

ted by a photograph. It took place on 13-VI-1994, at an oxbow in Berd' River, near Legostaevo, Iskitim distr., Novosibirsk prov., Russia. A statement on the prezygotic mating barriers in dragonflies is made.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

1512. **Kuhn, J. (2000):** Libellen (Odonata) im Murnauer Moos, Oberbayern: Fauna und Naturschutzprobleme. Verh. Westd. Entom. Tag 1998: 141-146. (in German with English summary). ["Murnauer Moos" is a large bog and fen complex in southern Bavaria, Germany. In this paper the dragonfly fauna (55 species) is listed and its conservation problems are summarized."] Address: Kuhn, J., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82319 Seewiesen. E-mail: kuhn@mpi-seewiesen.mpg.d

1513. **Littlewood, N. (2000):** Reports from Coastal Stations - 1999: South Walney Nature Reserve, Cumbria. Atropos 9: 76-77. (in English). [Odonata are rare in general on the reserve, *Sympetrum striolatum*, *Aeshna mixta* c.f.] Address: not stated

1514. **Long, R.; Long, M. (2000):** Non-British Damselflies in Jersey. Atropos 9: 95-96. (in English). [The current status of *Sympetma fusca*, *Chalcolestes viridis*, *Lestes barbarus*, and *Crocothemis erythraea* on Jersey is briefly commented] Address: Long, R., Ozard, St. John, Jersey, Channel Islands JE3 4FP, UK

1515. **Long, R. (2000):** Southern Migrant Hawker *Aeshna affinis* in Jersey, Channel Islands. Atropos 9: 81. (in English). [Second British record from 17 July 1998 at Rosel Manor, St. Martin, Jersey] Address: Long, R., Ozard, St. John, Jersey, Channel Islands JE3 4FP, UK

1516. **Marsh, P. (2000):** Odonata at Heysham Industrial Estate, Lancashire. Atropos 9: 81-82. (in English). ["site in an old industrial area in desperate need of bio-remediation due to unpleasant chemicals lingering underground or in the substrate in the wetland area"; 13 odonate species could be recorded including freshly emerged *Sympetrum flaveolum*] Address: Marsh, P., 17 Albion Street, Lancaster, Lancashire LA1 1DY, UK

1517. **Mauersberger, R. (2000):** *Coenagrion johansoni* (Wallengren), *Aeshna crenata* Hagen and *A. subarctica elisabethae* Djakonov found in Belarus (Zygoptera: Coenagrionidae; Anisoptera: Aeshnidae). Notul. odonatol. 5(5): 56-57. (in English). [7 spp. were recorded in a peat bog near Polozk in northern Belarus, July 1996. *Aeshna crenata* and *A. subarctica* are new additions to the fauna of the country.] Address: Mauersberger, R., Waldstr. 4, D-16278 Steinhöfel, Germany

1518. **McPeck, M.A.; Brown, J.M. (2000):** Building a regional species pool: diversification of the *Enallagma* damselflies in eastern North America. Ecology 81(84): 904-920. (in English). ["We use a phylogeny of the North American *Enallagma* damselflies, derived from molecular and morphological data, to examine how the patterns of local and regional assemblage structure developed in this taxon across eastern North America. The two primary clades in the genus have nearly identical numbers of extant species, but the centers of diversity and the diversification rates for the two clades are quite different. One clade has its center of diversity in

New England and radiated very recently from three species to give the current 18. Although most of this radiation involved the creation of new species in the ancestral fish-lake habitat, at least two independent lineages invaded and adapted to a new habitat: ponds and lakes lacking fish but supporting large numbers of large predatory dragonflies. The other clade with greatest diversity in the southeastern United States, contains species that inhabit only water bodies that support fish populations. This "south-eastern" clade diversified at a much slower and more steady pace within the fish-lake habitat than the "New England" clade, but four speciation events in this clade appear to have occurred at the same time as the northern radiation. Combined with our current understanding of local community structure in fish and fishless lakes, these results indicate that most of the species in this regional assemblage were created by speciation mechanisms other than filling empty niches, which have resulted in many locally coexisting species that are very similar in their ecological characteristics. Damselflies in eastern North American ponds and lakes appear to exemplify features of both a regulated component of the littoral food web (i.e., a functional group) and an assemblage whose local community composition is influenced by nonadaptive macroevolutionary processes that have operated on a much larger regional scale." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

1519. **Misof, B.; Anderson, C.L.; Hadrys, H. (2000):** A phylogeny of the damselfly genus *Calopteryx* (Odonata) using mitochondrial 16S rDNA markers. Molecular phylogenetics and evolution 15(1): 5-14. (in English). ["[...] In this study, we concentrate on establishing phylogenetic information from parts of the 16S rDNA gene, which we sequenced for nine *Calopteryx* species and five outgroup species. The mt 16S rDNA data set did not show signs of saturated variation for ingroup taxa, and phylogenetic reconstructions were insensitive to variation of outgroup taxa. Parsimony, neighbor-joining, and maximum-likelihood reconstructions agreed on parts of the tree. A consensus tree summarizes the significant results and indicates problematic nodes. The 16S rDNA sequences support monophyly of the genera *Mnais*, *Matrona*, and *Calopteryx*. However, the genus *Calopteryx* may not be monophyletic, since *Matrona basilaris* and *Calopteryx atrata* are sister taxa under every parameter setting. The North American and European taxa each appear as monophyletic clades, while the Asian *Calopteryx atrata* and *Calopteryx cornelia* are not monophyletic. Our data implies a different paleobiogeographic history of the Eurasian and North American species with extant Eurasian species complexes shaped by glacial periods, in contrast to extant North American species groups." (Authors)] Address: Misof, B., Institute for Evolutionary Biology and Ecology, Universität Bonn, An der Immenburg 1, D-53121 Bonn, Germany

1520. **Mitra, A. (2000):** Annotated Odonata inventory of the Asan reservoir, Dehra Dun, India. Notul. odonatol. 5(5): 57-60. (in English). ["44 spp. are listed, of which *Anax p. parthenope* (Sel.) is new for the Doon Valley. 13 spp. have been found to breed exclusively in the Reservoir, 8 spp. breed in the adjacent streams, while the remaining 23 spp. are common in both the habitats." (Author)] Address: Mitra, A., D/6, Government Quarters, 10 M.B. Road, Calcutta-700 083, India

1521. **Mitra, T.R. (2000):** A note on an Odonata collection from Orissa, India. *Notul. odonatol.* 5(5): 60-61. (in English). [69 spp. are so far known from the state Orissa, eastern India. No locality data were published for 11 of these (Mitra, 1994, *Rec. zool. Surv. India, Occ. pap.*, 166: 1-40); they are listed here, and the complete regional bibliography is provided. "Note on *Enallagma insula* Fraser: This enigmatic species has been described from a single female specimen, from the Chilka Lake, Ganjam district (FRASER, 1920). The type is apparently lost. Zoological Survey of India has undertaken several faunistic surveys, especially in the district of Ganjam, but no party was ever successful in collecting further specimens of this species. The authenticity and the status of *E. insula* remain uncertain."] Address: Mitra, T.R., Zoological Survey of India, M-Block, New Alipore, Calcutta-700 053, India
1522. **Müller, J.; Steglich, R. (2000):** Zur Verbreitung der Südlichen Mosaikjungfer *Aeshna affinis* (Odonata) in Sachsen-Anhalt in den Jahren 1993 bis 1999. *Entomol. Mitt. Sachsen-Anhalt* 8(1): 22-32. (in German). [Documentation of all known records (n = 92) of *A. affinis* in Sachsen-Anhalt, Germany; *A. affinis* prefers the floodplains of River Elbe with thermically favoured periodic water bodies with reed vegetation; in 17 cases *A. affinis* was associated with *Lestes barbarus*] Address: Müller, J., Frankfelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@MU.LSA-NET.dbp.de
1523. **Naraoka, H. (2000):** Obituary: Professor Dr Kazuo Saitoh (1927-1998). *Notul. odonatol.* 5(5): 66-68. (in English). [10-2-1927 - 25-11-1998] Address: Naraoka, H., 36-71, Motoizumi, Fukunoda, Itayanagi, Kitagun, Aomori, 038-3661, Japan
1524. **Neboiss, A. (2000):** Obituary for Dr. Zandis Spuris. *W.D.A.'s Agrion* 4(1): 11-12. (in English). [Obituary for the famous Latvian zoologist Dr. Zandis Spuris who died on 15 November 1998. The odonatological bibliography (compiled by M. Schorr) comprises nearly 40 titles.] Address: Neboiss, A., 8 Andrew St., Forest Hill, Victoria Australia 3131
1525. **N.N. (2000):** Reports from Coastal Stations - 1999: Minsmere RSPB Reserve, Suffolk. *Atropos* 9: 71. (in English). [Late record of *Sympetrum striolatum* from 2 December] Address: not stated
1526. **Novelo-Gutiérrez, R. (2000):** Description of the larva of *Hetaerina infecta* Calvert (Odonata: Calopterygidae). *Proc. ent. soc. Washington* 102(1): 99-104. (in English with Spanish summary). [The larva is described and illustrated based on two exuviae of reared final instar larvae, and six F-1 instar larvae. It is compared to its close relative *H. capitalis*. Data on distribution, habitat and habits, as well as a key to larvae for the Mexican species of *Hetaerina* are provided.] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico
1527. **Odin, N. (2000):** Reports from Coastal Stations - 1999: Landguard Bird Observatory, Suffolk. *Atropos* 9: 70-71. (in English). [*Coenagrion puella*] Address: not stated
1528. **Olberg, R.M.; Worthington, A.H.; Venator, K.R. (2000):** Prey pursuit and interception in dragonflies. *Jour. comp. physiol. (A), Sensory, neural and behavioral physiology* 186(2): 155-162. (in English). ["Perching dragonflies (Libellulidae; Odonata) are sit-and-wait predators, which take off and pursue small flying insects. To investigate their prey pursuit strategy, we videotaped 36 prey-capture flights of male dragonflies, *Erythemis simplicicollis* and *Leucorrhinia intacta*, for frame-by-frame analysis. We found that dragonflies fly directly toward the point of prey interception by steering to minimize the movement of the prey's image on the retina. This behavior could be guided by target-selective descending interneurons which show directionally selective visual responses to small object movement. We investigated how dragonflies discriminate distance of potential prey. We found a peak in angular velocity of the prey shortly before take-off which might cue the dragonfly to nearby flying targets. Parallax information from head movements was not required for successful prey pursuit." (Authors)] Address: Olberg, R.M., Union Coll, Dept Biol. Sci., Schenectady, NY 12308 USA; Siena Coll, Dept Biol, Loudonville, NY 12222 USA. E-mail: olbergr@union.edu
1529. **Parr, A. (2000):** Blue Dasher *Pachydiplax longipennis* (Burmeister) on an oil rig in the north sea. *Atropos* 10: 3-5. (in English). [On the occasion of the first European record of *P. longipennis* in Sept. 1999 on the Sedco 706 oil rig at 60°38'N, 1°39'E in the North Sea, off the Shetland Isles, by Mr. P. Burr, the species is characterized incl. two excellent colour photos. The possibility of an accidental introduction by air or by sea direct from the Houston area, USA, and the possibility of the dragonfly being a genuine vagrant are discussed in some detail.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1530. **Parr, A. (2000):** Migrant dragonflies in 1999 including recent decisions and comments by The Odonata Record Committee. *Atropos* 9: 21-25. (in English). [The following species are treated: *Calopteryx splendens*, *Erythromma viridulum*, *Aeshna mixta*, *A. affinis*, *Anax parthenope*, *A. ephippiger*, *Sympetrum striolatum*, *S. fonscolombii*, *S. flaveolum*, *S. sanguineum*, *S. danae*, and *Pachydiplax longipennis*(!). The latter is a new addition to the European odonate fauna. The female specimen was detected dead on 6 September 1999 on the Sedco 706 oil rig in the Dunbar field on the east of Shetland.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1531. **Parr, A. (2000):** Odonata Records Committee News. *Atropos* 10: 58. (in English). [Reports on *Anax parthenope*, and *Pachydiplax longipennis*] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1532. **Parr, A. (2000):** Review: Dragonflies. Behaviour and Ecology of Odonata by Philip S. Corbet. 1999 Harley Books. Colchester. ISBN 0 946589 64 X. 829 pp. *Atropos* 9: 92. (in English). [Review of P.S. Corbet's book, see OAS 1566] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
1533. **Parr, A. (2000):** Southern Migrant Hawker *Aeshna affinis* Vander Linden: a guide to identification. *Atropos* 10: 26-28. (in English). [*A. affinis* is a quite rare migrant odonate species in UK. To trace possible specimens and to separate them from *A. mixta*, the paper provides detailed information on *A. affinis*. Brilliant colour photos and information on habitat and behaviour will help to spot *A. affinis* among the *A. mixta*.] Address:

Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

1534. **Parr, M.; Corbet, P.S. (2000):** The 1999 International Congress of Odonatology. WDA's Agrion 4(1): 5-6. (in English). [Report on the WDA meeting held on 11 through 16 July at Colgate University, Hamilton, New York, USA; it gives some general information on the participants and the atmosphere among participants, and short summaries of the lectures held in different sessions] Address: Parr, M., Little Island, Stembidge, Martock, Somerset TA12 6BW, UK. E-mail: mmcz@parr37.freesevice.co.uk

1535. **Pellow, K. (2000):** Lesser Emperor Dragonfly *Anax parthenope* (Selys) breeding in Cornwall. *Atropos* 9: 28-29. (in English). [Exuviae of the species were secured at Trerulefoot, Cornwall on 16 August 1999; male exuviae of *Anax parthenope* are compared with exuviae of *A. imperator*; the female of *A. parthenope* is described in detail] Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Cornwall PL12 6NQ, UK

1536. **Pellow, K. (2000):** Observations of the Red-veined Darter *Sympetrum fonscolombi* (Selys) at Bake Lakes in Cornwall during 1999. *J. Br. Dragonfly Society* 16(1): 29-30. (in English). [The paper presents further observations on the persistence of a population of *S. fonscolombi* that may be in the early stages of colonizing Britain.] Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Cornwall PL12 6NQ, UK

1537. **Piper, W.; Krüner, U. (2000):** Libellennachrichten. *Libellennachrichten* 3: 1-20. (in German). [Volume 3 contains a lot of information on recent activities of the Society of German speaking odonatologists, announcement of meetings, reviews of odonatalogical publications and CD-ROM's, new theses on Odonata, calls for cooperation ...] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany

1538. **Piper, W. (2000):** *Perithemis mooma* Kirby emerge in a cave (Anisoptera: Libellulidae). *Notul. odonatol.* 5(5): 65-66. (in English with Portuguese summary). [The cave „Gruta do Padre" is situated NE of Santa Maria de Vitoria, in the direction of Santana dos Brejos, Bahia, Brazil. A river runs through ca 10 km of the cave. On 9-11-1996, some 3 km off the cave entrance a female *P. mooma* was sitting on the helmet of the author. On the 10th, another member of the party detected another female on his helmet, at about the same section of the river. The two dragonflies were freshly emerged with very soft wings and bodies. Apparently, the larvae drifted into the cave during the rainy season.] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany. E-mail: werner.piper@t-online.de

1539. **Poepperl, R. (2000):** Benthic secondary production and biomass of insects emerging from a northern German temperate stream. *Freshwater Biology* 44(2): 199-211. (in English). [“1. Secondary production and emergence of aquatic insects were examined in the outlet of Lake Belau, Northern Germany, by means of benthic samples and emergence traps. 2. At three stream sections annual larval secondary production varied between 4.9 and 10.8 gDM (dry mass) m⁻² year⁻¹. Insects contributed with 3.4, 8.9, and 8.7% to the total macroinvertebrate production [...]. Emerged biomass was between 1.0 and 2.0 gDM m⁻² year⁻¹. At all three stream sections Diptera dominated [...] followed by Trichoptera [...] and Ephemeroptera . 3. Average larval

production amounted to 9.0 gDM n⁻² year⁻¹ and emerged biomass to 1.7 gDM m⁻² year⁻¹. Larvae of insects amounted to 7.0% of total macroinvertebrate production. 4. The ratio of annual emerged biomass to secondary production (E/P) varied among individual taxa. At the stream sections the ratio ranged from 15.9% to 20.1% with an average of 18.3% for the stream. [...].” (Author) *Pyrrhosoma nymphula*, *Ischnura elegans*, *Aeshna cyanea*] Address: Poepperl, R., Ökologie-Zentrum, Christian-Albrechts-Universität Kiel, Schauenburgerstr. 112, D-24118 Kiel, Germany. E-mail: rainer@pz-oekosys.uni-kiel.de

1540. **Pretschner, P. (2000):** Neue Bücher: Sternberg, Klaus & Buchwald, Rainer: *Die Libellen Baden-Württembergs*. Band 1. Stuttgart: Eugen Ulmer Verlag, 1999. 468 S. - 98 DM. ISBN 3-8001-35098. *Natur und Landschaft* 75(5): 233. (in German). [book review, see OAS 1149] Address: Pretschner, P., c/o Bundesamt für Naturschutz, Konstantinstr. 110, 53179 Bonn, Germany

1541. **Reinhardt, K.; Seidenbusch, R.; Foitzik, O.; Roth, S. (2000):** A small dragonfly collection from Turkmenistan. *Notul. odonatol.* 5(5): 61-63. (in English). [7 spp. were recorded from southern Turkmenistan of which *Gomphus schneideri* is new to the fauna of Turkmenistan.] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5kltre@pluto.rz.uni-jena.de

1542. **Reinhardt, K. (2000):** Aspects of the dragonfly fauna of eastern Kazakstan. *IDF-Report* 2(2): 1-11. (in English). [Detailed report on the results of an expedition to Kazakstan in May 1999; 17 sites were surveyed, 17 species could be identified; reproductive behaviour, oviposition, and egg parasitic wasps of *Sympecma paedisca* were investigated] Address: Reinhardt, K., Hauptstr. 38, D-09244 Oberlichtenau, Germany. E-mail: b5kltre@pluto.rz.uni-jena.de

1543. **Schorr, M. (2000):** Bilder aus dem Leben des Odonatologen Dr. Erich Schmidt (1890 - 1969). *IDF-Report* 2(2): 12-33. (in German). [Short introduction to a leaflet of W. Kanzler circulated on the opportunity of Erich Schmidt's 70th birthday; this "Festschrift" documents in black and white sketches some stations of the odonatalogical life of Dr. E. Schmidt, giving some intimate insight into the personality of the famous odonatologist] Address: Schorr, M., Waldfrieden 25, D-54314 Zerf. E-mail: foeatrier@aol.com

1544. **Silsby, J. (2000):** A social look at the symposium. WDA's Agrion 4(1): 6-7. (in English). [report on the WDA meeting held on 11 through 16 July at Colgate University, Hamilton, New York, USA; it gives some personal impression on the warmth of atmosphere among the participants, and the things happening around the scientific part of the meeting] Address: Silsby, J., 1, Haydn Avenue, Purley, Surrey, CR8 4AG, UK. E-mail: jsilsby1@aol.com

1545. **Silsby, J. (2000):** W.D.A.'s Agrion. W.D.A.'s Agrion 4(1): 16 pp. (in English). [A large variety of information is presented in this issue, including the minutes of the first WDA Biennial General Meeting on 13 July 1999 at Colgate University, NY, USA, reports from the Colgate symposium (Mike Parr & Philip Corbet) and the post-symposium tour (Dorothy Gennard), news from members, universities, and museums, new members, announcement of the 2nd International Symposium of W.D.A. in Sweden in 2001, etc.] Address: Silsby, J., 1,

Haydn Avenue, Purley, Surrey, CR8 4AG, UK. E-mail: jsilsby1@aol.com

1546. **Slaughter, L.; Best, L. (2000):** A late Southern Hawker *Aeshna cyanea* and other observations. *Atropos* 9: 87. (in English). [A. *cyanea* was recorded on 21 November 1999 in Par Beach Dunes, south Cornwall; *Sympetrum striolatum* were also on the wing] Address: Slaughter, L., P.O. Box 16, St. Austell, Cornwall, PL25 5LY, UK

1547. **Solly, F. (2000):** Reports from Coastal Station - 1999: Isle of Thanet, Kent. *Atropos* 9: 67-68. (in English). [Good year; there are no waterbodies in the recording area, so all records are thought to refer to dispersal/migration: *Aeshna mixta*, *A. cyanea*, *Libellula quadrimaculata*, *Orthetrum cancellatum*, *Sympetrum striolatum*, *S. sanguineum*, *S. flaveolum*, and *S. danae*] Address: not stated

1548. **Spence, B. (2000):** Reports from Coastal Stations - 1999: Spurn Bird Observatory, East Yorkshire. *Atropos* 9: 73-74. (in English). ["very disappointing year", few records of *Sympetrum fonscolombii* and *S. danae*] Address: not stated

1549. **Steglich, R. (2000):** Zum Vorkommen der "FFH-Libellen" *Ophiogomphus cecilia* und *Gomphus (Stylurus) flavipes* sowie von *Gomphus vulgatissimus* (Odonata, Gomphidae) in der "Magdeburger Strom-Elbe". *Entomol. Mitt. Sachsen-Anhalt* 8(1): 3-6. (in German). [Detailed documentation of records on River Elbe in the area of the town Magdeburg, Sachsen-Anhalt, Germany] Address: Steglich, Rosmarie, Quittenweg 53, 39118 Magdeburg, Germany

1550. **Steigner, W. (2000):** Naturkundliche Wanderung im LSG Höcherberg-Westrich. *Pollichia-Kurier* 16(1): 26-27. (in German). [Report of an excursion with natural history purposes in the district of Kusel, Rheinland-Pfalz, Germany; among the traced Odonata mentioned are *Orthetrum coerulescens*, and *Ceragrion tenellum*; the observer and odonatologist Siegmund Ohlinger corrected the record to *Pyrrhosoma nymphula*.] Address: not stated

1551. **Stevani, C.V.; Porto, J.S.; Trindade, D.J.; Bechara, E.J.H. (2000):** Automotive clearcoat damage due to oviposition of dragonflies. *Journal of applied polymer science* 75: 1632-1639. (in English). ["Automotive industries are increasingly interested in learning how to pro-long the clearcoat resin lifetime and avoid its thermal, photochemical, and chemical degradation. While chemical degradation by acid rain has been well known since the beginning of the decade and the subject of many studies, chemical degradation of the automotive clearcoat by living organisms (except by bird droppings) is a newly recognized problem. In this work, we report the chemical degradation of the automotive clearcoat caused by oviposition of dragonflies. These insects, very common in Brazil, are attracted by the reflecting surface of cars exposed in the sun and lay eggs on them. We observed that the eggs, at the high temperatures (50-92°C) of the car surface, can cause damage similar to that of acid rain. In experiments on resin-coated plates, we excluded the involvement of H₂O₂- or hydroquinone-derived radicals, of enzyme-catalyzed hydrolysis, and of photosensitizer-induced damage. The damage was very similar, however, to that produced by the sulfur-containing amino acids, cysteine and cystine, at high temperature. Due to this similarity, and because

the eggs are rich in sulfur amino acids, we propose a mechanism involving cysteine and cystine residues in the clearcoat damage." (Authors) *Miathyria* sp., *Tauriphila* sp., *Erythemis* sp.] Address: Bechara, E.J.H., Instituto de Química, Universidade de São Paulo, C.P. 26077, 05599-970, São Paulo, SP, Brazil. E-mail: ebechara@quim.iq.usp.br

1552. **Stevani, C.V.; Faria, D.L.A. de; Porto, J.S.; Trindade, D.J.; Bechara, E.J.H. (2000):** Mechanism of automotive clearcoat damage by dragonfly eggs investigated by surface enhanced Raman scattering. *Polymer Degradation and Stability* 68: 61-66. (in English). ["Dragonflies are attracted by the reflection of sunlight on car surfaces and lay their eggs on the clearcoat resin. Considering that the surface can reach up to 93°C and that during the egg hardening process (sclerotization) H₂O₂ is released, cysteine and cystine residues present in the egg protein can be oxidized to sulfinic and sulfonic acids. These are strong acids which, like acid rain, can hydrolyze the acrylic/melamine resin causing damage where the eggs were laid. Confocal Raman spectroscopy revealed that the spectra obtained from damaged and intact portions of the clearcoat were similar, in agreement with infrared absorption spectroscopy data. These data demonstrate that the attack by eggs, H₂SO₄ and cysteine/H₂O₂ only promotes solubilization of resin through acid hydrolysis of the resin ester and amide moieties. Furthermore, surface enhanced Raman scattering (SERS) spectra obtained from dragonfly eggs and cysteine/H₂O₂ reaction products treated with a silver colloid were very similar, thus confirming the presence of sulfinic and sulfonic acids. [...] Conclusion: Altogether the data support the proposition that the damage caused by dragonfly eggs to acrylic/melamine resins is due to acid hydrolysis. [...] As the sulfinic/sulfonic acids putatively formed are attached to the protein structure of the eggs, only damage in the contacted area between eggs and resin takes place. Contrarily, in the case of either acid rain or "acid solutions" tested in the laboratory, the acids are free in solution and can extend the damage to a greater surface area as well as to inner layers of the clearcoat. Once inner layers are destroyed, significant changes in the structure of the polymeric material can thereafter occur." (Authors)] Address: Bechara, E.J.H., Instituto de Química, Universidade de São Paulo, C.P. 26077, 05599-970, São Paulo, SP, Brazil. E-mail: ebechara@quim.iq.usp.br

1553. **Stoks, R.; De Block, M. (2000):** The influence of predator species and prey age on the immediate survival value of antipredator behaviours in a damselfly. *Archiv für Hydrobiologie* 147(4): 417-430. (in English). ["The efficacy of antipredator behaviours may depend on both intrinsic and extrinsic factors. We experimentally studied the effects of predator species and prey age on the immediate survival value of swimming and lamellae loss in larval damselflies. Four predators: two invertebrates (the notonectid, *Notonecta viridis* and the dragonfly larva *Aeshna cyanea*), and two vertebrates (the three-spined stickleback *Gasterosteus aculeatus* and the sunfish *Lepomis gibbosus*) were tested with all combinations of two instars of the damselfly *Lestes sponsa* (F-0 and F-2). The number of escapes by swimming away were much lower when larvae were attacked by the two fishes than by the two invertebrates. Moreover *Lepomis* never removed lamellae and killed all larvae. The instars did not differ in the number of escapes by swimming, but F-0 instars were caught more

at the lamellae than F-2 instars. All larvae that survived a capture were caught at the lamellae and the majority (90 %) did so by autotomy. The ontogenetic increase in the immediate survival value of this antipredator behaviour was dependent upon the predator species. It was highest in captures by the *Notonecta* (40 %), and lower when larvae were caught by the *Aeshna* or *Gastrophysus* (ca. 17 %). This was probably because the biological relevance of the magnitude of the speed difference between damselfly instars depends upon the predator's attack performance. We discuss the consequences of these findings for the macrohabitat distribution of the larvae and for the multicomponent antipredator behaviours prey may use." (Authors)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. E-mail: stoks@ruca.ua.ac.be

1554. **Switzer, P.V.; Schultz, J.K. (2000):** The male-male tandem: a novel form of mate guarding in *Perrithemis tenera* (Say) (Anisoptera: Libellulidae). *Odonatologica* 29(2): 157-161. (in English). ["Observations on male-male tandems are reported; these tandems occur at very low frequency during mate guarding sequences. When initiating a tandem, a male territory resident grabs an intruding male behind the head and flies with him. This behavior is similar to the tandem formation more usually associated with male-female pairs. Because the male-male tandems occurred during mate-guarding and because tandems do not follow courtship of the intruder by the resident, this rare behavior is interpreted as a form of mate guarding rather than misdirected mating behavior." (Authors)] Address: Switzer, P.V. & J.K. Schultz, Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920, USA. E-mail: cfpvs@eiu.edu

1555. **Tenessen, K.J. (2000):** *Micrathyria sympriona* spec. nov., a new dragonfly from Ecuador and Peru (Anisoptera: Libellulidae). *Odonatologica* 29(1): 67-73. (in English). ["The new sp. (holotype male, allotype female: Ecuador, Zamora Chinchipe prov., grassy marsh 5.5 km SE of Zamora, ca 3000 ft, 4°10'S, 78°56'W, 5-XI-1997; deposited at FSCA, Gainesville, FL, USA) is described and compared with *M. hypodidyma* Calvert. *M. sympriona* differs in the low, laterally rounded transverse ridge on the venter of abdominal segment 1 which bears 0 to 3 widely spaced black denticles on each side of the median depression, the tips of the outer arms of the hamules surpassing the anterior laminae, and segment 9 all black. Females have abdominal segment 9 sternite convex instead of flat as in *M. hypodidyma*." (Author)] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. ktennessen@aol.com

1556. **Troake, P. (2000):** Reports from Coastal Station - 1999: Rye Harbour SSSI, East Sussex. *Atropos* 9: 63-64. (in English). [The usual variety of resident dragonfly species were recorded including *Brachytron pratense* and *Coenagrion pulchellum*] Address: not stated

1557. **Tunmore, M. (2000):** Reports from Coastal Station - 1999: The Lizard, Cornwall. *Atropos* 9: 58-60. (in English). [*Pyrrhosoma nymphula*, exuvia of *Anax parthenope* (first proof of breeding in UK), *Sympetrum fonscolombii*, *Orthetrum coerulescens*, late season records of *Anax imperator* and *Sympetrum striolatum*]

Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

1558. **Tunmore, M. (2000):** Review: Dragonflies and Damselflies of Great Britain. - A video guide. Produced by C.R. Casey, J. Parker and M. Lote; narration by R. Campey. Otus Video. 1999. Running time approx 80 minutes. £14.99. . *Atropos* 9: 92-93. (in English). [Review of a video with British odonate species excluding the Irish *Coenagrion lunulatum*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

1559. **Voigt, H.; Göhlert, T. (2000):** Erstnachweis von *Gomphus flavipes* (Charpentier, 1825) in der Dresdener Elbtalweitung (Odonata). *Entomologische Nachrichten und Berichte* 44(1): 50. (in German). [Records of *Stylurus flavipes* (near Dresden-Gohlis, 8/1999) and *Ophiogomphus cecilia* (near Dresden-Loschwitz, 1997) along the River Elbe in Saxony, Germany] Address: Voigt, H., Grundstr. 152, D-01324 Dresden, Germany

1560. **Ward-Smith, A.J.; Sussex, D.J.; Cham, S.A. (2000):** Flight characteristics of the Brilliant Emerald *Somatochlora metallica* (Vander Linden) in south-east England. *J. Br. Dragonfly Society* 16(1): 24-28. (in English). [The three different forms of flight styles of male *S. metallica* observed at woodland ponds near Bracknell in South-east Berkshire, UK are described and discussed: Flight style I: This flight style is typically at a height of about 1 m above the water and close to the edge. It takes the dragonfly beneath overhanging vegetation, where it is prone to loiter with spells of hovering, and into regions of shade. The male appears to be searching for ovipositing females that use water margins for egg-laying. Flight style II: In this style the male patrols back and forth along a regular beat in the sunshine with a slow, controlled flight, occasionally punctuated by hovering. [...] Typically the flight is about 2-3 m above the water, but where the pond has steeply sloping banks the dragonfly will occupy airspace as high as 6 m above the water level. Over small ponds (up to about 20 m diameter) the dragonfly occupies an area above the centre of the pond. but in larger ponds the flight is typically within an airspace about 4-6 m from the edge. When several males are present, as happens on rare occasions, they space out, each patrolling over different parts of the pool. This flight style may represent general territorial behaviour. Flight style III: In this style the dragonfly upon visiting a site flies around it on an irregular flight path. These visits typically last 1-2 minutes, but may be as short as 20 seconds, sometimes longer than 2 minutes. During this brief period *S. metallica* maintains a sense of urgency, flying faster than in the first two flight styles. Its height above the water varies. *S. metallica* appears to be carrying out a general reconnaissance of a site. The observations are discussed with reference to the energy consumption during flight. "It is conjectured that the slow, controlled flight adopted by *S. metallica* during FS I and FS II is the equivalent of the minimum-power speed of aircraft flight" (Ward-Smith, 1984). "At this flight speed, the dragonfly is able to remain airborne whilst adopting an energy-conservation strategy."] Address: Ward-Smith, A., The Ridge-way, Bracknell, Berkshire RG12 9QU, UK

1561. **Wasscher, M.; Hoeffnagel, W.-J. (2000):** Opmerkelijk veel vroege waarnemingen in 1999. Mededelingen van de Nederlandse Vereniging voor Libellen-

studie 4(1): 9-10. (in Dutch). [In 1999 many odonate species started flying season very early in the year. The phenological data of *Orthetrum cancellatum*, *Leucorrhinia rubicunda*, *Libellula depressa*, *Ischnura elegans*, *I. pumilio*, *Coenagrion hastulatum*, *Platycnemis pennipes*, *Anax imperator*, *Ceriagrion tenellum*, *Orthetrum coerulescens*, *Aeshna mixta*, and *Sympetrum flaveolum* are documented and discussed with reference to data of 1997 and 1998] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1562. **Wasscher, M. (Ed.) (2000):** NVL Nieuwsbrief Februari 2000. Mededelingen van de Nederlandse Vereniging voor Libellenstudie 3(4): 14 pp. (in Dutch). [A lot of information on activities of the Dutch odonatologists is given, including a report on the financial year 1999 and planned activities in 2000. Some of the papers are abstracted separately in this issue of OAS.] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1563. **Wasscher, M.T; Bos, F.G. (2000):** The European dragonflies: notes on the checklist and on species diversity. *Odonatologica* 29(1): 31-43. (in English). ["Casing natural geographical boundaries, 130 spp. can be considered as European, though when broader political borders are followed this number rises to 136. In addition 20 exotic spp. have been recorded as a result of accidental importation. The highest diversity, defined by the number of spp. per standard area of 250x250 km², is found in the Alps, while the lowest diversity occurs in the northern parts of mainland Europe and on some islands. Surprisingly, the Mediterranean region is not as rich in spp. as the central part of Europe. When compared with other continents, it is clear that Europe has the lowest number of spp. However, when compared specifically with areas at the same latitude, the odonate diversity in Europe is relatively average: somewhat higher than expected in the northern regions, somewhat lower than expected in southern regions." (Authors)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

1564. **Westman, A.; Johansson, F.; Nilsson, A.N. (2000):** The phylogeny of the genus *Leucorrhinia* and the evolution of larval spines (Anisoptera: Libellulidae). *Odonatologica* 29(2): 129-136. (in English). ["A cladistic analysis of the genus *Leucorrhinia*, based on adult morphological characters, found one most parsimonious tree with a consistency index of 0.35. The evolution of large dorsal larval spines was mapped on the resulting tree. This mapping suggests that the presence of spines is the primitive state within *Leucorrhinia* and that they have disappeared on five different occasions, or have disappeared twice on lower branches and reappeared three times higher up in the tree." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

1565. **Wildermuth, H. (2000):** Buchbesprechung: Corbet, P.S. 1999. *Dragonflies. Behaviour and Ecology of Odonata*. 829 pages, 252 figures, 16 colour plates and 189 tables. Harley Books, Colchester, U.K., ca. Fr. 160.-, ISBN 0 946589 64 X.. *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich*: (in German).

[Book review submitted in November 1999 to *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich*. [In German]. The English translation that follows has been approved by the author of the review.

Dragonflies date from the Lower Permian. During their more than 250 million years' existence their body plan has remained remarkably conservative, although they show striking diversity of ecology and behaviour. Among the insects in the order one sees displayed a range of specializations: the aquatic larva possesses a feeding mechanism equipped with pincers that can be protracted explosively, and a multifunctional hindgut (rectum) that serves for nutrient intake, respiration, ionic regulation, energy storage and jet propulsion. Adult dragonflies are impressive as astonishingly agile and enduring flyers. Their gigantic compound eyes form a morphological and physiological mosaic, the highly developed perception encompassing a high flicker threshold and resolving power, and colour and polarization receptors with a corresponding capability for image processing in the nervous system. Unique for all dragonflies is the typical copulation wheel, and associated with this a variety of strategies for mating and egg-laying. A model organisms, dragonflies have been studied to investigate biological principles and processes. For several decades they have been among the front-runners in zoological research in the fields of behavioural ecology, ecophysiology, reproductive biology and neurobiology. The principles of territoriality and sperm displacement during copulation, widespread in many animal groups, were first described for insects in dragonflies. To an increasing extent dragonflies also feature in applied ecology, especially in land management and nature conservation: Because they exhibit many habitat specializations, dragonflies provide local species-spectra by which the quality of aquatic habitats can be assessed. In Philip S. Corbet's "Dragonflies" a monumental work on the biology of dragonflies has appeared, for which the international readership has waited impatiently for almost twenty years. From the standpoint of knowledge at the end of the 20th Century, the book treats all current fields of ecology and behaviour with reference to the global fauna, comprising some 5000 species. Information is presented throughout in an evolutionary context; yet the book is more than a compendium on behavioural ecology as this discipline is currently perceived. Besides addressing causal (proximate) and functional (ultimate) aspects of behaviour, the book gives ample attention to descriptive biology in its variety at the species level, providing an important foundation for posing questions in future. "Dragonflies" is arranged according to the dragonfly life cycle and begins with habitat selection, egg-laying and developmental biology. More chapters follow on larval biology with especial reference to respiration, feeding, biotic and abiotic factors, growth, metamorphosis and emergence, in which predation and parasitism are duly treated. About half the text is devoted to the adult stage. Such general themes as maturation, activity patterns, thermoregulation, foraging and dispersal are treated in detail. Most space is devoted to the field of odonatology that has made special progress in the last two decades: reproductive biology. The last chapter, entitled "Dragonflies and people" focuses mainly on aspects of nature conservation. Despite the book's unassuming subtitle, Corbet does not confine himself to behaviour and ecology. Wherever an opportunity offers to improve overall understanding of ecological and behavioural principles, corresponding knowledge from the neighbouring

disciplines of physiology and functional morphology is presented. For example the foraging behaviour of adult dragonflies is discussed in the context of flight performance, compound eyes and the nervous system. This approach offers a more comprehensive view than if prey capture were to be treated in isolation. Likewise, correlations are shown between reproductive behaviour and both sperm competition and microscopic anatomy, as well as between behavioural ecology of larvae and their respiration and osmoregulation. Corbet's strength lies in synthesis. He has succeeded in ordering an immense body of information, put in a clear general context and in a challenging way that leads one to a total view, provided not least by the information-rich tables in the text and the appendix. How much labour this entailed is evident from the cited references: the bibliography includes some 4,000 entries. In addition to works cited in English are those in German, Japanese and various other languages. Thus "Dragonflies" represents an extraordinarily comprehensive biology of dragonflies, the significance of which extends far beyond this animal group. The new "Corbet" will indubitably belong among the classic organism-based texts of the 20th Century, like its predecessor from 1962, "A Biology of Dragonflies" - certainly the most often cited publication in odonatology. A final remark about the illustrations: all 96 colour photographs are biologically documented, and complement the text in an excellent way. Obviously the fundamental criteria for selection and compilation were their morphological, ecological and behavioural merits rather than their technical or aesthetic quality. Thus one has to accept a certain lack of uniformity in some plates. Most diagrams and drawings derive from original publications, inevitably causing a mish-mash of styles and also resulting in places in poor resolution of detail. However, new illustrations would have resulted in a higher price and further delay in the book's appearance. The small shortcomings are therefore pardonable. It is superfluous to say that these minor blemishes hardly detract from an otherwise very carefully edited work. Thus it is that "Dragonflies" belongs in the library of every researcher and committed teacher. (Hansruedi Wildermuth)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: wildermuth@swissonline.ch

1566. **Wilson, K.; Evans, S. (2000):** Reports from Coastal Stations - 1999: Gibraltar Point NNR, Lincolnshire. *Atropos* 9: 72-73. (in English). [14 species were seen in 1999, most of them are shortly commented] Address: not stated

1567. **Wilson, K.D.P. (2000):** Distributional notes on the genus *Rhipidolestes* with descriptions of two new species from South China (Zygoptera: Megapodagrionidae). *Odonatologica* 29(1): 45-50. (in English). ["*R. aleni* sp. n. (holotype male: Da Ming Shan, Guangxi) and *R. cyanoflavus* sp. n. (holotype male: Bai Yong, Guangdong) are described from South China. A table and map is provided detailing the distribution of all known *Rhipidolestes* species and subspecies." (Author)] Address: Wilson, K.D.P., Agriculture and Fisheries Department, 6F, 25 Borrett Rd, Mid Levels, Hong Kong, China. E-mail: wislonhk@hk.super.net

1568. **Wootton, R.J.; Kukalova-Peck, J. (2000):** Flight adaptations in Palaeozoic Palaeoptera (Insecta). Biological reviews of the Cambridge philosophical society 75(1): 129-167. (in English). ["The use of available morphological characters in the interpretation of the

flight of insects known only as fossils is reviewed, and the principles are then applied to elucidating the flight performance and techniques of Palaeozoic palaeopteran insects. Wing-loadings and pterothorax mass/total mass ratios are estimated and aspect ratios and shape-descriptors are derived for a selection of species, and the functional significance of wing characters discussed. Carboniferous and Permian ephemeropteroids ('mayflies') show major differences from modern forms in morphology and presumed flight ability, whereas Palaeozoic odonatoids ('dragonflies') show early adaptation to aerial predation on a wide size-range of prey, closely paralleling modern dragonflies and damselflies in shape and wing design but lacking some performance-related structural refinements. The extensive adaptive radiation in form and flight technique in the haustellate orders Palaeodictyoptera, Megasecoptera, Diaphanopteroidea and Permothemistida is examined and discussed in the context of Palaeozoic ecology." (Authors)] Address: Wootton, R.J.; Univ. Exeter; Sch. Biol. Sci. Exeter EX4 4PS; Devon; England

1569. **Yeh, W.C.; Chen, Y.M. (2000):** Descriptions of two new species of the genus *Oligoaeschna* from northern Taiwan with notes on the status of the pryeri-group (Anisoptera: Aeshnidae). *Odonatologica* 29(2): 137-150. (in English). ["2 syntopic new sp. of the pryeri-group *Oligoaeschna*, *O. lieni* sp. n. (holotype male: Tsaopi bog, 850m, Yuanshan, Ilan county, northern Taiwan, II-V-1997) and *O. tsaopiensis* sp. n. (holotype male: Tsaopi bog, 850m, Yuanshan, Ilan county, northern Taiwan, II-V-1997) collected from northern Taiwan are named, described and diagnosed. Relationship amongst the members of eastern Asian pryeri-group is discussed and inferred mainly from their male penile structure. With regard to male penile glans structure, the pryeri-group is considered to be the extant sister-group of the nearctic genus *Gomphaeschna*." (Authors)] Some additional information is given on *O. pyanan* [Asahina 1951] Address: Yeh, W.C. & Y.M. Chen, Division of Forest Protection, Taiwan Forestry Research Institute (TFRI), 53 Nanhai Rd, Taipei, Taiwan, R. O. C.

1570. **Zhu, H.-q.; Han, F.-y. (2000):** *Cercion yunnanensis* spec. nov., a new damselfly from Yunnan, China (Zygoptera: Coenagrionidae). *Odonatologica* 29(2): 163-166. (in English). ["Both sexes are described, illustrated and the new sp. is compared with *Coenagrion impar* Needham. Holotype male, allotype female: China. Yunnan prov., Zong-dian, 29-VII-1998, deposited at Shanxi University; paratypes of both sexes from same locality and date, deposited at Dali Teachers Training School, Dali, Yunnan, China. This is the eighth member of the genus known from China. The transfer of *Coenagrion impar* Needham to *Cercion* is suggested." (Authors)] Address: ZHU, H.q. and F.-y. HAN, Shanxi University. Department of Life Sciences, Taiyuan 030006, Shanxi, China

1571. **Zorina, O.V.; Ivanov, P.Yu.; Storozhenko, S.Yu.; Kholin, S.K. (2000):** To the knowledge of insects of Putyatyn Island (South Primorye). The North Pacific Islands Biological Researches 3: 1-11. (in Russian with English summary). [The following odonate species are shortly commented and listed for Putyatyn Island (42.50N 132.29E, SE Wladiwostok): *Lestes sponsa*, *L. temporalis*, *Coenagrion johanssoni*, *C. ecornutum*, *C. lanceolatum*, *Cercion v-nigrum*), *Erythromma humeral*, *Nehalennia speciosa*, *Aeshna crenata*, *A. caerulea*, *Cordulia aenea*, *Epithea bimaculata*, *Somatoch-*

lora metallica exuberata, *S. graeseri*, *Leucorrhinia orientalis*, *Libellula quadrimaculata*, *Orthetrum albistylum*, *Sympetrum cordulegaster*, and *S. eroticum*.] (Address: Ivanov, P.Yu., Laboratory of Hydrobiology, Institute of Biology and Soil Sciences, Far East Branch of the Russian Academy of Sciences, Vladivostok, 690022, Russia. E-mail: zoology@eastnet.febras.ru (P.Yu.Ivanov)

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1572. Aida, M. (1997): Two cases of ovipositing *Sympetrum frequens* (Selys). *Gekkan-Mushi* 320: 40-41. (in Japanese). [S. *frequens* usually lay eggs at the open space of puddles dipping in the mud or sometimes in the water. The following observations seem exceptional: 1. Oviposition in the bush of reed. 2. Oviposition on the gravel in a slow running stream. (taken from DJOSC No. 6)] Address: Aida, Masahito, 1-7-15, Sakae, Ichinomiya City, Aichi Pref., 491, Japan

1573. Andrew, R.J.; Tembhare, D.B. (1997): Collection of Odonata from Nagpur City, Maharashtra State, India. *Fraseria* (N.S.) 4: 1-4. (in English). ["A total of 43 species and subspecies of Odonata were collected from the city of Nagpur, India. Among these, 12 are recorded for the first time from Central India and two are new records for the state of Maharashtra. A list of species caught at night around electric light and the physico-chemical parameters of local water bodies are appended." (Authors)] Address: Tembhare, D.B., Dept Zool., Nagpur Univ. Campus, Amravati Road, Nagpur-440010, Maharashtra, India

1574. Arai, Y.; Kita, H. (1997): Ecological notes on *Gynacantha japonica* Barteneff at the paddy fields (I). *Gekkan-Mushi* 320: 8-12. (in Japanese). [The following items are treated: occurrence of larvae and emergence of adults from paddy fields; period of emergence and adult season; behaviour of teneral; feeding behaviour of mature adults; seasonal change of adult behaviour; u-lined searching flight; hovering flight; copulation; oviposition (taken from DJOSC 7)] Address: Arai, Y., 1233-2, Oaza Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-12, Japan. Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan.

1575. Arai, Y. (1997): Some ecological observations on *Sympetrum pedemontanum elatum* Selys. *Tombo* 40: 15-20. (in Japanese with English summary). ["During a period from 1996 to 1997, some ecological observations on *Sympetrum pedemontanum elatum* Selys were carried out at Yatsuda and its vicinity in Yorii-machi, Saitama Prefecture. The results are summarized as follows: 1. Although the emergences were seen in one rice field, no emergences were observed in the other adjacent rice field. The cause of this difference is thought to be water condition meaning whether the field dried up or not even temporarily during the period of larvae. 2. In the rice field the emergences began in the beginning of July and ended in the beginning of Sep-

tember, but in the flume to the field the emergences started in the latter part of August and finished in the end of September. The difference will come from the fact that the water temperature of the flume is lower than that of the rice field. 3. The teneral or immature dragonflies used to remain near the site of emergence, and after getting mature they dispersed. 4. The male insect did not make his territory, but when he found the female under both in flying and sitting conditions he caught her and copulated. 5. They usually laid eggs to the slow-running water of the flume and small stream by striking the surface with the tip of female's abdomen in tandem, but occasionally to the still water and rarely to the wet mud." (Author)] Address: Arai, Y., 1233-2, Oaza Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-12, Japan.

1576. Artmeyer, C. (1997): Ökologische Untersuchungen zur Libellenfauna der Ems und ausgewählter Auenengewässer im Kreis Steinfurt unter besonderer Berücksichtigung von *Gomphus vulgatissimus* (Linné, 1758). Diplomarbeit am Institut für Landschaftsökologie der Universität Münster. 104 pp, Anhänge. (in German). [For published odonatological details of the M.Sc. thesis see OAS 1329 and 1788] Address: Artmeyer, C., Philip-pistraße 16, D-48149 Münster, Germany. E-mail: artmeyer@uni-muenster.de

1577. Asahina, S. (1997): On the breeding habitat of the halophilous damselfly *Mortonagrion Hirosei* Asahina. *Tombo* 40: 34. (in Japanese with English translation of the title). Address: Asahina, S., 4-4-24 Takadanobaba, Shinjuku-ku, Tokyo 169, Japan

1578. Asahina, S. (1997): Records of six Chinese dragonfly species. *Tombo* 40: 2-5. (in Japanese with English summary and description of the new species). [*Enallagma* sp., *Somatochlora dido*, *Palpopleura sexmaculata*, *Orthetrum brunneum neglectum*, *Sympetrum commixtum*, and *Sympetrum nomurai* sp. nov. are recorded from western China (29.IX.1996, Sewurong Yidui, Dichi Shan Mts., Kangding Xian, 3300m). *S. nomurai* spec. nov. and *S. commixtum* are figured.] Address: Asahina, S., 4-4-24 Takadanobaba, Shinjuku-ku, Tokyo 169, Japan

1579. Asahina, S.; Togame, S. (1997): The insect of the month: *Aeschna nigroflava* (text by Dr. S. Asahina, photo by S. Togame). *Insectarium* 34 (9): 291. [General introduction into the distribution of *A. nigroflava*, and comparison with *A. mixta* (taken from DJOSC 6, see

page 54).] Address: Asahina, S., 4-4-24, Takadanobaba, Shinjuku-ku, Tokyo, 160, Japan

1580. Bland, K.P. (1997): A precisely timed case of nocturnal migration by *Aeshna cyanea* (Müller) (Odonata: Aeshnidae). Ent. Rec. J. Var. 109(5/6): 154-155. (in English). ["During the night of 2-3 August 1996, I was running a mains-operated m.v. moth-trap in a garden on a housing estate in the village of Tarvin in Cheshire, VC58 (OS Grid reference SJ 4S66). [...] At precisely 03.40 hrs, I was suddenly awakened by a vigorous scraping and rustling sound coming from the vicinity of the light-trap some three metres away. Investigation revealed a fine female Southern Hawker *Aeshna cyanea* Müller, 1764), rattling against the illuminated asbestos wall immediately behind the light-trap. As the trap was more than a mile from the nearest open water it is probable that this individual was pulled into the light while actively migrating at this early hour. However, none of the 64 species of moth in the trap next morning were particularly indicative that a long-distance migration of other insects was in progress." (Verbatim)] Address: Bland, K.P., 35 Charterhall Road, Edinburgh EH9, 3HS, UK

1581. Eda, S (1997): A female of *Libellula quadrimaculata asahinai*, forma *praenubila* from Nagano Prefecture. Tombo 40: 31. (in Japanese with English summary). ["Although forma *praenubila* of *Libellula q. quadrimaculata* Linne is common in Europe, the forma of Japanese subspecies, *L. quadrimaculata asahinai* is extremely rare. On July 6, 1997, a female of forma *praenubila* was captured in Nagano Prefecture." (Author)] Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1582. Eda, S. (1997): Annual meeting of the Japanese Society of Odonatology in 1997. Tombo 40: 47. (in Japanese with English translation of the title.) Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1583. Eda, S. (1997): Division of Nature Conservation in Japanese Society of Odonatology will start in next year. Tombo 40: 46. (in Japanese with English translation of the title.) Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1584. Eda, S. (1997): Dragonflies on stamps in the world. 13th report. Tombo 40: 38-43. (in Japanese with English translation of the title.) Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1585. Eda, S. (1997): Heterospecific connection of *Sympetrum frequens* male and *S. infuscatum* female. Tombo 40: 37. (in Japanese with English summary). ["On October 10, 1997, it was observed at a pond in Miasa, Nagano Pref. that a heterospecific tandem of *Sympetrum frequens* Selys male and *S. infuscatum* Selys female adhered to thread of a spider. Just after only one picture [...] was taken they got free from the thread and separated each other; then flew away." (Author)] Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1586. Eda, S. (1997): The 40th Anniversary of the Japanese Society of Odonatology. Tombo 40: 36. (in Japanese with English translation of the title). [Docu-

mentation of the signatures of the participants of the 10th, 20th, and 30th anniversaries of the Japanese Society of Odonatology.] Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan

1587. Fukui, M. (1997): Record of *Sympetrum cordulegaster* from Shizuoka Pref.. Tombo 40: 14. (in Japanese with English translation of the title)] Address: not stated

1588. Hacet, N.; Aktac, N. (1997): Odonata fauna of Istranca Mountains. Turkish Journal of Zoology 21(3): 275-289. (in Turkish with English summary). [The odonate fauna of Istranca Mountains, (European part of Turkey) has been investigated in 1992-1993. 19 species are recorded from 39 localities. *Pyrrhosoma nymphula* and *Aeshna cyanea* are considered new for Turkey. Of some interest are the records of *Epallage fatime*, *Coenagrion scitulum*, *Brachytron pratense*, *Cordulegaster picta*, and *Somatochlora metallica* (?), *S. meridionalis*?)] Address: Hacet, N., Institution Trakya Univ., Fen-Edebiyat Fak., Biyol. Bolumu, Edime, Turkey

1589. Hara, T. (1997): *Mortonagrion hirosei*, its new distribution and homoeochromatic female from Ube. Yamaguchi Pref.. Tombo 40: 21-24. (in Japanese with English summary). [On July 8, 1995, a new habitat of *Mortonagrion hirosei* at Takenokojima in Ube, Yamaguchi Prefecture was discovered. This locality is the westernmost of Honshu. One week later 2 homeochromatic females were found in the same habitat.] Address: not stated

1590. Inoue, K. (1997): Report and information on the SIO. Tombo 40: 44-45. (in Japanese with English translation of the title). Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

1591. Ishida, M. (1997): *Epitheca marginata* and *E. bimaculata sibirica* inhabit together in Hokuragawa lake. Tombo 40: 25-26. (in Japanese with English summary). Niigata Pref., Japan] Address: not stated

1592. Ishizawa, N. (1997): A drop of haemolymph in the forewing of a female *Anax parthenope julius*. Gekkan-Mushi 320: 39-40. (in Japanese). [On December 8, 1996, I caught a larva of *Anax parthenope julius* at Omori flood controlling pond at Miyadera, Iruma City, Saitama Prefecture, which is a spring pond, and bred it indoors. From the larva, a female emerged on January 9, 1997. I kept the dragonfly covered with a basket overturned on a table. When I saw it on January 22, it was still alive and a light green drop of haemolymph was seen near the tip of the right forewing [...]. As the dragonfly perched hanging from the top of the basket with its wings hanging down perpendicularly, haemolymph seemed to be accumulated in the wing. When I moved the dragonfly into the warm room out of the basket, it unfolded the wings and warmed up, and in around ten minutes the drop disappeared, absorbed into the body. I returned the dragonfly to the basket, and the phenomenon was seen on the next day too. Circulatory flow of haemolymph into wings was experimentally proved by Münchberg (1966), and the wings are said to be easily broken by the lack of the haemolymph flow into the wings (Wigglesworth, 1950). (taken from DJOSC 6)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan

1593. Ishizawa, N. (1997): Record of a male of *Sympetrum depressiusculum* from Saitama Prefecture. Tombo 40: 33. (in Japanese with English summary). ["A male of *Sympetrum depressiusculum* Selys was captured at a spring in Iruma City, Saitama Prefecture on October 29, 1997. This is the first record from the Kanto district. The abdominal length is 23.3 mm, thoracic height: 5.6 mm. hind wing: 27.2 mm. This specimen lacks the right hind wing from outer side of the node. Its face was rather whitish, and pterostigmas were dark brown. The ratio of the thoracic height to the length of hind wing was 0.206, which coincides with that (0.20) calculated from Naraoka's data, and is significantly different from that of *Sympetrum frequens* (0.23)."] (Author)] Address: see above.
1594. Kita, H. (1997): Four cases of unusual copulation and/or connection in dragonflies. Tombo 40: 27-28. (in Japanese with English summary). [In 1997 four cases of abnormal copulation and/or connections in dragonflies were observed as follows: "1. Heterospecific copulation: *Leucorrhinia dubia orientalis* Selys male x *Sympetrum frequens* Selys female. 2. Heterospecific connection: *Cercion sexlineatum* Selys male - *Cercion plagiolum* Needham female. 3. Oviposition in triple-connection of *Sympetrum frequens* Selys male - male - female (Type A) 4. Male-male tandem: *Mnais p. pruinos*a Selys male - male. In this position the first male transferred sperm to his sperm bursa, and the second male bended his abdomen like a female." (Author)] Address: not stated
1595. Kunz, B.; Nowak, A. (1997): Die Libellen des Landkreises Schwäbisch Hall. Jahresbericht 95/96 der Arbeitsgemeinschaft Libellen im Landkreis Schwäbisch Hall. 39 pp. (in German). [Baden-Württemberg, Germany; general introduction into the activities of the working group; detailed comments on records of new or formerly known species of the region: *Coenagrion ornatum*, *Crocothemis erythraea*, and *Sympetrum depressiusculum*, and the dragonflies of river Jagst; 49 odonate species are shortly commented and mapped.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@gmx.de
1596. Lien, J. C.; Watanabe, K. (1997): A female of *Anotogaster sieboldii* carrying a corbicula on her ovipositor. Tombo 40: 20. (in Japanese with English summary). [On July 19, 1975, a female of *A. sieboldii* carrying a *Corbicula fluminea* on the tip of abdomen was resting on a branch at Taipei, Taiwan. It is considered that during the female laying eggs into the muddy bottom the ovipositor accidentally inserted into the open mouth of the shell.] Address: not stated
1597. Nakamoto, O.; Kagimoto, B. (1997): An observation on *Orthetrum p. poecilops* at Nam-chung, Hong Kong. Tombo 40: 29-31. (in Japanese with English summary). ["During a survey of Nam-chung. Hong Kong, June 10 - 11, 1977, we observed the behavior of *Orthetrum poecilops poecilops* and their habitat. Comparing with the Japanese subspecies *O. p. miyajimensis*, their behaviours and habitats are very similar to each other, but *O. p. poecilops* seems to be more prompt." (Verbatim)] Address: not stated
1598. Naraoka, H. (1997): A list of dragonflies in Hoto-kenuma marsh, Aomori Prefecture (Insecta, Odonata). The Journal of The Natural History of Aomori 7: 19-21. [Of special interest are *Mortonagrion seleni*, *Nehalennia speciosa*, *Lyriothemis pachygastra*, and *Sympetrum kunkeli* which are rare in Aomori Prefecture, Japan. A total of 34 species was observed in 1994 and 1995. (taken from DJOSC 8)] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagi-cho, Kita-gun, Aomori Prefecture, 038-3661, Japan
1599. Naraoka, H. (1997): Reproductive Behavior of *Sympetma paedisca paedisca* (Odonata, Libellulidae). New Entomol. 46 (1/2): 20-25. (in Japanese with English summary). ["The reproductive behaviour of *S. p. paedisca* was studied at a small pond in Shiura village, Kita-gun, Aomori-Pref., northern Japan, from May to August, 1996. Hibernated adults appeared at the pond side from mid May, and a few adults remained until early August. Reproductive behavior was observed on fine and warm days from late May to mid July. The peak was the first half of June [...]. A male seized a female without courtship and display immediately after he found her. Sperm transfer ($x=60.8$ seconds) was carried out just after the tandem was formed at a perching place. Copulations were observed between 7:30 and 14:30 with the peak from 9:00 to 10:00, and it was divided into three stages, in each of which the characteristic pumping was seen [...]. Duration of copulation was 15 minutes 47 seconds in average (Stage 1 : 14 m 42 s., n : 93.4 s., E: 10.3 s.). Sperm displacement was recognized by comparing the volumes of female's sperm storage organ collected at precopula, copula and postcopula [...]. Tandem ovipositions were done soon after copulation to the leaves of the reed *Phragmites communis* above the water during 8:00 to 16:00 with the peak from 10:00 to 12:00 [...]. Interspecific tandem concerned to this species was observed in 3 cases." (Author) (taken from DJOSC 7)] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagi-cho, Kita-gun, Aomori Prefecture, 038-3661, Japan
1600. Pangelian, A.A. (1997): Demography and life history of the orangeblack hawaiian damselfly (*Megalagrion xanthomelas*) (Selys-Longchamps, 1876) on Oahu, Hawaii. Masters Thesis. University of Guam: Not available for abstracting.]
1601. Rai, T.; Asahina, S. (1997): Observations on *Sympetrum frequens* at Chiba and Tokyo in 1997. Tombo 40: 35-36. (in Japanese with English translation of the title.) Address: Asahina, S., 4-4-24 Takadanobaba, Shinjuku-ku, Tokyo 169, Japan
1602. Rupperecht, R. (1997): Sanierungskonzept Lahn. 6. Gewässerökologie II "Makrozoobenthos, Fischfauna, Ufervegetation". Sanierungsprojekt Lahn, Rheinland-Pfalz 2: 167-232. (in German). [Based on the status quo - analysis published in the first preliminary report (see OAS 1603) in the second report (status 1994) the results of macrozoobenthos samples including Odonata are presented and shortly discussed. *Calopteryx splendens*, *C. virgo*, *Gomphus pulchellus*, *G. vulgatissimus*, and *Ischnura elegans* are listed in Tab. 6.4.] Address: Landesamt für Wasserwirtschaft Rheinland-Pfalz, Am Zollhafen 9, D-55118 Mainz, Germany
1603. Rupperecht, R. (1997): Sanierungskonzept Lahn. 6. Gewässerökologie II "Makrozoobenthos, Fischfauna, Ufervegetation". Sanierungsprojekt Lahn, Rheinland-Pfalz 1: 96-120. (in German). [Preliminary report (status 1993) on the fauna of the River Lahn, Rheinland-Pfalz, Germany. In Tab. 3 data from literature or reports are compiled. Due to long lasting and heavy pollution of the

river Lahn, there are only few sources available with data on the fauna. But the list of literature used for this compilation is not complete. *Calopteryx splendens*, *C. virgo*, *Ischnura elegans*, *Platycnemis pennipes*, and "Coenagrionidae" are considered.] Address: Landesamt für Wasserwirtschaft Rheinland-Pfalz, Am Zollhafen 9, D-55118 Mainz, Germany

1604. Sonehara, I.; Ubukata, H. (1997): Life history of *Agrion terue* Asahina (2). Tombo 40: 6-11. (in Japanese with English summary). ["Life history of *Agrion* (=Coenagrion) *terue* Asahina was studied by field observation and rearing experiment. (1) Adult emergence occurred from mid May to mid April. (2) Pre-reproductive period was estimated as 9-12 days (males) and 15-18 days (females). (3) Reproductive period was from the end of May to the beginning of September. (4) The widths of eggs laid in plant tissues were larger than those of mature eggs in the ovaries. (5) The portion near the apex of the laid egg had prominent reddish yellow color from the second day after oviposition to the date of hatching. (6) Rearing experiment showed that the larva has fourteen instars excluding prolarva. (7) Larval growth period was two years under the rearing conditions. But this result should be compared with a future survey of larval growth in the habitat, because the pond temperatures were lower than the rearing temperatures." (Authors)] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan

1605. Srivastava, V.K.; Suri Babu, B. (1997): Annotations to the damselfly collection from Sagar, Central India. *Fraseria* (N.S.) 4: 13-15. (in English). ["24 spp. belonging to 12 genera of damselflies from the city of Sagar and its surrounding areas are listed. This is the first report on the zygopteran odonates inhabiting this region." (Authors)] Address: Srivastava, V.K., Department of Zoology, C.M.P.College, Allahabad 211002 India

1606. Subranabian, M.A.; Reni Prabha, A.; Varadaraj, G. (1997): Effect of tannery effluent on biochemistry of larvae of the dragonfly *Pantala flavescens* (Fabricius) (Libellula: Anisoptera). *Fraseria* (N.S.) 4: 5-8. (in English). ["By static bioassays, the 96 hr LC 50 value of the tannery effluent of the antepenultimate larvae of *P. flavescens* was found to be 15%. The larvae required 36 days to become adult. The moulting is arrested in the larvae treated to sublethal concentrations of the effluent and all of them died between 30-36 days. Various biochemical constituents in the tissues decreased significantly. However, lactic acid accumulated in all the tissues implying the shifting of metabolism towards anaerobic side to meet excess energy under the stress of tannery effluent. The diminution of organic compounds and accumulation of lactic acid could be the casuative factor for the mortality of effluent - treated larvae." (Authors)] Address: Subramanian, M.A.; P.O. and Research Department of Zoology Chikkaiah Naicker College, Erode - 638 004, Tamil Nadu, India.

1607. Suzuki, K.-J., Saitoh, K.; Sawano, J. (1997): Male germ-line chromosomes of *Davidius moiwanus taruii* Asahina et Inoue (Anisoptera: Gomphidae). Tombo 40: 12-14. (in Japanese with English summary). ["Using three immature males of *Davidius moiwanus taruii* Asahina et Inoue, 1973, obtained in Kamisaibara-son of Okayama Prefecture, germ-line chromosomes were examined by conventionally air-dried and Giemsa-

stained testis-preparations. The spermatogonial diploid complements comprise 23 chromosomes, including a single X and a pair of m chromosomes. The X is the largest in size in the complement. The m is much smaller in size than the rest. In the first and second divisions in spermatocytes, the haploid complements consist of twelve chromosomes. The parallel arrangement of sister chromatids is apparent in the X at diakinesis. At early anaphase II, the undivided, rod-shaped X is easily distinguishable from the rest of dumbbell-like shape. The male is therefore the heterogametic sex. Each of the n, 13 complements observed in the first division in the male (No. 3) includes a minute univalent which is smaller in size than the m. This element might be a B chromosome." (Authors)] Address: Suzuki, K., Toyama University, Dept of Biology, Faculty of Sciences, 3190 Gofuku, Toyama, 930, Japan

1608. Ubukata, H. (1997): An introduction to Worldwide Dragonfly Society (W.D.A.). Tombo 40: 45-46. (in Japanese with English translation of the title).] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan

1609. Uono, K.; Takasaki, Y. (1997): Morphological diagnosis on the seasonal types of a damselfly: *Acia-grion migratum* (Selys). *Gekkan-Mushi* 313: 20-23. (in Japanese). [Detailed morphological descriptions (measurements and figures) of the summer and winter types of *A. migratum*. ["Conclusion: The most useful marking for distinction of the seasonal types is the difference of the black spot on the mid leg, but in teneral it is not clear. As to the color of pterostigma, both types had exceptions. In adults the difference of the black spotted part and the width of the black stripe on the frontal thorax are available for distinction, and in teneral only the black stripe on the frontal thorax. The black stripe on the frontal thorax is the most available for distinction throughout seasons." (taken from DJOSC 6)] Address: Uono, Kiyofumi, 1-14-47, Mitake, Togo-cho, Aichi-gun, Aichi Pref., 470-01, Japan. Takasaki, Yasuo, 1-14, Fujimori, Meito-ku, Nagoya City, 465, Japan.

1610. Wada, S. (1997): Unusual 'Sitting-oviposition into the water' of *Onychogomphus viridicostus*. Tombo 40: 32. (in Japanese with English summary). ["The oviposition of *Onychogomphus viridicostus* (Oguma) is usually 'Non-contact flying-oviposition' and occasionally 'Flying-oviposition into the water' (Arai, 1975). On August 26, 1997, I observed and took the picture of "sitting-oviposition into the water" [...], at Kidonouchi-cho. Fukui, Fukui Prefecture. This method is unusual, and is considered due to two reasons: avoiding interruption by the male of the same species and other ones such as *Boyeria maclachlani*, and being too tired to fly." (Author)] Address: not stated

1611. Watanabe, Y. (1997): Observation on embryonic development and morphological characteristic of first instar larva in the dragonfly, *Libellula angelina*. *Nature and Insects* 32(7): 23-26. (in Japanese). (taken from DJOSC 6)] Address: Watanabe, Yoko, 4-14 Nishida-cho, Nishinomiya City, Hyogo Prefecture, 662, Japan.

1612. Ambrus, A.; Bankuti, K.; Csanyi, B.; Gulyas, P.; Juhasz, P.; Kovacs, T. (1998): Faunistical data on dragonflies (Odonata) from the floodplain area of River Tisza between Tiszabercel and Balsa (HNBM Programme, Pilot Project. *Studia odonatologica hungarica* 4: 65-72. (in Hungarian with English summary). ["The paper presents faunistical data on dragonflies (larvae and adults) collected in 1996 in the "Pilot Project" study area of the Hungarian National Biodiversity Monitoring (HNBM) Programme. Collections were carried out in water bodies [...] situated in the floodplain area (active and ancient floodplain) of River Tisza along both sides between settlements Tiszabercel and Balsa. [...] Collections were made on 14 localities. "20 dragonfly species [...] were found throughout the area, representing the following classes of country-wide occurrence frequency: 1 very frequent, 10 frequent, 6 less frequent, 2 rare and 1 sporadic." (Authors)] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary
1613. Anderson, T.M.; Anderson, N. H. (1998): The life history of *Arrenurus hamrumi*, a water mite from rangeland springs in central Oregon, USA. In: Botosaneanu, L. (Ed.): *Studies in crenobiology: The biology of springs and springbrooks*. ISBN 90-73348-04-8.: 63-74. (in English). ["Water mites, which have both predatory and parasitic life stages, make an important contribution to the biodiversity and trophic dynamics of spring ecosystems. We studied the life history of the water mite, *Arrenurus hamrumi* Anderson & Smith (Hydrachnida: Arrenuridae) and its damselfly host, *Argia vivida* Hagen (Odonata: Coenagrionidae), which occur in small springs in rangeland habitats in central Oregon, USA. A common feature of these springs is the dominance of emergent vegetation, while hydrologic and thermal regimes are quite variable. Through field collections and laboratory observations we associated all life stages of *A. hamrumi* and documented its interaction with *A. vivida*. Adult mites occur in the springs throughout the year where they feed on ostracods. In the field sex ratios favour females, but equal numbers of males and females emerged in the laboratory. Mite larvae locate hosts in the benthic habitat and become phoretic under their wingpads until the damselfly emerges and the mites then become parasitic. Phoretic mite larvae occur year-round in the springs, while the parasitic stage is limited to the flight season of the damselfly. The extended period of phoresy by the larvae prior to becoming parasitic seems to facilitate synchronization of the life cycles of the water mite and its host, which has a two-year life cycle. The occurrence of deutonymphs begins after the first parasitic larvae of the season detach and transform (usually in early May), and lasts well into the fall. Features of the life history of *A. hamrumi* seem to be directed toward successfully parasitizing its host, *A. vivida*, rather than being adaptations specific to existence in spring environments. The trophic structure of these habitats is detritus-driven and favors abundance of ostracods and Chironomidae, which are the primary food resources for the predatory stages of the two species that we studied." (Authors)] Address: Anderson, Tracey, Institution Dep. Entomol., Oregon State Univ., Corvallis, OR 97331, USA
1614. Aoki, T.; Azuma, T. (1998): A report from Hyogo Prefecture on the reduction of population size of *Sympetrum maculatum* Oguma. *Nature and Insects* 33(10): 18-20. (in Japanese). ["Description of habitat; life history, ecology; possible impact of insecticide spraying on the species; the importance of pine forests in the habitat of the species is discussed (see DJOSC 10).] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp
1615. Arai, Y. (1998): Records of the activities of Conservation committees: "Other dragonfly" group. *Tombo* 41: 60-61. (in Japanese with English translation of the title.) Address: Arai, Y., 1233-2, Oaza Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-12, Japan.
1616. Arunachalam, A.; Subramanian, M.A. (1998): Tannery induced alterations on total haemocyte counts in the larvae of dragonfly, *Pantala flavescens* (Fabricius) (Anisoptera: Libellulidae). *Fraseria* (N.S.) 5: 19-21. (in English). ["When the last three larval instars of *P. flavescens* were reared in sublethal concentrations of tannery effluent, there was no moulting at all in the larvae throughout the experimental period. They died between day 30 and 36. In various concentrations of the effluent, the number of haemocytes in the blood of the larvae were found to decrease leading to leucopenia. This pathological condition, in turn, could have increased the toxicity of the effluent on the larvae resulting in mortality. The reduction in number of haemocytes could possibly cause a restricted transport of moulting hormone from the site of secretion to the tissues. This might also be the probable cause for the death of the effluent-treated larvae without undergoing moulting and metamorphosis." (Authors)] Address: Arunachalam, A. & M. A. Subramanian, P. G. & Research Department of Zoology, Chikkaiah Naicker College, Erode - 638 004, India
1617. Asahina, S. (1998): Reminiscences of an odonatologist. *Tombo* 41: 52-54. (in Japanese with English translation of the title.) Address: Asahina, S., 4-4-24 Takadanobaba, Shinjuku-ku, Tokyo 160, Japan
1618. Bhawane, G.P.; Gaikwad, A.R.; Nikam, D.S. (1998): Thoracic muscle trehalase the larvae and adults of *Pantala flavescens* (Anisoptera: Libellulidae). *Fraseria* (N.S.) 5: 23-28. (in English). ["The optimal pH, the optimal temperature and Km of the enzyme trehalase of thoracic muscle in the last instar larvae and adults of *Pantala flavescens* were determined. The pH of 5.6 and the temperature of 40°C was optimum for thoracic muscle trehalase of larvae and male dragonfly. The Km for the muscle trehalase of larvae was 1.7621×10^3 M of trehalose. The half life period for thoracic muscle trehalase at 50°C was 29 minutes. A period of 60 minutes was fit for the linear activity of thoracic muscle trehalase. Both, NaCl and KCl accelerate the enzyme activity even at the concentration of 0.01 M in reaction mixture. The specific enzyme activity is more in the larvae as compared to the adults." (Authors)] Address: Bhawane, G.P., Department of Zoology, Shivaji University, Kolhapur 416 004, India
1619. Bönsel, A. (1998): Verbreitung und Bestandsabschätzung der Hochmoor-Mosaikjungfer - *Aeshna subarctica* (Walker 1908) in Mecklenburg-Vorpommern. *Naturschutzarbeit in Mecklenburg-Vorpommern* 41: 32-38. (in German). [Documentation of the present status of *Aeshna subarctica elisabethae* Djakonov, 1922 in six

- bogs in Mecklenburg-Vorpommern, Germany. In Tab. 1 the associated odonate species are listed.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany
1620. Chandler, C.R.; Lindemann, S.A.; Kinsey, A.A.; Shuford, R. (1998): Late-summer congregation of swallow-tailed kites in southeast Georgia. *Oriole* 62(3-4): 29-34. (in English). [Altamaha River (Tattnall County, Georgia, USA); late-summer congregation; "By late July, dragonflies (tentatively identified as *Pantala flavescens* and *Tramea carolina*) were more apparent around the field and among the insects on which kites were feeding."] Address: Chandler, C.R., Institution Dep. Biol., Ga. South. Univ., Statesboro, GA 30460, USA
1621. Dévai, G.; Miskolczi, M.; Olajos, P. (1998): Faunistical data on dragonflies (Odonata) from the floodplain area of River Tisza between Tiszabercel and Balsa (HNBM Programme, Pilot Project). *Studia odonologica hungarica* 4: 73-82. (in Hungarian with English summary). [Observations and collections were carried out 1996 in a part of the active floodplain of River Tisza along the left side, over the administrative area of the settlement Gávavencsello (3 localities), Hungary. 33 species were found to occur in the area.] Address: Dévai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
1622. Dévai, G.; Miskolczi, M. (1998): Faunistical data on dragonflies (Odonata) from the geographical region Tisza-Bodrog-Köze (NE-Hungary). *Studia odonologica hungarica* 4: 5-10. (in Hungarian with English summary). [23 species including *Leucorrhinia caudalis* and *L. pectoralis* could be recorded between 1970 and 1987 in this region.] Address: Dévai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
1623. Dévai, G.; Miskolczi, M. (1998): Previous faunistical data on dragonflies (Odonata) from the floodplain area of River Tisza between Tiszabercel and Balsa (HNBM Programme, Pilot Project). *Studia odonologica hungarica* 4: 53-63. (in Hungarian with English summary). [24 species are listed from the River Tisza between Tiszabercel and Balsa.] Address: Dévai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
1624. Dévai, G.; Szilagyi, G.; Kiss, B.; Olajos, P. (1998): Proposal for the unification of locality names in the floodplain area (HNBM Programme, Pilot Project) of River Tisza between Tiszabercel and Balsa (NE-Hungary). *Studia odonologica hungarica* 4: 99-110. (in Hungarian with English summary). ["A proposal in order to unify the usage of locality names during the preparatory works of the biotic data collection in the Pilot Project area of the Hungarian National Biodiversity Monitoring (HNBM) Programme is introduced. Experiences of the development of the Natural Wildlife Information System as well as that of the Hungarian Odonatological Database and the National Biodiversity-monitoring System have proven, that besides the identification of sampling sites by geo-coordinates it is necessary to indicate the topographical names of them as well. [...]."] (Authors)] Address: Dévai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
1625. Eda, S. (1998): Annual meeting of the Japanese Society for Odonatology in 1998. *Tombo* 41: 63. (in Japanese with English translation of the title.) Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan
1626. Eda, S. (1998): Dragonflies on stamps in the world, 14th report. *Tombo* 41: 55-58. (in Japanese with English translation of the title.) Address: Eda, S., Matsumoto Dental University, Gobara, Hirooka, Shiojiri, Nagano 399-0781, Japan
1627. Englund, R. (1998): Response of the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*), a candidate threatened species, to increases in stream flow. *Bishop Museum Occasional Papers* 56: 19-24. (in English). [Although formerly one of the most common damselflies in the Hawaiian Islands, USA the O'ahu populations of *M. xanthomelas* have been reduced to little more than 95 m of stream habitat located within the Tripler Army Medical Center (TAMC). Because of continued stable stream flow, the damselfly numbers increased from May 1997 (17 males and two females) to a total in February 1998 of 162 damselflies (123 males and 39 females). Besides drying up of the channel, introduced fishes are the major threat for *M. xanthomelas*.] Address: Englund, R., Hawaii Biol. Survey, Bishop Mus., 1525 Bernice St., Honolulu, HI 96817, USA
1628. Fischer, J.; Fischer, F.; Schnabel, S.; Wagner, R.; Bohle, H.W. (1998): Die Quellfauna der Hessischen Mittelgebirgsregion. Besiedlungsstruktur, Anpassungsmechanismen und Habitatbindung der Makroinvertebraten am Beispiel von Quellen aus dem Rheinischen Schiefergebirge und der osthessischen Buntsandsteinlandschaft. In: Botsaneau, L. (Ed.): *Studies in Crenobiology*. Backhuys Publishers. Leiden: 181-199. (in German with English summary). [*Thecagaster bidentata* is recorded from the spring of the brook Ohe, a secondary tribute of the middle range of River Lahn (Hessen, Germany).] Address: Bohle, H.-W., Fachbereich Biologie - Zoologie, Karl-von-Frisch-Str., D-35032 Marburg, Germany.
1629. Futahashi, R.; Araki, Y. (1998): Successive invasion and colonization of Odonate species into reclaimed land Koshino-kata. Shinminato City. Toyama Pref. (Addition). *Tombo* 41: 32. (in Japanese with English summary). [*Indolestes peregrinus* (Ris, 1916), *Anax nigrofasciatus nigrofasciatus* Oguma, 1995, *Anax guttatus* (Burmeister, 1839), *Epithea marginata* (Selys, 1883), *Sympetrum pedemontanum elatum* (Selys, 1872), *Sympetrum risi risi* Barteneff, 1914, and *Sympetrum croceolum croceolum* (Selys, 1883) were newly added to the fauna of the reclaimed land Koshino-kata, Shinminato City, Toyama Pref. A total of 38 species have been recorded from this land since 1988.] Address: not stated
1630. Gupta, A.; Gupta, S. (1998): Sensilla on the antenna and leg of the larvae of *Crocothemis servilia* (Drury) (Anisoptera: Libellulidae). *Fraseria* (N.S.) 5: 29-32. (in English). ["Major sensillar types on the antenna and leg of the larva of *Crocothemis servilia* [...] are described with the help of scanning electron microscopy. The 7-segmented antenna has sensilla campaniformia, sensilla trichoidea and hemispheroidal cuticular protuberances. The coxa and trochanter of each leg have hairplate proprioceptive sensilla some of which

may be bimodal in function. The 'tibial comb' comprises polydentate sensilla chaetica, which are also present along the outer tarsal margin. Besides, the tarsus also has sensilla trichoidea of two distinct types." (Authors)] Address: Gupta, A., Department of Ecology, Assam University, Silchar, 788 011, India

1631. Hayford, B.; Herrmann, S.J. (1998): Migration patterns of four macroinvertebrates along a thermal spring rheocrene. In: Botosaneanu, L. (Ed.): Studies in crenobiology: The biology of springs and springbrooks. Backhuy Publishers. Leiden. ISBN 90-73348-04-8.: 75-83. (in English). ["We studied migration patterns of *Argia vivida* [...], *Hyalella azteca* Saussure (Crustacea, Amphipoda), *Paracymus* sp. (Coleoptera, Hydrophilidae), and *Chimarra utahensis* Ross (Trichoptera, Philopotamidae) along the thermal gradient of Poncha Hot Spring (T48N, R8E, S15), Colorado, U. S. A. Samples were taken once each month from September 1991 through February 1992. Chemical analyses revealed moderate ion concentrations for a thermal spring, with little variation along the rheocrene. Conductivity remained relatively constant, while pH ranged from 7.9 to 8.5. Temperatures ranged from 22 °C to 42 °C over the six month period. Two-way ANOVAs were used to determine migration. *Argia vivida*, *H. azteca*, and *Paracymus* sp. migrated" [towards the spring source, but no clear pattern of movement and no apparent temperature preference along the rheocrene; "However, decreasing water temperatures below the study area represented an environmental pressure pushing *A. vivida* upstream"] "for a portion of the study period. There was only marginal evidence that *C. utahensis* migrated. Migration patterns were interpreted as a form of behavioural thermoregulation." (Authors)] Address: Hayford, Barbara, Kansas Biol. Survey, 2041 Constant Ave., Lawrence, KS 66045, USA

1632. Hiratsuka, K. (1998): An ethological study on the genus *Sympetrum* at Harutori lake, Kushiro City. Bulletin of the Hokkaido Odonatological Society 10: 1-9. (in Japanese). [*Sympetrum striolatum* imitoides, *S. frequens*, *S. flaveolum*, *S. danae*; maturation period; interspecific relations during the immature period; searching for females and mating; oviposition; post-reproduction period. (taken from DJOSC 9)] Address: Hiratsuka, K., 2-20-113, Honcho 2 jo-9, Higashi-ku, Sapporo City, 065-0042, Japan

1633. Hunger, H. (1998): Biozöologische Untersuchungen zum Habitatschema der Pokal-Azurjungfer (*Cercion lindenii* Selys 1840) in der südlichen Oberrheinebene. Naturschutz am südlichen Oberrhein 2: 159-166. (in German, with English summary). ["[...] In the study area, *C. lindenii* is a common damselfly species occurring predominantly in quite large waters characterized by ground water influence or slow current. These waters usually display buffered seasonal and diurnal changes of water temperature. The water temperature, however, always reaches high values in shallow regions during the summer. In the southern Upper Rhine plains, *C. lindenii* is a typical species of gravel pits on the one hand and river arms and oxbows on the other hand. It has the ability to utilize parts of helophytes or floating debris for oviposition when hydrophyte vegetation misses or is very scarce. Submerged parts of hydrophytes can become available for oviposition because of the female's ability to lay their eggs under water. Therefore, it can thrive in young gravel pits as well

as in angling ponds kept almost free of water vegetation. In such waters, single water plants may play an important role for oviposition. *C. lindenii* tolerates stronger wave action than *Erythromma viridulum*. This might be explained by a relatively lower risk during emergence owing to *C. lindenii*'s preference for vertical structures for emergence. However, the species is also capable of emerging horizontally." (Author)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Am Pfahlgraben 8, D-79276 Reute, Germany

1634. Hunger, H. (1998): Biozöologische Untersuchungen zum Habitatschema des Kleinen Granatauges (*Erythromma viridulum* Charpentier 1840) in der südlichen Oberrheinebene. Naturschutz am südlichen Oberrhein 2: 149-158. (in German, with English summary). ["[...] In the study area, *E. viridulum* inhabits different types of stagnant waters such as ponds and gravel pits as well as areas of oxbows with slowed water movement. Waters suitable for reproduction have to be furnished with fine-leaved submerged vegetation which is probably required as larval habitat. These hydrophytes have to reach the surface at least partly and during a certain period of time in order to be available as substrates for oviposition and as emergence sites. Hydrophytes with swimming leaves can occur in addition, whereas pure waterlily vegetation is not sufficient. Other limiting factors for colonization of waters by this holomediterranean damselfly species are insufficient warming of the water during the summer, strong inflow of ground water or surface water, and wave action. Waters which are ice-free during the winter are usually too cool during the summer to be used as reproduction habitats by *E. viridulum*. Protection of the water vegetation - threatened by strong fishing or leisure activities (swimming, boating) is the most important measure for protection of *E. viridulum*." (Author). Baden-Württemberg, Germany] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Am Pfahlgraben 8, D-79276 Reute, Germany

1635. Inoue, K.; Aiura, M. (1998): Distribution of the dragonflies of Tsushima Island, Nagasaki Prefecture, Part 6. Tombo 41: 46-48. (in Japanese with English summary). ["Many immature males and females of *Sympetrum depressiusculum* and *S. cordulegaster* have been found in Tsushima Island during June 6 to September 27, 1998 rather successively. This fact strongly suggests that these northern species emerged there, though neither larvae nor exuviae have been found. Three males and four females of the latter species collected by Aiura on September 20 were sent in cool condition to Inoue, and they started to fly when placed at the room temperature. They were photographed and measured, and revealed to be of the normal size: not so large as those bred from eggs by the late Dr Obana in Osaka Pref. (Obana and Inoue, 1982). The problem why such postponed emergence occurred is left to be discussed. On the other hand, southern species *Anax guttatus* and *Tramea transmarina euryale* were found. It is to be noted that many fresh insects of the former species were found even on September 1 and 3, 1998." (Authors)] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

1636. Inoue, K. (1998): Information on the S.I.O.. Tombo 41: 62. (in Japanese with English translation of the title.) Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

1637. Ishizawa, N. (1998): Adaptability of male *Anax guttatus* to the environment of Honshu in autumn. *Tombo* 41: 13-16. (in Japanese with English summary). [Twenty males of *A. guttatus* were collected at Omori pond in Iruma City, Saitama Prefecture, Japan in the middle of October. 1998. The mean weight of the dragonfly was 1.18 ± 0.07 g. The thoracic length, and lengths of abdomen, forewing and hindwing were longer than that of *A. parthenope julius*. The relative wing loading of *A. guttatus* was larger than that of *A. parthenope julius*. Therefore, *A. guttatus* flew faster without gliding, while sympatric *A. parthenope julius* often glided during flying. The warm-up rate was $2.1^\circ\text{C}/\text{min}$, less than half of that of *Anax concolor*. The body temperature of the initiation of flight was 35.5°C , which was lower than that of *A. junius*. Mean body temperature of patrolling *A. guttatus* was $40.4 \pm 1.1^\circ\text{C}$, higher than air temperature by about 14°C . The high body temperature in flight seems to be due to the large relative wing load and the lower air temperature in the temperate zone. Males of *A. guttatus* showed a reversible colour change, controlled by temperature. The blue of the dorsal parts of the second and third abdominal segments changed to dark blue with decreasing temperature, and the reverse colour change occurred when temperature increased. Based upon these facts it is considered that *A. guttatus* seems to be able to adapt to the environment of Honshu in autumn.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan
1638. Johnson, P. (1998): Scissor-tailed flycatcher in Peach County, Georgia. *Oriole* 62(3-4) (1997): 46-47. (in English). [The bird perched on a power line above a small horse pasture and "caught a variety of insects, including some dragonflies."] Address: Johnson, P., 901 Santa Fe Trail, Macon, GA 31220, USA
1639. Kagimoto, B. (1998): Some observations on the two cases of heterospecific tandem between *Orthetrum albistylum speciosum* male and *O. poecilops miyajimaense* female. *Tombo* 41: 50-51. (in Japanese with English translation of the title.) Address: not stated
1640. Kalaskar, K.; Kalaskar, A.S. (1998): Odonate wealth of Pench National Park, Maharashtra State, India. *Fraseria* (N.S.) 5: 33-35. (in English). [The Pench National Park is rich in odonate fauna. Large number of spp belong to only two families, Coenagrionidae with 7 spp and Libellulidae with 13 spp. *Ceriagrion coromandelianum*, *Ischnura aurora*, *Orthetrum sabina*, *Crocothemis servilia*, and *Diplocodus trivialis* occur regularly throughout the year. Identification of odonates of other families is in progress.] Address: Kalaskar, A.S., Divisional Forest Officer, Maharashtra Forest Department, Chandrapur Maharashtra State, India
1641. Kanou, K.; Miyahata, T.; Okazaki, K.; Kobayashi, F. (1998): Sperm transference by *Chlorogomphus brunneus costalis* Asahina before tandem formation. *Gekkan-Mushi* 333: 39-40. 10-VI-1997, Materiya, Amami-oshima Island, Japan] Address: Kanou, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan
1642. Kato, S. (1998): A fresh female of *Lyriothemis pachygastra* wateched at Tochigi Pref. in late autumn. *Tombo* 41: 58. (in Japanese with English translation of the title.) Address: not stated
1643. Kato, T. (1998): New record of *Sympetrum fonscolombei* from Aichi Prefecture. *Tombo* 41: 18. (in Japanese with English translation of the title). Address: not stated
1644. Knott, B.; Jasinska, E.J. (1998): Mound springs of Australia. In: Botosaneanu, L. (Ed.): *Studies in Crenobiology. The biology of springs and springbrooks*. Backhuys Publishers. Leiden. ISBN 90-73348-04-8: 23-38. (in English). ["The present state of knowledge of mound springs in Australia is reviewed. Points of groundwater discharge, characterised by mounds of peat or calcarenite about the spring boil, they function as mesic refuges for plants and animals in an arid landscape. [...] In terms of the mound spring fauna, results of distributional surveys and physiological tolerance tests of a number of fish and hydrobiid molluscs show that even species endemic to springs with nearly constant physicochemistry tolerate a wide range of temperatures and salinities. The origins and mechanisms of dispersal of the fish and hydrobiid snails from the springs are also addressed. [...] The Ellenbrook mound springs are raised peat structures and occur only in a restricted area but comprise discrete plant and animal communities which include endemic species and northern outlier populations of mesic species which now occur only in the wetter southwest of Western Australia. The conservation of all Australian mound springs is under threat from three principal causes: groundwater abstraction from their source aquifers; physical destruction either by land-clearing or cattle-grazing; and invasion of exotic plant and animal species." (Authors) Odonata are listed in Tab. 1 on the family level as a spring fauna (Lake Eyre Supergroup) of high vagility which also occurs in temporary waters.] Address: Knott, B., Jasinska, Edyta, Department of Zoology, The University of Western Australia, Nedlands, Western Australia 6907
1645. Kohl, S. (1998): Odonata. Anisoptera-Exuvien (Großlibellen-Larvenhäute) Europas. Bestimmungsschlüssel. Privately published. 27 pp. (in German). [This is a well organised determination key for the exuviae of most of the anisopteran Odonata of Europe; species not included in this key are listed on page 7. It compiles the relevant European literature up to 1998 on the morphology of the anisopteran exuviae, and provides a binomical key with figures of the morphological structures. Identifications are made easy by the arrangement of discriminative characters on one page opposite to each other. This synthesis of the work of many experienced odonatologists is definitely the most useful and cheapest determination key on the European anisopteran exuviae at present on the market.] Address: Kohl, S., Seestr. 107, CH-8610 Uster, Switzerland
1646. Kumar, A.; Mitra, A. (1998): Odonate diversity at Sahstradhara (Sulphur springs) Dehra Dun, India with a note on their habitat ecology. *Fraseria* (N.S.) 5: 37-45. (in English). ["A detailed study on the Odonate diversity at Sahastradhara (Sulphur Springs, alt 700 m), a perennial hill stream situated 13 km away from the city, has been made during the years 1996-98. An annotated list of 50 species from the area has been provided along with their habitat ecology. *Lestes praemorsus*, *Anormogomphus heteropterus*, *Nepogomphus modestus*, *Orthetrum b. brunneum*, *O. glaucum*, *O. japonicum internum* Mac Lachlan, and *Neurothemis intermedia* more recently listed by Singh & Prasad and Prasad

- & Singh, and *Gynacanthaeschna sikkima* (Karsch) recorded by Hämäläinen from this locality, could not be recorded during the present study. This may probably be due to their habitat degradation/loss by the increasing anthropogenic pressures the excessive influx of tourists and creation of hotels and tea shops in vicinity of the stream. However, *Ceriagrion fallax cerinomelas* Lieftinck, *Onychogomphus biforceps* (Selys) and *Anax nigrofasdatus nigrolineatus* Fraser are the 3 species recorded for the first time not only from this locality but also from the Dehra Dun Valley itself, whereas *Copera vittata serapica* (Selys), although previously reported from Dehra Dun Valley, is recorded for the first time from this locality." (Authors)] Address: Kumar, A. & A. Mitra, Northern Regional Station, Zoological Survey of India, Dehra Dun - 248 195, India
1647. Lahiri, A.R. (1998): New records of Odonata (Insecta) from little Andaman Island. *Fraseria* (N.S.) 5: 57-59. (in English). [*Vestalis gracilis gracilis*, *Prodasineura verticalis andainanensis*, *Copera marginipes*, *Ceriagrion cerinorubellum*, *Crocothemis servilia servilia*, *Lathrecista asiatica asiatica*, *Neurothemis fluctuans*, *Pantala flavescens*, *Potamarcha congener*, *Trithemis aurora*, and *T. festiva* have been reported for the first time from Little Andaman Island.] Address: Lahiri, A.R., Zoological Survey of India, "M" Block New Alipur, Calcutta - 700 053, India
1648. Lahiri, A.R.; Walia, G. (1998): On the status of female *Palpopleura sexmaculata* (Fabricius) (Anisoptera: Libellulidae) marked by preapical spot in hindwing. *Fraseria* (N.S.) 5: 61-62. (in English). [It is suggested that the rare varieties of dwarf, melanotic female of *P. sexmaculata* may not represent regular heterochromatic female of the species.] Address: Lahiri, A.R., Zoological Survey of India, "M" Block New Alipur, Calcutta - 700 053, India
1649. Leroy, T. (1998): Les odonates de l'étang de Farges (Puy-de-Dôme). *Arvernensis. Bull. ass. ent. d'Auvergne* 10: 3-10. (in French). [Commented checklist of 28 odonate species recorded from an artificial lake in 740 m a.s.l. near Combrailles, France.] Address: Leroy, T., Le Bourg, F-63210 Heume-L'Église, France
1650. Matsuki, K. (1998): Description of the larva of *Neurothemis tullia tullia* obtained from Taiwan (Libellulidae). *Tombo* 41: 29-31. (in Japanese with English summary). [Detailed description of *N. tullia*; comparison with *N. stigmatizans braminea*] Address: Matsuki, K., 1575-14, Funabashi, Japan
1651. Matsuki, K. (1998): Records of the activities of Conservation committees: "*Libellula angelina*" group. *Tombo* 41: 59-60. (in Japanese with English translation of the title.) Address: Matsuki, K., 1575-14, Funabashi, Japan
1652. Matsuki, K. (1998): Threatened dragonfly species in Japan. *Nature and Insects* 33(10): 2-3. (in Japanese). [General introduction into the current activities in Japan to protect dragonflies. *Mortonagrion Hirosei*, *Libellula angelina*, and *Mnais pruinosa costalis-forma edai* (the latter threatened by over-collecting!) are commented shortly. In a tab. Japanese species listed in the Red Data Book of Odonata are compiled. *Sympetrum maculatum* will be added to the Red Data Book. (see DJOSC 10).] Address: Matsuki, K., 3-1575-14, Hazama, Funabashi City, Chiba Pref., 274-0822, Japan
1653. Mitra, T.R. (1998): Development of Indian Odonatology. *Fraseria* (N.S.) 5: 9-14. (in English). ["The first Odonata species based on Indian materials was *Rhyothemis variegata* (Linné). It was recorded from East India in 1768 by Johannson. Since 1768 till date 494 species and subspecies have been recorded from India (political area). In 1933, 1934 and 1936 F.C. Fraser published three volumes of Fauna of British India, including Ceylon and Burma. In post-Independent India, taxonomy, morphology, anatomy, ecology, neuroendocrinology, reproductive biology, physiology, cytology and various aspects of behaviour and applied significance are being studied. In advancement of Indian Odonatology, Zoological Survey of India played a pioneer role all the while. The SIOROSA (Societas Internationalis Odonatologica, Regional Office South Asia) is indeed, a source of communication, transaction and inspiration." (Author)] Address: Mitra, Tridib Ranjan, Zoological survey of India, 18/L Dakshin Para Road, Calcutta 700 028, India
1654. Nakahara, M. (1998): The difference of the larval period of *Oligoaeschna pryeri*, hatched from eggs of the same female. *Tombo* 41: 48-49. (in Japanese with English summary). ["In May, 1992, I got about 400 eggs laid by a female of *Oligoaeschna pryeri* (Martin) into wet paper in a vessel." During a period between 40 and 65 days after oviposition, 184 larvae hatched. After rearing in the laboratory, only 2 adults emerged in May, 1993, and 7 adults emerged in April, 1994. ["It seems to be very interesting that there is a difference in the larval period, one year and two years, among the larvae hatched from eggs laid by the same female even in a laboratory condition." (Author)] Address: not stated
1655. Naruse, K.; Eda, S. (1998): The first record of *Aeshna nigroflava* from Chiba Pref.. *Tombo* 41: 43. (in Japanese with English summary). [Record of this - in Japan - alpine distributed species at Ichikawa city adjacent to the Tokyo metropolis on 21 August, 1998] Address: Eda, S., Matsumoto Dental University, Gohara, Hirooka, Shiojiri, Nagano 399-0781, Japan.
1656. Ogata, Y. (1998): An investigation on *Calopteryx atrata* in the Yonezawa basin, Yamagata Pref., by a citizens' activity. *Tombo* 41: 41-43. (in Japanese with English translation of the title.) Address: not stated
1657. Olsvik, H.; Hungnes, T. (1998): *Kongeoyensikker* (Odonata) funnet på Vestlandet. *Insekt-Nytt* 15(3): 3-4. (in Norwegian). [Norway, *Cordulegaster boltonii*] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no
1658. Paulson, D.R.; Minakawa, N.; Gara, R.I. (1998): Recent collections of Odonata from the Kuril Islands. *Species diversity* 3: 75-80. (in English). ["17 species of Odonata were collected in 1994-1996 from 21 localities in the Kuril Islands. *Mnais pruinosa*, *Aeshna nigroflava*, *Cordulia aenea*, and *Pseudothemis zonata* are first records from the archipelago, and the last species represents a significant range extension from Honshu. *Enallagma belyshevi* is synonymized with *E. circumlatum*, which is considered a valid species rather than a subspecies of *E. boreale*." (Authors) *Libellula quadrimaculata asahinai* Schmidt, 1957 is considered a poorly differentiated subspecies.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

1659. Pirnat, A. (1998): Fauna and ecology of dragonflies (Odonata) at Ljubljana Moor. M.Sc. Thesis, University of Ljubljana, Biotehniška Fakulteta, Oddelek za Biologijo: 92 pp. (in Slovene with English summary). [The odonate fauna of the Ljubljana Moor, situated in central Slovenia, was surveyed in detail. At 126 localities 32 species were recorded of which 27 species are reproducing successfully. The odonate fauna of each of the localities is documented in detail. The species are detailed in a monographic way, the odonate communities of the drainage ditch system are analysed, the conservation value of the Odonata of the region is assessed, and management measures of the ditch system are suggested.] Address: Pirnat, Alja, Vosnjakova 4a, SI-1000 Ljubljana, Slovenia. E-mail: alja.pirnat@guest.arnes.si
1660. Plantinga, J.-E. (Red.) (1998): De Südheide in vogelvlucht. Waarnemingen van de Lüneburg kampen 1998. *Amoeba*, Amsterdam 72(3): 140-146. (in Dutch). [19 localities of the heathlands in the Lüneburg-region (Niedersachsen, Germany) were surveyed for different groups of flora and fauna including Odonata. Antoine van der Heyden and Laurens Sparrius traced 38 species including *Ceriagrion tenellum*, *Ophiogomphus cecilia*, *Somatochlora arctica*, *S. flavomaculata*, *Orthetrum brunneum*, *O. coerulescens*, and *Sympetrum depressiusculum*.] Address: Sparrius, L., Kongsbergstraat 1, NL-2804 XV Gouda, The Netherlands
1661. Rai, T. (1998): 1998 observations on the emergence-season of *Sympetrum frequens* at Narashino, Chiba Pref.. *Tombo* 41: 51. (in Japanese with English translation of the title.) Address: not stated
1662. Roy, S.P. (1998): Energetics and trophic biology of larval odonates with special reference to their role in the management of aquatic ecosystem. *Fraseria* (N.S.) 5: 47-56. (in English). ["The present paper deals with the seasonal variations in the energy contents, productivity in terms of grams/m²/day/month/year, food and feeding biology and foraging ratio (FR) of *Mesogomphus lineatus*, *Cordulegaster* sp., and *Ischnura* sp. of a fish pond of Bhagalpur (Bihar, India). The maximum calorific values of *M. lineatus* Selys and *Cordulegaster* sp. (5.487 ± 0.003 Kcal/gram dry weight and 5.430 ± 0.00 Kcal/gram ash-free dry weight) was recorded in September. However, the minimum calorific value (4.133 ± 0.09 Kcal/gram dry weight) was recorded in January. The calorific values of *Ischnura* sp. (3.706 ± 0.032 Kcal/gram dry weight and 3.470 ± 0.034 Kcal/gram ash-free dry weight) was measured. It was investigated that the calorific values of these larvae varied from instar to instar, month to month and upon the physiological state of the animals. The annual productivity was measured as 2.414 g. dry wt./cub. met/year with monthly productivity being 0.210 g. dry wt./cub. met/ month. The gut content analysis of the larval odonates revealed that the Rotifera, Cladocera, Rhizopoda and aquatic insects form the maximum percentage of food items in *Ischnura* sp. but in *M. lineatus* Selys and *Cordulegaster* sp. Rhizopoda were recorded in very small quantity and other food items such as Rotifera, Cladocera, Copepoda, aquatic insects and other animal tissues were found in maximum percentage in the foregut. Due to the utilization of food present at various trophic levels of the food chains, they have regulatory impact in the management of the aquatic ecosystems as well as their mere presence indicates healthy and non-contaminated environments." (Author)] Address: Roy, S.P., University Department of Zoology, T. M. Bhagalpur University, Bhagalpur - 812 007, India
1663. Sawano, J.; Itani, Y.; Zhi-Hui Su; Osawa, S. (1998): Evolutionary distance between *Orthetrum poecilops poecilops* and its subspecies *O. p. miyajimaense*. *Tombo* 41: 28. (in Japanese with English summary). ["The difference of mitochondrial COI gene sequence between *Orthetrum poecilops poecilops* Ris from Hongkong, China and *O. p. miyajimaense* Yuki et Doi from Miyajima, Japan was very small, suggesting that the Miyajima population is a relic of what invaded Japan from south-east China fairly recently." (Authors)] Address: not stated
1664. Schiel, F.-J. (1998): Zur Habitatbindung der Becher-Azurjungfer (*Enallagma cyathigerum* Charpentier 1840) (Odonata: Zygoptera) am südlichen Oberrhein. *Naturschutz am südlichen Oberrhein* 2: 139-147. (in German, with English summary). ["In 1994 and 1995 the habitat requirements of *E. cyathigerum* were investigated at 28 water bodies located in the Upper Rhine valley and additionally in the northern Black Forest (South-west Germany). In the investigated area, *E. cyathigerum* breeds exclusively in still waters at an early stage of succession. 42 % of the examined waters are distinguished by hydrophyte vegetation typical for oligo- to mesotrophic conditions (e.g. *Utricularietum australis*, *Charetum hispidae*, *Eleocharitetum acicularis*). In a quarter of the investigated localities submerged vegetation is missing completely and in the last third eutrophic hydrophytes only cover small ranges. In only a few water bodies floating vegetation (e.g. *Nuphar lutea*) is developed to a very small extent. Though *E. cyathigerum* does not depend on a special type of reed vegetation, a minimum coverage of vertical vegetation structures on the shoreline is regarded as an essential habitat element for this species. *E. cyathigerum* needs a certain minimum size of open water; the smallest water body bearing a large population has a size of 80 m². All other measured morphological, physical and hydrochemical parameters do not influence the occurrence of the species. In most waters fish are abundant." (Author)] Address: Schiel, F.-J., Institut für Naturschutz und Landschaftsanalyse (INULA), Friesenheimer Hauptstr. 20, D-77948 Friesenheim, Germany
1665. Schiel, F.-J. (1998): Zur Habitatbindung des Großen Granatauges (*Erythromma najas* Hansemann 1823) (Zygoptera: Coenagrionidae) am südlichen Oberrhein. *Naturschutz am südlichen Oberrhein* 2: 129-138. (in German, with English summary). ["In 1994 and 1995 the ecological requirements of *E. najas* were studied at 24 waters located in the Upper Rhine valley. Floating water vegetation (*Nuphar lutea* and/or *Nymphaea alba*) provides the most important structural resources for *E. najas*, because the single leaves of the water lilies are preferred as perches by the males and the blossom stalks by the females for oviposition. If there exists a submerged vegetation layer, which can be utilized for oviposition, water lily-leaves can be replaced structurally by freely floating pleustophytes such as *Hydrocharis morsus-ranae*. Other plants play a minor role for *E. najas*, despite a minimum of reed vegetation in the border line is needed. The minimum size of the investigated standing waters covers 100 m². All waters are shallow with maximum depths between 2 and 4 meters and a mostly mighty muddy ground. Most breeding sites are

- oxbows located within or very close to forest. In 1994 and 1995 the observed changes in water levels were up to 2.3 meters high. Hydrochemically the waters are characterized by pH-values between 7.2 and 8.3, a total hardness between 8.8 and 17.6°dH and a conductivity between 280 and 705 $\mu\text{S} / \text{cm}$. Remarkably high is the nymph's tolerance to low oxygen levels (down to a 2 % concentration measured at the water surface). Habitat requirements, threats and protection are discussed. (Author)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Friesenheimer Hauptstr. 20, D-77948 Friesenheim, Germany. E-mail: Jupp@INULA.de
1666. Someya, T. (1998): Records of the activities of Conservation committees: "Mortonagrion Hiroseii" group. Tombo 41: 60. (in Japanese with English translation of the title.) Address: not stated
1667. Someya, T. (1998): The present state of the damselfly, *Mortonagrion Hiroseii*. Nature and Insects 33(10): 4-8. (in Japanese). [Introduction, and causes to protect *M. Hiroseii*; description of the habitat; status of the species in Japan. (taken from DJOSC 10)] Address: Someya, T., 2-4313-9, Ishikavva-cho, Mito City, 3 10-0904, Japan
1668. Sparrius, L.; Heyden, A. van der (1998): Libellen in de Reeuwijkse Hout. Amoeba, Amsterdam 72(3): 150-151. (in Dutch). [Commented list of the odonate fauna of the recreation area Reeuwijkse Hout in the southern Netherlands. 17 species could be observed in 1998. Special emphasize is given to the water bodies with *Stratiotes aloides* and *Aeshna viridis*.] Address: Sparrius, L., Kongsbergstraat 1, NL-2804 XV Gouda, The Netherlands
1669. Srivastava, B.K. (1998): The marvellous Odonata. *Fraseria* (N.S.) 5: 1-8. (in English). ["Origin, evolution, wing and flight, eyes, predation, feeding behaviour and reproduction (organs, mechanism and behaviour) all these aspects of their biology are very fascinating and often strongly convincing to call them 'the marvellous Odonata'." (Author) A short note on current research is made to use *Anax immaculifrons* larvae to suppress mosquito larvae.] Address: Srivastava, B.K., Department of Zoology, Sagar University, Sagar - 470 003, India
1670. Suzuki, K.; Miyachi, K. (1998): Body size variation in *Mnais costalis* Selys (Zygoptera, Calopterygidae) - Miscellaneous notes on the Japanese *Mnais* (8). Tombo 41: 24-27. (in Japanese with English summary). ["Intraspecific body size variation in *Mnais costalis* Selys, 1869 was statistically analyzed for 21 local populations (demes) from Hokkaido Island and Niigata Prefecture (Tôhoku District, Honshu, Japan). Colored-winged males are significantly larger in body size than hyaline-winged ones in the populations from both Hokkaido Is. and Niigata Pref." (Authors)] Address: Suzuki, K., Toyama University, Dept of Biology, Faculty of Sciences, 3190 Gofuku, Toyama, 930, Japan
1671. Suzuki, K.; Miyachi, K. (1998): Sexual difference of body size in *Mnais nawai* Yamamoto and *M. sp.* (Zygoptera, Calopterygidae) from Toyama Prefecture, Honshu, Japan - Miscellaneous notes on the Japanese *Mnais* (6). Tombo 41: 21-22. (in Japanese with English summary). ["Sexual difference in body size was statistically analyzed for two *Mnais* species, *M. nawai* Yamamoto, 1956 (Chûbû Group) and *M. sp.* (undescribed: Suzuki, in preparation) (Zygoptera, Calopterygidae) from Toyama Prefecture, Honshu, Japan." (Authors)] Address: Suzuki, K., Toyama University, Dept of Biology, Faculty of Sciences, 3190 Gofuku, Toyama, 930, Japan
1672. Suzuki, K.; Miyachi, K. (1998): The relationship between adult body size and emergence time in *Mnais nawai* Yamamoto and *M. sp.* (Zygoptera, Calopterygidae) from Toyama Prefecture, Honshu, Japan. Tombo 41: 19-21. (in Japanese with English summary). ["Seasonal body size variation in the Chûbû Group of *Mnais nawai* Yamamoto, 1956 and *M. sp.* (undescribed: Suzuki, in preparation) was examined for two local populations (demes) from Toyama Prefecture, Honshu, Japan. Negative correlation was recognized between adult body size and occurrence time in males of both species but not in females." (Authors)] Address: Suzuki, K., Toyama University, Dept of Biology, Faculty of Sciences, 3190 Gofuku, Toyama, 930, Japan
1673. Suzuki, K.; Miyachi, K. (1998): The relationship between body size and the number of times of mating in males of *Mnais nawai* Yamamoto and *M. sp.* (Zygoptera, Calopterygidae) from Toyama Prefecture, Honshu, Japan - Miscellaneous notes on the Japanese *Mnais* (7). Tombo 41: 23-24. (in Japanese with English summary). ["The relationship between body size and the number of times of mating in males of the Chûbû Group of *Mnais nawai* Yamamoto, 1956 and *M. sp.* (undescribed: Suzuki, in preparation) was examined for two local populations (demes) from Toyama Prefecture, Honshu, Japan. Positive correlation was recognized between body size and the number of times of mating in males of both " (Authors)] Address: Suzuki, K., Toyama University, Dept of Biology, Faculty of Sciences, 3190 Gofuku, Toyama, 930, Japan
1674. Takasaki, Y. (1998): A male *Crocothemis servilia mariannae* Kiauta with glittery wings. *Gekkan-Mushi* 334: 11. (in Japanese). [A male at Okazaki factory yard of Yunuchika, Meihoku-cho, Okazaki City, Aichi Pref., on July 6, 1998 occupied its territory in the pond of the yard for several days. The dragonfly was not different from normal ones, but it had strong glittering on the surface of the wings, though it was mature. When it was flying the wings looked white. This glittering of the wings did not change even when the wings were treated in acetone or metanol, and this may be caused by physically rough surface. (taken from DJOSC 10)] Address: Takasaki, Y., 1-14, Fujimori, Myoto-ku, Nagoya City, 465-0026, Japan
1675. Takasaki, Y. (1998): Dragonflies of the projected site of the exposition at Seto City, Aichi. *Kakocho* 50(195): 33-42. (in Japanese). [Assessment of the dragonfly fauna of the area the EXPO 2005 is scheduled to be realised. 66 species correspond to app. 70% of the species so far observed in Aichi Prefecture. (for more details see DJOSC 10).] Address: Takasaki, Y., 1-14, Fujimori, Myoto-ku, Nagoya City, 465-0026, Japan
1676. Tembhare, D.B. (1998): Odonate ovary and vitellogenesis. *Fraseria* (N.S.) 5: 15-18. (in English). ["The female reproductive system in Odonata consists of a pair of ovaries and a post ovarian genital complex. The system is well-developed in the newly emerged adult female. Each ovary consists of large number of panoistic type of ovarioles. Oogenesis is initiated in the larval stage while vitellogenesis starts after the emergence of adult female. The process of vitellogenesis

passes through five consecutive stages, pre-vitellogenic, early-vitellogenic, mid-vitellogenic, late-vitellogenic and maturation. Yolk deposition starts from the early to late vitellogenic stages while the egg-membranes are formed during the late-vitellogenic and maturation stages. During vitellogenesis, the developing oocytes grow gradually and the follicular epithelium shows cytological modifications. The yolk material is composed of protein, carbohydrate and lipid. It is transported from haemolymph into the vitellogenic oocytes. The egg membranes are secreted by the follicular epithelium. The medial A neurosecretory cells of the brain and the corpora allata play important role during vitellogenesis. The histochemical evidence of steroidogenesis in odonate ovary producing ovarian hormone is quite obvious. Hormonal control of vitellogenesis has been discussed." (Author)] Address: Tembhare, D.B., Dept Zool., Nagpur Univ. Campus, Amravati Road, Nagpur-440010, Maharashtra, India

1677. Tembhare, D.B. (1998): Vth South Asian Symposium of Odonatology (December 20-21, 1998. *Fraseria* (N.S.) 5: I-III. (in English). [Short report on the Vth South Asian Symposium of Odonatology including a list of the 21 lectures held.] Address: Tembhare, D.B., Dept Zool., Nagpur Univ. Campus, Amravati Road, Nagpur-440010, Maharashtra, India

1678. Tóth, S. (1998): Data on the dragonfly (Odonata) fauna from the surrounding area of River Tisza according to my collections by December 31, 1987. *Studia odonologica hungarica* 4: 11-44. (in Hungarian with English summary). [Collections in the surrounding area of River Tisza, Hungary were made from 53 localities throughout the area. The sites are situated in 30 grids according to the 10 by 10 km UTM grid map. Between 1960 and 1986 41 species were found to occur in the area. 1 species is very frequent, 19 are frequent, 14 are less frequent, 6 are rare, and 1, *Stylurus flavipes*, is listed in the Appendix to the European Habitat-Directive.] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

1679. Vass, I. (1998): Data on the dragonfly (Odonata) fauna of Hungary according to my scatter-collections by December 31, 1987. *Studia odonologica hungarica* 4: 45-51. (in Hungarian with English summary). [From 22 localities, in most cases situated in the north-eastern part of the Great Hungarian Plain, between 1979 and 1987 40 species were recorded. *Coenagrion scitulum*, *Stylurus flavipes*, and *Leucorrhinia pectoralis* are of special interest.] Address: Vass, I., 4400 Nyíregyháza, Ferenc krt. 14., IV/1, Hungary

1680. Wada, S. (1998): A blackish aberrant form of *Orthetrum triangulare melania* found in Fukui Pref.. *Tombo* 41: 31. (in Japanese with English translation of the title). Address: not stated

1681. Wada, S.; Wada, Y. (1998): An unusual occurrence of *Hemianax ephippiger* in Fuki Pref.. *Tombo* 41: 17-18. (in Japanese with English translation of the title.) Address: not stated

1682. Walia, G.K.; Sandhu, R. (1998): Female karyotypic study of four species of family Libellulidae (Anisoptera: Odonata). *Fraseria* (N.S.) 5: 63-67. (in English). [Germ cell complements of both the sexes of *Aciosoma panorpoides*, *Brachythemis contaminata*, *Crocothemis servilia* and *Pantala flavescens* have been

studied and illustrated. ["These have been collected from North and North-Eastern states of India. All the species possess diploid chromosome number $2n M = 25m$, $2nF = 26 m$ with $x_0 - xx$ sex determining mechanism. The structure and behaviour of chromosomes during mitosis and meiosis have been observed. The study of female karyotype is new to cytology." (Authors)] Address: Sandhu, R.; Department of Zoology, Punjabi University, Patiala - 147002, India

1683. Xylander, W.E.R.; Stephan, R. (1998): Die Libellen des Braunkohletagebauebiets Berzdorf. *Abh. Ber. Naturkundemus. Görlitz* 70(2): 65-80. (in German with English summary). ["During investigations of the brown coal mining site Berzdorf (south of Görlitz, Saxonia) 48 dragonfly species could be found from May 1996 to August 1998 and documented in the collection of the Staatliches Museum für Naturkunde. 31 of these species are included in the Red List for Saxonia, five of which are threatened by extinction (*Coenagrion lunulatum*, *Ophiogomphus cecilia*, *Aeshna isosceles*, *Brachytron pratense* and *Orthetrum brunneum*). Five groups of ponds and a brook, significantly differing in age, structure and physico-chemical characters, and their dragonfly coenoses are described. The number of dragonfly species in Berzdorf is extraordinarily high for such a secondary biotope (so far known the highest in Saxonia). The recultivation must allow for the maintenance and development of the ponds and their dragonfly coenoses." (Authors) The records of *Aeshna affinis*, *Crocothemis erythraea*, *Leucorrhinia pectoralis*, and *Symphetrum depressisculum* should be noticed too. The record of 48 odonate species indicates that the region is an odonatological hot spot in Germany.] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

1684. Yamaguchi, M. (1998): Dragonflies appeared to an artificial pond in Metropolis. *Tombo* 41: 45. (in Japanese with English summary). Japan, [*Polycanthagyna melanictera*, *Anaciaeschna martini*] Address: not stated

1685. Yokoyama, T. (1998): The northernmost record of *Planaeschna mitnei* (Selys). *Tombo* 41: 36. (in Japanese with English translation of the title.) Address: not stated

1686. Yosef, R.; Deyrup, M.A. (1998): Effects of fertilizer-induced reduction of invertebrates on reproductive success of Loggerhead Shrikes (*Lanius ludovicianus*). *Journal für Ornithologie* 139: 307-312. (in English with German summary). ["We examined the effect of spraying the common fertilizer, sodium ammonium nitrate, on cattle pastures in central Florida. Shrikes are considered good indicators of habitat quality. [...] The eight treatment pairs [with sprayed territories] expanded their territories significantly by 138.5% on average, and the smaller their initial territory, the greater the change. The total number of insects collected in the sprayed pasture in the first three weeks was extremely low compared to the number in the unsprayed pasture. In the control pairs no loss of eggs, young, or adults owing to abiotic causes was observed. However, in the treatment pairs seven eggs, two nestlings, and eight fledglings disappeared, or died from causes attributed to the spraying. [...]"] (Authors). Odonata occurred only in unsprayed pastures.] Address: Yosef, R. and M.A. Deyrup, Areh-

bold Biological Station, P. O. Box 2057, Lake Placid, PL 33852, USA

1687. Yoshino, Y. (1998): Odonata from Nij-jima, in the Izu Islands (2). Tombo 41: 44-45. (in Japanese with English summary). *Anotogaster sieboldii*, *Polycanthagyna melanictera*, *Orthetrum albistylum speciosum*, *Pseudothemis zonata*, and *Pantala flavescens* are recorded in 1998 from the Nij-jima Islands.] Address: not stated

1999

1688. Akaishi, S.; Yokoyama, T. (1999): A record of the forty first odonate species at Nishioka reservoir, Sapporo city. Bulletin of the Hokkaido Odonatological Society 11: 9. (in Japanese). [*Somatochlora viridiaenea*] Address: not translated

1689. Artiss, T. (1999): Molecular phylogenetic analyses of the odonate genera *Libellula*, *Ladona* and *Plathemis*. *Argia* 11(4): 8-12. (in English). ["There are three important conclusions from this study. (1) The genus *Orthemis* is traditionally distinguished from *Libellula* on wing venation characters. However, my results indicate that the monophyly of *Libellula* was not supported, and *Orthemis ferruginea* was found to be part of *Libellula* s.l.. I employed statistical tests to determine whether this tree was significantly different from trees where *Orthemis* was constrained to be an outgroup to *Libellula* s.l.. There were no significant differences in these trees. Given the indecisiveness of the molecular data on this point, I suggest that, because it is conventionally favored by morphological data, we should continue to accept the current hypothesis of *Libellula* monophyly and a corresponding outgroup position for *O. ferruginea*. However, I caution that traditional classification of these taxa may be based on potentially homoplastic (similarities not due to common ancestry) characters, and suggest that further research is needed to assess the natural delineations of taxa in these groups. (2) The results of my study indicate that *Plathemis* and *Ladona* are distinct monophyletic lineages within *Libellula* s.l.. My results indicate that *Plathemis* forms the basal sister group to the remainder of *Libellula* s.l., and that *Ladona* is the next most basal clade within the *Libellula* lineage. All three analytical approaches supported the monophyly of *Plathemis* and *Ladona*, and there was strong quantitative support (bootstrap values >90%) for these groups. Bootstrap values indicate the percent support for clades based on the randomization tests (a bootstrap value of 100 indicates that clade was supported in 100% of randomization tests). These results therefore support the original classification proposed by Needham (1897) in regard to the delineation of natural groups, with the exception that *Libellula depressa* and *Libellula fulva* would both need to be included within *Ladona* s.l. were it accorded generic or subgeneric status. Based on my results, I propose that the separate generic or subgeneric ranks be adopted for *Plathemis* and *Ladona* within *Libellulidae*; a conclusion that was supported by a previous molecular phylogenetic study on these groups (Kambhampati and Charlton 1999). (3) Phylogenetic relationships within *Libellula* s.s. generally supported the subgeneric classifications of Kennedy (1922 a,b). While Kennedy proposed that *L. angelina*,

semifasciata and *quadrifasciata* were separate subgenera, I found strong support for these species forming a monophyletic clade. I also found support for the subgenera *Neotetrum* (*forensis*, *pulchella*, *nodistica*), *Belonia* (*foliata*, *saturata*, *croceipennis*), and *Holotania* (*axilena*, *composita*, *jesseana*, *flavida*, *auripennis*, *luciosa*, *cyanea*, *comanche*, *incesta*, *vibrans*). The only exception to Kennedy's classification was *L. composita* which he assigned to *Holotania*, but I found to be part of, or sister taxon to *Belonia*." (Author)] Address: Artiss, T., Dept of Biology, Clark University, 950 Main Street, Worcester, MA, 01610-1477, USA. E-mail: tartiss@black.clarku.edu

1690. Batzer, D.P.; Rader, R.B.; Wissinger, S.A. (Eds) (1999): *Invertebrates in Freshwater Wetlands of North America*. John Wiley & Sons, New York. ISBN 0-471-29258-3: 1100 pp. (in English). ["This volume provides an excellent overview of the different wetland types of North America and their characteristic invertebrate communities. It is the most comprehensive book in existence on this topic, consisting of 41 chapters, written by 87 authors, who collectively address a range of different wetland types. The book covers marshes, peatlands, wetland forests and restored/man-made wetlands, with the main focus on marshes and temporary pools and ponds. Although the book is entitled 'Invertebrates in freshwater Wetlands of North America', it primarily deals with wetlands in the conterminous U.S.A. Alaska's wetlands are not considered, although they make up 62% of the present wetlands of the U.S.A. Canada has about three times the area of wetlands found in the lower 48 states, with most of the area covered by peatlands. One chapter on Canadian springs, two chapters on peatlands, and three chapters on the well-studied Delta-Marsh in Manitoba cover Canadian wetlands. [...] As many of the wetlands discussed are temporary, specific attention is devoted to life history and colonization strategies of invertebrates (e.g. chapters 14 and 15). It was shown that species richness normally increases with the duration of the hydroperiod, but an extended inundation period can also be a disturbance to some wetland invertebrates, as demonstrated for limesink wetlands in southeast U.S.A. (chapter 9). In addition, the invertebrate communities in floodplain pools differ from those in seasonal wetland pools, as fish have access to them during flooding (chapter 29). The large variety of invertebrate and vertebrate predators makes many wetlands unique among freshwater ecosystems (e.g. the Everglades, chapter 2). Most chapters discuss conservation issues and management schemes for individual wetland types and the potential role of invertebrates therein. The book's 41 chapters are organized into six parts that mainly correspond to different geographic regions across North America. It starts with an introductory chapter that provides an overview of North American wetlands, their physicochemical properties, and their characteristic plant and invertebrate communities. Part 1 (chapters 2-11) discusses marshes and swamps of the southeast, ranging from the Florida Everglades [...] to the fascinating life in pitcher plant wetlands. Part 2 introduces woodland ponds, peatlands and marshes of the north and northeast (chapters 12-20). Part 3 presents selected wetlands of the central prairies and the Mississippi River basin (chapters 21-29). Part 4 introduces wetlands of the western mountains, deserts and valleys, including springs and California ricelands (chapters 30-35). Part 5 gives an overview of coastal freshwater wet-

lands, in particular, the bayous of the Gulf of Mexico and coastal wetlands of the Great Lakes. In part 6, Wissinger summarizes the different aspects discussed in the previous chapters, and provides general conceptual models that can help to understand wetland ecosystems better. [...] (Klement Tockner, *Freshwater Biology* 45(1): 103-104). Odonates are mentioned in many chapters of the book. Odonatologist should pay special attention to the chapters 6 (Okefenokee Swamp, Georgia and Florida), 8 (Carolina Bays, North and South Carolina), 10 (Beaver-impounded wetlands of the southeastern coastal plain, Alabama), 15 (Beaver pond wetlands in northwestern Pennsylvania), 17 (Canadian peatlands), 21 (Wetlands of the prairie Pothole region (southern Canada and northern USA), 26 (Playas of the Southern High Plains, Texas), 30 (Wetlands of Grand Teton and Yellowstone National Parks, Wyoming), and 31 (Subalpine Wetlands in Colorado: Habitat Permanence, salamander predation, and invertebrate communities).]

1691. Beckemeyer, R.J. (1999): Measurements of total fresh mass for some species of Odonata from the Great Plains of the United States. *Notul. odonatol.* 5 (3): 35-36. (in English). [Kansas, Nebraska; the weight of the following taxa is published: *Calopteryx aequabilis*, *C. maculata*, *Hetaerina americana*, *Enallagma exsulans*, *Aeshna multicolor*, *Anax junius*, *Nasiaeschna pentacantha*, *Gomphus externus*, *Ophiogomphus severus*, *Stylurus plagiatus*, *Somatochlora ensigera*, *Celithemis eponina*, *Leucorrhinia intacta*, and *Amphiagrion* spp.] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

1692. Belgische Libellenonderzoekers (1999): *Gomphus*. *Gomphus* 15(3): 109-155. (in French or Dutch). [Papers of scientific interest are abstracted in this issue of OAS. The Belgian society of Dragonfly recorders provides some more information in *Gomphus* 15(3) such as the agenda of the 20th Belgian odonatalogical symposium on March 26, 2000, information on the book on the Moroccan Odonata by Gilles Jacquemin and Jean-Pierre Boudot, the scheduled reprint of P.-A. Robert's "Les Libellules", the Atlas-project, and internet activities of the society.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

1693. Buczynski, P. (1999): Dragonflies (Odonata) of sandpits in south-eastern Poland. *Acta Hydrobiol.*, *Cracow* 41: 219-230. (in English). ["Dragonflies of sandpits and their succession were studied in 10 sand mines in south-eastern Poland in the years 1996-1998, based mainly on larval communities. 41 species were collected, of which 28 were autochthonous, and 6 probably autochthonous. A rapid succession of larval communities was observed. Many Mediterranean species occurred in the sandpits, of which the most interesting were: *Lestes barbarus*, *Aeshna affinis*, *Hemianax ephippiger*, *Anax imperator*, *Sympetrum fonscolombii*, and *S. meridionale*. Dragonflies inhabiting sand- and gravelpits in Central Europe, and the importance of these secondary biotopes for protection of the endangered dragonflies are briefly discussed." (Author)] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1694. Butler, M.A. (1999): Is evolution in the color vision system of Hawaiian damselflies adaptive or neutral? *American Zoologist* 39(5): 33A. (in English). [visual pigment; body coloration; color vision system: evolution; environmental light stimuli; spectral sensitivities] Address: Butler, M.A., Institute of Statistical Mathematics, Tokyo Japan

1695. Butler, S.G. (1999): Further additions to the knowledge of the fauna of the island of Corfu, Greece. *Notul. odonatol.* 5(3): 25-27. (in English). [In June 1998, 19 species were recorded including *Chalcolestes viridis*, *Anaciaeschna isosceles*, *Anax parthenope*, *Brachytron pratense*, and *Sympetrum meridionale* as new additions to the fauna of the island. The records of *Pyrrosoma elisabethae* Schmidt 1948, *Coenagrion pulchellum*, and *Gomphus schneiderii* should be mentioned too.] Address: Butler, S.G., Red Willow, All Stretton, Shropshire SY6 6HN, UK

1696. Costa, J.M.; De Souza-Franco, G.M.; Takeda, A.M. (1999): Description of the larva of *Diastatops intensa* Montgomery, 1940 and morphology of different instars (Odonata: Libellulidae). *Boletim Museu Nacional Rio de Janeiro, Zoologia* 410: 1-14. (in Portuguese with English summary). [80 males and 40 females "of different instars of *D. intensa* were collected monthly from associations with *Eichornia azurea* and *E. crassipes* at three habitats (Rio Ivinheima Lagoa dos Patos e Lagoa do Guarana), from March 1992 to February 1993. The larvae from Rio Ivinheima, associated with *E. azurea* were used in this study. Sex identification was observed after the 7th instar. Two specimens of the ultimate instar larvae were identified as *D. intensa* through structure of wing pads and by presence of the adults at the same place. Five adults (3 males and 2 females) were collected on only one day during every period and identified as *D. intensa*. The immature form collected in Rio Ivinheima is presented in various stages of growth of the instars including the ultimate instar, from June 1992 to December 1993. The presence of 11 instars was confirmed. Differences observed among the several instars and descriptions of the ultimate instar are presented and compared with the larvae of *D. obscura*." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

1697. Daigle, J.; Behrstock, B.; Krotzer, S.; Mauffray, B. (1999): Arizona adventures! *Argia* 11(4): 4-6. (in English). [Report from a trip to several habitats in Arizona (and New Mexico), USA. Among a lot of interesting species found, *Argia lacrimans* was found west of Sierra Vista; the locality may be the only one for the Mexican adventive species in USA.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: daiglej@dep.state.fl.us

1698. Davies, D.A.L.; Fliedner, H. (1999): Entomological etymology, a correction (Zygoptera: Megapodagrionidae, Rhipidolestes). *Notul. odonatol.* 5(3): 36-37. (in English). [Discussion of the meaning of the name *Rhipidolestes* Ris 1912; the name was chosen by F. Ris after the Greek rhiphidion (= fan).] Address: Davies, D.A.L., 23 Cedar Court, Hills Road, Cambridge, CB2 2QJ, United Kingdom; Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany

1699. De Souza, L.; Costa, J.M.; Santos, T.C. (1999): Redescription of the larva of the *Tremea calverti* Muttkowski, 1910 with key to the identification of the known larvae of the genus (Odonata: Libellulidae). *Boletim Museu Nacional Rio de Janeiro Zoologia* 409: 1-7. (in Portuguese with English summary). ["The ultimate instar larva of *Tremea calverti* Muttkowski, 1910, from the Pantanal of Mato Grosso do Sul, Brazil is redescribed, and illustrated. Notes on other larvae of the genus are presented. A key to the larvae of the known species of *Tremea* Hagen, 1861 is appended." (Authors)] Address: De Souza, L., Departamento de Biologia, Universidade Federal do Mato Grosso do Sul, Mato Grosso do Sul, Brazil
1700. Defoort, T. (1999): Verslag van de excursie naar de Eendenputten te Beernem op 6 juni 1999. *Gomphus* 15(3): 133-134. (in Dutch). [Report from an excursion to a bog near Beernem, Belgium. *Enallagma cyathigerium* and *Coenagrion puella* were recorded.] Address: not stated
1701. Dijk, D.E. van; Geertsema, H. (1999): Permian Insects from the Beaufort Group of Natal, South Africa. *Annals of the Natal Museum* 40: 137-171. (in English). ["An account is given of the fossil insects of the Beaufort Group (Late Permian) investigated since the last publication by Riek (1976). The Odonata and Trichoptera are reported for the first time; specimens are assigned to three known genera not previously recorded in South Africa; eight new species are described, two in new genera [...]" (Authors)] Address: Dijk, D.E. van, Department of Zoology, University of Stellenbosch, Matieland, 7602 South Africa
1702. Donnelly, N. (1999): History of American Odonata: Clarence Kennedy (1879-1952). *Argia* 11(4): 12-15. (in English). [Quite few is known about the (early) years of C.H. Kennedy who was one of the "giants of American Odonata study", and who was an outstanding illustrator of Odonata. This paper compiles the most essential odonatological stations in Kennedy's life.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu
1703. Donnelly, N. (1999): Juanda Bick: 1919-1999. *Argia* 11(4): 2-4. (in English). [Obituary] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu
1704. DuBois, R.B.; Johnson, R.; Puiz, S. (1999): *Aeshna subarctica* (Odonata: Aeshnidae) in northwestern Wisconsin. *Great Lake Entomologist* 32(1/2): 29-31. (in English). ["Nine adult specimens of *A. subarctica*, a boreal dragonfly typically associated with muskeg wetlands, were collected from Black Lake and Breitzman Lake in northwestern Wisconsin (Douglas County). Viable populations likely exist in both lakes. Oviposition by three females is described. This represents the first published report of *A. subarctica* for the state of Wisconsin. Because Black Lake lies on the border of Wisconsin and Minnesota, *A. subarctica* likely occurs in Minnesota as well. Further sampling of acidic peatland habitats for aquatic macroinvertebrates is recommended to document populations of northern species at the southern periphery of their ranges. These species could function as indicators of climate change." (Authors)] Address: DuBois, R.B., Bureau of Integrated Science Services, Department of Natural Resources, 6250 South Ranger Road, Brule, WI 54820, USA. E-mail: duboir@dnr.state.wi.us
1705. Eklov, P.; Werner, E.E. (1999): Multiple predator effects on size-dependent behavior and mortality of two species of anuran larvae. *Oikos* 88(2): 250-258. (in English). ["This study examined the effects of multiple predators on size-specific behavior and mortality of two species of anuran larvae. Particularly, we focused on how trait changes in predators and prey may be transmitted to other species in the food web. In laboratory experiments, we examined the effects of bluegill sunfish, *Lepomis macrochirus*, and the odonate larva *Anax junius* on behavior and mortality of tadpoles of the bullfrog, *Rana catesbeiana*, and the green frog *R. clamitans*. Experiments were conducted with predators alone and together to assess effects on behavior and mortality of the tadpoles. The experiments were replicated on five size classes of the tadpoles to evaluate how responses varied with body size. Predation rates by *Anax* were higher on bullfrogs than on green frogs, and both bullfrogs and green frogs suffered greater mortality from *Anax* than from bluegill. Bluegill only consumed green frogs. Predation rates by both predators decreased with increasing tadpole size and decreased in the non-lethal (caged) presence of the other predator. Both anuran larvae decreased activity when exposed to predators. Bullfrogs, however, decreased activity more in the presence of *Anax* than in the presence of bluegill, whereas green frogs decreased activity similarly in the presence of both predators. The largest size class of green frogs, but not of bullfrogs, exhibited spatial avoidance of bluegill. These responses were directly related to the risk posed by the different predators to each anuran species. *Anax* activity (speed and move frequency) also was higher when alone than in the non-lethal presence of bluegill. We observed decreased predation rate of each predator in the non-lethal presence of the other, apparently caused by two different mechanisms. Bluegill decreased *Anax* mortality on tadpoles by restricting the *Anax* activity. In contrast, *Anax* decreased bluegill mortality on tadpoles by reducing tadpole activity. We discuss how the activity and spatial responses of the tadpoles interact with palatability and body size to create different mortality patterns in the prey species and the implications of these results to direct and indirect interactions in this system." (Authors)] Address: Eklov, P., Dept of Ecology and Environmental Science, Animal Ecology, Umea Univ., SE-901 87, Umea, Sweden
1706. Ellenrieder, N. von (1999): Description of the last larval instar of *Aeshna* (*Hesperaeschna*) *cornigera planaltica* (Odonata: Aeshnidae). *Revista de la Sociedad Entomologica Argentina* 58(3-4): 151-156. (in English with Spanish summary). ["The last larval instar of *Aeshna* (*Hesperaeschna*) *cornigera planaltica* Calvert, 1952 (Odonata: Aeshnidae) is here described and compared to its closest allies and other known larvae of this genus from Argentina. It differs from them mainly in the prementum ratio width/length, the shape of prothoracic processes and the relative length of the abdominal lateral spines." (Author)] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@iipla.edu.ar
1707. Englund, R. (1999): New records and range extensions of native Odonata (Coenagrionidae) and intro-

duced aquatic species in the Hawaiian islands. Bishop Museum Occasional Papers 59: 15-19. (in English). [Record of *Megalagrion pacificum* believed extirpated from Hawai'i Island in a tributary of Ma'ili Stream without introduced fishes in 1998; probably due to two introduced fish species the damselfly didn't dwell the main stream. *Orthemis ferruginea* was first recorded in 1977 at Hale'iwa, O'ahu; it now appears to be established throughout the Hawaiian Archipelago. The records of the species on Hawai'i are documented.] Address: Englund, R., Hawaii Biol. Survey, Bishop Mus., 1525 Bernice St., Honolulu, HI 96817, USA

1708. Englund, R.A.; Filbert, R.B. (1999): Flow restoration and persistence of introduced species in Waikele Stream, O'ahu. *Micronesica* 32(1): 143-154. (in English). ["Unintentional stream flow restoration in Waikele Stream, O'ahu, Hawai'i resulted from the demise of sugar cane cultivation on O'ahu and subsequent cessation of direct surface water diversions in 1989. Previous artificial stream studies in Hawai'i have suggested that increases in the base flow of a diverted stream would displace or reduce introduced fish populations. Surveys of Waikele Stream, conducted in 1993 and 1997-1998 from the Waikele Springs area downstream to the beginning of the tidal reach found that despite an increase in stream flow, introduced fish remained abundant and native species appeared to have declined. In fact, two new introduced aquatic taxa, a dragonfly and a shrimp, had appeared. These results indicate that although restoring hydrological conditions is an important first step in overall restoration of degraded aquatic ecosystems, flow restoration alone is not a panacea, especially in O'ahu streams with naturally low discharge rates. For stream and wetland restoration to fully succeed, introduced fish and other alien aquatic species must be eradicated by methods other than simply increasing stream base flows. [...] Introduced dragonflies and damselflies dominated the aquatic insect fauna of Waikele Stream. All damselfly species were introduced (Table 2). Native *Megalagrion* damselflies were not observed in lower Waikele Stream in 1993 or 1998. The indigenous dragonfly *Anax junius* was common around Waikele Springs, and the introduced dragonfly *Crocothemis servilia* was absent in 1993, but common in 1998." (Authors) Dates of introduction: 1936: *Ischnura posita*, *Enallagma civile*; 1973: *Ischnura ramburii*; 1977: *Orthemis ferruginea*; 1994: *Crocothemis servilia*.] Address: Englund, R.A.; Filbert, R.B., Hawai'i Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA

1709. Ferreras-Romero, M.; Corbet, P.S. (1999): The life cycle of *Cordulegaster boltonii* (Donovan, 1807) (Odonata: Cordulegastridae) in the Sierra Morena Mountains (southern Spain). *Hydrobiologia* 405: 39-48. (in English). ["The life cycle of the dragonfly *Cordulegaster boltonii* was studied for five consecutive years, mainly by systematic sampling of larvae, in a permanent upland stream in southern Spain, towards the southern part of this species' range. The instar distribution during winter is that of a 'spring species' (Corbet, 1964) in which larvae destined to emerge in the next spring are predominantly in the final instar. During larval development a hatching cohort divides into "slow" and "fast" components which respectively complete development in three and two years, the former component predominating. Signs of advanced metamorphosis (in the last larval instar) are confined to late winter and spring. E-

mergence is protracted, there being a long "tail" after most of" the population has emerged, resulting in a long flying season." (Authors)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain

1710. Fleck, G.; Nel, A.; Martinez-Delclos, X. (1999): The oldest record of libellulid dragonflies from the Upper Cretaceous of Kazakhstan (Insecta: Odonata, Anisoptera). *Cretaceous Research* 20(5): 655-658. (in English). ["*Palaeolibellula zherikhini* gen. nov., sp. nov. ... is the oldest record of the dragonfly family Libellulidae. This discovery extends the stratigraphic range of the family about 60 my into the past, hence emphasizing the incompleteness of present knowledge of the Mesozoic insect fauna." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

1711. Fuchs, H.-J.; Kistner, A. (1999): Die Wüstung Pferdsfeld im Soonwald nach 20 Jahren: eine landschaftsökologische Bestandsaufnahme, Bewertung und Konzeption einer sozial-ökologischen Inwertsetzung. *Mitt. Pollichia* 86: 35-68. (in German with English and French summaries). [The abandoned settlement of Pferdsfeld in the Soonwald after 20 years: an ecological analysis, evaluation and conception for a socio-ecological implementation. - Due to the serious noise impact of the Bundeswehr-airfield Pferdsfeld, Rheinland-Pfalz, Germany, 400 inhabitants decided to resettle voluntarily in 1979, and the village Pferdsfeld closely located to the runway was immediately flattened completely. After the transfer of the phantom-fighter group and the closing of the military airfield of Pferdsfeld in 1997, the abandoned settlement gained in significance. During the last 20 years, a number of outstanding, biologically valuable areas with a very interesting flora and fauna have developed at the place of the former village. These areas have been mapped, characterised and evaluated in the course of an ecological analysis. A detailed concept for a future use of the Pferdsfeld area was worked out. Some common central European Odonata are mentioned.] Address: Fuchs, H.-J., Geographisches Institut, Johannes Gutenberg-Universität Mainz, 55099 Mainz, Germany

1712. Fudalewicz-Niemczyk, W.; Petryszak, A.; Rosciszewska, M. (1999): Cuticular sensory organs of the mouthparts of larvae of the dragonfly *Libellula* (Odonata: Libellulidae). *Acta Biologica Cracoviensia Series Zoologia* 41: 25-33. ["The following types of sense organs were found ...: sensilla trichodea, s. chaetica, s. coeloconica, s. papillacea, s. campaniformia, s. canaliculata, and hair plates. The occurrence and arrangement of sensilla were compared between the larva and imago of the dragonfly. It is suggested that sensilla can be helpful in determining the homology of modified appendages." (Authors)] Address: Fudalewicz-Niemczyk, Wladyslawa, Department of Zoology and Ecology, Agricultural University, Al Mickiewicza 24/28, 30-059, Cracow, Poland

1713. Gassmann, D. (1999): Taxonomy and distribution of the inornata species-group of the Papuan genus *Idiocnemis* Selys (Odonata: Zygoptera: Platycnemididae). *Invertebrate Taxonomy* 13: 977-1005. (in English). ["The inornata species-group, a presumed monophyletic assemblage of species of the Papuan damsel-

damselfly genus *Idiocnemis* Selys, 1878, is revised with special regard to phylogenetically relevant morphological characters and the distribution of its species. Diagnoses of all nine previously described species are presented together with the description of two new species, *I. adelbertensis*, sp. nov. from northeast New Guinea and *I. australis*, sp. nov. from southern central New Guinea. Keys to males and females are provided. The male ligulae of all species were examined by using scanning electron microscopy. A diagnosis of the genus and a nomenclatural note on the family-group name *Calicnemiinae* Fraser, 1957 is included." (Author). *Idiocnemis inornata* Selys 1878, *I. strumidens* Lieftinck 1958, *I. huonensis* Lieftinck 1958, *I. kimminsi* Lieftinck 1958, *I. louisianensis* Lieftinck 1958, *I. leonardi* Lieftinck 1958, *I. zebrina* Lieftinck 1958] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o Naturalis (National Museum of Natural History), P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

1714. Geenen, S.; Jordaens, K.; De Block, M.; Stoks, R.; Gossum, H. van; De Bruyn, L. (1999): Een nieuwe voortplantingsplaats van *Sympecma fusca* (Vander Linden, 1820) in Vlaanderen. *Gomphus* 15(3): 111-117. (in Dutch with English summary). ["A new reproduction site of *Sympecma fusca* (Vander Linden, 1820) in Flanders, Belgium. During a population genetic study on *Lestes viridis*, we discovered a population of *S. fusca* in a pond located at the University of Antwerp (UIA, Wilrijk). This population is a new site in Flanders where the species reproduces since we were able to capture 30 larvae. Recent data indicate that *S. fusca* is possibly recovering from a strong decline since 1950. The warm summers of the recent years possibly enables this holomediterranean species to reproduce in our regions. This study further shows that molecular techniques are a useful tool to discriminate between morphologically highly similar species." (Authors) In a tab. the "Nei genetics distances" (Nei, M., 1978, *Genetics* 89: 583-590) between different investigated populations of *Sympecma fusca* and *Chalcolestes viridis* are presented.] Address: Geenen, Sofie, Koninklijk Belgisch Instituut voor Natuurwetenschappen, Vautierstraat 29, 1000 Brussel, Belgium

1715. Goffart, P. (1999): Compte-rendu de l'excursion sur l'Ourthe moyenne, de Hotton à Noisieux du dimanche 27 juin 1999. *Gomphus* 15(3): 139-141. (in French with Dutch summary). [The river Ourthe, Belgium famous for its population of *Oxygastra curtisii* was surveyed using canoes. *Calopteryx splendens*, *C. virgo*, *Platynemis pennips*, *Onychogomphus forcipatus*, and *Gomphus pulchellus* could be observed. *O. curtisii* was extremely rare this day.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

1716. Gorb, S.N. (1999): Serial elastic elements in the damselfly wing: Mobile vein joints contain resilin. *Naturwissenschaften* 86(11): 552-555. (in English). ["Two main types of joints occur in the damselfly wing: mobile and immobile. Some longitudinal veins (RP2⁻, RP3&4⁻, and MP⁻) are elastically joined with cross veins, whereas other longitudinal veins (1R1⁺, 1R2⁺, MA⁺, CuA⁺) are firmly joined with cross veins. In this study we mapped the distribution of serial elastic elements in the wing. The occurrence of resilin, a rubberlike protein, in

mobile joints suggests that the automatic twisting mechanism of the leading edge by aerodynamic force works not by flexibility but by the elasticity of these joints. First, it should result in elastic energy storage in the distal areas of the wing. Second, serial elastic elements of wing presumably act as dampers of an aerodynamic force, which are responsible for gradual twisting of the leading edge." (Author) *Enallagma cyathigerum*] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

1717. Guiliazova, E.V. (1999): Effects of environmental pollution on the nestling diet of Pied Flycatcher *Ficedula hypoleuca* on the Kola Peninsula, Russia. *Vogelwelt* 120, Suppl.: 371-374. (in English). [Nesting diet differed between the two surveyed sites (heavy and less polluted). Odonata were not preyed but were present in random samples of invertebrates available as potential prey to Pied Flycatchers in frequencies between 1.12 to 3.23 %.] Address: Guiliazova, Elena, Lapland Biosphere Reserve, Zeleny, 8, 184280 Monchegorsk, Murmansk reg., Russia. E-mail: root@zap.mgus.murmansk.su

1718. Hämäläinen, M.; Prashanth-Mohanraj, Veenukumari, K. (1999): Additions to the odonate fauna of the Andaman and Nicobar Islands, Indian Ocean. *Notul. odonatol.* 5(3): 27-29. (in English). [Nine species are recorded for the first time from the Andaman and Nicobar islands, of which *Neurothemis r. ramburii* and *Zyxomma obtusum* are new for the fauna of the territories of the Indian Union. New species for the fauna of each of the 2 island groups are also presented.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

1719. Harthun, M. (1999): Der Einfluss des europäischen Bibers (*Castor fiber albus*) auf die Biodiversität (Odonata, Mollusca, Trichoptera, Ephemeroptera, Diptera) hessischer Bäche. *Limnologica* 29(4): 449-464. (in German with English summary). ["Due to the return of the beaver an increasing number of brooks become restored to a natural condition. It is characterized by an alternation of flowing and standing sectors. In the summer of 1995, different groups of organisms (Odonata, Mollusca, Trichoptera, Ephemeroptera, Diptera) of two brooks in the Spessart mountains (Hesse, Germany) were studied to compare the composition of invertebrates in beaver homeranges and in the non-influenced sectors above. The new living conditions resulted in the disappearance of some species (*Drusus anulatus*, *Trich.*, *Sericostoma personatum*, *Trich.*, *Radix peregra*, *Gastr.*). Nevertheless the beaver homeranges accommodate a significant higher number of species of dragonflies and damselflies, molluscs and caddisflies than the brooks above the homeranges. The heterogeneity of natural river systems make a coexistence of running water and silent water organisms possible. The examinations result in a significant higher group dominance of ephemeras (i.p. *Cloeon dipterum*) in a beaver pond than in lenitic sectors conditioned by the gradient without beaver influence. Here the dominance of chironomids was much higher. High current sectors with their characteristic organisms are also present in the beaver homeranges. The higher number of insects is the basis of nourishment for predatory insects and fishes. The potential effects of beaver ponds on fishes are discus-

sed." (Author)] Address: Harthun, M., Landesverband Hessen e.V., Naturschutzbund Deutschland (NABU), D-35531 Wetzlar, Germany

1720. Hiratsuka, K. (1999): Odonata of Horonobe-cho, north of Rumoi District. Bulletin of the Hokkaido Odonatological Society 11: 2-4. (in Japanese). [Ten odonate taxa are reported from four localities in Horonobe-cho, Japan. *Nehalennia speciosa*, *Aeshna nigroflava*, *Coenagrion lanceolatum*, *C. ecornutum*, *Cordulia aenea amurensis*, *Lestes dryas*, *L. sponsa*, *Sympetrum risi*, *Cercion calamorum*, *Enallagma boreale circulatum*] Address: not translated

1721. Hiratsuka, K. (1999): *Sympetrum frequens* caught at Mt. Hachiken-zan, Sapporo. Bulletin of the Hokkaido Odonatological Society 11: 1. (in Japanese). [A specimen of *S. frequens* in which the black stripes on the lateral sides of pterothorax looks like those of *Sympetrum danae* is figured] Address: not translated

1722. Hochkirch, A. (1999): Libellen und Heuschrecken eines Militärgeländes bei Bremen (Tanklager Farge). Abhandlungen des Naturwissenschaftlichen Vereins von Bremen 44(2-3): 803-818. (in German with English summary). ["During summer 1997 Odonata and Orthoptera were mapped at an army site in Bremen ("Tanklager Farge"). Thirty Odonata species and eight Orthoptera species were found. Twenty-three of the Odonata species were indigenous, five more were assumably indigenous, too. Two species were only recorded by single specimens. Ten of the Odonata species are listed in the red data book for Bremen and Lower Saxony. Species of peat bogs, heath pods and pioneer species have a high value for conservation efforts. The waters "Farger Heidetümpel" (25 species) and fire protection pond 4 (26 species) have the highest importance for those Odonata. [...]"] (Author)] Address: Hochkirch, A., Abt Evolutionsbiologie, FB 2: Biologie/Chemie, Institut für Ökologie und Evolutionsbiologie, Universität Bremen, D - 28334 Bremen, Germany. E-mail: axelhoch@uni-bremen.de

1723. Hoekstra, J.D.; Smith, R.L. (1999): Descriptions of the final instar larvae of *Argia sabino* Garrison and *Argia pima* Garrison (Odonata: Coenagrionidae). Proc. entomol. soc. Washington 101(84): 887-896. (in English). ["We illustrate and describe the final instar larvae of *Argia sabino* Garrison 1994 and *Argia pima* Garrison 1994 based on preserved exuviae and larvae from Sabino Creek, Arizona, U.S.A. A dichotomous key is provided to integrate *A. sabino* and *A. pima* into an existing larval key to North American *Argia* spp." (Authors)] Address: Smith, R.L., Department of Entomology, University of Arizona, Tucson, AZ 85721, USA. E-mail: bob.smith@ag.arizona.edu

1724. Hoekstra, J.D.; Garrison, R.W. (1999): Range extension of *Palaemnema domina* Calvert (Odonata: Platystictidae) to southeastern Arizona, U.S.A.: a new odonate family for the United States. Proc. entomol. Soc. Washington 101(4): 756-759. (in English). ["The occurrence of a population of *Palaemnema domina* Calvert in south-eastern Arizona, U.S.A. extends the known northern range limit of this species from Chihuahua, Mexico. It is the first record of the Platystictidae for the United States. Notes on adult perching habits" in humid, dark, cave-like riparian roosting sites "and a brief habitat description are provided." (Authors)] Address: Hoekstra, J.D., Illinois Natural History Survey,

Center for Aquatic Ecology, 607 E. Peabody Dr., Champaign, IL 61820, U.S.A. E-mail: hoekstra@inail.inhs.uiuc.edu

1725. Ichijo, N.; Takahashi, T.; Izumiura, H.; Ohta, A.; Kawamura, E.; Takiuchi, S. (1999): Larval assemblage of Odonata in an artificial pond near Lake Harutori, Kushiro City. Sylvicola 17: 13-17. (in Japanese with English translation of the title). A total of 1163 larvae of twenty odonate species were collected from 1994 to 1999, among them *Aeshna nigroflava* and *Epiheca bimaculata* were most abundant. Possible influence of (fish) predators and vegetation structure are briefly discussed] Address: Kushiro Koryo Senior High School, Midorigaoka, Kushiro, 085, Japan

1726. Kano, K.; Hirose, Y. (1999): *Orthetrum triangulare melania* (Selys) inhabiting spas of the northern district. Gekkan-Mushi 341: 16-17. (in Japanese). [*Orthetrum triangulare melania* is distributed widely in Japan, but in Hokkaido the species occurs on the northern limit of its distribution. ["We found that the localities surveyed in Hokkaido were all located at spas" (hot springs). (taken from DJOSC 10)] Address: Kanou, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

1727. Kenner, R.D. (1999): First Canadian breeding record for *Tanypteryx hageni*. Argia 11(4): 15-16. (in English). [Cypress Provincial Park, West Vancouver, September 1, 1999] Address: Kenner, R., Spencer Entomological Museum, Dept Zoology, University of British Columbia, Vancouver, BC, Canada V6T 1Z4. E-mail: kenner@zoology.ubc.ca

1728. Knijf, G. de (1999): Invasie van *Anax parthenope* (Selys) in België in 1999. Gompheus 15(3): 119-129. (in Dutch with English and French summary). ["Invasion of *Anax parthenope* (Selys) in Belgium in 1999. - With a total of 16 observations from 8 different localities, an invasion of *A. parthenope* was recorded in 1999 in Belgium. An overview of all data from *A. parthenope* in Belgium is given. In 1999 two influx can be distinguished. A first one occurred at the end of May / beginning of June and a second in the first weeks of July. The first individuals were observed two days earlier in the southern, Walloon part than in Flanders. As in previous years nearly no females were seen in 1999. All Belgium localities are medium to big sized ponds well exposed to the sun and sheltered from wind. Nearly all localities are situated along the border with France. On two localities, species were observed in 1998 and in 1999. Until now no proof of successful reproduction exists for Belgium." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

1729. Knijf, G. de (1999): Verslag van de excursie naar Mol-Postel op zaterdag 21 augustus 1999. Gompheus 15(3): 134-136. (in Dutch with French summary). [Report from a trip to the Mol-Postel region, Belgium with records of *Sympetrum depressiusculum*, *S. pedemontanum*, *Somatochlora metallica*, *Orthetrum coerulescens*, *Aeshna juncea*, *Ceriagrion tenellum*, and *Cercion lindenii*.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

1730. Kosterin, O.E. (1999): Fauna of Dragonflies (Odonata) of the Daurkii State Nature Reserve and its

surroundings. Insects of Dahuria and adjacent territories. Proceedings of the Dahurskii State Biosphere Nature Reserve. Vol. II. Novosibirsk: 5-40. (in Russian with English summary). ["Dragonflies of the Daurkii State Nature Reserve and the surroundings of the village Nizhnii Tsasuchei, where its office is situated, were observed and collected in 1995 - 1997. The region studied is briefly characterized. An annotated list of species contains a full reference to the specimens collected, notes on biotope preferences and relative abundance of species, for some species systematic notes and data on variation are given. Earlier 17 species were reported for this territory, now their number have risen to 31. Among them the Manshurian species *Cercion v-nigrum* Needham and *Anisogomphus maackii* Selys, thought to range westwards up to Blagoveshchensk only, were found out. *Anax parthenope* Selys and *Pantala flavescens* Fabricius proved to be present in Transbaikalia. A Chinese/Mongolian species *Ophiogomphus spinicornis* Selys is for the first time reliably reported for the Russian territory. Small dragonfly collections made in July 1996 on the territory of the adjacent Mongol Daguur Natura Reserve (Mongolian People's Republic) are also considered. Dragonfly faunas of Transbaikalia, Mongolian People's Republic and the NW part of Inner Mongolia (China) are compared preliminarily." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

1731. Kreuzweiser, D.P.; Capell, S.S.; Scarr, T.A. (1999): Acute lethal and sublethal effects of a neem-based insecticide on nontarget aquatic insects in stream channels. *Bulletin of Environmental Contamination & Toxicology* 63(3): 365-371. (in English). [Extracts from seeds and leaves of the neem tree, *Azadirachta indica*, express insecticidal activity against a broad range of insect pests. The primary active ingredient in neem extracts is the triterpenoid, azadirachtin. Because several common forest pests are among the most susceptible insects to azadirachtin, the use of neem-based insecticides in Canadian forest pest management programs is being investigated. Insecticide applications to forests may result in some of the product entering nearby water bodies and it is therefore important to ensure that these insecticides do not pose a risk of adverse effects on aquatic organisms. Small streams are particularly susceptible to contamination by runoff from adjacent sprayed areas because of low dilution potential, and from inadvertent overspray because they are difficult to avoid during aerial applications. The authors investigated the potential for adverse effects on stream insects by applying a neem-based insecticide to outdoor stream channels and measuring acute lethal and sublethal responses. Experiments were conducted at the Icewater Creek Research Area, 50 km north of Sault Ste. Marie, Ontario, Canada. In a laboratory study, at a concentration of 0.84 mg/L azadirachtin, only the stonefly *Isogenoides* sp. exhibited a drift rate (64%) that was significantly different from controls. At concentrations of 0.28 mg/L azadirachtin the drift was not significantly different from controls. Survival of *Isogenoides* sp., the mayfly *Isonychia bicolor/rufa*, and the caddisfly *Hydropsyche bifida/recurvata* were negatively affected by exposure to the maximum test concentration of 0.84 mg/L azadirachtin. Nor drift rate nor mortality of *Ophiogomphus* sp. was affected by azadirachtin.] Address: Kreuzweiser, D.P., Canadian Forest Service,

Great Lakes Forestry Centre, 1219 Queen Street East, Sault Ste. Marie, Ontario, Canada P6A 5M7.

1732. Krotzer, S. (1999): *Erythemis vesiculosa* (Fabricius), Great Pondhawk, new for Alabama. *Argia* 11(4): 7-8. (in English). [Alabama, USA, Grand Bay Savanna Nature Preserve, August 14, 1999] Address: Krotzer, S., 6010 Woodvale Drive, Helena, AL 35080, USA. E-mail: smjkrotzer@aol.com

1733. Lang, C. (1999): Zur Biologie und Mikrohabitatwahl der Larven von *Cordulegaster heros* Theischinger, 1979 und *Cordulegaster bidentata* Selys, 1843 (Insecta: Odonata) im Weidlingbach (Niederösterreich). Diplomarbeit, Formal- und Naturwissenschaftliche Fakultät der Universität Wien. 97 pp. (in German with English summary). ["Between May 1997 and April 1998, the biology and ecology of larvae of *Cordulegaster heros* and *C. bidentata* were examined in the catchment area of the Weidlingbach (Lower Austria). A total of 688 *C. heros* and 314 *C. bidentata* larvae at 12 sampling sites were collected, measured biometrically (caput width, whole length, length of tibia, mentum and wing pad, and mentum width), and their occurrence related to physical and chemical parameters. With increasing developmental stage, *C. heros* larvae are larger than *C. bidentata*, and females larvae are bigger than males. The last five of a total of 14 stages (DOMBROWSKI, 1989) are particularly well delimited from each other in both species. Applying the rule of DYAR reveals an exponential increase in caput width per developmental stage. A life cycle diagram shows that larval development from stage F-4 to F-1 takes place within a year. The last molt to F occurs in autumn. The larvae hibernate in stage F until they leave the larval developmental cycle by imaginal ecdysis in late May to early June. Certain differences were recorded between *C. heros* and *C. bidentata* in connection with hydrological parameters. *C. heros* larvae tolerate higher velocities and water depth than *C. bidentata*, which counteract drift by burrowing into the sediment. Especially earlier, smaller developmental stages of *C. bidentata* often colonize microhabitats at the margin of the brook with low velocity and shallow water depth. A high negative correlation was found between water depth and water temperature, enabling the larvae to avoid freezing in winter. In general the larvae are exposed at right angles to the current; the stronger the current (> 5 cm/s), the less sectional area the animals expose to the current. The preference for coarse sediment increases with developmental stage, except the last instar, where the trend reverses. *Cordulegaster* larvae are mostly found totally burrowed and lying in wait, exposing only the antennae and the anal pyramid. Smaller individuals, which settle zones with weaker current, are uncovered or less covered with sediment than larger animals colonizing sites with higher velocity. In winter, at low water temperature, most of the animals are totally covered with sediment; about the half the *C. heros* larvae (n = 36) were burrowed as deep as 4 cm. Prior to imaginal emergence, most *Cordulegaster* larvae apparently stay in moist mud outside the water (1-69 cm) for physiological transformation to the adult. Generally, *C. heros* and *C. bidentata* are able to syntopically colonize a brook because of overlapping ecological valences. *C. bidentata* prefers smaller waters with slower flow, higher conductivity and water hardness than *C. heros*. This preference is also reflected in the different abundance of both species at sampling sites PI to PI 2. PI 1 and P 12 are outside both ecological va-

lences because of the high flow ($> 0,03 \text{ m}^3\text{s}^{-1}$) and great depth ($> 19 \text{ cm}$); consequently, they do not serve as a breeding water for *Cordulegaster*." (Author)] Address: Lang, C. c/o Waringer, J., Fachrichtung Biologie, Formal- und Naturwissenschaftliche Fakultät der Universität Wien, Wien, Austria

1734. Lauder milk, E. (1999): Carl Cook receives Kentucky award. *Argia* 11(4): 2. (in English). [C. Cook was selected for the Biodiversity Protection Award of the Kentucky State Nature Preserves Commission, USA.] Address: Lauder milk, E., 570 Catalpa Lane, Shelbyville, KY, 40065, USA.

1735. Léonard, N.J.; Forbes, M.R.; Baker, R.L. (1999): Effects of a mite, *Limnochares americana* (Hydrachnida: Limnocharidae), on the life-history traits and grooming behaviour of its damselfly host, *Enallagma ebrium* (Odonata: Coenagrionidae). *Can. J. Zool.* 77: 1615-1622. (in English). ["We examined whether experimental parasitism by a mite *L. americana* (Lundblad) affected survivorship and maturation of adult damselflies *E. ebrium* (Hagen). We then tested whether differences in grooming activity between control and exposed individuals (within different age or sex categories of host) mirrored reductions in fitness that resulted from experimental parasitism. We based our choice of experimental numbers of mites on our finding that adult damselflies had between 0 and 12 mites (71% had 0 mites), and mature adults had a higher prevalence and intensity of parasitism than did prereproductive damselflies in two of three field surveys. Low numbers of mites did not affect survivorship of teneral or mature males and females: however, high numbers of mites significantly depressed survivorship of teneral males and females and mature males, and were associated with a delay in maturation of females of teneral individuals, only females groomed more than controls when challenged with low numbers of mites: mature individuals of both sexes groomed more than controls in response to high numbers of mites but not in response to low numbers. Our results suggest that variation in grooming behaviour partially reflects variation in fitness costs, due to mite parasitism, across age and sex categories of hosts." (Authors)] Address: Forbes, M.R., Department of Biology, 2240 Herzberg Laboratories, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

1736. Machado, A.B.M. (1999): Studies on neotropical Protoneuridae. 9. *Phasmoneura ciganae* Santos, conspecific with *Phasmoneura sancta* (Hagen) comb. n. (Zygoptera). *Notul. odonatol.* 5(3): 37-38. (in English). [Detailed discussion of the synonymy of *Forcepsioneura sancta* (Hagen in Selys, 1860).] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

1737. Marden, J.; Fitzhugh, G.H.; Wolf, M.R.; Arnold, K.D.; Rowan, B. (1999): Alternative splicing, muscle calcium sensitivity, and the modulation of dragonfly flight performance. *Proceedings of the National Academy of Sciences of the United States of America* 96(26): 15304-15309. ["Calcium sensitivity of myosin cross-bridge activation in striated muscles commonly varies during ontogeny and in response to alterations in muscle usage, but the consequences for whole-organism physiology are not well known. Here we show

that the relative abundances of alternatively spliced transcripts of the calcium regulatory protein troponin T (TnT) vary widely in flight muscle of *Libellula pulchella* dragonflies, and that the mixture of TnT splice variants explains significant portions of the variation in muscle calcium sensitivity, wing-beat frequency, and an index of aerodynamic power output during free flight. Two size-distinguishable morphs differ in their maturational pattern of TnT splicing, yet they show the same relationship between TnT transcript mixture and calcium sensitivity and between calcium sensitivity and aerodynamic power output. This consistency of effect in different developmental and physiological contexts strengthens the hypothesis that TnT isoform variation modulates muscle calcium sensitivity and whole-organism locomotor performance. Modulating muscle power output appears to provide the ecologically important ability to operate at different points along a tradeoff between performance and energetic cost." (Author)] Address: Marden, J.H., Dept Biol., Pennsylvania St. University, 208 Mueller Laboratory, University Park, PA 16802, USA

1738. Marino, P.I.; Ellenrieder, N. von (1999): New records of *Forcipomya* (*Pterobosca*) *incubans* (Macfie) (Diptera: Ceratopogonidae) on Libellulids (Anisoptera). *Notul. odonatol.* 5(3): 38-39. (in English). [Argentina; *F. incubans* was found parasitic on *Miathyria marcella* and *Erythrodiplax melanorubra*.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

1739. Marinov, M. (1999): *Chalcolestes parvidens* (Artoboleviski) and *Somatochlora meridionalis* Nielsen in Bulgaria (Zygoptera: Lestidae; Anisoptera: Corduliidae). *Notul. odonatol.* 5(3): 31-33. (in English). [The occurrence of the two species is documented in a tab. with detailed recording data and presented in distribution maps.] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

1740. McPeck, M. (1999): Biochemical evolution associated with antipredator adaptation in damselflies. *Evolution* 53(6): 1835-1845. (in English). ["Previous studies have shown that at least two lineages of *Enallagma* damselflies (Odonata: Coenagrionidae) shifted from inhabiting lakes with fish as top predators to inhabiting ponds and lakes with large dragonflies as the top predators. In adapting to living with the new predator type, these lineages evolved much greater swimming speeds to avoid attacking dragonflies. In this paper, I test whether biochemical adaptations to fuel swimming arose in concert with previously identified morphological changes that increase swimming speed. I assayed the mass-specific enzyme activities of three enzymes involved in fueling strenuous activity: pyruvate kinase and lactate dehydrogenase (enzymes involved in glycolysis) and arginine kinase (the enzyme that recharges the ATP pool). Enzyme activities were determined for 14 *Enallagma* species from across the genus. Species that coexist with dragonfly predators had significantly higher mass-specific arginine kinase activities than species that coexist with fish. and the results of evolutionary contrasts analyses indicate that this difference between the two groups is the result of evolutionary change associated with the habitat shifts of lineages from fish lakes to dragonfly lakes. Although significant evolution was documented for lactate dehydrogenase and pyru-

vate kinase across the genus, evolutionary change in the activities of these enzymes was not consistent with adaptation to coexisting with dragonfly predators. Swimming bouts to avoid dragonfly predators last for only a few seconds, and the action of arginine kinase to phosphorylate ADP to make ATP will extend the duration of maximal exertion for swimming for a few seconds. However, much longer time periods (over 45 sec) are required to generate ATP via glycolysis. Therefore, selection may have favored adaptation only at the arginine kinase locus." (Author)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

1741. Miller, M.N.; Fincke, O.M. (1999): Cues for mate recognition and the effect of prior experience on mate recognition in *Enallagma damselflies*. *Journal of Insect Behavior* 12(6): 801-814. (in English). ["In many coenagrionid damselflies, sexually mature females exhibit color polymorphisms, with some females resembling conspecific males. Although it has been suggested that the latter function as male mimics, this does not appear to be the case for those in the genus *Enallagma*. We found that sexually dimorphic coloration of the female abdomen and thorax are important cues for sexual recognition by males. We demonstrate for the first time in the Odonata, that males learn to recognize andromorphs as potential mates. After 2 days in an enclosure, sexually mature males exposed to only andromorphic females initiated more sexual interactions with tethered andromorphs than with heteromorphs, the majority morph in the natural population. Exposure to only heteromorphic females tended to decrease males' sexual responses to andromorphs, but not significantly so. Because the frequency of female morphs often varies within a population, learned mate recognition would be advantageous for males that search for mates. Our results lead to a novel, frequency-dependent hypothesis for the occurrence and maintenance of female-limited color polymorphisms." (Authors)] Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA

1742. Mitra, A. (1999): Two new odonate records for the western Himalaya, India (Anisoptera: Macrodiplacidae, Libellulidae). *Notul. odonatol.* 5(3): 39. (in English). [*Urothemis signata*, *Diplacodes lefebvrei*] Address: Mitra, A., Northern Regional Station, Zoological Survey of India, 218 Kaulagarh Roads, Dehra Dun - 248195, India

1743. Mola, L.M.; Papeschi, A.G.; Taboada Carrillo, E. (1999): Cytogenetics of seven species of dragonflies. novel sex chromosome determining system in *Micrathyrina unguolata*. *Hereditas* 131: 147-153. (in English). ["More than 80% of the taxonomically described species of Anisoptera (Odonata) belong to the families Libellulidae and Aeshnidae. Here the chromosome complement and male meiotic behaviour of seven species of dragonflies of these families are analysed. *Anax amazili* and *Coryphaeschna perrensi* are $2n = 27$, $n = 13+X$, which is characteristic of Aeshnidae. Within Libellulidae, *Planiplax erythrogyga*, *Micrathyrina spuria*, and *M. hesperis* have $2n = 25$, $n = 12+X$, which corresponds to the modal chromosome number of the family. *Oligoclada laetitiae* and *M. unguolata*, on the other hand, have a reduced chromosome complement ($n = 11 + X$ and $n = 10 + X1X2Y$, respectively). In *Micrathyrina unguolata* an $X1X2Y$ sex chromosome system is described, and its origin is discussed. This represents a new sex chromo-

some determining system in the order Odonata." (Author)] Address: Mola, Liliana, Genetica. Depto. de Cs. Biológicas, Fac. Cs. Exactas y Naturales, Univ. de Buenos Aires, Ciudad Universitaria, 1428 Buenos Aires, Argentina. E-mail: limola@bg.feen.uba.ar

1744. Monnerat, C. (1999): Premières observations de *Anax imperator* Leach et *Orthetrum cancellatum* (L.) pour Chypre (Anisoptera: Aeshnidae, Libellulidae). *Notul. odonatol.* 5(3): 34-35. (in French with English abstract). [From four localities, visited in early May 1998, 11 species are recorded. *A. imperator* and *O. cancellatum* are listed as new to Cyprus. The occurrence of *Pantala flavescens* is remarkable too.] Address: Monnerat, C., Laboratoire de Phanérogamie, Université de Neuchâtel, Rue Emile-Argand 11, CH-2007 Neuchâtel, Switzerland

1745. Müller, H. (1999): Zur Phänologie und Ökologie der Imagines von *Cordulegaster heros* Theischinger, 1979 und *Cordulegaster bidentata* Selys, 1843 (Insecta: Odonata) im Weidlingbach (Niederösterreich). *Diplomarbeit, Formal- und Naturwissenschaftliche Fakultät der Universität Wien*. 90 pp. (in German with English summary). ["Between June and August in 1997 and 1998 the biology and ecology of the Odonata species *Cordulegaster heros* and *C. bidentata* were examined in the catchment of the Weidlingbach (Lower Austria). Four main sampling sites with a length of respectively 100 m were visited regularly and eight secondary sampling sites, which were patrolled for mapping, were selected. A total of 89 individuals of *C. heros* and 23 of *C. bidentata* of both sexes were measured biometrically (wingspan, forewing, hindwing, total length). *C. heros* is clearly larger and this species can therefore be delimited taxonomically from the *C. boltoni* and *C. picta*. *C. bidentata* coincides both biometrically and regarding its species-specific black-yellow pattern with existing bibliographical data (e. g. ASKEW, 1988). Both odonates belong to the late spring species because of their short emergence period between late May and early June; on average, *C. bidentata* appears seven days earlier than *C. heros*. For imaginal emergence, larvae select vegetational structures directly next to the brook at a horizontal distance of 2.3 - 3.0 m and at an average height of 1.2 - 1.5 m. Sites with certain substructures (twigs, leaves, branch stigmata) at the hatch site are preferentially sought out. After a maturation period of about two weeks, during which the dragonflies also colonize sites far from the brook, the sexually mature imagines return to their breeding waters. *C. bidentata* males largely patrol smaller brooks with a maximal width of 200 cm. The main flying direction over the water is upstream; the males return to the starting point in rapidly flight over land. *C. heros* males overfly brooks with a maximum width of 350 cm and patrol the water both upwards and downwards in the same frequency. Changes in flight direction are caused by barriers such as debris dams or bushes projecting over the brook. A positive correlation was found between flight height and water width as well as with the number of barriers in the water. Such patrol flights can be distinguished from hunting flights based on higher flying speed and larger distance from the surface. Moreover, there is a correlation between unfavorable meteorological conditions and inactivity of the imagines of *C. heros* and *C. bidentata*. Females located by males during patrol flights are grasped and taken into the bank vegetation for subsequent copulation (> 40 min). After copula, the females search for shallow,

search for shallow, less flooded sites (max. depth 4 cm) to deposit the eggs into the sediment with their robust ovipositor. Flying speed and flight height coincide with those of patrolling males. The frequency of oviposition is ca. 1-2 per second and more than 100 holes may be made at suitable sites. The "Cordulegaster-Ophiogomphus-coenosis" defined by JACOB (1959) could not be verified at the Weidlingbach." (Author)] Address: Müller, Heidemarie c/o Waringer, J., Studienrichtung Biologie, Formal- und Naturwissenschaftliche Fakultät der Universität Wien, Wien, Austria

1746. Müller, J. (1999): 7.24 Bestandsentwicklung der Libellen (Odonata). In: Frank, D. & V. Neumann (Hrsg.): Bestandssituation der Pflanzen und Tiere Sachsen-Anhalts. Ulmer Verlag, Stuttgart. ISBN 3-8001-3368-7: 442-448. (in German). [Short introduction into current odonatological research in the Federal State Sachsen-Anhalt, Germany; comments on some species with reference to their status: *Calopteryx splendens*, *C. virgo*, *Lestes barbarus*, *Coenagrion mercuriale*, *Aeshna affinis*, *A. viridis*, *Anax parthenope*, *Cordulegaster boltonii*, *Stylurus flavipes*, *Gomphus pulchellus*, *G. vulgatissimus*, *Ophiogomphus cecilia*, and *Orthetrum coerulescens*; bibliography; checklist of the Odonata of Sachsen-Anhalt.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. jmueller@mu.lsa-net.de

1747. Mungenast, F. (1999): Aus der Nordtiroler Odonatenfauna: Die Libellen der Trams bei Landeck (Insecta: Odonata). Veröffentlichungen des Tiroler Landesmuseums Ferdinandeum 79: 317-326. (in German with English summary). [The Trams is a recreation park in the Landeck region, Austria. The Odonata of two ponds were surveyed in 1997 and 1998. A total of 22 species was recorded, reflecting a typical dragonfly cenosis of ponds: *Erythromma-Anax imperator*-cenose. The presence of *Erythromma najas* and *Chalcolestes viridis* in the region is of special faunistic interest.] Address: Mungenast, F., Stadtplatz 12, A-6460 Imst, Austria

1748. Nakatani, M.; Nakamura, N.; Tsuchiya, K. (1999): *Anax guttatus* was collected from the Nemuro Peninsula. *Sylvicola* 17: 9-11. (in Japanese with English translation of the title). [Japan; Collection data, photographs of the specimens and the habitat, and distribution map] Address: Sichou Koutaku, Meiji-machi 2-6, Nemuro city, 087-0003, Japan

1749. Nakatani, M.; Nakamura, N.; Tsuchiya, K. (1999): Discovery of *Ischnura elegans elegans* and re-discovery of *Cercion hieroglyphicum* in Lake Harutori, Kushiro City. *Sylvicola* 17: 1-8. (in Japanese with English translation of the title). [Japan; Collection data, photographs of the specimens and distribution map] Address: Sichou Koutaku, Meiji-machi 2-6, Nemuro city, 087-0003, Japan

1750. Nel, A.; Gand, G.; Fleck, G.; Bethoux, O.; Lapeyrie, J.; Garric, J. (1999): *Saxonagrion minutus* nov. gen. et sp., the oldest damselfly from the Upper Permian of France (Odonatoptera, Panodonata, Saxonagrionidae nov. fam.). *Geobios* 32(6): 883-888. (in French with English summary). ["*Saxonagrion minutus* nov. gen. et sp. was found in the Saxonian (Salagou Formation) of the Lodeve basin. It is the oldest and the first record of the modern infra-order Panodonata in the Palaeozoic (Upper Permian of France). The present discovery supports the hypothesis concerning the persistence of many groups of Odonatoptera through the Permo-Triassic

boundary." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

1751. Nel, A.; Gand, G.; Garric, J.; Lapeyrie, J. (1999): The first recorded protozygopteran insects from the Upper Permian of France. *Palaeontology* 42(1): 83-97. (in English). ["The earliest known Odonatoptera: Protozygoptera from the Upper Permian of Lodeve (France) are described. *Epilestes gallica* sp. nov. belongs to the Permolestidae and *Lodevia longialata* gen. et sp. nov. to the Permepallagidae. Both of these families were previously known from the Kazanian of Russia, suggesting a similar age for the formation of Lodeve." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

1752. Pix, A. (1999): Im Reich der Libellen. ISBN 3-933241-27-8: 192 pp. (in German). [This book is directed to the reader interested in these beautiful creatures, and not to the professional odonatologist. Readers will find interesting details on dragonflies, their habitats, and behaviour. The information presented is sound and well documented. The texts are easy to read. The strength of the book are the very good colour photographs from habitats and species. Each of the photographs is documented in an appendix. Most of the pictures were taken in the region South of the federal state Niedersachsen and north of the federal state Hessen, Germany.] Address: Krone-Verlag, Waldstr. 2a, D-42799 Leichlingen, Germany

1753. Polhemus, D.A.; Oppenheimer, H.; Starr, F.; Martz, K. (1999): Notable rediscoveries of Megalagrion species on Maui (Odonata: Coenagrionidae). *Bishop Museum Occasional Papers* 59: 27-29. (in English). [Among the species of endemic Megalagrion damselflies in Hawai'i, particular concern in recent years has centered on the fate of *M. pacificum* and *M. xanthomelas*, which formerly occupied lowland habitats throughout the state. ["Based on surveys conducted in the early 1990s, the former species was known to occur only as scattered populations on the windward flanks of Haleakala and eastern Moloka'i, while a distributional review of the latter species by Polhemus (1996) noted that it had not been taken on the island of Maui in this century. It is therefore significant that additional colonies of both these species have been located on Maui during the past two years"; these records are reported in this paper.] Address: Polhemus, D., Dept. of Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

1754. Prat, N.; Toja, J.; Sola, C.; Burgos, M.D.; Plans, M.; Rieradevall, M. (1999): Effect of dumping and cleaning activities on the aquatic ecosystems of the Guadiamar River following a toxic flood. *The sciences of the total environment* 242: 231-248. (in English). ["The main aim of the study was to document the recovery of the aquatic ecosystem after the release of toxic mining waste in the Guadiamar River Basin (Sevilla, SW Spain) in April 1998. Samples of water, plankton, periphyton and macroinvertebrates were taken once a month at nine sampling stations (six affected by the toxic release and three for control).[...] After 6 months of cleaning operations, in November 1998 the macroinvertebrate community of the river was composed mainly of species of short life cycles typical of ponds (Heteroptera,

ra, Coleoptera and Odonata ["Coenagrionidae"]), while typical riverine species found at the upstream control station had not recolonised the river due to the transformation of the river into a series of artificial ponds constructed as sediment traps. An analysis of variance showed significantly higher values ($P < 0.05$) for all heavy metals analysed (Zn, Cu, Pb, As, Cd, Sb, Tl) in plankton and macroinvertebrate communities from impacted sites. Values found in invertebrates were highly variable, with a mean concentration of the most abundant metals, Zn and Cu, between two and three times those found in unpolluted areas. Values for As were up to five times higher while Pb, Sb and Tl showed up to 10-fold increases. At the affected stations, the metal concentrations found in biofilms, plankton and particulate material were more than five times greater than those in invertebrates. The slow recovery of the aquatic ecosystem clearly reflected the impact of metal discharge and the subsequent cleaning activities following the mine spill, as well as the sewage inputs at two of the stations studied." (Authors)] Address: Prat, N., Department of Ecology, Universidad de Barcelona, Av. Diagonal 645, E-08028 Barcelona, Spain. E-mail: narcis@porthos.bio.ub.es (N. Prat)

1755. Ramos Hernandez, J.M. (1999): New records of Odonata for some provinces of the Dominican Republic. *Argia* 11(4): 6-7. (in English). [15 taxa are listed from the Dominican Republic.] Address: Ramos Hernandez, J.M., Apartado Postal 2204, Sancti-Spiritus, Cuba, CP 60100

1756. Riffell, S.K. (1999): Road mortality of dragonflies (Odonata) in a Great Lakes coastal wetland. *Great Lake Entomologist* 32(1/2): 63-73. (in English). ["Although road mortality of vertebrates has been well studied, road mortality of invertebrates has rarely been studied or considered in management scenarios. Mackinac Bay is an extensive coastal wetland in northern Michigan. It is bordered by a two-lane paved highway that separates the marsh, where dragonflies defend territories and breed, from the adjacent forest where dragonflies forage and rest. During mid-summer of 1997, daily collections of dragonfly corpses from the road and road edge were used to estimate daily mortality rates and sex ratios among casualties. Daily mortality was highly variable, ranging from 10 to 256 casualties per kilometer. Sex ratios among casualties were generally male-skewed (60% or higher). Life-history differences between the sexes present a parsimonious explanation for male-specific mortality. Mortality was even or female-skewed for some species, and impacts of road mortality may be more severe in populations where mortality is female-skewed. More research about the effects of roads on dragonflies is warranted because dragonfly populations are small relative to many invertebrates and are restricted to wetland habitats which are being degraded or destroyed in many regions." (Authors) 29 odonate taxa are considered in this study.] Address: Riffell, S.K., Department of Zoology, Michigan State University, East Lansing, MI 48824, USA

1757. Rolff, J.; Schröder, B. (1999): Regaining the water: a simulation model approach for *Arrenurus* larvae (Hydrachnellae) parasitizing damselflies (*Coenagrion puella*: Odonata). In: Bruin, J., L.P.S. van der Geest & M. Sabelis (Ed.) *Evolution and Ecology of Acari*, Kluwer Academic Publishers: 359-366. (in English). ["A matrix population model is presented which describes the po-

pulation dynamics and the return rate of parasitic *Arrenurus* larvae to the pond. This is a function of hosts' post-emergence life history and mating success. Three different aspects were simulated: a change in daily miteload, the impact of weather on hosts oviposition probability and a combination of both. It was found that a high abundance of larval water mites drastically reduces their return rate mites due to the high parasite-induced mortality of the hosts. Reduced oviposition probabilities of *Coenagrion puella* also decrease dramatically the number of mites detaching. The model may be applicable to other water-mite/host systems if the life-table data of the host are known."] Address: Rolff, J., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: j.rolff@tu-bs.de

1758. Rolff, J. (1999): Vom individuellen Verhalten zur Population: Ökologie eines Wirt-Parasit-Systems in Freiland und Modell (*Coenagrion puella*, Odonata, *Arrenurus cuspidator*, Acari). Dissertation, Technische Universität Carolo-Wilhelms Braunschweig: 95 pp. [Ph.D. on the host-parasite interaction of *Coenagrion puella* and *Arrenurus cuspidator*; the thesis is structured in German and English overviews and summaries, six chapters, acknowledgments, and list of publications. The chapters are published separately in different journals: Chap. 1: see OAS 206; Chap. 2: see OAS 1936; Chap. 3: see OAS 1757, Chap. 4: submitted, see next issue of OAS; Chap. 5: see OAS 1935; Chap. 6: see OAS 1419.]

1759. Schaetzen, R. de (1999): Compte rendu de l'excursion à l'ancien canal entre Ronquières et Seneffe du 13 juin 1999. *Gomphus* 15(3): 136-138. (in French with Dutch summary). [Of special interest is the record of the rare *Libellula fulva*; further Odonata observed and including *Erythromma najas* and *Gomphus pulchellus* are shortly commented] Address: not stated. E-mail: roland.deschaetzen@advalvas.be

1760. Schmid, U. (1999): Das Makrozoobenthos des Unteren Odertals - Faunenzusammensetzung und Besiedlungsdynamik in einer Flußäue. *Limnologie aktuell* 9: 317-336. (in German with English summary). ["The macrozoobenthos from nine sampling sites in the Lower Oder Valley (Brandenburg, Germany) was investigated from December 1993 to May 1997. Samples were collected from permanent water bodies of the former and the active floodplain and from the River Oder. Additional samples were taken from the alluvial plains. The area is flooded extensively every year. It is characterized by a high number of rare and endangered species. In summer, species composition in the active floodplain is similar to that of the former floodplain. In the active floodplain, the floodpulse causes a gradient of species composition during spate. With the flood, species of the running water enter the Alte Oder, an old arm of the river. Due to man-made regulation of the water regime, these species are confronted with unfavourable conditions in these water bodies. Numerous taxa of the macrozoobenthos have developed strategies to survive the alternation of flooding and desiccation, i.e. drought resistance, or recolonization during each flooding period by means of egg-laying, drift, or active migration." (Author). 20 odonate taxa are listed including a first record of *Gomphus pulchellus* in the Federal State of Brandenburg which urgently is in need to be confirmed. Although *Stylurus flavipes* is well represented along the Oder, it is not listed.] Address: Schmid, Ulrike, Freie U-

niversität Berlin, Inst. Zool., Königin-Luise-Str. 1-3, D-14195 Berlin, Germany

1761. Schmidt, E.; Woike, M. (1999): Rote Liste der in Nordrhein-Westfalen gefährdeten Libellen (Odonata) (3. Fassung, Stand 1.10.1998). Schriftenreihe der Landesanstalt für Ökologie, Bodenordnung und Forsten / Landesamt für Agrarordnung 17: 507-521. (in German). [Short introduction into dragonfly biology; remarks on nomenclature and categories of threat; remarks on mapping of dragonflies in Nordrhein-Westfalen, Germany; detailed remarks on threats and establishment of selected species; checklist of the dragonflies with assessment of the situation of threat in six different regions ("Großlandschaften") of Nordrhein-Westfalen] Address: Schmidt, E., Biologie und ihre Didaktik, FB9/S05, Universität GH Essen, D-45117 Essen, Germany

1762. Seidenbusch, R. (1999): Annotations in females types of *Ischnura aralensis* Haritonov, 1979 (Odonata: Coenagrionidae). Sulzbach-Rosenberger Libellenrundbriefe 11: 1-2. (in English). [Discussion of the relationships between *Ischnura aralensis* Haritonov, 1979, *I. haritonovi* Dumont, 1997, and *I. calicis* Bartenev nom. nud.. It is quite likely that *I. haritonovi* is *I. aralensis*. But further studies are needed.] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

1763. Seidenbusch, R. (1999): Description of two last instar larvae out of the genus *Gomphidia* (Odonata, Anisoptera, Gomphidae). Sulzbach-Rosenberger Libellenrundbriefe 11: 3-9. (in English). [One exuvia of a *Gomphidia* female had been collected in Kenia (Hunter's Lodge, on a shady brook) by H.U. Kohler. It was compared with five other exuviae out of the genus *Gomphidia* collected in Comol (Ivory Coast) by K. Grabow. First one is presumed belonging to *Gomphidia madi* Pinhey, 1961, the only species common there (Miller, 1991). Both specimens are described and compared with other members of the genus *Gomphidia* (*G. confluens*), *Ictinogomphus ferox* and *Lindenia tetraphylla*.] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

1764. Seidenbusch, R. (1999): Tandem-linkage structures in females of the genus *Enallagma* (Odonata: Coenagrionidae). Sulzbach-Rosenberger Libellenrundbriefe 11: 10-20. (in English). [The following species were examined: *Enallagma cyathigerum cyathigerum* (Germany), *E. cyathigerum antiquum* (E-Siberia), *E. cyathigerum annexum* (USA), *E. deserti* (Marocco), *E. risi* (Central-Asia), *E. belyshevi* (Kuriles Islands), *E. circulatum* (Japan), and *E. boreale* (USA, Canada). The synonymy of *E. antiquum* Malikova, 1995 is outlined on page 11. Some hypothetical remarks on the possible superspecies *E. cyathigerum* and/or *E. deserti* and/or *E. boreale* are made.] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

1765. Sirot, L.K. (1999): Reproductive behavior of two female morphs of the damselfly, *Ischnura ramburii*. *American Zoologist* 39(5): 23A. (in English).] Address: Sirot, L.K., Univ of Florida, Gainesville, FL USA

1766. Siva-Jothy, M. (1999): Book reviews: *Damsels and dragons. Dragonflies: Behaviour and Ecology of Odonata* by Philip S. Corbet. Harley: 1999. 882pp.. *Nature* 400: 634. (in English). ["... as one of the definitive

natural history texts of the twentieth century". For an extensive review see OAS 1565.] Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK. E-mail: m.siva-jothy@sheffield.ac.uk

1767. Siva-Jothy, M.T. (1999): Male wing pigmentation may affect reproductive success via female choice in a calopterygid damselfly (Zygoptera). *Behaviour* 136: 1365-1377. (in English). ["Male calopterygid damselflies show striking morphological and behavioural secondary sexual traits which are known to function in intrasexual contests. The distribution of pigment in the sexually dimorphic wing 'spot' is prominently displayed to the female during courtship, yet there is little empirical evidence that this trait functions in an epigamic context. Observations of marked field populations revealed (a) there was variation in wing pigment distribution in males, (b) the pigmentation was fixed in reproductively active males, (c) resource holding males had less heterogeneity in the distribution of the wing pigment than males that were never observed to hold a resource and (d) that females frequently (60,3%) rejected males after courtship. An experiment was conducted in which the frequency of key reproductive behaviours (female inspection flights, courtships, copulations, and oviposition) was measured for the same male utilising the same territory before and after treatment or control manipulation of wing pigment parameters. Increasing the heterogeneity (and decreasing the area) of the wing pigmentation by removing small areas of pigmented cuticle from their wings resulted in a decrease in the measured reproductive behaviours (control males that had non-pigmented areas removed from their wings showed no decreases). Since females cannot be coerced into these behaviours, the experimentally induced decrease suggests females avoided males with higher levels of wing pigment heterogeneity. The results are discussed in the context of the benefits females might receive as a consequence of their reproductive decisions." (Author)] Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK. E-mail: m.siva-jothy@sheffield.ac.uk

1768. Stoks, R.; De Block, M.; Van Gossum, H.; De Bruyn, L. (1999): Phenotypic shifts caused by predation: Selection or life-history shifts? *Evolutionary Ecology* 13(2): 115-129. (in English). ["Predators can impose both selection and life-history shifts in prey populations. Because both processes may affect phenotypic distributions, the estimates of selection differentials may be biased. We carried out two field experiments to disentangle these separate effects. We studied whether dragonfly predation by *Aeshna cyanea* changes the distributions in body size and lamellae morphology in the damselfly *Lestes sponsa*. Damselflies have caudal lamellae which are used in escapes by swimming. In a first experiment, we manipulated predator presence (No *Aeshna*, Encaged *Aeshna* or Free-ranging *Aeshna*) and stopped the experiment when all larvae had moulted once. In a second experiment, larvae were confronted with a Free-ranging *Aeshna* but collected before moulting, and survivors were compared with a control sample taken at the start of the experiment. The presence of *Aeshna* largely reduced the survival probabilities of the *Lestes* larvae at a very similar rate in both experiments. Daily survival probabilities did not differ between the No *Aeshna* and Encaged *Aeshna* treatments. In the Free-ranging *Aeshna* treatment of the first experiment,

size was reduced compared to the other two treatments, creating a significant apparent selection differential. This was probably mainly due to predator-induced reduced growth because in the second experiment, where growth effects were excluded, size of the survivors did not differ from the control sample. In both experiments there was a significant selection pressure for larger lamellae. Standardized directional selection differentials were similar in both experiments (0.57 and 0.28 phenotypic standard deviation units). No survival selection on lamellae shape was detected. These results are in agreement with previous findings that lamellae size, but not lamellae shape, enhances swimming performance and thereby predator escape in this species." (Authors)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. e-mail: stoks@ruca.ua.ac.be

1769. Sudo, S.; Tsuyuki, K.; Ikohagi, T.; Ohta, F.; Shida, S.; Tani, J. (1999): A study on the wing structure and flapping behavior of a dragonfly. JSME - International Journal, Ser. C. Mechanical systems, machine elements and manufacturing: 721-729. (in English). [Wing structure and aerodynamic characteristics of a dragonfly in flight (*Sympetrum infuscatum*, *S. frequens*) are studied. The structural properties of dragonfly wings were characterised by morphological parameters using scanning electron microscopic observation. Dragonflies were examined in a small low-turbulence wind tunnel. For measurements of wing flapping, an optical displacement detector was used to measure the displacement of the dragonfly wing. In the experiment on the measurements of the velocity fluctuation, a hot-wire anemometer was used to measure the velocity field. The spectrum of dragonfly flight was revealed by the measurements of velocity fluctuation.] Address: Sudo, S., Dept of Mechanical Engineering, Iwaki Meisei University, Iino 5-5-1, Chuohdai, Iwaki 970-8551, Japan. E-mail: sudou@iwakimu.ac.jp

1770. Wakeham-Dawson, A.; Benton, T.; Barnham, V. (1999): Butterflies and dragonflies in northern Greece, 27 June - 9 July 1997. Entomologist's Record & Journal of Variation 111(3): 121-128. (in English). [The following note on Odonata is made: "We explored Mount Falakrón (north-west of Drama) on 6 July. Along a small stream at 600 m, we found many Odonata including *Calopteryx splendens* Harris, *Platycnemis pennipcs* Pallas, *Anax imperator* Leach, *Orthetrum brunneum* Fonscolombe and a fine species of damselfly, *Epallage fatime* Charpentier (Fig. 3). This damselfly is similar to *Calopteryx* spp., and we saw several males, which had a blue abdomen and clear wings with smoky black tips. They settled on twigs or stream-edge vegetation and behaved rather like darter dragonflies when in pursuit of insect prey."] Address: Wakeham-Dawson, A., Mill Laine Farm, Lewes, East Sussex, UK

1771. Walia, G.K.; Sandhu, R. (1999): Karyological investigation on *Davidius zallorencis zallorencis* (Gomphidae: Anisoptera: Odonata). Chromosome Science 3 (1): 43-44. (in English). ["Chromosome analysis on a cytologically new species *Davidius zallorencis zallorencis* belonging to the family Gomphidae has been carried out. The diploid chromosome number is 23, without m chromosomes. Sex determining mechanism is XO-type, showing sex element as the smallest one. Structure and behaviour of chromosomes during mitosis and

mitosis and meiosis has been studied and the recombination index and relative lengths of chromosomes has also been calculated." (Authors)] Address: Walia, G.K., Department of Zoology, Punjabi University, Patiala, PU, 147 002, India

1772. Walia, G.K.; Sandhu, R. (1999): Karyotypic study of two species of the family Aeschnidae (Anisoptera: Odonata). Chromosome Science 3(1): 45-47. (in English). ["Spermatogonial and primary spermatocyte chromosomes of *Anaciaeschna jaspidea* and *Anax nigrofasciatus nigrolineatus* [...] from Punjab and Himachal Pradesh, India, have been described and illustrated. The former species possess the chromosome number of $2n_{male}=25$, $n_{male}=13$, while the latter species reveal $2n_{male}=27$, $n_{male}=14$ with XO sex determining mechanism. The diploid number in both the species include a pair of m chromosomes. The sex elements are the smallest during the spermatogenic cycle. *Anaciaeschna* is new to cytology, while *Anax* [...] shows variation in diploid number reported earlier from the same locality." (Authors)] Address: Walia, G.K., Department of Zoology, Punjabi University, Patiala, PU, 147 002, India

1773. Wataji, M.; Maruyama, F.; Kanou, M.; Yoshinuma, T.; Taguchi, M. (1999): Present situation, behaviour and life history of *Nehalennia speciosa* (Coenagrionidae, Odonata) at a disappearing habitat, Shinoro Fukui bog, situated in the wetland zone of Ishikari River, Hokkaido. (1) Adult stage. Bulletin of the Hokkaido Odonatological Society 11: 10-18. (in Japanese). [Brief description of the habitat, seasonal occurrence, population density, food habit, mating, oviposition, number of eggs in the ovaries, territorial behavior, movement] Address: not translated

1774. Watanabe, Y.; Yokota, H.; Kato, K.; Hatakeyama, M. (1999): Artificial parthenogenesis in the dragonfly, *Stylurus ocellatus* (Odonata). Proc. Arthropod. Embryol. Soc. Japan 34: 31-32. (in Japanese). [Parthenogenesis in insects have been so far reported in all the orders except Odonata [...]. We used the females of *S. ocellatus* captured at the Biwa lakeside. Females of the species conduct in general flying-oviposition into the water, and prior to oviposition they usually perch on the sand making an egg mass on the abdominal tip. We captured a female just making an egg mass on the sand, and collected eggs (normally oviposited eggs) by soaking the abdominal tip into a film case filled with water. As a female that appears to an oviposition site, usually has mature eggs in ovaries, which lie in 1st -9th segment, we separated the thorax and the abdomen, from which we cut off 4 posterior segments with seminal receptacle, and pulled out the anterior part of the ovaries and collected eggs. These eggs (experimented group) were divided into three groups and kept in plastic petri dishes filled with the city water; 1st group dissected from ovaries. 2nd: dissected from ovaries and macerated with sperm, 3rd: dissected from ovaries and macerated without sperm. [...] The eggs of Odonata generally exhibit chorionic pigmentation when they start normal embryonic development (Corbet, 1962). All of normally oviposited eggs exhibited chorionic pigmentation, and also in the dissected groups 83-93% of the eggs were chorionically pigmented. In further development of embryos, eye pigmentation can be observed. In almost all the normally oviposited eggs pigmentation occurred, and from them normal larvae were seen hatched. In the

ched. In the experimented groups lastly less than 20 % of the eggs hatched, however, a lot of the hatched larvae were morphologically abnormal, some without some segments or legs. Among the groups there were no significant difference of hatchability, therefore, these larvae seemingly hatched from the eggs of parthenogenesis, not from fertilized eggs. So we tried the same treatments on other females, and made chromosome specimens from the embryos soon before the eye pigmentation, and examined the chromosome [...]. In the genus *Stylurus*, the number of chromosomes is reported 23 XO in the male and 24 XX in the female (Katatani, 1995). In the normally oviposited eggs, the number was 23 or 24, and this is assumed to be similar to that of other *Stylurus*. In the larvae hatched from the eggs of 2nd and 3rd group none of them had 23 chromosomes, but some had 24 chromosomes, and others had cells mixed with 12 and 24 chromosomes. Thus, these facts suggests that unfertilized mature eggs of *S. oculatus*, activated in the water, developed as haploid cells, and the chromosomes were doubled by some factors and continued development. The occurrence of many morphologically abnormal larvae in the experimented groups may be related to the high frequency of larvae, the number of which chromosomes was abnormal. (Verbatim, translation from DJOSC 10.) Address: Watanabe, Yoko, 4-14, Nishida-cho, Nishinomiya City, Hyogo Pref., 662-0034, Japan

1775. Weihmann, T. (1999): Untersuchung von Makroinvertebratengemeinschaften in ausgewählten Kleingewässern im Gebiet des Tagebaues Berzdorf bei Görlitz. Diplomarbeit. Fakultät für Biowissenschaften, Pharmazie und Psychologie. Inst. für Zoologie. Universität Leipzig: 150 pp. (in German). [Investigation of the macroinvertebrates of small waters in brown coal mining regions in southeastern Germany; 24 odonate species were recorded in eleven waters including *Coenagrion lunulatum* and *Sympetrum depressiusculum*. The dominance of the species is discussed, and some species are shortly commented. For more details see: Xylander, W.E.R.; Stephan, R., 1998, OAS 1683] Address: Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany

1776. Williamson, M.; Gaston, K.J. (1999): A simple transformation for sets of range sizes. *Ecography* 22(6): 674-680. (in English). ["Transformation of data to normality may be illuminating and useful statistically. There are two standard families of transformations, power transformations for positive numbers, bounded at the left, and folded transformations for proportions, bounded both at the left and the right. It has been shown that there is no one satisfactory power transformation for range size data. However, such measures are limited to the right as well as the left, and we consider applying folded transformations to them. Seven data sets of range sizes recorded by 10 km squares are studied. Six are British (native and introduced plants, mammals, dragonflies and two breeding bird surveys) the seventh is of Swiss breeding birds. Using these we show that the right hand limit of the distribution can be estimated and the best folded transformation found. In all cases the right hand limit is larger than the range size of the most widespread species and smaller than the national scope of the survey. In all cases the logit or flog, the logarithmic folded transformation, is satisfactory; in five cases it is the best. It is well known that abundance is approximately (though not exactly) log-normally distributed.

The relationship of that to our discovery that range size data are approximately logit-normal is discussed. There is no fully satisfactory explanation for either observation at present." (Authors)] Address: Williamson M., Dept of Biology, Univ of York, York, YO10 5DD, UK

1777. Xylander, W.E.R. (1999): Aquatic insects in mining and post-mining sites: Investigations on a species rich dragonfly coenosis. Abstracts of the International Symposium "Ecology of Post-Mining Landscapes. EcoPoL '99". Brandenburg University of Technology at Cottbus, Germany, March 15-19, 1999: 1 p. (in English). ["Investigations of about 50 ponds (of the 250 present) and two creeks in the former brown coal mining site of Berzdorf (Upper Lusatia, Saxonia, Germany) from summer 1996 to autumn 1998 showed that a species rich dragonfly coenosis occurs in this habitat. 48 species (of 80 species found in Germany and 67 in Saxonia) could be observed in this area. 31 of the species found are on the red list of dragonflies in Saxonia; a few of the threatened species can be found at some ponds in high numbers (e. g. *Coenagrion lunulatum*, *Orthetrum brunneum*). The post-mining site at Berzdorf holds the highest number of dragonfly species in such a small scale area all over Germany. For this species richness the mosaic of aquatic habitats in the mining site is responsible. The highest number of species (36 species) could be found in a number of larger formerly separated ponds made in the late seventies and recently fused due to recultivation activities. These ponds therefore form a temporary mosaic of several younger and older subbiotopes at different stages of succession (with large groups of *Typha*, large areas covered with *P. natans* vs. no vegetation at all). Other species rich ponds arose since the eighties by slipping of the edge of the mining site that still holds on resulting in permanent changes of the area (32 species). High numbers (between 20 and 30 species) could, however, also be observed in artificial older ponds at the periphery and younger ones in the center of the recultivation area. The age of the artificial ponds had some influence on species richness but other factors like depth, vegetation of the ponds and the surroundings, exposure to sun and shelter from wind seem to be of higher importance; water chemistry is of low significance. The recultivation activities of the next years - actually transferring the mining into post-mining sites - should consider not only the terrestrial and larger aquatic habitats but also the ponds and creeks and their biocoenoses which comprise a large number of endangered species that have found their transitory home in this secondary biotope." (Verbatim)] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

1778. Xylander, W.E.R. (1999): Libellen (Insecta: Odonata) der Grube Fernie, einer ehemaligen Mangan-grube bei Linden (Hessen). *Chionea* (Zeitschr. Naturk. Natursch. Vogelsberg) 15: 5-18. (in German with English summary). ["The dragonfly coenosis of the Grube Fernie, a former manganese mining site close to Großen-Linden (Hessie, Germany) had been steadily investigated from late summer 1991 to autumn 1994 and sporadically hereafter until late summer 1998; 11 species of Anisoptera and 11 of Zygoptera could be found; among these species was *Crocothemis erythraea*. Information pertaining to imaginal periods, abundance

abundance and reproduction is given. Of the species documented, four are encountered on the Red List for Dragonflies in Hessie (*O. brunneum*, *C. virgo*, *S. fusca*, and *E. najas*). The number of species found at the Grube Fernie is high in comparison to other ponds and lakes around Gießen. The locality must therefore be regarded as of high biological value." (Author)] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

1779. Yamamoto, Y. (1999): A female *Cercion melanurum* Selys preyed a male *Nannophya pygmaea* Rambur - On its foraging behaviour. *Gekkan-Mushi* 345: 26. (in Japanese). Address: Yamamoto, Y., Urban Rafure Nijigaoka-nishi 6-704, 2-7, Nijigaoka, Meito-ku, Nagoya City, 465-0078, Japan

1780. Yanoviak, S.P. (1999): Effects of *Mecistogaster* spp (Odonata: Pseudostigmatidae) and *Culex mollis* (Diptera: Culicidae) on litter decomposition in neotropical treehole microcosms. *Florida Entomologist* 82(3): 462-468. (in English with Spanish summary). ["I investigated the effects of a top predator, *Mecistogaster* spp (Odonata: Pseudostigmatidae), on survivorship of the grazer *Culex mollis* (Diptera: Culicidae) and decomposition rates of leaf litter in treehole microcosms. In a factorial experiment using 200 ml cups, less litter mass remained when grazers (51%) and grazers plus predators (51%) were present, than without grazers (57%). Predators reduced mosquito survival, but had no indirect effect on litter decomposition rate. Mosquito larvae facilitated decomposition of litter and may have become food limited." (Author)] Address: Yanoviak, S.P., Lab I, Evergreen State College, Olympia, WA, 98505, USA

1781. Yokoyama, T. (1999): A record of winter emergence in *Aeschnophlebia longistigma* reared in a room. *Bulletin of the Hokkaido Odonatological Society* 11: 8. (in Japanese). [A full grown larva of *A. longistigma* captured at Ebetsu city on 1st November emerged on 20th December after rearing in a room without heating] Address: not translated

1782. Yokoyama, T.; Fujibayashi, T. (1999): Dragonflies of Ebetsu city (2): Records of *Somatochlora clavata* in Nishi-Nopporo. *Bulletin of the Hokkaido Odonatological Society* 11: 5-7. (in Japanese). [Larval habitat as well as collection records of adults and larvae of *Somatochlora clavata* which is a rare species in Japan are reported] Address: not translated

1783. Zhang, Junfeng (1999): Aeschnidiid nymphs from the Jehol biota (latest Jurassic-Early Cretaceous), China, with a discussion of the family Aeschniidae (Insecta, Odonata). *Cretaceous Research* 20: 813-827. (in English). ["Undoubted fossil nymphs of the family Aeschniidae within the Aeschnioidae of the Anisoptera, Odonata are identified and described and their phylogenetic relationship and bioecological characteristics are deduced. The nymphs discovered previously in China, Mongolia and Russia and considered to be aeschniids are, in fact, unrelated to this group. All nine Chinese species in six genera can be merged into one alone, *Aeschnidium heishankowense*. It is the first animal from the 'Jehol biota' of East Asia to be linked with the species known from the Lower Tithonian of Germany. The geological age of the oldest strata bearing the fossil nymphs is debatable; it could be latest Jurassic rather than Early Cretaceous." (Author)]

Address: Junfeng Zhang, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China

1784. Zhu, Hui-qian (1999): *Sympetrum daliensis* spec. nov. from Yuannan, China (Anisoptera: Libellulidae). *Wuyi Science Journal* 15: 27-29. (in Chinese with English summary). [Holotype male, allotype female, and paratype males and females are described from Can-shan, China. Collector: B.-y. Mao; Collecting date: 26 July, 1998; Collection deposited at the Dali Teachers Training Collage and the Shanxi University.] Address: Zhu, HuiQian, Shanxi University, 12-38, Taiyuan 030006, China

2000

1785. Andres, J.A.; Cordero, A. (2000): Copulation duration and fertilization success in a damselfly: An example of cryptic female choice? *Animal Behaviour* 59 (4): 695-703. (in English). ["Copulation duration is highly variable (0.5-3 h) in the damselfly, *Ceriatrigon tenellum* (Coenagrionidae). Using laboratory experiments, we tested four adaptive hypotheses to explain this variation: the effect of time constraints, in-copula mate guarding, sperm displacement and cryptic female choice. Copulation duration was negatively correlated with time of day, as predicted by the first two hypotheses, and positively correlated with male density, as predicted by the mate-guarding hypothesis. Males prolonged copulation in response to the volume of sperm stored by females, suggesting they were able to detect and quantify the amount of sperm stored. This behaviour is not explained by mate guarding or time constraint effects. Males removed all the sperm from the bursa copulatrix in just 10 min. Our results also suggest that, because the duct is too narrow to allow male genitalia to enter, males do not remove spermathecal sperm. Therefore, direct sperm removal could not explain long copulations. Prolonged copulations could also have evolved as a result of cryptic female choice if they increase male fertilization success by female-mediated processes. Our results support this idea: male fertilization success was greater after long copulations. Apparently, male copulatory behaviour elicits female responses that increase male fertilization success." (Authors)] Address: Cordero, A., Area Ecol., EUET Forestal, Campus Univ., 36005 Pontevedra. Spain.

1786. Anonymus (2000): Flugtechnik: High-Tech im Libellenflügel. *Bild der Wissenschaft* 3/2000: 9. (in German). [Short report on the results of S. Gorbs's studies on the functional morphology of dragonfly-wings.] Address: not stated

1787. Artmeyer, C.; Fronek, A.; Göcking, C.; Häusler, M.; Menke, N.; Willigalla, C.; Winters, S. (2000): Die Libellenfauna der Stadt Münster. *Abh. Westfäl. Mus. Naturk.* 62(4): 73 pp. (in German with English summary). [Monographic treatment of the dragonfly fauna (57 species) of the town of Münster, Nordrhein-Westfalen, Germany. 52 species are mapped for three different periods of investigation: historical data until 1975, 1976-1995, and 1996-1999. Currently, 43 species including 30 indigenous species, are occurring in the town, 14 species are extirpated or have not been recorded in the

past years. Selected habitats are described, and an action plan for dragonfly conservation in Münster is presented. This is an interesting regional odonate fauna from a region with some historical importance for odonatology in Germany and Central Europe.] Address: Menke, N., Stephansweg 15, D-48155 Münster, Germany. E-mail: menkems@aol.com

1788. Artmeyer, C. (2000): Untersuchungen zur Libellenfauna (Odonata) ausgewählter Stillgewässer in der Emsaue des Kreises Steinfurt. *Natur und Heimat* 60(1): 25-32. (in German). [In the floodplaine of River Ems (Landkreis Steinfurt, Nordrhein-Westfalen) in 1997 33 odonate species were recorded. Special emphasize is given to the alteration of vegetation and its impact on suitability of habitats for Odonata. Eutrophication, grazing, and the lack of flood dynamic seem to be the most negative factors impacting the odonate fauna of the Ems alluvium. Therefore species which tolerate or need eutrophic (old) waters are dominant.] Address: Artmeyer, C., Philippstraße 16, D-48149 Münster, Germany. E-mail: artmeyc@uni-muenster.de

1789. Beckemeyer, R. (2000): R.J. Tillyard and the medium Margery: dragonflies and seances. *Argia* 12(2): 11-13. (in English). [Short biography of Robin John Tillyard (1881-1937) with special emphasize on his visites in USA, his interest in Permian odonate fossils from Kanadas, and his interest in spiritualism.] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

1790. Bedê, L.C.; Piper, W.; Peters, G.; Machado, A. B.M. (2000): Phenology and oviposition behaviour of *Gynacantha bifida* Rambur in Brazil (Anisoptera: Aeshnidae). *Odonatologica* 29(4): 317-324. (in English). ["On 2 evenings in late Oct. 1999 several females were observed laying eggs in almost dry mud and sand and under mosses, within a temporary pond system, surrounded by rain forest, near Tiradentes, Minas Gerais, Brazil. The ponds are filled with water during the rainy season (Oct. - March) but dry up entirely by the end of the dry season (Aug. - Sept.). Data compiled from field records, Odonatological collections and literature showed that in Brazil *G. bifida* stays on the wing throughout the year. Apparently, the sp. possesses a univoltine life cycle with 2 generations of larvae, one during the warmer rainy season and another in the early dry season (Oct./Nov. - Jan./Feb. and Feb./March - May/June, respectively). Mud attached to the terminal abdominal segments of 9 specimens in Odonatological collections was used as an evidence of an oviposition mode comparable to that observed in the field." (Authors)] Address: Bedê, L.C., Laboratorio de Ecologia e Comportamento de Insetos, Departamento de Biologia Geral. 1CB/UFMG, Cx.P. 486, BR-30161-970 Belo Horizonte, MG, Brazil

1791. Bedjanic, M.; Weltt, S. (2000): Rediscovery of *Coenagrion hastulatum* (Charpentier, 1825) in Slovenia (Zygoptera: Coenagrionidae). *Exuviae* 7: 27-30. (in English with Slovene summary). ["At the pond Jezerce in the vicinity of Rogia, Pohorje Mts., NE Slovenia, four males and one tandem of the species were recorded on 30-VI-1999. The occurrence of the species on the southern border of its European range is outlined and a short discussion on its threat status in Slovenia is appended." (Authors)] Address: Weltt, S., Delavska ulica

26, SI-2215 Cersak, Slovenia. E-mail: welti@mailcity.com

1792. Behrstock, R.A. (2000): First Texas record of Amethyst dancer (*Argia pallens*) Calvert, 1902. *Argia* 12(2): 6-7. (in English). [USA; Big Bend Rance State Park, east of Presidio, Texas; the paper includes a list of additional species caught in this desert oasis] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@aol.com

1793. Behrstock, R.A. (2000): New records of neotropical odonates on the upper Texas coast with comments on recent temperature increases. *Argia* 12(1): 8-11. (in English). USA, [Texas; Records of *Micrathyrta hageni*, *Erythemis plebeja*, *Erythemis vesiculosa*, *Orthemis discolor*, and *Lestes forficula* are documented and commented in view of range extension and global warming.] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@aol.com

1794. Blumenkamp, K. (2000): Die Odonatenfauna einer ehemaligen Kiesgrube (heute flächenhaftes Naturdenkmal) in Düsseldorf/Kaiserswerth. *Verh. Westd. Entom. Tag* 1998: 147-156. (in German). [Commented list of the dragonfly fauna (27 species) of a former gravel-pit (Lake Spee) in Nordrhein-Westfalen, Germany. The trade-off between vegetation and species assemblages and species richness are stressed.] Address: Blumenkamp, Karin, Biologie und ihre Didaktik, FB9/ S05, Universität GH Essen, D-45117 Essen, Germany

1795. Bocanegra, O.R. (2000): An interesting county record for Texas. *Argia* 12(2): 8-9. (in English). [Tarrant County, Texas, USA; *Epiaschna heros*] Address: Bocanegra, O.R., US Fish and Wildlife Service, Arlington, Texas, USA

1796. Bright, E.; Cronk, K.L. (2000): *Perigomphus*: a new country record for Honduras. *Argia* 12(2): 10-11. [Larva of *Perigomphus pallidostylus*; the locality is described in detail.] Address: Bright, E., School of Natural Resources and Environment, University of Michigan and Univ. of Mich. Museum of Zoology, Insect Division

1797. Brock, V. (2000): Quelljungfer. Eine ungewöhnliche Begegnung am Krötenzaun. *Naturschutz in der Samtgemeinde Tostedt* 11: 23. (in German). [A larva of *Cordulegaster boltonii* was found in a bucket used to sample migrating amphibs on 5 February 2000 near the Holmer Teiche (Harburg, Niedersachsen, Germany). The origin of the dispersive larva must have been in a distance of 50 m in a ditch which was in this period without running water at least for two month. The nearest ditch with running water was in a distance of 140 m. The author supposes that the larva was actively in search for a suitable new habitat.] Address: Brock, Vilmut, Heidekamp 7, D-21256 Handeloh, Germany

1798. Brockhaus, T.; Huth, J. (2000): Die Libellenfauna im Großschutzgebiet "Presseler Heidewald- und Moorgebiet" in Sachsen. *Artenschutzreport* 9 (1999): 45-48. (in German). [Saxonia, Germany; 40 odonate species were recorded. They are listed in a tab. locality wise and shortly commented. Of special interest are records of *Aeshna subarctica elisabethae* Djakonov, 1922, *Brachytron pratense*, *Somatochlora flavomacula-*

ta, *Orthetrum coerulescens*, *Leucorrhinia albifrons*, *L. pectoralis*, *Sympetrum pedemontanum*, and *S. flaveolum*.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

1799. Brugière, D. (2000): Du nouveau sur *Macromia splendens* (Pictet, 1843) en Lozère. *Martinia* 16(1): 8. (in French). [Observation of *M. splendens* along the river Tarn, France near Montbrun in the Lozèrian part of the river. The species is well known from the part of the River Tarn in the Département Aveyron (Milliau-region) but was not known from the part of the River Tarn in Lozère prior the record of July 18, 1999.] Address: Brugière, D., 39, rue Sidi-Brahim, F-03200 Vichy, France

1800. Buczynski, P. (2000): New data on the occurrence of *Orthetrum brunneum* (Fonsc.) and *O. coerulescens* (Fabr.) (Odonata: Libellulidae) in the Lublin region. *Wiad. entomol.* 19(1): 51-52. (in Polish; a German translation of the paper is available from the author). [Detailed documentation of habitat parameters and records of *O. brunneum* and *O. coerulescens* from three Polish localities.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1801. Buskirk, J. van; McCollum, S.A. (2000): Functional mechanisms of an inducible defence in tadpoles: morphology and behaviour influence mortality risk from predation. *Jour. evol. biol.* 13: 336-347. (in English). ["In many amphibian larvae a suite of morphological and behavioural characters varies together in an induced defence against predators, but it remains unclear which features are functionally related to defence. We independently manipulated behaviour and morphology in tadpoles of *Hyla versicolor* and assessed their consequences for swimming performance and predator escape. Data on burst swimming showed that tadpoles which accelerated rapidly were elongate, with shallow bodies and tails. Predator escape was measured by exposing tadpoles to predators (larval *Anax longipes* dragonflies or larval *Ambystoma salamanders*) and recording time until death. Tadpoles were first reared for 30 days in ponds containing either caged *Anax* or no predators; individuals responded to predators by developing large brightly coloured tails and short bodies. We placed tadpoles of both morphological phenotypes into plastic tubs, and manipulated their behaviour using food and chemical cues from predators. Mortality risk experienced by the predator-induced phenotype was about half that of the no-predator phenotype, and risk increased with time spent swimming. An interaction between morphology and behaviour arose because increasing activity caused higher risk for tadpoles with deep tail fins but not shallow tail fins." (Authors)] Address: Buskirk, J. van & S.A. McCollum, Department of Biology, University of Michigan, Ann Arbor, MI 48109 USA

1802. Buskirk, J. van (2000): The costs of an inducible defence in anuran larvae. *Ecology* 81(10): 2813-2821. (in English). ["Costs of inducible phenotypes are a central component of theoretical treatments for the evolution of plasticity but have proved difficult to measure empirically. I estimated the costs of responding to predators for 15 species of anuran tadpoles, in artificial pond experiments performed over a period of several years. The experiments included a treatment without predators

and another treatment with aeshnid dragonfly larvae (*Aeshna cyanea*, *Anax junius*, *A. longipes*, *A. imperator*) confined within cages; experimental protocols and ponds were generally similar. Tadpoles in the caged-predator treatment were not at risk of predation, but they responded as if predators were present. The cost of the predator-induced response was estimated by the difference in growth rate or survival between the two treatments. There was considerable variation among species (experiments) in growth and survival. Across all species there was a highly significant reduction in growth rate in the presence of predators, but no tendency for a survival cost of responding to predators. I tested whether particular components of the anti-predator response are especially costly by comparing, within a phylogenetic context, the magnitude of costs with the magnitude of predator-induced plasticity in behavior and morphology. The absence of significant correlations in this analysis indicated that evolutionary changes in specific phenotypic responses to predators have not been accompanied by changes in the cost. The prevalence of growth costs of responding to predators, but not survival costs, supports models of induced defenses that assume that fitness costs arise from shifts in allocation of time and energy." (Author)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

1803. Carchini, G.; Chiarotti, F.; Di Domenico, M.; Paganotti, G. (2000): Fluctuating asymmetry, size and mating success in males of *Ischnura elegans* (Vander Linden) (Odonata: Coenagrionidae). *Animal behaviour* 59 (1): 177-182. (in English). ["Fluctuating asymmetry (FA) is thought to be an indicator of developmental stability and negatively related to male mating success in many animal taxa. We investigated the relationships between mating success of males, body size and FA for both wing length and number of setae on the legs in the damselfly *Ischnura elegans*. Males were classified as mated or unmated at the time of sampling. Fluctuating asymmetry, expressed as right - left differences, showed normal distributions without evidence of directional asymmetry or antisymmetry. Univariate analyses showed a significant negative correlation between size and mating success, and significant negative correlations between FA and mating success for both characters. On the other hand, with a multivariate analysis, new to studies on FA, the effect of body size was still significant but FA did not reach significance for either character. We conclude that the multivariate analysis should be used to assess the role of the different factors affecting mating success." (Authors)] Address: Carchini, G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. E-mail: archini@utovrm.it

1804. Carvalho, A.L. (2000): Descriptions of the last instar larva and some structures in the pharate male adult of *Praevigomphus proprius* Belle, 1995, with notes on the occurrence and taxonomic status of the species (Anisoptera: Gomphidae, Octogomphinae). *Odonatologica* 29(3): 239-246. (in English). ["The ultimate instar larva, as well as wing venation and male secondary genitalia of a pharate adult, assigned to *P. proprius*, are described and figured, based on material from Teresópolis, Rio de Janeiro State, Brazil. Some notes on the collecting site are provided. The taxonomic status of the sp. and the geographic distribution of the *Octogomphi-*

nae are evaluated." (Author)] Address: Carvalho, A.L. Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufjr.br

1805. Charvet, S.; Statzner, B.; Usseglio-Polatera, P.; Dumont, B. (2000): Traits of benthic macroinvertebrates in semi-natural French streams: an initial application to biomonitoring in Europe. *Freshwater Biology* 43: 277-296. (in English). ["The methods used to indicate the biological state of streams are often based on taxonomic composition, and the abundance of species or other taxa. This 'taxonomic structure' varies among eco-regions and cannot be applied to wider geographical areas. Therefore, we assessed the species traits of benthic macroinvertebrates from semi-natural reference sites as a potential benchmark for large-scale biomonitoring. Our purpose was to assess the stability of community structure, based on the representation of taxa and of traits, across large gradients of geology, altitude, geographical coordinates, stream order, and slope. [...]"] (Authors). Invertebrate abundance data from 62 most natural French stream sites were analysed. 11 odonate genera are considered in this study.] Address: Charvet, S., Cemagref, Laboratoire Diagnose des Systemes Aquatiques, 3 bis quai Chauveau, 69336 Lyon Cedex 09, France. E-mail: charvet@lyon.cemagref.fr

1806. Corbet, P.S. (2000): The first recorded arrival of *Anax junius* Drury (Anisoptera: Aeshnidae) in Europe: A scientist's perspective. *International Journal of Odonatology* 3(2): 153-162. (in English). ["In September and October 1998 adults of *Anax junius* (Common Green Darner) were encountered in small numbers at coastal sites in southwestern U.K. Circumstantial evidence supports the inference that they reached there on winds originating from New Brunswick and Quebec, Canada in early September, a time when this species regularly migrates southwards along the Atlantic Canada and New England coasts of northeastern North America. Although identification of the specimens to species as currently denned seems secure, attempts to retain a voucher specimen were frustrated, making it impossible to re-evaluate the identification in the light of future taxonomic knowledge. Two physiological subspecific entities of *Anax junius* are currently recognized in North America and it is not known to which entity the arriving individuals belonged. Capture of a voucher specimen for The Natural History Museum, London was prevented by vigilante action on a Cornwall Wildlife Trust nature reserve at Penlee, despite prior permission to collect having been granted by the Trust. The incident was followed by wide dissemination of e-mails from an individual endorsing the vigilante action mounted against the would-be collector. Recommendations are offered for safeguarding the interests of scientists who deem it necessary to obtain voucher specimens." (Author)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

1807. Cordero Rivera, A. (2000): Distribution, habitat requirements and conservation of *Macromia splendens* Pictet (Odonata: Corduliidae) in Galicia (NW Spain). *Int. Jour. Odonatology* 3(1): 73-83. (in English). ["The range of *Macromia splendens*, a rare anisopteran, includes SE France and some scattered localities on the Iberian Peninsula. During 1996-1998, I made an exhaustive search for the characteristics of the species' larval and adult habitat, flight period and adult activity in NW

Spain. Nine populations were found, greatly increasing its known range. Adults were observed on slowly flowing rivers, with deep, warm water. Seven populations were found on natural rivers, but two inhabited man-made hydroelectric reservoirs, where aquatic and riverine vegetation are absent. One population was found inside a Natural Park. Populations concentrated in zones with a mean annual temperature higher than 13°C. Larvae live among tree roots or flattened on the muddy substrate and emerge in May-June from eggs laid in June-July two years earlier. Pollution and habitat destruction are the main problems for the conservation of this species." (Author)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

1808. Córdoba-Aguilar, A. (2000): Reproductive behaviour of the territorial damselfly *Calopteryx haemorrhoidalis asturica* Ocharan (Zygoptera: Calopterygidae). *Odonatologica* 29(4): 295-305. (in English). ["The reproductive behaviour of *C. h. asturica* is described. Males fought with each other for the possession of territories which contained the oviposition resource required by females. Females arrived at territories and either copulated and left the territory, copulated and oviposited in that territory or oviposited without a preceding copulation with the territorial male. Territorial males seemed to have a higher mating success than nonterritorial males. Males carried out courtship displays before and after copulation until females finished oviposition. Copulation was divided in two stages which were characterised by the nature of the male's abdominal flexions. The number of abdominal flexions during stage I and II was 50.2 ± 7.2 and 54.5 ± 16.7 (mean \pm s.d.) respectively. The sexual behaviour of both sexes is discussed under current knowledge of sexual selection studies in Calopterygidae." (Author)] Address: Córdoba-Aguilar, A. Departamento de Entomología, Instituto de Ecología, A.C., Apdo Postal 63. MX-91000 Xalapa, Ver. Mexico

1809. Costa, J.M.; Santos, T.C. (2000): *Neocordulia mambucabensis* spec. nov., a new dragonfly from Rio de Janeiro, Brazil (Anisoptera: Corduliidae). *Odonatologica* 29(3): 247-253. (in English). ["The new sp. is described and illustrated and its affinities are discussed. Holotype male, allotype female: Brazil, Rio de Janeiro, Serra da Bocaina, Rio Mambucaba, 22-XI-1979; deposited at MNRJ, Rio de Janeiro. The known spp. of the subgenus *Neocordulia* are keyed." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisy.com.br

1810. Czachorowski, S.; Buczynski, P. (2000): Threats to and protection of water insects in Poland. *Wiad. entomol.* 18, Suppl. 2: 95-120. (in Polish with English summary). [Based on literature data, enquiries filled in by specialists and collections of the authors the present status of more than 3340 species of aquatic insects occurring in Poland is reviewed. No information on threat of app. 80 % of the species is available. 30 % of the better recognised species are vulnerable. Current activities aimed at the protection of the water insects of Poland are reviewed, and proposals for intensified activities to protection and study of the water insects are made. The authors propose legal protection of some species living in freshwater habitats. Odonata are trea-

ted in chapter 3.2.3, and the habitats of Odonata in tab. III. Most endangered species are those of high and transitional bogs, running waters, and the species of stagnant, small waters without adaption to temporal water levels. The following odonate umbrella species are introduced: *Calopteryx virgo*, *Stylurus flavipes*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Thecagaster bidentata*, *Orthetrum brunnum*, *O. coerulescens*, *Sympetrum pedemontanum* (running waters), *Cercion lindenii* (lakes), *Coenagrion armatum* (small stagnant waters), *Nehalennia speciosa*, *Aeshna caerulea*, *A. juncea*. *A. subarctica* (elisabethae), *Soatochlora arcitia*, *S. alpestris*, *Libellula fulva*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. dubia* (bogs)] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

1811. Daigle, J.J.; Tennessen, K.J. (2000): Cades Cove cook-down! *Argia* 12(2): 1-2. (in English). [Report on the 2000 Southeast Regional Meeting of the Dragonfly Society of the Americas which was held in Cades Cove, Blount County, Tennessee in the Great Smoky Mountains National Park from May 26 to 28. 22 odonatologists participated in the meeting. 29 odonate taxa are listed. ["Carl Cook presented a small roast of Nick Donnelly. Just before our meeting in Cades Cove, Carl had been talking to a group of KY farmers about the seriousness of the drought. He told them that whenever Nick Donnelly showed up for a DSA meeting, it would rain and even storm, and that we called it the "Donnelly Effect". Later that day it rained 6" in their area, so they wrote a letter of appreciation to Nick and they all signed it."] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: daiglej@dep.state.fl.us

1812. Daigle, J.J.; Tennessen, K.J. (2000): *Heteragrion cooki* spec. nov. from Ecuador (Zygoptera: Megapodagrionidae). *Odonatologica* 29(3): 255-259. (in English). ["The new sp. is described from Ecuador (holotype male Pichincha Province, Hotel Tinalandia, 31-1-1997; allotype female: Pichincha prov., Rio Palenque Biological Station, 9-X-1988; both deposited in FSCA). Males can be distinguished by the very large decumbent tooth on the cercus." (Authors)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. e-mail: daiglej@dep.state.fl.us

1813. Daigle, J.J. (2000): Meet the beetles! *Argia* 12(2): 9-10. (in English). [Report of a trip in February to Buenavista, Bolivia; the odonate species caught are listed including some species unknown to science.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. e-mail: daiglej@dep.state.fl.us

1814. Daigle, J.J. (2000): *Metaleptobasis mauffrayi* sp. nov. from Ecuador and Peru (Zygoptera: Coenagrionidae). *Odonatologica* 29(4): 325-328. ["The new sp. is described from Ecuador (holotype male: Napo Province, Parque Nacional Yasuni, July 1996; allotype female: Napo Province, Parque Nacional Yasuni, November 1997; both deposited in FSCA, Gainesville, FL, USA). Males can be distinguished by the long cerci, subequal to epiprocts." (Author)]. Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: daiglej@dep.state.fl.us

1815. D'Antonio, C. (2000): *Lindenia* - Notiziario dell'Ufficio Nazionale Italiano della Società Odonatologica Internazionale. *Lindenia* 32: 135-138. (in Italian).

[In this issue of *Lindenia* some contributions of interest to Italian members are published: reduced subscription fees for *Odonatologica* for students, announcements of the international symposia of WDA, SIO-Foundation, and DSA, changes of address or e-mail, and information on Odonata links in the World Wide Web. Additions to the *Hemianax*-archive in Italy are given on page 137, and an up-to-date distribution map of *Anax ephippiger* in Italy is given on page 138.] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindeniam@freemail.it

1816. Dettinger-Klemm, A. (2000): Temporäre Stillgewässer - Charakteristika, Ökologie und Bedeutung für den Naturschutz. *Natur- und Umweltschutz Akademie Nordrhein-Westfalen - Seminarberichte* 5: 17-42. (in German). [Introduction into the ecology of temporary water bodies with emphasis on Culicidae (Diptera), Scirtidae (Coleoptera), and Crustacea (Anostraca, Conchostraca, Notostraca). In Tab. 5, 7 European odonate species considered typical for temporary water bodies are listed.] Address: Dettinger-Klemm, A., Fachbereich Biologie/Zoologie, Arbeitsgruppe Tierökologie, Phillips-Universität Marburg, Karl-von-Frisch-Straße, D-35043 Marburg, Germany

1817. Dieterich, M. (2000): Stoffretention und Habitatqualität: Die potentielle Bedeutung temporärer Fließgewässer für naturschutzfachlich orientierte Landschaftsplanung. *Natur- und Umweltschutz Akademie Nordrhein-Westfalen - Seminarberichte* 5: 156-166. (in German). [Results from a Ph.D.Thesis (Oregon State University, Corvallis, USA) "Insect community composition and physico-chemical processes in summer-dry streams in western Oregon" are presented. Tab. 3 contains a passing reference to "Odonata". For more (odonatological) details see OAS 1492.] Address: Dieterich, M., Büro für Landschaftsökologie, Freiraumplanung und nachhaltige Landnutzung, Röntgenstr. 17, D-73230 Kirchheim, Germany

1818. Dijkstra, K.-D.; Dingemans, N.J. (2000): New records of *Crocothemis sanguinolenta* (Burmeister, 1839) from Israel, with a critical note on the subspecies *arabica* Schneider, 1982. *International Journal of Odonatology* 3(2): 169-171. (in English). [*C. sanguinolenta* is a widespread Afrotropical species whose area of distribution extends into the south of the Arabian Peninsula. Additionally, isolated populations have been found in the Dead Sea Basin. The first report from this region is by Morton (1924). The species is known from Jordan (Schneider 1982, 1985). In Israel it is thus far known only from En Gedi on the Dead Sea coast (31°27'N, 35°22'E). Morton (1924) already noticed that his specimens differed from African ones. These were later described as a separate subspecies, *Crocothemis sanguinolenta arabica* Schneider, 1982. According to Schneider (1982) the male of the subspecies *arabica* differs from the nominate in being smaller, having a more open venation, less yellow on the wing bases and no dark markings on the abdomen. The single male from Israel is compared with material from Jordan, Yemen, Oman and Uganda in Table 1. It is obvious that the distinction between *arabica* and *sanguinolenta* is not clear-cut and that intermediate forms occur. The authors take a Levantine subspecies not justified to recognise a subspecies *arabica*.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

1819. Dolédec, S.; Olivier, J.M.; Statzner, B. (2000): Accurate description of the abundance of taxa and their biological traits in stream invertebrate communities: effects of taxonomic and spatial resolution. *Arch. Hydrobiol.* 148(1): 25-43. (in English). ["Studies of biodiversity and ecosystem function require to consider the identification level that accurately describes the functional diversity of communities, in terms of their biological traits, at different spatial scales. Therefore, we combined three published data sets of stream macroinvertebrate" (including Odonata) "abundances collected at three spatial scales with a database of functional species traits (e.g. life history, morphology, physiology, and behaviour). We investigated the abundance of taxa and their traits at five levels of taxonomic (from species to class) and three levels of spatial resolution (from local habitat to catchment). We used multivariate analyses and correlations to evaluate the accuracy of community descriptions through the stability of such descriptions, the degree of similarity of site ordinations, and the overall community structure expressed at each taxonomic level. The accuracy of community descriptions based on the abundance of taxa depended on the spatial scale considered. The accurate description of the abundance of taxa required identifications to genera and/or families on the local habitat scale, while species identifications were needed on the catchment scale. In contrast, the accurate description of the abundance of biological traits was achieved by identifications to species, genera, or families on all three spatial scales. Thus, species identifications may not be necessary for future studies on the functional diversity of the stream benthos at different spatial scales." (Authors)] Address: Statzner, B., CNR, Ecologie des Eaux Douces et des Grands Fleuves, Université Lyon I, F-69622 Villeurbanne Cedex, France. E-mail: sylvain@biomserv.univ-lyon1.fr
1820. Dommanget, J.-L. (2000): Analyses d'ouvrages: Dragonflies, Behaviour and Ecology of Odonata, par Philip S. Corbet, 1999. ISBN 0-946589-64 X.. *Martinia* 16(1): 20-22. (in French). [Book review; see OAS 1565] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
1821. Donnelly, T.W.; Carle, F.L. (2000): A new subspecies of *Gomphus* (*Gomphurus*) *septima* from the Delaware River of New Jersey, New York, and Pennsylvania (Odonata, Gomphidae). *International Journal of Odonatology* 3(2): 111-123. (in English). ["*Gomphus* (*Gomphurus*) *septima* *delawarensis* is described from the Delaware River, NJ, PA, and NY (Type locality: Flatbrookville, NJ). The new subspecies differs from nominate *G. septima septima* Westfall (new status) mainly by differences in the male cerci and epiproct, and in the female vulvar lamina and lateral occipital horns. The larvae of the two subspecies are similar and differ widely from other *Gomphurus* by the rounded dorsal tubercles on abdominal segments 6-8, and by the highly shortened row of teeth on the lateral palp of the labium. *Gomphus septima* is most closely related to the *vastus* group of *Gomphurus*." (Authors)] Address: Carle, F.L., 146 Mountain View Rd., Warren NJ 07060, USA.
1822. Donnelly, N. (2000): Disjunct odonata records - the agony and the ecstasy. *Argia* 12(1): 7-8. (in English). [Examples of the so called disjunctive range of species which in some cases is due to misidentified specimens. Examples from Nebraska, USA are shortly outlined.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu
1823. Donnelly, N. (2000): Dot map project nearing completion! *Argia* 12(1): 6-7. (in English). [More than 102000 records of North American Odonata (USA, Canada) are existing. The current status of the dot map project is shortly outlined. A map with dots (Counties and 30' cells) and a map of the distribution of the most common North American dragonfly *Anax junius* are presented.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu
1824. Donnelly, N. (2000): Northeast DSA meeting in Sterling Forest. *Argia* 12(2): 2-3. (in English). [Report on the DSA meeting in Orange Co., NY, on 10 June 2000] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu
1825. Donnelly, N. (2000): The hunt for red *Orthemis*. *Argia* 12(1): 11-12. (in English). [Attempt for defining the red to purplish colours of the *Orthemis* taxa; report on efforts to spot the undescribed *Orthemis* taxa different from *ferruginea* and *discolor* on Grenade and Puerto Rico; "the red form may be a juvenile (not teneral) stage that "purple" with age ..."] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu
1826. Dudgeon, D. (2000): Indiscriminate feeding by a predatory stonefly (Plecoptera: Perlidae) in a tropical Asian stream. *Aquatic Insects* 22(1): 39-47. (in English). ["The diet of an undescribed species of *Kamimuria* was investigated in Tai Po Kau Forest Stream, Hong Kong, by comparing larval gut contents with the array of available prey living on and among cobble substrates. Diets were dominated by chironomids and philopotamid caddisflies, with Baetidae, Heptageniidae, Hydropsychidae and Simuliidae comprising secondary dietary items. These six taxa made up 94% of the prey individuals eaten by *Kamimuria*. Data analysis using a selectivity index revealed that these stoneflies fed indiscriminately, eating individual prey taxa in proportion to their availability in the environment. Large and small *Kamimuria* exploited essentially the same prey. A comparison of the diet of *Kamimuria* with the diets of four sympatric Odonata indicated that the degree of interspecific similarity was determined by the extent of overlap in microhabitat use. Diets of *Euphaea decorata* [...] larvae, which live under cobbles, were most similar to *Kamimuria*. This is the first - albeit limited - study of the gut contents of a tropical Asian stonefly. The results suggest that these predators have the potential to limit benthic invertebrate abundance but, because *Kamimuria* larvae feed unselectively, community structure may not be affected by their activities." (Author)] Address: Dudgeon, D., Department of Ecology and Biodiversity, University of Hong Kong, Pokfulam Road, Hong Kong, China
1827. Dyrce, A.; Flunks, H. (2000): Potential food resources and nestling food in the Great Reed Warbler (*Acrocephalus arundinaceus arundinaceus*) and Eastern Great Reed Warbler (*Acrocephalus arundinaceus orientalis*). *J. Ornithol.* 141: 351-360. (in English with German summary). ["The main ecological difference between the Great Reed Warbler and Eastern Great Reed Warbler lies in the density of breeding population,

which in the Eastern subspecies studied in Japan is on average 10 times higher than that of European populations of the Western subspecies. In this study it is shown that potential food resources of the Great Reed Warbler in Japan are more than ten times more abundant than those in Poland, with respect both to the number of potential prey items (invertebrates) and to their total biomass. This strongly suggests that such high densities of Great Reed Warbler in Japan are at least partly due to more plentiful food supply. Other factors which could explain the difference between breeding densities in Japan and Poland are the predation by Marsh Harrier (*Circus aeruginosus*) in Poland and lack of competition with Reed Warbler (*Acrocephalus scirpaceus*) in Japan. The abundance of food on the sample plot in Japan resulted primarily from outbreaks of dipterans of the suborder Nematocera, the most common of which were Chironomidae. Although Chironomidae were not the preferred prey, they made up a substantial proportion of the diet of nestlings. In both studied areas, apart from dipterans, the greatest proportion of nestlings' diet constituted arachnids. Differences in nestlings' diet between study sites resulted mainly from a greater proportion of Nematocera and lower proportion of Coleoptera and Odonata in Japan." (Authors) The potential availability of Odonata as food (collected by the sweep-net method in reed and herbaceous vegetation) is greater in Poland than in Japan (Fig. 4 and 5). The proportion of Odonata in the food composition (number of individuals) of nestlings is in Poland app. 10%, and in Japan app. 5%.] Address: Dyrz, A., Department of Avian Ecology, University of Wrocław, Sienkiewicza 21, 50-335 Wrocław, Poland; Flinks, H., Am Kuhm 19, D-46325 Borchen, Germany

1828. Eklov, P. (2000): Chemical cues from multiple predator-prey interactions induce changes in behavior and growth of anuran larvae. *Oecologia* 123(2): 192-199. (in English). ["Chemical signals are used as information by prey to assess predation risk in their environment. To evaluate the effects of multiple predators on prey growth, mediated by a change in prey activity, I exposed small and large bullfrog (*Rana catesbeiana*) larvae (tadpoles) to chemical cues from different combinations of bluegill sunfish (*Lepomis macrochirus*) and larval dragonfly (*Anax junius*) predators. Water was regularly transferred from predation trials (outdoor experiment) to aquaria (indoor experiment) in which activity and growth of tadpoles was measured. The highest predation mortality of small bullfrog larvae in the outdoor experiment was due to *Anax*, and it was slightly lower in the presence of both predators, probably resulting from interactions between predators. There was almost no mortality of prey with bluegill. The activity and growth of small bullfrog larvae was highest in the absence of predators and lowest in the presence of *Anax*. In the presence of bluegill only, or with both predators, the activity and growth of small bullfrog tadpoles was intermediate. Predators did not affect large tadpole activity and growth. Regressing mortality of small bullfrog tadpoles against activity and growth of bullfrog tadpoles revealed a significant effect for small bullfrog larvae but a non-significant effect for large bullfrog larvae. This shows that the response of bullfrog tadpoles to predators is related to their own body size. The experiment demonstrates that chemical cues are released both as predator odor and as alarm substances and both have the potential to strongly alter the activity and growth of prey. Different mechanisms by which chemical cues

may be transmitted to species interactions in the food web are discussed." (Author)] Address: Eklov, P., Department of Ecology and Environmental Science, Animal Ecology, Umea University, S-901 87 Umea, Sweden

1829. Ellenrieder, N. von (2000): *Aeshna tinti* sp. nov. from Chile and redescription of *A. elsia* Calvert (Anisoptera: Aeshnidae). *Odonatologica* 29(4): 347-358. (in English). ["*A. tinti* sp. n. is described and illustrated from the Chilean Tarapaca and Antofagasta regions (holotype male and allotype female: Chile, Antofagasta, El Loa prov., Tilopozo, 23°49'S 68°15'W, 1-1996; deposited at MLP, Argentina). A redescription and drawings of *A. elsia* Calvert are provided, as well as a comparison of the new sp. with all the sympatric *Aeshna* spp." (Author). *A. variegata*, *A. brevifrons*.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

1830. Ellenrieder, N. von; Muzón, J. (2000): Description of the last instar larva of *Erythrodiplax nigricans* (Rambur) (Anisoptera: Libellulidae). *Odonatologica* 29 (3): 267-272. (in English). [The larva is described and illustrated, based on Argentinean specimens. Larval structural features of *Erythrodiplax ochracea* (Burmeister 1839), *E. pallida* (Needham 1904), *E. umbrata* (Linnaeus 1758), *E. anomala* (Brauer 1865), *E. berenice* (Drury 1770) (and *E. naeva* syn of *E. berenice*), *E. connata* (Burmeister 1839), *E. funerea* (Hagen 1861), *E. fusca* (Rambur 1842), *E. juliana* Ris 1911, *E. justiniana* (Selys 1857), *E. melanorubra* Borrer 1942, *E. minuscula* (Rambur, 1842) are reviewed.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

1831. Endersby, I.D. (2000): Checklist of Victorian dragonflies (Insecta: Odonata). *Proceedings of the Royal Society of Victoria* 112(1): 59-64. (in English). [The dragonfly fauna currently known from Victoria comprises 74 species: 26 Zygoptera and 48 Anisoptera (here named: Eiproctophora). New distribution records and taxonomic nomenclatural changes since 1974 are detailed for 31 species.] Address: Endersby, I.D., 56 Looker Road, Montmorency, VIC, 3094 Australia. E-mail: endersby@werple.net.au

1832. Faton, J.-M.; Deliry, C. (2000): Nouvelles données sur la population de *Coenagrion caerulescens* (Fonscolombe, 1838) dans les Hautes-Alpes. *Martinia* 16(1): 11-14. (in French, with English summary). [Between 1996 and 1999, four localities of *C. caerulescens* have been discovered in the Département Hautes-Alpes, France. The habitat of the species is figured and described, and the co-occurring odonate species are listed.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France

1833. Feld, C.; Pusch, M. (2000): Die Bedeutung von Totholzstrukturen für die Makroinvertebraten-Taxozönose in einem Flachlandfluß des Norddeutschen Tieflandes. *Verh. Westd. Entomol. Tag 1998*: 165-172. (in German). [*Ophiogomphus cecilia* is said to be present in abundances between 5 and 11 ind./m² on waddy debris in the Müggelspree, Berlin/Brandenburg, Germany.] Address: Feld, C. & M. Pusch, Institut für Gewässerökologie und Binnenfischerei im Forschungsver-

bund Berlin e.V., Müggelseedamm 310, D-12561 Berlin, Germany. E-mail: pusch@igb-berlin.de

1834. Ferreras-Romero, M.; Atienzar, M.D.; Corbet, P.S. (2000): Voltinism of *Calopteryx haemorrhoidalis* (Vander Linden) in the Sierra Morena mountains, southern Spain (Zygoptera: Calopterygidae): a preliminary study. *International Journal of Odonatology* 3(2): 125-130. (in English). ["Small sweep-net samples of larvae of *C. haemorrhoidalis*, obtained during five consecutive years from a permanent stream in the Sierra Morena Mountains, southern Spain, were combined according to month to infer the voltinism during the study period. Detailed records of head width, wing-sheath length and metamorphosis status for individual larvae are consistent with the population being mainly univoltine, a few individuals being semivoltine, and the life cycle being predominantly of the summer-species type." (Authors)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain. E-mail: ferreras@teleline.es

1835. Fet, V.; Bechly, G. (2000): *Ischnurinae* Fraser, 1957 (Insecta, Odonata): Proposed conservation as the correct spelling of *Ischnurinae* to remove homonymy with *Ischnuridae* Simon, 1879 (Arachnida, Scorpiones). *Bulletin of Zoological Nomenclature* 57(1): 26-28. (in English). ["The purpose of this application is to remove the homonymy between the damselfly subfamily name *Ischnurinae* Fraser, 1957 (type genus *Ischnura* Charpentier, 1840; family Coenagrionidae) and the scorpion family name *Ischnuridae* Simon, 1879 (type genus *Ischnurus* C.L. Koch, 1837, a junior subjective synonym of *Liocheles* Sundevall, 1833). It is proposed that the entire generic name of *Ischnura* should be adopted as the stem, so that the correct spelling of the damselfly subfamily will be *Ischnurinae* Fraser, 1957." (Authors)] Address: Fet, V., Department of Biological Sciences, Marshall University, Marshall, WV, 25755, USA

1836. Fliedner, T.; Fliedner, H. (2000): Herbstschlupf von *Gomphus vulgatissimus* (Odonata: Gomphidae). *Libellula* 19(1/2): 79-84. (in German with English summary). ["A teneral male of *G. vulgatissimus* was observed on 26-IX-1999 10 km NW Verden, Lower Saxony, Germany. This autumnal emergence is probably due to a period of extraordinary warm weather in September." (Authors)] Address: Traute und Heinrich Fliedner, Louisa-Seegelken-Str. 106, D-28717 Bremen, Germany

1837. Fonseca, T. de (2000): The dragonflies of Sri Lanka. WHT Publications, Colombo. ISBN 955-9114-19-0: 303 pp. (in English). [The dragonflies of Sri Lanka provides a comprehensive review of the Odonata of the Indian-Ocean island of Sri Lanka. It draws together such information on taxonomy, distribution and ecology as is presently available in the published literature. The dragonflies of Sri Lanka includes complete descriptions of the imagines, keys to the imagines (adults) of all species hitherto recorded from the island. In addition, it also includes keys to and descriptions of the larval stages of many of the species. The black and white drawings are taken - in most cases - from different publications of Fraser or Lieftinck. For each species, there are also information on references, its synonymy, and distribution. ["The book is intended to serve as an introduction to a more comprehensive exploration of this remarkable fauna, which includes some 52 species endemic

to Sri Lanka. The fauna is far from well known, however, and future studies will undoubtedly bring several more species to light; this guide is intended to lay a foundation for future research. [" 20 colour plates, information on rearing of dragonfly larvae, information on "Making and keeping a collection", a checklist of the Sri Lankan Odonata in the National Museum, Colombo, a glossary, a bibliography, and a species index will provide a lot of useful information on the Sri Lankan Odonate fauna. I enjoyed this book. It should not be missing in any odonatological library. (M. Schorr)] Address: WHT Publications, 95 Cotta Road, Colombo 8, Sri Lanka

1838. Frat, J. (2000): Première observation de *Leucorrhinia pectoralis* (Charpentier, 1825) dans le département de l'Allier (Odonata, Anisoptera, Libellulidae). *Martinia* 16(1): 15-17. (in French, with English summary). [*L. pectoralis* was detected on May 29, 1999 near Chevagnes, Département Allier, France.] Address: Frat, J., Les Hauts Goths, F-03230 Lusigny, France

1839. Fürst von Lieven, A. (2000): The transformation from monocondylous to dicondylous mandibles in the Insecta. *Zoologischer Anzeiger* 239(2): 139-146. (in English with German summary). ["The evolution of the dicondylous mandible of insects can be reconstructed because the Lepismatidae show an intermediate condition between monocondylous and dicondylous mandibles. Monocondylous mandibles as in the Entognatha and Archaeognatha have only the dorsal (primary) condyle found in all Mandibulata and are moved around a vertical axis. Dicondylous "biting-type" mandibles as in the Pterygota have an additional (secondary) articulation anterior to the primary articulation, so that movement is limited to a transverse adduction around a horizontal axis of swing. Mandibles of the Lepismatidae have been considered intermediate with respect to their elongated shape and their musculature (BORNER 1909). Video recordings of the feeding movements of *Lepisma saccharina* L., 1758 show an unexpected motion pattern of the mandibles. The anterior articulation of *L. saccharina* comprises a clypeal and a tentorial condyle forming a guide for two sclerotized ridges on the dorsal surface of the mandible. Contrary to orthopteroid mandibles, which possess ball and socket type articulations, the movement of lepismatid mandibles is mainly a pro- and retraction. The secondary articulation acts as a guide. The same components of the secondary articulation as in the Lepismatidae can be found in larval Ephemeroptera, where the tentorial condyle is attached to the inner ridge of the mandible. In Odonata and Neoptera the secondary articulation is a ball joint, formed between the clypeal condyle and the ridges. These results show that the mandibles in the Lepismatidae have an intermediate condition in regard to shape, musculature and function of the secondary articulation. The further transformation of the insect mandible took different paths in Ephemeroptera and Metapterygota." (Author)] Address: Fürst von Lieven, A., AG Evolutionsbiologie, Freie Universität Berlin, Institut für Zoologie, Königin-Luise-Str. 1-3, D - 14195 Berlin, Germany

1840. Garcia Berthou, E.; Moreno Amich, R. (2000): Food of introduced pumpkinseed sunfish: ontogenetic diet shift and seasonal variation. *Journal of Fish Biology* 57(1): 29-40. (in English). ["The pumpkinseed sunfish *Lepomis gibbosus* introduced into Lake Banyoles (Spain) were predominantly littoral but there was a tendency of large fish to use deeper zones. Their diet was

dominated by littoral macrobenthos, particularly amphipods (*Echinogammarus* sp.). There was ontogenetic variation in the diet, with small young-of-the-year (L-F < 4 cm) feeding on several littoral microcrustaceans, especially the cladoceran *Ceriodaphnia reticulata*, whereas larger fish shifted to a freshwater shrimp (*Atyaephyra desmaresti*), snails and damselfly larvae. Seasonal variation in diet was linked to resource availability, with consumption of fish eggs and plant debris in spring and summer. In autumn, pumpkinseeds were partially zooplanktivores, preying on the cladoceran *Daphnia longispina*. The diet of pumpkinseeds in Lake Banyoles and other Iberian populations shows less molluscivory than North American populations. The potential ecological impact of this successful exotic species involves mainly predation on fish eggs and molluscs." (Authors)] Address: Garcia Berthou, E., Univ. Girona, Dept Ciencias Ambientals, E-17071 Girona, Spain. E-mail: caegb@fc.udg.es

1841. Geenen, S.; Jordaens, K.; de Block, M.; Stoks, R.; De Bruyn, L. (2000): Genetic differentiation and dispersal among populations of the damselfly *Lestes viridis* (Odonata). *J. N. Am. Benthol. Soc.* 19(2): 321-328. (in English). ["We investigated genetic differentiation among 8 populations of the protected damselfly *L. viridis* (Vander Linden, 1825) in permanent ponds in northern Belgium by means of allozyme electrophoresis and isoelectric focusing, and estimated levels of gene flow using F-statistics. In addition, we did a capture-mark-recapture experiment to estimate direct levels of gene flow. Our aim was to test whether populations of *L. viridis* represented a single, large panmictic population or formed a series of demographically isolated populations, which may be defined as appropriate management units (MU). None of the marked individuals moved among the ponds, indicating a strong fidelity for adults to their breeding pond. Only 1 population was genetically strongly differentiated, whereas little or no differentiation was observed among the 7 other ponds. Absence of adult dispersal but genetic homogeneity between ponds thus suggested substantial general dispersal. We observed large heterozygote deficiencies at 2 loci (*Fdh* and *Est*). Significant differences in allele frequencies among ponds suggests that populations of *L. viridis* in northern Belgium may consist of >1 MU. Management plans for conservation should therefore take into consideration the presence of several MUs in this species." (Authors)] Address: Geenen, Sofie, Department of Biohy, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: sgeenen@ruca.ua.ac.be

1842. Geissen, H.-P. (2000): Faunistische Mitteilungen für den Regierungsbezirk Koblenz, Beobachtungsjahre 1997 und 1998. *Fauna und Flora in Rheinland-Pfalz, Beih.* 25: 123-176. (in German). [Records of 23 odonate species are documented including records of *Lestes barbarus*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, and *Thecagaster bidentata*. Rheinland-Pfalz, Germany] Address: Geissen, H.-P., Brunnenstr. 34, D-56075 Koblenz, Germany

1843. Gesellschaft deutschsprachiger Odonatologen (2000): 19. Jahrestagung der GdO in Schwäbisch-Hall, 17. - 19. März 2000 Programm. Tagungsband: 31 pp. (in German / English). [The following lectures were held on the occasion of the 19th meeting of the German speaking Odonatologists: • Busch-Nowak, A.: Die AG

Libellen (AGL) Schwäbisch Hall • Riexinger, W.-D.: Naturschutz an naturnahen Fließgewässerökosystemen am Beispiel der Jagst, Baden-Württemberg. • Schmidt, B.: Modelluntersuchung zur Flußlibellenfauna an der Jagst. - insbesondere zu Metapopulationen von Gomphiden. • Sternberg, K.: Die Verbreitung der Libellen Baden-Württembergs im Einfluß der geografischen Lage und Topographie des Landes. • Schiel, F.J.: Aktuelle Bestandsentwicklung von und geplante Artenschutzmaßnahmen für *Leucorrhinia caudalis* in Baden-Württemberg. • Hunger, H.: Bemerkenswerte Vorkommen von *Sympetrum pedemontanum* und *S. fonscolombii* in der Oberrheinebene, Baden-Württemberg. • Rademacher, M.: Libellengemeinschaften von Kleingewässern im Randbereich einer Kiesgrube der Hartheimer Trockenau (Landkreis Breisgau-Hochschwarzwald), Baden -Württemberg. • Buchwald, R. & W. Röske: Welche Bedeutung hat die Vegetation für die Wahl des Kleinhabitats bei Zygopteren? • Bárdosii, E.; Müller, Z.; Nagy, S.; Devai, G.; Kiss, B.; Csabai, Z.;- Móra, A.; Szálassy, N.: Ein Vorschlag zur quantitativen Sammlung der in den verschiedenen Pflanzenbeständen lebenden Libellenlarven. • Buczynski, R.: Zwischen Ost und West: ein Vorkommen von *Sympetma paedisca* in Polen. • Samraoui, B.: Delayed maturation in Algerian Odonata: a response to the Mediterranean climate. • Jödicke, R.: Saisonale Anpassungen mediterraner und mitteleuropäischer *Sympetrum striolatum*. • Olberg, R.: Neuroethology of prey pursuit: neural connections from eyes to wings. (Part I). • Worthington, A.: Neuroethology of prey pursuit: video analysis of prey interception. (Part 2). • Schneider, W.: Die Insel Soqatra - Galapagos des Indischen Ozeans. • Ott, J.: 15 Jahre Monitoring der Libellenfauna einer Kiesgrube - wann ist endlich Schluss? • Kühn, J., & J.M. Müller: 20 Jahre Libellen am Schmiechener See: Zwischenbilanz einer Langzeitstudie. • Wildermuth, H.: Hat sich das Rotations-Modell zur Pflege kleiner Libellengewässer bewährt? Eine Rückschau auf 25 Jahre Erfahrung. • Clausnitzer, H.-J.: Auswirkungen einer Naturschutzmaßnahme auf Libellen. • Brockhaus, T.: Größendifferenzierungen in Libellenpopulationen und ihre mögliche Bedeutung für die Populationsdynamik. • Jahn, P.: Kopfhöcker als Sonderbildungen früherer Stadien von Libellenlarven. • Günther, A.: Reproduktionsverhalten einer bisher unbeschriebenen Form der Gattung *Disparocypha* aus Zentralsulawesi (Indonesien). • Grebe, B.: Violinen und kleine Müller - Libellen in Bulgarien. • Miller, E. & J. Miller: Winterbeobachtung von *Sympetma paedisca*. • Kern, D.: Bericht vom ersten Treffen der *Gomphus vulgatissimus* AG. The abstracts of each lecture are in German or English. On pages 25 - 27 an introduction into the natural history of the region around Schwäbisch-Hall, Baden-Württemberg, Germany is given with special emphasis on Odonata.] Address: GdO, z.H. Ulrike Krüner, Gelderner Str. 39, D-41189 Mönchengladbach, Germany

1844. Gillooly, J.F.; Dodson, S.I. (2000): The relationship of egg size and incubation temperature to embryonic development time in univoltine and multivoltine aquatic insects. *Freshwater biology* 44: 595-604. (in English). ["1. We used published data to investigate the combined influence of egg size and incubation temperature on embryonic development time for a broad assortment of aquatic insects at four different incubation temperatures (10, 15, 20 and 25 °C). 2. Embryonic development time (EDT) was positively correlated with egg size at each of the four temperatures, but with diffe-

rent relationships for univoltine and multivoltine aquatic insects. The relationships of embryonic development time to egg size expressed in degree-days did not significantly differ in slope ($P > 0.50$) or intercept ($P > 0.05$) for either univoltine or multivoltine aquatic insects at each of the four temperatures. 3. The relationship of EDT (degree-days) to egg mass in multivoltine aquatic insects ($EDT = 885 \times 0,19$, $P < 0.0001$, $r^2 = 0.48$) is similar in slope and intercept to that for other oviparous animals (i.e., zooplankton, fish, amphibians and reptiles), and to the relationship of embryonic development time to neonate mass in mammals. Univoltine species on average require 3-5 times longer to develop ($EDT = 14190 \times 0,29$, $P < 0.001$, $r^2 = 0.29$) than most other animals of equivalent egg mass, but the relationship of embryonic development time to egg mass is similar in slope to that of most other animals. Together, these relationships provide a basis for evaluating differences in embryonic development time among aquatic insects." (Authors). Data of *Diplacodes bipunctata*, *Diplacodes haematodes*, *Orthetrum caledonicum*, *Enallagma vernale*, *Enallagma ebrium*, and *Coenagrion puella* are involved in this study.] Address: Gillooly, J.F., 104 13th Avenue, St Pete Beach, FL 33706, USA. E-mail: jfgillooly@hotmail.com

1845. Goffart, P. (2000): Compte-rendu de l'excursion au Plateau des Tailles du dimanche 19 septembre 1999. *Gomphus* 16(1): 110-112. (in French). [Report from a trip to the bog of 'As Massotais', Belgium. *Aeshna cyanea*, *A. juncea*, *A. subarctica elisabethae*, and *Sympetrum danae* could be observed.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvai-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

1846. Goffart, P. (2000): Compte-rendu des observations d'espèces prioritaires d'Odonates en Wallonie durant la saison 1999, dans le cadre du programme d'Inventaire et Surveillance de la Biodiversité (ISB). *Gomphus* 16(1): 85-98. (in French with English and Dutch summaries). ["This report gives an account of observations made in 1999 by the Gomphus Working Group collaborators about Odonata priority species, grouped out in the "Biodiversity Survey and Monitoring" program in Wallonie because of their great rarity and/or decline. It also presents collected information dealing with rare southern species, expanding to the north, during the same flight-season. New reproductive populations were discovered for the following species: *Sympetma fusca*, *Lestes dryas*, *Coenagrion pulchellum*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Oxygastra curtisii*, *Somatochlora arctica*, *Libellula fulva* and *Orthetrum coerulescens*. The progression of some southern species has been confirmed, in particular for *Coenagrion scitulum*, *Anax parthenope* and *Sympetrum fonscolombii*: serious presumptions of reproduction now exist for the first two and new evidences were reported for the third one." (Author). In addition, the following species are commented in some detail: *Lestes barbarus*, *Coenagrion hastulatum*, *C. mercuriale*, *C. pulchellum*, *Ceriagrion tenellum*, *Thecagaster bidentata*, *Aeshna subarctica elisabethae* Djakonov, 1922, *Brachytron pratense*, *Epithea bimaculata*, *Somatochlora arctica*, *S. flavomaculata*, *Leucorrhinia rubicunda*, and *Orthetrum brunneum*.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvai-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

1847. Gonzalez-Soriano, E.; Del Pilar Villeda-Callejas, M. (2000): *Ophiogomphus purepecha* spec. nov. from Mexico (Anisoptera: Gomphidae). *Odonatologica* 29(3): 261-266. (in English). ["The new sp. is described, illustrated and compared with *O. arizonicus* Kennedy, 1917. Holotype male Michoacán state, Los Azufres, Arroyo San Pedro, 4 km NW of San Pedro Jácuaro, alt. 2295 m, 29-XI-1998; allotype female, same data, but 18-XI-1989; deposited at CNIN, UNAM, Mexico. Its discovery in central Mexico represents a notable southern extension of the range of this genus in America." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico

1848. Gorb, S.N. (2000): Ultrastructure of the neck membrane in dragonflies (Insecta, Odonata). *Journal of Zoology* 250(4): 479-494. (in English). ["This study describes and quantifies the microsculpture and ultrastructural design of the neck membrane of adult Odonata using scanning and transmission electron microscopy. The membranous cuticle has a complex pattern of microfolds, which appear to have a specialized mechanical function. The membrane has two layers of cuticle: the epicuticle and exocuticle. The outermost layer is the electron-opaque epicuticle, which repeats the shapes of the microfolds. The epicuticle has no fibrillar elements. The exocuticle is electron-lucent and rather thin (0.5-1.5 μm) compared with the sclerite cuticle. The cuticle microfibrils in successive lamellae are at angles to each other. The epidermal cells underlying the membrane have an electron-lucent matrix filled with electron-opaque spherical vesicles of 0.1-0.4 μm in diameter. The behaviour of the membrane folds under loading was studied by shock-freezing experiments; these showed that the shape of the folds changed in response to head movements, and stretched under loading. A comparison of the surface patterns of the membrane in 10 odonate species from seven families [...] had not revealed any correlation of the measured parameters with the size, sex or systematic position of species studied." (Author) *Aeshna mixta*, *Anotogaster sieboldii*, *Coenagrion puella*, *Hemicordulia okinawensis*, *Hypolestes clara*, *Ischnura elegans*, *Lestes barbarus*, *Pyrrosoma nymphula*, *Sympetrum sanguineum*, *Zygonyx ida*] Address: Stanislav Gorb, Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-Mail: stas.gorb@tuebingen.mpg.de

1849. Grabow, K.; Martens, A. (2000): Polypen von *Hydra* sp. als Epizoen der Larve von *Somatochlora metallica* (Cnidaria: Hydrozoa; Odonata: Corduliidae). *Libellula* 19(1/2): 89-91. (in German with English summary). ["One final-instar larva taken from the stony shore of a navigable canal SE Berlin, Germany, in May 1998 bore 3 hydrozoan polyps." (Authors)] Address: Grabow, K., Hangelsberger Weg 23, D-15537 Grinheide/Mark, Germany. E-mail: karstengrabow@01019freenet.de

1850. Grand, D.; Papazin, M. (2000): Étude faunistique des odonates de Corse. *Martinia* 16(2): 31-50. (in French with English summary). [On the base of new records (in most cases from July 1999), the list of the 46 odonate species hitherto known from the island of Corsica, is commented, and a bibliography is provided. The fauna of Corsica (France) is compared with that of Sardinia and Sicily (Italy).] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mt d'or, France

1851. Hämäläinen, M.; Yeh, W.-C. (2000): *Matrona cyanoptera* spec. nov. from Taiwan (Odonata: Calopterygidae). *Opusc. zool. flumin.* 180: 1-6. (in English). ["The well known Taiwanese damselfly, usually called 'Matrona basilaris subsp.', is described as a new species *Matrona cyanoptera* (holotype male: northern Taiwan: Taipei, Neishwangshi, 29-VI-1997)."] (Authors)] Addresses: Hämäläinen M., Dept Applied Zool., P.O. Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi.

Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nanhai Road, Taipei, Taiwan, R.O.C. E-mail: wcyeh @serv.tfri.gov.tw

1852. Hämäläinen, M. (2000): *Risioenemis seidenschwarzi* spec. nov., an endangered damselfly from Tabunan forest in Cebu, the Philippines (Odonata: Platycnemididae). *Entomologische Berichten*, Amsterdam 60 (3): 46-49. (in English). ["A new dragonfly species, *Risioenemis seidenschwarzi* spec. nov. (holotype male: Philippines, Cebu, Tabunan, 9.II.1999) is described, illustrated and compared with the closely related *R. rolandmuelleri* Hämäläinen. The new species appears to be endemic to Cebu, where it, as a forest stream dweller, has a very limited area left for survival. Its endangered status is emphasized and its remaining habitat in the Tabunan forest area is characterized in detail."] (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; e-mail: matti.hamalainen@helsinki.fi

1853. Hardersen, S. (2000): Effects of carbaryl exposure on the last larval instar of *Xanthocnemis zealandica* - fluctuating asymmetry and adult emergence. *Entomologia experimentalis et applicata* 96(3): 221-230. (in English). ["Fluctuating asymmetry (FA), a measure of developmental stability, has been suggested as a monitoring tool for environmental pollution. Aquatic pollution events are often transitional and the level of FA in populations exposed to such incidents has not yet been investigated. Research into the morphological effects of transitional pollution also provides a tool to elucidate the timing and duration of any 'window of opportunity' for the determination of FA in the developing organism. The present study was undertaken to investigate if exposure of the last instar of the damselfly *X. zealandica* [...] to different levels of insecticidal stress resulted in different levels of FA in the wings of the adult insects and if adult emergence was altered by different concentrations of pesticide. Three concentrations of carbaryl (40 ppb, 2 ppb and 0.1 ppb) and a control were used. The emergence success of the damselflies was not affected by any treatment, but the insecticide had a stimulatory effect on the developing larvae. Exposure of the last instar of *X. zealandica* to carbaryl at 40 ppb had no consistent effect on FA in metric traits and increased FA in meristic traits compared with the control. Segregation of the emerged adults into two groups revealed more details about the 'window of opportunity' in the meristic traits. Larvae which had already completed more than half of their development when the experiment started did not show significant differences in the level of FA. In contrast, damselflies which were exposed for more than half of the final instar showed a clear difference in their levels of FA. The greater difference in the latter group was mainly caused by a decrease of FA in the controls rather than by an increase in the treatment. These data suggest that the 'window of opportunity' for the determination of the level of FA of the meristic traits

in damselfly wings closes approximately halfway through the final larval instar." (Author)] Address: Hardersen, S., Tiergartenstr. 111, D-47533 Kleve, Germany. E-mail: sonke7hard@aol.com

1854. Hardersen, S.; Wratten, S.D. (2000): Sensitivity of aquatic life stages of *Xanthocnemis zealandica* (Odonata: Zygoptera) to azinphos-methyl and carbaryl. *New Zealand Journal of Marine & Freshwater Research* 34(1): 117-123. (in English). ["The susceptibility (48-h LC50 values) of aquatic life stages of *Xanthocnemis zealandica* McLachlan to azinphos-methyl and carbaryl was investigated. The LC50 values of azinphos-methyl did not correlate with instar. The most susceptible stage was instar 7 (LC50 value: 26.6 ppb), and the least susceptible were instars 2 (LC50 value: 50.2 ppb) and 13 (LC50 value: 45.1 ppb). In contrast, LC50 values for carbaryl were positively related to larval instar (instar 2: LC50 value: 156.6 ppb; instar 13: LC50 value: 760 ppb). Damselfly eggs were exposed to insecticide solutions (azinphos-methyl: control, 0.04, 0.4, 4, and 40 ppb; carbaryl: 0.6 and 6, 60, and 600 ppb) and hatching success evaluated. Only carbaryl at 600 ppb reduced hatching success significantly. Although the investigation on eggs was carried out at a higher temperature than the LC50 experiments it can be concluded that the egg stage is more resilient to both insecticides than the larval stages." (Authors)] Address: Hardersen, S., Tiergartenstr. 111, D-47533 Kleve, Germany. E-mail: sonke7hard@aol.com

1855. Hardersen, S. (2000): The role of behavioural ecology of damselflies in the use of fluctuating asymmetry as a bioindicator of water pollution. *Ecological Entomology* 25: 45-53. (in English). *Xanthocnemis zealandica* (McLachlan, 1873), "1. Fluctuating asymmetry has been used widely to investigate questions concerned with evolution and behaviour, and to study the effects of environmental pollution. Damselflies have been used to answer questions in both fields, but no attempt has been made to combine the knowledge from these areas to investigate whether and how evolutionary ecology and behaviour interfere with the use of fluctuating asymmetry as a bioindicator of water pollution. 2. Four hypotheses were formulated to investigate possible interferences: (1) Paired males should be less asymmetrical than unpaired males. (2) Males caught at breeding sites should be less asymmetrical than females caught at breeding sites. (3) Damselflies caught earlier in the season should be less asymmetrical than those caught later in the year. (4) Damselflies caught at control sites should be less asymmetrical than those caught at sites within areas of high pesticide usage. 3. No significant difference in asymmetry levels was found between paired and unpaired males. 4. Males were significantly less asymmetrical than females. 5. Damselflies caught earlier in the year were less asymmetrical than those caught later. 6. The data used to test the hypothesis that fluctuating asymmetry in the wings of mature damselflies reflects the level of pesticides used in the surrounding environment were equivocal. 7. The findings suggest that evolutionary ecology and behaviour interfere with the suitability of fluctuating asymmetry in mature damselflies as a biomonitoring tool and it is concluded that fluctuating asymmetry in emerging adults should be much more appropriate as a bioindicator." (Author)] Address: Hardersen, S., Tiergartenstr. 111, D-47533 Kleve, Germany. E-mail: sonke7hard@aol.com

1856. Haritonov, A.Yu. (2000): Charter meeting of the Russian section of Societas Internationalis Odonatologica (R.S.S.I.O.). Notul. odonotol. 5(3): 29-31. (in English). ["The meeting took place in Novosibirsk, on 11 Feb. 1998, and was attended by 13 workers. The Chairman of the Section and the Editor of its semiannual periodical, BELYSHEVIA, is Prof. Dr. A.Yu. Haritonov. Among the objectives of the Section are the coordination and promotion of Odonatological research in Russia, and the organisation of the 15th International Symposium of Odonatology, scheduled to be convened in Novosibirsk, in July 2001." (Author)] Address: Haritonov, A.Yu., Institute of Animal Systematics and Ecology, Siberian Branch of the Russian Academy of Sciences, Ul. Frunse 11, RUS-630091 Novosibirsk, Russia

1857. Harp, G.L. (2000): New zygopteran state records. *Argia* 12(2): 6. (in English). [USA; Tennessee: Telebasis byersi; Missouri: *Lestes inaequalis*, *Ischnura kellicottii*] Address: Harp, G.L., 3206 Maplewood Terrace, Jonesboro, AR, 72401, USA. E-mail: glharp@navajo.astate.edu

1858. Harrison, J.F.; Roberts, S.P. (2000): Flight respiration and energetics. Annual review of physiology 62: 179-205. (in English). ["We use a comparative approach to examine some of the physiological traits that make flight possible. Comparisons of related fliers and runners suggest that fliers generally have higher aerobic metabolic capacities than runners but that the difference is highly dependent on the taxa studied. The high metabolic rates of fliers relative to runners, especially in insects, are correlated with high locomotory muscle cycle frequencies and low efficiencies of conversion of metabolic power to mechanical power. We examine some factors that produce variation in flight respiration and energetics. Air temperature strongly affects the flight metabolic rate of some insects and birds. Flight speed interacts with flier mass, so that small fliers tend to exhibit a J-shaped power curve and larger fliers a U-shaped power curve. As body size increases, mass-specific aerobic flight metabolism decreases in most studies, but mass-specific power output is constant or increases, leading to an increase in efficiency with size. Intraspecific studies have revealed specific genetically based effects on flight metabolism and power output and multiple ecological correlates of flight capabilities." (Authors); *Anax junius* is mentioned] Address: Harrison, J.F., Arizona State Univ., Dept Biol., Tempe, AZ 85287, USA. E-mail: j.harrison@asu.edu

1859. Herren, B.; Herren, K. (2000): Entwicklung von *Onychogomphus forcipatus unguiculatus* in einem See (Odonata: Gomphidae). *Libellula* 19(1/2): 105-106. (in German with English summary). ["In 1998, 2 exuviae were collected at the Italian part of the Lago di Lugano. This is the first breeding record of the ssp. in a lentic habitat." (Authors)] Address: Bernhard und Kathrin Herren, Oberfeldstr. 46, CH-3550 Langnau im Emmental, Switzerland

1860. Hill, B.; Beinlich, B. (2000): The dragonfly community of a communal cattle pasture in the Sava floodplain (Croatia) with special reference to the biology of *Lestes barbarus* (Fabricius, 1798) (Zygoptera: Lestidae). *Exuviae* 7: 1-18. (in English with Slovene summary). ["A total of 25 dragonfly species were recorded between May and September 1997 on the communal cattle pasture of Lonja village and its surrounding area

in the Lonjsko Polje Nature Park. At least 10 dragonfly species were reproducing successfully in the astatic ponds. *Sympetrum* spp. were dominating the community as they accounted for 95 % of all exuviae collected. Their high productivity in astatic environment is shown by average densities of over 70 exuviae/m²/year. By employing mark-recapture techniques it was stated that after emergence, *L. barbarus* covers distances of 80 to 880m to reach the hedges surrounding the pasture, where the animals spend the entire maturation period. Suitability of hedges as maturation habitat depends on their width and the width of adjacent margins. When mature, nearly all animals observed returned to the pond where they had emerged. Densely vegetated pond habitats with vegetation heights between 20 and 50cm are preferred reproduction sites for *L. barbarus*. The highest recorded age for individuals was 69 and 68 days for males and females respectively. The importance of low-intensity pasturing systems for nature conservation is briefly discussed." (Authors)] Address: Hill, B.T.; Beinlich, B., Bioplan Marburg - Höxter, Deutschausstr. 36, D-35037 Marburg, Germany. E-mail: bioplan.marburg@t-online.de

1861. Hoekstra, J.D.; Smith, R.L. (2000): Reproductive behavior of two *Argia* spp. (Odonata: Coenagrionidae) at an Arizona stream. *Int. Jour. Odonatology* 3(1): 85-94. (in English). ["Here we provide a first report on the reproductive behavior of *Argia sabino* Garrison and *Argia pima* Garrison from observations at Sabino Creek, Arizona. Both species reproduce in autumn (September-October) following late summer rainstorms. Tandem pairs of *A. sabino* submerge to oviposit on rock substrates. The oviposition substrate is abundant and widespread. Male *A. sabino* defend mate-encounter territories in the morning at boulder fields or rock outcrops away from the stream. Copulation may last 30 minutes or more. Ovipositing females submerge in tandem with males, typically to depths of 10-30 cm, and pairs may remain submerged for over 30 minutes. Male submergence with females can be interpreted as contact mate guarding promoted by sperm competition and/or as a male investment in the female's survival and oviposition success. We discuss evidence for both possibilities based on field observations. Whereas ovipositional resources for *A. sabino* are ubiquitous at Sabino Creek, *A. pima* uses patchily distributed, discrete ovipositional habitats (wetter rootlets of riparian trees at waterfalls and riffles). Males of *A. pima* employ a mixture of contact and noncontact mate-attendance strategies. Females occasionally submerge to oviposit. Often they oviposit along the margins of torrential cascades. Male *A. pima* have been observed to release submerging mates just before their own wings become wetted, and to monitor submerged ovipositing females from a nearby perch thereafter." (Authors)] Address: Hoekstra, J.D., Center for Aquatic Ecology, Illinois Natural History Survey, 607 E. Peabody, Champaign, IL 61820, USA. E-mail: hoekstra@inhs.vivc.edu

1862. Hoffmann, L. (2000): Vergleich von Libellenvorkommen an Gewässern mit vergleichbaren Strukturen im Bereich von ehemaligen Tongruben im Westerwald. *Pflanzen und Tiere in Rheinland-Pfalz - Berichtsjahr 1999 - Heft 10*: 181. (in German). [List of odonate records from 14 clay pits in the Westerwald region, Rheinland-Pfalz, Germany. 24 species are listed; the records of *Erythromma najas*, *Ischnura pumilio*, and

Orthetrum brunneum are of some faunistical interest.]
Address: not stated

1863. Holmen, M. (2000): Comments on Henning Pedersen's paper about rare and new dragonfly species in Denmark 1997-1998. *Nordic Odonatological Society Newsletter* 6(1): 16-17. (in Danish with English summary). ["In recent, almost identical papers in this and two other magazines, Henning Pedersen presented new records of several dragonfly species rare or new to the Danish fauna. The papers also includes a severe criticism on the presented distribution of species in the book on Danish dragonflies by Nielsen (1998). The present paper comments on the often very unprecise and reduced data, that are so far available from Henning Pedersen and his Danish mapping-project GOMPHUS. It also emphasizes the need to bring forward knowledge relevant for the protection of species and their habitats. A few corrections about older records mentioned in Henning Pedersen's paper are suggested. It is also suggested, that the specimen published by Ole Fogh Nielsen as *Sympetrum fonscolombei* new to Denmark, is actually a female *S. flaveolum*." (Author)] Address: Holmen, M., Gadeledsvej 48, Gadevang, DK.-3400 Hillerød, Denmark. E-mail: ma@fa.dk

1864. Hunter, M. (2000): Broad-bodied Chaser *Libellula depressa* in County Durham. *Atropos* 11: 58. (in English). [September record of *L. depressa* in north-east England.] Address: Hunter, M., 45 Brinkburn Avenue, Darlington, Co. Durham, DL3 0JN, UK.

1865. Illmonen, J.; Korkeamäki (2000): The fourth nordic meeting for odonatologists. *Nordic Odonatological Society Newsletter* 6(1): 8-10. (in English). [Report from the 4th meeting of the Scandinavian odonatologists on 26-28 June 1998 in Konnevesi Research Station, Finland. In the framework of the meeting, 28 species on five localities surveyed could be recorded, including species as *Platycnemis pennipes*, *Erythromma najas*, *Coenagrion armatum*, *C. johanssoni*, *Aeshna subarctica elisabethae*, *Ophiogomphus cecilia*, *Somatochlora flavomaculata*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, and *Sympetrum flaveolum*.] Address: Korkeamäki, E., Karkunkatu 18 a 4 b, FIN-48600 Karhula, Finland.

1866. Jiang, Y.-H. (2000): Verification and distribution of genus *Aeschnophlebia* Selys (Odonata: Aeschnidae) in China. *Zhonghua Kunchong* 20(1): 63-67. (in Chinese with English summary). ["This article discusses the identity of two species of *Aeschnophlebia* Selys 1883, *A. anisoptera* Selys and *A. logistigma* Selys, in China. The author fully recognizes the presence of the latter by the specimen obtained from Nanjing and Yuntai Mountain in the northern part of Jiangsu Province. *A. anisoptera* Selys is not present in China. Descriptions and illustrations of these two species are provided. This article also states that *A. kolthoffi* Sjöstedt 1925 is a new synonym of *A. longistigma* Selys 1883." (Author)] Address: Jiang, Yao-Hua, Yuntaixiang Diversified Management Office, Lianyungang City, Jiangsu, 222064, China

1867. Jödicke, R.; Borisov, S.N.; Haritonov, A.Y.; Popova, O. (2000): Additions to the knowledge of *Sympetrum sinaiticum* Dumont (Odonata: Libellulidae). *International Journal of Odonatology* 3(2): 131-140. ["New information shows that *S. sinaiticum* is not divided into subspecies, as hitherto supposed. The subspecific name *tarraconense* Jödicke, 1994 must be regarded as a

junior synonym of *sinaiticum*. In contrast, the name *arenicolor* Jödicke, 1994 denotes a taxon at full species rank, characterized by its larval and ligula morphology. This species is taxonomically identical to *S. s. deserti* Jödicke, 1994. Since the latter name has been established in the same work, we determine the precedence of *arenicolor* as the valid name for the Asiatic species. Range, seasonality, and habitat selection of *S. sinaiticum* are outlined." (Authors)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

1868. Jödicke, R. (2000): Späte Herbstnachweise von *Lestes sponsa* und *Sympetrum striolatum* (Odonata: Lestidae, Libellulidae). *Libellula* 19(1/2): 113-115. (in German with English summary). ["*L. sponsa* was on the wing until 07-XI-1999 in Baden-Württemberg, southwestern Germany, and *S. striolatum* until 17-XII-1994 in Switzerland. Both observations are the latest autumnal records of these species in Central Europe." (Author)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

1869. Jödicke, R.; Arlt, J.; Kunz, B.; Lopau, W.; Seidenbusch, R. (2000): The Odonata of Tunisia. *Int. Jour. Odonatology* 3(1): 41-71. (in English). ["Between 1987 and 1999 several visits to 69 localities in Tunisia were made. Altogether 46 species of Odonata, including 10 new to Tunisia, were recorded, raising the Tunisian checklist to 52 species. Our observations cover early May to mid June and late September to early November. Using as a basis for inference data from nearby Numidia that cover the period missing from our own observations, we assume that many species have a long flight period. Among such species, some are known to be univoltine, exhibiting protracted aestivation as a prereproductive adult, whereas some others, we suggest, may be bivoltine." (Authors)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

1870. Johnson, M.D. (2000): Evaluation of an arthropod sampling technique for measuring food availability for forest insectivorous birds. *J. field ornithol.* 71: 88-109. (in English). [In Tab. 2 Odonata are mentioned as food of Northern Parula and American Redstart] Address: Johnson, M.D., Dept of Wildlife, Humboldt State Univ., Arcata, California 95521, USA

1871. Jourde, P. (2000): Nouvelles données de captures d'odonates par un végétal non carnivore. *Martinia* 16(1): 3-7. (in French with English summary). [More than 200 individuals of *Calotperyx splendens*, *Platycnemis latipes*, *Ischnura elegans*, *Cercion lindenii*, *Ceragrion tenelleum*, and *Sympetrum striolatum* were seen caught by the bristles of Rough Bristle-grass *Setaria verticillata* growing along the river Charente in the French départements of Charente and Charente-Maritime.] Address: Jourde, P., 4, rue du Fressin, Les Creuseaux, 17250 Romegoux, France

1872. Jurzitza, G. (2000): *Der Kosmos Libellenführer. Die Arten Mittel- und Südeuropas.* Kosmos Naturführer. Franckh. Stuttgart. 2. überarbeitete und aktualisierte Ausgabe. ISBN 3.440-08402-7: 191 pp. (in German). [When in 1978 Gerhard Jurzitza's book on the Central European Odonata was published, a corner stone of Central and Western European odonatology was set. I can hardly imagine what would have happen with my li-

fe if I had not purchased this book as a schoolboy. I think, it was the most important book in my life. This book was translated into several languages and I suppose it has influenced many of us. Ten years later a new edition - with the species from southwestern Europe added - was published. The reader got a sound introduction into odontology, and many very good colour pictures which enabled people to enjoy and to identify dragonflies. The book was modern and the information given up-to-date. The second edition is improved by some amendments. The checklist of European dragonflies is quite complete, including species from Italy and southeastern Europe. The book is now hard bound. It is regrettable that the opportunity was not taken to produce a completely new book on the Odonata of Central and Southern Europe (as the title suggests!), Colour photographs of all species (except of *Cordulegaster charpentieri*?) are available and thus all species could have been covered. Additional species for France (*Somatochlora meridionalis*) are also not documented. Although this is a fine book, it contains no real new information compared to the 1988 edition. I never will forget the merits Dr. G. Jurzitza earns for his 1978 book and his odontological vita. Therefore it is very sad that he was not given the opportunity to write a completely new book on the (southern) European Odonata. (M. Schorr)]

1873. Kalkman, V.J. (2000): Records on the dragonfly fauna of northwestern Albania (Odonata). *Libellula* 19 (1/2): 107-111. (in English with German summary). ["A total of 24 Odonata species were recorded in June and July 1996. The characters of the ssp. of *Lestes virens* conform with neither with ssp. *virens* nor with ssp. *vestalis*. As expected the specimens of *Lestes viridis* belong to the ssp. *parvidens*." (Author)] Address: Vincent J. Kalkman, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

1874. Kamimura, Y. (2000): Possible removal of rival sperm by the elongated genitalia of the earwig, *Euborellia plebeja*. *Zoological science* 17(5): 667-672. (in English). ["Sperm displacement is a sperm competition avoidance mechanism that reduces the paternity of males that have already mated with the female. Direct anatomical sperm removal or sperm flushing is known to occur in four insect orders: Odonata, Orthoptera, Coleoptera and Hymenoptera. In a fifth order, Dermaptera (earwigs), I found that the virga (the elongated rod of the male genitalia) of *Euborellia plebeja* seems to be used to remove rival sperm from the spermatheca (a fine-tubed female sperm storage organ). In this species, copulation lasted on average 4.6 minutes, during which time the male inserted the virga deep into the spermatheca, and then extracted it ejaculating semen from the opening of the virgal tip. The extraction of virgae (with its brim-like tip) appeared to cause removal of stored sperm in the spermatheca. The virga was as long as the body length of males, and the spermatheca was twice the female body length. The long length of the spermatheca and the possible removal function of the virga may select for virgal elongation." (Author)] Address: Kamimura, Y., Tokyo Metropolitan Univ., Dept Biol., Minamiosawa 1-1, Hachioji, Tokyo 0397, Japan. E-mail: kamimu@comp.metro-u.ac.jp

1875. Kempe, R. (2000): Das NSG "Heidemoor bei Ottermoor" und die "Otterheide". *Naturschutz in der*

Samtgemeinde Tostedt 11: 10-12. (in German). [In a more popular account on the flora and fauna of two bog-dune habitats near Tostedt (Niedersachsen, Germany) 15 odonate species not further detailed are mentioned. A freshly emerged *Aeshna subarctica elisabethae* is pictured.] Address: Kempe, R., Wörner Weg 3, D-21256 Höckel, Germany. E-mail: JureiKempe@aol.com

1876. Kenner, R.D.; Cannings, R.A.; Cannings, S.G. (2000): The larva of *Leucorrhinia patrica* Walker (Odonata: Libellulidae). *Int. Jour. Odonatology* 3(1): 1-10. (in English). [The final-stadium larva of *L. patricia* is described from six exuviae with associated teneral adults collected in northern British Columbia, Canada. "*L. patricia* belongs to the group of nearctic *Leucorrhinia* that has larvae with three ventral stripes. The larvae are very similar to those *L. hudsonica* (Sélys) larvae that are small and lack dorsal spines. Several characters help to separate these species, at least in the western part of their range: length of the epiproct and patterns of the profemora and abdomen. The preparation of a more definitive key awaits the analysis of more material of *L. patricia* and *L. hudsonica*." (Authors)] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca

1877. Kinvig, R.G.; Samways, M.J. (2000): Conserving dragonflies (Odonata) along streams running through commercial forestry. *Odonatologica* 29(3): 195-208. (in English). ["Commercial afforestation of natural ecosystems is increasing worldwide. There is little information however, on the extent to which biodiversity is being affected by this practice. This is especially so for stream fauna, including the conspicuous Odonata. Some dragonflies and damselflies may decline when their natural environment is anthropogenically changed and, as a group, they are sensitive to the impact of afforestation. The sites were four pine plantations in KwaZulu-Natal, South Africa. 14 environmental factors were recorded along stretches of streams running through each of the four sites. The diversity of odonate spp. and their abundances along these streams were measured. There was a strong positive correlation between certain abiotic factors, for example, boulder cover and shade, with the local distributions of these insects. Water pH was also a strong correlate. Most spp. required both unpolluted water and a sunlit stream. Particular vegetation type and exact distance of pine trees from the water's edge (so long as they did not shade the stream) were not strong correlates. This meant that species diversity dropped dramatically where the water was completely shaded by a closed canopy, whether it was from natural forest or from exotic trees. It is recommended that no plantation trees should shade a stream edge, and should be planted at least 30m from the water. All highly invasive, dense-canopy weeds, especially *Acacia mearnsii*, should be removed, and extensive and intensive cattle trampling of the banks avoided." (Authors)] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. e-mail: samways@zoology.unp.ac.za

1878. Kobayashi, H.; Sekizawa, Y.; Aizu, M.; Umeda, M. (2000): Lethal and non-lethal responses of spermatozoa from a wide variety of vertebrates and invertebra-

tes to lysenin, a protein from the coelomic fluid of the earthworm *Eisenia foetida*. *Journal of Experimental Zoology* 286(5): 538-549. (in English). ["Lysenin, a novel protein that we isolated from the coelomic fluid of the earthworm *Eisenia foetida*, binds specifically to sphingomyelin (SM) among various phospholipids found in cell membranes, and causes cytolysis. The plasma membrane of mammalian spermatozoa is known to contain SM at relatively high levels and we therefore examined the effects of lysenin on the spermatozoa of various animals. Lysenin had lethal effects on spermatozoa of 5 of 33 species of invertebrates tested and on spermatozoa of 30 of 39 species of vertebrates. We postulated that plasma membranes of the spermatozoa of most invertebrates might not contain SM whereas those of most vertebrate species might contain SM. These possibilities were supported by our failure to detect SM chemically in the testes of three species of invertebrates, in none of which spermatozoa responded to lysenin. In contrast, we detected SM in the testes of all 25 vertebrate species examined, irrespective of a negative or positive response of spermatozoa to lysenin. None of the six species of Protista examined was affected by lysenin. Our survey suggests that, in general, the spermatozoa of animals can be grouped into two categories, invertebrate and vertebrate, depending on the absence or presence of SM in their plasma membrane. The incorporation of SM into spermatozoa seems first to have occurred in protochordates during the course of evolution. Discussions about the exceptional responses to lysenin observed in the spermatozoa of five species of invertebrates and of nine species of vertebrates are made from phylogenetic and reproductive viewpoints." (Authors) *Crocothemis servilia*, *Orthetrum albistylum japonicum*, *Sympetrum darwinianum*, *Sympetrum frequens*] Address: Kobayashi, H., 3-16-17 Kamisaginomiya, Nakano-ku, Tokyo, 165-0031, Japan

1879. Kuhn, J. (2000): Pflegeproblematik in präalpinen Mooren am Beispiel von Libellen und Amphibien. In: Schutzgemeinschaft Libellen in Baden-Württemberg (SGL). Artenschutz in Mooren - Konzeption um Umsetzung. Vorträge der Tagung der Schutzgemeinschaft Libellen in Baden-Württemberg am 19. und 20. Mai 2000 in Kißlegg: 10. (in German). [The efficiency of "Prozeßschutz" (self-regulated processes of habitat development) for nature conservation aims is critically discussed with emphasize to habitat selection of Odonata and Amphibia. In most cases self-regulated processes are unsuitable to realise the tasks of habitat and species conservation in Central Europe.] Address: Kuhn, J., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82319 Seewiesen. E-mail: kuhn@mpi-seewiesen.mpg.de

1880. Kunz, B. (2000): Zum Lac Obeira in Algerien. *Libellennachrichten* 4: 16-18. (in German). [Report on a short odonatological trip to the famous Lac Obeira in Algeria. *Urothemis edwardsii* and *Acisoma panoroides ascalapoides* could not be traced.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@gmx.de

1881. Lafontaine, R.-M.; Goffart, P. (2000): *Compte-rendu de l'excursion du 18 juillet 1999 en Gaume ou "Peut-on voir 40 espèces de libellules en une journée en Wallonie?"*. *Gomphus* 16(1): 106-110. (in French). [34 species were observed near Gaume, Belgium. Of

special interest are observations of *Coenagrion scitulum*, *C. mercuriale*, *C. pulchellum*, *Somatochlora flavomaculata*, *S. arctica*, *Thecagaster bidentata*, *Crocothemis erythraea*, and *Sympetrum fonscolombei*.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

1882. Laurila, A. (2000): Behavioural responses to predator chemical cues and local variation in antipredator performance in *Rana temporaria* tadpoles. *Oikos* 88(1): 159-168. (in English). ["Antipredator behaviour is an important factor influencing survival probability of prey animals, and it may evolve rapidly as a response to changes in predator regime. I studied antipredator behaviour of common frog (*Rana temporaria*) tadpoles from three populations that differ in predator regimes. In the first experiment, tadpoles obtained from four natural matings in each population were subjected to chemical cues from either European perch (*Perca fluviatilis*) or from larvae of the dragonfly *Aeshna juncea*. Tadpoles decreased their activity in response to both predators, but the spatial behaviour of tadpoles differed between the two predator treatments. In general, there were no differences in behaviours among the populations, but in three out of four studied behaviours there were differences between parentages within the populations suggesting that these behaviours may be genetically determined. The lack of a significant Predator X Population interaction suggests no differences in plastic antipredator behaviour among the populations, while the lack of significant Predator X Parentage interaction suggests no genetic variance within the populations for plastic antipredator behaviour. In the second experiment, tadpoles from the three populations were exposed to predation by a free-ranging *A. juncea*. In line with the first experiment, there were no differences in survival rate between the populations. *R. temporaria* tadpoles seem to rely heavily on plastic antipredator behaviour as their main response to predator chemical cues. There was very little indication of local behavioural differentiation and the possible reasons for the lack of divergence among populations are discussed." (Author)] Address: Laurila, A., Dept of Population Biology, Evolutionary Biology Centre, Uppsala Univ., Norbyvagen 18d, SE-75236, Uppsala, Sweden

1883. Lederer, P. (2000): The travelling ode show. *Argia* 12(2): 3-6. (in English). [Teaching about dragonflies] Address: Lederer, P.T., 33 Hamden Avenue, Staten Island, NY, 10306, USA

1884. Lingenfelder, U. (2000): Die Libellenfauna (Odonata) des Wieslautertales und ausgewählter Seitentäler im Pfälzerwald. Diplomarbeit, FB Sozial- und Umweltwissenschaften, Fachrichtung Biogeographie, Universität des Saarlandes: 186 pp. (in German). [The Pfälzerwald-region is situated in the southwestern part of Rheinland-Pfalz, Germany. The natural heritage of this region is outstanding, and so is its odonate fauna. Most important are the so called "Wooge", standing waters with a flora and fauna of transition bogs. Of European importance are the running waters with their strong populations of *Ophiogomphus cecilia*, and other river dwelling odonate species. One of these running waters, the Wieslauter, and the waters situated close to this brook, were investigated in 1999. 32 species could be observed. Each of the species is treated in a monographic way, and the records are mapped localitywi-

se. This is a very sound regional fauna with a lot of interesting details.] Address: Lingenfelder, U., Seebergstr. 1, 67716 Heltersberg, Germany

1885. Lohr, M. (2000): Reproduction de *Trithemis annulata* (Palisot de Beauvois, 1805) dans le département des Pyrénées-Orientales (Odonata, Libellulidae). *Martina* 16(2): 51-52. (in French with English summary). [July 5, 1999 two exuviae of *T. annulata* were found on the banks of River Tech near its mouth at the Mediterranean Sea, 15 km south-east of Perpignan, France.] Address: Lohr, M., An der Kirche 22, D-37671 Hörter, Germany

1886. Lucker, T. (2000): Revitalisierung von Fließgewässern der Agrarlandschaft - Ergebnisse limnologischer Effizienzuntersuchungen und Schlußfolgerungen für die Praxis. *Artenschutzreport* 9 (1999): 48-55. (in German with English summary). ["Since 1990 the nature conservation project „Revitalisierung in der Ise-Niederung" has taken a variety of measures to revitalise the cultivated land in the catchment area of the river Ise (east Lower Saxony). Scientific efficiency controls were carried out to determine the results for nature conservation aims. An increase of macrozoobenthos species diversity over a period of 7 years has been observed. However the number of rheotypical species showed more growth compared to limnotypical or indifferent species. These positive changes were analysed and discussed. References for establishing nature conservation achievements in landscapes of intensive farming were given from the limnological point of view." (Author). 7 odonate species including *Calopteryx splendens*, *Gomphus vulgatissimus*, and *Ophiogomphus cecilia* are recorded from 3 sample localities.] Address: Lucker, T., Otter-Zentrum, D-29386 Hankensbüttel, Germany

1887. Mahato, M. (2000): Resource partitioning among larvae of six coexisting odonate species of the Kali Gandakiriver, central Nepal (Anisoptera). *Odonatologica* 29(3): 209-223. (in English). ["Odonate larvae were collected from 50-1190 m elevation in central Nepal's Gandaki River from 1984 to 1986. Resource partitioning among coexisting odonate spp. at high (>500m) and low (<500m) elevations was investigated by examining their gut contents. At both elevations, diet differences between *Anisogomphus occipitalis* and *Davidius* sp. were statistically significant. *A. occipitalis* ate mostly midges whereas *Davidius* sp. ate mayflies and caddisflies as well as midges. At low elevation there was no diet difference between *A. occipitalis* and *Paragomphus lineatus* nor between the libellulids *Crocothemis servilia* and *Trithemis festiva*. Analyses of niche breadths indicate overlap between *Davidius* sp., *Macromia moorei*, *C. servilia*, and *T. festiva*, and between *A. occipitalis* and *P. lineatus*. Significant diet differences in both *A. occipitalis* and *Davidius* sp. between low and high elevations may indicate negative interactions in the presence of other coexisting species at low elevation. Similarly, at low elevation both spp. have a narrow niche breadth, a low average number of prey items per gut, and also more empty guts than at high elevation. Mean body weights of studied Odonata were relatively higher at lower elevation than at higher elevation. Predatory interactions seemed to be of little or no importance in structuring this lotic odonate assemblage, in contrast with lentic Odonata in other studies." (Author)] Address: Mahato, M., URS Greiner Woodward

Clyde, P.O. Box 681059, Franklin, Tennessee 37067, USA. E-mail: MahendraMahato@urscorp.com

1888. Mardulyn, H. (2000): Évolution des populations d'Odonates dans la réserve naturelle du Bec du Feyi, en Ardenne. *Gomphus* 16(1): 37-48. (in French with English and Dutch summaries). ["Since the creation of the nature reserve of Bec du Feyi in 1992, its dragonfly populations have been systematically monitored [...]. After seven seasons, 25 species have been found. The noticeable increase of observed annual species number, from 1993 to 1999, could be a result of the conservation and management measures taken in the reserve. Possible causes of important populations fluctuations noticed in some species are discussed." (Author) Emphasize is given to the development of the populations of *Coenagrion puella*, *Lestes sponsa*, and *Gomphus pulchellus*.] Address: Mardulyn, H., Avenue de la Liberté, 101, B-1080 Bruxelles, Belgium

1889. Marinov, M. (2000): Pocket field guide to the dragonflies of Bulgaria. Eventus Publishing House, Sofia. ISBN 954-90613-1-0: 104pp. (in Bulgarian). [In fact this is the first color field guide for any invertebrate group for Bulgaria. Only imagines are dealt with. Twelve color photos (page 14-17) represent different types of habitats in Bulgaria. The identification key (page 18-32) is organized using color computer graphics with arrows pointed to the exact morphological features. All 66 species so far known for Bulgaria are illustrated (page 34-95) and the color graphics from the identification key are added. In addition very short information for each species is provided. It refers to the species dimorphism (if any) - sexual and age dependend; closely related species; subspecies in Bulgaria (only for established ones); ecological notes (larval preferences); flying period (according to the earliest and latest observation dates for Bulgaria) and measurements (total length and wing span). The guide suffers from some mistakes the most significant of which is the coloration of the abdominal tip in female *Ischnura pumilio* (page 19 and 57), which is illustrated like in the male. (Autorreferat Milen Marinov). On page 79 frons and wing venation of *Somatochlora meridionalis* and *S. metallica* seem to be exactly the same computer graphs which correspond to *S. metallica*. The distribution maps of the species are useful. "The British Government, through the British Embassy in Bulgaria, decided to fund the publication because such a well-designed guide, used properly, can help in encouraging an interest of nature among young people in Bulgaria. We hope that the guide will bring a great deal of enjoyment to many people, and help them to appreciate and become more involved in Bulgaria's nature heritage."] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

1890. Martens, A. (2000): Group oviposition in *Coenagrion mercuriale* (Charpentier) (Zygoptera: Coenagrionidae). *Odonatologica* 29(4): 329-332. (in English). ["Pairs aggregate during oviposition. Discrimination experiments with pairs of floating leaves of *Berula erecta* show that tandems land preferentially on leaves where a single motionless male in the typical vertical position of a tandem male is present." (Author)] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: andreas.martens@tu-bs.de

1891. Mauersberger, R. (2000): Rezentes Fließgewässervorkommen von *Onychogomphus forcipatus forcipatus* in Brandenburg (Odonata: Gomphidae). *Libellula* 19(1/2): 97-103. (in German with English summary). [In 1999, the reproduction of *Onychogomphus forcipatus* (L.) in running waters in Brandenburg was recorded for the first time. The habitats are brooks between Feldberg (Mecklenburg-Vorpommern) and Lychen (Brandenburg) with solid sediments comprising gravel and shells, fully shaded by forests and supplied with warm water by clear water lakes. Other rheophilous species found there are *Gomphus vulgatissimus*, *Calopteryx virgo*, *Unio crassus* and *Theodoxus fluviatilis*. Lake habitats of *O. forcipatus* as they are typical for the glacial formed landscape of NE-Germany are situated nearby." (Author)] Address: Mauersberger, R., Waldstr. 4, D-16278 Steinhöfel, Germany. E-mail: FoerderevereinUckermaerk.Seen@t-online.de
1892. May, M. (2000): Margaret Westfall: 1921-2000. *Argia* 128(1): 4-5. (in English). [Obituary of Margaret Westfall born in Corning NY (USA), on August 5, 1921 and passed away in Gainesville, GA, on February 9, 2000.] Address: ML 5109L 5109ay, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA
1893. McIntyre, P.B.; McCollum, A.S. (2000): Responses of bullfrog tadpoles to hypoxia and predators. *Oecologia* 125: 301-308. (in English). [Low dissolved oxygen concentrations present numerous challenges for non-air-breathing aquatic organisms. Amphibian larvae and their predators can respond to oxygen levels by altering their behavior and physiology, but the ecological consequences of these responses are generally unknown. We conducted two laboratory experiments to study the effects of dissolved oxygen on respiratory behavior and susceptibility to predation of larval bullfrogs (*Rana catesbeiana*). In the first, we exposed small, lungless tadpoles to a predatory salamander larva (*Ambystoma tigrinum*) under high and low oxygen conditions. More tadpoles were consumed in high oxygen tanks than in low ones, presumably because salamanders remained near the surface in the low oxygen tanks while most tadpoles rested on the bottom. Tadpole activity depended on both oxygen and predator presence: swimming decreased after addition of salamanders under high oxygen, but increased under low oxygen. In the second experiment, we examined the effect of predator chemical cues on the air-breathing rate of large tadpoles with well-developed lungs under low oxygen conditions. In the presence of chemical cues produced by dragonfly larvae (*Anax longipes*) consuming bullfrog tadpoles, air-breathing and swimming were significantly reduced relative to controls. These experiments demonstrate the potential impact of dissolved oxygen on predator-prey interactions, and suggest that outcomes depend on the respiratory ecology of both predator and prey." (Authors)] Address: McIntyre, P.B., Department of Ecology and Evolutionary Biology, Corson Hall, Cornell University, Ithaca, NY 14853-2701, USA
1894. McMillan, V.E. (2000): Postcopulatory behavior in *Libellula pulchella* Drury (Odonata: Libellulidae) and female tactics for avoiding male interference with oviposition. *Journal of insect behavior* 13(4): 573-583. (in English). [Postcopulatory behavior was studied in *Libellula pulchella*, a North American dragonfly in which ovipositing females face frequent harassment by unpaired males seeking matings. Although males performed noncontact guarding of their mates after copulation, females received minimal protection since their guards tended to leave on extended chases of other males when harassment was intense. Ovipositions by unguarded females were even more likely to be terminated by harassment and were disrupted sooner. Female tactics to minimize interference included rapid escape flights, repeated return visits to the water within short time periods, perching when severely harassed, and proceeding with mating when clasped. Female use of multiple oviposition sites is discussed in the context of guarding effectiveness and mate recognition by males." (Author)] Address: McMillan, Vicky, Colgate Univ., Dept. Biol., 13 Oak Dr. Hamilton, NY 13346, USA . E-mail: vmcmillan@mail.colgate.edu
1895. Meurgey, F.; Herbrecht, F.; Gurliat, P.; Dortel, F.; Boureau, A.; Duscoulier, F.; Williamson, T. (2000): Atlas préliminaire des Odonates de Loire-Atlantique. *Martinia* 16 (Suppl. 1): 1-28. (in French with English summary). [Commented maps of the 54 Odonata species recorded so far in Loire-Atlantique département, France.] Address: Meurgey, F., 2, rue Bossuet, F-44000 Nantes, France
1896. Meyer, E.; Meyer, A.; Billen, M. (2000): Fallbeispiel Sauer, ein Karstbach der Paderborner Hochfläche. *Natur- und Umweltschutz Akademie Nordrhein-Westfalen - Seminarberichte* 5: 121-128. (in German). [In a case study the macrozoobenthos of a carstic brook in the east of the federal state Nordrhein-Westfalen, Germany was surveyed from January to October 1996. *Calopteryx splendens* (larva) was found at a single sampling point.] Address: Meyer, Elisabeth, Inst. Spezielle Zoologie, Abt. Limnologie, Westfälische Wilhelms-Universität Münster, Hüfferstr. 1, D-48149 Münster, Germany.
1897. Mikolajewski, D.J.; Miksche, D.; Leipelt, K.G.; Suhling, F. (2000): Weibchenpolymorphismus, Geschlechterverhältnis und Größenunterschiede in französischen Populationen von *Boyeria irene* (Odonata: Aeshnidae). *Libellula* 19(1/2): 1-15. (in German with English and French summaries). In July 1999 exuviae of *B. irene* "were collected at three river systems in southern and southwestern France. Females were polymorphic in regard to cercus length. Whereas at the Gardon de Mialet the ratio of females with long and females with short cerci was about 50 %, we found 41 % females with long cerci at the Gardon de St. Jean and only 12 % at the Aveyron-system. The sex ratio was slightly female biased at all sites. The size (labium length) was significantly different between males and females at all rivers, but did not differ between the two female forms. The ratio of the female forms is compared with results from other parts of the range." (Authors)] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de
1898. Moore, N. (2000): Book review: *Dragonflies: Behaviour and Ecology of Odonata*. Philip S. Corbet. Harley Books, Great Horkeley, 1999. 829 pp. *Biological Conservation* 94: 264. (in English). ["... I am convinced that Philip Corbet's *Dragonflies* is and will remain one of the truly great entomological books." (see also OAS 1565).] Address: Moore N.W., The Farmhouse, 117

Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom

1899. Moore, N.W. (2000): Interspecific encounters between male aeshnids: do they have a function? *International Journal of Odonatology* 3(2): 141-151. (in English). ["Male aeshnid dragonflies at a small pond (circumference ca 90 m) in Cambridgeshire, U.K. generally pursued males of other aeshnid species as well as their own. As a result of these encounters the pursued insect frequently left the pond, particularly when it belonged to a smaller species. Libellulids, which differed greatly from the aeshnids in size and appearance, were also pursued. Male aeshnids attacking males of other species frequently pressed home their attacks even when they were close enough apparently to identify the pursued insect. Consequently interspecific pursuits appear to have a function over and above ensuring that no opportunity is lost to mate or to drive out a conspecific rival. It is suggested that a positive function of interspecific pursuit is practice in developing fighting skills against conspecifics." (Author)] Address: Moore, N.W., The Farm House, 117 Boxworth End, Swavesey, Cambridge, CB4 5RA, UK.

1900. Moritz, K. (2000): Beitrag zur Insektenfauna des Bezirks Mattersburg, Burgenland. *Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen* 52(1-2): 35-54. (in German with English summary). [Presentation of data of different insect groups collected in northern Burgenland (environs of Mattersburg): Lepidoptera, Coleoptera, Saltatoria, and Odonata.] Address: Moritz, K., Bachzeile 7, A-7022, Loipersbach, Austria

1901. Müller, J.M. (2000): *Coenagrion lunulatum* in einem oberschwäbischen Moorgebiet (Odonata: Coenagrionidae). *Libellula* 19(1/2): 65-69. (in German with English summary). ["In 1998 and 1999 the species was recorded at a bog pond. The status of this rare species in southwestern Germany is briefly discussed. Observations on phenology and behaviour are given and the habitat is characterized." (Author)] Address: Müller, J.M., Goethestr. 25, D-89601 Schelklingen, Germany. E-mail; Jochen.Mueller@Student.Uni-Ulm.de

1902. Nelson, B. (2000): Dragonflies of the Burren and surrounding areas. *Atropos* 11: 9. (in English). [The odonate fauna of the seasonal turloughs and permanent lakes and fens of the Burren National Park situated in north Clare, North Ireland, UK is shortly described. Of some interest is the metapopulation of *Lestes dryas* in this region.] Address: Nelson, B., Dept of Zoology, Ulster Museum, Botanic Gardens, Belfast BT9 5AB, UK.

1903. Nelson, B. (2000): Irish Odonata Recording Project. *Atropos* 11: 60. (in English). (Verbatim) ["A new project to record the distribution of Odonata in Ireland, DragonflyIreland, has been launched. This ambitious four-year project is supported by Dúchas, The Heritage Service, Environment and Heritage Service, and the Ulster Museum, Belfast. The active participation of all dragonfly recorders and naturalists is sought, and we would especially welcome records from anyone visiting Ireland. Old records would also be very welcome. Full details of the scheme can be found on the Dragonfly-Ireland webpages at <http://www.ulstermuseum.org.uk/> cedar or by contacting the scheme organiser Robert Thompson, 8 Weaver's Court, Banbridge, Co Down BT32 4RP. Enquiries about species or habitats can be

addressed to me at the address below."] Address: Nelson, B., Dept. of Zoology, Ulster Museum, Botanic Gardens, Belfast BT9 5AB, UK

1904. Nessimian, J.L.; Ribeiro, J.R.I. (2000): On the biology of *Buenoa platycnemis* (Fieber) (Insecta, Heteroptera, Notonectidae) at Restinga de Marica, Rio de Janeiro State, Brazil. *Revista Brasileira de Zoologia* 17 (1): 229-239. (in Portuguese with English summary). ["A monthly quantitative study on *B. platycnemis* (Fieber, 1851) was carried out in a sand dune marsh, on the littoral of Rio Janeiro State. The aims of this study were to correlate the life cycle of the species with the seasonal regime of the water body, defining steps of the annual cycle, age structure, and to indicate oviposition sites and trophic relations. The species shows a marked seasonal tendency. The major steps of the life cycle obtained were an invernal (weak) with a predominance of imagines, followed by another of population expansion, characterized by the absence of adults, massive eclosures and predominance of low instar nymphs. Probably, *B. platycnemis* has a sensibility to water level variation and might be influenced by the concentration of *Spirogyra* sp. (Chlorophyceae) in the water column. In relation to oviposition, *B. platycnemis* has not shown preference for any macrophyte [...]. The observed predators of *B. platycnemis* were *Anax amazilli* (Burmeister, 1839) (Aeshinidae), *Erythemis credula* (Hagen, 1861) (Libellulidae) and other Odonata [...]" (Authors)] Address: Nessimian, J.L.; Ribeiro, J.R.I., Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, 21944-970 Rio de Janeiro, RJ Brazil

1905. O'Brien, M. (2000): A brief history of odonatologists at the University of Michigan Museum of Zoology. *Argia* 12(2): 13-16. (in English). [Edward Bruce Williamson, Clarence H. Kennedy, Dolly Gloyd, Mike Wright; for German odonatologists the paragraph on Friedrich Förster ist of special interest; this contribution will be of enormous importance for all odonatologists interested in the history of odonatology because it opens a window to new and unexpected sources of information.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

1906. O'Brien, M. (2000): Leonard's *Acanthagrion* specimens presents continuing problems for UMMZ. *Argia* 12(1): 20-21. (in English). [Brief history of J.W. Leonard's revision of the genus *Acanthagrion* and the problems caused by publishing his thesis unreviewed posthumously.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

1907. Olsvik, H. (2000): A dragonfly visit in Ostfold, SW-Norway in 1999. *Nordic Odonatological Society Newsletter* 6(1): 13-15. (in Norwegian with English summary). ["Dammyrtjenn, Rakkestad got the Norwegian record in best numbers of *Somatochlora flavomaculata* when more than 50 ind. were seen. Gjolsjo, Marker has one of Norways most dense occurrences of *Leucorrhinia pectoralis* and 50-100 ind. were observed. Brutjenna, Marker still houses occurrences *Leucorrhinia caudalis* and *L. albifrons*. *Coenagrion puella*, that is rare in Ostfold, found again in some ponds near Refsahl, Fredrikstad. At Svarverudtjenn, Eidsberg 18 dragonfly species were observed, probably a Norwegian record at one locality at one day. *Epithea bimaculata* was ob-

servered at Gyltetjennet, Trogstad and Moentjenn, Eidsberg." (Author)] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

1908. Olsvik, H. (2000): Dragonflies in man influenced environments. Nordic Odonatological Society Newsletter 6(1): 4-7. (in Norwegian with English summary). The following species are treated: *Calopteryx splendens*, *C. virgo*, *Lestes dryas*, *Platycnemis pennipes*, *Coenagrion armatum*, *Aeshna cyanea*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Cordulegaster boltonii*, *Somatochlora flavomaculata*, *Libellula depressa*, and *Sympetrum flaveolum*.] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

1909. Olsvik, H. (2000): Dragonflies in Rindal, western central Norway. Nordic Odonatological Society Newsletter 6(1): 18-19. (in Norwegian with English summary). [65 localities of the Rindal municipality in More & Romsdal, Norway have been surveyed between 1971 and 1998. A total of 19 species is listed in a tab. according to the frequency of records. *Aeshna juncea*, *Coenagrion hastulatum*, *Leucorrhinia dubia*, and *A. caerulea* could be detected at more than 50% of the surveyed localities. *Sympetrum striolatum*, and *Leucorrhinia rubicunda* are the most rare species in the region (each 1 record). The most interesting (seven) localities are shortly presented.] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

1910. Olsvik, H. (2000): En liten samling fra Lefkas, Hellas. Nordic Odonatological Society Newsletter 6(1): 19. (in Norwegian with English summary). [Short documentation of 27 specimens from 8 species collected by Torgeir Berge in the last week of May 1998 on the Island Lefkas, Greece: *Calopteryx virgo festiva*, *Coenagrion scitulum*, *Callaieschna microstigma*, *Gomphus schneideri*, *Libellula fulva*, *Orthetum coerulescens*, *Crocothemis erythraea*, and *Sympetrum fonscolombii*.] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

1911. Olsvik, H. (2000): From the 5th summer meeting of the nordic odonatological society in Aure, Norway, 6.-8. August 1999. Nordic Odonatological Society Newsletter 6(1): 11-12. (in Norwegian with English summary). [Short report from the 5th meeting of the Nordic Odonatological Society in Aure, Norway, and presentation of the results of the odonatological survey of 11 localities. *Aeshna caerulea*, *Somatochlora alpestris*, *S. arctica*, *Sympetrum nigrescens*.] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

1912. Olsvik, H. (2000): Mer om larve / exuvia -kjennetegn på *Somatochlora arctica*. Nordic Odonatological Society Newsletter 6(1): 17. (in Norwegian). ["A larvae of *Somatochlora arctica* lacking the specific recognising feature/marks at the underside of abdominal segment 7 was found in Tingvoll, western central Norway October, 2nd. 1999." (Author)] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

1913. Orr, R. (2000): The dragonflies and damselflies of Finzel swamp (Maryland). *Argia* 12(1): 13-14. (in English). [The Finzel swamps are one of the last relict ice age plant community places left in Maryland, USA. In this habitat with cold microclimate 40 odonate species could be recorded including *Enallagma antennatum*, known in Maryland only from this locality.]

Address: Orr, R.L., 5215 Durham Road East, Columbia, MD 21044-4444, USA. E-mail: richard.l.orr@usad.gov

1914. Pankratius, U. (2000): Vermehrungsnachweis von *Sympetrum meridionale* in Nordbayern (Odonata: Libellulidae). *Libellula* 19(1/2): 85-88. (in German with English summary). ["On 26-VI-1999 a newly emerged male was found at the fish-ponds "Schwarzweiher" in the district of Höchststadt/Aisch, Bayern, Germany. This is the first record of reproduction for this species in northern Bavaria." (Author)] Address: Pankratius, U., Al-lensteiner StraBe 6, D-90766 Fürth, Germany.

1915. Papazian, M. (2000): Chronique de l'insolite: (2 ème note): *Sympetrum fonscolombii* (Selys, 1840), la mer et l'automobile. *Martinia* 16(1): 9-10. (in French, with English summary). [France; oviposition in open sea, and on the clearcoat of a car are reported.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

1916. Parr, A. (2000): An annotated list of the Odonata of Britain and Ireland. *Atropos* 11: 10-20. (in English). [According four categories, the odonate species recorded in Britain are listed and commented: A: Species resident in Britain and Ireland or recorded as a genuine immigrant (n=55). B: Species whose status is unclear or where doubt exists about the validity of records (n=3). C: Exotics. Species recorded as obvious accidental introductions, principally from aquatic nurseries (n=12). D: Species known only from the Channel Islands (n=2).] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

1917. Paternoster, T. (2000): Implantation récente du *Sympetrum* à nervures rouges (*Sympetrum fonscolombii* Selys, 1840) dans le bassin de la Haine. *Gomphus* 16(1): 61-68. (in French with English and Dutch summaries). ["Since 1996, repeated observations of *Sympetrum fonscolombii* adults groups have been done in three noteworthy humid areas from the Haine basin (the marshes of Harchies-Hensies-Pommeroeul, the approved nature reserve of Thieu, and an old quarry at Ville-rot). The first neonate of this species has been seen in the nature reserve of Thieu in September 1999, denoting a successful reproduction. This meridional species, considered a few years before as being rare in Wallonia, seems now well established in this area of the hen-nuyer district." (Author)] Address: Paternoster, T., C.R.N.F.B. 10, rue des Preaux B-7321 Harchies, Belgium. E-mail: T. Paternoster (c)mrw.wallonie.be.

1918. Paulson, D. (2000): First record of two tropical damselflies from the United States. *Argia* 12(1): 12. (in English). [USA, Florida; *Nehalennia minuta* (Selys in Sagra, 1857), *Chrysobasis lucifer* Donnelly, 1967] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

1919. Peters, G. (2000): Unbekannte Bekannte: die Anax-Species in Europa (Odonata: Aeshnidae). *Libellula* 19(1/2): 53-64. (in German with English summary). ["The records of a fifth Anax species in Europe, namely *A. junius* (DRURY), invited comment on the systematics and nomenclature of the taxon Anax in general and the westpaleartic species in particular, supplemented by remarks on their species-specific characters, including a determination key for their exuviae. It seems likely that *A. junius* will appear again in western Europe. Thus

strong emphasis should be put on accurate observations of the activities of living specimens as well as on safeguarding of voucher specimens and their examination by specialists." (Author)] Address: Peters, G., Museum für Naturkunde, Institut für Systematische Zoologie, Invalidenstr. 43, D-10115 Berlin, Germany. E-mail: dirzool@rz.hu-berlin.de

1920. Pinkney, A.E.; McGowan, P.C.; Murphy, D.R.; Lowe, T.P.; Sparling, D.W.; Ferrington, L.C. (2000): Effects of the mosquito larvicides temephos and methoprene on insect populations in experimental ponds. *Environmental Toxicology and Chemistry* 19(3): 678-684. (in English). ["The nontarget effects of Abate(r) 4E (44.6% temephos) at 0.054 kg of active ingredient (a.i.) per 1 ha and of Altosid(r) Liquid Larvicide (5% methoprene) at 0.011 kg a.i./ha were investigated in 18 experimental ponds (average area, 202 m² maximum depth. 0.7 m) at Patuxent Wildlife Research Center, Laurel, Maryland, USA. Ponds were sprayed three times at 3-week intervals. Six ponds were sprayed with Abate, six with Altosid, and six with distilled water. Two insect-emergence traps per pond collected for 7 d and were then harvested 1 d before each spray and 13 to 14 days afterward. A repeated measures analysis of variance (ANOVA) revealed significant reductions in Shannon diversity, equitability, and numbers of individuals, species, and families in the Abate ponds relative to controls. Significant reductions also occurred in Ephemeroptera, Odonata, Diptera, Chironomidae, and Chaohorus sp. Hester-Dendy samplers were installed before spray one and harvested 16 d after spray three. Based on one-way ANOVA, Shannon diversity, equitability, and number of Ephemeroptera and Chironomidae were significantly reduced in the Abate ponds. Emergence data indicate only isolated cases with significant reductions in the Altosid ponds relative to controls, and the Hester-Dendy data indicate no significant differences between the Altosid and control ponds." (Authors)] Address: Pinkney, A., U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, 177 Admiral Cochrane Drive, Annapolis, Maryland 21401 tU.S. Geological

1921. Piper, W.; Krüner, U. (2000): Libellennachrichten. *Libellennachrichten* 4: 1-20. (in German). [Volume 4 of the newsletter of the Society of German Speaking Odonatologists contains information on recent activities of the society as well as the minutes of the 19th meeting, announcement of meetings, reviews of odonatological publications and CD-ROM's, new theses on Odonata, calls for cooperation ...] Address: Krüner, Ulrike, Gelderner Str. 39, D-41189 Mönchengladbach, Germany

1922. Plaistow, S.J.; Tsubaki Y. (2000): A selective trade-off for territoriality and non-territoriality in the polymorphic damselfly *Mnais costalis*. *Proceedings of the Royal Society Biological Sciences Series B*. 267(1447): 969-975. (in English). ["Males of the damselfly *Mnais costalis* occur as territorial orange-winged 'fighter' males or non-territorial clear-winged 'sneaker' males. Their morph life histories differ considerably but the estimated lifetime reproductive success is the same for the two morphs. In this study we compared the developmental and reproductive costs associated with the two morphs. Orange-winged male and female reproductive costs resulted in a decline in adult fat reserves with increasing age. In contrast, the fat reserves of clear-winged males remained constant with adult age. Body size was posi-

tively correlated with mating success in orange-winged males, but had no influence on the mating success of clear-winged males. The orange-winged male flight muscle ratios (FMRs) were significantly higher than the clear-winged male and female FMRs. However, there was no difference in the size-corrected fat reserves of the two morphs; both had higher fat reserves than females. The gain in mass between eclosion and reproduction in orange-winged males and females was almost double the mass gained by clear-winged males, suggesting that clear-winged male development is less costly. An experiment in which pre-reproductive levels of nutrition were manipulated confirmed this." (Authors)] Address: Plaistow, S.J.; Tsubaki Y., Laboratoire Ecologie-Evolution (UMR CNRS 2155 Biogeosciences), Université de Bourgogne, 6 Boulevard Gabriel, F-21000 Dijon, France

1923. Pritchard, G.; Harder, L.D.; Kortello, A.; Krishnaraj, R. (2000): The response of larval growth rate to temperature in three species of coenagrionid dragonflies with some comments on *Lestes disjunctus* (Odonata: Coenagrionidae, Lestidae). *International Journal of Odonatology* 3(2): 105-110. (in English). ["Larval growth rate has the same temperature coefficient in three species of coenagrionids, but *Argia vivida* and *Amphiagrion abbreviatum*, which frequently live in geothermally heated water, grow fastest at 29.0-30.0°C compared with 23.4°C for *Coenagrion resolutum*, which lives in cooler water. Survival below 15°C in the laboratory was much better in *C. resolutum*. These characteristics are reflected in the distributions of the three species, *C. resolutum* ranging much further north in North America than the other two species, but not penetrating as far south. By contrast, the temperature coefficient for *Lestes disjunctus* is higher than that of the coenagrionids, and this is related to a different life history. In the coenagrionids, one or more winters are spent in the larval stage. In *L. disjunctus*, winter is spent in the egg stage, and larval growth must be completed quickly." (Authors)] Address: Pritchard, P., Department of Biological Sciences, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4. E-mail: gpritcha@ucalgary.ca

1924. Ramirez, A.; Paulson, D.R.; Esquivel, C. (2000): Odonata of Costa Rica: Diversity and checklist of species. *Revista de biología tropical* 48(1): 247-254. (in English). ["An updated list of the Odonata of Costa Rica is presented containing 268 species. Since the last published list for the country, 41 additional species have been reported. The country is the best studied in Central America. The most species-rich families are Libellulidae, Coenagrionidae, Gomphidae, and Aeshniidae, together comprising similar to 75% of the total fauna. Most species in the country are also found in South America, indicating a tendency for wide ranges rather than endemism. However, about a fifth of the species appear to be endemic to the Costa Rica-Panama region. Estimates of the range of the proportion of total world species occurring in Costa Rica lead to predictions of a range of 5 600-9 000 species of Odonata worldwide." (Authors)] Address: Ramirez, A., Univ. Georgia, Inst. Ecol., Athens, GA 30602, USA. E-mail: aramirez@arches.uga.edu

1925. Ramos Hernández, J.M. (2000): Predation by the bat *Macrotus waterhousei* minor (Chiroptera: Phyllostomatidae) on dragonflies. *Argia* 12(2): 7-8. (in Eng-

English). [Survey of bat predation on dragonflies in the province Sancti-Spiritus, Cuba; the 17 odonate taxa preyed are listed locality wise (n=8) in a tab.] Address: Ramos Hernández, J.M., Apartado Postal 2204, Sancti-Spiritus, Cuba CP. 60100

1926. Raskin, R. (2000): Renaturierung eines Heidemoores im Hohen Venn. Ergebnisse einer fünfjährigen ökologischen Effizienzkontrolle. Naturschutz und Landschaftsplanung 32(7): 212-221. (in German with English summary). ["A degraded heath-moor complex in the 'Hohes Venn' (Eifel), comprising 4 ha, has been renatured as a compensatory measure [...]. The restoration measures included rewetting, tree removal and topsoil removal during winter 1992/93. In an ecological efficiency control effects of the renaturation on flora, vegetation and fauna have been investigated for five years. So far the renaturation was successful. The size of boggy heathland and moors has more than doubled. With an increase of typical plant and animal species the quality of the heathland biotopes has improved [...]."] *Aeshna juncea*, *Leucorrhinia dubia*, *Libellula quadrimaculata*, *Pyrrhosoma nymphula*, *Sympetrum danae*, and *Sympetrum striolatum* could be observed in the heath-moor complex.] Address: Raskin, R., Kirberichshofer Weg 6, D-52066 Aachen, Germany. E-mail: info@raskin-ac.de

1927. R.C. (2000): Analyses d'ouvrages: Die Exuvien Europäischer Libellen, Insecta, Odonata. Par Bernd Gerken et Klaus Sternberg. 1999. Huxaria-Verlag. ISBN 3-9805700-4-5. *Martinia* 16(1): 18-22. (in French). [Book review of the bilingual (German/English) determination key of most of the European dragonfly exuviae.] Address: not stated

1928. Reinhardt, K. (2000): Eine Libellenbeobachtung in etwa 5000 m Höhe. *Libellennachrichten* 4: 15-16. (in German). [Note on a book (Walter Steiner: Auf den Gletschern des Pamir [Tadshikistan, Pamir-Alai-mountains]) with a short notice on a dragonfly gliding from ice tip to ice tip on a glacier. With reference to a chapter in Philip Corbet's (1999) book, Klaus Reinhardt comments on some further high mountain records of dragonflies. It is likely that the record of Steiner refers to *Pantala flavescens*.] Address: Reinhardt, K., Institut für Ökologie, Universität Jena, Dornburger Str. 159, D-07743 Jena, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

1929. Relyea, R.A.; Werner, E.E. (2000): Morphological Plasticity in Four Larval Anurans Distributed along an Environmental Gradient. *Copeia* 2000(1): 178-190. (in English). ["We investigated morphological plasticity to the presence of predators in the tadpoles of four ranid frog species distributed along a pond hydroperiod gradient in southeast Michigan. We first reared all four species (Wood Frog, *Rana sylvatica*, Leopard Frog *R. pipiens*, Green Frog, *R. clamitaw*, and Bullfrog, *R. catesbeiana*) under identical laboratory conditions in the presence and absence of caged larval dragonflies (*Anax* spp. [*A. junius*, *A. longipes*]). We then reared wood frog and leopard frog in outdoor mesocosms to examine the predator-induced responses during ontogeny. Finally, we reared leopard frog with predators fed either leopard frog or wood frog larvae to determine whether prey responses depended upon predators consuming conspecific prey. All four ranids exhibited some degree of morphological change in the presence of *Anax*; these differences were species specific and fairly robust to

different experimental conditions. The responses over ontogeny indicated that the changes were direct responses to the predator's presence and not an indirect result of the predator slowing anuran growth or development. Finally, larval leopard frog responded similarly to predators feeding on conspecifics and congeners. Taken together, these results suggest that morphological responses to predators may be relatively common in larval anurans. Further, because many of the responses are known to be adaptive antipredator strategies, predator-induced morphological plasticity has important evolutionary and ecological implications." (Authors)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

1930. Reyniers, J. (2000): Vespreidmgsonderzoek van libellen in Klein-Brabant (provincie Antwerpen). *Gomphus* 16(1): 5-36. (in Dutch with English and French summaries). ["Distribution of dragonflies in 'Klein - Brabant (province of Antwerp). This study shows the results of an inventory over 1996 and 1997, where most of the 1 km-squares in the communes of Bornem, Puurs and Sint-Amands were visited. To these data older observations going back to 1983 and recent ones from 1998 and 1999 were added. During the inspections numbers of adults were counted and proofs of reproduction (egg-laying, exuvia, ...) noted." (Author) The results of the study are mapped, and the distribution of the species is discussed in detail.] Address: Reyniers, J., Pandgatheide 2, B-2890 Sint-Amands, Belgium. Email: joost.reyniers@lin.vlaanderen.be

1931. Rhl (2000): Warum Libellen rückwärts fliegen. *Welt am Sonntag* 30. April 2000: (in German). [Report on the work of S. Gorb on functional morphology of dragonfly wings in a newspaper.] Address: not stated

1932. Rincon, J. Cressa, C. (2000): Temporal variability of macroinvertebrate assemblages in a neotropical intermittent stream in Northwestern Venezuela. *Archiv für Hydrobiologie* 148(3): 421-432. (in English). ["Changes in macroinvertebrate assemblages were identified among different flow phases during the dry and rainy seasons in a neotropical intermittent stream in Northwestern Venezuela. Invertebrates and physicochemical parameters were sampled during 9 months to assess temporal changes in biotic and abiotic variables. Macroinvertebrate densities decreased following either a high-flow or a stream drought. Three invertebrate assemblages were identified via PCA and cluster analysis..." (Authors) Abundance of *Coenagrionidae* was highest at "low-intermediate flow" and "high flow", abundance of *Libellulidae* was highest at "low-intermediate flow".] Address: Rincón, J., Department de Biología, Facultad Experimental de Ciencias, Universidad del Zulia. Apdo. 15247, Maracaibo 4005-A, Las Delicias, Estado Zulia. Venezuela

1933. Rodrigues Capitulo, A. (2000): Population dynamics of larval stages of *Tauriphila risi* Martin and *Erythemis attala* (Selys) in Punta Lara Gallery Forest, Buenos Aires, Argentina (Anisoptera: Libellulidae). *Odonatologica* 29(4): 333-340. (in English). ["Larval populations of the 2 spp. were studied in a lentic freshwater environment. 13 larval instars were recognized from plots of head width and length of wing-pads. Density, population dynamics, age structure, flying period and winter

quiescence were analysed. Both uni- and semivoltine individuals were found. Microhabitat differences were found between the 2 spp. T. risi preferring *Pistia stratiotes* and *Hydrocotyle ranunculoides*, whereas *E. attala* preferred *lemnaceas*. A life table was constructed for *T. risi*, which showed mortality rate maxima at hatching and at 10 and 23 months." (Author)] Address: Rodrigues Capitulo, A., Instituto de Limnología "Raúl A. Ringuelet", Universidad Nacional de La Plata, C.C. 712, AR-1900 La Plata, Argentina

1934. Rolff, J. (2000): Intime Interaktionen: ektoparasitische Wassermilben an Libellen (Hydrachnidia; Odonata). *Libellula* 19(1/2): 41-52. (in German with English summary). ["This review of host-parasite interaction in dragonflies and water mites has three major aims. First, the life cycle of water mites parasitizing dragonflies is briefly reviewed. Second, the impact of water mite parasitism on dragonfly condition and ecology is illuminated. Water mite parasitism lowers dragonfly survivorship and decreases clutch sizes. Third an experimental approach to investigate which water mite species parasitizes which dragonfly species is described." (Author)] Address: Rolff, J., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: j.rolff@tu-bs.de

1935. Rolff, J.; Antvogel, H.; Schrimpf, I. (2000): No correlation between ectoparasitism and male mating success in a damselfly: Why parasite behavior matters. *Journal of insect behavior* 13(4): 563-571. (in English). ["The mating success of individually marked male damselflies parasitized by water mites was closely followed. The number of ectoparasites could be determined exactly from knowledge of the parasite's life cycle. In contrast to previous studies no correlation between water mite infestation and male mating success was revealed. The reasons for this discrepancy may be explained by the inclusion of the parasite's behavior. The body fat content of the males was negatively correlated with the mite load, indicating that parasitism reduces host's condition. It is hypothesised that the water mites damselfly system is not valuable for testing the Hamilton and Zuk hypothesis. Furthermore, selection exerted or mediated by parasites should act during the teneral phase." (Authors) *Enallagma ebrium*, *Coenagrion puella*] Address: Rolff, J., Tech. Univ. Braunschweig, Inst. Zool., Fasanenstr 3, D-38092 Braunschweig, Germany. E-mail: j.rolff@tu-bs.de

1936. Rolff, J. (2000): Water mite parasitism in damselflies during emergence: two hosts, one pattern. *Ecography* 23: 273-282. (in English). ["The infections of emerging damselfly cohorts by ectoparasitic water mites *Arrenurus cuspidator* were followed closely over two years in two populations. In one pond *Coenagrion puella* was the single host species, whereas in the second pond *C. hastulatum* co-occurred. The prevalences found were close to 100%. The mean daily abundance of mites ranged from 1 to 45 mites per host with a peak after roughly one third of the emergence period. The water mites displayed a clumped distribution on their hosts measured by the variance/mean ratio. No differences in parasite abundance due to host sex, head width, or host species could be detected. The abundance of mites was synchronised with host's emergence patterns. This was stronger in the system with two host species. Shaw and Dobson recently showed a generalised relationship of variance/mean of parasite abun-

dance combining data from 269 host parasite systems. The data presented here and some other water mite associations show a significant deviation from this general rule." (Author)] Address: Rolff, J., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: j.rolff@tu-bs.de

1937. Rose, J.S. (2000): Dragonfly days (13-14 may, in the Rio Grande Valley). *Argia* 12(2): 3. (in English). *Brachymesia gravida*, *Gomphus militaris*, *Erythemis plebeja*, *Micrathyria hageni*, *Micrathyria aequalis*, *Enallagma novaehispaniae*, *Tramea calverti*, *Dythemis nigrescens*, *Libellula needhami*, *Erpetogomphus designatus*, *Enallagma signatum*] Address: not sated

1938. Ross, S. (2000): The occurrence of a male - male tandem pair of *Enallagma damselflies* in Mecosta County, Michigan. *Argia* 12(1): 20. (in English). [*Enallagma geminatum* (m) / *Enallagma traviatum* (m)] Address: E-mail: rosssb@tucker-usa.com

1939. Samraoui, B.; Corbet, P.S. (2000): The Odonata of Numidia, northeastern Algeria. Part I: status and distribution. *Int. Jour. Odonatology* 3(1): 11-25. (in English). ["Forty-five species of Odonata have been recorded within Numidia, which includes the El Kala and the Guerbes-Senhadja wetlands in northeastern Algeria. Five species are new to the area. Changes occurring in dragonfly diversity over a century and a half are discussed. This paper (Part I) deals with the status and spatial distribution of each recorded taxon." (Authors)]. Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

1940. Samraoui, B.; Corbet, P.S. (2000): The Odonata of Numidia, northeastern Algeria. Part II: Seasonal ecology. *Int. Jour. Odonatology* 3(1): 27-39. (in English). ["This paper [...] summarizes current knowledge of their seasonal ecology and identifies areas where promising research avenues exist. Annual patterns of adult occurrence and reproductive activity are used to infer life cycles, with particular reference to strategies that enable species to bridge the hot, dry summer, and to propose a phenological classification applicable to south-temperate north-African Odonata." (Authors)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

1941. Schall, B. (2000): Artenschutz durch Prozessschutz am Beispiel des Wurzacher Riedes. In: Schutzgemeinschaft Libellen in Baden-Württemberg (SGL). Artenschutz in Mooren - Konzeption um Umsetzung. Vorträge der Tagung der Schutzgemeinschaft Libellen in Baden-Württemberg am 19. und 20. Mai 2000 in Kißlegg: 4-6. (in German). [The Wurzacher Ried, Baden-Württemberg, Germany; the author discusses the strategy of nature conservation to develop a dynamic, self-regulated succession in bog and fen habitats ("Prozeßschutz"). Orthoptera, Lepidoptera, and Odonata are discussed with special emphasize to the winners and the losers of the self-regulated processes. *Somatochlora arctica* and *Nehalennia speciosa* are assessed as winners. *Aeshna subarctica elisabethae*, *Leucorrhinia dubia*, *L. pectoralis*, *Lestes virens*, and *Coenagrion hastulatum* are assessed as losers.] Address: Schall, B., Bezirksstelle für Naturschutz und Landschaftspflege, Konrad-Adenauer-Str. 20, D-72072 Tübingen, Germany. E-mail: Schall@BNLTU.BWL.de

1942. Schiel, F.-J.; Buchwald, R. (2000): Konzeption, Durchführung und erste Ergebnisse des LIFE-Natur-Projektes "Gefährdete Libellenarten in SW-Deutschland (Teil *Leucorrhinia pectoralis*). In: Schutzgemeinschaft Libellen in Baden-Württemberg (SGL). Artenschutz in Mooren - Konzeption um Umsetzung. Vorträge der Tagung der Schutzgemeinschaft Libellen in Baden-Württemberg am 19. und 20. Mai 2000 in Kißlegg.: 23-26. (in German). [Aims and results of the LIFE-project - promoted by the European Union - are presented. The main tasks are (1) surveying the known and the possible new localities of the species, (2) the analysis of the habitat requirements of the species in Baden-Württemberg, Germany, and (3) the realisation of practical measures to protect the populations of *L. pectoralis*.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Friesenheimer Hauptstr. 20, 77948 Friesenheim, Germany. E-mail: Jupp@INULA.de

1943. Schorr, M. (2000): Störungsökologische Wirkungen von Bootsportaktivitäten auf Fließgewässer-Libellen - dargestellt am Beispiel der Wieslauter (Pfälzerwald, Rheinland-Pfalz). *Fauna und Flora in Rheinland-Pfalz* 10: 663-679. [Possible conflicts between boating activities on running waters and the needs of conservation - exemplified by dragonflies (Odonata) along the brook Wieslauter (Pfälzerwald, Rheinland-Pfalz, Germany). The Wieslauter, a brook situated in the District Südwestpfalz (Rhineland-Palatinate), is of European importance as far as nature conservation is concerned. Over the past few years the brook has been increasingly used by canoeists and this has caused a lot of problems with local people owning property on its banks and it has also caused conflict with the conservationists. As the problems escalated, it became necessary to resolve them by using official administrative procedures ("Regelung des Gemeingebrauchs durch Kanuten an der Wieslauter"). This paper focuses on the odonatological arguments used to solve the conflicts. (1) Canoeing seriously affects the habitats of the early stages of Odonata: scraping along the bed of a brook causes a catastrophic drift of larvae and ova; people getting in or out of canoes can hurt or even cause death in larvae living in the substrate near the shore line; drifts of fine sand particles block the rectum of larvae and this can cause suffocation, especially among the later instars (see Tobias 1996). (2) The wash of moving canoes can seriously harm individuals emerging near the waterline, often causing deformities in abdomen and wings. Those affected by the wash will try to remove the water drops by moving the abdomen up and down and by beating the wings, actions which make them more detectable for predators such as birds. Heavy wash can also remove an individual from its chosen emergence site, which will lead to its death by drowning. (3) Passing canoes in smaller parts of a brook have an impact on the territories of the males by causing them to move away; they will also disturb ovipositing females and even prevent them from egg laying. When such disturbances occur frequently, the residents and dispersing individuals along the brook will leave it; in some species, females only use a short period of the day for egg laying and, if distracted in this period, no reproduction is possible. Both factors have serious effects on the reproduction success of a population. To solve the problems between canoeists and the needs of conservation, it may, in a few cases, become necessary to curb such disruptive activities in order to preserve the biotopes. It is vital for the preservation of

such key stone species as *Ophiogomphus cecilia* (species of the European Habitats Directive) to have brooks without any canoeing at all. In other cases it may be possible to find solutions for a common enjoyment of running waters by sportsmen and dragonflies. (Jill Silsby)] Address: Martin Schorr, Waldfrieden 25, D-54314 Zerf, Germany. E-mail: foeatrier@aol.com

1944. Sibley, F.C. (2000): Additional comments on the dragonflies of the British Virgin Islands. *Argia* 12(1): 18-19. (in English). [More recent studies of the odonate fauna von British Virgent Island brought the list of species to 11, of which 4 species could be collected as larvae or exuviae. In addition this paper some remarks to response of *Pantala flavescens* to storms are made.] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA. E-mail: fcs@george.peabody.yale.edu

1945. Sibley, F.C. (2000): Mismatched mating *Enallagma*. *Argia* 12(1): 19-20. (in English). [Cayuta Lake, Schuylar Co, New York, USA; *Enallagma carunculatum* (m) / *Argia moesta*(f); *Enallagma geminatum* (m) / *Enallagma exulans* (f)] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA. E-mail: fcs@george.peabody.yale.edu

1946. Simpkin, J.L.; Britten, H.B.; Brussard, P.F. (2000): Effects of habitat fragmentation and differing mobility on the population structures of a Great Basin dragonfly (*Sympetrum corruptum*) and damselfly (*Enallagma carunculatum*). *Western North American Naturalist* 60(3): 320-332. (in English). ["The population structure of 2 Great Basin odonate species was assessed using protein electrophoresis. Analyses included 7 populations of *Sympetrum corruptum* [...], a migratory and highly mobile dragonfly and 8 populations of *Enallagma carunculatum* [...], a weak flier that is not known to migrate far from natal water sources. Though we expected the damselfly (*E. carunculatum*) to show greater genetic isolation than the dragonfly (*S. corruptum*). Both species apparently had high levels of gene flow ($\theta = 0.0604$ for *S. corruptum*, $\theta = 0.0485$ for *E. carunculatum*) and showed no evidence for isolation by distance. These results suggest that both species are highly vagile and that the most important factors affecting population structure of these odonates may be ecological conditions such as habitat patchiness and the ephemerality of water sources." (Authors)] Address: Simpkin, Janice, Life Sciences. College of Southern Idaho, Twin Falls, ID 83303, USA

1947. Sokolovska, N.; Rowe, L.; Johansson, F. (2000): Fitness and body size in mature odonates. *Ecological Entomology* 25(2): 239-248. (in English). ["The relationship between body size and fitness components in odonates was examined using a meta-analysis of 33 published studies. There was a positive and significant overall effect of body size on mating rate and lifetime mating success among males. There was also a weaker but still significant positive effect of body size on survivorship of males. The relationship between body size, mating rate, longevity, and lifetime mating success differed significantly between males of territorial species. The effect of body size was significant for all fitness components in territorial species but significant only for longevity and lifetime mating success in nonterritorial species. Effect sizes appeared to be strongest on longevity in both sexes, and on male mating rate in

territorial species. Other effect sizes, even when significant, were small. Despite a much smaller data set, female fitness also increased significantly with body size. Both clutch size and longevity showed a significant positive relationship with body size. These results suggest that there is a general fitness benefit to large size in odonates. Nevertheless, significant heterogeneity is apparent in this effect, which can be attributed to sex, mating system, and fitness component. Finally, these analyses point to inadequacies in the current data that need further study before the potentially rich patterns in size effects on fitness can be explored more thoroughly." (Authors)] Address: Rowe, L., Department of Zoology, University of Toronto, Toronto, Ontario, M5S 3G5 Canada

1948. Sommerhäuser, M. (2000): Sommertrockene Fließgewässer im nordrhein-westfälischen Tiefland - Lebensbedingungen und Lebensgemeinschaften. Natur- und Umweltschutz Akademie Nordrhein-Westfalen - Seminarberichte 5: 101-114. (in German). [The ecology of temporary - summer dry - brooks in western Europe is outlined. In Tab. 4 Cordulegaster boltonii is listed to be characteristic for such water bodies with a terrestrial phase in September and October.] Address: Sommerhäuser, M., Universität-GH Essen, Inst. Ökologie, Abt. Hydrobiologie, D-45117 Essen, Germany

1949. Soors, J. (2000): De Bandheidelibel (*Sympetrum pedemontanum*) in Vlaanderen. *Gomphus* 16(1): 75-84. (in Dutch with English and French summaries). ["*Sympetrum pedemontanum* in Flanders. - In the summer of 1999, several individuals of *Sympetrum pedemontanum* were observed in the 'Bos van Aa' in Zemst (Vlaams-Brabant). The high number of individuals suggest that it may be a new local population. This was the reason to outline the evolution of the distribution of *S. pedemontanum* in Flanders. We compare the habitat requirements found in the literature with the habitat choice in the 'Bos van Aa'. It is clear that the last years, *S. pedemontanum* has shifted its distribution in northwestern direction. Outside the source population in the eastern part of the province of Antwerp, we only find on some places a new population. The 'Bos van Aa' can probably become one of them." (Author)] Address: Soors, J., Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. Email: jan.soors@instnat.be

1950. Steiner, C.; Siegert, B.; Schulz, S.; Suhling, F. (2000): Habitat selection in the larvae of two species of Zygoptera (Odonata): biotic interactions and abiotic limitation. *Hydrobiologia* 427(1-3): 167-176. (in English). ["Field and laboratory experiments were set up to obtain data on the reasons for different habitat selection of *Enallagma cyathigerum* and *Platycnemis pennipes*. (1) Rearing of larvae in two different ponds showed that while *P. pennipes* was not able to survive conditions of low oxygen content, 50% of the *E. cyathigerum* larvae survived. (2) In field predation experiments with sticklebacks and dragonflies as predators, we found that *E. cyathigerum* suffered highest predation by the fish. In *P. pennipes*, mortality was highest with *Anax imperator*. (3) Experiments regarding larval behaviour showed that *E. cyathigerum* was generally more active and had higher foraging success than *P. pennipes*. Both species reduced activity in the presence of fish, but *E. cyathigerum* did so to a minor extent. In contrast to *P. pennipes*, *E. cyathigerum* showed escaping behaviour. (4) In the laboratory, the growth of *E. cyathigerum* was faster

than that of *P. pennipes*." (Authors)] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

1951. Stephan, R.; Xylander, W.E.R.; Zumkowski-Xylander H. (2000): Nachweise von *Gomphus vulgaticornis* (Linné, 1758) im ehemaligen Braunkohletagebau Berzdorf. *Abh. Ber. Naturkundemus. Görlitz* 72(1): 151-152. (in German with English summary). ["Adult specimens of the club-tailed dragonfly *Gomphus vulgaticornis* were detected at different sites of the former lignite mining area Berzdorf near Görlitz/Saxonia in June 2000; however, neither larvae nor exuviae could be found. The odonate coenosis documented in this secondary biotope now comprises 49 species."] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

1952. Stoks, R. (2000): Components of lifetime mating success and body size in males of a scrambling damselfly. *Animal Behaviour* 59(2): 339-348. (in English). ["Sexual selection is hypothesized to favour small body size in males of scrambling species, that is, those in which males obtain matings by actively searching for females. I tested this hypothesis in a natural population of the scrambling emerald damselfly, *Lestes sponsa*. Mating efficiency (matings/visit to the pond) was the most important factor explaining variation in male lifetime mating success (LMS; 71%). This suggests a large potential for sexual selection. Path analysis of male LMS suggested a quality factor that positively affected both mating efficiency and life span. In contrast with the small-male mating advantage hypothesis, part of this potential for sexual selection was realized as stabilizing selection on male body size, indicating that there may also be a lower limit to body size for mating efficiency. This also illustrates that the constancy of body size may be explained by sexual selection alone. Survival explained about 20% of the variation in LMS and random processes were potentially important for determining LMS. My results show the problems of using mating efficiency as a measure for the intensity of sexual selection and the need to distinguish between potential and realized selection pressures, especially when comparing the importance of natural and sexual selection. I discuss mechanisms that may have caused the intermediate-male mating advantage in this scrambling species." (Author)] Address: Stoks, R., Department of Biological Sciences, Dartmouth College, Hanover, NH, USA

1953. Stoks, R. (2000): De Bruine Korenbout (*Libellula fulva*) in Vlaanderen in de jaren '90: vooruitgang of status quo? *Gomphus* 16(1): 49-60. (in Dutch with English and French summaries). ["*Libellula fulva* in Flanders in the '90: advance or status quo? - The dragonfly *Libellula fulva* is a critically endangered species in Flanders. In the period 1996-1999 there was a sharp increase in both the number of observations and observation sites. Analysis of the new records showed that the new sites were almost always very close to the known sites in the regions Klein-Brabant and northeast Limburg. Furthermore, at a lot of the observation sites there is no proof of local reproduction and even if there is proof, populations are always small. Therefore, the increase in records probably does not reflect a real increase in numbers and may just reflect an increase in

observation intensity and the status of the species in Flanders probably has not changed. Some evidence is given for the existence of a population north of Antwerpen. At least in Belgium, the species seems to have a broad habitat spectrum with a preference for lentic or lotic water depending on the region. The apparent difference in habitat choice of the species between countries and its potential reasons and implications for species conservation are discussed." (Author)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. E-mail: stoks@ruca.ua.ac.be

1954. Stoks, R. (2000): Recensies-Recensions: Corbet, P.S. (1999). Dragonflies - Behaviour and ecology of Odonata. *Gomphus* 15(3): 130-131. (in Dutch). [Book review of P.S. Corbet's outstanding work (see OAS 1565)] Address: Stoks, R., Evolutionary Biology Group, Department of Biology, University of Antwerpen (RUCA), Groenenborgerlaan 171, B-2020 Antwerpen, Belgium. e-mail: stoks@ruca.ua.ac.be

1955. Suri Babu, B. (2000): Description of the larva of *Neurothemis intermedia* (Rambur), with notes on biology (Anisoptera: Libellulidae). *Odonatologica* 29(4): 341-346. (in English). ["The morphology of the final instar larva is described and illustrated, based on exuviae and larvae from Sagar, Madhya Pradesh, India. Notes on the larval habitat, life history pattern and emergence are added." (Author)] Address: Suri Babu, B., Scene of Crime Mobile Unit, Police Control Room, Jagdalpur-494001 (M.P.), India

1956. Switzer, P.V.; Grether, G.F. (2000): Characteristics and possible functions of traditional night roosting aggregations in rubyspot damselflies. *Behaviour* 137(4): 401-416. (in English). ["Many species of animals congregate into groups when roosting. While studies exploring roosting behavior are common, relatively few detailed, quantitative studies have been done on the roosting behavior of insects, and the adaptive value of roosting aggregations are still unclear for most edible (non-distasteful) species of any taxon. We investigated night roosting aggregations of the rubyspot damselfly, *Hetaerina americana*, along a creek in the Coastal Range Mountains of California. Both male and female rubyspots were found in roosting aggregations, although the aggregations tended to be male-biased relative to the population sex ratio. Rubyspots roosted on the west side of slow moving sections of the creek; within this habitat they were highly aggregated but were not associated with any particular habitat features. The spatial pattern of site use tended to change gradually over time and sites with a relatively large number of individuals were more likely to be used on subsequent nights. These results suggest that within suitable habitat, the specific locations of roosting aggregations were traditional (socially learned). Rubyspot roosting patterns, when taken in combination with other aspects of this species' biology, do not support habitat limitation, thermal or desiccation benefit, foraging, and aposematic hypotheses for the function of rubyspot roosting aggregations. Rather, the roosting aggregations most likely serve an anti-predator function or are the result of using conspecifics to choose safe sites." (Authors)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

1957. Szalay, F. de (2000): Factors influencing macroinvertebrate colonization of seasonal wetlands: responses to emergent plant cover. *Freshwater biology* 45: 295-308. (in English). ["We conducted field experiments to examine factors influencing macroinvertebrate colonization of seasonally flooded marshes. Few macroinvertebrate species were found aestivating in soils within non-flooded wetlands indicating that most taxa colonize these marshes from other flooded habitats. ... These results demonstrate that invertebrate communities may be different within plant stands with heterogeneous amounts of emergent cover, and management practices that alter the structure of wetland vegetation can influence macroinvertebrate communities colonizing seasonal marshes." (Authors). *Pachydiplax* sp. ist listed in tab. 2 for sample areas with high plant cover.] Address: Ferenc de Szalay, Department of Biological Sciences, Kent State University, Kent, OH 44242, U.S.A. Email: ferenc@kent.edu

1958. Theischinger, G. (2000): A new species of *Pseudagrion* SELYS from Australia (Odonata: Coenagrionidae). *Linzer biol. Beitr.* 32(1): 253-257. (in English). ["*Pseudagrion ingrid* sp. n. (male holotype: Eubenangee Swamp near Babinda, Queensland, Australia) is described, illustrated and compared with the other species of *Pseudagrion* SELYS known from Australia." P. jedda, P. microcephalum, P. aureofrons, P. cingillum, P. ignifer ignifer, P. ignifer aureum, and P. lucifer are figured too.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

1959. Theischinger, G. (2000): The *Acanthaeschna* Story (Odonata: Aeshnoidea). *Linzer biol. Beitr.* 32(1): 235-240. (in English). [The history of discovery and re-discovery of *Acanthaeschna victoria* Martin are presented, together with the description of its supposed larva and a discussion of its possible systematic position, ecology and distribution.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

1960. Theischinger, G.; Hawking, J.H. (2000): The larva of *Eusynthemis ursula* Theischinger (Odonata: Synthemistidae). *Linzer biol. Beitr.* 32(1): 247-251. (in English). [The larva of *E. ursula* is described, illustrated, diagnosed and discussed. Colour photos of the larva and its habitat are provided.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

1961. Theischinger, G. (2000): The larva of *Synthemipsis gomphomacromioides* Tillyard (Odonata: Synthemistidae). *Linzer biol. Beitr.* 32(1): 259-263. (in English). ["The larva of *S. gomphomacromioides* is described, illustrated and compared with the larvae of the other Tasmanian synthemistid species and with all other Australian synthemistid genera." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

1962. Theischinger, G. (2000): The male of *Eusynthemis tenera* Theischinger (Odonata: Synthemistidae). *Linzer biol. Beitr.* 32(1): 241-245. (in English). [The male of *E. tenera* is described. The species is compared with all known Australian *Eusynthemis* species, particularly with its closest ally, *E. barbarae* (Moulds).] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

1963. Thompson, D.J. (2000): On the biology of the damselfly *Vestalis amabilis* Liefinck (Odonata: Calopterygidae) in Borneo. *International journal of Odonatology* 3(2): 179-190. (in English). ["The habitat, territorial and reproductive behaviour of the Bornean calopterygid damselfly *V. amabilis* are described. Males are territorial and will remain at the same site defending a territory for up to three weeks. Territories take the form of sun flecks whose physical location changes slowly throughout the day as the sun moves across the sky. There is a considerable amount of fighting between males, ranging from simple, short chases to more extensive escalated contests. Longer contests are thought to be brought about due to confusion over residency as the physical location of the territory changes. Courtship is brief and simple, copulation duration is around 2 minutes and females oviposit alone while being non-contact guarded by the male. Oviposition takes place in dead leaves, usually over about 30 minutes during which time the pair is harassed by other males. Matings are infrequent and females prospect either the territories or the territory owners before accepting courting males, resulting in more copulations later in the day." (Author)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK
1964. Tóth, S. (2000): Comparative analysis of dragonfly (Odonata) fauna living in the streams flowing into shallow lake Balaton. *Folia Musei historico-naturalis Bakonyiensis* 15 (1996): 53-73. (in Hungarian with English and German summaries). [The odonate fauna of the running waters feeding Lake Balaton was surveyed in 1994 and 1995. 29 species are recorded and documented locality wise. Of some interest is the strong population of the rare European *Coenagrion ornatum* along the small running waters.] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu
1965. Trockur, B.; Mauersberger, R. (2000): Vergleichende ökologische Untersuchungen an *Epitheca bimaculata* Charpentier 1825 im Saarland und in der Uckermark (Odonata: Corduliidae). *Beiträge zur Entomologie* 50(2): 487-518. (in German with English summary). [Between 1988 and 1998, more than one hundred habitats of the rare *E. bimaculata* were studied in the western parts of the Saarland (SW-Germany) including the adjacent parts of Luxembourg and France (especially the valleys of the rivers Saar and Mosel), and in the Uckermark („Biosphärenreservat Schorfheide-Chorin“, NE-Germany). In the Saarland-region, "the species inhabits eutrophic to polytrophic artificial backwaters, gravelpits and fish-ponds, whereas in the Uckermark it occurs in small natural, predominantly eutrophic lakes. Relevant characteristics of the *Epitheca*-habitats in both regions are: ● calm waters of small area: 85% of the habitats are less than 10 ha, 63% less than 4 ha; ● relatively shallow water body without distinct stratification: maximum water depth between 1.1 and 12 m (91% less than 8 m, 67% between 2 and 6 m, only 12% with complete temperature stratification) ● low oxygen content in deeper strata: usually less than 2 mg O₂/l below 4 m; ● water clouded by phytoplankton, eutrophic to polytrophic: breeding sites between 0.5 and 3.1 m median Secchi-depth (68% with visibility of less than 2 m); ● water surface with abundant floating or submerged vegetation, more rarely also tree trunks or reed: substrates for oviposition and habitats of the younger larvae; ● water surrounded by shrubs and/or deciduous woodland; ● water inhabited by fish populations; ● the dragonfly communities are dominated by *Orthetrum cancellatum*, *Cordulia aenea* and *Erythromma* species; aeshnids usually occur at low densities. The typical habitats of *Epitheca* in central and western Europe are not large, oligotrophic lakes or slightly acetous bog ponds, but still waters in the flood plain (river lagoons or gravel pits) and small lakes inhabited by fish populations." (Authors).] Address: Trockur, B., Schulstr. 4, D-66636 Tholey-Scheuern, Germany.
1966. Valley, S. (2000): Some interesting observations of *Tanypteryx hageni*. *Argia* 12(2): 9. (in English). [Observation on drought resistance and (re-)colonisation potential of larval *T. hageni* in the bogs of Todd Lake in Deschutes National Forest, Oregon, USA.] Address: E-mail: svalley@skipnet.com
1967. Vick, G.S. (2000): *Mesumbethemis takamandensis* gen. nov., spec. nov., a new genus and species of the Tetrathemistinae from Cameroon, with a key to the African genera of the subfamily (Anisoptera: Libellulidae). *Odonatologica* 29(3): 225-237. (in English). ["The new sp. is described from a single male from Cameroon (South West Prov., Manyu, Takamanda Forest Reserve, Assam, 06°01'N, 09°18'E, alt.140 m, 20-II-1998). The holotype will be deposited in the collection of the Natural History Museum (London). The justification for the placement of the new genus in the Tetrathemistinae is presented. Because of the combination of characters of wing venation which it possesses, the new sp. does not fit into any existing genus and the new genus *Mesumbethemis* is erected to accommodate it. The unique shape of the anal appendages and the accessory genitalia can at this stage also be regarded as characteristic of this presently-monotypic genus. A key to the African Tetrathemistinae genera is provided." (Author)] Address: Vick, G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, United Kingdom
1968. Viessmann, R. (2000): Libellen - Odonata. Pflanzen und Tiere in Rheinland-Pfalz - Berichtsjahr 1999 - Heft 10: 195-209. (in German). [Compilation of dragonfly records from different habitats situated in the eastern and southern parts of Rheinland-Pfalz, Germany. Of faunistical interest are the records of *Coenagrion mercuriale*, *C. pulchellum*, *Erythromma najas*, *Ischnura pumilio*, *Lestes barbarus*, *Sympetma fusca*, *Brachytron pratense*, *Aeshna affinis*, *Anax parthenope*, *Ophiogomphus cecilia*, *Crocothemis erythraea*, *Libellula fulva*, *Orthetrum brunneum*, and *Sympetrum flaveolum*.] Address: Viessmann, R., Gängelstockweg 8, D-67295 Bolanden, Germany
1969. Viessmann, R. (2000): Populationsförderung einer seltenen Libellenart am Beispiel *Orthetrum brunneum* - Südlicher Blaupfeil. Pflanzen und Tiere in Rheinland-Pfalz - Berichtsjahr 1999 - Heft 10: 182-183. (in German). [Donnersberg, Rheinland-Pfalz, Germany. Mass emergence of *O. brunneum* occurred between May 25 and 29, 1999 and May 15-16, 2000 in a habitat improved by compensatory measures for nature conservation purposes. 125 specimens emerged in a shallow spring area of app. 120m². From the same region, additional examples of newly created habitats with a colonisation potential are given.] Address: Viess-

mann, R., Gängelstockweg 8, D-67295 Bolanden, Germany

1970. Vlietinck, K. (2000): Monitoring van de libellenfauna van het Boerenven in de Kalmthoutse Heide in 1999. *Gomphus* 16(1): 69-74. (in Dutch with English and French summaries). ["Census of the Odonatafauna of the Boerenven in 1999 in the Kalmthoutse heide. - The dragonfly-fauna of the Boerenven in the heathlands of Kalmthout was weekly censused in the period between May and September. The Boerenven is a small fen, which is covered by abundant water vegetation. 10 species of dragonflies were observed. Two species, *Enallagma cyathigerum* and *Coenagrion puella*, which are very common, don't occur at the same time. The reproduction of 8 species was documented." (Authors)] Address: Vlietinck, K., Koningin Astridlaan 4 B-2920 Kalmthout, Belgium. E-mail: kristof.vlietinck@instnat.be

1971. Walker, J.; Smentowski, J. (2000): Swinging nets in the "bootheel". *Argia* 12(1): 16-17. (in English). [USA, Missouri] Address: Smentowski, J.H., 9714 Mueck Terrace, Rock Hill, MO, 63119, USA.

1972. Watanabe, M.; Taguchi, M. (2000): Behavioural protandry in the damselfly *Mnais pruinosa costalis* Selys in relation to territorial behaviour (Zygoptera: Calopterygidae). *Odonatologica* 29(4): 307-316. (in English). ["The reproductive strategy of the male *M. p. costalis* can be defined as an attempt to maximize the number of females mated. Males exhibit wing colour dimorphism: one form has orange wings, and the other has hyaline wings which resemble female wings. The former is usually territorial and the latter uses sneaky mate securing tactics around the territories of orange-winged males. Although the length of the emergence period varied from year to year, no evidence of protandry was observed. Studies over 10 years have shown that if the length of the sexually active period in females is stable, the orange-winged males should become sexually mature before females do to achieve maximal reproductive success. On the other hand, the hyaline-winged males do not mature before females due to the fact that they utilize the territories of orange-winged males. This study shows that behavioural protandry should be considered a reproductive strategy of the orange-winged males for establishing territories." (Authors)] Addresses: Watanabe, M., Department of Biology, Faculty of Education, Mie University, Tsu, Mie 514-8507, Japan. E-mail: watanabe@edu.mie-u.ac.jp. Taguchi, M., Yaei-Higashi High School, Sagamihara, Kanagawa 229-0029, Japan

1973. Wazalwar, S.M.; Tembhare, D.B. (2000): Innervation of mouthpart sensilla in the dragonfly *Brachythemis contaminata* (Fabricius) (Anisoptera: Libellulidae). *Odonatologica* 29(4): 359-364. (in English). ["Neuroanatomical studies demonstrate single dendritic innervation of trichoid sensilla, basiconic sensilla and microtrichia, and multidendritic innervation of the papillae and sensory pegs. These sensilla can therefore be considered as mechano- and chemo-receptors respectively. The campaniform sensilla are innervated by several dendrites and may function as proprioceptors. No innervations of the spines, teeth, hooks and acanthae was observed suggesting non-sensory nature." (Authors)] Address: Tembhare, D.B., Dept Zool., Nagpur Univ. Campus, Amravati Road, Nagpur-440010, Maharashtra, India

1974. Weidel, B.C.; Josephson, D.C.; Krueger, C.C. (2000): Diet and prey selection of naturalized smallmouth bass in an oligotrophic Adirondack lake. *Journal of freshwater ecology* 15(3): 411-420. (in English). ["Smallmouth bass (*Micropterus dolomieu*) introduced nearly 50 years ago have established a permanent population in Little Moose Lake, NY. Over 500 smallmouth bass were collected by angling in the littoral zone from June to August. Gut contents were compared for differences based on length of bass, date of capture, and substrate type where each fish was caught. Crayfish were the most frequent diet item and made up the largest percent composition by number. The average number of crayfish per stomach increased with bass length as did the number of fish per stomach. Crayfish, Ephemeroptera, Odonata, and fish made up 77% of the total number of diet items, excluding zooplankton. A noticeable diet shift from smaller diet items (Ephemeroptera) to larger ones (crayfish and fish) occurred when smallmouth bass approached 150 mm. A high amount of diet overlap occurred between bass caught over different substrate types and among most size classes. Smallmouth bass in Little Moose Lake were opportunistic feeders, using benthic, terrestrial, and pelagic littoral zone food resources. The most likely processes by which smallmouth bass affect salmonid and native fishes in Little Moose Lake are competition for food resources and predation." (Authors)] Address: Josephson, D.C., Cornell Univ., Dept Nat. Resources, Fernow Hall, Ithaca, NY 14853, USA. E-mail: dcj3@cornell.edu

1975. Weihrauch, F. (2000): A note on *Brachytron pratense* (Müller, 1764) from coastal Istria, NW Croatia (Anisoptera: Aeshnidae). *Exuviae* 7: 19-26. (in English with Slovene summary). ["A good population of *Brachytron pratense* was recorded on 25-IV and 28-IV-2000 from Lake Palud near Rovinj, representing its first record for the Istria peninsula. All relevant references as well as known unpublished data were gathered in order to outline and discuss the distribution of the species in the Adriatic region. In addition, April records for five other dragonfly species, observed at eight localities in Croatian Istria, are appended." (Author)] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Florian.Weihrauch@lbp.bayern.de

1976. Wildermuth, H. (2000): Das Rotationsmodell zur Pflege kleiner Moorgewässer - Simulation naturgemässer Dynamik. In: Schutzgemeinschaft Libellen in Baden-Württemberg (SGL). Artenschutz in Mooren - Konzeption um Umsetzung. Vorträge der Tagung der Schutzgemeinschaft Libellen in Baden-Württemberg am 19. und 20. Mai 2000 in Kißlegg.: 11-13. (in German). [Wildermuth & Schiess (1983), *Odonatologica* 12: 345-366 introduced the so called "Rotations-Modell" to realise different states of vegetation succession in water bodies. In dependence of the state of succession different species find optimal possibilities to develop. To protect the whole spectrum of a local or regional fauna and flora it is mandatory to develop in a given time and in a given area water bodies with a different succession of vegetation. The transfer of the modell to practice is exemplified with *Leucorrhinia pectoralis*. In the past two decades the measures developed from the modell guaranteed a stable metapopulation of *L. pectoralis* in the Swiss nature reserve "Drumlinlandschaft Zürcher Oberland".] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: wildermuth@swissonline.ch

1977. Wildermuth, H. (2000): *Lestes barbarus* bei der Eiablage in einem subalpinen Hochmoor der Schweizer Alpen (Odonata: Lestidae). *Libellula* 19(1/2): 93-96. (in German with English summary). ["On 22 August 1999 a single female was seen ovipositing in stems of *Scheuchzeria palustris* and *Trichophorum caespitosum* in a small alpine bog at 1690 m a.s.l. near the natural tree line. The record is unusual regarding the climatic situation as well as the habitat type." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: wildermuth@swissonline.ch

1978. Wildermuth, H. (2000): Totstellreflex bei Großlibellenlarven (Odonata). *Libellula* 19(1/2): 17-39. (in German with English summary). ["Larvae of 18 European Anisoptera species, mainly final instar, were studied with respect to reflex immobilization (RI). In *Brachytron pratense*, *Somatochlora flavomaculata*, *S. meridionalis*, and *S. metallica* RI revealed an obligatory reaction to disturbance in the water. An additional 4 species exhibited facultative RI. All the other species reacted by rapid escape or became immobile for some time but only when they were brought on land. RI was released exclusively by tactile stimulation, especially by a firm grip on the thorax or abdomen, but not on the legs or antennae. In 3 *Somatochlora* spp. RI lasted 83, 87 and 154 s (median values) and varied between 5 and 679 s. The posture during RI, depicted in 10 line drawings, differed according to the species. In *Somatochlora* up to 3 postures were recorded: larvae either extended their legs laterally or folded them closely against the body or held them obliquely upwards. In individuals that were successively stimulated, the duration of RI tended to decrease, but not in all cases. Larvae of 2 *Somatochlora* alpestris, *S. arctica* and *S. flavomaculata* exhibited RI already in the first free-living larval instar. The adaptive value of RI which is assumed to be an antipredation strategy, is discussed with respect to the species, microhabitats and potential predators." (Author)] Occurrence of reflex immobilization of the following species is compiled in a tab.: *Aeshna cyanea*, *A. juncea*, *Anax imperator*, *Cordulegaster boltonii*, *Cordulia aenea*, *Epithea bimaculata*, *Libellula quadrimaculata*, *Libellula fulva*, *Orthetrum cancellatum*, *Orthetrum coerulescens*, *Sympetrum striolatum*, *Leucorrhinia dubia*, and *L. pectoralis*.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: wildermuth@swissonline.ch

1979. Wilson, K.D.P.; Zhou, W.-b. (2000): *Sinocnemis yangbingi* gen. nov., sp. nov. and *Sinocnemis dumonti* sp. nov., new platycnemidids from south west China (Odonata: Platycnemididae). *International Journal of Odonatology* 3(2): 173-177. (in English). ["A new genus, *Sinocnemis* gen. n., is established to receive two new species of platycnemidid described here as *Sinocnemis yangbingi* sp. n., from Emeishan, Sichuan, China and *Sinocnemis dumonti* sp. n. from Xishui, Guizhou, China." (Authors)] Address: Wilson, K., 6F, 25 Borrett Rd, Mid-levels, Hong Kong, China. E-mail: wislonhk@hk.super.net. Hou, W.-b., Zhejiang Museum of Natural History, Jiaogonglu 71, Hang Zhou-310012, China.

1980. Yeh, W.-C.; Veenakumari, K. (2000): Description of *Gynacantha andamanae* spec. nov. from south Andaman Island, Indian ocean (Anisoptera: Aeshnidae). *International Journal of Odonatology* 3(2): 162-167. ["*Gynacantha andamanae* [Yeh & Veenakumari] sp. nov., collected from Mt Harriet in South Andaman Island of Indian Ocean, is described and figured. The

relationship of the new species with its oriental congeners is discussed." (Authors)] Address: Yeh, Wen-Chi, Division of Forest Protection, Taiwan Forestry Research Institute (TFRI) 53 Nan-hai Rd, Taipei, Taiwan. E-mail: wcyeh @ serv.tfri.gov.tw. Veenakumari, K., Central Agricultural Research Institute, P. B. No. 181, Port Blair 744 101, Andaman and Nicobar Islands, India.

1981. Yong, H.S.; Bernard, H.; Hämäläinen, M. (2000): A collection of Odonates from the northern part of the Belum Forest Reserve, Perak, Peninsular Malaysia. *Malayan Nature Journal* 54: 255-257. (in English). 19 odonate species are listed resulting from a brief survey in May 1998] Address: Yong, H.S, Institute of Biological Sciences, University Malaya, 50603 Kuala Lumpur, Malaysia Hämäläinen M., Dept Applied Zool., P.O. Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

1982. Zhu, H.-q; Ou-Yan, J. (2000): *Coenagrion bifurcatum* spec. nov., a new damselfly from Heilongjiang, China (Zygoptera: Coenagrionidae). *Odonatologica* 29 (4): 365-368. (in English). Holotype male and allotype female: Mao-er shan, Dong-ling, Heilongjiang, China, 15-VII-1999; deposited at Heilongjiang Nonken Teachers' College, Achen. The new sp. is described, illustrated and compared with *C. hylas*. Address: Zhu H.-q, Dept Biol., Shanxi University 42-38, Taiyuan 030006, Shanxi, China. Ou-Yan, J., Heilongjiang Nonken Teachers' College, Achen 150301, Heilongjiang, China

Annotation to this issue of OAS:

(1) Persons interested in Japanese odonatology profit from the journal TOMBO. Reading the Odonatological Abstracts in *Odonatologia* it becomes clear that there are some other journals in which odonatologists publish the result of their studies or observations. Regrettably in most cases these publications are written in Japanese, a language not understood by most odonatologists, and the papers are published in journals not available in any of the western libraries.

I was more than surprised to get information from Dr. Klaus Sternberg, Germany on an English written journal on Japanese odonatology that covers these small, scattered publications on dragonflies. In March 2000 number 10 of the "Digest of Japanese Odonatological Short Communications" (DJOSC) was released, with translations of many small, but noteworthy papers on Odonata.

In October 2000 I contacted the editor of the Digest, Naoya Ishizawa, and arranged an exchange between the Digest and OAS. So users of OAS can profit from the Digest. In OAS abstracts taken from the Digest are identified as follows: "taken from DJOSC No. nn". The journal is worth to be subscribed. Only with the Digest one has full access to the information of papers published in different Japanese journals.

Persons interested in this journal should contact:

Naoya Ishizawa
1644-15, Yamaguchi
Tokorozawa City
Saitama Pref., 359-1145
Japan

(2) OAS profits from the cooperation with many odonatologists who send their reprints or give copies of papers not known to us. We cordially thank them all. Of special value is the help of Pawel Buzcynski, Poland, and Hidenoi Ubukata, Japan, who translated papers in their languages into English. We have an extraordinarily good cooperation with Jill Silsby and Wolfgang Schneider.

Odonatological Abstract Service

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1997

1983. Paternoster, T. (1997): 1996 une année exceptionnelle pour l'observation des odonates du marais d'Harchies-Hensies-Pommeroeul. Naturalistes de Mons et du Borinage 99: 8-15. (in French). [27 odonate species are recorded in 1996 in the swamps of Harchies, Belgium. Of special interest are the records of *Brachytron pratense* (supposed extinct in the Wallonia), *Aeshna affinis*, *Anax parthenope*, and *Sympetrum fonscolombii*. The distribution of these species in Belgium and Luxemburg is mapped.] Address: Paternoster, T., Direction Générale des Ressources naturelles et de l'environnement, Centre Recherche de la nature, des forêt et du bois, Chemin des Préaux 5, B-7321 Harchies, Belgium

1984. Rebhan, H. (1997): Naturschutz- und Bewirtschaftungskonzepte für Stillgewässer, Fallbeispiele Craimoosweiher (Lkr. Bayreuth) und Stocksee (Lkr. Bamberg). Bericht der naturforschenden Gesellschaft Bamberg 71: 33-52. (in German). [Concepts for restoration of eutrophicated large ponds in Bavaria, Germany via foodchain manipulation are outlined. For the odonatalogical aspects of this paper see OAS 2006; *Erythromma viridulum* is a key stone species of submerse vegetation and used as monitoring organism for assessing the conservation measure efforts.] Address: Rebhan, H., Regierung von Oberfranken, Ludwigstr. 20, D-95444 Bayreuth, Germany

1998

1985. Brux, H.; Döring, G.; Hielscher, M.; Nordmann, M.; Walter, G. Wiegler, G. (1998): Zur Fauna der Stadt Oldenburg: Erste Übersicht ausgewählter Gruppen: Säugetiere, Vögel, Reptilien, Amphibien, Libellen, Heuschrecken, Laufkäfer, Schmetterlinge. Oldenburger Jahrbuch 98: 247-319. (in German). [On the basis of so called functional ecological areas in the town of Oldenburg, Germany, 23 odonate species are recorded. They are listed in a tab. and shortly commented.] Address: Brux, H., c/o IBL Umweltplanung, Unterm Berg 39, D-26123 Oldenburg, Germany

1986. Endersby, I.D. (1998): Dragonflies of Mount Buffalo National Park. Victorian Entomologist 28(5): 83-85. (in English). [At 6 localities situated within the Mount Buffalo National Park, Victoria, Australia, 12 odonate species were recorded. The habitats of *Synthemis eustalacta* and *Austroaeschna flavomaculata* are shortly discussed.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

1987. Holusa, O. (1998): On the occurrence of dragonfly *Leucorrhinia pectoralis* (Charpentier, 1825) (Odonata: Libellulidae) in the Czech and Slovak Republics. Sbornik Přírodovědného klubu v Uh. Hradisti 3: 45-53. (in Czech with extensive English summary). [Between 1995-1998 12 new localities of *L. pectoralis* in the Czech Republic could be traced. All published data on the occurrence of this species in the Czech and Slovak Republics are summarized and plotted in a distribution map. Figures demonstrate the abundance at the Dobra - Kamenec locality in the season of 1997 and 1998 as well as the number of localities according to the sea level and phenology in the Czech and Slovak Republics. The habitats of some localities are described in some detail.] Address: Holusa, O., Muzeum Beskyd, přírodovědné oddelení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

1988. Hughes, S.J.; Furse, M.T.; Blackburn, J.H.; Langton, P.H. (1998): A checklist of Madeiran freshwater macroinvertebrates. Bolm Mus. munic. Funchal 50 (284): 5-41. (in English with Portugese summary). [The checklist of the Madeira's 240 freshwater macroinvertebrates includes 6 Odonata compiled from literature data; the taxa are briefly annotated. *Ischnura senegalensis*, *I. pumilio*, *Anax imperator*, *Sympetrum nigrifemur*, *S. fonscolombii*, *Gomphus* sp.] Address: Hughes, Samantha, Laboratório Regional de Engenharia Civil, Departamento de Recursos Naturais e de Hidráulica, Rua Agostinho Pereira de Oliveira, PT-9000-264 Funchal, Madeira. E-mail: samjhughes@hotmail.com

1989. Lopez, R.; Espinoza, P.; Lopez-Q., M.M.; Valle, S.; Rivera, P.; Garcia, I. (1998): Las libelulas (Insecta: Odonata) come bioreguladores de larvas de mosquitos en Nicaragua. Revta nicarag. Ent. 45: 1-6. (in Spanish with English summary). [During 1996, the mosquito-regulation capacities of larval *Ischnura ramburii*, *Anax amazillii*, and *Pantala flavescens* were examined in the laboratory. These species can be successfully used in mosquito control, but *A. amazillii* is the most effective.

The numbers of the consumed mosquito larvae per day are stated for habitats with vegetation and for those without it.] Address: Lopez, R., Centre Nac. de Diagnostico y Referencia, Ministerio da Salud, A.P. 2900, Managua, Nicaragua

1990. Richards, S.; Kawanamo, M.; Torr, G. (1998): Insects part 2: Odonata (Dragonflies and damselflies). Conservation International: A biological assessment of the Lakekamu basin, Papua New Guinea. Washington. Rapid Assessment Programm 9. ISBN 1-881173-20-8: 10-11, 47-49, 144-148. (in English). [The Odonata of the Lakekamu Basin, Papua New Guinea were surveyed in Nov. to Dec. 1996, yielding a total of 34 species. Among these there is at least one, possibly three, undescribed species and possibly a new genus. Taxonomic knowledge of south PNG's Odonata is poor enough that certain identification of just these 34 species is extremely difficult. One species collected appears to be identical to a species previously known only from Misool Island (*Diplacina erigone*). A checklist (Appendix 7) and a compilation of the habitat preferences and some taxonomic remarks of each species (Appendix 8) are also presented.] Address: Richards, S., James Cook University, Department of Zoology, Townsville, QLD 4811, Australia. E-mail: stephan.richard@jcu.edu.au

1999

1991. Bönsel, A. (1999): Das Kleine Granatauge (*Erythromma viridulum* Charp., 1840) in Mecklenburg-Vorpommern. Naturschutzarbeit in Mecklenburg-Vorpommern 42(1): 48-56. (in German). [Documentation of the dispersion of *E. viridulum* in Mecklenburg-Vorpommern, Germany, and discussion of factors influencing colonisation success of water bodies. Presence of *Ceratophyllum*- or *Myriophyllum*-vegetation, and weather conditions with high temperatures, high global radiation and low precipitation are discussed as the most important factors for the range extension of the species into northern Central Europe.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

1992. Braun, M.; Braun, U. (1999): Fliegende Edelsteine. Libellen im Naturpark Nassau. Zweckverband Naturpark Nassau (Hrsg.): 32 pp. (in German). [This is a nicely produced booklet (reprint from: Heimatjahrbuch Rhein-Lahn-Kreis 2000: 97-128) on the dragonflies of the Regional Park Nassau, Rheinland-Pfalz, Germany. Chapter 2 contains a general introduction into biology and ecology of the Odonata, chapter 4 some remarks on dragonfly conservation, and chapter 5 a short bibliography. In chapter 3 the 33 species known from the region are treated in a monographic way. Information on morphology is accompanied in most cases by excellent colour pictures; in addition notes on the regional phenology and the habitats are given. The booklet is directed to a more general readership, but as in many other cases it contains very interesting information for the advanced odonatologist: here it is a picture of a lizard (*Lacerta agilis*) devouring an imago of *Orthetrum concellatum*. This is one of the rare documents of predation of reptiles on Odonata.] Address: Braun, Ursula, Im Mühlbachtal 2, D-56377 Nassau, Germany

1993. Chao, H.-f.; Zhu, H. (1999): A new species of *Nihonogomphus* from Guangxi, China (Odonata: Gomphidae). *Wuyi Sci. J.* 15: 17-18. (in English with Chinese summary). [*N. huangshaensis* sp. n. is described, illustrated and compared with *N. lieftincki*. Holotype male: Huangsha, Guangxi prov., no date; deposited at the institution of the first author.] Address: Chao, H.-f., Biol. Control Res. Inst., Fujian Agric. Univ., Fuzhou-350002, Fujian, P.R. China

1994. Chao, H.-f. (1999): New or little-known gomphid dragonflies from China, 1 [recte: 2] (Odonata: Gomphidae). *Wuyi Sci. J.* 15: 12-16. (in English with Chinese summary). [*Paradavidius* sgen. n. is proposed in *Davidius* (type sp.: *D. fruhstorferi* Martin); the 9 subgeneric distinctions in *Nihonogomphus* are stated; and *Mergomphus vespertinus* sp. n. is described, illustrated and compared with the two Chinese congeners. Holotype male: Lushan Co., Sichuan prov., mid-V / mid-VIII-1997; deposited at Author's institution.] Address: Chao, H.-f., Biol. Control Res. Inst., Fujian Agric. Univ., Fuzhou-350002, Fujian, P.R. China

1995. Darblade, S.; Avignon, S. (1999): Effect of water treatment and site reallocation on Odonates (Arjuzanx, Landes). *Gibier Faune Sauvage* 16(4): 339-353. (in French with English and German summaries). ["Many aquatic organisms are closely dependent on the physico-chemical quality of the water and the morpho-dynamic characteristics of the biotopes in which they are evolving and often adapt to the environmental changes the latter are submitted to over more or less long periods. In a former mining site in Arjuzanx (Landes), which was reallocated and became a National Hunting and Wildlife Reserve, we studied the effect of wetland basification treatments (in particular by liming with 'Champagne chalk') on dragonflies, Odonata [...]. We monitored several environmental parameters (pH, conductivity, turbidity, quantity of dissolved oxygen and temperature) as well as biological ones (species presence/absence at adult/larval stages) that had been delineated across small shallow water basins and their edges from April to August 1998. We showed that when left untreated the water basin's basification (pH 3.5-4 to 8.2) took only fifteen years (1985-1998). 29 Odonate species (representing about one-third of the Odonate species present in France) could be listed. When evaluating Odonate presence with respect to the two adult and larval stages, the Odonate species frequented the untreated habitats more intensively than the treated ones ($P < 0.05$), probably because of a lesser degree of turbidity ($P < 0.05$), all other physico-chemical parameters being the same. At the adult and larval stages, however, the indicator species of sensitivity to habitat treatment were not the same. The Arjuzanx site is classified as a site of special patrimonial interest, because of the presence of two dragonfly species with a special protection status: *Leucorrhinia pectoralis* and *L. albifrons*. Management of this type of habitat for Odonates, thus should be directed towards favouring species diversity, and towards protecting the rare species which are often associated with endangered habitats." (Authors). A further species of interest is *Coenagrion scitulum*.] Address: Darblade, Stéphanie, Reserve Naturelle de l'E-tang Noir, Avenue du Hall des Sports, F-40510 Seignosse, France

1996. David, S. (1999): Dragonfly research in Slovakia. *Sbornik z mezinárodního semináře "Vážky 1999"*,

CSOP Vlasim: 83-92. (in Slovakian with English summary). [This paper is a short introduction into the odonatological history of Slovakia. Distribution maps of *Thecagaster bidentata* and *Crocothemis erythraea* and a checklist of the 73 species known to occur in Slovakia are presented. In a Red List the species are classified according to the criteria of IUCN.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: nrukdavi@savba.sk

1997. De Marmels, J. (1999): A new species of *Dimeragrion* Calvert 1913 from Pantepui, Venezuela (Odonata: Megapodagrionidae). *Boln Ent. venez.* 14(1): 27-36. (in English with Spanish summary). [*Dimeragrion clavijoi* sp. n. (holotype male: Venezuela: Amazonas, Cerro Yutaje, lat 05°43'35"N, long 66°08'03"W, 1750 m, 12/19.ii.1995; MIZA) is described and illustrated on the basis of eighteen males and eight females. A key to the species of *Dimeragrion* Calvert 1913 and distributional maps are provided. The supposed larva of *D. percubitale* Calvert 1913 is described and figured." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela

1998. Düttmann, H. (1999): Die Marka-Mittelradde-Niederung. Plädoyer für ein bedeutendes Feuchtgebiet in Nordwestdeutschland. *Oldenburger Jahrbuch* 99: 333-357. (in German). [This is a natural history of a marsh region the northwestern part of Germany (Emsland, Niedersachsen) with special emphasize on its importance for nature conservation purposes. 15 odonate species are listed; the data are resulting from different sources including unpublished expertices.] Address: Düttmann, H., Institut für Naturschutz und Umweltbildung, Hochschule Vechta, Driverstr. 22, D-49377 Vechta, Germany.

1999. Endersby, I.D. (1999): Dragonflies of the Organ Pipes national Park. *Victorian Entomologist* 29(3): 51-52. (in English). [The Organ Pipes National park is situated 30 km NW of Melbourne, Australia. 4 trips in 1997 to 1999 yielded in 12 odonate taxa including *Rhadinosticta simplex*.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

2000. Holusa, O. (1999): The dragonflies (Odonata) in the surroundings of Vsetín and Valasské Mezirici. *Sbornik Přírodovedneho klubu v Uh. Hradisti* 4: 82-102. (in Czech with extensive English summary). [Between 1992-1998 some localities in the surroundings of Vsetín and Valasské Mezirici (south-eastern region of the Czech Republic) were investigated. Different habitats were studied - from stagnant waters in lowlands (274 m a.s.l.) to streams in mountain regions (650 m a.s.l.). 36 species are known from the region, 33 species were recorded in the framework of this study. *Thecagaster bidentata* was very abundant, *Brachytron pratense*, and *Leucorrhinia pectoralis* belong to the very rare species.] Address: Holusa, O., Muzeum Beskyd, prirodovedné oddelení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

2001. Holzinger, W.E.; Ehmann, H.; Schwarz-Waubke, M. (1999): Rote Liste der Libellen Kärntens (Insecta: Odonata). *Naturschutz in Kärnten* 15: 497-507. (in German). [917 data sets of odonatological data known from the Federal State Kärnten, Austria are analysed and compiled in a commented list of 60 species (name

of the species, habitat, records prior 1980, records of 1980 and the following years, classification according to the Red List criteria). The distribution of *Coenagrion hastulatum*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Orthetrum albistylum*, *O. cancellatum*, *Leucorrhinia pectoralis*, *L. albifrons*, *Somatochlora flavomaculata*, and all localities with records of Odonata in Kärnten are mapped. Some of the old records are discussed, and a bibliography of odonatological publications from Kärnten is annexed.] Address: Schwarz-Waubke, Maria, Eben 21, A-4202 Kirschsschlag, Austria

2002. Jost, W. (1999): Libellenfauna rund um Wiesbaden. *Jahrbuch des nassauischen Vereins für Naturkunde* 120: 75-81. (in German). [Hessen, Germany; this paper is a mixture of general remarks on Odonata, a checklist of 25 species from the Wiesbaden region based on 15 years of investigation, and some notes on localities of special odonatological or conservational interest. Examples of impacts of recreational fishing on habitats and species are outlined.] Address: Jost, W., Dr.-Jakob-Witte mann-Str. 20, D-65527 Niedernhausen, Germany

2003. Jourde, P.; Allenou; Caupenne, M.; Thirion, J.-M. (1999): Contribution à l'Inventaire des odonates de Charente-Maritime. *Annales de la société des sciences naturelles* 8(8): 967-972. (in French, with English summary). [For more details, see OAS 1022] Address: Jourde, P.; La Grande Métairie, 20 rue de Charnay, F-17250 Pont-L'Abbé-D'Arnoult, France

2004. Lange, L. (1999): Ganzliner Torfstiche - ein Lebensraum für gefährdete Libellen. *Naturschutzarbeit in Mecklenburg-Vorpommern* 42(2): 64-65. (in German). [29 odonate species are reported from the localities situated in the southwestern part of Mecklenburg-Vorpommern, Germany. Of special interest is the record of *Leucorrhinia albifrons*.] Address: Lange, L., Deichreihe 21, D-25599 Wewelsfleth, Germany.

2005. Papazin, M. (1999): Les odonates de Guyane française I. Les Calopterygidae (Odonata, Zygoptera). *L'entomologiste* 55(6): 235-239. (in French with English summary). [In French Guyana, Calopterygidae are represented by two genera, *Hetaerina* and *Mnesarete* including six species. *Hetaerina gallardi* Machet, 1989 has been rediscovered at the locus typicus. A key, based on the wing coloration, is proposed to identify the males of the six known species. Male appendices are figured.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

2006. Romstöck-Völkl, M.; Rebhan, H.; Völkl, W. (1999): Folgen des Auswinterns von Stillgewässern. Veränderungen der Libellenfauna im NSG Craimoosweiher. *Naturschutz und Landschaftsplanung* 31(5): 143-146. (in German, with English summary). [Consequences of the Winter Draining of Ponds - Changes in the Fauna of Damselfly and Dragonflies in the Nature Reserve 'Craimoosweiher' (Bavaria) In the nature conservation area 'Craimoosweiher' (administrative district of Bayreuth), 25 species of Odonata were recorded between 1995 and 1997. The abundance of most damselfly species declined in 1997 compared to 1995. The most conspicuous decline was found in *Erythromma viridulum* (population extinct in 1997) and *Erythromma najas* (only few individuals in 1997) whilst the abundance of Anisoptera varied only slightly. The most important reasons for the dramatic reduction in damselfly a-

bundance may be the drainage of the pond and the severe frost during winter 1995/96. This thoughtless measure resulted in the disappearance of the submerse vegetation which had provided oviposition sites for adult damselflies and hiding-places for larvae." (Authors)] Address: Romstöck-Völk, Maria, Hohe Eiche 6, D-95517 Seybothenreuth, Germany

2007. Rumpf, M. (1999): Nachweis der Zierlichen Moosjungfer *Leucorrhinia caudalis* im Naturpark Feldberger Seenlandschaft. *Naturschutzarbeit in Mecklenburg-Vorpommern* 42(2): 81- (in German). [In 1999 a strong population of the rare *L. caudalis* which was thought extinct in Mecklenburg-Vorpommern, Germany was recorded in a *Cladium mariscus* marsh in the NSG Krüselin-Mechowseen.] Address: Rumpf, M., Blumenstr. 13, D-17268 Warthe, Germany

2008. Schulz, R.; Mühle, R.-U.; Wilke, T. (1999): Zur Odonatenfauna des einstweilig gesicherten Teichgebietes Lakoma. *Veröff. Potsdam-Museum* 33: 71-76. (in German with English summary). [Brandenburg, Germany; in July 1994 19 odonate species were recorded at 10 localities; *Orthetrum coerulescens*, *Sympetrum depressiusculum*, *S. pedemontanum*] Address: Mühle, R.U., Universität Potsdam, Inst. Ökologie und Naturschutz, Lennéstr. 7a, D-14471 Potsdam, Germany.

2009. Starke, W.; Wachlin, V. (1999): Konzept für ein Monitoring zum LIFE-Projekt "Erhaltung und Wiederherstellung des Trebeltalmooses". *Naturschutzarbeit in Mecklenburg-Vorpommern* 42(1): 41-47. (in German). [Mecklenburg-Vorpommern, Germany; the monitoring concept includes the Odonata] Address: Wachlin, V., Karrenderfer Str. 3, D-17498 Leist, Germany

2010. Usseglio-Polatera, P.; Thomas, S.; Beisel, J.-N.; Moreteau, J.-C. (1999): Illustration de la valeur indicatrice des caractéristiques biologiques des macroinvertébrés d'une communauté benthique à différentes échelles d'observation. *Annls Limnol.* 35 (1): 71-80. (in French with English summary). ["The faunal assemblage of a river ecosystem integrates the spatial and temporal variability of the habitat. Taxa with appropriate combinations of adaptations, concerning especially traits related to survival and reproduction use particular habitat types. Consequently, the synthesis of published autecological information on macroinvertebrate taxa can be used to demonstrate some of the environmental changes of an ecosystem. Mesohabitats were sampled in spring and autumn 1993 and 1994 in twelve study sites on 1st to 4th order streams in three river catchments located in the northeast of France. Sites were selected to exhibit high microscale heterogeneity. Affinities of taxa for modalities of biological traits and/or ecological strategies were described. The investigation of the relationship between traits and distributions of taxa can demonstrate some of the characteristics of both faunal community and environment and provide clear information on changes in biotopes across different spatial scales (mesohabitat, station, catchment basin). The benthic assemblage of each mesohabitat type displayed a specific combination of biological traits. Thus, taxa can provide insights about mesohabitat characteristics in terms of stability, diversity or trophic potentialities of their potential ecological niches." (Authors) Odonata are treated on the family level.] Address: Usseglio-Polatera, P.; ESA 5023 CNRS, Ecologie des Eaux Douces et des Grands Fleuves, 43 Bd du 11 No-

vembre 1918, F-69622 Villeurbanne Cedex, France. E-mail: usseglio@sciences.univ-metz.fr

2011. Uvíra, V.; Jeziorski, P.; Hanel, L.; Holusa, O. (1999): Aquatic Invertebrates of the Pálava Biosphere Reserve of UNESCO: Odonata. *Folia Fac. Sci. Nat. Univ. Masaryk. Brun., Biol.*, 101: 173-180. (in English). [So far 69 species of dragonflies have been recorded in the territory of the Czech Republic; in the Pálava Biosphere Reserve (in its extended concept) 45 species have been ascertained, i.e. 65 % of the total number known to occur in the Czech Republic. The paper outlines some general introduction into Odonata, collection methods, the history of odonatological investigation of the Pálava Biosphere Reserve, some species of special faunistic interest (*Epitheca bimaculata*, *Stylurus flavipes*, *Anax ephippiger*, *Sympetrum fonscolombii*), the potential for monitoring, and some information referring conservation of Odonata. All records are documented in detail.] Address: Holusa, O., Muzeum Beskyd, prírodovedné oddelení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

2012. Wachlin, V.; Müller-Motzfel, G. (1999): Monitoring von Insekten in Mecklenburg-Vorpommern. *Naturschutzarbeit in Mecklenburg-Vorpommern* 42(1): 17-23. (in German). [According to the Fauna-Flora-Habitat-Directive of the European Union monitoring of species and habitats is mandatory for the Natura 2000 areas. This paper lists the present status of the species of Appendix II of the Directive in Mecklenburg-Vorpommern, Germany, and proposes insect orders and methods suitable for monitoring. The results of an inventory in 1997 and 1998 of the Odonata are presented. *Sympecma paedisca*, *Aeshna viridis*, *Leucorrhinia albifrons*, and *L. pectoralis* were recorded in 1998, while *Stylurus flavipes*, *Ophiogomphus cecilia*, and *L. caudalis* could not be traced.] Address: Wachlin, V., Karrenderfer Str. 3, D-17498 Leist, Germany

2013. Weissmann, M.J.; Kondratieff, B.C. (1999): An inventory of arthropod fauna at Great Sand Dunes National Monument, Colorado. *Spec. Publ. Univ. Kansas not. Hist. Mus.* 24: 69-80. [USA, Colorado; *Lestes congener*, *L. dryas*, *L. unguiculatus*, *Aeshna constricta*, *A. palmata*, *Sympetrum corruptum*, and *S. occidentale*] Address: Weissmann, M.J., Dept Bioagric. Sci. & Pest Manag., Colorado St. Univ., Fort Collins, CO 80523, USA

2014. Wernicke, P.; Rumpf, M.; Mösch, W. (1999): Die Vorkommen bedeutsamer Lebensräume und Arten im Naturpark Feldberger Seenlandschaft. *Naturschutzarbeit in Mecklenburg-Vorpommern* 42(2): 15-26. (in German). [Habitats, flora and fauna of special interest are described for this 34500 ha large area in Mecklenburg-Vorpommern, Germany. 52 odonate species are reported, but only *Leucorrhinia pectoralis* and *Aeshna viridis* are briefly discussed.] Address: Wernicke, P., Dorfstr. 33c, D-17237 Thurow, Germany

2015. Wieland, A. (1999): Surveys of flora and fauna in the Senné fishpond area, Slovakia, spring 1997. Report of the Working Group International Wader and Waterfowl Research 65: 85 pp. (in English). [The Senné fishponds, situated in eastern Slovakia, have been surveyed between April 15 and June 9, 1997. During the migration season up to 20000 waterbirds are present regularly. Thus this report stresses on birds. In addition, data on dragonflies, butterflies, amphibians, mammals,

and plants are also presented. The odonatological results - 12 species including *Coenagrion pulchellum*, *Erythromma najas*, and *Brachytron pratense* - are compiled in tab. 7. Additions to this list can be taken from a list of 24 species (including *Erythromma viridulum*, *Crocothemis erythraea*, *Sympetrum flaveolum*) with observations between 6th and 16th of August 1998 (Appendix 3). In total 27 species could be observed in the Senné fishponds.] Address: WIWO, P.P. Box 925, NL-3700 AX Zeist, The Netherlands

2016. Wolf, F. (1999): Die Tier- und Pflanzenwelt im Hütter Wohld: Kartierungen der Libellen (Odonata), Süßwassermollusken (Gastropoda et Bivalvia) und Laufkäfer (Carabidae) des "Hütter Wohldes". *Archiv d. Freunde Naturg. Mecklenburg* 38: 309-326. (in German). [Germany, Mecklenburg-Vorpommern; commented list of 13 odonate species] Address: Wolf, F., Martin-Andersen-Nexo-Ring 7, D-18106 Rostock, Germany

2017. Xylander, W.E.R.; Stephan, R. (1999): Habitatwahl und ökologische Ansprüche ausgewählter Libellenarten im Braunkohletagebauegebiet Berzdorf. *Ber. Naturforsch. Gesell. Oberlausitz* 7/8: 95-100. (in German with English summary). ["Habitat selection and ecological demands of selected dragonfly species from the brown coal mining site Berzdorf. During investigations of small ponds in the former brown coal mining site Berzdorf (Upper Lusatia. Saxonia. Eastern Germany) 48 dragonfly species were documented from May 1996 until October 1998. Some of these species developed in ponds and a smaller river which significantly differ - with regard to their biological and physico-chemical properties - from the habitat demands described in the literature. At several ponds coenoses occur, the species of which should not share the same habitats according to their postulated habitat preferences. Selected dragonfly species and their habitats in the former brown coal mining site are described and compared with data from the literature." (Authors) *Leucorrhinia dubia*, *L. rubicunda*, *Ophiogomphus cecilia*] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum. GR.Dr.Xylander@t-online.de

2018. Zhou, W.-b. (1999): A new species of the genus *Phaenandrogomphus* from Yunnan (Odonata: Gomphidae). *Wuyi Sci. J.* 15: 40-41. (in Chinese with English summary). [*P. yunnanensis* sp. n. is described, illustrated and compared with *P. aureus* Laidlaw holotype male: Simao, Yunnan prov., 20-IV-1996.] Address: Zhou, W.-e., Zhejiang Mus. Nat. Hist., Gu-shan, Hanzhou-310012, P.R. China

2019. Zhu, B. (1999): A new species of *Lamelligomphus* Fraser from Yunnan, China (Odonata: Gomphidae). *Wuyi Sci. J.* 15: 36-37. (in Chinese with English summary). [*L. chaoi* sp. n. is described and illustrated from a single female: Canshan, Dali, Yunnan prov., China, 5-VI-1998; deposited at Dali Teacher Training Coll., Dali, China.] Address: Zhu, H.-q., 42-38. Shanxi University, Taiyuan 030006 Shanxi. China

2020. Zhu, H.; Zhou, W.. (1999): A new species of the genus *Anisopleura* Selys from Yunnan (Odonata: Euphaeidae). *Wuyi Sci. J.* 15: 33-35. (in Chinese with English summary). ["*A. yunnanensis* sp. n. is described and illustrated. Holotype male: Canshan, Dali, Yunnan prov., China, 15-V-1987; deposited at Shanxi Univ.; several paratypes of both sexes. The new species is rela-

ted to *A. subplatystyla*, from which it differs in the colour of prothorax, legs and abdomen, and in the structure of anal appendages."] Address: Zhu, H.-q., 42-38. Shanxi University, Taiyuan 030006 Shanxi. China

2021. Zhu, H.; Mao, B. (1999): The first descriptions of the male *Indolestes assamica* Fraser, 1930 and the female *Gynacantha incisura* Fraser, 1935 (Odonata: Lestidae, Aeshnidae). *Wuyi Sci. J.* 15: 30-32. (in Chinese with English summary). [The allotypes of *I. assamica* are described from Canshan, Dali city, Yunnan prov., China, and are deposited in Dept Biol., Dali Teacher Training Coll., Dali-671000, Yunnan, P.R. China. *G. incisura* is a new record for China.] Address: Zhu, H.-q., 42-38. Shanxi University, Taiyuan 030006 Shanxi. China

2000

2022. Anonymus (2000): Mitarbeiter des Arbeitskreises Libellen NRW treffen sich in Herne. *LÖBF-Mitteilungen* 3/00: 14. (in German). [Announcement of the 6th meeting of the working group of dragonfly researchers in the Federal State Nordrhein-Westfalen, Germany.] Address: <http://www.ak-libellen-nrw.de>

2023. Anonymus (2000): Warum gelingt der Libellenflug? *Klett-Magazin* 24: p? (in German). [Description of the role of the protein Resilin giving the wings of dragonflies elasticity; for more details see the paper abstracted as OAS 1716.] Address: not stated

2024. Bailey, M.P. (2000): Predation of Four-spotted Chaser *Libellula quadrimaculata* L. by otter *Lutra lutra* L.. *J. Br. Dragonfly Society* 16(2): 64. (in English). [Wings and other fragments of *L. quadrimaculata* were found on a route used by an otter and close by an Otter spraint. The diet of Eurasian Otter has been investigated in some detail but this observation appears to be the first record instance of predation on adult Odonata.] Address: Bailey, M.P., Countryside Council for Wales, Plas Gogerddan, Aberystwyth, Ceredigion SY23 3EE, UK

2025. Bal, B. (2000): L'inventaire des odonates de Haute-Savoie. *Bulletin romand d'entomologie* 18: 59-64. (in French). [Status quo report on faunistic research of the Odonata of the south-eastern part of France. 69 species are known at present, most of them are discussed briefly.] Address: Bal, B., APEGE, BP 66, F-74963 Cran-Gevrier Cedex, France

2026. Baltes, B. (2000): Einfluss der Gewässerversauerung auf aquatische Insekten. *Mitt. dtsh. Gesell. allg. angew. Entomol.* 12: 232-235. (in German). [In the middle range mountain Hunsrück (Saarland, Germany) *Cordulegaster boltonii* was found to be quite tolerant against acidification of running waters.] Address: Baltes, Brigitte, Institut für Natur-, Landschafts- und Umweltschutz / Biogeographie, Universität Basel, St. Johannes-Vorstadt 10, CH-4056 Basel, Switzerland. E-mail: Brigitte.Baltes@unibas.ch

2027. Baumann, R.W.; Huillet, A.L. (2000): Odonata of Moapa warm springs, Clark county, Nevada. *Argia* 12(4): 2-3. (in English). [25 species are listed; *Ischnura barberi*, *I. hastata*, *Brechmorhoga mendax*, and *Stylu-*

rus plagiatus are new for Nevada, USA.] Address: Baumann, R.W., Brigham Young University, Provo, Utah 84602, USA

2028. Bechly, G. (2000): Two new fossil dragonfly species (Insecta: Odonata: Pananisoptera: Aeschnidiidae and Aktassiidae) from the Solnhofen lithographic limestones (Upper Jurassic, Germany). Stuttgarter Beiträge zur Naturkunde Serie B (Geologie und Paläontologie) 288: 1-9. (in English with German summary). ["Two new dragonfly taxa are described from the Upper Jurassic Solnhofen Limestone (Bavaria, Germany) Solnhofenia stobeneri n. g., n. sp. is the sixth species of Aeschnidiidae from this locality and also the smallest one. Aeschnogomphus kuempeli n. sp. (Petalurida: Aktassiidae) is one of the biggest dragonflies known from this locality and even from the whole post-Triassic Mesozoic and Cenozoic." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

2029. Belz, A.; Fuhrmann, M. (2000): Die Libellen des Kreises Siegen-Wittgenstein. Der Sauerländische Naturbeobachter 27: 45-48. (in German with English summary). [For a more detailed presentation of this paper see OAS 2030] Address: Fuhrmann, M., Zum Großen Wald 19, D-57223 Kreuztal, Germany

2030. Belz, A.; Fuhrmann, M. (2000): Libellen. Beiträge zur Tier- und Pflanzenwelt des Kreises Siegen-Wittgenstein 6: 83 pp. (in German). [This regional fauna on the Odonata of the low mountain range in the southern region of the federal state Nordrhein-Westfalen, Germany, gives information on 35 species of which 28 are assessed as autochthonous. Each species is treated in a monographic style, providing information on regional distribution (the maps are plotted against altitude), habitat, and habits. The species are documented by colour photographs.

(Auf der Informationsbasis eines etwa 25 jährigen Untersuchungszeitraums legen die Autoren Albrecht Belz und Markus Fuhrmann eine 83 Seiten umfassende Regionalfauna vor. Im Bundesland Nordrhein-Westfalen gelegen grenzt der Landkreis Siegen-Wittgenstein an Rheinland-Pfalz und Hessen. 35 nachgewiesene Arten, von denen 28 als bodenständig angesehen werden, dokumentieren eine eher artenarme Mittelgebirgs-Libellenfauna, was jedoch angesichts der Höhenlage (meist über 400 m und bis über 750 m NN) nicht weiter verwundert. Das Werk gliedert sich in 7 Kapitel: Einleitung, Geschichte der odonatologischen Kartierungen im Landkreis, Einführung in die regionale Geographie, Methoden und allgemeine Angaben zu Libellen, Liste und monographische Abhandlung der nachgewiesenen Arten, Anmerkungen zu Gefährdungen und Schutzmaßnahmen, Literatur. Den Artunterkapiteln sind jeweils Angaben zu "Verbreitung und Bestand", "Lebensraum", "Lebensweise" und - selten - "Besonderheiten" oder "Kuriosa" (u.a. Hinweis auf eine zwergwüchsige Aeshna cyanea) zu entnehmen. Beigegeben sind Rasterverbreitungskarten sowie ein Flugzeitendiagramm und - im Regelfall - ein Farbfoto der jeweiligen Art, jedoch nur dann, wenn das Belegfoto im Landkreis angefertigt werden konnte. Willenkommen ist dieses Buch für alle, die sich für Regionalfaunen und Ergänzungen im Flickenteppich der Verbreitungskarte der deutschen Libellenfauna interessieren. Für mich am interessantesten

waren einige Hinweise - manchmal nur am Rande erwähnt - zur (Wieder-?)besiedlung des Landkreises durch einige Arten vor dem Hintergrund der Landschaftsveränderungen und der klimatischen Änderungen in den zurückliegenden zwei Dekaden. (Martin Schorr)] Address: NABU Siegen-Wittgenstein e.V., In der Hüttenwiese 30, D-57072 Siegen, Germany

2031. Bernard, R. (2000): State of knowledge of the occurrence and biology of Cordulegaster boltonii (Donovan, 1807) in Poland (Odonata: Cordulegastridae). Roczn. nauk. Pol. Tow. Ochr. Przyr. "Salamandra" 4: 55-87. (in Polish with extensive English summary). ["All literature data on the occurrence of C. boltonii in Poland are summarized and new localities are added. Distribution, habitat, period of flight, location of exuviae and selected aspects of behaviour of the species in Poland are presented and discussed. C. boltonii is a vulnerable species in Poland. Threats are given and ways to stop a regressive trend are proposed." (Author)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

2032. Bezdecka, P. (2000): Effect of extreme floods in July 1997 on the dragonfly diversity (Odonata) in the middle section of the river Morava (Moravia, Czech Republic). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 37-51. (in Czech with English summary). [The author compares the dragonfly diversity in the middle section of the Czech river Morava (river km 98,9-172,15) on the basis of investigation in 1955-1956, 1995-1996, and 1997-1998. "In July 1997, the northeastern part of the Moravian territory and north-east part of the Bohemian were afflicted by intensive rains lasting several days, and as a result, the water streams in the drainage areas of the rivers Morava, Odra, Orlice and in the upper part of the drainage of the river Labe were marked of extreme flood flows, which attained or surpassed the level of so called Q 100 years' flows." A total of 42 odonate species are known from the study area. "[...] It is interesting that extreme floods in July 1997 had no negative influence on dragonfly diversity, even the increasing of dragonfly diversity was found during two years after floods in most examined localities (backwaters)."] Address: Bezdecka, P., V. Vaculky 994, 686 05 Uherské Hradiste, Czech Republic. E-mail: pbezdecka@iol.cz

2033. Binot-Hafke, M.; Buchwald, R.; Clausnitzer, H.-J.; Donath, H.; Hunger, H.; Kuhn, J.; Ott, J.; Piper, W.; Schiel, F.-J.; Winterholler, M. (2000): Ermittlung der Gefährdungsursachen von Tierarten der Roten Liste am Beispiel der gefährdeten Libellen Deutschlands - Projektkonzeption und Ergebnisse. Natur und Landschaft 75(9/10): 393-401. (in German with English summary). ["This presented project aims on national level a compilation of causes of threat for the animal species of the Red List. For this there was a catalogue developed, which contains general causes of threat and enables to evaluate results comprehensive for all animal groups. It was tested exemplary for the dragonflies, if this catalogues is suitable for using. By means of expert opinions the data admit conclusions about causes of threat for each species, responsible groups and trends. The results confirm the procedure. In future the catalogue and

the number of sampling must be optimized for the survey of the causes of threat of other animal groups." (Authors)] Address: Binot-Hafke, Margret, Bundesamt für Naturschutz, FG I1.1, Konstantinstr. 110, D-53179 Bonn, Germany. E-mail: binotm@bfn.de

2034. Bönsel, A.; Kühner, A. (2000): (Odonata) aus der Sammlung des Zoologischen Instituts der Universität Rostock. *Libellula* 19(3/4): 199-211. (in German with English summary). [Mecklenburg-Vorpommern, Germany. "The collection includes 92 specimens of 33 spp. Most specimens were collected by Mr A. GUNDLACH between 1906 and 1909 in the vicinity of Neustrelitz, northern Germany. That area is known for one of earliest faunistic works in northern Germany (FÜLDNER 1855). The data on collecting sites were compared with a map from 1882 and the recent situation. There was a drastic decrease in swamps and fens which could be related to changes in species composition." (Authors)] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

2035. Bönsel, A.; Matthes, H.; Matthes, J. (2000): Wo existiert noch ein bodenständiges Vorkommen der Torf-Mosaikjungfer, *Aeshna juncea* (L. 1758), in Mecklenburg-Vorpommern? *Naturschutzarbeit in Mecklenburg-Vorpommern* 43(2): 44-45. (in German). [This paper compiles the current knowledge on the distribution of *A. juncea* in the Federal State Mecklenburg-Vorpommern, Germany, and intends to make faunists sensible for the species. Surprisingly this species is very rare. The authors give some advice to the identification of the species.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

2036. Boness, M. (2000): Massenflug der Schabrackenlibelle *Hemianax ephippiger* Burmeister an der Küste der Algarve (Portugal). *Atalanta* 31(3/4): 585. (in German). [Near Ferragudo, Portugal, September 16, 1999, several hundreds to thousands immature *Anax ephippiger* perched on shrub vegetation or near the ground directly in front of the cliff. The following days only few specimens could be traced. The possibility of an influx originating from Africa or Spain is shortly discussed.] Address: Boness, M., Birkenweg 18, D-51381 Leverkusen, Germany

2037. Bornholdt, G.; Braun, H.; Kress, J.C. (2000): Erfolgskontrollen im abgeschlossenen Naturschutzgroßprojekt "Hohe Rhön / Lange Rhön". *Angewandte Landschaftsökologie* 30: 261 pp.- (in German with English summary). ["It is the aim of this survey to gather experience in controlling the success of large scale national nature projects and to find practical guidelines for future projects. For that model success controls were made in the large scale conservation project „Hohe Rhön / Lange Rhön" during the vegetation periods of 1996 and 1997. They dealt with the flora, the vegetation, birds, amphibians, ground beetles, bugs, cicadas and dragonflies. Furthermore changes in the structure of the landscape and its use were analysed. [...]". Measures for Odonata nearly totally failed; the population of *Cordulegaster boltonii* and *Calopteryx virgo* diminished greatly. *Thecagaster bidentata* could not be observed. Due to priority for conservation measures directed to the Black Grouse (*Aves: Tetrao tetrix*), which is highly sensitive against human impacts including scientific studies, it was not possible to assess measures reali-

sed to increase populations of odonate bog species.] Address: not stated

2038. Breuer, M.; Douma-Petridou, E. (2000): A Greek mountain stream (N Peloponnesus) as habitat of *Callaieschna microstigma* (Odonata: Aeshnidae). *Libellula Suppl.* 3: 1-7. (in English with German summary). ["The odonate fauna of a small stream, bordered with plane trees in the mountain area of Panahaikon (SE Patras, Achaia, Greece), was studied in 1994 and 1997. Two species were found: *Callaieschna microstigma* and *Calopteryx virgo festiva*. The flight period of *C. microstigma* lasted from May to August, with a maximum emergence in the first half of June. The adult behaviour was inconspicuous and flight occurred until late dusk. *C. microstigma* seems to be restricted to a definite habitat. The following habitat characteristics may be important for its occurrence: (1) a wooded or at least tree-bordered shaded small watercourse, and (2) fast running water with calmer areas. The latter seem to serve as larval habitats." (Authors)] Address: Breuer, M., Zoological Institute, Laboratory for Developmental Physiology and Molecular Biology, Katholieke Universiteit Leuven, Naamsestraat 59, B-3000 Leuven, Belgium. E-mail: michael.breuer@bio.kuleuven.ac.be

2039. Breuer, M.; Douma-Petridou, E.; Koutsaftikis, A. (2000): Seasonal distribution of Odonata in brackish temporary wetlands of the NW Peloponnesus, Greece. *Libellula Suppl.* 3: 9-24. (in English with German summary). ["For at least one annual cycle, three different waters at the wooded coastal area of Strofilia (district Achaia) were studied. 17 species were recorded, some in rather high numbers. Limiting factors might be the salinity and the temporary character of the waters. A range of adaptations to these conditions are discussed: deposition of drought-resistant eggs, early and late appearance of the adults and protracted emergence. Several species appear to be multivoltine. High densities of *Aeshna mixta* and *A. affinis* as well as occurrence of hibernating adults of *Sympetrum striolatum* are noteworthy. Many species recorded at the Strofilia area are well known as dispersing insects." (Authors)] Address: Douma-Petridou, E., University of Patras, Faculty of Science, Department of Biology, Section of Animal Biology, GR-26110 Patras, Greece

2040. Brown, D. (2000): Lilac Beauty *Apeira syringaria* (L.) (Lep.: Geometridae): a second generation specimen at Charlecote Warwick. *Entomologist's record and Journal of variation* 112: 170. (in English). [*Aeshna mixta* was attracted by a light trap September 22, 1999.] Address: Brown, D., Jacksons Lawn, Charlecote, Warwick, CV35 9EW, UK

2041. Bruyn, L. de; Grootaert, P.; Pollet, M.; Knijf, G. de (2000): Hebben ongewervelden een toekomst in onze tuinen? *Ankora, Antwerpse Koepel voor Natuurstudie, Jaarboek 1999*: 68-83. (in Dutch). [Is there any future for invertebrates in our gardens? - The role of garden habitats in protection of Syrphidae (Diptera) and Odonata was investigated in the surroundings of Antwerpen, Belgium. In comparison to nature reserves, garden habitats are inhabited by ubiquitous species only.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

2042. Buczynski, P. (2000): Dragonflies (Odonata) of some existing and proposed peat bog reserves in the

region Polesie Lubelskie. Roczn. nauk. Pol. Tow. Ochr. Przyr. "Salamandra" 4: 89-101. (in Polish with extensive English summary). [Between 1992 and 1997, 39 species are recorded in four peat bogs in the Polish part of the region Polesie (border region to Belarussia and Ukraine). The most interesting species are "Sympecma fusca, Orthetrum albistylum, Libellula fulva, and Sympetrum pedemontanum. The northern range limits of the former two species run in eastern Poland, and the last compact complexes of localities of these species are known in the study area; northwards only single localities occur [...]. The development of *O. albistylum* in peat bog waters confirms also its wide habitat spectrum in mideastern Poland [...]. *L. fulva* and *S. pedemontanum* are widely distributed, but they occur rarely. *S. pedemontanum* was known from only one locality in the Polish Polesie [...]. *L. fulva* is given from this region for the first time and two other new records are also given. Both species are probably more frequent in the region, but they need intensive investigations focused on their typical habitats. [...]" (Author)] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2043. Buczynski, P. (2000): Großlibellen auf Kiefernadeln aufgespießt (Odonata: Libellulidae). *Libellula* 19(3/4): 213-216. (in German with English summary). ["Dragonflies speared by pine needles (Odonata: Libellulidae) - Adult *Orthetrum cancellatum* and *Sympetrum danae* pinned to coniferous needles were found at peatbogs in southeastern Poland. The imago of *S. danae* had survived and flew dexterously with a pin impaling its abdomen. It is suggested that this phenomenon was caused by shrikes." (Author)] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2044. Buczynski, P.; Pakulnicka, J. (2000): Odonate larvae of gravel and clay pits in the Mazurian lake district (NE Poland), with notes on extremely northern localities of some Mediterranean species. *Notul. odonatol.* 5(6): 69-72. (in English). [Larvae of 30 spp. were collected during 1998 and 1999 at 6 localities. Of special interest are *Orthetrum albistylum*, *Sympetrum depressiusculum*, *S. fonscolombii*, *S. meridionalis*, *S. striolatum*, and *Leucorrhinia pectoralis*. The localities for *O. albistylum* lie far from its hitherto known area of distribution.] Address: Pakulnicka, J., Chair of Ecology and Environment Protection, Warminko-Mazurski University, Zolnierska 14, PL-10-561 Olsztyn, Poland

2045. Burbach, K.; Weihrach, F. (2000): Entwicklung von drei Gomphiden-Arten in einem Baggersee bei München (Odonata: Gomphidae). *Libellula* 19(3/4): 237-240. (in German with English summary). ["In June 2000, exuviae of *Gomphus pulchellus*, *G. vulgatissimus* and *Onychogomphus f. forcipatus* were collected at an old gravel pit lake near Munich, Bavaria, Germany. In September 2000, these species were recorded as larvae in the same lake. This is the first record for Central Europe of the concurrent development of three gomphid species in stagnant waters." (Authors)] Address: Burbach, K., Griesfeldstr. 5a, D-85354 Freising, Germany. E-mail: klaus.burbach@gmx.de

2046. Burbach, K. (2000): Nachweis einer zweiten Jahresgeneration von *Enallagma cyathigerum* und

Ischnura pumilio in Mitteleuropa (Odonata: Coenagrionidae). *Libellula* 19(3/4): 217-227. (in German with English summary). ["South of Neuburg/Donau, Bavaria, Germany (48°41'N, 11°11'E) two freshly emerged adults and five exuviae of *E. cyathigerum* as well as one emerging and two fresh emerged imagines of *I. pumilio* have been recorded on 26-VIII and 30-VIII 1998, respectively. The site was a newly built pond which was flooded on 20-V-1998. The only probable origin of the odonates is from oviposition into the vegetation in spring 1998. The development from egg to adult must have taken place in about 100 days and was favoured by warm weather, high water temperature and lack of competition. Long flight periods and late emergence records suggest that a second generation is not uncommon and may often be overlooked due to methodical problems. The variation of life cycles in both spp. is discussed." (Author)] Address: Burbach, K., Griesfeldstr. 5a, D-85354 Freising, Germany

2047. Burkart, W.; Lopau, W. (2000): Libellen im Landkreis Rotenburg (Wümme). *Naturkundliche Schriftenreihe der Stiftung Naturschutz im Landkreis Rotenburg (Wümme)* 2: 175 pp. (in German). [The Landkreis Rotenburg (Wümme) is situated in the north of the Federal State Niedersachsen, Germany, south-west of Hamburg. The odonate fauna of this region is treated in a very nice, sophisticated book. In a general part the authors present an introduction into the natural history (geology, climate etc.) and the typical dragonfly habitats; maps and colour photos illustrate the given information. Furthermore the data basis is outlined, including a short history of odonatological research in the region. The book is directed to the advanced amateur and a more general public, thus: a biology of dragonfly is not lacking. Part II treats in a monographic style 55 odonate species. Each species is introduced by a colour photo and characterised more generally. Special emphasize is given to the distribution and the habitats in the Landkreis Rotenburg (Wümme). A map, a figure with phenology, information on threat, and possible conservation measures provide a lot of sound information of more than regional interest. A quite extensive chapter is directed to the protection of dragonflies under a more regional view. Some habitats and species in the Landkreis Rotenburg (Wümme) are of national importance in view of conservation view. The appendix includes a glossary and a regional bibliography. No doubt, this is a book which should not be missing from your odonatological library. (M. Schorr)] Address: Stiftung Naturschutz im Landkreis Rotenburg (Wümme), Postfach 1440, D-27344 Rotenburg (Wümme), Germany

2048. Buskirk, J. van; Schmidt, B.R. (2000): Predator-induced phenotypic plasticity in larval newts: trade-offs, selection, and variation in nature. *Ecology* 81(11): 3009-3028. (in English). ["Phenotypic plasticity has important ecological consequences because the strengths of species interactions can change with the behavior and morphology of interacting individuals. Evolutionary studies of plasticity can predict conditions under which shifts in phenotypes will occur and, therefore, may modify species interactions. We studied evolutionary mechanisms maintaining an induced response to predators in *Triturus* newt larvae, which are among many taxa in freshwater habitats exhibiting predator-induced plasticity. When exposed to caged (nonlethal) *Aeshna* dragonfly larvae, newts of two species (*T. alpestris* and *T. helveticus*) spent more time hiding in the leaf litter,

had darker pigmentation in the tail fin, and developed larger heads and larger tails relative to their body size, in comparison with newts in predator-free ponds. The two phenotypes faced a performance trade-off across environments with and without odonates: the predator-induced phenotype survived twice as well as the no-predator phenotype when exposed to free dragonflies, but the predator-induced phenotype of both species grew more slowly until just before metamorphosis. For *Triturus alpestris*, a direct comparison of performance between phenotypes was complicated because predator-induced newts emerged later in the summer but at a larger body size. Nonrandom mortality imposed by hunting dragonflies caused selection favoring increasing tail size, but we found no selection on specific traits in predator-free ponds. Head shape was not subject to selection in either environment; we suspect that head shape is involved in consuming different prey in the presence and absence of predators and is unrelated to predator escape. *Triturus* in 25 natural populations from which we collected quantitative samples in 1997 and 1998 exhibited extreme spatial variation in predation regime (density of large predators ranged from 0 to 24 individuals/m²). Variation among populations in head shape was exactly as predicted by experimental results (*Triturus* of both species had relatively large heads when exposed to predators), but results for tail shape were consistent with the experiments in only one of the two years. The evolutionary mechanisms maintaining plasticity in *Triturus* and other amphibian larvae should apply to many organisms inhabiting freshwater ponds, so trait-mediated indirect effects seem especially likely to occur in these habitats." (Authors). *Aeshna cyanea*, *Anax imperator*] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

2049. Bußmann, M. (2000): Libellenfunde im nord-westlichen Sauerland - eine vorläufige, kommentierte Artenliste. *Der Sauerländische Naturbeobachter* 27: 49-56. (in German with English summary). [Commented list of 27 odonate species of the northwestern Sauerland, Nordrhein-Westfalen, Germany.] Address: Bußmann, M., Elberfelder Str. 9, D-58285 Gevelsberg, Germany

2050. Carvalho, A.L.; Calil, E.R. (2000): Identification Keys to the Families of Odonata (Insecta) occurring in Brazil, Adults and Larvae. *Papeis Avulsos de Zoologia* 41(5): 223-241. (in Spanish with English summary). [New identification keys for adults and last instar larvae of 13 odonate families are presented. A synopsis of the geographic range, habitats of breeding, and number of genera and species is compiled for each family. General data on the biology and morphology of the order with emphasize on wing venation are added.] Address: Carvalho, A.L., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil

2051. Cempírek, J. (2000): The contribution about dragonflies marking (Odonata). In: Hanel, L. (Ed.): *Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim*. ISBN 80-86327-12-4: 24-29. (in Czech with English summary). [The author communicates his with experience marking *Cordulia aenea* wings with a acetone car paint. He uses the 12 positions (loci) method. "Each locus has its own number

code beginning from the tip of the anterior left wing - code 1, to the last locus on the tip of the posterior right wing- code 12. The combination of the single spot codes gives a resulting individual code number for each specimen. The colour spots are well visible, permanent and help to identify each marked specimen during its fly or rest without any recapture."] Address: Cempírek, J., Vidov 37, 370 07 České Budejovice, Czech Republic

2052. Chalmel, R.; Dommanget, J.-L. (2000): Rubrique bibliographique. *Martinia* 16(4): 209-212. (in French). [Odonatological publications from 1995 to 2000 referring to France are listed.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2053. Cloupeau, R.; Boudier, F.; Levasseur, M.; Coquempot, C. (2000): Les odonates de Touraine (Département d'Indre-et-Loire, France). Bilan de l'Inventaire en cours. *Martinia* 16(4): 153-170. (in French with English summary). [Records of 58 odonate species - own field observations, literature data, and data from the French record scheme - are listed and commented. Special attention is paid to the Gomphidae dwelling the River Loire and its tributaries. The records of *Leucorrhinia caudalis*, *Oxygastra curtisii*, *Ophiogomphus cecilia*, *Gomphus graslinii*, *Stylurus flavipes*, and *Coenagrion mercuriale* are of European importance.] Address: Cloupeau, R., 10, av. L. Brulé, F-37210 Vouvray, France

2054. Collier, K.J.; Halliday, J.N. (2000): Macroinvertebrate-wood associations during decay of plantation pine in New Zealand pumice-bed streams; stable habitat or trophic subsidy? *Journal N. Am. benthol. Soc.* 19(1): 94-111. (in English). [Antipodochlora braueri was identified in 3 wood and 2 inorganic substrate samples, collected in summer 1996 from 12 New Zealand pumice-bed streams.] Address: Collier, K.J., Natn. Inst. Water & Atmospheric Res., P.O. Box 11-115, Hamilton, New Zealand

2055. Conze, K.-J. (2000): Faunistische Untersuchungen zur Effizienzkontrolle im Gewässerrenaturierungsprogramm 1999. *Natur- und Umweltschutzakademie Nordrhein-Westfalen - Seminarbericht* 6: 62-66. (in German). [Controlling the success of restoration measures of the River Ems, Nordrhein-Westfalen, Germany, birds and dragonflies were monitored along four sampling stretches. 21 odonate species were observed. The results are critically assessed with emphasize on age of restoration measures / substrat diversity, so called standard methods for ecological surveys, and biocological phenomena as between years changing abundances of insect populations. If monitoring has to be realised under the pressure of a low budget, results are hardly to be considered as serious in a scientific sense.] Address: Conze, K.-J., LökPlan-Conze, Cordes & Kirst GmbH, Hedwigstr. 32b, D-59609 Anröchte, Germany. E-mail: lökplan@t-online.de

2056. Costa, J.M.; Santos, T.C (2000): *Especie nova de Heteragrion Selys, 1862 do estado do Rio de Janeiro, Brasil (Odonata: Zygoptera: Megapodagrionidae)*. *Bolm Mus. nac. Rio de J. (N.S. / Zool.)* 411: 1-7. (in Portugese with English summary). [*Heteragrion muryense* sp. n. is described and illustrated. Holotype male, allotype female: Rio de Janeiro, Nova Friburgo, Mury, alt. 1500 m, 10-11-1990; deposited at MNRJ. Keys to separate the three groups within the genus, and the

eight species (groupe I and II) that occur in the state of Rio de Janeiro, Brasil are provided.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

2057. Couteyen, S.; Papazin, M. (2000): Contribution à la connaissance des Odonates de l'île de la Réunion 2. Description de la larve de *Gynacantha bispina* Rambur. (Odonata, Aeshnidae). *L'entomologiste* 56(5): 215-219. (in French with English summary). ["The ultimate instar larva of *Gynacantha bispina* Rambur, 1842 is described and figured. Some biological notes are added. It is compared to the larva of *Anax imperator mauricianus* Rambur, 1842, the other known Aeshnidae from La Réunion." (Authors)] Address: Couteyen, S., 188, Chemin Nid Joli, F 97430 Le Tampon, La Réunion

2058. Couteyen, S.; Papazin, M. (2000): Contribution à la connaissance des odonates de la Réunion 3. *Hemicordulia asiatica* Sélys, 1878, une espèce nouvelle pour l'île (Odonata, Corduliidae). *Martinia* 16(3): 107-110. (in French with English summary). [*H. asiatica* was observed December 17, 1998. A checklist of the Réunionian Odonata is added.] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France

2059. Couteyen, S.; Papazin, M. (2000): Contribution à la connaissance des odonates de l'île de la Réunion 1. Présence de *Gynacantha bispina* Rambur, 1842 (Odonata, Aeshnidae). *Entomologiste* 56(3): 127-134. (in French with English summary). [*Gynacantha bispina*, *G. radama*, *G. malgassica*, and *G. hova* are known to occur on the isles of Madagascar, Réunion, Mauritius, and the Comores. The specimens of the genus known from Réunion are analyzed, and turned out to belong exclusively to *G. bispina*. Thus, *G. radama* has to be eliminated from the checklist of the Odonata from Réunion; a new checklist (16 species) is given in the appendix of the paper. The species (excl. *G. hova*) are figured, *G. bispina* is described, and compared in detail with *G. malgassica*.] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France

2060. Couteyen, S. (2000): Déterminisme de la posture de guet chez *Trithemis annulata haematina* (Rambur, 1842) (Odonata, Libellulidae). *Martinia* 16(3): 101-106. (in French with English summary). [Réunion; the perch site selection of *T. haematina* is studied in dependence of day time, temperature of air, temperature of perch surface, wind, and on of four differed perch positions previously occupied.] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France

2061. Cruden, R.W.; Gode, O.J. (2000): The Odonata of Iowa. *Bulletin of American Odonatology* 6(2): 13-48. (in English). ["We report 108 species from Iowa, which include 103 species collected since 1985, two accidentals, and three species that were probably extirpated many decades ago. We discuss reports of 20 additional species whose presence in the state is questionable. As many as 31 species may be imperiled or critically imperiled. This reflects, at least in part, that the distributional ranges of 19 species barely reach Iowa. Most of the imperiled species occur in lotic habitats or wetlands, habitats most affected by human activity. Dramatic post-settlement changes in the state's river systems

were followed by the movement of species into lotic systems, e.g., *Argia moesta*, *Enallagma anna*, *Gomphus externus*, *Progomphus obscurus*, and *Stylurus notatus*. [...] *Hagenius brevistylus*, *Gomphus fraternus*, *G. exilis*, have become less common or were extirpated due to stream degradation. Further, prior to settlement there were few deep lakes and ponds in the state and virtually no wetlands or ponds in southern Iowa. The construction of farm ponds, gravel pits, etc., and the elimination of wetlands dramatically changed the lentic fauna. Species that were absent from Iowa, rare, or restricted to eastern Iowa early in the 1900s are now common across the state, e.g., *Epitheca princeps*, *Celithemis eponina*, and *Perithemis tenera*. In contrast, at least one wetland species was possibly extirpated, i.e., *Lestes vigilax*, and the ranges of others probably contracted, e.g., *Aeshna verticalis*, *Nasiaeschna pentacantha*, and *Sympetrum ambiguum*." (Authors)] Address: Cruden, R.W., Department of Biological Sciences, University of Iowa, Iowa City, IA 52242, USA. E-mail: robert-cruden@uiowa.edu

2062. Czachorowski, S.; Buczynski, P.; Walczak, U.; Pakulnicka, J. (2000): Cover species (umbrella species) in the protection of insects. *Przegląd Przyrodniczy* 11(2-3): 139-148. (in Polish with English summary). ["Current laws on nature protection in Poland are grounded on experiences with protection of vertebrates and plants. However, they are often insufficient and ineffective in case of insects. Moreover, they also make difficult basic studies on faunistics and ecology which are vital to plan proper protection activities. Such activities, outside protected areas (National Parks and Nature Reserves) are proposed in this article, using the so-called 'cover species' ('umbrella species') method. The umbrella species for variable biotopes in Poland are suggested, including the caddisflies, dragonflies, water beetles, water bugs, and butterflies." (Authors) A German translation of the paper is available from Pawel Buczynski.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2063. d'Aguilar, J. (2000): Les descriptions originales des Odonates d'Europe. 6. Fonscolombe, Etienne, Laurent, Joseph, Hyppolyte, Boyer de (1775-1853). *Martinia* 16(4): 185-208. (in French with English summary). [The sixth article in the series of facsimilies of fundamental odonatological publications is devoted to Boyer de Fonscolombe (1775-1853) who described several Odonata species, among them *brunneum* (Orthetrum), *caerulescens* (Coenagrion) and *irene* (Boyeria).] Address: d'Aguilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France

2064. Daigle, J.J. (2000): Sarasota surprises! *Argia* 12(4): 9-10. (in English). [USA, Florida; *Coryphaeschna adnexa*, *Crocothemis servilia*, *Erythemis plebeja*, *Brachymesia gravida*, *Aphylla williamsoni*, *Erythrodiplax umbrata*, *Miathyria marcella*] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: daiglej@dep.state.fl.us

2065. Danforth, D. (2000): First record of *Dythemis maya* for Arizona. *Argia* 12(4): 3. (in English). [September 30, 2000; Lower Parker Canyon, Santa Cruz County, Arizona, USA] Address: Danforth, D., P.O. Box 232, Bisbee, Az., 85603, USA. E-mail: Dougofbis@yahoo.com

2066. David, S. (2000): Bibliography of dragonflies (Insecta: Odonata) of Slovakia. III (1993-2000). Sborník referátu III. celostátního semináře odonatologi v CHKO Trebonsko, 2000: 175-183. (in Slovakian with English summary). [The third part of the Slovakian odonatological bibliography compiles 86 publications.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: nrukdavi@savba.sk

2067. David, S. (2000): Dragonfly (Odonata) communities and water habitats in the inundation of the Hron river potamal (SW Slovakia). Ekológia (Bratislava) 19 (Suppl. 2): 137-150. (in English with Slovakian summary). ["The species composition in the dragonfly communities of lentic and lotic habitats in the inundation area of the Hron River is analysed. The investigation was carried out from April 1987 to October 1993, neglecting the winter period. A total of 61 samples were taken in 20 habitats. A total of 33 species were captured, 28 of which were found in the larval stage. One of these - *Sympetrum danae* (as a peat-moos species) is recorded for the first time in the Hron floodplain. Among endangered and rare species, *Onychogomphus forcipatus*, *Sympetrum meridionale*, *S. pedemontanum*, and *Somatochlora metallica* respectively, may be mentioned about. Surprising is the finding of the peat-moss and moorland species *S. danae*. According to origin 17 Mediterranean and 10 Palearctic species dominate. Five species originate from Ponto-Caspian refuge area. 17 species are wide-spread in Euro-Siberian and west-Siberian areas, Palearctic area harbours 9 species and 5 species are wide-spread in the area extending from Mediterranean region to southern Scandinavia and Russia. *Erythromma viridulum*, *Aeshna affinis*, *Anax imperator*, and *Crocothemis erythraea* are species of invasion character. The types of habitat could be separated into the four groups of different community structure. The ordination and classification of the dragonfly communities were set up using NCLAS and PRINCOMP programs. We have identified odonatocenoses: *Gomphus - Calopteryx splendens* in the Hron river (rheophile communities) and small defined species communities of *Orthetrum - Lihellula depressa* in study area. The habitats present here are the Hron branches (oxbow lakes) and the big gravel pits. The habitats of the richest communities of species *Lestes - Sympetrum - Aeshna* (*mixta*, *affinis*) are gravel pits filled with soil and oxbow lakes of Hron. Despite the difficulties with interpretation of the results obtained by ordination (indirect gradient analysis), the presented methods of numeric data elaboration are considered to be a contribution to the study on community composition problems of dragonflies." (Author)] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: nrukdavi@savba.sk

2068. David, S. (2000): Dragonfly fauna (Insecta: Odonata) of the Stiavnické vrchy Mts. Entomofauna carpathica 12: 25-31. (in Slovakian with English summary). [The dragonfly fauna of 25 localities in the Stiavnické vrchy Mts. (middle Slovakia) was investigated from 1990 to 1998. 28 species are documented in detail and zoogeographically analyzed. A total of 33 odonate species is known from the region. The records of *Coenagrion ornatum*, *Thecagaster bidentata*, *Orthetrum brunneum*, and *Leucorrhinia pectoralis* are the most considerable faunistic results from the surveys of the Stiavnické vrchy Mts.] Address: David, S., ÚKE SAV,

Akademická 2, SK-94901 Nitra, Slovakia. E-mail: nrukdavi@savba.sk

2069. David, S. (2000): New records of dragonflies (Insecta, Odonata) from Slovakia. Biologia, Bratislava 55(5): 444- (in English). [The record of *Coenagrion armatum* (May 15, 1999, Poprad-Stufy) enlarges the number of odonate species known from Slovakia to 74. Some additional records of *Somatochlora meridionalis* (different dates, Semerovský potok brook and Sahy-Tesmak) are dealt with.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: nrukdavi@savba.sk

2070. Dijkstra, K.D.; Dingemans, N.J. (2000): Odonata from Kibale National Park, western Uganda. Notul. odonatol. 5(6): 72-75. (in English). [Records for 47 spp. collected from Oct. 1995 to Febr. 1996 in Kibale National Park and its surroundings are presented. Notes on habitat, behaviour and taxonomy are added for some spp, e.g. *Umma saphirina* Förster 1916, *Chlorocnemis marshalli* Ris 1921, *Chlorocnemis pauli*, *Enallagma pseudelongatum*, *Pseudagrion hageni*, *Pseudagrion kibalense*, *Aeshna ellioti*, *Notogomphus butoloensis*, *Atoconeura biordinata*, *Hemistigma albipuncta*, *Micromacromia camerunica*, *Notiothemis robertsi*, *Orthetrum julia*, *Zygonyx regisalberti*.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

2071. Dolný, A. (2000): Dragonflies (Odonata) as biological indicators. In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 8-23. (in Czech with English summary). [Dragonflies are suitable to determine the saprobity of running waters based on a calculation of the saprobic index of the community. "In this contribution the author sums the knowledge about the possibilities of using dragonfly (Odonata) larvae for bioindication. [...] Dragonflies are also a suitable group of insects for bioindication of the naturalness level of zoocenoses and for monitoring the ecological state of biotops significant from the point of view of conservation of the nature and namely peat bogs."] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic

2072. Dommangeat, J.-L.; Mashaal, M. (2000): Les Départements et Territoires d'Outre-mer français. Généralités. Martinia 16(3): 85-94. (in French with English summary). [This is a general introduction into the political and geographical situation of the French overseas departments and territories in the framework of a special issue of Martinia on the Odonata of these countries. They represent an area of about 120000 km² and a population of more than 2,2 millions inhabitants. "Most of these territories are tropical and have therefore weather conditions favorable to Odonata. A general introduction is followed by some information about the geography, the climate and the economy of the different territories. The odonatological interest of each is also mentioned, mainly for the territories not covered in other articles of the present issue." (Authors)] Address: Mashaal, M., 2, rue Meilhac, F-75015 Paris, France

2073. Dommangeat, J.-L. (2000): Note préliminaire sur des collections d'odonates exotiques mises à disposition de la SFO. Martinia 16(3): 133- (in French). [Short

notice with reference to specimens from different countries waiting for determination, including some identifications from Guadeloupe.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2074. Donath, H. (2000): Bergbaufolgelandschaft - Leit- und Zielarten zur Beurteilung von Naturschutzkonzepten. Teil 2: Odonata. Biologische Studien, Luckau 29: 25-41. (in German). [Odonata were surveyed between 1995 and 2000 in the abandoned brown-coal-mining area Schlabendorf Nord and Schlabendorf Süd, Brandenburg, Germany. 43 (27 autochthonous) species could be recorded. In addition data of the Stoßendorf See (colonisation by Odonata after flooding) and the Tornower Waldsee are presented. The author defines umbrella species (e.g. species of ponds, acid lakes, high bogs, ubiquitous) dwelling the brown coal waters and compares their habitat selection with different stages of succession of these waters. Factors discussed are pH, age, water level, wind exposition, or vegetation. The author concludes that measures for species of late succession stages with reed belts and hydrophyte and submerged vegetation should be given priority.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

2075. Donnelly, N. (2000): A hybrid *Ophiogomphus* female - again. *Argia* 12(4): 9. (in English). ["A few years ago I reported on a strange *Ophiogomphus* female collected by the late Richard Forster. It was found on the Squannacook River at West Groton, Middlesex Co., Massachusetts, on 10 Aug. 1996. Its characters were almost precisely halfway between *O. rupinsulensis* and *carolus*, and I determined it to be a hybrid between those two species. This summer Jeremiah Trimble found a second example, on the Machias River, Washington Co., Maine, on 26 June 2000. It is also a female and is essentially identical to the Forster specimen. The morphological character that is most significant in both examples is the post-occipital horn, which is similar to that of *rupinsulensis*, but very thin. (*O. carolus* lacks a horn here). It is curious that these two specimens are females; generally males show their hybrid origins much more clearly." (Verbatim)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2076. Donnelly, N. (2000): Hybrid between *Enallagma anna* and *civile* - from Ontario and Iowa!. *Argia* 12(4): 8-9. (in English). [The male appendages of *E. anna* and *E. civile*, and of *E. anna* x *civile* are figured. The case of *E. optimolocus* Miller & Ivie, 1996 is discussed; the species could possibly be a hybrid between *E. anna* and *E. carunculatum*. Nick Donnelly concludes: "Hybridization may be more frequent than we think."] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2077. Donnelly, N. (2000): Review: Dragonflies of North America. Revised edition. By Needham, J.G., Westfall, M.J., and May, M.L. Gainesville. Scientific Publishers. *Argia* 12(4): 11-13. (in English). [Critical and detailed review of the new cornerstone of north American anisopteran odonatology.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2078. Donnelly, T.W. (2000): Clef d'identification des Odonates de Guadeloupe, Dominique et Martinique. *Martinia* 16(3): 111-121. (in French with English sum-

mary). ["The author provides an identification key to Odonata of Guadeloupe, Dominica, and Martinique. It includes also some species not recorded in these islands of the Lesser Antilles but whose presence is a possibility." (Author)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2079. Duhé, R. (2000): Ant lion eats *Erythemis*. *Argia* 12(4): 9. (in English). [Texas, USA; "[...] there was a female *Erythemis simplicicollis* apparently "stuck" to the ground and flapping its wings wildly. Closer observation showed the dragon had, most unfortunately, chosen a bare spot on the bank only a few square inches in area that happened to be the site of an antlion's den! An ill-fated rescue attempt (mostly to discover the predator's true identity) only yielded the dragonfly minus its abdomen. The mostly clay with sand bank was too difficult to dig fast enough to yield the culprit." (Author)] Address: Rand Duhé. E-mail: duhe@infohwy.com

2080. Duinen, G.-J. van ; de Bruijn, L.; Hanzen, D.; Kleef, H. van; Kuper, J.; Scarse, D.; Esselink, H. (2000): Do restoration measures help to restore dragonfly communities in raised bog remnants? Proceedings of the Section Experimental & Applied Entomology of the Netherlands Entomological Society (N.E.V.) 11: 151-158. (in English). ["Until now it is unknown whether restoration of raised bog remnants in The Netherlands result in the restoration of fauna communities characteristic of intact raised bog systems. Preliminary results of a comparative study in four different raised bog remnants under restoration show remarkable differences in dragonfly density and species composition. A main factor seems to be the presence or absence of variation in water quality, as found in intact raised bog complexes, including natural transitions to the surrounding landscape. Influence of atmospheric deposition, present spatial configuration of raised bog remnants, and hydrological interactions may hinder restoration efforts." (Authors) Abundance and total number of individuals were counted using the transect method. All species observed (n = 30) were divided into ecological categories. An analysis of the current species composition compared with these categories concluded that dragonfly communities of both ombrotrophic raised bog centres (*Aeshna subarctica elisabethae* and *Somatochlora arctica*, the latter not present in the study area) and of gradients to more minerotrophic parts of the systems are still not completely present in the studied raised bog remnants.] Address: Duinen, G.-J. van, Department of Environmental Studies, Bargerveen Foundation, University of Nijmegen, 6500 GL, Nijmegen, Netherlands

2081. Dupont, P. (2000): Contribution à l'inventaire des odonates de Martinique. *Martinia* 16(3): 122. (in French). [Lesser Antilles; Martinique; a list of ten taxa collected at five localities is presented] Address: Dupont, P., Cidex 116, 1286, rue de Belledonne, F-38920 Crolles, France

2082. Easton, E.R.; Liang, G.-Q. (2000): The Odonata of Macao, southern China. *Notul. odonatol.* 5(6): 75-80. (in English). [27 spp. are listed, of which 25 are considered new records for the region. *Cercion sexlineatum*, *Sinictinogomphus clavatus*, and *Anax parthenope julius* were attracted to lights.] Address: Easton, E.R., 46-130 Kiowai Street No. 2714, Kaneohe, Hawaii 96744, USA; Liang, G.-Q., Research Institute of Ento-

mology, Zhongshan University, Guangzhou-510275, China

2083. Ehmann, H. (2000): Libellenfunde im Bundesland Salzburg 1990-1999 (Insecta: Odonata). *Anax*, Wien 3: 1-17. (in German with English summary). [119 localities in the federal state Salzburg, Austria were surveyed for their odonate fauna. The records of the 55 species are documented date- and locally-wise. Compared to the checklist of Landmann (1984) 6 species (*Coenagrion ornatum*, *C. lunulatum*, *Ophiogomphus cecilia*, *Leucorrhinia pectoralis*, *L. caudalis*, and *Sympecma paedisca*) could not be traced again, five species (*Anax ephippiger*, *Libellula fulva*, *Orthetrum albistylum*, *Epitheca bimaculata*, and *Cercion lindenii*) are new for the region.] Address: Ehmann, H., Hirschenh hstr. 25, A-5450 Werfen, Austria

2084. Eisermann, K.; Schulz, U.; Oehlke, J. (2000): Die Libellenfauna (Odonata) eines extensiv genutzten Schifffahrtskanals: der Finowkanal in Eberswalde. *Entomologische Nachrichten und Berichte* 44(4): 253-258. (in German with English summary). [19 odonate species were recorded in 1996. *Platycnemis pennipes* and *Ischnura elegans* are dominant. The following species are discussed in some detail: *Brachytron pratense*, *Erythronia najas*, *Coenagrion puella*, *C. pulchellum*, *Sympecma fusca*, *Gomphus vulgatissimus*, *Libellula fulva*, *Calopteryx splendens*, *P. pennipes*, *I. elegans*, *Somatochlora metallica*, *Orthetrum cancellatum*, *Sympetrum sanguineum*.] Address: Oelke, J., Fachhochschule Eberswalde, Fachbereich Landschaftsnutzung und Naturschutz, Schicklerstr. 3-5, D-16225 Eberswalde, Germany

2085. Eklov, P.; Werner, E.E. (2000): Multiple predator effects on size-dependent behavior and mortality of two species of anuran larvae. *Oikos* 88(2): 250-258. (in English). [This study examined the effects of multiple predators on size-specific behavior and mortality of two species of anuran larvae. Particularly, we focused on how trait changes in predators and prey may be transmitted to other species in the food web. In laboratory experiments, we examined the effects of bluegill sunfish, *Lepomis macrochirus*, and the odonate larva *Anax junius* on behavior and mortality of tadpoles of the bullfrog, *Rana catesbeiana*, and the green frog *R. clamitans*. Experiments were conducted with predators alone and together to assess effects on behavior and mortality of the tadpoles. The experiments were replicated on five size classes of the tadpoles to evaluate how responses varied with body size. Predation rates by *Anax* were higher on bullfrogs than on green frogs, and both bullfrogs and green frogs suffered greater mortality from *Anax* than from bluegill. Bluegill only consumed green frogs. Predation rates by both predators decreased with increasing tadpole size and decreased in the non-lethal (caged) presence of the other predator. Both anuran larvae decreased activity when exposed to predators. Bullfrogs, however, decreased activity more in the presence of *Anax* than in the presence of bluegill, whereas green frogs decreased activity similarly in the presence of both predators. The largest size class of green frogs, but not of bullfrogs, exhibited spatial avoidance of bluegill. These responses were directly related to the risk posed by the different predators to each anuran species. *Anax* activity (speed and move frequency) also was higher when alone than in the non-lethal presence of bluegill. We observed decreased predation rate of

each predator in the non-lethal presence of the other, apparently caused by two different mechanisms. Bluegill decreased *Anax* mortality on tadpoles by restricting the *Anax* activity. In contrast, *Anax* decreased bluegill mortality on tadpoles by reducing tadpole activity. We discuss how the activity and spatial responses of the tadpoles interact with palatability and body size to create different mortality patterns in the prey species and the implications of these results to direct and indirect interactions in this system." (Authors)] Address: Eklov, P., Dept of Ecology and Environmental Science, Animal Ecology, Umea Univ., SE-901 87, Umea Sweden

2086. Elkin, C.M.; Baker, R.L. (2000): Lack of preference for low-predation-risk habitats in larval damselflies explained by costs of intraspecific interactions. *Animal Behaviour* 60(4): 511-521. (in English). [Many studies indicate prey organisms select microhabitats with high structural complexity as a way of reducing risk of predation. We used laboratory experiments to show that damselfly larvae, *Ischnura verticalis*, suffer higher predation rates from pumpkinseed sunfish in low-density vegetation. However, larvae do not preferentially occupy microhabitats with high vegetation density in either the presence or absence of sunfish; when given a choice, the number of larvae per stem of vegetation was equal across all densities of vegetation. That larvae do not congregate in dense vegetation may reflect costs of aggressive interactions. Results from laboratory experiments indicated larval interactions increase conspicuous behaviours (most notably swimming) and consequently increase fish predation. A subsequent experiment indicated that frequency of larval interactions increases with increased vegetation density when number of larvae/stem is constant. Thus, larval microhabitat selection may reflect a trade-off between reduced risk of predation in areas of high vegetation density, caused by reduced fish foraging ability, and increased aggressive larval interactions, due to decreased proximity of larvae." (Authors)] Address: Baker, R.L., Dept Zoo], Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6. Canada. E-mail: rba-ker@credit.erin.utoronto.ca

2087. Endersby, I.D. (2000): Common names for dragonflies. *Victorian Entomologist* 30(4): 53-54. (in English). [The author compiles on the family level common names for Australian Odonata; he compares the names used in UK, USA, and New Zealand. In the cases of species occurring in New Zealand and Australia common names on the species level are adopted. He concludes that except for Gomphidae ("Clubtails") and Corduliidae ("Emeralds") "Australia can feel free to produce a unique set of vernacular names as there is no international standard to which it should conform."] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

2088. Endersby, I.D. (2000): Dragonfly conservation in Victoria. *Victorian Entomologist* 30(4): 47-51. (in English). [This is a general introduction into problems of dragonfly conservation in Victoria, Australia. Special emphasis is given on defining so-called flagship species. For those species which are known to occur in Victoria, Hawking's (1999) (see OAS 983) assessment of their Australian status is delimited to the Victorian regional situation. 74 species are listed; *Hemiphysbia mirabilis* is listed as 'Vulnerable', 11 species as 'Near threatened', 55 as 'Least concern', and 7 as 'Data defi-

cient'.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

2089. Endersby, I.D. (2000): Nomenclatural changes affecting Victorian dragonflies. *Victorian Entomologist* 30(3): 40-41. (in English). [A full catalogue of Victorian Odonata is given in Endersby (2000) (see OAS 1831). This paper summarises the family level taxonomy changes as they affect the Victorian Odonata.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

2090. Etter, W.; Kuhn, O. (2000): An articulated dragonfly (Insecta, Odonata) from the Upper Liassic Posidonia shale of northern Switzerland. *Palaeontology* 43(5): 967-977. (in English). ["An articulated dragonfly from the Lower Jurassic Posidonia Shale of northern Switzerland is described. The specimen is assigned to *Liassogomphus brodiei* (Buckman). This is the first description of an articulated member of the family Liassogomphidae, hitherto known from isolated wings only. Almost identical wings were previously described as *Phthitogomphus angulatus* (Handlirsch) and *Palaeogomphus propinquus* (Bode). The latter is now treated as synonymous with *Liassogomphus brodiei*, and the genus *Palaeogomphus* Handlirsch is therefore a junior synonym of *Liassogomphus* Cowley. The structures of the head, eyes, thorax, legs, and first segments of the abdomen confirm the state of the Liassogomphidae within the Anisoptera (or Pananisoptera) and point perhaps to a close relationship of the Liassogomphidae to the extant family Aeshnidae. This has already been stated previously based on wing venation patterns alone. The taphonomy of dragonflies in marine settings is briefly addressed. Only a combination of several exceptional circumstances led to the fossilization of this remarkable fossil." (Authors)] Address: Etter, W., Paläontologisches Institut und Museum der Universität, Karl Schmid-Str. 4, CH-8006 Zürich, Switzerland. E-mail: wetter@pim.unizh.ch

2091. EVSA e.V. (2000): Bestandserhebungen bei Insekten im Norden Sachsen-Anhalts. *Entomol. Mitt. Sachsen-Anhalt* 8(2): 68-76. (in German). [Several localities in the north of the Federal State Sachsen-Anhalt, Germany, the fauna of which is very insufficient known, were surveyed in end of June 2000. Weather conditions have been poor. Therefore quite few dragonflies could be traced. J. Müller and R. Steglich list eleven species from five sampling sites including records of *Stylurus flavipes* from the River Elbe.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: jmueller@mu.lsa-net.de

2092. Falck, J.; Johansson, F. (2000): Patterns in size, sex ratio and time at emergence in a south Swedish population of *Sympetrum sanguineum* (Odonata). *Aquatic Insects* 22(4): 311-317. (in English). ["Differences between sexes in life history patterns of *Sympetrum sanguineum* were studied in a small pond in southern Sweden by means of exuviae and adult sampling. Emergence occurred from 4 to 28 July, and mean emergence date was 10 July for both males and females. The sex ratio at emergence (53% females) did not differ from 1:1, but significantly more females emerged during the first 5 days of the emergence period. Size of emerging individuals (immatures) decreased as season progressed and males emerged at a larger size than fema-

les. While immature males were heavier than immature females, no such difference was found in mature individuals. We suggest that the sexual differences in size and emergence patterns observed are the result of different optimisation by males and females with respect to the growth-mortality risk trade-off in the larval and adult stages." (Author)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umeå University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

2093. Faton, J.-M. (2000): L'intérêt odonatologique du Marais de Printegarde, au confluent de la Drôme et du Rhône. *Sympetrum* 15: 39-49. (in French). [41 species of which 34 are considered autochthonous, are reported from a marsh situated in the confluent of the rivers Drôme and Rhône, France. In tab. 2 the species turn over of the periods 1985 to 1991 and 1994 to 1997 is compared. In fig. 1 the population density of *Coenagrion mercuriale*, *C. puella*, *C. pulchellum*, *C. scitulum*, and *Cercion lindenii* is presented. First results of a transect walk to document the abundance and dominance of the species is presented in tab. 3 and fig. 2.] Address: Faton, J.-M., Réserve Naturelle des Ramières, les Garis, F-26120 La Baume Cornillane, France

2094. Fischer, U.; Weigel, A. (2000): Beitrag zur Fauna des Geschützten Landschaftsbestandteiles "Wiese am Kirchsteig" und dessen Umfeld bei Niederböhmersdorf (Thüringen: Landkreis Greiz). *Thüringer Faunistische Abhandlungen* 7: 21-44. (in German with English summary). [Between 1995 and 2000, 27 odonate species including *Coenagrion hastulatum*, *Erythromma najas*, *Sympetrum flaveolum*, and *S. pedemontanum* are recorded. They are listed and interesting species are shortly discussed.] Address: Fischer, U., Anton-Günther-Str. 12, D-08340 Schwarzenberg, Germany

2095. Fitzstephens, D.M.; Getty, T. (2000): Colour, fat and social status in male damselflies, *Calopteryx maculata*. *Animal Behaviour* 60(6): 851-855. (in English). ["In the black-winged damselfly, *Calopteryx maculata*, younger males challenge and displace older males from mating territories. Fatter males tend to win fights. These fights were initially interpreted as wars of attrition based on fat reserves, but the distributions of fat at the end of fights suggests at least some assessment of the opponent's condition. Alternatively, new models have been developed that show how the observed pattern could result without assessment. We show that there is a subtle but reliable cue to fat reserves: colour. Females are a relatively drab brown-black. Males are a strikingly iridescent blue-green colour, resulting from a multilayer constructive interference reflector system in the epicuticle. In fatter males the lamellae are more compressed and the peak reflectance is at shorter wavelengths (blue). Leaner, greener males have greater spacing between lamellae and reflect longer wavelengths. The peak reflectance is as predicted from transmission electron micrograph measurements of the lamellar spacing. The rate of change in spacing over time can be manipulated experimentally by manipulating the diet. Individuals on a higher food diet remained blue longer and at the end of the experiment were fatter and bluer. In our studies, colour is a better predictor of territorial status than fat." (Authors)] Address: Getty, T., Kellogg Biological Station, Michigan State University, Hickory Corners, MI, 49060, USA. E-mail: getty@kbs.msu.edu

2096. Flíček, J. (2000): A current state of the knowledge of the dragonflies (Odonata) of peat bogs around the river Luznice (Southern Bohemia). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 60-65. (in Czech with English summary). [47 species were collected during 1966 - 2000 in peat bogs in the river Luznice basin (region of Trebonsko, southern Bohemia, Czech Republic). The current state of the dragonfly fauna of seven localities is compared for four decades. Records of *Coenagrion hastulatum*, *C. lunulatum*, *C. pulchellum*, *Brachytron pratense*, *Aeshna subarctica elisabethae*, *A. juncea*, *Anaciaeschna isoceles*, *Gomphus pulchellus*, *Ophiogomphus cecilia*, *Somatochlora flavomaculata*, *S. arctica*, *Sympetrum flaveolum*, *Leucorrhinia dubia*, *L. pectoralis*, and *L. rubicunda* are of some interest.] Address: Flíček, J., Velký kopec 325, 378 04 Chlum u Třebone, Czech Republic. E-mail: drflíček@satnam.cz
2097. Flint, O. (2000): *Nehalennia pallidus* in Texas! *Argia* 12(4): 3-4. (in English). [Odonate specimens from a 1918 collection made in Texas yielded to be *N. pallidus*. This species was formerly thought to be endemic for Florida, USA] Address: Flint, O.S., Natn Mus. Nat. Hist., Smithsonian Inst., Washington, DC 20560, USA
2098. Flint, O. (2000): *Sympetrum signiferum* at Leslie Canyon, Arizona. *Argia* 12(4): 6-7. (in English). [*S. signiferum* was recorded from August 30 until around November 20, 2000.] Address: Flint, O.S., Natn Mus. Nat. Hist., Smithsonian Inst., Washington, DC 20560, USA
2099. Garcia-Berthou, E.; Moreno-Amich, R. (2000): Food of introduced pumpkinseed sunfish: Ontogenetic diet shift and seasonal variation. *Journal of Fish Biology* 57(1): 29-40. (in English) ["The pumpkinseed sunfish *Lepomis gibbosus* introduced into Lake Banyoles (Spain) were predominantly littoral but there was a tendency of large fish to use deeper zones. Their diet was dominated by littoral macrobenthos, particularly amphipods (*Echinogammarus* sp.). There was ontogenetic variation in the diet, with small young-of-the-year (LF<4 cm) feeding on several littoral microcrustaceans, especially the cladoceran *Ceriodaphnia reticulata*, whereas larger fish shifted to a freshwater shrimp (*Atyaephyra desmaresti*), snails and damselfly larvae. Seasonal variation in diet was linked to the availability, with consumption of fish eggs and plant debris in spring and summer. In autumn, pumpkinseeds were partially zooplanktivores, preying on the cladoceran *Daphnia longispina*. The diet of pumpkinseeds in Lake Banyoles and other Iberian populations shows less molluscivory than North American populations. The potential ecological impact of this successful exotic species involves mainly predation on fish eggs and molluscs."] (Authors).] Address: Garcia-Berthou E., Departament de Ciències Ambientals and Institut d'Ecologia Aquàtica, Universitat de Girona, E-17071, Girona, Catalonia, Spain
2100. Gassmann, D. (2000): Revision of the Papuan *Idiocnemis bidentata*-group (Odonata: Platycnemididae). *Zool. Med. Leiden* 74 (23): 375-402. (in English). ["Eight species of the Papuan genus *Idiocnemis* Selys, 1878, sharing common traits in ligula structure and colour pattern, referred to here as the *Idiocnemis bidentata*-group, are redescribed or newly described. Taxonomy and distribution are updated and one new taxon, *Idiocnemis polhemi* spec. nov., is described from South-East New Guinea." (Author) *Idiocnemis bidentata*, *I. dagnyae*, *I. mertoni*, *I. nigrivertris*, *I. obliterateda*, *I. inaequidens*, *I. pruinescens*. An identification key to the species (males and females) and a distribution map of the *I. bidentata*-group in New Guinea are also provided.] Address: Dirk Gassmann, Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: Gassmann@rulsfb.leidenuniv.nl
2101. Gebhard, B. (2000): EU-LIFE-Projekt "Feuchtlebensraummanagement im Biosphärenreservat Schaalsee". *Naturschutzarbeit in Mecklenburg-Vorpommern* 43(1): 13-21. (in German). [Report on a management plan for the biosphere reserve "Schaalsee" in Mecklenburg-Vorpommern, Germany. A monitoring for Odonata is scheduled; only *Lestes dryas* and *Brachytron pratense* are mentioned in the text.] Address: Gebhard, Bettina, Amt für das Biosphärenreservat Schaalsee, Wittenburger Chausee 13, D-19246 Zarrentin, Germany
2102. Geissen, H.-P. (2000): Gomphidae vom südlichen Mittelrhein (Odonata). *Libellula* 19(3/4): 157-174. (in German with English summary). [Rheinland-Pfalz, Germany. "Based on collections of exuviae, *Gomphus flavipes*, *G. pulchellus*, *G. vulgatissimus*, *Ophiogomphus cecilia*, and *Onychogomphus f. forcipatus* were recorded from the southern Midrhine in 2000. The most abundant species, *G. flavipes* and *G. vulgatissimus*, emerged on a variety of substrates which, in contrast to other studies, included boulder embankments but not trees. The origin of the populations is discussed." (Author)] Address: Geissen, H.-P., Brunnenstr. 34, D-56075 Koblenz-Stolzenfels, Germany
2103. Gemeinhardt, M. (2000): Zur Fauna der Unstrutniederung bei Heldrungen (Kyffhäuserkreis/Thüringen). *Thüringer Faunistische Abhandlungen* 7: 45-64. (in German with English summary). [The floodplain of the river Unstrut, Thüringen, Germany was investigated in 1996 and 1999. 19 odonate species are recorded. One oxbow of the River Unstrut is of special importance as habitat of a strong population of the rare *Coenagrion pulchellum*.] Address: Gemeinhardt, M., Rathenastr. 24, D-99085 Erfurt, Germany
2104. Geraeds, R.P.G.; Hermans, J.T. (2000): Dragonfly *Ophiogomphus cecilia* (Fourcroy, 1785) along the River Roer. *Natuurhistorisch Maandblad* 89: 254-259. (in Dutch with English summary). ["*O. cecilia* has always been a rare dragonfly in the Netherlands, where it had been extinct since 1936. In 1995 and 1996, a few animals were found at the Geleen-beek brook. In August and September of 2000, the species was spotted in low densities along the river Roer near Melick. The animals were mostly found perching in full sunlight on sandy soil, pieces of dead wood and vegetation on the banks of the river. Two females were observed while ovipositing. How *O. cecilia* managed to reach the river Roer after such a long time is not clear. An explanation could be that the animals drifted towards the Roer from the nearest populations in Germany and France. Another option could be that a small, undiscovered population of this species has lived along the river Roer for a longer period of time. The improving quality of the water could have made this possible. Further investigations

will have to show whether the Roer is a suitable habitat for *O. cecilia*." (Authors)] Address: Geraeds, R.P.G., Julianalaan 46, NL-6042 JH Roermond, The Netherlands

2105. Gilard, B.; Dommagnet, J.-L. (2000): 3e rencontres odonatologiques de France. Saint-Beuzire (Haute-Loire), 29 et 30 juin, 1er, 2 et 3 juillet 2000. Bilan et perspectives. *Martinia* 16(4): 175-184. (in French with English summary). [This is a detailed report of the third odontological meeting of France. In a chronological order lectures and field trips are documented. The data of the field trips are documented, including records of the rare *Coenagrion lunulatum*.] Address: Dommagnet, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2106. Gilard, B. (2000): Une visite au "Lac du Lauzon" (Lus-la-Croix-Haute, massif du Dévoluy, Drôme). *Symptetrum* 15: 51-53. (in French). [France; at 1935 m asl, *Aeshna juncea* and *Coenagrion puella* are recorded.] Address: Gilard, B., 6, Route du Saut du Loup, F-63340 Le Beuil-sur-Couze, France

2107. Goffart, P. (2000): Compte-rendu de l'excursion aux étangs de Virelles et Roly du samedi 1er juillet 2000. *Gomphus* 16(2): 150-151. (in French with Dutch summary). [Belgium; *Coenagrion scitulum*, *Cercion lindenii*, *Anax parthenope*, *Somatochlora flavomaculata*, *Epithea bimaculata*, *Crocothemis erythraea*, and *Symptetrum fonscolombii* are among the species observed.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

2108. Goffart, P. (2000): Compte-rendu de l'excursion du samedi 26 août 2000 dans la région de Spa. *Gomphus* 16(2): 151-153. (in French with Dutch summary). [14 odonate species are reported from this trip to Spa, Belgium. *Aeshna subarctica elisabethae* could not be traced. Of some interest is the record of *Lestes barbarus*.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

2109. Goffart, P. (2000): Statut des espèces prioritaires d'Odonates du programme "Inventaire et Surveillance de la Biodiversité en Wallonie": bilan décennal (1990-1999). *Gomphus* 16(2): 139-149. (in French with English and Dutch summaries). ["The aim of this article is to offer a very concise survey of the 21 species considered priority in Wallonia. The survey is based on data collected in Wallonia during the last decade. A number of data of 2000 have also been used. All the information is presented in the form of synoptic tables. Among those priority species 4 have clearly declined, so have probably 6 others more (= 48%); one species (*Aeshna isosceles*) probably has disappeared. The others show a status-quo or some even a possible expansion. The tables show for each of these 21 species: natural regions, habitat, number of populations, threats and appropriate conservation measures." (Author)] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

2110. Gomez-Anaya, J.A.; Novelo-Gutierrez, R.; Arce-Perez, R.A.C (2000): The Odonata in the zone affected by the Central Hydroelectric Plant of Zimapan named for Engineer Fernando Hiriart Balderrama, Hidalgo, Mexico. *Folia Entomologica Mexicana* 108: 1-34. (in Spanish with English summary). ["A faunistic study of

Odonata, based mainly in the larval stage, was carried out in Zimapan's influence area, which is located at the boundaries of Hidalgo and Queretaro States, Mexico. Samples were taken monthly, from August-95 to July-96 in five water bodies. The whole community structure of each water body was described and compared regarding to the others in terms of richness, Shannon diversity index, Hill's evenness index, rareness and density. Ecological distributional and seasonal data are provided for the majority of species, a list of species and an illustrated key to larvae species were also included. A total of 10,943 larvae and 193 imagoes belonging to 41 species of 23 genera included in seven families were caught. We found the highest richness, diversity, rareness and evenness in San Francisco River, whereas Tula River had the lowest density and diversity values. Fourteen species were recorded for the first time for Hidalgo State: *Argia pallens*, *A. pulla*, *A. sedula*, *A. tezpi*, *Ischnura ramburii*, *Aeshna dugesi*, *Anax walsinghami*, *Erpetogomphus crotalinus*, *Brechmorhoga praecox postlobata*, *Dythemis maya*, *Erythemis plebeja*, *Paltothemis lineatipes*, *Perithemis intensa*, and *Pseudoleon superbus*." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@sun.ieco.conacyt.mx

2111. Goodyear, K.G. (2000): A comparison of the environmental requirements of larvae of the Banded Demoiselle *Calopteryx splendens* (Harris) and the Beautiful Demoiselle *C. virgo* (L.). *J. Br. Dragonfly Society* 16 (2): 33-51. (in English). [The only previous detailed work on the habitats and ecological requirements of the two *Calopteryx* species in UK covered the Wey river system of Hampshire and Surrey. In this paper the author observed that there has been considerable variation in the reported habitat requirements of these species compared with the study of Prendergast (1988). 20 locations were surveyed for their (co-occurring) dragonfly fauna, physical factors (water temperatures, water flow, depth, volume), chemical factors (hydrogen-ion concentration, oxygen, nitrate), and ecological factors (aquatic, emergent, and marginal vegetation).] Address: Goodyear, K.G., 26 Twynham Avenue, Christchurch, Dorset BH23 1QU, UK

2112. Gorb, S.N.; Kesel, A.; Berger J. (2000): Microsculpture of the wing surface in Odonata: Evidence for cuticular wax covering. *Arthropod Structure & Development* 29(2): 129-135. (in English). ["The insect wing membrane is usually covered by scales, hairs, and acanthae, which serve diverse functions, such as species-specific coloration pattern, decrease of wind resistance during flight or decrease of wing wettability. Representatives of Palaeoptera (Odonata and Ephemeroptera) have no hairy structures on the wing membrane, but both its sides are fine-sculptured. In this study, the nature of the wing covering was studied using acoustic microscopy, scanning- and transmission electron microscopy followed by a variety of chemical treatments. It was shown that wing microsculptures are not cuticular outgrowths, but a wax covering, which is similar to pruinosity, which has been previously described in several odonate taxa. Data from scanning acoustic microscopy revealed that scratches on the wax covering have material density different from the surrounding material. Various functions of the wax covering are discussed." (Authors)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie,

Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

2113. Grand, D. (2000): Influence d'une éclipse de soleil sur une population d'odonates. Bulletin romand d'entomologie 18: 84-91. (in French). [15 km NE of Lyon, France along a line transect abundance and activities of Odonata were observed during the 91,2% solar eclipse of August 11, 1999.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

2114. Grand, D. (2000): USA été 1979. Sympetrum 15: 55-58. (in French). [15 common taxa from six localities from eastern USA are listed.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

2115. Grand, D. (2000): Voyage en Martinique. Martinia 16(3): 127-132. (in French with English summary). [In April and early May 2000, 14 odonate species were observed in Martinique, including *Tholymis citrina* which seems to be a new species for the Lesser Antilles.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

2116. Grangier, C. (2000): Les araignées au menu de ces demoiselles. Sympetrum 15: 3-4. (in French). [Usually Odonata are preyed by spiders. This article reports two examples of spider preying Odonata from France. (1) *Ischnura elegans* devours a small *Araniella cucurbitina* (or *A. inconspicua*). (2) *Sympecma fusca* preyed on a very small, probably immature indetermined spider.] Address: Grangier, C., Le Trio, F-8460 Optevoz, France

2117. Greis-Harnischmacher, W. (2000): Bemerkungen zum Vorkommen von *Cordulegaster bidentata* in Hagen. Der Sauerländische Naturbeobachter 27: 115-120. (in German with English summary). [*Thecagaster bidentata* has been found on three localities of the Hagen region, Nordrhein-Westfalen, Germany. The reproduction habitats are gathering areas, where the larvae live buried in fine-sediments. The author used an interesting method to reveal the larvae by digging small hollows in which water and fine sediments can gather. After a few hours he succeeded in sifting out larvae from these hollows. Some advice in identification of early instar larvae of *T. bidentata* is given (dark spots on the ventral side of young larvae).] Address: Greis-Harnischmacher, W., Arndtstr. 20, D-58097 Hagen, Germany

2118. Grether, G.F.; Switzer, P.V. (2000): Mechanisms for the formation and maintenance of traditional night roost aggregations in a territorial damselfly. Animal Behaviour 60(5): 569-579. (in English). ["Communal roosting has been studied extensively in birds, but the mechanisms and functions of this taxonomically widespread behaviour pattern remain poorly understood. We studied the roosting behaviour of rubyspot damselflies, *Hetaerina americana*, in relation to sex and territorial status, and conducted field experiments to test for specific mechanisms of roost formation and maintenance. Both sexes tended to return close to their previous night's roost, but only males were significantly more roost site faithful than chance expectations based on individual day ranges. Males were more roost site faithful when they held mating territories. After acquiring a territory, males usually began roosting closer to the territory after a delay of a few days. Roosts were not lo-

cated at sites that reduced the daily commuting distance between hunting areas and territories; males generally hunted closer to their territories than to their roosts. In field experiments, sites 'seeded' with synthetic models of male rubyspots attracted more recruits than vacant control sites and control sites seeded with nonrubyspot (clear-winged) damselfly models. Sites seeded repeatedly with rubyspot models often remained popular for roosting after the models were removed, suggesting that the models established new traditional roosts. These results indicate that conspecific attraction and individual spatial memory together may be sufficient to explain, at a proximate level, the traditional night roost aggregations of this species. We discuss these results in relation to functional hypotheses for roost site choice and fidelity." (Authors)] Address: Grether, G.F., Department of Organismic Biology, Ecology and Evolution, University of California, 621 Charles E Young Drive South, Los Angeles, CA, 90095. USA. E-mail: ggrether@obee.ucla.edu

2119. G.R.P.L.S. (2000): Publications du G.R.P.L.S. depuis de Sympetrum n° 11. Sympetrum 15: 59-61. (in French). [In most cases unpublished reports of the Groupe de Recherche et de Protection des Libellules "Sympetrum" are compiled. There are many studies referring to one locality or some referring to species of special interest like *Leucorrhinia pectoralis* and *Coenagrion mercuriale*.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France

2120. Gurliat, P. (2000): Les Odonates de Loire-Atlantique. Bull. soc. sci. nat. Ouest de la France N.S. 21(2): 83-89. (in French with English summary). [Commented checklist of the 55 Odonata species recorded so far in the Loire-Atlantique département, France.] Address: Meurgey, F., 2, rue Bossuet, F-44000 Nantes, France

2121. Hämäläinen, M. (2000): The status of *Calopteryx okinawana* Matsumura, 1931 (Zygoptera: Calopterygidae). Notul. odonatol. 5(6): 83. (in English). ["In his '6000 illustrated insects of Japan-Empire', S. Matsumura (1931, p. 1454) described and illustrated *Calopteryx okinawana* Mats. as a new species from Okinawa, Japan. This is conspecific with *Matrona basilaris japonica* Förster, 1897. However, as far as I know, this synonymy has not been presented in any publication. Consequently, in their catalogues, C.A. Bridges (1994) and H. Steinmann (1997) list *okinawana* as a good species in *Calopteryx*, though the former hesitantly so, with a question mark after the genus name. Thus: *Matrona basilaris japonica* Förster, 1897, *Calopteryx okinawana* Matsumura, 1931, syn. nov.." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

2122. Hájek, J.; Mocek, B. (2000): The occurrence of the dragonfly *Sympecma annulata* (Selys, 1887) (Odonata: Lestidae) in the Czech Republic. In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 52-59. (in Czech with English summary). [Three notes on the occurrence of *Sympecma paeidisca* in the area of the Czech Republic are resulting from the 30s and 40s of the past century. Thus, the species has been catalogued in the Red List of dra-

gonflies of the Czech Republic as missing. It now was rediscovered during surveys of insects of reclaimed dumps of lignite from the Sokolov region in the years 1998-2000. A revision of the known data and of the stored specimens in the collections of the National museum shows that *S. paedisca* is restricted in the Czech Republic to the north-western Bohemian districts Sokolov and Karlovy Vary (Sokolov basin, one locality reaching as far as to the Doupovské hory mountains). "New findings originate from strongly anthropic localities, which are recultivated dumps of lignite, where the species prefers only several years old reservoirs and wet-grounds that are only sparsely covered by herbal vegetation." A successive concentration of high mineral salt content in water has been recorded. Ten adults were observed from May till September. [...] It seems that the species has been overseen in this area, or that an extensive survey of dragonflies has not been done there, for more than fifty years." The Czech population is considered as an isolated population on the western border of the area. Abstracters note: The publications of Bönisch, R. (1994): Die Odonaten der Naab-Wondreb-Senke / Nordost-Bayern unter besonderer Berücksichtigung von *Sympetrum depressiusculum*. Naturschutzzentrum Wasserschloß Mitwitz - Materialien 1/94: 85-88 and Pröse, H. (1954): *Sympetma paedisca* Brau., neu für Nordbayern. Nachbl. bay. Entomol. 3: 55-56 seem to be unknown to the authors. These publications document a Bavarian / Czech population of *S. paedisca* closely related resp. ranging to the Sokolov region.] Address: Mocek, B., Regional Museum of Eastern Bohemia, Dept Natural History, Eliscino Nábřeží 465, CZ-50001 Hradec Králové, Czech Republik. E-mail: mvc@mvc.anet.cz

2123. Hanel, L. (2000): The influence of the solar eclipse on dragonfly activities. In: Hanel, L. (Ed.): *Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000*. Vlasim. ISBN 80-86327-12-4: 30-34. (in Czech with extensive English summary). [...] From the observation it is clear that dragonfly imagoes reacted in a similar way during the solar eclipse like during any other unpleasant change of weather. The majority of the individuals left the vegetation near the bank and hid in the near-by growth. The individuals that stayed near the bank were not active and remained sitting on the vegetation most of the time (at the maximum of the eclipse the least number of individuals was found in the area - four - out of whom only one was flying). A similar behaviour was observed during a bad change in the weather (overcast, breeze, light shower during the walk from 11.50 till 12.00). After the eclipse had terminated, dragonflies returned back gradually to the banks of the pond, the same number of individuals were counted approximately 30 minutes after the solar eclipse had ended." (Author)] Address: Hanel, L., Správa chráněné krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republik. E-mail: blanik@schkocr.cz

2124. Hauck, S. (2000): Die Ausbreitung der Gebärderten Prachtlibelle (*Calopteryx splendens*) im mittleren Lennetal. *Der Sauerländische Naturbeobachter* 27: 134. (in German with English summary). [Presentation of some counts of *C. splendens* along the River Lenne, Nordrhein-Westfalen, Germany in the period between 1993 and 1997.] Address: Hauck, S., Schulstr. 15, D-58513 Lüdenscheid, Germany

2125. Hedge, T.A.; Crouch, T. E. (2000): A catalogue of the dragonflies and damselflies (Odonata) of South Africa with nomenclatural clarification. *Durban Museum Novitates* 25: 40-55. (in English). ["The past 10 years have been marked by a renewed interest in the biogeography and conservation of southern African Odonata. While significant advances have been made within these fields, the taxonomy of this group last received attention during the 1980s. One of the consequences of this neglect is the perpetuation of orthographic errors and incorrect and inconsistent usage of species names in subsequent literature. In order to obviate further confusion, a catalogue of the Odonata of southern Africa is presented. It is a synopsis of current odonate literature, names in current usage, authors and dates at all cited taxonomic levels. Families, genera and species are listed alphabetically within each superfamily and no synonymies are given. The catalogue is thus taxonomic rather than systematic, with emphasis on clarification and correction of earlier nomenclatural irregularities appearing in literature. All species recorded for the country, irrespective of the current status of these records, have been included. Two suborders, six superfamilies, 11 families, 59 genera, 147 species and 13 subspecies, are recorded from past literature as South African. Of the 170 species-group taxa listed, 10 do not occur in South Africa as the nominotypical taxon, but as subspecies thereof, three are known from only one collection, one is known from only two collections and two are of doubtful provenance in South Africa." (Authors)] Address: Crouch, T. E., Durban Natural Science Museum, Durban, 4000 South Africa

2126. Heimann, H. (2000): Libellenvorkommen im Raum Schwerte und Holzwickede. *Der Sauerländische Naturbeobachter* 27: 121-128. (in German with English summary). [Nordrhein-Westfalen, Germany. Between 1991 and 1997 26 odonate species were recorded. The results of the survey are presented on distribution maps.] Address: Heimann, H., Albert-Schweizer Str. 8, 59439 Holzwickede, Germany

2127. Hochebner, T.; Lopau, W.; Pennerstorfer, J. (2000): Die Libellenfauna der Insel Lesbos, Griechenland (Odonata). *Libellula Suppl.* 3: 25-40. (in German with English summary). ["Records of six journeys from 1995 to 1998 have been combined with published and unpublished data known from the island. Altogether, 42 spp. have been recorded. The checklist is discussed in terms of behaviour and habitat preferences." (Authors)] Address: Hochebner, T., Hauptstr. 13, A-3153 Eschenau, Austria. E-mail: t.hochebner@utanet.at

2128. Holusa, O. (2000): The dragonflies (Insecta: Odonata) in the collections of the Museum of the Beskydy Mts Frydek-Místek (Czech Republic). *Klapalekia* 36: 71-79. (in Czech with English summary). [578 imagoes and 132 larvae of 37 species, mainly collected between 1963-1996 in north-eastern Moravia and Silesia, Czech Republik, are stored in the collection.] Address: Holusa, O., Muzeum Beskyd, přírodovědné oddělení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

2129. Holusa, O. (2000): The results of faunistics research of the dragonflies (Odonata) in the Bohemian Forest. *Silva Gabreta* 5: 149-166. (in Czech with extensive English summary). [In 1997-1998 in "Bohemian Forest" (Sumava National Park and Protected Landscape

Area) 27 odonate species were collected. Published records arise the number of species to a total of 31. The region is situated in southwestern Czech Republic close to the German border. *Aeshna caerulea*, *A. subarctica elisabethae*, *Somatochlora arctica*, *S. alpestris*, and *Leucorrhinia dubia* are discussed in some detail with special reference to habitats and altitudinal distribution.] Address: Holusa, O., Muzeum Beskyd, prirodovedné oddelení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

2130. Hochstettler, K. (2000): Neue Fundorte der Sibirischen Winterlibelle und der Gemeinen Keiljungfer (Odonata) im Gottlieber Ried und am Seerhein (Thurgau). Mitt. thurg. naturf. Ges. 56: 83-88. (in German). [Switzerland; documentation of dragonfly records between 1985 and 1996; 18 species are recorded including the new to the region records of *Sympetma paedisca* and *Gomphus vulgatissimus*. Habitat, oviposition of *S. paedisca*, and the effects of changing lake levels on oviposition side quality are described in detail.] Address: Hostettler, K., Schulstr. 7, CH-8590 Romanshorn, Switzerland

2131. Huber, A. (2000): On the odonate fauna of the Szamos (Somes) River and its surroundings in Romania. Notul. odonatol. 5(6): 80-82. (in English). [Commented checklist of 26 species including *Stylurus flavipes*, *Ophiogomphus cecilia*, and *Somatochlora flavomaculata* evidenced in August 1996. The record of *S. metallica* is questionable; the specimens should be *S. meridionalis*.] Address: Huber, A., Ecological Institute, Lajos Kossuth University, H-40010 Debrecen, Hungary

2132. Jacquemin, G. (2000): Une petite collection d'odonates de la Guadeloupe. *Martinia* 16(3): 100. (in French). [From 7 localities 10 taxa were collected in 1996.] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

2133. Jödicke, R.; Lopau, W. (2000): Overlapping adult generations of the univoltine dragonfly, *Sympetrum striolatum* in southern Greece (Odonata: Libellulidae). *Libellula Suppl.* 3: 41-47. (in English with German summary). ["Very old individuals were still on the wing in late April when the next generation started emergence. The unusually long life-span of adults corresponds with a long prereproductive aestivation. The phenology of *S. striolatum* in Greece is compared to that in Central Europe." (Authors)] Address: Lopau, W., Kuhstedtermoor 26, D-27442 Gnarrenburg, Germany. E-mail: lopi@t-online.de

2134. Johnson, M.E.; Lombardo, M.P. (2000): Nestling Tree Swallow (*Tachycineta bicolor*) diets in an upland old field in western Michigan. *Am. Midl. Nat.* 144 (1): 216-219. (in English). ["We collected and identified 1852 prey items from 89 boluses delivered to 62 nestling tree swallows (*Tachycineta bicolor*) at 14 nests in an upland old field in western Michigan. We found that 90.8% of nestling diets was insects from the Orders Diptera, Homoptera, Hymenoptera and Coleoptera. We also found clam and snail shells in boluses. [...]. Nestling diets at our study site were similar in the proportions of many prey items, such as Diptera and Homoptera, to tree swallow nestling diets in other habitats but contained fewer aquatic forms such as Odonata and Ephemeroptera." (Authors)] Address: Johnson, M.E., Lombardo, M.P., Dept of biology, Grand Valley State University, Allendale, Michigan

State University, Allendale, Michigan 49401, USA. E-mail: lombardm@gvsu.edu

2135. Juliand, C.; Juliand, P.; Ladet, A. (2000): Bilan de neuf années de prospection odonotologique dans le département de L'Ardeche. *Sympetrum* 15: 5-18. (in French). [A total of 66 species (68 taxa) is reported from the department L'Ardeche, France. Each of the species is shortly commented. In tab. 2 some interesting altitude records of ten species are documented. Of special interest are the records of *Coenagrion mercuriale*, *C. caerulescens*, *C. hastulatum*, *Gomphus graslini*, *Oxygastra curtisii*, *Macromia splendens*, *Somatochlora arctica*, *Sympetrum depressiusculum*, and *Leucorrhinia dubia*.] Address: Juliand, Christine, Le Serre, F-07110 Joannas, France

2136. Kenner, R. D. (2000): *Somatochlora kennedyi* (Odonata: Corduliidae): A new species for British Columbia, with notes on geographic variation in size and wing venation. *Journal of the Entomological Society of British Columbia* 97: 47-49. (in English). ["The first confirmed record for *S. kennedyi* in British Columbia is reported. Specimens of this species from the northern Yukon are smaller than those from elsewhere in its range and have a reduced number of cells in certain parts of the wings." (Author)] Address: Kenner, R. D., 5560 Linscott Court, Richmond, BC, V7C 2W9 Canada

2137. Kesel, A.B. (2000): Aerodynamic characteristics of dragonfly wing sections compared with technical aerofoils. *Journal of Experimental Biology* 203(20): 3125-3135. (in English). ["During gliding, dragonfly wings can be interpreted as acting as ultra-light aerofoils which, for static reasons, have a well-defined cross-sectional corrugation. This corrugation forms profile valleys in which rotating vortices develop. The cross-sectional configuration varies greatly along the longitudinal axis of the wing. This produces different local aerodynamic characteristics. Analyses of the CL/CD characteristics, where CL and CD are the lift and drag coefficients, respectively (at Reynolds numbers Re of 7880 and 10 000), using a force balance system, have shown that all cross-sectional geometries have very low drag coefficients ($CD_{min} < 0.06$) closely resembling those of flat plates. However, the wing profiles, depending upon their position along the span length, attain much higher lift values than flat plates. The orientation of the leading edge does not play an important role. The detectable lift forces can be compared with those of technical wing profiles for low Re numbers. Pressure measurements (at $Re=9300$) show that, because of rotating vortices along the chord length, not only is the effective profile form changed, but the pressure relationship on the profile is also changed. Irrespective of the side of the profile, negative pressure is produced in the profile valleys, and net negative pressure on the upper side of the profile is reached only at angles of attack greater than 0 degree. These results demonstrate the importance of careful geometrical synchronisation as an answer to the static and aerodynamic demands placed upon the ultra-flight aerofoils of a dragonfly." (Author)] Address: Kesel, Antonia B., Department of Zoology, Technical Biology and Bionics, University of Saarland, D-66041, Saarbrücken, Germany. E-mail: a.kesel@rz.uni-sb.de

2138. King, R.S.; Nunnery, K. T.; Richardson, C. J. (2000): Macroinvertebrate assemblage response to highway crossings in forested wetlands: Implications for

biological assessment. *Wetlands Ecology & Management* 8(4): 243-256. (in English). [USA, North Carolina; "Despite the mandate of the Clean Water Act to protect the physical, chemical, and biological integrity of the USA's wetlands, the use of biota to assess wetland condition has not been well explored. During June, 1996, we evaluated the response of macroinvertebrate assemblages to fill-culvert highway crossings in two bottomland forested wetlands in North Carolina. Our objective was to apply biological assessment methods and metrics that have been effectively used in streams to explore their applicability in forested wetlands. We found significant changes in several metrics as a function of distance from the highway crossings. Areal and numerical taxon richness increased within at least 40 m of highway when compared to control locations. Percent dominant taxon values were lowest within 10 m of the highway. Percent herbivores also increased significantly within at least 40 m of the highway, reflecting the lower % crown closure and associated shift in primary production from trees to herbaceous macrophytes and algae. The North Carolina Biotic Index, a metric of tolerance, did not reflect assemblage changes near the highway. Ordination and permutation tests revealed that assemblage composition was significantly different from controls at 10 and 40 m distances from the highway crossings. In particular, algal grazers such as the mayflies *Caenis* sp. and *Callibaetis* sp. responded positively and the damselflies *Ischnura* spp. and the finger-nail clams *Sphaerium* spp. responded negatively to the crossings. Favorable algal and herbaceous detrital resources, greater patchiness and habitat complexity, and overall high tolerance to natural stressors probably contributed to the increase in taxon richness near the highway. However, significant deviation from control locations indicated the highway was a source of perturbation. Our findings illustrate the potential utility of macroinvertebrate assemblages for wetland assessment, but suggest the importance of defining the reference condition as well as the need for development of metrics for specific classes of wetlands." (Authors) *Nehalennia irene*, *Ischnura posita*, *I. prognata*, *Erythemis simplicollis*, *Pachydiplax longipennis*, *Libellula* sp., *Epitheca* sp.] Address: King, R.S., Duke Wetland Center, Nicholas School of the Environment, Durham, NC, 27708 USA

2139. Knab, N.; Göcking, C.; Knab, D.; Schelden, A.; Willigalla, C. (2000): Zur Verbreitung von *Gomphus vulgatissimus* (L.) im Einzugsgebiet der Ems im Kreis Warendorf (Odonata: Gomphidae). *Natur- und Umweltschutzakademie Nordrhein-Westfalen - Seminarbericht* 6: 76-81. (in German). [The distribution of *G. vulgatissimus* in the River Ems system, Nordrhein-Westfalen, Germany, was studied in 1999. *G. vulgatissimus* occurs in all stretches of the Ems and in many stretches of its tributaries. This increase of records is discussed under the aspects of reduced maintaining measures of river banks, improvement of water quality, favourable climate conditions in the past years, and optimised methods for collecting exuviae.] Address: Göcking, C., Zum Hiltruper See 9, D-48161 Münster, Germany. E-mail: gockinc@uni-muenster.de

2140. Knaus, P. (2000): Emergenzstudien an *Somatochlora alpestris* in den Zentralalpen (Odonata: Corduliidae). *Libellula* 19(3/4): 117-142. (in German with English summary). ["*S. alpestris* was analysed in regard to

to its emergence period and emergence ecology. The study was carried out in 1997 and 1998 at »Barenseewen«, a subalpine plateau with several ponds at 2000 m a.s.l. in the Prättigau valley (Orisons, Switzerland). The emergence lasted about 3.5 hours and the behavioural pattern of *S. alpestris* was similar to that of other corduliids. Emergence took place mainly within a strip of 1 m on either side of the water line and at a median height of 9.0 cm above ground. In total 674 exuviae at 16 ponds were collected during the emergence period in 1998. The density per pond ranged from 0.03 to 5.51 emerging adults per m². The mortality during emergence was 7.1 %. As a typical spring species *S. alpestris* has a synchronised emergence with an EM50 of 5.5 days. The emergence period in 1998 lasted 37 days, beginning on 19 June. With 44.0 % males the sex ratio was significantly different from 1:1, and males emerged earlier than females. The results are discussed in respect to habitat preference and adaptation strategies and are compared with those of other corduliids." (Author)] Address: Peter Knaus, Schweizerische Vogelwarte, CH-6204 Sempach, Switzerland. E-mail: peter.knaus@vogelwarte.ch

2141. Knijf, G. de; Demolder, H. (2000): Een populatie van *Coenagrion mercuriale* en *Libellula fulva* in de Gaume (Belgisch Lotharingen). *Gomphus* 16(2): 115-122. (in Dutch with English and French summaries). ["A population of *Coenagrion mercuriale* and *Libellula fulva* in the Gaume (Belgium). A population of both species was discovered in June 2000 in the Gaume, the most southern part of Belgium. Until then, only two, respectively three populations were known from the Walloon part of Belgium. We suspect that both species have colonized the region the last years from the adjacent northern part of France, but it is possible that they were already present for many years. We suppose that the very good weather in the spring of the year 2000, has contributed to a higher number of individuals in the population of both species so that the probability to catch them becomes greater. We presume that it is possible to find more populations from both species in some of the many similar valleys in the Gaume."(Authors) The habitat is described and co-occurring Odonata are briefly discussed.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

2142. Kordges, T. (2000): Die Libellenfauna der Stadt Hattingen. *Der Sauerländische Naturbeobachter* 27: 57-66. (in German with English summary). [Since 1985 a total of 28 species of dragonflies was recorded in the district of Hattingen, Nordrhein-Westfalen, Germany. In the period since this to 1999 *Coenagrion pulchellum* and *Aeshna grandis* have become extinct, while *Erythromma vindulum*, *Gomphus vulgatissimus*, and *G. pulchellum* were recorded for the first time. *Libellula quadrimaculata*, *Lestes sponsa*, *Sympetrum flaveolum*, and *S. danae* seem to become rare. On the other hand the situation especially in some rheophilous species obviously has become better within this time due to the better water quality of the river Ruhr and some brooks. "Within the study area more than 78% of the species prefer the Ruhr valley, where species diversity and the population density reach the highest values. Few species are widely distributed in the region but prefer the hillsides in the south of Hattingen (*P. nymphula* and *A.*

cyanea), while *C. virgo* and *C. boltonii* are mainly restricted to this hillside area." Address: Kordges, T., Feldstr. 79, D-54549 Sprockhövel, Germany

2143. Kordges, T.; Keil, P. (2000): Erstnachweis der Frühen Heidelibelle *Sympetrum fonscolombii* (Selys) im Ruhrgebiet. Dortmund Beiträge zur Landeskunde, Naturwiss. Reihe 34: 117-121. (in German). [Near Essen, Nordrhein-Westfalen, Germany freshly emerged *S. fonscolombii* were recorded on September 7, 1999. On July 14, 2000 at the same water several specimens of *Lestes barbarus* but no *S. fonscolombii* could be observed. The flora of the water body prior and after clearing the shrub on the water's edge is described. A total of 21 odonate species is listed.] Address: Kordges, T., Ökoplan, Husmannshofstr. 10, D-45143 Essen, Germany

2144. Kruijs, I. (2000): [Butterfly watching: An alternative to collecting]. *Fauna och Flora* (Stockholm) 95(3): 105-112. (in Swedish with English summary). ["It is no longer necessary to collect and preserve the larger insects which are identifiable in the field in order to add to our knowledge of their distribution and behaviour. Killing insects can be a daunting factor in furthering entomology as a field of interest. The main advantage of collection, the ease of identification, can be matched by developing identification techniques without having to catch and kill specimens. Like bird watching, insect watching can be an interesting pastime and can do much to add to our knowledge, especially where butterflies and dragonflies are concerned. Though collectors gain much knowledge through their experience, the very aim to collect as many species as possible puts the occurrence of species that they already have in their collections in the background. The art of identifying butterflies in the field includes the use of binoculars that reduces the need to use a net. Since different butterfly families have characteristic types of flight, many species can be identified by observing their flight, much in the same way as watching birds. Records can be made as to locality, occurrence and estimation of numbers, behaviour with notes on temperature, weather, as well as date and time. Behaviour studies can include effects of temperature, territorial behaviour, courtship and mating, egg-laying and choice of foodplant. Taking photographs and video films might be a useful aid and can satisfy the need to collect, if collecting actual sightings is in itself not satisfying." (Author)] Address: not stated

2145. Kuhn, J. (2000): Libellen (Odonata) am Schmiechener See 1980-1999-Zwischenbilanz einer Langzeitstudie. *Verhandlungen des Westdeutschen Entomologen Tag 1999*: 185-190. (in German with English summary). ["The "Schmiechener See" (SW Germany, Bayern) is a shallow 50 ha lake strong and irregular in water-level. Composition and abundances of the fauna (42 species) are subject both to heavy short-term fluctuations and to pronounced long-term changes. Special attention is directed to the efficiency of conservation and management measures, particularly with regard to survival of the target species *Lestes dryas* and *Sympetrum flaveolum*." (Author)] Address: Kuhn, J., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82319 Seewiesen. E-mail: kuhn@mpi-seewiesen.mpg.de

2146. Lässig, A.; Brockhaus, T.; Küttner, R. (2000): Einige interessante Insektennachweise aus dem Raum Rochlitz und Colditz (Lepidoptera, Odonata, Ephemeroptera, Trichoptera). *Entomologische Nachrichten und*

Berichte 44(4): 279-283. (in German). [Germany, Sachsen; checklist of 18 species recorded in summer 1999 including *Sympecma fusca*, *Somatochlora flavomaculata*, *Cordulegaster boltonii*] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

2147. Lang, C. (2000): Untersuchungen zu *Cordulegaster heros* Theischinger, 1979 und *C. bidentata* Selys, 1843. Teil 2: Larven. *Anax*, Wien 3: 23-27. (in German with English summary). ["Between May 1997 and April 1998, the biology of larvae of *Cordulegaster heros* and *C. bidentata* were examined in the catchment area of the Weidlingbach (Lower Austria). A total of 688 *C. heros* and 314 *C. bidentata* larvae at 12 sampling sites were collected and their occurrence related to physical and chemical parameters. Generally, both species are able to colonize a brook syntopically, but *C. bidentata* prefers stream sections nearer to the source with slower flow, higher conductivity and water hardness than *C. heros*." (Author) For more details see OAS 1733.] Address: Lang, C., Muhrhoferweg 1-5/4/42, A-110 Wien, Austria. E-mail: lang.mueller@EUnet.at

2148. Lange, L. (2000): Ein weiterer Beitrag zur Libellenfauna des Kreises Steinburg. *Bombus* 3(45/46): 177-179. (in German). [Schleswig-Holstein, Germany; 32 species are listed for three localities; the impact of road construction activities on Odonata is shortly outlined; *Lestes barbarus*, *Ischnura pumilio*, *Aeshna viridis*, *Sympetrum fonscolombii*, *S. pedemontanum*, and *Leucorrhinia rubicunda* are discussed] Address: Lange, L., Deichreihe 21, D-25599 Wewelsfleth, Germany

2149. Leitfeld, D.; Lohr, M. (2000): Erstfund von *Gomphus flavipes* an der Oberweser (Odonata: Gomphidae). *Libellula* 19(3/4): 229-231. (in German with English summary). [Germany, Niedersachsen, River Weser, 29-VII-1999] Address: Leitfeld, D., Projektgruppe Weserniederung, Lehrgebiet Tierökologie, Universität Paderborn, Fachhochschulabteilung Höxter, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: dleitfeld@fh-hoexter.de

2150. Loos, G.H. (2000): Libellen im Siedlungsbereich. *Der Sauerländische Naturbeobachter* 27: 129-133. (in German with English summary). [The occurrence of Odonata in typical water bodies of urban zones is outlined and exemplified in the district of Unna, Nordrhein-Westfalen, Germany. 23 species are listed including rare species as *Ceriagrion tenellum* and *Sympetrum depressiusculum*. The draft of typical urban dragonfly ponds and species composition of different waterbodies is presented.] Address: Loos, G.H., Ruhr-Universität Bochum, AG Geobotanik und Geographisches Institut, ND 03/175, D-44780 Bochum, Germany

2151. Lopau, W. (2000): Bisher unveröffentlichte Libellenbeobachtungen aus Griechenland II (Odonata). *Libellula* Suppl. 3: 81-112. (in German with English summary). ["More than 1 000 Odonata records provided by 9 workers are listed. The data for 57 of the 73 species known from Greece, were recorded between 30-III-1970 and 27-IV-2000." (Author)] Address: Lopau, W., Kuhstedtermoor 26, D-27442 Gnarrenburg, Germany. E-mail: lopi@t-online.de

2152. Lotzing, K. (2000): Untersuchungen zur aktuellen Libellen-Fauna (Odonata) in ausgewählten natürlichen Binnenland-Salzstellen am Südrand der Magde-

burger Börde (Sachsen-Anhalt). *Entomologische Nachrichten und Berichte* 44(3): 175-182. (in German with English summary). [27 odonate species are recorded for three saline habitats situated in the Magdeburger Börde, Sachsen-Anhalt, Germany. The species are shortly commented; a special halophile odonate fauna is not represented. *Lestes barbarus* and *Sympetrum pedemontanum* are typical for sparsely-vegetated and thermally favoured waters which are protected from wind. The rare *Sympetrum flaveolum* is represented with high population densities.] Address: Lotzing, K., Am Hollschen Bruch 4c, D.39435 Unseburg, Germany

2153. Lytle, D.A. (2000): Biotic and abiotic effects of flash flooding in a montane desert stream. *Archiv für Hydrobiologie* 150(1): 85-100. (in English). ["Flash floods in desert streams can be more sudden, brief, and severe compared to floods in mesic streams. To determine their biotic and abiotic effects, substrate composition, organic detritus abundance, and aquatic animal taxonomic richness and abundance were measured 8-16 d before and 7 d after a flash flood in a 122 m reach of a montane desert stream (Chihuahuan Desert, USA). The flash flood severely altered channel morphology by scouring and depositing substrates, but it did not change the overall abundance of any substrate particle size class. The flood removed most coarse detritus from the stream reach, although the quantity of organic particles <2 mm was unchanged. High losses were observed in most animal taxa (95 % overall), and reach-wide taxonomic richness was reduced from 35 to 21 taxa. Ephemeroptera were entirely eliminated from the study reach. The taxon experiencing the lowest percent loss (the belostomatid hemipteran *Abedus herberti*, 14 % loss) is known to possess behavioral mechanisms for flash flood avoidance. Compared to studies of flooding in mesic streams, this study suggests that flash floods in montane desert streams cause greater mortality in animal populations and remove more detritus. Ecologically, these high local mortality rates stress the importance of recolonization mechanisms. Evolutionarily, flash floods provide a strong selection pressure that may influence the genetic structure of populations." (Author) "*Argia*" and *Cordulegaster diadema* were eliminated from the reach (100% loss), "early instars" were reduced by 87%.] Address: Lytle, D.A., Dept. of Ecology & Evolution, University of Chicago, 1101 E. 57th St., Chicago, IL 60637, USA. E-mail: dalytle@uchicago.edu

2154. Maillet, G. (2000): Note pratique sur l'observation des libellules et l'utilisation d'une pochette en plastique. *Martinia* 16(4): 171-173. (in French with English summary). ["The author presents a method for observing Odonata adults in the field. It consists in using transparent plastic bags in which the insect can be immobilized without damage, and released after identification." (Author)] Address: Maillet, G., Château de la Touvière, F-38690 Chabons, France

2155. Malmqvist, B.; Hoffsten, P.-O. (2000): Macroinvertebrate taxonomic richness, community structure and nestedness in Swedish streams. *Archiv für Hydrobiologie* 150(1): 29-54. (in English). ["Taxonomic richness and community composition were related to environmental variables in 88 streams in an area of 60,000 km² in central Sweden. In all, 247 macroinvertebrate taxa were recorded and taxonomic richness observed per site ranged from 21 to 77. Partial least squares regression analysis suggested that taxonomic richness

was positively and most strongly correlated with channel width and catchment size. Correlations were also positive, but weaker, with the percentage of lakes in the catchment, temperature and macrophyte abundance, whereas the degree of shading, moss coverage and distance to upstream lakes showed negative associations with species richness. The number of 'rare' (found at <25 % of the sites) and 'very rare' (found at <10 % of the sites) taxa, showed similar trends although the correlation with distance below upstream lakes was positive rather than negative in the 'very rare' taxa category. The most taxa-rich sites were found in streams of intermediate size leading to a significant quadratic relationship between catchment size and taxonomic richness. Canonical correspondence analysis indicated that catchment area, distance from upstream lakes, substratum, temperature, altitude, amount of macrophytes, pH, colour, and *Fontinalis* spp. were the variables explaining most variation in community composition. Ephemeroptera, Plecoptera, Trichoptera and Diptera: Simuliidae showed nested distribution patterns, i.e. species-rich sites tended to be inhabited by species present also at species-poor sites. Some taxa, however, deviated from expected distributions possibly because they are sensitive to biotic interactions, restricted to small streams, or specialised with respect to some habitat features. In comparisons with other studies of Swedish macroinvertebrates, we observed differences suggesting that the design of studies, including the selection of geographical regions and limited range of stream sizes, can importantly influence the results." (Authors) 10 odonate species are listed in the appendix. In most cases species are represented "very rare" at the sampling sites.] Address: Malmqvist, B., Department of Ecology and Environmental Science, Umea University SE-90187 Umea, Sweden. E-mail: bjorn.malmqvist@eg.umu.se

2156. Marigo, P. (2000): Étude de la faune des tourbières subalpines du Plateau des Lac du massif du Taillefer (Isère). *Sympetrum* 15: 19-37. (in French). [Selected species of Hemiptera, Mollusca, Araneae, and Odonata characteristic for the subalpine bogs in the Massif du Taillefer (Isère, France) are discussed - but in most cases on the basis of literature - in some detail. *Aeshna juncea*, *Somatochlora alpestris*, *S. arctica*, *S. metallica*, *Leucorrhinia dubia*.] Address: Marigo, P., 20 allée du Bouchon, F- 74940 Annecy Levieux, France

2157. Marinov, M. (2000): An atypical *Caliaeschna microstigma* (Schneider) habitat in Bulgaria (Anisoptera: Aeshnidae). *Notul. odonatol.* 5(6): 83. (in English). ["On 22-VI-1999, numerous males were sighted flying over a small forest stream, the Izgrevsko Dere, in the village of Izgrev, Mt Strandja, SE Bulgaria. Surprisingly, the rivulet is completely devoid of any kind of vegetation, whether aquatic or on the banks. The bottom is stony and stones are spread along the bank as well. The surrounding trees (mainly *Alnus*) are casting a deep shade, as peculiar for the *Caliaeschna* habitats. The sole exuviae found was sitting on the bark of a tree." (Author)] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

2158. Mashaal, M. (2000): Bref souvenirs odonatologiques de Guadeloupe, Martinique et Réunion. *Martinia* 16(3): 123-126. (in French with English summary). [Lists of species from Guadeloupe (9 localities/11 taxa), Martinique (4 loc./6 taxa), and Réunion (11 loc./11 ta-

xa)] Address: Mashaal, M., 2, rue Meilhac, F-75015 Paris, France

2159. Mason, R.P.; Laporte, J.-M.; Andres, S. (2000): Factors controlling the bioaccumulation of mercury, methylmercury, arsenic, selenium and cadmium by freshwater invertebrates and fish. *Archiv environment. Contain. Toxicol.* 38(3): 283-297. (in English). ["Concentrations of Hg, MMHg, As, Se, and Cd were measured in atmospheric deposition, stream water, and biota in two streams in Maryland, USA. They are stated for *Aeshna* sp., compared with other insect orders, and discussed."] Address: Mason, R.P., Cent. Envir. Sci., Chesapeake Biol. Lab., Univ. Maryland, P.O. Box 38, Solomons, MD 30688, USA

2160. Mauersberger, R. (2000): Artenliste und Rote Liste der Libellen (Odonata) des Landes Brandenburg. *Naturschutz und Landschaftspflege in Brandenburg* 9(4, Beilage): 22 pp. (in German). [This is an introduction into the Odonata of the Federal State Brandenburg in Germany. Several aspects of the odonate fauna e.g. climatic or anthropogenic factors responsible for the occurrence on the geographic scale of the state, information on invasive species, reasons for threats, a commented checklist of the 66 species known to occur in Brandenburg, an assessment according to the criteria of the Red List, main tasks for conservation action plans, and a bibliography are briefly outlined or compiled. This is a short but sound contribution to the knowledge of the Odonata in the eastern part of Germany written by one of the leading German odonatologists.] Address: Mauersberger, R., Waldstr. 4, D-16278 Steinhöfel, Germany

2161. Maxted, J.R.; Harbour, M.T.; Gerritsen, J.; Porretti, V.; Primrose, N.; Silva, A.; Penrose, D.; Renfrow, R. (2000): Assessment framework for mid-Atlantic coastal plain streams using benthic macroinvertebrates. *Journal N. Am. benthol. Soc.* 19(1): 128-144. (in English). ["A collaborative study among 6 states along the mid-Atlantic seaboard of the USA developed a consistent approach for collecting and interpreting macroinvertebrate data for low-gradient streams of the coastal plain. The study had 3 objectives: (1) to evaluate the validity of aggregating reference site data into a single bioregion, (2) to select biological metrics that best discriminated reference sites from sites impaired by habitat disturbance and organic pollution, and (3) to combine these metrics into an index of biological quality. Macroinvertebrate, physical habitat, and water-quality data were collected in 106 streams during autumn 1995. Fifty-five sites were referenced, 34 sites had habitat stresses, and 17 sites had water-quality stresses. Classification of reference sites divided the coastal plain into 3 bioregions, separated N and S by Chesapeake Bay and separated E and W by ecoregion. - 20 odon. genera are listed, with annotations on tolerance values and clinger habit."] Address: Maxted, J.R., Delaware Dept Natural Resour. & Envir. Control, 89 Kings Highway, Dover, DE 19903, USA)

2162. McMillan, V. (2000): Aggregating Behavior During Oviposition in the Dragonfly *Sympetrum vicinum* (Hagen) (Odonata: Libellulidae). *Am. Midl. Nat.* 144: 11-18. (in English). ["This study examined the adaptive significance of ovipositing near conspecifics by pairs of the dragonfly *Sympetrum vicinum*. Studies were conducted at two artificial ponds in New York using a series of 1 m² plots along their shorelines. Although the major-

ity of pairs oviposited alone, pairs also tolerated the presence of others only 5-10 cm away, and sometimes 2-7 pairs oviposited together within a single plot. Habitat selection (preference for certain plots over others) partially accounted for such behavior. However, where adjoining plots were homogeneous (i.e., used equally for oviposition), newly arriving pairs were more likely to begin dipping in a plot in which one or more pairs were already present, thus also suggesting mutual attraction among pairs. Oviposition efficiency (measured as no. abdominal dips/s) was apparently not compromised by ovipositing near conspecifics. Harassment from unpaired males had little effect on oviposition since unpaired males were uncommon and rarely approached pairs. However, lone pairs were attacked relatively more frequently by frogs than were pairs present simultaneously in the same plot. Although none of the 112 predation attempts I recorded were successful, frog attacks forced pairs to change sites, thereby lengthening the time required for oviposition. The absence of frogs or frog attacks at a site provided favorable conditions for pairs to accumulate at a site; thus the presence of conspecifics may have signaled a safe area for oviposition." (Author)] Address: McMillan, Vicky, Colgate Univ., Dept. Biol., 13 Oak Dr. Hamilton, NY 13346-1398, USA . E-mail: vmcmillan@mail.colgate.edu

2163. Meitzner, V.; Martschei, T. (2000): Neue Funde europäisch geschützter Insektenarten. *Naturschutzarbeit in Mecklenburg-Vorpommern* 43(1): 70-71. (in German). [Mecklenburg-Vorpommern, Germany. Records of species of the Appendix II of the European Fauna-Flora-Habitat-Directive are shortly reported. *Leucorrhinia pectoralis* is given for two localities.] Address: Meitzner, V.; Bischofstr. 13, D-17033 Neubrandenburg, Germany

2164. Mey, D. (2000): Vorkommen der Gestreiften Quelljungfer *Cordulegaster bidentata* (Insecta, Odonata, Anisoptera) an Kalksinterbächen in Nordwestthüringen. *Rudolstädter naturhist. Schr.* 10: 33-46. (in German with English summary). [In April 1998 a habitat of *Thecagaster bidentata* was discovered in the border region of Thüringen and Hessen, Germany. This is the first breeding record of the species in Thüringen. The localities are characterised in detail by vegetation, morphology of the krenal, and chemical and physical factors. Observations on larval habitat, emergence, hunting of imagos, oviposition, and accompanying fauna are dealt with.] Address: Mey, D., Karl-Hermann-Str. 3, D-99848 Wutha-Farnroda, Germany

2165. Mielewczyk, S. (2000): Wazki (Odonata). *Flora i Faua Pienin - Monografie Pieninskie* 1: 143-145. (in Polish with English summary). [This short paper summarizes the current knowledge on the dragonfly fauna of the Pienin mountains, Poland based on historical and recent data. A total of 38 species is known from the region; *Sympetrum pumilum*, *Anax ephippiger*, *Thecagaster bidentata*, and *Sympetrum pedemontanum* are stressed.] Address: Mielewczyk, S., Zaklad Badan, Srodowiska Rolniczego i Lesnego, Polska Akademia Nauk, ul. Bukowska 19, 60-809, Poznan, Poland

2166. Ministerium Ländlicher Raum Baden-Württemberg; Landesanstalt für Umweltschutz Baden-Württemberg (Hrsg) (2000): *NATURA 2000 in Baden-Württemberg*. Ministerium Ländlicher Raum Baden-Württemberg. Stuttgart: 162 pp. (in German). [This is a recom-

modation for the realisation of the European Flora-Fauna-Habitat-Directive directed to the general public. Some elucidation of the aims and task of this directive are outlined, and the Directive is printed in a German translation. Each of the habitats and the species listed in the annexes of the Directive and represented in Baden-Württemberg, Germany are briefly characterised, their distribution in Baden-Württemberg is mentioned, the importance for nature conservation is outlined, each habitat type and species are documented by very good colour photographs. Three odonate species included in the Annex II of the Directive occur in Baden-Württemberg: *Coenagrion mercuriale*, *Leucorrhinia pectoralis*, and *Ophiogomphus cecilia*.] Address: Ministerium Ländlicher Raum Baden-Württemberg, Kernerplatz 10, D-70182 Stuttgart, Germany. E-mail: poststelle@lfuka.lfu.bwl.de

2167. Miserendino, M.L.; Pizzolón, L.A. (2000): Macroinvertebrates of a fluvial system in Patagonia: altitudinal zonation and functional structure. *Archiv für Hydrobiologie* 150(1): 55-83. (in English). [This "study of altitudinal zonation of macrobenthic communities in the Patagonian Andes was carried out at 14 sampling stations along 51 km of the Esquel-Percy River system over a 1000 m altitudinal gradient. Untreated sewage of Esquel City discharges in the middle section of the system. The main species assemblages of the monitored sites were identified and a functional categorization of the taxa was produced. Population distribution patterns were analyzed throughout a complete annual cycle [...] The macrobenthic community found along the Esquel-Percy system is rich and diverse, except at middle-stretch stations, which are altered by anthropogenic perturbations. Specific composition, diversity and density were influenced by the topographic gradient, geochemical (conductivity and total alkalinity) and anthropogenic factors (BOD and oxygen saturation), and the seasonality of the system. [...] The biomass of shredders and predators decreased, while collectors increased, downstream from the headwaters. Collector-gatherers were the most important group at all sites. Functional organization showed better correspondence with the RCC model if biomass was used instead of macroinvertebrate density. We found that local and regional characteristics produced deviations from the RCC model, but it is still useful as a comprehensive framework for stream ecology in the Patagonian Andes." (Authors) "*Aesha variegata*?" is listed for one sampling site.] Address: Miserendino, Laura, Laboratorio de Ecología Acuática, Sarmiento 849, Universidad Nacional de la Patagonia, Sede Esquel, 9200 Esquel, Chubut, Argentina. E-mail: Lauram@teletel.com.ar

2168. Monaghan, K.A.; Peck, M.R.; Brewin, P.A.; Masiero, M.; Zarate, E.; Turcotte, P.; Ormerod, S.J. (2000): Macroinvertebrate distribution in Ecuadorian hill streams: the effects of altitude and land use. *Archiv für Hydrobiologie* 149(3): 421-440. (in English). [To assess the effects of altitude and land use on stream fauna macroinvertebrates were sampled from riffle and marginal habitats of 45 streams in three regions of the Ecuadorian Andes. "Assemblage structure and richness were assessed in relation to habitat character, water chemistry and catchment land use. Land use varied from humid montane forest in the Western and Eastern Cordillera to transition forest and Parámo in the Central Valley. However, c. 30 % of sites in each region were

located in managed catchments of cleared forest, pasture or crop plantations. Water chemistry and stream habitat varied significantly between regions, altitudes and land use. Invertebrate assemblages were dominated by Baetidae, Leptophlebiidae, Tricorythidae, Elmidae, and Chironomidae, but ordination revealed major variations in assemblage structure with altitude. Hydropsychidae, Philopotamidae, Ptilodactylidae and Gomphidae" (and "Calopterygidae", "Libellulidae", and "Zygoptera A") were restricted to lower altitude whereas Scritidae and Gammaridae characterised higher altitude sites. Secondary variations in assemblage structure were correlated with habitat structure and metal concentrations (Al, Fe and Mn), and in turn were reflected in taxon richness. Classification revealed generally similar patterns, but showed also potential effects on assemblage structure in the Western Cordillera where humid montane forest had been cleared for agriculture. We conclude that, as in other mountain regions, major downslope patterns are clear among aquatic invertebrates in the Ecuadorian Andes. However, from these data altitude affects assemblage composition more than richness. Downslope patterns might have been modified by human activity at the catchment scale, and also by local site attributes such as habitat structure and stream chemistry." (Authors) "*Aeshnidae*" are restricted to the Eastern Cordillera.] Address: Monaghan, K.A., Catchment Research Group, School of Biosciences, Cardiff University, P.O. Box 915, Cardiff, CF10 3TL, UK. E-mail: K.A.Monaghan@bham.ac.uk

2169. Moskowitz, D. (2000): A new county record of *Archilestes grandis* in New York with notes on habitat and water quality. *Argia* 12(4): 7-8. (in English). ["On 3 October 2000 a male *Archilestes grandis* was collected on Mine Brook in Mt. Pleasant, Westchester County, New York. This appears to be the first record for Westchester County and only the second confirmed record for the state. [...] When combined with other measured parameters and field data including dissolved oxygen and temperature, Mine Brook is best characterized as moderately impaired. This is consistent with other reports of *A. grandis* habitats [...]" (Author)] Address: Moskowitz, D. c/o EcolSciences, Inc. 75 Fleetwood Drive, Suite 250 Rockaway, New Jersey 07866 dmoskowi@ecolsciences.com

2170. Müller, H. (2000): Untersuchungen zu *Cordulegaster heros* Theischinger, 1979 und *C. bidentata* Selys, 1843. Teil 1: Imagines. *Anax*, Wien 3: 19-22. (in German with English summary). [In 1997 and 1998, data about the phenology and ecology of *Cordulegaster heros* and *C. bidentata*, co-occurring syntopic, were obtained in the catchment of the Weidlingbach (Lower Austria). Emergence, dimigration and habitat during the maturation period, dependence of the high of patrol flights of males from the width of the brook, dependence of velocity of the patrol flight in relation to riffles and pools (preferred egg deposition habitats), and reproduction behaviour of the females were examined. For more details see OAS 1745.] Address: Müller, Heidemarie, Muhrhoferweg 1-5/4/42, A-110 Wien, Austria. E-mail: lang.mueller@EUnet.at

2171. Müller, J. (2000): Untersuchungen zur Ökologie und Verbreitung der Sibirischen Azurjungfer (*Coenagrion hylas*) im Tiroler Lechtal (Odonata: Coenagrionidae). Zulassungsarbeit zur wissenschaftlichen Prüfung für das Lehramt an Gymnasien. Fach Biologie, Institut

für Experimentelle Ökologie der Tiere der Universität Ulm.: 118 pp. (in German). [The very rare *C. hylas* is known from the Ural mountains in Russia to Japan, and from a disjunct area in the European alpes. This study enlarges our knowledge on ecology and distribution in this disjunct area of the species in quite extent. Seven habitats with records of *C. hylas* are known now, all situated in the valley of the River Lech. In detail the habitats are described and figured, and characterised by chemical and physical parameters. Larval, emergence, maturation, hunting, reproduction, oviposition, and perching (dormitories) habitats and ethoecology are analyzed. Information on phenology with special reference to emergence period, abundance, morphology of larvae, and co-occurring Odonata are given. In considerable detail conservation measures are outlined. This publication is a corner stone on ecology of one of the most interesting and threatened western palearctic damselflies.] Address: Müller, J., Goethestr. 25, D-89601 Schelklingen, Germany

2172. Müller, J. (2000): Zur Schutzwürdigkeit und nachhaltigen Entwicklung der Elbe unter besonderer Berücksichtigung der Libellen-Fauna. 7. Landschaftstag 1999. Flusslandschaft Elbe: 24-31. (in German). [This is an introduction into the odonate fauna of the rivers and their floodplains in central Germany exemplified with the river Elbe. The main factors characterising the floodplain, its vegetation, and its fauna and flora with special emphasize to the species of the European Bird habitat- and Fauna-Flora-Habitat- directives are outlined. The bioindicatorial value of Odonata for different habitats in the river-floodplain landscape is assessed, and characteristic species are presented. A cross-section through the river and the floodplain gives an insight into the use of habitats by odonate larva and imago. The booklet can be ordered at a price of DM 3,- from: Landeshauptstadt Magdeburg, Umweltamt, D-39090 Magdeburg, Germany.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. jmueller@mu.lsa-net.de

2173. Müller, O.; Schütte, C.; Artmeyer, C.; Burbach, K.; Grand, D.; Kern, D.; Leipelt, K.G.; Martens, A.; Petzold, F.; Suhling, F.; Weihrauch, F.; Werzinger, S. (2000): Entwicklungsdauer von *Gomphus vulgatissimus*: Einfluss von Gewässertyp und Klima (Odonata: Gomphidae). *Libellula* 19(3/4): 175-198. (in German with English summary). ["*G. vulgatissimus* lives in different waters and completes its life cycle in two, three or four years. These different life cycles indicate that the duration of larval development depends on the type of water or climatic situation. Therefore, in the middle of October 1999 larvae were collected at 11 localities in Central Europe. Larval population structures were investigated by measuring the head widths of larvae. The data show that larval development could be finished within two years in warm, shallow rivers like the Oder and the Ems. In streams with low temperatures and lakes the sp. has a three or four year life-cycle. The population structures and duration of life cycles did not show any clear dependence on climate or latitude." (Authors)] Address: Müller, O., Birkenweg 6d, D-13206 Libbenichen, Germany. E-mail: olemuller@freenet.de

2174. Needham, J.G.; Westfall, M.-J.; May, M.L. (2000): *Dragonflies of North America*. Revised Edition. Scientific Publishers. Gainesville. Washington, Hamburg. Lima. Taipei. Tokyo. ISBN 0-945417-94-2: I-XY,

940 pp. (in English). [Everyone interested in the Odonata of the North American continent will welcome this book. It is a manual with special emphasize on larval and imaginal taxonomy and morphology. Many (colour) illustrations and keys will enable people to identify all North American species including *Erythrodiplax bromeliicola* Westfall n. sp. from Jamaica. I am not the position to criticize this impressive work. For a detailed review see Donnelly (2000, *Argia* 12(4): 11-13). But if I may criticize one aspect of the book: I miss information on habitats and habits of the species. (M. Schorr)] Address: Scientific Publishers, Inc., 4460 SW 35th Terrace, Suite 305, Gainesville, FL 32608, USA

2175. O'Brien, M. (2000): New additions to the University of Michigan Museum of Zoology Odonata Library. *Argia* 12(4): 10. (in English). ["We recently received a shipment of books belonging to the estate of Leonora (Dolly) K. Gloyd from her son, Roger Gloyd, of Plano, TX. Mrs. Gloyd had been an adjunct curator of Odonata at the UMMZ for nearly 50 years, and although we had her reprints and specimens here at the UMMZ, her personal library had been sent to her son when she left the museum to live in Texas. Dolly had acquired many books on Odonata, some of which are quite rare. All of the Odonata-related books will be housed in the Williamson-Kennedy-Gloyd Odonata Library. [...]"] (Author)] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfbrien@umich.edu

2176. Ott, J. (2000): Die Ausbreitung mediterraner Libellenarten in Deutschland und Europa - die Folge einer Klimaveränderung? *Berichte der Niedersächsischen Naturschutzakademie* 2/2000: 13-35. (in German). [This paper discusses extensively the current range extensions or changes in odonate faunas with focus on Europe. There is evidence that in the past years some species extended their distribution area to the north and to higher altitudes, with an increase in breeding habitats and population size; best studied species is *Crocothemis erythraea*. The author presents some additional examples of species for which global warming is advantageous. He also discusses amendments of regional species composition giving indication for processes of dominance of "Mediterranean" species over "Nordic" or "Eurosiberian" species.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

2177. Parr, A. (2000): Migrant dragonflies in 1999 including recent decisions and comments by The Odonata Record Committee. *J. Br. Dragonfly Society* 16(2): 52-58. (in English). [The following species are treated and in most cases discussed in detail (see also *Atropos* 9: 21-25): *Calopteryx splendens*, *Erythromma viridulum*, *Aeshna mixta*, *A. affinis*, *Anax parthenope*, *A. ephippiger*, *Libellula depressa*, *Sympetrum striolatum*, *S. fonscolombii*, *S. flaveolum*, *S. sanguineum*, *S. danae*, and *Pachydiplax longipennis*. The latter is a new addition to the European odonate fauna. The female specimen was detected dead on 6 September 1999 on the Sedco 706 oil rig in the Dunbar field on the east of Shetland.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

2178. Paulson, D.; Potter, S. (2000): Three dragonflies new to Nevada. *Argia* 12(4): 3- (in English). [*Argia sedulum*, *Perithemis intensa*, *Libellula luctuosa*]

Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

2179. Peacor, S.D.; Werner, E.E. (2000): Predator effects on an assemblage of consumers through induced changes in consumer foraging behavior. *Ecology* 81(7): 1998-2010. ["This investigation examines how a predator-induced reduction in activity of a prey species (a "nonlethal" predator effect) affects the growth rate of the prey and, indirectly, the growth rate of competitors of the prey. We further determine how the magnitudes of these effects depend on density of the prey species. We develop a foraging model that predicts a predator will reduce the growth of a focal prey species at low prey density but have little effect at high prey density. The model also predicts that presence of the predator will indirectly facilitate growth of a competitor of the focal species, and that this effect will be negligible at low, and maximal at high, focal species density. Thus it is precisely where the effect of the predator on the growth of the focal species is minimum that the indirect effect on the competitor is maximum. We tested these predictions using a system of three species/size classes of anuran larvae and a larval odonate predator (*Anax longipes*) in cattle watering tanks. By caging the predator we isolated its effect on foraging behavior of the anuran larvae from that of density reduction. We manipulated the density of small green frog larvae (*Rana clamitans*) while holding density of small bullfrog (*R. catesbeiana*) and large green frog competitors constant. Small green frogs and bullfrogs reduce their activity in the presence of caged *Anax* whereas the large green frogs do not. Results were in accord with the model predictions. Caged *Anax* reduced small green frog and bullfrog growth at low small green frog density but had no effect at high small green frog density. In contrast, caged *Anax* had a positive effect on large green frog growth, but this effect was negligible at low small green frog density and maximal at high small green frog density. The results also showed that the indirect effects of the predator that arose through reduction in prey foraging activity were comparable in magnitude to those expected through reduction in prey density. These results suggest that the nonlethal effects of a predator on prey and, indirectly, on competitors of their prey, can be large in magnitude and depend strongly on relative species densities." (Authors)] Address: Werner, E.E., Department of Biology, University of Michigan, Ann Arbor, MI, 48109 USA.

2180. Perron, J.-M.; Ruel, Y (2000): Extension de l'aire de répartition connue au Québec d'*Ophiogomphus anomalus* Harvey (Odonata: Gomphidae). *Faberies* 25(1): 22. (in French). [Canada, Québec; the records of exuviae from Moulin Banal (1 male, 7-VII-1998; 2 males, 1 female, 9/16-VI-1999) are to be added to the known localities of the species.] Address: Perron, J.-M., 506-953, rue Grandjean, Sainte-Foy, Que, G1X4P9, Canada

2181. Perron, J.-M.; Jobin, L.J. (2000): Faune odonotologique du territoire du marais Léon-Provancher, Neuville, Québec. *Naturaliste can.* 124(1): 26-33. [A comprehensive review of the fauna (42 spp.) of this wetland area, Québec, Canada, with annotations on species abundance, flight periods etc., and with specimen phot. of all spp.] Address: Perron, J.-M., 506-953, rue Grandjean, Sainte-Foy, Que, G1X4P9, Canada

2182. Perron, J.-M.; Ruel, Y. (2000): Implantation d'*Enallagma civile* (Hagen) (Odonata: Coenagrionidae) sur le territoire du marais Léon-Provancher, Neuville (Québec). *Faberies* 25(1): 20-21. (in French). [A small population of *E. civile* was discovered in 1999; its habitat is described in detail.] Address: Ruel, Y., 760, chemin Saint-Louis, Quebec, Que., G1S 1C3, Canada

2183. Peters, G.; Günther, A. (2000): Frühjahrsbeobachtungen an *Anax ephippiger* auf Rhodos nebst Anmerkungen über den Invasionsraum der Art (Odonata: Aeshnidae). *Libellula Suppl.* 3: 49-61. (in German with English summary). ["The numerous specimens recorded during the last week of March 1999 and the few which lingered at the island until the last days of April, are interpreted as being members of a mass invasion in mid March. More than 50 % of the *Anax ephippiger* sightings in the area of the Aegean Sea occur in springtime, up to the first third of May. Observations made in late summer and autumn confirm the development of a summer generation of larvae and adults. The probability of the existence of resident populations in the Mediterranean, produced by successful hibernation of larvae and subsequent emergence of adults, remains to be proved. It seems likely, that *Anax imperator*, *A. parthenope* and *A. junius*, have been unable to produce diapause larvae, which would allow them to survive under conditions of low temperature." (Authors)] Address: Peters, G., Museum für Naturkunde, Institut für Systematische Zoologie, Invalidenstraße 43, D-10115 Berlin, Germany. E-mail: thekla.kauffmann@rz.hu-berlin.de; Günther, A., Naturschutzinstitut Freiberg, Waisenhausstr. 10, D-09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

2184. Pfau, H.K. (2000): *Erasipteron larischi* PRUVOST, 1933, *Eugeuropterun lunatum* RIEK, 1984 und die Evolution der Verstellpropeller-Flügel der Libellen. *Mitt. Schweiz. Entomol. Gesell.* 73: 223-263. (in German with English summary). ["The functional morphology of the dragonfly wing base is shortly described using a mechanical model (details see PFAU, 1986). Special attention has been put on the mechanism of supinatory twisting of the wing in the range of upstroke pitch (Aufschlagsdrehbereich). In this range the fulcroalar muscle, a pronator which reduces the wing twist, is most essential for enhancement of forward thrust. The wings of *Erasipteron larischi* PRUVOST, 1933 and *Eugeuropterun lunatum* RIEK, 1984, which have been classified amongst the oldest representatives in the stem group of Odonata, are "reanimated" by postulation of various functional wing characters (mainly joints between veins) concerning wing twisting. These fossil wings are interpreted as early steps of an evolutionary sequence, which led from *Erasipteron* to *Eugeuropterun* (in contrast to the sequence proposed by RIEK & KUKALOVA-PECK, 1984, based on morphological considerations). In this sequence the efficiency of wing twisting in the range of upstroke pitch (Aufschlagsdrehbereich) is enhanced. This is due mainly to evolution of the mid and posterior arculus, since frontal veins of the wing were integrated into the twisting part of the wing (Cubital-sector), enlarging it considerably by adding their distal surface parts. As a next step, the formation of a further (frontal) part of the arculus, the anterior arculus, integrated a very large part of the wing (including the wings tip!) into the cubital sector. This was followed by the evolution of the nodus, a most essential joint of the "variable-pitch propeller wing" of dragonflies. The

further functional development of the nodus and the improvement of co-operation of arculus and nodus presumably then happened in a petiolate zygopteroid wing with a proximally situated nodus. It is postulated that this was the wing-type of the common ancestor of all extant Odonata (i.e. of the stem species of *Odonata). The Protanisoptera, possessing a primitive "distal" nodus and a very oblique ("soft") anterior and mid arculus are considered as a "transition stage" on the way to the Protozygoptera and the "Odonata. The complicated mechanical interaction between the wing base, arculus, and nodus has been tested in different constellations using working models. Within the *Odonata the wings again broadened and the nodus was shifted distally resulting in a functional bisection of the wing into a proximal bearing-surface part ("airfoil") and a distal twisting part. It is possible that this evolution, which led to Anisozygoptera+Anisoptera, included groups of Zygoptera ("Lestine Complex", "Calopterygoidea"), supporting the hypothesis of paraphyly of Zygoptera (FRASER, 1957). Convergence, however, could not be excluded. At the base of the Anisozygoptera+Anisoptera - and again at the base of Anisoptera - the wing also broadened in its proximal part (mainly the hind wings). This evolution proceeded with parallel changes in the flight apparatus as a whole: alteration of the basic (i.e. thorax-integrated) angle of wing stroke-plane, simplification and strengthening of the flight motor (the latter mainly in the metathorax)." (Author)] Address: Pfau, H.K., Rathenaustr. 14, D-65326 Aarbergen, Germany

2185. Pither, J.; Taylor, P.D. (2000): Directional and fluctuating asymmetry in the black-winged damselfly *Calopteryx maculata* (Beauvois) (Odonata: Calopterygidae). *Canadian Journal of Zoology* 78(10): 1740-1748. (in English). ["Directional asymmetry (DA) has received considerably less attention than fluctuating asymmetry (FA) in the literature. Evidence for DA, however, is building among insect taxa. We examined asymmetries in two wing traits within both sexes of the damselfly *Calopteryx maculata* [...] sampled from three sites in southeastern Ontario. After accounting for measurement error, we show that proximal segments within right fore and hind wings are consistently longer than those in the left in all but one sample group. Full wing lengths, however, exhibited FA rather than DA. Mean asymmetry values for both traits (segment and length) occurred in the direction of right-wingedness significantly more often than expected by chance. Patterns of asymmetry were generally consistent among the sexes and sites, although males tended to exhibit more pronounced DA. We suggest that the wings of *C. maculata* may undergo compensatory development, so that full lengths are more bilaterally symmetrical than their component parts." (Author)] Address: Pither, K., Department of Biology, Queen's University, Kingston, ON, K7L 3N6 Canada

2186. Postler, E.; Postler, W. (2000): Entwicklung von *Gomphus vulgatissimus* im Datteln-Hamm-Kanal (Odonata: Gomphidae). *Libellula* 19(3/4): 233-235. (in German with English summary). ["In May and June 2000, 138 exuviae of this running-water species were collected from a navigable canal in the region of Lünen-Hamm, Northrhine-Westphalia, Germany. One exuvia of *G. vulgatissimus* was found with an attached Zebra Mussel *Dreissena polymorpha*." (Authors)] Address: Postler, Elisabeth und Wolfgang, Hammer Straße 39, D-59174 Kamen

2187. Pottgiesser, T.; Sommerhäuser, M. (2000): Naturnahe Tieflandbäche in Nordrhein-Westfalen - Refugien seltener und gefährdeter Wasserinsekten. *Verhandlungen des Westdeutschen Entomologen Tag 1999*: 233-246. (in German). [30 brooks and rivers in the lowlands of Nordrhein-Westfalen, Germany are surveyed for their macrozoobenthos; *Calopteryx splendens*, *C. virgo*, *Gomphus vulgatissimus*, and *Cordulegaster boltonii* are mentioned in a tab.] Address: Sommerhäuser, M., Universität Essen, Institut für Ökologie, Abt. Hydrobiologie, D-45117 Essen, Germany. E-mail: sommerhaeuser@uni-essen.de

2188. Prokop, J.; Nel, A. (2000): *Merlax bohemicus* gen. n., sp. n., a new fossil dragonfly from the Lower Miocene of northern Bohemia (Odonata: Aeshnidae). *European Journal of Entomology* 97(3): 427-431. (in English). ["Two aeshnid dragonflies are described from the Lower Miocene deposits in the Bilina mine in the north of the Czech Republic, including a new genus and species of Anactini, *Merlax bohemicus* gen. n., sp. n., and a further specimen assigned to the genus *Aeshna*." (Authors)] Address: Prokop, J., Department of Palaeontology, Charles University, Albertov 6, CZ-128 43, Praha 2 Czech Republic

2189. Reder, G.; Vogel, W. (2000): Wellenschlag als limitierender Faktor bei der Emergenz von Libellen? Beobachtungen beim Schlupf von *Gomphus flavipes* (Charpentier) (Anisoptera: Gomphidae). *Fauna Flora Rheinland-Pfalz* 9(2): 681-685. (in German). [A male of *Stylurus flavipes* was traced emerging on the margin of a groyne in River Rhine near Worms, Rheinland-Pfalz, Germany. The specimen was caught by the wash off of a boat and washed into the open water of the river. The abdomen still stuck into the larval skin. After ten minutes the authors caught the specimen and put it near the bank onto a log. The specimen had put its abdomen out of the skin floating in the water. After 40 min the specimen take off to its maturation flight.] Address: Reder, Gerd, Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany. E-mail: PG.Reder@t-online.de

2190. Rejl, J. (2000): Finding of dragonflies in bird's nets. In: Hanel, L. (Ed.): *Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000*. Vlasim. ISBN 80-86327-12-4: 34-35. (in Czech with English summary). [In the framework of catching of birds living in reeds in the National Reserve Bohdanecký rybník pond and the pond Matka *Orthetrum cancellatum*, *Aeshna cyanea*, and *A. mixta* were regularly caught in mist nets. Rare species (first proof of the existence in the region of Eastern Bohemia) are: 19.7.1999 *Ophiogomphus cecilia*, and 2.8. 1999 *Anax parthenope*. In the meadows of the Svratka river (township territory Krizánky, region Zďár nad Sázavou, mapping field no. 6362a) *Cordulegaster boltonii* was caught in a mist net on 17.6.1998.] Address: Rejl, J., Agentura ochrany přírody a krajiny CR, Bozeny Nemcové 2625, 530 02 Pardubice, Czech Republic

2191. Relyea, R. (2000): Trait-mediated indirect effects in larval anurans: reversing competition with the threat of predators. *Ecology* 81(8): 2278-2289. (in English). ["Ecologists recently have been focusing on the role that trait-mediated indirect effects can have on community structure and composition. To date, this

work has primarily focused on the effects of predator-induced behavioral plasticity on communities. However, predator-induced morphological plasticity, which has been documented in many taxa, might also lead to trait-mediated indirect effects. Here, I examined how predators altered the behavior and morphology of larval wood frogs (*Rana sylvatica*) and leopard frogs (*R. pipiens*) and how these phenotypic changes altered the outcome of competition between the two species. Competition in the absence of caged predators was asymmetric; when reared separately, leopard frogs grew more than wood frogs, but when competing (without predators), wood frogs grew faster than leopard frogs. The presence of caged predators reversed the outcome of competition between the two anuran prey. In the presence of larval dragonflies (*Anax* spp.) or caged mudminnows (*Umbra limi*), leopard frogs grew faster than wood frogs while total tadpole biomass production remained unchanged. Thus, there was a predator-mediated indirect effect. Because predators alter both the behavior and morphology of larval anurans and both of these traits are known to affect resource consumption and growth, both are potential mechanisms to explain the change in competitive outcome. Changes in behavior were not related to changes in growth, but changes in morphology (specifically mouth width and tail length) were related to changes in growth. When competitors were added (without predators), wood frogs increased their mouth width by 10% and their tail length by 3%, while leopard frogs increased their mouth width by 5% and did not change their tail length. The greater increase in mouth width for wood frogs should increase their forage intake, since tadpoles feed by scraping periphyton; the importance of a 3% longer tail in competitive ability is unknown. The presence of the predator threat (via chemical cues from the caged predators) reduced both the mouth width and tail length in the two prey species to pre-competition levels. This response corresponded with the reduced competitive ability of the wood frogs. This work demonstrates that both competitors and predators can alter prey morphology and suggests that changes in morphology can cause trait-mediated indirect effects." (Authors)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

2192. Schlüpmann, M. (2000): Die Libellen des Hagerer Raumes - Verbreitung, Bestand und Lebensräume. Der Sauerländische Naturbeobachter 27: 71-115. (in German with English summary). [Starting in 1980 324 small stagnant water bodies and 65 running water segments were surveyed in the Hagen area. The distribution of the 32 dragonflies species is displayed as 1 square km grid maps. Up to now data has been collected for 184 grid areas. "Distribution and frequency is characterized by percentage of the populated grid areas and populated bodies of water, the indigeneness or rather, the probability of it, is included in derived values and a frequency index is formed." *Aeshna cyanea* is the most widespread and frequent species. *Pyrrhosoma nymphula* was recorded in 40%, *Ischnura elegans* in 35% of the water bodies. *Coenagrion puella* and *Libellula depressa* belong to these widespread species, too. All the other species achieve low frequency indices. Some examples of regional fluctuation in species representation are given: *Gomphus pulchellus* was observed for the first time in 1994. *Erythromma najas* could be observed on old branches of the Ruhr-

River-Valley until 1980, however, it was impossible to find it between 1980 and 1989. In 1997 *Erythromma viridulum* was discovered in the Lenne floodplain for the first time. *Platycnemis pennipes*, which was present in the seventies, but was missing in the eighties, could just recently be confirmed on three places in the Ruhr-Valley. In 1983 and 1984, *Ischnura pumilio* was only observed in the region of the Lenne-Valley and the adjoining region; it was never been seen since that time. Special emphasize ist given to the regional distribution, and their habitat preference (small body of water type, general characteristics of the body of water, vegetation).] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, Germany. E-mail: martin-schluempmann@t-online.de

2193. Schlüpmann, M. (2000): Die Libellen des Südwestfälischen Berglandes. Der Sauerländische Naturbeobachter 27: 5-55. (in German with English summary). [The distribution of Odonata in Southern Westphalia, Germany is grid mapped. Information from 172 topographic maps from a possible total of 219 has been made available. 45 dragonfly species are known from the region, 3 of them couldn't be traced in the framework of this study. 35 species are indigenous, *Sympetrum pedemontanum* appeared temporarily in the eighties. In 1998 *Sympetrum fonscolombii* and in 2000 *Ophiogomphus cecilia* were found for the first time. The status for another six species remains questionable. *Aeshna cyanea* and *Pyrrhosoma nymphula* are the dominate species in the region. An analysis of the distribution of the species on the basis of geographic landscapes ("Naturräume") shows that higher altitudes are represented by a clearly defined smaller amount of species. Many species have only been found in peripheral regions only. *Leucorrhinia dubia* and *L. pectoralis* are confined on a few boggy habitats of the higher region of the study area. Due to the water quality improvement of the rivers a population increase of *Calopteryx splendens* has been observed. *Anax imperator* and *Erythromma viridulum* could also increase their populations during the last 10 years - the reason might be an increase in temperatures. A population decrease is to be observed in species of oligotrophic to mesotrophic habitats (*Aeshna juncea*, *Sympetrum danae*, *S. flaveolum*). The regional distribution, population and habitat ecology, and range extensions of the species are described and discussed in some detail.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, Germany. E-mail: martin.schluempmann@t-online.de

2194. Schmidt, E. (2000): Emergenzuntersuchungen an *Gomphus vulgatissimus* und *G. pulchellus* (Odonata: Gomphidae) am Dortmund-Ems-Kanal bei Lüdinghausen (Westmünsterland). Verhandlungen des Westdeutschen Entomologen Tag 1999: 191-197. (in German). [Nordrhein-Westfalen, Germany; emergence patterns in 1999 (long emergence period) and in 2000 (short emergence period) are compared and discussed.] Address: Schmidt, E., Biologie und ihre Didaktik, FB9/S05, Universität GH Essen, D-45117 Essen, Germany

2195. Schnapauff, I; Ullmann, K.; Suhling, F. (2000): Die Libellen-Lebensgemeinschaft griechischer Reisfelder (Odonata): Auswirkungen von Habitatdauer, Anbaumethode und Vegetationsdichte. *Libellula* Suppl. 3: 63-80. (in German with English summary). ["The Odonata of experimental rice-fields situated in the Nestos-delta (NE Greece) were studied from May to September

1994. The number of species breeding successfully in rice-fields was lower than that in ponds and ditches in the vicinity. Only species with a larval period of less than 120 days were able to emerge from the rice-fields. The phenology of adults and the emergence of *Sympetrum fonscolombii* from rice-fields are described. The larval densities of *Ischnura elegans* and *S. fonscolombii* are not significantly different between pesticide-free rice-fields and those treated with propanil and parathion. On the other hand, the number of emerging individuals of both species differed between the treatments. A significant negative correlation between the density of rice plants and the larval density of *I. elegans* in the experimental fields was found. The comparability of results from small experimental plots with original rice-fields is discussed." (Authors)] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

2196. Schöll, F.; Fuksa, J. (2000): Das Makrozoobenthos der Elbe vom Riesengebirge bis Cuxhaven. Bundesanstalt für Gewässerkunde Koblenz. T.G. Masaryk Water Research Institute Prag. Internationale Kommission zum Schutz der Elbe. Koblenz: 29 pp. (in German). [Compilation of faunistic data of the River Elbe covering the fauna from the spring in the Czech Republic up to the estuary in Germany. The data are arranged in an appendix according to four ecoregions: (1) Bohemian Elbe (Krkonoše [Riesengebirge], Vrchlabí - Decín), (2) Upper range (Decín - Pirna, Pirna - Hirschstein) [Czech Republic], (3) Middle range (Hirschstein - Magdeburg, Magdeburg - Geesthacht), and (4) Tide influenced region (Geesthacht - Wedel, Wedel - Cuxhaven) [Germany]. 9 odonate species are listed; this list of course is far away of being complete even for rheophiles species or species of the floodplain of the river Elbe. In spite of this the paper gives a good introduction into the ecological importance of this river in Europe and the fauna of the different ranges of the Elbe. Characteristic species are figured (colour pictures) and some chemical factors influencing the macrozoobenthos are presented in graphs.] Address: Bundesanstalt für Gewässerkunde, Kaiserin-Augusta-Anlagen 15-17, D-56068 Koblenz, Germany; T.G. Masaryk Water Research Institute, Podbabska 30, Praha 6, Czech Republic.

2197. Schulz, C.-J. (2000): Aquatische Insekten der Wipper, einem salzbelasteten Fluß Nordthüringens. Mitt. dtsh. Gesell. allgem. angew. Entomol. 12: 249-254. (in German with English summary). ["Decline of potassium mining in Northern Thuringia led to a decrease in salinity of the river Wipper during the last years. Up to now, drainage waters from the salt heaps cause a salinization, reaching an annual mean value of 1,528 mg Cl⁻ l⁻¹ at the sampling location at the village of Hachelbich in 1998. However, this is only little compared to a decade ago (1989: 7,080 mg Cl⁻ l⁻¹). This severe salinization affected also the aquatic insect community of the river Wipper. Whereas records from the beginning of this century report a diverse aquatic insect fauna, Chironomidae started dominating nearby the potassium mines in the 1930's. Since the beginning of the 1950's, mass developments of a few species, mostly Chironomidae, had characterized long sections of the river. This remained so until in 1994 chloride concentration dropped to 1,575 mg l⁻¹ (annual mean at Hachelbich). From then on, taxa such as *Sialis*, *Agabus* and *Polamonectes* occurred, most of them being euryhaline." (Author)] Also *Calopteryx virgo* and *C. splendens* could be

recorded in the sampling period 1992-1998.] Address: Schulz, C.-J., Staatliches Umweltamt Sondershausen, Postfach 36, D-99701 Sondershausen, Germany

2198. Schwarz-Waubke, M.; Schwarz, M. (2000): Die Libellenfauna im Stadtgebiet von Salzburg (Österreich) - Ergebnisse einer Biotopkartierung aus den Jahren 1994 und 1995. Linzer biologische Beiträge 32(2): 1093-1162. (in German with English summary). [In 1994 and 1995 the dragonfly fauna of 173 water bodies in the city of Salzburg, Austria was investigated. A total of 41 odonate species has been found (hitherto 46 species are known from the city of Salzburg and its environs). The distribution of the species in the Federal State Salzburg and habitat requirements are discussed, and their distribution is mapped. The odonate fauna of twenty waters was examined more intensively with special emphasis on indigeneity and abundance.] Address: Schwarz-Waubke, Maria, Eben 21, A-4202 Kirschschlag, Austria

2199. Sibley, F.C. (2000): New records of *Sympetrum signiferum* from Arizona. *Argia* 12(4): 4-5. (in English). [Compilation of records of the rare *S. signiferum* resulting first from 1968 and following years] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA. E-mail: fcs@george.peabody.yale.edu

2200. Siva-Jothy, M. (2000): A mechanistic link between parasite resistance and expression of a sexually selected trait in a damselfly. *Proceedings of the Royal Society Biological Sciences Series B* 267(1461): 2523-2527. (in English). ["This paper examines a field-based insect system in which a signal trait and an immune effector system responsible for parasite resistance rely on the same melanin-producing enzyme cascade (phenoloxidase, PO). Observations and experiments on males of the calopterygid damselfly *Calopteryx splendens xanthostoma* revealed that resistance to the prevalent parasite in the study system (a eugregarine protozoan infecting the mid-gut) was correlated with quantitative aspects of the sexually dimorphic melanized wingspot of males, a trait that is produced and fixed before the host comes into contact with the sporozoites of the parasite. Regulation of PO during experimental immune challenge showed that males with dark, homogenous melanin distribution in their wings showed no change in PO levels 24 h after challenge. By contrast males with lighter and/or more heterogenous melanin distribution in their wings tended to show higher PO levels 24 h after immune challenge. The changes in PO levels occur despite the lack of a relationship between wing-pigment distribution and the cellular encapsulation response. These results suggest a shared, limiting re may form the mechanistic basis of the trade-off between a condition-dependent signal trait and immune function in this system." (Author)] Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK. E-mail: m.siva-jothy@sheffield.ac.uk

2201. Siva-Jothy, M.T. (2000): Phenoloxidase, parasite resistance and reproductive success: Immunity from an evolutionary ecologist's perspective. *Developmental & Comparative Immunology* 24(Suppl. 1): S54- (in English). [Verbatim: "In recent years evolutionary biologists have begun to realise that immune function is an important life-history trait in animals. In particular the cost of investing in immunity may preclude investment

in other life-history traits. I present the results of a field-based study of a damselfly that show how investment in immune traits (phenol oxidase regulation and encapsulation) varies between individuals and show that that variation affects reproductive success in those individuals. I will discuss the implications of this for our understanding of insect immune function." Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK. E-mail: m.siva-jothy@sheffield.ac.uk

2202. Smith, B. (2000): *Cicindela* larva eats *Gomphus*. *Argia* 12(4): 9. (in English). ["My very first publication was in the *Journal Cicindela* in which I described finding an adult clubtail (probably *Gomphus spicatus*) "stuck" to a sand trail. It was vibrating its wings but couldn't move. I grabbed it thinking this is an easy one and in the process pulled a last instar larva of *Cicindela scutellaris* out of its burrow. The larva had the dragonfly by the anterior portion of the abdomen and didn't let go till it was too late." (verbatim)] Address: not stated

2203. Société française d'odonatologie. Groupe odonatologique Outre-mer (2000): Liste provisoire des odonates de Guadeloupe et de Martinique (Synthèse: Jean-Louis Dommaget). *Martinia* 16(3): 134-137. (in French). [Checklist (35 taxa) from Guadeloupe and Martinique (Lesser Antilles) with comments and bibliography.] Address: Dommaget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2204. Société française d'odonatologie. Groupe odonatologique Outre-mer (2000): Liste provisoire des odonates de Guyane française (Synthèse: Jean-Louis Dommaget et Michel Papazian). *Martinia* 16(3): 138-141. (in French). [Checklist (160 species) from French Guyana.] Address: Dommaget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2205. Société française d'odonatologie. Groupe odonatologique Outre-mer (2000): Liste provisoire des odonates de la Nouvelle-Calédonie (Synthèse: Jean-Louis Dommaget). *Martinia* 16(3): 142-144. (in French). [Checklist (51 species) from New-Caledonia.] Address: Dommaget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2206. Sonntag, H. (2000): Erster Bodenständigkeitsnachweis von *Aeshna mixta* Latreille, 1805 für das Bundesland Tirol. *Anax*, Wien 3: 29-30. (in German with English summary). [Terfens, Tirol, Austria; 10 exuviae were collected between July 27 and August 19, 1998.] Address: Sonntag, H., Bahnhofstr. 2, A-6112 Wattens, Austria. E-mail: hes@tirol.wwf.at

2207. Soupir, C.A.; Brown, M.L.; Kallemeyn, L.W. (2000): Trophic ecology of largemouth bass and northern pike in allopatric and sympatric assemblages in northern boreal lakes. *Canadian Journal of Zoology* 78(10): 1759-1765. (in English). ["Largemouth bass (*Micropterus salmoides*) and northern pike (*Esox lucius*) are top predators in the food chain in most aquatic environments that they occupy; however, limited information exists on species interactions in the northern reaches of largemouth bass distribution. We investigated the seasonal food habits of allopatric and sympatric assemblages of largemouth bass and northern pike in six interior lakes within Voyageurs National Park, Minnesota. Percentages of empty stomachs were variable for largemouth bass (38-54%) and northern pike (34.7-66.7%).

Fishes (mainly yellow perch, *Perca flavescens*) comprised greater than 60% (mean percent mass, MPM) of the northern pike diet during all seasons in both allopatric and sympatric assemblages. Aquatic insects (primarily Odonata and Hemiptera) were important in the diets of largemouth bass in all communities (0.0-79.7 MPM). Although largemouth bass were observed in the diet of northern pike, largemouth bass apparently did not prey on northern pike. Seasonal differences were observed in the proportion of aquatic insects ($P = 0.010$) and fishes ($P = 0.023$) in the diets of northern pike and largemouth bass. Based on three food categories, jackknifed classifications correctly classified 77 and 92% of northern pike and largemouth bass values, respectively. Percent resource overlap values were biologically significant (greater than 60%) during at least one season in each sympatric assemblage, suggesting some diet overlap." (Authors)] Address: Soupir, C.A., Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, SD, 57007 USA

2208. Stav, G.; Kotler, B. P.; Blaustein, L. (2000): Direct and indirect effects of predatory dragonfly (*Anax imperator*) nymphs on green toad (*Bufo viridis*) tadpoles. *Israel Journal of Zoology* 46(2): 173. (in English). [Verbatim: "Artificial-pool experiments were conducted to assess the effects of predatory dragonfly (*Anax imperator*) nymphs on green toad (*Bufo viridis*) tadpoles. Six replicate pools were used for each of three treatment groups: (1) presence of free *Anax* nymphs (direct effects on mortality), (2) caged *Anax* (indirect effects on behavior, development, and individual growth rates), and (3) control (no *Anax*). Each pool consisted of 15 liters (10 cm depth) of water. After five days, 30 three-day-old tadpoles that had hatched from the same egg string were added. Caged *Anax* were fed with tadpoles three times a week. The experiments ran from 11 April through 4 August. Free *Anax* eliminated 90% of the tadpoles within two days and all of them within six days. Caged *Anax* had no effect on the spatial distribution of tadpoles. However, caged *Anax* caused tadpoles to metamorphose earlier and to a larger size (both statistically significant), and to attain a lighter color." Address: Stav, G., Life Science Department and Mitrani Center for Desert Ecology, Jacob Blaustein Institute for Desert Research, Ben-Gurion University of the Negev, Sede Boqer Campus, Beer Sheva, 84990 Israel

2209. Stav, G.; Blaustein, L.; Margalit, Y. (2000): Influence of nymphal *Anax imperator* (Odonata: Aeshnidae) on oviposition by the mosquito *Culiseta longiareolata* (Diptera: Culicidae) and community structure in temporary pools. *Journal of Vector Ecology* 25(2): 190-202. (in English). ["We assessed the overall (consumptive plus non-consumptive) and non-consumptive effects of nymphal *A. imperator* on experimental pool communities by comparing three treatments: (1) control (no *Anax*); (2) free *Anax* (*Anax* was not constrained); and (3) caged *Anax* (*Anax*, enclosed within a cage, could not consume prey outside the cages, but could possibly influence them via perceived risk of predation). Fewer egg rafts of the mosquito *Culiseta longiareolata* were found in the free *Anax* treatment compared to the other two treatments. There was no statistically significant difference in the number of egg rafts between control and caged *Anax* pools. Thus, while *Culiseta* females apparently oviposit fewer egg rafts in the presence of unconstrained *Anax*, they did not respond to predation risk from the caged *Anax*. Larval *Culiseta* densities were drastically reduced by free *Anax*; there

ties were drastically reduced by free *Anax*; there was nearly a 100% reduction in the number reaching metamorphosis (pupae) and a 100% reduction in emergence (pupal exuviae). There were no significant treatment effects on densities of crustaceans, *Daphnia magna* and *Heterocypris* sp., or on chironomid pupal exuviae. Ceratopogonid pupal abundance was higher in free *Anax* pools than in the other two treatments toward the end of the experiment. Free *Anax* caused a trophic cascade, presumably by strongly reducing the dominant periphyton grazer, *Culiseta* larvae; periphyton mass was greater in the free *Anax* treatment than in the control. However, there was no behavioral trophic cascade, i.e., no difference in periphyton abundance between the control and caged *Anax* treatment." (Authors)] Address: Stav, G., Institute for Desert Research, Ben-Gurion University, Sede Boqer Campus, 84990 Israel.

2210. Stiehler, H. (2000): 60 Jahre Naturschutzgebiet Döpe. Naturschutzarbeit in Mecklenburg-Vorpommern 43(1): 72-77. (in German). [*Leucorrhinia pectoralis*, *Ischnura elegans*, *I. pumilio*, *Lestes sponsa*, and *Sympetrum vulgatum* are communicated for the lake Döpe, Mecklenburg-Vorpommern, Germany] Address: Stiehler, H., Schweriner Str. 8, D-23972 Dorf Mecklenburg, Germany

2211. Stoks, R.; Knijf, G. de (2000): De Bruine korenbout (*Libellula fulva*) in Vlaanderen in 2000: hoop voor een met uitsterven bedreigd buitenbeentje? *Gomphus* 16(2): 131-138. (in Dutch with English and French summaries). ["*Libellula fulva* in Flanders in 2000: hope for a treathened outsider? The increase in the number of observations of the Scarce Chaser, *Libellula fulva*, in Flanders during the nineties was continued in 2000. More than 1.600 animals were seen at 13 different sites. In the region Noordoost Limburg there were three sites with only one solitary female and one site with about 100 animals. Very large (>100 individuals) populations were seen at the known sites in Klein-Brabant (Fort van Walem, Kleiputten van Niel, and Grote Wiel te Wintam). Surprisingly, more than 60% of the observations were concentrated outside the known sites in three populations in the Polders of the Scheldt (Waasland). A central population of more than 150 animals was present at the Rupelmondse Kreek. The other two populations of the Waasland were at Paviljoen in Bazel (more than 60 animals) and Steenbakkerij Steendorp (more than 40 animals). These populations together with the ones of Klein-Brabant constitute the region Rupel-Scheldepolders. The data of 2000 confirm the fact that *L. fulva* is a quite unusual 'Critically endangered' species as it can occur in large populations and shows a preference for habitats with fish. It is therefore not surprising that a re-analysis of the Red list status suggests that the species now should be considered 'Endangered' in Flanders." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

2212. Suhling, F.; Befeld, S.; Hausler, M.; Katur, K.; Lepkojus, S.; Mesleard, F. (2000): Effects of insecticide applications on macroinvertebrate density and biomass in rice-fields in the Rhone-delta, France. *Hydrobiologia* 431(1): 69-79. (in English). ["The density of 23 macroinvertebrate species and the total macroinvertebrate biomass were compared between rice-fields treated with lindane and diazinon in June and alphasmethine in Au-

gust and untreated controls. The macroinvertebrates could be divided into four groups: (1) Taxa, in which the densities were lower in the insecticide treatment in July and August than in the non-insecticide treatment. (2) The Culicidae which occurred in the insecticide treatment in significantly lower density in July, but in significantly higher density in August. (3) *Ischnura elegans* (Vander L.) which was found in July after the lindane application in significantly higher numbers in the insecticide treatments, but in significantly lower numbers in the insecticide treatment in August after the application of the pyrethroid. In these three groups, we assumed that direct effects due to the insecticides toxicity were the reason for the differences in density. (4) The fourth group included three taxa in which the densities were significantly higher in the insecticide treatment in July and August than in the control. For this, indirect effects due to reduced biotic interactions may be responsible. The biomass was higher in the insecticide treatments in July, mainly because of a high increase in gastropod density, during the rest of the season it was similar between treatments and controls." (Authors) Odonata treated are *Ischnura elegans*, *Orthetrum albistylum*, *O. cancellatum*, *Crocothemis erythraea*, and *Sympetrum fonscolombii*.] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

2213. Swanson, N.L.; Liss, W.J.; Ziller, J.S.; Wade, M.G.; Gresswell, R.E. (2000): Growth and diet of fish in Waldo Lake, Oregon. *Lake & Reservoir Management* 16(1-2): 133-143. (in English). ["Waldo Lake, located in the Oregon Cascades, is considered to be one of the most dilute lakes in the world. Even with low nutrient concentrations and sparse populations of zooplankton, introduced fish in the lake are large in size and in good condition when compared to fish from other lakes. This apparent anomaly is due to the availability of benthic macroinvertebrates. Taxa found in the stomach contents of fish captured in Waldo Lake consist primarily of Chironomidae larvae and pupae, Trichoptera larvae and pupae, amphipods, Ephemeroptera larvae, and Odonata larvae." (Authors)] Address: Swanson, Nicola, USFS, Willamette National Forest, Middle Fork Ranger District, 46375 Highway 58, Westfir, OR, 97492 USA

2214. Switzer, P.V.; Eason, P. K. (2000): Proximate constraints on intruder detection in the dragonfly *Perithemis tenera* (Odonata: Libellulidae): Effects of angle of approach and background. *Annals of the Entomological Society of America* 93(2): 333-339. (in English). ["The implications of insects' vision for territorial defense have been relatively little studied in the field. In the dragonfly *Perithemis tenera* Say we investigated whether either the angle at which an intruder was viewed by a territorial resident or the background against which it was viewed affected the detection of that intruder. Residents detected intruders at a greater distance if the intruders were directly in front of them; they also detected more intruders in front of them than from other angles. Intruders viewed against distant vegetation were detected more readily than were intruders against near vegetation. Residents detected more intruders viewed against distant vegetation than viewed against near vegetation; however, more intruders than expected were detected against near vegetation. The probability of detecting intruders depends on the angle at which they are viewed and the background behind them. Hence, there may be selection on territorial resi-

dents to adjust their orientation and space use to enhance their view of their territory and intruders."(Authors)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

2215. Theischinger, G. (2000): A new species of *Nososticta* HAGEN from Australia (Odonata: Protoneuridae). *Linzer biol. Beitr.* 32(2): 1175-1179. (in English). [*Nososticta mouldsi* sp. n. (male holotype: Florence Falls (13°04'S/130°45'E), in shade along small rainforest stream, Northern Territory, Australia, June 21st) is described, illustrated and compared with *Nososticta taracumbi*.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

2216. Theischinger, G. (2000): Preliminary keys for the identification of larvae of the Australian Gomphides (Odonata). Cooperative Research Centre for Freshwater Ecology Identification Guide No. 28: I-III, 48pp. (in English). ["The descriptive information available on the larvae of the Australian Gomphides is presented. Keys are given for the identification of families, genera, subgenera and species. In this paper the classification of Australian gomphids as adopted by Watson (1991) and Theischinger (1998) is replaced by the classification proposed by Bechly (1996) [...] with Gomphides standing for Gomphidae, Lindeniidae for Ictinogomphinae and Gomphidae for Gomphinae. [...] Six gomphid genera, five subgenera and 39 species, generally based on adults only, have been described since 1854. Only much more recently some information on the larvae was presented. After the most recent comprehensive treatment of Australian gomphid larvae (Theischinger 1998) we now know the larvae of most species, but there are still large gaps in our knowledge. It is the main intention of this presentation to make possible or facilitate the identification of known larvae of Australian gomphid species. I have, however, strongly emphasised existing gaps in our knowledge in order to make it more interesting and easier for people from a wide range of activities to attempt to close some of them. [...] Measurements and descriptions are given from last instar larvae or from final instar exuviae. Most illustrations are given from final instar exuviae. As colouration of individuals may be variable in life due to specific conditions in the habitat and as colouration of preserved specimens may reflect the ways or methods of collection and preservation, colours are not given in the descriptions; they may range from pale greyish yellow to dark greyish brown. Pubescence that is rather strong in all taxa does not appear useful for diagnoses and is therefore omitted in illustrations and usually not mentioned or specified in descriptions. Smoothness or dentition of premental ligula and labial palps may to some degree be effected by conditions of habitat and food and possibly others. All diagnoses are made up in similar style facilitating comparison. Only the most reliable characters are used in keys and diagnoses. In spite of that the keys may be of limited use for identifying other than last instar larvae and exuviae." (Author) G. Theischinger presents information on the family level on taxonomy and diagnosis, and a checklist of the genera. On generic level information on taxonomy, diagnosis, general ecology, and a checklist of the species is given. Each species is keyed out, black-and-white drawings give optimal insight of morphological structures. On the species level information on dimensions, significant morphological structures, ecology, and distribution are compiled. These

attractive volume of the Odonata identification guide series (see OAS 2306) presents also a plate with colour photographs of nine species.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. Orders: Cooperative Research Centre for Freshwater Ecology Identification, Murray-Darling Freshwater Research Centre, PO Box 921, Albury, NSW 2640, Australia. E-mail: enquiries@mdfrc.canberra.edu.au. / WWW.freshwater.canberra.edu.au

2217. Titeux, H. (2000): Les Odonates de la réserve de Ben-Ahin (vallée de la Meuse): bilan des relevés de 1993 à 2000. *Gomphus* 16(2): 123-130. (in French with English and Dutch summaries). ["During 8 years of Odonata monitoring at Ben-Ahin (Huy, Belgium), 29 species were observed. Reproduction evidences were collected for 20 species. Among them, 4 are critically endangered within the Walloon region (*Sympecma fusca*, *Ceriagrion tenellum*, *Brachytron pratense*, and *Libellula fulva*). Protection status for some of the ponds as well as management measures contribute to the preservation of the rather small populations." (Author)] Address: Titeux, H., Rue d'Angleterre 13, B-4500 Huy, Belgium. E-mail: titeux@pedo.ucl.ac.be

2218. Tol, J. van (2000): The Odonata of Sulawesi and adjacent islands Part 5 The genus *Protosticta* Selys (Platystictidae). *Tijdschrift voor Entomologie* 143(2): 221-266. (in English) ["The type species of the genus *Protosticta* Selys, *P. simplicinervis* Selys, was described from Sulawesi (formerly Celebes, Indonesia). The present paper provides a revision of all Sulawesi species of the genus, and those of the adjacent island of Buton and the Sangihe Islands. Twelve species are recognized, three of which were previously known (*P. bivittata* Lieftinck, *P. gracilis* Kirby, and *P. simplicinervis*). One nominal species, *P. annulata* Fraser, appeared to be a synonym of *P. simplicinervis*. Consequently, nine species are described as new to science, viz *P. coomansi* (type locality: Palu: Lindu valley), *P. geijskesi* (type locality: NNE of Malili), *P. linduensis* (type locality: Polewali), *P. marenae* (type locality: Palu: Lindu valley near Gimpu), *P. maurenbrecheri* (type locality: NW of Palopo), *P. pariwonoi* (type locality: N of Ujung Pandang: Maros), *P. reslae* (type locality: Polewali), *P. rozendalorum* (type locality: Sangihe Islands), and *P. vanderstarrei* (type locality: Polewali). Characters of importance for species recognition are the thoracal and abdominal markings, and the structure of the prothorax and anal appendages in the male. Diagnostic characters of females include the structure of prothorax and anal appendages. The females of four species are unknown. The status of the genus *Protosticta* of the family Platystictidae is preliminarily discussed. Its high diversity in Sulawesi is in contrast with the complete absence of Platynemididae and Euphaeidae, and the virtual absence of the Protoneuridae from this island. Besides, various species as here recognized, show significant variation between populations. The morphological variation is clinal in some species (*P. coomansi*, *P. geijskesi*), presumably related to the geological history of the island." (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

2219. Tomás, P. (2000): Dragonflies as prey of the spider *Araneus quadratus*. In: Hanel, L. (Ed.): *Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti*

Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 36- (in Czech with English summary). [Nature Reserve Smolenská louka (Oderské vrchy, Czech Republic); *Sympetrum danae*, *Aeshna juncea*] Address: Tomáš, P., Zahradní 1260, 31 Lipník nad Bečvou, Czech Republic

2220. Tonczyk, G. (2000): Dragonflies (Odonata) of Niebieskie Zródla Nature Reserve near Tomaszów Mazowiecki (Central Poland). *Acta Universitatis Lodzianis, Folia limnologica* 7: 79-85. (in English with Polish summary). [Faunistic investigations of the Niebieskie Zródla nature reserve carried out in 1997-1998 resulted in 17 odonate species, 9 of which were new for the area. "All species are typical of small eutrophic pools and streams in Central Poland. The human impact, e.g. dredging of the reservoir and large-scale tourism, seem to have an effect on the changes in the dragonfly community."] Address: Tonczyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i hydrobiologii, Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland

2221. Tonczyk, G.; Klukowska, M.; Jurasz, W.; Markowski, J. (2000): The Niebieskie Zródla Nature Reserve as a subject of scientific research. *Acta Universitatis Lodzianis, Folia limnologica* 7: 3-17. (in English with Polish summary). ["The landscape nature reserve Niebieskie Zródla is an interesting natural object located in the Polish Lowland. Its very specific natural conditions were created by the discharge of very clear and cold karst waters. During investigations carried out for over 40 years the occurrence of more than 400 plant species and 440 animal species have been recorded. The attempts to institute economical use of underground waters in the vicinity, growing tourism and recreation in the area, as well as the reclamation measures undertaken in the nineties, have resulted in alterations of the environmental conditions of the reserve. The research carried out in 1997-1998 should make it possible to identify the directions and rate of faunistic changes and to prepare a project for the further protection of the karst springs." (Authors) The taxa investigated including Odonata are listed. For the odonatalogical details of the survey see OAS 2220.] Address: Tonczyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i hydrobiologii, Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland

2222. Trusch, R. (2000): Bericht über die Jahrestagung der Entomofaunistischen Gesellschaft e.V. vom 12.-14. Mai 2000 in Üdersee. *Entomologische Nachrichten und Berichte* 44(3): 209-210. (in German). [In the framework of the meeting of the Entomofaunistic Society six odonatalogical lectures were held. The meeting was also the charter meeting for the scheduled atlas of the Odonata of the Federal State Brandenburg, Germany.] Address: not stated

2223. Upson, S. (2000): Life history observations on *Sympetrum signiferum* in Arizona. *Argia* 12(4): 5-6. (in English). [The species was first recorded in early September, 1999 in Leslie Canyon National Wildlife Refuge. On this locality it was on the wing in August between November 2000 (see Flint 2000). Colouration during maturation period, habitat preferences in Arizona, and oviposition are described. Some additional Arizonan localities with records of the species are reported

(see Sibley, 2000).] Address: Upson, Sandy, PO Box, 1453 Bisbee, AZ 85603, USA

2224. Usseglio-Polatera, P.; Bournaud, M.; Richoux, P.; Tachet, H. (2000): Biological and ecological traits of benthic freshwater macroinvertebrates: relationships and definition of groups with similar traits. *Freshwater Biology* 43: 175-205. (in English). ["1. Relating species traits to habitat characteristics can provide important insights into the structure and functioning of stream communities. However, trade-offs among species traits make it difficult to predict accurately the functional diversity of freshwater communities. [...]. 2. We used multivariate analyses to examine separately the relationships among 11 biological traits and among 11 ecological traits of 472 benthic macroinvertebrate taxa (mainly genera). The main objective was to demonstrate (1) potential trade-offs among traits; (2) the importance of the different traits to separate systematic units or functional groupings; and (3) uniform functional groups of taxa that should allow a more effective use of macroinvertebrate biological and ecological traits. 3. We defined eight groups and 15 subgroups according to a biological trait ordination [...]. 4. Seven ecological groups and 13 ecological subgroups included organisms with combinations of traits which should be successively more adequate in habitats from the main channel to temporary waters, and from the crenon to the potamic sections of rivers, and to systems situated outside the river floodplain. [...]. 5. Monitoring and assessment tools for the management of water resources are generally more effective if they are based on a clear understanding of the mechanisms that lead to the presence or absence of species groups in the environment. We believe that groups with similar relationships among their species traits may be useful in developing tools that measure the functional diversity of communities. [...] Group d consisted of a homogeneous assemblage of medium to large-sized insects dominated by Odonata." (in Appendix 1, 25 European odonate genera are classified) "Genera were often semivoltine and had a long life cycle duration. They used a variety of reproductive techniques. Adults were strong fliers. As a result, the dispersal was usually aerial. Egg and larval diapause could be used as resistance strategies. Crawlers and engulferers were dominant in the larvae, and their food was mainly represented by macroinvertebrates." (Authors)] Address: Usseglio-Polatera, P., EBSE, Université de Metz, BP 4116, F-57040 Metz Cedex 01, France. E-mail: usseglio@sciences.univ-metz.fr

2225. Vaillant, F. (2000): Les Odonates de Saint-Pierre-et-Miquelon. *Martinia* 16(3): 95-99. (in French with English summary). [On the occasion of a holiday at Saint-Pierre-et-Miquelon in July 1999, the dragonflies of this French territory located in the east of the Atlantic ocean, 25 km away from Newfoundland (Canada) were studied. The author observed 13 species, bringing the number of odonate species known from Saint-Pierre-et-Miquelon to 15.] Address: Vaillant, F., 41, rue Ausone, F-33000 Bordeaux, France

2226. Wallaschek, M. (2000): Zur Libellen-, Ohrwurm- und Heuschreckenfauna (Odonata, Dermaptera, Saltatoria: Ensifera et Coelifera) des Sonnensteins, des Ohmberges und des Speichers Teistungen im Landkreis Eichsfeld (Thüringen). *Thüringer Faunistische Abhandlungen* 7: 113-135. (in German with English summary). [11 species are reported; *Calopteryx splendens*

and *Cordulia aenea* are red listed species.] Address: Wallaschek, M., Agnes-Gosche-Str. 43, D-06120 Halle (Saale), Germany

2227. Wallaschek, M. (2000): Zur Libellenfauna (Odonata) des Großen Otterbaches (Saale-Orla-Kreis, Thüringen). *Thüringer Faunistische Abhandlungen* 7: 137-152. (in German with English summary). [In 1999, 26 odonate species are recorded from the Otterbach and some closely situated standing waters. The species are listed in different tabs according to their threat in Germany and Thüringen, their distribution in zoogeographic areas, some habitat parameters as vegetation and substrat, and according to their abundance. Special attention is given to *Calopteryx splendens*, *C. virgo*, *Coenagrion hastulatum*, *Ischnura pumilio*, *Cordulegaster boltonii*, *Orthetrum coerulescens*, and *Sympetrum pedemontanum*.] Address: Wallaschek, M., Agnes-Gosche-Str. 43, D-06120 Halle (Saale), Germany

2228. Weide, M. van der (2000): Libellen (Odonata). *Nieuwsbrief European Invertebrate Survey - Nederland* 30: 6. (in Dutch). [Short notice on the range extension of *Stylurus flavipes* in the Netherlands, and the status of the scheduled distribution atlas of the Netherlands Odonata.] Address: Weide, M. van der, Heidevenstraat 223, NL-6533 TP Nijmegen, The Netherlands

2229. Wendler, G. (2000): Steuerungsmechanismen bei Lauf und Flug von Insekten: ein Vergleich. *Verhandlungen des Westdeutschen Entomologen Tag 1999*: 23-57. (in German). [Introduction into neuronal regulation and function of muscles in walking and flying insects.] Address: Wendler, G., Zool. Inst. Universität Köln, Weyertal 119, D-50923 Köln, Germany. E-mail: g.wendler@uni-koeln.de

2230. Wendzonka, J. (2000): New localities of some species of dragonflies (Odonata) rare in central and eastern Poland. *Wiadomosci Entomologiczne* 19(2): 124. (in Polish). [*Aeshna affinis*, *Sympetrum pedemontanum*, *S. depressiusculum*; short description of the habitats] Address: not stated

2231. Westermann, F. (2000): Versauerung von Fließgewässern in Rheinland-Pfalz. *Untersuchungen von Bachoberläufen im Hunsrück 1983-1999 - Entwicklungen und Trends. Landesamt für Wasserwirtschaft - Bericht 206/00*. Mainz: 113 pp. (in German). [Brooks and creeks in the low range mountain Hunsrück, Rheinland-Pfalz, Germany suffered strongly from acidification caused by air pollution. Chemical parameters indicate that acidification has slightly reduced in the past years. Compared with so-called reference running waters which are not acidified macrozoobenthos of acidified running waters indicate a species deficit of 65%. Abundance of *Cordulegaster boltonii* is low in acid and not acid creeks.] Address: not stated

2232. Wildermuth, H. (2000): Alternative Taktiken bei der Weibchensuche von *Boyeria irene* (Odonata: Aeshnidae). *Libellula* 19(3/4): 143-155. (in German with English summary). ["The flight behaviour of the males over water was studied at two mountain streams in southern France. Three flight styles were discriminated: cruise flight, territorial flight and search flight. All flight modes are described in detail and in association with the structural features of the habitat. Only the territorial and search flights were considered sexually motivated. Both tactics were restricted to the same oviposition and

rendezvous sites, these being distributed nonhomogeneously along the watercourse. The shift from one to the other flight mode may be caused by male density. It is suggested that *B. irene* recognizes the rendezvous by bright linear structures with dark cavities along their border. This view is supported by the observation of an obviously deceived male that searched intensely for females along the border of a dirt road with structures similar to those at streams." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: wildermuth@swissonline.ch

2233. Wildermuth, H. (2000): Larvae of the Downy Emerald *Cordulia aenea* (L.) examine the space for eclosion with their hind-legs. *J. Br. Dragonfly Society* 16 (2): 59-62. (in English). ["The reactions to contact with the experimental obstacle during hind-leg circling were the same in all four larvae tested. None remained at the site but all descended and tried to find a new place. However, they did not return to the water but climbed up the same stick and repeated the procedure as before. Having found a new site for emergence, definite clinging and ecdysis ensued. No reaction was found when the pencil was held close to the larvae without physical contact. From the reactions of the larvae it is concluded that only physical contact of the circling hind-legs with the obstacle causes a larva to leave the site and search for a new one for ecdysis. Responses of larvae showed that visual cues were not dictating the behaviour observed. The findings support the hypothesis that an important function of the circling leg movements in emerging *C. aenea* larvae is to test the space around them for unhindered eclosion." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: wildermuth@swissonline.ch

2234. Wimmer, W.; Winkel, W. (2000): Libellen (Odonata) in der Nestlingsnahrung des Trauerschnäppers *Ficedula hypoleuca* (Aves). *Libellula* 19(3/4): 241-246. (in German with English summary). ["The odonate component in the diet of Pied Flycatcher nestlings was examined during 2000 in an afforested area near Lingen / Emsland, NW Germany, by using the neck-ring method and collecting food-remains from the nests. The component amounted to 0.29 % (neck-ring method) and 0.57 % (food remains in nests). *Enallagma cyathigerum*, *Pyrrhosoma nymphula*, *Erythromma najas* and *Gomphus vulgatissimus* were recorded as imagines and *E. cyathigerum* and *Sympetrum flaveolum* as larvae." (Authors)] Address: Walter Wimmer und Dr. Wolfgang Winkel, Institut für Vogelforschung, Außenstation Braunschweig, Bauernstr. 14, D-38162 Cremlingen-Weddel, Germany. E-mail: w.winkel@tu-bs.de

2235. Yeh, W.-C. (2000): Description of a new species of the genus *Oligoaeschna* Selys (Anisoptera: Aeshnidae) from Northern Thailand. *Zhonghua Kunchong* 20(3): 225-231. (in English with Chinese summary). [*Oligoaeschna pramoti* sp. nov., the second representative of the genus recorded from Thailand, is described, figured, and compared with a paratype male of *O. niisatoi*.] Address: Yeh Wen-Chi, Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nan-Hai Rd., Taipei, Taiwan. E-mail: wcyeh@serv.tfri.gov.tw

2236. Yoshida, M. (2000): Predatory behavior of *Leucage magnifica* (Araneae: Tetragnathidae). *Acta Arachnologica* 49(2): 117-123. (in English). ["The predatory behaviour of *L. magnifica* was studied. This spe-

cies employed five predatory sequences: seize-pull out, bite-pull out, bite-wrap, wrap-bite, and wrap. Attack wrapping was used to subdue various types of prey such as grasshoppers, damselflies, ants and stinkbugs, which may be large and/or dangerous prey. Furthermore, living ants were more frequently immobilized by wrapping than dead ants. It suggests that attack wrapping is an effective method to immobilize large and/or dangerous prey." (Author)] Address: Yoshida, M., Department of Biotechnology, Faculty of Science and Engineering, Ritsumeikan University, Kusatsu, Shiga, 525-8577 Japan

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2237. Ak Libellen NRW (Menke, N.; Conze, K.-J.; Göcking, C.; Artmeyer, C.) (2001): Ergebnisse der landesweiten Libellenerfassung / Rasterkartierung in NRW von 1996 - 2000. AK Libellen in Nordrhein-Westfalen, c/o Conze, K.-J., LökPlan-Conze, Cordes & Kirst GmbH, Hedwigstr. 32b, D-59609 Anröchte, Germany. E-mail: lökplan@t-online.de: 79 pp. (in German). [Nordrhein-Westfalen, Germany; the results of the dragonfly survey of the mapping period 1996 to 2000 are presented on distribution maps. The distribution of 63 species is documented on the basis of 1/4 grid maps, in addition 10 species not traced in the mapping period are shortly discussed. They are briefly commented. The species are arranged in a tab. according to their grid frequency: *Ischnura elegans* occupies 71% of all grids, five species are only known from one locality in this federal state. This very useful up-to-date distribution atlas can be purchased for DM 10,- / Euro 5 from H.-J. Conze.] Address: see above

2238. Address, R. (2001): Obituary: Terrence de Fonseka (1919 - 2000). *Notul. odonatol.* 5(7): 95. (in English). [Born Sept. 6, 1919 in Kalutara, Sri Lanka, passed away March 21, 2000, Finchley, UK] Address: Address, R., 38 Capel Close, Whetstone, London, N20 0QU, UK

2239. Artiss, T. (2001): Structure and function of male genitalia in *Libellula*, *Ladona* and *Plathemis* (Anisoptera: Libellulidae). *Odonatologica* 30(1): 13-27. (in English). ["Male genitalia of 25 spp. are studied using scanning electron microscopy, and the structure of the fourth penile segment is described. [...] Species are categorized according to the morphology of the penis and inferred patterns of sperm removal. Type 1 taxa possess relatively large, broad, flat lateral lobes, and lack cornua, or possess cornua that are greatly reduced in size. These spp. are believed to displace sperm in the bursa copulatrix before depositing their own sperm, thereby gaining positional priority during oviposition. Type 2 spp. possess elongated lateral lobes and/or cornua. These taxa are believed to engage in a mixed strategy of sperm displacement and sperm removal. Optimization of these characters on a phylogeny of the 3 genera indicates that the Type 1 sperm displacement strategy is ancestral, and that the Type 2 strategy was subsequently derived within the majority of the *Libellula* s.s. taxa." (Author)] Address: Artiss, T, Lakeside School, 14050 1st Avenue NE, Seattle, WA 98125-3099, United States. E-mail: thomas.artiss@lakesideschool.org

2240. Bagworth, T. (2001): Reports from Coastal Stations - 2000: Calf of Man Bird Observatory. *Atropos* 12:

66-67. (in English). [United Kingdom, *Orthetrum coerulescens*] Address: not stated

2241. Bang, C. (2001): Constructed wetlands: high-quality habitats for Odonata in cultivated landscapes. *International Journal of Odonatology* 4(1): 1-15. (in English). [This study has investigated the potential constructed wetlands (CW) have as habitat for freshwater organisms, exemplified by Odonata. "Four different CWs in southern Norway were investigated, and larval Odonata species composition was related to a wide range of environmental variables. The material was ordinated using Detrended Correspondence analysis (DCA) and Canonical Correspondence analysis (CCA). All the CWs had high nutrient values and high diversities of aquatic plants. Of the 11 Odonata species found, the richest CW contained 10 species. During the study, one of the CWs was exposed to diazinon (an insecticide). Sun exposure and nutrient content were the most important variables determining species composition. The species that dominated the wetlands were typically euryoecious species, indicating harsh living conditions. Despite the high nutrient content, the results clearly indicate that CWs have an obvious role in pond habitat creation, especially in areas managed according to pesticide-free management." (Author)] Address: Bang, C., Syverudveien 80, N-1430 As, Norway. E-mail: christoferbang@hotmail.com

2242. Belle, J. (2001): Two species added to the list of Balinese Odonata, Indonesia. *Notul. odonatol.* 5(7): 94. (in English). [Bali, Indonesia; *Agrionemys pygmaea*, *Tholymis tillarga*] Address: Belle, J., Onder de Beumkes 35, NL-6883 HC Velp, The Netherlands

2243. Beynon, T. (2001): My best day. *Atropos* 12: 36-37. (in English). [Report from a 'dragonfly day' in Chartley Moss, Staffordshire, UK. (see OAS 2244)] Address: Beynon, T.G.; 34 Church Lane, Checkley, Stoke-on-Trent, Staffordshire ST10 4NJ, UK

2244. Beynon, T.G. (2001): Colonization by White-faced Darter *Leucorrhinia dubia* (Vander Linden) of the East-West Ditch at Chartley Moss NNR, Staffordshire, with notes on its status at other pools. *J. Br. Dragonfly Soc.* 17(1): 20-30. (in English). ["*L. dubia* has bred for many years at two pools on Chartley Moss. [...] A rising lens of peat plugged Dead Pine Gulch some years ago, and this has gradually become vegetated so that the amount of free water is now minimal, and it is likely that the *L. dubia* population here will soon become extinct. [...] A significant recent development has been the colonization by *L. dubia* of the largest water body on the Moss, the East-West Ditch" (draining ditch constructed in the 18th century and maintained the following years). "[...] Fewer than ten adults were recorded annually between the mid 1980s and 1995. The population has increased rapidly since the first proof of breeding in 1995. About 850 adults emerged in 1998, and a careful census during emergence in 1999 produced a minimum of 826, with a probable population of c. 1,240. [...]". A series of 19 dams were constructed between 1986 and 1989 to reverse the drying out of the Moss. After damming, most sections gradually became colonized by Sphagnum moss to a varying extend. "The colonization increased very rapidly in the summers of 1998 and 1999, so that with few exceptions most now have more than 90 per cent cover. It is noticeable that those with almost complete semi-submerged Sphagnum produce

far more emerging adults of *L. dubia* than clearer sections [...]". Systematic counts of exuviae and habitat parameters (length, temperature, Sphagnum cover) per section are documented in tabs and discussed in detail.] Address: Beynon, T.G.; 34 Church Lane, Checkley, Stoke-on-Trent, Staffordshire ST10 4NJ, UK

2245. Bogunski, G. (2001): Zusammenfassung entomologischer Daten vom NSG "Jahnsgrüner Hochmoor" im Hartmannsdorfer Forst. Mitteilungen Sächsischer Entomologen 53: 11-18. (in German). [Sachsen, Germany; 19 odonate species from a devastated bog are listed; *Lestes virens vestalis*, *Coenagrion hastulatum*, *Aeshna juncea*, *Libellula quadrimaculata*, and *Leucorhinia dubia* are remains from the formerly typical odonate fauna of the bog.] Address: Bogunski, G., Gartenstr. 10, D-08141 Reinsdorf, Germany

2246. Boudot, J.-P. (2001): Les Cordulegaster du Paléarctique occidental: identification et répartition (Odonata, Anisoptera, Cordulegastridae). *Martinia* 17(1): 3-34. (in French with English summary). [An illustrated identification key of most of the known European cordulegastid taxa is proposed and distribution maps of the species are presented.] Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Notre-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. E-mail: boudot@cpb.cnrs-nancy.fr

2247. Bowers, J. (2001): Identification of Southern Darter *Sympetrum meridionale*. *Atropos* 12: 79. (in English). [April 26, 2000, Lesbos, Greece; a black triangle on the synthorax is documented on a colour photo and discussed as a field identification character for general individuals of the species] Address: Bowers, J., 6 Ashwood Terrace, Leeds, West Yorkshire, L56 2EH, UK

2248. Bowman, N. (2001): Reports from Coastal Stations - 2000: Eccles-on-Sea, Norfolk. *Atropos* 12: 60-61. (in English). [United Kingdom; 3 odonate species are recorded] Address: not stated

2249. Brooks, S.J.; Jackson, K.A. (2001): The Odonata of Bioko, Republic of Equatorial Guinea, with the description of fan-shaped setae on early instar *Libellulidae* larvae. *Odonatologica* 30(1): 29-38. (in English). ["A checklist of 48 spp. recorded from the island of Bioko (3°30'N 8°40'E), based on historical records compiled by Dr Elliot Pinhey and augmented by a collection made in March-April 1999, is presented, together with notes on the distribution of the species on the island. The Odonata fauna apparently comprises 2 elements, an upland fauna which includes 6 spp. that only occur above 500 m, and a lowland fauna of 17 spp., none of which occurs above 500 m. A further 13 spp. have been found in both lowland and upland sites. There are insufficient published data on the remaining 13 spp. to assign them to either of these faunistic elements. In addition, unique fan-shaped setae on the dorsum of the head, thorax and abdomen of early instar libellulid larvae are described. These setae are thought to be mechano-receptors that are held above the sediment to detect the presence of prey and current flow while the larva remains buried." (Authors)] Address: Brooks, S.J., Entomology, The Natural History Museum, Cromwell Road, London, SW7 5BD, United Kingdom

2250. Brunelle, P.-M. (2001): Status of *Somatochlora brevicincta* (Odonata: Corduliidae), the Quebec Eme-

rald, in North America. *IDF-Report* 3(1/2): 1-8. (in English). [*Somatochlora brevicincta* is one of the rarest odonates in Canada, and one of the most recently described. In the past few years considerable efforts were made to discover new localities of the species. This paper presents in detail the current known distribution, *S. brevicincta* is now known cross-continently over ca. 66 degrees of longitude (54°W in Newfoundland to 120°W in British Columbia), and the known latitude range is 8°75' (54°N in British Columbia to 45°25'N in Maine). In addition it provides information on phenology and habitat.] Address: Brunelle, P.-M., Nova Scotia Museum, 1747 Summer Street, Halifax, Nova Scotia, Canada, B3H 3A6. E-mail: as849@chebucto.ns.ca

2251. Burmeister, E.-G. (2001): Insekt des Jahres 2001: Der Plattbauch (*Libellula depressa* L., 1785). *Nachrichtenblatt der bayerischen Entomologen* 50(1/2): 68. (in German). [*L. depressa* was declared in Germany as the "Insect of the year". This article provides some general information on this dragonfly species and the bioindicatorial reasons for its choice.] Address: Burmeister, E.-G., Zoologische Staatssammlung, Münchenstr. 21, D-81247 München, Germany

2252. Busuttil, S. (2001): Lesser Emperor *Anax parthenope* at Dungeness in 2000. *Atropos* 12: 77. (in English). [United Kingdom; documentation of the records of *A. parthenope*] Address: Busuttil, S., Dungeness RSPB Reserve, Boulderwall Farm, Dungeness, Romney Marsh, Kent, UK

2253. Busuttil, S. (2001): Red-veined Darters *Sympetrum fonscolombi* (Selys) at Dungeness RSPB Reserve (1993 to 2000). *Atropos* 12: 24-27. (in English). [2000 proved to be the year with highest abundance of *S. fonscolombii* in Dungeness Reserve, Kent, UK. The recent history of this species in the locality is outlined. In addition the habitat is described and conservation management measures are discussed. Additional records of the species are reported from a locality 30 km north-east of Dungeness: Samphire Hoe.] Address: Busuttil, S., Dungeness RSPB Reserve, Boulderwall Farm, Dungeness, Romney Marsh, Kent, UK

2254. Cham, S. (2001): The status of Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier) in the British Isles. *Atropos* 12: 7-9. (in English). [In 1999 *E. viridulum* was discovered breeding in Essex, UK. In summer 2000 further discoveries provided the opportunity to follow the progress of colonisation. The new records are documented and mapped. In a figure the flight period of *Erythromma najas* is compared with that of *E. viridulum*.] Address: Cham, S., 45 Weltmore Road, Luton, Bedfordshire LU3 2TN, UK

2255. Chelmick, D.G. (2001): Larvae of the genus *Aeshna* Fabricius in Africa south of the Sahara (Anisoptera: Aeshnidae). *Odonatologica* 30(1): 39-47. (in English). ["9 species have been recorded from sub-Saharan Africa, of which only 5 species have been described as larvae. A more complete larval description of *A. scotias* Pinhey from Cameroon and a review of the current level of information on the larvae of the genus in the region, are provided here, and the known larvae are keyed." (Author) *Aeshna ellioti*, *A. rileyi*, *A. subpupillata*, *A. minuscula*] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: david.chelmick@mdagroup.com

2256. Clancy, S. (2001): Reports from Coastal Stations - 2000: Dungeness area, Kent. *Atropos* 12: 55-56. (in English). [United Kingdom; *Anax parthenope*, *Sympetrum fonscolombii*] Address: not stated
2257. Clausnitzer, V. (2001): Notes on the species diversity of East African Odonata, with a checklist of species. *Odonatologica* 30(1): 49-66. (in English). ["Preliminary considerations concerning the species diversity of East African dragonflies and the problems of identifying and using such diversity figures are given. For a detailed approach the basic problem is lack of sufficient data in that area. A checklist of species recorded so far for East Africa is given. Looking at pure species number in relation to area, Uganda is definitely more important for dragonfly diversity than its eastern neighbouring countries. If taking endemism and taxonomic singularity into account, the coastal forests of Tanzania and Kenya are very important too." (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: wesche@mail.uni-marburg.de
2258. Dewick, S. (2001): Problems at Small Red-eyed Damselfly *Erythromma viridulum* Site. *Atropos* 12: 74- (in English). [Verbatim: " In *Atropos* 9: 3-4 Richard Gerussi and I gave an account of our discovery of the first British colonies of Small Red-eyed Damselfly *Erythromma viridulum*. We were concerned about the vulnerability of the sites and explained that until such time as a foothold in this country appears more secure, the authors have decided to withhold information that could identify the existing localities. It is hoped that readers will understand and respect our decision. Acts of selfishness and stupidity are sadly not unknown in the world of insect recording, but nothing could have prepared me for what was to follow. From 30 July 2000, Curry Lane was invaded by in excess of 200 twitchers who had located a previously unknown colony at New House, Mill End, Bradwell. Our private lane just happened to be a convenient way to reach it! As if mass trespass was not enough, those approached reacted with rudeness and defiance, and bizarre messages appeared on the internet accusing us of obstructing a public footpath. Conservationists face an uphill struggle to convince many farmers to support wildlife the kind of behaviour seen at Bradwell does nothing to help our cause!"] Address: Stephen Dewick, Curry Farm, Bradwell-on-Sea, Southminster, Essex, CMO 7HL, UK
2259. Dewick, S. (2001): Reports from Coastal Stations - 2000: Bradwell-on-Sea, Essex. *Atropos* 12: 56-57. (in English). [United Kingdom; a list of 15 odonate species is communicated including *Brachytron pratense*. 19 specimens of *Sympetrum* were taken at light.] Address: not stated
2260. Di Domenico, M.; Carchini, G.; Samways, M.J.; Whiteley, G. (2001): Description of the last instar larva of *Chalcostephia flavifrons* Kirby, 1889 and comparison with other *Brachydiplactinae* (Anisoptera: Libellulidae). *Odonatologica* 30(1): 97-101. (in English). ["The morphology of this African sp. is illustrated and described. A comparison is made with other known *Brachydiplactinae*, the South American *Elga leptostyla* and *Nephepeltia phryne* and the African *Hemistigma albipuncta*. The group is a very heterogeneous one in terms of larval morphology." (Authors)] Address: Carchini, G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. E-mail: ar-
- chini
@utovrm.it
2261. Dijkstra, K.D.; Koese, B. (2001): Dragonflies of the Priyat National Park, Belarus (Odonata). *Opusc. zool. flumin.* 192: 1-20. (in English). ["Priyat National Park in Gomelskaya Oblast, southern Belarus was studied as a reference for conservation of river systems in Western Europe. A total of 43 odonate species is reported. *Sympecma paedisca*, *Coenagrion armatum*, *Ischnura pumilio*, *Pyrrhosoma nymphula*, *Aeshna subarctica*, *Anax imperator*, *Cordulegaster boltonii*, *Somatochlora arctica*, and *Leucorrhinia albifrons* are recorded from the Oblast for the first time. Records of " *Leucorrhinia pectoralis*, " *Lestes barbarus* and *Nehalennia speciosa* are also of interest. Information on ecology and larval habitats is provided for many spp. Early or mass emergence in relation to climate and habitat structure is discussed for *A. subarctica*, *N. speciosa*, *S. arctica* and other bog species. Peculiarities in habitat choice of *C. armatum*, *I. elegans*, and *P. nymphula* are also stipulated." (Authors) Of some interest is the observation that villagers in the area harvest *Stratiotes aloides* as pig fodder. *S. aloides* nearly exclusively is used by *Aeshna viridis* for egg deposition. This plant overgrows quite fast ditches, then becoming unsuitable as habitat for *A. viridis*. The villagers unintentionally maintain the larval biotops, which would otherwise disappear with progressing succession of the vegetation.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl
2262. Dijkstra, K.-D.; Kalkman, V.J. (2001): Early spring records of Odonata from southern Turkey, with special reference to the sympatric occurrence of *Crocothemis erythraea* (Brullé) and *C. servilia* (Drury) (Anisoptera: Libellulidae). *Notul. odonatol.* 5(7): 85-88. (in English). [Odonata from eight localities - in most cases situated in the Silifke region (Göksu-Delta) - collected from 29 March to 9 April 1999 are presented. They are among the earliest ever published for Turkey. 22 species are recorded; the records of *Lestes macrostigma* and *Anax immaculifrons* are noteworthy. *Crocothemis erythraea* and *C. servilia* were found emerging from the same ditch; notes on their identification in teneral state and as exuviae are added.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl
2263. Dijkstra, K.-D.; Cordero Rivera, A.; Andrés, J.A. (2001): Repeated predation of Odonata by the hornet *Vespa crabro* (Hymenoptera: Vespidae). *International Journal of Odonatology* 4(1): 17-21. (in English). ["Predation of aggregated, ovipositing tandems of *Sympetrum sanguineum* and *S. vulgatum* by the hornet *Vespa crabro* was observed in Belarus. The same species of hornet was seen killing territorial males and copulating females of *Calopteryx haemorrhoidalis* in Italy. Numerous remains of these odonates at the oviposition sites suggest that attacks occur frequently. A short review of vespid predation of Odonata is given. Species of the genera *Vespa* and *Vespula* have often been reported as predators of single, emerging and ovipositing odonates, taking prey as big as large *Aeshna* species. Odonata may form an important source of protein for *V. crabro* in parts of its range. Such predation may contribute strongly to odonate mortality locally. The disturbing effect may also disrupt opportunity for reproductive be-

haviour." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

2264. Field, R. (2001): Reports from Coastal Stations - 2000: Skomer Island NNR, Pembrokeshire. *Atropos* 12: 67-68. (in English). [United Kingdom, eight odonate species are documented] Address: not stated

2265. Finck, P. (2001): Untersuchungen des Makrozoobenthos am Strom zwischen Boitzenburg und Prenzlau (Uckermark). *Naturschutz und Landschaftspflege in Brandenburg* 10(1): 36-42. (in German). [Brandenburg, Germany; The survey of the 'most important' creek system in Uckermark, the Strom, conducted between 1993 and 1995, yielded in a list of macrozoobenthos including *Calopteryx splendens* and *C. virgo*.] Address: Finck, P., Bundesamt für Naturschutz, Abt. Biotopschutz und Landschaftsökologie, Konstantinstr. 110, D-53179 Bonn, Germany

2266. Gossum, H. van; Stoks, R.; De Bruyn, L. (2001): Discriminative mate choice in relation with female maturation in *Ischnura elegans* (Odonata: Coenagrionidae). *International Journal of Odonatology* 4(1): 83-91. (in English). ["It is often assumed that males do not choose among females because competition for partners is high and male mating costs are low. Nevertheless, this assumption does not always hold. In some species duration of copulation is long, possibly causing a limitation on the lifetime number of matings for males. In this case we expect males to discriminate among females differing in quality. We first discuss quality differences between immature and mature females. Second, we test whether males of the zygopteran *Ischnura elegans* discriminate between immature and mature females. The hypothesis was examined by performing binary choice experiments in small cages in three different populations. To examine possible mechanisms for discrimination we excluded behavioural differences in one of the two experiments by using dead females. The results show that males of *I. elegans* prefer mature to immature females and that this choice is probably based upon a difference in body coloration." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

2267. Gossum, H. van; Stoks, R.; De Bruyn, L. (2001): Reversible frequency-dependent switches in male mate choice. *Proceedings of the Royal Society Biological Sciences Series B* 268(1462): 83-85. (in English). ["Current sexual-selection theories predict that mating should occur preferentially with the highest-quality partner, and assume that for distinguishing among potential mates the choosy sex applies an internal representation of the characteristics of the desired mate, i.e a template. Binary choice experiments were performed to test male mate choice between two different female colour morphs in the damselfly *Ischnura elegans*. Choice experiments were conducted before and after an habituation period, during which males were exposed to only one female colour morph. Given the choice between the two female morphs, males did exhibit a choice for the most recently experienced female morph. This is the first evidence for a reversible switch in mate choice in a frequency-dependent way. In contrast with previous studies on mate choice, template

formation in male *I. elegans* seems not to be based on quality. Switching mate choice in a frequency-dependent manner, choosing the most common morph, probably allows males to minimize their search efforts and to maximize fitness." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020, Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

2268. Hämäläinen, M.; Karube, H. (2001): Two new species of Caloptera damselflies from southern Vietnam (Zygoptera: Chlorocyphidae, Euphaeidae). *Odonatologica* 30(2): 209-215. (in English). ["*Rhinocypha seducta* sp. n. (holotype male: southern Vietnam, Lam Dong prov., nr Di Linh, 26-IV-1998) and *Euphaea hirta* sp. n. (holotype male: southern Vietnam, Lam Dong prov., Bao Loc, 14-VI-1996) are described and illustrated, and their taxonomic status is discussed. The latter species co-occurs with *E. guerini* Rambur and *E. masoni* Selys." (Authors)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

2269. Hunter, I. (2001): Reports from Coastal Stations - 2000: Elms Farm, Icklesham, East Sussex. *Atropos* 12: 53-54. (in English). [United Kingdom; *Aeshna juncea*, *Sympetrum flaveolum*, *S. danae*, *Libellula quadrimaculata*.] Address: not stated

2270. Inoue, K.; Yokota, H. (2001): *Somatochlora taiwana* spec. nov., a new dragonfly from Taiwan (Anisoptera: Corduliidae). *Odonatologica* 30(2): 217-221. (in English). ["The new sp. is described and illustrated from a single male (holotype): Taiwan, Hsinchu Hsien, Chienshih, nr Yuan Yang Lake, alt. 1670 m, 11-VIII-2000; to be deposited at Taiwan Forest Res. Inst., Taipei. It is compared with *S. dido* Needham." (Authors)] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abenoku, Osaka 545, Japan

2271. Jenkins, D.K. (2001): Population studies of the Southern Damselfly *Coenagrion mercuriale* (Charpentier) in the New Forest. Part 8. Short range dispersal. *J. Br. Dragonfly Society* 17(1): 13-19. (in English). ["In the New Forest there is little evidence for establishment of new colonies over the past 50 years. The few new sites discovered are probably the result of more thorough coverage by recorders and are offset by a similar number of sites which have been lost through prolonged summer drought or habitat change. It has been established that *C. mercuriale* regularly move short distances along the same watercourse (Hopkins & Day, 1997), but are reluctant to pass sections of unsuitable habitat (Jenkins, 1998). Systematic attempts with marked insects to prove long distance dispersal have been disappointing. At Crockford in the New Forest, only two males have been recovered away from the marking area, both at distances of approximately 1km on, or near, the same stream (Hopkins & Day, 1997; Thompson & Purse, 1999). [...] Considering the high number of *C. mercuriale* marked, as well as the potential for dispersal arising from both weather conditions and site topography, it is quite remarkable that only one individual was confirmed as crossing the short distance between the ditches. This does, however, fit well with previous observations. [...] However, on 6 June 1986 and 12 June 1994, large numbers of male *C. mercuriale* were seen at distances of up to 0.5km west and east of Upper Crockford Stream respectively. Although this

might suggest a coordinated maiden flight and the possibility that most dispersal occurs at this stage, mass movement appears to be a rare phenomenon. At Rooks Bridge, a relatively high proportion of unmarked insects appeared each day, but none were found more than 3-4m from the water." (Author)] Address: Jenkins, D.K., 7 Lakewood Road, Ashurst, Southampton, SO40 7DH, UK

2272. Kemp, R.G.; Butler, S.G. (2001): Some dragonfly records from Phewa Tal, Pokhara, Nepal with notes on *Philoganga montana* (Selys) (Zygoptera: Amphipterygidae). *Notul. odonatol.* 5(7): 88-91. (in English). [Between the 22nd May and 27th May, 2000, dragonfly observations were made at the south-east end of the lake Phewa Tal, Pokhara, Nepal in the vicinity of the Fish Tail Lodge Hotel complex. Of the 20 species observed at the locality, *Gomphidia t-nigrum* is recorded for the first time from Nepal. *Philoganga montana* appears to be an exclusively arboreal insect during the adult stage. Observations on *Calicnemia nipalica*, *C. pulverulans*, *Epopththalmia frontalis* and *Macromia flavicolorata* are commented.] Address: Kemp, R.G., "Tree Tops" 5 Mailings Close, Ackleton, Wolverhampton, WV6 7WB, UK

2273. Kitt, M. (2001): Wiederaufnahme von Grabenräumungen zur Wiederherstellung seltener Lebensgemeinschaften? *Pollichia-Kurier* 17(2): 26-28. (in German). [Results of a ditch cleaning management system to restore a typical vegetation and fauna are reported. The measures are conducted in the Special protected area of the "Lauterniederung", Rheinland-Pfalz, Germany, a part of the European network NATURA 2000. Special emphasize is given to *Coenagrion ornatum*, *C. mercuriale*, and *Cordulegaster boltonii*.] Address: Kitt, M., Raiffeisenstr. 39, D-76872 Minfeld, Germany

2274. Knill-Jones, S. (2001): Reports from Coastal Stations - 2000: Isle of Wight. *Atropos* 12: 49-50. (in English). [United Kingdom; *Erythromma viridulum* and *Sympetrum fonscolombii* are communicated.] Address: not stated

2275. Kohler, H.-U. (2001): Odonate records from the Island of Mahé, the Seychelles. *Notul. odonatol.* 5(7): 94, (in English). [10 of 19 species known to occur on Mahé were evidenced in early May 2000.] Address: Kohler, H.-U., Tulpenweg 107, CH-3098 Köniz, Switzerland

2276. Kuratorium Insekt des Jahres (2001): Insekt des Jahres 2001: Die Plattbauch-Segellibelle. Leaflet: 6 pp. (in German). [In 2001 *L. depressa* was selected as "Insect of the Year". The leaflet gives a general introduction into dragonflies as an example with *L. depressa*, and directed to the more general reader. Special emphasize is given to the bioindicator value of the species for waters in an early succession status and the legal protection of Odonata in Germany.] Address: Deutsches Entomologisches Institut, PF 100238, D-16202 Eberswalde, Germany. E-mail: DEI@DEI-eberswalde.de

2277. Leipelt, K.G.; Suhling, F. (2001): Habitat selection of larval *Gomphus graslinii* and *Oxygastra curtisii* (Odonata: Gomphidae, Corduliidae). *International Journal of Odonatology* 4(1): 25-34. (in English). ["The microdistribution patterns of larval *Gomphus graslinii* and *Oxygastra curtisii* in three rivers in southern France we-

re studied. While *G. graslinii* was caught mainly in sandy reaches covered with leaf litter, *O. curtisii* was found almost exclusively clinging to alder roots at the river margins. Preferences of habitat structure were determined from habitat selection experiments under outdoor conditions with four types of substrates: (I) gravel, (II) sand, (III) sand covered with leaves, and (IV) alder roots. *G. graslinii* preferred substrate types III and II over I and IV; *O. curtisii* preferred IV and III over I and II." (Authors)] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

2278. Marinov, M. (2001): Commented Bibliography of the Bulgarian fauna of the Odonata. IDF-Report 3(1/2): 17-45. (in English). [There are 108 years of history for Bulgarian odonatology. The first material was published by Hristovitch in 1892. Many scientists have since contributed to the understanding of the Bulgarian dragonfly fauna. A total of 135 articles dealing with the dragonfly fauna of Bulgaria were found during the literature survey. All papers are listed and - in some cases critically - annotated.] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

2279. Marinov, M. (2001): *Somatochlora borisi* spec. nov., a new European dragonfly species from Bulgaria (Anisoptera: Corduliidae). IDF-Report 3(1/2): 9-16. (in English). [*Somatochlora borisi* n. sp. is described and depicted. Short ecological and behavioural notes from the type locality are given. Holotype: 1 male, Deimin dere river (41°26'N 25°54'E) near the village of Byal Gradetz, Eastern Rhodopes mountain, S Bulgaria, 20 May 2000. Paratypes: 3 males, same locality, one 20 May 1999, one 20 May 2000 and one 22 June 2000. Holotype and paratypes are deposited in the National Museum of Natural History in Sofia. One paratype is deposited in the collection of Dr. H. Wildermuth, Rütli, Switzerland.] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

2280. Marinov, M. (2001): The genus *Somatochlora* Selys in Bulgaria. IDF-Report 3(1/2): 46-53. (in English). [With an IDF grant M. Marinov studied the distribution of the genus *Somatochlora* in Bulgaria by reviewing museums collections and conducting field work. The results of this study are published in this paper. The distribution of four of the seven members of the genus known to occur in Europe are listed in a tab, discussed, and mapped: *Somatochlora metallica*, *S. meridionalis*, *S. flavomaculata*, and *S. borisi*.] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

2281. Marinov, M. (2001): The *Orthetrum coerulescens* complex in Bulgaria (Odonata: Libellulidae). *International Journal of Odonatology* 4(1): 35-40. (in English). ["Although there are many records of *Orthetrum coerulescens* in Bulgaria, the presence of the nominotypical subspecies is doubtful. A critical analysis of all specimens available revealed that they belong either to *O. c. anceps* or to intermediate forms, but not to *O. c. coerulescens*. The latter taxon is therefore omitted from the Bulgarian species list, bringing the number of recorded species to 66." (Author)] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

2282. Martens, A. (2001): Oviposition of *Coenagrionemis reuniensis* (Fraser) in volcanic rock as an adaptation to an extreme running water habitat (Zygoptera: Coenagrionidae). *Odonatologica* 30(1): 103-109. (in English). ["The sp. inhabits streams and rivers in the mountain forests of the Indian Ocean of La Réunion. Because of heavy seasonal rainfalls and steep inclines, there are drastic changes of water level. As a consequence, no water plants, roots or wet driftwood at all are available for oviposition. The sp. seems to be well adapted to this habitat: females oviposit into wet soft and porous lava stones. The closely related *C. insularis* and *C. rufipes* inhabit streams and rivers on Mauritius, where there are less extreme conditions. Both spp. deposit eggs in plant tissue." (Author)] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: andreas.martens@tu-bs.de
2283. Mauersberger, R. (2001): *Orthetrum brunneum* (Fonscolombe, 1837) und *Orthetrum coerulescens* (Fabricius, 1798) wieder im Nordosten Deutschlands (Odonata: Libellulidae). *Märkische entomologische Nachrichten* 3(1): 29-32. (in German with English summary). [Germany, Brandenburg, Lychen; *Orthetrum coerulescens* and *O. brunneum* - both rare in northeastern Germany - were observed as pioneer colonizers of a restored spring swamp. Also the well known pioneer species *Ischnura pumilio* and *Libellula depressa* co-occurred.] Address: Mauersberger, R., Waldstr. 4, D-16278 Steinhöfel, Germany
2284. May, M.L.; Corbet, P.S. (2001): Occurrence and taxonomic significance of a palpal spine in larvae of *Enallagma* and other genera (Odonata: Coenagrionidae). *International Journal of Odonatology* 4(1): 41-49. (in English). ["A small inconspicuous spine, first detected at the base of the distal-most seta on each labial palpus of early stadia of two species of *Enallagma*, is reported to occur in final-stadium (F-0) larvae of Palearctic and Nearctic *E. cyathigerum*, in F-0 of 31 other Nearctic species of *Enallagma* and in F-0 of three other coenagrionid genera among 11 inspected for this character. The spine is absent from F-0 of eight other coenagrionid genera, including *Coenagrion* and *Ischnura*. It is also lacking from F-0 of the two species of Afrotropical *Enallagma* that we examined, a discovery that suggests the latter may not be closely related to Nearctic and Palearctic species. In European populations such a spine occurs in the first few stadia of certain Coenagrion species but persists to F-0 only in *E. cyathigerum*. We re-emphasize the potential value of this spine as a means of distinguishing at least the last three stadia of *E. cyathigerum* from those of other coenagrionid genera in Europe, and very probably from *Coenagrion* and *Ischnura* everywhere." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu
2285. Nakott, J. (2001): Horror am Baggersee. Die Ur-libelle *Meganeuropsos* - lebensgroß rekonstruiert. *National Geographic* (German edition) April 2001: 9-11. (in German). [Short report on the efforts of Werner Kraus, University Aachen, Germany to reconstruct *Meganeuropsis permiana* after a fossil wing from Elmo, Kansas, USA and parts of bodies from additional localities scattered above the globe. The reconstruction was realised in cooperation with Carsten Brauckmann, University Clausthal-Zellerfeld. The model is presented to the public in the palaeontological collection of the University Clausthal-Zellerfeld, Germany.] Address: not stated
2286. O'Neill, G.; Paulson, D.R. (2001): An annotated list of Odonata collected in Ghana in 1997, a checklist of Ghana Odonata, and comments on West African odonate biodiversity and biogeography. *Odonatologica* 30(1): 67-86. (in English). ["Collections were made at 8 localities in southern Ghana during the summer of 1997. Three regions were sampled: coastal savanna, wooded savanna, and rainforest. 71 spp. were collected, 24 of which are new for the country, bringing the Ghana list to 123 spp. A list of spp. known from the country is included. *Trithemis dejouxi* Pinhey, 1978, is raised to specific rank. Individual variation in *Phaon iridipennis* and *Palpopleura lucia* is quantified. West African Odonata biodiversity and biogeography are discussed." (Authors)] Address: O'Neill, G., 14 Lehigh Ave., Wilmington, DE 19805, USA
2287. Orr, A.G.; Tol, J. van (2001): *Pseudagrion lalakense* spec. nov. from Borneo with notes on its ecology (Odonata: Coenagrionidae). *International Journal of Odonatology* 4(1): 51-56. (in English). ["*Pseudagrion lalakense*, a new species of coenagrionid from Borneo, is described and figured. The species is phylogenetically close to the very widespread and eurytopic *P. microcephalum* and the two fly together. [...] *P. lalakense* is highly stenotopic, being known only from highly acidic black-water marsh in two localities in Brunei where it is associated with the sedge *Hydrolytha*. Activity patterns of *P. lalakense* appear similar to those of *P. microcephalum* but the two species differ in their preferred perches and oviposition sites. A list of seven species of other odonates flying in the same habitat is provided." (Authors). Holotype: male, Brunei, Belait District, Luagan Lalak, 17-04-1994, RMNH; paratypes, same locality, different sampling dates, RMNH, Cambridge University, Zool. Dept Mus., UBD Biology Dept Mus., A.G. Orr collection.] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au
2288. Parfitt, A. (2001): Reports from Coastal Stations - 2000: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 12: 59-60. (in English). [United Kingdom; 14 odonate species are recorded, but not all are listed] Address: not stated
2289. Parr, A. (2001): Another record of Green Darner *Anax junius* (Drury). *Atropos* 12: 28-29. (in English). [Photographs of the species taken at Penlee NR, Rame Head, Cornwall, UK (September 11/12, 1998) turned out to be of two different specimens, and not as supposed of one individual.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK
2290. Parr, A. (2001): Migrant dragonflies in 2000 including recent decisions and comments by The Odonata Record Committee. *Atropos* 12: 16-19. (in English). [The following species are treated: *Calopteryx splendens*, *Ceriagrion tenellum*, *Erythromma viridulum*, *Aeshna mixta*, *A. grandis*, *Anax imperator*, *A. parthenope*, *Libellula quadrimaculata*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. fonscolombii*, and *S. flaveo-*

lum.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

2291. Patton, S. (2001): Reports from Coastal Stations - 2000: Selsey Peninsular, West Sussex. *Atropos* 12: 50-51. (in English). [United Kingdom; *Brachytron pratense*, *Aeshna mixta*, *A. juncea*, *Sympetrum sanguineum*] Address: not stated

2292. Paulson, D.R. (2001): Recent Odonata records from southern Florida - effects of global warming? *International Journal of Odonatology* 4(1): 57-69. (in English). ["A brief Odonata survey in southern Florida, USA, in January 2000 resulted in the discovery of two new species, *Chrysobasis lucifer* and *Nehalennia minuta*, for the USA and established populations of two other species, *Tholymis citrina* and *Tramea calverti*, that had been considered vagrants. Flight seasons of six additional species were extended. These records are discussed in light of the predicted effects of global warming." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

2293. Pellow, K. (2001): Observations of the Red-veined Darter *Sympetrum fonscolombi* (Selys) at Bake Lakes in Cornwall during 2000. *J. Br. Dragonfly Soc.* 17 (1): 31-32. (in English). ["Following successful breeding at Bake Lakes each summer since 1997, regular visits were again made to the site in 2000 to monitor the breeding activity of *S. fonscolombii*. Between 29 April and 21 October 2000, a total of 48 visits were made. In comparison to 1999, substantially more adult *S. fonscolombii* were encountered during the early summer of 2000, resulting in a proportionately higher number of emerging dragonflies later in the season. However, in comparison to 1998, far fewer dragonflies emerged [...]" (Author) A lot of phenological data on flight season are communicated too.] Address: Pellow, K., Mount Pleasant Bungalow, Botus Fleming, Cornwall PL12 6NQ, UK

2294. Piper, W.; Krüner, U. (2001): *Libellennachrichten*. *Libellennachrichten* 5: 1-20. (in German). [Vol. 5 of the newsletter of the Society of German Speaking Odonatologists contains information on the 20th meeting to be held in Görlitz, announcements of meetings of other European odonatological societies, reviews of odonatological publications and new theses on Odonata, and information on "Dragonflies and Music", "Dragonflies and Literature", and "Dragonflies and Art".] Address: Krüner, U., Gelderner Str. 39, D-41189 Mönchengladbach, Germany

2295. Preddy, S. (2001): Identification workshop: The common *Aeshna* hawkers. *Atropos* 13: 44-48. (in English). [Identification characters of *Aeshna mixta*, *A. cyanea*, and *A. juncea* are discussed; colour plates present the species in both sexes and in so called colour forms which are age- or temperature related.] Address: Preddy, S., 94 Winchester Road, Bristol, BS4 3NL, UK. E-mail: Steve.Preddy@blueyonder.co.uk

2296. Ramírez, A.; Pringle, C.M. (2001): Spatial and temporal patterns of invertebrate drift in streams draining a Neotropical landscape. *Freshwater Biology* 46: 47-62. (in English). ["1. Invertebrate drift in streams draining a tropical landscape in Costa Rica was studied to assess differences in assemblage composition above and below a major gradient break in geomorphic land-

form and to assess temporal patterns of drift in lowland reaches below the gradient break. The gradient break (~ 50 m a.s.l.) is the point at which the foothills of the Costa Rican Cordillera Central (piedmont) merge with the Caribbean coastal plain (lowlands). 2. Spatial patterns were assessed along two streams by sampling drift over 24 h once a month for 3 months in both the piedmont (90 m a.s.l.) and lowlands (30 m a.s.l.). Temporal patterns of drift were assessed through monthly diel sampling of three lowland sites over 8-10 months, encompassing both 'dry' (< 400 mm precipitation per month, November to May) and wet (July to October) seasons. 3. Drift composition was insect dominated in piedmont sites and larval shrimp dominated in the lowlands. Percent similarity of assemblages between piedmont and lowland sites was low (range 26-43%) because of high larval shrimp densities in lowland versus piedmont sites. 4. Drift densities were higher during night than day, with peaks at sunset on all dates and at all sites. Diel patterns in drift agree with previous observations for the study area and support the 'risk of predation' hypothesis. 5. Analysis of monthly patterns in lowland sites showed high variability in drift densities; however, all major taxa were found every month. Overall, there was a trend for high invertebrate densities during the 'dry' season but these trends were not significant. 6. Observed changes in drift composition support the concept of river zonation, which predicts a change in community composition along the stream continuum due to geomorphic features. Drift at lowland sites below the gradient break was dominated by shrimps, which are linked to marine environments via their migratory behaviour." (Authors) Drift densities of Odonata are measured on the family level.] Address: Ramírez, A., Inst. Tropical Ecosystem Studies, Univ. of Puerto Rico, P.O. Box 363682, San Juan PR 00936-3682, Puerto Rico. E-mail: aramirez@sunites.upr.clu.edu

2297. Relyea, R. (2001): The relationship between predation risk and antipredator responses in larval anurans. *Ecology* 82(2): 541-554. (in English). ["Organisms that produce alternative, nondiscrete phenotypes in response to environmental conditions are expected to alter their phenotypes in relation to the degree of environmental change. This idea has been applied to the evolution of antipredator responses by prey, in which it has been hypothesized that prey should respond more strongly to predators that pose greater mortality risk. In a companion paper, I quantified predator-induced behavioral and morphological responses in six species of larval anurans across five different predator environments and found that these responses were prey- and predator-specific. In the present study, I addressed whether the responses were related to the level of predation risk posed by each of the predators. Within each prey species, I found that different predators posed different levels of predation risk; within each predator species, different prey species experienced different levels of risk. The differences in predation risk could be understood mechanistically after I quantified differences among predators in their ability to capture, handle, and consume prey and differences among prey in behavior and morphology. Using multivariate analyses, I found that predation risk had no significant effect on how a given prey responds to predators, although there were significant univariate behavioral effects; higher predation risk was related to greater decreases in activity and greater spatial avoidance. I also examined the relationship between risk and response across the six prey

species within a predator treatment and found that higher predation risk across species leads to greater decreases in activity in the presence of Umbra and greater increases in tail depth in the presence of Anax. Thus, while previous studies have found relationships between predation risk and prey response when focusing on relatively few species, few predators, and a single trait, this more powerful test using 30 predator-prey combinations and nine traits suggests that the relationship is not well supported. This finding arises from the fact that larval anurans, as well as many other taxa, exhibit predator- and prey-specific behavioral and morphological changes in response to predator- and prey-specific risk. " (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

2298. Ryazanova, G.I. (2001): One the reproduction tactics in the males of *Lestes sponsa* (Hansemann) (Zygoptera: Lestidae). *Notul. odonatol.* 5(7): 92-93. (in English). [The behaviour at the water of individually marked males of *L. sponsa* was observed in the floodplain of Borzhava river, Ukraine. Elements of territoriality and conservatism of individual reproductive tactics, despite a lasting absence of reproductive success, are demonstrated.] Address: Ryazanova, G.I., Department of Entomology, Faculty of Biology, Moscow State M.V. Lomonosov University, RUS-119899 Moscow, Russia

2299. Samways, M.J. (2001): *Aciagrion pinheyi* spec. nov. from South Africa (Zygoptera: Coenagrionidae). *Odonatologica* 30(1): 111-116. (in English). ["*Aciagrion* had until now not been recorded in South Africa. The new sp. from a pan in thick subtropical savanna is described, illustrated and compared with similar congeners. Holotype male, allotype female (in copula): South Africa, KwaZulu-Natal prov., Ndumo Game Reserve, 21-1-2000; deposited at SAM, Cape Town." (Author) The sp. n. is compared with *Aciagrion gracile gracile*, *A. g. attenuatum*, and *A. ? hamoni*] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

2300. Sherratt, T. (2001): The evolution of female-limited polymorphisms in damselflies: A signal detection model. *Ecology Letters* 4(1): 22-29. (in English). ["Female-limited intraspecific colour variation is a widely distributed trait within damselflies. Typically, one morph resembles the male (the andromorph) whereas one, or sometimes more, do not (the heteromorph(s)). While several selective explanations have been offered, such as decreased harassment by males balanced by predation or lack of mating success, field data indicate that andromorphs and heteromorphs mate at equal frequencies in the field, and survive equally well. In this paper, I use a signal detection model to characterize the properties of a new male-mimicry hypothesis, in which andromorphs are not only more similar to males, but are also encountered more by males. I show that this combination of frequency-dependent and frequency-independent factors readily combine to generate a balanced polymorphism. The model explains why morphs have similar mean mating frequencies, why the experimentally observed mating preferences of males vary between ponds, and why the frequency of andromorphs tends to rise with sex ratio." (Author)] Address: Sherratt, T.N., Department of Biological Sciences, Uni-

versity of Durham, South Road, Durham, DH1 3LE, UK. E-mail: T.N.Sherratt@durham.ac.uk

2301. Sirot, L. K.; Brockmann, H. J. (2001): Costs of sexual interactions to females in Rambur's forktail damselfly, *Ischnura ramburi* (Zygoptera: Coenagrionidae). *Animal Behaviour* 61(2): 415-424. (in English). ["Several species of damselflies, dragonflies and butterflies are characterized by a female-limited polymorphism in which one type of female, the andromorph, looks and behaves like males whereas the other type of female, the gynomorph, looks and behaves differently. Sexual conflict has been hypothesized to play a role in the maintenance of this polymorphism in that andromorphs may have an advantage over gynomorphs by avoiding costly sexual interactions through male mimicry. We tested for costs of sexual interactions to female *Ischnura ramburi* damselflies by comparing the success of singly mated females maintained with no males to the success of females maintained continuously with males at a 3:1 (male to female) operational sex ratio (OSR) and a 1:1 OSR. Our findings suggest that sexual interactions affect the two morphs differently. The time spent feeding, number of eggs laid and egg-laying rate of andromorphs were lower in the 3:1 OSR treatment than in the treatment with no males. Time spent feeding and number and rate of eggs laid by gynomorphs did not differ among treatments. Sexual conflict may be occurring between males and mated andromorphs because sexual interactions are associated with net costs to mated andromorphs whereas sexual interactions with mated andromorphs are beneficial to males because there is high last-male sperm precedence. Based on this experiment, andromorphs cannot be said to have an advantage over gynomorphs by avoiding costly sexual interactions because sexual interactions were not associated with net costs to gynomorphs." (Author)] Address: Sirot, Laura, Department of Zoology, University of Florida, 223 Bartram Hall, Gainesville, FL, 32611-8525. USA. E-mail: lsirot@zoo.ufl.edu

2302. Smith, P.H. (2001): Diversity of dragonflies in dune ponds at Birkdale Sandhills, Sefton Coast, Merseyside. *J. Br. Dragonfly soc.* 17(1): 1-12. (in English). [11 of 16 odonate species known from this British locality breed in sand dune waterbodies. Of these, in 1994 and 1995 8 breeding species from a total of 13 observed species are analysed using different diversity indices, and counting maximum abundance. Dominant species are *Lestes sponsa* and *Enallagma cyathigerum*, *Sympetrum striolatum*, *Ischnura elegans*, and *Coenagrion puella* are fairly numerous, and the remaining eight species being relatively scarce. There is a positive relationship between the total numbers of individuals and the length of the margin at each pond. The ponds surveyed are assessed according positive and negative environmental factors.] Address: Smith, P.H., 2 Highfield Grove, Lostock Hall, Preston, Lancashire PR5 5YB, UK

2303. Spence, B. (2001): Reports from Coastal Stations - 2000: Spurn NNR, East Yorkshire. *Atropos* 12: 62-63. (in English). [United Kingdom; *Libellula depressa* and *Anax parthenope* are new; population of *Sympetrum fonscolombii* increased; *Anax imperator*, *Orthetrum cancellatum*] Address: not stated

2304. Stoks, R. (2001): Food stress and predator-induced stress shape developmental performance in a damselfly. *Oecologia* 127: 222-229. (in English). ["I stu-

died effects of stress factors like food shortage, non-lethal predator presence and autotomy on survival and larval performance (growth rate, development rate and developmental stability) of larvae of the damselfly *Lestes sponsa*. In a laboratory experiment, larvae were raised during their last two instars at two food levels (high or low) crossed with two levels of autotomy (caudal lamellae present or absent). These treatments were nested within three levels of predation risk (*Aeshna cyanea* absent, *Chironomus*-fed caged *Aeshna* or *Lestes*-fed caged *Aeshna*). The diet of the predator had no effects. The low food level and the presence of *Aeshna* independently increased mortality rates of *L. sponsa* larvae. The low food level, presence of a caged *Aeshna* and autotomy all independently reduced growth rate (mass and body size at day 40) and wing size at emergence, and the first two stress factors also reduced development rate. Regardless of predator presence and autotomy, all damselfly larvae consumed the food available. This indicated that the predator-induced stress effects were not due to reduced food uptake, but probably reflected lowered assimilation efficiency and/or a higher metabolic rate. Besides a low food level, the presence of caged *Aeshna* predator larvae and autotomy also increased hind wing asymmetry. This result demonstrated that predator-induced stress may reduce developmental stability in the prey." (Author)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U. Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

2305. Tennessen, K.J. (2001): *Coryphaeschna huaorania* spec. nov. from central Ecuador with keys to all species in the genus (Odonata: Aeshnidae). *International Journal of Odonatology* 4(1): 71-81. (in English). ["*Coryphaeschna huaorania* sp. n. (holotype male: Ecuador, Morona Santiago Prov., pond 5 km N of Mendez jet., 6 Nov 1997; allotype female, same data; both to be deposited in FSCA, Gainesville, FL, USA) is described and compared with *C. amazonica*, *C. apeora*, and *C. perrensi*. The new species can be recognized by having 3 transverse rows of cells in the fork of Rs for a distance of 2 to 4 cells, and a combination of reddish frons without a dark spot, green thorax with small brown mesepisternal stripes, a reddish abdomen, and epiproct about half as long as the cerci. Separate keys are provided to males and females of the eight species currently recognized in the genus." (Author)] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennessen@aol.com

2306. Theischinger, G. (2001): Preliminary keys for the identification of larvae of the Australian Synthemiidae, Gomphomacromiidae, Pseudocorduliidae, Macromiidae, and Austrocorduliidae (Odonata). Cooperative Research Centre for Freshwater Ecology Identification Guide No. 34: I-IV, 88pp. (in English). ["The more primitive Australian Libelluloidea were treated by Watson et al. (1991) under the corduliid subfamilies Synthemiinae, Gomphomacromiinae and Macromiinae. Hawking & Theischinger (1999), however, adopted for the above group of dragonflies a classification that Bechly (1996) based mainly on his own studies and on Carle (1995) and Lohmann (1996). The families Synthemiidae, Gomphomacromiidae, Pseudocorduliidae, Macromiidae and Austrocorduliidae in their present concepts are a significant portion of the Australian dragonfly fauna including 42 recognised species in 16 genera. Whereas Gomphomacromiidae, Pseudocorduliidae and Macro-

miidae each are represented in Australia by a single genus with two species, Synthemiidae and Austrocorduliidae are quite diverse, particularly at generic level. [...] It is the aim of this presentation to facilitate the identification of all known larvae of a group of Australian dragonflies whose identification up to now would have required a rather large number of papers, some of them containing misleading errors. There is also strong emphasis on the still existing gaps in our knowledge. To establish and confirm family identification, an updated version of the family key presented by Hawking & Theischinger (1999) is given at the beginning. Then there are, for each of the five families concerned, a taxonomic overview, a brief diagnosis and a key to genera and species followed by more detailed generic and specific treatments. Whereas the species lists given for each family are alphabetical, the more detailed treatments of genera and species are arranged in an order of detected similarity which may or may not reflect phylogenetic relationships. [...]. Measurements and descriptions are given from last instar larvae or from final instar exuviae. Most illustrations are given from final instar exuviae. As colouration of individuals may be variable in life due to specific conditions in the habitat and as colouration of preserved specimens may reflect the ways or methods of collection and preservation, colours are not given in the descriptions; [...] (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. Orders: Cooperative Research Centre for Freshwater Ecology Identification, Murray-Darling Freshwater Research Centre, PO Box 921, Albury, NSW 2640, Australia. E-mail: enquiries@mdfrc.canberra.edu.au. / WWW.freshwater.canberra.edu.au

2307. Theischinger, G. (2001): Regions of taxonomic disjunction in Australian Odonata and other freshwater insects: Second addendum, with the description of *Austroaeschna unicornis pinheyi* ssp. nov. (Anisoptera: Aeshnidae). *Odonatologica* 30(1): 87-96. (in English). ["The information on taxonomic disjunction at the gap between the Paluma Range (ca 19°S) and Eugella (ca 21°S) of mostly species pairs of Odonata is updated and discussed. The holotype male of *A. u. pinheyi* ssp. n. comes from Queensland, Carnarvon Gorge (18/ 21-11-1990), deposited in ANIC, Canberra. *A. u. cooloola* Theischinger and *A. u. speciosa* Sjöstedt are appraised, respectively re-appraised, as distinct species." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

2308. Tunmore, M. (2001): Reports from Coastal Stations - 2000: The Lizard, Cornwall. *Atropos* 12: 46-48. (in English). [United Kingdom; *Ischnura pumilio*, *Sympetrum fonscolombii*, and *S. striolatum* are communicated.] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

2309. Uzunov, Y.; Tzavkova, V.; Todorov, I.; Varadinova, E. (2001): The macrozoobenthic fauna of the Biosphere reserve Srebarna Lake in north-eastern Bulgaria. *Lauterbornia* 40: 43-51. (in English). ["The paper represents the results of two years regular observations on the species diversity of the benthic invertebrate communities of the Srebarna Lake - a Biosphere Reserve, World Natural Heritage Site and Ramsar Site of international importance, located on the Danube bank in north-eastern Bulgaria. All available faunistic information about the species content is associated with the data obtained in 1997-1999 as a part of a large monito-

ring program in developing a management plan of the reserve." 36 Odonata based on a survey of V. Beschovsky and M. Marinov are listed.] Address: Uzunov, Y., Central Laboratory of General Ecology, Bulgarian Academy of Sciences, 2 Gagarin Street, BG-1113 Sofia, Bulgaria

2310. Watts, P.C.; Thompson, D.J.; Kemp, S.J. (2001): A protocol for non-destructive extraction of DNA from odonates. *Odonatologica* 30(2): 223-226. (in English). ["Genetic methods are often utilised for the ecological study of odonate species. In many instances, especially from a conservation standpoint, it is desirable to employ a method of extracting DNA that does not affect the subsequent survival of the animal under investigation. Removal of part of an odonate leg has been demonstrated not to affect the subsequent reproductive success of the animal. Thus for odonates, a simple and quick method of extracting DNA from a portion of an odonate leg is presented that provides high yields of DNA suitable for PCR." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

2311. Wilson, K. (2001): Reports from Coastal Stations - 2000: Gibraltar Point NNR, Lincolnshire. *Atropos* 12: 61-62. (in English). [United Kingdom; a total of 13 breeding odonate species and one migrant were recorded in 2000. *Sympetrum fonscolombii*, *Orthetrum cancellatum*, *Coenagrion puella*, and *Lestes sponsa* are briefly discussed.] Address: not stated

2312. Wilson, K.D.P.; Reels, G.T. (2001): Odonata of Hainan, China. *Odonatologica* 30(2): 145-208. (in English). ["The odonate fauna from Hainan, is enumerated. *Vestalis miao* sp. n., *Bayadera kirbyi* sp. n. (Calopterygidae), *Burmargiolestes xinglongensis* sp. n., *Rhinagrion hainanense* sp. n., *Podolestes pandanus* sp. n. (Megapodagrionidae), *Drepanosticta zhoui* sp. n., *D. elongata* sp. n., *Sinosticta hainanense* sp. n. (Platystictidae), *Chlorogomphus icarus* sp. n., *C. gracilis* sp. n. (Chlorogomphidae), *Planaeschna celia* sp. n. and *Oligoaeschna sabre* sp. n. (Aeshnidae) are described. *Lamelligomphus hongkongensis* Wilson is assigned as a synonym of *L. hainanensis* Chao. 6 spp. of *Macromia* are treated. *Macromia hamifera* Lieftinck is synonymised with *M. clio* Ris and other potential synonymies of Vietnamese and South China *Macromias* are discussed. *Pseudagrion australasiae* Lieftinck, *Ceriagrion indochinense* Asahina, *Gomphidia a. abbotti* Williamson and *Macromia calliope* Ris are recorded from Chinese territory for the first time. A checklist of dragonfly species from Hainan and details of 71 taxa not previously recorded from Hainan are provided." (Authors)] Address: Reels, G.T. 23-24, Section 3, Wu Kau Tang Village, Tai Po, Hong Kong. E-mail: gtreels@cyberdude.com

2313. Wormwell, K. (2001): A very late record of Beautiful Demoiselle *Calopteryx virgo*. *Atropos* 13: 66. (in English). [8 and 12 October 2000, St. Levan, west Cornwall, UK] Address: Wormwell, K., 53 Cloughbane Drive, Ramsey, Isle of Man IM5 2BH, UK. E-mail: wormwell@mcb.net

2314. Yanoviak, S.R. (2001): Predation, resource availability, and community structure in Neotropical water-filled tree holes. *Oecologia* 126: 125-133. (in Eng-

lish). ["Predation and resource availability influence community structure in many aquatic ecosystems. Predators (odonates) and resources (leaf litter) were manipulated to determine their independent effects on macroorganism species richness, abundance, and composition in water-filled tree holes of Barro Colorado Island, Panama. Interactive effects of these factors were also investigated in artificial tree holes. Large odonates reduced species richness in natural tree holes, but did not significantly reduce macroorganism abundance. The presence of larvae of the mosquito *Culex urichii* and the ceratopogonid midge *Bezzia snowi* were negatively associated with the presence of large odonate larvae. In natural tree holes, leaf litter addition and removal respectively increased and decreased richness by c. 1 species relative to controls, and macroorganism abundance was greater in litter addition holes than in litter removal holes. Independent effects of predation showed similar patterns in artificial holes, but there was no predator x resource interaction, partly due to the short duration of the experiment. Predators grew faster when litter was abundant, and indirectly reduced litter degradation rates when resources were scarce in artificial holes. Both resource availability and predation influence species richness in water-filled tree holes, but act at different time scales; richness follows productivity (litter quantity) over a period of weeks, whereas effects of predation may span several months." (Author). *Megaloprepus coerulatus*] Address: Yanoviak, S.R., Evergreen State College, Lab I, Olympia, WA 98505, USA. E-mail: yanoviak@racsa.co.cr

2315. Zhou, W.-b.; Wilson, K.D.P. (2001): *Priscagrion kiautai* gen. nov., spec. nov. and *P. pinheyi* spec. nov., new damselflies from southwestern China (Zygoptera: Megapodagrionidae). *Odonatologica* 30(1): 117-121. (in English). ["The new genus is established to receive the 2 new spp., *P. kiautai* sp. n. (type sp.; holotype male, paratypes of both sexes: China, Guizhou, Chishui Alsophila Nature Reserve, 18-V-2000; deposited at the Zhejiang Mus. Nat. Hist., Hangzhou) and *P. pinheyi* sp. n. (holotype male: China, Guangxi, Damingshan, 13-V-1997, paratypes of both sexes; same locality, 14-V-1997; holotype and 1 female to be deposited at the Tai Lung Experimental Stn, Agriculture & Fisheries Dept, Lin Tong Mei, Sheung Shi, NT, Hong Kong). *Priscagrion* gen. n. is compared with *Arrhenocnemis* Lieftinck and *Mesopodagrion* McLachlan" (Authors)] Address: Zhou, W.-b., Department of Entomology, Zhejiang Museum of Natural History, Jiaogonglu 71, Hangzhou-310012, China

2316. Zimmermann, W.; Klöppel, M. (2001): Erfassung der Libellenfauna Thüringens. *Landschaftspflege und Naturschutz in Thüringen* 38(1):24-25. (in German). [Short report on the results of the odonatological survey of the Federal State Thüringen, Germany. Prior December 2000, more than 22000 records are available in a database. A first published result is e.g. the plot of a distribution map of *Aeshna affinis*, *A. grandis*, and *A. mixta* in this paper.] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

2317. Zloty, J.; Pritchard, G. (2001): *Cora chiribiquete* spec. nov., a new damselfly species from Colombia (Zygoptera: Polythoridae). *Odonatologica* 30(2): 227-232. (in English). ["The new sp. is described from the Sierra de Chiribiquete of Colombian Amazonia. Holotype male: Colombia, Sierra de Chiribiquete, Puerto Abe-

ja, 5-VII-1996; to be deposited in USNM, Washington, DC. It belongs to the modesta group of G.H. Bick & J.C. Bick (1991, Odonatologica 20: 453-458), and can be distinguished from all other Polythoridae by transverse gold bands on the hind wings." (Authors)] Address: Pritchard, P., Department of Biological Sciences, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4. E-mail: gpritcha@ucalgary.ca

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1997

1984. Dauphin, P.; Laguerre, M.; Tamisier, J.-P.; Teissier, F. (1997): Remarques botaniques et entomologiques sur la Réserve naturelle du marais de la Mazière (Lot-et-Garonne). Bull. soc. linn. Bordeaux 25(1): 15-24. (in French). [18 odonate species are mentioned for the locality but not specified.] Address: Dauphin, P., Poitou, F-33570 Lussac, France

1985. Kesel, A. (1997): Einige Aspekte zur Statik der Insektenflügel. Biona-Report 11: 89-114. (in German). [Biophysical factors of insect wings using *Aeshna cyanea* as an odonate example are outlined in some detail (network of veins, geometry of veins, stability of wing [nodus, pterostigma, membranula]). Models to enlarge constructively stability of wings are developed and tested.] Address: Kesel, Antonia, Department of Zoology, Technical Biology and Bionics; University of Saarland; D - 66041 Saarbrücken. E-mail: a.kesel@rz.uni-sb.de

1986. Orr, A.G. (1997): Odonate predation in Bornean treehole communities: some observations on predator density and prey diversity. H. Ulrich (ed.): Tropical biodiversity and systematics. Proceedings of the International Symposium on Biodiversity and Systematics in Tropical Ecosystems, Bonn, 1994. Zoologisches Forschungsinstitut und Museum Alexander König, Bonn, 1997: 223-227. (in English). ["Phytotelmata in Bornean mixed dipterocarp forest fall into several categories, the more common of which is the buttress or trunk pan. Such holes are often quite large (up to 10 litres) and are mostly filled nearly to the brim with a thick layer of leaf litter, under which is a large body of anoxic sludge. Despite apparently high rates of decomposition only a few (6-10) species make up the metazoan community, including up to three species of predatory odonate larvae; the Zygopteran *Pericnemis triangularis* (Coenagrionidae) and the Anisopterans *Lyriothemis cleis* (Libellulidae) and *Indaeschna grubaueri* (Aeshnidae). Odonates generally account for a relatively high proportion of the metazoan biomass, in some cases far exceeding the biomass of detritivores. This suggests that decomposition rates must be very high, and it is possible that high predation levels are responsible for suppressing diversity in the detritivore community." (Author)] Address: Orr, A.G., 26 Currimundi Rd, Caloundra, Qld 4451, Australia

1987. Ponta, U. (1997): Beitrag zur Kenntnis der Libellenfauna im Gurk-Einzugsgebiet (Insecta, Odonata). Carinthia (II) 187 / 107: 381-384. (in German). [Austria;

abundance, sampling site, and altitude of *Onychogomphus forcipatus*, *Gomphus vulgatissimus*, *Calopteryx splendens*, *C. virgo*, *Platycnemis pennipes*, and *Somatochlora metallica* are documented.] Address: Ponta, Ursula, Kärntner Institut für Seenforschung, Amt der Kärntner Landesregierung, Flatschacher Str. 70, A-9021 Klagenfurt, Austria

1998

1988. Bernabel, S.; Di Girolamo, I.; Iavarone, I.; Mancini, L. (1998): Alcune note sul popolamento macrobentonico del fiume Arrone (Lazio-Italia). Riv. Idrobiol. 37(1-3): 203-209. (in Italian with English summary). [The macrobenthic community of the river Arrone, Italy first was surveyed in the early 70th, and restudied app. 20 years later. Anthropogenic impacts increased and surrounding land cover was modified, but the macrozoo-benthos seems not to have changed significantly. In a tab, all determined taxa are listed including 11 Odonata of which *Pyrrhosoma nymphula* and *Onychogomphus uncatatus* seem to be the most interesting species.] Address: Istituto Superiore di Sanità, Laboratorio di Igiene Ambientale, Viale Regina Elena, 299, I-00191 Roma, Italy

1989. Dolmen, D. (1998): *Orthetrum cancellatum* (L.) (Odonata) rediscovered in Norway. Fauna Norvegica Series B. 45(1-2): 114-115. (in English with Norwegian summary). [The third record of *O. cancellatum* in Norway happened July 8, 1997. The habitat - the brackish-water lake Langangsvatnet - is characterised by physical and chemical parameters, and co-occurring Odonata are listed.] Address: Dolmen, D., NTNU Museum, N-7004, Trondheim Norway

1990. Donnelly, T.; Ellenrieder, N. von; Muzon, J. (1998): Nuevos registros de Odonata (Insecta) para la Argentina. Neotropica (La Plata) 44(111-112): 115-116. (in Spanish). [16 taxa are added to the list of Odonata of Argentina including several species to be described: *Aeshna psilus* Calvert 1947, *Andaeschna rufipes* (Ris 1918), *Progomphus recticarinatus* Calvert 1909, *Argia translata* Hagen in Selys 1865, *Enallagma novaehispaniae* Calvert 1907, *Brechmorhoga praedatrix* Calvert 1909, *Tramea rustica* De Marmels & Racenis 1982, *Mecistogaster amalia* (Burmeister, 1839), *Neoneura ethela*

Williamson 1917, *Argia hasemani* Calvert, 1909, *Argia reclusa* Selys 1865, *Aeshna* n.sp., *Limnetron* n.sp., *Erythrodiplax* n.sp., and *Epipleoneura* n.sp.. Additions to the list of the National parks of Callegua and Iguazú are also made.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. tdonnel@binghamton.edu

1991. Ehmann, H. (1998): Beitrag zur Kenntnis der Libellenfauna Kärntens (Insecta: Odonata). *Carinthia* II 188(108): 607-617. (in German with English summary). [Between 1991 and 1997, the odonate fauna has been investigated on various waters of Carinthia, Austria. Records of 51 species are documented for 31 localities. *Crocothemis erythraea*, *Leucorrhinia dubia*, and *Erythromma viridulum* have been found for the first time in Carinthia. In addition the following interesting species should be mentioned: *Coenagrion hastulatum*, *C. pulchellum*, *Anaciaeschna isosceles*, *Brachytron pratense*, *Ophiogomphus cecilia*, *Cordulegaster heros*, *Somatochlora meridionalis*, *Sympetrum pedemontanum*, and *Leucorrhinia albifrons*.] Address: Ehmann, H., Hirschenhöfstr. 25, A-5450 Werfen, Austria.

1992. Keim, C. (1998): Emergence hivernale d'*Anax imperator* Leach (Odonata: Aeshnidae) à Martigny (Valais, Suisse). *Bull. romand Ent.* 16(2): 57-64. (in French, with English summary). ["On January, 9th 1998, a living adult Emperor dragonfly (*Anax imperator*) has been found close to an artificial pond in Martigny, Valais (southwestern Switzerland). Because of its pale coloration, the specimen was apparently a freshly-emerged adult. The relatively high ambient temperatures, which prevailed from October 1997 through to the beginning of January 1998, could explain this winter emergence. To our knowledge, winter emergences of *A. imperator* have never been reported in Switzerland." (Author)] Address: Keim, C., Finettes 10, CH-1920 Martigny, Switzerland

1993. Kreuz, P.; Kempf, M.; Kesel, A.; Göken, M.; Vehoff, H.; Nahtigall, W. (1998): Materialwissenschaftliche Analyse der Insektenkutikula am Beispiel Libellenflügel. *Biona-Report* 12: 327-329. (in German). [Functional morphologic studies of a wing of *Anax imperator* to test mechanical capacity of the membranula are shortly outlined. Hardness and elastic modulus of cuticula are variable. Dragonfly wings are assessed to have a great potential to develop new technical materials for human use.] Address: Kesel, Antonia, Department of Zoology, Technical Biology and Bionics; University of Saarland; D - 66041 Saarbrücken. E-mail: a.kesel@rz.uni-sb.de

1994. Rademacher, M. (1998): Bioökologische Untersuchungen zur Habitatpräferenz der Fledermaus-Azurjungfer (*Coenagrion pulchellum*). *Naturschutz am südlichen Oberrhein* 2: 119-128. (in German with English summary). ["In 1994 and 1995, waters in the southern and middle Upper Rhine valley serving as reproduction habitats for [...] *C. pulchellum* were studied. Vegetation maps, protocols of oviposition and emergence, and supplementary measurements of the morphology of the waters, physical and chemical parameters were employed to investigate the function of vegetation for occurrence and reproduction of the species. An experiment was conducted to document diurnal activity patterns. The results allow a detailed description of the species' preferred habitats within the study area. Threat factors and protective measures that should be

taken are discussed. In the study area, *C. pulchellum* colonizes mainly older still waters with well-developed water-plant vegetation. Oviposition and emergence sites of the examined waters can be divided into two types distinguished by their markedly different structure: A) Phytocoenoses characterized by water-plants with floating leaves (alliance *Nymphaeion*) mixed with reed and sedge vegetation (alliances *Phragmition* and *Magnocaricion*). B) Areas of waters with phytocoenoses of water-plants with floating leaves (alliance *Nymphaeion*), or containing other floating oviposition substrates, that are moderately shaded (maximum: 80 %) by overhanging woody vegetation." (Author)] Address: Rademacher, M., c/o Heidelberger Technology Center, Peter-Schumacher-Str. 8, 69181 Leimen, Germany

1995. Rademacher, M. (1998): Untersuchungen zum Schlupf- und Eiablagehabitat der Gemeinen Winterlibelle (*Sympecma fusca*) am südlichen und mittleren Oberrhein und mögliche Schutzmaßnahmen. *Naturschutz am südlichen Oberrhein* 2: 107-118. (in German with English summary). ["On 33 waters in the southern and middle Upper Rhine valley serving as reproduction habitats for *Sympecma fusca* oviposition sites and emergence sites were analyzed using standardized protocol forms. Oviposition and emergence occur in more or less extensive reed and sedge communities (alliances *Phragmition* and *Magnocaricion*) which are intensely mixed with water-plant communities. This vegetation has to be submerged from April/ May through July/ August and must have low coverages (<40 %) of emerged vegetation during the period of oviposition. The presence of a certain amount of dead or fresh plant material floating on the surface is a prerequisite for oviposition. The sites have to be well exposed to the sun during the whole day; shading by surrounding woody plants must not exceed 10 %. Compared to surrounding areas, the water temperature is markedly higher where oviposition takes place." (Author)] Address: Rademacher, M., c/o Heidelberger Technology Center, Peter-Schumacher-Str. 8, D-69181 Leimen, Germany

1996. Suri Babu, B. (1998): Final instar larva of *Ischnura aurora aurora* (Brauer) (Zygoptera: Coenagrionidae). *Journal of the Bombay Natural History Society* 95: 354-357. [India (M.P.), Sagar, Gwalla mohalla village and Dharmashri village; description of final instar larvae of *I. aurora* from specimens reared in the laboratory.] Address: Suri Babu, B., Forensic Science Laboratory, Police Control Room, Jagdalpur-494001 (M.P.), India

1997. Vogel, J. (1998): Das Dubringer Moor. *Staatliches Umweltfachamt Bautzen und Naturforschende Gesellschaft der Oberlausitz* (Hrsg.): 128 pp. (in German). [30 odonate species are listed from the bog of Dubringen, Saxonia, Germany. Population regression trends of some species are shortly outlined.] Address: Staatliches Umweltfachamt Bautzen, Postfach 1343, D-02603 Bautzen, Germany

1999

1998. D'Antonio, C. (1999): Nuovi reperti odontologici della provincia di Bergamo, Lombardia, Italia settentrionale (Odonata). *Opusc. zool. flum.* 173: 11-15. (in Italian with English summary). [So far only 4 odonate species were known from the province Bergamo, Italy. Here, an annotated provincial checklist of 30 spp. is pre-

sented. Most of these were evidenced at 23 localities in July-August 1997. The record of *Coenagrion pulchellum mediterraneum* (Schmidt) (2 males 1 female, Oltre di colle, alt. 1050 m; 9-VII-1997) is extending the northern limit of the ssp. range.] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindenia@freemail.it

1999. D'Antonio, C. (1999): Odonati della provincia di Brescia, Lombardia, Italia settentrionale (Odonata). *Opusc. zool. flum.* 173: 17-32. (in Italian with English summary). [An annotated checklist is presented of the 56 spp. hitherto known to occur in the province, based on literature and on previously unpublished material, brought together in 1997 from 46 localities. The species composition is biogeographically analysed. Also provided are concise comments on the occurrence of 15 spp., considered of particular regional interest. The complete regional bibliography is appended.] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindenia@freemail.it

2000. D'Antonio, C. (1999): Odonati italiani della collezione entomologica del Museo Civico di Scienze Naturali di Brescia (Odonata). *Opusc. zool. flum.* 173: 1-10. (in Italian with English summary). [53 spp. are listed along with the precise locality data and collection dates. *Aeshna juncea* is recorded from the province of Brescia for the first time since 1879. *Ophiogomphus cecilia* is new for the fauna of Brescia, *Somatochlora metallica* is new for that of the province of Mantova, and 20 spp. are added to the province of Cremona list. Records from the following Italian regions are dealt with: Emilia Romagna, Friuli Venezia Giulia, Liguria, Lombardia, Veneto, Sardegna, and Trentino Alto Adige. *Sympetrum fonsolombii* is listed from Corsica, France.] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindenia@freemail.it

2001. Federschmidt, A. (1999): Die Libellen der Taube und angrenzender Gräben auf dem Gebiet der Stadt Dessau. *Naturwiss. Beitr. Museum Dessau* 11: 66-73. (in German). [The River Taube (Dessau, Sachsen-Anhalt, Germany) and tributary ditches were surveyed for their dragonfly fauna. 27 species could be traced in 1995. 9 different stretches of the river including some ditches are assessed according to its species diversity. Records of *Orthetrum coerulescens*, *Ischnura pumilio*, *Calopteryx splendens*, and *Sympetrum pedemontanum* are of some regional interest.] Address: Federschmidt, A., LPR Landschaftsplanung Dr. Reichhoff GmbH, Außenstelle Magdeburg, Am Vogelgesang 2a, D-39124 Magdeburg, Germany

2002. Klop, E.; Hahn, T.; Kauth, M.; Engel, S.; Lastimoza, L.; Curio, L. (1999): Diet composition and food provisioning of the Visayan Tarictic Hornbill (*Penelopides panini panini*) during the breeding season. *Ökologie der Vögel* 21: 389-404. (in English with German summary). [Two nests of the Visayan Tarictic hornbill (Aves) on the Philippine island of Panay were monitored for a total of 465 hours, to reveal the diet composition both during the breeding season and in the course of the day. About 32 different fruit species were observed to be delivered by the male Tarictic during the nestling period, which comprise about 83% of the food items. Small insects like flies, ants and termites make up the biggest part of the invertebrate prey, whereas the vertebrate prey consisted mainly of lizards. Odonata are

among the food delivered, but the number of specimens was too small to be quantified.] Address: Curio, E.; Conservation Biology Unit, Faculty of Biology, Ruhr-Universität Bochum, D-44780 Bochum, Germany.

2003. Lange, L. (1999): Die Libellen der Wilstermarsch. *Bombus* 3(42/44): 172-176. (in German). [The odonate fauna of the marsh regions in Schleswig-Holstein, Germany is quite poorly known. Aim of the study was to make a significant contribution to close this gap of knowledge. Between 1996 and 1999 several standing water bodies were studied. A total of 33 species could be found, among them *Aeshna viridis*, a species of the European Fauna-Flora-Habitat-Directive. Influence of weather conditions in different years on the species composition of the region and the importance of selected water bodies as source habitats are outlined. Special attention is given to *Anax imperator*.] Address: Lange, L., Deichreihe 21, D-25599 Wewelsfleth, Germany

2004. Rademacher, M. (1999): Die Bedeutung von Kleingewässern in Kiesgruben für Libellen (Odonata) - Ein Fallbeispiel aus der südbadischen Trockenaue. *Ber. naturforsch. Gesell. Freiburg im Br.* 88/89: 185-222. (in German with English summary). [In a gravel pit northwest of Hartheim (Landkreis Breisgau-Hochschwarzwald, Baden-Württemberg, Germany) odonate "communities" in 22 small ponds and one gravel lake were studied from 1997 to 1999 and the results were compared with the species spectrum of 1 km along the Rhine River. Totally 32 species can be proved in the gravel pit area of which 24 species were indigenous (proof of reproduction by finding exuviae). Nearly 50% of the species are protected in Baden-Württemberg. Based on vegetation mapping four successional stages (Characeen-, Initial-, Accumulation- and Reed-Stage) were distinguished differing significantly in dragonfly species spectra. The highest species diversity was found in the accumulation-stage. A comparison with the shoreline of the river Rhine shows that many pioneer species of the ancient wild water meadow find important secondary habitats in gravel pits. The value of these secondary habitats for nature protection will be discussed and some maintenance measures for the gravel pit near Hartheim will be suggested." (Author) Finally some general proposals for dragonfly protection in gravel pits in the southern upper Rhine Valley are given.] Address: Rademacher, M., c/o Heidelberger Technology Center, Peter-Schumacher-Str. 8, 69181 Leimen, Germany

2005. Rademacher, M. (1999): Naturschutzwert von Baggerseen am Oberrhein. *Steinbruch und Sandgrube* 92(10): 6-11. (in German). [Presentation of some results of an intensive study of vegetation of the gravel pits in the upper Rhine floodplains, Germany. The importance of gravel pits for Odonata is shortly outlined. For more details see OAS 2004.] Address: Rademacher, M., c/o Heidelberger Technology Center, Peter-Schumacher-Str. 8, 69181 Leimen, Germany

2006. Rademacher, M. (1999): Naturschutzwert von Kies- und Sandrohböden im Bereich von Baggerseen der Oberrheinebene - Statusbericht. *Schriftenreihe der Umweltberatung im ISTE Baden-Württemberg* 2: 75-83. (in German). [M. Rademacher studied intensively in the past years vegetation and fauna - with special emphasis Odonata - of gravel pits. Results of his study, relevant for nature conservation measures, are outlined.

Odonata are discussed in terms of habitat requirements of *Sympecma fusca* and *Leucorrhinia caudalis*. Odonata demonstrate that the different aging stages of gravel pits have their own importance for different odonate coenocenes. In the case of *L. caudalis*, this extremely rare and threatened species stands for the stage of old gravel pits, often assessed as less important for nature conservation purposes.] Address: Rademacher, M., c/o Heidelberger Technology Center, Peter-Schumacher-Str. 8, 69181 Leimen, Germany

2000

2007. Anderson, N.; Barclay, M.; Menzies, I.S.; Page, K.; Prowse, A.D.; Swinney, I.F.; Willmott, K.J. (2000): Survey of Bookham Common: Fifty-eighth year: Progress report for 1999. *London Naturalist* 79: 177-186. (in English). [Anderson reports of two visits in July and August at two standing waters. The results, some more common odonate species in low abundance, are assessed as disappointing. It is supposed that fish have a significant negative impact on odonate fauna of the waters] Address: Anderson, N., 52 Beechwood Avenue, Greenford, Middlesex, UB6 9UB, UK

2008. Andres, J. A.; Sanchez-Guillen, R.A.; Cordero Rivera, A. (2000): Molecular evidence for selection on female color polymorphism in the damselfly *Ischnura graellsii*. *Evolution* 54(6): 2156-2161. (in English). ["The significance of female color polymorphism in Odonata remains controversial despite many field studies. The importance of random factors (founder effects, genetic drift and migration) versus selective forces for the maintenance of this polymorphism is still discussed. In this study, we specifically test whether the female color polymorphism of *Ischnura graellsii* (Odonata, Coenagrionidae) is under selection in the wild. We compared the degree of genetic differentiation based on RAPD markers (assumed to be neutral) with the degree of differentiation based on color alleles. Weir and Cockerham's theta values showed a significant degree of population differentiation for both sets of loci (RAPD and color alleles) but the estimated degree of population differentiation (theta) was significantly greater for the set of RAPD loci. This result shows that some sort of selection contributes to the maintenance of similar color morph frequencies across the studied populations. Our results combined with those of previous field studies suggest that at least in some *I. graellsii* populations, density-dependent mechanisms might help to prevent the loss of this polymorphism but cannot explain the similarity in morph frequencies among populations." (Authors)] Address: Andres, J. A., Animal Ecology, Ecology & Environmental Science, Umea University, SE 90187, Umea, Sweden. E-mail: jose.andres@eg.umu.se

2009. Arnold, A. (2000): Verbreitungsatlas der Libellen im Regierungsbezirk Leipzig. Veröffentlichungen des Naturkundemuseum Leipzig 19: 55-144. (in German with English summary). [More than 4400 data sets of odonatological records are compiled for the district Leipzig, situated in the west of Saxonia, Germany. 58 species could be traced. They are presented in a monographic way. Each species is discussed in most cases presenting interesting original material from the region or adjacent regions, e.g. reflections about colonisation and dispersal of the studied area by some spe-

cies (e.g. *Brachytron pratense*). Faunistic records are analyzed for the periods 1884-1945, 1946-1980, and 1981-1996, and presented in distribution maps. 12 additional species, occurring in neighbouring regions, are shortly discussed. The history of regional odonatological research is outlined, trends of development of populations, and the phenology of species are presented in some detail. This is a sound study with a lot of interesting material. Nevertheless it will be necessary to correct the chapter on *Coenagrion armatum*: we have to assume that this species never was represented in Saxonia (for details see Müller & Schorr, 2001: 41f.; **OAS 2160**).] Address: Arnold, A., Zur schönen Aussicht 25, D-04435 Schkeuditz, Germany

2010. Barker, J.J. (2000): Dragonfly Migration in the western Lake Ontario area in 1999. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 49-50. (in English). [Approximately 4000 dragonflies were recorded at two locations in the western Lake Ontario area in August and September 1999 during monitoring of hawk migration. The dominant *Anax junius* and *Tamea lacerata*, but *Pantala flavescens* and *P. hymenaea* were also present.] Address: Barker, J.J., 55-4101 Westminster Place, Mississauga, Ontario L4W 4X4, Canada

2011. Berrady, I.; Essafi, K.; Mathieu, J. (2000): Comparative physico-chemical and faunal studies of two thermal springbrooks near Sidi Harazem (Morocco). *Annales de Limnologie* 36(4): 261-274. (in English with French summary). ["The origin of the water of the two Sidi Harazem springs (Morocco), was found to be different. Environmental parameters made it possible to recognise three types of water: one issuing from a "cool spring", with lowest temperature (mean: 26.7°C), conductivity and chloride concentration; one issuing from the "hot spring" (mean: 31.7°C) with the highest temperature and high conductivity; and the one of the oued itself with into which both springs flow. This oued had the highest values of pH, conductivity, chlorides, and calcium. The interstitial fauna collected by means of artificial substrates was composed of both epigeal and stygobite species. Only the "cool spring" included stygobite species, the number of which generally decreased with depth." (Authors) "Odonata" are recorded on sampling sites of the "hot spring" upstream, but not at the "cools spring" or "cool stream".] Address: Mathieu, J., Laboratoire d'Hydrobiologie et Ecologie Souterraines, Université Claude Bernard Lyon I, ESA CNRS 5023, 43 Bd du 11 Novembre 1918, F-69622, Villeurbanne Cedex, France. E-mail: mathieu@biomserv.univ-lyon1.fr

2012. Bree, D. (2000): Observations of Stream Bluets (*Enallagma exulans*) ovipositing at Mazinaw Lake, some interesting questions. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 21-22. (in English). ["Observations of relatively large numbers of *Enallagma exulans* ovipositing on floating aquatic vegetation around a dock at Mazinaw Lake raise some interesting questions regarding effects of man-made shoreline structures and survival of eggs in detached vegetation." (Author)] Address: Bree, D., Box 123, Bloomfield, Ontario K0K 1G0, Canada. E-mail: dbree@post.kosone.com

- 2013.** Bree, D. (2000): Odonata of Bon Echo Provincial Park - Preliminary checklist with notes. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 17-20. (in English). [Based largely on fieldwork in 1999, an annotated list of 48 species of Odonata with notes on specific locations and abundance is provided for Bon Echo Provincial Park (44°55' N., 77° 15' W) in Lennox and Addington and Frontenac counties, Ontario.] Address: Bree, D., Box 123, Bloomfield, Ontario K0K 1G0, Canada. E-mail: dbree@post.kosone.com
- 2014.** Catling, P.M. (2000): Erosion control, channelization and reservoirs destroy habitats of imperiled dragonflies. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 24-25. (in English). ["Although only about 25% of Ontario's damselflies and dragonflies are characteristic inhabitants of streams and rivers, about 75% of the imperiled species are characteristic of riverine habitats. Habitats of these species are destroyed by water pollution, but also by manipulations, such as erosion control, channelization and construction of dams for reservoirs. The hanging clubtails (*Stylurus* spp.), in particular, require ongoing erosion and depositional processes to provide fresh sand and silt deposits for burrowing nymphs." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net
- 2015.** Catling, P.M. (2000): An illustrated key to the mature nymphs and exuviae of eastern Canadian Hanging Clubtails (*Stylurus*). In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 52-54. (in English). ["An illustrated key to the mature nymphs and exuviae of eastern Canadian *Stylurus* including *Stylurus amnicola*, *S. laurae*, *S. notatus*, *S. plagiatus*, and *S. scudderi* is presented. The key includes a few new characters, separates most distinct species first and emphasizes characters useful in both nymphs and exuviae." (Author) Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net
- 2016.** Catling, P.M.; Brownell, V.R.; Bree, D. (2000): Notes on the Odonata of Sandbanks Provincial Park and surrounding area. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 10-13. (in English). ["42 species of Odonata are reported for Sandbanks Provincial Park at the eastern end of Lake Ontario. The area is important for southern species near their northern range limit and as a staging area for autumn migration. Restricted species probably breeding include *Enallagma asperum* and *Lestes inaequalis*. Large populations of *Epitheca princeps* and *Celithemis eponina* are noteworthy." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net
- 2017.** Catling, P.M.; Brownell, V.R.; Catling, C.H. (2000): Notes on the Odonata of Wheatley Provincial Park. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 20-21. (in English). ["Twenty species of Odonata are reported for Wheatley Provincial Park on the Lake Erie shore of extreme southwestern Ontario. Evidence suggests that the park may have a resident population of *Libellula vibrans*, a species at its northern range limit and previously considered to be accidental and non-breeding in Ontario." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net
- 2018.** Catling, P.M.; Brownell, V.R.; Pratt, P.; Marshall, S. (2000): A preliminary annotated list of the Odonata of northern Bruce County including Bruce Peninsula National Park. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 34-39. (in English). ["Sixty species of Odonata are reported for northern Bruce County including Bruce Peninsula National Park on the east side of Lake Huron. Of particular interest are the records of the localized *Nehalennia gracilis* and *Nannothemis bella* in fens whereas these species have often been associated with bogs. The generally western and boreal *Aeshna interrupta lineata* is apparently a significant southeastern range extension from northwestern Ontario. Presence of *Enallagma asperum* and *E. civile* support recent observations of these species being widespread in southern Ontario. The peninsula represents a near northern limit for some southern species such as *Libellula pulchella* and a southern limit for some boreal species such as *Somatochlora minor*." (Authors)] Address: Pratt, P.D., 7100 Matchette Rd, La Salle, ON, Canada, N9C 2S3. E-mail: prairie@netcore.ca
- 2019.** Curio, E. (2000): Die Dolchstichttaube von Panay, Philippinen - eine erste Bilddokumentation. Nachrichten der Vereinigung für Artenschutz, Vogelhaltung und Vogelzucht 47(7): 386-389. (in German). [The first record of *Gallicolumba keayi* (Eagle-Clark, 1900) (Aves) is documented including pictures of a preying individual. Odonata are among the invertebrate prey, but it is unclear if the dove preys on Odonata under natural conditions or if it was fed with dragonflies in a cage. The latter seems to be the most possible case (see Curio 2001: 261, OAS 2087).] Address: Curio, E., Conservation Biology Unit, Ruhr-Universität Bochum, Postfach 102148, D-44780 Bochum, Germany. Email: Eberhard.curio@ruhr-uni-bochum.de
- 2020.** Eisermann, K. (2000): Ökologische Bewertung einer ehemaligen Militärfäche: Das Tanklager Zeisigwald. Veröff. Museum für Naturkunde Chemnitz 23: 51-62. (in German). [The odonate fauna of a petrol depot, used until 1991, and situated near Chemnitz, Saxonia, Germany, totals in 27 species. The results of the study - arranged according to the odonate dominance structure of the surveyed water bodies - are compiled in a tab., and shortly discussed. Some emphasis is given to the function and importance of short turf vegetation including heathlands as hunting area of *Lestes sponsa* and *L. virens*, as well as the genera *Aeshna* and *Sympetrum*.] Address: Eisermann, K., Carl-von-Ossietzky-Str. 213, D-09127 Chemnitz, Germany
- 2021.** Eterovick, P.C.; Sazima, I. (2000): Structure of an anuran community in a montane meadow in southeastern Brazil: Effects of seasonality, habitat, and predation. *Amphibia-Reptilia* 21(4): 439-461. (in English). ["In order to assess the main factors influencing its structure, an anuran community was studied from August 1996 to July 1997, in a 1200 m high rocky meadow site at the Serra do Cipo, Minas Gerais, Brasil, a region with markedly seasonal climate. The study site

included three temporary habitats: a stream, a puddle, and a swamp. Thirteen anuran species were recorded at the study site. Species of tadpoles differed in microhabitat as to their position in water column, annual occurrence period, and water flow in the occupied sites. Aquatic vegetation, depth and occupied habitat (stream, swamp, or puddle) were of secondary importance in telling species apart. Calling sites of males were distinguished based on occupied habitat and annual activity period. Most species started their reproductive activities at the onset of the rains, in an opportunistic way. Water availability in the habitat seems to be the most important factor affecting temporal distribution of reproductive activities in the anuran community. Competitive interactions could not be detected in the community. The most important tadpole predators recorded at the study site were belostomatid water bugs and dragonfly nymphs. Their abundance peaks occurred after those of tadpoles, as predicted for predator-prey populations with interconnected cycles. Mortality rates were high for tadpoles, and predation is the most likely cause. Differences recorded among species, considering time of occurrence, tadpole microhabitats, and male calling sites, may reflect distinct specific adaptations and preferences." (Authors)] Address: Eterovick, Paula Cabral, Departamento de Biologia Geral, Instituto de Ciencias Biologicas, Universidade Federal de Minas Gerais, 30161-970, Belo Horizonte, MG, Brazil. E-mail: ecpaula@mono.icb.ufmg.br

2022. France, R. L.; Schlaepfer, M. A. (2000): 13C and 15N depletion in components of a foodweb from an ephemeral boreal wetland compared to boreal lakes: Putative evidence for microbial processes. *Hydrobiologia* 439: 1-6. (in English). ["Stable carbon and nitrogen isotope ratios were used to posit the relative importance of microbial processes on energy pathways in an ephemeral, humic boreal wetland compared to four clearwater lakes in northwestern Ontario, Canada. In addition to algae and dipteran larvae, odonate larvae were sampled as these latter organisms are known to predate indiscriminately on smaller invertebrates and are thus likely to have average isotope ratios reflective of their habitats. Similarities in delta13C and delta15N values between lake insect larvae and emerged adults suggested that littoral foodwebs in these oligotrophic lakes may rely to a considerable degree upon terrestrial carbon. Wetland insect larvae and algae were depleted in both 13C and 15N compared to biota in lakes Carbon isotope analysis implied a substantial presence of microbial respiration from decomposition in the humic wetland, whereas nitrogen isotope analysis suggested the prevalence of microbially modified nitrogen dynamics, including the possibility of N-fixation." (Authors)] Address: France, R. L., Graduate School of Design, Harvard University, 48 Quincy Street, Cambridge, MA, 02138 USA

2023. Gorb, S.N.; Kesel, A.; Berger, J. (2000): Microsculpture of the wing surface in Odonata: evidence for cuticular wax covering. *Arthropod Structure & Development* 29: 129-135. (in English). ["The insect wing membrane is usually covered by scales, hairs, and acanthae, which serve diverse functions, such as species-specific coloration pattern, decrease of wind resistance during flight or decrease of wing wettability. Representatives of Palaeoptera (Odonata and Ephemeroptera) have no hairy structures on the wing membrane, but both its sides are fine-sculptured. In this study,

the nature of the wing covering was studied using acoustic microscopy, scanning- and transmission electron microscopy followed by a variety of chemical treatments. It was shown that wing microsculptures are not cuticular outgrowths, but a wax covering, which is similar to pruinosity, which has been previously described in several odonate taxa. Data from scanning acoustic microscopy revealed that scratches on the wax covering have material density different from the surrounding material. Various functions of the wax covering are discussed." (Authors) Coenagrion puella, Pyrrhosoma nymphula, Aeshna cyanea] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

2024. Gorb, S.N.; Pavljuk, R.S.; Spirus, Z.D. (2000): Odonata of Ukraine. A faunistic overview. *Vestnik zoologii, Suppl.* 15: 154 pp. (in Ukrainian). [Keys, numerous b/w morphological drawings, all localities listed, bibliography, paperback. This publication summarises the results of faunistic odonatological research in the Ukraine. Using the original and literature data, the authors created and analysed a database containing 4635 records. Numerous records have not been previously published. This work is not only a comprehensive list of Odonata in the Ukraine, but contains some general information on odonate morphology, biology, flight periods, and a history of studies of the odonate fauna in the Ukraine. Identification tables and numerous illustrations of morphological details will help with species identification.] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

2025. Hänel, S.; Schrack, M. (2000): Zur Moosflora in Waldmooren der Radeburger und Laußnitzer Heiden. *Veröff. Mus. Westlausitz Kamenz* 22: 15-44. (in German). [Mosses with boreo-montaneous distribution are well represented in the region. Co-occurring Odonata with similar distribution are listed.] Address: Schrack, M., Hauptstr. 48a, D-01471 Radeburg-Großdittmannsdorf, Germany

2026. Hayes, P.A.; Maret, T.J. (2000): Wood frog and American toad tadpole behavioral responses to predators. *Journal of the Pennsylvania Academy of Science* 73 (Suppl.): 160. (in English). [Verbatim: "We examined the behavioral responses of tadpoles of wood frogs, *Rana sylvatica*, and American toads, *Bufo americanus* to the presence of bluegill sunfish, adult red-spotted newts, marbled salamander larvae, and dragonfly naiads. Groups of ten tadpoles of one species were placed into containers of water containing one large leaf as a hiding place and a wire cage into which a predator was added. The numbers of tadpoles moving and hiding under the leaf were counted before and after addition of a predator to the cage. Movement of wood frog tadpoles decreased in the presence of the newts and salamander larvae. Hiding by wood frog tadpoles increased in the presence of salamander larvae. Toad tadpoles, which are considered to be unpalatable to many vertebrates, showed no significant responses to presence of any predators. Wood frog tadpoles appear to respond adaptively to avoid predation by vertebrate predators they naturally encounter in temporary pond habitats."] Address: Hayes, P.A., Department of Biology, Shippensburg University, Shippensburg, PA, 17257 USA

2027. Hostettler, K. (2000): Neue Funde der Sibirischen Winterlibelle und der Gemeinen Keiljungfer (*Odonata*) im Gottlieber Ried und am Seerhein (Thurgau). *Mitt. thurg. naturf. Ges.* 56: 83-88. (in German). [In the "Gottlieber Ried" and along the "Tägerwilen See-Rhein", situated in the south of the Bodensee ("Lake Constanze"), Switzerland, 19 odonate species were recorded between 1985 and 1996 with *Ischnura pumilio* as an additional record in 2000. The reproduction habitat of *Sympecma paedisca* and its strategies to recognize suitable habitats are discussed in detail with special reference to factors as high waters. The regionally rare *Gomphus vulgatissimus* was found 21 May 1995.] Address: Hostettler, K., Schulstr. 7, CH-8590 Romanshorn, Switzerland

2028. Jones, C.D. (2000): Common Garter Snake (*Thamnophis sirtalis*) preying upon a teneral Black-tipped Darner (*Aeshna tuberculifer*) at Bat Lake, Algonquin Provincial Park, Ontario. In: Catling, P.M.; Jones, C.D.; Pratt, P. (Eds.): *Ontario Odonata*, vol. 1. Toronto Entomologists Association. ISBN 0-921631-22-7: 22-24. (in English). ["A review of the literature revealed that an observation of a Common Garter Snake [...] preying upon [...] *A. tuberculifer* is possibly the first unequivocal evidence of adult odonates as food items of garter snakes. Aspects of insects in the diet of garter snakes are discussed." (Author)] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

2029. Jones, C.D. (2000): New odonate records for Timiskaming District, Ontario. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 25-27. (in English). ["Sixteen new district records are reported for Timiskaming District, Ontario. A record of *Enallagma carunculatum* is a northern range extension. The rare species *Somatochlora incurvata* was discovered and the habitat described."] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

2030. Jones, C.D.; Holder, M.L. (2000): Additions to (and a deletion from) the Odonata list of Algonquin Provincial Park. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 13-17. (in English). ["Continued interest in the Odonata by Park Naturalists in Algonquin Provincial Park has led to the addition of 14 species (*Lestes forcipatus*, *Amphiagrion saucium*, *Coenagrion interrogatum*, *Enallagma carunculatum*, *E. cyathigerum*, *E. geminatum*, *Nehalennia gracilis*, *Epi-aeschna heros*, *Gomphaeschna firicillata*, *Arigomphus jurcifer*, *Somatochlora cingulata*, *Williamsonia fletcheri*, *Leucorrhinia intacta*, and *Nannothemis bella*) and the deletion of one (*Stylurus spiniceps*) from the Park's list since 1996. These changes are reported here along with annotations." (Authors)] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada

2031. Jones, C.D.; Michener, C.; Purdon, C.; Runtz, M.W.P. (2000): An annotated checklist of the Odonata of Renfrew County, Ontario. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 39-48. (in English). ["An annotated checklist of the Odonata of Renfrew County, Ontario is presented detailing the records for 93 species (26 Zygoptera, and 67 Anisoptera).

A list of an additional 36 species expected to occur in the county is also provided. This makes Renfrew the third in known diversity of approximately 50 Ontario counties and districts. Noteworthy species include *Gomphus vastus*, *Ophiogomphus anomalus*, *Stylurus spiniceps*, *S. notatus* and *Aeshna clepsydra*, the latter at or near to its northern limit." (Authors)] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

2032. Kalkman, V.; Dijkstra, K.D. (2000): The dragonflies of the Bialowieza area, Poland and Belarus (*Odonata*). *Opusc. zool. flumin* 185: 1-19. (in English). ["A synthesis of 942 records from the Bialowieza Forest and its surroundings, collected in 1983, 1990, 1993 and 1995-1999, is presented. Only 10% of them refer to Belarus, the rest being from Poland. A total of 49 spp was found. The fauna includes southern elements (*Sympecma fusca*, *Lestes barbarus*, *Erythromma viridulum*, *Ischnura pumilio*, *Anax imperator*, *Crocothemis erythraea*, *Orthetrum albisylum*, and *Sympetrum depressusculum*) and interesting northern and eastern spp (*Sympecma paedisca*, *Coenagrion armatum*, *C. hastulatum*, *C. lunulatum*, *Ophiogomphus cecilia*, *Epi-theca bimaculata*, *Somatochlora arctica*, *Sympetrum pedemontanum*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. pectoralis*). Brief remarks are made about differences in habitat preference of spp between western and eastern Europe. It is postulated that *Pyrrhosoma nymphula* is restricted to running waters in the East. A short note on the subspecific status of *Somatochlora metallica* in northeastern Europe is added. It is concluded that specimens show a mix of features of the ssp. *metallica* and *abocanica* and that the recognition of the latter in the region by H. Lohmann (1994, *Notul. odonol.* 4: 39-40) is unjustified. The value of the area as a reference for conservation is discussed and conservation priorities are stressed." (Authors)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: kalkmann@naturalis.nnm.nl

2033. Koyama, T. (Publ.) (2000): *Bulletin of The Hokkaido Odonatological Society* Vol. 12, December, 2001. *Bulletin of The Hokkaido Odonatological Society* Vol. 12: [Contents Cover photo: *Coenagrion terue* at the lake Chitose by Hiratsuka, Kazuhiro. WATAJI, Masashi, TAMURA, Sanae, YAMADA, Kozue, OTA, Kengo, KURAUCHI, Yohei and UEMURA, Takeji, The original fauna and its shift at the lower reach of the River Ishikari: 1; YOKOYAMA, Toru, A report of Odonata fauna of Ono Pond at Hokkaido University: 14; YOKOYAMA Toru & Fujimoto, Shigeyuki, A record of *Oligo-aeschna pryleri* from Nishioka Reservoir: 17; YOKOYAMA, Toru and TSUJI, Masahiko, Investigation of the survival of *Aeshna subarctica* at Kyogoku-cho: 18; FUTAHASHI, Ryo, FUTAHASHI, Hiroyuki and FUTAHASHI, Seishi, Sighting of *Rhyothemis fuliginosa* at Nishinoboro, Ebetsu City: 21; HIRATSUKA, Kazuhiro, Observation on dragonflies at Onuma Park at Nanae-cho: 24; HIRATSUKA, Kazuhiro, Collection of *Cordulia aenea amurensis* in Soya-shicho: 25; Editorial board, First and last records (literature data): 26; Editorial board, Phenological data in Hokkaido (1): 29; Editorial board, Table of the regional distribution of Odonata by shicho (12): 32; HIRATSUKA, Kazuhiro, Book review: 35; Editorial board, Report on conservation efforts of *Mortonagrion hirossei* at Nishioka Reservoir and Yamaguchi Prefecture: 36 Translation: Ishizawa, Naoyo]

2034. Kreuz, P.; Kesel, A.; Göken, M.; Vehoff, H. (2000): Mechanische Eigenschaften biologischer Materialien am Beispiel der Insektenflügel. Biona-Report 14: 201-202. (in German). [Elasticity of membranulae of wings of *Aeshna cyanea* and *Orthetrum cancellatum* are tested.] Address: Kesel, Antonia, Department of Zoology, Technical Biology and Bionics; University of Saarland; D - 66041 Saarbrücken. E-mail: a.kesel@rz.uni-sb.de

2035. Kuhn, K. (2000): Untersuchungen zum Vorkommen der Helm-Azurjungfer (*Coenagrion mercuriale* Charpentier, 1840) im mittleren Mindeltal (Insecta, Odonata). Ber. naturf. Ges. Augsburg 59: 39-50. (in German). [Bavaria, Germany; the general amendment of regional running waters in the past 170 years, and the distribution of the species in Bavaria are outlined, and known regional records are compiled. The habitats of five populations of *C. mercuriale* are described in detail and the habitat requirements are analysed. The velocity and aquatic and riparian vegetation are of principal importance, while the quality of water is but rarely of any significance in habitat choice of *C. mercuriale* in this area. In addition, abundance and accompanying odonate species are dealt with.] Address: Kuhn, K., Ravensburgerstr. 7, D-86150 Augsburg

2036. Labeledzki, A. (2000): Dragonflies (Odonata) in the Bieszczady Mountains. In: Pawlowski, J. (Ed.): Osirodek Naukowy - Dydaktyczny Bieszczadzkiego Parku Narodowego. Monografie Bieszczadzkie VII. Bezkręgowce Bieszczadów Zachodnich ze Szczególnym uwzględnieniem Bielszczadzkiego Parku Narodowego Czesc. Ustrzyki Dolne: 157-163. (in Polish with English summary). ["Data from the literature and the results of contemporary studies indicate that the Bieszczady Mountains harbour 45 dragonfly species, which constitutes 62,5% of the native dragonfly fauna in Poland (72 species). In the Bieszczady National Park and its protection zone 30 dragonfly species have been identified. Among them there are 4 protected species (*Sympetma braueri* Bianchi, *Ophiogomphus cecilia* (Fourcroy), *Leucorrhinia albifrons* (Burmeister), *Leucorrhinia pectoralis* (Charpentier), of the total of 7 dragonfly species protected by law in Poland. In respect of the number of southern taxa, the BdnP is one of the richest national parks in Poland. In the Bieszczady fauna the most interesting and valuable dragonfly species are *Ophiogomphus cecilia*, *Aeshna affinis*, *Hemianax ephippiger*, *Cordulegaster bidentatus*, *Crocothemis erythraea*, *Tarnetrum fonscolombii*, *Leucorrhinia albifrons*, and *Leucorrhinia pectoralis*. Among the most endangered species one should reckon taxa connected with small water bodies (*O. cecilia*, *C. bidentatus*, and *O. coerulescens*) and acid bog waters (*S. braueri*, *L. albifrons*, and *L. pectoralis*) because these species can not develop in replacement sites. The best form of conservation of rare and critically endangered species in the Bieszczady National Park and its protection zone should be protection of their biotopes, as recommended by the European Commission of Nature and Natural Resources Conservation. Individual species protection does not produce satisfactory results, as exemplified by *O. cecilia* in Poland." (Author) *Sympetrum meridionale* is also listed; this record is of special faunistic interest in central Europe.] Address: Labeledzki, A., Akademia Rolnicza, Katedra Entomologii Lesnej, ull. Wojska Polskiego 71c, PL-60-625 Poznan, Poland. E-mail: andrzejlab@poczta.onet.pl

2037. *Lindenia* No. 33 (2000): *LINDENIA*. Notiziario dell'Ufficio nazionale italiano della Societa odonologica internazionale, Napoli. *Lindenia* No. 33: 140-142. (in Italian). [Announcements of odonatological symposia; faunistic notes: Anonymous: Le libellule di Campo Imperatore (pp. 140-141; L'Aquila prov., with a distribution map of *Orthetrum albistylum* in Italy); 11 *Hemianax ephippiger* sightings in Italy, in 2000, a poem, and a bibliographic note.] Address: Di C. D'Antonio, Via A. Falcone 386/b, 1-80127 Napoli, Italy; E-mail: lindenia@freemail.it

2038. Lüderitz, V.; Pütter, S.; Heidecke, F.; Jüpner, R. (2000): Revitalisierung der Alten Elbe bei Magdeburg - ökologische und wasserwirtschaftliche Grundlagen. Abhandlungen und Berichte für Naturkunde, Magdeburg 23: 29-46. (in German with English summary). [A project for revitalisation of the old water course of river Elbe near Magdeburg, Sachsen-Anhalt, Germany is scheduled. An extensive study of biological and hydrological factors was realised including a survey of the Odonata. 38 species were traced including *Anaciaeschna isosceles*, *Aeshna viridis*, *Somatochlora flavomaculata*, *Leucorrhinia pectoralis*, and *Coenagrion lunulatum*. The species are arranged according to a classification of dragonflies in coenoses erected by J. Müller (1996).] Address: Heidecke, F., BUND Sachsen-Anhalt, Olvenstedter Str. 10, D-39108 Magdeburg, Germany

2039. Marden, J.H.; Rowan, B. (2000): Growth, differential survival, and shifting sex ratio of free-living *Libellula pulchella* (Odonata: Libellulidae) dragonflies during adult maturation. *Annals of the Entomological Society of America* 93(3): 452-458. (in English). ["We performed a mark-recapture study to determine rates of change in body mass during maturation of adult free-living *L. pulchella* dragonflies. We captured, weighed, marked, and released 444 individuals (278 females, 166 males) that were 0-5 d old, including 261 that had emerged on the day of initial capture. On subsequent days, we recaptured 87 individuals at least once, and 6 were recaptured more than once. Nearly all new emergents (mean mass = 272 mg) that were recaptured after 1 or 2 d had lost mass (mean change = -29 mg), whereas most individuals recaptured after 3 days had gained mass (mean change = 109 mg; mean rate = 18 mg/d). Individuals that were heavier at emergence were much more likely to gain mass and to be recaptured at ages >1 or 2 d, thus suggesting differential survivorship based on size at emergence. Average growth rates of gainers were as high as 57 mg/d over a 5-d period. The sex ratio of newly emerged adults was heavily biased toward females (61%), but males were significantly larger at emergence, were more successful at gaining mass, and the sex ratio of individuals that ultimately gained mass did not differ significantly from 1:1. New emergents had empty guts and minimal fat, and changes in fat and water content explained very little of the average decrease in body mass observed for most new emergents. Overall, our data suggest that *L. pulchella* dragonflies face severe energy stress during early adult maturation, which strongly affects their demography." (Authors)] Address: Marden, J.H., Dept Biol., Pennsylvania St. University, 208 Mueller Laboratory, University Park, PA 16802, USA

2040. McPeck, M.A. (2000): Predisposed to adapt? Clade-level differences in characters affecting swimming performance in damselflies. *Evolution* 54(6):

2072-2080. (in English). ["Previous studies have shown that two or three lineages of *Enallagma* damselflies, which historically co-existed with fish, recently invaded and adapted to living with large dragonfly predators in fishless waters. In adapting to live with these new predators, lineages shifted behaviorally to using swimming as an evasive tactic against attacking predators, evolved morphological features that made them faster swimmers, and evolved biochemical features to increase refueling strenuous activities like swimming. However, these habitat shifts have occurred in only one of the two primary clades within the genus in North America. Here, I show that clade-level differences exist among species in the ancestral, fish-lake habitat that should make habitat shifts easier to accomplish in the clade in which they have occurred. Specifically, fish-lake species in the clade in which habitat shifts occurred have much higher propensities to swim in the laboratory, swim faster when they do swim, and have higher mass-specific activities for arginine kinase than do species in the other primary clade, in which no extant species are found in fishless waters. These results are discussed in the context of the dynamics of founder events and the potential implications for community structure." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

2041. Oldham, M.J. (2000): Citrine Forktail (*Ischnura hastata*) in Ontario. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 7-9. (in English). [I. *hastata* "is reported from three sites in three SW Ontario counties (Kent, Essex, and Wellington) based on collections made in 1999. The three previous Ontario records are discussed and mapped and information is provided on habitat and identification." (Author)] Address: Oldham, M.J., Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Box 7000, 300 Water Street, Peterborough, Ontario K9J 8M5, Canada. E-mail: michael.oldham@mnr.eov.on.ca

2042. Oldham, M.J. (2000): Green-faced Clubtail (*Gomphus viridifrons*) in Ontario. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 51-52. (in English). [*G. viridifrons* "is reported for the second time in Ontario and Canada, based on two collections from Rainy River District in northwestern Ontario. The previous Canadian record, from Middlesex County in SW Ontario, is discussed, as is the distribution and status of this species elsewhere in North America." (Author)] Address: Oldham, M.J., Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Box 7000, 300 Water Street, Peterborough, Ontario K9J 8M5, Canada. E-mail: michael.oldham@mnr.eov.on.ca

2043. Oldham, M.J.; Elder, D.R. (2000): Noteworthy Odonata records from northwestern Ontario. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 28-33. (in English). ["Information is presented on 39 new county records for dragonflies and damselflies in the three northwestern Ontario districts of Rainy River, Kenora, and Thunder Bay. Rainy River District in particular has been little studied in the past and our records more than double the list of species known from the district, bringing the total to 73 odonate taxa. Some

of these records (e.g. for *Boyeria vinosa*, *Celithemis elisa*, *Chromagrion conditum*, *Enallagma exsulans*, *Epi-theca princeps*, *Pantala flavescens*, and *Sympetrum vicinum*) represent range extension of several hundred kilometers within the province. Notes are provided on habitat, abundance, collection details, and distribution and status in adjacent areas." (Authors)] Address: Elder, D.R., Ontario Ministry of Natural Resources, 922 Scott Street, Fort Frances, Ontario P9A 1J4, Canada. E-mail: darren.elder@mnr.gov.on.ca

2044. Oldham, M.J.; Sutherland, D.A.; Holder, M.L. (2000): Conservation Status Ranks for Ontario Odonata. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 1-7. (in English). ["The system of conservation status ranks used by Ontario's Natural Heritage Information Centre and similar conservation data centres throughout the Western Hemisphere is described, defined and applied to 164 Ontario dragonflies and damselflies. Global (Granks) and subnational (Srank) conservation status ranks are provided for all Ontario odonate species." (Authors)] Address: Oldham, M.J., Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Box 7000, 300 Water Street, Peterborough, Ontario K9J 8M5, Canada. E-mail: michael.oldham@mnr.eov.on.ca

2045. Pudwill, R. (2000): Kolonisation und Populationsdynamik von Libellen an neu angelegten Moorweihern (Odonata). Braunschweiger Naturk. Schr. 6(1): 57-67. (in German with English summary). ["The dragonfly fauna of a newly made acid and oligotrophic moor pond in Lower Saxony, Germany was investigated for 3 years. 25 species were recorded as adults, 16 of them as exuviae. The dragonfly fauna was a typical bog fauna. Characteristic species were: *Leucorrhinia dubia*, *Leucorrhinia rubicunda*, *Aeshna juncea*, and *Sympetrum danae*." (Author) Emergence patterns of *Anax imperator*, *Leucorrhinia dubia*, *L. rubicunda*, *Libellula quadrimaculata*, *Aeshna juncea*, and *Sympetrum danae* are documented in detail.] Address: Pudwill, R., Böttcherstr. 3, D-38518, Gifhorn, Germany

2046. Rademacher, M. (2000): Pilotprojekt "Konfliktarme Baggerseen". Ergebnisse und Erfahrungen am Beispiel der Region Oberrhein - Naturschutz-Asepkte. Beiträge der Akademie für Natur- und Umweltschutz Baden-Württemberg 29: 183-194. (in German). [Conflicts between excavation of gravel in the alluvium of River Rhine, Germany and succeeding use for different purposes are studied with special emphasize on nature conservation purposes. Different succession stadia of vegetation and odonate fauna in gravel pits and possibilities to maintain different old stadia are discussed.] Address: Rademacher, M., c/o Heidelberger Technology Center, Peter-Schumacher-Str. 8, D-69181 Leimen, Germany

2047. Rantala, M.J.; Koskimaki, J.; Taskinen, J.; Tynkkynen, K.; Suhonen, J. (2000): Immunocompetence, developmental stability and wingspot size in the damselfly *Calopteryx splendens* L.. Proc. of the Royal Society Biological Sciences Series B 267(1460): 2453-2457. (in English). ["*Calopteryx splendens* males exhibit a remarkable variation in wing pigmentation both within and between populations. In this study, we examined whether the wingspots of male *C. splendens* are related to male quality. We measured the nylon implant en-

capsulation rate for 85 males and found that males with larger wingspots had a faster encapsulation rate, indicating a better immunocompetence. We also found that the encapsulation rate was positively correlated with the density of haemocytes in the haemolymph. Another measurement of male quality, fluctuating asymmetry of wingspots, correlated negatively with the size of the wingspots. Males with asymmetrical wingspots also had lower encapsulation rates than more symmetrical males. Our results suggest that the size of wingspot is an indicator of male quality in *C. splendens*." (Authors)] Address: Rantala, M., Dept of Biological and Environmental Science, University of Jyväskylä, FIN-40351, Jyväskylä, Finland. E-mail: marrant@st.jyu.fi

2048. Salm, P. (2000): Methodentests zur Erfassung von Arten der Anhänge II, IV und V der FFH-Richtlinie. Schriftenreihe für Landschaftspflege und Naturschutz 68: 137-151. (in German with English summary). [Article 17 of the Fauna-Flora-Habitat Directive requires the member states to produce a report at six-year intervals concerning the implications of the required measures and their effects on the Annex I habitat types and on the Annex II species. Therefore, the Federal Agency for Nature Conservation at Bonn, Germany carried out a research project „Selection of parameters and tests of methods to record and evaluate the conservation status of species and habitat types according to the Habitats Directive". The aim of the project was to suggest how these reporting obligations should be implemented. The study of species from the Habitats Directive Annexes served for the development of a standardised method for the conservation-orientated implementation of the reporting obligations. An overview of the species studied is given in this paper; as an example a study on *Aeshna viridis* is presented.] Address: Salm, Petra, c/o Landschaftsökologisches Planungsbüro Stelzig, Aldegreverwall 1, D-59594 Soest, Germany

2049. Schnabel, H. (2000): Der Libellenbestand eines Naturschutzteiches am Stadtrand von Wittichenau. Veröff. Mus. Westlausitz Kamenz 22: 57-64. (in German). [Saxonia, Germany; after restoration of the standing water, between 1996 and 1998 22 odonate species could be observed.] Address: Schnabel, H., Keula 16, D-02997 Wittichenau, Germany

2050. Schoorl, J. W. (2000): Notes on Central Asian dragonflies (Insecta: Odonata). Zoologische Mededelingen (Leiden) 74: 205-213. (in English). ["New and old material from Central Asia is published. In total 38 species are recorded from various locations in this region. For the more interesting species notes and figures are provided. One probably new *Ischnura* species is briefly described, but not formally named. For a, possibly new, subspecies of *Sympetrum sinaiticum* Dumont, 1977, a short diagnosis with figures is provided." (Author) The material studied was collected in Turkmenistan, Tajikistan, Kirgizistan, and Uzbekistan. *Calopteryx orientalis*, *Sympecma fusca*, *S. gobica*, *S. paedisca*, *Lestes barbarus*, *Callaeschna microstigma*, *Cordulegaster insignis*, *Sympetrum striolatum*, *S. vulgatum*, and *S. sinaiticum* are commented more in detail, and partly illustrated. Of some interest are the records of *Onychogomphus forcipatus* in the eastern part of its range and of the very rare *Ladona pontica*.] Address: Schoorl, J. W., Jr., F Simonszstraat 86 II, 1017 TK, Amsterdam, The Netherlands

2051. Stoks, R.; Johansson, F. (2000): Trading off mortality risk against foraging effort in damselflies that differ in life cycle length. *Oikos* 91(3): 559-567. (in English). ["Life history theory predicts that size and age at emergence depend on the slope and shape of the relationship between mortality rate and foraging effort. Given the high expected foraging effort in obligate univoltine species compared with semivoltine species we expected a low slope and an increase in foraging effort in the presence of a predator for the former and the opposite pattern for the latter. We tested these predictions in two damselfly species of the univoltine genus *Lestes*, and the semi-voltine genus *Coenagrion* when confronted with perch. We determined for each of the four study species the relationships between mortality rate and foraging effort at an individual level. As expected by the different growth demands associated with differences in life cycle length, both *Lestes* species had a higher foraging effort than the two *Coenagrion* species in the absence as well as in the presence of perch. As a result, *lestids* also suffered a higher mortality rate. The slope of the regression between mortality rate and foraging effort was, as predicted, lower for *lestids* than for *coenagrionids*, for one species pair. Despite this, and opposite to our prediction, the *lestids* decreased foraging effort even more than *coenagrionids* in the presence of perch. We discuss these findings in the light of life history responses in species that differ in life cycle length." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

2052. Stolzenburg, U. (2000): Nachweis der Arktischen Smaragdlibelle (*Somatochlora arctica* Zetterstedt, 1840) in der Radeburger Heide. Veröff. Mus. Westlausitz Kamenz 22: 93-96. (in German). [Saxonia, Germany, Landkreis Meißen, NSG "Töpfergrund in der Radeburger Heide"; *S. arctica* was recorded in June / July 2000 and May/June 2001. The habitat and co-occurring odonate species are described, and some conservation measures are proposed.] Address: Stolzenburg, U., Bärnsdorfer Str. 1a, D-01471 Berbisdorf, Germany

2053. Tanaka, S. (2000): Induction of darkening by corazonins in several species of Orthoptera and their possible presence in ten insect orders. *Applied Entomology & Zoology* 35(4): 509-517. (in English). ["(His7)-corazonin is known to play an important role in the control of body-color polymorphism in the migratory locust, *Locusta migratoria* (Orthoptera: Acrididae). Another neuropeptide, (Arg7)-corazonin, which has been isolated from other insects, is also known to induce darkening in this locust. These two neuropeptides were injected into nymphs of other orthopteran species to determine if they could induce darkening in those species. The test species belonged to 4 families: Acrididae (*Acrida cinerea*, *Gastrimargus marmoratus* and *Nomadacris succincta*), Catantopidae (*Oxya yezoensis*), Pyrgomorphidae (*Atractomorpha lata*), and Tettigoniidae (*Euconocephalus pallidus*). Except for the katydid, *E. pallidus*, all species injected with 1 nmol of (His7)-corazonin turned dark as compared with oil-injected controls. (Arg7)-corazonin showed a similar effect in the two acridid species tested, but no effect in the katydid. These results suggest that (His7)-corazonin or a similar neuropeptide may be involved in the control of body color in the locusts and grasshoppers, but not in the katydid. When a brain and/or corpora cardiaca (CC)

When a brain and/or corpora cardiaca (CC) taken from nymphs of each test species were implanted in albino nymphs of *L. migratoria*, dark color was induced in the latter, indicating that all test orthopterans contained some factor identical or similar to (His7)- or (Arg7)-corazonin. Likewise, brain-CC complexes from 47 other species of 10 insect orders including Orthoptera, Dermaptera, Dictyoptera, Isoptera, Homoptera, Hemiptera, Odonata, Hymenoptera, Lepidoptera, and Diptera induced darkening in albino locusts, whereas those from 8 species of Coleoptera all failed to do so." (Author)] Address: Tanaka, S., Department of Insect Physiology and Behavior, National Institute of Sericultural and Entomological Science, Tsukuba, Ibaraki, 305-8634, Japan. E-mail: stanaka@nises.affrc.go.jp

2054. Tannert, R.; Rupprecht, R. (2000): Erfassung der Insektenfauna im Nürnberger Reichswald bei Fischbach-Brunn von 1978 bis 1999, insbesondere Macro-, Microlepidoptera und Coleoptera. *Galathea* 16(3): 75-108. (in German with English summary). [Nürnberg, Bavaria, Germany; *Pyrrhosoma nymphula*, *Aeshna cyanea*] Address: Tannert, R., Josef Simon Str. 52, D-90473 Nürnberg, Germany

2055. Thomas, H. (2000): La boîte à bonnes bêtes. *Bulletin de la Société Linnéenne de Bordeaux* 28(3): 152-155. (in French). [*Leucorrhinia albifrons* was recorded in a bog on 29-06-1993 in Hostens, Département Gironde, France] Address: Thomas, H., 48 rue du Bocage, F-33200 Bordeaux, France. E-mail: pelobates@wanadoo.fr

2056. Witte, R (2000): Zuidelijke Glazenmaker (*Aeshna affinis*) ontdekt tijdens de excursie op de Schotsman. *Zeeuwse Prikkebeen* 8(3): 5-7. (in Dutch). [*A. affinis* and additional 8 Odonata are listed from the Schotsman, Zeeland prov., the Netherlands; 19-V11I-2000.] Address: Witte, R., Parelplein 36, NL-4337 MS Middelburg, The Netherlands. E-mail: Richard.Phoenix@planet.nl

2057. Zipfel, C.; Xylander, W.E.R. (2000): Zoogeographical investigations on *Cercion lindenii* (Odonata, Coenagrionidae) based on morphometry and isoenzyme-PAGE. *Zoology* 103 (Suppl. 3): 14. (in English). [Verbatim: *C. lindenii* occurs in Germany with at least two isolated populations that are considered to represent different subspecies. *C. lindenii* has been increasing its zoogeographical distribution significantly since the early eighties and the isolation may be overcome within the next years. In this investigation, therefore, 117 adult specimens from five localities have been investigated regarding their wing morphometry and protein differences in electrophoresis: two each from southwestern (Giessen, Hessen; St. Leon, Baden-Württemberg) and central (Rheine, Nordrhein-Westfalen; Hameln, Niedersachsen), and one from eastern Germany (Großer Schwansee, Brandenburg). Wing morphometry showed significant differences (euclidean distance and UPGMA) between the eastern and all other populations. The males of the eastern population had larger wings whereas there was no significant difference between the females. This corresponds to earlier results (Beutler, H., 1985, *Faun. Abh. Staatl. Mus. Tierk., Dresden* 49, 82) but may, however, not definitively indicate the occurrence of an eastern subspecies, whereas odonate populations from colder regions tend to have larger wings (Carius, W., 1993, Dissertation,

Univ. Bremen). 5 of 21 enzymes tested were polymorphic (IDH, esterases, PGM, GPD, diaphorase); in all cases but one the less frequent allele(s) occurred only in heterozygotes. Specimens from central Germany showed the highest heterozygosity (up to half of the population in IDH) whereas all other locations tested showed very high frequencies of one allele and low frequencies of all others or were homozygote. Also similarities between distant populations are often higher than to those from nearer locations. Regarding the isoenzyme patterns found, the German *C. lindenii* populations appear to be biochemically rather uniform and the variability is too low for postulating two subspecies. The evaluation of the total protein spectrum, however, showed that two groups can be differentiated: one group comprising all western populations investigated (Hameln, Rheine, Giessen, St. Leon) showed a homogeneous pattern of protein bands (within and between populations). The protein samples from the Schwansee population, however, differed significantly. The similarity between the Schwansee and the other populations decreased continuously from north to south.] Address: Zipfel, C., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany

2001

2058. Andrés, J.A.; Cordero Rivera, A. (2001): Survival rates in a natural population of the damselfly *Ceragrion tenellum*: effects of sex and female phenotype. *Ecological Entomology* 26: 341-346. (in English). ["1. *Ceragrion tenellum* females show genetic colour polymorphism. Androchrome (erythrogastrum) females are brightly (male-like) coloured while gynochrome females (typica and melanogastrum) show cryptic colouration. 2. Several hypotheses have been proposed to explain the existence of more than one female morph in damselfly populations. The reproductive isolation and intraspecific mimicry hypotheses predict greater survival of gynochrome females, while the density dependent hypothesis predicts no differential survival between morphs. 3. Mature males had greater recapture probability than females while the survival probability was similar for both sexes. Survival and recapture rates were similar for androchrome and gynochrome females. 4. Gynochrome females showed greater mortality or migration rate than androchrome females during the pre-reproductive period. This result is not predicted by the above hypotheses or by the null hypothesis that colour polymorphism is only maintained by random factors: founder effects, genetic drift, and migration." (Authors)] Address: Andrés, J.A., Department of Ecology and Environmental Science, Animal Ecology, SE-90187 Umeå, Sweden. E-mail: jose.andres@eg.umu.se

2059. Andrew, R.J. (2001): Evidence of sperm displacement in *Ischnura aurora* (Brauer) (Zygoptera: Coenagrionidae). *Odonatologica* 30(4): 435-439. (in English). ["Five spindle-shaped sperm 'pellets' (bundles) were found in the vagina of copulation-interrupted androchrome female. The second and third pellets had a long thin tail while the fourth had partly and the fifth completely disintegrated. In an other female, the vagina was packed with sperm material even though the sperm storage organs (spermatheca and bursa copulatrix) were completely filled. It is proposed that this sp. exhibits a transitional reproductive behaviour with respect to

sperm competition." (Author)] Address: Andrew, R.J., Department of Zoology, Shri Shivaji ESA's Science College, Congress Nagar, Nagpur - 440012 (MS), India

2060. Anholt, B.; Vorburger, C.; Knaus, P. (2001): Mark-recapture estimates of daily survival rates of two damselflies (*Coenagrion puella* and *Ischnura elegans*). *Canadian Journal of Zoology* 79(5): 895-899. (in English with French summary). ["Male-biased operational sex ratios are very common in sexually mature dragonflies. These may be due to differential survival or differences in time spent at the breeding site by the sexes. Because most studies are carried out at the breeding site, these two processes can be measured as survival rates or recapture rates using modern capture-mark-recapture methods. We marked 66 female and 233 male *Coenagrion puella*, and 137 female and 347 male *Ischnura elegans* during three capture periods spread over 18 days. Each time an animal was recaptured it was remarked so that the capture history of any captured animal could be readily identified. We recaptured 131 *C. puella* and 55 *I. elegans* at least once. We used the Cormack-Jolly-Seber model to estimate the daily probability of survival and recapture. The probability of recapture was, on average, more than three times higher for male *C. puella* (0.489) than females (0.133) with significant day to day variation. The daily probability of survival did not differ significantly between the sexes (0.860), with no significant variation among days. In contrast, in *I. elegans* the probability of recapture did not differ between the sexes (0.139 for the first 5 days; between 0.032 and 0.287 for the final 3 days), but the daily probability of surviving was much higher for males (0.812) than for females (0.579). Assuming that the sex ratio was unity at sexual maturity, the recapture and survival rates predicted well the sex ratio of the sample of *C. puella* but predicted more males than were observed in the sample of *I. elegans*. This suggests that male *I. elegans* may suffer higher mortality than females in the immature stage." (Authors)] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada. E-mail: banholt@uvic.ca

2061. Arai, Y. (2001): Wonders of dragonflies (Tombo no Fushigi). Dobutsu-sha. Tokyo. Japan: 166 pp. (in Japanese). [This book based on the author's observations made in many years and the uniqueness of his hypotheses regarding the ecology of dragonflies. Therefore this book is enriched with many suggestions and problems to be investigated. Contents. Prologue. Part 1 Midair: Quiz on Odonata 12; wings are most important to fly 15; eyes more beautiful than jewels 17; though fragile legs are indispensable 19; aim of their lives 20; the reason why they do not stay at emergence sites 22; aka-tombo is not a name for the species 23; travel for summering 25; how to clarify the enigma 27; doubt on the accepted view 29; ransoceanic dragonflies 30; coming over to Chichibu City 31; cause of the death 34; why do they go north? 35; rendez-vous sites of both males and females 37; males' strategies for mating 39; Shiokara-tombo (male of *Orthetrum albistylum speciosum*) and Mugiwara-tombo (female of the species) 42; need not hold territories 45; awaiting females at roosting sites 47; process of copulation 48; gentle courtship 52; refusal of copulation 54; two ways of prevention of unfaithfulness of females 57; choose ways to suit cases 60; various ways of oviposition 61; oviposition at midnight 64; one hypothesis 66; intriguing styles of perching 68; dragonflies at night 70; bathing in the

water and dress up 72; predators 74; overwintering 76; another way of wintering 77; catching dragonflies 80; smart catching of dragonflies 81. Part 2 Underwater: What is a larva? 86; their lives 88; how to breed larvae 89; preparation for emergence 92; dramatic emergence 93; the first step of the underwater life 95; lotic larvae 98; lentic larvae 101; dragonflies living in the rice paddies 102; tragedies of *Sympetrum frequens* 104; larvae living in different habitats 106; enigma of *Oligoaeschna pryleri* 108; morphology of larvae 110; how to distinguish larvae 113; feed of larvae 113; four ways of lives 116; predators of larvae 117; ways to protect themselves 119; death mimicry 121; go downstream 122; why larvae go downstream? 124; survival from drought 126; larvae tolerant or intolerant of drought 130; one more step to the wonderful world 132. Part 3 Easy way to distinguish 30 species: Let's learn about familiar dragonflies 136; there is no rule without exceptions 137; males have penes 137; three groups of Odonata 139; Aeshnidae 140; Cordulegastridae 141; Corduliidae 141; Libellulidae 142; Gomphidae 146; Calopterygidae 146; Coenagrionidae 147; Platycnemididae 148; Lestidae 149. Epilogue 162. Index 165. Translation: Naoya Ishizawa] Address: Arai, Yutaka, 1233-2, Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-1205. Japan. Published by Dobutsu-sha, 4-27-4, Koenji-kita, Suginami-ku, Tokyo, 166-0002, Japan. Price: 1,500 Yen (tax 75 Yen + postage added)

2062. Artiss, T.; Schultz, T.R.; Polhemus, D.A.; Simon, C. (2001): Molecular phylogenetic analysis of the dragonfly genera *Libellula*, *Ladona*, and *Plathemis* (Odonata: Libellulidae) based on mitochondrial cytochrome oxidase I and 16S rRNA sequence data. *Molecular Phylogenetics & Evolution* 18(3): 348-361. (in English). ["Molecular phylogenetic relationships among members of the odonate genus *Libellula* (Odonata: Anisoptera: Libellulidae) were examined using 735 bp of mitochondrial COI and 416 bp of 16S ribosomal RNA gene sequences. Considerable debate exists over several relationships within *Libellula*, as well over the status of two putative genera often placed as subgenera within *Libellula*: *Ladona* and *Plathemis*. Parsimony and maximum-likelihood analyses of the separate and combined data sets indicate that *Plathemis* is basal and monophyletic and that *Ladona* is the sister clade to the remainder of *Libellula sensu stricto* (s.s.) (all species within the genus *Libellula*, excluding *Plathemis* and *Ladona*). Moreover, two European taxa, *Libellula fulva* and *L. depressa*, were found to occupy a sister group relationship within the *Ladona* clade. Relationships within *Libellula* s.s. are less well resolved. However, monophyletic lineages within the genus are largely consistent with morphologically based subgeneric classifications. Although tree topologies from each analysis differed in some details, the differences were in no case statistically significant. The analysis of the combined COI and 16S data yielded trees with overall stronger support than analyses of either gene alone. Several analyses failed to support the monophyly of *Libellula sensu lato* due to the inclusion of one or more outgroup species. However, statistical comparisons of topologies produced by unconstrained analyses and analyses in which the monophyly of *Libellula* was constrained indicate that any differences are nonsignificant. Based on morphological data, we therefore reject the paraphyly of *Libellula* and accept the outgroup status of *Orthemis ferruginea* and *Pachydiplax longipennis*." (Authors)] Address: Artiss, T., Lakeside School, 14050 1st Avenue NE, Seat-

tle, WA, 98125. USA. E-mail: thomas.artiss@lakesideschool.org

2063. Babbitt, K.J. (2001): Behaviour and growth of southern Leopard frog (*Rana sphenoccephala*) tadpoles: Effects of food and predation risk. *Canadian Journal of Zoology* 79(5): 809-814. (in English with French summary). ["I examined the effects of a nonlethal predator, larvae of the odonate *Anax junius*, and food-resource level on behaviour and growth of larval southern Leopard frogs (*Rana sphenoccephala*) to test whether the strength of effects of a nonlethal predator was influenced by background resource level. I crossed two levels of food resources, growth-limiting and non-growth-limiting, with the presence or absence of *A. junius*. Tadpoles responded to predators by altering spatial distribution and activity. When predators were present, tadpoles on both food treatments had similar low levels of activity, but tadpoles on the nonlimiting food treatment showed a much larger reduction in activity than tadpoles on the growth-limiting treatment. Tadpoles on both food treatments delayed metamorphosis when exposed to predators. Growth and size at metamorphosis were affected significantly by food treatment but not by predator treatment. However, the direction of response to predators differed. Tadpoles on the growth-limiting treatment were larger at metamorphosis and grew faster when exposed to predators; the opposite was true for tadpoles on the non-growth-limited food treatment. This raises the interesting possibility that for some species experiencing low resource availability, predators may induce a behaviourally mediated positive effect on growth." (Author)] Address: Babbitt K J, Dept of Natural Resources, University of New Hampshire, Durham, NH, 03824: kbabbitt@christa.unh.edu USA

2064. Baptista, D.F.; Dorville, L.; Buss, D.F.; Nessiamian, J.L. (2001): Spatial and temporal organization of aquatic insects assemblages in the longitudinal gradient of a tropical river. *Brazilian Journal of Biology* 61(2): 295-304. (in English with Portuguese summary). ["The distribution and abundance of aquatic insects were studied in the longitudinal gradient of the watershed of Macae River, a coastal Atlantic Forest river in Southeastern Brazil. Sampling stations were selected in the first, second, fourth, fifth, and sixth orders and sampled in April, July, and October 1995. This represented the end of the rainy season, the dry season, and the beginning of another rainy season, respectively. In each month four samples were collected using a Surber sampler from each of the following substrates: sand, litter deposited in pool areas, litter in riffle areas, and stones. A total of 46,431 specimens of aquatic insects belonging to ten orders were obtained. The data were analyzed by the multivariate methodologies of Correspondence Analysis (CA) and Cluster Analysis (UPGMA) using the similarity index of Morisita, for all three months. Both showed a significant faunal disruption in the river, which can be divided in two sections: the upper one, from first to fourth orders, and the lower section, including fifth and sixth orders. The same results were obtained with presence-absence matrices, using Jaccard similarity index, showing that the changes are not only due to quantitative differences. A Mantel test was used to compare the assemblage composition temporally and no difference was detected between the three months. Moreover, a Canonical Correspondence Analysis (CCA) was applied to the data to check which of the 14 physical and chemical variables significantly

explained macro-invertebrate community variation. The most significant variables were conductivity, CPOM, and pH for the upper stations (1st, 2nd and 4th orders), and alkalinity, FPOM, and HCO₃ for the lower stations (5th and 6th orders)." (Authors)] Address: Baptista, D.F., Laboratorio de Avaliacao e Promocao da Saude Ambiental, Departamento de Biologia, IOC, Fiocruz, Av. Brasil, 4.365, CEP 21045-900, Manguinhos, Rio de Janeiro. Brazil. E-mail: darcilio@gene.dbbm.fiocruz.br

2065. Benke, A.C.; Wallace, J.B.; Harrison, J.W.; Koebel, J.W. (2001): Food web quantification using secondary production analysis: Predaceous invertebrates of the snag habitat in a subtropical river. *Freshwater Biology* 46(3): 329-346. (in English). ["1. Secondary production was estimated for Plecoptera, Odonata and Megaloptera (mostly large predators) occurring on the snag habitat of a subtropical blackwater river in the southeastern U.S.A. Coastal Plain for 2 years. Production estimates and gut analyses were used in estimating species-specific ingestion to construct a quantitative foodweb of the predator portion of the invertebrate assemblage. Neither basal resources (e.g. detritus) nor predaceous vertebrates (e.g. fishes) were considered in this analysis. A discharge-specific model of snag-habitat availability was used to convert values per m² of snag surface to values per m² of river bed. 2. These three orders included the major large predators on the snag habitat, as well as two detritivorous stoneflies. The major predators were the hellgrammite (*Corydalus cornutus*), five perlid stoneflies (*Paragnetina kansensis*, *Perlesta placida*, *Neoperla clymene*, *Acroneturia evoluta* and *A. abnormis*) and two dragonflies (*Neurocordulia molesta* and *Boyeria vinosa*). The detritivores were *Pteronarcys dorsata* and *Taeniopteryx lita*. 3. Total predator production was high, but varied from only 7.1 to 7.4 g dry mass (DM) m⁻² y⁻¹ of snag surface (2.4-2.7 g DM m⁻² y⁻¹ of river bed) over two years. *Corydalus* was the largest predator and had the highest production (2.8-3.1 g DM m⁻² of snag surface). The most productive stoneflies were *Perlesta* (0.7-1.0 g DM m⁻² of snag surface) and *Paragnetina* (1.0-1.3 g DM m⁻² of snag surface). The most productive dragonfly was *Neurocordulia* (0.7-1.9 g DM m⁻² of snag surface). Production of the non-predaceous stoneflies was 1.0-2.3 g DM m⁻² of snag surface. Production values per m² of river bed were 2-3.5 times lower than the values per m² snag surface. 4. Measurement of ingestion fluxes within the predator portion of the food web showed that predaceous invertebrates were primarily supported by chironomid and mayfly prey. However, the greatest consumption of chironomids and mayflies was by omnivorous hydropsychid caddisflies, which had a considerably higher production than the larger predators. There was a hierarchy of feeding with *Corydalus* as top predator consuming all other groups, followed in order by dragonflies, stoneflies and hydropsychids. Although the feeding hierarchy suggested the presence of four predatory trophic levels within the invertebrate assemblage, calculations of trophic position indicated there were less than two. With primary consumers (e.g. midges) having a trophic position of 2, *Corydalus* had a trophic position of only 3.5. 5. A relatively high fraction of invertebrate production was consumed by predaceous invertebrates, ranging from 9 to > 100% for various primary consumer groups, with total consumption representing 52% of total production. Because these estimates do not include vertebrate consumption or emergence, it means that a high fraction of larval mortality is due to predation."

(Authors)] Address: Benke, A.C., Department of Biological Sciences, University of Alabama, Tuscaloosa, AL, 35487. USA. E-mail: abenke@biology.as.ua.edu

2066. Benstead, J.P.; Barnes, K.H.; Pringle, C.M. (2001): Diet, activity patterns, foraging movement and responses to deforestation of the aquatic tenrec *Limnogale mergulus* (Lipotyphla: Tenrecidae) in eastern Madagascar. *Journal of Zoology (London)* 254(1): 119-129. (in English). ["The aquatic or web-footed tenrec *Limnogale mergulus* is a semi-aquatic lipotyphlan insectivore known only from stream habitats of eastern Madagascar. *Limnogale* is considered a high conservation priority because of its rarity, suspected vulnerability to habitat degradation, and unique ecological niche on the island. However, its ecology and behaviour remain poorly understood. Quantitative faecal analysis and radio-tracking were used to study the diet and foraging activity of *Limnogale* in eastern Madagascar. Faecal pellet counts along forest and zero-canopy streams were also conducted to examine the response of aquatic tenrec populations to catchment deforestation. Faecal analysis indicated that the diet of *Limnogale* consists mainly of larval and adult aquatic insects, larval anurans and crayfishes. The most important prey were Ephemeroptera, Odonata and Trichoptera larvae. Diets did not differ substantially between forest and zero-canopy streams. Radio-tracking of two individuals indicated that *Limnogale* is strictly nocturnal and remains in streamside burrows during daylight. Nocturnal movement was restricted solely to stream channels and consisted of active foraging by swimming and diving. Distance travelled per night ranged from 200 to 1550 m along the stream channel (means 1067 and 860 m, respectively). The total lengths of stream channel used by the two aquatic tenrecs during each radio-tracking study were 1160 and 505 m, respectively. Faecal pellet counts along forest and zero-canopy streams suggested that *Limnogale* was at least as abundant in zero-canopy streams. This finding suggests that *Limnogale* is not an obligate forest species; however, it preys on benthic communities that are extremely vulnerable to sedimentation. Control of excessive sedimentation and maintenance of healthy benthic communities are essential to *Limnogale* conservation. We include an updated list of known sites for *Limnogale* and recommend the use of faecal pellet surveys to assess the current distribution of the species." (Authors)] Address: Benstead, J.P., Institute of Ecology, University of Georgia, Athens, GA, 30602. USA. E-mail: benstead@sparc.ecology.uga.edu

2067. Benzler, A. (2001): Seltene, bedrohte und endemische Tier- und Pflanzenarten - Auswahl von Artengruppen und Arten für ein bundesweites Naturschutzmonitoring. *Natur und Landschaft* 76(2): 70-87. (in German with English summary). ["In 1999 a nationwide monitoring concept for nature conservation was elaborated by a working group comprising experts of the nature conservation authorities of the German federal states (Länder) and the German Federal Agency for Nature Conservation. This was spurred by the lack of biotic data on national level, which is needed urgently in order to evaluate biodiversity status and trends, and to provide arguments for the policy process. This paper considers only one component of the overall concept, namely the monitoring of rare, threatened and endemic animal and plant species. Three groups of species are considered; species which must be monitored under

commitments resulting from international agreements and directives, species which are the object of particular German responsibility (e.g. endemic species) and species which are the focus of conflicts between nature conservation and land-use interests. The objective of monitoring is to meet the need for nation-wide representative data on these species. The paper describes the methods of selecting systematic species groups and species, and presents the species lists in an annex. There is a need for further work to develop monitoring methods." *Aeshna viridis*, *Coenagrion hylas*, *C. mercuriale*, *Epitheca bimaculata*, *Stylurus flavipes*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, *Nehalennia speciosa*, *Ophiogomphus cecilia*, *Oxygastra curtisii*, and *Sympecma paedisca* are selected for odonatological monitoring.] Address: Benzler, A., Bundesamt für Naturschutz, Konstantinstr. 110, D-53179 Bonn, Germany

2068. Bilton, D.T.; Foggo, A.; Rundle, S.D. (2001): Size, permanence and the proportion of predators in ponds. *Arch. Hydrobiol.* 151(3): 451-458. (in English). ["The species richness and proportion of predatory species were investigated in ponds of differing area and permanence on the Lizard Peninsula, West Cornwall, UK, an area with a high density of seasonally fluctuating waterbodies, and a rich aquatic biota. A total of 169 taxa [including "Odonata"] were identified through monthly sampling of 16 ponds. Permanence, rather than pond area, was strongly related to overall species richness and the proportion of predators found. These results contrast with other studies which have shown strong effects of area on such community parameters. We suggest that issues of scale, and differences in regional species pools account for these contrasting results, and should be considered when searching for common factors underlying community attributes." (Authors)] Address: Bilton, D.T., Department of Biological Sciences & Plymouth Environmental Research Centre, University of Plymouth, Drake Circus, Plymouth PL4 8 AA, UK. E-mail: dbilton@plym.ac.uk

2069. Bönsel, A. (2001): Zusammenhänge zwischen der Gewässereutrophierung und der Ausbreitung von *Erythromma viridulum* (CHARP. 1840) (Zygoptera: Coenagrionidae), am Beispiel von Mecklenburg-Vorpommern. *Zeitschrift für Ökologie und Naturschutz* 9: 211-217. (in German with English summary). ["*E. viridulum* obviously established local populations only during the last 10-20 years in the northern part of Mecklenburg-Vorpommern. Only in the southern part the species was found already in the 1960's. At the end of the 20th century it occurred all over the county [...]. The phenomenon of expansion was not connected with the global climate change. It was rather the water eutrophication that created the conditions for a successful establishment of the originally Mediterranean species in northern Central Europe. Eutrophication supported the expansion of *Ceratophyllum* species. The enormous biomass production caused foul sludge deposits which entailed a decreasing water level. Shallow waters warm up rapidly. So numerous thermically favourable larval waters were created for the Mediterranean species. Besides few predatory species or other dragonflies were found amongst the tangle of the *Ceratophyllum*-population. This missing pressure by competition and predators is also considered as a favourable habitat constellation for the establishment of *Erythromma viridulum*." (Author)] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresen-

D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

2070. Borisov, S.N.; Haritonov, A.Y. (2001): A study of dragonflies of central Asian Nature Reserves. *Belyshevia* 1(1): 2-5. (in Russian, with short English summary). [In Central Asia 15 Nature Reserves were established; 7 of them - the one with information of their odonate fauna - are shortly characterised. The Odonata are presented in a checklist with information on their presence in the very Nature Reserve. It is not clear if the list was checked critically, for it seems impossible that e.g. *Coenagrion scitulum* is occurring in the region (The species was given for the nature Reserve Ramit).] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia

2071. Braune, P.; Rolff, J. (2001): Parasitism and survival in a damselfly: Does host sex matter? *Proc. Royal Soc. Biol. Sci. Ser. B* 268(1472): 1133-1137. (in English). ["We present experimental data on the survivorship of damselflies infested by parasitic water mites from a population in field cages. In addition, we show correlative laboratory data under simulated severe weather conditions. In the manipulative experiment, parasitized females' individual condition, which was measured as weight at emergence, was an important determinant of survival under field conditions. In contrast, such a relationship did not occur in males and unparasitized females. It was found in the laboratory experiment that water mites as well as weight at emergence both contributed significantly to the reduced survivorship of male and female damselflies. It was concluded that the impact of parasitism depends on environmental conditions and that host sexes differ in their responses to parasitism. This is discussed in the light of immunocompetence in invertebrates." (Authors)] Address: Rolff, J., Evolutionary Ecology Group, Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN. UK. E-mail: jor@sheffield.ac.uk

2072. Bree, D. (2001): Further notes on the Odonata of Sandbanks Provincial Park. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 24-26. (in English) ["Records on flight periods, abundance, and behaviour are provided for 17 species of odonates from Sandbanks Provincial Park, Ontario. *Aeshna canadensis*, *Sympetrum internum*, and *S. semicinctum* are added to the park list, while *Argia jumipennis violacea* is removed." (Author)] Address: Bree, D., Box 123, Bloomfield, Ontario K0K 1G0, Canada. E-mail: dbree@post.kosone.com

2073. Buczynski, P. (2001): Dragonflies (Insecta: Odonata) of the Krzczonowski Landscape Park. *Park Narodowe i Rezerwat Przyrody* 20(1): 63-78. (in Polish with English summary). [The area of Krzczonowski Landscape Park is deforested and impacted by an intensive agriculture. Water basins occur almost exclusively in river valleys. The rivers Gieiczew, Gielczewka and Olszanka drain the area. They are free of organic pollution. Only the Olszanka is impacted by poultry droppings. The rivers are partially regulated and their valleys are reclaimed. Dragonflies were studied in the years 1998 - 2000 at 38 localities of which only 26 are dragonfly habitats. 37 species have been found. The

species number is low, especially compared with other protected areas in the SE Poland (e.g. Poleski National Park: 52 species, Janowskie Forests Landscape Park: 58). Only 13 species occurred outside of the river valleys, but all species are representatives of the "valley-fauna": 15 species were collected in the Olszanka, 24 in the GieJczewka, and 36 in the Gietczew valley. The highest diversity was found at ponds and small pools.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2074. Buczynski, P. (2001): The first record of *Coenagrion armatum* (Charpentier, 1840) (Odonata: Coenagrionidae) from the Roztocze Upland. *Wiad. entomol.* 20(1-2): 87-88. (in Polish). [The in Poland "Critically Endangered" *C. armatum* was discovered in May 2000 in the floodplain of River Wieprz near the village Gućiów. Locality, habitat and co-occurring species are described, and the current situation of the species in Poland is discussed.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2075. Buskirk, J. van; Saxer, G. (2001): Delayed costs of an induced defense in tadpoles? Morphology, hopping, and development rate at metamorphosis. *Evolution* 55(4): 821-829. (in English). ["Models for the evolution of plasticity predict that individuals having phenotypes induced by exposure to enemies should experience relatively low fitness when enemies are absent. However, costs of induced phenotypes have been difficult to find in both plants and animals, perhaps because costs are expressed at later stages in the life cycle. We searched for delayed costs of an induced defense in larvae of the water frog *Rana ridibunda*, which exhibits strong phenotypic responses to predators. Tadpoles grew to metamorphosis in outdoor artificial ponds, in either the presence or absence of *Aeshna* dragonfly larvae confined within cages. We collected metamorphs at forelimb emergence, estimated their development rate until tail resorption was complete, and measured their body and leg shape and hopping performance. Development rate through metamorphosis reflects the duration of a transitional period during which metamorphs are especially vulnerable to predators, and hopping performance may reflect ability to escape predators. Froglets from the dragonfly treatment lost mass through metamorphosis significantly faster than those from predator-free ponds, but they resorbed their tails at about the same rate, despite the fact that their tails were relatively large to begin with. Froglets developing from predator-induced tadpoles had shorter, more muscular legs, and hopped 5% longer distances (difference not significant). Therefore, producing an induced defense against insect predators during the tadpole stage did not exact a cost during or immediately after metamorphosis; if anything, tadpoles with the predator-induced phenotype gave rise to more vigorous froglets. These results focus attention on other costs of the induced phenotype, as well as alternative explanations for plasticity that do not rely on direct fitness trade-offs." (Authors)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

2076. Buskirk, J. van (2001): Specific induced responses to different predator species in anuran larvae. *Jour. evol. biol.* 14(3): 482-489. (in English). ["Models of de-

fence against multiple enemies predict that specialized responses to each enemy should evolve only under restrictive conditions. Nevertheless, tadpoles of *Rana temporaria* can differentiate among several predator species. Small tadpoles used a refuge when *Notonecta* backswimmers were in the pond, but showed a weaker hiding response to adult *Triturus alpestris* newts and no response to aeshnid dragonfly larvae (*Aeshna* and *Anax*). All predators caused a decline in feeding and swimming activity. Large tadpoles reserved the strongest behavioural response for dragonflies, while *Triturus* caused no response. The shift during development suggests that tadpoles distinguished among predators, rather than exhibiting a graded dosage response to a single cue associated with predation. Information on habitat distributions of predators suggests that they are regularly encountered, which would facilitate evolution of adaptive behavioural responses. Morphological responses to all predators were similar, perhaps because similar morphologies defend against all four predators. The evolutionary maintenance of specialized responses to multiple predators may be possible because adaptive responses do not conflict and the predators themselves do not interact strongly." (Author)] Address: Buskirk, J. van, Inst. Zool., Univ. of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

2077. Carchini, G.; Chiarotti, F.; Di Domenico, M.; Mattocchia, M.; Paganotti, G. (2001): Fluctuating asymmetry, mating success, body size and heterozygosity in *Coenagrion scitulum* (Rambur) (Odonata: Coenagrionidae). *Animal Behaviour* 61(3): 661-669. (in English). ["For decades fluctuating asymmetry (FA) has been considered a good descriptor of developmental stability. Correlations have been shown between FA and several fitness components, including mating success and heterozygosity level. However, some doubts have been expressed about the generalization of these results, perhaps because of bias towards positive results and a poor critical approach in the first phase of FA studies. Studies on Odonata are scarce and are concentrated on the Coenagrionidae family, with contrasting results in the relationships between FA and mating success, size and other fitness components. We investigated the relationships between FA expressed as right - left wing length ($R - L$), body size expressed as $(R+L)/2$, multilocus and single locus heterozygosity assessed by allozyme electrophoresis and short-term mating success (SMS) assessed from the status (mated or not) of the males at the moment of collection. We collected 260 males from a breeding population. The data were analysed by both univariate and multifactorial statistical methods. After excluding a correlation between FA and body size, we checked the presence of a true FA by using tests for normality, directional asymmetry, antisymmetry and difference from the interindividual variations. The results showed no correlation between FA (either signed or absolute) and heterozygosity, body size and SMS, while heterozygosity was clearly positively correlated with body size and with SMS. Our data suggest an effect of the presence of some particular alleles on SMS, instead of an effect of the multilocus heterozygosity, even if the presence of only three polymorphic loci weakens the conclusions. Finally, no correlation was found between body size and SMS." (Authors)] Address: Carchini, G., Dipartimento di Biologia, Università 'Tor Vergata', Via della Ricerca Scientifica, I-00133, Roma. Italy. E-mail: carchini@uniroma2.it

2078. Cashatt, E.D.; Vogt, T.E. (2001): Description of the larva of *Somatochlora hineana* with a key to the larvae of the North American species of *Somatochlora* (Odonata: Corduliidae). *Int. Jour. Odonatology* 4(2): 93-105. (in English). ["A detailed description of the final stadium of *Somatochlora hineana*, with brief notes on the penultimate stadium, is presented. An illustration of the entire larva and separate line drawings of the labium and dorsal and lateral views of the abdomen are also included. The habitat of the larva is discussed briefly. Combinations of diagnostic characters are used for distinguishing the *S. hineana* larva from its allied congeners.[...]" (Authors)] Address: Cashatt, E.D., Zoology Section, Illinois State Museum Research and Collection Center, 1011 East Ash, Springfield, IL 62703, USA. E-mail: cashatt@museum.state.il.us

2079. Chivers, D.; Mirza, R.S. (2001): Importance of predator diet cues in responses of larval wood frogs to fish and invertebrate predators. *Journal of Chemical Ecology* 27(1): 45-51. (in English). ["We examined the effects of predator diet on the antipredator responses of larval woodfrogs (*Rana sylvatica*). We found that tadpoles showed stronger responses to fish (*Perca flavescens*) than were fed tadpoles than those fed invertebrates. Similarly, we found that tadpoles responded more strongly to larval dragonflies (*Anax* spp.) fed tadpoles than to dragonflies fed invertebrates. The overall intensity of response of tadpoles to fish was much stronger than that to dragonflies. Predator diet effects are not ubiquitous in predator-prey systems. We discuss possible reasons why predator diet effects are seen in some, but not all, predator-prey systems." (Authors)] Address: Chivers, D., Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, Saskatchewan, S7N 5E2. Canada. E-mail: doug.chivers@usask.ca

2080. Clausnitzer, H.-J. (2001): Auswirkungen von Naturschutzmaßnahmen auf Libellen und Lurche: Ökologische Verbesserung an Bächen durch Rückbau von Teichen. *Natur und Landschaft* 76(4): 145-151. (in German with English summary). ["In the basin of the Lutter, a small river in Lower Saxony (Germany), three large fishpond areas through which the river flows were converted with the aim of ecological restoration of the river. Two former fishpond areas are developing into oligotrophic spring fens; the river flows through these. It does not flow through the third former fishpond area; here, after the removal of dams, small pools, ponds and ephemeral waters have resulted. The article describes the effects of these measures on amphibians and dragonflies. All previous amphibian species are still present, but *Bufo bufo* is not expected to have much breeding success in the future. *Rana esculenta* is also reproducing less. On the other hand, *Rana temporaria* is profiting from the modification, with increasing populations. As concerns dragonflies, in the two oligotrophic fens seven widespread and frequent species have decreased or disappeared, while seven stenoeicous species of swamps and springs have settled. In the third area, with new habitats formed by ponds and pools, there have been only two new species settlements, while four species have disappeared. The removal of the commercial fishponds in the river basin has had positive ecological effects in total, as rare habitats have developed for stenoeicous and endangered species. Losses are limited to euryoeicous and therefore widespread species." (Author) Populations of *Ceragrion*

tenellum, *Orthetrum coerulescens*, *Sympetrum pedemontanum*, *Coenagrion hastulatum*, and *Aeshna juncea* increased, populations of *Lestes viridis*, *Erythromma najas*, *Aeshna mixta*, and *A. grandis* decreased. *Calopteryx splendens*, *C. virgo*, *Cordulegaster boltonii*, *Lestes dryas*, *Sympetrum flaveolum*, *Ischnura pumilio*, and *Libellula depressa* are new.] Address: Clausnitzer, H.-J., Eichenstr. 11, D-29348 Eschede, Germany.

2081. Clausnitzer, V. (2001): Notes on *Trithemis bifida* and *T. donaldsoni* (Odonata: Libellulidae). *Int. Jour. Odonatology* 4(2): 107-117. (in English). ["*Trithemis bifida* is reported for the first time from East Africa. Previously there were only two Afrotropical records of this species: one male from Zambia and one male from the Ivory Coast. The male of *T. bifida* is described and compared with the closely related *T. donaldsoni* which is also found in East Africa. Taxonomically relevant structures are figured, differential features between both species are described and notes on the ecology of *T. bifida* are given."(Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: wesche@mail.uni-marburg.de

2082. Cleto, F.S.E.N.; Walker, I. (2001): Efeitos da ocupação urbana sobre a macrofauna de invertebrados aquáticos de um igarapé da cidade de Manaus/AM - Amazonia central. *Acta Amazonica* 31(1): 69-89. (in Portuguese with English summary). ["Effects of urban occupation on the aquatic macroinvertebrates from a small stream of Manaus, Amazonas State, Brazil. - Conditions of water quality and of the invertebrate fauna in the stream Mindu, originating in undisturbed forest area and crossing the city of Manaus/AM, were studied from 1993 to 1995. Deforestation and invasive colonization along the headwater streams and pollution in the city center caused drastic alterations of the limnological and faunistic conditions. Thus, water temperature, conductivity, pH values and quantity of sediments in suspension rose significantly, while oxygen levels dropped. Together with the natural reduction of flow speed and increased solar radiation these alterations resulted in eutrophication and a marked change of the composition of the invertebrate fauna." (Authors)] Address: Cleto, F.S. & Walker, Ilse, INPA/CPEC/PPG, Manaus, AM, Brasil, E-mail: sergiocleto@bol.com.br, iwalker@inpa.gov.br

2083. Córdoba-Aguilar, A. (2001): Sperm displacement ability in the damselfly *Calopteryx haemorrhoidalis asturica* Ocharan: no effect of male age, territorial status, copulation duration and syn-copulatory behaviour (Zygoptera: Calopterygidae). *Odonatologica* 30(4): 375-380. (in English). ["During copulation and before sperm transfer, odonate males are able to manipulate rival sperm stored in the 9 sperm storage organs (usually the bursa copulatrix and spermathecae). Males of the territorial *C. h. asturica* use 2 mechanisms for this. Bursal sperm is removed physically whilst spermathecal sperm is displaced via aedeagal stimulation (through a series of abdominal flexions) of the female sensory system that controls spermathecal sperm ejection. Most bursal sperm is removed but there is individual variation in spermathecal sperm displacement. Previous results have found that this variation is related to aedeagal width. In this paper 4 variables that may also explain variation in spermathecal sperm displacement ability are investigated: Male age and status (territorial and nonterritorial), duration of the sperm displacement sta-

ge and the number of aedeagal stimulatory flexions. Variation in the ability to displace spermathecal sperm, however, was not related to these variables. This suggests that variation in this ability is reliant only on <J genitalic attributes, aedeagal width. These results are briefly discussed in terms of current theory of sexual selection as the process propelling genitalic evolution." (Author)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

2084. Costa, J.M.; Garrison, R.W. (2001): Description of the female of *Leptagrion aculeatum* Santos, 1965 with keys to the known species (Zygoptera: Coenagrionidae). *Odonatologica* 30(4): 381-394. (in English). [The female of *Leptagrion aculeatum* is described after material from Amapá, Serra do Navio, rio Amapari, Brasil from 26 Sept. 1965. The generic or species status of *L. aculeatum* Santos, 1965, *L. auriceps* St. Quentin 1960, *L. autazense* Sjöstedt 1918, *L. croceum* (Burmeister 1839), *Leptagrion* ? *obsoletum* Selys 1876, and *Leptagrion* ? *rufum* Selys, 1876 are discussed in detail on the basis of a re-analysis of the original descriptions. The known species of the genus represented in Brasil are presented in illustrated keys both for males and females.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisy.com.br

2085. Costa, J.M.; Santos, T.C. (2001): Occurrence of *Tigriagrion aurantigrum* (Calvert) in Paraguay and new sites in Brazil (Zygoptera: Coenagrionidae). *Odonatologica* 30(3): 327-333. (in English). ["The sp., formally known from only Chapada, Brazil, has now been reported at other sites and 2 other countries from South America (Bolivia, Paraguay). Some additional characters including penis structure in the male and the prothoracic hind lobe, mesostigmal plates and caudal appendages of the female are described and illustrated." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisy.com.br

2086. Couteyen, S.; Papazian, M. (2001): Contribution à la connaissance des Odonates de l'île de la Réunion 4. *Sympetrum fonscolombii* (Selys, 1840), une espèce nouvelle pour l'île (Odonata, Libellulidae). *Martinia* 17(2): 51-53. (in French with English summary). [*S. fonscolombii* has recently been discovered in La Réunion at app. 2000 a.s.l. The presence of this species on this island proves that it is able to colonize high altitude tropical regions.] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France

2087. Curio, E. (2001): Wie Vögel ihr Auge schützen: Zur Arbeitsteilung von Oberlid, Unterlid und Nickhaut. *Journal für Ornithologie* 142: 257-272. (in German with English summary). ["Birds close their eyes during sleep in various taxon-specific ways. Either the lower lid moves up as in the majority of species including the Anseres, Accipitres, Falconiformes, Galli, Charadriodea, Columbiformes, and Oscines; or the upper lid moves down (Psittaciformes, Trochili), or both lids close the eye as in

Strigiformes and Caprimulgi. Such information is absent for most orders, or the handbooks provide wrong or conflicting information. Beside the tonic, sleep-related eye closure, birds move one or both lids in a phasic, usually swift mode when awake. These frequent lid movements are typified by their different co-ordination and function. Photographic and observational evidence strongly suggests mechanical protection of the eye as a novel function (where this had not been proposed previously). When an impact from any object is imminent from in front of or above the head, the upper lid shuts in pigeons, owls and oscines, and with water splashing, the lower lid as well (Cinclus). The most convincing evidence for mechanical protection comes from the deployment of the upper lid during the picking up of spiny insect prey as compared to easy-to-swallow berries, when both lids stay at rest (*Gallucolumba*). [...] In fig. 1 a black and white drawing shows a Negro Bleeding-heart Pigeon (*Gallucolumba keayi*) from the Philippines picking up a dragonfly. Closure of the eye with the upper lid in response to imminent mechanical impact (after Curio et al. 2000, see OAS 2019), where alternatively, the picking up of a berry with open eyes is documented.] Address: Curio, E., Conservation Biology Unit, Ruhr-Universität Bochum, PF 102148, 44780 Bochum, Germany. Email: Eberhard.curio@ruhr-uni-bochum.de

2088. d'Aguiar, J. (2001): Les descriptions originales des Odonates d'Europe 7. Sulzer, Johan Heinrich (1735-1813). *Martinia* 17(2): 69-74. (in French with English summary). [Faksimiles of Johan Heinrich Sulzer's descriptions of *Pyrrhosoma nymphula* and *Sympetrum danae* are published and shortly commented.] Address: d'Aguiar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France

2089. Danielzik, J. (2001): FFH-Umsetzung in Nordrhein-Westfalen aus Sicht der Entomofaunistik. - Situationsanalyse zur Realisierung der Fauna-Flora-Habitat-Richtlinie. *Naturschutz und Landschaftsplanung* 33(11): 344-350. (in German with English summary). ["The study examines the FFH site proposals in the Federal State of North Rhine-Westphalia (NW), Germany to the European network of conservation areas "Natura 2000". After introducing faunistic characteristics and investigation methods of the sites the paper illustrates why the 490 FFH site proposals and the 15 International Bird Areas are assessed as insufficient from a nature conservation point of view as regards the insects according to Appendix II of the Habitats Directive (34 species in Germany, 11 in NW). [...] The present scientific knowledge of the distribution and ecology of the species needs urgent improvement as well as the quality of the data, which are partly difficult to access." It is said that only *Coenagrion mercuriale* and *Leucorrhinia pectoralis* occur in NW; their habitat requirements and threats are shortly outlined.] Address: Danielzik, J., Auf der Kämpe 11, D-46244 Bottrop, Germany. E-mail: daejd@gmx.de

2090. De Marmels, J. (2001): *Aeshna* (*Hesperaeschna*) *condor* sp. nov. from the Venezuelan Andes, with a redescription of *A. (H.) joannisi*, comments on other species, and descriptions of larvae (Odonata: Aeshnidae). *Int. Jour. Odonatology* 4(2): 119-134. (in English). ["*Aeshna* (*Hesperaeschna*) *condor* sp. nov. is described and illustrated from four males and six exuviae. The adult color pattern does not resemble that of any other Venezuelan species, but structurally the new species

comes closest to *A. (H.) punctata* and *A. (H.) joannisi*. This latter is here recorded for the first time from Venezuela, and its exuviae are described. The larva of *A. (Marmaraeschna) vigintipunctata* is also described and figured. A key to the ultimate instar larvae of all aeshnids found in the region of the upper Rio Quinimari, Tachira State, Venezuela, is presented." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

2091. De Marmels, J. (2001): *Sympetrum paramo* sp. n. (Odonata: Libellulidae) from the Venezuelan high Andes, with a key to the species of *Sympetrum* Newman, 1833 found in Venezuela. *Entomotropica* 16(1): 15-19. (in English with Spanish summary). ["The new species is described and illustrated on the basis of four males and one female (holotype cf. Venezuela: Merida State, Sierra Nevada National Park, Paramo El Tisure, Laguna Tisure, 3 650 m, 29.XII.1994; MIZA). Diagnostic characters are the strongly developed first white lateral thoracic stripe, the dark tibiae and the checkered abdominal pattern. A key to adults of all species of *Sympetrum* found in Venezuela is provided. The difference at the species level between *S. illotum* (Hagen) and *S. gilvum* (Selys) is confirmed and illustrations of important features of both are given." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

2092. Donath, H. (2001): Erstnachweis der Feuerlibelle (*Crocothemis erythraea* (Brullé)) in der Niederlausitz. *Biologische Studien, Luckau* 30: 56-58. (in German). [The second record of this southern species in Brandenburg, Germany (Neuer Grubensee, Bornsdorf) in June and July 2001 is documented in detail: description of habitat, field diagnostic flight behaviour, co-occurring species (including the rare *Leucorrhinia caudalis* and *L. albifrons*), and some reflections for species turn over in Brandenburg. In the past years new records represent Ethiopian or Mediterranean species (*Anax ephippiger*, *Aeshna affinis*, *Crocothemis erythraea*). Only *L. caudalis* - an Eurosiberian element of fauna - was successful to colonise the region Niederlausitz more recently. Regionally declining or even extinct species belong in general to the Eurosiberian, continental faunistic element.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

2093. Doty, G.; Welch, A. (2001): Advertisement call duration indicates good genes for offspring feeding rate in gray tree frogs (*Hyla versicolor*). *Behavioral Ecology & Sociobiology* 49(2-3): 150-156. (in English). ["Indicator or "good genes" models of sexual selection predict that mating preferences allow females to choose mates that are genetically superior. Female gray tree frogs (*Hyla versicolor*) prefer male advertisement calls of long call duration, which can be indicators of enhanced offspring growth performance. We tested the effects of father's call duration and the presence of a caged predator (dragonfly naiad) on tadpole activity and growth in a factorial experiment, controlling for maternal and environmental effects. The effect of food availability (a repeated measure) on tadpole activity was also examined. Tadpoles responded to predator presence and to high food availability by decreasing activity and feeding.

Tadpoles exposed to a caged predator were smaller after 14 days than those exposed to an empty cage, suggesting that spending less time feeding carries the cost of reduced growth. Offspring of males with long versus short calls responded similarly to the presence of a predator. Nonetheless, offspring of long-calling males spent more time feeding than did offspring of short-calling males, except when a predator was present but no food was available. Increased time spent feeding may contribute to enhanced offspring growth and, therefore, to the indirect benefit that a female may realize by selecting a mate with long calls. However, because the behavioral differences depended on the environment, and because the fitness consequences of such behavioral differences should also vary with the environment, the benefit of mating with a long-calling male may depend on the conditions encountered by the offspring." (Authors)] Address: Doty Grace & Welch Allison, Department of Biology, University of North Carolina, Coker Hall, Chapel Hill, NC, 27599-3280, USA. E-mail: welcha@unc.edu

2094. Dronzikova, M.V. (2001): "Life cycles of separate species of dragonflies in conditions of Kuznetskoi valley". *Belyshevia* 1(1): 6-9. (in Russian with short English summary). [Life cycles of *Libellula quadrimaculata*, *Sympetrum flaveolum*, *Aeshna viridis*, *Orthetrum cancellatum*, *Coenagrion hastulatum*, and *Leucorrhinia pectoralis* were studied in the Altai-Sajan mountains, Russia.] Address: Dronzikova, M.V., Novokuznetskii Pedagogicheskii Institut, 654000 Novokuznetsk, PR., Pionerskii, 13, Russia

2095. Ellenrieder, N. von (2001): A synopsis of the Patagonian species of the genus *Aeshna* Fabricius (Anisoptera: Aeshnidae). *Odonatologica* 30(3): 299-325. (in English). ["This synopsis includes diagnoses for adults, a key for male and female, illustrations of taxonomic characters and updated distribution data for each sp. The ventral terga contour is found to vary interspecifically allowing identification of all species. Other useful characters are the presence or absence of black stripes over frontoclypeal and fronto-ocular grooves, abdominal colour pattern and shape of the cerci. Some colour characters of *A. variegata* vary geographically and two forms are described: a dark (humid biomes) and light form (dry biomes). The synonymy of *A. peralta* and *A. variegata* is considered doubtful." (Author) *Aeshna variegata* Fabricius 1775, *A. absoluta* Calvert 1952, *A. bonariensis* Rambur 1842, *A. diffinis* Rambur 1842, *A. confusa* Rambur 1842] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

2096. Ellenrieder, N. von (2001): The larvae of Patagonian species of the genus *Aeshna* Fabricius (Anisoptera: Aeshnidae). *Odonatologica* 30(4): 423-434. (in English). ["The last larval instar of *Aeshna absoluta* Calvert 1952 and *A. confusa* Rambur 1842, as well as that of the light form of *Aeshna variegata* Fabricius, are described for the first time and compared with the other Patagonian larvae of this genus. They can be identified based on prementum width/length ratio, number of teeth on each side of the prementum median cleft, shape of prothoracic processes and relative length of the terminalia." (Author)] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C.

712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

2097. Englund, R.A. (2001): Long-term monitoring of one of the most restricted insect populations in the United States, *Megalagrion xanthomelas* (Selys-Longchamps), at Tripler Army Medical Center, Oahu, Hawaii (Zygoptera: Coenagrionidae). *Odonatologica* 30(3): 255-263. (in English). ["Long-term monitoring of a remnant population of *M. xanthomelas*, located at Tripler Army Medical Center (TAMC) began in May 1997 and continued to Febr. 2000 for the mitigation ponds and June 2000 for the TAMC stream. This sp. has been reduced to little more than 100 m of stream habitat on Oahu at the TAMC. Threats to *M. xanthomelas* include alien fish spp., stream dewatering, and habitat alteration. The TAMC stream now requires augmented water flow because construction of a facility up gradient of the TAMC stream disrupted the normal hydrology of the small stream. The Oahu race of *M. xanthomelas* will soon become extinct if the stream were allowed to become dry, as nearly happened in June 1997. The most cost-effective way to ensure the survival of this sp. on Oahu would be to continue some mitigation water flows to the TAMC stream. The next step would be the establishment of another wild population to a stream lacking alien fish spp. It is highly recommended that a cooperative association of biologists from the Bishop Museum, University of Hawaii, U.S. Fish and Wildlife Service, and U.S. Army environmental staff continue to monitor the population of *M. xanthomelas*, arguably the rarest insect population in the United States." (Author)] Address: Englund, R.A., Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA. E-mail: englund@bishopmuseum.org

2098. Feld, C.K.; Grünert, U.; Schönfelder, J.; Pusch, M. (2001): Beitrag zur Kenntnis des Makrozoobenthos der Spree oberhalb von Berlin ("Müggelspree"). *Lauterbornia* 41: 113-128. (in German with English summary). ["From 1994 to 2000 the macrozoobenthos of the River Spree was sampled with various methods, focussing on the colonisation of woody debris. A total of 210 taxa (196 species) was identified including 145 insect species. Many species showed preferences for wood and other solid substrates. Wood was colonised by the highest number of taxa (107) compared to 72 taxa on stones of artificial rip-rap." (Authors) 11 odonate species were recorded including *Stylurus flavipes*, *Gomphus vulgatissimus*, and *Ophiogomphus cecilia*.] Address: Feld, C.K., Parrisiusstr. 35, D-12555 Berlin, Germany. E-mail: feld@effplan.de

2099. Fincke, O.M.; Hadrys, H. (2001): Unpredictable offspring survivorship in the damselfly, *Megaloprepus coerulatus*, shapes parental behavior, constrains sexual selection, and challenges traditional fitness estimates. *Evolution* 55(4): 762-772. (in English). ["Evolutionary biologists typically assume that the number of eggs fertilized or developing embryos produced is correlated with an individual's fitness. Using microsatellite markers, we document for the first time estimates of realized fitness quantified as the number of offspring surviving to adulthood in an insect under field conditions. In a territorial damselfly whose males defend tree hole oviposition sites, patterns of offspring survivorship could not be anticipated by adults. Fewer than half of the parents contributing eggs to a larval habitat realized any reproductive success from their investment. The best

fitness correlate was the span over which eggs in a clutch hatched. Among parents, female fecundity and male fertilization success were poor predictors of realized fitness. Although body size was correlated with female clutch size and male mating success, larger parents did not realize greater fitness than smaller ones. The uncoupling of traditional fitness surrogates from realized fitness provides strong empirical evidence that selection at the larval stage constrains selection on mated adults." (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: finke@ou.edu

2100. Fossati, O.; Wasson, J.-G.; Hery, C.; Salinas, G.; Marin, R. (2001): Impact of sediment releases on water chemistry and macroinvertebrate communities in clear water Andean streams (Bolivia). *Archiv für Hydrobiologie* 151(1): 33-50. (in English). ["The impact of sediment releases due to road construction on water chemistry and invertebrate communities was studied in a clear water river system in the tropical humid Bolivian Andes. Eight sites (2 reference, 1 source and 5 impacted along the main river) were sampled during the 1997 low flow season. Suspended sediment concentrations exhibited a 500-fold increase downstream from the source of pollution compared to the reference site, but recovered to natural levels within 90km in the main river. Suspended solids had only a minor influence on other chemical parameters, but had a clear negative effect on invertebrate density (200-fold decrease in abundance) and diversity (6-fold decrease in number of taxa) in the main river. The most affected insects were epibenthic gatherers (e. g. Ephemeroptera: Leptohyphidae, Coleoptera: Elmidae), swimmers (Ephemeroptera: Leptophlebiidae), and scrapers (Coleoptera: Psephenidae, Trichoptera: Hydroptilidae). These families are therefore considered to be the best potential bio-indicators of sediment release impact in clear-water Andean rivers." (Authors) The density of Odonata ("Libellulidae, Gomphidae") in the streams surveyed is very low.] Address: Fossati, Odile, Institut de Recherche pour le Developpement (IRD) - Université Lyon 1, Ecologie des Hydrosystemes fluviaux, 43 Bd du 11 novembre 1918, 69622 Villeurbanne Cedex, France. - E-mail: j.o.fossati@wanadoo.fr

2101. Gaino, E.; Reborá, M. (2001): Apical antennal sensilla in nymphs of *Libellula depressa* (Odonata: Libellulidae). *Invertebrate Biology* 120(2): 162-169. (in English). ["In an ultrastructural study of the apical antenna of the last nymphal stages of *L. depressa*, we found long sensilla trichodea, 2 sensory pegs, and a coeloconic sensillum on the last article of the flagellum (the distal part of the antenna). The long sensilla trichodea are mechanoreceptors, almost identical to the long filiform hairs of some terrestrial insects and the first sensilla of this kind to be described in aquatic insects. Particular attention was given to the complex coeloconic sensillum, a compound sensillum innervated by 2 groups of 3 neurons wrapped in a dendritic sheath. A cuticular sleeve envelops the distal portion of the outer dendritic segment. The cuticle of the coeloconic sensillum shows wide channels and is contiguous to the underlying granular and fibrillar layer. Similar structures on the antennae of the adults of other dragonflies were identified as chemoreceptors in previous studies. We hypothesize that this larval coeloconic sensillum might likewise have a chemosensory function, responding to molecules that diffuse through the cuticle and the un-

derlying granular and fibrillar layer, as no clear pore or pore-tubule system is visible. Alternative functions are also explored on the basis of morphological details." (Authors)] Address: Gaino, E., Dipartimento di Biologia Animale ed Ecologia, Università di Perugia, Via Elce di Sotto, I-06123, Perugia, Italy. E-mail: gaino@unipg.it

2102. Gallie, J.A. ; Mumme, R.L.; Wissinger, S.A. (2001): Experience has no effect on the development of chemosensory recognition of predators by tadpoles of the American toad, *Bufo americanus*. *Herpetologica* 57(3) : 376-383. (in English). ["Although chemosensory recognition of predators by larval amphibians is well known, the extent to which experience plays a role in the development of this anti-predator behavior is unclear. We addressed this issue by exposing laboratory-reared (naive) and wild-caught (experienced) tadpoles of the American toad, *Bufo americanus*, to water-borne chemical cues of three different potential predators (bluegill sunfish, *Lepomis macrochirus*, larvae of the odonate *Anax junius*, and adults of the red-spotted newt, *Notophthalmus viridescens*). Compared to control tadpoles exposed to dechlorinated water, tadpoles exposed to chemical cues of *Lepomis* and *Anax* significantly decreased activity and significantly increased aggregation. However, the behavior of tadpoles exposed to chemical cues of *Notophthalmus* was identical to that of control tadpoles. Most importantly, we found no difference in anti-predator behavior between laboratory-reared and wild-caught tadpoles. We conclude that larval experience with predators is unnecessary for the development of chemosensory predator recognition and that anti-predator behavior in this species is largely innate." (Authors)] Address: Gallie, J., Department of Biological Sciences, Northern Arizona University, Flagstaff, AZ, 86011 USA.

2103. Gierk, M.; Kalbe, L. (2001): Ökologische Bewertung von Wiedervernässungsgebieten in Brandenburg - dargestellt am Beispiel der Nuthe-Nieplitz-Niederung. *Naturschutz und Landschaftspflege in Brandenburg* 10(2): 52-61. (in German). [Increasing water tables in the Nuthe-Nieplitz-lowlands, Brandenburg, Germany caused changes of vegetation and fauna. The current situation is assessed as an intermediate stadium of succession to silting up mires. In the early 90th, 42 odonate species were recorded from the region. *Gomphus vulgatissimus*, *Stylurus flavipes*, and *Orthetrum cancellatum* are the only species mentioned.] Address: Gierk, Meike, Landesumweltamt Brandenburg, Abteilung W 2, PF 601061, D-14410 Potsdam, Germany

2104. Göbl, O. (2001): Exkursion der Pollichia-Kreisgruppe Birkenfeld in das Naturschutzgebiet Birkenfelder Tongruben. *Pollichia-Kurier* 17(4): 31. (in German). [Report of an excursion to a clay pit near Birkenfeld, Rheinland-Pfalz, Germany, one of the most important standing water habitats in the region. Some common odonate species are referenced.] Address: not stated

2105. Gonzalez-Soriano, E.; Novelo-Gutiérrez, R. (2001): *Lestes alfonsoi* spec. nov., a new damselfly from Mexico (Zygoptera: Lestidae). *Odonatologica* 30(4): 441-444. (in English). ["The new species is described, illustrated and compared with *L. simplex* Hag. Holotype male and allotype female: Veracruz, Laguna de Santo Domingo, 4 km NW of Huatusco, alt. 1300 m, 9-VII-2000; deposited at CNIN, UNAM, Mexico." (Au-

thors)] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

2106. Gonzalez-Soriano, E. (2001): An unusual male aggregation in the Odonata: An aerial mating swarm in *Protoneura cara* Calvert and notes on other Mexican Protoneuridae (Zygoptera). *Odonatologica* 30(3): 335-340. (in English). ["On several occasions aggregations were seen hovering high among trees beside streams in Mexico. Intermittent arrival of conspecific females at some aggregations and their departure, sometimes in tandem, and the apparent absence of foraging within aggregations supports the inference that such aggregations are mating swarms. It remains to be discovered whether trees over which swarms form are potential oviposition sites for this sp., or are places in which both males and females overnigh. Flying aggregations of males in other spp. of Protoneuridae are described and discussed." (Author)] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

2107. Gossum, H. van; Stoks, R.; De Bruyn, L. (2001): Reversible frequency-dependent switches in male mate choice. *Proceedings of the Royal Society Biological Sciences Series B* 268(1462): 83-85. (in English). ["Current sexual-selection theories predict that mating should occur preferentially with the highest-quality partner, and assume that for distinguishing among potential mates the choosy sex applies an internal representation of the characteristics of the desired mate, i.e. a template. Binary choice experiments were performed to test male mate choice between two different female colour morphs in the damselfly *Ischnura elegans*. Choice experiments were conducted before and after an habituation period, during which males were exposed to only one female colour morph. Given the choice between the two female morphs, males did exhibit a choice for the most recently experienced female morph. This is the first evidence for a reversible switch in mate choice in a frequency-dependent way. In contrast with previous studies on mate choice, template formation in male *I. elegans* seems not to be based on quality. Switching mate choice in a frequency-dependent manner, choosing the most common morph, probably allows males to minimize their search efforts and to maximize fitness." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

2108. Grand, D. (2001): Quelques observations de libellules en Grèce et à Chypre (Odonata). *Opusc. zool. flumin.* 196: 1-10. (in French with English summary). [A commented checklist is presented of 41 spp., evidenced at 30 localities during 5 visits (1978-1999) in Chalkidiki, Thessaloniki, and on the islands of Crete, Lesbos, Rhodos, Samos, Eubeos, Skyros, and Cyprus. Some of the noteworthy species are: *Boyeria cretensis* (Crete), *Lindenia tetraphylla* (Thessaloniki), *Orthetrum sabina* (Samos), *O. taeniolatum* (Rhodos), *Sympetrum meridionalis* (Chalkidiki), *Trithemis festiva* (Rhodos, Cyprus), *Coenagrion scitulum* (Lesbos), *Lestes macrostigma* (Lesbos), and *Cordulegaster picta* (Samos).] Address: Grand, D., 3 bis, Impasse de la Voute, F-69270 St-Romain-au-Mont-d'Or, France

2109. Haesloop, U. (2001): Erfolgskontrolle vom Umgestaltungsmassnahmen an bremschen Gräben und Fleeten. *Bremer Beiträge für Naturkunde und Naturschutz* 5: 197-202. (in German with English summary). [After revitalisation of different ditches throughout the Bremen city area, *Calopteryx splendens* and *Brachytron pratense* recolonised some of them.] Address: Haesloop, U., Gewässerökologisches Büro, Jenaer Str. 10, D-28215 Bremen, Germany

2110. Hampton, S.E.; Gilbert, J.J. (2001): Observations of insect predation on rotifers. *Hydrobiologia* (446-447): 115-121. (in English). ["Interactions between rotifers and their insect predators have not received adequate attention, possibly due to the assumption that rotifers are too small for insects to eat. In laboratory experiments, we offered the rotifers *Hexarthra mira*, *Platinius patulus* and small and large *Synchaeta pectinata* to four common insect predators: the notonectids *Notopecta lunata* and *Buenoa macrotibialis*, the smaller hemipteran *Neoplea striola* and small (1.5 mm) aeshnid dragonfly larvae. Excepting *Platinius* offered to dragonflies, all rotifer preys were consumed to some degree. No size selectivity was apparent for predators that ate few rotifers, but small instar *Buenoa* ate significantly more large (420 µm) than small (300 µm) *Synchaeta*. Predator size appeared to be less important than predatory style and prey morphology in determining ingestion rates. *Neoplea* and dragonflies ate more *Hexarthra* than *Platinius*, while the pattern was reversed for *Buenoa*, possibly because *Buenoa* is able to manipulate the hard lorica of *Platinius* better. Insect predators are capable of direct suppression of rotifer populations, an interaction which may be particularly important in littoral zones and fishless ponds where macroinvertebrates are numerous." (Author)] Address: Hampton, Stephanie, Department of Biological Sciences, Dartmouth College, 6044 Gilman, Hanover, NH, 03755-3576, USA. E-mail: stephanie.e.hampton@dartmouth.edu, john.j.gilbert@dartmouth.edu

2111. Hansen, M.D. (2001): Mass occurrence and migration of *Libellula quadrimaculata* at the Skaw Peninsula, N Jutland, Denmark in 2000. *Flora og Fauna* 107(1): 22-26. (in Danish with English summary). ["During May and June 2000 *L. quadrimaculata* was extremely common at the Skaw Peninsula in northern Jutland, Denmark. A sudden, massive emergence from the small, shallow lakes (water-covered area >1 km²) on the peninsula took place on May 8, after a long period of hot and sunny weather conditions. The density of larval exuviae in this area was estimated to exceed 1 m², and on May 14, more than 3000 stationary dragonflies were recorded in a 300 m transect count. At the northernmost coastline of the peninsula, migrations took place during the period May 12-16, with a pronounced peak on May 16 when thousands of dragonflies migrated towards west against a light westerly breeze. Four 1-minute counts were performed, and the mean density was estimated to 160 migrating *L. quadrimaculata* per 50 meter front per minute. As the width of the migratory wave was approx 500 meters, it can be calculated that, on this day, almost 100.000 *L. quadrimaculata* per hour migrated towards west on the Skaw Peninsula. Although the species was still very common during the following weeks, no further migrations were recorded, probably due to cold and windy weather conditions. These observations are discussed in relation to the migration ecology of the species." (Author)] Address: Han-

(Author)] Address: Hansen, M.D., Naturhistorisk Museum, Aarhus Universitetsparken, Bygning 210, 8000, Aarhus C Denmark

2112. Heino, J. (2001): Regional gradient analysis of freshwater biota: Do similar biogeographic patterns exist among multiple taxonomic groups? *Journal of Biogeography* 28(1): 69-76. (in Danish with English summary). ["Aim: To examine if different groups of freshwater organisms show concordant distribution patterns at large spatial scales. Location: Northern Europe: Denmark, Sweden, Norway, Finland. Methods: I analysed provincial distribution records of macrophytes, dragonflies, stoneflies, dytiscid beetles and teleost fishes in northern Europe. I conducted multivariate analyses, including two-way indicator species analysis (TWINSPAN), canonical correspondence analysis (CCA) and Mantel test to reveal biogeographical patterns and the degree of concordance in the distribution patterns among taxa. Results: TWINSPAN and Mantel tests indicated that broadly similar biogeographical patterns existed among the taxonomic groups. The results of CCA confirmed that variation in provincial species composition was generally related to climatic variation along latitudinal and altitudinal gradients. However, variation partitioning revealed that less than 50% of variation in the distribution patterns of each taxonomic group was accounted for by the climatic and geographical variables. Main conclusions: The distribution patterns of most taxonomic groups were strongly concordant and related to provincial climate and geographical location. Such patterns suggest that large-scale factors determine not only provincial species combinations, but also express severe constraints on the composition of local communities. Therefore, these factors should also be considered in studies on the structure and conservation of local freshwater systems. [...] Dragonflies: Data for the distribution of dragonflies were derived from Askew (1988) and references therein. Although less accurate than the maps for macrophytes, these distribution maps are based on relatively good north European literature. Original data were transformed to provincial records. Altogether 56 species of dragonflies were regarded as having breeding populations in the area." (Author)] Address: Heino, J., Department of Biology, University of Oulu, 90401, Oulu, Finland. E-mail: jani.heino@oulu.fi

2113. Hero, J.-M.; Magnusson, W.E.; Rocha, C.F.D.; Catterall, C.P. (2001): Antipredator defenses influence the distribution of amphibian prey species in the central Amazon Rain Forest. *Biotropica* 33(1): 131-141. (in English with Portuguese summary). ["The high diversity of amphibians in the central Amazon Rain Forest allowed us to examine the influence of tadpole antipredator defenses on assemblage structure and composition within bodies of water (alpha diversity) and among aquatic sites (beta diversity) at a local scale. During a three-year study of tadpole assemblage composition, we found that the anuran community used a variety of bodies of water for reproduction; these ranged from streams and streamside ponds to isolated forest ponds. The distribution of several tadpole species was negatively related to fish density, while other species coexisted with high densities of fish. Tadpole size did not ensure survival against fish, and few tadpoles avoided fish by hiding in the leaf litter. Controlled predation experiments using a single tadpole species in a no-choice situation were conducted over 24- to 48-hour periods. Nearly all species of tadpoles that occurred in habitats

with high fish densities were unpalatable to fish (except *Centrolenella oyampiensis*), indicating that unpalatability is a major adaptation allowing tadpoles and fish to coexist in this system. Unpalatability (to fish), however, was not an effective antipredator defense against odonate larvae, the other major tadpole predator in this system. The combination of predation pressure and the antipredator traits exhibited by individual species largely determined the composition of tadpole assemblages in individual bodies of water (alpha diversity). The heterogeneous distribution of predators among bodies of water and the diversity of antipredator defenses exhibited by larval amphibians facilitated high diversity in this community (beta diversity)." (Authors)] Address: Hero, J.-M., School of Environmental and Applied Sciences, Griffith University Gold Coast, Southport, QLD, 9726, Australia. E-mail: M.Hero@mailbox.gu.edu.au

2114. Heßberg, A. von (2001): Anstieg der Biodiversität im Bereich eines redynamisierten Fließgewässers (Obermain). *Verhandlungen der Gesellschaft für Ökologie* 31: 219. (in German). [Beginning in 1992 river banks were renaturalised along the river main, Bavaria, Germany. The efforts of these measures are assessed using different fauna groups including Odonata and the vegetation by comparing renaturalized (22 species) with canal (14 species) strips of the bank. No further details are outlined.] Address: Heßberg, A. von, Lehrstuhl für Tierökologie I, Universität Bayreuth, D-95440 Bayreuth, Germany. E-mail: andreas.vonhessberg@uni-bayreuth.de

2115. Higashi, K.; Lee, C.E.; Kayano, H.; Kayano, A. (2001): Korea Strait delimiting distribution of distinct karyomorphs of *Crocothemis servilia* (Drury) (Anisoptera: Libellulidae). *Odonatologica* 30(3): 265-270. (in English). ["In order to define the eastern limit of the distribution of *C. s. servilia* (2n male = 25, XO) and the western limit of *C. s. mariannae* (2n male = 24, neo-XY), the karyotypes were studied in specimens from Cheju island and the mainland of the Republic of Korea, and from the islands of North Kyushu, Japan. The dividing line between the 2 spp. appears in the Korea Strait, between the Korean mainland and Tsushima island. The mechanism of maintaining a distinct karyomorph in each area of distribution is discussed in details." (Authors)] Address: Higashi, K., Department of Applied Biological Sciences, Faculty of Agriculture, Saga University, Honjyo-machi 1, Saga, 840-8502, Japan. E-mail: higashik@cc.saga-u.ac.jp

2116. Hopkinson, P.; Travis, J.M.J.; Evans, J.; Gregory, R.D.; Telfer, M.; Williams, P.H. (2001): Flexibility and the use of indicator taxa in the selection of sites for nature reserves. *Biodiversity & Conservation* 10(2): 271-285. (in English). ["'Minimum' sets of complementary areas represent all species in a region a given number of times. In recent years, conservation assessments have centred around the evaluation of these 'minimum' sets. Previous research shows little overlap between 'minimum' sets and existing nature reserves and between 'minimum' sets for different taxonomic groups. The latter has been used as an argument to discount the use of indicator taxa in the selection of sites for nature reserves. However, these 'minimum' set analyses have only considered a single set for each taxonomic group when there are, in fact, a large number of equally valid 'minimum' sets. We present new methods for evaluating all of these alternative 'minimum' sets. We de-

monstrate that if all of the sets are evaluated, significantly higher levels of overlap are found between 'minimum' sets and nature reserves, and pairs of 'minimum' sets for different taxonomic groups. Furthermore, significantly higher proportions of species from non-target taxonomic groups are recorded in the 'minimum' sets of target groups. Our results suggest that previous conservation assessments using 'minimum' sets may have been unduly pessimistic." (Authors)] Address: Hopkinson, P., NERC Centre for Population Biology, Imperial College at Silwood Park, Ascot, Berkshire, SL5 7PY, UK. E-mail: paulhopkinson@mail.com

2117. Hopper, K.R (2001): Flexible antipredator behavior in a dragonfly species that coexists with different predator types. *Oikos* 93(3): 470-476. (in English). ["Two of the main predators of dragonfly larvae, insectivorous fish in communities with fish and large dragonfly species in communities without fish, differ markedly in their mode of predation. In general, dragonfly species coexist successfully with one predator or the other, but larvae of the dragonfly *Pachydiplax longipennis* can coexist successfully with both. I examined the behavioral response of these larvae to a simulated predator attack to determine whether their response (1) differs between the two communities, and (2) is sensitive to waterborne cues about the type of predator present. I compared larvae from two different communities: fish ponds where insectivorous fish were the top predators, and fish-free ponds where large dragonflies were the top predators. Larvae from fish-free ponds actively moved away from an attack significantly more than did larvae from fish ponds, provided each was attacked in its native pond water. Larvae collected from a fish-free pond but then attacked in fish water moved less than did controls (larvae attacked in fish-free water). Likewise, larvae collected from a fish pond but attacked in fish-free water moved more than did controls (larvae attacked in fish water). Larvae attacked first in water from their native pond and then in water from the contrasting pond changed their response in the expected direction. These results indicate that escape behavior in *P. longipennis* differs between communities with different predator types and is sensitive to water-borne cues in a manner consistent with the mode of predation employed by each predator." (Author)] Address: Hopper, K.R. Biological Sciences, Univ. of Kentucky Lexington Community College, Lexington, KY, 40506-0235, USA. E-mail: hopper@pop.uky.edu

2118. Hostettler, K. (2001): Libellen (Odonata) in Vorarlberg (Österreich). *Vorarlberger Naturschau* 9: 9-134. (in German with English summary). ["In 1991 the first mapping of dragonflies for Vorarlberg was started at the Rhine delta. In the course of the subsequent eight years, in collaboration with the Vorarlberger Naturschau, it was extended to the other regions of this mountainous region. At nearly 336 habitats 55 species of dragonflies were recorded. 49 species were found in the valley and 37 species in mountainous at subalpine altitudes. In particular the large populations of *Sympetma paedisca* and *Sympetrum depressiusculum* in the Rhine delta at the Lake of Constance have to be mentioned, but also the relatively good presence of *Somatochlora alpestris*, *Orthetrum coerulescens*, *Aeshna caerulea*, *Leucorrhinia dubia*, and *Cordulegaster bidentata* at certain altitudes and regions." Each species is characterised in a monographic way containing a map of its regional distribution, and information

on habitat and ecology, threat and protective measures. "For the first time a red list of the endangered species of dragonflies is provided for Vorarlberg. Finally some types of habitats (mires, flowing waters) and their dragonfly fauna are presented." (Author) This paper also includes a short introduction into dragonfly biology and some nice colour photographs of species and habitats.] Address: Hostettler, K., Schulstr. 7, CH-8590 Romanshorn, Switzerland

2119. Hunger, H.; Röske, W. (2001): Short-range dispersal of the Southern Damselfly (*Coenagrion mercuriale*, Odonata) defined experimentally using UV fluorescent ink. *Zeitschrift für Ökologie und Naturschutz* 9: 181-187. (in English with German summary). [Specimens of *C. mercuriale* were marked with numbers and with a dot of UV fluorescent ink. At night "controls with a portable UV-lamp allowed high recapture rates. Only few individuals, however, were recaptured in study sites different from the ones where they had been marked. The maximum distance covered by an individual was 300 m. [...] this means that protective measures with the aim of preventing further habitat fragmentation are of extreme importance for *C. mercuriale* as one of the most endangered Odonata species of Central Europe." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Am Pfahlgraben 8, D-79276 Reute, Germany

2120. InsectLine (2001): Insects reported during April and July 2001. *Atropos* 14: 33-35. (in English). ["[...] Dragonfly immigration was also low-key. Single Red-veined Darter *Sympetrum fonscolombei* were reported at Heysham, Lancashire (also seen the next day), and near Tring, Hertfordshire, on 6th. Reports also came from some of the suspected West Country breeding sites later in the month, but all in very low numbers and more suggestive of immigration. Single Lesser Emperor *Anax parthenope* were at the Middleton Industrial Estate, Lancashire, and Dungeness RSPB, Kent, on 23rd, Marazion Marsh RSPB, Cornwall, from 28th with one nearby on the Lizard the following day. A Small Red-eyed Damselfly *Erythromma viridulum* was reported at Sizewell, Suffolk, on 31st. [...] (Verbatim)] Address: InsectLine, 1 Cline Cottage, London road, Allstock, Knutsford, Cheshire, WA16 9LT, UK

2121. Johansson, F.; Stoks, R.; Rowe, L.; De Block, M. (2001): Life history plasticity in a damselfly: Effects of combined time and biotic constraints. *Ecology* 82(7): 1857-1869. (in English). ["Optimal values for life history traits are expected to depend upon environmental conditions during development and the period within which development is constrained (e.g., biotic factors and time constraints, respectively). Theory predicts that life history responses to both biotic factors and time constraints may be both direct and behaviorally mediated. Few experimental studies of life histories have considered the joint effects of biotic factors and time constraints, and fewer still have been able to disentangle direct from behaviorally mediated effects. We studied such interactions by manipulating the perceived time to the onset of winter, predation risk, and food resources level in larvae of the damselfly *Lestes sponsa*. In the first experiment (predation X time constraint), the presence of a predator caused an overall reduction in foraging activity, development rate, and mass at emergence. However, larvae that had less time available before the end of the season, increased foraging activity and development

rate, while mass at emergence decreased. These results suggest that the observed changes in life history characters were behaviorally mediated in the presence of predators. In contrast, life history responses of time-constrained larvae occurred independently of the behavioral changes and, therefore, were direct. In the second experiment (food level X time constraint) larvae under high food levels had a higher foraging activity, increased development rate, and higher growth rates, compared to low food-level treatments. Time-constrained larvae accelerated development and had a smaller mass at emergence at high food levels than larvae that were not time constrained. In contrast, and opposite to predictions, time-constrained larvae at low food levels had the slowest development rate and the largest mass at emergence. We suggest that larvae in the latter group were aiming to delay emergence to the next season (cohort splitting). Our results suggest that both behaviorally mediated and direct responses to biotic factors and time constraints are a feature of the life history of this damselfly." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

2122. Karouna-Renier, N.K.; Sparling, D.W. (2001): Relationships between ambient geochemistry, watershed land-use and trace metal concentrations in aquatic invertebrates living in stormwater treatment ponds. *Environmental Pollution* 112(2): 183-192. (in English). ["Stormwater treatment ponds receive elevated levels of metals from urban runoff, but the effects of these pollutants on organisms residing in the ponds are unknown. We investigated the accumulation of Cu, Zn, and Pb by macroinvertebrates collected from stormwater treatment ponds in Maryland serving commercial, highway, residential and open-space watersheds, and determined whether watershed land-use classification influences metal concentrations in macroinvertebrates, sediments, and water. Three types of invertebrate samples were analyzed - molluscs, odonates, and composite. Zn concentrations in odonates from ponds draining watersheds with commercial development (mean = 113.82 $\mu\text{g g}^{-1}$) were significantly higher than concentrations in the other land-use categories. Similarly, Cu levels in odonates from commercial ponds (mean = 27.12 $\mu\text{g g}^{-1}$) were significantly higher than from highway (mean = 20.23 $\mu\text{g g}^{-1}$) and open space (mean = 17.79 $\mu\text{g g}^{-1}$) ponds. However, metal concentrations in sediments and water did not differ significantly among land-uses. The results suggest that despite the high variation in ambient metal concentrations within each land-use category, macroinvertebrates in ponds serving commercial watersheds accumulate higher levels of Cu and Zn. The levels of Cu, Zn, and Pb in invertebrates from all ponds were less than dietary concentrations considered toxic to fish." (Authors)] Address: Sparling, D.W., USGS Patuxent Wildlife Research Center, 11510 American Holly Drive, Laurel, MD, 20708, USA. E-mail: donsparling@usgs.gov

2123. Karube, H. (2001): Three new species of gomphidae from Vietnam (Anisoptera). *Odonatologica* 30 (3): 271-279. (in English). ["*Amphigomphus nakamurai* sp. n. (holotype male: Vietnam, Binh Phuh prov., Mt Tamdao, 30-V-1993), *Merogomphus tamdaoensis* sp. n. (holotype male: Vietnam, Binh Phuh prov., Mt. Tamdao, 19/24-V-1993), and *Leptogomphus baolocensis* sp. n. (holotype male: Vietnam, 15 km from Baoloc to

Ho-chi-minh, Lamdong prov., 16-VI-1996) are described, illustrated and their affinities are pointed out. Material is deposited in the author's institution." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

2124. Kenner, R.D. (2001): Redescription of the larva of *Leucorrhinia glacialis* Hagen with a key to the nearctic *Leucorrhinia* species (Anisoptera: Libellulidae). *Odonatologica* 30(3): 281-288. (in English). ["The final-stadium larva is redescribed from 24 authenticated larvae and exuviae. It is a medium-sized larva (total length 17.6-20.8 mm) with three ventral stripes and a dorsal pattern on the abdomen that includes large spots in the sublateral area on at least segments 4-7. The penultimate stadium is also briefly described and some natural history observations are reported. A key for the seven nearctic *Leucorrhinia* spp. is given." (Author)] Address: Kenner, R.D., c/o Spencer Entomological Museum, University of British Columbia, Vancouver, BC, V6T 1Z4, Canada. E-mail: kenner@zoology.ubc.ca

2125. Kesel, A.B. (2001): The ultralight aerofoils of insects - an evolutionary masterpiece. *Zoology* 103: 222-229. (in English). ["The development of wings can be regarded as the key innovation in the course of insect evolution. They make locomotion in a three-dimensional space possible, a world wide spreading and the inhabitation of almost all biotopes. Due to their low mass and high stability, wings can be interpreted as ultralight aerofoils. To guarantee the enormous mechanical demands of flight, the material and its geometrical arrangement are of crucial importance. The wings are part of the cuticular exoskeleton of the insects. This cuticle is a helicoidal fibre reinforced material of crystalline biopolymers, embedded in a protein matrix. Apart from providing the necessary stability, the ingenious structure design induces excellent aerodynamic performance. The statics as well as the aerodynamic quality of the highly complex system wing are supported throughout all hierarchic levels by a series of fine structures." (Author) *Libellula depressa* has "a very conservative wing vein pattern. An encircling marginal vein, serving as mechanical protection and stiffening of the wing and, compared to other species, a complex network of smaller veins with thin membranes stretched between them."] Address: Kesel, Antonia, Department of Zoology, Technical Biology and Bionics; University of Saarland; D - 66041 Saarbrücken. E-mail: a.kesel@rz.uni-sb.de

2126. Ketelaar, R. (2001): European Reports 2000. The Netherlands. *Odonata. Atropos* 14: 48-49. (in English). [The year 2000 was an average year for southern migrants. Records of *Lestes barbarus*, *Sympetma fusca*, *Anax parthenope*, *A. ephippiger*, *Sympetrum fonscolombii*, and *Crocothemis erythraea* are documented. In addition, *C. erythraea* now breeds in at least four localities, all in the southern part of the Netherlands, and *Cercion lindenii* is expanding northwards and is increasing its populations. Range extension of *Leucorrhinia dubia*, *L. rubicunda*, and *Coenagrion lunulatum* is also considered. A major discovery in 2000 was a possible breeding site of *Ophiogomphus cecilia* and *Onychogomphus forcipatus* along the river Roer, near the German border.] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

- 2127.** Ketelaar, R. (2001): Verspreidingsgegevens van libellen als instrument bij het herstel van vennen. *Levende Natuur* 102(4): 166-170. (in Dutch with English summary). ["Distribution records of dragonflies as a management tool in moorland pool restauration projects. - In The Netherlands moorland pools (shallow lakes on sandy soils) are highly valuable in terms of dragonfly species diversity. However, most pools are negatively influenced by acidification, eutrofication and desiccation. Especially dragonflies of (weakly) buffered, mesotrophic, moderately acid pools have declined severely during the last century. A number of restauration plans for moorland pools have been prepared or executed in the past decade in the southern part of The Netherlands. These measures include removal of the organic top layer of both the bottom of the pool and the shore and cutting of forest and (artificially) restauration of the buffering capacity. However the ecological demands of fauna are often not taken into consideration and this sometimes result in 'fauna accidents': special fauna elements disappear. In the province of Noord-Brabant dragonfly distribution data are now available for most moorland pools, thus making it possible to take full account of dragonflies while making restauration plans. Dependent on the number of characteristic dragonfly species four scenarios for restauration are presented: If more than two characteristic dragonfly species are present: Stop restauration. If there are one or two characteristic species present: Take care while planning the restauration. If there are no characteristic species present: Continue. If there is insufficient data available: More research." (Author)] Address: Ketelaar, R., De Vlinderstichting, 6700 AM, Wageningen, The Netherlands. E-mail: robert.ketelaar@vlinderstichting.nl
- 2128.** Kilgour, R. (2001): Emperor Anax imperator predating Brimstone *Gonepteryx rhamni*. *Atropos* 14: 62. (in English). [UK, Park Corner Heath Butterfly Conservation reserve, East Sussex, 4 June 2001, "[...] Libellula depressa and an Emperor Anax imperator were also present. Much to our surprise, the Emperor was seen to take one of the Brimstone butterflies in flight and carry it off to a bush, where it became its next meal."] Address: Kilgour, R., 153 Heron Way, Cranham, Upton, Essex, RM14 1EE, UK
- 2129.** Kirkton, S.D.; Schultz, T.D. (2001): Age-specific behavior and habitat selection of adult male damselflies, *Calopteryx maculata* (Odonata: Calopterygidae). *Journal of Insect Behavior* 14(4): 545-556. (in English). ["We compared the age, movement, and time-activity budgets of male *Calopteryx maculata* damselflies occupying off-stream tree-fall gaps with those at stream sites within a 10-ha woodland. All males collected at off-stream sites were younger than males collected at stream sites-as indicated by their significantly higher wing transmittance. Thirty-three percent of teneral males marked at off-stream gaps moved to stream sites within 4 days (mean distance = 140 m), while mature males marked at stream sites never left the stream. In contrast to stream site males, off-stream males spent significantly more time capturing prey and never engaged in aggressive interactions with other males. Behavioral differences were not due to variations in the operative body temperature. However, malaise trapping revealed a greater frequency of suitable prey in forest light gaps. Our findings support the idea that teneral male *Calopteryx* leave their emergence sites along the stream for off-stream light gaps to forage without interference and build the energy reserves necessary to attain and hold streamside territories." (Authors)] Address: Schultz, T. D. Dept of Biology, Denison University, Granville, Ohio 43023, USA. E-mail: Schultz@Denison.edu
- 2130.** Klaus, D. (2001): Bericht über die Tagung Sächsischer Entomologen am 6. Oktober 2001 in Dresden. *Mitteilungen Sächsischer Entomologen* 55: 20-21. (in German). [The report of the meeting of Saxonian entomologists includes short summaries of two lectures devoted to Odonata: The discovery of *Ophiogomphus cecilia* and *Gomphus vulgatissimus* along the River Elbe (Saxonian part), and a report of Thomas Brockhaus of the SIO meeting in summer 2001 in Novosibirsk, Russia.] Address: Klaus, D., Heimstätten 10, D-04571 Rötha, Germany
- 2131.** Knijf, G. de (2001): Bosbeheer en biodiversiteit - bijdrage 11. Libellen en bosbeheer: graag wat meer licht en structuur in het bos!. *De Boskrant* 31(2): 22-25. (in Dutch). [The protection of woods and the biodiversity - Part 11: Odonata and wood protection: Please, a lit bit more light and structure in our forests! - This is an introduction into general aspects of dragonfly biology with special emphasis to the importance of woods in life cycle. The author take *Calopteryx virgo* and *Cordulegaster boltonii* as characteristic "wood-dragonflies", and outlines some ecological factors influencing these brook dwelling species as acidification of water and shading of banks by dense and high growing trees.] Address: Knijf, G. de, Inst. v. Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be
- 2132.** Knijf, G. de; Anselin, A. (2001): Libellen in Limburg: verandering in verspreiding en het belang voor Vlaanderen. *LIKONA jaarboek 2000*: 51-62. (in Dutch). [Odonata in Limburg: changes in distribution, and the importance of this for Flandern. - 58 odonate species are recorded from the province of Limburg, southern Belgium. All available records of odonata in Limburg (n = 9136) are analyzed for five periods on the basis of 5 x 5 km squares. Aims are to compare the frequency of squares of the Odonata of Limburg, to demonstrate hot spots of species diversity, and to analyze trends in population density in southern Belgium. In a tab. the population trends of the periods of 1980-1989 and 1990-2000 are documented in detail: generally spoken, Mediterranean species are increasing, in some cases dramatically, and species of bogs are decreasing. This publication is very useful for all odonatologists interested in population trends over a longer period of time.] Address: Anselin, Anny, Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be
- 2133.** Kosterin, O.E.; Haritonov, A.; Inoue, K. (2001): Dragonflies of the part of Novosibirsk Province east of the Ob River, Russia. *Sympetrum Hyogo* 7/8: 24-49. (Bilingual in Japanese and English). ["An annotated list of the dragonfly fauna is presented of the part of the Novosibirsk Province situated east of the Ob River as the most interesting territory including the city, within 53° 28' - 56° 03' N and 82° 48' - 85° 10' E. and comprising the Bolotninskii, Moshkovskii, Toguchinskii, Novosibirskii, Iskitimskii, Cherepanovskii, Maslyaninskii, and Suzunskii Districts. A short sketch of natural conditions of this region is presented. 48 species are recorded. In-

formation is given on the distribution of dragonfly species over the territory considered, their biotope preferences and approximate flight periods. The fauna has in general a western appearance. 5 species (*Lestes dryas*, *Aeshna subarctica*, *A. juncea*, *Sympetrum danae*, *Libellula quadrimaculata*) have holarctic ranges, 21 species (*Lestes sponsa*, *Sympecma paedisca*, *Coenagrion armatum*, *C. johannsoni*, *C. lunulatum*, *Erythromma najas*, *Enallagma cyathigerum*, *Ischnura elegans*, *Nehalennia speciosa*, *Aeshna mixta*, *A. crenata*, *A. serrata*, *A. viridis*, *Stylurus flavipes*, *Epitheca bimaculata*, *Somatochlora metallica*, *S. arctica*, *Cordulia aenea*, *Sympetrum flaveolum*, *S. pedemontanum*, *S. vulgatum*) have Transpalearctic or nearly Transpalearctic ranges. 18 species (*Calopteryx splendens*, *Lestes barbarus*, *L. virens*, *Coenagrion hastulatum*, *C. puella*, *C. pulchellum*, *Platycnemis pennipes*, *Aeshna affinis*, *A. grandis*, *Ophiogomphus serpentinus*, *Gomphus vulgatissimus*, *Somatochlora flavomaculata*, *Leucorrhinia caudalis*, *L. pectoralis*, *L. albifrons*, *L. dubia*, *L. rubicunda*, *Sympetrum sanguineum*) have West Palearctic ranges, 4 species (*Nihonogomphus ruptus*, *Gomphus epophthalmus*, *Macromia amphigena*, *Sympetrum croceolum*) have East Palearctic ranges being distributed from the Pacific to the Ob River and found in the territory considered the western borders of their ranges. Distribution in Siberia of *Gomphus epophthalmus*, *Macromia amphigena*, and *Sympetrum croceolum* is given in detail [...]. The two former are East-Asiatic species absent (or at least extremely local) from the vast territory of East Siberia (not taking into account a very doubtful original report of *G. epophthalmus* for Irkutsk) but appear in the piedmonts of the western South Siberian mountains: in the environs of Krasnoyarsk, in North Altai, Kuznetskii Alatau, Gomaya Shoria and Salairskii Kryazh Mts. For *S. croceolum* only two localities are hitherto known in its western range: on NW Altai (Kosterin, 1987a, b, 1997b) and the SE extreme of the Novosibirsk Province (Belyshev et al., 1989) (detailed information on these two localities is given in this paper). Such a disjunctive Altai-Far Eastern range type was recently isolated for some Lepidoptera connected with nemoral forest formations. It is supposed to be exhibited by some species which acquired a continuous Siberian-Far Eastern distribution during the Climatic Optimum of the Holocene due to westward migrations but later retrived due to cooling and aridisation of the climate, leaving isolates in sufficiently moist NW part of the Altai-Sayan Mountain System (Dubatolov, Kosterin, 1998; 2000). Interesting is the fact that an in general rare species *Gomphus epophthalmus* predominates over other Gomphid species on the Inya River while *G. vulgatissimus* (so far not found in other regions in Siberia) prevails on all other rivers and rivulets. An intergeneric copulation was observed and photographed between a male *Cordulia aenea* and a female *Epitheca bimaculata*. (Authors)] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

2134. Koyama, T. (Publ.) (2001): Bulletin of The Hokkaido Odonatological Society Vol. 13, March, 2001. Bulletin of The Hokkaido Odonatological Society Vol. 13: (in Japanese). [Contents Cover photo: *Gomphus postocularis* at Nishioka Reservoir on May 22, 1997 by YOKOYAMA, Toru.; KOYAMA, Tomoyasu, For the new century: 1; YOKOYAMA Toru, AKAISHI, Shinichi & HIROSE, Yoshinori, The new locality of *Lyriothemis pachygastra* and its life history in the southern Hokkaido: 2; YOKOYAMA, Toru, Larval duration of *Planaeschna*

milnei in Hokkaido: 5; YOKOYAMA, Toru, Overwintering of the larvae of several lotic species in the northern district: 10; HORI, Shigehisa & Toru YOKOYAMA, Record of two species at Noboro Forest Park: 11; AKAISHI, Shinichi, Dragonfly fauna of Matsuyama Marsh at Miyuki-cho: 13; AKAISHI, Shinichi, Probable emergence of *Boyeria maclachlani* at Asahikawa City: 15; NATSUME, Hidetaka, Collection of *Sympetrum darwinianum* at Nishioka Reservoir: 16; NARAOKA, Hiroji, Correction of Report of observations on dragonflies at Kushiro Marsh in Hokkaido (1972): 17; Editorial board, Table of first and last records in Hokkaido (2): 18; Editorial board, Table of the regional distribution of Odonata by shicho (13): 21; Editorial board, Table of the regional distribution of Odonata by island (12): 24; Editorial board: 27; Translation: Ishizawa, Naoya] Address: Editor: HARAUCHI, Yutaka, Editor's address: 9-2-20-113, Hon-machi 2 jo, Higashi-ku, Sapporo City, 062-0042, Japan

2135. Kraft, H.W. (2001): Libellen. Rasante Flieger in schillernden Farben. Paulinus Kalender 2002: 121-124. (in German). [Popular account on dragonflies in the religious annual of the German diocese Trier.] Address: Paulinus Verlag GmbH, Trier

2136. Krech, M.; Lindner, I. (2001): Ein Beitrag zur Libellenfauna nordostdeutscher Regenhochmoore. - Das NSG "Teufelsmoor" bei Samitz (Landkreis Bad Döberan). Archiv der Freunde für Naturgeschichte in Mecklenburg-Vorpommern 39 (2000): 45-56. (in German). [The Odonata of a bog moor in north-eastern Germany (Mecklenburg-Vorpommern) was surveyed between 1997 and 2000. 31 species were traced of which 24 are assessed as autochthonous. Special emphasize was given to reproduction habitats of *Aeshna subarctica elisabethae* and its phenology of emergence.] Address: Lindner, Iris, Universität Rostock, FB Biowissenschaften, Doberaner Str. 143, D-18051 Rostock, Germany

2137. Kuhn, K. (2001): Libellen am nördlichen Lech. Ber. naturf. Ges. Augsburg, Sonderbericht 2001: 138-146. (in German). [Bavaria, Germany; the Odonata of an area covering 150 km² were studied. 41 odonate species are known to occur in the region. 39 species are shortly commented. Special emphasize is given to *Coenagrion mercuriale*, a species of the EU-Fauna-Flora-Habitat-Directive and the problems of legal and actual protection of the species in the town of Augsburg.] Address: Kuhn, K., Ravenspurgerstr. 7., D-86150 Augsburg, Germany

2138. Labeledzki, A. (2001): Ordo (rzad): Odonata - wazki. In: Gutowski, J.M. & B. Jaroszewicz (Eds): Catalogue of the fauna of Bialowieza Primeval Forest. Instytut Badawczy Lesnictwa. Warszawa.: 88-91. (in Polish and English). [Verbatim: "In the work (ARABINA et al. 1984) concerning the Belarussian part of PB three further genera of dragonflies from the River Przewtoka are reported (*Calopteryx* sp., *Coenagrion* sp., *Sympetrum* sp.). Due to the lack of the species determination, they are excluded from the systematic list. In the Polish part of PB the occurrence of 50 species of dragonflies was ascertained, which makes more than 68% of Odonata from Poland. There are 30 species from the materials not published yet, being new to PB; the data come from the author's own investigations as well as from the papers of Bargiel (1990) and Dijkstra et Kalkman (1997). The Belarussian part of PB is almost not

recognised yet, probably due to the fact that in Belarus for several years there have been no entomologists specialising in dragonflies. Among the most interesting and scarce species there are: *N. speciosa* (associated with sedge lowmoors), *H. ephippiger* (flying to Poland from southern Europe and northern Africa only during the hottest summers), *L. fulva* (developing in small in-forest water bodies with the thick layer of not decomposed alder leaves on the bottom) and *O. brunneum* (southern species associated with shallow, warm running waters). In the described area, 5 out of 7 species protected by law in Poland were found: *Sympetma paedisca*, *Aeshna viridis*, *Ophiogomphus cecilla*, *Leucorrhinia albifrons*, *L. pectoralis*. Taking into consideration the diversity of water body types one can suspect that more detailed investigations could allow to increase the number of dragonfly species known from PB by at least 5-6. [...] (Author) Address: Labedzki, A., Akademia Rolnicza, Katedra Entomologii Lesnej, ull. Wojska Polskiego 71c, PL-60-625 Poznan, Poland. E-mail: andrzejlab@poczta.onet.pl

2139. Laister, G. (2001): Wieder vital? - Libellenbestand 7 Jahre nach der Renaturierung. ÖKO-L. Zeitschrift für Ökologie, Natur- und Umweltschutz, Linz 23(2): 3-10. (in German). [To assess the success of revitalisation of a running water of the town of Linz, Austria ("Sammelgerinne Urfahr"), starting in 1995 the odonate fauna of some stretches was surveyed. The following species are analysed in detail: *Calopteryx splendens*, *C. virgo*, *Platycnemis pennipes*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Onychogomphus forcipatus*, and *Cordulegaster boltonii*. There was no significant difference between regulated and revitalised stretches of the running water. Ecological quality for dragonflies depends on structural diversity of the running waters and ecological processes (e.g. availability of sand or gravel banks) more than on revitalisation or not.] Address: Laister, G., Naturkundliche Station, Neues Rathaus, Hauptstr. 1-5, A-4041 Linz, Austria

2140. Lang, C.; Müller, H.; Waringer, J.A. (2001): Larval habitats and longitudinal distribution patterns of *Cordulegaster heros* Theischinger and *C. bidentata* Selys in an Austrian forest stream (Anisoptera: Cordulegastriidae). *Odonatologica* 30(4): 395-409. (in English). ["From May 1997 to April 1998 larvae were recorded at the Weidlingbach, a fourth order tributary of the Danube nr Vienna, at 12 sampling stations from source to mouth. From the 14 larval instars reported for the genus, 5 (F to F-4; based on head width) could be identified in both spp.; head widths of female larvae were significantly larger than in male. Both spp. were most abundant within medium sand sediments with a mean grain size (Q50) of 2.04 mm in *C. bidentata* and 2.79 mm in *C. heros*. Mean water depths and nose current speeds measured at larval microhabitats were 4.4 cm and 2.3 cm s⁻¹ (*C. bidentata*) and 5.6 cm and 2.6 cm s⁻¹ (*C. heros*). During the winter months larvae chose the water depths slightly deeper than during summer. Throughout the observation period, a high proportion of the larvae (*C. bidentata*: 70-100%; *C. heros*: 41-90%) were burrowed in sandy sediments, either totally or displaying the typical ambush posture with only head and anal pyramid visible. In winter, the proportion of burrowing larvae was insignificantly higher than in summer. *C. bidentata* larvae were most abundant near the sources, preferring first order stream sections (discharge 0.1 -3.21 s⁻¹) with high hardness (up to 34

German degrees) and conductivity (up to 1100 uS cm⁻¹) and a high proportion of fine sediments. Although *C. heros* larvae were also collected at such first order sites, they reached their highest abundance (larval density up to 7.84 specimens per 10 meter shore length) at second order stream sections (discharge 0.3-6.0 l s⁻¹) with lower hardness and conductivity and a higher proportion of coarse sediments." (Authors)] Address: Waringer, J., Institute of Ecology and Nature Conservation, University of Vienna, Althanstr., A-1090 Vienna, Austria

2141. Legrand, J.; Lachaise, M. (2001): Un nouveau gomphidae afrotropical, *Lestinogomphus matilei* n. sp. (Odonata, Anisoptera). *Revue Française d'Entomologie (Nouvelle Série)* 23(1): 1-8. (in French with English summary). [*L. matilei* is described and illustrated on a single male specimen from Ivory Coast; it is dedicated to late Professor Loic Matile who was director of the Laboratoire d'Entomologie (MNHN). A diagnose of the genus and an illustrated redescription of the type species *L. angustus* Martin, are given.] Address: Legrand, J., 10, rue du Chemin de fer, F-94110 Arcueil, France

2142. Leipelt, K.G. (2001): Larvenfund der Gestreiften Quelljungfer *Cordulegaster bidentata* Selys (Odonata: Corduliidae) in Sachsen-Anhalt. *Entomol. Mitt. Sachsen-Anhalt* 8(1): 19-22. (in German with English summary). [Stolberg, eastern Harz Mountains, Sachsen-Anhalt, Germany; September 20, 1999, in the crenal of a brook near Stollberg, two larvae were caught; this record is considered the first larval record of *Thecagaster bidentata* in Sachsen-Anhalt.] Address: Leipelt, K.G., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

2143. Lencioni, F.A.A. (2001): *Cyanallagma angelae* spec. nov. and a key to the non-Andean species of *Cyanallagma* (Zygoptera: Coenagrionidae). *Odonatologica* 30(3): 345-350. (in English). ["The new species is described from 15 male and 3 female collected in Salesopolis-Sao Paulo State (23°35'52"S, 45°43'41"W; alt. 1074 m) 14-III and 3-IV-1999. Keys and illustrations to the non-Andean species of *Cyanallagma* are given." (Author) *C. trimaculatum* (Selys 1876), *C. interruptum* (Selys 1876), *C. bonariense* (Ris 1918), *C. nigrinuchale* (Selys 1876)] Address: Lencioni, F.A.A., Rua dos Ferrovianos 55, Jardim Mesquita, BR-12300-000, Jacarei, S.P., Brazil. E-mail: odonata@iconet.com.br

2144. Lenders, H.J.R.; Leuven, R.S.E.; Nienhuis, P.H.; Nooij, R.J.W. de; Rooij, S.A.M. van (2001): BIO-SAFE: A method for evaluation of biodiversity values on the basis of political and legal criteria. *Landscape & Urban Planning* 55(2): 121-137. (in English). ["This paper presents a Spreadsheet Application For Evaluation of Biodiversity (BIO-SAFE) on the basis of political and legal criteria derived from national and international policy plans, laws, treaties and directives. The BIO-SAFE is developed as a management tool to optimise mutual attuning of nature conservation policies and other interests in spatial planning. Fields of application of BIO-SAFE comprise designs and evaluations of physical planning projects, environmental impact assessments and comparative landscape-ecological studies. Taxonomic groups involved in BIO-SAFE are higher plants, dragonflies and damselflies, butterflies, fish, amphibians, reptiles, birds and mammals. The development of BIO-SAFE was based on species characteristic of rivers and their floodplains, but the principles of the me-

thod can easily be applied to other ecosystems as well. The BIO-SAFE has been applied on behalf of a combined flood risk reduction and ecological rehabilitation plan for the Rijnwaarden floodplains (River Rhine, the Netherlands). Application to flora and fauna data available for this area showed that the BIO-SAFE method enables the user to express politically and legally based biodiversity values in quantitative terms and to compare biodiversity values for various taxonomic groups, landscape-ecological units (e.g. ecotopes) and physical planning scenarios. By linking habitat preferences of the species selected to ecotopes, the method also allows the user to derive relevant information at the ecosystem level. Because of its policy-based character, BIO-SAFE yields complementary information to more established ecological biodiversity indices." (Authors)] Address: Lenders, H.J.R., Department of Environmental Studies, Faculty of Science, Mathematics and Informatics, University of Nijmegen, 6500 GL, Nijmegen, The Netherlands. E-mail: rlenders@sci.kun.nl

2145. Leroy, T. (2001): Les Odonates des lacs-tourbières de l'Artense en Auvergne (Puy-de-Dôme et Cantal). *Martinia* 17(2): 37-50. (in French with English summary). [Between 1996 to 1999, composition and the structure in terms of frequency and abundance of the odonate fauna of 8 bog lakes of Artense, France was studied. 40 species are present, of which 34 are autochthonous. The species composition is characterised by a high degree of species typical for the peat bogs of the Massif Central (e.g. *Somatochlora arctica*, *Leucorrhinia dubia*) and a strong contingent of species not belonging to bogs, most of them of Mediterranean or Atlantic affinity (e.g. *Platycnemis acutipennis*, *Lestes v. virens*).] Address: Leroy, T., Le Bourg, F-63210 Heume-L'Église, France

2146. Leung, B.; Forbes, M.R.; Baker, R.L. (2001): Nutritional stress and behavioural immunity of damselflies. *Animal Behaviour* 61(6): 1093-1099. (in English). ["Increased mortality in the presence of stress may result from stress-reduced availability of energy for immune function, coupled with the presence of pathogens or parasites. We tested the hypothesis that stress reduces antiparasite responses of damselflies *Ischnura verticalis* (Hagen) to their ectoparasitic mites *Arrenurus pseudosuperior* (Marshall). Numbers of colonizing mites did not differ between nutritionally stressed and unstressed damselflies. However, unstressed damselflies successfully removed more attached mites than nutritionally stressed host larvae. Furthermore, certain damselfly behaviours increased in the presence of non-feeding mite larvae. Some of these behaviours were effective in defending against mites, but were reduced by nutritional stress. These results are sufficient to explain inverse relations found between damselfly condition and intensity of mite parasitism seen in nature, and are likely to be applicable to other host-ectoparasite associations." (Authors)] Address: Leung, B., Department of Zoology, Cambridge University, Downing Street, Cambridge, CB2 3EJ, UK. E-mail: bleung@zoo.cam.ac.uk

2147. Lotzing, K. (2001): Die Plattbauchlibelle (*Libellula depressa* L.) - Insekt des Jahres 2001. *Halophila* 42: 17. (in German). [Short and general remarks on the "Insect of the Year" in Germany, *L. depressa*.] Address: Lotzing, K., Am Hollschen Bruch 4c, D.39435 Unseburg, Germany

2148. Manteifel, Y.B.; Reshetnikov, A.N. (2001): Selective predation on tadpoles of three anuran species. *Zhurnal Obshchei Biologii* 62(2): 150-156. (in Russian with English summary). ["In laboratory experiments an introduced fish *Perccottus glenii* consumed selectively tadpoles of three numerous anuran amphibian species of Moscow Province. *Perccottus glenii* actively consumed all seized tadpoles of the *Rana arvalis* and *R. temporaria*. These predators consumed significantly lesser number of *Bufo bufo* tadpoles and frequently rejected them after seizing without considerable damages. Observations showed that *P. glenii* rejects *B. bufo* after intraoral testing. Larvae of dragonfly *Aeshna cyanea* also actively consumed almost all seized *R. arvalis* tadpoles, while usually rejected *B. bufo* after attacking and damaging them. Larvae of diving beetle *Dytiscus marginalis* sucking out captured prey, intensively consumed tadpoles of *R. arvalis* and *B. bufo* and did not reject them." (Authors)] Address: Manteifel, Y.B., A. N. Severtsov Institute of Ecology and Evolution, Russian Academy of Science, Leninsky pr. 33, Moscow, 117071, Russia. E-mail: sevin@orc.ru

2149. Marinov, M. (2001): Does *Coenagrion mercuriale* (Charpentier, 1840) occur in Bulgaria? *Exuviae* 8(1): 13-19. (in English with Slovene summary). ["Older Bulgarian larval material, reported by several authors as *C. mercuriale* (Charp.) and deposited in the collection of the Institute of Zoology in Sofia, was re-examined. It was mostly identified as *Coenagrion ornatum* (Sélys) which is not uncommon in Bulgaria and other parts of the Balkans. Because of very doubtful determination in older records, and lack of any fresh material from south-eastern Europe it is suggested that *C. mercuriale* be deleted from the species lists of Bulgaria, Macedonia and Croatia." (Author)] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

2150. Martens, A. (2001): Initial preference of oviposition sites: discrimination between living and dead plant material in *Sympecma fusca* and *Coenagrion caerulescens* (Odonata: Libellulidae, Coenagrionidae). *European Journal of Entomology* 98: 121-123. (in English). ["*Sympecma fusca* and *Coenagrion caerulescens* mainly deposit their eggs into floating dead parts of emergent plants. In their initial choice of oviposition site (selection of landing site) *S. fusca* does not distinguish between fresh and dead plant material, whereas *C. caerulescens* significantly prefers dead material. In *S. fusca*, the missing discrimination of the plant condition in the choice of the landing site is explained by its oviposition period in the beginning of the vegetation period when the green plant material is rare. *C. caerulescens* reproduces in summer and finds dead and living plants side by side. I suggest that in the latter species an early recognition of dead material is advantageous because of the reduction of the expense in searching." (Author)] *S. fusca* was studied between 1989 and 1995 near Gifhorn, Germany, and *C. caerulescens* from 20 to 30 June 1993 at the Canal de Vergières, France.] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: andreas.martens@tu-bs.de

2151. Martens, A. (2001): Perching site choice in *Onychogomphus f. forcipatus* (L.): an experimental approach (Anisoptera: Gomphidae). *Odonatologica* 30(4): 445-449. (in English). ["At the rendezvous, males prefer

stones as perches. Discrimination experiments with pairs of substrates showed that they land preferentially on perches that correspond in height to the flight level of females appearing at the water. When they first landed, males preferred perches in the middle of the stream, but afterwards they also used those near the stream margin. The results are interpreted in terms of early recognition of females and rapid formation of tandem linkage." (Author)] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: andreas.martens@tu-bs.de

2152. Mauco, L.; Favero, M.; Bo, M.S. (2001): Food and feeding biology of the Common Tern during the nonbreeding season in Samborombon Bay, Buenos Aires, Argentina. *Waterbirds* 24(1): 89-96. (in English). ["Common Terns (*Sterna hirundo*), which breed in North America and migrate into the southern hemisphere in winter, show a wide nonbreeding distribution that includes the Atlantic coasts of Argentina and Brazil. At Punta Rasa (Samborombon Bay, Argentina), there were about 30,000 Common Terns. Their diet in winter was assessed by the analysis of regurgitated pellets collected at Punta Rasa. Adult Coleoptera, Odonata, Orthoptera and Hemiptera were the main insects found in the diet. A total of 14 species of fishes were identified. Argentine Anchovy (*Engraulis anchoita*) and Anchovy (*Anchoa mitchilli*) (Family Engraulidae), represented 79% by number and the 78% of the consumed biomass of fish prey. The average length of fish prey was 90.0 ± 17.6 mm. Half the prey lived in seawater, while the other half was taken in estuarine or seawater. There was no evidence of fish prey taken by terns foraging in freshwater habitats. Total consumption of food was estimated as 106 tons of fish (most of them juvenile) during a five month period at Punta Rasa." (Authors)] Address: Mauco, Laura, Departamento de Biología, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Mar del Plata, Funes 3250, 7600, Mar del Plata, Argentina. E-mail: lmauco@mdp.edu.ar

2153. Mayer, G. (2001): Neue Vorkommen der bedrohten Grünen Keiljungfer entdeckt. *Vogelschutz* 2 / 2001: 20. (in German). [A survey of the river Paar between Schmiechen and Unterbernbach, Landkreis Aichach-Friedberg, Bayern, Germany, resulted in the discovery of a strong population of the rare *Ophiogomphus cecilia*.] Address: not stated

2154. McPeck, M.A.; Grace, M.; Richardson, J.M. L. (2001): Physiological and behavioral responses to predators shape the growth/predation risk trade-off in damselflies. *Ecology* 82(6): 1535-1545. (in English). ["Most organisms must simultaneously find enough food for themselves while trying not to become food for some other organism. Previous field experiments have shown that larvae of *Enallagma* and *Ischnura* species are able to coexist in the littoral zones of lakes because they resolve this growth/predation risk trade-off differently: *Ischnura* species grow more quickly than *Enallagma* species, but *Ischnura* species suffer higher mortality rates than *Enallagma*. We performed a series of laboratory studies to explore the mechanistic basis for the difference in growth between the genera. When held in complete isolation and with unlimited food, larvae of a number of *Enallagma* species that coexist with fish accumulated mass at much faster rates than *Ischnura* species. This difference in isolation was due to the fish-lake *Enallagma* simply ingesting more food. In contrast,

contrast, when held in the presence of other damselflies or a fish predator, *Ischnura* had significantly higher growth rates than *Enallagma* species from fish lakes. All species decreased the amount of food they ingested in the presence of the fish predator as compared to when fish were absent, which resulted in decreased growth in the presence of the predator for all species. However, the interspecific differences in growth rate were due primarily to differences in the abilities of the species to convert ingested food into their own biomass; in the presence of fish, comparably sized larvae ingested nearly identical amounts of food, but *Ischnura* larvae grew faster because they converted significantly more ingested food into their own biomass than did larvae of *Enallagma* species from fish lakes. This difference in conversion efficiency between the genera was not apparent when larvae were raised in complete isolation. These results indicate that *Enallagma* and *Ischnura* species differ in physiological stress responses to the presence of predators, and this difference may facilitate the coexistence of *Enallagma* and *Ischnura* species in the field." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

2155. Meurgey, F. (2001): Donnée nouvelle pour *Paragomphus genei* (Sélys, 1841). Contribution à la faune des odonates de Corse. *Martinia* 17(2): 54. (in French). [*P. genei* was captured 21 July 1972 near Porto Vecchio, Island of Corsica, France.] Address: Meurgey, F., Museum d'histoire naturelle de Nantes, 12, rue Voltaire F-44000 Nantes, France

2156. Meurgey, F. (2001): Les collections d'Odonates du Muséum d'Histoire Naturelle de Nantes. 1. Collection H. et T. Piel de Churcheville. Inventaire et revision. *Martinia* 17(2): 55-66. (in French with English summary). [The author presents an inventory and revision of the Piel de Churcheville Odonata collection. It includes 49 species caught in Loire-Atlantique department, France between 1889 and 1895, and was published in 1895. The list of species and references of capture data are given.] Address: Meurgey, F., Museum d'histoire naturelle de Nantes, 12, rue Voltaire F-44000 Nantes, France

2157. Misof, B.; Rickert, A. M.; Buckley, T.R.; Fleck, G.; Sauer, K. P. (2001): Phylogenetic signal and its decay in mitochondrial SSU and LSU rRNA gene fragments of Anisoptera. *Molecular Biology & Evolution* 18(1): 27-37. (in English). ["The phylogeny of Anisoptera, dragonflies in the strict sense, has proven to be notoriously difficult to resolve. Based on morphological characters, several recent publications dealing with the phylogeny of dragonflies proposed contradicting inter- and intrafamily relationships. We explored phylogenetic information content of mitochondrial large-subunit (LSU) and small-subunit (SSU) ribosomal gene fragments for these systematic problems. Starting at published universal primers, we developed primer sets suitable for amplifying large parts of the LSU and SSU rRNA genes within dragonflies. These fragments turned out to harbor sufficient phylogenetic information to satisfactorily resolve intrafamily relationships, but they contain insufficient phylogenetic structure to permit reliable conclusions about several interfamily relationships. We demonstrate that decay of phylogenetic signal progresses from intrafamily to interfamily to outgroup relationships and is correlated with an increase of genetic di-

stances. As expected, signal decay is most pronounced in fast-changing sites. Additionally, base composition among fast-changing sites significantly deviates from the expected homogeneity. Homogeneity of base composition among all included taxa was restored only after removing fast-changing sites from the data set. The molecular data tentatively support interfamily relationships proposed by the most recent publication based on morphological characters of fossil and extant dragonflies." (Authors)] Address: Misof, B., Institute for Evolutionary Biology and Ecology, University of Bonn, An der Immenburg 1, D- 53121 Bonn, Germany. E-mail: bmisof@evolution.uni-bonn.de

2158. Misof, B.; Rickert, A.M.; Buckley, T.R.; Fleck, G.; Sauer, K.P. (2001): Phylogenetic signal and its decay in mitochondrial SSU and LSU rRNA gene fragments of anisoptera. *Molecular Biology & Evolution* 18(1): 27-37. (in English). ["The phylogeny of Anisoptera, dragonflies in the strict sense, has proven to be notoriously difficult to resolve. Based on morphological characters, several recent publications dealing with the phylogeny of dragonflies proposed contradicting inter- and intrafamily relationships. We explored phylogenetic information content of mitochondrial large-subunit (LSU) and small-subunit (SSU) ribosomal gene fragments for these systematic problems. Starting at published universal primers, we developed primer sets suitable for amplifying large parts of the LSU and SSU rRNA genes within dragonflies. These fragments turned out to harbor sufficient phylogenetic information to satisfactorily resolve intrafamily relationships, but they contain insufficient phylogenetic structure to permit reliable conclusions about several interfamily relationships. We demonstrate that decay of phylogenetic signal progresses from intrafamily to interfamily to outgroup relationships and is correlated with an increase of genetic distances. As expected, signal decay is most pronounced in fast-changing sites. Additionally, base composition among fast-changing sites significantly deviates from the expected homogeneity. Homogeneity of base composition among all included taxa was restored only after removing fast-changing sites from the data set. The molecular data tentatively support interfamily relationships proposed by the most recent publication based on morphological characters of fossil and extant dragonflies." (Authors)] Address: Misof, B., Institute for Evolutionary Biology and Ecology, University of Bonn, An der Immenburg 1, 53121 Bonn, Germany. E-mail: bmisof@evolution.uni-bonn.de

2159. Moore, N.W. (2001): Changes in the dragonfly communities at the twenty ponds at Woodwalton Fen, Cambridgeshire, United Kingdom, since the study of 1962-1988. *Odonatologica* 30(3): 289-298. (in English). ["The pattern of the number of spp. per pond changed completely between 1988 and 2000. The growth of scrub on the edges of the ponds caused a decline in the number of dragonfly spp. when more than 50% of pond edge was shaded by bushes. When the ponds were completely shaded they lost all their dragonfly spp. The decline in spp. appeared to be caused by shading rather than changes in the aquatic flora caused by shading. When the scrub was not controlled the ponds were inhabited by dragonflies from 26 to at least 39 yr. In ponds where no scrub developed, or where it was controlled, *Coenagrion puella*, *Ischnura elegans*, *Aeshna cyanea*, *Libellula quadrimaculata*, *Sympetrum striolatum* and *Sympetrum sanguineum* were still conti-

ning to inhabit the ponds after 39 yr. *Aeshna grandis*, which had occurred most yr. in the 1962-1988 period, was still present in 2000. *Pyrrhosoma nymphula* and *Brachytron pratense*, which had bred from 1964 to 1972 and 1968 to 1973 respectively, both reappeared after 20 yr. absence. Their return to the ponds appeared to be connected with their increase in adjacent habitats at Woodwalton Fen in the 1989-2000 period. *Anax imperator* and *Libellula fulva*, which had also increased at Woodwalton Fen, were seen for the first time at the ponds during this period. The reason for the recent disappearance of *Lestes sponsa* from the ponds and adjacent habitats is not known. This study yet further emphasises the need to conserve large core populations of dragonflies, and it reiterates the need for really long term monitoring." (Author)] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom

2160. Müller, J.; Schorr, M. (2001): Verzeichnis der Libellen (Odonata) Deutschlands. *Entomofauna Germanica* 5: 9-44. (in German with English summary). [Data on the representation of the German odonate fauna are compiled in a table (checklist). Each species is arranged according to its occurrence and its current status in the 16 Federal States of Germany. The compilation is based on an extensive survey and on a critical discussion of literature data. In some cases annotations on nomenclatorial problems are made. In other cases it is mandatory to evaluate the identification of species, to discuss possible misidentifications or to discuss trends of range extension. This refers to the following species: *C. armatum*, *C. ornatum*, *C. scitulum*, *G. pulchellus*, *G. flavipes*, *O. cecilia*, *B. pratense*, *A. isoceles*, *A. ephippiger*, *C. bidentata*, *L. depressa*, *L. fulva*, *C. erythraea*, *S. fonscolombii*, and *S. meridionale*. A selected but representative bibliography and some introductory remarks on the German odonatological history provide some additional information.] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

2161. Müller, O.; Suhling, F. (2001): *Phyllogomphoides litoralis* Belle: description of the final instar larva (Anisoptera: Gomphidae). *Odonatologica* 30(4): 451-456. (in English). [*P. litoralis*, El Valle, Panama, 5/6-III-1998 was reared in the laboratory. Morphological characters are described and illustrated.] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, 38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

2162. Muzón, J.; Ellenrieder, N. von (2001): Revision of the subgenus *Marmaraeschna* (Odonata: Aeshnidae). *Int. Jour. Odonatology* 4(2): 135-166. (in English). ["This revision of the subgenus *Marmaraeschna* includes the description of three new species: *Aeshna* (*M.*) *fissifrons*, *A.* (*M.*) *obscura* and *A.* (*M.*) *brevicercia*, as well as redescrptions of the previously known species, including the first description of the male of *A.* (*M.*) *pallipes*, a key for males and females and an updated distribution for each species. Useful characters are the presence or absence of black stripes over frontoclypeal and fronto-ocular grooves, T-spot shape, abdominal colour pattern, ventral terga contour and cerci shape." (Authors)] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

2163. Naraoka, H. (2001): Post-copulatory behaviour in the dragonfly *Sympetrum parvulum* Bartenef (Anisoptera: Libellulidae). *Odonatologica* 30(4): 411-422. (in English). ["According to their social status, the males are divided into 2 categories: territory holders (territorial males) and non-territory holders (wandering males). The duration of copulation was longer in wandering (461.5±347.8 s.n = 46) than in territorial pairs (201.3±149.8 s.n = 85). Oviposition modes are 3-fold: viz. (1) single, with non-contact guarding (territorial pairs: 115.1±75.5 s.n = 27; wandering pairs: 133.9±45.5 s.n = 14); (2) tandem oviposition (territorial pairs: 214.6±76.6 s.n = 5; wandering pairs: 141.0±76.2s.n = 7); - and (3) tandem oviposition + non-contact guarding (NCGO) (territorial pairs: 131.6±93.8 s.n = 5; wandering pairs: 157.5±72.8 s.n = 2). The first type was most common in territorial (75%) and in wandering pairs (62.1 %). The second type was in wandering pairs (24.1 %) twice as frequent as in territorial pairs (10.4%). The third mode was infrequent (territorial pairs: 14.6%, wandering pairs: 13.8%). The relationships between male social status and the interference of territorial males on one hand, and the duration of copulation and the oviposition mode on the other, are discussed. The effects of vegetation and air temperature on the oviposition mode are briefly outlined." (Author)] Address: Naraoka, H., 36-71 Motoizumi, Fukunoda, I-tayanagi-machi, Kita-gun, Aomori prefecture, 038-3661, Japan

2164. Nishhu, S. (2001): The present situation of *Lestes japonicus*. *Nature and Insects* 36(7): 22-25. (in Japanese). [*Lestes japonicus* Selys, 1883 is designated as a Vulnerable species in Red Data Book of the Ministry of the Environment in Japan. Its distribution is restricted to the region reaching from the Aomori Pref. to the Kagoshima Pref, with the exception of Toyama, Ishikawa, Yamanashi, and Kochi. The species is recorded from 155 localities, but only 46 turn out to have reproductive populations. The present status of the species urgently needs to be investigated. (Extracted from a translation of Naoya Ishizawa).] Address: not stated

2165. Oldham, M.J.; Sutherland, J.A.; Jones, C.D. (2001): Additions to the Odonata of Sudbury District and Regional Municipality, Ontario. In: Cating, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 1-4. (in English). ["21 new county records are reported for Sudbury District and Regional Municipality based on two days of fieldwork in August 2000. Notes are provided on six rare species (*Nehalennia gracilis*, *Ophiogomphus carolus*, *O. colubrinus*, *O. rupinsulensis*, *Stylogomphus albistylus*, *Stylurus scudderii*)" (Authors)] Address: Oldham, M.J., Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Box 7000, 300 Water Street, Peterborough, Ontario K9J 8M5, Canada. E-mail: michael.oldham@mnr.eov.on.ca

2166. Orr, A.G. (2001): An annotated checklist of the Odonata of Brunei with ecological notes and descriptions of hitherto unknown males and larvae. *Int. Jour. Odonatology* 4(2): 167-220. (in English). ["This study records 175 species of odonates from Brunei, representing more than half the known Bornean fauna. Of these, 169 species were collected by the author and associates using a systematic sampling protocol at 35 sites throughout the country. Sites were located in diverse habitats: in primary forest, natural lakes and marshes

and degraded areas. Species richness and faunistic composition are discussed for all sites and the levels of similarity between sites is assessed on the basis of species and higher taxonomic level comparisons. Patterns of habitat utilization are assessed for higher taxonomic groupings. Notes on behaviour and ecology are provided for all species for which adequate information was available. The previously unknown males of *Pericnemis triangularis* and *Drepanosticta versicolor* comb. nov. and the larvae of *Tetracanthagyna degorsi* and *Onychothemis coccinea* are described and figured." (Author)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest, Ecology and Management, Environmental Sciences, Griffith Univ., Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

2167. Oyediran, I.O.; Heinrichs, E.A. (2001): Arthropod populations and rice yields in direct-seeded and transplanted lowland rice in West Africa. *International Journal of Pest Management* 47(3): 195-200. (in English). ["Two methods for planting rice in irrigated lowland were evaluated during the wet seasons of 1994 and 1995 to determine their effect on rice arthropod numbers, insect-caused rice plant damage and rice grain yield. The six treatments tested were: hand transplanting of seedlings at spacings of 14 cm X 14 cm, 20 cm X 20 cm, and 30 cm X 30 cm; and direct-seeding of rice at 60 kg seeds ha⁻¹, 90 kg seeds ha⁻¹ and 120 kg seeds ha⁻¹. The most abundant arthropods in the study were the diopsid flies, *Diopsis longicornis* Maquart and *D. apicalis* Dalman; the green leafhoppers *Nephotettix* spp.; the white leafhoppers *Cofana unimaculata* (Signoret) and *C. spectra* (Distant); spiders; dragonflies and damselflies; and stem borers. There was no overall difference between transplanting and direct-seeding, or between plant densities, in regard to sweep net counts of *Cofana* spp. and spiders. *Diopsis longicornis* and *D. apicalis* adult numbers were highest in the 20 cm X 20 cm transplanted plots in 1994, but no significant differences occurred in 1995. *Nephotettix* spp. adult numbers were highest in the 120 kg seeds ha⁻¹ direct-seeded plots in 1995 but no significant differences occurred in 1994. The percentage of tillers infested with stem borers was highest in the three transplanted and the 120 kg seed ha⁻¹ direct-seeded treatments in 1994 and the three transplanted treatments in 1995. In 1995, the percentage of whiteheads (empty panicles) caused by stem borer feeding was highest in the direct-seeded treatments, increasing from the low rate of 60 kg seeds ha⁻¹ to the highest rate of 120 kg seeds ha⁻¹. Grain yields were generally similar in the transplanted and direct-seeded plots. Implications of planting methods and plant density as management practices in rice IPM and labour requirements for rice production are discussed." (Authors)] Address: Heinrichs, E.A., Department of Entomology, University of Nebraska, 202 Plant Industry-East Campus, Lincoln, NE, 68583-0816, USA. E-mail: eheinric@unlnotes.unl.edu

2168. Parr, A. (2001): Thoughts on the identification of Lesser Emperor *Anax parthenope* Selys. *Atropos* 14: 17-18. (in English). ["[...] Although there is a form with a brighter abdomen, showing some blue along its entire length, this has so far not been reported in Britain." This colour form is discussed in detail and compared with *Aeshna mixta*, *Anax ephippiger*, and males and females of *A. imperator*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

- 2169.** Peacor, S.D.; Werner, E.E. (2001): The contribution of trait-mediated indirect effects to the net effects of a predator. *Proceedings of the National Academy of Sciences of the United States of America* 98(7): 3904-3908. (in English). ["Many prey modify traits in response to predation risk and this modification of traits can influence the prey's resource acquisition rate. A predator thus can have a "nonlethal" impact on prey that can lead to indirect effects on other community members. Such indirect interactions are termed trait-mediated indirect interactions because they arise from a predator's influence on prey traits, rather than prey density. Because such nonlethal predator effects are immediate, can influence the entire prey population, and can occur over the entire prey lifetime, we argue that nonlethal predator effects are likely to contribute strongly to the net indirect effects of predators (i.e., nonlethal effects may be comparable in magnitude to those resulting from killing prey). This prediction was supported by an experiment in which the indirect effects of a larval dragonfly (*Anax* sp.) predator on large bullfrog tadpoles (*Rana catesbeiana*), through nonlethal effects on competing small bullfrog tadpoles, were large relative to indirect effects caused by density reduction of the small tadpoles (the lethal effect). Treatments in which lethal and nonlethal effects of *Anax* were manipulated independently indicated that this result was robust for a large range of different combinations of lethal and nonlethal effects. Because many, if not most, prey modify traits in response to predators, our results suggest that the magnitude of interaction coefficients between two species may often be dynamically related to changes in other community members, and that many indirect effects previously attributed to the lethal effects of predators may instead be due to shifts in traits of surviving prey." (Author)] Address: Peacor, S., Department of Biology, University of Michigan, Ann Arbor, MI, 48109, USA. E-mail: speacor@umich.edu
- 2170.** Perepelov, E.; Bugrov, A.G. (2001): C-heterochromatin in chromosomes of *Ophiogomphus cecilia* (Four.) (Anisoptera: Gomphidae) with notes on the sex chromosome origin in the species. *Caryologia* 54(2): 169-172. (in English). ["The karyotype of *Ophiogomphus cecilia* ($2n$ male=23, X0) was analyzed using C-banding technique. All autosomes possess terminal C-bands. The X-chromosome is the largest element of the set and it consists of heterochromatic region at one of the ends and euchromatic part with three interstitial heterochromatic blocks. Possible ways of the formation of the X-chromosome are considered." (Authors)] Address: Perepelov, E. & A. Bugrov, Siberian Branch, Institute of Animal Systematics and Ecology, Russian Academy of Sciences, 11 Frunze St., 630091, Novosibirsk, Russia. E-mail: bugrov@fen.nsu.ru
- 2171.** Perepelov, E.A.; Bugrov, A.G. (2001): The constituent heterochromatin in karyotypes of dragonflies. *Belyshevia* 1(1): 10-13. (in Russian with short English summary). ["The karyotypes of 35 species of dragonflies were studied using the C-banding method. The results received allow to value positively the perspectives of usage of the method in cytogenetics of dragonflies and other insects groups possessing the holokinetic chromosomes." (Authors) The following species were studied: *Calopteryx splendens*, *Coenagrion lunulatum*, *Enallagma circuratum*, *Erythromma najas*, *Lestes dryas*, *L. sponsa*, *Gomphus epoptalmus*, *G. vulgatisimus*, *Nihonogomphus ruptus*, *Ophiogomphus cecilia*, *O. obscurus*, *Stylurus flavipes*, *Aeshna crenata*, *A. grandis*, *A. juncea*, *A. mixta*, *A. nigroflava*, *A. viridis*, *Anax imperator*, *Anotogaster sieboldii*, *Cordulia aenea*, *Macromia amphigena*, *Somatochlora graeseri*, *S. metallica*, *Leucorrhinia pectoralis*, *Libellula depressa*, *L. quadrimaculata*, *Orthetrum albistylum*, *O. brunneum*, *O. coerulescens*, *O. triangulare*, *Pantala flavescens*, *Sympetrum pedemontanum*, and *S. sanguineum*.] Address: Perepelov, E. & A. Bugrov, Siberian Branch, Institute of Animal Systematics and Ecology, Russian Academy of Sciences, 11 Frunze St., 630091, Novosibirsk, Russia. E-mail: bugrov@fen.nsu.ru
- 2172.** Phillips, E.C. (2001): Life history, food habits and production of *Progomphus obscurus* Rambur (Odonata: Gomphidae) in Harmon Creek of east Texas. *Texas Journal of Science* 53(1): 19-28. (in English). ["*P. obscurus* is a burrowing dragonfly species which is abundant in eastern Texas sandy streams. The naiads and adults of *P. obscurus* were collected from and around Harmon Creek (Walker County, Texas) from November 1995 through May 1997. This species has a univoltine life cycle and produces a total of 11 instars. At Harmon Creek, emergence of adults began in mid April and continued until mid to late September. Oviposition was observed from early May through mid August. First instar naiads were collected from May through early September. May, June and July were the months of greatest recruitment. Penultimate naiads were first collected during late February. The annual secondary production estimate for *P. obscurus* was 6.842 g/m²/yr, the standing stock biomass was 1.682 g/m², and the cohort production/biomass ratio (P/B ratio) was 4.067. The primary food items consumed by naiads of *P. obscurus* were chironomid larvae, followed by mayfly naiads of the families Caenidae and Baetidae." (Author)] Address: Phillips, E.C., Department of Biology, Gannon University, Erie, PA, 16541 USA
- 2173.** Popova, O.N. (2001): "Dependence of dragonfly distribution of the genus *Sympetrum* on larval features". *Belyshevia* 1(1): 14-17. (in Russian with short English summary). [Environmental factors affecting the distribution of larvae of the genus *Sympetrum* are discussed.] Address: Popova, O.N., Institut Sistemati i Zkologii Zhivotnykh, 630091 Novosibirsk, Ul. Frunze 11, Russia
- 2174.** Reder, G.; Vogel, W. (2001): Nachweise der Grünen Flußjungfer - *Ophiogomphus cecilia* (Fourcroy, 1785) - in Hessen (Anisoptera: Gomphidae). *Hessische Faunistische Briefe* 20(1): 11-18. (in German with English summary). [26 June 1999 a female of *O. cecilia* was discovered on a clearing in a forest closeley situated to Bürstadt, Hessen, Germany. This is the first record for the Federal State of Hessen since 70 years. In addition, in the same time period some exuviae of *O. cecilia* were found in the Hessian part of the River Rhine.] Address: Reder, Gerd, Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany. E-mail: PG.Reder@t-online.de
- 2175.** Reinhardt, K.; Gerighausen, U. (2001): Oviposition site preference and egg parasitism in *Sympecma paedisca* (Odonata: Lestidae). *Int. Jour. Odonatology* 4(2): 221-230. (in English). ["Oviposition of *Sympecma paedisca* was observed in eastern Kazakstan. The main oviposition substrates were living *Phragmites* leaves. In comparison with European and Japanese popu-

lations we propose geographic variation in the proportional use of horizontal versus vertical oviposition substrates. Ovipositing females seemed to avoid the inner parts of Phragmites stands and there was a preference for individual plants. Eggs were on average 1.28 mm long and densities of up to one egg per mm² leaf area were observed. Parasitoid wasps of the genus *Anagrus* emerged from almost 2% of 13,938 eggs examined. Further estimates revealed that 22.4% of the eggs were parasitized. There was no significant correlation between the degree of parasitism and egg density. We propose that clutch size may not be the best female fitness parameter in endophytically laying odonate species." (Authors)] Address: Reinhardt, K., Institut für Ökologie, Universität Jena, Dornburger Str. 159, D-07743 Jena, Germany. E-mail: b5klre@pluto.rz.uni-jena.de

2176. Relyea, R.A. (2001): The lasting effects of adaptive plasticity: Predator-induced tadpoles become long-legged frogs. *Ecology* 82(7): 1947-1955. (in English). ["Changes in environmental conditions often alter the traits of individuals; however, we have a poor understanding of how changes in phenotypically plastic traits early in development may affect traits later in life. Such effects are of particular interest in organisms with complex life cycles in which early and late life stages can have drastically different morphologies and occupy different habitats. In this study, I examined how differences in the mass, morphology, and larval period of wood frog tadpoles (*Rana sylvatica*) subsequently affected the mass and morphology of metamorphic frogs. I found three major patterns: (1) larval mass and larval period were positively related to metamorphic mass; (2) larval period was positively related to metamorph hindlimb and forelimb length and negatively related to metamorph body width; and (3) larval body length was positively related to metamorph forelimb size. I then used these correlations to interpret the connection between the traits of predator-induced tadpoles and the subsequent traits of metamorphic frogs. Tadpoles reared with caged predators (aeshnid dragonflies) developed relatively deeper tail fins and had shorter bodies, lower mass, and longer developmental times than tadpoles reared without predators. Metamorphs emerging from larval predator environments exhibited no differences in mass but developed relatively large hindlimbs and forelimbs and narrower bodies than metamorphs emerging from predator-free larval environments. These differences arose primarily due to predator-induced changes in larval development time and not due to the predator-induced changes in larval morphology. By focusing on a large number of traits and a wide range of trait values, one can readily generate predictions about how a variety of environments, which alter traits early in development, can subsequently alter traits later in development." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburg, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

2177. Richardson, J. (2001): A comparative study of activity levels in larval anurans and response to the presence of different predators. *Behavioral Ecology* 12(1): 51-58. (in English). ["Activity level is a key behavioral trait in many animals which mediates a trade-off between finding food and avoiding predation. Optimal activity level will therefore depend on environment, and plasticity in response may increase fitness (if an organism encounters multiple environments in a lifetime).

One group in which activity level, and its relationship to foraging and predation risk, has been well studied is larval anurans. Anurans inhabit a range of distinct freshwater aquatic community types that are created by differences in pond permanency and top predator. Species segregate across these pond types and therefore tadpoles from different species encounter different selection regimes. I hypothesized that species from different pond types would therefore differ in activity behavior, and in plasticity of this behavior. I tested this in a phylogenetic framework to consider the evolution of plasticity in anurans diversifying into different pond types. Time spent active was quantified for larvae of each of 13 anuran species (from three taxonomic families) in four conditions: when no predator was present, and in the non-lethal presence of a dragonfly, newt, or fish predator. Species nested within pond type by taxonomic family differed significantly in time spent active. A significant interaction between predator treatment and taxonomic family was also observed. A phylogenetic analysis of change in behavior revealed strong positive correlations in evolution of these behaviors and suggests constraints on the ability of larval anurans to independently modify activity levels in the presence versus absence of predators." (Author)] Address: Richardson, J.M. L., Department of Zoology, University of Toronto, 25 Harbord St., Toronto, ON, M5S 3G5, Canada. E-mail: jmlr@zool.utoronto.ca

2178. Richardson, J.M.L. (2001): A comparative study of activity levels in larval anurans and response to the presence of different predators. *Behavioral Ecology* 12(1): 51-58. (in English). ["Activity level is a key behavioral trait in many animals which mediates a trade-off between finding food and avoiding predation. Optimal activity level will therefore depend on environment, and plasticity in response may increase fitness (if an organism encounters multiple environments in a lifetime). One group in which activity level, and its relationship to foraging and predation risk, has been well studied is larval anurans. Anurans inhabit a range of distinct freshwater aquatic community types that are created by differences in pond permanency and top predator. Species segregate across these pond types and therefore tadpoles from different species encounter different selection regimes. I hypothesized that species from different pond types would therefore differ in activity behavior, and in plasticity of this behavior. I tested this in a phylogenetic framework to consider the evolution of plasticity in anurans diversifying into different pond types. Time spent active was quantified for larvae of each of 13 anuran species (from three taxonomic families) in four conditions: when no predator was present, and in the non-lethal presence of a dragonfly, newt, or fish predator. Species nested within pond type by taxonomic family differed significantly in time spent active. A significant interaction between predator treatment and taxonomic family was also observed. A phylogenetic analysis of change in behavior revealed strong positive correlations in evolution of these behaviors and suggests constraints on the ability of larval anurans to independently modify activity levels in the presence versus absence of predators." (Author)] Address: Richardson, J., Department of Zoology, University of Toronto, 25 Harbord St., Toronto, ON, M5S 3G5, Canada. E-mail: jmlr@zool.utoronto.ca

2179. Roos, P.; Marten, M. (2001): Das Makrozoobenthos der Alb im Stadtgebiet von Karlsruhe. *Lauter-*

bornia 41: 89-103. (in German with English summary). [Macrozoobenthos of the River Alb, a right affluent of the Rhine in Karlsruhe (Germany) was studied in 1995-2000. In total 241 taxa have been recorded, 198 of them identified up to species level. Remarkable is the constant presence of *Allogamus ligonifer*, a in Germany extremely rare Trichoptera, and *Ophiogomphus cecilia*; the river Alb harbours the most important population of this species in the Federal State Baden-Württemberg. The black fly *Simulium degrangei* was found for the first time in Germany.] Address: Marten, M., Landesanstalt für Umweltschutz Baden-Württemberg, Griesbachstr. 1, D-76185 Karlsruhe, Germany

2180. Ryazanova, G.I. (2001): Ontogenesis of behavior in insects: Specific features in sexual behavior of odonate larvae. *Zoologicheskii Zhurnal* 80(1): 45-51. (in Russian with English summary). ["Specific features in sexual behavior of *Calopteryx splendens* Harris larvae were revealed. Such a specificity was found in responses of larvae to a large threatening object and in conspecific interactions of larvae. The behavioral peculiarities are manifested to a greater degree in increasing the aggressiveness of male larvae resulted in a greater damage of them. The specific sexual behavior described is considered as a display of forming the future imago behavior similar to developing imaginal morphology in larvae of hemimetabolic insects. The behavior of elder larvae is characterized as a forced compromise of the larva adaptive behavior and peculiarities of developing imaginal behavior which are of no adaptive value." (Author)] Address: Ryazanova, G., Faculty of Biology, Moscow State University, Moscow, 119899 Russia

2181. Sahlén, G.; Ekestubbe, K. (2001): Identification of dragonflies (Odonata) as indicators of general species richness in boreal forest lakes. *Biodiversity & Conservation* 10(5): 673-690. (in English). ["We argue the need to select indicator species on empirical data to avoid influence of personal opinions. To test an empirical selection process based on a nested subset matrix, we sampled partivoltine dragonfly larvae from 74 small lakes in central Sweden. A nestedness matrix was set up using the 'nestedness temperature calculator' program, selecting 11 species as potential indicators of species richness. These were tested against a known indicator species for water quality (the pool frog) and plant diversity through inventories and comparison to existing surveys of biological values ('rich' lakes vs. 'ordinary' lakes). We could only see a trend towards the pool frog occurring in dragonfly-rich lakes, but found a significant connection between the number of aquatic plants along the shore line and the number of dragonfly species present. A significantly higher number of indicators were encountered in lakes previously surveyed as 'rich' in plants than in lakes classified as 'ordinary'. Dragonfly species richness therefore appears to be positively associated with species richness of vascular plants. We propose nestedness matrices to be a good selecting tool for indicator species, particularly in groups where the biology of the species is not well known. However, it is important to define what such indicators really indicate." (Authors)] Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18d, SE-752 36 Uppsala, Sweden. E-mail: goran.sahlen@ebc.uu.se

2182. Santos, L.N. dos; Gonzalez. A.F.; Araujo, F.G. (2001): Dieta do tucunare-amarelo *Cichla monoculus*

(Bloch & Schneider) (Osteichthyes, Cichlidae), no Reservatório de Lajes, Rio de Janeiro, Brasil. *Revista Brasileira de Zoologia* 18(Supl. 1): 191-204. (in Portuguese with English summary). ["Diet of *Cichla monoculus* (Bloch & Schneider) (Osteichthyes, Cichlidae) in Lajes' Reservoir, Rio de Janeiro, Brazil. - The diet of *C. monoculus* in Lajes's Reservoir, a major impoundment in Rio de Janeiro State, Brazil, was assessed, from fishes collected in 1994, 1996 and 1999/2000. Gut contents in individuals was analyzed by the index of relative importance (IRI) which deals with numerical, gravimetric and frequency of occurrence. *C. monoculus* showed a strong piscivorous habits feeding on Cichlidae, Characidae and Pimelodidae, in decreasing order of importance, with a remarkable cannibalism on young-of-the-year. Others minor items in the diet were *Macrobrachium* sp. and Odonata. Changes in feeding composition varied with reservoir's zones and seasons, with higher diversity in autumn and peaks of cannibalism in lower zone during spring/summer. [...]" (Authors)] Address: Gonzalez. A.F., Laboratório de Ecologia de Peixes, Posto de Aquicultura, Universidade Federal Rural do Rio de Janeiro, Antiga Rodovia Rio-Sao Paulo, Km 47, 23851-970, Seropedica, RJ. Brazil. E-mail: alejandrafilippo@hotmail.com

2183. Schneider, W. (2001): Buchbesprechungen: Gerken, B. & K. Sternberg (1999): *Die Exuvien europäischer Libellen*. *Insecta Odonata*. ISBN 3-9805700-4-5. *Nachrichten der Deutschen Gesellschaft für allgemeine und angewandte Entomologie* 15(1): 26-27. (in German). [Review of the identification key of European odonate larvae with special emphasize of species not covered by the key.] Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany. E-mail: w.schneider@hlmd.de

2184. Seidenbusch, R. (2001): "Dragonflies of the Adana-region, southern Turkey in May 2000 and May 2001". *Sulzbach-Rosenberger Libellenrundbriefe* 12: 59 pp. (in English). [This issue is an extensive report on two odonatological trips to the Adana region in Turkey. It contains a broad range of information starting with some private "remembers" of landscapes, culture, and human beings of the region, "curiosities" (*Calopteryx intermedia*, *Gomphus davidi*, *Libellula depressa*), observations on habitat requirements or emergence habitats (*Ladona pontica*, *Platycnemis kervillei*, *P. dealbata*, *Coenagrion syriacum*, *Crocothemis erythraea*, *Gomphus schneiderii*, *G. davidi*, *Stylurus flavipes lineatus*, *Onychogomphus macrodon*, *O. lefebvrei*, *O. assimilis*, *Paragomphus lineatus*) and regional altitudinal distribution of Gomphidae. A photo gallery documents in a most impressive way the destruction of habitats of (running water dwelling) Odonata in southern Turkey. The collected material of the trips is used to increase our knowledge on morphological structures of exuviae of some poorly known species; most of them are compared with closely related species: *Ladona pontica*, *Ceragrion georgifreyi* and *C. tenellum*, *Coenagrion syriacum* and *C. puella*, *C. pulchellum*, *C. intermedium*, *Platycnemis kervillei* and *P. dealbata*, *Onychogomphus lefebvrei*, key to the European and Turkish members of *Onychogomphus*, *Paragomphus lineatus* and *P. genei*, *Gomphus schneiderii* and *G. davidi*, *Stylurus flavipes lineatus*. The habitats are described and photographically documented, and their odonate fauna - including *Brachythemis fuscopalliata* (Selys 1887) - is documen-

ted in detail.] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

2185. Serbina, E.A.; Haritonov, A.Yu. (2001): The role of dragonflies in the life cycles of trematodes of the family Prosthogonimidae living in west Siberian forest-steppe water bodies. *Belyshevia* 1(1): 18-20. [Life cycles of trematodes living in the Lake Chany are described. In the intermediate stage Mollusca, and supplementary Odonata (*Aeshna juncea*, *Sympetrum flaveolum*, and *S. vulgatum*), and in the final stage birds are used as hosts.] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia

2186. Sherwin, G. (2001): White-faced Darter *Leucorrhinia dubia* and Black Darter *Sympetrum danae* in Tandem. *Atropos* 14: 64. (in English). [United Kingdom, Scotland, Highlands, Glen Affric, 27 July 2001; mixed couple of a *Sympetrum danae* male and a female of *Leucorrhinia dubia* with a blue coloured abdomen] Address: Sherwin, G., The Beeches, Sporle Road, Little Dunham, Kings Lynn, Norfolk, PE32 2DG, UK

2187. Silsby, J. (2001): Dragonflies of the world. Natural History Museum, London. ISBN 0-565-09165-4: VII + 216 pp. (in English). [This valuable book presents, for the first time, a comprehensive account of representatives of each of the 73 subfamilies of the Odonata, together with an account of their habits and habitats, and clear colour photographs of preserved or (more often) living specimens of larvae and adults and (sometimes) typical habitats. In this regard it fills a long-standing lacuna in the odonatological literature. Besides the main chapter devoted to representatives of subfamilies, there are 12 others treating various aspects of odonate biology, five of which have been authored by appropriate specialists. Eight other specialists have contributed sections within chapters. A wide range of diverse information about odonate biology is included in the book, for the most part being cited to secondary sources. Apart from its unique value in documenting representatives of all subfamilies, the book is likely to be much in demand for its many beautiful photographs, of odonates and of their habitats, mostly by the author, but including those from 27 other people. Another strength of the book, which achieves a stated aim of the author, is that biological and technical information is presented in a way that makes it readily accessible, and enjoyable, to the non-specialist. The book has been attractively produced, and the lay-out makes excellent use of the large page size of 22.5 x 25.5 cm. It is expected that all odonatologists, no matter how experienced they are, will wish to possess a copy of this fine book. Philip Corbet] Address: The Natural History Museum, Cromwell Road London SW7 5BD, UK. Price: £27.50

2188. Sirot, L.K.; Brockmann, H.J. (2001): Costs of sexual interactions to females in Rambur's fork-tail damselfly, *Ischnura ramburi* (Zygoptera: Coenagrionidae). *Animal Behaviour* 61(2): 415-424. (in English). ["Several species of damselflies, dragonflies and butterflies are characterized by a female-limited polymorphism in which one type of female, the andromorph, looks and behaves like males whereas the other type of female, the gynomorph, looks and behaves differently. Sexual conflict has been hypothesized to play a role in the maintenance of this polymorphism in that andromorphs

may have an advantage over gynomorphs by avoiding costly sexual interactions through male mimicry. We tested for costs of sexual interactions to female *Ischnura ramburi* damselflies by comparing the success of singly mated females maintained with no males to the success of females maintained continuously with males at a 3:1 (male to female) operational sex ratio (OSR) and a 1:1 OSR. Our findings suggest that sexual interactions affect the two morphs differently. The time spent feeding, number of eggs laid and egg-laying rate of andromorphs were lower in the 3:1 OSR treatment than in the treatment with no males. Time spent feeding and number and rate of eggs laid by gynomorphs did not differ among treatments. Sexual conflict may be occurring between males and mated andromorphs because sexual interactions are associated with net costs to mated andromorphs whereas sexual interactions with mated andromorphs are beneficial to males because there is high last-male sperm precedence. Based on this experiment, andromorphs cannot be said to have an advantage over gynomorphs by avoiding costly sexual interactions because sexual interactions were not associated with net costs to gynomorphs." (Authors)] Address: Sirot, Laura, Department of Zoology, University of Florida, 223 Bartram Hall, Gainesville, FL, 32611-8525, USA. E-mail: lsirot@zoo.ufl.edu

2189. Siva-Jothy, M.T.; Tsubaki, Y.; Hooper, R.E.; Plaistow, S.J. (2001): Investment in immune function under chronic and acute immune challenge in an insect. *Physiological Entomology* 26(1): 1-5. (in English). ["In this paper we investigate the relationship between the chronic burden of mid-gut parasites (eugregarine trophozoites) and the effect of an acute haemolymph challenge (a nylon insert) on two important insect immune effector systems (phenol oxidase (PO) and the encapsulation response) in a field-population of damselflies. PO levels in the haemolymph, and the magnitude of the encapsulation response were maintained, regardless of chronic and subsequent acute experimental immune challenges. The maintenance of these effector systems is therefore probably an important life-history requirement in these damselflies. Investment in mid-gut PO levels was significantly negatively related to the animal's chronic parasite burden after an acute experimental challenge in the haemolymph, suggesting that maintaining PO levels across two physiological compartments (haemolymph and mid-gut) is costly. The results suggest that the immune effector system activity in different physiological compartments in an insect's body is affected by chronic parasite burdens in the face of the demands imposed by an acute immune insult." (Authors)] Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK. E-mail: m.siva-jothy@sheffield.ac.uk

2190. Spindola, L.; De Souza, L.O.I.; Costa, J.M. (2001): Descrição da larva de *Perithemis thais* Kirby, 1889, com chave para identificação das larvas das espécies conhecidas do gênero citadas para o Brasil (Odonata: Libellulidae). *Boletim Museu Nacional Rio de Janeiro Zoologia* (442): 1-8. (in Portuguese with English summary). ["Description of the larva of the *Perithemis thais* Kirby, 1889, with key to identification of the known larvae of the species of the genus cited to Brazil (Odonata: Libellulidae). -The last instar larva of *Perithemis thais* Kirby, 1889, from the Pantanal of Mato Grosso do Sul, Brazil, is described and illustrated. A key to the lar-

vae of the species of *Perithemis* Hagen, 1861, cited to Brazil is appended." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

2191. Steglich, R. (2001): Die Tier- und Pflanzenarten nach Anhang II der Fauna-Flora-Habitatrichtlinie im Land-Sachsen-Anhalt. 3.1.2 Odonata. Naturschutz im Land Sachsen-Anhalt 38 (Sonderheft): 15-21. (in German). [A special issue of the journal is dedicated to the species of Appendix II of the Fauna-Flora-Habitat-Directive of the European Union. Each species occurring in the Federal State Sachsen-Anhalt, Germany is treated in a monographic way: short description of the species including a photograph of the species and its habitat, information on biology and ecology, distribution in Europe and a detailed commented map of its distribution in Sachsen-Anhalt, and information on threats and conservation measures. This is a sophisticated contribution on *Coenagrion mercuriale*, *Leucorrhinia pectoralis*, and *Ophiogomphus cecilia* in Sachsen-Anhalt and a solid fundament for building the European network NATURA 2000.] Address: Steglich, Rosmarie, Quittenweg 53, 39118 Magdeburg, Germany

2192. Stoks, R. (2001): Male-biased sex ratios in mature damselfly populations: Real or artefact? *Ecological Entomology* 26(2): 181-187. (in English). ["1. There is ongoing controversy about whether biased sex ratios in diploid insect populations are real or an artefact caused by different behaviours and/or different catchability of the sexes. This was tested by monitoring two field and three semi-natural populations of the damselfly *Lestes sponsa*. 2. Capture-mark-recapture data showed that population size estimates were about twice as large for males as for females at both field sites. Independent estimates of the sex ratios based on total numbers of males and females captured supported the male bias. 3. Males had higher recapture probabilities than females due to longer times between successive visits in females. Because the same pattern was found in the semi-natural populations, the longer intervals in females are no artefact due to their lower detectability. 4. Theoretical models show that the strong temporary emigration of females tends, if anything, to overestimate female population sizes and that the heterogeneity of recapture probabilities observed in males tends to underestimate male population sizes. Hence, behavioural differences between the sexes do not cause an artificially male-biased sex ratio. 5. Spatial data show that operational sex ratios are male biased at the pond but become female biased in the plots further away from the shoreline; however because of the decrease in densities away from the shoreline, this does not result in a global even sex ratio. 6. Spatial data, temporary emigration patterns, and independent estimates suggest strongly that the male-biased sex ratios in mature damselfly populations are real." (Author)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

2193. Stoks, R. (2001): What causes male-biased sex ratios in mature damselfly populations? *Ecological Entomology* 26: 188-197. (in English). ["1. Several hypotheses to account for biased sex ratios in mature insect populations were tested by monitoring two field popula-

tions of the damselfly *Lestes sponsa* and by performing experiments in field cages. The population sex ratios are heavily male biased in this species. 2. The observed sex ratio at emergence was even and both sexes emerged synchronously. Females had longer maturation times but these were insufficient to explain the observed sex ratio shift. 3. Mass increases during maturation were consistently larger in females. In agreement with this, immature females made more flights per unit of time, which should make them more vulnerable to predation, however maturation probabilities were lower in females only in one field cage experiment. This inconsistency may be due to long bad weather conditions. Interestingly, predators reduced mass increase and this reduction was larger in females than in males. 4. Calculations based on the sex specific maturation times show that only slightly lower daily survival probabilities during maturation in females are enough to generate the observed sex ratio shift. 5. Mature survival was higher in males than in females in one field population but not in another, indicating that this cannot be a general mechanism causing the sex ratio. A higher maturation probability in males is therefore the most plausible mechanism causing the sex ratio shift in damselfly populations." (Author)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

2194. Suh, A.; N.; Samways, M.J. (2001): Development of a dragonfly awareness trail in an African botanical garden. *Biological Conservation* 100: 345-353. (in English). ["The IUCN/SSC Status Survey and Conservation Action Plan: Dragonflies calls for an increase in educating the public and increasing awareness of dragonflies (Odonata). Dragonflies are conspicuous and attractive, and can 'stand in' for other invertebrates in raising awareness of the necessity to conserve invertebrates. While reserves have been set aside for dragonfly awareness and conservation in the northern hemisphere, no such dragonfly reserves appear to exist in the southern hemisphere, despite its rich dragonfly fauna. This paper describes the development of a dragonfly-awareness trail in an established and well-visited botanical garden (The National Botanical Gardens, Pietermaritzburg, South Africa). Correlations between species and environmental variables were significantly high for six measured environmental variables: pH, percentage shade, vegetation (structural and compositional), ambient and water temperature, and water depth. Multivariate analyses of data, classified 20 a priori selected sampling units into four ecologically meaningful biotope types, each with a characteristic dragonfly assemblage. The four biotopes provided potential viewing points. To these were added a further three duplicate biotopes so as to link the trail into a circuit. Questionnaires assessed public awareness of dragonflies, and helped design a preliminary leaflet. A final trail design was drawn up along with an expanded booklet. The trail has now been implemented. Recommendations are made on the minimal scientific underpinning required for future trail design." (Authors)] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., Univ. of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

2195. Suhling, F.; Lepkojus, S. (2001): Differences in growth and behaviour influence asymmetric predation among early-instar dragonfly larvae. *Canadian Journal*

of Zoology 79(5): 854-860. (in English with French summary). ["Libellulid dragonflies lay large egg clutches. When eggs of two or more species are deposited at the same time and patch, one can expect a high density of early-instar larvae. Thus, interspecific interactions should be evident. We studied the interaction of two species, *Sympetrum fonscolombii* and *Orthetrum cancellatum*, which typically co-occur in French rice fields. We experimentally simulated the laying of egg clutches of both species at the same time and site. Survival of *O. cancellatum* was reduced compared with that of controls without *S. fonscolombii* and also with that of *S. fonscolombii* in the two-species treatment. At the end of the experiment, mean head width of *S. fonscolombii* was greater than that of *O. cancellatum*, which may be one reason for the differential survival. In a second experiment we observed the behaviour of pairs of early-instar larvae of both species in different size combinations. Small larvae of *S. fonscolombii* reduced locomotory activity in the presence of larger *O. cancellatum*. In contrast, small *O. cancellatum* did not do so in the presence of larger *S. fonscolombii*. This behavioural difference may also cause asymmetric interspecific predation." (Authors)] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

2196. Suhling, F. (2001): Intraguild predation, activity patterns, growth and longitudinal distribution in running water odonate larvae. *Archiv für Hydrobiologie* 151(1): 1-15. (in English). ["I studied predation by larval *Cordulegaster boltonii* on larvae of two other dragonfly species in a laboratory artificial stream. *Onychogomphus forcipatus unguiculatus* suffered significantly higher predation than *Onychogomphus uncatus*. Activity was much lower in *O. uncatus*, which is interpreted as an antipredation trait against *C. boltonii*. The higher activity of *O. f. unguiculatus* makes it vulnerable to the Sit-and-wait predator *C. boltonii* due to increased encounters. Rearing of both *Onychogomphus* in field cages under the same conditions of temperature, food availability and density revealed lower growth rates of *O. uncatus*, which may be interpreted as a cost of the antipredation behaviour. To test whether experimental results have relevance for large-scale distribution patterns of the two *Onychogomphus*, samples were taken at 23 sites in river-systems of southern France where both species co-occur. In the field I found that *O. f. unguiculatus* does not coexist with *C. boltonii* at sites where the latter occurs in high numbers. In contrast, *O. uncatus* is established even at high density of *C. boltonii*." (Author)] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

2197. Suri Babu, B.; Srivastava, V.K. (2001): Annotations on the dragonfly fauna of Sagar, Madhya Pradesh, Central India (Odonata: Anisoptera). *Opusc. zool. flumin.* 193: 1-7. (in English). [21 anisopteran species, evidenced during 1992-1996, are listed and field notes are provided on all of them. 17 species were not previously recorded from the district of Sagar. The obscure status of *Crocothemis misrai* Baijal & Agarwal, 1956 is shortly discussed.] Address: Suri Babu, B., Forensic Sciece Laboratory, Police Control Room, Jagdalpur-494001 (M.P.), India

2198. Theischinger, G. (2001): The larva of *Gynacantha mocsaryi* FÖRSTER (Odonata: Aeshnidae).

Linzer biol. Beitr. 33(1): 603-605. (in English). [Morphological details presented by FRASER (1963) in the description of the larva of *G. mocsaryi* are corrected, illustrated and discussed.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

2199. Theuerkauf, J.; Rouys, S (2001): Habitats of Odonata in the Bialowieza Forest and its surroundings (Poland). *Fragmenta Faunistica* (Warsaw) 44(1): 33-39. (in English. with Polish summary). ["From 1997 to 1999, we found 48 Odonata species in the Bialowieza Forest and its surroundings (Poland). We attribute the high number of species in the mainly forested study area to the extensive river network, which is shaped by a mostly natural water regime including many natural pools, and to the abundance of small-scale sandpits bearing water bodies in various stages of succession. The Bialowieza Forest is, until now, the northernmost place of a reproduction of *Crocothemis erythraea* (52°39' N, 23°35' E)." (Authors) There are some more species of special faunistic interest, e.g. *Sympecma paedisca*, *Coeagrion lunulatum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Epithea bimaculata*, *Sympetrum meridionale*, *S. pedemontanum*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. pectoralis*.] Address: Theuerkauf, J., Wildlife Biology and Management Unit, Dept of Ecosystem and Landscape Management, Munich University of Technical Sciences, 85354 Freising, Germany. E-mail: Theuerkauf.Joern@t-online.de Germany

2200. Thurnheer, S.; Reyer, H.-U. (2001): Spatial distribution and survival rate of waterfrog tadpoles in relation to biotic and abiotic factors: A field experiment. *Amphibia-Reptilia* 22(1): 21-32. (in English). ["Predictions about population and community dynamics are usually based on lab experiments. Because the results are difficult to transfer to natural conditions, the major purpose of this study was to test the effects of biotic and abiotic factors on tadpole populations in a natural environment. We stocked six ponds, created the previous year, with known numbers of *Rana esculenta* and *R. lessonae* tadpoles and followed their development over several months. When compared among ponds, tadpole density correlated positively with the nitrate:phosphate ratio. This suggests that water chemistry may have affected survival, either directly or indirectly via productivity. Within ponds, both species showed a clear preference for the shallow zone. This behavior probably reflects a preference for warm water close to the surface, rather than avoidance of predators, because relative densities of odonates also increased from deep to shallow zones. This study is one of few that not only considers the distribution of the anuran tadpoles but the distribution of their predators as well." (Authors)] Address: Thurnheer, Sylvie, Zoological Institute, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: ulireyer@zool.unizh.ch

2201. Tolonen, K.T.; Hämäläinen, H.; Holopainen, I. J.; Karjalainen, J. (2001): Influences of habitat type and environmental variables on littoral macroinvertebrate communities in a large lake system. *Arch. Hydrobiol.* 152(1): 39-67. (in English). ["The community structure of littoral macroinvertebrates was explored by multivariate analyses in three basins of the large Lake Saimaa system (eastern Finland). The basins differed in trophic status and degree of human influence. It was hypothesized that the structure of littoral invertebrate communi-

ties is influenced by lake trophic status, as is the case in profundal communities. Three littoral habitat types with different substrate (stony, sandy and vegetated shores) were sampled from the shoreline to a depth of 1.5-3 meters. The habitat type was found to be largely determined by the slope of the shore and the wind exposure. Each habitat type supported fairly characteristic fauna, and detrended correspondence analysis grouped the invertebrate assemblages by habitat type rather than by basin. Within each habitat type, canonical correspondence analysis indicated that species composition changed along the trophic gradient. In the vegetated littoral zone, the greatest change in community structure occurred within the macrophyte beds, varying from the outer edge of macrophytes to the shoreline. Two alternative or complementary explanations are given for this horizontal gradient. First, a horizontal gradient of abiotic characteristics results in a change of community composition. Second, the macrophyte beds may form a horizontal transition zone in predation, from invertebrate predation inshore to fish predators offshore. On the stony and sandy shores, the magnitude of wave action was also important in structuring the communities. As each habitat type harbors characteristic fauna, a variety of habitats needs to be protected in order to conserve littoral macroinvertebrate diversity in large lakes. To make among-lake comparisons of littoral macroinvertebrate assemblages, stratification by habitat type is obviously necessary. The effects of eutrophication on invertebrate assemblages were most pronounced in stony habitats." (Authors) 13 odonate taxa (11 on species level) are listed in appendix 1.] Address: Tolonen, K.T., Department of Ecology, Karelian Institute, University of Joensuu, P.O. Box 111, 80101 Joensuu, Finland. E-mail: ktolonen@cc.joensuu.fi

2202. Tonn, M. (2001): Hochzeit in Herzform. Hamburger Abendblatt 24. Juli 2001: 6. (in German). [Popular article on dragonflies in a German newspaper. Special emphasize is given to mating behaviour, which is compared with human sexuality.] Address: not stated

2203. Vacher, J.-P. (2001): Nouvelles observations d'*Oxygastra curtisii* (Dale, 1834) dans le département de la Haute-Garonne (Odonata, Corduliidae). *Martinia* 17 (2): 67-68. (in French with English summary). ["The presence of *O. curtisii* in Haute-Garonne, near Toulouse, is confirmed. The previous notice of this Odonata in this department was that of Marquet in 1881. Although breeding has not been proved, the observation of individuals in the three localities surveyed make it likely that the species is still breeding in this area." (Author)] Address: Vacher, J.-P., 5, rue Pons-Capdenier, F-31500 Toulouse, France

2204. Weekers, P.H.; De Jonckheere, J.F.; Dumont, H.J. (2001): Phylogenetic relationships inferred from ribosomal ITS sequences and biogeographic patterns in representatives of the genus *Calopteryx* (Insecta: Odonata) of the West Mediterranean and adjacent West European zone. *Molecular Phylogenetics & Evolution* 20 (1): 89-99. (in English). ["Western Europe is a reinvansion zone for the riverine dragonfly genus *Calopteryx* (Insecta: Odonata). Reinvansion may have been from central West Asia or from the West Mediterranean refugium. Phylogenetic relationships of West Mediterranean and West European taxa of the genus *Calopteryx* from different localities were inferred from sequences of the internal transcribed spacers (ITS1 and ITS2) of the nuclear

ribosomal RNA genes. 26 taxa belonging to the species groups *C. splendens*, *C. meridionalis*, *C. haemorrhoidalis*, *C. virgo*, *C. xanthostoma*, and *C. exul* were analyzed, with two North American species, *C. amata* and *C. aequabilis*, as outgroup. Sequence data and phylogenetic analyses were used to infer biogeographical patterns. The ribosomal spacers (ITS1 and ITS2) and the intervening 5.8S rDNA gene were amplified by PCR and sequenced. The ITS2 sequences of the West Mediterranean and West European calopterygids show no length variation but the ITS1 region was slightly variable in length. The sequence variation for ITS1 and ITS2 regions between different West Mediterranean and West European calopterygids was 14.5 and 6.1%, respectively. Phylogenetic relationships inferred from ITS sequences only partly confirm morphological data. A monophyletic origin of all West Mediterranean and West European species emerged. They are separated into two main clades; the splendens-like forms and the virgo/meridionalis/haemorrhoidalis group. Intraspecific variability, indicating different stages of speciation, was detected only in West Mediterranean representatives (e.g., *C. xanthostoma*) but not in invasive representatives in West Europe. The North African endemic *C. exul* is more closely related to the Italian *C. s. caprai* than to *C. splendens sensu strictu*. Based on the present information, Cretan populations are the only splendens-like taxa in addition to *C. s. caprai* that deserve subspecies status." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstr. 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

2205. Wendzonka, J. (2001): Dragonflies (Odonata) of Gostyn at its environs (southern Wielkopolska). *Badania fizjograficzne nad Polska zachodnia Ser. C., Zool.* 48: 29-39. (in Polish with English summary). [In 1995-2000 the Odonata of Gostyn and its environs in southern Wielkopolska-Kuiawy Lowland, Poland have been investigated. A total of 44 species was recorded, including several rare species such as *Aeshna affinis*, *Orthetrum albistylum*, *Sympetrum striolatum*, *Leucorrhinia caudalis*, and *L. albifrons*, and some species which are not rare but "insufficiently presented in published papers", such as *Lestes barbarus*, *Ischnura pumilio*, and *Erythromma viridulum*. *A. affinis* has its northern range limit in Wielkopolska ("Great Poland"), so this is a region where the species reproduces probably only temporarily. *O. albistylum*, almost till the end of the 20th century only known from the south of Poland, now has been found also in other parts of the country, mostly in mid-eastern and northeastern parts. Two localities near Gostyn, described in this paper, are the northernmost in western Poland. *O. albistylum* significantly prefers gravel and sand pits, unshaded habitats, protected from wind, generally with well-developed vegetation but also with some bare patches. At the locality Pokrzywnica *O. albistylum* predominated over the rare *O. cancellatum*, however in Smilowo the former species was rare and occupied positions away from water. In Smitowc only tandems and ovipositing females used habitats, where *O. cancellatum* and *L. depressa* (aggressive towards each other) predominated.] Address: Wendzonka, J., Zakład Ekologii, Akademia Bydgoska im. Kazimierza Włocławskiego, ul. Chodkiewiczza 51, 85-667 Bydgoszcz, Poland. E-mail: wendzonkafawp.pl

2206. Wheeler, W.; Whiting, M.; Wheeler, Q. D.; Carpenter, J.M. (2001): The phylogeny of the extant hexa-

pod orders. *Cladistics* 17(2): 113-169. (in English). ["Morphological and molecular data are marshalled to address the question of hexapod ordinal relationships. The combination of 275 morphological variables, 1000 bases of the small subunit nuclear rDNA (18S), and 350 bases of the large subunit nuclear rDNA (28S) are subjected to a variety of analysis parameters (indel and transversion costs). Representatives of each hexapod order are included with most orders represented multiply. Those parameters that minimize character incongruence (ILD of Mickevich and Farris, 1981, *Syst. Zool.* 30, 351-370), among the morphological and molecular data sets are chosen to generate the best supported cladogram. A well-resolved and robust cladogram of ordinal relationships is produced with the topology (Crustacea (Chilopoda Diplopoda) (Collembola Protura) (Japygina Campodeina) (Archaeognatha (Zygentoma (Ephemera (Odonata (Mantodea Blattaria) Isoptera) Zoraptera) (Plecoptera Embiidina) (Orthoptera Phasmida) (Grylloblattaria Dermaptera) (Psocoptera Phthiraptera) Thysanoptera) Hemiptera) ((Neuropteroidea Coleoptera) (Strepsiptera Diptera) Mecoptera) Siphonaptera) (Trichoptera Lepidoptera) Hymenoptera)."] (Authors)] Address: Wheeler, W.; Div. Invert. Zoology, American Museum of Natural History, Central Park West at 79th Street, New York, NY, 10024-5192 USA

2207. Wildermuth, H. (2001): Concealment in European Somatochlora larvae (Anisoptera: Corduliidae). *Exuviae* 8(1): 1-12. (in English with Slovene summary). [Adaptive coloration and concealment behaviour were studied in late-stadium larvae of *Somatochlora alpestris*, *S. flavomaculata*, *S. meridionalis*, and *S. metallica*. Their features were interpreted in the light of antipredation adaptations. "Differences between species in body shape, coloration, color pattern, and behaviour are considered to be correlated with the presence or absence of fish in the habitats as well as by the microhabitats the larvae occupy."] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

2208. Wildermuth, H. (2001): Das Rotationsmodell zur Pflege kleiner Moorgewässer. - Simulation naturgemäßer Dynamik. *Naturschutz und Landschaftsplanung* 33(9): 269-273. (in German with English summary). ["The model describes a management mode enabling the establishment of a mosaic of all succession stages, with changes in space and time on a confined area. By offering different succession stages at the same time it is intended to provide permanent habitats for a high diversity of aquatic organisms. The model simulates the fictitious dynamics of small water bodies in certain moorland biotopes formerly unimpaired by human activities. It has been applied for about 20 years in a nature reserve in the Swiss Alpine Foothills where peat was exploited by hand up to 1950. Long-term monitoring of selected plant and animal taxa shows that typical biocoenoses of small peat ponds could be preserved and promoted in various succession stages. Special attention was given to the population dynamics of the local dragonfly fauna including the highly endangered *Leucorrhinia pectoralis*, a species of the Bern Convention and the Habitats Directive of the EU. The prerequisites, possibilities and limits of the model are discussed with respect to biodiversity conservation and landscape management as well as in terms of their practicability."] (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-

8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

2209. Wong, A.; Forbes, M.R.; Smith, B.P. (2001): Characterization of AFLP markers in damselflies: Prevalence of codominant markers and implications for population genetic applications. *Genome* 44(4): 677-684. (in English with French summary). ["Amplified fragment length polymorphism (AFLP) analysis is becoming increasingly popular as a method for generating molecular markers for population genetic applications. For practical considerations, it is generally assumed in population studies that AFLPs segregate as dominant markers, i.e., that present and absent are the only possible states of a given locus. We tested the assumption of dominance in natural populations of the damselfly *Nehalennia irene* [...] Electro-blotted AFLP products from 21 samples were probed with individual markers. Eleven markers were analyzed, of which two were monomorphic and nine were polymorphic. Only two of the polymorphic markers behaved in a strictly dominant manner. The remaining seven polymorphic markers displayed various degrees of codominance, with 2-10 visible alleles in the sample. Of the three markers displaying the highest degree of variability, two contained microsatellite repeat tracts. Our results suggest that the assumption of dominance is unfounded. As a result, AFLP analysis may be unsuitable for estimating several important population genetic parameters, including genetic diversity."] (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

2210. Wood, P.J.; Greenwooda, M.T.; Barkerb, S.A.; Gunn, J. (2001): The effects of amenity management for angling on the conservation value of aquatic invertebrate communities in old industrial ponds. *Biological Conservation* 102: 17-29. (in English). ["The conservation value of aquatic macroinvertebrate assemblages in old industrial mill ponds was examined within the urban environment. Of the 60 pond sites identified, 18 (31%) have been drained and/or redeveloped since 1985. Canonical correspondence analysis identified differences between the invertebrate communities of managed and unmanaged ponds. Community composition was strongly influenced by the percentage of vegetation cover and the presence of stocked fish for recreational angling. Managed/ stocked ponds have communities dominated by burrowing Oligochaeta and Chironomidae. Unmanaged sites had higher macroinvertebrate diversity compared to managed/stocked ponds and were typified by larval Trichoptera, Coleoptera and Zygoptera. However, unmanaged and 'derelict' sites are at greater risk of drainage and redevelopment in the urban environment. The potential conflict between active management of old industrial mill ponds for recreational angling and the conservation of macroinvertebrate biodiversity is explored."] (Authors) In an appendix the invertebrate taxa recorded and the number of ponds at which they were recorded are documented: *Coenagrion puella* (15), *Ischnura elegans* (14), *Enallagma cyathigerum* (12), and *Pyrrhosoma nymphula* (1).] Address: Wood, P.J.; Department of Geography, Loughborough University, Loughborough, Leicestershire, LE1 1 3TV, UK. E-mail: p.j.wood@lboro.ac.uk

2211. Woodward, G.; Hildrew, A.G. (2001): Invasion of a stream food web by a new top predator. *Journal of*

Animal Ecology 70(2): 273-288. (in English). [1. A new top predator, the dragonfly *Cordulegaster boltonii* Donovan, 'invaded' a stream with a well-described food web. 2. The pre-invasion web was species-poor but complex, with prevalent intraguild predation, cannibalism and omnivory. Such characteristics differ from expectations based upon the early food web literature, but are consistent with more recent empirical webs and theoretical developments. 3. Exhaustive sampling was necessary to describe web structure, with the gut contents of several hundred individuals being required to reach the asymptote of the total number of links for individual species. There was no single 'standard' sample size that was applicable for estimating the number of links: sampling 'x' guts gave a different fraction of the asymptotic value for different species. Smaller predators were more prone to under-estimation of links than larger species higher in the web. 4. The number of feeding links, trophic status and the degree of omnivory increased progressively with predator body size, both within and among species. The diet of each predator species (or instar) was effectively a subset of the diet of the next largest predator. 5. The invader was extremely polyphagous and fed at all trophic levels. Mean chain length increased by half a link following the invasion. Web complexity, and omnivory in particular, also increased. Pre- and post-invasion webs displayed intervality and rigid circuitry. The resident predators were frequently eaten by the invader, but the only significant predators of *C. boltonii* were larger conspecifics. Although no species have yet been deleted, there has been a 21% increase in links for a 6% increase in species since the invasion, suggesting that the members of the web had become more tightly packed within niche space. Most prey species were eaten by every predator species (including *C. boltonii*), indicating the potential for strong apparent competition within the web." (Authors)] Address: Woodward, G., IERM, University of Edinburgh, Mayfield Road, Edinburgh, EH9 3JU: UK. E-mail: Guy.Woodward@ed.ac.uk

2212. Worthen, W.B.; Blue, T.; Haney, D.C.; Andersen, C.B. (2001): Abundance of *Boyeria vinosa* larvae in the Enoree River basin, USA: chemical, physical, and biological correlates (Odonata: Aeshnidae). *Int. Jour. Odonatology* 4(2): 231-240. (in English). [Relationships between the abundance of *B. vinosa* larvae and the chemical, physical and biological properties of the Enoree River of South Carolina, USA and nine of its tributary stream systems are described. "The abundance (number/sample) of *B. vinosa* was positively correlated with stream means for pH, bicarbonate, silicon, magnesium, and calcium ($p < 0.01$). Also, *B. vinosa* were more abundant in streams with a higher frequency of sandy bottoms sites ($r = 0.622$, $p < 0.05$). At the site scale, sites with *B. vinosa* had significantly more crayfish, fish, and other odonates, higher pH, and dissolved oxygen, and less chloride than sites without *B. vinosa* (Mann-Whitney U tests, $p < 0.05$). Where *B. vinosa* were present, abundance was positively correlated with fish abundance, odonate abundance, pH, conductivity, and concentrations of sodium, calcium, magnesium, bicarbonate, bromine, silicon, and aluminum ($p < 0.05$). As such, larval abundance of *B. vinosa* was strongly correlated with chemical and physical parameters at both site and stream scales, but only covaried with the abundance of other organisms at the site scale. Larval abundance did not correlate with the abundance of predatory centrarchid fish at either scale." (Authors)] Ad-

dress: Worthen, W.B. D., Department of Biology, Furman University, Greenville, SC, USA, 29613. E-mail: worthen@furman.edu

2213. Wright, A.B.; Smock, L.A. (2001): Macroinvertebrate community structure and production in a low-gradient stream in an undisturbed watershed. *Arch. Hydrobiol.* 152(2): 297-313. (in English). ["Macroinvertebrate community composition, abundance and production were measured in a sand-bottomed, headwater stream on the Coastal Plain physiographic province in the southeastern U.S.A. The stream's watershed had experienced almost no anthropogenic disturbance for over 100 years and thus the stream represented as close to pristine, reference conditions as occurs in this geographic region. Macroinvertebrates were sampled over one year in the three dominant habitats in the stream: sand sediment, submerged wood and macrophytes (*Sparganium americanum*). Total taxa richness as well as the taxa richness of Ephemeroptera, Plecoptera, Trichoptera and Chironomidae all were greater than in streams flowing through more disturbed watersheds in the area. Annual mean habitat-specific density and biomass were highest in the sediment; density was lowest on the wood and biomass lowest on *Sparganium*. Habitat-specific production was $39-42 \text{ gm}^{-2} \text{ y}^{-1}$ in the sediment and on wood and $16 \text{ gm}^{-2} \text{ y}^{-1}$ on *Sparganium*. The majority of production in all three habitats was by Chironomidae, which comprised 80-92% of total production in each habitat. Taxa in the collector-gatherer and predator functional feeding groups accounted for the majority of production in the sediment and on wood, whereas filter-feeders were predominant on *Sparganium*. Whole-stream production, calculated by summing habitat-specific values that had been weighted for habitat availability, was $64 \text{ gm}^{-2} \text{ y}^{-1}$, considerably higher than production in more disturbed streams in the region. About 65 % of the total production occurred in the sediment, 26 % on wood, and 9 % on *Sparganium*. [...] The production to biomass ratio for the macroinvertebrate community was 33.3; ratios for six taxa of chironomids exceeded 100. Along with the higher species richness in this stream, production of macroinvertebrates was at least twice as high as that in nearby streams with more disturbed watersheds. These differences may be attributable to the long time since the last anthropogenic disturbance of the stream's watershed, which has led to a mature forest covering nearly all of the watershed and which has resulted in a more stable stream flow and less disturbance of the sediment during high flow than in streams in more disturbed watersheds." (Authors) In tab. 1 *Boyeria vinosa*, *Calopteryx maculata*, *Cordulegaster maculata*, and *Dromogomphus spinosus* are listed.] Address: Smock, L.A., Department of Biology, Virginia Commonwealth University, Richmond, Virginia, U.S.A. 23284-2012.

2214. Yourth, C.P.; Forbes, M.R.; Smith, B.P. (2001): On understanding variation in immune expression of the damselflies *Lestes* spp. *Canadian Jour. Zoology* 79(5): 815-821. (in English with French summary). ["Immune ability and immune expression have been viewed as life-history traits that are influenced by such factors as the likelihood of being parasitized, intensity and costs of parasitism, and trade-offs associated with immune expression. In this paper we show that different patterns of infestation by a generalist ectoparasite, *Arrenurus planus* Marshall (Arrenuridae: Hydrachnida), do not fully explain the variation in immune expression ac-

ross four species of sympatric damselflies (Lestidae: Zygoptera). Within species, no gender biases in immune expression were evident. Whereas both males and females of one oft-exploited species did not mount immune responses against attending larval mites, males and females of three other species showed similar immune responses, with variable expression. The immune response was melanotic encapsulation of mite feeding tubes, and was associated with dead mites. Of the three species showing immune expression, the species with the highest prevalence and intensity of infestation had a significantly higher proportion of individuals responding immunologically to mites. In conclusion, current infestation levels only partially predict immune investment; consideration of the timing of emergence of different species suggests that season may be an important predictor of immune investment." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

Thanks to all who contributed to this issue of OAS!

This issue is dedicated to the memory of Joachim Werzinger, Nürnberg, who died in December 2001, and who made many significant contributions to odonatology and friendship among odonatologists.

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- 2215.** Aoki, T. (1997): Dragonflies inhabiting Shijimi River in Shijimi-cho, Miki City, Hyogo Prefecture. *Sympetrum Hyogo* 4: 15. (in Japanese with English summary). [A survey on the Odonata fauna of Shijimi River, Japan was carried out on 26 May 1996. Relatively clear water from Donto-dam before joining Ogo River enabled the development of gomphid species such as *Nihonogomphus viridis*, *Stylogomphus suzukii*, *Onychogomphus viridicostus*, *Asiagomphus pryleri*, *Trigomphus citimus tabei*, *Gomphus postocularis*, and *Sieboldius albardae*. Increasing water pollution downstream reduced gomphid diversity.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp
- 2216.** Aoki, T. (1997): *Lanthus fujiacus* (FRASER) was discovered in Kobe City, Hyogo Prefecture. *Sympetrum Hyogo* 4: 4. (in Japanese with English summary). [I collected an ultimate instar larva of *L. fujiacus* at Arima-cho, Kobe on July 9, 1996. This species has often been found at habitats of *Epiophlebia superstes*. I heard that the latter species was found there, so I tried to collect the former species. It was successful, and the total number of species recorded in Kobe counts 89 including 14 species in Gomphidae.] (Author) Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp
- 2217.** Aoki, T. (1997): Odonata fauna of Kobe City, Part 5. (Lestidae). *Sympetrum Hyogo* 4: 2-4. (in Japanese with English summary). [*Lestes sponsa*, *L. japonicus*, *Sympecma paedisca*, and *Indolestes peregrinus* are treated. *L. japonicus* seriously has been influenced negatively by destruction of habitats.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp
- 2218.** Aoki, T. (1997): The Odonata fauna of Kobe City, Part 6. (Calopterygidae). *Sympetrum Hyogo* 4: 25-27. (in Japanese with English summary). [*Calopteryx atrata* Selys 1853, *C. cornelia* Selys 1853, *Mnais pruinosa* Selys 1853, *Mnais nawai* Yamamoto, 1956. The status of *C. japonica* Selys 1869 in the Kobe region is unknown; only old records are existing.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp
- 2219.** Muraki, A. (1997): A case of oviposition of *Epiophlebia superstes* in Gifu Prefecture. *Sympetrum Hyogo* 4: 16-17. (in Japanese with English summary). [A female *E. superstes* was laying eggs into bryophytes in Gifu Pref. in 1975. This is the 12th prefecture in which this species was found ovipositing into mosses.] Address: not stated
- 2220.** Nishu, S. (1997): Report of the survey trip of the Hyogo Society of Odonatology, Part 1 in 1996. *Sympetrum Hyogo* 4: 8-13. (in Japanese with English summary). [27 species have been recorded on April 28 and May 6, 1996. Special emphasis was given to *Libellula angelina*. This endangered species was found in low abundance at Sara Pond, Fukuden-cho, Ono City, but none was observed in the additionally visited habitat Maruodani, Kobe City. "The latter pond lost its water because of drought in 1994, leak from cracks of pond walls caused by the great earthquake in 1995 and complete drainage for the repairing works in 1995 and 1996." In 1970's, more than ten habitats of *L. angelina* in Hyogo Prefecture were known, but actually only Sara Pond seems to bear a population. Even this habitat is threatened by a local government "development plan". Action has to be taken, to enable survival of the species at Sara Pond.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net
- 2221.** Nishu, S. (1997): Report of the survey trip of the Hyogo Society of Odonatology, Part 2 in 1996. *Sympetrum Hyogo* 4: 18-24. (in Japanese with English summary). ["The Hyogo Society of Odonatology had a survey tour for *Mortonagrion hirosei* visiting Momojima Pond, Kinohira-cho, Hyogo Prefecture on July 20-21. Estimation of the individual number was made through the marking-recapturing method. 100 males were marked and released, and 92 males were captured on the next day including 13 marked ones. The total number of this damselfly inhabiting this pond was estimated to be at the order of 10,000 for the time. Masses of this species were found sleeping at night. Most of them were roosting on stalks at a height of 10 to 20 cm above water-level. [...]"] A list of 41 species recorded in the framework of the survey are listed in a table.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net
- 2222.** Nishu, S. (1997): Report of the survey trip of the Hyogo Society of Odonatology, Part 3 in 1996. *Sympetrum Hyogo* 4: 28-31. (in Japanese with English sum-

summary). ["An immature male *Stylurus nagoyanus* was caught in Mt. Funakoshi, Sayo-cho in 1993. This is the only record of this species in Hyogo Prefecture until today. Immature imagoes of this species are known to migrate to distant places, and we had a survey trip to find the original habitat. One of our members, Mr Inoue, once happened to see a gomphid dragonfly much like this species along Ibo River, hence we had a survey trip to this river on September 8, 1996. The results were not successful, but we recorded 14 species in 6 families including many males and 3 females of *Onychogomphus viridicostus* and 5 males of *Anisogomphus maaki*." (Author) In addition species lists for five localities are given in two tables.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2223. Sogame, S. (1997): A male *Sympetrum pedemontanum elatum* with an aberrant wing brown marking. *Sympetrum Hyogo* 4: 14. (in Japanese with English summary). [A male *S. pedemontanum elatum* had a round colourless area in the brown marking on right forewing. This area is thinner than the other parts, and was found broken after the specimen was kept in a triangular paper.] Address: not stated

2224. Wada, N.; Inoue, K. (1997): First record of *Zygomma obtusum* from Kuroshima island, Taketomi-cho, Okinawa Prefecture. *Sympetrum Hyogo* 4: 5-7. (in Japanese with English summary). [A male *Z. obtusum* was caught on Kuroshima Island, Japan, a small oceanic island located between Ishigaki and Iriomote Islands. "This crepuscular insect was found at 20:00 - 21:00 attracted to a fluorescent lamp in a passage of a cottage in Marine Research Center. This species had been found only on North and South Borodino Islands in Japan, but in 1996 a female was caught by Mr Akira Nishida on June 23 at Nishi-funatsukibashi, Iriomote Island (Nishida, A. 1996) and males and females were captured by Mr Osamu Tabata on June 30 to July 2 at Taisho Pond, Iriomote Island [...]. Thus this is the third record outside N. and S. Borodino Islands. Oguma, K. recorded a male of this species in 1915. The specimen is labelled "Okinawa, VIII, 1902", but no additional material had been found from Okinawa Main Island, and many males and females have been found after 1958 on N. and S. Borodino Islands which are in Okinawa Prefecture, thus the Oguma's specimen had been supposed to have come from N. or S. Borodino Island. The new discovery of this oceanic species from islands outside N. and S. Borodino Islands brought a discussion on the possibility to be found on Okinawa Main Island. Another point to be mentioned is that this male was attracted to an artificial light. Lieftinck (1954) writes "Females often attracted to light", and it is advised to try "light trap method" for further studies." (Authors)] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

1998

2225. Althmoos, M. (1998): Möglichkeiten und Grenzen des Einsatzes regionalisierter Zielarten - dargestellt am Modellbeispiel des Biosphärenreservates Rhön. *Laufener Seminarbeiträge* 8/98: 127-156. (in German). [This

is an extensive and sound discussion of methods and fundamentals for the use of a regionalised target species concept. Odonata are considered as good target species; in the studied area *Calopteryx virgo* / *C. splendens*, *Gomphus vulgatissimus*, *Coenagrion hastulatum*, *Lestes dryas*, *Aeshna juncea*, *A. subarctica* / *Soma-tochlora arctica*, *Cordulegaster boltonii*, and *Sympetrum flaveolum* are important umbrella species for nature conservation measures.] Address: Althmoos, M., Projekt "Zoologischer Artenschutz im Biosphärenreservat Rhön", Bauerbacher Str. 46, D-35043 Marburg, Germany.

2226. Aoki, T.; Nishu, S. (1998): A survey for discovery of new breeding sites colonized by *Ictinogomphus pertinax* (Selys) in southwestern Hyogo Prefecture. *Sympetrum Hyogo* 5: 16-20. (in Japanese with English summary). [*I. pertinax* extends its range northeastward in Japan. It was found at Ushimado in eastern part of Okayama Prefecture in 1980, and at Akashi in southwestern part of Hyogo Prefecture in 1987. "In 1994, the senior author found a new locality at Kakogawa, some 25 km northwest to Akashi. The area from Ushimado to Kakogawa has been left unrecorded for this species." On 18 August 1997 five members of the Hyogo Society of Odonatology tried to fill the blank. Eleven localities - with splendid dragonfly populations - were visited, but they failed to discover this southern gomphid species. The results of the survey are compiled in a table including 24 species.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp

2227. Aoki, T. (1998): Odonata fauna of Kobe City, Part 7. (Platycnemididae, Epiophlebiidae, Petaluridae). *Sympetrum Hyogo* 5: 21-22. (in Japanese with English summary). [*Platycnemis foliacea sasakii*, *Copera annulata*, *Epiophlebia superstes*, and *Tanypteryx pryeri* are recorded in Kobe City. "*E. superstes* was found at Arima in Mt. Rokko area on June 12, 1996 (two larvae), on July 9, 1996 (two larvae) and on May 25, 1997 (oviposition incisions). These records are rediscoveries after 60 years for this area."] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp

2228. Fincke, O.M. (1998): The population ecology of *Megaloprepus coerulatus* and its effect on species assemblages in water filled tree holes. In: Dempster, J.P. & I.F.G. Mclean (Eds.): *Insect populations: in Theory and Practice*. Kluwer Academic Publishers. London: 391-416. (in English). ["Although its larvae are restricted to tree holes, the influence of *M. coerulatus* extends beyond that microhabitat via its effects on intraguild predators, such as *Dendrobates* and *Toxorhynchites*, that also breed in other phytotelmata. The evidence to date suggests that the abundance of *M. coerulatus* is primarily affected by biotic factors during the larval stage, specifically obligate sibicide and cannibalism followed by intraguild predation. Within this competitive framework, at a local level, population size should be affected by abiotic factors. The number of generations a tree hole can support annually reflects rainfall patterns as well as nutrient input (e.g. leaf and fruit detritus), which influences growth rate and adult body size via increased prey productivity. Among forests, body size probably reflects evolutionary responses to differences in tree-hole nutrient levels. Finally, changes in forest

composition would affect the abundance of *Megaloprepus* because tree holes are non-randomly distributed with respect to tree species. There is no evidence that adult *Megaloprepus* are limited by the availability of prey (i.e. spiders) or by predation. Their ability to find tree-hole oviposition sites may be more limiting than their capacity to produce excess eggs. However, in seasonal forests, persistence of *Megaloprepus* depends on adults surviving the dry season. Adults are also the dispersal stage. Because *Megaloprepus* avoids large, man-made clearings, it may be particularly vulnerable to habitat fragmentation." (Author)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

2229. Franz, D. (1998): Das Blaukehlchen. ISBN 3-89104-582-4: 140 pp. (in German). [Odonata rarely seem to be the prey of *Luscinia svecica* (Aves). On page 104 a few records are compiled, among them a note on a picture of a male *Libellula depressa* preyed by the Bluethroat.]

2230. Grosser, N.; Rötzer, B. (1998): Realisierbarkeit eines Zielartenkonzepts auf regionaler Ebene. - Ergebnisse einer Projekt-Diskussion im Bereich der Gemeinde Friedenfels, Landkreis Tirschenreuth (Oberpfalz). Laufener Seminarbeiträge 8/98: 121-126. (in German). [A students project group discussed - in the framework of the realisation of the communal landscape plan of the community Friedenfels, Bavaria - the possibilities to use target species for a sound realisation of measures. Some theoretical thoughts to select target species are presented. These species are discussed on the in reality existing level of restrictions among a community and acceptance of nature conservation measures by its population. Among the target species without any conflict potential are *Calopteryx virgo*, *C. splendens*, and *Cordulegaster boltonii*.] Address: Grosser, N., Fachhochschule Erfurt, Fachbereich Landschaftsarchitektur, Leipziger Str. 77, D-99085 Erfurt, Germany. E-mail: grosser@la.fh-erfurt.de

2231. Marabini, J. (1998): Die Rolle von Ziel- und Leitarten für die Renaturierung von Mooreichen - am Beispiel eines ABSP-Projektes im Aischgrund. Laufener Seminarbeiträge 8/98: 165-168. (in German). [Activities of human beings in ancient times e.g. to create and to run carp ponds provided suitable habitats for some specialized plants and animals. This paper discusses activities to manage abandoned ponds for nature conservation purposes. Examples given are the plant genus *Utricularia*, the moor frog (*Rana arvalis*), and *Leucorrhinia dubia*, *L. rubicunda*, and *L. pectoralis*.] Address: Marabini, J., Landratsamt Erlangen-Höchststadt, Schloßberg 10, D-91315 Höchststadt/Aisch, Germany

2232. Matsuda, I. (1998): Memories of the late Mr. Hiroshi Itoh. *Sympetrum Hyogo* 5: 2-3. (in Japanese with English summary). ["Mr. Hiroshi Itoh passed away on July 14, 1997 at the age of 62. He was a very kind person, and he had often guided us to many good habitats of various species. An oral tumour was found in October, 1995, and the operation was carried out successfully. But it metastasized to the lung, and he had operations during July to October, 1996. He had recovered well, and he attended field meetings and the Celebrating Party of Mr. Y. Miyatake held on June 1, 1997. In early July he was hospitalised again, and could not re-

cover this time. He, with his kind and heartily personality, will live in our heart forever." (Author)] Address: not stated

2233. Müller, J. (1998): Die Libellenfauna (Insecta: Odonata) der Naturschutzgebiete Mahlpfuhler Fenn, Jävenitzer Moor und Benitz des Tanger-Gebietes und der Altmark-Heiden in Sachsen-Anhalt. *Abh. Ber. Mus. Naturk. Magdeburg* 20: 3-18. (in German with English summary). [The odonate fauna of two bog moors (Mahlpfuhler Fenn, Jävenitzer Moor) and a gravel pit (Benitz), Sachsen-Anhalt, Germany, is documented in detail. The species are arranged according to ecological groups of habitat preference and the zoogeographical distribution. The species list accounts 42 species, 19 of them are commented.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: Fau-nOek.Jmueller@t-online.de

2234. Muraki, A.: (1998): Record of dragonflies of Kohama Island, Yaeyama, Okinawa Pref. made by the late Mr. Hiroshi Itoh. *Sympetrum Hyogo* 5: 4. (in Japanese with English summary). ["The late Mr. Hiroshi Itoh visited Kohama Island on May 13, 1996, but he has not reported on the results. He found seven species including *Ictinogomphus pertinax*, *Brachythemis contaminata*, *Pseudothemis zonata*, and *Tholymis tillarga* which are new to this island." (Author)] Address: not stated

2235. Nishu, S. (1998): A supposed hybrid between *Anax parthenope julius* and *A. n. nigrofasciatus* emerged from a bred larva. *Sympetrum Hyogo* 5: 31-33. (in Japanese with English summary). ["A final instar larva of a suspicious species was caught at a dragonfly pond in Amagasaki No.3 Power Plant of Kansai Electric Power Co. on August 9, 1997. It resembled that of *Anax n. nigrofasciatus*, but larvae of this species are univoltine which generally reach the final instar much later. It was brought home, and emerged on September 11, the same year. It is a male *Anax* which shows three features intermediate between *A. parthenope julius* and *A. n. nigrofasciatus*, seven features like the latter while a feature like the former. Thus it is most probably a hybrid between these two species, and the second record of emerged hybrids in this combination of species." (Author)] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2236. Nishu, S. (1998): A survey report of *Libellula angelina* Selys in Hyogo Pref., 1997. *Sympetrum Hyogo* 5: 5-8. (in Japanese with English summary). ["*L. angelina* was seen in many places in Hyogo Pref. until several years ago, but Sara Pond, Fukuden-cho, Ono City is the only known habitat for this endangered species in this prefecture at present. Members of the Hyogo Society of Odonatology visited this pond on April 29 and May 11, and two additional localities on April 29." Two males were found in May at Sara Pond. The environmental condition of the habitat seem to have recovered and be comparable with that formerly existing. In spite of this first side indication, low abundance demonstrates that at least one ecological factor must prevent the species to settle on this habitat.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2237. Nishu, S. (1998): A survey report of *Mortonagrion hirosei* Asahina in Hyogo Pref., 1997. *Sym-*

petrum Hyogo 5: 9-11. (in Japanese with English summary). [M. hirosei was surveyed during 20-21 July 1997 at three localities in the northern part of Hyogo Prefecture, Japan. Abundance was higher than the years before (Counts of sleeping specimens). But contrary to the previous year the specimens were found sleeping rather dispersed and not congregated. A list of 23 additional species found at the four localities is appended.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2238. Nishu, S. (1998): First discovery of the locality of *Stylurus nagoyanus* (Asahina) in Hyogo Prefecture. *Sympetrum Hyogo* 5: 12-15. (in Japanese with English summary). [A male *S. nagoyanus* was found in Hyogo Pref. in 1993, but the larval habitat was unknown. Izushi River in the northern part of this prefecture turned out to be a reproductive habitat of the species: 3 males, 1 female and 8 larvae were caught on 21 July 1997, and 2 males and 1 female were caught on September 21. The habitat seems to provide suitable conditions, and was dwelled by one of the Japanese Red Data Book species, *Macromia daimoji* too. 23 additional species recorded at this locality are listed in a table.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2239. Reck, H. (1998): Der Zielartenansatz in großmaßstäbiger Anwendung - anhand von Beispielen aus Eingriffsplanung, Flurbereinigungsverfahren sowie der Erfolgskontrolle von Pflege- und Entwicklungsplänen. *Laufener Seminarbeiträge* 8/98: 43-68. (in German). [Target species concepts are used to focus assessment of environmental impacts or nature conservation measures on so-called umbrella species or selected species of special importance for nature conservation purposes. This paper compiles such concepts and exemplifies them on different levels of planning. Odonata are used to demonstrate the deduction of renaturation aims for the peat bog / fen habitat mosaic of the Wurzachener Ried, Baden-Württemberg, Germany.] Address: Reck, H., Ökologiezentrum der Univ. Kiel, Fachabteilung Landschaftsökologie, Schauenburger Str. 112, D-24118 Kiel, Germany

2240. Sachtleben, J. (1998): Von der Theorie in die Praxis - zur Umsetzung des bayerischen Arten- und Biotopschutzprogrammes auf der Grundlage von Ziel- und Leitarten. *Laufener Seminarbeiträge* 8/98: 157-164. (in German). [Report on the current status of realisation of the Bavarian Programme for Species and Habitat Conservation. Odonata are referred as good target species on several occasions.] Address: Sachtleben, J., Projektgruppe ABSP / PAN Partnerschaft, Rosenkavaliertplatz 10, D-81925 München, Germany. E-mail: panp@t-online.de

2241. Sasamoto, A. (1998): A female *Davidius nanus* having aberrant wings. *Sympetrum Hyogo* 5: 34-35. (in Japanese with English summary). [A female *Davidius nanus* having aberrant wings emerged from a larva which I caught in Kyoto prefecture. Its right fore-wing lacks 3rd radius and has several small vein aberrations. In its right hind-wing the pterostigma is long and curved and includes postnodal nerves, in addition, many disordered veins and spaces are found. The exuviae has also transformed right hind wing sheath. The other spe-

cimens caught at the same time were normal." (Author)] Address: not stated

2242. Sogame, S. (1998): A malformed exuviae of *Onychogomphus viridicostus* (OGUMA). *Sympetrum Hyogo* 5: 30. (in Japanese with English summary). [74 exuviae of *O. viridicostus* collected along the shore of Hazu River, Takarazuka City, Hyogo Prefecture, Japan, contained an exuvium with only 9 segments. In addition, the 7th segment is fused with the 8th at the left side when seen ventrally.] Address: not stated

2243. Sogame, S. (1998): Dragonflies inhabiting Hatsuka River in Sanda City, Hyogo Prefecture. *Sympetrum Hyogo* 5: 28-29. (in Japanese with English summary). [Between May 1996 and August 1997, 19 taxa could be recorded from the river. The occurrence of *Calopteryx japonica* and a strong population of *Platycnemis foliacea sasakii* indicate a quite good water quality.] Address: not stated

2244. Sogame, S. (1998): Odonate fauna of Takarazuka City, Hyogo Prefecture. *Sympetrum Hyogo* 5: 23-27. (in Japanese with English summary). [66 odonate species could be recorded between 1992 and 1997. 8 of them are new compared with a compilation published in 1982, but also 8 species couldn't be confirmed.] Address: not stated

1999

2245. Aoki, T. (1999): Odonata fauna of Kobe City, Part 8 (Libellulidae 2 and supplements). *Sympetrum Hyogo* 6: 9-13. (in Japanese with English summary). [13 libellulid species - excluding the genus *Sympetrum* - and *Anax guttatus*, *Ictinogomphus pertinax*, *Ashna juncea*, and *Stylurus ocellatus* are documented for Kobe City, Japan.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp

2246. Azuma, T.; Aoki, T. (1999): Supposed westward expansion of *Ictinogomphus pertinax* in southern part of Hyogo Prefecture. *Sympetrum Hyogo* 6: 2-3. (in Japanese with English summary). ["Some new breeding sites of *I. pertinax* were found in the southern part of Hyogo Prefecture in 1998. They are situated some kilometers west of the known localities. It is very likely that this species started to extend its breeding sites westward after" - a ten years lasting interruption - "since the first finding in the southern part of Hyogo Prefecture." (Authors)] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp

2247. Bezdecka, P. (1999): The current state of dragonfly research in the Bělé Karpaty (White Carpathians), Czech Republic. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi* 6.-7.3.1999. ISBN 80-86327-00-0: 69-72. (in Czech with English summary). [List of 36 Odonata (37 taxa) from the Carpathian mountains resp. the Region of the Czech - Slovakian border.] Address: Bezdecka, P., Správa CHKO Bílé Karpaty, Nádrázní 318, CZ 76326 Luhacovice, Czech Republic

- 2248.** Carl, M. (1999): Biomonitoring zur Ökologie und Renaturierung anthropogen veränderter Lebensräume des bayerischen Salzachauen-Ökosystems von Freilassing bis zur Mündung in den Inn. *Berichte der Akademie für Naturschutz Laufen* 23: 121-131. (in German). [In the framework of a revitalisation project of the river Salzach, Bavaria, Germany, *Thecagaster bidentata* was considered a good bioindicator for assessing success of measures undertaken. This assumption is based on the known distinct factors characterising the habitat of the species. Going ahead with the revitalisation measures *T. bidentata* turned out to be unsufficiently suitable to indicate and assess the middle to large scale measures. Even natural factors may influence the habitat of larvae, while an indicator for revitalisation measures has to react on a causal scale: The species is a good indicator for micro habitats, but not for the ecosystem of the alluvium. Thus, it was excluded from the list of bioindicator species that will be used to assess the success of the revitalisation in future.] Address: Carl, M., Gollenbergstr. 12, D-82299 Türkenfeld, Germany
- 2249.** Cempírek, J. (1999): The dragonflies of the town České Budjovice I. (southern Bohemia). In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 47-52. (in Czech with English summary). [Two localities (forest lake, gravel-pit) in the environs of České Budjovice, Czech Republic were surveyed for their odonate fauna. 33 excursions between 1985 and 1988 are documented in detail in a "present-absent-table" for the forest lake and the gravel pit (5 excursions).] Address: Cempírek, J., Vidov 37, 370 07 České Budjovice, Czech Republic
- 2250.** Devai, G.; Miskolczi, M. (1999): Faunistical data on dragonflies (Odonata) of the creek Ólyvös (E-Hungary). *Studia odonatol. hung.* 5: 5-13. (in Hungarian with English summary). [The paper presents faunistical data based on an adults collection of the geographical microregion Bihari-sík in E-Hungary (administrative area of the settlements Berettyóújfalu, Bojt, Mezöpeterd). Between 1983 and 1986, 28 species were recorded along the Ólyvös, a typical small and fast-flowing creek of the Hungarian plains. *Coenagrion pulchellum*, *C. ornatum*, *Sympecma fusca*, *Brachytron pratense*, *Sympetrum flaveolum*, and *S. meridionale* should be mentioned.] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
- 2251.** Devai, G.; Miskolczi, M. (1999): Revelation of the facts and prediction of the state for the dragonfly (Odonata) fauna of the Aggtelek National Park and its surroundings. *Studia odonatol. hung.* 5: 47-65. (in Hungarian with English summary). [Aggtelek National Park, North-Hungary; the paper compiles and discusses literature data of 22 species including *Coenagrion lunulatum* and *C. scitulum*.] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
- 2252.** Hanel, L. (1999): A six-language dictionary of the central European dragonflies. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 105-116. (in Czech with English summary). [The popular names of 78 central European Odonata are compiled covering the Latin, Czech, Slovak, Hungary, German, and English languages.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz
- 2253.** Hanel, L. (1999): An odonatological bibliography of the Czech Republic. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 93-104. (in Czech with English summary). [About 200 papers with original odonatological information and covering 1859 - 1999 are compiled in this list] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz
- 2254.** Hanel, L. (1999): The directory of co-workers of dragonfly research in the Czech Republic. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 117-119. (in Czech with English summary). [The list compiles 40 addresses of persons co-operating in the Czech Dragonfly Project.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz
- 2255.** Hanel, L. (1999): The dragonflies (Odonata) of the nature Reserve "Podlesi" in the Protected Landscape Area Blaník (Central Bohemia, Czech Republic). In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 53-59. (in Czech with English summary). [A total of 29 odonate species were collected between 1992 and 1999. The two ponds studied are characterised by chemical parameters (including sediment load with heavy metals) and vegetation. The Odonata are arranged in a table, which provides information on phenology, dominance, and autochtony of the species. Some species of interest are *Lestes dryas*, *Sympecma fusca*, *Coenagrion hastulatum*, *Erythromma najas*, *Aeshna grandis*, *Anax parthenope*, *Anaciaeschna isocetes*, *Somatochlora metallica*, *Orthetrum albistylum*, *Sympetrum danae*, *S. flaveolum*, and *Leucorrhinia pectoralis*.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz
- 2256.** Hanel, L.; Zelený, J. (1999): The Red List of Odonata in the Czech Republic - 1999 version. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 77-81. (in Czech with English summary). [Based on the 1997-state of information a Red List of the Czech Republic is presented. The list also contains the Czech names of the Odonata.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz
- 2257.** Hanel, L. (1999): Topical knowledge on dragonflies (Odonata) in the Czech Republic territory. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 7-

15. (in Czech with extensive English summary). [The paper outlines the current status of odonatological research in the Czech Republic starting with the first studies published in the end of the 19th century. In 1994 a National Biodiversity projekt "Dragonflies" was started, which enforced recent odonatological research. As a aim of this project, handbooks were released, and educating of persons interested in Odonata was started. The first results of these endeavours were presented in 1999 in the framework of an odonatological meeting in Vlasim. Assessed on the basis of 100 km² squares, in the end of the 20th century odonatological information of app. 1/3 of all squares is available. Middle term aims of odonatological studies are the preparation of a Red List and realising an atlas of the Czech Odonata.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blanik@schkocr. cz
- 2258.** Hatanaka, N. (1999): Report of the survey trip of the Hyogo Society of Odonatology, Part 4 in 1998. *Sympetrum Hyogo* 6: 33-35. (in Japanese with English summary). [The rare *Stylurus nagoyanus* (imagoes), and *Macromia daimoji* (larvae) were observed on 6 September 1998 at Izushi River, Izushi-cho, Hyogo Prefecture, Japan. A table with additional records of 18 taxa is appended.] Address: not stated
- 2259.** Hlásek, J. (1999): The dragonfly *Nehalennia speciosa* - a new species in the Czech Republic. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 75-76. (in Czech with English summary). [*N. speciosa* is described from the boggy fen "Kramafka" (Czech mapping square 6854). The locality is situated in the Protected Landscape Area Trebonsko (South Bohemia). In total 37 mostly freshly hatched specimens (17 males and 20 females) were found on 14. July 1998. The habitat is characterized by the plant community of *Caricetum rostratae*. Co-occurring species are *Aeshna juncea*, *Calopteryx splendens*, *Coenagrion hastulatum*, *C. puella*, *Cordulia aenea*, *Erythromma najas*, *Ischnura elegans*, *Lestes sponsa*, *Leucorrhinia rubicunda*, *Libellula quadrimaculata*, *Platycnemis pennipes*, *Pyrrosoma nymphula*, *Sympecma fusca*, *Sympetrum danae*, and *S. vulgatum*.] Address: Hlásek, J., 39181 Veseli nad Luznici I/308, Czech Republic
- 2260.** Huber, A. (1999): Data on the dragonfly (Odonata) fauna of the Landscape Protection Area of Middle-Tisza and its surroundings. *Studia odonotol. hung.* 5: 29-46. (in Hungarian with English summary). [Hungaria; between April 1994 and November 1996, 38 species were collected at 51 localities. Records of *Coenagrion pulchellum*, *Erythromma najas*, *E. viridulum*, *Sympecma fusca*, *Stylurus flavipes*, *Epitheca bimaculata*, *Lestes virens*, *Brachytron pratense*, *Sympetrum depressiusculum*, *S. flaveolum*, *S. meridionale*, and *S. pedemontanum* should be noted.] Address: Huber, A., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
- 2261.** Isley, M. (1999): Flutter by, dragonfly, that we may know you better. *Lake County News-Chronicale* 19 July 1999: 1, 3. (in English). [Copy of a report of the WDA-symposium in a regional newspaper, printed in the Nord. *Odonatol. Soc. Newsl.* 7(1): 18.] Address: not stated
- 2262.** Lucan, R. (1999): The first discovery of the dragonfly *Coenagrion scitulum* in the Czech Republic. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 73-74. (in Czech with English summary). [4.7.1997 a small population of *C. scitulum* was found near the village Sisma (district Prerov, central Moravia) behind a dam. Unfortunately the habitat was destroyed later by the destruction of the dam as a consequence of a big flood.] Address: Lucan, R., U rev'ru 151, CZ-76872 Chvalcov, Czech Republic
- 2263.** Marík, J. (1999): A note to the occurrence of the dragonfly *Cordulegaster boltonii* in the vicinity of the town As (western Bohemia, Czech Republic). In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 61-63. (in Czech with English summary). [Several specimens of *C. boltonii* were observed near the Czech-German border. The habitats are briefly characterized and co-occurring odonate species are listed.] Address: Marík, J., Dukelská 26, CZ-35002 Cheb 2, Czech Republic
- 2264.** Matsuda, I. (1999): A late emergence of *Anax nigrofasciatus nigrofasciatus*. *Sympetrum Hyogo* 6: 38. (in Japanese with English summary). ["A male *Anax n. nigrofasciatus* emerged at an outdoor pond on October 13, 1998 from a larva caught on October 10 at a dragonfly pond in Amagasaki City, Hyogo Prefecture. This record is noteworthy as a case of very late emergence." (Author)] Address: not stated
- 2265.** Mocek, B. (1999): A current state of the dragonfly (Odonata) research in the eastern Bohemia. In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 17-46. (in Czech with English summary). [508 odonatological data from 97 localities and referring to 46 species (collected between 1981 and 1997) are detailed in an extensive table.] Address: Mocek, B., Regional Museum of Eastern Bohemia, Dept Natural History, Eliscino Nábřezí 465, CZ-50001 Hradec Králové, Czech Republic. e-mail: mvc@mvc.anet.cz
- 2266.** Moens, J. (1999): Libellen boeiende getuigen van een verleden. *Limburg University Centre-nieuws* Feb. 1999: 20-24. (in Dutch). ["Dragonflies, fascinating witnesses from a far past." This is an introduction into dragonfly biology directed to a general reader. The paper is illustrated with some black and white drawings, and a portrait of Prof. Dr. Jos Moens.] Address: Moens, J., Dept. S.B.M., Limburgs Universitair Centrum, Universitaire Campus, B-3610 Diepenbeek, Belgium
- 2267.** Moriyasu, T. (1999): Larvae of *Macromia daimoji* first caught at Chikusa River, Hyogo Prefecture. *Sympetrum Hyogo* 6: 8. (in Japanese with English summary). [Two final instar larvae of *M. daimoji* were caught on 3 January 1998 in the Chikusa River, Ako City, Hyogo Prefecture, Japan.] Address: not stated
- 2268.** Naraoka, H. (1999): On the *Forcipomyia* (*Pterobasca*) *tokunagai* Oka and *Asahina* (Diptera: Ceratopogonidae). *Journal of natural History of Aomori* 4: 17-21. (in Japanese (Translation by H. Naraoka and N. Ishizawa)). [The paper compiles published records of the ceratopogonid *F. (Pterobasca) tokunagai* parasitizing

Japanese Odonata. The author adds some new material collected between 1985 and 1998 (*Mnais pruinosa* Selys 1853, *Davidius moiwanus* (Okumura 1935), *Davidius fujiana* Fraser, 1936, *Sympetrum darwinianum* (Selys 1883), *S. frequens* (Selys 1883), *S. eroticum* (Selys 1883), *S. infuscatum* (Selys 1883), *Trithemis aurora* (Burmeister 1839), and *Pseudothemis zonata* Burmeister, 1839). More recently published assumptions, Ceratopogonidae would stuck Odonata during emergence are rejected. The author didn't find just emerged dragonflies parasitised, but parasitism on mature dragonflies was recognized. Parasitism is interpreted to depend on congruence of flight period of the ceratopogonid and odonate specimens.] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagi-cho, Kitagun, Aomori Prefecture, 038-3661, Japan

2269. Nishu, S. (1999): Report of the survey trip of the Hyogo Society of Odonatology, Part 3 in 1998. *Sympetrum Hyogo* 6: 29-32. (in Japanese with English summary). [Momojima Pond, Kinosaki-cho Hyogo Prefecture, Japan was visited during July 19-20, 1998. The society carried out annual survey trips for *Mortonagrion Hirosei* since the first discovery in 1992. It is planned to construct a sewage treatment plant at Kinosaki-cho, and a part of the habitat has to be filled up. Construction works had started already. *M. Hirosei* inhabits also the part to be destroyed. Some larvae of this species were found together with the larvae of *Ischnura senegalensis* which is a strong predator on the former species. Two additional habitats of *M. Hirosei* were visited. *Stylurus nagoyanus*, *Onychogomphus viridicostus*, and *Macromia daimoji* have been found at Izushi River.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisq.net

2270. Nishu, S. (1999): *Stylurus ocellatus* first found in Hyogo Prefecture. *Sympetrum Hyogo* 6: 3. (in Japanese with English summary). [The species was caught on 18 July 1998 at the seashore of Suma, Kobe City, Japan. It is the 98th Odonata reported from the Hyogo Pref., and the 90th in Kobe City.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisq.net

2271. Oka, I. (1999): Report of the survey trips of the Hyogo Society of Odonatology, Part 1 and 2 focused to *Libellula angelina*. *Sympetrum Hyogo* 6: 23. (in Japanese with English summary). [A total of 18 members of the Society failed on 3 and 24 May 1998 to discover this endangered species in Sara Pond, Ono City, Hyogo Prefecture, while between 1991-1994, about 200-300 immature specimens were observed every year at both Yude Pond in Kobe City and Sara Pond in Ono City. The species disappeared in 1995 at the former pond, and in 1997 at the latter pond. The law regulation - started in 1993 - couldn't stop the extinction of *L. angelina*. A brief note is made to longevity of a specimen marked at emergence (53 days). Additional species recorded in the framework of the survey are listed in appended tables.] Address: not stated

2272. Olajos, P.; Kiss, B. (1999): Data on the dragonfly (Odonata) fauna of the north-eastern part of the Hungarian flatland Tiszai-Alföld. *Studia odonatol. hung.* 5: 15-28. (in Hungarian with English summary). [A total of 43 species was collected at 54 localities in the eas-

tern part of Great Hungarian Plain. Records of *Leucorrhinia caudalis*, *L. pectoralis*. and *Aeshna cyanea* are considered of special regional interest. In addition, *Brachytron pratense*, *Aeshna viridis*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Epithecica bimaculata*, and *Sympetrum depressiusculum* should be noted.] Address: Olajos, P., Hortobágy Nemzeti Park, Igazgatóság, H-4024 Debrecen, Sumen u.2, Hungary

2273. Potrykus, W.; Strätz, C.; Weid, S. (1999): Zum Vorkommen der Gemeinen Keiljungfer [*Gomphus vulgatissimus* (Linnaeus 1758)] in Oberfranken. *Ber. naturf. Ges. Bamberg* 73: 51-64. (in German). [Compilation and mapping of records of *G. vulgatissimus* in the region Oberfranken, Bayern, Germany. In addition records of the regionally rare *Onychogomphus forcipatus* are dealt with.] Address: Strätz, C., Alexanderstr. 5, D-95444 Bayreuth, Germany. E-mail: chris.straetz@bth.de

2274. Sálek, P. (1999): The faunistic research of dragonflies (Odonata) in three marshes in the district Vsetín (north Moravia, Czech Republic). In: Hanel, L. (Ed.): *Vazky 1999. Sborník referátu z mezinárodního semináře konaného v Podblanickém ekocentru CSOP ve Vlasimi 6.-7.3.1999.* ISBN 80-86327-00-0: 65-68. (in Czech with English summary). [A total of 22 species were recorded at three localities. Some management measures are proposed to improve situation for Odonata.] Address: Sálek, P., Visnovce 1093, CZ-746824 Hulín, Czech Republic

2275. Sasamoto, A.; Inoue, K. (1999): *Anax guttatus* caught at Aonogahara, Hyogo Prefecture. *Sympetrum Hyogo* 6: 36-37. (in Japanese with English summary). ["Sasamoto visited Sara Pond and Hira Pond in Aonogahara, Hyogo Prefecture on October 10, 1998, and caught 1 male and 1 female *Anax guttatus*. Next day Inoue visited Sara Pond, not knowing the former's findings, and caught 1 male of the same species. In both cases several males of this tropical aeshnid species were observed patrolling rapidly in search of females along the shore, and Sasamoto found a female ovipositing solitarily. This female was brought home, and laid ca 2,000 eggs in two days. Eggs started to hatch 15 days after oviposition under the room temperature of about 20°C."] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

2276. Sogame, S. (1999): Odonate fauna of Kohzuki and the neighbouring localities in Sanda City, Hyogo Prefecture. *Sympetrum Hyogo* 6: 4-7. (in Japanese with English summary). [Between 1996 and 1998, 47 species were recorded. The survey stressed on the fauna of sunny irrigation ponds (For riverine Odonata see Sogame 1998).] Address: not stated

2277. Yagi, T. (1999): Collection records of *Anax guttatus* in Sanda City, Hyogo Prefecture. *Sympetrum Hyogo* 6: 38. (in Japanese). [Two records of *A. guttatus* are communicated.] Address: not stated

2278. Yagi, T. (1999): Poster exhibition at the 9th Dragonfly Citizen Summit in Kobe. *Sympetrum Hyogo* 6: 39. (in Japanese). [A poster of *Mortonagrion Hirosei* without further explanations presented on 23 August 1998 is documented.] Address: not stated

2000

2279. Alvo, R.; Campbell, D. (2000): Pre-fledged Common Loon, *Gavia immer*, on an acidic lake dies with food bolus in esophagus. *Can. Field-Nat.* 114(4): 700-702. (in English). ["A moribund pre-fledged Common Loon (*Gavia immer*) with a bulge in its throat was collected from acidic Silvester Lake. It died soon afterwards. Dissection of the bird revealed that the bulge was a food bolus containing Yellow Perch (*Perca flavescens*), dragonfly larvae (*Somatochlora cingulata* and *Aeshna* sp.), crayfish (*Cambarus robustus*) and whirligig beetles (*Dineutus* sp.). We suggest this bird may have swallowed a large fish that punctured the esophagus on its way to the proventriculus, causing peristalsis to cease. Food subsequently swallowed could not move beyond the esophagus, thus forming the bolus. The loon may have swallowed the large fish because food of suitable size for a bird of that size was in short supply due to the lakes acidity." (Author)] Address: Alvo, R., 58 Rue Parulines, Hull, PQ J9A 1Z2, Canada

2280. Bánkuti, K.; Devai, G.; Miskolczi, M. (2000): Data on the dragonfly (Odonata) fauna of the Aggtelek region based on a survey of exuvia. *Studia odonotologica*. 6: 21-25. (in Hungarian with English summary). [In 1993, 18 odonate species (exuviae) were collected at 17 localities in Aggtelek National Park, N-Hungary. The list includes *Coenagrion ornatum* and *Ophogomphus cecilia*.] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2281. Bechly, G. (2000): A new fossil damselfly species (Insecta: Odonata: Zygoptera: Coenagrionidae: Ischnurinae) from Dominican Amber. *Stuttg. Beitr. Naturk. (B)* 299: 1-9. [*Ischnura velteni* sp. n. is described from an unknown locality, Dominican Republic, Eocene-Miocene (female holotype: Do-5687, in SMNS, Stuttgart). It represents the first fossil record of this genus, and it is one of the smallest known fossil Odonata. Its systematic position is outlined and discussed.] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

2282. Bedjanic, M.; Pirnat, A. (2000): A contribution to the knowledge of the dragonfly fauna (Insecta, Odonata) of the Vipava valley, W-Slovenia. *Natura Sloveniae* 2(2): 29-45. (in Slovene with extensive English summary). ["An annotated list of 32 dragonfly species collected at 27 localities during the 1994-2000 period is given. Three species, viz. *Ceragrion tenellum*, *Anax parthenope*, and *Libellula fulva*, are new for the investigated area. The records of *Coenagrion ornatum*, *Cercion lindenii*, *Cordulegaster heros*, *Somatochlora flavomaculata*, and *Orthetrum c. coerulescens* are also briefly commented as they deserve attention from zoogeographical or nature conservation point of view. A list of 44 dragonfly species, hereto reported from the Vipava valley with its surroundings, is compiled and an odonatological bibliography of the investigated area is presented." (Authors)] Address: Pirnat, Alja, Bioloski Institut, ZRC

SAZU, Novi trg 5, SI-1000 Ljubljana, Slovenia. E-mail: alja@zrc-sazu.si

2283. Beutler, H. (2000): Landschaft in neuer Bestimmung. Russische Truppenübungsplätze. Findling. Neuenhagen. ISBN 3-933603-11-0. 192 pp. (in German). [Texts directed to a public interested in nature, and intrusive colour photos elucidate the outstanding importance of the former military training areas of the Russians in Germany for nature conservation purposes. In an appendix, 12 of these training areas are characterised in detail. As far as odonatological data are available, these are compiled. Of special interest are *Coenagrion mercuriale*, *Nehalennia speciosa*, *Aeshna viridis*, *Epithea bimaculata*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, and lake-populations of *Cercion lindenii* and *Onychogomphus forcipatus*.] Address: Beutler, H., Kirschallee 35, D-15848 Stemmen, Germany

2284. Bezdecka, P. (2000): Dragonflies (Odonata) of the Chriby Highlands (Moravia, Czech Republic). In: Hanel, L. (Ed.): *Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000*. Vlasim. ISBN 80-86327-12-4: 154-161. (in Czech with English summary). [The survey of 47 localities resulted in 35 Odonata, which are briefly commented. The region seems to be a hot spot for the rare *Cordulegaster boltonii* and *Thecagaster bidentata* in the Czech Republic.] Address: Bezdecka, P., V.Vaculky 994, CZ-68605 Uherské Hradiště, Czech republic. E-mail: pbezdecka@iol.cz.

2285. Bösel, A. (2000): Hat *Aeshna subarctica* (Walker 1908) in Nordostdeutschland eine Überlebenschance? *Natur und Landschaft* 76(6): 257-261. (in German with English summary). ["The exuvia of *A. subarctica* have been recorded since 1995 in the Gölde nitzer Moor mire in the German regional state of Mecklenburg / Western Pomerania. Occurrence declined within 6 years from 322 to 12 hatched individuals. This is associated with the simultaneously observed disappearance of *Sphagnum* ssp. The loss of *Sphagnum* plants is due to intensive drainage and elevated nutrient availability. In the Horster Moor mire, a presumably extinct population re-established itself after restoration measures as an abundant and autochthonous population. Restoration of the Horster Moor site, where peat had previously been extracted industrially commenced in 1986 by water-logging this ombrogenous bog. At first, *Sphagnum* cover developed only slowly. Finally, however, in shallow flooded areas a stand of *Eriophorum* ssp. with mossy bog ponds developed. In areas where manual peat-digging was practised, too, flooded *Sphagnum* grew again after the water level rose. Consequently, after 14 years of recultivation, *A. subarctica* has re-established itself with a major autochthonous population. However, this population remains endangered by eutrophication of its larval waters." In Western Pomerania 9 additional localities with records of *A. subarctica* are known, which are in total severely threatened. The author therefore takes at medium-terms the extinction of this dragonfly in north-eastern Germany as likely. Comment of M. Schorr: *A. subarctica* is not occurring in Germany, the correct taxa is *Aeshna subarctica elisabethae* Djakonov, 1922.] Address: Bösel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

2286. Burkart, G.; Burkart, W. (2000): Två nya trollsländearter för Gotland! *Körkmacken* 27: 14-15. (in Swedish). [Two new Odonata for Gotland. *Sympecma fusca* and *S. paedisca* have been discovered in late April 2000 on the island of Gotland, Sweden. Both species are new for the island, and *S. paedisca* never has been observed prior 2000 in Sweden. Hence, a new Swedish name "Sibirisk vinterflickslända" is proposed.] Address: Burkardt, G. & W., Am Emel 7, D-27412 Wilstedt b. Bremen, Germany

2287. Burkart, W. (2000): Trollsländefynd, *Aeshna mixta*. *Körkmacken* April 2000: 3. (in English with Swedish notes). [This is a faunistic note on a record of *A. mixta* which is new to the Island of Gotland, Sweden. Locality information are very detailed, but the date of record (probably 1999) is missing.] Address: Burkardt, W., Am Emel 7, D-27412 Wilstedt, Germany.

2288. Burmeister, E.-G. (2000): Der Einsatz von Bti-Präparaten zur Stekmückenbekämpfung - Hintergründe, Risiken und Bedenken. *Berichte der Akademie für Naturschutz, Laufen* 24: 125-136. (in German with English summary). ["In the last years in Germany, especially in Bavaria, mosquito control has come into high demand. Mosquito populations, within their natural turnover have not increased, but the contact zones between mosquito and man have. Recreational activities, sports and sports fields, camping sites, restaurants etc. are entering areas like alluvial flood plains or flooded areas of lakes dominated by mosquitoes. The same applies to residential areas. The extract from *Bacillus thuringiensis israelensis* (Bti) was developed for biological pest-control (endo-toxin) effective specifically against mosquitoes (Culicidae) and black-flies (Simuliidae), according to assurances by the producer and persons with interests in using Bti. The difficulties with Bti applications are demonstrated here. Bti has also been used against non-biting midges (Chironomidae) in the impoundments of the Danube river (Bavaria). This study documents further that other animals in small ponds are also killed. Together with the primary effect on target and non-target organisms also the secondary effect on higher levels in the food chains, such as birds and bats, is to be emphasised: the reduction of the masses of mosquitoes and midges, the basis for their nutrition. Pest control with Bti is an intervention in the biocoenotic systems of valuable habitats. In the present work, the biology of mosquitoes, their control with modern methods and aspects, the effect on animal life in habitats and the studies on the success of the pest-control are documented. The most problematic applications of this special insecticide in protected areas are discussed. Some alternative methods for prevention against mosquitoes are given." (Author) In table 1 literature data on impact of Bti on taxa is compiled. Short time studies - up to 1 month - on Odonata (*Calopterygidae* spp., *Ischnura elegans*, *Aeshna* sp., *Sympetrum striolatum*, *Orthetrum brunneum*) didn't find any influence on the taxa. In two studies population density of *Coenagrionidae* and *Anax* sp. was reduced.] Address: Burmeister, E.-G., Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany

2289. Catling, P.M.; Jones, C.D.; Pratt, P. (Eds) (2000): Ontario Odonata, vol. 1. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario. 153 pp. (in English). [This is the first volume of a series devoted

to the Ontario (Canada) Odonata. Plenty odonatological contributions - as far as they are "scientific papers" they are abstracted in OAS 9 - are published. The issue contains some additional organisational information and comments as follows: "Ontario Odonata Projects", "News: 1. A new species of *Neurocordulia* (Odonata: Anisoptera: Corduliidae) from eastern North America", 2. Damselflies and dragonflies (Odonata) of Ontario: resource guide and annotated list, and 3. A field guide to the Dragonflies and Damselflies of Algonquin Provincial Park". "Notice to contributors" introduces and organises the Ontario Odonata Survey. An index of 1999 Ontario species closes the impressive contribution to the knowledge of North American Odonata.] Address: Alan J. Hanks, 34 Seaton Drive, Aurora, Ontario, Canada L4G 2K1. E-mail: A.Hanks@aci.on.ca

2290. Catling, P.M.; Jones, C.D.; Pratt, P. (2000): Introduction to the 1999 Ontario Odonata Summary Records. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 1. Toronto Entomologist's Association, Toronto, Ontario: 54-145. (in English). [29 odonatologists contributed to the Ontario odonate survey. The data are presented in a table giving information on species, county, location, latitude and longitude of localities, collecting date, collector, and status (imago, larva); the table includes 3612 records. In addition, information of weather conditions in 1999 and trends, analyses and notable records of selected species are given. Special emphasis is given to *Anax junius*, *Epithea canis*, and *Sympetrum vicinum*] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2291. Cempírek, J. (2000): A contribution to the knowledge of dragonflies (Odonata) of the pond Svárov near Porčí nad Sázavou (Central Bohemia). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 114-117. (in Czech with English summary). [A fishpond - surveyed in 1991 - harbours 18 odonate species.] Address: Cempírek, J., Vidov 37, 370 07 České Budejovice, Czech Republic

2292. Cempírek, J. (2000): Dragonflies (Odonata) of three peat bogs in the Sumava mountains. In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 130-143. (in Czech with English summary). [The list of 17 species include *Coenagrion hastulatum*, *Aeshna juncea*, *A. subarctica elisabethae*, *Somatochlora alpestris*, *S. arctica*, and *Leucorrhinia dubia*.] Address: Cempírek, J., Vidov 37, 370 07 České Budejovice, Czech Republic

2293. Chovanec, A. (2000): Dragonflies (Insecta: Odonata) as indicators of the ecological integrity of aquatic systems - a new assessment approach. *Verh. Internat. Verein. Limnol.* 27: 887-890. (in English). [Odonata are considered reliable indicators for assessing the "ecological quality of land-water ecotones and the habitat heterogeneity (e.g. structural components like aquatic vegetation) of water bodies. In view of the new European water management legislation, the development of new practical assessment approaches is essential. One of the major targets of the draft Council Directive establishing a Framework for Community Action in the

Field of Water Policy (EU Water Framework Directive, EUWFD; EUROPEAN UNION COUNCIL 1998) is to classify the ecological status of surface waters in a five-stage system ("high", "good", "moderate", "poor", "bad"). Within this process, investigations of the biological community play a major role. The ecological status of water bodies can be assessed by comparing the status quo of the habitat and a reference condition [...]. The goal of this paper is to demonstrate a new approach to assess aspects of the ecological integrity of standing waters or wetlands by analysing dragonfly communities. The method has been designed to meet the requirements of the new EUWFD" using the dragonfly fauna of the Tritonwasser and Priessnitz Pond (Austria) as case studies.] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria. E-mail: chovanec@ubavie.gv.at

2294. David, S. (2000): Dragonflies (Insecta-Odonata) of the Slovak-Moravian Carpathians Mountains and the Dolnovazska niva Lea. *Biodiversitas Slovaca* 1: 61-69. (in English with Slovakian summary). [Between 1988 and 1993 21 localities of the Biele Karpaty mountains, Povazie Valley, Myjaské pahorkatiny Hill-land and Dolnovazska niva Lea were surveyed. 28 odonate species including the rare Slovakian *Sympecma fusca*, *Lestes virens*, *L. viridis*, *Ischnura pumilio*, *Anax imperator*, *Epi-theca bimaculata*, *Crocothemis erythraea*, and *Sympetrum pedemontanum* could be traced. The species of different water body types are classified as *Orthetrum - Libellula depressa*-, *Lestes - Sympetrum - Aeshna mixta*- and *Anax - Erythromma najas*- coenoses.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: david@pribina.savba.sk

2295. Devai, G.; Miskolczi, M. (2000): Data on the dragonfly (Odonata) fauna of the Aggtelek region based on a survey of adults. *Studia odonatol. hung.* 6: 5-19. (in Hungarian with English summary). [In 1992 and 1993, 40 odonate species (imagos) were collected at 54 localities in Aggtelek National Park, N-Hungary. The species-wise documentation includes *Coenagrion ornatum*, *Ophiogomphus cecilia*, and *Sympetrum depressiusculum*.] Address: Devai, G., Dept of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2296. Devai, G.; Miskolczi, M. (2000): Results of biodiversity monitoring on community level by dragonflies (Odonata) in the inundation area (HNBM Programme, Pilot Project) of River Tisza between Tiszabercel and Balsa (NE-Hungary). *Studia odonatol. hung.* 6: 27-54. (in Hungarian with English summary). [This is an attempt to characterise odonate species assemblages on the community level building so called coenoses. The study was realized in the framework of the Hungarian National Biodiversity Monitoring (HNBM)-Programme at six localities in the floodplain of river Tisza. Ox-bows are characterised by a *Ischnura elegans*-*Orthetrum albistylum*-coenoses, marshes by the *Lestes sponsa*-*Sympetrum sanguineum* coenoses. The localities are documented in detail by habitat parameters and photographs as well as by species assemblages.] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2297. Di Giovanni, M.V.; Goretti, E.; Larporta, E.; Ceccagnoli, D. (2000): Larval development of *Libellula depressa* (Odonata, Libellulidae) from pools in central Italy. *Ital. J. Zool* 67: 343-347. ["The developmental sta-

ges of the larvae of *L.depressa* were investigated for three years in permanent freshwater pools in central Italy. Eleven instars (F-0 - F-10) of *L. depressa* were discriminated by size and scatter plot. Scatter plots were constructed using the following measurements: labium length, head width, metafemur length, forewing-pad length, and total larval body length. Prolarvae instar was derived by Dyer's law. The mean growth rate coefficient values were about 0.77 for isometric parameters and 0.51 for the forewing-pad allometric parameter. *L. depressa* appeared to be a 'spring species', as defined by Corbet, and the population we studied had a mainly semivoltine life history and, probably, a small proportion of the larvae a univoltine cycle. Eggs showed direct development."] Address: Di Giovanni, M.V., Dipto Biol. anim. & Ecol., Univ. Perugia, Via Elco di Sotto, 1-06123 Perugia

2298. Dolný, A.; Volná, K.; Veselý, M. (2000): On the occurrence of dragonflies (Odonata) in two nature reserves of south-east Asia (Thailand, Malaysia). In: Hanel, L. (Ed.): *Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000.* Vlasim. ISBN 80-86327-12-4: 171-174. (in Czech with English summary). [24 taxa are listed for Chiang Mai (Thailand) and Kenong Rimba State Park (Malaysia).] Address: Dolný, A., Katedra biologie e ekologie, Přírodovědecká fakulta Ostravské university, Bráfova 7, CZ-70103 Ostrava 1, Czech Republic.

2299. Dunkle, S.W. (2000): *Dragonflies through binoculars.* Oxford University Press. ISBN 0-19-511268-7: 266 pp, 47 plates. (in English). [I hesitate to write that it will be possible to identify with certainty a specimen using a binocular and using this book. To do so, (1) a lot of "plate-turing" will be necessary, and (2) stamp-scaled photos will not enable you in every case to identify the species. I think the blatant title of the book - I expected figures and photos definitively enabling the secure identification of a specimen - "dazes" the real quality of Sid Dunkle's book. It contains a lot of sound information on North American Anisoptera well organised in app. 15 introductory chapters and 307 species accounts. After careful reading, Sid's description of the very species will enable you in fact to identify a specimen: extensive information on identification, body features, and similar species provide a lot of help from one of the leading odonatologist, if not the authority on identification of North American Odonata. But, in field and using a binocular: is there enough to read the text and to find the plate with the very species? I feel not competent to assess this book resp. its didactical concept. Therefore I would recommend to read the reviews of Ken Tennessen in *Argia* 12(3), or Colin Jones in *Ontario Odonata* Vol 2. (Martin Schorr)]

2300. Fischer, S. (2000): Kleiner Beitrag zur Ernährung des Drosselrohrsängers *Acrocephalus arundinaceus*. *Berliner ornithologische Berichte* 10: 49-51. (in German with English summary). [Odonata regularly are a preferred prey of the Great Reed Warbler, *A. arundinaceus* (Aves). In contrast to this, no Odonata could be found as prey at the Müggelsee, Berlin, Germany.] Address: Fischer, S., Anzengruberstr. 23, D-12043 Berlin, Germany

2301. Friess, T. (2000): Libellen (Odonata) und Wanzen (Heteroptera) aus dem Naturschutzgebiet "Gut

Walterskirchen" am Wörthersee. Carinthia (II) 190/110: 517-530. (in German with English summary). [14 odonate species. are listed from the "Walterskirchen" property, W of Krumpendorf, on the northern shore of Wörthersee, Carinthia, Austria. 4 of these are redlisted and their occurrence and biology are outlined in some detail.] Address: Friess, T., Inst. Zool., Univ. Graz, Universitätsplatz 2, A-8010 Graz, Österreich

2302. Gerhards, E. (2000): Der fliegende Tod (Gottfried von Wedig, Stilleben, 1639), Wallraf-Richartz-Museum, Köln. SWR-Schulfernsehen Schuljahr 1999/2000 (3): 22-23. (in German). [A still life with a fly (Diptera: Muscidae) is described and background information on diseases caused by flies in past centuries are outlined. A dragonfly is sitting on an apple situated in a bowl. The text of the paper is laid out using *Aeshna cyanea*, but no reference is made to Odonata. Probably dragonflies symbolise most best a "flying death".] Address: SWR Schulfernsehen, Hans-Bredow-Straße, D-76530 Baden, Germany

2303. Gerken, B.; Böttcher, H.; Leitfeld, D.; Lohr, M.; Dörfer, K.; Leushacke-Schneider, C. (2000): Beurteilung von Regenerationsmaßnahmen durch vegetationskundliche und faunistische Untersuchungen - Beispiele aus der Oberweserniederung. Angewandte Landschaftsökologie 37: 205-216. (in German with English summary). [Results of a project to restore floodplain dynamics in the alluvium of the river Weser, Germany are briefly outlined. A status quo analysis was realized in 1989, restoration measures started in 1993. Vegetation was mapped in detail, and its succession and dynamic in the floodplain channel are illustrated. 32 species of Odonata are compiled in a table. Prior to the measures, 14 (1989) and 12 (1993) species could be observed. Species number increased in 1994 to 20, and 23 - 25 in 1995-1999. Dominance and abundance of species pulsated depending on habitat diversity and dynamic of water regime and vegetation development. Special emphasize is given to Lestidae, and the dependence of the genus from reed vegetation. The results demonstrate that measures as well as natural factors (flood) modify species composition, and make it sometime difficult to assess the "success" of the measures in a political framework.] Address: Lohr, M., An der Kirche 22, D-37671 Hötter, Germany. E-mail: mlohr@fh-hoexter.de

2304. Gueffroy, D.; Lieckweg, T. (2000): Zur Odonatenfauna des Fintlandsmoores (Landkreis Ammerland). Dossera, Oldenburg 2000: 53-65. (in German with English summary). ["On 10 excursions during 1999 the dragonfly fauna of the Fintlandsmoor, Ammerland county, was surveyed. The main focus of the survey was on the southern dystrophic rewetted bog and the undisturbed section of the former raised bog, which is situated in the centre of the nature reserve. A total of 15 indigenous dragonfly species were found. With reference to former surveys performed in 1973-78 and 1986 an increasing eutrophication was clearly shown by the changes in species composition. Currently suggestions for land-use, which would help secure the presence of certain endangered species such as *Ceriatagrion tenellum*, *Aeshna subarctica*, and members of the genus *Leucorrhinia*, are being developed and strengthened in order to protect these species within this region. It is important to note, that through a spatial separation of functions the conflicts between species protection, tou-

rism, and natural succession will be reduced. The high dragonfly species diversity as well as the species composition are indicative of the extreme natural value of the Fintlandsmoor." (Authors)] Address: Gueffroy, D., Littenweilerstr. 36c; D-79117 Freiburg, Germany. E-mail: gueffroy@uni-freiburg.de

2305. Halacka, K.; Hanel, L. (2000): Dragonflies (Odonata) of the alluvial area of the lower stream of the river Dyje (Southern Moravia, Czech Republic). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 118-129. (in Czech with English summary). [An intensive study from 1997 to 1999 along 32 stretches of the river Dyje, resulted in a total of 32 odonate species. Remarkable species are, *Lestes virens*, *L. dryas*, *Ischnura pumilio*, *Aeshna affinis*, *Anaciaeschna isocetes*, *Anax parthenope*, *Gomphus vulgatissimus*, *Orthetrum albistylum*, *O. brunneum*, *Sympetrum danae*, and *S. meridionale*.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blanik@schkocr.cz

2306. Hanel, L.; Hlásek, J.; Cempírek, J.; Ciesla, M.; Dolný, A.; Fikáček, M.; Flíček, J.; Honcu, M.; Mocek, B.; Rejl, J.; Rus, I.; Sálek, P.; Zelený, J. (2000): List of dragonflies (Odonata) found during the 3rd Odonatological Days in June 2000 in the protected landscape area Trebonsko (southern Bohemia). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 66-77. (in Czech with English summary). [A total of 36 species were found at ten localities during 15.-18. June 2000. The species list includes some (very) rare Czech species as *Sympecma fusca*, *Lestes virens*, *L. dryas*, *Coenagrion hastulatum*, *Erythromma najas*, *Ischnura pumilio*, *Nehalennia speciosa*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Orthetrum albistylum*, *Crocothemis erythraea*, *Leucorrhinia dubia*, *L. pectoralis*, and *L. rubicunda*.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blanik@schkocr.cz

2307. Hanel, L. (2000): Note on dragonflies (Odonata) of the pools along-side Labe river near Celákovice (Central Bohemia). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 102-113. (in Czech with English summary). [Recently 25 species could be traced in the study area. Compared with data from 1889 to 1956 this is a significant loss of species.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blanik@schkocr.cz

2308. Hanel, L. (2000): Preliminary list of dragonflies (Odonata) in the protected landscape area Krivoklátsko (Central Bohemia). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 86-94. (in Czech with English summary). [28 species including the rare *Lestes virens*, *Coenagrion hastulatum*, *Erythromma najas*, *Gomphus vulgatissimus*, and *Sympetrum*

danae are listed from 22 localities.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz

2309. Hanel, L. (2000): The world Red List of Odonata - version 1996. In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 162-170. (in Czech with English summary). [This is a documentation of the IUCN Red List of Odonata, which in 1996 comprised 162 species. No species occurring in the Czech Republic are included in this list.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz

2310. Honcu, M.; Waldhauser, J. (2000): The dragonflies (Odonata) of the ponds Hranicni rybnik and jedlovské rybnik in the Lusation mountains (northern Bohemia, Czech Republic). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 78-85. (in Czech with English summary). [This study presents for the first time odonatological results from the Luzické hory Mountains. In total, 23 species including Anax imperator, Aeshna juncea, and Cordulegaster boltonii which are rare in the Czech Republic, are listed.] Address: Honcu, M., District Museum, CZ-47001 Česká Lípa, Czech Republic.

2311. Jelený, J.; Hanel, L. (2000): Comments on dragonflies (Odonata) of the Sumava mountains (southern Bohemia). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chránené krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 144-153. (in Czech with English summary). [A compilation of available data totals in 40 odonate species. Among them are Lestes macrostigma, Erythromma najas, Coenagrion hastulatum, C. pulchellum, Aeshna caerulea, A. subarctica elisabethae, Thecagaster bidentata, Cordulegaster boltonii, Somatochlora alpestris, S. arctica, Sympetrum pedemontanum, S. danae, S. meridionale, Leucorrhinia albifrons, L. rubicunda, and L. dubia.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz

2312. Kroehling, A. (2000): Renaturierung der Ergoldinger Au - Vorstellung der bisherigen Umsetzung (1995-1999). Selbstverlag Markt Ergolding: 26 pp. (in German). [Report of the realisation of an ambitious action plan for revitalising the floodplain of the Ergoldinger Au in Bavaria, Germany. Starting in 1991, in the successive period conservation and developing measures were realised. The report presents the results and the efficiency of measures for the period between 1995 and 1999. Odonata are referred and presented as "umbrella-species" or used as examples in the framework of environmental education. The booklet is a didactically very interesting combination of landscape or measurement plans with colour photos of species and habitats, and some general, but very interesting biological information. It can be ordered for 4 Euro at the address below.] Address: Markt Ergolding, Lindenstr. 25, D-84030 Ergolding, Bayern

2313. Lindenia No. 32 (2000): LINDENIA. Notiziario dell'Ufficio nazionale italiano della Società odonatologica internazionale, Napoli. Lindenia No. 32: 135-138. (in Italian). [Announcements of odonatological symposia; Dragonflies in WWW; Anax (Hemianax) ephippiger sightings in Italy, 1998- 2000] Address: C. D'Antonio, Via A. Falcone 386/b, 1-80127 Napoli, Italy; E-mail: lindenia@freemail.it

2314. Meier, C.; Zucchi, H. (2000): Zur Bedeutung von Regenwasserrückhaltebecken für Libellen (Odonata): ein Beitrag zum urbanen Artenschutz. Osnabrück. naturw. Mitt. 26: 153-166. (in German with English summary). [The investigations were carried out at 5 selected rainwater retention basins in the city of Osnabrück, Lower Saxony, Germany, where 22 out of the 27 regional species were evidenced. Though most of these were generalists, the results indicate the importance of city retention basins for the preservation of the fauna.] Address: Meier, C., Girardetstr. 71, D-45131 Essen, Germany.

2315. Mermet, E.; Galli, P. (2000): Contributo alla conoscenza delle libellule (Insecta: Odonata) del Varesotto. Bollettino della società di scienze naturali 88(1-2): 19-23. (in Italian with English summary) [Records of 47 species are documented and commented.] Address: Mermet, E., Civico Museo Insubrico di Storia Naturale, Piazza Giovanni XXIII, I-21056 Induno Olona, Italy.

2316. Mitchell, F.L.; Lasswell, J.L. (2000): Digital dragonflies. American Entomologist 46(2): 110-115. (in English). [The authors present a method conserving the colours of collected specimens. Odonata were refrigerated for app. 30 min, and put on a scanner. Catching dragonflies, handling, hard- and software are described in detail to realise optimal results of colour preservation. This interesting method is a combination of a conservative collection with dried pinned or acetoned specimens and a data base with identical scanned specimens.] Address: Lasswell, J.L., Institution Texas Agric. Exp. Stn., Route 2 Box 00, Stephenville, TX 76401, USA.

2317. Müller, Z.; Szállassy, N.; Jakab, T.; Bárdosi, E. (2000): Faunistical data on dragonflies (Odonata) from the ancient floodplain area Berek-lapos (Sárospatak). Studia odonatol. hung. 6: 55-68. (in Hungarian with English summary). [The paper presents faunistical data on dragonflies collected in the ancient floodplain area Berek-lapos, situated in the geographical microregion Bodrogbz (administrative area of the settlement Sárospatak), Hungaria. The fieldwork was carried out in 1999 at 12 localities. The list of 33 odonate species include the rare Hungarian Sympetrum danae as well as Brachytron pratense, Aeshna viridis, Epithea bimaculata, and Leucorrhinia caudalis.] Address: Müller, Z., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2318. O'Brien, M. (2000): Williamson dragonfly gun confiscated! Argia 13(1): 22. (in English). [Verbatim: "In early February, Univ. of Michigan Dept. of Public Safety and Security conducted an inventory of firearms being stored in the Museum of Zoology While most of the attention was on the Bird, Mammal and Herpetology Divisions, it turned out that the only illegal weapon being stored here was in the Insect Division. Yes, you guessed it - the 22-cal. pistol with a soldered on 26" barrel that E.B. Williamson used to shoot down high-flying Odonata. He used 22 - cal. dust-shot rounds, which we-

re only potent enough to bag small creatures. I suspect that E.B. subscribed to "walking softly and carrying a big stick" and certainly the weapon in question looks somewhat impressive. Officer Tim Shannon was very apologetic about confiscating the pistol, as it was illegally modified under State law and also illegal under campus policy. However, since the weapon has not been fired in probably 75 years, it will not be a loss in terms of its use. At my suggestion, they'll make the pistol inoperable and return it so we can mount it on a plaque for display. Okay, so you thought dragonflies were harmless. They used to be bigger and a lot meaner, which was why EBW carried the weapon in the field. I don't know if they ever used dynamite for catching larvae." Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

2319. Rus, I. (2000): The current state of knowledge about dragonflies (Odonata) research in the vicinity of the town Kolin near Labe river (Central Bohemia). In: Hanel, L. (Ed.): Vazky 2000. Sborník referátu III. celostátního semináře odonatologu, který se konal v Chráněné krajinné oblasti Trebonsko 15.-18.6.2000. Vlasim. ISBN 80-86327-12-4: 95-101. (in Czech with English summary). [1995-2000, 12 localities were surveyed for their Odonata. A total of 29 species also includes *Lestes virens*, *Sympetma fusca*, *Coenagrion pulchellum*, *Erythromma najas*, *Brachytron pratense*, *Crocothemis erythraea*, and *Sympetrum flaveolum*.] Address: Rus, I., Regionální muzeum, v Kolíne, Brandlova 27, CZ-28002 Kolin I, Czech Republic

2320. Schulz, C.-J.; Bellstedt, R. (2000): Die Wipper: Verödung und Wiederbesiedlung eines Flusses im ehemaligen Kalirevier "Südharz", dargestellt am Beispiel aquatischer Insekten. Abh. Ber. Nat. Gotha 21: 103-110. (in German). [The decline of potassium mining in Northern Thuringia, Germany led to a decrease in salinity of the river Wipper during the last years. Recolonisation of the river is documented comparing macrobenthos collections from the tenth, fifties, and ninties of the 20th century. Five odonate taxa including *Calopteryx splendens*, *C.virgo*, *Ischnura elegans*, and *Platycnemis pennipes*.] Address: Schulz, C.-J., Staatliches Umweltamt Sondershausen, Am Petersenschacht 3, D-99701 Sondershausen, Germany

2321. Wang, L.-J. (2000): Dragonflies of Taiwan. ISBN 957-30885-1-7: 349 pp. (in Chinese and English). [This is my favourite dragonfly book of the year. Liang-Jong Wang has written a fascinating book on the Taiwanese Odonata! The chapters and species accounts are written in Chinese. But to enable access to the species monographs, a brief "Natural history" and information on the distribution on the Asian scale are added. Together with the excellent, in some cases outstanding photographs of the species, you will have full access to the Odonata of Taiwan. Additional information is given - and sometimes illustrated by photographs - to morphology, life history, and behaviour. Very useful is the chapter of typical Taiwanese habitats: Photographs - reduced in scale - of the typical species of paddy fields, fish ponds, forest lakes and swamps, ponds in parks, mountain lakes, hill streams, and forest brooks are compiled and crossreferenced to the species chapter. This book definetly should not be missing in any odonatalogical library. (Martin Schorr)] Address: www.jccalendar.com.tw

2322. Wedmann, S. (2000): Die Insekten der oberoligozänen Fossilagerstätte Enspel (Westerwald, Deutschland). Systematik, Biostratonomie und Paläökologie. Mainzer Naturwissenschaftliches Archiv, Beiheft 23: 142 pp, Anhang. (in German with English summary). [The insect taphocoenosis from the Upper Oligocene lacustrine deposits of Enspel (Westerwald, Rheinland-Pfalz, Germany) was studied in detail. The systematic composition of the over 5000 insect fossils permits detailed paleoecological conclusions. These interpretations are based on the spectra of the different digging sites and horizons as well as on the ecological needs of the closely related extant taxa. The taphocoenosis is dominated by terrestrial insects. Aquatic taxa - including 15 specimens of Odonata - are represented with only a few fossils. *Oligaeschna jungi* is a dragonfly which is already known from a fossil site in France. Additional species are identified on the family-level. A zygopteran species is pictured on a colour plate showing the colouration of the species. The ecosystem of lake Enspel is reconstructed; Odonata are treated in some detail. The fauna of Enspel is compared with some other regional fossil deposits.] Address: Wedemann, Sonja, Institut für Zoologie und Anthropologie, Berliner Str. 28, D-37073 Göttingen, Germany. E-mail: swedman@gwdg.de

2323. Westermann, K. (2000): Die Eiablageplätze der Weidenjungfer (*Chalcolestes viridis*) in einem südbadischen Altrheingebiet. Naturschutz südl. Oberrhein 3(1): 93-107. (in German with English summary). [A survey for *C. viridis* clutches was conducted along the Old-Rhine nr Weisweil, co. Emmendingen, Baden-Württemberg, SW Germany. 37 tree and bush species with successfully hatched prolarvae were identified, 15 of them have not been previously mentioned in the literature. Young trees and bushes, such as *Viburnum opulus*, *Alnus glutinosa*, *A. incana*, *Fraxinus excelsior*, *Ligustrum vulgare*, *Salix alba*, some smaller willow species and *Prunus padus*, appear the preferred oviposition sites. The branches were selected from close above the water to an approx. height of 25 m, the number of clutches decreasing with the height. At some distance from the water, they were rarely seen.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany

2324. Yokoi, N. (2000): A list of dragonflies collected in Central Laos. Gekkan-Mushi 356: 18-22. (in Japanese with English summary). [23 species are dealt with, 20 of them are recorded for the first time in central Laos. *Prodasineura auricolor* (Fraser 1927), *Protosticta taipokauensis* Asahina & Dudgeon 1987, *Ictinogomphus pertinax* (Hagen 1854), *Labrogomphus torvus* Needham 1931, *Merogomphus paviei* Martin 1904, *E-pophthalmia elegans* (Brauer, 1865), *Macromia callisto* Laidlaw 1922, *Macromia chaiyaphumensis* Hämäläinen 1985, *Macromia pinratani* Asahina 1983, and *Hylaeothemis clementia* Ris 1909 are illustrated. *P. taipokauensis* and *E. elegans* are first records for Indochina. *I. pertinax* and *P. taipokauensis* are compared with specimens from Hong Kong, China.] Address: Yokoi, N., 2-37-11, Kaisei, Koriyama, Fukushima, 963-8851, Japan

2001

- 2325.** Abbott, J.C. (2001): Distribution of dragonflies and damselflies (Odonata) in Texas. *Trans. Am. Entomol. Soc.* 127(2): 189-228. (in English). [“205 species of Odonata are listed from Texas. County records, seasonal occurrence and habitat preference are given for each species. Publications containing Texas records are presented and briefly discussed in a history of the Odonata research in the state. The physiography of Odonata habitats and zoogeography of the species themselves are discussed. Texas contains a highly diverse odonate fauna, because of its unique geographic position and highly variable physical composition relative to other physiographic provinces. A total of 5,098 records of Odonata are documented from 210 counties in Texas. These records include personal collections, valid literature records, verified material in museum and personal collections, and verified photographic records.” (Author)] Address: Abbott, J.C., Univ Texas, Sect. Integrat. Biol., Austin, TX 78712 USA
- 2326.** Adena, J.; Handke, K. (2001): Die Libellenfauna von Grünland-Grabensystemen im Bremer Raum. *Bremer Beiträge für Naturkunde und Naturschutz* 5: 91-103. (in German with English summary). [Based on investigations starting in 1980, a compilation of the dragonfly fauna of 7 selected ditch systems in the lowlands of the Bremen area, Germany, is presented and analyzed. A total of 35 odonate species including 29 probably or securely indigenous species could be recorded. The species are discussed according their regional rarity, which discriminates the regions from other western or central European regions. Species like *Lestes sponsa*, *Coenagrion pulchellum*, *Aeshna grandis*, and *Sympetrum vulgatum* belong to the most common Odonata whereas species like *Enallagma cyathigerum*, *Aeshna cyanea*, and *Sympetrum flaveolum* are more rare ones. The rare *Brachytron pratense*, *Aeshna viridis*, and *Anaciaeschna isosceles* build strong populations in the ditch systems in the environs of Bremen. Factors as ditch maintenance, waterflow, water supply, water level, morphology, and vegetation succession explain different odonate coenoses and habitat quality for dragonflies. The most significant threat for the odonate coenoses of the ditch systems are high frequent dredging, upsilting and build over with buildings.] Address: Adena, Julia, Geibelstr. 61, D-28215 Bremen, Germany
- 2327.** Andrew, R.J.; Chandrasekhar, S. (2001): A collection of Odonata from Umrer, Nagpur district, central India, with a note on the behaviour of *Pantala flavescens* (Fabricius) in the rain. *Notul. odonatol.* 5(8): 97-108. (in English). [48 species are recorded, 5 of these are new to the fauna of central India. The behaviour of *P. flavescens* during rainfall is discussed in terms of endothermic warming. Feeding behaviour of *P. flavescens* on termites is shortly outlined.] Address: Andrew, R.J., Department of Zoology, Shri Shivaji ESA's Science College, Congress Nagar, Nagpur - 440012 (MS), India
- 2328.** Andrews, S.J. (2001): Some observations on the identification of the exuviae of the final-instar larvae of the Common Blue Damselfly *Enallagma cyathigerum* (Charpentier). *J. Br. Dragonfly Society* 17(2): 35-44. (in English). [A total of 553 exuviae of *E. cyathigerum* were collected: “Conclusions: Significant intraspecific variation in labial setation was noted and, as such, it is not considered a sufficiently consistent character to use for larval identification. It is suggested that the following amendments should be made to the commonly used specific characters to identify the exuviae of *E. cyathigerum*: (1.) Mean body length (including lamellae) about 20.5 mm (range 17 to 23.5 mm). (2.) Labial palp with a very small spine on at least one of the outer margins adjacent to the distal seta. (3.) Prominent mid-dorsal, longitudinal pale line on all visible segments except S10. (4.) Caudal lamella subnodate and about 6 mm long (range 3.5 to 7 mm), usually with one to three (rarely zero or four) narrow, transverse, dark bands; thicker setae generally reaching to (or beyond) the mid-point on both margins of the caudal lamellae.” (Author)] Address: Andrews, S.J., 39 Guildford Street, Staines, Middlesex TW18 2EQ, UK
- 2329.** Andretzke, H. (2001): Naturschutzmassnahmen am Grabensystem des NSG "Borgfelder Wümmewiesen" - Erfolgskontrolle anhand der Libellenfauna. *Bremer Beiträge für Naturkunde und Naturschutz* 5: 189-196. (in German with English summary). [The efficiency of reshaping measures at stretches of the ditch system in the nature protection area "Borgfelder Wümmewiesen" is assessed using Odonata. 26, including 19 indigenous species had been observed in the area. As to expect, the more ubiquitous species could be listed completely, but the target species of oxbow lakes and fens are still lacking about 4 years after first reshaping measures. But, even successful reproduction of the more common species was missed at most of the ditches with compensation measures due to unsuitable habitat conditions (e.g. extensive mudbeds). The author concludes that for the time the measures at the draining ditches have to be assessed as unsuccessful.] Address: Andretzke, H., BIOS, Lindenstr. 40, D-27111 Osterholz-Scharmbeck, Germany
- 2330.** Aoki, T. (2001): Active flights of *Chlorogomphus brunneus costalis* in late evening. *Sympetrum Hyogo* 7/8: 70. (in Japanese with English summary). [“Active flight of many males of *C. brunneus costalis* was observed in the evening during 17:30-18:50 on June 24, 2000 at Hiwasa-cho, Tokushima Prefecture, Japan. They flew low about 1 m above ground. In early hours most males came out of the shaded stream, where females oviposited in the morning, and went away along the road (path 1) and a few males returned to the stream (path 2). In later hours most males came out and went back soon to the shaded stream (path 2). When two males encountered on the road, one chased the other. Exceptions are a female flew from the opposite side (path 3) and a male staying for feeding at a space among the trees on the road side at 3 m above ground (path 5).” (Author) Path numbers refer to a figure with a map of the locality.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp
- 2331.** Aoki, T. (2001): Odonata fauna of Kobe City, Part 9. (Corduliidae and supplement 2). *Sympetrum Hyogo* 7/8: 6-8. (in Japanese with English summary). [*Macromia amphigena* Selys 1871, *M. daimoji* Okumura, 1949, *Epophthalmia elegans* (Brauer, 1865), *Soma-tochlora viridiaenea* (Uhler 1858), *S. clavata* Oguma 1922, *S. uchidai* Förster 1909, *Epiteca marginata* (Selys 1883), *Sympetrum uniforme* (Selys 1883), *Lanthus fujiacus* (Fraser 1936), *Tramea virginia* (Rambur 1842), *Tanypteryx pryeri* (Selys, 1889), *Cercion melanotum*

(Selys, 1876), and *Ceriagrion nipponicum* Asahina 1967 are treated in the 9th part of the odonata fauna of the city of Kobe, Japan.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp

2332. Aoki, T. (2001): Three males of *Sympetrum depressiusculum* were caught in Ibogawa-cho, Hyogo Prefecture. *Sympetrum Hyogo* 7/8: 13. (in Japanese with English summary). [S. *depressiusculum* was found on October 22, 2000 at a pond in Baba, Ibogawa-cho, Hyogo Prefecture, Japan. This record is one of the scarce records on the Setonaikai Inland Sea side, while in contrast more records on the Japan Sea side are made. The pond was visited again on November 3, but the species had disappeared.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp

2333. Auerswald, J.; Franke, T.; Reisinger, E. (2001): Erfolgreiche Pflegemaßnahmen im NSG "Dreba-Plöthner Teichgebiet". *Landschaftspflege und Naturschutz in Thüringen* 38(2): 62-65. (in German). [Efficiency of conservation measures in the Nature Conservation Area "Dreba-Plöthener Teichgebiet" (Thüringen, Germany) was assessed using some indicator species. Odonata are mentioned to have developed strong populations, and the species mentioned are including e.g. *Anaciaeschna isosceles*.] Address: Auerswald, J., Landratsamt Saale-Orla-Kreis, Umweltamt, Oschitzer Str. 4, D-07907 Schleiz, Germany

2334. Azuma, T. (2001): Distribution of *Trigomphus melampus* in Hyogo Prefecture. *Sympetrum Hyogo* 7/8: 4-5. (in Japanese with English summary). [18 new habitats of *T. melampus* were discovered in the northern district of Hyogo Prefecture, Japan, in 1999, totaling the known habitats to 24. Larvae prefer shallow ponds with grass vegetation; it is assumed that they inhabit irrigation ditches too. The distribution of the species is limited to the northeastern parts, namely Kinosaki-gun, Toyo-oka City and Mikata-gun, and does not reach Yabu-gun. Abandonment of traditional rice field cultivation and development of artificial irrigation ditches are reasons for regressing populations of this species.] Address: not stated

2335. Azuma, T. (2001): Odonate fauna of Sanda City, Gyogo Prefecture. *Sympetrum Hyogo* 7/8: 14-20. (in Japanese with English summary). ["The odonate fauna of Sanda City, Hyogo Prefecture, Japan, had been reported only incompletely, while the urbanization owing to an exceptional rapid expansion of population has caused big loss of natural environment. [...] To document the remaining odonate fauna, 90 localities had been surveyed in 1998. Now, 61 species including the author's unpublished former records of 1972 and 1993 are known from the region. Sogame (1998, 1999) recorded additional 13 species; this totals the number of species to 74.] Address: not stated

2336. Baumann, K. (2001): Habitat und Vergesellschaftung von *Somatochlora alpestris* und *S. arctica* im Nationalpark Harz (Odonata: Corduliidae). *Libellula* 20 (1/2): 47-67. (in German with English summary). ["In 2000, thirty moorland pools and the pothole in the "Odersprungmoor" have been analysed in regard to their population of dragonflies by collecting exuviae. In the

moorland-pools different data concerning the structure were surveyed in order to compare the habitat selection of the various species. In total, 705 exuviae of 10 species were collected. The species with the highest number of individuals was *Leucorrhinia dubia*. *Somatochlora alpestris* was detected in most of the pools but the populations usually were small. This species and the less frequent *S. arctica* could be found in the smallest and shallowest waterbodies. Both were able to coexist with up to 5 additional species. Larger populations of both *Somatochlora* species and *Leucorrhinia dubia* excluded each other." (Author)] Address: Baumann, Kathrin, Arbeitsgemeinschaft für Landschaftsplanung, Naturschutz und Umweltstudien (ALNUS GbR), Rudolf-Huch-Straße 6, D-38667 Bad Harzburg, Germany. E-Mail: alnus-k.baumann@t-online.de

2337. Bechly, G.; Brauckmann, C.; Zessin, W.; Gröning, E. (2001): New results concerning the morphology of the most ancient dragonflies (Insecta: Odonoptera) from the Namurian of Hagen-Vorhalle (Germany). *J. Zool. Syst. Evol. Res.* 39(4): 209-226. (in English). ["The holotype specimen of the 'protodonate' *Erasipteroides valentini* (Brauckmann in Brauckmann et al., 1985) and the paratype specimen K-13 of the giant 'protodonate' *Namurotypus sippeli* Brauckmann and Zessin, 1989 from the Upper Carboniferous (Namurian B) of Hagen-Vorhalle (Germany) are redescribed, and a new specimen of *Erasipteroides* cf. *valentini* is described. The new evidence is used to refine the groundplan reconstruction of Odonoptera and the reconstruction of odonatoid phylogeny. Prothoracic winglets for *Erasipteroides* and the absence of an archaedictyon are documented. Furthermore, a very long and sclerotized ovipositor with gonangulum is described from the female holotype specimen of *Erasipteroides valentini*, and it is proposed that it was not used for endophytic but for endosubstratic oviposition. The record of prothoracic winglets in early 'odonatoids' and their presence in fossil Palaeodictyoptera and 'protorthopteres', indicates that the groundplan of Pterygota indeed included three pairs of wings. A phylogenetic analysis suggests that the Palaeozoic giant Meganisoptera and "higher" odonatoids (incl. crown group Odonata) together form a monophyletic group which is here named Euodonoptera. *Erasipteroides* and the other 'Erasipteridae' are shown to be more closely related to Euodonoptera than to Eugeopteridae. The description of the male primary genital structures of *Namurotypus sippeli* is emended and a new interpretation is proposed including new hypotheses concerning their function. The males of *Namurotypus* had a paired penis with a pair of lateral parameres, and a pair of leaf-like, but still segmented, gonopods. Segmented leg-like male gonopods are considered as a groundplan character of insects, while a paired penis is regarded as a putative synapomorphy of the palaeopterous insect orders Palaeodictyopteroidea, Ephemeroptera, and Odonoptera. It is proposed that *Namurotypus* did not mate by direct copulation but retained the archaic deposition of external spermatophores, just like the primarily wingless insects. The sigmoidal male cerci may have been placed behind the female head and used to drag the female over the spermatophore, which is remotely similar to the mating behaviour of some extant arachnids (e.g. *Amblypygi*). Three hypothetical scenarios regarding the evolution of secondary copulation in modern Odonata are proposed." (Authors)] Address: Bechly, G., Staatliches Museum für

Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

2338. Beckemeyer, R. (2001): Biological diversity and politics: the impact of recent regulatory trends on scientists who study the taxonomy and distribution of organisms. *Argia* 13(1): 28-29. (in English). [This is a discussion of current trends in getting collecting permissions in the framework of biodiversity politics. Current regulations in India and Brazil are to assess that they will stop any transboundary scientific work on species. "This is a sad state of affairs that truly bodes ill for increasing our understanding of Earth's biodiversity."] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

2339. Beckemeyer, R. (2001): Phop Gan Mai Tik Khrap, Thailand. *Argia* 13(1): 9-12. (in English). [Report from a birding and dragonflying trip to Thailand in early 2000. Most of the referred species are common ones with the exception of *Coeliccia kazukoae* Asahina 1984 and *Vestalis yunosukei* Asahina 1990.] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

2340. Bedell, P. (2001): Some recent Odonate records for Nebraska. *Argia* 13(2): 2. (in English). [*Ischnura barberi*, *Aeshna californica*] Address: Bedell, P., 10120 Silverleaf Terr., Richmond, VA 23236, USA. E-mail: pbedell@vci.org

2341. Behrends, T. (2001): Libellen-Monitoring im Rahmen des E & E-Projektes "Halboffene Weidelandchaft Hölftigbaum" von 2000 - 2004. Abh. Ber. Naturkundemus. Görlitz 73(1): 1-2. (in German with English summary). ["Dragonfly populations of a newly established, 220-hectare comprising pasture landscape on a former military area in northern Germany near Hamburg will be investigated over a period of 5 years. An average of 100 cattle and 120 sheep graze on the semi-open landscape without any restriction. One of the main characteristics of the landscape are numerous small temporary pools on sandy or loamy soil with less nutritive substances. Most of them are flooded in winter or early spring and dry out during summer. Within the first year of this study, 22 species of dragonflies were observed, of which some were endangered or vulnerable in Germany such as *Lestes virens*, *L. barbarus*, *L. dryas*, *Coenagrion lunulatum*, and *Ischnura pumilio*. The population dynamic and short distance migration within the area of *L. barbarus* will be further investigated with a capture-mark-recapture method." (Author)] Address: Behrends, T., Inst. Ökologie und Umweltchemie, Univ. Lüneburg, Scharnhorststr. 1, D-21332 Lüneburg, Germany. E-mail: thomasbehrends@exmail.de

2342. Belgische Libellenonderzoekers (2001): Diffusion d'un communiqué de presse de Gomphus en relation avec le changement climatique et la Conférence de la Haye. *Gomphus* 17(1): 63-68. (in partly bilingual in French and Dutch). [End of November 2000 the international conference of climatic change was held in Den Haag, The Netherlands. The Belgian odonatologists used the situation to present to the public changes of odonate composition in Belgium. Climatic warming is indicated by several species; the increasing number of records is plotted in a graph showing the relative observation frequency of six southern species (*Sympetrum fonscolombii*, *Lestes barbarus*, *Crocothemis erythraea*, *Coenagrion scitulum*, *Anax parthenope*, and *Aeshna af-*

finis) in Wallonia during the last 20 years.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

2343. Belshe, J. (2001): Children's stories about dragonflies. *Argia* 13(1): 28. (in English). [Some brief information is given on a book "Nature stories for little folk" from the beginning of the 20th century including some dragonfly illustrations and a story about a dragonfly.] Address: Belshe, J.F., 221 SW 21 Rd., Warrensburg MO 64093, USA

2344. Bender, J.; Xylander, W.E.R.; Stephan, R. (2001): Lösungsansätze im Zielkonflikt zwischen Rekultivierung und Naturschutz in der Bergbausanierung-Wiederherstellung eines Libellengewässers auf Halden des Braunkohletagebaus Berzdorf. Abh. Ber. Naturkundemus. Görlitz 73(1): 3-8. (in German with English summary). ["A geological depression was formed by chance during mine dumping at the Neuberzdorfer Holz. In the course of natural events the depression developed into a favourable biotope for dragonflies, in which a number of rare species have been recorded. After the closing of mining activities in 1997 reclamation work began, which in the meanwhile has led to a nearly total destruction of the new biotope. It was agreed between the mining corporation, the conservation authorities and the Natural History Museum in Görlitz to create a similar biotope in the vicinity as a replacement for that lost through reclamation activities." (Authors) Habitat developing measures with special emphasize to Odonata are outlined.] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum. GR.Dr. Xylander@t-online.de

2345. Benedikt R. Schmidt, B.R.; Van Buskirk, J. (2001): Verhalten, Wachstum und Morphologie von Kammolch-Larven in der An- und Abwesenheit von Libellenlarven. *Rana*, Sonderheft 4: 179-191. (in German with English summary). ["We tested for predator-induced plasticity in behavioural, morphological and life-history traits of larvae of the newt *Triturus cristatus* using larvae of the dragonfly *Aeshna cyanea* as predators. There was no evidence for plasticity in morphology or life history in a controlled experiment and we found no evidence for morphological plasticity in samples taken from natural ponds. In contrast to other newt species, larvae of *T. cristatus* were more active in the presence of predatory dragonflies. We do not know why phenotypic plasticity in *T. cristatus* is different from the predator-induced defences seen in other newt species. We suggest that differences between newt species in plasticity and predator-prey interactions may affect their distribution and abundance." (Authors)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch; bschmidt@zool.inizh.ch

2346. Bönsel, A. (2001): *Aeshna subarctica* Walker, 1908 in the Biebrza Valley (Odonata: Aeshnidae). *Wiad. entomol.* 19(3/4): 187. (in Polish with English title). [4 males and 1 female of *Aeshna subarctica* elisabethae Djakonov, 1922 were recorded at 9 Aug. 1998; co-occurring species were *Libellula quadrimaculata*, *Leucorrhinia rubicunda*, and *Sympetrum danae*.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

- 2347.** Borgula, A. (2001): Die Würfelnatter während und nach dem Bau des Seeuferweges am Lopper. In: Amphibien und Reptilien in Ob- und Nidwalden. Naturforsch. Gesell. Ob- und Nidwalden, Grafenort. 227 pp. (in German). [In the framework of conservation measures directed to the serpent *Natrix tessellata*, the emergence of *Gomphus vulgatissimus* on the shore of lake Alpnach, Switzerland was recorded. Three photographs document the emergence of the species in 1998.] Address: Borgula, A., Brambergstr. 3B, CH-6004 Luzern, Switzerland. E-mail: borgula@freesurf.ch
- 2348.** Bräu, M.; Schwibinger, M.; Weihrauch, F. (2001): Die Libellenfauna der Stadt München. NachrBl. bayer. Entomol. 50(4): 128-137. (in German with English summary). ["A commented list of 52 Odonata, which have been reported within today's borders of the City of Munich, Bavaria, Germany is given. It "covers the 41 currently recorded species since 1990 as well as the 46 historical records. Nowadays, a number of species are restricted to only a few sites and apparently endangered. More detailed information on the status of *Coenagrion mercuriale*, *Gomphus vulgatissimus*, *Onychogomphus f. forcipatus*, *Orthetrum coerulescens*, *Sympetrum flaveolum* and *Sympetrum pedemontanum* is given." The record of *S. meridionale* is of special faunistic interest.] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Florian.Weihrauch@lbp.bayern.de
- 2349.** Bree, D. (2001): European Praying Mantis (*Mantis religiosa*) feeding on a Common Green Darner (*Anax junius*). In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 49. (in English). ["An observation of [...] *M. religiosa* preying upon [...] *A. junius* is reported from a migration resting place for odonates on the north shore of Lake Ontario in Prince Edward County, Ontario." (Author)] Address: Bree, D., Box 123, Bloomfield, Ontario K0K 1G0, Canada. E-mail: dbree@post.kosone.com
- 2350.** Bree, D.; White, H.; Deliry, C. (2001): Mantids eating dragonflies. *Argia* 13(1): 27-28. (in English). [Several recent e-mail noting mantids foraging Odonata are compiled in this contribution. Two of the observations are from North America (*Anax junius*, Ontario, Canada; *Pachydiplax longipennis*, Delaware, USA), one from France, Europe (*Anax parthenope*.)] Address: David Bree: dbree@post.kosone.com; Hal White: halwhite@UDel.Edu; Cyrille Deliry: cyrille@deliry.com
- 2351.** Bree, D. (2001): Odonates of the Sandbanks Pannes during 2000. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 27-30. (in English). ["Twenty-six species of odonates are reported for the interdunal pannes at Sandbanks Provincial Park during an abnormally wet year when the pannes, which often dry out in summer, retained as much as 1.75 m of water throughout the season. Eleven of the species recorded showed evidence of larval development in the pannes. Both *Pantala hymenaea* and *Pantala flavescens* were found emerging and as teneral. Seven species are reported as new for Sandbanks Provincial Park including *Ischnura hastata* and *Leucorrhinia frigida*. The *Ischnura hastata* record represents a northern range extension in Ontario." (Author)] Address: Bree, D., Box 123, Bloomfield, Ontario K0K 1G0, Canada. E-mail: dbree@post.kosone.com
- 2352.** Bridgehouse, D.W. (2001): Occurrence of *Ce-lithemis martha* (Odonata: Libellulidae) in Nova Scotia. *Northeastern Naturalist* 8(4): 495-498. (in English). [This note augments previous historical records of *Ce-lithemis martha* by presenting a new locality and further flight season records for Nova Scotia, Canada.] Address: Bridgehouse DW 24 Kiel Court, Eastern Passage, NS B5G 1R3, Canada
- 2353.** Briscoe, A.D.; Chittka, L. (2001): The evolution of color vision in insects. *Annu. Rev. Ent.* 46: 471-510, 1 Pl. excl. (in English). ["The physiological, molecular and neural mechanisms of insect colour vision are reviewed. A review of spectral sensitivity data for 6 anisopteran species is included. Phylogenetic and molecular analyses reveal that the basic bauplan, UV-blue-green-trichomacy, appears to date back to the Devonian ancestor of all pterygote insects."] Address: Briscoe, A.D., Dept Molec. & Cell Biol, Univ. Arizona, Tucson, AZ 85721, USA
- 2354.** Brockhaus, T. (2001): Beobachtungen zur Libellenfauna der Shivapuri Berge, Nepal (Odonata). *Ent. Nachr. Berichte* 45(3/4): 221-223. (in German with English summary). [In May 2000, *Caliphaea confusa*, *Anotogaster nipalensis*, *Neallogaster hermione*, *Davidius aberrans*, and *Orthetrum glaucum* were recorded app. 10 km N of Kathmandu. Habitats and altitudinal distribution are briefly described.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de
- 2355.** Brockhaus, T.; Fischer, U. (2001): Die Verbreitung von *Cordulegaster boltonii* und *Somatochlora arctica* in Sachsen - Ergebnisse aus dem Projekt "Entomofauna Saxonica". *Abh. Ber. Naturkundemus. Görlitz* 73(1): (in German with English summary). [The distribution of *C. boltonii* (101 localities) and *S. arctica* (11 loc.) in Saxony is briefly described.] Address: Fischer, U., Anton-Gunter-Str. 12, D-08340 Schwarzenberg, Germany
- 2356.** Brockhaus, T. (2001): Untersuchungen zur Individualentwicklung, Phänologie und Populationsdynamik der Imagines von *Sympetrum pedemontanum* (Odonata: Libellulidae). *Libellula* 20(3/4): 115-130. (in German with English summary). ["In 1994 and 1995, *S. pedemontanum* was investigated by a mark-and-recapture study at River Zschopau in Saxony, Germany. In 1994, 23 of 281 specimen were recaptured once or more. In 1995, the recapture rate was 23 specimen of 444 specimen total. The maturation time of males was approximately eight days and a little bit longer in females. The duration of imaginal life was 13-17 days for males and 7-16 days for females. One male survived 45 days. From 77 (1994) and 211 (1995) emerged specimen, 34 (1994) and 90 (1995) were females, respectively. Emergence was strongly synchronised in both years: EM50 was seven days in 1994 and 11 days in 1995. After a strong emigration after emergence, especially in females, during the reproduction period the population remained stable at a low level." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de
- 2357.** Buczynski, P.; Czachorowski, S.; Lechowski, L. (2001): Some groups of water insects (Odonata, Hete-

roptera, Coleoptera, Trichoptera) of the projected reserve "Hanging peat bogs by Jaczno Lake" and its surroundings: results of preliminary studies. *Rocz. nauk. Tow. Ochr. Przyr. "Salamandra"* 5: 27-42. (in Polish with English summary). [On the north eastern edge of Poland (54°17'N 22°53'E) 37 odonate species from seven localities are listed. Here, *Chalcolestes viridis* and *Anax parthenope* reach the northernmost edge of their ranges in Poland. Other remarkable species are: *Symplocma paedisca*, *Ophiogomphus cecilia*, *Brachytron pratense*, *Anaciaeschna isocetes*, *Somatochlora arctica*, *S. flavomaculata*, *Libellula fulva*, and *Leucorrhinia caudalis*.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2358. Burkart, W.; Burkart, G. (2001): Two new Odonata species for Gotland, Sweden. *Nord. Odonat. Soc. Newsl.* 7(1): 10. (in Swedish with English summary). ["In an article in the journal "Körkmacken" (No. 27, August 2000, pp. 14-15) of the Gotland Entomological Society, Werner and Gudrun Burkart briefly presents their records of *Symplocma fusca* and *S. paedisca* in April 2000 at the island Gotland in the Baltic sea. Both species are new to Gotland, and the record of *S. paedisca* is the first for Sweden and Scandinavia."] Address: Burkart, W. a. G., Am Emel 7, D-27412 Wilstedt, Germany

2359. Burks, R.L.; Jeppesen, E.; Lodge, D.M. (2001): Pelagic prey and benthic predators: impact of odonate predation on *Daphnia*. *J. N. Am. Benthol. Soc.* 20(4): 615-628. (in English). ["Interactions between benthic predators and pelagic prey, such as larval odonates and *Daphnia*, are often used to describe classic predator-prey relationships in laboratory-studies. However, few field studies explore the potential impact of benthic predators on pelagic prey. Recent studies of cladocerans document diel horizontal migration (DHM), where large-bodied zooplankton (i.e., *Daphnia*) decrease their exposure to pelagic predators by seeking refuge among macrophytes. However, daphnids undergoing DHM may simultaneously increase their likelihood of encountering benthic predators that commonly occur in littoral zones. In laboratory experiments, we showed that dragonfly nymphs (*Epiheca cynosura*) effectively eliminated all *Daphnia* within 24 h, regardless of macrophyte presence or architecture. We also tested whether additions of larval damselflies (*Ischnura elegans*, *Coenagrion puella*, *C. pulchellum*) and dragonflies (*Somatochlora flavomaculata*) (total odonate density of 35-55 / m²) significantly reduced total zooplankton or benthic invertebrate abundance in field enclosures with different macrophyte densities (20, 40, 80% volume infested [PVI]). Odonates significantly reduced *Daphnia* abundance at 20 PVI. However, the magnitude of the influence of odonates on daphnids, as well as *Ceriodaphnia* and *Polyphemus*, decreased with increasing macrophyte density. Odonate predation did not significantly affect benthic taxa abundance. Thus, daphnids undergoing DHM may lower predation from pelagic predators, but our results suggest that mortality from littoral predators may be significant. The net benefit of DHM may, therefore, differ among lakes as a function of the relative threats posed by pelagic and littoral predators." (Authors)] Address: Burks, R.L., Rhodes Coll, Dept Biol., 2000 N Pkwy, Memphis, TN 38112 USA

2360. Cai, Z.J.; Zeng, L.J.; Feng, Z.J. (2001): Extracting the weak distorted fringes on the dragonfly wing by a correlation algorithm. *Optics & Laser Technology* 33(7): 493-497. (in English). ["We have proposed a simple correlation algorithm to extract weak distorted fringes buried in both background noise and random noise. The relationship among threshold value, signal to noise ratio and least frame number was discussed. The method, is efficiency to measure the shape of an object with low diffuse reflectivity. We have successfully applied the method to measure the shape of a dragonfly wing." (Authors)] Address: Cai Z.J., Tsing Hua Univ., Dept Precis Instruments, State Key Lab Precis Measurement Technol & Instru, Beijing 100084, Peoples Rep. China

2361. Catling, P.M.; Jones, C.D.; Pratt, P. (Eds) (2001): Ontario Odonata, vol. 2. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario. 186 pp. (in English). [Plenty odonatological contributions - as far as they are "scientific papers" they are abstracted in OAS 9 - are published in Vol. 2 of the Ontario Odonata. The issue contains some additional information and comments as follows: "Corrections to Volume 1", "Ontario Odonata Projects", "News and comments: 1. Ontario Odonata Survey, 2. *Amphiagrion abbreviatum*, a possible addition to the damselflies of northern Ontario, 3. Damselflies and dragonflies (Odonata) of Ontario: resource guide and annotated list, 4. A field guide to the Dragonflies and Damselflies of Algonquin Provincial Park", 5. A Guide to the Damselflies and Dragonflies of Ontario: Part 1 Damselflies", 6. Atlas of Ontario Odonata, 7. Value of Records" (P.M. Catling), "Recent literature" referring to Ontario, and instructions to contributors of the Ontario Odonata Survey ("Notice to contributors"). This most impressive volume closes with a species index.] Address: Alan J. Hanks, 34 Seaton Drive, Aurora, Ontario, Canada L4G 2K1. E-mail: A.Hanks@aci.on.ca

2362. Catling, P.M.; Brownell, V.R.; Hutchinson, R.; Ménard, B. (2001): A preliminary annotated list of the Odonata of Lanark County, Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 13-23. (in English). ["Eighty species of Odonata are reported for the county of Lanark in eastern Ontario at approximately 45.0176° N, 76.3630° W. The county is a Carolinian subzonal limit with southern species, such as *Celithemis eponina* and *Pachydiplax longipennis*, reaching their northern limits, and northern species, such as *Aeshna eremita*, *Gomphus adelphus*, and *Leucorrhinia glacialis*, at or near their southern limits in Ontario." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2363. Catling, P.M. (2001): Emergence of Odonata in southern Ontario during cool and wet weather. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 44. (in English). ["Species of Odonata emerging in relatively large numbers in eastern Ontario during cool and rainy weather included *Argia moesta*, *Dromogomphus spinosus*, and *Hagenius brevistylis*. Emergence under such conditions when adults are inactive may reduce predation. Significant information on dragonfly populations can be obtained during cool

and wet weather." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2364. Catling, P.M.; Brownell, V.R.; Pratt, P. (2001): Extension of the known range of *Argia tibialis* in Ontario beyond the Carolinian zone. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 4-8. (in English). ["The discovery of *Argia tibialis* on a semi-shaded path on the east side of the Nottawasaga River, 1 km northeast of Angus (44.336° N, 79.8705° W) in Simcoe Co., extends its known range 211 km to the northeast and outside the Carolinian zone. This inconspicuous species has probably been overlooked in this subunit of the Carolinian zone, and may have been present in the area for thousands of years, but a recent expansion of range into the region cannot be completely ruled out." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2365. Catling, P.M.; Brownell, V.R.; Jones, C.D.; Sutherland, D. (2001): Further northeastern extension of the range of River Bluet (*Enallagma anna*). In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 8-10. (in English). ["The known range of River Bluet (*Enallagma anna*) is extended 322 km to the northeast to Oxford, Brant, and Peel counties in southwestern Ontario. Habitats at the newly discovered locations included a small, clean and spring-fed stream, three ditch-like, and muddy-bottomed streams, and one fast-flowing rocky river. It may have been overlooked at these locations, rather than being a recent immigrant as suggested by its general rarity and association with long established habitats." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2366. Catling, P.M.; Jones, C.D.; Pratt, P. (2001): Introduction to the 2000 Ontario Odonata Summary Records. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 53-170. (in English). [23 odonatologists contributed to the Ontario odonate survey. The data are presented in a table giving information on species, county, location, latitude and longitude of localities, collecting date, collector, and status (imago, larva); the table includes 5699 records. In addition, information of weather conditions in 1999 and trends, analyses and notable records of selected species are given (*Ischnura hastata*, *Stylurus notatus*, *S. amnicola*, *Gomphaeschna furcillata*, *Gomphus viridifrons*, *Somatochlora tenebrosa*, *Macromia taeniolata*, *Sympetrum corruptum*, *S. danae*, and two hybrids: *Enallagma anna* x *civile*, *E. ebrium* x *hageni*.)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2367. Catling, P.M. (2001): Odonata associated with temporary pools on the Burnt Lands Alvar, Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 23-24. (in English). ["Shallow pools on alvars are available during wet and/or cool years. Surveys of adult Odonata associated with such pools on the Burnt Lands alvar, near Ottawa, Ontario, were conducted on 11 July 2000, and on 4 Aug. 2000. Odonata

associated with the temporary pools as tenerals and in sufficient numbers to suggest development in the pools included *Lestes congener*, *L. disjunctus*, *L. forcipatus*, *L. dryas*, *L. unguiculatus*, *Ischnura verticalis*, *Nehalennia irene*, *Sympetrum costiferum* and *S. obtrusum*." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2368. Catling, P.M. (2001): Odonata in the University of Western Ontario Insect Collection. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 30-36. (in English). ["The University of Western Ontario insect collection consists of two sections. One is referred to as the "University collection" which includes many older specimens verified by E.M. Walker and voucher specimens, and the other is referred to as the "student collections", mostly obtained during the 1960s and 1970s. A database including 176 Odonata specimens, i.e. most of the Ontario material, is included here. The principal values of the collection are (1) the vouchers for W.W. Judd's publications, (2) the older collections from well-known professional entomologists, and (3) the extensive material from the London area. This survey of Odonata in the University's collection is not only of interest with regard to mat group, but also provides a general picture of the contents of the collection that can be applied to other groups of insects. The collection is scientifically valuable and is much more than just a very good teaching collection." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2369. Catling, P.M.; Brownell, V.R.; Pratt, P. (2001): Range expansion of Double striped Bluet, *Enallagma basidens* in Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 10-13. (in English). ["First discovered in Ontario in 1985 in southern and western Essex County, *E. basidens* appears to have expanded its range northward and eastward by 100 km and since 1991 has been found in 20 additional locations. In Ontario it occurs primarily in man-made ponds including gravel pit ponds, but it has also been found on three rivers. Adults have been reported from late May to early September with a peak in late June and early July and another less prominent peak in late August." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2370. Catling, P.M. (2001): Review of "Distribution of damselflies and dragonflies (Odonata) of Cape Breton Island, Nova Scotia, Canada". In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 53. (in English). ["Review of "Brunelle, Paul-Michael. 2000. Distribution of damselflies and dragonflies (Odonata) of Cape Breton Island, Nova Scotia, Canada. Parks Canada Technical Reports in Ecosystem Science no. 24: pp. iv + 52. Available from: Neil Munro, Report Series Editor, Parks Canada, Historic Properties, Halifax, Nova Scotia, B3J 1S9, Canada. Tel: 902 426 2797, FAX: 902 426 2728": This report is exceptionally good and sets a high standard for regional evaluation. It should be of interest to anyone doing regional inventories. [...]."] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3,

Metcalf, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2371. Catling, P.M. (2001): Streams and rivers highlighted as major natural area protection priorities in Ontario based on damselfly and dragonfly indicators. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 36-43. (in English). ["The highest ranking groups of Ontario Odonata of conservation concern include globally vulnerable (G3) and provincially critically imperilled (SI) species most of which are inhabitants of large rivers and streams. In fact there are significantly more rare species in high risk categories associated with rivers and streams than would be expected on the basis of habitat frequencies of Ontario Odonata overall. Particular Ontario rivers highlighted for biodiversity protection on the basis of Odonata are the Ausable, Ottawa, Sydenham, and Thames, and these same rivers have been highlighted by other groups of environmental indicators such as Unionid molluscs. Recent emphasis on the protection of wetlands has focussed on extensive areas with emergent plant communities, while rivers and streams have suffered seriously inadequate attention." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, USA. E-mail: brownell@achilles.net

2372. Chovanec, A.; Waringer, J. (2001): Ecological integrity of river-floodplain systems-assessment by dragonfly surveys (Insecta: Odonata). Regul. Rivers: Res. Manage. 17(4-5): 493-507. ["Dragonflies are reliable indicators of the ecological quality of land-water ecotones, habitat heterogeneity and the hydrological dynamics of water bodies. In recent years, surveys of dragonfly communities have become a powerful tool for the ecological assessment of floodplain areas. The goal of this paper is to present a new approach towards assessing the ecological integrity of river-floodplain systems by analysing resident breeding dragonfly species. The methodology is based on experiences with existing approaches using macroinvertebrates as bioindicators, in particular, calculations of saprobic indices, longitudinal zonation and functional feeding group patterns. In addition to the total number of species and the number of sensitive species, the 'Odonate Habitat Index' (OHI) is a key element of the assessment method. It indicates characteristic features of a river-floodplain system, such as connectivity aspects, flow dynamics and terrestrialization processes. The OHI is calculated from the species-specific habitat values (expressing habitat preferences), abundances and the species-specific indication weight, which distinguishes eurytopic from stenotopic species. The comparison of the status quo with a reference condition allows an assessment of individual water bodies and/or of a whole area in a five-tiered classification scheme. The approach presented may also be used for the evaluation of restoration measures (e.g. reconnection of side arms) and for the definition of management objectives. Apart from the methodological framework, the results of a first application of this approach are presented in the paper as well. The study areas were selected floodplain systems of the Austrian section of the Danube and man-made inshore structures of the impounded Danube section in Vienna." (Authors)] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria. E-mail: chovanec@ubavie.gv.at

2373. Clausnitzer, H.-J. (2001): Die Zwerglibelle (*Nehalennia speciosa*) in Niedersachsen. Abh. Ber. Naturkundemus. Görlitz 73(1): 11-12. (in German with English summary). ["The occurrence of the rare damselfly *N. speciosa* in Lower Saxony is described. The habitats of the larvae and imagines differ considerably from those in southern Germany. In Lower Saxony larvae grow up in pools within bogs with relatively scarce vegetation, mostly dense carpets of *Sphagnum cuspidatum* and *Drepanocladus fluitans*. The imagines live in large tussocks of *Mollinia coerulea* not far from the water." (Author)] Address: Clausnitzer, H.-J., Eichenstr. 11, D-29348 Eschede, Germany. E-mail: H.-J.Clausnitzer@t-online.de

2374. Conze, K.-J.; Göcking, C. (2001): 'FFH - Libellenarten' in Nordrhein-Westfalen (NRW). Abh. Ber. Naturkundemus. Görlitz 73(1): 13-15. (in German with English summary). ["The current state of knowledge about dragonfly species in Northrhine-Westfalia, which are protected by the 'flora-fauna-habitat' (ffh) directive (appendix II and IV) of the European Community, is outlined. At least historical records show that nine out of the 'ffh-dragonfly species' known in Germany were found in NRW. Four of these species (*Coenagrion mercuriale*, *Leucorrhinia pectoralis*, *Ophiogomphus cecilia*, and *Gomphus flavipes*) have been reported to exist presently in NRW. The official proposal list of NRW includes several special protection areas for the species *C. mercuriale* and *L. pectoralis*." (Authors)] Address: Conze, K.-J., LökPlan-Conze, Cordes & Kirst GmbH, Hedwigstr. 32b, D-59609 Anröchte, Germany. E-mail: lökplan@t-online.de

2375. Cook, T.J.P.; Janovy, J.; Clopton, R.E. (2001): Epimerite-host epithelium relationships among eugregarines parasitizing the damselflies *Enallagma civile* and *Ischnura verticalis*. J. Parasitol. 87(5): 988-996. (in English). ["The host-parasite interface between 2 species of damselflies and 4 species of eugregarines was examined at the ultrastructural level. *Nubenocephalus nebraskensis* organisms attached to the host midgut epithelium by means of a sucker-like protomerite; the space between the epicytic folds and host epithelium was filled with electron-dense material interpreted to be adhesive in nature. *Actinocephalus carrilynae* organisms attached by means of the epimerite, which had no epicytic folds, and by the fluted stalk with characteristic epicytic folds; host cell and parasite membranes appeared fused at some places on the epimerite. *Hoplorhynchus acanthatholius* organisms attached by means of an ovoid epimerite with backward-pointing digitations; the entire epimerite was embedded in a host cell, and host cell microvilli surrounded the stalk. *Steganorhynchus dunwoodyi* organisms attached by means of an ovoid stalk papilla enclosed in a retractable globular sheath; the papilla was covered with epicytic folds, but the sheath was not, and the sheath had a single membrane, whereas the epicytic folds had 2 or 3 membranes. The entire apparatus was inserted between epithelial cells, and the sheath was highly folded at its surface. The ultrastructural observations suggest that actinocephalid gregarines have evolved 2 general strategies for attaching to the host epithelium, that is, suckerlike protomerites, as in the case of *N. nebraskensis*, and deeply embedded epimerites inserted within or between host cells, as in the other species studied." (Authors)] Address: Janovy, J., Univ Nebraska, Sch. Biol. Sci., Lincoln, NE 68588 USA

- 2376.** Couteyen, S.; Papazian, M. (2001): Contribution à la connaissance des Odonates de l'île de la Réunion 5. Orthetrum stemmale (Burmeister, 1839), une espèce redécouverte sur l'île (Odonata, Libellulidae). *Martinia* 17(3): 89-90. (in French with English summary). [14 Feb. 2001 O. stemmale has been rediscovered in la Réunion. The species was considered by Selys in 1862 as *Libellula contracta* Rambur, 1842.] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France
- 2377.** Curry, J.R. (2001): Dragonflies of Indiana. Indiana Academy of Sciences. ISBN 1-883362-11-3: 303 pp. (in English). [European readers may know Indiana from the mad rush of racing cars across the Indianapolis circuit. This wonderful book gives the chance to read something about fast flying beasts, the dragonflies. Dragonflies means Anisoptera, Zygoptera are not treated in the book. Curry's book starts with a brief but very readable account on a history of dragonfly biology in Indiana with some very prominent members of our community as T. Say, E.B. Willamson, and B.E. Montgomery. This chapter is followed by an account of the immature stages and life history. 97 individual species accounts, which comprise the bulk of the book, are clearly organised as follows: Most of the species in the book are represented by two photographs. These illustrate the recognition characters discussed in the text. The common names are heading each species chapter. Specific characters common or unique to the species including the mean size are listed to aid in identification ("Recognition"). "Indiana Flight season" data are based upon published reports as well as specimens in the collection of the author. "Status" indicate the current status of the species in Indiana. A "description" of the physical characteristics of the species intends to focus identification on essential morphological characters. In the paragraph "Habitat" it is outlined where the species is most commonly found to exist, including its preferred breeding habitat. Commonly observed habits ("Behaviour") may help in identification. North American "ranges" are based primarily upon published reports. A visual display of the flight season in Indiana, and distribution maps on the basis of counties where the particular species has been reported provide additional information. A glossar and a bibliography are also useful. From the European view, I personally think this is a wonderful book fascinating in its scope and in the quality of species (and habitat) photographs. I am very glad to have the book in my library. (Martin Schorr)] Address: Indiana Academy of Science, Chair of Publ. Comit., Bill N. McKnight, c/o Park Tudor School, 7200 North College Avenue, Indianapolis, Indiana 46240-3016, USA. US\$ 32.00.
- 2378.** d'Aguilar, J. (2001): Les descriptions originales des Odonates d'Europe 8. Leach, William Elford (1790-1836). *Martinia* 17(3): 115-118. (in French with English summary). [This eighth article of the series is devoted to William Elford Leach (1790-1836), who described several genera - in the case of Odonata: *Cordulia*, *Cordulegaster*, *Gomphus*, *Anax*, *Lestes*, *Calopteryx*, and *Anax imperator*.] Address: d'Aguilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France
- 2379.** D'Aguilar, J. (2001): Sur la date de description de *Calopteryx splendens* (Harris). *Entomologiste* (Paris) 57(2): 85-88. (in French). [Evidence is given to the fact that *C. splendens* first was described in 1776 and not in 1782 as stated in odonatological literature and taxonomical lists.] Address: d'Aguilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France
- 2380.** D'Antonio, C. (2001): Dati inediti di libellule catturate in Sicilia nella primavera del 1998. *Lindenia* 34: 145-146. (in Italian). [20 species from 27 localities in Sicilia, Italy, are listed. *Sympetma fusca*, *Coenagrion puella*, *Pyrrhosoma nymphula*, and *Orthetrum brunneum* are briefly discussed. Species with the highest locality-frequency are *Calopteryx haemorrhoidalis*, *Anax imperator* and the rare European *Coenagrion caerulescens* (ssp *caesarum*)!] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: lindenia@freemail.it
- 2381.** De Almeida Spindola, L.; Irineu de Souza, L.; Costa, J.M. (2001): Descriçao da larva de *Perithemis thais* Kirby, 1889, com chave para identificacao das larvas das especies conhecidas do genero citadas para o Brasil (Odonata: Libellulidae). *Bolm Mus. nac. Rio de J. (N.S.) Zool.* 442: 1-8. (in Portuguese with English summary). [The final instar larva is described and illustrated and the known Brazilian *Perithemis* larvae are keyed.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br
- 2382.** Denson, D. (2001): *Anax* on ice. *Argia* 13(1): 29. (in English). [*Anax junius* was collected 20th December 2000 in the Orlando area, (Florida?), USA encaged in a 1 cm thick piece of ice.] Address: not stated
- 2383.** Devai, G.; Miskolczi, M. (2001): Fundamental knowledge to the long term biodiversity monitoring on the basis of dragonfly (Odonata) fauna in the inundation area of River Tisza between Tiszabercel and Balsa (HNBM Programme, Pilot Project). *Studia odonatol. hung.* 7: 13-37. (in Hungarian with English summary). [The paper compiles the results of studies performed in the framework of the Hungarian Biodiversity Monitoring Programme. The analysis of data refers to a 37year period between 1961 and 1996. In the studied region, a total of 42 odonate species was recorded. Records of the following species should be of some interest: *Brachytron pratense*, *Aeshna viridis*, *Sympetrum depressiusculum*, *S. fonscolombii*, and *Leucorrhinia pectoralis*.] Address: Devai, G., Dept of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary
- 2384.** Dommangeat, J.-L.; Jolivet, S. (2001): Découverte d'une petite population de *Coenagrion caerulescens* (Fonscolombe, 1838) dans le département de l'Aveyron (Odonata, Zygoptera, Coenagrionidae). *Martinia* 17(3): 88. (in French). [In July 2001 in a marshy littoral habitat along the Dourdou de Camarès (affluent of the river Tarn), *C. caerulescens* was discovered. Habitat, co-occurring odonate species, and the azonal distribution in the "continental", not Mediterranean region of France are discussed.] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 2385.** Dommangeat, J.-L.; Heidemann, H. (2001): In memoriam Herbert Wichmann. 1922-2000. *Martinia* 17 (4): 121-122. (in French). [Interest in dragonflies, especially dragonfly photographing, led to a friendship between H. Wichmann and J.-L. Dommangeat which is as important as scientific contacts among odonatolo-

gists.] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2386. Dommange, J.-L. (2001): Le point sur les connaissances relatives aux Odonates du département de l'Aveyron. *Martinia* 17(3): 95-106. (in French with English summary). [On the occasion of an unpublished report about *Macromia splendens* (Pictet, 1843) in Tarn valley (Aveyron département) for the French Ministry of Development and Environment, the author presents an assessment of the Odonata recorded in Aveyron. Two tables summarize the 57 species observed, according to their autochthonous character and their habitats. Some species are commented, and reflections about the potential number of species in different regions - depending on geographic situation and the diversity of aquatic habitats - of the Tarn catchment are made. Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2387. Dommange, J.-L. (2001): Rubrique bibliographique. *Martinia* 17(4): 169-175. (in French). [The odonatological bibliography covers publications from 1994 to 2001.] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2388. Donnelly, N. (2001): History of Odonata study in America: Donald J. Borror (1909 - 1988). *Argia* 13(2): 4-5. (in English). [A further part of the welcome series on pioneer odonatologists.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2389. Donnelly, N. (2001): Rediscovery of *Orthemis sulphurata*. *Argia* 13(2): 11-12. (in English). [The puzzle with the enigmatic *O. sulphurata* Hagen, 1868 could be solved due to specimens caught by Fred Sibley in Guayaquil, Ecuador.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2390. Donnelly, N. (2001): Taxonomic problems with North American Odonata species - a last appeal for information. *Argia* 13(2): 5-10. (in English). [The following taxa are treated: *Lestes disjunctus*-complex (*disjunctus*, *forcipatus*, *australis*), *Amphiagrion saucium* (Burmeister 1839) and *A. abbreviatum* (Selys 1876), *Enallagma vernale* Gloyd, 1943 and *E. cyathigerum* (Charpentier, 1840), *Aeshna interrupta* subspecies, *Cordulegaster bilineata* (Carle 1983) and *C. diastatops* (Selys 1854), *Epitheca costalis* (Selys 1871), *E. petechialis* Muttkowski 1911 and *E. cynosura* (Say 1839), *Erythemis collocata* (Hagen 1861) and *E. simplicollis* (Say 1839), *Orthemis ferruginea* (Fabricius 1775), *O. discolor* (Burmeister, 1839) and "a third species", *Sympetrum internum* Montgomery 1943, *S. janeae* Carle 1993 and *S. rubicundulum* (Say 1839), *Sympetrum semicinctum* (Say 1839) and *S. occidentale* Barteneff 1914, and *Sympetrum signiferum* Cunnings & Garrison, 1991 and *S. vicinum* (Hagen 1861).] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2391. Donnelly, N.: (2001): Watch out for warthogs! *Argia* 13(1): 15-17. (in English). [Uganda records including *Umma saphirina* Förster 1916, *Chlorocypha trifaria* (Karsch 1899), *Anax speratus* Hagen 1867, *Aethriamanta rezia* Kirby 1889, *Ceriagrion kordofanicum* Ris 1924, *Platycypha caligata* (Selys 1853), and *Chlorocypha curta* (Hagen in Selys 1853).] Address: Donnelly,

T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2392. Ellwanger, G. (2001): Verbreitungskarten der Libellenarten der Anhänge II und IV der FFH-Richtlinie in Deutschland auf der Basis des Messtischblattrasters. *Abh. Ber. Naturkundemus. Görlitz* 73(1): 19-21. (in German with English summary). ["The distribution of the dragonflies listed in Annex II of the Habitats Directive was analysed in a project, which was carried out on behalf of the Federal Agency for Nature Conservation. Data about the distribution of the Annex-IV-species are lacking with the exception of *Gomphus flavipes*." (Author)] Address: Ellwanger, G., Cäsariusstr. 1b, D-53173 Bonn, Germany. E-mail: EllwangerG@bfn.de

2393. Engemann, R.; Marx, J.; Schwab, U. (2001): Lebensräume, Flora und Fauna im Gebiet der Pöplitzer Teiche / Dübener Heide. *Naturschutz im Land Sachsen-Anhalt* 38(1): 9-26. (in German). [Germany, Sachsen-Anhalt; 22 species are listed as a result of a survey in 1999. It is assumed that due to the unaccessibility of the area and the low frequency of excursions the actual number of species will be significantly higher. Of special interest are the records of the regionally rare *Calopteryx virgo*.] Address: Engemann, R., c/o peb Gesellschaft für Landschafts- und Freiraumplanung, Münchener Str. 37, D-85221 Dachau, Germany

2394. Englund, R.A.; Polhemus, D.A. (2001): Evaluating the effects of introduced Rainbow Trout (*Oncorhynchus mykiss*) on native stream insects on Kauai Island, Hawaii; Contribution No. 2001-012 to the Hawaii Biological Survey, Bishop Museum. *Journal of Insect Conservation* 5(4): 265-281. (in English). ["Rainbow trout (*Oncorhynchus mykiss*) and other salmonids have been widely stocked into upland streams throughout the world to provide a basis for sport fisheries, but the effects of such introductions on indigenous and endemic aquatic insect assemblages are poorly documented. In this study, we examine the impact of rainbow trout on the indigenous and endemic entomofauna of upland streams in Kokee State Park, Kauai, Hawaii, with particular emphasis on the potential threat trout pose to populations of endemic damselflies in the genus *Megalagrion*. Rainbow trout were introduced into the upland streams of Kauai beginning in the 1920s, with over 60 years of subsequent restocking. This study indicates, however, that streams in this area still maintain diverse populations of *Megalagrion* damselflies and other indigenous and endemic aquatic insects, both in catchments containing naturally reproducing trout populations and in catchments lacking rainbow trout. Our results indicate that the indigenous and endemic aquatic insect communities in the streams under study compare favorably in terms of density and taxonomic richness with other isolated and unimpacted streams elsewhere in Hawaii, and retain high densities and relative percentages of indigenous and endemic aquatic insect taxa. Our results demonstrate that the threats posed by conspicuous introduced species such as trout should not simply be assumed a priori on the basis of postulated negative interactions, because this may divert limited resources from programs aimed at control of other, potentially more destructive introduced taxa such as inconspicuous poeciliid fishes." (Authors)] Address: Englund, R.A., Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA. E-mail: englund@bishopmuseum.org

2395. Fleck, G.; Nel, A.; Bechly, G.; Martinez-Delclos, X. (2001): Revision and phylogenetic affinities of the Jurassic Steleopteridae Handlirsch, 1906 (Odonata : Zygoptera). *Insect Syst. Evol.* 32(3): 285-305. (in English). ["The Jurassic odonate family Steleopteridae is revised. Two new genera and species *Parasteleopteron guischari* and *Euparasteleopteron vohli* are described. The phylogenetic affinities of this group are discussed. The Steleopteridae are excluded from the Epiproctophora and transferred into the Zygoptera (stemgroup). *Euphaeopsis multinervis* is redescribed and transferred to Epiproctophora: Isophlebioidea, and the genus *Pseudoeuphaea* with its four species is considered as a nomen dubium in Odonata incertae sedis." (Authors)] Address: Fleck, G., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France

2396. Fukui, M.; Iwamoto, A.; and 21 other members (Okegayanuma group of Biology Club of Iwata-minami Prefectural High School) (2001): A study of the way to breed *Libellula angelina* in the Okegayanuma, Iwata - city. *Nature and Insects* 36(7): 20-23. (in Japanese). [Introduction: Okegayanuma marsh is located at the northeast of Iwata-city, the west of Shizuoka Prefecture, and famous for the rich habitat of aquatic creatures, especially dragonflies. Among them, *L. angelina* is designated as Endangered species in RDB List. To protect the environment, local people, government and nature conservation groups are in action in closer connection. We investigated the population size since 1991. In 1993 to 1994 the population amounted 700 to 800 but thereafter it decreased and at last in 1999 only to 47. This was a critical situation. The factor of the sharp decrease was the burst multiplication of crayfish. We caught more than 20000 crayfish in the year, and from the year on we have continued to rid the marsh of it. 2. Breeding in our high school: Under the permission of the Ministry of the Environment we caught ten female of *L. angelina* in mid May, and got 5000 to 6000 eggs. We bred them in outdoor plastic containers, each containing aquatic plants, and bred 60 to 210 larvae in each container. At first we bred them with planktons which were collected from ponds, and brine shrimp and from the later stages with tubifexes and larvae of midge. 3. Result and analysis of the conditions of breeding: Larvae bred in 41 cases in 1999 to 2000 amounted 1326, and in 2000 to 2001, 1813 in 52 cases. The mean of larvae bred outdoors 36.9 for each case (total 49), and 1.3 indoors (3 cases). Larvae were bred outdoors more than indoors. This seems to be due to abundance with plankton, supply of rain water, and oxygen supply by water plants. The mean viability was 24.4%. 4. Emergence from bred larvae at Okegayanuma and its effect: Bred larvae (1300) were moved to the marsh, where emergence began on April 15, reached its peak on April 23. More than 70% of emergence from the larvae were counted. Adults of 131 were recorded. Adults came to oviposit in the containers for emergence. 5. Management of breeding containers and tracking of growth of larvae: We compared the conditions of larval growth between the containers from which intruders' larvae were eliminated and those not eliminated. Intruders were seven species; *Crocothemis servilia mariannae*, *Orthetrum albistylum speciosum*, *Lyriothemis pachygastra*, *Pantala flavescens*, *Anax parthenope julius*, *A. nigrofasciatus nigrofasciatus*, *Rhyothemis fuliginosa*. Among them *A. n. nigrofasciatus* has great impact to the larvae of *L. angelina*. Translation: Ishizawa, Naoya] Address: not stated

2397. Gaino, E.; Reborra, M. (2001): Apical antennal sensilla in nymphs of *Libellula depressa* (Odonata: Libellulidae). *Invertebr. Biol.* 120(2): 162-169. (in English). ["In an ultrastructural study of the apical antenna of the last nymphal stages of *Libellula depressa* (Odonata: Libellulidae), we found long sensilla trichodea, 2 sensory pegs, and a coeloconic sensillum on the last article of the flagellum (the distal part of the antenna). The long sensilla trichodea are mechanoreceptors, almost identical to the long filiform hairs of some terrestrial insects and the first sensilla of this kind to be described in aquatic insects. Particular attention was given to the complex coeloconic sensillum, a compound sensillum innervated by 2 groups of 3 neurons wrapped in a dendritic sheath. A cuticular sleeve envelops the distal portion of the outer dendritic segment. The cuticle of the coeloconic sensillum shows wide channels and is contiguous to the underlying granular and fibrillar layer. Similar structures on the antennae of the adults of other dragonflies were identified as chemoreceptors in previous studies. We hypothesize that this larval coeloconic sensillum might likewise have a chemosensory function, responding to molecules that diffuse through the cuticle and the underlying granular and fibrillar layer, as no clear pore or pore-tubule system is visible. Alternative functions are also explored on the basis of morphological details." (Authors)] Address: Gaino, E., Univ. Perugia, Dipartimento Biol. Anim. & Ecol., Via Elce Sotto, I-06123 Perugia, Italy

2398. Garrison, R. (2001): Brazil 2000, or living it up (and collecting) in Rio. *Argia* 13(1): 12-15. (in English). [Report of a visit in the Museu Nacional do Rio de Janeiro working with Hetaerina and *Argia*, trips to the National Park of Itatiaia, to Iha de Marambaia and Cochoeira de Macucu, reflections on difficulties identifying members of the genus *Heteragrion*. The following species are mentioned in the paper: *Telebasis filiola* (Perty 1834), *Hetaerina hebe* Selys 1853, *H. rosea* Selys 1853, *Heteragrion consors* Hagen in Selys 1862, *Perilestes fragilis* Hagen in Selys, 1862, *Epigomphus paludosus* Hagen in Selys, 1854, *Forcepsioneura sancta* (Hagen in Selys, 1860), *Leptagrion elongatum* Selys 1876, *Tramea binotata* (Rambur 1842), *T. calverti* Muttkowski 1910, *Tramea cophysa* Hagen 1867, *Perithemis icteroptera* (Selys 1857), *Forcepsioneura itatiaiae* (Santos 1970), *Hetaerina proxima* Selys 1853, *Argia tamoyo* Calvert, 1909, *A.sordida* Hagen in Selys, 1865, *Macrothemis imitans* Karsch 1890, *Dasythemis venosa* (Burmeister 1839), *Orthemis cultriformis* Calvert 1899, *Triacanthagyna satyrus* (Martin 1909), *Minagrion mecistogastrum* (Selys 1876), *Elasmothemis constricta* (Calvert, 1898), *Acanthagrion gracile* (Rambur 1842), *Argia lilacina* Selys 1865, *Oxyagrion terminale* Selys 1876, *Erythrodiplax juliana* Ris 1911, *Heteragrion dorsale* Selys 1862, *Hetaerina brightwelli* (Kirby 1823), *Progomphus gracilis* Hagen in Selys 1854, and *Hetaerina longipes* Hagen in Selys 1853] Address: Garrison, R., 1030 Fondale, Azusa, CA 91702-0821, USA: rosergarrison@compuserve.com

2399. Glatzle, B. (2001): Die Rolle der Libellen im Nahrungsspektrum der Gebirgsstelze *Motacilla cinerea* Tunstall, 1771 an einem Tieflandfluss. *Abh. Ber. Naturkundemus. Görlitz* 73(1): 23-24. (in German with English summary). ["In 2000, three breeding pairs of the Grey Wagtail nesting along the river Oker near Braunschweig (Lower Saxony, Germany) were observed and filmed in order to analyse their food composition. The

Oker river is a lowland river with high abundance of dragonflies. Corresponding with the opportunistic feeding behaviour of the Grey Wagtail, Odonata form the dominant food component in this study, reaching up to 20 % of all prey individuals recorded." (Author)] Address: Glatzle, Birgit., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: B.Glatzle@tu-bs.de

2400. Glover, K.: (2001): Poem: "Flash and flicker". *Argia* 13(1): 26. (in English). Address: not stated

2401. Goffart, P. (2001): Compte-rendu des observations d'espèces prioritaires d'Odonates en Wallonie durant la saison 2000, dans le cadre du programme d'Inventaire et Surveillance de la Biodiversité (ISB). *Gomphus* 17(1): 23-36. (in French with Dutch and English summaries). ["This report gives an account of observations made in 2000 by the Gomphus Working Group collaborators on Odonata priority species, pointed out in the "Biodiversity Survey and Monitoring" program in Wallonie because of their great rarity and/or decline. It also presents information dealing with rare southern species, expanding to the North, during the same flight-season. [...]"] (Author) The following species are treated in detail: *Sympetma fusca*, *Lestes dryas*, *Coenagrion hastulatum*, *C. mercuriale*, *C. pulchellum*, *Ceragrion tenellum*, *Gomphus vulgatissimus*, *Thecagaster bidentata*, *Aeshna subarctica elisabethae*, *Brachytron pratense*, *Epitheca bimaculata*, *Oxygastra curtisii*, *Somatochlora arctica*, *S.flavomaculata*, *Libellula fulva*, *Orthetrum coerulescens*, *Sympetrum pedemontanum*, *Leucorrhinia rubicunda*, *Lestes barbarus*, *Coenagrion scitulum*, *Aeshna affinis*, *Anax parthenope*, *Orthetrum brunneum*, *Sympetrum fonscolombii*, and *Sympetrum meridionale* .] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

2402. Goretti, E.; Ceccagnoli, D.; La Porta, G.; Di Giovanni, M.V. (2001): Larval development of *Aeshna cyanea* (Müller, 1764) (Odonata: Aeshnidae) in Central Italy. *Hydrobiologia* 457: 149-154. (in English). ["A three-year investigation was carried out on the life cycle of *A. cyanea* in temporary freshwater pools in Central Italy. The instars were discriminated by size and scatter plot, based on measurements of labium length, head width, metafemur length, forewing-pad length and total larval body length. The prolarvae instar was derived by Dyar's law. The mean increase value index between following and previous instar was between 1.26 and 1.33 for isometric variables, and around 1.96 for the wing-pad allometric variable. *A. cyanea* entered diapause mainly at the F-2 instar, placing it almost intermediate between the Southern Spain populations, which usually overwintered in the F-3 instar, and those of England and Central Europe, who spent their last winter in F-1. *A. cyanea* appeared to be a 'summer species', as defined by Corbet (1962), and the population we studied had a semi-voltine life cycle." (Authors)] Address: Di Giovanni, M.V., Univ. Perugia, Dipartimento Biol. Anim. & Ecol., Via Elce di Sotto, I-06123 Perugia, Italy

2403. Grand, D.; Greff, N.; Delcourt, G. (2001): *Leucorrhinia pectoralis* (Charpentier, 1825) nouveau pour le département du Rhône. *Martinia* 17(3): 107-109. (in French with English summary). [In 2000, *L. pectoralis* was recorded at two localities of the Rhône département,

France. The habitats and co-occurring species are described.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

2404. Grimaldi, D. (2001): Insect evolutionary history from Handlirsch to Hennig, and beyond. *J. Paleontol.* 75 (6): 1152-1160. (in English). ["Significant investigators and aspects in the past century of insect paleontology are briefly reviewed. Despite the pervasive influence of the paleontologist Willi Hennig in systematic biology, the study of fossil insects remains more descriptive than most other paleontological areas. Hypotheses are reviewed on relationships and chronologies of early divergences in insects (Paleozoic, Lower Mesozoic), particularly living and extinct orders of the lower pterygotes and putative monophyly of the Paleoptera (Odonata + Ephemeroptera). The Dictyoptera (Mantodea, Isoptera, Blattaria) illustrate relationships and discrepancies between stratigraphic record and phylogenetic relationships. Future directions in the field are suggested." (Author)] Address: Grimaldi, D., Amer. Museum Nat. Hist., Dept. Invertebrates, New York, NY 10024 USA

2405. Gubbels, R. (2001): Eerste waarneming van *Gomphus flavipes* (Charpentier, 1825) in België: een grensgeval. *Gomphus* 17(1): 3-8. (in Dutch with English and French summaries). ["First observation of *G. flavipes* in Belgium: a borderline case. In the summer of 2000 two males of *G. flavipes* were found along the river Meuse (Grensmaas) in the neighbourhood of Maasmechelen. This is the first observation of *G. flavipes* for Belgium." (Author)] Address: Gubbels, R., Langs de Veestraat 15, NI-6125 RN Obbicht, The Netherlands

2406. Günther, A. (2001): Differenzierung von Drohflügen und Balzverhalten verschiedener Rhinocypha-Formen Sulawesi (Indonesien). *Abh. Ber. Naturkundemus. Görlitz* 73(1): 25-26. (in German with English summary). ["The genus *Rhinocypha*, which has its distribution range in southeast Asia, exhibits ritualised threatening flights and specialised courtship behaviour, both of which are closely connected with the egg deposition substrate. The differentiation of this behaviour in several *Rhinocypha* species is briefly described and discussed." (Author)] Address: Günther, A., Naturschutzinstitut Freiberg, WaisenhausstraBe 10, D-09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

2407. Guerold, F.; Boudot, J.-P.; Jacquemin, G. (2001): Première preuve de la reproduction d'*Aeshna affinis* Vander Linden, 1820 (Odonata, Anisoptera, Aeshnidae) et nouvelles observations d'Odonates rares en Lorraine. *Martinia* 17(3): 77-87. (in French with English summary). ["During Odonatological studies in the Lorraine area in 1999, we observed both immature and mature males of *Aeshna affinis* in the vicinity of Pont-à-Mousson. An exuvia corresponding to this species was collected on macrophytes growing in a artificial pond resulting from archaeological soundings. This observation constitutes the first evidence of the reproduction of *A. affinis* in the Lorraine region. Companion species and earlier records of this species in NE France are specified. Other records of rare or new species in this area (*Lestes barbarus*, *Coenagrion scitulum*, *Aeshna isoceles*, *Anax parthenope*, *Sympetrum meridionale*, *S. flaveolum*, *S. fonscolombii*, *S. pedemontanum*, *Leucorrhinia caudalis*, *L. pectoralis*) are brought on record. *Boyeria irene* was found one time at short distance of the

the Lorraine limits. Some of these dragonflies are thermophilous species often regarded in progression towards the N of Europe. Some of them were known in Lorraine in the second half of the 19th century, but have not been recorded again since." (Authors)] Address: Guerold, F., Université de Metz, Équipe d'Écotoxicologie, Campus de Bridoux, BP 4116, F- 57040 - Metz Cedex 1, France. E-mail: gue- rold@bridoux.sciences.univ-metz.fr

2408. Handke, K.; Adena, J. (2001): Zur Fauna neu angelegter Gewässer in der Bremer Flussmarsch unter besonderer Berücksichtigung der Libellen. Bremer Beiträge für Naturkunde und Naturschutz 5: 175-188. (in German with English summary). [In the middle of the 1980th in the Niedervieland-region near Bremen, Germany due to industrial development measures many habitats had been destroyed. To compensate habitat destruction, due to legal restrictions new habitats had to be created, and the success of the measures had to be monitored. In 1997 28 odonate species including 21 indigenous species colonised the newly created system of waters. The authors conclude, that "most of the animal species of the former ditch systems have also been found at and in the new waters in the course of the ten years." But compared to the old ditch systems significant differences turned out for the specialists of Water Aloe (*Stratiotes aloides*) habitats like *Aeshna viridis* and *Anaciaeschna isosceles*, which are less frequent than formerly. The paper provides some interesting observations on dispersal of species and on succession of odonate species composition in dependence of the succession status of the waters.] Address: Handke, K., Delmestr. 28, D-27777 Ganderkesee, Germany

2409. Hardersen, S. (2001): "Fluctuating Asymmetry" als Instrument für die Bioindikation mit Libellen. Abh. Ber. Naturkundemus. Görlitz 73(1): 27-28. (in German with English summary). ["The damselfly *Xanthocnemis zealandica* was used to investigate the practicability of 'fluctuating asymmetry' (FA) as a bioindicator. Exposure of the last larval instar to the insecticide carbaryl (40 ppb) increased the level of FA compared with the control in the laboratory. Attempts to confirm these laboratory results using artificial ponds or field populations were only partly successful. It is concluded that the use of FA as a bioindicator is fraught with difficulties." (Author)] Address: Hardersen, S., Tiergartenstr. 111, D-47533 Kleve, Germany. E-mail: sonke7hard@aol.com

2410. Harding, R.W. (2001): *Enallagma aspersum* in Prince Edward Island. *Argia* 13(2): 2-3. (in English). [First record of *E. aspersum* at Isaac's Lake, Prince Edward Island, Canada on 2 Sept. 2000.] Address: Harding, R.W., PR#3 Montague, Summerville, PE, C0A 1R0, Canada

2411. Hartung, M. (2001): Bestimmung von isolierten Flügeln von Gomphiden am Ufer der Oder. Abh. Ber. Naturkundemus. Görlitz 73(1): 29-31. (in German with English summary). [The use of 'leftover' wings of *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Stylurus flavipes* preyed upon by birds is discussed as an indicator for the occurrence of dragonfly species.] Address: Hartung, M., Wehnertstr. 20A, D-12277 Berlin, Germany. E-mail: AEH.Matthias.Hartung@t-online.de

2412. Heijligers, H.; Hermans, J. (2001): Dragonflies in northern Limburg. *Natuurhistorisch maandblad* 90: 101-109. (in Dutch with English summary). ["This article

reports the findings of a weekend survey by the Venray branch and the Dragonfly Study Group of the Limburg Natural History Society. Twenty-two persons inspected 37 different areas in northern Limburg for dragonflies. Data were collected on a total of 33 different species of dragonfly. The areas visited are briefly characterised. A more detailed description is provided of the species *Lestes virens*, *Ceriagrion tenellum*, *Coenagrion pulchellum*, *Cordulia aenea*, *Somatochlora metallica*, *Crocothemis erythraea* and the genus *Leucorrhinia*. New locations were found for *Lestes virens* (Ravenvennen), *Ceriagrion tenellum* (Ravenvennen, Grinderij Hamert), *Coenagrion pulchellum* (Gubbelsvijver, Schuitwater Mergelsum), *Cordulia aenea* (Elsbeemden, Ravenvennen, Gubbelsvijver, Linksstraat), *Somatochlora metallica* (Gubbelsvijver, Groote Molenbeek, Broekhuizer Molenbeek), *Crocothemis erythraea* (Bergerheide, Elsbeemden, Hamert), *Leucorrhinia pectoralis* (Ravenvennen, Duivelskuil) *Leucorrhinia dubia*, and *L. rubicunda* (Bergerheide, Grinderij Hamert, Ravenvennen)." (Authors)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands

2413. Heinze, B. (2001): Insekt des Jahres 2001: Die Plattbauch-Segellibelle *Libellula depressa* Linnaeus, 1758. *Untere Havel - Naturkundliche Berichte* 11: 23-24. (in German). [Some general information referring to *L. depressa*] Address: Heinze, B., Lindenstr. 16, D-39539 Havelberg, Germany

2414. Heitz, S. (2001): Integration des Libellenschutzes in die Unterhaltung von Wiesenbächen. Maßnahmen zum Schutz der Helm-Azurjungfer (*Coenagrion mercuriale*) im Ortenaukreis (Baden-Württemberg). Diplomarbeit an Institut für Landschaftspflege und Naturschutz der Universität Hannover. 98 pp., Anhang. (in German). [Ditch management in most cases leads to significant impacts on fauna and flora. This thesis provides sound information and practicable measures to combine a ditch management that guarantees minimal (and where necessary, differentiated) economical and ecological standards. The partitioning of ditches into a system of stretches enables *C. mercuriale* (and additional species as *Orthetrum coerulescens* etc.) to complete its life cycle, to disperse, and to recolonize new stretches. This thesis can be considered a handbook for ditch management with special emphasize on Odonata. In addition it provides plenty of information referring to general aspects of ditch management, and it compiles the long lasting experience of conflict management between German conservationists and the responsible authorities for ditch management. The thesis is organized, so it even enables everyone from abroad and non German speaking persons to profit from the study. It is highly recommended to everybody interested in *C. mercuriale* or ditch management. (Martin Schorr)] Address: Heitz, S., Moosweg 15, D-77749 Hohberg, Germany

2415. Herren, B.; Herren, K. (2001): Libellule in Sicilia (Autunno 2000). *Lindenia* 34: 144-145. (in Italian). [Odonate taxa of 12 localities situated in Sicilia, Italy are listed; 15 species could be identified to the species level including a record of *Orthetrum trinacria*.] Address: Herren, B. & K., Oberfelderstr. 46, CH-3550 Langnau, Switzerland. E-mail: schule.rosig@bluewin.ch

2416. Hess, M.; Heckes, U. (2001): Beitrag zur Wasserinsektenfauna der Bäche und Quellen im Stadtge-

biet München (Ephemeroptera, Plecoptera, Heteroptera, Coleoptera, Trichoptera u.a.). NachrBl. bayer. Ent. 50 (4): 113-127. (in German with English summary). ["Based on an actual study in streams and springs in the City of Munich records of aquatic insects from various orders are summarized. They are supplemented by data from recent literature. Some faunistically remarkable species are commented more in detail. By way of a resemblance analysis a faunistic classification is worked out, examining particularly the correspondence with hydrogeological / geo-morphological subunits of the Münchener Ebene within the city. The differentiated species communities are characterised and discussed with regard to the assumed near-natural state." (Authors) 8 odonate species including *Coenagrion mercuriale* are listed in tab. 1] Address: Hess, Monika, c/o ÖKOKART, Wasserburger Landstr. 151, D-81827 München, Germany. E-mail: info@oekokart.de

2417. Heymer, A. (2001): Gedanken zum "Vier-Beine-Sitzen" bei Libellen. Notul. odonotol. 5(8): 99-103. (in German with English summary). ["In odonates, the prothoracic legs serve, among other purposes, for holding prey while eating and, with the help of the specialised tibial combing spikes, they function as a "cleaning apparatus" for the head and the compound eyes. Thus, early in the hexapod evolution they have assumed the functions, which entailed that in some species the clasping reflex is no longer elicited during perching. Among the phylogenetically relatively young Libellulinae, the non-use of fore legs while sitting on substrate seems a general habit in Libellula and Orthetrum. Apparently, this behavioural peculiarity is to be considered a progressive feature in phylogeny. In the Zygoptera, this phenomenon has been so far recorded only in the euphaeid, *Dysphaea dimidiata*, which displays a perching behaviour convergent to that in Orthetrum." (Author)] Address: Heymer, A., Écologie Générale, Muséum National d'Histoire Naturelle, 4, Avenue du Petit Château, F-91800 Brunoy (Essone), France

2418. Hiemeyer, F.; Miller, E.; Miller, J. (2001): Winterbeobachtungen an *Sympetma paedisca* (Odonata: Libellula 20(3/4): 103-113. (in German with English summary). ["After several sightings in November 1997 and 1998, we systematically studied the behaviour of hibernating individuals at two ponds in the Allgäu, south-eastern Bavaria, Germany, in both following winters 1999/2000 and 2000/2001. They stayed during the winter in the shore vegetation of their breeding waters, sitting vertically on reedblades or horizontally on *Carex elata*. All were completely exposed to sun, wind, rain and snow. They safely survived snowing in, hoarfrost and freezing. If temperature was above 0 °C, the individuals were able to move and to crawl over snow, and if temperature was about 15 °C, they even could fly." (Author)] Address: Hiemeyer, F., Gögginger Str. 120, D-86199 Augsburg, Germany. E-mail: FritzHiemeyer@web.de

2419. Holder, M.; Kingsley, A. (2001): Summer 2000 peatland odonate surveys in New Brunswick and Nova Scotia, Canada. Argia 13(1): 17-19. (in English). [Examining peatland flora and fauna, 59 odonate species were spotted in 2000 including 30 new county records for the provinces of New Brunswick and Nova Scotia. *Somatochlora kennedyi* was recorded for the first time in Nova Scotia. *Leucorrhinia patricia* is considered a further remarkable record; the habitat of the species is

briefly characterised.] Address: Holder, M., Kingsley, Andrea, 4605 Hwy'12, Kentville, Nova Scotia B4N 3V8, Canada. E-mail: kingsley.holder@ns.sympatico.ca

2420. Hostettler, K. (2001): Der Kleine Blaupfeil (*Orthetrum coerulescens*) in Vorarlberg. mercuriale 1: 2-4. (in German). [39 localities with records of *O. coerulescens* in Vorarlberg, Austria are analyzed according to their altitudinal situation and to co-occurring Odonata.] Address: Hostettler, K., Schulstr. 7, CH-8590 Romanshorn, Schweiz. E-mail: kurt.hostettler@gmx.ch

2421. Huang, D.Y.; Lin, Q.B. (2001): The Early Cretaceous Hemeroscopid larva fossils from Beijing, China. Chin. Sci. Bull. 46(17): 1477-1481. (in English with Chinese summary). ["More than 100 hemeroscopid larva fossils were discovered from the Lower Cretaceous in southwest Beijing, which effectively ends the discussion of morphology and makes it more complete. It is assigned within the Libelluloidea, and shows close evolutionary correlations with modern Libellulidae. Although the wing characters of adult Hemeroscopus from the same formation indicates the close relationship to Aeschnoidea, we suggest that the larvae and the adults were the same species. Therefore, it probably shows the evolutionary ancestors of Libellulidae. Being the fundamental species discriminating Jehol Entomofauna and Lushangfen Entomofauna, Hemeroscopus bears great significance in the study of stratigraphy." (Author)] Address: Huang, D.Y., Acad. Sinica, Nanjing Inst. Geol. & Paleontol., Nanjing 210008, Peoples Rep. China

2422. Hünken, A.; Schütte, C. (2001): Im Trüben fischen: Predation von Flussbarschen auf Calopteryx-Larven. Abh. Ber. Naturkundemus. Görlitz 73(1): 33-34. (in German with English summary). ["Fishing in murky waters: Predation of perch on two Calopteryx species. - The role of turbidity in predator-prey interactions between *Perca fluviatilis* and *Calopteryx splendens* and *C. virgo* respectively was tested in laboratory experiments. In turbid water mortality induced by the fish was significantly higher in *C. splendens* as in *C. virgo*. *C. virgo* was less affected by predation of the fish than *C. splendens*, no matter if water was turbid or not. The differences between both Calopteryx species are discussed in terms of their life style." (Authors)] Address: Schütte C., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

2423. Huth, J. (2001): Libellen (Odonata) der Braunkohlen-Bergbaufolgelandschaft Sachsen-Anhalts. Abh. Ber. Naturkundemus. Görlitz 73(1): 35-37. (in German with English summary). ["From 1996 to 2000 altogether 47 species of dragonflies (75 % of the recorded species of Sachsen-Anhalt), including 21 endangered species of Sachsen-Anhalt and 22 endangered species of Germany, were found in the open-cast lignite post-mining landscapes of Sachsen-Anhalt. The importance of dragonflies of different types of post-mining waters are described, the most important of which is the nature reserve 'Schlauch Burgkernitz' near Bitterfeld. 40 species (including 17 endangered species of Sachsen-Anhalt and 19 endangered species of Germany) were found there." (Author)] Address: Huth, J., Oekokart GmbH, G.-Cantor-Str. 31, D-06108 Halle/Saale. E-mail: oekokart-halle@t-online.de

2424. Inoue, K. (2001): Non-contact sitting oviposition of *Sympetrum maculatum*. Sympetrum Hyogo 7/8: 2. (in Japanese with English summary). [*S. maculatum* fema-

les usually oviposit in tandem or single flight (non-contact flying oviposition), but a case of non-contact sitting oviposition was observed on October 20, 1990 at Sara Pond, Aonogahara, Ono City, Hyogo Prefecture, Japan. A few minutes later the female started to fly and oviposited in flight.] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

2425. Jakab, T.; Müller, Z.; Dévai, G. (2001): Quantitative survey of *Gomphus flavipes* (Charpentier, 1825) exuviae along River Tisza. Abh. Ber. Naturkundemus. Görlitz 73(1): 39. (in English with German summary). [In February 2000 accidentally cyanid-pollution penetrated the ecosystem of River Tisza, Hungaria. Along a 17 km stretch of this river *Stylurus flavipes* exuviae were sampled. Co-occurring species are *Ophiogomphus cecilia*, *Gomphus vulgatissimus*, *Platycnemis pennipes* *Calopteryx splendens*, *Ishnura elegans*, *Sympetrum vulgatum*, "*Cordulia aeneaturfosa*", and "*Crocothemis servilia*" (= *C. erythraea*). The author conclude that there was no negative influence of cyanid pollution resp. no drastic decrease in *S. flavipes* population.] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2426. Jeffries, M. (2001): The Northumbrian frontier of the Banded Demoiselle *Calopteryx splendens* (Harris). J. Br. Dragonfly Society 17(2): 55-58. (in English). [*C. splendens* is a species with a southern and midland distribution in England and Wales, declining in Yorkshire, and with an isolated northern outpost on the Solway Firth. More recent studies on the distribution of this species "show a stronger presence up through County Durham and one record north of the River Tyne in southern Northumberland. This paper describes the recent distribution of *C. splendens* within Northumberland (north of the River Tyne), from the time of its discovery in 1988. The extent of available habitat appearing suitable for further colonization is also considered." Address: Jeffries, M., Division of Geography and Environmental Management, Lipman Building, University of Northumbria, Newcastle upon Tyne, NE1 8ST, UK.

2427. Jödicke, R. (2001): Saisonale Einnischung von *Paragomphus genei* in Tunesien (Odonata: Gomphidae). *Libellula* 20(1/2): 13-22. (in German with English summary). ["On the basis of the seasonal pattern of emergence and the flying season the species can be best considered to be bivoltine. This life cycle is supposed to be typical of the West-Mediterranean populations; univoltinism may partly occur. In the southern oases a continuous emergence throughout the year was recorded, indicating a facultative multivoltinism." (Author)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

2428. Jones, C.D.; Burke, P.S.; Falls, J.B.; Oldham, M.J.; Sutherland, D.A. (2001): Additions to the Odonata list of Peterborough County, Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 44-47. (in English). ["Twelve new county records are reported for Peterborough County from the 1999 and 2000 field seasons, bringing the county list to a total of 96 species. Additions reported are: *Lestes eurinus*, *Amphiagrion saucium*, *Aeshna constricta*, *A. eremita*, *A. verticalis*, *Nasiaeschna pentacantha*, *Gomphus borealis*, *G. descriptus*, *Stylurus scudderi*, *Cordulegaster diastatops*, *Helocordulia uhleri*, and *Somatochlora*

franklini. In addition, the occurrence of *Lestes forcipatus* has been confirmed and another species, *Sympetrum costiferum*, which was inadvertently excluded from a published 1999 list is "officially" added here. Nine of these species are considered provincially rare. Notes on habitat, behaviour and relative abundance are provided for some species." (Authors)] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

2429. Jones, C.D. (2001): Book Review of "Dragonflies through Binoculars: A Field Guide to Dragonflies of North America". In: Catling, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 49-52. (in English). [Colin D. Jones reviews extensively Sid Dunkle's book "Dragonflies through Binoculars: A Field Guide to Dragonflies of North America Oxford University Press, New York. Softcover, 266 pages. US\$ 29.95 (ISBN 0-19-511268-7)". Special emphasize is given to the discussion of common - English - names of the dragonflies, and to the range maps of the species which are commentend and corrected - where necessary - in detail.] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

2430. Jones, C.D. (2001): *Somatochlora incurvata* (Incurvate Emerald) New to Algonquin Provincial Park, Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 2. Toronto Entomologist's Association, Toronto, Ontario: 47-48. (in English). ["*S. incurvata* [...] is reported from Algonquin Provincial Park, Ontario - representing the fourth location of this rare species in Ontario. With the inclusion of this species, the park's list of Odonata now stands at 99 species. The habitat is described as a sedge bog or poor fen, dominated by *Carex*, with *Sphagnum* and scattered clumps of *Chamaedaphne calyculata*. A female was observed ovipositing by dipping her abdomen into a shallow pool of water (30 x 30 cm) within the sedge-sphagnum mat." (Author)] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

2431. Kagimoto, B. (2001): The present state and the protection of the dragonfly, *Orthetrum poecilops miyajimaense* Yuki et Doi. *Nature and Insects* 36(7): 17-19. (in Japanese). [Introduction: *O. poecilops miyajimaense* is a rare species which inhabits only Miyajima in Hiroshima Prefecture in Japan, and is listed as an endangered species in RDB. This dragonfly was first discovered by Yuki, Jiro at Yamashiraura on Miyajima in 1936, and in 1955 by Dr. Sawano, Juzo it was rediscovered at the same point. After that the discovered spot had disappeared due to development. Also in Hiroshima Prefecture this species has been designated as a special wildlife species, which should be protected by the local governmental by law of Hiroshima. Collection of the species is prohibited and a violator will be sentenced to one year's penalty or fined 500 thousand yen. This species inhabit wetlands on the seashore, where rice grass, *Claudium chinense*, grows, and is rather tolerant of saline water. Development has been prohibited all over in Miyajima as a holy island, and the environment of the dragonfly has been preserved. The conditions of the environment for the species are as follows; (1) The wetland is always filled with spring water or by small streams which flow from the forests of the hinterland.

(2) The bed of the wetland is covered by the organic mud. (3) The sea water is quickly drained from the wetland. Only three well conditioned spots are left in the island. 1. Situation of the habitats: Habitat A: the southern limit on the island, which was pooled with sea water by the typhoon 19th of 1991 and the 18th in 1999 and damaged. The population decreased sharply. Habitat B: this habitat is located closely near to Habitat A, and rather well conditioned. Population is maintained in spite of the 19th typhoon. Habitat B: this habitat harbours the strongest population, and its ecological conditions are the best of the three locations 2. Measures for protection: The bylaw of prefectural government and municipal preservation activities for the habitats are helpful for the protection of the dragonfly. Also stock of larvae bred from eggs by members of Hiroshima Mushi no Kai has contributed to the increase of the population. 3. Prospect: The preservation of the habitats is most important. (1) Preservation of the forests of the hinterland. (2) Maintenance of shallow pools of sea water; drainage is important. (3) Precise investigation of the population size. (4) Preservation of the species from the view point all over the Inland Sea. Translation: Ishizawa, Naoya] Address: not stated

2432. Kalko, E. (2001): Bats gleaning dragonflies. *Argia* 13(1): 27. (in English). [Infrared filming of bats (*Micronycteris megalotis*) resulted that they prey using echolocation on sitting dragonflies] Address: Elisabeth.Kalko@biologie.uni-ulm.de

2433. Kamigaki, K. (2001): Intergeneric tandem of *Sympetrum frequens* male and *Pantala flavescens* female. *Sympetrum Hyogo* 7/8: 9. (in Japanese with English summary). [The intergeneric tandem was observed at Aonogahara, Ono City, Hyogo Prefecture, Japan on November 3, 2000. "They were flying swinging up and down, and perched on a grass on the margin of a pond, but flew away soon. They did not copulate during my observation."] Address: not stated

2434. Keil, R. (2001): Die Rolle von Libellen in der historischen Karpfenteichwirtschaft. *Abh. Ber. Naturkundes. Görlitz* 73(1): 41-43. (in German with English summary). ["Based on literature, considerations on the impact of carp farming on the occurrence and development of Odonata in historic fishery ponds are presented." (Author)] Address: Keil, R., Prof. Wagenfeld-Ring 102, D-02943 Weißwasser. E-mail: rene-keil@gmx.de

2435. Kerry, L. (2001): Habitat management for the Southern Damselfly *Coenagrion mercuriale* (Charpentier) on Aylesbeare Common, Devon. *J. Br. Dragonfly Soc.* 17(2): (in English). [A colony of *C. mercuriale* has been recorded intermittently at this site in low numbers since 1956. With the exception of 1986, when twelve individuals were recorded, the maximum count was four individuals for each year from 1977 to 1990. Two other colonies are present within 5 km of this site [...] Colaton Raleigh Common, has been recorded since 1963, with a maximum count of over 100 in 1986. [...] Venn Ottery Common, has been recorded since 1979, but only low numbers were recorded prior to the last sighting of a lone male in 1990. [...] The population of *C. mercuriale* at Aylesbeare Common has significantly increased since the advent of cattle grazing up to more than 300 specimens in 2001. "It is probable that the grazing is responsible for the increase in damselflies. Various factors may be important, for example the cattle poach the sub-

strate and create a mosaic of shallow pools; their droppings enrich the water; and their grazing alters the vegetation structure." The crucial parameter is unknown; therefore a PhD study will bring together the management regimes on other sites and establish the specific habitat requirements for *C. mercuriale*. "The future management at Aylesbeare will continue with light summer grazing, followed by brush cutting of small areas of Black Bog-rush (*Schoenus nigricans*) during the winter. The *C. mercuriale* population will continue to be monitored on a standard transect and the vegetation quadrats will be surveyed on a long-term basis." (Author)] Address: Kerry, L. Mount Pleasant, Stoneyford, Colaton Raleigh, Sidmouth, Devon EX 10 OHZ, UK

2436. Kitching, R.L. (2001): Food web in phytotelmata: "bottom-up" and "top-down" explanations for community structure. *Annu. Rev. Ent.* 46: 729-760, 1 Pl. excl. (in English). [The field study of food webs and the processes maintaining them is hampered by the sheer complexity and unreplicated nature of natural systems. The animal communities in phytotelmata, plant-held waters, are a convenient exception to this generalization. Tree holes, bamboo internodes, pitcher plants, tank bromeliads, and water-retaining plant axils contain a rich fauna, principally of arthropods, which constitute more or less complex, highly discrete food webs. They are widespread and replicated. The explanations for the community structure observed in these systems may call on "bottom-up" mechanisms such as simple environmental limitations, competition, predation, and facilitation, or they may adduce grander "top-down" theories, which explore biogeographic, energetic, dynamic, or biodiversity-related constraints. The existence of the bottom-up mechanisms is well established in experimental systems, and their consequences may be apparent in naturally occurring food webs. Top-down mechanisms demand a more holistic approach and are more difficult to test either by pattern analysis or experimental manipulation. The synoptic explanation of community composition and structure demands a multidimensional approach best expressed as a heuristic "template". Phytotelmata represent nearly ideal natural instruments for further study of food web dynamics, and exciting opportunities exist for the development and testing of community theories through their manipulation."] Address: Kitching, R., Aust. School Envir. Stud., Griffith Univ., Brisbane, Qld 4111, Australia

2437. Knaus, P.; Vorburger, C. (2001): Neuer Fundort von *Sympetma paedisca* in der Ostschweiz (Odonata: Libellulae). *Libellula* 20(1/2): 91-96. (in German with English summary). ["The species is threatened of extinction in Switzerland with the only actual breeding localities in the Valais and at Lake Constance (Untersee). We report on a new locality near St. Margrethen where *S. paedisca* was recorded regularly since 1994 in summer and autumn. Records derive from the northern slope of the »Heldsberg« at 420 - 440 m a.s.l., which is mainly covered with deciduous and coniferous forest. It is yet unclarified whether the species is autochthonous at the locality or whether the animals originated from the large population in the Rhine delta (Vorarlberg, Austria), approximately 5 km away." (Authors)] Address: Knaus, P., Schweizerische Vogelwarte, CH-6204 Sempach, Switzerland. E-Mail: peter.knaus@vogelwarte.ch

2438. Knijff, G. de (2001): *Leucorrhinia pectoralis* (Charpentier, 1825) in 2000 in Vlaanderen: terug van

weggeweest of toch nooit volledig verdwenen? *Gomphus* 17(1): 9-22. (in Dutch with English and French summaries). ["*L. pectoralis* in 2000 in Flanders: back again or never disappeared? The last observations of *L. pectoralis* in Flanders date back from 1989 and this was the reason to consider this species in the red list as 'extinct in Flanders'. In 2000 however, *L. pectoralis* was observed at 5 different localities and altogether 10 individuals were noted. At one site one tandem and a third individual were observed. All these sites are situated in the Campine (Kempen), 4 in the province of Antwerp (Kalmthout, Herentals and Mol, twice) and one in the province of Limburg (Opglabbeek). From those 5 sites, *L. pectoralis* had only been observed in the past in Opglabbeek. The habitats where *L. pectoralis* was observed in 2000 are an acidified fen (twice), a humic acid fen, a mesotrophic pond and a nutrient poor peatbog with seepage chalk water. All the observations of *L. pectoralis* in 2000 are situated between the 13th of May and the 11th of July. This corresponds completely with the old observations from Flanders. It is impossible to track the origin of the individuals seen in 2000. Considering the great distance (>150 km) to the known populations in Northwestern Europe and the fact that 10 individuals were seen within a time period of two months, we presume that at least the majority, if not all, of the individuals have emerged in Flanders and that there still exist one or more populations in Flanders. Extra arguments for this reasoning are the facts that the optimal habitat of *L. pectoralis* is only accessible with difficulty for men, the usually small number of individuals in a population and the short flying period. We suggest that the Red list status of *L. pectoralis* should now be considered 'Critically endangered' in Flanders." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

2439. Krech, M. (2001): Ein Beitrag zur Libellenfauna nordostdeutscher Regenhochmoore - Das NSG Gölde-nitzer Moor bei Cammin. (Landkreis Bad Doberan). Archiv Freunde Naturgeschichte in Mecklenburg 40: 161-172. (in German). [The Gölde-nitzer Moor is one of the classical odonatological localities in Germany (see W. Rabeler, 1931, who lists 20 species). Additional surveys in the 1980ies increased the species list, and today 39 species are known, 24 to be autochthonous. Bog species are well represented; the rare *Aeshna subarctica elisabethae* continuously is known from the 1920ies. Interesting is the reproduction of *Anax imperator* in an dystrophic water body. The bog is threatened by peat harvesting, melioration and succession of vegetation in the water bodies used for reproduction.] Address: Krech, M., Auf der Großen Mühle 7, D-99198 Erfurt, Germany

2440. Kreuz, P.; Arnold, W.; Kesel, A.B. (2001): Acoustic microscopic analysis of the biological structure of insect wing membranes with emphasis on their waxy surface. Annuals Biomedical Engineering 29(12): 1054-1058. (in English). ["The mechanical performance of natural materials depends on the type, and especially the composition of the molecular constituents. They are almost without exception composite materials, whose characteristics are determined by the characteristics of the individual constituents, their shape, their interaction, and in particular their orientation within the natural material. One of the most impressive natural composites is the insect cuticle. This lightweight building material im-

presses one with its ability to withstand extremely heavy loading. Even the ultrathin (3-10 µm) membranes of insect wings add greatly to the structural stability of the wings. By means of acoustic microscopy, the present study also shows that the thin covering of wax on the membrane is not an accidental material arrangement. Contrary to that of locust wings, dragonfly (*Aeshna cyanea*) wing membranes were found to have a criss-cross fiber-like density gradient within to the waxy layer. This density gradient proved to be mechanically relevant in stabilizing the wings." (Authors)] Address: Kesel, Antonia, Department of Zoology, Technical Biology and Bionics; University of Saarland; D - 66041 Saarbrücken. E-mail: a.kesel@rz.uni-sb.de

2441. Krüner, U. (2001): *Orthetrum brunneum* (Fonscolombe, 1837), ein fester Bestandteil der Libellenfauna in NRW?. Abh. Ber. Naturkundemus. Görlitz 73(1): 45-46. (in German with English summary). [A large breeding population of *O. brunneum* with more than a hundred individuals is reported from a location in Northrhine-Westfalia, Germany. The regional dispersion of the species, development of habitat parameters in the open drain of a hard coal dump since 1992, and conservation measure are briefly outlined.] Address: Krüner, Ulrike, Gelderner Str. 39, D-41189 Mönchengladbach, Germany. E-mail: kruener@t-online.de

2442. Kuhn, J. (2001): Prozessschutz versus Nutzung und Pflege: Probleme des Libellenschutzes in Mooren des süddeutschen Alpenvorlandes. Abh. Ber. Naturkundemus. Görlitz 73(1): 47-49. (in German with English summary). ["Process conservation versus use and maintenance: Problems of dragonfly conservation in bogs of the southern German prealpine district. - Several dragonfly species of prealpine mires (fens and bogs) in southern Germany largely depend on recent and/or historical land use by man (e.g. litter meadows, bog clearing, peat cutting by hand). Due to irreversible hydrological and trophic changes as well as for lack of exogenous dynamics, conservation of these species by means of 'process conservation' probably will not be successful. Problems of abandonment and management of 'semi-natural' man-made dragonfly habitats in mires are discussed." (Author)] Address: Kuhn, J., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82319 Seewiesen. E-mail: kuhn@mpi-seewiesen.mpg.de

2443. Kunz, B.; Kunz, D. (2001): *Lindenia tetraphylla*: Wiederfund für Nordafrika (Odonata: Gomphidae). Libellula 20(1/2): 79-85. (in German with English summary). ["After a period of more than 150 years the species has been recorded in the Maghreb again. The finding place is a reservoir in central Tunisia. The individuals observed were conspicuously dark. This fact is discussed to conform with the age colouration. We interpret our record as the result of an actual migration rather than a permanent occurrence. The possible origin and migration path of the individuals are discussed. The Tunisian checklist of dragonflies is thus enlarged to 53 spp." (Authors)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

2444. Kunz, B. (2001): Suchstrategien für in Baden-Württemberg (vermutlich) unterrepräsentierte Libellenarten. mercuriale 1: 4-8. (in German). [The following species are assessed as underrepresented in field

records of odonatologists: *Sympecma fusca*, *Coenagrion hastulatum*, *C. ornatum*, *Ischnura pumilio*, *Lestes virens*, *L. barbarus*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Onychogomphus forcipatus*. Information on tracing strategies are outlined with the aim to get a more realistic view of the current situation of the species in the Federal State Baden-Württemberg.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

2445. Kunz, B. (2001): Zum Kenntnisstand des aktuellen Fundortes der Vogelazurjungfer (*Coenagrion ornatum*). *mercuriale* 1: 24. (in German). [Status quo report of the small population of *C. ornatum* in the Federal State Baden-Württemberg, Germany.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

2446. Kurstjens, G. (2001): Lesser Emperor (*Anax parthenope*) found in Limburg. *Natuurhistorisch maandblad* 90: 94-95. (in Dutch with English summary). ["On 7 June 2000, *Anax parthenope* was observed in a brook valley near the Belgian-Dutch border at Kessenich-Thorn. This was the sixth observation of this rare dragonfly species recorded in the Netherlands. The occurrence of the specimen may have been due to the period of unusually hot weather from the end of April to mid-May. This observation fits into a pattern of increasing numbers in western Europe during the 1990s, when the species was also found in England and Belgium. In view of the current climate changes, the species might be expected to start breeding in the Netherlands in the near future, as has also been found for other southern insect and spider species." (Author)] Address: Kurstjens, G., Ecologisch adviesbureau, Col. Ekmanstr. 15, NL-6573 BM Beek-Ubbergen, The Netherlands

2447. Lafontaine, R.-M.; Goffart, P. (2001): Comptendu de l'excursion en Gaume de juillet 2000: le record n'est pas battu, mai il le sera bientôt *Gomphus* 17 (1): 51-53. (in French). [Belgium; 32 species were recorded on 22 July 2000 including *Sympecma fusca*, *Coenagrion scitulum*, *C. mercuriale*, *Ischnura pumilio*, *Somatochlora flavomaculata*, *Orthetrum brunneum*, and *O. coerulescens*] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

2448. Lafontaine, R.-M.; Knijf, G. de (2001): Libellules observées lors de l'excursion *Gomphus* en Lorraine française du 25 juin 2000. *Gomphus* 17(1): 54-55. (in French). [Documentation of records of 21 species including *Lestes virens*, *Erythronomus najas*, *Coenagrion pulchellum*, and *C. scitulum*. Records from 20-06-1999 (e.g. *Anaciaeschna isosceles*, *Leucorrhinia caudalis*) and 10-06-2000 (e.g. *Brachytron pratense*, *Coenagrion mercuriale*) are added.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

2449. Landesumweltamt Nordrhein-Westfalen (Hrsg.) (2001): Referenzgewässer der Fließgewässertypen Nordrhein-Westfalens. Teil 2: Mittelgroße bis große Fließgewässer - Gewässerabschnitte und Referenzstrukturen. Merkblätter des Landesumweltamt Nordrhein-Westfalen 29. 247 pp. (in German). [42 stretches of running waters in the Federal State Nordrhein-Westfalen, Germany are characterised and documented in detail; such stretches with reference character can

serve to develop so called "Leitbilder" (strategic models, ecological goal functions) for revitalisation measures along additional stretches of the same water or comparable waters in the catchment area. Macrozoobenthos of the stretches is also compiled including odonate taxa, in most cases *Calopteryx virgo*, *C. splendens*, *Platycnemis pennipes*, and *Gomphus vulgatissimus*. *Onychogomphus forcipatus* is documented for the river Eder. *Ischnura elegans*, *Coenagrion puella*, *Pyrrhosoma nymphula*, and *Chalcolestes viridis* are documented for a few rivers with slow current.] Address: Landesumweltamt NRW, PF 102363, D-45023 Essen, Germany

2450. Legrand, J. (2001): *Malgassophlebia mayanga* (Ris, 1909) et une nouvelle espèce du genre à Madagascar (Odonata, Anisoptera, Libellulidae). *Revue Française d'Entomologie (Nouvelle Série)* 23(4): 225-236. (in French with English summary). [Male, female, and last instar larvae of *Malgassophlebia mayanga* (Ris 1909) are redescribed. Male, female, and last instar larvae of *Malgassophlebia mediodentata* n.sp. (holotype male, allotype female, 7/XI/1998, Bassin du Rianila, 15 km east of Morarano, Madagascar) are described. Both species are illustrated and compared in detail. Larval characters, allied species, biology, and distribution are briefly discussed.] Address: Legrand, J., 10, rue du Chemin de fer, F-94110 Arcueil, France

2451. Leipelt, K.G.; Schütte, C.; Suhling, F. (2001): Neue Daten zur Larvalökologie von *Macromia splendens* (Odonata: Macromiidae). *Libellula* 20(1/2): 1-11. (in German with English and French summaries). ["At the end of July, 1998, in mid July, 1999, and in mid June, 2000, a total of 67 larvae was recorded at a section of about 100 m in length at the Garden de Mialet in the mountain range of the Cevennes, southern France. Only one larval generation, comprising up to four different stadia was found during June and July. Another generation was on the wing, the third was in the egg stage. Therefore the duration of larval development is considered to last two years in that region. All larvae were found in reaches where the water current was hardly noticeable: We recorded 53 larvae at sandy patches in shallow water near the river margin, five in deposits of a mixture of twig, leaf and fine detritus, and nine on bedrock in about 1 m water depth. In other microhabitats like alder roots, gravel and boulder no larvae were found." (Authors)] Address: Leipelt, K.G., Zoologisches Institut -Ökologie-, Technische Universität Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-Mail: k.leipelt@tu-bs.de

2452. Leipelt, K.G.; Sommer, R.; Martens, A. (2001): Territorialität bei *Oxygastra curtisii* (Odonata: Corduliidae). *Libellula* 20 (3/4): 155-170. (in German with English summary). ["In the Cevennes mountains, southern France, males patrolled continuously at 6-15 m long stretches at the river margin. They defended their territories against conspecific males. In the territories patrol flights of individual marked males lasted between less than one and up to 28 minutes. Within one hour males patrolled in up to four different territories." (Authors) In addition information on habitat preference and activity patterns in relation to temperature and rain of *Boyeria irene* are given.] Address: Leipelt, K.G., Zool. Inst. -Ökologie-, Technische Universität Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-Mail: k.leipelt@tu-bs.de

- 2453.** Lenk, P. (2001): Libellenbeobachtungen in der Kahler Seenlandschaft. Unser Kahlgrund. Heimatjahrbuch für den ehemaligen Landkreis Alzenau. 2002: 68-76. (in German). [Germany, Bavaria; 26 odonate species could be observed between 1999 and 2001. Habitats are in most cases brown coal mining waters and sand pits. Records of *Anaciaeschna isoceles*, *Anax parthenope*, *Brachytron pratense*, and *Crocothemis erythraea* are of some interest. The negative impact of carp and swans on vegetation and Odonata is briefly discussed.] Address: Lenk, P., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany. E-mail: p-lenkr@hlmd.de
- 2454.** Lett, J.-M.; Cloupeau, R.; Pratz, J.-L.; Male-Malherbe, E. (2001): Liste commentée des odonates de la région Centre (Département du Cher, de l'Eure-et-Loir, de l'Indre, de l'Indre-et-Loire, du Loir-et-Cher et du Loiret). *Martinia* 17(4): 123-168. (in French with English summary). [Published data, data from the French mapping programme of Odonata and observations of the authors are compiled. 34 of the 68 species known to be represented in the region (62 species between 1990 and 2001) are commented in detail and the distribution 28 species is mapped: *Lestes dryas*, *Platynemesis acutipennis*, *Coenagrion mercuriale*, *C. ornatum*, *C. pulchellum*, *C. scitulum*, *Ischnura pumilio*, *Aeshna grandis*, *Anaciaeschna isoceles*, *Anax parthenope*, *Boyeria irene*, *Brachytron pratense*, *Stylurus flavipes*, *Gomphus graslinii*, *Onychogomphus uncatius*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Epithea bimaculata*, *Oxygastra curtisii*, *Somatochlora flavomaculata*, *S. metallica*, *Leucorrhinia caudalis*, *L. pectoralis*, *Libellula fulva*, *Sympetrum danae*, *S. fonscolombii*, *S. meridionale*, and *S. vulgatum*.] Address: Lett, J.-M., 1, les Cosses, F-41320 Saint-Loup-sur-Cher, France
- 2455.** Lett, J.-M. (2001): Première donnée de *Coenagrion ornatum* (Sélys, 1850) dans la région Centre, département du Cher (Odonata, Zygoptera, Coenagrionidae). *Martinia* 17(3): 94. (in French). [29 June 2001 the rare *C. ornatum* was recorded at Neuvy-le-Barrois situated near Sancoins, France (catchment of river Allier). The habitat is described, and the regional distribution of the species is outlined. *C. mercuriale* is also well represented in the habitat.] Address: Lett, J.-M., 1, les Cosses, F-41320 Saint-Loup-sur-Cher, France
- 2456.** Levasseur, M.; Dommange, J.-L. (2001): *Martinia*. Index 1985-2000. *Martinia* 17 (Suppl. 1): 44 pp. (in French). [The issues of the odonatological journal *Martinia* issued between 1985 and 2000 are indexed in detail: dates of release, bibliography, geographic index (Départements), index of species, (a few) key words.] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 2457.** Lohr, M.; Mitzka, H.-D. (2001): Die Libellenfauna der Weserrandsenke "Taubenborn" bei Höxter (Insecta: Odonata). Eine Dokumentation von Bestandentwicklungen am Beispiel der Libellen zwischen 1989 und 2001. *Egge-Weser* 14: 31-50. (in German). [29 odonate species are documented from several water bodies in the floodplain of river Weser, Nordrhein-Westfalen, Germany. Habitat parameters (vegetation) and species composition of the waters are documented in tables and discussed in detail. Regional development of species composition over a period of 12 years is outlined as well as range extensions are discussed. Of some interest are notes on the occurrence of some Mediterranean species and *Brachytron pratense*, and dynamic of population fluctuation of *Sympetrum flaveolum*. The habitat is assessed as one of the most important regional habitats.] Address: Lohr, M., An der Kirche 22, D-37671 Höxter, Germany. E-mail: mlohr@fh-hoexter.de
- 2458.** Male-Malherbe, E.; Caupenne, M. (2001): Le point sur six odonates remarquable de Brenne (département de l'Indre). *Martinia* 17(3): 111-114. (in French with English summary). [France; records of *Coenagrion mercuriale*, *Anax parthenope*, *Epithea bimaculata*, *Leucorrhinia caudalis*, *L. pectoralis*, and *Sympetrum danae* are discussed.] Address: Male-Malherbe, E., 38, La Gabrière, F-36220 Lingé, France
- 2459.** Manach, A. (2001): Atlas préliminaire des Odonates de Bretagne (Région administrative: départements des Côtes-d'Armor, du Finistère, de l'Ille-et-Vilaine et du Morbihan). *Martinia* 17 (Suppl. 2): 3-60. (in French with English summary). [Distribution maps for each of the 54 Odonata taxa recorded in the Brittany region (France) are presented. The paper also includes eight colour plates with some regionally remarkable or rare species.] Address: Manach, A., 11, rue d'Ouesant, F-29200 Brest, France
- 2460.** Marden, J.H.; Fitzhugh, G.H.; Girgenrath, M.; Wolf, M.R.; Girgenrath, S. (2001): Alternative splicing, muscle contraction and intraspecific variation: associations between troponin T transcripts, Ca_{2+} sensitivity and the force and power output of dragonfly flight muscles during oscillatory contraction. *J. Exp. Biol.* 204(20): 3457-3470. (in English). ["The flight muscles of *Libellula pulchella* dragonflies contain a mixture of six alternatively spliced transcripts of a single troponin T (TnT) gene. Here, we examine how intraspecific variation in the relative abundance of different TnT transcripts affects the Ca_{2+} sensitivity of skinned muscle fibers and the performance of intact muscles during work-loop contraction regimes that approximate in vivo conditions during flight. The relative abundance of one TnT transcript, or the pooled relative abundance of two TnT transcripts, showed a positive correlation with a 10-fold range of variation in Ca_{2+} sensitivity of skinned fibers ($r(2)=0.77$, $P < 0.0001$) and a threefold range in peak specific force ($r(2)=0.74$, $P < 0.0001$), specific work per cycle ($r(2)=0.54$; $P < 0.0001$) and maximum specific power output ($r(2)=0.48$, $P=0.0005$) of intact muscle. Using these results to reanalyze previously published data for wing kinematics during free flight, we show that the relative abundances of these particular transcripts are also positively correlated with wingbeat frequency and amplitude. TnT variation alone may be responsible for these effects, or TnT variation may be a marker for changes in a suite of co-regulated molecules. Dragonflies from two ponds separated by 16 km differed significantly in both TnT transcript composition and muscle contractile performance, and within each population there are two distinct morphs that showed different maturational trajectories of TnT transcript composition and muscle contractility. Thus, there is broad intraspecific variability and a high degree of population structure for contractile performance phenotypes, TnT ribotypes and ontogenetic patterns involving these traits that affect locomotor performance." (Authors)] Address: Marden, J.H., Dept Biol., Pennsylvania St. University,

208 Mueller Laboratory, University Park, PA 16802, USA

2461. Marinov, M. (2001): Review of *Hemianax ephippiger* (Burm.) records from Bulgaria (Anisoptera: Aeshnidae). *Notul. odonatol.* 5(8): 105-106. (in English). [Compilation of Bulgarian records of *A. ephippiger*; the author tentatively postulates that one of the East Mediterranean migration routes of the species leads along the Black Sea coast.] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

2462. Martens, A. (2001): Buchbesprechung: Sternberg, K. & R. Buchwald (Eds.): *Die Libellen Baden-Württembergs*. Band 2. Ulmer. Stuttgart. ISBN 3-8001-3514-0. *Lauterbornia* 41: 184-185. (in German). [Review of this outstanding book on central and west European Anisoptera.] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: andreas.martens@tu-bs.de

2463. Martens, A. (2001): Experimente zur Sitzplatzwahl von *Onychogomphus forcipatus forcipatus* (L., 1758). *Abh. Ber. Naturkundemus. Görlitz* 73(1): 51. (in German with English summary). ["At the rendezvous males prefer stones as perches. Discrimination experiments with pairs of substrates showed that males land preferentially on perches that correspond in height to the flight level of females appearing at the water. When they first landed males preferred perches in the middle of the stream, but afterwards they used perches near the stream margin. The results are interpreted in terms of early recognition of females and rapid formation of tandem linkage." (Author)] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: andreas.martens@tu-bs.de

2464. Mauersberger, H.; Mauersberger, R. (2001): Hornisse *Vespa crabro* als Prädator von *Aeshna cyanea* (Hymenoptera: Vespidae; Odonata: Aeshnidae). *Libellula* 20(1/2): 87-89. (in German with English summary). [Germany, Brandenburg. "A worker of *Vespa crabro* caught a fully active male of *A. cyanea* at a sunny day. During the fight the dragonfly was often stung and then decapitated. The large wasp removed the whole dragonfly body piece by piece." (Authors)] Address: Mauersberger, R., Waldstr. 4, D-16278 Steinhöfel, Germany

2465. Mauersberger, R.; Petzold, F. (2001): Seen als Habitate für *Onychogomphus forcipatus forcipatus* (L.) im Jungpleistozängebiet Nordost-Deutschlands. *Abh. Ber. Naturkundemus. Görlitz* 73(1): 53-55. (in German with English summary). ["The occurrence, distribution, phenology and abundance of *O. forcipatus* are described, along with a brief characterisation of the northeast German lake district as a habitat for *O. forcipatus*." (Authors)] Address: Mauersberger, R., Waldstr. 4, D-16278 Steinhöfel, Germany. E-mail: FoerderevereinUeckermark.Seen@t-online.de

2466. Mikolajewski, D.-J. (2001): Dornenausbildung bei Larven der Gattung *Sympetrum* (Odonata: Anisoptera): Induzierbarer Schutz gegen Fischprädation. *Abh. Ber. Naturkundemus. Görlitz* 73(1): 59-61. (in German with English summary). ["Effects of chemical cues by fish on the shape of abdominal spines of *S. sanguineum* and *S. vulgatum*: Inducible defence against predation. - The question whether the presence of fish has an influence on the shape of the abdominal spines was

tested in non-lethal laboratory experiments and field studies. It was shown that the presence of fish induced an increase of spine length and the distance between the dorsal spines on the abdomen in both species. The results are interpreted as an inducible morphological defence against fish predation." (Author)] Address: Mikolajewski, D.-J., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.mikolajewski@tu-bs.de

2467. Moroz, M.; Czachorowski, S.; Lewandowski, K. (2001): Aquatic insects (Insecta: Ephemeroptera, Odonata, Heteroptera, Trichoptera) of the Bieriezinsky Biosphere Reserve. *Parki Narodowe i Rezerwy Przyrody* 20(4): 75-81. (in Russian with Polish and English summaries). [Belorussia; between 1997 and 2000 the valley of river Berezyna was surveyed. 44 species are traced, among them *Calopteryx splendens*, *Platycnemis pennipes*, *Erythromma najas*, *Stylurus flavipes*, *Gomphus vulgatissimus*, *Aeshna grandis*, *Sympetrum flaveolum*, and *S. sanguineum*.] Address: Moroz, M., Inst. Zool., Belarussian Academy of Sciences, Akademicheskaja 27, Minsk 220072, Belarus

2468. Moskowitz, D.; Moskowitz, J.; Moskowitz, S.; Moskowitz, H. (2001): Notes on a large dragonfly and butterfly migration in New Jersey. *Northeastern Naturalist* 8(4): 483-490. (in English). ["We report our observations of a large migratory flight of monarch butterflies (*Danaus plexippus* L.) and dragonflies (*Anax junius* Drury, *Tramea lacerata* Hagen) in central New Jersey and review what is currently known about these migratory movements in eastern North America. The migration followed the passage of Hurricane Floyd, one of the strongest coastal storms to cross New Jersey during the twentieth century. Our observations suggest that weather conditions associated with this storm may have signaled the onset of the migration we recorded." (Authors)] Address: Moskowitz, D., EcolSci Inc, 75 Fleetwood Dr, Rockaway, NJ 07866 USA

2469. Müller, J.; Steglich, R. (2001): Zum aktuellen Vorkommen der Flußjungfern (*Gomphus* et *Ophiogomphus* - Odonata) in der Elbe Sachsen-Anhalts. *Entomol. Nachr. Berichte* 45(3/4): 145-150. (in German with English summary). [*Ophiogomphus cecilia*, *Stylurus flavipes*, and *Gomphus vulgatissimus* are assessed to be well suitable bioindicators to monitor habitat development in the special protected site according the European Fauna-Flora-Habitat-Directive. The distribution of the species along the River Elbe is documented on the basis of a grid map.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.Jmueller@t-online.de

2470. Müller, J.; Steglich, R. (2001): Zur Indikation der "FFH-Tauglichkeit" der Elbe durch die Flußjungfern (*Gomphidae*). *Abh. Ber. Naturkundemus. Görlitz* 73(1): 59-61. (in German with English summary). ["Gomphids as indicators for FFH classification of the Elbe River. - The occurrences of *Ophiogomphus cecilia*, *G. (Stylurus) flavipes*, and *G. vulgatissimus* in the Elbe River are of superregional importance and allow areas along the Elbe to be placed in proposed Sites of Community Interest (pSCI of FFH-GL)." (Authors)] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

2471. Müller, J.H. (2001): Neue Erkenntnisse zu Ökologie und Verbreitung der Sibirischen Azurjungfer *Coe-*

nagrion hylas. mercuriale 1: 9-12. (in German). [This is a compilation of the significant results of an extensive study (see OAS 2171) of the most rare damselfly of central Europe. Reproduction habitat, hunting habitat (up to 500 m away from reproduction habitat), diurnal activity rhythms, emergence curve, and phenology of the species are outlined. The significant increase of knowledge on ecology of the extremely rare species enlarges the chance to preserve it in central Europe. Conservation measures are developed in the framework of a LIFE-project financed by the EU and realised by WWF-Austria.] Address: Müller, J.M., Goethestr. 25, D-89601 Schelklingen, Germany. E-mail: Libellen@Jo-chen.de

2472. Müller, O.; Müller, B. (2001): Armeleuchteralgen als Substrat für Larven von *Onychogomphus forcipatus* (Odonata: Gomphidae). *Libellula* 20(1/2): 69-78. (in German with English summary). ["In an oligotrophic mining lake in Brandenburg, Germany, larvae of *O. f. forcipatus* were found in pads of the Common Stonewort *Chara contraria* (Charophyceae: Characeae). Under laboratory conditions, given the choice between stoneworts and bare sand the larvae preferred stoneworts significantly, but they showed no significant preference when the sand was covered by detritus. The pads provide different microhabitats for larvae of gomphid dragonflies. Under artificial conditions in the laboratory, *O. forcipatus* larvae were usually found buried in the basal layer which consist of rotting material and *Chara* rhizoids. Some larvae were also recorded sitting in the *Chara* thalli and waiting for prey. The use of different microhabitats is interpreted as an anti-predator behaviour and adaptive behaviour to improve the efficiency of hunting as well." (Authors)] Address: Müller, O., Birkenweg 6d, D-13206 Libbenichen, Germany. E-mail: olemueller@freenet.de

2473. Müller, O.; Müller, B. (2001): Sand oder Algen? Habitatwahlverhalten der Larven von *Onychogomphus f. forcipatus* (L., 1758). *Abh. Ber. Naturkundemus. Görlitz* 73(1): 63. (in German with English summary). ["In an oligotrophic mining lake in Brandenburg, larvae of *Onychogomphus f. forcipatus* were found in pads of the stonewort *Chara contraria* (Charophyceae: Characeae). Habitat selection experiments showed that *O. forcipatus* prefers algal pads to bare sand. The use of different microhabitats in the pads is interpreted as an anti-predator behaviour and as an adaptive behaviour to improve the efficiency of hunting." (Authors)] Address: Müller, O., Birkenweg 6d, D-13206 Libbenichen, Germany. E-mail: olemueller@freenet.de

2474. Müller, Z.; Jakab, T.; Szállassy, N. (2001): Faunistic data on dragonflies (Odonata) from the inundation area of River Tisza between Tiszabercel and Balsa. *Studia odonatol. hung.* 7: 39-58. (in Hungarian with English summary). [Hungary; in 1998 and 1999, 22 localities were surveyed for their Odonata. A total of 34 species were recorded. The species list include *Brachytron pratense*, *Epitheca bimaculata*, and *Stylurus flavipes*.] Address: Müller, Z., Dept of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2475. Müller, Z.; Jakab, T.; Devai, G.; Szállassy, N. (2001): The effect of habitat degradation on dragonfly assemblages on the floodplain of the River Tisza. *Abh. Ber. Naturkundemus. Görlitz* 73(1): 65-66. (in English with German summary). [The floodplain of River Tisza

including many backwaters plays an important role as a core area in the conservation of biodiversity in Hungary. In spite of this these water bodies are effected by numerous unfavourable human impacts (intense agricultural, forestry and angling utilisation). The aims of the study (conducted 1998 and 1999) were to answer the questions: (i) how biotope and habitat differences caused by the different intensity of angling are related and (ii) what kind of connection exists between the intensity of angling and some variables of dragonfly assemblages: "(i) the presence-absence data of dragonfly species show that habitat-level differences caused by the different intensity of angling within a specific water body can exceed biotope-level differences among water bodies of different types, (ii) the species number of dragonfly assemblages and the summarised data number relative abundance of the 5 rarest species of the floodplain section decrease parallel with the increase in the intensity of angling utilisation according to linear relation, at the same time the summarised data number relative abundance of the 5 most frequent species increases."] Address: Müller, Z., Dept of Ecol., Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2476. Nawroth, J. (2001): Libellen an der lykischen Küste (Türkei). *Naturkundliche Beiträge des Deutschen Jugendbund für Naturbeobachtung* 34: 3-4. (in German). [Some notes from a travel along the lykian coast (Turkey). Some odonate species are referred, but no localities are given. None of the specimens was collected, and all identifications are doubtful due to insufficient identification literature used.] Address: Nawroth, Janna, Johann-Fischer-Str. 21, D-69121 Heidelberg, Germany

2477. Nel, A.; Bethoux, O.; Bechly, G.; Martinez-Delclos, X.; Papier, F. (2001): The Permo-Triassic odonoptera of the "protodonate" grade (Insecta: Odonoptera). *Ann. Soc. Entomol. Fr.* 37(4): 501-525. (in English with French summary). ["We describe a new fossil dragonfly *Permophlebia uralica*, gen. n., sp. n. that we attribute to a new family *Permophlebiidae*. Several Permo-Triassic odonate taxa are redescribed, viz. the taxa of the family *Triadotypidae*, and the genera *Kargalotypus* Rohdendorf, 1962, and *Liadotypus* Martynov, 1937. Their phylogenetic positions are discussed, and some earlier taxonomic decisions re-evaluated. The *Piroutetiidae* Nel, 1989 is transferred in the *Triadophlebiomorpha*, superfamily undetermined sit. nov. The *Kargalotypidae* Zessin, 1983 is transferred in the *Triadophlebiomorpha*: *Zygophlebiida* sit. nov. The *Liadotypidae* Grauvogel & Laurentiaux, 1952 (non Martynov, 1937) is transferred in the *Isophlebiida* sit. nov. family incertae sedis stat. nov. The cladistic analysis of the *Zygophlebiida* (new clade) is proposed." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

2478. Nielsen, O. F. (2001): *Anax imperator* - records in Denmark in the period 1994 - 2000. *Nord. Odonat. Soc. Newsl.* 7(1): 12-13. (in Danish with English summary). ["*A. imperator* was first recorded in Denmark in 1994, in SW-Jylland (Jutland). Later the species has been found at several new localities, also at the islands Fyn and Sjælland. It is now known from seven localities, both lakes poor on nutrients and richer ponds and lakes." (Author)] Address: Nielsen, O.F., Tulstrupvej 112, DK-8680 Ry, Denmark

- 2479.** Nielsen, O. F. (2001): *Ischnura pumilio* - a description of the larva and a comparison with the larva of *Ischnura elegans*. Nord. Odonat. Soc. Newsl. 7(1): 14. (in Danish with English summary). ["8 larvae of *I. pumilio* from the Ry area were hatched under controlled conditions in 1999, 10-13 days after they were collected 8 April. Nordic larvae of *I. pumilio* have not been described before, so a short description is given here. Most of these exuviae and also a number of larvae were pale (reddish yellow, pale brown), some darker brown or almost black. Femura without dark ring. Gills pale with pale or reddish brown trachea. Weak contrast between trachea and the rest of the gill, few and sparsely branched side-trachea. Gills with long pointed tips, the white tip clearly visible in 10x magnification." (Author)] Address: Nielsen, O.F., Tulstrupvej 112, DK-8680 Ry, Denmark
- 2480.** Nielsen, O. F. (2001): Surveillance of 6 of the red-listed dragonflies in Denmark. Nord. Odonat. Soc. Newsl. 7(1): 6-10. (in Danish with English summary). ["The situation for six of the red-listed dragonfly species in Denmark the last ten years is surveyed and discussed. *Coenagrion armatum* (E) has disappeared at the old localities that have been investigated, and is only known from three localities in the last decade. *Aeshna viridis* (V) still seems to be present at a few localities in two areas, and is also recorded more accidentally (?) in other places. *Ophiogomphus cecilia* (R) still occurs in fairly good numbers in three of the four river systems where it has been recorded. *Libellula fulva* (E) is still living in good numbers at four clean lakes and one stream. Only one female of *Orthetrum coerulescens* (E) has been seen in Denmark since 1935, in 1991, but a possible occurrence could not be confirmed in the investigations of the last years. *Leucorrhinia pectoralis* (E) has only been found present at four of the about twenty previous known localities.] Address: Nielsen, O.F., Tulstrupvej 112, DK-8680 Ry, Denmark
- 2481.** Nikula, B.J.; Sones, J.L.; Trimble, J.R. (2001): New and notable records of Odonata from Massachusetts. Northeastern Naturalist 8(3): 337-342. (in English). [The occurrence of six species of Odonata previously unknown from Massachusetts, USA is documented: *Ischnura prognata*, *Aeshna subarctica*, *Somatochlora incurvata*, *Gomphaeschna antilope*, *Libellula axilena*, and *Tamea calverti*. Four of these species were unknown from New England prior to 1995. Additionally, recent records of *Somatochlora georgiana* and *Sympetrum corruptum*, two species rarely recorded from New England, are discussed.] Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. E-mail: odenews@capecod.net
- 2482.** Nishu, S. (2001): *Aeshna mixta soneharai* caught in Toyano-gata Pond, Niigata Prefecture. *Sympetrum Hyogo* 7/8: 23. (in Japanese with English summary). [Japan; the first regional records of *Aeshna mixta soneharai* are documented.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net
- 2483.** Nishu, S.; Azuma, T. (2001): Northern record of *Ictinogomphus pertinax* in the southern part of Hyogo Prefecture. *Sympetrum Hyogo* 7/8: 22-23. (in Japanese with English summary). [Eleven new habitats of this southern species were discovered in 2000. The habitats include two in Ono City which are the northernmost record in Hyogo Prefecture, Japan.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net
- 2484.** Nishu, S. (2001): Record of the odonate fauna of Dragonfly Pond in Kyoto Gyo-en, Kyoto Prefecture. *Sympetrum Hyogo* 7/8: 74-75. (in Japanese with English summary). ["The so-called Dragonfly Pond in Kyoto Gyo-en was built in 1994 or 1995, and a survey on the odonate fauna was made on March 6, 1997 by four members including the author. Larvae of four species including *Libellula quadrimaculata asahinai*" which is an addition to the twenty recorded by Tsukamoto et al. (1995). Deep shading by *Nelumbo nucifera* is responsible for the poor odonate fauna at the pond.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net
- 2485.** Nishu, S. (2001): Report of the survey trips of the Hyogo Society of Odonatology in 1999. Part 1 focused to *Libellula angelina*. *Sympetrum Hyogo* 7/8: 53-56. (in Japanese with English summary). ["Survey trips [...] were held on April 29, May 2 and May 15, 1999 at Sara Pond in Ono City, Japan, but no *angelina* was found. On the contrary, about one hundred *angelina* were found at a pond in Kasai City on May 15, 1999. This pond had been inhabited by a good number of *angelina* before 1996, but the population was destroyed by the civil works which destroyed the bank and the water was removed for a few years." The origin of the immigrating specimens is not known.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net
- 2486.** Nishu, S. (2001): Report of the survey trips of the Hyogo Society of Odonatology in 1999. Part 2 focused to *Mortonagrion hirosei* and *Stylurus ngoyanus*. *Sympetrum Hyogo* 7/8: 57-61. (in Japanese with English summary). [Both species were surveyed during June 26-27 visiting Momoshima Pond and its vicinities, Funa-machi, Toyo-oka City along Maruyama River and Izushi-cho along Izushi River, Japan. Abundance of adult *M. hirosei* was quite low, but the larval population was high, presumably due to the visit in the early season of the species. 19 exuviae of *S. ngoyanus* were found at the bank of Maruyama River some 7 km downstream of the oviposition sites. This is the first discovery of the emerging site of this species in Hyogo Prefecture. Tables with localities and accompanying species are included in this paper.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net
- 2487.** Nishu, S. (2001): Report of the survey trips of the Hyogo Society of Odonatology in 2000. Part 1 focused to *Libellula angelica*. *Sympetrum Hyogo* 7/8: 62-66. (in Japanese with English summary). [*L. angelina* was surveyed on April 30, May 14 and 21, 2000 at some localities including the Pond A, B and C in Kasai City, with a strong population of the species. The author takes it for very likely "that females judge whether a pond is suitable for larval growth or not, and they will not be attracted by males in their territory if females judge negatively." Sara Pond was also surveyed, but no *angelina* was found in 2000.] Address: Nishu, S., 247 Gunge

Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2488. Nishu, S. (2001): Report of the survey trips of the Hyogo Society of Odonatology in 2000. Part 2 focused to *Chlorogomphus brunneus costalis*. *Sympetrum Hyogo* 7/8: 67-69. (in Japanese with English summary). ["Four localities in Tokushima Prefecture were visited by members of the Hyogo Society of Odonatology during June 24-25, 2000. Larvae, exuviae and imagoes of *C. brunneus costalis* were found at two localities, and those of *Rhipidolestes hiraoui* were found at three localities." To trace *Chlorogomphus* in the southern part of Awaji Island failed.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2489. Nishu, S. (2001): Report of the survey trips of the Hyogo Society of Odonatology in 2000. Part 3 focused to *Mortonagrion Hirosei* and *Stylurus nagoyanus*. *Sympetrum Hyogo* 7/8: 71-73. (in Japanese with English summary). ["Many imagoes and larvae of *M. Hirosei* were found at Momoshima Pond on July 15 and 16, 2000. The pond was partly filled up by the construction civil works of a sewage treatment plant, but it is proved that the habitat of this coenagrionid damselfly was not influenced. Exuviae and emergence of *S. nagoyanus* were observed at the bank of Maruyama River and exuviae of this species were found also at Izushi River." (Author)] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2490. Nishu, S. (2001): *Tramea virginia* observed at the Expo Site of Japan Flora 2000. *Sympetrum Hyogo* 7/8: 21. (in Japanese with English summary). [*T. virginia* was found at a newly constructed pond at the Expo Site of Japan Flora 2000 on August 25, 2000. This southern species is considered not established in Hyogo Prefecture.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

2491. Norma-Rashid, Y.; Mohd-Sofian, A.; Zakaria-Ismail, M. (2001): Diversity and distribution of Odonata (dragonflies and damselflies) in the fresh water swamp lake Tasek Bera, Malaysia. *Hydrobiologia* 459: 135-146. (in English). ["Fifty-nine species of Odonata were collected in a recent study in the freshwater swamp lake of Tasek Bera, Peninsular Malaysia, in contrast to 33 species that were recorded previously from the Ramsar site. This study added 35 species to the odonate records and together with the museum records, the number of species for the site now stands at 78 from 12 families. The causal factors for the absence of 19 species and other biological aspects such as habitat clustering and temporal activity profile were discussed." (Authors)] Address: Norma-Rashid, Y., Univ. Malaysia, Fac. Sci., Inst. Biol. Sci., Kuala Lumpur 50603, Malaysia

2492. Ochsner, E. (2001): Libellen - Kleinodien unserer Gewässer. *Insektenkurier* 70: 28-33. (in German). [This popular, but well written introduction into dragonflies is published in a journal of stamp collectors with interest in insects. The paper is illustrated with stamps from different countries showing dragonflies. A checklist of German dragonflies is appended.] Address: Ochsner, E., Schulstr. 4, CH-8640 Rapperswil, Switzerland

2493. Ochsner, E. (2001): Plattbauch-Segellibelle - Insekt des Jahres 2001. *Insektenkurier* 70: 27. (in German). [*Libellula depressa* was elected the "Insect of the year 2001"; the author introduces into several aspects of this dragonfly with special emphasize to the name, habitat, and habits. Because the 'Insektenkurier' is a journal for stamp collectors with interest in insects, the species is illustrated by a stamp issued by the German Bundespost in 1991.] Address: Ochsner, E., Schulstr. 4, CH-8640 Rapperswil, Switzerland

2494. Oda, I. (2001): Some observations on the behaviour of *Sympetrum frequens*. *Sympetrum Hyogo* 7/8: 50-53. (in Japanese with English summary). [During a stay at a hospital in Yonago City, Tottori Prefecture, Japan during October 17-31, 1999, the behaviour of *S. frequens* was observed. The Yone River was degraded to a concrete channel, but after flooding it with water ("First stage"), tandems of this species passed over the river, but without taking any attention. When the water table diminished to 3 to 4 cm depth and current velocity receded to zero ("Second stage"), "some pairs came down, but flew away, while the other pairs passed by without attention". When the water table diminished more strong, leaving only splashes ("Third stage"), 100% of tandems used it for oviposition. [...] "Two modes of oviposition were recognized based on 11 cases in which tandem pairs visited Yone River. One is called "tentative oviposition" and another "substantial oviposition". In tentative oviposition pairs oviposit slowly for a short while, then they copulate and oviposit again. In substantial oviposition pairs oviposit rapidly for a longer while, and they separate after oviposition, sitting separated without paying any attention to the former partner.] Address: not stated

2495. Olsvik, H. (2001): From the meeting in Skane in August 2000. *Nord. Odonat. Soc. Newsl.* 7(1): 15-16. (in Norwegian). [The 6th nordic Odonata meeting was held in Scania, Sweden from 4 to 6th August 2000. Some photos of give an impression of the meeting. Odonate species recorded at three localities in the framework of the meeting are listed. The list includes species as *Coenagrion lunulatum*, *Aeshna viridis*, *Somatochlora flavomaculata*, *Orthetrum cancellatum*, and *Leucorrhinia albifrons*.] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

2496. Olsvik, H. (2001): Late dragonflies and new autumn extremes in More and Romsdal 2000. *Nord. Odonat. Soc. Newsl.* 7(1): 17. (in Norwegian with English summary). ["New national late extremes were recorded for *Pyrrhosoma nymphula* (6.9), *Ischnura elegans* (20.9), *Aeshna caerulea* (1.10), *A. grandis* (7.10), *Somatochlora metallica* (20.9), *S. arctica* (1.10), *Libellula quadrimaculata* (20.9), and the second overall late Odonata-record in Norway, from Nov. 6th, and as the first, the species was *Sympetrum nigrescens*." (Author)] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

2497. Orr, R. (2001): Preliminary list of the dragonflies and damselflies of Washington D.C.. *Argia* 13(1): 20-22. (in English). [This primarily and discussion list compiles available information - published and unpublished - on the Odonata of Washington D.C., USA.] Address: Orr, R.L., 5215 Durham Road East, Columbia, MD 21044-4444, USA. E-mail: richard.l.orr@usad.gov

2498. Ott, J. (2001): Erfahrungen aus der Planungspraxis bei Monitoringstudien mit Libellen. Abh. Ber. Naturkundemus. Görlitz 73(1): 67-68. (in German with English summary). ["Four monitoring studies, which all took place in different parts of the German federal state Rhineland-Palatinate, are presented. The studies covered the long-term impact of fish stocking on the dragonfly fauna of a gravel pit, the constant changing of the fauna of some shallow waters, control of the success of a restoration measure, and finally the monitoring of a possible future impact on wetlands as a consequence of groundwater extraction." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

2499. Ott, J. (2001): Expansion of Mediterranean Odonata in Germany and Europe - consequences of climatic changes. In: Walther, G.-R., C.A. Burga & P.J. Edwards (Eds.): "Fingerprints" of Climate Change. Kluwer Academic/Plenum Publishers. New York, Boston, Dordrecht, London, Moscow: 89-111. (in English). ["Whereas a few years ago a clear northward expansion was shown only for the dragonfly *Crocothemis erythraea*, a Mediterranean element of the German dragonfly fauna, now for a lot of dragonflies a comparable situation is very obvious. In this paper an overview of recent expansion of many dragonfly species in Germany and Europe is given, as well as some information on the biological and ecological consequences. Beside this clear trend of expansion towards the north, the increase of population sizes and the colonisation of biotopes in higher altitudes, also several biological and behavioural adaptations could be registered, which are shown in detail. Consequences and scenaria for the future of several dragonfly species and for the aquatic systems as a whole are pointed out." (Author).] Address: Ott, J., L.U.P.O. GmbH, Friedhofstrasse 28, D-67705 Trippstadt, Germany

2500. Ott, J. (2001): Zum Einsatz von Libellen als Bioindikatoren und Monitoringorganismen in Feuchtgebieten - das Beispiel einer geplanten Wasserentnahme im Naturschutzgebiet «Täler und Verlandungszone am Gelterswoog» (Biosphärenreservat Pfälzerwald). Ann. Sci. Rés. Bios. Trans. Vosges du Nord-Pfälzerwald 9: 151-177. (in German with French and English summaries). ["In a system of valleys measuring approximately 50 hectares, to the south west of Kaiserslautern, the extraction of approximately one million m³ of ground water is planned from the year 2001 onwards in the «Valleys and alluvial zones in the Gelterswoog». To ensure that this water extraction does not create any significant damage to the area's important flora and fauna, ecological monitoring with intensive studies of flora and fauna has been carried out since 1998. As part of this, individual aspects of dragonfly species have been presented, and related back to previous examinations of the same area. In total in the most varied wet, habitat rich areas (streams, low-lying marshland, dystrophic ponds, alluvial zones, fallow lands, etc.) 33 species of dragonflies have been recorded thus far, [...] including 23 species on the Rheinland-Pfalz Red List and 17 species on the German National Red List. It has so far, except for individual fish stocking measures and local water management operations, as well as natural succession, established only few massive damaging factors for the dragonfly population. In addition to the high degree of diversity and mosaic type of habitats it is above all remarkable for its almost barrier free composi-

tion. The number of indigenous species is relatively constant and the annual turnover of species throughout the whole area is low. One indigenous species that has now disappeared is *Calopteryx splendens*, but on the other hand the following species have re-established themselves and are breeding successfully: *Gomphus pulchellus*, *Brachytron pratense*, *Anax imperator*, *Sympetma fusca*, and *Erythromma viridulum*. As regards species protection, the most significant species in the area in addition to *Coenagrion hastulatum*, *Orthetrum coerulescens* and *Leucorrhinia dubia* is *Somatochlora arctica*. The possibilities for using dragonflies as bioindicators and monitoring organisms are explained in detail as an example of possible reactions to changes in water level." (Author)] Address: OTT, J., L.U.P.O., Friedhofstrasse 28, D-67705 Trippstadt, Germany

2501. Parr, A. (2001): Migrant and dispersive dragonflies in Britain during 2000. J. Br. Dragonfly Society 17 (2): 49-54. (in English). ["The year 2000 was perhaps not as dramatic for migrant Odonata in Britain as, for example, 1995 or 1998, but there were a number of highlights. Most notably, high numbers of *Sympetrum fonscolombii* arrived for the third time in the last five years and several other unusual migrant species were recorded. Two main periods of immigration took place. A brief hot spell in mid-June saw a significant arrival of migrant insects, including dragonflies such as *S. fonscolombii*, *Anax parthenope* and a single *Crocothemis erythraea*. During late-July, further arrivals of *Anax parthenope* and *S. fonscolombii* were observed. The first wave of immigration pushed quite far north; the record of *A. parthenope* from Orkney represents the most northerly record for this species in Europe. Complementing the events in Britain, three species new to Ireland (*Aeshna mixta*, *A. imperator*, *A. parthenope*, were recorded during the year." (Author). Additional species treated are: *Calopteryx splendens*, *Ceriagrion tenellum*, *Erythromma viridulum*, *Aeshna grandis*, *Cordulia aenea*, *Libellula quadrimaculata*, *L. depressa*, *Orthetrum cancellatum*, *Sympetrum striolatum*, *S. sanguineum*, and *S. flaveolum*. Some observations referring *A. grandis*, *A. imperator*, and *S. striolatum* attracted by UV light resp. moth traps are of general interest.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

2502. Paulson, D. (2001): A Venezuelan odonate vacation. Argia 13(1): 7-9. (in English). [The trip in the dry season to Venezuela turned out - from the odonatological view - to be quite "disappointing". 500+ specimens in 102 species could be collected among them *Phyllogomphoides major* Belle 1984, *Erythemis credula* (Hagen 1861), *Neoneura cristina* Rácenis, 1955, *Neoneura luzmarina* De Marmels 1989, *Neoneura sylvatica* Hagen in Selys 1886, and *Oligoclada sylvia* (Kirby 1889). New species for Venezuela are *Phyllocycla bartica* Calvert 1948, *Idiataphe cubensis* (Scudder 1866), *Micrathyrina dunklei* Westfall 1992, and *Micrathyrina occipita* Westfall 1992.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

2503. Paulson, D. (2001): Review: Dragonflies through binoculars - A field guide to dragonflies of North America. Science 293(5537): 2005. (in English). [Review of Sid Dunkle's book on North America Anisoptera.] Address: Paulson, D.R., Slater Museum, Univ. of

Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

2504. Paulson, D. (2001): *Sympetrum madidum* in Minnesota. *Argia* 13(1): 19-20. (in English). [S. madidum caught 11 July 1966 near Karistad has to be added to the list of Minnesotan Odonata.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

2505. Pavey, C.R.; Burwell, C.J.; Grunwald, J.E.; Marshall, C.J.; Neuweiler, G. (2001): Dietary benefits of twilight foraging by the insectivorous bat *Hipposideros speoris*. *Biotropica* 33(4): 670-681. (in English). ["Although bats are nocturnal, many species emerge from roosts to forage during twilight, despite a presumed high risk of predation at this time. Here, we describe twilight foraging by a maternity colony of Schneider's leafnosed bat (*Hipposideros speoris*) in the dry zone of Sri Lanka and determine the dietary benefits of such behavior. Bats usually began foraging during dusk, sometimes before sunset, and also foraged during twilight in the morning. Mean use of available twilight by four radio-tagged bats was 75 percent. Twilight foraging made up, on average, 47 percent of the total foraging time of these bats (range = 25-96%), although twilight consisted of only 12 percent of the available time between sunset and sunrise the next morning. Eight species of potential predators (7 birds and 1 mammal) were observed within a 1 km radius of the colony, of which 5 species are predicted to regularly capture bats. Bats took a wide diversity of prey (11 insect orders, including at least 27 families, and spiders) that ranged in wing length from 2.0 to 54.0 mm. Major orders in the diet were Coleoptera, Lepidoptera, and Diptera. Prey of secondary importance included Hemiptera, Hymenoptera, Isoptera, and Neuroptera. Bats captured large numbers of insects that were only available or had marked peaks of abundance during twilight. These groups included small, swarming insects (especially flies) that have peaks in flight activity at dusk and dawn, large diurnal species (especially dragonflies) that have crepuscular activity, and winged termites that emerge in swarms at dusk. Access to these insects was a clear benefit of twilight foraging." (Authors)] Address: Pavey, C.R., Pk & Wildlife Commission Northern Territory, Arid Zone Research Institute, POB 1046, Alice Springs, NT 0871, Australia

2506. Perepelov, E.; Bugrov, A.G.; Warchalowska-Sliwa, E. (2001): C-banded karyotypes of some dragonfly species from Russia. II. The families Cordulegasteridae, Corduliidae and Gomphidae. *Folia Biologica, Krakow* 49(3-4): 175-178. (in English with Polish summary). ["The C-stained karyotypes of five species of three dragonfly families from Western Siberia and Kunashir Island have been analysed. *Gomphus epoptalmus*, *G. vulgatissimus*, *Nihonogomphus ruptus*, and *Anotogaster sieboldii* showed usual character of C-heterochromatin distribution, all chromosomes have terminal C-bands. *Somatochlora graeseri* has unique for dragonflies type of terminal C-blocks on autosomes. Three pairs of autosomes have the very large heterochromatic blocks, other chromosomes, including the X, have no C-band." (Authors)] Address: Perepelov, E. & A. Bugrov, Siberian Branch, Institute of Animal Systematics and Ecology, Russian Academy of Sciences, 11 Frunze St., 630091, Novosibirsk, Russia. E-mail: bugrov@fen.nsu.ru

2507. Phoenix, J.; Kneis, P.; Zinke, J. (2001): *Ophiogomphus cecilia* im sächsischen Abschnitt der Elbe (Odonata: Gomphidae). *Libellula* 20(1/2): 23-32. (in German with English summary). ["Along the River Elbe in the Free State of Saxony about one hundred individuals (larvae, exuviae, adults) of *O. cecilia* were recorded at 26 localities in the year 2000. The species settles along the whole Saxon section of the River Elbe with a length of about 180 km. The species is the most frequently recorded gomphid in this section of the River Elbe. [...]" (Authors)] Address: Phoenix, J., Goethestr. 22, D-01824 Königstein, Germany. E-mail: Juergen.Phoenix@t-online.de

2508. Piper, W.; Schrimpf, I. (2001): *Libellennachrichten*. *Libellennachrichten* 6: 1-16. (in German). [Volume 6 of the newsletter of the Society of German Speaking Odonatologists contains information on the 20th meeting held in Görlitz, the minutes of this meeting, announcements, reviews, calls for cooperation, reports of the 2001 odonatological symposia in Novosibirsk and Gällivare, "Dragonflies and new media", "Dragonflies and Literature", and "Dragonflies and Art".] Address: Schrimpf, Ilona, Heimbühlerstr. 32, D-72768 Reutlingen, Germany

2509. Plotnikova, S.I.; Sinakevich-Pean, I.E. (2001): Descending neurons of the epipharyngeal ganglion in the dragonfly *Aeshna* larva. *J. Evol. Biochem. Physiol.* 37(4): 441-443. (in English). [Using staining with methylene blue, several descending neurons were revealed in the epipharyngeal ganglion of an *Aeshna* larva. "Among them there is a neuron that has extensive arborization and unites a significant part of the epipharyngeal ganglion. The contacts of this neuron with the bundle of optic fibers from the lobule are found, which allows suggesting its participation in the descending visual pathway. A neuron of the central complex of the descending tract is revealed." (Authors)] Address: Plotnikova, S.I., Russian Acad. Sci., Sechenov Inst. Evolutionary Biochem. & Physiol., St Petersburg, Russia

2510. Radford, A.P. (2001): Repeated interception of wind blown flowers of Common Cottongrass by the Emperor Dragonfly *Anax imperator* Leach. *J. Br. Dragonfly Society* 17(2): 59. (in English). [28 June 2001, at the Waldegrave Pool, near Priddy, Somerset, UK; a strong, gusting, south-west wind carried the flowers of Common Cottongrass *Eriophorum angustifolium* "towards the pool where a male *A. imperator* was routinely patrolling over the water. As the flowers approached, the dragonfly flew towards them, into the wind. The dragonfly usually made contact with the flowers that were intercepted, although no attempt was made to seize any flowers, either by using the legs or the mouthparts. This behaviour continued, intermittently, for about five minutes, during which five or six flowers were intercepted. The individual dragonfly then resumed normal patrol activity, quite ignoring any further flowers that drifted over. There were other individuals of *A. imperator* patrolling over the pond, but none of these flew towards the airborne flowers. It was clear that only one individual was involved. Corbet (1999) mentions that Anisoptera may make investigatory flights towards large objects and then reject them when a few feet away. He states that in Florida, *Anax junius* (Drury) and *Coryphaesctma ingens* (Rambur) have been observed chasing badminton shuttlecocks. It is not clear whether these activities represent territorial defence or mistaken

prey identification." (Author)] Address: Radford, A.P., Crossways Cottage, West Bagborough, Taunton, Somerset TA4 3EG, UK.

2511. Rantala, M.J.; Hovi, M.; Korkeamaki, E.; Suhonen, J. (2001): No trade-off between the size and timing of emergence in the damselfly, *Calopteryx virgo* L.. *Ann. Zool. Fenn.* 38(2): 117-122. (in English). ["Many species of insects have been reported to show seasonally declining size at emergence. This has been explained as an adaptive response to time constraint between size and age at maturity (emergence). We studied seasonal variation in the size of damselfly *Calopteryx virgo* L. in six different creeks in central Finland. The length of hind wings was measured for 942 males and 285 females covering the flying period from mid June to mid August. The length of the hind wings of damselflies did not decrease towards the end of flying period in any river or either sex. In light of this study, seasonal reduction of body size is not a general phenomenon among odonates contrary to common understanding." (Authors)] Address: Rantala, M.J., Univ. Jyväskylä, Dept Biol. & Environm. Sci., POB 35, FIN-40351 Jyväskylä, Finland

2512. Reder, G. (2001): Späte Flugzeit von *Gomphus flavipes* am nördlichen Oberrhein (Odonata: Gomphidae). *Libellula* 20 (3/4): 175-178. (in German with English summary). [16-X-2000 and 21-X- 200, river Rhine near Nordheim, Hessen, Germany (49°42'N, 08°23'E).] Address: Reder, Gerd, Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany. E-mail: PG.Reder@t-online.de

2513. Reinhardt, K.; Naumann, J. (2001): Ergänzungen zur Libellenfauna des Mittleren Saaletales (Insecta: Odonata). *Thüringer faunistische Abhandlungen* 8: 59-61. (in German with English summary). ["Twenty-seven species of dragonflies are recorded from 17 localities. *Brachytron pratense* is recorded for the first time. *Cordulia aenea* has been discovered for the first time since the 1960ies. Two new localities for *Leucorrhinia rubicunda* are mentioned. *Erythromma viridulum*, *Sympetrum pedemontanum*, *S. vulgatum*, and *Anax imperator* were shown to be able to complete their development in one year." (Authors)] Address: Naumann, J., S.-Jacob-Str. 18, D-07743 Jena, Germany

2514. Rettig, K. (2001): Glänzende Smaragdlibelle (*Somatochlora metallica*). *Beitr. Vogel-Insektenwelt Ostfrieslands* 166: 19. (in German). [Germany, Lower-Saxony, LSG "Restmoor Ochtelbur", Mow; a copula of *S. metallica* was observed at 10-VII-2001.] Address: Rettig, K., Danziger Str. 11, D-26725 Emden, Germany

2515. Röhn, C. (2001): Libellen des Hepbacher-Leimbacher Rieds. *mercuriale* 1: 12-14. (in German). [This fen situated near the Lake Constance, Baden-Württemberg, Germany inhabits 40 odonate species including *Coenagrion mercuriale*, *Brachytron pratense*, *Somatochlora flavomaculata*, and *Sympetrum depressiusculum*. For more than 20 years, it harbours one of the most important populations of *S. flaveolum* in the Federal State Baden-Württemberg, Germany, [the location may be therefore considered as a core habitat of the *S. flaveolum*-population in Europe (comment of M.S.).] Address: Röhn, C., Bernried 15, D-88099 Neukirch, Germany.

2516. Rolff, J.; Vogel, C.; Poethke, H.J. (2001): Co-evolution between ectoparasites and their insect hosts: a simulation study of a damselfly-water mite interaction. *Ecol. Entomol.* 26(6): 638-645. (in English). ["1. A simulation model investigating the co-evolution of water mites infesting their aquatic insect hosts during emergence is presented. The model is based on field and experimental studies of the ectoparasitic water mite *Arrenurus cuspidator* and the damselfly *Coenagrion puella*. 2. Three scenarios were studied: (1) Only the host was allowed to evolve timing of emergence, while the timing of the parasites' infestation opportunity was held constant. (2) Both host and parasite were allowed to evolve. (3) Only the parasite's timing was allowed to evolve, while the host was constrained completely. 3. In the first two scenarios, parasite abundances decreased in the course of evolution and reached values well below, those found in the field, whereas in the third scenario parasite abundances were maintained at a level close to that found in the field. In the second scenario (co-evolution), the host seemed to be the leader in the evolutionary race. 4. It is concluded that water mite parasitism is capable of shaping emergence patterns in aquatic insects and, despite the same life-cycle length for host and parasite, the parasite evolves fast enough to shape its hatching pattern to match the emergence pattern of its host." (Authors)] Address: Rolff, J., Department of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

2517. Rolff, J.; Braune, P.; Siva-Jothy, M.T. (2001): Ectoparasites do not affect ejaculate volume in the dragonfly *Coenagrion puella*. *Physiol. Entomol.* 26(4): 315-319. (in English). ["Imagoes of the dragonfly *C. puella* are parasitized frequently by ectoparasitic water mites. In an experimental study of the parasite load we examined the influence of parasite burden on host sperm volume. Infection with ectoparasitic water mites did not affect sperm volume in the seminal vesicle (ejaculate volume). It is concluded that water mite parasitism does not affect male fitness in *C. puella* by reducing sperm production." (Authors)] Address: Rolff, J., Department of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

2518. Rolff, J. (2001): Effects of age and gender on immune function of dragonflies (Odonata, Lestidae) from a wild population. *Can. J. Zool.* 79(12): 2176-2180. (in English). ["Immunity is a crucial determinant of fitness. Despite this, very few studies have addressed the expression of immune function in insect populations in the wild. I present data on two immune parameters, hemocyte load and expression of phenoloxidase, in adult damselflies (*Lestes viridis*) from a wild population. In a comparison of newly emerged with sexually mature adults, it was found that the latter had higher hemocyte loads but lower phenoloxidase expression. Mature females showed significantly higher phenoloxidase expression than mature males. The sexual differences might be explained by gender differences in life history." (Author)] Address: Rolff, J., Department of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

2519. Rolff, J. (2001): Evolutionary Ecology of water mite-insect interactions: a critical appraisal. *Archiv für Hydrobiologie* 152(3): 353-368. (in English). ["Water mites are ubiquitous parasites in freshwater ecosystems.

The interaction between water mites and aquatic insects has been scarcely studied from an evolutionary ecology viewpoint. Host finding is an important feature of the water mite's life cycle. The host finding success is suggested to depend upon host behaviour and quality. Water mite parasitism lowers host fitness via different routes: by draining nutrients hosts can suffer from decreased fecundity, increased mortality etc. Host sexes and closely related species are affected differently. Recent studies on host fitness, whilst taking the parasite behaviour into account, revealed results contrasting older studies where knowledge of the parasites' life cycle was absent. The potential for coevolution is discussed. For exploring evolutionary trends a water mite phylogeny is needed. Water mite-aquatic insect interactions can be assumed to provide excellent conditions to conduct experimental studies on direct and indirect effects of multiple natural enemies in freshwater ecosystems." (Author)] Address: Rolff, J., Department of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

2520. Samways, M. (2001): Testing the new Categories of Threat on dragonflies in Africa. *Species* 35: 23. (in English). ["Verbatim: In a recent assessment of dragonflies across Africa and neighboring islands, it was important to distinguish between those species that are simply rare, those that are 'Data Deficient', and those that are actually threatened. The Extinct category needs very careful consideration, as premature inclusion of a species or ESU (Evolutionarily Significant Unit) could thwart further searches. In short, the IUCN 2000 Categories of Threat were found to be very workable for African dragonflies. Problems encountered were more in terms of difficulties of field assessments than with the categorization process. However, while the Red List is of great value when considering one species at a time, it should not be considered as a general database for analyzing comparative figures on assemblages. Such an analysis is likely to reveal more on assessment efforts than on the organisms themselves."] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P / Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

2521. Sasahara, S. (2001): On the status quo and conservation of *Rhyothemis severini* Ris. *Nature and Insects* 36(7): 26-28. (in Japanese). [*R. servini* was first found by me at Naze on the Amami Islands in July, 1993 and was designated as Near Threatened species in 2000. This dragonfly inhabits about ten bogs (20 to 30 cm deep) of about 50 to 500 square meters in the fallow fields, where wild millets grow. 19 sympatric species of Odonata inhabit there. The species has a weak territoriality. Males watch their mates ovipositing at the height of 1 meter from the surface of the water. They were often interfered by sympatric *R. variegata* impenetratrix. The maximum population was 30 in 1993 and in 2000 none was sighted. The main factor of decreasing is widening of a road, which caused scanty of filling water into the bogs, and pollution of water, and increasing of crayfish. This dragonfly is a newcomer to the island and preservation of it is an difficult problem. Translation; Ishizawa, Naoya] Address: not stated

2522. Saugestad, T. (2001): New observations of *Leucorrhinia pectoralis* (Charpentier, 1825) in Hordaland, western Norway. *Nord. Odonat. Soc. Newsl.* 7(1): 11.

(in Norwegian with English summary). ["A second and probable third locality in Hordaland for *L. pectoralis* was discovered 14.vii. 2000, at two small nameless bog lakes in Os municipality, near Bergen. The localities are briefly described. The probable origin of what seems to be an isolated occurrence at the west coast of Norway is also discussed." (Author)] Address: Saugestad, T., Gml. Kalvedalsv.12B, N- 5019 Bergen, Norway

2523. Schaijk, V.A. van; Geraeds, R.P.G. (2001): First findings of exuviae of the dragonfly *Ophiogomphus cecilia* (Fourcroy 1785) in the Netherlands. *Natuurhistorisch maandblad* 90: 166-167. (in Dutch with English summary). ["In the period of the 25th of June until the 29th of July 2001, four exuviae of *O. cecilia* were found along the river Roer. These are the first exuviae of this species found in the Netherlands. During the same inventory, two freshly emerged female adults were also spotted in the same area. These observations are the result of an intensive survey undertaken after the first sighting of this species along the river Roer last year (GERAEDS & HERMANS, 2000). The findings confirm the existence of a population of *O. cecilia* in this particular river. Further investigations in the next few years will have to show whether this species can establish itself in this area." (Author)] Address: Geraeds, R.P.G., Juliana-laan 46, NL-6042 JH Roermond, The Netherlands

2524. Schiel, F.-J. (2001): Aktuelle Daten zum Vorkommen der Asiatischen Keiljungfer (*Gomphus flavipes*) in Baden-Württemberg. *mercuriale* 1: 23-24. (in German). [Additional four localities in the Federal State Baden-Württemberg, Germany with records (exuviae) of *Stylurus flavipes* along river Rhine are dealt with.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

2525. Schiel, F.-J.; Buchwald, R. (2001): Die Große Moosjungfer in Südwest-Deutschland. Konzeption, Durchführung und Ergebnisse des LIFE-Natur-Projekts für gefährdete Libellenarten am Beispiel von *Leucorrhinia pectoralis*. *Naturschutz und Landschaftsplanung* 33(9): 274-280. (in German with English summary). ["The LIFE-Nature project, running from 1997 to 2000, included population counts, various management measures, and extensive public information aiming to support the long-term survival of *L. pectoralis*. The survey of a total of 37 mires identified 15 populations. All of them are situated in the region "Oberschwäbisches Hügelland" (County of Ravensburg). For 11 of these populations, successful reproduction of the species has either been proven or can be considered likely. The present habitats are negatively affected by nutrient inputs and internal mineralisation. These processes lead to an accelerated growth of shore plants, and the colonised peat pools become more and more shaded by woody plants. Practical implementation of the LIFE-Nature project focused on 24 management measures undertaken in 12 different mires respectively mire areas. In four cases the removal of the dense vegetation led to a clear rise in number of observed adult dragonflies. In at least one case an increase in number of emerging individuals was shown three years after the management measures. In order to guarantee the long-term survival of *L. pectoralis* in Baden-Württemberg, management activities will remain absolutely necessary. We recommend the employment of Wildermuth's rotation model which has been successfully tested over

many years in Switzerland. Re-establishment respectively improvement of several metapopulations in the "Oberrschwäbisches Hügelland" has to be the main purpose of future management plans. In this way, a stable situation for *L. pectoralis* can be achieved, possibly also allowing recolonisation of adjacent regions." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

2526. Schlüpmann, M. (2001): Beobachtungen zur Phänologie der Libellen-Imagines im nördlichen Sauerland (Odonata). Entomol. Nachr. Berichte 45(3/4): 171-179. (in German with English summary). [Nordrhein-Westfalen, Germany; phenological data of several Odonata including seasonal dependend abundances are documented. Special emphasize is given to *Aeshna cyanea* and its long lasting maturation resp. pre-reproductive period.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, Germany. E-mail: martin.schluempmann@t-online.de

2527. Schlüpmann, M. (2001): Die Libellenfauna urbaner Lebensräume am Beispiel der Stadt Hagen. Dortmunder Beitr. Landeskunde, Naturwiss. Mitt. 35: 191-216. (in German with English summary). [The study discusses parameters responsible for suitability of water bodies in urban environments. Frequency and indiginity of species are compiled in a table. Relationships between Odonata and the degree of areas developed for buildings are discussed. The importance of garden ponds, and measures to improve their habitat quality for dragonflies is outlined. It is concluded that a urbanophilous odonate coenoses is not existing.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, German. E-mail: martin-schluempmann@t-online.de

2528. Schmidt, B.; Osterried, J.; Stottele, T. (2001): Gewässerbericht 2000 der Stadt Friedrichshafen; Zustände, Entwicklungsziele und Maßnahmen. Schriftenreihe Umwelt der Stadt Friedrichshafen 1. 116 pp. (in German). [This is an exhaustive report on the current situation of the running waters and water management on the territory of the city of Friedrichshafen, Lake Constance, Germany. Each of the running waters is described in detail with special emphasize on restoration measures to be realised. Fauna and flora, and bordering vegetation and biotyps in the catchment area are characterised stressing indicator species and measures according environmental quality aims. Many tabs and colour pictures help to get a deep insight into the situation of the running waters of the region. Some of the material and (didactical) graphs are sound and very original. B. Schmidt is one of the leading German odonatologists, thus Odonata are well represented in this report.] Address: Stadt Friedrichshafen Amt für Umwelt und Naturschutz und Eigenbetrieb Stadtentwässerung, Postfach 2440, D-88014 Friedrichshafen, Germany

2529. Schmidt, B. (2001): Habitate, Fortpflanzungsverhalten und Eiablagestrategien der Südlichen Mosaikjungfer (*Aeshna affinis*) im Eriskircher Ried (Bodensee). *mercuriale* 1: 14-18. (in German). [Probably since more than 10 years, an autochthonous population of the Mediterranean species *A. affinis*, which currently extends its range to the north, exists in the Eriskirchener Ried (fen situated near Lake Constance, Baden-Württemberg, Germany). The author documents all records of the species in this locality, supposing that the initial establishment of the species

establishment of the species may be the result of influxes in 1987 (or 1992 and 1995). In 1999 *A. affinis* was the most common member of Aeshnidae in the Eriskircher Ried! The climatic preferred situation of the locality is in addition documented by a strong population of *Lestes barbarus*. The author describes the habitat, hunting and searching flights for females, and oviposition sites in detail. He discusses the possibility of different oviposition strategies of the two colour morphs of females (brown/light blue and brown/yellow green): the light blue colour morph seems to oviposit without male in more densely grown habitats, while the yellow green morph seems to oviposit in tandem position with male in more open, shallow waters. Advantage and disadvantage of the strategies on the population level are discussed.] Address: Schmidt, B., Sandöschstr. 28; D-88048 Friedrichshafen, Germany. E-mail: Schmidt-empire@gmx.de

2530. Schmidt, Eb. (2001): Strittige systematische Fragen auf Gattungsniveau bei mitteleuropäischen Libellen (Odonata). Abh. Ber. Naturkundemus. Görlitz 73 (1): (in German with English summary). ["The following genera (including European species) can be separated by autapomorphies: *Chalcolestes* Kennedy, 1920, from *Lestes* Leach, 1815, with *C. viridis* (Vander Linden, 1825); *Stylurus* Needham, 1897, from *Gomphus* Leach, 1815, with *S. flavipes* (Charpentier, 1825); *Platetrum* Newman, 1833, from *Libellula* L., 1758, with *P. depressum* (L., 1758); *Ladona* Needham, 1897, from *Libellula* too, with *L. fulva* (Müller, 1764). *Aeshna isocoetes* (Müller, 1767) should not yet be transferred into the (palaetropical) genus *Anaciaeschna* Selys, 1878. *Tarnetrum* Needham & Fisher, 1936 is now accepted on subgenus level only for *Sympetrum* (*Tarnetrum*) *fonscolombii* (Selys, 1840). The genera *Cercion* and *Erythromma*, *Anax* and *Hemianax* should still remain separated for the European species." (Author)] Address: Schmidt, E., Biologie und ihre Didaktik, FB9 / S05, Universität GH Essen, D-45117 Essen, Germany

2531. Schnabel, H. (2001): Untersuchungen zum Vorkommen larval überwinternder Libellenlarven in Karpenteichen des Oberlausitzer Heide- und Teichgebietes. Abh. Ber. Naturkundemus. Görlitz 73(1): 79-83. (in German with English summary). ["In 1999 and 2000, 69 commercial fishery ponds in the Upper Lusatian heath and lake district were investigated as to the occurrence of dragonfly larvae. A total of 12668 individuals belonging to 19 species was recorded. The results are compared with existing literature and the relationship between occurrence and fish stocking density are discussed on the representative basis of the 'Großer Streichteich'-Pond in Bernsdorf, Germany". (Author)] Address: Schnabel, H., Keula 16, D-02997 Wittichenau, Germany

2532. Schultz, J.K.; Switzer, P.V. (2001): Pursuit of heterospecific targets by territorial Amberwing Dragonflies (*Perithemis tenera* Say): A case of mistaken identity. *Journal of Insect Behavior* 14(5): 607-620. (in English). ["Although they are defending mating territories, territory residents of a wide variety of insect species have been observed to pursue heterospecifics in addition to the conspecifics that intrude on their territories. One species that has such heterospecific pursuits is" *Perithemis tenera* "In this study, we tested five alternative hypotheses for the function of heterospecific pursuits in amberwings: competition for resources, preven-

tion of interference while mating, predator deterrence, foraging, and mistaken identity. Resident males pursued both male and female conspecifics, as well as a species of horse fly (*Tabanus* spp.) and butterfly (*Ancyloxypha numitor*). Other intruding odonates, including *Epitheca princeps*, *Erythemis simplicicollis*, *Libellula luctuosa*, *Pachydiplax longipennis*, and *Plathemis lydia*, were relatively ignored. Because the horse fly and butterfly were similar to amberwings in body size, color, and flight height, and because they are not predators or prey of amberwings, we concluded that the pursuit of these heterospecifics was due to mistaken identity. The characteristics of the horsefly and butterfly likely correspond to the cues that the male amberwings use to identify conspecifics, and the relative rarity of intrusions by these two species (as well as by female amberwings) probably made it more costly to discriminate and pursue only conspecifics than to make some mistaken pursuits." (Authors)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfvps@eiu.edu

2533. Schutzgemeinschaft Libellen in Baden-Württemberg (2001): Kurzbeiträge / Termie 2002 / SGL mercuriale 1: 25-36. (in German). [Documentation of some mailings circulated to members of the SGL with notes on records of *Coenagrion scitulum* in Vorarlberg, Austria, a new record of *Ophiogomphus cecilia*, some sneering comments on the myth of sticking dragonflies (the myth is assessed as unthreatened in the Red list of myths), notes on the comming meeting of SGL and GdO, and the minutes of the founding meeting of SGL and the constitution of this organisation.] Address: SGL c/o Röske, W., Kandelstr. 26, D-79106 Freiburg, Germany

2534. Sherratt, T.N.; Forbes, M.R. (2001): Sexual differences in coloration of Coenagrionid damselflies (Odonata): a case of intraspecific aposematism? *Anim. Behav.* 62(4): 653-660. (in English). ["Sexual dimorphism is commonly explained as a consequence of selection on traits that increase male attractiveness to females, or simply allow males greater access to females. Here, we consider another explanation for sexual differences in coloration within species of the damselfly family Coenagrionidae (Odonata: Zygoptera). In many of these species, males are more brightly coloured than females and have different patterns. Yet they are non-territorial and do not engage in displays: indeed, male competition for mates often resembles a scramble. We therefore argue that even if females show a degree of mate choice, then it is unlikely to be based on colour or pattern. Instead, we suggest that sexual dimorphism has evolved in this group primarily as a form of sex-related warning coloration. First, we argue that it is almost inevitable that male-male interactions will incur a small cost to both participants. We then provide some evidence that males are capable of using colour as a clue to sexual identity. Using a simple model, we show that if these conditions hold, then sexual dimorphism will readily evolve. Furthermore, the model shows that if females are selected to avoid excessive harassment by males as is often suggested, then males should evolve much brighter coloration than females. If the assumptions underlying our 'unprofitable mate' model are broadly correct, then not only does it offer a novel explanation for sexual dimorphism, but it also provides the first case example of the evolution of aposematism as a result of intraspecific interactions." (Authors)] Address: Sherratt

T.N., Univ Durham, Dept Biol Sci., South Rd, Durham DH1 3LE, UK

2535. Showers, J.; Horsnail, P. (2001): Damselfly exuviae found in a UV light moth trap. *J. Br. Dragonfly Society* 17(2): 33-34. (in English). ["Damselflies were first noted in the trap on 31 May 2000, and were then found on each day until 12 June 2000. A total of 187 exuviae were collected during this period, with a maximum total of 56 collected on 1 June. After 12 June, only occasional exuviae were found and these were not identified. In addition to the exuviae found inside the light trap, many exuviae were present on the supports, but these were not collected. The emerged damselflies either found their own way out of the trap or were released when the trap was checked for moths." A total of 105 exuviae of *Enallagma cyathigerum* and three *Erythromma najas* exuviae were identified. "It was not possible to identify all specimens, as many were badly damaged." [...] "The discovery of large numbers of damselfly exuviae in the moth trap suggests that damselfly larvae may be attracted to UV light at emergence. This observation supports previous work indicating a response to UV light by emerging larvae of the family Coenagrionidae (Lavoie-Dornik & Pilon, 1987). It also poses several areas for further investigations, including the variation in response between species, the most effective wavelengths for eliciting a response, and the relationship between the intensity of the light source and the distances over which damselfly larvae will be attracted." (Authors)] Address: Showers, J., B., Desborough Road, Rothwell, Kettering, Northants NN14 6JQ, UK

2536. Sibl, J.; Seginkova, A.; Bulánková, E. (2001): Contribution to the knowledge of dragonfly fauna (Odonata) of the Danubian Plain (southwestern Slovakia). *Entomofauna carpathica* 13: 68-71. (in Slovakian with English summary). [The regional Odonata fauna totals in 45 species including literature records. In 1999 and 2000, 34 species could be recorded at 9 localities. Some rare Slovakian species as *Coenagrion scitulum*, *Brachytron pratense*, *Anaciaeschna isocles*, *Anax parthenope*, *Orthetrum albistylum*, *O. coerulescens*, *Symptetrum meridionale*, *S. pedemontanum*, *S. depressiusculum*, and *Leucorrhinia pectoralis* could be confirmed.] Address: Sibl, J., J. Stanislava 15, SK 84105 Bratislava, Slovakia. E-mail: sibl@changenet.sk

2537. Silsby, J. (2001): WDA: present status report. *Argia* 13(1): 22-23. (in English). [Report of activities and services of Worldwide Dragonfly Association.] Address: Silsby, Jill, 37 Astoria House, 116 Hight Street, Purley, Surrey CR8 2XT, UK

2538. Silsby, J. (Ed.) (2001): Newsletter of the worldwide Dragonfly Association 5(1). W.D.A.'s AGRION 5(1): 16 pp. (in English). [[Scientific notes:] Dunkle, S.: Apache Spiketail, *Cordulegaster diadema* Selys, 1868 (pp. 3-4); - Paulson, D.: Zenithoptera americana Linnaeus, 1758 (p. 4); - Wasscher, M.: A Mecistogaster smarter than me (p. 4); - Alien, P.: *Scapanea frontalis* Burmeister, 1890 (p. 4); - Garrison, R.: Two beautiful odonates from Brazil (pp. 4-5); - Endersby, I.: *Cordulephya pygmaea* Selys, 1871 (p. 5); - Taylor, J.: The reed "butterfly", *Rhyothemis graphiptera* Rambur, 1842 (pp. 5-6); - Moore, N.: *Archipetalia auriculata* Tillyard, 1917 (p. 6); - Silsby, J.: *Cyrano unicolor* Selys, 1869 (pp. 6-7); - M. Hämäläinen: In search of beautiful wings: *Vestalis melania* Selys, 1873 (pp. 7-8); - Natsume, H.:

Globe Skimmer, *Pantala flavescens* (Fab., 1798) & other favourites (p. 8); - Wilson, K.: *Chlorogomphus papilio* Ris, 1927 (p. 9); - Kalkman, V.: The Oriental Rock-dweller, *Bradinopyga geminata* (Rambur, 1842) (pp. 9-10); - Miller, K.: The Twister, *Tholymis tillarga* (Fabricius, 1798) (pp. 10-11); - Dijkstra, K.-D.B.: Sky-blue Skimmer, *Cyanothemis simpsoni* Ris, 1915 (pp. 11-12); - Clausnitzer, V.: Mock Emerald, *Olpogastra lugubris* (Karsch, 1895) (p. 12); - Corbel, P.S.: An abiding magical moment: *Rhyothemis fenestrina* Rambur, 1842 (p. 12); - Jödicke, R.: *Sympetrum sinaiticum* Dumont, 1977 (pp. 12-13); - Parr, M.: *Ischnura elegans* (Vander Linden, 1820) (p. 13); - Champion, M.H.: Notes on sighting of *Lindenia tetraphylla* (Vander Linden) by lake Volvi, Greece in July 2000 (p. 13; with a postscript by P.S. Corbet); - Beckemeyer, R.: Favorite dragonflies in Thailand and the USA (p. 14); - Orr, A. G.: *Rhinocypha aurofulgens* Laidlaw, 1931 & others from Australia, New Guinea, Africa & Sulawesi (pp. 14-15); - Corbet, P.S.: [book review] All about dragonflies, by K. Inoue & K. Tani (p. 16); - de Fonseca, N.: [obituary] Terence de Fonseca (p. 16).] Address: Silsby, Jill., 37, Astoria House, 116 Hight Street, Purley, Surrey CR8 2XT, UK. E-mail: jsilsby1@aol.com

2539. Sommerhäuser, V. (2001): Insekt des Jahres 2001 - Plattbauchlibelle (*Libellula depressa* Linnaeus). Naturschutz und Landschaftspflege in Brandenburg 10 (4): 126. (in German). [General resp. introductory remarks on the "Insect of the Year" in Germany, *L. depressa* are outlined; special emphasize is given to the adaptations to the primary habitat in floodplains of rivers and to secondary habitats in gravel pits or garden ponds.] Address: not stated

2540. Stephan, R.; Xylander, W.E.R. (2001): Die Libellen der Umgebung von Görlitz, gestern und heute. Abh. Ber. Naturkundemus. Görlitz 73(1): 85-89. (in German with English summary). ["The dragonflies of Görlitz and the neighbouring area have been investigated since 1885. Since then, 68 species have been encountered. In recent investigations, 58 species were documented within an area of 30 km around the city of Görlitz. This high number results from an extraordinary diverse landscape structure and thus many different biotopes. The coenoses of dragonflies have obviously changed significantly, resulting in formerly rare species being abundant today (e.g. *A. imperator*, *O. cancellatum*) whereas others have declined in number (*S. flaveolum*, *G. vulgatissimus*, *O. cecilia*, *O. coerulescens*, *O. brunneum*)."] (Authors)] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum. GR. Dr.Xylander@t-online.de

2541. Sternberg, K.; Buchwald, R. (2001): 20 Jahre "Schutzgemeinschaft Libellen in Baden-Württemberg" von den ersten Anfängen bis Grundlagenwerk und Vereinsgründung. *mercuriale* 1: 19-23. (in German). [This is a detail history of the most active regional odonatological society in Germany, which "produced" a lot of leading German odonatologist, and the recently published most impressive German book on Odonata "Die Libellen Baden-Württembergs Vol. 1 & 2". Of some interest are reflections about the work of amateur odonatologists using political economy cost calculations: More than 20000 hours were necessary to produce the book; but this was only possible on a basis of amateur or student research activities calculated with nearly 90000

hours.] Address: Sternberg, K., Schillerstr. 15, D-76297 Stutensee, Germany

2542. Stevani, C.V.; Liria, C.W.; Miranda, M.T.M.; Bechara, E.J.H. (2001): Cysteic acid is the chemical mediator of automotive clearcoat damage promoted by dragonfly eggs. *J. Appl. Polym. Sci.* 81(6): 1549-1554. (in English). ["The damage caused by dragonfly eggs on automotive clearcoats exposed to sunlight occurs by a chemical mechanism similar to that caused by acid rain. Cysteine and cystine residues present in dragonfly eggs are oxidized during the egg hardening process, which releases hydrogen peroxide, to a cysteic acid derivative, a strong acid capable to catalyze the hydrolysis of acrylo/melamine clearcoat polymer. Cysteic acid was indeed identified and quantified by ion-exchange HPLC in dragonfly egg extracts submitted to oxidation by H_2O_2 followed by acid digestion. Moreover, H_2O_2 concentration, temperature, and exposure time profiles of cysteic acid formation as well as an apparent activation energy for cysteine (in dragonfly eggs) oxidation to cysteic acid by H_2O_2 (32 +/- 2 kJ/mol) were determined."] (Authors)] Address: Bechara, E.J.H., Univ. São Paulo, Inst. Quim., CP 26077, BR-05513970 São Paulo, Brazil

2543. Stevens, M.; Riedel, H.-W. (2001): Die Wiederbesiedlung des Gebietes der Stadt Bergisch Gladbach durch die Blauflügel-Prachtlibelle *Calopteryx virgo* (L. 1758) (Odonata, Calopterygidae) in den Jahren 1989-2000. *Verh. Westd. Entomol. Tag* 2000: 51-64. (in German with English summary). [In the Rhine-Ruhr agglomeration, Germany, *C. virgo* survived in the near-natural forests of the "Königsforst" in small populations. Between 1990 and 1994, the species seems to have been extirpated in the region. But, it was able to spread into urban areas of Bergisch Gladbach. "From 1995 to 2000 both the number of sites and the number of larvae increased continuously. The "Königsforst" is a refugial habitat, necessary both for survival of nucleus populations and centres of dispersal. A prerequisite for successful recolonisation is a high quality of water and a divers structure of stream-morphology. Recolonisation by larvae takes place in the upwards direction. [...]"] Address: Riedel, H.-W., Stadt Bergisch Gladbach, Fachbereich Umwelt und Technik, Wilhelm-Wagner Platz, D-51429 Bergisch Gladbach, Germany

2544. Struktur- und Genehmigungsdirektion Süd (Hrsg.) (2001): NSG Täler und Verdandungszonen am Gelterswoog. Leaflet: 6 pp. (in German). [The leaflet shortly characterizes a Nature Conservation Areal situated near the town of Kaiserslautern, Rheinland-Pfalz, Germany. Pictures of *Erythromma najas* and *Somatochlora arctica* illustrate the odonatological importance of the area. For more odonatological details see: Ott, J. (1990): Die Libellenfauna des geplanten Naturschutzgebietes "Gelterswoog - Kolbenwoog" - mit einem Wiederfund von *Somatochlora arctica* Zetterstedt für Rheinland-Pfalz. *Fauna Flora Rheinland-Pfalz* 6: 227-246.] Address: Struktur- und Genehmigungsdirektion Süd, Neustadt an der Weinstraße

2545. Swaay, C. van; Ketelaar, R.; Groenendijk, D. (2001): Dagvlinders en libellen onder de meetlat: jaaverslag 2000. Rapport VS2001.07. De Vlinderstichting Wageningen: 29 pp. (in Dutch with English summary). [This is a report on the monitoring scheme of butterflies and dragonflies in The Netherlands in 2000. The butterfly scheme started in 1990, the dragonfly scheme in

1997. Butterflies and dragonflies are counted using a line-transect method. Dragonfly transects are visited once every two weeks. "The length of the transects is variable and dependent on habitat quality and availability. In addition, single species transects are exclusively counted for a specific threatened butterfly or dragonfly. Thus, more information is obtained on trends of our Red List species. Indices were calculated using the computer program TRIM (Trends and Indices for Monitoring Schemes). This program was developed by CBS ("Statistics Netherlands") for the analysis of time series of counts with missing observations." 185 Odonata-transects were visited every fortnight and 133 single species plots were counted. "Although the number of transects is still growing, in the southern provinces more plots are needed for reliable indices. *Enallagma cyathigerum* was again by far the most numerous dragonfly species in 2000. At the most species-rich plots 25 species were recorded. Special results from the monitoring scheme include for example: (1) *Calopteryx virgo* was counted at 8 transects in 2000. A total of more than 1600 individuals was recorded. At one wooded lowland river densities were much higher than in any other river system in The Netherlands. *C. virgo* is now satisfactorily covered within the monitoring scheme. (2) *Aeshna viridis* is one of the best followed species within the dragonfly monitoring scheme. At a total of 14 transects 185 dragonflies were counted. (3) In the city of Gouda much more dragonflies (both diversity and the number of individuals) were counted at transects alongside ecologically restored banks in the city than in non-restored localities." Address: De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: info@vlinderstichting.nl

2546. Szállassy, N.; Bárdosi, E.; Szabó, Z.; Dévai, G. (2001): Fluctuating asymmetry and mating success in males of *Libellula fulva* Müller, 1764. *Abh. Ber. Naturkundemus. Görlitz* 73(1): 91-92. (in English with German summary). [In this study, individually marked *Libellula fulva* males were used to compare short-term and medium-term methods on the basis of correlating wing asymmetry with mating success.] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

2547. Tabata, O. (2001): Odonae fauna of Hongo, Sasayama City, Hyogo Prefecture. *Sympetrum Hyogo* 7/8: 10-12. (in Japanese with English summary). ["I spent my boyhood catching insects and fish at Kongo, Sasayama City, which was a cosy country surrounded by hills of 300-400 m altitude. Rice fields were fed by upper and middle reaches of two rivers joining there, and many animals including dragonflies were living. A list of 41 odonate species and short account of the habitats are given based on the records in the 1960s and 1990s. Artificial construction works have damaged the habitats, and 16 species are recorded only in the 1960s." (Author)] Address: not stated

2548. Tailly, M. (2001): De libellen van het Kraaibos te Moen-Zwevegem (West-Vlaanderen). *Gomphus* 17(1): 37-45. (in Dutch with English and French summaries). ["The dragonflies of the Kraaibos at Moen-Zwevegem (West-Flanders). The Kraaibos at Moen-Zwevegem is a new site, made by the heaping up of clay when modernising the adjacent canal. The terrain has been planted with trees but a central part with a number of smaller ponds is grazed by ponies. Since 1992 a total of 21 dra-

gonfly species were observed, with *Sympetma fusca* and *Ischnura pumilio*. For 14 of them reproduction was at least probable. Also interesting is the presence since some years of a nice population of *Lestes barbarus*. The text closes with some remarks on the management of the site." (Author)] Address: Tailly, M., Hoonakkerdreef 35, 8791 Waregem marc.tailly@pandora.be

2549. Tailly, M. (2001): Een vondst van *Ischnura pumilio* (Charpentier, 1825) te Moen-Zwevegem (West-Vlaanderen). *Gomphus* 17(1): 46-50. (in Dutch with English and French summaries). ["An observation of *Ischnura pumilio* in Moen-Zwevegem (West-Flanders). One male of this in Flanders threatened species was found on 19/08/2000 on a site with a typical habitat for the species. This fact is discussed with the rareness in the western part of Belgium and its ecology in mind." (Author)] Address: Tailly, M., Hoonakkerdreef 35, 8791 Waregem marc.tailly@pandora.be

2550. Tennessen, K. (2001): Color pattern in immature *Coryphaeschna adnexa*. *Argia* 13(2): 10-11. (in English). [Preparing a description of a new *Coryphaeschna*, the author checked *C. guyanensis* Machet (1991) which was synonymized with *C. adnexa* for colour patterns. The synonymization is correct, but it was possible to show the problems which lead to the description of *C. guyanensis*: obviously the specimen was an teneral with colour patterns which disappear in a few days in immature stage.] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennessen@aol.com

2551. Trapero Quintana, A.; Naranjo Lopez, C. (2001): New locality reports for *Crocothemis servillia* (Drury, 1773) (Odonata: Libellulidae) in Cuba. *Argia* 13(2): 3. (in English). [Compilation of present records of *C. servillia* in Cuba.] Address: not stated

2552. Trockur, B.; Didion, A. (2001): Libellenatlas Saar. Sektion Libellen der Arbeitsgemeinschaft für Tier- und Pflanzengeographische Heimatforschung im Saarland - Delattinia. 83 pp. (in German). [This atlas of the Odonata of the German Federal State Saarland compiles all available data on Odonata. Few data are available from the period prior 1980. An significant increase resulted in the period between 1980 and 1990. The majority of data was obtained after 1990 - 1998 when several odonatologists surveyed with increased intensity the water bodies in Saarland. Data of 55 species are provided. For each species two distribution maps are presented (one with all records of the very species, and one with records of indigeneity) and a table which demonstrates the status of the species in the regional ecoregions ("Naturräumliche Einheiten"). Additional information is given to the regional odonate biodiversity, and an "appendix" with remarkable records including some records from Luxembourg from 1998 - 2001 is added. The booklet contains also an updated Red List and a bibliography. The study is available from the senior author at 10,- EURO (plus P+P).] Address: Trockur, B., Schulstr. 4, D-66636 Tholey-Scheuern

2553. Upson, S.: (2001): A further *Argia lacrimans* population in southeast Arizona. *Argia* 13(1): 19. (in English). [In 1999 and 2000, the species was observed in Leslie Canyon National Wildlife refuge, 16 miles N Douglas, Arizona, USA. Co-occurring species are listed, and useful morphological features to separate it from its nearest congener *Argia pima* are outlined.] Address:

Upton, Sandy, P.O. Box 1453, Bisbee, Arizona, 85603, USA. E-mail: sandyupson@excite.com

2554. Utzeri, C. (2001): Winter oviposition of *Sympetrum striolatum* (Charp.) in central Italy (Anisoptera: Libellulidae). *Notul. odonatol.* 5(8): 106-107. (in English). [In January 2000 and 2001 *Sympetrum* sp. were observed in Italy. "The present record suggests, therefore, that at least at the central Italian latitudes, the yearly extinction of the *S. striolatum* adult population in late autumn is probably caused by long periods of bad weather, including drop of temperature, which preclude dragonfly activity and feeding. If ambient conditions keep relatively good and stable, dragonflies can probably go on with feeding and egg maturation, and perform normal reproductive behaviour, including mating and oviposition." (Author)] Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza". Viale dell'Università 32, 1-00185 Roma, Italy. E-mail: carlo.utzeri@uniroma1.it

2555. Van Gossum, H.; Stoks, R.; De Bruyn, L. (2001): Frequency-dependent male mate harassment and intra-specific variation in its avoidance by females of the damselfly *Ischnura elegans*. *Behav. Ecol. Sociobiol.* 51: 69-75. (in English). ["We focused on male harassment on different female color morphs of the damselfly *Ischnura elegans* and on variation in morph-specific mating avoidance tactics by females. In *I. elegans*, one of the female morphs is colored like the conspecific male (andromorphs) while the other morphs are not (gynomorphs). Our first goal was to quantify morph-specific male mating attempts, hence male harassment, in populations with manipulated population parameters (densities, sex ratios, and proportion of andromorphs). Second, we examined the female's perspective by looking for potential differences in morph-specific mating avoidance tactics and success of those tactics in a natural population. Differences in population conditions did influence the number of male mating attempts per morph. The less frequent female morph was always subject to fewer mating attempts, which contradicts earlier hypotheses on mimicry, but supports those that assume that males learn to recognize female morphs. Gynomorphs occupy less open habitat and often fly away when a male approaches, while andromorphs use more open habitat, do not fly large distances and directly face approaching males. Female morphs did not differ in the proportion of successful mating-avoidance attempts. Our results suggest that the maintenance of the color polymorphism is most probably the result of interactive selective forces depending on variation in all population conditions, instead of solely density- or frequency-dependent selection within populations." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

2556. Vanappelghem, C.; Veille, F. (2001): Observations de *Leucorrhinia rubicunda* (L., 1758) dans le Nord-Pas-de-Calais en 2000 (Odonata, Anisoptera, Libellulidae). *Martinia* 17(3): 91-94. (in French with English summary). [Two male adults of *L. rubicunda* were captured 15 May 2000. The habitat is described, and the existence of local populations is discussed, but it may be likely that the species has (dis)migrated from Belgium.] Address: Veille, F., Office National des Forêts, 19 avenue du General de Gaulle, F-62600 Berck, France

2557. Vizslán, T.; Huber, A. (2001): Odonate records from sub-Carpathia, southwestern Ukraine. *Notul. odonatol.* 5(8): 103-105. (in English). [Records of 24 odonate species from 21 localities in the area of the rivers Latorcyja and Uz are presented. The list includes *Coenagrion pulchellum*, *Erythromma viridulum*, and *Soma-tochlora metallica*] Address: Vizslán, T., Szent Mihály út 9., H-9400 Sopron, Hungary

2558. Wallaschek, M. (2001): Zur Insekten- und Herpetofauna (Odonata, Dermaptera, Blattoptera, Saltatoria: Ensifera et Caelifera, Amphibia, Reptilia) von Trocken- und Feuchtgebieten im Landkreis Eichsfeld (Thüringen). *Thüringer faunistische Abhandlungen* 8: 7-36. (in German with English summary). [22 odonate species from 7 sampling localities are documented and briefly discussed. *Lestes dryas*, *L. virens*, *Sympetma fusca*, *Ischnura pumilio*, *Sympetrum flaveolum*, and *Leucorrhinia rubicunda* are of some regional interest.] Address: Wallaschek, M., Agnes-Gosche-Str. 43, D-06120 Halle (Saale), Germany

2559. Weatherhead, M.A.; James, M.R. (2001): Distribution of macroinvertebrates in relation to physical and biological variables in the littoral zone of nine New Zealand lakes. *Hydrobiologia* 462: 115-129. (in English). ["[...] there have been few attempts to relate macroinvertebrates to habitat factors in lakes. In this study, nine mainly oligotrophic lakes from throughout New Zealand were surveyed for macroinvertebrates. The lakes were selected to represent a range of suspended sediment loading and lake level regimes. Within each lake, several sites were selected to provide a range of exposure to wave action. A multiple regression approach was taken to relate macroinvertebrate community composition and habitat characteristics. The results of the analysis suggest that the littoral zone of the lakes we studied could be divided into four general habitats. The first is the wave wash zone characterised by coarse substrates and macroinvertebrate taxa usually associated with lotic environments, such as Ephemeroptera and Plecoptera. The second habitat is associated with macrophytes and is limited at the top by wave action and at depth by light attenuation. In this zone, the snail *Potamopyrgus antipodarum* is dominant, along with Trichoptera and Odonata. At the base of the macrophytes is the detrital habitat characterised by fine, organic rich sediments and dominated by chironomids, oligochaetes and Trichoptera. At depths below the macrophyte zone, fine sediments are found, and bivalves such as the freshwater mussel *Hyridella menziesi* are common. While macroinvertebrate abundance can be highly variable, some general predictions of community structure can be made based on a few key environmental factors. Abundance of snails, Odonata and Trichoptera was positively related to macrophyte biomass. Some macroinvertebrate groups such as oligochaetes, chironomids, snails and bivalves were more common in line substrates, while Ephemeroptera were characteristic of coarse substrates. Detrital biomass was important for most of the macroinvertebrate groups studied showing a positive relationship for oligochaetes and Trichoptera and a negative relationship for Ephemeroptera and Plecoptera." (Authors)] Address: Weatherhead, M.A., Natl Inst Water & Atmospher Res Ltd, POB 8602, Christchurch, New Zealand

2560. Weihrauch, F. (2001): Entwicklung von *Onychogomphus f. forcipatus* in einem Kleingewässer (Odonata)

ta: Gomphidae). *Libellula* 20 (3/4): 149-154. (in German with English summary). ["From May 21 to June 02 2001, 175 exuviae of *O. f. forcipatus* were collected at a shallow gravel pond with a size of almost 300 m² in Munich, Bavaria, Germany. This is the first record of the successful development of the species in waters of that kind. Besides, this is the hitherto earliest seasonal record of *O. f. forcipatus* from Bavaria." (Author)] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Florian.Weihrauch@t-online.de

2561. Weipert, J.; Bößneck, U. (2001): Die Schutzgebiete der Landeshauptstadt Erfurt (Thüringen) Teil IV: Flora und Fauna des GLB "Dorfstattwiese". Veröff. Naturkundemus. Erfurt 20: 57-80. (in German with English summary). [Thuringia, Germany; in 1995, five common odonate species were recorded.] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Staffenbergallee 18, D-99085 Erfurt, Germany

2562. Werzinger, S.; Werzinger, J. (2001): Ganz schön flexibel! Zur Entwicklung von *Anax parthenope* in Bayern (Odonata: Aeshnidae). *Libellula* 20(3/4): 131-148. (in German with English summary). ["A Bavarian larval generation of *A. parthenope* developed bivoltin as well as univoltin. At an unused fish-free pond we recorded 244 exuviae - 226 (92,6 %) during the autumn in 1998 and 18 (7,4 %) during the following spring in 1999. The pond was located in an area of about 400 km², the so-called Florisches Weihergebiet, about 40 km northwest of Nuremberg. *A. parthenope* is well known here for several decades, but there have been no breeding records so far. Since 1998 we observed increasing occurrences of imagines, especially in springtime. In spite of the successful development in 1998 and 1999 it is still unknown where the breeding generations normally origin. Larval development and emergence of *A. parthenope* are discussed." (Authors)] Address: Werzinger, S., Düsseldorfer Str. 15, D-90425 Nürnberg, Germany. E-mail: Werzinger-Nbg@t-online.de

2563. Wildermuth, H.; Bauer, S. (2001): Das Wurzelgeflecht schwimmender Seggenstöcke als Mikrohabitat von Libellenlarven (Odonata). *Libellula* 20(1/2): 33-45. (in German with English summary). ["Larvae of 4 Zygoptera and 4 Anisoptera species were found among roots and in cavities of floating sedge (*Carex elata*, *C. paniculata*) tussocks of two small moorland lakes in southern Germany. *Cordulia aenea* was the most numerous species, followed by *Platycnemis pennipes*, *Erythromma najas*, *Somatochlora metallica*, *Aeshna grandis* and *Epitheca bimaculata*. Prior to the emergence period of the «spring species», a single tussock harboured at least 1 and 46 larvae at most (43 *C. aenea*) on a probing day. Final stage larvae of *C. aenea* amounted up to 77% of a day total. The root system of sedge tussocks at steep lake and pond shores otherwise poor in structure turned out to be an important microhabitat for dragonfly larvae, especially during the final stage, as well as for many other benthic animal species. Measures for conservation and promotion of the structural diversity at the shores of stagnant waters are discussed." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

2564. Wildermuth, H. (2001): Moostierchen und Zuckmücken als Epizoen von *Macromia amphigena* (Bryo-

zoa: Plumatellidae; Diptera: Chironomidae; Odonata: Macromiidae). *Libellula* 20(1/2): 97-102. (in German with English summary). ["A small colony of *Fredericella* sp. was found on the left hind leg of an exuvia of *M. amphigena* originating from the Bevd River of the Novosibirsk District, Siberia, Russia. The same exuvia bore four cases of chironomid larvae, two attached to the mesothorax, one to the femur of the right hind leg and one to the 6th abdominal tergite." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

2565. Wildermuth, H. (2001): Zuckmückenlarven als Epizoen von *Somatochlora metallica* (Diptera: Chironomidae; Odonata: Corduliidae). *Libellula* 20 (3/4): 171-174. (in German with English summary). ["In a pond SE of Zürich, Switzerland a living red chironomid larva within its tube consisting of mud particles was found firmly attached to the dorsal side of the abdomen of a F-0-larva of *S. metallica*. The role of Odonata larvae for epizoic chironomids is discussed." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

2566. Williams, C.E. (2001): Avian dragonfly collectors (Anisoptera). *Notul. odonatol.* 5(8): 107. (in English). [In July 1998 Purple martins [...] were observed feeding large dragonflies to their almost fully-grown fledglings. The species turned out to be *Anax junius*, *Macromia annulata*, and the very rare *Anax amazili*.] Address: Williams, C.E., 704 Foster Street, Marlin, Texas 76661-2428, US

2567. Williamson, T.; Meurgey, F. (2001): Microhabitats refuges pour d'Ischnura elegans (Vander Linden, 1820) et *Platycnemis pennipes* (Pallas, 1771) (Odonata, Zygoptera, Platycnemididae et Coenagrionidae). *Martinia* 17(3): 110. (in French). [A case of drought resistance resp. the use of terrestrial habitats of larvae and the co-occurring macrobenthic species are outlined.] Address: Williamson, T., 13, impasse du Moulin, F-49270 Champtoceaux, France

2568. Willigalla, C.; Artmeyer, C. (2001): Zur Verbreitung von *Sympecma fusca* (Vander Linden) und *Gomphus vulgatissimus* (Linnaeus) (Odonata: Lestidae & Gomphidae) in Nordrhein-Westfalen. *Verh. Westd. Entomol. Tag 2000*: 287-290. (in German). [The development of knowledge of the distribution of *S. fusca* and *G. vulgatissimus* in the Federal State Nordrhein-Westfalen, Germany is briefly outlined. *S. fusca* could be observed in 12.8% of all grid squares. In most cases records refer to single specimens, only few strong populations are existing. Records of *G. vulgatissimus* increased in the past years significantly.] Address: Willigalla, C., Brock 45, D-48346 Ostbevern, Germany. E-mail: christoph@willigalla.de

2569. Wong, A.; Forbes, M.R.; Smith, M.L. (2001): Characterization of AFLP markers in damselflies: prevalence of codominant markers and implications for population genetic applications. *Genome* 44(4): 677-684. (in English). ["Amplified fragment length polymorphism (AFLP) analysis is becoming increasingly popular as a method for generating molecular markers for population genetic applications. For practical considerations, it is generally assumed in population studies that AFLPs segregate as dominant markers, i.e., that present and absent are the only possible states of a given locus. We tested the assumption of dominance in natural popula-

tions of the damselfly *Nehalennia irene* [...]. Electroblotted AFLP products from 21 samples were probed with individual markers. Eleven markers were analyzed, of which two were monomorphic and nine were polymorphic. Only two of the polymorphic markers behaved in a strictly dominant manner. The remaining seven polymorphic markers displayed various degrees of codominance, with 2-10 visible alleles in the sample. Of the three markers displaying the highest degree of variability, two contained microsatellite repeat tracts. Our results suggest that the assumption of dominance is unfounded. As a result, AFLP analysis may be unsuitable for estimating several important population genetic parameters, including genetic diversity." (Authors)] Address: Wong, A., Carleton Univ, Dept Biol, Ottawa, ON K1S 5B6, Canada

2570. Xylander, W.E.R.; Stephan, R. (2001): Libellenzönosen in Braunkohle-Tagebaufolgelandschaften als Reflexion von Rekultivierung und Sukzession. Abh. Ber. Naturkundemus. Görlitz 73(1): 93-95. (in German with English summary). ["Since 1996 dragonflies are documented in ca. 50 ponds of a lignite-mining site close to Görlitz where mining took place until December 1997. 49 species were found, 28 of which are listed in the red data list for dragonflies in Saxony, Germany. This high number is the result of a complex biotope mosaic. Since the beginning of the investigation, a decline of some species could be documented (mostly due to reclamation activities) whereas other species, which prefer later stages of succession, increased in number (mostly owing to the enhanced development of vegetation as a result of amelioration)."] (Authors)] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

2571. Xylander, W.E.R. (Hrsg.) (2001): Kurzfassungen der Vorträge der 20. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen [GdO], Görlitz, 16.-18. März 2001. Abh. Ber. NaturkMus. Görlitz 73(1): VIII + 100 pp. (in German). [Behrends, T.: Libellen-Monitoring im Rahmen des E & E-Projektes "Halboffene Weidelandchaft Höltigbaum" von 2000-2004 (pp. 1-2); - Bender, J., W.E.R. Xylander & R. Stephan: Lösungsansätze im Zielkonflikt zwischen Rekultivierung und Naturschutz in der Bergbausanierung: Wiederherstellung eines Libellengewässers auf Halden des Braunkohletagebaus Berzdorf (pp. 3-8); - Brockhaus, T. & U. Fischer: Die Verbreitung von *Cordulegaster boltonii* und *Somatochlora arctica* in Sachsen: Ergebnisse aus dem Projekt "Entomofauna Saxonica" (p. 9); - Clausnitzer, H.-J.: Die Zwerglibelle (*Nehalennia speciosa*) in Niedersachsen (pp. 11-12); - Conze, K.-J. & C. Göcking: "FFH-Libellenarten" in Nordrhein-Westfalen (NRW) (pp. 13-15); - Donath, H.: Sukzessionsverlauf und Libellenzönosen an Tagebauseen im Naturpark Niederlausitzer Landrücken (pp. 17-18); - Ellwanger, G.: Verbreitungskarten der Libellenarten der Anhänge II und IV der FFH-Richtlinie in Deutschland auf der Basis des Messischblatrsters (pp. 19-21); - Glatzle, B.: Die Rolle der Libellen im Nahrungsspektrum der Gebirgsstelze *Motacilla cinerea* Tunstall, 1771 an einem Tieflandfluss (pp. 23-24); - Günther, A.: Differenzierung von Drohflügen und Balzverhalten verschiedener *Rhinocypha*-Formen Sulawesi (Indonesien) (pp. 25-26); - Hardersen, S.: "Fluctuating Asymmetry" als Instrument für die Bioindikation mit Libellen (pp. 27-28); - Hartung, M.: Bestimmung von isolierten Flügeln von Gomphiden am Ufer

der Oder (pp. 29-31); - Hünken, A. & C. Schütte: Im Trüben fischen: Pradation von Flussbarschen auf *Catopteryx*-Larven (pp. 33-34); - Huth, J.: Libellen (Odonata) der Braunkohlen-Bergbaufolgelandschaft Sachsen-Anhalts (pp. 35-37); - Jakob, T., Z. Mutter & G. Devai: Quantitative survey of *Gomphus flavipes* (Charpentier, 1825) exuviae along river Tisza (p. 39); - Keil, R.: Die Rolle von Libellen in der historischen Karpfenteichwirtschaft (pp. 41-43); - Krüner, U.: *Orthetrum brunneum* (Fonscolombe, 1837), ein fester Bestandteil der Libellenfauna in NRW? (pp. 45-46); - Kuhn, J.: Prozessschutz versus Nutzung und Pflege: Probleme des Libellenschutzes in Mooren des süddeutschen Alpenvorlandes (pp. 47-49); - Martens, A.: Experimente zur Sitzplatzwahl von *Onychogomphus f. forcipatus* (L., 1758) (p. 51); - Mauersberger, R. & F. Petzold: Seen als Habitate für *Onychogomphus f. forcipatus* (L.) im Jungpleistozängebiet Nordost-Deutschlands (pp. 53-55); - Mikolajewski, D.-J.: Dornenausbildung bei Larven der Gattung *Sympetrum* (Odonata: Anisoptera): Induzierbarer Schutz gegen Fischpradation (pp. 57-58); - Müller, J. & R. Steglich: Zur Indikation der "FFH-Tauglichkeit" der Elbe durch die Flussjungfern (Gomphidae) (pp. 59-61); - Müller, O. & B. Müller. Sand oder Algen? Habitatwahlverhalten der Larven von *Onychogomphus f. forcipatus* (L., 1758) (p. 63); - Müller, Z., T. Jakob, G. Devai & N. Szdllassy: The effect of habitat degradation on dragonfly assemblages on the floodplain of the river Tisza (pp. 65-66); - Ott, J.: Erfahrungen aus der Planungspraxis bei Monitoringstudien mit Libellen (pp. 67-68); - Schmidt, E.G.: Strittige systematische Fragen auf Gattungsniveau bei mitteleuropäischen Libellen (Odonata) (pp. 69-77); - Schnabel, H.: Untersuchungen zum Vorkommen larval überwinternder Libellenlarven in Karpfenteichen des Oberlausitzer Heide- und Teichgebietes (pp. 79-83); - Stephan, R. & W.E.R. Xylander: Die Libellen der Umgebung von Görlitz, gestern und heute (pp. 85-89); - Szdllassy, N., E. Bdrdosi, Z. Szabo, Z. Müller & G. Devai: Fluctuating asymmetry and mating success in males of *Libellula fulva* Müller, 1764 (pp. 91-92); - Xylander, W.E.R & R. Stephan: Libellenzönosen in Braunkohle-Tagebaufolgelandschaften als Reflexion von Rekultivierung und Sukzession (pp. 93-95); - Teilnehmerliste (pp. 97-99).] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

2572. Zhang, J.F.; Zhang, H.C. (2001): New findings of larval and adult aeschnidiids (Insecta: Odonata) in the Yixian Formation, Liaoning Province, China. *Cretac. Res.* 22(4): 443-450. (in English). ["Two new species referable to two new genera of the family Aeschnidiidae are described. *Stylaeschnidium rarum* gen. et sp. nov. is based on a pair of near-ultimate instar female larvae, and *Dracontaeschnidium orientale* gen. et sp. nov. on a single adult hindwing. The age of the dragonfly-bearing beds of the Yixian Formation in Liaoning, China, may be as old as latest Jurassic and as young as mid-Early Cretaceous, A larval mask described previously from Transbaikal, Russia, is unrelated to aeschnidiids, it belongs instead to the larvae of *Hemeriscopos baissicus* Pritykina, 1977 within the Hemeroscopidae, whereas the adult *Hemeriscopos baissicus* is probably related to the larva *Hemeriscopos baissicus* according to new material recently recovered in China." (Authors)] Address: Zhang, J.F., Chinese Acad. Sci., Nanjing Inst. Geol. & Palaeontol., Nanjing 210008, Peoples Rep. China

2573. Zimmermann, W. (2001): Rote Liste der Libellen (Odonata) Thüringens. 3. Fassung, Stand 10/2001. Naturschutzreport 18: 76-79. (in German). [Red list of endangered Odonata from Thuringia, Germany. 52 of the 61 Thuringian Odonata are autochthonous, 32 species are redlisted. Compared with the second version of the list (Zimmermann & Mey, 1993) *Calopteryx splendens*, *Coenagrion hastulatum*, and *Aeshna grandis* could be deleted from the list due to improvement of knowledge or increasing populations. *Leucorrhinia dubia* and *Erythromma najas* had to be added due to decline of populations, and *Coenagrion ornatum*, *Gomphus vulgatissimus*, *Thecagaster bidentata*, and *Leucorrhinia albifrons* have been (re-)discovered in recent years.] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

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2574. Andrew, R.J. (2002): Egg chorionic ultrastructure of the dragonfly *Tramea virginia* (Rambur) (Anisoptera: Libellulidae). *Odonatologica* 31(2): 171-175. (in English). ["SEM studies reveal that the egg chorion of *T. virginia* is divided into an outer soft exochorion and an inner tough endochorion. The exochorion expands into a jelly-like, sticky coat in water, while the endochorion is smooth, thin and unsculptured. The apically situated micropylar apparatus is formed of a large, dome-shaped, sperm-storage chamber and a small, flat, micropylar stalk which contains a pair of circular micropylar orifices. The micropylar apparatus is encircled by an exochorionic collar. The chorion is modified in accordance with the aquatic (still-water) mode of oviposition exhibited by this species while the micropylar apparatus is shaped to fit in the fertilization pore of the vagina." (Author)] Address: Andrew, R.J., Department of Zoology, Shri Shivaji ESA's Science College, Congress Nagar, Nagpur - 440012 (MS), India

2575. Bede, L.C.; Machado, A.B.M.; Piper, W. (2002): *Erythrodiplax venusta* (Kirby), an Amazonian species introduced into Minas Gerais, SE Brazil (Anisoptera: Libellulidae). *Notul. odonatol.* 5(9): 113-114. (in English). [The distribution of *E. venusta* encompasses the Amazonian parts of Venezuela, Surinam, Guiana, Bolivia, Peru and northern to western Brazil. The compilation of Borror (1942) and the examination of the Machado-collection with material from all Brazilian states showed *E. venusta* to be restricted to the Amazonian region, thus not belonging to the fauna of Minas Gerais, a state that has been intensively collected for about 50 years. It was surprising therefore, that on February 26 and April 9, 1994, 5 male *E. venusta* were collected at the Sumidouro lake (municipalities of Pedro Leopoldo & Lagoa Santa, Minas Gerais, southeast Brazil, 19°32'05"S; 43°56'28"W), a locality situated as far as 1300 km from the hitherto known southernmost range of this species, in Mato Grosso. The locality was surveyed formerly by Machado in March 1975. At that time, no *E. venusta* was sighted. The authors conclude, that these circumstances indicate that this species has been introduced into the area not too long ago, and the question raised as to how it was transported there. The possibility that *E. venusta* was brought to the Lagoa Santa region by some atmospheric phenomenon, involving wind transportation, cannot be ruled out. However, in 1984 a modern airport was built in the area (Confins Internatio-

nal Airport, ca 20 km from the Sumidouro lake) and started receiving regular cargo from the northern cities, like Manaus and Belem, where *E. venusta* occurs. Therefore it is probable that the species may have been incidentally introduced into the area by aircraft. The Confins Airport frequently receives ornamental and game fish from the Amazon region, bringing the possibility of eventual introduction of dragonfly eggs or larvae into the Lagoa Santa karst system.] Address: Bede, L.C., Laboratorio de Ecologia e Comportamento de Insetos, Departamento de Biologia Geral, ICB/UFMG, C.P. 486, BR-31270-901 Belo Horizonte, MG, Brazil

2576. Belle, J. (2002): Commented checklist of the Odonata of Surinam. *Odonatologica* 31(1): 1-8. (in English). ["A list is given of 283 spp. and sspp., referable to 87 genera of 15 families. Some additional taxa are evidenced but remain unidentified. Notes are supplied on some spp. *Hetaerina cruentata*, *Argia extranea*, *Phyllocycla signata*, *Phyllogomphoides audax*, *Dythemis sterilis*, *D. velox*, *Erythrodiplax attenuata*, *E. ochracea*, *E. aequatorialis*, and *Perithemis waltheri* are deleted from the national list." (Author)] Address: Belle, J., Onder Beumkes 35, NL-6883 HC Velp, The Netherlands

2577. Bernard, R. (2002): First records of *Aeshna crenata* Hagen, 1856 in Lithuania with selected aspects of its biology (Odonata: Aeshnidae). *Opusc. zool. flumin.* 202: 1-21. (in English). [The six Lithuanian records of *A. crenata* have significantly broadened the known range of the species to the southwest. Its habitat - wind sheltered, mostly Shagnum-rich lakes - is characterized in detail. The size of individuals and the thoracic pattern are briefly described. Some aspects of the emergence are presented. The behaviour of territorial males and ovipositing females is described in great detail. The co-existence with other aeshnids is briefly analysed, with reference to spatial segregation between *A. crenata* and *A. juncea* / *A. subarctica elisabethae*. The 6 localities are described in detail and the co-occurring odonate species are listed, among them *Nehalennia speciosa*, *Epithea bimaculata*, *Leucorrhinia albifrons*, and *L. caudalis*.] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

2578. Beukema, J.J. (2002): Changing distribution patterns along a stream in adults of *Calopteryx haemorrhoidalis* (Odonata: Calopterygidae): a case of larval-drift compensation? *International Journal of Odonatology* 5(1): 1-14. (in English). ["The distribution of an isolated population of adult *C. haemorrhoidalis* was studied along a small stream in NE Spain, during two-week or three-week summer periods over five years. Distribution patterns differed consistently between age groups. Reproductive activities took place along the entire stream, whereas the presence of teneral and older immature individuals was restricted to the lower reaches of the stream. It is concluded that emergence took place only in the lower reaches and that this can be explained by larval drift due to strong currents regularly depleting the upper half of the stream. Recovery of individually marked teneral specimens indicated that immature individuals remained in the area around the lower reaches, during roughly the first week of their adult life. During the following week, when they had attained mature wing coloration but did not yet show reproductive activities, they moved for long distances.

This was particularly true for newly matured males, where the distance between two successive encounters could amount to hundreds of meters. By far the greatest proportion of these moves was upstream. Movement in later life stages, i.e. during the reproductive part of their life, was infrequent, much shorter and less consistently directed, though generally more often upstream than downstream. Once the males defended a territory, they hardly moved anymore. Territories were spread more evenly along the stream at high rather than at low overall densities. It is concluded that territorial behaviour contributed to a more even distribution of mature males and that an inborn tendency to fly upstream is not a prerequisite for the observed upstream-biased dispersal during adult life." (Author)] Address: Beukema, J.J., Netherlands Institute for Sea Research, P.O. Box 59, NL-1790 AB Den Burg, Texel, The Netherlands. E-mail: janb@nioz.nl

2579. Beukema, J.J. (2002): Survival rates, site fidelity and homing ability in territorial *Calopteryx haemorrhoidalis* (Vander Linden) (Zygoptera : Calopterygidae). *Odonatologica* 31(1): 9-22. (in English). ["In a small isolated population along a small stream in NE Spain, a high proportion of the adults present were individually marked. During subsequent days, their locations were assessed by twice-daily surveys along the entire length of the stream. Mean daily survival rates in mature males and females and pre-reproductive males were similar, 94%. Only during the first day after marking were survival rates significantly lower (viz. 77 to 84% in the various groups). High proportions (around 90%) of mature males were found to return to the same (territory) site every morning once they had occupied that site for 2 or more days. Site fidelity was low in pre-reproductive males and intermediate in mature females. In a displacement experiment, 67 territorial males were transferred one by one to distant locations (80 to 240 m along the stream). Half of them returned to their original territory, usually on the same day." (Author)] Address: Beukema, J.J., Netherlands Inst Sea Research, POB 59, NL-1790 AB Den Burg, The Netherlands. e-mail: janb@nioz.nl

2580. Bowles, B. (2002): Results of the 2001 Garden Odonate Count. *Ontario Insects* 7(2): 39. (in English). [Canada, Ontario; the 5th annual Garden Odonate count was held on Saturday, July 14, 2001. Five observers tallied a total of 26 species and 1581 individuals. A male Midland Clubtail (*Gomphus fratremus*) represents a new species for Victoria County.] Address: not stated

2581. Bowles, B. (2002): Results of the 2001 Pelee Island Butterfly and Odonate Counts. *Ontario Insects* 7(2): 34-35. (in English). ["The 2nd annual Pelee Island Odonate count was held on Sunday, August 5, 2001. Twelve observers reported only 12 species and 82 individuals. Hot dry weather in late July probably contributed to the low numbers of Odonata on the island. No new species were reported for the Pelee Island list." (Author)] Address: not stated

2582. Bowman, N. (2002): Reports from Coastal Stations - 2001: Eccles-on-Sea, Norfolk. *Atropos* 15: 64. (in English). [United Kingdom; *Erythromma viridulum*, *Sympetrum sanguineum*, *Aeshna juncea*] Address: not stated

2583. Brockhaus, T.; Fischer, U.; Günther, A.; Phoenix, J. (2002): Das Projekt "Libellenfauna Sachsen

2004". *Mitt. Sächs. Entomol.* 56: 18-20. (in German). [It is planned to enlarge and to compile information on the Saxonian Odonata to be published in 2004. Odonatologists are asked to make available old and current data referring Saxonia, Germany.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

2584. Broek, J. van den (2002): *Libellen en juffers in waterverf*. *Natuur & Techniek* 70(6): 52-53. (in Dutch). [This is a quite unusual review of a new book on Odonata: De Nederlandse Vereniging voor Libellenstudie. De Nederlandse fauna Deel 4. De Nederlandse libellen. Utrecht. 496 pp. ISBN 90-5011-154-8. On two pages illustrations (watercolour pictures) are presented, and some information on the artists, the publishing politics of the Nationaal Natuurhistorisch Museum Naturalis, Leiden, and the content of the book are given. The species illustrated are: *Anax imperator*, *Cordulegaster boltonii*, *Libellula depressa*, *Lestes barbarus*, *Chalcolestes viridis*, *Enallagma cyathigerum*, and *Calopteryx virgo*.] Address: not stated

2585. Buczynski, P.; Theuerkauf, J.; Rouys, S. (2002): New records of *Cordulegaster bidentata* Sélys, 1843 (Odonata: Cordulegastridae) from the Bieszczady Mountains. *Wiad entomol.* 20(2/4): 183-184. (in Polish). [Two new records are added to the previously known app. 40 records of this species rare in Poland.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2586. Buskirk, J., van (2002): Phenotypic lability and the evolution of predator-induced plasticity in tadpoles. *Evolution* 56(2): 361-370. (in English). ["The hypothesis that predator-induced defenses in anuran larvae are maintained by divergent selection across multiple predation environments has not been fully supported by empirical results. One reason may be that traits that respond slowly to environmental variation experience a fitness cost not incorporated in the standard adaptive model, due to a time lag between detecting the state of the environment and expressing the phenotypic response. I measured the rate at which behavior and morphology of *Rana temporaria* tadpoles change when confronted with a switch in the predation environment at two points in development. Hatchling tadpoles that had been exposed during the egg stage to *Aeshna* dragonfly larvae were not phenotypically different from those exposed as eggs to predator-free conditions, and both responded similarly to post-hatching predator treatments. When 25-day-old tadpoles from treatments with and without dragonflies were subjected to a switch in the environment, their activity budgets reversed completely within 24-36 h, and their body and tail shape began changing significantly within 4 days. The behavioral response was conservative: Tadpoles switched from high-risk to predator-free treatments were slower to adjust their activity. The study confirmed that behavioral traits are relatively labile and exhibit strong plasticity, but it did not reveal such a pattern at the level of individual traits: Morphological traits that developed slowly did not show the least plasticity. Thus, I found that differences in lability of traits here useful for predicting the magnitude of plasticity only for fundamentally different kinds of characters." (Author)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

- 2587.** Carvalho, A.L.; Werneck-de-Carvalho, P.C.; Caill, E.R. (2002): Description of the larvae of two species of *Dasythemis* Karsch, with a key to the genera of Libellulidae occurring in the states of Rio de Janeiro and São Paulo, Brazil (Anisoptera). *Odonatologica* 31(1): 23-33. (in English). ["The ultimate instar larvae of *D. mincki* and *D. venosa* are described and illustrated, based on material from SE Brazil, and general notes on the breeding habitats are provided. A preliminary key to the genera of Libellulidae larvae occurring in the region is appended." (Authors)] Address: Carvalho, A.L., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Caixa Postal 68044, BR 21944-970, Cidade Universitária, Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br
- 2588.** Cham, S. (2002): The range expansion of small Red-eyed Damselfly *Erythromma viridulum* (Charp.) in the British Isles. *Atropos* 15: 3-9. (in English). [This is an detailed up date of the current state of colonisation of the British Isles by *E. viridulum*. Known records are documented and the recent distribution of the species is mapped.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com
- 2589.** Cheverton, J. (2002): Emperor *Anax imperator* predated Brimstone *Gonepteryx rhamni*. *Atropos* 15: 75. (in English). [Parkhurst Forest, Isle of Wight, UK, 30 May 2001. A female *A. imperator* spent at least five minutes consuming its prey.] Address: Cheverton, J., 6 Westhill Drive, Shanklin, Isle of Wight, PO37 6PX, UK
- 2590.** Chovanec, A.; Schindler, M.; Waringer, J. (2002): Bewertung des ökologischen Zustandes eines Donaualtarmes ("Alte Donau") in Wien aus libellenkundlicher Sicht (Insecta: Odonata). *Lauterbornia* 44: 83-97. (in German with English summary). ["The ecological status of a Danubian backwater (Old Danube) situated in Vienna (Austria) was assessed by a dragonfly survey. 8 field trips were conducted at 9 sites (shore length = 100 m). A total of 20 species was recorded, 17 of them autochthonous. In this study a new assessment procedure based on the Odonate Habitat Index ("OHI") was applied. The range of site-specific index values was very close (2.49-3.05) with the mean OHI being 2.81. These numbers indicate a low level of habitat diversity. The comparison of the status quo with a reference condition is the basis of the assessment of the ecological status according to the EU Water Framework Directive. According to this the ecological status of the Old Danube was ranked as class III ("moderate ecological status") in the 5-tiered classification scheme. Missing littoral habitat structures and the lack of hydrological dynamics are the main reasons for this result." (Authors)] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria
- 2591.** Chovanec, A.; Raab, R. (2002): Die Libellenfauna (Insecta: Odonata) des Tritonwassers auf der Donauinsel Wien - Ergebnisse einer Langzeitstudie, Aspekte der Gewässerbewertung und der Bioindikation. *Densia* 03: 63-79. (in German with English summary). [The paper presents a long-term study dealing with the colonisation of a man-made pond by dragonflies. Between 1990-1998 a total of 36 species had been observed. A steady increase of number of species over this period could be observed. Finally, in 1998, 29 species were recorded, 23 of them have been classified as autochthonous or probably autochthonous. The species inventory comprises species typical of open water areas with floating macrophytes, for dense reed stands and for littoral zones poor in vegetation. The dragonfly fauna of a potentially natural dragonfly fauna (reference fauna) is compared with the current fauna.] Address: Raab, R., Anton Bruckner-Gasse 2/2, A-2232 Deutsch-Wagram, Austria. E-mail: rainer.raab@gmx.at
- 2592.** Clancy, S. (2002): Reports from Coastal Stations - 2001: Dungeness area, Kent. *Atropos* 15: 59-60. (in English). [United Kingdom; *Erythromma viridulum*, *Anax parthenope*, *Sympetrum fonscolombii*] Address: not stated
- 2593.** Clausnitzer, V.; Lindeboom, M. (2002): Natural history and description of the dendrolimnetic larva of *Coryphagrion grandis* (Odonata). *International Journal of Odonatology* 5(1): 29-44. (in English). ["The morphology of the last stadium larvae of the African *C. grandis* is described for the first time, based on one exuvia and three last instar larvae from Kenya. Taxonomically important morphological characters are illustrated and discussed. [...] Notes on habitat conditions are given and compared with results for other odonate species, which are known to breed in phytotelmata. The systematic position of *Coryphagrion* is briefly discussed. *Coryphagrion* is hypothesised to be phylogenetically closely related with the neotropical family Pseudostigmatidae based on larval morphology, adult morphology, behaviour and ecology." (Authors)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: wesche@mail.uni-marburg.de
- 2594.** Clausnitzer, V. (2002): Reproductive behaviour and ecology of the dendrolimnetic *Hadrothemis scabrifrons* (Odonata: Libellulidae). *International Journal of Odonatology* 5(1): 15-28. (in English). ["Oviposition in water-filled tree holes and mating behaviour of *H. scabrifrons* was observed in a lowland coastal forest in Kenya. Conforming with the predominant mode of oviposition in the Libellulidae, females of *H. scabrifrons* touch the water with their ovipositor while hovering above tree holes. Male behaviour is opportunistic: usually males perch and patrol in clearings away from tree holes but at exceptionally large tree holes males are territorial and guard mates. Larvae and adults were found in different seasons; the species seems to be non-seasonal." (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: wesche@mail.uni-marburg.de
- 2595.** Corbet, P.S. (2002): Stadia and growth ratios of Odonata: a review. *International Journal of Odonatology* 5(1): 45-73. (in English). ["A terminology is presented for structures and events in larval development of Odonata with the aim of bringing terms into conformity with those used for other insect orders in the light of accepted views of homology. The terms 'exuvia', 'larva', 'prolarva' and 'stadium' receive special mention. Records of the number of stadia required to complete larval development for 118 species are listed and analysed, showing that the range for Odonata is 8 through 18 stadia (8 through 18 for 8 species of Anisoptera; 8 through 17 for 38 species of Zygoptera) averaging 12.4 stadia for the order (Anisoptera 12.5 and Zygoptera 12.2), in which >90% of records range from 10 through 16 stadia (both Anisoptera and Zygoptera >90%). The number of stadia varies between and within species,

sometimes within members arising from a single egg batch. No unifying hypothesis exists to rationalize variation in the number of stadia. Duration of successive stadia within a species can be a smooth, increasing progression but can also show wide departures from such a pattern. Duration of a single stadium can range from 1 day (or <1 day in the prolarva) through >1 year. Uniformity of size of the final-stadium larva can be achieved by the growth ratio (between successive ecdyses) compensating for the number of stadia. Aeshnidae typically have more stadia than do Libellulidae and also have a smaller average growth ratio. Ontogenetic profiles of growth ratios for different dimensions tend to have a characteristic form for each dimension, regardless of the eventual number of stadia. For some dimensions (e.g. headwidth) and some species the profile forms a smooth declining progression but for others (e.g. length of caudal appendage) it fluctuates irregularly. Headwidth therefore represents the dimension of choice for specifying stages of larval development. Rewarding avenues for research include the documentation of prospective links between larval life style on the one hand and stadal numbers and growth-ratio profiles on the other, and discovery of morphological characters that make it possible to determine to species larvae of early stadia." (Author)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

2596. Cordero Rivera, A.; Egido Perez; F.J.; Andres, A. (2002): The effect of handling damage, mobility, body size, and fluctuating asymmetry on lifetime mating success of *Ischnura graellsii* (Rambur) (Zygoptera: Coenagrionidae). *Odonatologica* 31(2): 117-128. (in English). ["Several species of odonates have been the subject of sexual selection studies. In non-territorial species most variance in lifetime mating success (LMS) is accounted for by lifespan and specially by the number of visits, and random factors (like rainy weather) can have strong effect on reproductive success. Here we present the study of 2 natural populations of *I. graellsii* by marking-recapture methods. Our results show that male mating success is related to body size, mobility and handling damage, but not to fluctuating asymmetry. Larger males had greater success in both populations, a result in agreement with previous findings on the same sp. Nevertheless, multivariate analyses indicate that body length was a significant correlate of LMS in just one of the studied populations. We estimated a mobility index for males averaging the distance between consecutive resightings. For long-lived males, we found a positive relationship between mobility and LMS. There was a clear effect of leg loss during marking on survivorship, and a marginally significant negative effect on LMS. Finally, we studied the effect of wing fluctuating asymmetry (FA) on LMS by capturing a sample of marked individuals at the end of field work. Results suggest that FA is not an important correlate of LMS in this sp." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

2597. Covanec, A.; Schiemer, F.; Waidbacher, H.; Spolwind, R. (2002): Rehabilitation of a heavily modified river section of the Danube in Vienna (Austria): Biological assessment of landscape linkages on different scales. *Internat. Rev. Hydrobiol.* 87: 183-195. (in German with English summary). ["The ecological condition

of the Danube section in Vienna (Austria) has been greatly impaired by urban development, regulation, channel straightening and the construction of a hydroelectric power plant. In 1997, the shoreline of the Danube in this area was restructured by artificial side channels, coves, gravel banks, pools and temporary waters. A monitoring programme has been established focusing on the investigation of the functional integrity of these inshore structures: first results show that the sites isolated from the Danube serve as stepping stone biotopes for dragonflies and amphibians. Particularly amphibians are suitable indicators of the ecological functioning of riparian migration linkages on a (macro-) habitat scale. Rheophilic fish species (e.g. *Chondrostoma nasus*) colonise side channels connected with the Danube and indicate a longitudinal connectivity on a landscape scale. The role of these structures within an urban greenway is discussed." (Authors) Fig. 2 demonstrates succession of odonate fauna at different newly created inshore zone each for the successive years 1998 and 1999.] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria. E-mail: chovanec@ubavie.gv.at

2598. Daigle, J.J. (2002): *Telebasis bickorum* spec. nov. from Bolivia (Zygoptera: Coenagrionidae). *Odonatologica* 31(2): 177-180. (in English). ["The new species is described from Bolivia (holotype male: Santa Cruz Dept, Ichilo Province, Buena Vista, February 2001; allotype female: same data as holotype). Holotype deposited in Universidad Autonoma "Gabriel Rene Moreno" (U.A.G.R.M.) in Santa Cruz, Bolivia; allotype deposited in the Florida State Collection of Arthropods in Gainesville, Florida, USA. Both sexes differ by the long and narrow black mesopleural suture on the thorax and acuminate male cerci which are longer than the paraprocts." (Author)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

2599. Daigle, J.J. (2002): *Telebasis gigantea* spec. nov. from Bolivia (Zygoptera: Coenagrionidae). *Odonatologica* 31(1): 73-76. (in English). ["The new species is described and illustrated (holotype male: Santa Cruz dept., Ichilo prov., Buena Vista, Feb. 2000; allotype female: same data as holotype). Holotype deposited in Universidad Autonoma "Gabriel Rene Moreno" (U.A.G.R.M.) in Santa Cruz, Bolivia; allotype deposited in Gainesville, Florida, USA. Male and female can be distinguished by their very large size, dull gold thorax, and facial color which is sky-blue in male but yellowish-blue in female." (Author)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

2600. De Marco, P.; Resende, D.C. (2002): Activity patterns and thermoregulation in a tropical dragonfly assemblage. *Odonatologica* 31(2): 129-138. (in English). ["Solar exposure is a key factor determining odonate activity, particularly in tropical areas. Small sized perchers, classified as thermal conformers, can begin their activity when air temperature is sufficiently high, and larger species become active when direct exposure to the sun is possible. In this study, the activity patterns in a neotropical dragonfly assemblage present on the Federal University of Viçosa, SE Brazil, have been described and following predictions about their thermoregulatory behaviour tested: (a) a decrease in activity of the percher dragonflies in the warmest peri-

ods is expected due to high thoracic temperatures; (b) conformers species will be controlled by temperature, not luminosity, whereas in heliothermic species, the initiation and termination of their activity is only constrained by luminosity. In the dry season, low air temperatures represent a limiting factor to the beginning and the end of activity, resulting in a shorter total activity time. *Orthemis discolor* and *Micrathyria hesperis* showed a decrease in activity in the middle of the day in the rainy season. *Perithemis mooma* was the only species that had a higher abundance near midday. As this species had a light-coloured thorax compared to the others, it is suggested that it could minimize the effect of the high temperatures. There is a clear effect of season on activity time, and also large differences in the intensity of this effect among species. When clouds precluded direct exposure to sun, variations only in the temperature did not affect the activity of *Erythrodiplax fusca*, *M. hesperis*, and *O. discolor*, but the activity of the small sized *P. mooma* remained dependent on temperature. These results highlighted that the minimum body size to be a heliotherm could be a complex function of behavioural and morphological characteristics, including body colour, preferred substrate and perch posture." (Authors)] Address: De Marco, P., Laboratory of Quantitative Ecology, Department of General Biology, Federal University of Viçosa, BR-36571-000 Viçosa, MG, Brazil

2601. De Marmels, J. (2002): A study of *Chromagrion* Needham, 1903, *Hesperagrion* Calvert, 1902, and *Zoniagrion* Kennedy, 1917: Three monotypic North American damselfly genera without uncertain generic relationships (Zygoptera: Coenagrionidae). *Odonatologica* 31 (2): 139-150. (in English). ["Comparative morphology identifies *Chromagrion* as the sister genus of *Pyrrhosoma* Charp. The genera *Hesperagrion*, *Anisagrion* Selys, *Apanisagrion* Kennedy and *Calvertagrion* St. Quentin probably form a monophyletic group as they share a bifid apical penis segment armed with a pair of sclerotized spine-like processes. A new interpretation of certain penis structures, and biogeographic considerations, suggest that *Zoniagrion* is probably a primitive genus, which occupies a basal position on the stem of the *Acanthagrion*-series, within the *ischnurine* Coenagrionidae." (Author)] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

2602. Dewick, S. (2002): Reports from Coastal Stations - 2001: Bradwell-on-Sea, Essex. *Atropos* 15: 61-62. (in English). [United Kingdom; a list of 17 odonate species is communicated including *Erythromma viridulum* and *Brachytron pratense*] Address: not stated

2603. Donnelly, T.W. (2002): Odonata in and around Murchison Falls national Park, Uganda. *Notul. odonatol.* 5(9): 114-115. (in English). [A list of 42 odonate taxa collected from 21 to 25 January 2001 around the Murchison Falls (e.g. Nile River, Lake Albert, Sambiya River, river at the Rabongo Forest) is compiled. "The placement of F.C. FRASER's (1928, *Trans. ent. Soc. Lond.* 70: 123-138) *Copera subaequistyla* (= *sikasoesensis* [Martin] in *Platycnemis* is mysterious. I can find few differences between this species and the SE Asian *Copera vittata* (Sel.), and I regard Fraser's generic placement as correct."] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2604. Fleck, G.; Nel, A.; Bechly, G.; Escuillite, F. (2002): The larvae of the mesozoic family aeschniidae and their phylogenetic implications (Insecta, Odonata, Anisoptera). *Paleontology* 45(1): 165-184. (in English). ["Four giant dragonfly larvae are described from the Lower Cretaceous of China. Owing to the preservation of wing tracheal venation on the larval wing sheaths, they can be identified as the first undoubted larvae of the extinct Mesozoic family Aeschniidae. They are ultimate or penultimate male and female specimens, and a younger larva. The female larva has a very long ovipositor sheath. These larvae have an anisopteran anal pyramid and a very particular spoon-shaped labial mask, with a very narrow prementum and large palps with numerous teeth, suggesting possible affinities of the Aeschniidae with the Anisoptera Cavilabiata. The positions of other larvae formally attributed to the Aeschniidae are discussed, i.e. *Nothomacromia sensibilis* (Carle and Wighton, 1990), *Sona nectes* Pritykina, 1986, and the alleged larvae of *Hemeroscopus baissicus* Pritykina, 1977. They differ greatly from the true Chinese larval Aeschniidae, in the labial mask and female ovipositor, even if they show some similarities in the anal pyramid." (Authors)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France

2605. Geissen, H.-P. (2002): Faunistische Mitteilungen 1999 und 2000 aus dem Bereich des ehemaligen Regierungsbezirks Koblenz. *Fauna und Flora in Rheinland-Pfalz*, Beih. 27: 155-213. (in German). [Rheinland-Pfalz, Germany; records of 32 odonate species are documented including *Lestes barbarus* and *Orthetrum brunneum* which are annotated with some detail.] Address: Geissen, H.-P., Brunnenstr. 34, D-56075 Koblenz, Germany

2606. González-Soriano, E. (2002): *Leptobasis melinogaster* spec. nov., a new species from Mexico (Zygoptera: Coenagrionidae). *Odonatologica* 31(2): 181-185. (in English). ["The new species is described, illustrated and compared with *Leptobasis vacillans* Hag. in Sel. and L. *candelaria* Alayo. A key to separate males of Mexican and Central American species of *Leptobasis* is provided." (Authors)] Address: González-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

2607. Gwynne, D.T. (2002): A secondary copulatory structure in a female insect: a clasp for a nuptial meal? *Naturwissenschaften* 89(3): 125-127. (in English). ["Secondary copulatory structures are well-known in male dragonflies and spiders. Here I report a secondary copulatory organ in female ground wets, *Hemiandrus pallitarsis* (Ensifera, Orthoptera - crickets and allies). The organ, located on the underside of the abdomen, appears to secure the male's genitalia during the transfer of a spermatophylax nuptial meal to this location, an area quite separate from the female's primary copulatory structures, where the sperm ampulla is attached." (Author)] Address: Gwynne, D.T., Univ Toronto, Dept Zool, Mississauga, ON L5L 1C6, Canada

2608. Harrison, P. (2002): 'Blue' Southern Hawker *Aeshna cyanea* in Worcestershire. *Atropos* 15: 74-75. (in English). [Verbatim: I am prompted by Steve Freddy's comprehensive treatment of the identification of the common *Aeshna* hawkers (*Atropos* 13 : 44-48) to relate

our experience with the blue colour morph of the Southern Hawker *Aeshna cyanea* in Monkwood nature reserve, near Worcester. They are said to be very rare in Britain. If that is the case then we can count ourselves rather lucky we have recorded a 'blue' specimen in each of the years 1998, 1999 and 2000. What has surprised us is that all three records occurred within the same 150 m stretch of woodland path. We have thus seen three individuals, three years running, and in virtually the same spot. It could be pure chance, but might there be genetic factors at play here? Perhaps a local strain of Southern Hawker with an inherited tendency to throw up a blue male every now and then? It may be worthy of note that the photograph we took of the 2000 specimen reveals that though the dorsal abdominal spots are all blue, the triangular marking on segment 2 remains green.] Address: Harrison, P., Moorcroft Barn, Sinton Green, Hallow, Worcester, WR2 6NW, UK

2609. Hartung, M. (2002): *Heteragrion palmichae* spec. nov., a new damselfly from the Cordillera de la Costa, Venezuela (Zygoptera: Megapodagrionidae). *Odonatologica* 31(2): 187-191. (in English). ["The new species is described from the Cordillera de la Costa in Venezuela. Holotype male: Venezuela, Edo. Carabobo, Bejuma, Cerro de Paja mountain, alt. ca 1200 m, 13-VI-1992; paratype female, same data; the holotype is to be deposited in MIZA, Maracay, Venezuela. No other specimens are known to date. This is one of the largest species within *Heteragrion*. The appendices are strongly arched in contrast to other members of the genus. Some similarities of appendices or size exist with *H. tricellulare* Calv., *simulation* Wllmsn, *peregrinum* Wllmsn, and *icterops* Sel. The new species was found in an inhabited region of the Cordillera de la Costa, near Bejuma, Carabobo." (Author)] Address: Hartung, M., Wehnertstr. 20a, D-12277 Berlin, Germany. E-mail: AEH.Matthias.Hartung@t-online.de

2610. Hecker, K.R.; Forbes, M.R.; Leonard, N.J. (2002): Parasitism of damselflies (*Enallagma boreale*) by gregarines: sex biases and relations to adult survivorship. *Can. J. Zool.* 80(1): 162-168. (in English with French summary). ["We studied host damselflies *E. boreale* [...] and their gregarine parasites (Apicomplexa: Eugregarinidae) to elucidate the causes and consequences of any sex biases in parasitism of adult hosts. Larvae of both sexes were highly infected, but there was no difference between male and female larvae in either prevalence or intensity of gregarine infections. Newly emerged adults had few or no parasites, thereby setting the stage for investigating accumulation of parasites by adults. Adult females had a higher prevalence and intensity of infection by gregarines than did males, but only on 1 (of 2) days when the potential confounding factor of host age was controlled for. Both adult males and females showed a positive correlation between longevity under conditions of food stress and the number of gregarines they initially carried. This finding may be explained if the food ingested with the infective cysts is more beneficial than the parasites are harmful, and it also has implications for investigating sex biases in numbers of trophically transmitted parasites of such insects." (Author)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

2611. Heino, J. (2002): Concordance of species richness patterns among multiple freshwater taxa: a regional perspective. *Biodivers. Conserv.* 11(1): 137-147. (in English). ["Geographical gradients in species richness and the degree to which different taxa show congruent patterns remain unknown for many taxonomic groups. Here, I examined broad-scale species richness patterns in five groups of freshwater organisms; macrophytes, dragonflies, stoneflies, aquatic beetles and fishes. The analyses were based on provincial distribution records in Denmark, Norway, Sweden and Finland. In general, variation in species richness across provinces was concordant among the groups, but stoneflies showed weaker negative relationships with the other taxonomic groups. Species richness in most groups decreased with increasing latitude and altitude, and a considerable part of the variation was explained by mean July temperature. However, stoneflies showed a reversed pattern, with species richness correlating positively, albeit more weakly, with mean provincial altitude. Nevertheless, combined species richness of all five taxa showed a strong relationship with mean July temperature, accounting for 74% of variation in provincial species richness alone. Such temperature-controlled patterns suggest that regional freshwater biodiversity will strongly respond to climate change, with repercussions for local community organization in freshwater ecosystems in Fennoscandia." (Author)] Address: Heino, J., Dept of Biology, University of Oulu, 90401, Oulu, Finland. E-mail: jani.heino@oulu.fi

2612. Hoshide, K.; Janovy, J. (2002): The structure of the nucleus of *Odonaticola polyhamatus* (Gregarinea: Actinocephalidae), a parasite of *Mnais strigata* (Hagen) (Odonata: Calopterygidae). *Acta Protozool.* 41(1): 17-22. (in English). ["The nucleus of *Odonaticola polyhamatus* was isolated from the body and observed with light, scanning electron and transmission electron microscopy. The nucleus had a thick thread-like structure with which it was tied to the septum. This thread-like structure has not been reported or described previously. The gregarine nuclear surface was covered with a fine fibrous net. This is the first report of the surface structure of a gregarine nucleus as revealed by SEM. Inside the nuclear membrane was a thin honeycomb layer similar to that reported for some other gregarines. Several spherical nucleoli and numerous electron dense small structures were observed inside the nucleus." (Author)] Address: Hoshide, K., Yamaguchi Univ., Inst. Biol., Fac. Educ., Yamaguchi 7538513, Japan

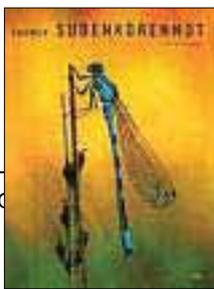
2613. Hunter, I. (2002): Reports from Coastal Stations - 2001: Elms Farm, Icklesham, East Sussex. *Atropos* 15: 58-59. (in English). [United Kingdom; *Calopteryx splendens*, *C. virgo*, *Brachytron pratense*, *Aeshna mixta*, *Sympetrum striolatum*] Address: not stated

2614. Ivanov, P.Yu. (2002): To the fauna of dragonflies (Odonata) of Sakhalin Island. The North Pacific Islands Biological Researches 7: 1-9. (in Russian with English summary). [21 odonate species from 19 localities are annotated in a checklist. *Aeshna caerulea* and *Leucorrhinia intermedia* are new to Sakhalin. This totals the known species to 31.] Address: Ivanov, P., Inst. of Biology and Soil Sciences, Far East Branch of the Russian Academy of Sciences, RUS 690022 Vladivostok-22, Russia. E-mail: entomol@ibss.dvo.ru (Pavel Ivanov)

2615. Jenkins, R.K.B; Ormerod, S.J. (2002): Habitat preferences of breeding water rail *Rallus aquaticus*. *Bird Study* 49(1): 2-10. (in English). ["[...] To test a survey method for estimating the abundance of breeding Water Rail and to provide an assessment of coarse-scale habitat selection, Water Rails were surveyed in 1996-97 at 77 wetland sites across Wales using broadcast vocalizations from a handheld cassette player. [...] Basic habitat characteristics were recorded for all sites and more detailed information, including freshwater invertebrate samples, were taken from a subset of 22 sites. A minimum of 43 to 49 breeding pairs of Water Rail were counted. Numbers of individuals differed significantly between the two survey years, but estimates of the number of pairs were consistent. Water Rail occurrence at a site was significantly related to the presence of wet reed *Phragmites* sp. Dry sites with low vegetation cover were the least occupied. Water Rail abundance was positively correlated with the abundance of Odonata, Plecoptera and Diptera larvae, but lack of data on actual dietary composition prohibits concluding a causal relationship. We hypothesize that increased Water Rail abundance associated with expanses of wet reed reflects a combination of nest safety, reduced risk of predation, and increased food availability. Current reed-bed management to maintain wetland conditions, often standard procedures for such systems, are probably beneficial to Water Rail." (Authors)] Address: Ormerod, S.J., Cardiff Univ, Sch Biosci, POB 915, Cardiff CF10 3TL, S Glam, Wales

2616. Johansson, F.; Wahlström, E. (2002): Induced morphological defence: evidence from whole-lake manipulation experiments. *Can. J. Zool.* 80(2): 199-206. (in English). ["Predator-induced defences are activated by cues associated with predators and confer some degree of resistance to subsequent attacks. Laboratory studies of many taxa have revealed such induced defences, and these data often conform to large-scale surveys of defence levels in habitats with and without predators. However, there have been no studies that make the direct connection between these laboratory studies and field surveys. We conducted a large-scale field manipulation of predators to provide this connection. Previous laboratory experiments on dragonfly (*Leucorrhinia dubia*) larvae have demonstrated that the presence of fish predators induces the development of elongated abdominal spines that serve to reduce mortality risk. In this study we determine the effect of whole-lake predator manipulation on this induced morphological defence of *L. dubia*. We monitored the spine lengths of final-instar larvae in two experimental lakes for 7 consecutive years. Fish were present during the first 2 years and then removed for the remaining 5 years. Results demonstrate that the spine lengths of *L. dubia* larvae decreased significantly in both lakes after the removal of fish. In contrast, there was no corresponding change in the spine lengths of larvae in reference lakes, and we found little change in food supply for larvae. Our results suggest that the plastic response in spine length is strong and attributable to the presence of predators." (Authors)] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

2617. Karjalainen, S. (2002): Suomen sudenkorennot (The Dragonflies of Finland). Tammi.



ISBN 951-31-2212-3. 222 pp. (in Finnish with brief instructions in English) [This book covers the 52 odonate species recorded in Finland. 51 were observed in the field and photographed by the author over a period of more than ten years. Only *Somatochlora sahlbergi* was netted and posed for photographing. A total of 228 colour photographs, some of outstanding quality, and almost 80 of full page size, will enable non-Finnish readers to enjoy the dragonflies of northern Europe. Of special value are the distribution maps which will close a gap in our knowledge on the distribution of the dragonflies in western palaearctic. This book should not be missing in your odonatological library.] Address: Karjalainen, S., <http://dragonflies.korento.net>. E-mail: sk@korento.net. Orders of the book (hardcover, 21 x 26 cm) should be directed to Academic bookstore (<http://iki.fi/sudenkorennot/book.html>). The price of the book is 42,- EURO plus 20,- EURO for postage and handling charges.

2618. Knill-Jones, S. (2002): Reports from Coastal Stations - 2001: Isle of Wight. *Atropos* 15: 54-55. (in English). [United Kingdom; *Erythromma najas*, *E. viridulum*, *Brachytron pratense* and *Sympetrum danae* are communicated.] Address: not stated

2619. Kotiaho, J.S.; Hovi, M. (2002): Correcting species richness hotspots for latitudinal gradients: a new method. *Ann. Zool. Fenn.* 39(1): 3-6. (in English). ["Species richness hotspots are of critical importance in conserving biodiversity, but by using simple species richness in an area, there is an inevitable bias in favour of lower latitudes. We propose a simple method for estimating regionally representative species richness hotspots where the effect of latitudinal gradients is accounted for. By using this method, the same number of species are conserved but instead of being concentrated on lower latitudes the selected areas fall into much larger geographical regions resulting in a broader range of habitat types conserved. This method suits any scale and is also applicable to other kinds of environmental gradients. These regions are illustrated with data on birds and dragonflies of Finland." (Author)] Address: Kotiaho, J.S., Univ. Jyväskylä, Dept Biol. & Environm. Sci., POB 35, FIN-40351 Jyväskylä, Finland

2620. Legrand, J. (2002): Un nouveau *Tragogomphus* d'Afrique équatoriale: *T. ellioti* spec. nov. (Anisoptera: Gomphidae). *Odonatologica* 31(2): 193-197. (in French with English summary). ["The new species is described and illustrated from a single male, collected in Gabon. Holotype male: Eastern Gabon, Makokou area, 1-XI-1976; deposited in MNHN, Paris. It lives in the upper sections of forest streams. The new sp. seems to be close to *T. aurivillii* Sjöstedt, 1899, but it is very different from the sympatric *T. tenaculatus* (Fraser, 1926), known from this region." (Author)] Address: Legrand, J., 10, rue du Chemin de fer, F-94110 Arcueil, France

2621. Long, R. (2002): Southern Skimmer *Orthetrum brunneum* (Fonsc.) on Guernsey. *Atropos* 15: 10. (in English). [Supposed to be a representative of the Guernseyian fauna since 1999, 10 July 2001 it was possible to net a specimen of *O. brunneum*.] Address: Long, R., Ozarda, Les Hammonnets, St. John, Jersey, Channel Islands, JE3 4FP, UK

2622. Lopau, W.; Adena, J. (2002): Die Libellen von Cypern. *Naturkundliche Reiseberichte* 19. 72 pp. (in German). [This paper is divided into two major parts: in

Part 1 odonate data from different workers including historical data and material from museums are documented in detail. Part 2 gives information on the 33 species of *Cyprus*. For every species a black and white photo, a map, a detailed documentation of records, and a discussion of the taxonomic status and the habitats are presented. This paper is a further example of the sophisticated work of W. Lopau to increase our knowledge on the eastern-Mediterranean Odonata, and a cornerstone for ongoing odonatological work in the region.] Address: Lopau, W., Kuhstedtermoor 26, D-27442 Gnarrenburg, Germany. E-mail: lopi-@t-online

2623. Lorenz, J.; Voigt, H.; Walter, S.; Zinke, J. (2002): Erste Ergebnisse entomofaunistischer Untersuchungen im Bahretal südlich von Pirna. Mitt. Sächs. Entomol. 58: 4-9. (in German). [6 species including *Lestes barbarus* and *Ischnura pumilio* are listed. Only a few water bodies are existing in the study area; thus, its odonate fauna has to be expected as being poor.] Address: Lorenz, J., Talmühlenstr. 4, D.01737 Tharandt, Germany

2624. Machado, A.B.M. (2002): *Neoneura lucas* spec. nov. from Brazilian Pantanal (Zygoptera: Protoneuridae). *Odonatologica* 31(2): 199-204. (in English). ["The new sp. is described and illustrated from 15 males and 2 females, collected in the Pantanal Region of Brazil. Holotype male, allotype female: Poconé, Rio Cuiabá, Mato Grosso, Feb. 1986; deposited in the author's collection, Belo Horizonte. In view of the arrangement of the decumbent process of the dorsal branch of the superior appendage, the new sp. belongs to the fulvicollis-group R.W. GARRISON (1999, *Odonatologica* 28: 343-375), differing from the other species of this group mainly by the presence of a small ventral hook on the apex of the upper branch of the superior appendage." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

2625. Machado, A.B.M. (2002): Studies on neotropical Protoneuridae, 13: The types of *Neoneura rufithorax* Selys (Zygoptera). *Notul. odonatol.* 5(9): 115-116. (in English). [(1) It was possible to trace the believed lost specimens described by Selys as *N. rufithorax* in a cabinet (Box 27) of the Selysian collection in Bruxelles. Two specimens were labeled as *N. parvula*. The author logical arguments the conspecificity of *N. rufithorax* with the two specimens labeled "*N. parvula*" in the cabinet. He declared the undamaged specimen as lectotype, the damaged specimen became paralectotype of *N. rufithorax*. (2) It is confirmed that the description of a specimen by Garrison (1999) believed to be *N. rufithorax* now unequivocal belongs to this species. (3) In addition some records of *N. rufithorax* stored in the Machado-collection are documented.] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

2626. Martens, A. (2002): Group oviposition in three platycnemidid species (Odonata: Platycnemididae). *International Journal of Odonatology* 5(1): 75-80. (in English). ["The European *Platycnemis acutipennis* and *P. latipes* and the African *Mesocnemis singularis* aggregate during oviposition. Choice experiments show that, in all three species, groups develop because tan-

dems preferentially land where conspecifics already show oviposition behaviour. Just a single motionless male in the typical vertical position of a tandem male stimulates aggregation and oviposition behaviour in conspecifics." (Author)] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: andreas.martens@tu-bs.de

2627. Martins, G.F.; Serrão, J.E. (2002): Notes on ovary structure in four species of adult dragonflies (Anisoptera: Gomphidae, Libellulidae). *Notul. odonatol.* 5 (9): 109-113. (in English). [Histological aspects of the panoistic ovarioles of the Brazilian dragonfly species *Aphylla theodorina* (Gomphidae), *Orthemis discolor*, *Pantala flavescens*, and *Perithemis mooma* (all Libellulidae) are described. "Each ovary consists of a great number of peccated ovarioles. A typical germarium, with undifferentiated germ cells, was not observed in these spp. In the vitellarium, 3 regions can be distinguished, viz. previtellogenic, vitellogenic and postvitellogenic. A single layer of follicular, often binucleated cells lines each follicle."] Address: Serrão, J.E., Departamento de Biologia Geral, Universidade Federal de Viçosa, BR-36571-000 Vicosa, MG, Brasil. E-mail: jeser-ao@mail.ufv.br

2628. Matushkina, N.; Gorb, S. (2002): Stylus of the odonate endophytic ovipositor: a mechanosensory organ controlling egg positioning. *J. Insect Physiol.* 48(2): 213-219. (in English). ["Using light and scanning electron microscopy, a sensory field consisting of 15-20 campaniform sensillae is described on the base of the stylus of the endophytic ovipositor of Odonata. It is hypothesised that two symmetric styli equipped with this number of sensillae can function as a mechanosensory organ responsible for control of precise egg positioning in plant stems during oviposition. In laboratory experiments with females of damselflies *Lestes sponsa* and *L. barbarus*, it was demonstrated that the distance between laid eggs is not dependent on the presence of styli. Removal of styli from both sides did not influence a shift of oviposition to one side. Females with one removed stylus shifted the clutch line in the opposite direction toward the removed stylus. Additionally, removal of styli influenced positions of single eggs in egg sets, and disturbed the capacity for complex oviposition. Thus, both morphological and experimental data support the hypothesis that styli participate in the control of egg line and egg patterning in the clutch." (Author)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiol., Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

2629. Melnychuk, M.C.; Srivastava, D.S. (2002): Abundance and vertical distribution of a bromeliad-dwelling zygopteran larva, *Mecistogaster modesta*, in a Costa Rican rainforest (Odonata: Pseudostigmatidae). *International Journal of Odonatology* 5(1): 81-97. (in English). ["We compared the larval abundance of *M. modesta* between bromeliads at ground level and canopy level in a primary tropical wet forest. Zygopteran abundance correlated strongly with bromeliad diameter at both levels. Although the per-bromeliad zygopteran abundance did not differ between vertical levels, *M. modesta* showed a strong vertical distribution in abundance owing to the variation in bromeliad size and density along a vertical gradient, with more and larger bromeliads closer to ground level than to the canopy. We predict *M. modesta* larval abundance to be 171 ± 65

(s.e.) per hectare, with >80% of larvae below halfway to the lower canopy limit. The total prey abundance or species richness did not differ between ground and canopy bromeliads, further suggesting that apart from bromeliad size, habitat quality for *M. modesta* was similar between vertical levels. Effects of habitat size on larval abundance patterns are addressed by comparing habitat volume and basal resource mass with diameter. Finally, larger-scale spatial patterns in zygopteran abundance are discussed with reference to bromeliad distributions." (Authors)] Address: Melnychuk, M. & Diane S. Srivastava, Dept of Zoology, University of British Columbia, 6270 University Boulevard, Vancouver, B.C., Canada V6T 1Z4. E-mail: srivast@zoology.ubc.ca

2630. Minelli, A. (2002): Homology, limbs, and genitalia. *Evolution & Development* 4(2): 127-132. (in English). ["Similarities in genetic control between the main body axis and its appendages have been generally explained in terms of genetic co-option. In particular, arthropod and vertebrate appendages have been explained to invoke a common ancestor already provided with patterned body outgrowths or independent recruitment in limb patterning of genes or genetic cassettes originally used for purposes other than axis patterning. An alternative explanation is that body appendages, including genitalia, are evolutionarily divergent duplicates (paramorphs) of the main body axis. However, are all metazoan limbs and genitalia homologous? The concept of body appendages as paramorphs of the main body axis eliminates the requirement for the last common ancestor of limb-bearing animals to have been provided with limbs. Moreover, the possibility for an animal to express complex organs ectopically demonstrates that positional and special homology may be ontogenetically and evolutionarily uncoupled. To assess the homology of animal genitalia, we need to take into account three different sets of mechanisms, all contributing to their positional and/or special homology and respectively involved (1) in the patterning of the main body axis, (2) in axis duplication, followed by limb patterning mechanisms diverging away from those still patterning the main body axis (axis paramorphism), and (3) in controlling the specification of sexual/genital features, which often, but not necessarily, come into play by modifying already developed and patterned body appendages. This analysis demonstrates that a combinatorial approach to homology helps disentangling phylogenetic and ontogenetic layers of homology." (Author) *Drosophila* and *Odonata* are studied.] Address: Minelli, A., Univ Padua, Dept Biol, Via Ugo Bassi 58B, I-35131 Padua, Italy

2631. Novelo-Gutiérrez, R. (2002): Larvae of the ophibolus-species group of *Erpetogomphus* Hagen in Selys from Mexico and central America (Anisoptera: Gomphidae). *Odonatologica* 31(1): 35-46. (in English). ["Detailed descriptions and illustrations of *Erpetogomphus* *agkistrodon* Garrison, *E. erici* Novelo and *E. ophibolus* Calvert are provided and a comparison with other larvae of the subgenus *Erpetocyclops* Carle is also included. Larvae of *E. agkistrodon* and *E. erici* show the closest resemblance, while *E. ophibolus* is more similar to *E. constrictor*." (Author) In addition *Erpetogomphus* *sabaleticus* Williamson 1918 and *E. tristani* Calvert 1912 are described without figures.] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a

Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

2632. Odin, N. (2002): Reports from Coastal Stations - 2001: Landguard Bird Observatory, Suffolk. *Atropos* 15: 63. (in English). [*Sympetrum striolatum*] Address: not stated

2633. Oertli, B.; Auderset Joye, D.; Castella, E.; Juge, R.; Cambin, D.; Lachavanne, J.-B. (2002): Does size matter? The relationship between pond area and biodiversity. *Biological Conservation* 104: 59-70. (in English). ["Larger areas support more species. To test the application of this biogeographic principle to ponds, we consider the relationship between size and diversity for 80 ponds in Switzerland, using richness (number of species) and conservation value (score for all species present, according to their degree of rarity) of aquatic plants, molluscs (Gastropoda, Sphaeriidae), Coleoptera, Odonata (adults) and Amphibia. Pond size was found to be important only for Odonata and explained 31% of the variability of their species richness. Pond size showed only a feeble relationship with the species richness of all other groups, particularly the Coleoptera and Amphibia. The weakness of this relationship was also indicated by the low z-values obtained (< 0.13). The SLOSS analyses showed that a set of ponds of small size has more species and has a higher conservation value than a single large pond of the same total area. But we also show that large ponds harbour species missing in the smaller ponds. Finally, we conclude that in a global conservation policy (protection, restoration, management), all size ranges of ponds should be promoted." (Authors) 0-24 odonate species, in mean 8,4 species, occurred at the ponds.] Address: Oertli, B., Laboratoire d'Ecologie et de Biologie Aquatique, University of Geneva, IS chemin des Clochettes, CH-1206 Geneva, Switzerland. E-mail address: beat.oertli@leba.unige.ch.

2634. Parr, A. (2002): Migrant dragonflies in 2001 including recent decisions and comments by The Odonata Record Committee. *Atropos* 15: 31-35. (in English). [The following species are treated: *Calopteryx virgo*, *C. splendens*, *Ischnura pumilio*, *Erythromma najas*, *E. viridulum*, *Aeshna mixta*, *A. parthenope*, *Orthetrum brunneum*, *Sympetrum fonscolombii*, *S. flaveolum*, *S. vulgatum*, and *S. danae*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

2635. Patton, S. (2002): Reports from Coastal Stations - 2001: Selsey Peninsular, West Sussex. *Atropos* 15: 55-56. (in English). [United Kingdom; *Brachytron pratense*] Address: not stated

2636. Peacor, S.D. (2002): Positive effect of predators on prey growth rate through induced modifications of prey behaviour. *Ecology Letters* 5(1): 77-85. (in English). ["Many prey modify behaviour in response to predation risk and this modification frequently leads to a foraging rate reduction. Although this reduction can have a clear direct negative effect on prey growth rate, theory predicts that a net positive effect can occur when the combined reduction in foraging by the entire population leads to a large increase in resource level. Here, I present experimental results that corroborate this counterintuitive prediction: the predation threat of 'nonlethal' caged larval dragonflies (*Anax longipes*) caused a net increase in small bullfrog (*Rana catesbeiana*) growth. *A. longipes* caused a net increase in small bullfrog be-

havioural response (i.e. a reduction in activity, level and microhabitat usage) was likely to have negatively affected growth, but was offset by a positive effect of growth from a large increase in resource levels (measured using a bioassay). Further, the positive *Anax* effect was dependent on nutrient level, illustrating the role of the resource response magnitude. Results of this study are discussed in the context of studies in which *Anax* had the opposite (i.e. negative) effect on tadpole growth. Predator-induced modifications in prey behaviour can have large negative or positive effects on prey growth, the sign and magnitude of which are dependent on relative species density, and resource dynamics." (Author)] Address: Peacor, S.D., Michigan State Univ, Dept Fisheries & Wildlife, E Lansing, MI 48824 USA

2637. Perepelov, E.; Bugrov, A.G. (2002): Constitutive heterochromatin in chromosomes of some Aeshnidae, with notes on the formation of the neo-XY/neo-XX mode of sex determination in *Aeshna* (Anisoptera). *Odonatologica* 31(1): 77-83. (in English). ["C-stained male karyotypes of *Aeshna crenata* (2n male = 27; X0), *A. grandis* (2n male = 26; neo-XY), *A. juncea* (2n male = 26; neo-XY), *A. nigroflava* (2n male = 27; X0) and *Anax imperator* (2n male = 27 X0) from W Siberia, N Caucasus, Russian Far East and Hokkaido (Japan) are figured and analyzed." (Authors)] Address: Perepelov, E. & A. Bugrov, Siberian Branch, Institute of Animal Systematics and Ecology, Russian Academy of Sciences, 11 Frunze St., 630091, Novosibirsk, Russia. E-mail: bugrov@fen.nsu.ru

2638. Purse, B.V.; Thompson, D.J. (2002): Voltinism and larval growth pattern in *Coenagrion mercuriale* (Odonata : Coenagrionidae) at its northern range margin. *Eur. J. Entomol.* 99(1): 11-18. (in English). ["Voltinism and larval growth pattern were investigated in an edge-of-range population of *C. mercuriale*. *C. mercuriale* is semi-voltine in Britain and growth is inhibited in winter. The 2nd year group overwinters in a range of instars between the antepenultimate and final instar consistent with the early, asynchronous emergence pattern of this species. A facultative autumnal diapause in the penultimate instar is the most likely mode of seasonal regulation. The broad size distribution of larvae produced by this growth pattern was wider than that found in co-occurring populations of *Pyrrhosoma nymphula*, a "spring" species with synchronous emergence. The broad size distributions may lead to considerable intraspecific interference between *C. mercuriale* larvae. Sex ratio in the last three larval instars of *C. mercuriale* did not differ significantly from unity. A laboratory investigation of the effect of temperature and photoperiod on growth and diapause in *C. mercuriale* is recommended to determine whether high minimum temperature thresholds for development limit both the width of the temporal niche and microhabitat use by this species at its range margin." (Authors)] Address: Purse, B.V., Univ Liverpool, Populat & Evolutionary Biol Res Grp, Sch Biol Sci, Nicholson Bldg, POB 147, Liverpool L69 3GS, Merseyside, UK

2639. Reinhardt, R.; Klausnitzer, B. (2002): Bibliographie über Sachsens Insekten - ein 300jähriger Rückblick. *Mitt. Sächs. Entomol.* 57: 183 pp. (in German). [This bibliography is a real treasure trove for anybody looking for the regional literature on Saxonian entomofauna. The titles are organised alpha-numerical, and according to five regions ("Planungsregionen") and in-

sect orders. The bibliography includes published and unpublished literature, e.g. management plans or expertises. Odonatological literature is easy to trace from this bibliography. It is planned to edit an electronic version of the bibliography in the beginning of 2003. Orders should be directed to the address below.] Address: Reinhardt, R., Burgstädter Str. 80a, D-09648 Mittheida, Germany. E-mail: Reinhardt-Mittw@t-online.de

2640. Relyea, R.A. (2002): Costs of phenotypic plasticity. *American Naturalist* 159(3): 272-282. (in English). ["Phenotypically plastic organisms display alternative phenotypes in different environments. It is widely appreciated that possessing alternative phenotypes can affect fitness. However, some investigators have suggested that simply carrying the ability to be plastic could also affect fitness. Evolutionary models suggest that high costs of plasticity could constrain the evolution of optimal phenotypes. However, costs (and limits) of plasticity are primarily hypothetical. Little empirical evidence exists to show that increased plasticity leads to reduced growth and development, leads to increased developmental instability, or limits the ability of organisms to produce more extreme phenotypes. I used half-sib families of larval wood frogs (*Rana sylvatica*) reared in outdoor mesocosms to examine how tadpoles altered behavioral, morphological, and life-historical traits in response to larval dragonfly predators (*Anax longipes*). The predators induced lower activity and the development of relatively large tails and small bodies in wood frogs. As a result, wood frogs experienced reduced growth and development. I then examined whether tadpole sibships with higher plasticity experienced fitness costs (above and beyond the costs of expressing a particular phenotype) and whether they were limited in producing extreme phenotypes. Fitness effects of plasticity were widespread. Depending on the trait examined and the environment experienced, increased plasticity had either positive effects, negative effects, or no effects on tadpole mass, development, and survivorship. I found no relationship between increased plasticity and greater developmental instability. There was also no evidence that sibships with increased plasticity produced less extreme phenotypes; the most extreme trait states were always produced by the most plastic genotypes. This work suggests that costs of plasticity may be pervasive in nature and may substantially impact the evolution of optimal phenotypes in organisms that live in heterogeneous environments." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

2641. rtr (2002): Kunstinsekten für den Mars. die tagzeitung, Freitag, 25. Januar 2002: 14. [Verbatim: "SYDNEY rtr Über die Oberfläche des Mars könnten bald winzige Flugzeuge mit der Gewandtheit von Libellen und dem Sehvermögen von Bienen schwirren. Wissenschaftler in Australien haben eigenen Angaben zufolge die Sinnesorgane verschiedener Insektenarten imitiert und neuartige Navigations- und Fluggeräte entwickelt. Die neuen Sensoren seien so klein, dass sie auf "Microflyers" mit einem Gewicht von 75 Gramm Platz fänden, sagten die Forscher der Australian National University (ANU). Trotz ihrer kleinen Gehirne können Insekten wie Libellen schnelle und präzise Manöver fliegen, die Flugstabilität und Kollisionsvermeidung voraussetzen", sagte Javaan Singh Chahl von der ANU. Die diesem Prinzip nachentwickelte Technologie

könnte seinen Angaben zufolge 2007 bei einer Mission eingesetzt werden, bei der die Felsstruktur des Val-les Marineris auf dem Mars erkundet werden soll. Das Modell der Wissenschaftler ist den Facettenaugen von Insekten nachempfunden. Nach Aussagen der Forscher könnten die Kunstinsekten auch in der äußerst dünnen Atmosphäre des Mars stabil und kontrolliert navigiert werden."]

2642. Samways, M. (2002): Red-listed Odonata of Africa. *Odonatologica* 31(2): 151-170. (in English). ["The Red-Listed African Odonata species are re-assessed and are assigned or re-assigned to the IUCN Categories of Threat. It is important to distinguish between those species that are simply rare, those that are 'Data Deficient' and those that are genuinely threatened. It is also important to consider the 'Extinct' category very carefully as premature inclusion of a taxon in this category can preclude further searches for it. The IUCN Categories of Threat were found to be very workable for the African Odonata. Problems are more to do with the practicalities of doing the field assessments, rather than with the categorisation itself. While the Red List is of enormous value when considering one species at a time, it should not be seen as a generalized data base amenable to comparative assemblage statistics, which are likely to reveal more on assessment efforts than on the organisms." (Author)] Address: Samways, M., Invertebrate Conservation Research Centre, School of Botany and Zoology, University of Natal (Pietermaritzburg), Private Bag X01, Scottsville 3209, South Africa. E-mail: samways@nu.ac.za

2643. Schütte, C.; Schrimpf, I. (2002): Explaining species distribution in running water systems: larval respiration and growth of two Calopteryx species (Odonata, Zygoptera). *Archiv für Hydrobiologie* 153(2): 217-229. (in German with English summary). ["*C. virgo* is most often encountered at running water rhitron, whereas *C. splendens* predominantly chooses the hyporhitron to metapotamon. Larval growth of both species was studied in two streams in the field and under three different temperatures in the laboratory (12 °C / 18 °C / 24 °C). Their respiration was tested at the same three temperatures by measuring the CO₂-production of the larvae via gas chromatography. At low temperatures, *C. virgo* was growing faster and had a higher standard metabolism than *C. splendens*. While *C. splendens* had similar respiration rates at 12 °C, 18 °C and 24 °C, the respiration of *C. virgo* was significantly higher at lower temperatures, as it is adapted to cold environments. But additionally, *C. virgo* is outspeeding *C. splendens* in growth even at 24 °C, suggesting that besides temperature adaptation there have to be other factors hindering co-occurrence of both species in warm streams." (Authors)] Address: Schütte C., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

2644. Sefrin, E. (2002): Libellenvorkommen an zwei Gewässern der Vorderpfalz. *Pflanzen und Tiere in Rheinland-Pfalz - Berichtsjahr 2001 - Heft 12*: 155. (in German). [Rheinland-Pfalz, Germany; 11 species are listed for a water body situated in the NSG Schwarzwald, and 17 species for the NSG Mechttersheimer Tongruben. Of some interest are records of *Brachytron pratense*.] Address: not stated.

2645. Spence, B. (2002): Reports from Coastal Stations - 2001: Spurn NNR, East Yorkshire. *Atropos* 15: 66-67. (in English). [United Kingdom; *Libellula depressa*, *Sympetrum fonscolombii*, *Anax imperator*, *Aeshna mixta*] Address: not stated

2646. Stansfield, S. (2002): Reports from Coastal Stations - 2001: Bardsey Island. *Atropos* 15: 68-69. (in English). [United Kingdom; *Anax imperator*, *Aeshna juncea*, *A. mixta*] Address: not stated

2647. Telfer, M. (2002): Insects at sea. *Atropos* 15: 83-84. (in English). ["[...] Surprisingly, only a single dragonfly was reported: a Brown hawkler *Aeshna grandis* seen two miles out off the East Anglian coast in 2000, heading towards the continent."] Address: Telfer, M., 7 Tennyson Avenue, St. Ives, Cambridgeshire, PE27 6TU, UK. E-mail: mgt@ceh.ac.uk

2648. Tembhare, D.B.; Wazalwar, S.M. (2002): Stomodaeal cuticular structures in the dragonfly *Brachythemis contaminata* (Fabricius) (Anisoptera : Libellulidae). *Odonatologica* 31(1): 47-54. (in English). ["Light and scanning electron microscopic studies reveal various stomodaeal cuticular structures. In the larvae and adults, microspines on the surface of the longitudinal folds of the pharynx, and dome-shaped, beaded structures on the inner surface of the oesophagus are evident. In the larvae, the folds of the crop bear long hairs laterally and parallel rows of microspines medially. In the larvae, the proventriculus is provided with 4 longitudinal plates; 2 large plates with teeth on each lateral side and 2 small plates each with 4 fine apical teeth, on either side. Scale-like acanthae are observed near the stomodaeal valve. A whorl of long hairs is evident in the stomodaeal valve. In the adult dragonfly, the acanthae and curved spines occupy the anterior and posterior regions of the proventricular dental plates, respectively. The functional significance of various stomodaeal cuticular structures is discussed." (Author)] Address: Tembhare, D.B., Dept Zool., Nagpur Univ. Campus, Nagpur 440010, Maharashtra, India

2649. Tennessen, K.J. (2002): *Argia rosleri* sp. nov. from central Bolivia (Odonata: Coenagrionidae). *International Journal of Odonatology* 5(1): 99-104. (in English). ["*Argia rosleri* sp. nov. is described from central Bolivia. Holotype male: Santa Cruz Department, Florida Province, seep along Rio Achira, 8.6 km E of Samaipata (18°09'42"S, 63°48'53"W), 1,400 m a.s.l., 25 xi 1999; allotype female: same locality, 05 xi 1998; both leg. K.J. Tennessen. The new species appears to be related to the *A. gerhardi/nigrior* complex, but differs in being mostly pale and having the decumbent ventral tooth of the male cerci apically situated." (Author)] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennessen@aol.com

2650. Tennessen, K.J. (2002): *Telebasis simulata* spec. nov. from South America, previously confused with *T. sanguinalis* Calvert (Zygoptera: Coenagrionidae). *Odonatologica* 31(2): 205-210. (in English). ["The new species (holotype male, allotype female: Brazil, State of Amazonas, Manaus, 20-V-1-1922; deposited in FSCA, Gainesville, Fla, USA) is described and illustrated based on 82 males and 15 females from Brazil, Surinam, Trinidad and Venezuela. It most closely resembles *T. sanguinalis* but differs mainly by: (1) translucent dorsal flap of terminal penile segment rectangular in lateral view, gradually tapered to posterior lateral

angle (vs flap with a posterolateral lobe-like extension directed posteriorly); (2) cerci 1.6 to 1.8 times as long as paraprocts (vs 2.0 times as long); (3) rear of head half black, black marking extending to occipital foramen (vs pale except for a pair of small, dark circular spots). *T. sanguinalis* is known only from central Bolivia and western Brazil." (Author)] Address: Tennesen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennesen@aol.com

2651. Trembath, R.; Anholt, B.R. (2002): Predator-induced morphological and behavioral changes in a temporary pool vertebrate. *Israel Jour. Zool.* 47(4): 419-431. (in English). ["Temporary pools vary unpredictably in their complement of predators, which should select for inducible anti-predator defenses. Temporary pools are used by many amphibians during the larval stage. We raised larvae of a hylid frog, *Hyla versicolor*, in the presence and absence of their predator, the larval dragonfly *Anax junius*. Tadpoles raised in the presence of predators were less active, more variable in size, and had larger, more brightly colored tails than those raised in the absence of predators. We found that acceleration from a motionless start was related to tail morphology. Similar to previous studies, our data suggested that tadpoles raised in the presence of predators were less vulnerable than those raised in the absence of predators, although our results were not statistically significant. The stochastic nature of oviposition into temporary pools argues that their biota will be variable in space and time. We expect that temporary pool specialists will often show inducible phenotypes for anti-predator defenses." (Authors)] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada. E-mail: banholt@uvic.ca

2652. Troake, P. (2002): Reports from Coastal Station - 2001: Rye Harbour SSSI, East Sussex. *Atropos* 15: 56-58. (in English). [*Anax parthenope*, *Calopteryx splendens*] Address: not stated

2653. Tunmore, M. (2002): Reports from Coastal Stations - 2001: The Lizard, Cornwall. *Atropos* 15: 50-52. (in English). [United Kingdom; *Sympetrum fonscolombii*. One male was caught in an UV light trap.] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

2654. Weihrauch, F.; Borchering, J. (2002): The zebra mussel, *Dreissena polymorpha* (Pallas), as an epizoon of anisopteran larvae (Anisoptera: Gomphidae, Corduliidae, Libellulidae). *Odonatologica* 31(1): 85-94. (in English). ["A list of records of anisopteran larvae and final instar exuviae with attached zebra mussels is provided. It contains records of 29 specimens from 10 spp. with zebra mussels including 2 new records. The possibilities how this association between odonate larvae and zebra mussels comes into being are discussed. Considering the biology and the life history of the mussels, from a few of the recorded cases of this interaction it is assumed that the larval development of the Odonata involved is more variable than hitherto known." (Authors)] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Florian.Weihrauch@lbp.bayern.de

2655. Williams, P.; Whitfield, M.; Biggs, J.; Fox, G.; Nicolet, P.; Shillabeer, N.; Sherratt, T.; Heneghan, P.; Jepson, P.; Maund, S. (2002): How realistic are outdoor microcosms? A comparison of the biota of microcosms

and natural ponds. *Environ. Toxicol. Chem.* 21(1): 143-150. (in English). ["This study investigated the extent to which aquatic plant and macroinvertebrate assemblages in small outdoor microcosms (cylinders 1.25 m diameter x 1.25 m deep) resembled assemblages found in natural ponds in Britain. Comparisons were made in terms of community structure, species richness, and numbers of uncommon species. Multivariate analysis indicated that, although the microcosms had no exact natural analogues, their plant and animal assemblages were most like those of deep, circumneutral ponds. Unlike natural ponds, the microcosms supported relatively species-poor invertebrate assemblages, lacking uncommon species. Among individual taxa, microcosms supported similar numbers of species of Gastropoda, Isopoda, Amphipoda, and Odonata as natural ponds but significantly fewer Coleoptera, Hemiptera, and Trichoptera species. This was most likely due to the absence of a shallow littoral area in the microcosms. Because of their vertical sides, the microcosms supported no marginal wetland plants, but submerged and floating-leaved plant assemblages were similar in community type and species richness to natural ponds. Refinements to microcosm and mesocosm designs are identified that would enable experimental systems to more closely replicate the assemblages found in natural ponds. In particular, the incorporation of natural margins would be likely to lead to experimental communities that were closer analogues of natural ponds." (Authors)] Address: Biggs, J., Oxford Brookes Univ., Ponds Conservat. Trust Policy & Res., Gipsy Lane, Oxford OX3 0BP, UK

2656. Wilson, K. (2002): Reports from Coastal Stations - 2001: Gibraltar Point NNR, Lincolnshire. *Atropos* 15: 66. (in English). [United Kingdom; *Lestes sponsa*] Address: not stated

2657. Wilson, K.D.P. (2002): Notes on Chlorogomphidae from southern China, with descriptions of two new species. *Odonatologica* 31(1): 65-72. (in English). ["*Chlorogomphus shanicus* sp. n. and *Chloropetalia soarer* sp. n. are described and illustrated from north Guangdong, China. *Chlorogomphus icarus* Wilson & Reels is synonymised with *C. usudai* Ishida and *C. papilla* Ris is illustrated." (Author)] Address: Wilson, K.D.P., Flat 20, 6 Mansfield Road, The Peak, Hong Kong, China. E-mail: wilsonkd@netvigator.com

2658. Yourth, C.P.; Forbes, M.R.; Smith, B.P. (2002): Immune expression in a damselfly is related to time of season, not to fluctuating asymmetry or host size. *Ecol. Entomol.* 27(1): 123-128. (in English). ["Variation in immune responsiveness within and among species is the subject of the emerging field of ecological immunology. The work reported here showed that individuals of *Lestes forcipatus* Rambur differ in their likelihood of mounting immune responses, and in the magnitude of those responses, against a generalist ectoparasite, the water mite *Arrenurus planus* Marshall. 2. Immune responses took the form of melanotic encapsulation of mite feeding tubes, occurred in the few days after host emergence, and resulted in mites dying without engorging. Such immune responses were more probable and stronger for hosts sampled later rather than earlier in the season. Such responses may act as selection affecting seasonal patterns of egg hatching and larval abundance of mites. 3. Contrary to expectation, metrics of host size (wing length) and wing cell fluctuating asym-

metry were not related to the likelihood of immune responses. 4. The importance of season on immune expression of insects has not been explored in detail. These results suggest possible trade-offs in allocation of melanin (or its precursors) to maturation versus immunity and indicate the need for studies on the synergistic effects of weather and parasitism on host species that use melanotic encapsulation to combat parasites and pathogens." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

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- 2660.** Anzai, M. (1997): A record of *Aeshna mixta soneharai* in Kamikawa District. Bulletin of the Hokkaido Odonatological Society 9: 2. (in Japanese). [Japan; August 1, 1991, *A. mixta sonehara* was observed along with additional six odonate species listed.] Address: not stated in English
- 2661.** Beckemeyer, R. (1997): Some Nebraska Odonata specimens in the University of Nebraska - Lincoln Insect Collection. *Argia* 9(4): 7. (in English). [A preliminary browsing in the insect collection of Univ. of Nebraska, Lincoln Insect Collection resulted in 9 Anisoptera. Zygoptera are waiting for a detailed survey of the collection.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net
- 2662.** Cole, J. (1997): The second coming of *Argia lacrimans*. *Argia* 9(4): 10-11. (in English). [*Argia lacrimans* was confirmed for the second time in USA. At the same locality (Garden Canyon, near Fort Huachuca, Arizona) *A. tonto* was also recorded. In the paper the additional species from the collecting trip in July 1997 are documented.] Address: Cole, J., 7926 Ramsgate Avenue, Los Angeles, CA 90045, USA
- 2663.** Donnelly, T.W. (1997): *Somatochlora brevicincta* in New Brunswick and Nova Scotia!. *Argia* 9(4): 5. (in English). [Report on some e-mail news about new discovered localities or specimen of the rare *S. brevicincta*.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 2664.** Foeckler, F.; Schmidt, H.; Deichner, O. (1997): Naturschutzfachliche Analyse und Bewertung der Auswirkungen von Fischteichen auf die Gewässerfauna von Flußperlmuschelbächen Nordostbayerns. *Zschr. Ökol. u. Naturschutz* 6: 111-123. (in German with English summary). [Eutrophication caused by water body effluents degrades the water quality of pearl mussel brooks in Bavaria, Germany. Measures to improve the water quality are discussed. Odonata dwelling the water bodies are listed along with other macrozoobenthic species.] Address: ÖKON, Dechbettener Str. 9, D-93049 Regensburg, Germany
- 2665.** Harauchi, Y.; Joh, Y. (1997): Emergence process of *Epiophlebia superstes* in laboratory. Bulletin of the Hokkaido Odonatological Society 9: 8-9. (in Japanese). [This is a detailed (photo) documentation of the emergence of *E. superstes*.] Address: not stated in English
- 2666.** Hiratuka, K. (1997): Two dragonfly species new to Shiribeshi District. Bulletin of the Hokkaido Odonatological Society 9: 1. (in Japanese). [Japan; *Coenagrion terue* (Asahina 1949), *Copera annulata* (Selys 1863)] Address: Hiratsuka, K., 2-20-113, Honcho 2 jo-9, Higashi-ku, Sapporo City, 065-0042, Japan
- 2667.** Hirose, Y. (1997): A record of *Coenagrion ecorutum* representing its southern limit. Bulletin of the Hokkaido Odonatological Society 9: 10. (in Japanese). Address: not stated in English
- 2668.** Hori, S. (1997): *Aeschnophlebia longistigma* recorded from Lake Utona. Bulletin of the Hokkaido Odonatological Society 9: 24. (in Japanese). [Japan; female, 16-VIII-1995] Address: not stated in English
- 2669.** Naraoka, H. (1997): Reproductive behavior of *Sympecma paedisca paedisca* (Odonata, Lestidae). *New Entomologist* 46(1/2): 20-25. (in Jap., with English summary (English translation of Naoya Ishizawa in Digest of Japanese odonatological Short Communications 7, 1998)). ["The reproductive behaviour was studied at a small pond in Shiura village, Kita-gun. Aomori pref., N Japan, from May to Aug. 1996. Hibernated adults appeared at the pond from mid May, and a few adults remained until early August. Reproductive behaviour was observed on fine and warm days from late May to mid July (peak during the first half of June). Male seized the female without courtship and display, immediately after he found her. Sperm transfer ($x=60.8$ s) was carried out just after the tandem was formed at a perching site. Copulation was observed between 7:30 and 14:30 h with the peak from 9:00 to 10:00 h and it was divided into 3 stages; the characteristic pumping was seen at each stage. Copulation lasted 15 min 47 s on average (stage 1: 14 min, 42 s, I: 93.4 s. III: 10.3 s). Sperm displacement was recognized by comparing the volumes of 9s sperm storage organ collected at precopula, copula and postcopula. Tandem oviposition took place soon after copulation in the leaves of *Phragmites communis*, above the water, during 8:00-16:00 h, with the peak from 10:00 to 12:00 h; interspecific tandem was recorded in 3 cases." (Author)] Address: Naraoka, H.,

36-71, Aza Motoizumi, Fukunoda, Itayanagi-machi, Kita-gun, Aomori, 038-36, JA

2670. O'Brien, M. (1997): *Somatochlora tenebrosa* not in Michigan. *Argia* 9(4): 9-10. (in English). [*S. tenebrosa* turned out to be *S. hineana*, but the locality data of the specimen are quite obscure.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

2671. O'Brien, M. (1997): *Stylurus spiniceps* finally verified for Michigan (Odonata: Gomphidae). *Argia* 9(4): 8-9. (in English). [On 20 July 1997, *Stylurus spiniceps*, prior only known from a little bit obscure literature data, was verified from a Michigan locality (Huron River).] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

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2673. Ozono, A. (1997): Re-discovery of *Macromia daimoji* OKUMURA from Osaka Prefecture. *Aeschna* 34: 24. (in Japanese). Address: not stated in English

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2675. Paulson, D. (1997): New odonata records for Maine and New Hampshire. *Argia* 9(4): 7. (in English). [New county records from a collection Netta Smith made in 1997 in Maine and New Hampshire, USA are documented.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

2676. Sato, M. (1997): Phenology of *Sympetrum frequens* in Obihirocity. *Bulletin of the Hokkaido Odonatological Society* 9: 16-19. (in Japanese). [Phenological data of *S. frequens* from 1989, 1990, and 1992 are presented in detail.] Address: not stated in English

2677. Wataji, M.; Maruyama, F.; Taguchi, M.; Kano, M.; Yoshinuma, T. (1997): Species composition and collection records of the dragonflies inhabiting Tonneusu Pond. *Bulletin of the Hokkaido Odonatological Society* 9: 20-23. (in Japanese). [Japan; collection data of 28 odonate species resulting from 1990-95 are documented in detail.] Address: Taguchi, M., Yaei-Higashi High School, Sagamihara, Kanagawa 229-0029, Japan

2678. Wilson, J. (1997): Continuation. *Argia* 9(4): 27. (in English). [dragonfly poem] Address: Wilson, Jacquelyn, 245 South Park St., Apt. 811, Madison WI 53715, USA.

2679. Wisenden, B.D.; Chivers, D.P.; Smith, J.F. (1997): Learned recognition of predation risk by *Enallagma* damselfly larvae (Odonata, Zygoptera) on the basis of chemical cues. *Journal of Chemical Ecology* 23(1) : 137-151. (in English). ["We studied two populations of damselfly larvae (*Enallagma boreale*): one popu-

lation cooccurred with a predatory fish (northern pike, *Esox lucius*); the other did not. Damselflies that cooccurred with pike adopted antipredator behavior (reduced activity) in response to chemical stimuli from injured conspecifics, and to chemical stimuli from pike, relative to a distilled water control. Damselflies from an area where pike do not occur responded only to chemical stimuli from injured conspecifics. In a second set of experiments, we conditioned pike-naive damselflies to recognize and respond to chemical stimuli from pike with antipredator behavior. Damselfly larvae that were previously unresponsive to pike stimuli learned to recognize pike stimuli after a single exposure to stimuli from pike and injured damselflies or pike and injured fathead minnows (*Pimephales promelas*). The response to injured fathead minnows was not a general response to injured fish because damselfly larvae did not respond to chemical stimuli from injured swordtails (*Xiphophorus helleri*), an allopatric fish. Taken together, these data suggest a flexible learning program that allows damselfly larvae to rapidly acquire the ability to recognize local predation risk based on chemical stimuli from predators, conspecifics, and heterospecific members of their prey guild." (Authors)] Address: Wisenden, B.D., Department of Biology, University of Saskatchewan 112 Science Place, Saskatoon, Saskatchewan, Canada, S7N 5E2, Canada

2680. Wudkevich, K.; Wisenden, B.D.; Chivers, D.P.; Smith, J.F. (1997): Reactions of *Gammarus lacustris* to chemical stimuli from natural predators and injured conspecifics. *Journal of Chemical Ecology* 23(4) : 1163-1171. (in English). ["We exposed the freshwater amphipod *G. lacustris*, to chemical stimuli from injured conspecifics and to chemical stimuli from two types of natural predators: dragonfly larvae (*Aeshna eremita*) and northern pike (*Esox Indus*). Exposure to all three stimuli caused *G. lacustris* to reduce significantly its level of activity relative to activity recorded in response to a distilled water control. The similarity in responses to chemicals associated with predators and to injured conspecifics suggests the presence of an alarm pheromone within the body tissues of *G. lacustris*. In response to chemical stimuli from pike, *G. lacustris* tended to reduce its time in the water column and spend more time near the bottom of the test aquaria. However, no such trend was apparent in response to chemical stimuli from dragonfly larvae. The differences in response to chemical stimuli from pike and larval dragonflies suggest that *G. lacustris* does not have a rigid behavioral response to predation risk; instead, antipredator behavior may be modified to maximize avoidance of predators that are active in different microhabitats." (Authors)] Address: Wisenden, B.D., Department of Biology, University of Saskatchewan 112 Science Place, Saskatoon, Saskatchewan, Canada, S7N 5E2, Canada

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2682. Yokoyama, T. (1997): Records of *Sympetrum parvulum* in Tomakomai city and Chitose city. *Bulletin of the Hokkaido Odonatological Society* 9: 7. (in Japanese). [12-X-1996] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

- 2683.** Adena, J. (1998): Zur Libellenfauna neuangelegter Gewässer in einem Flussmarschgebiet Bremens - Erfolgskontrolle von Ausgleichs- und Ersatzmaßnahmen. Diplomarbeit. Prof. Dr. D. Mossakowski. Universität Bremen: 102 pp, Anhang 35 pp. (in German). [A published abridged version of this M. Sc. thesis is abstracted in OAS 2408. The thesis provides a lot of additional information, e.g. distribution maps, graphs of the sampling localities, detailed species lists, and species monographs. The focus of the thesis is set on the efficiency and efforts of measures made to compensate impacts on landscape and habitats from the odonatological point of view. Each of these measures is assessed in detail. Of some interest is the description of the success of ditch management with special emphasize of species preferring *Stratiotes aloides* (*Aeshna viridis*, *Anaciaeschna isosceles*). In general, the study provides interesting material on the design of compensation measures for Odonata.] Address: Adena, Julia, Geibelstr. 61, D-28215 Bremen, Germany
- 2684.** Beckemeyer, R. (1998): 1997 publications on odonata of other lands. *Argia* 9(4): 22-24. (in English). [Reviews of Terence de Fonseca's book "A Guide to the Dragonflies of Sri Lanka", "Dragonflies of the Natal Drakensberg" by M. J. Samways and G. Whiteley, and S. Brooks' "Field Guide to the Dragonflies and Damselflies of Great Britain and Ireland".] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net
- 2685.** Beckemeyer, R.J.; Huggins, D.G. (1998): Some midwestern Odonata records for 1997. *Argia* 9(4): 6. (in English). [USA; records from Boone county, Arkansas, some from Kansas, and several from Nebraska.] Address: Beckemeyer, R.J., 957 Perry, Wichita, KS 67203-3141, USA
- 2686.** Donnelly, T.W. (1998): "Guidebook to dragonflies of Taiwan (Part 1)". *Argia* 9(4): 24. (in English). [Review of Wang, H.Y. & J.B. Heppner (1997).] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 2687.** Donnelly, T.W. (1998): "Status survey and conservation plan. Dragonflies". *Argia* 9(4): 24-25. (in English). [Critical account on the Odonata conservation plan.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 2688.** Donnelly, T.W. (1998): Ecuador epilogue: a trip to La Selva. *Argia* 9(4): 15-16. (in English). [Report of a short collecting visit in La Selva, Coca, Ecuador. Some attention is given to *Microstigma rotundatum*.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 2689.** Donnelly, T.W. (1998): Massachusetts group has a productive summer, digested from the ODE NEWS. *Argia* 9(4): 12. (in English). [Massachusetts, USA; records of the following species are briefly discussed: migrating *Anax junius*, some preyed by Kestrels, *Somatochlora georgiana*, *Coenagrion resolutum*, *Gomphaeschna antilope*, *Aeshna mutata*, *Tramea calverti*, and *Calopteryx dimidiata*.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 2690.** Donnelly, T.W. (1998): Michigan odonate survey news, extracted from WILLIAMSONIA. *Argia* 9(4): 12. (in English). [The second record of *Enallagma exsulans* in Michigan, USA is used to outline briefly the range extension of the species in the past decades in USA.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 2691.** Mauffray, B. (1998): Update from the IORI. *Argia* 9(4): 25-26. (in English). [Report of the 1997 activities of the International Odonata Research Institute in Gainesville, Florida, USA.] Address: Mauffray, B., 4525 N.W. 53rd Lane., Gainesville, FL 32653, USA. E-mail: iori@afn.org
- 2692.** May, M. (1998): International odonatology: participation and peaceful coexistence. *Argia* 9(4): 3-5. (in English). [This is a personal and balanced account on the relationships between WDA and SIO-Foundation.] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu
- 2693.** Nikula, B. (1998): *Neoneura amelia*, new to the United States. *Argia* 9(4): 11-12. (in English). [*N. amelia* was caught at 25 April 1997 in the Rio Grande valley of south Texas, and confirmed on 12./13. May 1997 at the same locality. The habitat and the co-occurring species are briefly described.] Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. e-mail: odenews@capecod.net
- 2694.** Paulson, D. (1998): Dragonflies out of Africa. *Argia* 9(4): 17-20. (in English). [Detailed report of a trip in October-November 1997 to Zimbabwe and South Africa; *Pseudagrion deningi* is a new record for Zimbabwe.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu
- 2695.** Paulson, D. (1998): Specimens tell story of migration - but no longer? *Argia* 9(4): 22. (in English). [Some reflections on fat deposition of wandering dragonflies.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu
- 2696.** Rampazzi, F. (1998): Le libellule (Insecta: Odonata) delle torbiere a sfagni del cantone Ticino e del Moesano (Val Calanca e Val Mesolcina, GR), Svizzera. *Boll. Soc. ticin. Sci. not.* 86(2): 19-28. (in Italian, with English summary). [During the period 1990-1993 the Odonata of 20 peat-bogs of the Canton Ticino and Moesano (Calanca and Mesolcina, GR, Switzerland) were surveyed. The study sites are situated in the southern Swiss Alps (Ticino, Grisons) at altitudes between 275 and 2020 m a.s.l. 25 species of dragonflies were recorded, 18 of which are reproducing in at least one of the 20 investigated sites, but only *Aeshna caerulea*, *A. juncea*, *Somatochlora alpestris*, *S. arctica*, *Libellula quadrimaculata*, *Sympetrum danae*, and *Leucorrhinia dubia* show clear preferences for peat-bog habitats. The occurrence of peat-bog species depends particularly on temperature, water acidity and structure of aquatic habitats. The most characteristic species are represen-

ted by *S. arctica* and *A. caerulea* (only in peat-bogs above 1700 m a.s.l.) and particularly by *L. dubia*, which occurs only in peat-bogs with dystrophic ponds. In the study-area *A. caerulea* and *L. dubia* are very rare species (only 3 sites), while *A. juncea* and *S. alpestris* show the higher frequency among the investigated dragonflies-communities (12-14 sites). However, the affinity of *A. juncea* and *S. alpestris* with peat-bog habitats decrease strongly by increasing altitude, and in the subalpin region they become more or less eurytopic. The likewise "tyrphobiontic species" such as *Coenagrion hastulatum* or *L. pectoralis*, which are both present in the northern part of Switzerland and of Italy, could not be found.] Address: Rampazzi, F., Mus. cantonale Stor. nat., Viale Cattaneo 4, CH-6900 Lugano, Switzerland.

2697. Tennessen, K. (1998): Ecuador IV - we learn some more. *Argia* 9(4): 13-15. (in English). [Report of a collecting trip to the eastern slopes of Ecuador.] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennessen@aol.com

2698. Utzeri, C.; Cordero, A., Santolamazza Carbone, S.; Dell'Anna, L.; Mamcini, L. (1998): *Somatochlora meridionalis* Nielsen, 1935 nel Lazio (Italia centrale), con note di autecologia e comportamento (Odonata: Corduliidae). *Opusc. zool. flumin.* 163: 1-16. (in Italian, with English summary). ["The 12 hitherto known *Lalium* localities of the species are mapped. At 5 sites, in 2 streams, the temperature, pH, dissolved oxygen, oxygen saturation, conductivity and salinity were recorded, and the concentration of sulfite-reducing clostridia was evidenced in water and in sediments by means of anaerobic culture on SPS-agar. In winter, during the larval stage, water was cool and oversaturated by oxygen, pH was over 8. Since water bodies with such pH values are uncommon in central Italy, the high alkalinity might present a restricting factor for larval growth, hence it could be responsible for the localised distribution of the species. Mature individuals were recorded on the wing between early July and the second half of August, but the entire flight period, incl. the maturation time, probably extends from mid June to the end of August at least. Throughout this period, 13 odonate species were associated with *S. meridionalis* at 3 of its habitats. There is no evidence on territorial behaviour. Males search for females in the shadedmost parts of the river banks. However, the copulation takes place either at the watersite or, in 1 case, it occurred 2 km off the water. This may suggest an unusual mating system in this species. Intra-male sperm translocation behaviour was observed once, after tandem formation. The oviposition takes place at very sheltered and shaded sites, either in the water, or in the mud at the water edge. At times, females can also repeatedly alternate several oviposition movements onto the ground (at a short distance from water) with a single one onto the water. Eggs, deposited on 22 August 1997, and reared first under natural conditions, and subsequently in the laboratory (15 h light period), hatched after 29 days. The female preference for very shaded oviposition sites might explain the literature reports on larvae, recovered from flooded caves and Etruscan tombs, although these can be carried into the caves by the surface streams as well." (Authors)] Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma, Italy

2699. Vizslán, L.; Vizslán, T. (1998): Adatok a Varbói-Tározó szilakötő (Odonata) faunájához. *Acta Academiae Paedagogicae Agriensis Nova Series (Sectio Zoologica)* 22: 35-46. (in Hungarian with English summary). [The paper documents the odonate fauna of the Varbó reservoir in the Tardonai Hills, Hungaria. 29 species, most of them collected in 1995 and 1996, are listed. Special emphasize is given by the authors to *Pyrrhosoma nymphula interposita*, *Aeshna mixta*, *Anax imperator*, *Libellula fulva*, and *Sympetrum pedemontanum*.] Address: Vizslán, V., Kitaibel Pál út 32/C Fsz: 2, HU-9400 Sopron, Hungaria

1999

2700. Angelibert, S.; Cayrou, J.; Cereghino, R.; Giani, N. (1999): Biodiversity of three rocky ponds of the "Causses du Quercy" Regional Natural Park. *Bulletin de la Societe D'Histoire Naturelle de Toulouse* 135: 37-45. (in French with English summary). ["In the arid Causse region (South-western France), aquatic ecosystems are scarce, and essential to the maintain of both wildlife and human activities. Since the 12th century, several ponds were bored into the calcareous rock of this region. These man-made ecosystems belong now to the patrimony of the "Causses du Qercy" Regional Natural Park. The aim of this work was to evaluate the biodiversity of the aquatic flora and fauna of these ponds. Because of the rocky nature of the substrate, the specific richness of the flora was low (only 13 plant species were recorded). The invertebrate and vertebrate fauna was sampled from March to July 1999 :155 taxa (i.e. 145 invertebrates and 10 vertebrates) from 61 families were recorded. These taxa were characteristic of plains and mountains from occidental Europe. However, this species list is certainly not extensive. Most of the winged adults could be considered as migrating species (i.e. from pond to pond), with reproduction occurring in a certain number of ponds only. Diptera Chironomidae were the most diversified group, with 33 identified taxa. The absence of expected taxa (i.e. usually found in such ecosystems: Odonata Gomphidae, Mollusca Sphaeriidae) was probably due to the absence of mud accumulation on the rocky substrate. Our study showed that these ponds require particular attention and should be preserved, as : i) they could be considered as isolated biodiversity reservoirs within this wide arid area, and ii) they are the only of water for the terrestrial fauna, including insects which have a major role in plant pollinisation." (Authors)] Address: Angelibert, S., Centre d'Ecologie des Systemes Aquatiques Continentaux, UMRC 5576, 118 route de Narbonne, F-31062, Toulouse Cedex, 4 France

2701. Foeckler, F.; Theiß, J.; Schmidt, H.; Deichner, O.; Schiller, W. (1999): Auswirkungen der Extensivierung teichwirtschaftlicher Nutzung auf Makrozoobenthos, Plankton-Entwicklung und Trophie am Beispiel der Naturschutzgebiete "Vogelfreistätte Großer Rußweiher" und "Eschenbacher Weihergebiet". *Schriftenreihe des Bayerischen Landesamtes für Umweltschutz* 150: 245-267. (in German). [Bavarian (Germany) conservation measures for water bodies intent to extensify pisciculture. To assess efforts of this extensification, the fauna including Odonata of six water bodies before (1995) and after (1996) extensification measures was

surveyed. At present, there is no significant increase of species diversity measurable.] Address: ÖKON, Dechbettener Str. 9, D-93049 Regensburg, Germany

2702. Futahashi, R. (1999): Late records of *Crocothemis servilia mariannae* KIAUTA and *Aeschnophlebia longistigma* SELYS. *Aeschna* 35: 47-48. (in Japanese). Address: not stated in Japanese

2703. Inoue, K.; Kano, K.; Kuwahara, H.; Sano, O.; Yahiro, I. (1999): Records of Odonata from Guam Island, Mariana Islands, USA. *Sympetrum Hyogo* 6: 14-22. (in Japanese with English summary). ["Many Japanese travelers have visited this island mainly for sight-seeing, but no faunal records have ever been published after Lieftinck's publication on Odonata of Micronesia in 1962. This report compiles specimens collected by Kano, Kuwahara, Sano and Yahiro, who have visited this island during 1983 to 1997 independently. The twelve species listed by Lieftinck for Guam, could be confirmed. *Orthetrum s. sabina*, *Zyxomma petiolatum*, and *Macrodiplax cora* are new additions to this island (cf. Kano, 1990 and 1991), and *Anax guttatus* was proved to occur in good numbers in contrast to Lieftinck's single female. The status of *Anax piraticus* is discussed in comparison with *A. guttatus* and *A. panybeus* in great detail and the taxa are figured. Figures of *Agrionoptera insignis guamensis* and the Japanese *A. i. insignis* are welcome for studying the status of the taxa. Some of the species are pictured with colour photos, and a picture shows a couple of *O. sabina* and *Z. petiolatum*. In addition body length of *Hemicordulia mindana mindana* and *H. m. nipponica* are compiled in a table." (Authors)] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

2704. Kitagawa, K. (1999): Mr. Wako KITAWAKI in memoriam. *Aeschna* 35: 1-2. (in Japanese). [Obituary] Address: Kitagawa, K., Imaiti 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan

2705. Larube, H. (1999): A note on *Zyxomma obtusum* ALBARDA caught with light traps. *Aeschna* 36: 32. (in Japanese). Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

2706. *Lindenia* No. 33 (1999): LINDENIA. *Notiziario dell'Ufficio nazionale italiano della Società odonologica internazionale*, Napoli. *Lindenia* No. 30: 129-132. (in Italian). [Announcements of odonatological symposia; review; list of province-wise occurrence (absolute and relative amount) of each Italian odonate species] Address: C. D'Antonio, Via A. Falcone 386/b, 1-80127 Napoli, Italy; E-mail: lindenia@freemail.it

2707. Matsuda, I. (1999): A record of the dragonflies newly caught in Kohama Island, the Ryukyus. *Aeschna* 35: 44. (in Japanese). [Japan; 6 species caught at 16 July 1997 are listed.] Address: not stated in Japanese

2708. Muraki, A.; Fujimoto, K. (1999): A record of *Sympetrum cordulegaster* (SELYS) from Nagano Prefecture in 1997. *Aeschna* 35: 36. (in Japanese). [Japan; 26-X-1997.] Address: Muraki, A., Shigino-nishi 3-4-2-309, Jôtô-ku, Osaka C., Osaka 536, Japan

2709. Sacha, D.; Sibl, J. (1999): Príspevok k poznaniu fauny vážok (Odonata) Záhoria. *Folia faunistica Slovaca*, Bratislava 4: 45-53. (in Slovakian with English

summary). [Between 1995 and 1997, 46 odonate species were collected in the Rudna river-basin, Slovakia. This totals the number of the regionally known species to 49. Most interesting records are *Coenagrion scitulum*, *C. ornatum*, *Ophiogomphus cecilia*, *Brachytron pratense*, *Anaciaeschna isocles*, *Anax parthenope*, *Cordulegaster boltonii*, *Somatochlora flavomaculata*, *Epithea bimaculata*, *Orthetrum brunneum*, *O. coerulescens*, *Sympetrum danae*, *S. meridionale*, *S. pedemontanum*, and *Leucorrhinia pectoralis*.] Address: Sibl, J., J. Stanislava 15, SK 84105 Bratislava, Slovakia. E-mail: sibl@changenet.sk

2710. Schmidl, J. (1999): Erfolgskontrolle an Tümpelneuanlagen in schwäbischen Niedermooren anhand Kleingewässer bewohnender Insektengruppen (*Hydradephaga*, Odonata). *Schriftenreihe des Bayerischen Landesamtes für Umweltschutz* 150: 269-274. (in German). [In the past decades, water bodies in fen bogs in Bavaria, Germany were impacted heavily by a diversity of human activities. To assess conservation measures (creation of new water bodies), water beetles and Odonata were used as monitoring organisms for the colonisation success of these water bodies. Records of Odonata with a "special value for nature conservation purposes" are *Sympecma fusca*, *Aeshna grandis*, *Brachytron pratense*, *Somatochlora flavomaculata*, and *Sympetrum striolatum*.] Address: Schmidl, J., bufos, Schopershofstr. 63, D-90489 Nürnberg, Germany

2711. Sugitani, A. (1999): Cherish the memory of Mr. Hiroshi ITOH. *Aeschna* 35: 56. (in Japanese). [Obituary] Address: not stated in English

2712. Suhling, F.; Schütte, C. (1999): Sternberg, K.; Buchwald, R. (Eds.) (1999): *Die Libellen Baden-Württembergs*. Band 1. *Lauterbornia* 37: 248-249. (in German). [oas 6; Review of the book, see OAS 1149] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

2713. Vizslán, T.; Pingitzer, B. (1999): Adatok Magyarország szitakötő - faunájához (Odonata) III. *Folia hist. nat. Mus. matraensis* 23: 179-190. (in Hungarian with short English summary). [Records of 47 Odonata from 151 Hungarian localities are presented species wise. The list includes species as *Lestes virens vestalis*, *Erythromma najas*, *Coenagrion ornatum*, *C. pulchellum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Thecagaster bidentata*, *Somatochlora metallica*, *Epithea bimaculata*, *Sympetrum meridionale*, and *S. pedemontanum*. Of more anecdotal interest is that *Crocothemis erythraea* (Brullé, 1832) at last! replaced *C. servillia* (Drury 1770) from Hungaria; it ever will remain a secret of (some) Hungarian odonatologists why they insisted on a disjunctive area of *C. servillia* in Hungaria.] Address: Vizslán, T., Kitaibel P. u. 32/C. Fru 2, HU-9400 Sopron, Hungaria

2714. Vizslán, T.; Pingitzer, B. (1999): Publication of data to the Odonata of County Borsod-Abaúj-Zemplén 4.. *Folia hist. nat. Mus. matraensis* 23: 171-177. (in Hungarian, with English summary). [Records of 34 species evidenced in 1995 are documented along with locality records and dates. Of some interest are records of *Coenagrion ornatum*, *Lestes dryas*, *L. sponsa*, *Anax ephippiger*, *Epithea bimaculata*, *Orthetrum coerulescens anceps*, and *Sympetrum meridionale*.] Address: Vizslán, T., Szent Mihály u. 9, HU-9400 Sopron, Hungaria

2715. Yoshida, K. (1999): New localities of *Macromia daimoji* OKUMURA from Shikoku. *Aeschna* 35: 53. (in Japanese). Address: not stated in English

2716. Yoshida, M.; Ohkubo, K. (1999): A record of *Anax guttatus* (BRUMEISTER) in late season. *Aeschna* 36: 46. (in Japanese). [11. Nov. 1998] Address: not stated in Japanese

2000

2717. Bechly, G. (2000): Two new fossil dragonfly species (Insecta: Odonata: Anisoptera: Araripegomphidae and Lindeniidae) from the Crato Limestone (Lower Cretaceous, Brazil). *Stuttgarter Beitrage zur Naturkunde Serie B (Geologie und Palaeontologie)* 296: 1-16. (in English with German summary). ["Two new dragonfly taxa are described from the Lower Cretaceous limestones of the Crato Formation (Brazil): *Araripegomphus hanseggeri* n. sp. and *Cratolindenia knuepfiae* n. gen. n. sp. which both belong to the gomphid clade within Anisoptera. With at least 10 known species the gomphids represent the most diverse and also most abundant group of dragonflies at this locality, which has to be regarded as strong evidence for the presence of rivers. While all other known gomphid species belong to the Araripegomphidae and Proterogomphidae - Cordulagomphinae, the new genus *Cratolindenia* appears to be the first record of Lindeniidae - Lindeniinae from this locality." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

2718. Boonthai, C.; Scott, R.R. Chapman, R.B. (2000): Acetylcholinesterase as a biomarker to assess the effect of chlorpyrifos and atrazine on some New Zealand aquatic invertebrates. *Australasian Journal of Ecotoxicology* 6(1): 59-64. (in English). ["Acetylcholinesterase (AChE) activity was investigated in selected species of New Zealand aquatic invertebrates using a modified microplate assay based on the Ellman technique as a biomarker of chlorpyrifos and atrazine exposure. After two days exposure to different concentrations of chlorpyrifos and atrazine, mayfly nymphs, *Deleatidium* sp., common water boatman, *Sigara arguta*, and common red damselfly nymphs, *Xanthocnemis zealandica*, showed a general trend of depression in AChE level but there were differences between the species. The results indicate that acetylcholinesterase may be useful as a biomarker but the choice of species is critical. The results also showed that atrazine may inhibit the activity of AChE. These results suggest that the restriction of AChE as a biomarker for organophosphorus and carbamate pesticides may not be valid and the use of this enzyme as a biomarker may be able to extended." (Authors)] Address: Boonthai, C.; Ecology and Entomology Group, Soil, Plant, and Ecological Sciences Division, Lincoln University, Canterbury New Zealand.

2719. Brown, J.M.; McPeck, M.A.; May, M.L. (2000): A phylogenetic perspective on habitat shifts and diversity in the North American *Enallagma* damselflies. *Systematic Biology* 49(4): 697-712. (in English). ["Community ecologists are increasingly aware that the regional history of taxon diversification can have an impor-

tant influence on community structure. Likewise, systematists recognize that ecological context can have an important influence on the processes of speciation and extinction that create patterns of descent. We present a phylogenetic analysis of 33 species of a North American radiation of damselflies (Zygoptera: Coenagrionidae: *Enallagma* Selys), which have been well studied ecologically, to elucidate the evolutionary mechanisms that have contributed to differences in diversity between larval habitats (lakes with and without fish predators). Analysis of molecular variation in 842 bp of the mitochondrial cytochrome oxidase I and II subunit and of the intervening Leu-tRNA and 37 morphological characters resulted in three well-defined clades that are only partially congruent with previous phylogenetic hypotheses. Molecular and morphological data partitions were significantly incongruent ($p < .01$). Lack of haplotype monophyly within species and small amounts of sequence divergence (<1%) between related species in three of the four clades suggest that recent, and parallel, speciation has been an important of community diversity. Reconstruction of habitat preference over the phylogeny suggests that the greater species diversity in fish-containing lake habitats reflects the recency of shifts into the fishless lake habit, although a difference in speciation or extinction rates between the two habitats is difficult to exclude as an additional mechanism." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

2720. Chae, J.-S.; Pusterla, N.; Johnson, E.; Derock, E.; Lawler, S.P.; Madigan, J.E. (2000): Infection of aquatic insects with trematode metacercariae carrying *Ehrlichia risticii*, the cause of Potomac horse fever. *Journal of Medical Entomology* 37(4): 619-625. (in English). ["We provide evidence of *Ehrlichia risticii* Holland, the agent of Potomac horse fever, in trematode stages found in aquatic insects collected from a pasture stream in northern California, using nested polymerase chain reaction (PCR) amplification and sequence analyses of the 16S rRNA, 51 kDa major antigen and groEL heat shock protein genes. *E. risticii* was detected in metacercariae found in the immatures and adults of the following insects: caddisflies (Trichoptera), mayflies (Ephemeroptera), damselflies (Odonata, Zygoptera), dragonflies (Odonata, Anisoptera), and stoneflies (Plecoptera). The prevalence of *E. risticii* was 31.9% ($n = 454$ individuals) in aquatic insects (13 of 17 species were positive). Prevalence within orders was as follows: 43.5% ($n = 207$) in caddisflies, 15.2% ($n = 92$) in mayflies, 13.9% ($n = 115$) in damselflies, 10.0% ($n = 10$) in dragonflies, and 80.0% ($n = 30$) in stoneflies. This study demonstrates a broad intermediate host range for trematodes that act as vector for *E. risticii*. Insects are likely to play an important role in the epidemiology of this disease." (Authors)] Address: Chae J.-S., College of Veterinary Medicine, Chonbuk National University, Chonju, Chonbuk, 561-756 South Korea

2721. Combes, S.A.; Trimble, A.C.; Daniel, T.L. (2000): Spatial profiles of wing stiffness in hawk-moths and dragonflies. *American Zoologist* 40(6): 978. (in English). ["Insect flight performance depends strongly on the dynamic geometry of wings. The curvature of the trailing edge, in particular, is a crucial determinant of aerodynamic force generation. In insects, wing curvature results from the instantaneous interaction between

aerodynamic forces and bending stiffness. If bending stiffness varies spatially, then regional flow control is possible, suggesting a passive mechanism of stability. To examine this structural heterogeneity and its consequences for flight aerodynamics, we characterize spatial variation of wing flexural stiffness in both the spanwise and chordwise direction of insect wings. We measure the surface shape of wings by multiple laser ranging techniques, and then calculate flexural stiffness along the wing by comparing the surface shape of wings before and after loading the tip with a known force. We compare the spatial distribution of wing stiffness in the hawkmoth, *Manduca sexta*, and an aeshnid dragonfly, *Aeshna multicolor*. These insects, both excellent fliers, differ greatly in wing shape and venation pattern. Despite such morphological differences, we find that the profile of flexural stiffness in the spanwise direction is remarkably similar in both species, with a peak in stiffness located between 1/3 and 1/2 of wing span, and a sharp drop in stiffness (apprx2 fold) past this point. In contrast, chordwise stiffness differs in the two species; in *Manduca*, stiffness falls sharply towards the trailing edge, while the dragonfly does not display this abrupt drop. Thus, trailing edge curvature and chordwise flow may differ significantly in these species." (Authors)] Address: Combes, S.A. ; Trimble, A. C. ; Daniel, T. L., University of Washington, Seattle, WA USA

2722. Fischer, S.; Marinone, M.C.; Fontanarrosa, M.S.; Nieves, M.; Schweigmann, N. (2000): Urban rain pools: Seasonal dynamics and entomofauna in a park of Buenos Aires.. *Hydrobiologia* 441: 45-53. (in English). ["We describe the seasonal variations of the insect community of the rain pools in a park of Buenos Aires during a 1-year period, based on a weekly sampling programme. We also analyse the relationships between the observed biotic patterns and some physical and meteorological variables. Four periods, fairly coincident with the seasons of the year, were graphically identified as functions of temperature, rainfall, flooded area, number of rain pools, depth and taxonomic richness. A total of 45 insect taxa was identified: 18 Coleoptera, 15 Diptera, 9 Heteroptera, 1 Ephemeroptera and 2 Odonata. [...]."] (Authors). Address: Fischer, Sylvia, Departamento de Ciencias Biologicas, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, Pabellon II, C1428 EHA, Buenos Aires, Argentina. E-mail: mosquito@bg.fcen.uba.ar

2723. Fleck, G.; Nel, A.; Ploeg, G. de; Masselot, G. (2000): A fossil dragonfly from the Paris Basin amber of France (Lowermost Eocene) (Insecta, Odonata, Anisoptera). *Acta Geologica Hispanica* 35(1-2) : 131-134. (in English). ["A new fossil libelluloid dragonfly is recorded from the Lowermost Eocene amber of Oise (France). This discovery is not only exceptional as a dragonfly in amber but also represents one of the oldest records of the libelluloid clade in the Cenozoic." (Authors)] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France

2724. Gröger, T.; Lange, K.-P. (Bearb.) (2000): Beiträge zur Entwicklung eines ökologischen Leitbildes für Flusslandschaften am Beispiel der Jahna, einem Nebenfluss der Elbe in Sachsen. Staatsministerium für Umwelt und Landwirtschaft, Freistaat Sachsen (Hrsg.): 183 pp. (in German). [Aim of the study is to prepare fundamentals for a river management plan. It documents extensively the ecological (abiotic, biotic, mana-

gement) situation in the catchment of the Jahna, a tributary of the River Elbe, Sachsen, Germany. In Chap. 4.1.5, the results of an odonatological survey are briefly outlined, but without details. In 1999 and 2000, 25 species were recorded. From the odonatological point of view, management measures should be developed on the basis of habitat requirements of *Ophiogomphus cecilia*. The study can be obtained for 5,- Euro from the address listed below.] Address: Staatliches Umweltfachamt Radebeul, Wasastr. 50, D-01445 Radebeul, Germany. E-mail: poststelle@sturfARB.smul.sachsen.de

2725. Habdua, I.; Radanovic, I. Matonickin, R. (2000): Functional feeding structure of benthic macroinvertebrates in travertine barrier biotopes. *Verh. int. Ver. Limnol.* 27(5): 2594-2599. (in English). [Plitvice Lakes, NW Dinarid Mts, Croatia; *Onychogomphus forcipatus* is reported from the travertine moss- and filamentous algae covered substrate.] Address: Habdua, I., Dept Zool., Fac. Sci., Univ. Zagreb, Rooseveltov trg 6, CRO-10000 Zagreb, Croatia

2726. Hiratsuka, K. (2000): Collection of *Cordulia aenea amurensis* in Soya-shicho. *Bulletin of The Hokkaido Odonatological Society* 12: 25. (in Japanese). [Hokkaido, Japan; 30 Aug. 2000.] Address: Hiratsuka, K., 2-20-113, Honcho 2 jo-9, Higashi-ku, Sapporo City, 065-0042, Japan

2727. Hiratsuka, K. (2000): Observation on dragonflies at Onuma Park at Nanae-cho. *Bull. Hokkaido Odonatol. Society* 12: 24-25. (in Japanese). [Japan; *Lestes dryas*, *Somatochlora viridiaenea*, *Sympetrum risi*, *S. darwinianum*] Address: Hiratsuka, K., 2-20-113, Honcho 2 jo-9, Higashi-ku, Sapporo City, 065-0042, Japan

2728. Huth, J. (2000): Libellen (Odonata) der Braunkohlen-Bergbaufolgelandschaft Sachsen-Anhalts. *Abh. Ber. Naturkunde, Magdeburg* 23: 3-27. (in German with English summary). [Between 1996 and 1998, 46 odonate species were recorded from 93 water bodies within open-cast lignite post-mining landscapes of Sachsen-Anhalt, Germany. From the nature conservation point of view, the most important habitats are those with good water quality and a high diversity of vegetation. Each species is discussed in some detail. Succession of water body (early phase, transition phase, established phase [>35 years old]) and the specific odonate species are outlined. This paper provides significant information on the characteristic coenosis and key species of different water bodies.] Address: Huth, J., OEKOKART GmbH, Georg-Cantor-Str. 31, D-06108 Halle/Saale, Germany

2729. Iannacone, J.A.; Alvarino, L.; Moreno, R.; Reyes, M.; Chauca, J. (2000): Culicidos (Diptera) del rio Chillón y sectores adyacentes de la provincia constitucional del Callao, Peru, durante El Niño 1997-1998. *Acta Entomologica Chilena* 24: 51-60. (in Spanish with English summary). [The study evaluated some areas of natural breeding places of mosquitoes - in most cases near underdeveloped town - near human populations in Callao-Peru during December 97 to August 98. Larvae of culicids of medical importance as *Anopheles pseudopunctipennis* (Theobald), *Culex quinquefasciatus* (Say), and *Aedes taeniorhynchus* (Wiedemann) were assessed. Habitat conditions resp. requirements of the species as salinity, temperature, and pH (7,8) were analyzed. "Moreover, spatial and temporal variation of population and the larvae index were observed in nine

survey points of Chillan River. High larvae indexes of *A. pseudopunctipennis* were associated with presence of the algae *Cladophora glomerata* (L.) Kuetzing and with the macrophyte *Lemna minor* (L.). The larvivorous fish *Poecilia reticulata* Peters, nymphs of Libellulidae and Coenagrionidae (Odonata) and adults of Dytiscidae (Coleoptera) were recorded as potential predators. The results were compared with those of the 1995-96 Pre-ENSO event, concluding that one of the consequences of Southern Oscillation ENSO "El Niño" 1997-98 event in the Peruvian coast was an increase of the population of these culicids of medical importance." (Authors)] Address: Iannaccone, J.A., Laboratorio de Ecofisiología, Área de Biodiversidad Animal, Facultad de Ciencias Naturales y Matemáticas, Universidad Nacional Federico Villarreal, Calle San Marcos 383, Pueblo Libre, Lima 21, Peru. E-mail: joselorena@terra.com.pe

2730. Jeziorski, P. (2000): *Leucorrhinia albifrons* (Burmeister, 1839) and *L. caudalis* (Charpentier, 1840) (Insecta: Odonata: Libellulidae) in the Czech Republic. *Casopis Národního Muzea Rada Přírodovědná* 169(1-4): 45-46. (in English). [*L. albifrons* and *L. caudalis* were traced in the collection of the National Museum Prague, Czech Republic. The findings are listed in a tab. with the known (very few) Czech records.] Address: Jeziorski, P., Na belide 1, CZ-73564 Havírov-Suchá

2731. Jonsen, I.; Taylor, P.D. (2000): Calopteryx damselfly dispersions arising from multiscale responses to landscape structure. *Conservation Ecology*. [online] 4(2). [cited September 14, 2001] Dec, 2000. 1-29. <http://www.consecol.org/Journal/vol4/iss2/art4/index.html>: (in English). ["Using spatially explicit simulation models, we explored the extent to which fine-scale (i.e., meters to tens of meters) movement behaviors could be used to predict broader scale patterns of distribution on heterogeneous landscapes. Our models were tailored by empirical data on Calopterygid damselfly movements on three types of landscapes that differed in amount of forest habitat. Surveys of the two congeneric damselflies, *C. aequabilis* and *C. maculata*, demonstrated that both species occupied stream and forest habitats on forested and partially forested landscapes, but were found primarily along streams on nonforested landscapes. Simulation models whose parameters were derived using empirical movement data for both species showed that fine-scale movement behaviors could be used to predict, on average, broader scale dispersion across a range of landscape structures, but that it was necessary to include information about broader scale landscape features in those models. In particular, the probability of crossing a patch boundary (patch boundary permeability) and the rate of movement in a given habitat patch (patch viscosity) were important determinants of damselfly dispersion on heterogeneous landscapes. In other words, our results suggest that damselfly dispersions may arise as a function of behavioral responses to spatial patterns at multiple scales." (Authors)] Address: Jonsen, D.I., Lethbridge Research Centre, Agriculture & Agri-Food Canada, P.O. Box 3000, Lethbridge, AB, Canada T1J 4B1. E-mail: jonse- ni@em.agr.ca

2732. Kenner, R.D. (2000): *Somatochlora kennedyi* (Odonata: Corduliidae): a new species for British Columbia, with notes on geographic variation in size and wing venation. *J. ent. Soc. Br. Columbia* 97: 47-49. (in English). [1 female, Andy Bailly Lake, S of Fort Nelson,

25-VI-1997. Specimens from the northern Yukon are smaller than those from elsewhere in its range and have a reduced number of cells in R2 in fore- and hind-wing.] Address: Kenner, R.D., Spencer Ent. Mus., Dept Zool., Univ. Brit. Columbia, Vancouver, BC, V6T 1Z4, CA

2733. Kopij, G.; De Swardt, D.H.; Nuttall, R.N. (2000): Diet of seven coraciiform species (Coraciiformes) in South Africa. *Acta Ornithologica* (Warsaw) 35(2): 207-209. (in English with Polish summary). ["A total of 62 stomach contents of four Merops and three other coraciiform species from South Africa, were analysed. Hymenoptera constituted the bulk of the diet of all four Merops species examined, with Odonata and Coleoptera being supplementary components. Upupa epops and *Phoeniculus cyanomelas* fed mainly on insect larvae, while *Coracias caudata* preyed upon Scarabaeidae, Acrididae, Isoptera and Solifugae." (Authors) The percentage of Odonata "of the prey in relation to the total number of prey identified" was 6.1 (*Merops apiaster*), 5.2 (*M. bullockiodes*), 8.5 (*M. persicus*), and 0 (*M. hirundineus*). It is discussed that "if wet mass is taken into consideration, the contribution of Odonata to the diet [...] is probably underestimated."] Address: Kopij, G., Dept Biol., National University of Lesotho, P.O. Roma 180, Lesotho. E-mail: g.kopij@nul.ls

2734. Kúdela, M. (2000): On the occurrence of some dragonflies (Odonata) in Podunajská rovina Plain. *Entomofauna carpathica* 12: 32-33. (in Slovakian, with English summary). [Trpis (1957) published odonate records from the Podunajská rovina Plain. The red listed *Stylurus flavipes* and *Sympetrum depressiusculum* have been rediscovered in this region; *Aeshna cyanea* has been recorded for the first time. *Gomphus pulchellus*, listed for the Podunajská rovina Plain, turns out to have been misrecorded, "as the place of record does not belong to this area." Annotation of ms: *G. pulchellus* was published for the Slovakian Republic from Dudich, E. (1958): Die Grundlagen der Fauna eines Karpaten-Flusses. *Acta zool. Acad. sci. hung.* 3(3-4): 179-200; the correct identification of the specimen is questionable.] Address: Kúdela, M., Katedra zoológie Prírodovedeckej fakulty UK, Mlynská dolina B-1, 842 15 Bratislava, Slovakia

2735. Mostert, K. (2000): Fauna in de stad: Mogelikheden en beperkingen. *Levende Natuur* 101(6): 209-212. (in Dutch with English summary). ["Fauna in urban areas: Chances and limitations: In general urban areas host a large number of fauna species. Many of these species roam a lot. Far less species manage to maintain vital populations in urban areas. In larger cities most species are found in the sub-urban areas. Specific management offers especially in these areas attractive ecological possibilities. Apart from some building dwelling species the urban bird fauna consists mainly of forestborn species. Settlement of colonies causes often conflicts with 'human' fauna. Water birds and birds nesting on the ground are rare, because of predating pets. For example White wagtail, Swallow and Tree sparrow breed in rural areas in or around human buildings, but are largely absent in urban areas. Bats indicate ecological infrastructure in urban areas. The ecological quality of lawns in recreational areas and roadsides is well indicated by abundance and diversity of butterflies and grasshoppers. Dragonflies and in a lesser extent amphibians are suitable for judging the suc-

cess of riparian ecological management. Opportunities for ecological successes are linked to ecological corridors, extensive grassland management and in riparian management. Vegetations consisting of ruderal plant species are important in suburban areas, whereas these can accommodate many species, which lack in urban areas. Exotic species like Ring-necked parakeet, Siberian chipmunk and Midwife toad increase as a part of the urban fauna. Contrary to the flora the urban fauna hardly contains rare (Red List) species." (Author)] Address: Mostert, K., Palamedesstraat 74, NL-2612 XS Delft, The Netherlands

2736. NABU (2000): Das NABU-Naturschutzprojekt "Vogelsbergteiche" - ein einmaliges Naturidyll in Deutschland wird vorgestellt. Jahrbuch Naturschutz in Hessen 5: 7-9. (in German). [These water bodies are situated in the high middle range mountains in Hessen, Germany and of special ornithological importance. A passing reference on Odonata states that the population density of *Enallagma cyathigerum* was projected to 300000 individuals. So far 16 species are known from the region, but only *Aeshna mixta* is specified.] Address: NABU, Landesverband Hessen, Garbenheimer Str. 32, D-35578 Wetzlar, Germany. www.NABU-Hessen.de

2737. Niesler, A. (2000): Ocena jakosci wody potoku Slepjotka na podstawie badan sestonu oraz bentosu. *Acta Biologica Silesiana* 34(51): 97-118. (in Polish with English and Russian summaries). ["Estimation of the water quality in Slepjotka stream on the ground of seston and bentos investigations: Studies concerned qualitative and quantitative analysis of seston and bentos fauna communities of the stream Slepjotka (Upper Silesia). Samples were taken from March to November 1996, once a month. Ciliata were the group which dominated in number and variety in species. Qualitative and quantitative analysis were helpful in distinguishing three different zones: the clean water zone (corresponded with oligosaprobic zone - next to the spring), the strong polluted zone (corresponded with alpha-mesosaprobic zone with some polisaprobionts - in the middle site) and the self-clarificated one (corresponded with alpha-mesosaprobic zone with some oligo- and beta-mesosaprobionts - near the fall of Slepjotka into Klodnica River). The communal sewage which flew down into the stream had a double influence over organisms living there. On the one hand it was connected with degradation of Ostracoda, Coleoptera, Dixidae, Heleidae, Ephemeroptera, Heteroptera, Odonata, Plecoptera (in bentos) and Cladocera (in seston). On the other hand it caused the massive occurrence of Ciliata, Nematoda and Diptera. Taking into account variety of trophic types, the lowest number of bacteria-feeders at the clean zone and their higher amount in the remaining sites were recorded. In spite of fact that the qualitative composition of bentos was indicative of greater pollution than in seston, the bentos communities as well as the seston one were helpful in estimating of the water quality." (Author)] Address: Niesler, Anna., Katedra Ekologii, Uniwersytet Slaski, ul. Bankowa 9, 40-007, Katowice Poland

2738. Polhemus, D.A.; Asquith, A.; Miller, S (2000): A new species of *Ischnura* from Rota (Odonata: Coenagrionidae), and a discussion of zygopteran zoogeography in the insular tropical Pacific. *Occ. Pap. Bemise P. Bishop Mus.* 62: 5-12. (in English). [*Ischnura luta* sp.

n. is described from the island of Rota in the northern Marianes. Holotype male, allotype female: Mariana Isls, Rota: Talakhaya, Water Cave Stream, 1/2-IV-1996; deposited at BPBM, Honolulu. It is similar to *I. ezoin* from the Bonin Isls, but can be easily distinguished from all Micronesian congeners by the structure of the male genitalia. The key characters are illustrated, and its biogeographic significance is discussed in the overall context of zygopteran distribution patterns in the tropical Pacific.] Address: Polemus, D.A., Dept Ent., MRC 105, Natn. Mus. Nat. Hist., Smithsonian. Instn, Washington, DC 20560, USA

2739. Pretscher, P. (2000): Neue Bücher: Sternberg, Klaus & Buchwald, Rainer: Die Libellen Baden-Württembergs. Band 1. Stuttgart: Eugen Ulmer Verlag, 1999. 468 S. - 98 DM. ISBN 3-8001-35098. *Natur und Landschaft* 75(5): 233. (in German). [oas 6; book review, see OAS 1149] Address: Pretscher, P., c/o Bundesamt für Naturschutz, Konstantinstr. 110, 53179 Bonn, Germany

2740. Primack, R.; Kobori, H.; Mori, S. (2000): Dragonfly pond restoration promotes conservation awareness in Japan. *Conservation Biology* 14(5): 1553-1554. (in English). ["The Yokohama city authorities and community groups have restored a dragonfly habitat (1986) in a previous ornamental fish pond. The odonate fauna increased from the original 3 to 27 species now, and dragonfly watching became a popular pastime for the urban population. On school grounds, 70 more dragonfly ponds were built in the Yokohama area, 300 being the final goal. The program, with pronounced educational and teaching objectives, has attracted widespread attention in Japan, and there are 500-1000 dragonfly ponds elsewhere in the country. Those next to schools are successfully encouraging an appreciation for nature and its conservation in children."] Address: Primack, R., Biol. Dept, Boston Univ., Boston, MA 02215, USA

2741. Reeves, D. (2000): *Austrolestes*, Newsletter of the Australian Dragonfly Society. *Austrolestes* 1: 1-4. (in English). [In 2000, the Australian Dragonfly Society was launched. 'Austrolestes' will deal as newsletter, will give advice in identifying specimens, will prepare bibliographic information, and will report on current activities in Australian odonatology. Issue No. 1 introduces *Austrolestes*, provides a key to the red species of *Diplacodes*, defines the terminology of Odonata size by wingspan, and lists most recent publications. It also will prepare species profiles.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

2742. Reeves, D. (2000): *Ictinogomphus australis* at Brown Lake, North Stradbroke Island, QLD. *Austrolestes* 1: 2. (in English). [8 exuviae of *I. australis* were discovered in November 2000.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

2743. Reeves, D. (2000): Species profile: *Austrolestes minjerriba* Watson 1979. *Austrolestes* 1: 4. (in English). [Morphological features and the habitat of the species are briefly outlined. Special emphasize is given to oviposition behaviour.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

- 2744.** Schultz, T.D. (2000): *Libellula flavida* (Odonata: Libellulidae), a dragonfly new to Ohio. *Great Lakes Entomologist* 33(3-4): 205-207. (in English). ["*L. flavida*, a widespread but uncommon dragonfly of southeastern and south central North America, is now recorded from Ohio. A breeding population was discovered in an acidic fen on the site of a sandstone quarry in southern Ohio." (Author)] Address: Schultz, T.D., Dept Biol., Denison Univ., Granville OH 43023, USA. E-mail: schultz@cc.denison.edu
- 2745.** Soldan, T.; Putz, M. (2000): Karyotypes of some Central European mayflies (Ephemeroptera) and their contribution to phylogeny of the order. *Acta Societatis Zoologicae Bohemicae* 64(4): 437-445. (in English). [Relations of the mayfly karyotype to that of the Odonata are discussed. Quite different Ephemeroptera karyotype supports the idea of the Ephemeroptera and Odonata + Neoptera sister grouping of pterygote insects.] Address: Soldan, T., Institute of Entomology, Academy of Sciences of the Czech Republic, Branišovska 31, CZ-370 05, Ceske Budejovice Czech Republic
- 2746.** Twisk, W.; Noordervliet, M.A.W.; ter Keurs, W.J. (2000): Effects of ditch management on caddisfly, dragonfly and amphibian larvae in intensively farmed peat areas. *Aquatic Ecology* 34(4): 397-411. (in English). ["Conservation of natural values within farming practice is growing rapidly within the Netherlands. The focus is primarily on terrestrial flora and fauna such as the vegetation in ditch banks and meadow birds. Knowledge needed to enhance biodiversity in ditches is limited. Therefore, a field study was set up to determine the effects of dredging, ditch cleaning and nutrient supply in the adjacent fields on caddisfly, dragonfly and amphibian larvae in the ditches in a peat area. Two-hundred forty ditches spread over 84 dairy farms were selected to determine the individual effect of several management aspects. Generalised linear modelling was used as a tool to detect the most relevant aspects and to obtain quantitative relations with the chance of the larvae being present. Dredging had an impact on the presence of all larvae types. The type of dredging machine, the dredging period, the water depth and the frequency of dredging can influence the presence of the larvae. The presence of caddisfly larvae was also affected by the cleaning machine and period and by the P supply in the adjacent field. The presence of amphibian larvae was also affected by the cleaning period. Measures that will enhance the presence of the larvae are formulated. Options for water boards and other government authorities to stimulate farmers to take these measures are given." (Authors) *Coenagrion pulchellum*, *Erythromma najas*, *Ischnura elegans*, and *Chalcolestes viridis* are listed in tab. 2.] Address: Twisk, W., Section Environmental Biology, Institute of Evolutionary and Ecological Sciences, Leiden University, 2300 RA, Leiden, The Netherlands. E-mail: w.twisk@zhew.nl
- 2747.** Ubukata, H. (2000): The impact of global warming on insects. In: Domoto, A., K. Iwatsuki, T. Kawamichi and J. McNeely (Eds): *A threat to life. The impact of climate change on Japanese biodiversity. Biodiversity network Japan & IUCN*: 61-70. (in English). [The paper compiles the current knowledge on possible impacts of climate change on Japanese butterflies and dragonflies using examples from different literature sources from Japan, Europe, and North America. Special emphasize is given to northward expanding Odonata as *Ictinogomphus pertinax*, the fate of so called northern species as *Somatochlora alpestris* and *Aeshna subarctica*, and *Mortonagrion Hirose* which may be impacted by increasing sea water table.] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp
- 2748.** Vizslán, T. (2000): Data on the odonate fauna of Transdanubia, 1.. *Folia hist. not. Mus. matraensis* 24: 139-144. (in Hungarian with English summary). [Compilation of 30 odonate species recorded from 56 Hungarian localities. The list includes records of *Lestes macrostigma* and *Coenagrion ornatum*.] Address: Vizslán, T., Kitaibel P. u. 32/C. Fru 2, HU-9400 Sopron, Hungaria
- 2749.** Wataji, M.; Tamura, S.; Yamada, K.; Ota, K.; Kurauchi, Y.; Uemura, T. (2000): The original fauna and its shift at the lower reach of the River Ishikari. *Bulletin of The Hokkaido Odonatological Society* 12: 1-13. (in Japanese with English summary). [Urbanization in and around of Sapporo, Japan, changed the dragonfly fauna in a drastic way; this is exemplified by a survey of seven habitats (6 rivers and a bog in the northern part of Sapporo City) near the mouth of the Ishikari River. The present dragonfly fauna is dominated by pond-dwellers, whereas bog-species appear to have been exterminated by modification of the natural environment. The results are presented in tabs and graphs.] Address: not stated in English
- 2750.** Winterbourn, M.J.; Gregson, K.L.D.; Dolphin, C.H. (2000): *Guide to the Aquatic Insects of New Zealand, Third Edition.* *Bulletin of the Entomological Society of New Zealand* 13: 102 pp.. (in English). ["This guide includes the latest information on the aquatic insects of New Zealand. Illustrated taxonomic keys are provided for the 11 orders of aquatic and water-associated insects inhabiting the three main islands of New Zealand. Where possible, insects are identified to genera and sometimes species. Annotated notes on distribution, habitat, and taxonomic problems are incorporated in the keys and references to relevant taxonomic studies are provided. A chapter on the collection, preservation, and curation is provided and the text is supplemented by maps and an index."] Address: Winterbourn, M., Zool. Dept, Univ. of Canterbury, Christchurch New Zealand
- 2751.** Xyländer, W.E.R.; Zumkowski-Xyländer, H.; Franke, R. (2000): *Libellenfunde (Insecta, Odonata) in den Königshainer Bergen. Przyroda Sudétow Zachodnich* 3: 77-84. (in German, with Polish and Czech summaries). [In 1999 and 2000, 40 odonate species could be recorded in the Landscape Protection Site "Königshainer Berge" situated in Saxonia, Germany. A total of 45 species - including some hitherto unpublished records of Petzold and Seiffert, and records of Weibel (1930) - are listed and briefly discussed. Among other species *Ophiogomphus cecilia*, *Somatochlora flavomaculata*, *Anaciaeschna isocetes*, *Brachytron pratense*, *Anax ephippiger*, *Leucorrhinia pectoralis*, *Sympetrum depressiusculum*, and a strong population of *Cordulegaster boltonii* (rare in Saxonia) are of some interest.] Address: Xyländer, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xyländer@t-online.de

2752. Yokoyama, T.; Fujimoto, S. (2000): A record of *Oligoaeschna pryeri* from Nishioka Reservoir. Bulletin of The Hokkaido Odonatological Society 12: 17. (in Japanese). [Japan] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2753. Yokoyama, T. (2000): A report of Odonata fauna of Ono Pond at Hokkaido University. Bulletin of The Hokkaido Odonatological Society 12: 14-16. (in Japanese). Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2754. Yokoyama, T.; Tsuji, M. (2000): Investigation of the survival of *Aeshna subarctica* at Kyogoku-cho. Bulletin of The Hokkaido Odonatological Society 12: 18-20. (in Japanese). [Japan] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2755. Zeng, L. (2000): Optical methods for measuring the natural frequencies and torsional deformations of a dragonfly wing. Internet article: <http://www.jst.go.jp/jst/erato/erato-symp-j/95Yo1/9501-TXT/koe nl-07-E.html>.

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2756. Akaishi, S. (2001): Dragonfly fauna of Matsuyama Marsh at Miyuki-cho. Bulletin of The Hokkaido Odonatological Society 13: 13-14. (in Japanese). [Lestes sponsa, Enallagma boreale circulatum, Aeshna juncea, A. nigroflava, Cordulia aenea, Sympetrum frequens, S. infuscatum, Leucorrhinia orientalis.] Address: not stated in English

2757. Akaishi, S. (2001): Probable emergence of *Boyeria maclachlani* at Asahikawa City. Bulletin of The Hokkaido Odonatological Society 13: 15. (in Japanese). Address: not stated in English

2758. Arnold, A. (2001): Neue Nachweise von Gomphiden (Odonata) im Regierungsbezirk Leipzig (Sachsen) und am Bitterfelder Muldestausee (Sachsen-Anhalt). Veröff. Naturkundemuseum Leipzig 20: 62-65. (in German). [Emerging Gomphus vulgatissimus were found on 15 May 2001 along the shore of the Muldestausee near Bitterfeld, Sachsen-Anhalt, Germany; the emerging habitats are characterised. In addition, the species occurs in the river Mulde (Sachsen). Comparable to *Calopteryx splendens*, *G. vulgatissimus* seems to recolonise some of the formerly heavily impacted rivers in the eastern parts of Germany. 11 and 14 July 2001 (a freshly emerged) *Ophiogomphus cecilia* was recorded near Scholtitz, Sachsen. This is one of the rare Saxonian records of the species which are also documented.] Address: Arnold, A., Zur schönen Aussicht 25, D-04435 Schkeuditz, Germany

2759. Baptista, D.F.; Buss, D.F.; Dorville, L.F.M.; Nessimian, J. L. (2001): Diversity and habitat preference of aquatic insects along the longitudinal gradient of the Macae River basin, Rio de Janeiro, Brazil. Brazilian Journal of Biology 61(2): 249-258. (in English with Portuguese summary). ["Diversity and habitat preference of macroinvertebrates were studied in Macae River basin, Rio de Janeiro State, Brazil, along its longitudinal gradient. We selected stream reaches corresponding to

1st, 2nd, 4th, 5th and 6th orders. A Surber sampler was used to collect four macroinvertebrates samples of each substrate (sand, litter in pool areas, stones, and litter in riffle areas) during the three sampling periods, defined based on the rain regime: April (end of the rainy season), July (dry season), and October (beginning of the rainy season). We identified 46,431 specimens corresponding to 117 taxa. Analysis of diversity numbers (both for family or genus level) indicated that all insect taxonomic orders had higher numbers on 2nd order stream reach, except for Ephemeroptera, on 4th order. However when considering morph-species taxonomic level, the higher diversity number occurred on 4th order stream. The highest richness and diversity numbers were found at the dry season. Considering habitat preference, both litter in pool areas and litter in riffle areas had the highest faunal richness." (Authors)] Address: Baptista, D.F., Laboratorio de Avaliacao e Promocao da Saude Ambiental, Departamento de Biologia, IOC, Fiocruz, Av. Brasil, 4.365, CEP 21045-900, Manguinhos, Rio de Janeiro, Brazil. E-mail: darcilio@gene.dbbm.fiocruz.br

2760. Bechly, G. (2001): A new species of *Cymatophlebia* (Insecta: Odonata: Anisoptera: Cymatophlebiidae) from the Solnhofen lithographic limestone (Upper Jurassic, Germany). Stuttgarter Beiträge zur Naturkunde Serie B (Geologie und Palaeontologie) 301: 1-5. (in English). ["A new dragonfly species, *Cymatophlebia densa* n. sp. (Anisoptera: Aeshnoptera: Cymatophlebiidae), is described from the Upper Jurassic Solnhofen Limestone of Germany. It is the fourth species of this Mesozoic genus known from this famous fossil locality." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

2761. Bechly, G.; et al. (2001): A revision and phylogenetic study of Mesozoic Aeshnoptera, with description of numerous new taxa (Insecta: Odonata: Anisoptera). Neue Paläontologische Abhandlungen 4. ISBN 3-931689-07-7: 230 pp., 137 textfig., 48 pls. (in English with German summary). ["All Mesozoic Aeshnoptera are revised and their phylogenetic relationships are reconstructed. The type species of the genus *Mesuropetala* is redescribed, and *Mesuropetala muensteri* (GERMAR, 1839) comb. nov. is considered as its valid name instead of *Mesuropetala koehleri* (HAGEN, 1848). *Mesuropetala magna* sp. nov. is described from the Lower Cretaceous of Russia. "*Aeschna*" *antiqua* VANDER LINDEN, 1827 and "*Aeschna*" *schmiedeli* GIEBEL, 1856 could be synonyms of *Mesuropetala muensteri* or *Protolindenia wittei*, and thus are here considered as nomina dubia in Anisoptera incertae sedis. *Cymatophlebiopsis pseudobubas* HANDLIRSCH, 1939 is regarded as junior subjective synonym of *Aeschnopsis perampla* (BRODIE, 1945), and the genus *Aeschnopsis* HANDLIRSCH, 1939 stat. restor. is transferred to *Mesuropetalidae*. *Necrogomphus jurassicus* (GIEBEL, 1856) from the Lower Cretaceous of England is attributed to the genus *Aeschnopsis*. Furthermore, two new species, *Aeschnopsis perkinsi* sp. nov. and *A. tischlingeri* sp. nov. are described from the Upper Jurassic of Germany. *Liupanshanina* HONG, 1982 (*L. sijiensis* HONG, 1982) is transferred from Aeshnidae to a new family *Liupanshaniidae* fam. nov. that is regarded as sistergroup of *Mesuropetalidae*, and also includes the new taxa *Paramesuropetala gigantea* gen. et sp. nov. and *Araripeliupanshanina annesusae* gen. et sp. nov.

from the Lower Cretaceous of Brazil, *Paraliupanshania torvaldsi* gen. et sp. nov. and *P. rohdendorfi* sp. nov. from the lower Upper Cretaceous of Russia, and *Paraliupanshania britannica* sp. nov. from the Lower Cretaceous of England. *Progobiaeshna liaoningensis* gen. et sp. nov. is described from the Lower Cretaceous of China in a new family *Progobiaeshnidae* fam. nov. which is regarded as sistergroup of *Aeshnida* within *Aeshnomorpha* taxon nov. - *Panaeshnida* taxon nov. *Gobiaeshna PRITYKINA, 1977* (*G. occulta PRITYKINA, 1977*) is preliminarily attributed to *Progobiaeshnidae* fam. nov. as well. *Cymatophlebia longialata* (MÜNSTER in GERMAR, 1839) from the Upper Jurassic of Germany is redescribed and all *Cymatophlebiidae* are revised. Curious (autapomorphic) structures on the male abdomen of *Cymatophlebia* and *Rudiaeshna* are described in detail and their function is discussed. The phylogenetic position of *Cymatophlebiidae* within *Anisoptera* is discussed and seven new species are described: *Cymatophlebia kuempeli* sp. nov., *Cymatophlebia pumilio* sp. nov., *Cymatophlebia suevica* sp. nov., and *Cymatophlebia herrlenae* sp. nov. from the Upper Jurassic of Germany, as well as *Cymatophlebia purbeckensis* sp. nov., *?Valdaeshna andressi* sp. nov., and *Prohoyaeshna milleri* gen. et sp. nov. from the Lower Cretaceous of England. "*Cymatophlebia*" *mongolica* COCKERELL, 1924 is transferred as nomen dubium to *Anisoptera incertae sedis*. *Libellulum* WESTWOOD, 1854 is rejected as synonym of *Cymatophlebia*, and its type species *L. agrias* WESTWOOD, 1854 is regarded as nomen dubium, probably belonging to *Valdaeshninae* subfam. nov. within *Cymatophlebiidae*. The two holotype specimens of *Cymatophlebia suevica* sp. nov., and *Cymatophlebia herrlenae* sp. nov. represent the first and currently sole fossil insect remains known from the Malm beta of the Swabian Alb in Southern Germany. These two new species furthermore have to be regarded as the oldest known crown-group representatives of *Anisoptera*. With an estimated wing span of more than 220 mm, *Cymatophlebia suevica* sp. nov. and *Prohoyaeshna milleri* gen. et sp. nov. seem to represent the biggest *Anisoptera* and even the biggest crown-group *Odonata* known at all. *Rudiaeshnidae* fam. nov. is proposed as new family for *Rudiaeshna limnobia* DONG & ZI-GUANG, 1996 (Lower Cretaceous, China). This new family is regarded as sistergroup of *Cymatophlebiidae* and classified with the latter in a new superfamily *Cymatophlebioidea* stat. nov. *Paracymatophlebia splendida* gen. et sp. nov. from the Upper Jurassic of Kazakhstan is described in a new family *Paracymatophlebiidae* fam. nov. which is regarded as sistergroup of *Euaeshnida* (together: *Panaeshnida* taxon nov.). *Eumorbaeshnidae* fam. nov. from the Upper Jurassic of Germany is proposed as most basal family of *Euaeshnida*, based on *Eumorbaeshna jurassica* (CARPENTER, 1932) gen. et comb. nov. as "replacement" name for the aeshnid described by NEEDHAM (1907) under the incorrect name "*Morbaeshna muensteri*" because of a misidentified type species. The genus *Morbaeshna* NEEDHAM (1907) is synonymized with the genus *Mesuropetala*. *Anomalaeshna berndschusteri* gen. et sp. nov. (Lower Cretaceous, Brazil), *Paramorbaeshna araripensis* gen. et sp. nov. (Lower Cretaceous, Brazil), *Progomphaeshnaoides ursulae* gen. et sp. nov. and *Progomphaeshnaoides staniczeki* sp. nov. (Lower Cretaceous, Brazil), *Plesigomphaeshnaoides mongolensis* gen. et sp. nov. (Lower Cretaceous, Mongolia) and *Plesigomphaeshnaoides pindelskii* sp. nov. (Lower Cretaceous, England) are described

within *Neoaeshnida* - *Gomphaeshnidae* in a new subfamily *Gomphaeshnaoidinae* subfam. nov. In the same group three new species, *Gomphaeshnaoides magnus* sp. nov., *Gomphaeshnaoides petersi* sp. nov., and *Gomphaeshnaoides betoreti* sp. nov. are described from the Lower Cretaceous of Brazil, together with a redescription of the type species *Gomphaeshnaoides obliquus*, including its previously unknown forewings and body. "*Gomphaeshna*" *paleocenica* and "*Gomphaeshna*" *danica* from the Palaeocene of Denmark are preliminarily transferred to the new genus *Plesigomphaeshnaoides* gen. nov. as well. *Sinojagoria imperfecta* gen. et sp. nov. is described from the Lower Cretaceous of China and regarded as most basal representative of *Gomphaeshnaoidinae* subfam. nov. *?Gomphaeshna sibirica* sp. nov. and *Baissaeshna zherikhini* sp. nov. are described from the Lower Cretaceous of Russia. The genus *Cymatophlebiella* PRITYKINA, 1968 is excluded from *Cymatophlebiidae* and regarded as a basal *Aeshnoptera incertae sedis*; its type species *C. euryptera* PRITYKINA, 1968 is redescribed. Several taxonomic errors in LOHMANN (1996a-c) are corrected. Some general conclusions concerning the evolution and historic biogeography of *Aeshnoptera* are suggested, including an Mid-Jurassic Palaeartic origin and radiation of this monophylum. Totally 26 genera and 52 species of fossil dragonflies are revised. The following new taxonomic decisions are found in this publication: 5 taxa nov., 5 fam. nov., 2 subfam. nov., 2 trib. nov., 12 gen. nov., 29 sp. nov., 8 syn. nov., 5 stat. nov., 6 comb. nov., 2 nom. correct., 3 stat. restor., 3 sensu nov., 5 pos. nov." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

2762. Bezdecka, P. (2001): A contribution to the knowledge about Dragonflies (*Odonata*) of the Vizovické vrchy Highlands and Hlucka pahorkatina Highlands (Moravia, Czech Republic). *Vázky* 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 50-61. (in Czech with English summary). [In 2000, 25 localities were sampled for *odonata*. A total of 40 species including *Coenagrion pulchellum*, *Erythromma viridulum*, *Brachytron pratense*, *Aeshna affinis*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Thecagaster bidentata* are compiled, arranged according their locality frequency, and briefly commented.] Address: Bezdecka, P., V. Vaculky 994, 68605 Uherské Hradiste, Czech Republic. E-mail: pbezdecka@iol.cz

2763. Bryer, P.J.; Glanz, W.E. (2001): Oviposition site selection by a tropical treefrog in a temporary pool environment. *American Zoologist* 41(6): 1639. (in English). ["Frogs that oviposit unguarded aquatic eggs display various strategies to help ensure their offspring's survival. At one extreme, frogs can rely on camouflage or aversive taste to protect their eggs from predators, particularly fish. Alternatively, frogs can lay eggs in places where predators cannot survive, such as in temporary pools. These ephemeral environments, although typically fishless, still possess risks from the presence of predatory invertebrates and possibility of the pool drying up before the young metamorphose. To compound the difficulty faced by ovipositing pairs, pools that are free of predators may be very small and ephemeral,

while other pools that are more likely to persist for the entire period of development usually contain predatory invertebrates. We tested whether a temporary-pool breeding frog (*Hyla parviceps*) would discriminate between these pools. Thirty-five temporary pools near Posadas Amazonas, Madre de Dios province, Peru were censused daily for egg deposition. The pools were monitored weekly for invertebrate predators (primarily odonates), tadpole competitors of the families Hylidae and Leptodactylidae, and abiotic measurements (DO, pH, temperature, surface area, and depth). When the numbers of eggs laid in predator-free pools were compared with those pools containing predators a significant positive correlation between predator abundance and number of eggs laid was found. However, the main predictor of both predator abundance and the number of eggs laid was pool permanency, as estimated from pool volume. We feel that the frogs are choosing to ignore the risk posed by aquatic invertebrate predators because the alternative, drying risk, is greater in the smaller temporary pools." (Authors)] Address: Bryer, P.J.; Glanz, W.E., University of Maine, Orono, ME USA

2764. Catling, P.M.; Brownell, V.R. (2001): Biodiversity of adult damselflies (Zygoptera) at eastern Ontario gravel pit ponds. *Canadian Field-Naturalist* 115(3): 402-405. (in English). ["Adults of twenty-five species of damselflies were recorded at 41 gravel pit ponds in eastern Ontario. Twenty-four of the species recorded are believed to breed in the ponds where they were captured. Species present at 16 or more of the sites included *Enallagma boreale*, *E. civile*, *E. cyathigerum*, *E. ebrium*, *E. hageni*, *Ischnura verticalis*, *Lestes forcipatus*, *L. unguiculatus*, and *Nehalennia irene*. Two provincially and regionally rare species, *Lestes eurinus* and *Enallagma aspersum*, were abundant in some of the pit ponds. With 70% of the eastern Ontario zygopteran fauna, these naturally colonized sites may serve as important habitats for the conservation of biodiversity. The relatively high overall diversity compared to the much lower within-pond diversity is probably related to variation between ponds in flora, fauna, depth and other characteristics. Species specific associations with characteristics of the water body other than chemistry, may make damselflies a valuable group of bioindicators." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Kanada. E-mail: brownell@achilles.net

2765. Cempírek, J. (2001): Dragonflies (Odonata) of the town Ceske Budejovice (Southern Bohemia). Part II, the pond Bagr in Stromovka (1985-86, 2001). *Vázky* 2001. Sborník referátu IV. celostátního seminare odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 109-123. (in Czech with English summary). [Faunistical data from this Czech locality, resulting from 1985 and 1986 (26 species) are compared with data from 2001 (12 species). In the 1980ies the pond was in nearly natural condition including species as *Leucorrhinia dubia* and *L. pectoralis*. Later, the pond was amended to a concrete recreational reservoir. Most of the species were lost, but *Erythromma viridulum* and *Anax parthenope* are new immigrants to the locality.] Address: Cempírek, J., Vidov 37, 370 07 České Budejovice, Czech Republic

2766. Cervenka, P. (2001): A further discovery of the dragonfly *Leucorrhinia albifrons* (Odonata: Libellulidae)

in Moravia (Czech Republic). *Vázky* 2001. Sborník referátu IV. celostátního seminare odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 143-145. (in Czech with English summary). [*L. albifrons* is rare in the Czech Republic; one male was caught on 6 Aug. 2001 at the Malovický pond (mapping square 6871, 226 m asl, district Zlín).] Address: Cervenka, P., Pionýrů 862, 76302 Zlín-Malenovice Czech Republic. E-mail: pcervenka@seznam.cz

2767. Cervenka, P. (2001): Dragonflies (Odonata) in Finnish National Parks. *Vázky* 2001. Sborník referátu IV. celostátního seminare odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 158-164. (in Czech with English summary). [A total of 22 odonate species was found by visiting 11 National Parks in Finland (Nuuksio, Helventijärvi, Pyhä-Häkki, Salamajärvi, Rokua, Lemmenjoki, Urho Kekkonen, Oulanka, Hiidenportti, Isojärvi) in June-July 2001. The following species are documented National Park - wise: *Calopteryx virgo*, *Pyrrhosoma nymphula*, *Erythromma najas*, *Coenagrion johanssoni*, *C. hastulatum*, *Enallagma cyathigerum*, *Ischnura elegans*, *Aeshna caerulea*, *A. juncea*, *A. suharctica*, *A. grandis*, *Cordulegaster boltonii*, *Cordulia aenea*, *Somatochlora metallica*, *S. alpestris*, *S. arctica*, *Libellula quadrimaculata*, *L. depressa*, *Leucorrhinia caudalis*, *L. dubia*, *L. rubicunda*, and *L. pectoralis*.] Address: Cempírek, J., Vidov 37, 370 07 České Budejovice, Czech Republic

2768. Costa, J.M.; Vieira, L.P.; Do Nascimento, L.A. (2001): Descricao de tres larvas de *Erythrodiplax Brauer*, 1868, e redescricao das larvas de *E. pallida* (Needham, 1904) e *E. umbrata* (Linnaeus, 1758), com chave para identificacao das larvas conhecidas das especies Brasileiras (Odonata, Libellulidae). *Boletim do Museu Nacional Rio de Janeiro Zoologia* 465: 1-16. (in Portuguese with English summary). ["The ultimate larvae of *E. basalis* (Kirby, 1897), *E. latimaculata* Ris, 1911, *E. lygaea* Ris, 1911, *E. pallida* (Needham, 1904), and of *E. umbrata* (Linnaeus, 1758) are described or redescribed, and illustrated based on exuviae of reared specimens. A key to the larvae of the known Brazilian species of *Erythrodiplax Brauer*, 1868 is presented." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

2769. Dannelid, E.; Ekestubbe, K. (2001): Vinterflickslandan (*Sympecma fusca*) på spridning norrut? *Ent. Tidskr.* 122(4): 173-176. (in Swedish, with English summary). [Winter Damselfly (*Sympecma fusca*) spreading north in Sweden? The species, known from SE Sweden, has been recorded recently from various localities in the provinces of Sodermanland and Uppland, and from the island of Gotland (where *S. paedisca* also occurs). The possibility of a northward expansion trend is discussed.] Address: Dannelid, E., Inst. Zool., Univ. Stockholm, S-10691 Stockholm, Sweden

2770. David, S. (2001): *Vázky* (Insecta: Odonata) dolního toku reky Ipel'. *Acta Musei Tekovensis Levice* IV: 37-48. (in Slovak with English summary). [The Odonata of the lower reaches of the river Ipel, southern Slovakia, characterised by a high sediment load, have been sur-

veyed starting in 1982 at 22 sampling places. The list of 13 species includes *Ophiogomphus cecilia*, *Stylurus flavipes*, *Somatochlora metallica*, *Onychogomphus forcipatus*, *Coenagrion pulchellum*, and *Orthetrum albistylum*. The dominant species are *Calopteryx splendens*, *Gomphus vulgatissimus*, and *Platycnemis pennipes*.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: david@pribina.savba.sk

2771. De Marmels, J. (2001): Revision of Megapodagrion Selys, 1886 (Insecta, Odonata: Megapodagrionidae). Dissertation, Mathematisch-naturwissenschaftlichen Fakultät, Universität Zürich: 220 pp. (in English with German summary). ["The South American genus Megapodagrion Selys is split into Megapodagrion s. str. [monotypic: megalopus (Selys)], Allopodagrion Förster rev. status, [three species, viz., brachyurum sp. n., conortum (Hagen) (type species), erinys (Ris) comb. n., and Teinopodagrion gen. n. [24 species, viz., angulatum sp. n., caquetanum sp. n., chinchaysuyum sp. n., curtum (Selys) comb. n., decipiens sp. n., depressum sp. n., epidrium sp. n., eretes sp. n., lepidum (Racenis) comb. n., macropus (Selys) comb. n. (type species), mercenarium (Hagen) comb. n., meridionale sp. n., muzanum (Navas) comb. n., nebulosum (Selys) comb. n., oscillans (Selys) comb. n., schiessi sp. n., setigerum (Selys) comb. n., temporale (Selys) comb. n., turikum sp. n., vallenatum sp. n., venale (Selys) comb. n., vilorianum sp. n., waynu sp. n., yunka sp. n.]. The two unidentified species of RIS [1918, Arch. Naturg. (A) 9: 1-197] are also discussed. All taxa are keyed (except *T. muzanum*), described and their characteristic features are illustrated. A complete list of synonyms and misapplied names is presented for every taxon. Notes on habitats are given, if known. The larva of *Teinopodagrion* is characterized on the basis of *T. venale* and *T. oscillans*, the latter of which is here described for the first time. The geographic distribution of all taxa is mapped. The monophyly of the Megapodagrion-complex, composed of the three genera, is shown on the basis of four synapomorphies in adult morphology, including two penis characters. The ground pattern -or groundplan- of the Megapodagrion-complex is reconstructed using 35 adult and three larval characters. The apomorphic character states are established through comparison with numerous megapodagrionid and other odonate taxa (outgroups). The three genera of the Megapodagrion-complex are equally related to each other, but Megapodagrion s. str. is the most autapomorphic. Penis morphology suggests a closer transpacific relationship of the Megapodagrion-complex with several argiolestine genera found in the Malayan and Australo-Papuan region, and a more remote relation with some genera present in Asia, Madagascar, West Africa, Central America and western South America. The three genera of the Megapodagrion-complex began to rise from a common ancestor probably in the late Cretaceous, while the recent species are of Oligocene/Miocene age. The evolution of Allopodagrion is thought to be related with the formation of the southeast Brazilian mountains, while the origin and speciation of Teinopodagrion was triggered by the Andean orogeny. Megapodagrion s. str. evolved in the large intracratonic basins which separate the Guyana from the Brazilian shield, and both from the Andes. Mapping of some key characters present in Teinopodagrion allows for recognition of a southern and a northern group of species. The presence amidst the northern group of a species morphologically referable to the southern group based on synapo-

morphies suggests repeated and independent local fixation of identical combinations of character states already present in a polymorphic ancestor, rather than colonizing events through migration out of a 'center of origin'. Ecologically the distribution of each of the three genera of the Megapodagrion-complex closely matches certain well-defined types of forest." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

2772. Dijkstra, K.-D.; Kalkman, V.J. (2001): Orange and gold. Malangpo 18: 164-166. (in English). [Checklist of Odonata taken at seven localities in Thailand from late January to mid February 2001.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

2773. Dolný, A. (2001): A discovery of the dragonfly *Libellula fulva* (Odonata: Libellulidae) in the Protected Landscape Area Poodří (Silesia). Vázky 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 146-151. (in Czech with English summary). [An adult male was caught on 26 June 1999; coordinates of the locality are: 49°44.145'N, 18°06.542'E.] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

2774. Dolný, A.; Teperova, E.; Volna, K. (2001): Dragonflies (Odonata) of the Nature Reserve Rajviz: current state, changes during the 20th century, conservation. Cas. slez. Muz. Opava (A) 50 (Suppl.): 66-77. (in Czech, with English summary). [The status of the 27 odonate species in the peat bog nature reserve in 1929-1932, 1949, 1950-1956, 1992, and 1998-2000 is compared and discussed. *Aeshna subarctica elisabethae*, *Somatochlora alpestris*, and *Leucorrhinia dubia* are of particular interest.] Address: Dolný, A., Katedra Biol. & Ekol., Ostravske Univ., ul. 30-dubna 22, CZ-70103 Ostrava, Czech Republic

2775. Dolný, A. (2001): The unusual occurrence of the dragonfly *Leucorrhinia pectoralis* (Odonata: Libellulidae) in the mining landscape in the town Karvina (Silesia, Czech Republic). Vázky 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 124-130. (in Czech with English summary). [*L. pectoralis* was found in the mining landscape in the town Karvina (49° 49.309'N, 18° 29.529'E, Silesia, Czech Republic). The bottom of the shallow pond (size 90 x 20 m, maximum depth of 90 cm) is muddy, only sporadically covered with stones and reminders of flooded woods. The locality is heavily influenced by human activities (building waste, dumps of mining deads, old tyres etc.). The dominant plant species *Typha latifolia* forms discontinuous growth in the pond. On 11.9.2001 chemical water parameters were: 7,42 pH, conductivity 1021 uS/cm. On 14.7.2001 10-20 males of *L. pectoralis* were accompanied by the following species: *Lestes viridis*, *L. sponsa*, *L. virens*, *Platycnemis pennipes*, *Coenagrion puella*, *Enallagma cyathigerum*, *Ischnura pumilio*, *I. elegans*, *Aeshna mixta*, *A. cyanea*, *A. grandis*,

Anax imperator, A. parthenope, Somatochlora metallica, Libellula depressa, L. quadrimaculata, Orthetrum cancellatum, O. albistylum, O. coerulescens, Symptetrum striolatum, S. vulgatum, S. sanguineum, and S. danae.] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

2776. Editorial board (2001): Daily Table of the first and the last records in Hokkaido (2). Bulletin of The Hokkaido Odonatological Society 13: 18-20. (in Japanese). Address: Harauchi, Y., 9-2-20-113, Hon-machi 2 jo, Higashi-ku, Sapporo City, 062-0042, Japan.

2777. Editorial board (2001): Table of the regional distribution of Odonata by island (12). Bulletin of The Hokkaido Odonatological Society 13: 24-26. (in Japanese). Address: Harauchi, Y., 9-2-20-113, Hon-machi 2 jo, Higashi-ku, Sapporo City, 062-0042, Japan.

2778. Editorial board (2001): Table of the regional distribution of Odonata by shicho (13). Bulletin of The Hokkaido Odonatological Society 13: 21-23. (in Japanese). Address: Harauchi, Y., 9-2-20-113, Hon-machi 2 jo, Higashi-ku, Sapporo City, 062-0042, Japan.

2779. Eidietis, L. (2001): Escape response of *Rana sylvatica* and *Rana clamitans* tadpoles. American Zoologist 41(6): 1641-1642. (in English). ["Predation of dragonfly larvae (*Anax junius*) on wood frog (*Rana sylvatica*) tadpoles was observed using standard and high-speed video. Typical predatory behavior of *A. junius* consists of stalking, extending the lower mouthparts, grasping the tadpole, and drawing it into the mouth. *A. junius* typically neither chase prey nor repeat strikes before tadpoles move out of range. *R. sylvatica* response to *A. junius* contact begins with curling into a tear-drop shape, followed by large-amplitude tail motions. Both curl and tail motions often rip *R. sylvatica* from the grasp of *A. junius*, at which point, the tail motions propel the tadpole. Green frog (*Rana clamitans*) tadpole response to poking were recorded and analyzed to ascertain whether tadpole escape behavior is caused by touch and to acquire multiple replicates of the response for analysis of kinematics. *R. clamitans* response to poking was similar to *R. sylvatica* response to *A. junius* strikes. The curl consisted of rotating the body around the center of mass while folding the tail towards the body. The amplitude of tail motions increased linearly with distance from the center of mass. A probabilistic model based on these descriptions of predation and escape behavior predicts that the performance of both the curl and the tail motions affects the probability of tadpoles surviving *A. junius* strikes. Increasing the rotational momentum of the point of contact would improve curl and tail motion performance. An empirically based model suggests that morphological changes induced by predators in *R. sylvatica* would serve to substantially increase the curl and tail motion performance, thereby increasing the probability of surviving a predatory strike." (Author)] Address: Eidietis, L., University of Michigan, Ann Arbor, MI, USA

2780. Ellenrieder, N. von (2001): Species composition and distribution patterns of the Argentinian Aeshnidae (Odonata: Anisoptera). Revista de la Sociedad Entomologica Argentina 60(1-4): 39-60. (in English). ["Ten genera and 27 species of Aeshnidae are recorded from Argentina: For each species a synonymy list and dist-

tribution data are provided, as well as diagnostic keys for adults and known larvae. Distribution data per biogeographic province in Argentina are compared through cluster analysis. Specific and generic distribution patterns show that the richest areas are those of the subtropical forests encompassed by the Paranaense and Yungas biogeographic provinces, and that there are no Subantarctic endemics within Aeshnidae. Cluster analysis and complementarity values show that the Aeshnidae assemblage of the Monte biogeographic province is more closely related to that of Prepuna, Patagonian and Subantarctic provinces than to that of the Guyano-Brazilian provinces, supporting the existence of an Andean-Patagonian domain as proposed by Ringuélet." (Author)] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuélet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

2781. Endersby, I.D. (2001): Lentic habitat for *Rhadinosticta simplex* (Odonata). Victorian Entomologist 31: 55. (in English). [Bayule, Victoria, Australia, 6 March 2001; a lentic habitat of this stream and river dwelling species is described.] Address: Endersby, I.D., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

2782. Feng, Y.; Chen, X.-m.; Wang S.-.; Ye S.-d.; Chen Y. (2001): Three edible Odonata species and their nutritive value. Forest Research 14(4): 421-424. (in Chinese with English summary). ["Dragonflies are common insects distributed widely. Parts of their larvae are edible. The research results showed that there is custom of eating dragonfly larvae in many places of Yunnan. The common edible species are *Crocothemis servilia*, *Gomphus cuneatus*, and *Lestes praemorsa*. The larvae contain protein, fat, amino acids and microelements. The average contents of protein, fat and amino acids are 58.92%, 25.37% and 46.03% respectively. The content of 8 kinds amino acids necessary for human body is 16.41% in average, which accounts for 35.69% of the total amount of amino acids. The content of potassium, zinc, calcium and ferrum are 2 960 mg cntdotkg-1, 125.4 mgcntdotkg-1, 2 616.9 mgcntdotkg-1 and 796.2 mgcntdotkg-1. Therefore the dragonfly larva is one of nutritive edible insect resources."(Authors)] Address: Feng, Y., Research Institute of Resource Insects, CAF, Kunming, Yunnan, 650216 China

2783. Fet, V.; Bechly, G. (2001): Liochelidae, fam. nov. (Scorpiones): Proposed introduction as a substitute name for Ischnuridae Simon, 1879, as an alternative to the suggested emendment of Ischnurinae Fraser, 1957 (Insecta, Odonata) to Ischnurinae in order to remove homonymy. Bulletin of Zoological Nomenclature 58(4): 280-281. (in Chinese with English summary). ["The purpose of this application is to establish the new scorpion family name Liochelidae Fet & Bechly, 2001 (1879) as a substitute name for Ischnuridae Simon, 1879, which is a homonym of the widely used damselfly (Odonata) name Ischnurinae Fraser, 1957. In a previous application (BZN 57: 26-28) the authors proposed emending the latter name to Ischnurinae, but the introduction of Liochelidae avoids this undesirable change. The type genus of the Liochelidae is *Liocheles Sundevall*, 1833, which is in wide use as the valid senior synonym of the long abandoned name *Ischnurus* C.L. Koch, 1837 (the type genus of Ischnuridae Simon, 1879)." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosen-

stein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

2784. Flíček, J. (2001): Dragonflies (Odonata) of the Natural Reserve Dráčovské tune in the central reaches of the river Luznice (Southern Bohemia). *Vázky* 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 26-31. (in Czech with English summary). [At three localities a total of 30 species was collected; 16 species were proved by larvae.] Address: Flíček, J., Velký kopec 325, 378 04 Chlum u Trebone, Czech Republic. E-mail: drflíček@satnam.cz

2785. Flíček, J. (2001): Dragonflies (Odonata) of the Natural Reserve Krabonosska niva on the upper reaches of the river Luznice (Southern Bohemia). *Vázky* 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 32-36. (in Czech with English summary). [In 1999, a total of 27 species (17 proved by larvae) was collected in the floodplain of river Luznice, Czech Republic. The list includes *Ophiogomphus cecilia* and *Leucorrhinia pectoralis*.] Address: Flíček, J., Velký kopec 325, 378 04 Chlum u Trebone, Czech Republic. E-mail: drflíček@satnam.cz

2786. Fritzlar, F.; Nöllert, A.; Westhus, W. (2001): Übersicht über die im Jahr 2000 erarbeiteten Naturschutz-Gutachten. *Landschaftspflege und Naturschutz in Thüringen* 38(3): 105-112. (in German). [List of expertises for nature conservation purposes including some with odonatological subject, finished in 2000 and referring to Thüringen, Germany.] Address: Fritzlar, F., Thüringer Landesanstalt für Umwelt und Geologie, Abt. Ökologie und Naturschutz, Prüssingstr. 25, D-07745 Jena, Germany

2787. Goffart, P.; Testaert, D.; Paquay, M. (2001): Actualisation du statut de l'Agrion de Mercure (*Coenagrion mercuriale*) dans la plaine de Focant (Beauraing). *Gomphus* 17(2): 83-94. (in French with English and Dutch summaries). ["Systematic surveys were conducted by means of transect-walk during the 2000 and 2001 seasons in order to estimate the current situation of *C. mercuriale* in the Focant floodplain and to compare it to those of the previous decades. The species has been found on 13 distinct zones, from which 11 were not known before, but the numbers were below 10 individuals in 7 of them. Two sectors only housed high level populations, with counts reaching nearly 100 and 500 individuals. The species has disappeared from 4 previously occupied zones and has severely declined in one other, facts which can be explained by negative habitat evolutions. If the species doesn't seem to be in the dangerous posture which could have been predicted from the mid nineties results, thanks maybe to better climatic conditions, its situation is not really safe and reassuring in the Focant area, where intensive agriculture still influence negatively aquatic habitats. Some tracks are suggested to conserve both the species and a certain level of farming." (Authors)] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

2788. Gonseth, Y.; Monnerat, C.; (et la collaboration de René Hoess, Christian Keim, Tiziano Maddalena, Alain Maibach, Claude Meier, Peter Weidmann, Hansruedi Wildermuth) (2001): *Odonata 2000* Activités et résultats de la saison de terrain 2000. www.cscf.ch: 30 pp. (in French). [This report presents the results of a mapping scheme resp. monitoring of the Swiss Odonata. Special emphasize is given to population trends, and a current version of the Red list of the Swiss Odonata is implemented. Population trends of the following species are outlined: *Calopteryx splendens caprai*, *Lestes dryas*, *L. sponsa*, *L. virens*, *Nehalennia speciosa*, *Coenagrion lunulatum*, *C. pulchellum*, *Cercion lindenii*, *Erythromma viridulum*, *Epithea bimaculata*, *Ophiogomphus cecilia*, *Gomphus pulchellus*, *Brachytron pratense*, *Thecagaster bidentata*, *Sympetrum flaveolum*, *S. pedemontanum*, *Leucorrhinia pectoralis*, *Orthetrum albistylum*, and some more common species were population trends may be influenced by mapping methodology.] Address: CSCF, Terreaux 14, CH-2000 Neuchâtel, Switzerland

2789. Hämäläinen, M. (2001): Review of two recent Japanese papers on Thai dragonflies, with some additional notes. *Malangpo* 18: 169-170. (in English). [Two papers of Kazuma Kitagawa published in *Aeschna*, Osaka are abstracted and commented. Novelities (*Aciagrion azureum*, *Macromia* undescribed species) are brought to notice, the insufficiently known taxonomic status of the genus *Aciagrion* is discussed, and empty places on the Thai Odonata Atlas are filled in.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

2790. Hämäläinen, M.; Karube, H. (2001): *Rhinocypha oreo spec. nov.*, a new damselfly from Vietnam (Odonata: Chlorocyphidae). *Zool. Med. Leiden* 75(23): 405-408. (in English). ["*Rhinocypha oreo spec. nov.* (holotype male, northern Vietnam, Vinh Phu province, Mt Tam Dao, 1993) is described and illustrated in both sexes. Its unique wing colour pattern among the chlorocyphids is emphasized." (Authors)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi.; Karube, H., Kanagawa Prefectural Museum of Natural History, 499 Iryuda, Odawara, Kanagawa, 250-0031, Japan

2791. Hanel, L.; Cempírek, J.; Zelený, J. (2001): A list of Dragonflies (Odonata) found during the 4th Odonatological Days in August 2001 in the Sumava Mountains (Southern Bohemia). *Vázky* 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 37-49. (in Czech with English summary). [In the framework of the 4th Czech odontological symposium four localities in the Sumava mountains (southern Bohemia, Czech republic) were surveyed. A total of 24 species was found. These records and records from the same localities starting in 1985 were compiled.] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blanic@schkocf.cz

2792. Hanel, L.; Cempírek, J. (2001): A note on the evidence of a dragonfly occurrence within the faunistic research of dragonflies (Odonata). *Vázky* 2001.

Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminář uspořádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 22-25. (in Czech with English summary). [30 odonate species are listed in a special matter. The paper tries to set up a new standard of documentation of odonate records.] Address: Hanel, L., Správa chráněné krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz

2793. Hanel, L. (2001): Addenda et Corrigenda to three Odonatological publications; Hanel, L., (1999): „Vázky Podblanicka“, Hanel L., Zeleny J. (2000): „Vázky - výzkum a ochrana“ a „Vázky 2000 - Sborník referátu z celostátního semináře“. Vázky 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminář uspořádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 165-169. (in Czech with English title). [In most cases spelling errors are corrected.] Address: Hanel, L., Správa chráněné krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz

2794. Hanel, L. (2001): Fundamental identification parameters for faunistic studies of dragonflies (Odonata). Vázky 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminář uspořádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 12-21. (in Czech with English summary). [The author identified some fundamental parameters for documentation of odonotological records. These include "locality", "date", "habitat", "weather conditions", "method of investigation", and "faunistic data".] Address: Hanel, L., Správa chráněné krajinné oblasti Blaník, 257 06 Lounovice pod Blaníkem 8, Czech Republic. E-mail: blantik@schkocr.cz

2795. Hedström, I.; Sahlén, G. (2001): A key to the adult Costa Rican "helicopter" damselflies (Odonata: Pseudostigmatidae) with notes on their phenology and life zone preferences. *Revista de Biología Tropical* 49(3-4): 1037-1056. (in English). ["We present a key to the Costa Rican species of Pseudostigmatidae, comprising three genera with the following species: *Megaloprepus caerulatus*, *Mecistogaster linearis*, *M. modesta*, *M. ornata* and *Pseudostigma aberrans*. *Pseudostigma accedens*, which may occur in the region, is also included. For each species we give a brief account of morphology, phenology and life zone preferences, including distributional maps based on more than 270 records. These are not all of the known specimens from the area, but a high enough number to give a relatively good picture of the distribution and status of the species. We found *M. caerulatus* to be active during the first half of the year in seasonal, tropical semi-dry lowland forest and tropical moist forest at mid-elevation, but like *M. linearis*. *M. caerulatus* was active all year round in non-seasonal, tropical wet lowland forest and tropical moist forest at mid-elevation. *Mecistogaster modesta* also flew year round in non-seasonal, tropical wet lowland forest and tropical moist evergreen forest at mid-elevation, and likewise in seasonal and non-seasonal, tropical premontane moist forest. Only a few findings, however, have been made of *M. modesta* in seasonal, tropical semi-dry deciduous forest and seasonal, tropical moist evergreen forest. *Mecistogaster*

ornata was missing entirely from non-seasonal, tropical wet lowland forest and non-seasonal, tropical moist forest at mid-elevation, while this species was active year round in seasonal, tropical dry lowland forest and tropical semi-dry forest, as well as in seasonal, tropical moist evergreen forest and tropical premontane moist forest, both at mid-elevation. *Pseudostigma aberrans* has so far been found too few times in Costa Rica for any indication of flight time preference." (Authors)] Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@zoologi.uu.se

2796. Henry, J.D.; O'Carroll, D.C. (2001): What visual information do hawking dragonfly predators use to intercept prey? *American Zoologist* 41(6): 1470. (in English). ["Dragonflies are voracious predators that locate and intercept prey with astonishing accuracy. Many dragonflies (e.g. Corduliidae and Aeshnidae) are hawking predators, hunting while patrolling a territory. Dragonfly hunting is a visually guided behavior, utilizing large, highly acute eyes. Hawking dragonflies could use one or both of two mechanisms to extract visual information from their environment to determine prey location: (i) stereopsis and (ii) motion parallax. Stereopsis requires binocular overlap to determine object depth. Motion parallax uses relative image motion (due to motion of the viewer) to determine object distance; near objects will appear to move more quickly than far objects. Stereopsis would require an interneuron acting as a coincidence detector for movement in both halves of the small dorsal region of binocular overlap. Motion parallax would require integrating the output of two neurons that view the same region in space but are tuned to different velocities. To investigate which mechanism hawking dragonflies employ, we use intracellular recording and dye injection in the third optic ganglion (lobula) of Aeshnidae and Corduliidae. We find: (i) There are neurons that selectively respond to the motion of small targets. (ii) Neuroanatomical and physiological data indicate the presence of a binocular feature detecting neuron in the Corduliid *Hemicordulia tau*. (iii) There are at least three distinct classes of velocity tuning in target sensitive neurons (two classes have been found in Corduliids, three in Aeshnids). Data thus far support both models, indicating the potential for behavioral plasticity within the general strategy of being a hawking predator." (Authors)] Address: Henry, J.D., Univ Washington, Seattle, WA 98195 USA

2797. Herrmann, T.; Altmüller, R.; Grein, G.; Podloucky, R.; Pott-Dörfer, B. (2001): Das Niedersächsisches Tierarten-Erfassungsprogramm. Informationsdienst Naturschutz Niedersachsen 5/2001 (Suppl.): 44 pp. (in German). [Detailed introduction how to map the animals of Niedersachsen, Germany. Odonata are treated on pages 10-11, 25-26, and 35.] Address: Niedersächsisches Landesamt für Ökologie, Abt. Naturschutz, Postfach 101062, D-31110 Hildesheim, Germany. www.nloe.de

2798. Hesoun, P. (2001): An occurrence of the dragonfly *Coenagrion lunulatum* (Odonata: Libellulidae) in six localities in the district Jindřichuv Hradec (Bohemia). Vázky 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminář uspořádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: (in Czech

with English summary). [Six localities with records of *C. lunulatum* are described in detail; special emphasize is given to the accompanying odonate species. Records of *Leucorrhinia pectoralis* and *L. rubicunda* are of some interest.] Address: Hesoun, P., Bednářeck 58, CZ-37842 Nová Včelnice, Czech Republic. E-mail: krme@quick.cz

2799. Hiemeyer, F.; Miller, E.; Miller, J. (2001): Winterbeobachtungen an *Sympetma paedisca* (Odonata: Lestidae). *Berichte des naturwissenschaftlichen Vereins für Schwaben* 105: 126-137. (in German). [This is a nearly identical publication of the paper abstracted as OAS 2418; from this paper it differs by a quite extensive discussion of hibernation behaviour and habitat.] Address: Hiemeyer, F., Gögginger Str. 120, D-86199 Augsburg, Germany. E-mail: FritzHiemeyer@web.de

2800. Hoess, R. (2001): Die Libellen (Odonata) des Giswilriedes, Kanton Obwalden. *Entomologische Berichte Luzern* 46: 129-146. (in German). [The paper compiles historical and present data from a fen bog (Giswilried) situated on the upper corner of lake Sarner, Switzerland. 14 odonatologists visited the region including F. Ris and O.-P. Wenger. The latter contributed extensive records, the specimens are deposited in the museum collections of ETH Zürich and NM Bern. In detail, 13 localities were surveyed between 1998 and 2001 by the author. Historical and present records count to a total of 51 odonate species, including *Boyeria irene* (from 1985), a rare Swiss species at the northern border of its range. The species turn-over is discussed in some detail. In addition, phenology, collecting localities of O.-P. Wenger, and conservation measures are stressed.] Address: Hoess, R., Normannenstr. 35, CH-3018 Bern, Switzerland. E-mail: ReneHoess@1st.ch

2801. Honcu, M. (2001): The occurrence of the dragonfly *Ophiogomphus cecilia* (Odonata: Gomphidae) in the district Ceska Lipa (Northern Bohemia), and a proposal to proclaim the protection of a part of the Ploucnice River in the framework of the Programme NATURA 2000. *Vázky 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 131-142.* (in Czech with English summary). [Between 1982 and 2001, *O. cecilia* was observed at 27 localities. The natural meandering stretch of the River Ploucnice from the bridge of Boreček to the village Veseli is proposed as a NATURA 2000 area.] Address: Honcu, M.; Okrewsni vlastivedné muzeum, námesti Osvobození 297, 47001 Ceska Lipa, Czech Republic

2802. Honcu, M.; Roztocil, O. (2001): The results of monitoring of dragonflies (Odonata) in the district Ceska Lipa (Northern Bohemia). *Vázky 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 79-108.* (in Czech with German and English summaries). [Between 1995 and 2001, 83 localities were surveyed for their odonate fauna. The faunistic data of 36 species is documented in detail. The results of the survey were compared with material collected prior 1995. In total 43 species are known from the district of Ceska Lipa.] Address: Honcu, M.;

Okrewsni vlastivedné muzeum, námesti Osvobození 297, 47001 Ceska Lipa, Czech Republic

2803. Hori, S.; Yokoyama, T. (2001): Record of two species at Noboro Forest Park. *Bulletin of The Hokkaido Odonatological Society* 13: 11-12. (in Japanese). [*Mnais pruinosa costalis*, *Davidius moiwanus*] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2804. Karube, H. (2001): On the endangered species of *Sympetrum maculata* Oguma. *Nature & Insects* 36(7): 14-16. (in Japanese). [Introduction: Nearly unnoticed, *S. maculatum* turned out to be one of the most endangered species in Japan. It is indigenous to Japan, and recorded from 17 prefectures of the southern part of the northeastern district to the Chugoku region of Japan. It inhabits clean and shallow reservoirs mainly to the west of central Japan, and highland bogs located close to the Sea of Japan. Due to reports of a significant decrease of the species, it was assessed as endangered in Hyogo Prefecture (Aoki and Azuma, 1998). When, in spring 1999, we collected information on endangered species from all over the country to revise the RDB of the Environment Agency, we found the species in critical condition: only less than 30 habitats could be traced in Japan. This situation contrasts with the fact, that it was not listed as an endangered species in the RDB of 1991, and was not designated as a rare species. The current survey of the species results as follows: Situation: *S. maculata* is known from 30 habitats in 10 prefectures; it is extirpated from 7 prefectures. Most of the habitats are in a critical condition, and especially the habitats to the west of the Japanese mainland sharply decreased. Most habitats are isolated with distances of about 50 to 100 km to the next habitat. In 2000, in Hyogo Prefecture, all habitats seem to be lost. Causes of decrease: It inhabits natural habitats which are easily developed. The factors are as follows; No. 1: reclamation of reservoirs and bank protection works; No. 2: aridity of bogs and growth of reeds; No. 3: drought damage in 1994 and 1995; No. 4: Changes of environment of the habitats; No. 5: chemical spraying to rid pine weevils; No. 6; water pollution; No. 7: Change of management of reservoirs, e.g.; non drainage of water in winter. Also the character of persistency to special environment accelerate the decrease. Oviposition sites are situated in bogs of low grasses, and shallow ponds, therefore the habitats are often damaged by drought. In addition, *S. maculata* is endangered by black bass. Habitat environment: The investigated habitats - wet land with low grasses - were characterised in most cases by clean and rather acid water. Ecology: Most *Sympetrum* species including this species are active from morning till noon. In the region near the Sea of Japan, I found that species active at the edges of water bodies on cloudy or rainy days as long as the ambient temperature was high. The time of activity and ecology differed between the populations near the Sea of Japan and in central Japan. In the latter the species was not active in the unfavorable weather. Prospect of protection: I think this species should be designated as Endangered species for the RDB List. Furthermore we need to investigate the known habitats and new habitats and notify the habitats to governments and promote the preparation of conservation action plans. Translation: Ishizawa, Naoya] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

2805. Kazunobu, K. (2001): The deteriorating situation of the Endangered *Copera tokyoensis* Asahina in Japan. *Nature & Insects* 36 (7): 10-13. (in Japanese). [Introduction: *Copera tokyoensis* Asahina was designated as a Critically Endangered species (CR+EN) in Red Data Book by Ministry of the Environment in April, 2000. The committee of nature conservation of The Japanese Society for Odonatology decided to conduct a long term investigation of the situations of the damselfly and to collect information about it including other endangered species from 2000. As I am the organizer of the division of *Copera tokyoensis* Asahina and *Cercion plagiolum* (Needham) of the committee, I studied the situations of the species in the recorded localities. Here I report the data and an example of the action for conservation of the species. Also I expect readers to contribute to us information on the species.]

Distribution: In the genus *Copera* Kirby, 8 species and 7 subspecies have been recorded from all over the world, and from Japan only two, the species and *C. annulata* were recorded. This damselfly was discovered in the northeastern Tokyo by Ishikura, Hideji in 1936, and named as a new species by Dr. Asahina, Syojiro in 1948. Its zoological name *tokyoensis* was named after the locality of the discovery: Tokyo (Koaidame at Kanamachi). *C. annulata* and *C. ciliata* are the closely related species of the damselfly. *C. annulata* is widely distributed at ponds and marshes surrounded by forests in the lowlands in Japan from Hokkaido, Honshu: the mainland of Japan, Shikoku and Kyushu, and in China. While *C. tokyoensis* is limitedly distributed wide and open ponds, of which vegetation are reed and Indian rice, along the main and branch streams of the Tone River in the Kanto plains, the lower reaches of the Shinano River in Niigata Pref., and in Miyagi Pref. In abroad it was recorded from Seoul in South Korea and the Yangtze Basin. It has not been cleared yet why the damselfly is isolatedly distributed, however, in the ice age when the regression advanced, the main river of Japan and the Yangtze River were said to be connected, and this species might have been distributed the lower reaches of the old Yangtze River. Thereafter the rivers were separated by the transgression, and in Japan it has been reliclike distributed to the well developed deltas of the Tone and the Shinano. 2. Flying season and body size: The flying season of the species is from mid May to the end of September, its peak is August. The latest record was October 10, 1975 at Yagyū, Kitakawabe-cho, Saitama Pref. As the season advances the body size becomes smaller. The individuals emerges in mid and late August are considered as the second generation for the year. 3. Behaviour of adult: The behaviour of immature adults is not so different from *C. annulata*. The damselflies perch low on leaves or stems of grasses at the water edges of reed and Indian rice, or open spaces by trampled down. They did not move long distance, at longest within 10 meters, and rest in the shade at the edges of forests. They reproduce after the rainy season. They oviposit in tandem endophytically into tissues of water plants. At the time males of the species often stand upright with the prothorax of the female grasped by the appendage of the male. The substrate of oviposition is submerged plants, or rotten leaves and stems drifting on the surface of water. 4. Intermediate form: The distributions of both species overlap each other, but they do not rarely inhabit the same water body (only a few areas in the Kanto district). Many intermediate form of individuals had been recorded

from Sakata Marsh, Gunma Pref., the Lake Semba, Ibaraki Pref., Amidase Pond, and Junsai Pond, Niigata Pref., etc. and these are necessary to be investigated the possibility of the hybrid with *C. annulata*. 5. Localities: This damselfly has been recorded from 135 localities since 1952, however, only 22 localities are left for these 3 years. Only two (from Niigata and Ibaraki, respectively) are newly found for the three years. The past localities are as follows; Chiba (45), Ibaraki (25), Saitama (25), Gunma (19) and Niigata (12), among them in Chiba and Gunma the numbers decreased sharply and in these areas conservation plan should be formed. 6. Problems for conservation: Most of the localities distributed in the delta areas and these are likely to be reclaimed for residential areas, and the waters are polluted by domestic waste and eutrophication. Also the damselfies are being endangered by secret release of black bass. Now these ponds are aged and accumulated by sludge, which prevents growth of water plants, and consequently oviposition substrates of the damselfly are lost which lastly causes it to extinction. At isolated areas in such circumstances, the dragonfly is driven to extinction because of lack of dispersibility. Here I introduce an example of action for conservation at Hakidashi-numa in Noda City, Chiba Pref. The area belong to an inundated region of the Tone River, where many farming reservoirs had been distributed. In the pond, which is 400 meters around, spring water wells up and 23 species including *C. tokyoensis* inhabit. The local action of conserving the pond started in 1996. The pond was leased by the city government, and eight local volunteers groups organized a conservation union of Noda and are managing actions; watch of illegal dumping of waste, mowing of weeds and grasses, investigation of fluctuation of specified species and forbidding of anglers into the pond, etc. 7. Prospect: These endangered species are necessary to be notified well to people. The conservation should not be limited only to the specified species and specified areas but more widened in cooperation with governments, citizens and NPO, who discuss each other and consult experts. Translation: Ishizawa, Naoya] Address: not stated

2806. Klausnitzer, B. (2001): Gemeinschaftsjagd von *Aeshna mixta* Latreille, 1805 (Odonata) in einem Naturgarten in der Oberlausitz. *Ent. Nachr. Ber.* 45(2): 137-138. (in German). [Opitz, Bautzen Saxonia, Germany; aggregations of feeding *Aeshna mixta* preying on the ant *Lasius flavus* (Insecta: Hymenoptera) are described in detail. These feeding aggregations were observed over a period of seven years (1995-2001); potential reproduction waters are situated in a distance of more than 1 km from the feeding grounds. In addition, observations of *Symetrum vulgatum* and *S. sanguineum* sitting on fence wires are given.] Address: Klausnitzer, B., Lannerstr. 5, D-01219 Dresden, Germany

2807. Knijf, G. De (2001): Bibliografisch overzicht van de periode 1995-2001. *Gomphus* 17(2): 95-101. (in Dutch with French summary). [Bibliographie of the odonatalogical literature from Belgium covering the period 1995 to 2001.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

2808. Knijf, G. De (2001): Observation of *Leucorrhinia rubicunda* (Linnaeus, 1758) at the 'Kraaibos' in Moen-Zwevegem (Province of West-Flanders). *Gomphus*

17(2): 75-82. (in Dutch with English and French summaries). [29 May, 2001, two adult males of *L. rubicunda* were observed at the Kraaibos, Belgium. "This is the first observation of the species for this most western province of Belgium and the first observation after more than 70 years outside their distribution area in Flanders. The habitat, especially clay soils, is aberrant from the other sites in Belgium and doesn't correspond with the literature. The nearest Belgian populations of *L. rubicunda* are located more than 100 km away from the 'Kraaibos'. Very remarkable are the observations of three adult males on three different localities since 1998 in adjacent northern France, where the species was considered as extinct. Suitable habitat seems to be still present there and it is very likely that there are locally some populations present." (Author)] Address: Knijf, G. de, Instituut v. Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

2809. Kurashina, H.; Kikuya, N. (2001): A study of the decreasing cause of *Libellula angelina*. *Nature & Insects* 36 (7): 5-9. (in Japanese). [In 1969, habitats of *Libellula angelina* were spread from the northern Miyagi Prefecture to Kagoshima Prefecture, mostly in Honshu, the main Island of Japan, however in 2000, only 3 habitats remained in Honshu. The species also occurs in Kyushu except Oita Prefecture and Kagoshima Prefecture, the rest of the habitats are in an extremely critical condition. We studied distribution, ecology, behaviour and fluctuation of populations of *L. angelina*, particularly in Oita since 1993. In 1997, *L. angelina* was found at nine localities in Oita Prefecture. These habitats are all in a critical, unpreferable condition. Reasons of the decline of *L. angelina* are discussed as follows. 1. The first stage of extinction: In general, *L. angelina* inhabits shallow habitats within reservoirs in the rice farming area of the lowlands along the coast. Reservoirs were depreciated recently because of large scale irrigation works, reclamation of farm land for road construction, development of residential areas and factories, or reduction of rice cultivation acreage. Consequently most of the reservoirs were reclaimed and disappeared. Thus, habitat loss is a serious reason for the declining populations of *L. angelina*. Also agricultural chemicals which came into wide use since the latter half of 1950s affected the decrease of the dragonfly. Insecticides affected preys as well as predators. *L. angelina* is more sensitive to chemicals than other odonata. This can be concluded by the fact that imagines could be observed at ponds polluted by waste water of farming and domestic waste, but never reproduced there. 2. The second stage of extinction: In spite of the the habitat loss and habitat depreciation, a few populations of the species survived at isolated localities. In these habitats the dragonfly is endangered by drought, aridity, and introduced species like black bass, bullfrog, carp and crayfish, and especially technical maintainance of reservoirs. After emergence, most of the individuals of *L. angelina* don't disperse and stay in "its habitat". 90-95% of a local population are estimated to be philopatric. This increase the risk of local extincting (e.g. by habitat loss) significantly. Populations in (newly settled?) habitats in large reclaimed areas near the seashores, were given up soon. This could be due to genetic isolation and lack in diversity of gene. Therefore the adaptability to the environment of the species may be low and the population can not be stable. 3. Conditions in the stable populations: Now isolated populations were extinguished one after another. Though isolated, a population in Imuta Pond at Ketoin-

cho, Kagoshima Pref., could kept be stable by optimization habitat management system. 4. Hypothesis of sub population: We define a 'sub population' as the population that belongs to the same habitat population but differs in the emergence and reproductive site. In a large bog, there exist several sub population, and this may enable the genetic diversity of the species to enhance. At Noishin-ike 1000 to 2000 individuals occurred every year since 1994. Therefore populations of Noishin-ike or Imuta-ike might be kept stable by steady environment and sub populations, which must enhance steady genetic diversity. Translation Ishizwawa, Naoya. (The translation was slightly revised by M. Schorr).] Address: not stated

2810. Lambrechts, J.; Knijf, G. De (2001): Verslag van de excursie naar het Wik te Bokrijk en De Teut te Zonhoven op 9 juni 2001. *Gomphus* 17(2): 102-105. (in Dutch with French summary). [An excursion to 2 localities in Belgium resulted in a total of 18 odonate species; as most interesting species for Wik te Bokrijk are: *Sympetma fusca*, *Ischnura pumilio*, *Cordulia aenea*, *Soma-tochlora metallica*, *Orthetrum coerulescens*, and *Leucorrhinia rubicunda*. In De Teut are remarkable *Coenagrion hastulatum*, *Ceriagrion tenellum*, *O. coerulescens*, and *L. dubia*.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

2811. Machado, A.B.M. (2001): Studies on neotropical protoneuridae. 11. Two new species of *Forcepsioneura* Lencioni (Odonata-Zygoptera) with a key to males of the genus. *Revista Brasileira de Zoologia* 18(3): 845-854. (in English). [*Forcepsioneura haerteli* sp. n. and *F. westfalli* sp. n. are described and illustrated from material collected respectively in the Santa Catarina State (Blumenau), Brazil and in the Napo Province (Limoncocha), Ecuador. Some notes are made on *Forcepsioneura sancta* (Hagen, 1860) and a male topotype is illustrated. A key to males of *Forcepsioneura* is provided." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

2812. Mahaulpatha, T.; Mahaulpatha, D.; Nakane, K.; Fujii, T. (2001): Nestling diet and prey selection of the Japanese Wagtail *Motacilla grandis*. *Journal of the Yamashina Institute for Ornithology* 33(1): 36-43. (in English with Japanese summary). ["Nestling diet of Japanese Wagtails (*Motacilla grandis*) was investigated by the neck ligation method and compared with the food availability in their feeding habitat during the breeding season of 1999 in Higashi Hiroshima, western Japan. Nestling diet comprised of 85.5% insects, 14.2% arachnids and 0.3% chilopods in individual number basis. Odonata order comprised nearly one-fourth of the diet in dry weight basis. Diptera, Lepidoptera, Coleoptera, Orthoptera and Arachnida were also important contributors to the total prey weight. Chironomidae and Ephemeroptera families were the most numerous prey items but their contribution to the total prey weight was small. Electivity indices indicated that the Japanese Wagtail prefer certain prey items (*Libellulidae*, *Tipulidae*, *Dytiscidae*) when collecting prey for the nestlings." (Authors)] Address: Mahaulpatha, T., Graduate School of Biosphere Sciences, Hiroshima University, Higashi-Hiroshima, 739-8521 Japan

2813. Marconi, A.; Terzani, F.; Carletti, B. (2001): Descrizione di *Phyllogomphus bartolozzii* spec. nov. della Sierra Leone (Odonata: Gomphidae). *Opusc. zool. flum.* 199: 1-5. (in Italian with English summary). [The new species is described and illustrated, and its affinities with *P. montanus* Fraser, 1957 and *P. corbetiae* Vick, 1999 are discussed and keyed. Holotype male: Sierra Leone, Northern prov.: Bumbuna, 4/5-VI-1994; deposited at MZUF, Firenze.] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2814. Martin, D.C.; Neely, R.K. (2001): Benthic macroinvertebrate response to sedimentation in a *Typha angustifolia* L. wetland. *Wetlands Ecology & Management* 9(5): 441-454. (in English). ["Fiberglass mesh enclosures (1 X 1 m²) in a *Typha angustifolia* L. marsh were employed to examine the effects of clay additions on the resident macroinvertebrate communities. Total invertebrate density, insect density, and number of insect families decreased significantly by 33%, 37%, and 17%, respectively, in enclosures receiving sediment. More specifically, incoming clay adversely affected densities of Coleoptera larvae, Diptera larvae, Megaloptera larvae, Odonata larvae, Pelecyptoda, and Gastropoda. Densities of specific families within the Diptera (larvae) and Coleoptera were also affected; Dolichopodidae, Stratiomyidae, Hydrophilidae, Tabanidae, Dytiscidae adults, and Scirtidae larvae decreased significantly in numbers in sedimented enclosures. In contrast, the effect of sedimentation on Carabidae (adults and larvae) and Dytiscidae larval densities varied significantly with time, whereby densities were higher in the sedimented treatment only for the initial two months of the study. Densities of predator-engulfer, collector-filterer, and scraper feeding groups were reduced in sedimented plots by 28%, 44%, and 27%, respectively. Significant short- and long-term increases in turbidity and suspended solids in enclosures treated with clay, as well as sediment deposition, were probably responsible for changes in the invertebrate communities." (Author)] Address: Martin, Dianne, Department of Biology, Eastern Michigan University, Ypsilanti, MI, 48197, USA. E-Mail: bob.neely@emich.edu

2815. Matsuki, K. (2001): Threatened dragonfly species in Japan. Part II. *Nature & Insects* 36 (7): 2-4. (in Japanese). [This number is a sequel to the articles "Threatened dragonflies" *Nature & Insects* Vol.33, No. 10, October, 1998. Thereafter the revised list of Red Data Book (RDB) was published by the Environment Agency (from the start of the fiscal year, April, 2001 its name was changed to Ministry of the Environment) in March, 2000. In order to cope with the revision, the committee of nature conservation of The Japanese Society for Odonatology set up new sections, and started collection of information. Last year the problem of black bass (large mouth bass) became a subject of discussion abruptly. For these years, RDB of prefectures have been published, and some of them are under the first revision. 1. Revision of RDB and the change of the criteria. For these ten years, the habitat environment of Odonata has been worsened heavily, and Odonata decreased sharply, especially lentic Odonata. (1) Endangered species of Odonata increased from two in RDB of 1991 to 10 in RDB of 2000, and the Vulnerable species, which is the Endangered species in the old category, increased from one to ten (Table 1). (2) Five rare species of Odonata of

re species of Odonata of the Ogasawara Islands were designated as Endangered species: *Indolestes boninensis* and *Hemicordulia ogasawarensis*; Vulnerable species: *Boninagrion ezoin*, *Rhinocypha ogasawarensis* and *Boninthemis insularis*. The revised Red List of Odonata was taken charge of by the committee of nature conservation of The Japanese Society for Odonatology based upon the quantitative data during these ten years, and 38 species and one local population were listed and included around 20% of Japanese fauna of Odonata. 2. Actions of The Japanese Society for Odonatology. As the Red List of Endangered species and Vulnerable species of RDB increased, we set up the new special sections for *Sympetrum maculatum*, *Orthetrum poecilops miyajimensis*, *Cercion plagiosum*, *Copera tokyoensis*, *Sympetrum uniforme*, *Lestes japonicus*, *Coenagrion hylas*, *Leucorrhinia intermedia ijimai*, *Macromia daimoji*, *Rhyothemis severini*, Indigenous species of Ogasawara Islands and Okinawa and local populations, and collect information and literature on them. But our staff for the sections is not enough, and we give priority over the Endangered species and Vulnerable species. The sections of *Libellula angelina* and *Mortnagrion Hirosei* accumulated so much information for these several years, and appealed conservation of the species to local governments and provided local citizens with useful information. It was reported that Fisheries Agency was reconsidering the administration policy and relaxing fishing rights of black bass, enlarging the licensed areas of the fish. This means change of policy by the agency to habitat segregation of the fish. For fear that the predation pressure by the fish may cause reduction of the local dragonfly fauna or extinction of the designated species from all over Japan, we requested the Minister of Agriculture, Forestry and Fisheries, Director General of Fisheries, prefectural governors and prefectural committees of administration of fresh-water fisheries not to enlarge the licensed areas of the fish in corporation with The Ichthyological Society of Japan and The Japanese society of Coleopterology. We, President Eda, Vice-president Inoue and Secretary Karube visited Director General of Fisheries and explained foreign and domestic examples of predation on Odonata by black bass and professed opposition to the Fisheries' Plan. According to a report from Niigata Prefecture, black bass preyed on adult dragonflies as well as larvae in the water; from stomach contents of nine black bass about 70 dragonflies were found. We set up the countermeasure section of foreign fish, such as black bass or bluegill. 3. Problems of Prefectural RDB and the prospect. Obscure criteria of data collection(1), ranking(2) and attitude for conservation(3).

Table 1. The list of RDB of 1991 and 2000, 1991 Red List: Endangered species (E), 1: *Mortnagrion Hirosei*, *Libellula angelina*; Vulnerable species (V), 2: *Orthetrum poecilops miyajimaense* Rare species (R), 38: *Agrion hylas*, *Erythromma najas baicalense*, *Nehalennia speciosa*, *Boninagrion ezoin*, *Coelicia ryukyuensis ryukyensis*, *C. r. amamii*, *C. flavicauda masakii*, *Rhipidolestes okinawana*, *Indolestes boninensis*, *Rhinocypha ogasawarensis*, *R. uenoi*, *Bayadera brevicauda ishigakiana*, *Matrona basilaris japonica*, *Asiagomphus amamiensis okinawanus*, *A. a. amamiensis*, *A. yayeyamensis*, *Stylogomphus ryukyuanus asatoi*, *S. shirozui watanabei*, *Leptogomphus yayeyamensis*, *Oligoaeschna kunigamiensis*, *Planaaeschna ishigakiana nagami-nei*, *P. i. ishigakiana*, *P. risi sakishimana*, *Aeschna subarctica*, *Chlorogomphus brunneus brunneus*, *C. b. ke-*

ramensis, *C. brevistigma okinawaensis*, *C. iriomotensis*, *Macromia kubokaiya*, *M. urania*, *M. clio*, *Macromia ishidai*, *Hemicordulia ogasawarenis*, *H. mindana nipponica*, *H. okinawaensis*, *Boninthemis insularis*, *Lyriothemis tricolor*, *Leucorrhinia intermedia ijimai*

2001 Revised Red List: Endangered species (EN), 10: *Mortonagrion Hirosei*, *Pseudoagrion microcephalum*, *Cercion plagiosum*, *Coenagrion hylas*, *Copera tokyoensis*, *Indolestes boninensis*, *Hemicordulia ogasawarenis*, *Orthetrum poecilops miyajimaense*, *Libellula angelina*, *Orthetrum poecilops miyajimaense*, *Sympetrum maculatum*. Vulnerable species (VU), 10: *Ceriagrion nipponicum*, *Boninagrion ezoin*, *Platycnemis foliacea sasakii*, *Lestes nipponicus*, *Rhincocypha ogasawarenis*, *Macromia daimoji*, *Boninthemis insularis*, *Sympetrum gracile*, *Sympetrum uniforme*, *Leucorrhinia intermedia ijimai*. Near Threatened species (NT), 18: *Agrionemis pygmaea*, *Ischnura elegans elegans*, *Nehannia speciosa*, *Erythromma humerale*, *Asiagomphus amamiensis okinawanus*, *A. a. amamiensis*, *A. yayeyamaensis*, *Davidius moiwanus sawanoi*, *Chlorogomphus brevistigma okinawensis*, *C. brunneus keramensis*, *Oligoaeschna kunigamiensis*, *Planaeschna ishigakiana nagaminei*, *P. ishigakiana*, *Aeshna subarctica*, *Macromia urania*, *Macromia kubokaiya*, *Diplacodes bipunctata*, *Rhyothemis severini*. Threatened local population (LP), 1: *Mnais pruinosa costalis* including *M. pruinosa costalis-forma edai* from the Boso Peninsula. Translation: Ishizawa, Noaya] Address: Matsuki, K, 3-1575-14, Hazama, Funabashi City, Chiba Pref., 274-0822, Japan

2816. Matthes, H.; Meyer, E.I.; Artmeyer, C.; Göcking, C.; Krismann, M.; Niepagenkemper, O. (2001): Kanusport und Naturschutz - Forschungsbericht über die Auswirkungen des Kanusportes an Fließgewässern in NRW. Forschungsprojekt im Auftrag des Ministeriums für Umwelt, Raumordnung und Landwirtschaft des Landes Nordrhein-Westfalen, des Ministeriums für Arbeit, Soziales und Stadtentwicklung, Kultur und Sport des Landes NRW, der Landesanstalt für Ökologie, Bodenordnung und Forsten / Landesamt für Agrarordnung, des Deutschen Kanu-Verbandes und des Kanu-Verbandes NRW.: 259 pp. (in German). [Conflicts between boating and target species of nature conservation are analysed and assessed. The main focus lays on birds, but fishes and macrozoobenthos have been studied too. Boat induced drift of macrozoobenthos was studied by field observations and experiments. Odonata are among the taxa listed for the study localities. For more, and detailed information see: www.bfn.de (NaturSportInfo; browse to the author Mattes). In this exhaustive data base, there are some additional studies which surveyed boat induced mortality and drift on Odonata (search for the studies of Bertrand Schmidt, Schorr, Sabarth, and Tobias).] Address: not stated, but you can contact Artmeyer, C., Philippstr. 16, D-48149 Münster, Germany. E-mail: artmeyc@uni-muenster.de

2817. Mayer, G. (2001): Die Grüne Keiljungfer *Ophiogomphus cecilia* im Landkreis Aichach-Freiberg. Berichte des naturwissenschaftlichen Vereins für Schwaben 105: 138-148. (in German). [The paper compiles all known records of *O. cecilia* in the county Aichach-Freiberg, Bavaria, Germany. The habitats of *O. cecilia* are described. The river Paar and its tributaries seem to be a regional core habitat of *O. cecilia*. In spite of this, it was not reported as Natura 2000 site to the European Commission by the Bavarian government. In the frame-

work of a local Agenda 21 process some conservation measures have been undertaken to secure the habitat along the river Paar.] Address: Mayer, G., Am Harfenacker 10, D-86316 Friedberg, Germany.

2818. Miserendino, M.L. (2001): Length-mass relationships for macroinvertebrates in freshwater environments of Patagonia (Argentina). *Ecologia Austral* 11(1): 3-8. (in English). [Mass-length equations were obtained for aquatic macroinvertebrates collected in different streams and rivers of Patagonia, Argentina. Thirty-six taxa were studied: [...] Anisoptera (1 genus), [...]. Mass-length relationships were estimated by fitting the model $UPSILON = aX^b$ linearized by logarithmic transformation) to data of dry mass vs. body length of preserved specimens. The regressions were highly significant and explained a high proportion of variation of the dependent variable, as expressed by the Coefficient of Determination ($R^2 = 0.58-0.98$). The equations obtained allow the estimation of biomass of invertebrates in Patagonian running waters from measurements of linear dimensions, facilitating calculations of benthic standing crop and of secondary production.] Address: Miserendino, Maria, Flathead Lake Biological Station, The University of Montana, 311 Bio Station Lane, Polson, MT, 59860 9659, USA. E-Mail: mlau@ar.inter.net

2819. Mungenast, F. (2001): Die Libellen des Gurgltales bei Imst, Nordtirol (Insecta: Odonata): Eine faunistisch-ökologische Untersuchung. *Veröff. Tiroler Landesmus. Ferdinandeum* 81: 113-153. (in German with English summary). [Between 1996-1999, the survey of 36 habitats/localities in the Gurgl Valley, between Imst and Nassereith, N Tyrol, Austria, totaled in 35 species. Of particular interest are the occurrence of *Nehalennia speciosa* (Kropfsee) and *Aeshna subarctica* (Sinnerbrunn, alt. 1500 m). Data concerning the horizontal and vertical distribution, frequency, abundance, flight phenology and associations of adult dragonflies are presented. In addition records of *Thecagaster bidentata*, *Cordulegaster boltonii*, and *Orthetrum coerulescens* are stressed.] Address: Mungenast, F., Stadtplatz 12, A-6460 Imst, Austria

2820. Muzon, J.; Ellenrieder, N. von; Pessacq P. (2001): Description of the last larval instar of *Acanthagrion hildegarda* (Odonata: Coenagrionidae). *Revista de la Sociedad Entomologica Argentina* 60: 95-98. (in English). [The last larval instar of *Acanthagrion hildegarda* Gloger, is here described and compared to the other known larvae of this genus. It differs from them mainly in number of palpal and premental setae.] (Authors)] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

2821. Naraoka, H. (2001): Correction of Report of observations on dragonflies at Kushiro Marsh in Hokkaido (1972). *Bulletin of The Hokkaido Odonatological Society* 13: 17. (in Japanese). Address: not stated in English

2822. Natsume, H. (2001): Collection of *Sympetrum darwinianum* at Nishioka Reservoir. *Bull. Hokkaido Odonatological Society* 13: 16. (in Japanese). [S. baccha, S. darwinianum.] Address: not stated in English.

2823. Nel, A.; Bechly, G.; Martinez-Delclos, X.; Fleck, G. (2001): A new family of anisoptera from the Upper Jurassic of Karatau in Kazakhstan (Insecta: Odonata: Juragomphidae n. fam.). *Stuttgarter Beiträge zur Natur-*

kunde Serie B (Geologie und Palaeontologie) 314: 1-9. (in English). ["A new dragonfly genus and species, *Juragomphus karatauensis*, from the Upper Jurassic of Karatau in Kazakhstan is described and attributed to a new family Juragomphidae. The phylogenetic position and relationships of this new taxon are discussed." (Authors)] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

2824. Nel, A.; Bechly, G.; Martinez-Declos, X. (2001): A new fossil dragonfly from the Upper Jurassic in Germany (Odonata, Anisoptera, Protolindeniidae). *Revue Française d'Entomologie (Nouvelle Série)* 23(4): 257-261. ["*Protolindenia vohly* sp. n is described and illustrated from Lower Tithonian (Hybonotum Zone), Solnhofen Lithographic Limestone of Frankonian Alb, Bavaria. Holotype (imprint and counterimprint) and paratype (distal part of a hindwing) are deposited in MNHN, Paris (MNHN-LP-R. 55238) and in Jura. Mus. (SOS 1693), resp."] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

2825. Ortaz, M. (2001): Diet seasonality and food overlap among fishes of the upper Orituco stream, northern Venezuela. *Revista de Biología Tropical* 49(1): 191-197. (in English with Spanish summary). [The diet of four diurnal fish species (*Creagrutus bolivari*, *Knodus deuterodonoides*, *Knodus* sp. and *Poecilia reticulata*) from the Orituco stream at northern Venezuela include also Odonata. Address: Ortaz, M., Instituto de Biología Experimental, Universidad Central de Venezuela, Caracas, 1041, Venezuela. E-Mail: capricorniomvos@star-media.com

2826. Pathak, S.C.; Choubey, A.K.; Kulshrestha, V. (2001): Biodiversity of insects trapped over Bay of Bengal. *Entomon* 26(3-4): 211-226. (in English). [Wind borne insects of terrestrial origin in the aeolian environment over Bay of Bengal were trapped using multinet trapping system aboard the Ocean going Research Vessel (ORV), Sagar Kanya. Insects trapped belonged to eleven orders of which four viz., Hemiptera (94%), Diptera (4%), Hymenoptera (1%) and Coleoptera (0.5%) accounted for almost 99% of the total haul of 16429 in two traps with three nets in each, operated continuously for the duration of the cruise. Trichoptera, Neuroptera, Thysanoptera, Odonata and Dictyoptera were represented by single digit numbers.] Address: Pathak, S.C., Rani Durgavati Univ, Dept Biol Sci, Jabalpur 482001, India

2827. Pinratana, A. (2001): Editorial. *Malangpo* 18: 163. (in English). [Brief introduction into more recent odonate collecting activities in Thailand, and a short note on increasing interest in odonatology in Thailand.] Address: Pinratana, Bro Amnuay, Saint Gabriel's College, Bangkok 10300, Thailand

2828. Pliúraitė, V. (2001): The seasonal change of macrozoobenthos is the Merkys river in 1998. *Acta zool. lituan.* 11(1): 39-52. (in English with Lithuanian summary). [Information are given on seasonal dynamics, abundance and biomass in various habitats of the Merkys River, Lithuania. These data refer to "*Odonata*", while *Calopteryx splendens* and *Gomphus vulgatissimus* are listed in the 1998 taxa list of Merky River.] Address: Pliúraitė, V., Inst. Ecol., Akademijos 2, 2600 Vilnius, Lithuania

2829. Prot, J.-M. (2001): Atlas commenté des insectes de France-Comté. Odonates. Office pour l'information eco-entomologique de France-Comté: 185 pp. (in French). [This atlas covers records of Odonata from a region (including 3 Départements) in eastern France situated to the western border of Switzerland and - partly - Germany. This information may be of some interest to stimulate vigilance of odonatologists for some species to be expected under the amendments of global climate: it is fascinating to see that *Boyeria irene* reaches the latitude of Basel. 63 species - regularly reproducing in the region - are presented in detail: each monograph contains information on the habitat and habits, distribution, phenology, status, and comments. The species are documented by colour photographs (exception *Sympetrum sanguineum*), a graph with flight season, and two maps (records per UTM, numbers of observations plotted against locality and altitude). In addition, 16 species probably to occur in the region or to be expected in near future, and species with questionable status are commented. Some introductory chapters with information on history, development of inventarisation of the species, geography, a bibliography, a list of species and their current status specified for each Département and the town of Belfort complete this very interesting atlas. It is fascinating to observe the development of the atlas project of the French odonatologists. Obviously (compare OAS 2887), they have reached the level of regionalised maps with plenty of highly welcome information.] Address: Insectarium - Muséum d'histoire naturelle, La Citadelle, F-25000 Besançon, France. OPIE-Fcomte@wanadoo.fr

2830. Ramos-Elorduy, B.J.; Pino Moreno, J.M. (2001): Insectos comestibles de Hidalgo, Mexico. *Anales del Instituto de Biología Universidad Nacional Autónoma de México Serie Zoología* 72(1): 43-84. (in Spanish with English summary). [99 species of edible insects in Hidalgo, Mexico include 12 orders: Hymenoptera (35 species), Hemiptera (15 species), Lepidoptera (15 species), Coleoptera (15 species), Trichoptera (four species), Orthoptera (five species), Diptera (four species), Ephemeroptera (two species) and Odonata, Isoptera, Homoptera and Neuroptera with one species each. Regional distribution, consumption period and the way to fix, preserve and commercialize them, are discussed.] Address: Ramos-Elorduy B Julieta, Instituto de Biología, UNAM, 04510, Mexico, D.F. Mexico

2831. Reeves, D. (2001): From the president et al.. *Austrolestes* 2: 1-4. (in English). [D. Reeves introduces into some current activities in Australian odonatology (preparation of identification keys for larvae by Günther Theischinger, activities of the society), reviews Jill Silsbys book "*Dragonflies of the World*", and answers "Frequently asked questions".] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

2832. Reeves, D. (2001): Roma street wetlands. *Austrolestes* 2: 2. (in English). [Australia; 13 odonate species were recorded in a newly created water body.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

2833. Reeves, D. (2001): Species profile: S-e Queensland's "Giant Dragonfly" - *Petalura litorea* Theischinger. *Austrolestes* 2: 3-4. (in English). [Habits and the habitat of the species are briefly outlined. Special

emphasize is given to the legal conservation status of the species. In addition, the rest of the taxa of the genus *Petalura* are briefly discussed.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

2834. Rumpf, M.; Wernicke, P. (2001): Die Libellenfauna ausgewählter Gewässer im Naturpark Feldberger Seenlandschaft. Natur und Naturschutz in Mecklenburg-Vorpommern 36: 92-109. (in German with English summary). [Mecklenburg-Vorpommern, Germany; in 1998 and 1999, 45 water bodies (in most cases lakes, and a few running waters) were surveyed for their odonate fauna. Along with detailed data on morphology and chemistry, the Odonata are documented for each of the water bodies. 48 species could be traced; considering literature data, a total of 55 species is known from the region. The lake with highest diversity (31 species) is the dystrophic Mummelsee, a shallow, temporarily drying out water body with a surface of app. 1-2 ha only. Five species of the genus *Leucorrhinia* make the region to an odonatological hot spot in Europe; the occurrence of "lake-populations" of *Onychogomphus forcipatus* and *Gomphus vulgatissimus* is of special interest. 23 species are discussed in some detail.] Address: Rumpf, M., Blumenstr. 13, D-17268 Warthe, Germany

2835. Salamanca-Ocana, J.C.; Cano-Villegas, F.; Ferreras-Romero, M., (2001): Contribution al conocimiento de la distribución ibérica actual de *Onychogomphus costae* Selys, 1885 (Odonata: Gomphidae). Boln Asoc. esp. Ent. 25(1/2): 187-188. (in Spain with English title). ["The published records are reviewed and annotated, and records from Palma de Rio and Cordoba (V/VI-2000) are added."] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain. E-mail: ferreras@teleline.es

2836. Schilder, R.J.; Marden, J.H. (2001): Workloop force and lever arm length allometry in dragonfly flight motors. American Zoologist 41(6): 1651. (in English). ["Maximum isometric muscle force production scales as muscle mass^{2/3}, whereas maximum net force output by flying animals scales isometrically with total flight muscle mass. What causes this transition between the two scaling relations? We examined this question by subjecting dragonfly flight muscles to contraction regimes (workloops) that simulated working conditions of the muscle during maximum load lifting. Our hypothesis is that a combination of allometric (rather than isometric) scaling of average net muscle force output and the ratio of lever arm lengths (i.e. mechanical advantage) in the muscle-to-wingtip mechanical linkage is sufficient to account for the observed transition from muscle mass^{2/3} scaling to the isometric scaling. We found that 1) maximum isometric force scales as muscle mass^{0.67}, 2) maximum net force production during load lifting (F₂) scales as total flight muscle mass^{1.067} (M_{1.067}), 3) workloop average net force output (F₁) scales as muscle mass^{0.86} (M_{0.86}), 4) muscle fulcrum-lever arm length (d₁) scales as muscle mass^{0.54} (M_{0.54}), and 5) fulcrum-wingtip length (d₂) scales as muscle mass^{0.33} (M_{0.33}). Since moments are conserved on either side of a fulcrum (F₁*d₁=F₂*d₂), maximum net force output by the muscle-wing system (F₂) should scale as: M_{0.86}*(M_{0.54}/M_{0.33})=M_{1.07}, which agrees well with the observed scaling (M_{1.067}) in this study and previ-

ous load lifting experiments on dragonflies and other flying animals." (Authors)] Address: Marden, J.H., Dept Biol., Pennsylvania St. University, 208 Mueller Laboratory, University Park, PA 16802, USA

2837. Schmidt, E. (2001): Der Plattbauch *Platetrum depressum* (L., 1758), (Odonata), das Insekt des Jahres 2001. Entomologische Nachrichten und Berichte 45(1): 1-8. (in German with English summary). ["It is the type species of *Platetrum* NEWMAN, 1833, which within the *Libellula*-group is based on the prominent bifurcate process at 1st sternum. It is part of the secondary copulatory apparatus at sterna 2/3 and forms a good autapomorphy at genus level. Thus North American *Platetrum* HAGEN, 1861 became the nearctic subgenus of *Platetrum*, including *P. lydia* (DRURY, 1770), the Common Whitetail." This finding coincides with that of Carle & Kjer (2002), see OAS 2902. "The biology/ecology in Central Europe are summed up. They are interpreted as adaptations to settle in open wetlands in natural river landscapes of the plains, which today are devastated in most parts of Germany. Nowadays the species here breeds usually only in man made habitats in the pioneer stage (like shallow drying up pools or gravel pits), which requires a special habitat management." (Author)] Address: Schmidt, E., Biologie und ihre Didaktik, FB9/S05, Universität GH Essen, D-45117 Essen, Germany

2838. Schupp, D.; Behm-Berkelmann, K.; Herrmann, T.; Pilgrim, B.; Schacherer, A. (2001): Arten brauchen Daten - Erfassung von Tier- und Pflanzenarten in Niedersachsen. Informationsdienst Naturschutz Niedersachsen 5/2001: 210-239. (in German). [This introductory manual for the species mapping scheme of the Federal State Niedersachsen in Germany refers on pages 230-231 on Odonata. Detailed instructions on mapping have to be taken from Herrmann et al. (see OAS 2797)] Address: Niedersächsisches Landesamt für Ökologie, Abt. Naturschutz, Postfach 101062, D-31110 Hildesheim, Germany. www.nloe.de

2839. Seidenbusch, R. (2001): Die Gefährdung der Libellen im Landkreis Amberg-Sulzbach. Eisengau 16: 5-16. (in German). [Amberg-Sulzbach district, Bavaria, Germany; 53 species are listed, and the status of the various aquatic habitats in the region is outlined.] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

2840. Sformo, T.T.S. (2001): Minimum flight temperature and thermoregulatory performance of sub-arctic dragonflies. American Zoologist 41(6) : 1584-1585. (in English). ["Sub-arctic dragonflies (Odonata: Anisoptera), an order of insect previously not studied in Alaska, provide a unique system with which to examine questions of thermal biology. Two potential adaptations are the ability to initiate flight at low temperature and to thermoregulate. To establish minimum flight temperatures, I record the lowest temperature at which a species can maintain level flight, both in the lab and in the field. To determine thermoregulating ability, I measure thoracic temperature (T_{th}) of individual dragonflies using a thermocouple. T_{th} is then compared to the dragonfly model providing the operative environmental temperature (T_e). By regressing T_{th} on T_e, the slope of the regression line indicates thermoregulatory ability (Thermoregulation Performance Index). I predict that northern dragonflies will have lower minimum flight temperatures

than comparable species from lower latitudes. I also predict a general pattern wherein more massive species are able to thermoregulate by both physiological and behavioral means, while less massive species rely solely on behavioral repositioning. The relationship between T_{th} of living specimens and T_e is examined for each species and compared across species to examine relative thermoregulating ability. I show, contrary to speculation by Vogt and Heinrich (1983), that minimum flight temperature of northern dragonflies are not different from comparable species from Maine, although they differ from species in Florida. Minimum temperatures range from 14°C for *S. danae* to 22°C for aeshnids. Finally, I conclude that the relative thermoregulating ability is a function of mass, which ranges from 0.09g for the least to 0.86g for the most massive, while the Thermoregulatory Performance Index ranges from 0.90 (a thermal conformer) to 0.14 (a thermal regulator), respectively. (Author)] Address: Sformo, T.T S., University of Alaska Fairbanks, Fairbanks, AK USA.

2841. Sharifi, M.; Hemmati, Z. (2001): Food of Mehely's horseshoe bat *Rhinolophus mehelyi* in a maternity colony in western Iran. *Myotis* 39: 17-20. (in English). ["The diet of *R. mehelyi* was investigated from droppings collected in spring and summer 2000 in a maternity roost in Killasefid cave, west-central Zagros Mts. Moths (Lepidoptera) dominated in the food (68-97% of volume), being followed by beetles (Coleoptera, 3-29%) and flies (Diptera, 0.1-1.3). Other prey included Odonata, Neuroptera, Homoptera, Hemiptera, Trichoptera, Dictyoptera and Acarina. Prey diversity declined sharply from April/May to June/July." (Author)] Address: Sharifi, M., Dept of Biology, Faculty of Science, Razi University, Kermanshah, Baghabrisham, 67149, Iran. E-Mail: msharifi@razi.ac.ir

2842. Síbl, J.; Seginkova, A. (2001): Contribution to the knowledge of dragonflies (Insecta: Odonata) of national nature reserve Súr fen and its surrounding (southwestern Slovakia). *Entomofauna carpathica* 13: 5-9. (in Slovakian, with English summary). [In 1999 and 2000, 31 dragonfly species have been recorded at 5 localities of the National Nature Reserve "Súr fen" and its surroundings (situated in southwestern Slovakia). The present number of species - including literature records - now amounts to 40. The occurrence of several dragonfly species, which are considered rare in the Slovak Republic, was confirmed, e.g. *Orthetrum coerulescens*. 11 species (*Brachytron pratense*, *Anaciaeschna isosceles*, *Anax imperator*, *A. parthenope*, *Orthetrum albistylum*, *O. coerulescens*, *Libellula quadrimaculata*, *Crocothemis erythraea*, *Cordulia aenea*, *Sympetrum danae*, *S. meridionale*) were recorded for the first time in the study area. The species are grouped to three dragonfly communities following the system of Jacob (1969): Gomphus - *Calopteryx splendens*, *Erythromma* - *Anax imperator*, *Lestes-Sympetrum* - *Aeshna mixta* and *Orthetrum* - *Libellula depressa*.] Address: Síbl, J., J. Stanislava 15, SK 84105 Bratislava, Slovakia

2843. Síbl, J. (2001): On the distribution of *Leucorrhinia pectoralis* (Odonata: Libellulidae) in western Slovakia. *Entomofauna carpathica* 13: 3-4. (in Slovakian, with English summary). [The red listed *L. pectoralis* is considered rare in the Slovak Republic; it was confirmed recently in western Slovakia within 2 geomorphological units at 10 localities for the first time.] Address: Síbl, J., J. Stanislava 15, SK 84105 Bratislava, Slovakia

2844. Song, D.; Wang, H.; Zeng, L.; Yin, C. (2001): Measuring the camber deformation of a dragonfly wing using projected comb fringe. *Review of Scientific Instruments* 72(5): 2450-2454. [This is a contribution about non-contact methods of measuring wing deformation patterns.] Address: unknown.

2845. Sprandel, G.L. (2001): Fall dragonfly (Odonata) and butterfly (Lepidoptera) migration at St. Joseph Peninsula, Gulf County, Florida. *Florida Entomologist* 84(2): 234-238. (in English). [The author describes the fall 1999 migration of 5 Lepidoptera and 4 Odonata species north along St. Joseph Peninsula, Gulf County, in the Florida Panhandle. The Gulf fritillary butterfly (*Agraulis vanillae* (L.), Lepidoptera: Nymphalidae) accounted for 58% of the insects counted; the highest rate was 3,162/h, with an estimate of total season migration of over 250000 individuals. *Anax junius* was the next most common with a maximum rate of 3,297/h, and with an estimate of total season migration of app. 78000 individuals. "The median and peak period for these two species was the first week in October. The observed flight pattern may demonstrate a reluctance to cross open water." In tab. 1 the migration levels of all dragonflies and butterflies incl. *Tramea lacerata* (3.3% / app. 21000 ind.), *Pantala flavescens* (1.8% / app. 9000 ind.), and *Tramea carolina* (1% / app. 4700 ind.) are documented. Additional information of preying of *A. junius* on insects, road traffic mortality, flying in tandem, and flight high should be noted.] Address: Sprandel, G.L., Florida Fish & Wildlife Conservation Commission, 620 Meridan St., Tallahassee, FL 32399 USA

2846. Terzani, F.; Carletti, B. (2001): Descrizione di *Pseudagrion bernardi* spec. nov. della Repubblica del Congo (Odonata: Coenagrionidae). *Opusc. zool. flum.* 199: 7-12. (in Italian with English summary). ["The new species is described and illustrated, and its affinities with *P. kibalense* Longfield, 1959, *P. symoensii* Pinhey, 1967, and *P. fisheri* Pinhey, 1961 are discussed. Holotype male and allotype female; Republic of Congo: Kintele, 6-XI-1978; deposited at MZUF, Firenze. Paratypes of both sexes from Djili (VI-1978, XII-1979, XI-1980), Kintele (V, VI, 6-XI-1978, 5-1, II, III, XII-1980), Loufula (1-1980), Makabana (X-1980), Voka (1-1980) and Dimonika (VI-1980)." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2847. Terzani, F. (2001): Odonati. In: A. Sforzi & L. Bartolozzi, [Eds], *Libro Rosso degli insetti della Toscana*, ARSIA, Regione Toscana, Firenze: 49-70. (in Italian). [20 (including *Coenagrion caerulescens caesarum* Schmidt, 1959, *C. mercuriale castellanii* (Roberts, 1848), and *C. pulchellum mediterraneum* Schmidt, 1964) out of the 55 species known to occur in the province of Toscana, Italy are redlisted. Colour portraits, brief descriptions, provincial distribution dot maps, and statements on their habitat, biology, ecology, distribution and status are provided.] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2848. Theischinger, G. (2001): A new species of *Eurysticta* WATSON from Australia (Odonata: Isostictidae). *Linzer biol. Beitr.* 33(2) : 1291-1294. (in English). ["*E. reevesi* sp.n. (male holotype: Torrens Creek Gorge,

White Mountains National Park, Queensland, Australia) is described after two males. The species is illustrated and compared with the described species of *Eurysticta WATSON*. (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

2849. Thipaksom, A.; Kittayapong, P.; Milne, J.R.; Thirakupt, V.; Sindhusake, C.; Poonchaisri, S. (2001): Additions to the distributions of rice field odonates in Thailand. *Malangpo* 18: 171-174. (in English). [In 1998-2000, we collected adult odonates from rice fields in 36 provinces of every part of Thailand. We collected them by sweep net and stored them in a foam box containing dry ice (-78°C) until they were transported to an experimental laboratory at the Department of Biology, Mahidol University, for further analysis. Odonate specimens were identified to species by morphology and confirmed by comparison with representative specimens at St. Gabriel's Museum, Bangkok. After identification, the specimens were kept at -20°C until used for the molecular detection of *Wolbachia* infection in odonates (Thipaksom et al. in preparation). From our material we could determine a large number of new provincial distribution records for a total of 15 coenagrionid and 11 libellulid species. They are reported here.] Address: Thipaksom, A., Department of Biology, Faculty of Science, Mahidol University, Bangkok

2850. Vick, G.S. & D.G. Chelmick (2001): A preliminary report on the odonate fauna of Guapi Acu, a nature reserve in the Atlantic coast forest of Brazil, with taxonomic notes and annotations. *Opusc. zool. flumin.* 200: 1-11. (in English). [Based upon a preliminary survey, the presence of 48 species is brought on record; 20 of these are Atlantic coast endemics. A second species was discovered in the hitherto monotypic genus *Limnetron* (female only); the differing features of the respective female specimens are outlined.] (Authors)] Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, United Kingdom

2851. Viessmann, R. (2001): Libellen - Odonata. Pflanzen und Tiere in Rheinland-Pfalz - Berichtsjahr 2000 - Heft 11: 207-220. (in German). [Compilation of dragonfly records from different habitats situated in the eastern and southern parts of Rheinland-Pfalz, Germany. Of faunistic interest are the records of *Coenagrion mercuriale*, *Erythromma najas*, *Ischnura pumilio*, *Lestes barbarus*, *L. virens*, *Sympetma fusca*, *Brachytron pratense*, *Aeshna affinis*, *Anax parthenope*, *Ophiogomphus cecilia*, *Crocothemis erythraea*, *Libellula fulva*, *Orthetrum brunneum*, and *Sympetrum flaveolum*.] Address: Viessmann, R., Gängelstockweg 8, D-67295 Bollanden, Germany

2852. Vizslán, T.; Pingitzer, B. (2001): Data on the odonate fauna of Bükk Mountains and Miskolc. *Folia hist. not. Mus. matraensis* 25: 121-126. (in Hungarian with English summary). [40 species, evidenced during 1999-2000, are listed along with the locality data and collection dates. Of some interest are records of *Lestes sponsa*, *Coenagrion ornatum*, *Brachytron pratense*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Libellula quadrimaculata*, and *Sympetrum danae*.] Address: Vizslán, T., Kitaibel P. u. 32/C. Fru 2, HU-9400 Sopron, Hungaria

2853. Vizslán, T.; Pingitzer, B. (2001): Data on the odonate fauna of Transdanubia, 2.. *Folia hist. not. Mus. matraensis* 25: 127-134. (in Hungarian with English

summary). [40 species, evidenced in 2000, are listed along with the locality data and collection dates. Noteworthy are species as *Coenagrion scitulum*, *Brachytron pratense*, *Cordulegaster heros*, *Epitheca bimaculata*, *Libellula quadrimaculata*, *Sympetrum danae*, *S. pedemontanum*, and *Leucorrhinia pectoralis*.] Address: Vizslán, T., Kitaibel P. u. 32/C. Fru 2, HU-9400 Sopron, Hungaria

2854. Waldhauser, M. (2001): The current state of knowledge about dragonflies (Odonata) research in the Protected Landscape Area Luzické hory Mountains (Northern Bohemia). *Vázky* 2001. Sborník referátu IV. celostátního semináře odonatologu, který se konal v Národním parku Sumava 2. - 5. 8. 2001. Seminár usporádali: ZO CSOP Vlasim, Správa NP Sumava, Správa. CHKO Blaník: 62-79. (in Czech with English summary). [The paper compiles and briefly discusses records of 35 species which were collected in 2000 and 2001.] Address: Waldhauser, M., Správa CHKO Luzické hory, Skolín 12, 47125 Jablonné v Podjestedi, Czech Republic

2855. Wootton, R.J. (2001): How insect wings evolved.. In: If. Woiwod, D.R. Reynolds & C.D. Thomas, [Eds], *Insect movement mechanisms and consequences*. CABI Publishing, Wallingford, ISBN 0-85199-456-3: 43-64. (in English). [There is now a majority support for the view that insect wings evolved from lateral segmental structures which were already mobile. The most plausible routes for the origin of flight appear to be either through parachuting and gliding, or through skimming on the surface of water. For the development of active flight, wing would initially need to enlarge, and to develop structural rigidity and a firm articulation to the thorax, then progressively to acquire structural adaptations for automatic, useful deformation when aerodynamically and inertially loaded. Thereafter the way would be open for specialization into different modes of flight, e.g. slow flight and hovering (Zygoptera: narrowing of the base, usually accompanied by vein fusion, etc.), or adaptations for flight over a wide speed range (Anisoptera: combining torsionally compliant wings with broad bases, usually associated with faster flight).] Address: Wootton, R.J., Hatherly Lab., Sch. Biol. Sci., Univ. Exeter, Prince of Wales Rd, Exeter, EX4 4PS, UK

2856. Yang, Z.-d.; Zhu, H.-q (2001): A new species of the genus *Lamelligomphus* (Odonata: Gomphidae) from Shaanxi province. *Entomotaxonomia* 23(3): 157-159. (in Chinese with English summary). [*L. hanzhongensis* sp. n. is described, illustrated and compared with *L. formosanus* (Matsumura in Oguma, 1926). The holotype is deposited at Shaanxi University.] Address: Yang, Z.-d., Adult Education Dept, Hanzhong Normal College, Hanzhong, Shaanxi-72300, China

2857. Yanoviak, S.P., (2001): Container color and location affect macroinvertebrate community structure in artificial treeholes in Panama. *Florida Entomologist* 84(2): 265-271. (in English with Spanish summary). [I investigated the effects of habitat color and location on community structure in artificial water-filled treeholes in the forest of Barro Colorado Island, Panama. The macroinvertebrate fauna of 9 replications (5 in understory, 4 in tree-fall gaps) of black, blue, red, and green 650 ml plastic cups were censused weekly for 7 wks. Macroinvertebrate abundance and species richness were greater in understory cups than in gap cups. Seven species

colonized black cups exclusively. Black cups in the understory, and red and black cups in gaps, attracted more species on average than other colors. Species richness and abundance were consistently lowest in green cups. Species were more broadly distributed among cup colors in the understory, suggesting that diffuse light conditions influenced color perception. There was no overlap in species composition between water in the artificial treeholes and water held by red *Heliconia* bracts or green tank bromeliads." (Author) *Mecistogaster* ssp. was found one time in a black container in understory, and one time in a black container in gap. *Mecistogaster* on BCI avoid other phytotelmata, including bromeliads, and prefer treeholes. "It is reasonable to conclude that the presence ... only in black cups reflects a habitat color preference."] Address: Yanoviak, S.P., Evergreen State College, Lab 1, Olympia, WA 98505, USA

2858. Yokoi, N. (2001): Studying dragonflies in central Laos. *Malangpo* 18: 167-169. (in English). [This paper presents a compilation of several publications of the author from 1995 to 2001 on the Odonata of Laos, most of them written in Japanese. Along with some remarks on more recently visited localities the paper is welcome to people not common with the Japanese language.] Address: Yokoi, N., 2-37-11, Kaisei, Koriyama, Fukushima, 963-8851 Japan

2859. Yokoyama, T. (2001): Larval duration of *Planaeschna milnei* in Hokkaido. *Bulletin of The Hokkaido Odonatological Society* 13: 5-9. (in Japanese). Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2860. Yokoyama, T. (2001): Overwinter of the larvae of several lotic species in the northern district. *Bulletin of The Hokkaido Odonatological Society* 13: 10. (in Japanese). [*Mnais pruinosa*, *Davidius moiwanus*, *Anotogaster sieboldii*] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2861. Yokoyama, T.; Akaishi, S.; Hirose, Y. (2001): The new locality of *Lyriothemis pachygastra* and its life history in the southern Hokkaido. *Bulletin of The Hokkaido Odonatological Society* 13: 2-4. (in Japanese). Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2862. Zimmer, K.D.; Hanson, M.A.; Butler, M.G.; Duffy, W.G. (2001): Size distribution of aquatic invertebrates in two prairie wetlands, with and without fish, with implications for community production. *Freshwater Biology* 46: 1373-1386. (in English). ["1. We compared the size distribution of aquatic invertebrates in two prairie wetlands, one supporting a population of fathead minnows and the other fishless. Both wetlands were sampled in three depth zones on three dates, allowing assessment of temporal and spatial variation. 2. We determined biomass of aquatic invertebrates in 17 log₂ size classes, and used these data to develop normalized size spectra. We also coupled size distributions with an allometric model to estimate relative production at the community level. 3. The composition of the invertebrate communities differed greatly between sites, and invertebrate biomass was higher in nearly all size classes in the fishless wetland. Intercepts of normalized size spectra were significantly different between wetlands, but slopes generally were not, indicating differences in

standing-stock biomass but similar size structures between the two invertebrate communities. Higher standing-stock biomass in the fishless wetland resulted in higher relative production per unit area, but similar size distributions resulted in similar mass-specific production (P/B) between wetlands. 4. Our results indicate that invertebrate communities in prairie wetlands may have relatively consistent size structures in spite of large differences in community composition and standing-stock biomass. We hypothesize that the observed differences are because of predation by the minnow population and/or differences in the macrophyte communities between the two sites. However, the relative importance of macrophytes and fish predation in structuring invertebrate communities in prairie wetlands is poorly known." (Authors) The biomass of Odonata depends from the stratum and the date of sampling. In the fishless pond Odonata biomass of e.g. the shallow stratum accounts to nearly 60% of the total macroinvertebrate biomass, and to nearly 50% on 23 June. Whereas in the pond supporting a population of the fathead minnow biomass in the mid-depth stratum accounts for less than 5% (app. 0% in the shallow and deep stratum); biomass was less than 5% on 19 May, no Odonata could be sampled on the two succeeding sampling dates.] Address: Zimmer, Kyle, D., Dept of Ecology, Evolution and Behavior, University of Minnesota, 100 Ecology, 1987 Upper Buford Circle, St Paul, MN 55108, USA. E-mail: zimme076@umn.edu

2863. Zottoli, S.J.; Walfish, D.T.O.; Westbrooks, D.A.; Smith, D.C. (2001): Small tadpoles do not initiate a startle response before being struck by the labium of dragonfly larvae. *Society for Neuroscience* 27(2): 1984. (in English). ["Dragonfly larvae of the family Aeshnidae are voracious predators whose diet includes tadpoles. Larvae hydraulically protrude a labium that has movable hooks, which may attach to prey on contact. This rapid labial movement (13.8+-3.7ms to full extension; mean+-S.D.; n=10) may preclude the ability of tadpoles to use a startle response to escape being struck by the labium. Digital imaging (500 frames/s) was used to detect whether a tadpole startle response is involved in escape from the dragonfly labial strike. Dragonfly larvae (2.8+-1.7cm in total length; 6.5+-2.5mm head width; n=10) were held at 22degreeC and were not fed for three days prior to trials. In each trial a dragonfly larva was placed in the base of a 60X5mm petri dish, covered with conditioned water and allowed to acclimate for at least 10 min. A small tadpole (*Rana*, 12.3+-3.7mm in total length; n=10; purchased from suppliers) was then introduced into the dish and images of labial strikes were saved and analyzed. Tadpoles never displayed a startle response before being struck by the dragonfly labium. When tadpoles were hooked, they were almost always eaten or released by the dragonfly larvae and in a few cases the tadpole was able to break free from the labial hooks utilizing a startle response. When tadpoles were struck but not hooked, startle responses were initiated 23.8+-4.8ms (n=10) after contact by the labium. The results clearly indicate that small tadpoles do not initiate a startle response before being struck by the dragonfly labium. We hypothesize that the startle response may aid in escape from predation only after labial contact." (Authors)] Address: Zottoli, S.J., Biology, Williams College, Williamstown, MA, USA

- 2864.** Abbott, J.; Donnelly, T.W.; Gonzalez-Soriano, E.; Harp, G.L. ("Nicaragua expedition 2001") (2002): Odonata collected in Nicaragua. *Notul. odonatol.* 5(10): 125-128. (in English). [71 species (and 4 spp.) were collected at 12 localities in the Jinotega and Matagalpa Departments, Nicaragua. 25 species are new and raise the number of Odonata of Nicaragua to 124. The possible odonate diversity of Nicaragua is briefly discussed.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu
- 2865.** Abbott, J.C. (2002): A new dragonfly for Utah. *Argia* 14(2): 13. (in English). [Utah, USA; *Aeshna persephone*] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu
- 2866.** Altwegg, R. (2002): Predator-induced life-history plasticity under time constraints in pool frogs. *Ecology* 83(9): 2542-2551. (in English). ["The mere presence of predators often decreases the growth rate of prey individuals, which devote energy and time to predator avoidance mechanisms. However, if time constraints are present, the prey individuals might be forced to neglect predators in order to grow faster. Amphibian larvae lower their activity when exposed to predators, which increases their survival probability but lowers their growth rate. I investigated how time constraints affect the growth strategies of pool frogs (*Rana lessonae*) in the presence and absence of caged (i.e., nonlethal) predators (*Anax imperator*), and what the consequences are for their survival during the larval and the subsequent terrestrial life stage. In two outdoor experiments, I limited the available development time by delaying the hatching date, and by simulating pond drying. Tadpoles whose hatching date was experimentally delayed reduced their development and their activity less in the presence of predators than did control tadpoles. The survival consequences of caged predators was similar for early- and late-hatched tadpoles. Tadpoles exposed to falling water level increased their developmental rate compared to constant-water-level controls. In response to predators, however, tadpoles decreased activity and developmental rate, regardless of the water level treatment. Survival in treatments combining fast drying and caged predators was lower than in the other treatments. These results suggest that time constraints critically affect the role of predators in the life history of pool frogs and might change the relative importance of lethal and nonlethal predator effects on their population dynamics." (Author)] Address: Altwegg, R., Institute of Zoology, University of Zürich, Winterthurerstr. 190, CH-8057 Zürich, Switzerland. E-mail: Altwegg@zool.unizh.ch
- 2867.** Altwegg, R. (2002): Trait-mediated indirect effects and complex life-cycles in two European frogs. *Evolutionary Ecology Research* 4(4): 519-536. (in English). ["Most animals actively avoid predators. If such a reaction reduces competitive ability, for example by reducing food intake, predator presence can lead to trait-mediated indirect effects. Because predator avoidance typically leads to reduced growth rather than reduced survival, its effect on population processes is difficult to assess. This is especially true for organisms with complex life-cycles, where predator avoidance during one stage is expected to lead to trait-mediated indirect effects if it has effects reaching into the following life stages. I experimentally investigated the effect of caged (thus non-lethal) dragonfly larvae on the competition between tadpoles of two frog species (*Rana lessonae* and *R. esculenta*) and on juvenile frog survival during the subsequent terrestrial stage. In response to caged predators, *R. lessonae* delayed metamorphosis more than *R. esculenta*, but they both metamorphosed heavier. These differences suggest the possibility of a competitive disadvantage for *R. lessonae* in the presence of predators, which could lead to trait-mediated indirect effects. However, the presence of predators did not modify competitive effects and had no measurable consequences on terrestrial survival. Regardless of the presence of predators, competition during the larval stage had large effects on metamorphosis and led to strongly decreased survival in the subsequent terrestrial stage. These results suggest that trait-mediated indirect effects are not important in this system, because the predator reaction of the tadpoles in both species had no measurable effect on the following life stage and, therefore, probably no strong effect on community dynamics." (Author)] Address: Altwegg, R., Institute of Zoology, University of Zürich, Winterthurerstr. 190, CH-8057 Zürich, Switzerland. E-mail: Altwegg@zool.unizh.ch
- 2868.** Andres, J.A.; Sanchez-Guillen, R.A.; Cordero Rivera, A. (2002): Evolution of female colour polymorphism in damselflies: testing the hypotheses. *Animal Behaviour* 63(4): 677-685. (in English). ["The existence of several female colour morphs is a conspicuous characteristic of many damselflies that show one male-like (androchrome) and several nonmale-like (gynochrome) morphs. We tested several adaptive hypotheses and the null model for the maintenance of female polychromatism (one androchrome and two gynochromes) in the damselfly *Ceriatagrion tenellum*. We tested the null model by comparing the degree of genetic differentiation between the colour locus and a set of 19 neutral RAPD loci in five populations. Our results indicate that selection is acting to maintain similar frequencies between populations at the colour locus. Using mark-recapture techniques we found that mating success is not dependent on female coloration. We tested the mimicry hypothesis by presenting live and dead models to males. Dead models were highly attractive irrespective of coloration. In contrast, with live models males could not distinguish between androchromes and other males, and were more attracted to gynochrome females. Despite this, within populations morph frequencies remained constant over time and mating was at random with respect to female coloration. However, there was a positive relationship between male density and androchrome frequency in a comparative study of eight populations. We discuss our results in the framework of sexual conflict theory and suggest that andro- and gynochrome females are using different strategies to control their number of matings. The different morphs might be maintained in a balanced polymorphism by a combination of density- and frequency-dependent mechanisms." (Author)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidad de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es
- 2869.** Anonymus (2002): Gebänderte Heidelibelle. *Hydrologie und Wasserbewirtschaftung* 46(2): 254. (in

German). [A picture of *Sympetrum pedemontanum* is mounted on the front page of the periodical; the species is briefly characterised, some of the given information is questionable.] Address: not stated

2870. Anonymus (2002): Zur Titelseite: Vogel-Azurjungfer. *Hydrologie und Wasserbewirtschaftung* 46(4): 200. (in German). [Coenagrion ornatum was printed on the journal's front page. Some brief remarks on the species and on Odonata in general are added.] Address: not stated.

2871. Armstrong, A.J. (2002): Insects and the determination of priority areas for biodiversity conservation in KwaZulu-Natal province, South Africa. *African Entomology* 10(1): 11-27. (in English). ["The KwaZulu-Natal Nature Conservation Service is undertaking a long-term project to determine the value of untransformed land for biodiversity conservation, to map these areas in accordance with their relative values, and to identify and prioritize irreplaceable areas. The overall goal of the initial stage of the project was to use existing data and expertise to define areas of conservation importance in KwaZulu-Natal. The aim of this paper is to illustrate the procedures used to incorporate insect species and subspecies into the project, including those for identifying insects of conservation concern and for making a first assessment of their distribution and conservation status. A biodiversity hierarchy (from landscapes through ecosystems and communities to species and populations) forms the basis of the analysis. Information received from taxonomists working in South Africa in response to a questionnaire survey was used to choose the species for inclusion in the initial analysis. A total of thirty-seven species and subspecies endemic to the Province in certain families of Coleoptera, Diptera, Lepidoptera, Mecoptera and Odonata were included. Existing distribution data were collated and the potential distributions of the endemics were modelled at a scale of 4 ha. Factors that potentially influence the distributions of the endemics were gleaned from the literature. Database queries using distribution data with a spatial resolution of less than or equal to 250 m and cartographic overlays formed the basis of the modelling procedure. Two areas with little or no statutory protection, the high-lying grasslands of the northwestern region and much of the central region of the Province, are predicted to have a relatively high diversity of endemic insects. Fifty-one percent of the insect species and subspecies in the analysis met the two conservation goals, i.e. 1) at least 10% of their present distributions under formal conservation management, and 2) three such protected areas with viable populations. A benefit of modelling the potential distributions of endemics is that searching for populations of these insects can be directed to areas where they are expected to occur. The data collected can then be used to improve the distribution models for these insects, some of which are poorly known. The distributions and their associated conservation targets form a vital component of the iterative systematic conservation planning project currently underway in the Province." (Author)] Address: Armstrong A J ., Biodiversity Division, KwaZulu-Natal Nature Conservation Service, P.O. Box 13053, Cascades, 3202, South Africa. E-Mail: armstronga@kznnccs.org.za

2872. Balázs Bernáth, B.; Szedenics, G.; Wildermuth, H.; Horváth, G. (2002): How can dragonflies discern bright and dark waters from a distance? The degree of

polarisation of reflected light as a possible cue for dragonfly habitat selection. *Freshwater Biology* 47(9): 1707-1719. (in English). ["1. Based on the findings that some dragonflies prefer either 'dark' or 'bright' water (as perceived by the human eye viewing downwards perpendicularly to the water surface), while others choose both types of water bodies in which to lay their eggs, the question arises: How can dragonflies distinguish a bright from a dark pond from far away, before they get sufficiently close to see it is bright or dark? 2. Our hypothesis is that certain dragonfly species may select their preferred breeding sites from a distance on the basis of the polarisation of reflected light. Is it that waters viewed from a distance can be classified on the basis of the polarisation of reflected light? 3. Therefore we measured, at an angle of view of 20° from the horizontal, the reflection-polarisation characteristics of several ponds differing in brightness and in their dragonfly fauna. 4. We show that from a distance, at which the angle of view is 20° from the horizontal, dark water bodies cannot be distinguished from bright ones on the basis of the intensity or the angle of polarisation of reflected light. At a similar angle of view, however, dark waters reflect light with a significantly higher degree of linear polarisation than bright waters in any range of the spectrum and in any direction of view with respect to the sun. 5. Thus, the degree of polarisation of reflected light may be a visual cue for the polarisation-sensitive dragonflies to distinguish dark and bright water bodies from far away. Future experimental studies should prove if dragonflies do indeed use this cue for habitat selection." (Authors) Field studies were carried out near Zürich, Switzerland. The species surveyed are: *Enallagma cyathigerum*, *Anax imperator*, *Libellula depressa*, *Orthetrum cancellatum*, *Orthetrum brunneum*, *Pyrrhosoma nymphula*, *Coenagrion puella*, *Aeshna cyanea*, *Libellula quadrimaculata*, *Sympetrum striolatum*, *Lestes virens*, *L. sponsa*, *Chalcolestes viridis*, *Coenagrion pulchellum*, *Aeshna juncea*, *Cordulia aenea*, *Somatochlora flavomaculata*, *Leucorrhinia pectoralis*, and *Sympetrum sanguineum*.] Address: Horváth, G., Dept Biol. Physics, Eötvös Univ., Pázmány sétány 1, HU-1117 Budapest, Hungary. E-mail: gh@arago.elte.hu

2873. Bazyluk W. (2002): Material to the fauna of dragonflies (Odonata) in the vicinity of Siemien in the Lublin province. *Novvy Pam. Fizjogr.* 1(1): 45-52. (in Polish with English summary). [Between 1941 and 1944, the author (who died in 1988) collected dragonflies in the vicinity of Siemien (Lublin province, Poland). 39 species, including *Coenagrion armatum*, *Erythromma najas*, *E. viridulum*, *Aeshna viridis*, *A. affinis*, *Ophiogomphus cecilia*, *Epithea bimaculata*, *Leucorrhinia pectoralis*, *L. rubicunda*, and *Sympetrum depressisculum*. Pawel Buczynski wrote, that the manuscript of this paper - prepared in the 1950 for publication - was stored in a drawer. The wife of W. Buzyluk, Prof. Dr. Anna Liana, app. 50 years later prepared it for publication. P. Buczynski could check the specimens in the zoological institut of the Polish Academy of Sciences, and proved that *Symecma fusca* was misidentified: it should be *S. paedisca*.] Address: Liana, Anna, Muzeum i Instytut Zoologii PAN, ul. Wilcza 64, PL-00-679 Warszawa, Poland

2874. Beck, M.L.; Pruett-Jones, S. (2002): Fluctuating asymmetry, sexual selection, and survivorship in male Dark-Winged Damselflies. *Ethology* 108(9): 779-791. (in English). ["We examined fluctuating asymmetry and

morphology as they relate to reproductive success, territoriality, and relative survivorship in the dark-winged damselfly *Calopteryx maculata*. Fluctuating asymmetry was not correlated with any aspect of morphology in males, but it did predict mating status in males. Mating males showed significantly lower levels of forewing asymmetry than did non-mating males holding adjacent territories. While fluctuating asymmetry did not relate to survivorship or resource holding ability, body size did. Larger males were able to hold territories longer and lived longer than smaller individuals. We suggest that size is of greater importance in this species with regards to fitness and that fluctuating asymmetry may play a minor role by impacting short-term mating success." (Authors)] Address: not stated

2875. Beckemeyer, R. (2002): Dragonflies in the land of the Incas. *Argia* 13(4): 9-11. (in English). [Some impressions from a three week trip to Peru in November 2000, combining archeological, birding, and odonatological interests.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

2876. Beckemeyer, R. (2002): Some great plains Odonata records for 2000 and 2001. *Argia* 13(4): 7-8. (in English). [New records from Kansas, Oklahoma, and Nebraska, USA.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

2877. Beckemeyer, R.J. (2002): Odonata in the Great Plains States: Patterns of distribution and diversity. *Bull. American Odonatology* 6(3): 49-99. (in English). ["Through the March, 1999 cutoff date of this study, a total of 320 species of dragonflies and damselflies, 73% of the Nearctic fauna, had been recorded as occurring in the 13 states comprising the Great Plains of the United States. These species are listed together with the Great Plains states in which they occur and the larger biogeographic region to which they belong. A significant latitudinal gradient in species richness was found to be present in the central Great Plains, with 194 species in Texas and 55 in North Dakota. A suite of similarity and diversity measure were mapped to visually display patterns of relationships of the state faunas. This process led to the identity of four faunal groups in the central Great Plains: Texas; Kansas - Oklahoma; Nebraska - South Dakota - Colorado - Iowa; and North Dakota. In terms of Nearctic biogeographical affinities, 43% of the Great Plains odonate fauna is of eastern origin. The large number of tropical species (42) in Texas contributes 14% of the Great Plains total. Northern transcontinental, western, southwestern, transcontinental, and central groups contribute 11%, 9%, 8%, 8%, and 7%, respectively. The Great Plains is home to major faunal boundaries and regions of overlap, many occurring in the central tier of states from Oklahoma north through North Dakota. The Hicks' 1957 assertion that the 32 to 36 inch precipitation isolines correlated with the area of overlap of eastern and western species groups in Oklahoma appears to hold true for Kansas as well." (Author) The paper contains a brief historic account on dragonfly research in the Great Plains states Colorado, Iowa, Kansas, Missouri, Minnesota, Montana, North Dakota, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. Distribution patterns of the following species are briefly discussed: *Enallagma anna* Williamson, *E. clausum*, *E. praevarum*, *Ischnura barberi*, *I. da-*

mula, *I. perparva*, *Argia alberta*, *A. emma*, and *A. imundum*.] Address: Beckemeyer, R.J., 957 Perry Ave, Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

2878. Behrstock, B.; Prasad, S. (2002): Odonate species observed at Ft. Clark Springs, Brackettville, Kinney CO, TX: 7/8 Sept. 2001. *Argia* 13(4): 8-9. (in English). [USA, Texas; compilation of odonate records from several localities.] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@aol.com

2879. Beketow, M.A. (2002): Ammonia toxicity to larvae of *Erythromma najas* (Hansemann), *Lestes sponsa* (Hansemann) and *Sympetrum flaveolum* (Linnaeus) (Zygoptera: Coenagrionidae, Lestidae; Anisoptera: Libellulidae). *Odonatologica* 31(3): 297-304. (in English). ["Three different types of toxicological test were conducted, viz. the standard toxicological test at varying pH, a test with starved larvae and a test with different ionic composition of the water. For the larvae of *L. sponsa*, ammonia toxicity was examined only in the standard test at one pH value and in the test with varying ionic composition of the medium. Total ammonia was more toxic at elevated than at low pH to both *S. flaveolum* and *E. najas* larvae. In contrast, toxicity based on the un-ionized form appeared to increase with decrease in pH value. In general, larvae of all species have a high ammonia tolerance when compared to other aquatic animals. Tests with starved larvae showed that the ammonia tolerance of starved larvae of *S. flaveolum* was 3.7 times greater than that for the fed ones; for *E. najas*, this difference was only 1.2 times, explanations of this effect are discussed. Tests in varying ionic composition of the water illustrated that the absence of sodium ions accounts for a considerable increase in ammonia toxicity. It is interesting that a similar trend was found for fishes and crustaceans. Mechanistic explanations, which may differ from that for other groups, are proposed. Odonate larvae seem to be unsuitable for the bioindication of ammonia pollution." (Author)] Address: Beketow, M.A., Department of Zoology, Novosibirsk State Pedagogical University, P. O. Box 156, RUS-630048 Novosibirsk, Russia. E-mail: Mbeketov@mail.ru

2880. Bernard, R.; Samolag, J. (2002): *Coenagrion johanssoni* (Wallengren) in Lithuania (Zygoptera: Coenagrionidae). *Notul. odonatol.* 5(10): 117-120. (in English). [*C. johanssoni* was recorded for the second time in Lithuania (Akutė Lake, NNE of Januliskis, 55°10'59"N 25°51'43"E). The habitat is described in detail. The wind sensitivity of the species is briefly discussed, and cooccurring species including *Nehalennia speciosa* and *Leucorrhinia albifrons* are listed.] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

2881. Bernard, R.; Buczynski, P.; Labeledzki, A.; Tonczyk, G. (2002): Odonata - wazki. In: Glowacinski, Z. (Ed.): Red List of threatened animals in Poland. ISBN: 83-88934-21-X.: 125-127. (in Polish with English summary). [16 of the 72 odonate species known to occur in Poland are red listed. Specialists of Sphagnum bogs and small running waters are the most endangered ones. A German translation of the paper is available from P. Buczynski or the IDF.] Address: Bernard, R., De-

partment of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

2882. Beutler, H.; Beutler, D. (2002): Katalog der natürlichen Lebensräume und Arten der Anhänge I und II der FFH-Richtlinie in Brandenburg. Naturschutz und Landschaftspflege in Brandenburg 11(1/2): 1-175. (in German). [This catalog of the habitats (Appendix I), the fauna and the flora (Appendix II) of the European FFH-Directive represented in the Federal State Brandenburg, Germany, compiles in a monographic style the relevant ecological information. Three odonate species of the appendix occur in Brandenburg: *Coenagrion mercuriale*, *Ophiogomphus cecilia*, and *Leucorrhinia pectoralis*. Information on current distribution, biology, fundamentals for actions plans, and monitoring are presented.] Address: Landesumweltamt Brandenburg, Abt. Naturschutz, PF 601061, D-14410 Potsdam, Germany.

2883. Bocanegra, O.R. (2002): First record of *Somatochlora tenebrosa* for Texas. *Argia* 13(4): 8. (in English). [Using a rifle loaded with rat shot, the author succeeded to "bring down" *Somatochlora linearis*. Once established in the 1950th (see Buchholz, K.F. (1955): Morphologische Differenzierung bei der Rassenbildung von *Anax parthenope* Sélys (Odonata, Aeshnidae). *Bonner zoologische Beiträge* 6 (1/2): 118-131 and Donnelly, T.W. (1995): The Beatty - Donnelly southwestern expedition, 1954. *Argia* 7(2): 15-19) it obviously is still state of the art to get specimens (In addition, I know four further papers with this method of dragonfly collecting). But, *S. tenebrosa* was caught using traditional methods, while the specimen was flying over a road: on June 8, 2001 this species was recorded for the first time in Texas, USA.] Address: Bocanegra, O.R., U.S.Fish and Wildlife Service, 711 Stadium Drive, Suite 252, Arlington, Texas 76011, USA

2884. Böhm, K. (2002): Erstfund und zugleich erster Entwicklungsnachweis von *Sympetrum meridionalis* in Nordrhein-Westfalen (Odonata: Libellulidae). *Libellula* 21(1/2): 45-47. (in German, with English summary). ["A freshly emerged female was collected near Monheim, Mettmann district, at 12 July 2000. Up to now this is, as far as known, the northernmost breeding place for this species." (Author)] Address: Böhm, K., Erich-Müller-Straße 6, D-40597 Düsseldorf, Germany

2885. Bönsel, A. (2002): Standortsuche und Eignungsprüfung für ein zukünftiges FFH-Monitoring der Libellen. *Naturschutzarbeit in Mecklenburg-Vorpommern* 45(1): 48-55. (in German). [The European Fauna Flora Habitat Directive determines that the development of habitats and populations of species has to be monitored. According to an assessment scheme valid in Mecklenburg-Vorpommern, Germany, potential odonate habitats of the Annex II species of this directive have been traced. Maps with records and tab. with detailed information on *Aeshna viridis*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. pectoralis* are documented. In addition, *Stylurus flavipes* is proposed to be integrated into the monitoring program.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andr.boensel@gmx.de

2886. Botman, G.; Coenen, L.; Lanciani, C.A. (2002): Parasitism of *Ischnura posita* (Odonata: Coenagrionidae) in Florida by two species of water mites. *Florida Entomologist* 85(1): 279-280. (in English). ["Two species

of water mites, tentatively identified as *Arrenurus major* and *Arrenurus americanus*, were found to parasitize the damselfly *Ischnura posita* in Florida. The 2 mites attached to different host sites: *A. major* attached to the thorax and abdominal segments 1 through 3 while *A. americanus* attached to abdominal segments 5 through 8." (Authors)] Address: Botman, G., Univ Florida, Dept Zool, Gainesville, FL 32611 USA

2887. Boudot, J.-P.; Jacquemin, G. (2002): Inventaire et statut des libellules de Lorraine. *Société Lorraine d'entomologie*: 68 pp. (in French). [This atlas of the Lorrainean Odonata (NE-region of France) provides detailed maps and information on 66 species known from the region. Information on maps are differed for the periods 1863-1969 and 1970-2001. Some additional species occurring close to the borders of the region or expected to be found soon are treated too. This is a highly informative atlas with a lot of original material.] Address: Société Lorraine d'Entomologie, c/o Laurent Godé, 2ter, Quai Choiseul, F-54000 Nancy, France. E-mail: laurent.gode@pnr-lorraine.com

2888. Brackenbury, J. (2002): Kinematics and hydrodynamics of an invertebrate undulatory swimmer: The damselfly larva. *Journal of Experimental Biology* 205(5): 627-639. (in English). ["The kinematics and hydrodynamics of free-swimming larvae of *Enallagma cyathigerum* were investigated using videography combined with a simple wake visualisation technique (tracer dyes). Damselfly larvae are undulatory swimmers with two distinct styles of movement: 'slow' swimming, in which body undulation is assisted by paddling of the legs, and 'fast' swimming, in which the legs are inactive. In both cases, the wake consists of discrete ring vortices shed from the caudal fin at the end of each half-stroke. The vortices propagate away from the mid-line, alternately to one side of the body then the other, at an angle of 67degree from dead aft. There is no aft-flowing jet such as that observed in the wakes of continuously swimming fish that use caudal fin propulsion. The estimated momentum within the vortices, and the resultant thrust on the body are in tolerable agreement with calculations based on the large-amplitude bulk momentum model of fish locomotion. However, the drag on the body is not known, so it cannot be concluded with certainty that a force balance exists. The agreement between experiment and prediction gives confidence to the idea that most, if not all, of the vorticity generated by the swimming larva is located within the observable wake elements." (Author)] Address: Brackenbury J., Department of Anatomy, University of Cambridge, Downing Street, Cambridge, CB2 3DY, UK. E-Mail: jhb1000@cam.ac.uk

2889. Braddy, S.J.; Briggs, D.E.G. (2002): New Lower Permian Nonmarine Arthropod Trace Fossils From New Mexico And South Africa. *Journal of Paleontology* 76(3): 546-557. (in English). ["The Lower Permian (Late Wolfcampian) marginal marine facies of the Robledo Mountains Member (Hueco Formation) of the Robledo Mountains, New Mexico, contains a diverse ichnofauna dominated by vertebrate trackways. Four new arthropod ichnotaxa are described. *Tonganoxichnus robledoensis* new ichnospecies, consists of repeated small traces comprising imprints of anteriorly directed legs, an elongate tapering abdomen, and a thin tail. *Hedriumiichnus apacheensis* new ichnogenus and ichnospecies consists of isolated small traces comprising imprints of

laterally-directed legs, a broad tapering abdomen, and a short tail. *Rotterodichnium major* new ichnospecies is a large trace with imprints of the head and thorax, a long thin abdomen and three pairs of legs, increasing in length posteriorly. *Quadrispinichna parvia* new ichnogenus and ichnospecies consists of four diverging or sub-parallel linear or curvilinear imprints of approximately equal length. *Tonganoxichnus*, previously known from the Upper Carboniferous of eastern Kansas, is interpreted as produced by a jumping monuran (an extinct group of wingless insects). *Hedriumichnus*, known only from the Robledo Mountains, is interpreted as the resting trace of a nymph of a primitive Ephemeroptera or Plecoptera. *Rotterodichnium*, previously known from the Lower Permian of Germany, is interpreted as the resting trace of a large dragonfly-like form (Protodonata, Odonata, or Megasecoptera). *Quadrispinichna*, previously recorded but not named, from the Lower Permian *Ecca* succession of South Africa, is interpreted as a resting trace of a crustacean. These rare traces increase our understanding of the diversity and behavior of nonmarine arthropod communities in the Lower Permian." (Author)] Address: Braddy, S., Department of Earth Sciences, University of Bristol, Queen's Road, Wills Memorial Building, Bristol, BS8 1RJ, UK. E-Mail: S.J.Braddy@bris.ac.uk

2890. Braune, E.; Söndgerath, D. (2002): Biodiversity of dragonflies in arid regions regarding habitat variability. *Verhandlungen der Gesellschaft für Ökologie, Cottbus 2002*: 290. (in English). [Verbatim: "We examined factors that regulate the biodiversity of dragonflies within the scope of a sub-project of BIOTA Africa. The main aim of this study is to construct models for the prediction of the dispersal of the dragonflies. The areas under investigation are the ephemeral river catchments in western Namibia. In these arid regions changes in the biodiversity of the Odonata can be expected through changes in the water budget on the local scale, as well as through largescale processes like the climate change. Both processes are influencing the habitat quality and quantity. To model the changes in the population dynamics the first step is to identify the factors which are responsible for the development of a population. Different multivariate analysis methods are used. For single species habitat suitability models are build up using logistic regression. Biotic and abiotic parameters which were recorded during a one year field period in a monitoring program throughout the western river catchments are used as input data. Additionally artificial parameters describing the structural diversity of the habitats were generated. On the (micro-) habitat scale we identified for the most common species habitat properties which favour the occurrence of the adult dragonflies (see Figure 1). These results are supported by field experiments carried out within our project. By incorporating the changes of the habitat quality, resulting in the growth or decline of local populations, the basis for the spatially explicit modelling of the population dynamics is established. In the next step models for the local population dynamics will be linked with each other through a density- and habitat quality dependent dispersal. Figure 1: Example for habitat suitability models for two namibian dragonfly species. L.h.s.: univariate model for *Crocothemis erythraea*, r.h.s.: bivariate model for *Orthetrum chrysostigma*."] Address: Braune, E., Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c, D-38106 Braunschweig, Germany. E-mail: e.braune@tu-bs.de

2891. Brodin, T.; Johansson, F. (2002): Effects of predator-induced thinning and activity changes on life history in a damselfly. *Oecologia* 132: 316-322. (in English). ["We investigated how the lethal and non-lethal presence and absence of a fish predator, perch (*Perca fluviatilis*), influenced behaviour, numbers emerging, size at emergence, and development rate of the damselfly *Lestes sponsa*. The experiment was carried out in outdoor artificial ponds and spanned from the egg stage to emergence of the damselflies. During the experiment food resources for the damselflies were continuously monitored. Damselflies exposed to a lethal predator showed a significantly lower activity level than those in the absence of predators or subjected to a non-lethal predator. Half-way through the larval stage the reduction in activity level was correlated with the presence of lethal predators, and at the end of the larval stage with higher zooplankton densities. Though larvae decreased activity level, size at emergence was larger and development time faster for individuals in the lethal predator treatment. Since fewer larvae emerged from that treatment we interpret the larger size at emergence to be an effect of a combination of thinning and higher zooplankton densities." (Authors)] Address: Brodin, T., Animal Ecology, Department of Ecology and Environmental Science, Umea University, 90187 Umea, Sweden. E-mail: tomas.brodin@eg.umu.se

2892. Brunke, M.; Hoffmann, A.; Pusch, M. (2002): Association between invertebrate assemblages and mesohabitats in a lowland river (Spree, Germany): A chance for predictions?. *Arch. Hydrobiol.* 154: 239-259. (in English). ["The influence of hydrological and sedimentological variables on invertebrate assemblages was investigated in the 6th order lowland river Spree (Brandenburg, Germany). The river bottom consisted of eight visually distinguishable organic and inorganic mesohabitats: Dreissena-bank, unionid mussel bed, rip-rap, coarse woody debris, alder roots, stable sand, shifting sand, and mud. The mesohabitats differed in their physical structure, substrate properties, temporal stability, flow velocity and grain size composition. Taxon richness and abundances varied markedly between mesohabitats. Ordination analyses revealed significant differences in taxonomic composition and dominance structure. Nevertheless, similarities in assemblage structure were found for (a) Dreissena-banks and unionid beds, (b) alder roots and coarse woody debris and (c) shifting sand, stable sand and mud. Thus four main habitat groups can be distinguished; mussel, rip-rap, woody, and fine sediment mesohabitats. Mussel mesohabitats, rip-rap and wood mesohabitats exhibited transitions in assemblage structure towards fine mesohabitats. In the case of mussel and wood mesohabitats, these transitions were temporal and occurred during extended periods of low flow and concomitant deposition of seston. In rip-rap these transitions were spatial and occurred when distances to fine sediment mesohabitats were small and nearbed flow velocities were low. Mesoscale predictions of assemblages for this section of river appear to be feasible when processes are taken into account that might affect transitions." (Authors) Only *Gomphus vulgatissimus* occurred exclusively in fine sediment mesohabitats, *Calopteryx* nearly exclusively in woody mesohabitats.] Address: Brunke, M., Institute of Freshwater Ecology and Inland Fisheries, Department of Lowland Rivers, Müggelseedamm 310,12587 Berlin, Germany. E-mail: brunke@igb-berlin.de

2893. Buczynski, P. (2002): Materials to the knowledge of dragonflies (Odonata) of the Lublin region. Part II. Dragonflies in the collection of the Department of Zoology of the Maria Curie-Skłodowska University in Lublin. *Wiad entomol.* 21(1): 5-10. (in Polish with English summary). [25 odonate species - resulting from collections made between 1947 and 1967 and stored in the institute's collection - are documented in detail. The majority of records results from the Lublin region (SE Poland). The most interesting species are the "thermophilous" *Sympetrum depressiusculum*, *S. fonscolombii*, *S. meridionale*, and *S. striolatum*. It is supposed that these species were rare in this period, while they belong today to the more common element of the dragonfly fauna, indicating an increasing global warming.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2894. Buczynski, P.; Zawal, A.; Filipiuk, E. (2002): Neue Nachweise von *Orthetrum albistylum* in Nordpolen: Erweitert sich sein Verbreitungsgebiet in Mitteleuropa? (Odonata: Libellulidae). *Libellula* 21(1/2): 15-24. (in German, with English summary). ["Within Central Europe, the range of *O. albistylum* hitherto was confined to the southern parts. However, in the last few years eight localities were found in Poland far beyond the northern border of its former distribution area. Two new records of the species are provided from north-western Poland. Possibly this expansion results from the exceptionally favourable climatic conditions during 1998-2000 and is only temporary." (Authors)] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

2895. Bulankova, E.; Halgos, J.; Krno, I. (2002): The influence of the Turcek dam on the macrozoobenthos of the Turiec River basin. *Verhandlungen der Gesellschaft für Ökologie, Cottbus 2002*: 270. (in English). ["Turiec Wetland is part of the Central-Slovakian Turiec River ecosystem, which is internationally important (Ramsar, Emerald localities). Long-term hydrobiological research of the Turiec River basin [...] point to the high biological value of this region. 792 taxa of benthos have been recorded, some of them are endangered: [...] *Ophiogomphus cecilia* (Odonata) [...]. We evaluated the influence of a submontane water supply dam (build in 1993) in the vicinity of Turcek village on the structure of macrozoobenthos of the Turiec River. The dam got a barrier for epirhithral species in the upper part of the river, in the middle part occurred cumulative organic pollution and diversity of macrozoobenthos decreased. Down-stream the dam the river has a more natural character due to underground water supply in Mala Fatra Mts. The construction and present functioning of a water supply dam has adverse downstream effects, which reflects in spreading of eurytherm, mesotroph, betameosaprob, semirheophil species of macrozoobenthos and in increasing of filtrators. Some arrangements were suggested to improve this situation. [...]"] (Authors)] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia. E-mail: Bulankova@nic.fns.uniba.sk

2896. Burcher, C.L.; Smock, L.A. (2002): Habitat distribution, dietary composition and life history characteristics of odonate nymphs in a blackwater coastal plain

stream. *American Midland Naturalist* 148(1): 75-89. (in English). ["The ecology and life histories of odonates were studied in a headwater, sand-bottomed coastal plain stream in Virginia. Quantitative sampling of odonates in sand and silt sediments, on submerged snags and in debris dams was conducted monthly for 13 mo. Six species of odonates were common in the stream. *Calopteryx maculata* had a univoltine life history, whereas *Boyeria vinosa*, *Cordulegaster maculata*, *Gomphus cavillaris*, *Hagenius brevistylus*, and *Progomphus obscurus* were semivoltine. The odonates were most abundant in debris dams, less abundant in silt and sand sediments and least abundant on snags. Habitat-specific production of odonates was 1.3 g m⁻² y⁻¹ in debris dams and 0.1-0.3 g m⁻² y⁻¹ in the sand, silt and snag habitats. The production to biomass ratio (P/B) for *Calopteryx* was 5.9, whereas ratios for semivoltine species ranged from 2.0-4.0. Analysis of overlap in the use of habitat, food and time showed that greatest ecological separation of the species was in their different use of habitat. *B. vinosa* and *C. maculata* primarily inhabited debris dams, *H. brevistylus* and *G. cavillaris* were most abundant in silt and *P. obscurus* was found almost exclusively in sand. *Cordulegaster maculata* occurred throughout the stream except on snags. Narrow niche breadths for *B. vinosa*, *C. maculata* and *P. obscurus* based on their use of habitat suggest high fidelity of these species to one habitat, whereas *C. maculata*, with the broadest habitat niche breadth, was a habitat generalist. There was little difference among the species in prey items. Trophic niche breadths of all species were broad, all species feeding on a wide variety of invertebrates, in particular Chironomidae, Ephemeroptera and Plecoptera. Little ecological separation of the species occurred based on their use of time, all species occurring in the stream throughout the year with little staggering of life history events or growth patterns. Seasonal patterns of changing resource availability and the dynamic nature of the stream environment likely are important in regulating the distribution, abundance and interactions of the odonate community in this stream." (Authors)] Address: Smock, L.A., Department of Biology, Virginia Commonwealth University, Richmond, Virginia, U.S.A. 23284-2012.

2897. Buskirk, J. van (2002): A comparative test of the adaptive plasticity hypothesis: Relationships between habitat and phenotype in anuran larvae. *American Naturalist* 160(1): 87-102. (in English). ["The hypothesis that phenotypic plasticity is maintained by divergent natural selection acting across different environments predicts that populations and species exposed to highly variable environments will express high levels of plasticity. I tested this prediction by measuring the behavioral and morphological responses to aeshnid dragonfly larvae of 16 tadpole species and asking whether predator-induced plasticity is greater in species that experience more variable densities of predators in nature. Tadpole phenotypes were measured in a series of similar experiments in outdoor artificial ponds carried out over a 9-yr period. I quantified tadpole habitats by soliciting evaluations by seven to 36 experienced field observers for each species. There were large differences among species in phenotype, mostly in agreement with earlier descriptions. Nearly all species responded to dragonflies by decreasing activity and body length relative to overall body size and by increasing relative tail fin depth, although the magnitude of the responses differed among species. There was a significant positive

phylogenetic correlation between morphological plasticity and variability in exposure to predators, thus upholding the adaptive hypothesis. The correlation between behavioral responses and habitat variability was not significant, and there was little relationship between behavioral and morphological plasticity, raising the possibility that behavioral responses evolve under different scales of environmental variation than morphological responses." (Author)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

2898. Buskirk, J. van; Müller, C.; Portmann, A.; Surbeck, M. (2002): A test of the risk allocation hypothesis: Tadpole responses to temporal change in predation risk. *Behavioral Ecology* 13(4): 526-530. (in English). ["The risk allocation hypothesis predicts that temporal variation in predation risk can influence how animals allocate feeding behavior among situations that differ in danger. We tested the risk allocation model with tadpoles of the frog *Rana lessonae*, which satisfy the main assumptions of this model because they must feed to reach metamorphosis within a single season, their behavioral defense against predators is costly, and they can respond to changes in risk integrated over time. Our experiment switched tadpoles between artificial ponds with different numbers of caged dragonfly larvae and held them at high and low risk for different portions of their lives. Tadpoles responded strongly to predators, but they did not obey the risk allocation hypothesis: as the high-risk environment became more dangerous, there was no tendency for tadpoles to allocate more feeding to the low-risk environment, and as tadpoles spent more time at risk, they did not increase feeding in both environments. Our results suggest that the model might be more applicable when the time spent under high predation risk is large relative to the time required to collect resources." (Authors)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

2899. Buskirk, J. van; Arioli, M. (2002): Dos age response of an induced defense: How sensitive are tadpoles to predation risk?. *Ecology* 83(6): 1580-1585. (in English). ["Models of behavior and life history evolution under predation risk often assume that animals can detect and respond to subtle temporal, and spatial variation in mortality risk, but there is little evidence supporting this assumption. We measured phenotypic responses of *Rana lessonae* tadpoles to variation in apparent predation risk signaled by different numbers of *Aeshna cyanea* dragonfly larvae consuming different quantities of tadpoles. The experiment took place in 80-L artificial ponds, and the predators were confined within cages so that they could not capture the experimental animals. There was good support for continuous dosage response curves for most behavioral and morphological traits, which indicates sensitivity to graded risk and therefore supports the assumptions of many models. Behavioral traits were most responsive to the number of tadpoles killed by the predators, whereas morphological traits responded to the number of dragonflies independent of the predators' diet. The results imply that behavioral and morphological responses can be triggered by different cues, and suggest that increasing investment in defensive traits entails increasing fitness costs." (Authors)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

2900. Butler, S.G. (2002): The larva of *Macromia euterpe* Laidlaw, 1915 (Anisoptera: Macromiidae). *Odonatologica* 31(4): 383-388. (in English). [An exuvia of *M. euterpe* is described, illustrated and compared with *M. moorei fumata* Krüger and *M. westwoodi* Selys. In addition, larval head and protothorax of *Macromia amphigena* Selys, 1871 (Japan), *Macromia flavocolorata* Fraser, 1922 (Nepal), and *Phyllomacromia trifasciata* (Rambur, 1842) (Madagascar) are illustrated.] Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, United Kingdom

2901. Cannings, R.A. (2002): Introducing the dragonflies of British Columbia and the Yukon. Royal British Columbia Museum, Victoria, B.C. ISBN 0-7726-4637-6 (paper): 96 pp.. (in English). [This book introduces into the odonate fauna of two Canadian provinces. It is lavishly illustrated. With one exception (*Somatochlora septentrionalis*), all 88 species are documented with color photographs. Rob Cannings has wisely included line drawings of structural details for some of the more difficult genera. After introducing into Odonata, and the regional odonate habitats, the species are briefly described and compared it with closely related ones. Additional information refer to range, and "field notes" include habitat and flight period. This is a really sophisticated book, and its low price makes it very attractive. If I should visit B.C. for odonatological reasons, I would not miss any information! (Martin Schorr)] Address: The book (CAN Dollar 9.95.) can be ordered from: Royal Museum Shop, Royal British Columbia Museum, 675 Belleville Street, Victoria, B.C., V8W 9W2, Canada

2902. Carle, F.L.; Kjer, K.M. (2002): Phylogeny of *Libellula* Linnaeus (Odonata: Insecta). *Zootaxa* 87: 1-18. (in English). ["Phylogenetic analysis was performed on a set of 242 morphological characters. The taxon sample included 31 *Libellula*, and representative species from selected libelluline tribes, from all libellulid subfamilies, from all libelluloid families, from all anisopteran superfamilies, and *Epiophlebia*. *Corduliinae* was shown to be paraphyletic even among genera characterized by a well developed anal loop bisector. *Sympetrini* was found to be polyphyletic with *Crocothemis* the sister group to *Libellulini*. The traditional placement of *Trameini*, far from *Libellulini* is in doubt, because it is here placed as the sister group to *Crocothemis* + *Libellulini*. Kennedy's phylogeny of *Libellula* was largely corroborated, with the following exceptions: the subgenera *Libellula*, *Eolibellula*, and *Syntetrum* form a monophyletic group which is the sister group to a clade including *Bellonia*, *Holotania*, *Neotetrum*, and *Eotainia* subgenus nov. [type species *Mesothemis composita* Hagen]; and *Eurothemis* is determined to be the sister group of *Ladona* instead of *Neotetrum*. In addition we confirm *Bellonia* to be monophyletic, and find *Platetrum* + *Platthemis* to form a monophyletic group, sister to *Ladona* + *Eurothemis*; these four subgenera together form the sister group to *Libellula sensu stricto* (s.s.)." (Authors)] Address: Carle, F.L.; Kjer, K.M., Dept of Entomology, Cook College Rutgers, The State University of New Jersey, 93 Lipr Brunswick, NJ 08901, USA. E-mail: carle@aesop.rutgers.edu

2903. Carpenter, N.M.; Casazza M.L.; Wylie, G.D. (2002): *Rana catesbeiana* (bullfrog). Diet. *Herpetological Review* 33(2): 130. (in English). [Diet analysis of bullfrogs from Colusa National Wildlife Refuge, Califor-

nia, USA] Address: Carpenter, N. M., U.S. Fish and Wildlife Service, 752 County Road 99W, Willows, CA, 95966, USA. E-Mail: mikecarpenter@r1fws.gov

2904. Catling, P.M.; Brownell, V.R. (2002): Large numbers of *Aeshna interrupta* in southeastern Saskatchewan. *Argia* 13(4): 7. (in English). [In July 2001, thousands of *A. interrupta lineata* were seen flying over the (agricultural) prairie landscape while driving along the trans-Canada highway from Ottawa in eastern Ontario to coastal British Columbia. This species "must have a very significant influence on the prairie ecosystem as both predator and prey." From the view of impacts of roads on ecosystems resp. Odonata, some interesting details of road kills by vehicles are outlined.] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net

2905. Cauchie, H. (2002): Chitin production by arthropods in the hydrosphere. *Hydrobiologia* 470(1-3) : 63-95. (in English). ["Chitin is widely distributed in nature and its annual production is thought to be huge. However, the chitin production has been rarely estimated in aquatic ecosystems, despite the growing economic interest in this polymer. Arthropods are one of the main chitin producers in the hydrosphere and a correct evaluation of the chitin production by these organisms in the different marine and freshwater ecosystems is of prime interest to understand their importance in the biogeochemical cycles of carbon and nitrogen. Such evaluation is also worth considering to achieve a rational exploitation of crustaceans which are currently the major source of chitin for the industry. Annual chitin production of crustaceans and insects in aquatic ecosystems was estimated on the basis of annual tissue production estimates and body chitin content measurements. About 800 annual tissue production estimates were collected from the literature. Estimates mainly concerned continental fresh waters and neritic ecosystems. Data were almost inexistent for athalassohaline and oceanic ecosystems. On the whole, 60% of the production estimates fell between 0.1 and 10.0 g dry weight m² super(-2) yr super(-1). Published chitin levels in crustaceans and insects ranged from 3 to 16% of the whole body dry weight. Data were, however, lacking for some major groups such as trichopterans or amphipods. Aquatic insects and crustaceans were therefore collected and assayed for chitin using a highly specific enzymatic method. The chitin content of the collected insects (Coleoptera, Diptera, Ephemeroptera, Odonata, Plecoptera, Trichoptera) varied from 3 to 10% of the whole body dry weight; that of the collected crustaceans (Amphipoda, Branchiopoda, Copepoda) from 2.5 to 8.5% of the whole body dry weight. Total annual chitin production by arthropods had been estimated to 28 x 10⁶ T chitin yr super(-1) for the freshwater ecosystems, to 6 x 10⁶ T chitin yr super(-1) for athalassohaline ecosystems and to 1328 x 10⁶ T chitin yr super(-1) for marine ecosystems. The importance of the chitin production corresponding to the formation of exuviae and peritrophic membranes in arthropods and the chitin production by non-arthropod organisms in the chitin budget of aquatic ecosystems was highlighted and discussed." (Author)] Address: Cauchie, H.-M., CREBS, CRP-Gabriel Lippmann, 162a avenue de la Faiencerie, L-1511, Luxembourg, Luxembourg; E-Mail: cauchie@crp.gl.lu

2906. Cham, S. (2002): Mate guarding behaviour during intense competition for females in the Common Blue Damselfly *Enallagma cyathigerum* (Charpentier). *J. Br. Dragonfly Society* 18(1/2): 46-48. (in English). ["These observations demonstrate that single males of *E. cyathigerum* will harass tandem pairs as they approach the oviposition site and also when oviposition commences. When densities are high it is in the interest of the males to stay in tandem with the female for as long as possible. This increases his chances of guarding the female until she has laid the eggs that he is likely to have fertilized. This guarding behaviour is imperative at high densities as aggressor males appear to go to great lengths to 'win over' a female and are prepared to submerge in order to achieve tandem." (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

2907. Cham, S. (2002): Review: Dragonflies of the World.. *Atropos* 16: 74. (in English). [Jill Silsby's fine book on the Odonata of the world is reviewed..] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1 @compuserve.com

2908. Clausnitzer, V. (2002): Dragonflies of East Africa. *IDF-Report* 4(1): 11-17. (in English). [Between 1998 and 2000, the IDF supported three studies of V. Clausnitzer on East African Odonata, which include i) the preparation of an identification key, ii) inventories of different areas, iii) collection of ecological data, iv) providing information for and capacity building within the countries. This report gives an overview of what has been done and what research will be done on East African dragonflies. Here scientific results are only mentioned briefly; some of the results have been presented in publications or are in preparation for publication.] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

2909. Conrad, K.F.; Willson, K.H.; Whitfield, K.; Harvey, I.F.; Thomas, C.J.; Sherratt, T.N. (2002): Characteristics of dispersing *Ischnura elegans* and *Coenagrion puella* (Odonata): Age, sex, size, morph and ectoparasitism. *Ecography* 25(4): 439-445. (in English). ["In this study we assessed whether individuals of the damselfly species *Ischnura elegans* and *Coenagrion puella* that moved between ponds differed in their mean characteristics from individuals that did not move. Overall, the sex (female) and species (*C. puella*) that spent the most time away from the breeding site was more likely to move between ponds. *Ischnura elegans* males that dispersed had significantly longer forewings than males that did not, while male *C. puella* parasitised by water mites were more likely to disperse than unparasitised males. There was no evidence for differences in dispersal rates among the female colour forms of either *I. elegans* or *C. puella*. In general, the differences in dispersal characteristics between sexes and species could be explained by underlying variation in activity and mobility. The majority of dispersal between breeding sites by *C. puella* and *I. elegans* did not appear to be directed, but probably arose from chance movements occasionally taking individuals to a different pond from which they emerged." (Authors)] Address: Sherratt, T.N., Department of Biological Sciences, University of Durham, South Road, Durham, DH1 3LE, UK. E-mail: T.N.Sher-ratt@durham.ac.uk

- 2910.** Corbet, P.S.; Chowdhury, H. (2002): Voltinism of the Common Blue Damselfly *Enallagma cyathigerum* (Charpentier) in a Scottish loch: a preliminary study. *J. Br. Dragonfly Society* 18(1/2): 23-39. (in English). ["During 1986-1987 a larval population of *E. cyathigerum* was sampled repeatedly from a *Littorella* sward near the margin of a small Scottish loch (Rohallion Loch) to determine the species' voltinism and to characterize ontogenetic changes in external morphology. Size-overlap between hatching cohorts made it difficult to trace cohort development but results support the inference that most larvae were developing as semivoltine summer species, spending their second (last) winter in stadia F-I (mainly) and F-0, while a few larvae showed the potential to complete development in either one or three years. Extrapolation backwards from the last three stadia revealed that larvae completing development passed through about 15 stadia (including the prolarva). Regular, heavy stocking of Rohallion Loch with insectivorous fish (including trout) invited comparison with observations by Macan in a tarn in the Lake District with attributes, including aquatic macrophytes and a predominantly semivoltine population of *E. cyathigerum* occupying *Littorella*, resembling those of Rohallion Loch. In Rohallion Loch, larvae of *E. cyathigerum*, though known from research in North America to be vulnerable to predation by fish, were maintaining dense populations in the presence of fish, probably by obtaining refuge in *Littorella* swards. We emphasize the need to discover secure morphological characters for distinguishing small larvae of *E. cyathigerum* from those of other coenagrionids." (Authors)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com
- 2911.** Cordoba-Aguilar, A. (2002): Wing pigmentation in territorial male damselflies, *Calopteryx haemorrhoidalis*: a possible relation to sexual selection. *Animal Behaviour* 63(4): 759-766. (in English). ["One striking characteristic in adult males of some odonate species is the presence of wing pigmentation. In *Calopteryx* species, males show a series of pre- and postcopulatory behavioural displays during which they face females while showing their pigmented wings. One hypothesis to explain the precopulatory flying displays and the associated wing pigmentation is that they may serve a sexual selection function. I investigated this in the territorial damselfly *Calopteryx haemorrhoidalis*. Males of this species defend aquatic substrates that females use for oviposition. Observational evidence indicated that males with a higher proportion of wing pigmentation were more likely to defend a territory, obtained more matings, had fewer gut parasites, survived in the study site and stayed in territories for longer. Experimental evidence suggested that the relationship mating success and wing pigmentation still held when controlling for the size of the substrate defended by territorial males. Similar to other studies in the *Calopterygidae*, these results suggest that wing pigmentation may be favoured by sexual selection. I discuss, however, whether an alternative function for male copulatory courtship displays and wing pigmentation, as sexual and/or species recognition, may also explain the evolution of these traits." (Author)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.edu.mx
- 2912.** Craves, J. (2002): Cuba trip report. *Argia* 14(2): 6-7. (in English). [The paper reports some late February 2002 records from Cuba. Special emphasis is given to *Crocothemis servillia*, and activities to control the mosquito-borne dengue fever virus by eliminating standing waters and spraying diesel on water surfaces.] Address: Craves, Julie, Rouge River Bird Observatory, University of Michigan-Dearborn, Dearborn, MI 48128, USA
- 2913.** Cross, C.L.; Gerstenberger, S.L. (2002): *Rana catesbeiana* (American bullfrog). *Diet. Herpetological Review* 33(2): 129-130. (in English). [Diet of bullfrog from Nevada, USA] Address: Cross, C. L. ; Gerstenberger, Shawn L., Landscape Ecology Branch, U.S. EPA, 944 East Harmon Avenue, Las Vegas, NV, 89119, USA. E-Mail: cross.chad@epa.gov, sgersten@ccmail.nevada.edu
- 2914.** Crowley, P.H.; Johnsson, F. (2002): Sexual dimorphism in Odonata: age, size, and sex ratio at emergence. *Oikos* 96(2): 364-378. (in English). ["Males and females of many organisms differ in important life-history and behavioral characters. Following its recent optimization analysis of sexually dimorphic life histories, we employed an odonate-like parameter set to identify patterns of life history and behavior to be expected in an odonate population. The default parameter magnitudes generated a smaller body size and shorter development time for males than for females, which resulted in a male-biased sex ratio. Whether population growth as density dependent or density independent, and whether development time was fixed or flexible had major impacts on life-history features. The model generated five general production, for odonate systems. (1) For species with fixed development times, males and females should differ more in activity level, growth and mortality rates than for species, with flexible life cycles. (2) In species with fixed development times population at high latitude or high altitude should be more active, emerge and reproduce at smaller size and have a more male-biased sex ratio than low latitude and low altitude populations. (3) In density-dependent populations, with density dependence mediated by activity-dependent mortality higher predation rates should increase activity levels and reduce development time in species with flexible development times. (4) For species with flexible development times, in strongly density-dependent population, with density dependence mediated by mortality, activity levels should decrease and development times should increase at high prep.abundance. (5) Males should be larger at emergence relative to female, and the sex ratio at emergence should be more female-biased in territorial than in non-territorial species. Existing empirical evidence concerning these predictions is generally sparse and equivocal focused tests are clearly needed." (Authors)] Address: Crowley, P.H., Umea Univ, Dept Ecol & Environm Sci Anim Ecol, SE-90187 Umea, Sweden
- 2915.** Crowley, P.H.; Johansson, F. (2002): Sexual dimorphism in Odonata: age, size, and sex ratio at emergence. *Oikos* 96(2): 364-378. (in English). ["Males and females of many organisms differ in important life-history and behavioral characters. Following a recent optimization analysis of sexually dimorphic life histories, we employed an odonate-like parameter set to identify patterns of life history and behavior to be expected in an odonate population. The default parameter magnitudes

des generated a smaller body size and shorter development time for males than for females, which resulted in a male-biased sex ratio. Whether population growth was density dependent or density independent, and whether development time was fixed or flexible had major impacts on life-history features. The model generated five general predictions for odonate systems. (1) For species with fixed development times, males and females should differ more in activity level, growth and mortality rates than for species with flexible life cycles. (2) In species with fixed development times, populations at high latitude or high altitude should be more active, emerge and reproduce at smaller size and have a more male-biased sex ratio than low latitude and low altitude populations. (3) In density-dependent populations, with density dependence mediated by activity-dependent mortality, higher predation rates should increase activity levels and reduce development time in species with flexible development times. (4) For species with flexible development times, in strongly density-dependent populations with density dependence mediated by mortality, activity levels should decrease and development times should increase at high prey abundance. (5) Males should be larger at emergence relative to females, and the sex ratio at emergence should be more female-biased in territorial than in non-territorial species. Existing empirical evidence concerning these predictions is generally sparse and equivocal; focused tests are clearly needed." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

2916. Cummins, S.; O'Halloran, J. (2002): An assessment of the diet of nestling Stonechats *Saxicola torquata* using compositional analysis. *Bird Study* 49: 139-145. (in English). [Ireland; Odonata play a minor role in the diet of Stonechat nestlings.] Address: O'Halloran, J., Department of Zoology and Animal Ecology, University College Cork, Ireland. E-mail: j.ohalloran@ucc.ie

2917. d'Aguilar, J. (2002): Les descriptions originales des odonates d'Europe. 9. Latreille, Pierre-André (1762 - 1833). *Martinia* 18(2): 69-75. (in French with English summary). [Two of Latreille's works are related to Odonata. They include the description of *Aeshna mixta* and the designation of *virgo* as the type-species of the genus *Agrion*.] Address: d'Aguilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France

2918. d'Antonio, C.; Vegliante, F. (2002): *Derivatio nominis libellularum europaeorum*. <http://www.mimiko.it/rubriche/entomolog/doc/Derivatio.htm>; 31.7.2002: (in Italian, with English summary). [The etymology of 197 European dragonfly names is outlined.] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: constantino.d@tin.it

2919. Davies, D.A.L. (2002): The odonate fauna of new Caledonia, including the descriptions of a new species and a new subspecies. *Odonatologica* 31(3): 229-251. (in English). ["An updated list is provided of the 55 species known to occur in New Caledonia, with some behavioural and distribution data, and with information on possible origin of the species which found and colonized the island. The new taxa described are: *Adversaeschna brevistyla caledonica* ssp. n. (holotype

male: New Caledonia, Yate-Goro Rd, 22-11-1983), and *Synthemis pamela* sp. n. (holotype male: New Caledonia, Mt Koghis, 9-V-1983). Also described are the previously unknown male *Metaphya elongata* Campion and the previously unknown female *Synthemis serendipita* Winstanley. All type specimens are deposited at CUMZ, Cambridge, UK." (Author)] Address: Davies, D.A.L., 23 Cedar Court, Cambridge CB2 2QJ, UK

2920. De Marco, P.; Latini, A.O.; Ribero, P.H.E. (2002): Behavioural ecology of *Erythemis plebeja* (Burmeister) at a small pond in southeastern Brazil (Insecta: Libellulidae). *Odonatologica* 31(3): 305-312. (in English). [The time-budget of *E. plebeja* is analyzed, and its reproductive behaviour at a small pond is described. The species is classified as a percher; large perchers are usually more aggressive toward conspecifics. *E. plebeja* males were usually observed simulating oviposition in the areas they previously defended, and evolutionary aspects of this behaviour are discussed.] Address: De Marco, P., Laboratório de Ecologia Quantitativa, Departamento de Biologia Geral, Universidade Federal de Viçosa, BR-36571-000 Viçosa, MG, Brazil. E-mail: pdemarco@ufv.br

2921. De Marmels, J. (2002): Phylogenetic relationships of *Priscagrion* Zhou & Wilson, 2001, with a description of *Teinopodagrion croizati* spec. nov. from Ecuador (Zygoptera: Megapodagrionidae). *Odonatologica* 31(4): 389-394. (in English). ["The generic characters of *Priscagrion* Zhou & Wilson, 2001 are reviewed. It is shown that this genus is closely related with the Australo-Papuan 'Argiolestinae' and with the South American 'Megapodagrion-complex'. Hence, a Pacific origin for the whole group seems probable. *Teinopodagrion croizati* sp. n. (holotype male: Ecuador, Pichincha prov., 7.3 km W of Alluriquin, at Hotel Tinalandia, 20-VII-1977; deposited at MIZA, Maracay) is described and illustrated, and its position within the genus is outlined." (Author)] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

2922. Deliry, C. (2002): Nouveaux articles, études ou notes concernant les Libellules dans la région Rhône-Alpes-Dauphiné. *Sympétrum piémontais* 48: 12-15. (in French). [Bibliography of odonatological papers referring to the region Rhône-Alpes-Dauphiné, France, and the period 1997-2000.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France

2923. Dijkstra, K.-D.; Kalkman, V.; Ketelaar, R.; Weide, M. van der (2002): *De Nederlandse Libellen* (Odonata). *Nederlandse Fauna* 4. ISBN 90-5011-154-8: 440 pp. (in Dutch with English summaries). [Under the auspices of the Nationaal Natuurhistorisch Museum Naturalis, Leiden, the Koninklijke Nederlandse Natuurhistorische Vereniging, Utrecht, and the European Invertebrate Survey, Leiden, and in cooperation with numerous amateur odonatologists, the authors here present an extraordinarily fascinating book on the Netherlands Odonata. It is a heavy weighting book in every sense. Information is presented in 15 chapters, an appendix lists the names of the contributors, and contains the index and a regional gazetteer. Chap. 1 introduces into Dutch dragonfly research and outlines the management to compile the tremendous database which is the fundament of the dot maps. Chap. 2 discusses

aspects of morphology in relation to the life history of Odonata. Excellent illustrations help to understand the Dutch written texts (here and in the following chapters!). Chap. 3 is dedicated to phenological aspects, which means that the different stades (egg, larvae, imago) are discussed with emphasize on the timing of the life cycle of dragonflies. Chap. 4 outlines life history aspects and behaviour of the Odonata in relation to their environment (landscape, weather, prey, enemies). I want to stress the (informative) quality of some most intrusive colour photos of "beasts" preying on Odonata. Chap. 5 is an introduction into evolution and phylogeny of Odonata, it also presents a map of regional diversity on a global scale. The focus is set on the (global) distribution of the European Odonata families. This chapter also provides the folk names of the Odonata in the Netherlands, and explains the (Latin / Greek) nomenclature. Chap. 6 gives a detailed and well illustrated introduction in the identification of Odonata, and provides the identification keys for the adults. Some of the illustrations belong definitely to the best I have seen for European Odonata. Chap. 7 describes in detail the habitats of the species, and maps the potential distribution of special habitats in the Netherlands, which likewise limits the potential distribution of specialised species. Changes (population development trends) in the dragonfly fauna are dealt with in Chap. 8. Natural and anthropological factors which cause the species turn over are discussed. Aspects of conservation and management of species and habitats are treated in Chap. 9. It details on the Red list and results of the monitoring scheme as well as on conservation measures. Chap. 10 outlines details of data collection and validation of the data collected in the framework of the mapping scheme. The core of the book is Chap. 11; each of the 70 species observed in The Netherlands is treated monographically: A more general introduction is followed by a detailed description of the habitat, the life history (egg, larvae, imago, phenology, dispersal potential, cooccurring species), areal, distribution in the Netherlands, conservation measures, and an English summary. Graphs (mostly maps) demonstrate the distribution in different periods and in western Europe, the flight period and a tab. with the cooccurring species (dominances). The quality of the colour photos is impressive, and definitely one of the most amazing high lights of the book are some water colour paintings showing in some cases the species damaged or in more than unfavourable situations. In most cases, these pictures demonstrate simply the beauty of our favorite insects. Compliments to the illustrators! Chap. 12 is devoted to the study of dragonflies. Chap. 13 contains a glossar, and Chap. 14 an extensive bibliography. Chap. 15 summarizes the previous chapters briefly in English. The books price is Euro 74,50 + handling (app. 16,- Euro). This looks much, but not too much for this book! The past two years have produced some remarkable books on dragonflies, may be that the book on the Netherlands dragonflies is the most impressive of all of them. This book may not be missing in any odonatological library. (Martin Schorr)] Address: Publisher: KNNV Publishing House, PO Box 19320, NL-3501 DH Utrecht, The Netherlands. www.knnvuitgeverij.nl

2924. Dijkstra, K.-D. (2002): The identity of the West African zygoptera *Pseudagrion emarginatum* and *P. camerunense* (Odonata: Coenagrionidae). *International Journal of Odonatology* 5(2): 105-110. (in English). ["*Pseudagrion emarginatum* is removed from the syno-

nymy of *P. melanicterum*. The following synonymies are established: *P. coeruleiceps* of *P. emarginatum* and *P. angelicum* of *P. camerunense*. The latter, formerly known as *Enallagma camerunense*, should be removed from the list of threatened African Odonata." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

2925. Dommangeat, J.-L. (2002): Protocole de l'inventaire cartographique des odonates de France (Programme INVOD). *Muséum national d'Histoire Naturelle & Société française d'odonatologie*: 64 pp. (in French). [Handbook and mapping instructions for the French Odonata survey.] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

2926. Donnelly, T.W. (2002): Dot map project - patterns of diversity are emerging. *Argia* 14(2): 13-16. (in English). [This is a status quo report on the odonate dot map project which currently covers nearly 109000 species/county records.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2927. Donnelly, T.W. (2002): Gorilla my dreams - Uganda revisited. *Argia* 14(2): 7-10. (in English). [This report on an excursion to Uganda, Africa outlines records and additional information on habitats and habits of some interesting species as *Paragomphus viridior*, *Neodythemis fitzgeraldi*, *Brachythemis leucoosticta*, and *Ceragrion bidentatum*. A collection of 88 species was brought together.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2928. Donnelly, T.W. (2002): Odes in a cold climate - the DSA Arkansas outing. *Argia* 14(2): 4-5. (in English). [Collecting results from Glenwood, Arkansas, USA (18-19. May 2002) are briefly outlined. Due to insufficient weather conditions, only few species could be traced. Microhabitat use of *Epiheca cynosura* and *E. costalis* is briefly discussed.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2929. Donnelly, T.W. (2002): Some names for "Dragonfly". *Argia* 14(2): 16-17. (in English). [Common names of Odonata in Birma and Uganda are communicated.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

2930. Eda, S. (2002): Unusually early occurrence of *Aeshna mixta soneharai* Asahina. *Tombo* 44 : 11. (in English with Japanese summary). [On 8 July 2002, a teneral female of *A. mixta soneharai* was captured at the Sunahara-ike pond, Ueda city, Nagano Pref., Japan. This is about one month earlier than in the of past years.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND02767@nifty.com

2931. Editorial board (2002): Table of the first and last records of dragonflies in Hokkaido (3). *Bulletin of The Hokkaido Odonatological Society* 14: 21-23. (in Japanese). [Tab. with phenological data from Hokkaido, Japan.] Address: Hiratsuka, K., 2-20-113, Honcho 2 jo-9, Higashi-ku, Sapporo City, 065-0042, Japan

2932. Editorial board (2002): Table of the regional distribution of Odonata by shicho in Hokkaido (15). Bulletin of The Hokkaido Odonatological Society 14: 24-26. (in Japanese). Address: Hiratsuka, K., 2-20-113, Honcho 2 jo-9, Higashi-ku, Sapporo City, 065-0042, Japan

2933. Ellenrieder, N. von (2002): A phylogenetic analysis of the extant Aeshnidae (Odonata: Anisoptera). Systematic Entomology 27: 437-467. (in English). ["A cladistic analysis of the world Aeshnidae is presented, based on fifty-eight characters of adult and larval anatomy. The ingroup taxa include all the extant genera of Aeshnidae, and the austropetaliid genera Phyllopetalia and Hypopetalia were chosen as the outgroup. The strict consensus tree obtained after successive weighting shows that the subgroups defined traditionally for Aeshnidae are paraphyletic or polyphyletic. The previous reclassification derived from analyses based on wing venation is supported in terms of the monophyly of Aeshnidae, Gomphaeschninae and its sister group comprising the remaining Aeshnidae. Gomphaeschninae is confirmed as sister group of the remaining Aeshnidae (= Aeshnodea Bechly). The sister-group relationships between Gomphaeschninae+Sarasaeschna and Linaeschna+Oligoaeschna are corroborated. Within Aeshnodea, three monophyletic groups emerged: Boyeria + (Petaliaeschna+ (Limnetron+Gynacanthaeschna+Periaeschna)) + ((Cephalaeschna+Caliaeschna)+(Allopetalia (Notoaeschna+Spinaeschna))); Dendroaeschna+(Ephiaeschna+ (Aeschnophlebia+ (Nasiaeschna+ (Tetracanthagyna+Brachytron))); and Polycanthagyna+ (Basiaeschna+ (Amphiaeschna+ (Indaeschna+ (Oplonaeschna+ (Racenaeschna+Plattycantha+Agyrtacantha+Triacanthagyna+ (Subaeschna+ Austrogynacantha+Gynacantha) + (Heliaeschna+ (Neuraeschna+Staurophlebia))) + ((Castoraeschna+ Coryphaeschna+Remartinia) + (Oreaeschna+ (Aeshna+ (Anaciaeschna+ ('A.'isosceles+Andaeshna) + (Anax+Hemianax)))))). Additional informative characters are required to test the relationships suggested here between the main groups of Aeshnodea and some enigmatic basal taxa (Antipodophlebia, Austroaeschna, Acanthaeschna, Telephlebia, Austrophlebia and Planaeschna)." (Author) SEM photos or drawings of the following species are provided: Brachytron pratense (Müller, 1764), Rheopetalia apicalis (Selys 1858), Oligoaeschna pryleri (Martin 1909), Boyeria vinosa (Say 1839), Oplonaeschna armata (Hagen 1861), Remartinia luteipennis (Burmeister 1839), Anax amazili (Burmeister 1839), Hemianax papuensis (Burmeister 1839), Allopetalia reticulosa Selys 1873, Nasiaeschna pentacantha (Rambur 1842), Caliaeschna microstigma (Schneider, 1845), Spinaeschna tripunctata (Martin 1901), Limnetron debile (Karsch 1891), WStaurophlebia reticulata (Burmeister 1839), Coryphaeschna perrensi (McLachlan 1887), Gynacantha bifida Rambur 1842, Aeshna absoluta Calvert 1952, Acanthaeschna victoria Martin, 1901, Austropetalia patricia (Tillyard 1910), Andaeschna rufipes (Ris 1918), Ephiaeschna heros (Fabricius 1798), Gomphaeschna furcillata (Say 1839), Basiaeschna janata (Say 1839), Aeshna cornigera Brauer 1865, Hypopetalia pestilens MacLachlan 1870, Coryphaeschna adnexa (Hagen 1861), Anaciaeschna jaspidea (Burmeister 1839), Anaciaeschna isoceles (Müller, 1767), Andaeschna andresi (Racenis 1958), and Aeschnophlebia anisoptera Selys 1883.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

2934. Ellenrieder, N. von (2002): Redescription of *Linaeschna polli* Martin, 1909 (Anisoptera: Aeshnidae: Gomphaeschninae). Odonatologica 31(4): 409-413. (in English). [*L. polli* is redescribed and illustrated, based on the male holotype deposited at the National Museum of Natural History, Leiden. Its position in the phylogenetic system of the aeshnids is discussed.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

2935. Evans, H.E. (2002): A Review of Prey Choice in Bembicine Sand Wasps (Hymenoptera: Sphecidae). Neotropical Entomology 31(1): 1-11. (in English). ["The prey of 132 species of Bembicini (Hymenoptera) that have been studied is reviewed. About three quarters of the species prey on Diptera, and it is believed that fly predation is ancestral in the group. Eleven species make occasional or regular use of other insects as prey in addition to Diptera (Lepidoptera, Hymenoptera, Neuroptera, Odonata, and/or Homoptera), while 21 species of five genera prey on insects of these same five groups with no use of Diptera. It is hypothesized that this represents an evolutionary progression, whereby populations have experienced shortages of dipterous prey in the past and have broadened their sensory focusing to include other groups of flying insects. Behavior initially learned has, over time, been reinforced genetically to produce the currently observed radiation in prey choice within the group." (Author)] Address: Evans, H. E., Dept. Bioagricultural Sciences and Pest Management, Colorado State University, Fort Collins, CO, 80523-1177 USA

2936. Fachgruppe Faunistik und Ökologie Staßfurt (2002): Dr. Joachim Müller zur Vollendung des 60. Lebensjahres. Entomol. Nachr. Ber. 46(3): 207-208. (in German). [Joachim Müller, Magdeburg is one of the leading German odonatologists with a broad interest in entomology, ornithology, and nature conservation. His companions of the Fachgruppe Faunistik und Ökologie Staßfurt compiled some of the essentials of his curriculum vitae as biologist in Sachsen-Anhalt.] Address: not stated.

2937. Ferreira-Peruquetti, P.S.; De Marco, P. (2002): Efeito da alteração ambiental sobre comunidades de Odonata em riachos de Mata Atlântica de Minas Gerais, Brasil. Revista Brasileira de Zoologia 19(2): 317-327. (in Portuguese with English summary). ["Effects of environmental degradation on Odonata community of Atlantic Forest streams from Minas Gerais, Brazil: The effect of riparian deforestation and stream impoundments on an odonate community was studied in areas of surviving Atlantic forest in Vicososa and in Rio Doce State Park (PERD), Marliéria, Minas Gerais, Brazil. During 1997 16 species of Libellulidae, 4 Coenagrionidae, 2 Gomphidae, 2 Calopterygidae, 1 Megapodagrionidae, 1 Aeshnidae and 3 Protoneuridae were collected. In Vicososa, the association of sampled odonates with lotic or lentic systems, and in PERD for areas with or without riparian vegetation were compared. The results suggest that overall odonate taxonomic richness is high in areas without riparian vegetation. This is probably caused by increase of productivity, and the invasion of lentic odonate species." (Authors)] Address: Ferreira-Peruquetti, Patricia Santos, Departamento de Hidrobiologia, Universidade Federal de Sao Carlos, 13565-905, Caixa

Postal 676, Sao Carlos, Sao Paulo, Brazil. E-Mail: patricia@iris.ufscar.br

2938. Forbes, M.R.; Muma, K.E.; Smith, B.P. (2002): Diffuse coevolution: Constraints on a generalist parasite favor use of a dead-end host. *Ecography* 25(3): 345-351. (in English). ["Many evolutionary models and empirical studies of parasite-host interactions consider single species of parasites exploiting single host species. However, many parasites are generalists in that they parasitize more than one host species (often many more) and establish associations with other hosts that cannot be described as true parasitism. We identify such an association, explain how constraints may maintain it, and indicate why such diffuse interactions are deserving of attention. We describe the use of two closely related *Sympetrum* dragonfly species by larvae of the water mite *Arrenurus planus* Marshall. Adults of one dragonfly species are resistant whereas adults of the other species are almost wholly susceptible to *A. planus*. However, *A. planus* attaches as often to the resistant host as it does to the susceptible host species when relative abundance and seasonal timing of adult emergence of both species is considered. We present evidence that mites track the susceptible host and are most active early in the season, when early-emerging unsuitable hosts are also present. Thus, use of resistant hosts appears an unavoidable outcome of constraints promoting discovery and use of susceptible hosts. Such findings have implications for studies of local adaptation and host switching." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

2939. Fritz, K. M.; Dodds, W. K. (2002): Macroinvertebrate assemblage structure across a tall grass prairie stream landscape. *Arch. Hydrobiol.* 154(1): 79-102. (in English). ["Stream macroinvertebrates were collected from four intermittent tributaries and two perennial sites within the Kings Creek basin, Konza Prairie Biological Station (KPBS) near Manhattan, KS, USA. The objectives of this study were to assess the roles of disturbances (floods and drying) and refugia on benthic and colonization (drift and aerial) assemblage composition over two years among sites with contrasting hydrologic regimes. Benthic taxa richness and diversity at the perennial headwater site were significantly greater than richness and diversity at intermittent sites, whereas the downstream perennial site did not differ significantly from two of the intermittent sites. The larger magnitude of floods at the downstream perennial site resulted in greater losses in richness than at the upstream intermittent and perennial sites. Both classification and ordination revealed that benthic assemblage composition was more strongly correlated with time since last disturbance and season than with static hydro-logic descriptors, microhabitat measures, or assemblage characteristics (richness or density). Richness of aerial colonization and drift samples collected at intermittent sites was greatest at the site with the nearest upstream perennial surface water. Because Kings Creek is a relatively pristine stream, these data may be useful as a baseline for comparison with future efforts for bioassessment of intermittent prairie streams." (Authors) *Calopteryx maculata*, *Argia plana*, *Archilestes grandis*, and *Erythemis* sp. are listed in tab. 1.] Address: Dodds, W.K., Department of Biological Sciences, Auburn University, Auburn, AL 36849, USA.

2940. Futahashi, R.; Futahashi, H. (2002): A case of female adult of *Anax nigrofasciatus nigrofasciatus* (Aeshnidae) bitten by a last instar larva of the same species. *Tombo* 44: 33. (in Japanese with English summary). ["We observed a female adult of *Anax nigrofasciatus nigrofasciatus* bitten on the tip of abdomen by a last instar larva of the same species. The adult thrashed her wings and finally tried to escape from the predator, but she was injured from the 9th to 10th abdominal segments and was unable to fly." (Authors) This encounter between two different life stages is documented by an informative photo.] Address: not stated in English

2941. Futahashi, R.; Futahashi, H.; Araki, Y. (2002): The odonate fauna of Noto peninsula, Hokuriku District, Honshu. *Tombo* 44: 25-28. (in Japanese with English summary). ["The Odonate fauna in the Noto Peninsula, Ishikawa Prefecture, Hokuriku District, central Honshu, Japan, is outlined based primarily on our recent survey. *Lestes japonica* Selys, 1883 (Lestidae) was found at five ponds (first record from Ishikawa Prefecture). *Soma-tochlora clavata* Oguma, 1913 (Corduliidae) was newly recorded from the peninsula. Consequently, a total of 77 species of 11 families have been recorded from the peninsula. Some zoogeographical comments are given for the following two noteworthy species: *Sympetma paedisca* (Brauer, 1877) (Lestidae) and *Sympetrum speciosum speciosum* Oguma, 1915 (Libellulidae)." (Authors)] Address: not stated in English.

2942. García-Criado, F.; Fernández-Aléz, M.; Fernández-Aléz, C. (2002): Relationships between benthic assemblage structure and coal mining in the Boeza River basin (Spain). *Arch. Hydrobiol.* 154(4): 665-689. (in English). [Taxon richness and taxonomical composition of three rivers in northwestern Spain were studied in a two-year survey. Canonical Correspondence Analysis revealed mining as one of the main factors conditioning the faunal composition together with the distance from the source. Richness decreased at impacted sites and was negatively correlated with variables indicating mining pollution (conductivity, sulfate, silt accumulation and some metals, among others). The "Cordulegastridae" seem to tolerate even heavily impacted running waters, but the abundance was low.] Address: García-Criado, F., Departamento de Biología Animal. Facultad de Ciencias Biológicas y Ambientales, Universidad de León, 24071 León, Spain. E-mail: dbafgd@unileon.es

2943. Garrison, R.W.; Costa, J.M. (2002): The identity of *Agrion ? minutissimum* Selys, 1876 and *Leptobasis rosea* Selys, 1877 (Zygoptera: Coenagrionidae). *Odonatologica* 31(4): 395-401. (in English). ["Holotypes and allotypes of *Calvertagrion dicellularis* St. Quentin, 1960 and *Inpabasis eliori* Santos, 1961 were compared to holotypes of *Agrion ? minutissimum* Selys, 1876 and *Leptobasis rosea* Selys, 1877, respectively. The first 2 names are considered junior synonyms of the older names. Diagnostic illustrations of all type material are provided." (Authors) *Inpabasis rosea* (Selys, 1877), *Calvertagrion minutissimum* (Selys, 1876)] Address: Garrison, R., 1030 Fondale, Azusa, CA 91702-0821, USA. E-mail: rossergarrison@compuserve.com

2944. Glotzhober, R.C.; Moody, D.L. (2002): *Soma-tochlora walshii* (Odonata: Corduliidae), a new state record for Ohio. *Ohio Journal of Science* 102(3): 40-42. (in English). [*S. walshii* was previously unknown from

Ohio. "During the summer of 2000 this species was documented in apparent breeding populations at State Nature Preserves in Ashtabula and Portage counties. While no larvae were found, reproductive behavior was observed and the numerous adults suggest a stable breeding population. Habitat descriptions from other localities match that of these 2 sites, and a long-known population exists in Pennsylvania only about 21 km from the Ashtabula County site. This brings the total number of reported Odonata for Ohio to 162 species and subspecies." (Authos)] Address: Glotzhofer, R., Ohio Natural history society, 1982 Velma Ave., Columbus OH 43211-2497, USA. E-mail: bglotzhofer@ohio-history.org

2945. Grand, D. (2002): La distribution de *Coenagrion ornatum* (Sélys, 1850) en France centrale. *Martinia*, Hors Série 4: 55-57. (in French with English summary). ["The distribution of *C. ornatum* (Selys, 1850) was studied in Central France. 21 localities with sunny small brooks were identified as presumed reproductive sites for this species within the Allier, Côte-d'Or, Loire, Nièvre and Saône-et-Loire departments. Together with previous reports, this study shows that this species occurs in at least 28 localities in Central France." (Author)] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

2946. Grand, D. (2002): Voyage en Guadeloupe. *Martinia* 18(1): 29-36. (in French with English summary). [In March 2001, 19 odonate species were recorded on Guadeloupe, Lesser Antilles. 19 taxa are commented in some detail. The rare *Protoneura ailsa*, and taxonomic problems between *Brechmorhoga praecox* and *B. grendadensis* are discussed.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

2947. Grimaldi, D.A.; Engel, M.S.; Nascimbene, P.C. (2002): Fossiliferous Cretaceous amber from Myanmar (Burma): Its rediscovery, biotic diversity, and paleontological significance. *American Museum Novitates* 3361: 1-72. (in English). ["Amber from Kachin, northern Burma, has been used in China for at least a millennium for carving decorative objects, but the only scientific collection of inclusion fossils, at the Natural History Museum, London (NHML), was made approximately 90 years ago. Age of the material was ambiguous, but probably Cretaceous. Numerous new records and taxa occur in this amber, based on newly excavated material in the American Museum of Natural History (AMNH) containing 3100 organisms. Without having all groups studied, significant new records and taxa thus far include the following (a dag refers to extinct taxa): [...] Odonata indet. (wing fragment); [...]. The stratigraphic distribution of exclusively Mesozoic arthropods in Burmese amber is reviewed, which indicates a probable Turonian-Cenomanian age of this material (90-100 Ma). Paleofaunal differences between the NHML and AMNH collections are discussed, as is the distinct tropical nature of the original biota. Burmese amber probably harbors the most diverse biota in amber from the Cretaceous, and one of the most diverse Mesozoic microbiotas now known." (Authors)] Address: Grimaldi, D., Amer. Museum Nat. Hist., Dept. Invertebrates, New York, NY 10024 USA

2948. Günther, A. (2002): Erstnachweis von *Ophiogomphus cecilia* und Wiedernachweis von *Gomphus*

vulgatissimus (Odonata: Gomphidae) im Regierungsbezirk Chemnitz. *Mitt. sächs. Ent.* 60: 3-6. (in German). [Sachsen, Germany; both species were considered extinct in the region; this was proved by several collecting trips in the past years. Most recent records of *G. vulgatissimus* and *O. cecilia* are documented in a tab. along with a detailed characterisation of the habitats. The colonisation must have happened in the past few years, and the source population probably originate in the River Elbe.] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstraße 10, D-09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

2949. Guerbaa, K.; Barataud, J. (2002): Découverte de *Cordulegaster bidentata* Sélys, 1843 dans le département de la Haute-Vienne (Odonata, Anisoptera, Cordulegasteridae). *Martinia* 18(2): 66. (in French). [Two records of *Thecagaster bidentata* are briefly documented; the species was not known from the Département Haute-Vienne (France) prior May 2001.] Address: Guerbaa, K., 1, rue de la Madonnette, F-87250 Bessines-sur-Gartempe, France

2950. Guerbaa, K. (2002): Les espèces d'odonates "remarquables" du Limousin. *Martinia* 18(1): 3-12. (in French with english summary). [34 species of the Limousin, France are briefly commented; records base on a collection of 15000 species/location made after 1980.] Address: Guerbaa, K., 1, rue de la Madonnette, F-87250 Bessines-sur-Gartempe, France

2951. Ha, L.Y.; Wildermuth, H.; Dorn, S. (2002): Emergenz von *Cordulia aenea* (Odonata: Corduliidae). *Libellula* 21 (1/2): 1-14. (in German with English summary). ["Emergence of *C. aenea* was studied at two ponds in northern Switzerland at 475 m asl in 2000. Emergence started on 27 April and lasted 25 days. The EM50 fell at 8 days for males and 9 days for females. A diel periodicity of emergence with a major peak in the morning was found. The preferred site of emergence was within a strip 5 metres wide along the margin of each pond. Within this strip 99.8 % of the 917 exuviae were found. Exuviae abundance in the 7 sections sampled around the perimeter ranged from 1.4 to 5.5 per metre, depending on the structure of the margin. Both sexes emerged more frequently above dry ground than above water. The sex ratio did not differ significantly from 1 : 1 (48.3 % males). The population size of *C. aenea* emerging from the two ponds in the study year was estimated as 3300 individuals. The spatio-temporal emergence pattern of *C. aenea* is discussed, special emphasis being placed on habitat preferences and comparisons with other corduliid species." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

2952. Hämäläinen, M. (2002): *Idionyx iida* spec. nov. from Kanchanaburi, Thailand (Odonata: Corduliidae). *Opusc. zool. flumin.* 203(2002): 1-4. (in English). ["*I. iida* sp. n. (holotype male: Thailand, Kanchanaburi prov., Kroeng Kra Via, 5-IV-2001; deposited in RMNH, Leiden) is described and illustrated. The diversity of the genus in Thailand is briefly discussed." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

2953. Hämäläinen, M. (2002): Notes on the *Libellago* damselflies of the Andaman and Nicobar Islands, with

description of a new species (Zygoptera: Chlorocyphidae). *Odonatologica* 31(4): 345-358. (in English). ["*Libellago blanda* (Hagen) and *L. andamanensis* (Fraser) are removed from synonymy with *L. lineata* (Bur.); they are redescribed in both sexes and compared with *L. lineata*. Recently acquired material from the Nicobar Isls (Camorta and Great Nicobar) reveals that the original type series of *Micromerus blandus* consists of 2 close, but distinct species. A male specimen (in ZMUC) from Nancowry Island is designated as the lectotype of *L. blanda*. Former syntype females from Little Nicobar belong to a new species, described here as *L. balus* sp.n., holotype (deposited at RMNH, Leiden) of which comes from Great Nicobar Island, Campbell Bay area, 24-XII-2000. Males of *L. blanda* and *L. balus* sp.n. differ in the colour pattern of abdomen and in the shape of rhinarium. The status of *L. indica* (Fraser) is briefly discussed." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

2954. Hart, E.A.; Lovvorn, J.R. (2002): Interpreting stable isotopes from macroinvertebrate foodwebs in saline wetlands. *Limnology & Oceanography* 47(2): 580-584. (in English). ["We compared stable-isotope ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) and gut-content analyses of macroinvertebrate foodwebs in saline wetlands of the Laramie Basin, Wyoming, USA. Standard assumptions of stable-isotope fractionation between trophic levels (<1 permil for $\delta^{13}\text{C}$, mean of 3.4permil for $\delta^{15}\text{N}$) suggested that zygopteran (damselfly) larvae consumed mainly amphipods. However, the guts of zygopterans contained no amphipods but rather a mix of chironomid larvae and zooplankton. In all wetlands the gut contents of zygopterans indicated that they were secondary consumers (trophic level 3), but enrichment of $\delta^{15}\text{N}$ between zygopterans and their prey ($\Delta\delta^{15}\text{N}$) varied from 1 to 3.4permil between wetlands. In other studies, such variation in $\Delta\delta^{15}\text{N}$ has been interpreted to mean that food-chain length differed between aquatic systems. We review alternative interpretations of variable $\delta^{15}\text{N}$ enrichment, namely, varying C:N ratios in food, differential enrichment between consumer species, and habitat-specific variation of $\delta^{15}\text{N}$ at the base of foodwebs. We also suggest that variation in the timing and rates of nitrogen cycling can affect measured $\Delta\delta^{15}\text{N}$ both within and between foodwebs. For aquatic macroinvertebrates, we urge that stable isotopes be supplemented with independent observations to avoid incorrect conclusions about trophic pathways, trophic levels, and food-chain lengths in different ecosystems." (Authors)] Address: Hart, E.A., Department of Zoology, University of Wyoming, Laramie, WY, 82071, USA. E-Mail: lovorn@uwyo.edu

2955. Hawking, J.H.; Theischinger, G. (2002): Vernacular names for the Australian dragonflies (Odonata). *Austrolestes* 4 (Suppl.): 1-6. (in English). [Checklist of all Australian species with latin and vernacular names, and distributional data (geographic regions).] Address: Hawking, J.H., Murray-Darling Freshwater Research Centre, Cooperative Research Centre for Freshwater Ecology, P.O. Box 921, Albury, NSW 2640, Australia

2956. Heidari, H.; Dumont, H.J. (2002): An annotated check-list of the Odonata of Iran. *Zoology in the Middle East* 26: 133-150. (in English with German summary). ["A perusal of the literature and study of some additio-

nal collections leads to a list of 95 species and subspecies of dragonflies for Iran. We claim that at least another 15 Eurosiberian and Oriental species await discovery. Eurosiberian species dominate in the north-west and along the Caspian coast; as one moves south in western Iran, Middle-East endemics become more prominent, and a limited admixture of Afrotropical species occurs. The central desert axis is a zoogeographical break, in which predominantly Irano-Turanian species are found. East of it, Irano-Turanians mix with Oriental elements. The Oriental element is particularly strong along the Makran coast, where, additionally, a short series of species occurs with a full Oriental-Afrotropical range. The Zagros mountains and their extensions in Sistan-Baluchistan facilitate dragonfly dispersal across an otherwise arid area, but have been insufficiently studied. The same is true of the Kopet Dag, which provides a wedge between the Asian deserts, and acts as a filter for Eurosiberian species to reach the high mountains of Afghanistan and, vice versa, allows Me-siatic species to spread west. All these conclusions are at a qualitative level: large parts of Iran are still unstudied, and the mapping of the range of individual species remains to be done. East-west and north-south clines are common in *Calopteryx splendens* and other zygopterans, but remain to be worked out in detail." (Authors) Of some interest are records of *Lestes concinnus*, *Pseudagrion laidlawi*, *Brachytron pratense*, *Libellula quadrimaculata*, *Sympetrum arenicolor*, *S. haritonovi*, and *Zygonyx torridus*.] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

2957. Heidemann, H.; Seidenbusch, R. (2002): Die Libellenlarven Deutschlands. Die Tierwelt Deutschlands. Teil 72: 328 pp. (in German). [In 1993, H. Heidemann and R. Seidenbusch published a long awaited book on the larvae resp. exuviae of the Odonata occurring in France and Germany. In spite of some shortcomings this was a significant contribution to our knowledge of the larval stage of the Odonata of western Europe. On the fundament of this publication, the authors nearly ten years later publish two revised - a French and a German - editions. The plenty of detailed information makes it very difficult to compare these three editions. More generally spoken, the French edition is more close to the book of 1993, while the German edition appears more original. The French version - which of course includes 11 more species than the German edition - is paperback, while the German version has a solid spine. There are a lot of amendments in detail, even some new plates resp. drawings. From the didactical point of view, the rearrangement of the drawings and the labeling of the drawings (but exclusively in the German version!) improve the useability in a significant way. I personally miss a concept where key and figures are printed close on one page or two opposed pages. Maybe that this is a matter of taste. The scale of the figures was changed in some cases; the printing quality of some of the figures was improved (the labeling is more professional; but e.g. partly missing on plate 7 in the German version). In some cases it will be better to use the 1993-version (e.g. epi- and paraproct of *Pyrrhosoma nymphula*), because the contrast of some of the figures of the first version is better. Without detailing the differences between the two versions - which are original works - the general structure is as follows: Preface, notes for the user, glossar, mor-

phology of the larva, larval ecology, collecting and storing of exuviae, catching and rearing larvae, questions of nomenclature (with some worth reading additions compared with the 1993-version), keys (with extensive additional information on morphological structures, habitats, and distribution), and a selected bibliography. In the framework of nomenclature questions, it is remarkable that *Aeshna subarctica elisbatheae* (Djakonov, 1922) was replaced by the nominate form *A. subarctica* Walker, 1908. I couldn't find any explanation for this. The German edition is written in German, the book on the exuviae of Germany and France in French. Without any doubt, both works are indispensable for field work in Germany and/or France. I think, a forthcoming edition should be improved by separating keys and additional information, and by arranging keys and figures close together. (Martin Schorr) Address: Goecke & Evers, Inh. E. Bauer, Sportplatzweg 5, D-75210 Keltern, Germany. E-mail: www.goeckeevers.de

2958. Heidemann, H.; Seidenbusch, R. (2002): Larves et exuvies des libellules de France et d'Allemagne (sauf de Corse). ISBN 2-9597291-5-0: 415 pp. (in French). [For a review of the work see OAS 2957. The book can be obtained by the SFO for 28 Euro.] Address: Société française d'odonatologie (SFO), 7, rue Lamartine, F-78390 Bois-d'Arcy, France.

2959. Heitz, S. (2002): Libellen der Wiesenbäche und ihre Einbindung in bestehende Planungsinstrumente - am Beispiel von *C. mercuriale* (Helm-Azurjungfer). *mercuriale* 2: 7-13. (in German). [For details see OAS 2414] Address: Heitz, S., Schlesische Str. 2, D.78224 Singen, Germany. E-mail: stefanheitz@web.de

2960. Hellmund, M. Hellmund, W. (2002): Eigelege fossiler Zygoteren auf Dikotylenblättern aus dem Mittelmiozän von Salzhausen (Vogelsberg, Hessen, Deutschland). *Odonatologica* 31(3): 253-272. (in German, with English summary). ["22 specimens of dicotyledon leaves with egg-sets of fossil Zygoptera, originating from a locality NE of Frankfurt/Main, Germany and preserved in SMF, Frankfurt/Main are described, illustrated and discussed. In the past (1846, H.R. Goepfert, Die Gattungen der fossilen Pflanzen, Henry & Cohen, Bonn), these structures were misinterpreted as saprophytes, "Hysterites opegraphoides". The true nature of the sets is apparent from fossil and recent evidence; they are to be attributed to the "coenagrionid type" of oviposition, more particularly to the so-called "Zickzack- und Bogenmodus" mode sensu M. Hellmund & W. Hellmund, 1991 (Stuttg. Beitr. Naturk. [B] 177: 1-17). Here-with the phenomenon is recorded for the first time from the Middle Miocene and the Lower Neogene (age ca 15 mio yr), though this oviposition mode is practised since the Upper Cretaceous times (ca 90 mio yr ago) until present. In some Tertiary localities, e.g. Messel (Hesse) and Hammerunterwiesenthal (Saxony), egg-sets are the only evidence of the Zygoptera occurrence." (Authors)] Address: Hellmund, W., Institut für Geologische Wissenschaften und Geiseltalmuseum, Martin-Luther-Universität Halle-Wittenberg, Domstr. 5, D-06108 Halle (Saale), Germany. E-mail: hellmund@geologie.uni-halle.de 2 von-Loe-Strasse 31, D-53840 Troisdorf, Deutschland

2961. Herkenrath, P.; Evans, M. (2002): Die Mesopotamischen Sümpfe -eine unbemerkte Tragödie. *Ber. Vogelschutz* 38: 157-161. (in German with English sum-

mary). ["The Mesopotamian Marshes in Iraq and Iran, formed by the rivers Euphrates and Tigris, consisted of a range of wetland ecosystems and stretched over an area of 15,000 - 20,000 km². They have been inhabited by the Marsh Arabs with a unique 5,000 year-old culture. For millions of migratory waterbirds and raptors, the Marshes formed one of the most important wintering areas along the West Siberian-Caspian-Nile flyway. The Marshes also harboured globally significant breeding populations of a number of rare and threatened species. Two bird and several other vertebrate species are strictly endemic to the area. 32 large dams in Turkey, Iraq, Iran and Syria have considerably reduced the water flow and changed the sedimentation regime of Euphrates and Tigris while more dams are being planned or under construction. Huge drainage schemes by the Iraq government, especially in the 1990s, have left only some 14.5% of the area of the marshes, as of May 2001. Desertification with the subsequent formation of salt deserts is widespread. The Marsh Arabs were forced to leave their land and to abandon their traditional way of living. [...]. The United Nations Environment Programme (UNEP) has developed a set of recommendations for the regeneration of the Marshes." (Authors) The marshes also harbour a population of *Brachythemis fuscopalliata*; this species is assessed by the authors as "globally endangered" and "a regional endemic species".] Address: Herkenrath, P.; Evans, M.; BirdLife International, Wellbrook Cowl, Girton Road, Cambridge CB3 0NA. UK. E-Mail: peter.herkenrath@birdlife.org.uk, mike.evans@birdlife.org.uk.

2962. Hernández, J.M.R. (2002): Notes on the feeding of three species of odonates of the suborder Zygoptera in central Cuba. *Argia* 13(4): 13-14. (in English). [10 insect taxa (Diptera, Homoptera, Heteroptera) preyed by *Ischnura ramburii*, *I. capreolus*, and *Enallagma coecum* are listed in a table along with a list of species caught in the framework of the study.] Address: Hernández, J.M.R., Apartado Postal 2004, Sancti-Spiritus, Cuba CP 60100

2963. Hiratsuka, K (2002): New records of dragonflies from Rumoi-shicho. *Bulletin of The Hokkaido Odonatological Society* 14: 19-20. (in Japanese). [Japan; *Trigomphus melampus*, *Anax parthenope julius*, *Soma-tochlora uchidai*, *Libellula quadrimaculata asahinai*] Address: Hiratsuka, K., 2-20-113, Honcho 2 jo-9, Higashi-ku, Sapporo City, 065-0042, Japan

2964. Honig, B. (2002): Myth of the fishless pond. *Argia* 13(4): 14-15. (in English). [The author reports the 21 odonate species of his garden pond, and discusses the factors which enable an owner to have fishes and dragonflies in his ponds.] Address: Honig, R., 3803 Purdue, Houston TX 77005-1129, USA. E-mail: mandrhonig@aol.com

2965. Hori, S.; Yokoyama, T. (2002): *Boyeria mac-lachlani* from Noboro Forest Park. *Bull. Hokkaido Odonatological Society* 14: 4-5. (in Japanese). [Records from September and October 2001 are discussed.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2966. Hovmöller, R.; Pape, T.; Källersjö, M. (2002): The Palaeoptera problem: Basal pterygote phylogeny inferred from 18S and 28S rDNA sequences. *Cladistics* 18(3): 313-323. (in English). ["Monophyly of the pterygote insects is generally accepted, but the relationships

among the three basal branches (Odonata, Ephemeroptera and Neoptera) remain controversial. The traditional view, to separate the pterygote insects in Palaeoptera (Odonata + Ephemeroptera) and Neoptera, based on the ability or inability to fold the wings over the abdomen, has been questioned. Various authors have used different sets of morphological characters in support of all three possible arrangements of the basal pterygote branches. We sequenced 18S and 28S rDNA from 18 species of Odonata, 8 species of Ephemeroptera, 2 species of Neoptera, and 1 species of Archaeognatha in our study. The new sequences, in combination with sequences from GenBank, have been used in a parsimony jackknife analysis resulting in strong support for a monophyletic Palaeoptera. Morphological evidence and the phylogenetic implications for understanding the origin of insect flight are discussed." (Authors)] Address: Hovmöller, R., Department of Zoology, Stockholm University, Stockholm Sweden

2967. Hunger, H. (2002): Anwendungsorientiertes Habitatmodell für die Helm-Azurjungfer (*Coenagrion mercuriale*, Odonata) aus amtlichen GIS-Grundlagendaten. *Natur und Landschaft* 77(6): 261-265. (in German with English summary). ["A GIS-based habitat model was developed for *C. mercuriale*, a species considered to be 'under immediate threat of extinction' in Germany's Red List of endangered species and listed in Annex II of the European Union Habitats Directive. ATKIS land-use data and a groundwater model were used as thematic layers. Occurrences of *C. mercuriale* in the 'Freiburger Bucht' study area (SW-Germany) were mapped. Following this, a preference analysis was performed. The results showed that, within the study area, the species prefers sections of watercourses that are situated within areas characterized by high groundwater levels. Within arable lands, this preference was distinct up to a groundwater depth of one metre, in grassland up to a depth of 2 metres. The model produced results that are consistent with 'intuitive expert knowledge'. It uses basic geodata which are available at nature conservation agencies. It uses few parameters, which, however, appear to be key factors. Therefore it belongs to a 'new generation' of habitat models with a strongly applied focus. This type of model is in increasing demand for applied nature conservation purposes and planning issues. In 2001 and 2002, the model is being evaluated in an even larger study area." (Author)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Am Pfahlgraben 8, D-79276 Reute, Germany

2968. Hutchings, G. (2002): Three new species of Odonata for Saskatchewan, Canada. *Argia* 13(4): 5-7. (in English). [In June and July 2001, *Basiaeschna janata*, *Somatochlora walshii*, and *S. williamsoni* were discovered. Habitats and co-occurring species are described resp. listed.] Address: Hutchings, G., 971 Arundel Drive, Victoria, British Columbia, V9A-2C4, Canada. E-mail: sea-trek@islandnet.com

2969. Inoue, K. (2002): Report of the 15th International Symposium of Odonatology held in Novosibirsk, Russia. *Argia* 13(4): 3-4. (in English). [This report gives some information on the symposium, with records of species made during the field trips, and the announcement of the 16th symposium to be held in Schwerin, Germany. Of some interest is the note that *Calopteryx virgo* (records from Siberia and Amur-region) is con-

specific with *C. japonica*.] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

2970. InsectLine (2002): Insects reported during the early part of 2002. *Atropos* 16: 74-75. (in English). [*Pyrrhosoma nymphula* was on the wing in April at several sites.] Address: not stated

2971. Irineu de Souza, L.O.; Costa, J.M.; Espindola, L.A. (2002): Description of the last instar larva of *Oligoclada laetitia* Ris, 1911 and comparison with other Libellulidae (Anisoptera). *Odonatologica* 31(4): 403-407. (in English). [Specimens of *O. laetitia* from Pantanal Sul-Mato-Grossense, Brazil are illustrated, described and compared with other genera of Libellulidae possessing dorsal hooks on abdominal segments VIII-X: *Dythemis*, *Macrothemis*, *Perithemis*, *Planiplax*, and *Tauriphila* (in part).] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisis.com.br

2972. Jacquemin, G.; Boudot, J.-P. (2002): Les Odonates des tourbières et lacs acides du massif vosgien: bilan de dix années de prospection. *Martinia Hors Série* 4: 27-38. (in French with English summary). [The odonate fauna of 66 peat bogs and 36 peaty lakes in the Vosges mountains (Eastern France) is reported. "One erratic and 48 indigenous species were observed. *Somatochlora alpestris* and *Aeshna subarctica elisabethae* were found to be confined above 700 m a.s.l., 7 species to occur whatever the altitude, and 17 taxa to occur under 500 m a.s.l."] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

2973. Jödicke, R. (2002): Nachruf auf Joachim Wenzinger (1. Oktober 1944 -12. Dezember 2001). *Libellula* 21(1/2): 71-76. (in German, with English summary). ["In odonatological circles the German zoologist and journalist was highly regarded, especially owing to his long-term studies on *Ophiogomphus cecilia*. A short biography is followed by a list of his Odonatological publications." (Author)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany. E-mail: r.joedicke@t-online.de

2974. Johansson, F. (2002): Reaction norms and production costs of predator-induced morphological defences in a larval dragonfly (*Leucorrhinia dubia*: Odonata). *Canadian Journal of Zoology* 80(5): 944-950. (in English). ["To understand the evolution and ecology of inducible defence we need to understand the genetics and costs underlying this phenomenon. It has been suggested that the abdominal spines of odonate larvae work as a defensive trait, and that the presence of fish predators induces the production of longer abdominal spines. This study was designed to answer the following questions: (i) What is the shape of the reaction norms of spine length in the larvae of the dragonfly *Leucorrhinia dubia* reared in the presence and absence of fish? (ii) Does the production of longer spines imply that production costs are incurred in terms of development time or size? I performed a laboratory experiment in which I raised 30 families of *L. dubia* larvae in the presence and absence of fish. In general, the presence of fish induced the production of longer abdominal spines in the larvae, and there was a genotype X environment interaction, suggesting the potential for evolution

of plasticity of the traits. No production costs could be found with respect to development time and size at final instar." (Author)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

2975. Johnson, J.; Cooms, E.; Valley, S. (2002): Recent highlights in Oregon. *Argia* 14(2): 11-13. (in English). [Oregon, USA; new findings total the Oregon Odonata to 88 species: *Lestes stultus*, *Nehalennia irene*, *Aeshna subarctica*, *A. sitchensis*, and *Paltothermis lineatipes*. In addition "other interesting records" are: *A. walkeri*, *Somatochlora minor*, *S. semicircularis*, *S. walshii*, and *Libellula comanche*. The habitats/localities of the species are discussed in some detail.] Address: Johnson, J., 6303 SE Ramona Street, Portland OR 97206-5930, USA. E-mail: jimjohn@teleport.com

2976. Juillerat, J. (2002): Emergence, mobilité et milieu reproduction chez *Orthetrum coerulescens* (Odonata, Libellulidae) dans le Jura et le Jura bernois. *Nachrichten des Schweizer Zentrums für Kartographie der Fauna* 24: 14. (in French). [Verbatim: Travail de diplôme de Laurent Juillerat, Institut de zoologie, Université de Neuchâtel L'Orthétrum bleuissant (*Orthetrum coerulescens*) est une libellule qui, dans le Jura, se reproduit avant tout dans des marais de pente pâturés par le bétail. La principale menace qui plane sur ses populations est le drainage de ses milieux de reproduction. Dans une logique de conservation, ce travail a démontré qu'un piétinement mesuré des marais par le bétail est favorable à l'espèce, puisqu'il crée les gouilles dans lesquelles elle se reproduit. Il ne peut toutefois dépasser un certain seuil, un piétinement trop intense conduisant à la destruction pure et simple des marais. Près de 600 libellules ont été capturées et marquées entre le 27 mai et le 30 août 2001 dans trois vallées du Jura central. Ce travail a permis d'estimer la durée de vie maximale des adultes à près de 70 jours, ce qui dépasse largement les chiffres jusqu'alors avancés pour l'espèce (32 jours) ; de démontrer que la durée de la période de maturation des adultes était fortement influencée par les conditions météorologiques et qu'elle était plus importante chez les femelles ; de mettre en exergue de fréquents déplacements entre les différents marais d'une même vallée, la distance maximale étant de 1600 m. Cependant, aucun déplacement entre les différentes vallées n'a pu être mis en évidence.] Address: not stated

2977. Kalkman, V.J.; Duinen, G.A. van; Esselink, H.; Kuper, J.T. (2002): New records of Odonata from Estonia, with notes on breeding in the Baltic Sea and on species assemblages of raised systems. *Notul. odonatol.* 5(10): 120-125. (in English). [The records (1-21 July 1999, 14-24 July 2000) of 42 spp. resulting from 32 localities are presented. Records of *Lestes virens*, *Coenagrion johanssoni*, *C. puella*, *Pyrrhosoma nymphula*, *Aeshna ossiliensis*, *A. subarctica*, *Anax imperator*, *Somatochlora arctica*, and *Libellula fulva* are discussed in detail. *Ischnura elegans*, *Enallagma cyathigerum*, and *Orthetrum cancellatum* were found breeding in the Baltic Sea. It is concluded that the northward extension of the ranges of *I. elegans* and *O. cancellatum* in the Baltic region is influenced by their concurrence in brackish habitats along the Baltic Sea. Waterbodies in different parts of intact raised bog systems could be distinguished by differences in species assemblages and species

richness. In this context *Leucorrhinia rubicunda* and *L. caudalis* are briefly discussed.] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

2978. Kalkman, V.J.; Smit, J.T. (2002): *Platycnemis subdilatata* Sel., new to the Canary Islands? (Zygoptera: Platycnemididae). *Notul. odonatol.* 5(10): 128. (in English). [A specimen in the collection of the Zoological Museum of Amsterdam with label information on Tenerife is discussed in detail. It is concluded that the origin of the specimen lies in the Sahara from where it was wind dispersed. A less probable explanation is that it was transported by a vessel.] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

2979. Kano, K. (2002): Microhymenopteran insects phoretic on adult female of *Gynacantha ryukyurnis*. *Tombo* 44: 21-22. (in Japanese with English summary). [Tenjinny, Nago City, Okinawa-jima Island, Japan; on 1-VII-2001 a micro-hymenoptera was photographed sitting on the thoracic dorsum near the basal part of the wings of *G. ryukyurnis*.] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

2980. Kano, K.; Kobayasi, F. (2002): Some behaviors of *Rhipidolestes asatoi* Asahina. *Tombo* 44: 19-20. (in Japanese with English summary). [*R. asatoi* was found at Nakakosiki Island, Japan, an island never investigated prior 2001 (?). Photographs document the habitat and some behaviours.] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

2981. Karube, H. (2002): A new record of *Boninthemis insularis* (Matsumura) from Kitaiwo-jima Island. *Tombo* 44 : 7-8. (in Japanese with English summary). [*B. insularis* was considered as an endemic species from the Ogasawara Islands, Japan. 20/21 June 2001 it was recorded from the Kita-Iwojima Island of the Kazan-retto Group, app. 175 km SSE of the Ogasawara Islands.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

2982. Karube, H. (2002): A new record of *Philosina alba* Wilson from Laos. *Tombo* 44 : 5-6. (in Japanese with English summary). [Prior this record from Laos (1 male, Lak Sao, Vietnam border, 30.IV.1995, S. Nakamura leg.), the species has only been known from the type locality Guandong, China.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

2983. Karube, H. (2002): New records of *Archineura hetaeroides* (Fraser) (Calopterygidae) from northern Vietnam with collecting data from Laos. *Tombo* 44 : 6-7. (in Japanese with English summary). [Specimens from Vietnam and Laos are illustrated. The Vietnam specimens have larger milky white maculation on both fore and hind wing than the Laos specimens. The differences are considered as geographical variation.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

2984. Karube, H. (2002): Notes on the Chinese *Planaeschna* (Odonata: Aeshnidae) deposited in the Natural History Museum, London, with description of a new species from southern China. *Tombo* 44: 1-5. (in English). [*Planaeschna gressitti* spec. nov., holotype male, Yim Na San, 650 m asl., Kwangtung, China, 15.VI.

1936, J.L. Gressitt leg., holotype deposited in NHML. The species is closely related to *P. tamdaoensis* of northern Vietnam. *P. suichangensis* from Fujian is redescribed.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

2985. Kipping, J. (2002): Dragonfly research in the Okavango Delta, Botswana. IDF-Report 4(1): 18-26. (in English). [Between April and August 2000, Odonata were studied on West Chief's Island as well as on the Boro and Thamalakane River in Maun, Botswana, in the southeastern range of the Okavango delta. Furthermore, the author joined an excursion to the Panhandle around Mohembo and Shakawe during the first week of June. A total of 72 odonate species is listed without further comments. IDF and WdA promoted this study; more extensive results of the study will be published in the Int. Jour. Odonatology.] Address: Kipping, J., Ringstr. 5/6, D-04600 Altenburg, Germany. E-mail: jenskiping@hotmail.com

2986. Kita, H. (2002): Notes on the situation of the dying aged female of *Epiophlebia superstes* (Selys) in ovipositing in the field. Tombo 44: 23-24. (in Japanese with English summary). ["The author observed an aged female of *E. superstes* trying to lay eggs into a hard twig for oviposition. The female was, however, unable to lay eggs into the twig, and after 1 hour and a half, she dropped onto the river water. Dissection of her abdomen revealed no eggs inside." (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan (probably not the actual address)

2987. Kitt, M.; Werth, C. (2002): Libellen in der Bruchbach-Otterbachniederung. Pollichia-Kurier 18(3): 27-29. (in German). [The paper reviews records of Odonata from the Bienwald region near the German-French border in Rheinland-Pfalz, Germany previously published by M. Kitt or M. Niehuis. In the framework to re-establish the White Stork (*Ciconia ciconia*) in this region, numerous little water bodies have been created. These were surveyed by Christine Werth (University of Karlsruhe) with special emphasize to water chemistry, Amphibians, and Odonata (Ms thesis). The odonatological results are very briefly outlined, and a list of species including older and new records is compiled.] Address: Kitt, M., Raiffeisenstr. 39, D-76872 Minfeld, Germany, E-mail: MKitt@tonline.de; Werth, Christine, Mittelberg 4, D-76571 Gaggenau, Germany

2988. Klaus, D. (2002): Bericht über die Tagung Sächsischer Entomologen im Jahre 2002. Mitt. sächs. Ent. 60: 31-33. (in German). [Thomas Brockhaus gave a status quo report on the planned Odonata-fauna of Sachsen.] Address: Klaus, D., Heimstätten 10, D-04571 Rötha, Germany

2989. Klausnitzer, B. (2002): Libellen jagen schwärmende Ameisen - eine ältere Literaturangabe (Odonata). Ent. Nachr. Ber. 46(2): 134. (in German). [In 1897, Alexander Reichert published a paper "Aeschna cyanea MÜLL. und Formica rufa L." in the Entomologische Jahrbuch von Krancher 7: 190. He described a feeding aggregation of *A. cyanea* preying on swarming *F. rufa*. This paper is documented as verbatim.] Address: Klausnitzer, B., Lannerstr. 5, D-01219 Dresden, Germany

2990. Klein, J.-P. (2002): *Leucorrhinia pectoralis* (Große Moosjungfer) im Elsass. mercuriale 2: 13-16. (in German with French summary). [In 2000 and 2001, new localities of *L. pectoralis* in eastern France were traced. The habitats are described in detail along with a compilation of ancient and present known localities in Alsace.] Address: Klein, J.-P., Laboratoire d'Analyses et de Biologie Médicales Aubert, 22, rue des Carnes, F-54063 Nancy, France. E-mail: jpklein@free.fr

2991. Knaus, P.; Wildermuth, H. (2002): Site attachment and displacement of adults in two alpine metapopulations of *Somatochlora alpestris* (Odonata: Corduliidae). International Journal of Odonatology 5(2): 111-128. (in English). ["Site attachment and displacement of adult *S. alpestris* were studied by means of mark-release-resighting during two years at two clusters of ponds (A, B) ca 8 km distant from each other on opposite slopes of Prattigau Valley in the Swiss Alps. Data on 127 marked teneral in 1998 and 92 in 2000 at (A) were obtained. Additionally, in 1998, 187 and in 2000, 23 matures were marked at (A) and 162 at (B). No marked individuals were detected during the pre-reproductive period in the surroundings of the breeding sites. 14.0% of the males and 7.1% of the females marked as tenerals in 1998 were resighted at water subsequently. In 2000 the corresponding resighting rate was significantly lower due to a cold spell (4.0% and 2.4%, respectively). Only one male was resighted for the first time at its emergence pond. The resighting rates of marked adults at (A) were 59.2% (males) and 28.6% (females) in 1998, but only 5.6% and 0% in 2000, respectively. The corresponding resighting rates at (B) in 2000 amounted 27.1% (males) and 9.1% (females). Site attachment and displacement during the reproductive period differed between the two study sites. At (A) site attachment was modest and limited to the largest ponds. Many individuals shuttled between neighbouring ponds and some did so between waters distant up to 2 km from each other. Individuals at (B) exhibited stronger site attachment than at (A) with many being recorded exclusively at their marking water. No marked dragonfly was found to cross the main valley. We conclude that differences in site fidelity and displacement between the localities are due to weather conditions (affecting survival probability), population density (influencing competition) and separation of ponds by forest (inhibiting commuting flights)." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

2992. Knijff, G. de.; Anselin, A.; Goffart, P. (2002): The Belgium Odonata Atlas Project: changes in distribution. Bull. Inst. Roy. Scien. Nat. Belg. 72 (Suppl.): 111-112. (in English). [The paper abstracts the results of the atlas-activities of the Belgian odonatologists which started in 1983. On the basis of a distribution map presenting data since 1990 the species turn-over with special emphasize to southern species is discussed, and some large scale distribution patterns are outlined.] Address: Knijff, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijff@instnat.be

2993. Koel, T.M.; Stevenson, K.E. (2002): Effects of dredge material placement on benthic macroinvertebrates of the Illinois River. Hydrobiologia 474(1-3): 229-238. (in English). ["Since the 1930s, dredge material has been removed from the Illinois River and placed a-

long the main channel border in shallow depths to maintain a 2.7 m deep main channel for commercial navigation. Placement of this material changes the sediment composition from primarily silt/clay to primarily sand, and it buries pre-existing benthic invertebrates. During 1997 and 1998, the benthos of an 125 km reach of the middle Illinois River (La Grange Reach) was studied by extracting 1065 Ponar samples from randomly-selected sites which had never received dredge material, received dredge material one year previous, or received dredge material during the current year. Although total numbers of macroinvertebrates collected was lower in 1998 than in 1997, relative abundances of eight targeted taxa were highly similar between years. Chironimidae were most abundant and comprised >66% of all macroinvertebrates collected both years. Differences in densities of Chironomidae, Ephemeroptera, Sphaeriidae, Corbicula fluminea (Müller, 1774), Dreissena polymorpha (Pallas, 1771), Odonata, and Gastropoda among the three classes of dredge material placement were all significant ($P < 0.05$). For all taxa, densities were highest at sites that had never received dredge material; and, for all taxa except Chironimidae, densities were lowest at sites that received dredge material during the current year. No significant recovery by macroinvertebrates was noticed on dredge areas of this reach after one year ($P > 0.05$). Future operations to maintain a channel for navigation should consider pre-existing densities of macroinvertebrate taxa. Because benthic macroinvertebrates are an important component of the food web and shifting sand does not support diverse macroinvertebrate communities, strategic placement of dredge material by avoiding islands or other areas of high macroinvertebrate diversity could improve overall system productivity and biotic integrity of large river-floodplains." (Authors)] Address: Koel, T.M., Illinois Natural History Survey, LTRMP Havana Field Station, 704 N. Schrader Ave, Havana, IL 62644, U.S.A. Present address: Center for Resources, P.O. Box 168, Yellowstone National Park, WY 82190, U.S.A. E-mail: toddkoel@nps.gov

2994. Korkeamäki, E.; Suhonen, J. (2002): Distribution and habitat specialization of species affect local extinction in dragonfly Odonata populations. *Ecography* 25(4): 459-465. ["The object of our study was to determine the effect of distribution and habitat specialization of odonate species on local extinction in streams in central Finland. We studied the local extinction of the 20 most abundant dragonfly (Odonata) species in 34 small creeks and brooks in central Finland. The historical presence of each studied species in our research area was confirmed using existing records gathered between 1930 and 1975. A minimum of five records was available for each species. During the summers of 1995 and 1996, we investigated the current persistence of 219 separate populations with historical presence. In total, 98 historical populations were vanished. As predicted, we found that species with a narrow distribution were less persistent than species with a broad distribution. Therefore, the extinction risk of a species was inversely related to the width of its regional distribution. Using reference works, species were categorized into two main breeding habitat types: lotic species or lentic species. The species main habitat type was a significant predictor of local extinction risk after statistical removal of the effect of regional distribution on extinction risk. The lotic species had lower local extinction risk than other species. Altogether, the highest extinction

risk was found in habitat-specialist species associated with peatlands, probably due to loss of natural breeding habitat. On the other hand, extinction risk was lower in widely distributed habitat generalist species than true lotic species. The local extinction within species was more common in small dynamic upstream than in larger stable downstream habitats. The results of this study are consistent with meta-population theory." (Authors)] Address: Korkeamäki, E., Karkunkatu 18 a 4 b, FIN-48600 Karhula, Finland

2995. Krokalo, L.A.; Davydenko, E.V. (2002): Notes on dragonflies (Insecta: Odonata) of Dnipropetrovsk region. *Ecology & Noospherology* 11(1-2): 91-94. (in English with Russian and Ukrainian summaries). [In August 2000, in the environs of the village Andryvka, Novomoskov district, Ukraine (45°15'N 35°00'E), 14 odonate species have been recorded. This enlarges the number district species to 21. Feeding aggregation of *Aeshna mixta* is briefly described.] Address: not stated

2996. Krotzer, S. (2002): *Gomphus septima* rediscovered in Alabama. *Argia* 14(2): 10. (in English). [Bibb County, Alabama, USA, 5 May 2002] Address: Krotzer, S., 6010 Woodvale Drive, Helena, AL 35080, USA. E-mail: smjkrotzer@aol.com

2997. Kuhn, J. (2002): *Sympetrum meridionale* am Schmiechener See, Schwäbische Alb: Entwicklungsnachweis und Habitate (Odonata: Libellulidae). *Libellula* 21(1/2): 57-63. (in German, with English summary). ["On 1 August 2000 six newly emerged individuals were recorded at the shallow lake "Schmiechener See" (9°44'E, 48°21'N; altitude 534 m, which oscillates strongly and irregularly in water-level. Habitats were a meadow and a ploughed field, both temporarily flooded and maintained for conservation purposes. The presence and abundance of Mediterranean dragonfly species at the "Schmiechener See" strongly increased during 1980-2001." (Author)] Address: Kuhn, J., Max-Planck-Inst. für Verhaltensphysiologie, Abt. Winckler, D-82319 Seewiesen. E-mail: kuhn@mpi-seewiesen.mpg.de

2998. Kunz, B. (2002): *Coenagrion ornatum* an einem ausgebauten Wiesengraben in Baden-Württemberg (Zygoptera: Coenagrionidae). *Libellula* 21(1/2): 49-55. (in German, with English summary). ["The species has not been recorded in this federal state of Germany since 1993. In mid-July 1996, a new locality was found in the northeast of the state. This is the first record ever made in this area. Exuviae and a fairly high number of individuals were recorded in all subsequent years. A description of the unusual habitat is given." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

2999. Lange, M.; Hofmann, T. (2002): Zum Beutespektrum der Rohrweihe *Circus aeruginosus* in Mecklenburg-Strelitz, Nordost-Deutschland. *Vogelwelt* 123: 65-78. (in German with English summary). ["Between 1995 and 1997 prey remains and pellets were collected from 61 Marsh Harrier nests in Mecklenburg Strelitz (North-east Germany) in order to study the diet composition. Seventy-six species of vertebrates (53 birds species, 14 mammals species) and 38 insect taxa were identified. Species numbers and proportions of prey types differed significantly between prey remains at the nest and pellets. Birds made up 63% of all prey remains but constituted only 23% in pellets where mammals

proved to be dominant with a content of 75% (prey remains 23%). [...] The determination of insect remains turned out to be a special problem and their origin in pellets could not always be accurately solved. Coleoptera, especially carabids, dominated with 87%. [...] Each one unidentified Anisoptera and Zygoptera could be found in the pellets too.] Address: Lange, M., F.-Mehring-Str. 20, D-17489 Greifswald, Germany. E-mail: morgus.lange@gmx.de

3000. Lecompte, T. (2002): *Symeptum danae* (Sulzer, 1776) espèce nouvelle pour le marais Vernier (Département de l'Eure). *Martinia* 18(2): 67-68. (in French with English summary). [After starting an intensive survey of Odonata in 1971, the discovery of *S. danae* lasted until August 1999; the species was discovered in and nearby the Nature Reserve Coutils de Bouquelon, France.] Address: Lecompte, T., R.N.V. des Courtils de Bouquelon, la Courtilière, la Vallée, F-27500 Bouquelon, France

3001. Leconte, M.; Ilbert, N.; Lapalisse, J.; Laporte, T. (2002): Le point sur les connaissances relatives aux odonates rares des pays de l'Adour (Gers, Landes, Pyrénées-Atlantiques, Hautes-Pyrénées). *Martinia* 18(2): 39-65. (in French with English summary). [72 odonate species have been recorded from the catchment of the River Adour, France. This river system encompasses several smaller rivers north of the Pyrenees-high mountains and the southwestern part of France. Recent and historical records of 32 species are discussed in detail] Address: Leconte, M., Quartie du Caü, F-64260 Arudy, France

3002. Leipelt, K.G.; Sommer, R.; Martens, A. (2002): Erratum zu *Libellula* 20 (3/4): 155-170: Territorialität bei *Oxygastra curtisii* (Odonata: Corduliidae). *Libellula* 21 (1/2): 77-78. (in German, with English summary). [In the original paper several lines are missing. These are published in this erratum.] Address: Leipelt, K.G., Zoologisches Institut -Öologie-, Technische Universität Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-Mail: k.leipelt@tu-bs.de

3003. *Lindenia* No. 36 (2002): LINDENIA. Notiziario dell'Ufficio nazionale italiano della Società odonologica internazionale, Napoli. *Lindenia* No. 36: 151-152. (in Italian). [Announcements of odonological symposia; new Italian dragonfly site in WWW; Dr. B. Kiauta received a decoration of the brother members of Oranje-Nassau. (see: www.libellen.org/extra/decorated.html)] Address: C. D'Antonio, Via A. Falcone 386/b, 1-80127 Napoli, Italy; E-mail: lindenia@freemail.it

3004. Loman, J. (2002): *Rana temporaria* metamorph production and population dynamics in the field Effects of tadpole density, predation and pond drying. *J. Nat. Conserv.* 10: 95-107. (in English). ["This study investigates factors of importance for tadpoles survival and metamorph production in the common frog *R. temporaria*. It also assesses the importance of this for the population dynamics of the species. Eighteen ponds were studied for up to 8 years. Data collected each year included: number of spawn clumps deposited, tadpole number and metamorph number. The permanency of the ponds was also recorded each year. Measures were taken of predator density. There was no suggestion of density dependence in the survival of tadpoles. In contrast, the number of spawn clumps deposited per pond area was highest for ponds with high survival.

Density of predators (sticklebacks, newts and invertebrates [including "larval Anisopteran"]) was negatively correlated to tadpole and metamorph survival. This was true both within (among years) and among ponds. Several of the study ponds dried completely before metamorphosis in some years. However, those ponds also were those with the smallest number of predators and in years with successful metamorphosis, these ponds produced more metamorphs than more permanent ponds. An analysis of the year to year dynamics showed that population size (number of deposited spawn clumps) was correlated to that in the previous year, suggesting a fairly high adult survival, but also on the number of metamorphs emerging two or three years before (corresponding to the age of sexual maturity of the species). It is concluded that the aquatic stage is not strongly limiting in these ponds but conservation efforts should be focused on the terrestrial habitat. Also, the study stresses the value of temporary ponds, despite the fact that recruitment often fails totally in these." (Author)] Address: Loman, J., Department of Animal Ecology, Lund University, SE-223 62 Lund, Sweden; e-mail: jon.loman@zoekol.lu.se

3005. Lopez, R. (2002): X-50 Dragonfly poised for takeoff. *Aerospace America* 40(4): 30-34. (in English). [Although designed as a vertical takeoff and landing aircraft, the Dragonfly will be able to achieve much higher forward speeds than conventional manned helicopters. Its design combines the low disk-loading hover efficiency and low-speed flight characteristics of a helicopter with the high subsonic cruise speed of a fixed-wing aircraft. This new developed aircraft obviously integrates some of the flight characteristics of the Anisoptera, and this may be a reason to name it "Dragonfly".] Address: not stated

3006. Lotzing, K. (2002): Die aktuelle Libellen-Fauna (Odonata) der Bergbaufolgegewässer im Bereich der Egelner Mulde innerhalb der Bodeniederung des Landkreises Aschersleben-Staßfurt (Sachsen-Anhalt). *Entomologische Nachrichten und Berichte* 46(2): 85-89. (in German with English summary). [Prior brown coal mining, which started in the first half of 20th century, the region was quite poor in water bodies. This situation changed significantly after ceasing mining activities: the excavations filled with groundwater, and in some cases interesting habitats developed. The Odonata were studied between 1980 and 2001 intensively. A total of 31 species including species of regional interest could be traced: *Calopteryx splendens*, *Lestes barbarus*, *L. dryas*, *L. virens*, *Erythromma viridulum*, *Aeshna affinis*, *Anaciaeschna isosceles*, *Anax parthenope*, *Libellula fulva*, and *Sympetrum pedemontanum*. In addition, records of *Lestes barbarus*, *Erythromma viridulum*, *Brachytron pratense*, *Aeshna affinis*, and *Sympetrum flaveolum* should be mentioned too. The species are listed for each of the 15 surveyed waterbodies, and are zoogeographically classified.] Address: Lotzing, K., Am Hollschen Bruch 4c, D.39435 Unseburg, Germany

3007. Luglia, M.; Luglia, T. (2002): Comptage de larves d'*Aeshna cyanea* (Müller, 1764). *Martinia* 18(1): 28. (in French). [273 larvae of *A. cyanea* were recorded in a small bassin near Sault, Vaucluse, France. The habitat is characterised.] Address: Luglia, M.; Luglia, T., La Fontaine de Durefort, F-84390 Saint Jean de Sault, France

3008. Machado, A.B.M. (2002): Description of *Lauro-macromia flaviae* spec. nov., with notes on the holotype of *L. luismoojeni* (Santos) (Anisoptera: Corduliidae). *Odonatologica* 31(3): 313-318. (in English). [*L. flavia* sp. n. (male holotype: Jaboticatubas, Minas Gerais, Brasil, 14-1-1975; deposited in Author's collection), is described, illustrated, and compared with the males of the two congeners *L. luismoojeni* and *L. dubitalis*. Some amendments are made on the original description of *L. luismoojeni*, based on the examination of the holotype.] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

3009. Manteifel, Y.B.; Reshetnikov, A.N. (2002): Avoidance of noxious tadpole prey by fish and invertebrate predators: Adaptivity of a chemical defence may depend on predator feeding habits. *Archiv für Hydrobiologie* 153(4): 657-668. (in English). ["We conducted laboratory experiments where different types of predators were allowed to prey on noxious versus non-noxious tadpoles. The introduced fish *Perccottus glenii* showed prey selectivity: while actively consuming all seized tadpoles of *Rana arvalis* and *Rana temporaria*, it consumed significantly fewer *Bufo bufo* tadpoles. When a *Bufo* tadpole was seized, it was frequently rejected after intraoral testing without much damage done to the tadpole. Nymphs of the dragonfly *Aeshna cyanea*, chewing captured prey, also consumed significantly more tadpoles of *Rana* spp. than *Bufo*. Seized *Bufo* tadpoles were as a rule released seriously damaged. The *Aeshna* readily caught the next *Bufo* tadpole. On the contrary, larvae of the diving beetle *Dytiscus marginalis*, who suck out their prey, did not reject *Bufo* tadpoles. Hence, the relative unpalatability of the *Bufo* tadpoles may provide them with a satisfactory defence against *Perccottus*, an incomplete defence against *Aeshna*, and no protection against *Dytiscus*. It is possible that the relative unpalatability of *Bufo* tadpoles increases their population mortality in ponds with high *Aeshna* density." (Authors)] Address: Manteifel, Y.B., A. N. Severtsov Institute of Ecology and Evolution, Russian Academy of Science, Leninsky pr. 33, Moscow, 117071, Russia. E-mail: sevin@orc.ru

3010. Mashaal, M. (2002): *Somatochlora metallica* (Vander Linden, 1825), espèce nouvelle pour la Corse (Odonata, Corduliidae). *Martinia* 18(1): 25-27. (in French with English summary). [*Somatochlora metallica meridionalis* was recorded on 13 July, 2001 app. 15 km SE of Ajaccio, Corsica, France. Habitat and taxonomic status are discussed.] Address: Mashaal, M., 89 avenue Emile Zola, F-75015 Paris, France. E-mail: mashaal@club-internet.fr

3011. Matushkina, N.; Gorb, S. (2002): Stylus of the odonate endophytic ovipositor: A mechanosensory organ controlling egg positioning. *Journal of Insect Physiology* 48(2): 213-219. (in English). ["Using light and scanning electron microscopy, a sensory field consisting of 15-20 campaniform sensillae is described on the base of the stylus of the endophytic ovipositor of Odonata. It is hypothesised that two symmetric styli equipped with this number of sensillae can function as a mechanosensory organ responsible for control of precise egg positioning in plant stems during oviposition. In laboratory experiments with females of *Lestes sponsa* and *L. barbarus*, it was demonstrated that the distance

between laid eggs is not dependent on the presence of styli. Removal of styli from both sides did not influence a shift of oviposition to one side. Females with one removed stylus shifted the clutch line in the opposite direction toward the removed stylus. Additionally, removal of styli influenced positions of single eggs in egg sets, and disturbed the capacity for complex oviposition. Thus, both morphological and experimental data support the hypothesis that styli participate in the control of egg line and egg patterning in the clutch." (Authors)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

3012. May, M.L.; Baird, J.M. (2002): A comparison of foraging behavior in two "percher" dragonflies, *Pachydiplax longipennis* and *Erythemis simplicicollis* (Odonata: Libellulidae). *Journal of Insect Behavior* 15(6): 765-778. (in English). ["Feeding behaviors of two adult libellulid percher dragonflies, *Pachydiplax longipennis* and *Erythemis simplicicollis*, were compared. All results pertain to feeding from natural perches located some distance away from reproductive rendezvous sites. Compared to *P. longipennis*, *E. simplicicollis* chose broader and less structurally discrete perches, moved more frequently and over a larger area, and took, on average, much larger prey, although diet overlapped broadly in the two species. *Erythemis* made more frequent feeding flights but with a much lower success rate than *Pachydiplax*; consequently the prey capture rate was similar in the two species. Gut contents of mature, but not of immature, *E. simplicicollis* comprised a significantly greater proportion of body mass than in *P. longipennis*, apparently confirming the importance of larger prey in the diet of the former. (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

3013. May, M.L. (2002): Phylogeny and taxonomy of the damselfly genus *Enallagma* and related taxa (Odonata: Zygoptera: Coenagrionidae). *Systematic Entomology* 27: 387-408. (in English). ["The zygopteran genus *Enallagma* has been the subject of numerous behavioural and ecological studies, but phylogenetic relationships among species have been examined only within eastern North America, and even the composition and diagnosis of the genus are unclear on a world-wide basis. Most authorities currently recognize about seventy species within *Enallagma*, comprising two major radiations, in North America and Africa. This study, using morphological data, demonstrates that the North American and a few related Palaearctic species form a monophyletic group that is quite distinct from the African species. The latter are themselves divided into at least three, and probably four, separate clades, one of which may be related to *E. parvum* of India. Consequently, three of Kennedy's long disused genera, *Africallagma*, *Amphiallagma* and *Proischnura* (Kennedy, 1920) are resurrected and two new genera, *Azuragrion* gen.n. and *Pinheyagrion* gen.n. are established for the remaining African taxa. Finally, *Enallagma* is divided into two subgenera, *Enallagma* s.s., the typical 'bluets', including many North American, Holarctic and Palaearctic species, and *Chromatallagma* subgen.n., comprising a group of species of more variable colour that is confined to North America, the Caribbean and northernmost South America." (Author)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook

College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

3014. McMillan, V. (2002): 2nd WDA International Symposium of Odonatology, July 22-27, 2001. *Argia* 13(4): 4-5. (in English). [Personal account of the 2nd WDA symposium in Gällivare, Sweden.] Address: McMillan, Vicky, Colgate Univ., Dept. Biol., 13 Oak Dr. Hamilton, NY 13346-1398, USA. E-mail: vmcmillan@mail.colgate.edu

3015. Meurgey, F. (2002): Les collections d'odonates du Muséum d'Histoire naturelle de Nantes. 2. Collection G. Broquet. *Inventaire et révision. Martinia* 18(1): 13-24. (in French with english summary). [The collection with 50 species from the mainland of France and the isle of Corsica includes in most cases specimens collected in the 1950th. The collection data are listed in detail.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France

3016. Meurgey, F. (2002): Un cas de colonisation par les odonates d'un milieu modifié par les tempêtes de décembre 1999 en Ile-d-France. *Martinia* 18(1): 27-28. (in French). [10 months after the heavy storms that broke some forests, a small brook was settled by *Enallagma cyathigerum*, *Anax imperator*, and *Orthetrum cancellatum*. This brook formerly had been heavily shaded by oaks, and therefore was unsuitable for Odonata.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France

3017. Mitra, T.R.; Prasad, M.; Sinha, C. (2002): A note on Odonata recorded from Nagaland, northeastern India. *Opusc. zool. flumin.* 201: 1-6. (in English). [The history of the odonate recording in Nagaland, India is outlined, and 35 species along with collecting data are brought on record.] Address: Mitra, T.R., Zool. Surv. India, M Block, New Alipore, Calcutta-700053, India

3018. Monetti, L.; Sanchez-Guillen, R.A.; Cordero Rivera, A. (2002): Hybridization between *Ischnura graellsii* (Vander Linder) and *I. elegans* (Rambur) (Odonata: Coenagrionidae): Are they different species?. *Biological Journal of the Linnean Society* 76(2): 225-235. (in English). ["Two closely related damselflies, *Ischnura graellsii* and *I. elegans*, were analysed for morphological differences and reproductive isolation in the north coast of Galicia (NW Spain). We compared animals from sympatric and allopatric localities, including *I. elegans* from Belgium and *I. graellsii* from southern Spain as pure allopatric populations. A set of morphometric characters were studied by means of multivariate discriminant analysis to determine if these two species can be unambiguously distinguished. Discriminant analysis revealed that *I. graellsii* and *I. elegans* are well differentiated on the first two axis (86% and 11%, respectively). *I. graellsii* individuals are distinguished from *I. elegans* by their smaller size and, specifically, by their narrower and shorter wings and shorter tibiae. In addition, *I. elegans* has a narrower space between the branches of each cercus, and greater distance between the branches of each paraproct. Sympatric individuals are morphologically intermediate, suggesting hybridization. When the species were put together in the laboratory, they showed partial temporal separation in mating behaviour, but males of *I. elegans* readily mated with females of *I. graellsii*, and hybrid individuals were obtained. The opposite heterospecific cross was almost impossible, apparently because of mechanical problems

with the tandem linkage. Laboratory-reared hybrids (from male *I. elegans* X female *I. graellsii*) are morphologically intermediate, mainly resembling the maternal phenotype. Although hybridization between both taxa is common, we suggest maintaining the specific status for both phenotypes because they show incipient reproductive isolation, as it is reported in the literature." (Authors)] Address: Monetti, Liliana, Departamento de Ecología e Biología Animal, Universidade de Vigo, EUET Forestal, Campus Universitario, 36005, Pontevedra, Spain. E-Mail: lmonetti@uvigo.es

3019. Müller, J.; Wüstemann, O.; Müller, R.; Steglich, R. (2002): Neufunde von *Cordulegaster bidentata* im Harz und *Epitheca bimaculata* im Elbtal (Odonata) - zur Roten Liste Sachsen-Anhalt. *Entomol. Mitt. Sachsen-Anhalt* 9(2): 47-49. (in German). [The paper compiles and discusses extensively new records of *Thecagaster bidentata* and *E. bimaculata* in Sachsen-Anhalt, Germany. These records cause the modification of the classification of the species in the Red List of endangered Odonata of the Federal State Sachsen-Anhalt.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

3020. Müller, O. (2002): Die Habitate von Libellenlarven in der Oder (Insecta, Odonata). *Naturschutz und Landschaftspflege in Brandenburg* 11(3): 205-212. (in German). [The River Oder along the German-Polish border harbours one of the most important populations of different gomphid species in Central Europe. Exemplified for the middle stretches of the river, the habitats of *Gomphus vulgatissimus*, *Stylurus flavipes*, and *Ophiogomphus cecilia* are described and analysed in detail. Sedimentation between groynes is the main determinant for habitat quality for the species. In dependence of velocity of water flow and substrat, different substrat types are provided which are used species specific by larvae. This paper provides a significant contribution to the understanding of habitat use by dragonflies in a dynamic ecosystem. In addition, special emphasize is given to aspects of conservation measures. The illustrations and photographs attribute significant information too.] Address: Müller, O., Birkenweg 6d, D-13206 Libbenichen, Germany. E-mail: olemueller@freenet.de

3021. Murry, C. (2002): Dragonfly conservation from the BDS. *Atropos* 16: 78-79. (in English). [It is intended to establish a regular column in *Atropos* dedicated to dragonfly conservation. Some main factors causing threat to Odonata are discussed, and ideas to broaden knowledge on conservation measures ("management fact files") are outlined.] Address: not stated

3022. Nakatani, M.; Ubukata, H. (2002): Some Dragonflies Collected from Kuril Islands and Sakhalin. *Bulletin of The Hokkaido Odonatological Society* 14: 12-15. (in English with Japanese summary). [*Coenagrion ecornutum*, *Enallagma circulatum*, *Lestes dryas*, and *Pantala flavescens* have been recorded from Sakhalin, *Aeshna juncea* and *P. flavescens* from the Kurile Islands (Paramushir, Matua) in July 2000.] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

3023. Nishu, S. (2002): Discovery of an exceptional habitat of *Libellula angelina* Selys. *Tombo* 44: 31-32. (in Japanese with English summary). [An exceptional habi-

tat of *L. angelina* was found in Kasai City, Hyogo Prefecture, Japan. This endangered species was considered to inhabit typically ponds with sparse vegetation of *Phragmites australis*, *Typha latifolia* and *Zizania latifolia*. 12 exuviae of this species were found on the concrete breast wall of Pond B where *Paspalum distichum* grows sparsely on April 22-IV-2001. On subsequent days until May 13, several males patrolling in their territories and a female ovipositing were observed.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisq.net

3024. Novelo-Gutierrez, R.; Gomez-Anaya, J.A.; Arce-Perez, R. (2002): Community structure of Odonata larvae in two streams in Zimapan, Hidalgo, Mexico. *Odonatologica* 31(3): 273-286. (in English). ["Community structure of odonate larvae was investigated at El Saucillo (ES) and San Francisco (SF) streams, from August 1995 to July 1996. Species richness (S), species composition, Margalef's richness index (R), Shannon-Wiener's diversity index (H'), Hill's evenness index (E), and rareness (Rs) were used to describe and compare the communities. Annual variation of the indices was examined within and among streams. Streams were significantly different in terms of physical/chemical variables, and faunistic similarity between the communities was quite low (37%). Mean larval density was highest at ES, but the remaining parameters were highest at SF. Global richness was 31 spp. and some species such as *Hetaerina americana*, *Enallagma civile*, *Anax junius*, *Erpetogomphus elaps*, *Dythemis nigrescens*, *Aeshna multicolor*, *A. dugesi*, *Erythemis plebeja* and the majority of *Argia* spp. were only found at SF. More abundant spp. at SF were *Pseudoleon superbus*, *Telebasis salva*, *Libellula saturata* and *Enallagma praevarum*, while those more abundant at ES were *Paltothemis lineatipes* and *Argia anceps*." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

3025. Orr, A.G. (2002): Notes on the *Rhinocypha cucullata* Selys group from Borneo, with a description of *R. viola* spec. nov. (Zygoptera: Chlorocyphidae). *Odonatologica* 31(3): 287-295. (in English). ["The new species from the central Kalimantan province of Borneo is described and figured. The original type series of *R. cucullata* Selys was examined and a male specimen is designated as lectotype. The single female syntype is shown to in fact be *R. humeralis* Selys. The true female *R. cucullata* is described and figured for the first time. Significant characters of *R. aurofulgens* Laidlaw are figured for comparative purposes. Keys are provided to both sexes of the three species, comprising the extended *cucullata* group of F.F. Laidlaw (1950, *Trans. R. ent. Soc. Land.* 101: 233-269)." (Author)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

3026. Orr, A.G. (2002): Photographing dragonflies in tropical rainforest. *Austrolestes* 5: 3. (in English). [Special emphasize is given to light conditions in tropical rainforests, and technical possibilities to take photos of dragonflies under this restricting conditions.] Address: Orr, A.G., Cooperative Research Centre for Tropical

Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

3027. Parr, A. (2002): Lesser Emperor *Anax parthenope* Update. *Atropos* 16: 78. (in English). [Verbatim: "The number of *A. parthenope* seen in Britain since the initial discovery of the species in 1996 now totals at least 45 individuals. Of those dragonflies that were sexed, some 92% have been males with only 8% (3 individuals) being female. Genuine imbalances in the sex ratio of migrating dragonflies have sometimes been noted during periods of visible migration, particularly for darters *Sympetrum* spp., but there are also instances/species where a more equal sex ratio is apparent (Bertram & Haacks 1999, *Libellula* 18: 89-94). The pronounced bias towards records of males in the case of Lesser Emperors seen in Britain must surely in part reflect behavioural differences that make males, especially those holding territory, much more easy to spot than females. One other factor that also needs to be taken into account when considering the British records is the likelihood that females are still being overlooked. Few identification guides as yet contain any illustrations of the female, and with different colour forms existing (Parr 2001) even one picture is not really enough. To facilitate identification of females and to supplement the illustration in Brooks & Lewington (1999) two colour forms are now illustrated on Plate 8 (of *Atropos* 16). It will be of interest to see if more records of females are forthcoming in the next few years, not least in the context of regular breeding in this country."] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

3028. Parr, A. (2002): Migrant and dispersive dragonflies in Britain during 2001. *J. Br. Dragonfly Society* 18(1/2): 40-45. (in English). [Information referring to the following species are provided: *Calopteryx virgo*, *Ischnura pumilio*, *Erythromma najas*, *E. viridulum*, *Aeshna cyanea*, *A. mixta*, *Anax parthenope*, *Cordulia aenea*, *Libellula depressa*, *Orthemis brunneum*, *O. cancellatum*, *Sympetrum striolatum*, *S. fonscolombii*, and *S. danae*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

3029. Paulson, D.R. (2002): Odonata records from Nayarit and Sinaloa, Mexico, with comments on natural history and biogeography. *Odonatologica* 31(4): 359-370. (in English). ["Although the odonate fauna of the Mexican state of Nayarit has been considered well-known, a 7-day visit there in Sept. 2001 resulted in records of 21 species new for the state, bringing the state total to 120 species, fifth highest in Mexico. Records from a 2-day visit in Aug. 1965 are also listed, many of them the first specific localities published for Nayarit, and the first records of 2 species from Sinaloa are also listed. The biology of most neotropical species is poorly known, so natural-history notes are included for many species. A storm-induced aggregation and a large roost of dragonflies is described. The odonate fauna of Nayarit consists of 2 primary elements: a large number of neotropical species reaching their northern known limits, and a montane fauna of the drier Mexican Plateau. At least 57 species of tropical origin reach their northern distribution in the western Mexican lowlands in or N of Nayarit, and these limits must be more accurately defined to detect the changes in distribution that may be taking place with global climate change."]

(Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3030. Peiffer, B. (2002): Interesting encounter between *Dromogomphus* and *Sympetrum*. *Argia* 13(4): 14. (in English). [Using some military terms, an encounter between two adults of *Dromogomphus spinus* and *Sympetrum spec.* is reported; 29 July 2001, New York, USA.] Address: Peiffer, B, bryan@VermontBirdTours.com

3031. Peiffer, B. (2002): Vermont Ode Study Group. *Argia* 13(4): 15-16. (in English). [Short report about the scheduled activities of the newly founded Vermont Ode Study Group, USA.] Address: Peiffer, B, bryan@VermontBirdTours.com

3032. Petzold, F. (2002): Erster Nachweis von *Leucorrhinia albifrons* in Thüringen (Odonata: Libellulidae). *Libellula* 21(1/2): 37-39. (in German, with English summary). [An exuvia was recorded in a drinking-water reservoir near the village of Remptendorf on 19-06-2001. The habitat is described, and the closest regional records are discussed.] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

3033. Petzold, F. (2002): *Gomphus vulgatissimus* wieder in der thüringischen Saale (Odonata: Gomphidae). *Libellula* 21(1/2): 41-43. (in German, with English summary). ["On 19 May 2001, a larva was recorded in the river Saale between Stoben and Kaatschen 19 km NNW of Jena. The species was proved again to exist in Thuringia, Germany. The most recent previous record was 1960. The species became extinct because of heavy pollution of the river." (Author)] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

3034. Pfau, H.K. (2002): Tandem grip mechanics and tandem linkage shifting in Odonata - reconstruction of evolution and phylogenetic significance. *International Journal of Odonatology* 5(2): 129-179. (in English). ["The functional morphology of the male caudal clasping apparatus of Zygoptera is compared to that of Epiophlebia superstes (Anisozygoptera) and Anisoptera. Hypotheses concerning the mechanics and muscle functions have been advanced by parallel construction of mechanical working models. The evolution of the clasping apparatus and the tandem linkage shifting - from the female pronotum to the head - in the stem group of the Anisozygoptera + Anisoptera (Neoconjuncta) is reconstructed, beginning with a system, which in essential characters resembles that of Epallage fatime (Euphaeidae). New acquisitions of the Neoconjuncta, Anisozygoptera and Anisoptera are described and interpreted. An interdependent evolution of the clasping apparatus + tandem linkage and the flight apparatus is discussed. Characters of both systems in the Euphaeidae and the Neoconjuncta are evaluated as synapomorphies, establishing a group Heteronoda. The Zygoptera are substantiated as a paraphyletic group. The functional morphology of the motion system of the cerial and epiproctal filaments of the Ephemeroptera has been studied for comparison. It shows strongly autapomorphic features, adapted to the display flight." (Author)] Address: Pfau, H.K., Rathenastr. 14, D-65326 Aarbergen, Germany. E-mail: clauspfau@web.de

3035. Reeves, D. (2002): From the president. *Austrolestes* 5: 1-4. (in English). [D. Reeves stresses on some contents of *Austrolestes*, gives extensive information on the forthcoming WdA-meeting in Australia in January 2003, and provides a (commented) key of the Australian members of the genus *Orthetrum*.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3036. Reeves, D. (2002): From the president. *Austrolestes* 3: 1-3. (in English). [A brief note on dragonfly habitats worth to visit in Herston, Australia, recent odonatalogical publications, 'Questions and Answers', and a new frog book are published.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3037. Reeves, D. (2002): From the president. *Austrolestes* 4: 1-4. (in English). [D. Reeves introduces the issue No. 4 of *Austrolestes*, and stresses the autumn species *Cordulephya pygmaea*. Under the aspect of climate change, the notes of Deniss's disappointing dragonfly summer may be of some interest: some of the creeks ceased running, and water tables of standing waters falls at app. 1 meter down to extraordinary drought conditions. Thus, some species could not be traced. The issue closes with some thoughts on future improvement and development of *Austrolestes*.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3038. Reeves, D. (2002): Key to the males of *Diphlebia* (Amphipterygidae). *Austrolestes* 4: 3. (in English). [The key is a reproduction from Watson et al. (1991): *The Australian Dragonflies*.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3039. Reeves, D. (2002): Species profile: *Cordulephya pygmaea*. *Austrolestes* 4: 2. (in English). [The endemic Australian genus *Cordulephya* is introduced, and a key for identifying adults is provided. A few notes on habitat and habits of *C. pygmaea* are given.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3040. Reeves, D. (2002): Species profile: Jade Hunter - *Austrogomphus ochraceus* (Selys, 1869). *Austrolestes* 5: 3. (in English). [Some information on the habits of this stream-dwelling species are outlined.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3041. Reeves, D. (2002): Species profile: *Telephlebia cyclops* Tillyard. *Austrolestes* 3: 4. (in English). [The genus *Telephlebia* is briefly introduced, and (the crepuscular) *T. cyclops* is presented with emphasize on roosting behaviour at day.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3042. Rehn, A.; Paulson, D. (2002): *Orthemis discolor* from Arizona. *Argia* 14(2): 11. (in English). [The specimens were caught 22 August 1977 in Arizona, USA. *O. discolor* museum material is compared with *O. ferruginea*, and colour differences in preserved specimens are outlined.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3043. Reinhardt, K.; Köhler, G. (2002): Bedeutung aktueller Befunde der Verhaltensökologie für den Artenschutz. *Naturschutz und Landschaftsplanung* 34(6): 171-180. (in German with English summary). [Exemplified on the basis of most recent research on grasshopper (meta-)population ecology and behaviour, the authors make a highly significant contribution on conservation of insect populations. Klaus Reinhardt, a well known German odonatologist, makes in this paper some references to odonatological research too.] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: bgykr@leeds.ac.uk

3044. Reinhardt, R.; Findeis, T.; Fischer, U. (2002): "Grünes Band" Sachsen - der sächsisch-bayerische Grenzstreifen. *Mitt. sächs. Ent.* 60: 14-20. (in German). [The former boundary between GDR and FRG developed to a 'green band' with a high species diversity including numerous highly endangered species. A survey of the stretch between Sachsen and Bayern yielded in 28 Odonata. Only the red listed species are documented.] Address: Reinhardt, R., Burgstädter Str. 80a, D-09648 Mittweida, Germany. E-mail: Reinhardt-Mittw@t-online.de

3045. Relyea, R.A. (2002): Costs of Phenotypic Plasticity. *American Naturalist* 159(3): 272-282. (in English). ["Phenotypically plastic organisms display alternative phenotypes in different environments. It is widely appreciated that possessing alternative phenotypes can affect fitness. However, some investigators have suggested that simply carrying the ability to be plastic could also affect fitness. Evolutionary models suggest that high costs of plasticity could constrain the evolution of optimal phenotypes. However, costs (and limits) of plasticity are primarily hypothetical. Little empirical evidence exists to show that increased plasticity leads to reduced growth and development, leads to increased developmental instability, or limits the ability of organisms to produce more extreme phenotypes. I used half-sib families of larval wood frogs (*Rana sylvatica*) reared in outdoor mesocosms to examine how tadpoles altered behavioral, morphological, and life-historical traits in response to larval dragonfly predators (*Anax longipes*). The predators induced lower activity and the development of relatively large tails and small bodies in wood frogs. As a result, wood frogs experienced reduced growth and development. I then examined whether tadpole sibships with higher plasticity experienced fitness costs (above and beyond the costs of expressing a particular phenotype) and whether they were limited in producing extreme phenotypes. Fitness effects of plasticity were widespread. Depending on the trait examined and the environment experienced, increased plasticity had either positive effects, negative effects, or no effects on tadpole mass, development, and survivorship. I found no relationship between increased plasticity and greater developmental instability. There was also no evidence that sibships with increased plasticity produced less extreme phenotypes; the most extreme trait states were always produced by the most plastic genotypes. This work suggests that costs of plasticity may be pervasive in nature and may substantially impact the evolution of optimal phenotypes in organisms that live in heterogeneous environments." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburg, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

3046. Relyea, R.A. (2002): Local population differences in phenotypic plasticity: predator-induced changes in wood frog tadpoles. *Ecological Monographs* 72(1): 77-93. (in English). ["Taxa that are divided into separate populations with low levels of interpopulation dispersal have the potential to evolve genetically based differences in their phenotypes and the plasticity of those phenotypes. These differences can be due to random processes, including genetic drift and founder effects, or they can be the result of different selection pressures among populations. I investigated population-level differences in predator-induced phenotypic plasticity in eight populations of larval wood frogs (*Rana sylvatica*) over a small geographic scale (interpopulation distances of 0.3-8 km). Using a common-garden experiment containing predator and no-predator environments, I found population differences in behavior, morphology, and life history. These responses exhibited a habitat-related pattern: the four populations from closed-canopy ponds did not differ from each other in any of their phenotypes whereas the four populations from open-canopy ponds did differ from each other in these traits. This phenotypic pattern matches the pattern of competitors and predators found in these two types of ponds. Based on two years of pond surveys, the four closed-canopy ponds contained very similar competitor and predator assemblages while the assemblages of the four open-canopy ponds were more diverse and highly variable among open-canopy ponds. When combined with past studies, which demonstrate that predators and competitors select for alternative behavioral and morphological traits, these patterns suggest that the population differences may have arisen via natural selection and not via random mutation or drift. In a second experiment, I cross-transplanted two of the populations into each other's ponds to determine if the populations were locally adapted to the conditions of their native pond (using low and high competition crossed with the presence or absence of a lethal predator). The populations continued to exhibit phenotypic differences, and one of the two populations tested exhibited superior growth in its native pond. This suggests that some wood frog populations are adapted to the local conditions of their natal pond and that localized selection by predation and competition may be the underlying mechanism. Collectively, these experiments indicate that taxa that are divided into discrete populations and face different predator and competitor environments can evolve different phenotypically plastic responses." (Author) Odonate predators were aeshnid and libellulid dragonflies, not further specified.] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburg, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

3047. Relyea, R.A.; Yurewicz, K.L. (2002): Predicting community outcomes from pairwise interactions: integrating density- and trait-mediated effects. *Oecologia* 132: 569-579. (in English). ["[...] many species change their behavior and morphology with different predators and competitors and, thus, change their per-capita interaction rates (i.e. trait-mediated interactions). Our objective was to use a simple experimental community of two predators (larval dragonflies, *Anax longipes*, and larval salamanders, *Ambystoma tigrinum*), two prey (larval green frogs, *Rana clamitans*, and larval bullfrogs, *R. catesbeiana*), and a shared prey resource to determine whether we can predict interactions in a reassembled community by combining our knowledge of density- and trait-mediated interactions. We combined

pairwise laboratory experiments on predation rates and predator-induced behaviors with a mesocosm experiment to examine density- and trait-mediated effects. We used a factorial combination of no predators, caged Anax (to induce anti-predator traits without changing prey density), and lethal Anax crossed with no predators, caged *Ambystoma*, and lethal *Ambystoma*. The species interactions in the reassembled community were qualitatively predictable based on the pairwise experiments. Lethal Anax preyed upon *Ambystoma* and green frogs while lethal *Ambystoma* only preyed upon green frogs. Anax also reduced the activity of the green frogs; this caused a decrease in salamander predation on green frogs, a decrease in green frog acquisition of resources, and an increase in bullfrog acquisition of resources. *Ambystoma* had no effect on green frog activity, no effect on resource acquisition by green frogs, and no effect on resource acquisition by bullfrogs. These results suggest that we can better understand how species interact in natural communities if we have a more detailed understanding of trait-mediated mechanisms. However, if predicting the structure of large communities requires identifying how each species alters its traits in the presence of all other species along with altering density, improving our predictive ability may be a prohibitively large undertaking." (Authors)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

3048. Röhn, C. (2002): *Écologie de Lestes dryas* Kirby, 1890 et de *Sympetrum flaveolum* (L., 1758) dans le sud-ouest de l'Allemagne. *Martinia*, Hors Série 4: 109-114. (in French with English and German summaries). ["The most important habitats colonised by *L. dryas* in south-western Germany are extensively managed fish-ponds, small waterbodies and marshes. As a rule the shallow parts of the waters are well developed. In most cases strong oscillations of the water level were observed. The most attractive plant communities for *L. dryas* are the *Caricetum rostratae*, the *Caricetum vesicariae*, the *Caricetum gracilis* and the community of *Glyceria fluitans*. The colonised plant communities are 40 to 100 cm high and cover between 20 and 90 %. *S. flaveolum* prefers marshes which are normally dominated by sedges or rushes as well as extensive silting up areas of lakes and ponds. Strong oscillations of the water level and the existence of extensive areas with shallow water are essential for the presence of this species. Open water surfaces without vegetation are of no importance. The most attractive plant communities for *S. flaveolum* are the *Caricetum gracilis*, the *Caricetum distichae* and the *Caricetum vesicariae*. These communities are 40 to 100 cm high and cover between 50 and 95 %." (Author)] Address: Röhn, C., Mettnauweg 4, D-88048 Friedrichshafen, Germany

3049. Rose, J.S. (2002): Dragonfly days (Lower Rio Grande Valley). *Argia* 14(2): 5-6. (in English). [Texas, USA; brief report of records from a few localities including the rare *Aeshna psilus*.] Address: not stated

3050. Rowe, D.K.; Konui, G.; Christie, K.D. (2002): Population structure, distribution, reproduction, diet, and relative abundance of koaro (*Galaxias brevipinnis*) in a New Zealand lake. *Journal of the Royal Society of New Zealand* 32(2): 275-291. (in English). ["[...] Overall, the diet of lake-dwelling koaro was dominated by purse caddis larvae (*Paroxythira* sp.), but small fish (<70 mm

also fed extensively on *Daphnia*, whereas larger ones (>90 mm) fed on Odonata larvae, snails, and common bullies. [...]"] (Authors)] Address: Rowe, D. K., National Institute of Water and Atmospheric Research Limited, NIWA, P.O. Box 11 115, Hamilton, New Zealand. E-Mail: d.rowe@niwa.cri.nz

3051. Rowe, R. (2002): Rearing dragonflies. *Austrolestes* 3: 2-3. (in English). [Based on a long year experience with rearing Odonata, R. Rowe provides significant information for successful odonate rearing from the egg stage to the imago. Special emphasis is given to the provision of food, and the feeding of early stage larvae.] Address: Richard.Rowe@jcu.edu.au

3052. Rowe, R.J. (2002): Agonistic behaviour in final-instar larvae of *Agriocnemis pygmaea* (Odonata: Coenagrionidae). *Australian Journal of Zoology* 50(2): 215-224. (in English). ["Larval agonistic displays are reported from *Agriocnemis pygmaea*, a small coenagrionid damselfly. Twenty-five major displays were distinguished. The behavioural repertoire of *A. pygmaea* is broadly consistent with published information on other coenagrionid larvae. The 'abdomen lift' behaviour, largely restricted to smaller instars of other examined species, occurs with some frequency in final-instar *A. pygmaea*. The use of larval agonistic display characters in phylogenetic analysis is discussed." (Author)] Address: Rowe, R.J., School of Tropical Biology, James Cook University, Townsville, QLD, 4811 Australia

3053. Rudolf, V.; Rödel, M.-O. (2002): Tree-hole breeding frogs in the Upper Guinea rain forest, West Africa. *Verhandlungen der Gesellschaft für Ökologie*, Cottbus 2002: 160. (in English). ["In West African rain forests two tree-hole breeding frogs have been recorded so far: a small ranid, *Phrynobatrachus guineensis* (SVL: 17-22 mm), and a larger hyperoliid species, *Acanthixalus* nov. sp. (SVL: 33-40 mm). *P. guineensis* tadpoles develop in small (2-900 ml) tree-holes and empty snail shells, whereas *A. sp.* selects tree-holes with at least 10 l (up to several hundred l) water volume. *P. guineensis* tadpoles are suspension-feeders and rasps, (20 d from hatching to metamorphosis). *A. sp.* tadpoles are carnivorous (>3 month to metamorphosis). Water filled tree-holes are a limited resource, however holes of intermediate size are not used by any frog for reproduction. Distribution in *P. guineensis* seems to be limited by predation and desiccation risk (selecting tree-holes with water presence at least 20 d, while being eliminated in larger holes that are used by dragonfly larvae). Only the largest tree-holes provide a water persistency period, long enough to assure metamorphosis in *A. sp.* In *P. guineensis* spawning events were clearly positively correlated with time a certain tree-hole is occupied by males. Tadpole densities in this species were extremely high ($x = 0.5$ tadpoles/ml; max: 2 tadpoles/ml). Intraspecific competition significantly negatively affect developmental patterns in *P. guineensis* tadpoles. Neither *P. guineensis*, nor *A. sp.* seems to exhibit any kind of brood-care." (Authors)] Address: rudolf @biozentrum.uni-wuerzburg.de

3054. Sahlen, G.; Suhling, F. (2002): Relationships between egg size and clutch size among European species of Sympetrinae (Odonata: Libellulidae). *International Journal of Odonatology* 5(2): 181-191. (in English). ["A negative relationship between clutch size and egg size is generally expected. However, no such trade

off has been reported in Odonata. In this paper we analyse relationships between egg size and clutch size in the dragonfly subfamily of Sympetrinae using material from Norway, Sweden, Germany and France. Clutch size varied within and among the species, and only maximum clutch size was comparable between species. Both egg length and width varied among species. Moreover, mean egg length differed significantly intraspecifically among individual clutches of all species. We found mean egg length to be negatively correlated to clutch size, confirming the trade off between egg size and clutch size across species. Clutch size was positively correlated to female size, but egg size was not." (Authors)] Address: Sahlen, G., Applied Wetland Ecology, School of Business and Engineering, Halmstad University, P. O. Box 823, SE-301 18 Halmstad, Sweden. E-mail: goran.sahlen@set.hh.se

3055. Samraoui, B.; Weekers, B.H.H.; Dumont, H.J. (2002): The Enallagma of the western and central Palearctic (Zygoptera: Coenagrionidae). *Odonatologica* 31(4): 371-381. (in English). ["Six populations of the *E. cyathigerum* complex from North Africa, Europe and West and Central Asia were examined, mainly using DNA analysis and scanning electron microscopy. The taxa *deserti* and *risi* are geographic ssp. to *E. cyathigerum*: although males can unequivocally be identified from their superior anal appendages, their 18 S rDNA and intergenic spacers ITS 1 and 2 are identical. Moreover, morphological intermediates have become known between *deserti* and *cyathigerum*, and between *risi* and *cyathigerum*. The habitat choice (predatory fish tolerated but with difficulty) and salinity tolerance of all 3 are similar as well. It is concluded that they share a common origin, and only recently started to diverge." (Authors) Outgroup analysis: *E. parvum* (India), *E. nigridorsum*, and *E. granti* (both Socotra Island, Yemen)] Address: Samraoui, B., Laboratoire de Recherche des Zones Humides, Université d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@hotmail.com

3056. Samways, M.J. (2002): A strategy for the national red-listing of invertebrates based on experiences with Odonata in South Africa. *African Entomology* 10 (1): 43-52. (in English). ["The IUCN Red List of Threatened Species is widely recognized as an authoritative compilation of globally threatened taxa. From an invertebrate perspective it presents a challenging dilemma. As all species are given equal credence, a worm has the same exposure as a whale. Yet there are several million species of invertebrates, thus putting great onus on invertebrate conservationists. South African Odonata species have received considerable conservation focus and have been used to test the most recent IUCN categories and criteria of threat. The importance of overcoming both the taxonomic and perception challenges in invertebrate conservation are discussed. The categorization process is also discussed. Recommendations for South African national red-listing are made, with special reference to the dynamics of such red-listing. A simplified strategy is finally presented, which includes a suggestion for compiling a list of potential focal taxa which in the first instance are not categorized. The species on this list then become a core in field searches, both during wide-scale atlasing and during more focussed threat category assessments." (Author)] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Na-

tal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

3057. Schmid-Araya, A.; Hildrew, G.; Robertson, A.; Schmidt, P.E.; Winterbottom, J. (2002): The importance of Meiofauna in food webs: evidence from an acid stream. *Ecology*, 83(5): 1271-1285. (in English). ["Seasonal food webs were constructed for the whole invertebrate assemblage (meio- and macrofauna) inhabiting Broadstone Stream (southeast England). High and uniform taxonomic resolution was applied in a dietary analysis, by resolving the complete benthic community to species, including the meiofauna, protozoa, and algae. Meiofauna accounted for 70% of all species in the summary web and for 73% and 63% of those in the summer/autumn and spring webs, respectively. The web structure changed between summer/autumn and winter/spring, due to differences in species composition. Many stream invertebrates fed on meiofauna and organic matter. Addition of meiofauna to the Broadstone web increased the percentage of intermediate species. Seasonal webs contained between 54 (spring 1997) and 86 (autumn 1996) interactive taxa and 229-378 trophic links. Marked differences in web complexity were found between the summer/autumn and winter/spring periods. Meiofauna accounted for most of the links in the web with a high proportion of intermediate-intermediate links in summer and autumn (0.421-0.440) and also of intermediate-basal links during winter and spring (0.509 0.628). In general, the summary web showed that intermediate species and basal resources were numerically dominant components in this stream. Web connectance rose slightly between summer (0.052) and winter (0.061) and increased further in spring (0.079), coinciding with a reduction in species number. A high fraction of detritivores was combined with omnivorous predators, many of which supplemented their diets with organic matter and, depending on season, with algae and invertebrate eggs. In addition, a wide range of feeding modes was found among meiofaunal species. The diversity of the Broadstone community suggests that the impact of top predators tends to dissipate. A low proportion of top predators in the web was combined with a low mean number of prey items, other than detritus, in their guts (large predators, 1.08-1.26 prey/individual gut; small-sized tanypods, 2.15-2.32 prey/individual gut). Dietary similarity was highest in autumn and winter 1996, and observed feeding links of the most common predatory species showed low overlap in their diets. The web architecture of this stream is reticulate and complex, and the patterns observed in these seasonal webs differed from previous stream webs, resulting in low connectance, high linkage density, long food chains, and a high proportion of intermediate species and of intermediate-intermediate links. The food web derived from Broadstone Stream clearly demonstrates that the meiofauna increases web complexity and thus, taking into account their functional diversity, may be crucial to the understanding of food web properties and ecosystems processes in streams." (Authors) *Cordulegaster boltonii* is a top predator; for more details see OAS 2211.] Address: Schmid.Araya, J.M., School of Biological Sciences, Queen Mary, University of London, Mile End Road, London E1 4NS, UK. E-mail: J.M.Schmid-Araya@qmw.ac.uk

3058. Schmitt, H. (2002): Introduction à l'inventaire des odonates des environs de Barbezieux (Charente). *Martinia*, Hors Série 4: 52. (in French). [France; 13

common odonate species are listed.] Address: Schmitt, H., La Champagne-Barret, F-16300 Barbezieux, France

3059. Schöll, F.; Goldschmidt, B. (2002): Die Binger Kribben - ein durch Stromregulierungsmaßnahmen geschaffener Auenbiotop. *Fauna Flora Rheinland-Pfalz* 9(4): 1421-1447. (in German with English summary). [Rheinland-Pfalz, Germany; 7 odonate taxa from the locality are listed.] Address: Schöll, F., Bundesanstalt für Gewässerkunde, Kaiserin-Augusta-Anlagen 15-17, D-56068 Koblenz, Germany

3060. Sefton, B. (2002): Egret pigging out of dragonflies. *Wild Bird Magazine*, Jan-Feb. 2002: (in English). [Argia 13(4), page 15, documents an observation of the hunting behaviour of an Egret, which successfully snapped flying dragonflies, but didn't recognize an Anisoptera just perching in front of it.] Address: not stated

3061. Söndgerath, D.; Braune, E. (2002): Skalenübergreifende Modellierung der Populationsdynamik von Libellen. *Verhandlungen der Gesellschaft für Ökologie*, Cottbus 2002: 308. (in German). [A model to simulate processes of odonate dispersal (in Namibia, Africa) are briefly outlined.] Address: Söndgerath, Dagmar, Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c, D-38106 Braunschweig, Germany. E-mail: d.soendgerath@tu-bs.de

3062. Sprandel, G. (2002): Florida migration tales. *Argia* 13(4): 11-12. (in English). [St. Joseph Peninsula, Gulf County, Florida, USA; "In the evening of 2 October 1999 when the mosquitoes were thick and Anax were flying, I allowed mosquitoes to bite my legs to see if I could attract dragonflies, and had six Anax pick mosquitoes from my leg. This is no longer recommended due to arboviral encephalitis." Additional information are provided referring roosting areas of migrating Odonata (Anax junius, Tramea lacerata, T. carolina, Pantala flavescens), predation by birds, road kills by collision with vehicles, reflections about the unknown destination of the migrations, and some interesting reflections about potential methods to get information on the origin of the migrations.] Address: Sprandel, G., Florida Fish and Wildlife Conservation Commission, 620 S. Meridian St., Tallahassee, Florida 32399-1600, USA. E-mail: sprandg@fwc.state.fl.us

3063. Srivastava, D.S.; Melnychuk, M.C. (2002): Ground to canopy distribution of bromeliad-dwelling *Mecistogaster modesta* larvae (Odonata: Pseudostigmatidae) in a Costa Rican rainforest. *IDF-Report* 4(1): 27-30. (in English). ["Larvae of *M. modesta* occur only in bromeliads. We quantified the vertical distribution of larvae in a Costa Rican tropical wet forest, from ground to canopy. Approximately 171 larvae per hectare are estimated to occur in this primary forest, most at intermediate heights above the ground. Only 4% were found in the canopy proper. These distributions reflect mainly spatial patterns in both the size and abundance of bromeliads, although there may also be subtle vertical differences in habitat quality." (Authors) IDF and WdA promoted this study.] Address: Srivastava, D.S., Department of Zoology, University of British Columbia, Vancouver B.C., Canada V6T 1Z4. E-mail: srivast@zoology.ubc.ca

3064. Stange, G.; Stowe, S.; Chahl, J.S.; Massaro, A. (2002): Anisotropic imaging in the dragonfly median ocellus: A matched filter for horizon detection. *Journal of*

Comparative Physiology A-Sensory Neural & Behavioral Physiology 188(6): 455-467. (in English). ["It is suggested that the dragonfly median ocellus is specifically adapted to detect horizontally extended features rather than merely changes in overall intensity. Evidence is presented from the optics, tapetal reflections and retinal ultrastructure. The underfocused ocelli of adult insects are generally incapable of resolving images. However, in the dragonfly median ocellus the geometry of the lens indicates that some image detail is present at the retina in the vertical dimension. Details in the horizontal dimension are blurred by the strongly astigmatic lens. In the excised eye the image of a point source forms a horizontal streak at the level of the retina. Tapetal reflections from the intact eye show that the field of view is not circular as in most other insects but elliptical with the major axis horizontal, and that resolution in the vertical direction is better than in the horizontal. Measurements of tapetal reflections in locust ocelli confirm their visual fields are wide and circular and their optics strongly underfocused. The ultrastructure suggests adaptation for resolution, sensitivity and a high metabolic rate, with long, widely separated rhabdoms, retinulae cupped by reflecting pigment, abundant tracheoles and mitochondria, and convoluted, amplified retinula cell plasma membranes." (Authors)] Address: Stange, G., Centre for Visual Sciences, Research School of Biological Sciences and ANU Electron Microscopy Unit, Australian National University, P.O. Box 475, Canberra, ACT, 0200, Australia. E-Mail: gert.stange@anu.edu.au

3065. Stavenga, D.G. (2002): Colour in the eyes of insects. *Journal of Comparative Physiology A-Sensory Neural & Behavioral Physiology* 188(5): 337-348. (in English). ["Many insect species have darkly coloured eyes, but distinct colours or patterns are frequently featured. A number of exemplary cases of flies and butterflies are discussed to illustrate our present knowledge of the physical basis of eye colours, their functional background, and the implications for insect colour vision. The screening pigments in the pigment cells commonly determine the eye colour. The red screening pigments of fly eyes and the dorsal eye regions of dragonflies allow stray light to photochemically restore photoconverted visual pigments. A similar role is played by yellow pigment granules inside the photoreceptor cells which function as a light-controlling pupil. Most insect eyes contain black screening pigments which prevent stray light to produce background noise in the photoreceptors. The eyes of tabanid flies are marked by strong metallic colours, due to multilayers in the corneal facet lenses. The corneal multilayers in the gold-green eyes of the deer fly *Chrysops relictus* reduce the lens transmission in the orange-green, thus narrowing the sensitivity spectrum of photoreceptors having a green absorbing rhodopsin. The tapetum in the eyes of butterflies probably enhances the spectral sensitivity of proximal long-wavelength photoreceptors. Pigment granules lining the rhabdom fine-tune the sensitivity spectra." (Author)] Address: Stavenga, D.G., Department of Neurobiophysics, University of Groningen, 9747 AG, Groningen, The Netherlands. E-Mail: stavenga@phys.rug.nl

3066. Steglich, R.; Müller, J. (2002): Eine wertvolle kleine Libellen-Sammlung (Odonata) aus den Jahren 1923 bis 1944 im Heimatnaturgarten Weißenfels (Coll. Beuthan). *Entomol. Mitt. Sachsen-Anhalt* 9(2): 37-41. (in German). [The collection of Odonata included some

very remarkable species from Sachsen-Anhalt, Germany. *Nehalennia speciosa* is new for this Federal State, some more species are interesting indicators to assess and to date the impact of water pollution on odonate assemblages (*Gomphus vulgatissimus*). The importance of this collection which covers a period with very few information on the German odonate fauna is outlined. Of special interest are records of *Coenagrion mercuriale* and *Epiteca bimaculata*.] Address: Steglich, Rosmarie, Quittenweg 53, 39118 Magdeburg, Germany

3067. Taketo, A. (2002): Notes on recent information of odonate fauna in Ishikawa and Fukui Prefectures, Honshu. Tombo 44: 29-30. (in Japanese with English summary). [Information on 13 species are given. In the English summary an record of *Sympetrum cordulegaster* (teneral male early in July), a teneral female of *Pantala flavescens* (late in October, 2001), and a population, counting 300 individuals, of *Gomphus postocularis* in a concrete ditch running through the streets of Fukui City are high lighted.] Address: Taketo, A., 1-19, Ishibiki 1-chome, Kanazawa City, 920, Japan

3068. Tarr, T.L.; Babbitt, K.J. (2002): Effects of habitat complexity and predator identity on predation of *Rana clamitans* larvae. *Amphibia-Reptilia* 23(1): 13-20. (in English). ["We examined the microhabitat distribution of green frog larvae (*Rana clamitans*) and two common predacious insect genera at 27 wetlands in southern New Hampshire to determine if it was related to the presence of vegetation. *Rana clamitans* and hemipterans (*Belostoma* spp.) were rarely captured in non-vegetated microhabitats. Larval odonates (*Aeshna* spp.) were captured more frequently in vegetated microhabitats but the difference was not significant. In a laboratory experiment, we tested the effects of plant density on the survival of *R. clamitans* larvae exposed to either *Belostoma flumineum* or *Aeshna mutata*. When no cover was available, survival of *R. clamitans* tadpoles was very low when exposed to either predator. *Belostoma flumineum* was a less effective predator than *A. mutata*, and survival rates of tadpoles did not differ between high and low plant density when exposed to this predator. In contrast, survival of tadpoles was significantly higher in the high density vegetation treatment compared to the low density treatment when exposed to *A. mutata*. Although plant structure can reduce predation on *R. clamitans* larvae, the level of structure necessary to significantly mediate predation may depend largely on the foraging mode of the predator." (Authors)] Address: Tarr, Tracy L., Department of Natural Resources, University of New Hampshire, Durham, NH, 03824, USA. E-Mail: kbabbitt@christa.unh.edu

3069. Theischinger, G. (2002): Preliminary keys for the identification of larvae of the Australian Petaluridae, Archipetalidae, Austropetalidae, Telephlebiidae & Aeshnidae (Odonata). The Murray-Darling Freshwater Research Center. Identification & Ecology Guide No. 42: I-IV, 102 pp. (in English). [The Petaluridae, Archipetalidae, Austropetalidae, Telephlebiidae and Aeshnidae represent 56 of the recognised Australian species in 18 genera. "It is the aim of this presentation to facilitate the identification of all known larvae of several groups of Australian dragonflies whose identification up to now would have required a rather large number of papers, some of them containing misleading errors. There is also strong emphasis on the still existing gaps in our knowledge. To establish and confirm family iden-

tification, an updated version of the family key presented by Hawking & Theischinger (1999) is given at the beginning. In addition there are, for each of the five families concerned, a taxonomic overview, a brief diagnosis and when appropriate a key to genera and species followed by more detailed generic and specific treatments. Whereas the genus lists given for each family and the species lists given for each genus are alphabetical, the more detailed treatments of genera and species are arranged in an order of detected similarity which may or may not reflect phylogenetic relationships." Taxonomic notes and diagnoses under higher taxa only cover the Australian members. "Measurements and descriptions are given from last instar larvae (L) or from final instar exuviae (E). Most illustrations are given from final instar exuviae. As colouration of individuals may be variable in life due to specific conditions in the habitat and as colouration of preserved specimens may reflect the ways or methods of collection and preservation, colours are not given in the descriptions [...]. Generally pubescence is rather weak in all taxa and does not appear particularly useful for diagnoses. It is omitted in illustrations of most larvae or exuviae but presented and specified in some detail illustrations and descriptions. Smoothness or dentation of labial palps may to some degree be effected by conditions of habitat and food and possibly others. Generally only the most reliable characters are used in keys and diagnoses. In spite of that the keys may be of limited use for identifying specimens other than final instar larvae and exuviae. All diagnoses are made up in the same style facilitating comparison with taxa of the same rank and confirmation of the results obtained from running the keys." In addition, colour pictures of the following species (larvae or imagos) are presented: *Austropetalia tonynana*, *Hemianax papuensis*, *Petalura ingentissima*, *Austroaeschna flavomaculata*, *Archipetalia auriculata*, *Antipodophlebia asthenes*, *Telephlebia godeffroyi*, *Austroaeschna atrata*, *Austroaeschna inermis*, *Dendroaeschna conspersa*, *Petalura gigantea*, *Austropetalia patricia*, *Acanthaeschna victoria*, *Austroaeschna unicornis*, and *Anax guttatus*.] Address: Murray Darling Freshwater Research Centre, P.O. Box 921, Albury, 2640, Australia

3070. Theischinger, G.; Brown, G.R. (2002): The larva of *Huonia melvillensis* Brown & Theischinger (Anisoptera: Libellulidae). *Odonatologica* 31(3): 319-322. (in English). [The larva of *H. melvillensis* - the species is known only from Melville Island, off the northern coast of Australia - is described from 5 final instar exuviae from the type locality.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

3071. Thomas, B. (2002): Temperaturrekorde in den 1990er Jahren und früher Beginn von Flugzeit und Fortpflanzung bei häufigen Libellenarten in Nordwestdeutschland (Odonata). *Libellula* 21(1/2): 25-35. (in German, with English summary). ["As another fingerprint of climate change, data on the flying season of dragonflies are related to the average air temperatures. In the district of Viersen, Northrhine-Westphalia, Germany, the temperature from March to August rose from 13,1 °C in 1951-1980 to 14,4 °C in 1990-1999. The dragonfly data compared here were collected during the 1980s and 1990s. On the average, in the 17 most widespread species the earliest records of flight and reproduction dated nearly two weeks earlier in the 1990s. The shift was stronger and more frequent in species

with an early starting flying season: the reproductive periods of *Pyrrhosoma nymphula*, *Coenagrion puella*, *Ischnura elegans*, *Libellula depressa*, and *L. quadrimaculata* started 20-28 days earlier than in the 1980s. From September onward there were no obvious trends, regarding neither the average air-temperatures nor shifts of the flying seasons." (Author)] Address: Thomas, Barbara, Biologische Station Krickenbecker Seen e.V., Krickenbecker Allee 17, D-41334 Nettetal, Germany. E-mail: barbara-thomas@web.de

3072. Thompson, D.J.; Fincke, O.M. (2002): Body size and fitness in Odonata, stabilising selection and a meta-analysis too far?. *Ecological Entomology* 27(3): 378-384. (in English). [Sokolovska et al. (2000) (see OAS 1947) concluded that "there is a general fitness benefit to large size in odonates". In this paper, Thompson & Fincke critically re-analyze the meta- data and conclusions. They conclude that of the eight species for which studies provide comparable data on lifetime mating success, only five reported statistics for both longevity and mating rates, the two major fitness components comprising lifetime mating success. Hence, only five of the species listed in table A1 (Sokolovska et al., 2000) could be used correctly to address the question of possible trade-offs between longevity and mating rate with respect to size [...]. Given the multiple weaknesses of the analysis, the conclusion of Sokolovska et al. (2000) that 'large size is associated with increased lifetime reproductive success in odonates of both sexes' is at best overstated and at worst misleading. Indeed, as a taxon, the Odonata seem to be an exception to any trend for selection on large size; the advantage of small size for aerial manoeuvrability probably counters any large size advantage in many species (Fincke et al., 1997). Future meta-analyses may be used fruitfully to determine trends with respect to selection for size and phylogeny, mating systems, or the degree and direction of sexual size dimorphism, however the application of the technique demands a knowledgeable and critical reading of the studies in the literature. It remains unclear whether even a meta-analysis can handle the dual possibility of stabilising and directional selection acting within a taxon. Finally, lifetime mating success should not be equated with lifetime reproductive success. The latter usually refers to the number of eggs fertilised by males or laid by females. The use of either measure as a fitness correlate remains untested for most species. For *Megaloprepus coerulatus*, a highly territorial species in which males are under strong sexual selection on body size, neither male fertilisation success nor female clutch size was a good predictor of realised fitness among mated individuals (Fincke & Hadrys, 2001). In both sexes, larval ecology constrains selection on adult size. Future studies designed to identify contrasting selective pressures acting on body size in insects at both the adult and immature stages of their life history are critical to clarify the true picture of how body size affects fitness in organisms with a complex life cycle. As pointed out by Sokolovska et al. (2000), far more emphasis is needed on the larval stage of most odonates. After all, any selection on adult size of odonates begins when they are still in the water." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

3073. Ubukata, H. (2002): A record of *Rhipidolestes aculeatus yakushimaensis* Asahina f. *kyushuensis* from Kagoshima Prefecture. *Bulletin of The Hokkaido Odonatological Society* 14: 17-18. (in Japanese). [teneral male, 3-V-1991] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

3074. Ubukata, H. (2002): Dragonflies collected at Banna-dake on Ishigaki Island in November. *Bulletin of The Hokkaido Odonatological Society* 14: 16. (in Japanese). [Japan; *Ischnura senegalensis*, *Orthetrum sabina*, *Crocothemis servilia*, *Diplacodes trivialis*] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

3075. Vaughan, D. M. (2002): Potential Impact of Road-Stream Crossings (Culverts) on the Upstream Passage of Aquatic Macroinvertebrates. US Forest Service Report, San Dimas Technology and Development Center, March 21, 2002.: 15 pp. (in English). [On page 5 it is stated that some endemic damselflies of Hawaii are protected in some stream reaches by culverts or waterfalls which keep out mosquitofish (see Polhemus 2001).] Address: www.xerces.org

3076. Vick, G.S. (2002): Preliminary biodiversity assessment of the odonate fauna of the Takamanda Forest Reserve, Cameroon. IDF-Report 4(1): 1-10. (in English). [IDF helped Otto Mesumbe (Cameroon Dragonfly Project; CDP) to study the Odonata of the Takamanda-Mawne Forest Reserves, a region likely to be one of the highest importance for odonate diversity in Africa. The results of this excursion, and two additional collections are listed and crossreferenced with locality data. In addition some interesting information are given on the CDP, Cameroon as a hot spot region for dragonfly diversity in Africa, relict elements in the fauna, and African Calopterygidae.] Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, UK

3077. Viessmann, R. (2002): Libellen - Odonata. Pflanzen und Tiere in Rheinland-Pfalz - Berichtsjahr 2001 - Heft 12: 179-191. (in German). [Compilation of dragonfly records from different habitats situated in Rheinland-Pfalz, Germany. Of faunistic interest are the records of *Coenagrion mercuriale*, *Erythromma najas*, *Ischnura pumilio*, *Lestes barbarus*, *L. virens*, *Sympetma fusca*, *Aeshna affinis*, *Anax parthenope*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Thecagaster bidentata*, *Crocothemis erythraea*, *Libellula fulva*, and *Orthetrum brunneum*.] Address: Viessmann, R., Gängelstockweg 8, D-67295 Bolanden, Germany

3078. Vorndran, I.C.; Reichwaldt, E; Nürnberger, B. (2002): Does differential susceptibility to predation in tadpoles stabilize the *Bombina* hybrid zone?. *Ecology* 83(6): 1648-1659. (in English). ["Despite substantial divergence, the European toads *Bombina bombina* and *Bombina variegata* (*Anura*: *Discoglossidae*) interbreed freely wherever their parapatric distributions adjoin. Natural selection that stabilizes the resulting hybrid zones should rest in part on the adaptation to different breeding habitat of the pure taxa. While *B. bombina* lays its eggs in semipermanent ponds, *B. variegata* is a typical puddle breeder. Here, we investigate whether selection for rapid larval development in *B. variegata* has resulted in the loss of effective antipredator defenses, thus exc-

cluding this species from predator-rich ponds. We collected adults from four populations in Romania (two for each taxon) and reared the offspring from four crosses per population in the laboratory either in the presence or in the absence of caged odonate predators (*Aeshna cyanea*). In predation trials, we found no taxon difference in mortality rate among tadpoles that had been reared with predators. The resilience of *B. variegata* tadpoles may have been due to their remarkable phenotypic plasticity. In both taxa, predator presence led to the development of a higher tail fin, which has been shown to reduce predation rates in other amphibians. This response was much stronger in *B. variegata* than in *B. bombina*. Moreover, differences between the two *B. variegata* populations in terms of laboratory predation rates and levels of plasticity correlated with predator abundance at the collection sites so as to suggest local adaptation in predator defenses. Finally, delayed metamorphosis in the predator-induced morphs of both taxa implies a cost to the defense. Given the heterogeneity of temporary habitat in terms of desiccation rate and predator occurrence, the greater amount of phenotypic plasticity in *B. variegata* fits predictions of life history theory. At the same time, our results leave the question unresolved as to why this species avoids ponds." (Authors)] Address: Nürnberger, Beate, Zoologisches Institut, Ludwig-Maximilians-Universität, Karlstr. 23, D-80333 München. Germany: E-Mail: nurnbb@zi.biologie.uni-muenchen.de

3079. Walia, G.K.; Sandhu, R. (2002): Chromosomal data on seven species of genus *Orthetrum* (Libellulidae Anisoptera Odonata). *Bionature* 22(1): 7-12. (in English). ["Cytogenetical analysis on seven species of genus *Orthetrum* [...] from North and North-east Indian states have been carried out. Among these, *Orthetrum glaucum*, *O. prunosum neglectum*, *O. sabina sabina*, *O. taeniolatum* and *O. triangulare triangulare* possess diploid numbers 25 m, that is typical libellulid number. [...] *O. luzonicum* and *O. japonicum internum* show variation from this number in having $2n=23$, without m chromosomes. All the species possess XO-XX type sex determining mechanism. Variation in chromosome number, total chromosome length (TCL), $m : X$ & longest autosome: X ratios have been studied for the first time in this genus." (Authors)] Address: Sandhu, R., Dep. Zool., Punjabi Univ., Patiala-147 002, Punjab, India

3080. Wataji, M.; Ohta, K.; Kurauchi, Y.; Uemura, T. (2002): A new record of *Anax nigrofasciatus nigrofasciatus* from Hokkaido. *Bulletin of The Hokkaido Odonatological Society* 14: 1-3. (in Japanese). [Record of a female at 26 August 2001.] Address: not stated in English

3081. Werth, C. (2002): Faunistische und wasserchemische Erstuntersuchung an sekundären Stillgewässern der Südpfalz. Diplomarbeit. Zool. Inst. für Ökologie und Parasitologie, Universität Karlsruhe: 132 pp. (in German). [On a broad ecological basis, bio-ecological and hydrochemical factors of 19 water bodies in the Bienwald-region (Rheinland-Pfalz, Germany) were sampled. The study aims to get information on the development of these water bodies in the framework of their function as food habitats of the White Stork (*Ciconia ciconia*), a species once extinct but now re-established. Heteroptera, water-Coleoptera, molluscs, amphibians, and Odonata were surveyed. A total of 22 odonate species was collected including species of thermic preferred waters as *Lestes barbarus* and Cro-

preferred waters as *Lestes barbarus* and *Crocothemis erythraea*, or rare species as *Brachytron pratensis*.] Address: Werth, Christine, Mittelberg 4, D-76571 Gaggenau, Germany

3082. Westermann, K.; Westermann, E. (2002): Das Große Granatauge (*Erythromma najas*) am Schlüchtsee - erster Bodenständigkeitsnachweis für den Schwarzwald. *Naturschutz südl. Oberrhein* 3: 189-192. (in German, with English summary). [At lake Schlüchtsee (County of Waldshut, southeastern Black Forest, Baden-Württemberg, Germany), 914 m a.s.l., a large population of *E. najas* was found. This first proof of reproduction obtained for the Black Forest is likewise the highest altitude record in Baden-Württemberg and Germany.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

3083. Westermann, K. (2002): Phänologie der Emergenz bei der Gemeinen Weidenjungfer (*Chalcolestes viridis*) an südbadischen Altrheinen. *Naturschutz südl. Oberrhein* 3: 201-214. (in German, with English summary). [A systematic sampling of exuviae near the town of Weisweil (County of Emmendingen, Federal state of Baden-Württemberg, Germany) totalled in app. 38 000 exuviae of *C. viridis*. "The earliest start of emergence was noticed on 23 June 1998. Along one section with a very high abundance of emerging and adult imagines, emergence always started only in late July. At this site emergence finished in four years around 20 September. In 1999, a year of high floods, imagines emerged regularly also along other sections until mid September. The median of different sections varied, in the extremes it dated before mid July and on 31 August. Within 800 m linear distance between sections the median shifted significantly according to lower water temperature in two years of the study towards later dates. The duration of the emergence is described by two variables. The peak of emergence is defined as the interval between the first and third quartile, the main periods of emergence as the interval between the dates when 10% and 90% of all imagines emerged, respectively. In this study the two variables reached average values of 12 and 22 days respectively in 17 samples. Within all samples the number of emerged imagines can be described by the logistic model of growth. Median, peak of emergence and main period of emergence are the more useful variables to describe the emergence, rather than the frequently used EM50 - Index. In the early period of emergence a higher proportion of females emerge, in total more males emerged." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

3084. Wichard, W.; Arens, W.; Eisenbeis, G. (2002): Biological atlas of aquatic insects. Edition 1. Apollo-Books, Stenstrup. ISBN 87-88757-60-9: i-iv; 339 pp. (in English). [This atlas gives an overview of the numerous adaptations of aquatic insects in an aquatic environment. 12 orders of aquatic insects are covered including Odonata (chap. 2.3, pp. 38-61). Bibliographical references, an index of scientific names, and a subject index are included. It was written for graduate students and research professionals in the field. 148 picture plates are included as well as 150 line drawings, graphs and diagrams. These SEM photographs give a fascinating insight into a lot of morphological structures of larval Odonata including e.g. an emerging prolarva of a Sym-

petrum sp.] Address: Apollo books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark. W-mail: apollobooks@vip.cybercity.dk

3085. Wildermuth, H. (2002): Artenschutz im Spannungsfeld zwischen Forschung und Umsetzung - Beispiel Libellen (Odonata). Artenschutzreport 12: 1-6. (in German with english summary). ["Conservation of animal species requires interaction between applied research and realisation of projects. This is exemplified by the dragonflies (Odonata), an insect order that is represented by about 80 species in Central Europe. Research related to dragonfly conservation comprises quantified ecofaunistic surveys with evidence of autochthony, ecological analyses of limiting niche factors, mainly of larvae, ecophysiological studies of habitat recognition by adults and investigations of habitat use as well as population biology and dispersal. Thereby, research concentrates on threatened species. The realisation of conservation projects is based on the results of research aimed at single species or species communities. Preservation of primary biotopes, especially of rare larval habitats, must obtain priority. Secondary biotopes such as water bodies in partly drained moorland, gravel excavations or man-made ponds may also be of some importance for numerous species. However, most of them need continuous management or regeneration. The rotary management of small ponds enables the establishment of a mosaic of all succession stages, which changes in space and time on a confined area, thus providing permanent habitats for a high diversity of aquatic organisms. Success in species preservation ultimately depends less on research than more on the good will of all the people concerned and on the high qualities of the conservancy actors." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

3086. Wildermuth, H. (2002): Kadaver von Somatochlora flavomaculata als Rendezvous-Platz für Skorpionfliegen (Mecoptera: Panorpidae; Odonata: Corduliidae). Libellula 21(1/2): 65-69. (in German, with English summary). ["A pair of *S. flavomaculata* was found dead in an orb-web of *Larinioides cornutus* suspended above a pond. The carcasses were obviously not, or not completely, eaten by the spider and therefore attracted some flies and scorpionflies (*Panorpa communis*). Up to five *Panorpa* individuals comprising both sexes assembled simultaneously on the carcasses. The dragonflies were probably trapped shortly after the male had grasped the female in flight for copulation above the oviposition site and served subsequently as rendezvous for scorpionflies."(Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

3087. Wildermuth, H.; Knaus, P. (2002): The impact of incidental summer snowfall on two alpine metapopulations of *Somatochlora alpestris* (Selys) (Anisoptera: Corduliidae). Odonatologica 31(1): 55-63. (in English). ["In the course of a 2-yr mark-resighting study on *S. alpestris* at 2000 m a.s.l. in the Central Alps of Switzerland snow fell during the beginning of the reproductive period in July 2000. The snow cover was up to 30 cm thick and remained for about 8 days. Only 3% of the individuals marked as teneral and 4% of those marked as matures before the cold spell were resighted afterwards. In 1998 (a season without snow) the corresponding resighting proportions amounted 10% and 54%

respectively. In 2000, at a second study site at 1700-1800 m, 11 % of the individuals marked as matures before the cold spell were found again. It is concluded that, unlike the aquatic stages, the imagines of *S. alpestris* are not well adapted to survive cold periods with snowfall lasting more than a few days. Various survival strategies focused on egg and larval development of the sp. are discussed with respect to adaptation to a subarctic climate." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

3088. Yokoi, N.; Mitamura, T. (2002): Description of a new *Macromia* species from Central Laos (Odonata: Corduliidae). Tombo 44 : 9-10. (in English with Japanese summary). [*M. vangviengensis* sp. n. is described from central Laos. The new species is characterized (differentiated from species of the *M. clio*-group) by its smaller size, developed triangular projection on the 10 th abdominal segment and the absence of the antehumeral band. Holotype : Male, Ban Phon-Ngam (18° 55' N, 102° 27' E), Vangvieng, central Laos, 28-VI-1994, T. Mitamura leg. The specimen will be deposited in the Swedish Museum of Natural History.] Address: Yokoi, N., 2-37-11 Kaisei, Koriyama, Fukushima, 963-8851 Japan; Mitamura, T., 3-20 Youkodai, Yanagawa, Fukushima, 960-0760 Japan

3089. Yokoyama, T. (2002): A record of *Aeschnophlebia longistigma* from Tobetsu-cho. Bulletin of The Hokkaido Odonatological Society 14: 11. (in Japanese). [A female was caught at 13 July, 2001.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

3090. Yokoyama, T. (2002): Discovery of *Aeshna mixta* soneharai Asahina in Tokachi subprefecture, Hokkaido. Tombo 44: 34. (in Japanese with English summary). [The northern limit of the range of *A. mixta* sonehara in Japan is Asashikawa-shi, Hokkaido (Anzai, 1997), while the eastern limit was considered in the Hidaka Province, Hokkaido (Fukumoto, 1987; Itoh, 1993). In 2001, the author confirmed the species in the Tokachi Province, which turns out to be the new most eastern distributional record in this species in Japan.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

3091. Yokoyama, T. (2002): Larval duration of *Somatochlora uchidai* Foerster. Bulletin of The Hokkaido Odonatological Society 14: 5-10. (in Japanese). [The life history of *S. uchidai* is documented in considerable detail in different tabs.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

3092. Young, M.E. (2002): Dragonflies: they're ravenous, a little scary and oh-so-helpful: Bugs have an appetite for pests and no real drawbacks, experts say. The Dallas Morning News 21 July 2002: (in English). [This is a popular account on Odonata in a newspaper; the article is documented in *Argia* 14(3): 21-22] Address: myoung@dallasnews.com

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- 3093.** Carletti, B.; Terzani, F. (1997): Descrizione di *Pseudagrion simplicilaminatum* spec. nov. sulla Repubblica del Congo (Odonata: Coenagrionidae). *Opusc. zool. flum.* 152: 1-7. (Italian with English summary). ["The new species is described and illustrated, and its affinities with *P. flavipes leonensis* Pinhey, 1964 and *P. thenartum* Fraser, 1955 are outlined and discussed. Holotype ♂: Kintele, 6-IX-1978, paratypes ♂: Kintele, 5-I-1980, II-1980, III-1980, XII-1980; — Voka, I-1980; — Djili, XII-1979; — Loufoula, I-1980." (Authors)] Address: Carletti, B., Viale Raffaello Sanzio 5, I-50124 Firenze, Italy
- 3094.** Fujimoto, K. (1997): New Record of *Neurothemis* from Inomote Island of the Ryukyus. *Aeschna* 33: 27-28. (in Japanese with English summary). [*Neurothemis* sp. and *Rhyothemis phyllis* are documented along with weather maps.] Address: not stated in English
- 3095.** Katatani, N.; Muraki, A. (1997): Records of the Odonata taken in Palau, Part I. *Aeschna* 33: 1-10. (in Japanese with English summary). [5 species were collected from 27 Feb. to 1 March 1996 on Palau (Carolinean Islands, SE of the Philippines). *Agriocnemis femina* (Brauer 1868), *Ischnura senegalensis* (Rambur 1842), *Teinobasis palauensis* Lieftinck 1962, and *Hemicordulia lulico* Asahina 1940 were illustrated. The latter is compared with *Hemicordulia mindana* Needham & Gyger 1937 from the Ryukyus. *I. senegalensis* was detected for the first time on Palau, and the previously unknown ♀ of *T. palauensis* is illustrated and described for the first time.] Address: Muraki, A., Shigino-nishi 3-4-2-309, Jôtô-ku, Osaka C., Osaka 536, Japan
- 3096.** Kitagawa, K. (1997): Records of the Odonata from Penang Island, Malaysia. *Aeschna* 33: 11-18. (in Japanese with English summary). [32 species were taken in 1995 and 1996, of which 17 species are new records from Penang Island. These records total the known species to 54. *Prodasineura collaris* (Selys 1860), *P. notostigma* (Selys, 1860), *Calicnemia chaseni* (Laidlaw 1928), *Microgomphus chelifera* Selys 1858, and *Orchithemis pulcherrima* Brauer, 1878 are documented by back and white photos, and in the case of *Prodasineura* species with drawings of the synthorax.] Address: Kitagawa, K., Imaiti 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan
- 3097.** Kitagawa, K. (1997): Records of the Odonata from Sarawak, Malaysia]. *Aeschna* 34: 5-10. (in Japanese with English summary). [In Dec. 1990, 27 odonate species from Kuching were brought on record. Drawings illustrate the labrum of ♀ *Vestalis amaryllis* and *V. atropa*. Black and white photos refer to *Prodasineura dorsalis*, *Amphicnemis wallacei*, *Coeliccia coomansi*, *Indaeschna grubaueri*, *Brachygonia oculata*, and *Euphaea* sp.] Address: Kitagawa, K., Imaiti 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan
- 3098.** Kitagawa, K.; Sugitani, A.; Hayashi, K.; Masaki, N.; Muraki, A.; Katatani, N. (1997): Records of the Odonata of Hong Kong, Part IV. *Aeschna* 34: 11-21. (in Japanese with English summary). [In June, July, and Oct. 1996, a total of 69 species was recorded, of which *Cercion sexlineatum* is a new addition to the Hong Kong odonate fauna.] Address: Kitagawa, K., Imaiti 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan
- 3099.** Kohama, T. (1997): Odonata from Kohama Island, the Ryukyus. *Aeschna* 33: 19-20. (in Japanese with English summary). [On 20 Sept., 1985, 8 odonate species - in total new to the Island - were recorded.] Address: not stated in English
- 3100.** Kohama, T. (1997): Odonata from Shimoji Island of Aragusuku Islands, the Ryukyus. *Aeschna* 33: 21-22. (in Japanese with English summary). [On 18 July, 1985, 6 odonate species were recorded.] Address: not stated in English
- 3101.** Moriyasu, A. (1997): A record of the larvae of *Macromia daimoji* OKUMURA from Shikoku, Japan. *Aeschna* 34: 36. (in Japanese). [29-XII-1996; documentation of the habitat.] Address: not stated in English
- 3102.** Moriyasu, T. (1997): Larval development of *Macromia daimoji* OKUMURA in nature. *Aeschna* 33: 31-36. (in Japanese with English summary). [Kurashiki-city, Okayama Pref., Japan; the study documents extensively the larval growth of *M. daimoji*; larval development lasts 2 years including 9 instars.] Address: not stated in English
- 3103.** Naraoka, H. (1997): A list of dragonflies in Hotokeuma marsh, Aomori Prefecture (Insecta, Odonata). *The Journal of The Natural History of Aomori* 2: 19-21. (in English translation of Naoya Ishizawa in *Digest of Japanese Odonatological Short Communications* 8, 1998). [The history of a water body near Misawa City, Japan is briefly outlined along with a list of 34 odonate species recorded.] Address: Naraoka, H., 36-71, Motoizumi, Fukunoda, Itayanagi-cho, Kita-gun, Aomori Prefecture, 038-3661, Japan

3104. Schmidl, J. (1997): Adephege Wasserkäfer in schwäbischen Niedermooren - Faunistische Ergebnisse von Aufsammlungen in Kleingewässer-Neuanlagen der Natur- und Artenschutzprogramme. (Coleoptera: Halipilidae, Noteridae, Dytiscidae, Gyrinidae). Ber. naturforsch. Gesell. Augsburg 56: 6-17. (in German, with English summary). [Bayern, Germany; *Sympecma fusca*, *Brachytron pratense*, *Aeshna grandis*, *A. juncea*, *Somatochlora flavomaculata*, and *Sympetrum striolatum* are listed from different localities in Sept. 1995.] Address: Schmidl, J., Lettenstr. 8, D-90562 Kalchreuth, Germany

3105. Sugimura, M. (1997): Migrant species of the Odonata into Kochi Prefecture recorded in the first half of the 1990's. *Aeschna* 33: 23-25. (in Japanese with English summary). [*Anaciaeschna jaspidea*, *Anax guttatus*, *Brachydiplax chalybea*, *Sympetrum cordulegaster*, *S. fonscolombii*, *Hydrobasileus croceus*, and *Tholymis tillarga* are treated.] Address: Sugimura, M., 9-7, Uyamasatsuki-cho, Nakamura City, Kochi Prefecture, 787, Japan

3106. Tabata, O. (1997): New Record of *Zyxomma obtusum* SELYS from Inomote Island of the Ryukyus. *Aeschna* 33: 29-30. (in Japanese with English summary). [*Z. obtusum* was recorded at three dates in 1996.] Address: Tabata, O., Shoubuen-cho 79-18, Kamigamo, Kita-ku, Kyoto C., Kyoto 603-8064, Japan

3107. Tone, S.; Yagi, T. (1997): Records of the exceptional migration of *Anax guttatus* (Burmeister) and *Tramea virginia* (Rambur) out of seasons in 1994 at Mie Prefecture, central Japan. *Aeschna* 34: 29. (in Japanese with English summary). [This is a detailed account on migrating *A. guttatus* and *T. virginia* in dependence of weather conditions.] Address: Yagi, T., Otobe 2113-102, Tsu C., Mie 514-0016, Japan

3108. Yoshida, M. (1997): A study on the migration of Odonata for extending their habitats. *Aeschna* 33: (in Japanese with English summary). [Japan; the paper compiles the ability of different odonate species to colonise new water bodies from published studies.] Address: not stated in English

1998

3109. Bernabei, S.; Di Girolamo, I.; Iavarone, I. (1998): Alcune note sul popolamento macrobentonico del fiume Arone (Lazio, Italia). *Riv. Idrobiol.* 37: 203-209. (in Italian with English summary). [The checklist of macrozoobenthos of the River Arrone, Italy includes 11 species of Odonata. Of interest are *Pyrrhosoma nymphula* and *Onychogomphus uncutus*. No additional odonatological details are given.] Address: Bernabei, S., Istituto Superiore di Sanita, Laboratorio di Igiene Ambientale, Viale Regina Elena 299, I-00191 Roma, Italy

3110. Cordero Rivera, A.; Pérez, F.J.E. (1998): Mating frequency, population density and ♀ polychromatism in the damselfly *Ischnura graellsii*: an analysis of four natural populations. *Etologia* 6: 61-67. (in English with Spain summary). ["The maintenance of ♀ polychromatism in *I. graellsii* is addressed by reanalysing data from two natural populations studied by Cordero (1992, *J. Anim. Ecol.*, 61:769-780) and two additional populati-

ons. We used mark-resighting methods to estimate mating frequency by ♀ morphs. Results indicate that ♀ mating probability is positively related to ♂ density in three populations, but androchrome (♂-like ♀♀) only mated less often than gynochromes in one sample. ♀ morphs did not differ in size and oviposition frequency. Nevertheless, among populations, androchrome frequency was positively related to an index of ♂ density. We suggest that population density might have an effect on the maintenance of ♀ morphs in *I. graellsii*, but this does not seem to be because androchrome ♀♀ avoid matings. A more accurate analysis of the benefits and costs of mating in polychromatic damselflies is needed." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidad de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

3111. Deliry, C. (1998): Nouveaux articles ou études concernant les libellules dans la région Rhône-Alpes. *Sympetrum piémontais* 38: 2-3. (in French). [France; regional odonatological bibliography covering the period 1996/98 and abstracting in most cases unpublished expertises.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France

3112. Glotzhober, R. (1998): Tiger seen in Ohio's Hill Country. *WildOhio*. Spring 1998. *WildOhio* (Ohio Division of Wildlife newsletter) Spring 1998: 17. (in English). [Ohio, USA; *Cordulegaster erronea*] Address: Glotzhober, R., Ohio Natural history society, 1982 Velma Ave., Columbus OH 43211-2497, USA. E-mail: bglotzhober@ohiohistory.org

3113. Naraoka, H. (1998): Establishment of *Pseudothemis zonata* to central and south of Aomori. *Gekkan-Mushi* 342: 45- (in Japanese). [5. July 1998; published records from Aomori Pref., Japan are compiled, and the current range extension is discussed with special emphasis to global warming. A translation of the paper is published in *Digest of Japanese Odonatological Short Communications* 14] Address: Naraoka, H., 36-71, Motoizumi, Fukunoda, Itayanagi-cho, Kitatsuguru-gun, Aomori Prefecture, 038-3661, Japan

3114. Taketo, A. (1998): On the Odonate fauna of Ishikawa and Fukui Prefectures in 1998. *Tombo* 41: 33-36. (in Japanese with English summary). [Two adult ♂♂ of *Trigomphus ogumai* were captured at Daishoji, Ishikawa Pref., Japan at its northern range limit on the Japan Sea side. New locality records of rare species, include *Sympecma p. paedisca* (a coastal pond at Hakui / Ishikawa), *Nihonogomphus viridis* (Nata River / Ishikawa), *Lyriothemis pachygastra* (Mihama/Fukui), and *Onychogomphus viridicosta* (Kanazu, Fukui). *Indolestes peregrinus* is spreading into the Kaga district/Ishikawa; oviposition into young rice stem has repeatedly been observed at Daishoji. Influenced by the climatic conditions of 1998, seasonal appearance of several Odonata was advanced considerably: e. g. mating and oviposition of *Enallagma boreale circulatum* were observed in early May at a pond in a hilly region of Komatsu. The succession of the odonate fauna in newly formed ponds in Kanazawa, was documented by mainly collecting exuviae. Within 6 years, 46 species were recorded from this sanctuary. Both northern (e. g. *Coenagrion lanceolatum*) and southern (e. g. *Anaciaeschna martini*) species coexist in these ponds.] Address: Taketo, A., 1-19, Ishibiki 1-cho, Kanazawa City, 920, Japan

- 3115.** Aoki, T.; Kondoh, S. (1999): A note on reproductive behaviour of *Sympetrum striolatum imitoides* BARTENEV in Kobe. *Aeschna* 35: 37-40. (in Japanese with English summary). [Compared with other Japanese *Sympetrum*-species, with the exception of *S. uniforme*, pre-reproductive behaviour of ♂ *S. striolatum imitoides* seems to be unique. Their continuous hover flight starts just before ♀♀ arrive at the water for oviposition (about 10:30 J.S.T.), and lasts for about an hour. At the same time other ♂♂ wait for ♀♀ perching around the pond. Apparently two tactics for mating are used.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: taoki@ma3.justnet.ne.jp
- 3116.** Clausnitzer, V. (1999): Dragonfly (Odonata) records of Kawamega Forest, western Kenya, with notes on the ecology of rain forest species. *Journal of East African Natural History* 88 (2003): 17-23. (in English). [The list of 51 recorded Odonata includes ten new records for Kenya. "Some of the species have their centre of distribution in West Africa. Ecological notes on different adaptation strategies of rain forest dragonflies are given, mainly focusing on visibility and flight behaviour of the ♂♂. Seasonality patterns of the observed dragonflies and distinct behavioural features of selected species, e.g. *Hadrothemis* and *Gynacantha* are described." (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: we-sche@mail.uni-marburg.de
- 3117.** Deliry, C. (1999): Nouveaux articles ou études concernant les libellules dans la région Rhône-Alpes. *Sympetrum piémontais* 39: 9-11. (in French). [France; regional odonatological bibliography covering the period 1997/98 and abstracting unpublished expertises in most cases.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France
- 3118.** Deliry, C. (1999): Nouveaux articles ou études concernant les libellules dans la région Rhône-Alpes. *Sympetrum piémontais* 42: 17-21. (in French). [France; regional odonatological bibliography covering the period 1997-2000 and abstracting unpublished expertises in most cases.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France
- 3119.** Desmeules, M. (1999): Compte-rendu littéraire: Les Odonates du Québec. Par Jean-Guy Pilon et Denise Lagacé. 1998. Corporation Entomofaune du Québec, Chicoutimi, Québec. 367 pages. ISBN 2-9802763-2-4. *Nouv'Ailes* 9(3): 12. (in French) [Review] Address: Publisher: Entomofaune du Québec, 637, blvd Talbot, suite 108, Chicoutimi, QC G7H 6A4, Canada
- 3120.** Futahashi, R. (1999): Notes on unusual connection and copulation in some species of dragonflies. *Aeschna* 36: 47-56. (in Japanese with English summary). [25 cases of interspecific connection and copulation, 8 cases of triple-connection, and 4 cases of ♂-♂ tandems are documented.] Address: not stated in Japanese
- 3121.** Futahashi, R.; Futahashi, H. (1999): Records of large scale migration of *Sympetrum cordulegaster* (SELYS) and *Sympetrum depressiusculum* (SELYS) in 1997 and emergence of both species in 1998 at Toyama Pref. *Aeschna* 36: 33-42. (in Japanese with English summary). [Many migratory adults of both species were found during a period between 6 Oct. and 10 Nov. 1997 at the reclaimed land of Kairyumachi Sinmmato City Toyama Pref. Japan. Some immature specimen were likewise found there during 18 June and 7 Aug. 1998. "Some of them seemed to be very immature or just emerged. This fact suggests that these species emerged there although neither larvae nor exuviae have been found." Intermediate specimens between *S. depressiusculum* and *S. frequens* were recorded at the same locality.] Address: not stated in Japanese
- 3122.** Haase, P. (1999): Zootaxonomie, Chemismus und Struktur regionaler Biotypen im niedersächsischen und nordhessischen Bergland. *Ökologie und Umweltsicherung* 18. 157 pp., appendix. (in German with English summary). [From 1996 to 1999 limnological investigations on upper courses of near natural brooks of the mountainous areas of Lower Saxony and northern Hesse (Germany) were carried out. The aim of these studies was the development and description of a regional typology of brooks. In total more than 200 macrozoobenthos species including *Cordulegaster boltonii* and *Thecagaster bidentata* were found.] Address: Univ.-Gesamthochschule Kassel, Fachgebiet Landschaftsökologie und Naturschutz, Nordbahnhofstr. 1a, D-37213 Witzenhausen, Germany
- 3123.** Hujihara, H.; Adati, T. (1999): Records of the emergence of *Macromia daimoji* OKUMURA from Asida river at Hiroshima Prefecture. *Aeschna* 36: 57-58. (in Japanese). [Japan; five records from May and June 1998 are documented.] Address: not stated in English
- 3124.** Hutchinson, R. (1999): Rayon Entomologie: Corbet, P.S. 1999. *Dragonflies: Behaviour and ecology of Odonata*. Comstock Publishing Associates, Ithaca NY. 829 pp. *Nouv'Ailes* 9(3): 7. (in French) [Review of Philip Corbet's outstanding book.] Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Québec), Canada, J8T 1P7
- 3125.** Itoh, S. (1999): A ♂ *Aeshna juncea* (L.) that misidentified a dead branch as a female. *Aeschna* 35: 51. (in Japanese). [Photodocumentation] Address: Itoh, S., Kinoshita 4-9-7-102, Wakabayashi-ku, Sendai-shi, Miyagi, 984-0047 Japan
- 3126.** Katatani, N.; Muraki, A. (1999): Records of the Odonata taken in Palau, Part II. *Aeschna* 35: 9-22. (in Japanese with English summary). [The Libullidae of Palau, Caroline Islands are treated in some detail. Observations were made from 27 Feb. to 1 Mar. 1996. "*Agrioptera cardinalis* is forest-hunting insects and is chiefly confined to lower altitudes. Adults are usually most abundant near the seacoast. The mature ♂♂ hold territories in shady places of jungle marshes and pools behind the beach. ♀♀ may wander far from their breeding places, congregating in sunlit spots and clearings. Further, many individuals settle on the branches of mangroves [...]. *Neurothemis t. terminata* is a very common and widespread species, occurring in both grassland and marsh. As to extent of brown wing color, ♂♂ form a homogeneous series. ♀♀ have androchromatic wings and heterochromatic wings." ♀♀ with androchromatic wings dominate on heterochromatic in Palau. "♂♂ of *Rhyothemis phyllis vitellina* have two large brown spots on base of hind wing separated by opaque

yellow coloring. On the other hand ♀♀ are with polychromatic wing pattern and very variable as to extent of dark marking." *Ischnura senegalensis* and *Orthetrum s. sabina* are added new to the list of Odonata of Palau, now totalling in 20 species. Colour patterns of ♂ synthorax, ♂ genitalia and caudal appendices of *Agrionoptera cardinalis* Lieftinck 1962 (Palau) are compared with *A. sanguinolenta* Lieftinck, 1962 (Truk, Guam), and *A. insignis* (Rambur 1842) (Iriomoete Islands, Palawan Islands, Mindanao, Philippines).] Address: Muraki, A., Shigino-nishi 3-4-2-309, Jôtô-ku, Osaka C., Osaka 536, Japan

3127. Kawashima, I.; Itoh, S. (1999): Notes on the last instar larva of *Somatochlora alpestris* (Selys, 1840) (Odonata, Corduliidae) from Hokkaido, Northern Japan. *Aeschna* 36: 25-31. (in English, with Japanese summary). [The external morphology of the last instar larva of *S. alpestris* from Hokkaido, Japan is described and illustrated in detail.] Address: Kawashima, I., Nagasawa 1-50-9, Yokosuka-shi, Kanagawa, 239-0842 Japan

3128. Kishi, K. (1999): Records of the Odonata in Bali Island, Indonesia. *Aeschna* 35: 23-35. (in Japanese with English summary). [Ten collecting trips to Bali between Dec. 1984 and April 1991 totaled in 42 odonate species; additional material referred in the paper rises the number of Odonata to 44. The author discusses the difference in faunal composition between the western and eastern part of Bali; four odonate taxa are known only from the western part. The records are documented in detail, some of the species are illustrated with black and white photos.] Address: not stated in English

3129. Kitagawa, K.; Ichii, H. (1999): Records of the Odonata from Southern Thailand. *Aeschna* 36: 59-68. (in Japanese with English summary). [62 species were taken at Trang, southern Thailand in 1991. The list includes an undescribed *Macromia*, which is illustrated by drawings and a black and white photo. In addition, *Tetrathemis irregularis hyalina* Kirby, *Drepanosticta khao-chongensis*, *Euphaea pahyapi*, *Aciagrion borneense*, *Rhinagrion mima*, *Macrogomphus borikhanensis*, *Megalogomphus sumatranus*, *Macromia chaiyaphumensis*, and *Macromia cupricincta* are stressed or documented by black and white photos.] Address: Kitagawa, K., Ima-iti 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan

3130. Kitagawa, K. (1999): Rediscovery of *Lin-aeschna polli* from Borneo. *Aeschna* 35: 41-42. (in Japanese). [*L. polli* was recorded in March 1997 at Kimanis Road (Crocker Range), Sabah, Borneo, Malaysia.] Address: Kitagawa, K., Ima-iti 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan

3131. Lissak, W. (1999): Erstnachweis für Bodenständigkeit des Südlichen Blaupfeils (*Orthetrum brunneum*) im Landkreis Göppingen. *Naturkundliche Mitteilungen Landkreis Göppingen* 18: 4-5. (in German). [clay pit near Ottenbach, Landkreis (county) Göppingen, Baden-Württemberg, Germany; 12.07.1990; in 1991 the habitat was filled with building rubble.] Address: Lissak, W., Schubartstr. 12, D-73092 Heiningen, Germany. E-mail: W.Lissak@naturschutzzentrum-schopfloch.de

3132. Maibach, A.; Meier, C. (1999): 11. Libellen-Symposium in Neuchâtel, 21.11.1998. *Nachrichten des Schweizer Zentrum für die Kartographie der Fauna* 17: 34-38. (in German, French and Italian). [Summaries of the following lectures are presented: 1. Beat Oertli : Alti-

tude et diversité des Odonates 2. Antoine Gander: Suivi des populations des larves de libellules dans un décapage expérimental de roselière inondée de la Grande Caricaie. (Groupe d'étude et de gestion de la Grande Caricaie; GEG). 3. Riccardo Pierallini: Le libellule delle Bolle di Magadino. *Aggiornamenti sull'inventoria degli Odonati in Ticino. Gruppo di lavoro «Libellule Ticino»* 1998. 4. Stefan Kohl: Reisebericht vom 3. Alp-Adriatischen Libellensymposium in Kroatien. 5. Alain Maibach : Suivi de la colonisation d'un étang amortisseur de crues pour les libellules 1993-1998 - étang de Suchy (VD) 6. Peter Knauss: Beobachtungen zur Populationsökologie von *Somatochlora alpestris* 7. Irene Flöss: Struktur- und Raumnutzung von *Somatochlora flavomaculata* in einer zürcherischen Moorlandschaft 8. Hansruedi Wildermuth: Die Paarung von *Somatochlora alpestris* 9. Gerhard Vonwil: Überwachung von Libellenbeständen - Möglichkeiten und Grenzen 10. Ernst Grüter: Einige Dias zur Eiablage von *Coenagrion mercuriale*] Address: CSCF, Terreaux 14, CH-2000 Neuchâtel, Switzerland

3133. Matsuda, I. (1999): A record of *Rhyothemis variegata imperatrix* SELYS with developed dark marks of the wings. *Aeschna* 35: 45-46. (in Japanese). [A black and white photo documents the ♀ with the dark wings caught at 11 July 1997.] Address: not stated in Japanese

3134. Moriyasu, T. (1999): A record of larva of *Macromia daimoji* OKUMURA from Oita Prefecture, Kyushu, Japan. *Aeschna* 35: 52. (in Japanese). [A brief documentation of the record of a larval *M. daimoji* along with a picture of the habitat are presented.] Address: not stated in English

3135. Moryasu, T. (1999): Notes on moulting and regeneration of an anterior leg in the larvae of *Macromia daimoji* OKUMURA. *Aeschna* 36: 43-45. (in Japanese). [Japan; the moulting is documented by 11 black and white photos.] Address: not stated in Japanese

3136. Nishida, T. (1999): The Odonata in the United States of America, mainly in the State of Michigan. *Aeschna* 36: 1-20. (in Japanese with English summary). [61 odonate species are documented in most cases for Michigan and in some cases for California, Oregon, and Florida, USA. The record of *Libellula vibrans* seems to be a new state record for Michigan. Many species are documented with colour photos.] Address: not stated in Japanese

3137. Ozono, A. (1999): A record of *Tholymis tillarga* from Nara Prefecture. *Gekkan-Mushi* 342: 44. (in Japanese). [Japan, 18 and 25 Sept. 1998; a translation of the paper is published in *Digest of Japanese Odonatological Short Communications* 14] Address: Ozono, A., 5-7-5, Myomihigashi, Habikino City, 576-0012, Japan

3138. Pinratana, A.; Hämäläinen, M. (1999): Checklist of dragonflies recorded at Doi Inthanon. *Malangpo* 16: 150-154. (in English). [The checklist of Doi Inthanon mountain, Chiang Mai prov., Thailand, totals to 117 odonate species. A brief history of odonatological research in the region is outlined; some of the species are commented, and the phenology of each species is presented.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

- 3139.** Schmidt, B. (1999): Effizienzkontrolle von Besucherlenkungsmaßnahmen an naturnahen Fließgewässern - tierökologische Untersuchungen an der mittleren Jagst. Landesamt für Umweltschutz Baden-Württemberg, Naturschutz-Info 2/99: 16-19. (in German). [The paper summarises the results of an (unpublished) extensive study to analyse and assess the impacts of canoeing on the fauna of the river Jagst, Baden-Württemberg, Germany. Special emphasis is given to birds and Odonata. Scrapping on ground causes drift of larvae, leaving the canoe causes death of larvae by trampling, driving the boats can influence the emergence of Odonata by crippling or alerting predators. Some more detailed results of this study can be taken from the paper of Schorr (2000) (see OAS 1943).] Address: Schmidt, B., Sandöschstr. 28; D-88048 Friedrichshafen, Germany. E-mail: Schmidt-empire@gmx.de
- 3140.** Suda, S. (1999): A record of *Macromia urania* Ris from Taiwan. *Aeschna* 35: 43. (in Japanese). [A ♂ *M. urania* was caught at 27 June 1997, a ♀ at 11 July 1997; the habitat (Chii-Man-Ru) is documented with a photo.] Address: not stated in Japanese
- 3141.** Yeh, W.C. (1999): Notes on three aeshnid species from Thailand. *Malangpo* 16: 144-145. (in English). [First records for Thailand are *Anax indicus* Lieftinck 1942 and *A. panybeus* Hagen 1867; *Petaliaeschna pinratana* Yeh, 1999 is synonymized with *P. flavipes* Karube, 1999. The species / specimens are discussed and described in detail. The discussion includes a specimen of *A. indicus* from Nepal (Phewa Tal, Pokhara, 25. Sept. 1986, coll. G.S. Vick). In addition, misidentifications resp. illustrations of *A. guttatus* in papers of Laidlaw (1921) and Kennedy (1934) are documented, which turned out to be *A. indicus*.] Address: Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nanhai Road, Taipei, Taiwan, R.O.C. E-mail: wcyeh@serv.tfri.gov.tw
- 3142.** Yokoi, N. (1999): Dragonflies of Central Laos in mid-summer. *Malangpo* 16: 146-149. (in Japanese with English summary). [The paper documents in detail the results of an excursion to Laos from 30 July to 4 Aug. 1998. In total, 50 species were collected, among them, 24 are new records for Laos. The current (1999) checklist of the Odonata of Laos totals to 123 species. Figures of *Argiocnemis rubeola* Selys, 1877 (this taxon is considered a ssp. of *A. rubescens* Selys, 1877), *Pseudagrion pruinatum* (Burmeister 1839), *Devadatta ducatrix* Lieftinck 1969, *Orolestes* sp., and *Macromia* sp. are presented.] Address: Yokoi, N., 2-37-11, Kaisei, Koriyama, Fukushima, 963-8851, Japan
- 3143.** Yokoyama, T. (1999): Notes on the duration of egg stages on some dragonflies in Hokkaido. *Aeschna* 35: 49-50. (in Japanese). [Latin names of the 16 species are not given.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan
- 3144.** Yoshida, M.; Yagi, T.; Futahashi, R. (1999): Early Records of some Odonata in 1998 at central Japan. *Aeschna* 36: 21-24. (in Japanese). [Phenological data of 26 odonate species are presented.] Address: Yagi, T., Otobe 2113-102, Tsu C., Mie 514-0016, Japan
- 3145.** Aoki, T. (2000): Evidence of rapid decreasing of Aka-tombo in Kobe. *Symnet* 8: 3-4. (in English). [Japan; revisiting localities known to harbour great populations of *Sympetrum frequens* in 1999 showed, that abundance has decreased dramatically, or the species may even have disappeared.] Address: Aoki, T., Rokko Island High School, Naka 4-chome, Koyo-cho, Higashinada-ku, Kobe, 658-0032, Japan. E-mail: tao-ki@ma3.justnet.ne.jp
- 3146.** Arai, Y. (2000): A report on night oviposition of *Lestes temporalis* Hanseman [sic]. *Gekkan-Mushi* 358: 5. (in Japanese). [Japan, *Lestes temporalis* Selys 1883] Address: Arai, Y., 1233-2, Oaza Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-12, Japan.
- 3147.** Barlow, A.E. (2000): Additions to the checklist of odonata from New Jersey. *Argia* 12(3): 21-25. (in English). [6 new additions total the list of Odonata of New Jersey, USA to 178; Sussex County with 132 species is probably the hot spot of odonate diversity in the USA.] Address: Barlow, A.E., 10 Belle Court, Budd Lake, NJ 07828, USA. e-mail: a.barlow@smtphost.elsevier.com
- 3148.** Barlow, A.E. (2000): Observation of Odonata utilizing ants as prey. *Argia* 12(3): 32-33. (in English). [USA; New Jersey; the feeding behaviour of *Erythemis simplicicollis*, *Plathemis lydia*, and *Pachydiplax longipennis* on ants (*Formica exsectoides*) is described; exclusively ♀♀ (12 subsequent visits of the anthill) where observed to use ants as prey.] Address: Barlow, A.E., 10 Belle Court, Budd Lake, NJ 07828, USA. E-mail: a.barlow@smtphost.elsevier.com
- 3149.** Beckemeyer, R. (2000): Dragonfly dogs: canine collecting companions. *Argia* 12(3): 35-36. (in English). [R. Beckemeyer reports on experiences with his Labrador retriever spotting and chasing Odonata.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net
- 3150.** Beckemeyer, R. (2000): Some arcane dragonfly publications from the past. *Argia* 12(3): 36-37. (in English). [The paper refers to some hidden dragonfly tales, some referring to very personal interests of the author: Aman, P. 1883-1884. "Essai sur le vol des Insectes, Rev. Sci. net. Montpellier. 3rd Ser. n et III. Lamborn, R.H. (Editor) 1890. Dragon flies vs mosquitos. Appleton. New York. Randolph, V. 1925. Life among the dragonflies. Little Blue Book No. 818. Haldeman-Julius. Girard, Kansas. Tillyard, R.J. 1917. The biology of dragonflies. Cambridge University Press. Cambridge. (chapter on Odonata and aviation) The paper also refers to a list of the Odonata of the state New York (W. Beutemiller) and the observation of a mass migration of Odonata on 2 June 1880 at Weymouth, Massachusetts] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net
- 3151.** Beckemeyer, R.J. (2000): Some county Odonata records for Kansas and Nebraska for 1999 and 2000. *Argia* 12(3): 27-28. (in English). [USA; Kansas, Nebraska; of some interest is the rediscovery of *Telebasis salva* in Kansas.] Address: Beckemeyer, R.J.,

957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3152. Behrstock, R.A. (2000): Results of a brief odonate survey at East Sandia Spring, Reeves Co., Texas, including a new state record of Paiute dancer (*Argia alberta*, Kennedy, 1918). *Argia* 12(3): 13-15. (in English). [The paper lists the Odonata from the Balmorhea State Park (region), Texas, USA, and discusses the attempts to (re)discover *Argia leonorae* Garrison, 1994.] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@aol.com

3153. Cannings, R.; Cannings, S. (2000): Post-meeting field trip. *Argia* 12(3): 6-7. (in English). [The 2000-DSA-post-meeting field trip resulted in some most southern range records, and in the extremely rare *Somatochlora brevicincta*.] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca

3154. Cashatt, T. (2000): Hine's Emerald workshop 2000. *Argia* 12(3): 8-10. (in English). [July 12-14, 2000, a workshop to train 38 field biologists to recognize the federally listed *Somatochlora hineana* and its habitats was organised in Door County, Wisconsin, USA. The training sessions consisted of class room instructions as well as field trips to breeding sites in Door Co.] Address: Cashatt, E.D., Illinois State Museum, 1920 10 1/2 St., Springfield, IL 62703, USA. E-mail: cashatt@museum.state.il.us

3155. Chazal, A.C. (2000): Two Virginia records for *Enallagma weewa*. *Argia* 12(3): 26-27. (in English). [USA; Virginia; detailed documentation of two records of *E. weewa*.] Address: Chazal, Anne, Virginia Dept of Conservation and Recreation, Div. Natural Heritage, Richmond, Virginia, USA

3156. Cordero Rivera, A. (2000): An analysis of multivariate selection in a non-territorial damselfly (Odonata: Coenagrionidae). *Etologia* 8: 37-41. (in English with Spain summary). ["The relationship between fitness and phenotypic traits (body, thorax and wing length, head width and date of emergence) was studied in a sample of 187 ♂♂ and 113 ♀♀ of *I. graellsii* by means of a multivariate regression analysis of selection. ♂ fitness was estimated as lifetime mating success divided into three multiplicative episodes: lifespan, visits / lifespan and matings/visit (mating efficiency). In ♀♀, reproductive success was estimated from the lifetime number of ovipositions divided into lifespan, visits / lifespan and ovipositions/visit. Results indicated the absence of directional selection but highly significant nonlinear selection was observed in both sexes in respect to the date of emergence and body proportions. These results suggest that selection acts simultaneously on the multivariate phenotype and several traits should therefore be included in the selection analysis." (Author)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

3157. Donnelly, N. (2000): Farangpo 2000 - Hong Kong, Thailand and Cambodia. *Malangpo* 17: 160-162. (in English). [Odonatological report of a trip to these 3 Asian countries.] Address: Donnelly, T., 2091 Partridge

Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3158. Donnelly, T.W. (2000): Change in *Cannaphila insularis* common name. *Argia* 12(3): (in English). [Verbatim: "The Common Names Committee of the DSA has changed the common name of *C. insularis* (Libellulidae) from Narrow-winged Skimmer to Gray-waisted Skimmer. This change was to accommodate the necessity of giving *Cannaphila vibex* a common name, as the latter species was recently reported from Nuevo Leon, Mexico, and thus will be included in the new dragonfly manual by Needham, Westfall, and May (in which numerous species found in the northernmost Mexican states and the Caribbean islands will first be given English names). The name "narrow-winged skimmers" is being retained for the genus *Cannaphila*, and the most obvious field mark of *C. insularis*, the gray pruinosity at the base of the black abdomen of mature ♂♂, is now featured in its common name."] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3159. Donnelly, T.W. (2000): Dot-map project - hung up on *Lestes*! *Argia* 12(3): 31-32. (in English). [The author takes *Lestes disjunctus*, *forcipatus*, and *australis* for three distinct species. Due to insufficient identification keys (in the past) this taxonomic problem causes difficulties to map the three taxa in USA. Additional problems refer to taxa which intergrade (*Aeshna interrupta* vs. *A. lineata*; *Sympetrum semicinctum* vs. *S. occidentale*; *Erythemis simplicicollis* vs. *E. collocata*; *Epithecica costalis* vs. *E. petechialis*; *Amphiagrion saucium* vs. *A. abbreviatum*.)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3160. Donnelly, T.W. (2000): Farangpo 2000 - Hong Kong, Thailand, and Cambodia. *Argia* 12(3): 18-21. (in English). [The most interesting species from different localities in Hong Kong, Thailand, and Cambodia are dealt with.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3161. Donnelly, T.W. (2000): History of American Odonata studies - Edmund M. Walker. *Argia* 12(3): 33-35. (in English). [This is an additional contribution to the series of important North American odonatologists written by N. Donnelly with a significant contribution on his personal cooperation with E. Walker: "There are dozens (perhaps hundreds) of odonatists who can truly say that he was the most helpful, enthusiastic, and inspirational odonatist that they have ever known."] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3162. Donnelly, T.W. (2000): Late records in the northeastern United States and eastern Canada. *Argia* 12(3): 28. (in English). [Causes for the late records may be a late start of flying season due to bad weather conditions or the absence of violent weather in August.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3163. Donnelly, T.W. (2000): Na-Nick of the north strikes again - a visit to Churchill, Manitoba. *Argia* 12(3): 12-13. (in English). [Manitoba, Canada; 9 species were collected including *Aeshna septentrionalis*. A brief note on roosting site selection of *A. sitchensis* (warm,

gravel road and others), and *A. septentrionalis* (large granite glacial boulders). Species started to fly at temperatures of 14°C.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3164. Dunkle, S. (2000): Fun in Oz. *Argia* 12(3): 15-18. (in English). [This is a nice talk on Odonata based on a four month trip to Australia, and how to spot them.] Address: Dunkle, S., Biol. Dept, Collin County Community College, 2800 E, Spring Creek Parkway, Plano, TX 75074, USA

3165. Futahashi, R.; Futahashi, H.; Araki, Y (2000): Supposed records on migration of *Sympetrum depressusculum* (SELYS). *Aeschna* 37: 28-30. (in Japanese). Address: not stated in English

3166. Glotzhober, B. (2000): Bernie V. Counts Jr., Ohia, dead at 42. *Argia* 12(3): 3-4. (in English). [obituary] Address: Glotzhober, R., Ohio Natural History Society, 1982 Velma Ave., Columbus OH 43211-2497, USA. E-mail: bglotzhober@ohiohistory.org

3167. Hämäläinen, M. (2000): Additions and corrections to dragonfly lists of five protected areas in Thailand. *Malangpo* 17: 156-157. (in English). [Additions to previously reported Odonata of Khao Yai National Park, Khao Soi Dao Wildlife Sanctuary, Doi Suthep - Pui national Park, Phu Kradung National Park, and Doi Inthanon National Park are made. Some species reported are critically discussed.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

3168. Hämäläinen, M.; Yeh, W.-C. (2000): Polycanthagyna ornithocephala - again a new aeshnide to the Thai fauna. *Malangpo* 17: 158-159. (in English). [2 ♀♀ of *P. ornithocephala*, new additions to the Thai fauna, were caught at Kanchanaburi province, Kroeng Kra Via alt 22 Oct. 1999. One of the specimens is described in detail, and the species' distribution is briefly outlined. The species is compared with *P. erythromelas* and *P. melanictera*. In addition, habitat and habits are briefly described. *Tetracathagyna waterhousi*, a likewise rare species in Thailand, is reported from the same place from 2 May 2000.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

3169. Hernández, J.M. (2000): Geographic distribution of *Crocothemis servilia* (Drury) (Odonata: Libellulidae) in Cuba. *Argia* 12(3): 28-29. (in English). [The Asiatic *C. servilia* was first recorded on Cuba in Dec. 1994; the present knowledge, based on collection of the author in successive years, is documented.] Address: Hernández, J.M.R., Apartado Postal 2004, Sancti-Spiritus, Cuba CP 60100

3170. Hutchings, G. (2000): DSA annual meeting, 27 July - 1 August 2000, British Columbia. *Argia* 12(3): 4-6. (in English). [Canada, British Columbia; this report includes lists of species collected in the framework of the meeting.] Address: Hutchings, G., 971 Arundel Drive, Victoria BC, Canada V9A 2C4

3171. Ishizawa, N. (2000): Aka-tombo at Otemachi in 1999. *Symnet* 8: 9-10. (in English). [Counts of *Sympetrum frequens*, *S. infuscatum*, and *S. darwinianum* are presented and discussed. "It is likely that because

of continuation of the climate change, the period of descent from highlands in *S. frequens* may be later than usual."] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@mars.ccn.ne.jp

3172. Ishizawa, N. (2000): Articles on Aka-tombo in newspapers. *Symnet* 8: 2-3. (in English). [Finding a note in a more popular book on insects on a migratory swarm of *Sympetrum frequens* at June 21, 1973, the register of the regional newspaper was consulted to find out more details on this mass swarm. Disappointingly, only very few information on the migration were to extract from the newspapers. Some additional notes on articles with information of Odonata are listed, and the reasons are discussed why so little information on Odonata is present in newspapers.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@mars.ccn.ne.jp

3173. Ishizawa, N. (2000): *Sympetrum frequens* at Omori Pond (3). *Symnet* 8: 10-11. (in English). [In *S. frequens* more fertilized eggs were found in mid autumn than in early or late autumn. Data on larval growth, size of sexes at emergence, and the start of reproduction period are presented.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@mars.ccn.ne.jp

3174. Ishizawa, N. (2000): Thermoregulation in calopterygid damselflies. *Nature & Insects* 35(11): 14-17. (in Japanese). [This is a detailed survey of the thermoregulation in *Mnais pruinosa costalis* and *Calopteryx cornelia* in Japan. Mean thoracic temperature, mean weight, thoracic length, and wing loading are measured and compared. "In the orange-wing ♂, the relation of the temperature of thorax (Tth) to the ambient temperature in the sun was highly correlated and the regression coefficient was larger than 1.0, while in the hyaline-wing ♂, those coefficients were lower, and Tth of the latter was highly thermoregulated. So was the immature hyaline-wing ♂, too [...]. The experiment (the bodies except wings were covered and exposed to the light of 75 W halogen lamp from over 25 cm) proved that wing colour did not affect thoracic temperatures. Immature adults thermoregulated their thoracic temperatures rather lower than mature adults. Tth of the hyaline-wing ♂ increased higher than the orange-wing ♂, probably due to their lighter weight and the scantiness of pruinescence. In orange-wing ♂♂ their bodies were heavily pruinose and this may reflect the sunshine and keep Tth not so high in the direct sunshine. But due to it they can not be superior to hyaline ♂♂ at small sunlit spaces in the shaded areas, while hyaline-wing ♂♂ are superior in such areas. The ♀ of *M. p. costalis* has a relatively large thorax and this may be common among damselflies. This may be helpful for ovipositing ♀♀ to prevent from losing Tth in the water. In a ovipositing ♀ of *Cercion sieboldii*, Tth was lower by 3.8°C than that of her partner, and the difference was far larger than that (0.2°C) of other pairs ovipositing on the surface of water. ♀♀ of *M. p. costalis*, of which wing loading is larger are said to perch on the canopies of trees in the daytime except during oviposition to maintain high Tth. In ♂♂ of *C. cornelia*, they perch nearby streams or on boulders stuck out from the streams, so their Tth are low and their wing beat frequency is small. But their wing loading is light and they can fly easily, though they are not so agile." A translation of the paper is available from Naoya Ishiza-

wa, or IDF.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: isizawa7@mars.ccn.ne.jp

3175. Kano, K.; Yokoi, N. (2000): On the plant worms of Odonata. *Nature & Insects* 35(11): 6-9. (in Japanese (translated in English by Naoya Ishizawa)). [A parasitic fungus belonging to the Clavicipitaceae, Ascomycota was found on *Sympetrum infuscatum*, Yasato-cho, Ibaraki Pref, Japan. The paper describes the infection route and compiles reports with information on "plant worms" on Odonata. A translation of the paper is available from Naoya Ishizawa, or IDF.] Address: Yokoi, N., 2-37-11 Kaisei, Koriyama, Fukushima, 963-8851 Japan

3176. Karube, H. (2000): Records of the New Caledonian Odonata. *Aeschna* 37: 37-42. (in Japanese). [26 species are listed; *Isosticta robustior*, *Caledopteryx maculata*, *Oreaeschna dominatrix*, *Synthemis miranda*, *Synthemis fenella*, and *Metaphya elongata* are documented by black and white photos.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

3177. Kitagawa, K. (2000): The Odonata of Thailand taken by Mr. Jyun Hase. *Aeschna* 37: 33-36. (in Japanese with English summary). [In 1991, 15 odonate species were collected at Khao Yai, Central Thailand. 3 species, *Ceriaton azureum*, *Lathrecista a. asiatica*, and *Zyxomma petiolatum*, are new additions to the odonate fauna of Khao Yai.] Address: Kitagawa, K., Imai 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan

3178. Kitching, R.L. (2000): Food webs and container habitats: The natural history and ecology of phytotelmata. Cambridge Univ. Press, New York. ISBN 0-521-77316-4: xiii + 431 pp. (in English). ["[...] An annex (p. 301-384) is a bestiary. Phylum by phylum, from Platyhelminthes to Chordata, it gives a brief account of each major taxon, for some at the level of phylum, for some arthropods down to the level of family. It provides a classification, down to the level of species, of some of the taxa (Annelida, Crustacea, Odonata, Culicidae, Chironomidae, Ceratopogonidae, Psychodidae, Phoridae, Syrphidae, Coleoptera, Acari, and frogs) in tables. This classification was a brave undertaking because it seems to be the first to attempt a listing for the fauna of all phytotelmata. [...]" (Book review of J. H. Frank, Entomology & Nematology Dept., University of Florida, Gainesville, FL 32611-0630, USA; published in *Florida Entomologist* 84(3): 461-462, 2001).]

3179. Kitowski, I. (2000): The food of Mantagu's Harrier (*Circus pygargus*) in the post-fledging period on the carbohydrate peat-bog near Chelm. *Walory Przyrodnicze Chelmskiego Parku Krajobrazowego i Jego Najbliższych okolic*: 177-182. (in Polish with English summary). [Chelm (51°08N 27°37E), Poland; "Odonata indet." account to 1,7% of the diet.] Address: not stated

3180. Kowalik, W.; Stryjecki, R. (2000): The invertebrates macrofauna of the Chelm Landscape Park peat-bog pools with special regard to the water mites (Hydracarina). *Walory Przyrodnicze Chelmskiego Parku Krajobrazowego i Jego Najbliższych okolic*: 165-176. (in Polish with English summary). [Poland; Odonata are not detailed at the genus or species level.] Address: not stated

3181. Laudermik, E. (2000): New Kentucky records. *Argia* 12(3): 26. (in English). [USA, Kentucky; *Enallagma daeckii*, *Telebasis byersi*] Address: Laudermilk, E.L., 199 Meadow View Drive, '3, Frankfort, KY 40601, USA. E-mail: Ellis.Laudermilk@mail.state.ky.us

3182. Maibach, A.; Meier, C. (2000): 12. Libellen-Symposium in Neuchâtel, 27.11.1999. *Nachrichten des Schweizer Zentrum für die Kartographie der Fauna* 19: 38-42. (in German, French and Italian). [Summaries of the following lectures are presented: 1. T. Maddalena: *Novità dal Ticino - Gruppo di Lavoro «Libellule Ticino»* 2. N. Dulka: *Approche autécologique de trois espèces de Coenagrionidae (Odonata: Zygoptera) en Suisse Occidentale (Coenagrion puella, C. pulchellum, Enallagma cyathigerum)* 3. Ch. Keim: *Recolonisation par les Odonates des gravières du Verney (Martigny, VS) asséchées en 1998* 4. B. Oertli: *Prédiction des peuplements d'Odonates des étangs suisses*. 5. H. Wildermuth: *Das Rotationsmodell zur Pflege von kleinen Libellengewässern - Rückblick auf 15 Jahre Praxis*. 6. H. Humbert-Droz & S. Dubouchet: *Suivis spatial et temporel d'une population d'Orthetrum brunneum sur la Seymaz (GE)*. 7. R. Hoess: *Libellenbeobachtungen im Kanton Bern in Zusammenhang mit dem Jahrhunderthochwasser vom Mai 1999*] Address: CSCF, Terreaux 14, CH-2000 Neuchâtel, Switzerland

3183. Matsumura, T.; Uéda, T. (2000): A report on the vertical distribution of Aka-tombo on Akausage, Fukui Pref. and marking survey of *Sympetrum frequens*. *Symnet* 8: 6-8. (in English). [The distribution of *S. frequens*, a species known to disperse in summer to higher altitudes, was studied along a transect at 14 different elevations. The abundance increased significantly above 1000m a.s.l. Additional data are presented for *S. infuscatum*, *S. darwinianum*, and *S. eroticum*. Marking of 709 specimens of *S. frequens* resulted in a recapture of an individual 72 km apart from the marking locality.] Address: Ueda, T., Ishikawa Agricultural College, Suetatsu, Nonoichi, Ishikawa Pref., 921, Japan

3184. Mauffry, B.; Roble, S.; Tennesen, K. (2000): New state records of Odonata for West Virginia in the collection of the late Paul D. Harwood. *Argia* 12(3): 29-31. (in English). [USA; West Virginia; Based on a collection of app. 5000 specimens, three new state records could be added to the list of West Virginia Odonata: *Lestes inaequalis*, *Pantala flavescens*, and *Pantala hymenaea*. Some of the voucher specimens and publications of Harwood are critically discussed.] Address: Mauffray, B., 4525 N.W. 53rd Lane., Gainesville, FL 32653, USA. E-mail: iori@afn.org

3185. Nakai, K. (2000): Watching a migration of Aka-tombo in swarms. *Symnet* 8: 2. (in English). [Japan; 27 July, 1991 a swarm of migrating *Sympetrum frequens* was observed. It is described in detail. The number of the involved (mature) specimens is estimated at 800000 per hour.] Address: Nakai, K., Tsubata-machi, Kahoku-gun, Ishikawa Pref., Japan

3186. Nikula, B. (2000): Bog hopping and stream sloshing in the Maine woods. *Argia* 12(3): 10-12. (in English). [84 odonate species were collected in end of June, 2000 in the northeastern part of Maine, USA. *Anax longipes* is an addition to the Maine Odonata list. *Somatochlora hineana* could - contrary to 1999 - not be traced, but the quite recently described *Neurocordulia michaeli* Brunelle, 2000 was. The most interesting spe-

cies are listed locality-wise.] Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. e-mail: ode-news@capecod.net

3187. Paulson, D. (2000): New records from Washington and Idaho. *Argia* 12(3): 25-26. (in English). [Records of *Coenagrion interrogatum*, *Aeshna subarctica*, *Nehalennia irene*, and *Epitheca spinigera* are documented in detail.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3188. Sasamoto, A.; Ushijima, K (2000): Records of the Odonata collected at Kathmandu Valley, in Nepal. *Aeschna* 37: 1-12. (in Japanese with English summary). [Between 1997 and 1999, 50 species were recorded. Some are illustrated by black and white photos (*Rhincocypha trifasciata*, *Coeliccia renifera*, *Ceriagrion fallax*, *Gynacanthaeschna sikkima*, *Cephalaeschna masoni*, *Aeshna petalura*, *Anaciaeschna donaldi*, *Scalmogomphus bistrigatus*, *Macromia moorei*, *Sympetrum haematoneura*) or drawings (*Aciagrion olympicum*, aberrant *Crocothemis* sp.).] Address: not stated in English

3189. Tabata, O.I. (2000): A Record of *Lyriothemis elegantissima* Selys from Tokunosima Island. *Aeschna* 37: 27. (in Japanese). [Japan, 13-VII-1999] Address: Tabata, O., Shoubuen-cho 79-18, Kamigamo, Kita-ku, Kyoto C., Kyoto 603-8064, Japan

3190. Thiele, V.; Berlin, A.; Wichert, R. (2000): Zur Kenntnis zoologischer Taxa (Avifauna, Lepidoptera, Trichoptera, Odonata, Saltatoria) im Bereich von Knochenhauerwiese und Galgenbruch (Hansestadt Rostock). *Archiv der Freunde der Naturgeschichte in Mecklenburg* 39: 85-104. (in German). [Mecklenburg-Vorpommern, Germany; 20 odonate species are listed for three localities. The list includes *Aeshna viridis* and *Leucorrhinia pectoralis*.] Address: Thiele, V., biota, Am Augraben 2, D-18273 Güstrow, Germany

3191. Tsubuki, T. (2000): A record of *Sympetrum darwinianum* at the Yunomaru heights. *Symnet* 8: 8-9. (in English). [Japan; some altitudinal records of (mature) *S. darwinianum*, and observations on pre-reproductive *S. frequens* are reported.] Address: not stated

3192. Tsubuki, T. (2000): Observation on *Sympetrum frequens* and *Sympetrum darwinianum* at Soja City, Okayama Pref. in the early November. *Symnet* 8: 9. (in English). [Japan; faunistic data on the two species] Address: not stated

3193. Tsubuki, T. (2000): Seasonal fluctuations of Aka-tombo in the peripheries of Mogusayama, Hino City, Tokyo in 1997. *Symnet* 8: 11-13. (in English). [Japan; detailed documentation of seasonality of *Sympetrum frequens*, *S. infuscatum*, *S. speciosum*, *S. darwinianum*, and *S. eroticum* between July and December 1997.] Address: not stated

3194. Ueda, T. (2000): "The Japanese" and dragonflies. *Symnet* 8: 1. (in English). [The paper documents the title pages of the journal "The Japanese" which first was published in 1888, the 21th year of the Meiji era. Obviously it was a nationalistic magazine aimed to try to avoid europeanism in Japan. Some of the items of the journal referring to Odonata are briefly noted, and the special relationship between Japan (Akit-sushima - Country of Dragonflies) and dragonflies is

briefly outlined.] Address: Ueda, T., Ishikawa Agricultural College, Suematsu, Nonouchi, Ishikawa Pref., 921, Japan

3195. Ugai, S. (2000): Hybrid records of dragonflies in Japan. *Nature & Insects* 35(11): 18-22. [The paper documents and compiles extensively hybrids between odonate species in Japan. A translation of the paper is available from Naoya Ishizawa, or IDF.] Address: not stated

3196. Ushiyama, M. (2000): Rescue works of larvae in swimming pools. *Symnet* 8: 5. (in English). [The author describes the situation of school ponds in Japan used for swimming purposes; cleaning of the ponds prior emergence of Odonata leads to the destruction of the dragonfly population. The author describes who it may be possible to combine the functions "swimming pond for pupils" and "habitat of Odonata".] Address: not stated

3197. Wagner, D.L. (2000): Dragonfly and damselfly workshop, University of Connecticut. *Argia* 12(3): 8. (in English). [Report from a workshop organised in May 2000.] Address: Wagner, D.L., Ecol. & Evol. Biology, U. Box 42, Univ. Connecticut, Storrs, CT 06269, USA. E-mail: dwagner@uconnvm.uconn.edu

3198. Watanabe, K. (2000): *Coeliccia* of Thailand and Malaysia. *Nature & Insects* 35(11): 2-5. (in Japanese (translated in English by Naoya Ishizawa)). [The paper lists all known species of the genus *Coeliccia* in table along with the countries they occur. Areal maps and information on altitudinal distribution of *C. didyma* (Selys 1863), *C. pounyi* Fraser 1924, *C. loogali* Fraser 1932, *C. chromothorax* (Selys 1891), and *C. doisuthensis* Asahina 1984 are presented. *C. cyanomelas* Ris 1912, *C. flavicauda* Ris 1912, and *C. ryukyuensis* Asahina 1951 are discussed from the evolutionary point of view. A translation of the paper is available from Naoya Ishizawa, or IDF.] Address: not stated

3199. Watanabe, Y. (2000): Attachment apparatus of dragonfly eggs. *Nature & Insects* 35(11): 10-13. (in Japanese (translated in English by Naoya Ishizawa)). [Eggs are enclosed by a gelatinous substance which is interpreted as an adaptation to protect the eggs. The substance is discussed from an evolutionary point of view. Eggs and their specific attachment apparatus are documented for the followings species: *Ischnura asiatica*, *Copera annulata*, *Anax parthenope julius*, *Stylurus annulatus*, *Asiagomphus amamiensis*, *Gomphus postocularis*, *Nihonogomphus viridis*, *Sinictinogomphus clavatus*, *Onychogomphus forcipatus*, *Sympetrum frequens*, *Epitheca bimaculata sibirica*, and *Deielia phaon*. A translation of the paper is available from N. Ishizawa, or IDF.] Address: Watanabe, Yoko, 4-14, Nishida-cho, Nishinomiya City, Hyogo Pref., 662-0034, Japan

3200. Yokoyama, T. (2000): Notes on the durations of the egg stages on some dragonflies in Hokkaido 2. *Aeschna* 37: 22-26. (in Japanese). [*Mnais pruinosa*, *Lestes sponsa*, *Sympecma paedisca*, *Coenagrion e-cornutum*, *C. hylas*, *Enallagma circulatum*, *Nehalennia speciosa*, *Gomphus postocularis*, *Davidius moiwanus*, *Trigomphus melampus*, *Oligoaeschna pryeri*, *Aeshna juncea*, *A. nigroflava*, *Somatochlora viridiaenea*, *S. arctica*, *S. alpestris*, *Cordulia aenea*, *Epitheca bimaculata*, *Lyriothemis pachygastra*, *Sympetrum frequens*, *S. darwinianum*, *S. infuscatum*, *S. eroticum*, *Sympetrum kun-*

ckeli, S. risi, S. flaveolum, Sympetrum danae, Leucorhinia intermedia.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

3201. Yoshida, M. (2000): Collecting and breeding data of some odonate larvae, 3rd report. *Aeschna* 37: 13-21. (in Japanese with English summary). [Japan; 19 species are treated.] Address: not stated in English

3202. Yoshida, M. (2000): Dispersive record of *Boyeria maclachlani* (SELYS) at Yahagi River. *Aeschna* 37: 28. (in Japanese). Address: not stated in English

3203. Zschunke, R. (2000): Untersuchungen zum Einfluss des Wetters auf das Verhalten der Gebändernten Prachtlibelle (*Calopteryx splendens*) unter besonderer Berücksichtigung der Reviermännchen. Diplomarbeit im Fachbereich Biologie (Zoologie) der Universität des Saarlandes. 100 pp. (in German). [River Nied, Saarland, Germany; Effects of weather on *C. splendens* were surveyed in 1999; special emphasis was given to territorial ♂♂. Meteorological data (air-temperature, 400 - 700nm - radiation, UV-radiation, wind speed, relative atmospheric humidity, and rain / precipitation) were measured continuously. These data were plotted against the dynamic of the population and the behaviour of selected specimens. Air temperature and visible radiation determined the behaviour of *C. splendens* predominately. Wind velocity influenced the behaviour. Atmospheric humidity was equal at maturation places and territories; there was no indication that teneral specimens prefer places with higher humidity than mature specimens. In addition, this M.Sc. includes observations on behaviour of *C. splendens* during the solar eclips of 11/08/1999, and many additional information on population dynamics, sex-ratio, roosting site selection, diurnal activity, etc. This study provides highly significant information on the influence of weather on the behaviour of Odonata.] Address: Zschunke, R. E-mail: rasz@gmx.de

2001

3204. Abbott, J. (2001): The 2001 DSA annual meeting at Junction, Texas. *Argia* 13(3): 2-4. (in English). [*Erythemis peruvia* - new to the USA - was collected at the South Llano River State park, Texas. In addition species lists from several localities in Texas and New Mexico, USA are provided.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

3205. Akagi, M. (2001): Observation on a swarming aka-tombo. *Symnet* 9: 5. (in English). [Japan, Miyauchi, Tottori, Pref.; July 3, 2001, report on an aggregation of *Sympetrum frequens*.] Address: Akagi, M., Nichinancho, Hino-gun, Tottori Prefecture, Japan

3206. Araki, Y.; Futahashi, R. (2001): Record of collecting and breeding of larvae of *Anax guttatus* in Toyama Prefecture. *Aeschna* 38: 35-38. (in Japanese with English summary). ["We collected some larvae of *A. guttatus* at Daimon-machi and Asahi-machi, Toyama Prefecture in October and November 1998. This is probably the northernmost record of the larvae of this tropical migratory species in Japan. According to our

breeding data the egg period was 11 to 19 days, and the larvae period was 55 to 88 days. Hence, the larvae we collected outdoors are supposed to have been originated from the eggs laid in August and September 1998 In 1998 autumn, we found many adults of *Anax guttatus* but it was not easy to find the larvae mainly because of the difficulty in identifying young larvae. But we also speculate that the eggs or the young larvae of this species could not adequately adapt themselves to the cold climate of the late autumn in the Hokoku district because no late-stage larvae was found through our repeated research in October and November at Shimamoto-city and Himi-city (Toyama Prefecture) where we observed its reproductive behavior many times since September."] Address: not stated in English

3207. Barlow, A.E. (2001): Second annual report of the new Jersey Odonata Survey including a state record and numerous county records. *Argia* 13(3): 18-22. (in English). [*Somatochlora kennedyi* was discovered on June 7, 2001 in New Jersey, USA. 36 additional species to counties are briefly discussed.] Address: Barlow, A.E., 10 Belle Court, Budd Lake, NJ 07828, USA. E-mail: a.barlow@smtp.elsevier.com

3208. Beckemeyer, R. (2001): "How far to Wiwili?" "Quince Minutos! (Fifteen minutes)" a Nicaraguan adventure. *Argia* 13(3): 9-14. (in English). [This is an extensive report of collecting Odonata in the mud of Nicaragua.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3209. Brockhaus, T. (2001): Libellen (Odonata). In: Verein zur Förderung von Landschaftspflege und Naturschutz & Stadtverwaltung Chemnitz, Umweltamt (Hrsg.): Pflanzen-Tiere-Lebensräume in Chemnitz. Ein Arten- und Biotopschutzkonzept: 178-188. (in German). [37 odonate species are known to occur in Chemnitz, Sachsen, Germany. The species - including historical data - are listed in a table. 24 species are discussed in detail, the distribution of some is mapped.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

3210. Brown, G. (2001): Rhode Island update. *Argia* 13(3): 22. (in English). [Current results of odonatological mapping of Rhode Island, USA are presented including details on *Aeshna mutata*.] Address: Brown, Virginia, The Nature Conservancy, 159 Waterman Avenue, Providence, RI, 02906, USA

3211. Buidin, C. (2001): Premiere mention de *Sympetrum (Sympetrum) semicinctum* Say (Odonata: Libellulidae) par la Côte-Nord du Saint-Laurent. *Fabriques* 26(2): 82. (in French). [Quebec, Canada; 1 ♀, 9-IX-2000.] Address: Buidin, C., 1 ch. du Grand Ruisseau, Riviere-Saint-Jean, QC, G0G 2N0, Canada

3212. Daigle, J.J. (2001): Cades cove dragonfly bioblitz II. *Argia* 13(3): 6. (in English). [Report from a regional meeting including a list of twelve new species for the Great Smoky Mountains National Park, Tennessee, USA.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@netally.com

3213. Deliry, C. (2001): *Sympetrum piémontais* n°1 à 46. Un retour sur les activités du GRPLS *Sympetrum piémontais* 47: 12-15. (in French). [The French "Groupe de Recherche et de Protection des Libellules

"Sympetrum" is definitely one of the most active dragonfly associations within our community of odonatologists. This paper compiles the essentials of the work starting in 1986/87 and is a significant document of dragonfly research in France.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France

3214. Donnelly, N. (2001): There are definitely no flying fishes on the road to Mandalay. *Argia* 13(3): 15-18. (in English). [Report from a collecting trip to Myanmar / Burma.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3215. Futahashi, M.; Fukui, M; Yoshida, M.; Yokoyama, T. (2001): Breeding records of eggs and larvae of *Sympetrum depressiusculum* (Selys, 1841). *Aeschna* 38: 24-26. (in Japanese with English summary). [The authors outline that "previous breeding records regarded most of the offspring of *S. depressiusculum* caught in Japan as hybrids between *S. depressiusculum* and *S. frequens*." To obtain "genuine *S. depressiusculum*", specimens thought to have just reached the coastal area of Japan from overseas were caught. Eggs reared to the imago proved to be typical *S. depressiusculum*.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

3216. Futahashi, R.; Futahashi, H.; Araki, Y. (2001): Observation of copulation and oviposition of *Sympetrum cordulegaster*. *Aeschna* 38: 39-40. (in Japanese with English summary). [Records of copulation behaviour of *S. cordulegaster* in Japan are rare. The authors present photographs of the copulation and oviposition ("Flying-oviposition into the water") of this species.] Address: not stated in English

3217. Gianti, M. (2001): Segnalazioni faunistiche italiane. *Coenagrion mercuriale* ssp. *castellani* Roberts, 1948 (Odonata: Coenagrionidae). *Boll. Soc. ent. ital.* 133(3): 267. (in Italian). [*C. castellani* is for the first time recorded for Piemonte, N Italy (1 ♂, 2 ♀♀, Salmour/CN, 13-VI-1999). Its distribution in Italy is briefly outlined.] Address: Gianti, M., Via Divisione Cuneese 17, I-12023 Garaglio CN, Italy

3218. Hachiya, K. (2001): Seasonal fluctuations of adult *Sympetrum frequens* and *Sympetrum infuscatum* at rice paddies in Hokkaido. *Symnet* 9: 6-9. (in English). [In 1998 and 1999, the emergence and pre-reproductive period of *Sympetrum frequens* and *S. infuscatum* was studied near Sapporo, Hokkaido, Japan.] Address: Hachiya, K., Kuriyama-cho, Yubari-gum, Hokkaido, Japan

3219. Higashi, K. (2001): Kotee of dragonflies and quails. *Symnet* 9: 1-2. (in English). [Japan; "Kotee is said to be an art of moulding on a plaster wall with only a trowel by a plasterer." This paper reports extensively on a kotee representing dragonflies.] Address: Higashi, K., Department of Applied Biological Sciences, Faculty of Agriculture, Saga University, Honjyo-machi 1, Saga, 840-8502, Japan. E-mail: higashik@cc.saga-u.ac.jp

3220. Ikezaki, Y. (2001): The extinct and seriously endangered species of insects in Nagasaki prefecture. *Nature & Insects* 36(11): 23-25. (in Japanese with English title). [Japan, the list of 5 insect species includes *Mortonagrion Hirosei*, and *Libellula angelina*.] Address: not stated

3221. Ishizawa, N. (2001): Capture of a ♀ *Sympetrum frequens* Selys with highly reflective wings. *Gekkan-Mushi* 370: 31-32. (in Japanese). [I captured a ♀ *S. frequens* of which wings were highly reflective at Mikajima, Horinouchi, Tokorozawa City, Saitama Prefecture on September 18, 2001. It was fine, and the air temperature was 29.113 at 2:50 p.m. The dragonfly perched on a rope, and was rather inactive in flight. The abdominal dorsum was dark brown; body weight: 301 mg, abdominal length: 28.7 mm, fore wing: 35 mm, hind wing: 33.5 mm, the total weight of four wings: 11 mg, rather heavier than those of ordinary ones (8.9+1.3 mg, n=16). The wings were glistening like those of teneral soon after emergence. The body sizes were not so different from ordinary ones except the fore wings. The ♀ had a large fore wings for its body, because such a dragonfly of which fore wings exceed 35 mm is rarely seen. I compared the dragonfly with ordinary ones on the effect of wings on body temperature by irradiating them with a halogen lamp (75W) from over 20 cm apart. Fig. 1 shows the changes of the odds of the body temperatures of the same ♀♀ before and after cutting off wings at intervals of 30seconds. Body temperatures (T_b) were measured with a thermocouple (diameter, 0.05 mm) connected to a digital thermometer by inserting the probe to the center of the 1 thorax, 1 mm up the mesothoracic spiracle. The starting T_b was 25°C (some specimens 23.5°C) at 22-24°C of indoor temperature. The odds of T_b of the highly reflective ♀ was 3.3 °C for 3 minutes, higher than those of the ordinary ones (1.3 ±0.4, n=10). I don't know why it was so high, however, the haemolymph might have remained inside the wings, absorbing the radiation heat of the lamp, and it might have been taken into the thorax. That might have raised the body temperature. In the same case as this, I saw a ♂ of the species at Sawairi in Mt. Nyugasa, Nagano Prefecture (1,450 m a.s.l.) (Ishizawa, 1988: *Nature & Insects* 23 (13): 28). The ♂ was not so active and weak in flight. If T_b was high, it must have flown actively, however, curiously it did not. Did it only look weak in fluttering because of the high reflection? Such cases have been reported; one ♂ and one ♀ of *S. frequens* were caught by Takasaki (1996: *Symnet* (5): 8), one ♂ by Udono (1997: *Symnet* (6): 4), and the dragonflies were said to be not so different from ordinary ones besides the physically high reflection. (Taken from *Digest Jap. Odonatol.* Short Comm. No. 12, February, 2002; fig 1 and photo 1 are omitted.)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozawa City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

3222. Ishizawa, N. (2001): Early reproductive behaviours in *aka-tombo* in Honshu. *Symnet* 9: 13. (in English). [Japan; August records of oviposition of *Sympetrum frequens* and *S. infuscatum* are compiled.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozawa City, Saitama Pref., Japan. E-mail: isizawa7@mars.ccn.ne.jp

3223. Jones, C.D. (2001): Ontario hosts the first Great lakes Odonata meeting. *Argia* 13(3): 4-6. (in English). [Report from the meeting held from July 3-6, 2001 including some species collected in the framework of the meeting.] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

3224. Kawasima, I. (2001): A Record of *Somatochlora clavata* OGUMA, from Gifu City, Gifu Prefecture.

- Aeschna 38: 8. (in Japanese). [Japan, a record of *S. clavata* from 22 Oct. 1996 is documented along with the cooccurring species.] Address: not stated in English
- 3225.** Kawasima, I. (2001): The Records of Odonata from Mikasa City, Sorachi Province, Hokkaido. *Aeschna* 38: 17-23. (in Japanese with English summary). [Japan; 28 species are listed.] Address: not stated in English
- 3226.** Keiper, J.B.; Casamatta, D.A. (2001): Benthic organisms as forensic indicators. *Jl N. Am. benthol. Soc.* 20(2): 311-324. (in English). ["Forensic entomology is the use of the presence or absence of specific sarcophagous insect life stages to gain information on the time since death, cause of death, and other facets of criminal investigation. ... It is especially useful in providing important supporting evidence during investigations of mysterious or suspicious deaths." Based on literature, a review is given of 5 forensic odonate records, pertaining to the larvae of *Calopteryx*, *Argia*, *Ischnura*, *Zoniagrion*, and *Gomphus*, all from the USA. Records of *Ischnura* and *Gomphus* were associated with human remains.] Address: Keiper, J.B., Dept Invert. Zool., Cleveland Mus. Nat. Hist., 1 Wade Oval Dr., University Circle, Cleveland, OH 44106, USA. E-mail: jkeiper@cmnh.org
- 3227.** Khrokalo, L.A. (2001): [Environmental separation of dragonfly larvae (Insecta: Odonata) in some regions of Ukraine]. *Biologia*, (Kiew?) 14(2): 183-186. (in Russian). [36 odonate species were recorded at 7 localities; they are analysed according to their abundance. The list includes rare European species or species near the boundaries of their ranges as *Lestes virens*, *Erythromma viridulum*, *Brachytron pratense*, *Aeshna cyanea*, *Aeshna viridis*, *Anaciaeschna isocetes*, *Epithea bimaculata*, *Sympetrum flaveolum*, *S. meridionale*, *Leucorrhinia albifrons*, *L. pectoralis*, *L. rubicunda*, and *Leucorrhinia caudalis*.] Address: Khrokalo, L.A., Dept Zool., Fac. Biol., Shevchenko Univ., Volodymirska 64, UKR-01033 Kiev, Ukraine
- 3228.** Kitagawa, K. (2001): The Odonata of the paddy field in Sri Lanka collected by Mr. Terunobu HIDAHA. *Aeschna* 38: 41-43. (in Japanese with English summary). [11 common odonate species from Sri Lanka are documented.] Address: Kitagawa, K., Imai 1-11-6, Asahi-ku, Osaka C., Osaka, 535-0011, Japan
- 3229.** Kondoh, S. (2001): Notes on dragonflies in Rokko Island, an artificial island in Kobe, Hyogo Pref., Japan. *Aeschna* 38: 1-7. (in Japanese with English summary). [Between Sep. 1991 and Dec. 1999, 26 odonate species were recorded.] Address: Kondoh, S., 1-214-719, Koyo-cho, Naka 2-chome, Higashinada-ku, Kobe City, 658 Japan
- 3230.** Kumashiro, B.R.; Nishida, G.M.; Beardsley, J.M. (2001): Listings of new state records of immigrant insects in the Hawaiian Islands for the years 1991-1998. *Proc. Hawaii, ent Soc.* 35: 157-169. (in English). [*Crocothemis servilia* is listed for 1994] Address: Kumashiro, B.R., Hawaii Dept Agric., P.O. Box 22159, Honolulu, HA 96823-2159, USA
- 3231.** Liu, R.K. (2001): The symbolic importance of insects in jewelry. *Trans. Am. ent. Soc.* 127(32): 167-171. (in English). ["5 insect orders are symbolically important in jewelry, viz. Homoptera, Coleoptera, Lepidoptera, Odonata, and Diptera, of which the portrayals of butterflies are the most numerous. In the dragonfly, its importance symbolically was probably due to its swift flight and the capacity of rapid change of direction. Thus, Native Americans equate it to the whirlwind, swiftness and activity. By Plains Indians, who used its image on shirts, it was regarded as a spirit helper in warfare. The dragonfly is also used in the jewelry of the Navajo and Zuni. There is a XII dynasty Egyptian dragonfly amulet, but its significance is unknown. It is the emblem of summer for Chinese, who also regard the dragonfly as a symbol of instability and weakness, almost matched by the Japanese regard of it as denoting irresponsibility and unreliability, but both these cultures use its image in adornment. Western jewelers employed it as a motif in 19th and 20th century jewelry."] Address: "Ornament" Ed. Office, P.O. Box 2349, San Marcos, CA 92079, USA
- 3232.** Nagayama, S. (2001): Memories on dragonflies. *Symnet* 9: 3-5. (in English). [This is a very personal report on the dragonflies of the childhood, and the relations between man and dragonflies. Special emphasis is given to methods catching them by hand or using a rod and line.] Address: Nagayama, S., Tatsuguchi-cho, Nomi-gun, Ishikawa Prefecture, Japan
- 3233.** O'Brien, M. (2001): *Somatochlora tenebrosa* at Ives Road Fen, Lena Wee Co, Michigan (Corduliidae). *Argia* 13(3): 22-24. (in English). [The paper updates the present knowledge on the occurrence of *S. tenebrosa* in Michigan; the new habitat of the species traced on July 1, 2001 is described in some detail.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfbrien@umich.edu
- 3234.** Paulson, D. (2001): *Hetaerina pilula* from Costa Rica. *Argia* 13(3): 24. (in English). [21-II-1967] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu
- 3235.** Paulson, D. (2001): Maine Trip. *Argia* 13(3): 15. (in English). [Records made end of June 2001 include species which seem to extend their ranges.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu
- 3236.** Paulson, D. (2001): *Orthemis schmidtii* is a widespread species. *Argia* 13(3): 24-25. (in English). [*Orthemis schmidtii* Buchholz 1950 was found in the collection of D. Paulson from Ecuador, Guatemala, Costa Rica, Peru, Venezuela, Trinidad, Surinam, and Brazil. *O. ferruginea*, *O. discolor*, and *O. schmidtii* are compared to each other.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu
- 3237.** Pusch, M.; Köhler, S.; Wanner, S.; Ockenfeld, K.; Hoffmann, A.; Brunke, M.; Grünert, U.; Kozerski, H.-P. (2001): Ökologisch begründetes Bewirtschaftungskonzept für die Spree unter dem Aspekt der bergbaubedingten Durchflußreduktion. *Berichte des Leibniz-Institut für Gewässerökologie und Binnenfischerei Berlin* 11. 244 pp. (in German). [River Spree, Brandenburg, Germany; the larval abundance of *Gomphus vulgatissimus* in relation to the distance from the shore line and the degree of naturality was investigated. It is concluded that a reduction of the water volume will lead to a drying

out of the habitats near the shore line with a drastic impact on larval abundance and probably the conditions of eggs to develop.] Address: Pusch, M., Institut für Gewässerökologie und Binnenfischerei im Forschungsverbund Berlin e.V., Müggelseedamm 310, D-12561 Berlin, Germany. E-mail: pusch@igb-berlin.de

3238. Rodrigues, G.G.; Scharf, B.W (2001): Review of benthic invertebrate fauna in extremely acidic environments (pH < 3). *Mine Water and the Environment* 20: 114-121. (in English). ["Some benthic invertebrate species are able to colonise habitats in extremely acidic waters. We compiled a list of acid-resistant benthic invertebrates from the literature and extended it by studying extremely acidic mining lakes in eastern Germany. Acid-resistant species were registered for some habitats with pH < 3, such as volcanic-lakes, acid strip streams, and acidic mining lakes. Twenty nine taxa were found in waters with pH below 3. Diptera comprised 48.3% of the total number of taxa, followed by Coleoptera with 10.3%, Trichoptera 10.3%, Ephemeroptera, Megaloptera, and Plecoptera each with 6.9%, and Odonata, Hirudinea, and Acari each with 3.5%. Chironomus (Diptera: Chironomidae) were the most common genus in extremely acidic environments with 9 species. [...]"] (Authors) *Coenagrion mercuriale* is reported from a mining lake near Grünewalde, Brandenburg, Germany (13°34'E 51°30'N) with a pH value of 3. Comment: It should be considered that *C. mercuriale* in Brandenburg is extremely rare, only one locality is known (Mauersberger 2000), and that the described habitat should be quite exceptional for this species. The general discussion on acid water tolerance of Odonata by the authors ignores most significant literature on the subject, and even the fact that there are many bog dwelling species in Germany or world wide. In addition, none of the publications on the odonate fauna of the brown coal mining lakes in eastern Germany is considered.] Address: Rodrigues, G.G.; Scharf, B.W., UFZ - Centre for Environmental Research Leipzig-Halle, Dept of Inland Water Research, Magdeburg, Brückstr. 3 a, D-39114 Magdeburg, Germany. E-mail: rodrigues@gm.ufz.de

3239. Rose, J.S. (2001): Dragonfly days. *Argia* 13 (3): 6-7. (in English). [The report from a dragonfly meeting in May 2001 in Weslaco, Texas, USA, includes species records.] Address: Rose, J.S., Biology Dept, Box 90338, Duke University, Durham, NC 27708, USA. E-mail: jsr6@duke.edu

3240. Sasamoto, A. (2001): Records of the Odonata collected from Sichuan of China by Kyoto University Butterfly Research Club. *Aeschna* 38: 13-16. (in Japanese with English summary). [Five taxa are documented with black and white photos or drawings: *Megalestes distans* Needham 1930, *Anisogomphus maacki* (Selys, 1872), *Bayadera melanopteryx* Ris 1912, *Orthetrum melania* (Selys, 1883), which is treated by some authors as a subspecies of *Orthetrum triangulare* (Selys, 1878), and *Planaeschna* sp.] Address: not stated in English

3241. Sergio, F.; Bijlsma, R.G. (2001): *Falco subbuteo* Hobby. *BWP Update* 3(3): 133-156. (in English). [New information on food of the hobby, yielded by intensive studies conducted in Great Britain, France, Netherlands, Germany, and Italy are compiled. Dragonflies play an important role as food, *Cordulegaster*

boltonii is communicated as a prey example from UK. Prey remains at the nest and under perches account near Groningen, the Netherlands to 7,2%, and in a study area comprising a border region of Belarus and Poland to 52% of all prey items. "A perch-hunting third-caller-year ♀ captured 142 insects with 301 attempts between 07.51 and 19.21 hours on 31 Aug.-2 Sept., 1997, mostly *Aeshna* and *Sympetrum* species." (probably near Groningen).] Address: Sergio, F., Raptor Conservation Research Unit, Museo Tridentino di Scienze Naturali, Via Calepina 14, 38100 Trento, Italy. E-mail: Fabrizio.sergio8@tin.it

3242. Tennesen, K. (2001): A visit to the Mississippi museum of natural science. *Argia* 13(3): 25-26. (in English). [Brief report on two lectures held at the new established museum. The huge metal fence that leads to the front doors is including motifs of large metal dragonflies and mayflies painted black.] Address: Tennesen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennesen@aol.com

3243. Tsubuki, T. (2001): Group migration of *Sympetrum frequens* at Toshima-ku, Tokyo in early summer. *Symnet* 9: 9. (in English). [An early summer migration (27 June 2001) of *S. frequens* at Toshima-ku, Tokyo, Japan is reported in detail.] Address: Tsubuki, T., Jumonji middle and highschool, Toshima-ku, Tokyo, Japan

3244. Tsubuki, T. (2001): Shelters for bad weathers in *Sympetrum* species. *Symnet* 9: 11-12. (in English). [Information on resting sites and behaviour of *Sympetrum eroticum*, *S. frequens*, and *Sympetrum pedemontanum elatum* under bad weather conditions (rain, overcast) are described in detail.] Address: not stated

3245. Tsubuki, T.; Sumiko, I.; Noriko, O. (2001): *Sympetrum infuscatum* and *Sympetrum frequens* at the Yunomaru Heights in early August, 2000. *Symnet* 9: 8. (in English). [Japan; some notes on diurnal and seasonal change of abundance of *S. infuscatum* and *S. frequens* near the Jizo pass (about 1650 m a.s.l.) are reported.] Address: Tsubuki, T., Jumonji middle and highschool, Toshima-ku, Tokyo, Japan

3246. Ueda, T. (2001): One example of oviposition site of *Sympetrum frequens*. *Symnet* 9: 10. (in English). [An oviposition in a river habitat of the standing water dwelling *S. frequens* is documented.] Address: Ueda, T., Ishikawa Agricultural College, Suematsu, Nonoichi, Ishikawa Pref., 921, Japan

3247. Ueda, T. (2001): Two cases of evening migration in *Sympetrum frequens*. *Symnet* 9: 12-13. (in English). [Kanazawa City, Japan; Sept.11, 1989; Sept. 21, 1994.] Address: Ueda, T., Ishikawa Agricultural College, Suematsu, Nonoichi, Ishikawa Pref., 921, Japan

3248. U.S. Fish and Wildlife Service (2001): Hine's Emerald Dragonfly (*Somatochlora hineana*) Recovery Plan. Fort Snelling, MN. 120 pp. (in English). [Verbatim: EXECUTIVE SUMMARY Hine's Emerald Dragonfly Recovery Plan Current Status: The Hine's emerald dragonfly, *Somatochlora hineana*, was listed as endangered in January 1995. Extant Hine's emerald dragonfly populations are currently known to persist in Illinois, Wisconsin, Michigan, and Missouri. The Illinois population is the most genetically diverse, and the Wisconsin populations are the largest and presumably most secu-

re. Information on the status of the Michigan and Missouri populations is limited because of their recent discoveries. Historically known from Ohio and Indiana, it is thought to be extirpated from these states. Habitat Requirements and Limiting Factors: The Hine's emerald dragonfly occupies marshes and sedge meadows fed by calcareous groundwater seepage and underlain by dolomite bedrock. In general, these areas are characterized by the presence of slowly flowing water and nearby or adjacent forest edges. Known occupied habitats are currently restricted to the lower Des Plaines River valley, in Illinois; northeastern Door County and Cedarburg Bog, Wisconsin; areas of the Hiawatha National Forest, in the Upper Peninsula of Michigan, three areas in the Lower Peninsula of Michigan, and at three fens in Missouri. Loss of this already rare and restricted habitat to agriculture, commercial and industrial development is the primary cause of the species' decline. Loss of remaining habitat from the same pressures, combined with successional change in the existing habitats and disruption of ecological and hydrological processes, are threats to surviving populations. Recovery Objectives: The objective of this recovery plan is to restore the Hine's emerald dragonfly to viable populations so that it may be removed from the Federal list of Endangered and Threatened Wildlife and Plants. Recovery Criteria: Each of the two Recovery Units contains a minimum of three populations composed of at least three subpopulations. Each subpopulation contains a minimum of 500 reproductive adults for 10 consecutive years. Within each subpopulation, there are at least two breeding habitat areas, each fed by separate seeps and/or springs. For each population, the habitat supporting at least three subpopulations should be legally or formally protected and managed for Hine's emerald dragonfly, using long-term protection mechanisms such as watershed protection, deed restrictions, land acquisition, or nature preserve dedication. In addition, mechanisms protecting the up gradient groundwater watershed should also be in place. Actions Needed: 1. Protect and manage extant populations 2. Conduct studies 3. Conduct searches for additional Hine's emerald populations 4. Conduct an information and education program 5. Conduct a reintroduction and augmentation program 6. Review and track recovery progress Total Cost of Recovery: The total estimated cost for the recovery actions outlined in this plan is \$13,163,000. These recovery actions will benefit not only the Mine's emerald dragonfly, but entire natural communities and other environmental amenities such as drinking water. Many of the actions described in this recovery plan are already funded by existing programs in agency and private organization budgets. The cost estimate represents expenditures over a 20 year time period. Date of Recovery: Full recovery of this species could occur within 10 years of initially meeting the recovery criteria for delisting. It is anticipated that recovery could occur as soon as 2019. This recovery plan has been prepared by the Mine's emerald dragonfly Recovery Team under the leadership of Dr. Dan M. Johnson with assistance in writing the document by Deanna Zercher of the Illinois Natural History Survey in Champaign, Illinois.] Address: U.S. Fish and Wildlife Reference Service 5430 Grosvenor Lane, Suite 110 Bethesda, Maryland 20814 301-492-6403 or 1-800-582-3421

3249. Utzeri, C. (2001): Il sapore delle libellule. *Lindenia* 35: 149-150. (in Italian). [Carlo Utzeri is reflecting on the taste of dragonflies on the opportunity of a pub-

lication in the newspaper "La Stampa", issue 28-05-2001 written by Dr. Edoardo Raspelli.] Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma, Italy. E-mail: carlo.utzeri@uniroma1.it

3250. Worthen, W.B. (2001): New dragonfly records for Sierra County, New Mexico. *Argia* 13(3): 14-15. (in English). [The collecting of Odonata in July 2001 resulted in 17 species.] Address: Worthen, W.B., Biology Dept, Furman University, Greenville, SC 29613, USA. E-mail: worthen@furman.edu

3251. Yanoviak, S.P. (2001): The macrofauna of water-filled tree holes on Barro Colorado Island, Panama. *Biotropica* 33(1): 110-120. (in English). ["The fauna of water-filled tree holes in neotropical forests is not well documented. Cumulatively, 54 macroinvertebrate and 5 vertebrate taxa were found in artificial and natural tree holes censused over four wet seasons on Barro Colorado Island, Panama. Most of the species were in the insect order Diptera, occurred as aquatic larvae in tree holes, and were detritivore/omnivores. Half (49%) of the collected species are considered specialists in this and similar container habitats, and three invertebrate taxa were previously unknown from tree holes. Successional patterns were weak in the tree holes, but some taxa predictably colonized holes shortly after they were filled. The mosquito *Culex urichii* was more common and abundant in artificial than in natural tree holes; occurrence frequencies and densities of most other taxa were similar between hole types. [...] *Libellula* sp. was a very rare occupant in natural tree holes on BCI; the only natural tree hole occurrence of *Libellula* sp. was in large, highly insulated holes of a recently fallen *Platydiurn clegans* near a stream; however, this species sometimes colonized large artificial holes located in treefall gaps and was common in moats surrounding greenhouses. Larvae of the remaining five species of odonates - "*Gynacantha membranalis*, *Triacanthagyna dentata*, *Mecistogaster linearis*, *M. ornata*, and *Megaloprepus caerulatus*" - (along with larvae of the mosquito *Toxorhynchites theobaldi* and *Dendrobates auratus* tadpoles), were the top predators in tree holes. The behavior and ecology of these odonate species have been studied extensively by O. Fincke and S.P. Yanoviak." (Author)] Address: Yanoviak, S.P., Dept Zool., Univ. Oklahoma, Norman, Oklahoma 73019. USA

3252. Yokoyama, T. (2001): Notes on the duration of the egg stages of some dragonflies in Hokkaido. *Aeschna* 38: 9-12. (in Japanese). [Data of 27 odonate species from Hokkaido, Japan are presented.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

3253. Yoshida, M. (2001): Collecting and breeding data of some odonate larvae, 4th report. *Aeschna* 38: 27-34. (in Japanese with English summary). [Japan; 26 species are treated.] Address: not stated in English

3254. Zasybkina, I.A.; Ryabukhin, A.S. (2001): Amphibiotic insects of the Northeast of Asia. Pensoft, Sofia-Moscow & Backhuys, Leiden. ISBN 954-642-138-3 (Pensoft) & 90-5782-089-7 (Backhuys): vii+183 pp.- [An annotated list is presented of the 24 odonate taxa known to occur in NE Asia. Their regional distribution and habitat types are stated, and an exhaustive bibliography is provided. The records are not critically discussed as *Coenagrion lunulatum* and *C. vernale* nom.

nud. and *Sympetrum danae* and *S. scoticum* are treated each as valid species. *Enallagma antiquum* Barteneff, 1911 is also listed; the status of this taxon is unknown and not described in the paper of Barteneff listed in the bibliography.]

3255. Zawadzka D.; Zawadzki J. (2001): Breeding populations and diets of the Sparrowhawk *Accipiter nisus* and the Hobby *Falco subbuteo* in Wigry National Park (NE Poland). *Acta Ornithol.* 36: 25-31. (in English with Polish summary). [The diet composition of the two species was studied by the analysis of pellets and prey remains. Sparrowhawks fed on birds (97% of prey items, 99% of food biomass) and insects (43% of prey, 1% of biomass). Sparrowhawks specialized in forest birds, positively selecting *Parus* spp., *Turdus* spp., *Picidae* and *Ficedula* spp. Hobbies hunted mainly birds of open habitats (*Alauda arvensis*) and woodland (*Anthus trivialis*). As usually, Odonata are among the prey of the Hobby, but they account only 3,7 % of the prey items and 0,1% of the biomass. Surprisingly, in one case even Sparrowhawks preyed on Odonata.] Address: Zawadzka D., Zawadzki J., 25 Czerwca 68b/15, 26-600 Radom, Poland

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3256. Adriaens, T (2002): Dragonflies of the northern part of Western Flanders: status, importance and conservation. *Gomphus* 18(1-2): 15-40. (in Dutch, with English and French summaries). ["The odonatofauna of the north of the province West-Flanders (Belgium) is relatively well-known. This article deals with historical and recent distribution of observed species (31 in total) and aims to determine the most important sites (species diversity, rarity) for dragonflies. Sites were clustered in respect to species composition using TWINSPLAN software. Division levels were then displayed in a GIS-environment, so as to get an idea about the usefulness of the current ecodistricts in interpreting distribution patterns of dragonflies in the region. The Houtland ecodistrict, a region of pleistocene sands, appeared most species diverse, with the Bell Heather Reserve fen (Zevenkerke) displaying the highest species richness in the region (22 species). No less than three Red List species were recorded in this district, the latter probably being extinct: *Cordulia aenea*, *Leucorrhinia dubia*, and *Coenagrion pulchellum*. The ecodistrict "dunes" is important for the vulnerable *Ischnura pumilio*. It is suggested that ecodistricts might be too detailed for interpreting dragonfly distribution. Finally we present ideas for maintaining and managing populations of some delicate species." (Author) The following species are discussed in detail: *Sympecma fusca*, *Lestes barbarus*, *Ischnura pumilio*, *Coenagrion pulchellum*, *Cercion lindenii*, *Erythromma najas*, *Gomphus pulchellus*, *Cordulia aenea*, *Crocothemis erythraea*, *Leucorrhinia dubia*, and *Sympetrum fonscolombii*.] Address: Adriaens, T., Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: tim.adriaens@instnat.be

3257. Adriaens, T (2002): Verslag van de excursie naar Den Diel en het Buitengoor (Mol) op 19 augustus 2001. *Gomphus* 18(1-2): 41-43. (in Dutch, with French summary). [Belgium; in spite of quite unfavourable weather condition, 21 odonate species were recorded. The

list includes the rare or threatened species *Ceragrion tenellum*, *Erythromma najas*, *Orthetrum coerulescens*, and *Sympetrum depressiusculum*.] Address: Adriaens, T., Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: tim.adriaens@instnat.be

3258. Anonymus (2002): Erläuterung zur Titelseite: Prachtlibelle. *Hydrologie und Wasserbewirtschaftung* 46(6): 312. (in German). [A ♀ *Calopteryx virgo meridionalis* was printed on the journal's front page. Brief remarks on the species and on the Odonata in southern Europe (compiled from G. Jurzitza's book) are added.] Address: not stated

3259. Baker-Schommer, M. (2002): What's in a name? Understanding the Latin names of dragonflies. *Dragonfly news* 42: 10-14. (in English). [Origins and meanings of the names of UK's Odonata are outlined basing on the book of H. Fliedner "Die Bedeutung der wissenschaftlichen Namen europäischer Libellen" - *Libellula* suppl. 1, 111 pp., 1997.] Address: not stated

3260. Beckemeyer, R. (2002): George H. Bick, Honorary member, the Dragonfly Society of the Americas. *Argia* 14(3): 4-5. (in English). [R. Beckemeyer introduces the recognition of Dr. George H. Bick as Honorary Member of DSA, and briefly outlines some mile stones in his odonatological work.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3261. Beckemeyer, R. (2002): Some Odonata records for the Oxley Nature Center, Tulsa County, Oklahoma. *Argia* 14(3): 12-13. (in English). [USA, a brief survey of a pond and the insect collection of the Center resulted in many new County records.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3262. Bedjanic, M.; Salamun, A. (2002): Additional notes on the last larval instar of *Epophthalmia vittata cyanocephala* Hagen, 1867 from Sri Lanka (Odonata: Corduliidae). *Opusc. zool. flumin.* 204: 1-6. (in English). [The original description of the larva (cf. M. Bedjanic, 2000, *Odonatologica* 29: 57-61) is supplemented on the basis of appreciable fresh material, collected in Oct. 2001 in northern and central Sri Lanka. The measurements, illustrations and additional descriptions of some morphological features of the exuviae are presented and a considerable variation in the peculiarly shaped labial palps is pointed out. The current knowledge of the larval forms in the genus is briefly outlined, and comments on ecology, distribution and adult phenology of the endemic *E. v. cyanocephala* are supplied.] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

3263. Behrstock, R.A. (2002): First known U.S. population of the Tropical Sprite *Nehalennia minuta* (Selys) (Odonata: Coenagrionidae). *Argia* 14(3): 9-10. (in English). [In January 2000, *N. minuta* was first recorded for the USA in Florida. Additional specimens of the species were found on 26 February 2002 at Key West, Florida. The species is compared morphologically with *N. pallidula*. Co-occurring species are briefly outlined.] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@aol.com

- 3264.** Bramati, J. (2002): Vergnügungssüchtige Libellen? Was treibt Männchen von *Calopteryx splendens* (Gebänderte Prachtlibelle) in eine Riesenrutsche?. *mercuriale* 2: 26- (in German). [Two cases where *C. splendens* ♂♂ were observed in a glass covered slide of a swimming pool.] Address: Bramati, J., Hauptstr. 111, D-74595 Langenburg, Germany
- 3265.** Bried, J. (2002): Miscellaneous Mississippi. *Argia* 14(3): 17-18. (in English). [Mississippi, USA; special emphasis is given to the records of *Ischnura prognata*, *Dromogomphus spinosus*, *D. spoliatus*, and *Argia fumipennis*.] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA
- 3266.** Brook, J.; Brook, G. (2002): Small Red-eyed Damselfly proven breeding in Kent. *Dragonfly news* 42: 17. (in English). [*Erythromma viridulum*, 29/07/2002, near Dartford, Kent, UK; some additional records are also documented.] Address: not stated
- 3267.** Brunel, C. (2002): Les Odonates de Picardie. État d'avancement de l'inventaire. *Martinia Hors Série* 4: 9-12. (in French). [The paper compiles and discusses historical and more recent data (up to the end of the 1980th) on the 48 odonate taxa of the Picardie which comprises the departments Somme, Aisne, and Oise located in northwestern France.] Address: Brunel, Christine, 8, rue de Général Frère - Appt. 7, F-80080 Amiens, France
- 3268.** Buchwald, R.; Schiel, F.-J. (2002): Möglichkeiten und Grenzen gezielter Artenschutzmaßnahmen in Mooren - dargestellt am Beispiel ausgewählter Libellenarten in Südwestdeutschland. *Telma* 32: 161-174. (in German, with English summary). [Conservation management measures for *Leucorrhinia pectoralis*, *Ceragrion tenellum*, and *Nehalennia speciosa* are presented. These dwellers of mires are used to discuss prospects and limits of special management action plans. "As the primary habitats of these species are destroyed partly or even completely throughout Central Europe, management measures are mandatory. The following prerequisites are necessary: detailed knowledge of biology and ecology of the target-species, its specificity for the habitat-type mire, consideration of possible other objects of protection, adequate abiotic conditions (especially hydrology and trophic status), monitoring of the resulting effects, and information of the public. In intact primary habitats, management measures have to be omitted. On the other hand, conservation of mires can not be limited to the protection of dynamic processes and of abiotic resources, but has to take into consideration the needs of mire species and species-groups as well." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de
- 3269.** Buczyński, P.; Serafin, E. (2002): Wazki Parku Krajobrazowego Pojezierza Iławskiego. Zespół Parków Krajobrazowych w Jerzwa³dzie, Jerzwa³d: 31 pp. (in Polish). [Between 1998 and 2002, P. Buczynski surveyed the Odonata of the landscape park of the Iławskie lakes, located in the northern part of Poland. This nice booklet which is directed to the visitors of the park, bases on the results resp. the checklist of the survey. Additional information of dragonfly morphology and biology, Latin and Polish names of the Odonata, habits, how to observe Odonata, threats, and an identification key of the regional dragonfly imagoes are the main contents of the booklet.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl Wydawca Zespół Parków Krajobrazowych w Jerzwa³dzie 14-233 Jerzwa³d 67, Poland. tel./fax 089 758 85 27 e-mail: park-jeziorak@pro.onet.pl www.jezioro.com.pl
- 3270.** Bulánková, E.; Halgos, J. (2002): Characteristic macroinvertebrates of temporal waters of the Morava wetland. *Verhandlungen der Gesellschaft für Ökologie, Cottbus* 2002: 269. (in English). [The Odonata of the Morava (March) wetland (designated as a 'wetland of international importance' under the 'Ramsar' Convention in 1993) was surveyed in 1999 and 2001-2002. The fauna is differed according to the habitat types "temporal waters" (*Lestes barbarus*, *L. viridis*, *L. dryas*, *Coenagrion pulchellum*, *Cordulia aenea*), "fens" (*Lestes virens*, *L. viridis*, *L. sponsa*, *Aeshna isosceles*, *Libellula quadrimaculata*, *Sympetrum flaveolum*, *Sympetrum pedemontanum*), and "riparian flood plain and extra flood plain palustrine wetlands", "spring palustrine wetlands", and "summer and autumnal palustrine wetlands" (no Odonata).] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia. E-mail: Bulankova@nic.fns.uniba.sk
- 3271.** Busch-Nowak, A. (2002): Schlupf einer *Libellula depressa* im Oktober. *mercuriale* 2: 22-23. (in German). [Baden-Württemberg, Germany; on 6 October, 2001, a freshly emerged *L. depressa* was found; questions of voltinism are discussed.] Address: Busch-Nowak, A., Eichenbaumstr. 4 D.74564 Tiefenbach, Germany. Alexanderbusch-Nowak@web.de
- 3272.** Cating, P.M. (2002): Pygmy Snaketail (*Ophiogomphus howei*), new to Canada. *Argia* 14(3): 11-12. (in English). [June 22, 2002, St. John River, New Brunswick, Canada. The habitat and co-occurring Odonata are described.] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net
- 3273.** Chanpaisaeng, J.; Khunwiset, S. (2002): Survey of Odonata adults at Ao Luk, Krabi province, Thailand. *Malangpo* 19: 191. (in English). [From July to October 2001, 11 odonate taxa were recorded in the western part of southern Thailand, some 800 km from Bangkok. They are listed in a tab. Imagoes were collected at three habitats at Ao Luk, at a palm garden, a community forest, and slopes of a hill forest.] Address: Jariya Chanpaisaeng and Sirikanya Khunwiset, Department of Entomology, Faculty of Agriculture, Kasetsart University, Bangken, Bangkok 10900, Thailand
- 3274.** Che Salmah, M. R.; Abu Hassan, A.; Azmi, M. (2002): Safe pre-emergence herbicides for dragonflies (Libellulidae) in the rice fields. *Malangpo* 19: 186-190. (in English). [The herbicides Propanil, Quiclorac, and Bensulfuron were applied as pre-emergence treatments in an experimental rice plots. The population of libellulides - in the plots - different at the genus level were found to be higher and significantly different in the herbicide treated plots compared to control plots that were manually weeded twice in the season. "The herbicides were considered safe for the libellulids and presumably for other macroinvertebrates in the rice fields."]

Address: Che Salmah, Md Rawi; Abu Hassan, Ahmad, School of Biological Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia Azmi Man, Malaysian Agriculture Research Institute, Bertam, Seberang Perai, Malaysia

3275. Clarke, D. (2002): Growth and autumnal decline of feeding in captive-reared first-year larvae of the Azure Hawker *Aeshna caerulea* (Ström). *J. Br. Dragonfly Society* 18(1/2): 9-12. (in English). ["In temperate latitudes, larvae of Odonata show a decline in rate of development and food intake in late summer autumn in preparation for surviving adverse winter conditions. I was able to characterize this by monitoring the production of faecal pellets by larvae of *A. caerulea*. Faecal pellet production correlates with prey intake (Corbet 1999: p.105). The results appear to confirm expectations that seasonal factors are involved in the regulation of the life-history of this species. The study also enabled comparisons to be made with field observations of larval growth-rates." (Author)] Address: David Clarke, Tullie House Museum & Art Gallery, Carlisle CA3 8TP

3276. Coppa, G. (2002): Gestion et protection des milieux aquatiques. *Martinia Hors Série* 4: 13-15. (in French). [Conservation measures for the Odonata of bog and fen moors in northern France are briefly outlined. The paper includes a map with localities of special importance resp. conservation status for Odonata in the region Champagne-Ardenne.] Address: Coppa, G., 1, rue du Courlis, F-08350 Villers-sur-Bar, France

3277. Cordoba-Aguilar, A. (2002): Sensory trap as the mechanism of sexual selection in a damselfly genital trait (Insecta: Calopterygidae). *American Naturalist* 160: 594-601. (in English) ["During copulation, males of some calopterygid damselfly species displace the sperm stored in the spermatheca: the male genital appendages enter into the spermathecal ducts and physically remove sperm. In *Calopteryx haemorrhoidalis*, the genital appendages are too wide to penetrate the spermathecae, but males use a different mechanism in which the aedeagus stimulates the vaginal sensilla that control spermathecal sperm release. Since these sensilla are used during egg fertilization and oviposition, it was hypothesized that this function evolved before the male stimulatory ability. I investigated this using *Hetaerina cruentata*, a species whose position in the Calopterygidae phylogeny is more basal than *Calopteryx*. Given this position and having determined that males of this species are not able to displace sperm of their conspecific females during copulation, it was expected that *H. cruentata* females would eject sperm when stimulated with the aedeagi of *C. haemorrhoidalis* but not when stimulated with the aedeagi of their conspecifics. This prediction was confirmed. In order to investigate the widespread nature of this result, some other Calopteryx species *Calopteryx xanthostoma* and *Calopteryx virgo* were investigated. The results were similar to those of *H. cruentata*: conspecific males were unable to stimulate their females, but females ejected sperm when stimulated with *C. haemorrhoidalis* aedeagi. Morphometric analysis suggests that the mechanistic explanation for the stimulatory ability of *C. haemorrhoidalis* genitalia is that the aedeagal region that makes contact with the vaginal sensilla is wider in *C. haemorrhoidalis* than in the other species. These results suggest that the sensory "bias" shown and shared by *H. cruentata*, *Calopteryx splendens*, *C. virgo*, and *C. haemor-*

rhoidalis females represents an ancestral condition and that the male stimulatory ability is absent in the evolutionary history of the clade. These pieces of evidence as well as another one presented elsewhere, which indicates that *C. haemorrhoidalis* males vary in their stimulatory ability, constitute the three criteria for a case of sexual selection via exploitation of a female sensory bias. These results also provide support to the sensory trap hypothesis that indicates that the female bias in this case, egg fertilization and oviposition evolved in a context different from sexual selection. Considering that the male genital appendages responsible for physically removing spermathecal sperm in other calopterygids are present in *C. haemorrhoidalis*, I suggest that males were once able to displace spermathecal sperm physically. Such ability may have been later impeded by a reduction in size of the spermathecal ducts. Possibly, one of the latest events in this sequence is the male's stimulatory ability. This hypothetical series of events suggests a coevolutionary scenario in which the central actor is the sperm stored in the spermathecae."] (Author) Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

3278. Correia, A.M. (2002): Niche breadth and trophic diversity: feeding behaviour of the red swamp crayfish (*Procambarus clarkii*) towards environmental availability of aquatic macroinvertebrates in a rice field (Portugal). *Acta Oecologica* 23: 421-429. (in English). [*P. clarkii* (Girard 1852), "an alien species in Portugal, may have dramatic effects on aquatic communities by depleting all food resources available, just after its introduction. The purpose of this study was to evaluate, through the concept of niche breadth, whether the diet of this species reflected the temporal changes of aquatic macroinvertebrate availability once it is acclimated. Petraitis' index of niche breadth and Herrera's trophic diversity index were used to evaluate the trophic behaviour of *P. clarkii* towards available resources over time and intraspecifically (size classes and sex) in a rice field in Portugal. Results from this study showed that the consumption of aquatic macroinvertebrates by *P. clarkii* reflected their seasonal availability. The high values of niche breadth and trophic diversity indicated resource use according to trophic availability, diversified diets and different individual exploitation of resources regardless of size or sex. These findings suggest that in habitats where *P. clarkii* is already acclimated, it adjusted its trophic behaviour to the seasonal availability of aquatic macroinvertebrates. The large niche breadth and high trophic diversity presented by *P. clarkii* enables it to successfully expand its range to new areas, when other environmental conditions are favourable, as has been observed in Portugal and worldwide." (Author) In autumn, "Lestidae" belong to the diet of *P. clarkii*.] Address: Correia, Alexandra Manjal, Centra de Biologia Ambiental (CBA), Department Zoologia (Museu Bocage), Museu Nacional de Historia Natural, Universidade de Lisboa, R. Escola Politecnica, 58, 1269-102 Lisbon, Portugal: E-mail: amarcal@fc.ul.pt

3279. Curry, J. (2002): Observations on *Neurocordulia*. *Argia* 14(3): 13-14. (in English). [From June to August 1999, *N. molesta* and *N. yamaskanensis*, were observed. Both species are extremely rare in Indiana, USA. They started their flight activities shortly before dusk, flying with an extraordinary speed. This short period of

time before getting dark, was used to pair and to feed. The author wonders how these Odonata could capture prey at such low levels of light, and how they could feed sufficiently in such a short period of time. There is evidence that the biomass over the river is as dense as a "soup" of small insects filling the air (based on collecting insects with a net driving with a boat on the river). "Based on this experience, I can't help wondering if the Shadowdragons were foraging by flying through the "soup" of tiny insects and scooping them up with their legs without ever targeting individual prey. The long spines of the tibiae could form a very nice net for sweeping tiny insects from the air. This would be similar to what some marine mammals do when plowing through a concentration of algae or krill with their mouths open. If so, the questions about how shadowdragons see prey in low light, why they never deviate the flight path while foraging, and how they are able to feed themselves in only 20 or 30 minutes would be answered." Address: Curry, J., Biology Dept, Franklin College, 501 E. Monroe Street, Franklin, IN 46131-2598, USA. E-mail: CURRYJ@franklincoll.edu

3280. Daigle, J.J. (2002): Nicj-at-night: episode II. *Argia* 14(3): 14-15. (in English). [In Aug. 2002, 56 odonate species, 27 new to Nicaragua, were caught near Bartola.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

3281. Deliry, C. (2002): Études générales, dossiers et suivi des sites (à jour: septembre 2002). *Sympetrum piémontais* 49: 2-8. (in French). [France, Rhône-Alpes, Ain, Hautes-Alpes, Ardèche, Drôme, Isère, Loire, Rhône, Savoie, Haute-Savoie; very brief reports on odonatalogical research activities at 46 habitats in different Departments in France are outlined; the focus is set on species of Appendix II and IV of the European Habitat Directive.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France. www.sympetrum.org

3282. Deliry, C. (2002): Nouveaux articles, études ou notes concernant le libellules dans la région Rhône-Alpes-Dauphiné. *Sympetrum piémontais* 49: 11. (in French). [List of 22 papers or expertises referring to the odonate fauna of southeastern France.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France. www.sympetrum.org

3283. Deliry, C. (2002): Rapport moral 2001. *Sympetrum piémontais* 49: 21-22. (in French). [Some historical data on Odonata in the region of Grenoble, France are documented along with some recent records from 2001 from different Departments in France including data on *Coenagrion mercuriale*, *Leucorrhinia caudalis*, *L. albifrons*, *Oxygastra curtisii*, *Boyeria irene*, and others.] Address: Deliry, C., La Paluette, 2338 route de Belley, F-38490 Aoste, France. www.sympetrum.org

3284. Donnelly, T.W. (2002): DSA northeastern field trip to the Tug Hill Plateau, New York. *Argia* 14(3): 6. (in English). [50 species were found in a - from the odonatalogical point of view - poorly known region of the New York state, USA.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

3285. Dunkle, S.W. (2002): Minter J. Westfall, Jr., Honary member, the Dragonfly Society of the Americas. *Argia* 14(3): 4. (in English). [Sid Dunkle very personally introduces into the recognition of Minter Westfall as

Honary Member of DSA.] Address: Dunkle, S., Biol. Dept, Collin County Community College, 2800 E. Spring Creek Parkway, Plano, TX 75074, USA. E-mail: SDunkle@ccccd.edu

3286. Endlein, T. Strohm, E.; Poethke, H.-J. (2002): Reproduction in a heterogeneous landscape: The consequences of habitat quality for reproduction and larval development in a damselfly. *Zoology (Jena)* 105 (Suppl. 5): 17. (in English). [Verbatim: "A landscape provides a heterogeneous mosaic of unsuitable and more or less suitable habitat patches. The differences in habitat quality affects survival and other fitness parameters of individuals and therefore oviposition of adults varies among habitats. In this study, we investigated variations in reproduction and larval development of the damselfly *Coenagrion puella* (Coenagrionidae: Odonata) in three neighbouring ponds (A, B, D in the following) in Bavaria/Germany. We examined (1) the density of egg laying ♀♀ as a measure of the number of eggs laid per pond, (2) the number of emerging adults, and (3) the size of the exuviae at each pond. The number of ovipositing ♀♀ was recorded by observation. Surprisingly, much more ♀♀ laid their eggs in D, the smallest of the three ponds compared to A and B. To count the number of emerging larvae a gauze fence was used as an emergence substrate that allowed standardised collection of exuviae. At D, 22 times more larvae emerged per meter shore line than from each of the large ponds. To compare the success of development in the different ponds we calculated the proportion of successfully developing larvae (estimated total number of eggs laid into a pond divided by the estimated total number of emerging adults). The smallest pond showed the highest estimated success, though the variance was high. The length of the tibia and praementum of a sample of ♂ exuviae was measured with high precision (1/1000 mm). Exuviae at pond D were significantly larger than exuviae at pond A and B over the whole emergence period. In conclusion, unexpectedly the smallest pond seems to offer the best conditions for larval development and survival for the damselflies and is preferred by ovipositing ♀♀. The causes for these small scale differences in habitat quality are not yet known." Address: Endlein, T., Ecological Station Fabrikschleichach and Department of Animal Ecology and Tropical Biology Theodor-Boveri-Inst., University of Würzburg, 97074 Würzburg, Germany. E-mail: endlein@biozentrum.uni-wuerzburg.de

3287. Feldwieser, G. (2002): Doppelter Irrtum: Männchen von *Lestes viridis* (Gemeine Weidenjungfer) ergreift Männchen von *Enallagma cyathigerum* (Gemeine Becherjungfer). *mercuriale* 2: 25. (in German). [The accompanying picture documenting the linkage between a ♂ *Chalcolestes viridis* with a ♂ *E. cyathigerum* can be seen at www.SGlibellen.de.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

3288. Feldwieser, G. (2002): Paarungsrade von *Aeshna cyanea* (Blaugrüner Mosaikjungfer) benutzt anderes Paarungsrade der gleichen Art als Sitzunterlage. *mercuriale* 2: 26- (in German). [The picture which documents the situation can be seen at www.SGlibellen.de.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

3289. Feldwieser, G. (2002): Zu einer Beobachtung von *Leucorrhinia rubicunda* (Nordische Moosjungfer) im

Raum Reutlingen. mercuriale 2: 6-7. (in German). [Documentation of two specimens of the regional very rare *L. rubicunda* from the former military training area NSG Listhof, Baden-Württemberg, Germany from 25. and 26. May 2001.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

3290. Freeland, J.R.; Conrad, K.F. (2002): Genetic similarity within and among populations of the Variable and Azure damelflies (*Coenagrion pulchellum* and *C. puella*). *Hydrobiologia* 479(1-3): 69-73. (in English). ["In the first half of this century, seven species of the damselfly genus *Coenagrion* regularly bred in Britain. Since that time, two of these species have become extinct, and three currently have highly restricted distributions. Of the remaining two species, *C. puella* is both common and abundant, but *C. pulchellum*, while more common than most *Coenagrion* species, is experiencing a national decline in Britain. The reasons for the decline of *C. pulchellum* are poorly understood, and therefore its future in Britain is difficult to predict. The aim of this study was to investigate genetic relationships among populations of *C. puella* and *C. pulchellum*. We obtained mitochondrial sequence data from 36 *C. puella* and *C. pulchellum* individuals collected from five different sites across central England. These revealed three haplotypes with high overall similarity. Hybridisation between *C. puella* and *C. pulchellum* was suggested by (1) The sharing of a haplotype between *C. puella* and *C. pulchellum*, and (2) The fact that morphological characters of sympatric *C. puella* and *C. pulchellum* populations are not always species-specific. More research is required before we can determine whether or not hybridisation is playing a role in the decline of *Coenagrion* species in the U.K." (Authors)] Address: Freeland, Joanna R., Dept of Biological Sciences, Open University, Walton Hall, Milton Keynes, Buckinghamshire, MK7 6AA, U.K.

3291. Fuhlendorf, S.D.; Englea, D.M.; Arnold, D.C.; Bidwell, T.G. (2002): Influence of herbicide application on forb and arthropod communities of North American tallgrass prairies. *Agriculture, Ecosystems and Environment* 92: 251-259. (in English). ["The primary approach used for reducing "weeds" in the native grasslands of the North American Great Plains is the application of a broadleaf-selective herbicide, which could have important implications to native plant and arthropod diversity. The objectives of this study were to identify the influence of herbicides on the forb and arthropod community composition, richness, and density, and determine relationships among the forb and arthropod communities in a tallgrass prairie of the North American Great Plains. In 1994, arthropod and forb communities were evaluated in eight treatment units and then a broadleaf-selective herbicide was applied to four of these units. Sampling of arthropod and forb communities were sampled under similar conditions in 1995 for post-treatment effects. These communities were highly variable across years regardless of treatment (herbicide and no herbicide). The herbicide treatment caused a reduction in overall forb dominance the year after treatment. Species richness increased from 1994-1995 in both treatments but the increase was less in the herbicide treatment. The herbicide application had no overall effect on forb species composition. The lack of effect of herbicide on the forb community composition coupled with a significant effect on species richness suggests that an important effect of herbicide application was a reduction of rare forbs. Analysis of these

tallgrass communities did not yield significant differences in arthropod abundance or richness between grasslands treated with a herbicide and grasslands not treated with a herbicide. The arthropod community was defined by extreme variability across years reflecting extreme fluctuations regardless of herbicide application." (Authors) "*Coenagrionidae*" are among the sampled taxa.] Address: Fuhlendorf, S.D.. Department of Plant and Soil Sciences, Oklahoma State University, Stillwater, OK 74078-6028, USA . E-mail: fuhlend@mail.pss.okstate.edu

3292. Gassmann, D.; Hämäläinen, M. (2002): A revision of the Philippine subgenus *Risiocnemis* (*Igneocnemis*) Hämäläinen (Odonata: Platycnemididae). *Tijdschrift voor Entomologie* 145: 213-266. (in English). ["Descriptions and diagnoses of both sex of all 15 previously recognized species are provided, and five new taxa are described: *R. antoniae* sp. n. and *R. rubricercus* sp. n. from northeastern Mindanao, *R. pistora* sp. n. from southeastern Mindanao, and *R. kaiseri* sp. n. and *R. nigra* sp. n. from Samar. The ♀♀ of 11 species are described for the first time. Keys to ♂♂ and ♀♀ are provided. Based on extensive new collections from across the Philippine archipelago, the distribution of all species is mapped. Characters of the ♂ ligula and appendages and the ♀ prothorax were studied by scanning electron microscopy." (Authors)] Address: Gassmann, D., Inst. of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

3293. Geppert, C.; Müller, J.; Xyländer, W.E.R. (2002): Marking of insects for finding them again at night. *Zoology (Jena)* 105 (Suppl. 5): 17. (in English). [Verbatim: "Marking of insects for the purpose of ecological studies has been used since 1920 (3). These methods only enable researchers to find insects again during daylight. Markings that allow to study the nocturnal behaviour of insects have been used and tested only occasionally due to the difficult procedures (1,2, 4). To investigate the roosting site behavior of odonates, we developed a marking method that can be used quickly on a large number of individuals without harming them. From the end of May until the end of August 2001 a total of 1907 damselflies, *Calopteryx splendens* Harris 1782 (1203 F and 704 E and 1659 dragonflies of different species (1067 F and 565 E were marked in the open cast mining area Berzdorf, about 5 km from Görnitz/Saxony. The following substances for marking were tested: 1) colored substances, applied to the thorax and/or the abdomen (Night pen, UHU neon glue, Pilot super color whit, Jenzi Tages-leuchtfarbe), 2) adhesive foils, applied to the thorax and/or the wings (glow-in-the-dark paper, reflecting foil), 3) substances for injection, injected into segments of the abdomen (Visible Implant Fluorescent Elastomer System). A 8 W/12 V UV fluorescent light (black light) was used for the detection of the insects at night. The following criteria were used to evaluate the marking procedures: good adhesion to the insect body, quick application, short drying period, low impairment of the insects, strong fluorescence at night as well as visibility during the day. These criteria were best met by the viscous paint "Jenzi Tages-leuchtfarbe". The outstanding feature of the paint was a maximum fluorescence at night of up to 4 meters distance. Marked insects showed no impairment in their behavior and could be observed during matings. With

the help of this method it was possible to find 125 out of 1,872 marked *C. splendens* again at night. While this only constitutes a recapture rate of 6.6%, it is high considering the extremely difficult circumstances of the nocturnal search. 1 Heller, K.-G. & O. von Helversen (1990): Survival of a phaneropterid bush-cricket studied by a new marking technique (Orthoptera: Phaneropteridae). *Entomol. Gener.* 15 (3): 203-208. 2 Hunger, H. & W. Röske (2001): Short range dispersal of the Southern Damselfly (*Coenagrion mercuriale*, Odonata) found experimentally using UV fluorescent ink. *Z. Ökologie Naturschutz* 9, 181-187. 3 Stonehouse, B. (1978): Animal marking. University Park Press, Baltimore. 4 Wheye, D. & P. R. Ehrlich (1985): The use of fluorescent pigments to study insect behaviour: investigating mating patterns in a butterfly population. *Ecol. Entomol.* 10, 231-234.]" Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

3294. Glotzhober, R.C.; McShaffrey, D. (Eds) (2002): The dragonflies and damselflies of Ohio. Ohio Biological Survey Bulletin New Series Volume 14 Number 2: ix + 364 pp. - (in English). [This manual, based on Ohio, will work for Ontario to Tennessee, and from Missouri to New Jersey. In addition to the 162 Ohio species, 18 are found in neighboring states that are included in the keys (larvae: to the genus level, imagoes: to the species level). The book is organized in three parts resp. 17 chapters (I: Natural history, Collection and preservation of Odonata, History of Ohio odonatology, How to use the book; II: Photographing Odonata; III: Identification keys), and references, and six appendices. The book is lavishly illustrated, with 460 line drawings and wing scans. State maps show the distribution of all the species in Ohio at the county level, and the monographic descriptive accounts includes generous information on the natural history of each species. There are 88 color photos of adults; my impression is that some of them are reproduced too dark. In spite of this, they give me - unexperienced in North American Odonata - a significant impression of many species from Ohio. This is a heavy weighted, helpful, and very complete regional fauna with a lot of significant information on Odonata. (M. Schorr).] Address: \$40 plus shipping and handling (\$5) and Ohio Tax (\$2.30 if applicable). Send cheque to Ohio Biological Survey, Inc., P.O. Box 21370, Columbus, OH 43221-0370, USA

3295. Goffart, P. (2002): Compte-rendu de l'excursion sur l'Ourthe moyenne, de Marcourt à Hotton, due 26 juin 2002. *Gomphus* 18(1-2): 50-52. (in French with Dutch summary). [Belgium; 9 odonate species were recorded; main emphasis was given to *Oxygastra curtisii* which was recorded at six stretches of the river Ourthe. Foraging behaviour of a ♂, and oviposition of a ♀ are described. In addition, records of the stream dwelling species *Gomphus pulchellus*, *G. vulgatissimus*, and *Onychogomphus forcipatus* are briefly commented upon.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

3296. Gonseth, Y.; Monnerat, C. (in Zusammenarbeit mit: Rene Hoess, Christian Keim, Tiziano Maddalena, Alain Maibach, Claude Meier, Peter Weidmann, Hansruedi Wildermuth) (2002): Rote Liste der gefährdeten Libellen der Schweiz. Hrsg. Bundesamt für Umwelt, Wald und Landschaft, Bern, und Schweizer Zent-

rum für die Kartographie der Fauna, Neuenburg. BUWAL-Reihe Vollzug Umwelt: 46 pp. (in German, with Italian, French and English summaries). ["The Red List 2002 of the Swiss Dragonflies has been established applying the criteria and using the threatened species categories proposed by the IUCN (2001). The procedure used was adapted from GARDENFORS & al. (2001). Of the 72 native species of the Swiss fauna, 26 (36%) are threatened, while 12 (17%) are potentially endangered (NT). Out of the 72 species listed in the Red List, 2 are at present extinct in Switzerland (RE), 12 are nearly extinct (CR), 7 are endangered (EN) and 5 are vulnerable (VU). Species of marshes and of gravel banks along rivers are the most threatened. The Red List 2002 replaces the one published in 1994 (MAIBACH & MEIER in DUELLI 1994) and based on different criteria. This explains the rather important differences between the two, differences that essentially concern the proportion of species included in the categories of least threat. The comparison of the Red List 1994 and the Red List 2002 shows most convincingly the evident degradation of the situation where the most threatened species are concerned: two have not been observed for ten years and five others have suffered a severe decline." (Authors) The species included in the list are briefly discussed.] Address: BUWAL, Dokumentation, CH-3003 Bern, Schweiz.. E-Mail: docu@buwal.admin.ch. Bestellnummer VU 9011-D (gratis)

3297. Grand, D. (2002): La faune odonatologique de la fontaine vaclusienne du Lamalou (Hérault). *Martinia Hors Série* 4: 23-26. (in French). [The odonate fauna of the headwaters of the rivers Argens (n = 10) and Lez (n = 13) (taken from literature data) is compared with the fauna of the headwater of the Lamalou (n = 30). The habitat is described in detail and some species are discussed. *Coenagrion mercuriale* - a species of special conservation concern in Europe - is dominant. The emergence and sex-ratio of exuviae (♂♂: 49% of 233 exuviae) of *Boyeria irene* are outlined, and the oviposition behaviour of *Cordulegaster boltonii* is described likewise including a note on sex-ratio (♀: 58,2% of 337 collected exuviae).] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

3298. Grand, D. (2002): Sur la distribution de *Macromia splendens* (Pictet, 1843) en région méditerranéenne française: complément et synthèse. *Martinia Hors Série* 4: 17-22. (in French). [The paper documents efforts to trace *M. splendens* in the French mediterranean region including some localities published in the 19th and early 20th century. *M. splendens* was found only at the Ardèche whilst e.g. the species was lost for the type locality at the Lez near Montpellier. Co-occurring species are listed and some remarks on the behaviour and the habitat of *M. splendens* are made.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

3299. Greff, N.; Manach, A.; Tillier, P. (2002): Atlas des Odonates de Bretagne. État d'avancement et éléments de réflexion. *Martinia, Hors Série* 4: 59-77. (in French with English summary). [Distribution maps of 55 odonate species for the region of Brittany in western France (Departments: Côtes-d'Armor, Finistère, Île-et-Vilaine, Loire-Atlantique, Morbihan) are presented.] Address: Greff, N., Ossée, F-38510 Sermerieu, France.

- 3300.** Grillet, E.M.; Legendre, P.; Borcard, D. (2002): Community structure of Neotropical wetland insects in Northern Venezuela. I. Temporal and environmental factors. *Arch. Hydrobiol.* 155(3): 413-436. (in English). ["The temporal distribution of aquatic insects in relation to habitat conditions was assessed in some northern Venezuelan Neotropical wetlands. The hypothesis that abiotic and biotic factors interacting in time may simultaneously explain the community structure of aquatic organisms was evaluated. Larval insects were sampled over a one-year period in five wetland types; 13 variables were quantified to describe each habitat. Partial redundancy analysis was used on insect abundance data to partition the variance into four components: a) pure environmental variation without seasonal effect, b) seasonal variation of environmental factors, c) pure temporal factors (months), and d) unexplained variation. Our results showed that pure and temporally-structured environmental factors (a + b) explained between 30 % and 58 % of the variation of insect abundances within wetlands, whereas pure temporal factors also significantly contributed 13 % -29% to variation in taxa abundance. Physical factors (rainfall and water depth), wetland trophic state (phytoplankton), and water chemistry (mainly CO₂ and alkalinity) were significantly associated to community structure variability. We hypothesize that the interplay of trophic conditions, related chemical conditions, wetland duration, and insect life history patterns, all of which are mediated by seasonal fluctuation in rainfall, could largely account for the temporal distribution of the insect taxa in these wetlands.."] (Authors) Odonata are treated at the family level.] Address: Grillet, Maria Eugenia, Laboratorio de Biología de Vectores. Instituto de Zoología Tropical. Facultad de Ciencias. Universidad Central de Venezuela, Apartado 47058, Caracas 1041-A, Venezuela. E-mail: mgrillet@strix.ciens.uvc.ve
- 3301.** Grillet, E.M.; Legendre, P.; Borcard, D. (2002): Community structure of Neotropical wetland insects in Northern Venezuela. II. Habitat type and environmental factors. *Arch. Hydrobiol.* 155(3): 437-453. (in English). ["This study examined the spatial distribution of wetland insects in relation to selected environmental variables in northeastern Venezuela. Sampling was carried out over two sampling periods (rainy and dry season) in seven wetland types (brackish and freshwater herbaceous swamps, mangrove swamps, freshwater ponds, clear-cut marsh forests, small irrigation canals, and swamp forests), covering three environmental gradients (salinity, aquatic vegetation type, and habitat permanence). Using the partial redundancy analysis, we determined that occurrence and abundance of insects was significantly ($P < 0.05$) accounted for by the relative contributions of pure environmental (29-34 %) and habitat type-related (12-15 %) variations among wetlands. Water chemistry (salinity), wetland trophic state (phytoplankton), habitat heterogeneity (aquatic vegetation type), and habitat physical features (depth and habitat permanence) were significantly associated to community structure. Insect richness was higher in the less saline, more vegetated, and less temporary wetlands. Our findings add to previous results suggesting that adversity, productivity, heterogeneity and permanence of the habitat represent important axes along which Neotropical wetland insect communities are organized." (Authors) Odonata are treated at the family level.] Address: Grillet, Maria Eugenia, Laboratorio de Biología de Vectores. Instituto de Zoología Tropical. Facultad de Ciencias. Universidad Central de Venezuela, Apartado 47058, Caracas 1041-A, Venezuela. E-mail: mgrillet@strix.ciens.uvc.ve
- 3302.** Hämäläinen, M. (2002): The species list of Thai dragonflies increases steadily - an update. *Malangpo* 19: 176-179. (in English). ["*Anaciaeschna martini* (Aeshnidae), *Macromia arachnomima* (Corduliidae) and *Nesoxenia lineata* (Libellulidae) are recorded from Thailand for the first time. Preliminary comments are presented on several other species new to Thailand, so far identified to genus level only. References to recent papers (published in 1999-2002), reporting additions to the Thai odonate fauna, are also given." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi
- 3303.** Harrison, S.S.C.; Harris, I.T. (2002): The effects of bankside management on chalk stream invertebrate communities. *Freshwater biology* 47: 2233-2245. (in English). ["1. Communities of aquatic macroinvertebrates and the terrestrial adult phases of aquatic insects were investigated from short stretches of English chalk streams with two different bankside vegetation types: simply structured grazed grass (grazed) and structurally complex herbaceous vegetation with scattered trees (ungrazed). Macroinvertebrates were sampled in spring, summer, autumn and winter 1996-97 from three aquatic habitats: mid-channel gravel, patches of the aquatic macrophyte *Ranunculus* and marginal emergent macrophytes. The terrestrial adult phases of aquatic insects were sampled in spring, summer and autumn from bankside vegetation. 2. Total macroinvertebrate abundance did not differ between stretches with different bankside vegetation. Taxon richness of mid-channel gravel was, however, significantly higher in ungrazed compared with grazed stretches and Shannon diversity (H') of mid-channel gravel and marginal vegetation was significantly higher in ungrazed compared with grazed stretches. Total abundance, taxon richness and H' of the terrestrial adult phases of aquatic insect were significantly higher from the bankside vegetation of ungrazed compared with grazed stretches. 3. Ordination of communities of aquatic macroinvertebrates and terrestrial adults demonstrated that individual families of both groups were generally more abundant in ungrazed stretches. Many more families were significantly associated with ungrazed stretches than with grazed stretches. 4. This investigation has shown that high structural diversity of bankside vegetation along lowland chalk streams is accompanied at the reach scale by increased diversity of both aquatic macroinvertebrates and the terrestrial adult phases of aquatic insects. The conservation potential of such streams may thus be lowered by management practices that result in the removal or simplification of bankside vegetation along extensive stream stretches." (Authors) *Calopteryx splendens* was significantly associated with ungrazed margins.] Address: Harrison, S., Department of Zoology and Animal Ecology, University College Cork, Lee Mailings, Prospect Row, Mardyke, Cork, U.K. E-mail: s.harrison@ucc.ie
- 3304.** Heitz, A. (2002): Habitat und Eiablage von *Coenagnum scitulum* (Gabel-Azurjungfer) an einem Fundort in Ost-Frankreich. *mercuriale* 2: 3-6. (in German). [In 2000, a population of *C. scitulum* near Passavant la Rochère, 38 km sw Epinal, Département Haute

Saone, France was traced. Habitat, oviposition behaviour, and identification features are outlined.] Address: Heitz, A., Moosweg 15, D-77749 Hohberg, Germany.

3305. Hoess, R. (2002): Odonata found in Chiang Mai, northwestern Thailand, in May 2002. *Malangpo* 19: 180-185. (in English). [A total of 67 odonate species was collected in Chiang Mai city and its surroundings in northwestern Thailand in May 2002. Additional 11 species were identified by sight records. Exuviae representing app. 20 species were found, but not yet identified. The localities are described, and the species are documented locality wise.] Address: Hoess, R., Normanenstr. 35, CH-3018 Bern, Switzerland

3306. Hunger, H. (2002): "Keuchheitsgürtel": Überreste eines Männchens verhindern weitere Paarung eines Weibchens von *Ischnura elegans* (Große Pechlibelle). *mercuriale* 2: 25- (in German). ["Chastity belt": Remains of a ♂ *I. elegans* abdomen on a ♀ prevented additional copulations. The picture which documents this curious situation can be seen at www.SGlibellen.de.] Address: Hunger, H., August-Ganther-Str. 16, D-79117 Freiburg, Germany. E-mail: Holger.Hunger@inula.de

3307. Hunger, H.; Kunz, B. (2002): Phänologische Daten. *mercuriale* 2: 27-29. (in German). [Phenological data (2000-2002) from Baden-Württemberg (a few additional from Bayern and Saarland), Germany, of the following species are documented: *Gomphus pulchellus*, *Anax imperator*, *A.parthenope*, *Aeshna cyanea*, *Cordulegaster boltonii*, *Sympetrum fonscolombii* (Bad.-W., Saarland), *S. meridionale* (Bayern), *S. striolatum*, *Sympetma fusca*, *Coenagrion puella*, *Enallagma cyathigerum*, *Ischnura elegans*, *Libellula depressa*, *L. quadrimaculata*, *S. sanguineum*, and *S. vulgatum*.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

3308. Jacquemin, G. (2002): Les odonates de Lorraine: rôle bio-indicateur, protection. *Martinia, Hors Série* 4: 79-84. (in French). [In the framework of FFH-Directive of the EU, the author outlines the situation of dragonflies in 1995 in the Lorraine, western France. He describes the site-protection and legal situation of the Odonata, discusses the data basis, and compiles a list of regional Odonata.] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

3309. Janzen, J.-W. (2002): Arthropods in Baltic Amber. *Ampyx Verlag, Halle/Saale*. ISBN 3-92795-14-8. 167 pp. (in Bilingual in English and German). [Based on extensive collection material, this book introduces into the arthropod orders represented in Baltic amber. Each order is briefly characterised and documented by excellent colour photos. A head and wings of zygopteran Odonata are presented on page 91 of the book.] Address: Ampyx-Verlag, Dr. A. Stark, Seebener Str. 190, D-06114 Halle/Saale, Germany. E-mail: ampyxstark@aol.com

3310. Kano, K.; Karube, H. (2002): Endophytic oviposition into leaves by *Agriomorpha fusca* from Vietnam. *Gekkan-Mushi* 381: 45-46. (in Japanese). [Silver Cloud Mountains, Cuc Phuong national Park, May 1999; the oviposition took place above the water level; after a heavy rain in next day, the leaves were flooded. A translation of the paper is published in *Digest of Japanese Odonatological Short Communications* 14]

Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3311. Katbeh-Bader, A.; Amr, Z.; Schneider, W. (2002): Odonata of Jordan. *Fragmenta entomologica* 34(1): 147-170. (in English). ["A total of 47 species of Odonata are reported from Jordan based on this study and previous records in literature. More than 600 Odonata specimens collected between 1974 and 2001 were examined and found to belong to 29 species. *Onychogomphus macrodon* and *Chalcolestes parvidens* are recorded for the first time. Several rare species known previously from only one or two sites are recorded from new localities. Number of specimens examined, collecting sites, dates of collecting, and the distribution of species in Jordan and the world is given for each species. Remarks about the status, biology or ecology of species are also provided." (Authors)] Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany. E-mail: w.schneider@hlm.de

3312. Ketelaar, R. (2002): Odonata in the Netherlands, 2001. *Atropos* 17: 58-59. (in English). [This is a brief but competent account on essential records of Odonata in 2001 in the Netherlands. Records are organised according to the phenology and the weather conditions of the year. The species commented are listed as follows: *Pyrrhosoma nymphula*, *Sympetma fusca*, *Coenagrion lunulatum*, *Lestes barbarus*, *Erythromma najas*, *Sympetrum flaveolum*, *S. fonscolombii*, *Aeshna affinis*, *Anax parthenope*, *Ophiogomphus cecilia*, and *Onychogomphus forcipatus*.] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

3313. Ketelaar, R. (2002): The recent expansion of the Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier) in The Netherlands. *J. Br. Dragonfly Society* 18(1/2): 1-8. (in English). [It seems most likely that *E. viridulum* became established in the Netherlands during the early years of the 1970th. The paper documents in detail records prior and after the first proof of a reproductive population in the country. Today, *E. viridulum* is one of the most abundant species in The Netherlands. Habitat choice, phenology, and the patterns of expansion are outlined. The colonization of the Waddensea Islands also gives significant information to understand the potential of *E. viridulum* to disperse, and the most recent colonization of Great Britain.] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

3314. Khunwiset, S.; Chanpaisaeng, J. (2002): A survey of Odonata adults and larvae in Thong Pha Phum district, Kanchanaburi province, Thailand. *Malangpo* 19: 192-194. (in English). [Verbatim: "Thong Pha Phum area in Kanchanaburi province in western Thailand has a high biodiversity, since it is within the precincts of 3 biogeographical regions (North, South and Central) joined together. It can be classified by ecological and biogeographical factors into 3 ecoregions i.e., Tenasserim-South Thailand Semievergreen Rain Forest, Kayah-Karen Montane Rain Forest and Chao Phraya Lowland Moist Deciduous Forest. Nearness of the Andaman Sea and surrounding mountain ranges provide plenty of rainfall in this region. The survey stu-

dying and collecting Odonata adults and larvae was carried out monthly during 6 months between March 2002-August 2002 at streams in the following 5 localities: Pongpuron, Ban Lampilok, Ban Prajammai, Ban Patsaduklang and Maenamnoi. A total of 44 species of adult Odonata belonging to 36 genera in 11 families were collected by using sweep net. Larvae were collected in March 2002. The material has been identified to the family level only. They represent 7 families: Chlorocyphidae, Euphaeidae, Lestidae, Coenagrionidae, Aeshnidae, Gomphidae and Libellulidae. The streams studied have high water level and currency, which moved larvae when the heavy rain occurred." Address: Jariya Chanpaisaeng and Sirikanya Khunwiset, Department of Entomology, Faculty of Agriculture, Kasetsart University, Bangken, Bangkok 10900, Thailand

3315. Klaus, D. (2002): Bericht von der Tagung Sächsischer Entomologen im Jahre 2002. Entomol. Nachr. Ber. 46(3): 209-211. (in German). [Dr. Thomas Brockhaus gave a lecture on the current status of the Odonata fauna of Saxonia, scheduled to be published in 2004. New data of 2003 should be added, and special emphasis will be given to the impacts of the flood on the Odonata in the River Elbe catchment in summer 2002.] Address: Klaus, D., Heimstätten 10, D-04571 Rötha, Germany

3316. Knijf, G. de; Lambrechts, J. (2002): Verslag van de excursie naar de vallei van de Zijpbeek en de Mechelse heid op zaterdag 30 juni 2001. Gomphus 18 (1-2): 43-46. (in Dutch with French summary). [Belgium; a total of 21 odonate species was observed. The list includes *Ceriagrion tenelleum*, *Ischnura pumilio*, *Cordulegaster boltonii*, *Somatochlora flavomaculata*, *Orthetrum coerulescens*, and *Leucorrhinia dubia*.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

3317. Koch, H.-M. (2002): Drei Lestiden an einem künstlichen Tümpel auf der Alb in 705 m üNN. mercuriale 2: 23. (in German). [Baden-Württemberg, Germany; *Lestes sponsa*, *L. barbarus*, *Lestes virens vestalis*; in addition, an attempt of an *A. cyanea* ♂ to copulate with a ♀ of *A. juncea* is reported.] Address: Koch, H.-M., Krämerstr. 40, D-72764 Reutlingen, Germany. E-mail: koch.druckerei@t-online.de

3318. Koch, H.-M. (2002): Nachweis einer 2. Generation bei mehreren Libellenarten. mercuriale 2: 23. (in German). [Baden-Württemberg, Germany; in December 2001, a water body was created. It was rapidly colonized in 2002 by Odonata. Exuviae of *Enallagma cyathigerum*, *Ischnura elegans*, and *Sympetrum fonscolombii* were found indicating a second generation resulting from egg depositions in early summer 2002.] Address: Koch, H.-M., Krämerstr. 40, D-72764 Reutlingen, Germany. E-mail: koch.druckerei@t-online.de

3319. Krech, M. (2002): Zur Verbreitung von *Epitheca bimaculata* (Charpentier, 1825) in Mecklenburg-Vorpommern. Archiv der Freunde der Naturgeschichte in Mecklenburg 41: 77-86. (in German). [In 2001 and 2002, *E. bimaculata* was surveyed in the catchments of the rivers Rechnitz, Trebel, and Peene, Mecklenburg-Vorpommern, Germany. The species was traced in the marshy stretches of the rivers resp. mires run through by rivers ("Durchströmungsmoore, Flusstalmoore"). Oxbow lakes and (small) peat ponds exploited by hand

were the preferred habitats. The water bodies are in most cases eutrophic or even polytrophic and lack submerged vegetation. The river bank vegetation is well developed; the fish population density seems to be high.] Address: Krech, M., Auf der Großen Mühle 7, D-99198 Erfurt, Germany

3320. Kunz, B. (2002): Partnersuche mit Todesfolge: Ein kurioser Zwischenfall im Paarungsvorspiel bei *Onychogomphus forcipatus forcipatus* (Kleine Zangenlibelle). mercuriale 2: 24. (in German). [The behaviour of a ♀ along a rendez-vous place at the river Jagst, Baden-Württemberg, Germany is described; a curious example of ♀ mortality is reported: an accident during a rapid flight caused the splitting of a leave of *Sparganium* sp., when the ♀ flow against the leave. The head of the dragonfly was caught in the crack. The ♀ couldn't rescue herself from this situation.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

3321. Kunz, B. (2002): Zwei ungewöhnliche Larvenbeobachtungen von *G. vulgatissimus*. mercuriale 2: 21-22. (in German). [(1) An obviously unhurt larva of *G. vulgatissimus* was found dead in the crack of a weir; it is suspected that the specimen moved to this crack due to disturbance by bathing people which hindered the specimen to emerge, and tried out. (2) An extremely prolonged emergence of two larvae of *G. vulgatissimus* from the River Jagst, Baden-Württemberg, Germany is reported and (physiological) mortality factors during emergence are discussed.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

3322. Lambrechts, J.; Knijf, G. de (2002): Verslag van de excursie naar de vallei van de Drie Beken te Diest op zaterdag 9 juni 2002. Gomphus 18(1-2): 46-50. (in Dutch with French summary). [Belgium; a total of 17 odonate species was observed. The list includes *Ischnura pumilio*, *Lestes dryas*, *L. barbarus* (teneral), and *Erythromma najas*.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

3323. Leconte, M. (2002): Comptes rendues des Rencontres Odonatologiques d'Aquitaine des 25 et 26 mai 2002 à l'Atelier-Gîte de Saugnacq-et-Muret (49). Société française d'ontonologie: La lettre des sociétés 29: 7-8. (in French). [Report of an excursion to several localities with records of *Leucorrhinia* sp.; *L. albifrons* and *L. pectoralis* could be traced. *L. caudalis* was missing. The records are briefly documented along with co-occurring odonate species.] Address: Leconte, M., Quartier du Caü, F-64260 Arudy, France

3324. Lederer, P. (2002): Damsel fly "pancake net" made with fiberglass screening material. Argia 14(3): 18-19. (in English). [A technical solution to avoid wet nets while catching Zygoptera is presented.] Address: Lederer, P.T., 33 Hamden Avenue, Staten Island, NY, 10306, USA

3325. Lin, Qi-Bin; Nel, A.; Huang, D.-Y. (2002): Phylogenetic analysis of the Mesozoic dragonfly family Liupanshaniidae (Insecta: Aeshnoptera: Odonata). Cretaceous Research 23(4): 439-444. (in English). ["The Chinese Lower Cretaceous dragonfly genus *Guyuaneschnidia* Lin, 1982, originally considered to be an Aeshnidae, is redescribed and transferred to the family

Liupanshaniidae Bechly et al., 2001. A phylogenetic analysis of the family is presented." (Authors)] Address: Lin, Qi-Bin, Nanjing Institute of Geology and Palaeontology, Academia Sinica, Nanjing, 210008, PR China

3326. Lissak, W. (2002): Neue Funde von *Orthetrum brunneum* (Südlicher Blaupfeil) im Lias-Vorland der Schwäbischen Alb (Lkr Göppingen). *mercuriale* 2: 18-19. (in German). [Baden-Württemberg, Germany; documentation of regional records of *O. brunneum* starting in 1990.] Address: Lissak, W., Schubartstr. 12, D-73092 Heiningen, Germany. E-mail: W.Lissak@natur-schutzzentrum-schopfloch.de

3327. Machado, A.B.M. (2002): *Neuraeschna tapajonica* sp. n. from the Amazonian region of Brazil (Odonata: Aeshnidae). *Lundiana* 3(1): 29-30. ["The new species is described and illustrated from a single ♂ (Brazil, Para, Itaituba, X-1977; deposited in Author's collection). It belongs to the dentigera-group.] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

3328. Marinov, M. (2002): Dragonflies (Odonata: Insecta) in the Bulgarian Wetlands - Current Status, Distribution and their Importance as Bio-indicators. Proceedings of the Asian Wetland Symposium 2001 "Bringing Partnerships into Good Wetland Practices", 27-30 August 2001, Penang, Malaysia. ISBN 983-8614-230-8. 10 pp. (in English) [Dragonfly species in Bulgaria are overviewed and their importance for the protection of the wetlands is briefly discussed. Wetlands are one of the main subjects of the conservation activities in the country. Here a short historical review is given and their current conservation status is outlined. The main wetlands groups are overviewed according to their dragonfly fauna established up to now. As dragonflies could play a considerable role in wetlands management, some suggestions for monitoring programmes and using dragonflies as bio-indicators are provided." (Author)] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mg_marinov@yahoo.com. Distributor: Penerbit University Sains Malaysia Co-operative Bookshop Ltd., University Sains Malaysia, 11800 USM Pulau Pinang, Malaysia

3329. Matsuda, S.; Hiasa, M.; Sugihara, K.; Miyashita, M. (2002): Discovery of *Mortonagrion hirosei* from the mainland of Kyushu (Coenagrionidae). *Tombo* 44: 13-18. (in Japanese with English summary). [*M. hirosei* was discovered at two localities in 1998 for the first time from the main land of Kyushu, Japan. "Both sites are seaside marshes where reed bushes grow. We found andromorphic (homoeochromatic) ♀♀ at each locality. Although the distance between these two localities is only 2 km, the ratio of homoeochromatic ♀♀ differed greatly between them, being ca 1% at Mikoyama-shinden, and ca 50% at Otome-shinden. As the difference can be regarded as being genetically determined, the population of each local habitat should be conserved with no changes occurring in the type ratio." (Authors)] Address: not stated in English

3330. Mauersberger, R.; Bönsel, A.; Matthes, H. (2002): *Anax parthenope* in Seenlandschaften entlang der Pommerschen Eisrandlage in Nordost-Deutschland (Odonata: Aeshnidae). *Libellula* 21(3/4): 145-165. (in German, with English summary). ["From the lake-land-

scapes of Mecklenburg and northern Brandenburg, Germany, 146 localities of *A. parthenope* are listed, including 29 formerly published records. Completion of development was recorded at 28 waters. In one part of the area of investigation, the UNESCO-Biosphere Reserve 'Schorfheide-Chorin', *A. parthenope* is recorded from 15 % of the lakes. In the region, distribution and abundance of the species fluctuate considerably. Especially a cold winter with deficits in the supply of oxygen below the ice cover caused a strong temporary decline in population size. If these fluctuations are not taken into account, an increase of population size from 1989 until 2002 can be assumed. Stratified clear-water lakes with a constantly balanced oxygen supply in the littoral region constitute a persistent habitat in NE Germany. Moreover, *A. parthenope* is able to colonize for a limited time numerous lakes of all trophic levels and all sizes, as long as they are bordered by reed belts." (Authors)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

3331. Mauersberger, R.; Petzold, F. (2002): Seen als Habitate für *Onychogomphus forcipatus forcipatus* im Jungpleistozängebiet Nordost-Deutschlands (Odonata: Gomphidae). *Libellula* 21(3/4): 101-144. (in German, with English summary). [Brandenburg, Mecklenburg, Germany; *O. forcipatus* reproduces in 62 of 600 lakes, examined by the authors from 1989-2001. The habitat requirements can be described as follows: "volume (much) more than 30 000 m³ balanced oxygen proportion throughout the year without deficiency below ice cover often supplied by ground water in forested areas and without an outflow; accordingly with a high long-term water level amplitude low trophic state: total phosphorus mostly less than 25 mg/m³ surf zones with mineral sediment, usually at east or southeast banks exposed to wind inhabited parts of the shore are bare of vegetation or covered with thin reed belts up to 60 culms/m² (e.g. Meso-Phragmitetum). At the optimum habitat - mesotrophic ground-water lakes - *O. forcipatus* and *G. vulgatissimus* are the dominant anisopteran species." (Authors)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

3332. Merritt, R.W.; Cummins, K.W.; Berg, M.B.; Novak, J.A.; Higgins, M.J.; Wessell, K.J.; Lessard, J.L. (2002): Development and application of a macroinvertebrate functional-group approach in the bioassessment of remnant river oxbows in southwest Florida. *J. N. Am. benthol. Soc.* 21(2): 290-310. (in English). [Calcosahatchee River, SW Florida, USA; includes information on voltinism and larval habits for *Argia*, *Enallagma*, *Ischnura*, *Aphylla*, *Anax*, *Boyeria*, *Epithea*, *Brachymesia*, *Erythemis*, *Erythrodiplax*, *Miathyria*, *Pachydiplax*, and *Perithemis*.] Address: Merritt, R.W., Dept Ent., Fish. & Wildlife, Michigan St. Univ., East Lansing. MI 48824, USA

3333. Misof, B. (2002): Diversity of Anisoptera (Odonata): Inferring speciation processes from patterns of morphological diversity. *Zoology* 105: 355-365. (in English). ["With roughly 2500 described species Anisoptera are among the species-poor suborders within insects. [...] In this analysis phylogenetic research is integrated with comparative approaches to investigate possible explanations of differential speciation rates within this suborder. A short review of phylogenetic work based on

morphological characters is compared to published molecular Sistergroup comparisons are used to elucidate whether a) sexual selection, b) duration of life cycles, or c) differentiation in body size, have had a detectable effect on speciation rate. In all three analyses effects of distributional range and latitudinal distribution were controlled. These analyses suggest sexual selection promotes speciation and an increase in body size is positively correlated with speciation rate. The evolutionary significance of these results is discussed and experimental approaches that should advance our understanding of anisopteran diversity are suggested." (Author)] Address: Misof, B., Department of Entomology, Zoological Research Institute and Museum Alexander König, Adenauerallee 160, D-53113 Bonn, Germany E-mail: b.misof.zfmk@uni-bonn.de

3334. Moore, N.W. (2002): The dragonflies of a Cambridgeshire pond and its surroundings in 2001. *J. Br. Dragonfly Society* 18(1/2): 13-22. (in English). [The author visited a pond at Swavesey in Cambridgeshire on most days during the flying season (30 April to 15 November) of 2001. "As a result the records for that year are more complete than for any previous year since the pond was dug in 1983 (Moore, 1987) and thus seem worth recording. An additional reason for publishing the records for 2001 is that the flying season followed the wettest winter ever recorded and it was interesting to discover, whether this had had any noticeable effect on the dragonfly fauna of the pond. This paper provides a summary of my observations, which are related to other observations made on the pond since 1983 (Moore, 1987, 2002 and unpublished). The nature of the pond's dragonfly fauna is outlined, and the value and limitations of such studies is discussed." (Author)] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom

3335. Moroz, M.; Maksimenkov, M.V.; Czachorowski, S.; Buczynski, P. (2002): Results of the investigation of aquatic insects (Insecta: Collembola, Ephemeroptera, Odonata, Trichoptera, Heteroptera, Coleoptera) of the Biosphere Reserve "Sporovskii". *Natural Resources 2* (National Academy of Sciences of Belarus. Ministry of Natural Resources and Environmental Protection. Scientific Edition): 88-94. (in Russian, with English summary) [Belorussia; 11 odonate taxa were traced, among them *Calopteryx splendens*, *Erythromma najas*, *Nehalennia speciosa*, *Epitheca bimaculata*, and *S. sanguineum*.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3336. Mulnet, D. (2002): Développement larvaire de *Leucorrhinia dubia* dans deux biotopes de tourbières. *Martinia*, Hors Série 4: 85-90. (in French). [A population of *L. dubia* in a high bog near the Puy de Dôme, Auvergne, France, was surveyed for the development time in two different habitat types: one was covered densely with *Sphagnum* mosses, while the second type was characterised by a quite sparsely vegetation and a free water column. Larval developments in type 1 lasted 5 years, while in type 2 emergence took place after three years.] Address: Mulnet, D., 330 Rue Vercingétorix, F-63110 Beaumont, France

3337. Mulnet, D. (2002): Étude comparative de l'émergence de plusieurs espèces d'Odonates de tour-

bière. *Martinia*, Hors Série 4: 91-108. (in French). [Emergence patterns differed for 1986, 1990, and 1991 of *Leucorrhinia dubia*, *Pyrrhosoma nymphula*, *Libellula quadrimaculata*, *Somatochlora arctica*, *Lestes* sp., *Aeshna juncea*, and *A. cyanea* are presented and discussed in detail] Address: Mulnet, D., 330 Rue Vercingétorix, F-63110 Beaumont, France

3338. Mulnet, D. (2002): Utilisation pratique des modèle de capture recapture: application à une population de *Leucorrhinia dubia*. *Problèmes méthodologiques concrets et perspectives. Martinia* Hors Série 4: 39-48. (in French). [A study to estimate the size of a population of *L. dubia* in a bog near the Puy de Dôme, Auvergne, France is used to discuss in very detail the accuracy of population estimation methods.] Address: Mulnet, D., 330 Rue Vercingétorix, F-63110 Beaumont, France

3339. Murray, C. (2002): Dragonflies - ancient animals under threat. *Atropos* 17: 19-25. (in English). [This is a general account on factors threatening Odonata, including brief remarks on habitat destruction, pollution, inappropriate habitat management, alteration of site hydrology, and global climate change] Address: Murray, Charlotte, English Nature North Mercia team, Attingham park, Shrewsbury, SY4 4TW, UK

3340. Naraoka, H. (2002): Reproductive behaviour of *Lestes temporalis* Hanseman [sic] (Odonata, Lestidae). *Gekkan-Mushi* 381: 38-41. (in Japanese). [The oviposition of *Lestes temporalis* Selys 1883 at night and the egg deposition frequency in dependence of air-temperature are reported. A translation of the paper is published in *Digest of Japanese Odonatological Short Communications* 14.] Address: Naraoka, H., 36-71, Motoizumi, Fukunoda, Itayanagi-cho, Kitatsuguru-gun, Aomori Prefecture, 038-3661, Japan

3341. O'Brien, M. (2002): Highlights from the Great Lakes Odonata meeting, Higgins Lake MI, July 1-4, 2002. *Argia* 14(3): 6-9. (in English). [The dragonfly records of different trips are outlined; records of *Somatochlora hineana* and *Aeshna sitchensis* are of some interest.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

3342. Orioux, G.; Laleure, J.-C. (2002): Les Odonates de la Loire et de l'Allier dans le département de la Nièvre. *Martinia*, Hors Série 4: 49-51. (in French). [Between 1983 and 1993 a total of 35 odonate species was recorded. The species composition of the channel, the branches, and standing waters within the floodplain are briefly compared] Address: Orioux, G., 25, rue Gambetta, F-58000 Nevers, France

3343. Orszaghova, Z.; Suplatova, M.; Orszagh, I. (2002): Changes in food composition of the tree sparrow (*Passer montanus*) nestlings. *Biologia* (Bratislava) 57(2): 251-259. ["Using the neck ring method we gathered two hundred and ninety-nine samples of food for nestlings of the tree sparrow (*Passer montanus*) at two sites (the Biological station and the alder forest in the National Nature Reserve Sur). The samples were divided into 12 animal (Gastropoda, Arachnida, Odonata, Mantodea, Saltatoria, Homoptera, Heteroptera, Megaloptera, Lepidoptera, Coleoptera, Formicoidea, Diptera) and 3 vegetable (grains of wheat, pea and fragments of various plant species) food groups. Soft-bodied Arachnida, beetle larvae and butterfly caterpillars predomina-

ted in the food of the youngest nestlings throughout the breeding season. With increasing age the food contained more hard-bodied arthropods and harder components of plants and their seeds. In May, 55 diet samples for the nestlings consisted mainly of butterfly caterpillars (25%), leaf hopper larvae (21%) and beetles (19%), the animal to vegetable component ratio (A:V) was 99.1%:0.9%. In June, spiders (20%) and beetles (20%) were the most frequent items in 108 samples. Three quarters of the beetles were larvae of *Spercheus emarginatus* (Spercheidae), and wheat grains represented 25%, the A:V ratio amounted to 69.7%:30.3%. In July one hundred and four food samples were collected, including praying mantes (*Mantis religiosa*) forming 28.5% of the material, Saltatoria 24.6%, and Arachnida 12%. The other diet groups were represented by lower percentages - the A:V ratio being 97.9%:2.1%. In August, 32 samples were collected, with beetles predominating in the food (28.8%), and a high proportion of *Sialis* sp. related larvae (26.4%) and Arachnida (24%). The A:V ratio was 99%:1%." (Author)]

3344. Parr, A. (2002): First and last dates. Dragonfly news 42: 17-18. (in English). [Compilation of early records of several odonate species in UK in spring 2002.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

3345. Parr, A. (2002): The southern Skimmer *Orthetrum brunneum* (Fonscolombe). *Atropos* 16: 31-33. (in English). [The discovery of *O. brunneum* on Guernsey rises the possibility to discover the species on the mainland of Great Britain too. Therefore, some information on range expansion on the European continent, identification features, and the biology of the species are provided.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

3346. Paulson, D. (2002): New state records of *Enallagma* from Minnesota and New Hampshire. *Argia* 14(3): 12- (in English). [USA, *Enallagma clausum* (Minnesota, 30 May 1977); E. doubleday (New Hampshire, 7 July 1974)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3347. Paulson, D. (2002): Philip S. Corbet, Honary member, the Dragonfly Society of the Americas. *Argia* 14(3): 5-6. (in English). [Dennis Paulson introduces into the recognition of Dr. Philip Corbet - "the preeminent odonatologist of our time" - as Honary Member of DSA, and briefly outlines some mile stones in his odonatological work. Special emphasize is given to the fact that Philip unhesitatingly shared his knowlege and ideas with many students and colleagues over the years, and to his inspiration to his colleagues.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3348. Perrin, V. (2002): Highlights of the early season. Dragonfly News 42: 16- (in English). [Compilation of odonate records in 2002 with special emphasis on phenology from differend localities in UK] Address: not stated

3349. Petrulevicius, J.K.; Nel, A. (2002): A new libelluloid dragonfly from late Paleocene deposits in Argentina (Odonata: Italoansida). *Eur. J. Entomol.* 99: 485-489. (in English). ["A new genus and species of "libellu-

loid" dragonfly, *Jujusia maizgorda* gen. n., sp. n., of the clade Italoansida Bechly, 1996, from the late Paleocene, Maiz Gordo Formation, north-western Argentina, is described. Its phylogenetic relationships within the clade Cavilabiata Bechly, 1996 are discussed." (Authors)] Address: Petrulevicius, J.K., Departamento Cientifico Paleozoologia Invertebrados, Museo de La Plata. Paseo del Bosque, s/n. 1900 La Plata, and CONICET, Argentina. E-mail: levicius@mnhn.fr

3350. Petzold, F. (2002): Beobachtungen zum Verhalten von *Aeshna crenata* und *A. grandis* an einem Gewässer in Westsibirien (Odonata: Aeshnidae). *Libellula* 21(3/4): 79-100. (in German, with Russian and English summaries). [Sedelnikowo (56°57'N 75°16'E), NE part of administration district of Omsk, Russia; the behaviour of the coexisting species was observed from 1999-2001 at a man-made water body that was constructed as watering-place for cattle. "*A. grandis* was numerically the more dominant species; however, no interspecific interactions were noted. The reproductive activities of both species concentrated on a section of the water with highly structured vegetation and a great amount of dead wood. Both species preferred dead wood for oviposition but *A. crenata* used other kinds of dead and fresh plant material as well." ♀ refusal behaviour against ♂ mates is discribed. "Matings were not seen in *A. crenata* and only rarely in *A. grandis*. [...] More ♂♂ than ♀♀ of *A. crenata* and clearly more ♀♀ than ♂♂ of *A. grandis* were present at water. The activity of ♀ *A. crenata* lasted four hours per day and was significantly shorter than the eight hours spent by *A. grandis*." (Author)] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

3351. Petzold, F.; Wildermuth, H. (2002): Massiver Wassermilbenbefall bei *Cordulia aenea* (Hydrachnida: Arrenurus; Odonata: Corduliidae). *Libellula* 21(3/4): 167 - 173. (in German, with English summary). ["A population of *C. aenea* heavily parasitized by larvae of *Arrenurus* sp. was found at a moorland lake in northern Germany in May 2002. The parasites attached in clusters, mainly to the pleural membrane ventrally on abdominal segments 7, 8 and 9. The findings are discussed in the frame of earlier observations on parasitized corduliids with corresponding interpretations that go back as far as to the 18th century." (Authors)] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

3352. Pfeiffer, B. (2002): *Willamsonia fletcheri* encountered in Vermont. *Argia* 14(3): 10-11. (in English). [June 4, 2002, Washington County, Vermont, USA] Address: Pfeiffer, B., 113 Bartlett Rd, Plainfield VT, 05667, USA

3353. Purse, B. (2002): Conservation of the southern damselfly in Britain. *Biodiversity Technical Series* 1: 10 pp. (in English). [*Coenagrion mercuriale* is the only odonate species to have a national Species Action Plan (SAP) within the UK Biodiversity Action Plan. In the UK it is basically restricted to a few sites in Anglesey, West Wales, Gower, Devon, the New Forest, and the Itchen and Test valleys. Amongst these it occurs in three quite different habitat types: small lowland heathland streams, water-meadow ditches and calcareous fenland. In 1996/97 a Steering Group was set up to coordinate research and implement the SAP. A PhD was completed by Beth Purse, working under the direction

of Dr David Thompson at Liverpool University, to investigate the species on heathland sites. A second PhD study is now underway to investigate the ecology of the species in its other contrasting habitats: chalk stream, watermeadow and fen. The Environment Agency has recently published a superb illustrated booklet Conservation of the southern damselfly in Britain, R7D Leaflet W1-021/L, (contact 01793 860512 or publications@wrcplc.co.uk), which summarises Beth Purse's results. Other current research has involved collecting DNA samples from all known UK sites. Analysis should show what links, if any, exist between the somewhat discrete populations in their varying habitats.] Address: Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS32 4UD, UK.

3354. Quintana, A.T.; López, C.N. (2002): New locality records for Odonata in Pico Cristal National Park, Cuba. *Argia* 14(3): 15-16. (in English). [9 species were observed in 2001.] Address: Quintana, A.T., Univ. De Oriente, Santiago, Cuba

3355. Ring, S.; Kraus, F.B.; Schierwater, B.; Hadrys, H. (2002): Evolutionary ecology and genetic diversity measures in dragonflies. *Zoology (Jena)* 105 (Suppl. 5): 73. (in English). [Verbatim: "Dragonflies provide key model systems not only to study the evolution of mating systems (Fincke & Hadrys 2001, *EVOLUTION* 55: 762) but also to address the issue of how to define operational taxonomic units in conservation biology (conservation units). Field studies on dragonfly diversity and abundance in a variety of European, African, North and South American habitats have been combined with genetic diversity measures by means of multiple nuclear and mitochondrial DNA sequence markers (including ITS1, ITS2, C01, CO2, D-loop, ND1, 16S rDNA, and Hox genes) and neutral DNA markers (microsatellites, RAPDs). Information on both data sets helps to detect ecological and evolutionary effects on population networks and species assemblages, e.g. demographic patterns of habitat fragmentation, bottleneck effects and habitat shift processes. For example, within the European members of the riverine damselfly family Calopterygidae the identification of taxonomic units is very controversial and varies from 3 to 200 reproductive entities. Despite the high number of different phenotypes, sequence analyses of four DNA loci show very low genetic diversity within and between the proposed species/subspecies. This incongruence suggests recent speciation processes. Reconstruction of habitat preferences suggests that recent habitat shifts correlate with differences in the phenotype. In a second study on the keeled skimmer *Orthetrum coerulescens* the genetic consequences of a local bottleneck have been quantified. The latter revealed a significant number of private alleles for the largest population within a local network. These alleles were lost after the breeding site was dredged and a significant mode shift in allele frequencies (typical for a genetic bottleneck) took place. This demonstrates, that despite the fast recovery potential in terms of effective population (within 2 generations) and a network of smaller populations in the surrounding, a large self-perpetuating dragonfly population was affected by a cryptic loss of genetic diversity. We acknowledge support from the DFG and BMBF."] Address: Hadrys, H., Ecology and Evolution, ITZ, Tierärztliche Hochschule Hannover, 30559, Hannover, Germany. E-Mail: heike.hadrys@ecolevol.de

3356. Rosche, L. (2002): Dragonflies and damselflies of Northeast Ohio. *Cleveland Mus. Nat. Hist., Cleveland/OH*. ISBN 0-9717460-0-1. vii, 94 pp. (in English). [I assume, this book was planned as a guide directed to a public interested more generally in dragonflies, and to motivate it to get more and more interested in the Odonata. Larry Rosche documents the species that occur in a region that is - as J.B. Keiper states in his foreword - "fantastically rich with aquatic habitats. Fens, bogs, marshes, lakes, streams, springs and other wonderful ecosystems exist within an hour's drive of any northeastern Ohio city or town. In these areas, you can easily find a species-rich and abundant odonate fauna whose patrolling of territories, mating activities, predatory efforts and other behaviors will offer many rewarding observations. Use this guide and put names on those species you see." The book should also be useful elsewhere in the Great Lakes Region of USA and Canada, as most of the 124 species found in the scope of the book are found in Michigan, Indiana, Wisconsin, Minnesota, and Illinois as well as Ontario. The book is filled with lots of hints on identification, biology and habitat information; special emphasis is given to the phenology, and it is useful to get information on the regional rarity of the species. In general, the illustrations (most seem to be watercolor or color-pencil realized by three artists with different styles: Jacqueline Haley, Jennifer Brumfield and David Metcalf) depict the species well enough for identification. The digital images of the bluet reference guide on page 90 are very nice: The placement of all the bluets on one page is a great idea that enables the user to compare the species in one view. Some of the illustrations (Aeshnidae, Gomphidae) look digitally mounted using a morphological construction kit. It is hard to assess with the view of a European whether the illustrations fit to the reality. I think some of the artwork lacked detail in some cases, some of the perspectives seemed to distort terminal genitalia of the damselflies (way too big), some of the colors were too muted, or in the case of the *Argia* or *Hetaerina americana*, the bodies looked like pinned. Some of the paintings - especially the clubtails - lack in contrast and details. The wire-comb binding allows the pages to lie flat, which is great. However, the cover pages will be easily ripped or bent by repeated use in the field, so a plasticized cover is recommended. The book is attractive and reasonably priced, and I think it will deserve a spot on your shelf or in your backpack when travelling through NE Ohio. (M. Schorr)] Address: Publishers: Cleveland Mus. Nat. Hist., 1 Wade Oval, University Circle, Cleveland, OH 44106-1767, USA. Price: US \$ 18.95 net

3357. Samolag, J. (2002): New records of *Coenagrion armatum* (Charp.) and *Sympetrum fonscolombii* (Selys) (Odonata: Coenagrionidae, Libellulidae) in the Wielkopolska region. *Wiad. ent.* 21(1): 51-52. (in Polish, with English title). [*C. armatum*: 2 ♂, S of lake Lusowskiego and SE of Lusówko, 7-V-2000; *S. fonscolombii*: 1 ♂, SW of Młodasko, 22-X-2000. The habitats are briefly characterised, the accompanying odonate species are listed, and the occurrence of the 2 species in Poland is briefly outlined.] Address: Samolag, J., Ul.Poznanska 72, PO-62080 Tamowo Podgorne, Poland

3358. Schiel, F.-J. (2002): Entwicklungsnachweis von *Lestes virens vestalis* (Kleine Binsenjungfer) in der Oberrheinebene südwestlich von Baden-Baden. *mercuro*

riale 2: 2-3. (in German). [In 2001, near Sinzheim, Baden-Württemberg, Germany, the regional very rare *L. virens* was recorded. Its habitat is described in some detail.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

3359. SGL Baden-Württemberg (2002): Vereinsnachrichten. mercuriale 2: 30-40. (in German). [Includes a discussion on the potential and importance of ♀♀ in colonisation of water bodies (Sternberg, K. H. Hunger: Ja, wo fliegen sie denn?!?), Systematics of German Odonata (Kunz, B. R. Jödicke), soldes ("Schwarzes Brett"), the minutes of the meeting of the society, a membership list etc.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTO-GRAFIE@t-online.de

3360. Stoverock, M.; Schierwater, B.; Soendergerath, E.; Braune, E.; Suhling, F.; Martens, A.; Richter, O.; Hadrys, H. (2002): Understanding the dynamics of biodiversity in African dragonflies: Genetic approaches. *Zoology (Jena)* 105 (Suppl. 5): 74. (in English). [Verbatim: "Present-day patterns of biodiversity among ecosystems have arisen over time through a variety of natural and anthropogenic factors. Understanding these factors may provide crucial insights into the effects of future environmental changes. One basic requirement here is to understand and follow population structures and dynamics, for which estimates of gene flow and genetic diversity become a sine qua non. We use molecular genetic data from the mitochondrial and nuclear genome to monitor the genetic composition of defined key species under various demographic and ecological settings. Four different DNA sequence markers allow the straightforward detection of taxonomic units at the population to genus level. Microsatellites offer insights into intrapopulation structures. The genetic data provide first insights into the genetic structure, viability and dispersal potential of natural populations which differ in habitat selection, abundance, life cycle parameters and dispersal behaviour. The combination of multiple genetic markers also provides information on different evolutionary time scales and therefore accounts for the historical dimension of changes in biodiversity. The data will be used in mathematical simulation studies that will model the dynamics of dragonfly biodiversity in African dragonflies. We acknowledge support from the BMBF (BIOLOG Africa #01LC0024).] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.d

3361. Szállassy, N.; Bárdosi, E.; Szabó, Z.D.; Dévai, G. (2000): Fluctuating asymmetry and mating success in mated and solitary *Ischnura elegans* (Zygoptera: Coenagrionidae) males. *Hidrológiai Közlöny* 81: 514-516. (in Hungarian with English summary). ["The hypothesis that the more symmetrical are the wings, the greater is the success the individuals achieve in pairing was tested. [...] Neither reproductive success nor body size were correlated significantly with wing asymmetry."] Address: Szállassy, N., Dept of Ecol. Hydrobiol., University of Debrecen, Egyetem tér 1, HU-4032 Debrecen, Hungary. E-mail: szallassy@tigris.klte.hu

3362. Tarboton, W.; Taboton, M. (2002): A fieldguide to the Dragonflies of South Africa. Private publication, 2002. 97 pages. ISBN 0-620-29887-1. 97 pp. (in English). ["This colourful little fieldguide treats all 90

species of Anisoptera found in the Republic of South Africa. Following a brief introduction to classification, behaviour and identification methods, the larger part of the book is devoted to species identification. Brief texts on occurrence and identification are accompanied with distribution maps and 34 colour plates. The latter are composed of scans of specimens, the majority of which is of very fresh individuals, showing the life colours. The layout of the plates is attractive and roomy, with on average 7 scans on each plate. Distinctive features are indicated, sometimes elucidated with simple line-drawings, and the scans are sufficiently clear for the user to compare and find additional characters himself. On average there are about 3 scans per species, e.g. a dorsal aspect of both sexes and a lateral aspect of one, allowing an impression of the variability. The book is augmented with 29 photographs of free-living dragonflies, including some of the most stunning pictures of African species ever published (e.g. *Anax tristis* ♀ in flight and ovipositing). With the wealth of illustrations, identification becomes surprisingly straightforward, and the user is helped further with simple pictorial keys to families and gomphid and libellulid genera. The accessible image-oriented concept of the book is highly innovative in a group where we are used either to complicated technical keys or photoguides using field photos, allowing only limited views of characters and variation. The example is definitely one to be followed, especially in the species-rich faunas of the tropics where the scans-approach is perhaps the only way to do justice both to the diversity of Odonata and the growing interest for them. It is to be hoped the authors are planning a similar book for the Zygoptera!" (K.D. Dijkstra, taken from Phaon 2003:01, 11 March 2003).] Address: The book can be ordered for 200 rand, which includes postage (approx. 23 euro/US dollar) from: Russel Friedman Books cc, P O Box 73, Halfway House 1685, SOUTH AFRICA; attention Shelley Tel 027 -11-702-2300; Fax 027-11-702-1403; Email: shelleyrh@mighty.co.za Website: vwww.rfbooks.co.za

3363. Versonnen, B.; Knijf, G. de; Vercruyse, W.; Verhaeghe, W.; Van Wichelen, T. (2002): Four observations and first successful reproduction of *Sympetrum meridionale* (Selys, 1841) in Belgium. *Gomphus* 18(1-2): 3-13. (in Dutch, with English and French summaries). ["After nearly a century of absence, *S. meridionale* was seen 3 times in 2000 and once in 2001. There was an observation at Rekem (Limburg) on 20/06/2000, one at Harchies (Hainaut) on 25/06/2000 and one at Zelzate (East-Flanders) also on 25/06/2000 and finally one at Stekene (East-Flanders) on 01/08/2001." The specimens "of 2000 were young: twice a young ♂ (Rekem and Zelzate) and one freshly emerged ♀ at Harchies. Especially this last observation proves that *S. meridionale* was able to reproduce successfully in Belgium. Very remarkable was the predation on a young ♂ at Zelzate by a domestic cat." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

3364. Wasscher, M. (2002): Canal damselfly *Cercion lindenii* (Selys) - a species to look out for. *Atropos* 16: 62-63. (in English). [Some information on range extension on the European continent, identification features, and biology are provided, because the possibility exists to discover *C. lindenii* on the mainland of Great Britain in near future.] Address: Wasscher, M., Minstraat 15bis,

3365. Weihrauch, F. (2002): Ein Weibchen von *Enallagma cyathigerum* als Unterwasser-Prädator der Großen Weidenrindenlaus (Odonata: Coenagrionidae; Homoptera: Lachnidae). *Libellula* 21(3/4): 175-180. (in German, with English summary). ["A ♀ *E. cyathigerum* was observed feeding on larvae of *Tuberolachnus salignus* (Gmelin), on an accidentally submerged willow twig during a subsurface walk, possibly with the aim of oviposition. Seven or eight of the obviously soaked and half-drowned aphids were consumed within five minutes. This observation is discussed, and a list of other records from the literature of Homoptera as odonate prey is given. This is apparently the first published record of an imaginal dragonfly foraging under water." (Author)] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Florian.Weihrauch@t-online.de

3366. Weihrauch, F. (2002): *Enallagma* versus *Vespa*. *mercuriale* 2: 17-18. (in German). [Detailed description of the preying of a *Vespa* sp. upon *Enallagma cyathigerum*. Special emphasis is given to the habit of the *Vespa* to secure the damselfly from the surface of the water.] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Florian.Weihrauch@lbp.bayern.de

3367. Westermann, K. (2002): Die Abundanz schlüpfender Libellen in einem südbadischen Altrheingebiet. *Naturschutz südl. Oberrhein* 3: 215-244. (in German, with English summary). ["Within six years of research 192 000 exuviae of dragonflies were collected along two sections of side streams (2.6 km long, 10 to 50 m wide) of the river Rhine near the village of Weisweil (County Emmendingen; Baden-Württemberg, SW Germany). Thus the successful reproduction of 34 dragonfly species could be proven. The occurrence of all species is shown in classes of abundance, spanning six orders of magnitude. 1 The most common species is *Cercion lindenii* with a maximum abundance of 15 000 emerged imagines along 50 m of the stream. The species was found in perfect habitat in a 32 to 40 m wide section of the river, where eutrophic water is running with a regular speed of 0.1 to 0.2 m/s. Here also *Platycnemis pennipes*, *Ischnura elegans* and other species reach high abundance. Optimal habitat for *Pyrrosoma nymphula* exists along shallow sections, where there is no fish. Other species that reach their highest classes of abundance when emerging in shallow sections, are *Aeshna cyanea*, *Brachytron pratense*, *Libellula fulva*, *Sympetrum vulgatum* and *S. sanguineum*. *Gomphus pulchellus* is widely distributed in the study area and along other side streams, and reaches classes of abundance that can presumably exceed those of artificial lakes in gravel pits. Along old side streams *Calopteryx splendens*, *Chalcolestes viridis*, *Platycnemis pennipes*, *P. nymphula*, *Coenagrion puella*, *C. lindenii*, *Erythromma najas*, *Ischnura elegans*, *G. pulchellus*, *G. vulgatissimus*, *B. pratense*, *L. fulva*, and *S. striolatum* probably find optimal habitat in the southern Upper Rhine plains. Due to the large number of waters more species have also huge populations. The dragonfly communities of various stream sections can differ enormously. The biggest difference was found between a slowly and steadily running old side stream and the upper section of a cool, wide source; river ("Gießen") with summer

temperatures of 14 to 17°C. While *P. nymphula*, *C. viridis*, and *Coenagrion puella* have large populations at the Gießen every year, *P. pennipes*, *C. lindenii*, *I. elegans* and other species almost entirely fail. Results obtained in this study show the current status of dragonflies in typical waters called "Altrhein" (old) side stream and "Gießen" (source river). Changes and losses in the dragonfly communities might occur as soon as the "Integrated Rhine Program" (a programme to manage high floods of the river Rhine) will come into effect." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

3368. Westermann, K. (2002): Schlupf einer *Gomphus vulgatissimus* im August. *mercuriale* 2: 20-21. (in German). [Documentation of a late seasonal record (9. August 2002) of *G. vulgatissimus* from an oxbow of River Rhine near Weisweil, Baden-Württemberg, Germany.] Address: Westermann, K.; Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

3369. Westermann, K. (2002): Zur Phänologie der Emergenz bei der Gebänderten Prachtlibelle (*Calopteryx splendens*) an südbadischen Altrheinen. *Naturschutz am südl. Oberrhein* 3: 193-200. (in German, with English summary). [Along old side streams of the river Rhine in South Baden the emergence of *C. splendens* lasts until late August or the first days of September and thus at least six weeks longer than according to data given in the literature for the Federal state of Baden-Württemberg, Germany. High floods and rainfall shortly before emergence probably lead to considerable temporal shifts in the emergence and losses in the population.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

3370. Woodward, G.; Hildrew, A.G. (2002): Body-size determinants of niche overlap and intraguild predation within a complex food web. *Journal of Animal Ecology* 71: 1063-1074. (in English). ["1. Body-size may be an important feature of the structure of food webs. Detailed food web data are however scarce, particularly those including ontogenetic dietary shifts within species. We examined the predator guild in a well characterized food web, that of Broadstone Stream (UK), to assess the importance of body-size within and among species in relation to intraguild predation and niche overlap. 2. In agreement with recent food web theory, mutual predation and cannibalism were frequent and occurred in many pairwise permutations. This intraguild predation was strongly asymmetric, being determined by relative body-size within and among species, and seasonal 'ontogenetic reversals' in trophic status arose when generations overlapped. 3. Predator size determined dietary overlap, with ontogenetic shifts often outweighing taxonomic differences. Small predators had the narrowest diets, regardless of species, and were limited to feeding on a restricted subset of the total prey size-spectrum. Niche overlap decreased as pairwise differences in body-size increased among and within species. Overlap in diet also tracked seasonal changes in resource availability, being highest in summer, when prey were abundant and small, and declining progressively over time, as prey became scarcer and/or larger. The small predators also became more detritivorous as prey abundance declined and the larger prey species attained size-refugia. 4. The body-size

constraints driving feeding relationships within the predator guild, in terms of both resource partitioning and intraguild predation, lend support to recent niche models of food web structure (Warren 1996; Williams & Martinez 2000). The highly interconnected food web of Broadstone Stream appeared to be structured by relatively simple rules, with seasonal and ontogenetic shifts in the size-spectrum accounting for most of the changes in predator diet and trophic position. Encounter rate in time (prey and predator mobility) and space (micro-habitat use) and foraging mode also influenced prey vulnerability and niche overlap, but were secondary to the effect of body-size." (Authors) Key predator is *Cordulegaster boltonii*; thus, some focus of the study lies on this species.] Address: Woodward, G., School of Biological Sciences, Queen Mary University of London, Mile End Road, London, E1 4NS, UK. E-mail: Guy-Woodward@hotmail.com

3371. Woodward, G.; Hildrew, A.G. (2002): Differential vulnerability of prey to an invading top predator: integrating field surveys and laboratory experiments. *Ecological Entomology* 27: 732-744. (in English). ["1. A new top predator, the dragonfly *Cordulegaster boltonii*, invaded Broadstone Stream (U.K.) in the mid-1990s. This provided a rare opportunity to assess the impact of a new, large carnivore on a community that has been studied since the 1970s and has one of the most detailed food webs yet published. The vulnerability of the resident species to the invader was assessed by integrating experiments, which examined discrete stages in the predation sequence, with empirical survey data. 2. Although the new predator preyed on nearly every macro-invertebrate in the food web, vulnerability varied considerably among prey species. Size-related handling constraints initially set the predator's diet, resulting in strong ontogenetic shifts, with progressively larger prey being added while small prey were retained in the diet, as predators grew. Within the size range of vulnerable prey, encounter rate limited the strength of predation, with mobile, epibenthic species being most at risk. Contrary to most studies of interactions between freshwater predators (usually stoneflies) and prey (usually mayflies), the new predator did not elicit avoidance responses from its prey, probably because it combined a highly cryptic feeding posture with an extremely rapid attack response. 3. The invader exploited its prey heavily in experiments, even at prey densities orders of magnitude above ambient. In the field, electivity reflected prey availability, as determined by mobility and microhabitat use, rather than prey abundance or active predator choice. Consequently, the invader had skewed effects within the prey assemblage, with sedentary, interstitial species being far less vulnerable than more active, epibenthic species, some of which, including a previous top predator, have declined markedly since the invasion. 4. By examining the predation sequence in detail and integrating surveys with experiments, species traits and system characteristics that determine the strength of trophic interactions may be identified, and their potential importance in natural food webs assessed. In so doing, greater insight can be gained into which species (and systems) will be most vulnerable to invading or exotic predators, an imperative in both pure and applied ecology." (Authors)] Address: Woodward, G.; Department of Zoology and Animal Ecology, University College Cork, Cork, Ireland. E-mail: g.woodward@ucc.ie

3372. Xylander, W.E.R. (2002): Bericht des Staatlichen Museums für Naturkunde Görlitz für die Jahre 1999-2001. *Abh. Ber. Naturkundemus. Görlitz* 74(1): 47-158. (in German). [This impressive report on the activities of the staff of the museum in Görlitz, Sachsen, Germany includes some odonatological activities. Most prominent are the organisation of a meeting of the society of German speaking odonatologists in 2001 and the intensive surveys of the odonate fauna of the brown coal mining region of Berzdorf.] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

3373. Xylander, W.E.R.; Richter, M. (2002): Erstnachweis der Pokalazurjungfer *Cercion lindenii* (Selys, 1840) (Odonata, Coenagrionidae) für den Freistaat Sachsen. *Abh. Ber. Naturkundemus. 74(2)*: 273-282. (in German with English summary). [Germany; "*C. lindenii* was recorded for the first time in Saxony in July 2002 at the Knappensee about 15 km south of the Brandenburg border. The Knappensee was formed by lignite mining and flooded about 1945. The lake exhibits a rich submerged vegetation dominated by *Myriophyllum spicatum* and a fragmented peripheral reed vegetation, especially at those sites where *C. lindenii* was found; this corresponds with the habitat characteristics from other localities. The adult density was low compared to other sites in Germany. Morphometric data show that the population from the Knappensee corresponds to those of the eastern population in Germany (from Brandenburg) in that the specimens are larger than individuals from western populations. However, the Saxon specimens even exceeded the data of Brandenburg *C. lindenii* regarding all morphometric parameters." (Authors)] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Naturmuseum.GR.Dr.Xylander@t-online.de

3374. Yagi, T. (2002): *Aeshna juncea* male copulated with a dead female. *Gekkan-Mushi* 381: 45. (in Japanese). [pond on Mt. Daisetsu at Kamikawacho, Hokkaido, Japan, 20. August 2000; a translation of the paper is published in *Digest of Japanese Odonatological Short Communications* 14] Address: Yagi, T., 2113 O-tobe, Tsu City, 514-0016, Japan

3375. Yourth, C.P.; Forbes, M.R.; Baker, R.L. (2002): Sex differences in melanotic encapsulation responses (immunocompetence) in the damselfly *Lestes forcipatus* Rambur. *Can. J. Zool.* 80(9): 1578-1583. (in English, with French summary). ["A few studies have shown that ♂ and ♀ invertebrates differ in immunity and that these differences appear related to differences in sexual dimorphism and gender differences in life histories. Melanotic encapsulation of foreign objects in insects is one form of immunity. *L. forcipatus* is moderately sexually dimorphic, and much is known about patterns of mass gain in congeners relating to differences in life history between ♂♂ and ♀♀. In this study, ♀♀ were more immunoresponsive than ♂♂ under controlled temperatures, following emergence, and at a time when parasitic mites were challenging these hosts. However, ♂♂ and ♀♀ that overlapped in mass at emergence did not differ in their immune responses. ♂♂ in better condition at emergence were more immunoresponsive than lighter ♂♂, but this relation was not found in ♀♀. Sex differences in immune expression

may have implications for how ♀♀ versus ♂♂ are able to deal with challenges from parasites, under varying environmental conditions.] Address: Baker, R.L., Dept Zoo., Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6. Canada. e-mail: rbaker@credit.erin.utoronto.ca

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3376. Abro, A. (2003): The composition of sperm bundles in *Aeshna juncea* (L.) (Anisoptera: Aeshnidae). *Odonatologica* 32(2): 153-157. (in English). [Using light and electron microscopy, sperm packing has been studied in the large sperm bundles of *A. juncea*. "Each large bundle is built up of variously-sized smaller bundles which probably reflects the intracyst formation procedure. It is proposed that initially there is a gathering of immature sperm cells into small bundles at several sites within the testicular cyst, and secondly all sperm heads are bundled together. This construction of subunits may be of importance to bundle break-down and release of individual sperm cells after transfer to the ♀ reproductive organs." (Author)] Address: Abro, A., Department of Anatomy, University of Bergen, Arstadveien 19, N-5009 Bergen, Norway

3377. Baird, J.M.; May, M.L. (2003): Fights at the dinner table: Agonistic behavior in *Pachydiplax longipennis* (Odonata: Libellulidae) at feeding sites. *Journal of Insect Behavior* 6(2): 189-216. (in English) ["Aggressive behavior of *Pachydiplax longipennis* during foraging was quantified by observing focal individuals on arrays of artificial perches. *Pachydiplax* apparently aggressively defend, for up to several hours at a time, one or a few feeding perches. Seventeen percent of all behaviors included agonistic actions, e.g., chasing or physical contact. The frequency of interactions was correlated positively with ambient temperature, solar radiation, prey density, and density of other dragonflies. Both sexes initiated and responded to intra- and interspecific aggression; intraspecific interactions were more intense, however. Males had significantly higher interaction rates and fighting success than females, and intraspecific male-male contests were particularly intense. When prey were visibly localized, contest winners commonly gained perches closer to the prey swarm, and aggressive behavior was apparently correlated with feeding opportunity. Despite the frequency of aggression, these dragonflies allocated only about 19 s, on average, to agonistic behavior during 30-min observation periods. This and other costs appear small compared to foraging benefits of occupying a favorable perch, although at a very high interaction intensity high energy costs and lower intake reduce the net energy gain." (Authors) Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

3378. Beckemeyer, R. (2003): Are beetle dogs smarter than dragonfly dogs? A challenge from the past. *Argia* 14(4): 21. (in English). [In *Argia* 12(3), R. Beckemeyer (see OAS 3146) reported on his dog and its useful help to trace Odonata. In a note from 1911 in the *Entomological News*, he found the story of a setter dog, who very efficiently helped to collect beetles, some ne-

ver would have been collected without the help of this dog.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3379. Beckemeyer, R. (2003): Dragonflies infiltrate Texas butterfly festival. *Argia* 14(4): 18-19. (in English). [Brief report on the odonatological results of the trip to Texas, USA.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3380. Beckemeyer, R. (2003): New Harmony, Indiana - a stop along interstate 64 of historical interest to odonatists. *Argia* 14(4): 19-20. (in English). [During a trip across the USA, the author visited New Harmony, a town, where Thomas Say, the father of US-American entomology, spent many years of his life. R. Beckemeyer visited a museum with much information on Say, and provides some additional information on Say.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3381. Beynon, T. (2003): Dragonfly conservation from the BDS. *Atropos* 19: 70-71. (in English). [Coenagrion mercuriale; status quo report on research and conservation activities in UK] Address: Beynon, T.G., 34 Church Lane, Checkley, Stoke-on-Trent ST10 4NJ, UK

3382. Blaskovic, T.; Bulánková, E.; Síbl, J. (2003): First record of *Cordulegaster heros* ssp. *heros* Theischinger, 1979 (Cordulegastridae, Odonata) from Slovakia. *Biologia, Bratislava* 58(2): 293-294. (in English). [C. *heros* is added new to the Slovakian list of Odonata. 9 records of *C. heros* from the Borská nížina lowland in 2002 along with re-examined material collected in 1980, 1991, and 1998, are documented in detail.] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia. E-mail: Bulankova@nic.fns.uniba.sk

3383. Bowman, N. (2003): Reports from Coastal Stations - 2002: Eccles-on-Sea, Norfolk. *Atropos* 18: 63. (in English). [United Kingdom; *Erythromma viridulum*, *Anaciaeschna isosceles*] Address: not stated

3384. Brockhaus, T. (2003): *Pantala flavescens* (Fabricius) in Khumbu Himal, Nepal (Anisoptera: Libellulidae). *Notul. odonatol.* 6(1): 2-3. (in English). [Report on the observation of *P. flavescens* in the Mount Everest region in April and May 2000; *Crocothemis erythraea* is recorded from Phakding.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

3385. Brockhaus, T. (2003): Ein weiteres Vorkommen von *Aeshna subarctica elisabethae* (Walker, 1908) [sic] in Sachsen (Odonata, Aeshnidae) und Hinweise zur Libellenfauna der Natura-2000-Lebensraume 7110, 7140 und 7150. *Entomologische Nachrichten und Berichte* 47(1): 27-30. (in German with English summary) [Adults and exuviae of *A. subarctica elisabethae* Djakonov, 1922 were found in a transition mire in the south of the "Muskauer Heide" (Germany, Saxony) near the Polish border in 2001 and 2002. The habitats are described, co-occurring Odonata (including *Ophiogomphus cecilia*, *Somatochlora arctica*, *Leucorrhinia pectoralis*, *L. rubicunda*, and *Sympetrum depressiusculum*), and a list

of the known Saxonian localities of *A. subarctica* is given. The potential as bioindicators of the odonate fauna of the NATURA-2000-habitats 7110 (bogs), 7140 (transition mires), and 7150 (Rhynchosporion) is discussed.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

3386. Brooks, S. (2003): Dragonflies. life series. ISBN 0 565 09189 8. 96 pp. (in English). [In general, I think, we are living in times with overboarding information. The same goes for odonatology. Browsing OAS, one will find more and more papers intensifying the study of details on many subjects of odonatology. That's science, and it is necessary to do so. On the other hand, one needs time to handle all these details. The outstanding book of Philip Corbet helped to do so in a very significant part of odonatology, but it is a heavy weight in any sense. Steve Brooks explicitly refers to Corbet's book, and to Jill Silsby's fine book introducing odonate species diversity. In his new book "Dragonflies", S. Brooks compiles the essentials of current knowledge in odonatology on 96 pages. He directs precise information on a reader more generally interested in dragonflies. "Most of us are aware of dragonflies and damselflies. Their aerial agility and vivid colours are evocative of the long, hot days of summer, of shimmering lakes and dappled shade by trickling streams. But fewer people will have looked beyond the flash of blue, red, green or yellow to consider what each dragonfly is doing. This book takes you into the world of these fascinating insects and introduces you to their complex lifestyles - from the ferocious larval stages, lurking amongst plants and debris in lakes and rivers, to the breathtaking adults swooping after prey or fighting rivals to defend their territories." All information are organised in brief chapters. This also helps the advanced odonatologist to update his knowledge, and it is done in a language easy to read. The book is furnished with brilliant photographs. If one intends to motivate people's interest in dragonflies by a book, one should take Steve Brook's book. It is a really excellent book, and moderate in price (app. 15,- Euro). Of course, it should not be missing from your own odonatological library. (M. Schorr)] Address: The Natural History Museum Publishing, Cromwell Road, London, SW7 5BD, United Kingdom

3387. Brown, V. (2003): Rhode Island Odonata Atlas 2002 summary. *Argia* 14(4): 9-10. (in English). ["The fifth season of the Rhode Island Odonata Atlas was characterized by low water, a marked increase in records of southern species, a dearth of river species, and a change of place for both the project and the collection." *Williamsonia lintneri*, *Gomphaeschna antilope*, *Enallagma weewa*, *Somatochlora georgiana*, *S. linearis*, *Cordulegaster maculata*, *C. diastatops*, *Pantala flavescens*, and *P. hymenaea* are discussed in detail.] Address: Brown, Virginia, The Nature Conservancy, 159 Waterman Av., Providence, RI, 02906, USA.

3388. Buczynski, P. (2003): Remarks on the paper by W. BAZYLUK about dragonflies of the vicinities of Siemich. *Nowy Pam. Fizjogr., Warszawa* 2003 (2002) 1(2): 207-208. (in Polish with English summary). [Basing on original material of W. BAZYLUK (2002) (compare OAS 2873) deposited in the Museum and Institute of Zoology Polish Academy of Sciences, Warszawa it can be stated, that *Sympetma fusca* was confused with

S. paedisca. A small collection of larvae collected in the same area by W. BAZYLUK in 1950 adds *Coenagrion hastulatum* and *C. pulchellum* to the regional list.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3389. Butler, S.G. (2003): The larva of *Phyllomacromia trifasciata* (Rambur, 1842) (Anisoptera: Macromiidae). *Odonatologica* 32(2): 159-163. (in English). [Description and illustration of a ♀ final instar larva from NW Madagascar; discussion of the generic affinities of *Phyllomacromia*.] Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, United Kingdom. E-mail: sgbutler@talk21.com

3390. Cade, M. (2003): Reports from Coastal Stations - 2002: Portland, Dorset. *Atropos* 18: 49-51. (in English). [Verbatim: "[...] *Sympetrum fonscolombi* was the main Odonata immigration highlight. After an early single at Bottomcombe Quarry on 22 May, there were three ♂♂ at Yeolands Quarry on 24 June and at least four ♂♂ and a ♀ on ponds in the Bird Observatory garden from 28 June to 6 July [...]. Despite egg-laying being observed at the latter site, the only later record involved a single ♂ seen nearby on 31 July. A Ruddy Darter *S. sanguineum* was recorded at Culverwell on 31 August, which was the first record for Portland Bill."] Address: not stated

3391. Cham, S. (2003): Small Red-eyed damselfly *Erythromma viridulum* (Charpentier) records in 2002. *Atropos* 19: 19-24. (in English). ["The colonisation of Britain by *E. viridulum* continued apace during 2002 with records coming from many more new sites across southern and south-east England. From the original sightings at the Essex coastal sites this species is now being recorded in increasing numbers further inland. The range has spread from the most northerly records in Norfolk down through Suffolk, Essex, Kent and Sussex to the most south-westerly records on the Isle of Wight. From the number of sites recorded, the main thrust inland appears to be north of the Thames estuary with the species recorded in Hertfordshire and again in Bedfordshire. [...]" (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

3392. Clancy, S. (2003): Reports from Coastal Stations - 2002: Dungeness area, Kent. *Atropos* 18: 56-58. (in English). [United Kingdom; *Erythromma viridulum*, *Anax parthenope*, *Calopteryx splendens*, *Sympetrum fonscolombi*] Address: not stated

3393. Clarke, D. (2003): Blue Southern Hawker spotted. *Dragonfly news* 43: 35- [Aeshna cyanea; "I had almost forgotten about Mike Averill's appeal [...] when on 26 October I found myself watching a hawker quartering a forest ride in the Eden valley, Cumbria, in low mid-day sunshine. Fortunately, it settled to bask on low vegetation and I was able to approach undetected. The size and shape of the (yellow) dorsal patches on its thorax showed it to be a ♀ Southern Hawker. However, it was a very unusual one: all its dorsal abdominal markings were a clear blue, when this colour should have been restricted to the last segments! The sides of the thorax were the usual greenish yellow. I have not seen another like it before or since." (Author)] Address: David Clarke, david.clarke19@virgin.net

- 3394.** Clarke, D. (2003): Cumbria produces the goods! Dragonfly news 43: 35. (in English). ["[...] (Aeshna mixta) were duly seen in September (in the best weather of the season!), and in at least three different localities. At one site in the Lindale area the species was evidently in some numbers, and mating was seen. It also seems likely that the remaining sectors of the Lancaster-Kendal canal may be one of the routes for this dragonfly's northward movements. My note had also mentioned four other species as 'desirables', at least two of which were reported: singles of Emperor and Broad-bodied Chaser were noted (in August), again in this southern extremity of the county. [...]"] (Author)] Address: not stated
- 3395.** Clausnitzer, V. (2003): Dragonfly communities in coastal habitats of Kenya: indication of biotope quality and the need of conservation measures. Biodiversity and Conservation 12(2): 333-356. (in English). ["This study highlights the species diversity of Odonata from coastal forests in southern Kenya, identifying indicator species for certain habitat types and emphasising the importance of conserving the last remaining coastal forest areas. A total of 78 species were recorded from coastal habitats in southern Kenya in this study; five species for the first time in eastern Africa. Dragonfly communities relative to different habitat types from indigenous forest to cultivated landscapes are described and compared. The forest species are often confined to coastal forests of East Africa. They are stenotopic and highly sensitive to disturbance. With increasing habitat disturbance the species richness increases at first, but most of the colonisers are eurytopic species that are common and widely distributed in Africa. The species assemblages between different habitat types in the disturbed landscape are more or less the same; the beta-diversity is much lower than in different habitat types of the natural coastal landscape. In the end, management implications are briefly discussed."] (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de
- 3396.** Clausnitzer, V.; Peters, G. (2003): Identity and distribution of the little known Aeshna meruensis (Odonata: Aeshnidae). International Journal of Odonatology 6(1): 9-15. (in English). ["Status and records of Aeshna meruensis are published for the first time. This species has been confused with A. rileyi for a long time, although A.R. Waterston separated and labelled specimens of both species in the collection of the Natural History Museum, London, as early as 1974. A. meruensis is known from seven localities in East Africa so far, but the authors anticipate a wider distribution."] (Authors)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle, Germany. E-mail: violacl@gmx.de
- 3397.** Clausnitzer, V. (2003): Rediscovery of Amani-podagrion gilliesi, with notes on habitat, behaviour and conservation (Odonata: Megapodagrionidae). International Journal of Odonatology 6(1): 1-8. (in English). ["A. gilliesi was known previously only from four ♂♂ collected in 1959 and 1962 in the Usambara Mountains, south-east Tanzania. Recently it has been rediscovered at two shady streams in that area. The species is not living in swamps, as previously stated, but is apparently restricted to a small area in the Amani-Sigi Forest. Data on its ecology, behaviour and reproductive habitat are presented for the first time."] (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle, Germany. E-mail: violacl@gmx.de
- 3398.** Clausnitzer, V. (2003): The synonymy of the East African Notogomphus cataractae Consiglio, 1978 and N. immisericors Campion, 1923 with N. lectyhus Campion, 1923. Odonatologica 32(1): 85-87. (in English). ["Based on the examination of the holotypes of the 3 taxa and on fresh material from Kenya, these appear conspecific. Consequently, N. cataractae and N. immisericors are placed in synonymy of N. lectyhus."] (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de
- 3399.** Cordoba-Aguilar, A. (2003): Predicting mechanisms of sperm displacement based on genital morphometrics in the Calopterygidae (Odonata). Journal of Insect Behavior 16(1): 153-167. (in English) [...] "It is widely accepted that detailed studies of the copulatory interaction of males and females are the basis for outlining the coevolutionary trajectories that both sexes have followed [...]. Unfortunately, the study of copulatory mechanisms has been hampered by a number of practical reasons and consequently, our knowledge is limited to a few animal taxa within which the best known are the Odonata insects. [...] The main aim of this paper is to characterize the different copulatory mechanisms calopterygids utilize on the basis of genital morphometry. I test this by examining a set of calopterygids whose copulatory mechanisms have been documented. Using the same morphometric analysis, I then propose the likely mechanisms in a set of calopterygids whose mechanisms are unknown." (Author) Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx
- 3400.** Cross, I. (2003): Tiger beetle predation on adult Common Hawker [sic!]. Dragonfly News 43: 33. (in English). [13-9-2002, Puddletown Forest, Dorset, UK; a teneral Sympetrum striolatum was drawn into the burrow of a larval Green Tiger Beetle (Coleoptera: Cicindelidae).] Address: not stated
- 3401.** Dana, D. (2003): Quite a few Southern Hawkers from a garden pond. Dragonfly News 43: 33. (in English). [Isle of Wight; detailed report on Aeshna cyanea in a garden pond including some remarks on emergence damages. "In fact last year a ♂ came into the lounge via the French doors, looked at the television, left and returned for another look."] Address: not stated
- 3402.** Darke, J.; Hayden, J. (2003): Reports from Coastal Stations - 2002: Skomer Island NNR, Pembrokeshire. Atropos 18: 68- (in English). [United Kingdom; Verbatim: "Six species of Odonata were recorded, the highlight being the first record of Banded Demoiselle Calopteryx splendens for the island on 15 September. Thirty-seven Migrant Hawker Aeshna mixta were recorded between 6 August and 14 October. There were also ten sightings of Emperor Anax imperator and nine of Common Darter Sympetrum striolatum between 1-23 September. Both of these species are known to breed on the island. Common Blue Damselfly Enallagma cyathigerum and Blue-tailed Damselfly Ischnura elegans were recorded again."] Address: not stated

- 3403.** Deussen, M.; Voigt, H.; Zinke, J. (2003): Gomphidenfunde an der Elbe im Dresdener Stadtgebiet (Odonata). *Entomologische Nachrichten und Berichte* 47 (1): 51-52 (in German) [Records of Gomphus vulgatissimus and Ophiogomphus cecilia along the River Elbe in the area of the town of Dresden, Saxony, Germany made in 2002, are documented. The habitats are described in detail.] Address: Voigt, H., Grundstr. 152, D-01324 Dresden, Germany
- 3404.** Dewick, S. (2003): Reports from Coastal Stations - 2002: Bradwell-on-Sea, Essex. *Atropos* 18: 59-61. (in English). [United Kingdom; a list of 19 odonate species is communicated including *Erythromma viridulum* and *Brachytron pratense*] Address: not stated
- 3405.** Donnelly, T.W. (2003): Problems with *Tetragoneuria*!. *Argia* 14(4): 10-11. (in English). [The author outlines the history of *Tetragoneuria* / *Epitheca* in USA. New records of "*Epitheca costalis*" in Ohio, cause the continuation of the current discussion on the taxonomic status of the taxa *E. cynosura* and *E. costalis*. There is a lot of intergradation between both taxa, and a solution of the problem seems not to be in sight.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 3406.** Ellenrieder, N. von; Muzón, J. (2003): Description of the last larval instar of *Aeshna* (*Marmaraeschna*) *pallipes* Fraser, 1947 (Anisoptera: Aeshnidae). *Odonatologica* 32(1): 95-98. (in English). ["The last larval instar is described and illustrated, based on reared specimens from Argentina (Salta and La Rioja provinces). The species differs from the only other *Marmaraeschna* larva known, *A. (M.) brevicercia*, by the antennae surpassing anterior margin of labrum, lateral spine of abdominal segment IX as long as segment X, and ♂ basal lamina of epiproct with rounded tip and half as long as epiproct. Both *pallipes* and *brevicercia* larvae differ from other *Aeshna* larvae by the U-shaped apical excision of epiproct and the marginal tubercles on sides of ligula medial cleft." (Authors)] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C. C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@iipla.edu.ar
- 3407.** Fleck, G. (2003): Contribution à la connaissance des Odonates de Guyane française. Les larves des genres *Argyrothemis* Ris, 1911 et *Oligoclada* Karsch, 1889 (Insecta, Odonata, Anisoptera, Libellulidae). *Ann. Naturhist. Museum Wien* 104B: 341-352. (in French, with German and English summaries). [Le Petit Saut, French Guyana; the larvae of *Argyrothemis argentea* Ris, 1911, *Oligoclada abbreviata* (RAMBUR, 1842), and *O. pachystigma* KARSCH, 1889 are described and illustrated. In Nov. 2001, both species of the genus *Oligoclada* were frequently found in artificial water reservoirs with strongly fluctuating water levels. The taxon *O. abbreviata* *limnophila* Machado & Machado, 1993 (*Odonatologica* 22: 479-486) is critically discussed.] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr
- 3408.** Garner, P. (2003): An odd pair - Scarce Blue-tailed Damselfly. *Dragonfly news* 43: 34. (in English). ["We have just one breeding site for [...] *Ischnura pumilio* in Herefordshire. I first discovered the colony in 1999 confined to a small seepage in an abandoned area of Stretton Sugwas Gravel Pit, which is situated in the centre of the county, very close to the city of Hereford. On 2nd June 2002 [...]. I observed a most unusual mating attempt. A ♂ *Pyrrhosoma nymphula* grabbed an *aurantiaca* phase I. *pumilio* behind the neck with its anal claspers. Originally, I assumed The Large Red was attacking The Scarce Blue-tail, but it persisted and I quickly realised what was happening. The Scarce Blue-tail convulsed and wriggled, then paused and briefly kept quite still, then it fanatically twisted, arched itself and wriggled violently for almost a minute. The Large Red Damselfly hung on and after that there were several still periods [...], in between more twisting and wriggling. They remained united for about five minutes before the Large Red let go and flew off leaving the poor Scarce Blue-tail in a state of 'shock' on the stem of a spike-rush. [...]"] (Author)] Address: Peter Garner, West Malvern, Wares, UK
- 3409.** Harp, G.L. (2003): First records for the USA and Arkansas. *Argia* 14(4): 3-4. (in English). [2 Nov. 2000, Cypress National Preserve, *Triacanthagyna septima* was recorded for the first time in the USA. In addition, *Ischnura prognata* and *Nehalennia integricolis*, recorded at two different localities, were new for Arkansas.] Address: Harp, G.L., 3206 Maplewood Terrace, Jonesboro, AR, 72401, USA. E-mail: glharp@mail.as-tate.edu
- 3410.** Hedström, I.; Sahlén, G. (2003): An extended description of the larva of *Megaloprepus caerulatus* from Costa Rica (Odonata: Pseudostigmatidae). *International Journal of Odonatology* 6(1): 1-8: 23-31. (in English). ["The larva of *Megaloprepus caerulatus* is described and illustrated from specimens collected near the northern border of Barbilla National Park on the Costa Rican Caribbean slope. Habits and characters of larvae of three different size classes obtained from artificial tree holes permit the identification of small (body length 4 mm, excluding the caudal lamellae) larvae up to the final stadium. New diagnostic characters include the shape of the prementum and head." (Authors)] Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@zoologi.uu.se
- 3411.** Hepper, D. (Ed.) (2003): Spelling of *fonscolombi*. *Dragonfly news* 43: 35. (in English). [Documentation of contributions of different authors on the correct spelling of *Symepterus fonscolombii* according the rules of nomenclature.] Address: Hepper, D. (Ed.), 12 Three Stiles Road, Farnham, Surrey GU 9 7DE, UK. E-mail: David.Hepper@Local-Software.co.uk
- 3412.** Hernández, J.M.R. (2003): Odonata of the Sierra las Damas, Sancti-Spiritus Province, Cuba. *Argia* 14(4): 16-18. (in English). [In 2001, 27 odonate species were recorded. They are listed and briefly commented.] Address: Hernández, J.M.R., Apartado Postal 2004, Sancti-Spiritus, Cuba CP 60100
- 3413.** Hornung, J.P.; Rice, C.L. (2003): Odonata and wetland quality in southern Alberta, Canada: a preliminary study. *Odonatologica* 32(2): 119-129. (in English). [The study was realised in Brooks, from May until Sept. 1999. "Sixteen study sites were each visited 7 times to survey adult dragonflies and aquatic macroinvertebrates, record environmental parameters, collect water samples, record vegetative characteristics, and assess beef cattle grazing influences. 25 odonate species were

recorded, of which *Ischnura verticalis* is new to Alberta. A significant negative correlation was detected between cattle presence (measured as percent stems grazed surrounding the wetland) and odonate species richness ($p = 0.022$; $r^2 = 0.322$), teneral species richness ($p = 0.018$; $r^2 = 0.337$), and the Shannon-Weiner diversity indices ($p = 0.060$; $r^2 = 0.230$) of the study sites. In addition, vegetation species richness and odonate species richness show a positive correlation ($p = 0.066$; $r^2 = 0.221$). A logistic regression establishes that the absence of *Coenagrion angulatum*, *Enallagma ebrium*, and *Aeshna interrupta* is associated with high cattle impacts, or low vegetation species richness. This study outlines the effect that cattle can have on wetland odonate species diversity and recommends that measures are taken to protect wetlands, while offering an incentive and reasonable cost/benefit ratio to both rangeland and wetland managers." (Authors) Address: Hornung, J.P., 751 General Services Building, University of Alberta, Edmonton, Alberta, T6G2H1, Canada

3414. Hunter, I. (2003): Reports from Coastal Stations - 2002: Elms Farm, Icklesham, East Sussex. *Atropos* 18: 55-56. (in English). [United Kingdom; Verbatim: "The Odonata highlight was the arrival of Small Red-eyed Damselfly *Erythromma viridulum*. They were first noticed on 10 August when seven were present. This rose to a maximum of 125, including 30 pairs, at the main site plus 10 at other sites on 19 August. The resultant close examination of all damselflies led to Red-eyed Damselfly *E. najas* being located and photographed for the first time on 18 August; it was recorded on four subsequent dates. Both Migrant Hawker *Aeshna mixta* and Common Darter *Sympetrum striolatum* were still being seen on suitable days in November."] Address: not stated

3415. Hutchings, G.E. (2003): A list of the Odonata of Athabasca sand dunes Provincial Wilderness Park, Saskatchewan. *Argia* 14(4): 4-8. (in English). [2500 odonate specimens, collected in August 2002, resulted in 22 species. "*Aeshna tuberculifera* is a very significant range extension for North America with previous records in Canada being from southern Ontario and the British Columbia / Alberta border in the southern Rocky Mountains."] Address: Hutchings, G.E., 971 Arundel Dr., Victoria, B.C., Canada, V9A-2C4. E-mail: sea-trek@islandnet.com

3416. Inoue, K. (2003): Report on the 1st Symposium of the S.I.O. Regional Office in east Asia (SIO-ROEA). *Notul. odonatol.* 6(1): 10-11. (in English). [The Symposium was held in the National Science Museum, Daejeon, Korea during 26-29 My 2002. 51 odonatologists from Belgium, China, Germany, Japan, Korea, Russia, and Taiwan have attended. Eleven oral presentations and three posters were presented.] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan

3417. Johnson, A. (2003): Two new species for Iowa. *Argia* 14(4): 4-5. (in English). [July, 2002; Iowa, USA; *Somatochlora linearis*, *Libellula incesta*; in addition the rare *Sympetrum ambiguum* is dealt with.] Address: not stated

3418. Kamimura, Y. (2003): Effects of repeated mating and polyandry on the fecundity, fertility and maternal behaviour of ♀ earwigs, *Euborellia plebeja*. *Animal Behaviour* 65: 205-214. (in English). [I examined mul-

tiple mating and its function in ♀ earwigs, *Euborellia plebeja* (Dermaptera: Ani-solabididae). Like other earwigs, ♀♀ of this species care for their eggs and intermittently lay eggs in clutches (iteroparity). Analysis of two polymorphic allozyme loci revealed that wild-caught adult ♀♀ laid clutches with low within-brood genetic relatedness (0.210), indicating that ♀♀ were promiscuous under natural conditions. Rearing experiments in the laboratory revealed that: (1) repeated mating with a single ♂ increased ♀ fecundity (number of clutches laid) and hence the number of hatchlings produced; (2) estimated sperm number was positively correlated with hatchability; (3) when frequency of mating was controlled, polyandry enhanced hatchability, although this effect was not statistically significant; (4) duration of maternal care varied for clutches with low hatchability, and -sometimes exceeded the mean interclutch interval. Thus, although a possible benefit of polyandry is suggested, the greater beneficial effect of repeated mating on ♀ fecundity can explain polyandrous mating in this species. Because ♀ earwigs invest considerable effort in brooding their clutches, it may be adaptive to suppress oviposition unless stored sperm ensures high fertility." (Author) The results are discussed stressing sperm removal behaviour of Odonata.] Address: Kamimura, Y., Laboratory of Animal Ecology, Dept of Biol., Tokyo Metropolitan Univ., Minamiosawa 1-1, Hachioji, Tokyo 192-0397, Japan. E-mail: kamimu@comp.metro-u.ac.jp

3419. Kano, K. (2003): Dragonflies reacted to rotating fans. *Boso no Konchu* 29: 40. (in Japanese). [Japan; *Matrona basilaris*, *Boyeria maclachlani*; a translation of the paper is published in *Digest of Japanese Odonatological Short Communications* 14] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3420. Karjalainen, K.; Hämäläinen, M.; Hulden, L. (2003): *Aeshna mixta* funnen i Finland och annat intressant. *Nord. Odonatol. Soc. Newsl.* 8-9(1): 6-8. (in Swedish with English summary) ["*Aeshna mixta* found in Finland and other interesting records: Migrated individuals of *A. mixta* were recorded in Finland for the first time in August-September 2002. Confirmed observations are available from several sites along the southern coast of the country (in Porvoo, Helsinki, Espoo, Kirkkonummi and Pohja), most of them from bays of the sea. The nearest autochthonous populations of *A. mixta* occur in the Riga region in Latvia, and this area might be the source of the migration to Finland. Records made by Doppler weather radar show that large insects flew from Estonia towards Helsinki in many occasions at the end of July and the beginning of August, in afternoons when southeastern winds prevailed; these insects probably were migrating *A. mixta*. A population of *Nehalennia speciosa* was found in N: Tammisaari (Ekenäs); the previous Finnish record dates back to 1981. The new "provincial records" of Finnish dragonflies made since the 1997 update in *Nord. Odonatol. Soc. Newsl.* 3(1): 10-11 are listed." (Authors) These provincial records refer to *Coenagrion puella*, *Ischnura pumilio*, *Aeshna subarctica*, *A. viridis*, *Epithea bimaculata*, *Sympetrum sanguineum*, *Leucorrhinia pectoralis*, and *Libellula fulva*. Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail: sk@korento.net

3421. Knill-Jones, S. (2003): Reports from Coastal Stations - 2002: Isle of Wight. *Atropos* 18: 51-52. (in

English). [United Kingdom; Verbatim: "Single Red-veined Darter *Sympetrum fonscolombi* were seen at Wheelers Bay on 16 June and at Culver Cliff on 17 July. A Hairy Dragonfly *Brachytron pratense* was observed at Bouldnor Forest on 16 May and a Downy Emerald *Cordulia aenea* was seen on Elmsworth Farm Pond, Newtown, on 1 June. There are now seven new sites for Small Red-eyed Damselfly *Erythromma viridulum* and over 200 were seen on Sandown canoe lake in the summer."] Address: not stated

3422. Lagos, A.R.; Oliveira, C.H.P.; Gomes, V.S.M.; Alves, M.A.S. (2003): Predation on *Philaethria wernickei* (Röber) by *Anax concolor* Br. in Parque Nacional da Restinga de Jurubatiba, Rio de Janeiro, SE Brazil (Lepidoptera: Nymphalidae; Anisoptera: Aeshnidae). *Notul. odonatol.* 6(1): 11. (in English). [In March 2002, a ♀ *A. concolor* was noticed preying on the butterfly, *P. wernickei*. The dragonfly was seen eating the butterfly's head. After this, it flew off with its prey to a shrub, where, by the time the authors caught it, it had completely consumed the butterfly's head. *Philaethria* is considered as presumably unpalatable and/or aposematic. However, the possible unpalatability of *P. wernickei* apparently does not affect the voracious *A. concolor*, and the tropical kingbird, *Tyrannus melancholicus* (Vieillot) (Tyrannidae). Therefore, it seems the unpalatability of *Philaethria* spp. may not affect all predators.] Address: Alves, M.A.S., Ecologia, IBRAG, Universidade do Estado do Rio de Janeiro, Rua Sao Francisco Xavier 524, BR-20550-011 Rio de Janeiro, RJ, Brazil. E-mail: masa@uerj.br

3423. Machado, A.B.M. (2003): *Neoneura moorei* spec. nov. from the amazonian region of Brazil (Zygoptera: Protoneuridae). *Odonatologica* 32(1): 89-93. (in English). ["The new species is described and illustrated from 3 ♂♂ and 3 ♀♀ collected in the state of Rondonia, Brazil (holotype ♂, allotype ♀: Ji-Parana, II-1961, deposited in the author's collection). By the arrangement of the decumbent process of the dorsal branch of the superior appendages it belongs to the *N. maria*-group whose species had never been found in Brazil. It differs from the other species of this group by its color pattern, by the structure of the 6th superior appendages and shape of the ♀ posterior prothoracic lobe." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

3424. Maezono, Y.; Miyashita, T. (2003): Community-level impacts induced by introduced largemouth bass and bluegill in farm ponds in Japan. *Biological Conservation* 109: 111-121. (in English). ["Largemouth bass *Micropterus salmoides* and bluegill *Lepomis macrochirus* have been introduced into many countries and have become cosmopolitan exotic species. However, only a few studies show their impact on introduced communities. To investigate their impact, we performed natural snapshot experiments in 15 farm ponds in Saitama prefecture, eastern Japan. We selected 10 and 5 small ponds in similar environmental conditions, but with and without exotics, respectively. The numbers of fish, crustaceans, and nymphal odonates were smaller in ponds where exotics were found and some species were considered to be locally extinct in several ponds. On the other hand, the numbers of benthic organisms, i.e. tadpoles, chironomids, chaoborids, and Oligochaeta

were more abundant in ponds with exotics. These two groups of organisms were separated clearly on the first axis of DCA, which indicates that this difference was mainly induced by bass predation. This result suggests a trophic cascade in which top-down effects induced by exotics propagated to fish, crustaceans, and nymphal odonates directly and to some benthic organisms indirectly. Therefore, when one is to conserve native organisms, attention should be paid not only to direct negative effects, but also to indirect effects propagating to various trophic levels. Because farm ponds are typical Japanese small lentic systems having rich biodiversities and bass and bluegill have been shown to change farm pond communities widely, conservational treatments including eradication of exotic fish should be conducted immediately." (Authors)] Address: Maezono, Y., Laboratory of Biodiversity Science, School of Agriculture and Life Sciences, The University of Tokyo, Tokyo 113-8657, Japan. E-mail: zephyrus@es.a.u-tokyo.ac.jp

3425. Malikova, E.I.; Ivanov, P.Yu (2003): The larva of *Shaogomphus schmidti* (Asahina, 1956) (Anisoptera: Gomphidae). *Odonatologica* 32(2): 165-169. (in English). [The exuviae from Primorye and the Amur Region, Russia is described, illustrated and compared with *S. postocularis* *epophthalmus* (Selys).] Address: Malikova, E.I.; Department of Zoology, Blagoveshchensk State Pedagogical University, Lenina Street 104, RUS-675000 Blagoveshchensk, Amurskaya oblast, Russia. E-mail: helen@amur.ru

3426. Manolis, T. (2003): *Dragonflies and Damselflies of California*. California Natural History Guides 72 (ISBN 0-520-23567-3). 201 pp. (in English). [A field guide has to introduce its subject to the reader. Thus, adult dragonfly anatomy, behaviour (feeding, antipredator, and reproduction behaviour, thermoregulation, dispersal), life cycles and larvae of dragonflies, family and subfamily key to dragonfly larvae, distribution (including a brief overview into Californian geographic regions), watching and identifying of dragonflies, taxonomy and nomenclature, "About the Maps", and family and subfamily key to adult dragonflies form the basement of this field guide on the first 36 pages. Species accounts refer to 108 odonate species known to occur in California (pages 39 -179): In a monographic style, each species is described in detail and compared with similar species. Its behaviour is briefly outlined, the habitat described, and the flight season given. In addition, the distribution is outlined in detail. A checklist of Californian Odonata, species of hypothetical occurrence, a glossary, references, and an index complete the book. The heart of the book are 40 plates of a breathtaking quality. They slightly resemble Dan Powell's plates in his book "Guide to the dragonflies of Great Britain", but they seem to be more precise in a scientific sense. Each species is illustrated, and details necessary to separate it from similar species are added on the plates. This book is a further addition to the (in most cases) excellent books on the North American Odonata currently published. My personal impression is, that it will be a precise and reliable tool to identify the Californian Odonata. I am fascinated from the artwork of Tim Manolis, and I can't stop thinking that the plates of the book should exist in an enlarged version for study rooms. My personal opinion is that Tim Manolis talent urgently should be used to prepare a new edition of Sid Dunkle's excellent book (*Dragonflies through binoculars*), which was disappointing in terms of the stamp like photo-

graphic illustrations. The book on Californian Odonata is priced 17,- US Dollar; this seems to me extremely good value compared with the quality of the book. (M. Schorr) Address: University of California Press, Publicity Dept, 2120 Bekeley Way, Berkeley CA 94720, USA

3427. Mauffray, B. (2003): Georgia summary. *Argia* 14(4): 5- (in English). [Status report on odonatological activities in Georgia, USA. The contribution include addresses of three web sites, and a note on the discovery of *Gomphus adelphus* cf.] Address: Mauffray, B., 4525 N.W. 53rd Lane., Gainesville, FL 32653, USA. E-mail: iori@afn.org

3428. Moore, J. (2003): Norman Winfried Moore. *Odonatologica* 32(1): 9-18. (in English). [A biography of Dr N.W.Moore (born 24 Feb. 1923) emphasize on matters concerning the study of Odonata and nature conservational activities. His bibliography (1939-2002) comprises of app. 135 odonatological titles, but ca 45 papers on pesticides and environment are omitted.] Address: Moore, J., Department of Zoology, University of Cambridge, Downing Street. Cambridge, CB2 3EJ, United Kingdom

3429. Müller, Z.; Jakob, T.; Toth, A.; Devai, G.; Szalassy, N.; Kiss, B.; Horvath, R. (2003): Effect of sports fisherman activities on dragonfly assemblages on a Hungarian river floodplain. *Biodiversity and Conservation* 12(1): 167-179. (in English). ["We studied the dragonfly fauna along a 15 km stretch of the floodplain of the regulated, first-order river Tisza, Hungary. Data on captured and observed adults, larvae and exuvia were recorded. Observations were made from May to October 1998 and 1999 on 34 species, which is 52% of the Hungarian fauna. Classification on the basis of faunistic similarity revealed that habitat-level differences, associated with various degrees of physical anthropogenic impact on bank vegetation, can exceed variation among the water bodies of different types (backwater, pond, marsh, canal, river). The richest sites were dominated by structurally diverse macrophyte vegetation, while flowing waters (river and canal) were poorest in species. Odonata were found to be reliable indicators of small-scale habitat patterns, reflecting vegetation differences even within single water bodies where the sampling spots were arranged just a few hundred metres apart. Along a gradient of utilisation intensity, the species number of Odonata assemblages and the summed relative abundance of the five rarest species of the study area decreased linearly with increasing fragmentation of the marginal vegetation. Sports fisherman activities, implying disruption of the littoral marsh zone by establishment of clearings and excessive trampling of the banks, can also be monitored by dragonfly faunistic investigations. Our results demonstrate that conservation of these varied floodplain water bodies requires the control of sports fishing activity, suggesting that (i) to maintain the representative odonate fauna of the water bodies, some non-fragmented shores must be provided; and (ii) permanent fishing stands should not exceed 8 m mean width and should be separated by at least 12 m of intact riparian sections." (Authors)] Address: Müller, Z., Debrecen University, Department of Ecology, H-4010, Debrecen, Hungary. E-mail: muller@tigris.klte.hu

3430. Muzlanov, Yu. A. (2003): The pattern of distribution of defects of wing venation in the Banded Agrion

(*Calopteryx splendens*). *Russian Journal of Developmental Biology* 34(1): 51-56. (in English). ["The distribution of morphological structures was studied in wings of *C. splendens* from different intrapopulation groups. Damselflies of odd years of emergence are characterized by a more stable pattern of ontogenetic processes according to the mean total number of venation defects. The sharply increased level of radiation in summer 1986, which coincided with the flight of damselflies, could have caused hereditary defects expressed in a sequence of generations of even years of emergence. Apparently, most alternative features of wing venation in damselflies can be considered as markers of stability of the ontogenetic processes, which reflect, to a great extent, genotypic features of the organisms in a population. A possible mechanism has been described, which explains the proposed topological model of formation of the venation defects of different types. The increase in mean frequencies of defects can suggest an enhanced development over the aberrant epigenetic trajectories, which may lead to the elimination of these organisms under the influence of various agents, i.e., to the stabilizing selection in a population. The results obtained suggest that defects of venation arise on the stochastic basis and their frequency increases upon destabilization of ontogenetic processes not only by the environmental factors, but also by genetic stress. Venation defects can be successfully used in population biomonitoring." (Author)] Address: Muzlanov, Yu. A., Zarevskii Secondary School, Zarya, Mikhailovskii raion, Ryazan oblast, 391728 Russia

3431. Nobes, G. (2003): Small Red Damselfly *Ceragrion tenellum* in Norfolk. *Atropos* 19: 75-76. (in English). [Verbatim: "[...] *C. tenellum* was first reported breeding in Norfolk on 3 August 1955 (Durrant 1960) when a small colony was found, including several pairs seen in copula, at Seaming Fen. However, Ken Durrant (pers. comm.) says that as far back as 1937 he knew of a colony of this species at this site, when it was present in large numbers for many years. This small Norfolk Wildlife Trust Reserve, near Dereham, is still the only known site in the county for this species and is apparently also the only extant one in East Anglia. In recent years sightings have continued in very small numbers, though in some years there have been no records and the long-term future of the colony has been in doubt. Thus it is heartening to report that a ♂ of this species was seen on 15 July 2002 flying around the small Sphagnum moss pools where it breeds [...]."] Address: Nobes, G., Springside, Carbrooke, Thetford, Norfolk, IP25 6SQ, UK

3432. Nobes, G. (2003): Southern Emerald Damselfly *Lestes barbarus* (Fabr.) - The first British record. *Atropos* 18: 3-6. (in English). [On 30/07 and 7/08/2002, *L. barbarus* was recorded at Winterton Dunes, Norfolk, UK. This first mainland record for UK is documented in detail. A comment of Adrian Parr is added.] Address: Nobes, G., Springside, Carbrooke, Thetford, Norfolk, IP25 6SQ, UK

3433. O'Brien, M.; Bright, E.; Kielbaso, M.A. (2003): The Odonata of the Huron Mountains, Marquette Co., Michigan. *Bulletin of American Odonatology*: 1-22. (in English). [The Odonata fauna of the Huron Mountains - 26 localities were visited - was surveyed during 1996 - 2002. This survey, combined with specimens from earlier collectors resulted in a total of 79 species known

from the area, which is nearly half of Michigan's known Odonata species. In addition, 9 species are new records for Marquette County. Each of the species is briefly commented (habitat, habits), the records are documented locally wise.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

3434. Odin, N. (2003): Reports from Coastal Stations - 2002: Landguard Bird Observatory, Suffolk. *Atropos* 18: 61-62. (in English). [United Kingdom; *Aeshna mixta*, *Sympetrum striolatum*] Address: not stated

3435. Padeffke, T.; Suhling, F. (2002): Temporal priority and intra-guild predation in temporary waters: an experimental study using Namibian desert dragonflies. *Ecological Entomology* 28(3): 340-347. (in English) ["1. Intra-guild predation between early larval instars of two co-existing dragonflies, *Sympetrum fonscolombii* and *Trithemis kirbyi*, was investigated with respect to temporal advantage and growth. Three situations were simulated experimentally: (1) *Sympetrum fonscolombii* began development 11 days before *T. kirbyi*. (2) *Trithemis kirbyi* began development 11 days before *S. fonscolombii*. (3) Both species began on the same day. 2. With a temporal advantage of 11 days to the second species, the resulting larval density of the respective first species was significantly higher than that of the second species. 3. Without a temporal advantage, the survival of *S. fonscolombii* was higher than that of *T. kirbyi*, and *S. fonscolombii* had a larger size due to faster growth than *T. kirbyi*. Hence, it is assumed that survival depended on early oviposition as well as on larval growth. 4. To test the relevance of the laboratory results, observations at artificial ponds in the Namibian semi-desert were conducted. *Trithemis kirbyi* was the first species colonising these ponds while *S. fonscolombii* arrived 15 days later. In field samples, many more *Trithemis* larvae than *Sympetrum* larvae were found, a pattern similar to the laboratory experiments in which *T. kirbyi* enjoyed a temporal advantage." (Authors) Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

3436. Parfitt, A. (2003): Reports from Coastal Stations - 2002: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 18: 62. (in English). [*Erythromma viridulum*, *Calopteryx splendens*, *Sympetrum fonscolombii*, *S. striolatum*] Address: not stated

3437. Parr, A. (2003): First & last dates 2002. *Dragonfly News* 43: 24-25. (in English). [Phenological data of numerous species in Great Britain are documented.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

3438. Parr, A. (2003): Migrant dragonflies in 2002 including recent decisions and comments by The Odonata Record Committee. *Atropos* 18: 18-24. (in English). [Of special interest is the first record of *Lestes barbarus* on the mainland of UK. Brief comments on *Ischnura pumilio*, *Erythromma viridulum*, *Aeshna mixta*, *Anax parthenope*, *Crocothemis erythraea*, and *Sympetrum fonscolombii* are made. A sighting of *Epithecina bimaculata* was not accepted by the Records committee.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

3439. Parr, A. (2003): Migrants & vagrants 2002. *Dragonfly News* 43: 22-23. (in English). [Information identical with OAS 3424] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

3440. Parr, A. (2003): Odonata Records Committee Update. *Atropos* 19: 73. (in English). [Verbatim: "Since the last issue of *Atropos* the following record has been formally accepted: Lesser Emperor *Anax parthenope* ♂ near Netherfield, Nottinghamshire, on 16 July 2002 (R. Woodward). This is the third record in five years from a small area of Nottinghamshire centred loosely on the National Water Sports Centre. In Britain 'repeat' sightings of Lesser Emperor are generally from key coastal sites such as Dungeness, Kent, though on the near Continent other favoured inland localities are known. At present there is no evidence of breeding, but with its great expanses of open water this particular region does seem attractive to the species."] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

3441. Parr, M.J. (2003): Evelyn D.V. Prendergast (1918-2001). *International Journal of Odonatology* 6(1): 95-98. (in English). [obituary] Address: Parr, M., Little Island, Stembidge, Martock, Somerset TA12 6BW, UK. e-mail: mmc37@parr37.freesevice.co.uk

3442. Paulson, D. (2003): Comments on the *Erythrodiplax connata* (Burmeister, 1839) group, with the elevation of *E. fusca* (Rambur, 1842), *E. minuscula* (Rambur, 1842), and *E. basifusca* (Calvert, 1895) to full species (Anisoptera: Libellulidae). *Bull. American Odonatology* 6(4): 101-110. (in English). ["The *E. connata* group is revised, based on examination of 855 specimens. *E. connata* of Borror (1942) is divided into four species: *E. connata* (Burmeister, 1839), *E. fusca* (Rambur, 1842), *E. minuscula* (Rambur, 1842), and *E. basifusca* (Calvert, 1895). *E. fusca* and *E. minuscula* had been previously considered subspecies of *E. connata*, while *E. basifusca* is resurrected for northern populations of *E. connata*. The remaining species of Borror's *connata* group - *E. abjecta* (Rambur, 1842), *E. atroterminata* Ris, 1911, *E. cauca* Borror, 1942, *E. cleopatra* Ris, 1911, *E. ines* Ris, 1911, *E. justiniana* (Selys, 1857), *E. media* Borror, 1942, *E. melanorubra* Borror, 1942, and *E. paraguayensis* (Förster, 1905) - are considered valid, with the addition of *E. bromeliicola* Westfall, 2000. A population in the Andes of Argentina is similar to *E. fusca* but is possibly specifically distinct. *Diplax portoricana* Kolbe, 1888, is probably a synonym of *E. justiniana* rather than *E. connata*, and *Diplax fraternata* Hagen, 1873, is considered a nomen nudum rather than a synonym of *E. connata*." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3443. Paulson, D. (2003): Flame-tailed Pondhawk common name for *Erythemis peruviana*. *Argia* 14(4): 22- (in English). [The first USA record of this species in Texas in 2001, makes it necessary to proclaim a common name of *E. peruviana*: Flame-tailed Pondhawk] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3444. Paulson, D. (2003): Where to go on your next dragonfly trip. *Argia* 14(4): 20-21. (in English). [D. Paulson presents a map of the counties in USA with less

than 10 species of Odonata recorded.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3445. Paulson, D.R. (2003): *Teinobasis budeni* sp. nov. from Pohnpei, Eastern Caroline Islands, Micronesia (Odonata: Coenagrionidae). *International Journal of Odonatology* 6(1): 33-37. (in English). ["*T. budeni* sp. nov. is described from Pohnpei, Federated States of Micronesia. Holotype ♂: Micronesia, Pohnpei, Sokehs, Nanpil River headwaters, 01 July 2001; allotype ♀: same locality, 03 February 2001, both leg. D.W. Buden; to be deposited in FSCA, Gainesville, FL, USA. The new species belongs in the Fortis-group and differs from all species in that group by characters of the ♂ appendages, ♀ ovipositor, hind prothoracic lobe, and coloration of immatures." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3446. Paulson, D.R.; Buden, D.W. (2003): The Odonata of Pohnpei, Eastern Caroline Islands, Micronesia. *International Journal of Odonatology* 6(1): 39-64. (in English). ["A collection of 448 Odonata specimens made on Pohnpei, Caroline Islands, Micronesia, in 2001-2002 allows a reassessment of the fauna of this small, isolated island. There are 15 species, including six species of the zygopteran genus *Teinobasis*, which apparently speciated in situ, an unusually great diversity for such a small island. One of these species was undescribed. A revised key to the *Teinobasis* of Pohnpei is included, the larvae of three species of *Teinobasis* are compared, and the ♀♀ of *T. aerides* and *Pacificothemis esakii* are described for the first time. The three odonate species represented by adequate series, *T. ariel*, *T. fortis*, and *Hemicordulia haluco*, appear to increase in body size with elevation. The island still has all of its natural habitats, although native upland forests continue to decrease as more land is cleared for agriculture. All of the odonate species seem secure at this time, although *T. nigrolutea* appears to be less common now than in the past." (Authors)] Address: Buden, D.W., Division of Natural Sciences and Mathematics, College of Micronesia-FSM, P.O. Box 159, Kolonia, Pohnpei FM 96941, Micronesia. E-mail: donbuden@comfsm.fm

3447. Peters, G. (2003): Buchbesprechungen: Harald Heidemann & Richard Seidenbusch (2002): *Die Libellen Deutschland. Reihe: Die Tierwelt Deutschlands und der angrenzenden Meeresteile ("Dahl-Reihe")*, Teil (Odonata II). Goecke & Evers, Keltern. ISBN 3-931374-07-6. *Entomologische Nachrichten und Berichte* 47(1): 241-242. (in German) [Review of the publication abstracted in OAS No. 2957] Address: Peters, G., Museum für Naturkunde, Institut für Systematische Zoologie, Invalidenstr. 43, D-10115 Berlin, Germany. E-mail: thekla.kauffmann@rz.hu-berlin.de

3448. Peterson, M. (2003): WDA:s andra internationella symposium om Odonatologi. *Nord. Odonatol. Soc. Newsl.* 8-9(1): 4-5. (in Swedish with English summary) [Brief and personal report on the WDA symposium held in Gällivare, Sweden in 2001. Some emphasis is given to the (unsuccessful) attempt to trace *Somatochlora sahlbergi*. Address: Peterson, M.; Åbymovägen 35, S-616 30 Åby, Sweden. E-mail: martin.peterson@mbox391.swipnet.se

3449. Peterson, M. (2003): Samtliga svenska Leucorrhiniarter representerade i en enda lokal. *Nord. Odo-*

natol. Soc. Newsl. 8-9(1): 10. (in Swedish with English summary title) [All five Swedish *Leucorrhinia* species found in the same small lake in western Sweden: *L. albifrons*, *L. caudalis*, *Leucorrhinia dubia*, *Leucorrhinia rubicunda*, and *L. pectoralis* were found at Lillesjön, ca. 60 km north of Göteborg, Sweden.] Address: Peterson, M. Åbymovägen 35, S-616 30 Åby, Sweden. E-mail: martin.peterson@mbox391.swipnet.se

3450. Peterson, M. (2003) Trollsändan i nordisk folketro. *Nord. Odonatol. Soc. Newsl.* 8-9(1): 11-12. (in Swedish with English summary) ["The dragonfly in Nordic folklore: There are many myths around the dragonfly in the folklore all over the world. The Nordic countries are no exemption. Many local names for Dragonfly are very interesting and a lot of similarities are found between the Nordic dragonfly folklore." (Author)] Address: Peterson, M.; Åbymovägen 35, S-616 30 Åby, Sweden. E-mail: martin.peterson@mbox391.swipnet.se

3451. Pietsch, T. (2003): Nachweis der Grünen Flußjungfer, Keiljungfer (*Ophiogomphus cecilia* Fourcroy, 1785) im südlichen Sachsen-Anhalt im NSG "Forst Bibra" (Burgenlandkreis. *Entomol. Mitt. Sachsen-Anhalt* 11(1): 3-6. (in German). [Bad Bibra, Sachsen-Anhalt, Germany; on 3 July 2002, a specimen of *O. cecilia* was found away from running waters on a wind sheltered meadow (*Bromion erecti*).] Address: Pietsch, T., Friedrich-List-Str. 25, D-06110 Halle/Saale, Germany. E-mail: saale-unstrut@t-online.de

3452. Prather, B.; Prather, I. (2003): First Colorado record of *Celithemis elisa*. *Argia* 14(4): 3. (in English). [17 July, 2001, 18 June, 2002, 20 July, 2002, Boulder County, and 18 June, 2002, Longan County, USA] Address: not stated

3453. Purse, B.V.; Thompson, D.J. (2003): Reproductive morphology and behaviour in *Coenagrion mercuriale* (Charpentier) (Zygoptera: Coenagrionidae). *Odonatologica* 32(1): 29-37. (in English). ["The reproductive morphology and behaviour of ♂ and ♀ at the northern edge of the species range, in Britain are described. Copula duration was relatively short and occurred in tussocks around the stream and oviposition usually occurred in tandem. Although there was no significant relationship between body size and clutch size, large clutches were only found in the largest individuals and larger ♀♀ produced larger, and thus better-provisioned eggs. Examination of the dimensions of the aedeagus and the ♀ sperm storage organs revealed that ♂♂ could remove rival sperm from both the bursa copulatrix and spermatheca consistent with the presence of extensive proximally oriented microspination with sperm masses on the surface of the aedeagi. ♀ store sperm from previous matings and a few partition clutches between consecutive oviposition episodes. The fulfilment of these ecological and behavioural pre-requisites and the predominance of mate guarding during oviposition suggests that sperm competition by sperm displacement is prevalent in this species and constitutes a substantial selection pressure." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

3454. Rehn, A.C. (2003): *Oligoclada teretidentis* spec. nov. from eastern Ecuador (Anisoptera: Libellulidae). *Odonatologica* 32(2): 171-175. (in English). ["The

new sp. is described and illustrated (holotype ♂ allotype ♀: Ecuador, Orellana prov., forested shore of oxbow lagoon near Rio Tiputini, approximately 1 km. NW of Biological Research Station, Parque Nacional Yasuni, II-X-2001; deposited in UMMZ, Ann Arbor, MI, USA). Species is peculiar in having a large yellowish patch on the ventral mesepisternum and by discrete lateral bands of pruinosity on synthorax (these bands yellow in ♀♀) and, in the ♂, by the ventral, rounded tooth at 1/2 length of cercus." (Author)] Address: Rehn, A.C., 2817 G Street Apartment 1, Sacramento, California 95816, USA

3455. Reinhardt, K. (2003): Aspects of the reproductive behaviour and physiology in three north American Gomphidae species (Anisoptera). *Notul. odonatol.* 6(1): 4-8. (in English). ["Field and laboratory observations on the reproduction of *Gomphus externus*, *G. graslinellus*, and *Progomphus obscurus* are presented from Illinois, United States. Mating of *G. externus* in the field took 12 min. 2 phases were distinguished, the first consisted of tapping movements of the ♂ hamulus, the second of pumping movements of the ♀ abdomen. The ovary yielded 5100 eggs of which 690 were laid during hand-held oviposition in the laboratory. Only eggs laid by the ♀ but not the ones dissected from the ovary developed a sticky jelly coat around themselves. Eyespots of developing embryos were visible after 13 days. This ♀ had stored approximately 200 thousand sperm (about 160 bundles) in her spermatheca. The sperm were still mobile 3 days after mating. A comparison of the penis horn length and the length of the spermathecal tubes revealed that ♂♂ cannot reach the end of the spermathecal tubes. A *G. graslinellus* ♀ was observed to employ the dipping mode of oviposition. After oviposition she had approximately 1 million sperm remaining. ♀♀ of both species showed no muscle contraction response when the cerci were touched with water, but responses to water differed between the 2 ♀ on segments 9 and 10. ♂ *P. obscurus* perched on the sandy ground along the bank without territorial behaviour though ♂♂ were observed to follow other ♂♂. The penis morphology of *P. obscurus* was similar to members of the genus *Gomphus*.] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: bgykr@leeds.ac.uk

3456. Relyea, R.A.; Hoverman, J.T. (2003): The impact of larval predators and competitors on the morphology and fitness of juvenile treefrogs. *Oecologia* 134: 596-604. (in English). ["Studies of phenotypic plasticity typically focus on traits in single ontogenetic stages. However, plastic responses can be induced in multiple ontogenetic stages and traits induced early in ontogeny may have lasting effects. We examined how gray treefrog larvae altered their morphology in four different larval environments and whether different larval environments affected the survival, growth, development, and morphology of juvenile frogs at metamorphosis. We then reared these juveniles in terrestrial environments under high and low intraspecific competition to determine whether the initial differences in traits at metamorphosis affected subsequent survival and growth, whether the initial- phenotypic differences converged over time, and whether competition in the terrestrial environment induced further phenotypic changes. Larval and juvenile environments both affected treefrog traits. Larval predators - *Anax*. sp. - induced relatively deep tail fins and short bodies, but there was no impact on

larval development. In contrast, larval competitors induced relatively short tails and long bodies, reduced larval growth, and slowed larval development. At metamorphosis, larval predators had no effect on juvenile growth or relative morphology while larval competitors produced juveniles that were smaller and possessed relatively shorter limbs and shorter bodies. After 1 month of terrestrial competition among the juvenile frogs, the initial differences in juvenile morphology did not converge. There were no differences in growth due to larval treatment but there were differences in survival. Individuals that experienced low competition as tadpoles experienced near perfect survival as juvenile frogs but individuals that experienced high competition as tadpoles suffered an 18% decrease in survival as juvenile frogs. There were also morphological responses to juvenile competition, but these changes appear to be due, at least in part, to allometric effects. Collectively, these results demonstrate that larval environments can have profound impacts on the traits and fitness of organisms later in ontogeny." (Authors)] Address: Relyea, R.A. & J.T. Hoverman, Department of Biological Sciences, University of Pittsburgh, Pittsburgh, PA, 15260 USA. E-mail: relyea@pitt.edu

3457. Sadler, D. (2003): Water rail predating dragonflies. *Dragonfly News* 43: 33. (in English). [9-X-2002, Pagham Harbour, West Sussex, UK; *Rallus aquaticus* (Aves) preyed successfully on *Aeshna mixta* and *Sympetrum striolatum* roosting on branches by jumping vertically toward the dragonflies.] Address: not stated

3458. Sahlén, G. (2003): Nordisk Odonata møde 28-30 juni 2002 vid Gadevang, Sjælland, Danmark. *Nord. Odonatol. Soc. Newsl.* 8-9(1): 13-17. (in Swedish with English summary) [Some personal reflections and memories from the 2002 Nordic Odonatological Society meeting in Gadevang, Denmark: The paper includes some photographs of the participants and *Libellula fulva*, and a list of the 24 odonate species collected at 10 localities. Of special interest are records of *Nehalennia speciosa* and *Leucorrhinia pectoralis*. Address: Sahlén, G., Höskolan i Halmstad, SET, Box 823, SE-301 18 Halmstad. E-mail: goran.sahlen@set.hh.se

3459. Samraoui, B.; Weekers, P.H.H.; Dumont, H.J. (2003): Two taxa within the north African *Lestes virens* complex (Zygoptera: Lestidae). *Odonatologica* 32(2): 131-142. (in English). ["A study of *Lestes "virens"* in Algeria, based on SEM, size analysis, and molecular analysis of nuclear ribosomal DNA genes (18S, 5.8S) and spacers (ITS1 and 2), reveals the presence of two taxa that can be separated by the length and sequence of their ITS1 and their adult coloration, but not by molecular features in their 18S and 5.8S genes, the ITS2 spacer, and morphology. This contrasts with the *Enallagma cyathigerum*-gro, where geographically defined morphological differences were unaccompanied by differences in ITS1 and ITS2. Previous ecological data had shown the first lestid to be a summer, and the second an autumnal reproducer. The red autumnal species is here named *Lestes numidicus* sp. n. (holotype ♂, allotype ♀: Algeria, Lac des Oiseaux, X-1993; deposited in IRSN, Brussels); the status of the green summer species is discussed. It probably corresponds to *L. virens*, but this is likely to be a hybrid taxon, resulting from the postglacial introgression of *L. numidicus* with a taxon invading from the East, via the Iberian Peninsula.

L. virens vestalis from France is likely to be introgressed as well. In case this hypothesis is confirmed, the first junior synonym available, *L. marikovskii* (Belyshev) from Kazakhstan, applies to the taxon extending from Kazakhstan-Tajikistan to Central Europe." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

3460. Samways, M.J. (2003): Conservation of an endemic odonate fauna in the Seychelles Archipelago. *Odonatologica* 32(2): 177-182. (in English). ["The odonate species richness of the granitic islands of Seychelles, a biodiversity hotspot, is significantly correlated to island size. The larger islands also have the highest elevations and hence the most streams from cloud catching as well as from downpours. The Seychelles odonate fauna can be divided into 2 groups: (1) endemic species, and, (2) geographically--widespread eurytopic, vagile species. The endemic species are elevational fugitives that need high-elevation forest cover, even if secondary. They are remarkably tolerant of temporary drying out of streams. In contrast, the widespread species occur at low elevations, are pool species, and are tolerant of removal of forest cover. They emigrate when the pools dry out. Conservation of the endemic taxa depends on maintaining cloud-catching forest, although evidence suggests that their populations are maintained even where the forest is partly alien invasive trees or secondary regrowth.] Address: Samways, M.J., Department of Conservation Ecology and Entomology, University of Stellenbosch, Private Bag XI, Matieland 7602, South Africa. E-mail: samways@sun.ac.za

3461. Samways, M.J. (2003): Threats to the tropical island dragonfly fauna (Odonata) of Mayotte, Comoro archipelago. *Biodiversity and Conservation* 12(9): 1785-1792 (in English) "The dragonfly fauna of the 374 km² island of Mayotte in the western Indian Ocean comprises some widespread African species and some Comoro endemics, and is a biodiversity hotspot. This dragonfly assemblage is under threat from increasing human impact as it creeps up the water courses from the periphery of the island towards the centre. Among these impacts are indigenous tree removal and replacement growth by alien vegetation. An even greater impact and threat is detergent input into streams. The intensity of this impact is so great that the streams and rocks become white. To date, although often the wings and bodies of odonates become stained white with detergent, the dragonfly assemblage appears remarkably tolerant of this impact. However, there is differential impact, with loss of island endemic species in the most impacted areas. In contrast, the geographically widespread and eurytopic species continue to thrive in these impacted areas, at least in the short term. It is urgent to change people's water-usage behaviour, both for their benefit and for the endemic dragonfly assemblage." (Author) Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

3462. Sasamoto, A. (2003): Aberrant wing colouration in a *Neurothemis fluctuans* (Fabr.) ♂ (Anisoptera: Libellulidae). *Notul. odonotol.* 6(1): 12. (in English). [The brown wing markings in the ♂ are one of the distinctive features of the wide spread Asian *N. fluctuans*. The brown area in the forewing extends from wing base to

close to pterostigma, whereas in the hindwing, at the costal side it reaches almost the same level as in the forewing, but at the margin it bends towards the wing base. In immature stage the spots are pale yellowish, becoming gradually darker with maturity. In the ♀, the wing colouration is variable: from almost colourless to such resembling the ♂. On May 2, 2001, the author captured an aberrantly coloured ♂ at Pondok Tanjung, Perak, in peninsular Malaysia. Its forewing is similar to a typical ♂, but the hindwing colouration is much different. Only 2 or 3 costal cells are patchy brown, the remaining area of the standard spot being pale yellow. The colouration is symmetrical in both wings. Specimens with "normal" and aberrant wing colouration are figured.] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto-cho, Shiki-gun, Nara pref., 636-0341, Japan

3463. Schmidt, E. (2003): Die Torf-Mosaikjungfer *Aeshna juncea* (L., 1758) (Odonata, Aeshnidae) an Tontümpeln und an Gartenteichen im West-Münsterland und in Essen, ein ökologisches Rätsel. *Verh. Westd. Entomol. Tagung 2001*: 75-80. (in German). [Discussion of records of *A. juncea* at "atypical" habitats (clay pits, garden ponds). These habitats are compared with the typical habitats of the species in the region (transition mires, bogs). Proximate factors seem to be the structure of the vegetation, the ultimate factor may be the microclimate.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

3464. Scott, D.A. (2003): Reports from Coastal Stations - 2002: Dursey Island, Co. Cork. *Atropos* 18: 68-69. (in English). [United Kingdom; *Sympetrum striolatum*] Address: not stated

3465. Sibley, F. (2003): 60 species in 60 ponds. *Argia* 14(4): 11-16. (in English). [Schuyler and Tempkins County, New York, USA; the paper focusses on locality / habitat frequency of the species, and discusses a lot of factors which could be responsible for species distribution.] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA. E-mail: fcs@george.peabody.yale.edu

3466. Spence, B. (2003): Reports from Coastal Stations - 2002: The Spurn Area, East Yorkshire. *Atropos* 18: 64-65. (in English). [United Kingdom; *Aeshna cyanea*, *Libellula depressa*, *Sympetrum fonscolombii*] Address: not stated

3467. Srygley, R.B. (2003): Wind drift compensation in migrating dragonflies *Pantala* (Odonata: Libellulidae). *Journal of Insect Behavior* 6(2): 217-232. (in English) ["Tailwind drift compensation serves to maximize a migrant's flight distance on a given amount of energy, and crosswind drift compensation serves to hold a course true and minimize the distance flown. With full or part compensation, airspeeds are predicted to increase with greater crosswind drift. To test whether migrating dragonflies compensated for wind drift, I measured the velocity and heading of *Pantala hymenaea* and *P. flavescens* in natural flight over a lake and the ambient wind speed and direction. *P. hymenaea* flew north-easterly (58°), whereas *P. flavescens* flew significantly more east-north easterly (74°) throughout the day. *Pantala* spp. demonstrated part compensation for changes in crosswind drift within individuals (mean compensation = 54%, P = 0.0000), evidence for use of a ground reference to correct for drift when flying over water. Among individuals, *P. flavescens* compensated for crosswind

drift. P. hymenaea overcompensated and then drifted downwind on one morning and compensated for cross-wind drift on the next. As predicted from optimal migration theory, airspeed (5.0 m/s for both species with no tailwind) decreased with tailwind velocity both among individuals (data for both species pooled [n = 19], P < 0.0001) and within each individual as it crossed the lake (P = 0.0016)." (Author) Address: Srygley, R.B., Dept of Zool., University of Oxford, South Parks Road, Oxford OX 1 3PS, UK; bob.srygley /@zoo/ogy. oxford, ac. uk

3468. Sykes, T. (2003): Reports from Coastal Stations - 2002: Gibraltar Point, Lincolnshire. *Atropos* 18: 64. (in English). [United Kingdom; *Aeshna mixta*, *Sympetrum fonacolumbii*] Address: not stated

3469. Szállassy, N.; Bárdosi, E.; Szabó, Z.D.; Szép, T.; Dévai, G. (2003): Fluctuating asymmetry, survival and mating success in ♂ *Libellula fulva* Müller (Anisoptera: Libellulidae). *Odonatologica* 32(2): 143-151. (in English). ["The studies were conducted at Kutas canal near Ártánd, Hungary. In order to reveal whether there is any relationship between wing fluctuating asymmetry and mating success in mated (observed at least once in wheel position) and solitary ♂♂ (not involved in pairing during the study period), 106 ♂♂ were marked and their wing length between arculus and pterostigma measured. Mated ♂♂ had more symmetrical forewings, but in the case of hindwings there were no differences between solitary and mated individuals. The survival rate did not differ between the 2 groups and it was constant over time. The probability of recapture was higher in mated ♂♂ and varied with time. The number of hours spent with observation did not explain the variation in the recapture rate." (Authors)] Address: Szállassy, N., Department of Ecology and Hydrobiology, University of Debrecen, Egyetem tér 1, HU-4032 Debrecen, Hungary. E-mail: szallassy@tigris.klte.hu

3470. Szállassy, N.; Bárdosi, E.; Zoltán, S.D.; Tibor, S.; Dévai, G. (2002): Fluctuating asymmetry, survival and mating success in males of dragonfly *Orthetrum coerulescens* (Odonata: Libellulidae). *Hidrológiai Közlöny* 82: 125-127. (in Hungarian, with English summary) [The studies were conducted in a population along a slow flowing creek. Survival rate of unpaired ♂♂ differed significantly from that of paired ones on the first 2 days after marking; in both paired and unpaired ♂♂ it became constant later. Recapture rate differed in the 2 groups and changed in time. Neither the forewings nor the hindwings differed significantly in their fluctuating asymmetry values between the paired and the unpaired ♂♂.] Address: Szállassy, N., Dept Ecol. Hydrobiology, Univ. of Debrecen, Egyetem tér 1, HU-4032 Debrecen, Hungary. E-mail: szallassy@tigris.klte.hu

3471. Tagg, D. (2003): Raising *Brachytron* Larvae. *Dragonfly news* 43: 34. (in English). ["In May 1999 a ♀ *Brachytron* was ovipositing in the small pond at Sparr Rough nr Wisborough Green. She seemed to lay exclusively into dead soggy stems of the rush *Juncus effuses*, laying ar or just below the water surface. In one stem she appeared to have deposited at least 8 eggs. I took this home and kept it in a jar of water and in fact 19 larvae hatched out 3 weeks later, all neatly synchronised on the same day. They were given plenty of *Daphnia* and *Cyclops*, but within a month, although tiny and delicate-looking, they started eating each other in the traditional dragonfly manner! I returned some to the

pond and concentrated on keeping four individuals. Two died for no apparent reason in the winter of 2001/2001 but the other two flourished and grew on schedule for hatching in May 2001. In April one killed and ate the other, although they were of a similar age and until then had avoided one another. They had eaten aquatic worms, Chironomid larvae and damselfly nymphs. Water Hoglouse were also taken but usually tackled when the *Asellus* were moulting. *Brachytron* larvae are much more sluggish than *Aeshna* larvae, clinging to the same piece of weed or debris and hardly moving for days at a time. They cling tightly to a finger if fished out of the water." (Author)] Address: Don Tagg, Farnham, Surrey, UK

3472. Taylor, P. (2003): Dragonfly conservation from the BDS. *Atropos* 18: 35-36. (in English). [This is a brief history of the British Dragonfly Society and its objectives with special reference on conservation activities.] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK

3473. Tol, J. van.; Müller, R. (2003): Forest damselflies of the Philippines, their evolution and present status, with the description of *Drepanosticta moorei* spec. nov. from Luzon (Zygoptera: Platystictidae). *Odonatologica* 32(1): 39-45. (in English). ["*D. moorei* sp. n. (holotype ♂: Philippines, Luzon, Nueva Viscaya. Sta Fe, Atbo River, 550-800 m, 10-VI-1991, in RMNH) is described, and illustrated. It is closely related to *D. belyshevi* Hämäläinen from the Philippines. Some general remarks on the historical biogeography and the present status of the family are made. The current distribution of the family (SE Asia. Middle and northern South America) presumably dates back to the Upper Cretaceous." (Authors)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands. E-mail: tol@nmm.nl

3474. Troake, P. (2003): Reports from Coastal Station - 2001: Rye Harbour SSSI, East Sussex. *Atropos* 18: 54-55. (in English). [UK; *Brachytron pratense*, *Sympetrum striolatum*, *Aeshna mixta*] Address: not stated

3475. Tunmore, M. (2003): Reports from Coastal Stations - 2002: The Lizard, Cornwall. *Atropos* 18: 48-49. (in English). [Verbatim: "It was not a notable year for Odonata. Twelve Red-veined Darter *Sympetrum fonscolombei* were recorded at Predannack on 4 June, including a pair in cop; numbers increased to 30 there on 27 June and a ragged individual was seen on 3 August. At another site on Goonhilly Downs two were seen on 23 June. Late examples of Emperor *Anax imperator* and Golden-ringed Dragonfly *Cordulegaster boltonii* were seen on 17 and 28 October respectively."] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK

3476. Vick, G.S. (2003): Notes on the genus *Notogomphus* Selys, 1858 in Cameroon with the description of two new species (Anisoptera: Gomphidae). *Odonatologica* 32(1): 47-60. (in English). ["Twelve *Notogomphus* specimens from Cameroon were available for analysis. Previously only *N. spinosus* Karsch was known from the country; its holotype and allotype have been re-examined and comments are included. *N. maryae* sp. n. (holotype ♂: SW Province. Mt Kupe, Nhiangse. 25-VI-1998 and *N. moorei* sp. n. (holotype ♂: SW Province, Kodmin, 15-XII-1998 are described. The types are in the author's collection. A key to separate the 3 species

is provided." (Author)] Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, UK

3477. Viessmann, R. (2003): Libellen - Odonata. Pflanzen und Tiere in Rheinland-Pfalz - Berichtsjahr 2002 - Heft 13: 189-201. (in German). [Compilation of dragonfly records from different habitats situated in Rheinland-Pfalz, Germany. Of faunistical interest are the records of *Coenagrion mercuriale*, *C. pulchellum*, *Erythromma najas*, *Ischnura pumilio*, *Lestes barbarus*, *L. virens*, *Sympetma fusca*, *Brachytron pratense*, *Aeshna affinis*, *Anaciaeschna isosceles*, *Anax parthenope*, *Crocothemis erythraea*, *Libellula fulva*, *Orthetrum brunneum*, and *Sympetrum fonscolombii*.] Address: Viessmann, R., Gängelstockweg 8, D-67295 Bolanden, Germany. E-mail: viessmann@freenet.de

3478. Vischer, M.; Binot-Hafke, M. (2003): Artenhilfsprogramme der Bundesländer: Fauna. Natur und Landschaft 78(2): 56-63. (in German with English summary) ["In Germany there are currently 239 conservation action plans and programmes for 153 taxa groups which are (at least partially) financed and supported by the German regional states (Länder). 55 % of the programme's involve not only population records and conservation measures, but also evaluation and monitoring activities. Most programmes take vertebrates in consideration (76 %), especially birds. The present article is followed by tables of plans, programmes and measures implemented, sorted both by species group and regional state. These tables also indicate the degree of success as reported by the regional states." Special conservation action plans referring to Odonata are existing in Baden-Württemberg ("15 priority odonate species"), Bavaria (*Coenagrion lunulatum*, *C. mercuriale*, *C. ornatum*, *Nehalennia speciosa*, *Leucorrhinia pectoralis*), Bremen (*Aeshna grandis*, *A. viridis*, *Anaciaeschna isosceles*), Hamburg ("threatened odonate species"), and Thüringen (*C. mercuriale*, *C. ornatum*).] Address: Binot-Hafke, Margret, Bundesamt für Naturschutz, Fachgebiet 11.1 Zoologischer Artenschutz, Konstantinstr. 110, D-53179 Bonn, Germany

3479. Wain, B. (2003): A nice day out! Bill Wain in Oz. Dragonfly News 43: 20-21. (in English). [Report on observing *Petalura hesperia* south of Perth, Australia. A brief note on oviposition (?) of a ♀ *Petalura* sp. on a dark blue roof of a car is made.] Address: not stated

3480. Wallace, I. (2003): Late winter nymph of *Sympetrum fonscolombii* from N. Wales. Dragonfly news 43: 34. (in English). [Verbatim: "On 13.2.2001 I took a mature nymph of *S. fonscolombii* from a shallow, two year old pool constructed on the reclaimed pit heap at Point of Ayr Colliery (grid reference SJ12-83-). [...] The nymph is 17 mm long with wing pads stretching to the end of the 7th segment, and showing venation. It might have emerged successfully if not collected, but temperature data from the nearby Bidston Weather Observatory (available on the WWW) indicates that there was quite a severe cold spell at the start of March 2001, the most severe for the entire 2000/ 2001 winter, with several successive days of minimum temperatures lower than -2°C; a soil temperature data logger operated as part of studies on the Sandhill Rustic Moth at nearby Gronant, by Adrian Spalding also recorded sub-zero soil temperatures during that cold spell. Adrian Parr informs me that an adult was taken at Heysham on 30.6.2001, which as the crow flies is about 50 miles ac-

ross Liverpool Bay. Tantalisingly this could have been locally bred, but Adrian thinks it could also have been from an early spring 2001 migration. [...]"] Address: Wallace, I., Liverpool Museum, William Brown Street, Liverpool L3 8EN, UK. Ian.Wallace@nmgm.org

3481. Watanabe, M.; Mimura, Y. (2003): Population dynamics of *Mortonagrion hirosei* (Odonata: Coenagrionidae). International Journal of Odonatology 6(1): 65-78. (in English). ["The mark-and-recapture method was used to study the population dynamics of the endangered brackish water species, *Mortonagrion hirosei*, in a small reed community of an estuary in the warm-temperate zone of Japan. The flying season was from late May to early August. The age structure showed that newly emerged adults always stayed in the reed community and the maiden flight did not involve leaving the colony area. Although reed communities were abundant in the estuary, it appears possible that none or only very few of the individuals emigrated. Thus, both sexually immature and mature adults coexisted in the same reed community. The average distance covered by daily movements was 1.7 and 3.3 m for immature and mature ♂♂ respectively, which were longer than those for ♀♀. Since the average durations of the immature and reproductive periods were respectively about 5 and 30 days in both sexes, the individuals may have moved less than 110 m throughout their life span, which corresponds to twice the length of the habitat. The estimated daily number of adults in the community was about 200 in 2000 and 500 in 2001. As the population was isolated, the estimated input of new individuals into the population had to be the number of individuals emerging. Thus, the total number of adults in both years was estimated to be about 5,000 and 6,000 respectively." (Authors)] Address: Watanabe, M., Institute of Biological Sciences, University of Tsukuba, Tsukuba 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

3482. Weihrauch, F.; Weihrauch, S. (2003): Spring Odonata from Alentejo (Portugal), Andalusia and Extremadura (Spain). Opusc. zool.flumin. 207: 1-18. (in English) ["An annotated list of 25 species recorded on the wing or as exuviae during 2 journeys to SW Iberia in spring 1999 and 2001 is presented. 3 more species were recorded as larvae. Phenological data were compared with data from the literature, obtaining particularly noteworthy early records for *Gomphus simillimus*, *Cordulegaster boltonii*, *Brachythemis leucosticta*, and *Sympetrum striolatum* for the region. For most species recorded, additional notes on biology or an assessment of abundance and distribution in the region in spring are given. The status of *Paragomphus genei*, *Anax ephippiger*, *C. boltonii*, *Oxygastra curtisii*, *Macromia splendens*, *B. leucosticta*, *Sympetrum fonscolombii*, and *S. striolatum* is discussed. *Brachytron pratense* was not encountered at localities with former records given in the literature and the possible extinction of the outstanding population in the Goto Donana is apprehended."] (Authors) Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-mail: Florian.Weihrauch@t-online.de

3483. Wildermuth, H. (2003): Fortpflanzungsverhalten von *Somatochlora arctica* (Zetterstedt) (Anisoptera: Corduliidae). Odonatologica 32(1): 61-77. (in German with English summary). ["The reproductive behaviour in relation to structural habitat resources was studied at

mountain bogs of the Centra] Alps (Tyrol, Austria). The ♂♂ searched for mates at small clearings in coniferous forests where numerous scattered oviposition sites were hidden in dense vegetation, using 3 tactics: (1) they scanned the oviposition sites by slow flights at low height over large vegetated areas (scan flight). (2) they patrolled restricted areas with frequent hover stops while chasing any intruder (patrol flight), (3) they dived repeatedly into gaps of emergent vegetation, searching for ♀♀ close to the water (dive flights). 62% of the ♀♀ remained undiscovered by ♂♂. 11% fled successfully and 27% accepted copulation (n = 139). The copulation was always initiated in the air or on the ground when both partners plunged into the vegetation following a clash. Immediately after the take off and possibly after intra♂ sperm translocation the tandem assumed the wheel position. The pairs often circled over the clearings for several minutes and perched on sunlit branches of spruce or pine trees. 0.8-12 m above ground (mean 2.75 m. n = 20). During copulation that lasted 31-150 min (mean 85 min. n = 14) rhythmic pumping movements of the 6 basal abdominal segments with frequencies from 0.14 to 0.36 Hz were observed. Copulation terminated by disengagement of the genitalia, then the partners separated immediately or after a short tandem flight. Oviposition never followed directly upon copulation and always occurred unguarded. The oviposition sites were selected carefully at shallow puddles among emergent vegetation. Eggs were laid by touching soaked moss or turf mud with the tip of the abdomen during rhythmic dipping flight movements with mean frequency of 0.61 Hz. One oviposition bout lasted 1-3 min and featured an egg flow of 1.7-4.5 eggs per s. Ovipositing ♀♀ were sometimes successfully attacked by frogs (*Rana temporaria*). and ♂♂ were occasionally found in orb-webs of spiders (*Araneus* sp.), however, predation risk was low at rendez-votis sites. Sperm competition is discussed with respect to behaviour during copulation and to the morphology of ♂ and ♀ genitalia." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

3484. Willmann, R. (2003): Die phylogenetischen Beziehungen der Insecta: Offene Fragen und Probleme. Verh. Westd. Entomol. Tagung 2001: 1-64. (in German). [Compilation of current knowledge, questions, and problems on the phylogenetic relationships among insecta including the Odonata.] Address: Wittmann, R.,

Inst. Zoologie und Anthropologie, Univ. Göttingen, Berliner Str. 28, D-37073 Göttingen

3485. Worthen, W.B. (2003): Nested-subset structure of larval odonate assemblages in the Enoree River basin, USA. *International Journal of Odonatology* 6(1): 79-89. (in English). ["Communities have a nested-subset structure if the species found in species-poor assemblages are also found in progressively more species-rich assemblages. This nested-subset structure can be caused by differential colonization rates among species, differential extinction rates among species, or nested niche space. In this study, the assemblages of larval odonates in the Enoree River of South Carolina (USA) and nine of its tributaries were found to have statistically significant nested-subset structure. In addition, the degree of nestedness in these ten streams correlated with several chemical and physical variables. Nestedness was correlated with pH, turbidity, and concentrations of silica, bicarbonate, and calcium; suggesting that differential extinction in response to environmental stress may play a role in structuring these assemblages. However, nestedness also correlated with a crude measure of habitat homogeneity. Drainages with a heterogeneous mix of substrate types (cobbles and sand) maintained different sets of species from site to site, and had the lowest nestedness scores. Drainages with exclusively sandy substrates were dominated by burrowing species at all sites, and showed the strongest nested-subset patterns. As such, nested-subset structure in these assemblages is related to both chemical and physical parameters." (Author)] Address: Worthen, W. B., Dept of Biology, Furman University, Greenville, SC, USA, 29613. E-mail: worthen@furman.edu

3486. Zhou, W. (2003): *Macromia hamata* sp. nov. from Guizhou, China (Odonata: Corduliidae). *International Journal of Odonatology* 6(1): 91-93. (in English). [*M. hamata* (holotype ♂: 01 August 2001, Fanjingshan, Guizhou, China) is described and illustrated from a single ♂, deposited at the Zhejiang Museum of Natural History.] Address: Zhou Wenbao, Zhejiang Museum of Natural History, Jiaogonglu 71, Hangzhou 310012, China

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1997

- 3487.** Adamovic, Z.R.; Vijatov, S.T. (1997): Morphometric distinction of *Platycnemis pennipes nitidula* Brullé, 1832 from *P.p. pennipes* Pallas, 1771 (Odonata: Platycnemididae). *Acta entomol. serb.* 2(1/2): 61-75. (in English with Serbian summary). ["The statistical examination confirmed that the males and females of *P. p. nitidula* have significantly wider hind tibiae than the males and females of the nominate subspecies *P. p. pennipes*. The ratio: maximum width of hind tibia / length of median tibial spine of the males and females of *P.p. nitidula* are significantly larger than that of the nominate subspecies. Distribution of two subspecies was discussed." (Authors)] Address: Vijatov, S.T., Institute for Medical Research, P.O. Box 721, 11001 Beograd, Serbia
- 3488.** Elsner, O. (mit Beiträgen von Fischer-Leipold, O.; Meyer, N.; Reiser, B; Uhlenhaupt, H.; Weber, K.) (1997): Ökologische Untersuchungen zu Keupersandsteinbrüchen im Landkreis Haßberge. *Ber. naturforsch. Ges. Bamberg* 71: 69-154. (in German). [Bavaria, Germany; 7 quarries were surveyed for their flora and fauna; records of *Coenagrion hastulatum*, *Leucorrhinia dubia*, *Orthetrum brunneum*, *Sympetrum danae*, *S. flaveolum*, and *Cordulia aenea* are of some interest. Management measures are proposed.] Address: Elsner, O., Inst. für Vegetationsk. und Landschaftsökologie, Georg-Eger-Str. 1b, D-91334 Hemhofen/Zeckern, Germany
- 3489.** Hilfert, D.; Rüppell, G. (1997): Early morning oviposition of dragonflies with low temperatures for male avoidance (Odonata, Aeshnidae, Libellulidae). *Entomol. gen.* 21(3): 177-188. (in English with German summary). ["The relationship between oviposition by females and the beginning of male flight activity, on the one hand, and air temperature and time of day, on the other, was investigated in Northern Germany, in Southern France and in Japan. Females of some Anisoptera species, as females of *Orthetrum cancellatum*, *Aeshna cyanea*, and *A. mixta*, avoid further matings by appearing before the males at oviposition sites, when air temperature are still low. In contrast, the females of *Anax imperator* are able to defend themselves against males successfully. Females of the Aeshnidae in S-France and in Japan fly to oviposition with higher air temperatures than the females of Aeshnidae in N-Germany. In the Zygoptera examined here (*Ischnura elegans*, *Coenagrion puella*), there is no such male avoidance strategy involving oviposition at lower temperature to avoid males. Here the beginning of oviposition and male flight activity is determined by the mating system." (Authors)] Address: Rüppell, G. Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany
- 3490.** Jödicke, R. (1997): Die Verbreitung von *Sympetrum sinaiticum tarraconense* Jödicke (Odonata, Anisoptera: Libellulidae). *Opusc. zool. flum.* 155: 1-7. (in German, with English summary). ["A map is provided which demonstrates the occurrence of this Iberian taxon in the Mediterranean parts of Spain. 18 localities are compiled, ranging from Andalusia to the Pyrenees. There seems to be no recent contact with the nominate ssp. from northern Africa." (Author)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: r.joedicke@t-online.de
- 3491.** Prasad, M. (1997): Additions to the odonate fauna of Mizoram, northeastern India. *Opusc. zool. flumin.* 154: 7-10. (in English). [12 odonate species are added to the fauna of Mizoram, totalling the list of species to 44. Descriptive note on the following species are given: *Aciagrion borneense*, *Calicnemia miniata*, *C. eximia*, *Lestes dorothea*, *Caliphaea confusa*, *Anisopleura comes*, *Euphaea ochracea*, *Merogomphus martini*, and *Idionyx imbricata*.] Address: Prasad, M., Zool. Survey of India, M-Block, New Alipore, Calcutta - 700 053, India
- 3492.** Prasad, M. (1997): Further additions to the odonate fauna of Arunachal Pradesh, eastern India. *Opusc. zool. flum.* 154: 1-6. (in English). [21 species are added to the fauna of the state, totalling the odonate fauna of the Arunachal Pradesh to 77 species. Descriptive notes are provided for *Aciagrion olympicum*, *Ischnura rufostigma mildredae*, *Coelliccia renifera*, *Megalestes major*, *Onychogomphus risi*, *Orthetrum japonicum internum*, and *Sympetrum orientale*.] Address: Prasad, M., Zool. Survey of India, M-Block, New Alipore, Calcutta - 700 053, India
- 3493.** Tremblay, A.; Lucotte, M. (1997): Accumulation of total mercury and methyl mercury in insect larvae of hydroelectric reservoirs. *Can. J. Fish. Aquat. Sci.* 54: 832-841. (in English with French summary). ["Mean total mercury (Hg) and methyl mercury (MeHg) concentrations in insect larvae from hydroelectric reservoirs were 3-5 times (up to 10 times) higher than in their counterparts from natural lakes. Taxonomic differences, which may be related to feeding behavior, and substrate type (lake sediment or flooded soils) together explained a large part of the total variability of total Hg ($r^2 = 0.64$) and MeHg ($r^2 = 0.79$) concentrations in insects. MeHg concentrations in flooded soils increased from 0.3-2 ng Hg.g dry weight⁻¹ after 1-2 years of flooding to 15-2 ng Hg.g dry weight⁻¹ after 16 years of impound-

ment. Total Hg and MeHg concentrations in insect larvae followed a similar pattern, but only weak correlations of both total Hg and MeHg concentrations were found between flooded soils and insect larvae, suggesting that factors other than MeHg content of flooded soils also affect the accumulation of these compounds in insects. Our results indicate that suspended particulate matter eroded from flooded soils by wave and ice action and bacterial activity enhanced by the release of labile carbon and nutrients from the flooded soils may indirectly transfer MeHg from flooded soils to insect larvae." (Authors) Mercury concentration in Odonata is presented in several tables and graphs.] Address: Tremblay, A., Chaire de recherche en environnement, Université du Québec à Montréal, C.P. 8888, succursale Centre-Ville, Montréal, QC H3C 3P8, Canada. E-mail: tremblaa@envir.hydro.qc.ca

3494. Vizslán, T.; Pingitzer, B. (1997): Adatok Magyarország szitakötő - faunájához (Odonata) II. Folia hist. nat. Mus. matraensis 22: 99-108. (in Hungarian with brief English summary) [43 species from 94 Hungarian localities are documented.] Address: Vizslán, T., Kitabel P. u. 32/C. Fru 2, HU-9400 Sopron, Hungaria

3495. Wong, A.; McQueen, D.J.; Williams, D.D.; Demers, E. (1997): Transfer of mercury from benthic invertebrates to fishes in lakes with contrasting fish community structures. Can. J. Fish. Aquat. Sci. 54: 1320-1330. (in English with French summary). ["We examined the flow of mercury (Hg) from benthic invertebrates to fishes in lakes with contrasting fish community structure. The study was carried out in two whole lakes in south-central Ontario in 1992. Both were remote from direct sources of contamination and were chosen because of their physical and chemical similarities. Although the fish communities in the two lakes were qualitatively similar, the total number of fishes in Ranger Lake was an order of magnitude smaller than that in Mouse Lake. As a result of the lower net predation from benthivorous fishes, documented in earlier studies, Ranger Lake benthic invertebrate populations were significantly higher. However, benthic invertebrate taxa in Mouse Lake were generally larger and had higher Hg concentrations. This was partly attributed to the stunted growth of Mouse Lake fishes, which did not allow them to prey on larger benthos as a result of gape limitations. Despite the lower Hg concentrations in Ranger Lake benthos, total benthic invertebrate Hg pools were higher in this lake as a result of its higher total benthic invertebrate biomass. However, the transfer of total Hg from benthic invertebrates to fishes was higher in Mouse Lake due to the higher consumption rates of benthivorous fishes." (Authors) Data of biomasses, mean individual wet mass, Hg concentration, and mean Hg pool for "Odonata" are presented in tables.] Address: Wong, A.H.K., Division of Life Sciences, University of Toronto at Scarborough, 1265 Military Trail, Scarborough, ON M1C 1A4, Canada. E-mail: alwong@lakc.scar.utoronto.ca

1998

3496. Faton, J.M. (1998): Les libellules du Tricastin. Le Courrier des Epines drômoises 85: 12-15. (in French). [Tricastin (44.35N 4.76E) is situated in the Rhône-Alpes-region in France. The author outlines so-

me records of faunistic interest, e.g. *Coenagrion mercuriale*, *Oxygastra curtisii*, *Sympetrum depressiusculum*, and *S. pedemontanum*. Some focus is set on the development of two newly created water bodies south of the nature reserve "L'Étang Saint-Louis" near Suze-la-Rousse; a checklist of 33 odonate species is documented.] Address: Faton, J.-M., Réserve Naturelle des Ramières, les Garis, F-26120 La Baume Cornillane, France. E-mail: Fatonjm@aol.com

3497. Gottschalk, H.-J. (1998): Beitrag zur Odonaten-Fauna im Niederungsgebiet der Nebel. Naturschutzarbeit in Mecklenburg-Vorpommern 41(1/2): 46-50. (in German). [Mecklenburg-Vorpommern, Germany; between 1992 and 1994, 36 odonate species were recorded.] Address: not stated

3498. Ketcheniev, H.A.; Haritonov, Yu. (1998): Identification key for the dragonflies of the Caucasus. Karbaidino-Balkarskiy University, Nal'chik. ISBN 5-7558-0017-0. 118 pp. (in Russian). [This identification key includes both imagines (focus) and larvae. The species in some cases are briefly commented. Some general information on Odonata and a bibliography comprising of 74 titles are added too.] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia

3499. Siva-Jothy, M.T.; Hadrys, H. (1998): A role of molecular biology in testing ideas about cryptic female choice. In: R. DeSalle & B. Schierwater (Eds.): Molecular approaches to ecology and evolution. Birkhäuser. Basel: 37-53. (in English). ["If cryptic female choice exists, observations on mating behaviour will not reflect the actual patterns of paternity. Genetic profiling techniques are needed to identify patterns of paternity (and sperm storage) that deviate from expectations based on behavioural observations. Our chapter addresses this problem in two parts. The first provides a critical review of the concept of cryptic female choice leading to a set of criteria required to demonstrate its occurrence. Second, we explore the repertoire of molecular methods available to answer certain questions about cryptic female choice in insects. The potential and limitations of polymerase chain reaction-based single locus and multilocus DNA fingerprint techniques are discussed along with the different options of analysing the data. Two case studies illustrate that sperm storage and usage in odonates might enable females to control paternity." (Authors)] Address: Siva-Jothy, M.T., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK. E-mail: m.siva-jothy@sheffield.ac.uk

3500. Wain, W.H.; Wain, C.B. (1998): Observations on the Odonata of Silhouette, Seychelles archipelago. Phelsuma 6: 27-31. (in English). [Between 17 to 24th Nov. 1997, 14 odonate species have been recorded from Silhouette. The species are documented locality-wise and discussed in detail.] Address: Wain, W.H. & C.B., The Haywain, Hollywater Road, Bordon, Hants, GU35 OAD, United Kingdom

1999

3501. Brooks, S.J. (1999): Odonata: the dragonflies and damselflies (45 species in 9 families). In: Barnard,

P.C. (Ed.): Identifying British insects and arachnids. An annotated bibliography of key words: 30-32. (in English). [S. Brooks briefly introduces into the order, and lists and comments on 9 books covering Odonata.] Address: Brooks, S.J., Entomology, The Natural History Museum, Cromwell Road, London, SW7 5BD, UK

3502. Goldstein, M.L.; Bloom, P.H.; Sarasola, J.H.; Lacher, T.E. (1999): Post-migration weight gain of Swainson's Hawks in Argentina. *Wilson Bull.* 111(3): 428-432. (in English). ["Whether hawks forage or fast en route to Argentina, or whether specific stopover habitats are regularly used is not known. The extent of predation on airborne dragonflies and other flying insects during migration is also unknown. Nevertheless, if migrating hawks used only stored fat they might arrive in the pampas in poor condition. Hawks have been reported arriving in Argentina in such weak condition that they were picked up by hand. None of these birds, however, were checked for contaminants." For more details on Swainson's Hawk predation on dragonflies, see: Jaramillo, A. (1995): Swainson's hawks and dragonflies. *Argia* 7(4): 3, Jaramillo, A. (1993): Wintering Swainson's hawks in Argentina: Food and age segregation. *Condor* 95: 475-479, and Rudolph, D.C.; Fisher, C.D. (1993): Swainson's hawk predation on dragonflies in Argentina. *Wilson Bulletin* 105: 365-366.] Address: Goldstein, M.L., Texas A&M Univ., Dept. of Wildlife and Fisheries Sciences, 210 Nagle Hall, College Station, TX 77843-2258. E-mail: mgoldstein@tamu.edu

3503. Kano, K.; Miyahata, T. (1999): Evening foraging and thermal behavior in a male of *Trithemis aurora* (Burmeister). *Nature & Insects* 36(11): 32. (in Japanese). ["We sighted evening foraging and thermal behavior in a male of *Trithemis aurora* (Burmeister). We happened to see an individual of *Trithemis aurora* perching on a tip of stem of grass, of which height was 1.6 meter, at a foot path between fallow rice paddies at Oyasu, Kunigami-gun, Okinawa Prefecture in the evening of July 1, 2001. The place is not a suitable habitat of the dragonfly usually, and I aimed my camera at the dragonfly, that raised its abdomen upward. It often took off for preying small insects, and returned to the same tip of the grass, and took often obelisk posture to exposure its body to the setting sun. There were several tall grasses near the perch, and when the perch was shaded, the dragonfly changed its perch to the perch in the sunshine and took the same posture. In the hot daytime dragonflies usually take obelisk posture for avoidance of rising body temperature, however this time, the behavior was for raising body temperature in the cool evening. We stayed there from 6:30 to 7:20 p.m., L, and when the sun set, the dragonfly flew away for roosting." (Taken from the translation of Naoya Ishizawa in *Digest of Japanese Odonatological short Communications* 12).] Address: Miyahata, T., 2: 9-20-9 mitsumata-cho, Maebashi City, Gunma Pref., 371-0018, Japan

3504. Kano, K. (1999): Morning and evening swarms in *Chlorogomphus brunneus brunneus* Oguma near the seashore. *Yosegaki* 102: 40. (in Japanese). [Swarming behaviour - in most cases - of females is described in detail. In general, the swarms are feeding aggregations, in a few cases seizures of females by a male was observed. (more details can be taken from the translation of Naoya Ishizawa in *Digest of Japanese Odonatological short Communications* 12).] Address: Kano, K., 5-19-

17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3505. Ram, R.; Prasad, M. (1999): On the collection of Odonata from Arunachal Pradesh, India. *Rec. zool. Surv. India* 97: 113-132. (in English). [92 species and subspecies from Arunachal Pradesh, NE India are checklisted and commented in detail with focus on the species distribution. 15 species are new stated records. Remarks on morphology of *Aciagrion pallidum* Selys 1891 and *Ceriagrion olivaceum* Laidlaw, 1914 are made.] Address: Prasad, M.; Zool. Surv. India, M-Block, New Alipore, Calcutta-700053, India

3506. Sabarth, A. (1999): Bedeutung von Substrat und Versandung für die Verteilung des Makrozoobenthos in naturnahen Heidebächen. *Dissertation, TU Braunschweig*: 98 pp. (in German). [The macrozoobenthos of three sand bottomed streams in the Lüneburger Heide (Niedersachsen, Germany) were surveyed with special emphasis on the habitat choice of the species in different sediment types, submerged snags, and alder roots. (Covering with) sand sediments was one of the most important factors to explain the (low) abundance of species. *Calopteryx splendens*, *C. virgo*, *Cordulegaster boltonii*, and *Ophiogomphus cecilia* have been recorded at the sampling sites. *O. cecilia* is vulnerable against sand sediment cover, and its abundance can be explained by the depth of cumulated sand sediment.] Address: not stated; Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

2000

3507. Bach, L. (2000): Auswirkungen von Revitalisierungsmaßnahmen an dem Heidebach Ise auf dessen Libellenfauna. *Angewandte Landschaftsökologie* 37: 267-270. (in German with English summary). [Niedersachsen, Germany; monitoring the effects of revitalisation effects on the odonate fauna between 1991 and 1999, it was found that rheophilous species were favoured significantly; this refers especially to *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Calopteryx splendens*, and *Platycnemis pennipes*. In total, 36 odonate species could be observed, of which 18 regularly were autochthonous. Year by year, larvae of rheophilous species spread over more stretches of the river, and adults could be observed in greater abundances.] Address: Bach, L., Hamfhofsweg 125b, D-28357 Bremen, Germany. E-mail: lotharbach@aol.com

3508. Bass, D. (2000): A preliminary study of aquatic macroinvertebrates from two springs in the Pontotoc Ridge Nature Preserve, Oklahoma. *Proceedings of the Oklahoma Academy of Science* 80: 105-109. (in English). [Little is known regarding the spring invertebrate fauna in Oklahoma, USA. The purpose of this investigation was to collect baseline data concerning the physicochemical conditions of the water and to determine distributions of macroinvertebrates in spring-brooks resulting from 2 springs (Pot Spring (34.4973°N, 96.6022°W) and Coal Creek Cave Spring (34.5247°N, 96.6014°W)) emerging on the property. *Argia* sp., *Cordulegaster* sp., *Hetaerina* sp., and *Lestes* sp. are listed in a table and classified according Surber Net Sample

Number and downstream distance from the spring.] Address: Bass, D., Biology Dept, University of Central Oklahoma, Edmond, Oklahoma 73034, USA.

3509. Buczynski, P.; Czachorowski, S.; Pakulnicka, J. (2000): Do small man-made water bodies can be a substitute habitat for the lake littoral benthos? In: Cerbin, S. (Ed.): Bottom Fauna of lakes. Materials of the VII Polish Benthological Workshop, Jezioro Wielkopolski National Park: 45-47. (in Polish). [The Odonata, Trichoptera, and Coleoptera of some gravel and sand pits near Olsztyn, Lublin-region, Poland were investigated. Emphasis is given to the fauna of different stages of vegetation succession. A total of 37 odonate species were found, but not details are given. A German translation of the paper is available from P. Buczynski.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3510. Buczynski, P. (2000): Jak larwy wazek (Odonata) przezywaja wysychanie drobnych zbiorników? In: Czczuga, B. & J.L. Rybak (Eds): XVIII Zjazd hydrobiologów Polskich w Białymstoku. Szacunek dla wody. Materiały zjazdowe. 4-8. IX 2000. Polskie Towarzystwo hydrobiologiczne zakład biologii ogólnej am w Białymstoku: 33-34. (in Polish). [How do larvae of Odonata survive in drying out pools? Records on *Libellula depressa* and *Ischnura pumilio* - characteristic species of temporary water bodies - are referred: The larvae search successively for the most moisty places; shortly before the pools are totally drying out, they crawl in fissures. If it shouldn't rain, these specimens would die too. Larvae of *Coenagrion puella* and *Libellula quadrimaculata* protected themselves under a layer of *Lemna minor*, while *Aeshna cyanea* was found under leaves on the bottom of a pool. Here, they were able to survive a period of 3-4 weeks of drying out. A German translation of the abstract is available from P. Buczynski.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3511. Clausnitzer, V. (2000): Interspecific competition in rainforest dragonflies (Tetratheminae, Libellulidae). Poster, 13. Jahrestagung der Deutschen Gesellschaft für Tropenökologie, 1.-3. März 2000 in Würzburg; <http://www.biozentrum.uni-wuerzburg.de/zoo3/gtoe/>: 1 pp. (in English). [Verbatim: It is generally hold that "displays of closely related species are clearly distinct so as to minimize the chance of confusion between species" (Krebs & Davies, 1993, p. 363). The similarity in morphology, colouring and behaviour of sympatric rainforest Tetratheminae does not fit this considerations. The territorial behaviour of two *Notiothemis* and one *Tetrathemis* species was studied in a West Kenyan rainforest. Males establish territories at small pools and keep them for several days. The territories are visited by females either for egg-laying or mating; males would approach any female and try to copulate, species determination being tactile only. Within *Notiothemis* inter- and intraspecific competition for the pools is nearly identical, *Tetrathemis* is inferior to the former. The number of territorial males depends on the pool circumference and vegetation cover; the number of territorial *Tetrathemis* being significantly correlated on presence or absence of *Notiothemis*. For both *Notiothemis* species the territory size is larger than for *Tetrathemis*. Neither behaviour nor colouring shows reduction of am-

biguity between the species. The inter- and intraspecific aggression is very similar; species recognition is by contact only. To minimise disturbance for approaching females the territorial male keeps all potential competitors away. In West African rainforests even more species of the Tetratheminae inhabit the same habitats, all showing very similar behavioural and colouring patterns. It remains unclear how such different species have evolved. Literature: Krebs, J. R. & Davies, N. B. (1993): An introduction to behavioural ecology. 420 pp. Blackwell Scientific Publications, Oxford.] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle / Saale, Germany. E-mail: violacl@gmx.de

3512. Czachorowski, S.; Buczynski, P.; Majewski, T.; Malek, J.; Monko, M.; Rudowska, K.; Rykowski, D. (2000): Wstępne badania chruscików i wazek okolic Górowa Iławeckiego (Północna Polska). In: Czczuga, B. & J.L. Rybak (Eds): XVIII Zjazd hydrobiologów Polskich w Białymstoku. Szacunek dla wody. Materiały zjazdowe. 4-8. IX 2000. Polskie Towarzystwo hydrobiologiczne zakład biologii ogólnej am w Białymstoku: 40-41. (in Polish). [Trichoptera and Odonata of the environs of Górowo Iławeckie (NE Poland): In the framework of a monitoring of anthropogen caused changes in the fauna of water bodies, in May 1998 and in July 1999, 30 odonate species including *Calopteryx virgo*, *Libellula fulva*, *Leucorrhinia dubia*, *L. albifrons*, and *L. pectoralis* were recorded.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3513. Czerniawska-Kusza, I.; Kochanowski, T. (2000): Characteristics of a benthos in chalk-marl excavations in the Opole city. In: Cerbin, S. (Ed.): Bottom Fauna of lakes. Materials of the VII Polish Benthological Workshop, Jezioro Wielkopolski National Park: 77-78. (in Polish). [Poland; the water bodies are dominated by a submerged vegetation and *Stratiotes aloides*. Odonata have been sampled, but no details are given] Address: not stated

3514. Domek, P.; Joniak, T. (2000): Benthic fauna and water trophy in three dystrophic lakes in the Drawa National Park (northern Poland). In: Cerbin, S. (Ed.): Bottom Fauna of lakes. Materials of the VII Polish Benthological Workshop, Jezioro Wielkopolski National Park: 81-84. (in Polish). [Poland; *Enallagma cyathigerum*, *Ischnura elegans*, *Pyrrhosoma nymphula*, *Cordulia aenea*, and *Leucorrhinia* sp. are listed in a table for two of the three investigated lakes.] Address: Domek, P.; Joniak, T., Zakład Ochrony Wód, Uniwersytet im A. Mickiewicza, ul. Drzymaly 24, PL-60-613 Poznan, Poland

3515. Emilyamma, K.G.; Radha-Krishnan, C. (2000): Odonata (Insecta) of Parambikulam Wildlife Sanctuary, Kerala, India. *Rec. zool. Surv. India* 98(1): 157-167. (in English). [Palakka district of Kerala, India; the paper combines checklisting the Odonata of the wildlife sanctuary by providing an identification key of the known species (n=25).] Address: Emilyamma, K.G., Western Ghats Field Res. Stn, Zool. Surv. India, Calicut-673002, India

3516. Henson, S. (2000): First & last dates for 1998 & 1999. *Dragonfly news* 37: 14-16. (in English). [Phenological data of the Odonata of UK are listed in a table.] Address: Henson, S., 10 Shotesham Road, Poringland, Norwich NR14 7LE, UK

- 3517.** Kriegel, P. (2000): I love Dragonflies. *Dragonfly news* 38: 11. (in English). [Dragonfly poem.] Address: Kriegel, Patricia, 2600 SW 80th, Oklahoma City, Oklahoma 73159, USA
- 3518.** Lewandowski, K. (2000): Wazki (Odonata) drobnych zbiorników wodnych. In: Czeczuga, B. & J.L. Rybak (Eds): XVIII Zjazd hydrobiologów Polskich w Białymstoku. Szacunek dla wody. Materiały zjazdowe. 4-8. IX 2000. Polskie Towarzystwo hydrobiologiczne zakład biologii ogólnej am w Białymstoku: 151-152. (in Polish). [Odonata of small pools. Between 1986 and 1990, in the environs of Olsztyn, Lomza, and in the marshes of Biebrza, Poland, Odonata were collected. Some examples are outlined to document specific abundances in the very water-bodies, and the frequency of occurrence of selected species in the region. Some species of special interest are highlighted. A German translation of the abstract is available from P. Buczynski.] Address: Lewandowski, K., Katedra Ekologii i Ochrony Środowiska, Uniwersytet Warmińsko-Mazurski w Olsztynie, Poland
- 3519.** Lounaci, A.; Brosse, S.; Ait Mouloud, S.; Lounaci-Daoudi, D.; Mebarki, N.; Thomas, A. (2000): Current knowledge of benthic invertebrate diversity in an Algerian stream: a species check-list of the Sebaou river basin (Tizi-Ouzou). *Bull. Soc. Hist. nat. Toulouse* 136: 43-55. (in English, with French summary). [Between 1984 and 1996, 23 sampling sites along the Sébaou River and its tributaries (N Algeria), covering a large range of altitudinal, discharge, and topographic features, were surveyed for their fauna. *Onychogomphus costae* and *O. uncatulus* are recorded from the Aissi Wadi. The latter species is restricted to the altitudes below 140 m.] Address: Thomas, A., CESAC, UMR 5576 CNRS, Univ. Paul Sabatier, 118 rue de Narbonne, F-31062 Toulouse, France
- 3520.** Machado, A.B.M. (2000): Studies on neotropical Protoneuridae, 10. *Forcepsioneura lucia* sp. n. from Parque Estadual Rola Moça, Minas Gerais, Brazil (Odonata, Zygoptera). *Bolm Mus. Biol. Prof. Mello-Leitao (N.S.)* 11/12: 127-134. (in English with Portuguese summary). [The new species is described, illustrated, and compared with *F. garrisoni*, *R. itatiaiae*, and *F. sancta*. Holotype ♂, allotype ♀, 7 paratypes: Brazil, Minas Gerais, Ibirite, alt. 1000 m, various dates: Oct. / Dec. - 1980 / 1984. Some notes on ecology (it is possible that the larvae live on humid leaf litter on the forest floor) and conservation are provided. The ♂♂ of the genus - comprising of currently known five species - are keyed.] Address: Machado, A.B.M., Depto Zool.-Ent., Inst. Cienc. Biol., UEMG, Caixa Postal 256, BR-31270-901 Minas Gerais, MG, Brasil
- 3521.** Meadows, D.W. (2000): Effect of bison trampling on aquatic invertebrates in streams on Antelope Island, Utah. The Ecological Society of America, 85th Annual meeting August 6-10, 2000 Snowbird, Utah, Document: LAU-3-56-31 WA-3-84-2: (in English). [Verbatim: Trampling of riparian habitats by large herbivores can have significant impacts on aquatic communities. I examined numerous environmental variables and aquatic invertebrate community composition from paired trampled and untrampled sites in eight first or second order streams on Antelope Island, in the Great Salt Lake, Utah. Percent mud and sand substrates were more common in trampled sites in most streams, while percentage cover of aquatic vegetation was lower in trampled sites. Of the twenty taxa common enough to be analyzed statistically, five showed no difference in untrampled vs trampled areas, seven had consistent differences across streams, and eight had stream x trampling level interactions. Annelid worms, ostracods, the beetle *Helophorus*, and the snail *Physella* were more common in trampled areas while the odonate *Argia*, the beetle *Agabus*, the snail *Stagnicola*, the dipteran *Dixa*, hydrophilid beetles, limnephilid caddisflies, and simuliid and chironomid flies were more common in untrampled areas. These results can mostly be explained by direct trampling effects and indirect interactions of bison trampling affecting environmental features and substrate composition. These results suggest the need for managers and ranchers to control access of bison to riparian zones as is necessary for cows and sheep, even though bison wander more and spend much less total time in riparian zones.] Address: Meadows, D.W., Weber State University, Ogden, UT 84408 USA
- 3522.** Merrill, I. (2000): Scotland 2000 - in search of four-winged wonders and much, much more. *Dragonfly news* 38: 12-15. (in English). [Report on a trip to Scotland, UK from 29. June - 4. July 2000. Some emphasis is given to birds and dragonflies.] Address: Merrill, I., 20 Ashford Road, Whitwick, Coalville, Leics., LE67 5GD, UK
- 3523.** Mielewczyk, S. (2000): Larvae of dragonflies (Odonata) of the Great Poland National Park and changes in their composition. In: Cerbin, S. (Ed.): *Bottom Fauna of lakes. Materials of the VII Polish Benthological Workshop, Jezioro Wielkopolski National Park*: 13-17. (in Polish). [The odonate fauna of different habitats within the borders of the National Park is briefly outlined. Emphasis is given to historical data.] Address: Mielewczyk, S., Polska Akademia Nauk, Zakład Badan Środowiska Rolniczego i Lesnego, ul. Bukowska 19, PL-60-809 Poznan, Poland
- 3524.** Moore, N. (2000): Applying IUCN criteria to assess threats to British dragonflies. *Dragonfly news* 37: 19-20. (in English). [Conservation actions are more urgently required for some species than others, priorities have to be worked out so that the limited manpower and financial resources can be used to best effect. 20 odonate species are classified according to the criteria to assess the degree of threat of extinction in UK.] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom
- 3525.** Parr, A. (2000): Dragonfly news for 1999 - Migrants & vagrants. *Dragonfly news* 37: 12-13. (in English). [UK; *Erythromma viridulum*, *Anax parthenope*, *Pachydiplax longipennis*, *Sympetrum fonscolombii*, *S. flaveolum*] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 3526.** Perrin, V.; Clarke, D. (2000): Can BAPs benefit dragonflies? - experiences from Cumbria & Cambridgeshire. *Dragonfly news* 37: 17-18. (in English). [Biodiversity Action Plans (BAP) aim to preserve species of special concern under an EU-level (*Coenagrion mercuriale*) or a more national or regional context. In Cumbria BAP-drafts for *Coenagrion pulchellum* and *Leucorrhinia dubia* have been written. In Cambridgeshire *Libellula fulva* is a candidate for an BAP; the status of *Platycnemis pennipes*, *Coenagrion pulchellum*, and *Brachytron pra-*

tense should be monitored.] Address: Perrin, V., 13 Pettitts lane, Dry Drayton, Cambridgeshire CB3 8BT, UK. E-mail: valperrin@dial.pipex.com

3527. Perrin, V. (2000): Dragonfly news for 1999 – Resident's round-up. *Dragonfly news* 37: 11-12. (in English). [UK; phenological data of *Pyrrhosoma nymphula*, *Erythromma najas*, *Coenagrion pulchellum*, *Brachytron pratense*, *Aeshna mixta*, and *Sympetrum striolatum* from different British regions are documented. The current status of *Aeshna caerulea*, *Somatochlora arctica*, and *Leucorrhinia dubia* is briefly exemplified. "Mobbing" behaviour of *Calopteryx splendens* against an ovipositing female of *Anax imperator* is described. Mixed pairing between *Libellula fulva* and *L. quadrimaculata* is reported. Northward range extension of *Sympetrum sanguineum* is outlined.] Address: Perrin, V., 13 Pettitts lane, Dry Drayton, Cambridgeshire CB3 8BT, UK. E-mail: valperrin@dial.pipex.com

3528. Pintor, L.M.; Soluk, D.A. (2000): Understanding the interaction of crayfish and the Hine's Emerald Dragonfly larvae coexisting in crayfish burrows. The Ecological Society of America, 85th Annual meeting August 6-10, 2000 Snowbird, Utah, Document: LAU-3-56-31: (in English). [Verbatim: Biotic interactions, such as predation, can have significant influences on population dynamics, community structure, and the behaviors of organisms. Odonates are a group of organisms in which predation has been a major factor shaping the observed life histories and behaviors. While most studies have focused on the effect of vertebrate fish predators and intraguild predation, crayfish are another predator present in many aquatic systems that can have an effect on larval Odonate populations. Habitat duration can also influence larval Odonate communities by limiting the species that can maintain populations in variable environments. It can also effect the strength of biotic interactions between those organisms that persist. *Somatochlora hineana* inhabits small, ephemeral streamlets that experience seasonal drying; a situation intolerable for many larval Odonates. Field studies indicate that larvae use active crayfish burrows to survive through periods of drought. Crayfish are predators of dragonfly larvae, which raises the question of how these organisms coexist in burrows. To resist predation, *S. hineana* larvae may simply be distasteful or crayfish may fail to recognize them as prey. Lab experiments were conducted to establish whether a direct predator-prey relationship exists between *S. hineana* larvae and the crayfish, *Cambarus diogenes*. Results show that *C. diogenes* readily consume *S. hineana* and other dragonfly larvae, and are only limited by the size of the larvae relative to its own size. To further investigate predation by crayfish inside burrows and whether larvae avoid active burrows, we conducted a field exclusion experiment manipulating the presence of crayfish in burrows. Preliminary results of a repeated-measures analysis shows no significant difference between treatments ($p=0.87$), indicating that the presence of crayfish has no effect on *S. hineana* larval densities within burrows. This suggests either that larvae may not be able to discriminate between burrows with crayfish present/absent, or that the cost may not be high, relative to the benefits attained by inhabiting the burrow. *S. hineana* larvae probably exhibit unique behaviors that allow them to avoid predation by crayfish within burrows.] Address: Pintor, L.M.; Soluk, D.A., University of Illinois, Urbana-Champaign, Champaign, IL 61820, USA

3529. Ram, R.; Chandra, K.; Yadav, K. (2000): Studies on the Odonata fauna of Andaman and Nicobar Islands. *Rec. zool. Surv. India* 98(3): 25-60. (in English). [India; 58 species are listed resp. documented in detail, keyed, and discussed, incl. 8 species that are new to the fauna of the Archipelago, of which *Cratilla metallica* is for the first time recorded from the Indian territory. Address: Ram, R., Zool. Surv. India, M-Block, New Alipore, Calcutta-700053, India

3530. Rasch, P.; Trapp, M. Ein Fließgewässer im urbanen Umfeld. Analyse des ökologischen Zustandes des unteren Belmer Baches (Osnabrück, Niedersachsen) anhand des Makrozoobenthos. *Osnabrücker Naturwissenschaftliche Mitteilungen* 28: 167-190. (in German with English summary). ["The organic pollution of the lower Belmer Bach can be attributed to its agriculturally intensively used drainage area. Already before entering the urbanized region, the macrozoobenthos is poor in species due to saprobic pollution and the structural poverty of the waterbed and the banks. When comparing the species numbers of a reference sampling plot located before the urban region and a sampling plot situated within this region, hardly any differences could be ascertained. The longitudinal isolation and the rise in temperature of app. 1 °C in the urban brook section negatively influence its fauna; this, however, is compensated by the varied riparian vegetation and the greater structural diversity of the waterbed due to hydraulic engineering. A rise in temperature of app. 5 °C a continuous inflow of suspended matter from a sewageworks reduce the macrozoobenthos to few dominant taxa." (Authors) *Calopteryx splendens*, *Ischnura elegans*, *Letes sponsa*, *Chalcolestes viridis*, and *Zygoptera* are listed represented samples from May 1996, and May, July, and Sept. 1997.] Address: Rasch, P., Fachgebiet Ökologie, FB Biologie/Chemie, Universität Osnabrück, Barbarastr. 11, D-49069 Osnabrück, Germany

3531. Rutkowski, D.H. (2000): Dziemna i nocna zawartosc przewodów pokarmowych larw wazek równokrzydłych (Odonata, Zygoptera) w litoralu jeziora Kuc. In: Czeczuga, B. & J.L. Rybak (Eds): XVIII Zjazd hydrobiologów Polskich w Białymstoku. Szacunek dla wody. Materiały zjazdowe. 4-8. IX 2000. Polskie Towarzystwo hydrobiologiczne zakład biologii ogólnej am w Białymstoku: 226. (in Polish). [Daily site change in preying *Zygoptera* larvae in the litoral of lake Kuc. The diurnal and nocturnal dwellings of larval *Enallagma cyathigerum*, *Erythromma najas*, and *Ischnura elegans* were studied in a mesotrophic lake. During day time, Chironomidae and Ephemeroptera dominated as prey, while during night Cladocera were preferred. Preyed biomass in night was higher than on day. This is explained by a compromise between avoiding being preyed by fishes and searching for prey.] Address: Rutkowski, D.H., Zakład Hydrobiologii, Instytut Zoologii, Uniwersytet Warszawski, Poland

3532. Stav; G.; Kotler, B.P.; Blaustein, L. (2000): Direct and indirect effects of the predatory dragonfly nymph *Anax imperator* on green toad *Bufo viridis* tadpoles. The Ecological Society of America, 85th Annual Meeting, August 6-10, 2000 Snowbird, Utah, This abstract is being presented at: 9:00 AM in session: Oral Session #38: Amphibian Ecology, Document: GIL-3-56-2: (in English). [Verbatim: We conducted an artificial pool experiment to assess effects of the predatory dragonfly nymph *Anax imperator* on green toad *Bufo viridis*

tadpoles. We ran three treatments (with six replicate pools each): (1) free *Anax* (direct effects on mortality); (2) caged *Anax* (indirect effects on behavior, development and individual growth rates); and (3) control (no *Anax*). We added 15 liters (10 cm depth) of water to each pool. After five days, we added 30 three-day old tadpoles, all hatched from the same egg string. Caged *Anax* were fed with tadpoles three times a week. The experiment ran from 11 April through 4 August. Free *Anax* eliminated 90% of the tadpoles within three days and all of them within six days. Caged *Anax* had no effect on the spatial distribution of tadpoles. However, caged *Anax* caused tadpoles to metamorphose earlier to a larger size (both statistically significant), and to obtain lighter color. This study shows that *Anax* has a very strong direct effect on the population of *Bufo* tadpoles. Future experiments will be designed to determine whether the prey responses to the predator are reactions to predation or the result of extra organic matter in this treatment (consequence of *Anax* feeding and secretion).] Address: Stav, G., Ben-Gurion University of the Negev, Sede-Boqer Campus, 84990, Israel

3533. Sudhaus, W.; Peters, G.; Balke, M.; Manegold, A.; Schubert, P. (2000): Die Fauna in Berlin und Umgebung: Veränderungen und Trends. Sitzungsber. Gesell. naturforsch. Freunde Berlin (N.F.) 39: 75-87. (in German). [The paper compiles recent range changes of different faunal groups with special emphasis on the region around Berlin, Germany. Günther Peters contributes several odonatological examples referring to *Symptetrum pedemontanum*, *Stylurus flavipes*, *Anax imperator*, *A. parthenope*, and *A. ephippiger*.] Address: Peters, G., Museum für Naturkunde, Institut für Systematische Zoologie, Invalidenstraße 43, D-10115 Berlin, Germany. E-mail: thekla.kauffmann@rz.hu-berlin.de

3534. Zawal, A.; Mrowinski, P. (2000): Zsynchronizowany wylot *Cordulia aenea* (Linnaeus, 1758). In: Czeczuga, B. & J.L. Rybak (Eds): XVIII Zjazd hydrobiologów Polskich w Białymstoku. Szacunek dla wody. Materiały zjazdowe. 4-8. IX 2000. Polskie Towarzystwo hydrobiologiczne zakład biologii ogólnej am w Białymstoku: 300. (in Polish). [Synchronized emerging of larvae of *Cordulia aenea*. Between 10.00 to 17.00 h, along a 50m² great stretch of a *Carex*-belt, 48 specimens emerged at 02/05/1999. The process of emerging lasted in the mean app. 5 hours. Emerging was induced by a high water temperatures in the shallow zone of the pool from 9°C at 9.00 h to 22°C at 16.00 h. The day prior and after emerging was overcast with low water temperatures; no emerging could be observed.] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Waska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

2001

3535. Adams, M.J.; Pearl, C.A.; Bury, R.B.; Nebeker, A.V. (2001): Introduced fish increases survival of introduced bullfrogs. Ecological Society of America Annual Meeting, 86th Annual Meeting in Madison, WI, August 2001: 41. (in English). [Verbatim: We hypothesized that nonnative bluegill (*Lepomis macrochirus*) are facilitating the survival of nonnative bullfrogs (*Rana catesbeiana*)

through an indirect effect mediated by dragonfly larvae (Aeshnidae) in western North America. Aeshnid larvae were capable of high predation rates on bullfrog larvae in laboratory experiments and reduced survival to zero in field enclosures with either native fish (*Richardsonius balteatus*) or no fish. Adding bluegill increased survival of bullfrog larvae from zero to 20% when aeshnids were present but had no effect when aeshnids were absent. Field surveys at 57 permanent ponds in Oregon and Washington revealed higher bullfrog abundance and lower predaceous macroinvertebrate abundance when nonnative fish were present but this pattern was weak. We conclude that bluegill facilitate survival of bullfrog larvae in PNW ponds but field surveys suggest that other factors may have more important effects on bullfrog distribution and abundance.] Address: Adams, M. J.; Pearl, C.A.; Bury, R.B.; Nebeker, A.V., USGS Forest & Rangeland Ecosystem Science Center, Corvallis, OR 97330 US Environmental Protection Agency, Corvallis, OR 97330, USA

3536. Anonymus (2001): Bienenfresser überbringt seiner Partnerin eine Libelle. Kosmos & Natur, Juni 2001: 6-7. (in German). [The courtship behaviour of the bee-eater (*Merops apiaster*) is pictured: a male juggles a *Libellula quadrimaculata* in front of a female.] Address: natur media GmbH, Belfortstr. 8, D-81667 München, Germany

3537. Bernard, R. (2001): Badania biologii i rozmieszczenia wazek (Odonata) prowadzone w Zakładzie Zoologii Ogólnej UAM w Poznaniu. Polskie Towarzystwo Entomologiczne: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materiały zjazdowe, Spala, 14 - 16 wrzesnia 2001, Poznan: 20-21. (in Polish). ["Research activities of the Department of General Zoology at the Adam Mickiewicz University with special emphasis to the biology and distribution of Odonata". - Odonatological research in Poznan, Poland, dates back more than 70 years. J. Urbanski, J. Musial, and R. Bernard are odonatologists well known abroad of Poland. More recent research focus on mapping the Polish dragonflies to prepare distribution maps of the Polish Odonata, and the ecology of selected species as *Nehalennia speciosa*, *Cercion lindenii*, and species with range extensions as *Aehna affinis*, and *Anax ephippiger*. A German translation of the paper is available by P. Buczynski, or the IDF.] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

3538. Bönsel, A.; Höning, D. (2001): Die Zukunftsfähigkeit nationaler Schutzkategorien. Zeitschrift für angewandte Umweltforschung 14: 268-277. (in German with English summary). [The paper critically reflects the recent situation of German nature conservation activities with special emphasis on protected areas. Some odonatological examples underline success and failure of species directed actions plans. Many examples document that it will not be possible to save the species exclusively in protected areas. This requires special measures outside of protected areas.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

3539. Bowler, J. (2001): New Odonata records from Seychelles 1998-2000. Phelsuma 9: 56-57. (in English). [13 species from the islands of Aride, Grande Soeur, Praslin, La Digue, and Curieuse are briefly annotated.]

Address: Bowler, J., Shepherds's Cottage, Heylipol, Tیره, Scotland PA77 6TY, UK

3540. Brendonck, L.; Michels, E.; De Meester, L.; Rid-doch, B. (2001): Temporary pools are not 'enemy-free'. *Hydrobiologia* 486: 147-159. (in English). ["Temporary pools are traditionally considered as refuges where the conspicuous anostracans are protected from predation. While this is true for the size-selective predation by fish, there is compelling evidence that invertebrate predation is an important biotic stress regulating temporary pool communities. In rock pools in southeastern Botswana, we studied the impact of some suspected invertebrate predators on populations of the freshwater anostracan *Branchipodopsis wolfi* by means of observations and manipulative experiments. In a survey of 45 pools, the relationship between *B. wolfi* natural population sizes and the abundance of suspected predators were never negative for turbellarians and mosquito larvae. When dragonfly larvae, notonectids or tadpoles were present, the anostracan populations were generally non-existent or very small. In enclosure experiments with turbellarians, there was a significant effect of predation within one hour of the start; the average daily predation rate was about 1/4 anostracan per turbellarian. Anostracans from a pool with few turbellarians were slightly less vulnerable than those from a turbellarian-rich pool. Furthermore, there was an indication of males being predated on more than females. With dragonfly larvae and notonectids, the predation effect was marked with all six anostracans in an experiment eaten in less than one day by a single predator (predation rate: about one anostracan every 2 h per predator). In a behavioral study, both sexes of *B. wolfi* avoided swimming above sediment that held more turbellarians than the open patches; there was no evidence for chemical communication with respect to this behavior." (Authors)] Address: Brendonck, L., Laboratory of Aquatic Ecology, K.U. Leuven, De Beriotstraat 32, B-3000, Leuven, Belgium. E-Mail: Luc.Brendonck@bio.kuleuven.ac.be

3541. Buczynski, P. (2001): Wpływ intensywnego rolnictwa na wazki (Odonata): przykład okolic Krzczoczowa (Wyzyna Lubelska). *Polskie Towarzystwo Entomologiczne*: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materiały zjazdowe, Spala, 14 - 16 września 2001, Poznan: 22. (in Polish). ["Odonata and intensive agriculture exemplified for the region of Krzczoczów (Wyzyna Lubelska)". Between 1998 and 2000, 37 odonate species could be observed. Compared to other areas in the Lublin region, app. 10-20 species are lacking. Most of the taxa are concentrated on habitats in the small floodplains and meadows of the rivers, while the bordering areas are inhabited only by few species. A German translation of the paper is available by P. Buczynski, or the IDF.] Address: Buczynski, P., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3542. Faton, J.-M. (2001): Le libellules de la forêt de Saou. *Le Courrier des Epines drômoises* 103: 37. (in French). [A total of 27 odonate species (not listed in this paper) are known from the Saou-woods (Drôme, France). Three habitats are described in more detail: The standing water body of Le Pas de Lestang is habitat of *Lestes barbarus*, *Ischnura pumilio*, *Coenagrion scitulum*, and *Sympetrum flaveolum*. The water courses of La Vèbre au Pertuis and the Lauzens are inhabited by

Cordulegaster boltonii immaculifrons, and *Onychogomphus f. forcipatus*.] Address: Faton, J.-M., Réserve Naturelle des Ramières, les Garis, F-26120 La Baume Cornillane, France. E-mail: Fatonjm@aol.com

3543. Gaines, K.H. (2001): Are 'sinkholes' aptly named? Larval odonate ecology and adult species diversity in southeastern New Mexico. *Ecological Society of America Annual Meeting, 86th Annual Meeting in Madison, WI, August 2001*: 281. (in English). [Verbatim: The Bitter Lake National Wildlife Refuge is an unusual complex of alkaline salt flats interspersed with wetlands and water-filled sinkholes. Recent collections of over ninety species of adult dragonflies and damselflies on the refuge suggest that the highest diversity of odonates in New Mexico may occur in this relatively small area. The composition of the resident breeding population and the factors that contribute to the observed adult species diversity were unknown. In order to resolve these issues, odonate exuviae, larvae, and adults were collected periodically at more than thirty-five sinkholes exhibiting a wide range of physical and biological characteristics. Habitat data (water chemistry, aquatic vegetation, and fish species assemblages) were also collected at each sinkhole and used to determine ecological correlates of larval species diversity and distribution. Exuviae of one odonate species were the only exuviae found at many of the sinkholes surveyed, indicating larval tolerance of a wide range of ecological conditions. In contrast, exuviae of several species observed as adults throughout the refuge were found at only a few sinkholes, suggesting larval stenotopy (primarily with respect to water salinity) and thus limited suitable breeding habitat availability for those species. The composition of species breeding successfully at sinkholes did not correspond to the adult species composition found to date, indicating that these sinkholes may indeed represent sinks for dispersing individuals rather than sources of species diversity.] Address: Gaines, Karen, Dept Biol., Univ. of New Mexico, Castetter Hall, Albuquerque NM 87131, USA. E-mail: kgaines@umm.edu

3544. Gossum, H. van; Stoks, R.; De Bruyn, L. (2001): Male mate choice for female colour morphs: frequency and method dependence. *Animal behaviour* 61: F31-F34. (in English). [The authors compile current studies and theories on male mate choice, and discuss constraints of study design. This paper is a welcome provisional appraisal on the subject, and offers some insight in studies necessary in near future.] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

3545. Hermans, J.T. (2001): The dragonfly fauna of the Weerterbos. *Natuurhistorisch Maandblad* 91: 270-274. (in Dutch with English summary). [The Netherlands; "During a field survey weekend on 9 and 10 June 2001, members of the Natuurhistorisch Genootschap observed 19 different species of dragonfly. Six of these were present in large numbers: *Calopteryx splendens*, *Pyrrosoma nymphula*, *Ischnura elegans*, *Coenagrion puella*, *Anax imperator*, and *Libellula quadrimaculata*. Over the past four years (1998-2002), 37 dragonfly species have been observed, 20-25 of which can be regarded as permanent or occasional residents. The most unusual species found was *Calopteryx virgo* whose occurrence is restricted to some parts of the Oude

Graaf brook." (Author)] Address: Hermans, J.T.; Herestraat 21, NL-6067 ER Linne, The Netherlands

3546. Herrmann, J. (2001): Aluminium is harmful to benthic invertebrates in acidified waters, but at what threshold(s)? *Water Air Soil Pollut.* 130(1/4): 837-842. (in English). [The paper compiles and assesses literature on acidification effects related to the contributing impact of increased aluminium levels at low pH on benthic invertebrates. The evidence on *Enallagma* sp., *Soma-tochlora cingulata*, and *Libellula julia* (Mackie, 1989; Correa et al., 1987; Rockwood et al., 1990) indicates, the odonate larvae are relatively resistant.] Address: Herrmann, J., Freshw. Ecol. Group, Dept Biol. & Environ. Sci., Univ. Kalmar, P.O. Box 905, S-391 82 Kalmar, Sweden

3547. Jacquemin, G. (2001): Les marais salés de Lorraine. Premier bilan entomologique (Bescançon 1999). *Bulletin de la société lorraine d'entomologie* 8: 6-11. (in French). [Starting in 1992, the halophilous entomofauna of the Lorraine (France) region was surveyed. A total of more than 400 species, including 31 halophilous species was traced. The list of species includes 28 Odonata; none of these species can be classified as halophilous. *Lestes dryas*, *Coenagrion mercuriale*, *Libellula fulva*, and *Orthetrum coerulescens* are listed as remarkable species. No locality data is given.] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

3548. Kano, K. (2001): Dragonflies preserved in amber. *Gekkan-Mushi* 345: 5-7. (in Japanese). [The author briefly introduces into Japanese fossils (taken from layers of the later Miocene, the later Pliocene, and the later Pleistocene) and the process of fossilization in amber. He reports on collection material of the Kuji Amber Museum, Kuji City, Iwate Pref., Japan representing material from Domenica and Kaliningrad (Russia). (for more details see Digest of Japanese Odonatological Short Communications 12).] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3549. Kano, K. (2001): Dragonflies prey on cicadas, *Moganmia minuta* Matsumura. *Nature & insects* 36(1): 35. (in Japanese). ["I sighted *M. minuta* was preyed on by an expectedly lot of species of dragonflies at Kainan, Ishigaki island, on May 2- 5, 1995. It was cloudy and occasionally rainy. This cicada appears from March to July on Ishigaki island; the body length: 2.2-2.3 cm, the smallest in Japan, and it sings on ziiiiiii on leaves of sugar cane. It feeds on the sap from veins of leaves, and perches on the upper side in action and at rest on the underside. So far there have been a few report made on cicadas as prey of dragonflies; *Platypleura kaempferi* Fabricius by *Ictinogomphus clavatus* (Fabricius) (Corbet, 1999), *Graptopsaltria nigrofusca* Motschulsky by *Anotogaster sieboldii* (pers. com. Kurashina). Most of preys are Dipterans and *Moganmia minuta* of Hemipteran may be a rare case. I found a male *Asiagomphus yayeyamensis* (Oguma) subduing and eating a *M. minuta* at grass field in a branch stream of the Miyara River on Ishigaki island on May 2. The dragonfly bit the head of the prey and subdued the cicada, then chewing it, removing the wings onto the ground and finished consumption for five minutes. On that day two species were seen that preyed on *M. minuta* beside the dragonfly; *Orthetrum s. sabina* (Drury) and *O. pruinosum*

neglectum (Rambur). In general, there are two modes of foraging; one is midair foraging and the other, gleaning (Corbet, 1999). In Anisopteran dragonflies, they adopt mostly midair foraging and in Zygopteran, gleaning, glean small insects such as aphids perching on grasses. The above three species usually take the midair foraging mode, by darting to flying insects from their perches, however, in the afternoon on May 5 *O. s. sabina* attacked *M. minuta* that perched on a leaf of Japanese pampas grass, and the latter flew away with a scream. Thereafter I saw the dragonfly approached and attacked twice on *M. minuta* perched on grasses. In this case, dragonflies searched and attacked the preys perching on the upper side of leaves of grasses, though they usually hide underside of leaves. In gleaning capture success may be lower and not so more effective than midair foraging. It was cloudy and occasionally rainy, and flying insects were not seen, therefore the dragonflies took the mode of gleaning." (Taken from Digest of Japanese Odonatological Short Communications 12, 2002)] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3550. Knijf, G. de (2001): Libellen in Vlaams-Brabant: stand van zaken van het verspreidingsonderzoek. *Brakona jaarboek 2000*: 53-57. (in Dutch). [Odonata in Vlaams-Brabant: the current status of the mapping project - On a fundament of 39000 records, the current status of the knowlege on the odonate fauna of Vlaams-Brabant, Belgium is discussed. A total of 67 species is mapped; in the period between 1990-1999, 59 species could be recorded. Many species are discussed and all species are documented in a table. Their presence in three differnt periods and their grid-frequencies are outlined.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

3551. Kowalczyk, J.K.; Szczepko, K. (2001): Inwentaryzacja entomofauny terenów porolnych w fazie renaturyzacji w zachodniej czesci Kampinoskiego P.N.. *Polskie Towarzystwo Entomologiczne: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materiały zjazdowe, Spala, 14 - 16 wrzesnia 2001, Poznan*: 40. (in Polish). [After abandonment of agriculture, the western part of the Polish Kampinoski Nationalpark was restored. In 1998, 25 odonate species were recorded; *Sympetrum pedemontanum* is the only odonate species listed.] Address: Kowalczyk, J.K., Muzeum Przyrodnicze UL, ul. Kilinskiego 101, PL-90-011 Łódź, Poland

3552. Kurzatowska, A.; Pakulnicka, J.; Czachorowski, S. (2001): Badania entomologiczne w Katedrze Ekologii i Ochrony Srodowiska UWM w Olsztynie. *Polskie Towarzystwo Entomologiczne: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materiały zjazdowe, Spala, 14 - 16 wrzesnia 2001, Poznan*: 41-42. (in Polish). [Among the entomological surveys of the Department of Ecology and Environmental protection of the UWM Olsztynie, Poland, 16 are of odonatological content.] Address: Kurzatowska, Alicja, Katedrze Ekologii i Ochrony Srodowiska UWM w Olsztynie, Poland

3553. Kuska, A. (2001): Entomologia amatorska na Górnym Slasku. *Polskie Towarzystwo Entomologiczne: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materiały zjazdowe, Spala, 14 - 16 wrzesnia 2001, Poznan*: 42. (in Polish). [Poland; the importance of amateur research on insects is exemplified using among

others the paper of Sakwiewicz & Zak (1966) on the Silesian Odonata.] Address: Kuska, A., Katedra Nauk Biologicznych AWF, Katowice, ul. Raciborska 1, Poland

3554. Letowski, J. (2001): Aktualne kierunki badan entomologicznych w Zakladzie Zoologii UMCS. Polskie Towarzystwo Entomologiczne: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materialy zjazdowe, Spala, 14 - 16 wrzesnia 2001, Poznan: 46-47. (in Polish). [Current research activities at the Dept of Zool., Marie Curie-Sklodowska University, Lublin, Poland, including Pawel Buczynski's impressive studies on Odonata are briefly outlined.] Address: Letowski, J., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland

3555. Margolis, B.E.; Raesly, R.L.; Shomway, D.L. (2001): The effects of beaver-created wetlands on the benthic macroinvertebrate assemblages in two Appalachian streams. *Wetlands* 21(4): 554-563. (in English). [The effects of beaver impoundments on the benthic macroinvertebrate assemblages were examined in 2 small streams in Somerset Co., Pennsylvania and Garrett Co., Maryland, USA. Cordulegaster was among the dominant taxa above the impoundment, Chromagrion, Calopteryx, Boyeria, Erythemis, and Plathemis occurred below the impoundment, and Gomphus and Epitheca within it. The presence of submerged aquatic vegetation was responsible for the Chromagrion and Boyeria occurrence below the impoundments. Generally, taxonomic and functional changes in benthic macroinvertebrate assemblages of the beaver-altered streams were a results of direct (impoundment) and indirect (changes in temperature, water chemistry, plant growth) alterations of the stream environment.] Address: Margolis, B.E., New Jersey Dept. Envir. Prot., Bureau Freshw. & Biol. Monitoring, P.O. Box 427, Trenton, NJ 08625-0427, USA)

3556. McPeck, M.A.; Turgeon, J.; Thum, R.; Stoks, R. (2001): Generating biodiversity: The phylogeography of a North American insect radiation. *Ecological Society of America Annual Meeting, 86th Annual Meeting in Madison, WI, August 2001*: 156. (in English). [Verbatim: Recent phylogenetic analyses have shown that two lineages of North American Enallagma damselflies (Odonata: Coenagrionidae) radiated very recently to give 18 extant species, and ecological studies have demonstrated that multiple habitat shifts occurred as part of this radiation. We are now using phylogenetic analyses using a 940 bp mtDNA fragment to reconstruct how speciation proceeded during this radiation. The phylogenetic relationships and geographic distributions of 54 haplotypes identify E. hageni as the ancestor of one radiating lineage. These data also show that E. hageni is comprised of disjunct Continental and Atlantic races that are indicative of restrictions to separate refuges during the last glacial period. Nine new species arose by at least three different speciation mechanisms from the Continental hageni race as it expanded its range following glacial retreat, but no new species arose from the Atlantic race. Three coastal plain endemics show very low genetic diversity and were each derived by a few populations differentiating from the Continental hageni in a local area. Three other widely distributed species show substantial polyphyletic origins within the Continental hageni. Parallel speciation events driven by habitat shifts appear to have created two of these species, and sharply contrasts with the apparent lack of ecologi-

cal differentiation in the third. These results taken with previous studies suggest that both ecological and non-ecological speciation mechanisms can simultaneously drive radiation events.] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: rob-by.stoks@bio.kuleuven.ac.be

3557. Mocek, B.; Mikat, M. (2001): The second contribution to the knowledge of the dragonfly fauna (Odonata) in the Nature Monument "Na Plachte", eastern Bohemia, Czech Republic. *Acta Mus. reginaehradecensis* (A) 28: 135-142. (in Czech, with English summary). [Compared with records made between 1997-2000, the number of thermophilous species (e.g. Aeshna affinis, Anaciaeschna isoceles) has increased, while some psychrophilous taxa (species preferring lower temperatures) have disappeared (Leucorrhinia pectoralis, L. dubia). 5 species were added to the list, totalling now at 37 species.] Address: Mocek, B., Regional Museum of Eastern Bohemia, Dept Natural History, Eliscino Nábřeží 465, CZ-50001 Hradec Králové, Czech Republik. E-mail: mvc@mvc.anet.cz

3558. Monnerat, C. (2001): Prolongement de la periode de vol de certains odonates en octobre 2001. *Bull. romand Ent.* 19(2): 95-106. (in French with english summary). [An extension of the flying period in western Switzerland was noticed in October 2001 in several species, most particularly in Enallagma cyathigerum, Ischnura elegans, and I. pumilio. Bad weather conditions in September did not cause a significant mortality, and favourable weather in October favoured the adult longevity. The 2001 evidence is compared with 4990 observations made during 1989-2000, 99 of which were made in October. In addition, phenological of Calopteryx splendens, Chalcolestes viridis, Lestes sponsa, Sympecma fusca, Aeshna cyanea, A. grandis, A. juncea, A. mixta, Somatochlora arctica, Orthetrum brunneum, Sympetrum fonscolombii, S. pedemontanum, S. sanguineum, S. striolatum, and S. vulgatum are documented.] Address: Monnerat, C., Centre suisse Cartogr. Faune, Terreaux 14, CH-2000 Neuchatel, Switzerland. E-mail: christian.monnerat@cscf.unine.ch

3559. Napiórkowska-Kowalik, J.; Letowski, J. (2001): Stan poznania entomoloafauny Lublina. *Polskie Towarzystwo Entomologiczne: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materialy zjazdowe, Spala, 14 - 16 wrzesnia 2001, Poznan: 50-51.* (in Polish). [The authors document the present knowledge on the entomofauna of the town of Lublin, Poland. Within the borders of the town, at present 28 odonate species could be traced.] Address: Letowski, J., Dept of Zool., Marie Curie-Sklodowska University, Akademicka 19, PL-20-033 Lublin, Poland

3560. Piotrowski, W. (2001): Wyniki badan entomologicznych w Poleskim Parku Narodowym do konca 2000 r.. *Polskie Towarzystwo Entomologiczne: 44 Zjazd, Polskiego Towarzystwa Entomologicznego, Materialy zjazdowe, Spala, 14 - 16 wrzesnia 2001, Poznan: 54-55.* (in Polish). [While in 1994, no odonate species were known for the Poleskie Nationalpark, Poland, 51 species had been recorded in the succeeding period up to 2000.] Address: Piotrowski, W., Poleski park Narodowy, Urszulin, Poland

3561. Rolando, A. Boano, G. (2001): Aggressive interactions and demographic parameters in Libellula fulva

(Odonata, Libellulidae). *Advances in Ethology* 36: 253-254. (in English). [Verbatim: Male aggressive interactions and demographic parameter of the dragonfly *Libellula fulva* were studied for four years at a low marshy site in north-western Italy. Individuals were caught and marked with white marking fluid. Perching males attacked every dragonfly passing near the perch. The mean conspecific attack distance was significantly longer than the heterospecific one and this suggests that males were able to discriminate among species, at least partially. Sex ratio was very biased toward males and adult females were in fact rather rare. Life span estimates were similar to field observations, both suggesting most males stayed alive for less than 10 days. Male aggressive behaviour may be viewed as an adaptation to a sexual environment where the time for reproduction is very short and the probability of meeting a partner is very low. Such an aggressive behaviour may enhance the probability of males catching and copulating with females which are flying through the site. It is significant that the releaser of aggressive attacks, as demonstrated by experimental tests, is the moving individual, not the individual per se. Weather conditions influenced male behaviour, attack distance being significantly and positively related to light intensity. We believe the aggressive pattern observed in *Libellula fulva* cannot be properly classed as territoriality. In this case, in fact, the classical "defence of resources" approach does not work because males did not defend any resources located inside their hypothetical territories. We suggest aggressive interactions may be, in reality, mere attempts to catch females.] Address: Rolando, A. & G. Boano, Dipartimento di Biologia Animale e dell'Uomo, Turin University, Italy

3562. Stav, G.; Kotler, B. P.; Blaustein, L. (2001): Effect of risk of predation on two temporary pool species (*Bufo viridis* and *Culiseta longiareolata*). *Ecological Society of America Annual Meeting, 86th Annual meeting in Madison, WI, August 2001*: 211. (in English). [Verbatim: Green toad (*Bufo viridis*) tadpoles and mosquito larvae (*Culiseta longiareolata*) are highly vulnerable to predation by the dragonfly nymph, *Anax imperator*. We assessed various responses of tadpole and mosquito larva to caged *Anax* in artificial pools. We compared responses in seven treatments (five replicate pools each) of various combinations of presence or absence of: one caged *Anax*, 30 *Bufo* tadpoles and 100 *Culiseta* larvae. Caged *Anax* were fed with 1 tadpole and 3 mosquito larvae once a week. *Culiseta* females oviposited more in pools without *Bufo*. *Bufo* were more prevalent farther from *Anax* in the absence of *Culiseta*, but closer to *Anax* when *Culiseta* were also present. *Culiseta* larvae did not respond spatially to caged *Anax* in the absence of *Bufo*, but when *Bufo* were present, they were more prevalent closer to the predator. The presence of *Culiseta*, but not *Anax*, affected time to and size at metamorphosis, and survival of *Bufo* tadpoles. Both the presence of *Anax* and water turbidity affected color of *Bufo* tadpoles. When *Anax* was present or when water was cloudy, *Bufo* tadpoles were lighter in color. In the lab, lighter colored tadpoles were more vulnerable to *Anax* in clear water, while no difference was found in cloudy water. This study shows the complexity of predation risk on prey species, and its potential effect on temporary pool community.] Address: Blaustein, L., Life Science Department and Mitrani Center for Desert Ecology, Blaustein Institute for Desert Research, Ben-Gurion University, Sede-Boqer Campus, 84990, Is-

rael Community Ecology Laboratory, Institute of Evolution, University of Haifa, 31905, Israel

3563. Steglich, R. (2001): Libellen (Odonata). In: *Arten- und Biotopschutzprogramm Sachsen-Anhalt, Landschaftsraum Elbe. Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt, Sonderheft 2/2001*: 342-352. (in German). [The Federal State of Sachsen-Anhalt, Germany elaborated an extensive study (comprising more than 700 pages) for habitat and species conservation in the floodplain of the River Elbe. Rosmarie Steglich contributed the chapter on Odonata. The odonatalogical importance of the region is outlined, and some consideration on research activities necessary to solve some open questions on the status of rare species are made. *Aeshna affinis*, *A. viridis*, *Lestes barbarus*, *Erythromma viridulum*, *Ophiogomphus cecilia*, *Calopteryx splendens*, *Epitheca bimaculata*, *Stylurus flavipes*, *Gomphus vulgatissimus*, and *Leucorrhinia pectoralis* are commented. In addition, the paper contains a list of unpublished expertises with odonatalogical data, and distribution maps of *A. affinis*, *L. barbarus*, *A. viridis*, *E. viridulum*, *O. cecilia*, and *C. splendens*.] Address: Steglich, Rosmarie, Quittenweg 53, 39118 Magdeburg, Germany

3564. Stevens, L.E.; North, E.; Meretsky, V.J. (2001): Wings and mucus in space and time: Patterns of invertebrate biogeography in Grand Canyon. *Ecological Society of America Annual Meeting, 86th Annual meeting in Madison, WI, August 2001*: 349. (in English). [Verbatim: Taxa with vastly differing vagility may encounter similar dispersal challenges in complex terrain over evolutionary time. Diverse topography and Pleistocene-Holocene climate changes have affected invertebrate biogeography in the Grand Canyon region. Museum collections and published data allowed us to examine the biogeographic role of Grand Canyon as a barrier/filter, corridor, refuge, or null effect. We studied the distribution of landsnails, Odonata, Orthoptera, semi-aquatic Heteroptera, butterflies, and bees. Grand Canyon is a barrier/filter that limits the northward expansion of desert species, and a southern boundary for some Rocky Mountain taxa. The neoregional inner Grand Canyon desert is depauperate and has low levels of endemism, a conclusion supported by the distribution of 31 semi-aquatic Heteroptera, 110 butterflies and skippers, 38 Colorado River chironomid midge species. Butterfly diversity in the desert (42 taxa) is lower than that on either rim (58 and 77 species on the South and North rims, respectively), and that in southern Arizona. The positive relationship between butterfly diversity and elevation is likely an artifact of the small, isolated area of low desert habitat, the evolutionarily brief time (10,000 yr) it has supported desert vegetation, and the long-linear habitat shape. Similar patterns exist among 20 landsnail taxa, with only one endemic snail at one inner canyon spring. However, more than 60 percent of invertebrate taxa are affected by the Grand Canyon as a biogeographic feature.] Address: not stated

3565. Stoks, R.; McPeck, M.A.; Turgeon, J.; Thum, R. (2001): Intercontinental phylogeography of an insect radiation and its ecological implications. *Ecological Society of America Annual Meeting, 86th Annual meeting in Madison, WI, August 2001*: 212. (in English). [Verbatim: Phylogenetic reconstructions provide historical hypotheses for the development of biodiversity in an ecological context. We are investigating the diversification

of one clade of *Enallagma* damselflies on three continents. Based on mtDNA data, this clade appears to have originated in eastern North American lakes containing fish -10 million years ago, with 38 extant North American species. Moreover, about half of these species are derived from the radiation of two lineages in association with the last glacial period (15,000 years ago). Most of these new species are found only in fish lakes, but at least two independent adaptive habitat shifts into fishless waters where large dragonflies are the top predators also occurred. Substantial morphological evolution associated with adapting to dragonfly predation was associated with these habitat shifts. Interestingly, the three Eurasian and one North African *Enallagma* species are derived from an ancestor that split from the North American clade ~900,000 years ago. These four species are also derived from a radiation event that occurred at the same time as the North American radiation. The morphology of one Eurasian species that is distributed from Spain to Russia is very similar to the fishless-lake species of North America, but this species is found in both fish and fishless waters. These data suggest a number of testable hypotheses about differences in the role of fish predation in structuring littoral communities on the two continents.] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

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3566. Akkermans, R.W. (2002): Dragonflies in the Roermond urban area. *Naturhistorisch Maandblad* 91: 103-107. (in Dutch, with English summary). ["A two-year survey of the urban area of the city of Roermond, The Netherlands found 22 species of dragonfly. There are three different water systems within the Roermond urban area: the river Meuse, the river Roer and the Maasnielderbeek brook, each with its own typical dragonfly community. The Meuse system has the smallest number of species, but houses rheophile species like *Calopteryx splendens* and *Platycnemis pennipes*. The Roer, a small river, has a wide spectrum of species, dominated by rheophile species like *C. splendens*, *P. pennipes*, and *Gomphus vulgatissimus*, the latter a red-listed species. The Maasnielderbeek is a brook which was converted to a series of more or less static ponds in the process of urban expansion. These static ponds house the largest numbers of species within the Roermond urban area, including especially species of stagnant water like *C. puella*, *Pyrrhosoma nymphula*, *Aeshna mixta*, and *Sympetrum striolatum*. Finally, the urban area includes a number of garden ponds. These were found to house only the most common species present in the surrounding areas, and added no further species to the survey." (Author)] Address: Akkermans, R.W., Wilhelmialaan 47, NL-6042 EL Roermond, The Netherlands

3567. Alonso-Eguia, L.P.E.; Gonzalez-Soriano, E.; Gutierrez-Yurrita, P.J. (2002): Listado y distribucion de los odonatos de la Cuenca del Rio Moctezuma, Centro-Occidente de Mexico (Insecta: Odonata). *Folia Entomologica Mexicana* 41(3): 347-357. (in Spanish with English summary). ["The Moctezuma basin is located in junction of three North American freshwater ecoregions:

1) Springs in the headwaters of Rio Verde, 2) Rivers and streams in Tamaulipas-Veracruz and 3) Watersheds of the Lerma river system and has been considered as a zone of top priority for the National Board for the knowledge and Use of the Biodiversity (CONABIO). The high deterioration rate of the aquatic ecosystems of the Moctezuma river system make necessary to promote and reinforce this kind of studies to gather information concerning the biological conservation of the ecosystem ecological processes that give biological identity of the area. The main purpose of this study was to know the species of odonata and their distribution in the river Moctezuma Basin. Seventy eight species of Odonata belonging to 36 genera and 10 families were recorded; the family Libellulidae and Coenagrionidae, *Argia* genus in particular, are of special interest due to their great number of species. Four species are new records for Guanajuato, four for Hidalgo and one for San Luis Potosi. *Progomphus belyshevi* is striking for its rarity to this region; *Hetaerina americana* and *Macrothemis pseudimitans* were the more distributed species in the basin. Approximately 70% of the species are limited to one or two localities; 78.5% of Zygoptera and 59.2% of Anisoptera are of netotropical affinity." (Authors)] Address: Gutierrez-Yurrita, P.J., Biología, Facultad de Ciencias Naturales, Universidad Autonoma de Queretaro, Centro Universitario s/n, Cerro de las Campanas, Santiago de Queretaro, QRO, 76010, Mexico; E-Mail: yurrita@sunserver.uaq.mx

3568. Bamnowska, A.; Zawal, A. (2002): Odonate fauna of Binowskie Lake. All-Poland scientific conference "Insect conservation in Poland", Abstracts of papers. *Pol. Tow. Ent., Poznani & Univ. Warmirisko-Mazurski, Olsztyn*: 29. (in Polish). [The odonate fauna of the Binowskie lake near Szczecin in NW Poland is composed of largely common species as *Enallagma cyathigerum* (dominance: > 10%), and *Coenagrion puella*, *C. pulchellum*, *Erythromma najas*, *Ischnura elegans*, and *Platycnemis pennipes* (dominance: each > 5%). No additional species are mentioned.] Address: Polskie Towarzystwo Entomologiczne, Ul Dabrowskiego 159, PO-60-594 Poznan

3569. Barnett, H.K.; Richardson, J.S. (2002): Predation risk and competition effects on the life-history characteristics of larval Oregon spotted frog and larval red-legged frog. *Oecologia* 132(3): 436-444. (in English). ["We conducted an artificial pond experiment to test hypotheses about the effects of competition and non-lethal predator cues on metamorphic characteristics of sympatric Oregon spotted frogs (*Rana pretiosa*) and red-legged frogs (*R. aurora*) in southwestern British Columbia. Tadpoles were exposed to the presence or absence of one another, two density levels and to the presence or absence of predacious odonate larvae (*Aeshna palmata*) isolated in enclosures. In the artificial pond study, *R. aurora* were significantly larger at metamorphosis (12%) and exhibited only slightly longer larval periods when exposed to *Aeshna*. In the presence of *R. pretiosa*, they significantly decreased time to metamorphosis, and were significantly larger at metamorphosis (12%) than those reared alone. *Rana pretiosa* in treatments with *R. aurora* were somewhat larger at metamorphosis when a non-lethal predator was present, and in treatments where *R. pretiosa* were alone with a predator tadpole mass at metamorphosis was smaller than those in the absence of *Aeshna*, but these results were not statistically significant. Both species reduced activity

and moved away from the predator in the presence of an enclosed dragonfly larva in the laboratory. Most tadpole mesocosm experiments have found that the trade-off between size and timing of metamorphosis is extremely important to amphibians, but we suggest that the trade-off discussed in traditional amphibian models may not apply to species like *R. pretiosa* that are exposed to the same grape-limited predators upon reaching metamorphosis." (Authors)] Address: Barnett, Heidy, Department of Forest Sciences, University of British Columbia, 3041-2424 Main Mall, Vancouver, BC, V6T 1Z4 Canada; E-Mail: Heidy.Barnett@ci.seattle.wa.us

3570. Bechly, G.; Sach, V.J. (2002): An interesting new fossil dragonfly (Anisoptera: Libellulidae: "Brachydiplacini") from the Miocene of Germany, with a discussion on the phylogeny of Tetrathemistinae and a fossil list for the locality Heggbach. *Stuttgarter Beiträge zur Naturkunde Serie B (Geologie und Paläontologie)* 325: 1-11. (in English with German summary) ["A new dragonfly species, *Parabrachydiplax miocenica* n. gen. n. sp. (Anisoptera: Libellulidae), is described from the early Middle Miocene of Heggbach in southern Germany. The holotype was collected by the priest J. PROBST in 1865 and represents the earliest record of fossil insect remains from the Upper Freshwater Molasse of Baden-Württemberg. The phylogenetic position of this new genus and species is discussed. It is a very primitive Libellulidae of the subfamily Tetrathemistinae, and can be attributed within the latter taxon to a basal grade within the clearly paraphyletic tribus "Brachydiplacini". The accompanying fauna and flora of *Parabrachydiplax miocenica* n. gen. n. sp. is presented, based on a newly revised fossil list for the locality Heggbach." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

3571. Bechly, G.; Ueda, K. (2002): The first fossil record and first New World record for the dragonfly clade Chlorogomphida (Insecta: Odonata: Anisoptera: Araripechlorogomphidae n. fam.) from the Crato Limestone (Lower Cretaceous, Brazil). *Stuttgarter Beiträge zur Naturkunde Serie B (Geologie und Paläontologie)* (328): 1-11. (in English). ["A new dragonfly is described from the Lower Cretaceous limestones of the Crato Formation (Brazil): *Araripechlorogomphus muratai* n. gen. n. sp. (Araripechlorogomphidae n. fam.) which clearly belongs to the chlorogomphid clade within Anisoptera. It is the first fossil record of Chlorogomphida and also the first New World record of this dragonfly group that is now exclusively distributed in East Asia. The phylogenetic and biogeographic implications of this new discovery, are discussed. As consequence of the phylogenetic analysis the new higher taxa Cristotibiata, Paucipostnodalia, Eubrachystigmata, Neobrachystigmata, Paneurypalpidomorpha, Eurypalpidomorpha, and Eurypalpidiformia are introduced. A monotypic family Juracordulidae n. fam. is established for the genus Juracordulia, and the genus *Prohemeroscopus* is transferred from Nannogomphidae to a new monotypic family Prohemeroscopidae n. fam. within Paucipostnodalia as sister-group of Eubrachystigmata." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

3572. Bernard, R.; Buczynski, P.; Tonczyk, G. (2002): Status, threats to, and conservation of the odonate fauna

of Poland. All-Poland scientific conference "Insect conservation in Poland", Abstracts of papers. *Pol. Tow. Ent., Poznani & Univ. Warmirisko-Mazurski, Olsztyn*: 8-9. (in Polish). [The summary refers on current activities of Polish odonatologists preparing an distribution atlas of the odonate fauna, on most recent odonatological phenomenes as range extensions of southern species to Poland, and on considerations to focus conservation activities on habitats and specialized species. A German translation of the paper is available from IDF or P. Buczynski.] Address: Polskie Towarzystwo Entomologiczne, Ul Dabrowskiego 159, PO-60-594 Poznani

3573. Biber, E. (2002): Habitat analysis of a rare dragonfly (*Williamsonia lintneri*) in Rhode Island. *Northeastern Naturalist* 9(3): 341-352. (in English). ["*W. lintneri* is a rare dragonfly species restricted to southern New England and some northern states. In 1999, I tested the hypothesis that upland development around wetlands reduces habitat suitability for *W. lintneri* through increased nutrient runoff. I examined 27 wetlands and analyzed water quality and depth data, the composition of aquatic invertebrate assemblages, and land use patterns. Sites where *W. lintneri* was present did not differ in water quality from sites where it was absent (i.e., null sites). However, *W. lintneri* sites had significantly deeper levels of water throughout the summer, were dry for shorter periods of time, and had significantly lower levels of development in the surrounding uplands than did null sites. These results suggest that both hydrologic cycle and upland development are important in limiting the local distribution of this species." (Author)] Address: Biber, E., Yale School of Forestry and Environmental Studies, 370 Prospect Street, New Haven, CT, 06511, USA. E-Mail: eric.biber@aya.yale.edu

3574. Brauckmann, C.; Herd, K.J. (2002): Insekten-Funde aus dem Westfalium D (Ober-Karbon) des Piesberges bei Osnabrück (Deutschland). Teil 1: Palaeoptera. *Osnabrücker Naturwissenschaftliche Mitteilungen* 28: 27-69. (in German with English summary). ["In this first part of a monograph on the hitherto known fossil insects (exclusively Blattodea) from Westphalian D beds of the Piesberg quarry near Osnabrück (Lower Saxony, Germany) the palaeopteran taxa are described. They are distributed among the Palaeodictyoptera (*Homoioptera kortumi* n. sp., *Breyeria brevis* n. sp., *B. bistrata* Brauckmann, 1995, *B. solida* Brauckmann & Herd, 2000, *Hasala inferiorsaxonica* Brauckmann, 1995), Megasecoptera (*Aspidothorax tristrata* n. sp., *A. aestatis* Brauckmann, 1991, *Pyebrodia martinsnetoi* n. gen. n. sp.), Diaphanopteroidea (*Piesbergala leipnerae* n. gen. n. sp.), and Odonatoptera (*Erasipterella piesbergensis* Brauckmann, 1983)." (Authors)] Address: Brauckmann, C., Institut für Geologie und Paläontologie, TU Clausthal, Leibnizstr. 10, D-38678 Clausthal-Zellerfeld, Germany. E-mail: Carsten.Brauckmann@tu-clausthal.de

3575. Buczynski, P.; Czachorowski, S.; Serafin, E.; Szczepanski, W. (2002): Is a nature reserve the optimal place for conservation of aquatic insects?: an example of dragonflies and caddisflies (Odonata, Trichoptera) in the "Kosno Lake" Nature Reserve. All-Poland scientific conference "Insect conservation in Poland", Abstracts of papers. *Pol. Tow. Ent., Poznani & Univ. Warmirisko-Mazurski, Olsztyn*: 30-31. (in Polish). [The nature Reserve 'Kosno Lake' (app. 53.34N 20.19E) was surveyed for its odonate fauna. Within the borders of the reserve,

14 species, and outside the borders 30 species could be recorded. It is concluded that the area of the nature reserve should be expanded. A German translation of the paper is available from P. Buczynski.] Address: Polskie Towarzystwo Entomologiczne, Ul Dabrowskiego 159, PO-60-594 Poznan

3576. Buczynski, P.; Lewandowski, K. (2002): Is a period of 200 years sufficient for dragonfly exploration of a region: exemplified on dragonflies of the North Polish lake district. All-Poland scientific conference "Insect conservation in Poland", Abstracts of papers. Pol. Tow. Ent., Poznan & Univ. Warmirisko-Mazurski, Olsztyn: 31-32. (in Polish). [The paper outlines some milestones in odonatological survey of the Polish lake district. In spite of the fact, that it is explored quite intensively, some periods are nearly without any odonate data. Thus, it will not be possible to analyse the importance of some ancient human exploitation activities on the fauna in a more regional scale, or it will not be possible to analyse the range extensions of some southern species in the last decades. The paper can be understood as an appeal for a long term monitoring of the fauna.] Address: Polskie Towarzystwo Entomologiczne, Ul Dabrowskiego 159, PO-60-594 Poznan

3577. Buskens, R.; Mars, H. de (2002): Attention for moorland pools in Limburg. *Naturhistorisch Maandblad* 91: 195-201. (in Dutch, with English summary). [The ecological value and the variation in moorland pools in terms of their ecohydrological position in the context of the landscape in Limburg, The Netherlands are outlined. Some typical species including the Odonata are briefly annotated.] Address: Buskens, R.; Mars, H. de, Royal Haskoning, Postbus 1754, NL-6201 BT Maastricht, The Netherlands

3578. Buss, D.F.; Baptista, D.F.; Silveira, M.P.; Nesimian, J.L.; Dorville, L.F.M. (2002): Influence of water chemistry and environmental degradation on macroinvertebrate assemblages in a river basin in south-east Brazil. *Hydrobiologia* 481: 125-136. (in English). ["Benthic macroinvertebrate assemblages, water chemistry variables and environmental degradation were investigated in an Atlantic Forest region in Brazil. Seven sites of the Guapimirim river basin were studied during three sampling periods based on the rain regime: end of wet season (May 1998), dry season (August 1998), and wet season (January 1999). Four substrates were collected at each site: sand, stony substrates, litter in pool areas and litter in riffle areas. Relationships between macroinvertebrate assemblages, water chemistry variables and environmental degradation were examined using canonical correspondence analysis (CCA). According to CCA, concentrations of dissolved oxygen and chloride, and the environmental degradation, measured by the Riparian Channel Environment index, exhibited the strongest relationship to macroinvertebrate assemblages. Overall, the loss of community diversity measured by the Shannon Index along the degradation gradient was observed. Some taxa were shown to be sensitive to water pollution, especially among Plecoptera, Trichoptera, Coleoptera and some Ephemeroptera, while others such as Simuliidae, Odonata and molluscs were tolerant to moderate levels of pollutants. The Chironomidae were the only group tolerant to a high level of pollutants and degradation." (Authors)] Address: Buss, D.F., Laboratorio de Avaliacao e Promocao da Saude Ambiental, Departamento de Biologia, IOC, FIOCRUZ,

Av. Brasil 4365, Mangueiras, CEP 21045-900, Rio de Janeiro, RJ, Brazil. E-Mail: buss@centroin.com.br

3579. Carron, G. (2002): *Leucorrhinia albifrons* (Burmeister, 1839), nouvelle espece de libellule (Odonata) pour le canton de Geneve. *Bull. romand Ent.* 20(1): 45-49. (in French). [1 male, Moulin-de-Vert(Cartigny), 17-VIII-2000. This is the first record for the canton of Geneva, Switzerland. The habitat is described in detail.] Address: Carron, G., C.P. 250, CH-2002 Neuchâtel, Switzerland

3580. Catling P.M. (2002): Decline of *Gomphus fraternus fraternus* (Odonata: Gomphidae) in Lake Erie. *Great Lakes Entomologist* 34(1) (2001): 1-7. (in English). ["Collections and literature reports indicate that *Gomphus fraternus fraternus* was abundant on the shoreline of Lake Erie prior to 1960, and "tens of thousands" were reported at Long Point Bay. After 1960 there were no reports from the shoreline, although there have been a number of comprehensive studies that have included the shoreline area and a number of Odonata specialists have also visited the Lake Erie shoreline regularly. A survey of portions of the Lake Erie shoreline, including the Long Point Bay area in 1999 and 2000, during the established peak and late peak flight period in southwestern Ontario, did not result in any observations. It is concluded that *G. fraternus* has declined substantially in Lake Erie and is possibly extirpated from the lake. The decline appears to have occurred between 1950 and 1960, and thus approximates the mid-1950s decline of burrowing mayflies in Lake Erie, which has been associated with warm weather oxygen depletion and pollution. Although it may never be possible to precisely determine the cause of the decline of *G. fraternus*, it is likely that a number of factors are involved including climatic warming, pollution, changes to the shoreline, other effects of shoreline development, and introduced species." (Author)] Address: Catling P.M., 2326 Scrivens Drive, R.R. No. 3, Metcalfe, ON, KOA 2P0, Canada

3581. Cordero, A.; Andres, J.A. (2002): Male coercion and convenience polyandry in a calopterygid damselfly. *Journal of Insect Science*, 2:14: 7 pp. ["Copulation in odonates requires female cooperation because females must raise their abdomen to allow intromission. Nevertheless in *Calopteryx haemorrhoidalis haemorrhoidalis* males commonly grasp ovipositing females and apparently force copulations. This has been interpreted as a consequence of extreme population density and male-male competition. We studied this behavior at two sites on a river that had different densities over three years. As predicted, at high densities most matings were forced (i.e. not preceded by courtship), but at low density most were preceded by courtship. Courtship matings were shorter at high density, but density did not affect the duration of forced matings. Females cooperated in forced matings even if they had very few mature eggs. Furthermore, females mated more times if they experienced higher male harassment during oviposition, and at low density second and subsequent matings were more likely to be forced. We interpret these results to mean that females engage in "convenience polyandry", because they gain more by accepting copulation than by resisting males. The results also suggest that females might trade copulations for male protection, because under extreme population density harassment by males is so intense that they

can impede oviposition." (Authors) This paper includes three videos that can be accessed at <http://insect-science.org/2.14>

3582. Costa, J.M.; Lourenco, A.M.; Vieira, L.P. (2002): *Micrathyria pseudhypodidyma* sp. n. (Odonata: Libellulidae), com chave das especies do genero que ocorrem no Estado do Rio de Janeiro. *Neotrop. Ent.* 31(3): 377-389. (in Portuguese, with English summary). [The new species is described, illustrated, and compared with *M. hypodidyma*. Holotype ♂: Brazil, Rio de Janeiro, Restinga de Marambaia, 1942; paratypes: 2 ♂♂, Goiás State; deposited at UFRJ. The congeners (*M. almeidai*, *M. artemis* Ris, *M. atra*, *M. borgmeieri*, *M. catenata*, *M. hesperis*, *M. mengeri*, *M. hypodidyma*, *M. ocellata*, *M. pirassunungae*, *M. pseudeximia*, *M. spinifera*, *M. spuria*, *M. stawiarskii*, *M. unglata*) from the state of Rio de Janeiro are illustrated, keyed, and commented.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

3583. Dathe, W.; Piechocki, R. (2002): Juan Cristóbal Gundlach - una vida para la ciencia, una vida en 'modestia biblica'. In: Dathe, W. & R.M. González López (Ed.): *Johann Christoph Gundlach (1810-1896). Una naturalista en Cuba / Naturforscher auf Cuba*. ISBN. 3-925347-65-8.: 125-136. (in German and Spanish). [Wilfried Dathe and Rosa María González López edited a book on the Cuban naturalist J.C. Gundlach, born in Marburg, Germany. 11 chapters treat several aspects on the person Gundlach, and on his scientific vita. Special emphasis is given to birds, amphibs, molluscs, and the flora. The book includes a commented translation of his autobiography and a list of his correspondance as far as it was to trace. Regrettably, few information on Gundlach's entomological activities are given. Gundlach co-operated with H. A. Hagen by shipping specimens; Hagen's publications on the Cuban Odonata are based substancially on the collections of Gundlach, and his accompanying descriptions of the dragonflies in life condition (!) (compare: Hagen, H.A. (1867): *Die Neuropteren der Insel Cuba*. *Stettiner entomol. Zeitung* 28: 215- 232; Hagen, H.A. (1868): *The odonata-fauna of the island of Cuba*. *Proceedings of the Boston society for natural history* 11: 289- 294; Hagen, H.A. (1868): *Odonaten Cubas*. *Stettiner entomol. Zeitung* 29: 274-287). In addition, Gundlach published a comprehensive work on the Odonata of Cuba by himself (Gundlach, J.C. (1888): *Contribución á la entomología Cubana*. *Neurópteros*. Habana, Alvarez & Co. 2: 189-281). This publication was failed to notice for long years. P.P. Calvert traced it, and commented critically on Gundlach's publication (see: Calvert, P.P. (1919): *Gundlach's work on the odonata of Cuba, a critical study*. *Transactions of the American entomological society* 45: 335- 396; Calvert, P.P. (1921): *On Gundlach's work and on Enallagma pollutum and E. vesperum*. *Ent. news* 32: 32). In a chapter (pages 125-136) the correspondance of Gundlach with Carl Robert von Osten Sacken, Herman August Hagen, and Philip Reese Uhler is outlined. This interesting book - priced 24,50 Euro - can be obtained by W. Dathe.] Address: Dathe, W., Hegelstr. 73, D-06114 Halle/Saale, Germany. E-mail: wilfried.dathe@gmx.de

3584. Dolny, A.; Misztka, A.; Parusel, J. (2002): Dragonfly conservation perspectives in the Czech and Polish parts of the Upper Silesia. All-Poland scientific con-

ference "Insect conservation in Poland", Abstracts of papers. *Pol. Tow. Ent., Poznani & Univ. Warmirisko-Mazurski, Olsztyn*: 33-34. (in Polish). [The odonate fauna of the Czech-Polish border region is analyzed in terms of common conservation measures for the odonate fauna. Two main data pools exist: one from the beginning of the 20th century, and one resulting from studies between 2000 and 2002. It is concluded that most nature reserves (n=189) in the region are insufficient to protect Odonata. Only 23 nature reserves aim to conserve aquatic habitats. The restoration of water bodies with the rare and threatened *Stratiotes aloides* would give the opportunity to re-establish *Aeshna viridis* in the region.] Address: Available from *Pol. Ent. Soc. Polskie Towarzystwo Entomologiczne, Ul Dabrowskiego 159, PO-60-594 Poznani*

3585. Dorda, D. (2002): *Biotope und Schutzgebiete der Kreisstadt Homburg. Ein Beitrag zum kommunalen Umweltschutz. Kreis- und Universitätsstadt Homburg (Hrsg.)*. ISBN 3-924653-30-5: 73 pp. (in German). [Saarland, Germany; *Aeshna juncea* is mentioned for the valley of the Lambsbach.] Address: Kreis- und Universitätsstadt Homburg, Rathaus, Am Forum 5, D-66424 Homburg, Germany

3586. Evans, H.E. (2002): A review of prey choice in Bembicine sand wasps (Hymenoptera: Sphecidae). *Neotropical Entomology* 31(1): 1-11. (in English). ["The prey of 132 species of Bembicini (Hymenoptera) that have been studied is reviewed. About three quarters of the species prey on Diptera, and it is believed that fly predation is ancestral in the group. Eleven species make occasional or regular use of other insects as prey in addition to Diptera (Lepidoptera, Hymenoptera, Neuroptera, Odonata, and/or Homoptera), while 21 species of five genera prey on insects of these same five groups with no use of Diptera. It is hypothesized that this represents an evolutionary progression, whereby populations have experienced shortages of dipterous prey in the past and have broadened their sensory focusing to include other groups of flying insects. Behavior initially learned has, over time, been reinforced genetically to produce the currently observed radiation in prey choice within the group." (Author)] Address: Evans, H.E., Dept. Bioagricultural Sciences and Pest Management, Colorado State University, Fort Collins, CO, 80523-1177 USA

3587. Fagan, W.F.; Siemann, E.; Mitter, C.; Denno, R.F.; Huberty, A.F.; Woods, H.A.; Elser, J.J. (2002): Nitrogen in insects: Implications for trophic complexity and species diversification. *American Naturalist* 160(6): 784-802. (in English). ["Disparities in nutrient content (nitrogen and phosphorus) between herbivores and their plant resources have lately proven to have major consequences for herbivore success, consumer-driven nutrient cycling, and the fate of primary production in ecosystems. Here we extend these findings by examining patterns of nutrient content between animals at higher trophic levels, specifically between insect herbivores and predators. Using a recently compiled database on insect nutrient content, we found that predators exhibit on average 15% greater nitrogen content than herbivores. This difference persists after accounting for variation from phylogeny and allometry. Among herbivorous insects, we also found evidence that recently derived lineages (e.g., herbivorous Diptera and Lepidoptera) have, on a relative basis, 15% - 25% less body

nitrogen than more ancient herbivore lineages (e.g., herbivorous Orthoptera and Hemiptera). We elaborate several testable hypotheses for the origin of differences in nitrogen content between trophic levels and among phylogenetic lineages. For example, interspecific variation in insect nitrogen content may be directly traceable to differences in dietary nitrogen (including dilution by gut contents), selected for directly in response to the differential scarcity of dietary nitrogen, or an indirect consequence of adaptation to different feeding habits. From some functional perspectives, the magnitude rather than the source of the interspecific differences in nitrogen content may be most critical. We conclude by discussing the implications of the observed patterns for both the trophic complexity of food webs and the evolutionary radiation of herbivorous insects." (Authors). Predatory Odonata (n=2) were tested against herbivory Ephemeroptera (n=3) ((tab. 1). Within ordinal groups, mean predator N content always exceeded the corresponding herbivore mean. The difference between Odonata and Ephemeroptera was 2.20%. The mean within-order difference was 1.34%. More details may be available at <http://www.nceas.ucsb.edu/ecostoichiometry>.] Address: Fagan, W.F., Department of Biology, University of Maryland, College Park, Maryland 20742, USA. E-mail: bfagan@glue.umd.edu

3588. Faton, J.-M. (2002): Le libellules de la mare du vallon de Combau. Le Courrier des Epines drômoises 109: 51. (in French). [A survey of the locality, situated in the Drôme-region (France) at 1350 asl, resulted in 8 odonate species.] Address: Faton, J.-M., Réserve Naturelle des Ramières, les Garis, F-26120 La Baume Cornillane, France. E-mail: Fatonjm@aol.com

3589. Feiber, A.L.; Rangarajan, J.; Vaughn, J.C. (2002): The evolution of single-copy Drosophila nuclear 4f-rnp genes: Spliceosomal intron losses create polymorphic alleles. *Journal of Molecular Evolution* 55(4): 401-413. (in English). ["This study provides the first report in which spliceosomal intron losses within a single-copy gene create functional polymorphic alleles in a population. 4f-rnp has previously been shown to be a nuclear gene that is localized on the X chromosome in *D. melanogaster* and to have eight short spliceosomal introns. An insect species survey was done via polymerase chain reaction (PCR) amplification and sequencing of a 1028-bp gene fragment spanning introns 4-8, which are located in the 3' half of the gene. The results show that 4f-rnp and (thus far) introns 7 and 8 are at least as old as order Odonata, an early-diverging insect line. Unexpectedly, several species within the dipteran family Drosophilidae were found to contain two differently sized 4f-rnp gene sequence variants, owing to precise inframe intron losses. Results of single-male *D. melanogaster* PCR analyses show that the two gene size variants are allelic and that the intron loss mechanism appears to be biased toward the 3' end of the gene. A stable potential stem-loop has been identified in *D. melanogaster*, predicted to fold the 4f-rnp mRNA 3' terminus into a natural primer for subsequent reverse transcription into cDNA. When results are displayed in a phylogenetic context, multiple independent intron loss events are identified. These observations support a model in which frequently occurring cDNAs have led to numerous independent intron losses via homologous recombination/gene conversion during 4f-rnp gene evolution. The results provide insights into the evolution of intron loss and may lead to improved understanding of

the dynamics of this process in natural populations." (Authors)] Address: Vaughn, J.C., Dept of Zoology, Miami University, Oxford, OH, 45056, USA. E-Mail: vaughnjc@muohio.edu

3590. Fleck, G. (2002): Contribution à la connaissance des odonates de Guyane française. Notes sur les genres *Epigomphus* Hagen, 1854 et *Phyllocycla* Calvert, 1948 (Anisoptera, Gomphidae). *Bull. Soc. Entomol. France* 107: 493-501. (in French, with English summary). ["The larva of *Epigomphus hylaeus* Ris, 1916, and the true larva of *Phyllocycla neotropica* Belle, 1970, are described and illustrated for the first time. The differences with the other known larvae of these genera are listed. For both genera, a key in French and in English is given to separate the unambiguously known ultimate instars larvae. The previously unknown female of *Phyllocycla neotropica* is briefly described and illustrated. A reared larva of *Phyllocycla modesta* Belle, 1970, yielded a female showing a thoracic color pattern different from that of the allotype described by Belle (1970)."] (Author)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

3591. Fleck, G.; Nel, A. (2002): The first isophlebioid dragonfly (Odonata: Isophlebioptera: Campterothlebiidae) from the Mesozoic of China. *Palaeontology* 45(6): 1123-1136. (in English). ["*Bellabrunetia catherinae* gen. et sp. nov., the first Chinese Mesozoic isophlebioid dragonfly, is described. This fossil is the first known Isophlebioptera with well-preserved body structures, demonstrating that the fore- and hindwings are of very different size and shape in Campterothlebiidae, and that the female Campterothlebiidae had an endophytic way of oviposition, unlike the Isophlebiidae." (Authors)] Address: Fleck, G., Laboratoire d'Entomologie and CNRS UMR 8569, Muséum National d'Histoire Naturelle, 45 rue Buffon, F-75005, Paris, France. E-Mail: fleck@mnhn.fr, anel@mnhn.fr

3592. Fleck, G. (2002): Une larve d'Odonate remarquable de la Guyane française, probablement *Lauro-macromia dubitalis* (FRASER, 1939) (Odonata, Anisoptera, 'Corduliidae'). *Bulletin de la Société Entomologique de France* 107(3): 223-230. (in French, with German and English summary). [From French Guyana, a last instar larva of the neotropical "cordulid" *Lauro-macromia* Geijskes, 1970 - probably *L. dubitalis* - is described in detail. The "larvae show well-developed lateral spines on abdominal segments 3 to 9 which is unusual for cordulegastrid-like or libellulid-like larvae. In the libellulid-like larvae, the lateral spines are generally confined on segments 8 and 9. Traditionally the genus *Lauro-macromia* was considered to be a member of the Gomphomacromiinae sensu Davis & Tobin (1985). The features of the larva clearly demonstrate that the genus *Lauro-macromia* cannot be considered as a Gomphomacromiidae sensu Carle (1995) because of the presence of raptorial setae on the labial palp which are a clear synapomorphic character to the "Macromiid-Cordulid-Libellulid-Complex" sensu Carle, 1995 (= *Valvulida* sensu Lohmann, 1996) (= *Trichodopalpida* sensu Bechly, 1996)."] (Author)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

3593. Geraeds, R.P.G.; Schaik, V.A. van (2002): Observations on the distribution and ecology of the Club-

tailed dragonfly (*Gomphus vulgatissimus*) along the river Roer. *Natuurhistorisch Maandblad* 91: 113-118. (in Dutch with English summary). [*G. vulgatissimus* has always been a rare species in the province of Limburg, The Netherlands. "During an intensive inventory in 2000 and 2001, however, 1597 exuviae of this species were found along the river Roer. Observations on the adult dragonflies were also recorded. The species can be found along the entire river. The greatest densities of exuviae were found between Herkenbosch and Roermond. Here, the larvae find ideal conditions in slow-flowing muddy parts of the river. Most larvae emerge vertically and close to the waterline (0-0.5 m). They seem to prefer emerging among the vegetation. The average length of the exuviae was 29.5-30mm." (Authors)] Address: Geraeds, R., Julianalaan 46, NL-6042 JH Roermond, The Netherlands

3594. Gibbons, L.K.; Reed, J.M.; Chew, F.S. (2002): Habitat requirements and local persistence of three damselfly species (Odonata: Coenagrionidae). *Journal of Insect Conservation* 6(1): 47-55. (in English). ["Habitat requirements and population persistence were investigated in three damselfly species, all coastal plain pond specialists: *Enallagma recurvatum*, *E. laterale*, and *E. pictum*. Because of geographic restriction, two are of special concern to conservation, *E. recurvatum* and *E. laterale*. We surveyed more than 70 ponds on Cape Cod, Massachusetts, and collected adult presence-absence data during the summers of 1999 and 2000. We achieved a detection rate approaching 100% for each species by visiting each pond up to three times. We looked for relationships between the presence of each damselfly species and presence of specific aquatic vegetation, the presence of the other *Enallagma* species, and the number of ponds within various distances of the 72 surveyed ponds. Using stepwise logistic regression, we found the following significant associations: *E. recurvatum* with the rush *Juncus militaris*; *E. laterale* with water lilies (*Nuphar variegatum* and *Brasenia schreberi*) the damselfly *E. pictum*, and the number of ponds within 2 km; and *E. pictum* with the water lily *Nymphaea odorata*, the damselfly *E. laterale*, and the number of ponds within 1.5 km and 2.5 km. Presence-absence data were used to calculate turnover and local extinction rates for each species between the two years. *E. recurvatum*'s turnover and local extinction rates (33.3% and 41% respectively) were much higher than either *E. laterale* (9.8%, 11.5%) or *E. pictum* (7.7%, 10%). These results suggest that *E. recurvatum* occurs in a metapopulation, and that patch colonization rates might be important to local population persistence." (Authors)] Address: Reed, J.M., Dept Biol., Tufts Univ., Medford, MA 02155, USA. E.mail: mreed@tufts.edu

3595. Goldschmid, U.; Grotzer, C. (2002): Anlage und Management eines Teiches als ökologische Ausgleichsmaßnahme: Das Tritonwasser auf der Wiener Donauinsel. *Denisia* 3: 25-45. (in German with English summary). ["In 1989 the Department of Water Res decided to set up an about 2 ha large pond. It was to fulfil exclusively ecological functions and to serve as a further stepping-stone in a chain of humid biotopes. Special consideration was given to the demands amphibious animals, water- and reed-birds and dragonflies make on a water body. The design of the pond and its environment were derived from the ecological requirements as: well structured shoreline with bays, islands

and peninsulas; flat riparian zones; deep water zones which will not freeze; high structural diversity by initial plantings of submerged and emergent vegetation. The construction work was carried out during winter of 1989/90. The basin of the pond was sealed with a 30 cm-thick layer of clay. The substratum ranges along the gradient from sands to coarse gravel. The gradients of the slopes reach a maximum of 1:2, but are at an average of 1:5 to 1:10. Parts of the pond are separated by gravel ridges into several individual sections, which get an individual character from a hydrologic and faunistic point of view. The pond was filled via a feeding pipeline from the New Danube. Initial plantings were carried out, mainly with a variety of marsh and aquatic plants. These endemic plants were taken from several detention reservoirs of Vienna's rivers. The succession processes and colonization by animals and the increase of plants are subjected to a scientific long-term monitoring project." (Authors)] Address: Goldschmid, Ulrike, Wilhelminenstrasse 93, MA 45 - Wasserbau, A-1160, Wien, Austria. E-Mail: gol@m45.magwien.gv.at

3596. Harding, D.; Thompson, J. (2002): Habitat use by the Seychelles fineliner damselfly (*Teinobasis alluaudi*) on Silhouette island, Seychelles. *Phelsuma* 10: 35-40. (in English). [In 2002, research on the island located 4 sites for this species providing new data on appearance, vegetation use by teneral and adults, colour development, and oviposition. Apparent preference for alien vegetation (*Clidemia hirta*, *Paraserianthes falcata*) is attributed to males preferring an open vegetation structure.] Address: Harding, D., Sch. Biol. Sci., Univ. Sussex, Palmer, Brighton, BN1 9QJ, UK

3597. Heijligers, H. (2002): Boekbespreking: Libellen van Noordwest Europa. Determinatie, Verspreiding, Biotoopvoorkeur en Bedereiding van de libellensoorten van Noordwest-Europa. *Natuurhistorisch Maandblad* 91: 240. (in Dutch). [This is a brief book review of Wendler, A. & J.-H. Nüss. Vertaling: Willem Schipper. Bewerking: Arjan Stroo, Marcel Wasscher & Wendy Schuurmans, 2002. 136 pp. Jeugdbonduitgeverij, Utrecht. ISBN 90-5107-031-4.] Address: not stated

3598. Houston, W.A.; Duivenvoorden, L.J. (2002): Replacement of littoral native vegetation with the ponded pasture grass *Hymenachne amplexicaulis*: Effects on plant, macroinvertebrate and fish biodiversity of backwaters in the Fitzroy River, Central Queensland, Australia. *Marine & Freshwater Research* 53(8): 1235-1244. (in English). ["Changes in plant and macroinvertebrate communities were found following replacement of extensive zones of floating-attached/submergent native vegetation within Fitzroy River backwaters by the major environmental weed *Hymenachne amplexicaulis* (Poaceae). Impacts of *H. amplexicaulis* on native littoral flora and fauna (macroinvertebrates and fish) were assessed by comparing three sites previously supporting native vegetation and now invaded by *H. amplexicaulis* with nearby stands of native backwater vegetation. Plant biomass of *Hymenachne* plant beds was 30-fold greater than native plant beds, whereas plant species diversity (richness) was significantly less. Macroinvertebrate communities of *Hymenachne* beds were significantly lower in abundance of insect orders Ephemeroptera, Hemiptera and Odonata, while Coleoptera were more abundant in *Hymenachne* beds. Non-metric multidimensional scaling ordination of macroinvertebrate family abundance and composition data showed that

Hymenachne plant beds had a different assemblage to that in native plant beds. In common with other studies of weed invasions, an increased abundance of some vertebrate fauna was observed (in this case an introduced fish species *Xiphophorus maculatus* comprised 75% of fish captured in Hymenachne beds compared with 0% in native plant beds). Change in vegetation structure was implicated as an important factor influencing macroinvertebrate and fish faunal composition, and with potential to impact on waterbird habitat values of wetlands." (Authors)] Address: Houston, W.A., Centre for Environmental Management, Central Queensland University, Rockhampton, QLD, 4702, Australia. E-Mail: w.houston@cqu.edu.au

3599. Huguët, A.; Nel, A.; Martínez-Delclos, X.; Bechly, G.; Martins-Neto, R. (2002): Preliminary phylogenetic analysis of the Protanisoptera (Insecta: Odonatoptera). *Geobios* 35(5): 537-560. (in English). ["The Permian suborder Protanisoptera (Insecta: Odonatoptera) is revised and a new phylogenetic hypothesis proposed after analyses based on wing venation and different outgroups. After our study the families Camptotaxineuridae and Kaltanoneuridae are excluded from the Protanisoptera. After a new phylogenetic analysis, the family Permaeschnidae is redefined and the families Pholidoptilidae, Polytaxineuridae, Callimokaltaniidae and Hemizygopteridae are restored, as already proposed for the latter three families by Bechly (1996). The new genus *Proditaxineura* is described. The genus *Gondvanoptilon* ROSLER et al., 1981 is excluded from the Meganisoptera: Erasipteridae and re-included in the Permaeschnidae, as already proposed by Bechly (1998). *Permaeschna proxima* MARTYNOV, 1931 is considered as a junior synonym of *Permaeschna dolloi* MARTYNOV, 1931. *Pholidoptilon camense* ZALESSKY, 1931 is excluded from *Permaeschna* MARTYNOV, 1931 and the genus *Pholidoptilon* ZALESSKY, 1931 is restored. *Ditaxineurella stigmalis* MARTYNOV, 1940 is excluded from the Hemizygopteridae and considered as a Protanisoptera Incertae sedis." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

3600. Jacunski, L.; Teszner, L.; Tempin, J.; Napiórkoska, T. (2002): The case of oligomely in the larvae of the dragonfly *Aeshna grandis* L.. *Przegląd Zoologiczny* 46: 91-93. (in Polish with English summary). [A larva of *Aeshna grandis* with five legs (2/3) is documented and discussed.] Address: Teszner, Lidia, Zakład Zoologii Bezkręgowców, Instytut Biologii Ogólnej i Molekularnej, Uniwersytet M. Kopernika, ul. Gagarina 9, PL-87-100 Torun, Poland. E-mail: teszner@biol.uni.torun.pl

3601. Ketelaar, R. (2002): The status of the Northern Damselfly *Coenagrion hastulatum* in the Netherlands, a characteristic dragonfly of non-disturbed shallow lakes (Odonata). *Ned. faun. Meded.* 16: 1-10, col. phot. excl.. (in Dutch, with English summary). ["Between 1980-2000, the species disappeared from 7 localities, at present 16 populations are known in the southern and eastern Netherlands. These are reviewed, and circumstantial evidence is presented on the wandering of individuals over a distance of at least ca 2km."] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

3602. Knötzsch, G. (2002): Das Auftreten mediterraner Libellenarten im Eriskircher Ried. *Naturschutz zwischen Donau und Bodensee* 1: 37-42. (in German). [Baden-Württemberg, Germany; a monitoring of Odonata starting in the end of the 1980th proves that so called mediterranean species as *Aeshna affinis*, *Crocothemis erythraea*, and *Sympetrum fonscolombii* meanwhile belong to the characteristic and permanent fauna of the area. It can be assumed that global warming is one of the main reasons of the range extensions of these species. The author outlines in some detail the ecological factors responsible for the occurrence of *A. affinis* in the area: this species depends on the high flood of lake Constance, and builds up large populations in a year with high flood, while it may lack in dry summers. Records of *Sympetrum meridionalis* in August 2002 are very remarkable. In addition, records of *Lestes barbarus*, *C. erythraea*, and *S. fonscolombii* are reported in detail, and a check-list comprising of 45 odonate species is added. The Eriskirchener Ried is definitely a "Prime Dragonfly Area" in (Western) Europe.] Address: Knötzsch, G., Friedrichstr. 44, D-88045 Friedrichshafen, Germany.

3603. Koperski, P. (2002): Factors determining diversity in diet composition: multivariate analysis of a guild of epiphytic predators. *Arch. Hydrobiol.* 155(2): 291-314. (in English). ["The diet composition of five species of epiphytic predators (the larval damselfly *Enallagma cyathigerum*, larval midge *Ablabesmyia monilis*, larval caddisfly *Cyrnus flavidus* and leeches *Erbobdella octoculata* and *E. nigricollis*), inhabiting *Stratiotes aloides* in the shallow littoral of three Polish lakes, was analysed using multivariate methods. The gut contents of individuals living in experimental mesocosms were also analysed to test the behavioural effects of the stimuli released by larger predators - fish and aquatic insects. The main aims of the study were: to determine the most important interactions between particular members of the guild of epiphytic predators, to explain interactions between the above and their feeding resources and to characterize the effects of experimentally simulated predatory pressure. A further aim was also to test if the diversity in dietary composition caused by intrinsic, species-specific feeding preferences is higher or lower than that caused by anti-predator changes in their feeding behaviour. To design the data matrix, the dietary composition of each of 595 individuals was characterised by 28 variables, designing at the numbers or percentage of prey taxa and prey ecological groups as well as the cumulative metrics and indices. [...] Individual dietary composition has customarily been seen as depending more markedly on the presence of stimuli from larger predator than on taxonomic specifics. The dietary compositions of the three insect species studied were more similar in natural conditions than in experimental habitats. The dietary composition of *E. nigricollis* was more distinct from the diets of the other species, and significantly different even from that of the congeneric species *E. octoculata*. Diets of leeches diverged more significantly in various feeding habitats than those of insect larvae. Moreover, the diversity to the dietary compositions of particular species feeding in natural lake conditions was lower than that to the composition noted for conspecifics feeding in different habitats." (Author)] Address: Koperski, P., Department of Hydrobiology, Institute of Zoology, Warsaw University, Banacha 2, 02-097 Warszawa, Poland. E-mail: koper@hydro.biol.uw.edu.pl

- 3604.** Kozak, A.; Zawal, A. (2002): Comparison of dragonfly communities in the open-land and forest small water bodies. All-Poland scientific conference "Insect conservation in Poland", Abstracts of papers. Pol. Tow. Ent., Poznani & Univ. Warmirisko-Mazurski, Olsztyn: 42. (in Polish). [In both water body types - located near Binowo, Poland - *Coenagrion puella* was the dominant species. The similarity of the dragonfly fauna of different sample localities accounted to 30-50%. The nearby situated open-land water bodies influenced the composition of the small forest water bodies, e.g. *A. viridis* - definitely no species of wooded habitats - could be observed in the forest water body.] Address: Available from Polskie Towarzystwo Entomologiczne, Ul Dabrowskiego 159, PO-60-594 Poznan
- 3605.** Kury, D.; Bauer-Stingelin, K. (2002): Änderungen der Libellengemeinschaft in der Zurlindengrube Pratteln zwischen 1986 und 1996. Mitt. naturf. Gesell. beider Basel 6: 15-22. (in German with English summary). [A comparison is made between the 1986 and 1996 odonate assemblages of the abandoned gravel pit, canton Basel-Landschaft, Switzerland. The alterations are probably due to management measures, aiming at the re-institution of some early succession stage habitats.] Address: Bauer-Stingelin, Fraumattstr. 51, CH-4410 Liestal, Switzerland
- 3606.** Laurila, A.; Pakkasmaa, S.; Crochet, P.-A.; Merila, J. (2002): Predator-induced plasticity in early life history and morphology in two anuran amphibians. *Oecologia* 132(4): 524-530. (in English). ["Predation pressure during early life stages is often high, but few studies have examined antipredator responses at these stages. We studied the effects of an egg predator (leech, *Haemopsis sanguisuga*) and two tadpole predators (dragonfly larvae, *Aeshna* spp.; and three-spine stickleback, *Gasterosteus aculeatus*) on the timing of hatching and morphology of hatchlings and young tadpoles in two anuran amphibians (*Rana arvalis* (RA) and *R. temporaria* (RT)) in a factorial laboratory experiment. We also compared the responses of two geographically separated RA populations on the Baltic island of Gotland and in Uppland on the Swedish mainland. We found inconsistent evidence for the predictions that the presence of an egg predator induces earlier hatching, and the presence of a larval predator delays hatching. RT hatched later in the presence of stickleback than in the control treatment, but RA hatched earlier, less developed and at smaller size in the leech, dragonfly, and stickleback treatments. There was no indication of predator-induced morphology in hatchlings of either of the species. However, young RA tadpoles had shorter tails and deeper bodies in the stickleback treatment and RT had shorter tails in the leech, dragonfly and stickleback treatments. Irrespective of treatment, RA from Gotland hatched with relatively longer bodies than Uppland individuals and had relatively deeper and short tails as young tadpoles. Our results highlight the diversity of induced responses to predators in anuran amphibians: predator presence affects the timing of hatching and morphology of young tadpoles, but these responses vary depending on the species and predator considered." (Authors)] Address: Laurila, A., Dept of Population Biology, Uppsala University, Norbyvagen 18D, 75236, Uppsala Sweden. E-Mail: anssi.laurila@ebc.uu.se
- 3607.** Lucas, M.J. (2002): Spinning Jenny and Devil's darning needle. ISBN 0-9544035-09: viii + 88 pp. (in English). [This attractive book - including 25 colour illustrations - on anthrop-odonatology is structured in the following main chapters: "Folknames" (pp.1-12), "Folklore, myth and legend" (pp. 13-20), "Literature, poetry and music" (pp. 39), "Illustrations, sculpture and carvings" (pp. 40--62), "Art nouveau" (pp. 63-64), "Religion" (pp. 65--66), "Food, medicine and decorations" (pp. 67-68), "Stamps" (pp. 69-76), and "Miscellaneous" (pp. 77--79). The Bibliography comprises more than 150 references. The presented evidence from various fields is not exhaustive (e.g. music and stamps), but even so, the book gives a wealth of (introducing) information.] Address: Lucas, M. Jill., 8 Camborne Dr., Fixby, Huddersfield, Yorks., HD2 2NF, UK
- 3608.** Malkmus, R. (2002): Die Verbreitung der Libellen Portugals, Madeiras und der Azoren. *Nachr. naturwiss. Mus. Stadt Aschaffenburg* 106: 117-143. (in German with English summary). [64 odonate taxa are known from continental Portugal, from the Madeira archipelago 6 species, and from the Azores 4 species. The "continental" species are mapped on the basis of the UTM grid, while the rest is only listed. The maps were prepared after critically revising museum specimens and published data. They include museum-, literature-, and field-collection-data of the author.] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany
- 3609.** Malkmus, R. (2002): Weitere Funde von *Macromia splendens* (Pictet) in Portugal (Anisoptera: Corduliidae). *Nachr. naturwiss. Mus. Aschaffenburg* 106: 144-147. (in German with English summary). [Six additional records from northeastern Portugal resulting from trips in 1997 and 2000 enhance the known distribution of *M. splendens* on the Iberian peninsula in a significant way. The localities - situated along the rivers Tâmega, Tua, Côa, and Anguiera - are described in detail, co-occurring species (e.g. *Gomphus graslinii* and *Oxygastra curtisii*) are listed.] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany
- 3610.** Meurgey, F. (2002): Contribution a la connaissance des odonates de la Guadeloupe (Antilles Françaises): signalement de *Tholymis citrina* (Hagen, 1876) et resultats des prospections 2001. *Bull. Soc. Sci. not. Quest Fr. (N.S.)* 24(3): 135-145. (in French with English summary). [The results of an odonatological survey in Guadeloupe Island, Lesser Antilles (Dec. 2001-Jan. 2002) are reported; 13 localities are described and mapped, and 16 species (including a first record of *T. citrina*) are listed. So far, 31 species were recorded from the island.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12 rue Voltaire, F-44000 Nantes, France
- 3611.** Meurgey, F. (2002): Nouveau site de reproduction pour *Gomphus vulgatissimus* (Linné, 1758) en Loire-Atlantique (Odonata, Gomphidae). *Bull. Soc. Sci. not. Quest Fr. (N.S.)* 24(4): 215-217. (in French with English summary). [La Sevre, near Clisson, France; the locality is described and information on the occurrence of the species in the department is provided.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12 rue Voltaire, F-44000 Nantes, France
- 3612.** Mitra, T.R. (2002): Geographic distribution of Odonata (Insecta) of eastern India. *Memoirs of the Zoological Survey of India* 19(1): 208 pp. (in English). [294 odonate species and subspecies are known to occur in eastern India. The geographic scope of eastern India

includes the fauna of the states Arunachal, Pradesh, Assam, Bihar, Manipur, Mizoram, Nagaland, Orissa, Sikkim, Tripura, and West Bengal. The monograph compiles the available odonotological information, contains keys for the identification of the species, their variations from the reference collections present in the Zoological Survey of India, compiles descriptions available in the Fauna of British India volumes, and outlines the geographical distribution in detail. "It also embodies description of new species of *Calicnemia* and *Gomphidia* and five indeterminate species, females of *Agriocnemis nana*, *Indothemis limbata limbata*." This is a little bit obscure, because *C. sudhaae* and *G. leonoraee* were described in Mitra, T.R. (1994): Observations on the habits and habitats of adult dragonflies of eastern India with special reference to the fauna of West Bengal. Rec. zool. Survey India (Occ. pap.) 166: 1-40. The indeterminate taxa are *Crocothemis indica* Sahni, 1964 = *C. servillia* (Drury, 1773), *Crocothemis misrai* Bajjal and Agarwal, 1956 = *Trithemis aurora* (Burmeister, 1839), *Orthetrum ganeshii* Mehrotra, 1961 and *O. chandrabali* Mehrotra, 1961 = *Orthetrum triangulare* (Selys, 1878), and *Ictinogomphus distinctus* Ram (1985) = probably a synonym of *Ictinogomphus rapax* (Rambur, 1842), *Bradinyoga saintjohanni* Bajjal & Agarwal, 1955 = *Bradinyoga saintjohanni geminata* (Rambur, 1842). The geographic distribution of the taxa is discussed in detail. A bibliography and an index contribute significantly to this valuable and commendable publication.] Address: Mitra, T.R., "M" Block, New Alipore, Kolkata 700 053, India

3613. Monnerat, C.; Gonseth, Y. (2002): Jahresbericht 2001. Odonata 2000. Nachrichten des Schweizer Zentrum für die Kartographie der Fauna 23: 6-7;-23-24. (in German and French). [In the framework of preparing the Red List of endangered Swiss Odonata, trends of population development of selected species were analyzed using a statistic program. The results were compared with the opinion and field experiences of dragonfly experts. A special survey of the rare *Brachytron pratense* was realized to check the trends. It is concluded that the opinion of the experts fits best to the reality. In addition, some so called data sheets on *Ceragrion tenellum*, *Sympetma paedisca*, *Gomphus similimus*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, *Calopteryx virgo*, *C. splendens*, *Sympetrum flaveolum*, *Lestes dryas*, *L. virens*, *Eitheca bimaculata*, *Coenagrion mercuriale*, and *Ophiogomphus cecilia* were prepared for publication in 2002. Furthermore, an update of the dragonfly atlas of Switzerland was discussed with the experts, and its scope was defined.] Address: Monnerat, C., Centre suisse Cartogr. Faune, Terreaux 14, CH-2000 Neuchatel, Switzerland. E-mail: christian.monnerat@cscf.unine.ch

3614. Mustow, S.E. (2002): Biological monitoring of rivers in Thailand: Use and adaptation of the BMWP score. *Hydrobiologia* 479: 191-229. (in English). ["The performance of the BMWP biotic score, which is based on macroinvertebrates (including Odonata), in accurately classifying 23 sites on the River Ping system in northern Thailand, was assessed through comparison with physical and chemical data. Sites were located on the main River Ping, a highly polluted tributary (Kha Canal), a relatively unpolluted tributary (River Taeng) and an upland stream tributary system (River Klang). Data were collected between December 1990 and September 1993. The purpose of the research was to determine

whether the BMWP score, originally developed in the U.K., could be employed successfully in Thailand and potentially also in other subtropical and tropical developing countries. Biological monitoring techniques such as the BMWP score are low-tech, rapid means of assessing water quality, and involve significantly lower financial costs than chemical monitoring techniques. The BMWP score was capable of distinguishing between sites that were heavily impacted by organic pollution and relatively unpolluted sites, and showed some potential to identify lower levels of pollution. The overall performance was considered to be similar to that recorded in the U.K. It was noted during the study that several of the taxa used in the BMWP score were absent in Thailand and that other taxa were present that would potentially be useful indicators. The BMWP score was therefore modified by removing 15 taxa not present in Thailand and adding 11 replacement taxa. Also, in the modified score, 6 sets of families were combined due to taxonomic difficulties and 7 odonatan families were allocated lower scores. The modified procedure, named the BMWPTHAI score, did not significantly alter the way in which sites were classified, but was easier to use. There is strong potential for application of the BMWPTHAI score in Thailand and other developing countries, although some further testing is first recommended." (Author)] Address: Mustow, S.E., White Young Green Environmental, Arndale Court, Headingley, Leeds, LS6 2UJ, UK. E-Mail: stephen.mustow@wyg.com

3615. Muzlanov, Yu.A. (2002): Chronological dynamics of the distribution of wing venation anomalies in intrapopulation groups of *Calopteryx splendens* Harr. damselflies. *Ekologiya* (Moscow) 3: 209-214. (in Russian with English summary). ["The long-term dynamics of the number of full (normal) veins, venation anomalies, and linear parameters of the wings of *C. splendens* males from neighboring population groups were analyzed. Correlation analysis showed that some of the anomalies may emerge in addition to the full veins, whereas others are formed instead of them. The demoiselles from even-year generations had a significantly greater number of developmental abnormalities. This may have been caused by the sharp increase in the radiation level in the summer of 1986 due to the Chernobyl accident, which could have resulted in significant hereditary disorders manifested in the succession of generations of this genetic group. The emergence of venation abnormalities in demoiselle wings is a stochastic process, strengthened by both environmental and genetic stress. These anomalies may be considered as markers of the stability of ontogenetic processes, which greatly reflect the specific genotypic traits of individuals within a population. The analysis of average values for venation abnormalities in demoiselle wings is a more precise instrument for assessing ontogenetic stability than the levels of fluctuating asymmetry and general phenotypic variance." (Author)] Address: Muzlanov, Yu.A., Zarevskaya Secondary School of General Education, Zarya, Ryazan Russia

3616. Negishi, J.N.; Inoue, M.; Nunokawa, M. (2002): Effects of channelisation on stream habitat in relation to a spate and flow refugia for macroinvertebrates in northern Japan. *Freshwater Biology* 47(8): 1515-1529. (in English). ["1. The effects of channelisation on macroinvertebrates were examined in relation to a spate and flow refugia. Habitat components that can function as flow refugia were identified in a small, low-gradient

stream in northern Hokkaido, Japan. 2. Macroinvertebrates and their habitat characteristics (depth, current velocity and substratum) were sampled and measured in natural and channelised sections on three occasions: before, during and immediately after a spate. For macroinvertebrate sampling and habitat measurements, five (riffle, glide, pool, backwater and inundated habitats) and three (channelised-mid, channelised-edge and inundated habitats) habitat types were classified in the natural and channelised section, respectively. 3. The rate of velocity increase with discharge was compared among habitat types to determine which habitat types were less affected by increased discharge. The rate was the highest in riffles followed by glides and channelised-mids. Backwaters maintained low current velocity even at high flow. In addition, current velocity in both natural and channelised inundated habitats was low relative to other habitat types during the spate. 4. Through the spate, total density of macroinvertebrates in channelised-mids and taxon richness in both channelised-mids and edges decreased. In the natural section, however, such a significant decrease was not found except for taxon richness in pools. This indicated that the spate had a greater impact on assemblages in the channelised section. Riffle assemblages exhibited a rapid recovery immediately after the spate, suggesting the existence of flow refugia in the natural section. Among the habitat types we examined, backwaters and inundated habitats appeared to have acted as flow refugia, because these habitats accumulated macroinvertebrates during the spate. 5. The lower persistence of the macroinvertebrate assemblage in the channelised section was attributable to the lower availability of flow refugia such as backwaters and inundated habitats. Our results emphasised the importance of considering flow fluctuations and refugia in assessing the effects of channelisation. In addition, the lateral heterogeneity of stream channels should be considered in stream restoration and management." (Authors) "Davidius" ist listed in table 4.] Address: Negishi, J.N., Dept Forest Sci., Fac. Agriculture, Hokkaido Univ., Sapporo, Japan. E-mail: artp1496@nus.edu.sg

3617. Nel, A.; Huguet, A. (2002): Revision of the enigmatic Upper Carboniferous insect *Campyloptera eatoni* Brongniart, 1893 (Insecta: Odonatoptera). *Organisms Diversity & Evolution* 2(4): 313-318. ["*Campyloptera eatoni* Brongniart, 1893, the type species of the type genus of the Upper Carboniferous family Campylopteridae Handlirsch, is redescribed. It is not a Megasecoptera as previously supposed, but an Odonatoptera with a specialized wing venation. Although it has a more basal position than the Meganeuridae because of the absence of any nodal or subnodal structure, it has acquired a simple vein MA and a widening area between MP and CuA, convergently with the highly derived Discoidalia clade that includes the modern Odonata. A new diagnosis is given for Campylopteridae and its type genus, *Campyloptera* Brongniart. *Campylopteroidea* Rohdendorf, 1962 falls as a new junior synonym under Odonatoptera Martynov, 1932." (Author)] Address: Nel, A., Laboratoire d'Entomologie, CNRS UMR 8569, Museum National d'Histoire Naturelle, 45 Rue Buffon, F-75005, Paris, France. E-Mail: anel@mnhn.fr

3618. Nokkola, A.; Laukkanen, A.; Nokkola, C. (2002): Mitotic and meiotic chromosomes in *Somatochlora metallica* (Cordulidae, Odonata). The absence of localized centromeres and inverted meiosis. *Hereditas* 136(1): 7-

12. (in English). ["Spermatogonial metaphase chromosomes were examined in two dragonfly species, *Somatochlora metallica* (Cordulidae) and *Aeshna grandis* (Aeshnidae), and the behaviour of male meiotic chromosomes was studied in *S. metallica*. Both in *S. metallica* and *A. grandis* the male mitotic metaphase chromosomes from cells treated with colchicine consisted of two; equidistantly aligned chromatids, showing no primary constriction. In meiosis the chromosomes of *S. metallica* males showed telokinetic activity during the first meiotic division, and kinetic activity was restricted in the middle parts of chromosomes during the second division. The kinetic behaviour of the chromosomes both in mitosis and meiosis showed that they were holocentric. One chiasma arises interstitially in each bivalent in *S. metallica* male meiosis. The chiasmata retain their interstitial position at metaphase I and do not terminalize. At metaphase I bivalents co-orient with homologous telomere regions towards the opposite poles. Thus genuine dyads segregate at the first anaphase. Meiosis in these male dragonflies is thus pre-reductional or conventional, not post-reductional or inverted, as has been previously proposed." (Authors)] Address: Nokkala, S., Laboratory of Genetics, Department of Biology, University of Turku, FIN-20014, Turku, Finland. E-mail: seppo.nokkala@utu.fi

3619. Novelo-Gutierrez, R. (2002): Two new Mexican larvae of the genus *Erpetogomphus* Hagen in Selys (Odonata: Gomphidae). *Journal of the New York Entomological Society* 110(3-4): 370-375. ["Detailed descriptions and illustrations of the larvae of *Erpetogomphus* *boa* Selys and *E. cophias* Selys, are provided. Comparison with other larvae of the *crotalinus*-subgroup (sensu Garrison, 1994) is also included. Both species are easily separable by general body coloration, length and shape of ligula, and details of male's epiproct." (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

3620. Ocharan, R.; Ocharan, F.J. (2002): Odonatos del Valle de Cuatango (Alava). *Boletín de la Asociación Española de Entomología* 26(1-2): 97-110. (in Spanish with english summary). ["Complete data about 39 species of Odonata collected from 1994 to 1996 in the Valley of Cuatango and certain localities in its surroundings (Alava, North of Spain) are given; this is one of the "valleys of transition" between the atlantic Cornisa Cantabrica and the mediterranean Valley of Ebro River. A bibliographical revision of the previous records of Odonata in the province of Alava is offered. The records for *Gomphus vulgatissimus* and *Oxygastra curtisi* noticeably increase their distribution areas already known in the Iberian Peninsula." (Authors)] Address: Ocharan, R., Area de Zoología. Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, C/ Catedrático Rodrigo Uria s/n., 33071, Oviedo, Asturias, Spain. E-Mail: rocharan@correo.uniovi.es

3621. Oo, T.T.; Storch, V.; Becker, N. (2002): Studies on the bionomics of *Anopheles dirus* (Culicidae: Diptera) in Mudon, Mon State, Myanmar. *Journal of Vector Ecology* 27(1): 44-54. (in English). ["This study examined some environmental factors influencing the larval habitats of *Anopheles dirus* (breeding in wells) in Mudon, Myanmar, from May 1998 to March 2000. The lar-

val/pupal density was found to be directly proportional to rainfall and indirectly proportional to the well water level. Shade, vegetation and debris on the surface of well water were important factors influencing the abundance of the aquatic stages of *An. dirus*. Salinity had an inverse correlation with the larval and pupal density. Other mosquito species associated with *An. dirus* were identified. Important predators of the mosquito larvae were larvivorous fish, damselfly and dragonfly nymphs. All wells examined were lined with lateritic rocks. Chemical analysis of water samples from wells was conducted." (Authors)] Address: Becker, N., German Mosquito Control Association/KABS, Ludwigstr. 99, 67165, Waldsee, Germany Germany

3622. Pilgrim, E.M.; Roush, S.A.; Krane, D.E. (2002): Combining DNA sequences and morphology in systematics: testing the validity of the dragonfly species *Cordulegaster bilineata*. *Heredity* 89: 184-190. (in English). [Morphological techniques are combined with DNA sequences to determine the taxonomic status of *C. bilineata*. The latter and *C. diastatops* are very similar in morphological features, therefore the status of *C. bilineata* as a valid species is in question. Here, male morphological measurements and internal transcribed spacer 1 (ITS-1) sequences of rDNA are compared between the two taxa. "The male hamule measurements (where copulation occurs) show little difference between the taxa in question, but the anal appendage measurements (where the 6 first contacts the female) show marked divergence between the two taxa. Cluster analysis with these anal appendage measurements correctly assigns almost all individuals measured into their respective taxon. PCR amplification products of ITS-1 display a -50 bp size difference between *C. bilineata* (n = 4) and *C. diastatops* (n = 5) regardless of collection site. Sequence data or these amplifications show 51 bp missing in one locus in the ITS-1 of *C. bilineata* relative to *C. diastatops*. A lone population of *C. diastatops* from Wisconsin has three individuals with ITS-1 products that match the size of both *C. bilineata* and *C. diastatops*. One individual from this population appears to yield two ITS-1 amplification products that match both *C. bilineata* and *C. diastatops*. Although this population may be evidence for hybridization between the 2 taxa, such hybridization is not necessarily sufficient to disqualify the validity of a separate species designation for *C. bilineata*. Morphology and ITS-1 sequences depict a high degree of divergence that is consistent with species-level differences." (Authors)] Address: Pilgrim, E. M., Dept Biol., Utah St. Univ., Logan, UT 84322, USA

3623. Richardson, J.M.L. (2002): Burst swim speed in tadpoles inhabiting ponds with different top predators. *Evolutionary Ecology Research* 4(5): 627-642. (in English). ["Selection is likely to favour anti-predator strategies that are effective against predators encountered frequently. Larval anuran communities fall along a gradient of pond permanency and pond permanency also affects the type of top predator (including Odonata) present. These environmental factors combine to create distinct categories of pond types. In this study, I quantified the predator avoidance trait burst swim speed and related traits for 14 anuran species found in three pond types and within three taxonomic families. Absolute swim speed differed significantly among species and among taxonomic families. Inclusion of size in the model revealed a three-way interaction between size, habitat and taxonomic family. Tail beat frequency and body

shape differed significantly among species, but with no pattern by family or habitat. Functional relationships among traits also did not differ among family by habitat groups. The evolution of swim speed was significantly correlated with the evolution of increased size. In general, these results suggest that anurans have invaded new pond types using multiple mechanisms to cope with the predators that are present." (Authors)] Address: Richardson, J., Department of Zoology, University of Toronto, 25 Harbord St., Toronto, ON, M5S 3G5, Canada. E-mail: jmlr@zool.utoronto.ca

3624. Sabo, J.L.; Power, M.E. (2002): Numerical response of lizards to aquatic insects and short-term consequences for terrestrial prey. *Ecology* 83(11): 3023-3036. (in English). [Experiments with reduced (-) and ambient (+) subsidies in Mendocino Co., California, USA have shown that relative changes in lizard (*Sceloporus occidentalis*) abundance in - subsidy and + subsidy treatments were consistent with relative odonate abundance (e.g. *Argia* spp., *Archilestes californicus*, "*Ophiogomphus bicolor*" (?)), which represent one of the lizard's most common prey types (~20% by biomass).] Address: Sabo, J.L., Dept Biol., Arizona St. Univ., P.O. Box 871501, Tempe, AZ 85287-1501, USA

3625. Samways, M.J. (2002): Caring for the multitude: Current challenges. *Biodiversity & Conservation* 11(2): 341-343. (in English). [The author comments on some current challenges from the conservation resp. biodiversity point of view. Among others, dragonflies are used to focus on taxonomic problems (most of the invertebrates are undescribed) and the function of umbrella species to preserve biodiversity. Some relections are made on the importance of giving vernacular names to and red listing of invertebrates, the importance of soil dwelling organisms on the ecosystem-level, and the importance of invertebrates in general for "ecosystem health".] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

3626. Schlee, J. (2002): Zur Libellenfauna der Rieselfelder Windel in Bielefeld-Senne. *Ber. naturwiss. Ver. Bielefeld und Umgebung* 42: 355-364. (in German). [In 1997, nature conservation measures including creating some water bodies on the the sewage farm Windel near Bielefeld, Nordrhein-Westfalen, Germany were started. Between 1998 and 2001, odonate surveys were made to access the effects of the conservation measures. In total, 27 odonate species could be observed including *Sympetrum flaveolum*, *S. fonscolombii*, *Brachytron pratense*, *Gomphus pulchellus*, *Orthetrum coerulescens*, *Ischnura pumilio*, *Cordulia aenea*, and *Erythromma viridulum*. In 2002, *Sympecma fusca* reproduced in the sewage farm (pers. comm. of the author).] Address: Schlee, J., c/o Biol. Station Gütersloh / Bielefeld e.V., Niederheide 63, D-33659 Bielefeld, Germany. E-mail: BioStationGT-BI@t-online.de

3627. Schlüppmann, M. (2002): Zönosen der Odonaten stehender Kleingewässer im Hagener Raum - Artenzahlen, ihre Ermittlung und die Abgrenzung von Libellengemeinschaften. *Decheniana* 155: 59-76. (in German, with English summary). [Nordrhein-Westfalen, Germany; 312 stagnant ponds within the area of the town of Hagen and their odonate fauna were analysed. Statistics was applied to define affinities between spe-

cies groups, and to develop odonate coenoses.] Address: Schlüpman, M., Hierseier Weg 18, D-58119 Hagen, Germany. E-mail: Martin.Schluepmann@t-online

3628. Stevens, M.; Riedel, H.-W. (2002): Verbreitung der Larven der Quelljungfern (Cordulegaster) (Odonata, Cordulegastridae) im Raum Bergisch Gladbach. *Decheniana* 155: 105-112. (in German, with English summary). [Nordrhein-Westfalen, Germany; in the framework of saprobial examinations of 75 sample sites along running waters, *Cordulegaster boltonii* was recorded at 7 sample sites, while *Thecagaster bidentata* was traced only one time. These records are mapped together with literature data and records from unpublished expertises and a Ms thesis. The localities are described in detail, and the regional distribution of the species is discussed.] Address: Riedel, H.-W., Stadt Bergisch Gladbach, Fachbereich Umwelt und Technik, Wilhelm-Wagner Platz, D-51429 Bergisch Gladbach, Germany

3629. Switzer, P.V. (2002): Territory quality, habitat selection, and competition in the Amberwing Dragonfly, *Perythemis tenera* (Say) (Odonata: Libellulidae): population patterns as a consequence of individual behavior. *J. Kans. ent. Soc.* 75(3): 145-157. (in English). ["Basic habitat selection theory predicts that individuals will prefer relatively high quality habitats over low quality habitats. This preference may affect settlement patterns, with higher quality habitats being occupied first and more frequently. If locations vary in quality and good locations are limited, individuals may compete for the best locations rather than settle in lower quality sites. Thus, any factors which influence the number of individuals in an area may potentially affect patterns of habitat occupation. In this study, I tested these ideas using the settlement and fighting patterns of a territorial dragonfly, *P. tenera*. Females consistently arrived later and departed earlier than males. Male and female arrival, and male departure, was correlated with temperature, with earlier arrivals and later departures on warm days. More males were present at the pond as the summer progressed and on warmer days, but the number of females was not related to date or temperature. The amount of fighting for territories increased as the number of males increased. Individuals tended to occupy high quality sites (i.e., sites with a higher number of matings per minute occupied) first within a day, and were more likely to occupy low quality sites when the number of males on the pond was relatively high. The locations that were occupied first during a day were of relatively higher quality and more likely to be occupied by site-faithful males (i.e., males returning to their previous day's location) than those occupied later in the day. Finally, higher quality sites were occupied more often, had more fighting on them, and had a higher proportion of escalated fights than lower quality sites. These results indicate that patterns of competition and habitat occupation are a result of relationships among local breeding population size, individual behavior (e.g., preference for sites and reaction to environmental conditions), and habitat availability and quality." (Author)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

3630. Sy, T.; Schulze, M. (2002): Die Libellenfauna der Steckbyer Heide im Naturschutzgebiet "Steckby-Lödderitzer Forst" (Insecta, Odonata). *Naturwissen-*

schaftliche Beiträge Museum Dessau 14: 56-71. (in German). [Catchment of River Elbe, Sachsen-Anhalt, Germany; in 1999 and 2000, 34 (including 24 autochthonous) odonate species were collected. The study aimed to get information on conservation measures necessary to protect the biodiversity of the area. The following species are discussed in detail: *Lestes barbarus*, *L. virens*, *Aeshna affinis*, *Anaciaeschna isocetes*, *Cordulegaster boltonii*, *Ophiogomphus cecilia*, and *Leucorrhinia pectoralis*.] Address: Sy, T., RANA-Büro für Ökologie und Naturschutz, Am Kirchtor 27, D-06108 Halle (Saale), Germany

3631. Ternois, V. (2002): Un paradis pour les libellules. Situé au coeur de la Chamgagne humide, l'étang du Grand Verdat est un site naturel remarquable pour l'étude des libellules. Quarante espèces y sont recensées. *L'est Eclair*, 06.09.2002: 3. (in French). [This report in a French newspaper refers to the Odonata of the lake Grand Verdat. *Sympetrum danae* is introduced with a picture.] Address: Ternois, V., route de Sauvagny, F-52220 Anglus, France

3632. Walia, G.K.; Sandhu, R. (2002): Comparative chromosome data on twenty three species of family Coenagrionidae (Zygoptera: Odonata). *Bionature* 22(2): 79-97. (in Chinese with English summary). ["Karyological investigations have been carried out on 23 species of seven genera belonging to family Coenagrionidae. These have been collected from states of North-west and North-East India during pre-monsoon and post-monsoon seasons. Among these; 21 are male species and 4 are female species. In males, 16 species reveal $2n=27$ as diploid chromosome number and $2n=25$ in remaining five species. In females, all the species possess $2n=28$ as diploid chromosome number. All the species have XO-XX type sex determining mechanism. Autosomal fragmentation has been observed in *Agriocnemis obscura* (female) [= *Agriocnemis rubescens* Selys, 1877], *Ceriagrion coromandelianum* (male), *Coenagrion dyeri* (female) [= *Cercion calamorum* (Ris 1916)], *Pseudoagrion decorum* (male) and *Pseudoagrion rubriceps* (male & female). Chromosome number varies from 27-60 in gonial metaphase plates. Sex element could not be differentiated in the fragmented stages. Behaviour and morphology of chromosomes during meiosis have been studied and compared within family and within genera." (Author)] Address: Sandhu, R., Department of Zoology, Punjabi University, Patiala, 147 002, India

3633. Westhuis, W.; Fritzlar, F. (2002): Tier- und Pflanzenarten, für deren globale Erhaltung Thüringen eine besondere Verantwortung trägt. *Landschaftspflege und Naturschutz in Thüringen* 39(4, Sonderheft): 97-135. (in German). [Against the background of global responsibility of the state of Thüringen, Germany for fauna and flora, W. Zimmerman introduces to *Coenagrion mercuriale* and *C. ornatum*.] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

3634. Woodward, G.; Hildrew, A.G. (2002): The impact of a sit-and-wait predator: Separating consumption and prey emigration. *Oikos* 99(3): 409-418. (in English). ["Reviews of the impact of invertebrate predators in enclosure/exclosure experiments suggest that much of the apparent depletion of prey is due to prey emigration induced by the predators. However, these generalisati-

ons derive mainly from studies of invertebrate predators that are predominantly active searchers (usually stoneflies) and of prey with strong avoidance responses (mainly mayflies). We examined the impact of a large sit-and-wait predator, the nymph of the dragonfly *Cordulegaster boltonii*, which has recently invaded Broadstone Stream as a new top predator. Field enclosure / enclosure experiments were conducted to assess the impact of the invader on the benthos. Depletion of prey varied seasonally and among taxa, and was highest when prey density and encounter rates were high. Mobile prey, although least likely to show a statistically significant response because of high exchange rates, were those most strongly depleted. Experimental channels were used to separate the relative contribution of consumption and emigration to total impact for the two most depleted prey species. Depletion of prey was due solely to consumption and predators did not induce emigration. We therefore urge caution in making generalisations about the impacts of invertebrate predators, since sit-and-wait and searching predators potentially have very different impacts." (Authors)] Address: Woodward, G., Dept of Zoology and Animal Ecology, Univ. College Cork, Cork, Ireland. E-Mail: g.woodward@ucc.ie

3635. Worthen, W.B. (2002): The structure of larval odonate assemblages in the Enoree River basin of South Carolina. *Southeastern Naturalist* 1(3): 205-216. (in English). ["Odonate larvae were collected at 127 sites in the Enoree River and nine of its tributaries in the summers of 1999 and 2000. Mean odonate abundance, species richness, and Simpson's diversity were compared across tributaries and the main channel of the Enoree River with one-way ANOVA. These indices were significantly lower in Brushy Creek, Rocky Creek, and the Upper Enoree than in the other streams (Tukey multiple comparison test, $p < 0.05$). These three streams also differed from the others in species composition (MANOVA $p < 0.0001$), as measured by changes in the relative abundances of the five most abundant species: *Progomphus obscurus*, *Boyeria vinosa*, *Macromia illinoensis*, *Cordulegaster maculata*, and *Ophiogomphus mainensis*. For example, *O. mainensis* was nearly absent from Brushy, Rocky, and the Upper Enoree, but was a significant component of the assemblages in other streams. *Cordulegaster maculata* was rare in Rocky Creek but dominated the Upper Enoree where other species were less abundant. Brushy, Rocky, and the Upper Enoree are areas of either rapid residential development or known industrial contamination. The different structure of odonate assemblages in these streams may reflect the impact of these local anthropogenic effects." (Author)] Address: Worthen, W.B., Biology Department, Furman University, Greenville, SC, 29613, USA. E-Mail: worthen@furman.edu

3636. Zhang Y.-C.; Liu, B.; Zheng, Z.-m.; Li, L. (2002): DNA extraction and RAPD-PCR of insect specimens preserved with different methods. *Acta Entomologica Sinica* 45(5): 693-695. (in Chinese with English summary). ["Genomic DNA were extracted and amplified using the polymerase chain reaction and arbitrary primers from specimens of seven insect species: *Chrysomela vigintipunctata* (Scopoli) (Coleoptera: Chrysomelidae), *Harmonia axyridis* Pollard and *Coccinella septempunctata* Linnaeus (Col.: Coccinellidae), *Agrotis ypsilon* (Rottemberg) (Lepidoptera: Noctuidae), *Crocothemis servilia* Drury (Odonata: Libellulidae), and *Oxya abentata*

Willemse and *O. chinensis* (Thunberg) (Orthoptera: Caltantopidae). Of the specimens assayed, some had been naturally dried, some oven-dried and the remainder had been preserved in alcohol. The results suggest that, with respect to DNA extraction, oven-dried specimens and those preserved in alcohol are better than naturally dried specimens. Extraction of DNA using the CTAB method was easier, and more economical than other methods." (Authors)] Address: Zhang Ying-Chun, College of Life Science, Shaanxi Normal University, Xian, 710062, China. E-Mail: yingchunzcn@yahoo.com.cn

3637. Zimmermann, W. (2002): Checkliste der Libellen (Odonata) Thüringens. Stand 31.10.2002. *Checklisten Thüringer Insekten und Spinnentiere* 10: 5-11. (in German). [This is an update of Zimmermann's 1993-list, rising the number of Thuringian species by 9 to a total of 62 Odonata. More recent activities to study and map the odonate fauna of Thuringia, Germany are outlined. The species are listed and classified according to their regional abundance and the status (autochthonous, invasive, range extension). A few species are briefly commented.] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

3638. Zimmermann, W. (2002): Zur Libellenfauna der Hochmoore und Sauer-Zwischenmoore des Thüringer Waldes. *Naturschutzreport* 19: 101-115. (in German). [The paper summarizes long lasting researches of the odonate fauna of 10 bogs and transition mires in Thüringen, Germany, starting in the 1960th. A total of 19 species was found, 14 are to consider as autochthonous. *Aeshna juncea*, *Somatochlora alpestris*, *S. arctica*, and *Leucorrhinia dubia* are considered on the regional level as characteristic odonate species for bogs and transition mires. These species are annotated in detail. Very intensive surveys of the Saukopfmoor result in an nearly constant species spectrum over 30 years. *L. dubia* is the eu-dominant species in the total of the surveyed habitats.] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

3639. Zurek, R. (2002): Upper Vistula River: Response of aquatic communities to pollution and impoundment. VIII. Zooseston. *Polish Journal of Ecology* 50(2): 201-221. (in English). ["Zooseston of the Vistula River section almost 340 km long was investigated in the years 1997/98. In 99 samples collected 90 species of rotifers, 16 cladocerans, 9 copepods and other animals belonging to: Harpacticoidea, Oligochaeta, Nematoda, Chironomidae, Odonata, Simuliidae, Tardigrada and Coelenterata were found. Multiple regression analysis showed that the number of rotifers is significantly correlated with basic chemical indicators of water trophic state - phosphate, nitrate and nitrite as well as with the number of copepods which are usually predators. The numbers of copepods depends on the availability of possible prey, i.e. rotifers and cladocerans. Multiple regression confirmed known dependence of cladocerans from trophic conditions. Clustering of similarity matrices showed complex structure of sestonic assemblages on rhithral-potamal gradient additionally modified by hydrotechnical constructions. These constructions broke old river continuum. Ordination of sites gave complex pattern not only representing a simple gradient rhithral - potamal but also all transient stages caused by hydrotechnical construction (large dam reservoir) or by inflows of polluted waters from the tributaries. Ecologi-

cal meaning of principal component ordination for river zooseston assemblages is not simple and might be susceptible of various interpretations." (Author)] Address: Zurek, R., Karol Starmach Institute of Freshwater Biology, Polish Academy of Sciences, str. Slawkowska 17, 31-016, Cracow, Poland. E-Mail: zurek@zbw.pan.krakow.pl

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3640. Abbott, J.C.; Behrstock, R.A.; Larsen, R.R. (2003): Notes on the distribution of Odonata in the Texas Panhandle, with a summary of new state and county records. *Southwestern Naturalist* 48(3): 444-448. (in English). ["Previously, no Odonata have been reported from 44 Texas counties (17%), mainly from the northern Panhandle. Adult dragonflies and damselflies collected since September of 1999 are reported from 24 sites in 14 counties throughout the Texas Panhandle. A total of 35 species is discussed, representing 73 new county records and 4 new state records. First records of Odonata are included for 6 counties." (Authors)] Address: Abbott, J.C., Section of Integrative Biology, University of Texas, Austin, TX, 78712, USA. E-Mail: jcabbott@mail.utexas.edu USA

3641. Adams, M.J.; Pearl, C.A.; Bury, R.B. (2003): Indirect facilitation of an anuran invasion by non-native fishes. *Ecology Letters* 6(4): 343-351. (in English). ["Positive interactions among non-native species could greatly exacerbate the problem of invasions, but are poorly studied and our knowledge of their occurrence is mostly limited to plant-pollinator and dispersal interactions. We found that invasion of bullfrogs is facilitated by the presence of co-evolved non-native fish, which increase tadpole survival by reducing predatory macroinvertebrate densities. Native dragonfly nymphs in Oregon, USA caused zero survival of bullfrog tadpoles in a replicated field experiment unless a non-native sunfish was present to reduce dragonfly density. This pattern was also evident in pond surveys where the best predictors of bullfrog abundance were the presence of non-native fish and bathymetry. This is the first experimental evidence of facilitation between two non-native vertebrates and supports the invasional meltdown hypothesis. Such positive interactions among non-native species have the potential to disrupt ecosystems by amplifying invasions, and our study shows they can occur via indirect mechanisms." (Authors)] Address: Adams, M.J., Forest and Rangeland Ecosystem Science Center, USGS, 3200 SW Jefferson Way, Corvallis, OR, 97331, USA. E-Mail: MichaelAdams@usgs.gov

3642. Allen, P. (2003): Cuba 20 March - 5 April 2000. *Argia* 15(1): 16-17. (in English). [The paper lists some odonate species from the hills of Pinar del Rio Province, western Cuba from a trip in April 2000.] Address: Allen, P., Little Thatch, North Gorley, Fordingbridge Hants SP6 2PE, UK

3643. Altwegg, R. (2003): Hungry predators render predator-avoidance behavior in tadpoles ineffective. *Oikos* 100(2): 311-316. (in English). ["Behavioral responses of prey to their predators can critically alter community dynamics. Whether or not a prey responds, clearly depends on the effectiveness of that response.

The effectiveness on the other hand is predicted to depend on predator behavior. Actively searching predators can render the behavioral responses in their prey ineffective. Nevertheless, most studies investigating the optimal reaction of prey treated predators as immobile elements of the environment. I experimentally manipulated activity of poolfrog (*Rana lessonae*) tadpoles by keeping them at low and high food levels, and exposed them to three species of invertebrate predators (*Aeshna cyanea*, *Anax imperator*, and *Dytiscus marginalis*), whose activity also was manipulated through different food levels. Satiated, less active predators were more likely to kill hungry, more active tadpoles, but hungry predators killed hungry and satiated tadpoles about equally often. This result suggests that reducing their activity is a more effective strategy for tadpoles if the predators themselves are less active. On the other hand, against hungry, highly motivated predators, the behavioral avoidance strategies were essentially ineffective. Antipredator behavior is generally thought to stabilize the dynamics of predator-prey systems. The results presented here, however, suggest that the community dynamical consequences of antipredator behavior also critically depend on decisions made by predators." (Author)] Address: Altwegg, R., Dept of Biology, Univ. of Victoria, Victoria, BC, V8W 3N5, Canada. E-Mail: altwegg@uvic.ca

3644. Angelibert, S.; Giani, N. (2003): Dispersal characteristics of three odonate species in a patchy habitat. *Ecography* 26: 13-20. (in English). ["Dispersal has a potentially profound effect on the dynamics of populations especially when a population occupies a patchy habitat. Ponds surrounded by terrestrial landscape are an example of patchy distribution of physical conditions and constitute "islands" for odonates. Few studies have focussed on dispersal in odonates. We have used the direct method of dispersal observing (capture-mark-recapture technique) in order to estimate the degree of linkage in three patchy populations of odonate localised on three ponds. We also examined the differences in dispersal ability within and among three species (*Coenagrion puella*, *C. scitulum*, and *Libellula depressa*). The ponds were situated in southwest France on a limestone plateau. In this arid area, these ponds constitute the only surface water available and are relatively sparsely distributed. The size of the ponds ranged from 48 to 79 m² and they were 200 and 775 m apart. We demonstrated that three factors influence the dispersal ability of these odonates. The first is represented by the abiotic factors and especially weather conditions. This determines the number of days that dispersal is possible. The second is interspecific differences. We showed that sensitivity to weather conditions, species size and species behaviour influence dispersal ability. The third factor is the intraspecific characteristics. We demonstrated that there are differences in dispersal ability according to sex and age. To conclude, we discuss the importance of pond management to maintain the existing odonate populations and to facilitate introduction of new populations in this region where little exchange occurs between ponds." (Authors)] Address: Angelibert, S. CESAC UMR 5576, Bcjr 4R3, Univ. Paul Sabatier, 118 Route de Narbonne, F-31062 Toulouse, Cedex, France. E-mail: angelibe@cict.fr

3645. Anonymus (2003): Migrant insect summary (May to August 2003). A summary of some of the highlights by the telephone information service InsectLine.

Atropos 20: 42-45. (in English). [UK; Records of the following species are briefly commented: *Anax parthenope*, *Erythromma viridulum*, *Libellula depressa*, *Sympetrum flaveolum*, *S. fonscolombii*, *Lestes barbarus*.] Address: not stated

3646. Aspöck, H. (2003): 25 Jahre Österreichische Entomologische Gesellschaft. *Denisia* 8: 279-319. (in German with English summary). [The paper outlines the history of the Austrian entomological society and includes plenty photographs with many well known entomologists. Odonatologists seem to have had no significant role in founding the society. Only Günther Theischinger, now Australia, is pictured several times.] Address: Aspöck, H., Abt. Medizinische Parasitologie, Klinisches Institut für Hygiene der Universität Wien, Kinderspitalgasse 15, A-1095 Wien, Austria. E-mail: horst.aspoeck@univie.ac.at

3647. Beckemeyer, R. (2003): Short-term economic troubles and the potential destruction of irreplaceable taxonomic and biodiversity treasures: the University of Nebraska-Lincoln catastrophe. *Argia* 15(2): 16-17. (in English). [In response of budget shortfalls, all research divisions of the Nebraska State Museum, which also harbours a collection of Odonata and current activities on odonatalogical subjects including a mapping project, were "scrapped". Roy Beckemeyer is drawing a very pessimistic picture of the future of entomological research in USA due to economic problems continuing across the USA.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

3648. Bernard, M.F.; Fordyce, J.A. (2003): Are induced defenses costly? Consequences of predator-induced defenses in Western toads, *Bufo boreas*. *Ecology* 84(1): 68-78. (in English). ["Induced defenses are widespread in nature, and in amphibian larvae they are often expressed as altered behavior and changes in tail shape, color, and size. Theory predicts that induced defenses should be costly in the absence of a predator threat. No costs have been found for these defenses after metamorphosis. In this study, we tested for induced defenses in western toads, *Bufo boreas*, and measured larval and postmetamorphic consequences of these responses. Larvae were raised in either the presence or absence of nonlethal predator cues (including *Aeshna* sp.). Defense response of these larval treatments were measured during the larval stage and shortly after metamorphosis using both predator bioassays and quantification of the putative chemical defense common in toads, bufadienolides. We found no differences in larval morphology, growth rate, or development rate between the predator and control treatments. In the larval bioassays, some types of invertebrate predators consumed significantly fewer of the *B. boreas* larvae that were reared with predator cues compared to the control treatments. Bufadienolides were not present in *B. boreas* larvae. In the postmetamorphic bioassays, tiger salamanders (*Ambystoma tigrinum*) had longer handling times when consuming *B. boreas* that had developed in larval environments without predator cues compared to predator-treatment *B. boreas*. However, postmetamorphic *B. boreas* from predator cue larval environments had significantly higher concentrations of bufadienolides than did those from larval environments without predators, suggesting that these defenses are ineffective against tiger salamanders. Our results demonstrate

that there is plasticity in the chemical defenses of toads and suggest that induced larval defenses may incur costs that are only apparent after metamorphosis." (Authors)] Address: Bernard, M.F., Section of Evolution and Ecology, Center for Population Biology, University of California, Davis, California 95616 USA. E-mail: mfbenard@ucdavis.edu

3649. Bernard, R. (2003): *Aeshna crenata* Hag., a new species for the fauna of Latvia (Anisoptera: Aeshnidae). *Notul. odonatol.* 6(1): 8-10. (in English). [In 2001 *A. crenata* was discovered in a small area in NE Lithuania (Bernard, 2002, *Opusc. zool. flumin.* 202). In order to solve the puzzle of its range in this part of Europe, intensive searches were carried out in July 2002 in SE Estonia, SE Latvia and NE Lithuania (northward of the known localities). Only 1 locality of *A. crenata* was found, in the Rezekne district in Latvia: 2 small forest lakes (A, B), 400 m distant, 4.8-5.1 km NW of Andrupene, 2.15-2.65 km W of western shores of S part of Viraudas Lake, 56°13'10" N, 27°20'25"-50" E. The habitats are described along with the co-occurring odonate species including the rare *Nehalennia speciosa*.] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

3650. Bick, F.H. (2003): At-risk Odonata of conterminous United States. *Bull. American Odonatol.* 7(3): 41-56. (in English). [U.S. species at risk, their distribution, habitat, and conservation status are outlined: *Enallagma pictum*, *E. recurvatum*, *Ischnura gemina*, *Nehalennia pallidula*, *Neoneura aaroni*, *Aeshna persephone*, *Stenogomphus consanguis*, *Gomphus diminutus*, *G. sandrius*, *G. septima*, *G. westfalli*, *Ophiogomphus acuminatus*, *O. arizonicus*, *O. australis*, *O. edmundo*, *Progomphus bellei*, *Stylurus potulentus*, *S. townesi*, *Cordulegaster sayi*, *Macromia margarita*, *Somatochlora hineana*, *S. calverti*, *S. margarita*, *S. ozarkensis*, *Williamsonia lintneri*, *Libellula jesseana*.] Address: Bick, G.H., 141 W. Columbus St., Port Angeles, WA 98362, USA

3651. Biggs, K. (2003): *Illotum thermometer*. *Argia* 15(2): 18-19. (in English). [Kathy Biggs correlates the behaviour of *Sympetrum illotum* with air-temperature.] Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol CA, 95472, USA. E-mail: biggnest@sonic.net

3652. Bocanegra, O.R.; Lewis, J.M. (2003): A preliminary list of the Odonata of Terrell county, Texas. *Argia* 15(1): 11-13. (in English). [USA; a total of 46 species (including *Libellula comanche* from 21 May 1996) was collected at three localities in 2001 and 2002.] Address: Bocanegra, O.R., U.S.Fish and Wildlife Service, 711 Stadium Drive, Suite 252, Arlington, Texas 76011, USA

3653. Böhm, K. (2003): Erster Fortpflanzungsnachweis von *Anax parthenope* in Nordrhein-Westfalen (Odonata: Aeshnidae). *Libellula* 22(1/2): 31-34. (in German, with English summary). [Germany; "In summer of 2002, three exuviae were collected at a pond in Düsseldorf (51°21' N, 6°44' E). The late emergence date is interpreted as an indication for a bivoltine development." (Author)] Address: Böhm, K., Erich-Müller-Str. 6, D-40597-Düsseldorf, Germany

3654. Botsch, H.-J. (2003): Aktualisierung der Stadtbiotopkartierung Würzburg. *Berichte des bayerischen Landesamtes für Umweltschutz* 171: 76-78. (in German). [In 1983, for the first time the habitats in the town

of Würzburg, Bavaria, Germany were mapped and assessed for nature conservation purposes. In 2000 and 2001, the mapping was renewed. The odonatological results are very briefly commented: 55 water bodies harbouring 22 species were surveyed. Only *Gomphus vulgatissimus* is specified.] Address: Botsch, H.-J. E-mail: helmut.botsch@lfu.bayern.de

3655. Brackenbury, J. (2003): Escape manoeuvres in damselfly larvae: Kinematics and dynamics. *Jour. exp. Biol.* 206(2): 389-397. (in English). ["The kinematics and hydrodynamics of rapid escape manoeuvres executed by final-stage larvae of *Enallagma cyathigerum* were investigated using videography combined with a simple wake-visualisation technique. Two kinds of escape manoeuvres were identified: first, a 'rapid flex', comparable with the rapid C-start of fish, and, second, a 'rapid twist' that involves a helical contraction of the body inducing motion in the yaw, pitch and roll planes. In both cases, the initial flexion phase is concerned with re-orientating the body, the extensional phase with acceleration of the body in the new direction. The behaviour of the caudal fin during twist indicates considerable independence of movement and aspect control within the three constituent lobes. Dye deposited beneath the resting larvae showed a thrust jet shed into the wake at the end of the extension phase. The estimated momentum of the ring vortex containing the jet was similar to that imparted to the body at the start of the translational phase. Similarities between the swimming dynamics of damselfly larvae and fish are discussed, as well as the wider implications of these findings to other aquatic vertebrates whose normal, steady swimming appears to be based on unsteady manoeuvres." (Author)] Address: Brackenbury, J., Department of Anatomy, University of Cambridge, Downing Street, Cambridge, CB2 3DY, UK. E-Mail: jhb1000@cam.ac.uk

3656. Braun, M.; Braun, U.; Müllen, T. (2003): Zum Vorkommen der Kleinen Zangenlibelle (*Onychogomphus forcipatus*) an der unteren Lahn und an der Ahrmündung. *Fauna Flora Rheinland-Pfalz* 10(1): 273-277. (in German). [Rheinland-Pfalz, Germany; new records from the river Lahn, resulting from June 2003, and the river Ahr (17. July 2003) are briefly documented and discussed.] Address: Braun, M., SGD Nord, Stresemannstr. 3-5, 56068 Koblenz, Germany

3657. Braune, E. (2003): Live and get dry: A spatially explicit population model for Namibian Odonata. *Verhandlungen der Gesellschaft für Ökologie* 33: 297. (in English). [Verbatim: Within the scope of a BIOTA Southern Africa subproject a model for the dispersal of dragonflies in the arid regions of western Namibia was developed. The aim of this model is to predict changes in the diversity of Odonata under changing habitat conditions. These changes may be induced e.g. by intensive use of water resources or by climate change and may lead to a reduction of habitat quality and quantity. The modeling system consists of three parts: First, on the local level, habitat suitability models based on a one-year-monitoring program were calculated using logistic regression. Parameters used were biotic and abiotic parameters recorded during the monitoring, e.g. vegetation diversity, as well as parameters derived from remote sensing data based on LANDSAT 7 ETM+ satellite images like the density of open waters in the surrounding of the investigation sites or the NDVI. The second part of the model consists of a population dynamic mo-

del based on discrete difference-equations described by extended Leslie-matrices. The parameters of the model are formulated as dependent on food availability in the aquatic habitat. Interspecific competition in the larval stage of the dragonflies is also incorporated. This model depicts the typical life-cycle of tropical-centered dragonflies with a pattern of multivoltinism. Finally, the third part of the model combines the habitat suitability models and the population dynamics via a grid-based approach. In each grid cell the population dynamics is calculated in dependence of the respective habitat quality. Dispersal processes are modeled by a stochastic distribution of mature and immature adults in dependence of the relative population density and the suitability of the habitat. During the dispersal process there is a differentiation between long-distance and short-distance dispersal, so that even habitats in greater distances can be occupied provided that they exhibit a better habitat quality. By applying different scenarios of changing habitat quality, e.g. grazing cattle reducing the vegetation diversity, or habitat quantity, e.g. building of dams in the upper course of a river reducing, the available amount of water downstream, to the grid-based replication of the landscape, this model system offers the possibility to analyze the spatio-temporal development of Namibian Odonata and the consequences of changes in the environment. This grid-based formulation of a landscape can be used to apply different scenarios of changing habitat quality or quantity. So e.g. the destruction of habitats or of the vegetation diversity by grazing cattle can be simulated. Another possible scenario is the building of dams leading to a reduction of the available amount of water downstream. This model system offers the possibility to analyze the spatio-temporal development of Namibian Odonata and the consequences of changes in the environment.] Address: Braune, Eva, Institute of Geocology, Technical University of Braunschweig, Germany. E-mail: e.braune@tu-bs.de

3658. Bried, J. (2003): Notes on an *Epiaeschna heros* feeding swarm. *Argia* 15(2): 19-20. (in English). [Noxubee National Wildlife Refuge, Mississippi, USA; "Obviously these ±128 Swamp Darners weren't making an effort to avoid intraspecific competition. It seemed more the opposite. Have studies shown competitive facilitation within adult odonate populations? In other words, is there documented proof that individuals within a species work together to perpetuate their own population, such as by finding greater predator protection strength in numbers or by increasing foraging capacity?"] Address: Bried, J., Mississippi State Univ., Dept Biol. Sci., Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jasonbried@hotmail.com

3659. Bried, J.; Bennett, L.; Brown, R. (2003): Requesting Mississippi Odonata information. *Argia* 15(2): 22-23. (in English). [The odonate fauna of Mississippi, USA is poorly known. Data on Odonata are urgently requested.] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jasonbried@hotmail.com

3660. Briers, R.A.; Biggs, J. (2003): Indicator taxa for the conservation of pond invertebrate diversity. *Aquatic Conservation* 13(4): 323-330. (in English). ["1. Ponds are a valuable re for the conservation of freshwater biodiversity, but are often extremely numerous in a given

area, making assessment of the conservation value of individual sites potentially time consuming. 2. The use of indicator taxa, the species richness of which is representative of total site species richness, may provide one way to improve the efficiency of survey work. However, such indicators are poorly developed for freshwater systems. 3. A data set was used describing the occurrence of macroinvertebrate taxa in ponds in Oxfordshire, UK, to assess the extent to which variation in the species richness of selected taxa most consistently represented variation in all other taxa. 4. Coenagriidae (Odonata) and Limnephilidae (Trichoptera) reflected the variation in species richness of other taxa most consistently, with Coenagriidae showing the best overall performance as an indicator taxon. 5. For both suggested indicator taxa, selection of sites based solely on the presence of at least one species of indicator would represent over 95% of all species recorded across all sites. 6. Further investigation in different geographical regions is necessary to establish whether these relationships are consistent over a wider area." (Authors)] Address: Briers, R.A. Inst. of Biological Sciences, University of Wales, Edward Llwyd Building, Aberystwyth, Ceredigion, SY23 3DA, UK. E-Mail: rob@aber.ac.uk

3661. Brockhaus, T.; Fischer, U. (2003): Übersicht zur "Entomofauna Saxonica" unter besonderer Berücksichtigung der FFH-Arten und der "vom Aussterben bedrohten Arten" in Sachsen. 3. Libellen-Odonata. Mitt. Sächs. Entomol., Suppl. 1: 38-40. (in German). [The paper briefly outlines dragonfly research activities in Sachsen, Germany, reaching back to 1743. Odonata are assessed as one of the best surveyed insect groups in Sachsen. The present status of geographical coverage and "white gaps" are documented. Some species are very briefly discussed. Starting in the 1990th, records of mediterranean species are increasing in a remarkable way. Populations of running water dwellers are spreading in significant way due to improvement of water quality.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

3662. Buczynski, P. (2003): *Aeshna affinis* (Vander L.) (Odonata: Aeshnidae) in the valley of River Bug in the year 2000. Wiad. entomol. 22(1): 48-49. (in Polish). [On 11. Aug. 2000, *A. affinis* was recorded at three localities along the river Bug: Dorohusk, Uhanka ad Dorohusk, and Gródek ad Hrubieszów. These localities are briefly described, and the occurrence of *A. affinis* in south-eastern Poland is discussed. A German translation of the paper is available from IDF or the author.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3663. Buczynski, P. (2003): New locality of *Orthetrum coerulescens* (Fonscolombe, 1837) (Odonata: Libellulidae) in the southeastern Poland. Wiad. entomol. 22(1): 49-50. (in Polish). [On 25. Aug. 2001, a male *O. coerulescens* was recorded at Wieprów Ordynacki ad Tomaszów Lubelski. The locality is briefly described, and the rarity of the species in southeastern Poland is discussed. It is assumed that the potential habitats are insufficiently surveyed for the species. A German translation of the paper is available from IDF or the author.] Address: Buczynski, P., Dept of Zool., Marie Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3664. Buden, D.W.; Miller, J.Y. (2003): The butterflies of Pohnpei, eastern Caroline Islands, Micronesia. Pacific Science 57(1): 1-8. (in English). ["14 species of butterflies are recorded from Pohnpei, Micronesia, seven for the first time. None is endemic to the island; all are widely distributed in the western Pacific, including parts of Indo-Australia, with many extending into or beyond southeastern Asia. A long history of plant introductions and agricultural experimentation may have facilitated dispersal of butterflies to the island and provided a broad selection of host plants for those arriving otherwise unassisted. At least one, and possibly two or more, unidentified species apparently confined to deep forest habitats were seen but not collected during this study. Compared with the local odonate fauna, the butterflies of Pohnpei differ in reaching their greatest abundance and species diversity in the lowlands, in lacking endemic species, and probably in having a higher turnover rate." (Authors)] Address: Buden, D.W., Division of Natural Science and Mathematics, College of Micronesia-FSM, Kolonia, P.O. Box 159, Pohnpei, FM 96941, Micronesia. E-Mail: donbuden@comfsm.fm

3665. Burbach, K. (2003): Verbreitung und Habitate von *Leucorrhinia albifrons* in Bayern (Odonata: Libellulidae). Libellula Supplement 4: 105-132. (in German, with English summary). ["*L. albifrons* has been observed in at least 29-32 locations in 15 areas in Bavaria, Germany. Since 1995 the species has been recorded at only five locations. Three of these observations are from confirmed breeding sites; the other two are of a single male. At one of the breeding sites the species has probably been extirpated due to changes in habitat structure. The two remaining breeding sites have been known since 1993 and 1998, respectively. Characteristic habitat factors are low nutrient levels, the presence of vegetation immediately below the water surface and the (near) absence of fish. pH-value is apparently of little significance, since *L. albifrons* is known to occur in acidic as well as in calcareous bodies of water. The aquatic vegetation differs accordingly: whereas under calcareous conditions stoneworts (Characeae) and pondweeds (*Potamogeton* spp.) may be predominant, under acidic conditions floating sphagnum mats are common. Probable causes for the decline of the species are the eutrophication of breeding sites and the introduction of fish. The latter occurs even in smaller bodies of water, which are not suitable for stocking with fish. Especially the introduction of fish spp. which churn up the pond bottom or destroy vegetation (carp, grass carp) is likely to have contributed to the significant decline. Suggestions for the protection of the species are presented. The implementation of a monitoring programme for the last remaining populations is proposed." (Author)] Address: Burbach, K., Griesfeldstr. 5a, D-85354 Freising E-Mail: klaus.burbach@gmx.de

3666. Burmeister, E.-G.; Börzsony, L. (2003): *Polythore spaeteri*, spec. nov. from the Peruvian tropical rainforest (Panguana), with remarks on its ecology (Odonata, Zygoptera, Polythoridae). Spixiana 26(1): 43-48. (in English). ["A new species of *Polythore* from the area of Panguana (Prov. Huanuco, Peru) is described and compared with species of the groups of *Polythore* (Bick & Bick 1985, 1986, 1990a, 1990b). The coloration of wings in ♂♂ and ♀♀ and the structure of the penis differ from all other species. The observation of ♂♂ and ♀♀ in tandem or copula can open some aspects into the aquatic biotopes of the larvae. Larvae of *Polythore*

have not been described." (Authors)] Address: Burmeister, E.-G. Zoologische Staatssammlung München, Münchhausenstr. 21, D-81247, München, Germany

3667. Carvalho, A.D.L.; Salgado, L.G.V. (2002): Description of the larva of *Aeshna pauloi* Machado, 1994 (Odonata, Aeshnidae), with a key to the identification of the known larvae of the genus occurring in the states of Rio de Janeiro and Sao Paulo, Brazil. *Boletim Museu Nacional Rio de Janeiro Zoologia* 485: 1-8. (Portuguese, with English summary) ["The ultimate instar larva of *Aeshna pauloi* Machado, 1994 is described and figured, based on material from southeastern Brazil. A key to the known larvae of the genus occurring in the states of Rio de Janeiro and Sao Paulo, Brazil, is appended." (Authors)] Address: Carvalho, A.D.L., Departamento de Entomologia, Museu Nacional/UFRJ, Quinta da Boa Vista, Sao Cristovao, 20940-040, Rio de Janeiro, RJ, Brazil

3668. Cating, P.M. (2003): How important are dragonflies to Swallow-tailed Kites? *Argia* 15(1): 14-16. (in English). [On the opportunity observing *Elanoides forficatus* (Aves) preying on *Epiaeschna heros* cf. in southern Florida, USA on 20 April 2001, the author compiles all available information on the subject.] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net

3669. Catling, P.M. (2003): Exuviae from under the bridge - A threat to dragonfly collections? *Argia* 15(1): 18. (in English). [The paper reports on the loss of exuviae by the dermestid beetle *Anthrenus* sp.. Some considerations on preserving collections of dried material are made.] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net

3670. Clausen, W. (2003): Die Bestandsentwicklung von *Coenagrion ornatum* in Ostwestfalen, Nordrhein-Westfalen (Odonata: Coenagrionidae). *Libellula* 22 (1/2): 1-10. (in German with English summary). ["An isolated population at the NW border of its range, at ditches near Stemwede (52°24'51"N, 8°29'30"E) NE Osnabrück was monitored from 1990 to 2002. After a harsh frost period without snow and total freezing of most of the ditches in winter 1995 to 1996 there was a drastic decline. Additionally, because of a reduction of mowing intensity, the ditches were overgrown with reeds and the population tended to be extinct. Extra mowing near mid-May 2002 at some parts of the ditches brought back a little population" (Author)] Address: Clausen, W., Zur Bockwindmühle 60, D-32351 Stemwede, Germany. E-Mail: WernerClausen@freenet.de

3671. Combes, S.A.; Daniel, T.L. (2003): Flexural stiffness in insect wings. II. Spatial distribution and dynamic wing bending. *Jour. exp. Biology* 206(17): 2989-2997. (in English). ["The dynamic, three-dimensional shape of flapping insect wings may influence many aspects of flight performance. Insect wing deformations during flight are largely passive, and are controlled primarily by the architecture and material properties of the wing. Although many details of wing structure are well understood, the distribution of flexural stiffness in insect wings and its effects on wing bending are unknown. In this study, we developed a method of estimating spatial variation in flexural stiffness in both the spanwise and chordwise direction of insect wings. We measured dis-

placement along the wing in response to a point force, and modeled flexural stiffness variation as a simple mathematical function capable of approximating this measured displacement. We used this method to estimate flexural stiffness variation in the hawkmoth *Manduca sexta*, and *Aeshna multicolor*. In both species, flexural stiffness declines sharply from the wing base to the tip, and from the leading edge to the trailing edge; this variation can be approximated by an exponential decline. The wings of *M. sexta* also display dorsal/ventral asymmetry in flexural stiffness and significant differences between males and females. Finite element models based on *M. sexta* forewings demonstrate that the measured spatial variation in flexural stiffness preserves rigidity in proximal regions of the wing, while transferring bending to the edges, where aerodynamic force production is most sensitive to subtle changes in shape." (Authors)] Address: Combes, S.A., Department of Biology, University of Washington, Seattle, WA, 98195, USA. E-Mail: scombes@u.washington.edu

3672. Corbet, P.S. (2003): Reproductive behaviour of Odonata: the history of a mystery. *International Journal of Odonatology* 6(2): 185-193. (in English) ["The main, externally visible components of odonate reproductive behaviour were known from published accounts for about 300 years before sperm displacement during copulation was first described. The latter discovery, revealed by Jonathan Waage in 1979, revolutionised the interpretation of odonate reproductive behaviour, allowing it for the first time to be interpreted convincingly in the context of sexual selection and the evolution of mating systems. This insight has been a prerequisite for elegant, ongoing work on mechanisms of sperm displacement and sperm precedence in Odonata." (Author)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@crean-mill.u-net.com

3673. Cordoba-Aguilar, A.; Salamanca-Ocana, J.C.; Lopezaraiza, M. (2003): Female reproductive decisions and parasite burden in a calopterygid damselfly (Insecta: Odonata). *Animal behaviour* 66: 81-87. (in English). ["There is currently a gap in sexual selection theory about how much the environment drives female mating decisions. We present field data that suggest that female sexual behaviour in the damselfly *Calopteryx haerorrhoidalis* is influenced by parasite burden. Male wing pigmentation in *Calopteryx* is a sexually selected trait that signals a male's ability to cope with eugregarine parasites (an intestinal parasite that feeds on the adult's ingested food). Because adult *C. haerorrhoidalis* females also show wing pigmentation, we examined whether this trait is similarly influenced by parasite burden and whether it may signal the female's reproductive value. Male *C. haerorrhoidalis* defend riverine substrates that females use for oviposition. After copulation and during oviposition, females are guarded by the copulating male against intruder males. Alternatively, females may avoid mating and 'steal' an oviposition site within a male's territory. In the present study, we found that the amount of female wing pigmentation was negatively correlated with the number of eugregarines present. Females with more parasites produced fewer eggs, survived fewer days, spent less time during courtship, 'inspected' fewer males before mating, had a lower mating success, were guarded for less time during oviposition and engaged in fewer 'stealing' events during oviposition. The reduced egg production and survival of

heavily infected females may result from eugregarine depletion of the females' consumed food reserves. Thus, to offset reduced longevity, heavily infected females may accept a mating more rapidly and mate with fewer males. 'Stealing' behaviour may be related to the female's differential use of sperm from some males, particularly high-quality males. Interestingly, males that mated with low-pigmented females showed greater variance in wing pigmentation than did males that mated with high-pigmented females. Possibly, female wing pigmentation may signal a female's reproductive value, which provides females with longer mate-guarding episodes and reduced interference from intruder males. This study points out one possible constraint, intestine parasites, that females may face during mating decisions. Because females in bad condition mate with males in both good and bad condition, this constraint may be pervasive enough to weaken the intensity of selection for a male sexually selected trait, wing pigmentation, and help to maintain its variation in phenotypic expression." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

3674. Córdoba-Aguilar, A. (2003): A description of male and female genitalia and a reconstruction of copulatory and fertilisation events in *Calopteryx haemorrhoidalis* (Vander Linden) (Odonata: Calopterygidae). *Odonatologica* 32(3): 205-214. (in English). ["The genitalia have a "design" remarkably similar to those of other representatives of the family. The main female structures are the bursa copulatrix, a T-shaped spermatheca, a pair of vaginal plates bearing a variable number of mechanoreceptive sensilla, and a ganglion located at the VIII abdominal segment. The 6 intromittent organ is a curved, sclerotised aedeagus that ends in a distal penis head. This latter structure bears 2 lateral appendages which are covered by recurved spines. A construction of the fertilisation and copulatory events is proposed based on descriptive and experimental evidence in other zygopterans as well as in this species. The female genital anatomy suggests fertilisation occurs in the manner proposed for other odonates. Experimental evidence shown in this work suggests that, during fertilisation, the egg stimulates the mechanoreceptive sensilla and elicits contractile activity of the muscles that surround the sperm storage organs (SSOs). The contractile activity is likely to be mediated by the VIII abdominal segment ganglion. As a consequence of the muscular contractions, the SSOs eject sperm which arrive to the site where the egg is and fertilise it. During copulation, the aedeagus "imitates" the presence of an egg in the vaginal plates and stimulates the mechanoreceptive sensilla inducing spermathecal sperm ejection. It is likely that spermathecal sperm is ejected to the bursa copulatrix where it is removed by the penis head and lateral appendages. After this sperm displacement process, the copulating male's sperm, stored in the seminal vesicle, is transferred, through a canal-like passage, by the aedeagus to the SSOs. Since females exhibit a considerable intra- and inter-individual variation in sensillum distribution and number on the plates, it is discussed whether this may have an adaptive significance in terms of retaining more control over stored sperm for females during male stimulation." (Author)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Ap-

do. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

3675. Córroba-Aguilar, A. (2003): A note on territorial and mating behaviour in the dragonfly *Pseudoleon superbus* (Hag.) (Anisoptera: Libellulidae). *Notul. odonatol.* 6(1): 10. (in English). ["[...] Here I provide a short report on this species' sexual behaviour which was observed in Plan del Rio, Veracruz on June 9, 2002, from 13:00 to 15:00 h. Individuals of both sexes were seen in the river that surrounds this locality. Five males were seen patrolling each of five different ponds of varying diameter (3-20 m) and shallowness (0.30-3.0 m) which were fed by the river. [...] males were overtly aggressive against conspecific whenever these appeared on the pond, they were chased over distances as long as 30 m. Males also showed fidelity for concrete sites on the ponds. Given these activities, this species seems to exhibit territorial behaviour. During observations, two females were seen arriving to two ponds at different times (13:30 and 13:56 h resp.). They were taken with no apparent pre-copulatory courtship by the territorial male. Copulation was in the air and took 5 and 7 seconds for each pair. Soon after this, females went directly to sites with submerged vegetation and started an in-flight oviposition. [...] mating males showed non-contact guarding during oviposition. During this, copulating males chased approaching males (number of males chased for each male: 3 and 5, resp.). In one occasion, a male chased a conspecific male and while this pair was some metres away from the pond, another male took the ovipositing female in copulation which lasted 5 seconds. The female continued oviposition even when the previous copulating male came back after 58 seconds, but no copulation ensued." (Author)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

3676. Couteyen, S.; Papazian, M. (2003): Contribution a la connaissance des Odonates de l'île de la Reunion 6. Description de la larve de *Coenagriocnemis reunienensis* (Fraser, 1957) (Odonata, Coenagrionidae). *Entomologiste* 59(1-2): 9-12. (in French with English summary). [The larva of the endemic *C. reunienensis* is described. Some information on the biology of the species is included.] Address: Couteyen, S., 188 Chemin Nid Joli, F-97430, Le Tampon, La Reunion, France

3677. Mauersberger, R., (2003): *Crocothemis erythraea* recorded in northeastern Germany (Odonata: Libellulidae). *Libellula* 22(1/2): 55-60. (in German, with English summary). [Three males of *C. erythraea* were observed on July 29, 2002, and one male on June 17, 2003 at glacial formed lakes near Rheinsberg (53,1°N) resp. near Neustrelitz (53,4°N), Brandenburg, Germany. The specimen activity pattern were focused on shallow bays with dense structures consisting of *Ceratophyllum*, *Myriophyllum*, *Utricularia*, and *Nymphaea*, together with other dragonfly species e.g. *Leucorrhinia caudalis*. It is to be considered as the northernmost records in Germany.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-Mail: foerdervereinUckermaerk.Seen@t-online.de

3678. Crumrine, P.W.; Crowley, P.H. (2003): Partitioning composition of risk reduction in a dragonfly-fish intraguild predation system. *Ecology* 84(6): 1588-1597.

(in English). ["Risk to prey imposed by intraguild predation (IGP) can be influenced by a number of factors, yet to date, few studies have measured the contributions of these factors to overall risk. A three-species IGP system with larvae of the dragonfly *Anax junias* as IG (top) predators, larvae of the dragonfly *Plathemis lydia* as IG prey (intermediate predators), and fathead minnow hatchlings (*Pimephales promelas*) as shared prey was used to estimate the contribution of the following three factors to shared-prey mortality rate in combined predator treatments: (1) the trophic effect of the IG predator on IG prey density; (2) the effect of reduced shared prey consumption by the IG prey in the presence of the IG predator; and (3) the effect of alternative prey for the IG predator. These factors were integrated into a model of multiple predator effects. To quantify minnow mortality, *P. promelas* were exposed to *A. junius* only, *P. lydia* only, *A. junius* and *P. lydia*, or neither in a two-by-two factorial design. Additional treatments, in which one or both predators were unable to feed, were used to isolate behavioral (activity level) changes in dragonfly larvae. When predators preyed in combination on *P. promelas* their impact was less than that of the summed effects of the two predators, each in the absence of the other a result termed risk reduction. *A. junius* consumed a significant number of *P. lydia* when they were present (i.e., IGP), and behavioral interactions between *A. junius* and *P. lydia* were asymmetric. The presence of *A. junius* caused *P. lydia* to become less active, while the presence of *P. lydia* elicited a diet shift in *A. junius* to include some *P. lydia*. Interactions between predator species, specifically IGP, influenced prey survival. Trophic and behavioral effects of IGP were similar in magnitude. These results highlight the importance of trophic and behavioral interactions in predator-prey systems and also suggest that effects of multiple predators may not be predictable based on the sum of individual effects. Determining the effects of multiple predators requires the identification of mechanisms that contribute to nonadditive prey responses." (Authors)] Address: Crumrine, P.W., Department of Biology and Center for Ecology, Evolution and Behavior, University of Kentucky, Lexington, Kentucky 40506-0225 USA. E-mail: pwcumO@uky.edu

3679. Czaplak, D. (2003): A *Phyllocyba* in Texas. *Argia* 15(1): 18-19. (in English). [On 25 May 2002, at Santa Ana NWR, Hidalgo County, Texas, USA, a female *Phyllocyba* was photographed. Due to the unclear taxonomic status of *P. breviphylla* and *P. elongata*, it was at present not possible to identify the specimen. In any case, the taxa is a new addition to the odonate fauna of USA.] Address: Czaplak, D., 13641 Amnassador Drive, Germantown MD 20874, USA. E-mail: Dma3@aol.com

3680. Daigle, J.; Thom, T. (2003): 2003 Eglin AFB, Florida meeting. *Argia* 15(2): 8-9. (in English). [Eglin Air Force Base in Niceville, Florida is known to many odonatologists, yes it is: Remember the MOAB (Massive Ordinance Air Burst), the huge bomb which was tested before the Iraq war, and which's power of destruction was send on your television screen several times a day. One of the astonishing things of the country is, that the Air Force Base is employing an aquatic biologist - Theresa Thom - to inventory the invertebrates of the air base. The meeting intended to help surveying the Odonata, including a new *Ophiogomphus* still to describe.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

3681. Daigle, J.; Mauffray, B.; Beaton, G. (2003): 2003 SE meeting at Lafayette, Georgia. *Argia* 15(2): 9-10. (in English). [The regional meeting held in late May 2003 intended to contribute to the knowledge of the odonate fauna of three counties (Chattooga, Dade, Walker County) in the extrem northwest of Georgia, USA. Two new state records (*Arigomphus villosipes*, *Lestes eurinus*) and several second state records succeeded. Some emphasis ist given to *Gomphus lineatifrons*.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

3682. de Araujo-Coutinho, C.J.P.; Viviani Cunha, A.; Serra-Freire, N.M.; de Mello, R.P. (2003): Evaluation of the impact of *Bacillus thuringiensis* serovar israelensis and temephos, used for the control of *Simulium* (*Chirostilbia*) *pertinax* Kollar, 1832 (Diptera, Simuliidae) on the associated entomofauna, Paraty, state of Rio de Janeiro, Brazil. *Memorias do Instituto Oswaldo Cruz* 98(5): 697-702. (in English). ["The study was set up to evaluate the impact of two commercial larvicide formulations, *Bacillus thuringiensis* serovar israelensis base (Bti) at 15 ppm/l min and temephos at 0.03 ppm of active ingredient, used to control *Simulium pertinax* populations, on associated non-target entomofauna occupying the same breeding sites. The experiments were carried out on the Pedra Branca and Muricana rivers, on the slopes of Serra do Mar massif, municipality of Paraty, state of Rio de Janeiro, Brazil. B. t. i. was applied to the river Pedra Branca and temephos to the river Muricana. On both rivers, treatment and control sections were labeled as such, each one with two observation posts: slow moving water and fast water regions respectively. Artificial substrata was used to evaluate the abundance of associated entomofauna. Attached immature stages of arthropods were removed from both of its surfaces fortnightly. Were collected, from the two rivers, 28 477 specimens of the entomofauna associated with *S. pertinax*. The families Hydropsychidae, Chironomidae, Bactidae, Simuliidae, Blephariceridae and Megapodagrionidae were represented. These was an impact of temephos on the entomofauna associated with *S. pertinax* only in Simuliidae and Chironomidae, and to B. t. i. only in Simuliidae. However, the reduction in their numbers was not statistically significant." (Authors)] Address: de Araujo-Coutinho, C.J.P., Laboratorio de Simulideose e Oncocercose, Departamento de Entomologia, Instituto Oswaldo Cruz-Fiocruz, Av. Brasil 4365, 21045-900, Rio de Janeiro, RJ, Brazil. E-Mail: coutinho@ioc.fiocruz.br

3683. De Marmels, J. (2003): *Lamproneura lucerna* gen. nov., sp. nov. from Venezuela, and *Cyanallagma ferenigrum* sp. nov., a remarkable new species from Brazil (Odonata: Protoneuridae, Coenagrionidae). *Int. Jour. Odonatology* 6(2): 99-107. ["*Lamproneura lucerna* gen. nov., sp. nov. (Protoneuridae) is described from a male from the Turimiquere mountains, in northeastern Venezuela. Penis morphology places the new genus close to *Forcepsioneura*, *Psaironeura* and *Ropponeura*. The first Venezuelan record of the genus *Phasmoneura* (*P. exigua* (Selys 1886) is presented. *Cyanallagma ferenigrum* sp. nov. (Coenagrionidae) is described from a ♂ and a ♀ from Mato Grosso, Brazil. Morphologically, this species seems to bridge the gap between the *A-dustum*-group of *Acanthagrion* and southeastern *Cyanallagma*." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de

Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

3684. Deliry, C. (2003): Nouveaux articles, études ou notes concernant les libellules dans la région Rhônes-Alpes-Dauphiné. *Sympetrum piémontais* 51: 1-2. (in French). [France; 15 publications containing information on Odonata, nearly exclusively unpublished expertises, are compiled.] Address: Deliry, C., 20, rue de la Manine, F-38510 Morestel, France. E-mail: president@sympetrum.org

3685. Deliry, C. (2003): Nouvelles espèces dans les départements. *Sympetrum piémontais* 51: 2. (in French). [France: Ain, Hautes-Alpes, Ardèche, Drôme, Isère, Loire, Rhône, Savoie, Haute-Savoie; the species are listed without additional information.] Address: Deliry, C., 20, rue de la Manine, F-38510 Morestel, France. E-mail: president@sympetrum.org

3686. Devin, S.; Piscart, C.; Beisel, J.N.; Moreteau, J.C. (2003): Ecological traits of the amphipod invader *Dikerogammarus villosus* on a mesohabitat scale. *Archiv für Hydrobiologie* 158(1): 43-56. (in English). ["Since 1995, *Dikerogammarus villosus* SOWINSKI, a Ponto-Caspian amphipod species, has been invading most of Western Europe's hydrosystems. *D. villosus* geographic extension and quickly increasing population density has enabled it to become a major component of macrobenthic assemblages in recipient ecosystems. The ecological characteristics of *D. villosus* on a mesohabitat scale were investigated at a station in the Moselle River. This amphipod is able to colonize a wide range of substratum types, thus posing a threat to all freshwater ecosystems. Rivers whose dominant substratum is cobbles and which have tree roots along the banks could harbour particularly high densities of *D. villosus*. A relationship exists between substratum particle size and the length of the individuals, and spatial segregation according to length was shown. This allows the species to limit intra-specific competition between generations while facilitating reproduction. A strong association exists between *D. villosus* and other Ponto-Caspian species, such as *Dreissena polymorpha* and *Corophium curvispinum*, in keeping with Invasional Meltdown Theory. Four taxa (*Coenagrionidae*, *Calopteryx splendens*, *Corophium curvispinum* and *Gammarus pulex*) exhibited spatial niches that overlap significantly that of *D. villosus*. According to the predatory behaviour of the newcomer, their populations may be severely impacted." (Authors)] Address: Devin, S., Laboratoire B.F.E., Equipe de Démocologie, Université de Metz, Avenue du Général Delestraint, Campus Bridoux, 57070, Metz, France. E-Mail: devin@sciences.univ-metz.fr

3687. Dijkstra, K.-D. (2003): Dragonflies and damselflies (Odonata) in Bwindi Impenetrable and Semliki National Parks, Uganda. Final report for the project: "Biogeography and ecology of dragonflies (Odonata) of South and West Ugandan forests", 1 September 2003. In collaboration with: Viola Clausnitzer, Philipps-University of Marburg, Marburg, Germany and John Joseph Kisakye & Derek Pomeroy, Makerere University Institute for Environment and Natural Resources, Kampala, Uganda: 8 pp. (in English). [65 species from Bwindi Impenetrable, and 91 species from Semliki National Parks are listed in tables and briefly commented according to their (biogeographical) range, ecology, sampling locality. The species composition of both

parks is compared, and some remarkable species including some new to science are briefly discussed.] Address: Dijkstra, K.-D., Gortestraat 11, 2311 MS Leiden, The Netherlands, kddijkstra@hetnet.nl

3688. Dijkstra, K.D.; Lempert, J. (2003): Odonate assemblages of running waters in the Upper Guinean forest. *Archiv für Hydrobiologie* 157(3): 397-412. (in English). ["In order to describe the assemblages of adult Odonata of running waters in the Upper Guinean forest, 36 sites in Liberia and Ghana were analysed using Non-metric Multidimensional Scaling. Five groups were identified, which correspond with different assemblages in the sequence of habitats from small streams to large rivers. Taxonomically related species demonstrate distinct ecological segregation within this gradient, occupying different sections of running waters, or different microhabitats therein. The balance of sun and shade, resulting from a varying degree of habitat openness, is thought to be an important factor in habitat selection, but it is difficult to distinguish from other factors associated with stream size. Anthropogenic opening of stream habitat (e.g. by deforestation or damming) can downscale the present fauna, i.e. result in the invasion of species of downstream habitats (more open) and the disappearance of upstream (dense forest) species." (Authors)] Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany. E-mail: jochen.lempert@gmx.de

3689. Dijkstra, K.-D. (2003): Problems in Chlorocypha classification: four cases from West Africa and a discussion of the taxonomic pitfalls (Odonata: Chlorocyphidae). *International Journal of Odonatology* 6(2): 109-126. (in English). ["The taxonomy of Chlorocypha species is problematic due to variability and the paucity of morphological characters. Subspecies *radix* of *C. glauca* is raised to specific rank. *C. sharpae* is found to be a synonym of *C. luminosa*. The synonymy of *C. jejuna* with *C. luminosa* is rejected. The former species is similar to the Southern African *C. consueta* and differences are stated. *C. dispar ovulosa*, *Libellago dispar fraseri* and *C. mutans* are synonyms of *C. pyriformosa*, although the lost type series of *fraseri* appears to have contained immature specimens of *C. dispar*. Trends in African chlorocyphid variation, subsequent taxonomic pitfalls and suggested guidelines to deal with them are discussed. The main problems are age and environment related melanization intensity, dark patterns caused by reversible temperature-induced colour change, especially in teneral, and the switch between reddish and bluish colours in species with bicoloured abdomens." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

3690. Donnelly, N. (2003): Dragonflies as hitchhikers? A puzzling record of *Gomphus graslinellus* from eastern New York. *Argia* 15(1): 17-18. (in English). [On 14-VIII-1996, *G. graslinellus* was recorded in Newsburgh River, New York, far away from its known most eastern localities in Ohio, USA. N. Donnelly questions, if the specimen might have hitchhiked on a truck coming from the Midwest to New England. He refers to additional cases of possible hitchhiking: *Epiaeschna heros* in Panama, and *Pachydiplax longipennis* on an oil rig in the North Sea, Europe.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

- 3691.** Donnelly, N. (2003): Northeastern Great Plains - a side trip on the way to California. *Argia* 15(2): 14-15. (in English). [Some highlights from several places in North Dakota, USA are briefly documented; emphasis is given to the *Leucorrhinias*.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 3692.** Drost, C.A.; Paxton, E.H.; Sogge, M.K. Whitfield, M.J. (2003): Food habits of the Southwestern Willow Flycatcher during the nesting season. *Studies in Avian Biology* (26): 96-103. (in English). ["The food habits and prey base of the endangered Southwestern Willow Flycatcher (*Empidonax traillii* extimus) are not well known. We analyzed prey remains in 59 fecal samples from an intensively-studied population of this flycatcher at the Kern River Preserve in southern California. These samples were collected during the nesting season in 1996 and 1997 from adults caught in mist nets, and from nestlings temporarily removed from the nest for banding. A total of 379 prey individuals were identified in the samples. Dominant prey taxa, both in total numbers and in percent occurrence, were true bugs (Hemiptera), flies (Diptera), and beetles (Coleoptera). Leafhoppers (Homoptera: Cicadellidae), spiders (Araneae), bees and wasps (Hymenoptera), and dragonflies and damselflies (Odonata) were also common items. Diet composition was significantly different between years, due to a large difference in the numbers of spiders between 1996 and 1997. There was also a significant difference between the diet of young and adults, with the diet of young birds having significantly higher numbers of odonates and beetles. There was a trend toward diet differences between males and females, but this was not significant at the $P = 0.05$ level." (Authors)] Address: Drost, C.A., U.S. Geological Survey, Southwest Biological Science Center, Colorado Plateau Field Station, 2255 North Gemini Drive, Flagstaff, AZ, 86001, USA
- 3693.** DuBois, R.B. (2003): Unreliability of taxonomic keys to larval *Leucorrhinia*. *Argia* 15(1): 13-14. (in English). [Applying taxonomic keys to identify *Leucorrhinia intacta* and *L. proxima* from northern Wisconsin, USA, resulted in a failure to separate the specimens in a correct way.] Address: DuBois, R.B., DNR, 6250 S. Ranger Road, Brule WI 54820, USA
- 3694.** Dumont, H.J. (2003): Odonata from the Republic of Mongolia and from the Autonomous Region of Inner Mongolia. *International Journal of Odonatology* 6 (2): 127-146. (in English). ["Thirty-five dragonfly species are reported from Mongolia and Inner Mongolia. Three are first records (*Coenagrion johanssoni*, *Erythromma najas humerale* Selys 1887, *Sympetrum speciosum haematoneura* Fraser). A non-parametric test is used to determine the total number of species to be expected. It suggests that the current number of 62 may be asymptotically complete, except for some specific zones like the Bulgan valley in the south-west, and the upper catchment of the Amur River, which have a distinctive fauna. From a biogeographic point of view, the Mongolian fauna is predominantly of impoverished Eurosibirian extraction. The south of Mongolia (the Gobi) and adjacent Inner Mongolia are, however, enriched with a significant fraction of East-Mediterranean and Irano-Turanian species, taking advantage of the Dzungarian corridor(s). This is particularly true of the fauna found in the small cis-Altai 'exclave' of the extreme south-west of
- the country. True Oriental species are rare, but East Palaearctic species (e.g. of the genus *Cercion*) are well-represented, especially south and east of the Gobi desert, which itself remains in need of further exploration." (Author) *Coenagrion lunulatum*, *Cercion v-nigrum*, *Orthetrum brunneum lineostigma*, *Sympetrum speciosum haematoneura*, and *S. hypomelas* are figured, and discussed in detail.] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be
- 3695.** Dunkle, S. (2003): Minutes of the 2003 DSA meeting. *Argia* 15(2): 21-22. (in English). [20-21 June 2003, Williams, California] Address: Dunkle, S., Biol. Dept, Collin County Community College, 2800 E, Spring Creek Parkway, Plano, TX 75074, USA
- 3696.** Dyrzcz, A.; Flinks, H. (2003): Nestling food of the congeneric and sympatric Rusty-margined and Social flycatchers. *Journal of Field Ornithology* 74(2): 157-165. (in English). ["We studied the food of nestling Rusty-margined (*Myzotetes cayanensis*) and Social flycatchers (*M. similis*) in 1998 and 1999 at Barro Colorado Island, Panama. Food samples were taken from nestlings by fecal analysis and the neck-collar method. In both species most food items were beetles, winged ants, dragonflies, spiders, and seeds of *Miconia* spp. Water animals (mainly backswimmers, freshwater snails, and dragonfly larvae) constituted 7.8%-13.5% of animal prey. The nestlings of the Social Flycatcher received significantly more flying insects, while the proportion of fruits and seeds was significantly higher in the diet of Rusty-margined Flycatcher nestlings. Length of animal prey varied from 4-25 mm in the Rusty-margined Flycatcher and 2-50 mm in the Social Flycatcher, and the length of fruits and seeds were 4-11 mm and 2-19 mm, respectively. The average length of animal food was larger in the Rusty-margined Flycatcher despite its slightly smaller size. The number of broods with nestlings or fledglings present in the study area was positively correlated with the abundance of fruits in the Social Flycatcher." (Authors)] Address: Dyrzcz, A., Department of Avian Ecology, Wrocław University, Sienkiewicza 21, 50-335, Wrocław, Poland. E-Mail: dyrzcz@biol.uni.wroc.pl
- 3697.** Ellenrieder, N. von; Garrison, R.W. (2003): A synopsis of the genus *Triacanthagyna* (Odonata: Aeshnidae). *International Journal of Odonatology* 6(2): 147-184. (in English) ["This synopsis of adult *Triacanthagyna* includes the revalidation of two species thought to be synonyms (*T. nympha* and *T. obscuripennis*), the description of a new species (*T. williamsoni*; type locality: Peru, Tingo Maria), keys to both sexes, illustrations of diagnostic characters, and distribution maps of all species. A phylogenetic assessment of the nine species is included, using outgroup comparison and parsimony algorithm. The cladistic analysis shows *Triacanthagyna* to be partitioned into two monophyletic groups: (1) two species lacking humeral, interpleural and metapleural dark stripes on pterothorax and with male cerci narrowing gradually at tip (*T. septima* and *T. obscuripennis*), and (2) six species with male cerci bearing subbasal teeth (*T. satyrus*, *T. caribbea*, *T. ditzleri*, *T. williamsoni*, *T. nympha* and *T. trifida*)." (Authors)] Address: Ellenrieder, Natalia von, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA, 90007, USA. E-Mail: odo_nata@hotmail.com

- 3698.** Ellenrieder, N. von (2003): A synopsis of the Neotropical species of 'Aeshna' fabricius: The genus *Rhionaeschna* Förster (Odonata: Aeshnidae). *Tijdschrift voor Entomologie* 146(1): 67-207. (in English). [This study includes a revisionary, phylogenetic and biogeographical analysis of Neotropical components of *Aeshna* Fabricius characterized by a midventral tubercle on abdominal sternum I. Phylogenetic relationships of the Neotropical species of *Aeshna* were inferred based on 39 adult characters. Ingroup taxa included 68 out of the 85 species currently assigned to *Aeshna*, and two species each of *Andaeshna* De Marmels and *Anaciaeschna* Selys. *Oreaeschna dictatrix* Lieftinck was chosen as outgroup. The strict consensus tree obtained after successive weighting revealed that *Aeshna* is not monophyletic; some of its species are more closely related to *Anaciaeschna* or *Andaeshna*. The name *Aeshna* should consequently be restricted to the Holarctic group including the type species *Aeshna grandis* Fabricius. In the present synopsis the generic name *Rhionaeschna* Förster is assigned to the New World group characterized by the presence of a conical tubercle on abdominal sternum I, comprising 39 species formerly assigned to *Aeshna*. The synopsis includes keys to adults of both sexes, diagnoses, biological notes, distribution maps and more than 400 diagnostic illustrations. *Rhionaeschna demarmelsi* sp. n. is described, *R. maita* Förster is considered a junior synonym of *R. brevifrons* (Hagen), *R. planaltica* (Ris) is considered a valid species, not a synonym of *R. variegata* (Fabricius), *R. planaltica* (Calvert) is raised to specific rank, 'Aeshna' *williamsoniana* Calvert, formerly included in the subgenus *Hesperaeschna* Cockerell, is excluded from *Rhionaeschna*, and lectotypes are designated for *R. maita*, *R. intricata* (Martin), *R. multicolor* (Hagen), *R. bonariensis* (Rambur), *R. diffinis* (Rambur), and *R. perralta*. Females of three species and larvae of 16 species are still unknown. *Rhionaeschna* occurs from southern Argentina to southern Canada, but is primarily Neotropical with its highest diversity along the Andean mountain range between Venezuela and Bolivia. It is absent from the Amazon basin, only three species occur north to the Neotropical region. The sister group of *Rhionaeschna* includes some African species of 'Aeshna' (*A. rileyi* Calvert, *A. subpupillata* McLachlan and *A. moori* Pinhey). *Rhionaeschna* plus the African clade constitute the sister group of *Andaeshna*, *Anaciaeschna*, *Anax* Leach, *Hemianax* Selys and several species of 'Aeshna' of uncertain affinities (i.e. *A. affinis* Vander Linden, *A. brevistyla* Rambur, *A. ellioti* Kirby, *A. mixta* Latreille, *A. isoceles* Muller and *A. williamsoniana*); the phylogenetic relationships within this complex are not yet known and their resolution is beyond the scope of this study. *Rhionaeschna* is absent from the Brazilian shield. Its related species and genera ('*A. rileyi*', '*A. subpupillata*', '*A. moori*' in Africa; '*A. brevistyla*' in Australia and New Zealand, *Andaeshna* in the Andes and '*A. williamsoniana*' in Central America, '*A. isoceles*' and highest species numbers of *Anaciaeschna*, *Hemianax* and *Anax* species in the Indo-Australian region) display a low diversity in Africa, which suggests a trans-Pacific rather than trans-Atlantic (Gondwanian) track, as has been hypothesized for other groups of similarly distributed odonates." (Author)] Address: Ellenrieder, Natalia von, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA, 90007, USA. E-Mail: odonata@hotmail.com
- 3699.** Ellenrieder, N. von; Muzón, J. (2003): Description of the last larval instar of *Ischnura fluviatilis* Selys (Coenagrionidae). *Bull. American Odonatology* 7(3): 57-60. [The last larval instar of *I. fluviatilis* is described and compared with the species distributed in South America which larvae are known, i.e., *I. capreola* and *I. ramburii*. In addition, a modification of the Westfall & May (1996, *Damselflies of North America*, Scientific Publ.) larval key is proposed." (Author)] Address: von Ellenrieder, Natalia, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, 90007 CA, USA. E-mail: odonata@hotmail.com
- 3700.** Ferreira-Peruquetti, P.; Trivinho-Strixino, S. (2003): Notas sobre relações foréticas entre espécies de Chironomidae e Odonata do Estado de São Paulo, Brasil. *Entomotropica* 18(2): 149-151. (in Portuguese, with English summary). [The note reports phoresy between larvae of Chironomidae and larvae of Odonata in streams of Campos do Jordão and Luiz Antônio (São Paulo State, Brazil). *Thienemanniella* sp. Kieffer, 1911 (Orthocladiinae: Corynoneurini) was attached on *Argia modesta*, and *Rheotanytarsus* Thienemann & Bause, 1913 (Chironominae: Tanytarsini) on *Elasmotheremis cannacrioides*, *Heteragrion* sp., and *Castoreschna* sp.] Address: Ferreira-Peruquetti, Patrícia, Trivinho-Strixino, Susana, Universidade Federal de São Carlos, Departamento de Hidrobiologia, Laboratório de Entomologia aquática, C.P. 676, CEP 13565-905, São Carlos, SP, Brasil
- 3701.** Fleck, G.; Bechly, G.; Martinez-Delclos, X.; Jarzembowski, E.; Coram, R.; Nel, A. (2003): Phylogeny and classification of the Stenophlebioptera (Odonata: Epiproctophora). *Ann. Soc. Entomol. France* 39(1): 55-93. (in English with French summary). [The Juraheterophlebiidae, new family of the "heterophlebioid" lineage, the Henrotayiidae, new family of the "anisopteroid" lineage, the Prostenophlebiidae and the Liassostenophlebiidae, new families of the Stenophlebioptera, and three new genera and species of the Stenophlebiidae are described from the Mesozoic of Germany, Spain, England, Kazakhstan, and Mongolia. The phylogenetic positions of the families Erichschmidiidae and Gondvanogomphidae are discussed. A tentative phylogenetic analysis of the Anisopteromorpha is proposed. This significantly extends our knowledge on the palaeogeographical distribution of the Stenophlebioptera and the Epiproctophora ("dragondamselflies")." (Authors)] Address: Nel, A., Entomologie, CNRS UMR 8569, Museum National d'Histoire Naturelle, 45 Rue Buffon, F-75005, Paris, France. E-Mail: anel@mnhn.fr
- 3702.** Freeland, J.R.; May, M.; Lodge, R.; Conrad, K.F. (2003): Genetic diversity and widespread haplotypes in a migratory dragonfly, the common green darner *Anax junius*. *Ecological Entomology* 28(4): 413-421. (in English). [1. Species that undertake regular two-way migration may be expected, through population connectivity, to exhibit some level of genetic similarity over broad spatial scales. Although seldom following two-way migration, highly mobile insect species tend to exhibit either low haplotype diversity and no phylogeographic structuring, or relatively high haplotype diversity and pronounced phylogeographic structuring. 2. This study reveals the first wide-scale genetic characterization of a migratory dragonfly, *A. junius*. Unusually for insects, north-south two-way migration is common in this species, although not obligatory. In at least part of its

range, some individuals follow an extended developmental period and overwinter in a state of diapause. 3. Mitochondrial sequence data were obtained from 92 *A. junius* individuals collected from 35 sites across Canada, U.S.A., and Mexico. These revealed 38 haplotypes, some of which were extremely widespread, although the majority (27 haplotypes) was found in only one individual. In contrast to previous studies on mobile insects, the overall pattern was of relatively high haplotype diversity in the absence of phylogeographic structuring. 4. Migrants and non-migrants, which sometimes shared haplotypes, were distributed across multiple genetic lineages. This suggests that, contrary to some earlier assertions, developmental pathways in this species may be plastic. Such plasticity would allow highly mobile species to adapt to a range of environmental conditions, and may be key to the widespread distribution of multiple haplotypes." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

3703. Gilard, B. (2003): Nouvelles des région. SFO Auvergne (03, 15, 43, 63). Société française d'odonatologie. La lettre des sociétaires 33: 8-9. (in French). [The distribution of *Coenagrion lunulatum* is very restricted in France; the main population is concentrated to the region of the Auvergne. The author briefly outlines the current status of the species. In addition, he lists some interesting observations from the departments of Cantal, Haute-Loire, and Puy-d-Dôme.] Address: Gilard, B., 10, place du 8 mai, F-63490 Sauxillanges, France

3704. Glotzhober, R.C.; Chapman, E. (2003): Second location for two rare Odonata in Ohio, *Nannothemis bella* and *Ladona julia*, (Odonata: Libellulidae) discovered at Singer Lake Bog, Summit County, Ohio. *Great Lakes Entomologist* 34(2) (2001): 63-66. ["Previously [...] *L. julia* and *N. bella* were known in Ohio from only one extant population each: *L. julia* from extreme northwest Ohio in Williams County and *N. bella* from west-central Ohio in Champaign County. During the summer of 2000 populations of each of these species were found in close proximity to each other at Singer Lake, a wetlands complex in southern Summit County in northeastern Ohio. This new location is also home to a population of another rare Ohio dragonfly, *Dorocordulia libera* (Odonata, Corduliidae) that was discovered during 1999. The Singer Lake wetlands are proving to be a very significant habitat for Ohio Odonata." (Authors)] Address: Glotzhober, R.C., Ohio Historical Society, 1982 Velma Avenue, Columbus, OH, 43211-2497, USA

3705. Gronowski, T. (2003): Dragonflies (Odonata) of the Łuknajno Lake nature reserve. *Parki Narodowe i Rezerваты Przyrody* 22(4): 543-548. (in Polish with English summary). [In 2001 and 2002, 26 odonate species were sampled in the Łuknajno Lake nature reserve (Great Masurian Lakes, NE Poland). This lake is a small (680 ha) and shallow, eutrophic lake, with a rich and diverse emergent and submerged vegetation, and which occupies 20% of the lake area. Most of the dragonfly species are widespread and common in Poland, but *Anax parthenope* and *Anaciaeschna isocela* are rare in the north-east part of the country. An additional rare species is *Leucorrhinia pectoralis*.] Address: Gronowski, T., Zakład Zoologii Uniwersytet Warszawski, ul. Banacha 2, 02 - 097, Warszawa, Poland. E-mail: gronowski@biol.uw.edu.pl

3706. Günther, A. (2003): Eiablage von *Sympetrum vulgatum* auf ein parkendes Auto (Odonata: Libellulidae). *Libellula* 22(1/2): (in German with English summary). ["A tandem pair was observed placing eggs onto the metallic-green bonnet of a car that was parked in a sunlit place. Less than 50 eggs could be found on the car." (Author)] Address: Günther, A., TU Bergakademie, IÖZ, AG Biologie/Ökologie, Leipziger Straße 29, D-09599 Freiberg, Germany. E-Mail: andre.guenther@ioez.tu-freiberg.de

3707. Guerbaa, K. (Ed.) (2003): Atlas des libellules du Limousin. *Epops*, Hors Série 1: 110 pp. (in French). [In the beginning of the 20th century, René Martin surveyed the odonate fauna of the Limousin region in France. With focus on these data, the results of a mapping project referring to the period of 1980 to 2001 are presented and discussed. More than 15000 species/location data sets are used to provide distribution maps. These are briefly commented. The style of the small book is very sophisticated: Black and white drawings - in most cases realised by Catie Faurie - and some black and white photographs build a very harmonic unit with the brief but competent textes. The book can be obtained by the Société Limousine d'Odonatologie et la SEPOL, 11, Rue Jauvion, F-87000 Limoges, France. Please add 10,- Euro to your order.] Address: Guerbaa, K., 1, rue de la Madonnette, F-87250 Bessines-sur-Gartempe, France

3708. Haas, F.; Waloszek, D.; Hartenberger, R. (2003): *Devonohexapodus bocksbergensis*, a new marine hexapod from the Lower Devonian Hunsrück Slates, and the origin of Atelocerata and Hexapoda. *Organisms Diversity & Evolution* 3(1): 39-54. (in English). ["We describe a new arthropod (approximately 75 mm long) from the Lower Devonian (Lower Emsian) Hunsrück Slates near Bundenbach, western Germany. The specimen is from an isolated piece of rock found on the quarry dump, precluding precise resolution of stratigraphic age. The Hunsrück Slates are marine sediments with a rich fauna of exclusively marine taxa, suggesting that our fossil was also marine. The animal has a small head with large compound eyes and long, filiform, myocerate antennae. Its trunk is divided distinctly into a thorax with three segments and three pairs of slender legs, and a post-thoracic domain composed of 35-40 limb-bearing segments of which the anteriormost are paired, stout, and ventrally-oriented leglets; the 3 ultimate limb-bearing segments bear longer, posteriorly-oriented and apparently specialised appendages. The overall appearance of the new form is reminiscent of Archaeognatha or Odonata. It is interpreted as a representative of the Hexapoda because of the possession of a three-segmented thorax and three pairs of legs that are clearly distinct from the posterior set. The large number of leg-bearing post-thoracic segments discriminates it from the Insecta, which possess 11 "abdominal" segments maximally, originally also leg-bearing. The formal systematic classification of the organism is: (Hexapoda (*Devonohexapodus bocksbergensis*+Insecta ("entognaths"+Ectognatha))). The morphology of the fossil and its environment suggest that the hexapody of hexapods did not evolve as an adaptation to terrestrial locomotion, but was already developed in the marine habitat. No terrestrial arthropods have changed their original tagmosis for biomechanical reasons, for example, no "myriapods" have reduced their leg numbers or modified their trunk to evolve a thorax and ab-

domen similar to insects. Walking exclusively on uniramous prosomal legs in the Chelicerata also occurred well before terrestrialization of this other euarthropodan group. It is not unlikely that the last common ancestor of the Hexapoda was large and that the small size of extant "entognaths" evolved due to reduction in their stem lineage. Being marine, the new fossil also has considerable impact on hypotheses about the early evolution of Atelocerata ("myriapods"+Hexapoda). For example, if their last common ancestor was aquatic, terrestrialization took place at least twice and tracheal breathing probably evolved independently in both taxa after terrestrialization." (Authors)] Address: Haas, F., Section for Bio-systematic Documentation, University of Ulm, Helmholzstr. 20, D-89081, Ulm, Germany. E-Mail: haas.smns@naturkundemuseum-bw.de

3709. Haden, G.A.; Shannon, J.P.; Wilson, K.P.; Blinn, D.W. (2003): Benthic community structure of the Green and Colorado rivers through Canyonlands National Park, Utah, USA. *Southwestern Naturalist* 48(1): 23-35. (in English). ["We sampled the aquatic benthos at 6 remote sites on the Colorado and Green rivers through Canyonlands National Park, Utah, USA. This study provides the first published description of benthic standing mass, invertebrate community composition, and primary carbon for this portion of the Colorado River system. High suspended sediment concentrations prohibited growth of primary producers. The primary carbon for benthic invertebrates was terrestrial organic matter. The invertebrate community was composed of 49 taxa, mostly mayflies, caddisflies, and diptera, which were dominated by filterer/collector species. A smaller portion of the community was made up of predatory stoneflies and odonates. Standing mass of invertebrates on cobble substrates within a given site was stable over the multiyear sample period (1993 through 1996) and was comparable with other southwestern streams (overall mean = 0.41 g/m² ash-free dry mass +/- 0.01 SE). Invertebrate standing mass at each site was controlled by the availability of primary carbon. Primary carbon availability was controlled by supply to the site and retention within the site. Both aspects might be influenced by anthropogenic alteration of the river basin and discharge patterns upstream of the study site." (Authors)] Address: Haden, G.A., Dept of Biological Sciences, Northern Arizona University, P.O. Box 5640, Flagstaff, AZ, 86011, USA. E-Mail: Allen.Haden@nau.edu

3710. Hagen, H. von (2003): Artspezifische Exuvienhaltungen bei der Emergenz von drei Libelluliden auf Mallorca (Odonata: Libellulidae). *Libellula* 22(1/2): 25-29. (in German with English summary). ["At agricultural irrigation tanks, exuviae of *Selysiothermis nigra* were fixed to the substrate by their legs only, whereas *Crocothemis erythraea* and *Orthetrum cancellatum* additionally have contact with their abdomen two. The latter differ in the symmetry of the leg positions." (Author)] Address: von Hagen, H., Akazienweg 28, D- 58452 Witten, Germany. E-Mail: H.vonHagen@web.de

3711. Haines, T.A.; May, T.W.; Finlayson, R.T.; Mierzykowski, S.E. (2003): Factors affecting food chain transfer of mercury in the vicinity of the Nyanza site, Sudbury River, Massachusetts. *Environmental Monitoring & Assessment* 86(3): 211-232. (in English). ["The influence of the Nyanza Chemical Waste Dump Superfund Site on the Sudbury River, Massachusetts, was assessed by analysis of sediment, fish prey organisms,

and predator fish from four locations in the river system. Whitehall Reservoir is an impoundment upstream of the site, and Reservoir 2 is an impoundment downstream of the site. Cedar Street is a flowing reach upstream of the site, and Sherman Bridge is a flowing reach downstream of the site. Collections of material for analysis were made three times, in May, July, and October. Sediment was analyzed for acid-volatile sulfide (AVS), simultaneously-extracted (SEM) metals (As, Cd, Cr, Hg, Pb, Sb, Zn), and total recoverable Hg. The dominant predatory fish species collected at all sites, largemouth bass (*Micropterus salmoides*), was analyzed for the same suite of metals as sediment. Analysis of stomach contents of bass identified small fish (yellow perch *Perca flavescens*, bluegill *Lepomis macrochirus*, and pumpkinseed *Lepomis gibbosus*), crayfish, and dragonfly larvae as the dominant prey organisms. Samples of the prey were collected from the same locations and at the same times as predator fish, and were analyzed for total and methyl mercury. Results of AVS and SEM analyses indicated that sediments were not toxic to aquatic invertebrates at any site. The SEM concentrations of As, Cd, and Cr were significantly higher at Reservoir 2 than at the reference sites, and SEM As and Cd were significantly higher at Sherman Bridge than at Cedar St. Sediment total Hg was elevated only at Reservoir 2. Hg was higher at site-influenced locations in all fish species except brown bullhead (*Ameiurus nebulosus*). Cd was higher in bluegill, black crappie (*Pomoxis nigromaculatus*), and brown bullhead, and Cr was higher in largemouth bass fillet samples but not in whole-body samples. There were no seasonal differences in sediment or prey organism metals, but some metals in some fish species did vary over time in an inconsistent manner. Predator fish Hg concentration was significantly linearly related to weighted prey organism methyl Hg concentration. Largemouth bass Hg was significantly lower at Reservoir 2 in our study than in previous investigations in 1989 and 1990. High concentrations of inorganic Hg remain in river sediment as a result of operation of the Nyanza site, and fish Hg concentrations in river reaches downstream of the site are elevated compared to upstream reference sites. However, the differences are relatively small and Hg concentrations in largemouth bass from the site-influenced locations are no higher than those from some other, nearby uncontaminated sites. We hypothesize that this results from burial of contaminated sediment with cleaner material, which reduces bioavailability of contaminants and possibly reduces methylation of mercury." (Authors)] Address: Haines, T.A., Leetown Science Center, Orono Field Station, U.S. Geological Survey, Orono, ME, USA. E-Mail: haines@maine.edu

3712. Hamada, N.; Oliveira, S.J. de (2003): Food items of larvae of *Rimanella arcana* (Needham, 1933) (Odonata: Amphipterygidae) in Central Amazonia, Brazil. *Entomotropica* 18(2): 153-155. (in English, with Portuguese summary). ["The objective of the present study was to determine the prey of *R. arcana* larvae by means of stomach content analyses. A total of 39 larvae were dissected; three of them (7.7%) had empty stomachs. The following taxa were present in the stomach content of *R. arcana*: Diptera: Simuliidae (83.3%), Chironomidae (61.1%), Empididae (5.6%); Trichoptera: Hydroptilidae (19.4%), Hydropsychidae (8.3%); Ephemeroptera: Baetidae (8.3%); Lepidoptera: Crambidae (2.8%), and Acarina (5.6%). Simuliidae and Chironomidae were the most frequent food items of *R. arcana* lar-

vae, and both families also were the most abundant in the riffles and waterfalls of the study area." (Authors)] Address: Hamada, Neusa, Coordenação de Pesquisas em Entomologia, Instituto Nacional de Pesquisas da Amazonia, Caixa Postal 478, CEP 69011-970 Manaus, AM, Brazil. E-mail: nhamada@inpa.gov.br.

3713. Hawking, J.H.; New, T.R. (2003): Interpreting dragonfly diversity to aid in conservation assessment: Lessons from the Odonata assemblage at Middle Creek, north-eastern Victoria, Australia. *Journal of Insect Conservation* 6(3) (2002): 171-178. (in English). ["In order to evaluate single-occasion sampling in compiling inventories for Odonata, larvae were sampled on 20 occasions from 1987-1990 at a site on Middle Creek, north-eastern Victoria, and adults sought also on each visit to more fully evaluate the diversity of the assemblage, and limitations of depending on a single life stage for this purpose. A total of 18 species (7 Zygoptera, 11 Anisoptera) included 15 species collected as larvae and 16 as adults. Few species were common as larvae, and about half the 2806 specimens identified were *Austrogomphus cornutus* Watson. *Orthetrum caledonicum* (Brauer) and *Ischnura heterosticta* (Burmeister) were also abundant, and these three species were also the most common as adults. The number of species obtained ranged from 2-9 on different occasions, and represent different 'habitat groups' within the local fauna. The Middle Creek odonate fauna appears to be much richer than that of a nearby site on the Kiewa River (12 species), and reasons for this are discussed. Seasonal variation in species representation and relative abundances are noted. Any single sample occasion provided insufficient knowledge of the total assemblage to interpret odonate diversity reliably." (Authors)] Address: New, T.R., Department of Zoology, La Trobe University, Bundoora, Vic., 3083, Australia

3714. Herbeck, J.T.; Novembre, J. (2003): Codon usage patterns in cytochrome oxidase I across multiple insect orders. *Journal of Molecular Evolution* 56(6): 691-701. (in English). ["Synonymous codon usage bias is determined by a combination of mutational biases, selection at the level of translation, and genetic drift. In a study of mtDNA in insects (including Odonata), we analyzed patterns of codon usage across a phylogeny of 88 insect species spanning 12 orders. We employed a likelihood-based method for estimating levels of codon bias and determining major codon preference that removes the possible effects of genome nucleotide composition bias. Three questions are addressed: (1) How variable are codon bias levels across the phylogeny? (2) How variable are major codon preferences? and (3) Are there phylogenetic constraints on codon bias or preference? There is high variation in the level of codon bias values among the 88 taxa, but few readily apparent phylogenetic patterns. Bias level shifts within the lepidopteran genus *Papilio* are most likely a result of population size effects. Shifts in major codon preference occur across the tree in all of the amino acids in which there was bias of some level. The vast majority of changes involves double-preference models, however, and shifts between single preferred codons within orders occur only 11 times. These shifts among codons in double-preference models are phylogenetically conservative." (Authors)] Address: Herbeck, J.T., JBP Center for Comparative Molecular Biology and Evolution, Marine Biological Laboratory, Woods Hole, MA, 02543, USA. E-Mail: herbeck@mbl.edu

3715. Hoess, R. (2003): Ist *Sympetrum meridionale* in der Schweiz heimisch? Funde von 1998-2002 und Anmerkungen zu Habitat, Phänologie, Verhalten und Morphologie (Odonata: Libellulidae). *Libellula* 22(1/2): 61-86. (in German, with English summary). ["*S. meridionale* has been evidenced in Switzerland annually since 1998 with a total of 41 records from 20 localities. No large scale immigration was noticed although records exist from different parts of Northern and Western Switzerland. Reproduction is sure or probable at several waters. At four localities, the species was present in several years during this period. Individuals found in Eastern Switzerland in 2002 probably originate from a larger population near Chavornay in Western Switzerland. With one exception, parasitic mites on the wings were not recorded before 2002. Ecological and phenological data are summarized. Copulation and oviposition are described as well as eggs and exuviae from reared specimens. Diagnostic features of the imago are stressed out in order to facilitate future recording. Documentation by collecting voucher specimens or photographing is considered important and necessary." (Author)] Address: Hoess, R., Normannenstrasse 35, CH-3018 Bern, Schweiz. E-Mail: ReneHoess@lst.ch

3716. Johansson, F.; Brodin, T. (2003): Effects of fish predators and abiotic factors on dragonfly community structure. *Journal of Freshwater Ecology* 18(3): 415-423. (in English). ["We compared the community structure of odonates (Odonata) in 13 waters in northern Sweden, which differed with respect to fish presence and abiotic factors. Richness and abundance of odonates were estimated by collecting exuviae during the whole emergence season of 1999. Redundancy analysis revealed that fish presence influenced the community composition of the odonate larvae. While species richness per sample was not affected by the presence of fish, total abundance of odonates was higher in waters without fish. In waters with fish, *Aeschna juncea* and *Leucorrhinia dubia* showed lower abundances, whereas *Erythromma najas* and *Cordulia aenea* showed higher abundances. The abundances of *Coenagrion hastulatum*, *Libellula quadrimaculata*, and *Leucorrhinia rubicunda* did not differ between waters with and without fish. Of the six abiotic factors analyzed only water acidity was associated with odonate community structure." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science Animal Ecology Group, Umea University, 90187, Umea, Sweden. E-Mail: frank.johansson@eg.umu.se

3717. Johansson, F. (2003): Latitudinal shifts in body size of *Enallagma cyathigerum* (Odonata). *Journal of Biogeography* 30: 19-34. (in English). [Body size pattern for populations of *E. cyathigerum* across a south-north transect covering localities in Spain, Belgium, Sweden, and Norway was sampled. In total 253 newly emerged adults were collected from fourteen localities. "Body size was measured using thorax length, length of right front wing and length of right hind tibia. These body size estimates were thereafter related to latitude and mean temperature in January and July. Body size showed a U-shaped pattern with latitude, being large at low and high latitudes and small at intermediate latitudes. The same U-shaped pattern was found for mean January and July temperature, with large animals at low and high temperatures. The U-shaped relationship between body size and latitude is suggested to be a combination of two effects: (1) the length of the season favourable

for growth and development, and (2) variation in life cycle length with latitude." (Author)] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

3718. Jordan, S.; Simon, C.; Polhemus, D. (2003): Molecular systematics and adaptive radiation of Hawaii's endemic damselfly genus *Megalagrion* (Odonata: Coenagrionidae). *Systematic Biology* 52(1): 89-109. (in English). ["Damselflies of the endemic Hawaiian genus *Megalagrion* have radiated into a wide variety of habitats and are an excellent model group for the study of adaptive radiation. Past phylogenetic analysis based on morphological characters has been problematic. Here, we examine relationships among 56 individuals from 20 of the 23 described species using maximum likelihood (ML) and Bayesian phylogenetic analysis of mitochondrial (1,287 bp) and nuclear (1,039 bp) DNA sequence data. Models of evolution were chosen using the Akaike information criterion. Problems with distant outgroups were accommodated by constraining the best ML ingroup topology but allowing the outgroups to attach to any ingroup branch in a bootstrap analysis. No strong contradictions were obtained between either data partition and the combined data set. Areas of disagreement are mainly confined to clades that are strongly supported by the mitochondrial DNA and weakly supported by the elongation factor 1alpha data because of lack of changes. However, the combined analysis resulted in a unique tree. Correlation between Bayesian posterior probabilities and bootstrap percentages decreased in concert with decreasing information in the data partitions. In cases where nodes were supported by single characters bootstrap proportions were dramatically reduced compared with posterior probabilities. Two speciation patterns were evident from the phylogenetic analysis. First, most speciation is interisland and occurred as members of established ecological guilds colonized new volcanoes after they emerged from the sea. Second, there are several instances of rapid radiation into a variety of specialized habitats, in one case entirely within the island of Kauai. Application of a local clock procedure to the mitochondrial DNA topology suggests that two of these radiations correspond to the development of habitat on the islands of Kauai and Oahu. About 4.0 million years ago, species simultaneously moved into fast streams and plant leaf axils on Kauai, and about 1.5 million years later another group moved simultaneously to seeps and terrestrial habitats on Oahu. Results from the local clock analysis also strongly suggest that *Megalagrion* arrived in Hawaii about 10 million years ago, well before the emergence of Kauai. Date estimates were more sensitive to the particular node that was fixed in time than to the model of local branch evolution used. We propose a general model for the development of endemic damselfly species on Hawaiian Islands and document five potential cases of hybridization (*M. xanthomelas* X *M. pacificum*, *M. eudytum* X *M. vagabundum*, *M. orobates* X *M. oresitrophum*, *M. nesiotus* X *M. oahuense*, and *M. mauka* X *M. paludicola*)." (Authors)] Address: Jordan, S., Laboratoire d'Ecologie Alpine, UMR CNRS 5553, Université Joseph Fourier, 38041, B.P. 53, Grenoble Cedex 9, France. E-Mail: steve.jordan@ujf-grenoble.fr

3719. Kämpf, H. (2003): Entwicklung von vier Gomphiden-Arten in einem Baggersee in Nordbayern (Odonata: Gomphidae). *Libellula Supplement* 4: 99-104. (in

German, with English summary). ["From 5 May 2001 to 15 July 2001, the almost daily collecting of gomphid exuviae at a 150 m-strip of the banks of a gravel-pit lake near Neuses, Upper Franconia, Bavaria, Germany, for the first time provided the record of the joint development of *Gomphus flavipes*, *G. pulchellus*, *G. vulgaticus*, and *Ophiogomphus cecilia* in standing waters." (Author)] Address: Kämpf, H., Am Eichenwald 22a, D-91301 Forchheim, Germany

3720. Kalkman, V.J.; Wasscher, M.; Pelt. G.J. Van (2003): An annotated checklist of the Odonata of Turkey. *Odonatologica* 32(3): 215-236. (in English). ["In addition to the checklist, species of which the taxonomic status has changed, or with significant changes in the known distribution, are annotated. At present a total of 96 species (6 of which are divisible into 2 or more subspecies) are now known to occur in Turkey with certainty, and at least 15 species and an additional 5 subspecies are to be expected. *Ischnura fountainei* is new to the Turkish fauna. The sole Turkish record of *Ophiogomphus cecilia* pertains to *O. reductus* which is here mentioned for the first time from Turkish territory." (Authors)] Address: Kalkman, V.J., National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nnm.nl

3721. Kauppinen, J.; Mappes, J. (2003): Why are wasps so intimidating: field experiments on hunting dragonflies (Odonata: *Aeshna grandis*). *Animal Behaviour* 66: 505-511. (in English). ["The mechanisms of aposematism (unprofitability of prey combined with a conspicuous signal) have mainly been studied with reference to vertebrate predators, especially birds. We investigated whether dragonflies, *Aeshna grandis*, avoid attacking wasps, *Vespula norvegica*, which are an unprofitable group of prey for most predators. As a control we used flies that were painted either black or with yellow and black stripes. The dragonflies showed greater aversion to wasps than to flies. Black-and-yellow-striped flies were avoided more than black ones, suggesting that aposematic coloration on a harmless fly provides a selective advantage against invertebrate predators. There was no significant difference in reactions to black-painted and black-and-yellow wasps, indicating that, in addition to coloration, some other feature in wasps might deter predators. In further experiments we offered dragonflies artificial prey items in which the candidate warning signals (coloration, odour and shape) were tested separately while other confounding factors were kept constant. The dragonflies avoided more black-and-yellow prey items than solid black or solid yellow ones. However, we found no influence of wasp odour on dragonfly hunting. Dragonflies were slightly, but not significantly, more reluctant to attack wasp-shaped prey items than fly-shaped ones. Our results suggest that the typical black-and-yellow stripes of wasps, possibly combined with their unique shape, make dragonflies avoid wasps. Since black-and-yellow stripes alone significantly decreased attack rate, we conclude that even profitable prey species (i.e. Batesian mimics) are able to exploit the dragonflies' avoidance of wasps." (Authors)] Address: Mappes, J., Dept of Biological and Environmental Science, University of Jyväskylä, P. O. Box 35, FIN-40014 University of Jyväskylä, Finland. E-mail: mappes@byl.jyu.fi

3722. Kemp, D.J.; Alcock, J. (2003): Lifetime resource utilization, flight physiology, and the evolution of contest

competition in territorial insects. *Am. Nat.* 162: 290-301. (in English). ["Adaptationist analyses of animal contests have contributed much to our understanding of behavioral evolution. One class of contest, however, the war of attrition, has proven difficult to interpret. In wars of attrition involving aerial displays, there is evidence that asymmetries in performance parameters such as flight energetics may be important determinants of contest resolution. This paradigm is not universal, however, and we presently lack a framework for understanding why certain biophysical parameters are important only in some cases. One possibility is that the relevance of these parameters is determined by evolutionarily conserved life-history-scale patterns of resource allocation and acquisition. We evaluated this hypothesis by investigating the correlates of competitive success in two territorial insects that exemplify markedly different lifetime patterns of resource utilization. We found that in the bot fly *Cuterebra austeni*, an extreme capital breeding species that depends entirely on energy acquired during its immature stages, territorial residency was most strongly correlated with a size-independent measure of energetic availability. In contrast, residency in the tarantula hawk wasp *Hemipepsis ustulata* was best predicted by variation in body size per se. Adult *H. ustulata* are able to supplement their larval-derived nutrient capital in the manner of an income breeder, and fuel reserves were independent of age and actually correlated negatively with residency in this species. These results underscore how the study of sexually selected phenomena may be enriched by an explicit consideration of life-history principles." (Authors) Odonata are discussed at several contexts.] Address: Alcock, J., Department of Biology, Arizona State University, Tempe, Arizona 85287-1501, USA. E-mail: j.alcock@asu.edu

3723. Ketelaar, R. (2003): Libellen vliegen vroeger en noordelijker: Een gevolg van klimaatverandering? *Levende Natuur* 104(3): 83-85. (in Dutch with English summary). ["Dragonflies are flying earlier and expanding northwards: An effect of climate change?: A balance of Dutch dragonflies in terms of changes in distribution shows that the number of increasing and decreasing species are approximately equal. However, it appears that species with a mainly southern distribution dominate the increasing group. The decreasing group consists mainly of more stenotopic species. Northern species generally decrease in The Netherlands. Not only changes in distribution are apparent, it is also shown that dragonflies have shifted their flight season. In an analysis for ten common species it is evidenced that for nine species the peak flight season is nowadays much earlier than in 1980, in some cases two weeks earlier. Climate change (especially warmer summers) is thought to be one of the driving factors behind these processes and this is shortly discussed." (Author)] Address: Ketelaar, R., Vlinderstichting, 6700 AM, Postbus 506, Wageningen, Netherlands. E-Mail: robert.ketelaar@vlinderstichting.nl

3724. Klausnitzer, B. (2003): Gesamtübersicht zur Insektenfauna Deutschlands. *Entomologische Nachrichten und Berichte* 47(2): 57-66. (in German with English summary). [The "Entomofauna Germanica", presenting the first complete and up-to-date overview of the German insect fauna with a total of 1327 pages, documents 33466 species from 30 orders. A decline in species numbers from north to south is fairly striking, for example in Auchenorrhyncha, Heteroptera, Neuroptera,

Coleoptera and Hymenoptera. In almost all studied groups Bavaria is the federal state with the highest species numbers; Baden-Württemberg frequently holds second rank. According Müller & Schorr (2001), the Odonata contribute to the German fauna 80 species; in the meantime, *Boyeria irene* found in Bavaria, has to be added to the German check-list.] Address: Klausnitzer, B., Lannerstr. 5, D-01219 Dresden, Germany

3725. Kleukers, R.; Reemer, M. (2003): Veranderingen in de Nederlandse ongewerveldenfauna. *Levende Natuur* 104(3): 86-89. (in Dutch with English summary). ["Changes in the Dutch invertebrate fauna: Until now range changes in Dutch invertebrates were only documented for a few, large and conspicuous species, e.g. *Argiope bruennichi*, *Volucella zonaria* and *Phaneroptera falcata*. For the first time now a substantial part of the Dutch fauna was analysed, in a pilot study relying heavily on the expert judgement of the specialists of European Invertebrate Survey-The Netherlands. In total 1331 species of Apidae, Asilidae, Carabidae, Formicidae, Mollusca, Odonata, Orthoptera and Syrphidae were studied. In this paper we focus on the 339 species of which the northern border of the range runs through The Netherlands. No less than 101 species of this group have expanded their range to the north in the 20th century, especially in the groups Odonata, Syrphidae and Mollusca. In total 63 species were found to have retreated to the south, especially the Apidae. The expanding species of most groups are mainly eurytopic species, characteristic for disturbed, cultivated habitats. The declining species are mainly stenotopic species restricted to nature reserves. The Carabidae are an exception, as the expanding ground beetles seem to be mostly stenotopic." (Author)] Address: Kleukers, R., EIS-Nederland, 2300 RA, Postbus 9517, Leiden, Netherlands. E-Mail: eis@naturalis.nnm.nl

3726. Knijf, G. de; Anselin, A.; Goffart, P. (2003): Trends in dragonfly occurrence in Belgium (Odonata). *Proc. 13th Int. Coll. EIS, September 2001(2003)*: 33-38. (in English). ["The group 'Gomphus' collected 65 000 records of 69 species of Odonata, more or less equally scattered over Belgium. The best-investigated areas are the northern part and some river valleys in the south. Most hot spots can be found in the northeastern part, with a maximum of 48 species for 25 km². Remarkable is the fact that 50% of the species occurs in less than 7% of the 5 km grid cells (UTM). We determined trends in occurrence by comparing three periods: before 1950, 1950-1989 and 1990-2000. Four species show a clear decline over the three periods, eight species give evidence of a historical decline but survive on a limited number of sites and eight species also display a historical decline but have been increasing during the last decade. Six species show a (very) clear increase over the three periods and two species display their increase only during the last ten years." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

3727. Kühn, J.; Gutser, D. (2003): Beobachtung einer *Boyeria irene* bei Mittenwald, Oberbayern (Odonata: Aeshnidae). *Libellula* 22(1/2): 41-48. (in German, with English summary). [On 17 June 2002, a mature male of *B. irene* was watched extensively from little distance but could not be caught. It was hunting persistently on a clearance at an altitude of 1135 m (47°27,5'N 11°14'E),

southern Bavaria, Germany. This is the first observation of *B. irene* reported from Germany, and the 81th recorded odonate species in Germany. Possible immigration routes as well as the early date of the record are briefly discussed.] Address: Kuhn, J., Max-Planck-Institut für Verhaltensphysiologie, Abt. Winckler, D-82319 Seewiesen. E-mail: kuhn@mpi-seewiesen.mpg.de

3728. Lajeunesse, M.J.; Forbes, M.R. (2003): A comparison of structural size and condition in two female morphs of the damselfly *Nehalennia irene* (Hagen) (Zygoptera: Coenagrionidae). *Odonatologica* 32(3): 281-287. (in English). ["Female colour polymorphism in coenagrionid damselflies is genetically determined for the 4 species so far studied. No size differences between female morphs have been reported. In another species, size differences between morphs do exist but the genetic basis of the polymorphism has not been explored. In *N. irene*, 2 female morphs exist: one is similar to the male in both colour and pattern (the androchrome), whereas the other differs from the male (the more common gynochrome). No differences are shown in lengths of wing, femur or tarsus between androchromes and gynochromes, nor any differences in multivariate estimates of size or in wet mass corrected for these size estimates were found. The study controls for time of season, which is known to influence the size of emerging temperate damselflies. The results concur with results from other spp. where the genetic basis of colour polymorphism is known." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

3729. Landwer, B. H. P.; Sites, R.W. (2003): Redescription of the larva of *Gomphus militaris* Hagen (Odonata: Gomphidae), with distributional and life history notes. *Proc. Entomol. Soc. Washington* 105(2): 304-311. (in English). ["The final larval instar of *G. militaris* is described, diagnosed, and figured from exuviae and larval specimens from Missouri, Texas, and Kansas. A previous description was erroneously attributed to *G. militaris*, but actually pertained to *Arigomphus lentulus*. Thus, the use of many previously published characteristics to identify this species will result in misidentification. Larvae of *G. militaris* were common and widespread in ponds in the prairie region of Missouri. We report data on life history based on larval and adult collections." (Authors)] Address: Landwer, B., Entomology Museum, Department of Entomology, and Center for Agroforestry, University of Missouri, Columbia, MO 65211, USA. E-mail: bhl065@mizzou.edu.

3730. Lohr, M. (2003): *Crocothemis erythraea* auch in Niedersachsen (Odonata: Libellulidae). *Libellula* 22 (1/2): 35-39. (in German, with English summary). [On 26-VIII-2000, a male *C. erythraea* was found in a former gravel pit near Holzminen (51°49'N, 9°26'E), Niedersachsen, Germany. In 2001 and 2002 additional observations of the species in several gravel pits of the upper Weser floodplain (located in Nordrhein-Westfalen) were made. These findings are briefly discussed in the context of the recent range extensions of other thermophilous Odonata species (*Cercion lindenii*, *Aeshna affinis*, *Anax parthenope*).] Address: Lohr, M., Fachgebiete Tierökologie und Landschaftsökologie, Fachhochschule Lippe und Höxter, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-Mail: mlohr@fh-hoexter.de

3731. Mackenzie, R.A.; Kaster, J.L. (2003): A preservative-free emergent trap for the isotopic and elemental analysis of emergent insects from a wetland system. *Great Lakes Entomologist* 35(1) (2002): 47-51. (in English). ["This study reports a cost-effective, live emergent trap designed for the preservative-free use in both biogeochemical and ecological analyses of emerging insects. The trap proved to be advantageous in several ways. First, the simple design made the trap time-efficient since it was easy to set-up, change, and maintain. Second, live sampling not only provided uncontaminated organisms for elemental and stable isotopic analyses, it minimized disfigurement. This resulted in rapid and easy handling, as well as identification, of adult insects. Finally, trap avoidance by ephemeropterans and odonates, a common problem encountered in the literature, was minimal and organisms from both insect orders were successfully collected." (Author)] Address: Mackenzie, R., The Center for Great Lakes Studies at the Water Institute, University of Wisconsin-Milwaukee, 600 E. Greenfield Ave., Milwaukee, WI, 53204, USA

3732. Maczey, N. (2003): *Calopteryx splendens* und Straßenverkehr - Beobachtungen an einer Autobahnbrücke (Odonata: Calopterygidae). *Libellula* 22(1/2): 15-18. (in German with English summary). ["In 1998, during a short period of fierce wind, more than 30 specimens of *C. splendens* were recorded as traffic victims alongside a motorway crossing the river Dosse in Brandenburg, Germany. This surprisingly high number demonstrates that - under certain circumstances - local insect populations may be negatively influenced by heavy traffic." (Author)] Address: Maczey, N., Hospitalstr. 46, D-53840 Troisdorf, Germany. E-Mail: N.Maczey@cabi.org

3733. Maeto, K.; Kougo, K.; Kotani, E.; Miyata, H.; Sugimura, M. (2003): Geographical analysis of Odonata habitats in the Shimanto River basin, Shikoku, Japan. *Japanese Journal of Entomology* 6(1): 27-41. (in Japanese with English summary). ["We conducted a correspondence analysis (CA) of 88 species of Odonata (dragonflies) observed at 455 grid sites (ca. 0.5 kmX0.5 km) in the Shimanto River basin and adjacent areas in Shikoku, Japan. Multiple regression analyses of the two main axes of the CA ordination on the geographical features (altitude, relief) and vegetation of grid sites indicated that the degree of relief and the areal proportion of paddy fields were the main determinants of the species distribution of Odonata. The species were classified into 5 groups by k-means clustering based on the coordinate axes. Groups I and II mostly consisted of lentic species inhabiting ponds, marshes and paddy fields of flat lands. Groups III and IV were composed of lentic species mainly inhabiting marshes and paddy fields and lotic species in slow streams. Group V consisted of lotic species inhabiting mountain streams and spring s. Habitat requirements for the species appearing in the Red List of Kochi Prefecture are also discussed." (Authors)] Address: Maeto, K., Laboratory of Entomology, Faculty of Agriculture, Kobe University, Rokkodai-cho 1-1, Nada-ku, Kobe, 657-8501, Japan

3734. Malkmus, R. (2003): Die prächtige Smaragdlibelle - ein Juwel unter Portugals Libellen. *Natur & Museum* 133(7): 207-212. (in German). [The paper briefly compiles the present knowledge on the ecology (including an original observation of oviposition) and the dist-

ribution of *Macromia splendens* in Portugal.] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

3735. March, J.G.; Benstead, J.P.; Pringle, C.M.; Lukymis, M. (2003): Benthic community structure and invertebrate drift in a Pacific island stream, Kosrae, Micronesia. *Biotropica* 35(1): 125-130. (in English). ["Tropical Pacific island streams have poorly understood communities that deserve scientific attention. We examined benthic macroinvertebrates and fishes of the Inem River on Kosrae, Federated States of Micronesia. Larval chironomids, lepidopterans, odonates, and freshwater shrimps dominated the benthos and drift. Diel periodicity in drift was not evident. Nine fishes, two shrimps, and one snail species were identified. Kosrae's stream fauna appears even more depauperate than other Pacific high islands, possible due to its extreme isolation." (Authors)] Address: March, J.G., Department of Biology, Washington and Jefferson College, 60 South Lincoln St., Washington, PA, 15301, USA; E-Mail: jmarch@washjeff.edu USA

3736. Marinov, M. (2003): Chorology, biological and habitatic comments of the insects from the genus Odonata in Bulgaria. PhD thesis, University of Sofia, Institute of Zoology: 196 pp., 4 app.. (in Bulgarian). ["It summarizes the results either published, state and private collections as well as original information by the author received during the whole 119-years period (1892-2001) of the development of the odonatology in Bulgaria. The thesis consists of 11 chapters. 1. INTRODUCTION. Short general description of the Order Odonata and reasons for using dragonflies as subject of the investigation. 2. PHYSICO-GEOGRAPHIC REVIEW OF BULGARIA. Consequently situation, state borders, territory area, relief, geology and geomorphology, climate and water resources of Bulgaria are developed as abiotic factors influencing Odonata distribution pattern in Bulgaria. 3. ODONATOLOGICAL INVESTIGATIONS IN BULGARIA. Three periods are outlined according to the number of the publications published per year and the main contributions. Dragonflies are considered as well faunistically investigated insect group in Bulgaria. The main gaps are in regional investigations, species ecology and biology, dragonfly utility as bioindicators, population investigations. 4. GOALS AND OBJECTIVES. 5. MATERIAL AND METHODS. 6. RESULTS. Here each species is given with individual information about: 1) synonym list; 2) faunistical and taxonomic problems (if any); 3) biology and ecology (what is known for Bulgaria); 4) overall species distribution mapped for Europe and referenced for the rest of the area; 5) UTM map for the species' distribution in Bulgaria; 6) phenology and vertical distribution graphs. 7. DISCUSSION. Comments are given on the species' phenology, zoogeographic affiliation, distribution according to the main biotopes and habitats in Bulgaria as well as individual position in the First Conservation List developed for Bulgarian Odonata species. 8. CONCLUSIONS. Fourteen conclusions represent the main contributions made to the studying of Bulgarian Odonata fauna. 9. DEDUCTIONS. Fifteen deductions are given. They point the attention to some problems not solved during the current investigation and are given as some of the main tasks for future investigations. 10. REFERENCES. 11. ACKNOWLEDGEMENTS." (Author)] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@yahoo.com

3737. Masius, P. (2003): *Nehalennia speciosa* auf der Insel Usedom (Odonata: Coenagrionidae). *Libellula* 22 (1/2): 1-14. (in German with English summary). [In June 2001 the *N. speciosa* was recorded at a bog south of Ahlbeck, Island of Usedom, Mecklenburg-Vorpommern, Germany. The habitat is briefly described, and co-occurring odonate species are given.] Address: Masius, P., Erlanger Straße 69, D-95444 Bayreuth, Germany. E-Mail: Snoopy123dag@gmx.net

3738. May, M.; Corbet, P. (2003): Gathering useful information about the seasonal ecology of *Anax junius*. *Argia* 15(2): 15-16. (in English). ["A large question mark hangs over the movements and destination of adults of *Anax junius* after they fly southwards from southern Canada and northern states of the US in fall. Likewise, little is known about the northernmost latitude in North America at which resident populations of larvae can overwinter. It is likely to take a very long time if such information is going to be accumulated solely by chance observations. Much better that a planned survey could be undertaken that offers a high likelihood of early success. The knowledge that some populations of *A. junius* (occupying the same pond) have two components, one resident and one migratory, derives from a classic study by Robert Trotter in southern Ontario (Trotter 1971). [...] John Matthews, who is a student of John Abbot's at the Univ. of Texas, is currently looking ponds in Ontario, where Trotter worked, and in Texas. This approach has a lot of potential, despite its difficulties. I'm pretty sure that no one has studied the life history of any odonate species over a latitudinal and climatic range as great as that of *A. junius*, and no one has tied in phenology over such a range with migratory behavior. There's a chance to do something pretty unique here, if people can help us find additional suitable sites or even, if you're really interested and like working in mucky places on baking hot and miserably cold days, helping with." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

3739. McKee, D.; Harvey, I.; Thomas, M.; Sherratt, T.N. (2003): Mite infestation of *Xanthocnemis zealandica* in a Christchurch pond. *New Zealand Jour. Zool.* 30 (1): 17-20. (in English). ["Infestation of the common red-coat damselfly *Xanthocnemis zealandica* (McLachlan) with larval water mites (*Arrenurus* spp.) was examined in a single Canterbury population during November-December 2001. Teneral (immature adult damselflies) of both male and female morphs (androchrome and gynochrome) showed a similar prevalence of infestation, higher than the prevalence of infestation found in mature adults. As anticipated, mature adult males were more frequently infested than mature females, but there was no evidence that infestation reduced the mating activity of males. Up to 62 mites were found per infested host, although mean mite burdens were not significantly related to the size, gender or morph of the hosts." (Authors)] Address: McKee, D., School of Biological and Biomedical Sciences, University of Durham, Durham, DH1 3LE, UK. E-Mail: dermot.mckee@durham.ac.uk

3740. Mead, K. (2003): *Dragonflies of the North Woods*. Kollath-Stensaas Publishers. ISBN 0-9673793-6-9. 212 pp. (in English). [This attractive and very useful field guide covers the "northwoods" areas of Minnesota, Wisconsin, Michigan (USA), and western Ontario (Ca-

nada). It treats 102 Anisoptera only, except that six of the most common damselflies are illustrated and briefly described. This book can be assessed as an advanced field guide, that focus on identifying Anisoptera, and that goes beyond descriptions of species; it dwells on the problems of distinguishing similar species. Two pages are devoted to the thoracic patterns of *Aeshna*, showing color variants, followed by 30 additional pages on the Aeshnidae (they must be a favorite group of Kurt Mead). A second focus was set on the genus *Leucorhinia* with many useful advices for correct identification of the different stages of the very species. Fieldmark arrows point out the best distinguishing characteristics. Size-bars on the colour photos show the dragonfly's actual body length. This guide is very well illustrated with excellent - app. 200 - photographs. Throughout the text there are thoughtful and provocative behavioural observations, which will guide the user to becoming a good observer and not just an identifier. In addition you will find between the lines some useful information how to swing your net ... Quite unique is a chapter entitled "Binoculars for 'Dragonflying'"; binoculars are listed brand-wise with dates enabling persons interested in buying one for dragonflying to make a useful pre-selection. This is an excellent guide, with a didactical concept that could be interesting for other countries too. (Martin Schorr) Address: Mead, K., 6388 Lax Lake Rd., Finland, MN 5560, USA. <http://www.dragonfliesofthenorthwoods.com/>

3741. Meßlinger, U.; Winterholler, M. (2003): Bestandssituation und Ökologie von *Coenagrion lunulatum* in Franken (Odonata: Coenagrionidae). *Libellula Supplement 4*: 43-58. (in German, with English summary). [Between 1986 and 1995, 25 records of *C. lunulatum* have been documented for Bavaria between 1986 and 1995. In the following years, the species could be confirmed only at three localities. At one of these habitats further investigations regarding water chemistry, vegetation and biology of the species were carried out between 1998 and 2003. Effects of climatic change are discussed as a possible reason for the dramatic decline of *C. lunulatum* within Bavaria.] Address: Meßlinger, U., Am Weiherholz 43, D-91604 Flachslanden, Germany. E-Mail: u.messlinger@t-online.de

3742. Meßlinger, U.; Faltin, I. (2003): Verbreitung und Ökologie von *Coenagrion ornatum* in Westmittelfranken (Odonata: Coenagrionidae). *Libellula Supplement 4*: 19-42. (in German, with English summary). [On the basis of confirmed indications for a regional distribution of *C. ornatum*, in the year 2001 a full-coverage search for the species was carried out in western Middle Franconia. "Altogether 734 creek and ditch sections were visited, and *C. ornatum* was recorded at 55 of those waters. The core population discovered in 1997 in the upper River Altmühl valley extended over 28 sites, being one of the greatest populations of the species within Bavaria. In the catchments of the Rivers Zenn, Wörnitz, Wieseln, Sulzach and Tauber *C. ornatum* was reported for the first time. All populations along these rivers were small or very small. A presentation of the current regional distribution of the species is given. Essential factors of habitat and the influence of the management of inhabited waters and adjacent meadows are discussed. The results of the study indicate knowledge gaps concerning the actual distribution of *C. ornatum*, emphasizing the probability of undiscovered populations in hitherto insufficiently investigated running water systems outsi-

de western Middle Franconia." (Authors)] Address: Meßlinger, U., Am Weiherholz 43, D-91604 Flachslanden, Germany. E-Mail: u.messlinger@t-online.de

3743. Mirza, R.S.; Chivers, D.P. (2003): Influence of body size on the responses of fathead minnows, *Pimephales promelas*, to damselfly alarm cues. *Ethology* 109(8): 691-699. (in English). ["A wide diversity of aquatic organisms release chemical alarm cues upon encountering or being attacked by a predator. These alarm cues can be used by nearby individuals to assess local predation risk. Receivers warned by chemical alarm cues gain a survival benefit when encountering predators. Animals that are in the same prey guild (i.e. that co-occur and share the same predators) may learn to recognize each others' chemical alarm cues. This ability may confer an adaptive advantage if the prey animals are vulnerable to the same predators. However, if the prey grow to different sizes and as a consequence are no longer vulnerable to the same suite of predators, then there should no longer be an advantage for the prey to respond to each others' alarm cues. In this study, we exposed small and large fathead minnows (*Pimephales promelas*) to cues from syntopic injured damselfly larvae (*Enallagma boreale*), cues from injured mealworm larvae (*Tenebrio molitor*) and to distilled water. Small minnows exhibited antipredatory behaviour and increased shelter use in response to injured damselfly cues but not to the controls of injured mealworm or distilled water. On the contrary, large minnows exhibited no significant change in shelter use in response to any of the injured cues. These data demonstrate that fathead minnows exhibit an antipredator response to damselfly alarm cues, but only when minnows are small and members of the same prey guild as damselfly larvae. These results demonstrate the considerable flexibility in the responses to heterospecific alarm cues." (Authors)] Address: Mirza, R.S., Dept of Biology, Pennsylvania State University, 208 Mueller Laboratory, University Park, PA, 16802, USA. E-Mail: rsm12@psu.edu

3744. Montero Moreno, J.R. (2003): A note on *Thaumatoneura inopinata* McLachlan 1897 in Rio Chiarria Costa Rica with a list of Costa Rican Megapodagrionidae. *Argia* 15(1): 17. (in English). [*T. inopinata* was recorded twice along waterfalls of Rio Chiarria near Turrialba in Feb. 1998 and in Oct. 1999.] Address: Montero Moreno, J.R., P.O. box 1913-1000, San Jose, Costa Rica

3745. Morales, M. E.; Wesson, D.M.; Sutherland, I.W.; Impoinvil, D.E.; Mbogo, C.M.; Githure, J.I.; Beier, J.C. (2003): Scientific note determination of *Anopheles gambiae* larval DNA in the gut of insectivorous dragonfly (Libellulidae) nymphs by polymerase chain reaction. *Journal of the American Mosquito Control Association* 19(2): 163-165. (in English). ["We examined the predator-prey relationship between larvae of the malaria mosquito *Anopheles gambiae* and nymphs of the dragonfly (Libellulidae). Studies were conducted to determine whether polymerase chain reaction (PCR) can be used to detect DNA of *An. gambiae* in the gut of libellulid nymphs, and to determine how long after feeding on *An. gambiae* that mosquito DNA remains detectable by PCR. Total DNA was extracted from the gut contents of libellulid nymphs by using 2 types of DNA extraction methods. The target sequence for the diagnostic PCR was the intergenic spacer regions of the ribosomal DNA gene locus. These sequences were analyzed by using

An. gambiae complex-specific primers. After analyzing nymphal gut contents with PCR at regular postfeed intervals, a 390-base pair product could be amplified. The presence of mosquito larvae was visually confirmed for up to 40 min after feeding. Regardless of the number of mosquito larvae ingested, libellulid gut contents could be amplified or visually seen up to 1 h of digestion. This result indicates the nymphs have a high rate of digestion and that PCR with An. gambiae complex primers will be best utilized within 1 h after feeding as a detection system. This study confirmed that dragonfly nymphs feed well on anopheline larvae, and that mosquito DNA, although rapidly digested, can be successfully recovered and detected from within nymphal digestive tracts." (Authors)] Address: Morales, Maria E., Department of Tropical Medicine, 1430 Tulane Avenue, University School of Public Health and Tropical Medicine, Tulane University, New Orleans, LA 70112, USA.

3746. Moroz, M.; Czachorowski, S.; Lewandowski, K. (2003): Preliminary investigation of water insects of the Reserve "Prostyr" (Belarus). Parki nar. Rez. przyr. 22: 117-124. (in Polish with English summary). [Reserve "Prostyr", Belarus (51°56'N 26°05'E); Calopteryx virgo, Lestes dryas, Aeshna grandis, Sympetrum flaveolum, S. pedemontanum.] Address: Moraz, M., Inst. Zool., Belarussian Academy of Sciences, Akademicheskaja 27, Minsk 220072, Belaruss. E-mail: morozm@biobel.bas-net.by

3747. Moss, M.O.; Gibbs, G. (2003): Colour on the wings of Calopteryx damselflies. Quekett Journal of Microscopy 39(5): 491-497. (in English). ["The blue colour on the wings of the males of the two species of English damselflies of the genus Calopteryx is associated entirely with the veins and is a structural colour. Studies of the fine structure of sections of the veins of the banded demoiselle (C. splendens) by scanning electron microscopy have revealed a regular layered structure which could account for the blue colour by constructive interference as incident light is reflected by these layers. The dull brown pigment (described as an ommochrome) present in the membrane of the wing enhances the perceived intensity of the reflected blue light by absorbing the rest of the incident light." (Authors)] Address: Moss, M.O., School of Biological and Life Sciences, University of Surrey, Guildford, Surrey, GU2 7XH, UK

3748. Mrowinski, P.; Zawal, A. (2003): The new localities of Aeshna subarctica elisabethae Djak., 1922 in the Western Pomerania region. Wiad. entomol. 22(1): 47-48. (in Polish). [Poland; Równina Nowogardzka, UTM: VV95, 5-22-VIII-1999; Pojezierze Szczecineckie, UTM: XV03, 12-VI-2001.] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Waska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

3749. Muth, M. (2003): Aeshna caerulea im Landkreis Oberallgäu: Bestandssituation, Entwicklungsgewässer und Gefährdung (Odonata: Aeshnidae). Libellula Supplement 4: 71-97. (in German, with English summary). ["A. caerulea was monitored in the years 2000 and 2001 in the Allgäu Alps of the Bavarian Oberallgäu District, the distribution centre of the species within Bavaria and Germany. Thirty-one potential breeding habitats in subalpine bogs and minerotrophic ponds were

investigated. At altitudes between 1190 m and 1840 m above sea level the species was recorded at 16 localities. The bog and water types inhabited by A. caerulea in the region are characterized. Current populations and potential threats to the species by grazing cattle, wallowing red deer, and climate changes are discussed." (Author)] Address: Muth, M., Im Stiftallmeyer 4, D-87439 Kempten, Germany. E-Mail: muth.kempten@t-online.de

3750. Niehuis, M. (2003): Fund der Nordischen Moosjungfer - Leucorrhinia rubicunda (L.) - in der Südpfalz (Insecta: Odonata). Fauna Flora Rheinland-Pfalz 10(1): 279-284. (in German). [NSG Jockgrimer Tongruben, Rheinland-Pfalz, Germany; a record of L. rubicunda dated 4-VI-2003 is documented and discussed in detail. In addition, new records in southern Rheinland-Pfalz of the very rare L. caudalis are given.] Address: Niehuis, M., Inst. Naturwiss., Biologie, Universität Koblenz-Landau, Standort Landau, Im Fort 7, D-76829 Landau, Germany

3751. Novelo-Gutiérrez, R.; González-Soriano, E. (2003): The larva of Lestes alfonsoi González & Novelo (Zygoptera: Lestidae). Odonatologica 32(3): 289-294. (in English). ["Detailed description and illustrations are provided. A comparison with other Mexican larvae of the genus and a key to separate species are also included. Larva of L. alfonsoi seems not to be related to any of the known larvae of the genus, although it shares more features in common with the larva of L. alacer." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: e-soriano@mail.ibiologia.unam.mx

3752. Ogden, T.H.; Whiting, M. (2003): Genomic tissue library of Odonata: A call for specimens. Argia 15(2): 20-21. (in English). [Website: <http://odonata.byu.edu>; "... We have two immediate purposes for the obtained odonate specimens. First we want to investigate the relationships of the basal pterygote lineages (Ephemeroptera, Odonata, and Neoptera). The phylogenetic position of Odonata among the other orders has been controversial, and three main theories exist: (1) placement as sister group to Ephemeroptera (=Paleoptera); (2) placement as the most basal pterygote lineage; and (3) placement as sister to Neoptera. Second, we plan to address the higher-level phylogeny of Odonata using DNA sequence information combined with morphological data. Our goal, for the next year, is to sequence a wide range of exemplar taxa for multiple genes (~ 8 markers), combine this information with morphological data (collaboration with Andy Rehn), and use these data to gain new insights into odonate systematics and evolution. [...]" (Authors)] Address: T. Heath Ogden and Michael Whiting, Department of Integrative Biology, Brigham Young University, Provo, Utah 84602, USA, <heathogden@byu.edu> Department of Integrative Biology and Bean Life Science Museum, Brigham Young University, Provo, Utah 84602, USA, <michaelwhiting@byu.edu>

3753. Ogden, T.H.; Whiting, M.F. (2003): The problem with "the Paleoptera Problem:" sense and sensitivity. Cladistics 19(5): 432-442. (in English). ["While the monophyly of winged insects (Pterygota) is well supported, phylogenetic relationships among the most basal extant pterygote lineages are problematic. Ephemeroptera and Odonata represent the two most basal extant lineages

of winged insects, and determining their relationship with regard to Neoptera (remaining winged insects) is a critical step toward understanding insect diversification. A recent molecular analysis concluded that Paleoptera (Odonata + Ephemeroptera) is monophyletic. However, we demonstrate that this result is supported only under a narrow range of alignment parameters. We have further tested the monophyly of Paleoptera using additional sequence data from ISSrDNA, 28S rDNA, and Histone 3 for a broader selection of taxa and a wider range of analytical methodologies. Our results suggest that the current suite of molecular data ambiguously resolve the three basal winged insect lineages and do not provide independent confirmation of Odonata + Neoptera as supported via morphological data." (Authors)] Address: Ogden, T.H., Department of Integrative Biology, Brigham Young University, 401 WIDE, Provo, UT 84602-5255, USA. E-mail: heathogden@byu.edu

3754. Orr, A.G. (2003): A guide to the dragonflies of Borneo: Their identification and biology. Natural history publications (Borneo). Kota Kinabalu. ISBN 983-812-069-3. 195 pp. (in English). [With 275 named species so far recorded and doubtless many more yet to be discovered, Borneo has one of the richest and most exciting dragonfly faunas in the world. More than 40% of species occur nowhere else, making it the most distinctive sub-region of Sundaland. It is home to such spectacular species as *Tetracanthagyna plagiata*, the heaviest of all dragonflies, many beautiful picture-winged chlorocyphids and euphaeids, and high-altitude endemics such as *Matronoides cyaneipennis* restricted to Mount Kinabalu and nearby mountains. Species are figured by photographs, generally taken in nature, and half-wing coloured drawings (25 plates). Many are figured by both methods. About 60% of known species are shown, including almost all the distinctive and common species likely to be encountered by a casual visitor. Particular attention is given to the identification of the common but difficult medium-sized red dragonflies. The text augments the illustrations and provides - family- and species-wise - useful information on biology. Introductory chapters discuss structure and general biology, ecology and conservation, faunistics and biogeography and collecting techniques and photography. There is a complete and up to date checklist. Illustrated keys to families of adults give the reader an understanding of the structures used in classifying dragonflies and augment the usefulness of the illustrations of entire insects. Main larval forms are shown.] Address: Natural history publications (Borneo) SDN. BHD. A913, 9th Floor, Phase 1, Wisma Merdeka, P.O. Box 15566, 88864 Kota Kinabalu, Sabah, Malaysia. www.nhpborneo.com

3755. Orr, B. (2003): Review: Dragonflies of Victoria. *Austrolestes* 7: 1. (in English). [Review of: Theischinger, G.; Hawking, J.H. (2003): Dragonflies of Victoria: an identification guide to adult and larval dragonflies (Odonata). *Coop. Res. Cent. Freshw. Ecol.*, Albury / NSW. ISBN 1-876144-49-1. iv+65 pp.] Address: not stated

3756. Ott, J. (2003): Libellen im Stadtgebiet von Ludwigshafen. *Pollichia-Kurier* 19(2): 10-11. (in German). [The Schleusenloch situated near the town of Ludwigshafen, counts to the best investigated water bodies in Rheinland-Pfalz, Germany; the author reports on the history of the habitat. Special emphasis is given to the impacts caused by fishing, e.g. by introducing gras

carps to eliminate the vegetation in fishing waters. Nevertheless some odonate species (e.g. *Gomphus pulchellus*) profit from trampling by fishers and bather / swimmer. In addition he outlines the serious difficulties for Odonata to find suitable habitats in towns and agglomerations. A nice episode on puzzling people with dragonflies with numbers on their wings is added.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

3757. Parr, A. (2003): Views and Reviews of books, publications, products and services: Dragonflies by Steve Brooks. *Atropos* 20: 55. (in English). [Review of the books abstracted as OAS 3386.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

3758. Paulson, D. (2003): Down under again -- drought, dragonflies, and WDA. *Argia* 15(2): 12-14. (in English). [On the traces of the 1998 trip to Australia, Dennis Paulson and Netta Smith revisited some of the localities in January 2003. They report on the differences between the two years, which may be caused primarily by the severe drought in Australia in 2003. Some new places were visited, the most interesting species are documented. And a brief report on some essentials of the WDA meeting in Beechworth, NE Victoria is given.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

3759. Petzold, F. (2003): Nachweise von *Onychogomphus forcipatus forcipatus* an Seen in Schweden (Odonata: Gomphidae). *Libellula* 22(1/2): 49-54. (in German, with English summary). ["As *O. f. forcipatus* has been mainly been found at lakes in northern Germany, there was no evidence for this in Sweden. During the years of 1993, 1997 and 2002 there have been records of *O. forcipatus* at a total of five lakes in the southern part of central Sweden. At three lakes exuviae were recorded. All localities were lakes with tied into bigger waterscapes by over-ground affluxes and runoffs. The places of its evidence were mostly parts of the shore with no vegetation and stony, gritty ground. At one lake there were findings of exuvia in a shallow and lee cove formed of detritus and mud and surrounded with *Carex*."] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-Mail: falkpetzold@web.de

3760. Prud'Homme, E. (2003): Nouvelles des région. Département de Charente (16). *Société française d'odonatologie. La lettre des sociétaires* 33: 10-11. (in French). [Brief report on current odonatological activities including records of *Gomphus graslinii* and *Oxygastra curtisii*.] Address: Prud'Homme, E., rue des Colporteurs, F-16230 Nanclars, France. E-mail: eric.prud-homme6@wanadoo.fr

3761. Purse, B.V.; Hopkins, G.W.; Day, K.J.; Thompson, D.T. (2003): Dispersal characteristics and management of a rare damselfly. *Jour. Appl. Ecol.* 40: 716-728. (in English). ["1. *Coenagrion mercuriale* is a rare damselfly in Britain and mainland Europe and has been declining in the last 30 years. It has specialized habitat requirements and has been viewed, traditionally, as a poor disperser. Knowledge of its dispersal ability was considered in its Biodiversity Species Action Plan as essential for the formulation of appropriate conservation management strategies. 2. Mark-release-recapture studies of *C. mercuriale* in two large UK heathland popula-

tions were undertaken. Mature adults had a low rate of movement within continuous areas of habitat (average < 25 m movement), low emigration rates (1-3-11 -4%) and low colonization distances (maximum 1 km), all comparable to similarly sized coenagrionids. 3. Movements were more likely within than between patches of suitable habitat over short to medium distances (50-300 m). Between-patch movements were more likely between patches that were close together. Scrub barriers reduced dispersal. 4. The probability of dispersal between two recaptures depended on the length of the time interval between them. *C. mercuriale* performed considerable between-patch movements within a small fraction (1-2 days) of its mean mature adult life span (7-8 days). 5. Qualitative comparison of field colonization distances measured here and distances between UK sites occupied by *C. mercuriale* revealed that empty sites within large clusters of sites would probably be recolonized rapidly and dispersal events would be frequent. However, such events would occur rarely within small isolated sites or clusters of sites, leaving local populations prone to extinction. 6. Synthesis and applications. These data show that management effort should be directed towards maximizing the likelihood of *C. mercuriale* recolonizing sites naturally within 1-3 km of other populations (particularly within large clusters). Scrub boundaries should be removed between existing populations and empty, but suitable, sites to facilitate stepping-stone dispersal movements." (Authors)] Address: Purse, Bethan V., Institute for Animal Health, Pirbright Laboratory, Ash Road, Pirbright, Surrey GU24 0NF, UK. E-mail: beth.purse@bbsrc.ac.uk

3762. Purse, B.V.; Thompson, D.J. (2003): Emergence of the damselflies, *Coenagrion mercuriale* and *Ceragrion tenellum* (Odonata: Coenagrionidae), at their northern range margins, in Britain. *Eur. J. Entomol.* 100: 93-99. (in English). ["Emergence of *Coenagrion mercuriale* and *Ceragrion tenellum* was examined in a mixed population at their northern range margin in Britain. Mortality at emergence was quantified in *C. mercuriale*. Consistent with their larval diapause characteristics, both species had an asynchronous emergence pattern, typical of "summer" species. Daily emergence of *C. mercuriale* was positively correlated with the duration of sunlight on the previous day (controlling for season) and its emergence period was found to be shorter than that observed in its core populations in Central and Mediterranean Europe. No differences were found between the patterns of emergence of the sexes in either species. Sex ratio at emergence differed significantly from 1:1 (at 1.35 : 1 -males : females) in *C. mercuriale* but not in *Ceragrion tenellum* (at 1.04 : 1). Body size at emergence declined more steeply with time in females than in males of *C. mercuriale* because large size may confer a greater reproductive advantage in females (larger females may be more fecund) than males in non-territorial odonates. Percentage mortality of *C. mercuriale* at emergence was low (4.9% including deformed individuals), the main cause of mortality being deformity." (Authors)] Address: Purse, Beth, Population and Evolutionary Biology Research Group, Nicholson Building, University of Liverpool, School of Biological Sciences, Liverpool, L69 3GS, UK. E-mail: beth.purse@bbsrc.ac.uk

3763. Reeves, D. (2003): Obituary: Dr D.A.L. (Allen) Davies. *Austrolestes* 7: 3. (in English). [Some personal recollections resulting from a long lasting friendship with

Allen Davies.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3764. Reeves, D. (2003): Species profile - *Aeshna brevistyla* Rambur, 1842 - Blue-spotted Hawker. *Austrolestes* 7: 2. (in English). [*Adversaeschna brevistyla* (Rambur 1842) is briefly described, figured by a b & w photograph, and endophytic oviposition behaviour is noted.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

3765. Reinhardt, K.; Samietz, J. (2003): Libellenfunde in Ostkasachstan (Odonata). *Entomologische Nachrichten und Berichte* 47(2): 71-76. (in German with English summary). ["During two excursions to East Kazakhstan 25 species of Odonata were recorded from 21 sites. A *Macromia* species whose exuviae resemble those of *M. bartenevi* represents the first record of the genus for Kazakhstan. The exuviae are illustrated and appear to differ morphologically from *M. amphigena fraenata*, raising doubts about the recently claimed synonymy of *M. bartenevi* with *M. amphigena fraenata*. Records of *Calopteryx cf. splendens*, *Coenagrion lunulatum*, *Libellula depressa*, *L. quadrimaculata*, *Leucorrhinia pectoralis*, and *Sympetrum flaveolum* reported from Eastern Kazakhstan in 1906 were confirmed. Six species were recorded from the surroundings of Ust-Kamenogorsk for the first time. Presumably, *Ischnura pumilio*, *Orthetrum brunneum*, and *L. depressa* were frequently overlooked and are more widespread than presently assumed." (Authors)] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: bgykr@leeds.ac.uk

3766. Relyea, R.A. (2003): How prey respond to combined predators: a review and an empirical test. *Ecology* 84(7): 1827-1839. (in English). ["Studies of phenotypic plasticity frequently ask how organisms respond to a change in their environment, but most organisms do not experience single environmental changes. Therefore, we need to move to the next step and understand how organisms respond to combinations of environmental changes. Recent studies of predator-induced plasticity have addressed how prey respond to different combinations of predators. I briefly review 22 studies of combined predator effects on prey phenotypes and identify four factors that make it difficult to interpret the results of these studies: (1) uncontrolled prey consumption, (2) a low number of prey traits, (3) a low number of predator combinations, and (4) confounded predator composition and total predator density. I address these challenges in an experiment that examined how wood frog tadpoles (*Rana sylvatica*) altered 12 behavioral, morphological, and life historical traits in response to four different caged predators ("*Erythemis* sp.", *Belostoma*, *Dytiscus*, and *Anax junius*). The predators were present alone at low density, alone at high density (2X), or combined into six pairwise combinations. When each predator was alone (at either low < or high density), tadpoles discriminated among different predators and produced predator-specific phenotypes. The doubling of predator density rarely induced more extreme prey phenotypes. When predators were combined, the tadpoles generally developed phenotypes that were similar to those induced by the more risky predator alone (90% of all traits examined, at either low or high density). These results suggest that tadpoles per-

ceive the risk of combined predators as being similar to the risk of the most dangerous predator in the pair, and not as a summed or averaged predation risk. The actual risk from these predator combinations remains to be tested. This appears to be the first study to take a comprehensive approach that controls prey consumption, examines a large number of prey traits, uses a large number of predator combinations, and separates the effects of predator composition and predator density. There is a clear need for more such studies to determine whether these results can be generalized to other taxa." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: relyea@pitt.edu

3767. Relyea, R.A. (2003): Predators come and predators go: the reversibility of predator-induced traits. *Ecology* 84(7): 1840-1848. (in English). ["While numerous studies have been conducted on the ecology and evolution of phenotypic plasticity, to really understand plasticity we need to expose organisms to different environments over several ontogenetic stages. In this way, we can examine whether organisms change their phenotypic strategy over ontogeny, whether there are developmental windows that constrain the development of plastic traits, and whether behavior is more reversible than morphology if the environment reverts back to its original state. I addressed these questions by examining predator-induced plasticity in gray treefrog tadpoles (*Hyla versicolor*). Using aquatic mesocosms, I reared tadpoles with a constant absence of predators, a constant presence of predators (*Anax longipes*), and the addition or removal of predators at three different times during their larval period. Tadpoles changed their phenotypic strategy over ontogeny; early in ontogeny they responded to predators by hiding, reducing their activity, and developing relatively deep tail fins. Later in ontogeny the tadpoles no longer employed behavioral defenses but relied on a combination of greater mass, deeper tails, and shorter bodies. The phenotypic changes were inducible throughout most of ontogeny, suggesting that there were few developmental windows. Activity, tail depth, and body depth were highly reversible early in ontogeny but less reversible later in ontogeny; because hiding was only used early in ontogeny, I could not assess its reversibility. This reversibility should affect not only the induced species, but will likely transmit the effects throughout the larger ecological community." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: relyea+@pitt.edu

3768. Rose, J.S. (2003): Dragonfly days, 16 - 19 May, 2003. *Argia* 15(2): 10-12. (in English). [Valley Nature Centre, Weslaco, Texas, USA; the paper lists odonate species from several places in the region including *Perithemis domitia*, which is very rare in USA.] Address: Rose, J.S., Biology Dept, Box 90338, Duke University, Durham, NC 27708, USA. E-mail: jsr6@duke.edu

3769. Schleuter, M.; Haybach, A. (2003): Das Makrozoobenthos des Mains in den Jahren 1992-2001 - Eine Artenliste. *Lauterbornia* 48: 45-56. (in German with English summary). [10 odonate taxa are listed from river Main, Bavaria, Germany.] Address: Schleuter, M.; Haybach, A., Referat Tierökologie, Bundesanstalt für gewässerkunde, Kaiserin-Augusta-Anlagen 15-17, D-56068 Koblenz, Germany

3770. Schlüpmann, M. (2003): Zur Verbreitung, Phänologie, Ökologie und Einnischung des Plattbauches (*Libellula depressa* Linnaeus, 1758), des Vierflecks (*L. quadrimaculata* Linnaeus, 1785) und des Blaupfeils (*Orthetrum cancellatum* (Linnaeus, 1758)) im Raum Hagen (Insecta: Odonata: Libellulidae). *Dortmunder Beitr. Landeskunde, Naturwiss. Mitt.* 36/37: 113-162. (in German, with English summary). [On the fundament of an extensive odonatological survey in the region of the town Hagen, Nordrhein-Westfalen, Germany, habitat parameters for the three species were analysed in very detail. The focus is set on regional distribution, phenology, reproduction habitats in general and in detail (structure of vegetation, hydrochemical factors), competition effects of the three species, and conservation measures.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, Germany. E-mail: Martin.Schluempmann@t-online

3771. Sirot, L.K.; Brockmann, H.J.; Marins, C.; Muschett, G. (2003): Maintenance of a female-limited polymorphism in *Ischnura ramburi* (Zygoptera: Coenagrionidae). *Animal Behaviour* 66: 763-775. (in English). ["Colour" polymorphisms can be maintained in a population if all morphs have equal fitness on average, if fitness is frequency dependent or if fitness functions cross for some environmental or social variable. We studied female-limited colour polymorphism in the Rambur's fork-tail damselfly, *Ischnura ramburi*, in which one female morph looks like the male. The most commonly cited hypotheses to explain this polymorphism involve an advantage to andromorphs of avoiding costly matings through male mimicry. An alternative hypothesis argues that males learn the most common morph and that the polymorphism is maintained by a rare-morph advantage of mating avoidance, irrespective of male mimicry. We tested predictions of the male mimicry hypothesis, learned mate recognition hypothesis (LMR) and two new hypotheses. We used censuses and a mark-resight study to estimate density, sex ratio, morph frequency and mating frequencies. We observed interactions to test for male mimicry and female competition and to evaluate the frequency of mating attempts. Andromorphs were less likely than gynomorphs to receive mating attempts in encounters with males, but did not mate less frequently, or attack males or interrupt oviposition by other females more frequently. Contrary to the LMR hypothesis, the rarer morph was more likely to receive mating attempts. Andromorph frequency was greater in older females than in younger females, suggesting higher mortality or dispersal of gynomorphs. Our results support a modification of the male mimicry hypothesis, the signal detection hypothesis. Together with past studies, our results suggest that the female morphs may be alternative mating avoidance strategies." (Authors)] Address: Sirot, Laura, Dept of Zoology, University of Florida, 223 Bartram Hall, Gainesville, FL, 32611-8525. USA. E-mail: lsirrot@zoo.ufl.edu

3772. Stellmach, M. (2003): Landesweite naturschutzfachliche Bewertung der Auen im Rahmen des Auenprogramms Bayern. <http://www.bayern.de/lfu/tatbericht>: 27 pp. (in German). [The publication outlines a method to assess the Bavarian (Germany) floodplains. Odonata are among the indicator species: e.g. *Sympetrum flaveolum* (species of alternating water levels) and *S. pedemontanum* (species of early phases of vegetation succession).] Address: michael.stellmach@lfu.bayern.de

3773. Stewart, T. W.; Shumaker, T.L.; Radzio, T.A. (2003): Linear and nonlinear effects of habitat structure on composition and abundance in the macroinvertebrate community of a Large River. *Am. Midi. Nat.* 149: 293-305. (in English). ["We used an experiment and regression analyses to quantify effects of spatial variation in habitat structure abundance on a riverine macroinvertebrate community under winter conditions." Concrete slabs with different numbers of stones attached to upper faces were placed in the James River, Nelson County, Virginia, USA, and retrieved after 28 days "Erpetogomphus sp. nymphs were equally abundant in high and very high cover treatments, but were virtually absent in no cover, low cover, and intermediate cover treatments. Soft substratum is critical habitat for this burrowing taxon, and suitable quantities of particulate matter were apparently not present until stones covered almost the entire slab face and provided interstices where paniculate matter accumulated." (Authors)] Address: Stewart, T. W., Department of Biological Sciences, Ohio University, Athens 45701, USA

3774. Stoks, R.; McPeck, M.A.; Mitchell, J.L. (2003): Evolution of prey behavior in response to changes in predation regime: damselflies in fish and dragonfly lakes. *Evolution* 57(3): 574-585. (in English). ["In a large behavioral experiment we reconstructed the evolution of behavioral responses to predators to explore how interactions with predators have shaped the evolution of their prey's behavior. All *Enallagma* damselfly species reduced both movement and feeding in the presence of coexisting predators. Some *Enallagma* species inhabit water bodies with both fish and dragonflies, and these species responded to the presence of both predators, whereas other *Enallagma* species inhabit water bodies that have only large dragonflies as predators, and these species only responded to the presence of dragonflies. Lineages that shifted to live with large dragonflies showed no evolution in behaviors expressed in the presence of dragonflies, but they evolved greater movement in the absence of predators and greater movement and feeding in the presence of fish. These results suggest that *Enallagma* species have evolutionarily lost the ability to recognize fish as a predator. Because species coexisting with only dragonfly predators have also evolved the ability to escape attacking dragonfly predators by swimming, the decreased predation risk associated with foraging appears to have shifted the balance of the foraging/predation risk trade-off to allow increased activity in the absence of mortality threats to evolve in these lineages. Our results suggest that evolution in response to changes in predation regime may have greater consequences for characters expressed in the absence of mortality threats because of how the balance between the conflicting demands of growth and predation risk are altered." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

3775. Stoks, R.; McPeck, M.A. (2003): Predators and life histories shape *Lestes* damselfly assemblages along a freshwater habitat gradient. *Ecology* 84(6): 1576-1587. (in English). ["Survey data from New England showed that assemblages of *Lestes* damselflies are organized along the entire gradient of pond permanence and predator presence. One assemblage occupies vernal ponds lacking large dragonfly predators and fish; four are largely confined to temporary ponds that typi-

cally contain dragonfly predators; one dominates fishless permanent ponds and lakes where dragonflies are the top predators; and one dominates permanent ponds and lakes where fish are the top predators. We determined the role of life history and predation in maintaining this striking pattern by conducting a series of transplant experiments in the field and a laboratory experiment manipulating presence and absence of local predators. Life history (1) shaped the ability of species to cope with drying regime, thereby excluding temporary-pond *Lestes* from vernal ponds and permanent-water *Lestes* from temporary ponds, and (2) generated size differences among species due to differences in the timing of hatching. This mediated the exclusion of temporary-pond *Lestes* from permanent water bodies through asymmetric intraguild predation by permanent-water *Lestes*. Dragonfly predation on permanent-water *Lestes* had an indirect positive effect on the survival of temporary-pond *Lestes*; however, this effect apparently is too small to allow coexistence of both *Lestes* groups. Predation by large dragonfly larvae excluded the *Lestes* species of vernal ponds from temporary ponds, and differential vulnerability to large dragonfly larvae and fish shaped the reciprocal dominance of *L. eurinus* and *L. vigilax* in fishless and fish-containing permanent water bodies, respectively. Taken together, these results show that life history constraints and predation both shape the distributions of *Lestes* species along the pond permanence gradient in New England. We discuss the importance of this freshwater habitat gradient in shaping local and regional species diversity." (Authors)] Address: Stoks, R., Lab. voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

3776. Suhling, F.; Richter, O. (2003): Mathematical modeling of priority effects and intraguild predation with applications to Namibian Odonata populations. *Verhandlungen der Gesellschaft für Ökologie* 33: 169. (in English). [Verbatim: The model presented in this paper allows the study of the survival of populations in dependence on the intensities of cannibalistic interactions and intraguild predation, on the density of unspecific prey, on specific growth rates, and on temporal priority in colonization. Moreover, we study the question under which circumstances populations of predators may coexist. The parameter values used in this study are mainly derived from ongoing laboratory and field studies on the dragonfly assemblage of temporary freshwater ponds in the Namibian semi-desert. These assemblages may consist of up to about 25 species, mostly of the family Libellulidae, of which, however, only about ten species colonize temporary pools, i.e. lay eggs. Although all successful colonizers show rapid development some, such as *Pantala flavescens* and *Sympetrum fonscolombii*, grow faster than others, e.g. *Trithemis kirbyi* and *Crocothemis erythraea*. Our model includes age and size structure in form of partial differential equations, which is a compromise between simplistic model approaches in form of ordinary differential equations and individual based models. The classical model for the development of size structured populations based on a partial differential equation for the size density distribution as a function of time was extended to include cannibalism, intraguild predation among two populations and foraging behaviour in form of size dependent functional response curves. The mathematical formulation of intra- and interspecific predator prey interactions in size-structured populations lead

to integrals taking into account the interaction of all possible combinations of size classes. Introducing predation and cannibalism into the model leads thus to a system of coupled integro-differential equations, which are solved numerically by finite difference techniques. Models of this form possess a well-defined mathematical structure and are capable of capturing essential aspects of the interaction of age or size-structured populations. Figure 1 one shows as an example of model behaviour the effect of a "cohort splitting" occurring under shortage of nutrient resources due to intraspecific cannibalism. In this case, large larvae prey on small larvae of the same population and are thus able to survive and develop. The analysis of the model behaviour leads to the following conclusions 1. Cannibalism is a decisive factor of survival under scarce nutrition resources 2. Age cohorts of populations of different growth rates do not coexist under scarce nutrient resources 3. Foraging behaviour determines the window of opportunity for coexistence.] Address: Richter, O., Institute for Geocology, Technical University of Braunschweig, Germany. E-mail: o.richter@tu-bs.de

3777. Suhling, F.; Padeffke, T.; Johansson, F.; Richter, O. (2003): Mechanisms creating odonate community structure in desert wetlands. *Verhandlungen der Gesellschaft für Ökologie* 33: 282. (in English). [Verbatim: Temporary ponds in the Namibian semi-desert may be visited by a large number of dragonfly species even if the ponds are widely isolated from other aquatic habitats. At artificial ponds we identified 26 species, of which, however, only some colonised the ponds, i.e. laying eggs. The colonisers can be separated into two major groups. Group 1 consists of residents in the area, such as *Trithemis kirbyi* or are facultative migrants entering the area in small numbers, e.g. *Crocothemis erythraea* and *Orthetrum chrysostigma*. Species of group 2 are obligate migrants, which perform often long distance dispersal, normally in large aggregations, as obligate part of their life cycle [1], e.g. *Pantala flavescens* and *Sympetrum fonscolombii*. During two successive years almost exclusively migrants emerged successfully from the artificial ponds. Studies with early stadium larvae revealed that larvae of the migrants (group 2) are more active and have higher food intake than larvae of group 1; consequently the initial growth of the migrants was faster [2]. Fast growths allow species of group 2 to develop successfully under the conditions of temporary wetlands with short duration. Moreover, differences in growth should affect the outcome of interspecific interactions because size differences are the major driver for intraguild predation in dragonfly larvae [3, 4]. We tested the hypothesis that the larvae of the migrant *S. fonscolombii* grow faster and will be the superior predator to the larvae of the resident *T. kirbyi* when the eggs of both species are laid at the same time and place, because size differences of two or more instars will cause an increased mortality due to predation in a two-species interaction experiment [5]. We found that under these conditions *T. kirbyi* became almost extinct. However, the interaction between migrants and residents may also be altered by temporal differences in oviposition at a given habitat, i.e. temporal priority. At our artificial ponds we observed first ovipositions of *T. kirbyi* 11 days before those of *S. fonscolombii*. We therefore tested the hypothesis that the species that arrives first at the water (i.e. has temporal priority) is a superior predator to the later arriving species. We found that *T. kirbyi* survives and even dominates the competitive superior *S. fonscolombii* when the latter was introduced to the system 11 days later than *T. kirbyi*. References: [1] Corbet PS (1999) *Dragonflies: Behaviour and Ecology of Odonata*. Harley Books, Colchester. [2] Johansson F, Suhling F (subm.) Behaviour and growth of dragonfly larvae along a permanent to temporary water habitat gradient. [3] Anholt BR (1994) Cannibalism and early instar survival in a larval damselfly. *Oecologia* 99, 60-65. [4] Wissinger SA (1989) Seasonal variation in the intensity of competition and predation among dragonfly larvae. *Ecology* 70, 1017-1027. [5] Padeffke T, Suhling F (2003) Temporal priority and intra-guild predation in temporary waters: an experimental study using Namibian desert dragonflies *Ecol. Entomol.*: in press.] Address: Suhling F., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

3778. Switzer, P.V.; Eason, P.K. (2003): Space use in territorial amberwing dragonflies: are residents female maximizers or neighbor minimizers?. *Behavioral Ecology and Sociobiology* 54(4): 321-328. (in English). [Residents of mating territories interact with different categories of conspecifics: females, nonneighbor males, and neighbor males. Interaction with these different types of conspecifics is likely to have different costs and benefits; for example, interactions with females will be beneficial, while interactions with neighbors are more likely to be costly. In this study, we investigated patterns of intrusions and space use in territorial male amberwing dragonflies (*Perithemis tenera*) to test the idea that residents will adjust their use of space to maximize their beneficial interactions with conspecifics while minimizing their costly interactions with conspecifics. Because territories were arranged linearly around the edge of a pond, each resident had two neighbors, one of which was often closer to the focal resident than the other. Residents experienced more intrusions by neighbors and fewer intrusions by females on the side of their closer neighbor. Residents generally perched on the side of their territory that experienced the fewest intrusions by neighbors and the most intrusions by females, but the pattern was more strongly related to neighbor intrusions than female intrusions. Subsequent to pursuits of neighbors and females, residents tended to shift their perches away from where they pursued neighbors but toward where they pursued females. Nonneighbor intrusions were not affected by neighbor proximity, nor did residents adjust their space use in response to nonneighbor intrusions. Our results suggest that residents do adjust their space use in response to intrusions by conspecifics, that their adjustment depends on the type of conspecific that intruded, and that residents may be using a simple decision rule such as "move away from male intrusions, move closer to female intrusions" to adjust their within-territory space use.] (Authors)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

3779. Sy, T. (2003): Zur Libellenfauna des Naturschutzgebietes "Reudnitz" in der Dahleener Heide (Odonata). *Entomologische Nachrichten und Berichte* 47(1): 19-26. (in German, with english summary). [Sachsen, Germany; 13 water bodies of different trophic level were surveyed in 1999 and 2000. A total of 30 odonate species was recorded, including several rare species. *Lestes virens*, *Coenagrion hastulatum*, *Aeshna affinis*, *Cordulegaster boltonii*, *Orthetrum coerulescens*, *Leucorrhinia albifrons*, *L. rubicunda*, and *L. dubia* are dis-

cussed in detail.] Address: Sy, T., RANA-Büro für Ökologie und Naturschutz, Am Kirchtor 27, D-06108 Halle (Saale), Germany

3780. Taylor, J. (2003): Backyard dragonflies in Perth. *Austrolestes* 7: 4. (in English). [Australia; "Two years ago we moved to our present house in the western suburbs. It has a large swimming pool in full sun that has not been turned into a dragonfly pond as yet. This summer I had the idea that I could make the pool dual purpose -pool and pond. At the beginning of February I purchased a pair of kiddies plastic pool/sandpits in the form of scallop shells and floated them in the pool. They were not stable, so I tied rubber foam pipe insulation around the edge, to hold them level while swimmers used the pool. The ponds were filled with tap water and I added some lilies and material netted from local lakes to seed them with pond fauna. Initially there was a problem with midge and mosquito larvae, but these were soon controlled with a few gambusia fish. The fish are no longer needed, since there are now ample insect predators. I don't know how much these ponds have influenced visiting dragonflies - but there are always dragonflies present and almost every day in late March and early April I have seen mating pairs laying eggs in the ponds."; *Orthetrum caledonicum*, *Diplacodes haematodes*, *Hemicordulia australiae*, *H. tau*, *Trapezostigma stenoloba*, *Pantala flavescens*, *Hemianax papuensis*, *Ischnura aurora*, *Xanthagrion erythroneurum*. "It is interesting that in the early stages of the ponds, dragonflies did not seem to recognise them as being any better than the pool for laying eggs in. But now they lay there almost exclusively. *Xanthagrion* persistently tried to lay on the creepy crawly pipe, *Hemicordulia* lays anywhere, even on glazed tiles. *Trapezostigma* makes a single plunge to dip its abdomen into the pool and then flies off. [...]". This pool is compared with a shady pool overhung by a huge gum tree. "When going out at night with a torch to look for emerging adults I found that *Hemianax* larvae have an interesting nocturnal behaviour of gently jetting themselves through open water over two metres deep, presumably to catch unsuspecting planktonic life. When caught in the torchlight they zip off at great speed." (Author)] Address: not stated

3781. Tennessen, K. (2003): Minter J. Westfall, Jr. passed away. *Argia* 15(2): 2-5. (in English). [Minter Westfall (28 January 1916 - 20. July 2003) had an enormous influence on odonatology worldwide, and especially on today leading North-American odonatologists. Ken Tennessen, Mike May, Jerrell Daigle, Carl Cook, Bill Mauffray, and Nick Donnelly (in his introduction into the current issue of *Argia*) contributed some personal stories of a rich common odonatological life with Minter Westfall.] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennesen@aol.com

3782. Thakoor, S.; Chahl, J.; Srinivasan, M.V.; Young, L.; Werblin, F.; Hine, B.; Zornetzer, S. (2003): Bioinspired engineering of exploration systems for NASA and DoD. *Artificial Life* 8(4) (2002): 357-369. (in English). ["A new approach called bioinspired engineering of exploration systems (BEES) and its value for solving pressing NASA and DoD needs are described. Insects (for example honeybees and dragonflies) cope remarkably well with their world, despite possessing a brain containing less than 0.01% as many neurons as the human brain. Although most insects have immobile eyes with

fixed focus optics and lack stereo vision, they use a number of ingenious, computationally simple strategies for perceiving their world in three dimensions and navigating successfully within it. We are distilling selected insect-inspired strategies to obtain novel solutions for navigation, hazard avoidance, altitude hold, stable flight, terrain following, and gentle deployment of payload. Such functionality provides potential solutions for future autonomous robotic space and planetary explorers. A BEES approach to developing lightweight low-power autonomous flight systems should be useful for flight control of such biomorphic flyers for both NASA and DoD needs. Recent biological studies of mammalian retinas confirm that representations of multiple features of the visual world are systematically parsed and processed in parallel. Features are mapped to a stack of cellular strata within the retina. Each of these representations can be efficiently modeled in semiconductor cellular nonlinear network (CNN) chips. We describe recent breakthroughs in exploring the feasibility of the unique blending of insect strategies of navigation with mammalian visual search, pattern recognition, and image understanding into hybrid biomorphic flyers for future planetary and terrestrial applications. We describe a few future mission scenarios for Mars exploration, uniquely enabled by these newly developed biomorphic flyers." (Authors)] Address: Thakoor, Sarita, Jet Propulsion Laboratory, Caltech, Pasadena, CA, 91109, USA. E-Mail: sarita.thakoor@jpl.nasa.gov

3783. Trapero Quintana, A.; Naranjo López, N. (2003): Revision of the order Odonata in Cuba. *Bulletin of American Odonatology* 7(2): 23-39. (in English). [The list of the Odonata of Cuba is updated to 81 species. The species are annotated. In addition, the paper contains a brief history on studying Cubanian Odonata, an analysis of the altitudinal distribution of the odonate species, remarks to zoogeographic relationships, endemic species, and distribution maps on a regional level.] Address: Trapero Quintana, A., Departamento de Biología de la Universidad de Oriente, Santiago, Cuba

3784. Tunmore, M. (2003): A Stowaway Southern Oak Bush-cricket *Meconema meridionale* and other observations from Holland. *Atropos* 20: 59-60. (in English). [*Chalcolestes viridis*, *Coenagrion lunulatum*, and *Erythromma viridulum* are listed without site information.] Address: Tunmore, M., 36 Tinker Lane, Melt-ham, Huddersfield, West Yorkshire HD7 3ES, UK

3785. Valley, S. (2003): 2003 DSA annual meeting in Williams, CA and post meeting trip to Owens Valley, June 19-25. *Argia* 15(2): 5-8. (in English). [The paper includes some information about the business meeting of DSA, the lectures, and focus on the results of several field trips. Species list of the following localities are presented: Bear Creek, Colusa County, Pope Creek, Napa County, Guenoc Pond, Lake County, Putah Creek, Yolo/Solano county, Big Chico Creek and Cherry Hill Campground, Butte County, Horseshoe Lake in Bidwell Park, New York Creek, ? County, a grass lake, El Dorado County, Markleeville, Alpine County, Monitor Pass, Mono County (?), and several places in Inyo County. Some emphasis is given to records of *Tanypteryx hageni* and *Cordulegaster deserticola* Cruden, 1969 (Obviously, this taxa is a good species rather a syn. of *C. dorsalis*, for K. Tennessen reported several morphological differences between these two taxa). The paper also list all participants.] Address: Valley, S., 1165 SW

Lawrence, Albany, OR, 97321, USA. E-mail: svalley@comcast.net

3786. Van Buskirk, J.; Anderwald, P.; Lüpold, S.; Reinhardt, L.; Schullera, H. (2003): The lure effect, tadpole tail shape, and the target of dragonfly strikes. *Journal of Herpetology* 37(2): 420-423. (in English). ["Tadpoles of many species develop enlarged tail fins in the presence of insect predators, but the function of this response is not known. Because large tails do not improve swimming performance, we tested the hypothesis that the tail attracts predator strikes away from the more vulnerable head and body region. We first confirmed the assumption that attacks to the tail are less dangerous: Living tadpoles escaped from dragonfly larvae only 10% of the time when the strike landed on the head and body but 29.4% of the time when struck on the tail. We then constructed model tadpoles having four tail shapes: normal, predator-induced, and 50% shallower and 50% deeper than normal. The models were presented to dragonflies and the location at which the insect's labium struck the model was noted. Models having the predator-induced tail sustained 16% fewer strikes to the head and body than did models with the non-induced tail, lending credibility to the hypothesis that the tail acts as a lure. Models with an unnaturally large tail were attacked more often on the body than was the predator-induced model, which may create stabilizing selection on tail shape." (Authors)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

3787. Vick, G.S. (2003): Obituary David Allen Lewis Davies. *Odonatologica* 32(3): 295-301. (in English). [D.A.L. Davies, 18 March 1923 - 2 March 2003] Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, United Kingdom

3788. Walker, J.; Smentowski, J. (2003): Tachoptery thoreyi (Hagen), Somatochlora tenebrosa (Say) and S. hineana Williamson - observations from Missouri. *Argia* 15(1): 6-11. (in English). [On the opportunity for searching Somatochlora hineana in Missouri, USA, information on Tachopteryx thoreyi, S. tenebrosa, and S. hineana are compiled from literature data and personal communications. Special emphasis is given to habitat, oviposition, and larval habitats.] Address: Walker, Jane, Washington University Tyson Research Center, P.O. Box 258, Eureka, MO 63025, USA. E-mail: walker@biology.wustl.edu

3789. Wang, Z.-g. (2003): A new species of the genus Sinocnemis (Odonata: Platycnemididae) from Henan Province of China. *Entomotaxonomia* 25(1): 1-3. (in Chinese with English summary). ["The paper reports a new species of the genus Sinocnemis Wilson et Zhou. Type specimens are preserved in the Henan Academy of Science, China. Sinocnemis henanese, sp. nov. Measurements (mm): Abd. apprxapp. ♂ 35 mm apprx38 mm, ♀ 32 mm apprx34 mm. Hind-wing ♂ 28 mm apprx32 mm, ♀ 30 mm apprx32.5 mm. This species is similar to Sinocnemis yangbingi Wilson et Zhou, but differs from the latter as follows: 1) Pronotum of ♂ and ♀ with two yellowish round spots; 2) no small stripe at the upper posterior corner of the mesepimeron of synthoax; 3) lateral margin of abdominal segments 3 apprx4 with long yellowish stripe; 4) terminal margin of distal segment of penis with a apophysis. Holotype: ♂, Mt. Baiyun, Song County, Henan Province, 06-VIII-

1996, coll. WANG Zhi-guo. Paratypes: 1 ♀ Jiyuan County, Henan Province, 17-V-1987, coll. XI-AO Jian-guang; 2 ♂♂, 1 ♀ Lushan County, Henan Province, 22-VI-1990, coll. WANG Zhi-guo." (Author)] Address: Wang Zhi-guo, Henan Academy of Science, Zhengzhou, Henan, 450002 China

3790. Watson, E.J.; Carlton, C.E. (2003): Spring succession of necrophilous insects on wildlife carcasses in Louisiana. *Journal of Medical Entomology* 40(3): 338-347. (in English). ["Seven fresh animal carcasses were monitored throughout decomposition in a mixed flat-wood forest in East Baton Rouge Parish, LA from 1 April to 1 July 1999. Succession patterns of necrophilous insects were documented for the following: one Louisiana black bear (threatened species), two white-tailed deer, two alligators, and two swine as the experimental reference. Our results suggest variation in the species composition of necrophilous insects among animal carcass types. A total of 93 arthropod species, from 46 families and three classes, were manually collected from the seven carcasses. Only 19 insect species were collected on all four animal types and were represented by eight families: Coleoptera: Histeridae, Nitidulidae, Silphidae, Staphylinidae; Diptera: Calliphoridae, Muscidae, Piophilidae, Sepsidae. Eleven of the 46 families were not collected at either alligator site but were observed at bear, deer, and swine carrion: Coleoptera: Cleridae, Dermestidae, Geotrupidae, Scarabaeidae; Diptera: Micropezidae, Sarcophagidae, Syrphidae; Hymenoptera: Apidae; Lepidoptera: Nymphalidae; and Odonata: Libellulidae. Residency and succession patterns of necrophilous insects are presented for each animal type with particular emphasis on selected fly (Calliphoridae, Muscidae, Piophilidae, Stratiomyidae) and beetle species (Cleridae, Dermestidae, Histeridae, Nitidulidae, Silphidae, Staphylinidae)." (Authors)] Address: Carlton, C.E., Department of Entomology, Louisiana State University, Baton Rouge, LA, USA. E-Mail: ewatson@agctr.lsu.edu

3791. Weihrauch, F.; Schorr, M. (2003): Bibliographie der odonatologischen Literatur Bayerns 1996-2002 (Odonata). *Libellula Supplement* 4: 133-142. (in German, with English summary). ["A list of 107 references is given, covering relevant odonatological literature from this period of time for the state of Bavaria, Germany. Not considered in this list were articles concerning fossil dragonflies and unpublished diploma theses and reports." (Authors)] Address: Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-Mail: florian.Weihrauch@t-online.de

3792. Weihrauch, F. (2003): Emergenzstudien an Cordulegaster b. boltonii von einem niederbayerischen Waldbach (Odonata: Cordulegastridae). *Libellula Supplement* 4: 3-18. (in German, with English summary). ["Between 1996 and 2003 the emergence was studied at the Schallerbach, a forest rivulet near Siegenburg (48°45'N, 11°44'E) in Lower Bavaria, Germany. The period of emergence lasted from 24 May to 13 June. Exuviae hung preferably on twigs of spruce trees and on the bark of pine trees, to a height of 6 m above water level and 4.2 m from the shore. The mean distances of from the water were 112 cm (s.d. ±105 cm) horizontally and 198 cm (s.d. ±114 cm) vertically (n=76). Additional behavioural observations included oviposition, male "dunking" and precopulatory action." (Author)] Address:

Weihrauch, F., Hengelerstr. 9, D-80637 München, Germany. E-Mail: Florian.Weihrauch@t-online.de

3793. Weihrauch, F.; Burbach, K.; Hölken, U.; Netz, H.J.; Stettmer, C. (2003): Neue Nachweise von *Orthetrum albistylum* aus Bayern (Odonata: Libellulidae). *Libellula Supplement* 4: 59-70. (in German, with English summary). ["Within Central Europe, the range of *Orthetrum albistylum* (Selys) hitherto was confined to the southern parts, reaching Germany only in the extreme southwest, in the Upper Rhine Valley and at Lake Constance. Besides, there existed only five other German records of the species taken in Bavaria as single, obviously migrating individuals. In the years 1999-2002 we were able to take a number of new records of the species, including successful reproduction, at three localities in Bavaria. Obviously *O. albistylum* was able to establish at least temporary bridgeheads of possibly northern Italian origin in this region north of the Alps. Possible migration routes and an extension of range of the species in Central Europe are discussed."] (Authors) Address: Weihrauch, F., Hengelerstraße 9, D-80637 München, Germany. E-Mail: Florian.Weihrauch@t-online.de

3794. Werking-Radtke, J. (2003): Eingriffsregelung - Wirkungen von Kompensationsmaßnahmen. *LÖBF-Mitteilungen* 2/2003: 62-69. (in German). [Against the background of the German legal rules (§19 BNatSchG) to compensate impacts caused by the construction of a road, so called "compensation area-pools" were declared to focus compensation measures from several impacts on one - greater - area instead to have several small and isolated areas. The paper critically assesses the efforts of one of these "pools" in the county of Steinfurt, Nordrhein-Westfalen, Germany. 18 odonate species could be recorded; the species spectrum coincides with the typical regional odonate fauna. Therefore, it is concluded that water body-based measures have been successful. Nonetheless, a sustainable effort of the measures will not be given due to fast growing, expansive scrubs which will shade the bankside of the water bodies. This will cause the loss of several typical odonate species.] Address: Werking-Radtke, Jutta, Dezerinat: Biomonitoring und Erfolgskontrolle, LÖBF NRW, Castroper Str. 312-314, D-45665 Recklinghausen, Germany. E-mail: jutta.werking-radtke@loebf.nrw.de

3795. Willigalla, C.; Menke, M.; Kronshage, A. (2003): Naturschutzbedeutung von Regenrückhaltebecken. Dargestellt am Beispiel der Libellen in Münster/Westfalen. *Naturschutz und Landschaftsplanung* 35(3): 83-89. (in German, with English summary). [Nordrhein-Westfalen, Germany; "In the city of Münster rain storage ponds have been constructed since 1980 to temporarily store peak flow discharge and large amounts of surface effluents. A dragonfly inventory of all rain storage ponds identified 27 species (61 % of a total of 44 species occurring in the city area of Münster), with 22 classified as (potentially) permanent settlers and five species as guests. Beside species frequently occurring at all types of water habitats of the city area a number of specialised species could be found. The earlier comprise *Cercion lindenii*, *Erythromma najas*, *Ischnura pumilio*, and *Aeshna grandis*, more specialised species are *Lestes dryas*, *Somatochlora metallica*, and *Orthetrum brunneum*. The colonisation depends on the one hand on light conditions and vegetation structure of the ponds, on the other side on the spatial relationship to

other important dragonfly biotopes in Münster. The study shows that rain storage ponds in urban areas significantly contribute to the protection of mainly ubiquitous species but also support some more specialised species, at least as 'side-habitats' as referred to in the concept of metapopulations. Finally, the study proposes management and development measures for the establishment of rain storage ponds." (Authors) Address: Willigalla, C., c/o Willigalla Ökologische Gutachten, Franz-List-Str. 103, D-14624 Dallgow, Germany. E-mail: christoph@willigalla.de

3796. Willigalla, C. (2003): New data on dragonflies (Odonata) of the Masurian lakelands. *Wiad. entomol.* 22(1): 50. (in Polish). [NE Poland; data resulting from a survey of four localities in June 2001 are briefly documented.] Address: Willigalla, C., c/o Willigalla Ökologische Gutachten, Franz-List-Str. 103, D-14624 Dallgow, Germany. E-mail: christoph@willigalla.de

3797. Wilson, K.D.P.; Reels, G.T. (2003): Odonata of Guangxizhuang Autonomous Region, China, part I: Zygoptera. *Odonatologica* 32(3): 237-279. (in English). [Taxonomic and faunistic information is provided on the Zygoptera of Guangxi Zhuang Autonomous Region, China. *Megalestes haul* sp. n. (holotype: ♂, Shiwandashan), *M. tuska* sp.n. (holotype: ♂, Dayaoshan), *Rhipidolestes laui* sp.n. (holotype: ♂, Cenwanglaoshan), *Calicnemia haksik* sp.n. (holotype: ♂, Cenwanglaoshan), *Coelliccia galbina* sp.n. (holotype: ♂, Longrui), and *Drepanosticta magna* sp.n. (holotype: ♂, Cenwanglaoshan) are described. *Sinolestes truncata* Needham is synonymised with *Sinolestes edita* Needham. The hitherto unknown ♂ of *Indocypha katharina* (Needham) and ♀ of *Schmidtiphaea vietnamensis* (van Tol & Rozendaal) are described. *Devadatta ducatrix* Liefstinck, *Euphaea guerini* Rambur, *Euphaea superba* Selys, *Schmidtiphaea vietnamensis* van Tol & Rozendaal, *Indocnemis ambigua* (Asahina), *Calicnemia miles* (Laidlaw), and an undescribed species of *Drepanosticta* are recorded from China for the first time. The status of Guangxi as an important centre of odonate biodiversity is discussed."] (Authors) Address: Wilson, K.D.P., Flat 20, 6 Mansfield Road, The Peak, Hong Kong, China. E-mail: wilsonkd@netvigator.com

3798. Wong, A.; Smith, M. L.; Forbes, M. R. (2003): Differentiation between subpopulations of a polychromatic damselfly with respect to morph frequencies, but not neutral genetic markers. *Molecular Ecology* 12(12): 3505-3513. (in English). [*Nehalennia irene* "has two distinct female colour morphs. Individuals of one morph have male-like colouration and pattern (androchromes), whereas gynochromes are different from males and androchromes in these respects. In several damselflies, such female-limited polychromatism is attributable to a single genetic locus. We developed six polymorphic genetic markers, which were codominant, to test for genetic differentiation in *N. irene*, collected from two sites located 8 km from one another in eastern Ontario, Canada. Based on three censuses spanning a 10 year period (1992-2001), morph ratios differed consistently and significantly between these two sites. However, subpopulations at these sites were not genetically differentiated with respect to the putatively neutral markers. Our results suggest that site differences in morph ratios of female *N. irene* cannot be explained by genetic drift, but are consistent with spatially variable selection operating on different morphs, perhaps mediated by male

density. Alternatively, morph type may be a plastic trait and cues for induction may differ between sites." (Authors)] Address: Wong, A., Dept of Molecular Biology and Genetics, Biotechnology Building, Cornell University, Ithaca, NY 14853 USA. E-mail: aw246(@)cornell.edu

3799. Yates, N. (2003): Worldwide Dragonfly Association 3rd International Symposium of Odonatology. *Austrolestes* 7: 2-3. (in English). [This is a compact report on the WDA symposium held in January 2003 in Beechworth, Australia.] Address: not stated

3800. Zavodska, R.; Sauman, I.; Sehnal, F. (2003): Distribution of PER protein, pigment-dispersing hormone, prothoracicotropic hormone, and eclosion hormone in the cephalic nervous system of insects. *Journal of Biological Rhythms* 18(2): 106-122. (in English). ["Investigations performed on adult insects revealed that putative components of the central pacemaker, the protein Period (PER) and the pigment-dispersing hormone (PDH), are immunocytochemically detectable in discrete sets of brain neurons throughout the class of Insecta, represented by a bristletail, mayfly, damselfly, 2 locust species, stonefly, 2 bug species, goldsmith beetle, caddisfly, honeybee, and 2 blowfly species. The PER-positive cells are localized in the frontal protocerebrum and in most species also in the optic lobes, which are their only location in damselfly and goldsmith beetle. Additional PER-positive cells occur in a few species either in the deuto- and tritocerebrum or in the suboesophageal ganglion. The PER staining was always confined to the cytoplasm. The PDH immunoreactivity consistently occurs in a cluster of perikarya located fronto-ventrally at the proximal edge of the medulla. The mayfly and both locust species possess additional PDH neurons in 2 posterior cell clusters at the proximal edge of the medulla, and mayfly, waterstrider, and 1 of the blowfly species in the central brain. PDH-positive fibers form a fanlike arrangement over the frontal side of the medulla. Two or just 1 bundle of PDH-positive fibers run from the optic lobe to the protocerebrum, with collaterals passing over to the contralateral optic lobe. Antisera to the prothoracicotropic (PTTH) and the eclosion (EH) hormones, which in some insects regulate the molting and ecdysis rhythms, respectively, typically react with a few neurons in the frontal protocerebrum. However, the PTTH-positive neurons of the mayfly and the damselfly and the EH-positive neurons of the caddisfly are located in the suboesophageal ganglion. No PTTH-like antigen was detected in locusts, and no EH-like antigens were detected in the damselfly, stonefly, locusts, and the honeybee. There are no signs of colocalization of the PER-, PDH-, PTTH-, and EH-like antigens in identical neurons." (Authors)] Address: Sehnal, F., Institute of Entomology, Czech Academy of Sciences, Branisovska 31, 370 05, Ceske Budejovice, Czech Republic. E-Mail: sehnal@entu.cas.cz

3801. Zawal, A. (2003): Dragonflies (Odonata) of nature reserve "Dolina Pieciu Jezior" ("Valley of Five Lakes") (Drawskie Lake District). *Parki nar. Rez. przyr.* 22: 101-106. (in Polish with english summary). [The odonate fauna of the nature reserve "Valley of Five Lakes" (Poland) was investigated in 1999 and 2000. The list of 29 species (basing on a collection of 1264 specimens) includes species as *Coenagrion lunulatum*, *Brachytron*

pratense, *Aeshna viridis*, *Somatochlora flavomaculata*, and *Epitheca bimaculata*. *Calopteryx splendens*, *Lestes virens*, and *Libellula fulva* are probably not autochthonous. Dominant species are *Coenagrion hastulatum* (due to the dystrophic character of many water bodies), *C. puella*, *Ischnura elegans*, and *Erythromma najas*. *Erythromma viridulum* recently reach edin the region the north-eastern boundaries of its range.] Address: Zawal, A., Uniwersytet Szczecinski, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Waska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

3802. Zawal, A. (2003): Dragonflies (Odonata) of two small water bodies from Szczecin Landscape Park "Puszcza Bukowa". *Parki Narodowe i Rezerваты Przyrody* 22(3): 441-448. (in Polish, with english summary). [Poland; in 1999 and 2000, 28 odonate species, in most cases eurythopic species, were collected. *Platycnemis pennipes* and *Anaciaeschna isocetes* were found only as adults. *Coenagrion puella*, *Erythromma najas*, and *Ischnura elegans* totalled to over 70% of the collected specimens. The dystrophic lake Weglinek was characterised by a high number of species, but without any dominant species.] Address: Zawal, A., Uniwersytet Szczecinski, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Waska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

3803. Zawal, A.; Janicki, D. (2003): Pasożytowanie larw wodopójek z rodzaju *Arrenurus* na imagines wazek pochodz'cych z okolic Barlinka. In: *Zoologia na progu XXI wieku. Streszczenia referatów i plakatów ogólnopolskiej konferencji.* - [Zoologie an der Schwelle des XXI Jahrhunderts. Zusammenfassungen der Vorträge und Poster der allpolnischen Tagung]. Polskie Towarzystwo Zoologiczne, Uniwersytet Miko³aja Kopernika w Toruniu, Toruń: 257-258. (in Polish). [*Arrenurus* water mites as parasites of imagines of different odonate species in the environ of Barlinek, Poland - 557 odonate specimens from 24 species were collected. A total of 2218 specimens of water mites are reported. The infection rate is outlined for the following species as follows: *Enallagma cyathigerum* (56,5%), *Coenagrion puella* (53,6%), *Ischnura elegans* (46,9), and *Coenagrion pulchellum* (41,9%). Only two anisopteran species were infected: *ordulia aenea* (14,3%) and *Sympetrum sanguineum* (4%). In most cases, females were parasitised more intensively than males. Seperated according the odonate topography, the mites preferred the following regions: Metathorax: 910, mesothorax: 464, abdominal segment 1: 371, abdominal segment 2: 200, abdominal segment 3: 63.] Address: Zawal, A., Uniwersytet Szczecinski, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Waska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

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1997

- 3804.** Jansen, W.; Steiner, R.; Peissner, T.; Hövel, S.; König, A.; Rahmann, H. (1997): 4.3 Libellen. In: Böcker, R. (Ed.): Erfolgskontrolle im Naturschutz am Beispiel des Moorkomplexes Wurzacher Ried. Agrarforschung in Baden-Württemberg 28: 142-172. (in German). [Bad Wurzach (9.53E 47.54N), Baden-Württemberg, Germany; this fen bog is one of the most important in the middle range mountain region of Germany. Many habitat management measures have been realised to improve habitat quality. In spite of the importance of this fen bog, quite few older data on Odonata are available. Contrarily, in the 1990th, data on Odonata were extensively collected. To assess the measures and to make a prognosis on population development in the near future, key stone species (e.g. *Aeshna subarctica elisabethae*, *Somatochlora arctica*, *Lestes virens*, *Nehalennia speciosa*, *Coenagrion hastulatum*, *Leucorrhinia pectoralis*, *L. dubia*, *L. rubicunda*) were monitored. Without open water surfaces, many typical species will disappear. Conflicts between the management task to restore an undisturbed high bog (with a close sphagnum-vegetation and few typical odonate species) and a high bog with (small) peat ponds exploited by hand (high odonate diversity) are discussed. It is proposed to create suitable water bodies by peat cutting realising the so-called 'rotation model' of H. Wildermuth.] Address: Rahmann, H., Inst. Zool., Univ. Stuttgart, Garbenstr. 30, D-70599 Stuttgart, Germany
- 3805.** Knüttel, H.; Lunau, K. (1997): Farbige Augen bei Insekten. Mitteilungen der deutschen Gesellschaft für allgemeine und angewandte Entomologie 11(1-6): 587-590. (in German with English summary). ["Conspicuous, bright colorations of insect compound eyes may be caused by two different mechanisms resulting in different functions: 1) A thin layer of bright, light scattering pigment inside the pigment cells bordering cornea and crystalline cones may determine the eye's outer appearance when seen through the transparent dioptric apparatus. The insect's vision is not influenced by this phenomenon (STAVENOA 1979). The cornea transmits light equally well for all wavelengths involved in vision. As examples *Ischnura elegans* (Odonata: Coenagrionidae) and *Lathyrrophthalmis aeneus* (Diptera: Syrphidae) are presented. 2) Interference filters in the cornea cause colorful, metallic reflections. Transmission measurements of single cornea lenses revealed that the interference filters act as color filters by reducing transmission of light in a small limited waveband. These filters influence vision, because they change the spectral composition of visual stimuli. Results of transmission measurements of cornea lenses of *Heptatoma pellucens* FABRICIUS (Diptera: Tabanidae) and *Poecilobothris nobilitatus* Linné (Diptera: Dolichopodidae) are given." (Authors).] Address: Lunau, K., Institut für Zoologie, Universitätsstr. 31, D-93040 Regensburg, Germany
- 3806.** Matthews, J.V.; Telka, A. (1997): Insect Fossils from the Yukon. In: H.V. Danks and J.A. Downes (Eds.), *Insects of the Yukon. Biological Survey of Canada (Terrestrial Arthropods)*, Ottawa. 1034 pp: 911-962. (in English). [Verbatim: [...] Odonata. Despite the thickly sclerotized character of certain parts of adult damselflies and dragonflies, the only fossils identified to date are the distinctive mandibles. The odonate mandibles are so distinct that there may be a potential for identification at least to the family level. Their occurrence in Yukon samples is rare mainly because many of the samples studied to date represent treeline or tundra environments, not the types of habitat in which dragonflies and damselflies are abundant. One of the samples from Rock River (Table 2) contains a fragment of the genital apparatus of an odonate, but such fossils are very rare. Odonate larvae possess sclerotized and very distinctive mouthparts which one might expect to preserve as fossils, but to date none has been recovered from Yukon samples. [...] Address: Matthews, J.V., Ohana Productions, 23 Sherry Lane Nepean, Ontario, Canada K2G 3L4

1998

- 3807.** Bergeson, D.G. (1998): Whooping Crane monitoring in Wood Buffalo National Park. *Research Links* 6(3): 1, 10. (in English). [Odonata sampled in feeding ponds of Whooping Cranes (*Grus americana*) are *Aeshna* sp. and *Ophiogomphus* sp. For more details see: Bergeson, D.G.; Bradley, M.; Holroyd, G. (2001): Food items and feeding rates for wild Whooping Crane colts in Wood Buffalo National Park. *Proc. North American Crane workshop* 8: 36-39.] Address: not stated
- 3808.** Costa, J.M.; Araújo, B.J. de (1998): Catalogue of the types of Odonata in the Museu Nacional, Rio de Janeiro, Brazil. *Publções avuls. Muse. nac., Rio de Janeiro* 76: 1-30. (in Portuguese, with English summary). [Holo- or paratype material referring to 87 species and subspecies are deposited in the odonatological collection of the Museu Nacional, Rio de Janeiro, Brasil and

are documented in detail. A gazetteer with coordinates of the collection localities is listed in an appendix.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

3809. Hänggi, A. (1998): Bewertungen mit Indikatorarten versus Erfassung des gesamten Artenspektrums - ein Konfliktfall?. Laufener Seminarbeiträge 8/98: 33-42. (in German). [The author demonstrates significant different results in assessing the nature conservation value of exact the same habitat when using either spiders, Carabidae, amphibs, Odonata, and the vegetation, respectively.] Address: Hänggi, A., Naturhist. Mus. Basel, Abt. Zool., Augustinergasse 2, CH-4001 Basel, Switzerland

3810. Torralba Burrial, A.; Ortega Martínez, M. (1998): Libélula comedora de ranas. Boletín de la Sociedad Entomología Aragonesa 21: 14. (in Spanish with English summary). [Miramón, Spain, 13.09.1997; a larva of *Anax imperator* got a firm hold with a leg of an adult *Rana perezi*.] Address: Torralba Burrial, A., Av. Menéndez Pidal no 9, 2F, ES-22003 Huesca, Spain

1999

3811. Houpert, G. (1999): Excursion entomologique au lieu-dit "les Pontances", pelouse calcaire de Jezainville (54) le 6 juin 1998. Bull. Soc. Lorraine Ent. 6: 23-25. (in French). [Lorraine, France, *Calopteryx splendens*, *C. virgo* are recorded] Address: not stated

3812. Rückriem, C.; Roscher, S. (1999): Empfehlungen zur Umsetzung der Berichtspflicht gemäß Artikel 17 der Fauna-Flora-Habitat-Richtlinie. Angewandte Landschaftsökologie 22: 456 pp. (in German with English and French summary). ["Recommendations on the implementation of the reporting obligations according to article 17 of the Habitats Directive of the EU. "This work consists of two major parts: The first part deals with the requests on the implementations of the reporting obligations as they can be derived from the Habitats Directive. The different levels involved are mentioned, as the Natura 2000 Sites, the Member States and the European Union. For anyone interested in the Habitats Directive and its implementation basic information is provided. In the second part (chapter 3-6) detailed proposals for the implementation of the reporting obligations are made. This part is addressed mainly to experts responsible for the implementation and, at a later stage, for the performing of the reports. The major aim of the proposals made is to provide a basis for discussion and to encourage future work on this topic. Further expert discussions and amendments are needed in order to establish an appropriate, standardized, and cost-effective procedure for the reports. Based on a proposal for the reporting procedure, standards for parameters, methods and criteria for the evaluation of the conservation status of habitat types are explained. Detailed suggestions for the reporting procedure as it could be performed at a particular NATURA 2000 Site are made for 17 habitat types. For the implementation and the use of geographic information systems (GIS) the reporting procedure suggestions are made which are based on the

experiences gained in the project. The suggestions are explicitly designed to minimize the reporting efforts as far as possible." (Authors) On pages 378-380 the standards referring to the Odonata are outlined.] Address: Rückriem, C., c/o Bundesamt für Naturschutz, Konstantinstr. 110, D-53179 Bonn, Germany

3813. Vonwil, G. (1999): Jahresbericht 1998. Kontrollprogramm Natur und Landschaft Kanton Aargau. Libellen. Aargau, Baudepartement, Sektion Natur und Landschaft, Grundlagen und Berichte zum Naturschutz 19: 13. (in German). [Switzerland; the paper briefly reports on surveys to control the efficiency of habitat restoration or improvement measures for dragonflies. Some emphasis is given to the Odonata of running waters, the drift of *Ophiogomphus cecilia*, *Leucorrhinia caudalis*, impacts of weather conditions on the species dwelling temporary ponds, the occurrence of mediterranean species, and the duration of flood to ensure the successful development of *Sympetrum*-species. But, no detailed results are given.] Address: Baudepartement des Kantons Aargau, Abteilung Landschaft und Gewässer, Sektion Natur und Landschaft, Entfelderstr. 22, CH-5001 Aargau, Switzerland

2000

3814. Cham, S. (2000): Proof of breeding. *Darter* 20: 14. (in English). [*Sympetrum striolatum* is used as example to map and demonstrate the differences in the distribution in UK if different between "proven / probable breeding", "possible breeding / adults only".] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

3815. Costa, J.M.; Machado, A.B.M.; Lencioni, F.A.; Santos, T.C. (2000): Diversidade e distribuição dos Odonata (Insecta) no estado de São Paulo, Brasil: Parte 1 - Lista das espécies e registros bibliográficos. *Publ. Avul. Mus. Nac.*, Rio de Janeiro 80: 1-27. (in Portuguese, with English summary). [The checklist of São Paulo totals to 251 odonate species. Information is organized family wise, and notes to some selected species are included. The paper contains lists with localities including coordinates and altitudinal information, collections with voucher specimens, and bibliographic notes. A brief history of odonatological surveys in the state of São Paulo, and an extensive bibliography complete this paper.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

3816. De Jong, T.H. (2000): Soortenbeschermingsplan voor Krabbescheer en Groene glazenmaker. *Prov Utrecht, Utrecht*: 48 pp. (in Dutch). [Species conservation action plan for *Stratiotes aloides* and *Aeshna viridis* in the Netherlands: The distribution, habitat ecology, and the biology of the water aloe and *A. viridis* in the Netherlands are described and analysed in detail. The reasons responsible for their decline and the management measures are outlined.] Address: Available from: Ecologisch onderzoek en Groene regelgeving, Provincie Utrecht, P.O. Box 80300, NL-3508 TH Utrecht, The

Netherlands. (Coordinator: Jandirk Kievit: jandirk.kievit@province-utrecht.nl)

3817. Dolný, A. (2000): On the use of dragonflies (Odonata) for biological monitoring of water quality. Acta Fac. Rer. nat. Univ. ostraviensis (Biol.-Ecol.) 192: 89-104. (in Czech, with English summary). [Czech Republic; *Calopteryx splendens*, *C. virgo*, *Lestes sponsa*, *Platycnemis pennipes*, *Enallagma cyathigerum*, *Erythromma najas*, *Ischnura elegans*, *Aeshna grandis*, *Somatochlora metallica*, *Libellula quadrimaculata*, and *Sympetrum vulgatum* are considered as good bioindicators to assess water saprobity.] Address: Dolný, A., Dept Biol. & Ecol., Fac. Nat. Sci., Univ. Ostrava, Chittusihó 10, CZ--71000 Ostrava, Czech Republic

3818. Glandt, D.; Kaplan, K.; Keuck, T.; Kipp, M. (2000): Pflege- und Entwicklungsplan für das Naturschutzgebiet "Deipe Briäke" im Kreis Steinfurt (Nordrhein-Westfalen). Metelner Schriftenreihe für Naturschutz 9: 21-57. (in German with English summary). [Germany; baseline investigations for preparing a management plan for an acid, nutrient-poor water body included Odonata. In 1996 and 1997, 17 odonate species were recorded. Additional records from 1985, and data base records for the same locality, increase the list of the odonata to 24 species. The records of *Lestes barbarus*, *Erythromma viridulum*, *Leucorrhinia dubia*, *Sympetrum sanguineum*, and *S. flaveolum* are briefly discussed.] Address: Glandt, D., Biologisches Institut Metelen e.V., Samberg 65, D-48629 Metelen, Germany

3819. Jeyaprakash, A.; Hoy, M.A. (2000): Long PCR improves *Wolbachia* DNA amplification: wsp sequences found in 76% of sixty-three arthropod species. Insect Mol Biol 9(4): 393-406. (in English). ["Bacteria belonging to the genus *Wolbachia* are associated with a variety of reproductive anomalies in arthropods. Allele-specific polymerase chain reaction (= Standard PCR) routinely has been used to amplify *Wolbachia* DNA from arthropods. While testing the two-spotted spider mite *Tetranychus urticae* and other arthropods known to be infected with *Wolbachia*, Standard PCR frequently produced false negatives, perhaps because the DNA from the arthropod host interfered with amplification by Taq DNA polymerase. Long PCR, which uses two enzymes (Taq and Pwo), consistently amplified *Wolbachia* DNA and a sensitivity analysis indicated that Long PCR was approximately six orders of magnitude more sensitive than Standard PCR in amplifying plasmid DNA spiked into insect genomic DNA. A survey indicated that 76% of sixty-two arthropod species and two subspecies in thirteen orders tested positive for the *Wolbachia* wsp sequence by Long PCR, which is considerably higher than the rate of 16.9% obtained previously for the *ftsZ* sequence using Standard PCR (Werren, J.H., Windsor, D. and Gao, L. (1995a) Proc R Soc Lond B 262: 197-204). A subsample of Long PCR products from fourteen arthropod species and two subspecies were sequenced, both directly and after cloning. Two A- and eleven B-*Wolbachia* strains were detected and their wsp sequences displayed a maximum of 23.7% sequence divergence at this locus. Two new groups (named Fus and Ten) were identified in addition to nineteen reported earlier (Zhou, W, Rousset, F. and O'Neill, S.L. (1998) Proc R Soc Lond B 265: 1-7; van Meer, M.M.M., Witteveldt, J. and Stouthamer, R. (1999) Insect Mol Biol 8: 399-408), because they displayed more than 2.5% sequence divergence from other *Wolbachia* wsp se-

quences. PCR products from seventeen of twenty-nine (59%) arthropod species analysed could not be sequenced directly due to apparent infection by multiple *Wolbachia* strains. The wsp sequences cloned from two such species (*Plutella xylostella* and *Trichoplusia ni*) indicated both A- and B-*Wolbachia* were present in a single individual. Hence, superinfection also may be more widespread than the 1.2% incidence previously estimated." (Authors) *Perithemis tenera* was positively tested for *Wolbachia* super-group B.] Address: Jeyaprakash, A., Department of Entomology and Nematology, PO Box 110620, University of Florida, Gainesville, FL 32611, USA. E-mail: ajey@gnv.ifas.ufl.edu

3820. Kano, K. (2000): Male-male tandem formation in dragonflies. Yosegaki 99: 3053-3054. (in Japanese). [Japan; *Boyeria maclachlani*] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3821. Muzon, J.; Ellenrieder, N. von (2000): Estado de conservación de los Odonata en Argentina. In: Bertoniatti, C. & J. Corcuera (Eds.): Situación ambiental Argentina 2000. Fundación vida silvestre Argentina. Buenos Aires: 184-186. (in Spanish). [Brief report on the current knowledge and the situation of the Odonata in Argentina against the background of dragonfly conservation.] Address: Fundación vida silvestre Argentina, Defensa 251, piso 6°K (1065) Buenos Aires, Argentina. www.vidasilvestre.org.ar

3822. Schmidt, E. (2000): Odonata (Imagines). In: Hannemann, H.-J., B. Klausnitzer & K. Senglaub (Hrsg.): Stresemann - Exkursionsfauna von Deutschland. Wirbellose: Insekten. 9. Aufl.: 74-90. (in German). [Revised edition of a determination key on the species level of the German Odonata.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

3823. Schmidt, E. (2000): Odonaten, Libellen. In: Schaefer, M. (Hrsg.): Brohmer - Fauna von Deutschland. 20., überarb. Aufl. Quelle & Meyer. Wiebelsheim: 245-256. (in German). [Revised edition of a determination key on the species level for imagines and on the family level for larvae of the German Odonata.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

3824. Sudo, S.; Tsuyuki, K.; Tani, J. (2000): Wing morphology of some insects. JSME - International Journal, Ser. C. Mechanical systems, machine elements and manufacturing 43(4): 895-900. (in English). ["This paper describes detailed wing morphology of some kinds of insects. The structural properties of dragonfly, fly, and mosquito wings were studied. Microscopic observations on the insect wings were examined with a scanning electron microscope. The surface roughness of the insect wings was measured by a three-dimensional, optical shape measuring system. The roughness distribution on the wing surface was presented for some kinds of insects. Some functional principles underlying insect wing design were revealed by the measurements of surface roughness and microscopic observations." (Authors)] Address: Sudo, S., Iwaki Meisei Univ., Dept Mech. Engn., Iino 5-5-1, Iwaki, Fukushima 9708551, Japan

3825. Verrell, P. (2000): Methoxychlor increases susceptibility to predation in the salamander *Ambystoma macrodactylum*. Bulletin of Environmental Contaminati-

on & Toxicology 64: 85-92. (in English). [Exposure of young long-toed salamanders to non-lethal and ecologically-realistic concentrations of MXC may negatively impact their survival. Contaminated eggs hatch prematurely to produce larvae that move little and are susceptible to predation (*Aeshna* sp.). The author obtained no evidence that compromised cardiovascular performance may be responsible for these effects.] Address: Verrill, P., School of Biological Sciences, Washington State University, Pullman, WA 99164-4236, USA

3826. Zhang, J. (2000): The discovery of aeschnidiid nymphs (Aeschnidiidae, Odonata, Insecta). Chinese Science Bull. 45(11): 1031-1038. (in English). [Aeschnidiid nymphs are characterised, and discussed with focus on phylogenetic relationships and bioecological characteristics. Fossil nymphs known from China, Mongolia, Russia and Brazil, and arranged in the family Aeschnidiidae are, unrelated to this family. The known five Chinese "species" with descriptions based on fossil nymphs (four genera in the Gomphidae) were transferred to the Aeschnidiidae. These specimens turned out to belong to one species, *Sinaeschnidia cancellosa*. This is a geographically widespread species from the "Jehol biota" of East Asia and appeared in the latest Late Jurassic age.] Address: Zhang, J., Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China. E-mail: jfzhang@nigpas.ac.cn

2001

3827. Allen, J.; Humphries, T. (2001.): Are you a dragonfly? Kingfisher, London. ISBN 0-7534-5346-0. 31 pp. (in English). [This book, dedicated to kids, tells the story of *Aeshna cyanea* from egg to imago. Childrens are motivated to slip into the skin of a dragonfly and to experience all stages of a dragonfly's live with it's eyes.]

3828. Cordero Rivera, A.; Andrés, J.A. (2001): Estimating female morph frequencies and male mate preferences of polychromatic damselflies: a cautionary note. Animal behaviour 61: F1-F6. (in English). ["In all populations studied, the frequency of androchromes changed greatly between days, but only in the *I. elegans* population was a significant correlation found between androchrome frequency and date (Kendall's rank correlation coefficient: $T = -0.33$, $N=25$, $P<0.05$). The coefficient of variation of androchrome frequency was 18% for *I. elegans*, 26-73% for *I. graellsii*, 110% for *I. pumilio* and 61-76% for *C. tenellum*. Sample sizes of fewer than 100 females will rarely be a good estimate of the true population frequency. It is only above this that the frequency tends to become independent of sample size. Male preference for female colour morphs has been studied in 12 *Coenagrionidae* and one *Calopterygidae* species (listed in Table 1). Some studies have presented live tethered females to males and recorded whether males responded in a sexual or nonsexual way to the model. Other studies used immobile models (either dead or alive, paired or not) glued or pinned to the tip of a stem. Finally, a few followed male-female interactions in free-living specimens (Sirot 1999), or used small cages where males were allowed to choose between two females (Van Gossum et al. 1999). We have calculated the percentage of males that showed sexual

interest to androchrome models, excluding males that did not respond. This measure of male interest in androchromes does not correlate with the frequency of this morph in the population (all experiments: Spearman correlation: $r_s = -0.14$, $N=19$, $P=0.566$; experiments with live models (tethered, glued or pinned) presented one at a time: $r_s = -0.46$, $N=10$, $P=0.184$; all experiments with dead models: $r_s = 0.14$, $N=7$, $P=0.758$)."] (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

3829. Danielzik, K. (2001): Natura 2000 in Nordrhein-Westfalen. insecta 7: 90-102. (in German). [Germany, Nordrhein-Westfalen; some notes referring to *Leucorrhinia pectoralis* and *Coenagrion mercuriale* are made.] Address: Danielzik, J., Auf der Kämpe 11, D-46244 Bottrop, Germany. E-mail: muscidaejd@gmx.de

3830. Fartmann, T.; Gunnemann, H.; Salm, P.; Schröder, E. (2001): Berichtspflichten in Natura-2000-Gebieten Empfehlungen zur Erfassung der Arten des Anhangs II und Charakterisierung der Lebensraumtypen des Anhangs I der FFH-Richtlinie. Angewandte Landschaftsökologie 42: 725 pp, Appendix. (in German with English summary). ["Intensive studies of the natural habitat types listed in Annex I and the populations of the species listed in Annex II of the Habitats Directive were conducted in eight study areas of the continental biogeographic region of Germany as part of two research and development projects of the Federal Agency for Nature Conservation. These studies had two primary goals: first of all, to assess methods for the standardized registration of the species listed in Annex II as required by the reporting obligations according to article 17 of the Habitats Directive and to recommend species-specific methods. Secondly, to subject habitat types of Annex I to a more exhaustive, and particularly ecological characterization. Methods are suggested for the evaluation of the conservation status of the 96 plant and animal species listed in Annex II that presently occur in Germany, as well as six further species listed in Annexes IV and V as required by the reporting obligations. These methods are based in part on our own studies. For each species the relevant ecological characteristics required for its registration, the habitat requirements, and the factors of its endangerment are briefly described. In a second step, methods judged to be appropriate are presented and discussed. In the final recommendation, the selected methods are described in more detail with regard to their practical application, the data acquisition periods and their frequency, as well as the time requirements. The recommended methods should be able to produce reproducible results, to allow conclusions about the development of populations in the protected sites and have a neutral cost-benefit relationship. In the presentation and the discussion, the methods are differentiated into those for recording species or populations and those for recording their habitats. All suggestions pertain to the surveillance of the species' conservation status in Natura 2000 sites. The ecological characterization of the FFH habitat types was primarily made by floristic surveys that encompassed a total of 44 different types. [...]"] (Authors) The Odonata are treated in chapter 4.3.6 on pages 323-355. *Aeshna viridis* (Petra Salm), *Coenagrion mercuriale* (Wolfgang Röske), *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis* (Rüdiger Mauersberger), *Stylurus flavipes*, *Ophiogom-*

phus cecilia (P. Salm, Ole Müller), and *Oxygastra curtisii* (Klaus-Guido Leipelt).] Address: Schröder, E., c/o Bundesamt für Naturschutz, Mallwitzstr. 1-3, D-53170 Bonn, Germany

3831. Galdean, N.; Callisto, M.; Barbosa, F.A. (2001): Biodiversity assessment of benthic macroinvertebrates in altitudinal lotic ecosystems of Serra do Cipó (MG, Brazil). *Revista brasileira de biologia* 61(2): 239-248. (in English, with Portuguese summary). ["Five lotic systems of Serra do Cipó, south-east Brazil, were investigated in order to assess the existing diversity of benthic macroinvertebrates, habitats-microhabitats, and the available trophic resources. For each river the communities of benthic macroinvertebrates and the composition of some taxonomic groups (Plecoptera, Ephemeroptera, Trichoptera and Diptera Chironomidae) were analysed: the community with Bivalvia, Sphaeriidae, Oligochaeta and Ephemeroptera-Baetidae (being supposed a closed relation Bivalvia-Oligochaeta based on the process of bioturbation and enrichment of sediment in organic matter) in Tanque River; the macrofauna associated to aquatic macrophytes from rivers Peixe and Preto do I-també reflecting the reaction of the ecosystems versus the quantities of nutrients which originate from the farmlands; the lithoreophilic communities of Cipó River; the community depending on deposits of leaves and filamentous algae in Congonhas Stream; the very rich community of the moss clumps in the Indaiá Stream. A proposal for biological zonation of Cipó River and some comments about the importance of the analysed benthic macroinvertebrates in the biological production of the aquatic communities were done." (Authors) Odonata are mentioned on the order level only.] Address: Callisto, M., Laboratório de Limnologia/Ecologia de Bentos, Departamento de Biologia Geral, Universidade Federal de Minas Gerais, ICB, C.P. 486, CEP 30161-970, Belo Horizonte, MG, Brazil. E-mail: callisto@mono.icb.urmg.br

3832. Kesel, A.B. (2001): The ultralight aerofoils of insects - an evolutionary masterpiece. *Zoology - Analysis of Complex Systems* 103(3-4): 222-229. (in English). ["The development of wings can be regarded as the key innovation in the course of insect evolution. They make locomotion in a three-dimensional space possible, a world wide spreading and the inhabitation of almost all biotopes. Due to their low mass and high stability, wings can be interpreted as ultralight aerofoils. To guarantee the enormous mechanical demands of flight, the material and its geometrical arrangement are of crucial importance. The wings are part of the cuticular exoskeleton of the insects. This cuticle is a helicoidal fibre reinforced material of crystalline biopolymers, embedded in a protein matrix. Apart from providing the necessary stability, the ingenious structure design induces excellent aerodynamic performance. The statics as well as the aerodynamic quality of the highly complex system wing are supported throughout all hierarchic levels by a series of fine structures." (Author) Anax junius] Address: Kesel, A.B., Univ. Saarland, Dept Zool. Tech. Biol. & Bion., D-66041 Saarbrücken, Germany

3833. Lan, S.; Sun, M. (2001): Aerodynamic force and flow structures of two airfoils in flapping motions. *Acta Mechanica Sinica (English Series)* 17(4): 310-331. (in English). ["Aerodynamic force and flow structures of two airfoils in a tandem configuration in flapping motions axe studied, by solving the Navier-Stokes equations in

moving overset grids. Three typical phase differences between the fore- and aft- airfoil flapping cycles are considered. It is shown that: (1) in the case of no interaction (single airfoil), the time average of the vertical force coefficient over the downstroke is 2.74, which is about 3 times as large as the maximum steady- state lift coefficient of a dragonfly wing; the time average of the horizontal force coefficient is 1.97, which is also large. The reasons for the large force coefficients are the acceleration at the beginning of a stroke, the delayed stall and the "pitching-up" motion near the end of the stroke. (2) In the cases of two-airfoils, the time-variations of the force and moment coefficients on each airfoil are broadly similar to that of the single airfoil in that the vertical force is mainly produced in downstroke and the horizontal force in upstroke, but very large differences exist due to the interaction. (3) For in-phase stroking, the major differences caused by the interaction are that the vertical force on FA in downstroke is increased and the horizontal force on FA in upstroke decreased. As a result, the magnitude of the resultant force is almost unchanged but it inclines less forward. (4) For counter stroking, the major differences are that the vertical force on AA in downstroke and the horizontal force on FA in upstroke are decreased. As a result, the magnitude of the resultant force is decreased by about 20 percent but its direction is almost unchanged. (5) For 90 degrees - phase-difference stroking, the major differences axe that the vertical force on AA in downstroke and the horizontal force on FA in upstroke axe decreased greatly and the horizontal force on AA in upstroke increased. As a result, the magnitude of the resultant force is decreased by about 28% and it inclines more forward. (6) Among the three cases of phase angles, inphase flapping produces the largest vertical force (also the largest resultant force); the 90 degrees -phase-difference flapping results in the largest horizontal force, but the smallest resultant force." (Authors)] Address: Lan S.L., Beijing Univ. Aeronaut. & Astronaut., Inst. Fluid Mech., Beijing 100083, Peoples R China

3834. Mauch, E.; Wittling, T. (2001): Die Makroinvertebraten von Lech und Wertach im Stadtgebiet von Augsburg. *Berichte des naturwissenschaftlichen Vereins für Schwaben - Sonderbericht 2001*: 209-214. (in German). [The river Lech is a southern tributary of the river Danube in Bavaria, Germany, the Wertach is a tributary of the Lech. The checklist of the macrozoobenthos includes four odonate species. For a more detailed paper of the odonate fauna of the Lech see Kuhn 2001 (OAS 2137).] Address: Mauch, E., Mühlangerstr. 11, D-86424 Dinkelscherben, Germany. E-mail: Erik.Mauch.Verlag@t-online.de

3835. Mizera, F.; Bernath, B.; Kriska, G.; Horvath, G. (2001): Stereo videopolarimetry: Measuring and visualizing polarization patterns in three dimensions. *Journal of Imaging Science and Technol.* 45(4): 393-399. (in English). ["Because the human eye is practically blind to the polarization of light, biologists dealing with polarization vision of animals, or engineers designing robots using polarization- sensitive computer vision to enhance contrast in the optical environment need a technique to image the spatial distribution of polarized light in the visual environment. Recently, different kinds of imaging polarimetry were developed to measure the polarization patterns of objects and natural scenes in a single, two-dimensional, wide field of view. As a further development of this technique, we report here on the realization

of the addition of depth to scenes imaging the distribution of polarized light: One kind of stereo videopolarimetry was designed to measure and visualize in three dimensions the polarization patterns in nature and to mimic the ability of animal-eyes to receive visual information from a binocular field of view. We demonstrate the power of stereo videopolarimetry on an applied problem representing (in parallel view stereo format) a three-dimensional object, a car with a shiny bodywork and also having strong reflection polarization. The technical difficulties and hitches of stereo videopolarimetry as well as the importance of the distance of observation, the role of the angle of view, the influence of the color of the object, and the possibility to state differences between metallized and non-metallized paints are discussed." (Authors)] Address: Horvath, G., Lorand Eotvos Univ., Dept Biol. Phys., Pazmany Setany 1, H-1117 Budapest, Hungary

3836. Pérez-Bote, J.L.; Carpi, B.L. (2001): Nuevas aportaciones al catálogo odonológico de Extremadura (Odonata). Boletín de la Sociedad Entomológica Aragonesa 29: 97-98. (in Spanish). [47 species including new additions (*Diplacodes lefebvrei*, *Orthetrum nitidinerve*) are checklisted for the Extremadura in southern Spanish.] Address: Pérez-Bote, J.L., Área de Biología Animal, Facultad de Ciencias, Universidad de Extremadura, 06071 Badajoz. Spanish. E-mail: jlperez@unex.es

3837. Rademacher, M. (2001): Untersuchungen zur Vegetationsdynamik anthropogener Kiesflächen der Oberrheinebene unter Berücksichtigung landschafts-ökologischer und naturschutzfachlicher Belange. Inaugural-Dissertation, Fakultät für Biologie der Albert-Ludwigs-Universität Freiburg i.Br.: VI, 311 pp. (in German). [In the applied part of this Ph-thesis, which focusses on the vegetation of gravel pits, Odonata are mentioned on several opportunities.] Address: Rademacher, M., c/o Heidelberger Technology Center, Peter-Schumacher-Str. 8, D-69181 Leimen, Germany

3838. Schmidt, B.R.; Amezcua, A. (2001): Predator-induced behavioural responses: Tadpoles of the neotropical frog *Phyllomedusa tarsius* do not respond to all predators. Herpetological journal 11(1): 9-15. (in English). ["Many species show behavioural responses to predators that reduce predation mortality but are assumed to be costly. We tested whether an induced behavioural response is predator-specific and whether the strength is related to the risk of being killed by a predator. We used tadpoles of the neotropical frog *Phyllomedusa tarsius* as prey, and larvae of an aeshnid dragonfly and belostomatid bugs as predators. Belostomatids killed twice as many tadpoles within 24 hours as aeshnids did. Tadpoles reduced activity in the presence of aeshnids by 30% but did not respond at all to the more dangerous belostomatids. Tadpoles did not show spatial avoidance of predators. We favour the explanation that tadpoles of *P. tarsius* did not respond to belostomatids because belostomatids are encountered too rarely for evolution to favour an induced response to belostomatids." (Authors)] Address: Schmidt, B.R., Univ Zürich, Inst. Zool., Winterthurerstr. 190, CH-8057 Zürich, Switzerland

3839. Straka, V. (2001): Vázky (Odonata) národnej prírodnej rezervácie Raksianske Raselinisko. *Naturae Tutela* 6: 103-104. (in Slovakian). [Slovakia; nature reserve Raksianske Raselinisko; checklist of 7 odonate

species including *Coenagrion ornatum*.] Address: Straka, V., Slovenské národné múzeum - Múzeum Andreja Kmet'a, Ul. A. Kmet'a 20, 03601 Martin, Slovakia

3840. Timm, H.; Ivask, M.; Möls, T. (2001): Response of macroinvertebrates and water quality to long-term decrease in organic pollution in some Estonian streams during 1990-1998. *Hydrobiologia* 464: 153-164. (in English). [47 sampling sites in the area of 4 (mostly pig) farms were studied. *Calopteryx splendens* was represented in 9%, and *Gomphus vulgatissimus* in 3% of 1394 samples.] Address: Timm, H., Vortsjarv Limnol. Stn, Inst. Tool. & Bot, Estonian Agric. Univ., EE-61101 Rannu, Tartumaa, Estonia

3841. Torralba Burrial, A.; Ocharan, F.J. (2001): Un caso llamativo de supervivencia en *Libellula quadrimaculata* L., 1758 (Odonata: Libellulidae). *Boletín de la Sociedad Entomológica Aragonesa* 29: 104. (in Spanish with English summary). [Oviedo (Asturias, Spain), between May and June of 2000; a male *L. quadrimaculata* survived in the field during a minimum of 10 days without the right forewing.] Address: Ocharan, F.J., departamento de Biología de Organismos y Sistemas. Universidad de Oviedo. E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

3842. Weidmann, P. (2001): Naturschutzgebiet Siechenstuden: Artenvielfalt 10 Jahre nach seiner Gestaltung. *Libellen. Jber. naturf. Ges. Graubünden* 110: 71-76. (in German). [In 1993 and 1998, 29 species were evidenced in the Nature Reserve "Siechenstuden", Maienfeld. canton Grisons, Switzerland: alt. 520 m, surface ca 7 ha. Flight periods are stated for all species. *Chalcolestes viridis*, *Pyrrhosoma nymphula*, *Ischnura pumilio*, *Anax imperator*, *Crocothemis erythraea*, *Symphetrum pedemontanum*, and *S. depressiusculum* are commented, and changes in the species composition between the years discussed.] Address: Weidmann, P., Falknisstr. 15. CH-7000 Chur, Switzerland

3843. Wilson, K.D.P. (2001): *Orthetrum poecilops* Ris - A marine dragonfly of conservation priority. *Porcupine* 22: 5-9. (in English). [Porcupine is the Newsletter of the Dept of Ecol. and Biodiv. of the Univ. of Hong Kong. It contains a highly interesting compilation on the ecology, biology, distribution, synonymie, and identification of *O. poecilops*. The species is one of the very few odonate species which develops in brackish water. It is concluded that none of the few localities of the species is represented in the network of special protected areas in Hong Kong. The conservation of this "global rarity" should be considered a high priority.] Address: Wilson, K.D.P., Flat 20, 6 Mansfield Road, The Peak, Hong Kong, China. E-mail: wilsonkd@netvigator.com

3844. Worthen, W.B.; Haney, D.C.; Cuddy, C.C.; Turgeon, V.L.; Andersen, C.B. (2001): The effect of an industrial spill on the macrofauna of a South Carolina stream: Physiological to community-level responses. *Journal of Freshwater Ecology* 16(3): 467-477. (in English). ["In 1985, a waste retention pond ruptured at a galvanizing facility and spilled 75,700 liters of HCl and other contaminants into the groundwater above the Upper Enoree River in South Carolina, USA. In 1999, we examined the residual effects of this spill by surveying the water chemistry and biota in the main channel of the Upper Enoree River and uncontaminated tributaries. We also transplanted yellowfin shiners (*Notropis lutipinnis*) to channel and tributary sites and monitoring

their survivorship and the histological condition of their gills. The two upstream sites were significantly different in chemical composition from downstream sites and control tributaries.[...] The abundance and diversity of salamanders, fish, and macroinvertebrates correlated with these changes in water chemistry. Yellowfin shiners transplanted to the headwater site died within 24 hours, and fish in channel sites had significantly higher mortality than fish transplanted to tributary sites. At the tissue level, the size and density of gill pavement cells were significantly lower in fish transplanted into the two headwater sites closest to the spill compared to other channel and tributary sites. Thus, this spill continues to exert a significant effect on the chemistry and biota of the Upper Enoree River. [...] On average, invertebrate communities in the channel were similar to invertebrate communities in the tributaries and in other streams in the county. The channel sites had significantly fewer crayfish than tributaries and other county sites, but most other means were comparable. A total of 1256 macroinvertebrates was collected in the Upper Enoree, representing eight orders. Odonates accounted for 49.8% of the total sample, with a disproportionate number of *Progomphus obscurus* ($n = 228$) and *Cordulegaster maculata* ($n = 222$). (Authors)] Address: Worthen, W.B., Dept of Biology, Furman University, Greenville, SC29613 USA. E-mail: worthen@furman.edu

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3845. Anderson, D.; Anderson, K. (2002): Dragonfly review. Muntjac - Newsletter of the Bedfordshire Natural History Society 129: 5. (in English). [Brief report on some seasonal highlights (*Erythromma viridulum*, *Platycnemis pennipes*) in Bedfordshire, UK, and some administrative notes.] Address: Anderson, D., 88 Eastmoor Park, Harpenden, Herts. AL5 1BP, UK. E-mail: dandkk@andersonharp.freeserve.co.uk

3846. Bernard, R.; Buczyński, P.; Tończyk, G. (2002): Present state, threats and conservation of dragonflies (Odonata) in Poland. *Nature Conservation* 59 (2004) : 53-71. (in English). ["72 species of dragonflies have been recorded in Poland so far. The present state of knowledge of Odonata is generally moderate and unequal with reference to the particular regions. The main current topics in Polish Odonatological studies are briefly presented. The current picture of dragonfly fauna has been drawn, with special attention to the increased abundance and the broadened ranges of some Mediterranean and southeastern species (e.g. *Aeshna affinis*, *Orthetrum albistylum*), and to the falling numbers, the increasing scatter of localities and the narrowing ranges of some other species, mainly stenotopic (e.g. *Nehalennia speciosa*, *Coenagrion armatum*, *Coenagrion ornatum*). Threats and their mechanisms of affecting dragonflies are analysed in all the main water habitats in Poland. The species typical of small running waters and habitats connected with *Sphagnum* are the most endangered. It must be stressed, however, that generally the state of Polish dragonfly fauna is fairly good. The main forms of conservation of dragonflies, currently used or proposed for use in Poland, are analysed: passive (species and territorial protection, red list, umbrella species) and active (reintroduction, creating new waterbodies, interference in succession of wa-

terbody). The choice of species protected in Poland is partly inappropriate in comparison with the present situation of dragonfly fauna. The Polish Red List, comprising 16 species, is discussed in comparison with the red lists of other European countries. It is stressed that no species has become extinct in Poland. The proposed list of umbrella species for particular habitats is given. The Wildermuth's rotation model is suggested for the management of some habitats. All issues described in the article are presented synthetically and illustrated with the data and examples from Poland." (Authors)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznań, Poland; E-mail: rbernard@main.amu.edu.pl

3847. Callisto, M.; Moreno, P.; Barbosa, F.A.R. (2002): Habitat diversity and benthic functional trophic groups at Serra do Cipó, southeast Brazil. *Revista Brasileira de Biologia* 61(2): 259-266. (in English with Portuguese summary). ["The assessment of the diversity of habitats and the characterisation of the functional trophic groups of benthic macroinvertebrate communities of some rivers of Serra do Cipó (MG) were the main objectives of this study. The available trophic resources and the types of substrata were characterised along with the structure and composition of their using functional trophic groups. Serra do Cipó is a watershed divisor of the São Francisco and Doce River basins, including a series of streams and rivers, of good water quality and well preserved ecological characteristics. Samples were collected in Cipó, Peixe and Preto do I-també rivers, besides the Indaiá and Capão da Mata streams at 26 sampling stations, during the rainy (February) and dry (October) seasons of 1998, using Kicking nets of 0.125 mm mesh size. The group of collectors (Baetidae, Leptophlebiidae and Leptohyphidae) was the most abundant, followed by collector-predators (Hydrophilidae, Ceratopogonidae, Chironomidae-Tany-podinae), and detritivorous-herbivores (Oligochaeta). The riparian vegetation, together with the aquatic macrophytes, are the substrata containing the highest richness of functional trophic groups and the higher habitat diversity. The results suggest that the use of functional trophic groups, together with habitat evaluation, are efficient tools in the evaluation of the diversity of benthic macroinvertebrates, particularly in altitudinal lotic ecosystems." (Authors) There are two passing references to Odonata.] Address: Callisto, M., Laboratório de Limnologia/Ecologia de Bentos, Departamento de Biologia Geral, Universidade Federal de Minas Gerais, ICB, C.P. 486, CEP 30161-970, Belo Horizonte, MG, Brazil. E-mail: callisto@mono.icb.ufmg.br

3848. Catling, P.M.; Jones, C.D.; Pratt P. (2002): Ontario Odonata. Including observations for the year 2001. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 208 pp. (in English). ["This 208-page book is part of a series in odonate fauna of Ontario and details observations made in 2001. The nineteen individually authored reports include selected topics such as records from Petroglyphs Provincial Park, the lilypad forktail *Ishnura kellicotti*, black saddlebags *Tamea lacerata*, ebony jewelwing *Calopteryx maculata*, and mass aggregations of multiple species of dragonflies. Each article includes an and a list of references. The book highlights a list of contributors and their respective institutions. The text is written in English with an appendix of observations of Odonata in 2001, tables, illustra-

tions, and photographs, some of which are in color. Users of this book will include entomologists with interest in North American dragonflies and damselflies." Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

3849. Cordero, A. (2002): Influencia de la selección sexual sobre el comportamiento reproductor de los odonatos. In: M. Soler (Ed.): Evolución. La base de la Biología. Editorial Proyecto Sur, Granada. 2002.: 497-507. (in Spanish). [The paper compiles the recent knowledge on the influence of sexual selection on the reproductive behaviour of odonata. Basis of the compilation is an extensive analysis of published odonate studies. A table shows the influence of several variables on the reproductive success by species.] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spanish. E-mail: acordero@uvigo.es

3850. Costa, N.E.M. (2002): Entomophilately: Insects in philatelic art. *Bioikos* (Campinas) 16(1-2): 61-67. (in Portuguese with English summary). ["The use of insect design in the art of philately is analyzed from 80 postage stamps that are to be found in the Ethnobiology Laboratory Collection at Feira de Santana State University. These stamps come from 12 countries and insect species represented on them are distributed in seven taxonomic orders. Lepidoptera and Coleoptera are the two most represented orders with philatelic designs. The former contributes with 51 postage stamps, which are classified in 10 families and 46 identified species. The latter shows up with 17 postage stamps, which are classified in 8 families and 16 identified species. Through this entomophilatelic art Post Offices develop an environmental education by arousing in the public a liking for the study of entomology, as well as to make the presence of insects and other invertebrates more acceptable in daily life." (Author)] Address: Costa, N.E.M., Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, Km 03, BR 116, Av. Universitaria, 44031-460, Feira de Santana, BA, Brazil. E-Mail: eraldont@uefs.mail.br

3851. Couteyen, S.; Papazian, M. (2002): Les Odonates de la Réunion. *Éléments de biogéographie et de biologie, atlas préliminaire, reconnaissance des espèces, synthèse bibliographique.* *Martinia* 18(3): 79-106. (in French with English summary). [The paper compiles the present knowledge on the Odonata of La Réunion, Indian Ocean. Maps of the 18 species are presented, and information of the biogeographic origin, altitudinal distribution, and biology of the species are provided, and a key for the images and a bibliography are added.] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France

3852. de Souza, F.G.M.; Takeda, A.M. (2002): Spatial and temporal variation of Odonata larvae associated with macrophytes in two floodplain lakes from the upper Parana River, Brazil. *Acta Scientiarum Universidade Estadual de Maringá* 24(2): 345-351. (in English). ["Samples of aquatic macrophytes were collected on Guarana (*Eichhornia azurea*) and Patos (*E. crassipes* and *E. azurea*) Lakes from March 1992 to February 1993. On Guarana Lake the highest density and diversity were registered during the high water phase with dominance of *Telebasis* and *Acanthagrion*, while

dominance of *Telebasis* and *Acanthagrion*, while on Patos Lake, highest density and diversity were observed during the low water phase. The dominant taxa on Patos Lake were *Telebasis*, *Acanthagrion*, *Neoneura* (?), *Coryphaeschna adnexa*, *Miathyria*, *Diastatops intensa* and *Erythemis*. DCA and ANOVA differentiated Patos Lake mainly, because of the high abundance of *C. adnexa*, *Miathyria*, *D. intensa* and *Erythemis* which may be due to morphology of *E. crassipes* that shelters larger number of invertebrates. Water level variation of rivers influenced concentration of dissolved oxygen and pH. This variation was related the monthly fluctuation of larvae density. Difference between lakes shown in DCA analysis was chiefly due to variation of Odonata density." (Authors)] Address: de Souza, F.G.M., Universidade Comunitaria Regional de Chapeco, Av. Attilio Fontana, 591-E, Bairro Efapi, 89809-000, Chapeco, Santa Catarina, Brazil. E-Mail: gilzafranco@yahoo.com.br

3853. De Souza, L.O.I.; Costa, J.M. (2002): Description of three larvae of *Micrathyria* Kirby, 1889, with key to identification for the known larvae of the Brazilian species (Odonata, Libellulidae). *Arquivos do Museu Nacional Rio de Janeiro* 60(4): 321-331. (in Portuguese with English summary). ["The last instars larvae of the *Micrathyria longifasciata* Calvert, 1909, *Micrathyria spuria* (Selys, 1900) and *Micrathyria tibialis* Kirby, 1897, from Pantanal of Mato Grosso do Sul, Brazil, are described and illustrated. A key to the larvae of the known Brazilian species of *Micrathyria* Kirby, 1889 is presented." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisy.com.br

3854. Delgado, C. (2002): Spatial and temporal distribution patterns of Odonata larvae in the streams of a terra firma forest of the Central Amazon, Brazil. *Journal of Freshwater Ecology* 17(4): 555-561. (in English). ["This study was carried out from May 1995 to April 1996 in two streams within in the Adolfo Ducke Forest Reserve, located in Central Amazonia of Brazil. A total of 216 substrate samples was taken along 2000 m of each stream, starting from their origins, with the objective being to describe changes in structure of the Odonata community as a function of distance to the origin of the stream, substrate type, and season. Larvae of 24 taxa (in most cases on the generic level) were identified. Cluster analysis revealed two groups of associated species based on substrate type, and there was evidence of seasonal and spatial patterns in the abundance and diversity of these members. These patterns were most marked in substrate occupation." (Author)] Address: Delgado, C., Instituto de Investigaciones de la Amazonia Peruana-IIAP, CP. 784, Iquitos, Peru. E-Mail: cdelgado@iiap.org.pe

3855. Detzel, P.; Schmieder, H.-J.; Engelking, L.; Rohl, M.; Reidl, K. (2002): Die Hülben des Albuch. 2. Untersuchungen zur Amphibien- und Libellenfauna, Bewertung aus tierökologischer Sicht sowie Pflege- und Entwicklungsmaßnahmen. *Jh. Ges. Naturk. Württemberg* 158: 223-236. (in German). [20 odonate species are reported from 10 so-called Hülben (local name for man-made small bodies of water in Ostalb, Baden-Württemberg, SW Germany). The ecological significance of the "Hülbe" odonate communities is analysed and

assessed.] Address: Detzel, P., Dreifelderstr. 31, D-70599 Stuttgart-Plieningen, Germany

3856. Ellenrieder, N. von; Costa, J.M. (2002): *Aeshna brasiliensis* sp. nov. (Odonata: Aeshnidae) from south and southeastern Brazil, with a redescription of its larva. *Neotrop. Ent.* 31(3): 369-376. (in English with Portuguese summary). [Holotype male: Rio Grande do Sul, Rio Tainha, alt. 900 m, 20-1-1959; allotype female: Rio de Janeiro, Itatiaia, Repressa do Planalto de Itatiaia; deposited in MNRJ. The new species resembles *A. variegata* and *A. peralta* in colour pattern of head and abdomen, but differs from them in thoracic colour pattern and in shape of cerci. The larva uniquely differs from all other known Brazilian congeners by lacking lateral spines on abdominal segment VI. The last larval stage of *A. brasiliensis* is (re-) described and diagnostic characters are illustrated. A map documents the present knowledge of distribution of the species in Brazil. *Aeshna peralta* Ris, 1918 differs morphological clearly from *A. variegata* Fabricius, 1775, and was recognised as a good species.] Address: Ellenrieder, Natalie von, Ent. Sect., Nat. Hist. Mus. Los Angeles Co., 900 Exposition Blvd, Los Angeles, CA 90007, USA

3857. Endersby, I.D. (2002): Australian Odonata in the international literature. *Austrolestes* 6: 1-3. (in English). [The paper compiles publications on taxonomy, ecology, and conservation of Australian Odonata in journals issued abroad Australia.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@werple.net.au

3858. Endersby, I.D. (2002): The dragonflies of Norfolk Island, with the first record of *Pantala flavescens* (F.) (Odonata: Libellulidae). *Ent. mon. Mag.* 138: 241-246. (in English). [The collecting history of Norfolk Island Odonata is traced since 1915. *Agriocnemis vitienensis* is considered a juvenile (not teneral) colour form of *A. exsudans*. This species and *Ischnura aurora*, *Aeshna brevistyla*, *Hemicordulia australiae*, and *Pantala flavescens* seem to be well established on the island. Observations of specimens of *Anax* sp. and *Diplacodes* sp. are to be confirmed on the species level. The distribution within the Pacific of the Odonata found on Norfolk Island is shown in a table. The colonisation of the island is discussed, and the probability of facultative immigrants or wind-blown individuals is considered extremely small.] Address: Endersby, I.D., 56 Looker Rd, Montmorency, Vie. 3094, AU

3859. Fouque, C.; Corda, E.; Debot, S.; Combaz, B.; Broyer, J. (2002): The reedbed inventory, a monitoring tool for a key habitat for aquatic avifauna. *Zeitschrift für Jagdwissenschaft* 48 (Supplement): 115-129. (in English). ["For several years, a decrease in the reedbed surface areas has not only been noted in certain sectors of France but also in Europe and throughout the world. The importance of reedbeds to the fauna is obvious, notably for all paludicolous fauna for which it is a nesting place. In this context, making an inventory of all reedbeds is in line with a patrimonial approach that eventually should lead to the creation of a reedbed observatory. Thanks to the creation of a national network of observers between 1998 and 2000, in one third of the national surface area an inventory could be made of all wet reedbeds covering more than 1 hectare. Almost 1000 wetlands were identified covering a surface area of more than 7000 hectares. Two typologies were defi-

ned based on the factors obtained by multiple correspondence analyses: the first one for the wetlands containing 6 classes and the second one for the reedbeds, containing 4 classes. Reedbed habitat quality was assessed in a sample of 125 sites through an evaluation of the number of species present in two groups of indicator species, Birds and odonates. The median values for a wetland successively amount to 2 species (0 to 15 species interval) and 7 species (0 to 18 species interval). The high values of these indicators are essentially linked to the reedbed's high water level for the first group, and to the reedbed's geographic situation for the second one. Other descriptive parameters of the reedbeds and wetlands harbouring indicator species also have an effect, although they are less important from a hierarchical point of view. Bird diversity is linked to a lot of these parameters, but dragonfly diversity is not. This is the first inventory of the state of the reedbeds in the East of France. When another one is made 10 years from now, it would allow us to make an overall appraisal of the quantitative and qualitative changes affecting all reedbed-covered areas on the basis of objective knowledge." (Authors)] Address: Fouque, C., Migratory Avifauna Department, Station de la Dombes, O.N.C.F.S., 01330, Birieux, France. E-Mail: c.fouque@onc.gouv.fr

3860. Gorb, S.N.; Popov, V.L. (2002): Probabilistic fasteners with parabolic elements: biological system, artificial model and theoretical considerations. *Philos. Trans. R. Soc. Lond. Ser. A - Math. Phys. Eng. Sci.* 360 (1791): 211-225. (in English). ["Probabilistic fasteners are attachment devices composed of two surfaces covered with cuticular micro-outgrowths. Friction-based fasteners demonstrate high frictional forces when the surfaces come into contact. Attachment in this case is based on the use of the surface profile and mechanical properties of materials, and is fast, precise and reversible. The best-studied examples composed of parabolic elements are the wing-locking mechanism in beetles and the head arrester in dragonflies. This study combines experimental data of force measurements, obtained in an artificial model system, and theoretical considerations based on the simple model of behaviour of probabilistic fasteners with parabolic elements. Elements of the geometry in both cases correspond to the biological prototypes. Force measurements on the artificial system show that the attachment force is strongly dependent on the load force. At small loads, the increase of attachment is very slow, whereas rapid increase of attachment was detected at higher loads. At very high loads, a saturation of the attachment force was revealed. A simple explanation of the attachment principle is that with an increasing load elements of both surfaces slide into gaps of the corresponding part. This results in an increase of lateral loading forces acting on elements. High lateral forces lead to an increase of friction between single sliding elements. An analytical model which describes behaviour of the probabilistic fasteners with parabolic elements is proposed." (Authors)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

3861. Ingermann, R.L.; Bencic, D.C.; Verrell, P. (2002): Methoxychlor alters the predator-prey relationship between dragonfly naiads and salamander larvae. *Bulletin of Environmental Contamination & Toxicology* 68(6): 771-778. (in English). ["The pesticide methoxychlor (MXC; 1,1'-[2,2,2-trichloroethylidene]bis[4-methoxy]-

benzene) has been widely used as a replacement for DDT due to its lower toxicity and shorter half-life. In Canadian rivers, MXC has been applied to wetlands to control fly and mosquito larvae, particularly in the spring and summer, with target concentrations of about 0.9 μM (0.31 mg/L). Inadvertent exposure of non-target organisms with such applications cannot be avoided and pesticides may have a variety of sublethal, but nonetheless highly deleterious, effects on amphibians. In addition, pesticides may influence predator-avoidance behaviour. Verrell (2000) has shown that exposure of *Ambystoma macrodactylum* - salamander eggs to MXC concentrations as low as 0.03 μM leads to increased predation when larvae are combined with dragonfly naiads. We lack predator-prey studies in which both predator and prey are exposed to the pesticide. Deleterious effects of MXC on the feeding and perching of dragonfly naiads ($n=109$ specimens of *Aeshna* sp. and one of *Anax* sp.) "were not apparent with transient exposures to concentrations below about 0.4 μM MXC, while the startle response of *A. macrodactylum* larvae was severely compromised by transient exposures to at least 0.1 μM MXC. This suggests that naiads should be particularly effective predators of *A. macrodactylum* larvae when both are exposed to MXC concentrations between about 0.1 and 0.4 μM . Indeed, with a transient exposure of both dragonfly naiads and *A. macrodactylum* larvae to 0.32 μM MXC, the amphibian larvae were at increased risk of predation. Furthermore, over the range of 0.01 to 0.32 μM MXC, there was a linear relationship between the logarithm of MXC concentration and increased risk of larval predation by naiads. This relationship did not hold above 0.32 μM MXC perhaps due to an MXC-induced inhibition of naiad feeding. The results of these studies indicate that relatively low concentrations of pesticides such as MXC can influence predator-prey relationships and can have significant deleterious effects on amphibian larvae beyond any direct lethal effects. Whether larvae die from direct chemical exposure or from an inability to negotiate challenges present within their local environment, such as an impaired ability to avoid predation, is inconsequential relative to the stability and/or persistence of an amphibian population. Our data underscore the importance of testing for indirect, sublethal effects of xenobiotic exposure on both individuals and populations. Analyses of the effects of xenobiotics on predator-prey interactions are prime targets for further investigation." (Authors) Address: Ingermann, R.L.; Dept Biological Sciences, University of Idaho, Moscow, ID, 83844-3051, USA

3862. Irle, A.; Irle, S.; Conze, K.J. (2002): Erstnachweis der Grünen Keiljungfer *Ophiogomphus cecilia* (Fourcroy, 1785) im Kreis Siegen-Wittgenstein. Beiträge zur Tier- und Pflanzenwelt des Kreises Siegen-Wittgenstein 7: 63-64. (in German). [Siegen, military training area, Nordrhein-Westfalen, Germany, 13. IX. 2000.] Address: Irle, A., Oberholzstr. 41, 57258 Freudenberg, Germany

3863. Jacquemin, G.; Boudot, J.-P. (2002): Les Odonates (Libellules) de la Réserve de Biosphère des Vosges du Nord: originalité du peuplement. Annales scientifiques de la Réserve de Biosphère transfrontalière des Vosges du Nord-Pfälzerwald 10: 145-158. (in French, with English and German summaries). [The paper compiles the present knowledge on the odonate fauna of the biosphere reserve in the northern Vosges, France, and outlines a brief history of odonatological sur-

veys in the region. Some species of species interest (boggy and running waters) are briefly discussed and the distribution of *Ophiogomphus cecilia* is mapped.] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandœuvre-lès-Nancy, France

3864. Jakab, T.; Muller, Z.; Devai, G.; Tothmeresz, B. (2002): Dragonfly assemblages of a shallow lake type Reservoir (Tisza-to, Hungary) and its surroundings. Acta Zool. Acad. Scient. Hungaricae 48(3): 161-171. (in English). ["The dragonfly fauna of the typical water bodies of the Reservoir Tisza-to was characterised based on a two-year study. We collected 728 imagoes, 384 larvae and 194 exuviae during the study, and there were 101 observations of imagos. We confirmed the presence of 39 species (13 Zygoptera and 26 Anisoptera). We distinguished 5 types of water bodies inside and around the Reservoir Tisza-to: leaking canals, a new inundated area of the reservoir, native water bodies inside the reservoir, in- and outflows, and River Tisza inside the reservoir. Both traditional diversity statistics and scalable diversity characterisation suggested that the most species-rich were the native water bodies, with a species-pool of 34 species; there were 30 species in the in- and outflows, while the leaking canals and the reservoir were moderately species-rich with 25 species each. The River Tisza was relatively species-poor compared to the other water bodies (12 species). Cluster analysis of the species composition revealed that the fauna of the River Tisza is clearly separated from the other water bodies. The fauna of the new inundated area, the native water bodies, and the in- and outflows were similar; these water bodies had direct connection to the reservoir. The fauna of the leaking canals was slightly different from them." (Authors)] Address: Jakab, T. Dept of Ecology and Hydrobiology, Debrecen University, P.O. Box 71, Debrecen, H-4010, Hungary. E-Mail: jakabt@kossuth-tfured.sulinet.hu

3865. Kropf, C. (2002): Dauermarken: Insekten. Die Lupe 3/2002: 8-12. (in German (The magazine is available in German, French, Italian, and English)). [The Swiss Federal Postoffice issued at May 1, 2002 stamps with insects. The one with a value of CHF 0.10 shows *Anax imperator*. In its magazine "Die Lupe - Das Briefmarkenmagazine" a contribution attributed to these stamps also contains a small note to and pictures of *A. imperator*.] Address: Die Schweizerische Post, Briefmarken und Philatelie, Ostermundigernstr. 91, CH-3030 Bern, Switzerland. E-mail: stamps@post.ch

3866. Kulkarni, P.P.; Prasad, M. (2002): [Fauna of Ujani] Insecta: Odonata. Wetland Ecosyst. Ser. zool. Surv. India 3: 91-104. (in English). [A total of 42 species (literature data and field samplings) are listed from the man-made Ujani wetland, created by damming the Bhima River in Pune district, Maharashtra, India. Locality data and brief habitat descriptions are provided.] Address: Kulkarni, P.P., Western Reg. Stn, Zool. Surv. India, Sector 29, Ravet Rd, Akurdi, Pune-411044, Maharashtra, India

3867. Łabędzki, A. (2002): The Odonata of the water reservoirs of Czorsztyn-Niedzica and Stromowce and the adjoining areas. Pieniny - Przyroda i Człowiek 7: 99-103. (in Polish, with English summary). [The water reservoirs are located within the borders of the Pieniny National Park, Poland. After flooding the reservoirs, the

odonate fauna was studied for four years. A total of 38 species is known to occur. Fourteen species are known from between 1973-76, 21 from autumn 1995 (prior filling the reservoir), and 24 two years after filling. According the author, the most interesting species are *Sympetma paedisca*, *Ophiogomphus cecilia* and *Anax ephippiger*. In May 1996, the latter was seen to copulate and to oviposit. Additional records of *Coenagrion lunulatum*, *Orthertrum albistylum*, and *Thecagaster bidentata*.] Address: Łabędzki, A., Akademia Rolnicza, Katedra Entomologii Lesnej, ull. Wojska Polskiego 71c, PL-60-625 Poznań, Poland. E-mail: andrzejlab@poczta.net.pl

3868. Martynov, V.V. (2002): Notes about some rare and Red Book insect species from reserve territories of Donetsk and Lugansk regions. *Vest. Zool.* 36(2): 68. (in Russian, with English title). [*Ukraine, Calopteryx virgo, Anax imperator*] Address: not stated

3869. Martynov V.V. (2002): New record of *Cordulegaster bidentatus* (Insecta, Odonata) in Ukraine. *Vestnik Zoologii* 36(3): 24. (in English). [Carpathian Biosphere Nature Reserve (Mala Ugo'ka), alt. 410 m, 19/21-VIII-2001, first record since the 1930s.] Address: not stated

3870. Masselot, G. (2002): La synécoparcimonie: un outil d'évaluation biologique de la qualité des eaux courantes. *Théorie et applications.* Muséum National d'Histoire Naturelle (entomologie), Paris: 417 pp, app. (in French). [For details see OAS No 4011 and 4012] Address: Masselot, G., Laboratoire d'Entomologie, Muséum National d'Histoire Naturelle, 45, rue Buffon, F-75005 Paris, France. E-mail: gm@invfinr.org

3871. Mayhew, P.J. (2002): Shifts in hexapod diversification and what Haldane could have said. *Proc. R. Soc. Lond. B* 269: 969-974. (in English). ["Data on species richness and taxon age are assembled for the extant hexapod orders (insects and their six-legged relatives, includes Odonata). Coupled with estimates of phylogenetic relatedness, and simple statistical null models, these data are used to locate where, on the hexapod tree, significant changes in the rate of cladogenesis (speciation-minus-extinction rate) have occurred. Significant differences are found between many successive pairs of sister taxa near the base of the hexapod tree, all of which are attributable to a shift in diversification rate after the origin of the Neoptera (insects with wing flexion) and before the origin of the Holometabola (insects with complete metamorphosis). No other shifts are identifiable amongst supraordinal taxa. Whilst the Coleoptera have probably diversified faster than either of their putative sister lineages, they do not stand out relative to other closely related clades. These results suggest that any Creator had a fondness for a much more inclusive clade than the Coleoptera, definitely as large as the Eumetabola (Holometabola plus bugs and their relatives), and possibly as large as the entire Neoptera. Simultaneous, hence probable causative events are discussed, of which the origin of wing flexion has been the focus of much attention." (Author)] Address: Mayhew, P.J., Department of Biology, University of York, PO Box 373, York YO10 5YW, UK. E-mail: pj19@york.ac.uk

3872. Mielewczyk, S. (2002): Entomofauna (Odonata, Heteroptera, Coleoptera) torfowiska sfagnowego jako końcowego stadium łądowienia zbiornika dystro-

ficznego na przykładzie Niknącej Łąki (Park Narodowy Gór Stołowych). *Idee ekologiczne* 15 (Ser. Szkice) Nr. 8: 73-76. (in German, with French and English summary). [The entomofauna of the silting-up stage of a dystrophic water body in a peat bog of the National Park Gory Stołowe, Poland. Only *Aeshna cyanea* and *Somatochlora alpestris* are listed. *S. alpestris* is a rare species in Poland.] Address: Mielewczyk, S., Polska Akademia Nauk, Zakład Badań Środowiska Rolniczego i Leśnego, ul. Bukowska 19, PI-60-809 Poznań, Poland

3873. Monnerat, C. (2002): Déplacements chez le genre *Sympetrum* à l'automne 1999 en Suisse occidentale (Odonata, Libellulidae). *Bull. romand d'entomologie* 20: 13-27. (in French with English summary). [*Sympetrum depressiusculum*, *S. flaveolum*, *S. meridionale*, and *S. pedemontanum* have been observed at the end of August and in September 1999 in Swiss regions where they are not known to be indigenous. The possibility to colonise new habitats by such wandering or dispersing specimens is discussed.] Address: Monnerat, C. CSCF, 14 rue des Terreaux, CH-2000 Neuchâtel, Switzerland. E-mail: christian.monnerat@cscf.unine.ch

3874. Monnerat, C. (2002): *Lestes barbarus* (Fabricius, 1798) (Odonata: Lestidae) en Suisse: indigène ou hôte irrégulier? *Bull. soc. neuchâtel. Sci. nat.* 125: 77-91. (in French, with English and German summaries). [In 1999, *L. barbarus* was observed at a remarkable number of localities. Therefore, all information from 1846 to 1999 of *L. barbarus* in Switzerland is reviewed and assessed. It is concluded that the species is to be considered as an irregular guest in that country.] Address: Monnerat, C. CSCF, 14 rue des Terreaux, CH-2000 Neuchâtel, Switzerland. E-mail: christian.monnerat@cscf.unine.ch

3875. Nishida, G.M.; Beardsley, J.M. (2002): A review of the insects and related arthropods of Midway Atoll. *Occ. Pap. Bishop Mus.* 68: 25-69. (in English). [*Pantala flavescens*] Address: Nishida, G.M., Hawaii Biol. Surv., Bishop Mus., 1525 Bemice St., Honolulu, HA 96817-2704, USA

3876. Novelo-Gutiérrez, R. (2002): Descripción de las larvas de *Perithemis intensa* Kirby, 1889 y *P. domitia* (Drury, 1773), con notas sobre otras larvas del género en México (Odonata: Anisoptera: Libellulidae). *Folia ent. mex.* 41(3): 321-327. (in Spanish, with English summary). [The species described represent the Mexican members of the genus. The larva of *P. intensa* is the most stout and has a larger number of palpal setae than any other described congener, that of *P. domitia* is the most melanistic. The lateral border of prementum is considered a new generic diagnostic feature.] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

3877. Papazian, M.; Duquef, M. (2002): Compte rendu de la mission odonatologique « Duquef 2000 » en Guyane française. *Martinia* 18(3): 113-115. (in French with english summary). [In January and February 2000, Odonata have been recorded at 12 localities in French Guyana. A total of 39 species was collected, 5 of these seem to be new records for the country.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

- 3878.** Papazian, M. (2002): La collection d'Odonates de Monsieur Louis Bigot. *Martinia* 18(3): 107-111. (in French with english summary). [Collections of L. Bigot from different localities around the globe are deposited in the Museum of Natural History, Mareille, France. The species of French Guyana, New Caledonia, Mayotte, Gold Coast, Gabon, and Madagascar are listed. The records of Mayotte are from Prof. Dr. A. Champeau; these data are united with literature data to a current list of the Odonata of the Archipel of the Comores.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France
- 3879.** Papazian, M. (2002): Les Odonates de Guyane française II. Les Libellulidae: clé des genres (Odonata, Anisoptera). *Martinia* 18(3): 117-131. (in French with english summary). [27 genera of Libellulidae from French Guyana are keyed.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France
- 3880.** Papazian, M. (2002): Odonates nouveaux pour la Guyane française II (Odonata, Coenagrionidae, Libellulidae). *Martinia* 18(3): 116. (in French with english summary). [Records of *Ischnura hastata* (Say 1839), *Orthemis regalis* Ris 1910, and *Uracis siemensii* Kirby 1897 from September and November 2000, are added as new to the fauna of French Guyana.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France
- 3881.** Payne, J.C.; Dunley, J.E. (2002): Use of an elemental marker, rubidium, to study dispersal of aquatic insects. *Journal of the North American Benthological Society* 21(4): 715-727. (in English). ["We describe the first use of the element rubidium (Rb) to mark aquatic insects for the study of dispersal. It has been difficult to pursue research that integrates juvenile and adult life stages of aquatic insects. Most species of aquatic insects suffer high mortality during the larval phase; furthermore, larvae shed their entire exoskeletons as they emerge. Adults disperse by flying soon after emergence when they may still be fragile and difficult to handle. We demonstrate that it is possible in both controlled and natural settings to batch-mark very large numbers of aquatic dragonfly (Odonata) larvae by adding Rb as RbCl to the water in which they live. We found that the in-body concentration of Rb in odonate larvae rose to several hundred times the concentration of Rb in the water, and the high concentrations persisted in adults. Less than 1 part per million (by mass) of Rb in water was sufficient to mark odonate larvae. Rb is often used in research on dispersal of terrestrial insects, particularly crop pests, because it is relatively inexpensive and nontoxic at low concentrations. Rb is known to cause developmental problems in insects (probably through competitive binding with K) at much higher concentrations than we used, but we did not detect any evidence of toxicity at the levels used. The cost of Rb and of specimen analysis by atomic absorption spectrophotometry is moderate, compared to other marking techniques. We believe the method is an improvement over other marking techniques, and will facilitate the study of dispersal of aquatic insects, in cases where dispersing adults can be recaptured." (Authors)] *Ischnura cervula*, *Enallagma boreale*, *E. carunculatum*, *Lestes congener*, *Erythemis collocata*, *Pachydiplax longipennis*, *Sympetrum costiferum*, *S. corruptum*, *Tramea lacerata*, *Rhionaeschna californica*, *Aeshna interrupta*, *R. multicolor*, *Anax junius*] Address: Payne, J.C., Dept of Zoology, University of Washington, Seattle, WA, 98195-1800, USA. E-Mail: jcpayne@u.washington.edu
- 3882.** Petrulevicius, J.F. Nel, A. (2002): New Palaeomacromiid dragonflies from the upper Paleocene of Argentina. *Palaeontology* 45(4): 751-758. (in English). ["A new genus of palaeomacromiid dragonflies, *Curviarculia*, based on *Curviarculia delicata* sp. nov. and *Curviarculia lamasi* sp. nov., is erected from the upper Paleocene Maiz Gordo Formation of north-western Argentina. Phylogenetic relationships within Palaeomacromiidae are discussed, leading to a new family diagnosis." (Authors)] Address: Nel, A., Laboratoire d'Entomologie, Museum National d'Histoire Naturelle, 45, Rue Buffon, F-75005, Paris, France. E-Mail: anel@mnhn.fr
- 3883.** Prokop, J.; Nel, A. (2002): New Tertiary dragonflies from Lower Oligocene of the Ceske stredohori Mts and Lower Miocene of the Most Basin in the Czech Republic (Odonata: Anisoptera). *Acta Societatis Zoologicae Bohemicae* 66(2): 141-150. (in English). ["Two new representatives of the clade Aeshnoptera are described from the Lower Oligocene and Lower Miocene of northern Bohemia (Czech Republic), i. e. *Kvacekia infusca* gen. n. et sp. n. (Aeshnidae) and *Gomphaeschna miocenica* sp. n. (Gomphaeschnidae). *Kvacekia* gen. n. seems to be closely related to the Cenozoic genus *Oligaeschna* Piton et Theobald, 1939 and the recent genus *Oplonaeschna* Selys, 1883. *Gomphaeschna miocenica* sp. n. wing venation has particular wing coloration and distinctly different characters from all previously described species of the genus. A holarctic distribution in fossil history is proposed for both *Oplonaeschninae* and *Gomphaeschninae*." (Authors)] Address: Prokop, J.; Department of Zoology, Charles University, Vinicna 7, CZ-128 44, Praha, 2, Czech Republic; E-Mail: jprokop@natur.cuni.cz
- 3884.** Reeves, D.M. (2002): Book review: Theischinger, G. (2000): Preliminary keys for the identification of larvae of the Australian Gomphides (Odonata). Cooperative Research Centre for Freshwater Ecology Identification Guide No. 28, I-IV, 48pp. *Austrolestes* 6: 3-4. (in English). [Review if the book abstracted as OAS 2216.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au
- 3885.** Reeves, D.M. (2002): Lucid key review: Dragonflies of the World - Interactive identification to Subfamilies. Jill Silsby and John Trueman, CSIRO Publishing, Collingwood.. *Austrolestes* 6: 4. (in English). [For a review of the book compare OAS 2187.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au
- 3886.** Reimchen, T.E.; Nosil, P. (2002): Temporal variation in divergent selection on spine number in threespine stickleback. *Evolution* 56(12): 2472-2483. (in English). ["Short-term temporal cycles in ecological pressures, such as shifts in predation regime, are widespread in nature yet estimates of temporal variation in the direction and intensity of natural selection are few. Previous work on threespine stickleback (*Gasterosteus aculeatus*) has revealed that dorsal and pelvic spines are a defense against gape-limited predators but may be detrimental against grappling insect predators. In this study, we examined a 15-year database from an endemic population of threespine stickleback to look for evidence of temporal shifts in exposure to these diver-

gent predation regimes and correlated shifts in selection on spine number. For juveniles, we detected selection for increased spine number during winter when gape-limited avian piscivores were most common but selection for decreased spine number during summer when odonate predation was more common. For subadults and adults, which are taken primarily by avian piscivores, we predicted selection should generally be for increased spine number in all seasons. Among 59 comparisons, four selection differentials were significant (Bonferroni corrected) and in the predicted direction. However, there was also substantial variability in remaining differentials, including two examples with strong selection for spine reduction. These reversals were associated with increased tendency of the fish to shift to a benthic niche, as determined from examination of stomach contents. These dietary data suggest that increased encounter rates with odonate predation select for spine reduction. Strong selection on spine number was followed by changes in mean spine number during subsequent years and a standard quantitative genetic formula revealed that spine number has a heritable component. Our results provide evidence of rapid morphological responses to selection from predators and suggest that temporal variation in selection may help maintain variation within populations. Furthermore, our findings indicate that variable selection can be predicted if the agents of selection are known." (Authors)] Address: Reimchen, T.E., Department of Biology, University of Victoria, P.O. Box 3020, Victoria, BC, V8W 3N5, Canada. E-Mail: reimchen@uvic.ca, pnosila@sfu.ca

3887. Relyea, R.A. (2002): The many faces of predation: How induction, selection, and thinning combine to alter prey phenotypes. *Ecology* 83(7): 1953-1964. (in English). ["Populations in nature face a number of factors that can alter their traits and subsequent performance. Predation is one factor that can have widespread effects on the mean trait value in a prey population because predators can impact prey traits through a number of processes. Predators can directly induce prey phenotypes through visual and chemical cues, predators can indirectly alter prey phenotypes by thinning the prey population (thereby reducing competition), and predators can cause selection on prey phenotypes through nonrandom killing. Ecologists are beginning to understand each of these three processes in isolation, but these processes act on prey phenotypes simultaneously, and we lack information on the relative importance of these processes in determining the final phenotype of prey. I used a system of gray treefrog tadpoles (*Hyla versicolor*) and dragonfly predators (*Anax longipes*) to determine the separate and combined impacts of induction, thinning, and selection on the behavior, morphology, and growth of tadpoles reared in aquatic mesocosms. Using combinations of hand thinning, cues emitted from caged predators, and lethal predators, I demonstrated that the impact of lethal predators on growth was mediated primarily through thinning, the impact on morphology was primarily through induction, and the impact on behavior was affected similarly through thinning and induction. Surprisingly, while we know from numerous studies that the dragonflies kill tadpoles nonrandomly, selection did not have a significant impact on the final phenotypes of the tadpoles. This work appears to be the first study that identifies the relative magnitudes of the three predatory processes on a suite of prey phenotypes. The three processes can have opposing or supporting effects, the relative magni-

tudes of which likely differ among systems, illustrating why we often observe contradictory results when we examine the impact of lethal predators on prey phenotypes. Thus, it is important that we identify the mechanisms underlying the outcomes of predation, rather than simply observing the outcomes and then inferring which processes are responsible." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

3888. Ribeiro, R.P.; Hayashi, C.; Martins, E.N. (2002): Aquatic systems evaluation under controlled conditions. *Acta Scientiarum Universidade Estadual de Maringa* 24(4): 987-996. (in Portuguese with english summary). ["The present experiment was conducted to evaluate three different diets for *Leporinus macrocephalus* post-larvae (Garavello & Britski) (Characiformes, Anostomidae) in controlled aquatic systems. Data were subjected to path coefficient analysis, consisting of multiple regression expansion, when complex interrelations are involved. The selected dependent variables were gut repletion degree (GR), phytoplanktonic organisms biomass (FITV) and spineless organisms biomass, plus odonata egg (ZOOV). The results allow the conclusion that the methodology was efficient to evaluate the diets inside the complex aquatic system, and the variables' selection, as well as the proper data collection, show relevance in the results quality." (Authors)] Address: Hayashi, C., Departamento de Zootecnia, Universidade Estadual de Maringa, Av. Colombo, 5790, 87020-900, Maringa, PR, Brazil. E-Mail: rpribeiro@uem.br

3889. Rohr, J.R.; Madison, M. (2002): *Notophthalmus viridescens* (eastern red-spotted newt). Predation. *Herpetological Review* 33(2): 122-123. (in English). [No significant predation on adult *N. viridescens* has been documented in the wild. Adult newts were placed in a minnow trap overnight; and the loss of specimens or of limbs and tails are discussed. Fishes and larval Odonata were ruled out as predators, while snapping turtles (*Chelydra serpentina*) turned out to be most probably the newts predators.] Address: Rohr, J.R., Department of Biological Sciences, Binghamton University, Binghamton, NY, 13902, USA. E-Mail: jrohr@uky.edu

3890. Schulz, R.; Thiere, G.; Dabrowski, J.M. (2002): A combined microcosm and field approach to evaluate the aquatic toxicity of azinphosmethyl to stream communities. *Environ. Toxicol. Chem.* 21(10): 2172-2178. (in English). ["The potential effects of this organophosphate insecticide in a combined microcosm and field approach (Lourens R., S Africa) are evaluated. The 2 strongest treatments (concentrations 19.2 and 4.9 µg/l) resulted in a significantly reduced invertebrate density, but *Aeshna* sp. remained unaffected."] Address: Schulz, R., Zool. Inst., Techn. Univ., Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: R.Schulz@tu-bs.de

3891. Steglich, R.; Gentz, P.-L. (2002): *Libellenatlas Landeshauptstadt Magdeburg*. Umweltamt Magdeburg: 112 pp. (in German). [48 odonate species are presented in a monographic way: picture of each species, distribution map, note on typical characters, habitat, biological notes, threat.] Address: Umweltamt der Stadt Magdeburg, Mittelstr. 66, D-39114 Magdeburg, Germany. E-Mail: umweltamt@magdeburg.de

3892. Switzer, P.V. (2002): Individual variation in the duration of territory occupation by males of the dragonfly *Perithemis tenera* (Odonata: Libellulidae). *Annals of the Entomological Society of America* 95(5): 628-636. (in English). ["In the dragonfly *Perithemis tenera* Say, males defend territories around oviposition sites and defense of a site is critical for reproductive success. This study first demonstrated that individual males varied consistently in how long they defended a particular territory within a day (their "tenure") and in the quality of the sites they defended. I then investigated a number of factors that may have affected territory tenure and may have led to the observed variation among males. Territory occupations that ended "voluntarily" were significantly longer than those that ended because the male was evicted from his territory. For voluntary desertions, tenure duration was unrelated to age, wing length, the amount of time the male fought that day, or site quality. However, tenure durations were longer for males that arrived earlier in the day than for those that arrived later, and consistent differences existed among males in arrival time. Furthermore, tenure durations were longer when males had successfully mated than when they did not mate; available evidence suggests that this pattern may be because mating success causes them to stay longer. Thus, the results suggest that the problem of explaining tenure duration in *P. tenera* can be largely broken down into identifying factors that affect a male's likelihood of being evicted and his relative arrival time. Overall, males that defended better sites and males that had longer wings were territorial for fewer total days. Of these two factors, site quality seems to have a larger effect than wing length on the number of days, suggesting that males may incur an increased cost by defending sites that are more attractive to other males." (Author)] Address: Switzer, P.V., Department of Biological Sciences, Eastern Illinois University, Charleston, IL, 61920, USA; E-Mail: cfpvs@eiu.edu USA

3893. Thierry, C.; Dommanget, J.-L. (2002): Inventaire cartographique des odonates de France (Programme INVOD). Bilan 1982-2000. *Martinia* 18, Suppl. 1: 68 pp. (in French with English summary). [App. 800 persons contributed 130000 records to the French odonate mapping scheme. On a regional scale (Ile-de-France, Champagne-Ardenne, Picardie, Centre, Haute-Normandie, Basse-Normandie, Bourgogne, Nord-Pas-de-Calais, Lorraine, Alsace, Franche-Comté, Pays-de-Loire, Bretagne, Poitou-Charentes, Aquitaine, Midi-Pyrénées, Limousin, Rhône-Alpes, Auvergne, Languedoc-Roussillon, Provence-Alpes-Côte-d'Azur, and Corse) some statistical analyses of the records from 1985 - 2000 are presented.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

3894. Thompson, J.E.; Ankney, C.D. (2002): Role of food in territoriality and egg production of Buffleheads (*Bucephala albeola*) and Barrow's Goldeneyes (*Bucephala islandica*). *Auk* 119(4): 1075-1090. (in English). [oas 14 "Buffleheads (*Bucephala albeola*) and the North American population of Barrow's Goldeneyes (*Bucephala islandica*) typically breed in boreal and montane regions where food is less available relative to most habitats used by temperate nesting ducks. We investigated diets and digestive organ morphology of sympatrically breeding female Buffleheads and Barrow's Goldeneyes in central British Columbia. Because those congeners exhibit interspecific aggression in defense of breeding territories, we predicted that competition for

food could be a principal factor in evolution of that behavior. We also hypothesized that breeding Buffleheads would show greater variation in digestive organ morphology than Barrow's Goldeneyes because of their smaller body size and consequently greater reliance on their diet to meet nutritional requirements for egg production. Both species fed predominantly on aquatic insects during all reproductive periods, particularly larvae of damselflies (Zygoptera), midges (Chironomidae), and phantom midges (Chaoborinae). Plant foods, primarily seeds of submergent and emergent vegetation, generally represented <15% of diets in both species. Diets of breeding female Buffleheads and Barrow's Goldeneyes were similar throughout reproduction, hence competition for food has likely been a factor in evolution of territorial aggression between those species. The digestive tract morphology of Buffleheads was more variable than that of Barrow's Goldeneyes suggesting that the former relied more on dietary nutrients during reproduction than did their larger congener." (Authors)] Address: Thompson, J.E., Ducks Unlimited Canada, 10720-178 Street, No. 200, Edmonton, AB, T5S 1J3, Canada. E-Mail: jthompson@ducks.ca

3895. Tsunoda, W. (2002): External morphology of the giant water bugs, *Diplonychus japonicus* VUILLEFROY and *D. major* ESAKI (Hemiptera: Belostomatidae), in Fukushima and Kanagawa Prefecture. *Science Report of the Yokosuka City Museum* (49): 23-34. (in English). ["*Diplonychus japonicus* and *D. major* are two morphologically closely related species. It is difficult to distinguish them from each other simply by size and body color. Therefore, I carefully compared these two species with regard to external morphology in the hope of identifying sufficient morphological differences to separate the two. Generally *D. major* is bigger than *D. japonicus*, but some individuals of *D. major* are smaller than the bigger ones of *D. japonicus*. A further difference concerns proboscis length, which in *D. japonicus* is longer than in *D. major*. In the field, *D. major* feeds on dragonfly nymphs and larval amphibia, while *D. japonicus* feeds mainly on snails such as Physidae. Therefore, the different proboscis lengths appear to represent morphological adaptations to their different feeding habits." (Author)] Address: Tsunoda, W., Yokosuka City Museum, Yokosuka, 238-0016, Japan

3896. Turgeon, J.; McPeck, M.A. (2002): Phylogeographic analysis of a recent radiation of *Enallagma* damselflies (Odonata: Coenagrionidae). *Molecular Ecology* 11(10): 1989-2001. (in English). ["A phylogenetic hypothesis revealed two recent radiations among species of *Enallagma* damselflies, and extensive ecological work suggests that both adaptive and nonadaptive processes are involved in these radiations. We analysed the geographical pattern of genetic variability at 868 bp of mitochondrial DNA (mtDNA) among 283 individuals of 5 species displaying little ecological differentiation to identify the ancestral lineage, support their independent evolutionary trajectories and identify historical events and the underlying mechanism for one of these radiations. Nested clade analysis results clearly support a past event of range fragmentation in *E. hageni*. These Atlantic and Continental *hageni* races experienced distinct dispersal histories and still maintain nearly nonoverlapping ranges All four other species derive from the Continental *hageni*. Whereas three species endemic to the Atlantic coastal plain show little genetic variation, *E. ebrium* shared several haplotypes with the Con-

tinental hageni. Contrasting levels of genetic differentiation between *E. hageni* and *E. ebrium* in geographical areas associated with distinct events of *E. hageni*'s recent history support the recent origin of this species. Altogether, our results are compatible with a process of radiation via divergence in mate recognition systems within the Continental hageni race following secondary contacts between putative refugial races." (Authors)] Address: Turgeon, Julie.; Departement debiologie, Universite Laval, Quebec City, Quebec, G1K 794 Canada. E-Mail: julie.turgeon@bio.ulaval.ca

3897. Veenstra-Quah, A. (2002): Dragonfly nymphs with Dipterian 'Hitch-hikers': An example of phoresy found in Dandenong Creek. *Victorian Naturalist* (South Yarra) 119(5): 229-231. (in English). ["A phoretic association was observed between larvae of *Rheotanytarsus juliae* (Diptera: Chironomidae) and larvae of *Austroaeschna unicornis unicornis* (Odonata: Aeshnidae) collected from one site near the headwaters of Dandenong Creek, Victoria." (Author)] Address: Veenstra-Quah, Anneke, Faculty of Science and Technology, Deakin University, 221 Burwood Highway, Burwood Campus, Burwood, Victoria, 3125, Australia. E-Mail: vquah@deakin.edu.au.

3898. Verdcourt, B. (2002): Additions to the Wild Fauna and Flora of the Royal Botanic Gardens, Kew. *Kew Bulletin* 57(4): 1007-1022. (in English). [UK; 2/06/2002, *Brachytron pratense*] Address: Verdcourt, B., Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK

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3899. Amweg, E.L.; Stuart, D.L.; Weston, D.P. (2003): Comparative bioavailability of selenium to aquatic organisms after biological treatment of agricultural drainage water. *Aquatic Toxicology* 63(1): 13-25. (in English). ["Selenium (Se) is naturally abundant in the soils of the western San Joaquin Valley, California, USA. Intense agricultural activity in this region requires irrigation which leaches Se into surface waters draining to the San Joaquin River. Se water contamination and subsequent accumulation in wildlife is a serious problem in the Central Valley of California, and the subject of increasingly intensive regulatory action. Algal-bacterial selenium reduction (ABSR) is a potential new treatment approach to reduce Se in agricultural drainage, and an ABSR demonstration facility was examined with respect to its Se removal efficiency and effect on Se bioavailability and bioaccumulation. Water samples were taken to study treatment effects on Se speciation. Invertebrate tissue Se concentrations in the ABSR ponds were monitored for 2 years. Laboratory-based algal bioaccumulation tests and in situ microcosms with a variety of invertebrates were also used to address differences in Se bioavailability before and after ABSR treatment. The ABSR system removed about 80% of the total influent Se; however, microbial and algal activity produced selenite and organic Se, the combined concentration of which increased 8-fold during treatment. As a result of the greater bioavailability of selenite and organic Se, relative to the selenate of the influent, treatment contributed to greater Se concentrations in effluent-exposed organisms. ABSR-treated water

produced Se concentrations in biota 2-4 times greater than organisms exposed to untreated water. The bioavailability of Se in the treated water was 2-10 times greater than Se in the influent. The shift to more bioavailable Se forms due to biological treatment is inherent in system design, and makes it difficult to weigh the ecological benefits of a reduction in total Se loadings from a regional perspective against the greater toxicological risk to biota in the vicinity of the effluent." (Authors) Ischnura sp.] Address: Amweg, E.L., Dept of Integrative Biology, University of California, 3060 Valley Life Sciences Bldg., Berkeley, CA, 94720-3160, USA. E-Mail: eamweg@socrates.berkeley.edu

3900. Anlauf, A.; Kleinwachter, M.; Eggers, T.O. (2003): Modification of groynes and guide dykes at Elbe riverbanks: Impact of construction on the habitats of animals. Oral presentation at the Conference: Lowland River Rehabilitation, NCR & RIZA (Wageningen, September/October 2003) [Modifizierung von Buhnen und Leitwerken im Uferbereich der Elbe: Einfluss auf die Habitatbildung für Tiere] & Poster: 1 p. (in English). ["The river Elbe in Germany between the Czech Republic and the weir in Geesthacht has a length of 685 km and is characterized by about 6900 groynes and 300 km of stone-fixed embankments and dykes. The development of the embankment is strongly influenced by these constructions. Nevertheless many banks appear to have natural conditions. In the last years some special modifications of groynes and guide dykes were built in the field at different sections of the River Elbe. The aim of the investigations on different types of groynes, i.e. with an angle shape or with gaps in the groyne body is to change the hydromorphological regime in the groyne fields and increase structural dynamics. Similar aims are described from the banks behind guide dykes, which are constructed with gaps or tube outlets. The modifications showed direct influences on the appearance of species. The succession of different habitat types for fish, macrozoobenthos or carabid beetles in modified constructions is compared to conventionally regulated riverbanks. The results lead us to recommendations for the rehabilitation of riverbanks without abandonment of the constructions necessary for navigation." (Authors). The distribution pattern of *Stylurus flavipes* within a groyne field is presented. This species lives only in sandy-silty substrate within the groyne field; abundances at sample site are demonstrated.] Address: Eggers, T., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: t.eggers@tu-bs.de

3901. Arai, Y. (2003): A Countrywide Survey of Red Dragonflies. Introduction, aim of survey, methods, and results. In: Arai, Y. (Ed): *A Countrywide Survey of Red Dragonflies*. Musashino Satoyama Research Group, Institute of Agriculture and Natural environments. 47 pp. Translation: Ishizawa, N., Tokorozawa City, Japan: 3-12. (in Japanese). [Japanese are said to have a special relationship to (red) dragonflies. To get detailed information on and using this relationship, a questionnaire was developed and circled to more than 3000 persons. The focus was set on *Sympetrum frequens* and *Pantala flavescens*. Countrywide operating new media and the internet were used to inform and to motivate people. App. 300 questionnaires were returned, and reasons responsible for this quite disappointing result are discussed. Most interesting data are of phenological character which give a good impression on emergence,

emergence habitat, first records, and oviposition in different regions in Japan.] Address: Arai, Y., 1233-2, Oaza Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-12, Japan

3902. Arai, Y. (2003): Problems on *Pantala flavescens* and *Sympetrum frequens*. In: Arai, Y. (Ed): A Country-wide Survey of Red Dragonflies. Musashino Satoyama Research Group, Institute of Agriculture and Natural environments. 47 pp. Translation: Ishizawa, N., Tokorozawa City, Japan: 13-18. (in Japanese). [Browsing published information on *P. flavescens* and *S. frequens*, result in the ever same answers on e.g. distribution of the species in Japan, sensitive to cold, overwintering, time of larval development, dispersal, or migration (*P. flavescens*) and pre-reproductive habitats and behaviour and the reasons for decreasing populations of *S. frequens*. The author analyzes these information against the background of empirical based knowledge, and rises questions and methods to give correct answers. There are many questions which in part easily could be solved if odonatologists or universities would cooperate and participate in an action plan to survey both species.] Address: Arai, Y., 1233-2, Oaza Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-12, Japan

3903. Arnaboldi, F. (2003): Note sur les Odonates de Finlande. *Martinia* 19(2): 71-80. (in French with English summary). [In June and July 2002, the author recorded 35 odonate species in Finland, including *Nehalennia speciosa*, *Coenagrion puella*, *Ophiogomphus cecilia*, *Orthetrum coerulescens*, *Leucorrhinia pectoralis*, and *L. albifrons*. These species are briefly commented and their records are mapped. All records are listed locality-wise (scale: National parks) in a table.] Address: Arnaboldi, F., ONF Cellule d'Appui Ecologique F-78125 Poigny-la-Forêt, France. E-mail: fred.arnaboldi@wanadoo.fr

3904. Arnaboldi, F. (2003): Observation récente de *Nehalennia speciosa* (Charpentier, 1840) en Finlande - note sur son habitat. *Martinia* 19(3): 109-118. (in French with English summary). [Lacking records of *N. speciosa* for 21 years, the species was rediscovered in Finland at 16.VII.2002, 12 km north-east from its last known locality in the nature reserve Näsebyfladan. The habitat - helophytes in brackish water! - is described in detail.] Address: Arnaboldi, F., ONF Cellule d'Appui Ecologique F-78125 Poigny-la-Forêt, France. E-mail: fred.arnaboldi@wanadoo.fr

3905. Aziz, K.; Bowles, D.E. (2003): Predation of *Hagenius brevistylus* Selys on *Libellula luctuosa* Burmeister. *Argia* 15(3): 7-8. (in English). [16. July 2003, Spring Lake, San Marcos River, Hays County, Texas, USA; detailed description of devouring *L. luctuosa* by *H. brevistylus*.] Address: Aziz, K., Texas Parks & Wildlife Department, River Studies Program, P.O.Box 1685, San Marcos, Texas 78667, USA

3906. Bass, D. (2003): A comparison of freshwater macroinvertebrate communities on small Caribbean islands. *Bioscience* 53(11): 1094-1100. (in English). ["An ongoing survey of macroinvertebrates inhabiting the relatively unstudied freshwater habitats on 14 small Caribbean islands was initiated in 1991. These collections have yielded almost 200 species; when these species are combined with collections previously made by other researchers, a total of at least 328 freshwater macroinvertebrates are now known from these islands. The dominant taxa on the islands include several species of

snails, shrimps, mayflies, dragonflies, damselflies, beetles, and other insects. Many of these species have fairly widespread distributions across the islands. Most stream species are associated with leaf packs, and most pond species are associated with aquatic macrophytes. As is typical of tropical island systems, the macroinvertebrate faunas of these islands are sparse, most likely because of their oceanic origin, their small size, and the frequent disturbances to their freshwater environments." (Author) The islands studied in this investigation include Barbados, Tobago, Grenada, St. Lucia, Dominica, Montserrat, Nevis, St. Kitts, Saba, Antigua, Cayman Brae, Little Cayman, Grand Cayman, and Guanaja. A total of 39 odonate species represented at the listed islands is compiled; the species are not specified.] Address: Bass, D., Department of Biology, University of Central Oklahoma, Edmond, OK, 73034, USA. E-Mail: dbass@ucok.edu

3907. Blair, N.; Loose, J.L.; Burne, M.R. (2003): A field guide to the dragonflies and damselflies of Massachusetts. Massachusetts Division of Fisheries & Wildlife, Natural Species & Endangered Species Program: 197 pp. (in English). [The book begins with a key to odonate families, and continues with an introduction into odonate life history and biology, advice how to observe Odonata, and some information on conservation issues. The focus of the book was set to the identification of the Odonata, but without binomical identification keys. Each of the 165 species described includes color photos of males, and, in many cases, females. Additional drawings illustrate *Lestes* terminal appendages, abdomen tips of *Enallagma*, *Ischnura*, and *Argia*, *Aeshna* thoracic stripes in color, *Gomphus* terminal appendages, and *Somatochlora* terminal appendages. These drawings are very well done and may be the single most useful part of the guide. Each species is briefly described, incl. its range and status in North America, habitat, phenology, and some useful notes in finding the species. Larval sketches are included for each family. This is an excellent book and will be the most important guide to all of New England and many additional northeastern states in USA. The guide has a sturdy spiral binding, enabling it to lie flat This is an additional, welcome contribution to the library of North American books on Odonata. (Martin Schorr)] Address: Order from Massachusetts Division of Fisheries & Wildlife, Natural Species & Endangered Species Program, Route 135, Westborough MA 01581. \$20 postpaid. (508 - 792 - 7270 ext 200)

3908. Bowler, J. (2003): The Odonata of Aride Island Nature Reserve, Seychelles: patterns in seasonal abundance and breeding activity. *Opusc. zool. flumin.* 210: 1-22. (in English). ["The abundance and breeding activity were recorded over the course of a year. Observational data were collected on repeated weekly transects, conducted at 3 times of day, through both wet and dry sections of the low-lying coastal plateau from Feb. 1998 to Jan. 1999. A total of 11 species was recorded, including *Ceriagrion glabrum* which accounted for almost half of all sightings. Numbers were highest in the period Feb.-Apr. at the end of the wetter NW monsoon and declined thereafter during drier conditions, although species diversity remained similar throughout the year. Odonata became more closely tied to remaining patches of open water during the dry season. More of them were encountered at midday than on the morning and evening transects, although individual

spp. exhibited a range of diurnal activity patterns. Egg-laying was recorded for 7 species." (Author)] Address: Bowler, J., Shepherd's Cottage, Heylipol, Isle of Tiree, Argyll, PA77 6TY, UK

3909. Brook, G. (2003): Identification of the exuvia of the Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier). *J. Br. Dragonfly Society* 19(1/2): 40-43. (in English). [The paper provides useful characters to separate *E. viridulum* exuviae from exuviae of *E. najas* and *Cercion lindenii*.] Address: Brook, G., 12 Burgess Hall Drive, Leeds, Maidstone, Kent ME 17 1SH, UK

3910. Brook, J.; Brook, G. (2003): The Willow Emerald Damselfly *Chalcolestes viridis* (Vander Linden) in Kent: a case of mistaken identity. *J. Br. Dragonfly Society* 19(1/2): 51-54. (in English). [Re-examination of a collection of lestad exuviae from 29th June, 1992, Cliffe marshes, Kent, UK, proved that a specimen identified as *Lestes dryas* was *Chalcolestes viridis*. This seems to be the first record and prove of reproduction of this species on the British mainland.] Address: Brook, J. and G., 12 Burgess Hall Drive, Leeds, Maidstone, Kent ME17 1SH, UK

3911. Buchwald, R. (2003): *Cordulegaster bidentata* (Gestreifte Quelljungfer) im südlichen Feldberg-Gebiet (Schwarzwald): höchstgelegenes Vorkommen in Deutschland außerhalb der Alpen. *mercuriale* 3: 28-30. (in German). [Between 1994 and 2003, alkaline fens of the southern Schwarzwald-region in Baden-Württemberg, Germany have been extensively surveyed for vegetation and the odonate fauna. Only few habitats are used by *Thecagaster bidentata*. These habitats are described in detail.] Address: Buchwald, R., INU, Hochschule Vechta, Driverstr. 22, D-49377 Vechta, Germany. E-mail: rainer.buchwald@uni-vechta.de

3912. Buczyński, P. (2003): Dragonflies (Odonata) of an artillery range in Nowa Deba (Sandomierska Basin). *Nowy Pam. Fizjogr.* 2(1-2): 15-29. (in Polish with English summary). [A compilation of papers and surveys in 1998 and 1999 resulted in 57 odonate species. This military training area is of considerable value to conserve the Polish dragonfly fauna. The list of species include *Sympecma paedisca*, *Coenagrion armatum*, *Erythromma viridulum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Aeshna affinis*, *A. viridis*, *Orthetrum albistylum*, *Sympetrum depressiusculum*, *S. meridionale*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. pectoralis*.] Address: Buczyński, P., Dept of Zool., Mariae Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3913. Buczyński, P. (2003): Dragonflies (Odonata) of the Landscape Park of the Iława Lake District. *Rocz. nauk. Pol. Tow. Ochr. Przyr. "Salamandra"* 7: 65-85. (in Polish with English summary). [In the years 1998-2002 the dragonflies of the Landscape Park of the Iława Lake District were studied (N Poland, 53°37'-53°51' N, 19°22'-19°41' E). This park (25279 ha) with a diverse, postglacial relief is mainly covered with forests (62%) and lakes (19%). Small running waters, located in forests, and peatbogs are numerous, small waterbodies and ponds (situated on meadows) are less numerous. The 47 dragonfly species collected represent approximately 65% of the national odonate fauna (Mielewczyk 1990, 1997) and 77% of fauna of the lake districts of NE Poland. The forest character and geographical position are the natural factors limiting the dragonfly species

richness of this area. These are also the reasons why Mediterranean and/or open biotope species do not find it suitable for development. Of special interest are: *Sympecma fusca*, *S. paedisca*, *Coenagrion lunulatum*, *Erythromma viridulum*, *Aeshna juncea*, *A. subarctica elizabethae*, *A. viridis*, *Somatochlora arctica*, *Orthetrum coerulescens*, *Sympetrum pedemontanum*, *Leucorrhinia albifrons*, and *L. pectoralis*.] Address: Buczyński, P., Dept of Zool., Mariae Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3914. Buczyński, P.; Czachorowski, S.; Serafin, E.; Szczepański, W. (2003): Is a nature reserve the best form to protect invertebrates? - On the example of dragonflies and caddisflies (Insecta: Odonata, Trichoptera) of the Lake Kośno Reserve. *Acta Biol. Univ. Daugavp.* 3(2): 125-132. (in English). [Poland; in July 2001 a total of 31 odonate species was collected within (n= 14) and outside the borders (n= 30) of the nature reserve.] Address: Buczyński, P., Dept of Zool., Mariae Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3915. Buczyński, P.; Czachorowski, S.; Moroz, M.; Stryjecki, R. (2003): Odonata, Trichoptera, Coleoptera, and Hydrachnidia of springs in Kazimierski Landscape Park (Eastern Poland) and factors affecting the characters of these ecosystems. *Acta Hydrobiologica, Cracow Suppl.* 5: 13-29. (in English). [Selected arthropod taxa were studied in 8 springs of the Kazimierski Landscape Park (SE Poland). The springs are characterized by morphology, hydrology, water chemistry, and fauna. The list of species includes 10 Odonata recorded as imagos. None of these odonate species is a typical spring species.] Address: Buczyński, P., Dept of Zool., Mariae Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3916. Buczyński, P. (2003): Recenzje: Heidemann, H. & R. Seidenbusch (2002): *Die Libellenlarven Deutschlands*. ISBN 3-911374-07-6. *Wiad. entomol.* 22: 185-186. (in Polish). [Review of the book on the odonate larvae of Germany which represents the current status of knowledge.] Address: Buczyński, P., Dept of Zool., Mariae Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3917. Buczyński, P. (2003): Recenzje: Schorr, M. & M. Lindeboom (Red.): *CD-ROM Dragonfly Research 1*. 2003. ISSN 1438-034X. *Wiad. entomol.* 22: 168. (in Polish). [Review of the first issue of *Dragonfly Research*.] Address: Buczyński, P., Dept of Zool., Mariae Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

3918. Bueno, A.A.P.; Bond-Buckup, G.; Ferreira, B.D. (2003): Estrutura da comunidade de invertebrados bentônicos em dois cursos d'água do Rio Grande do Sul, Brasil. *Revista Brasileira de Zoologia* 20(1): 115-125. (in Portuguese, with English summary). [Community structure of benthic invertebrates in two watercourses in Rio Grande do Sul State, southern Brazil. The macrobenthic communities from two watercourses in Rio Grande do Sul State, Brasil, were sampled with a Surber sampler, monthly, from September 1999 to August 2000, in one of the creeks forming Tainhas River (29°15'30,2"S, 50°B'12,5"W), around São Francisco de

Paula city and in Mineiro Creek (29°30'0,2"S, 50°46'50"W), around Taquara city. "At each sampling point, physical and chemical variables of the waters were registered. [...]. Dissolved oxygen, pH and stream speed were very similar for both environments, whilst conductivity had extreme values. Insects, crustaceans, acari, and molluscs dominated in the samples. Abundance, richness and diversity indexes in Tainhas subsidiary had relatively higher average values than Mineiro Creek. Similarity matrix groupings between sampling units indicate three groups. Our research revealed important characteristics of the ecology and distribution of benthic invertebrates, information that can subsidise future environmental monitoring in the region of São Francisco de Paula and Taquara." (Authors) In table 2 absolute and relative frequencies of the taxa, including "Coenagrionidae" are presented.] Address: Bueno, Alessandra, Departamento de Zoologia, Instituto de Biodiversidade, PPC Biologia Animal, Universidade Federal do Rio Grande do Sul, Ave. Bento Gonçalves 9500, prédio 43435, 91 SOT-970 Porto Alegre, Rio Grande do Sul, Brasil. E-mail: alebueno@ufrgs.br, ginabb@ufrgs.br

3919. Büttger, H.; Finch, O.-D. (2003): Libellenzöosen an Krebscherengraben der südlichen Wesermarsch unter besonderer Berücksichtigung der FFH-Art "Aeshna viridis" EVERSMANN, 1936 (Insecta: Odonata). Oldenburger Jahrbuch 103: 317-331. (in German with English summary). ["In the southern part of the Wesermarsch district in Lower Saxony, Germany the coenoses of dragonflies of 21 ditches were examined during the summer 2001. Several structural parameters of the ditches and the vitality of *Stratiotes aloides* were measured. A total of 17 dragonfly species was recorded, two of which occur only in the vicinity of the examined ditches. *Coenagrion pulchellum*, red listed as "endangered" in Germany, was the dominant species. *Brachytron pratense*, also "endangered", was present with a few individuals. *A. viridis* is "threatened of extinction" in Lower Saxony as well as nation-wide. This species was recorded at six ditches with a maximum of four individuals. At single ditches six to thirteen species were established. *A. viridis* is a strictly protected species of common interest" according to the European Flora-Fauna-Habitat Directive (FFH). Therefore, monitoring is strongly recommended for this species. Conservation measures for the stenotopic dragonfly should include careful, regular and yearly alternating maintenance of ditches. Populations of *Stratiotes aloides* hopefully can be managed in this way and simultaneously the discharge conditions, which are important for agricultural purposes, will be secured." (Authors)] Address: Finch, O.-D., Universität Oldenburg Fk 5 / Bio-, Geo- und Umweltwissenschaften, AG Terrestrische Ökologie, D-26111 Oldenburg, Germany. E-mail: oliver.d.finch@uni-oldenburg.de

3920. Burt, J. (2003): Aquatic macroinvertebrates of an intermittent stream in the arid Hajar Mountains, Oman. *Tribulus* 13(2): 14-22. (in English). ["Aquatic macroinvertebrates were collected from six habitats in two permanently flowing sites to Wadi Qahfi, northern Oman. A total of 38 taxa were identified, many to taxonomic levels previously unrecorded for aquatic fauna in Arabia. Overall richness was comparable between airt habitats sampled. While very little regional information is available for identification of aquatic macroinvertebrates, the combination of regional descriptive information with foreign keys for aquatic stages has proven to be a

valuable approach. Recommendations are made for appropriate levels of classification for the major taxonomic groups, and references are provided to assist in identification." (Author) The possibilities to identify Odonata are briefly discussed, and in Tab. 3 as result of the survey, Gomphidae (indet.), Paragomphus, Libellulidae (indet.), and Coenagrionidae (indet.) are listed.] Address: Burt, J., Dept natural & Quantitative Sciences, Zayed Univ., PO Box 19282 Dubai, U.A.E. E-mail: John.Burt@zu.ac.ae

3921. Bußmann, M. (2003): Die Wiederbesiedlung der oberen Ennepe durch die Blauflügel-Prachtlibelle *Calopteryx virgo* (L., 1758) (Odonata, Zygoptera). *Natur und Heimat* 65(4): 109-117. (in German). [The upper reaches of the river Ennepe (Nordrhein-Westfalen, Germany) was surveyed for *C. virgo* on 17 June 1997 and repeated on 26/ 27 June 2002. The species spread closer to the epirhithral and krenal of the river. Population density had increased. The current extension of habitat use is documented and extensively discussed.] Address: Bußmann, M., Amselweg 18, D-58285 Gevelsberg, Germany

3922. Buttstedt, L. (2003): Wiederbesiedlung der mittleren Unstrut und unteren Helme in Thüringen durch stenöke Fließgewässerarten. *Thüringer Faunistische Abhandlungen* 9: 73-76. (in German with English summary). [Following a significant improvement of the water quality of the rivers Unstrut and Helme (Thüringen, Germany), in the mid of the 1990s *Calopteryx splendens* and *Platycnemis pennipes* could be re-observed. Their populations grow very strong in the succeeding years, and both species are common now. In 2003, exuviae, larvae, and imagines of *Gomphus vulgatissimus* could be traced along the Unstrut and the lower reach of the Helme. Imagines of *Ophiogomphus cecilia* have been observed along the Unstrut in 2003 too. It is supposed that the recolonisation process originating from Elbe and Saale now has reached northern Thuringia.] Address: Buttstedt, L., Ziegeleistr. 26, D-06536 Roßla, Germany

3923. Cabela, A.; Chovanec, A.; Ellinger, N.; Gressler, S.; Grötzer, C.; Pascher, K.; Raab, R.; Straif, M.; Teufl, H. (2003): Maßnahmenkatalog für die neu geschaffenen Uferstrukturen auf der Donauinsel. *Denisia* 10: 215-226. (in German with English summary). ["The results obtained in the Danube Island Monitoring Programme are the basis for management measures which should contribute to improve the migration linkages on the island itself and to provide new habitats particularly in the northern and central parts of the Danube Island." (Authors) Management measures from the odonological point of view are discussed.] Address: Raab, R., Anton Bruckner-Gasse 2/2, A-2232 Deutsch-Wagram, Austria. E-mail: rainer.raab@gmx.at

3924. Cham, S. (2003): Factors influencing the distribution of the White-legged Damselfly *Platycnemis pennipes* (Pallas) in Great Britain. *J. Br. Dragonfly Society* 19(1/2): 15-23. (in English). [*P. pennipes* is common and widespread throughout much of central and eastern Europe. In Britain it occurs south of the Wash (latitude 53 °N), and its distribution is associated with linear habitats, i.e. the larger rivers and their tributaries. It is absent from Ireland. It occurs in 6.4 per cent of the 10km squares from which Odonata records are available. This paper examines some of the factors influen-

cing the distribution of *P. pennipes* with reference to its often-quoted susceptibility to pollution. Heavy boat traffic (along the River Great Ouse in Bedfordshire and Huntingdonshire) seems to have no negative effect on the species. The study concludes that there is little evidence to support the view that the species is more susceptible to pollution than other species. It would appear to be more influenced by the habitat and the structure of bankside vegetation.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford MK45 4ER, UK

3925. Chelmick, D. (2003): A significant migration of the Red-veined Darter *Sympetrum fonscolombii* (Selys) in southern Spain. *J. Br. Dragonfly Society* 19(1/2): 35-36. (in English). ["In October 2002, near the port of Tarifa, situated in Andalucia at the southern-most tip of Spain, the author observed a significant migration of the Red-veined Darter *Sympetrum fonscolombii* (Selys). During a two and half hour period between 1500h and 1730h local time, an estimated total of 450,000 individual insects were observed migrating along the coast." (Author)] Address: Chelmick, D., 31 High Beech Lane, Haywards Heath, West Sussex RH16 1SQ, UK

3926. Chovanec, A.; Schiemer, F. (2003): Die Donauinsel in Wien als ökologischer Korridor? Untersuchung der Besiedlung neu geschaffener Uferstrukturen im Stauraum Freudenau - Hintergrund, Projektidee und zusammenfassende Darstellung. *Denisia* 10: 27-51. (in German with English summary). ["During the construction of the hydroelectric power plant Vienna-Freudenau, the previously straight shoreline of the 21 km long Danube Island was restructured by creating backwaters, coves, gravel banks, and pools. This paper describes the design and the results of a four year monitoring programme investigating the colonisation and successional processes at the study sites. The results show that the sites isolated from the Danube serve as stepping stone biotopes and breeding ponds for dragonflies, amphibians and reptiles. Rheophilic fish species colonise side channels connected with the Danube and indicate a longitudinal connectivity on a landscape scale due to a corridor function of the Danube Island." (Authors)] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria. E-mail: chovanec@ubavie.gv.at

3927. Clausnitzer, H.-J. (2003): Wie effektiv sind Naturschutzgebiete? Untersuchungen am Beispiel der Libellen (Odonata) im Landkreis Celle (Niedersachsen). *Braunschweiger naturkundliche Schriften* 6(4): 789-798. (in German with English summary). [A total of 53 odonate species are reproducing regularly in the district Celle, Germany. 28 of these species are listed as "Endangered" in the German Red List of threatened or vulnerable Odonata. 14 of these endangered dragonflies are found mainly within the boundaries of nature reserves, 6 species are evenly distributed in and outside nature reserves, and 8 species build up their greatest populations outside nature reserves. Protected by nature reserves are bog and fen dwelling species, while species of other biotopes (e.g. species of running waters) have greater populations outside of nature reserves. But even the latter areas (ponds) are in possessions of the public sector and looked after by nature conservation authorities. In general, the situation of endangered species is more unfavourable outside of protected areas.] Address: Clausnitzer, H.-J., Eichenstr. 11, D-29348 Eschede, Germany

3928. Clausnitzer, V.; Martens, A.; Suhling, F. (2003): From desert to forest: diversity of African Odonata. *Gesellschaft für Tropenökologie*. 16. Jahrestagung in Rostock. Abstracts: 32. (in English). [Verbatim: The two dragonfly projects of BIOTA (Biodiversity Transect Analysis in Africa; E07 and S08) work on diversity patterns of dragonflies in eastern and southwest Africa. Main topics of the joined studies are the effects of habitat fragmentation on species composition and genetic isolation, changes in diversity patterns along natural and anthropological gradients and adaptations to seasonal habitat conditions. Results of these studies are used to define indicator species and monitoring programmes for habitat quality and rapid assessments. Nearly all species found in Namibia are common in savannah habitats in East Africa and even West Africa as well. Most of these species are migratory and colonise seasonal wetlands even in an otherwise very dry matrix (temporal and spatial). The genetic variation between East and Southwest African populations of such species, e.g. *Crocothemis erythraea* or *Trithemis kirbyi* is very small. Species with adaptations to distinct habitats, e.g. forests or spring brooks on the other hand show genetic differences between isolated populations. *Coryphagrion grandis*, which occurs in the fragmented coastal forest regions of East Africa, shows high sequence diversity between populations, which correlates with the distance and therefore age of the single forest fragments. Our results from the BIOTA transect from east to southwest Africa allow biogeographic discussions about past and present distribution patterns of dragonflies and about shifts in biodiversity patterns with changing climatic and/or environmental conditions. Results of both projects also indicate that Odonata are good indicators for assessing anthropogenic impacts on inland waters.] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

3929. Clausnitzer, V. (2003): *Teinobasis alluaudi* Martin, 1896 from mainland Africa: notes on ecology and biogeography (Zygoptera: Coenagrionidae). *Odonatologica* 32(4): 321-334. (in English). ["New records of *T. alluaudi* have been made from coastal forests of Kenya and Tanzania and from Pemba and Zanzibar Islands, Tanzania. Habitat and reproduction of this species are described. The systematic status of *T. alluaudi*, *T. a. berlandi* Schmidt, 1951 and *T. malawiensis* Pinhey, 1966 are discussed." (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

3930. Costa, J.M.; Oldrini, B.B. (2003): Descrição da fêmea de *Argyrothemis argentea* (Odonata, Libellulidae). *Iheringia, Sér. Zool.* 93(3): 271-276. (in Portuguese with English summary). ["The female of *Argyrothemis argentea* Ris, 1911 is described and illustrated for the first time. New records expand the distribution range of the species to Central West Region of Brazil." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@univsys.com.br

3931. Cuvelier, J. (2003): Die Falsche geangelt - Teil I. *mercuriale* 3: 39. (in German). [NSG Teverener Heide, Lk. Heinsberg, Nordrhein-Westfalen, Germany; 31. VII.2003, mixed pair of a male *Sympetrum sanguineum* and a female *Crocothemis erythraea*.] Address: Cuve-

lier, J., An der Linde 28, D-52511 Geilenkirchen, Germany

3932. Daigle, J.J. (2003): *Metaleptobasis minteri* spec. nov. from Ecuador (Zygoptera: Coenagrionidae). *Odonatologica* 32(4): 371-374. (in English). ["The new species is described from eastern Ecuador (holotype male and allotype female, in copula: Ecuador, Napo prov., Primavera, Lake Taracoa lakeshore and nearby areas, 26-VIII-1978, deposited in the FSCA, Gainesville, FL, USA). Males are distinguished from its congeners by the slender paraprocts, and both males and females can be distinguished by their very small laterally directed thoracic horns." (Author)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@netally.com

3933. D'Amico, F. (2003): Densités et sex-ratio à l'émergence d'*Aeshna juncea* (L., 1758) dans différentes mares pyrénéennes. *Martinia* 19(2): 43-49. (in French with english summary). ["Between mid-July and mid-August 2000, 141 exuviae of *A. juncea* have been sampled at different sampling sites (each 10 m²) from six shallow ponds (1160-2040 m a.s.l.), grouped in 4 sites of Western Pyrénées. According to sites, densities of exuviae varied between 0.1 - 5.5 individuals per square meter whilst the range in sex-ratios was 33.3 - 50.0 % males (mean global sex-ratio = 46.04 % males)." (Author)] Address: D'Amico, F., Université de Pau & des Pays de l'Adour, LEM-IBEAS, BP1155, F-64013 Pau Cedex, France. E-mail: frank.damico@univ-pau.fr

3934. David S. (2003): Results of the monitoring of the dragonflies (Insecta : Odonata) in the catchment of the Pariz stream (SW Slovakia). *Ekológia (Bratislava)* 22, Supplement 2): 320-332. (in English with Slovakian summary). [Between 2000 and 2002, in the Pariz stream catchment a monitoring of the dragonflies and their habitats was realised. A total of 34 species were recorded, 17 of these are registered in the Slovak Red List, and 8 species are protected by law in the Slovak Republic. The most endangered and rare species in the study area are *Coenagrion scitulum*, *Libellula fulva*, *Brachytron pratense*, *Epitheca bimaculata*, and *Soma-tochlora flavomaculata*. 26 odonate species prefer stagnicolous water habitats, only *Calopteryx splendens* and *Platycnemis pennipes* are rheophilous. *Crocothemis erythraea*, *Anaciaeschna isosceles*, and *Aeshna mixta* are considered as migrant species. The dragonfly community structure and the types of habitat are described using of CANOCO statistical packages (indirect gradient analysis, procedure PCA, DCA). The stagnicolous *Lestes-Sympetrum-Aeshna* and the eurytopic *Orthetrum-Libellula depressa* odonatocoenosis but no rheophilous communities were identified. The importance of the man-made water habitats (sand-pits, marshland-pit, drain-streams and ponds) for Odonata is stressed.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

3935. David S. (2003): The Bioindication of Anthropogenic Changes Water Biotops (extractive sites) Using the Dragonflies (Insecta: Odonata). In: Olah, B. (ed.): IV. Ekologicke dni, SEKOS pri SAV - Ekologicke stiidie V., Banska Stiavnica, 7.-8. oktober 2003. SEKOS, Banska Stiavnica: 174-184. (in Slovakian with English summary). ["During the years 1986-2003, the monitoring of the dragonflies and their extractive sites habitats

(gravel pits, moorland pits and silty pits in some localities was realised. From different parts of Slovakia) we selected 7 localities. There were 39 species (n = 1539 specimens) of dragonflies recorded. Six of them are protected by law in the Slovak Republic and 16 species are registered in the Slovak Red List." The nature-conservation value of disturbed habitats is high due to the highest values of diversity and equitability. "The species data and 4 environmental variables (altitude, water surface area, depth of water and vegetation cover) at 7 sites were analysed by methods of Principal component analysis (PCA) and Canonical correspondence analysis (CCA), using CANOCO software. The ordination methods established the importance of current condition of the habitats but not of the way of their formation or disturbance." The altitude limits species diversity. The sensitivity of the dragonflies on environmental factors of the localities was confirmed. Dragonflies are suitable indicators of the current succession stage of aquatic habitats.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

3936. De Block, M.; Stoks, R. (2003): Adaptive sex-specific life history plasticity to temperature and photoperiod in a damselfly. *Journal of Evolutionary Biology* 16(5): 986-995. (in English). ["We investigated four predictions about how temperature, photoperiod and sex affect the life history plasticity and foraging activity of *Chalcolestes viridis*. (i) As predicted, increased temperatures increased foraging activity and growth rates, but in contrast with the prediction, late photoperiod (high time stress) did not affect foraging activity and growth rate. (ii) Unexpectedly, the increase in growth rate at increasing temperatures was not larger under high time stress. (iii) As predicted, age and size at emergence decreased at higher temperatures and at the late photoperiod. Temperature-induced life history shifts were direct or the result of behavioural growth mediation depending on the temperature range. Photoperiod-induced life history shifts were direct. (iv) As predicted, males emerged before females but at a smaller size. The degree of sexual size dimorphism was influenced by the joint effects of temperature and photoperiod. We could only detect genetic variation in size plasticity to photoperiod. The match between the sex-specific life history responses to temperature and photoperiod and predictions by relevant optimality models suggests adaptive life history plasticity to these variables." (Authors)] Address: De Block, M., Evolutionary Biology Group, University of Antwerp, Groenenborgerlaan 171, B-2020, Antwerp, Belgium. E-Mail: mdeblock@ruca.ua.ac.be

3937. De Marmels, J. (2003): Odonatos. In: M. Aguilera, A. Azócar & E. González Jiménez (Eds.): *Biodiversidad en Venezuela I*. ISBN 980-379-051-X: 312-325. (in Spanish). [The paper compiles information on general biology and ecology of the order, contributes a brief history of odonatological study of the Venezuelan species, totals the number of known species to 484 species, and outlines the geographical distribution and the conservation status of several species.] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

- 3938.** Deliry, C. (2003): Nouveaux articles, études ou notes concernant les libellules dans la région Rhônes-Alpes-Dauphiné. *Sympetrum piémontais* 52: 2-3. (in French). [France; 34 publications containing information on Odonata, nearly exclusively unpublished expertises, are compiled.] Address: Deliry, C., 20, rue de la Manine, F-38510 Morestel, France. E-mail: president@sympetrum.org
- 3939.** Dolný, A. (2003): Dragonflies (Insecta: Odonata) of four nature reserves in Śląskie Voivodship (Polish part of Upper Silesia) - the results of a preliminary study. *Natura Silesiae Superioris* 7: 93-103. (in Polish, with English and German summaries). [40 Odonata species were found in four nature reserves in the southern part of Poland. *Crocothemis erythraea* has been recorded for the first time since 1922. *Orthetrum albistylum* seems to expand its range. Among other species, records of *Sympetrum depressiusculum*, *Leucorrhinia albifrons*, and *L. pectoralis* are noteworthy.] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Ales.Dolny@osu.cz
- 3940.** Dolný, A. (2003): Faunistical data on endangered and protected dragonflies (Insecta: Odonata) in the Polish part of Upper Silesia (Opolskie and Śląskie voivodships). *Natura Silesiae Superioris* 7: 89-91. (in English, with Polish and German summaries). [Poland; records of the following odonate species are documented: *Aeshna juncea*, *Cordulegaster boltonii*, *Somatochlora alpestris*, *S. arctica*, *Orthetrum brunneum*, *O. coerulescens*, *Leucorrhinia albifrons*, *L. pectoralis*, *Stylurus flavipes*, *Ophiogomphus cecilia*.] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Ales.Dolny@osu.cz
- 3941.** Dolný, A.; Blaskovic; Síbl, J.; Bulánková, E.; Matejka, P. (2003): On the occurrence of *Libellula fulva* Müller in the Czech Republic and Slovakia (Odonata: Libellulidae). *Opusc. zool.flumin.* 212: 1-14. (in English). ["All Czech (3) and Slovak (24, incl. 14 new) localities are listed and, whenever possible, the respective habitats are described. The regional distribution of the species is mapped. Its habitat choice in the region is compared with that elsewhere in central and eastern Europe." (Authors)] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; tel.+ 421-7-728 922, e-mail: Bulankova@nic.fns.uniba.sk
- 3942.** Dommangeat, J.-L. (2003): Rubrique bibliographique. *Martinia* 19(4): 164-168. (in French). [Additions to the French odonatological bibliography covering publications of 2000-2003 are made.] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 3943.** Donath, H. (2003): New data on the dragonflies (Odonata) of North-Eastern Poland. *Wiad. entomol.* 22(3): 188-189. (in Polish). [A total of 35 odonate species from 14 localities in NE-Poland visited in June 2002 are documented. The list of species include *Onychogomphus forcipatus*, *Epitheca bimaculata*, *Leucorrhinia albifrons*, and *L. pectoralis*.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany
- 3944.** Donath, H. (2003): Verstärktes Auftreten südlich verbreiteter Libellenarten. *Biologische Studien*, Luckau 32: 100-102. (in German). [The current situation of the southern distributed species *Erythromma viridulum*, *Anax ephippiger*, *A. parthenope*, *Aeshna affinis*, *Sympetrum fonscolombii*, *S. striolatum*, *Crocothemis erythraea*, and *Orthetrum brunneum* in the northwest of Niederlausitz, Brandenburg, Germany, is discussed. This region was intensively surveyed for Odonata starting in 1976. None of the mentioned species could traced between 1976 and 1985, while some of them are common now or are colonising more and more water bodies.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany
- 3945.** Donnelly, N. (2003): Common name for *Enallagma vernale*. *Argia* 15(3): 17. (in English). ["Vernal Bluet"] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 3946.** Donnelly, N. (2003): *Lestes disjunctus*, *forcipatus*, and *australis*: a confusing complex of North American damselflies. *Argia* 15(3): 10-13. (in English). ["Few North American damselflies have given so much difficulty as the *Lestes disjunctus* complex. Frequent collections of these insects in southern New York have convinced me that the subspecies *australis* Walker 1952 should be elevated to species status. Extensive correspondence and discussion with fellow odonatists has convinced me that the most difficult diagnosis in the complex is the separation of males of *forcipatus* and *australis*. I present here what I hope will be a clarification of the diagnoses of these three difficult species. [...]"] (Author)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 3947.** Donnelly, T.W. (2003): Distribution of North American Odonata. Part I: Aeshnidae, Petaluridae, Gomphidae, Cordulegastridae. *Bull. American Odonatology* 7(4): 61-90. (in English). [Introduction to the Odonata mapping project in USA; dot map presentation of 150 taxa; taxa, species or subspecies of special interest are discussed.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 3948.** Down, R. (2003): A first trip to Thailand. *Malangpo* 20: 200-201. (in English). [Brief report on a stay in the Chiang Mai-region in northern Thailand with some odonate highlights of different habitats.] Address: Down, Rory, 6 Bramley Avenue, Coulsdon, Surrey CR5 2DP, UK
- 3949.** Elegem, B. van; Knijf, G. de (2003): An exceptional dragonfly community in the polder of Kruikebe, Bazel and Rupelmonde (East-Flanders, Belgium). *Gomphus* 19(1): 13-29. (in Dutch with English and French summaries). ["The polder of Kruikebe, Bazel and Rupelmonde, Belgium is one of the main open areas in the valley of the river Scheldt. This area was investigated on its Odonata fauna during spring and early summer of 2000. A total of 22 Odonata species were observed and 4 of them are included in the Red list of Flanders: *Brachytron pratense*, *Libellula fulva*, *Cordulia aenea*, and *Erythromma najas*. The presence of these species is a good indication of a dragonfly community of lowland peatbogs. *Libellula fulva* is the most common Anisoptera in spring and the species has its main

stronghold in Flanders at the creek of Rupelmonde. Due to a lack of visits in July and especially August we expect that several other species, especially from the genera *Aeshna* and *Sympetrum* could be found in this polder." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

3950. Ellenrieder, N. von (2003): *Agnophilogenia* Kennedy 1940 [sic], a junior synonym of *Philogenia* Selys 1862 (Zygoptera: Megapodagrionidae). *Odonatologica* 32(4): 387-391. (in English). ["*Agnophilogenia* Kennedy is shown to be a junior synonym of *Philogenia* Selys based on a comparison of diagnostic characters of the holotype female of its only known species, *A. monotis*, with those of *Philogenia* species. An analysis of the described species of *Philogenia* suggests that *P. tinalandia* Bick & Bick represents a junior synonym of *P. monotis* (Kennedy). The male holotype of *P. tinalandia* is illustrated and compared with the female holotype of *A. monotis*." (Author) Kennedy, C.H. (1941): *Agnophilogenia monotis*, new genus and species of dragonfly from humid northwestern Ecuador (Odonata: Megapodagrionidae). *Ann. ent. soc. Am.* 34: 490-494.] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

3951. Faton, J.-M. (2003): Avancement de la prospection dans la Drôme et découverte de trois nouvelles espèces dans le département : *Coenagrion caerulescens* (Fonscolombe, 1838), *Gomphus graslinii* Rambur, 1842 et *Hemianax ephippiger* (Burmeister, 1839). *Martinia* 19(2): 61-64. (in French with English summary). [Between 1998 and 2002, 65 odonate species could be recorded at 197 localities previously not surveyed for Odonata. *Coenagrion caerulescens*, *Gomphus graslinii*, and *Anax ephippiger* are new additions to the odonate fauna of the Département Drôme, France.] Address: Faton, J.-M., Réserve Naturelle des Ramières, les Garis, F-26120 La Baume Cornillane, France

3952. Feldwieser, G. (2003): Abdomen-Akrobatik. *mercuriale* 3: 40. (in German). [A female *Lestes barbarus* was unable to copulate due to a deformation of the abdomen.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

3953. Feldwieser, G. (2003): Das lästige Anhängsel *mercuriale* 3: 40. (in German). [A male *Calopteryx virgo* was hindered to fly by his complete exuviae attached to his left hind wing.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

3954. Feldwieser, G. (2003): Neue Libellendaten aus dem NSG "Listhof" bei Reutlingen. *mercuriale* 3: 31. (in German). [Records of the following species are briefly documented: *Ischnura pumilio*, *Anax parthenope*, *Crocothemis erythraea*, *Leucorrhinia dubia*, *Orthetrum brunneum*, and *Sympetrum fonscolombii*.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

3955. Ferreira-Peruquetti, P.S.; Fonseca-Gessner, A.A. (2003): Comunidade de Odonata [Insecta] em áreas naturais de Cerrado e monocultura no nordeste do Estado de São Paulo, Brasil: relação entre o uso do solo e a riqueza faunística. *Revista Brasileira de Zootaxia* 20(2): 219-224. (in Portuguese, with English summary). ["Odonata community on natural areas of Cerrado

and monoculture of northeastern SSo Paulo State, Brazil: relationship between land use and richness. Stream ecosystems may be strongly influenced in different ways by land use. The effects of land-cover patterns on Odonata community were studied in eight streams and seven lakes-dams of northeastern São Paulo State. The pattern analyzed was monoculture (sugar cane) vs. nature reserve in terms of Odonata species richness and similarity. Eighty-five Odonata species were sampled. The species richness was higher in the monoculture (33 species) than nature reserve (30 species) and 22 species were common to both areas. There was not verified relationship between land use and physical or chemical characteristics of the streams or lakes-dams water. These results suggest that some Odonata species are benefited and other affected by anthropogenic actions, although more studies are necessary to evaluate this hypothesis. There were ten new records for São Paulo State [*Neoneura sylvatica*, *Coryphaeschna adnexa*, *Erythemis haematogastra*, *E. mithroides*, *Micrathyria longifasciata*, *M. pseudeximia*, *Planiplax machadoi*, *Lauromacromia* sp., *Tibiagomphus* sp. and *Aeschnosoma* sp.]" (Authors)] Address: Ferreira-Peruquetti, Patrícia, Departamento de Hidrobiologia, Universidade Federal de São Carlos. Caixa Postal 676, 13565-905 São Carlos, São Paulo, Brasil. E-mail: patricia@iris.ufscar.br

3956. Fleck, G. (2003): Contribution à la connaissance des odonates de Guyane française: notes sur les larves des genres *Orthemis*, *Diastatops* et *Elgia* (Anisoptera: Libellulidae). *Odonatologica* 32(4): 335-344. (in French, with English summary). ["The ultimate instar larvae of *Orthemis aequilibris* and of *O. biolleyi* are described and illustrated for the first time. The penultimate instar of the supposed larva of *Diastatops pullata* is described and illustrated. *D. pullata* is considered again as a valid species. *Elgia leptostyla* has peculiar setae on the occiput." (Author)] Address: Fleck, G., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

3957. Fleck, G.; Nel, A. (2003): Revision of the Mesozoic family Aeschnidiidae (Odonata: Anisoptera). *Zoologica* 153: 172 pp. [Content of the book: 1. Introduction; 2. Adult and larval morphology of the Aeschnidiidae; 3. Systematic Palaeontology; 3.1 Taxa previously attributed to Aeschnidium: Genus *Aeschnidium* Westwood, 1854, *Aeschnidium bubas* Westwood, 1854, *Aeschnidium antiquum* (Brodie, 1845), Genus *Misofaeschnidium* gen. n., *Misofaeschnidium densum* (Hagen, 1862), Genus *Sinaeschnidia* Hong, 1965 stat. rest., *Sinaeschnidia martinezdelclosi* sp. n.; 3.2 Taxa previously attributed to *Urogomphus*: Genus *Urogomphus* Handlirsch, 1906, *Urogomphus giganteus* (Münster in Germar, 1839); *Urogomphus*(?) species undetermined, Genus *Lithoaeschnidium* Nel & Martínez-Delclòs, 1993 stat. rest., *Lithoaeschnidium viohli* Nel & Martínez-Delclòs, 1993 stat. rest., Genus *Brunetaeschnidium* gen. n., *Brunetaeschnidium nusplingensis* (Bechly, 1998) comb. n., *Brunetaeschnidium* sp.; 3.3 Other genera previously described: Genus *Aegyptidium* Schlüter & Hartung, 1982, *Aegyptidium aburasiensis* Schlüter & Hartung, 1982, Genus *Aeschnidiella* Zalesky, 1953, *Aeschnidiella kabanovi* Zalesky, 1953, Genus *Aeschnidiopsis* Tillyard, 1917, *Aeschnidiopsis flindersiensis* (Woodward, 1884), Genus *Bergeriaeschnidia* Nel, Bechly & Martínez-Delclòs, 1996, *Bergeriaeschnidia inexpectata* Nel et al., 1996 stat. rest., *Ge-*

nus Gigantoeschnidium Nel & Martínez-Delclòs, 1993, Gigantoeschnidium ibericus Nel & Martínez-Delclòs, 1993, Genus Iberoaeschnidium Nel & Martínez-Delclòs, 1993, Iberoaeschnidium conguensis Nel & Martínez-Delclòs, 1993, Genus Leptaeschnidium Pritykina, 1977, Leptaeschnidium latum Pritykina, 1977, Leptaeschnidium araripina (Carle & Wighton, 1990) comb. n., Genus Lleidoeschnidium Nel & Martínez-Delclòs, 1993, Lleidoeschnidium valloryi Nel & Martínez-Delclòs, 1993, Lleidoeschnidium maculatum sp. n., Genus Malmaeschnidium Nel & Martínez-Delclòs, 1993, Malmaeschnidium mayeri Nel & Martínez-Delclòs, 1993, Genus Nannoaeschnidium Nel & Martínez-Delclòs, 1993, Nannoaeschnidium pumilio Nel & Martínez-Delclòs, 1993, Genus Santanoptera Martill & Nel, 1996, Santanoptera gabbotti Martill & Nel, 1996, Genus Solnhofenia Bechly, 2000, Solnhofenia stoebeneri Bechly, 2000, Genus Tauropteryx Pritykina, 1993, Tauropteryx krassilovi Pritykina, 1993, Genus Stylaeschnidium Zhang & Zhang, 2001, Stylaeschnidium rarum Zhang & Zhang, 2001, Genus Dracontaeschnidium Zhang & Zhang, 2001, Dracontaeschnidium orientale Zhang & Zhang, 2001; Descriptions of new genera: Genus Angloaeschnidium gen. n., Angloaeschnidium toyei sp. n., Cf. Angloaeschnidium toyei, Angloaeschnidium montreuili sp. n., ? Angloaeschnidium lacuai sp. n., Genus Cooperaeschnidium gen. n., Cooperaeschnidium durandi sp. n., Genus Delclosaeschnidium gen. n., Delclosaeschnidium magnum sp. n., Genus Diastatopsaeschnidium gen. n., Diastatopsaeschnidium reneeheiko sp. n., Genus Jarzembowskiaeschnidium gen. n., Jarzembowskiaeschnidium polandi sp. n., Genus Kessleraeschnidium gen. n., Kessleraeschnidium simonae sp. n., Genus Rossaeschnidium gen. n., Rossaeschnidium patriciae sp. n., Genus Coramaeschnidium gen. n., Coramaeschnidium minimum sp. n., Genus Kimmeridgebrachypteraeschnidium gen. n., Kimmeridgebrachypteraeschnidium etchesi sp. n.; 3.5 Undetermined new genera and species; 3.6 List of genera and species of Aeschnidiidae; 4. Phylogenetic analyses; 4.1 Method; 4.2 Position of the Aeschnidiidae relative to the Anisoptera, 4.2.1 Previous works, 4.2.2 New analysis, 4.2.3 List of characters, 4.2.4 List of taxa, 4.2.4.1 Outgroups, 4.2.4.2 Ingroup, 4.2.5 Results, 4.3 Phylogenetic analysis of the Aeschnidiidae, 4.3.1 Previous works, 4.3.2 Excluded taxa, 4.3.3 Included taxa (in alphabetic order), 4.3.4 Outgroups, 4.3.5 List of character states, 4.3.6 Results; 5. Conclusions, Acknowledgements, References] Address: E.Schweizerbart'sche Verlagsbuchhandlung, Science Publishers, Johannesstr. 3A D-70176 Stuttgart, Germany

3958. Forrest, P.J. (2003): Southern Emerald Damselfly *Lestes barbarus*. *Atropos* 21: 81. (in English). [Documents the third British record of *L. barbarus* for 21 August 2004 at Sandwich Bay, Kent. The second record (female, 20 July 2003, Winterton Dunes, Norfolk) is documented on plate 5 in the same issue of *Atropos*.] Address: Forrest, P.J., Flat 3, No. 8 Chandos Square, Broadstairs, Kent, CT10 1QN, UK

3959. François, R.; Delasalle, J.-F.; Spinelli, F. (2003): Observations d'*Ischnura pumilio* (Charpentier, 1825) dans des champs inondés de la Somme et de l'Oise. Bilan des connaissances en Picardie et mentions récentes dans les départements du Pas-de-Calais, de Seine-Maritime et du Val-d'Oise. *Martinia* 19(3): 83-91. (in French with English summary). [In 2001, the Picardie (France) was struck by a huge flood. As a conse-

quence many habitats suitable for *I. pumilio* developed. The species, in most cases unknown to the region or very scarce, colonised these habitats.] Address: François, R., Bureau d'étude ECOTHEME, 185 rue Georges Latapie, F-60490 Ressons-sur-Matz, France. E-mail: ecotHEME@free.fr

3960. Gardiner, B.O.C. (2003): A brief note on Cambridge butterflies January to 15 August 2002. *Entomologist's Record & Journal of Variation* 115(1): 26-27. (in English). [Passing note on dragonflies.] Address: Gardiner, B.O.C., 2, Highfield Avenue, Cambridge, CB4 2AL, UK

3961. Garrison, R.W.; Ellenrieder, N. von; O'Brien, M. (2003): An annotated list of the name-bearing types of species-group names in Odonata preserved in the University of Michigan, museum of zoology. Occasional papers of the museum of zoology, University of Michigan 736: 73 pp. (in English). ["This catalog presents a listing of all species-group names associated with Odonata specimens currently housed in the type collection in the University of Michigan Museum of Zoology (UMMZ), Ann Arbor, MI. The names represent species described by P.P. Calvert, L.K. Gloyd, F. Förster, M.A. Lieftinck, C.H. Kennedy, F. Ris, E.B. Williamson and others, and transcription of data labels, reference and current status have been included. A lectotype is designated for *Argia cyathigera* Navás in order to stabilize that name. The following are new synonyms: *Mecistogaster garleppi* Förster, 1903 = *Mecistogaster buckleyi* McLachlan, 1881; *Argia augustana* Navás, 1934 = *Argia medullaris* Hagen in Selys, 1865; *Argia dagnina* Förster, 1914 = *Argia indicatrix* Calvert, 1902; *Argia machadina* Förster, 1914 = *Argia difficilis* Selys, 1865; *Argia medinensis* Navás, 1935 = *Argia gerhardi* Calvert, 1909. Of 389 names, 85 are considered junior synonyms." (Authors) Taxa of the following families are treated: Amphipterygidae, Calopterygidae, Chlorocyphidae, Dicteriadidae (Heliocharitidae), Polythoridae, Lestidae, Perilestidae, Megapodagrionidae, Platystictidae, Protoneuridae, Pseudostigmatidae, Platynemididae, Coenagrionidae, Aeshnidae, Gomphidae, Cordulegastridae, Corduliidae, Libellulidae. The paper is more than a study on nomenclature and taxonomy, for it contains many detailed information on localities and collecting details indispensable for workers in the history of odonatology.] Address: Garrison, R.W., Research Associate, Natural History Museum of Los Angeles County, Exposition Boulevard 900, CA 90007, USA. E-mail: rwgarrison@earthlink.net

3962. Gibson, V. (2003): Communication between the sexes at the end of copulation: a study of three species of Anisoptera. *J. Br. Dragonfly Society* 19(1/2): 44-46. (in English). ["There are many aspects of signalling that we know little about. For example how does a female signal to a male in tandem that she has completed oviposition? What signals are exchanged between the sexes at the end of copulation?" (Miller, 1995). Using a camcorder, sequences of *Aeshna mixta*, *A. juncea*, and *Sympetrum striolatum* have been analysed to find answers to these questions. It was found that "wing clapping behaviour" in *A. mixta* and *A. juncea*, "wing touching behaviour" in *A. mixta*, and "wing lifting" in *S. striolatum* can be interpreted as signals between the partners of the tandem. "The wing lifting behaviour described here provides a possible answer to the question 'how does the female indicate to the male that she is

ready to oviposit?' The video sequences seen in slow playback [...] do seem to show that the female action of wing touching and lifting is a definite signal to the male. Since uncoupling and flight soon follow, it is possible that it is a 'ready to oviposit' signal. The case is strongest for *S. striolatum*, where the male's wings are positively lifted rather than stroked, and where uncoupling and flight occur almost immediately on the cessation of wing lifting. This behaviour does not seem to be referred to elsewhere. The significance of the wing clapping is less obvious, but it is clearly a signal from the male to the female. Occurring, as it did, shortly before wing lifting, it might mean 'I have finished sperm transfer'. The third and last stage in prolonged copulation is the transfer of sperm within the female, although the stage is not as clear in darters as in some other Odonata (Miller, 1995). The male has no control over this stage and may be anxious to depart to avoid predators and interference from other males. Again, this behaviour does not seem to be referred to elsewhere." (Author)] Address: Gibson, V., 76 Pexton Road, Sheffield S4 7DA, UK

3963. Goddard, D. (2003): Inverted emergence recorded in the Common Darter *Sympetrum striolatum* (Charpentier). *J. Br. Dragonfly Society* 19(1/2): 39. (in English). [Verbatim: On Sunday 18 August 2002, whilst leading the British Dragonfly Society afternoon walk around the Bennerley Marsh recording area, we came to the de-acidification pits where the group looked for exuviae. I came across the inverted exuvia of *S. striolatum* which was attached to a dried leaf of a *Bulrush Typha latifolia* approximately 150mm above the water level. This is the first time that I have observed such an indication of inverted emergence in this particular species and I have not come across this being noted in any of the literature.] Address: Goddard, D., 30 Cliffe Hill Avenue, Stapleford, Nottingham NG9 7HD, UK

3964. Goddard, D. (2003): The domestic cat: a new dragonfly predator. *J. Br. Dragonfly Society* 19(1/2): 39. (in English). [Verbatim: On Saturday 10 August 2002, at approximately 1430h GMT, I witnessed what I thought was a very unlikely dragonfly predator. Two of our domestic cats acted together to chase a Migrant Hawker *Aeshna mixta* Latreille which was hawking over our garden pond. The chase took two or three minutes and the *A. mixta* did not seem to want to leave the area despite being chased by the cats. It eventually settled on the vegetation around the edge of the pond it was at this point that one of the cats pounced and caught the insect and consequently killed it. Once they had killed the insect they just left it on the lawn.] Address: Goddard, D., 30 Cliffe Hill Avenue, Stapleford, Nottingham NG9 7HD, UK

3965. Goffart, P.; Fichet, V. (2003): Compte-rendu de l'excursion du 16 juin 2003 à l'Étang de Virelles. *Gomphus* 19(1): 39-40. (in French with Dutch summary). [Belgium; 16 species including *Epitheca bimaculata*, *Somatochlora flavomaculata*, *Anax parthenope*, *Sympetrum fonscolombii*, and *Erythromma najas* are briefly discussed.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

3966. Goffart, P. (2003): Compte-rendu de l'excursion sur l'Ourthe moyenne, de Noiseux à Durbuy, du 21 juin 2003. *Gomphus* 19(1): 36-38. (in French with Dutch summary). [Belgium; 17 odonate species were recor-

ded; main emphasis was given to *Oxygastra curtisii* which was recorded from several stretches of the river Ourthe. In addition, records of the stream dwelling species *Gomphus pulchellus*, *G. vulgatissimus*, *Onychogomphus forcipatus*, and *Cercion lindenii* are briefly commented upon.] Address: Goffart, P., Unité d'Écologie et de Biogéographie, 5, Place Croix-du-Sud, B-1348 Louvain-la-Neuve, Belgium. E-mail: goffart@ecol.ucl.ac.be

3967. González-Soriano, E.; Córdoba-Aquilar, A. (2003): Sexual behaviour in *Paraphlebia quinta* Calvert: male dimorphism and a possible example of female control (Zygoptera: Megapodagrionidae). *Odonatologica* 32(4): 345-353. (in English). ["The sexual behaviour and a case of male phenotypic dimorphism in *P. quinta* are described: black-winged (BW) males and hyaline-winged (HW) males. Similar to other territorial odonate species, some males defended a space that females used for oviposition while other males acted as satellites. Copulation took place in 2 stages which differed in abdominal movement orientation and duration. Copulation duration varied between morphs and was frequently disrupted. During disruption, the genitalia of both sexes disengaged although the tandem position (the male's abdominal appendices grasping the female's prothorax) was maintained. Disruptions, which took place during the first stage (a stage during which displacement of rival sperm occurs in most odonate species), were sometimes followed by emissions of sperm from the vagina. Male morphs exhibit striking behavioural differences: HW males do not defend territories, but BW males do, and the former copulate for longer and show more copulatory disruptions. Some stages of female behaviour are described and suggested as instances during which females may be exerting mate choice: females copulated on fewer occasions with HW males, copulations with this morph were longer but ovipositions were not, and sperm emissions (possibly, sperm from previous mates) and copulatory disruptions of BW males were less frequent. Because of these differences, it is suggested this is a unique species to test current ideas of female control in an insect order in which the idea of male "control" has been traditional." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

3968. Gossum, H. van; Sánchez, R.; Cordero Rivera, A. (2003): Observations on rearing damselflies under laboratory conditions. *Animal Biology* 53(1): 37-45. (in English). ["Rearing damselflies under laboratory conditions is a promising means of solving a variety of biological questions. Therefore, in order to improve the success of future researchers we felt the need to indicate potential difficulties in carrying out rearing experiments. Laboratory crosses were obtained using virgin animals originating from natural populations in Belgium and Spain. Resulting offspring was maintained, under laboratory conditions, in small aquaria until emergence and in insectaries as adults. Our results show that keeping damselflies during their entire life cycle under artificial conditions can be very difficult. We suggest that future researchers should change water regularly, supply sufficient food, and rear animals at low density or even individually. Furthermore, suggestions are given on type of food, advisable laboratory conditions and female oviposition methodology." (Authors)] Address: Gossum, H.

van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgoosum@ruca.ua.ac.be

3969. Grand, D.; Roché, B. (2003): Complément à la faune des Odonates de Corse et nouvelles observations de *Somatochlora metallica meridionalis* Nielsen, 1935 (Odonata, Anisoptera, Corduliidae). *Martinia* 19(2): 57-60. (in French with english summary). [In July 2002, four new localities of *S. meridionalis* in southern Corsica, France could be traced. Records of *Chalcolestes parvidens* and *Somatochlora flavomaculata* are added, the presence of *Paragomphus genei* and *Orthetrum anceps* could not confirmed.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

3970. Grand, D. (2003): L'africain *Trithemis annulata* (Palisot de Beauvois, 1805) s'installe en Languedoc (Odonata, Anisoptera, Libellulidae). *Martinia* 19(4): 158-160. (in French, with English summary). [In August 2003, *T. annulata* was discovered in the French départements of Aude and Hérault. The habitats are briefly described, and the records are discussed as an additional example of range extensions of African species as a consequence of global warming.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

3971. Grand, D. (2003): Observation tardive de Libellules au Maroc. *Martinia* 19(4): 148. (in French). [Centre of Marrakech, Morocco; 24-XII-2002; *Sympetrum fonscolombii*, *Sympetrum striolatum* cf. *Trithemis annulata*, *T. kirbyi*] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

3972. Guerbaa, K.; Hennequin, E. (2003): Mise en place d'un suivi des peuplements d'Odonates de la tourbière de la Ferrière (Communes de Davignac et Bonnefond, Corrèze). Premiers résultats après deux ans. *Martinia* 19(3): 99-107. (in French with English summary). [To control the efficiency of habitat development measures in the Ferrière peat-bog, the Odonata were surveyed. The preliminary results are documented. In general, the odonate fauna is in a process of consolidation, but typical species as *Leucorrhinia dubia* could be recorded.] Address: Guerbaa, K., Conservatoire Régional des Espaces Naturels du Limousin, 6 ruelle du Theil, F-87510 Saint-Gence, France

3973. Hämäläinen, M. (2003): *Cryptophaea*, a new euphaeid genus and three new species of Caloptera damselflies from Thailand (Odonata: Euphaeidae, Calopterygidae). *Zool. Med. Leiden* 77(25): 441-454. (in English). [The euphaeid specimens from Doi Suthep (North Thailand) identified and redescribed by Asahina in 1987 as *Schmidtphaea schmidi* are not conspecific with the holotype of *S. schmidi* Asahina, 1978, from Manipur (North-east India), but represent a distinct new species described as *Cryptophaea saukra* gen. & spec. nov. *Bayadera vietnamensis* van Tol & Rozendaal, 1995 and *Schmidtphaea yunnanensis* Davies & Yang, 1996, are transferred to the genus *Cryptophaea* gen. nov. *Anisopleura trulla* spec. nov. from South Thailand is described and "*Caliphaea confusa* sensu Asahina, 1985" from Doi Inthanon (North Thailand) is described as *C. angka* spec. nov.] Address: Hämäläinen, M., Department of Applied Biology, P.O. Box 27, FIN-00014 University of Helsinki, Finland. E-mail: matti.hamalainen@helsinki.fi

3974. Hämäläinen, M. (2003): The 150 year anniversary of Selys' Synopsis des Caloptérygines. *Malangpo* 20: 196-200. (in English). [The paper acknowledges the outstanding work of Baron Michel-Edmond de Selys Longschamps (1813-1900) with special emphasis on the "Synopsis des Caloptérygines". The paper outlines the classification system and regional coverage of the species. App. 230 taxa have been known to Selys. At present, the number of the known Caloptera is already over 450 species. Many taxa await description, and the number of species in Caloptera is believed to pass the limit of 500 species.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

3975. Hatchings, G. (2003): Another dot on the map - *Aeshna tuberculifera* from north-central Saskatchewan. *Argia* 15(3): 9-10. (in English). [Canwood, Saskatchewan, Canada; continuation of range extension of *A. tuberculifera*.] Address: Hatchings, G. E-mail: sea-trek@islandnet.com

3976. Hatchings, G. (2003): Observations of an ovipositing dragonfly frenzy in the rain. *Argia* 15(3): 8-9. (in English). [Oviposition of dozens of *Aeshna eremita* was taking place in a real down-pour, but it was "also fairly dark with the thick, black clouds covering the sun low on the horizon. This downpour which must have been like large water-filled balloons to a dragonfly's wing, didn't slow down their hectic flight but did cause some to do these somersaults in mid-air. I could easily make out their complete flips and the reason they perform mis - to rid themselves of the water they had accumulated, flinging it off in all directions. It was cool to see this at such close proximity and as a backdrop, the sound of thunder and the flash of lightning. [...] (Author)] Address: Hatchings, G. E-mail: sea-trek@islandnet.com

3977. Hatchings, G. (2003): Where do dragonflies go when they die? *Argia* 15(3): 9. (in English). [Saskatchewan, Canada, 24.VIII. 2003; several adults with tattered outer wing margins plunge onto the surface only to be trapped by the surface tension, where they end stuck upside down. "Now, I'm sure many of us have seen this behaviour and have noted how these dragonflies almost seem Osprey-like in how they can extract themselves from the surface, somersault in the air [...], and carry on. I've seen mating or battling pairs perform this stunt with bom leaving the water eventually either singly or attached as a copulating pair. However, these observations I made in late August of aged individuals appeared almost as if they intended to remain here to die. At this latter site on the large lake, I observed two individuals about 15 metres offshore, plunge in and remain fluttering upside down on the surface for up to 15 minutes [...]. Their fluttering frequency diminished to the point where they eventually cooled down and become almost totally motionless." (Author)] Address: Hatchings, G. E-mail: sea-trek@islandnet.com

3978. Hayashi, F.; Dobata, S.; Arai, Y. (2003): Countrywide genetic map of DNA of migratory *Pantala flavescens*. In: Arai, Y. (Ed): A Countrywide Survey of Red Dragonflies. Musashino Satoyama Research Group, Institute of Agriculture and Natural environments. 47 pp. Translation: Ishizawa, N., Tokorozawa City, Japan: 24-32. (in Japanese). [To get information on the population genetics of *P. flavescens* in Japan, the DNA of 33 specimens from Japan, and additional 7 from the Mariana

Islands, Cambodia, and South Korea was analyzed. The primarily results suggest, that the species is highly migratory, and populations of it from oceanic islands far south of Japan toward the Indochina Peninsula have genetic exchanges to each other, as well as those in Japan.] Address: Arai, Y., 1233-2, Oaza Sueno, Yorii-machi, Osato-gun, Saitama Pref., 369-12, Japan.

3979. Hazet, G. (2003): Contribution à la connaissance de la faune odonatologique de l'île-au-Moine (Commune de Martot, département de l'Eure). *Martinia* 19(3): 97-98. (in French with English summary). [At the confluence of the river Eure into the Seine, 11 odonate species could be found.] Address: Hazet, G., 24, rue Martin, F-76320 Caudebec-lès-Elbeuf, France

3980. Heidemann, H. (2003): Analyses d'ouvrages: - Landschaft in neuer Bestimmung / Russische Truppenübungsplätze, par Horst Beutler. 2000 - Die Libellen Baden-Württembergs, Band 2, par Klaus Sternberg et Rainer Buchwald. 2000. *Martinia* 19(3): 119-120. (in French). [reviews] Address: Heidemann, H., Au in den Buchen 66, D-76646 Bruchsal, Germany

3981. Herren, B. (2003): Erstnachweis von *Sympetrum fonscolombii* (Sel.) in den Vereinigten Arabischen Emiraten (Anisoptera: Libellulidae). *Notul. odonat.* 6(2): 24. (in German). [1 male, Fujairah National Dairy Farm nr Dibba; 27 Jan. 2003.

3982. Hubble, D.S.; Hurst, D. (2003): Management of small dug ponds for Odonata conservation and colonization in an area of valley mire and wet heathland (Bourne Valley, Dorset). *J. Br. Dragonfly Society* 19(1/2): 24-34. (in English). ["Since 1996, and possibly earlier, around 30 small ponds have been dug for nature conservation purposes at a variety of locations within a six hectare area of valley mire and wet heath within the Bourne Valley Local Nature Reserve, Dorset. The site is nationally important for its dragonfly community, supporting 65 per cent of British species of Odonata, and is also noted for its other heathland flora and fauna, including all six British reptile species. To investigate the pattern of colonization over time by Odonata and other aquatic fauna, six ponds were sampled with all Odonata, Trichoptera, Coleoptera and newts (*Triturus*) identified and recorded. Odonata were more abundant and diverse in ponds six or more years old. Coleoptera also increased with age of pond, while Trichoptera decreased. Overall abundance and diversity of aquatic fauna were closely related with the greatest increases within the first three years after pond creation. After this, there was less increase in overall abundance and diversity and changes in community structure were seen. Therefore, to maximize the biodiversity of Odonata and other aquatic invertebrates, a full spectrum of pond ages is required. As some fill and dry, others are newly dug and there is a continual rotating succession of pond habitats. As well as increasing structural diversity within the pond system, more specific aims of heathland pond management are presented which may promote colonization by diverse Odonata populations." (Authors)] Address: Hubble, D.S., Ecological Monitoring & Research, 7 Ainsley Gardens, Eastleigh, Hampshire, UK

3983. Ishizawa, N. (2003): Population dynamics in *Sympetrum frequens* at the Okumusashi Hills. In: Arai, Y. (Ed): A Countrywide Survey of Red Dragonflies. Musashino Satoyama Research Group, Institute of Agriculture and Natural environments. 47 pp. Translation: Ishi-

zawa, N., Tokorozawa City, Japan: 38-43. (in Japanese). [*S. frequens* is said to spend its pre-reproduction period in highlands in summer far away from the breeding grounds in the lowlands. This widely accepted description of seasonal habitat change is questioned because of recent observations of summering in lowlands. (1) The author compiles the current status of knowledge. (2) He reports on his survey made at three sections of different altitude in Hanno City, Saitama Pref., Japan. Three transects were surveyed ten times between July and October 2002. Observation of first and last records, changes of population density at each of the three transects, perching on electric wires, migration, maturity, oviposition at high elevations, and co-occurring *Sympetrum*-species are documented and discussed.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozawa City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

3984. Iwabuchi, S.; Ukawa, Y. (2003): Survey of Red Dragonflies by using Internet. In: Arai, Y. (Ed): A Countrywide Survey of Red Dragonflies. Musashino Satoyama Research Group, Institute of Agriculture and Natural environments. 47 pp. Translation: Ishizawa, N., Tokorozawa City, Japan: 19-23. (in Japanese). [The paper outlines the concept and the technical equipment of the countrywide survey of red dragonflies in 2002. For more details see: <http://map.edb.miyakyo-u.ac.jp/akatombo/>] Address: Ukawa, Y., Environmental Education Research Center of Miyagi University of education, Japan

3985. Jacquemin, G.; Boudot, P. (2003): Le deuxième Symposium International d'Odonatologie de la W.D.A. («Worldwide Dragonflies Association») en Suède (22-27 juillet 2001). *Martinia* 19(2): 68-70. (in French). [Brief report of the WdA symposium in Gällivare, Sweden including some remarks on records made in the framework of a post symposium trip to Finland.] Address: Jacquemin, G., Biol. d. Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

3986. Jezierska-Madziar, M.; Gromadzińska-Graczyk, H.; Golski, J.; Dziurbacz, A. (2003): Zoobenthos of the Warta Rier oxbows as an important fish food. Abstracts of papers and posters presented at the 19th Symposium of Polish hydrologists, Fac. Biol., Univ. Warsaw, 9-12 Sept. 2003: 70. (in Polish). [passing reference to Odonata only.] Address: Katedra Rybactwa Śródlądowego Akwakultury, AR im. Augusta Cieszkowskiego w Poznaniu, ul. Wojska Polskiego 28, PL-60-625 Poznań, Poland. E-mail: madziar@owl. au.poznan.pl

3987. Jödicke, R.; Tol, J. van (2003): Case 3253 - *Libellula aenea* Linnaeus, 1758 (currently *Cordulia aenea*) and *L. flavomaculata* Vander Linden, 1825 (currently *Somatochlora flavomaculata*; Insecta, Odonata): proposed conservation of usage of the specific names by the replacement of the lectotype of *L. aenea* with a newly designated lectotype. *Bulletin of Zoological Nomenclature* 60(4): 272-274. (in English). ["The purpose of this application is to conserve, under Article 74.1 of the Code, the current usage of the names of two dragonfly species. In 1758, Linnaeus established the name *Libellula aenea* for three specimens. These have subsequently been recognized as belonging to two species: *L. aenea* and *L. flavomaculata* Vander Linden, 1825. In 1956, Fraser designated one of Linnaeus's specimens as the lectotype of *L. aenea*. However, the

specimen he designated was the one used by Vander Linden to denote his species *L. flavomaculata*. Fraser's action made *L. aenea* a senior objective synonym of *L. flavomaculata*. It is proposed that one of Linnaeus's specimens other than the one selected by Fraser be designated as the lectotype of *L. aenea*, thus conserving prevailing usage of both names." (Authors)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: r.joedicke@t-online.de

3988. Joniak, T.; Klimaszyk, P.; Domek, P. (2003): A comparative analysis of humus lake macrofauna communities in Drawieński and Wielkopolski national parks. Abstracts of papers and posters presented at the 19th Symposium of Polish hydrologists, Fac. Biol., Univ. Warszaw, 9-12 Sept. 2003: 71. (in Polish). [Poland; Lake Głodne Jeziorko III (0,65 ha), Lake Głodne Jeziorko IV (0,42 ha), Drawieński National Park, Lake Głębokie (0,5 ha); *Enallagma cyathigerum*, *Ischnura elegans*, *Pyrrhosoma nymphula*, *Cordulia aenea*, and *Somatochlora metallica* are listed.] Address: Joniak, T., Zakład Ochrony Wód, Uniwersytet im. A. Mickiewicza, ul. Drzymały 24, PL-60-613 Poznań, Poland. E-mail: tjoniak@hoga.pl

3989. Kalkmann, V.; Ketelaar, R.; Weide, M. van der (2003): Libellen (Odonata) in de Periode 1998-2002. In: EIS-Nederland, De Vlinderstichting en de Nederlandse Vereniging voor Libellenstudie (Hrsg.). Waarnemingen-verslag dagvlinders, libellen en springhanen: 31-53. (in Dutch). [Netherlands; distribution maps resp. maps with records of 64 Odonata are documented and discussed.] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

3990. Kano, K. (2003): An attempt of interspecific tandem formation with a female of *Planaeschna milnei* (Selys) by a male of *Boyeria maclachlani* (Selys). *Boso no Konchu* No. 31: 5. (in Japanese). ["On September 14, 2003, I saw a female of *P. milnei* ovipositing at a river at Obuta, Chonan-machi, Chosei-gun, Chiba Pref., Japan. It was attacked by a patrolling male of *B. maclachlani*, and fell onto the stream each other. The male struggled to copulate with the female for about 2 minutes, but it did not succeed and flew away. The female was unable to alight from the water and was carried away by the stream. Both species usually differ their habitat each other; in *P. milnei* in upper reaches of a stream and in *B. maclachlani* in the mid stream. My observation spot is a junction of a branch stream and the mid stream of the river, where both habitats might have been connected. I think the male might have mistaken the female for a conspecific female." (Taken from Digest of Japanese Odonatological Short Communications 15; edited and translated by ISHIZAWA, Naoya).] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3991. Kano, K. (2003): Copulating flight of a male *Boyeria maclachlani* (Selys) with an inactive female. *Gekkan-Mushi* 394: 25-26. (in Japanese). ["I saw a male *B. maclachlani* attempting copulation on an inactive congener female at the Obuta river at Chonan-machi, Chosei-gun, Chiba Pref., Japan on August 15, 1998. On that day it was fine, and around noon males flew about at the river and approached females for copulation. At 3:00 p.m. I found on the bank an inactive female with its four wings cut at the middle of them, only main

veins left. I picked it up and released it, however, it fell on the ground without fluttering. When put on a rotten log, which is a suitable oviposition substrate, a male appeared after a while took her into tandem formation to fly off. The male attempted to copulate with her, pulling her near him. They fell on to the water, struggling and somehow took tandem formation on the surface of the water. They flew up from the water and perched on a bamboo stem near my observation spot. When I approached it flew up and disappeared." (Taken from Digest of Japanese Odonatological Short Communications 15; edited and translated by ISHIZAWA, Naoya).] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3992. Kano, K. (2003): Male-male tandem formation in *Boyeria maclachlani* (Selys). *Boso no Konchu* 31: 5. (in Japanese). [River at Obuta at Chonan-machi, Chosei-gun, Chiba Pref., Japan; on September 14, 2003, a perched male-male tandem of *B. maclachlani* was observed. The connected male was dead. Its head was twitched oppositely, however, the pseudopupils were still fresh on the green compound eyes. Its right foreleg hung on its right forewing. (Taken from Digest of Japanese Odonatological Short Communications 15; edited and translated by ISHIZAWA, Naoya).] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

3993. Kiauta, B. (2003): A note on the Odonata collection of the Rev. Father Gabriel Strobl (1946-1925) in the Benedictine Abbey at Admont, Austria. *Notul. odonat.* 6(2): 14-19. (in English). ["A brief description is provided of a collection containing 62 European and 119 non-European species, mostly from Austria and northern Italy, but also from various regions of Africa, Asia and the Americas. [...] The note does not provide a taxonomic review of this collection; its sole objective is to draw attention to the valuable material in the Natural History Museum of the Benedictine Abbey at Admont. The Museum and all its collections were assembled by Strobl singlehandedly between 1866 and 1910." (Author)] Address: Kiauta, B., P.O. Box 256, NL-3720 AG Bilthoven, The Netherlands

3994. Klaus, D. (2003): Tagung Sächsischer Entomologen am 11.10.2003 Dresden (Gemeinschaftsveranstaltung des Landesverbandes Sachsen der Entomofaunistischen Gesellschaft e.V. und des Staatlichen Museums für Tierkunde in Dresden). *Mitt. Sächs. Entomol.* 65: 11-13. (in German). [In the framework of the scheduled 'Dragonfly fauna of Saxonia', Dr. Thomas Brockhaus gave a lecture on the current status of the Odonata fauna of Saxonia, Germany. New data of 2003 should be added, and special emphasis is given to the range extensions of *Gomphus vulgatissimus* and a new record of *Leucorrhinia caudalis*.] Address: Klaus, D., Heimstätten 10, D-04571 Rötha, Germany

3995. Koch, H.-M. (2003): Emergenz mehrerer Arten an einem einjährigen Gewässer. *mercuriale* 3: 31-35. (in German). [Inselsee, NSG Listhof, Baden-Württemberg, Germany; the emergence of the following species is documented in detail: *Anax imperator*, *Sympetrum striolatum*, *Sympecma fusca*, *Lestes sponsa*, *Libellula depressa*, *Orthetrum cancellatum*, and *O. brunneum*.] Address: Koch, H.-M., Krämerstr. 40, D-72764 Reutlingen, Germany. koch.druckerei@t-online.de

- 3996.** Korytcińska, M.; Tończyk, G. (2003): Odonate fauna of the Liwiec river (Południowopodlaska and Środkowomazowiecka Lowlands). Abstracts of papers and posters presented at the 19th Symposium of Polish hydrologists, Fac. Biol., Univ. Warszaw, 9-12 IX. 2003: 88. (in Polish). [The odonate fauna of the Południowopodlasla floodplain is hardly known. In 2000 and 2002, 12 localities along the river Liwiec, a left tributary of the river Bug (Poland), were sampled for Odonata. A total of 11 species was recorded, among them *Stylurus flavipes*, and *Ophiogomphus cecilia*. Dominant species have been *Calopteryx splendens*, *C. virgo*, *Platycnemis pennipes*, and *Gomphus vulgatissimus*.] Address: Korytcińska, Małgorzata, Katedra Ekologii i Ochrony Środowiska, Akademia Podlaska, Siedlce, ul. B. Prusa 12, PL-08-110 Siedlce, Poland. E-mail: gosiak@ap.siedlce.pl
- 3997.** Krech, M.; Lindner, I. (2003): Die Bedeutung von Sekundärgewässern als Lebensraum seltener und gefährdeter Libellenarten am Beispiel der Ziegeleiteiche Pölchow (Landkreis Bad Doberan). *Archiv der Freunde der Naturgeschichte in Mecklenburg* 42: 87-100. (in German). [A five year study of the odonate fauna in clay pits near Pölchow, Mecklenburg-Vorpommern, Germany resulted in 31 odonate species. Among the species most noteworthy are *Leucorrhinia caudalis*, *L. pectoralis*, *Libellula fulva*, and *Erythromma viridulum*. The emergence of *Brachytron pratense* (2003) and *Cordulia aenea* (2001) is documented in detail. Conservation measures are discussed.] Address: Krech, M., Ziolkowskistr. 11, D-18059 Rostock, Germany
- 3998.** Krech, M.; Biele, S. (2003): Reproduktionsnachweise der Zierlichen Moosjungfer (*Leucorrhinia caudalis* Charpentier, 1840) im Warnowtal mit Anmerkungen zum aktuellen Verbreitungsstatus der Art in Mecklenburg-Vorpommern. *Archiv der Freunde der Naturgeschichte in Mecklenburg* 42: 101-107. (in German). [*L. caudalis* is autochthonous in a 12 years old, groundwater-fed clay pit near Pölchow, Mecklenburg-Vorpommern, Germany. Phenology, emergence-habitat, and co-occurring odonate species are described, and threats are discussed.] Address: Krech, M., Ziolkowskistr. 11, D-18059 Rostock, Germany
- 3999.** Krekels, R. Jong, T. de (2003): *Krabbescheer en Groene glazenmaker in de provincie Utrecht*. Prov. Utrecht, Utrecht: 15 pp. (in Dutch). [*Stratiotes aloides* and *Aeshna viridis* in the province of Utrecht, the Netherlands: This attractive, richly illustrated booklet, outlines the biology and distribution of the 2 taxa in the province, and presents detailed suggestions for conservation management measures directed to the *Stratiotes* vegetation, which is mandatory for the persistence of the *A. viridis* population.] Address: Available from: *Ecologisch onderzoek en Groene regelgeving, Provincie Utrecht*, P.O. Box 80300, NL-3508 TH Utrecht, The Netherlands. (Coordinator: Jandirk Kievit: jandirk.kievit@province-utrecht.nl)
- 4000.** Kunz, B. (2003): Die Falsche geangelt - Teil II. *mercuriale* 3: 39. (in German). [Saarbergweiher, LK. Schwäbisch Hall, Baden-Württemberg, Germany; 04.IX.2003; mixed pair between a male *Sympetrum sanguineum* and a female *S. danae*.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de
- 4001.** Kunz, B. (2003): Mehrere Beobachtungen von *Sympetrum meridionale* in NO-Württemberg. *mercuriale* 3: 36. (in German). [Lk Schwäbisch Hall, Baden-Württemberg; three records of *S. meridionale* are briefly documented] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de
- 4002.** Kunz, B.; Hunger, H. (2003): Phänologiedaten 2003 einiger Libellen aus Mitteleuropa. *mercuriale* 3: 41-42. (in German). [Records refer to the following species from Switzerland and Baden-Württemberg, Germany: *Calopteryx virgo*, *Anax parthenope*, *Libellula depressa*, *Libellula quadrimaculata*, *Orthetrum cancellatum*, *Crocothemis erythraea*, *Sympetrum fonscolombii*, *S. pedemontanum*, *S. striolatum*, and *Leucorrhinia pectoralis*.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de
- 4003.** Leroy, T. (2003): *Coenagrion lunulatum* (Charpentier, 1840) et *Coenagrion hastulatum* (Charpentier, 1825): espèces nouvelles pour le département de l'Aveyron (Odonata, Zygoptera, Coenagrionidae). *Martinia* 19(4): 154-157. (in French, with English summary). [2-VI-2002, Curières, Dept. Aveyron, France. With focus on *C. lunulatum* and the region of Aubrac, the distribution of the species is discussed.] Address: Leroy, T., Le Bourg, F-63210 Heume-l'Eglise, France. E-mail: thierryleroy@caraimail.com
- 4004.** Lissak, W. (2003): Beitrag zur Libellenfauna im nördlichen Vorland der Schwäbischen Alb. *mercuriale* 3: 12-19. (in German). [Report on the present status of many odonate species resulting on a mapping scheme starting in the mid of the 1980s. Changes in the faunal composition and abundance (range declines, range extensions, global warming) are documented and discussed.] Address: Lissak, W., Schubartstr. 12, D-73092 Heiningen, Germany. E-mail: W.Lissak@naturschutzzentrum-schopfloch.de
- 4005.** Lodge, R.J.; Freeland, J.R. (2003): The use of Odonata museum specimens in questions of molecular evolution. *Odonatologica* 32(4): 375-380. (in English). ["Studies of population genetics and phylogenetics require samples from individuals representing a variety of species and populations. Collecting the necessary individuals may be problematic, particularly for seasonal, rare, or geographically remote organisms. Museum collections therefore provide a potentially valuable resource, and the widespread use of polymerase chain reactions (PCR) means that target regions of DNA can be amplified from very small amounts of tissue. Here modifications to DNA extraction techniques are described that have allowed the authors to extract, amplify, and sequence a portion of mitochondrial DNA from parts of single dragonfly legs taken from museum specimens up to 80 yrs old. It is anticipated that in future these techniques will be applied to a range of odonate studies, including questions of conservation genetics." (Authors)] Address: Freeland, J.R., Dept of Biological Sciences, Open University, Walton Hall, Milton Keynes, MK7 6AA, United Kingdom. E-mail: J.R.Freeland@open.ac.uk
- 4006.** Lohr, M. (2003): Étude faunistique des Odonates des plaines alluviales de l'Allier et de quelques affluents au nord-ouest de Moulins (Départements de l'Allier, du Cher et de la Nièvre). *Martinia* 19(4): 123-148. ["The results of a field survey on Odonata realized

between 1995 and 2002 in the alluvial floodplains of the lower Allier valley as well as in those of some tributaries are presented. The Odonata population of different types of habitats were studied during 10 field trips by observing adults and collecting exuviae at 65 sampling sites. The total number of species observed within the present study amounts 50, at least 40 of them are autochthonous. The study results of the Odonata population are presented for each type of aquatic habitat. The importance of the investigated area for conservation and protection of Odonata and alluvial ecosystems even at European level can be derived - among other things - from the extraordinary richness of the Odonata population. This richness is particularly demonstrated by the Odonata population of the main channel of the river Allier, where 19 autochthonous species were observed, 6 of them belonging to Gomphidae. The author discusses the possibilities of conservation and protection of the lower Allier alluvial floodplains. Finally the results are considered with regard to regeneration measures for other alluvial floodplains in Central Europe." (Author)] Address: Lohr, M., Fachhochschule Lippe und Höxter, Fachgebiete Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-hoexter.de

4007. Lucas, B. (2003): Overwintering of larvae of the Common Darter *Sympetrum striolatum* (Charpentier) in the north of England. *J. Br. Dragonfly Society* 19(1/2): 1. (in English). [On 10 December 2001, larvae of *Sympetrum spec.* with only 1.5mm in length were traced. Both *Sympetrum striolatum* and *S. sanguineum* are recorded from the site. "During 2001, both species had an extended flying season in this area, which may account for non-diapause eggs being laid so late in the year. The larval growth of overwintering *S. striolatum* has been recorded at a pond in the New Forest [...]. However, at the same time of year these larvae were twice the size of the Yorkshire ones, i.e. 3mm in length. Research to discover whether such small larvae could withstand a Yorkshire winter was undertaken. I decided to measure the larvae approximately every two weeks. This entailed pond dipping, measuring the larvae at home and then returning them to the pond. On only two occasions did thick ice inhibit access to open water. It was assumed that, as the larvae were only 1.5mm in length when first collected, they were in the second stadium, i.e. the first stadium after the prolarva. As expected, from 10 December 2001 to the end of February 2002, no growth took place. The rate of growth of the larvae until emergence of the adult insect matched that of the New Forest larvae, but was three to four weeks later in the year, this time difference being constant throughout the study. On 13 July 2002, no larvae were found and in fact *S. striolatum* was on the wing. Further visits have been made and exuviae collected. All were *S. striolatum*. Therefore, it seems safe to assume that none of the larvae recorded were *S. sanguineum*." (Author)] Address: Lucas, B., 8 Camborne Drive, Fixby, Huddersfield, West Yorkshire HD2 2NF, UK

4008. Martens, A.; Jödicke, R.; Suhling, F. (2003): An annotated checklist of the Odonata of Namibia. *Cimbebasia* 18: 139-160. (in English). ["This paper presents an annotated checklist of the Odonata of Namibia, which provides information for each recorded species on: World distribution, previous published records, detailed distribution within Namibia and specific notes where appropriate. To date, 102 species of Odonata

have been recorded from Namibia. Additionally, 9 species have been recorded from Botswana and Zambia at stretches of the Chobe/Linyanti and the Zambezi Rivers forming the Namibian borders. These species are also taken into account in the checklist. As many other species are recorded in Angola, in close proximity to the Namibian border further species are to be expected. In addition to the checklist, we further present some general distributional patterns of Namibian Odonata, being: (a) tropical running water species, mainly restricted to the northern or northeastern perennial rivers, (b) tropical species not restricted to running waters, but adapted to more humid environmental conditions, (c) species adapted to arid conditions; being mobile, having opportunistic habitat selection and rapid development, and being widespread in Namibia, (d) species of permanent waters occurring at isolated spots within Namibia, and (e) southern, subtropical species, restricted to the south." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

4009. Martens, A. (2003): Reproductive behaviour of African Odonata - a review. *Cimbebasia* 18: (in English). ["This paper presents a review of the reproductive behaviour of African Odonata, outlines our current knowledge, and further defines priorities for gathering information required to understand biodiversity patterns and evolution of mating systems. To date, information on reproductive behaviour is available for approximately 130 of the 850 species of Odonata known from Africa. A full bibliography of published papers in this field is provided. The aim of this paper is to stimulate systematic collection of previously unpublished observations and to encourage a broader approach to behavioural ecology by including experiences and observations of entomologists who regard themselves as non-specialists in this field. Priorities are defined, with special attention being given to the description and analysis of: (1) reproductive habitats, (2) species-specific behavioural patterns, (3) plasticity of behaviour within a species, (4) the search for behavioural patterns on a higher taxonomic level, and (5) placing behaviour in an ecological context." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

4010. Martens, A.; Suhling, F. (2003): The barbed inflorescences of the grass *Setaria verticillata* (L.) Paliot de Beauvois (Poaceae) as a lethal trap for dragonflies (Odonata). *Cimbebasia* 18: 243-246. (in English). ["At a pond below the Von Bach Dam near Okahandja, Namibia, adults of the libellulid anisopteran dragonflies *Crocothemis erythraea* (Brullé) and *Diplacodes lefebvrei* (Rambur) were observed being trapped by flowering stands of *Setaria verticillata* (Poaceae). The spiny seeds of this grass offer a means of seed dispersal by animals. As this species grows beside water, this grass serves fortuitously as a trap for adult dragonflies, especially males, which often use such conspicuous, upright structures as perching sites. Other published accounts of the same phenomenon from throughout the World are summarised." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

- 4011.** Masselot, G.; Nel, A. (2003): Les Odonates sont-ils des taxons bio-indicateurs? *Martinia* 19(1): 7-40. (in French with English summary). ["From a definition of the « biological indicator » concept, which covers very different uses (bio-monitoring, sentinel organisms, bio-informative species), a critical review of the significant contributions using Odonata is carried out. Autochthony of Odonata is discussed. Some synecoparsimony analyses are proposed, which expose a new method to study the relations between Odonata and macrophytes. These tend to show that this relation is not an association, but rather simply a « synecosis », and that many problems do not authorize, in the current state of knowledge, to establish a reliable tool for description of hydrosystems bioassessment, resting on the only conjunction between freshwater macrophytes and Odonates. Complementary studies, including both the whole of the freshwater entomocoenosis for example, and analysis tools that do not introduce neither preliminary scenarisation (ad hoc hypotheses), nor methodological bias, must be undertaken as prerequisites to elaborate a biomonitoring tool for freshwater hydrosystems assessment." (Authors)] Address: Masselot, G., Laboratoire d'Entomologie, Muséum National d'Histoire Naturelle, 45, rue Buffon, F-75005 Paris, France. E-mail: gm@invfinr.org
- 4012.** Masselot, G. (2003): Présentation succincte de la thèse : «La synécoparcimonie: un outil d'évaluation biologique de la qualité des eaux courantes. Théorie et applications». *Martinia* 19(1): 5-6. (in French with English summary). [This is a brief presentation of a thesis titled «Synecoparsimony: a freshwater biomonitoring tool. Theory and applications», comprising 417 pp and appendices, and presented at the Laboratoire d'Entomologie, Muséum National d'Histoire Naturelle, Paris, France. A facsimile of the thesis' cover is documented.] Address: Masselot, G., Laboratoire d'Entomologie, Muséum National d'Histoire Naturelle, 45, rue Buffon, F-75005 Paris, France. E-mail: gm@invfinr.org
- 4013.** Mayer, J. (2003): Zur Libellenfauna des NSG Schopflocher Moor ("Tongrube"). *mercuriale* 3: 4-5. (in German). [The peat bog, in the past years excavated for peat cutting and clay mining, was revitalised. The colonisation by Odonata is briefly outlined with special emphasis on the peat bog species. *Aeshna juncea*, *Sympetrum danae*, and *Libellula quadrimaculata* are reproducing, and a dispersing *Leucorrhinia dubia* was observed.] Address: Mayer, J., Dorfstr. 57, D-73061 Ebersbach-Rößwälden, Germany. JohannesDMayer@web.de
- 4014.** Mead, K. (2003): Findings of the 2003 Great Lakes Odonata Meeting. *Argia* 15(3): 1-3. (in English). [Report and list of collected species from the 2003 Great Lakes Odonata Meeting held in Finland, Minnesota, USA.] Address: Mead, K., 6388 Lax Lake Rd., Finland, MN 5560, USA
- 4015.** Meurgey, F. (2003): Comptage d'exuvies et observations relatives à l'émergence d'*Aeshna juncea* (L., 1758) en Haute-Savoie. *Martinia* 19(3): 92. (in French). [Ste Foy Tarentaise, Haute-Savoie, France, 2800 a.s.l.; the emergence habitat of *A. juncea* is described.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 4016.** Meurgey, F. (2003): Les Odonates dans le régime alimentaire de la Cigogne blanche (*Ciconia ciconia*) - nouvelle donnée en Loire-Atlantique. *Martinia* 19(3): 108. (in French). [The stomach of a dead White stork found in August contained 95% of Odonata, nearly exclusively *Sympetrum* sp.. *Sympetrum* is the most abundant species around lake Grand-Lieu in August, and the White stork is known to feed opportunistically.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 4017.** Meuris, L. (2003): Merkwaardige waarnemingen bij de voortplanting van de Bloedrode heidelibel (*Sympetrum sanguineum*). *Gomphus* 19(1): 33-35. (in Dutch with English and French summaries). [Belgium; observations of reproduction behaviour of *Sympetrum sanguineum*.] Address: Meuris, L., Van Bockstaelestraat 7, B-9050 Ledeborg, Belgium. E-mail: Luc.meuris@pan-dora.be
- 4018.** Mey, D. (2003): Vorkommen und Beobachtungen zur Verhaltensweise der Feuerlibelle *Crocothemis erythraea* Brullé, 1832 (Odonata: Libellulidae) in Thüringen. *Veröffentlichungen Naturkundemuseum Erfurt* 22: 137-148. (in German with English summary). [Since 2001, *C. erythraea* has been recorded in Thuringia, Germany at three habitats: in the gravel pits near Herrenhof in Central Thuringia, at Silbersee lake in the Hainich National Park in Western Thuringia, and at the former peat-cutting pit near Mühlberg in Central Thuringia. At the two latter water bodies, mating, copula, oviposition, and territoriality of the species was observed. Larvae or exuviae were not found. The records are documented and discussed in detail. Co-occurring odonate species - including *Coenagrion mercuriale* and *Leucorrhinia pectoralis* - are listed in an table.] Address: Mey, D., Karl-Hermannstr. 3, D-99848 Wutha-Farnroda, Germany
- 4019.** Michoński, G. (2003): The first record of *Sympetrum depressiusculum* (Sélys, 1841) (Odonata: Libellulidae) in the Western Pomeranian Lakeland. *Wiad. entomol.* 22(3): 187-188. (in Polish). [Poland, Lutkowo near Dobrzany (15°23N 15°22E), 14.X.2001, 1 male *S. depressiusculum*] Address: not stated
- 4020.** Mielewczyk, S. (2003): The study of entomofauna (Odonata, Hemiptera, Heteroptera, Coleoptera) of the "Niknaça Łąka" peatbog in Stołowe Mountains National Park. *Szczelinc* 7: 59-72. (in Polish, with English summary). [The paper seems to be quite identical with that of Mielewczyk (2002); see OAS 3872.] Address: Mielewczyk, S., Polska Akademia Nauk, Zakład Badań Środowiska Rolniczego i Leśnego, ul. Bukowska 19, PL-60-809 Poznań, Poland
- 4021.** Miller, P.; Miller, K. (2003): East African dragonflies. A guide for residents, students and visitors, with colour plates and keys.. *Nature Kenya*, Nairobi. ISBN 9966-9921-3-8: X + 263 pp., 8 col. pls incl. (in English). [Peter Miller, outstanding odonatologist of the past century and teacher for many of us, together with his wife Kate spent a significant time of his life studying African Odonata. He planned to intensify these studies and to write a book on African dragonflies, but was sadly no more in the situation to finish it. On the basis of his and their common ideas, Kate Miller prepared a book in the memorial of Peter. The book intends "to aid appreciation and conservation of dragonflies of East Africa. It

was written for School and University students and other residents in Kenya, Tanzania and Uganda, and also for visitors". Unique in its scope, it provides all the basic information required by a student of African odonate ecology, biology and behaviour, including a checklist of East African species, a key to the families and genera, and a very informative glossary. 30 selected species are introduced in a monographic way. Each species is depicted by a colour photo, and morphological characters are outlined. Much hitherto unpublished information by the authors is provided. The didactical concept of this book is unique and an authoritative example for introduction into the study of Odonata or any other group of insects. It should not be missing from any odonatological library. The following species have been selected for presentation: *Phaon iridipennis*, *Umma saphirina*, *Lestes virgatum*, *Chlorocypha trifaria*, *Platycypha caligata*, *Pseudagrion melanicterum*, *P. hageni*, *Mesocnemis singularis*, *Platycnemis congolensis*, *Chlorocnemis marshalli*, *C. pauli*, *Elatoneura glauca*, *Ictinogomphus ferox*, *Notogomphus leroyi*, *Paragomphus genei*, *Aeshna ellioti*, *Anax imperator*, *Gynacantha bullata*, *Phyllomacromia funicularia*, *P. nyanzana*, *Brachythemis lacustris*, *B. leucosticta*, *Crocothemis erythraea*, *Hadrothemis coacta*, *Orthetrum trinacria*, *Palpopleura lucia*, *Pantala flavescens*, *Rhyothemis notata*, *Tetrathemis polleni*, and *Tholymis tillarga*.] Order: Price £ 20.- net.: Prepaid orders to be sent to: Mrs A.K. Miller, 68 Blenheim Dr., Oxford, OX2 8DQ, UK

4022. Misof, B.; Fleck, G. (2003): Comparative analysis of mt LSU rRNA secondary structures of Odonates: structural variability and phylogenetic signal. *Insect Molecular Biology* 12(6): 535-548. (in English). ["Secondary structures of the most conserved part of the mt 16S rRNA gene, domains IV and V, have been recently analysed in a comparative study. However, full secondary structures of the mt LSU rRNA molecule are published for only a few insect species. The present study presents full secondary structures of domains I, II, IV and V of Odonates and one representative of mayflies, *Ephemera* sp. The reconstructions are based on a comparative approach and minimal consensus structures derived from sequence alignments. The inferred structures exhibit remarkable similarities to the published *Drosophila melanogaster* model, which increases confidence in these structures. Structural variance within Odonates is homoplastic, and neighbour-joining trees based on tree edit distances do not correspond to any of the phylogenetically expected patterns. However, despite homoplastic quantitative structural variation, many similarities between Odonates and *Ephemera* sp. suggest promising character sets for higher order insect systematics that merit further investigations." (Authors)] Address: Misof, B., Dept of Entomology, Researchinstitute Alexander König and Museum of Zoology, Adenauerallee 160, D-53113 Bonn, Germany. E-mail: b.misof@uni-bonn.de

4023. Moncomble, M. (2003): Première observation de la reproduction d'*Epitheca bimaculata* (Charpentier, 1825) en Poitou-Charentes et mise à jour des départements mentionnant cette espèce (Odonata, Anisoptera, Corduliidae). *Martinia* 19(4): 149-153. (in French, with English summary). [On 10-V-2003, *E. bimaculata* was traced near Poitou-Charentes, Dept. Vienne, France. The habitat is described in detail, co-occurring odonate species are listed, and the distribution of *E. bimaculata* in France is compiled and discussed.] Address: Mon-

comble, M., 5, Thublier de Vielleneuve, F-17600 Saint-Romain-de-Benêt, France. E-mail: mathieu-oncomble@tiscali.fr

4024. Moore, N.W. (2003): Four long term studies on dragonfly populations. *J. Br. Dragonfly Society* 19(1/2): 2-7. (in English). [Few long term studies on dragonfly populations have been published anywhere in the world. The author summarizes those four that have been undertaken since 1949. "1. A small canalized river (the Portbury River) in the Gordano valley, Avon (previously Somerset), 1949-1952. General studies on the behaviour and ecology of dragonflies and development of the transect technique. In these studies quantitative observations were confined to Anisoptera. References: Moore (1953a, 1953b) 2. Water-filled bomb craters, Arne Heath, Dorset, 1954-1960. Studies on dragonfly behaviour, notably on highest steady density. Reference: Moore (1964) 3. Experimental ponds, Woodwalton Fen National Nature Reserve Cambridgeshire (previously Huntingdonshire). Intensive observations 1962-1988, less intensive 1989 onwards. Studies on changes in populations due to serai development and management of the ponds, and on territorial behaviour. References: Moore (1991, 1995, 2001) 4. Large pond in small private nature reserve, Swavesey, Cambridgeshire. 1984 onwards. Studies on population changes due to habitat development and on the origins of the fauna, on territorial behaviour, and on the behaviour of immature insects. References: Moore (2000, 2001, 2002a,b)." All these sites were revisited during the years after starting the intensive studies. Major changes are briefly discussed.] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, UK

4025. Müller, J. (2003): RosMariea Steglich zum 60. Geburtstag. *Entomol. Mitt. Sachsen-Anhalt* 11(2): 84-86. (in German). [This is a brief curriculum vitae of Rosmarie Steglich, currently one of the most profiled odonatologists in the Federal state of Sachsen-Anhalt, Germany, and a specialist for Gomphidae.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

4026. Müller, J. (Red.) (2003): Programm & Abstracts der 22. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen, 14.-16. März 2003 in Dessau/Elbe, Sachsen-Anhalt. *pedemontanum* 4: 50 pp. (in German / English). [The following lectures have been held in Dessau: Ott, J.: Die Ausbreitung mediterraner Libellenarten nach Deutschland, Mittel- und Nordeuropa - Zusammenstellung aktueller Daten im Hinblick auf einen Klimawandel; Donath, H.: Veränderungen der Odonatenfauna der nordwestlichen Niederlausitz vor dem Hintergrund des Klimawandels; Schiel, F.-J.: Die Libellenfauna der Oberhainauen als Spiegelbild der historischen Verhältnisse und des rezenten Ausbauszustandes; Westermann, K.: Auswirkungen der Hochwasser 1995 und 1999 auf Libellenbestände von Fließgewässern der südbadischen Rheinniederung; Bulankova, E.: Distribution of "FFH-Annex species" of dragonflies (Odonata) in Slovakia and their ecological status; Zimmermann, W. & L. Buttstedt: Ökologische Beobachtungen an vergesellschafteten Subpopulationen von *Coenagrion ornatum* und *C. mercuriale* in der Helme-Unterstrut-Aue; Schmidt, E.: Zur Habitat-Präferenz einiger Sommer-Libellenarten in den Elbauen im Raum Dessau im Hinblick auf den Einfluß von Beweidung mit Großvieh; Clausnitzer, H.-J.: Ausbreitung von *Ceriagrion* te-

nellum und *Orthetrum coerulescens* in der Südheide; Brauner, O.: Beobachtungen zum Vorkommen und zur Reproduktion der Südlichen Mosaikjungfer *Aeshna affinis* in Brandenburg; Lohr, M.: Die Libellenbesiedlung des Unteren Allier nördlich Moulins - naturnahes Vorbild für vergleichbare mitteleuropäische Flüsse; Mauersberger, R.: Erste Antworten auf die Frage, warum *Anax parthenope* im Norden Brandenburgs klare und im Süden trübe Seen besiedelt; Leipelt, K.G.: Habitatspezifisches Driftverhalten der Larven von *Cordulegaster*-Arten: Erklärung für ihre Einnischung?; Kuhn, J.: *Nehalennia speciosa* - eine Schlüsselart im Moornaturschutz; Brockhaus, T.: Die Bestandsentwicklung ausgewählter Libellenarten in Sachsen während der vergangenen 200 Jahre; Burkart, W.: Der Libellen wegen nach Norden? - Ergebnisse langjähriger Libellenbeobachtungen auf der Ostseeinsel Gotland; Martens, A.: Die Wüste lebt! - Verbreitungsmuster der Libellen Namibias in Raum und Zeit; Rüppele, G.: Der Flug der Libellen und seine Bedeutung als Einnischungsmechanismus; Wildermuth, H.: Libellen in der Vorreiterrolle bei der Pflege und Gestaltung von Naturschutzgebieten - ein Beispiel aus der Schweiz; Behrends, T.: Ergebnisse dreijähriger Untersuchungen und Populationsentwicklung naturschutzfachlicher Zielarten in der halboffenen Weidelandschaft Hoeltigbaum bei Hamburg; Serfling, C.: Artenhilfsprogramm für die Libellenarten *Coenagrion mercuriale* und *C. ornatum* in Thüringen; Fliedner, T.: Entwicklung von *Sympetrum pedemontanum* vom Ei bis zum Imaginalschlupf am Sihsee (Schweiz); Jödicke, R.: An welche Libellenart dachte Linné, als er *Libellula aenea* beschrieb?; Kunz, B. & R. Jödicke: *Onychogomphus costae*: Portrat eines ibero-maghrebischen Endemiten; Lohr, M.: Zur Ausbreitung von *Crocothemis erythraea* in der nordrhein-westfälischen und niedersächsischen Oberweserniederung; Mauersberger, R.: Zur Kenntnis der potentiell natürlichen Fischfauna der Seentypen NO-Deutschlands als gedankliche Basis für den Libellenschutz; Richter, M.: Untersuchungen zu Habitatansprüchen und Morphometrie von *Cercion lindenii*; Workshop Fische, Fischerei und Libellenschutz (Konzept und Koordination: Kuhn, J., Seewiesen; Moderation: Martens, A., Karlsruhe); Clausnitzer, H.J.: Teichwirtschaft und Libellen; Clausnitzer, H.-J.: *Aeshna viridis* und Angelsport; Keil, R.: Der Einfluß traditioneller Nutzungsformen der karpenteichwirtschaft auf das Vorkommen und die Entwicklung von Libellen; Martens, A.: Koexistenz von Libellen und Fischen - die evolutionsökologische Perspektive; Ott, J.: Die ökologischen Folgen von Fischbesatz auf Libellenzönosen von Kiesgruben; Schmidt, E.: 20 Jahre GdO: Der offizielle Startpunkt am 4.9.1982 in Bonn; Schnabel, H.: Quantitative Untersuchungen zum Schlupf von Libellen an Fischteichen; Weihrauch, F.: Ein Baggersee mit reicher Libellenfauna trotz intensiver Angelfischerei; Wildermuth, H.: Inwieweit beeinträchtigen Fische die Libellenfauna kleiner Moorgewässer] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.Jmuel-ler@t-online.de

4027. Muzlanov, Yu.A. (2003): The pattern of distribution of defects of wing venation in the banded agrion (*Calopteryx splendens*). *Ontogenez* 34(1): 61-66. (in Russian with English summary). [The distribution of morphological structures was studied in wings of the banded agrion (*Calopteryx splendens* Harr.) from different intrapopulation groups. Dragon flies of odd years of emergence are characterized by a more stable pattern of ontogenetic processes according to the mean total

number of venation defects. The sharply increased level of radiation in summer 1986, which coincided with the flight of dragon-flies, could have caused hereditary defects expressed in a sequence of generations of even years of emergence. Apparently, most alternative features of wing venation in dragon-flies can be considered as markers of stability of the ontogenetic processes, which reflect, to a great extent, genotypic features of the organisms in a population. A possible mechanism has been described, which explains the proposed topological model of formation of the venation defects of different types. The increase in mean frequencies of defects can suggest an enhanced development over the aberrant epigenetic trajectories, which may lead to the elimination of these organisms under the influence of various agents, i.e., to the stabilizing selection in a population. The results obtained suggest that defects of venation arise on the stochastic basis and their frequency increases upon destabilization of ontogenetic processes not only by the environmental factors, but also by genetic stress. Venation defects can be successfully used in population biomonitoring." (Author)] Address: Muzlanov, Yu.A., Zarevskii Secondary School, Zarya, Mikhailovskii Raion, Ryazan Oblast, 391728, Russia

4028. Nachtigall, W. (2003): 'Aufflug, mit dem Widerstand' bei der Blauflügel-Prachtlibelle *Calopteryx virgo* (Odonata: Calopterygidae). *Entomologia Generalis* 26(4): 241-251. (in German with English summary). [It is shown that - contrary to equal phasic up to antiphase beating of the fore- and hindwings at normal flight and in mating flight (a.o. ANDERS & RÜPPELE 1996) - during quick vertical starts, all wings beat rapidly and synchronously downward. Model measurements using flow visualisation show that hereby a downward travelling vortex ring, very similar to that of a white cabbage butterfly's vertical take-off (ELLINGTON 1980), is generated. When parameters are measurable, calculations using approximation parameters show that an upward directed reaction force corresponding up to double body weight is generated, thus catapulting the insect vertically into the air. The very next wing-beat already shows a pronounced phase shift which permits lift generation. Thereby the possibility of flying by drag generation, that was indicated by RÜPPELE (1985, 1989) but not analysed in terms of flow mechanics was proved using a flight situation that was measurable and the parameters of which could be calculated." (Author)] Address: Nachtigall, W., Allgemeine Biologie, Universität des Saarlandes, D-66041, Saarbrücken, Germany

4029. Nagasaka, T.; Motobayashi, T.; Nakagawa, M. (2003): Relation of the rice planting period to the quantity of occurrence of *Sympetrum frequens*. In: Arai, Y. (Ed): A Countrywide Survey of Red Dragonflies. Musashino Satoyama Research Group, Institute of Agriculture and Natural environments. 47 pp. Translation: Ishizawa, N., Tokorozawa City, Japan: 33-37. (in Japanese). [The effects of temporal drainage, irrigation, and harvest of rice plants on *S. frequens* in the paddy fields of the Field Museum Honcho, Field Science Center, University of Agriculture and Technology, Tokyo, Japan are described.] Address: Nagasaka, T., Faculty of Agriculture, Tokyo University of Agriculture and Technology, Japan

4030. Naraoka, H. (2003): An early emergence of *Sympetrum frequens* from Aomori City in April. *Ce-*

lastrina 38: 92-93. (in Japanese). [In April, 2003, one teneral *S. frequens* has been found unseasonably at a residence area of Aomori City (morning edition of The Toa Nippou dated April 17). This individual emerged by three months earlier than usual, emerging one month earlier than *Ischnura asiatica* that emerges in early May, and which is the earliest among Odonata in Aomori Prefecture, Japan. (Taken from Digest of Japanese Odonatological Short Communications 15; edited and translated by ISHIZAWA, Naoya).] Address: Naraoka, H., 36-71 Aza Motoizumi, Oaza Fukunoda, Itayanagi-machi, Kita-tsugaru-gun, Aomori Pref., 038-3661, Japan

4031. Naraoka, H. (2003): Changes of the body colour of *Nehalennia speciosa* (Coenagrionidae: Odonata). *Gekkan-Mushi* 388: 38-40. (in Japanese) [The cyclo-morphosis of *N. speciosa* is documented with colour photos. Colour change of the adults was observed by breeding the damselflies in a cage of nylon mesh net soon after emergence. The body colour changed successively day by day, and the velocity of the change varied by individual. Seven stages for the male and nine stages for the female colour change were found and documented in a table and colour photographs. Survivorship of a male lasted in maximum 34 days, and for two females 41 days. The specimens in the cage were provided twice a day with plentiful of small insects. (Taken from Digest of Japanese Odonatological Short Communications 15; edited and translated by ISHIZAWA, Naoya).] Address: Naraoka, H., 36-71 Aza Motoizumi, Oaza Fukunoda, Itayanagi-machi, Kita-tsugaru-gun, Aomori Pref., 038-3661, Japan

4032. Novelo-Gutierrez, R. (2003): The larva of *Palaeonema domina* Calvert, 1903 (Odonata: Platystictidae). *Transactions of the American Entomological Society* 129(1): 71-75. (in English). ["A detailed description and illustrations of the larva of *P. domina* are provided. *P. domina* shows the most complex color pattern, and is the least setose larva of the three known species of the genus." (Author)] Address: Novelo-Gutierrez, R., Instituto de Ecología, A.C. Departamento de Entomología, 91000, Apartado Postal 63, Xalapa, Veracruz, Mexico. E-Mail: novelor@ecologia.edu.mx

4033. Olthoff, M.; Ikemeyer, D. (2003): Zur Libellenfauna der Moore und Heiden im Westmünsterland. Untersuchungen in ausgewählten Schutzgebieten des Kreises Borken. *LÖBF-Mitteilungen* 3/2003: 12-17. (in German). [43 odonate species have been recorded in the the peatbogs and fens situated in the Landkreis Borken, Nordrhein-Westfalen, Germany. *Lestes virens*, *Coenagrion hastulatum*, *C. lunulatum*, *Ceriagrion tenellum*, *Aeshna juncea*, *A. subarctica elisabethae* Djakov, 1922, *Somatochlora arctica*, *Sympetrum danae*, *Leucorrhinia dubia*, *L. pectoralis*, and *L. rubicunda* are briefly commented.] Address: Ikemeyer, D., Biologische Station Zwillbrock e.V., Zwillbrock 10, D-48691 Vreden, Germany. E-mail: info@bszwillbrock.de

4034. Orr, B. (2003): Rendzvous Kanchanaburi. *Malango* 20: 202-205. (in English). [Report of a common trip to Thailand of the currently most profiled odonatologists involved in Thai Odonata (Matti Hämäläinen, Annua Pinratana) and Bert Orr (Odonata of Borneo) including some species highlights of different localities in the Kanchanaburi region, and some private annotati-

ons.] Address: Orr, B., 26 Currimundi Rd, Caloundra, Q4551, Australia

4035. Ott, J. (2003): Das Biosphärenreservat "Pfälzerwald - Vosges du Nord" - eine multifunktionale Ressource zwischen verschiedenen urbanen Zentren: im Spannungsfeld zwischen Biodiversitätsschutz und Nutzung. In: Venturelli, R.C.; Müller, F. (Eds.): *Paesaggio culturale e biodiversità. Principi generali, metodi, proposte operative*. Firenze: 179-205. (in German with Italian summary). [The biosphere, situated in French-German border region, is of outstanding importance as culture landscape and as habitat for many highly specialised species. Many of them are depending of special land use regimes. The paper briefly summarizes and discusses the current situation of the biosphere and outlines measures which will guarantee a sustainable development of the region. Some key-stone species including Odonata are listed.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O. GmbH@t-online.de

4036. Parr, A. (2003): Guides to Odonata from various regions of the world. *Atropos* 20: 48-53. (in English). [The paper compiles dragonfly books available (with a few exceptions) from different book sellers.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4037. Parr, A. (2003): Migrant and dispersive dragonflies in Britain during 2002. *J. Br. Dragonfly Society* 19(1/2): 8-14. (in English). [The following species are discussed in detail: *Calopteryx virgo*, *C. splendens*, *Lestes barbarus*, *Ischnura pumilio*, *Erythromma viridulum*, *Aeshna mixta*, *Anax imperator*, *A. parthenope*, *A. ephippiger*, *Libellula quadrimaculata*, *Orthetrum coerulescens*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. fonscolombii*, and *S. danae*. Candidates for new British species should be *Chalcolestes viridis* and *Sympetma fusca*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4038. Paulson, D. (2003): Another tribute to Minter. *Argia* 15(3): 17-18. (in English). [Obituary of Minter Westfall.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

4039. Payne, J.C. (2003): Dispersal and dynamics of dragonfly communities in a lake network. Dissertation, Dept Biol., University of Washington: 146 pp. (in English). [In a network of desert lakes in eastern Washington State, USA, the population dynamics of dragonflies was studied. The dissertation comprises of four main chapters: "I. DRAGONFLY POPULATION DYNAMICS AT A LANDSCAPE SCALE: I studied the temporal and spatial variability in dragonfly populations [...], and investigated the causes of the variability. The simultaneous trapping of 25 lakes allowed temporal and spatial trends to be investigated. Four lakes were trapped in the 1960s and again in the 1990s, and an additional 21 lakes were simultaneously trapped in the late 1990s. I found that although the species pool was relatively stable over a 30-year period, the abundance of dragonflies varied greatly between lakes, years and species. Populations of rare species were more variable than common species. Predatory fish such as bass and carp had a strong negative impact on most dragonfly species but rainbow trout, which are stocked in

study area lakes, did not, perhaps because they do not reach high densities. Application of the toxin rotenone to lakes for the purpose of killing unwanted fish appeared to allow the recovery of some dragonfly species. Lastly, I argue that the scale of most dragonfly studies appears to be too small to answer questions about population dynamics.

II. USE OF AN ELEMENTAL MARKER, RUBIDIUM, TO STUDY DISPERSAL OF AQUATIC INSECTS (see OAS 3881 in this issue).

III. MEASURING THE RATIO OF IMMIGRANT TO RESIDENT BREEDERS IN A DRAGONFLY POPULATION: In a patchy landscape, the persistence of a metapopulation of animals or plants depends on the exchange of individuals between sub-populations via dispersal. However, not all populations in patchy landscapes are metapopulations; in some cases demographic or environmental forces are more important than the degree of connectivity between sub-populations. Unfortunately, it is difficult to estimate dispersal rates or to estimate the impact of dispersers, particularly for populations of small animals that cannot be easily marked, have high mortality in early life, and may be very mobile. This experiment was designed to measure the relative contribution of residents versus immigrants to reproduction in a dragonfly population in a highly dynamic, patchy landscape. I marked all of the resident larval dragonflies in a lake with an internal chemical marker, rubidium, that persists through emergence (i.e. between larval and adult life stages). Subsequently I collected breeding dragonflies at the marked lake and at several other lakes close by to investigate the relative exchange rates of breeding adults. The proportion of dragonflies that were residents was surprisingly low: only 9.8 % (61 out of 619) adult dragonflies captured at the pond were marked. A sample of 747 adults from 3 neighboring lakes within 3.2 km of the marked lake captured only four marked dragonflies, all at a lake less than 100 meters away. There were significant differences between taxonomic families: 30-60% of the breeding dragonflies of the family Libellulidae were residents, whereas fewer than 10% of the smaller Coenagrionidae and the larger Aeshnidae were residents. There were also differences between the sexes: there were fewer resident males than females in every species where I caught marked individuals, suggesting that dispersal rates of males are greater than dispersal rates of females. The design of the experiment did not allow me to distinguish between several possible interpretations, including that many of the native dragonflies may have dispersed.

III. MEASURING THE RATIO OF IMMIGRANT TO RESIDENT BREEDERS IN A DRAGONFLY POPULATION Abstract In a patchy landscape, the persistence of a metapopulation of animals or plants depends on the exchange of individuals between sub-populations via dispersal. However, not all populations in patchy landscapes are metapopulations; in some cases demographic or environmental forces are more important than the degree of connectivity between sub-populations. Unfortunately, it is difficult to estimate dispersal rates or to estimate the impact of dispersers, particularly for populations of small animals that cannot be easily marked, have high mortality in early life, and may be very mobile. This experiment was designed to measure the relative contribution of residents versus immigrants to reproduction in a dragonfly population in a highly dynamic, patchy landscape. I marked all of the resident larval dragonflies in a lake with an internal chemical marker, rubidium, that persists through emergence (i.e. between larval and adult life stages). Sub-

sequently I collected breeding dragonflies at the marked lake and at several other lakes close by to investigate the relative exchange rates of breeding adults. The proportion of dragonflies that were residents was surprisingly low: only 9.8 % (61 out of 619) adult dragonflies captured at the pond were marked. A sample of 747 adults from 3 neighboring lakes within 3.2 km of the marked lake captured only four marked dragonflies, all at a lake less than 100 meters away. There were significant differences between taxonomic families: 30-60% of the breeding dragonflies of the family Libellulidae were residents, whereas fewer than 10% of the smaller Coenagrionidae and the larger Aeshnidae were residents. There were also differences between the sexes: there were fewer resident males than females in every species where I caught marked individuals, suggesting that dispersal rates of males are greater than dispersal rates of females. The design of the experiment did not allow me to distinguish between several possible interpretations, including that many of the native dragonflies may have dispersed to breed elsewhere or died after emergence, or a large number of immigrants may have come in to breed. Nevertheless, it appears that immigration is very important to the population dynamics of dragonflies in some ponds, suggesting that some dragonfly communities may be characterized by metapopulation dynamics.

IV. THE INTERACTION OF STOCHASTIC DISPERSAL EVENTS WITH FOOD WEB DYNAMICS DURING THE FORMATION OF NEW DRAGONFLY COMMUNITIES: Metapopulation theory highlights the importance of organism movement and rare colonization events to population dynamics and community structure. However, the theory is simplistic in its treatment of species interactions, and evidence for the importance of metapopulation dynamics in nature is mixed. Furthermore, a large number of experiments have shown that inter-species interactions, particularly predation, can outweigh other factors in determining population dynamics and community composition. This experiment was an attempt to weigh the relative importance of dispersal dynamics versus food web interactions in determining the species composition of new communities. I created a set of widely-separated artificial ponds in a natural landscape inhabited by 20 species of dragonflies, and manipulated predation rates and dispersal distances to evaluate their influence on colonization success by dragonflies of different sizes. The body size of a predator can be a predictor of 1) its trophic level in a food web and 2) the scale of its movement in a landscape. Dragonflies of 3 taxonomic families colonized the ponds and there were differences between the families in their propensity to colonize isolated ponds. I found that the effects of predation dominated the community composition once dragonflies had arrived in the new habitat, and the identity of the top predator was important. However, the outcome of competition between large and medium-sized dragonflies depended on order of arrival (a so-called "priority effect"). Mid-sized species were particularly susceptible to predation. They gained an advantage by arriving first, and appeared to follow a strategy that increased the probability of discovering isolated ponds before potential predators did. In short, the species composition of new communities was determined by food web dynamics, but the strength and direction of some food web interactions depended on the timing of stochastic dispersal events whose probability was determined by the spatial layout of a pond and the dispersal behavior of the species involved." (Author) This dis-

sertation is rich in material, well organised, and written in a language quite easy to read.] Address: Payne, J.C., Department of Zoology, University of Washington, Seattle, WA, 98195-1800, USA. E-Mail: jcpayne@u.washington.edu

4040. Peters, A. (2003): Dragonfly conservation from the BDS: return of the Southern damselfly *Coenagrion mercuriale* (Charp.) to an historic site in Dorset. *Atropos* 20: 16-19. (in English). [On 26 June 2003, a male *C. mercuriale* was recorded at Scotland Pond. This water body is situated on New Mills Heath, which is part of Hartland SSSI and NNR, in Purbeck, south Dorset, UK. To enable recolonisation of the locality from the nearest known population of *C. mercuriale* about a mile west of the site, habitat recovery measures (scrub clearance) had been made in February 2003. The Southern Damselfly was last recorded at the site in 1969.] Address: Peters, Angela, Purbeck Estates Ecologist, The National Trust, Countryside Office, Middle Beach, Swanage, Dorset, BH19 3AX. UK. E-mail: angela.peters@nationaltrust.org.uk

4041. Petrick, W. (2003): Tag der Artenvielfalt 2003 in Wanninchen - bemerkenswerte Ergebnisse. *Biologische Studien, Luckau* 32: 25-28. (in German). [Brandenburg, Germany; The so-called Day of Biodiversity - initiated by the magazine GEO - was held on 28. / 29. VI.2003. Remarkable Odonata have been *Cordulegaster boltonii*, *Leucorrhinia albifrons*, and *L. dubia*.] Address: Petrick, W., Egsdorf, Dorfstr. 44, D-15926 Luckau, Germany

4042. Petrulevicius, J.F.; Nel, A. (2003): A new libellulid dragonfly (Insecta: Odonata: Italoansida) from the late Paleocene of Argentina. *Geobios* 36(4): 401-406. (in English). ["A new genus and species of "libellulid" dragonfly, *Austrolibellula noroestenia* nov. gen., nov. sp., of the group Italoansida, BECHLY, 1996, is described. The specimen comes from the Maiz Gordo Formation (late Paleocene) that crops out in northwestern Argentina. Its phylogenetic relationships within Cavilabiata BECHLY, 1996 are discussed." (Authors)] Address: Petrulevicius, J.F., Laboratoire d'Entomologie, Museum National d'Histoire Naturelle, 45, Rue de Buffon, 75005, Paris, France. E-Mail: levicius@mnhn.fr

4043. Petrulevicius, J.F.; Nel, A. (2003): Oldest petalurid dragonfly (Insecta: Odonata): a Lower Cretaceous specimen from south Patagonia, Argentina. *Cretaceous Res.* 24(1): 31-34. (in English). [*Argentinopetalia archangelskyi* gen. n., sp. n. from the Baquero Group, Anfiteatro de Ticó Formation, is described.] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

4044. Pfeiffer, B. (2003): Two new dragonflies for Vermont. *Argia* 15(3): 14. (in English). [USA, Vermont, *Aeshna subarctica*, *Libellula cyanea*] Address: Pfeiffer, B.; E-mail: Bryan@VermontBirdTours.com

4045. Pianalto, S.; Cuenin, C. (2003): Données nouvelles pour *Sympetrum pedemontanum* (Allioni, 1766). Contribution à la faune des Odonates du Languedoc-Roussillon. *Martinia* 19(2): 50. (in French). [At 11 VIII 2002, *S. pedemontanum* was traced in the Parc national des Cévennes, France.] Address: Pianalto, Silvie, L'école, F-48110 Le Pompidou, France

4046. Pinratana, A. (2003): Editorial. *Malangpo* 20: 195. (in English). [Bro. A. Pinratana highlights some odonatological activities in 2003 reporting on new records for the Thai odonate fauna, and the (negative) changes of one of the most important Thai habitats for Odonata, the Siribhum waterfall (Doi Inthanon in Chiang Mai).] Address: Pinratana, Bro Amnuay, Saint Gabriel's College, Bangkok 10300, Thailand

4047. Ponel, P.; Papazian, M. (2003): Une belle localité à Odonates en Sardaigne: le lac Baratz. *Martinia* 19(3): 93-96. (in French with English summary). [In the north of Sardinia, Province Sassari, Italy, *Brachythemis leucosticta* was recorded. On 2.VI.2001 at lake Baratz, a total of seven Odonata including *Ischnura genei*, *Coenagrion scitulum*, and *Paragomphus genei* were found.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France

4048. Pont, B. (2003): Quelques observations de Libellules de Guadeloupe. *Martinia* 19(4): 161-163. (in French, with English summary). [Guadeloupe, Desirade Islands (French West Indies), France; 9 taxa along with habitat descriptions are briefly discussed.] Address: Pont, B., Montée du village, F-38150 Anjou, France

4049. Poulton, B.C.; Wildhaber, M.L.; Charbonneau, C.S.; Fairchild, J.F.; Mueller, B.G.; Schmitt, C.J. (2003): A longitudinal assessment of the aquatic macroinvertebrate community in the channelized lower Missouri River. *Environmental Monitoring & Assessment* 85(1): 23-53. (in English). ["We conducted an aquatic macroinvertebrate assessment in the channelized reach of the lower Missouri River, and used statistical analysis of individual metrics and multimetric scores to identify community response patterns and evaluate relative biological condition. We examined longitudinal site differences that are potentially associated with water quality related factors originating from the Kansas City metropolitan area, using data from coarse rock substrate in flowing water habitats (outside river bends), and depositional mud substrate in slack water habitats (dike fields). Three sites above river mile (RM) 369 in Kansas City (Nebraska City, RM=560; St. Joseph, RM=530; Parkville, RM=377) and three below (Lexington, RM=319; Glasgow, RM=228; Hermann, RM=94) were sampled with rock basket artificial substrates, a qualitative kicknet method, and the Petite Ponar. We also compared the performance of the methods used. A total of 132 aquatic macroinvertebrate taxa were collected from the lower Missouri River; one third of these taxa belonged to the sensitive EPOT insect orders (Ephemeroptera, Plecoptera, Odonata, and Trichoptera). Rock baskets had the highest mean efficiency (34.1%) of the methods, and the largest number of taxa was collected by Ponar (n=69) and kicknet (n=69) methods. Seven of the 15 metrics calculated from rock basket data, and five of the nine metrics calculated from Ponar data showed highly significant differences (ANOVA, P<0.001) at one or more sites below Kansas City. We observed a substantial reduction in net-spinning Trichoptera in rock habitats below Kansas City (Lexington), an increase in relative dominance of Oligochaeta in depositional habitats at the next site downstream (Glasgow), and lower relative condition scores in rock habitat at Lexington and depositional habitat at Glasgow. Collectively, these data indicate that some urban-related impacts on the aquatic macroinvertebrate community are occurring. Our results suggest that the methods and assessment

framework we used in this study could be successfully applied on a larger scale with concurrent water and sediment chemistry to validate metrics, establish impairment levels, and develop a specific macroinvertebrate community index for the lower Missouri River. We recommend accomplishing this with longitudinal multi-habitat sampling at a larger number of sites related to all potential s of impairment, including major tributaries, urban areas, and points." (Authors)] Address: Poulton, B.C., Columbia Environmental Research Center, U.S. Geological Survey, Columbia, MO, USA. E-Mail: barry-poulton@usgs.gov

4050. Raab, R. (2003): Die Besiedlung neu geschaffener Uferstrukturen im Staubereich Freudenau (Wien, Niederösterreich) durch Libellen (Insecta, Odonata). *Denisia* 10: 79-99. (in German with English summary). [" From 1998 to 2001 the dragonfly fauna at nine new study sites along the restructured Danube shoreline as well as at the Tritonwasser on the Danube Island were observed in the course of 81 field trips. In all 14130 individuals and 29 species of dragonflies respectively were found at the nine new sites. Most frequent was *Ischnura elegans* with 55% of all individuals followed by *Platycnemis pennipes* with 20%. In the whole period from 1990 to 2001 39 species were observed at the Tritonwasser. In 2000 and 2001 *Leucorrhinia pectoralis* one of Europeans most threatened dragonfly species and listed in the Annex II of the Habitats Directive was found in a small autochthonous population at the Kreimellacke. With the results of the dragonfly fauna, the whole Danube Island is classified a good ecological status. Considering only the nine new sites, the ecological status would be moderate because of the relatively small number of autochthonous and sensitive autochthonous species as well as the small range of the Odonate Habitat Index (OHI). The straight structureless shoreline of the Danube is of no use for the dragonflies. The fourth year of investigation clearly showed that not only pools but also side channels and coves could be of importance for many dragonfly species if constructed right. The restructure measurements on the shoreline of the Danube Island are not sufficient enough to support a good corridor function of the Danube Island for dragonflies. Additional constructions of larger pools, for example the planned Phönixteich in the northern part of the Danube Island, are necessary to provide long-term suitable habitats also for highly threatened dragonfly species and also to improve the corridor function of the Danube Island." (Author)] Address: Raab, R., Anton Bruckner-Gasse 2/2, A-2232 Deutsch-Wagram, Austria. E-mail: rainer.raab@gmx.at

4051. Rackow, H. (2003): Beobachtungen von *Sympecma paedisca* (Sibirische Winterlibelle) an einem ungewöhnlichen Fundort. *mercuriale* 3: 6-8. (in German). [*S. paedisca* used a rain storage pond near Hohenwiel, Baden-Württemberg, Germany, as habitat in autumn 2000 and 2002. The habitat and the co-occurring odonate species, including *S. fusca*, are described. The next known locality of *S. paedisca* is located 5,5 km from Hohenwiel.] Address: Rackow, H., Virchowstr. 26, D-78224 Singen, Germany. E-mail: HartmutRackow@web.de

4052. Radford, P. (2003): The Azure Damselfly *Coenagrion puella* (L.) attacking the Common Blue Butterfly *Polyommatus icarus* (Rottemburg). *J. Br. Dragonfly Society* 19(1/2): 37. (in English). ["At c. 1230h GMT on 6

June 2003, at Westhay Moor Reserve, Somerset, UK I observed a mature male *C. puella* fly towards a male *P. icarus*, which was flying low over a grassy patch adjoining a reed-bed by a lake. The damselfly flew repeatedly at the butterfly, buffeting it at times, and so preventing it from settling. This aggressive behaviour, which occurred during a brief sunny spell, continued for one minute, after which the butterfly flew off. Male *C. puella* were numerous in the area at the time (several were in either the ring or tandem position) but, apart from the one individual, they all disregarded the Common Blue Butterfly." Possible reasons of this behaviour are discussed. It is believed that "the visual impact of the butterfly's relatively large blue wing expanse could have triggered sexual attraction."] Address: Radford, P., Crossways Cottage, West Bagborough, Taunton, Somerset TA4 3EG, UK

4053. Reeves, D. (2003): Australian crepuscular dragonflies. *Austrolestes* 8: 4. (in English). [23 species are listed and their behaviour is briefly described.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

4054. Reeves, D. (2003): Book review: Dragonflies by Steve Brooks. ISBN 0 565 09189 8. *Austrolestes* 8: 3-4. (in English). [Review of the book abstracted as OAS 3386.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

4055. Reeves, D. (2003): Species Profile: *Hemianax papuensis* Burmeister, 1839) Australian Emporor. *Austrolestes* 8: 1. (in English). [Brief information on distribution and morphology of the species.] Address: Reeves, D., 30 Bramston Tce, Herston, QLD 4006, Australia. E-mail: denissreeves@uq.net.au

4056. Rehn, A.C. (2003): Phylogenetic analysis of higher-level relationships of Odonata. *Systematic Entomology* 28(2): 181-240. (in English). ["This is the most comprehensive analysis of higher-level relationships in Odonata conducted thus far. The analysis was based on a detailed study of the skeletal morphology and wing venation of adults, complemented with a few larval characters, resulting in 122 phylogenetically informative characters. Eighty-five genera from forty-five currently recognized families and subfamilies were examined. In most cases, several species were chosen to serve as exemplars for a given genus. The seven fossil outgroup taxa included were exemplar genera from five successively more distant odonatoid orders and suborders: Tarsophlebiidae (the closest sister group of Odonata, previously placed as a family within 'Anisozygoptera'), Archizygoptera, Protanisoptera, Protodonata and Geroptera. Parsimony analysis of the data, in which characters were treated both under equal weights and implied weighting, produced cladograms that were highly congruent, and in spite of considerable homoplasy in the odonate data, many groupings in the most parsimonious cladograms were well supported in all analyses, as indicated by Bremer support. The analyses supported the monophyly of both Anisoptera and Zygoptera, contrary to the well known hypothesis of zygopteran paraphyly. Within Zygoptera, two large sister clades were indicated, one comprised of the classical (Selysian) Calopterygoidea, except that Amphipterygidae, which have traditionally been placed as a calopterygoid family, nested within the other large zygopteran clade comprised of Eraser's 'Lestinoidea' plus 'Coenagrionoidea'

(both of which were shown to be paraphyletic as currently defined). *Philoganga* alone appeared as the sister group to the rest of the Zygoptera in unweighted cladograms, whereas *Philoganga* + *Diphlebia* comprised the sister group to the remaining Zygoptera in all weighted cladograms. 'Anisozygoptera' was confirmed as a paraphyletic assemblage that forms a 'grade' towards the true Anisoptera, with *Epiophlebia* as the most basal taxon. Within Anisoptera, *Petaluridae* appeared as the sister group to other dragonflies." (Author)] Address: Rehn, A.C., 2817 G Street Apartment 1, Sacramento, California 95816, USA

4057. Rejl, J.; Mikát, M. (2003): *Orthetrum brunneum*, new species for East Bohemia. *Acta Mus. reginaehradecensis* (A) 29: 81-82. (in Czech, with English summary). [Czech Republic; 2 males of *O. brunneum* are listed from Hustirany (distr. Nachod) and Hradec Králové (July 2001).] Address: Rejl, J., Agentura Ochrány Přírody a Krajiny, Bozeny Nimcové 2625, CZ-53002 Pardubice, Czech republic

4058. Reum, D. (2003): Reproduktionsnachweise der Westlichen Keiljungfer (*Gomphus pulchellus* Sélys, 1840) in Thüringen (Odonata, Gomphidae). *Mitt. Thüringer Entomologenverb.* 9(1): 2-5. (in German). [13.VI. 2001, Immelborn, Wartburgkreis, Thüringen, Germany; first proof of reproduction (6 exuviae) in Thüringen. The habitats (gravel pits) are described, and the current range extension of *G. pulchellus* is discussed.] Address: Reum, D., Brunnebweg 4, D-36448 Liebenstein, Germany

4059. Rowe, R.J. (2003): Agonistic behaviour in final-instar larvae of *Austrocnemis splendida* (Odonata: Coenagrionidae), and a challenge to the 'Agriocnemidinae'. *Australian Journal of Zoology* 51(1): 51-59. (in English). ["Larval agonistic displays are reported from *Austrocnemis splendida*, a small coenagrionid damselfly. 16 major displays were distinguished. The agonistic behaviour repertoire of *A. splendida* is contrasted with published information on other coenagrionid larvae, especially with *Agriocnemis pygmaea*, putatively a member of the same subfamily. Marked differences in larval display behaviour between *A. splendida* and *A. pygmaea* provide evidence against a close relationship between these species. No support is found for including *A. splendida* in the Agriocnemidinae. It is postulated that the Agriocnemidinae are an artificial construct, its components linked through convergence in form of the reduced wing structures of these very small dragonflies." (Author)] Address: Rowe, R.J., School of Tropical Biology, James Cook University, Townsville, QLD, 4811, Australia; E-Mail: richard.rowe@jcu.edu.au

4060. Rowell, K.; Blinn, D.W. (2003): Herbivory on a chemically defended plant as a predation deterrent in *Hyalella azteca*. *Freshwater Biology* 48(2): 247-254. (in English). ["1. We investigated whether a population of the freshwater amphipod, *Hyalella azteca*, which consumed plants with defensive secondary compounds, reduced predation as reported for terrestrial and marine systems. 2. Field observations in Montezuma Well, U.S.A., indicated a strong association between the emergent macrophyte, *Berula erecta* and *H. azteca*. We hypothesised that this geographically isolated population of sedentary amphipods was able to consume roots of the chemically defended *B. erecta* as a deterrent against predation. *Berula erecta* is in the family Api-

aceae, which commonly produce coumarins that deter herbivory in terrestrial systems. 3. *Hyalella azteca* consumed roots of *B. erecta* at a significantly greater rate than alternative macrophyte substrata in Montezuma Well. Additionally, *H. azteca* moulted at a significantly higher rate when consuming *B. erecta* compared with a diet of periphyton. 4. Two insect predators (*Telebasis salva* and *Belostoma bakeri*) with different feeding strategies were used to assess the effects of a *B. erecta* diet on predation rates in the laboratory and in Montezuma Well. *Hyalella azteca* was preyed on at a significantly lower rate by both predators when given a strict diet of *B. erecta* roots compared with a diet of periphyton. 5. This is the first experimental evidence that predation on a freshwater herbivore, *H. azteca*, was reduced when it consumed a chemically defended plant." (Authors)] Address: Rowell, Kirsten, Department of Biological Sciences, Northern Arizona University, Flagstaff, AZ, 86011, USA. E-Mail: dean.blinn@nau.edu

4061. Sandkühler, J.; Brockmüller, N. (Red.) (2003): Erprobungs- und Entwicklungsvorhaben "Halboffene Weidelandschaft Höltigbaum. Stiftung Naturschutz Schleswig-Holstein (Hrsg.): 46 pp. (in German). [The influence of free ranging cattle on the ecosystem against the background of nature conservation measures to maintain landscape heterogeneity, are tested. Odonata are mentioned on pages 24/25; species of temporary pools (*Lestes barbarus*, *Ischnura pumilio*) and more southern distributed species (*Sympetrum striolatum*) are stressed.] Address: Stiftung Naturschutz Schleswig-Holstein, Eschenbrook 4, D-24113 Molfsee, Germany. www.stiftung-naturschutz-sh.de/hoeltigbaum/

4062. Sasamoto, A. (2003): Description of *Devadatta glaucinotata* spec. nov. from Laos (Zygoptera: Amphipterygidae). *Odonatologica* 32(4): 381-386. (in English). [holotype male: Phatang, Vang Vieng area, central Laos, 20-IV-2002; deposited at NSMT, Tokyo]; the new species is described, illustrated, and compared with the allied species. Special emphasize is given to *D. duca-trix* from Vietnam.] Address: Sasamoto, A., 190-4 Yakuoji, Tawaramoto-cho, Shiki-gun, Nara pref. 636-0341, Japan

4063. Sauseng, M.; Pabst, M.-A.; Kral, K. (2003): The dragonfly *Libellula quadrimaculata* (Odonata: Libellulidae) makes optimal use of the dorsal fovea of the compound eyes during perching. *Eur. J. Entomol.* 100: 475-479. (in English). ["We studied visual orientation and perching behaviour of a territorial libellulid dragonfly species, *L. quadrimaculata*. The studies were performed during sunny, cloudless conditions at a pond in southern Styria, Austria, from May to July of 2001 and 2002. Individual males were observed for periods of 3 to 4 weeks. We measured dragonfly's horizontal orientation relative to the solar azimuth, and vertical orientation relative to the solar altitude. The measurements indicated that the males had a favourable view of the sky during perching. In addition, the relative amounts of ultraviolet (UV) and blue-violet radiation in scattered light (not direct sunlight) were calculated for the whole sky and for the section of the sky viewed by the fovea. Our results show that the dorsal fovea is directed preferentially toward a section of the sky away from the sun, with less radiation but a higher UV and blue-violet saturation. The present findings fit in well with the hypothesis, based on optical and physiological data, that the fovea, which is sensitive only to blue and UV radiation, is

optimally suited to the detection of small, rapidly flying insects against the blue sky. The findings supply the first behavioural correlates of this foveal specialisation." (Authors)] Address: Sauseng, M., Institute of Zoology, Karl-Franzens-University Graz, A-8010 Graz, Austria. E-mail: manuela.sauseng@stud.uni-graz.at

4064. Schanowski, A. (2003): Ein Fund von *Sympetrum meridionale* am mittleren Oberrhein. *mercuriale* 3: 36. (in German). [12.VIII.2003, w Rheinmünster-Stollhofen, Lk Rastatt, Baden-Württemberg] Address: Schanowski, A., Lilienstr. 6, D-77880 Sasbach, Germany.

4065. Schiel, F.-J.; Leinsinger, H. (2003): Neufunde und Schlupfbeobachtungen von *Gomphus flavipes* (Asiatische Keiljungfer) an badischen Altrheinen. *mercuriale* 3: 8-12. (in German). [Detailed documentation (phenology, biotop parameters) of records of *S. flavipes* along the river Rhine; co-occurring Gomphidae are *Onychogomphus forcipatus*, *Gomphus vulgatissimus*, *G. pulchellus*, and *Ophiogomphus cecilia*.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

4066. Schiel, F.J.; Röske, W.; Hunger, H. (2003): Schutzgemeinschaft Libellen in Baden-Württemberg - Mitgliederversammlung am 29. März 2003 in Schopfloch. *mercuriale* 3: 43-48. (in German). [Report on a remarkable broad spectrum of activities of the SGL in Baden-Württemberg, Germany. The report includes a resolution directed against the stocking of grass carp in water bodies.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

4067. Schindler, M.; Fesl, C.; Chovanec, A. (2003): Dragonfly associations (Insecta: Odonata) in relation to habitat variables: a multivariate approach. *Hydrobiologia* 497: 169-180. (in English). ["In a dragonfly survey, carried out in a lowland wetland area in eastern Austria, a total of 19 resident species was recorded. Multivariate statistical procedures were used to analyse the relationship between dragonfly assemblage patterns and environmental variables. Besides widespread and euryoecious species with unspecific habitat requirements two dragonfly associations were identified: on the one hand species mainly occurring at temporary natural and near-natural ponds characterised by rush and reed vegetation, on the other hand species preferring permanent waters such as the artificial waterbodies in the investigation area characterised by floating macrophytes. Water persistence and the existence of floating macrophytes determined the formation of species assemblages." (Authors)] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria. E-mail: chovanec@ubavie.gv.at

4068. Schultz, H.; Waringer, J.A.; Chovanec, A. (2003): Assessment of the ecological status of Danubian floodplains at Tulln (Lower Austria) based on the Odonata Habitat Index (OHI). *Odonatologica* 32(4): 355-370. (in English). ["The ecological status of waterbodies situated in a Danubian floodplain section at Tulln (Lower Austria) was assessed by a dragonfly survey using the OHI approach suggested by CHOVANEC & WARINGER (2001, Regulated Riv. Res. Management 17: 493-507). The investigation was carried out at 28 standing water bodies and 2 reference sites situated directly at the Danube. Stretches of 100 m shorelength

were mapped and the "Representative Spectrum of Odonata Species" (SCHMIDT, 1985, *Odonatologica* 14: 127-133) was recorded. Only autochthonous species were used for the assessment procedure. A total of 11 Zygoptera and 20 Anisoptera species was recorded, 29 of them autochthonous. Site-specific Odonata Habitat Indices ranged from 1.72 to 3.67. The OHI of the only reference site where Odonata were detected directly at the Danube was 1.38. The mean OHI for the whole floodplain section was 2.79. These figures indicate a relatively high level of habitat diversity. By comparing this status quo with reference conditions derived from the overall habitat situation before the regulation and from old species inventories dating back to the 19th century, the status of the Tulln floodplain section was ranked as class II ("good ecological status") in a 5-tiered classification scheme." (Authors)] Address: Waringer, J.A., Institute of Ecology and Conservation Biology, University of Vienna, Althanstr. 14, A-1090 Vienna, Austria

4069. Seidenbusch, R. (2003): Lorenz'sche Prägung. *Agrion* 7(1): 4-5. (in English). [autobiographic note] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany

4070. Serafin, E.; Buczyński, P. (2003): The importance of fishponds for aquatic insects, exemplified by dragonflies (Odonata) and caddisflies (Trichoptera) in ponds of the Lublin region. Abstracts of papers and posters presented at the 19th Symposium of Polish hydrologists, Fac. Biol., Univ. Warszaw, 9-12 Sept. 2003: 168. (in Polish). [The importance of Polish fish ponds for nature conservation purposes is outlined; some of the ponds surveyed harbour odonate species as *Coenagrion armatum*, *Sympetrum pedemontanum*, *Aeshna affinis*, *A. viridis*, *Leucorrhinia albifrons*, *L. pectoralis*, and *Sympetrum pedemontanum*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4071. Shimoyamada, T.; Murayama, W.; The Katsushika Society of Odonatology (2003): Survey of dragonfly larvae in swimming pools of Primary Schools in metropolis. In: Arai, Y. (Ed): A Countrywide Survey of Red Dragonflies. Musashino Satoyama Research Group, Institute of Agriculture and Natural environments. 47 pp. Translation: Ishizawa, N., Tokorozawa City, Japan: 44-47. (in Japanese). [In the Katsushika-ku-region, Japan, in 2000 to 2002 swimming pools of primary schools were surveyed for their macrozoobenthos with special emphasis to Odonata. In most cases larvae of *Anax parthenope julius* and *Orthetrum albistylum speciosum*, and in few cases *Sympetrum* sp. (frequens, darwinianum, infuscatum, baccha) were traced.] Address: not stated

4072. Sibl, J.; Seginkova, A.; Bulánková, E. (2003): Dragonflies (Odonata) of the Malý Dunaj branch and its side arm Klátovské rameno (Danubian Plain, southwestern Slovakia). *Entomofauna carpathica* 14(2002): 55-58. (in Slovakian, with English summary). [In 2000 - 2001, the dragonfly fauna was studied at 24 localities along the main course of the Malý Dunaj branch and its tributary Klátovské rameno. One locality was investigated at Vá sky Dunaj (this name is used for the section of the Váh River between its confluence with Malý Dunaj branch and its confluence with the Dunaj (Danube) River. The number of species totalled to

29 dragonfly species. The occurrence of several dragonfly species considered rare in Slovak Republic, was confirmed in the study area: *Stylurus flavipes*, *Libellula fulva*, *Epiptera bimaculata*.] Address: Sibl, J., J. Stanislava 15, 84105 Bratislava, Slovakia. E-mail: sibl@changenet.sk

4073. Sibley, F. (2003): Nicaragua without the mud. *Argia* 15(3): 5-7. (in English). [The paper briefly outlines the results of a collection trip to Nicaragua in 2003. 70 species, 10 new to the country, brings the Nicaraguan list to approx. 150-160 odonate species.] Address: Sibley, F.C., 25 Shirley Street, Naugatuck, CT, 06770, USA. E-mail: fcs@george.peabody.yale.edu

4074. Smith, G.R.; Vaala, D.A.; Dingfelder, H.A. (2003): Distribution and abundance of macroinvertebrates within two temporary ponds. *Hydrobiologia* 497: 161-167. (in English). ["We investigated the distributions of macroinvertebrates within two temporary ponds (Spring Peeper Pond and Taylor-Ochs Pond) in central Ohio and examined what environmental factors may be driving those distributions. We sampled macroinvertebrates in Spring Peeper Pond three times from May to July 2001, and Taylor-Ochs Pond two times from May to June 2001. Macroinvertebrate distributions were significantly aggregated on all sampling dates in both ponds. Bivalve abundance in Spring Peeper Pond was higher in shallower water. The distribution of bivalves in Taylor-Ochs Pond was not correlated with any variable we measured. Dragonfly nymph abundance in Taylor-Ochs Pond decreased between the first and second sampling dates, whereas in Spring Peeper Pond no factor examined was correlated with dragonfly nymph density. Snail densities in Spring Peeper Pond were negatively related to dissolved oxygen and depth. In Taylor-Ochs Pond, snail abundance was positively related to temperature. The densities of damselfly nymphs in Spring Peeper Pond were positively related to dissolved oxygen and depth and declined across the study. In Spring Peeper Pond, hemipteran densities were negatively related to depth and increased across the study. Damselfly nymphs and hemipterans were not common enough in Taylor-Ochs to analyze. In general, the abiotic and biotic factors we examined explained relatively little (<37% in all cases) of the within pond distribution of the macroinvertebrates in our two study ponds." (Authors) Address: Smith, G.R., Department of Biology, Denison University, Granville, OH 43023 USA. E-mail: smithg@denison.edu

4075. Sparmberg, H.; Bößneck, U. (2003): Die Schutzgebiete der Landeshauptstadt Erfurt (Thüringen) Teil IX: Flora und Fauna des GLB "Feuchtwiese Schwansee". Veröffentlichungen Naturkundemuseum Erfurt 22: 91-113. (in German with English summary). [Thüringen, Germany; *Enallagma cyathigerum*, *Symptetrum striolatum*, and *S. vulgatum* are listed.] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Staffenbergallee 18, D-99085 Erfurt, Germany

4076. Sternberg, K. (2003): *Anax ephippiger* (Schabrackenlibelle) - das Leben eines afrikanischen Nomaden in Baden-Württemberg. *mercuriale* 3: 2-4. (in German). [Brief introduction into the ecology of *A. ephippiger*, with emphasis on the situation in west- and central Europe.] Address: Sternberg, K., Schillerstr. 15, D-

76297 Stutensee, Germany. E-mail: k.sternberg@t-online.de

4077. Stewart, T.W.; Shumaker, T.L.; Radzio, T.A. (2003): Linear and nonlinear effects of habitat structure on composition and abundance in the macroinvertebrate community of a large river. *American Midland Naturalist* 149(2): 293-305. (in English). ["We used an experiment and regression analyses to quantify effects of spatial variation in habitat structure abundance on a riverine macroinvertebrate community under winter conditions. Concrete slabs (0.21 m²; n=24) with different numbers of stones (mean individual stone surface area=6.44 cm²) attached to upper faces were placed in the James River and retrieved after 28 d. Macroinvertebrate abundance and taxonomic richness on slabs were significantly positively related to stone abundance. Total macroinvertebrate abundance and abundance of oligochaetes (*Nais* spp.), Asiatic clams (*Corbicula fluminea*), caddisflies (*Leptoceridae*), riffle beetles (*Elmidae*) and stoneflies (*Strophopteryx* sp.) were linearly related to stone abundance. However, nonlinear relationships occurred between stone abundance and macroinvertebrate taxonomic richness and between stone abundance and abundance of dragonflies (*Erpetogomphus* sp.), caddisflies (*Hydropsychidae*), chironomids (*Eukiefferiella* spp.), mayflies (*Ephemerelellidae*) and stoneflies (*Taeniopteryx* sp.). Nonlinear relationships were usually characterized by dramatic increases in macroinvertebrate abundance and taxonomic richness across a gradient of increasing stone abundance when abundance was low (0-43 stones/0.08 m² slab face; 0-40% of slab face covered by stones), but weak responses to additional stones at higher stone abundance (84-160 stones / 0.08 m²; 89-96% cover). These nonlinear relationships reflected similar nonlinear relationships between abundance of stones and particulate matter. We conclude that small quantities of habitat structure have significant positive effects on macroinvertebrate abundance and diversity in the James River during winter. At a local scale, habitat structure promotes macroinvertebrate colonization and retention by increasing habitat diversity. Stones and similar physical objects also indirectly benefit macroinvertebrates by trapping particulate matter that provides animals with food and additional habitat." (Authors)] Address: Stewart, T.W., Department of Natural Sciences, Longwood University, Farmville, VA, 23909, USA

4078. Stoks, R.; McPeck, M.A. (2003): Antipredator behavior and physiology determine *Lestes* species turnover along the pond-permanence gradient. *Ecology* 84(12): 3327-3338. (in English). ["Identifying key traits that shape trade-offs that restrict species to only a subset of environmental gradients is crucial to understanding and predicting species turnover. Previous field experiments have shown that larvae of *Lestes* damselfly species segregate along the entire gradient of pond permanence and predator presence and that differential predation risk and life history constraints together shape their distribution. Here, we report laboratory experiments that identify key differences in behavior and physiology among species that structure their distributions along this gradient. The absence of adaptive antipredator behavioral responses against large dragonfly larvae and fish of *Lestes* dryas, the only species to inhabit predator-free vernal ponds that dry each year, is consistent with its high vulnerability to predation and probably the key trait that excludes it from parts of the gra-

dient with predators. The reciprocal dominance of two other *Lestes* species in permanent waters dominated by either dragonflies or fish can be explained by the lack of effective antipredator behaviors against dragonflies and fish, respectively. Maximal growth rates did not differ among *Lestes* along the gradient. However, in the natural predator environment of vernal ponds (only conspecific cannibals), the vernal-pond *Lestes* had higher growth rates than the other *Lestes* suggesting that this excludes other *Lestes* from vernal ponds. Similarly, *Lestes* species that inhabit temporary ponds (i.e., ponds that dry intermittently every few years but not every year) had a higher growth rate than the fishless permanent-pond *Lestes* in the presence of the syntopic dragonfly predator. These growth differences among *Lestes* in predator treatments were not due to differences in food intake, but due to differences in physiology. The vernal-pond *Lestes* converted more assimilated food into body mass compared to the other *Lestes* in the presence of conspecific larvae, and the temporary-pond *Lestes* had a higher conversion efficiency than the fishless permanent-pond *Lestes* in the presence of the syntopic dragonfly predators. In contrast, reductions in growth rate within species in the presence of syntopic predators were both physiologically and behaviorally mediated. The interplay between behavior and physiology may be a common feature of the growth/predation-risk trade-off, and their joint study is therefore critical to mechanistically link phenotype, performance, and community assembly along the freshwater habitat gradient." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

4079. Suhling, F.; Jödicke, R.; Schneider, W. (2003): Odonata of African arid regions - are there desert species? *Cimbebasia* 18: 207-224. (in English) ["This paper reviews current knowledge of desert-inhabiting Odonata in Africa. By comparing literature data of countrywide and some regional African Odonata surveys we identify typical desert dragonflies and analyse traits enabling them to survive in desert conditions. Two criteria are used in order to differentiate such species, viz. endemism in deserts and widespread occurrence in desert areas. Very few endemics occur in the Sahara, Arabian and Somalian Deserts of Africa, almost all occurring in permanent waters. In southern African arid regions no desert endemics are known, and most of the widespread desert-dwelling species do not appear to be restricted to deserts, their main habitats being in savanna wetlands. All are shown to be common over most of the Afrotropical and/or southern Palaearctic Regions. In contrast to most endemics, widespread species colonise a broad spectrum of aquatic habitats, including ephemeral waterbodies. Some traits allow Odonata to exist in deserts. Typically desert species are highly mobile and multivoltine, i.e. they have up to four or five, sometimes overlapping, annual generations, allowing them to develop in temporary wetlands. Many species are opportunistic with respect to the type of aquatic habitat they colonise. A cluster analysis on presence/absence data for 529 dragonfly species reveals that, among dragonfly assemblages in deserts, most are similar to each other, but differ from those in non-desert regions in Africa. Thus, it is concluded that there are typical dragonfly assemblages of desert wetlands that are similar in the African and the Arabian Deserts. Based on research, Odonata assemblages of some typical wetlands in the Sahara and Namib De-

serts are described." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

4080. Sutton, P.G. (2003): Recent problems regarding the collection of voucher specimens. *J. Br. Dragonfly Society* 19(1/2): 47-50. (in English). [This is a very well balanced encounter reflecting the necessity of collecting voucher specimens. Biodiversity is not endangered by collecting, and - from the ethical point of view - "it must be assumed that those who object to the collection of voucher specimens do so with the welfare of that specimens at heart."] Address: Sutton, P.G., Habitat Conservation Officer, Amateur Entomologists' Society, 2 Fir Tree Close, Flitwick, Bedfordshire MK45 1NZ, UK

4081. Taily, M., (2003): Univoltine development in *Libellula depressa* in Belgium. *Gomphus* 19(1): 31-32. (in Dutch with english and French summaries). [The univoltine development of *L. depressa* is documented in a small (4x4 m) and new (1 year old) garden pool.] Address: Taily, M., Hoonakkerdreef 35, 8791 Waregem, Belgium. E-mail: marc.taily@pandora.be

4082. Takasaki, Y. (2003): *Ceriagrion nipponicum* A-sahina from Aichi Prefecture, II. Nature of Irrigation pond 38: 1-8. (in Japanese). [The known localities of the endangered species *C. nipponicum* in the Aichi Pref., Japan (n= 63; only 7 are existing in 2003) are documented in a map. The dispersal ability (2-3 km) of the species is outlined in detail. (Taken from Digest of Japanese Odonatological Short Communications 15; edited and translated by ISHIZAWA, Naoya).] Address: Takasaki, Y., 1-14, Fujimori, Meito-ku, Nagoya City, 465-0026, Japan

4083. Tennessen, K. (2003): Bolivia V: A dry season endeavor. *Argia* 15(3): 3-5. (in English). [Report of a collecting trip to Bolivia in August of ? in the northern Santa Cruz Department and the southern Beni Department.] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennessen@aol.com

4084. Theischinger, G. (2003): Coerrections to "Dragonflies of Victoria" by G. Theischinger and J.H. Hawking. *Austrolestes* 8: 4. (in English). [A few corrections are listed.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

4085. Theischinger, G.; Hawking, J.H. (2003): *Dragonflies of Victoria: an identification guide to adult and larval dragonflies (Odonata)*. *Coop. Res. Cent. Freshw. Ecol.*, Albury/NSW. ISBN 1-876144-49-1: iv+65 pp. (in English). ["An identification guide, designed for non-professional and professional entomologists. The dichotomous keys are accompanied by figs of diagnostic characters, to aid the identification of both adults and larvae known to occur in Victoria, Australia (76 species). Colour photographs of most species are also provided." For an extensive review see the following *Verbatim* from *Austrolestes* 7: Orr, B. (2003): "Dragonflies of Victoria is a slim A5 (21x15cm) volume of 64 pages, soft-bound and produced to a high standard on glossy paper. It is easily carried into the field, just fitting into the more capacious map pockets found on cargo trousers, but is best protected by a plastic bag if treated in this way. Following an introductory section including a checklist of Latin and vernacular names and a very compact but exceptionally clear illustrated guide to a-

dult and larval morphology, the book is essentially a collection of illustrated keys to suborders, families and the 80 species of Odonata recorded from Victoria and neighbouring regions of southern NSW. Separate keys cover both adults and larvae. The adults, mostly living, of nearly all species and the living larvae of over fifty species are illustrated by 136 thumbnail photographs. The dichotomous keys are exceptionally user-friendly. The language is simple and direct. Most key couplets are accompanied by identically labelled diagrams placed immediately to the right of the text. Photo references are provided for each species. A large number of the adult diagrams are taken from Watson et al, 1991, 'The Australian Dragonflies' and the new adult diagrams are after the same style. Larval diagrams are also clear and accurate. The photographs are of mixed quality, but at least give the reader a good idea of the general appearance of each species. For the novice especially they provide an invaluable confidence-building boost when using the keys, for no matter how well constructed, all dichotomous keys suffer from the problem that one false answer can lead the user well astray. For the dragonfly watcher, as opposed to the collector with a specimen in the hand, it would be beneficial if size ranges and habitat preferences were also given for each species. To readers not familiar with other recent works of these authors the higher classification used in the checklist may be confusing. Four family names, the Telephlebitidae, Austrocorduliidae, Cordulephyidae and Hemicorduliidae are not to be found in Jill Silsby's widely read 'Dragonflies of the World'. These are used without justification or explanation of how they relate to better-known schemes. Although I do not dispute the validity of these groupings, it is debatable if novel family-group names should be introduced in a key intended for popular use. The vernacular English names suggested in the checklist may not be to everyone's taste. However they are presented unobtrusively and may at least provide inspiration for those who see the need for such names. This list is, after all, neither authorized nor immutable and anyone wishing to dabble in popular nomenclature can do so, using if they wish, this list as a basis for forming new vernacular names. In summary this is an excellent little book which achieves its main aims very well. It contains a great amount of information compressed into a very small space. The quality of the drawings and text is very high. It suffers from only a very few typographic errors. It will be useful throughout Victoria and the southern part of New South Wales. Given its size it may seem a little expensive, but this is more than compensated by the amount of information it provides. Available from Murray Darling Freshwater Research Centre, P.O. Box 921, Albury, N.S.W. 2640. \$38.50 (incl. GST) + \$2.30 p/p. Phone (02) 6058 2300; fax (02) 6043 1626. Address: Orders to: Murray Darling Freshw. Res. Cent., P.O. Box 921, Albury, NSW 2640, Australia

4086. Theischinger, G. (2003): Dragonfly News from Cape York Peninsula. *Austrolestes* 8: 2-3. (in English). [The paper contains different notes on the history of the discovery of *Nannophya paulsoni* Theischinger, 2003, the questionable status of *pymaea* in Australia (it should be omitted from checklists and replaced by *N. paulsoni*), a first record of *Notolibellula bicolor* Theischinger & Watson, 1977 in eastern Queensland, and the attraction of *Austrocnemis maccullochi* (Tillyard, 1926) by a UV light. Though several coenagrionid and libellulid species had been seen in the same habitat,

only *A. maccullochi* was attracted.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

4087. Thipaksorn, A.; Jamnongluk, W.; Kittayapong, P. (2003): Molecular evidence of *Wolbachia* infection in natural populations of tropical odonates. *Current Microbiology* 47(4): 314-318. (in English). ["*Wolbachia* are endosymbiotic bacteria that cause reproductive alterations in numerous arthropod species. Using a PCR-based method, we found that, out of 33 odonate species, four species (*Agriocnemis femina*, *Pseudagrion pruinatum*, *Brachythemis contaminata*, *Neurothemis tullia*) were infected with *Wolbachia*. This finding represents the first record of *Wolbachia* infection in tropical odonates. Identical *wsp* gene sequences were found in the *Wolbachia*-infected common odonate species, *Agriocnemis f. femina*, collected from different locations in Thailand. The infection frequencies in several natural populations suggest that replacement of uninfected populations by *Wolbachia*-infected ones has recently occurred in this damselfly species." (Authors)] Address: Kittayapong, P., Center for Vectors and Vector-Borne Diseases, Faculty of Science, Mahidol University, Rama 6 Road, Bangkok, 10400, Thailand. E-Mail: grpkt@mahidol.ac.th

4088. Thipaksorn, A.; Kittayapong, P.; Jamnongluk, W.; Thirakhupt, V.; Milne, J.R.; Sindhusake, C.; Poonchaisri, S. (2003): Record of *Wolbachia* infection in zygopteran odonates. *Malangpo* 20: 206-209. (in English). ["The genus *Wolbachia* comprises rickettsia-like bacterial endosymbionts in a group of Alpha subdivision of proteobacteria that cause reproductive alterations in numerous arthropod species. [...] The infection by *Wolbachia* bacteria in odonate insects was first recorded in *Perithemis tenera*, by Jeyaprakash and Hoy (2000)." In 2003, Thipaksorn et al. (2003) reported a first recorded of *Wolbachia* infection in two zygopteran species and two anisopteran species. We caught 33 odonate species from rice fields in 36 provinces around of Thailand and screened *Wolbachia* infection by long PCR procedure with *wspL* primers. *Agriocnemis femina*, *Pseudagrion pruinatum*, *Brachythemis contaminata*, and *Neurothemis tullia* representing 12.12% (4/33) of the recorded species have been infected with *Wolbachia*. "A phylogenetic analysis of *Wolbachia* strains found in infected odonates, including the strain from the odonate, *Perithemis tenera*, and two previously published A group *Wolbachia* strains (Jeyaprakash and Hoy, 2000; Zhou et al., 1998) was conducted. All procedures used for phylogenetic reconstruction (maximum parsimony, maximum likelihood and neighbor-joining methods) place all odonate *Wolbachia* strains in a monophyletic group with those of B group *Wolbachia*. The *wsp* gene sequences of *A. femina* and *B. contaminata* were in the Pip subgroup with 100% of sequences, while the *wsp* gene sequences of *N. tullia* and *P. pruinatum* were identical and in the same Con subgroup as those of *Perithemis tenera*. The low *Wolbachia* infection frequencies and identical *wsp* gene sequences in related odonate species that are not closely related suggest that *Wolbachia* might have recently invaded rice field odonate populations through some means of horizontal transmission. Identical *wsp* gene sequences were found from all three positive populations of *A. femina* collected from different regions of Thailand may supports the hypothesis that *Wolbachia*-infected damselflies spread into uninfected populations. Further stu-

dy should be done to investigate the rates at which *Wolbachia*-infected damselflies could spread into uninfected populations." (Authors)] Address: Kittayapong, P., Department of Biology, Faculty of Science, Mahidol University, Rama VI Road, Bangkok 10400, Thailand

4089. Thipaksorn, A.; Kittayapong, P.; Milne, J.R.; Thirakhupt, V.; Sindhusake, C.; Ponbngaisri, S. (2003): Records of rice field Odonata from Thailand. *Notul. odonat.* 6(2): 20-24. (in English). ["Records (1998-2000) of 29 species, from 47 localities in 36 provinces are listed, and the abundance of some species is discussed." (Authors)] Address: Thipaksorn, A., Department of Biology, Faculty of Science, Mahidol University, Rama VI Road, Bangkok 10400, Thailand. E-mail: athipaksorn@scientist.com

4090. Torralba Burrial, A.; Ocharan, F.J. (2003): Cambio en la posición de reposo de *Lestes virens* (Odonata: Lestidae) por efecto de una lluvia fuerte. *Boln Soc. ent. aragon.* 32: 233. (in Spanish with English summary). [Spain; 2 resting males of *L. virens* folded up the wings in a heavy rain shower the way most other zygopterans do rather than holding them half open in the Lestidae mode.] Address: Ocharan, F.J., departamento de Biología de Organismos y Sistemas. Universidad de Oviedo. E-33071 Oviedo, Spanish: E-mail: focharan@oonreo.uniovi.es

4091. Torralba Burrial, A.; Ocharan, F.J. (2003): Emergencia tardía y voltinismo en *Sympetrum fonscolombi* (Odonata: Libellulidae). *Boletín de la Sociedad Entomología Aragonesa* 33: 279-280. (in Spanish, with English summary). [Numerous specimens of *S. fonscolombi* emerged in Ilche (Huesca, NE Spanish) on "2001.10.02". This is interpreted as an evidence of the existence of several annual generations of this species in the area.] Address: Ocharan, F.J., departamento de Biología de Organismos y Sistemas. Universidad de Oviedo. E-33071 Oviedo, Spanish: E-mail: focharan@oonreo.uniovi.es

4092. Torralba Burrial, A.; Ocharan, F.J. (2003): Predación per peces sobre *Anax imperator* asociada a la reproducción de éste (Odonata, Aeshnidae). *Boletín de la Sociedad Entomología Aragonesa* 32: 219-220. (in Spanish with English summary). ["The predation by the non-native fish, *Micropterus salmoides*, on *A. imperator* is reported. The attacks are associated with the dragonfly reproductive activity and represent a reproductive cost that effects, for different reasons, both sexes." (Authors)] Address: Ocharan, F.J., departamento de Biología de Organismos y Sistemas. Universidad de Oviedo. E-33071 Oviedo, Spanish: E-mail: focharan@oonreo.uniovi.es

4093. Torralba Burrial, A.; Ocharan, F.J. (2003): ¿Coches como hábitat para libélulas? Algunos machos de *Crocothemis erythraea* creen que sí. *Boletín de la Sociedad Entomología Aragonesa* 32: 214-215. (in Spanish with English summary). [Male *C. erythraea* mistake white and grey tops of cars for water surfaces in the Huesca province (NE Spain). The receiving antenna of the car radio was used as a perch.] Address: Ocharan, F.J., departamento de Biología de Organismos y Sistemas. Universidad de Oviedo. E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

4094. Truscott, L.A.C. (2003): Common Blue Damselfly *Enallagma cyathigerum* (Charpentier) capturing the

Rush Veneer *Nomophila noctuella* (Denis & Schiffermüller), a pyralid moth, as a prey item. *J. Br. Dragonfly Society* 19(1/2): 38. (in English). [Verbatim: On 8 June 2003, at Bake Fishing Lakes, Trerulefoot, Cornwall, UK, I observed *E. cyathigerum* capturing *N. noctuella*. The damselfly quickly alighted, possibly because of the weight of the prey, and had already removed one of the moth's forewings. However, not much time was spent tackling the prey and the damselfly flew off after about twenty seconds without the Rush Veneer. This (attempted) prey item is by far the largest I have ever noted. This is not a large moth (the wing length of this individual was only approximately 10mm), but it is still huge compared with the tiny prey items normally caught by this and other damselflies. Adrian Parr (pers. comm.) has mentioned that there are some records of damselflies taking larger prey, such as *Lestes sponsa* tackling a crane-fly. However, in most of the literature referring to the diet of adult Odonata, the prey of damselflies is usually described as small flies or similar, so prey of this size would appear to be very unusual.] Address: Truscott, L.A.C., 59 Cremyll Road, Torpomot, Cornwall PL11 2DZ, UK

4095. Tsubaki, Y. (2003): The genetic polymorphism linked to mate-securing strategies in the male damselfly *Mnais costalis* Selys (Odonata: Calopterygidae). *Population Ecology* 45(3): 263-266. (in English). ["Alternative male mate-securing strategies are widespread among animal taxa, but there are few well-documented examples of genetic polymorphisms for them. In the Japanese calopterygid damselfly *Mnais costalis*, males occur as either orange-winged territorial fighter males, or clear-winged non-territorial sneaker males. It has previously been suggested that this behavioral polymorphism is genetically controlled. However, there was no direct evidence for this. By rearing two groups of larvae from the same female but sired by different male morphs, I show that differential morph development is genetically controlled and consistent with a single-locus two-allele autosomal genetic polymorphism." (Author)] Address: Tsubaki, Y., Biodiversity Conservation Research Group, National Institute for Environmental Studies, 305-8253 Tsukuba, Japan

4096. Vamosi, S.M. (2003): Predation sharpens the adaptive peaks: Survival trade-offs in sympatric sticklebacks. *Annales Zoologici Fennici* 39(3): 237-248. (in English). ["This study tests whether living in different lake habitats in benthic and limnetic sticklebacks (*Gasterosteus aculeatus* complex) has resulted in divergence of antipredator traits and habitat-associated survival trade-offs. Adult benthics were larger than limnetics, had poorly developed defensive armour and showed no tendency to school with conspecifics. Limnetics, in contrast, were smaller, had well developed defensive armour and demonstrated strong schooling behaviour. In littoral arenas, juvenile limnetics were significantly more vulnerable than juvenile benthics to predation by adult benthics and backswimmers (*Notonecta* sp.) but not dragonfly larvae (*Aeshna* sp.). This pattern was reversed in open water arenas when adult benthics and limnetics were exposed to diving avian predators, double-crested cormorants (*Phalacrocorax auritus*). These findings show that divergence in antipredator traits between benthic and limnetic sticklebacks has accompanied divergence in foraging traits, resulting in survival trade-offs in addition to those previously observed for foraging success and growth rates across habitats."

(Author)] Address: Vamosi, S.M., Dept of Zoology, University of Toronto, 25 Harbord Street, Toronto, ON, M5S 3G5 Canada. E-Mail: vamosi@zoo.utoronto.ca

4097. Vanappelghem, C.; Fernandez, E. (2003): Nouvelle localité pour *Macromia splendens* (Pictet, 1843) au Portugal (Odonata, Anisoptera, Macromiidae). *Martinia* 19(2): 65-67. (in French with English summary). [July 2000, Rio Côa, near Castel Bom (Province of Guarda, northeastern Portugal)] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France

4098. Vasileva, Gergana; Gibson, D.I.; Bray, R.A. (2003): Taxonomic revision of *Joyeuxilepis* Spassky, 1947 (Cestoda: Amabiliidae): Redescriptions of *J. biuncinata* (Joyeux & Baer, 1943), *J. decacantha* (Fuhrmann, 1913) and *J. pilatus* Borgarenko & Gulyaev, 1991. *Systematic Parasitology* 56(1): 17-36. (in English). ["Two species of *Joyeuxilepis* Spassky, 1947 are redescribed from *Tachybaptus ruficollis* in Bulgaria: *J. biuncinata* (Joyeux & Baer, 1943) and *J. pilatus* Borgarenko & Gulyaev, 1991. The syntypes of *J. decacantha* (Fuhrmann, 1913) from *Podiceps cristatus* in Sweden and voucher specimens of *J. pilatus* (identified as '*Tatria decacantha*') from *T. ruficollis* in England (new geographical record) from the British Museum (Natural History) Collection are also re-described. The voucher specimens and cysticercooids of *Tatria* spp. from dragonfly nymphs (*Pyrrhosoma nymphula*, *Enallagma cyathigerum*) in Wales recorded by Rees (1973) were re-examined. Previous records of *J. biuncinata*, *J. decacantha* and *J. pilatus* are critically analysed in view of the present results. The major reliable diagnostic characters for species of *Joyeuxilepis* are presented and the distinguishing criteria for the three species studied are re-evaluated." (Authors)] Address: Vasileva, Gergana, Parasitic Worms Division, Department of Zoology, Natural History Museum, Cromwell Road, London, SW7 5BD, UK

4099. Vercoetere, B. (2003): *Calopteryx splendens* in the valley of the Dyle: a recent expansion? *Gomphus* 19(1): 3-12. (in Dutch with English and French summaries). [Belgium. "In Flanders, *C. splendens* is rather rare. Till recently this was also the case in the Dyle valley, but at present this species appears in great number south of Leuven. This paper gives details about the history of this recent expansion and of the habitat improvement leading to it." (Authors)] Address: Vercoetere, B. Leuvense baan 65, B-3220 Holsbeek, Belgium. E-mail: B.Vercoetere@haskoning.be

4100. Vick, G. (2003): Obituary: David Allen Lewis Davies. *J. Br. Dragonfly Society* 19(1/2): 55-56. (in English). Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, United Kingdom

4101. Villenave, J.; Cloupeau, R. (2003): Première donnée d'*Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785) sur les berges de la Mayenne dans le département du Maine-et-Loire (Odonata, Anisoptera, Gomphidae). *Martinia* 19(2): 51-55. (in French with English summary). [Records of *O. cecilia* in western France are restricted to the river Loire. This record from the Mayenne (Saint-Aubin Island, north of Angers, Maine-et-Loire, France) seems to be the first record in a running water of France not belonging to the Loire river system. A total of 13 odonate species was recorded at the sampling site. Records include *Gomphus simillimus* and *Orthetrum albistylum*. The dominant species of the river

Mayenne was *Gomphus pulchellus*.] Address: Villenave, Johanna, 12, rue H. Broutelle, F-44000 Nantes, France

4102. Virbickas, J.; Pliuraite, V. (2003): The species composition of macrozoobenthos in small Lithuanian rivers. *Acta zool. lithuan.* 12(3): 254-264. (in English, with Lithuanian summary). [4 odonate species are reported from 5 (out of the 12) rivers studied during 1996-2001. Among these, *Calopteryx splendens* is frequent, while larval *Epitheca bimaculata* is considered very rare, encountered in the Brazuole R. only. The data are compared with data from small rivers in the Kaliningrad region (Russia).] Address: Virbickas, J.; Pliuraite, V., Inst. Ecol., Akademijos 2, LIT-2600 Vilnius, Lithuania

4103. Wang, H.; Zeng, L.; Liu, H.; Yin, C. (2003): Measuring wing kinematics, flight trajectory and body attitude during forward flight and turning maneuvers in dragonflies. *Journal of Experimental Biology* 206(4): 745-757. (in English). ["A robust technique for determining the wing kinematics, body position and attitude of a free-flight dragonfly is described. The new method is based on a projected comb-fringe technique combined with the natural landmarks on a dragonfly, allowing us to establish the local body-centered coordinate system with high accuracy, and to measure the body attitude at any instant. The kinematic parameters, including wing-beat frequency, flapping angle, angle of attack, torsional angle and camber deformation, required no assumptions to be made with respect to wing geometry, deformability (except the assumption of rigid leading edges) or bilateral wing symmetry. Two typical flight behaviors, forward flight and turning maneuvers, of dragonflies *Polycanthagyna melanictera* Selys were measured and analyzed." (Authors)] Address: Wang, H., State Key Laboratory of Precision Measurement Technology and Instruments, Department of Precision Instruments, Tsinghua University, Beijing, 100084, China. E-Mail: whao98@mails.tsinghua.edu.cn

4104. Wappler, T. (2003): Systematik, Phylogenie, Taphonomie und Paläoökologie der Insekten aus dem Mittel-Eozän des Eckfelder Maeres, Vulkaneifel. *Clausthaler Geowissenschaften* 2: VIII, 241 pp. (in German, with English summary). [The Odonata are represented with seven records from the Middle Eocene fossil site Eckfelder maar, Rheinland-Pfalz, Germany. The records are presented and discussed. *Euarchistigma?* *superstes* n. sp. is described, compared and discussed in detail from the phylogenetic point of view with the recent *Thaumatoneura inopinata* from Costa Rica.] Address: Wappler, T., TU Clausthal, Inst. Geol. u. Paläontologie, Leibnizstr. 10, D-38678 Clausthal-Zellerfeld, Germany

4105. Werner, D.; Pont, A.C. (2003): Dipteran predators of simuliid blackflies: A worldwide review. *Medical & Veterinary Entomology* 17(2): 115-132. (in English). ["Haematophagous female blackflies (Diptera: Simuliidae) are serious biting pests and obligate vectors of vertebrate pathogens, namely filarial *Dirofilaria*, *Mansonella*, *Onchocerca* and protozoal *Leucocytozoon*. Immature stages of Simuliidae inhabit lotic waterways, the sessile larvae filter-feeding and often forming a large proportion of the benthic biomass, usually aggregated in well-oxygenated sections of streams, rivers, waterfalls and spillways. Simuliid control practices depend on larvicidal chemicals, biological products (bacteria, ne-

matodes) and environmental modification. The potential use of predators for biological control of Simuliidae has not been exploited. Predators of Simuliidae include examples of at least 12 families of Diptera and other predeaceous arthropods (Crustacea and insects: Coleoptera, Odonata, Plecoptera, Trichoptera), invertebrates (notably Turbellaria), as well as browsing fish. Diptera impacting upon simuliid populations comprise mainly Chironomidae, Empididae and Muscidae, although several other families (Asilidae, Dolichopodidae, Phoridae, Drosophilidae, Scathophagidae) play a significant role as predators. Details of predator and prey species and life stages are presented, by zoogeographical region, including the prevalence of cannibalism among Simuliidae." (Authors) Address: Werner, D. Humboldt-Universität zu Berlin, Institut für Biologie, Invalidenstr. 43, D-10115, Berlin, Germany. E-Mail: h0662cer@rz.hu-berlin.de

4106. Wildermuth, H. (2003): Der Schlupf von *Epitheca bimaculata* (Zweifleck). *mercuriale* 3: 20-28. (in German). [Detailed documentation of the emergence of a reared female larva of *E. bimaculata* in the laboratory.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

4107. Wildermuth, H. (2003): In der Not frisst der Teufel Fliegen *mercuriale* 3: 37. (in German). [The importance to import prey into a garden pond to maintain a population of *Aeshna cyanea* larvae is documented.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

4108. Wildermuth, H. (2003): Mosaikjungfer auf Fliegenjagd in der Morgendämmerung. *mercuriale* 3: 38. (in German). [Switzerland; early morning - preying on aggregations of small Diptera by *Aeshna cyanea* cf. is described.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

4109. Worthen, W.B. (2003): Survey of odonates of Congaree Swamp National Monument, Richland Co., South Carolina. *Argia* 15(3): 14-16. (in English). [Congaree Swamp national Monument, Richland County, South Carolina, USA; 41 species including 16 new county records for Richland County.] Address: Worthen, W.B., Dept of Biology, Furman University, Greenville, SC29613 USA. E-mail: worthen@furman.edu

4110. Zambo, J.M.; Maret, T.J. (2003): Direct and indirect effects of acidification on amphibians and their invertebrate predators. *Journal of the Pennsylvania Academy of Science* 76: 143. (in English). [Verbatim: Many studies have been done on the direct effects of acidity on amphibians, but little research has been conducted on the indirect effects of acidity on the interactions between amphibians and their predators. This study examined the effects of pH on the hatching success, hatching size, and hatching time of wood frogs (*Rana sylvatica*) and green frogs (*R. clamitans*) as well as the effects of pH on predation on different sizes of *R. sylvatica*, *R. clamitans*, and American toad (*Bufo americanus*) tadpoles by dragonfly naiads (families Corduliidae and Aeshnidae). The percentage of eggs that hatched and the time it took them to hatch was significantly influenced by pH for *R. clamitans*, but not *R. sylvatica*. Size of tadpoles at hatching was not significantly affected by pH for either species. The percentage of tadpoles attacked was dependent on the size of the tadpole

for *R. sylvatica* only and was not significantly influenced by pH for any species.] Address: Zambo, J.M., Department of Biology, Shippensburg University, Shippensburg, PA, 17257, USA

2004

4111. Abro, A. (2004): Structure and function of the male sperm ducts and female sperm-storage organs in *Aeshna juncea* (Anisoptera: Aeshnidae). *Odonatologica* 33(1): 1-10. (in English). ["By the use of light and electron microscopy, the micro-anatomy of the S genital ducts and the 9 reproductive organs have been surveyed. Sperm bundles transmitted from the testis through the vas deferens become embedded in a carrier jelly and also have additional substances bound to them; obviously the sperm cells are undergoing maturation. In the 9 9, sperm bundles in carrier jelly appear to be deposited in the vaginal canal and, particularly, in the receptaculum seminis, the latter serving for long-term conservation. It seems possible that agents emitted from the posterior accessory glands to the vaginal surface near the genital aperture diffuse forwards, reaching the receptacle entrance. Here they presumably induce a liquefaction of the jelly and break-down of sperm bundles, thus releasing individual sperm cells. Free sperm cells are expected to accumulate in the anterior accessory sacs which they leave during fertilization. The morphological changes taking place in the sperm after transfer to the 9 genital tract appear ambiguous." (Author)] Address: Abro, A., Department of Anatomy, University of Bergen, Jonas Lies vei 91, N-5009 Bergen, Norway

4112. Aguillard, D. (2004): Breaking news- *Paltotemis lineatipes* explosion in California. *Argia* 16(1): 28. (in English). [USA, California, 29 March 2004] Address: not stated

4113. Askew, R.R. (2004): *Dragonflies of Europe* - Revised edition in paperback. ISBN 0 946589 75 5: 308 pp. (in English). [When in 1992 I travelled to Italy and Greece for odonatological purposes, I had to make a quite difficult decision: Should I take Askew's weighty book along or should I leave it at home? In the future there will be no such problem: The revised edition of R.R. Askew's "The Dragonflies of Europe" will be released in a new, slightly reduced, paperback format (232 x 168 mm), and will fit into everybody's backpack. But, after browsing the book there will be an additional question: Is it worth being taken to the field? My personal opinion is that the chance to write an up to date book on European Odonata was missed.

After its publication fifteen years ago, this book was almost unanimously considered as the finest handbook ever produced on European Odonata. More than 3000 copies of the original hardback edition have been sold! In the revised edition, the author has made a few corrections and changes to the original text, which covered 114 species of Odonata breeding in Europe and added a new Preface and an updating Supplement. The Introduction, which seems to me unchanged, is followed as in the first edition by the chapters Life History, The Adult Dragonfly, The Distribution of European Dragonflies, Morphology of the Adult Dragonfly, The European Species of Odonata including an updated Check-

list, and finally Keys to the Final-Instar Larvae of European Odonata

The Systematic section includes keys to the suborders, families, genera, and species, species accounts with clear descriptions and details on biology, flight periods, and distribution of all species found in Europe, with distribution maps with national boundaries as they were in 1988. The status of information in all aspects is that of the first edition, except the updated checklist. Nevertheless, in the revised edition the excellent plates of the first edition have lost their brilliance.

The chapter on larvae is now followed by a Supplement, intended as the up date of the first edition in paperback format. R.R. Askew provides new information under the following headings: Nomenclature, Orthography, Thermoregulation, American species observed in Europe, Accidental Introductions into Europe (these are species imported together with aquatic plants for aquaria and which emerged in greenhouses), Other species newly recognized in Europe, Species new to British Isles, Expansion of recorded ranges within Europe, Other new distribution records, and Contraction of recorded ranges. As a supplement to the chapter References, the author lists more than 100 references on European Odonata published after 1988.

The supplement with numerous line-drawings is followed by a new index to English and scientific names, including all species, subspecies and synonyms cited in the revised text. An additional colour plate (number 30) depicts adults of the five "new" records and one from North America.

R.R. Askew has added a further ten resident species, and several adventures to the European checklist of species. The serious problems with this revised edition are starting here: A new species of the European fauna (*Sonjagaster helladica*, Lohmann 1993) described after the first edition of the book is omitted with the exception of a footnotelike note on page 213. Species not illustrated in the first edition like *Ischnura hastata*, *I. saharensis* and *Platycnemis subdilitata* (both from Canary Islands), and *I. fountaineae* are likewise not illustrated in the revised edition. *P. subdilitata* is not mentioned in the chapter of species newly recognized in Europe, but listed in the chapter of new distribution records. Serious examples of inadequate representation of important species in a book on European Odonata are *Boyeria cretensis* Peters 1991 and *Coenagrion intermedium* Lohmann, 1990. In the case of *B. cretensis* the differences between *B. irene* and *cretensis* are briefly described; for a drawing of *B. cretensis* there is a cross reference (!) to a paper of J.-P. Boudot and – in addition – not to the original description! In the case of *C. intermedium*, the species status is discussed, but *C. ponticum* is illustrated! *Somatochlora meridionalis* Nielson 1935 is accepted as a good species, but no illustration or any description of the morphological differences to *S. metallica* are given. In the revised edition of a book claiming to cover the European dragonfly fauna, the reader can expect a complete list of species and illustrations of all European species.

It remains a real secret to me what kind of useful information is intended in the chapter "Other new distribution records" which is a list of species and distributional information from different sources: Many information remain on a more regional scale while some contain quite precise information on the locality level. What kind of criteria to select or to omit records were chosen remains really unclear. Additions to the Odonata of France are reduced to information on Corsica (Chapter "Re-

cent literature"). The distribution maps and the accompanying texts of the first edition were in need of revision. The list of localities presented can not be a substitute of up-dated distribution maps.

The supplementary plate illustrates *Anax immaculifrons*, *A. junius*, *Orthetrum sabina*, *O. taeniolatum*, *Sympetrum sinaiticum*, and *Trithemis festiva*; the pictures are looking quite fine, and will be appreciated especially in cases of the very rarely pictured species like *A. immaculifrons* and *S. sinaiticum*. *Somatochlora borisi* is illustrated as black and white drawing and with a colour photo on the title page of the book. Being not acquainted with *A. immaculifrons* I cannot judge on the colours of the picture on plate 30, but I believe they are too pale (compare e.g.: <http://www.asia-dragonfly.net/picSearch-Species.php?Species=104> 3)

There remains a certain kind of sadness: the revised edition of a really outstanding book turns out to me as nearly completely unuseable if you are the happy owner of the first edition. If you didn't have had the chance to buy Askew's book, now you have it. But don't expect a book that keys or covers all European odonate species. (Martin Schorr) Address: Harley Books, Martins, Great Horkeley, Colchester, Essex CO6 4AH, UK. E-mail: harley@keme.co.uk. £30,- net.

4114. Barlow, A.E. (2004): Adverse weather and its impact on Odonata flights seasons. New record late dates from New Jersey. *Argia* 15(4): 21-22. (in English). [Flight season extensions for several species are listed.] Address: Barlow, A.E., 10 Belle Court, Budd Lake, NJ 07828, USA. e-mail: a.barlow@njodes.com

4115. Beckemeyer, R. (2004): Aerobic Anisoptera & zooming Zygoptera: Odonata flight from A to Z. *Argia* 15(4): 6-8. (in English). ["Key facts: (1) Wing Loading is just the weight of the insect divided by the total area of its wings. (2) The wing loading indicates the average differential pressure that the air must exert on the wings to support the insect in flight. (3) Lower wing loadings mean the insect can fly at lower speeds." (Author)] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

4116. Beckemeyer, R. (2004): Aerobic Anisoptera & zooming Zygoptera: Odonata flight from A to Z. Part 2. Dragonfly wings: responding to pressure. *Argia* 16(1): 4-9. (in English). ["Key facts: Wing loading indicates the average differential pressure that must be generated by aerodynamic forces acting on the wing to support it in flight. The actual pressure distribution across the chord of the wing from leading to trailing edge is not uniform, but has a large peak "suction" (pressure lower than atmospheric) area near the leading edge. Insect wings reflect this pressure distribution in having their corrugated longitudinal veins (costa, subcosta, radius) clustered near the costal margin (leading edge). Wings can only generate lift if they are inclined at a leading edge up (positive) angle of attack, or if they have a positive camber (convex dorsal curvature). A wing with positive camber will generate more lift than a flat wing at the same angle of attack." (Author) *Anax junius*] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

4117. Beckemeyer, R. (2004): Some Odonata records for the midwest and west for 2003. *Argia* 16(1): 26. (in English). [USA, Oklahoma, Idaho, Illinois, Kansas] Ad-

dress: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

4118. Beckemeyer, R.J. (2004): Notes on the behavior and mechanics of scooping oviposition in *Libellula composita* (Hagen) (Anisoptera: Libellulidae). *Odonatologica* 33(1): 11-23. (in English). ["Females were observed ovipositing, both alone and in tandem, in Chaves County, New Mexico, United States. The female oviposits by scooping water droplets into the air with the tip of her abdomen. This mode of oviposition is common in many Libellulinae, but this is the first report of a female using it in tandem as well as in solo oviposition. The female *L. composita* also grips the male abdomen with her legs during post-copulatory oviposition flight, a behavior previously reported only in subfamilies Trameinae and Zygonychinae. Possible functional significance of this flight behavior is discussed based on observations and analyses of the mechanics of the oviposition process that are evident in photographs." (Author)] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

4119. Brook, J.; Brook, G. (2004): The past breeding evidence of Willow Emerald Damselfly *Chalcolestes viridis* (Vander Linden) in Kent. *Atropos* 21: 3-6. (in English). [An exuviae of *C. viridis* was found 29th June, 1992, at Cliffe marshes, Kent, UK. This seems to be the first record and prove of reproduction of this species on the British mainland. The species could not be traced in summer 2003 at the given locality. A comment of Adrian Parr stresses the possibility of additional records in UK, and notes that an adult was caught in the 1980th in Sussex near Hastings.] Address: Brook, J. and G., 12 Burgess Hall Drive, Leeds, Maidstone, Kent ME17 1SH, UK

4120. Buchwald, R. (Ed.) (2004): Tagungsband. 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO). 19.-21.03.2004. Oldenburg. 44 pp. (in German) [Begrüßung: R. Buchwald, Institut für Naturschutz und Umweltbildung, HS Vechta; M. Fansa & U. Beichle, Landesmuseum Natur und Mensch, Oldenburg; P. Buczyński: Bug-Aue: Libellenparadies am südöstlichen Rand Mitteleuropas; A. Günther: Die Wiederbesiedlung des Flusssystemes der oberen Freiburger Mulde durch Libellen; H. Schlumprecht: Die Libellenfauna im Obermairtal (Nordbayern); M. Ewers & R. Buchwald: *Orthetrum coerulescens* zwischen Weser und Ems - Bestandssituation, Ökologie und Schutzmöglichkeiten; E. Schmidt: Zur Odonatenfauna von Freizeit-Angelteichen im Westmünsterland; K. Westermann: Zur Mortalität von *Lestes viridis* während der Emergenz; J. Ott: Zur Populationsökologie von *Aeshna isosceles* - vergleichende Ergebnisse zweier Fang-Wiederfang-Studien; A. Martens: Paarungssysteme bei Libellen - aktueller Kenntnisstand und offene Fragen; H. Wildermuth: Sequenzielle Mehrfachpaarung beim gleichen Vierfleckpaar (*Libellula quadrimaculata*) - Zufall oder Gesetzmäßigkeit?; T. & H. Fliedner: Repetitive Kopula bei *Sympetrum pedemontanum* am Sihlsee bei Einsiedeln (Schweiz) im Sommer 2003; K. Schenk: Fortpflanzungsstrategien bei Libellen: Risikostreuung, Habitatwahl und Qualität der Nachkommen; K. Sternberg: Stammesgeschichtliche Aspekte der Habitatselektion bei Libellen; R. Buchwald, A. Manzi & H. Hunger: Habitatwahl von *Lestes dryas* und *Sympetrum flavolum* in mittelitalienischen Karst-Hochebenen; B. Trockur: Aspekte der Habitatwahl bei *Epitheca bimacu-*

lata - Analyse der Eiablageorte und Exuvien-Fundstellen; R. Zschunke: Untersuchungen zur Abhängigkeit der Habitatnutzung und der Flugaktivität von mikrometeorologischen Bedingungen bei *Calopteryx splendens*; T. Lieckweg: Zur Verbreitung westafrikanischer Libellen - Ökofaunistische Untersuchungen zur Libellenfauna von Ghana, Togo, Benin, Nigeria und Kamerun; R. Zschunke: Landungen auf heiß und kalt - sind Libellen lernfähig? (Videobeitrag); M. Hartung: Reisebericht mit Landschaftsaufnahmen und Libellenphotos von den Philippinen; A. Bönsel: Erste Ergebnisse von Kartierung und Monitoring der FFH-Libellenarten in Mecklenburg-Vorpommern; F.-J. Schiel: Bilanz des Artenschutzprojekts *Leucorrhinia pectoralis* in Baden-Württemberg; R. Mauersberger, F.-J. Schiel & K. Burbach: Verbreitung und Bestandssituation von *Leucorrhinia caudalis* in Deutschland; R. Stephan, W. Bena & W. Xylander: Untersuchungen zu *Leucorrhinia albifrons* in der Görlitzer Heide/Westpolen; W. Röske: Artenschutz mit Tradition: *Coenagrion mercuriale* in Baden-Württemberg; K. Burbach: Schutzkonzeption für *Coenagrion ornatum* und *Coenagrion mercuriale* in Bayern; M. Schorr: Anmerkungen zum Vorkommen der Gekielten Smaragdlibelle (*Oxygastra curtisii*) in Deutschland und Luxemburg; H. Wildermuth: *Nehalennia speciosa* in der Schweiz ausgestorben - und in Europa?; M. Binot-Hafke & H. Haupt: Weiterentwicklung bundesweiter Roter Listen: Diskussionsstand zum Kriteriensystem (mit Diskussion); Poster: C.-J. Conze: Der aktuelle Kenntnisstand zu den vom Aussterben bedrohten Libellenarten in NRW; V. Sohni & O.-D. Finch: Bedeutung eines renaturierten Hochmoor-Restes bei Oldenburg (Oldb.) für die Libellenfauna; J. Arlt & J. Ruddek: Libellenbeobachtungen während der Trockenzeit in Gambia; E. Gärtner, U. Karsch, K.-P. Pryswitt, H. Scherzer: Libellenfauna im NSG Helstorfer Moor (Hannoversche Moorgeest) - Lebensraum der Zwerglibelle (*Nehalennia speciosa*); H. Hunger: GIS-gestützte Auswertungen und neue Rote Liste der Libellen Baden-Württembergs] Address: Buchwald, R., INU, Hochschule Vechta, Driverstr. 22, D-49377 Vechta, Germany. E-mail: rainer.buchwald@uni-vechta.de

4121. Buczyński, P. (2004): Gorb, S.N.; Pavljuk, R.S.; Spirus, Z.D. (2000): Odonata of Ukraine. A faunistic overview. *Vestnik zoologii, Suppl.* 15. 154 pp.. *Wiadomości Entomologiczne* 22(1): 18. (in Polish). [Detailed and critical review of the book on the Ukrainian Odonata.] Address: Buczyński, P., Dept of Zool., Mariae Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4122. Buczyński, P.; Zawal, A. (2004): New data about the occurrence of protected dragonflies Odonata in north-western Poland. *Chrońmy Przyrodę Ojczyzną* 60(1): 53-66. (in Polish with English summary). ["New data about the occurrence of *Aeshna viridis*, *Leucorrhinia albifrons*, *L. caudalis* and *L. pectoralis* are given. The material was collected in the years 1998-2001, from nine sample sites (Fig. 1): Krajnik (meadows at the River Odra), Binowo (Binowo Lake), Czermnica (a forest dystrophic water body), Żabowo (a forest dystrophic water body), Potczyn-Zdrój ("Valley of Five Lakes" nature reserve - Krąg Lake and Długie Lake), Lubowo (Lubicko Wielkie Lake), Borne-Sulinowo (forest dystrophic water body and transitional peat bog). Based on new records and on literature it can be stated that *L. albifrons* and *L. pectoralis* are relatively common in the north-western Poland (Fig. 2), whereas *A. viridis* and *L.*

caudalis are known from few localities. It may partially be the result of highly incomplete knowledge about the dragonfly fauna of the area. The characteristics of its habitat and the state of nature indicate that in fact the species may be much more frequent there. The mentioned species are protected in Poland due to their presence in the Annex II to Bern Convention, which reflects the situation in western Europe in 1970s. They are undoubtedly endangered. *L. caudalis* is on the Polish Red List of Threatened Animals in Poland in the category "Near Threatened", *A. viridis* and *L. albifrons* in "Least Concern", and *L. pectoralis* is not included on the List. Therefore their protection is being questioned. But the situation of the mentioned species in Germany, Czech Republic and Slovakia is serious (Tab. 1). Poland is the westernmost country of Central Europe, where the populations of the species are stable and little endangered. [...] The situation puts a great responsibility on Poland to preserve and protect the species. Besides, threats to dragonflies in Poland are similar to those in western Europe, though they are not as intensive. It is hard to forecast their progress. For that reason the monitoring of highly endangered species is desirable." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4123. Caldwell Rinehart, S.; Hovemann, A.C. (illust.) (2004): *Eliza and the dragonfly*. Dawn Publications. ISBN-58469-059-3: 32 pp. (in English). ["*Eliza and the Dragonfly*" is not primarily an instructive book (apart from two pages in the end of the book), but is designed to introduce children to the joys of actually looking for dragonflies. It develops attitudes more than it instructs. The book is richly illustrated with water-colour sketches of a little girl, her aunt, some friends, and dragonflies (named "Horace"). The illustrations might be more impressionistic than children appreciate. The strength of the book is the tying together of the pond habitat for the nymph and its development into a flying insect. Is this a children's book? I really don't know. But I do know that I enjoyed all the pictures and I do not want to miss it in my library. (Martin Schorr)] Address: Dawn Publ., 12402 Bitney Springs Road, Nevada City, CA 95959, USA. E-mail: nature@dawnpub.com

4124. Carvalho, A.L.; Salgado, L.G.V. (2004): Two new species of *Aeshna* in the punctata group from southeastern Brazil (Anisoptera: Aeshnidae). *Odonatologica* 33(1): 25-39. (in English). ["Based on material from the states of Rio de Janeiro and Minas Gerais, *A. serrana* sp. n. (holotype male: Serra do Subaio, Teresopolis, Rio de Janeiro State) and *A. itatiaia* sp. n. (holotype male: Brejo da Lapa, Itamonte, Minas Gerais State) are described and illustrated. The type material is to be deposited in the Museu Nacional and in the Instituto de Biologia, UFRJ, Rio de Janeiro. Morphological features of the 2 new species are compared in a table and SE Brazilian members of the punctata group (that includes also *A. decessus*, *A. eduardoi* and *A. punctata*) are keyed." (Authors) Note: The great revision of the genus *Aeshna* in Southamerica by N. von Ellenrieder (2003) (see OAS ..) was not considered in this publications. It is quite reasonable that both sp. n. have to be transferred to the genus *Rhionaeschna*.] Address: Carvalho, A.L., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro

(UFRJ), Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

4125. Catling, P.M.; Carriere, S.; Johnson, D.; Fournier, M. (2004): *Dragonflies of the Northwest Territories, Canada: new records, ecological observations and a checklist*. *Argia* 16(1): 9-13. (in English). [oas 14: (1) New records for the Northwestern Territories (NWT) are: *Stylurus notatus*, *Somatochlora minor*, *Aeshna canadensis*, *Lestes forcipata*, and *Enallagma ebrium*. (2) *Aeshna eremita* consuming biting insects: Traversing an open bog, specimens of *A. eremita* flew in to glean mosquitos, deer flies, horse flies, and blackflies mostly from the top of the head or the shoulders of one of the authors. (3) *A. eremita* adapting foraging behaviour to specific prey: *A. eremita* was observed to prey on *Lestes disjunctus*. (4) *A. eremita* capturing and feeding on *A. juncea*: A female *A. eremita* preyed on a male *A. juncea*. (5) Hilltopping of *Lestes congener*: *L. congener* was found on the top of hills, no specimens could be traced at the pools located app. 200 m apart. (6): Birds feeding on dragonflies hit by cars: The numbers of dragonflies per mile killed by car collisions on a sunny day of July ist astimated to several hunderts. Of 110 species examined in a mile of a highway *Aeshna eremita* represented 60%, *A. juncea* 30%, and *A. interrupta lineata* 10%. The killed specimens were quickly devoured by birds as ravens and gulls. (7) Directional movement of *Aeshna* species: *Aeshna* sp. (in most cases *A. eremita*) "on average crossed one hundred meter of road every minute". (8) Dependence of endangered bird on dragonflies: "At certain times dragonflies make up to 80% of the food of endangered Whooping Cranes (*Grus americanus*) (9) Dragonfly outing a success: On 19 July 2003, the first NWT dragonfly outing was held at the Northern Frontier Visitors Centre, Yellowknife. Almost 100 people (Families, childrens etc.) participated. 13 odonate species were traced and demonstrated. (10) Dragonflies and biodiversity protection: The results of the NWT Biodiversity Action Plan (including 209 odonate species) are advertised to be published on <http://www.wildspecies.ca>. (11) Checklist of the dragonflies of the NWT: The checklist includes 40 species.] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net

4126. Cham, S.A. (2004): *Dragonflies of Bedfordshire*. Bedfordshire Natural History Society, Luton. ISBN 0-9506521-7-2: 145 pp. (in English). [Regional dragonfly books have a long lasting tradition in UK. To see the evolution of this kind of books, Steve Cham's book is a good example: starting in the 1970th as a kind of "handmade" regional fauna it developed to a highly professional designed book using the latest digital and mapping technology. Species distribution mapping of dragonflies is presented in a special, highly informative chapter. The book covers the usual introducing chapters as morphology and (regional) habitats. It informs on predators and field technics to survey Odonata. The phenology of species is documented in most impressive graphs, and dragonfly recording in Bedfordshire is outlined. The 32 Bedfordshire species are documented monographically giving information on distinctive features, habitat, the past and current distribution in Bedfordshire, conservation status, highly informative field notes, and the flight period. Excellent colour pictures of the species, sometimes larvae, and excellent maps of the species distribution in UK / Ireland and in Bedford-

shire provide highly welcome information. I am really impressed by this book. (Martin Schorr)] Address: Bedfordshire Natural History Society, Bedford Museum, Castle Lane, Bedford MK40 3XD, UK. Orders of the book should be directed to Peter Glenister: E-mail: PEGlenister@ukonline.co.uk. The book is priced £ 24.50.

4127. Cleary, D.F.R.; Mooers, A.O.; Eichhorn, K.A.O.; Tol, J. van; Jong, R. de; Menken, S.B.J. (2004): Diversity and community composition of butterflies and odonates in an ENSO-induced fire affected habitat mosaic: a case study from East Kalimantan, Indonesia. *Oikos* 105(2): 426-448. (in English). ["Little is known about the diversity of tropical animal communities in recently fire-affected environments. Here we assessed species richness, evenness, and community similarity of butterflies and odonates in landscapes located in unburned isolates and burned areas in a habitat mosaic that was severely affected by the 1997/98 ENSO (El Niño Southern Oscillation) event in east Kalimantan, Indonesian Borneo. In addition related community similarity to variation in geographic distance between sampling sites and the habitat/vegetation structure Species richness and evenness differed significantly among landscapes but there was no congruence between both taxa. The species richness of butterflies was, for example, highest in sites located in a very large unburned isolate whereas odonate species richness was highest in sites located in a small unburned isolate and once-burned forest. We also found substantial variation in the habitat/vegetation structure among landscapes but this was mainly due to variation between unburned and burned landscapes and variation among burned landscapes. Both distance and environment (habitat/vegetation) contributed substantially to explaining variation in the community similarity (beta diversity) of both taxa. The contribution of the environment was, however, mainly due to variation between unburned and burned landscapes, which contained very different assemblages of both taxa. Sites located in the burned forest contained assemblages that were intermediate between assemblages from sites in unburned forest and sites from a highly degraded slash-and-burn area indicating that the burned forest was probably recolonised by species from these disparate environments. We, furthermore, note that in contrast to species richness (alpha diversity) the patterns of community similarity (beta diversity) were highly congruent between both taxa. These results indicate that community-wide multivariate measures of beta diversity are more consistent among taxa and more reliable indicators of disturbance, such as ENSO-induced burning, than univariate measures." (Authors).] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

4128. Cook, C.; Laudermilk, E.L. (2004): *Stylogomphus sigmastylus* sp. nov., a new North American dragonfly previously confused with *S. albistylus* (Odonata: Gomphidae). *International Journal of Odonatology* 7(1): 3-24. (in English). ["Previously, the genus *Stylogomphus* in North America was believed to contain only a single species, *S. albistylus*. We present evidence for recognizing a second species, *S. sigmastylus* sp. nov.: holotype male, allotype female: Big Swan Creek, near Gordonsburg Church of Christ, Lewis County, Tennessee, 11 June 1990, C. Cook leg., deposited in the Florida State Collection of Arthropods. The biology, distribution and morphology of the new species are described,

and *S. albistylus* is re-described and figured to differentiate between the two species. *S. sigmastylus* sp. nov. males primarily differ from *S. albistylus* by having a more divaricate epiproct with widely flaring apices and a "U" shaped median cleft; shorter, thicker cerci basal of ventrolateral denticles with width and length approximately equal; ventrolateral denticles located at ca 1/3 appendage length; and posterior hamules with apex carinae thicker. The new species occurs mainly west of the Appalachian Mountains, predominantly in Arkansas, Kentucky, Missouri and Tennessee. The two species are parapatric in an area from southwestern Virginia south to North Carolina, west to northwestern Alabama and north to south-central Kentucky.] Address: Cook, C., 1 469 Crailhope Road, Center, KY 42214, USA. E-mail: bugman@scrtc.com

4129. Corbet, P.S. (2004): Ballistic defaecation by anisopteran larvae (Odonata): a way to increase foraging success? *International Journal of Odonatology* 7(1): 25-32. (in English). ["The article considers the phenomenon of ballistic defaecation by odonate larvae, exhibited by certain Anisoptera but not by any Zygoptera, and explores two possibilities: (1) that ballistic defaecation in Anisoptera may correlate with increased foraging success (the 'Wudkevich Hypothesis') by distancing the prey's alarm pheromone, persisting in the pellet after defaecation, from the larva's ambush site; and (2) that its absence in Zygoptera may correlate with their much richer repertoire of intraspecific agonistic behaviour, perhaps reflecting the need to change, and compete for, ambush sites more often. Attention is drawn to kinds of information that could throw light on the Wudkevich Hypothesis and to the design of experiments that would sustain or refute it; and mention is made of the possible implications for larvae of Zygoptera of their ability to learn to modify their antipredation behaviour in response to chemical cues emitted by their predators or by injured conspecifics." (Author)] Address: Corbet, P. S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

4130. Daigle, J.J. (2004): Hunt for Red October. *Argia* 16(1): 15-16. (in English). [Report of a February 2003 trip to Florida, USA. Of special interest are records of "The red *Orthemis*" (*Orthemis ferruginea* cf. and a second taxon) and larvae of *Nehalennia pallidula*.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

4131. De Block, M.; Stoks, R. (2004): Life-history variation in relation to time constraints in a damselfly. *Oecologia* 140(1): 68-75. (in English). ["Although variation within populations in plasticity to time constraints is expected with regard to hatching date, empirical studies are largely lacking. We studied life-history responses to time constraints manipulated by photoperiod and associated with hatching date in larvae of the damselfly *Lestes viridis* for two populations with a different hydroperiod. In a common garden experiment, early- and late-hatched larvae from both populations were reared at two photoperiods mimicking the start and the end of the egg-hatching season. In a reciprocal transplant experiment, early- and late-hatched larvae from both populations were reared in both ponds. In all these experiments, larvae were reared from egg hatching until adult emergence. Within both populations, larvae reared at the photoperiod indicating a late time point in the growing season, reduced development time to compensate

for their perceived shorter development period. Growth rate, however, did not respond to photoperiod, resulting in a lower mass at emergence. As expected, both in the laboratory and in the field, larvae from eggs that hatched later in the season generally had a shorter development time and a faster growth rate, resulting in a higher mass at emergence compared to early-hatched larvae. This may explain the intriguing seasonal increase in mass at emergence in this species, and affect the predictions of optimality models. None of these life-history responses differed between the two populations, despite clear differences in time constraints linked to hydroperiod, suggesting the robustness of the observed patterns. Given the ubiquity of asynchronous hatching in nature, and the adaptive value of the observed differences between early- and late-hatched larvae, we expect the effects of hatching date on life-history plasticity to be widespread." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4132. Delord, K.; Kayser, Y.; Cohez, D.; Befeld, S.; Hafner, H. (2004): Fluctuations in chick diet of the Squacco Heron *Ardeola ralloides* in southern France: changes over the last 30 years. *Bird Study* 51(1): 69-75. (in English). ["Aims To determine the diet composition of chicks and its variations in 2000 and 2001. To look for any changes over the last 30 years. Methods: Chick regurgitates were analysed to determine which Order contributed most to the diet, by frequency and by biomass. Results: During 2000 and 2001 chick diet was dominated by insects (92% and 70% by biomass, respectively), mainly Coleoptera (60% and 41%) and Orthoptera (27% in both years). The dry mass of Orthoptera, Coleoptera adults, Odonata and amphibians differed significantly between breeding sites, months and years. The proportion of invertebrates (in biomass) increased from 36.5% in 1970 and 31% in 1971 to 95% in 2000 and 90% in 2001 whereas the proportion of amphibians decreased in the same time from 49% and 33% in 1970 and 1971 to 5.0% and 9.5% in 2000 and 2001, respectively. Conclusion: The proportion of prey types differed between colony sites and months. Major changes were found in the diet composition between the early 1970s and 2000s. The possible hypotheses for the observed differences are discussed." (Authors)] Address: Delord, K., Station Biologique Tour du Valat, Le Sambuc, F-13 200 Arles, France

4133. Donnelly, T.W. (2004): Distribution of North American Odonata. Part II: Macromiidae, Corduliidae and Libellulidae. *Bull. American Odonatology* 8(1): 1-32. (in English). [Dot map presentation of 165 taxa; species or subspecies of special interest are discussed.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

4134. Dwayne, L.S.; Thomas, A.W.; Makepeace, H.S. (2004): New Canadian and provincial odonate records for New Brunswick. *Argia* 16(1): 22-24. (in English). [Canada, New Brunswick, *Gomphus abbreviatus*, *Neurocordulia obsoleta*, *Gomphus vastus*, *Aeshna clepsydra*, *Argomphus furcifer*, *Hetaerina americana*.] Address: not stated

4135. Eason, P.K.; Switzer, P.V. (2004): The costs of neighbors for a territorial dragonfly, *Perithemis tenera*.

Ethology 110(1): 37-47. (in English). ["Past researchers have often considered neighbors to be beneficial to territorial residents, particularly compared with non-neighbor conspecific competitors. However, neighbors have the potential to be costly to residents in terms of both defensive costs and lost resources. In this study, we assessed the relative costs of defending a mating territory against neighbors and non-neighbors for the dragonfly *Perithemis tenera*, comparing across males with different numbers of contiguous neighbors; we also examined the possibility that the presence of contiguous neighbors might reduce the detection of potential mates. When neighbors were present, residents experienced a greater total number of intrusions by males; this increase in intrusions was due to higher numbers of intrusions by neighbors, as the number of intrusions by non-neighbor males did not differ. Residents with immediately adjacent neighbors also made more sorties toward neighbors than did residents whose nearest neighbors territories were not immediately adjacent. Interestingly, although the number of visits by females did not vary with the presence of neighbors, residents with neighbors made fewer sorties toward females than did residents without neighbors. Our results suggest that defensive costs increased when neighbors were present, that residents with neighbors may have missed opportunities to acquire mates, and thus that living with neighbors can be costly in this species." (Authors)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

4136. Egan, D. (2004): Lawsuit filed to establish habitats for dragonfly. *Argia* 16(1): 13-14. (in English). [A coalition of conservation groups has filed suit in a federal district court in Washington D.C., over its claims the federal government is not doing enough to help the endangered *Somatochlora hineana*.] Address: degan@journalsentinel.com

4137. Fincke, O.M. (2004): Polymorphic signals of harassed female odonates and the males that learn them support a novel frequency-dependent model. *Animal Behaviour* 67(5): 833-845. (in English). ["For mate-searching species, the learned mate recognition (LMR) hypothesis assumes that sexual harassment favours signal variation among females, which exploits the receiver ability of males. The model predicts that coevolving males have responded to the female sexual foil by learning to recognize female variants as potential mates. I translate the LMR hypothesis into the language of signal detection theory to explain its novelty as a dynamic, coevolutionary, negative frequency-dependent selection model. Due to gene environment interactions, males cueing to the morph detected most often should generate positive but often asymmetrical, detection-dependent harassment towards females. Females are expected to sort to an ideal free distribution where harassment costs are equal. At equilibrium, morph fitness, but not necessarily morph frequency, is predicted to be equal. The LMR hypothesis is consistent with recent experimental data and the distribution of colour polymorphisms in the Odonata, predicts general conditions favouring variation in sexual signals, and provides a novel mechanism for speciation via sexual signalling." (Author)] Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Fleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

- 4138.** Fliedner, H.; Fliedner, T. (2004): Enten auf Libellenjagd. Libellennachrichten 11: 7. (in German). [Switzerland, Höhi Wispile near Gstaad, 05.09.2003; a domestic duck was observed successfully hunting an *Aeshna juncea* male.] Address: Fliedner, H., Louis-Segelken-Str. 106, D-28717 Bremen, Germany
- 4139.** Foster, S.E.; Soluk, D.A. (2004): Evaluating exuvia collection as a management tool for the federally endangered Hine's emerald dragonfly, *Somatochlora hineana* Williamson (Odonata: Cordulidae). *Biological Conservation* 118(1): 15-20. (in English). ["Reliable population density estimates are crucial for monitoring endangered species. Many species are difficult to capture or range over large areas, making direct monitoring of populations through capture or observation extremely challenging. In such cases, indirect methods of assessing populations can be the only source of reliable information. We examined whether the discarded exoskeleton of the last larval instar (exuvia), left behind when dragonflies emerge into the adult stage, could be used to predict larval densities and provide life history information for the federally listed endangered, Hine's Emerald Dragonfly (*Somatochlora hineana*). Using standardized protocols, we collected exuvia within six 2 x 2 m plots in an ephemeral wetland in Door County, Wisconsin during spring and summer of 1999 and 2000. *S. hineana* is a "summer emerger", with more than 95% of the emergence occurring from late June until mid-July. Based on time of emergence and the flight period, adults appear to live a month or longer. The sex ratio at emergence did not differ significantly from a 1:1 ratio and emergence was synchronous between the sexes. Estimates of larval population density using exuvial data were similar to those obtained through intensive direct sampling for larvae. Exuvial collections provide a reliable estimate of larval population density, help link larval ecology to adult ecology and are a useful tool for assessing habitat suitability. Although sampling exuviae requires repeated searching on particular sites, less expertise and fewer people are required for this type of sampling, indicating that exuvial surveys can be a very effective tool for monitoring populations of endangered dragonflies." (Authors)] Address: Foster, S.E., Illinois Natural History Survey, Center for Aquatic Ecology, 607 East Peabody Drive, Champaign, IL 61820, USA. E-mail: sfoster@utm.utoronto.ca
- 4140.** Fothergill, K.; Keebaugh, J.; Austin, M. (2004): First records of Pacific spiketail, *Cordulegaster dorsalis*, in Idaho. *Argia* 16(1): 16-18. (in English). [Ada county, 29 June 2003; Cassia county, 22 July, 2003] Address: Fothergill, K., Red Willow Research, Inc. 780 Falls Av. #390, Twin Falls, ID 83301, USA
- 4141.** Garrison, R.W. (2004): An analysis of the *Psaironeura tenuissima* complex, including synonymy of *P. machadoi* De Marmels with *P. bifurcata* Sjöstedt (Zygoptera: Protoneuridae). *Odonatologica* 33(1): 83-89. (in English). ["A review of the exclusively South American components of the genus *Psaironeura* Williamson shows that only 2 species are involved, *P. bifurcata* (Sjöstedt), and *P. tenuissima* (Selys). *P. machadoi* De Marmels is considered a synonym of *P. bifurcata*. Illustrations of the variability within the appendages, keys to males, and comments on the taxonomy of the group are included." (Author)] Address: Garrison, R.W., Research Associate, Natural History Museum of Los Angeles County, Exposition Boulevard 900, CA 90007, USA. E-mail: rwgarrison@earthlink.net
- 4142.** Hämäläinen, M. (2004): The 150 year anniversary of Selys' Synopsis des Caloptérygines. *Argia* 15(4): 8-11. (in English). [see OAS 3974; Malangpo 20: 196-200] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi
- 4143.** Hawking, J.; Suhling, F.; Wilson, K.; Theischinger, G.; Reels, G. (2004): Underwater and epilithic oviposition by Australian Aeshnidae (Odonata). *International Journal of Odonatology* 7(1): 33-36. (in English). ["[...] We observed *Notoaeschna sagittata* totally submerged ovipositing on bare rock in the fast current of a rapid. *Dendroaeschna conspersa* oviposited also underwater, but into wood submerged in very clear water." (Authors)] Address: Hawking, J.H., Murray-Darling Freshwater Research Centre, Cooperative Research Centre for Freshwater Ecology, P.O. Box 921, Albury, NSW 2640, Australia. E-mail: John.Hawking@csiro.au
- 4144.** Hayley, S. (2004): The Dragonfly: Masterpiece of Design!. *Design Science Association - newsletter*, Feb. 21, 2004: 1. (in English). [Verbatim: "February's meeting will be dedicated to showcasing one of God's most unique creatures in the insect world: dragonflies! Descriptive terms like fastest flyer in the insect world, best vision of any insect, jewels of the insect world and camouflage and defense tactic expert might seem a bit overstated at first, but these are entirely fitting statements when the details of their anatomy and physiology are studied. These creatures are truly fascinating, with nearly 5,000 known species (worldwide) and 450 of these present in North America. Much remains a mystery about their behavior and life history, but the number of people interested in these insects of the order Odonata is growing rapidly and will probably cause an explosion in knowledge concerning dragonflies in the next few years. Therefore, we need to warn you that one of speaker Steve Hayley's goals in presenting this program will be to convert all those in attendance into amateur odonatists! Come prepared to start your own journey of studying and observing these creatures that so clearly demonstrate the beauty, design, order, purpose, complexity, precision and detail that are such a clear testimony of our Creator! Also, please note that: Jarred Vallorani of Answers in Genesis will be on hand to bring us up to date on the progress of the AIG Museum project, and to speak briefly on the upcoming Portland-area AIG Creation Conference." A colour photo of *Anax junius* is presented.] Address: not stated
- 4145.** Hummel, S. (2004): New county records for Iowa - 1999 to 2003. *Argia* 16(1): 18-22. (in English). [The update of the Iowa, USA checklist of Odonata includes 241 new county records for 71 species in 53 of Iowa's 99 counties.] Address: Hummel, S., P.O. Box 121, Lake View, IA, 51450, USA
- 4146.** Jödicke, R.; Langhoff, P.; Misof, B. (2004): The species-group taxa in the Holarctic genus *Cordulia*: a study in nomenclature and genetic differentiation (Odonata: Corduliidae). *International Journal of Odonatology* 7(1): 37-52. (in English). ["Two *Cordulia* species have been described so far, the Eurasian *C. aenea* and the North American vicariant *C. shurtleffii*. The names *amurensensis*, *tatica*, *turfosa*, *laubmanni*, *linaenea* and *aenae-turfosa* are available in the synonymy of *C. aenea*. Out

of these, only the name *amurensis* is deemed to denote a separate taxon, which is currently regarded as a weakly defined Far East subspecies. A molecular analysis of nuclear ITS I sequences of specimens representing all three taxa *aenea*, *amurensis* and *shurtleffii* shows a clear differentiation which suggests a recognition of three separate taxa with full biological species rank. The morphological and distributional differentiation between *C. amurensis* and *C. aenea* requires further investigation. The molecular approach based on the variability of nuclear ITS I sequences appears promising for further taxonomic studies within dragonflies." (Authors)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: r.joedicke@t-online.de

4147. Johansson, F.; Suhling, F. (2004): Behaviour and growth of dragonfly larvae along a permanent to temporary water habitat gradient. *Ecological Entomology* 29(2): 196-202. (in English). ["1. Freshwaters form a gradient from small temporary waters to large permanent waters. Identifying and examining traits that restrict the distribution of species along this gradient are crucial to the understanding of community structure in these habitats. 2. Using dragonfly larvae species, differences in traits important for growth and survival were studied. 3. The traits were studied in a series of laboratory experiments using two pairs of dragonfly species that coexist in the Namibian semi-desert. One species pair was from the most temporary part of the water permanence gradient and the other species pair from an intermediate part of the gradient. 4. As predicted, activity, capture rate, and growth rate were significantly greater in the two temporary water species. Contrary to the prediction made in the work reported here, species differences in microhabitat selection were not related to the species' habitat origin. Cannibalism did not differ between species. 5. The results lend support to the hypothesis that selection has favoured certain combinations of trait values and that these traits are important for a successful life in temporary and permanent waters." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umeå University, 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

4148. Kéry, M.; Juillerat, L. (2004): Sex ratio estimation and survival analysis for *Orthetrum coerulescens* (Odonata, Libellulidae). *Canadian Journal of Zoology* 82(3): 399-406. (in English, with French summary). [oas 14 "There is controversy over whether uneven sex ratios observed in mature dragonfly populations are a mere artifact resulting from the higher observability of males. Previous studies have at best made indirect inference about sex ratios by analysis of survival or recapture rates. Here, we obtain direct estimates of sex ratio from capture recapture data based on the Cormack Jolly Seber model. We studied *O. coerulescens* at three sites in the Swiss Jura Mountains over an entire activity period. Recapture rates per 5-day interval were 3.5 times greater for males (0.67, SE 0.02) than for females (0.19, SE 0.02). At two sites, recapture rate increased over the season for males and was constant for females, and at one site it decreased with precipitation for both sexes. In addition, recapture rate was higher with higher temperature for males only. We found no evidence for higher male survival rates in any population. Survival per 5-day interval for both sexes was estimated to be 0.77 (95% CI 0.75 0.79) without significant si-

te- or time-specific variation. There were clear effects of temperature (positive) and precipitation (negative) on survival rate at two sites. Direct estimates of sex ratios were not significantly different from 1 for any time interval. Hence, the observed male-biased sex ratio in adult *O. coerulescens* was an artifact resulting from the better observability of males. The method presented in this paper is applicable to sex ratio estimation in any kind of animal." (Authors)] Address: Kéry, M., CEFE/CNRS, 1919 Route de Mende, F-34033 Montpellier, France. E-Mail: kery@cefe.cnrs-mop.fr

4149. Kosterin, O.E. (2004): Odonata of the Daurkiy State Nature Reserve area, Transbaikalia, Russia. *Odonatologica* 33(1): 41-71. (in English). ["Data were recorded in 1995-1997. An annotated list of species contains a full reference to the specimens collected, notes on biotope preferences, and relative abundance of species. For some species, taxonomic notes and data on variation are given. Among the 31 species, there are the Manchurian *Cercion v-nigrum* Needham and *Anisogomphus maacki* (Selys), previously thought to range westwards up to Blagoveshchensk only. *Anax parthenope* Selys and *Pantala flavescens* Fabr. proved to occur in Transbaikalia. The Chinese/Mongolian *Ophiogomphus spinicornis* Selys enters the Russian territory in southern Transbaikalia, Baikal region and southern Tuva." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

4150. Lencioni, F.A.A. (2004): *Telagrion nathaliae* spec. nov. (Zygoptera: Coenagrionidae). *Odonatologica* 33(1): 91-98. (in English). ["Both sexes of the new species are described and illustrated. Holotype male: Brazil: Sao Paulo state, Jacarei, Fazenda Santana do Rio Abaixo, alt. 608 m, 07-11-1999, deposited in author's collection; allotype and paratypes from the same locality. It differs from *T. macilentum* by the male cerci possessing elongate, ventrally-directed projections, and by being straight in lateral view. 6 Brazilian species are keyed." (Author)] Address: Lencioni, F.A.A., Rua dos Ferroviarios, 55 - Jardim Mesquita, BR-12300-000 Jacarei, S.P., Brazil. E-mail: odonata@zygoptera.bio.br

4151. Lopau, W. (2004): Die Libellenfauna der Kykladen / Griechenland. *Naturkundliche Reiseberichte* 20: 59 pp. (in German). [The Kyklads, a group of islands in the central Aegean Sea in the Mediterranean Sea, are part of the territory of Greece. W. Lopau researched in 2002 extensively on the odonate fauna of the following islands: Anáfi, Ändros, Delos, Ios, Kea, Kimolos, Kithnos, Mikonos, Milos, Naxos, Páros, Santorini, Serifos, Sifnos, Siros, and Tinos. After a brief history of odonatological records referring to the Kyklads, the odonate fauna of each of the islands is documented considering old and new records. Each of the 29 taxa is commented in a monographic way, the distribution of the species is mapped, and a regional odonatological bibliography is added. This paper is an additional highly significant contribution of Wolfgang Lopau to the knowledge of the Greek and European odonate fauna.] Address: Orders: Kappes, W., Winsberggring 5, D-22525 Hamburg, Germany

4152. Marco, P. de; Cardoso Peixoto, P.E. (2004): Population dynamics of *Hetaerina rosea* Selys and its relationship to abiotic conditions (Zygoptera: Caloptery-

gidae). *Odonatologica* 33(1): 73-81. (in English). ["Aspects of population dynamics were tested against temperature, insolation and moisture. The monthly abundance of *H. rosea* was estimated utilizing a scan method based on 49 fixed areas in 30-min intervals from 0800 to 1700 h during the day. The daily male activity pattern is characterized by a sharp increase at 0900 h with continuous density until 1430 h, followed by a sharp decrease after 1600 h. A correlation between peak densities was observed during the year and high period of photoperiod and low evapotranspiration suggesting possible ways males can adjust their emergence periods to optimize water loss with longer reproduction periods of activities." (Authors)] Address: Marco, P. de, Laboratório de Ecologia Quantitativa, DBG, Universidade Federal de Vicosa, BR-36571-000, Vicosa, MG, Brazil. E-mail: pdemarco@mail.ufv.br

4153. McMillan, V.E.; Arnold, R.M. (2004): Oviposition behavior and substrate utilization by *Lestes* congener (Odonata: Lestidae). *International Journal of Odonatology* 7(1): 53-63. (in English). ["Here we describe tandem oviposition (contact guarding) in *L. congener* and the use of dry stems of the sedge *Eleocharis obtusa* as oviposition substrates at a pond in New York State. Pairs formed away from the pond, then flew to *Eleocharis* patches on dry land 0.5-3 m from the water's edge. Some copulations occurred at or near oviposition sites; these pairs began ovipositing immediately afterwards. Eggs were placed singly in a line of incisions down the length of the plant stem, and several to many different pairs might utilize a single stem over a period of time. However, less than 1 % of the surface area of such stems possessed incision scars, although, in regions of stems with a high density of incisions, some eggs were close enough to be touching. Lone males were present in small numbers at the pond, but male harassment of tandems was minimal and we observed no female take-overs. Some females remained to complete oviposition alone after being deserted by their mates. Lone females were most common in late afternoon, when few lone males remained at the pond and take-over risks were small." (Authors)] Address: McMillan, Victoria E., Department of Biology, Colgate University, 13 Oak Drive, Hamilton, NY 13346, USA. E-mail: vmcmillan@mail.colgate.edu

4154. Medland, J. (2004): Reports from Coastal stations - 2003: Guernsey, Channel Islands. *Atropos* 21: 37-39. (in English). [Verbatim: It is 25 years since the last survey of Odonata in Guernsey. Prior to this the only list was compiled in 1892. The 1978 results indicated that only six species were present: *Calopteryx virgo*, *Ischnura elegans*, *Pyrrhosoma nymphula*, *Aeshna mixta*, *Anax imperator*, and *Sympetrum striolatum*. Since this time there has been a considerable reduction in suitable habitat with two large wetland areas being drained. It was feared that at least *C. splendens* and *I. elegans* had become extinct. It was against this rather bleak background that Barry Wells and I made an attempt to survey all possible sites to determine the current status of those species still remaining. A teneral *I. elegans* on 19 April was unusually early with the next record for the species not being until 25 May. Two fresh Emperor exuviae on 26 May were the forerunners of a synchronized emergence over the next 11 days totalling 44 individuals from a small garden pond. A male *Libellula depressa* at the same site on 7 June was the first record for Guernsey. On 13 June two new damselfly species

were found: *Enallagma cyathigerum* and *Erythromma viridulum*. The latter was the first record for the Channel Islands. Both these species were seen in modest numbers at several sites with ovipositing noted later in the summer. Hard work and perseverance paid off the following week with a small population of *Orthetrum cancellatum* being located at a west coast site. It later transpired that the species had been present but not reported in 2001. The same site was then visited on a regular basis and on 12 July single male *Anax parthenope* and *Sympetrum fonscolombei* were found and photographed. Two days previously a probable male Lesser Emperor had been seen at another site. Both these vagrants were new for the Channel Islands. *S. striolatum* and *A. mixta* were found to be widespread and present at all suitable sites. The last new species to be found was a single male *Chalcolestes viridis* on 10 August. Only one individual was seen at the site with all sightings from a small area of *Phragmites* and *Salix*. It was last reported on 20 September. Despite extensive searching there were no records of *C. splendens* and only a tantalising glimpse of a single 'red' damselfly. All in all a very productive and rewarding first year's effort. Habitat creation and improvement is planned with more mapping work to locate further sites. The excellent atlas work being done by our French colleagues in Manche, Normandy is a constant reminder of those species which could one day colonise the Island.] Address: not stated

4155. Meurgey, F.; Perron, C. (2004): *Anax amazili* new for Guadeloupe and notes on other rare species (French West Indies). *Argia* 16(1): 24. (in English). [*Ischnura hastata*, *Anax amazili*, *A. concolor*, *Tramea binotata*] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

4156. Meurgey, F.; Perron, C. (2004): First French record for *Anax junius* (Drury, 1773). *Argia* 16(1): 25-26. (in English). [Not unexpected, likewise spectacular is a record of *A. junius* in France. The specimen was taken at Pointe St-Gildas, Dept. Loire-Atlantique, without further information.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

4157. Meurgey, F.; Perron, C. (2004): Newly discovered Odonata localities in the Dominican Republic (West Indies). *Argia* 16(1): 25. (in English). [Seven odonate species - all previously known from the Dominican Republic - are documented. *Scapania frontalis* was hit by the car of the authors.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

4158. Nelson, B.; Thompson, R. (2004): The natural history of Ireland's dragonflies. The national Museums and Galleries of Northern Ireland. ISBN 0 900761 45 8: 454 pp. (in English). [In this comprehensive study of the Irish odonate fauna, the authors combine their knowledge and research based on twenty years of field studies with new information gleaned from an extensive four year study carried out by the Dragonfly Ireland Project. The book covers all aspects of dragonfly biology and ecology, and the history of odonatological research in Ireland. There are comprehensive accounts of all re-

sident and migrant species, an in-depth description of the major odonate habitats and a gallery section, illustrating and describing over fifty sites in detail. Additional chapters include information on how to study and how to photograph Odonata. There is an extensive bibliography listing all currently known publications on the subject. The highly informative text is written for the keen naturalist. In a monographic style each species is described and compared with similar species. Behaviour, habitat, life cycle, and distribution in Ireland are presented. All these facts are interpreted and critically discussed. This publication is lavishly illustrated throughout, with over 300 outstanding colour photographs of habitats, larvae, and adults of all resident and migrant species found in Ireland. This attractive book is sold for 30,- Euro and is worth its price. The book is a highly significant contribution to the knowledge of the European odonate fauna and should not be missing in any odonatological library. (Martin Schorr)] Address: Ulster Museum, Botanic Gardens, Belfast, Northern Ireland BT9 5AB, UK

4159. Parr, A. (2004): Migrant update for 2003. Dragonfly news 45: 20. (in English). [Great Britain; *Lestes barbarus*, *Erythromma viridulum*, *Sympetrum fonscolombii*, *S. flaveolum*, *S. danae*, (range extensions), *S. pedemontanum* c.f., *Anax parthenope*, *Anaciaeschna isoceles*, *Orthetrum coerulescens*, *Libellula depressa* (range extension to Scotland).] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4160. Paulson, D. (2004): *Lestes forficula* new record from Cayman Islands. *Argia* 16(1): 26. (in English). [Red Bay, Grand Cayman, 5-7 Oct. 1983] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

4161. Petchey, O.L.; Downing, A.L.; Mittelbach, G.G.; Persson, L.; Steiner, C.F.; Warren, P.H.; Woodward, G. (2004): Species loss and the structure and functioning of multitrophic aquatic systems. *Oikos* 104(3): 467-478. (in English). ["Experiments and theory in single trophic level systems dominate biodiversity and ecosystem functioning research and recent debates. All natural ecosystems contain communities with multiple trophic levels, however, and this can have important effects on ecosystem structure and functioning. Furthermore, many experiments compare assembled communities, rather than examining loss of species directly. We identify three questions around which to organise an investigation of how species loss affects the structure and functioning of multitrophic systems. 1) What is the distribution of species richness among trophic levels; 2) from which trophic levels are species most often lost; and 3) does loss of species from different trophic levels influence ecosystem functioning differently? Our analyses show that: 1) Relatively few high-quality data are available concerning the distribution of species richness among trophic levels. A new data-set provides evidence of a decrease in species richness as trophic height increases. 2) Multiple lines of evidence indicate that species are lost from higher trophic levels more frequently than lower trophic levels. 3) A theoretical model suggests that both the structure of food webs (occurrence of omnivory and the distribution of species richness among trophic levels) and the trophic level from which species are lost determines the impact of species loss on ecosystem functioning, which can even vary in the

sign of the effect. These results indicate that, at least for aquatic systems, models of single trophic level ecosystems are insufficient for understanding the functional consequences of extinctions. Knowledge is required of food web structure, which species are likely to be lost, and also whether cascading extinctions will occur." (Authors) *Cordulegaster boltonii*] Address: Woodward, G., School of Biological Sciences, Queen Mary University of London, Mile End Road, London, E1 4NS, UK. E-mail: GuyWoodward@hotmail.com

4162. Rantala, M.J.; Ilmonen, J.; Koskimäki, J.; Suhonen, J.; Tynkkynen, K. (2004): The macrophyte, *Stratiotes aloides*, protects larvae of dragonfly *Aeshna viridis* against fish predation. *Aquatic Ecology* 38(1): 77-82. (in English). ["Predation could be one force determining which contemporary species occupy a certain habitat. *Aeshna viridis* is an endangered dragonfly species with a larval distribution strongly associated with lakes where the water plant, water soldier, *Stratiotes aloides*, occurs. In this study, the larvae were almost exclusively found in patches of *S. aloides*. To study larval association with *S. aloides* further, we conducted a series of laboratory experiments. Behavioural experiments indicated that larvae preferred *S. aloides*. *Aeshna viridis* larvae were nocturnal and rather inactive. Larvae on *S. aloides* were less susceptible to predation by the perch, *Perca fluviatilis*, than larvae on another water plant, *Myriophyllum alterniflorum*. According to our study it seems that occurrence of *S. aloides* may limit the distribution of *A. viridis*, and the protection of refuges may be essential in planning the conservation of this endangered species." (Authors)] Address: Rantala, M.J., University of Jyväskylä, Department of Biological and Environmental Science, P.O. Box 35, FIN-40014, University of Jyväskylä, Finland; Current address: Department of Biology, University of California, Riverside, CA 92521, USA. E-mail: marrant@st.jyu.fi

4163. Rasmussen, J. (2004): Recent dragonfly news from Denmark. *Atropos* 21: 79-80. (in English). [Range extensions of *Anax imperator* and *Erythromma viridulum*; *Anaciaeschna isoceles* was included into the Danish Red List as vulnerable, but has made a significant comeback in the recent years; three localities for *Coenagrion armatum* are known; some new localities of the rare *C. lunulatum* have been discovered in 2003; second Danish record of *Sympetrum pedemontanum* in 2002 (west of Jutland); a migration of darters (*Sympetrum sanguineum*, *S. flaveolum*, *S. danae*) has been recorded in mid-August 2003 by a small lake in the centre of Copenhagen.] Address: Rasmussen, J., Stockholmsgade 13 I tv, 2100 Ø, Denmark

4164. Rehfeldt, G. (2004): Diel pattern of activity, mating, and flight behaviour in *Onychogomphus uncatus* (Odonata: Gomphidae). *International Journal of Odonatology* 7(1): 65-71. (in English). ["The behaviour of *O. uncatus*, including flight and mating activity, was studied at a fast-flowing irrigation canal. During the day, males perched in sections of the canal with a strong current and a turbulent water surface. During short flights, interactions with other con-specific and hetero-specific males occurred, particularly with *Orthetrum coerulescens*. Under conditions of high population density, the frequent occurrence and disturbances by this species often resulted in male *O. uncatus* leaving a particular section of the canal. In the late afternoon and evening, males concentrated on ground perches in the

vicinity of the water. The reproductive system of *O. uncatatus* was found to be 'encounter limited'. The operational sex ratio of imagines at the water was always strongly biased in favour of the males. Individual females were observed at the water during the morning and evening hours. Following pair formation there was a prolonged period of copulation away from the water. Most pair formations were observed in the morning and evening hours. They took place over water, and in the evening hours also away from the water." (Author)] Address: Rehfeldt, G., FasanenstraBe 3, D-38102 Braunschweig, Germany. E-mail: g.rehfeldt@tu-bs.de

4165. Schmidt, E (2004): Die Alten Fahrten" des Dortmund-Ems-Kanals im Westmünsterland, ein spezifischer, wertvoller und gefährdeter anthropogener Stillwassertyp mit Auen-Charakter am Beispiel der Odonatenfauna - eine Aufgabe für den Naturschutz (Insecta, Odonata). Verh. Westd. Entomologentag 2002: 179-186. (in German). [Nordrhein-Westfalen, German; "Alte Fahrten" are remains of the former Dortmund-Ems-canal. Because they are linked with the new canal, they are influenced by the movement of water produced by the cargo ships using these new canals. The odonate fauna - 28 species could be recorded over a period of 10 years - is comparable with that of oxbows. Typical species are *Gomphus vulgatissimus*, *G. pulchellus*, and *Cercion lindenii*. Noteworthy species are the regional rare *Coenagrion pulchellum* and *Aeshna grandis*. *Crocothemis erythraea* was traced in 2002 and 2003.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

4166. Smallshire, D.; Swash, A. (2004): Britain's Dragonflies. WildGuides. Old Basing. ISBN 1-903657-04-0: 168 pp. (in English). [This is a photographic guide to the Odonata of Britain and Ireland, covering all 57 species recorded and 10 potential vagrants. 55 full colour plates depict males, females, immatures and e.g. colour forms. These plates are produced using the latest digital image technology, combining (high quality!) colour pictures of different specimens against a common background. This looks quite "naturally", but I hesitate to say there is any advantage for identification of the species; to present the species in this way, is - of course - a matter of taste. I think, most of the plates are printed a little bit too dark. There are two particular strengths of the book: (1) the British species (imagines and larvae) are arranged in "picture tables" so that you can compare the species at a glance. Significant identification features are optically stressed in the accompanying text. (2) The colour plates are presenting pictures of immature stages which are missed in most of the European identification guides. The (optical) concept of this book is quite unusual; it is stressing on field identification of the species. And if you want to know what a dragonfly really is, look at page 5 of the book. The pricing of the book (£ 15,-) is fair. (Martin Schorr)] Address: WildGuides Parr House, 63 Hatch Lane, Old Basing, Hampshire RG24 7EB, United Kingdom. www.wildguides.co.uk

4167. Suhling, F.; Schütte, C.; Müller, O. (2004): *Nesiothemis farinosa*: description of the final stadium larva (Odonata: Libellulidae). International Journal of Odonatology 7(1): 73-78. (in English). ["A written description and illustrations of the final stadium larva of *Nesiothemis farinosa* are presented, based on larvae and exuviae collected in Namibia. The larvae were reared in the

laboratory until emergence. Additionally, information on larval microhabitat, behaviour and development is provided." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

4168. Suutari, E.; Rantala, M.J.; Salmela, J.; Suhonen, J. (2004): Intraguild predation and interference competition on the endangered dragonfly *Aeshna viridis*. *Oecologia* 140(1): 135-139. (in English). ["We examined the effects of intraguild predation (IGP) and interference competition on an endangered dragonfly, *A. viridis*. *A. viridis* is rare in Europe due to the decrease in suitable habitats harboring the macrophyte *Stratiotes aloides* L. *Stratiotes* plants are the principal oviposition substrate for *A. viridis* females and protect the larvae of *A. viridis* from fish predation. In our study lakes *A. viridis* larvae are sympatric with larvae of *Aeshna grandis* and *Aeshna juncea*. The susceptibility of *A. viridis* larvae to IGP by similar-sized larvae of *A. grandis* and *A. juncea* was tested in a laboratory predation experiment. Microhabitat use of *A. viridis* and *A. grandis* was studied in the laboratory to determine the possible effects of interference competition on the spatial distribution of *A. viridis* larvae. Our results show that at least in laboratory conditions, *A. viridis* is susceptible to IGP and interference competition. In competition, *A. grandis* larvae dominated the middle and outer portion of *S. aloides* rosettes whereas *A. viridis* stayed in the inner parts. When *A. grandis* larvae were absent, *A. viridis* colonized the middle and outer parts of the rosettes. We conclude that asymmetric predation between odonate larvae of equal size can be intense, and that both IGP and interference competition affect *A. viridis*. Although natural habitat complexity diminishes their impact, these interactions may nevertheless influence the distribution of *A. viridis* in *S. aloides* waters and restrict its microhabitat use in *S. aloides* rosettes." (Authors)] Address: Suutari, Erna, Dept of Biol. and Environmental Science, University of Jyväskylä, P.O. Box 35, Jyväskylä, 40014, Finland. E-mail: ermasuut@byti.jyu.fi

4169. Switzer P.V. (2004): Fighting behavior and prior residency advantage in the territorial dragonfly, *Perrithemis tenera*. *Ethology, Ecology & Evolution* 16(1): 71-89. (in English with Italian summary). ["Many factors, including residency status, body size, age, and energetic reserves, have been implicated as possibly determining the winner in animal contests. In this study I investigated which of these factors were correlated with the outcomes of naturally-occurring territorial contests between male amberwing dragonflies (*P. tenera*). Amberwing contests consist of non-contact interactions and are characterized by a series of distinct stages that represent different levels of escalation. Prior residents did tend to win, but interestingly this residency advantage only occurred in interactions that were not escalated. For both non-escalated and escalated interactions, body size (wing length) did not influence the outcome. Age was correlated with outcome for escalated interactions, with the younger of the pair tending to win. Winning males had also spent less time in male-male interactions both the day of the interaction and during their entire life, suggesting that energy reserves may also affect the outcome of contests. In contrast to escalated interactions, age and time spent in male-male interactions was not related to the outcome of non-escalated interactions. The difference between the two opponents' sizes, ages, and time spent in previous male-male inter-

reactions did not correlate with duration or escalation level of contests. These results suggest that non-escalated interactions may occur when intruders are simply assessing the quality of the site. Contests that do not escalate, and thus the prior residency advantage, are probably a result of the intruder not challenging for ownership because the value of the territory is too low." (Author)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

4170. Tennesen, K.J. (2004): *Acanthagrion aepiolum* sp. nov. from South America (Odonata: Coenagrionidae). *International Journal of Odonatology* 7(1): 79-86. (in English). ["The new species - holotype male, Bolivia, Department of Santa Cruz, Nuflo de Chavez Prov., stream 11.8 km E of San Javier (16°17'S, 62°37'W), 16 November 1998, leg. K.J. Tennesen; deposited in El Museo de Historia Natural "Noel Kempff Mercado", Santa Cruz, Bolivia - has been confused with *Acanthagrion ascendens*. Abdominal segment 10 in males is higher than in *A. ascendens* and the second segment of the genital ligula lacks the two setal patches distinctive of *A. ascendens*. *A. luteum* is synonymized with *A. ascendens* [new synonymy]."] (Author)] Address: Tennesen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennesen@aol.com

4171. Tennesen, K.J. (2004): Obituary: Minter Jackson Westfall, Jr.. *Odonatologica* 33(1): 99-103. (in English). [M. J. Westfall (28 Jan. 1916 - 20 July 2003)] Address: Tennesen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennesen@aol.com

4172. Tsubaki, Y.; Hooper, R.E. (2004): Effects of eugregarine parasites on adult longevity in the polymorphic damselfly *Mnais costalis* Selys. *Ecological Entomology* 29(3) : 361-366. (in English). ["1. The relationship between the abundance of midgut parasites (eugregarine trophozoites) and the survival of hosts (field-collected damselflies, *Mnais costalis*) was investigated under laboratory conditions. 2. Males of *M. costalis* are morphologically and behaviourally polymorphic, typically existing as clear-winged non-territorial sneaks and orange-winged territorial fighters (the latter are larger in size). The survival cost of eugregarine infection for the two morphs was compared. 3. Orange-winged males showed shorter longevity compared to clear-winged males when they were fed at levels lower than the natural feeding rate, or when they were deprived of food. In contrast, morph longevity did not differ when they were fed until satiation every day. 4. Within each morph, the survival of damselflies was negatively correlated with the parasite abundance except when damselflies were fed until satiation. 5. The results suggest that the abundance of eugregarine parasites exerts a substantial cost, which is associated with the maintenance of alternative mating strategies, together with the higher developmental cost and energy expenditure of the fighter morph." (Authors)] Address: Tsubaki, Y., Biodiversity Conservation Research Group, National Institute for Environmental Studies, Onogawa, Tsukuba 305-8506, Japan. E-mail: Tsubaki@nies.go.jp

4173. Vance-Chalcraft, H.D.; Soluk, D.A.; Ozburn, N. (2004): Is prey predation risk influenced more by increasing predator density or predator species richness in stream enclosures? *Oecologia* 139(1): 117-122. (in English). ["The direct lethal impacts and the indirect ef-

fects predators have on prey characteristics, such as behavior, have fitness consequences for the prey. Whether the level of predation risk that prey face in the presence of multiple predator species can be predicted from a null model that sums the risk from each predator species in isolation is unclear. In field enclosures, we tested whether the predation risk experienced by *Stenonema* mayfly larvae from a dragonfly larva (*Boyeria vinosa*) and a hellgrammite (*Corydalus cornutus*) together matched the predictions of the multiplicative risk model. We then compared whether any deviations from the models predictions were larger in the presence of two predator species than in the presence of an equivalent density of individuals from either predator species alone, to determine if unique effects arise for the prey in the presence of multiple predator species. We also determined if prey moved preferentially into predator-free refuge spaces or decreased their movement in the presence of predators. *Stenonema* risk of predation was reduced compared to the models prediction, but no unique multiple predator species effects were present because this risk reduction was comparable in magnitude to the level exhibited in the presence of each predator species alone. The prey did not move into predator-free refuge spaces in the presence of predators in the field enclosures. Thus, these predators appear to interfere interspecifically and intraspecifically, which may facilitate the coexistence of the predators and the prey." (Authors)] Address: Vance-Chalcraft, Heather D., School of Integrative Biology, University of Illinois, Urbana, IL 61801, USA. Email: h.vance-chalcraft@ttu.edu

4174. Vukusic, P.; Wootton, R.J.; Sambles, J.R. (2004): Remarkable iridescence in the hindwings of the damselfly *Neurobasis chinensis chinensis* (Linnaeus) (Zygoptera: Calopterygidae). *Proceedings of the Royal Society: Biological Sciences* 271(1539): 595-601. (in English). ["The bright green dorsal iridescence of the hindwings of *Neurobasis chinensis chinensis* males, very rare in Odonata, is known to play a significant role in their courtship behaviour. The mechanism responsible for such high contrast and spectrally pure colour has been investigated and found to be optical interference, producing structural colour from distinct laminations in the wing membrane cuticle. The ventral sides of these iridescent wings are dark brown in colour. In a single continuous membrane of wing cuticle, this is an effect that requires a specialized structure. It is accomplished through the presence of high optical absorption ($k = 0.13$) within two thick layers near the ventral surface of the wing, which leads to superior dorsal colour characteristics. By simultaneously fitting five sets of optical reflectivity and transmissivity spectra to theory, we were able to extract very accurate values of the complex refractive index for all three layer types present in the wing. The real parts of these are $n = 1.47, 1.68$ and 1.74 . Although there is often similarly significant dorsal and ventral colour contrast in other structurally coloured natural systems, very few system designs comprise only a single continuous membrane." (Authors)] Address: Wootton R.J., School of Biological Sciences, University of Exeter, Exeter EX4 4PS, UK

4175. Watanabe, M.; Matsuoka, H.; Taguchi, M. (2004): Habitat selection and population parameters of *Sympetrum infuscatum* (Selys) during sexual mature stages in a cool temperate zone of Japan (Anisoptera: Libellulidae). *Odonatologica* 33(2): 169-179. (In English) ["The mark-and-recapture method was used to

study the population parameters of sexually mature adult *S. infuscatum* in a forest-paddy field complex in the cool temperate zone of Japan. After emergence, they moved into the forest gaps, and they remained and fed exclusively in the forest gaps throughout their lives. Mature males captured outnumbered mature female on each sampling day in the paddy fields, but not in the gaps. However, the estimated daily numbers in both habitats and/or the whole survey area roughly indicated a 1:1 sex ratio. The estimated daily survival rates and daily immigrations showed that females were apt to stay in the forests, while males sometimes dispersed, though females in the paddy fields tended to have a long-range flight. In the morning, some of the paired couples flew to the paddy fields in tandem and oviposited on the wing; these were so-called flyers. The rest remained in the forests the entire day; these were designated as perchers. The forest gaps were thus important for the life cycle of this species both as feeding and roosting sites." (Authors)] Address: Watanabe, M., Institute of Biological Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kan-kyo.envr.tsukuba.ac.jp

4176. Watts, P.C.; Wu, J.H.; Westgarth, C.; Thompson, D.J.; Kemp, S.J. (2004): A panel of microsatellite loci for the Southern Damselfly, *Coenagrion mercuriale* (Odonata: Coenagrionidae). *Conservation Genetics* 5 (1): 117-119. ["Of the 40 loci tested, 11 loci amplified spurious bands and 14 loci were monomorphic. We were able to develop, therefore, fifteen polymorphic loci that resolved distinct alleles within the expected size range. Numbers of alleles varied between 2 and 7 at the dinucleotide microsatellites and 2 and 6 at the trinucleotide loci (Table 1). Observed and expected heterozygosities varied between 0.233-0.732 and 0.291-0.799 respectively (Table 1. Three loci (LIST4-023, LIST4-030, LIST4-035), showed significant ($P < 0.05$) deviations from expected Hardy-Weinberg conditions, although these heterozygote deficits were all non-significant ($P > 0.05$) after correction for multiple testing. Only 4 of the 105 locus comparisons were ($P < 0.05$) out of linkage disequilibrium (LJST4-034-LIST4-002, $P = 0.043$; LIST4-037-UST4-002, $P = 0.030$; LIST4-058-LIST4-053, $P = 0.031$; LIST4-034-LIST4-060, $P = 0.031$). Given the large number of tests involved, however, these loci are probably not significantly linked but further samples are required to confirm this. We are presently using these loci to examine the genetic structure of the southern damselfly in the UK." (Authors)] Address: Watts, P.C., School of Biol. Scien., The Biosciences Building, Crown Street, University of Liverpool, Liverpool, L69 7ZB, UK. E-mail: p.c.watts@liv.ac.uk

4177. Watts, P.C.; Thompson, D.J.; Kemp, S.J. (2004): Cross-species amplification of microsatellite loci in some European zygopteran species (Odonata: Coenagrionidae). *International Journal of Odonatology* 7(1): 87-96. (in English). ["Microsatellites have been infrequently used for genetic analysis of odonate species. Here, we report four microsatellite loci that are polymorphic in *Coenagrion mercuriale*. Furthermore, we examine the success of cross-species amplification of a panel of 19 microsatellite loci that were developed from *C. mercuriale* in seven other European odonate species. PCR with microsatellite primers is more likely to be achieved in species that are closely related to the species used for marker isolation. Overall, 10 microsatellite loci amplified interpretable PCR products (seven

loci were variable) in both *C. puella* and *C. pulchellum*, whilst two loci were variable in *Ischnura elegans*. These markers should facilitate genetic research into these zygopteran species." (Authors)] Address: Watts, P.C., School of Biological Sciences, The Biosciences Building, Crown Street, University of Liverpool, Liverpool L69 7ZB, UK. E-mail: p.c.watts@liv.ac.uk.

4178. Wennemann, L. (2004): Neue Aspekte der kulturellen Entomologie. *Verh. Westd. Entomologentag 2002*: 129-136. (in German). [The journal *Digest of Cultural Entomology* briefly is introduced including a table of contents according the four issues released until 1997. The paper of Carlos Bonet Betoret on "Two Odonata citations in ancient Mesopotamian literature" was published 1993 in *Cultural Entomology Digest* 1(1): 15-16.] Address: Wennemann, L., Napoleonsweg 39, D-45721 Haltern am See, Germany. E-mail: wennemann@t-online.de

4179. White, H.; Donnelly, N. (2004): George Beatty passes away. *Argia* 15(4): 26. (in English). [George H. Beatty, III, died in Lemont, PA, USA on January 13, 2004 at the age of 80.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

4180. Worthen, W.B.; Gregory, S.; Felten, J.; Hutton, M.J. (2004): Larval habitat associations of *Progomphus obscurus* at two spatial scales (Odonata: Gomphidae). *International Journal of Odonatology* 7(1): 97-109. (in English). ["*P. obscurus* is one of the most abundant dragonflies in South Carolina, USA. We collected dragonfly larvae from 127 sites in the Enoree River and nine of its tributaries, and correlated the abundance of *P. obscurus* larvae with physical and chemical characteristics of these streams. As expected for this burrowing species, larval abundance varied among streams and was significantly correlated with mean silica concentrations and the proportion of sandy-bottom sites in these streams. We also examined habitat associations on a smaller spatial scale. We sampled *P. obscurus* larvae by kick-seine from fine sand, coarse sand, and pebble sediment types in five sites in the Enoree River basin. Larvae were collected, preserved in 75% EtOH, and their body lengths were measured. Sediment samples were collected and Ro-tapped, and mean particle size was calculated. Larvae were present in a greater fraction of the 'fine sand' samples than 'pebble' samples. In addition, abundance was inversely correlated with mean particle size. Mean larvae size was weakly correlated with mean particle size, and inversely correlated with larval abundance. This species is associated with sandy-bottom streams and fine sandy sediments within streams. Changes in sediment characteristics resulting from channelization, increased flooding, and increased stream flow could change sediment composition and impact the abundance of this common dragonfly species." (Author)] Address: Worthen, W.B., Dept of Biology, Furman University, Greenville, SC29613 USA. E-mail: worthen@furman.edu

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1997

4181. Haarstad, J. (1997): The dragonflies of selected eastern Minnesota rivers. Report submitted to the Minnesota Department of Natural Resources: 83 pp. (in English). ["During the summer of 1992 I visited 25 rivers and streams in eastern Minnesota collecting dragonfly exuviae and adults. Streams visited in the Northeast were the Gooseberry (1 site), Baptism (3 sites), Manitou (1 site), Temperance (4 sites), Cascade (2 sites), Stony (1 site), Kawishwi (1 site), and St. Louis (3 sites). Streams visited in Eastcentral Minnesota were the St. Croix (12 sites), Kettle (5 sites), Snake (7 sites), Crooked Creek (1 site), Little Sand (1 site), Sand (2 sites), Rock Creek (1 site), Sunrise (1 site), Groundhouse (1 site), Ann (1 site), and Rum (2 sites). Streams visited in the Southeast were the Cannon (4 sites), Zumbro (5 sites), Whitewater (2 sites), Root (8 sites) and Mississippi (5 sites). A total of 33 species of riverine dragonflies were collected. Species of Gomphidae included Hagenius brevistylus, Dromogomphus spinosus, Ophiogomphus earolus, O. colubrinus, O. howei, O. rupinsulensis, x O. sabrinus, Hylogomphus adelphus, H. viridifrons, Gomphus externus, G. fraternus, G. lineatifrons, G. vastus, G. ventricosus, Gomphus exilis, G. graslinellus, G. lividus, G. quadricolor, G. spicatus, Ariogomphus cornutus, Stylurus amnicola, S. notatus, and S. spiniceps. Species of Aeshnidae included Anax junius, Aeshna umbrosa, Basiaeshna janata, Boyeria grafi-ana, and B. vinosa. Species of Cordulegastridae included Cordulegaster maculata and C. obliqua. Species of Macromiidae included Didymops transversa and Macromia illinoensis. Species of Corduliidae included Cordulia shurtleffi, Epicordulia princeps, Epitheca canis, E. spinigera, Neurocordulia yamaskenensis, Somatochlora minor, and S. elongata. Libellulidae (primarily Plathemis lydia, Libellula pulchella, L. luctuosa) were noted but generally not collected since most occur abundantly at ponds and marshes. Also noted was the presence of the damselflies Calopteryx aequabilis, C. maculata, and Hetaerina americana." (Author)] Address: <http://files.dnr.state.mn.us/ecologicalservices/nongame/projects/consgrantreports/1997Haarstadsign.pdf>

4182. Hassan, S.T.S. (1997): Action thresholds of wet paddy arthropods for pest management decision-making in Malaysia. *Pertanika J. Trop. Agric. Sci.* 20(1): 65-74. (in English). ["Action thresholds to aid pest population management decision-making of 11 categories of wet paddy arthropods are suggested in terms of mean population density per hill and proportion of infestation (P(I)) of the field sampling units. [...] The respective va-

lues for pests are: 3.38, 0.92 (*Nephotettix* spp.), 6.28, 1.00 (*Nilaparvata lugens*), 1.37, 0.72 (*Cnaphalocrocis medinalis*- *Pyalidae*), 2.42, 0.90 (*Recilia dorsalis*), 3.81, 0.97 (*Sogatella furcifera*), and for predators are: 3.89, 0.98 (*Cyrtorhinus* sp.), 2.39, 0.85 (*Anatrichus pygmaeus*- *Diptera*), 2.02, 0.82 (*Odonata*), 1.65, 0.81 (*Casnoidea lividipennis*), 1.61, 0.64 (*Authaor*) (*Paederus fuscipes*), and 1.60, 0.69 (spiders). P(I) is significantly ($P < 0.001$) affected by arthropod category and growth stage of the crop. The observed P(I) indicated high fits (most $r^2 > 0.90$) to clumped- and Poisson-based distribution models."] Address: Hassan, S.T.S., Jabatan Biologi, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

4183. Kneitz, G. (Projektleitung); Zumkowski-Xylander, H.; Oerter, K. (Koord.) (1997): "Minimierung der Zerschneidungseffekte von Straßenbauten am Beispiel von Fließgewässerquerungen bzw. Brückenöffnungen". Endbericht zum Forschungsvorhaben FE 02.158.G 94 L der Bundesanstalt für Straßenwesen: 313pp. + Anhang- (in German). [The effect of bridges as barriers for dispersing animals was surveyed at 20 running waters across Germany. Dispersion ability of Anisoptera is nearly unaffected by bridges, while Zygoptera are influenced by barrier effects. Minimum width of 2.5 m enable Anisoptera and Calopteryx spec. to cross bridges following the running water. Serious effects are caused by car traffic, especially by heavy goods vehicles. Heavy air motion caused by these cars results in a sideways drift of the specimens and increased the risk of collisions. Dispersal of Zygoptera was effected by air motion caused by a tunnel effect due to suction or heavy headwind.] Address: Bundesanstalt für Straßenwesen (BAST), Brüderstraße 53, D-51427 Bergisch Gladbach, Germany. E-mail: info@bast.de

4184. Ziemba, M. (1997): Ehemalige Tonabgrabungen im Ravensberger Hügelland: erhaltenswerte Sekundärbiotope mit hohem ökologischen Wert - ein weiteres Beispiel. *Ber. naturwiss. Ver. Bielefeld und Umgebung* 38: 293-312. (in German). [A few water bodies located in a former clay pit have been surveyed for Odonata. The list of species includes some red-listed Odonata of the Federal State Nordrhein-Westfalen (Germany).] Address: Ziemba, M., Biologische Station Gütersloh / Bielefeld e.V., Niederheide 63, D-33659 Bielefeld, Germany

4185. Kosterin, O.E. (1998): Important findings of the dragonfly (Odonata) fauna of the Dahurian Nature Reserve and its environs. Problems of Entomology in Russian. Theses for XI Congress of Russian Entomological Society, Sanct-Petersburg, 1998 - Vol. 1): 210-211. (in Russian). [Verbatim: "Until recently the odonofauna of the steppen Transbaikalia was insufficiently studied. (Gorb et al., 1996) reported on a finding of 17 species in the Dahurian Nature Reserve (an extreme south of the Chita Province), of which *Aeshna serrata* Hag. found much more easterly of its previous easternmost finding on the Baikal longitude. In summer 1995-1996 in the same region we managed to find 30 species. Two localities were studied: the Onon River valley in the environs of the village Nizhnii Tsasuchei (the steppen zone but with an unique pine forest) and Torei Lakes (the dry steppe zone). In both localities 19 species were found: *Lestes dryas*, *L. sponsa*., *Sympetma paedisca*, *Coenagrion armatum*, *C. ecornutum*, *C. lanceolatum*, *C. lunulatum*, *Erythromma najas*, *Enallagma cyathigerum risi* Schmidt, *Ischnura elegans*, *Aeshna mixta*, *A. serrata*, *Pantala flavescens*, *Leucorrhinia intermedia*, *Libellula quadrimaculata*, *Sympetrum danae*, *S. flaveolum*, *S. (vulgatum) imitans*., *S. pedemontanum*. 10 species were found only in the Onon valley: *Cercion v-nigrum*, *Coenagrion glaciale*, *Aeshna crenata*, *A. juncea*, *Ophiogomphus spinicornis*, *Anisogomphus maacki*, *Stylurus flavipes*, *Epithea bimaculata*, *Somatochlora graeseri*, *S. (metallica) exuberata*. Only one species, *Anax parthenope*, was recorded in the Torei Lakes depression (lake Nizhnii Mukei); besides, *Sympetrum depressiusculum* was reported for this depression (Gorb et al., 1996) but not found by us. The odonofauna of the Onon valley is much more rich thanks to a diversity of intrazonal biotopes and the river presence while the Torei Lakes depression, bearing only more or less mineralized lakes, is poor of species. Unexpected are the findings of two Manshurian species, *C. v-nigrum* and *A. maacki*, known earlier no west of Blagoveshchensk (Malikova, 1995). Thus, they penetrate along the Onon valley to the steppen Transbaikalia and, probably, inhabit all the Amur River basin. Proved is the presence in Transbaikalia of southern species *P. flavescens*, which was reported earlier for the village Pokrovka at the Shilka and Argun' Rivers junction (Selys Longchamps, 1887), and *A. parthenope*, which has been observed visually by B.F. Belyshev (1973) at Lake Gusinoe. A Chinese-Mongolian species *O. spinicornis* is hereby for the first time reliably reported for Russia. Analysis of collections revealed that this species inhabit also the southern coast of Baikal and the northern Ubsu-Nur Hollow in the southern Tuva Republic. The author expresses his gratitude to V.A. Brinikh, a Director of the State Nature Reserve "Dauriskii" for a great help in work and to E.I. Malikova (Blagoveshchensk) for valuable consulting."] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

4186. Lotzing, K. (1998): Ergebnisse von Bestandserfassungen zur Libellen-Fauna (Odonata) in ausgewählten Biotopen am Südrand der Magdeburger Börde. Abh. Ber. Mus. Naturk. Magdeburg 20: 19-35. (in German). [Alt-Landkreis Staßfurt, Sachsen-Anhalt, Germa-

ny; a total of 36 odonate species resulting from collection made between 1970 to 1995 is documented in a table and briefly discussed.] Address: Lotzing, K., Am Hollschen Bruch 4c, D.39435 Unseburg, Germany

4187. Resetarits, W.J. (1998): Differential vulnerability of *Hyla chrysoscelis* eggs and hatchlings to larval insect predators. Journal of Herpetology. 32(3): 440-443. (in English). [Analysis of variance revealed a highly significant effect of treatments on the survival of *Hyla* tadpoles. Mean tadpole survival was 97.5% in the predator-free controls, but was reduced to 62.5% with dragonfly naiads (*Pachydiplax longipennis*) and to 0.84% with dytiscid larvae (*Ilybius* sp.). Tukey's procedure showed that both the dragonfly and dytiscid treatments were significantly different from the controls, and that the dytiscid treatment was significantly different from the dragonfly treatment. Dragonfly naiads and dytiscid larvae were both significant predators of newly hatched *Hyla* tadpoles in the experiment, but the predation rate by dytiscid larvae was much greater than that of dragonfly naiads. There was also a highly significant effect of treatments on the survival of *Hyla* eggs. Mean egg survival was 97% in the controls and 89% in the dragonfly treatment, but was reduced to only 16% in the presence of dytiscid larvae. In contrast to the results for tadpoles, the control and dragonfly treatments were not significantly different from each other, but the dytiscid treatment was significantly different from both the dragonfly treatment and the control. Therefore, only dytiscid larvae were important predators on the eggs of *H. chrysoscelis*.] Address: Resetarits, W.J., Jr., Cent. Aquatic Ecol., Illinois Nat. History Survey, 607 E. Peabody Dr., Champaign, IL 61820, USA.

4188. Wilson, K. (1998): New Hong Kong dragonfly. Porcupine 17: 9. (in English). [Verbatim: *Macrodiplax cora*, a dragonfly newly recorded for Hong Kong in May 1997 (see Porcupine! 16: 5), is a widespread species found in three zoogeographical areas - the Ethiopian, Oriental and Australasian regions. It is highly migratory with populations established on islands in the Indian and Pacific Oceans. The larvae are salt tolerant with populations occurring in lagoons and estuaries. The genus *Macrodiplax* is both tropical and neotropical and closely allied to *Pantala* which is also found throughout the tropics. *Macrodiplax cora* and *Pantala flavescens* are perhaps today's most successful dragonflies in terms of numbers and distribution.] Address: Wilson, K.D.P., Flat 20, 6 Mansfield Road, The Peak, Hong Kong, China. E-mail: wilsonkd@ntlworld.com

4189. Zeidler, A.; Burkl, G. (1998): Ökologische Studien zur Bewertung der Flußauengewässer. Münchener Beiträge zur Abwasser-, Fischerei- und Flußbiologie 51: 283-300. (in English). [Odonata were among the organisms used to classify and assess seven alluvial water bodies in Bavaria, Germany. No species list is documented.] Address: not stated

1999

4190. American Museum of Natural History (1999): Know your local dragonflies. The center hosts a summer odonate workshop. American Museum of Natural History. Center for Biodiversity Conservation Newsletter

Fall 1999/Winter 2000: 6- (in English). [Report on a course in June 1999 introducing into ecology and identification of Odonata and chaired by Mike May.] Address: American Museum of Natural History. Center for Biodiversity Conservation, Central Park West at 79th Street, New York, NY 10024-5192, USA. E-mail: biodiversity@amnh.org

4191. Bulet, P.; Hetru, C.; Dimarcq, J.-L.; Hoffmann, D. (1999): Antimicrobial peptides in insects; structure and function. *Developmental and Comparative Immunology* 23: 329-344. (in English). ["Antimicrobial peptides appear to be ubiquitous and multipotent components of the innate immune defense arsenal used by both prokaryotic and eukaryotic organisms. During the past 15 years a multitude of these peptides have been isolated largely from insects. In spite of great differences in size, amino acid composition and structure, most of the antimicrobial peptides from insects can be grouped into one of three categories. The largest category in number contains peptides with intramolecular disulfide bonds forming hairpin-like β -sheets or α -helical β -sheet mixed structures. The second most important group is composed of peptides forming amphipathic α -helices. The third group comprises peptides with an overrepresentation in proline and/or glycine residues. In general, the insect antimicrobial peptides have a broad range of activity and are not cytotoxic. Despite a wealth of information on structural requirements for their antimicrobial activity, the mode of action of these peptides is not yet fully understood. However, some data suggest the existence of two types of mode of action: 1. through peptide-lipid interaction or 2. through receptor-mediated recognition processes. This review presents the main results obtained during the last four years in the field of antimicrobial peptides from insects with a special focus on the proline-rich and cysteine-rich peptides." (Authors) *Aeshna cyanea*.] Address: Institut de Biologie Moléculaire et Cellulaire, Unité Propre de Recherche du CNRS 9022, 15 Rue René Descartes, 67084 Strasbourg, Cedex, France. <http://www.atheris.ch/pdf/Dev-Complmm-1999.pdf>

4192. Cham, S. (1999): Working together! Using DARTER and DMAP. *Darter* 19: 10-11. (in English). [Software to store data and to create distribution maps are demonstrated using *Calopteryx splendens* in Bedfordshire, UK.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4193. Cham, S. (Red.) (1999): News from the regions. *Darter* 19: 6-10-14-15. (in English). [oas 15: Cham, S.: News from East Anglia; Clarke, D.: News from North England; Averill, M.: News from the Midlands; Jones, S.: News from Cornwall; Taylor, P.: News from Norfolk; Smith, B.: News from Scotland; Smith, I.D.: Recording in Wales. The was forward!] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4194. Coughlan, C. (1999): Dragonflies. Pebble Books. ISBN 0-7368-0238-X: 24 pp. (in English). [First reading children book on dragonflies introducing into primary odonate morphology.] Address: Capstone Press, 151 Good Council Drive, P.O. Box 669, Mankato, Minnesota 56002, USA

4195. D'Andrea, M. (1999): La fauna odonatologica della provincia di Arezzo, Italia centrale (Odonata). *Bol-*

lettino dell'associazione Romana di entomologia 54: 1-30. (in Italian, with English summary). [The odonofauna of the province of Arezzo has been studied only sporadically in the past. Between 1986 to 1993, 106 sites have been sampled. the records total in 42 species, 10 of which are new to the region.] Address: D'Andrea, M., Musei die Storia Naturale dell'Università die Frenze, Sezione Zoologica "La Specola", Via Romana 17, I-50125 Firenze, Italy

4196. Entekin, S.; Golladay, S.; Ruhlman, M.; Hedman, C. (1999): Unique steephead stream segments in southwest Georgia: invertebrate diversity and biomonitoring. *Proceedings of the 1999 Georgia Water Resources Conference*, held March 30-31, 1999, at University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, The University of Georgia, Athens, Georgia: 4 pp. (in English). ["The steephead streams we studied are springfed, relatively high gradient, and have greater substrate diversity than is typical of most Coastal Plain streams. The study objectives were: 1) to describe the physical characteristics of the streams and quantify the seasonal biodiversity in several streams draining managed forestlands, and 2) test and adapt rapid bioassessment methods. Our results show these streams to have high invertebrate diversity throughout the year with the highest occurring in winter and early spring. The streams and their valleys had a regionally unique assemblage of plants and animals. Bioassessment values indicated water quality to be fair to good when sampling with the fixed area modified Hess sampler and good to excellent when sampling multiple habitats using a D-frame kicknet. The values were calculated using the rapid assessment methods adapted by Save-Our-Stream (SOS) and the Hilsenhoff Family Biotic Index (FBI). The results of the bioassessment values indicate that the streamside management zones (SMZs) implemented in these areas of silvicultural activity are effective in maintaining adequate water quality standards and supporting diverse and abundant aquatic life." (Authors). *Calopterygidae*, *Cordulegasteridae*, and *Gomphidae* are listed in table 1. The total density of individuals / m² was 699 in summer, 322 in winter, and 361 in early spring] Address: Entekin, Sally, Jones Ecological Research Center, Rte 2 Box 2324, Newton, GA 31770, USA.

4197. Goodyear, K.L.; McNeill, S. (1999): Bioaccumulation of heavy metals by aquatic macro-invertebrates of different feeding guilds: a review. *The Science of the Total Environment* 229: 1-19. (in English). ["The available literature on heavy metal bioaccumulation by freshwater macro-invertebrates has been analysed. A very uneven data distribution was found. Ephemeroptera and Diptera are the most commonly investigated orders of insect larvae, whilst many orders are not represented at all. The collector/gatherer and predator feeding guilds are more frequently investigated than other guilds. Furthermore, Zn, Cu, Pb and Cd are the most intensively researched heavy metals, and only infrequent investigations of other metals are documented. Relationships between metal concentrations in the animals and levels in sediments and waters were determined from the pooled data for three feeding guilds. No one relationship represents how each metal interacts within the feeding guilds. Each of the four metals Zn, Cu, Pb and Cd displays a unique relationship between metal concentrations in sediments or waters with those in individual feeding guilds of macro-invertebrates, indica-

ting the relative importance of different sources of metals to the different feeding types. Biomagnification of Zn, Cu, Pb and Cd has been demonstrated not to occur between these guilds." (Authors)] Address: Goodyear, K.L., Applied Geochemistry Research Group, Royal School of Mines, Imperial College, South Kensington, London, SW7 2BP,

4198. Harding, P. (1999): Dragonfly recording in the wider context. *Darter* 19: 4. (in English). [Several species recording schemes exist in the UK; they are enumerated, and possibilities to cooperate with the Odonata mapping scheme are briefly outlined.] Address: not stated

4199. Henson, S. (1999): First & last dates for 1998 and 1999. *Dragonfly News* 36: 9-12. (in English). [List of species with phenological data from Great Britain.] Address: Henson, S., 10 Shotesham Road, Poringland, Norwich NR14 7LE, UK

4200. Holmes, R.T.; Likens, G.E. (1999): Organisms of the Hubbard Brook Valley, New Hampshire. Agriculture Forest Service Northeastern Forest Service, Northeastern Research Station, General Technical Report NE-257: 37 pp. (in English). ["Lists the organisms, both plant and animal, that have been identified by scientists engaged in multidisciplinary ecological research in the Hubbard Brook Valley, New Hampshire, during the past three decades. The Valley encompasses the Hubbard Brook Experimental Forest, Mirror Lake, and other areas within the White Mountain region of Grafton County. The species lists included in this report are relatively complete for vascular plants, amphibians, birds, fish, mammals, phytoplankton, and zooplankton, and partially complete for insects, molluscs, and non-vascular plants." (Authors) Odonata are treated on the genus level.] Address: http://www.fs.fed.us/newtownsquare/publications/technical_reports/pdfs/1999/gtrne257.pdf

4201. Johnson, I. (1999): Dragonfly recording and Conservation. *Darter* 19: 3. (in English). [Appeal to get interested in odonate larvae too.] Address: not stated

4202. Leslie, H.A.; Pavluk, T.I.; bij de Vaate, A.; Kraak, M.H.S. (1999): Triad Assessment of the Impact of Chromium Contamination on Benthic Macroinvertebrates in the Chusovaya River (Urals, Russia). *Archives of Environmental Contamination and Toxicology* 37(2): 182-189. (in English). ["The impact of chromium (Cr) contamination on the benthic macroinvertebrate community (including "Odonata") of the Chusovaya River in the Ural Mountains of Russia was assessed using a triad approach. The triad consisted of chemical analysis of the contamination in various environmental compartments, examination of the benthic macroinvertebrate community structure, and analysis of ecotoxicological effects on the caddisfly *Hydropsyche pellucidula* (Trichoptera). Chemical analyses of water, sediments, and detritus indicated that the main contaminant present was indeed Cr and that the level of the Cr contamination near the point source, a severely polluted dead tributary, was extremely high: Downstream Cr concentrations were about 450 times higher in water and 25 times higher in sediments compared with a clean reference site upstream. The contamination at the mouth of the tributary was even more severe: 800 times more Cr in water and 50 times more Cr in sediments. Benthic macroinvertebrate community structure was

studied using artificial substrates colonized in situ. Lower species richness was observed at the downstream site compared with the upstream site. Larvae of *H. pellucidula* collected from the contaminated site on the river bioaccumulated large amounts of Cr and exhibited physical abnormalities. The incidence of tracheal gill damage was significantly higher than at a reference site on the nearby Reshotka River, as was the incidence of discoloration of the anal papillae of these animals. The application of a triad demonstrated that the observed extreme Cr contamination had an adverse effect on aquatic life in the Chusovaya River, both at the community level (reduced diversity) and at the level of individuals (sublethal effects on surviving individuals)." (Authors)] Address: Leslie, H.A., Department of Aquatic Ecology and Ecotoxicology, ARISE, University of Amsterdam, Kruislaan 320, 1098 SM Amsterdam, The Netherlands

4203. Linhart, J. (1999): Phytophilous macrofauna in the *Stratiotes aloides* vegetation of the Lake Lukie, Poland. *Acta Universitatis Palackianae olomucensis, Facultas Rerum naturalium, Biologica* 37: 67-76. (in English). ["On 14th July 1999, a small tentative investigation into the composition of phytophilous macrofauna in the *Stratiotes aloides* vegetation was conducted in the Lake Lukie, Poland. Altogether 22 main (33 recognized) invertebrate taxa were found. Out of these, only 7 taxa represented more than 1 % share on the total abundance - Chironomidae, Cladocera, Oligochaeta, Cyclopoida, Trichoptera, Isopoda and Gastropoda; chironomid larvae being by far the most abundant (almost 72 % of the total abundance). Representatives of groups Hydroida, Bivalvia, Hirudinea, Araneida, Hydrachnellae, Ostracoda, Anisoptera, Ceratopogonidae, Ephydriidae, Stratiomyidae and Coleoptera were found only occasionally (2-16 individuals per m²). The total abundance of phytophilous macroinvertebrates (> 300 µm) was estimated to be 8,328 ind. m² for epiphytic invertebrates and 11,800 ind. m² for all animals (including mining Chironomidae). An interesting feature was an enormous infection of *S. aloides* leaves by the mining chironomid larvae. These miners comprised about 40 % of all chironomid larvae found in the samples. I have estimated a number of mining Chironomidae in 1 plant to be 579 on average (15.6 ind.gn1 plant dry weight). It has been suggested that the quadrat sampling method underestimated numbers of highly active animals dwelling in macrovegetation - Cladocera, Copepoda, predators (Odonata, Heteroptera, Coleoptera)." (Author)] Address: Linhart, J., Department of Zoology and Anthropology, Natural Science Faculty, Palacký University, T. Svobody 26, 771 46 Olomouc, Czech Republic. E-mail: linhart@prfnw.upol.cz

4204. Martens, A. (1999): *Buchbesprechungen: Corbet, P.S. (1999): Dragonflies: Behaviour and Ecology of Odonata. Lauterbornia* 37: 247. (in German). [oas 6; Review of P.S. Corbet's book, see OAS 1566] Address: Martens, A., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

4205. Missfeld, S.; Schleef, J. (1999): Untersuchungen zur Libellenfauna des "Pölinxer Grund" (Kreis Höxter). *EGGE-WESER* 12: 3-18. (in German). [Nordrhein-Westfalen, Germany; 19 odonate species could be recorded in 1996. *Lestes barbarus*, *Cordulia aenea*, and *Aeshna juncea* are of special regional interest.] Address: Schleef, J., c/o Biol. Station Gütersloh / Bielefeld

e.V., Niederheide 63, D-33659 Bielefeld, Germany. E-mail: BioStationGT-BI@t-online.de

4206. Moore, N.; Colston, A. (1999): The dragonflies and damselflies of Wicken Fen. Guides to Wicken Fen 13: 3 pp. (in English). [The 26 odonate species ever known to occur in Wicken Fen, UK are listed in a table and their current status in the area is briefly commented. To enable an easy identification of the Coenagrionidae, an illustration of the Wicken Fen's blue damselflies is added.] Address: Colston, A., Wicken Fen NNR, Lode Lane, Wicken, ELY, Cambs, CB7 5XP, UK

4207. Moore, N. (1999): Under Threat! Norfolk Hawker (*Aeshna isosceles*). *Darter* 19: 2. (in English). [Brief introduction into the current distribution and threat of *Anaciaeschna isosceles*; appeal for mapping the distribution of the species in the UK.] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom

4208. Parr, A. (1999): Migrant dragonfly project.. *Darter* 19: 5. (in English). [The objects of the project are outlined, and some interesting data from the project are dealt with.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4209. Perrin, V. (1999): Here today and here tomorrow? Knowing our key sites. *Darter* 19: 12-13. (in English). [Introduction into the UK Odonata key site project.] Address: Perrin, V., 13 Pettitts lane, Dry Drayton, Cambridgeshire CB3 8BT, UK. E-mail: valperrin@dia1.pipex.com

4210. Steffens, W.P.; Smith, W.A. (1999): Status survey for special concern and endangered dragonflies of Minnesota: population status, inventory and monitoring recommendations. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources: 54 pp- (in English). ["Status determination surveys for Hine's emerald dragonfly (*Somatochlora hineana*), Saint Croix snaketail (*Ophiogomphus susbehcha*), and extra-striped snake-tail (*O. anomalus*) were conducted throughout eastern, central, and northern Minnesota. Threats to these rare species were evaluated, and conservation and population status recommendations for Minnesota dragonflies are presented. Baseline data on other dragonflies in under-surveyed habitats are reported, including several state records and numerous county records. Several collections of damselflies are also reported along with county distribution information, and recommendations for future Odonata surveys and monitoring are offered." (Authors)]. http://www.dnr.state.mn.us/ecologicalservices/nongame/projects/researchreports/abstracts/insect_s/steffenssmith1999.html

4211. Sykes, T. (1999): Getting to grips with the Southern Damselfly. *Dragonfly News* 36: 8-9. (in English). [Report from two workshops in July 1999 referring to *Coenagrion mercuriale* in the UK.] Address: Sykes, T., Environ. Agency, Colvedene Court, Wessex Way, Colden Common, Hants, SO21 1WP, UK

4212. Zherikhin, V.V. (1999): Cladistics in palaeontology: Problems and constraints. AMBA projects AM / PFICM98/L99: Proceedings of the First International Palaeontological Conference, Moscow 1998. In: AMBA/AM/PFICM98/1.99: 193-199. (in English). ["Cla-

distics was originally developed as a method of analysis of the present-day diversity pattern, and some problems are arising when it is applied to the palaeontological record. The most important difficulties are connected with 1. the different time scales (phylogenetic scale in cladistics, geological or physical scales in palaeontology where neither paraphyletic taxa nor chronotaxa can be excluded accurately); and 2. the different basic levels for establishment of terminal branches (the single present-day level in cladistics and numerous successive levels in palaeontology). Both modified versions of cladistics and complementary methods have to be developed to describe fossil biodiversity in an adequate manner." (Author) Several references are made to Odonata.] Address: Zherikhin, V.V., Palaeontological Institute, 123 Profsoyuznaya St., 117868 GSP Moscow, Russia

2000

4213. Bonet Betoret, C. (2000): Expansión de *Trithemis annulata* en Europa en los años 80 y 90 (Odonata). *Boletín de la Sociedad Entomología Aragonesa* 27: 85-86. (in Spanish). [Iberian peninsula, France. The paper compiles and discusses from literature date records of *T. annulata*.] Address: Bonet Betoret, C., Lintera, 28, ES-46001 Valencia, Spain

4214. Caley, K.J. (2000): Temperate Feet in Tropical Waters. *Porcupine* 21: 23-24. (in English). [Brief report on a students excursion in Hong Kong, China, with focus on marine fauna. A black & white drawing of *Rhincocypha perforata* illustrates the "stream day", but no additional information is given.] Address: Caley, K.J., Dept Ecol Biodiversity & Universitas 21, Virtual School of Biodiversity, School of Biol. Sciences, Univ. Nottingham, UK

4215. Campbell, J. (2000): The status of the Ruddy Darter *Sympetrum sanguineum* (Müller) in Oxfordshire. *Darter* 20: 4. (in English). [Increasing knowledge and range extension of *S. sanguineum* are outlined and mapped.] Address: not stated

4216. Cham, S. (2000): Co-occurrence mapping with DMAP. *Darter* 20: 5. (in English). [Two examples of coincidences are mapped: (1) Odonate species diversity in the UK and Ireland and (2) *Calopteryx splendens* and *Platycnemis pennipes* in Bedfordshire.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4217. Cham, S. (Red.) (2000): News from the regions. *Darter* 20: 6-8, 10-13. (in English). [Taylor, P.: News from Norfolk; Averill, M.: News from the Midlands; Clarke, D.: News from North England; Marshall, H. & D. Clarke: Hot news from Cumbria; Gladwin, T. & C. Shep-person: Dragonfly recording in Hertfordshire; Smith, B.: News from Scotland; Jones, S.: News from Cornwall; Halls, J.: Buckinghamshire Dragonfly Atlas] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4218. Clopton, R.E. (2000): Apicomplexa: Eugregariorida. The Genera. Order Eugregariorida Léger, 1892. In J. J. Lee, G. F. Leedale, & P. Bradbury (Eds.): *The Illustrated Guide to the Protozoa*, 2nd ed., Vol. 1. Society of Protozoologists, Lawrence, Kansas, U.S.A.

689 pp: 205-288, 353-369. (in English). [The genus *Odonaticola* Sakar & Haldar, 1981 known to host *Brachythemis contaminata* is described and illustrated.] Address: <http://science.peru.edu/gregarina/assets/images/Clopton200211GuideGregspreprint.pdf>

4219. Confiant, R. (2000): *Mamzelle* Dragonfly. ISBN 0374199329: 169 pp. (in English). [A novel about a girl trapped working in the cane fields of Martinique. She is later forced to move from her village to the island's politically restive capital where her aunt introduces her to the unsavory business of nightlife among the mulatto elite. Translated from the French by Linda Coverdale. The author is a winner of the French Prix Novembre.]

4220. Grawe, F. (2000): Tag der Artenvielfalt im Kreis Höxter. *Egge-Weser* 13: 63-74. (in German). [In the framework of the so-called "Day of Biodiversity" (3. June, 2000), 30 odonate taxa including *Lestes barbarus*, *Lestes virens*, and *Aeshna affinis* could be traced. No precise locality data are dealt with.] Address: not stated

4221. Kampa, E.; Artemiadou, V.; Lazaridou-Dimitriadou, M. (2000): Ecological quality of the River Axios (N. Greece) during spring and summer, 1997. *Belgian Journal of Zoology* 130 (supplement 1): 21-27. (in English). ["This study examines the applicability of five European biotic indices combined with the measurements of physicochemical parameters in order to determine the water quality at ten sites along the Greek part of the river Axios during the high flow (spring) and low flow season (summer) in 1997. The river Axios is situated in northern Greece, west of the city of Thessaloniki. [...] The Greek part of the river Axios receives mainly agricultural runoff but also urban sewage and industrial wastes." Physicochemical parameters were measured in situ. The benthic macroinvertebrates - including Odonata -, sampled with the 3 min kick/sweep method, were identified to the lowest possible taxonomic level, but not documented in this paper. "The faunal composition was typical of a lowland river, i.e. the zoobenthos was not very diverse. The quality of the water was influenced by human activities during both seasons. The deterioration in water quality during spring was due to excess suspended solids of diffuse agricultural origin, and during summer was due to organic pollution. Lower discharge and impoundment accentuated this deterioration. Overall, changes in physicochemical parameters were in agreement with the results of the biological data, despite their instant nature. However, some problems arose with regard to the applicability of the European biotic indices, thus emphasizing the need to develop a Greek Biotic Index." (Authors)] Address: Lazaridou-Dimitriadou Maria, Dept. of Zoology, School of Biology, Aristotle University of Thessaloniki, 54006 Thessaloniki, Greece. E-mail: mlazarid@bio.auth.gr

4222. Kumar, A. (2000): Fauna of Renuka Wetland: Odonata (adults). *Wetland Ecosyst. Ser. zool. Surv. India* 2: 45-53. (in English). [The odonate fauna (37 species) of Renuka Lake, Himachal Pradesh, India, is keyed and field notes are provided.] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

4223. Kumar, A. (2000): Fauna of Renuka Wetland: Odonata (larvae). *Wetland Ecosyst. Ser. zool. Surv. India* 2: 55-62, 4 pls. (in English). [The odonate larvae (37 known species), occurring in Renuka Lake, Himachal Pradesh, India, are keyed and their structural features

are illustrated. Regional habitat preferences are listed in a table.] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

4224. Lempert, J. (2000): *Libellen und Literatur XXIV*. *Libellennachrichten* 4: 12. (in German). [Extracts from two books referring to Odonata: (1) Arnold Zweig *Elegie über Blumensträuße in: Mädchen und Frauen*, Berlin 1931) and (2) Peter Huchel: *Ausgewählte Gedichte Suhrkamp Frankfurt* 1973.] Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany

4225. Lucas, M.J. (2000): The history and distribution of the Emperor dragonfly *Anax imperator* (Leach) in Yorkshire. *Darter* 20: 6- (in English). [Documentation of the range extension of *A. imperator* in Yorkshire, UK.] Address: Lucas, M. Jill., 8 Camborne Dr., Fixby, Huddersfield, Yorks., HD2 2NF, UK

4226. Museum Victoria (2000): Dragonflies and damselflies. Museum Victoria Information sheet 10178: 1 page. (in English). [Brief characterisation of Odonata (morphology, biology) (.)] Address: Museum Victoria, GPO Box 666E, Melbourne 3001, Victoria, Australia. www.museum.vic.gov.au/infosheets/10178.pdf

4227. Parr, A. (2000): Migrant dragonflies - Climate change, the new millennium, and all that. *Darter* 20: 3- (in English). [A. Parr compiles some highlights of records from the more recent past, and discusses some challenges for research on migrating Odonata in the future.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4228. Perrin, V. (2000): The key sites register - an update. *Darter* 20: 8-9. (in English). [Information of important dragonfly habitats (n= app. 450) from 26 counties in the UK are available.] Address: Perrin, V., 13 Pettitts lane, Dry Drayton, Cambridgeshire CB3 8BT, UK. E-mail: valperrin@dial.pipex.com

4229. Salur, A.; Kiyak, S. (2000): On the systematic and faunistic studies of Anisoptera species (Insecta: Odonata) of Kizilirmak River Basin (Kayseri Province). *Gazi University Journal of Science* 13(3): 829-841. (bilingual in Turkish and English). [267 anisopteran specimens collected in the Kizilirmak river basin situated on the border of Kayseri province, Turkey represent 14 species including *Stylurus flavipes lineatus*. 6 species are new records for the fauna of Central Anatolia and all are new for the fauna of Kayseri.] Address: Salur, A., Gazi University, Arts & Sciences Faculty of Corum, Biology Department, 19030 Corum. Turkey. E-mail: alisalur@gazi.edu.tr

4230. Salur, A.; Kiyak, S. (2000): On the systematic and faunistic studies of Zygoptera species (Insecta: Odonata) of Kizilirmak River Basin (Kayseri Province). *Gazi University Journal of Science* 13(3): 843-854. (bilingual in Turkish and English). [246 zygopteran specimens collected from 13 localities in the Kizilirmak river basin situated on the border of Kayseri province, Turkey represent 13 species. 5 species are new records for the fauna of Central Anatolia and 10 of them are new for the fauna of Kayseri.] Address: Salur, A., Gazi University, Arts & Sciences Faculty of Corum, Biology Department, 19030 Corum. Turkey. E-mail: alisalur@gazi.edu.tr

4231. Samusenko, I. (2000): Preservation of White Stork (*Ciconia ciconia* L.) population in Belarusian Polesia. MAB Young Scientist Research Project. Final Report. <http://www.unesco.org/mab/capacity/mys/99/Samusenko/FinRep.pdf>: 38 pp. (in English). [Belarus; Odonata are among the prey of White storks but play a minor role as food.] Address: Samusenko, Irina, Institute of Zoology, Belarus National Academy of Sciences (NASB), Academichnaya Street 27, 220072 Minsk, Belarus. E-mail: ring@biobel.bas-net.by)

4232. Sliva, J.; Marzelli, M.; Pfadenhauer, J. (2000): Renaturierung von landwirtschaftlich genutzten Niedermooren und abgetorften Hochmooren. Schriftenreihe des Bayerischen Landesamt für Umweltschutz 148: 160 pp- (in German). [Brief report on some Odonata of the Eittinger Moos, Bayern, Germany.] Address: Pfadenhauer, J., Lehrstuhl für Vegetationsökologie, TU München, Am Hochanger 6, D-85350 Freising-Weihenstephan, Germany

4233. Tomokuni, M.; Saito, Y. (2000): Dragonflies (Insecta, Odonata) of the garden of the Imperial Palace, Tokyo, Japan. Mem. natn. Sci. Mus., Tokyo 36: 7-18. (in Japanese, with extensive English summary). [The Imperial Palace occupies an area of 115 ha in the centre of Tokyo, with a well-preserved vegetation and a variety of aquatic habitats. During 1987-1988, and 1996-1999, 27 odonate species were evidenced. Their status and the current condition of the respective habitats are described. Special emphasis is given to some regional relict populations of *Ceriagrion nipponicum*, *Trigomphus melampus*, and *Aeschnophlebia longistigma*, which survived within the boundaries of the garden but were extinct outside.] Address: Tomokuni, M., Dept Zool., Natn. Sci. Mus., 3-23-1 Hyakunincho, Shinjuku-ku, Tokyo, 169-0073, Japan. E-mail: tomokuni@kahaku.go.jp

4234. Wilson, D.P (2000): *Aciagrion tillyardi* Laidlaw (Odonata: Zygoptera) a damselfly new to Hong Kong. Porcupine 21: 9-11. (in English). ["The dragonfly fauna of Hong Kong was comprehensively detailed in Wilson (1997). In this account 107 species were treated. A species of damselfly, *A. tillyardi*, discovered at Pat Sing Leng on 21 May 2000, brings the total odonate fauna known from Hong Kong to 108 species. A full description is provided here, with details of material and a full discussion of synonymy." (Author)] Address: Wilson, K.D.P., Flat 20, 6 Mansfield Road, The Peak, Hong Kong, China. E-mail: wilsonkd@ntlworld.com

2001

4235. Beutel, R.G.; Gorb, S.N. (2001): Ultrastructure of attachment specializations of hexapods (Arthropoda): evolutionary patterns inferred from a revised ordinal phylogeny. J. Zool. Syst. Evol. Research 39: 177-207. (in English with German summary). ["Attachment devices of representatives of most higher taxa of hexapods were examined. Short descriptions of tibial, tarsal and pretarsal adhesive structures for each order are presented. In their evolution, hexapods have developed two distinctly different mechanisms to attach themselves to a variety of substrates: hairy surfaces and smooth Pelexible pads. The Pelexible properties of pad material guarantees a maximal contact with surfaces, regardless of

the microsculpture. These highly specialized structures are not restricted to one particular area of the leg. They may be located on different parts, such as claws, derivatives of the pretarsus, tarsal apex, tarsomeres, or tibia. The 10 characters of the two alternative designs of attachment devices (smooth and hairy) were coded and analysed together with a data matrix containing 105 additional morphological characters of different stages and body parts. The analysis demonstrates, that similar structures (arolium, euplantulae, hairy tarsomeres) have evolved independently in several lineages. Nevertheless, some of them support monophyletic groups (e.g. Embioptera + Dermaptera; Dictyoptera + Phasmatodea + Grylloblattodea + Orthoptera; Dictyoptera + Phasmatodea; Hymenoptera + Mecoptera; Neuropterida + Strepsiptera + Coleoptera). Other structures such as claw pads (Ephemeroptera), balloon-shaped ever-sible pads (Thysanoptera), or fossulae spongiosae (Reduviidae) are unique for larger or smaller monophyletic units. It is plausible to assume that the evolution of Pight and the correlated necessity to cling to vegetation or other substrates was a major trigger for the evolution of adhesive structures. Groups with a potential to evolve a great variety of designs of adhesive pads are Hemiptera and Diptera. Even though characters of the adhesive pads are strongly subject to selection, they can provide phylogenetic information. The results of the cladistic analyses are largely congruent with current hypotheses of hexapod phylogeny. A sister-group relationship between Diplura and Insecta and between Zygentoma (excl. Tricholepidion) and Pterygota is confirmed. Plecoptera are probably the sistergroup of the remaining Neoptera. Dermaptera are the sistergroup of Embioptera and Dictyoptera the sistergroup of Phasmatodea. Paurometabola excl. Dermaptera + Embioptera are monophyletic. A sistergroup relationship between Zoraptera and a clade comprising Paraneoptera + Endopterygota is only supported by weak evidence. Coleoptera + Strepsiptera are the sistergroup of Neuropterida and Hymenoptera the sistergroup of Mecoptera." (Authors) *Enallagma cyathigerum*, *Lestes barbarus*, *Anax imperator*] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

4236. Bubinas, A.; Jagminiene, I. (2001): Bioindication of ecotoxicity according to community structure of macrozoobenthic fauna. Acta zool. Lituan. 11(1): 90-96. (in English with Lithuanian summary). [87 species of benthic macroinvertebrates (incl. *Calopteryx splendens*, *Stylurus flavipes*, *Gomphus vulgatissimus*, *Libellula quadrimaculata*, *Aeshna grandis*) were identified in the riparian zone of the Nemunas River, Lithuania. 4 species groups were discerned with reference to their pollution sensitivity. The Odonata are referable to the second most sensitive group.] Address: Inst. Ecol., Akademijos 2, 2600 Vilnius, Lithuania

4237. Clarke, D. (2001): Resilience of Azure Hawker larva: an unintended "experiment". Dragonfly News 39: 18-19. (in English). [UK, drought resistance of larval *Aeshna caerulea*.] Address: Clarke, D., Burnfoot, Cumwhitton, Carlisle, Cumbria CA4 9EX, UK

4238. Clarke, D. (2001): The first day in the life of a Southern Hawker. Dragonfly News 40: 13. (in English). [Report on a long lasting post-emergence pre-maiden flight period of *Aeshna cyanea* in a garden pond near

Carlisle, UK.] Address: Clarke, D., Burnfoot, Cumwhitton, Carlisle, Cumbria CA4 9EX, UK

4239. Clausnitzer, V. (2001): Libellen und Literatur XXVIII. Libellennachrichten 6: 14. (in German). [Extract from the book "Redmond O'Hanlon: Kongofieber. München. 1999"] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: viola@cl@gm.de

4240. Hunger, H. (2001): Libellen und Literatur XXVI. Libellennachrichten 5: 14-16. (in German). [Extract from the book Gerd Gaiser: "Schlußball. Aus den schönen Tagen der Stadt Neu-Spuhl." Carl Hauser-Verlag. München. 1958. 212 pp."] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), Am Pfahlgraben 8, D-79276 Reute, Germany

4241. Kriegel, P. (2001): Friendly Dragonfly. Dragonfly news 40: 14. (in English). [Dragonfly poem.] Address: Kriegel, Patricia, 2600 SW 80th, Oklahoma City, Oklahoma 73159, USA

4242. Lau, M. (2001): Interesting Odonates from Hong Kong Island. Porcupine 23: 4. [Verbatim: On 11 May 2001, one *Calicnemia sinensis* was found near a forest stream along Mount Parker Road at about 140 m. Two *Drepanosticta hongkongensis* were found near a small stream at about 210 m. Several *Drepanosticta hongkongensis* and two *Sinosticta ogatai* were found along a forest stream south of Quarry Gap from 180-260 m. According to Wilson (1997b) *C. sinensis* is a regionally rare species with restricted local distribution. It has been recorded from five sites in Hong Kong (Wilson, 1997) and this Mt. Parker record represents the sixth site. Both *D. hongkongensis* and *S. ogatai* are believed to be endemic (but see Reels article in this issue of Porcupine!) and have never been recorded on Hong Kong Island (Wilson, 1997b). Their presence in the Mount Butler area is hence of conservation interest.]. Address: not stated

4243. Lempert, J. (2001): Libellen und Literatur XXV. Libellennachrichten 5: 14. (in German). [Extract from the book "Ottfried Preussler: Der Kleine Wassermann. Stuttgart. 1958".] Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany

4244. Mackenzie Dodds, R. (2001): How a dream came true: ten years of dragonflies and the public at Ashton Water. Dragonfly News 39: 19-22. [Brief history of The National Dragonfly Museum, Ashton Mill, UK, which regrettably closed its doors in the meantime (see Dragonfly News 41: 22)] Address: Mackenzie Dodds, R., The National Dragonfly Museum, Ashton Mill, near Oundle, Peterborough PE8 5LZ, UK

4245. Martin, M. (2001): Environmental monitoring in Baden-Württemberg with special reference to biocoenotic trend-monitoring of macrozoobenthos in rivers and methodical requirements for evaluation of long-term biocoenotic changes. Aquatic Ecology 35(2): 159-171. ["Biomonitoring methods from a comprehensive study of man-made impacts on urban and on the near-natural environment are presented. Part of the environmental monitoring in Baden-Württemberg is a biocoenotic trend-monitoring project on macrozoobenthos in running waters which has resulted in a database enabling long-term trend assessment of biocoenosis in diverse rivers and streams in the future. About 561 species of

macrozoobenthos have been recorded (21 species for the first time in Baden-Württemberg). Data are analysed for different purposes: methodological requirements for aquatic trend-biomonitoring, status of endangerment according to the Red Data Book, and first assessment of faunistic long-term changes in the River Rhine. Calculation of cumulative species numbers over number of samples offers sampling success and therefore represents a good way to show how sure or complete results of a given faunistic approach are at a given time. One sample provides less than 25% of the fauna recorded within a three years period of quarterly inspections. To collect the main fraction (90%) of species, it takes 3 years of quarterly collections if all species recorded only once during the whole period are neglected. Several rare species were recorded within the project. 34% of mayflies, stoneflies and caddisflies are endangered. The River Rhine and its changes in faunal composition within the last century is the example to illustrate the principle of biocoenotic trend-monitoring. The more recent samples of the macrobenthic fauna of the River Rhine indicate an improved quality and diversity because of improved water quality. Several species, indicative of good water quality have returned, and invasion of neozoans is still high, too. However, with respect to extinct species of macrozoobenthos, especially stoneflies, mayflies and caddisflies, mentioned by former authors, there is still a marked absence of indigenous species in the River Rhine." (Author)] Address: Marten, M., Landesanstalt für Umweltschutz Baden Württemberg, Griesbachstr. 1, D-76185 Karlsruhe, Germany. E-mail: michael.marten@lfuka.lfu.bwl.de

4246. Parr, A. (2001): Dragonfly news for 2000 - Migrants & Vagrants. Dragonfly News 39: 13-15. (in English). [UK; *Erythromma viridulum*, *Aeshna mixta*, *Anax imperator*, *A. parthenope*, *Libellula depressa*, *L. quadrimaculata*, *Crocothemis erythraea*, *Sympetrum fonscolombii*, *S. flaveolum*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4247. Reels, G.T. (2001): Two Hong Kong endemics sunk at Wutongshan. Porcupine 23: 5- (in English). [*Sinosticta ogatai* and *Drepanosticta hongkongensis* (Platystictidae) previously only known from Hong Kong have been discovered on the slopes of Wutongshan in Shenzhen. Both were found in good numbers in wooded ravines on the north-facing slopes of the 944 m mountain, just over the border from Sha Tau Kok, during a field visit on 16-17 May.2001.] Address: not stated

4248. Smallshire, D. (2001): A warning for those "bitten by the bug"! Dragonfly News 40: 14- (in English). [Verbatim: Thankfully, we often hear of people who get bitten metaphorically by the dragonfly 'bug', but here is a tale of the unfortunate consequences of being literally bitten by a dragonfly. Those who have handled our larger dragonflies will be well aware that an adult in the hand will often try to nip a finger if it comes close enough. A BDS member (who will remain nameless!) at the Smallhanger field meeting in July was curious about how strong such a bite would be. When the chance came to try out the mandibles of a Golden-ringed Dragonfly held by another member, a finger was proffered. The bite was obviously more painful than expected, because the finger was withdrawn sharply but unfortunately, and to everyone's horror, the dragonfly's head came with it! I've never heard of this happening

me with it! I've never heard of this happening before, but to avoid a repeat I suggest that anyone desperate for a quick nip should ensure that both mandibles and legs are allowed to connect with the same finger!] Address: Dave Smallshire, 8 Twindle Beer, Chudleigh, Newton Abbot, TQ13 OJP, UK

4249. Smallshire, D. (2001): Criteria for proof of breeding in dragonflies. *Dragonfly News* 39: 17-18. (in English). [Suggested categories: Confirmed breeding: exuvia or newly emerged adult; probable breeding: larva, ovipositing female, or copulating pair (Zygoptera only); present: all other records.] Address: Smallshire, D., 8 Twindle Beer, Chudleigh, Newton Abbot, TQ13 OJP, UK

4250. Staniczek, A. H. (2001): Der Larvenkopf von *Oniscigaster wakefieldi* McLachlan, 1873 (Insecta: Ephemeroptera: Onscigastridae). Dissertation, Fakultät für Biologie, Eberhard-Karls-Universität Tübingen. 165 pp. (in German, with English summary). [The larval head of the New Zealand mayfly *Oniscigaster wakefieldi* is investigated, a mayfly which is thought of as plesiomorphic in many respects. Based on a broad comparison with other mayfly species, it is aimed to reconstruct the groundplan of the larval head of mayflies. Emphasis is laid on the anatomy and functional morphology of the larval mouthparts and the homologization of their muscles. The results indicate the presence of an anterior articulation complex of the mandible that is made up of two points of mandibular attachment to the cranium in the groundplan of Ephemeroptera. These attachment points are compared with the condition in the relic silverfish *Tricholepidion gertschi* and other *Zygentoma*. It is shown that in the *Zygentoma* there is a similar articulation complex present. This correspondence is regarded as a groundplan character of *Dicondylia*. The character transformation from the monocondylous mandibles of *Ectognatha* to the dicondylous mandible of *Odonata* and *Neoptera* is interpreted in its functional and phylogenetic context. The alterations of the mandible and its muscles are correlated with changes in the construction and position of the anterior tentorial arms and the lateral cranium. None of the investigated mandibles show traces of segmentation. Thus the hypothesis of a tripartite telognathic mandible in the groundplan of insects is rejected. The fused galeolacinia of mayfly larvae is compared to the ones of the *Odonata*. The different ways of interpretation of these results are discussed. The findings of this study, together with all previously discussed characters, are used for a phylogenetic analysis to unravel the phylogenetic affinities between the three basal groups of the *Pterygota* (Ephemeroptera, *Odonata*, *Neoptera*). The data point to a sistergroup relationship between the Ephemeroptera and all other pterygote insects, the *Metapterygota*. kationsdatum: 07.11.2001] Address: <http://w210.ub.uni-tuebingen.de/dbt/volltexte/2001/310/>

4251. Steffens, W.P. (2001): Status Survey for *Ophiogomphus anomalus* Harvey, and early-season dragonfly inventory of western Superior National Forest Rivers. Submitted to: Superior National Forest and Minnesota DNR Natural Heritage and Nongame Research Program: 12 pp. (in English). [Status surveys for the Special Concern dragonfly, *Ophiogomphus anomalus*, were conducted on selected rivers in northeastern Minnesota, along with an inventory of other early-season river dragonflies. *Ophiogomphus anomalus* were confirmed on the upper St. Louis River in St. Louis County, but no

new occurrences were found. Additional evidence of developmental abnormalities in northern Minnesota dragonfly larvae was found at several locations.] Address: <http://www.dnr.state.mn.us/ecologicalservices/nongame/projects/researchreports/abstracts/insects/steffens-2001.html>

4252. Taylor, G.K. (2001): Mechanics and aerodynamics of insect flight control. *Biol. Rev.* 76: 449-471. (in English). [Insects have evolved sophisticated flight control mechanisms permitting a remarkable range of manoeuvres. Here, I present a qualitative analysis of insect flight control from the perspective of flight mechanics, drawing upon both the neurophysiology and biomechanics literatures. The current literature does not permit a formal, quantitative analysis of flight control, because the aerodynamic force systems that biologists have measured have rarely been complete and the position of the centre of gravity has only been recorded in a few studies. Treating the two best-known insect orders (*Diptera* and *Orthoptera*) separately from other insects, I discuss the control mechanisms of different insects in detail. Recent experimental studies suggest that the helicopter model of flight control proposed for *Drosophila* spp. may be better thought of as a facultative strategy for flight control, rather than the fixed (albeit selected) constraint that it is usually interpreted to be. On the other hand, the so-called 'constant-lift reaction' of locusts appears not to be a reflex for maintaining constant lift at varying angles of attack, as is usually assumed, but rather a mechanism to restore the insect to pitch equilibrium following a disturbance. Differences in the kinematic control mechanisms used by the various insect orders are related to differences in the arrangement of the wings, the construction of the flight motor and the unsteady mechanisms of lift production that are used. Since the evolution of insect flight control is likely to have paralleled the evolutionary re-orientation of these unsteady aerodynamic mechanisms, taxonomic differences in the kinematics of control could provide an assay of the relative importance of different unsteady mechanisms. Although the control kinematics vary widely between orders, the number of degrees of freedom that different insects can control will always be limited by the number of independent control inputs that they use. Control of the moments about all three axes (as used by most conventional aircraft) has only been proven for larger flies and dragonflies, but is likely to be widespread in insects given the number of independent control inputs available to them. Unlike in conventional aircraft, however, insects' control inputs are likely to be highly non-orthogonal, and this will tend to complicate the neural processing required to separate the various motions.] Address: Taylor, G., Department of Zoology, Oxford University, South Parks Road, Oxford, OX1 3PS, UK. (E-mail: graham.taylor@zoo.ox.ac.uk)

4253. Taylor, P. (2001): Mixed pairs. *Dragonfly News* 40: 13-14. (in English). [Great Britain; male *Sympetrum sanguineum* x female *Leucorrhinia dubia*; male *Libellula fulva* x female *L. quadrimaculata*; teneral female *Sympetrum striolatum* (sitting on its exuvia) x male *S. sanguineum*.] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK

4254. Tóth, S. (2001): Checklist of dragonflies of Somogy county (Insecta: *Odonata*). *Natura Somogyiensis* 1: 93-99. (in Hungarian, with English summary). [55 *Odonata* species can be proved in Somogy county, 87%

of the dragonfly fauna in Hungary. Of special interest are *Aeshna viridis*, *Stylurus flavipes*, *Leucorrhinia caudalis*, *L. pectoralis*, *Ophiogomphus cecilia*, and *Coenagrion ornatum*.] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

4255. Wirsing, T. (2001): Libellenkartierung am Altmühlsee und der nahen Seeumgebung im Jahr 2000. Altmühlbericht 8: 72-91. (in German). [Bayaria, Germany; records of 30 odonates species are documented in detail. The succession of the present odonate fauna compared with records from 1984 and 1988 is briefly outlined.] Address: Wirsing, T., Zeilitzheimer Pfad 21, D-97332 Volkach, Germany. E-mail: wiedehopf@web.de

2002

4256. Bechly, G. (2002): Description of a new species of *Nannogomphus* (Insecta: Odonata: Nannogomphidae) from the Upper Jurassic Solnhofen Limestone in Germany. *Stuttgarter Beiträge zur Naturkunde, Serie B (Geologie und Paläontologie)* 339: 1-6. (in English with German summary). ["A new species of *Nannogomphidae*, *Nannogomphus buergen* n. sp., is described from the Upper Jurassic Solnhofen Limestones of Germany. The diagnosis of the genus is amended with a list of autapomorphics." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

4257. Blasius, B.J.; Merritt, R.W. (2002): Field and laboratory investigations on the effects of road salt (NaCl) on stream macroinvertebrate communities. *Environmental Pollution* 120(2): 219-231. [Short-term exposure to road salt did not significantly affect stream macroinvertebrate communities.] Address: Blasius, B.J., Southern Nevada Water Authority 243 Lakeshore Road, Boulder City, NV 89005, USA

4258. Bohra, C. (2002): Analytical studies on the food and feeding habits of tropically distinct aquatic odonate larvae of Udhuwa Lake in Santal Pargana, Jharkhand, India. In: Kumar, A. (Ed.): *Current trends in odonatology*. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 207-220. (in English). ["This investigation showed a special food preference of odonate larvae which was conducted in a lake during the year of 2000. This study revealed the fact that odonates are primarily carnivorous and feed on cladocera, copepoda, rotifera, rhizopoda, aquatic insects, fish fries and other animal life present in the surroundings. According to observations, the food preference of Zygoptera larvae is: Rhizopoda > Cladocera > Aquatic insects > Rotifers > Copepoda > Algae while the food preferences of Anisopteran larvae is utterly different being - Cladocera > Rotifera > Aquatic insect > Copepoda > Algae > Rhizopoda." (Author)] Address: Bohra, C., Pollution Research Laboratory, Dept of Zoology, B.S.K. College, Barharwa-816101 (Jharkhand), India

4259. Boudot, J.-P. (2002): Étude de la faune des odonates de la zone natura 2000 "Vallée du Madon - Vallée du Br'non - Carrière de Xeulley". Rapport: 108 pp- (in French). [This is a detailed and sound expertise

on the odonate fauna of a Natura 2000 site south of Nancy, France. The Madon is a tributary of the River Moselle, and a hotspot of Odonata dwelling running waters and river habitats. Special emphasize is given to *Oxygastra curtisii*, *Onychogomphus forcipatus*, *Gomphus vulgatissimus*, *Cercion lindenii*, *Libellula fulva*, *Ischnura pumilio*, *Orthetrum brunneum*, and *Orthetrum coerulescens*. Detailed maps of the localities of these species within the Natura 2000 site, and in northeast France are provided. In an appendix all Odonata recorded during the field studies (n = 32 species) are documented in detail.] Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Note-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. e-mail: boudot@cpb.cnrs-nancy.fr

4260. Craves, J.A.; O'Brien, D.S. (2002): *Dromogomphus spoliatus* (Odonata: Gomphidae): new for Michigan. *The Great Lakes Entomologist* 35(2): 115-116. (in English). [25-VIII-2002, Huron River, Wayne County, Michigan, USA] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

4261. Daniel, B.A.; Molur, S.; Walker, S. (2002): Conservation assessment and management plan (CAMP) process: a tool to provide strategic guidance for the management of threatened Odonata. In: Kumar, A. (Ed.): *Current trends in odonatology*. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 169-188. (in English). [The paper introduces into dragonfly conservation (strategies) with special emphasis on Red lists. The criteria of IUCN for assessing the status of species are outlined in detail.] Address: Daniel, B.A., Zoo Outreach Organisation, P.O. Box #1683, Peelamedu, Coimbatore-641004, India

4262. Fenoglio, S.; Badino, G.; Bona, F. (2002): Benthic macroinvertebrate communities as indicators of river environment quality: an experience in Nicaragua. *Revista de Biología Tropical* 50(3-4): 8 pp. (in English). ["Biotic indexes are one of severas types of measures that are routinely used in biological monitoring in temperate streams and offer interesting possibilities to assess the environmental quality of rivers in the neotropics. Macroinvertebrate communities of seven southeastern Nicaraguan streams were monitored and seven ecological indexes were applied. The results suggest that information from the Índice Biótico Esteso (I.B.E.) is closely correlated to the results of other methods, but the I.B.E. index is easier to apply as well as avoiding high costs and time-consuming procedures. A calibration of the method is necessary for rapid assessment approaches in the neotropics." (Authors) Odonata are listed on the genus-level.] Address: Fenoglio, S., Univ. di Torino - Dip. di Biologia Animale e dell'Uomo, Via Ace. Albertina 17. Torino, Italy. E-mail: fenoglio@mfn.unipmn.it

4263. Haldar, D.P.; Biswas, S. (2002): On the structure and life history of three new species of septate gregarines (Apicomplexa: Conoidasida) from odonates of West Bengal. In: Kumar, A. (Ed.): *Current trends in odonatology*. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 357-377. (in English). [*Odonatkola platypitnerita* sp. n. from *Orthetrum sabina*, *O. bengalensis* from *Trithemis aurora*, and *O. contaminata* from *Brachythemis contaminata* are described from West Bengal, India.] Address: Haldar, D.P., Protozoology Labora-

tory, Dept of Zoology, University of Kalyani, Kalyani-741235, West Bengal, India

4264. Hellebuyck, V.J. (2002): *Paltothemis nicolae* spec. nov., a new dragonfly from El Salvador (Odonata: Libellulidae). *Revta nicarag. Ent.* 59/62: 5-15. (in English with Spanish summary). [Both sexes are described, illustrated and compared with *P. cyanosoma* and *P. lineatipes*. Holotype male: El Salvador, Quebrada Piedra de Afilar, 5.5 km S of Tacuba, 19-IV-1986; deposited at FSCA, Gainesville/FL, USA.] Address: Hellebuyck, V.J., 1277 Lincoln St., Sherbrooke, QC, J1H2H8, Canada

4265. Hellmund, M.; Hellmund, W. (2002): Erster Nachweis von Kleinlibellen-Eiogen (Insecta, Zygoptera, Lestidae) in der mitteleozänen Braunkohle des ehemaligen Tagebaues Mücheln, Bfd. Neumark-Nrd (Geiseltal, Sachsen-Anhalt, Deutschland). *Hallesches Jahrb. Geowiss., Reihe B*, 24: 47-55. (in German, with English summary). ["In May 2001 geological and paleontological research was done in the opencast pit Mücheln, Neumark-Nord. During this effort egg-sets of fossil damselflies (Zygoptera, Lestidae) were found in the (?) Upper Middle Eocene brown coal (= MP 13) of the Geiseltal, the first record in this famous site ever found. In contrast to earlier treated specimens originating from the Messel pit near Darmstadt, whose sediments belong stratigraphically to the Lower Middle Eocene (= MP 11), the described new specimen is around 2.5 mio. a younger. The producer of the Geiseltal egg-sets presumably is a member of the family Lestidae, whereas the Messel specimens were made by individuals of the family Coenagrionidae, respectively Platycnemidae. [...] It is striking that the recently found egg-sets are the only evidence for the entire order Zygoptera over decades of collecting in the pits of the Geiseltal district. Corresponding larva or imagines were never observed. This fact may be due to biostratigraphical reasons on the one hand, but also because of the fact that such filigree and small objects may have been overlooked on the dark substratum during fossil excavations. It has to be underlined once more that the endophytic reproductive strategy of certain damselflies is at least successfully practised since the Paleogene until today. A lot of analogs can be observed in the recent Odonatafauna." (Authors) Egg sets of the recent *Lestes virens*, *L. sponsa*, and *Chalcolestes viridis* in the Köln-Bonn region, Nordrhein-Westfalen, Germany are illustrated in detail.] Address: Hellmund, M., Martin-Luther-Universität Halle-Wittenberg, Inst. Geol. Wiss. und Geiseltalmuseum, Domstr. 5, D-06108 Halle/Saale, Germany. E-mail: hellmund@geologie.uni-halle.de

4266. Hellmund, M.; Hellmund, W. (2002): Neufunde und Ergänzungen zur Fortpflanzungsbiologie fossiler Kleinlibellen (Insecta, Odonata, Zygoptera). *Stuttgarter Beiträge zur Naturkunde (B)* 319: 1-26. (in German, with English summary). ["A specimen from the Lower Miocene of Berzdorf (Lusatia, Saxony) was recently discovered during field work in an open coal mine. The other specimens described and figured here have also a Lower Miocene Age (MN5) and originate from the locality Randecker Maar (Southwest Germany). In both sites, Berzdorf and Randecker Maar, the fossil egg-sets are the only evidence for the presence of the Suborder Zygoptera in the fossil insect fauna, due to biostratigraphical reasons. Because of the rapid decomposition of such filigree animals after death, they rarely become fossil. For the first time, egg-sets of the „Lestid Type"

are documented in a monocotyledon leaf. A detailed overview of the hitherto published specimens of fossil egg-sets is compiled." (Authors)] Address: Hellmund, M., Martin-Luther-Universität Halle-Wittenberg, Inst. Geol. Wiss. und Geiseltalmuseum, Domstr. 5, D-06108 Halle/Saale, Germany. E-mail: hellmund@geologie.uni-halle.de

4267. Ishimoda-Takagi, T.; Nakamura, Y.; Takamori, H. (2002): On the tropomyosin isoforms contained in odonate muscles. *Zoological Science (Tokyo)* 19(12): 1436. (in English). [Verbatim: We have investigated heterogeneity of muscle tropomyosin obtained from various species of insects to understand generality of insect tropomyosin isoforms. However, we did not investigate yet tropomyosin obtained from Odonata, which is one of phylogenetically primitive insect and of which wing-beat depends on the action of both direct and indirect flight muscles. In the present study, we examined tropomyosin isoforms included in muscles of 4 species of the odonate, *Anax nigrofasciatus*, *Orthetrum albistylum*, *Pantala flavescens*, and *Calopteryx japonica*. Four to five kinds of tropomyosin isoforms were detected electrophoretically in each species. One kind of tropomyosin isoforms were detected exclusively in the flight muscles of all species. We also examined tropomyosin isoforms included in the larvae of *A. nigrofasciatus* and *C. japonica*. However, the flight muscle specific-isoform was not detected in the larval muscles of both species.] Address: Ishimoda-Takagi, T., Department of Biology, Tokyo Gakugei University, Koganei, Tokyo, 184-8501, Japan

4268. Jödicke, R. (2002): Libellen sammeln auf Reisen: Tips für eine Minimalausrüstung und geeignete Methoden. *Libellennachrichten* 7: 9-11. (in German). [Advice, how to collect Odonata on trips.] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: r.joedicke@t-online.de

4269. Kadoorie Farm and Botanic Garden (in collaboration with Shenzhen Fairy Lake Botanical Garden. The National Forest Park Office of Shenzhen Special Economic Zone Government) (2002): Report of a Rapid Biodiversity Assessment at Wutongshan National Forest Park, Shenzhen Special Economic Zone, China, 16 to 17 May 2001. *South China Forest Biodiversity Survey Report Series* 11: 20 pp. (in English). [Verbatim: Dragonflies. 17 dragonfly species were recorded (tab. 6). The stream at Xiaowutongshan, with more gentle flow and smaller rocks, yielded more species than the cascade-boulder stream at Dawutongshan. Table 6. Dragonflies recorded in Shenzhen Wutongshan National Forest Park on 16-17 May 2001. Sequence follows Schorr et al. (2001a, 2001b). Species 1. *Mnais mneume* 2. *Neurobasis chinensis* 3. *Rhinocypha perforata* 4. *Philloganga vetusta* 5. *Euphaea decorata* 6. *Agriomorpha fusca* 7. *Drepanosticta hongkongensis* 8. *Sinosticta ogatai* 9. *Coelliccia cyanomelas* 10. *Copera marginipes* 11. *Leptogomphus elegans* 12. *Hydrobasileus croceus* 13. *Orthetrum glaucum* 14. *Orthetrum triangulare* 15. *Tramea virginia* 16. *Trithemis aurora* 17. *Zygonyx iris* The most interesting findings were the records of *Drepanosticta hongkongensis* and *Sinosticta ogatai*. These two species of global conservation concern (Fellowes et al., in press) were previously thought to be endemic to Hong Kong (Reels, 2001). *Mnais mneume*, *Philloganga vetusta*, *Agriomorpha fusca* and *Leptogomphus elegans* are globally restricted, and known from a limited

number of sites in Hong Kong (Fellowes et al., in press), but do not appear to be highly restricted within South China. *Zygonyx iris* is also of potential global concern, due to its narrow global range. All dragonfly and damselfly species found in this survey have been recorded in Hong Kong. (Fellowes, J.R., Lau, M.W.N., Dudgeon, D., Reels, G.T., Ades, G.W.J., Carey, G.J., Chan, B.P.L., Kendrick, R.C., Lee K.S., Leven, M.R., Wilson, K.D.P. and Yu Y.T., in press. Wild animals to watch: terrestrial and freshwater fauna of conservation concern in Hong Kong. Memoirs of the Hong Kong Natural History Society 25.)] Address: www.kfbg.org.hk/download/No11Wutongshan0501Web.pdf

4270. Khaliq, A. (2002): Potential of dragonflies as bio-control agents of insect pests of rice. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 1-26. (in English). ["The feeding capacity of 11 dragonfly species on some insect pests of rice in a day (10 hours) was determined by forced feeding. The adults consumed [...] on yellow stem borers, white stem borers, hairy caterpillars, rice skippers, white-backed planthoppers, white leafhoppers, green leafhoppers, rice bugs, cicadellid leafhoppers and grasshoppers (*Oxya* spp.) respectively in 10 hours. The females of all the species proved to be the most voracious feeders as compared with their males, *Orthetrum sabina* was most voracious feeder followed by *O. prunosum neglectum*, *O. triangulare triangulare*, *O. glaucum*, *Crocothemis seivillia*, *O. erythraea*, *Pantala flavescens*, *Palpopleura sexmaculata sexmaculata*, *Sympetrum commixum*, *Acisoma panorpoides panorpoides* and *Trithemis festiva*. The population density of dragonflies was maximum from middle of August to the end of September. However, it was at peak from last week of August to 3rd week of September. The population then declined as the crop matured and the pest population become low. The studies on the seasonal abundance of insect pests of rice, namely rice skippers, grasshoppers, green leafhoppers, white leaf hoppers, hairy caterpillars, rice bugs, rice stem boms and *Poophilus* species were conducted at four localities, i.e. Hajeera, Mandhole, Harighale, and Banipasari during the crop season 1996-97. The population of rice skippers and grasshoppers was somewhat higher than other insect pests. However, the population of different insect pests was higher from the 2nd week of August to the 4th week of September. The population then decreased afterwards as the crop matured. The efforts were made to evaluate the feeding potential of dragonflies in the field cages. They did not show any activity and interest in their prey due to their captivity. In view of this dragonfly attitude, the relationship between the population of dragonflies and insect pests of rice was observed by the multiple linear regression equation. The statistical analysis revealed that the dragonflies had negative regression coefficient with the population density of all the insect pests. It indicated that the pest population was decreased with the corresponding increase in dragonflies population. However, their feeding behaviour was not similar at all the localities but differed from locality to locality." (Author)] Address: Khaliq, A., Dept of Entomology, University of Arid Agriculture, Murree Road, Rawalpindi, Pakistan

4271. Kovacs, T.; Ambrus, A.; Juhasz, P. (2002): Ephemeroptera, Odonata and Plecoptera larvae from the river Tisza in the year of cyanid pollution (2000). *Folia hist.-nat. Mus. matraensis* 26: 169-178. (in Eng-

lish). [This paper provides data on 43 Ephemeroptera, 12 Odonata and 6 Plecoptera species from the Hungarian section of the Tisza River. A total of 12 odonate species is listed, *Erythromma najas*, *Anaciaeschna isosceles*, *Anax imperator*, *Somatochlora metallica*, and *Orthetrum cancellatum* are recorded from the Tisza for the first time.] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary

4272. Kovacs, T.; Ambrus, A.; Juhasz, P. (2002): Ephemeroptera and Odonata larvae from the river Ipoly (Hungary). *Folia hist.-nat. Mus. matraensis* 26: 163-167. (in English). [Records of 7 odonate species are provided from the Hungarian section of the Ipoly River, including *Stylurus flavipes* and *Ophiogomphus cecilia*.] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary

4273. Kumar, A. (2002): Comparative studies on ecoenergetics of nymphs of Anisoptera and Zygoptera (Odonata) in the river Mayurakshi in Santal Pargana, India. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 272-279. (in English). ["Ecological energetics [...] have been estimated from January to December, 2000. The calorific values of anisopteran nymphs was recorded minimum in January (6.004 ± 0.080 K cal/g dry wt.) and maximum in July (6.510 ± 0.555 k cal/g dry wt). The zygopteran nymphs also showed variations and found maximum in June (5.955 ± 0.080 k cal/g dry wt.) and minimum in January (5.515 ± 0.105 k cal/g dry wt.). The possible factors responsible for these fluctuations in energetics have also been extensively discussed in the text." (Author)] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

4274. Kumar, A. (2002): Ecology of larval odonates in lentic freshwater ecosystems. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 115-150. (in English). [Wetlands of Santal Pargana, India; "The present investigation deals with the seasonality, species diversity, richness of species and secondary productivity of larval odonates as well as the various abiotic factors of the surroundings from January to December, 2000. The anisopteran larvae showed trimodal peaks whereas zygopteran larvae exhibited bimodal in their seasonality during the period of study. The species diversity varied between 0.332 to 1.918 bits and between 0.672 and 1.902 bits in anisopteran and zygopteran larvae respectively. The biomass of the larvae was recorded maximum in September (0.553 g/haul) whereas minimum was in April (0.212 g/haul). The net growth of the population varied between 0.0087 g. dry wt./cub. met. /day to 0.0005 g.dry wt./cub.met/day having positive growth in the population. The product moment correlation coefficient for biomass of larval population with different abiotic factors of water were also computed and dissolved oxygen (DO) showed marked correlation with the biomass of the Odonata larvae ($r=0.898$; $p>0.05$)."] (Author)] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

4275. Kumar, A. (2002): Functional morphology of rectal gills and oxygen consumption by dragonfly nymphs in aquatic ecosystems. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 189-206. (in English). ["The present article elaborates the structure of respiratory

organs and oxygen uptake by dragonfly larvae in freshwater ecosystems. Gills were found in branchial chamber which have filled the maximum posterior part of the abdominal cavity. The rectal gills were observed in six rows and recorded their tracheal supply from four to six main longitudinal tracheal trunks. The oxygen consumption by the 3rd and 5th instar nymphs of dragonfly was also estimated and found that oxygen uptake was directly dependent upon the body size and age group of the larvae. The average oxygen uptake (mlO₂/larvae/hr.) was 0.0112 ± 0.0015 for 3rd instar larvae whereas it was 0.0160 ± 0.0020 for 5th instar larvae. It was also observed that the 5th instar larvae utilized about 0.0048 ml O₂/individual/hr. more oxygen than the 3rd instar larvae." (Author)] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

4276. Kumar, A. (2002): Odonate diversity in Jharkhand state with special reference to niche specialization in their larval forms. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 297-314. (in English). [India; factors constraining the habitats of the regionally known 109 species are discussed.] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

4277. Kumar, A. (Ed.) (2002): Current Trends in Odonatology. Delhi: Daya. ISBN: 8170352746: 377 pp. [Contents: Foreword. Preface. 1. Potential of dragonflies as bio-control agents of insect pests of rice/Abdul Khaliq. 2. A Community structure of Odonata of the South West province of Cameroon with the description of *Phyllogomphus corbetae* spec. nov. (Anisoptera: Gomphidae) /G.K. Vick. 3. Endocrinology of Odonata / D.B. Tembhare. 4. Ecology of larval Odonates in lentic freshwater ecosystems/Arvind Kumar. 5. Biology of Odonata of Indian sub-continent: a review/B. Suri Babu and A. Kumar. 6. Conservation assessment and management plan (CAMP) process: a tool to provide strategic guidance for the management of threatened Odonata/B.A. Daniel, Sanjay Molur and Sally Walker. 7. Functional morphology of rectal gills and oxygen consumption by dragonfly nymphs in aquatic ecosystem /Arvind Kumar. 8. Analytical studies on the food and feeding habits of tropically distinct aquatic Odonata larvae of Udhwa Lake in Santal Pargana, Jharkhand, India/ Chandan Bohra. 9. Odonata diversity in Western Himalaya, India/M. Prasad. 10. Description of territoriality and reproduction of *Agriocnemis pygmaea* (Rambur, 1842) (Zygoptera: Coenagrionidae) / B. Suri Babu. 11. Comparative studies on eco-energetics of nymphs of anisoptera and zygoptera (Odonata) in the river Mayurakshi in Santal pargana, India / Arvind Kumar. 12. Synopsis of progress in taxonomical studies on Odonata in India/A.R. Lahiri. 13. Odonata diversity in Jharkhand state with special reference to Niche specialization in their larval forms/Arvind Kumar. 14. Trophic biology and energy contents of larval Odonates]

4278. Kumari, P. (2002): Species composition and seasonal fluctuations in biomass of zygopteran nymphs in a wetland of Santal Pargana, India. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 329-356. (in English). ["The present investigation has been made on the systematics, faunistic composition, and community structure and biomass estimation of zygopteran larvae.

During the present observation, altogether 22 species belonging to 9 genera under 4 families were recorded. The maximum production of the larvae was found in summer and monsoon months when positive increase in biomass was recorded. The maximum production rate was recorded in October (0.060 g/cub m/day) and minimum (0.004 g/cub m/day) in January. It was also found that the production of these larvae is governed by complex extrinsic and intrinsic physical, chemical and biological factors discussed in the text." (Author) Larvae of the following species are illustrated: *Elatoneura campioni*, *Copera marginipes*, *Pseudagrion rubriceps*, *P. laidlawi*, *Ceriagrion coromandelianum*, *Ischnura aurora*, *I. senegalensis*, *Rhodischnura nursei*, *Agriocnemis pygmaea*, *Bayadera indica*, *Neurobasis chinensis*, and *Rhinocypha unimaculata*.] Address: Kumari, Poonam, Dept of Zoology, S.G. Women's College, Sheikpura-811105, Bihar, India

4279. Kunz, B. (2002): Libellen und Literatur XXX: Tombo - Libellen in Kinderbüchern. Libellennachrichten 7: 8-9. (in German). [Extract from three books (1) *Der Mühlendorf*. Folke Tegethoff. F. Schneider-Verlag, 1987, ISBN 3-505-09635-0, (2) *Da ist ein Haar in meinem Dreck - Eine Wurmgeschichte*. Gary Larson, Goldmann, 8/2000, ISBN 3-442-30819-4, and (3) *Zwei Ameisen reisen nach Australien*. Jackie Niebisch, Ravensburger, 1999, ISBN 3-473-34995-X.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

4280. Lahiri, A.R. (2002): Synopsis of progress in taxonomical studies on Odonata in India. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 280-296. (in English). [Basing on Fraser odonate fauna of the British India, the author compiles and briefly discusses succeeding taxonomic additions and amendments of the list of Indian Odonata. App. 70 species have been described as new since the publication of Fraser's handbook and referring to the geographic scope of this book.] Address: Lahiri, A.R., Zoological Survey of India, "M" Block New Alipur, Calcutta - 700 053, India

4281. Lang, H.; Lang, C.; Raab, R. (2002): Erfassung der Quelljungfervorkommen auf Wiener Stadtgebiet. 13 pp. (in German). [Detailed documentation of records of *Thecagaster bidentata* and *Cordulegaster heros* in Vienna, Austria.] Address: Raab, R., Anton Bruckner-Gasse 2/2, A-2232 Deutsch-Wagram, Austria. E-mail: rainer.raab@gmx.at. <http://www.wien.gv.at/ma22/pool/doc/quelljungfer.pdf>:

4282. Lempert, J. (2002): Libellen und Literatur XXIX: Tombo - Libellen in Japan 1. Libellennachrichten 7: 7-8. (in German). [Extract from the book "Lafacadio Hearn: Izumo. Blicke in das unbekannte Japan. Frankfurt a.M. 1910." A note on catching dragonflies by children, and a note on wooden dragonflies as a toy.] Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany

4283. Lienenbecker, H.; Möller, E. (2002): Das Hücker Moor bei Spenge (Kreis Herford/NRW). Zur Naturgeschichte eines ehemaligen Torfstichgebietes. Berichte des naturwissenschaftlichen Verein für Bielefeld und Umgebung 42: 249-313. (in German). [Biological data referring to the Hücker Moor, located near Spenge, Nordrhein-Westfalen, Germany, are compiled as completely as possible, and the history of its investigation is outlined. Odonata (p. 295) have been not surveyed

systematically. A record of *Lestes virens* is very briefly discussed, and some more common species are mentioned.] Address: Möller, E., A.B.Ö.L., Biologiezentrum Bustedt, D-32120 Hiddenhausen, Germany. E-mail: eckhard.moeller@teleos-web.de

4284. Liljaniemi, P.; Vuori, K.-M.; Ilyashuk, B.; Luotonen, H. (2002): Habitat characteristics and macroinvertebrate assemblages in boreal forest streams: relations to catchment silvicultural activities. *Hydrobiologia* 474: 239-251. (in English). ["We compared the stream habitat characteristics and macroinvertebrate assemblages of boreal headwater streams in both the Finnish and the Russian parts of a single river basin, the Koitajoki River. Over the last 50 years, the Finnish side of the catchment has been managed using modern forestry techniques, whereas Russian side has remained nearly unexploited and is near to its natural state. Differences in silvicultural activities were observed to contribute to differences in habitat structure. The channel habitats were in fairly natural state in the Russian reference streams, whereas the impacted Finnish sites were cleared and straightened. In comparison with the impacted channels, the abundance of coarse woody debris (CWD) was 10-100-fold higher in the reference streams. Implications on the forestry-induced deterioration of water quality were also observed. On the contrary, only small differences in macroinvertebrate assemblages were detected. Despite the lower amount of retentive structures (CWD), significantly higher relative abundance of shredders was observed in the forestry-impacted streams. Otherwise the zoobenthic communities were quite similar in the two subcatchments. [...]" No reference to the Odonata is made in the main text. In an appendix, 4 odonate species are listed: *Calopteryx virgo*, *Cordulegaster boltonii*, and *Somatochlora metallica* from both countries, *Platycnemis pennipes* from Finland only.] Address: Liljaniemi, P., Dept Biol. & Envir. Sci., Univ. Jyväskylä, P.O. Box 35, FIN-40351 Jyväskylä, Finland. E-mail: liljanie@cc.jyu.fi

4285. Long, S.M.; Abang, F.; Rahim, K.A.A. (2002): The macroinvertebrate community of the fast flowing rivers in the Crocker Range National Park Sabah, Malaysia. ASEAN Review of Biodiversity and Environmental Conservation (ARBEC) July-September 2002: 8 pp. (in English). ["The macroinvertebrate community of the fast flowing rivers of the Crocker Range Park examined consists mainly of insects. All the six rivers surveyed demonstrated excellent water quality. The assemblages of taxa reported from the study sites are considered as that typical of the macroinvertebrate fauna in tropical rivers. Out of the existing ten orders of insects that contain aquatic species, a total of 7 orders of aquatic insect species were encountered in the rivers surveyed. These are Ephemeroptera, Odonata, Plecoptera, Hemiptera, Coleoptera, Trichoptera and Diptera. In addition to these insects, the hexapodan Collembola was also encountered. The overall macroinvertebrate density ranges from 71 to 303 individuals per 1m sq and all sampling sites were found to sustain at least three groups of taxa with the exception of Sg. Tikolud, which only contains the dipteran chironomids. The dipteran chironomid fauna was dominant and found at all stations and forms the highest density of up to 250 individuals per m² in Sg. Tandulu and Balayo." (Authors)] Address: www.arbec.com.my/pdf/art12julysep02.pdf

4286. Mackenzie Dodds, R. (2002): Goodbye National Dragonfly Museum ... welcome to the Dragonfly Project. *Dragonfly News* 41: 22. [Report on the unfavourable situation of The National Dragonfly Museum, Ashton Mill, UK, and current perspectives.] Address: Mackenzie Dodds, R., The National Dragonfly Museum, Ashton Mill, near Oundle, Peterborough PE8 5LZ, UK

4287. Mancinelli, G.; Costantini, M.L.; Rossi, L. (2002): Cascading effects of predatory fish exclusion on the detritus-based food web of a lake littoral zone (Lake Vico, central Italy). *Oecologia* 133: 402-411. (in English). ["An enclosure experiment was carried out in the reed-dominated littoral zone of a volcanic lake (Lake Vico, central Italy) to test whether the impact of predatory fish on benthic invertebrates cascades on fungal colonisation and breakdown of leaf detritus. The abundance, biomass, and Shannon diversity index of the invertebrate assemblage colonising *Phragmites australis* leaf packs placed inside: (1) full-exclosure cages, (2) cages allowing access only to small-sized fish predators, and (3) cageless controls, were monitored over a 45-day period together with the mass loss and associated fungal biomass of leaf packs. The species composition of the fungal assemblage was further assessed at the end of the manipulation. In general, invertebrate predators did not show any significant response to fish exclusion, either on a trophic guild or on a single taxon level. In contrast, the exclusion of large predatory fish induced a diverse spectrum of changes in the abundance and population size-structure of dominant detritivore taxa, ultimately increasing the biomass and Shannon diversity index of the whole detritivorous guild. These changes corresponded with significant variations in leaf detritus decay rates as well as in the biomass and assemblage structure of associated fungal colonisers. Our experimental findings provide evidence that in Lake Vico effects of fish predators on invertebrate detritivores influence the fungal conditioning and breakdown of the detrital substrate. We conclude that in lacustrine littoral zones predator-driven constraints may structure lower trophic levels of detritus-based food webs and affect the decomposition of leaf detritus originated from the riparian vegetation." (Authors) The biomass of "Odonata ssp (larval stages)" totalled to 0,66%.] Address: Rossi, L., Department of Genetics and Molecular Biology, Ecology Area, University of Rome "La Sapienza", Via dei Sardi 70, I-00185 Rome, Italy. e-mail: loreto.rossi@uniroma1.it

4288. Michal, A., (2002): Feeding ecology of Central European bat community. IXth European Bat Research Symposium Le Havre 26-30 August 2002: 22- (in English). ["Trophic ecology of 16 bat species living sympatrically in SE Czech Republic was studied by means of faecal analysis of netted animals. Food supply was studied using a light trap, sweeping and beating. The collected material enabled to assess main foraging strategies of bats, detailed seasonal dynamics of trophic niches and their overlaps in sympatry, foraging success of particular species etc. *E. serotinus*, *E. nilssonii*, *M. brandtii*, *M. mystacinus*, *M. daubentonii*, *N. leisleri*, *N. noctula* and *P. pipistrellus* s.l. can be classified as aerial hawkers, while *M. myotis* is a ground gleaner. Some food items (Odonata and Ephemeroptera larvae) in the diet of *M. daubentonii* indicate the use of water-surface gleaning. *M. nattereri*, *M. emarginatus*, *M. bechsteini*, *P. auritus* and *P. austriacus* are foliage gleaners. Two species do not fit well in any of these groups and their

groups and their strategies can be called slow hawking (*B. barbastellus*) or slow hawking/hovering/gleaning (*R. hipposideros*). Comparing food supply and the diets of bats, we can state opportunistic foraging of most species in the frame of their morphological and echolocation constraints. On the other hand, a trend of selectivity was found in several species which preferred hunting of relatively big species of Lepidoptera in summer, although small species distinctly prevailed in the food supply. Considerable differences were recorded in the foraging success rate, flying activity and weight changes between *P. auritus* and *M. daubentonii* - representatives of the groups applying different foraging strategies - foliage gleaning and aerial hawking. Compared to *M. daubentonii*, *P. auritus* is able to forage more effectively very early in the spring and late in the autumn, it shows higher flying activity during these periods and its weight grows earlier in spring." (Author)] Address: Michal, A., Agency of Nature Conservation and Landscape Protection of the Czech Republic, Kali nická 4-6, CZ-130 23 Praha, Czech Republic. E-mail: andreas@nature.cz

4289. Mitra, T.R. (2002): Note on zoogeography of Odonata (Insecta) of Nicobar Islands, Indian Ocean. *Rec. zool. Surv. India* 100(3/4): 183-188. (in English). [32 species are checklisted and their biogeographic affinities are discussed.] Address: Mitra, T.R., 208 Raja Ram Mohan Roy Rd, Calcutta-700 008, India

4290. Neumann, M.; Dudgeon, D. (2002): The impact of agricultural runoff on stream benthos in Hong Kong, China. *Water Research* 36: 3103-3109. (in English). ["We investigated three small streams in the New Territories of Hong Kong, China. In each stream, we compared the benthic macroinvertebrate fauna of one site immediately upstream of an area of agricultural land (market gardening) with a second site immediately downstream. Each pair of sites was <300m apart. Samples were taken at the end of the dry season (March 2000) and again (April 2000) just after heavy rainfall had caused runoff from the fields. The total number of taxa at the downstream sites was the same as that in the upstream sites in March. In April, the total taxon richness was lower at the downstream localities although this difference was statistically significant in only one stream. The acute toxic effect of runoff became clearer when focusing on the group of sensitive benthic fauna. The grouping was done by ranking the relatively physiological tolerance to organotoxins following the relevant literature (*Bull. Environ. Contam. Toxicol.* 67 (2001) 360). All streams showed a significant downstream decrease in the number of sensitive taxa in April, while in two of three streams the number of relatively tolerant taxa increased. Ordination (by n-MDS) confirmed this pattern. It revealed a marked temporal trend in all streams resulting from a decrease of sensitive taxa downstream that was not apparent at the upstream sites. The size of the observed effects varied among streams, and may have reflected differences in the composition of the agricultural runoff." (Authors) 7 odonate taxa are listed in table 1 including *Euphaea decorata* and *Zygonyx iris*.] Address: Naumann, M., Department of Limnology, Zoological Institute, Technical University Braunschweig, Fasanenstrasse 3, D-38092 Braunschweig, Germany

4291. Nikula, B.; Sones, J.; Stokes, D.; Stokes, L. (2002): *Beginner's guide to dragonflies*. Little, 1 Brown

& Co., Boston-New York-London. ISBN 0-316-81679-5: 161 pp. (in English). [Photographic identification guide, covering app. 115 North American odonate species. For each species are provided a concise description, notes on behaviour, information on habitat and flight season, a colour portrait, and a distribution map.] Address: Nikula, B., 2 Gilbert Lane, Harwich Port, MA 02646, USA. e-mail: odenews@capecod.net

4292. NSW Fisheries (2002): Adams emerald dragonfly *Archaeophya adamsi*. *Fishnote NSW* 1072 www.fisheries.nsw.gov.au/thr/species/pdf/fn-adams-emerald-dragonfly.pdf: 2 pp. (in English). [*A. adamsi* is one of Australia's rarest dragonflies. "Only five adults have ever been collected, and the species is only known from a few sites in the greater Sydney region. Some remaining areas of habitat are under threat from urban, industrial and agricultural development. Adams emerald dragonflies are listed as a vulnerable species in NSW." The species is depicted and described, habitat and ecology are briefly outlined, the known localities are mapped, and conservation action measures are proposed.] Address: Threatened Species Unit, Port Stephens Fisheries Centre Private Bag 1, Nelson Bay, NSW 2315, Australia. E-mail tsadmin@fisheries.nsw.gov.au. Website: www.fisheries.nsw.gov.au

4293. Oglęcki P., Popek, Z., Wasilewicz M. (2002): Występowanie fauny bezkręgowej i pierwotniaków w zróżnicowanych morfologicznie siedliskach rzeki Wkry. In: Kozłowski S., Kuśmierczyk J., Kamola M (red.), *Bug. Rzeka która łączy. Ekologiczny Klub UNESCO - Pracownia na Rzecz Bioróżnorodności, Piaski*: 123-129. (in Polish). [The occurrence of invertebrates and protozoans in morphological differentiated habitats in the River Wkra. Three odonate taxa are listed.] Address: Oglęcki P., Katedra Inżynierii Wodnej i Rekultywacji Środowiska SGGW Warszawa, Poland

4294. Ott, J. (Red.) (2002): Abstracts of the 21th meeting of the "Gesellschaft deutschsprachiger Odonatologen", 22.3.-24.3.2002, Worms. *Gesellschaft deutschsprachiger Odonatologen*: 82 pp- (in German / English). [Abstracts of the 21th meeting of the "Gesellschaft deutschsprachiger Odonatologen", 22.3.-24.3.2002, Worms: Dr. Rüdiger Mauersberger, Petra Salm & Stefan Bausch (Steinhöfel u.a.): "Zu Verbreitung und Habitatspektrum von *Aeshna viridis* in Nord-Brandenburg" Klaus-Jürgen Conze (Essen): "Hinter dem Horizont der FFH-Libellen - Überlegungen zu einer bundesweiten Datensammlung" Holger Hunger (Reute): "GIS-gestützte Untersuchungen zu den FFH-Libellen Baden-Württembergs" Martin Schorr (Zerf): "Repräsentativität der Odonata: Anhang II der FFH-Richtlinie" Lecures I: Dr. Frank Suhling & Dr. Andreas Martens: "Trockenflüsse und Folienteiche - Libellenforschung in Namibia" Peter Knaus & Dr. Hansruedi Wildermuth: "Ortstreue und Mobilität in zwei alpinen Metapopulationen von *Somatochlora alpestris*" Jochen M. Müller & Dr. Heiko Bellmann: "Coenagrion hylas und das Tiroler Lechtal" Prof. Dr. Eberhard Schmidt: "Auswirkungen der verregneten Sommer 2000 und 2001 auf die Odonatenfauna" Christoph Willigalla: "Die Libellenfauna der Regenrückhaltebecken der Stadt Münster" Franz-Josef Schiel: "Emergenzuntersuchungen an zwei Populationen von *Ophiogomphus cecilia* in der baden-württembergischen Oberrheinebene" Heiko Stuckas: "Gomphus vulgatissimus und *Ophiogomphus cecilia* an der Schwarzen Elster" Dr. Pawel Buczynski & Grzegorz Tonczyk: "Gefähr-

dete Libellen in Polen - Stand 2001" Dr. Dick Groenendijk: "Habitat characteristics and conservation of the Beautiful Demoiselle (*Calopteryx virgo*) in the Netherlands" Robert Ketelaar: "Habitat choice of the Norfolk damselfly (*Coenagrion armatum*) in Sweden, Norway and The Netherlands" Dr. Gilles Jacquemin & Dr. Jean-Pierre Boudot: "Libellen und ihre Biotope in Marokko" Dr. Hansruedi Wildermuth: "Raumbezogenes Fortpflanzungsverhalten der Arktischen Smaragdlibelle (*Soma-tochlora arctica*)"

Evening-Presentations: Hans-Joachim Clausnitzer: "Afrikanische Waldlibellen" Bernd Kunz: "Libellenimpressionen aus Tunesien" Dr. Wolfgang Zessin: "Bericht über das SIO-Symposium in Novosibirsk" und Infos zum SIO-Symposium in Schwerin 2004 Dr. Reinhard Joedicke: "Bericht vom WDA-Symposium in Schweden" Dr. Reinhard Jödicke & Bernd Kunz: "Gefangen zwischen Meer und Wüste: Endemiten im Maghreb"

Lectures II Gerrit Joop: "Gestresste Libellen: Auswirkungen natürlicher Feinde" Dirk Johannes Mikolajewski: "Fressen oder gefressen werden: Prädationsvermeidung bei *Leucorrhinia*-Larven" Dr. Andreas Martens & Dr. Hansruedi Wildermuth: "Blutsauger auf den Flügeln: Gnitzen als Parasiten europäischer Libellen" Prof. Dr. Philip Corbet: "Recent developments in odonatology" Rainer Raab: "Renaturierungsmaßnahmen an Flüssen im Stadtgebiet von Wien: Libellen als Bioindikatoren zur Überprüfung ihrer Wirksamkeit" Milen Marinov: "Ecological niches and adaptation of dragonflies to their habitats in Bulgaria" Klaus Guido Leipelt: "Im Osten nichts Neues? Verteilungsmuster von *Cordulegaster*-Arten auf griechischen Inseln" Andre Günther: "Reproduktionsverhalten von *Neurobasis kaupii*" Dr. Jürgen Ott: "Brauchen Libellenlarven wirklich Wasser?" Dr. Wolfgang Zessin: "Eine neue interessante Libellengattung (*Trigonophlebia*, Anisozygoptera) aus dem Lias Mitteleuropas" Cornelia Geppert: "Ruheplatzverhalten von *Calopteryx splendens* in der Nacht"

Poster-Presentations: Thomas Endlein, Erhard Strohm & Prof. Dr. H. J. Poethke: "Reproduction in a heterogeneous landscape - The consequences of habitat quality for reproduction and larval development in a damselfly" Vincent J. Kalkman, Wolfgang Lopau & Gert Jan van Pelt: "Mapping Turkish dragonflies" Dietrich Kern: "Libellen in spätmittelalterlichen Handschriften" Gerold Laister: "Wieder vital? - Libellenbestand sieben Jahre nach der Renaturierung" Tammo Lieckweg, Dr. Oliver-D. Finch & Rolf Niedringhaus: "Langjährige Änderungen der Libellenfauna einer ökologisch restaurierten Agrarlandschaft" Uwe Lingenfeider: "Faunistisch-ökologische Untersuchungen an Fließwasserlibellen der Wieslauter (Pfalz)" Massimo Salvarani, Prof. V. Parisi, Maurizio Pavesi, Maria Elena Ferrari: "Odonata community on Derivatore del Canale Naviglio Taro" Noemi Szállassy, Erika Bárdosi, Zoltán D. Szabó, Beáta Nagy, Prof. Dr. György Devai: "Survival and mating success in males of *Libellula fulva* Müller, 1764" Prof. Dr. Eberhard Schmidt: "Emergenzprofile für *Gomphus vulgatissimus* am Dortmund-Ems-Kanal im Westmünsterland" Prof. Dr. Eberhard Schmidt: "Winteraufenthalt von *Sympecma fusca* am Brutgewässer im Westmünsterland" Barbara Thomas: "Libellen im Kreis Viersen (NRW): Früher Beginn von Flugzeit und Reproduktion in den 90er Jahren" Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

4295. Parr, A. (2002): Migrant & Vagrants 2002. *Dragonfly News* 41: 16-17. (in English). [Great Britain; *Erythromma viridulum*, *Aeshna mixta*, *Anax parthenope*, *Orthetrum brunneum* (at Guenersey), *Sympetrum fonscolombii*, *S. vulgatum*] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4296. Prasad, M. (2002): Odonata diversity in Western Himalaya, India. In: Kumar, A. (Ed.): *Current trends in odonatology*. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 221-254. (in English). [Western Himalaya is defined as the region ranging from Jammu and Kashmir, Himachal Pradesh to Kumaon and Garhwal in Uttar Pradesh. A total of 155 taxa is compiled in a table. Typical habitats in the region are characterised by odonate species.] Address: Prasad, M.; Zool. Surv. India, M-Block, New Alipore, Calcutta-700053, India

4297. Ring, S.; Kraus, F. B.; Schierwater, B.; Hadrys, H. (2002): Evolutionary ecology and genetic diversity measures in dragonflies. *Poster, Deutsche Zoologische Gesellschaft 2002*: (in English). ["Results and discussion: The microsatellite analysis for *O. coerulescens* revealed 5 private alleles exclusively present in the CdV population. These alleles were lost after the dredging and a significant mode shift in allele frequencies took place which is typical for bottleneck situations (Fig. 1, Levins 1970; Luikart et al. 1998). Despite considerable gene flow between populations the alleles could not be recovered by the surrounding subpopulations (F-statistic). Due to the fact that the CdV population recovered very fast (2 generations) this cryptic loss of genetic diversity will remain undetected by traditional monitoring techniques. Sequence data for *C. splendens* and *C. haemorrhoidalis* populations on the contrary showed no to very little (<0.5%) intraspecific genetic diversity despite a broader geographic scale including various geographic phenotypes (Tab. 1). On the supposed subspecies level sequence divergence was also minimal, whereas depending on the marker a genetic variation of up to 15.7% could be detected among species (Fig. 2). The genetic homogeneity of all 3 markers tested is not congruent with data for other species and opposes our expectation based on the high number of geographical phenotypes within this family compared to other Odonata groups (Vogler & DeSalle 1994, Watanabe & Chiba 2001). The postglacial recolonization hypothesis presents a possible explanation for the low sequence divergence on the intraspecific and subspecies level suggesting recent habitat shifts and rapid radiation of the European *Calopteryx* clade (Hewitt 1993)."] (Authors)] Address: Ring, Sabine, ITZ, Ecology & Evolution, TiHo Hannover, Bünteweg 17d, 30559 Hannover, Germany. (see: <http://ecolevol.de/posters/AGSchi6-sabine.ppt>)

4298. Roy, S.P. (2002): Trophic biology and energy contents of larval odonates with special reference to their role in the management of aquatic ecosystems. In: Kumar, A. (Ed.): *Current trends in odonatology*. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 315-328. (in English). ["The present article deals with the seasonal variations in the energy contents, productivity in terms of g/m²/month/year, food and feeding biology and foraging ratio (FR) of *Mesogomphus lineatus* Selys, *Cordulegaster* sp. (Anisoptera: Odonata) and *Ischnura* sp. (Zygoptera : Odonata) of a fish pond of Bhagalpur (Bihar, India). The maximum calorific values of *M. lineatus*"]

tus Selys and Cordulegaster sp. (5.487 ± 0.003 Kcal/g dry weight and 5.430 ± 0.00 Kcal/g ash-free dry weight) was recorded in September. However, the minimum calorific value (4.133 ± 0.09 Kcal/g dry weight) was recorded in January. The calorific values of *Ischnura* sp. (3.706 ± 0.032 Kcal/g dry weight and 3.470 ± 0.034 Kcal/g ash-free weight) was measured. It was investigated that the calorific values of these larvae varied from instar to instar, month to month and upon the physiological state of the animals. The annual productivity was measured as 2.414g dry wt/cub. met/year with monthly productivity being 0.210 g dry wt/cub. met/month. The gut content analysis of the larval odonates revealed that the Rotifera, Cladocera, Rhizopoda and aquatic insects form the maximum percentage of food items in *Ischnura* sp. but in *M. lineatus* Selys and *Cordulegaster* sp. Rhizopoda were recorded in very small quantity and other food items such as Rotifera, Cladocera, Copepoda, aquatic insects and other animal tissues were found in maximum percentage in the foregut. Due to the utilization of food present at various trophic levels of the food chains, they have regulatory impact in the management of the aquatic ecosystems as well as their mere presence indicates healthy and non-contaminated environments." (Author)] Address: Roy, S.P., University Department of Zoology, T.M. Bhagalpur University, Bhagalpur-812007, Bihar, India

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polyphenol concentration was followed by an increase in invertebrate densities. The majority of the species observed in the detritus belongs to the collector group that was dominant after the 7th and 14th days in the rainy and dry seasons, respectively." (Authors)] Address: Henry, R., Departamento de Zoologia, Instituto de Biociências, Unesp, C.P. 510, CEP 18618-000, Botucatu, São Paulo, Brazil. E-mail: rhenry@ibb.unesp.br

4301. Suri Babu, B.; Kumar, A. (2002): Biology of Odonata of Indian sub-continent: a review. In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 151-168. (in English). ["A review on the biological studies on Odonates during 1985-2001 from Indian subcontinent is provided. The information on the egg stage, larval growth, larval habit and habitat, emergence, reproductive behaviour of adults, parasites and predators of adults have been dealt in detail in the text." (Authors)] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

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4303. Taylor, P. (2002): Small Red-eyed Damselfly in Norfolk. *Dragonfly News* 41: 20. (in English). [VIII 2001, UK, Norfolk, *Erythromma viridulum*] Address: Taylor, Pam, Decoy Farm, Potter Heigham, Norfolk, NR29 5LX, UK

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4305. Vick, G.K. (2002): A community structure of Odonata of the South-West Province of Cameroon with the description of *Phyllogomphus corbetae* spec. nov. (Anisoptera: Gomphidae). In: Kumar, A. (Ed.): Current trends in odonatology. Daya Publishing House. Delhi. ISBN 81-7035-274-6: 27-82. (in English). ["A checklist of the dragonflies of the South-West Province of Cameroon, based upon field work undertaken between 1995 and 1998, and a survey of historical records, is given. Notes on seasonal occurrence, habitat requirements and taxonomy are provided. As new is described: *P. corbetae* sp.n. (holotype male. Kumba, outlet stream from Barombi Mbo, 20-IX-1997; allotype female: Limbe, Bimbia, Elephant River, 4-VII-1996)."] (Author) This is a quite curious paper for it was already published as Vick, G.S. (1999): A checklist of the Odonata of the south-west province of Cameroon, with description of *Phyllogomphus corbetae* spec. nov. (Anisoptera: Gomphidae). *Odonatologica* 28(3): 219-256. Compared with the 1999 paper, contents remained unchanged, tables were slightly rearranged within the text.] Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, United Kingdom

4306. Zimmermann, W. (2002): Libellen (Odonata). In: M. Görner, [Ed.], Thüringer Tierwelt. ArbeitsGr. Artenschutz Thüringen, Jena, ISBN 3-00-010168-3: 263-273. (in German). [The book intends to introduce into biodiversity of Thuringia, Germany. The chapter on the Odonata gives a sound impression on the biology of the dragonflies with special emphasize on the regional situation. The paper contains also remarks on conservation measures, the history of odonatological research in Thuringia, and a checklist of the 61 odonate species known to be found in this Federal State.] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

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4307. Anderson, A.R.; Petranka, J.W. (2003): Odonate predator does not affect hatching time or morphology of embryos of two amphibians. *Journal of Herpetology* 37(1): 65-71. (in English). ["Many larval amphibians respond to predators by developing broad tail fins that increase maneuverability and reduce predation risk. Recent evidence also indicates that amphibian embryos may adaptively alter their time at hatching in the presence of a predator, but the generality of this phenomenon is unknown. We examined whether embryos of the Wood Frog (*Rana sylvatica*) and Spotted Salamander (*Ambystoma maculatum*) would alter hatching time, hatching synchrony, or body morphology in the presence of a larval predator. Using a 2 × 2 factorial design, we exposed developing embryos to four experimental treatments that varied in predation risk: unfed *Anax junius* (an odonate predator), fed *A. junius*, conspecific larvae, or water. Response variables were central tendency (mean or median) and variation (CV or range) for hatch time and developmental stage and four linear body dimensions that were used to detect changes in morphology. Effect sizes were small (< 0.36), and none of the response variables differed significantly among treatments, suggesting that embryos of these species do not respond strongly to the presence of a predator. This and other studies indicate that the response of

amphibian embryos to predators varies both within and between taxa, although the adaptive significance of such variation is poorly resolved. We discuss the possible roles of developmental constraints and natural selection in explaining the lack of strong responses of *Rana* and *Ambystoma* embryos to a dangerous larval predator." (Authors)] Address: Petranka, J.W.; Department of Biology, University of North Carolina, Asheville, North Carolina 28804, USA. E-mail: petranka@cs.unca.edu

4308. Ballantyne, A.P.; Brett, M.T.; Schindler, D.E. (2003): The importance of dietary phosphorus and highly unsaturated fatty acids for sockeye (*Oncorhynchus nerka*) growth in Lake Washington a bioenergetics approach. *Can. J. Fish. Aquat. Sci.* 60: 12-22. (in English). ["Juvenile sockeye salmon (*Oncorhynchus nerka*) in Lake Washington experience very high growth rates, but the mechanisms regulating their growth rates are poorly understood. The potential for food quality limitation of growth was tested using a coupled bioenergetics and mass balance model. Sockeye and zooplankton prey species were analyzed for their fatty acid composition. Ratios of phosphorus to carbon (P:C) for both sockeye and zooplankton were obtained from the literature. Based on sockeye stomach contents and zooplankton weights, diets of zooplankton biomass were calculated and monthly values of specific fatty acids and P:C ratios in the diet were derived. An increase in highly unsaturated fatty acids, especially in the liver, was observed with increased fork length up to smoltification size, with a subsequent decrease in smolts and kokanee. Measurements of docosahexaenoic (DHA) in daphnids were significantly lower than in cyclopoids. Model predictions suggest that sockeye are not limited by the availability of phosphorus or eicosapentaenoic acid (EPA) in their diet but may experience limited growth because of DHA deficiencies. Thus, the ability and efficiency of sockeye at elongating 18:3 ω 3, 18:4 ω 3, and EPA to DHA may be of critical importance to lacustrine growth and production. ... Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) contents (% total fatty acids) of various freshwater and marine prey taxa of salmonids (revised from Higgs et al. 1995 and references therein). Odonata: 9.4%." (Authors); Address: Ballantyne, A.P. Department of Civil and Environmental Engineering, University of Washington, Seattle, WA 98195, USA. E-mail: apb14@duke.edu. <http://faculty.washington.edu/mtbrett/2003BallantyneCJFAS.pdf>

4309. Bechly, G.; Dietl, G.; Schweigert, G. (2003): A new species of *Stenophlebia* (Insecta: Odonata: Stenophlebiidae) from the Nusplingen Lithographic Limestone (Upper Jurassic, SW Germany). *Stuttgarter Beiträge zur Naturkunde, Serie B (Geologie und Paläontologie)* 338: 1-10. (in English with German summary). ["A new dragonfly species, *Stenophlebia rolffuggeri* n. sp. (Odonata: Stenophlebiidae), is described from the Nusplingen Lithographic Limestone in SW Germany. It is the fourth dragonfly species recorded from this Upper Jurassic fossil locality." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

4310. Bedjanic, M.; Salamun, A. (2003): Large golden-ringed dragonfly *Cordulegaster heros* Theischinger 1979, new for the fauna of Italy (Odonata: Cordulegasteridae). *Natura Sloveniae* 5(2): 19-29. (in English with Slovenian summary). ["The species has been re-

corded at three localities in the extreme eastern part of the Friuli-Venezia Giulia region, north-eastern Italy, thus bringing the number of Italian dragonfly species to 89. The distribution of *C. heros* in Slovenia and Italy is mapped and discussed within the zoogeographical point of view. Additionally, the collected faunistic data on other dragonfly species and sympatric occurrence of endangered frog species *Rana latastei* Boulenger are given. Due to inclusion of *C. heros* and *R. latastei* to the Annexes II and IV of the Habitat Directive of EU, the conservation of their habitats in Italy and western Slovenia is proposed within the European network of protected areas NATURA 2000." (Authors)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

4311. Bergsten, J.; Ekkerholm, P.; Hellquist, S.; Hilszczanski, J.; Nilsson, A.; Pettersson, R.; Werner, T. (2003): Insekter och spindeldjur från Romelsön. *Natur i Norr*, Umeå 22(2): 65-87. (in Swedish). [Six odonate species collected 20-22 June 2003 at the island of Romelsön, Sweden are listed.] Address: Johannes.Bergsten@eg.umu.se

4312. Bojsen, B.H.; Jacobsen, D. (2003): Effects of deforestation on macroinvertebrate diversity and assemblage structure in Ecuadorian Amazon streams. *Archiv für Hydrobiologie* 158(3): 317-342. (in English). ["The effects of deforestation on stream macroinvertebrate faunas were studied at twelve sites located in an area of fragmented rainforest in the Ecuadorian Amazon. The most pronounced changes in habitat characteristics with reduced riparian canopy cover were a reduced amount of litter detritus on the streambed and an increased periphyton biomass. Alpha diversity decreased with the degree of deforestation. Beta diversity was also lower in deforested than forested sites, indicating that macroinvertebrate composition among the forested sites were more heterogeneous than among the deforested sites. Total macroinvertebrate density increased with decreasing canopy cover, and with increasing periphyton biomass. The relative density of Ptilodactylidae, Tanypodinae, Euthyplociidae, Libellulidae and Megapodagrionidae were positively related with either canopy cover or litter detritus. A marked effect on the trophic structure of the macroinvertebrate fauna was found. The relative density of collectors decreased with canopy cover and the amount of litter detritus, while the relative density of predators increased. Shredder abundance was low and unrelated with canopy cover. Temporal variability in the macroinvertebrate data were greater in the deforested sites than in the forested sites. Using two-way indicator species analysis (TWINSPAN) and principal components analysis (PCA) riparian canopy cover was found important structuring the macroinvertebrate assemblages. Litter detritus associated with particulate organic material was the main variable related with the PCA ordination axes." (Authors)] Address: Jacobson, D.; Freshwater Biological Laboratory, University of Copenhagen, 51 Helsingorsgade, DK-3400 Hillerød, Denmark

4313. Borkowski, A. (2003): Obserwacje entomologiczne (Lepidoptera, Odonata) w rezerwacie przyrody "Torfowisko pod Zielencem" w Sudetach. *Przyroda Sudetów Zachodnich* 6: 119-129. (in Polish, with German summary). [Entomological observations (Lepidoptera, Odonata) in the nature conservation area of "Torfowisko pod Zielencem" (formerly: "Seefelder bei Reinerz") in

the Sudeten. Compared with the odonate fauna documented by S. Mielewczyk (1969): Odonatenlarven einiger Sphagnum-Moore Polens. *Bull. entomol. Pologne* 39(1): 2-81, the species composition remained unchanged. All the typical peat bog species also could be found in 1998-2002. *Aeshna subarctica elisabethae*, *Somatochlora alpestris*, *S. arctica*, and *Leucorrhinia dubia* are discussed in some detail.] Address: Borkowski, A., Auf dem Huckstein 25, D-53117 Bonn, Germany. E-mail: abolep@aol.com

4314. Chovanec, A.; Fesl, C.; Kollar, H.P. (2003): Notes on the dragonfly community of a temporary pond near Vienna, Austria (Odonata). *Opusc. zool. flumin.* 215: 1-9. (in English). ["The systematic investigations conducted (1998-2002) at a temporary pond 1.5 km S of Vienna (alt. 185m, surface ca 1.5 ha, max. depth ca 1.0 m) indicate a relationship between the annual duration of water persistence and the total number of species. They also suggest that a longer water persistence in late spring and early summer favours high abundances of the characteristic pond dwellers, *Lestes barbarus* and *L. dryas*, but a statistically significant correlation could not be ascertained." (Authors)] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria. E-mail: chovanec@ubavie.gv.at

4315. Clausnitzer, V. (2003): Odonata of African humid forests - a review. *Cimbebasia* 18: 173-190. (in English). ["In this review, distribution patterns and diversity of dragonflies are discussed in respect to the geological and climatic history of African forests. The review focuses primarily on the humid forests of eastern Africa, but equally applies elsewhere in Africa. The ecology of forest dragonflies, which is as diverse as the broad spectrum of aquatic habitats in the forests, is outlined. The need for further research on all topics related to the ecology of forest dragonflies is stressed. Forest dragonflies are most often stenotopic and highly sensitive to habitat disturbance and have a high potential as indicator species. The conservation of African humid forests is discussed and possible steps towards their protection proposed." (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

4316. Corbet, P.S. (2003): A positive correlation between photoperiod and development rate in summer species of Odonata could help to make emergence date appropriate to latitude: a testable hypothesis 1. *J. entomol. soc. Brit. Columbia* 100: 3-17. (in English). ["In the western Nearctic and the Palearctic Regions several species of Odonata occur, without evident gaps in distribution, from latitude 50° N northwards to the Arctic Circle (66°30' N) and beyond. The decline in incident solar radiation along this latitude gradient does not appear to be reflected, as might be expected, in progressively later emergence, despite the progress of metamorphosis being dependent on ambient temperature. On the contrary, reports indicate that, in some species, northernmost populations may emerge at least as early as, and sometimes even earlier than, more southerly populations, suggesting that some mechanism exists that enables larval developmental rate to compensate for latitude. Reported responses by late-stadium larvae to photoperiod, placed in the context of seasonal changes of photoperiod at different latitudes, make it plausible to postulate the existence of a single, fixed response to photoperiod that would continuously adjust

developmental rate to latitude, at least between 50° and 70° N. In Odonata such a response, to be effective, would be confined to species possessing a Type-2 or Type-3 life cycle, in which more than one stadium precedes metamorphosis in spring or early summer. The hypothesis proposed here does not invoke genetic heterogeneity of response in populations at different latitudes, such as has been detected in certain other insects. The response predicted by the hypothesis may complement, rather than substitute for, other mechanisms of seasonal regulation. Steps are described by which the hypothesis could be tested in Odonata." (Author)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

4317. Corbet, P.S. (2003): Ecological perspectives of African Odonata. *Cimbebasia* 18: 167-172. (in English). ["The distribution and seasonal ecology of African Odonata are determined by the habitats available and their seasonal continuity, which in turn reflect seasonal patterns of rainfall. Rainfall within the tropics is determined by the periodic passage of the Inter-Tropical Convergence Zone; at Africa's northern and southern extremities the climate is Mediterranean. Life cycles of African Odonata reveal two dichotomies: temperate versus tropical, and regulated versus unregulated. Examples are provided of life-cycle strategies of species occupying temporary waters in the tropics. Hypotheses regarding their method of dispersal and dry-season survival are reviewed, and ways are suggested whereby useful information about their seasonal ecology may be obtained." (Author)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

4318. Córdoba-Aguilar, A.; Uhia, E.; Cordero Rivera, A. (2003): Sperm competition in Odonata (Insecta): the evolution of female sperm storage and rival's sperm displacement. *Journal of Zoology, London* 261: 381-398. (in English). ["Odonates are well known for the ability of the males to displace sperm stored in the female's spermstorage organs during copulation. By this means, copulating males are able to increase their fertilization success. This ability has been used as an example to illustrate a conflict of interests between the sexes in which males have evolved sperm-displacement mechanisms whilst females have presumably evolved means to avoid sperm displacement. The present review has four aims: (1) to describe the copulatory mechanisms used during sperm displacement; (2) to analyse the causes of sperm usage patterns; (3) to discuss this information using current hypotheses on conflict between the sexes; (4) to illuminate topics for further research. Four copulatory mechanisms are described: sperm removal (physical withdrawal of stored sperm), sperm repositioning ('pushing') of rival sperm to sites where its use will be least likely), female sensory stimulation to induce sperm ejection, and sperm flushing (displacement of sperm using the copulating male's sperm). Sperm-precedence studies in Odonata are scarce and their values vary considerably between species. In those species in which sperm-displacement is incomplete, the last copulating male obtains a high but variable short-term fertilization success which decreases with time. Some male and female factors affecting sperm precedence patterns are mentioned: (1) male variation in genital morphology; (2) duration of copulation influenced by the male (the lon-

ger the copulation, the more stored sperm displaced); (3) adaptations of the sperm-storage organs that allow the female to manipulate the sperm she has received (i.e. avoiding sperm displacement, re-distributing sperm masses, favouring sperm located in certain sites and ejecting sperm after copulation). We suggest that male and female odonates have co-evolved at the level of genital function with the control of stored sperm as the focus of the conflict. The benefits for males in this co-evolution lie in maximizing their fertilization success. However, it is not clear what females obtain from storing sperm and making it unreachable during sperm displacement. Two hypothetical benefits that females may obtain for which some evidence has been gathered are genetic diversity and viability genes. It is finally suggested that odonates can become excellent subjects of study for testing current ideas related to sexual conflict and speciation processes through sexual selection." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uah.reduaeh.mx

4319. Cross, W.F.; Benstead, J.P.; Rosemond, A.D.; Wallace, J.B. (2003): Consumer-resource stoichiometry in detritus-based streams. *Ecology Letters* 6: 721-732. (in English). ["Stoichiometric relationships between consumers and resources in detritus-based ecosystems have received little attention, despite the importance of detritus in most food webs. We analysed carbon (C), nitrogen (N), and phosphorus (P) content of invertebrate consumers (including *Lanthus* sp.), and basal food resources in two forested headwater streams (one reference and the other nutrient-enriched). We found large elemental imbalances between consumers and food resources compared with living plant-based systems, particularly in regard to P content, which were reduced with enrichment. Enrichment significantly increased nutrient content of food resources (consistent with uptake of N and P by detritus-associated microbes). P content of some invertebrates also increased in the enriched vs. reference stream, suggesting deviation from strict homeostasis. Nutrient content varied significantly among invertebrate functional feeding groups, orders and, to some extent, size classes. Future application of stoichiometric theory to detritus-based systems should consider the potential for relatively large consumer-resource elemental imbalances and P storage by insect consumers." (Authors)]. Address: Cross, W.F., Institute of Ecology, University of Georgia, Athens, GA 30602, USA. E-mail: cross@sparc.ecology.uga.edu

4320. Csabai, Z.; Boda, P.; Móra, A.; Müller, Z. (2003): Aquatic beetles, aquatic and semiaquatic bugs, dragonfly and caddisfly larvae from 32 backwaters in the Upper-Tisza-region, NE Hungary (Coleoptera: Hydradephaga, Hydrophiloidea; Heteroptera: Nepomorpha, Gerromorpha; Odonata; Trichoptera). *Folia historico naturalia musei Matraensis* 27: 217-235. (in English). [Records of 26 odonate species from Hungary are listed.] Address: Csabai, Z., University of Pécs, Department of General and Applied Ecology, Ifjúság útja 6, PÉCS, H-7624. Hungaria. E-mail: csabaizoltan@freemail.hu

4321. De Celis, J.F.; Diaz-Benjumea, F.J. (2003): Developmental basis for vein pattern variations in insect wings. *Int. J. Dev. Biol.* 47: 653-663. (in English). ["The

venation patterns characteristics of different insect orders and of families belonging to the same order possess enormous variation in vein number, position and differentiation. Although the developmental basis of changes in vein patterns during evolution is entirely unknown, the identification of the genes and developmental processes involved in *Drosophila* vein pattern formation facilitates the elaboration of construction rules. It is thus possible to identify the likely changes which may constitute a source of pattern variation during evolution. In this review, we discuss how actual patterns of venation could be accounted for by modifications in different Pterygota of a common set of developmental operations. We argue that the individual specification of each vein and the modular structure of the regulatory regions of the key genes identified in *Drosophila* offer candidate entry points for pattern modifications affecting individual veins or interveins independently. Assuming a general conservation of the processes involved in different species, the transitions between different patterns may require few changes in the regulatory gene networks involved." (Author) Several references are made to Odonata.] Address: De Celis, J.F., Centro de Biología Molecular Severo Ochoa, Universidad Autónoma de Madrid, Spain. E-mail: mail:jfdecelis@cblm.uam.es

4322. Dijkstra, K.-D. (2003): A review of the taxonomy of African Odonata - finding ways to better identification and biogeographic insight. *Cimbebasia* 18: 191-206. (in English). ["The taxonomy of the approximately 850 species of sub-Saharan African Odonata is relatively well-known, probably due to the impoverished nature of the fauna as compared to that of other tropical regions. The need for revisions, study of higher classification, comprehension of (often clinal, environmentally induced) variability and knowledge of larvae, phylogeny and biogeography are stressed. Taxonomic priorities are discussed for each family. Supportive activities include the production of identification manuals for a broader public, the accumulation of supplementary material and the conservation of existing collections. A list of genera with estimated numbers of species, taxonomic status and references is provided, as well as a list of important regional works.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

4323. Dijkstra, K.-D.; Martens, A.; Parr, M.J. (2003): African Odonatology - past, present and future. *Cimbebasia* 18: 161-166. (in English). [The paper introduces into history of African odonatology, current research activities, contains an outlook on research to have done, and presents PHAON (Pinhey's Heritage African Odonata Network) which is a loose cooperation of odonatologists with special interest in African Odonata and which is chaired by K.-D. Dijkstra.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

4324. Donnelly, N. (2003): Show us your tattoos! *Argia* 15(4): 27-28. (in English). [The story of a tattoo with a *Hetaerina* is told.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

4325. Duinen, G.-J. van; Brock, A.M.T.; Kuper, J.T.; Leuven, R.S.; Peeters, T.M.J.; Roelofs, J.G.M.; Velde, G. van der; Verberk, W.C.; Esselink, H. (2003): Do

restoration measures rehabilitate fauna diversity in raised bogs? A comparative study on aquatic macroinvertebrates. *Wetlands Ecology and Management* 11(6): 447-459. (in English). ["To assess whether raised bog restoration measures contribute to the conservation and restoration of the fauna diversity, macroinvertebrate species assemblages were compared between water bodies created by rewetting measures and water bodies which have not been subject to restoration measures, but are remnants of former peat cuttings and trenches used for buckwheat culture in the past. The restoration sites were inhabited by characteristic raised bog species and rare species, but their numbers were higher at the remnant sites not affected by restoration management. A considerable number of characteristic and rare fauna species were only found at the remnant sites. The remnant sites included considerably more variation in macroinvertebrate species assemblages and had a higher cumulative species richness. The number of characteristic macroinvertebrate species was not clearly related to the presence of a characteristic raised bog vegetation. In restoration sites numbers of rare and characteristic species per site tended to increase with the time elapsed after rewetting. However, restoration measures will not automatically result in restoration of a more or less complete macroinvertebrate species spectrum, as restoration measures have so far resulted in habitats for only a limited number of the characteristic species. When planning restoration measures, it is recommended to protect the populations of rare and characteristic species present in the area, as these populations may become the sources for colonization of rewetted sites. Safeguarding habitat diversity during the restoration process and restoration of different elements of the habitat diversity of complete raised bog systems will result in the characteristic fauna diversity being conserved and restored more successfully." (Authors) *Ceriatrion tenellum* and *Coenagrion lunulatum* are listed in tab. 4.] Address: Duinen, G.-J.A. van, Bargerveen Foundation, University of Nijmegen, The Netherlands Department of Environmental Studies, University of Nijmegen, The Netherlands. E-mail: duinen@sci.kun.nl

4326. Ferreira, S.; Grosso-Silva, J.M. (2003): Confirmação da presença de *Brachytron pratense* (Müller, 1764) (Odonata, Aeshnidae) em Portugal continental. *Boletim de la Sociedad Entomologia Aragonesa* 33: 272- (in Portuguese with Spanish summary). [The species was first reported in 1937 from Coimbra. Here, several specimens from Aveiro (27-III-2002) and Ovar (9-III-1997) are documented.] Address: Ferreira, S., Rua Rogerio Oliveira Monteiro 426, PT-4475-841 Silva Escura, Portugal

4327. Fliedner, H. (2003): Libellen und Literatur XXXIV. *Libellennachrichten* 10: 8-9. (in German). [A brief text on Odonata from Maria Sibylla Merian is documented in: KÜHN, D. (2002): *Frau Merian! Eine Lebensgeschichte*. S. Fischer Verlag, Frankfurt / M., S. 85.] Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany

4328. Geraeds, R.P.G. (2003): The river Roer offers perspectives for dragonflies of running water. *Natuurhistorisch Maandblad* 92: 223-227. (in Dutch with English summary). ["The river Roer houses populations of seven species of dragonfly associated with running water, viz. *Calopteryx splendens*, *Platynemis penni-*

pes, *Cercion lindenii*, *Gomphus vulgatissimus*, *G. pulchellus*, *Stylurus flavipes*, and *Ophiogomphus cecilia*. This makes the river Roer unique in the Netherlands. The most important causes of this variety of dragonflies are the improved water quality, morphology and natural dynamics of the Dutch Roer basin. Unlike the German situation, the river Roer is allowed to meander in most of its Dutch basin. This has resulted in a great morphological variety, providing suitable habitats for dragonfly larvae. It is expected that the circumstances for dragonflies of running water will further improve. The policy of the "Roer en Over-maas" water board aims at further improvement of the water quality and preservation of the unique meandering character of the river Roer. In addition, the Ministry of Agriculture, Nature Management and Fisheries has initiated a procedure to designate the valley of the river Roer as a special conservation area under the EU Habitat Directive." (Authors)] Address: Geraeds, R.P.G., Julianalaan 46, NL-6042 JH Roermond, The Netherlands

4329. Geske, C. (2003): Die Tier- und Pflanzenarten der Anhänge II und IV der Fauna-Flora-Habitat-Richtlinie in Hessen - Rechtliche Vorgaben, Rahmenbedingungen und Stand der Umsetzung in Hessen. Jahrbuch Naturschutz in Hessen 8: 115-123. (in German). [This paper is of some interest, for the odonate fauna of Hessen, Germany is known quite bad. It contains unpublished records of *Coenagrion mercuriale*, *Ophiogomphus cecilia*, and *Leucorrhinia pectoralis*, and outlines current activities for mapping these species in Hessen.] Address: Geske, C., Hess. Dienstleistungszentrum für Landwirtschaft, Gartenbau und Naturschutz (HDLGN), Europastr. 10-12, D-35394 Gießen, Germany.

4330. Glupov, V.V.; Kryukova, N.A.; Khodyrev, V.P.; Sokolova, Yu.Ya (2003): Endocytobionts of haemocytes of *Aeshna juncea* L. dragonfly (Odonata). Eurasian entomological journal 2: 131-132. ["In haemocytes of *Aeshna juncea* dragonfly larvae endocytobionts were found. After haemocyte monolayer staining endocytobionts were visualized in light microscope as dark-red inclusions contrasting to the surrounding haemocyte cytoplasm being blue in colour. EM analysis showed that the most of endocytobionts are look elongate in shape. An infected haemocytes contain microorganisms are surrounded by multilayer envelopes, residing in a special compartments very often, but not always filled with homogenous matrix. Presumably, these compartments represent the sites of bacteria multiplication, since several bacteria can be usually recognized within each vacuoles. Great number of coated vesicles, multivesicular bodies and an empty membrane profiles can be observed in the area of the cell being occupied by endosymbionts indicating the participation of host cell lysosomal system in the formation of endosymbiont-containing compartment. It is stated that only plasmatocytes and, sometimes, granulocytes bear endocytobionts of dragonfly haemocytes. The isolated microorganisms were identified as bacteria of the genus *Pseudomonas*. The number of dragonfly larvae containing *Pseudomonas* bacteria reached 73-78% of the whole population in natural water basins of Novosibirsk region in 1997. Water temperature rising up to 28°C in laboratory experiment caused to the mortality increasing of the infected larvae up to the 73-79%, whether mortality of the uninfected larvae population did not exceed the 5-7%. Analysis of the fresh cadaverous and alive insects shows big amount of *Pseudomonas* bacteria inside the hae-

mocytes and the lymph. Laboratory experiments proved that the occurrence of *Pseudomonas* does not depend on such reactions of the larvae cellular response as encapsulation. We suppose that the bacteria of the genus *Pseudomonas* are the normal bacterial endocommensals, which could be pathogenic under a certain stress factor(s), and influence on the regulation of population dynamics of the hosts." (Authors)] Address: Glupov, V.V., Laboratory of insect pathology, Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Frunze street 11, Novosibirsk 630091 Russia

4331. Goffart, P.; Fichet, V. (2003): Compte-rendu des observations d'espèces prioritaires d'Odonates en Wallonie durant la saison 2002, dans le cadre du programme d'Inventaire et Surveillance de la Biodiversité (ISB). *Gomphus* 19(2): 55-64. (in French, with English and Dutch summaries). ["Report on Odonate priority species observations in Wallonie (Southern Belgium) during 2002 flight-season, as part of the « Biodiversity Survey and Monitoring » program. This report give an account of the observations made in 2002 by the *Gomphus* Working Group collaborators about Odonata priority species, pointed out in the "Biodiversity Survey and Monitoring" program in Wallonie because of their great rarity and/or decline. It also present collected informations dealing with southern species. New reproductive populations were discovered for the following species: *Lestes dryas*, *Coenagrion mercuriale*, and *Somatochlora arctica*. Moreover, new data on the reproduction of scarce southern species have been collected, viz. *Lestes barbarus* and *Sympetrum fonscolombii*." (Authors)] Address: Goffart, P., Observatoire de la Faune, de la Flore et des Habitats, Centre de Recherche de la Nature, des Forêts et du Bois, Avenue de la Faculte d'Agronomic, 22, 5030 Gembloux, Belgium. E-mail: p.goffart@mrw.wallonie.be

4332. Gonseth, Y.; Monnerat, C. (2003): Recent changes in distribution of dragonflies in Switzerland. In: Reemer, M., Helsdingen, P.J. van & R.M.J.C. Kleukers (red.) 2003. Changes in ranges: invertebrates on the move. Proceedings of the 13th international colloquium of the European Invertebrate Survey, Leiden 2-5 september 2001: 23-31. (in English). ["Based on the number of sites where a given species has been found in the periods 1970-1998 and 1999-2000, trends were calculated for each species The results show that since 1994 3 species have disappeared from Switzerland, 9 species have declined, 2 species have increased, and 64 species have remained stable. *Crocothemis erythraea*, *Lestes virens*, *Nehalennia speciosa*, *Sympetrum depressiusculum*, and *S. pedemontanum* are discussed as examples of the different trend categories. It is concluded that the conservation of threatened species should not only focus on their last remaining habitats, but also on increasing the number of favourable sites."] Address: Gonseth, Y.; Monnerat, C., Centre Suisse Cartogr. Faune, Terreaux 14, CH-2000 Neuchâtel, Switzerland.

4333. Gottschalk, K.; Stübing, S. (2003): Libellen - "Teufelsnadeln" oder wilde Schönheiten? Naturschutzring Nordhessen e.V. & Philippi-Gesellschaft zur Förderung der Naturwissenschaften e.V. (Hrsg.): Naturschutzgebiete in Hessen. schützen-erleben-pflegen. Band 2. Stadt Kassel, Landkreis Kassel und Schwalm-Eder-Kreis. ISBN 3-932583-07-8: 45-49, -245-246. (in German). [Hessen, Germany; the authors introduce into

the order, highlighting some records from different regional Nature Conservation Areas (NCA), and list 49 species in a table.] Address: Cognito, Westendstr. 23, D-34305 Niedenstein, Germany. www.cognito.de

4334. Greenwood, M.T.; Wood, P.J. (2003): Effects of seasonal variation in salinity on a population of *Enochrus bicolor* Fabricius 1792 (Coleoptera: Hydrophilidae) and implications for other beetles of conservation interest. *Aquatic Conserv: Mar. Freshw. Ecosyst.* 13: 21-34. (in English). ["During the spring and summer, taxa more frequently associated with mild-brackish and freshwater were recorded for the first time including *Ischnura elegans* and *Aeschna mixta* (Odonata) together with *Notonecta viridis* and *Sigara stagnalis* (Hemiptera)."] (Authors)] Address: Greenwood, M.T., Dept of Geography, Loughborough University, Loughborough, Leicestershire, LE11 3TU, UK. E-mail: m.t.greenwood@lboro.ac.uk

4335. Grzywocz, J. (2003): Contribution to the knowledge on the dragonfly fauna in Poland. *Acta ent. sil.* 11(1-2): 97-99. (in Polish with english translation of the title). [Records of 13 species are documented: *Sympetma paedisca*, *Erythromma viridulum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Onychogomphus forcipatus*, *Anaciaeschna isocetes*, *Anax parthenope*, *A. ephippiger*, *Thecagaster bidentata*, *Orthetrum albistylum*, *O. brunneum*, *O. coerulescens*, and *Sympetrum fonscolombii*.] Address: not stated

4336. Hammer, J.; Linke, R. (2003): Assessments of the impacts of dams on the DuPage River. The Conservation Foundation, Naperville: 48 pp. (in English). [Illinois, USA. "Over the last fifteen years The Conservation Foundation and others have worked hard to improve and protect the quality of the DuPage River watershed. Many improvements have been seen both in water quality and the increased level of awareness people have for the river and river issues. Many more people view the river as an important part of the ecosystem and amenity in their community. Although great strides have been made, there is still much to do to meet the water quality goals of the Clean Water Act of fishable and swimmable. Some of the greatest constituents of concern are nutrients, sediment and habitat alteration. Dams can increase the impacts of all three, with the greatest consequences to aquatic habitat. This study has collected data that indicates that dams on the DuPage River are a significant contributor to the overall degradation of native aquatic species and their habitat. Water quality sampling performed as part of the study indicates that these low-head dams probably do not significantly exacerbate the existing, system-wide water quality problems of the DuPage River. As discussed in Sections 2 through 5 of this report, three of the five dams within the study area do not provide any useful function other than they maintain a flat water pool and create the sound of rushing water, both of which are usually considered attractive to many people visiting the public areas around these dams. Moreover, all of the dams (the ones at Channahon and Hammel Woods in particular) create an elevated safety hazard to the people using the river, be it for fishing, swimming, or boating. Dam owners and local decision makers should actively consider options to address these safety and ecological concerns so that the safety of the general public and patrons to these facilities is improved and the health of the watershed's natural resources are preserved.

The next four sections of the report are organized into separate assessment reports for each of the four dams included in this study. Information on potential alternatives, their benefits, drawbacks and associated costs has been included to provide decision makers and stakeholders with as much site-specific information as possible to make the most informed decision as to how to manage the dams to ensure a safe and healthy future for residents, visitors and the river." (Authors) 14 odonate taxa are listed in table 1.9. <http://www.theconservationfoundation.org/tcf/wp/assessmentofdupageriverdams.pdf>] Address: The Conservation Foundation, 10S404 Knoch Knolls Road, Naperville, IL 60565, USA

4337. Hermans, J.T.; Maanen, B. van (2003): Dragonflies of the Beegerheide area: survey findings from 2001 to 2002. *Natuurhistorisch Maandblad* 92: 126-133. (in Dutch with English summary). ["The adult dragonfly fauna of all the moorland pools of the Beegerheide area was monitored by the first author throughout the period from 1984 to 2001. In addition, eleven pools were examined for dragonfly larvae by the Limburg Water Authority in 2002. In 2001, 27 species of dragonfly were observed in the area, while the total number of species observed between 1984 and 2001 is 35. The status of the Beegerheide dragonflies is surveyed in table II. Fifteen species are regarded as wanderers or irregular guests, nineteen species are permanent inhabitants and one species (*Coenagrion lunulatum*) seems to have disappeared. The most common dragonflies of the Beegerheide are *Lestes vrens*, *Enallagma cyathigerum*, *Pyrrhosoma nymphula*, *Anax imperator*, *Libellula quadrimaculata*, and *Sympetrum danae*. Adults of *Lestes sponsa* and *Coenagrion puella* were also common, but their larvae were rather rare, suggesting the existence of very local, larger populations from which the adults disperse. *Ceragrion tenellum* was rediscovered as larvae at two locations in 2001 and four in 2002. Larvae of *Aeshna juncea* were still found in the area, although no adults were seen in 2001. A very interesting finding was that of larva of *Leucorrhinia pectoralis*. In addition, the larvae survey revealed several 'new' reproductive sites of *Lestes viridis*, *C. tenellum*, *Sympetrum sanguineum*, and *Leucorrhinia dubia*. There were no great shifts in the dragonfly species composition between 1984 and 2001, (table II) The pools at the Beegerheide area are very important for several species of dragonfly, and pool restoration measures taken during the last five years have had a favourable effect on the dragonfly fauna. The activities were implemented on a small scale to achieve greater habitat diversity by saving parts of the vegetation structure, especially at peat fens. It is essential that this process is continued to maintain the area's characteristic dragonfly community." (Authors)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands

4338. Holland, P. (2003): Damselfly forensics. *Bulletin of the Amateur Entomologists' Society*, 62 (Feb. 2003): 33-36. (in English). [Cooper, G., P.L. Miller & P.H.W. Holland published in 1996 a study titled "Molecular genetic analysis of sperm competition in the damselfly *Ischnura elegans* (Vander Linden). *Proc. R. soc. London (B)* 263: 1343-1349". The present paper gives an insight in the questions underlying the study (sperm removal in Zygoptera, paternity, development of a paternity test, frequency of matings) and describes the

work in laboratory.] Address: Holland, R., Purlieu, Porthleven, Halston, Cornwall TR13 9LT, UK

4339. Iwamura, K. (2003): La famille Souris et la mare aux libellules. Paris. ISBN 2 211 07077 9: 32 pp. (in French). [A family of mice decided to spend a nice summer day at a dragonfly pond. This is a most lovely children book lavishly illustrated with wonderful pictures. The book was translated from the Japanese by Irène Schwartz.] Address: Kaléidoscope, l'école des loisirs, 11, rue de Sèvres, Paris 6e, France

4340. Jacobs, L. (2003): Dragonflies. Blackbirch Press. ISBN 1-4103-0042-0: 24 pp. (in English). [This book is directed to childrens or young juveniles. It is lavishly illustrated throughout, with excellent colour photographs of Wen-Kuei (Taiwan). The presented information covers the usual subjects as eating and being eaten, cleaning, mating, larval growth, emergence etc.] Address: Thomson Gale, World Headquarters, 27500 Drake Road, Farmington Hills, MI 48331, USA

4341. Jansen, W.; Tham, J.; Koch, M. (2003): Die aquatische Invertebratenfauna des Moorkomplexes Wurzacher Ried (Landkreis Ravensburg): Biodiversität, habitatspezifische Artengemeinschaften, Rote-Liste-Status und Zielarten-Konzeption. Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) 655: 1-19. (in German with English summary). ["Between 1991 and 1996 we collected aquatic macroinvertebrates (MIB) from 28 water bodies within the Wurzacher Ried", a south German bog and fen complex of 17 km² area that has been awarded the European Diploma for nature reserves. In this baseline study, we documented 581 species of MIB. The three orders Trichoptera, Coleoptera, and Diptera, with more than 120 species each, contributed substantially to the biodiversity among the MIB. The relatively high proportion of specialized bog species among the Trichoptera (12%), the Coleoptera (21 %), and the Odonata (23%) is indicative of the generally natural state of the Wurzacher Ried. In addition to most of the bog specialists, numerous other endangered species were identified, resulting in a relatively high proportion of Red Data book species to the total number of species found. For Gastropoda and Odonata, this proportion amounted to 42 % and 58 %, respectively. The six types of water bodies differentiated in this study based on their water chemistry and vegetation (raised bog, acid transitional fen, neutral transitional fen, fen, bog forest, and streams) showed typical MIB communities that could be distinguished taxonomically at both the order and species level. Within each of the six types of water bodies we found further community differences that mainly correlated with structural features as, for example, the area of the open water. Based on our findings and literature data, we identified target/indicator species to facilitate the evaluation of future changes in the aquatic habitats of the Wurzacher Ried." (Authors)] Address: Jansen, W., Freshwater Insutute, DFO, 501 University Cres, Winipeg, MB, R3T 2N6, Canada. E-mail: wjansen@nscons.ca

4342. Jödicke, R. (2003): Mid-winter occurrence of dragonflies in southern Tunisia (Insecta: Odonata). *Kaupia - Darmstädter Beiträge zur Naturgeschichte* 12: 119-128. (in English, with German and French summaries). ["In January and early March 2000, 14 odonate species were recorded in freshwater habitats in the provinces of Tozeur, Kebili and Gabes. Compared with

the situation in spring and autumn, adult Odonata were very rare. It is supposed that ten species are on the wing throughout the year. The presence of adults of *Ichnura fountaineae*, *I. saharensis*, *Anax parthenope*, *Crocothemis erythraea*, *Orthetrum chrysostigma*, and *Trithemis annulata* during mid-winter is reported here for the first time within the borders of the West Palearctic. *Sympetrum sinaiticum* is the only univoltine species; all the others are multivoltine. Eight species emerged during mid-winter, indicating an absence of diapause in the larval stage under the subtropical desert climate in southern Tunisia." (Author)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: r.joedicke@t-online.de

4343. Kefford, B.J.; Papas, P.J.; Nugegoda, D. (2003): Relative salinity tolerance of macroinvertebrates from the Barwon River, Victoria, Australia. *Marine and Freshwater Research* 54(6): 755-765. (in English). ["Salinity levels are rising in many freshwater environments, yet there are few direct measurements of salinity tolerance of organisms likely to be salt sensitive. The relative salinity tolerance to artificial seawater of macroinvertebrates from the Barwon River in Victoria, Australia, was assessed by measuring the 72-h lethal concentrations required to kill 50% of individuals (LC50). LC50 values ranged from an electrical conductivity of 5.5 to 76 mS cm⁻¹ (mean 31 mS cm⁻¹, n = 57) and followed a log-normal distribution. The most salt-sensitive groups tested were Baetidae (LC50 value range: 5.5-6.2 mS cm⁻¹), Chironomidae (10 mS cm⁻¹) and several soft-bodied non-arthropods (Oligochaeta, Gastropoda, Nematomorpha, Tricladida and Hirudinea; 9-14 mS cm⁻¹). Other groups, from least to most tolerant, were non-baetid Ephemeroptera (>12.6-15 mS cm⁻¹), Plecoptera (>12.6-20 mS cm⁻¹), Trichoptera (9-26 mS cm⁻¹), Corixidae (18-26 mS cm⁻¹), non-corixid Hemiptera (33-44 mS cm⁻¹), Coleoptera (19-54 mS cm⁻¹), Hydracarina (39 mS cm⁻¹) and Odonata (30-55 mS cm⁻¹), and macrocrustaceans (Decapoda, Isopoda and Amphipoda; 38-76 mS cm⁻¹)."] (Author)] Address: ben.kefford@rmit.edu.au

4344. Knijf, G. de; Demolder, H. (2003): De Vroege glazenmaker (*Aeshna isocetes*) in Wallonie: eerste waarneming sedert 1993. *Gomphus* 19(2): 65-71. (in Dutch, with English and French summaries). ["*A. isocetes* in Wallonia: first observation since 1993. On the 8th of June 2003, three territorial males of *A. isocetes* have been seen in the valley of Laclaireau in Buzenol (Lorraine, Belgium). This was the first observation of this Red list species since 1993 in the Walloon part of Belgium and a new species for the ecoregion Lorraine. The habitat consists of 5 ponds which are connected with each other. The ponds have a good riparian vegetation of *Phragmites australis*, *Typha spec.* and sedges (*Carex*). We presume that this small population was established only very recently and has been colonised by individuals coming from the northeast of France, where an expansion of *A. isocetes* has been observed since 1990. This new site should be the only present population in the Walloon part of Belgium." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

4345. Knijf, G. de (2003): Verslag van de excursie van 15 juni 2003 naar de Limburgse Hoge Kempen (Ruw-mortelsven - Kruisven -Vallei van de Asbeek - Vallei van de Zijbeek). *Gomphus* 19(2): 90-92. (in Dutch,

with French summary). [Two mires (Ruwmortelsven, Kruisven) and two running waters including their alluvia (Asbeek, Zijpbeek), all located in the High Limburgian Campine, have been surveyed for their odonate fauna. (1) Ruwmortelsven: 15 species including *Lestes virens*, *Sympecma fusca*, *Ceriagrion tenellum*, and *Leucorrhinia rubicunda*. (2) Kruisven: 7 species including *L. virens*. (3) Asbeek: 19 including *Erythromma najas*, *C. tenellum*, *Cordulegaster boltonii*, *Cordulia aenea*, *Somatochlora flavomaculata*, *Orthetrum coerulescens* (> 300 ex.), *Crocothemis erythraea*, and *L. rubicunda*. (4) Zijpbeek (Gaarvijver): species of interest are: *S. fusca*, *C. tenellum*, *C. boltonii*, *S. flavomaculata*, and *O. coerulescens*.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

4346. Kosterin, O.E.; Zaika, V.V. (2003): Odonatological expeditions to the Tyva Republic (Tuva) 2000-2002. IDF-Report 5: 1-44. (in English). [This is an extensive report with detailed descriptions both of the country and its dragonfly fauna based on trips in 2000, 2001, and 2002 to the Tuva Republic, Russia. Records of 36 species from 22 localities are documented in detail and discussed. Taxonomic annotations referring to *Calopteryx splendens*, *Enallagma cyathigerum/risi*, *Ophiogomphus spinicornis*, *Somatochlora metallica* ssp. *abocanica*, and *S. exuberata* are made.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

4347. Kovács, T.; Ambrus, A. (2003): Data to the Odonata fauna of the Szigetköz. *Folia historica naturalia musei Matraensis* 27: 73-80. (in English). [Between 1999 and 2002, 46 odonate species were collected at 31 Hungarian localities. Of special interest are the nationally rare or protected species *Coenagrion scitulum*, *Anaciaeschna isosceles*, *Stylurus flavipes*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Epithea bimaculata*, *Libellula fulva*, *Sympetrum depressiusculum*, *Leucorrhinia pectoralis* cf.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

4348. Kuprian, M.; Winkel, S. (2003): NABU-Naturschutzprojekt "Klesberger Weiher". *Jahrbuch Naturschutz in Hessen* 8: 142-144. (in German). [Revitalisation measures resulted in an significant increase in faunal composition of a water body near Steinau, Hessen, Germany. The few notes stress also on *Sympetrum fonscolombii* and *Ischnura pumilio*.] Address: Winkel, Sibylle, Pommernstr. 7, D-63069 Offenbach, Germany

4349. Lamberigts, M. (2003): Diatoms, macroinvertebrates and water quality of the Beegderheide moorland pools. *Natuurhistorisch Maandblad* 92: 112-125. (in Dutch with English summary). ["The Beegderheide nature reserve was originally a sand dune landscape, and includes over thirty moorland pools. Eutrophication and natural succession have resulted in the pools being choked by vegetation. Various restoration measures have recently been successfully implemented: organic sediment has been removed and the borders of the pools have been restructured. The Limburg Water Authority has been monitoring the Beegderheide moorland pools since 1987 as part of its water quality survey. The

article outlines the changes in water chemistry found in these studies, particularly relating to the pH, nutrient status and buffer capacity of a number of soft-water moorland pools in the Beegderheide. The restoration measures have improved the environmental conditions and yielded favourable changes in animal and plant communities. Recovery of the specific, valuable circumstances found in moorland pools seems to have been successful, and the restoration measures have resulted in greater habitat diversity. The macroinvertebrate community proved to be species-rich, with many rare species characteristic of peat bogs. During the first year after the completion of the restoration, the relatively rich diatom flora indicated disturbance, some nutrient enrichment and a somewhat increased calcium buffering. In the following year, the diatom community in most of the pools became very poor in terms of species as well as numbers, with species indicating acid and nutrient-poor conditions abundant in some of the pools. The system seems to be lacking in buffer capacity. Acidification is to be expected in these areas, where acid deposition is high and the catchment soil is poor in lime and other easily dissolved minerals that provide a buffer against acid precipitation. The effects of future changes should be followed by continued chemical and biological monitoring, which should help to finetune the restoration activities to prevent further acidification." (Author) 19 odonate species including *Ceriagrion tenellum*, *Leucorrhinia rubicunda* and *L. pectoralis* are listed.] Address: Lamberigts, Monique, Barend van Maanen & Bert Pex, Zuiveringschap Limburg, Postbus 314, 6040 AH Roermond

4350. Legrand, J. (2003): Sur le genre malgache *Isomma*, I. hieroglyphicum Selys, male, female, larve et description d'une nouvelle espece (Odonata, Anisoptera, Gomphidae, Phyllogomphinae). *Revue française d'entomologie (N.S.)* 25(1): 43-54. (in French, with English summary). ["The genus *Isomma* has been described by Selys on a single female from Madagascar. Later he described the male on a specimen belonging to Rene Martin whose collection is preserved in MNHN Paris. Till now only a few specimens were known and the genus was erroneously placed among Gomphinae. The genus and the first species, *I. hieroglyphicum*, are redescribed and illustrated [...]. A new species, *Isomma elouardi*, also from Madagascar, is described.] Address: Legrand, J., 10, rue du Chemin de fer, F-94110 Arcueil, France

4351. Martens, K. (Ed.); [Dumont, H.J.] (2003): Bibliography of Henri J. Dumont. *Hydrobiologia* 500(1-3): 1-21. (in English). [The bibliography lists 349 publications, including some 80 odonatological papers. As far as I could trace, only two odonatological titles are missing: Dumont, H. (1996): The dragonfly fauna of the Caspian Basin. *Selysia* 24(1): 9-10, and Dumont, H.J. (2003): Odonata from the Republic of Mongolia and from the Autonomous Region of Inner Mongolia. *International Journal of Odonatology* 6(2): 127-146.] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

4352. Meuris, L. (2003): Na zeer lange afwezigheid terug *Glassnijder* (*Brachytron pratense*) in de Damvallei. *Gomphus* 19(2): (in Dutch, with English and French summaries). ["*Brachytron pratense* back in the Damvallei after a long absence. On June 19th 2002 a perching

male *B. pratense* has been reported from the peat-bogs of the Damvallei (Laarne, East-Flanders, Belgium). The previous observation dates from 73 years back. In other marshy areas along the Flemish section of the river Scheldt, there have also been some recent observations of the Hairy Dragonfly. It seems that *Brachytron* numbers are increasing in the Scheldt Valley. A similar tendency has recently become apparent in the neighbouring regions of France, Germany and the Netherlands. In this specific case, the observed *Brachytron* probably was a wanderer. Its origin remains uncertain. To establish any populations in the Flemish Scheldt Valley, one should search for exuviae in the areas surrounding the recent observations." (Author)] Address: Meuris, L., August Van Bockxstaelestraat 7, 9050 Gent, Belgium. E-mail: Luc.meuris@pandora.be

4353. Mitra, T.R. (2003): Ecology and biogeography of Odonata with special reference to Indian Fauna. Records of the Zoological Survey of India, Occasional Paper 202: 1-41. (in English). [This paper is a brief, compilatory introduction into odonatology with special emphasis on Indian biogeography. CONTENTS Introduction, Short History of Odonata, Adaptations in different phases of life Probable ecology of fossil Odonata Conspectus of ecology of modern Odonata (adults, larvae) Ecology and geographical distribution. 1. Hill and montane forms 2. Nonmontane forest forms 3. Insular forms 4. Xerophilic forms 5. Paraxerophilic forms Species occurring in physiography based ecosystems Himalayan ecosystems Fauna of Eastern Himalaya Fauna of Western Himalaya Fauna of Meghalaya-Mikir hill region Fauna of Purbanchal Fauna of peninsular uplands Fauna of Western Ghats Nilgiris and Deccan plateau Fauna of the Central upland Fauna of the Eastern Ghats Island Fauna of Indo-Ganga-Brahmaputra Plain Fauna of Brahmaputra valley including fauna of indeterminate localities of "Assam" Ecology and faunal affinities Discussion Simrany Acknowledgements References] Address: Mitra, T.R., 208 Raja Ram Mohan Roy Rd, Calcutta-700 008, India

4354. Mizutani, A.; Chahl, J.S.; Srinivasan, M.V. (2003): Insect behaviour: Motion camouflage in dragonflies. *Nature* 423, vom 5. Juni 2003: 604. (in English). ["Most animals can skilfully conceal themselves when stationary, but they may become apparent as soon as they move. Here we use stereo cameras to reconstruct the movements in three dimensions of dragonflies (*Hemianax papuensis*), and show that these insects actively use motion camouflage to disguise themselves as stationary during territorial aerial manoeuvres. Deployment of this sophisticated technique by the oldest airborne predator tricks the victim's retina into perceiving the stalker as stationary even while it darts about in pursuit." (Authors)] Address: Mizutani, Akiko, Centre for Visual Science, Research School of Biological Sciences, Australian National University, PO Box 475, Canberra, ACT 2601, Australia. E-mail: akiko@bio-robotics.anu.edu.au

4355. Nunn, M. (2003): Libellen und Wasserkäfer im Nürnberger Reichswald - Untersuchungen der Standortbedingungen von Moosjungfern (Odonata: Leucorrhinia). *Galathea - Berichte des Kreises Nürnberger Entomologen e.V.* 19 (3): 95-114. [The habitat requirements of *Leucorrhinia dubia* and *L. pectoralis* were examined in 10 ponds in the Reichswald of Nürnberg, Bavaria, S Germany. In addition to these, 19 other o-

don. species were also recorded. Low pH values (conditioning the growth of the indispensable *Sphagnum* vegetation) are of principal importance. The role of predators is relatively insignificant, but the temporary drying-out and/or the presence of fish are decisive factors precluding the *Leucorrhinia* breeding.] Address: Nunn, M., Eintrachtstr. 50, D-90409 Nürnberg, Germany

4356. ODNAT (2003): Les listes rouges de la nature menacée en Alsace. Les libellules. Collection Conservation, Strasbourg. ISBN 2 9520048 0 3: 130-149. (in French). [29 odonate species are listed as threatened in Alsace, France.] Address: not available

4357. O'Grady, E.W.; May, M.L. (2003): A phylogenetic reassessment of the subfamilies of Coenagrionidae (Odonata: Zygoptera). *Journal of Natural History* 37 (23): 2807-2834. (in English). ["We reanalyzed subfamily divisions of Coenagrionidae phylogenetically using morphological characters. Characters historically and currently used to divide Coenagrionidae, as well as previously unpublished characters, were carefully defined or redefined and coded. Many characters traditionally used in coenagrionoid taxonomy were found to be continuously distributed rather than falling into discrete states. Nevertheless, it is just these characters on which most subfamily distinctions are based, we regarded it as essential to try to assess their effects in phylogenetic analysis. Therefore, character states for continuously distributed morphometric characters were determined using a clustering algorithm. We also present trees that exclude these characters, however. Cladistic analysis indicates that, of the existing subfamilies, only the apophyletic Agriocnemidinae is monophyletic. Shortest trees were markedly shorter than ones in which all current subfamilies were constrained to be monophyletic. Cladistic analysis using characters of Davies and Tobin (1984) and Fraser (1957) alone to define subfamilies resulted in poorer resolution and failed to support monophyly of any of the current subfamilies, as did alternative character weightings. Even a phenetic comparison using discriminant analysis failed to support the existing taxonomy. Our phylogeny suggests the existence of several possible clades within Coenagrionidae, but none are strongly supported by bootstrap analysis or decay index values. Coenagrionidae as a whole is polyphyletic in our shortest trees, although trees supporting a monophyletic Coenagrionidae are only slightly longer. We conclude that subfamilies should not be recognized within Coenagrionidae until well-supported subdivisions are demonstrated." (Authors)] Address: O'Grady, Elyse, Department of Entomology Rutgers University 93 Lipman Drive New Brunswick, New Jersey 08901-8524 USA elyseogrady@hotmail.com

4358. Osada, M.; Matsumura, T. (2003): The record of *Enallagma boreale circumlatum* Selys (Coenagrionidae: Odonata) in Minamirokuroshi, Oono-shi, Fukui Prefecture. *Bulletin of the Fukui City Museum of Natural History* 50: 70. (in Japanese, with English translation of the title). [Japan; 29.VI.2001 and 30.VI.2003]

4359. Parr, A. (2003): Migrant dragonflies in 2003, including recent decisions and comments by the Odonata Records Committee. *Atropos* 21: 28-34. (in English). [UK; *Calopteryx virgo*, *C. splendens*, *Lestes barbarus*, *Chalcolestes viridis*, *Erythromma viridulum*, *Anax ephippiger*, *A. imperator*, *A. parthenope*, *Aeshna grandis*, *A. mixta*, *Anaciaeschna isocles*, *Cordulia ae-*

nea, *Sympetrum danae*, *S. fonscolombii*, *S. flaveolum*, *S. pedemontanum*, *S. sanguineum*, *S. striolatum*, *Libellula depressa*, *L. fulva*, *Orthetrum cancellatum*, *O. coeruleescens*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4360. Parr, A. (2003): Migrant news of early 2003. *Dragonfly News* 44: 13. (in English). [UK; *Anax ephippiger*, *A. parthenope*, *Sympetrum fonscolombii*, *S. flaveolum*, *Lestes barbarus*, *Erythromma viridulum*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4361. Perrin, V. (2003): Highlights of the 2003 early season. *Dragonfly News* 44: 12-13. (in English). [Compilation of odonate records in 2003 with special emphasis on phenology from different localities in the UK.] Address: Perrin, V., 13 Pettitts lane, Dry Drayton, Cambridgeshire CB3 8BT, UK. E-mail: valperrin@dial.pipex.com

4362. Revenga, C.; Kura, Y. (2003): Status and Trends of Biodiversity of Inland Water Ecosystems. 3.3.1 Odonata (dragonflies and damselflies). Secretariat of the Convention on Biological Diversity, Montreal, Technical Series no. 11. ISBN: 92-807-2398-7: 32. (in English). [General account on odonate diversity and conservation priority of regional faunas.] Address: <http://www.biodiv.org/doc/publications/cbd-ts-11.pdf>

4363. Ricono, K. (2003): Das Marscheider Bachtal - Biotoppflege- und -entwicklungsplan in einem FFH-Gebiet. *Charadrius* 39(1-2): 99-101. (in German). [Nordrhein-Westfalen, Germany; 20 odonate species are known to occur within boundaries of the site, only *Erythromma viridulum*, *Ischnura pumilio*, and *Calopteryx virgo* are listed.] Address: Ricono, Karin, Stadt Wuppertal, Ressort Umweltschutz, D-42269 Wuppertal, Germany

4364. Robert B. DuBois, R.B.; Smith, W.A. (2003): Odonata Research. The Ecological Inventory and Monitoring Program Bureau of Integrated Science Services: 15-18. (in English). [<http://maps.botany.wisc.edu/Atri/AboutAtri/eim/EIMAnnualReport.pdf>]

4365. Sane, S.P. (2003): Review: The aerodynamics of insect flight. *The Journal of Experimental Biology* 206: 4191-4208. (in English). ["The flight of insects has fascinated physicists and biologists for more than a century. Yet, until recently, researchers were unable to rigorously quantify the complex wing motions of flapping insects or measure the forces and flows around their wings. However, recent developments in high-speed videography and tools for computational and mechanical modeling have allowed researchers to make rapid progress in advancing our understanding of insect flight. These mechanical and computational fluid dynamic models, combined with modern flow visualization techniques, have revealed that the fluid dynamic phenomena underlying flapping flight are different from those of non-flapping, 2-D wings on which most previous models were based. In particular, even at high angles of attack, a prominent leading edge vortex remains stably attached on the insect wing and does not shed into an unsteady wake, as would be expected from non-flapping 2-D wings. Its presence greatly enhances the forces generated by the wing, thus enabling

insects to hover or maneuver. In addition, flight forces are further enhanced by other mechanisms acting during changes in angle of attack, especially at stroke reversal, the mutual interaction of the two wings at dorsal stroke reversal or wing wake interactions following stroke reversal. This progress has enabled the development of simple analytical and empirical models that allow us to calculate the instantaneous forces on flapping insect wings more accurately than was previously possible. It also promises to foster new and exciting multidisciplinary collaborations between physicists who seek to explain the phenomenology, biologists who seek to understand its relevance to insect physiology and evolution, and engineers who are inspired to build micro-robotic insects using these principles. This review covers the basic physical principles underlying flapping flight in insects, results of recent experiments concerning the aerodynamics of insect flight, as well as the different approaches used to model these phenomena." (Author) Odonata are referred on several opportunities.] Address: Sane, Sanjay P., Department of Biology, University of Washington, Seattle, WA 98195, USA. E-mail: sane@u.washington.edu

4366. Solem, J. (2003): You should have seen the one that got away! *Argia* 15(4): 27. (in English). [Verbatim: On a hot summer day, my husband, Bob, fellow enthusiast June Tveekrem, and I spent an afternoon visiting reservoir sites for odonates. At Pigtail boat landing on Triadelphia Reservoir in central Maryland, we were getting our gear assembled and checking out nearby odes when two young men with fishing rods came over and inquired what we were catching. Bob explained our quest; men we started down the path while they stayed in the parking lot to fish. We had not gone more than 100 yards when we heard yelling: "I've got one." "Do you want to see it?" "It's a big one!" After debating briefly how they could have actually caught a dragonfly when they didn't have a net, we started back, moving swiftly with Bob in the lead. When June and I arrived, Bob was kneeling on the ground extracting something from under his net. It was a female *Nasiaeschna pentacantha*. How had it been captured? As one fisherman dangled his lure over the water, the dragonfly zoomed up and grabbed the artificial 3 inch yellow minnow. (Talk about her eyes being bigger than her stomach!) The young man flipped the lure back on shore with the dragonfly still clinging to it. When Bob came up, the odonate and the lure were still on the ground so he clapped a net over them. It was the first female of the species we had had in hand so June took numerous photos, and the proud young man asked us to take his picture with the dragonfly and the lure. Eventually, we set the odonate on a shrub; later, when we returned, she was gone. Not only was this one of our most intriguing odonate experiences, but August 19 was also a new late date for the species for most part of the state.] Address: not stated

4367. Terzani, F.; Marconi, A. (2003): Descrizione della femmina di *Agriocnemis angustirami* Pinhey, 1974 e qualche osservazione sul maschio. (*Insecta*, Odonata, Coenagrionidae). *Quaderno di studi e notizie di storia naturale della Romagna* 17(Suppl.): 1-4. (in Italian with English summary). [Sierra Leone; a female - taken in copula - is described and illustrated for the first time. In addition, some descriptive notes on, and figures of the male are provided.] Address: Terzani, F., Mus. Zool., "La Specola", via Romana 17, I-50125 Firenze, Italy

- 4368.** Van de Meutter, F. (2003): 150 jaar libellengeschiedenis in de Maten (Genk): een reis doorheen de tijd. *Gomphus* 19(2): 79-89. (in Dutch, with English and French summaries). ["150 years of history of Odonata in de Maten (Genk, Belgium): a travel through time. Based on data spanning the past 150 years, we make a reconstruction of the history of the dragonfly fauna of the nature reserve 'de Maten' (Genk). These data were compared with data of the present dragonfly community. During the studied period of 150 years, 54 species of dragonflies were recorded in the reserve of which 18 have gone extinct by now. Recently, another 3 species succeeded in colonizing 'de Maten'. These 3 species presumably are not very choosy in their habitat requirements. Finally, the present status of some red-list species that still occur in de Maten is discussed." (Author) The locality once inhabited such species as *Nehalennia speciosa* and *Oxygastra curtisii*.] Address: Van de Meutter, F., Arthur De Greefstraat 36, 3000 Leuven, Belgium. E-mail: frank.vandemeutter@bio.kuleuven.ac.be
- 4369.** Van Lieshout, F.; Peelers, E.; Franken, R.; Kuiper, R. (2003): The river Allier as an ecological reference for the "Border Meuse"? *Natuurhistorisch Maandblad* 92: 10-16. (in Dutch with English summary). ["An ecological comparison was made between the section of the river Meuse that forms the border between the Netherlands and Belgium (the so-called "Border Meuse") and the Allier River in France, in order to assess the suitability of the river Allier as a reference for the ecological recovery to be expected in the Border Meuse after the implementation of the current reconstruction plans. Special attention was given to the macroinvertebrate community and its functional aspects, such as preference for flowing water and feeding ecology. The macroinvertebrate community in the Allier was found to include more families requiring good water quality. Furthermore, the Border Meuse community included only a few of the typical families with a preference for flowing water. Possible explanations for these differences are the lack of suitable habitats and the poor water quality in the Border Meuse. The Border Meuse community also includes very few sediment-inhibiting detritivores. This might be caused by the poor condition of the sediment, which is contaminated with heavy metals and organic micropollutants. Finally, several exotic species" - including *Dikerogammarus villosus*; see OAS 3686 for its negative effects on Odonata - "were found to have colonised the Border Meuse, which might have a dramatic effect on the native macroinvertebrate community. A comparison of the present data with historical data on the Border Meuse indicated that many species that prefer flowing water have disappeared, and that there used to be far more detritivores as well. The present study, along with previous research on the Border Meuse, revealed a number of bottlenecks for ecological recovery. The first is the poor water quality, but as water quality is improving, this may not be too serious. The second problem is the lack of habitat diversity, and the third is the unnatural discharge variations caused by the dam at Lixhe in Belgium. New bottlenecks identified by the present study are the polluted sediment and the presence of exotic species. Since the reconstruction project does not address these two impediments, they may undermine the expected ecological recovery of the Border Meuse." (Authors) While in the Allier "*Calopterygidae*" and "*Gomphidae*" are present, these taxa are not represented in the Border Meuse. Only "other Odonata" taxa are represented in both rivers.] Address: Floor van Lieshout, Edwin Peelers & Rob Franken, Waenigen Universiteit Leerstoelgroep Aquatische Ecologie en Waterkwaliteitsbeheer, Postbus 8080, 6700 DD Wageningen, The Netherlands
- 4370.** Vanreusel, W.; Cortens, J. (2003): Uitzonderlijk vroege waarnemingen van de Gewone bronibel (*Cordulegaster boltonii*). *Gomphus* 19(2): 51-54. (in Dutch, with English and French summaries). ["Exceptionally early recordings of the Golden-ringed dragonfly {*Cordulegaster boltonii*}. During fieldwork in the East of Flanders, we observed *Cordulegaster boltonii* on different locations in the National Park "Hoge Kempen". Several recordings were done early in the year. In 2003, the earliest observation was on May 7. This is more than 3 weeks before the earliest known recording in Belgium, Germany and the Netherlands. This is exceptional since the phenology of dragonflies is usually relatively constant. It could be interesting to pay more attention to this species in spring." (Authors)] Address: Vanreusel, W., & Cortens, Joeri, Onderzoeksgroep Dierenecologie, Universiteit Antwerpen, Campus Drie Eiken, Universiteitsplein 1, 2610 Wilrijk, Belgia. E-mail: wouter.vanreusel@ua.ac.be
- 4371.** Westermann, K.; Westermann, E. (2003): Ein Fortpflanzungsnachweis des Großen Granatauges (*Erythromma najas*) bei Hinterzarten im Schwarzwald in einer Meereshöhe von 1010 m NN. *Naturschutz am südlichen Oberrhein* 4(1): 89-90. (in German, with English summary). ["In the year 2003, *E. najas* reproduced successfully in a pond near Hinterzarten (Black Forest) at 1010 m a.s.l. In a second pond nearby, at 1001 m a.s.l., a tandem was spotted during oviposition. This is the highest altitude at which reproduction of the species was ever recorded in Baden-Württemberg and Germany." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de
- 4372.** Westermann, K. (2003): Erster Bodenständigkeitsnachweis der Pokaljungfer (*Cercion lindenii*) für den höheren Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(1): 87-88. (in German, with English summary). [Germany, Baden-Württemberg. "In the year 2003, *C. lindenii* emerged successfully in the Black Forest near St. Märgen (county of Breisgau-Hochschwarzwald) at 845 m a.s.l. The emergence site is the highest one known in Baden-Württemberg and in Germany. Most likely, the water does not support an autochthonous population but is being recolonised by migrating individuals stemming from the Upper Rhine Valley." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de
- 4373.** Westermann, K. (2003): Schlüpfabundanz und Schlüpfhabitat des Frühen Schilffjägers (*Brachytron pratense*) im Naturschutzgebiet Rheinniederung Wyhl-Weisweil. *Naturschutz am südlichen Oberrhein* 4(1): 99-112. (German, with English summary) [Germany. "In the nature reserve 'Rheinniederung Wyhl-Weisweil' (county of Emmendingen, Baden-Württemberg) with a total area of 1350 ha, exuviae of *B. pratense* were collected quantitatively as far as possible. At least 48 waters were inhabited by the species, with a total count of at least 400 freshly emerged imagoes. The highest abundances found were 39 exuviae/100m resp. 21 exu-

viae/50 m of water body length. Five waters yielded more than 50% and 15 waters more than 75% of all exuviae recorded. The population as a whole appears to be stable, supported by a few densely populated waters and a multitude of waters with medium or low abundances. *B. pratense* is common along spring fed waters ("Gießen"), ground water fed ponds, oxbows, excavated pools and backwaters of the Rhine river. All of these water types are stagnant or only slowly flowing and have extended zones of shallow water - these are probably the crucial habitat factors. The abundances of exuviae rise with the width of the zones of shallow water. Very shallow waters prone to sporadic desiccation are avoided. The habitat used for emergence and its usage during the process of emergence are described in detail." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

4374. Westermann, K. (2003): Zum Schlüpfsubstrat der Gebänderten Prachtlibelle (*Calopteryx splendens*) an südbadischen Altrheinen. *Naturschutz am südlichen Oberrhein* 4(1): 95-98. (in German, with English summary). [Germany, Baden-Württemberg; "Larvae *C. splendens* preferred several reed species for emergence. Shrubs thriving along the shoreline were used only sporadically. In most cases the imagoes emerged on the lower surface or on the edges of the substrate. Accordingly, the angle between larva and the horizontal line ranged from 90° to 180°. On a bridge made of concrete with a rough surface, the ceiling (180°) was clearly preferred over diagonal parts of the bridge. Vertical pillars and foundations, however, were usually avoided." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

4375. Westermann, K. (2003): Zum Status der Großen Königlibelle (*Anax imperator*) im höheren Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(1): 81-85. (in German, with English summary). [Germany, Baden-Württemberg. "Hitherto, useful data about occurrences of *A. imperator* in higher elevations of the Black Forest were very scarce. Successful reproduction was shown for the species in a pond at 830 m a.s.l. during two years, and, in the year 2003, in two ponds at 900 and 915 m a.s.l., respectively. In three more ponds at altitudes of up to 944 m a.s.l., ovipositions were observed. *A. imperator* was found almost exclusively in ponds with turbid or humic water, in which the water temperatures climb markedly during the summer. The waters were furnished with dense vegetation made up of floating-leaved aquatic macrophytes or at least with low reed vegetation." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

4376. Westermann, K. (2003): Zur Konkurrenz zwischen der Pokaljungfer (*Cercion lindenii*) und der Hufeisen-Azurjungfer (*Coenagrion puella*) an Altrheinen bei Weisweil (Landkreis Emmendingen). *Naturschutz am südlichen Oberrhein* 4(1): 91-94. (in German, with English summary). [Germany, Baden-Württemberg. "The once predominant damselfly species *C. puella* has become much less abundant in the backwaters of the Rhine river following the immigration of another Coenagrionid species, *C. lindenii*, which has established very large populations over the course of one or two decades. In backwaters which remain cool during the

summer or which are shallow, as well as in small water bodies, *C. lindenii* has remained scarce so that *C. puella* could maintain its original population sizes. A collapse of the *C. lindenii* populations following a major flood event led to a significant rise in the population sizes of *C. puella*. The data presented here support the hypothesis brought forward repeatedly that *C. puella* has become largely replaced by *C. lindenii* in many waters of the Upper Rhine valley in southern Baden." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

4377. Westneat, M.W.; Betz, O.; Blob, R.W.; Fezzaa, K.; Cooper, W.J.; Lee, W.-K. (2003): Tracheal Respiration in Insects Visualized with Synchrotron X-ray Imaging. *Science* 299, 24 January 2003: 558-560. (in English). ["...We observed this mechanism of active tracheal respiration in some members of diverse groups of endopterygote insects (beetles, butterflies, flies) as well as in Hemiptera, Orthoptera, Dermaptera, Blattodea, and more basal insect lineages such as Odonata. The spectacular diversity of insects likely includes a range of respiratory mechanisms, some of which depend on the compression and expansion of the tracheal system in a lung-like manner as the means to exchange gases with the environment." (Authors)] Address: Westneat, M.W., Department of Zoology, Field Museum of Natural History, Chicago, IL 60605, USA. E-mail: mwestneat@fieldmuseum.org

4378. Winkel, S.; Gall, M.; Kuprian, M. (2003): NABU-Artenschutzprojekt Helm-Azurjungfer. *Jahrbuch Naturschutz in Hessen* 8: 136-138, 230. (in German). [Four recent discoveries of *Coenagrion mercuriale* in Hessen, Germany are briefly presented and measures for conservation outlined. For more details see: <http://hessen.nabu.de/modules/presseservicehessen/index.php?s how=10>] Address: Gall, M., Bahnhofstr. 47, D-35510 Butzbach-Ostheim, Germany

4379. Winterholler, M. (2003): Rote Liste gefährdeter Libellen (Odonata) Bayerns. *Berichte des Bayerischen Landesamtes für Umweltschutz* 166: 59-61. (in German). [Bayern, Germany; revised red list of endangered Odonata] Address: Winterholler, M., Liebig-Str. 30, D-85354 Freising, Germany

4380. Wootton, R.J.; Herbert, R.C.; Young, P.G.; Evans, K.E. (2003): Approaches to the structural modelling of insect wings. *Philosophical Transactions: Biological Sciences* 358(1437): 1577-1587. (in English). ["Insect wings lack internal muscles, and the orderly, necessary deformations which they undergo in flight and folding are in part remotely controlled, in part encoded in their structure. This factor is crucial in understanding their complex, extremely varied morphology. Models have proved particularly useful in clarifying the facilitation and control of wing deformation. Their development has followed a logical sequence from conceptual models through physical and simple analytical to numerical models. All have value provided their limitations are realized and constant comparisons made with the properties and mechanical behaviour of real wings. Numerical modelling by the finite element method is by far the most time-consuming approach, but has real potential in analysing the adaptive significance of structural details and interpreting evolutionary trends. Published examples are used to review the strengths and weak-

nesses of each category of model, and a summary is given of new work using finite element modelling to investigate the vibration properties and response to impact of hawkmoth wings." (Authors) The paper contains references to Odonata.] Address: Wootton, R.J., School of Biol. Sciences, University of Exeter, Hatherly Laboratories, Prince of Wales Road, Exeter EX4 4PS, UK

4381. Zakaria, T. (2003): CIA used dragonfly, catfish as spy gadget models. *Argia* 15(4): 27. (in English). [Verbatim from *Argia* 15(4): 27: "CIA USED DRAGONFLY, CATFISH AS SPY GADGET MODELS from the web. Original article by Tabassum Zakaria (from Reuters, article appeared 28 Oct 2003) LANGLEY, Va. (Reuters) - The CIA once built a mechanical dragonfly to carry a listening device but found small gusts of wind knocked it off course so it was never used in a spy operation. The agency also tested a 24-inch-long rubber robot catfish named "Charlie" capable of swimming inconspicuously among other fish and whose mission remains secret. Charlie and the dragonfly were among spy gadgets displayed at CIA headquarters in an exhibit to mark the 40th anniversary of the Directorate of Science and Technology. It is not open to the public. "Charlie's mission is still classified, we can't talk about it," Toni Hiley, curator of the CIA museum, told Reuters on a tour of the exhibit "All we can say is he's our work on aquatic robotic technologies." After seeing the life-like "insectothopter," Hiley jokes that she cannot look at a dragonfly the same way anymore. In the 1970s the CIA had developed a miniature listening device that needed a delivery system, so the agency's scientists looked at building a bumblebee to carry it. They found, however, that the bumblebee was erratic in flight, so the idea was scrapped. An amateur entomologist on the project then suggested a dragonfly and a prototype was built that became the first flight of an insect-sized machine, Hiley said. A laser beam steered the dragonfly and a watchmaker on the project crafted a miniature oscillating engine so that the wings beat, and the fuel bladder carried liquid propellant. Despite such ingenuity, the project team lost control over the dragonfly in even a gentle wind. "You watch them in nature, they'll catch a breeze and ride with it. We, of course, needed it to fly to a target. So they were never deployed operationally, but this is a one-of-a-kind piece," Hiley said."]

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4382. Abro, A. (2004): The female seminal receptacle and accessory glands in *Pyrrhosoma nymphula* (Sulzer) (Zygoptera: Coenagrionidae). *Odonatologica* 33(3): 237-244. (in English). ["Sperm, transmitted to the female as individual filamentous cells suspended in a liquid medium, are discharged into a thick-walled pouch, the receptaculum seminis, on the dorsum of the vaginal canal. Spermatozoa soon appear concentrated in a single, smaller, pear-shaped accessory sac, the spermatheca, attached to the receptaculum-vagina junction. Particular cells in the wall of the accessory sac secrete a material that is thought to be added to the sperm concentrate. The purpose of the accessory sac is to serve as a store of spermatozoa for use in fertilization. A pair of posterior accessory glands has each an efferent duct that opens into the distal region of the vaginal canal; these ducts are provided with an elaborate muscular

apparatus probably serving as a pump; in fresh material, efferently directed peristaltic waves have been observed. The glands are presumed to contribute to the investment of the eggs. The apical domains of the glandular epithelial cells contain intraplasmic assemblages of multiplying bacteroids. They are likely to be transferred to the ooplasm and thereby transmitted to a new generation." (Author)] Address: Abro, A., Division of Anatomy, Departments of Biomedicine, University of Bergen, Jonas Lies vei 91, N-5009 Bergen, Norway

4383. Apodaca, C.K.; Chapman, L.J. (2004): Adult Zygoptera of Kibale National Park, Uganda: habitat associations and seasonal occurrence. *Odonatologica* 33(2): 129-146. (in English). ["In this study, a 10-month survey of four aquatic sites in Kibale National Park, Uganda was used to quantify seasonal and spatial variation in both limnological features of the sites and adult damselfly assemblage structure. Of the 4 limnological characters measured dissolved oxygen was the most variable among sites, ranging from an average of 1.01 mg l⁻¹ in the interior of the Rwembaita Swamp (a papyrus-dominated wetland) to 6.71 mg l⁻¹ in an inflowing tributary of the swamp. Species richness was similar among sites and did not correlate with dissolved oxygen concentration. However, site was a significant predictor of occurrence for some spp. This suggests that site effects are important, and that a combination of site-specific environmental characters may underlie the observed distributional patterns. Seasonal fluctuation in rainfall was not a good predictor of Zygoptera activity. Several species were active in both the wet and dry seasons. Surprisingly, adult *Proischnura subfurcatum* were detected year-round in the hypoxic waters of the Rwembaita (papyrus) Swamp and did not occur at any other sites in the larval or adult phase, suggesting that this species is a swamp specialist." (Authors)] Address: Apodaca, C.K., Fairbanks Fish and Wildlife Field Office, 101 12th Ave., Box 17, Room 222, Fairbanks, AK 99701-6236, USA. E-mail: ChrissyApodaca@fws.gov

4384. Apodaca, C.K.; Chapman, L.J. (2004): Larval damselflies in extreme environments: behavioral and physiological response to hypoxic stress. *Journal of Insect Physiology* 50(9): 767-775. (in English). ["The extensive papyrus (*Cyperus papyrus*) swamps of East and Central Africa form a habitat of great ecological importance due to their extent, the extreme and chronic hypoxia of the interior swamp, and the unique assemblages of water-breathing insects that characterize these communities, including zygopteran (damselfly) larvae. The major goal of this study was to quantify physiological and behavioral responses of gilled and gill-less damselfly larvae of a papyrus swamp specialist, *Proischnura subfurcatum*, to low-oxygen conditions. Gill autotomization was common in *P. subfurcatum* of the Rwembaita Swamp in Kibale National Park, Uganda, with one to three gills missing from 56% of the specimens surveyed. We examined behavioral (ventilation activity and vertical migration) and physiological (metabolic rate) response to hypoxia in gilled and gill-less *P. subfurcatum*. Behavioral response to progressive hypoxia indicated that gill-less individuals rely more on use of wing sheaths (lifting and spreading) than gilled *P. subfurcatum* larvae. However, both morphs migrated to the surface to gain contact with atmospheric air under extreme hypoxia. On average, the rate of oxygen consumption of gill-less individuals was 51% lower than that of gilled individuals. This observed metabolic de-

pression in gill-less *P. subfurcatum* may be attributed to the loss of major respiratory appendages. However, the apparent ability of both gilled and gill-less individuals to maintain their metabolic rates to a similar critical tension suggests other mechanisms may compensate for loss of gills, though not enough to mediate metabolic depression." (Authors)] Address: Apodaca, Christine, Fairbanks Fish and Wildlife Field Office, 101 12th Avenue, Box 17, Room 222, Fairbanks, AK 99701-6236, USA. E-mail: chrissyapodaca@fws.gov

4385. Artiss, T. (2004): Phylogeography of a facultatively migratory dragonfly, *Libellula quadrimaculata* (Odonata: Anisoptera). *Hydrobiologia* 515(1-3): 225-234. (in English). ["The biogeography of a widely distributed dragonfly (*Libellula quadrimaculata*) was examined via a phylogenetic analysis of 416 bp of the mitochondrial cytochrome oxidase I subunit (COI). Phylogenetic analyses under parsimony and minimum evolution produced trees with similar topologies, and revealed strong support for three clades corresponding to populations in Asia, Europe and North America. However, resolution was poor within clades, and genetic distances between populations within continents was quite low (1.2%). Several populations of this species are known to engage in periodic mass migrations, and it is possible that introgression from gene flow due to the mobility of this species has obscured phylogenetic patterns within continents. I was unable to test for phylogenetic patterns coincident with historical glacial refugia given the lack of phylogenetic patterns within continents. However, given that some sequence divergence was observed between populations within continents, it is possible that phylogenetic patterns exist, and subsequent studies should make use of larger data sets, and molecular data from faster evolving genes. Despite the propensity for periodic, short distance migrations in *L. quadrimaculata*, gene flow appears to be limited and does not influence the phylogenetic relationships of populations between continents." (Author)] Address: Artiss, T., Lakeside School, 14050 1st Ave NE, Seattle, WA-98125, U.S.A. E-mail: thomas.artiss@lakesideschool.org

4386. Assis, J.C.F. de; Carvalho, A.L.; Nessimian, J.L. (2004): Composição e preferência por microhabitat de imaturos de Odonata (Insecta) em um trecho de baixada do Rio Ubatiba, Maricá-RJ, Brasil. *Rev. Bras. entomol.* 48(2): 273-282. (in Portuguese, with English summary). ["Composition and microhabitat preferences of Odonata (Insecta) immatures in a lowland section of the Rio Ubatiba, Maricá-RJ, Brazil. Monthly sampling was held from May, 1999 to May, 2000 in the Rio Ubatiba, a lowland river situated at Maricá district, Rio de Janeiro State, Brazil. Seven different substrates were collected along fifty meters. A total of 1,279 larvae of Odonata were collected and identified in 27 species, belonging to five families. The most numerous species were *Acanthagrion lancea* (Selys, 1876), *Hetaerina auripennis* (Burmeister, 1839), *Micrathyrina hesperis* Ris, 1911 and *Telabasis filiola* (Perty, 1834). The greatest number of individuals were found in "riparian plants in depositional areas". In general, the species recorded showed habitat preferences: *Dythemis multipunctata* Kirby, 1894, *Erythrodiplax* sp., *M. hesperis*, *T. filiola*, *A. lancea*, *Erythemis* sp., *Coryphaeschna adnexa* (Hagen, 1861) and *H. auripennis* seem to prefer organic substrates and *Brechmorhoga* sp., *B. praecox* (Hagen, 1969) and *Progomphus complicatus* Selys, 1854, inorganic substrates." (Authors)] Address: Carvalho, A., Departamento

de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Brasil. E-mail: alagoc@acd.ufrj.br

4387. Averill, M. (2004): New from Worcestershire. *Darter* 21: 9. (in English). [Records of some interesting species are referred. The population of *Gomphus vulgatissimus* along the river Severn seems to drop.] Address: Averill, M., 49 James Road, Kidderminster, Worcs., DY10 2TR, UK

4388. Baber, J.M.; Fleishman, E.; Babbitt, K.; Tarr, T. (2004): The relationship between wetland hydroperiod and nestedness patterns in assemblages of larval amphibians and predatory macroinvertebrates. *Oikos* 107(1): 16-27. (in English). ["Assemblages exhibit nested distributional patterns if the species found in species-poor locations also occur in progressively richer locations. We investigated patterns of nestedness in assemblages of larval amphibians and predatory macroinvertebrates in 42 isolated freshwater wetlands in southern New Hampshire, USA. These wetlands varied markedly in hydroperiod and we predicted that nestedness would be relatively weak because changes in disturbance processes (the relative threat of desiccation and predation) along the hydroperiod gradient often generate distinct assemblages. Contrary to expectations we found that both amphibian and macroinvertebrate assemblages were strongly nested not only with respect to species richness but also with respect to hydroperiod and wetland size, which were positively correlated. We attribute our results to the increased colonization rates and decreased extinction rates associated with increasing hydroperiod, and to concomitant increases in wetland size, habitat heterogeneity / complexity, and possibly water temperature. Moreover, the impact of predatory fishes on species richness and composition of amphibians and macroinvertebrates was relatively minor. We found that amphibians had a significantly lower degree of nestedness than macroinvertebrates, suggesting that a higher proportion of amphibian species found in species-poor assemblages was unlikely to occur in species-rich assemblages of amphibians (e.g. wood frogs and spotted salamanders). The degree of nestedness appeared to be influenced primarily by hydroperiod and wetland size for amphibians, whereas nestedness of macroinvertebrates was influenced by unknown factors (possibly water temperature) in addition to hydroperiod and wetland size. The high degrees of nestedness observed in amphibian and macroinvertebrate assemblages imply that protection of larger, more permanent wetlands may be more important for conserving native biological diversity than protection of smaller, non-permanent wetlands. However, non-permanent wetlands are used by several species of conservation concern that often do not occur in larger and more permanent wetlands." (Authors)] Address: Baber, M.J., Dept of Natural Resources, Univ. of New Hampshire, 215 James Hall, Durham, NH 03824, USA. E-mail: matthew.baber@unh.edu

4389. Baranowska, A.; Zawal, A. (2004): Dragonflies (Odonata) of the Binowskie Lake in the Szczeciński Landscape Park. *Parki Narodowe i Rezerваты Przyrody* 23: 111-120. (in Polish with English summary). [Between 1999 - 2000, a total of 34 dragonfly species were collected. *Calopteryx splendens*, *Lestes dryas*, and *Sympteryx danae* were represented by adults only, and were regarded as immigrants. "The odonate fauna

of the area comprises primarily of eurytopic species with *Enallagma cyathigerum* (dominant) and *Ischnura elegans*, *Erythromma najas*, *Coenagrion pulchellum*, *C. puella*, and *Platycnemis pennipes* (subdominants), the most abundant species, which contributed together to more than 70% of the collection. Due to a high habitat complexity, *Platycnemis pennipes*, a rheophile species occurring also in lentic waters with abundant vegetation, and *Orthetrum cancellatum*, inhabiting mainly extensive lentic areas with poor vegetation, were quite frequent. There were also species such as *Lestes sponsa*, *L. virens*, *Coenagrion hastulatum*, *Aeshna juncea*, *Somatochlora flavomaculata*, and *Libellula fulva*, that are associated with peat bogs and/or dystrophic habitats. The first three of the above listed species inhabited exclusively sites in a peaty cove (stations 7 and 8)(Table 1). The sites located on a small beach (stations 9 and 10) provided a single larva of *Anax imperator* (an Ethiopian - Mediterranean species) and a single larva of *Aeshna viridis* (a protected species, associated with *Stratiotes aloides*)." (Authors)] Address: Anna Baranowska, Andrzej Zawal: Katedra Zoologii Bezkręgowców i Limnologii, Uniwersytet Szczeciński, ul. Waska 13, 71 415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

4390. Barlow, A.E. (2004): Third report of the New Jersey Odonata Survey - including one state record, numerous county records and corrections of previous literature. *Argia* 15(4): 16-21. (in English). [USA, New Jersey; new state record: *Sympetrum danae*. The records are documented species wise.] Address: Barlow, A.E., 10 Belle Court, Budd Lake, NJ 07828, USA. E-mail: a.barlow@njodes.com

4391. Batty, P. (2004): Addendum to Scottish Report: Dragonflies in Argyll. *Darter* 21: 6. (in English). [Scotland, UK; *Somatochlora metallica*, *Aeshna cyanea*] Address: Batty, Pat, Kirnan Farm, Kilmichael Glen, Lochgilphead, Argyll, PA31 8QL, UK. E-mail: battypatm@hotmail.com

4392. Beckemeyer, R.J. (2004): Measurements of total fresh mass for some species of Odonata from Kansas and Missouri, United States. *Notulae Odonatologicae* 6(3): 33-34. (in English). [Kansas, Missouri, USA; mass data of the following odonate taxa are given: *Lestes disjunctus australis*, *Argia apicalis*, *Enallagma basidens*, *E. civile*, *E. exsulans*, *E. vesperum*, *Ischnura posita*, *Ischnura verticalis*, *Anax junius*, *Dromogomphus spinosus*, *Gomphus externus*, *G. militaris*, *Macromia illinoensis*, *M. pacifica*, *Epithea princeps*, *Celithemis eponina*, *Dythemis fugax*, *Erythemis simplicicollis*, *Erythrodiplax umbrata*, *Libellula luctuosa* Burmeister, *L. pulchella*, *Pachydiplax longipennis*, *Pantala flavescens*, *Perithemis tenera*, *Plathemis lydia*, *Sympetrum corruptum*, *Tamea lacerata*, and *T. onusta*.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

4393. Bedjanic, M. (2004): Odonata fauna of Sri Lanka: research state and threat status. *International Journal of Odonatology* 7(2): 279-294. (in English). ["Altogether 116 odonate species are known from Sri Lanka. The level of endemism is high - 53 taxa or 45.7% are confined to the island. The Chlorocyphidae, Euphaeidae, Protoneuridae, Platystictidae, Gomphidae and Corduliidae consist of almost exclusively endemic taxa. The odonate fauna of Sri Lanka is still insufficiently

known. Knowledge on distribution, biology and taxonomy of adults and especially larval forms is very poor. An assessment of threat status showed that it is very endangered due to habitat destruction. A list of 47 endangered odonate taxa has been compiled. It consists of exclusively endemic taxa and comprises more than 80% of described species confined to the island. Altogether 20 species are preliminary put in the IUCN categories 'extinct' (EX) and 'critically endangered' (CR) and are urgently proposed for inclusion in the IUCN Red List. Future Odonatological research priorities and recommendations are given. Special attention should be devoted to the work dealing with taxonomy of larval forms and adults. Serious faunistic mapping should cover the whole island and should be focused on still preserved areas. Simultaneously also the research of biology of selected species and research of seasonal phenology of adult Odonata should be carried out. Effective nature conservation measures in declared protected areas as well as the establishment of new protected areas and corridors in the Wet zone is of biggest importance for effective long-term preservation of a rich endemic fauna and flora of Sri Lanka, including odonates." (Author)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

4394. Behrstock, R.A.; Danforth, D.; Upton, S. (2004): Yaqui dancer (*Argia calcooki*, Daigle 1995), new distributional records for northeastern Mexico and the U.S.. *Argia* 16(2): 11-16. (in English). [Brief introduction into the biodiversity of the genus *Argia* and problems of their correct determination. Special emphasis is given to specimens photographed on 8-IX-1998 at San Bernardino, National Wildlife Refuge, Cochise County, SE Arizona, USA, which turned out to be *Argia carlcooki* new for USA and northern Mexico. The identification key of R. Garrison (1994) is extended and amended by this species. Numerous drawings and colour photos help with identification of *A. carlcooki* and resembling species.] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@cox.net

4395. Beketov, M.A. (2004): Comparative sensitivity to the insecticides Deltamethrin and Esfenvalerate of some aquatic insect larvae (Ephemeroptera and Odonata) and *Daphnia magna*. *Russian Journal of Ecology* 35(3): 200-204. (in English). ["Sensitivity to the pyrethroids deltamethrin and esfenvalerate (aqueous solution) and LC50 have been determined in acute (96-h) toxicological tests on mayfly larvae (*Cloeon dipterum* and *Caenis miliaria*), damselfly larvae (*Lestes sponsa* and *Cordulia aenea*), and juveniles from a laboratory culture of *Daphnia magna*. Sensitivity to deltamethrin increases in the series *C. aenea* (Odonata) < *D. magna* (Cladocera) < *L. sponsa* (Odonata) < *C. miliaria* (Ephemeroptera) < *C. dipterum* (Ephemeroptera), and that to esfenvalerate, in the series *C. aenea* < *D. magna* < *L. sponsa* < *C. miliaria* < *C. dipterum*. The values of LC50 about 0.01 µg/l determined for mayfly larvae are below those known for various hydrobionts from the literature, indicating a very high sensitivity of these insects to pyrethroids." (Author)] Address: Beketov, M.A., Institute of Animal Systematics and Ecology, Siberian Division, Russian Academy of Sciences, ul. Frunze 11, Novosibirsk, 630091 Russia

4396. Benstead, J.P.; Pringle, C.M. (2004): Deforestation alters the resource base and biomass of endemic stream insects in eastern Madagascar. *Freshwater Biology* 49: 490-501. (in English). ["1. Rainforest streams in eastern Madagascar have species-rich and diverse endemic insect communities, while streams in deforested areas have relatively depauperate assemblages dominated by collector-gatherer taxa. We sampled a suite of benthic insects and their food resources in three primary rainforest streams within Ranomafana National Park in eastern Madagascar and three agriculture streams in the park's deforested peripheral zone. We analysed gut contents and combined biomass and stable isotope data to examine stream community responses to deforestation in the region, which is a threatened and globally important hotspot for freshwater biodiversity. 2. Gut analyses showed that most taxa depended largely on amorphous detritus, obtained either from biofilms (collector-gatherers) or from seston (microfilterers). Despite different resource availability in forest versus agriculture streams, diets of each taxon did not differ between stream types, suggesting inflexible feeding modes. Carbon sources for forest stream insects were difficult to discern using $\delta^{13}C$. However, in agriculture streams dependence on terrestrial carbon sources was low relative to algal sources. Most insect taxa with $\delta^{13}C$ similar to terrestrial carbon sources (e.g. the stonefly *Madenemura*, the caddisfly *Chimarra* sp. and *Simulium* blackflies) were absent or present at lower biomass in agriculture streams relative to forest streams. Conversely, collector-gatherers (*Afroptilum* mayflies) relied on algal carbon sources and had much higher biomass in agriculture streams. 3. Our analyses indicate that a few collector-gatherer species (mostly Ephemeroptera) can take advantage of increased primary production in biofilms and consequently dominate biomass in streams affected by deforestation. In contrast, many forest stream insects (especially those in the orders Plecoptera, Trichoptera and Diptera) depend on terrestrial carbon sources (i.e. seston and leaf litter), are unable to track resource availability and consequently decline in streams draining deforested landscapes. These forest-specialists are often micro-endemic and particularly vulnerable to deforestation. 4. The use of consumer biomass data in stable isotope research can help detect population-level responses to shifts in basal resources caused by anthropogenic change. We also suggest that restoration of vegetated riparian zones in eastern Madagascar and elsewhere could mitigate the deleterious effects of deforestation on sensitive, endemic stream taxa that are dependent on terrestrial carbon sources." (Authors) *Libellula* sp. is listed in table 2.] Address: Benstead, J.P., The Ecosystems Center, Marine Biological Laboratory, Woods Hole, Massachusetts 02543, MA, U.S.A. E-mail: jbenstead@mbl.edu

4397. Berger, C. (2004): *Dragonflies*. Stackpole Books. ISBN 0-8117-2971-0: 134 pp. (in English). [This field guide focuses not on the species descriptions, but in the introductory material, which covers slightly more than half of the entire (thoroughly treated and illustrated) book. Beginning with life history, Cynthia Berger continues with chapters on flight, territoriality, mating, oviposition, prey capture, thermal regulation, migration, construction of a dragonfly pond, etc.. The remainder of the book is devoted to the identification of 27 odonates from eastern US, four Zygoptera and 23 Anisoptera. The author aims to facilitate identification of the more common species encountered in the eastern US, it is

not intended to provide a complete identification key. Each of the 27 species has a page or two, an attractive colored picture, and discussion of habitat and behaviour. The species provided should facilitate to recognize any odonate at least at the family level. The author finishes with a list of useful books, contact addresses, organizations, web sites, and field equipment. This is an easy to read introduction in Odonata which will help many people to get more closely interested in dragonflies. (Martin Schorr)] Address: Stackpole books, 5067 Ritter Rd, Mechanicsburg, PA 17055-6921, USA. www.stackpolebooks.com

4398. Bernard, R.; Ivinskis, P. (2004): *Orthetrum brunneum*, a new species in Lithuania. *Acta Zoologica Lituonica* 14(3): 31-36. (in English, with Lithuanian summary). [*O. brunneum*, "was recorded in two localities in the years 2001-2003. The northernmost position of these localities, probably of the whole species' range, is shown and discussed with reference to climate-related changes in the range and numbers of this species and some other species. The habitat is described and discussed in comparison with the data from central Europe. The establishing of more permanent populations of *O. brunneum* in these latitudes is questionable; its occurrence in Lithuania seems to be dependent on allochthonous nomadic individuals." (Authors)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Fredry 10, PL-61-702 Poznań, Poland; E-mail: rbernard@main.amu.edu.pl

4399. Béthoux, O.; Galtier, J.; Nel, A. (2004): Earliest evidence of insect endophytic oviposition. *Palaios* 19 (4): 408-413. (in English) ["The knowledge of fossil plant-insect interactions is almost entirely restricted to evidences of feeding behavior. Records of endophytic oviposition are relatively scarce, with previous earliest reports from the Middle to the early Late Triassic. Nevertheless, several Paleozoic insect taxa have been suspected of this reproductive behavior, but without any direct evidence. Specimens of *Calamites cistii* (Sphenophyta; Pennsylvanian, France) are described showing endophytic cavities, located in the outer cortex of the stem, a tissue that is rarely preserved. This new record shifts the appearance of this behavior back 60 Ma. Possible tracemakers are representatives of the Odonoptera (Odonata and related extinct taxa), Palaeodictyopteroidea (extinct palaeopterous orders), and Archaeorthoptera (Orthoptera and related extinct orders). The antiquity of the insect endophytic oviposition behavior suggests that it could have been important during the emergence and diversification of the insect group." (Authors)] Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

4400. Beukema, J.J. (2004): Recognition of conspecific females by males of *Calopteryx haemorrhoidalis* (Vander Linden) (Zygoptera: Calopterygidae). *Odonatologica* 33(2): 147-156. (in English). ["Males of calopterygid damselflies appear to court females of other (related, sympatric) species only rarely. Apparently, females of this group bear species-specific characteristics that release sexual behaviour in conspecific males only. Sympatric *Calopteryx* species usually differ conspicuously in pigmentation (colour, transparency, darkness) of their wings. Female *C. haemorrhoidalis* differ from all other European species by the presence of a dark distal zone in the hindwings. - The relative value of various

(manipulated) sets of female wings for elicitation of male courtship was assessed using choice experiments. *C. haemorrhoidalis* males did not court wingless females of their own species nor did they court conspecific females with wings of the sympatric *C. xanthostoma*. However, the presence of a single wing of a conspecific female was sufficient to elicit courtship behaviour. Choices between 2 female models (presented simultaneously to territorial male individuals) revealed that the presence of a contrasting dark zone was an important distinguishing characteristic, whereas too high a transparency (a single wing as opposed to a set of 2 or 4 wings pressed against each other) greatly diminished the value of a model. The need for the presence of a dark zone will be effective in precluding courtship of females of other sympatric species. The need for sufficiently low transparency will put a check on courtship attempts of immature females." (Author)] Address: Beukema, J.J., Royal Netherlands Institute for Sea Research, P.O. Box 59, NL-1790 AB Den Burg, Texel, The Netherlands. E-mail: janb@nioz.nl

4401. Beynon, T. (2004): Book Review: Dragonflies of Bedfordshire. ISBN 0950652172. J. Br. Dragonfly Society 20(2): 83-84. (in English). [oas 15] Address: Beynon, T.G.; 34 Church Lane, Checkley, Stoke-on-Trent, Staffordshire ST10 4NJ, United Kingdom

4402. Beynon, T. (2004): Dragonfly Conservation from the BDS. *Atropos* 22: 63-64. (in English). ["[...] If you check the website www.dragonsoc.org.uk you will see a number of "Management Fact Files" on individual species. These collate the most up-to-date information, including case studies where possible. This is a major project for the Conservation Officer, and we decided to start with the rarest and most threatened, and then proceed 'downwards' to the commonest. When complete we have been promised funding to produce a book for conservationists and land managers. A new edition of *Managing Habitats* is being worked upon to fill the gap before the definitive book appears." (Author)] Address: Beynon, T., 34 Church Lane, Checkley, Stoke-on-Trent, Staffordshire, STW 4N, UK

4403. Beynon, T.G.; Goddard, D.P. (2004): Notes on the oviposition and flight attitude of the Brilliant Emerald *Somatochlora metallica* (Vander Linden) in Scotland. *J. Br. Dragonfly Society* 20(2): 77-78. (in English). ["...differences may exist in the oviposition behaviour of *S. metallica* in the two areas of Britain in which it occurs. Fox observed oviposition into Sphagnum lawns and damp peat in Scotland, whereas females were observed dropping eggs onto the water surface in southern England. Thus *S. metallica* may adopt one of two different oviposition behaviours. These may be determined by differences in the substrate into which the eggs are being released. Alternatively, these differences may be a function of two disjunct British populations, each of which may be the result of separate postglacial colonizations. ..." (Authors)] Address: Beynon, T.G.; 34 Church Lane, Checkley, Stoke-on-Trent, Staffordshire ST10 4NJ, United Kingdom

4404. Biswas, S.; Chatterjee, M.; Haldar, D.P. (2004): New Species of *Odonaticola* Sarkar et Haldar, 1981 (Apicomplexa: Conoidasida) from Dragonflies (Insecta: Odonata) in West Bengal, India. *Acta Protozoologica* 43: 183-191. (in English). ["Descriptions of four new species of the genus *Odonaticola* Sarkar et Haldar,

1981 (Apicomplexa: Conoidasida) from dragonflies (Insecta: Odonata) in the family Libellulidae in West Bengal are presented. These include: *Odonaticola bradinyoga* sp. n. from *Bradinyoga geminata*; *O. aspinosa* sp. n. from *Crocothemis servilia servilia*; *O. abhoytura* sp. n. from *Pantala flavescens* and *O. amojya* sp. n. from *C. s. servilia*." (Authors)] Address: Biswas, S., Protozoology Laboratory, Department of Zoology, University of Kalyani, Kalyani, West Bengal, India

4405. Blust, M. (2004): Vermont DSA gathering - county counts are big winner. *Argia* 16(2): 8-9. (in English). [USA; brief report on the meeting a few results from fieldwork in the framework of the meetin in 2004 (no additional date available)] Address: not stated

4406. Bocanegra, O.R. (2004): First record of *Tetragoneuria spinosa* for Texas. *Argia* 15(4): 23-24. (in English). [Davy Crockett National Forest, Houston County, Texas, USA: 13 March 2003] Address: Bocanegra, O.R., U.S.Fish and Wildlife Service, 711 Stadium Drive, Suite 252, Arlington, Texas 76011, USA

4407. Boronka, R. (2004): 2004 Great Lakes Odonata meeting. *Argia* 16(2): 9-10. (in English). [USA, Ohio, 23-26. June 2004; a few field notes are outlined.] Address: Boronka, Renee, Center for Conservation & Biodiversity, Cleveland Museum of natural History, USA

4408. Bouchard, R.W. (2004): Chapter 5. Odonata (Dragonflies & Damselflies). In: Guide to aquatic macroinvertebrates of the Upper midwest. Water Resources Center, University of Minnesota, St. Paul, MN. 208 pp: 63-73. (in English). [Introduction in larval morphology, and key on the family level.] Address: <http://wrc.coafes.umn.edu/VSMP/pdf/GuideContentsForeward.pdf>; /pdf/GuideChapter5.pdf

4409. Boudot, J.-P.; Grand, D.; Grebe, B.; Hacet, N.; Marinov, M. (2004): Description of the female of *Somatochlora borisi* with distributional notes on the species (Odonata: Corduliidae). *International Journal of Odonatology* 7(3): 431-438. (in English). ["The morphology of the hitherto unknown female of *Somatochlora borisi* is described and illustrated basing upon eight adults from Bulgaria, Greece and Turkey. A key is provided which allows the determination of the females of all West Palaearctic *Cordulia* and *Somatochlora* spp. A list of the presently known localities and a distribution map show the range of the species as currently known. The species is new to Turkey." (Authors)] Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Note-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. e-mail: boudot@cpb.cnrs-nancy.fr

4410. Bowman, N. (2004): Reports from Coastal Stations - 2003: Eccles-on-Sea, Norfolk. *Atropos* 21: 65-66. (in English). [UK; *Anax parthenope*, *Erythromma viridulum*] Address: not stated

4411. Boyero, L.; Bosch, J. (2004): Multiscale spatial variation of stone recolonization by macroinvertebrates in a Costa Rican stream. *Journal of Tropical Ecology* 20: 85-95. (in English). ["The process of stone recolonization by macroinvertebrates was studied at different spatial scales in a stream in Costa Rica. A hierarchical design was used with riffles nested into reaches, and individual stones nested into riffles. Macroinvertebrate abundance and taxon richness varied at riffle scale, although patterns of variation seemed to change with

time of recolonization, and taxonomic composition varied mostly at reach scale. Patterns of variation of background communities and macroinvertebrate drift at different spatial scales suggest that the contribution of these two sources of colonists to stone recolonization depends on spatial scale. Macroinvertebrate abundance was related to local environmental variables during recolonization, but taxon richness was related to the local environment only in the very first stage of the process. The need for explicitly determining the appropriate spatial scale in the study of substrate recolonization is emphasized." (Authors) "Zygoptera" are listed in Appendix 1 and 2.] Address: Boyero, L., Museo Nacional de Ciencias Naturales (CSIC), José Gutiérrez Abascal 2, 28006 Madrid, Spain. E-mail: luz@mncn.csic.es

4412. Braun, M. (2004): Was die Natur so alles zu bieten hat - Von den naturkundlichen Wanderungen des Hunsrückvereins - 2003. Hunsrückverein, Jahresheft 2004: 77-84. (in German). [Some passing notes referring to Odonata observed in the eastern region of the middle range mountain Hunsrück, the so-called Soonwald, Rheinland-Pfalz, Germany.] Address: Braun, M., SGD Nord, Stresemannstr. 3-5, 56068 Koblenz, Germany

4413. Braune, E. (2004): Dispersal of Namibian dragonflies: Population dynamics in a changing landscape. Abstracts: 5th International Symposium on Tropical Biology. SATELLITE EVENTS: 6th International Symposium on the Chrysomelidae; Workshop on African Odonata (Edited by Bernhard A. Huber); Zoologisches Forschungsinstitut und Museum Alexander König, Adenauerallee 160, 53113 Bonn, Germany: 142. (in English). [Verbatim: In the arid and semi-arid regions of western Namibia water is one of the most limiting and limited resources for biodiversity. Climate change is supposed to increase the problems rising from water deficiency. Due to their aquatic/terrestrial life cycle dragonflies may serve as indicator organisms for changes in the water balance, as they are affected through loss of potential habitats. I developed a model for the prediction of the dispersal of Odonata. The model incorporates a population dynamic model based on extended Leslie matrices. The development rates and the survival rates are mainly dependent on the available food in the aquatic habitat. Inter- and intraspecific competition between the larval stages as a mechanism of density dependent population regulation is also included in the model. The model reproduces population dynamic patterns which are typical for tropical-centered dragonflies. The population dynamic model is embedded in a landscape model developed for three regions (in the biomes Namib desert, Nama karoo and tree and shrub savanna). The spatial realisations are grid-based models with extensions of 50*50 km with a cell size of 1 km². Three different landscape parameters, representing the different habitat preferences of the modelled species *Pantala flavescens*, *Crocothemis erythraea* and *Paragomphus* sp., are used to describe the landscape: presence of water, aquatic vegetation diversity and riverbeds as guidelines. These parameters were gained using both GIS Information and expert knowledge. Different scenarios describing the effects of climate change are realised by dynamic modelling of the landscape parameters. With this model it is possible to simulate reactions of dragonfly populations on landscape changes due to water shortage and to investigate which landscape requirements must be met to avoid regional

extinction.] Address: Braune, E., Institute of Geocology, TU Braunschweig, Langer Kamp 19c, 38106 Braunschweig, Germany. E-mail: e.braune@tu-bs.de

4414. Brauns, M.; Garcia, X.-F.; Pusch, M.; Walz, N. (2004): Beitrag zur Litoralfauna der großen Seen in Brandenburg. *Lauterbornia* 49: 43-72. (in German, with English summary). [In the framework of a project on the implementation of the European Water Framework Directive in the Federal State Brandenburg, Germany, the invertebrate fauna of 31 lakes covering more than 50 ha each was examined in the eu littoral and litoprofundal zones. A total of 254 species or higher taxa have been sampled. These, and literature data are compiled in a table. Most of the Odonata (n=51) are from literature sources, while only 15 taxa have been collected using the sampling method of the authors.] Address: Brauns, M., Institut für Gewässerökologie und Binnenfischerei im Forschungsverbund Berlin e.V., Müggelseedamm 310, D-12561 Berlin, Germany. E-mail: brauns@igb-berlin.de

4415. Briggs, M.W. (2004): Dragonfly lampshades by Louis Comfort Tiffany. *Argia* 16(2): 20-22. (in English). [L.C. Tiffany (1848-1933), master of stained-glass medium and leading proponent in the U.S. of Art Nouveau movement.] Address: Briggs, Martha Wren, Art librarian Emeritus, C.W. Post College of L.I.U.; no address stated

4416. Brockhaus, T. (2004): Entwicklungszyklen und morphometrische Differenzierungen in einer Larvenpopulation von *Platycnemis pennipes* (Pallas) (Zygoptera: Platycnemidae). *Odonatologica* 33(3): 315-325. (in German, with English summary). ["A larval population was studied (1994-1996) on the Zschopau river, Saxony, Germany. In 325 larvae head widths and wing-sheath lengths were measured, and the abdominal segments that were partly or completely covered by the wing-sheaths were counted. Within the population, there was much size variation throughout the yr. This is interpreted in terms of co-occurrence of the univoltine and semivoltine cohorts. The semivoltine F-0 larvae were larger than the univoltine of the same stage. There are more males than females in the larval population." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

4417. Brockhaus, T. (2004): Interspezifische Konkurrenz zwischen *Sympetrum fonscolombii* und *Orthetrum cancellatum* in Mitteleuropa? (Odonata: Libellulidae). *Libellula* 23(1/2): 77-86. (in German, with English summary). ["In 2003, both spp. were observed as common at the pond 'Beuthenteich' (district Stollberg/Erzgebirge, Saxony, Germany). Apart from imaginal records, also larvae of both spp. were sampled. The head widths of 80 larvae of *O. cancellatum* were measured. For seven larvae of *S. fonscolombii* the total length, the head widths and the number of abdominal segments covered by the wing cases were determined. A larva of *S. fonscolombii*, found on 31 August 2003, was damaged partially by predation. The developmental cycles of both species are discussed under the aspect of interspecific competition of the larvae. It is suggested that in 2003 the sp. had three imaginal and two larval generations. However, one can also suggest a retarded development of *S. fonscolombii* because of the presence and the predatory or competitive effect of larger *O. cancellatum*"]

tum larvae in higher densities." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

4418. Brooks, S.; Lewington, R. (2004): Field Guide to the Dragonflies and Damselflies of Great Britain and Ireland. British Wildlife Publishing. Revised edition. ISBN 0 9531399 0 5: 160pp. (in English). [This latest edition of this popular field guide in Britain (first published in 1997) includes minor revisions to the text, but more significantly the addition of two species recently added to the British list: *Lestes barbarus* and *Chalcolestes viridis*. This book covers a wide range of topics; there is a sound introduction to the life history of the Odonata and their ecology, and also a section on good dragonfly sites throughout Britain and (to a lesser degree) Ireland, selected by people with local experience. About two thirds of the book comprises an identification guide, which includes a short section on larvae. Richard Lewington's artwork is of outstanding high quality, with illustrations typically showing the male and female in dorsal view, with one additional lateral view. Clearly distinct colour forms are also illustrated, and close up views show critical structural features where these are of help to species identification. A small-scale map illustrates the distribution of each species. The text to accompany the illustrations covers identification features, ecology and conservation aspects. Mark Tunmore writes in *Atropos* 22 (2004: 55): "The crisp and detailed illustrations combined with authoritative text ensure that it remains an essential publication for British Odonata enthusiasts." And more than this, it is of high interest for the odonatologists on the European continent too, especially due to its illustrations of all the *Anax* species. As happened in France last year, *Anax junius* can be expected in every western European country, and you should not miss it. (Martin Schorr)] Address: British Wildlief Publishing, Lower Barn Rooks Farm, Rotherwick, Hook Hampshire RG27 9BG, UK. www.britishwildlife.com

4419. Brown, G. (2004): Rhode Island Odonata atlas season summary, 2003. *Argia* 15(4): 14-16. (in English). [To fill taxonomic and geographic gaps, the atlas project was continued for a sixth season. Two new state records (*Stylurus spiniceps*, *Neurocordulia obsoleta*) could be added to the list of Rhode Island Odonata. Additional records of special regional interest are documented.] Address: Brown, Virginia, The Nature Conservancy, 159 Waterman Avenue, Providence, RI, 02906, USA

4420. Buczyński, P.; Lewandowski, K. (2004): Long studied „terra incognita” - the state of knowledge of dragonflies (Odonata) of the lakelands in north-eastern Poland. *Wiad. entomol.* 23(2): 97-111. (in Polish, with extensive English summary). [“Sixty one species of dragonflies were found in the lakelands in NE Poland during about 200 years of studies. The history of studies and the state of knowledge are presented. The list of species recorded in four macroregions and numbers of species known from 18 mesoregions are given.” (Authors)] Address: Buczynski, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4421. Buczyński, P.; Serafin, E. (2004): Is the incorporation of the "Krowie Bagno" marsh into the Poleski National Park well-founded? - on the basis of Odonata,

tional Park well-founded? - on the basis of Odonata, aquatic Coleoptera and Trichoptera. *Wiad. entomol.* 23 (Suppl. 2): 125-126. (in Polish, with English summary). [The recent conservational value of this Polish area assessed on the basis of the Odonata, Coleoptera, and Trichoptera is high. *Sympecma paedisca*, *Nehalennia speciosa*, *Aeshna juncea*, *A. viridis*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. pectoralis* are highlighted. A total of 36 odonate species was recorded in 2003.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4422. Bukowsky, N.; Mauersberger, R. (2004): 70 Jahre Naturschutzgebiet (NSG) Thymen. *Naturschutz und Landschaftspflege in Brandenburg* 13(2): 52-55. (in German). [Brandenburg, Germany; 38 odonate species are listed in a table, and the records of 1969 are compared with that of 1994.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerderevereinUeckermark.Seen@t-online.de

4423. Bulankova, E.; David, S. (2004): Die Verbreitung der in den Anhängen II und IV der FFH-Richtlinie aufgeführten Libellen in der Slowakei und ihr ökologischer Status (Odonata). *Libellula* 22(3/4) (2003): 127-138. (in German with English summary). [“In Annex II and IV 16 dragonflies species are included, 8 of which have been recorded in Slovakia: *Coenagrion mercuriale*, *C. ornatum*, *Leucorrhinia albifrons*, *L. pectoralis*, *Ophiogomphus cecilia*, *Gomphus flavipes*, *Sympecma paedisca*, *Cordulegaster heros*. Records of *C. mercuriale* and *L. albifrons* are of historical interest and in the Red List of plants and animals of Slovakia these species are therefore included in the category "Extinct". Records of the "Endangered" species *S. paedisca*, *L. pectoralis* and *O. cecilia* are still made at present. The "Vulnerable" species *C. ornatum* and *G. flavipes* have been recorded in the recent years in Slovakia too. Large populations of *G. flavipes* were found in the Maly Dunaj River (Danube River basin) and its occurrence was confirmed in the River Morava (March River basin) also. Some new localities of the occurrence of the species *Coenagrion ornatum* are in the Danube River basin too. The newest findings of the threatened species *Cordulegaster heros*, which was not included into the Check list of Odonata of Slovakia until now, is important from the european point of view. Our findings indicate the natural character of some biotopes in Slovakia and their high faunistic value.” (Authors)] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; E-mail: Bulankova@nic.fns.uniba.sk

4424. Buss, D.F.; Baptista, D.F.; Nessimian, J.L.; Engler, M. (2004): Substrate specificity, environmental degradation and disturbance structuring macroinvertebrate assemblages in neotropical streams. *Hydrobiologia* 518: 179-188. (in English). [“Structure and composition of benthic macroinvertebrate assemblages were investigated in seven sampling sites with a gradient of environmental integrity and water quality conditions. Composite samples of the four most representative substrates were collected in order to characterize the riffle-pool dynamic in each sampling site. Spatial and temporal variability of macroinvertebrate assemblages were analyzed at two scales: using substrates and grouping samples for comparing sampling sites. Distri-

bution of macroinvertebrates was influenced primarily by substrate type, but also by environmental integrity, water quality and sampling period. Species occurrence was highly dependent on substrate type. At local spatial scale, environmental degradation measured by the Riparian Channel Environmental Inventory and water chemistry were the determinants of assemblage patterns. We evaluated to which extent the substrates were influenced by environmental integrity and water chemistry, and we found that degradation influenced significantly the macroinvertebrate fauna on the four substrate types, although they were not responding to the same variables. Our results show that qualitatively communities were not influenced by seasonal changes, but abundance was stochastically dependent on rainfall." (Authors) On the genus level, seven odonate taxa are listed in table 2 as dwellers of pool litter.] Address: Buss, D.F., Laboratório de Avaliação e Promoção da Saúde Ambiental, Departamento de Biologia, IOC, FIOCRUZ, Av. Brasil 4365, Manguinhos, Rio de Janeiro, RJ, CEP 21045-900, Brazil. E-mail: buss@centroin.om.br

4425. Butler, S.G. (2004): Description of the last instar larva of *Onychogomphus aequistylus* Selys, 1892 (Anisoptera: Gomphidae). *Odonatologica* 33(2): 189-194. (in English). ["An ultimate male final instar larva from NW Madagascar is described and illustrated. Other, smaller larvae collected at the site are used for both support and comparison. Comparisons with the exuviae of 7 other species of the genus *Onychogomphus* are also provided." (Author)] Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, United Kingdom. E-mail: sgbutler@talk21.com

4426. Cade, M. (2004): Reports from Coastal stations - 2003: Portland, Dorset. *Atropos* 21: 47-50. (in English). ["As far as dragonflies were concerned, events in the general Observatory area were relatively quiet during the year, though an *Aeshna mixta* on 13 July was a good early record and a *Sympetrum striolatum* was caught at MV light on the night of 5 August. By contrast, a number of interesting observations were made at Yeolands and Broadcroft Quarries. A *S. fonscolombii* was observed at Broadcroft on 9 June and one or more were at Yeolands in early July. After the sightings of *Ischnura pumilio* at Yeolands in 2002, several individuals were again noted there during late June/early July, and an *Anax parthenope* was also reported on 19 July." (Author)] Address: not stated

4427. Cannings, R. (2004): Resources for the study of Odonata in Canada. *Newsletter of the Biological Survey of Canada (Terrestrial Arthropods)*: 25-33. (in English). [This paper provides basic information related to books, journals, internet, and societies useful to study Odonata. For a complete file see: www.biology.ualberta.ca/bssc/news231/bsscpring2004.pdf] Address: Cannings, R., Royal British Columbia Museum, 675 Belleville Street, Victoria, BC V8W 9W2, Canada. E-mail: rcannings@royalbcmuseum.bc.ca

4428. Carchini, G.; Pacione, T.; Tanzilli, C.; Di Domenico, M.; Solimini, A. (2004): Temporal variation of an Odonata species assemblage (Rome, Italy). *Odonatologica* 33(2): 157-168 (in English) ["The Castel Porziano estate is a well preserved coastal Mediterranean woodland, rich in still bodies of water, where odonatological studies have been taking place since the 1950s. Adult

Odonata were recorded for the entire estate in 1997 and 1998 (March-Nov.; 2 checks each month). 1,838 adults (22 species) were marked, to assess their movements. The results showed that in 1997-1998 a total of 31 species were present. This number is very close to the number (29) recorded up to 1976. Variation in species assemblage in 16 ponds was observed from 1997 to 1998. Although the overall species similarity was preserved, the number of species for each pond and the number of ponds inhabited by each species significantly increased from 1997 to 1998. In regard to the adult movements, 251 marked individuals of 13 species were re-sighted only at the same ponds where they had been marked and 30 individuals of 6 species were sighted at different ponds. Among the latter, the majority moved within a range of a few hundred metres, but some individuals were able to fly quite far, e.g. 2.7 km (*Coenagrion puella*) and 5.8 km (*Libellula depressa*). It is concluded that the assemblage variation for the entire estate was small, varying more on a decennial than on an annual scale, but for a single pond variation is wider on both time scales. The quick recolonization among ponds, due to the adult's movements, appears to be the cause of greater stability at meso-scale rather than at local scale." (Authors)] Address: Carchini, G., Dipartimento di Biologia, Università 'Tor Vergata', Via della Ricerca Scientifica, I-00133, Roma. Italy. E-mail: carchini@uniroma2.it

4429. Carvalho, A.L.; Salgado, L.G.V.; Werneck-de-Carvalho, P.C. (2004): Description of a new species of *Lauromacromia* Geijskes, 1970 (Odonata: Corduliidae) from Southeastern Brazil. *Zootaxa* 666: 1-11. (in English). ["*Lauromacromia pinguaba* sp. nov. is described and illustrated based on a series composed by a male and four females from Pinguaba, Ubatuba, São Paulo state, Brazil, all obtained from reared larvae. The type material is deposited in the Museu Nacional and the Instituto de Biologia, UFRJ, Rio de Janeiro. This is the first description of a female and the southernmost record for the genus. A key to the genera of Corduliidae occurring in Brazil is appended." (Authors)] Address: Carvalho, A., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Brasil. E-mail: alagoc@acd.ufrj.br

4430. Cattin Blandenier, M.-F. (2004): Food web ecology: models and application to conservation. Thèse présentée à la Faculté des Sciences de l'Université de Neuchâtel pour l'obtention du grade de Docteur ès sciences: 127 pp. (in English with French summary). ["Food webs are descriptions of who eats whom in an ecosystem. We propose here two different approaches to this topic. Firstly, we describe an empirical study applied to the management of fens of the Grande Caricaie (on the south bank of Lake Neuchâtel), a site of high value for nature conservation in Switzerland. Secondly, we introduce a new model explaining food-web structure, the nested-hierarchy model, which solves major problems encountered with former models. Nearly 90% of the fenlands in Switzerland have been lost during the last century. They harbour a high number of endangered species. Presently, they are threatened by brushwood encroachment and terrestrialisation due to water regulation and draining. Mowing is a commonly used management technique to prevent this succession. This management practice is beneficial for floristic diversity, but its effects on arthropods are less well known. Here, we use two different complementary approaches to

study the effect of mowing on two types of wet meadows. Firstly, we evaluate the impact of management by means of the comparison of a control and a two-year-old mown area. The results indicate that mowing reduces the less mobile spiders and species linked to litter or dead reeds, including rare species. Secondly, in order to measure the impact of mowing on the ecosystem structure and functioning, we adopt a food-web approach in the same wet meadows. Our results demonstrate that mowing has different consequences depending on the trophic group and level. It increases the total number of taxa, an increase particularly beneficial to species of the first trophic level. The impact on the third trophic level is hardly perceivable, because of the dominance of generalist feeders in this level. Intermediate species and particularly herbivores show the strongest change: mowing results in a shift towards more generalist herbivores and detritivores to the detriment of specialized species. This could be a particularly undesirable consequence of management. In the second part, we introduce the nested-hierarchy model, which describes foodweb structure. Though extremely complex and variable, their structure possesses basic regularities. Until now, two models have been devised for the description of trophic interactions within a natural community. Both are essentially based upon the concept of ecological niche, with the consumers organized along a single niche dimension, e.g., prey size. Unfortunately, they fail to describe adequately recent high-quality data. We propose here a new model built on the hypothesis that any species diet is the consequence of phylogenetic constraints and adaptation. Simple rules incorporating both concepts yield food webs whose structure is very close to real data. Consumers are organized in groups forming a nested hierarchy, which better reflects the complexity and multidimensionality of most natural systems. Our nested-hierarchy model emphasizes the role of phylogenetic constraints in food webs. It is an important element to be considered in the actual context of decrease in biodiversity. The relative impacts of taxonomy and adaptation in the reaction of ecosystems to species losses remains to be determined." (Author)] Address: www.unine.ch/biblio/bc/theses_pdf/these_CattinMF.pdf

4431. Chadd, R.; Hiley, A. (2004): News from Lincolnshire. *Darter* 21: 8. (in English). [Range extensions of different odonate species are documented.] Address: Chadd, R. Environment Agency (Biol. Lab.), Stepping Stone Walk, Winfrey, Winfrey Av., Spalding, Lincs., PE11 1DA, UK. E-mail: richard.chadd@environment-agency.gov.uk

4432. Cham, S. (2004): Dragonfly predation by European hornets *Vespa crabro* (L.) (Hymenoptera, Vespidae). *J. Br. Dragonfly Soc.* 20(1): 1-3. (in English). [In summer 2003, an exceptionally high abundance of hornets during the year could be observed. In spite of these high abundance, on one occasion over thirty unsuccessful and no successful attempts of hornets were recorded to prey dragonflies flying at a pond during day time. One successful attack on a sitting *A. mixta* is documented (7 Sept. 2003). "Although it may be difficult for hornets to catch active dragonflies, their chances increase when prey is incapacitated in some way. Ovipositing females are more vulnerable to hornet attack when they fly in confined spaces. The Felmersham observations indicate that hornets will search out roosting dragonflies, when they may be cooler and less active

and, therefore, easier to catch." (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4433. Cham, S. (2004): Observations on an inland population of the Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier) with notes on the first discovery of larvae in Britain. *J. Br. Dragonfly Soc.* 20(1): 31-34. (in English). [Priory Country Park, Bedford, Bedfordshire, UK. The presence of *Ceratophyllum* sp. or other floating weeds may provide an indication as to where best to look for *E. viridulum*.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4434. Cham, S. (2004): Oviposition behaviour of the two British species of Red-eyed Damselflies *Erythromma najas* (Hansemann) and *E. viridulum* (Charpentier). *J. Br. Dragonfly Society* 20(2): 37-41. (in English). ["A study of the oviposition behaviour of *E. najas* and *E. viridulum* was carried out during July and August 2003 and 2004 at sites in Bedfordshire, UK. With the relatively recent colonization of Britain by the latter, there is very little published information on its natural history. This study presents observations on oviposition behaviour, including group oviposition in response to the threat of predation." (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4435. Cham, S. (2004): Updates from the Dragonfly Recording Network (DRN) National Co-ordinator. *Darter* 21: 1-2. (in English). [Range extensions (*Erythromma viridulum*, *Lestes barbarus*, *Chalcolestes viridis*, *Libellula fulva*) and range contracting (*Leucorrhinia dubia*) are briefly outlined. Information on population trends of *Libellula depressa* and *Ischnura pumilio*, and habitat choice of *Cordulegaster boltonii* (chalk streams) are given. In addition, some information of recording and mapping software are provided.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4436. Cham, S. (Red.) (2004): News from the regions. *Darter* 21: 12-18. (in English). [oas 15: Taylor, P.: News from Norfolk; Donnithorne, N.: News from the southeast; Brook, J. & G. Brook: Addendum to the southeast report: History of *Libellula fulva* in Kent; Smallshire, D.: News from Devon; Jones, S.: News from Cornwall; News in brief ... from Gloucestershire, ... from Herefordshire, ... from Staffordshire, ...from Nottinghamshire, ...from Derbyshire.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

4437. Clancy, S. (2004): Reports from Coastal stations - 2003: Dungeness area, Kent. *Atropos* 21: 55-57. (in English). [*Anax parthenope*, *Sympetrum fonscolombii*, *S. striolatum*, strong colony of *Erythromma viridulum* with continuing colonisation of new habitats.] Address: not stated

4438. Clarke, D. (2004): "Southern" dragonflies make headway in Cumbria in 2003. *Darter* 21: 6-7. (in English). [UK; information on *Brachytron pratense*, *Anax imperator*, *Libellula depressa*, and *Aeshna mixta* are provided.] Address: Clarke, D., Burnfoot, Cumwhitton, Carlisle, Cumbria CA4 9EX, UK

- 4439.** Clausnitzer, V. (2004): Critical species of Odonata in eastern Africa. *International Journal of Odonatology* 7(2): 189-206. (in English). ["From eastern Africa, ranging from Somalia and Ethiopia south to Mozambique and Zimbabwe and west to eastern Democratic Republic of Congo and Botswana, ca 500 species of Odonata are known. Comments on species and sites of conservation concern are given as well as recommendations for future research and conservation activities. Due to the rapid and ongoing destruction of forests, especially of coastal, Guineo-Congolian and Eastern Arc forests, species confined to these habitats are the most threatened." (Author)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de
- 4440.** Clausnitzer, V.; Martens, A. (2004): Critical species of Odonata in the Comoros, Seychelles, Mascarenes and other small western Indian Ocean islands. *International Journal of Odonatology* 7(2): 207-218. (in English). [Excluding Madagascar, 33 species of conservation concern are given.] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de
- 4441.** Clausnitzer, V. (2004): Dragonflies in East Africa's coastal forests and Eastern Arc Mts indicators of habitat health and landscape history. Abstracts: 5th International Symposium on Tropical Biology. SATELLITE EVENTS: 6th International Symposium on the Chrysomelidae; Workshop on African Odonata (Edited by Bernhard A. Huber); Zoologisches Forschungsinstitut und Museum Alexander König, Adenauerallee 160, 53113 Bonn, Germany: 143. (in English). [Verbatim: The species diversity and the level of endemism in dragonflies from East Africa's coastal forests and the Eastern Arc Mts is very high. Many of the forest specialists are stenotopic, highly sensitive to habitat disturbance and confined to the coastal zone. Some of these species are relicts, indicating the former connection to central and west Africa and even to the Neotropics. Once a more or less continuous forest belt from southern Somalia to northern Natal, today's remaining coastal forests consist of highly isolated and often very tiny forest fragments. The effects of these habitat fragmentations will be briefly shown on the species community level and on the population level. With increasing forest destruction the alpha-diversity increases locally, while the beta-diversity decreases with the disappearance of the forest specialists. Most colonisers of disturbed habitats are eurytopic species, which are common and widely distributed all over Africa. The impacts of habitat fragmentation on the population level will be shown for a very ancient inhabitant of the coastal and Eastern Arc forests: *Coryphagrion grandis*, a giant damselfly and the only extant member in Africa of a family with otherwise neotropical distribution. This species is highly specialised and heavily reliant on a long-term habitat stability. The ongoing habitat destruction has already resulted in genetically isolated populations.] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de
- 4442.** cl.br. (2004): La libellula "cecilia" ritrovata a Novara. *Corriere di Novara* 30. September 2004: (in Italian). [Elisa Riservata, University of Pavia, found *Ophiogomphus cecilia* in the river Quartara, Parco del Ticino, near Novara, Italy. This record was worth for a brief contribution in the regional newspaper.] Address: not stated (a copy of the paper can be obtained by IDF or Jürgen Ott)
- 4443.** Cleary, D. F. R.; Mooers, A., Ø.; Eichhorn, K. A. O.; van Tol, J.; de Jong, R.; Menken, S. B.J. (2004): Diversity and community composition of butterflies and odonates in an ENSO-induced fire affected habitat mosaic: a case study from East Kalimantan, Indonesia. *Oikos* 105: 426-446. (in English). ["Little is known about the diversity of tropical animal communities in recently fireaffected environments. Here we assessed species richness, evenness, and community similarity of butterflies and odonates in landscapes located in unburned isolates and burned areas in a habitat mosaic that was severely affected by the 1997/98 ENSO (El Nino Southern Oscillation) event in east Kalimantan, Indonesian Borneo. In addition related community similarity to variation in geographic distance between sampling sites and the habitat/vegetation structure Species richness and evenness differed significantly among landscapes but there was no congruence between both taxa. The species richness of butterflies was, for example, highest in sites located in a very large unburned isolate whereas odonate species richness was highest in sites located in a small unburned isolate and once-burned forest. We also found substantial variation in the habitat/vegetation structure among landscapes but this was mainly due to variation between unburned and burned landscapes and variation among burned landscapes. Both distance and environment (habitat/vegetation) contributed substantially to explaining variation in the community similarity (beta diversity) of both taxa. The contribution of the environment was, however, mainly due to variation between unburned and burned landscapes, which contained very different assemblages of both taxa. Sites located in the burned forest contained assemblages that were intermediate between assemblages from sites in unburned forest and sites from a highly degraded slash-and-burn area indicating that the burned forest was probably recolonised by species from these disparate environments. We, furthermore, note that in contrast to species richness (alpha diversity) the patterns of community similarity (beta diversity) were highly congruent between both taxa. These results indicate that community-wide multivariate measures of beta diversity are more consistent among taxa and more reliable indicators of disturbance, such as ENSO-induced burning, than univariate measures." (Authors)] Address: Cleary, D.F.R., Inst. for Biodiversity and Ecosystem Dynamics, Univ. of Amsterdam, PO Box. 94766, NL-1090 GT Amsterdam, the Netherlands. E-mail: cleary@science.uva.nl
- 4444.** Conze, K.-J. (2004): Der Arbeitskreis Libellen NRW. *LÖBF-Mitteilungen* 2/2004: 50. (in German). [Brief report on the current activities of the working group Odonata in Nordrhein-Westfalen, Germany.] Address: Conze, K.-J., Listerstr. 13, D-45147 Essen, Germany. E-mail: Klaus-Juergen.Conze@t-online.de
- 4445.** [Corbet, P.S.] (2004): International Members of the ESO. *Entomological Society of Ontario Newsletter* 8(2): 9. (in English). [Verbatim: The Entomological Society of Ontario is not limited to residents of Ontario by any means. We have members across Canada and currently have about a dozen US members and half a dozen from other countries. International members were recently queried about their entomological activities abroad. Their replies will appear in the ESO newsletter

as space permits. Philip Corbet's reply is further proof that entomologists never really retire: Philip S. Corbet, Crean Mill, St Buryan, Cornwall, UK I left Canada, for a position in New Zealand, in 1974 and moved to UK in 1980. I retired from my position as Professor of Zoology and Head of the Department of Biological Sciences, University of Dundee in 1986. From then until 1996 I was given an Honorary Faculty position at the University of Edinburgh where I wrote a book *Dragonflies. Behaviour and Ecology of Odonata*, published by Cornell University Press and Harley Books (UK) in 1999. Since 1996 I have been living in an 18th Century converted mill house, the grounds of which I share with 15 species of butterfly and 11 species of dragonfly, the latter being encouraged to breed there by the presence of a pond and stream. My house is in West Cornwall, not far from Land's End where the climate is markedly milder than most of the British Isles. I devote my spare time to work for the Worldwide Dragonfly Association, travelling, and writing up (unpublished) work on mosquitoes, caddisflies and dragonflies. I also collaborate on joint research projects on dragonflies and mosquitoes. I work in a voluntary capacity for the Cornwall Wildlife Trust, serving on Council and the Executive, and chairing the Conservation Strategy Committee.] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: pscorbet@creanmill.u-net.com

4446. Córdoba-Aguilar, A.; Siva-Jothy, M.T. (2004): Sperm displacement ability in *Calopteryx haemorrhoidalis* (Vander Linden): male and female roles, male limits in performance, and female neural control (Zygoptera: Calopterygidae). *Odonatologica* 33(3): 245-252. (in English). ["During copulation, *C. haemorrhoidalis* males displace the sperm of rivals stored by the female. During displacement, sperm stored in 2 spermathecae are ejected by the female as a consequence of male genitalic stimulation: the aedeagus distorts 2 vaginal plates in which mechanoreceptive sensilla are embedded. The sensilla control spermathecal sperm release and a wider aedeagus displaces more sperm. There is variation between females in their sensillum number which might also affect sperm displacement rate. The role of sensillum number and aedeagal width in sperm displacement variation in copulations whose duration was controlled was investigated. Results indicated that only aedeagal width could predict sperm displacement variation. The neural communication between the vaginal plates and both spermathecae was also examined. Previous observations suggested a "lateral" control of sperm ejection between each vaginal plate and its corresponding spermatheca. This was corroborated by stimulating the mechanoreceptive sensilla of females that underwent different surgical treatments: only those females whose vaginal plate nerves were cut, showed no volumetric decline in sperm in the corresponding spermatheca. Finally, the effect of copula duration (number of aedeagal copulatory movements) on sperm ejection was experimentally examined. In natural conditions, males perform approximately 50 aedeagal movements during copulation. There was no difference in sperm volumes between the pairs of females that were subjected to 50 and 80 aedeagal movements of stimulation using the same aedeagus. These results help to understand the nature of the spermathecal sperm displacement mechanism in this species." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P.

69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico
E-mail: acordoba@uaeh.reduaeh.mx

4447. Daigle, J.J. (2004): *Metaleptobasis lillianae* spec. nov. from Bolivia (Zygoptera: Coenagrionidae). *Odonatologica* 33(2): 195-198. (in English) ["The new species is described and illustrated. Holotype male and allotype female (in copula): Bolivia, Cochabamba Department, Chapare prov., lake 2.5 km W of Villa Tunari gate on Hwy 4, 12-XI-2001; both deposited in U.A.G.R.M. in Santa Cruz, Bolivia. Males are characterized by the knobbed shaped paraprocts, and the homochromatic females by their black ovipositor. Both can be distinguished from other congeneric species by their dark, almost black terminal abdominal segments." (Author)] Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

4448. D'Amico, F.; Darblade, S.; Avignon, S.; Blanc-Manel, S.; Ormerod, S.J. (2004): Odonates as indicators of shallow lake restoration by liming: Comparing adult and larval responses. *Restoration ecology* 12(3): 439-446. ["Odonate assemblages were compared between replicate sets of shallow lakes that had been created and acidified by open-cast mining across a large area (2,451 ha) of southwest France (Arjuzanx, Landes); one set of lakes (n = 5) was experimentally restored by liming with calcium carbonate, whereas another group (n = 5) was left as untreated reference lakes. Both odonate adults and exuviae were sampled bimonthly during May August 1998. Elevated turbidity and conductivity in limed lakes were the only physicochemical measures differing between restored and reference lakes, because deacidification occurred naturally, even in reference lakes during the 17 years after the onset of restoration. Restoration by liming can apparently lead to effects on lake turbidity that might be considered adverse. Twenty-four and 19 odonate species occurred among adults and exuviae, respectively, but there were no significant differences in richness between restored and reference sites. However, significantly, more exuviae were collected from the reference sites (588 vs. 180), where exuvial diversity and rank abundance indicated more evenly structured assemblages than those in restored lakes. Ordination showed that adult assemblages differed significantly between restored and reference lakes, and varied highly significantly with lake turbidity. This effect occurred because a small group of generally scarce adults were characteristic of reference sites (*Chalcolestes viridis*, *Lestes virens*, *Cordulia aenae*, *Leucorrhinia albifrons*, and *Sympetrum sanguineum*). Exuviae of these same species were less abundant at restored sites, but exuvial assemblages overall did not discriminate between restored and reference lakes. We conclude that lake restoration by liming can reduce diversity and larval numbers among odonates and subtly affects adult assemblages. In this case study, adult assemblages discriminated best between the lake types involved in the experiment, but important additional information arose from exuvial abundance and structure. This study indicates that natural recovery processes after acidification in formerly open-cast areas rather than chemical intervention through liming might lead to preferable conservation outcomes." (Authors)] Address: Ormerod, S.J., Cardiff Univ, Sch Biosci, POB 915, Cardiff CF10 3TL, S Glam, Wales

- 4449.** De Block, M.; Stoks, R. (2004): Life history responses depend on timing of cannibalism in a damselfly. *Freshwater Biology* 49(6): 775-786. (in English). ["1. Cannibalism has often been suggested as an important mechanism to reach the necessary developmental stage and size before a critical time horizon is reached, but this role has been largely unexplored. We studied effects of cannibalism on the life history of the damselfly *Lestes viridis* under combinations of a time constraint (by manipulating the perceived time available in the growth season) and a biotic constraint (density). 2. Larvae had a faster development and growth rate when reared at high time stress (late photoperiod). They also had a higher growth rate and mass at emergence when cannibalism occurred (density 2 and 4). Cannibalism occurred earlier at higher density. Accelerated life history responses (faster development and growth rate) and a higher mass at emergence were dependent upon the timing of cannibalism. Responses were more pronounced or only present if cannibalism occurred early in the larval period. 3. Our data suggest that cannibalism may not only act as a lifeboat mechanism by enabling cannibals to survive detrimental ecological conditions, but may also act as a compensatory mechanism to keep life history variables near-optimal at life history transitions, even under sub-optimal conditions." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be
- 4450.** De Knijf, G. (2004): Libellen. In: Provoost, S. & Bonte, D. (red.) *Levende Duinen: een overzicht van de biodiversiteit aan de Vlaamse kust*. Mededelingen van het Instituut voor Natuurbehoud 22, Brussel: 298-311. (in Dutch, with English summary). [Flanders, Belgium; "Although dragonflies can certainly not be classified as a typical insect family of the coastal dunes, several species occur in dune slacks, pools and at the inner dune front. Twenty seven species have been recorded. Four of them are threatened in Flanders: *Sympecma fusca*, *Lestes dryas*, *Ischnura pumilio*, and *Coenagrion pulchellum*. The only population of *Coenagrion scitulum* know for Flanders, is found in the Houtsaecenouinen (De Panne). The restoration of OPEN water habitats at the inner dune front would probably increase the importance of the dune area for dragonflies in Flanders." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be
- 4451.** De Marco, P.; Resende, D.C. (2004): Cues for Territory Choice in Two Tropical Dragonflies. *Neotropical Entomology* 33(4): 397-401. (in English, with Portuguese summary). ["Classifications in mate systems of Odonata are generally based in the male ability to control the female access to oviposition resources. In this paper we discuss the criteria for male territory selection in the dragonflies *Perithemis mooma* Kirby and *Orthemis discolor* (Burmeister) (Libellulidae), in Viçosa, Brazil, controlling the availability of perches and aquatic vegetation. *P. mooma* males defended territories with vegetation and thus their choice was probably related to the oviposition resource of the females. *O. discolor* males preferred sites with tall perches, possibly because their choice was related to a mate-seeking resource. Interactions with another libellulid more active and aggressive, *Planiplax phoenicura* (Ris), changed the preference of *O. discolor* males to vegetated areas highlighting the influence of community composition and interactions on territorial site selection." (Authors)] Address: De Marco, P., Lab. Ecologia Quantitativa, Depto. Biologia Geral, Universidade Federal de Viçosa, 36571-000, Viçosa, MG, Brasil. E-mail: pdemarco@mail.ufv.br;
- 4452.** De Marmels, J. (2004): *Heteragrion makiritare* sp. nov., with descriptions of hitherto unknown females and larvae of other species from Venezuela (Odonata: Megapodagrionidae, Lestidae). *International Journal of Odonatology* 7(3): 439-458. (in English). ["*Heteragrion makiritare* sp. nov. is described from two males from the Pantepui region - holotype: Venezuela, Amazonas State, Marahuaka, Sima (3°43'N, 65°31'W), 1,140 m a.s.l., MIZA, no. 17250. It belongs in the species group whose paraprocts are absent in the male sex. The identity of *H. macilentum* is elucidated by examining its lectotype and a syntype, which resulted to be not conspecific. The females of *H. breweri* and *Philogenia ferox* are described for the first time. The ultimate instar exuviae of *H. bariai*, *H. breweri*, *H. chlorotaeniatum* and *H. mitratum* are figured and compared. Figures of the female intersternite of these species, and of *H. pemon*, are provided. The larva of *Sciotropis cyclanthorum*, as well as the ultimate instar exuviae of *Archilestes tuberculatus* and *Lestes apollinaris* are described and illustrated." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com
- 4453.** Dewick, S. (2004): An update on the continued succes of Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier) at its first known British sites. *Atropos* 21: 14-15. (in English). [On 17 July 1999 the first specimen of *E. viridulum* and a colony of the species were detected in "an area of unspoilt countryside in Essex", UK. The population dynamic of the succeeding years, including a decrease, is documented. Dispersal and use of terrestrial habitats are briefly discribed.] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM20 7HL, UK
- 4454.** Dewick, S. (2004): Reports from Coastal Stations - 2003: Bradwell-on-Sea, Essex. *Atropos* 21: 60-63. (in English). [United Kingdom; a list of 18 odonate species is communicated including *Erythromma najas*, *E. viridulum* ("excellent year"), and *Brachytron pratense* ("disasterous year" for this species).] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK
- 4455.** Dijkstra, K.-D.; Clausnitzer, V. (2004): Critical species of Odonata in Madagascar. *International Journal of Odonatology* 7(2): 219-228. (in English). ["Madagascar has approximately 175 species of Odonata. Of the Anisoptera ca 60% is endemic and of the Zygoptera almost 95%. The endemic species can roughly be separated into 'new endemics' that are probably recent arrivals from the African mainland and 'old endemics'. The latter group includes many members of the families Megapodagrionidae, Platycnemididae and Corduliidae, which are much more diverse here than on the African continent. Many of these species belong to endemic genera and appear to be restricted to rainforest habitat. The rate of deforestation on Madagascar is alarming, and therefore the majority of 'old endemics' is potentially threatened. One hundred and eleven species, 64% of the fauna, are listed as being of primary concern and

their conservation status needs to be assessed immediately. Research on Madagascar's Odonata is urgently needed in all aspects from basic inventories and systematic work to studies on ecology, biogeography and conservation related issues." (Authors)] Address: Clausnitzer, Viola, Liebenauer Str. 180, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

4456. Dijkstra, K.-D.; Vick, G.S. (2004): Critical species of Odonata in western Africa. *International Journal of Odonatology* 7(2): 229-238. (in English). ["Western Africa - defined as the tropical area from Cameroon westwards - probably has the richest odonate fauna in Africa, particularly the region of (and around) the Cameroon highlands. This region is home to many relict and endemic species, such as the continent's only representatives of the families Amphipterygidae and Perilestidae. Previous selections of threatened West African Odonata have been arbitrary because it is impossible to differentiate between species that are genuinely endangered and those which are simply data-deficient. Many listed species just appear to be difficult to record or have been taxonomically confused; some 'endangered species' have already dissolved into synonymy. A revised and probably more complete selection of species requiring attention is provided, but because the source data is so scanty it remains subjective. Species in Gomphidae and Corduliidae are not included, as the knowledge of their taxonomy and distribution is particularly problematic at present. Many listed species may prove to be of minor concern once more research in the field and in the museum has been done. It is argued that if rainforest reserves (existing in most nations discussed) are maintained, the great majority of West Africa's unique Odonata will be protected. Although most rare species are probably stenotopic rainforest inhabitants, open landscapes also harbour a rich and potentially endangered odonate fauna." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

4457. Dijkstra, K.D. (2004): Dragonflies (Odonata) of Mulanje, Malawi. *IDF-Report* 6: 23-29. (in English). ["65 species of Odonata are recorded from Mulanje and its slopes. Only eight species dominate on the high plateau. Among them are two relict species of conservation concern: The endemic *Oreocnemis phoenix* (monotypic genus) and the restricted-range species *Chlorolestes elegans*. The absence of mountain marsh specialists on the plateau is noteworthy. Mulanje's valleys, of which Likabula and Ruo are best known, have a rich dragonfly fauna. The Eastern Arc relict *Nepogomphoides stuhlmanni* is common here." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands, dijkstra@nnm.nl

4458. Dijkstra, K.-D.; Kisakye, J.J. (2004): *Idomacromia jillianae* sp. nov. from Uganda (Odonata: Corduliidae). *Int. Journal of Odonatology* 7(3): 459-466. (in English). ["*Idomacromia jillianae* sp. nov. (holotype female: Uganda, Kabale District, Ruhija, 1°02'59"S, 29°45'29"E, 2,100 m a.s.l., 24 v 2003) is described on the basis of two females from Bwindi Impenetrable National Park, Uganda, and compared with the known species of this elusive genus." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

4459. Donnelly, N. (2004): *Erythemis simplicollis* and *collocata* - subspecies? *Argia* 15(4): 11-13. (in English). ["On the basis of these measurements I conclude that *simplicollis* and *collocata* are putatively subspecies, which is to say, that genes are flowing freely between western and eastern populations. Are there alternative interpretations? The species could be distinct, with no free flow of genes, and with more specimens a break into two populations might become clear. Alternatively, the two species could be distinct, but could intergrade broadly (indeed, almost universally) in a broad zone. If this is the case (which is a very uncommon case demonstrated in only a few Odonata and relatively few other organisms), then there would have to be some basis for showing the species are really distinct I have posited mis for northeastern *Enallagma cyathigerum* and *venale*, and for mid-western *Tetragonearia cynosura* and *costalis*, but in these cases there was some additional evidence (different habits, distinct habitats, coexistence of both individuals of both species in some occurrences of the two.)" (Author)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

4460. Donnelly, T.W. (2004): Distribution of North American Odonata. Part III: Calopterygidae, Lestidae, Coenagrionidae, Protoneuridae, Platystictidae with data sources and bibliography, parts I-III. *Bull. American Odonatology* 8(2-3): 33-99. (in English). [133 dot maps with data of 5 odonate families, *Gomphus parvidens*, and *Brachymesia furcata* are showing the present knowledge of species distribution in the USA. Some taxonomical problems resulting from intergradation between taxa are discussed, and an extensive bibliography is added.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

4461. Dumont, H.J. (2004): Dragonflies from Azerbaijan. *Zoology in the Middle East* 31: 87-92. (in English, with German summary). ["Thirty-two species of dragonflies were recorded from Azerbaijan in late spring 2002. We estimate the true species richness to be about 45-50 species. Several of these are first records for the Caucasus region or for the Eastern Caucasus subregion. Two forms of *Calopteryx splendens* were found, separated by the valley of the lower Kura, of which only *C. splendens intermedia* occurs in the so-called southern and lower Kura. *C. s. orientalis* occurs on rivers that drain the Talysh hills directly to the Caspian, but there is some phenotypic evidence of hybridization with *intermedia* south-west of the Kura, where the lower River Vilescay approaches rather close to the Kura. A few species are salt-tolerant and may be outliers from populations further north and east. Others are derived from Iran. Two members of the *Coenagrion puella* group are recorded; they occur within 50 km of each other, so that Azerbaijan is part of the zone where the two meet. A blue male of *Aeshna cyanea* is recorded. This may be the first case in Odonata of a rare point mutation that causes wild-type green animals to occur in a blue form." (Author) colour mutation] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

4462. Dunkle, S.W. (2004): Critical species of Odonata in North America. *International Journal of Odonatology* 7(2): 149-162. (in English). ["Of the approximately

439 species of Odonata known from North America, north of Mexico, comments on 25 species (6%) of conservation concern are given. Species deemed to be under the most threat are *Ischnura gemina*, *Gomphus sandrius*, *Ophiogomphus australis*, *Stylurus potulentus*, and *Libellula jesseana*. Two other species not under threat, *Neurocordulia michaeli* and *Somatochlora brevicincta*, are briefly discussed because of their conservation interest. Some geographical clumping of species under threat is discussed, in southeastern Arizona, coastal New England, and the central Gulf of Mexico Coast." (Author)] Address: Dunkle, S.W.; Biology Dept, Collin County Community College, Spring Creek Campus, Plano, Texas, USA 75074. E-mail: sdunkle@ccccd.edu

4463. Dunkley, J. (2004): Four-spotted Chaser *Libellula quadrimaculata* form *praenubia*. *Atropos* 23: 56. (in English). [Billing gravel pit, Northamptonshire, UK, without date.] Address: Dunkley, J., 10 Stonelea Road, Sywell, Northampton, NN6 0AZ, UK

4464. Dyatlova, E.S. (2004): New records of *Cercion lindenii* (Odonata, Coenagrionidae) in the basins of lower Danube, Dniestr and Dnieper Rivers in the south of Ukraine. *Vestnik zoologii* 38(5): 10. (in English). [Verbatim: Detailed information on *Cercion lindenii* (Selys, 1840) was given in the second edition of "The Dragonflies of Europe" by R. R. Askew (2004). On the territory of the former USSR this Mediterranean species is known from Caucasian Black Sea coast and, probably, from Armenia (Popova, 1953). Akromovski (1975) recorded rare local population in the Armenian river Metsamor (Kalkman et al, 2004). Three specimens of *C. lindenii* were firstly recorded for Ukrainian fauna by R. S. Pavlyuk (1981) in the lower Danube (Odessa province, the vicinity of Vilko). The scarce earlier data on the regional occurrence of *C. lindenii* in the lower Danube were confirmed later (Gorb, Ermolenko, 1996) in SW Ukraine, Danube delta, Odessa Province, Kilijsky District, Primorskoje village. The species was included into Ukrainian Red Book (1994) with the status of 1st category of conservation. Our investigations showed that *C. lindenii* occur much wider in Danube delta and was firstly found in the basins of other rivers (lower Dniestr and Dnieper delta). There are following new records of *C. lindenii* in the Ukraine. Odessa Province, Bolgrad District, lake Yalpug, near Vinogradovka village. 13.07.03, 2 males. Odessa Province, Ismail District, Ismail city, near "Krepost", little pond near the Danube shore. 17.07.03, female. Odessa Province, Belyaevsky District, Mayaki village, lower Dniestr river. 12.06.04, male (teneral). Cherson Province, Golopristansky District, surroundings of village Staraya Zbur'evka, zaliv "Zbur'evskij Kut". 1.08.04, male; 2.08.04, female. Cherson Province, Golopristansky District, surroundings of Golaya Pristan', Dnieper delta, Konkra River, Belogradj Island. 3.08.04, 3 males; 4.08.04, 2 female and 8 males (7 mature and 1 teneral). Active mating of damselflies was observed in this period. Hie tandems and single individuals were found above the water surface and on the semi-aquatic plants.] Address: Dyatlova, Elena, French Boulevard 37, apt 3, Odessa, Ukraine

4465. Dyatlova, E.S. (2004): The first record of *Coenagrion scitulum* (Odonata, Coenagrionidae) in the south-western part of Ukraine. *Vestnik zoologii* 38(5): 10. (in English). [Verbatim: *C. scitulum* is a common species in the Mediterranean region of Europe and

North Africa, extending from Spain (north-east) and Morocco to the Middle East. It is local in central Europe and very rare in the north (Askew, 2004). It can be found near ditches, dykes, weedy eutrophic ponds, small streams and frequently in water with a slight flow (Boulard, 1981). In the Ukraine it was recorded only from Crimea by a few records (Bartenev, 1912). One male (16.06.2004) and one female (18.06.2004) of this species were firstly found in the coastal part of Odessa (north-western part of the Black Sea). The distribution of this rare species in the Ukraine is much wider than it was known before.] Address: Dyatlova, Elena, French Boulevard 37, apt 3, Odessa, Ukraine

4466. Ellzey, K.D. (2004): First state record of *Gomphus militaris* in Louisiana. *Argia* 16(2): 24. (in English). [USA, Louisiana, 18-V-2004.] Address: Ellzey, K.D., 3416 Gum Springs Loop. Hornbeck, LA 71439, USA

4467. Emary, C.; Emary, L. (2004): The domestic cat: a regular dragonfly predator?. *J. Br. Dragonfly Soc.* 20(1): 22. (in English). [Two additional observations of dragonfly chasing / preying of domestic cats from UK.] Address: Emary, C., 12 Norton Crescent, Towcester, Northamptonshire NN12 6DN, UK

4468. Frolich-Strong, K.; Robinson, G. (2004): Odonate communities of acidic Adirondack Mountain lakes. *Journal of the North American Benthological Society* 23(4): 839-852. (in English). ["New York State's fauna is exceptionally rich in odonates (dragonflies and damselflies), whose lengthy aquatic larval phases render them susceptible to effects of lake acidification, including the loss of fish. We used a collection of benthic macroinvertebrate samples taken by the Adirondack Lakes Survey Corporation to compare odonate communities in 460 lakes. Half were from the Adirondack Mountains, where acid neutralizing capacity (ANC) is low (mean ANC = 108.0 µg/L) and Al concentrations are high (mean Al = 111.61 µg/L), and half were from the Lower Hudson Valley, where ANC is significantly higher (mean ANC = 554.6 µg/L) and Al is significantly lower (mean Al = 0.049 µg/L). Many more lakes in the Adirondack lakes were fishless (52) compared to the lower Hudson (3), and the pH in Adirondack fishless lakes was an order of magnitude lower than the pH of Adirondack lakes with fish. Ninety-nine odonate taxa were identified (86 to species). In Adirondack samples, co-occurrence patterns were correlated with presence or absence of insectivorous fish and with acidic waters. Similar patterns were not apparent in Lower Hudson Valley samples. In Adirondack samples, richness of common taxa (found in 20 lakes) was higher in lakes with fish than in lakes without fish, regardless of pH. Loss of fish may enhance the top predator role of large larval dragonflies, causing change in odonate community structure, an interpretation consistent with previous research. Acidification of Adirondack lakes appears to promote a nonrandom subset of possible odonate communities, with negative implications for regional diversity." (Authors)] Address: Frolich Strong, Karen, Conservation and Policy, Department of Biological Sciences, State University of New York at Albany, 1400 Washington Avenue, Albany, New York 12222 USA

4469. Gäde, G.; Marco, H.G. (2004): Adipokinetic hormones in Odonata are group-specifically distributed. Abstracts: 5th International Symposium on Tropical Biology. SATELLITE EVENTS: 6th International Symposi-

um on the Chrysomelidae; Workshop on African Odonata (Edited by Bernhard A. Huber); Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany: 33. (in English). [Verbatim: "Peptides that regulate the level of circulating metabolites in energy metabolism of insects are synthesized in intrinsic neurosecretory cells of the corpora cardiaca. These neuropeptides have 8 to 10 amino acid residues, function as hormones and are named according to the specific metabolites that are affected when the neurohormone is injected into the insect or upon the stimulus of flight: i.e. adipokinetic (elicits elevation of diacylglycerols), hypertrehalosaemic (increases trehalose), and/or hyperprolinaemic (elevates proline levels). It is known that Odonata use lipids during flight and they, therefore, show an adipokinetic response to the specific hormones in the corpora cardiaca. In the current study, the adipokinetic hormone (AKH) was isolated and structurally characterized from various families of Odonata occurring in South Africa; some representatives from Europe, North America and Japan were also included. Sequences were compared to ascertain whether a specific pattern existed across families. All members from various zygopteran families, viz. Calopterygidae, Lestidae, Synlestidae, Chlorocyphidae, Platycnemididae and Coenagrionidae contain the same peptide, denoted Psi-AKH (sequence: pEVNFTPGWamide). The living fossil, the Japanese anisozygopteran species *Epiophlebia superstes*, contains the peptide denoted Ani-AKH (sequence differs from Psi-AKH: S5 instead of T5, and S7 instead of G7). Ani-AKH is also found in the anisopteran families Aeshnidae, Cordulegastridae and Corduliidae. In the anisopteran families Gomphidae and Libellulidae the main AKH peptide is Lia-AKH (sequence is similar to Psi-AKH: S7 instead of G7). Curiously, in one species of Libellulidae, the N. American *Erythemis simplicicollis*, a variant of Lia-AKH was sequenced containing a conservative L2 exchange instead of V2." (Authors)] Address: Marco, Heather G., Zoology Department, University of Cape Town, ZA-7701 Rondebosch, South Africa. E-mail: hmarco@bot-zoo.uct.ac.za

4470. García, G.; Dijkstra, K.D. (2004): Odonata collected in the Ankarafantsika National Park, Madagascar. IDF-Report 6: 7-22. (in English). ["Records of 33 species of Odonata from Ankarafantsika National Park are presented. Four additional species have been reported in the literature. Nineteen species are recorded from the site for the first time. The site is the largest remaining block of dry forest in Madagascar's Western Region. While 80% of Madagascar Odonata species are endemic, only 40% of the species recorded in Ankarafantsika is endemic. Moreover, the endemics recorded are mostly common throughout the island. The dry forests are thus of relatively little importance for Madagascar's diversity of Odonata." (Authors)] Address: García, G., Durrell Wildlife Conservation Trust, Les Augres Manor, Trinity, Jersey JE35BP, Channel Islands, UK, gerardo.garcia@durrell.org

4471. Garrison, R.W.; Ellenrieder, N. von (2004): *Orthemis sibylla*, a junior synonym of *O. ambirufa* (Odonata: Libellulidae). International Journal of Odonatology 7(3): 467-470. (in English). ["*Orthemis sibylla* is shown to be a junior synonym of *O. ambirufa*, based on a comparison of the holotype male of *O. ambirufa* with voucher specimens in the UMMZ identified as *O. sibylla* by Ris and specimens of this species from French

Guiana and Venezuela in the RWG collection. Diagnostic characters of the male holotype of *O. ambirufa* are illustrated, and compared with those of *O. lev* is." (Authors)] Address: Garrison, R.W., Research Associate, Natural History Museum of Los Angeles County, Exposition Boulevard 900, CA 90007, USA. E-mail: rwgarrison@earthlink.net

4472. Gerhard, A.; Janssens de Bisthoven, L.; Soares, A.M.V.M (2004): Macroinvertebrate response to acid mine drainage: community metrics and on-line behavioural toxicity bioassay. Environmental Pollution 130: 263-274. (in English). [Portugal. "The hypothesis is tested that toxicity of acid mine drainage can be detected by a selection of existing macroinvertebrate community and bioindicator metrics supplemented by toxicity tests with the local mosquitofish *Gambusia holbrooki* Girard and the shrimp *Atyaephyra desmaresti* Millet. The behavioural responses of *A. desmaresti* to acid mine drainage were recorded in the Multispecies Freshwater Biomonitor, based on behaviour and survival as parameters. Bioassessment methods were based on community diversity, structure, function, and bioindicators and supplemented by chemical analysis (temperature, pH, metals). The Biological Monitoring Working Party adapted for the Iberian Peninsula, the number of predators (Coleoptera, Hemiptera) and the number of Ephemeroptera and Trichoptera taxa differentiated the sites well. The on-line toxicity test revealed pH-dependent acute toxicity of the acid mine drainage for the shrimp (LC50-48 h: pH-AMD=5.8) and a pH-dependent decrease in locomotory activity with the lowest-observed-response-times (LORTs) within 5 h of exposure. Shrimp were more sensitive to acid mine drainage than fish (LC50-48 h: pH-AMD=4.9). A new multimetric index combining toxicity testing and bioassessment methods is proposed." (Author) Some Odonata are listed on the genus or family level including "*Epitheca* sp." for Portugal which is more than questionable.] Address: Gerhardt, A., LimCo International, An der Aa 5, D-49477 Ibbenbüren, Germany. E-mail: limco.int@t-online.de

4473. Gibbs, K. E.; Bradeen, B.; Boland, D. (2004): Spatial and Temporal Segregation Among Six Species of Coexisting *Ophiogomphus* (Odonata: Gomphidae) in the Aroostook River, Maine. Northeastern Naturalist 11(3): 295-312. (in English). ["Spatial and temporal segregation of six coexisting species of *Ophiogomphus* (*O. anomalus*, *O. aspersus*, *O. carolus*, *O. howei*, *O. mainensis*, and *O. rupinsulensis*) were studied in a 137.7 km reach of the Aroostook River in northern Maine. Collections of exuviae showed that *O. mainensis* was most abundant and dominated the assemblage at sites in the upper reaches of the study area and was in low numbers and percent of total *Ophiogomphus* at sites in the lower reaches of the study area. *Ophiogomphus rupinsulensis* was most abundant and dominated the assemblage at sites in the lower reaches of the study area but was absent or in low numbers and percent of total *Ophiogomphus* at sites in the upper reaches. *Ophiogomphus anomalus* and *O. carolus* were present at all sites and *O. anomalus* was generally more abundant and made up a higher percent of the total *Ophiogomphus* spp. than *O. carolus*. *Ophiogomphus howei* and *O. aspersus* were present at only a few sites in low abundance and percent of the total *Ophiogomphus*. Several species of *Ophiogomphus* coexisted as larvae in 0.20 m² areas of the substrate. There was little evi-

dence of temporal segregation among the six species. All species had short seasonal emergence periods in June. Diel emergence was during the morning and early afternoon. Timing of seasonal and diel emergence either differed little or not at all among the six species. Species that we were able to identify in all larval stages (*O. mainensis*, *O. anomalus*, and *O. howei*) were present in a wide range of instars on all sampling dates (May to October) suggesting overlapping generations and multivoltine life histories. In all six species, some larvae remained in the final instar for almost a year before emerging as adults." (Authors)] Address: Gibbs, K. Elizabeth

4474. Gibson, V. (2004): Wing clapping in the Blue-tailed Damselfly *Ichnura elegans* (Vander Linden). *J. Br. Dragonfly Society* 20(2): 70-72. (in English). ["Wing clapping by the male during copulation has been described in two species of Anisoptera, *Aeshna mixta* Latreille and *A. juncea* (L.) (Gibson, 2003). This behaviour is now reported from a species of Zygoptera, *I. elegans*. The manner of wing clapping differs between this damselfly and the two species of dragonflies." (Author)] Address: Gibson, V., 1 Pebley Cottages, Barlborough, Chesterfield, Derbyshire S43 4TG, UK

4475. Goddard, D. (2004): Dragonfly Conservation from BDS. *Atropos* 21: 82. (in English). [Brief report on the Exuviae Loan Scheme of the British Dragonfly Society.] Address: Goddard, D., 30 Cliffe Hill Avenue, Stapleford, Nottingham NG9 7HD, UK. E-mail: davidgoddard8@ntlworld.com

4476. González-Soriano, E.; Delgado-Hernández, O.; Harp, G.L. (2004): Biological notes on *Neoerythromma gladiolatum* Williamson & Williamson, 1930 with description of its female (Zygoptera: Coenagrionidae). *Odonatologica* 33(3): 327-331. (in English). ["The female is described and compared with that of *N. cultellatum* (Hagen in Selys, 1876). A key to separate the females of both species and notes on the taxonomy, biology and distribution of *N. gladiolatum* are provided." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail. i-biologia.unam.mx

4477. Graf, R.; Bolzern, H.; Röösl, T. (2004): Können auf Golfplätzen Naturschutzziele erreicht werden? - Eine Erfolgskontrolle in Holzhäusern (Kanton Zug, Schweiz). *Naturschutz und Landschaftsplanung* 36(10): 311-320. (in German with English summary). [The ecological diversity in a landscape before and after the construction of a golf course in Switzerland was surveyed including Odonata. It is stated that in general an improvement of ecological conditions has to be identified. *Crocothemis erythraea*, *Erythromma viridulum*, *Orthetrum albistylum*, *Ichnura pumilio*, *O. brunneum*, and *Sympetrum depressiusculum* are listed, indicating that at the stage of survey, immediately after the construction of the course, odonate species of early successional stages of water bodies were favoured.] Address: Graf, R., Schweizerische Vogelwarte, CH-6204 Sempach, Switzerland. E-mail: graf@vogelwarte.ch

4478. Gunzburger, M.S.; Travis, J. (2004): Evaluating predation pressure on green treefrog larvae across a habitat gradient. *Oecologia* 140(3): 422-429. (in English). ["The effect of a predator on the abundance of a prey species depends upon the predators abundance

and its ability to capture that prey. The objectives of this research were to evaluate the community structure of predators of green treefrog (*Hyla cinerea*) tadpoles across habitat types and evaluate the effectiveness of individual predators on *H. cinerea* tadpoles. Correspondence and cluster analyses of predator frequencies across 23 aquatic habitats indicated that the majority of variance in predator communities was due to a division between permanent and temporary habitats. Experimental work demonstrated that survival of the smallest *H. cinerea* tadpoles was significantly lower than survival of medium and large tadpoles with the most effective predators, indicating that *H. cinerea* tadpoles attain a refuge from predation at larger body sizes. We combined the effectiveness of predators in experiments with the abundance of each predator species from the predator community survey to demonstrate that predation pressure on *H. cinerea* tadpoles is higher in temporary ponds. This pattern may explain in part why this species generally breeds successfully only in permanent habitats. It also confirms that discussions about an increasing gradient of predation pressure from temporary to permanent aquatic habitats should be restricted to individual prey species for which such a gradient has been demonstrated." (Authors) *Anax junius* and *Traema lacerata* were the most effective predators on *H. cinerea*.] Address: Gunzburger, Margaret S., Department of Biological Science, Florida State University, Tallahassee, FL 32306-1100, USA. E-mail: gunz@bio.fsu.edu

4479. Hacet, N.; Aktaç, N. (2004): Considerations on the odonate fauna of Turkish Thrace, with some taxonomic notes. *Odonatologica* 33(3): 253-270. (in English). [The odonate fauna of Turkish Thrace (52 species / subspecies) is discussed, based on 40 taxa gathered during 1997-1999 from 86 localities. *Lestes macrostigma*, *Enallagma cyathigerum*, *Anaciaeschna isosceles antehumeralis*, *Anax ephippiger*, *Onychogomphus f. forcipatus*, *Cordulegaster i. insignis*, *Pantala flavescens*, and *Sympetrum pedemontanum* are new to this part of Turkey. Among the taxa discussed in some detail are *Calopteryx splendens amasina*, *Chalcolestes parvidens*, *Lestes v. virens* / *L. virens vestalis*, *Ichnura elegans ebneri* / *I. e. pontica*, *Gomphus vulgatissimus* / *G. schneiderii*, *Onychogomphus f. forcipatus* / *O. f. albotibialis*, *Somatochlora meridionalis*, *Libellula fulva* / *L. pontica*, and *Orthetrum c. coerulescens* / *O. c. anceps*. Some identification errors in earlier publications are corrected.] Address: Aktaç, N., Dept of Biology, Faculty of Arts and Sciences, Thrace University, TR-22030 Edirne, Turkey. E-mail: nihata@trakya.edu.tr

4480. Hämäläinen, M. (2004): Critical species of Odonata in Thailand and Indochina. *International Journal of Odonatology* 7(2): 295-304. (in English). ["The report provides a summary of our present knowledge of the odonate diversity (over 500 species) in the region and some general data on the habitat conservation in different countries. Thailand has the most diverse and best known odonate fauna, but knowledge of the Laotian and Vietnamese fauna has increased rapidly over the last 10 years. The conservation status of some species listed in the 1997 Action Plan is briefly discussed. No species are red-listed due to inadequate knowledge of their conservation status." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

- 4481.** Hämäläinen, M. (2004): Critical species of Odonata in the Philippines. *International Journal of Odonatology* 7(2): 305-310. (in English). ["The Philippine odonate fauna is characterized by a high percentage of endemic species, especially in Zygoptera, most of which have a very limited range. Due to the continuing loss of forests and other habitat destruction, a majority of the 300 plus known species could be red-listed, but only a few critical species are evaluated here. *Risicnemis seidenschwarzi* is added to the Red List. The need of further field surveys and taxonomic work is briefly emphasised and the present difficulties faced by field workers in the Philippines are discussed."] (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi
- 4482.** Hagen, H. von (2004): Erratum zu *Libellula* 22 (1/2): 25-29: Artspezifische Exuvienhaltungen bei der Emergenz von drei Libelluliden auf Mallorca (Odonata: Libellulidae). *Libellula* 23(1/2): 87-88. (in German, with English summary). ["Erratum: Species-specific postures for emergence in three Libellulidae in Mallorca (Odonata: Libellulidae) Due to technical problems, figure 1 of this article formerly published in *Libellula* 22 (2003) was printed in a disappointing quality. To do justice to the details of the original drawing, it is given again in the highest quality possible to us."] (Author)] Address: von Hagen, H., Akazienweg 28, D-58452 Witten-Bommern, Germany. E-mail: h.vonhagen@t-online.de
- 4483.** Harvey, R. (2004): Reports from Coastal Stations - 2003: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 21: 64-65. (in English). [*Erythromma viridulum*, *Sympetrum danae*, and *Anaciaeschna isoceles* are briefly discussed.] Address: not stated
- 4484.** Hawking, H.H.; Theischinger, G. (2004): Critical species of Odonata in Australia. *International Journal of Odonatology* 7(2): 113-132. (in English). ["The Australian Odonata fauna is reviewed. The state of the current taxonomy and ecology, studies on biodiversity, studies on larvae and the all identification keys are reported. The conservation status of the Australian odonates is evaluated and the endangered species identified. In addition the endemic species, species with unusual biology and species, not threatened yet, but maybe becoming critical in the future are discussed and listed."] (Authors)] Address: Hawking, J.H., Murray-Darling Freshwater Research Centre, Cooperative Research Centre for Freshwater Ecology, P.O. Box 921, Albury, NSW 2640, Australia. E-mail: John.Hawking@csiro.au
- 4485.** Hayden, J. (2004): Reports from Coastal Stations - 2003: Skomer Island NNR, Pembrokeshire. *Atropos* 21: 68-69. (in English). [United Kingdom; just four species of Odonata were recorded in 2003: *Enallagma cyathigerum*, *Aeshna mixta*, *Anax imperator*, and *Sympetrum striolatum*.] Address: not stated
- 4486.** Holusa, O.; Jeziorski, P. (2004): Bibliographie der odonatologischen Literatur der Tschechischen Republik, 1849 - 2000 (Odonata). *Libellula* 23(1/2): 53-76. (in German, with English summary). ["A list of 278 references of Odonatological literature from the years 1849 to 2000 for the territory of Czech Republic is presented. The list is divided into seven different topics. Not included are articles about fossil dragonflies, unpublished diploma theses, unpublished research reports and book reviews."] (Authors)] Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Mistek. E-mail: holusao@post.cz
- 4487.** Horn, R. (2004): Eine zweite Jahresgeneration bei *Crocothemis erythraea* in Deutschland während des extrem heißen Sommers 2003 (Odonata: Libellulidae)? *Libellula* 22(3/4) (2003): 139-142. (in German with English summary). ["In August and September 2003, at the end of the flight period young imagines of *C. erythraea* were recorded in the northern Hesse and southern Lower Saxony. In the light of the extremely hot summer, these records were interpreted as members of a second generation."] (Author)] Address: Horn, R., Philosophenweg 32, D-34121 Kassel, German. E-Mail: Reinhard-Horn@t-online.de
- 4488.** Hovmöller, R.; Johansson, F. (2004): A phylogenetic perspective on larval spine morphology in *Leucorrhinia* (Odonata: Libellulidae) based on ITS1, 5.8S, and ITS2 rDNA sequences. *Molecular Phylogenetics and Evolution* 30(3): 653-662. (in English). ["*Leucorrhinia* (Odonata, Anisoptera, Libellulidae) consists of 14-15 species with a holarctic distribution. We have combined the morphological characters of a previous study with sequence data from the ITS1, 5.8S rDNA, and ITS2 regions of the nuclear ribosomal repeat. Cloning was used to investigate the intra-individual variation and such variation was found in all investigated species. Parsimony jackknifing was used to identify supported groups. The effect of sequence alignment and gap coding was explored by a modified sensitivity analysis. Loss of spines in *Leucorrhinia* larvae has occurred twice: once in Europe and once in North America. The role of spines as a defence against predation is discussed in a phylogenetic context."] (Authors)] Address: Hovmöller, R., Department of Entomology, Swedish Museum of Natural History and Department of Zoology, Stockholm University, P.O. Box 500 07, 10405, Stockholm, Sweden. E-mail: rasmus.hovmolle@nrm.se
- 4489.** Huang, D.; Nel, A. (2004): Two new lower cretaceous dragonfly larvae from northeastern China (Anisoptera). *Odonatologica* 33(2): 199-205. (in English). ["2 larvae from the Yixian Formation are described. One of these has morphological similarities with the 'ultimate larval instars of *Sana nectes*', and the other one is of "cordulegastrid"-type. The relationships of the 'ultimate instars of *S. nectes*' and its young larvae are outlined and their identity is addressed. The "cordulegastrid"-like larva provides new data on the early evolution of the taxa involved."] (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr
- 4490.** Huber, A., (2004): Contribution to the knowledge of the odonate fauna of Transsylvania, Romania. *Notulae Odonatologicae* 6(3): 25-27. (in English). [30 species, collected in 1997, 1998 and 2001 from 17 localities in northern- (Szaplunca R. catchment) and eastern Transsylvania (Székely land), are brought on record. The list includes species as *Coenagrion hastulatum*, *C. ornatum*, *C. scitulum*, *Pyrrhosoma nymphula*, *Aeshna cyanea*, *Ophiogomphus cecilia*, *Somatochlora metallica*, *Leucorrhinia dubia*, and *Sympetrum danae*.] Address: Huber, A., Aggtelek National Park Directorate, Tengerszem oldal 1, H-3758 Jósvalfő, Hungary
- 4491.** Hunter, I. (2004): Reports from Coastal stations - 2003: Elms Farm, Icklesham, East Sussex. *Atropos*

21: 54-55. (in English). [Verbatim: Both of the new species of Odonata recorded during 2002 reappeared in 2003. The first *Erythromma najas* were two on 29 May. In July 100 *E. viridulum* were noted on 11th with 100+ on 8 August and the last four on 14 September. *Bra-chytron pratense* was noted from 28 May with a maximum of six on 16 June. *Libellula quadrimaculata* is surprisingly scarce here, so singles on 7 & 21 July were noteworthy. The first *Aeshna mixta* was recorded on 7 August, increasing to 50+ on 12th; the peak estimate in September was 100+ on 2nd with 40+ still around on 11 October.] Address: not stated

4492. Hunter, M. (2004): Durham's dragonflies. *Atropos* 22: 25-29. (in English). [Durham county, UK; introduction into the odonate fauna (22 known species) and some habitats of special odonatological interest.] Address: Hunter, M., 17 Gilerdale Close, Darlington, DL3 0EE, UK

4493. Inoue, K. (2004): Critical species of Odonata in Japan. *International Journal of Odonatology* 7(2): 311-324. (in English). ["Japan is a small country but ranges from the subtropical to the subarctic zone. Every year during spring to autumn, many typhoons bring tropical taxa, which occasionally establish in Japan. Up to now, 215 odonate taxa have been recorded, 34 of which are regarded as critical species. Intensive research on Odonata -supported by identification guides - has been carried out mainly after 1945. The current IUCN Red List does not sufficiently reflect present knowledge of the threat status of Odonata in Japan. Therefore changes for an updated global Red List are suggested and explained. The most critical sites are situated in suburban areas and in the isolated islands; the latter host many endemics. Conservation priorities and recommendations are stated and the importance of publicity is stressed. The Division of Nature Conservation of the Japanese Society for Odonatology is currently very active, and it is expected that the activity of all 15 committees will even increase in the future. The so-called "Dragonfly Citizen Summit" has been carried out every year since 1990. With this festival the number of dragonfly lovers has increased remarkably, and the knowledge and consent on conservation of Odonata and their habitats have made a good progress." (Author)] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abenoku, Osaka 545, Japan. E-mail: ks-inoue@mx2.nisiq.net

4494. Jödicke, R.; Boudot, J.-P.; Jacquemin, G.; Samraoui, B.; Schneider, W. (2004): Critical species of Odonata in northern Africa and the Arabian Peninsula. *International Journal of Odonatology* 7(2): 239-253. (in English). ["The region is broadly determined by desert, which forms a huge belt between the western Palaearctic and the Afrotropics. Fourteen out of the 125 odonate species recorded so far are endemics. There are two main centres of endemism in the region: the northern Maghreb and the southern Arabian Peninsula. Odonate habitats in the desert are especially endangered by dryness and pollution. Fourteen species -most of them endemics - are regarded as critical. Conservation measures are suggested." (Authors)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: r.joedicke@t-online.de

4495. Johnson, A. (2004): 2004 DSA post-meeting trip results in new state record. *Argia* 16(2): 5-6. (in English). [USA, Iowa, Lucas County, July 2004, *Libellula*

vibrans Fabricius 1793] Address: Johnson, Ann, Norwalk, IA, USA. E-mail: aj@hologrambirds.com

4496. Johnson, A. (2004): Iowa 2003 records. *Argia* 15(4): 23- (in English). [USA; *Gomphus militaris*, *Aeshna multicolor*, *Lestes inaequalis*] Address: Johnson, Ann, Norwalk, IA, USA. E-mail: aj@hologrambirds.com

4497. Johnson, N.F.; Masner, L. (2004): The Genus *Thoron* Haliday (Hymenoptera: Scelionidae), Egg-Parasitoids of Waterscorpions (Hemiptera: Nepidae), with Key to World Species. *American Museum Novitates* 3452: 16 pp. (in English). [Passing reference on Odonata: <http://diglib1.amnh.org/novitates/i0003-0082-3452-01-0001.pdf>] Address: Johnson, N.F.; Department of Entomology, The Ohio State University, 1315 Kinnear Road, Columbus, OH 43212, USA. E-mail: Johnson.2@osu.edu

4498. Jones, P. (2004): Small Red-eyed Damselfly *Erythromma viridulum* caught at light. *Atropos* 21: 81. (in English). [Verbatim: On 29 July 2003 I checked my MV light-trap, set at Elms Farm, Icklesham, East Sussex. The night had been warm and the usual moths were logged. Only 65 species of macro-moth were recorded [...]. Of note was a single male *E. viridulum*. The trap had been set in the dark and was taken in about half an hour before there was any light in the sky. Although the species does occur on our site, this individual must have been flying after dark and could well have been a newly arrived migrant. I have caught Migrant Hawker *Aeshna mixta* in the trap on several occasions but this was a new species for the trap.] Address: Jones, P., Elms Farm, Pett Lane, Icklesham, East Sussex, TN36 4AH, UK

4499. Kabus, T.; Hendrich, L.; Müller, R.; Petzold, F.; Meisel, J. (2004): Limnochemie, Flora, ausgewählte Gruppen des Makrozoobenthos und Libellen im mesotroph-kalkreichen Giesenschlagsee (Mecklenburgische Seenplatte). *Naturschutzarbeit in Mecklenburg-Vorpommern* 47(1): 27-37. (in German). [Germany; in 2002, 23 odonate species have been recorded including lake-populations of *Onychogomphus forcipatus* and *Gomphus vulgatissimus*.] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

4500. Kaiser, J.; Bellstedt, R. (2004): Der zweite Nachweis der Östlichen Moosjungfer (*Leucorrhinia albifrons*) in Thüringen. *Mitteilungen des Thüringer Entomologenverbandes* 11(2): 30-31. (in German). [gravel pit near Herrendorf, Landkreis Gotha, Thuringia, Germany, 15-VIII-2004; a corrective note with reference to the first Thuringian record of *Crocothemis erythraea* (Mey 2003) at the same locality is included: the correct date is 03-VIII-2001, not 02-06-2001.] Address: Kaiser, J., Heinoldsgasse 8, D-99867 Gotha, Germany

4501. Kalkman, V.J.; Pelt, G.J. van; Dumont, H.J.; Haritonov, A.Yu.; Taily, M. (2004): Critical species of Odonata in Turkey, Iran and the Caucasus. *International Journal of Odonatology* 7(2): 325-339. (in English). ["An overview is given of the present knowledge and current research on the Odonata fauna of Turkey, Iran, and the Caucasus. The occurrence of endemic taxa and of rare and possibly threatened species is discussed. The use of water from various aquatic habitats is reviewed in order to gain insight in existing and potential problems, and a number of conservation measures are proposed.

The creation of a few protected key areas for vulnerable species is considered to be the most effective measurement at short notice. Taking our restricted knowledge into account, it is concluded that only a general increase in the awareness of the necessity to deal with environmental problems, both with governmental organisations as well as with the public in the countries involved, may help solving problems regarding aquatic habitats." (Authors)] Address: Kalkman, V.J., Oude Rijnburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

4502. Kalkman, V.J.; Lopau, W.; Pelt, G.J. van (2004): Hitherto unpublished records of dragonflies from Turkey (Odonata). *Libellula Suppl.* 5: 65-166. (in English, with German and Turk summaries). ["Over 2000 records of 84 of the 96 species of Odonata known to occur in Turkey are presented. Many of the records were gathered during the last decades by entomologists from western Europe. Records based on material present in the collections of Naturalis (formerly the Rijksmuseum voor Natuurlijke Historie), Leiden, The Netherlands (RMNH), the Zoologisch Museum Amsterdam, The Netherlands (ZMAN), and the Natural History Museum, London, UK (NHM) are also included." (Authors)] Address: Pelt, G.J. van, Naturalis, P.O. 9517, NL-2300 RA Leiden, The Netherlands. E-mail: gj.vanpelt@wolmail.nl

4503. Kalkman, V.J. (2004): *Lindenia inkiti* (Bartenev, 1929) a synonym of *L. tetraphylla* (Vander Linden, 1825) (Anisoptera: Gomphidae). *Notulae Odonatologicae* 6(3): 34. (in English). [The taxonomic status of *L. inkiti* is discussed in detail; there is no reason to take it for a good species because all morphological characters are within the range of characters of *L. tetraphylla*.] Address: Kalkman, V.J., Oude Rijnburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

4504. Kalkman, V.J.; Kop, A.; Pelt, G.J. van; Wasscher, M. (2004): The dragonflies of the surroundings of Lake Koycegiz and the River Esen, Mugla province, SW Turkey (Odonata). *Libellula Suppl.* 5: 39-63. (in English, with German and Turk summaries). ["During a field trip in the coastal area of the Mugla province, SW Turkey, 48 species of Odonata were encountered. The data are compared with those of previous publications and unpublished material in the collections of the RMNH and of J.-P. Boudot. Of the surroundings of Lake Koycegiz 45 species are listed, seven of which had not previously been found. From the River Esen basin 28 species are listed, of which 13 are new to the area. The total number of species known from the study area has increased to 51, more than half of the number of species known to occur in Turkey. The data on distributional patterns, habitat preferences and seasonal ecology of the taxa involved are discussed." (Authors)] Address: Kalkman, V.J., Oude Rijnburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

4505. Katbeh-Bader, A.; Amr, Z.; Abu Baker, M.; Mahasneh, A. (2004): The dragonflies (Insecta: Odonata) of Jordan. *Denisia* 14: 309-317. (in English with German summary). [This is a review resp. compilatory paper of the 46 odonata species reported from Jordan. The conservation status is briefly discussed.] Address: Katbeh-Bader, A., Dept Horticulture and Plant Protection, Fac. Agriculture, Univ. of Jordan, Amman, Jordan

4506. Kenner, R.D. (2004): Chemist sees the light. *Bulletin of the Entomological Society of Canada* 36(1): 24-25. (in English). [Rex Kenner well known Canadian odonatologist gives a brief insight in his odonatological - entomological career from school day, over his profession as chemist to Assistant Curator at University of British Columbia. In a personal account he emphasises the importance of collections for documenting and studying biodiversity in Canada.] Address: Kenner, R.D., c/o Spencer Entomological Museum, University of British Columbia, Vancouver, BC, V6T 1Z4. Canada. E-mail: kenner@zoology.ubc.ca

4507. Khrokalo L.A. (2004): Special composition and ecological peculiarities of dragonflies (Insecta, Odonata) of the northeastern Ukraine.. Thesis, candidate of biological sciences in speciality 03.00.16 - ecology. - Kyiv National Taras Shevchenko University, Kyiv: 19 pp. (in Ukrainian, with Russian and English summaries). [Verbatim: This work is the first complex study of the dragonflies of northeastern part of Ukraine. 56 dragonflies species (including 55 ones in imaginal, 43 in larval phases) have been recorded for the area of research. Complete list of the northeastern Ukraine consists of 62 species including 6 ones reported by previous investigators only (Artobolewski, 1927a; Rodzyanko, 1895; Sharlemani & Artobolewski, 1915; Sheshchurak & Padalko, 1996; Gorb, 1991a; Gorb, 1996a). This number composes 85 % of all dragonflies species of the Ukrainian fauna. We separated the groups of the most rare (9), rare (15), common (19) and frequent (13) species according to the numbers of the specimens in our collection. 2 species (*Chalcolestes parvidens* and *Sympetrum depressiusculum*) have been first recorded for whole area of research, 18 species for Sumy, 2 species for Chernigiv, and 5 species for Cherkasy regions. "The most northern point of occurrence in the UKraine has been established for *Crocothemis erythraea*, and most eastern point for *Sympetrum pedemontanum*. The species have been divided into six seasonal groups by terms of flying periods and peculiarities of life cycles: 1) species, which overwinter in imago (2 species); 2) spring species (9); 3) spring-summer species (14); 4) summer species (7); 5) summer-autumn species (16); 6) transeasonal species (7). More precise definitions of the terms of flying periods in the UKraine have been given for 12 species (*Chalcolestes parvidens*, *Sympetrum fasca*, *Coenagrion armatum*, *Erythromma viridulum*, *Aeshna qffinis*, *Anaciaeschna isosceles*, *Anax imperator*, *Gomphus vulgatissimus*, *Cordulia aenea*, *Orthetrum albistylum*, *Sympetrum meridionale*, *Leucorrhinia rubicunda*). The analysis of seasonal distribution between the 10-day periods of months has been made for number of flying species. The beginning of fly period was registered in the second 10-day period of April; the number of flying species increased deeply during May-June; the maximum (42 species) was recorded in the middle of July; the ending of flying period was observed in the second 10-day period of October. The biotopic distribution of dragonflies larvae from 43 species on waterbodies of 18 types has been studied. The greatest number of the species showed euritopic, the smaller number stenotopic. *Calopteryx virgo*, *C. splendens*, *Stylurus flavipes*, *Gomphus vulgatissimus* were found in rivers and springs only (obligate reophyllic species). *Leucorrhinia*-species were found in lentic lakes and puddles and thus they are typical stagnophyllic forms. *Lestidae* and *Sympetrum* (*Libellulidae*) species adapted to existing in periodic waterbodies owing

to peculiarities of life cycles. The greatest species diversity (21 ones) was registered in rivers. Per one species were found in dystrophic creek of pond and open parts of reservoirs only. The analysis of the degree of similarities shown the existing of a few groups of biotopes. Stagnat dystrophic waterbodies and oligotrophic bogs complexes were separated deeply from flowing and stagnatic eutrophic waterbodies. The later were divided into complexes of periodic and permanent waterbodies. Special composition of anthropogenic waterbodies were very diversified due to variations of condition. Protection and conservation of the rare and endangered species are very actual today. The changes of the list of the dragonflies in Red Data book of Ukraine have been proposed. The finding of *Coenagrion mercuriale* in the Ukraine was not established and thus this species must be excepted from Red Data book. *Calopteryx virgo* and *Anax imperator* must be excepted too because a real risk of extinction of these species in the wild now and in near future isn't facing. The consideration of the five new species-candidates (*Nehalennia speciosa*, *Coenagrion lunulatum*, *Ophiogomphus cecilia*, *Cordulegaster bidentata*, *Leucorrhinia albifrons*) for making of a new list of the next edition of Red Data book of Ukraine have been proposed.] Address: Khrokalo, L.A., Dept Zool., Fac. Biol., Shevchenko Univ., Volodymirska 64, UKR-01033 Kiev, Ukraine

4508. Kitching, D. (2004): News from Cheshire. *Darter* 21: 8-9. (in English). ["[...] Following the major pollution incident and consequent fish kill on the River Dee in late 2000 there were concerns that the population of the Club-tailed Dragonfly *Gomphus vulgatissimus* would have suffered too. Searching for exuviae in late May 2001 soon showed that the lack of fish may well have reduced Odonate mortality as hundreds of exuviae were found rather than the usual few. Since then the population appears to have returned to the previous level. [...]". A lot of additional notes refering to different species are provided.] Address: Kitching, D., 84 Broken Cross, Macclesfield, Cheshire, SK11 8TZ, UK. E-mail: davidk@broccross.co.uk

4509. Kitt, M.; Reder, G. (2004): Gehäuftes Auftreten der Zierlichen Moosjungfer (*Leucorrhinia caudalis* Charpentier, 1840) am pfälzischen Oberrhein. *Fauna und Flora in Rheinland-Pfalz* 10(2): 493-507. (in German, with English summary). [New records of the very rare *L. caudalis* in Rhinland-Palatinate, Germany are documented in detail. In most cases, the species could be found at gravel pits or oxbows in the alluvium of the River Rhine. A few old records are included, including a previously unpublished first record for Hessia.] Address: Reder, Gerd, Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany. E-mail: PG.Reder@t-online.de

4510. Knill-Jones, S. (2004): Reports from Coastal stations - 2003: Isle of Wight. *Atropos* 21: 50-51. (in English). ["There were three records of *Sympetrum fonscolombii* one at Thorncross reservoir, Brightstone, on 15 June, one on Bonchurch Beach on 19 July and one at Atherfield on 24 August. An *Aeshna grandis* was seen at Alverstone on 19 June and I observed a very late *Sympetrum danae* on Afton Down on 20 October. There have only been a handful of records of the latter species for the island." (Author)] Address: Knill-Jones, S.A., 2 School Green Road, Freshwater, Isle of Wight, PO40 9AL, UK

4511. Koppmann, M. (2004): Natur erleben - Kultur genießen. Das Rußweihergebiet im Naturpark Nördlicher Oberpfälzer Wald. *Naturschutz und Naturparke* 192: 2-8. (in German). [Bavaria, Germany; This paper, directed to a more general in nature interested readership, outlines a few species of special aesthetic interest, and illustrates the contribution with two beautiful pictures of dragonflies.] Address: Koppmann, M., c/o Naturpark Nördlicher Oberpfälzer Wald, Stadtplatz 38, D-92660 Neustadt an der Waldnaab, Germany. E-mail: MKoppmann@neustadt.de

4512. Koskimäki, J.; Rantala, M.J.; Taskinen, J.; Tynkkynen, K.; Suhonen, J. (2004): Immunocompetence and resource holding potential in the damselfly, *Calopteryx virgo* L.. *Behavioral Ecology* 15(1): 169-173. (in English). ["It is generally believed that resource holding potential reliably reflects male quality, but empirical evidence showing this is scarce. Here we show that the outcome of male-male competition may predict male immunocompetence in the territorial damselfly, *C. virgo*. We staged contests between 27 pairs of males and found that winners of the contests showed higher immunocompetence, measured as encapsulation response, compared with that of losers. Furthermore, the winners had larger fat reserves. We also collected 29 males that had not been used in staged contests, and found that in these males encapsulation response correlated positively with an individual's fat reserves. Both immunocompetence and resource holding potential seem to depend on energy reserves, suggesting a trade-off between parasite resistance and energetically costly territorial behavior. The results suggest that the outcome of male-male contest can be used to predict male quality in terms of immune defense." (Authors)] Address: Taskinen, J., Institute of Applied Biotechnology, University of Kuopio, Box 1627, FIN-70211 Kuopio, Finland. E-mail: jouni.taskinen@uku.fi

4513. Kosterin, O.E.; Malikova, E.I.; Haritonov, A.Yu. (2004): Critical species of Odonata in the Asian part of the former USSR and the Republic of Mongolia. *International Journal of Odonatology* 7(2): 341-370. (in English). ["The region covered is briefly defined and characterized as relatively little disturbed. A survey of relevant Odonatological literature, including local Red Lists, is given, along with current scientific activity. Sixteen species are indicated, which deserve special attention, one of them, *Ischnura aralensis*, being the only strict endemic in the region. Some isolated populations deserving protection are indicated. Regions important for odonate protection are listed, including parts of the Russian Far East in which threatened Chinese populations find a northern refuge. Measures taken for nature protection in the countries considered are also discussed." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

4514. Kosterin, O.E. (2004): Some Odonata collected in Aldan Ulus of Sakha (Yakutia) Republic in late June 2002. *Notulae Odonatologicae* 6(3): 27-31. (in English). ["13 species were collected in S Yakutia at the towns of Aldan and Tommot. Most of them were confined to peat-moss bogs with open larch stand (loc. 'mari') on terraces of the major Aldan R., while the main area of the Aldan Upland seems to be almost devoid of Odonata. The record of the only rheophilic species found, Ni-

honogomphus ruptus (although not its northernmost record), and of a northern boreal species *Somatochlora sahlbergi* are new for Yakutia. A list of 32 species presently known for Yakutia is given." (Author) The taxonomic status of *Enallagma cyathigerum antiquum* Bartenev 1956 is briefly discussed.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

4515. Krüner, U. (2004): Die Häufigkeitsverteilung der Weibchenfarben von *Ceragrion tenellum* an drei Gewässern im Naturpark Schwalm-Nette (Odonata: Coenagrionidae). *Libellula* 22(3/4) (2003): 107-117. (in German with English summary). [Nordrhein-Westfalen, Germany; three ponds were studied for different frequencies of female colour morphs in *C. tenellum*. "In 1999 - 2001, at two ponds, all four different female colour morphs were observed. The morph *typica* and the morph *intermedium* were present at each pond. At the three study ponds the characteristic morph frequencies were constant for three years. At all three ponds small numbers of the morph *intermedium* appeared with varied black colouring on the abdomen. The nine variations of the morph *intermedium* are documented." (Author)] Address: Krüner, Ulrike, Gelderner Str. 39, D-41189 Mönchengladbach, Germany. E-mail: krue-ner@t-online.de

4516. Krüner, U. (2004): The Sixteenth International Symposium of Odonatology of the International Odonatological Foundation S.I.O. in Benzkow bei Schwerin vom 26.07.-04.08.2004. *Libellennachrichten* 12: 12. (in German). [Brief report from the odonatological symposium held near Schwerin, Germany in July 2004.] Address: Krüner, Ulrike, Gelderner Str. 39, D-41189 Mönchengladbach, Germany. E-mail: kruener@t-online.de

4517. Lajeunesse, J.M.; Forbes, M.; Smith, B. (2004): Species and sex biases in ectoparasitism of dragonflies by mites. *Oikos* 106(3): 501-508. (in English). ["An important problem in understanding the evolution of parasite host range is determining the extent to which parasite fitness varies among host species and the factors affecting that fitness variation. We present a detailed investigation on the patterns of host use and successful parasitism of two dragonfly species by the ectoparasitic water mite, *Limnochares americana* Lundblad. In our field surveys, we found both species biases and sex biases in parasitism by mites, which appear explained by differences in exposure. Differential habitat use by dragonflies helped explain male biases in parasitism in both host species, but was not useful in explaining species biases in parasitism. Species biases in parasitism may be explained by more subtle variation in habitat use not explored in this study, or perhaps by differences in timing of emergence, as we found for the two dragonfly species. Despite species differences in parasitism in nature, we found that mites attached equally successfully to both dragonfly species during experimental infestations. However, mites failed to engorge more often on the dragonfly species less often used as a host in nature. This host species also was more likely to have dead mites in natural infestations as compared to the other host species, which was more often and more heavily parasitized. Our results are consistent with previous research suggesting parasites are less successful on less often used hosts. Such research has

implications for understanding determinants of host range for animal parasites." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

4518. Laudermilk, E. (2004): 2004 DSA southeastern regional meeting, Mammoth cave, Kentucky, June 10-13. *Argia* 16(2): 8. (in English). [USA; the 47 species recorded by the meeting participants are listed.] Address: Laudermilk, E.L., 199 Meadow View Drive, #3, Frankfort, KY 40601, USA. E-mail: Ellis.Laudermilk@mail.state.ky.us

4519. Lingenfelder, U. (2004): Fließwasserlibellen in der Pfalz. *GNOR Info* 98: 16-18. (in German). [In the Pfälzerwald-region (Rhineland-Palatinate, Germany), 2003 62 brooks have been surveyed for their odonate fauna. The following locality-frequencies are result of the study: *Calopteryx virgo*: 95%, *Cordulegaster boltonii*: 66%, *Calopteryx splendens*: 52%, *Ophiogomphus cecilia*: 27%, *Gomphus vulgatissimus*: 8%, *Onychogomphus forcipatus*: 8%, and *Thecagaster bidentata*: 2%.] Address: Lingenfelder, U., Seebergstr. 1, D-67716 Heltersberg, Germany

4520. Lingenfelder, U. (2004): Zur Verbreitung der Grünen Flussjungfer - *Ophiogomphus cecilia* (Fourcroy, 1785) - in der Pfalz (Odonata: Gomphidae). *Fauna und Flora in Rheinland-Pfalz* 10(2): 527-552. (in German, with English summary). [The current regional distribution of *O. cecilia* "in the Palatinate (southern part of Rhineland-Palatinate) was researched between 1999 and 2004. Numerous previously unknown occurrences of *O. cecilia* were found. The species was recorded from the most important running waters of nearly all natural areas in the Palatinate. In addition, recordings made in some adjoining areas and observations of *O. cecilia* in the Palatinate made by other odonatologists were also compiled in this article. Findings are shown in a distribution map. This study also provides a brief survey of the distribution of the species in adjoining regions. Distribution, successful reproduction, and dispersal are discussed in short as well as recommendations for the protection of *O. cecilia* regarding the Habitats Directive." (Author)] Address: Lingenfelder, U., Seebergstr. 1, 67716 Heltersberg, Germany

4521. Machado, A.B.M. (2004): Studies on neotropical Protoneuridae. 15. *Amazona* gen. nov. with description of *A. juruaensis* sp. nov. (Odonata, Zygoptera). *Revista Brasileira de Zoologia* 21(2): 333-336. (in English, with Portuguese summary). ["The genus *Amazona* is erected to contain *A. ephippigera* (Selys, 1886), *A. westfalli* (Machado, 2001) and *A. juruaensis* sp. nov. The new genus is close to *Forcepsioneura* Lencioni, 1999 but differs from it mainly by the poorly-developed postero-lateral tubercles of the medium prothoracic lobe, by the dark colour of the metepimerum and of the rear of the head. *A. juruaensis* sp. nov. (holotype male, Acre, Brazil) differs from the other two species of the genus mainly by the structure of the superior anal appendages." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

4522. Mackenzie Dodds, R. (2004): The Dragonfly Project: an update. *Dragonfly news* 45: 24-25. (in English). [Extensive report on teaching Odonata in the

UK.] Address: Mackenzie Dodds, R., The National Dragonfly Museum, Ashton Mill, near Oundle, Peterborough PE8 5LZ, UK

4523. Manolis, T. (2004): Occipital spines on male *Ophiogomphus morrisoni*. *Argia* 16(2): 23-24. (in English). [USA, California; illustration and discussion of the occipital spines. The function of the spines seems to be unknown at present.] Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

4524. Marden, J.H.; Cobb, J.R. (2004): Territorial and mating success of dragonflies that vary in muscle power output and presence of gregarine gut parasites. *Animal Behaviour* 68(4): 857-865. (in English). ["Competition for mating territories in libellulid dragonflies involves aerial contests that require high levels of exertion and locomotor performance. Here we test the hypothesis that success of male *Libellula pulchella* dragonflies in territoriality and mating is affected by muscle contractile performance, and we examine how gregarine gut parasites affect muscle performance, energy reserves and territorial behaviour of their hosts. At a pond where gregarine parasites are rare, long-term territorial and mating success of males showed a significant positive association with muscle power output. At a nearby pond that had a much higher incidence and intensity of gregarine parasitism, there was no relationship between muscle performance and short-term territorial success. Instead, males assorted themselves into aggressive territory holders and submissive satellites, with the large majority of territory holders having no parasites and nearly all of the satellites parasitized. Unparasitized males showed a tight positive relationship between muscle power and fat content, which suggests that they use a known phenotypic adjustment in muscle contractile performance to allow the energy consumption rate of the flight muscles to match the rate at which energy can be mobilized from storage pools. Parasitized dragonflies showed a small decrease in average fat content and a marked change in the relationship between fat content and muscle power output. The apparent loss of the ability to match muscle contractility to the size of the energy storage pool in parasitized dragonflies suggests that gregarines may have systemic effects on signalling pathways and energy homeostasis. By indirectly choosing males that had successfully competed for territories, females consistently mated with physiologically or immunologically superior males despite large between-pond differences in male behaviour and the incidence and intensity of parasitic infection." (Authors)] Address: Marden, J.H., Dept Biol., Pennsylvania St. University, 208 Mueller Laboratory, University Park, PA 16802, USA

4525. Marinov, M.; Simov, N. (2004): *Somatochlora arctica* (Zett.) and *Leucorrhinia dubia* (Vander L.) new for the fauna of Bulgaria (Anisoptera: Corduliidae, Libellulidae). *Notulae Odonatologicae* 6(3): 34-35. (in English). [peatbog in "Ticha Rila", Rila Monastery National Park, 1994 m a.s.l., 42°07'N 23°28'E] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@mail.bg

4526. Marquis, O.; Saglio, P.; Neveu, A. (2004): Effects of predators and conspecific chemical cues on the swimming activity of *Rana temporaria* and *Bufo bufo* tadpoles. *Archiv für Hydrobiologie* 160(2) : 153-170. (in English). ["Behavioural observations were performed in

an olfactometer to examine the effects of chemical stimuli from predators and conspecifics on the swimming activity of two larval anurans, the common frog, *Rana temporaria*, and the common toad, *Bufo bufo*. Both species of tadpoles showed a slight but non significant reduction in swimming behaviour when confronted to chemical cues from starved sympatric predators (larval spotted salamander, *Salamandra salamandra*; larval dragonfly, *Anax imperator*). In contrast, test solutions from starved *Astacus leptodactylus*, a recently introduced predator, produced no change at all in behaviour. As a whole, significant results indicate that indirect chemical signals resulting from the preying activity of the predator are mainly used for the chemical assessment of predation risk by tadpoles. Swimming activity of *R. temporaria* and *B. bufo* tadpoles was also found to be significantly decreased in response to chemical cues released by crushed conspecifics, or by *A. leptodactylus* within the day following ingestion of conspecific tadpoles. Our results suggest that the presence of conspecific alarm substances in water and predators' waste products play a pre-eminent role in the chemical detection of predators by these larval anurans." (Authors)] Address: not available

4527. Martens, A. (2004): Die Solarzeit: wichtig und nicht schwer zu bestimmen. *Libellennachrichten* 12: 11-12. (in German). [In the framework of etho-ecological studies it is important to know the exact solar time. The author provides methods and links to calculate the solar time per locality within a time zone.] Address: Martens, A., Pädagogische Hochschule Karlsruhe, PF 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

4528. Martynov, V.V.; Martinov, A.V. (2004): Interesting findings of dragonflies (Insecta, Odonata) from Ukraine. *Vestnik zoologii* 38(5): 38- (in Russian(?)). [Ukraine, records of the following species are documented: *Somatochlora alpestris*, *Aeshna juncea*, *Thecagaster bidentata*, *Brachytron pratense*, and *Chalcolestes parvidens*.] Address: not stated

4529. Matushkina N. A. (2004): Comparative morphology of ovipositor in some damselflies (Odonata, Zygoptera). *Vestnik Zoologii* 38(3): 53-66. (in Russian with English summary). [*Bayadera melanopteryx* (Euphaeidae), *Chalcolestes parvidens* (Lestidae), *Heteragrion alienum* (Megapodagrionidae), *Platycnemis penripes* (Platycnemididae), and *Palaemnema domina* (Platystictidae); "Comparative study was aimed to reveal differences among species of these families. The table of ovipositor characters was compiled based upon the literature data and own results, which can be used for phylogenetic analysis. Possible correlations between ovipositor features and oviposition behaviour are discussed." (Author).] Address: Matushkina N. A. c/o Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

4530. Mauersberger, R.; Schiel, F.-J.; Burbach, K. (2004): Verbreitung und aktuelle Bestandssituation von *Leucorrhinia caudalis* in Deutschland (Odonata: Libellulidae). *Libellula* 22(3/4) (2003): (in German with English summary). ["*L. caudalis* is included in the species lists of 13 German federal states. However, it is considered to be extinct or lost in five of them. Within the last ten years, *L. caudalis* was recorded at 127 water bodies.

Seventy of these are situated in Brandenburg, 22 in Bavaria, 15 in Baden-Württemberg, seven in Rhineland-Palatinate, six in Mecklenburg-Vorpommern, four in Saarland and one in Hesse, Saxony and Lower Saxony, respectively. The maximum abundance hitherto discovered in Germany amounted to 1.004 emerging individuals at a 200-m-long shore sector at a lake in northern Brandenburg in 2001." (Authors)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

4531. Mauffray, B. (2004): Georgia 2003 summary. *Argia* 15(4): 23. (in English). [Georgia, USA; new state records are *Lestes eurinus*, *Arigomphus villosipes*.] Address: Mauffray, B., 4525 N.W. 53rd Lane., Gainesville, FL 32653, USA. E-mail: iori@afn.org

4532. McGeeney, A. (2004): Identification of Red Darters (Part 1). *Atropos* 23: 27-32. (in English). [*Sympetrum nigrescens*, *S. striolatum*, *S. flaveolum*, *S. sanguineum*, *S. fonscolombii*, *Crocothemis erythraea*, and *Orthetrum coerulescens* are introduced, and identification characters are compiled and discussed. Several very good colour pictures show most of the species (male and female).] Address: McGeeney, A., 12 Lincolns Field, Epping, CM16 5DY, UK

4533. McKee, D.; Harvey, I.; Sherratt, T.N. (2004): Behaviour of male coenagrionid damselflies towards conspecific females at the water's edge (Zygoptera: Coenagrionidae). *Odonatologica* 33(3): 271-278. ["The behaviour of male *Coenagrion puella* and *Xanthocnemis zealandica* towards conspecific andromorph and gynomorph females was studied at breeding ponds in the U.K. and in New Zealand respectively. As expected, male attention directed towards copulation wheels (*C. puella*) did not depend on whether the wheel contained an andromorph or a gynomorph. Similarly, male attention directed towards tandem pairs (*C. puella* and *X. zealandica*) did not depend on whether the tandem contained an andromorph or a gynomorph. When individual andromorph and gynomorph females (*C. puella* and *X. zealandica*) were released at the water's edge they experienced similar levels of attention from males. By contrast, males (*X. zealandica*) formed significantly more tandems with gynomorphs tethered at the water's edge than with tethered andromorphs. The observations suggest that males readily identify and intercept conspecific ♀♀ at the water's edge, particularly when in motion, and that andromorphs and gynomorphs are equally susceptible to ♂ attention. Behaviour of males towards tethered females may be atypical compared to that recorded under more natural conditions." (Authors)] Address: Sherratt, T.N., Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa ON, K1S 5B6, Canada. E-mail: sherratt@ccs.carleton.ca

4534. McPeck, M.A. (2004): The growth/predation risk trade-off: So what is the mechanism? *The American Naturalist* 163(5) (E-article): E88-E111. (in English) ["Among damselflies in natural lakes, *Ischnura* species grow faster than coexisting *Enallagma* species, but *Enallagma* species have higher survival under predation than *Ischnura* species. This growth/predation risk trade-off apparently allows these taxa to coexist in ponds and lakes across the Holarctic. However, laboratory studies presented here show that the mechanism assumed by most theoretical and empirical studies to mediate this

trade-off, namely activity simultaneously modulating foraging returns and predation risk, does not operate in this system. *Ischnura verticalis* larvae were more active than larvae of *Enallagma* species in a short-term behavioral experiment, which explains why *Ischnura* experiences greater mortality from predation. However, this greater activity did not translate into higher feeding rates. *Ischnura verticalis* and *Enallagma* species ate comparable amounts of food in both the short-term behavioral experiment and a longer feeding and digestion experiment. In spite of no difference in the amount of food ingested or assimilated, *I. verticalis* larvae grew faster than *Enallagma* larvae because they were better able to physiologically convert assimilated food into their own biomass in the presence of mortality threats. From these studies we understand the phenotypic mechanisms determining the antagonistic patterns of relative growth and survival between these two genera, but why these patterns exist remains unclear." (Author) Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

4535. McShaffrey, D. (2004): Swarming dragonflies in Florida. *Argia* 15(4): 25-26. (in English). [Feeding aggregation of a mixed swarm of *Miathyria marcella*, *Traema carolina*, and *Coryphaeschna ingens*. "My next stop that day was at the Archbold Biological Station. [...] Mark Deyrup, the resident entomologist, [...] said that the swarms were most likely feeding on adult fire ants. This invasive alien species is found in large numbers on the pastureland in the area, although it does poorly in the native scrub. Mark also passed along a request from Dr. Lubomir Masner at the Canadian National Collection in Ottawa to keep an eye open for flightless scelionid wasps that ride about on dragonflies. If you are ever at the Archbold Station, look Mark up. He is also the keeper of Needham's net; legend has it that anyone who touches the net will have better luck at collecting. Actually, I just made that up, but I've been getting better at collecting since I touched the net."] Address: McShaffrey, D., Dept of Biol. and Environ. Sci., Marietta College, Marietta, OH 45750, Florida

4536. Merrill, I. (2004): News from the Leicestershire and Rutland Dragonfly Group. *Darter* 21: 7-8. (in English). [Brief note on the activities of the dragonfly group. For more information see: <http://lrdragonfly.topcities.com>.] Address: Merrill, I., 20 Ashford Road, Whitwick, Coalville, Leics., LE67 5GD, UK. E-mail: i.merrill@btopenworld.com

4537. Meurgey, F. (2004): *Erythrodiplax berenice* (Drury, 1770) and *Traema calverti* Muttkowski, 1910, new species for Guadeloupe (Lesser Antilles). *Argia* 16(2): 25. (in English). [*Erythrodiplax berenice*: 10-XII-1973, Le Moule; *Traema calverti*: 31-III-2004, Ste Rose] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

4538. Meurgey, F. (2004): New records of *Argia cuprea* and *Lestes secula* - results of the 2003 collecting trip to Nicaragua. *Argia* 16(2): 22. (in English). [Between 17-IX. und 09-X-2003, 39 species were recorded.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

- 4539.** Mikolajewski, D.J.; Johansson, F.; Brodin, T. (2004): Condition-dependent behaviour among damselfly populations. *Canadian Journal of Zoology* 82: 653-659. (in English). ["Body condition is predicted to influence behaviours such as activity, which in turn affects energy gain and survival. In this study we investigated (i) whether populations of the damselfly *Lestes sponsa* (Hansemann, 1823) differ in body condition and activity among lakes, and (ii) which body condition factors affect behaviour. We estimated last instar larval behaviour (measured as activity), body condition (measured as size, body mass, muscle mass, fat content, and time to emergence), and fish presence/absence in eight lakes. Body condition of larvae differed among lakes but the presence/absence of fish in lakes had no effect on body condition. Activity did not differ among lakes and was not affected by the presence/absence of fish in lakes. Activity was negatively related to size, body mass, muscle mass, and fat content, and positively related with time to emergence, suggesting that final-instar larvae in good condition are favouring development over growth to emerge earlier. This study highlights the importance of differences in condition among populations and among individuals." (Authors)] Address: Mikolajewski, D., Technische Universität Braunschweig, Zoologisches Institut, Ökologie, Fasanenstraße 3, D-38102 Braunschweig, Germany. E-mail: d.mikolajewski@tu-bs.de
- 4540.** Mikolajewski, D.J.; Johansson, F. (2004): Morphological and behavioral defenses in dragonfly larvae: trait compensation and cospecialization. *Behavioral Ecology* 15(4): 614-620. (in English). ["Many animals have two basic traits for avoiding being killed by a predator: behavioral modification and morphological defense. We examined the relationship between antipredator behavior and morphological defense in larvae of three closely related dragonfly species within the genus *Leucorrhinia* (*L. albifrons*, *L. dubia*, *L. rubicunda*). The three species differ with regard to their morphological defense as expressed in the length of the larval abdominal spines. Results showed that longer abdominal spines provided protection against an attacking fish predator (perch) because the probability of being rejected after an attack was significantly higher in the species with the longest abdominal spines. In contrast to other studies, the species with the strongest morphological defense did not show the least behavioral predator avoidance. Instead, the species with intermediate morphological defense showed the least predator behavioral avoidance. The results suggest that the *Leucorrhinia* system is a mixture of trait cospecialization (a positive correlation between antipredator behavior and morphological defense) and trait compensation (a negative correlation between antipredator behavior and morphological defense). Differences in the relationship between morphological and behavioral defense between species might be related to abundance patterns of the three species in lakes with and without fish predators." (Authors)] Address: Mikolajewski, D.J.; TU Braunschweig, Zoologisches Institut Ökologie, Fasanenstr. 3, D-38102 Braunschweig, Germany. E-mail: d.mikolajewski@tu-bs.de
- 4541.** Mill, P.J.; Taylor, P.; Parr, A.J. (2004): Vernacular names for British and European Dragonflies. *Atropos* 23: 33-35. (in English). [English vernacular names for 84 odonate species are proposed.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 4542.** Mill, P.J.; Taylor, P.; Parr, A.J. (2004): Vernacular names for the dragonflies of north-western Europe. *J. Br. Dragonfly Society* 20(2): 73-76. (in English). [see OAS 4541] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 4543.** Miller, M.N.; Fincke, O.M. (2004): Mistakes in sexual recognition among sympatric Zygoptera vary with the time of day and color morphism (Odonata: Coenagrionidae). *International Journal of Odonatology* 7(3): 471-491. (in English). ["In odonates, female specific color polymorphisms appear to be an evolutionary response to sexual harassment, but we know little about the decision rules males use when searching for variable females. For two sympatric species of *Enallagma*, we measured male responses to live female variants under field conditions, early and later in the day. In the morning, when the operational sex ratio was the most male-biased and female density the lowest, males of the polymorphic *E. civile* did not discriminate among conspecific female morphs, and reacted sexually to the andromorphic females of *E. aspersum*, a monomorphic species. Then, male *E. aspersum* did not favor conspecific females over *E. civile* morphs. Both morph types were more confusing for males than were conspecific male signals. However, after 13:00 h, males of both species made few mistakes, and *E. civile* males reacted sexually relatively less often to conspecific andromorphs, the minority morph in this population. The changes in a male's sexual response suggested that they cued to female-specific traits when females were scarce, increasing their detection of potential mates at the expense of making mistakes with heterospecific females. When females of both species were more abundant, a male's behavior was consistent with cueing to morph-specific features. Analyses of comparative data suggested that for several genera, males of polymorphic species were more likely to mistake heterospecific females as mates than males of monomorphic congeners. Our results best support the learned mate recognition hypothesis for the evolution and maintenance of female-specific polymorphisms." (Authors)] Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu
- 4544.** Moore, N. (2004): The early days of dragonfly recording. *Darter* 21: 3. (in English). [This is a most authoritative account on the beginning and developing of mapping Odonata in the UK.] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom
- 4545.** Moore, N.W. (2004): Book Review: The natural History of Ireland's Dragonflies. ISBN 0900761458. *J. Br. Dragonfly Society* 20(2): 80-82. (in English). [review] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom
- 4546.** Moskowitz, D. (2004): A new late flight date for *Lestes* congener in North America. *Argia* 15(4): 22-23. (in English). [Morris county, New Jersey, USA: 21 Nov. 2003] Address: Moskowitz, D. c/o EcolSciences, Inc. 75 Fleetwood Drive, Suite 250 Rockaway, New Jersey 07866 dmoskowi@ecolsciences.com
- 4547.** Müller, O. (2004): Steinschüttungen von Buhnen als Larval-Lebensraum für *Ophiogomphus cecilia* (Odonata: Gomphidae). *Libellula* 23(1/2): 45-51. (in

German, with English summary). ["During a quantitative sampling of macrozoobenthos in the riprap areas of groynes of the River Oder (Brandenburg, Germany), larvae of *O. cecilia* were observed in microhabitats unusual for Gomphidae. Larvae settled on the surfaces of stones of the riprap of groynes. The habitat and the investigated fauna are described. Habitat choice and behaviour of the larvae are discussed under ecological aspects.] Address: Müller, O., Birkenweg 6d, D-13206 Libbenichen, Germany. E-mail: olemueller@bioscience-art.de

4548. Müller, R. (2004): *Cercion lindenii* (Sélys, 1840) am Mittellandkanal - Erstnachweis für Sachsen-Anhalt (Insecta: Odonata). *Lauterbornia* 50: 79-83. (in German with English summary). [Bülstringen near Haldenleben, Sachsen-Anhalt, Germany; 27.V.2003] Address: Müller, R., c/o Planungsbüro Hydrobiologie, Augustastr. 2, D-12203-Berlin, Germany. E-mail: hydrobiologie@t-online.de

4549. Nicolet, P.; Biggs, J.; Foa, G.; Hodson, M.J.; Reynolds, C.; Whitfield, M.; Williams, P. (2004): The wetland plant and macroinvertebrate assemblages of temporary ponds in England and Wales. *Biological Conservation* 120(2): 265-282. (in English). ["The biodiversity value of Northern European temporary ponds has been little recognised, and there are many gaps in our understanding of their ecology. This study investigated the wetland (including aquatic) plant and macroinvertebrate assemblages, and the physico-chemical characteristics of 71 temporary ponds in semi-natural habitats. Temporary ponds supported on average 17 (SD ± 8) wetland plant and 25 (SD ± 10) macroinvertebrate species. Over 75% of temporary ponds supported at least one uncommon (local, nationally scarce or Red Data Book) species. The number of uncommon wetland plant species and total number of macroinvertebrate species were both positively correlated with the total number of wetland plant species (richness), but there was no correlation between the number of uncommon and common macroinvertebrate species. Almost three-quarters of temporary ponds supported at least one nationally scarce macroinvertebrate and 8% supported at least one nationally scarce plant across a wide range of physico-chemical characteristics. The main environmental factor influencing the composition of temporary pond communities was water chemistry, particularly pH and alkalinity. The occurrence of facultative as well as obligate temporary pond species suggested that this habitat may play an important role in the interchange of species between waterbodies at the landscape scale." (Authors) The following odonate taxa are listed in Appendix B: *Ischnura elegans*, *Pyrrhosoma nymphula*, *Coenagrion puella/pulchellum*, *Libellula quadrimaculata*, *Aeshna juncea*, *Sympetrum sanguineum*.] Address: Nicolet, P., The Ponds Conservation Trust: Policy & Research, c/o Oxford Brookes University, School of Biological and Molecular Sciences, Gipsy Lane, Oxford OX3 0BP, UK

4550. Niehuis, M. (2004): Ergänzungen / Berichtigungen zu: Niehuis, M. (2003): Fund der Nordischen Moosjungfer - *Leucorrhinia rubicunda* (L.) - in der Südpfalz (Insecta: Odonata). *Fauna und Flora in Rheinland-Pfalz* 10(1): 279-284. *Fauna und Flora in Rheinland-Pfalz* 10(2): 753-754. (in German). [Additions to the records of *L. rubicunda* in Rhineland-Palatinate, Germany with a regional focus and including France and Luxembourg

are made.] Address: Niehuis, M., Im Vorderen Großthal, D-76857 Albersweiler, Germany. E-mail: Niehuis@t-online.de

4551. Niehuis, M.; Heilig, D. (2004): Später Nachweis der Gemeinen Keiljungfer (*Gomphus vulgatissimus*) in der Pfalz (Insecta: Odonata). *Fauna und Flora in Rheinland-Pfalz* 10(2): 703-704. (in German). [At 29-VII-2004, a nearly fresh female imago of *G. vulgatissimus* was recorded in the county Gernersheim, Rhineland-Palatinate, Germany. Normally, this species emerge early in May. The possible reasons underlying this late record are briefly discussed.] Address: Niehuis, M., Im Vorderen Großthal, D-76857 Albersweiler, Germany. E-mail: Niehuis@t-online.de

4552. Novelo-Gutiérrez, R.; González-Soriano, E. (2004): The larva of *Dythemis maya* Calvert, 1906 and a redescription of the larva of *D. sterilis* Hagen, 1861 with a key to the larvae of the genus (Anisoptera: Libellulidae). *Odonatologica* 33(3): 279-289. (in English). ["The last instar larva of *D. maya* is described and illustrated for the first time, based on reared material from Hidalgo, Morelos and Michoacan States, Mexico. The larva of *D. maya* is the largest of the genus and is remarkably different from other larvae, mainly by the reduced or wanting dorsal protuberances, and in the short lateral spines on the abdomen. A redescription of the larva of *D. sterilis* and some notes on other larvae of *Dythemis* are also provided, and all species are keyed." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

4553. O'Brien, M. (2004): An unusual mode of contraception. *Argia* 16(2): 24. (in English). [USA, Michigan; "...] One unfortunate male *Gomphus quadricolor* was collected ... with the terminal abdominal segments of a female still attached to the the male's penis. I suppose that had the male lived beyond Stephen's capture, he may have been able to disengage himself, but in this instance, he was removed from the gene pool a priori. [...]" (Author)] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

4554. Ocon, C.S.; Rodrigues Capítulo, A. (2004): Presence and abundance of Ephemeroptera and other sensitive macroinvertebrates in relation with habitat conditions in pampean streams (Buenos Aires, Argentina). *Archiv für Hydrobiologie* 159(4) : 473-487. (in English) ["The objective of this work was to analyse the presence and abundance of Ephemeroptera and other sensitive invertebrates in two streams in the pampean area of Argentina, which have different ecological conditions. Juan Blanco stream is a pristine system and a reference site for the area while Buñirigo stream is affected by industrial effluents coming from food industries and tanneries. Biological and physico-chemical samples were taken seasonally from each stream over two years at two sites (upstream and downstream). DO, conductivity, pH, BOD, COD, heavy metals (Pb, Cr, Cu, Cd, Zn and Hg) and nutrients were measured and biotic indices were applied to determine water quality. Among the Ephemeroptera, *Caenis cf. argentina* (Caenidae) and *Callibaetis cf. fasciatus* (Baetidae) were the dominant species with maximum densities in Juan Blanco

stream. Other macroinvertebrates found in the study area and considered sensitive were *Magellomyia bruchina* (Trichoptera, Limnephilidae), *Campsurus major* (Ephemeroptera, Polymitarcyidae), *Rhinoaeschna bonariensis* and *Micrathyrina dydima* (Odonata Anisoptera) and *Diplodon delodontus delodontus* (Pelecypoda, Hyriidae) recorded at low number in Buñirigo downstream. The abundance of individuals for each species can be correlated with water quality variations in the study sites. Certain parameters like pH can influence the distribution patterns of *C. cf. fasciatus*. (Authors)] Address: Rodrigues Capitulo, A., Instituto de Limnología "Raúl A. Ringuelet", Universidad Nacional de La Plata, C.C. 712, AR-1900 La Plata, Argentina

4555. Odin, N. (2004): Reports from Coastal Stations - 2003: Landguard Bird Observatory, Suffolk. *Atropos* 21: 63-64. (in English). [United Kingdom; *Aeshna cyanea*, *Orthetrum cancellatum*; *Calopteryx splendens* was caught in a Heligoland trap.] Address: not stated

4556. Orr, A.G. (2004): Critical species of Odonata in Malaysia, Indonesia, Singapore and Brunei. *International Journal of Odonatology* 7(2): 371-384. (in English). ["Malaysia, Brunei and the Indonesian archipelago comprise a total land area of ca 1.84 million km² including ca 13,000 islands, lying entirely within the tropics. The region is bisected by Wallace's line and supports a rich Oriental fauna to the west (Sundaland) and mainly Australian elements to the east. Taxonomic studies throughout the region were greatly advanced in the first part of the last century by M.A. Lieftinck especially, but many areas remain totally unexplored. Present knowledge suggests ca 700 species occur in the region of which ca 500 are endemic. Many species are known from limited material, often a single specimen or a type series from a poorly defined locality. It is certain that many are highly stenotopic and sometimes occur naturally at low abundance. The most critical habitats are mixed-dipterocarp terra firma forests and fresh-water swamp forests, both of which exhibit high a and /? diversity and harbour a majority of stenotopic species. However all potentially critical species must presently be classified as data deficient. On present knowledge it is not possible to recommend specific action against any species or habitat. No red listings are appropriate. There is an acute need for baseline data, especially from Central Borneo. Wholesale, unregulated habitat destruction for short-term profit poses the gravest threat to the region. Formerly well-studied areas such as Java are in urgent need of reassessment." (Author)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

4557. Orr, A.G. (2004): Territorial behaviour associated with feeding in both sexes of the tropical zygopteran, *Libellago hyalina* (Odonata: Chlorocyphidae). *International Journal of Odonatology* 7(3): 493-504. (in English). ["Territorial behaviour associated with adult odonate feeding in a Bornean rain forest under-storey is described and its underlying causes are analysed. Immature males and females of all ages of *Libellago hyalina* defended perches along a narrow trail in kerangas forest, concentrating especially around patches of sunlight. Throughout the day there was displacement of individuals as the illuminated areas moved and population levels of foragers increased, with maximal density

from 13:00 -15:00 h, but territorial success which followed physical combat could not be associated with size, sex or age. Foraging rates were also highest in this period but peaked clearly at 14:00 h. Both foraging attack rates and attack success were higher in sun patches than in shaded territories. Potential prey, mostly small Diptera < 4 mm length, were more abundant along the trail than in the surrounding forest, but were not concentrated in sunlight. It is suggested that, against the dark backdrop of the forest under-storey, prey became much more visible in sunlight, and were more easily detected and more easily captured, hence sites near sun patches were strongly contested. This behaviour constitutes a hitherto undescribed foraging strategy, which may be characterized as follows: "increasing capture success by concentrating in situations where prey visibility is enhanced by overhead sunlight against a dark background." It is suggested this strategy may be common in tropical rain forest, home to a majority of Odonata species." (Author)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

4558. Ott, J. (2004): Die Libellenfauna des unteren Moosalbtales bei Trippstadt/Pfalz - Ergebnisse eines 6-jährigen Monitorings. *Fauna und Flora in Rheinland-Pfalz* 10(2): 581-602. (in German, with English summary). ["Between 1999 and 2004 the dragonfly fauna of the 'Moosalbtal' near Trippstadt / Palatinate was investigated as part of an ecological monitoring programme. In total 22 species were recorded during this period, some of the species belonging to the federal and national Red Lists of endangered species. Some typical species of running waters are remarkable. The area must be seen in connection with other wetland biotopes in the near vicinity and the whole Palatinate. The real value of a site for nature conservation can only be recognised by longterm monitoring of at least several years and these kinds of studies should be carried out more often." (Authors)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

4559. Ott, J. (2004): S7.6 - Dragonflies as indicators for climatic changes - consequences for biodiversity and nature protection [ore 15.15]. *Società Italiana di Ecologia - XIV Congresso Nazionale in collaborazione con la European Section of the Society for Conservation Biology Università degli Studi di Siena. Conservazione e gestione degli ecosistemi. Programma e riassunti del XIV Congresso SItE* Editors: Carlo Gaggi, Valentina Nicolardi e Stefania Santoni Siena, Centro Didattico ale Scotte», 4-6 ottobre 2004: 26. (in English). [Verbatim: Climatic changes are meanwhile regarded as one of the main causes for species extinction and this process is still ongoing. Dragonflies were among the first taxonomic groups reacting on climatic changes: already about 15 years ago the first observations on changes in the distribution patterns of single species were made in Germany and Europe. Meanwhile northward expansions of mediterranean species to northern Europe, as well as invasions from African species into southern european countries are reported in lots of cases. Also the colonisation of biotopes in higher altitudes are documented and changes in the behaviour and in life history parameters (univoltine to bivoltine) are observed. Whereas the invasions of these southern species into the

north until recently was increasing the biodiversity in total, now also the first negative effects could be registered as the changes in the abiotic conditions of the waters - together with changes in dominance structures - could harm the coenosis of the waters (e.g. moorland biotopes) in the long term and will lead to a general change of the biocoenosis. Here the actual changes within the ecology and distribution of dragonfly species on the European level are shown and the negative effects on stenoeicous species (like *Leucorrhinia dubia*, *Somatochlora arctica* etc.) and consequences on protection measurements (e.g. landscape planning or the implementation of biotope webs according to the EC habitats directive) are pointed out] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

4560. Parr, A. (2004): Dragonfly records from autumn 2002. *Atropos* 22: 30-31. (in English). [The paper introduces into a new scheme of the British odonatologists: Due to climate change and global warming not less than six odonate species have been recorded in the past years, range extensions of some species are significant, and changes in phenology are obvious. The new scheme refers to these phenological changes, and demonstrate some late flight dates of *Leucorrhinia dubia*, *Erythromma najas*, *Libellula quadrimaculata*, *Orthetrum coerulescens*, *Sympetrum striolatum*, and *Aeshna mixta*. *S. striolatum* was latest seen on the wings on 11 December 2001. The paper also discusses some reasons for the prolonged flight season.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4561. Parr, A. (2004): First and last dates 2003. *Dragonfly news* 45: 18-19. (in English). [Phenological data referring to the UK in 2003.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4562. Parr, A. (2004): Migrant dragonflies in the 21st century. *Darter* 21: 4-5. (in English). [Some recent successful colonisations of odonate species new to Great Britain demonstrate the dynamics of the European Odonata. The author risks a view into near future which species could be the next to colonise the British Isles.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4563. Parr, A. (2004): Odonata Records Committee (ORC). *Dragonfly news* 45: 23. (in English). [Introduction into the work of the British Odonata Records Committee which checks records of rare or immigrant Odonata in the UK.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4564. Parr, A.; Knijf, G. de; Wasscher, M. (2004): Recent appearances of the Lesser Emperor *Anax parthenope* (Selys) in north-western Europe. *J. Br. Dragonfly Soc.* 20(1): 5-16. (in English). ["For much of the 20th century, *A. parthenope* was a considerable rarity in north-western Europe. In 1983, the first individuals for 100 years were noticed in Belgium, and by the mid 1990s the species had also started to appear in The Netherlands, and Britain. Records from all of these countries are now annual, with no fewer than 33 individuals reported from the region during 1999. This paper details and analyses the occurrences of *A. parthenope*

in north-western Europe during recent years, and relates them to records of the species in other parts of northern Europe. The distribution of *A. parthenope* currently seems to be undergoing significant modification, possibly as a result of climate change. Most records in north-western Europe are apparently still of immigrants, though successful breeding was recorded in Britain during 1999 and could easily have been overlooked elsewhere. Reports from north-western Europe span a time period from late May to early September, with the greatest number of individuals appearing in July. Meteorological evidence suggests that many migratory events have a likely origin in Iberia or other regions surrounding the western Mediterranean." (Authors)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4565. Parr, A.J. (2004): Migrant and dispersive dragonflies in Britain during 2003. *J. Br. Dragonfly Society* 20(2): 42-50. (in English). ["With a fine and hot summer and record high temperatures for the UK in August, it was no surprise that 2003 turned out to be an excellent year for dragonflies. As far as migrant and dispersive species were concerned there were many highlights. Several records were received of 'resident' species in very unusual locations, possibly in part due to the extreme weather providing favourable conditions for dispersal. Of the more traditional migrants, *Sympetrum flaveolum* reappeared in low numbers after an absence of three years, and *S. fonscolombii* and more especially *Anax parthenope* had a good year. However, the main theme was one of continuing range expansions. Following the first record for Britain during 2002, *Lestes barbarus* was again observed in eastern England, with single individuals seen at two sites. There was also a record of a possible *S. pedemontanum*. On a more local scale, several British residents continued their expansion northwards, and Scotland recorded at least two 'firsts' (*A. imperator* and *Libellula depressa*) during the course of the year." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4566. Parr, A.J. (2004): Odonata Records Committee Update. *Atropos* 22: 60. (in English). [Four additional 2003 records of *Anax parthenope* have been accepted by the committee, totalling the British records of the species to 16 in 2003. A claimed sighting of a female *Aeshna affinis* was not accepted.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

4567. Paulson, D.R. (2004): Critical species of Odonata in the Neotropics. *International Journal of Odonatology* 7(2): 163-188. (in English). ["This report summarizes progress that has been made during the past five years toward the understanding of Neotropical Odonata. It also presents a list of critical species and sites, threats to Odonata conservation in the region, and priorities for further research. This region, the richest in the world for Odonata, must be a focus of intense research and conservation efforts." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

4568. Paulson, D.R. (2004): Why do some zygopterans (Odonata) perch with open wings? *International Journal of Odonatology* 7(3): 505-515. (in English).

["Zygoptera show two perching modes, one with wings closed and one with wings open. These perching modes are distributed unequally through the suborder; most Zygoptera perch with closed wings, but species in 43 genera of eight families at least occasionally - in most cases usually - perch with open wings. Alternative hypotheses to explain this dichotomy are assessed. The dichotomy does not seem to be explicable by the Phylogenetic Inertia Hypothesis (PIH), the Wing Display Hypothesis (WDH), or the Thermoregulation Hypothesis (TH). I propose a hypothesis that the opening position used by some zygopterans facilitates either more rapid takeoff or quicker orientation toward flying prey: the Quick Takeoff Hypothesis (QTH). That opening species usually take flying prey furnishes support for the QTH, although many closedwing species also take flying prey. However, as most zygopterans perch with closed wings, that behavior needs explanation too, and I propose a hypothesis that perching with wings spread may make a zygopteran more conspicuous to predators and thus may be disadvantageous: the Shiny Wing Hypothesis (SWH). Larger species are less at risk of predation than smaller species, open wings in shade should be less conspicuous than in sunlight, and the majority of zygopterans with open wings are large tropical shade perchers, furnishing support for the SWH." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

4569. Pelt, G.J. van (2004): New records of dragonflies from Turkey (Odonata). *Libellula Suppl.* 5: 3-38. (in English, with German and Turk summaries). ["Material of 60 species of Odonata from numerous localities on the mainland of Turkey (collected in 1993, 1996, 1997, 1998, 1999, 2001) is reported upon. A list of taxa is provided, and a complete list of localities is presented. The material is preserved in the collection of the RMNH, Leiden, The Netherlands. Remarks on distribution and taxonomy are restricted to major issues, pending an overview of the odonatofauna of Turkey." (Author)] Address: Pelt, G.J. van, Naturalis, P.O. 9517, NL-2300 RA Leiden, The Netherlands. E-mail: gj.vanpelt@wolmail.nl

4570. Pelt, G.J. van; Kalkman, V.J. (2004): Research on dragonflies in Turkey: present status and future aims (Odonata). *Libellula Suppl.* 5: 167-192. (in English, with German and Turk summaries). ["An overview is given of our present knowledge on the dragonfly fauna of Turkey. A database has been created in order to file all published and unpublished records, and to generate distribution maps and histograms of flight periods. A summary of the taxonomical problems that remain is given, and a list of taxa of which the larvae and exuviae are insufficiently known is included. The gaps in our present knowledge are discussed, and ideas for further research and future aims are presented." (Authors)] Address: Pelt, G.J. van, Naturalis, P.O. 9517, NL-2300 RA Leiden, The Netherlands. E-mail: gj.vanpelt@wolmail.nl

4571. Pigkess, B.P. (2004): Rapid colonization of a newly dug pond on a Polish heathland. *J. Br. Dragonfly Soc.* 20(1): 4. (in English). [Information on the odonate fauna of an app. 1,5 year old pond, dug in the heathlands of the Cedyński Landscape Park, near Chocianów, Poland is provided. It is said, that the next pond is located in a distance of 3 km to the newly dug pond.

The species mentioned are: *Anax imperator*, *Enallagma cyathigerum*, *Sympetrum danae*, and *Lestes* sp.] Address: Pigkess, B.P., 8 Shaw Drive, Sandford, Wareham, Dorset BH20 7BT

4572. Polhemus, D.A. (2004): Critical species of Odonata in the Hawaiian Islands. *International Journal of Odonatology* 7(2): 133-138. (in English). ["Ten species of Hawaiian Odonata are considered to be currently at risk, all of them zygopterans belonging to the endemic genus *Megalagrion*. These species and their proposed status are as follows: *M. jugorum*, endemic to Maui and Lanai [CR, possibly EX]; *M. leptodemas*, endemic to Oahu [CR]; *M. molokaiense*, endemic to Molokai [CE, possibly EX]; *M. nesioties*, endemic to Hawaii and Maui [CR]; *M. nigrohamatum nigrolineatum*, endemic to Oahu [VU]; *M. oahuense*, endemic to Oahu [VU]; *M. oceanicum* endemic to Oahu [CR]; *M. pacificum*, formerly widespread in the lowlands on all high islands [EN]; *M. williamsoni*, endemic to Kauai [EN]; *M. xanthomelas*, formerly widespread in the lowlands on all high islands [VU]. Two species held on previous IUCN lists, *M. adytum* and *M. amaurodytum* peles, have been shown by recent surveys to be more locally abundant at remote sites than was previously realized, and are proposed to be dropped from the current Red List, since they are not immediately at risk." (Authors)] Address: Polhemus, D., Dept. of Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

4573. Proctor, N.S. (2004): Color of emergent Elfyn Skimmers *Nannothemis bella*. *Argia* 15(4): 13. (in English). [The bodies of teneral *N. bella* have been striking lime green. This colour, blending with the green of the emergence substract (stems of *Eleocharis* sp.), is said to be a perfect camouflage.] Address: not stated

4574. Prum, R.O.; Cole, J.A.; Torres, R.H. (2004): Blue integumentary structural colours in dragonflies (Odonata) are not produced by incoherent Tyndall scattering. *Journal of Experimental Biology* 207: 3999-4009. (in English). ["For nearly 80 years, the non-iridescent, blue, integumentary structural colours of dragonflies and damselflies (Odonata) have been attributed to incoherent Tyndall or Rayleigh scattering. We investigated the production of the integumentary structural colours of a damselfly the familiar bluet, *Enallagma civile* (Coenagrionidae) and a dragonfly the common green darner, *Anax junius* (Aeshnidae) using fibre optic spectrophotometry and transmission electron microscopy (TEM). The reflectance spectra of both species showed discrete reflectance peaks of 30% reflectance at 475 and 460 nm, respectively. These structural colours are produced by light scattering from closely packed arrays of spheres in the endoplasmic reticulum of box-shaped epidermal pigment cells underlying the cuticle. The observed reflectance spectra do not conform to the inverse fourth power relationship predicted for Tyndall / Rayleigh scattering. Two-dimensional (2-D) Fourier analysis of the TEM images of the colour-producing arrays reveals ring-shaped distributions of Fourier power at intermediate spatial frequencies, documenting a quasiperiodic nanostructure. The nanostructured Fourier power spectra falsify the assumption of spatial independence of scatterers that is required for incoherent scattering. Radial averages of the Fourier power spectrum indicate that the spheres are substantially nanostructured at the appropriate spatial scale to produce visible colours by

coherent scattering. However, the spatial periodicity of the arrays is apparently too large to produce the observed colour by coherent scattering. The nanospheres could have expanded substantially (50%) during preparation for TEM. Alternatively, coherent light scattering could be occurring both from the surfaces and from structures at the centre of the spheres. These arrays of colour-producing spheres within pigment cells have convergently evolved at least 11-14 times independently within the Odonata. Structural colouration from arrays in living cells has also fostered the convergent evolution of temperature-dependent colour change in numerous odonate lineages." (Authors)] Address: Prum, R.O., Department of Ecology and Evolutionary Biology, Yale University, PO Box 208105, New Haven, CT 06520, USA. E-mail: richard.prum@yale.edu

4575. Rathmacher, G.; Dziock, F. (2004): Libellen-Beifänge (Insecta, Odonata) aus Malaisefallen von der Mittleren Elbe. *Entomol. Mitt. Sachsen-Anhalt* 12(2): 96-102. (in German). [A total of 221 odonate specimens in 12 species were caught in 18 malaise traps located along the middle stretch of River Elbe, Sachsen-Anhalt, Germany. Dominant species was *Coenagrion puella* (n=170). Malaise traps are selective and don't represent the odonate spectrum of a sampling site.] Address: Dziock, F., UFZ Leipzig-Halle GmbH, Dept Naturschutzforschung, Permoser Str. 15, D-04318 Leipzig, Germany. E-mail: Frank-Dziock@ufz.de

4576. Ravenscroft, J. (2004): "Old female" form of Common Darter. *Atropos* 21: 80, plate 4. (in English). [UK; photographs demonstrate a female colour form of (a probably young) *Sympetrum striolatum* with red pigmentation about the abdominal mid-dorsal line.] Address: Ravenscroft, J., 19 Pool Close, Little Comberton, Pershore, Worcestershire, WR10 3EL, UK

4577. Reder, G. (2004): Nachweis der kleinen Moosjungfer - *Leucorrhinia dubia* (VD.L.) - im Oberrheingraben von Rheinland-Pfalz und Hinweise zu ihrem Vorkommen in südlichen Landesteilen (Odonata: Libellulidae). *Fauna und Flora in Rheinland-Pfalz* 10(2): 619-625. (in German, with English summary). [Offstein, Rheinland-Palatinat, Germany, 31-V to 4-VI-1992. Morphological characters to separate *L. dubia* from *L. rubicunda*, and some older records of *L. dubia* in the region are discussed.] Address: Reder, Gerd, Am Pfortengarten 37, D-67592 Flörsheim-Dalsheim, Germany. E-mail: PG.Reder@t-online.de

4578. Reeve, K.; Reeve, P. (2004): Recent changes in dragonfly distribution in Warwickshire. *Darter* 21: 10-11. (in English). [*Platycnemis pennipes*, *Orthetrum cancellatum*, and *Sympetrum sanguineum* are mapped. *Ischnura pumilio*, *Brachytron pratense*, *Gomphus vulgatissimus*, and *Sympetrum fonscolombii* are discussed.] Address: Reeve, P., The Outspan, Leamington Hastings, nr Rugby, Warwickshire, CV23 8DZ, UK. E-mail: peter@reeve60.freesevice.co.uk

4579. Reinhardt, K.; Dijkstra, K.D. (2004): Auf der Jagd nach Libellennamen in Malawi. *IDF-Report* 6: 31-34. (in German, with English summary). ["In Malawi, the Chichewa name tombolombo presumably stands for all dragonflies, all Anisoptera or all libellulids, rather than for *Philonomon luminans* only. It is possible that the low nutritional and traditional medical value may not have led yet to a diversity of names for dragonflies. Some Malawian names presented for dragonflies and their

larvae perhaps have a more generic meaning of insects, such as "bugs". The name tombolombo used in Ngoni for dragonflies is more similar to the Chichewa one than that used by the Yao (chensoa) or the Zulu in South Africa." (Authors)] Address: Reinhardt, K., 63 Huntingtower Road, Sheffield S11 7GT, United Kingdom, k.reinhardt@sheffield.ac.uk

4580. Röper, C. (2004): Managementplanung in Sachsen-Anhalt. *Naturschutz im Land Sachsen-Anhalt* 41(1): 3-26. (in German). [According art. 6 of the European Fauna Flora Habitat Directive, management plans have to be developed. The author introduces the activities in the Federal State Sachsen-Anhalt, Germany, and briefly outlines 4 plans including measures directed to *Coenagrion mercuriale* and *Ophiogomphus cecilia*.] Address: Röper, Christiane, Landesamt für Umweltschutz Sachsen-Anhalt, Reideburger Str. 47, D-06116 Halle/s., Germany

4581. Rowe, R.J. (2004): Conservation of Odonata in the South Pacific and Australasia. *International Journal of Odonatology* 7(2): 139-147. (in English). ["The conservation status of Odonata in the South Pacific Region and in Australasia is reviewed. Australian and New Zealand faunas have recently been monographed, for the rest of the region lack of data is the major handicap to concrete planning. The taxonomic status of the different island faunas and the state of habitat modification on land masses are indicated." (Author)] Address: Rowe, R.J., School of Tropical Biology, James Cook University, Townsville 4811, Australia. E-mail: Richard.Rowe@jcu.edu.au

4582. Ruddek, J. (2004): Die Libellen der kanarischen Inseln. Aktueller Stand der Beobachtungen zur Phänologie der Arten. Leaflet: 2 pp. (in German). [Phenological data of 10 odonate species are documented for each of the seven Canary Islands.] Address: Ruddek, J., Butendiek 34, D-28865 Lilienthal, Germany

4583. Rychła, A.; Buczyński, P. (2004): Wiederfund von *Leucorrhinia caudalis* in Sachsen (Odonata: Libellulidae). *Libellula* 22(3/4) (2003): 119-125. (in German with English summary). [Germany; "On 29 May 2003, imagines of *L. caudalis* were recorded in the vicinity of Weisswasser, at a water body originating from brown coal mining. This is the first record in Saxony since 1960. Additionally, two records of the rare *L. albifrons* in the area were obtained." (Authors)] Address: Rychła, Anna, ul. Osiedlowa 12, Ploty, PO-66-016 Czerwiensk, Poland. E-Mail: rychlinka@hotmail.com

4584. Sahlén, G.; Bernard, R.; Cordero Rivera, A.; Ketelaar, R.; Suhling, F. (2004): Critical species of Odonata in Europe. *International Journal of Odonatology* 7(2): 385-398. (in English). ["The status of the odonate fauna of Europe is fairly well known, but the current I-UCN Red List presents only six species out of ca 130, two of which are actually out of danger today. In this paper we propose a tentative list of 22 possibly declining or threatened species in the region. For the majority, reliable data of population size and possible decline is still lacking. Also 17 endemic species are listed, most occurring in the two centres of endemism in the area: the south-eastern (mountains and islands) and the western Mediterranean. These species should receive extra attention in future updates of the world Red List due to their limited distribution. The extreme variation in biomes and the human exploitation of habitats make con-

ervation planning complicated in Europe. Within the EU, the FFH directive is a working tool aiding conservation. However, the species included do not fully correspond to those on the current Red List, nor to those discussed in this paper. We believe that future conservation efforts should focus on the most valuable and threatened habitats in each sub-region. Active conservation measures could be implemented on a European scale, provided that research will establish a solid ground for such measures." (Authors)] Address: Sahlen, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@zoologi.uu.se

4585. SaintOurs, F. (2004): Notes on *Somatochlora linearis* in southeastern Massachusetts. *Argia* 15(4): 24-25. (in English). [The species, in previous years extremely rare in Mass., could be traced at many localities in 2003. Advice on habitats and field determination are outlined.] Address: <http://mothra.bio.umb.edu/Fred.html>

4586. Salur, A.; Ozsaraç, O. (2004): Additional notes on the Odonata fauna of Çiçekdağ (KIRSEHIR), Turkey. *Gazi University Journal of Science* 17(1): 11-19. (in bilingual in English and Turk). ["In this study, 74 Odonata specimens were collected and determined from Çiçekdağ between 2000 and 2001. Odonata specimens belonging to 21 species 15 genera of 7 families were determined. 18 species are new records for the Odonata fauna of Çiçekdağ. This study includes faunistic and distributional records of 21 species." (Authors)] Address: Salur, A., Gazi University, Arts & Sciences Faculty of Corum, Biology Department, 19030 Corum, Turkey. E-mail: alissalur@gazi.edu.tr

4587. Samways, M.J. (2004): Critical species of Odonata in southern Africa. *International Journal of Odonatology* 7(2): 255-262. (in English). ["Of the 160 species in South Africa, 29 are endemic. Threats to the local odonate fauna have increased in recent years due to the growth of agriculture and impact of invasive alien trees. Currently, 13 species are red-listed as threatened. Among the activities to ameliorate threats, is a massive programme, 'Working for Water', to remove invasive alien plants. This has had an enormously beneficial effect on many of the threatened species." (Author)] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

4588. Sawabe, K.; Ueda, T.; Higashi, K.; Lee, S.-M. (2004): Genetic identity of Japanese *Sympetrum frequens* and Korean *Sympetrum depressiusculum* inferred from mitochondrial 16S rRNA sequences (Odonata: Libellulidae). *International Journal of Odonatology* 7(3): 517-527. (in English). ["The Japanese endemic *Sympetrum frequens* is considered as the insular vicariant of *S. depressiusculum*, widely distributed in the Eurasian Continent. In Korea, morphologically intermediate specimens have been collected, mixed with typical *S. depressiusculum*. The taxonomical status of these two species is thus questionable. To clarify their status, sequencing of mitochondrial 16S ribosomal RNA (rRNA) was performed on 77 specimens of *Sympetrum* species collected from Korea and Japan. The pairwise differences between 378 nucleotides of *S. frequens* and *S. depressiusculum*, including the intermediate type, revealed only minor differences (< 0.5%, average 0.48%).

The neighbor-joining phylogenetic tree indicated that all *S. frequens* and *S. depressiusculum* form one clade, suggesting that they pertain to a single species. The tree also suggests that the *S. frequens* population from Hokkaido is different from all other populations." (Authors)] Address: Ueda, T., Ishikawa Agricultural College, Suematsu, Nonouchi, Ishikawa Pref., 921, Japan

4589. Schenk, K.; Suhling, F.; Martens, A. (2004): Egg distribution, mate-guarding intensity and offspring characteristics in dragonflies (Odonata). *Animal Behaviour* 68 : 599-606. (in English). ["We studied how egg size, larval size and egg development time are related to oviposition site selection and mate guarding in a dragonfly assemblage of the Namib desert. Species that oviposited mainly in tandem flight (*Pantala flavescens* and *Sympetrum fonscolombii*) spread their eggs over several ponds, which we interpreted as spatial risk spreading. Other species (*Orthetrum chrysostigma*, *Trithemis kirbyi*, *T. annulata*, and *Crocothemis erythraea*) performed noncontact guarding and localized their eggs, usually in a single pond, which we interpreted as distinct habitat selection. Because long oviposition durations increase the risk of disruption by rival males, we predicted that in species that localize their eggs to a distinct oviposition habitat the largest-laid eggs of a clutch should be the largest, indicating high quality. Species that perform risk spreading should distribute large eggs randomly over all oviposition sites. We tested our hypothesis at artificial ponds using experimental manipulations of oviposition. In *O. chrysostigma* and *T. kirbyi*, egg size and larval size decreased significantly with order of laying, and the time to hatch was randomly distributed. As predicted, within the clutches of *P. flavescens* and *S. fonscolombii*, egg size was randomly distributed over a clutch and we found no trend of decrease in larval size or increase in the time to hatch in relation to order of laying." (Authors)] Address: Schenk, Kamilla, Zoologisches Institut, Technische Universität Braunschweig, Fasanstraße 3, D-38092 Braunschweig, Germany. E-mail: k.schenk@tu-bs.de

4590. Schenk, K. (2004): Relation between egg distribution, mate guarding intensity, and offspring conditions in dragonflies (Odonata). Abstracts: 5th International Symposium on Tropical Biology. SATELLITE EVENTS: 6th International Symposium on the Chrysomelidae; Workshop on African Odonata (Edited by Bernhard A. Huber); Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany: 144- (in English). [Verbatim: How is egg size, larval size, and egg development time related to oviposition site selection and mate guarding in dragonflies? My behaviour studies showed species that oviposited mainly in tandem flight spread their eggs over several ponds (spatial risk spreading). Other species performed non-contact guarding and localised their eggs usually in a single pond only (distinct habitat selection). The longer females oviposited at one place the higher the risk caused by disruption by males or increasing predation. Therefore, I proposed that in species which layed their eggs into a distinct oviposition habitat, the eggs of a clutch laid first should be the largest, which I interpret as indicator for high condition. Species that perform risk spreading should distribute large eggs randomly over all oviposition sites. The hypothesis was tested and confirmed at artificial ponds in Namibia and Germany using experimental manipulations of oviposition.] Address: Schenk, Kamilla, Zoologisches Institut, Abtei-

lung angewandte Ökologie, Technische Universität Braunschweig, Fasanenstraße 3, 38102 Braunschweig, Germany. E-mail: k.schenk@tu-bs.de

4591. Schiel, F.-J. (2004): Libellen in oberschwäbischen Mooren. *Oberschwaben Naturnah* 2004: 38-40. (in German). [The paper outlines the characteristic odonate fauna of high bogs in Oberschwaben, Baden-Württemberg, Germany, its threats, and possibilities for maintaining the Odonata.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

4592. Schlotmann, F. (2004): Beobachtung einer Schabrackenlibelle - *Hemianax ephippiger* (Burmeister, 1839) - am Eich-Gimbsheimer Altrhein (Rheinessen, Rheinland-Pfalz). *Fauna und Flora in Rheinland-Pfalz* 10(2): 699-702. ["On May 4th 2003 a male imago of *Anax ephippiger* was recorded at the 'Meerwasser', a shallow pool with an extensive *Phragmites* reedbed belonging to the 'Eich-Gimbsheimer Altrhein', an oxbow lake of the Rhine river near the city of Worms (Rhinessen, Rhineland-Palatinate, Germany). Since there had been strong winds on the days before, it seems possible, that the specimen had been drifted by these winds. It is the second documented record of *A. ephippiger* in Rhineland-Palatinate where the species has been classified as an irregular immigrant." (Author)]. Address: Schlotmann, F., Bahnhofstr. 22a, D-55256 Harxheim, Germany.

4593. Schlumprecht, H.; Strätz, C.; Potrykus, W.; Frobel, K. (2004): Libellenverbreitung und wasserwirtschaftliche Renaturierungsmaßnahmen im oberen Maintal. Vorher-Nachher-Vergleich anhand einer Rasterkartierung. *Naturschutz und Landschaftsplanung* 36(8): 277-284. (in German with English summary). ["In the Upper Main Valley (Upper Frankonia, Bavaria) since 1991 many restoration projects have been planned and carried out by the local water authority. They included a survey of the dragonfly fauna which was compared to a former survey of FROBEL (1997; investigations from 1979 to 1993). The study investigated all water bodies in 61 squares of 1 km², covering the 51 km reach of the Upper Main. Applied methods comprised the determination of adults by sight or caught by net, collection of exuviae, and mapping dragonflies from the shore or by canoeing. Several species classified as very rare ten years ago, like *Gomphus vulgatissimus* and *G. pulchellus*, were now found as adults or exuviae in more than 50 % of all plots, mostly in river restoration areas. Furthermore, typical species of rivers and streams such as *Onychogomphus forcipatus* and *Calopteryx virgo* have considerably increased their regional distribution (covering 36 or 20 % of all plots). This is also true for *Orthetrum brunneum*, *Brachytron pratense*, *Anax parthenope* and *Erythromma viridulum*. For the first time *Crocothemis erythraea*, *Cercion lindenii*, *Sympetrum fonscolombii*, *Onychogomphus forcipatus* and *Ophiogomphus cecilia* (listed in the EU Habitat Directive, Annex II) were identified in 2003 in the Upper Main valley. Reasons for the increased distribution and abundance of the species characteristic for natural or near-natural rivers and streams are presumably the creation of new habitats like gravel banks, cut-off meanders, coves, ponds and shallow water zones and the widening of rivers sections which took place in 21 river restoration projects of the local water authority. On

the other hand, some species declined or vanished in the survey area. Ten years ago these species were rare (i. e. they were only found in 1 to 3 plots), namely *Aeshna juncea*, *Coenagrion lunulatum*, *Lestes virens*, *L. barbarus*, *Leucorrhinia dubia*, *L. pectoralis*, *Sympetrum pedemontanum* and *Somatochlora flavomaculata*. Some of these species can be classified from their preferred habitats as bog species (i. e. species of meso- or dystrophic habitats) or from their geographical distribution as boreomontane species. At the same time, thermophilic or mediterranean species increased, such as *Crocothemis erythraea*." (Authors)] Address: Schlumprecht, H., Büro für ökologische Studien, Oberkonnersreuther Straße 6a, D-95448 Bayreuth, Germany. E-Mail kontakt@bfoes.de

4594. Schmidt Furier, K.; Cardoso Barreto, F.C.; De Marco, P. (2004): The rediscovery of *Leptagrion capixabae* Santos, 1965 (Zygotera: Coenagrionidae). *Notulae Odonatologicae* 6(3): 31-33. (in English). [*L. capixabae* was only known from the holotype male, labelled "Espírito Santo - Brazil" and deposited at MNHN, Paris. Here, 4 males from Estação Biológica de Santa Lucia, Santa Teresa, Espírito Santo, Brazil (collected in 2002 and 2003) are brought on record. A photograph of the male anal appendages is also provided.] Address: De Marco, P., Laboratório de Ecologia Quantitativa, DBG, Universidade Federal de Viçosa, BR-36571-000, Viçosa, MG, Brazil.. E-mail: pdemarco@mail.uv.br

4595. Schneider, W. (2004): Critical species of Odonata in the Levant. *International Journal of Odonatology* 7(2): 399-407. (in English). ["Of the 86 Odonata species so far recorded for the Levant, four are considered as endangered (*Calopteryx hyalina*, *C. syriaca*, *Ceragrion georgifreyi*, *Pseudagrion torridum hulae*), six as vulnerable (*Coenagrion vanbrinckae*, *P. sublacteam mortoni*, *Gomphus kinzelbachi*, *Onychogomphus macrodon*, *Brachythemis fuscopalliata*, *Crocothemis sanguinolenta*), and two as extinct (*Rhyothemis semihyalina syriaca*, *Urothemis edwardsi hulae*). The history of Odonatological research in the Levant is outlined. The creation of protected areas for vulnerable and endangered species is suggested and a number of suitable sites proposed." (Author)] Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany. E-mail: w.schneider@hlmd.de

4596. Schorr, M. (2004): Die Gekielte Smaragdlibelle (*Oxygastra curtisii* DALE, 1834) an der Our (Rheinland-Pfalz / Luxemburg) (Insecta: Odonata: Corduliidae) Anmerkungen zur regionalen Verbreitung. *Fauna Flora Rheinland-Pfalz* 10(2): 627-643. (in German with English summary). [The discovery of *Oxygastra curtisii* in the late 1990th along the river Our rises the question where the specimens of the founder population could originate. Possible source populations could be in France or Belgium. It is discussed that the source population should be looked for in France in the "river Meuse-Moselle-system".] Address: Schorr, M., Schulstr. 7B, D-54314 Zerf, Germany. E-mail: martinschorr@online-home.de

4597. Schweizer Zentrum für die Kartographie der Fauna (2004): Jahresbericht 2003. *Schweizer Zentrum für die Kartographie der Fauna Nachrichten* 27: 8-9, 28-29. (in French / German). [Brief report on the status of the Red List of Odonata and a book on the Swiss odo-

nate fauna.] Address: CSCF, 14 rue des Terreaux, CH-2000 Neuchâtel, Switzerland. E-mail: www.cscf.ch

4598. Ściborska, M. (2004): Breeding biology of the citrine wagtail (*Motacilla citreola*) in the Gdańsk region (N Poland). *Journal of Ornithology* 145(1): 41-47. (in English with German summary). [Odonata (larvae and imagines) are among the prey carried by the parents to their brood] Address: Ściborska, Marta, Bird Migration Research Station, University of Gdańsk, Przebendowo 3, 84-210 Choczewo, Poland

4599. Scott, D.A. (2004): Reports from Coastal Stations - 2003: Dursey Island, Co. Cork. *Atropos* 21: 69-70. (in English). [UK, *Sympetrum striolatum*] Address: not stated

4600. Scott, M.A. (2004): Reports from Coastal stations - 2003: Longstone heritage Centre, St. Mary's, Isles of Scilly. *Atropos* 21: 39-42. (in English). [First record of *Orthetrum cancellatum*, second record of *Anax imperator*. *Sympetrum fonscolombii* on the nearby island of Annet on 21/X/2003.] Address: not stated

4601. Sénégas, S. (2004): Pourquoi les libellules ont le corps si long. D'après un conte zairois. *Kaléidoscope*. Paris. ISBN 2 211 075 16 9: 36 pp. (in French). [The idyll in a small village in Zaire was bothered by a dragonfly causing a domino effect of accidents. This gave rise to the boss of the village to imprison this dragonfly. It was chained up, but could escape by pulling its abdomen long and longer ... A nice story and lovely illustrated.] Address: Kaléidoscope, lutin poche de l'école des loisirs, 11, rue de Sèvres, Paris 6e, France

4602. Small, D. (2004): New England odonate conference April 17th 2004, Athol Massachusetts. *Argia* 16(2): 6. (in English). [148 dragonfly enthusiasts gathered the first odonatological meeting in Massachusetts, USA.] Address: not stated

4603. Smith, B. (2004): Report from Scotland 2002 / 2003. *Darter* 21: 5-6. (in English). [Some interesting records are documented, in most cases more southern species.] Address: not stated

4604. Smith, P.G. (2004): Dragonfly populations of peat-bog pools in north-east Scotland. *J. Br. Dragonfly Soc.* 20(1): 23-30. (in English). [UK, weather, abundance, *Lestes sponsa*, *Pyrrhosoma nymphula*, *Enallagma cyathigerum*, *Ischnura elegans*, *Aeshna juncea*, *Libellula quadrimaculata*, *Sympetrum danae*] Address: Smith, P.G., Lein House, Kingston, Moray IV32 7NW, UK

4605. Solly, F. (2004): Reports from Coastal stations - 2003: Isle of Thanet. *Atropos* 21: 57-59. (in English). [No odonate records on the Isle of Thanet, but records of *Erythromma viridulum* at Monkton Nature Reserve in North Kent, UK.] Address: not stated

4606. Spence, B. (2004): Reports from Coastal Stations - 2003: The Spurn Area, East Yorkshire. *Atropos* 21: 66-68. (in English). [Verbatim: It was also an excellent year for Odonata, three very unexpected new species being recorded single *Calopteryx splendens* on 15 June and 20 July, a *Anaciaeschna isosceles* on 20 July and *Cordulia aenea* on 22 July. Our local breeding *Sympetrum fonscolombii* also had a good season with at least 19 emerging. In addition, record numbers of *Anax imperator*, *Libellula quadrimaculata*, and *Orthetrum cancellatum* were seen. Lastly there was a sub-

stantial arrival of *Aeshna mixta* (58) on 31 July, increasing to 70 by 5 August.] Address: not stated

4607. Sternberg, K.; Sternberg, M. (2004): Veränderung der Artenzusammensetzung und erhöhte Abwanderung bei Libellen durch die Mahd der Uferwiesen zweier Fließgewässer (Odonata). *Libellula* 23(1/2): 1-43. (in German, with English summary). ["Change of species composition and increased migration rate of dragonflies due to cutting of adjacent meadows of two running waters (Odonata) At a lowland brook and a meadow ditch near Freiburg (Baden-Wuerttemberg, Germany), before cutting of adjacent meadows the damselfly assemblage at the brook comprised about 1100 individuals. During the day 89% and over night 50% of them stayed in the herbaceous, richly structured meadows up to >60 m from the bank. The ditch assemblage with about 350 individuals was found in the surrounding, monotonously structured tall oat grass meadow mainly near the water. Directly after cutting, the meadows along the brook and the ditch were almost free of damselflies, whereas the anisopteran *Orthetrum coerulescens* was still found in similar densities as before. As a result of cutting, the damselfly numbers of the brook decreased to 50% and that of the ditch to 32 %. Due to cutting, sex ratio and ratio of mature and immature damselflies changed at the brook as well as species composition and dominance relationships within the assemblages at the ditch. In the further surrounding, abundance in particular of females and numbers of flights away from the waters increased shortly after cutting. The study underlines the great importance of terrestrial habitats for dragonfly assemblages. Notes for practical nature conservation are given." (Authors)] Address: Sternberg, K., Schillerstraße 15, D-76297 Stutensee, Germany. E-mail: Klaus-Sternberg@web.de

4608. Stickney, D. (2004): Water bugs & dragonflies. Explaining death to young children. The Pilgrim Press. Cleveland. ISBN 0-8298-1624-0: 23 pp. (in English). [Small illustrated booklet explaining death using the metamorphosis from the larval stage (life in the real world) to the imaginal stage (death = life in a new world).] Address: www.pilgrimpress.com

4609. Suhling, F.; Schenk, K.; Padeffke, T.; Martens, A. (2004): A field study of larval development in a dragonfly assemblage in African desert ponds (Odonata). *Hydrobiologia* 528: 75-85. (in English). ["Aquatic animals distributed along a habitat-permanence gradient (HPG), differ in life history (Wellborn et al., 1996. *Annual Review of Ecology and Systematics* 27: 337-363). Dragonflies that occur in hot arid regions often occur in temporary waters and consequently perform direct and rapid development. Dragonfly species of the Namibian desert do differ in their selection of habitats along the HPG and therefore may also differ in life cycle. Here, we attempt to monitor colonisation, larval growth and emergence in a temporary pond of known history. We studied the development of dragonfly species that laid eggs in artificial ponds constructed by us in March 2001. The assemblage consisted of species that originate from different habitats along the HPG. To obtain data on larval development we took samples from the ponds at 10-day intervals. Most species showed rapid development. By regressing the maximum sizes attained by larvae on each sampling date against time we estimated growth rates for five species and were there-

by able to estimate that total duration of development from oviposition to emergence ranged between 38 and 70 days. Observation of first oviposition and first emergence for three of these species corroborated our estimates based on growth rate. Of few species, which laid eggs in the ponds no larvae or adults were found. For some this may have been the result of predation whereas others may not have grown fast enough to emerge before the ponds dried up. Our results indicate that dragonflies cannot recognise whether a pond will retain water long enough for full larval development and oviposit in waters that will not allow larval development." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

4610. Suhling, F.; Martens, A.; Marais, E. (2004): Critical species of Odonata in southwestern Africa. *International Journal of Odonatology* 7(2): 263-277. (in English). ["In this report we review the conservation status of Odonata of southwestern Africa, viz Angola, Botswana, Namibia, Zambia and Zimbabwe. In total, 287 species have been recorded of which three have been previously listed by IUCN. We consider 60 species mainly because of their endemism in the region. The majority of the species have to be categorised as 'data deficient' according to IUCN regulations. The most important freshwater habitats in the region are the extensive swamps in the Kalahari basin, such as the Okavango Delta, the Caprivi swamps and the swamps along the courses of the middle Zambezi system, which host a unique odonate community. The most important threats for species in the region include overuse of water, construction of dams in the large rivers and deforestation. We strongly recommend extensive research on the Angolan and Zambian odonate faunas, which appear to be the richest in the regions, although they are poorly investigated." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

4611. Suhling, F.; Schütte, C.; Martens, A. (2004): Habitat selection, ecological traits and regional distribution pattern of dragonflies in arid Namibia. *Zoologisches Forschungsinstitut, und Museum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany. 5th International Symposium on Tropical Biology: 145.* (in English). [Verbatim: Freshwaters can be classified into types with respect to the extent of drying they experience. While temporary waters limit the distribution of taxa due to harsh physical conditions (drying), perennial waters limit distribution of taxa through biotic factors. Hence, species occurring in different types of freshwaters along the gradient should differ in ecological traits, e.g. behaviour and life history. We studied adult habitat selection and behavioural and life history traits of larvae of 11 species of Namibian dragonflies. We hypothesised that species selecting different habitats along the gradient in Namibia should differ in traits studied. Three groups were identified: (1) species confined to perennial springbrooks, (2) species occurring mainly at large perennial lakes, and (3) species occurring at several types of habitats. Experimental studies revealed that perennial water species grow slower and are less active than temporary water species. The latter is normally interpreted as adaptation against large predators. Slow growth is a trade-off, which prevents species of developing in temporary waters. Because in arid Namibia perennial

freshwaters are limited we expected that species specialised to such freshwaters are rare, whereas species able to develop in temporary waters should be widespread. We produced distribution maps based on data of museum collections and own sample data, which revealed that species of type (1) and (2) are limited in distribution, while species of type (3) are widespread in the country.] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

4612. Sukacheva, I.D.; Rasnitsyn, A.P. (2004): Jurassic Insects (Insecta) from the Sai-Sagul Locality (Kyrgyzstan, Southern Fergana). *Paleontological Journal* 38(2): 182-186. (in English). [Translated from *Paleontologicheskii Zhurnal*, No. 2, 2004, pp. 64-68. [The Jurassic insect Sai-Sagul locality (sometimes designated as Shurab 3 or Svodovoe Ruslo) is situated in southern Fergana in the Batkenskii District of the Osh Region, Kyrgyzstan, at the boundary with the Isfarinskii District of the Leninabad (Khodzhen) Region, Tajikistan. A caddisfly *Dolophilodes* (*Sortosella*) *shurabica* subgen. et sp. nov. (Philopotamidae) is described from the Jurassic of Kyrgyzstan, from the Sai-Sagul locality. The ecology and taphonomy of this locality are analyzed, and the insects described from the Sai-Sagul locality are listed. 19 fossile odonate species are listed.] Address: I. D. Sukacheva and A. P. Rasnitsyn, Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117997 Russia. E-mail: rasna@online.ru

4613. Sykes, T. (2004): Reports from Coastal Stations - 2003: Gibraltar Point, Lincolnshire. *Atropos* 21: 66. (in English). [UK; "...] with the reserve's fourth and fifth records for both *Calopteryx splendens* (7 & 18 August) and *Aeshna grandis* (one on 24 July, one on an unrecorded date subsequently), all arriving off the sea. Two *Brachyton pratense* on 11 June were very notable, whilst *Sympetrum fonscolombii* on 21 June (two) and 24 June were almost expected. *Aeshna mixta* peaked at a modest 200+ on 6 September." (Author)] Address: not stated

4614. Taily, M.; Ananian, V.; Dumont, H.J. (2004): Recent dragonfly observations in Armenia, with an updated checklist. *Zoology in the Middle East* 31: 93-102. (in English, with German summary). ["Thanks to the work of N. N. Akramowski, the Odonata fauna of Armenia had become relatively well known by the late 1940s. In recent years, an effort has been made to collect new information, and this paper reports on the most striking results. Three species new for the country, *Erythromma lindenii*, *Coenagrion scitulum*, and *Orthetrum sabina*, are listed. Specimens presumed to be *Coenagrion ornatum* actually fit the description of *C. vanbrinkae*. A number of others, viz. *Anaciaeschna isocoela*, *Anax imperator*, and *A. parthenope*, are shown to be more abundant than in earlier times, probably due to the construction of ponds and canals. In most of Armenia, hybrid populations of *Calopteryx splendens* are found, but in the south only genuine *C. s. intermedia* occurs. The paper concludes with a checklist and a discussion of why certain species are considered doubtful and have not been included."] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

- 4615.** Taylor, P. (2004): Report of the Dragonfly Conservation Group. *Dragonfly news* 45: 20-22. (in English). [Report on current (2003) activities in the UK to study or protect Odonata.] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK. E-mail: ptaylor@acle.norfolk.sch.uk
- 4616.** Tchibozo, S.; Dijkstra, K.D. (2004): Rapport d'inventaire préliminaire des libellules des zones humides du Sud-Bénin. IDF-Report 6: 1-6. (in French with English summary). ["Dragonflies were collected at ten localities in five counties (sous-préfectures) in southern Bénin and are presently identified. A total of 73 species were found, including 45 new records for the country. The list of the odonates of Bénin currently comprises 86 species although more than 100 can probably be expected." (Authors)] Address: Tchibozo, S., Laboratoire d'écologie appliquée, Faculté des sciences agronomiques, Université d'Abomey-Calavi, 04 B.p. 0385 Cotonou, Bénin, E-mail: Tchisev@avu.org
- 4617.** Tennessen, K. (2004): *Enallagma exsulans* gleaning at the water surface. *Argia* 15(4): 13. (in English). [USA, Alabama; a male *E. exsulans* preyed on *Metrobates hesperius* (Gerridae).] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktinnessen@aol.com
- 4618.** Tennessen, K. (2004): *Hetaerina americana* in Florida. *Argia* 16(2): 7. (in English). [USA, Eglin Air Force base, 10 April 2004] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktinnessen@aol.com
- 4619.** Tennessen, K.J.; Vogt, T.E. (2004): *Ophiogomphus smithi* n. sp. (Odonata: Gomphidae) from Wisconsin and Iowa. *Proceedings of the Entomological Society of Washington* 106(3): 540-546. (in English). ["*Ophiogomphus smithi*, n. sp., is described and illustrated from 24 males and 15 females (holotype male and allotype female from Wisconsin, Eau Claire County, confluence of South Fork Eau Claire River and Horse Creek, 12 June 1994, K. J. Tennessen). The new species resembles *O. aspersus* Morse; however, the male has shorter proximal lobes on the anterior hamules and the female has occipital horns and a shorter vulvar lamina." (Authors)] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktinnessen@aol.com
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- 4621.** Thompson, D.J. (2004): Honest signals and female damselflies. *J. Br. Dragonfly Soc.* 20(1): 35-36. (in English). ["[...] Females arriving at the breeding site with a full clutch of eggs to lay are bound to be harassed by males until they enter tandem. The same females leaving the breeding site with no mature eggs to lay signal to males that they are not worth mating with and males believe them. Females might like to persuade males to leave them alone when they approach the breeding site, but invariably they do not. Why are they able to do it on the way out, but not on the way in? The answer would seem to be that they have an honest signal on the way out, a signal to males
- the way out, a signal to males with which they are unable to convey false information, an honest signal. When leaving a breeding site, female coenagrionid damselflies, if approached by males, bend their abdomens down outrageously, at an angle close to ninety degrees. Males seem to get the message that these females are not worth chasing. Females are quite unable to do this when they approach a breeding site because their abdomens are completely full of mature eggs such that it is impossible to bend them at such angles. So bending the abdomen at such an angle is an honest signal because it is impossible to cheat on this signal. The abdomen can only be bent to such a large extent when it is empty of mature eggs." (Author)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk
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pes, but abundance was lowest at downstream treatment sites and evenness was lowest at upstream treatment sites. Fish species richness did not differ among site types, but abundance was highest at downstream reference sites and evenness was highest at upstream sites. [...] Although limited to one system during a 1-year period, this study suggests that the effects of lowhead dams on fishes, macroinvertebrates, and habitat are similar to those reported for larger dams, providing important considerations for riverine ecosystem conservation efforts." (Authors) *Lestidae* and *Gomphidae* are listed in tab. 2] Address: Tiemann, J., Illinois Natural History Survey, Center for Biodiversity, Champaign, Illinois 61820, USA. E-mail: jtie-mann@inhs.uiuc.edu

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väskylä, Department of Biological and Environmental Science, P.O. Box 35, FIN-40014, University of Jyväskylä, Finland; Current address: Department of Biology, University of California, Riverside, CA 92521, USA. E-mail: marrant@st.jyu.fi

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4634. Tyrrell, M.; Brayshaw, S. (2004): Population expansion of the Hairy Dragonfly *Brachytron pratense* (Müller) and other breeding dragonflies of the Nene Valley in Northamptonshire. *J. Br. Dragonfly Society* 20(2): 51-60. (in English). ["The River Nene valley is the primary habitat for Odonata in Northamptonshire, hosting breeding populations of 18 of the 19 resident species. A series of gravel pits, many of which are managed nature reserves, have created excellent habitats for these typical lowland species. The data from the survey reported on in this paper has been included in a report to English Nature to support the case for expansion of the Nene Valley SSSI suite with the recommendation that some pits are designated as SSSI based purely on their assemblages of dragonflies. Following an apparent decline since the 1950s, *B. pratense* is now firmly established as a breeding species in the Nene Valley gravel pits, and breeds in fishing pits, country parks, dykes and managed nature reserves. The main dispersal route into the valley appears to have been along the River Nene corridor from the Cambridgeshire gravel pits located to the north-east. The expansion during the early 1990s coincided with a general range expansion in southern England. The Hairy Dragonfly appears absent from the newer heavily commercial pits, such as Billing Aquadrome south of Northampton, where the leisure uses of the pits may be incompatible with wildlife management, and from those pits with an open aspect such as those found in the Northampton, Hardingstone and Clifford Hill areas. Confirmed breeding is concentrated to the east of Northampton, with only occasional sightings to the west. Breeding sites in Northamptonshire are associated with moderately dense emergent vegetation, floating decaying plant debris, shallow water margins and the presence of Common Club-rush, Bulrush, sedges, Reed Canary-grass and Reed Sweet-grass. Ditchford Lakes and

grass. Ditchford Lakes and Meadows Nature Reserve is the primary breeding site, based on the number of exuviae collected. Breeding has been proven at one site away from the Nene Valley gravel pits and with regular sightings at others, the indications are that the Hairy Dragonfly continues to expand its range in the county, and may soon be recorded at other suitable habitats." (Authors)] Address: Tyrrell, M., 8 Warwick Close, Raunds, Wellingborough, Northamptonshire NN9 6JH

4635. Uéda, T. (2004): How do the Japanese see Dragonflies. Kyoto University Press. ISBN 4-87698-638-X: 505 pp. (in Japanese). [Translation by Naoya Ishizawa: "Uéda, Tetsuyuki: Prologue. While environmental problems aggravate, instead of the Western-like view on nature which conquers nature, the Japanese view on nature attracts attention. Surely, as we love the beauties of nature and enjoy the sound of crickets, Japanese people have lived identifying ourselves with nature. We also produced the peculiar art, which describes nature in haiku poem. However, on the other hand foreigners are disgusted that there is no country, which has been destroying nature of Japan so much. Is the Japanese view on nature surely the one, which brings about coexistence with nature? It is indicated that the Japanese view on nature is so much idealistic that the Japanese do not know the real nature. For example, a raccoon dog, popular to us, is the one that appears in folklore and literature, and we know little about it as a creature. Consequently, concerning management of wild animals, we react only emotionally; saying that killing it is pitiless. Thus our view on nature seems to be much inconsistent and confused. This seems to bring on destruction of culture as well as nature. Therefore, I tried to deal with the problem of the Japanese view on nature, with which we don't deal directly everyday, moreover, to review it thoroughly through the eyes on insects. Because I thought that the essential thing can be seen in the way of coming in contact with such trifles, smallness, and in a sense, peculiarity. Fortunately, I could organize the project supported by the Nissan Science Foundation; How do the Japanese see dragonflies?: A study on the Japanese view of nature. Various experts such as literary persons, linguists, sociologists, artists as well as ecologists reviewed our world through the eyes of insects besides their own works, and held a meeting once every year. This book was accomplished based on the result of the project. My specialty is animal ecology, and I have been studying particularly the behaviours of dragonflies and their life history. I never thought that I began such research till several years before. For these ten years I have been studying *Sympetrum frequens* that is famous of migration to highlands in summer, and I came to suspect that *S. frequens* might be not only an insect but also a scenery that was brought about in the course of interaction between human being and nature. I don't know what made me think so, however, such emotion is only noise for a natural scientist. But the more I endeavor to understand *S. frequens*, the larger my emotion was strengthened. Probably it may be related to the present day situation when rice fields of the main habitat of *S. frequens* have been devastated. Probably I could see it through *akatombo*: *S. frequens*, that agricultural devastation is that of the scenery, that has been suggested concerning the importance of neighbouring nature. Another chance of starting this research was brought about by a big incident. That was Great Hanshin Earthquake. There was a report, which was a relief among a lot of miserable

news. It was a newspaper report that the lives of a couple buried under debris had been supported by the song of "aka-tombo". The report said that only the song of "aka-tombo" that the wife sang was the support of the effort for the life of the husband. At the news I wondered deeply what of the song of "aka-tombo" had produced the effort for life. As you know, the song of "aka-tombo" is none to summon up people's courage. The song might have remembered the couple of the hills and rivers where they had lived in their childhood and might have made them want to live again in such a world. Or there may be another deep meaning. Anyway, it might have been the very thing that I wanted to understand the background of the "aka-tombo" through the word of "scenery". At such time I happened to be invited to a meeting of a research by Yuma, Masahide, Center for Ecological Research, Kyoto University, one of the member of this project. The meeting was the one of a small group for the large theme: General research of Stable Society- Kyoto International Seminar hosted by Foundation of Kyoto Seminar House, presided by Yokoyama, Toshio and others, Institute for Research in Humanities, Kyoto University. This was the group beyond the domain of learning. The theme at that time was "Things break out, continue/ on the mediation", which were like the spells for scientists. Then, in January 1997, two years after the earthquake, I made a presentation on "Change from insects to the scenery in S. frequens" at the seminar house in the cedar forest slightly covered with snow at Miyama-cho, Kyoto-fu. At the meeting I met Prof. Chung, Kwang of Korean University, who said that there had been the word of scenery, however, at present it is not used. His words were so much impressive, then, I decided to review seriously the scenery. Thus this research project started with many participants as well as Prof. Chung. However, without continuous support by Nissan Science Foundation in 1997, from 1999 to 2002 we could not have completed this project, and I express my cordial thanks to the staffs of the foundation. Part I focuses on dragonflies and I will introduce how the Japanese see dragonflies, with the views of Koreans, Chinese and Taiwanese. Part II was the selected results of researches on the Japanese views on nature from various aspects. The above mentioned presentation at "The General Research on the Stable Society", which became the start of this project, is carried in the introduction as it was.

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Postscript 489, Index 504"] Address: Kyoto University Press, 15-9 Yoshidakawara-machi, Sakyo-ku, Kyoto, 606-8305, Japan. <http://www.kyoto-up.gr.jp/body/shokai/4-87698-638-X.html>. E-mail sales@kyoto-up.gr.jp

4636. Utzeri, C.; Ercoli, C (2004): Distribution by unpaired males prolongs postcopulatory guarding duration in the damselfly *Lestes virens* (Charpentier) (Zygoptera: Lestidae). *Odonatologica* 33(3): 291-301. (in English). ["In *L. virens*, the tandem post-copulatory guarding varies from some minutes to more than 4 hours and appears correlated to the time of the day and disturbance by unpaired males. Using a multiple regression analysis, with guarding duration as the dependent variable and time of day, temperature and disturbance as the independent variables, it is shown that only disturbance significantly explains the model. An experimental test, in which early-occurring tandem males were not disturbed, while late-occurring ones were disturbed (a reverse situation of what happens in the field), showed that the latter kept their ovipositing females for significantly longer times than the former. The capability of males of varying guarding duration accordingly to the density of solitary males allows them to invest more or less time for guarding, according to the actual risk of losing sperm precedence." (Authors)] Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza", Viale dell'Università 32, I-00185 Roma, Italy; Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza". Viale dell'Università 32, I-00185 Roma, Italy. E-mail: carlo.utzeri@uniroma1.it

4637. Van Buskirk, J.; Aschwanden, J., Buckelmüller, I.; Reolon, S.; Rüttiman, S. (2004): Bold tail coloration protects tadpoles from dragonfly strikes. *Copeia*, 2004(3): 599-602. (in English). ["Some amphibian larvae develop brightly colored or black tail fins when reared in ponds with predaceous insects. The conspicuous tail has been proposed to lure predator strikes toward the tail and away from the more vulnerable head/body region. We tested this hypothesis by presenting model tadpoles that differed only in coloration to *Aeshna* dragonfly larvae. The models had either a dark body and pale tail, a dark spot in the middle of the tail, or a dark spot near the tip of the tail. Almost all models with plain tails were struck on the head/body, whereas those with dark spots in the tail were struck significantly more often on the tail. Because living tadpoles survive better when attacked on the tail than on the head, our results show that tail coloration can protect tadpoles from predators at close range." (Authors)] Address: Buskirk, J. van, Dept of Zoology, Melbourne University, Victoria 3010, Australia. E-mail: joshv@unimelb.edu.au

4638. Van de Meutter, F.; Stoks, R.; De Meester, L (2004): Behavioral linkage of pelagic prey and littoral predators: microhabitat selection by *Daphnia* induced by damselfly larvae. *Oikos* 107(2): 265-272. (in English). ["Only recently ecologists started treating the

previously separately considered benthic, littoral and pelagic zones of lake ecosystems as closely connected compartments. Here we study a link between organisms belonging to a different compartment - namely the pelagic and the littoral - through behavior in a series of laboratory experiments. Waterfleas of the genus *Daphnia* are inhabitants of the pelagic zone and suffer a high predation pressure from syntopic vertebrate predators (mainly fish). Presumably to escape this predation, they sometimes migrate in the day to the littoral to seek refuge within macrophytes and return to the pelagic at night. Zygopterans from the genus *Ischnura* do commonly co-occur in ponds with *Daphnia* and are known as opportunistic predators of *Daphnia*. In two initial experiments in microcosms in the lab we showed that *Ischnura* larvae are littoral predators strongly associated with macrophytes. Although we found that predation rates of individual *Ischnura* larvae on *Daphnia* are approximately 1.5 fold lower in macrophytes compared to open water, total predation from *Ischnura* on *Daphnia* per unit area is tenfold higher within macrophytes than in open water, making the open water a safer place for *Daphnia* with regard to *Ischnura* predation. In a third microcosm experiment we monitored horizontal distribution of *Daphnia* in the absence, presence and odor only of *Ischnura* larvae. After 2 hours, on average 10% less *Daphnia* remained within the vegetation when *Ischnura* larvae or only their odor were present compared to when *Ischnura* or their odor were absent. We interpret this as a behavioral anti-predation response of *Daphnia* to the presence of *Ischnura* larvae that seems primarily chemically mediated. The observed horizontal migration of the pelagic prey driven by the littoral predator may couple both lake compartments and may interact with the predator-prey relationships within the pelagic." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4639. Walsh, D. (2004): Influx of Vagrant Emperor Dragonfly *Hemianax ephippiger* in the Canary Islands. *Atropos* 22: 63. (in English). [Canary Islands, Spain, 21 February 2004, Fuerteventura, vicinity of Hotel Gorriones (near Costa Calma, on the coast in the south of the island); hundreds of *Anax ephippiger* were noticed feeding over the sandy coastal area adjacent to the beach.] Address: Walsh, D., 20 Netley Close, Ipswich, IP2 9YB, UK. E-mail: dfiv@ipswich.suffolk.sch.uk

4640. Walter, S. (2004): Protokoll der Beratung "Entomofauna Sayonica" am 04.03.2004. *Mitteilungen Sächsischer Entomologen* 67: 19-20. (in German). [Brief report on the current status of the planned book on the odonate fauna of Saxonia, Germany.] Address: not stated

4641. Ward, L.; Mill, P.J. (2004): Distribution of the Banded Demoiselle *Calopteryx splendens* (Harris) in northern England: an example of range expansion? *J. Br. Dragonfly Society* 20(2): 61-69. (in English). ["... In the north-east of England, comparison of the current distribution of *C. splendens* [...] with earlier distribution maps [...] shows that its area of occurrence appears to have increased considerably since 1961. However, when recorder effort is taken into account, most or all of the increase up to 1990 can be accounted for by the increase in the number of 10km squares for which odonate records in general have been received. By then,

21 % of the 10km squares in the 100km squares with the O.S. grid letters SE and NZ (which cover most of Yorkshire, Durham and Northumberland) had *C. splendens* records compared to an overall coverage of 94 per cent. The increase in *C. splendens* to 34 % of these squares since 1990 appears to reflect a real increase in the area of occupancy by this species in the north-east of England. ..."] (Authors)] Address: Ward, Louise, Mill, P.J., School of Biology, University of Leeds, Leeds LS2 9JT, UK

4642. Warfe, D.M.; Barmuta, L.A. (2004): Habitat structural complexity mediates the foraging success of multiple predator species. *Oecologia* 141(1): 171-178. (in English). ["We investigated the role of freshwater macrophytes as refuge by testing the hypothesis that predators capture fewer prey in more dense and structurally complex habitats. We also tested the hypothesis that habitat structure not only affects the prey-capture success of a single predator in isolation, but also the effectiveness of two predators combined, particularly if it mediates interactions between the predators. We conducted a fully crossed four-factorial laboratory experiment using artificial plants to determine the separate quantitative (density) and qualitative (shape) components of macrophyte structure on the prey-capture success of a predatory damselfly, *Ischnura heterosticta tasmanica*, and the southern pygmy perch, *Nannoperca australis*. Contrary to our expectations, macrophyte density had no effect on the prey-capture success of either predator, but both predators were significantly less effective in the structurally complex *Myriophyllum* analogue than in the structurally simpler *Triglochin* and *Eleocharis* analogues. Furthermore, the greater structural complexity of *Myriophyllum* amplified the impact of the negative interaction between the predators on prey numbers; the habitat use by damselfly larvae in response to the presence of southern pygmy perch meant they captured less prey in *Myriophyllum*. These results demonstrate habitat structure can influence multiple predator effects, and support the mechanism of increased prey refuge in more structurally complex macrophytes." (Authors)] Address: Warfe, Danielle, School of Zoology and Tasmanian Aquaculture and Fisheries Institute, University of Tasmania, GPO Box 252-05, Hobart, Tasmania, 7001, Australia. E-mail: Danielle.Warfe@dpiwe.tas.gov.au

4643. Watanabe, M.; Mimura, Y. (2004): Diurnal changes in perching sites and low mobility of adult *Mortonagrion hirosei* *Asahina* inhabiting understory of dense reed community (Zygoptera: Coenagrionidae). *Odonatologica* 33(3): 303-313. (in English). ["Shifts between perching sites, the flying behaviour as well as reproductive behaviour of adults were observed. All marked individuals inhabiting the dense reed community floor were followed from sunrise to sunset. Simultaneous observation was carried out by approximately 20 researchers. Every adult, sexually immature and mature, perched at 20 cm above the water surface within the reed community. For immature adults, about 120 flight activities were performed per day. The accumulated length of the movement was 9 m per day. When matured, the number of flight activities increased two-fold and the total length of the movement was 27 m per day. Although this species is a percher, showing little movement, increased flight activity by mature individuals caused encounters between individuals, hovering face-to-face. Few tandem flights were observed and females oviposi-

ted alone. The behaviour traits of this species at low light intensity are discussed." (Authors)] Address: Watanabe, M., Institute of Biological Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

4644. Watts, P.C.; Rouquette, J.R.; Saccheri, I.J.; Kemp, S.J.; Thompson, R.J. (2004): Molecular and ecological evidence for small-scale isolation by distance in an endangered damselfly, *Coenagrion mercuriale*. *Molecular Ecology* 13: 2931-2945. (in English). ["*C. mercuriale* is one of Europe 's most threatened damselflies and is listed in the European Habitats directive. We combined an intensive mark-release-recapture (MRR) study with a microsatellite-based genetic analysis for *C. mercuriale* from the Itchen Valley, UK, as part of an effort to understand the dispersal characteristics of this protected species. MRR data indicate that adult damselflies are highly sedentary, with only a low frequency of inter-patch movement that is predominantly to neighbouring sites. This restricted dispersal leads to significant genetic differentiation throughout most of the Itchen Valley, except between areas of continuous habitat, and isolation by distance (IBD), even though the core populations are separated by less than 10 km. An urban area separating some sites had a strong effect on the spatial genetic structure. Average pairwise relatedness between individual damselflies is positive at short distances, reflecting fine-scale genetic clustering and IBD both within- and between-habitat patches. Damselflies from a fragmented habitat have higher average kinship than those from a large continuous population, probably because of poorer dispersal and localized breeding in the former. Although indirect estimates of gene flow must be interpreted with caution, it is encouraging that our results indicate that the spatial pattern of genetic variation matches closely with that expected from direct observations of movement. These data are further discussed with respect to possible barriers to dispersal within the study site and the ecology and conservation of *C. mercuriale*. To our knowledge, this is the first report of fine-scale genetic structuring in any zygopteran species." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

4645. Wearing, M. (2004): A late dragonfly. *Dragonfly news* 45: 19. (in English). [Dragonfly poem.] Address: Wearing, M., Deadwater Valley Trust, Hants, UK

4646. Weekers, P.H.H.; Dumont, H.J. (2004): A molecular study of the relationship between the coenagrionid genera *Erythromma* and *Cercion*, with the creation of *Paracercion* gen. nov. for the east Asiatic "*Cercion*" (*Zygoptera*: *Coenagrionidae*). *Odonatologica* 33(2): 181-188. ["The ribosomal DNA genes (18S, 5.8S) and internal transcribed spacers (ITS1, ITS2) of 5 representatives of "*Cercion*" occurring in East Asia were examined and compared with west-palaearctic "*Cercion*" *lindenii*, *Erythromma najas* (2 populations), *E. viridulum*, some true *Coenagrion* species, and with *Enallagma* and *Ischnura* as outgroups. The molecular phylogenetic tree confirms the position of *H. Heidemann* & *R. Seidenbusch* (1993, *Die Libellenlarven Deutschlands und Frankreichs*, Bauer, Keltern) that *Cercion lindenii* belongs in *Erythromma*, and consequently, the binomen *Erythromma lindenii* is accepted. Regarding the "orien-

tal" group for which, under the new situation, the name *Cercion* is no longer available, the genus name *Paracercion* gen. n. is introduced. This is supported by molecular evidence and by some morphological traits. A morphological basis for setting apart the new genus from *Erythromma* is thus achieved, but its delimitation from *Coenagrion* remains to be defined." (Authors)] Address: Weekers, P.H.H., Department of Biology, University of Ghent, Ledeganckstraat 35, B-9000 Ghent, Belgium. E-mail: Peter.Weekers@UGent.be

4647. Westermann, K. (2004): Ausbreitungsversuche von *Lestes viridis* in den Schwarzwald - ein Beitrag zur Arealausweitung und Höhenverbreitung (*Odonata*: *Lestidae*). *Libellula* 22(3/4) (2003): 87-105. (in German with English summary). ["In the winters from 2000/2001 through 2002/2003, I examined shrubs and trees at 104 standing waters in the southern and south-western central Black Forest for traces of *Lestes viridis* egg clutches. All study sites were located higher than 700 m a.s.l. and had a size of at least 300 m². Approximately 120 traces of egg clutches were recorded at 31 different localities, the highest of which was at 1 109 m a.s.l. Prior to this study, only seven records of imagines existed for the study area and in rare cases involved observations of oviposition behaviour. As very few traces of egg clutches were found at certain sites, they can probably be attributed to either one or only a few females. Only rarely were these traces of egg clutches fresh; instead they were usually at least several years old. Therefore, in contrast to the number of findings, it is unlikely that the species succeeded in establishing permanent populations at any one of the localities. Instead, a permanent, low-level immigration of individuals from the Rhine Valley into the study area appears to take place. However, during the exceptionally hot summer of 2003, F-0 exuviae and emerging imagines were found at three localities at 845 and 900 m a.s.l., respectively. These results describe the status of *L. viridis* at higher elevations in the Black Forest and illuminate mechanisms of both immigration into mountainous terrain and range expansion." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

4648. White, H.; Hummel, S. (2004): 2004 Annual DSA meeting in Iowa. *Argia* 16(2): 2-5. (in English). [Report on the meeting held in July 2004 including some odonate records (e.g. *Ophiogomphus smithi* Tennessen & Vogt, 2004) taken along several trips, and brief abstracts of the lectures held.] Address: Hummel, S., P.O. Box 121, Lake View, IA, 51450, USA. E-mail: mshummel@netins.net

4649. Wilson, H. (2004): Perching orientation of sea-side dragonflies (*Erythrodiplax berenice*) in a Maine salt marsh. *Argia* 15(4): 14. (in English). ["[...] On five dates in 2002, I made opportunistic observations on the orientation of perched *E. berenice* with respect to the wind direction. On each occasion, the wind was either from the northeast or southwest so that a significant fetch resulted. Wind speeds varied from 5 to 10 miles per hour on each day. When I found a perched *E. berenice*, I recorded the quadrant in which its head was directed relative to the wind. For a southwesterly wind, a dragonfly with its head oriented between south and east was scored as upwind. Similarly, a dragonfly oriented between north and west was scored as downwind. Dragonflies oriented between east and north or between west and south were scored as lateral to the

south were scored as lateral to the wind. Some observations were made from upwind, others downwind and yet others lateral, eliminating any possible bias in direction of my presence on the orientation of the dragonflies. If the perching orientations were randomly distributed, one would expect a ratio of 1:1:2 for upwind, downwind and lateral orientations. The upwind and downwind orientations each include 90° of the compass and the lateral orientation includes 180° of the compass. The observed distribution is statistically different from random by a chi-square test ($X^2 = 19.32$, $p < 0.001$). A reasonable hypothesis for the preference of orienting into the wind is the generation of lift when *E. berenice* takes flight. If this hypothesis is true, one can draw a parallel with birds that engage in dynamic soaring over the ocean. Albatrosses and other procellariiform birds have mastered this technique in which the birds glide downwind until they lose attitude, then turn into the wind to generate lift and then turn again to continue downwind. One must be cautious in developing this analogy too far because odonate flight is much more difficult to model than albatross flight. Aside from twice as many wings, odonate wings deform in complex ways to accomplish flight. Nevertheless, for a weak flier like *E. berenice*, perching into the wind may provide a source of lift when the dragonflies take flight." (Author)] Address: Wilson, H., Dept of Biology, Colby College, 5739 Mayflower Hill Drive, Waterville, ME 04901, USA. E-mail: whwilson@colby.edu

4650. Wilson, K.D.P. (2004): Critical species of Odonata in China. *International Journal of Odonatology* 7(2): 409-422. (in English). ["The state of knowledge of China's Odonata is very much incomplete with many species awaiting description, especially from tropical and subtropical areas. A brief account is given of new odonate species described from China, including Taiwan, between 2000 and 2003. Information on identification guides, faunal lists and current studies, is provided. Species of Odonata, categorised as critically endangered or endangered in the 2003 IUCN Red List of threatened species, which are known to occur in China, are listed. Lists of Odonata, recommended by the IUCN Odonata Specialist Group as priority species for conservation, are updated to incorporate recently described species from China and Taiwan. Key threats to China's forest and surface waters are summarised. China has an ambitious programme to establish nature reserves and protect a high proportion of the country's natural resources. A brief account of China's protected areas and wetland conservation action plan is provided." (Author)] Address: Wilson, K.D.P., Flat 20, 6 Mansfield Road, The Peak, Hong Kong, China. E-mail: wilsonkd@ntlworld.com

4651. Woo, T.K. (2004): New record site of *Nannophya pygmaea* in the heart of Tai Lam Country Park. *Porcupine* 30: 3-5. (in English). ["There has been no new published record for the smallest anisopteran dragonfly, *N. pygmaea* in Hong Kong since 1996. In July 2002, a large and healthy colony of *Nannophya pygmaea* was found in the central part of Tai Lam Country Park. Over two hundred mature adults are recorded and confirmed breeding there. A further site is also reported in Luk Keng." (Author).] Address: not stated

4652. Woods, H.A.; Fagan, W.F.; Elser, J.J.; Harrison, J.F. (2004): Allometric and phylogenetic variation in insect phosphorus content. *Functional Ecology* 18: 103-

109. (in English). ["1. Phosphorus content was measured in adult insects and arachnids from 170 species collected in the Sonoran Desert. 2. Across insect body sizes spanning four orders of magnitude, phosphorus content was inversely related to body mass. The largest species (≈ 1 g dry) had phosphorus contents that were only about 60% (0.62 ± 0.0001 P absolute) as high as phosphorus contents of the smallest species (≈ 0.0001 g dry; 0.97 ± 0.0001 P). Negative phosphorus allometry was observed within each of seven insect orders and within arachnids. 3. Phosphorus contents of insect predators and herbivores were statistically indistinguishable. 4. More recently derived orders tended to have lower phosphorus contents with the exception of the most recently derived group (Panorpida = Diptera + Lepidoptera), which had high phosphorus contents." (Authors) Phosphorus content of Odonata is briefly discussed.] Address: Woods, H.A., Section of Integrative Biology C0930, University of Texas at Austin, Austin, TX 78712, USA. E-mail: art.woods@mail.utexas.edu

4653. Worthen, W.B.; Patrick, E.R. (2004): Competitive interactions affect perch-height preferences of three Odonata taxa (Coenagrionidae, Libellulidae). *International Journal of Odonatology* 7(3): 529-541. (in English). [Co-occurring odonate species often perch at different heights. We studied the effects of interspecific and intraspecific interactions on perch-height selection by *Perithemis tenera*, *Pachydiplax longipennis*, and *Enallagma* spp. by creating artificial perch stations and comparing perch selection when species perched alone or together. We also compared the frequency of perch-height use in the presence or absence of *P. tenera* and *P. longipennis* decoys (dead mounted specimens). When species perched alone, *Enallagma* spp. preferred low perches, *P. tenera* intermediate perches, and *P. longipennis* tall perches. This correlated with body mass; larger species used taller perches. Intraspecific responses to decoys were species specific; *P. tenera* showed an aggressive positive response to the presence of a conspecific decoy, whereas *P. longipennis* avoided conspecific decoys by shifting to lower perches. Interspecific effects were more consistent. The presence of living or decoy *P. tenera* at a station caused *Enallagma* to shift to lower perches. Likewise, the presence of living or decoy *P. longipennis* at a station caused *P. tenera* to shift to lower perches. Reciprocal effects were insignificant. These interactions were defined as interference competition because, in the decoy trials, perch-height shifts occurred although all four perches were available to visitors. We conclude that asymmetrical competition contributes to perch-height selection among these species." (Authors)] Address: Worthen, W.B., Dept of Biology, Furman University, Greenville, SC 29613 USA. E-mail: worthen@furman.edu

4654. Yates, B. (2004): Reports from Coastal stations - 2003: Rye Harbour, East Sussex. *Atropos* 21: 53-54. (in English). [*Erythromma viridulum* at Castle Water on 8 and 14th August 2003.] Address: not stated

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4655. Fincke, O.M.; Yanoviak, S.P.; Hanschu, R.D. (1997): Predation by odonate depresses mosquito abundance in water-filled tree holes in Panama. *Oecologia* 112: 244-253. (in English). ["In the lowland moist forest of Barro Colorado Island (BCI), Panama, larvae of four common species of odonates, a mosquito, and a tadpole are the major predators in water-filled tree holes. Mosquito larvae are their most common prey. Holes colonized naturally by predators and prey had lower densities of mosquitoes if odonates were present than if they were absent. Using artificial tree holes placed in the field, we tested the effects of odonates on their mosquito prey while controlling for the quantity and species of predator, hole volume, and nutrient input. In large and small holes with low nutrient input, odonates depressed the number of mosquitoes present and the number that survived to pupation. Increasing nutrient input (and consequently, mosquito abundance) to abnormally high levels dampened the effect of predation when odonates were relatively small. However, the predators grew faster with higher nutrients, and large larvae in all three genera reduced the number of mosquitoes surviving to pupation, even though the abundance of mosquito larvae remained high. Size-selective predation by the odonates is a likely explanation for this result; large mosquito larvae were less abundant in the predator treatment than in the controls. Because species assemblages were similar between natural and artificial tree holes, our results suggest that odonates are keystone species in tree holes on BCI, where they are the most common large predators." (Authors)] Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

4656. Gorb, S.N. (1997): Porous channels in the cuticle of the head-arrester system in dragon/damselflies (Insecta: Odonata). *Microscopy Research and Technique* 37: 583-591. (in English). ["The ultrastructure of the porous channels (PC) of the postcervical sclerite (SPC), which provides additional head fixation to the neck in adult odonates, was studied using TEM and high resolution SEM microscopy. Single chitin-protein microfibrils, about 0.14 μm thick, are arranged into channels with cylinder-like shapes. The axial rod of the chitin fiber (0.04 μm thick) is located in the center of the cylinder. The orientation of the axial rods was three-dimensionally demonstrated after dissolving the protein cover with NaOH. The PCs are arranged vertically to the surface and pass from the epidermal cells through

all the cuticular layers to the surface of the cuticle. In the exo- and endocuticle, the PCs are usually oval in cross-section and about 0.3 μm thick. In the endocuticle, the cross-sectional area of the PCs varies widely, from 0.01-0.15 μm^2 . The shape of the PC is determined by the macromolecular organization of the chitin-protein microfibrils: the long axis of the channel is orientated parallel to the axis of the preferred orientation of the cuticular microfibrils. The microfibrils tend to follow the line of the channel very closely. In fractures orientated perpendicular to the surface, the PC resembles a ribbon-like construction, which was clearly demonstrated by casts. The strongly parallel orientation of PCs in the deep layers of the cuticle changes within the microtrichia (MT), and they begin to be curved. Numerous PCs pass through the microtrichium, and most of them end on its side wall. PCs usually contain channel filaments about 0.09 μm thick. Usually, a single channel contained one filament, but channels located in the deep layers of the endocuticle have from one to five single filaments. The filaments were observed in the intact cuticle and in the cuticle enzymatically treated with chitinase, while in the cuticle treated with NaOH filaments were absent. The porous channel system of the odonate arrester is interpreted as a device transporting adhesive excretions from the epidermal cells to the cuticular surface." (Author)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

4657. Ohnishi, T. (1997): Ecological note on the genus *Nannophya pygmaea* Rambur (Libellulidae, Odonata) and fauna in Shonai, Toyo city, Ehime Prefecture, Japan. *Bulletin of Ehime Prefectural Science Museum* 2: 37-39. (in Japanese, with English summary). [www.sci-museum.niihama.ehime.jp/bulletin/02/06-oonoshi.pdf] Address: stated in Japanese

4658. Watanasit, S. (1997): Sperm displacement in the damselfly, *Xanthagrion erythroneurum* (Zygoptera: Coenagrionidae) - Variance in female sperm count and genital morphology. *J. Sci. Soc. Thailand* 23: 115-122. (in English). ["Sperm competition was examined in the non-territorial damselfly, *Xanthagrion erythroneurum* in a small freshwater lake (Forrestdale Lake reserve), which is close to city Perth, Western Australia. Mating pairs were collected along the shores of lake in 3 categories: precopula, interrupted copula and postcopula. Evidence of sperm removal in *X. erythroneurum* was found from two sources: counts of the number of sperm and penis / female genitalia morphology. Females captured during copulation had fewer sperm in their stora-

ge organ than pre- and post-copula females. These results suggest that male *X. erythroneurum* can remove rival sperm from a female's storage organ during copulation. The morphology of the penis shows that the distal appendage of the penis is a recurved flap-like structure covered with small spines. These structures suggest that the male scoops sperm from the bursa copulatrix before or during deposition of its own sperm. After removing the sperm from the previous matings, new sperm is discharged through a channel which opens on the tip of penis." (Author)] Address: Watanasit, S., Department of Biology, Faculty of Science, Prince of Songkla University, Hat Yai, Songkhla, Thailand, 90112. E-mail: wsupareg@ratree.psu.ac.th

4659. Watanasit, S. (1997): Size and mating success in a non-territorial damselfly *Xanthagrion erythroneurum* (Zygoptera: Coenagrionidae). *J. Sci. Soc. Thailand* 23: 61-74. (in English) ["Flight activity and reproductive behaviour of the damselfly *Xanthagrion erythroneurum* (Zygoptera: Coenagrionidae) was observed over a 2 year period (1989-1990). Marked insects were censused hourly between 0900 -1600 hs each day for 6 weeks in each year where, in addition to presence or absence, records were made of individual behaviour including mating and oviposition. Evidence for male-male behaviour was tested using models of both sexes. All observations and experiments were conducted at a focal pond close to Perth, Western Australia. Sex ratios of damselflies visiting the pond were male biased; males tended to arrive at the pond ahead of females. Sexual maturity, as indicated by the first attempts to mate were measured for both sexes. Both sexes matured within 8 days from emergence. Daily survival rate was estimated by the number of times individuals returned to the focal pond. Conservative estimates of survival were 80% for males and 70% for females. Males showed no signs of agonistic behaviour either towards other flying or perched males or towards the models of either sex. *X. erythroneurum* showed no signs of territorial behaviour. Mating behaviour involved males intercepting perched or flying females. Pairs adopted the tandem and wheel positions typical of all odonates. Oviposition immediately followed mating. Males remained with the submerged females or on the surface of the water close to the submerged female. Females remained underwater for an average of 35 mins. On emergence other males attempted to copulate with the female, adopting the tandem position for several minutes. No successful copulations were observed and males released the previously mated female within minutes. Although age had a significant effect on mating success, size (head width and wing length) of adult males and females had no effect on mating success. Both males and females close to 7 days post-emergence had the greatest chance of mating." (Author)] Address: Watanasit, S., Department of Biology, Faculty of Science, Prince of Songkla University, Hat Yai, Songkhla, Thailand, 90112. E-mail: wsupareg@ratree.psu.ac.th

1998

4660. Chou, L.-S.; Chen, C.-C.; Loh, W. (1998): Diet Analysis of the Gray-cheeked Fulvetta (*Alcippe morrissonia*) at Fushan Experimental Forest in Taiwan. *Acta Zoologica Taiwanica* 9(1): 59-66. (in English). [Odonata

totalled to 0.11 relative volume (%) of the arthropod remains identified from 626 gut flushing samples of Gray-cheeked Fulvettas at Fushan Experimental Forest, July 1994-April 1997. The frequency of occurrence was 0.32%. Most important prey were Coleoptera and Hymenoptera.] Address: Lien-Siang Chou, Department of Zoology, National Taiwan University, Taipei, Taiwan, R.O.C.

4661. Garrison, B.A. (1998): Bank Swallow (*Riparia riparia*). In: *The Riparian Bird Conservation Plan: a strategy for reversing the decline of riparian-associated birds in California*. California Partners in Flight. <http://www.prbo.org/calpif/htmldocs/riparianv-2.html>: (in English). [Odonata are preyed by the Bank Swallow.]

4662. Horner, P. (Ed.) (1998): Wildlife survey in freshwater ecosystems and adjoining terrestrial habitats on Melville Island, Northern Territory. Magnt Research Report No. 1. ISSN 1444-8939 PRINT. ISSN 1447-1981 ONLINE: 56 pp. ["Islands, comprising Bathurst and Melville Islands to the north of Darwin, Northern Territory, are of high natural and cultural significance. Separated by a narrow, fast-flowing strait, these large continental islands are approximately 70 kilometres from the mainland and are inhabited by the Tiwi people. Compared to the adjacent mainland, they include mostly pristine habitat, relatively undisturbed by European settlement and the effects of introduced plants and animals. This report presents the results of a two week field survey (3-17 October 1996) of wildlife in freshwater ecosystems on Melville Island. At the initial planning stage of the project it was intended to carry out surveys of freshwater ecosystems on both Islands, however, a funding reduction restricted field work to the larger Melville Island only. Conducted in collaboration with Aboriginal custodians, the survey aimed to assess wildlife associated with freshwater ecosystems, including the fauna occurring in the various terrestrial habitats bordering the creeks and streams on Melville Island. Results of the survey contribute to the assessment, conservation, documentation and management of the Tiwi Islands natural values, and also provide baseline data for the determination of faunal distributional patterns. Voucher specimens of most species recorded are lodged in the scientific reference collections of the Museum and Art Gallery of the Northern Territory (NTM). From the targeted faunal groups, the survey recorded 187 species on Melville Island. These were composed of 80+ aquatic insects, 49 fishes, 10 amphibians, 31 reptiles and 17 mammals. Results of particular interest include that 26 species of aquatic insects were either new or could not be identified to species with certainty. An as yet undescribed odonate (dragonfly) is the first record for the genus *Huonia* in Australia. The freshwater fish survey determined that the two drainage systems on the island (north and south) support different fish faunas, and terapontids (grunters) common elsewhere in the Northern Territory, appear to be absent from the Island. The terrestrial vertebrate survey recorded the Fawn Antechinus (a mouse-like marsupial) from the Tiwi Islands for the first time, and that colour forms of some tree snakes differed from local mainland forms and are biogeographically significant. These results indicate that the fauna of the Tiwi Islands contains many species of conservation significance. The brevity of the survey (13 days) and the inaccessibility of many potential collecting sites, means that the species lists given are incomplete. Further sur-

vey work, on both Bathurst and Melville Islands, will greatly contribute to knowledge of the Tiwi Islands natural resources." Odonata on pages 10-14.]

1999

4663. Lempert, J. (1998): Zum Fortpflanzungsverhalten von Libellen (Odonata) im tropischen Regenwald von Liberia. Salon Verlag, Köln. ISBN 3-932189-63-9. Zeitvertreib. Hrsg.: Klaus G. Gaida. Bd. 2. Wo sind WIR stehegeblieben: 71-79. (in German) [In the conceptual framework of a compilation on leisure activities, Jochen Lempert contributes a selection of black and white pictures (with annotations) on Odonata in Liberia, Africa. The following species are illustrated: *Prodasineura villiersi*, *Chlorocnemis elongata*, *Chlorocypha glauca*, *C. selysi*, *C. dispar*, *Malgassophlebia bispina*, *Porpax bipunctus*, *Tetrathemis godiardi*, and *Allorrhizucha klingi*. Address: Lempert, J., Vereinsstr. 41, D-20357 Hamburg, Germany.

4664. Moskowitz, D.P.; Bell, D.M. (1998): *Archilestes grandis* (Great Spredwing) in Central New Jersey, with notes on water quality. Bull. American Odonat. 5(3): 49-54. (in English). ["*Archilestes grandis* has undergone extensive range expansion during this century. *A. grandis* has been documented in a wide variety of aquatic habitats often with varying degrees of degradation or contamination, and biotic indices for this species based on relative water quality tolerances tend to vary widely. Water quality data for *A. grandis* habitats is limited, particularly in the northeast. We evaluated various water quality parameters at three man-made aquatic habitats in central New Jersey that support *A. grandis*. These evaluations and those of others suggest that *A. grandis* is very tolerant of water conditions generally considered "poor" by conventional water quality indices; this apparent tolerance of *A. grandis* to degraded water quality may explain its recent range expansion. The occurrence of this species in habitats generally depauperate in other, less tolerant odonate and other macroinvertebrate species may be a useful indicator of "poor" water quality in biotic "index" systems. Moreover, the facility with which the adult odonate community of an aquatic system can be characterized suggests, as other investigators of odonates have proposed, that "odonate metrics" would be ideal for the rapid biological assessment of such ecosystems." (Authors)] Address: David P. Moskowitz and David M. Bell, EcolSciences, Inc., 75 Fleetwood Drive, Suite 250 Rockaway, New Jersey 07866, USA

4665. Roderick, G.K.; Gillespie, R.G. (1998): Speciation and phylogeography of Hawaiian terrestrial arthropods. Molecular ecology 7: 519-531. (in English). [The evolution of biodiversity and species on Hawaiian islands is discussed including some remarks on the odonate genus *Megalagrion*.] Address: Gillespie, R.G., Center for Conservation Research and Training, 3050 Maile Way, Gilmore 409, Univ. of Hawai'i, Honolulu, Hawaii 96822, USA. E-mail: gillespi@hawaii.edu

4666. Balik, I. (1999): The feeding features of the pike perch (*Stizostedion lucioperca*) population in lake Beysehir. Turkish Journal of Zoology 23: 189-194. (in English with Turkish summary). [Turkey; odonata comprised 0,4% of stomach content in pike perch.] Address: Balik, I., Egirdir Fisheries Research Institute, Egirdir, Isparta, Turkey

4667. Feuler, G. (1999): Two new U.A.E. damselflies: *Ceriagrion glabrum* and *Pseudagrion decorum*. Tribulus 9(2): 31. (in English). [United Arabian Emirates, Wadi Shi dam near Khor Fakkan, March 1999] Address: not stated

4668. Haubruge, E.; Arnaud, L.; Mignon, J.; Gage, M.J.G. (1999): Fertilization by proxy: rival sperm removal and translocation in a beetle. Proc. R. Soc. Lond. B 266: 1183-1187. (in English). ["Competition between different males' sperm for the fertilization of ova has led to the evolution of a diversity of characters in male reproductive behaviour, physiology and morphology. Males may increase sperm competition success either by enhancing the success of their own sperm or by negating or eliminating the success of rival sperm. Here, we find that in the flour beetle *Tribolium castaneum*, the second male to mate gains fertilization precedence over previous males' sperm and fertilizes approximately two-thirds of the eggs. It is not known what mechanism underlies this pattern of last-male sperm precedence; however, the elongate tubules of the female sperm storage organ may encourage a 'last-in, first-out' sperm use sequence. Here we present an additional or alternative mechanism of sperm precedence whereby previously deposited sperm are removed from the female tract by the mating male's genitalia. In addition to providing evidence for sperm removal in *T. castaneum*, we also show that removed, non-self sperm may be translocated back into the reproductive tracts of new, previously unmated females, where the translocated sperm go on to gain significant fertilization success. We found that, in 45 out of 204 crosses, sperm translocation occurred and in these 45 crosses over half of the offspring were sired by spermatozoa which had been translocated between females on the male genitalia. In the natural environment of stored food, reproductively active *T. castaneum* adults aggregate in dense mating populations where copulation is frequent (we show in three naturally occurring population densities that copula duration and intermating intervals across three subsequent matings average 1-2min). Selection upon males to remove rival sperm may have resulted in counter-selection upon spermatozoa to survive removal and be translocated into new females where they go on to fertilize in significant numbers." (Authors) Reference to Odonata is made at several places.] Address: Gage, M.J.G., Population Biology Research Group, School of Biological Sciences, University of Liverpool, Liverpool L69 3BX, UK E-mail: mgage@liv.ac.uk

2000

4669. Biggs, K. (2000): Common dragonflies of California: a beginner's pocket guide. Azalea Creek Publishing, Sebastopol/CA. ISBN 0-9677934-0-8: 96 pp. (in English). [This attractive, concisely styled field guide, covers 61 California's common species. Size, recognition in the field, habitat, known flight period, status and general distribution in California is provided for each species. The book includes a brief outline of dragonfly biology (with a Glossary), concise suggestions for dra-

gonfly watchers, and a checklist of the California odonate species.] Address: Azalea Creek Publishing, 308 Bloomfield Rd, Sebastopol, CA 5472-5161, USA

4670. Bortolotti, G.R.; Tella, J.L.; Forero, M.G.; Dawson, R.D.; Negro, J.J. (2000): Genetics, local environment and health as factors in uencing plasma carotenoids in wild American kestrels (*Falco sparverius*). Proceedings of the Royal Socociety, London B 267: 1433-1438. (in English). ["Carotenoids are important as pigments for bright coloration of animals, and as physiologically active compounds with a wide array of health-related functions. Carotenoid-dependent coloration may have evolved as a signal to conspecifics; however, factors that may limit availability of carotenoids are poorly known. We investigated how the acquisition of carotenoids may be constrained by availability in the environment, diet, genetic make-up and health status of wild American kestrels. Plasma concentrations of siblings at the time of fledging showed a high degree of resemblance; however, a crossfostering experiment revealed that variance was largely explained by nest of rearing, rather than nest of origin, thus indicating a low genetic component. A multivariate analysis of attributes of nestlings (sex, size, plasma proteins, immune function), parental reproduction (laying date, clutch size) and rearing conditions (brood size, size hierarchy, nestling mortality) showed only a small significant effect of leucocyte differentials on carotenoid concentrations of nestlings. A strong environmental effect on plasma carotenoids was demonstrated by levels of adult kestrels being correlated within mated pairs, and having a significant association with the abundance of voles, the primary prey species, per territory. [...] A total of 5195 prey items was observed, 5070 of which could be identified to some taxonomic level. The major components as a percentage by number (and biomass) of all prey delivered were 10.4 (47.6) small mammals, 63.5 (21.5) dragonflies 3.1 (12.8) birds, 6.4 (9.3) fogs, and 5.4 (1.8) grasshoppers (Orthoptera)." (Authors)] Address: Dept of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, Saskatchewan, Canada S7N 5E2. E-mail: bortolotti@sask.usask.ca

4671. Brooks, K.M. (2000): Migration of polycyclic aromatic hydrocarbons (PAH) from new and used railway crossties into ballast and adjacent wetland environments. American Wood-Preservers Association 96th Annual Meeting: 34 pp. (in English). ["In 1996, an electric utility replaced weathered creosote treated railway ties with newly treated ties as part of a routine maintenance operation on a railway spur carrying coal through a wetland into a power generating facility. The wetland was considered important habitat to *Somatochlora hiemana* an endangered dragonfly. The US Fish and Wildlife Service considered the creosote treated railway ties a threat to this endangered dragonfly and required the utility to replace the treated wood ties with steel ties and to conduct a study to determine the potential risks to wetland environments associated with the use of creosote treated railway ties. Because there are many sources of polycyclic aromatic hydrocarbons associated with all forms of transportation, particularly railway lines carrying coal, a mesocosm study was used to determine the rate at which creosote derived PAH moves from treated ties into railway ballast and then into adjacent wetlands. This study included three cells containing newly treated ties, weathered (old) ties, and untreated red oak ties as a control. The mesocosms replicated

conditions, including the wetland's hydrology, found along the actual right-of-way. Concentrations of PAH were monitored quarterly in mesocosm ballast at distances of 5, 20 and 30 cm from the faces of all three types of railway ties and in sediments at distances of 0.0, 0.5 and 0.75 meters from the toe of the ballast for 555 days. The mesocosms were constructed without significant PAH contamination. Creosote was observed migrating from the newly treated ties into adjacent ballast to a distance of at least 30 cm during the summer of the first year following construction. A similar pulse of PAH was not observed in the weathered tie mesocosm. It appeared that this pulse of PAH was associated with warm ambient air temperatures experienced during July and August at the site and with solar insolation that may have significantly increased surface temperatures on the black colored ties, which act as a black body. Concentrations of PAH adjacent to the newly treated ties declined rapidly to low levels during the fall of the first year. This decline was likely associated with photochemical degradation in the dry ballast environment. A second pulse of PAH was not observed in any of the mesocosms during the second summer of monitoring and ballast concentrations remained low throughout the remainder of the study. Sediment concentrations of PAH remained low until near the end of the study when a small increase in sediment PAH was observed in the new tie mesocosm. The increase in sediment PAH attributable to the creosote treated railway ties was approximately 0.3 mg/g, which was equal to the observed atmospheric PAH deposition observed in this area. However, the observed increases were not statistically significant as a function of Distance, Treatment or Day of the study. Polycyclic aromatic hydrocarbons appeared to have migrated vertically downward to a depth of approximately 60 cm in the ballast. At the end of the study, the observed SPAH concentration was less than 0.85 mg SPAH/g dry ballast at any depth. PAH were detected in one of 16 water samples. Those samples were collected on the final day of the study. However the PAH concentrations were very low and an assessment using the sum of toxic units approach indicated that none of the samples approached concentrations associated with biological stress. Likewise, the PAH concentrations observed in the two most contaminated wetland sediment samples were not predicted to be stressful using the newly developed consensus sediment benchmark methodology of Swartz (1999). No adverse biological effects to even the most sensitive organisms were predicted at the PAH concentrations observed in wetland sediments during this study." (Author). www.rta.org/pdf/evaluationofpolycyclic.pdf] Address: Brooks, K.M., Aquatic Environmental Sciences, 644 Old Eaglemount Road, Port Townsend, WA 98368. USA. E-mail: brooks@olympus.net

4672. Bulánková, E. (2000): Selected groups of macrozoobenthos (Odonata, Cordulegasteridae, Diptera, Blephariceridae, Dixidae, Athericidae) as bioindicators of flowing waters. Conference proceedings, "Sbornek referu z XII. Limnologick conference, Limnologie na püelomu tisecilete öSL, SLS, Kouty nad DĚsnou, 18.-22.IX.2000, Univerzita Palackcho, Olomouc, Czech Republic: 163-166. (in Czech, with English summary). [Slovakia, Small Carpathian Mountains, Gidra creek, *Cordulegaster boltonii*] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava.,

Slovakia; tel.+ 421-7-728 922, e-mail: Bulankova@nic.fns.uniba.sk

4673. Englund, R. (2000): Report on Aquatic Insect Monitoring of May 2000 in Pelekunu Valley, Moloka'i, Hawai'i. Contribution No. 2000-011 to the Hawaii Biological Survey July 2000: 4 pp. (in English). [Hawai'i, USA; the Pelekuni stream is one of the rare running waters nearly undisturbed by introduced species in Hawai'i, and harbours (partly abundant populations of) 5 Megalagrion species, and (the introduced) *Ischnura ramburii*.] Address: Submitted to: TNCH Moloka'i Office, P.O. Box 220 Kualapu'u, Hawai'i; Ron Englund, Hawaii Biological Survey, 1525 Bernice Street, Bishop Museum, Honolulu, Hawaii, 96817

4674. García-Berthou, E.; Moreno-Amich, R. (2000): Food of introduced pumpkinseed sunfish: ontogenetic diet shift and seasonal variation. *Journal of Fish Biology* 57: 29-40. (in English). ["The pumpkinseed sunfish *Lepomis gibbosus* introduced into Lake Banyoles (Spain) were predominantly littoral but there was a tendency of large fish to use deeper zones. Their diet was dominated by littoral macrobenthos, particularly amphipods (*Echinogammarus* sp.). There was ontogenetic variation in the diet, with small young-of-the-year (LF<4 cm) feeding on several littoral microcrustaceans, especially the cladoceran *Ceriodaphnia reticulata*, whereas larger fish shifted to a freshwater shrimp (*Atyaephyra desmaresti*), snails and damselfly larvae. Seasonal variation in diet was linked to resource availability, with consumption of fish eggs and plant debris in spring and summer. In autumn, pumpkinseeds were partially zooplanktivores, preying on the cladoceran *Daphnia longispina*. The diet of pumpkinseeds in Lake Banyoles and other Iberian populations shows less molluscivory than North American populations. The potential ecological impact of this successful exotic species involves mainly predation on fish eggs and molluscs." (Authors) Odonate larvae total to 2.9% of number, 6.5% of biomass, and 18.2% in frequency of occurrence in the diet of *L. gibbosus*.] Address: García-Berthou, E., Departament de Ciències Ambientals and Institut d'Ecologia Aquàtica, Universitat de Girona, E-17071 Girona, Catalonia, Spain. E-mail: caegb@fc.udg.es

4675. Gaskin, B.; Bass, D. (2000): Macroinvertebrates collected from seven Oklahoma springs. *Proc. Okla. Acad. Sci.* 80: 17-23. ["We collected macroinvertebrates, measured physicochemical conditions, and visually observed the microhabitats of seven springs located across Oklahoma. Fifty-four species were collected from the seven springs. No single taxon was found in all seven sites and only four species were observed in over half of the sites. This indicates that many of the macroinvertebrates occurring in these springs are not truly spring invertebrates, but are local species able to exist in these environments. The number of taxa collected was directly related to the various microhabitats present and the concentration of dissolved oxygen. Based on the macroinvertebrate community, Sorensen's similarity coefficient revealed that Boiling Springs and Big Spring were most similar, with both containing abundant microhabitats. Desperado Spring and Cattlewash Spring were least similar, having a large difference in dissolved oxygen concentrations. Four of the seven springs were sampled previously. Only 17% of macroinvertebrate species had been previously recorded from a particular site, indicating that a large turnover of species occurs in

these spring habitats." (Authors) Anax junius and additional five taxa on the genus level are listed in table 2.] Address: Bass, D., Department of Biology, University of Central Oklahoma, Edmond, OK 73034

4676. Hall, O.R.; Wallace, B.; Eggert, S.L. (2000): Organic matter flow in stream food webs with reduced detrital resource base. *Ecology* 81(12): 3445-3463. (in English). ["Food webs based on flows of organic matter were developed for two small streams to examine food web response to a large reduction in detrital inputs. At the study site, Coweeta Hydrologic Laboratory in the southern Appalachians, leaf litter inputs and associated microbial assemblages are the main energy source for food webs in headwater streams. We eliminated leaf litter inputs to one stream using a net placed over the first 180 m of stream from its origin. Food webs based on flow of organic matter were developed for a reference stream and the litter-excluded stream for two months, July and December of year 1 of the litter exclusion, to examine effects of leaf litter exclusion on the trophic base of the food web, size distribution of flows, predator-prey interactions, and trophic structure. Flows (mg AFDM-m22-d21; AFDM 5 ash-free dry mass) were estimated using gut content analyses for detritus and prey items, coupled with secondary production estimates. We used a whole-stream $\delta^{13}\text{C}$ tracer method to estimate assimilation of bacteria by invertebrates. The food webs encompassed most (84-91%) of invertebrate secondary production, but 30% of the estimated total links. The primary sources of organic matter for the food web in the reference stream were leaf tissue, bacterial carbon, and animal prey, with 25-30% of total secondary production derived from each. In-stream primary production led to 1% of invertebrate secondary production. A higher fraction of food web production in the litter-excluded stream was derived from wood. Magnitudes of detrital flows were lower in the litter-excluded stream, and some taxa were missing compared to the reference stream. The fraction of predator ingestion approached 100% of total secondary production for both streams, but this predation was distributed diffusely among several taxa. Flows to predators were fewer and smaller in the litter-excluded stream, yet these flows had higher per-biomass consumption coefficients, suggesting stronger interactions among the remaining common taxa. These food webs enabled us to examine interactions among taxa in the streams; hence, we found responses of the stream ecosystem to litter exclusion that we would not have considered had we only measured changes in invertebrate population sizes or system-level changes in organic matter flow." (Authors) The paper contains notes on Odonata.] Address: Hall, R.O., Institute of Ecology, University of Georgia, Athens, Georgia 30602 USA. E-mail: bhall@uwoyo.edu

4677. Kazancı, N.; Dügel, M. (2000): An evaluation of the water quality of Yuvarlakçay stream, in the Köyceğiz-Dalyan protected area, SW Turkey. *Turkish Journal of Zoology* 24: 69-80. (in English, with Turkish summary). ["The longitudinal and seasonal distribution of macroinvertebrates and the physical and chemical variables of Yuvarlak Stream in the Köyceğiz-Dalyan Protected Area in South-Western Turkey were studied between April 1992 and April 1993. The diversity, frequency, dominance, abundance and similarity of macroinvertebrates through the year were recorded. In addition, the Belgian Biotic Index was used as a biological criterion for the assessment of water quality for the first

time in Turkey. According to the physico-chemical variables and the distribution of benthic macroinvertebrates, continuous slight and moderate organic pollution exists in the stream. The monitoring of the water quality of Yuvarlakçay Stream is also necessary for the protection of water quality in meromictic Lake Köyceğiz." (Authors) Odonate taxa are treated on the genus level, including "Ophiogomphus".] Address: Kazanci, N., Department of Biology, Faculty of Science, Hacettepe University, Beytepe, Ankara, Turkey

4678. Kazunobu, K.; Yokoi, N. (2000): On the plant worms of Odonata. *Nature & Insects* 35(11): 6-9. (in Japanese. [So-called plant worms, are parasitic fungi of the genus *Cordyceps* belonging to the Ascomycete fungi (for infected odonate species see, e.g.: <http://fruit.naro.affrc.go.jp/kajunoheya/epfdb/Deutte/Hymeno/Hodona.htm>). The authors document a plant worm found on *Sympetrum infuscatum* (Yasato-machi, Ibaraki Pref., Japan; 26-IX-1999) and discuss in general the relationship between fungus and Odonata, and, in special, the infection way of the fungus to the Odonata. An English translation of the paper is available from Naoya Ishizawa.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatte.net

4679. Polhemus, D.; Englund, R.; Jordan, S.; Polhemus, J. (2000): Trip report for 1999 entomological and freshwater surveys of the Smithsonian Institution and Bishop Museum expedition to the Marquesas Islands and Tahiti. Contribution No. 2000-002 to Pacific Biological Survey. Bishop Museum: 17 pp. (in English). [Detailed report from an extensive survey of the entomofauna of Marquesian Islands and Tahiti (French Polynesia) with special emphasis on Odonata. The focus is set on the taxonomic problems caused by some papers of Needham and Mumford, and new insights in taxonomic and species diversity of the Marquesas are given.] Address: Polhemus, D., Dept. of Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

4680. Reinhardt, K. (2000): Buchbesprechung - Gerken, Bernd & Sternberg, Klaus (1999) *Die Exuvien europäischer Libellen* (Insecta, Odonata). 354 S. Huxaria Druckerei GmbH, Verlag und Werbeagentur, Hörter 1999. *Limnologica* 30: 91-92. (in German). [book review] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

4681. Shieh, S.-H.; Yang, P.-S. (2000): Community structure and functional organization of aquatic insects in an agricultural mountain stream of Taiwan: 1985-1986 and 1995-1996. *Zoological Studies* 39(3): 191-202. (in English, with Chinese summary). ["Changes in stream water and habitat quality of Chichiawan Stream, which flows through Wulin Farm in central Taiwan, were examined using community structure and functional organization of aquatic insects at 4 sites in 1985-1986 and 1995-1996. Long-term records of water chemistry for the study area indicate that water quality in 1995-1996 had not degraded as compared with data in 1987-1988. It was found that there were significant differences in the number of taxa and number of individuals per sample unit for samples at all sites combined between 1985-1986 and 1995-1996. In general, the number of taxa and number of individuals per sample unit were

higher in 1985-1986 than in 1995-1996 at the 4 sites. Higher relative abundances of *Baetis* spp., *Rhithrogena* ample, *Cincticostella fusca*, and *Uenoa taiwanensis* were found in 1985-1986 compared to 1995-1996, suggesting that the substrate quality of the stream had deteriorated at sites located in agricultural areas. Similar results were found between the taxonomic and functional feeding group analyses when the percentage similarity analysis was used. The functional organization and community composition of aquatic insects at sites 1 and 2 in 1995-1996 were similar to those at site 4 in 1985-1986. Site 4 is located downstream of the confluence between Chichiawan Stream and Yousheng Stream where the stream watershed has been developed for agricultural land use. Principal component analysis indicated that, in addition to the substrate quality of the stream, water temperature, dissolved oxygen, conductivity, and ammonia were the most important physico-chemical variables shaping the aquatic insect community structure in the study stream reach. The study sites in agricultural areas had poorer stream water and habitat quality. The raw cropping of orchards and vegetable farms greatly increased soil erosion and suspended solids inputs to the stream which may have been harmful to the aquatic insect communities." (Authors) In table 2 (relative composition of total aquatic insect fauna in %), *Lanthus* sp. and *Sieboldius deflexus* represent the Odonata, which are very rare in the stream samples.] Address: Ping-Shih Yang, Department of Entomology, National Taiwan University, Taipei, Taiwan 106, R.O.C. E-mail: psyang@ccms.ntu.edu.tw

2001

4682. Bass, D.; Potts, C. (2001): Invertebrate community composition and physicochemical conditions of Boehler Lake, Atoka County, Oklahoma. *Proc. Okla. Acad. Sci.* 81: 21-29. (in English). [Boehler Lake is a 2.5 ha, dystrophic beaver pond. Odonates (listed on the genus level in table 2) formed a higher proportion of the insect community, constituting 7.6% of the insects.] Address: Bass, D., Department of Biology, University of Central Oklahoma, Edmond, OK 73034

4683. Bielli, E.; Tesauro, M. (2001): The littoral benthon community of Lake Orta after liming: a comparison between summer 1993 and summer 1998. *J. Limnol.* 60(2): 237-239. (in English). ["At different times in recent years (before, during and after liming) we have studied the littoral macrobenthonic community in Lake Orta, and, for comparison, in Lake Mergozzo (an unpolluted lake). In this paper we compare the situations after liming in summer 1993 and in summer 1998. We found no clear difference between the summer samples in 1993 and 1998 for each site; only seasonal fluctuations were in evidence, in particular in the sites of Gozano and Pella and in Lake Mergozzo. The two lakes, however, still present marked differences in the composition of their macrobenthonic communities." (Authors) 5 odonate species are listed in table 2] Address: Bielli, Ettore, Agenzia Regionale per la Protezione Ambientale Dipartimento di Novara, Viale Roma 7e, 28100 Novara, Italy. E-mail: e.bielli@arpa.piemonte.it

4684. Edwards, J.S.; Thornton, I.W.B. (2001): Colonization of an island volcano, Long Island, Papua New

Guinea, and an emergent island, Motmot, in its caldera lake. VI. The pioneer arthropod community of Motmot. *Journal of Biogeography* 28: 1379-1388. (in English). [Aim: To evaluate the arthropod community of Motmot in relation to primary colonization of young volcanic surfaces. Location: Motmot, an island in Lake Wisdom which occupies the caldera of Long Island, Papua New Guinea. Methods: Arthropod sampling by means of pit-fall, water and tube traps, fallout collectors, and hand collecting. Results: At least 35 species of arthropod were collected in 6 days between 23 June and 3 July 1999. Lycosid spiders and ants dominated in all areas. The predator± scavenger arthropod population is largely or entirely dependent on allochthonous input of aquatic insects from the surrounding lake. Main conclusions: Major changes in the arthropod fauna since the pioneer surveys of Ball and his colleagues in the 1970s are the loss of a strand flotsam community as the island has eroded to form a predominantly cliffed coastline. Ant and spider diversity has increased. The current colonists include a number of widespread 'tramp' species sensu Diamond." (Authors) The following Odonata have been observed. *Xiphagrion cyanomelas* (1969, 1999), *Orthetrum sabina* (1999), *Pantala flavescens* (1999), and *Tramea liberata* (1969, 1971, 1972, 1999). *Xiphagrion* was collected from spider webs, 125 specimens of *P. flavescens* emerged in a 1m² "of the surface of a low cliff about 1,5 m above lake level".] Address: John S. Edwards¹ and Ian W. B. Thornton² ¹Department of Zoology, University of Washington, Seattle, WA 98195, USA, and ²Department of Zoology, La Trobe University, Bundoora, 3083 Australia

4685. Feuler, G. (2001): The damselfly *Pseudagrion decorum* breeding in the U.A.E.. *Tribulus* 11(1): 24. (in English). [United Arab Emirates, Wadi Shi dam near Khor Fakkan; the oviposition behaviour is described, but no date of observation is documented.] Address: not stated

4686. Kovács, T.; Juhász, P.; Turcsány, I. (2001): Ephemeroptera, Odonata and Plecoptera larvae from the River Tisza (1997-1999). *Folia historico naturalia musei Matraensis* 25: 135-143. (in English). [The paper provides data on 34 Ephemeroptera, 7 Odonata (including *Stylurus flavipes* and *Ophiogomphus cecilia*) and 5 Plecoptera species from the Hungarian section of the Tisza River.] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

4687. Kovacs, T.; Ambrus, A. (2001): Ephemeroptera, Odonata and Plecoptera larvae from the rivers of Rába and Lapincs (Hungary). *Folia historico naturalia musei Matraensis* 25: 145-162. (in English). [The paper provides data on 9 Odonata species from the Hungarian section of the Rába River and 4 from the Hungarian section of the Lapincs River. The data include records of *Stylurus flavipes* and *Ophiogomphus cecilia*.] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

4688. Sheshurak, P. (2001): Dragonflies (Odonata) of the Regional Landscape Park "Granitno-Stepove Pobuzhza. *Vestnik Zoologii* 35(2): 22. (in Russian, with English title). [The following species are listed: *Calopteryx splendens*, *Platycnemis pennipes*, *Ischnura elegans*, *Erythromma viridulum*, *Gomphus vulgatissimus*, *Aeshna affinis*, *A. mixta*, *Libellula depressa*, *Orthetrum*

brunneum, *O. coerulescens*, *O. cancellatum*, *O. albistylum*, *Sympetrum flaveolum*, *S. vulgatum*, *S. striolatum*, and *S. sanguineum*.] Address: Sheshurak, P., St. Pedag. Inst. "M.V. Gogol", Nishin, Ukraine

4689. Walsh, S.J. (2001): Freshwater macrofauna of Florida karst habitats. In: Eve L. Kuniandy, ed., 2001, U.S. Geological Survey Karst Interest Group. Proceedings, Water-Resources Investigations Report 01-4011: 78-88. (in English). [*Cordulegaster obliqua fasciata*, *C. sayi*, *Somatochlora provocans*, *Dromogomphus armatus*, *Progomphus bellei*, and *Tachopteryx thoreyi* are listed as obligate and predominant Odonata of Florida, USA karst habitats dwelling the seeps.] Address: Walsh, S.J., U.S. Geological Survey, Florida Caribbean Science Center, 7920 NW 71st Street, Gainesville, FL 32653, USA

4690. Wells R.D.S.; Clayton, J.S. (2001): Ecological impacts of water net (*Hydrodictyon reticulatum*) in Lake Aniwhenua, New Zealand. *New Zealand Journal of Ecology* 25(2): 55-63. (in English). ["The ecological impacts of *Hydrodictyon reticulatum* blooms (1989-94) were studied at Lake Aniwhenua (a constructed lake) in North Island, New Zealand by collating fish, invertebrate and macrophyte data collected towards the end of a four year bloom period and following its decline. *Hydrodictyon reticulatum* had some localised impacts on the biota of the lake. Some macrophyte beds were smothered to the extent that they collapsed and disappeared, and dense compacted accumulations of *H. reticulatum* caused localised anoxic conditions while it decayed. However, fish and some invertebrates in the lake benefited from the *H. reticulatum* blooms. High numbers of *Ceriodaphnia* sp. (maximum, 5.5 x 10⁴ m⁻²) were recorded amongst *H. reticulatum*, and gastropods were exceptionally abundant, the most common being *Potamopyrgus antipodarum* (maximum, 1.8 x 10⁵ m⁻²). *Hydrodictyon reticulatum* was consumed by three species of common gastropods in experimental trials, with *Austropeplea tomentosa* consuming up to 1.3 g dry weight *H. reticulatum* g⁻¹, live weight of snail day⁻¹. Gastropods comprised the major portion of the diet of *Oncorhynchus mykiss* in Lake Aniwhenua during and after the *H. reticulatum* bloom. A marked peak in sports fishing (with exceptional sizes and numbers of fish caught) coincided with the period of *H. reticulatum* blooms and the abundant invertebrate food source associated with the blooms." (Authors) *Procordulia grayi* was only recorded after the bloom of *H. reticulatum*. Zygoptera indet. were recorded during both periods.] Address: Wells, R.D.S., National Institute of Water and Atmospheric Research, P.O. Box 11 115, Hamilton, New Zealand. E-mail: r.wells@niwa.cri.nz

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4691. Asaithambi, M.; Manickavasagam, S. (2002): Odonata of Annamalai University, Annamalaiagar, Tamil Nadu, India. *Zoos' Print Journal* 17(2): 704-706. (in English). ["Odonata population of Annamalaiagar, Tamil Nadu was surveyed and 23 species under four families and 21 genera were collected and identified. Suborder Zygoptera is represented by the family Coenagrionidae and Anisoptera by the families Libellulidae, Aeshnidae and Gomphidae. Various genera and spe-

cies collected are reported with their distribution in India." (Authors)] Address: unknown.

4692. Bedjanic, M. (2002): Dragonflies collected in Sri Lanka during January and February 1995 (Odonata). Opusc. zool. flumin. 205: 1-22. (in English). ["An annotated list of 53 taxa collected at 22 localities is given. The record of *Agrionemis cf. femina* confirms the occurrence of the taxon on the island and raises the question of the taxonomic treatment of the *A. femina* species/subspecies complex. For the endemic *Drepanosticta brincki* Lieft, known previously only from the type series, information additional to the original description is provided. Interesting new records of the endemic *Elatoneura bigemmata* Lieft., known only from the holotype male, are also presented. The allotype female is described and figured for the first time, and information additional to that in the original description of the male is given. Larval records of male of the 18 recorded endemic taxa, namely *Heliogomphus sp.*, *Paragomphus henryi* (Laidl.) and *Epophtalmia vittata cyanocephala* Hag., are briefly discussed. A general analysis of the species phenology has shown that, in the "dry season" between January and March, the adults of most endemic odon. spp. of the Platystictidae, Gomphidae, and Corduliidae are absent."] Address: Bedjanic, M., Fram 117/A, SI-2313 Fram, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

4693. Castro, B.; Colombi, S.D.; Flores, E.; Nery, L. (2002): Aplicación del biolarvívico *Bacillus sphaericus*-2362 (GRISELESF) para el control de la Malaria en un área de salud de la República de Honduras. Revista Cubana de Medicina Tropical 54(2): 134-141. (in Spanish, with English summary). ["The results of the application of biolarvívico *Bacillus sphaericus*-2362 (GRISELESF) for the reduction of larval densities of *Anopheles albimanus* as the impact on the epidemiological situation of the disease in health area 2, Sanitary Region 1 of the Ministry of Health Care of Honduras. The biolarvívico was applied in 1999 in five health units which were the most affected by this tropical disease (Ojo del Agua, Villa de San Francisco, San Juan de Flores, Moroceli and El Jicarito). The dose used was 10 ml per square meter of effective breeding area; larval densities were estimated during biological pre- and post-treatment phases. The product showed 100 % effectiveness and a lasting effect up to four months after treatment in the 11 monitored breeding sites. This entomological impact led to a significantly statistical reduction (p *Anopheles albimanus* larva-eating fish and insects (Coleóptera, Hemiptera and Odonata). The satisfactory entomological and epidemiological results in this health area allowed recommending this biological method as part of the comprehensive programs for the control of malarial vectors in the Republic of Honduras." (Authors)] Address: <http://scielo.sld.cu/pdf/mtr/v54n2/mtr09202.pdf>

4694. Chitra, N.; Gunathilagaraj, K.; Soundararajan, R.P. (2002): Habitat selection for oviposition by *Pantala flavescens* (Fab.) (Libellulidae: Odonata). Zoos' Print Journal 17(2): 957-958. (in English). ["The dragonfly *Pantala flavescens* (Fab) was observed for its habitat selection for oviposition in wetland simulated condition as well as in the wetlands at the Tamil Nadu Agricultural University, Coimbatore. These dragonflies preferred paddy fields with exposed water surfaces to fields with crop cover. The maximum number of dragonflies observed were between 0900 and 1200hr. Oviposition in

female dragonflies were observed to be held by the male. The eggs were deposited randomly on water surface. The oviposition was more during months of June and July while the adult emergence were more in August." (Authors)] Address: not stated

4695. Craves, J.A.; O'Brien, D.S. (2002): *Ischnura hastata* (Odonata: Coenagrionidae): new for Michigan. The Great lakes Entomologist 35(2): 117-119. (in English). [17-VIII-2002; "An adult male was collected at an old quarry in Ives Road Fen Preserve, Lenawee County, Michigan; and a small population was found at a new development site in Wayne County, Michigan." (Authors)] Address: O'Brien, D.S., Rouge River Bird Observatory, Environmental Interpretive Center, University of Michigan-Dearborn, Dearborn, MI 48128, USA

4696. Dittmann, C. (2002): Das Naturschutzgebiet "Schwanheimer Düne" in Frankfurt am Main: eine Effizienzkontrolle. Hess. Faun. Briefe 21(2/3): 27-47. (in German, with english summary). [Hessia, Germany; to assess the effort of management measures realized between 1990 and 1999, a selected fauna was surveyed in 2000. 18 odonate species were recorded, a species turn-over was observed, but in the sum the measures were assessed as positive from the odonatological point of view.] Address: Dittmann, C., Niedwiesenstr. 35, D-60431 Frankfurt a.M., Germany

4697. Domingo Calabuig, J. (2002): Un segle d'evolució de l'Albufera de València a través de la seua odonofauna (Insecta, Odonata): espècies perdudes i noves. Dugastella 3: 21-27. (in Spanish with English summary). [The development of the odonate fauna in the Albufera Nature Reserve, Spain in the last hundred years is studied behind the background of landscape and environmental changes. Studying the available entomological publications (1916 ff.) allowed to detect the local extinction of some species, the establishment of lentic-adapted species without specific ecological requirements as well as two new species for the Comunidad Valenciana Odonata checklist: *Orthetrum trinacria* and *Brachythemis leucosticta*.] Address: Domingo Calabuig, J. D., Laboratori d'Entomologia, Institut Cavanilles de Biodiversitat i Biologia Evolutiva (Universitat de València), Apartat Oficial 2085. 46071 València, Spain. E-mail: jordi.domingo@uv.es

4698. Gaunt, M.W.; Miles, M.A. (2002): An insect molecular clock dates the origin of the insects and accords with palaeontological and biogeographic landmarks. Mol. Biol. Evol. 19(5): 748-761. (in English). ["A unified understanding of >390 Myr of insect evolution requires insight into their origin. Molecular clocks are widely applied for evolutionary dating, but clocks for the class Insecta have remained elusive. We now define a robust nucleotide and amino acid mitochondrial molecular clock encompassing five insect orders, including the Blattaria (cockroaches), Orthoptera (crickets and locusts), Hemiptera (true bugs), Diptera, and Lepidoptera (butterflies and moths). Calibration of the clock using one of the earliest, most extensive fossil records for insects (the early ancestors of extant Blattaria) was congruent with all available insect fossils, with biogeographic history, with the Cambrian explosion, and with independent dating estimates from Lepidopteran families. In addition, dates obtained from both nucleotide and amino acid clocks were congruent with each other. Of particular interest to vector biology is the early date of

the emergence of triatomine bugs (99.8-93.5 MYA), coincident with the formation of the South American continent during the breakup of Gondwanaland. More generally, we reveal the insects arising from a common ancestor with the Anostraca (fairy shrimps) at around the Silurian-Ordovician boundary (434.2-421.1 MYA) coinciding with the earliest plant megafossil. We explore Tilyard's theory proposing that the terrestrial transition of the aquatic arthropod ancestor to the insects is associated with a particular plant group (early vascular plants). The major output of the study is a comprehensive series of dates for deep-branching points within insect evolution that can act as calibration points for further dating studies within insect families and genera." (Authors)] Address: Gaunt, M.W., Pathogen Molecular Biology and Biochemistry Unit, Department of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, Keppel Street, Street, London WC1E 7HT. E-mail: michael.gaunt@lshtm.ac.uk

4699. Gillett, M.P.T.; Gillett, C.P.D.T. (2002): A winter survey of insects and other terrestrial invertebrates on marawah Island, Abu Dhabi. *Tribulus* 12(2): 12-19. (in English). [United Arab Emirates, 27-29-XII-1998; *Anax ephippiger*, *Pantala flavescens*.] Address: Gillett, M., Dept Biochemistry, FMHS, UAE University, P.O. Box 17666, Al Ain, U.A.E. E-mail: M.gillet@uaeu.ac.ae

4700. Hawking, J.H.; Theischinger G. (2002): The larva of *Orthetrum balteatum* LIEFTINCK (Odonata: Libellulidae). *Linzer Biologische Beiträge* 34(2): 1511-1514. (in English). ["The supposed larva of *Orthetrum balteatum* LIEFTINCK is described from the Northern Territory, Australia, and compared with the other Australian species of *Orthetrum* NEWMAN." (Authors)] Address: Hawking, J.H., Cooperative Research Centre for Freshwater Ecology, Murray Darling Freshwater Research Centre, P.O. Box 921, Albury, NSW, 2640, Australia

4701. Heidemann, C. (2002): Kommentierte Libellen-Artenliste. *Bioökologische Exkursion Nordostbrandenburg SS 2002*: 35-38. (in German). [Brandenburg, Germany, summer 2002; 6 odonate species are briefly commented on.] Address: www.uni-muenster.de/Landschaftsoekologie/agbioz/Lehre/Protokoll22002.pdf

4702. Keats, R.A.; Osher, L.J.; Neckles, H.A. (2002): The effect of nutrient loading on an estuarine food web: A stable isotope approach. *Ecological Society of America Annual Meeting* s 87: 176. (in English). [Verbatim: Coastal ecosystems worldwide face increased nutrient enrichment from shoreline and watershed development and atmospheric pollution. Our research formed part of a larger study by the US Geological Survey of the relationship between watershed development and ecosystem integrity within a small estuary dominated by the submerged macrophyte *Ruppia maritima* (widgeon grass) in Acadia National Park, Maine. We used a stable isotope approach to characterize the natural faunal community of the estuary and to determine the response of dominant estuarine consumers to nutrient enrichment using existing *in situ* experimental mesocosms. The estuarine faunal community is dominated by brackish water invertebrates including midge larvae (Chironomidae), oligochaetes, damselfly larvae (*Enallagma* sp.), amphipods (*Gammarus* sp.), ostracods, and water boatmen (*Trichocorixa* sp.), and fish (*Fundulus* sp.). Experimental nutrient additions changed the community

of primary producers, with losses of *R. maritima* and increases in epiphytic and planktonic algae. Although increased nutrients did not significantly alter total invertebrate abundance and diversity, higher nutrient mesocosms had reduced densities of chironomids and greater densities of oligochaetes. Assessment of food web structure using stable isotopes showed a dependence of consumers on epiphytic algae and terrestrial detrital pools under both natural and enriched conditions. *R. maritima* and epiphytic algae were more enriched in $\delta^{15}\text{N}$ and *R. maritima* was more depleted in $\delta^{13}\text{C}$ in the enriched mesocosms. Experimental nutrient loading altered the composition and structure of the natural community in this estuary.] Address: Keats, Rachel, University of Maine-Orono, Orono, ME USA

4703. Matushkina, N.O.; Khrokalo, L.A. (2002): Identification key of the Ukrainian dragonflies: the larvae and the exuviae. Kyiv: Phytosociocentrum. ISBN 966-7938-64-6: 72 pp. (in Ukrainian). Address: Matushkina, Natalia, Department of Zoology, Biological faculty, Kyiv National Taras Shevchenko University, Ukraine. E-mail: matushkina@list.ru pr. Glushkova 2, b. 12, K680 Kyiv, Ukraine

4704. Moan, J.L.; Marks, J.C.; Williamson, C.; Leroy, C.J. (2002): The effect of elevated atmospheric CO_2 on in-stream cottonwood decomposition and detritivore assemblages. *Ecological Society of America Annual Meeting* s 87: 215. (in English). [Verbatim: Leaf litter is an important allochthonous energy source for stream ecosystems. It has been shown in previous studies that elevated atmospheric CO_2 can reduce leaf litter quality by increasing C:N ratios. We studied how elevated atmospheric CO_2 affects in-stream decomposition and detritivore assemblages. In this experiment, leaves from two species of cottonwoods, *Populus fremontii* and *P. angustifolia*, grown in greenhouse chambers under elevated and ambient CO_2 were collected and placed in litterbags in Beaver Creek, Arizona. Leaves grown in elevated CO_2 showed a significantly slower decomposition than those grown in ambient conditions during the first harvest (7 days), but not for subsequent harvests. Significantly slower decomposition was observed for *P. angustifolia* for all four harvests. This suggests that although atmospheric CO_2 may have an effect on early stages of leaf litter decomposition, three species has a greater overall effect. Over time, invertebrate abundance paralleled decomposition rates with significantly more invertebrates found on *P. fremontii* leaves over *P. angustifolia*. Invertebrate species richness increased in all treatments over time and the invertebrate assemblage shifted from dominance by chironomids to increased abundances of caddisflies and odonates.] Address: Moan, Jaina, Northern Arizona University, Flagstaff, AZ USA

4705. Rodrigues da Silva, E.; Jaffe, K. (2002): Expanded food choice as a possible factor in the evolution of sociality of Vespidae (Hymenoptera). *Sociobiology* 39(1): 1-12. (in English). ["A recent theory suggests that economic considerations are more important than genetic ones in the emergence and maintenance of social behavior. Evolution of social behavior in wasps, thus, could be based on the development of worker castes, which increase the efficiency of brood care and energy use of the colony. If so, social wasps should collect a larger range of prey, favoring polyethism, as social behavior should increase the adaptive value of social spe-

cies among wasps by increasing the range of prey accessible. We explored the literature and showed that the Eumeninae, which are mostly solitary, draw prey from significantly fewer orders of arthropods than wasps in the subfamily Vespinae and Polistinae, which are mainly social, supporting the hypothesis that social behavior may have emerged as a more efficient way to feed and care for the young by opening a wider range of food sources, increasing the amount of food and quality of care provided to the young. Two alternative explanations of this data are also discussed." (Authors) Odonata are listed as prey for several species of Vespinae and Polistes wasps.] Address: Rodrigues da Silva, E., UNESP, Instituto de Biociências, Departamento de Zoologia, C.P. 199, Rio Claro, Brazil. E-mail: ersilva@rc.unesp.br

4706. Schoeppner, N.M.; Relyea, R.A. (2002): You are what you eat: How prey discriminate among predator diets. Ecological Society of America Annual Meeting s 87: 258. (in English). [Verbatim: The evolution of predator-induced plasticity requires reliable environmental cues that convey information about predation risk. Many aquatic organisms rely on chemical cues (produced during predation events) for making phenotypic decisions and these cues differ when predators consume different prey diets. It has been hypothesized that prey should exhibit strong anti-predator responses when predators consume closely-related species but weak responses when predators consume distantly-related species (termed the "phylogenetic hypothesis"). However, tests of this hypothesis typically only include the extreme end points predators eating prey from the same species or prey from a different phylum. We reared three tadpole species (*Hyla versicolor*, *Rana sylvatica*, and *Rana catesbeiana*) in the presence of caged dragonflies (*Anax junius*) fed one of ten diets and quantified tadpole activity. The diets spanned a range of phylogenetic relatedness to include different species, different genera, different families, different orders, and different phyla. We found that while all three tadpole species could discriminate among predator diets, there was poor support for the phylogenetic hypothesis. The more distantly-related diets did not consistently produce weaker responses than the more closely-related diets in the target species. These results suggest that the chemical cues released during the predation event provides specific information about the species being consumed and that the recognition of this signal by other species is not determined solely by phylogenetic relatedness.] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

4707. Schwarz, D. (2002): Gedichte: Wenn Libellen weinen. Verlag Neue Literatur. ISBN 3-934141-46-3: 79 pp. (in German). [Book with poems, two of them with brief reference to dragonflies.]

4708. Srivastava, D.S. (2002): Trophic diversity, habitat complexity and ecosystem function: Complex linkages in bromeliad insect communities. Ecological Society of America Annual Meeting s 87: 272. (in English). [Verbatim: Biodiversity loss often begins at the top level of food webs and flows down, causing concomitant loss of trophic levels. Furthermore, biodiversity loss is frequently caused by habitat changes (i.e. change in amount, type, or heterogeneity). Therefore, two questions are key to understanding the effects of species loss

on ecosystem functions: (1) What is the effect of trophic diversity on ecosystem function? (2) How does trophic diversity interact with habitat changes to affect ecosystem function? These questions were examined using an aquatic insect food web in Costa Rican bromeliads. Bromeliads trap both water and detritus, and this detritus is consumed by larvae of many insect species. The rate of detrital processing by insects was examined as a critical ecosystem function for this system. All detritivore insects are preyed upon by nymphs of a single damselfly species. I examined detrital processing in bromeliads with and without this predatory trophic level. Bromeliads also vary substantially in structure, with high structural complexity (many bromeliad leaves dividing up a volume of water) or lower degrees of complexity (fewer bromeliad leaves per volume of water). The linkages between trophic diversity, habitat complexity and ecosystem function are surprisingly complex in this system. High habitat complexity decreases foraging efficiency of the detritivores (reducing detrital processing), but also reduces predation rates by damselfly nymphs, which indirectly increases detrital processing. Whether not these two effects cancel each other out depends on the equilibrium abundance of insects; that is the relative rate at which insects pupate and leave the bromeliad versus the rate at which new insects enter the bromeliad through oviposition. Increasing habitat size dampens these effects of habitat complexity.] Address: Srivastava, Diane, Dept of Zoology, University of British Columbia, 6270 University Boulevard, Vancouver, B.C., Canada V6T 1Z4. E-mail: srivast@zoology.ubc.ca

4709. Sunahara, T.; Ishizaka, K.; Mogi, M. (2002): Habitat size: a factor determining the opportunity for encounters between mosquito larvae and aquatic predators. Journal of Vector Ecology 27(1): 8-20. (in English). ["Occurrence patterns of mosquito immatures and insect predators in containers of various sizes were surveyed in summer (June-July) and autumn (September) of 1998 in a rural area of Saga, southwestern Japan. Mosquitoes were categorized into three types in relation to habitat size. First, *Aedes* (*Stegomyia*) spp. and *Tripteroides bambusa* occurred mostly in small containers of < 0.1 m². Second, *Ae. japonicus* and *Culex kyotoensis* occurred in larger container sizes, compared with the first group. Third, *Cx. tritaeniorhynchus* and *Anopheles sinensis* occurred in rice fields in summer and in large containers in the autumn. Predators such as Notonectidae, Anisoptera nymphs, and *Chaoborus* sp. and a predaceous mosquito *Cx. halifaxii* occurred mainly in large (D0.1 m²) containers. The mosquitoes of the third group showed similarities with predators in the occurrence of each habitat type, and they frequently co-occurred with predators. The mosquitoes of the first group showed less similarity with predators in habitat type preference, and they rarely co-occurred with predators. The second group mosquitoes showed intermediate patterns of the first and the third groups." (Authors)] Address: Sunahara, T., Division of Parasitology, Dept of Microbiology, Saga Medical School, Nabeshima 5-1-1 Saga 849-8501, Japan

4710. Vance, H.D.; Soluk, D.A. (2002): Evaluating the prevalence of non-additivity for multiple predator species in aquatic systems. Ecological Society of America Annual Meeting s 87: 288. (in English). [Verbatim: Understanding whether the consumption rates of two different predator species in isolation can be summed together to predict the consumption rate when those

predator species are present simultaneously has widespread implications. Some studies have shown that the observed consumption rates match the predictions of a null model of additivity (an additive outcome) while other studies show that the observed and predicted values differ dramatically (a non-additive outcome). We address the question of how prevalent additive interactions are in comparison to non-additive interactions and discuss when additivity and non-additivity may occur. We measured the consumption of mayfly larvae (*Isonychia* sp.) under conditions of varying predator density and species composition in artificial stream tanks. Two predatory invertebrates, dragonfly larvae (*Boyeria vinosa*) and hellgrammites (*Corydalus cornutus*), and two fish, greenside darters (*Etheostoma blennioides*) and creek chubs (*Semotilus atromaculatus*) were used. The consumption of every two-predator species combination was monitored in the same controlled experimental conditions. Out of six interspecific combinations of two predator species, only one combination demonstrated even a trend toward non-additivity. The low occurrence of non-additivity observed in this study suggests the possibility that predicting the outcome of multiple predator species interactions may be easier than previously thought.] Address: Vance, Heather, University of Illinois, Urbana, IL USA

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4711. Ackerman, J.; Galloway, T.D. (2003): Odonata larvae in urban retention ponds in Winnipeg, Manitoba, Canada. *Proceedings of the Entomological Society of Manitoba* 59: 5-15. (in English). ["We assessed the diversity of Odonata larvae in retention ponds, a prevalent but unexplored aquatic habitat in many cities. Ten storm water retention ponds in Winnipeg were sampled for larval Odonata during the 2001 summer season. Twenty-two species were collected. Six species were common in four or more ponds: *Anax junius*, *Sympetrum costiferum*, *Lestes unguiculatus*, *Enallagma hageni*, *E. ebrium* and *E. civile*. Of the other species found, only one specimen each of 10 species was collected. There appeared to be fewer species and fewer individuals of each species in ponds where vegetation control practices had been applied. No juvenile Odonata were found in ponds where carp were present. *Anax junius* was most abundant in ponds with emergent vegetation. However, in one pond where there had been no vegetation control and where there was no emergent vegetation, the greatest number of species was collected." (Authors)] Address: Ackerman, J., 500 Camden Place, Winnipeg, Manitoba, Canada R3G 2V7. E-mail: joeackerman@hotmail.com

4712. Adelman, T.L.; Bialek, W.; Olberg, R.M. (2003): The information content of receptive fields. *Neuron* 40(4): 823-833. (in English). ["The nervous system must observe a complex world and produce appropriate, sometimes complex, behavioral responses. In contrast to this complexity, neural responses are often characterized through very simple descriptions such as receptive fields or tuning curves. Do these characterizations adequately reflect the true dimensionality reduction that takes place in the nervous system, or are they merely convenient oversimplifications? Here we address this question for the target-selective descending neurons (TSDNs) of the dragonfly (*Aeshna canadensis*).

Using extracellular multielectrode recordings of a population of TSDNs, we quantify the completeness of the receptive field description of these cells and conclude that the information in independent instantaneous position and velocity receptive fields accounts for 70%-90% of the total information in single spikes. Thus, we demonstrate that this simple receptive field model is close to a complete description of the features in the stimulus that evoke TSDN response." (Authors)] Address: Adelman, T.L., Department of Molecular Biology, Princeton University, Princeton, NJ, 08544, USA. E-mail: tadelman@princeton.edu

4713. Adeniyi, A.A.; Idowu, A.B.; Okedeyi, O.O. (2003): Levels of cadmium, chromium and lead in dumpsites soil, earthworm (*Lybrodrius violaceous*), housefly (*Musca domestica*) and dragon fly (*Libellula luctosa*). *Pakistan Journal of Scientific & Industrial Research* 46(6): 452-456. (in English). ["Chemical analyses of cadmium, chromium and lead in dumpsites soil, earthworm (*Lybrodrius violaceous*), housefly (*Musca domestica*) and *Libellula luctosa* were performed by atomic absorption spectrophotometry to estimate the degree of metal pollution in two Lagos dumpsites located at Iba Housing Estate (dumpsite A) and Soluos along LASU - Isheri road (dumpsite B). Soil pH and moisture content were also determined. Chromium was not detected (ND) in most of the samples except in the soil samples whose mean and standard deviation (SD) were 0.43 +/- 0.37 µg/g and 0.23 +/- 0.37 µg/g, respectively for dumpsites A and B, and the earthworm samples harvested from dumpsite B (1.00 +/- 1.41 µg/g). The cadmium levels were 4.00 +/- 3.16 µg/g and 7.50 +/- 6.37 µg/g for earthworm; 2.86 +/- 1.43 µg/g and 4.29 +/- 3.74 µg/g for housefly, 0.75 +/- 1.26 µg/g and 1.25 +/- 0.95 µg/g for dragonfly, respectively for dumpsites A and B. However, the concentration of lead in the invertebrates were, 130.00 +/- 112.58 µg/g and 105.75 +/- 94.44 µg/g for earthworm; 145.71 +/- 101.87 µg/g and 225.71 +/- 79.31 µg/g for housefly; 165.00 +/- 69.78 µg/g and 85.00 +/- 69.73 µg/g for dragonfly respectively for dumpsites A and B. Cadmium and lead levels were found to be higher in the invertebrates harvested from the dumpsites than those collected from the non-dumpsites. The non-dumpsite values for cadmium were 1.24 +/- 0.94 µg/g, 0.45 +/- 0.56 µg/g and 0.38 +/- 0.14 µg/g for earthworm, housefly and dragonfly, respectively. Similarly, the non-dumpsite lead levels for earthworm, housefly and dragonfly were 23.12 +/- 10.11 µg/g, 20.75 +/- 11.85 µg/g and 33.62 +/- 14.95 µg/g, respectively." (Authors)] Address: Adeniyi, A., Dept Chem Sci, Univ Lagos, PMB 1087, Lagos, Nigeria. E-mail: lekeadeniyi@yahoo.com

4714. Albertoni, E.F.; Palma-Silva, C.; de Assis Esteves, F. (2003): Natural diet of three species of shrimp in a tropical coastal lagoon. *Brazilian Archives of Biology & Technology* 46(3): 395-403. (in English). ["The gut content of 495 specimens of *Farfantepenaeus brasiliensis*, 131 of *F. paulensis* (Penaeidae) and 102 of *Macrobrachium acanthurus* (Palaemonidae) were analyzed to establish the composition of their diets. *F. brasiliensis* had as the most important feeding items in its diet larvae of Chironomidae, Polychaeta and *Heleobia australis* (Mollusca). For *F. paulensis*, the most important items were the same as for *F. brasiliensis*, but the order of importance of *H. australis* and Polychaeta was inverted. *M. acanthurus* had detritus as the most important item, followed by Chironomidae larvae, Odonata

nymphs, and fragments of the macroalgae *Chara*. The results showed that the three species were omnivorous, with a varied diet including both components of macrofauna of benthos and associated to the macroalgae *Chara* and plant fragments and detritus." (Authors)] Address: Albertoni, Edelti, Departamento de Ciencias Morfo-Biologicas; Laboratorio de Ecologia, Fundacao Universidade Federal do Rio Grande, Av. Italia Km 8, Campus Carreiros, 96201-900, Rio Grande, RS, Brazil

4715. Asaithambi, M.; Manickavasagam, S. (2003): Effect of habitat manipulation on population density of odonates in paddy ecosystem. *Entomon* 28(2): 147-152. (in English). ["Trials were conducted in a Paddy field to study the effect of habitat manipulation on the population density of odonates. The field was divided into direct sown and transplanted paddy and each was further subdivided into weeded and anweeded plots. Population of both damselfly and dragonfly naiads were counted in one m² in each plot. Results revealed that the direct sown paddy plot harboured more damselfly population than transplanted paddy plot while the dragonfly population was high in transplanted plot than in direct sown plot. Odonate population increased gradually with monsoon and declined during dry weather." (Authors)] Address: Manickavasagam, S., Department of Entomology, Faculty of Agriculture, Annamalai University, Annamalaiagar, TN, 608002, India

4716. Bazzanti, M.; Della Bella, V.; Seminara, M. (2003): Factors affecting macroinvertebrate communities in astatic ponds in central Italy. *Journal of Freshwater Ecology* 18(4): 537-548. (in English). ["Twenty astatic ponds near Rome were studied in order to define the relationships between physicochemical variables and macroinvertebrate communities. The main abiotic factor differentiating the ponds was the annual hydrologic cycle. Depth, surface area, and sand percentages in the sediment were higher in permanent ponds, whereas silt+clay content was higher in temporary ones. No difference was recorded in pH, conductivity and oxygen content in the water or organic matter in the sediments between the two pond types. Three main ecological assemblages were distinguished: a) generalist taxa common to both pond types; b) taxa associated with and adapted to temporary ponds; and c) taxa which seemed to prefer permanent ponds. Overall, there was no relationship between number of taxa and surface area, except for Odonata and aquatic macrophytes. A positive correlation was observed between number of macrophyte species and macroinvertebrate taxa richness, and particularly of odonates and chironomids, suggesting that an increase in aquatic vegetation species leads to an increase in microhabitats and suitable food, substrate, and/or refuge from predators. Odonata seemed also to prefer more stable and sunny ponds." (Authors)] Address: Bazzanti, M., Dept. Animal & Human Biology, Univ. "La Sapienza", viale dell'Universita 32, 00185, Rome, Italy. E-mail: marcello.bazzanti@uniroma1.it

4717. Bohonak, A.J.; Jenkins, D.G. (2003): Ecological and evolutionary significance of dispersal by freshwater invertebrates. *Ecology Letters* 6: 783-796. (in English). ["Traditional expectations for how widely and how often freshwater invertebrates disperse differ from empirical data. Freshwater invertebrates have been characterized as frequent, widespread dispersers, particularly those that are transported passively. Our re-

view finds that this characterization may describe the potential for dispersal in some taxa, but it is not an accurate generalization for actual dispersal rates. High variance among habitats and taxonomic groups is a consistent theme. Advances in population genetics may help resolve these issues, but underlying assumptions should be carefully tested. Further, even unbiased estimates of gene flow may not equate with individual movement, because not all dispersers survive and reproduce. Some freshwater invertebrates may exist in classic Levins metapopulations. However, other species fit into a broader metapopulation definition, where temporal dispersal via diapause is functionally equivalent to spatial dispersal. In the latter case, local extinctions and rescue effects may be rare or absent. Finally, limited dispersal rates in many taxa suggest that theories of freshwater community assembly and structure can be made more robust by integrating dispersal and local processes as joint, contingent regulators. Recent research on freshwater invertebrate dispersal has substantially advanced our basic and applied understanding of freshwaters, as well as evolutionary ecology in general." (Authors)] Address: Bohonak, A.J., Dept of Biology, San Diego State University, 5500 Campanile Drive, San Diego, CA 92182-4614, USAE-mail: bohonak@sciences.sdsu.edu

4718. Buden, D.W.; Paulson, D.R. (2003): The odonata of Kosrae, Eastern Caroline Islands, Micronesia. *Pacific Science* 57(4): 399-407. (in English). ["A recent collection of 69 specimens together with survey counts and incidental observations during June-July 2002 provide new information on the odonate fauna of Kosrae, Micronesia. The fauna comprises one zygopteran (*Ischnura aurora*) and six anisopterans. It appears to have remained stable with no known extinctions or colonizations over the past half century. The fauna is nearly a subset of that of Pohnpei and the islands to the west, and it comprises six widespread weedy species and one endemic, *Hemicordulia erico*. Upland aquatic habitats appear largely unexploited or underutilized by odonates, and the absence of any *Teinobasis* species on Kosrae is in marked contrast to the presence of six species on the nearest high island, Pohnpei." (Authors)] Address: Buden, D.W., Division of Science and Mathematics, College of Micronesia-FSM, Kolonia, P.O. Box 159, Pohnpei, FM 96941, Micronesia. E-mail: donbuden@comfsm.fm

4719. Burwell, C.J.; Theischinger, G. (2003): New distribution records and notes on the larva of *Urothemis aliena selys* (Odonata: Urothemistidae). *Australian Entomologist* 30(2): 57-64. (in English). ["The distribution of *U. aliena* Selys in Australia is presented, based primarily on specimens in Australian insect collections. Specimens collected at two SE Queensland localities, Enoggera Reservoir and Birkdale, extend its known range by almost 1000 km to the south-east. *U. aliena* is recorded for the first time from Cape York Peninsula in northern Queensland. The final instar larval exuviae of *U. aliena* is illustrated and diagnostic features are provided." (Authors)] Address: Burwell, C.J., Higher Entomology Section, Queensland Museum, PO Box 3300, South Brisbane, Qld, 4101, Australia

4720. Campbell, L.M.; Hecky, R.E.; Wandera, S.B. (2003): Stable Isotope Analyses of food web structure and fish diet in Napoleon and Winam Gulfs, Lake Victoria, East Africa. *J. Great Lakes Res.* 29 (Supplement 2):

243-257. (in English). ["The food web structures in Napoleon and Winam gulfs, Lake Victoria, were characterized using stable nitrogen and carbon isotope analyses. Similar biota in Napoleon Gulf had significantly lighter $\delta^{15}\text{N}$ values and heavier $\delta^{13}\text{C}$ values than similar biota in Winam Gulf, indicating different basal isotopic values. In both gulfs, Nile perch (*Lates niloticus*) was the top trophic predator while Nile tilapia (*Oreochromis niloticus*) was littoral and feeding at lower trophic levels. *Rastrineobola argentea* and *Yssichromis laparograma* had surprisingly high $\delta^{15}\text{N}$ values, close to those of Nile perch, which were not consistent with the high isotopic values of their assumed zooplankton prey. *Caridina nilotica*, a freshwater shrimp, had a wide range of $\delta^{13}\text{C}$ values but low $\delta^{15}\text{N}$ values, consistent with their appearance in nearly all habitants in the lake, and their presence in the stomachs of most fish species. Nile perch showed an increase in $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values with size, signifying that piscivory increases and their dietary reliance on invertebrates decreases as they mature. Stable isotope values for Napoleon Gulf biota which were adjusted for different basal values were not statistically different from those of Winam Gulf biota, suggesting that stable carbon and nitrogen isotopes fractionate consistently through trophic transfers in Lake Victoria. The stable isotope data illustrate a short food web, with the top predator Nile perch feeding on a restricted set of fish and macroinvertebrate species (including Odonata), including its own young." (Authors)] Address: Campbell, Linda, Canada Centre for Inland Waters, Environment Canada, 867 Lakeshore Rd, Burlington, Ontario L7R 4A6. E-mail: lmcampbe@ec.gc.ca

4721. Chahl, J.; Thakoor, S.; Le Bouffant, N.; Stange, G.; Srinivasan, M.V.; Hine, B.; Zornetzer, S. (2003): Bioinspired engineering of exploration systems: A horizon sensor/attitude reference system based on the dragonfly ocelli for Mars exploration applications. *Journal of Robotic Systems* 20(1): 35-42. (in English). ["Bio-inspired engineering of exploration systems (BEES) is a fast emerging new discipline. It focuses on distilling the principles found in successful, nature-tested mechanisms of specific crucial functions that are hard to accomplish by conventional methods, but are accomplished rather deftly in nature by biological organisms. The intent is not just to mimic operational mechanisms found in a specific biological organism but to imbibe the salient principles from a variety of diverse organisms for the desired crucial function. Thereby, we can build exploration systems that have specific capabilities endowed beyond nature, as they will possess a mix of the best nature-tested mechanisms for each particular function. Insects (for example, honey bees and dragonflies) cope remarkably well with their world, despite possessing a brain that carries less than 0.01% as many neurons as ours does. Although most insects have immobile eyes, fixed focus optics, and lack stereo vision, they use a number of ingenious strategies for perceiving their world in three dimensions and navigating successfully in it. We are distilling some of these insect-inspired strategies for utilizing optical cues to obtain unique solutions to navigation, hazard avoidance, altitude hold, stable flight, terrain following, and smooth deployment of payload. Such functionality can enable access to otherwise unreachable exploration sites for much sought-after data. A BEES approach to developing autonomous flight systems, particularly in small scale, can thus have a tremendous impact on autonomous airborne navigation of these biomorphic flyers particularly for

planetary exploration missions, for example, to Mars which offer unique challenges due to its thin atmosphere, low gravity, and lack of magnetic field. Incorporating these success strategies of bioinspired navigation into biomorphic sensors such as the horizon sensor described herein fulfills for the first time the requirements of a variety of potential future Mars exploration applications described in this paper. Specifically we have obtained lightweight (6 g), low power (<40 mW), and robust autonomous horizon sensing for flight stabilization based on distilling the principles of the dragonfly ocelli. Such levels of miniaturization of navigation sensors are essential to enable biomorphic microflyers (<1 kg) that can be deployed in large numbers for distributed measurements. In this paper we present the first experimental test results of a biomorphic flyer platform with an embedded biomorphic ocellus (the dragonfly-inspired horizon sensor/attitude reference system). These results from the novel hardware implementation of a horizon sensor demonstrate the advantage of our approach in adapting principles proven successful in nature to accomplish navigation for Mars exploration." (Authors) For more details see: www.people.nas.nasa.gov/~aftosmis/publications/beesaiaa2004-6274.pdf Address: Chahl, J., Defence Science and Technology Organization Adelaide, Australia and Australian National University, Canberra, Australia

4722. Chase, J.M. (2003): Strong and weak trophic cascades along a productivity gradient. *Oikos* 101: 187-195. (in English). ["Variation in the strengths of predator effects, although commonly observed in natural communities, and predicted from theoretical models, remains poorly understood in the study of food web interactions and community structure. In this study, I first showed that prey species in benthic pond food webs were highly variable in their susceptibility to predators. Some were vulnerable throughout their lives, whereas others were vulnerable as juveniles, but able to grow to a size-refuge. Next, I showed that herbivore and predator abundance increased along a natural productivity gradient among 29 ponds, and herbivore species composition shifted from dominance by vulnerable to dominance by invulnerable herbivore species along this gradient. However, there was a considerable amount of variation both in herbivore biomass and composition at intermediate productivity; some were dominated by small species and others by larger species. Finally, in situ enclosure experiments, I found that predator effects were strong and cascaded to plants in a low productivity pond and in an intermediate productivity pond dominated by small herbivore species. Alternatively, in a high productivity pond and in an intermediate productivity pond dominated by larger herbivores, I found that predator effects on prey biomass were weak, and did not cascade to plants." (Author) Michigan, USA, *Erythemis simplicicollis*, *Anax junius*, *Tramea lacerata*, *Ischnura* ssp., *Enallagma* ssp., *Lestidae*] Address: Chase, J.M., Dept Biology, Box 1137, Washington Uni., Saint Louis, MO 63130, USA. E-mail: jchase@biology.2.wustl.edu

4723. Chessman, B.C. (2003): New sensitivity grades for Australian river macroinvertebrates. *Marine and Freshwater Research* 54: 95-103. (in English). ["The SIGNAL biotic index for river macroinvertebrates, originally developed and tested in eastern Australia, was revised for application to the entire continent. Macroinvertebrate survey data from the National River Health Program were used to set grade numbers between 1 and

10 to represent the water-quality sensitivities of 210 taxa (including the Odonata on the family level). Grades were assigned at the taxonomic levels customarily used by government agencies (predominantly family level) and by community groups (mainly order). A new index version using these grades, SIGNAL2, was correlated with water temperature, turbidity, electrical conductivity, alkalinity, pH, dissolved oxygen, total nitrogen and total phosphorus. Because of natural spatial variation in water quality, index scores need to be interpreted in a local context or against site-specific predictions generated by the Australian River Assessment System (AUSRIVAS)." (Author)] Address: Chessman, B.C., Centre for Natural Resources, Department of Sustainable Natural Resources, PO Box 3720, Parramatta, NSW 2124, Australia. Email: bchessman@dlwc.nsw.gov.au

4724. Combes, S.A.; Daniel, T.L. (2003): Flexural stiffness in insect wings I. Scaling and the influence of wing venation. *Journal Experimental Biology* 206: 2979-2987. (in English). ["During flight, many insect wings undergo dramatic deformations that are controlled largely by the architecture of the wing. The pattern of supporting veins in wings varies widely among insect orders and families, but the functional significance of phylogenetic trends in wing venation remains unknown, and measurements of the mechanical properties of wings are rare. In this study, we address the relationship between venation pattern and wing flexibility by measuring the flexural stiffness of wings (in both the spanwise and chordwise directions) and quantifying wing venation in 16 insect species from six orders (including *Aeshna multicolor*, *Pachydiplax longipennis*, *Letes* sp., *Ischnura* sp.). These measurements show that spanwise flexural stiffness scales strongly with the cube of wing span, whereas chordwise flexural stiffness scales with the square of chord length. Wing size accounts for over 95% of the variability in measured flexural stiffness; the residuals of this relationship are small and uncorrelated with standardized independent contrasts of wing venation characters. In all species tested, spanwise flexural stiffness is 1-2 orders of magnitude larger than chordwise flexural stiffness. A finite element model of an insect wing demonstrates that leading edge veins are crucial in generating this spanwise chordwise anisotropy." (Authors)] Address: Combes, S.A., Dept of Biology, University of Washington, Seattle, WA, 98195, USA. E-Mail: scombes@u.washington.edu

4725. Crumrine, P.W. (2003): Examining the role of size structure on intraguild predation in larval odonates. *Ecological Society of America Annual Meeting* s. [cdrom] 88: 76. (in English). [Verbatim: The direction and intensity of intraguild predation (IGP) interactions are heavily influenced by size differences among interacting species. Asymmetric IGP is common when IG predators are larger than IG prey, and many empirical studies on IGP include predators with these relative size relationships. In addition to size differences between species, individuals in most natural populations of predators and prey vary in size, but few studies specifically test how size variation within species influences IGP interactions. The aim of this study was to investigate how IG predator size structure influences the survival and behavior of IG prey and shared prey. I tested for these effects in a larval odonate system by exposing shared prey (*Ischnura verticalis*) to the presence or absence of IG prey (*Pachydiplax longipennis*) and two size classes of IG predators (small or large *Anax junius*) in a 2x2x2

factorial design. Both size classes of *A. junius* significantly decreased *I. verticalis* survival and activity level, but there were no significant effects of *P. longipennis* on *I. verticalis* survival or behavior. *P. longipennis* responded differently to the two size classes of *A. junius*. *P. longipennis* survival was significantly lower when exposed to only the large size class of *A. junius*, and *P. longipennis* also decreased their activity level in the presence of large *A. junius*. Survival of the small size class of *A. junius* was also lower in the presence of large *A. junius*. These results demonstrate that different size classes of IG predators can impose varying levels of risk on IG prey and shared prey, but these effects depend on the assemblage of predators in the system. Within-species size structure adds significant complexity to IGP interactions, and studies incorporating this feature should provide a more complete understanding of how IGP influences community structure] Address: Crumrine, P.W., University of Kentucky, Lexington, KY, USA USA

4726. Gaines, K.H. (2003): Does size really matter? Factors affecting larval odonate diversity patterns in a desert sinkhole complex. *Ecological Society of America Annual Meeting* s. 88. August 3 - 8, 2003. Savannah International Trade & Convention Center, Savannah, Georgia: 116-117. (in English). [Verbatim: The Bitter Lake National Wildlife Refuge in southeastern New Mexico contains an unusual ecological mosaic consisting of desert scrub and grassland surrounding dozens of saline water-filled sinkholes of varying sizes, geomorphologies, and water chemistries. Nearly one hundred species of adult dragonflies and damselflies (Order Odonata) have been collected on the refuge, representing the highest diversity of odonates in the state of New Mexico. In order to characterize the distribution and diversity patterns exhibited by the breeding odonate population, thousands of exuviae (final instar larval exoskeletons) were periodically collected at over thirty sinkholes in 2000, 2001, and 2002. Multivariate analyses of sinkhole dimensions and water quality data revealed that while larger sinkholes did tend to support more diverse larval odonate communities, average winter salinity levels explained nearly 70% of the variation observed in species diversity, as species with broad larval salinity tolerances successfully bred in most sinkholes visited by adults regardless of sinkhole size. In contrast to predictions of island biogeography theory, this study suggests that in certain cases, individual species characteristics (e.g. larval stenotopy) may have a far greater influence on community diversity patterns than does habitat patch size.] Address: Gaines, Karen H., University of New Mexico-Albuquerque, Albuquerque, NM, USA. E-mail: kgaines@unm.edu

4727. Gassmann, D. (2003): Phylogeny and distribution of the Philippine damselfly subgenus *Risioconemis* (*Igneocnemis*) *Hämäläinen* (Odonata: Platycnemididae). Fritz (ed.): Abstracts of the 6th Annual Congress of the Gesellschaft für Biologische Systematik (GfBS, Society for Biological Systematics). *Org. Divers. Evol.* 3, Electr. Suppl. 17: 20. (in English). [Verbatim: *Risioconemis* Cowley, 1934 is the largest genus of the zygopteran subfamily Calicnemiinae in the Indo-Pacific region. The group is endemic to the Philippines, except for the Sulu Archipelago and the Palawan island chain. Members of the group are confined to small, clear creeks in shady rainforest environment, occurring from lowland up to mid-montane forest. Two subgenera with-

in the genus *Risioenemis* are currently recognized: *Risioenemis* Cowley, 1934 s. str., and *Igneocnemis* Hämäläinen, 1991. A revision of the subgenus *Risioenemis* was presented by Hämäläinen (1991). Mainly based on the large Roland A. Müller collection from the Philippines, which is now housed by the Natural History Museum in Leiden, a complete taxonomic revision of the subgenus *Igneocnemis* has recently been completed by Gassmann & Hämäläinen (2002). In total, 20 species of sg. *Igneocnemis* have been recognized, of which five were newly described. Several putative synapomorphies of *Igneocnemis* species point to the monophyly of the group. However, the monophyly of the whole genus, i.e. *Risioenemis* Cowley sensu lato, is less certain. Within the scope of a phylogenetic-biogeographical study on the Indo-Pacific Platycnemididae, the phylogeny of the *Igneocnemis* species was reconstructed based on morphological characters. The distribution patterns of the species can be explained by Tertiary island arc connections as well as by the existence of larger islands during the Pleistocene. References: Gassmann, D. & Hämäläinen, M. (2002): A revision of the Philippine subgenus *Risioenemis* (*Igneocnemis*) Hämäläinen (Odonata: Platycnemididae). *Tijdschr. Entomol.* 145: 213-266. Hämäläinen, M. (1991): The Philippine genus *Risioenemis* Cowley (Zygoptera: Platycnemididae). 1. Subgenus *Risioenemis*. *Odonatologica* 20: 151-194.] Address: Gassmann, D., Inst. Biol. Leiden, Leiden University, c/o National Museum of Natural History (Naturalis), P.O. Box 9517, NL-2300 RA Leiden, The Netherlands; e-mail: gassmann@naturalis.nnm.nl

4728. Glaser, F.; Mungenast, F.; Sonntag, H. (2003): Bewässerungsteiche als Lebensräume für Amphibien und Libellen am Beispiel der Trams bei Landeck (Tirol, Österreich) - Artenbestand, naturschutzfachliche Bedeutung, Schutz und Erhaltung. *Berichte des Naturwissenschaftlich-Medizinischen Vereins in Innsbruck*. 90: 165-205. (in German, with English summary). ["Trams" near Landeck (Tyrol, Austria) [...] "Regarding the 25, thereof 20 (80%) autochthonous species of dragonflies in the study area, the "Trams" represents an area of high conservation value. Remarkable is the presence of a rich "Erythromma - Anax imperator- assemblage at relatively high altitude. [...] A redundancy analysis shows that vegetation structure and pond area were the most important factors determining distribution of species." (Authors)] Address: Glaser, F., Technisches Büro für Biologie, Gabelsbergerstr. 41, A-6020, Innsbruck, Austria. E-mail: Florian.Glaser@aon.at

4729. Goldschmid, U.; Teuffl, H. (2003): Der Bau des Phönixteiches. Umsetzung eines Ergebnisses des Monitoring-Projektes. *Denisia* 10: 227-241. (in German, with English summary). ["Ponds are very rare in the northern part of Vienna's Danube Island, an artificial building for flood control. The lack of suitable breeding sites become more and more crucial for the population of amphibians in this area. During a three year lasting ecological monitoring it was shown, that specially the populations of species needing open ground and young ponds without a lot of shrubs and trees along the shoreline, are decreasing rapidly. To stop this loss of specimens the Viennese Department for Flood Control and River Engineering built a new big pondsystem, planned by ecologists to suit the needs of amphibians and other animals like dragonflies and birds. It is composed of one large permanent pond and 3 smaller more or less temporary ponds, all in all about 5000 m² large. Because

the ponds have no connection to the ground water, the ponds are sealed with marl. The area is completed by a huge breeding wall for kingfishers (*Alcedo atthis*) and swallows (*Riparia riparia*)." (Authors)] Address: Goldschmid, Ulrike, MA 45 - Wasserbau, Wilhelminenstr. 93, A-1160, Wien, Austria. E-mail: gol@m45.mag-wien.gv.at

4730. Hart, R.C.; Campbell, L.M.; Hecky, R.E. (2003): Stable isotope analyses and demographic responses counter prospects of planktivory by *Caridina* (Decapoda: Atyidae) in Lake Victoria. *Oecologia* 136: 270-278. (in English). ["*Caridina nilotica*, a freshwater atyid prawn, is a vital component of the Lake Victoria ecosystem (Uganda). Despite its important role in the food web leading to Nile perch, the diet of *Caridina* is not well understood. *Caridina* freshly collected from the inshore littoral and offshore plankton of Lake Victoria were cultured individually under laboratory conditions[...]. Stable isotope analyses (SIA, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ signatures) of cultured shrimps were further consistent with their utilization of food type A but not D. SIA signatures of feral shrimps maintained in situ in enclosure bags with three separate potential fresh hydrophyte food sources (*Vossia cuspidata*, *Cyperus papyrus*, and *Eichhornia crassipes*) reflected *Caridina*'s probable dietary reliance on decomposed organic matter with accompanying bacterial exudates. Collections of feral shrimps from various locations yielded parallel SIA results. No support for zooplanktivory by shrimps occupying either inshore littoral/benthic or offshore planktonic habitats is provided by the 15N signatures obtained from our data, which support *Caridina*'s primary role as detritivore" (Authors). Stable isotope values for "Odonata" are given in table 5.] Address: Hart, R.C. School of Botany and Zoology, University of Natal, Private Bag X09, Scottsville, Pietermaritzburg, South Africa. E-mail: hartr@nu.ac.za

4731. Hovmöller, R. (2003): Evolution of pterygote insects. Perspectives on Odonata. www2.nrm.se/en/HovmollerPerspectivesonOdonata.pdf: 19 pp. (in English, with Swedish summary). [For detailed papers see: OAS 11 No. 2966 and OAS 15 No. 4488.] Address: Hovmöller, R., Department of Entomology, Swedish Museum of Natural History, P.O.Box 50007, S-104 05 Stockholm, Sweden. Email: rasmus.hovmoller@nrm.se

4732. Hsin-Chieh Tang; Szu-Lung Chen; Ching-Feng Lin (2003): A preliminary survey of the Odonata fauna (Insecta) at Taipei Zoo, Taipei. *Taipei Zoo Bulletin* 15: 17-30. (in Chinese, with English summary). ["A survey of diversity, distribution, and habitats of the dragonfly and damselfly species (Odonata) was conducted at Taipei Zoo from February 2003 to December 2003. Totally 67 species belonging to 45 genera and 10 families were identified. There are 30 and 10 species of Libellulidae and Aeshnidae, respectively. Forty-six and 44 species were recorded at Ecopark and Adolescent physical training field, respectively. Summer from June to August is the best season to observe dragonflies and damselflies at Taipei Zoo. Lacking of larger and stable streams at Taipei Zoo, very few species inhabiting lotic habitats were founded." (Authors)] Address: Hsin-Chieh Tang, Department of Education, Taipei Zoo, Taipei, Taiwan, R.O.C.

4733. Huang, D.-y.; Nel, A.; Lin, Q.-b. (2003): A new genus and species of aeshnopteran dragonfly from the

Lower Cretaceous of China. *Cretaceous Res.* 24(2): 141-147. (in English). ["*Parapetala liaoningensis* gen. et sp. nov. is described from the Lower Cretaceous of China. It has a very basal position in the clade Aeshnoptera (Odonata. Petalura, Spec. 2 (1996) 402), basal or close to the Upper Jurassic family Mesuropetalidae. This discovery confirms the high diversity of this group of dragonflies during the Late Jurassic-Early Cretaceous, suggesting rapid evolution of this clade in the Early or Middle Jurassic." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

4734. International Commission on Zoological Nomenclature (2003): Liochelidae Fet & Bechly, 2001 (1879) (Scorpiones): Adopted as a valid substitute name for Ischnuridae Simon, 1879 in order to remove homonymy with Ischnurinae Fraser, 1957 (Insecta, Odonata). *Bull. Zoological Nomenclature* 60(2): 159-161. (in English). ["The Commission has ruled that the scorpion family name LIOCHELIDAE Fet & Bechly, 2001 (1879) is to have precedence over ISCHNURIDAE Simon, 1879, which is a homonym of the widely used damselfly name ISCHNURINAE Fraser, 1957 (Odonata). The type genus of LIOCHELIDAE is Liocheles Sundevall, 1833, which is in wide use as the valid senior subjective synonym of the long abandoned name Ischnurus C.L. Koch, 1837 (the type genus of ISCHNURIDAE Simon, 1879). ISCHNURINAE Fraser, 1957 is not to be rejected despite being a junior homonym of ISCHNURIDAE Simon, 1879." (Author)] Address: International Commission on Zoological Nomenclature, Natural History Museum, Cromwell Road, London, SW7 5BD, UK

4735. Jacobsen, D. (2003): Altitudinal changes in diversity of macroinvertebrates from small streams in the Ecuadorian Andes. *Archiv für Hydrobiologie* 158(2): 145-167. (in English). ["Altitudinal patterns in diversity of macroinvertebrate families at different spatial scales (stone, stream and altitude) were studied by collecting stone samples from six streams at each of the three altitudes: lowlands (400 m), midlands (2000 m) and highlands (3800 m), in the equatorial Andes of Ecuador. Stream sites were characterised by a number of physico-chemical parameters and the fauna by several indices of richness, diversity and evenness. A MDS ordination on the composition of the fauna clearly separated the streams in three groups according to altitude. The invertebrate fauna was dominated by insects, mainly Ephemeroptera, Trichoptera and Diptera at all three altitudes. Odonata and Hemiptera were relatively rich in lowland streams, scarcely present in the midland streams and absent in the highland streams (as was the case for the less diverse orders Lepidoptera and Megaloptera). Four of the five measures of stream diversity correlated significantly with altitude and temperature. In addition, seven environmental parameters were correlated with one or more of the diversity measures. Of these parameters, stream width, riparian vegetation cover and coarse detritus cover were inter-correlated with altitude and temperature. With the effect of altitude removed, the number of families, the Jack-knife richness estimate and the evenness were positively correlated with an index of physical stream stability. The effect of region (altitude) explained more of total variability in family richness than that among streams within regions. The mean number of families was 8.2, 4.9 and 4.1 per stone, 26.5, 19 and 13.3 per locality (stream), and 44, 37 and 27 per region at the three alti-

tudes, respectively. Thus, both local and regional richness decreased approximately linearly with increasing altitude. In contrast, beta diversity (taxon turnover among streams) increased with altitude. The higher richness in the lowland streams appeared at the smallest spatial scale (stone), and was therefore not due to higher betadiversity among stones within streams. Local richness was nearly linearly related to regional richness, indicating non-saturated local communities, even in lowland streams." (Author)] Address: Jacobsen, D., Freshwater Biological Laboratory, University of Copenhagen, Helsingorsgade 51, DK-3400, Hillerod, Denmark. E-mail: Djacobsen@zi.ku.dk

4736. Johnson, E.B.; Bierzychudek, P.; Whiteman, H.H. (2003): Potential of prey size and type to affect foraging asymmetries in tiger salamander (*Ambystoma tigrinum nebulosum*) larvae. *Canadian Journal of Zoology* 81(10): 1726-1735. (in English). ["Although competitive interactions within predator populations are known to depend on their size structure, we understand less about how these interactions are influenced by prey characteristics. Most studies of such interactions for *A. tigrinum nebulosum* larvae have used small zooplankton prey. We investigate the potential of exploitation and interference competition to influence the success of tiger salamander larvae feeding on relatively large prey, mayfly and damselfly larvae. We measured salamander foraging efficiency for a range of salamander and prey sizes and observed aggression levels of salamanders of varying size housed together. Exploitative foraging efficiency (captures per attempts) increased with salamander size but was better predicted by relative prey size (prey size as a percentage of salamander snout-vent length) than by salamander size alone; it also depended significantly on prey type. Aggression (interference) levels were higher when prey were present, and larger salamanders were more aggressive than smaller ones but did not consume more mayfly prey. Our results suggest that investigating the environmental conditions, particularly the prey characteristics, that influence size-based competitive advantages will lead to a better understanding of predator population dynamics.] Address: Johnson, E.B., 524 W. 122nd Street, No. 4D, New York, NY, 10027, USA. E-mail: ebj2001@columbia.edu

4737. Johnson, J.B.; Saenz, D.; Adams, C.K.; Conner, R.N. (2003): The influence of predator threat on the timing of a life-history switch point: Predator-induced hatching in the southern leopard frog (*Rana sphenoccephala*). *Canadian Journal of Zoology* 81(9): 1608-1613. (in English). ["We tested the hypotheses that potential egg predators, crayfish *Procambarus nigrocinctus* and dytiscid *Cybister* sp. larvae, would accelerate the timing of hatching and that a larval predator, dragonfly naiad *Anax junius*, would delay hatching in the southern leopard frog (*Rana sphenoccephala*). We also tested the hypothesis that differences in response would be proportional to predator lethality. Our results indicate that our hypotheses were partially supported. The presence of an efficient egg predator (crayfish) induces hatching faster than a less efficient predator (dytiscid larvae). However, the presence of a larval predator (naiads) did not delay hatching. Eggs that developed in the presence of egg predators produced hatchlings that were shorter (total length) than those reared in the presence of larval predators or those reared in the absence of predators. We suggest that earlier hatching

times should decrease vulnerability to egg predators but result in shorter hatchlings." (Authors)] Address: Johnson, J.B., Department of Biology, Stephen F. Austin State University, Nacogdoches, TX, 75961, USA. E-mail: frogjinn@hotmail.com

4738. Jones, C.D. (2003): NHIC participates in the national Odonata assessment workshop. Ontario Natural Heritage Information Centre-Newsletter 8(1): 5-6. (in English). [Winnipeg, Canada, 9-X-2002; this is a brief report on the current situation on mapping the Odonata of Ontario and on assessing the current status of Odonata in their areas.] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

4739. Kirti, J.S.; Singh, A. (2003): Significance of male genitalic structures for differentiating three species of *Trithemis* Brauer (Libellulidae: Anisoptera: Odonata) occurring in India. *Geobios (Jodhpur)* 30(4): 259-264. (in English). [Male accessory genital structures of *Trithemis pallidinervis*, *T. aurora*, and *T. festiva* are described, illustrated and keyed.] Address: Kirti, J.S., Dept of Zoology, Punjabi University, Patiala, 147002, India

4740. Küry, D. (2003): Wirbellosen-Gemeinschaften der Gewässer Wildensteins. *Mitteilungen der Naturforschenden Gesellschaften Beider Basel* 7: 205-219. (in German, with English summary). ["To evaluate the success of the landscape restorations in the Wildenstein region (canton of Basel-Landschaft) the initial quality of the running and standing waters was assessed. Physico-chemical parameters showed a rather high quality of the brooks but eutrophic to hypertrophic conditions in ponds. Most of the 68 macrozoobenthos taxa in the brooks lived in the Wildensteinerbach (59 taxa) while in the Sormattbächli only 37 taxa were observed. The difference was explained with differing substrate conditions. A total of 45 macrozoobenthos taxa were determined in the ponds: 36 taxa in the Luxmatt ponds and 24 taxa in the Wildenstein pond. Compared to other ponds which are important for conservation, Luxmatt and Wildenstein ponds were poor in taxa. This could be explained with their small areas, the short period since their construction and the presence of fish populations. In both, running and standing waters, 11 species figured in the red lists of Switzerland and Southern Germany, respectively. The enhancement of habitat diversity in running waters and the reduction of the nutrients input in the ponds shall improve the conditions of the macroinvertebrate communities. A monitoring based on the present investigation will estimate the effect of the management to extensivate the farming and forestry." (Authors) The taxa lists include Odonata.] Address: Küry, D., Life Science AG, Greifengasse 7, CH-4058, Basel, Switzerland

4741. Legrand, J. (2003): Les odonates du Nimba et de sa région. *Mem. Mus. natn. Hist. nat.* 190: 231-310. (in French with English summary). [127 species from the Mimba region (Africa: Guinée, Côte d'Ivoire, Liberia) are treated. The (re)descriptions or descriptive notes, and the information on their ecology and distribution are provided. No endemics were encountered in the area (Guinea, Ivory Coast, Liberia), but some species seem to be located only in the slopes of the Nimba mountain. The following species are illustrated: *Gomphidia gamblesi*, *Diastatomma gamblesi*, *Chlorocnemis rossii*, *C. flavipennis*, *Microgomphus jannyae*, *Onychogomphus*

quirkii, *Paragomphus kiautai*, *P. tournieri*, *Phyllogomphus moundi*, and *Tragomomphus christinae*. *Chlorocnemis nubilipennis rossii* Pinhey, 1969 got species rank *C. rossii* Pinhey, 1969.] Address: Legrand, J., 10, rue du Chemin de fer, F-94110 Arcueil, France

4742. Mackenzie, R.A.; Kaster, J.L. (2003): A preservative-free emergent trap for the isotopic and elemental analysis of emergent insects from a wetland system. *Great Lakes Entomologist* 35(1), Spring-Summer 2002 (2003): 47-51. (in English). ["This study reports a cost-effective, live emergent trap designed for the preservative-free use in both biogeochemical and ecological analyses of emerging insects. The trap proved to be advantageous in several ways. First, the simple design made the trap time-efficient since it was easy to set-up, change, and maintain. Second, live sampling not only provided uncontaminated organisms for elemental and stable isotopic analyses, it minimized disfigurement. This resulted in rapid and easy handling, as well as identification, of adult insects. Finally, trap avoidance by ephemeropterans and odonates, a common problem encountered in the literature, was minimal and organisms from both insect orders were successfully collected." (Authors)] Address: The Center for Great Lakes Studies at the WATER Institute, University of Wisconsin-Milwaukee, 600 E. Greenfield Ave., Milwaukee, WI, 53204, USA

4743. Marden, J.H.; Thomas, M.A. (2003): Rowing locomotion by a stonefly that possesses the ancestral pterygote condition of co-occurring wings and abdominal gills. *Biological Journal of the Linnean Society* 79(2): 341-349. (in English). ["A leading hypothesis for the origin of insect wings is that they evolved from thoracic gills that were serial homologues of the abdominal gills present in fossil pterygotes and in the nymphs of some modern mayflies, damselflies and stoneflies. Co-occurrence of thoracic wings and abdominal gills is the primitive condition for fossil pterygote insects, whereas the winged stage of modern insects almost exclusively lacks abdominal gills. Here we examine the locomotor behaviour and gill morphology of a stonefly, *Diamphipnopsis samali* (Plecoptera), which retains abdominal gills in the winged adult stage. This species can fly, but also uses its forewings as oars to accomplish rowing locomotion along the surface of water. The abdominal gills are in contact with both air and water during rowing, and their elaborately folded surface suggests an ability to contribute to gas-exchange. *D. samali* nymphs also have behaviours that place them in locations where their gills are exposed to air; they forage at night at the stream margin and within bubble curtains in rapids. These traits may exemplify an early pterygote condition in which gill and protowing function overlapped in an amphibious setting during a transition from aquatic to aerial locomotion and gas exchange. Rowing locomotion provides a novel and mechanically intermediate stage for the wings-from-gills and surface-skimming hypotheses for the origin of insect wings and flight." (Authors)] Address: Marden, J.H., Dept Biol., Pennsylvania St. University, 208 Mueller Laboratory, University Park, PA 16802, USA. E-mail: jhm10@psu.edu

4744. Martinez, J. C. (2003): Habitat specificity and population genetics of three dragonfly larvae in fragmented landscapes. *Ecological Society of America Annual Meeting s. [cd-rom]* 88: 219. (in English). [Verbatim: While anthropogenic land use change is a major

component of environmental change and often results in fragmentation of habitat into isolated remnant patches, habitat specialization is another important mechanism that may lead to population patchiness. My research investigates the sensitivity to extinction by fragmentation in three dragonfly species with differing degrees of habitat specialization, a habitat generalist (*Libellula quadrimaculata*), intermediate habitat specialist (*Somatochlora williamsoni*), and habitat specialist (*Somatochlora tenebrosa*). This is based on principal component analysis using multiple habitat variables. I combine population genetics, ecology, and a modeling approach to gain a more complete understanding of species' sensitivity to extinction by fragmentation. My study species appear to exhibit metapopulation dynamics in the field. Preliminary results of my metapopulation model reveal that when female adults disperse into demes at low population densities, they provide a rescue effect because female immigrants carry thousands of potential eggs with them. On the other hand, male adult dispersal may generally contribute more to gene flow between demes because of their ability to mate with multiple females (pre-mating dispersal model). Preliminary population genetic results for the intermediate habitat specialist revealed no population subdivision on a spatial scale of 300 miles when allozymes were used as molecular markers.] Address: Martinez, Jeannette C., Dept. of Ecology, Evolution and Behavior, University of Minnesota, 100 Ecology, Saint Paul, MN, USA

4745. Pacheco-Flores, C.; Deloya, C.; Cortes-Genchi, P. (2003): Lista de nombres de insectos en lengua Tlapaneca de la "Region de la Montana", Guerrero, Mexico (Arthropoda: Insecta). *Folia Entomologica Mexicana* 42(3): 309-320. (in Spanish, with English summary). ["During the period between September 2000 and January 2001, a collection of insects was performed on herbaceous vegetation, shrubs and trees, in coffee plantations, excrement of different animals, ant detritus (*Atta mexicana* Smith, Hymenoptera: Formicidae), dead wood and public illumination; additionally, some people that was infested by ectoparasites was examined in the localities of Malinaltepec, Acatepec, Iliatenco, and Aseradero, at the "Mountain Region" of the State of Guerrero, Mexico. All the insects obtained were presented to some native people of the region asking their name in Tlapaneco language, the meaning of the name and their importance. By this method, a total of 41 names for the adults (Dyctioptera (1), Orthoptera (2), Hemiptera (2), Odonata (1), Diptera (3), Lepidoptera (1), Siphonaptera (1), Anoplura (1), Hymenoptera (15) and Coleoptera (14)), and only nine names for immature stages of Lepidoptera, Coleoptera and Anoplura, as used in Tlapaneco, were achieved. The results presented includes the Spanish common name, the Tlapaneco name, the meaning of the word, and the known importance for this people of type of each insect. Some species of Coleoptera Melolonthidae, Scarabaeidae and Passalidae, were taxonomically determined to specific level." (Authors)] Address: Deloya, Cuauhtemoc, Dept Entomol, Inst Ecol AC, Km 2-5 Carretera Antigua Coatepec 351, Apartado Po, Xalapa, Veracruz, 91070, Mexico. E-mail: deloyac@ecologia.edu.mx

4746. Petrulevicius, J.F.; Nel, A. (2003): Frenguelliidae, a new family of dragonflies from the earliest Eocene of Argentina (Insecta: Odonata): phylogenetic relationships within Odonata. *Journal of Natural History* 37 (24): 2909-2917. (in English). ["The new dragonfly fami-

ly Frenguelliidae based on *Frenguella patagonica* gen. nov., sp. nov., is erected from the earliest Eocene of Patagonia (Argentina). Its phylogenetic relationships within the Zygoptera and Epiproctophora (sensu Bechly, 1996) are discussed. The new family seems to be related to Sieblosiidae from the Oligo-Miocene of Eurasia; and both could pertain to the basal lineage of Epiproctophora. These attributions are not supported by the known stratigraphic data and could be explained by the incompleteness of the fossil record of Odonata, mainly in the Triassic." (Authors)] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

4747. Rasmussen, N.L.; Bidwell, J.R. (2003): Influence of fish introduction on the sex ratio and size of damselfly larvae of the *Enallagma* complex. *Proc. Okla. Acad. Sci.* 83: 100-101. [Verbatim: Ponds and wetlands are often stocked with fish as a way to improve their perceived recreational value. The influence of such stocking on resident invertebrates in these systems has not been extensively investigated, although fish predation could significantly change community structure. A previous laboratory study that examined the effects of sex on the behavior of larvae of a damselfly (*Ischnura verticalis*) indicated that male larvae spent more time moving and moved greater distances than did females which could result in differential susceptibility to capture. This could have serious implications for damselfly populations subjected to predation by introduced fish, since skewed sex ratios could severely impact population viability. The purpose of this study was to determine if damselfly larvae belonging to the *Enallagma* complex exhibit differential susceptibility to fish predation between males and females. Damselfly exuviae were sampled approximately every 48 h from mid-May to mid-September from a quarter-acre pond both before and after the addition of green sunfish (*Lepomis cyanellus*). A second quarter-acre pond that remained fishless was similarly sampled. Emergence structures constructed of window screen were placed in each pond and exuviae found on these screens were collected and sorted. For approximately every 4th sampling date, all exuviae of individuals belonging to the *Enallagma* complex were sexed and their head capsule width was measured. From these samples, it was determined that between 30 and 60 individuals had to be examined in order to get a sex ratio representative of the population. The average head capsule size of the damselfly larvae was reduced after the addition of fish, with a greater decrease apparent in female larvae. However, no significant difference in sex ratio was apparent. Laboratory studies will seek to more specifically characterize any sex-specific differences in susceptibility to predation that may exist in this particular genus. Results such as these may prove useful in the management of aquatic habitats, since the introduction of fish to a previously fishless system may reduce effective population sizes and threaten the viability of some damselfly populations.] Address: Rasmussen, N.L., Department of Zoology, Oklahoma State University, Stillwater, OK 74078

4748. Ren, D. (2003): A new hemeroscopid dragonfly from the Lower Cretaceous of Northeast China (Odonata: Hemeroscopidae). *Acta Entomologica Sinica* 46(5): 622-628. (in Chinese). ["[...] *Abrohmeroscopus mengi* gen. et sp. nov., of the family Hemeroscopidae Pritykina, 1977, from the Lower Cretaceous Jiufotang Formation, Liaoning Province, Northeastern China, is

described and illustrated. This new genus is rather similar to *Hemeroscopus Pritykina*, 1977, but differs from the latter in the following characters: (1) hindwing anal loop is smaller, only with 6-7 cells (plesiomorphy); (2) Rspl is absent (plesiomorphy); (3) the hindwing vein CuAa is curved and has five distinct posterior branches (plesiomorphy); (4) the forewing MP is not shortened, reaching the posterior wing margin slightly beyond the level of the nodus (plesiomorphy); (5) pterostigmata more distinctly braced (plesiomorphy); (6) the hindwing area between MP and CuAa is narrow, with only one row of cells near the discoidal triangle (plesiomorphy). This is the oldest fossil record of the Hemeroscopidae in China." (Authors)] Address: Department of Biology, Capital Normal University, Beijing, 100037, China. E-mail: rendongprof@yahoo.com.cn

4749. Ren, D.; Liu, J.-Y.; Cheng, X.-D. (2003): A new hemeroscopid dragonfly from the Lower Cretaceous of Northeast China (Odonata: Heteroscopidae). *Acta Entomologica Sinica* 46(5): 622-628. (in English with Chinese summary). ["A new genus and species of hemeroscopid dragonfly, *Abrohemeroscopus mengi* gen. et sp. nov., of the family Hemeroscopidae Pritykina, 1977, from the Lower Cretaceous Jiufotang Formation, Liaoning Province, Northeastern China, is described and illustrated. This new genus is rather similar to *Hemeroscopus Pritykina*, 1977, but differs from the latter in the following characters: (1) hindwing anal loop is smaller, only with 6-7 cells (plesiomorphy); (2) Rspl is absent (plesiomorphy); (3) the hindwing vein CuAa is curved and has five distinct posterior branches (plesiomorphy); (4) the forewing MP is not shortened, reaching the posterior wing margin slightly beyond the level of the nodus (plesiomorphy); (5) pterostigmata more distinctly braced (plesiomorphy); (6) the hindwing area between MP and CuAa is narrow, with only one row of cells near the discoidal triangle (plesiomorphy). This is the oldest fossil record of the Hemeroscopidae in China." (Authors)] Address: Ren, D., Dept Biol., Capital Normal Univ., Beijing-100037, P.R. China. E-mail: rendongprof@yahoo.com.cn

4750. Rose, J.S. (2003): Ecology of exotic dragonfly species in different native assemblages. *Ecological Society of America Annual Meeting* 88: 286-287. (in English). [Verbatim: To determine whether exotic species express the same ecology under different ecological contexts or whether these contexts alter their ecology, the ecological niches of dragonfly species were quantified in three bioregions: the Everglades of south Florida, the Lower Rio Grande Valley of south Texas, and the main islands of the Hawaiian archipelago. Florida and Texas each possess many more species of dragonflies than Hawai'i, and have many more types of predators and prey as well. Some dragonfly species are indigenous to all three regions, but most to one or two; a few species occur as nonnatives in two regions, or are native in one but have invaded another. Several species in Texas appear to use shaded and dry habitats more extensively than conspecifics in Florida. In Hawai'i neither indigenous nor exotic species appear to express wider niches than their conspecifics in Texas and Florida, nor is niche overlap among species in Hawai'i perceptibly lower. However, populations of some species do appear to express different ecological niches between two or three of these regions. Nonnative species occur predominantly in altered or artificial habitats in Florida and Hawai'i; Texas has only one invading

species, which occurs in apparently undisturbed habitat.] Address: Rose, J.S., Duke University, Durham, NC, USA

4751. Santharam, V. (2003): 4. Indian pond-herons *Ardeola grayii* feeding on dragonflies. *Journal Bombay Natural History Society* 100(1): 108. (in English). Address: Santharam, V., Rishi Valley Education Centre, Institute of Bird Studies and Natural History, Rishi Valley, Chittoor District, 517 352, Chittoor, AP, India

4752. Saux, C.; Simon, C.; Spicer, G.S. (2003): Phylogeny of the dragonfly and damselfly order Odonata as inferred by mitochondrial 12S ribosomal RNA sequences. *Annals of the Entomological Society of America* 96(6): 693-699. (in English). ["The phylogenetic relationships among members of the Odonates were inferred from mitochondrial DNA 12S ribosomal RNA sequence data. These data show support for a monophyletic Anisoptera suborder, which are consistent with previous phylogenetic work performed on the group. However, the Zygoptera are paraphyletic based on mitochondrial DNA evidence. In particular, the family Lestidae appears more closely related to the Anisoptera than the Zygoptera." (Authors)] Address: Saux, Corrie, San Francisco State University, Dept of Biology, 1600 Holloway Avenue, San Francisco, CA 94132, USA

4753. Schlüter, T.; Kohring, R.; Gregor, H.-J. (2003): Dragonflies preserved in transparent gypsum crystals from the Messinian (Upper Miocene) of Alba, northern Italy. *Acta tool crakov.* 46(Suppl.): 373-379. (in English). ["From the Upper Miocene (Messinian) of the Alba area in Piedmont, northern Italy, are fossil dragonflies (mainly larvae) described, which were preserved in transparent gypsum crystals. The specimens belong probably to a single species (*Oryctodiplax gypsorum*), but occur in various pre-imaginal stages. This individual-rich but species-poor palaeoentomofauna appears to be almost autochthonous in origin and may have developed under hypersalinar conditions in a lagoonal environment during the Messinian salinar event" (Authors)] Address: Kohring, R., Inst. Geowiss., FU-Berlin, Malteserstr. 74-10, Haus D, D-12249 Berlin, Germany. E-mail: palaeont@zedat.FU-Berlin.de

4754. Sherk, T.E., Rau, G.H.; Kraft, G.F. (2003): Emergence of Plecoptera from Findley Lake, Cascade Mountains, USA. *Research Update on Ephemeroptera & Plecoptera 2003*, E. Gaino (Ed.), University of Perugia, Perugia, Italy: 407-411. (in English). ["Plecoptera were collected in emergence traps on oligotrophic Findley Lake in the coniferous forest of the Cascade Mountains from 1972 to 1975. In 1974 most of the ice and snow cover did not thaw until July 31. *Suwallia pallidula* started to emerge before the entire lake had thawed. *Suwallia pallidula*, *Podmosta decepta*, *Sweltsa borealis* and *Setvena tibialis* emerged where the benthic accumulation of forest detritus was greatest. *Isoperla sordida* emerged from a pool below the lake outlet." (Authors) *Somatochlora albicincta*, *Aeshna palmata*, and *A. umbrosa* are listed as predators of Plecoptera. (www.u-nipg.it/maystone/PDF%202001%20proc/SHERK%20ET%20AL.%20IJM%20proceedings.pdf)] Address: Sherk, T.E., P.O. Box 331, Branford, Connecticut 06405, USA.

4755. Singh, R.K.; Dhiman, R.C.; Singh, S. P. (2003): Laboratory studies on the predatory potential of dragon fly nymphs on mosquito larvae. *Journal of Com-*

municable Diseases: 96-101. (in English). ["Biocontrol potential of dragonfly nymph, *Brachythemis contaminata* against the larvae of *Anopheles stephensi*, *Culex quinquefasciatus* and *Aedes aegypti* was studied under laboratory conditions. It was found that dragonfly nymph had highest predation efficacy against *A. stephensi* followed by *C. quinquefasciatus* and *A. aegypti*. Feeding rate increased with decrease in prey size / stage. Analysis of data indicated that dragonfly nymphs have good predatory potential and can be used as a biological control agent for control of mosquito breeding." (Authors)] Address: Singh, R. K., Malaria Res. Ctr., ICMR, 22 Sham Nath Marg, Delhi, 110054, India

4756. Soares, C.M.; Hayashi, C.; Reidel, A. (2003): Predacao de pos-larvas de curimba (*Prochilodus lineatus*, Valenciennes, 1836) por larvas de Odonata (Pantala, Fabricius, 1798) em diferentes tamanhos. *Acta Scientiarum Biological Sciences* 25(1): 95-100. (in Portuguese, with English summary). ["Predation of *Prochilodus lineatus* (Valenciennes, 1836) post-larvae by dragonfly (Pantala, Fabricius, 1978) fry in different development phases. The aim of this experiment was to evaluate the predation of dragonfly (*Pantala* sp.) fry in different development phases by the *Prochilodus lineatus* post-larvae (Characiformes, Prochilodontidae). Fifty-four dragonfly fry were distributed among eight length groups (2.54, 3.89, 6.37, 9.67, 10.98, 12.81, 18.50 e 24.50 mm), then they were also distributed among 27 aquarium (1.0 L), with constant illumination by fluorescent lamps (40 watts), and two dragonfly fry of similar size were put in each experimental unit. The *P. lineatus* post-larvae (Lt: 6.20+/-0.22 mm and Wt: 0.91 mg). 15 *P. lineatus* post-larvae were distributed in each aquarium (18:00h), each three-hour-interval (21.00, 0.00, 3.00, 6.00, 9.00, 12.00, 15.00 and 18.00h), the live post-larvae were counted and the dead ones were replaced. The physical and chemical parameters pH, dissolved oxygen, electric conductivity and temperature was measured in the beginning and in the end of the experiment, the average values of these ones were 7.83+/-1.11, 6.57+/-1.23 mg/L, 212.71+/-3.93 μ S/cm and 27.19+/-0.27°C, respectively. A quadratic effect of the dragonfly fry size on the total number of *P. lineatus* post-larvae eaten with maximum point with dragonfly larvae of 24.46mm. was observed. And a decrease in the number of post larvae eaten in time of the experimental period was also observed. It may be concluded that there was an increase in the number of *P. lineatus* post-larvae eaten with a size increase of dragonfly fry." (Authors)] Address: Soares, C.M. Dept Biol. Programa Posgrad Ecol. Ambientes Aquaticos Cont, Univ. Estadual Maringa, Av Colombo 5790, BR-87020900, Maringa, Parana, Brazil. E-mail: cmssoares@uem.br

4757. Stein, K.J.; Mitchell, J.C.; Smith, E.P.; Waldon, J.L. (2003): Trophic level distribution of ephemeral pool insects: Uniformity among pools. *Journal of Freshwater Ecology* 18(4): 549-556. (in English). ["We collected aquatic insects from three types of ephemeral pools (grassland, road, and woodland) in attempt to determine the trophic structure and trophic level distribution of insect communities. Each specimen was assigned to one of several trophic levels including carnivore, detritivore, herbivore, or some combination of these. Trophic level proportions were then compared for all pool classes; six of seven trophic level proportions were the same (P<0.05: except herbivores, P=0.01) in the following order of occurrence: 1) carnivores, 2) camivo-

re/detritivores, 3) detritivores, 4) detritivore/herbivores, 5) herbivores, 6) herbivore/carnivores, and 7) herbivore/detritivores. Carnivores (64.1%) and carnivore/detritivores (13.6%) accounted for 77.7% of the total insects; these consisted of odonates, dytiscids, and notonectids (58.1%), with gerrids, belostomatids, nepids, and naucorids, comprising an additional 19%. The near uniform distribution of trophic level proportion rankings found among pools regardless of surrounding habitat was independent of pool size and longevity and indicated baseline similarity. Although ephemeral pools are known for being transitory, with respect to trophic levels, they may be more ecologically stable than is implied by their name." (Authors)] Address: Stein, K.J., 20201 Lorain Rd., Suite 817, Fairview Park, OH, 44126, USA. E-mail: steinkj@earthlink.net

4758. Sukhacheva, G.A.; Krukova, N.A.; Glupov, V.V. (2003): On the roles of morphological and biochemical criteria in species identification: An example of dragonfly larvae of the genus *Aeshna*. *Biology Bulletin of the Russian Academy of Sciences* 30(1) : 63-68. (in English). ["Dragonflies belong to the group of organisms with numerous well-differentiated species-specific characters at the adult stage, on the one hand, and a significantly smaller number or even the absence of such characters at the early ontogenetic stages. An example of the genus *Aeshna* is used to show difficulties in revealing morphological and biochemical characters allowing identification of larval dragonflies belonging to closely related species of the family. Distinct morphometric characters can be found only in late-instar larvae. The presence of species-specific proteins in the homogenates of thoracic muscles provides the possibility of using biochemical tests for species identification of larvae. Infestation by parasites has no effects on the biochemical parameters studied. Species identification of the early-instar dragonfly larvae is still problematic." (Authors)] Address: Institute of Animal Systematics and Ecology, Siberian Division, Russian Academy of Sciences, ul. Frunze 11, Novosibirsk, 630091 Russia. E-mail: e-mail: mi@eco.nsc.ru

4759. Sutton, P.G. (2003): The changing fortunes of British Odonata. *Bulletin of the Amateur Entomologists' Society* 62: 52-71. (in English). [Very sophisticated compilation on British Odonata with special emphasis on the status of the species.] Address: Sutton, P.G., 2 Fir Tree Close, Flitwick Beds, MK45 1NZ, UK

4760. Takahara, T.; Kohmatsu, Y.; Maruyama, A.; Yamaoka, R. (2003): Effects of fish chemical cues on tadpole survival. *Ecological Research* 18(6): 793-796. (in English). ["The indirect effects of goldfish chemical cues on tadpole survival and predation by other predators (e.g. dragonfly nymph and crayfish) were tested in a field experiment. Fish chemical cues were found to affect tadpole survival when dragonfly nymphs were present. In contrast, this indirect effect was not detected in the presence of crayfish. The results from the present study found that predators, even without predation, can affect the predatory efficiency of other predators, and that the degree of such an indirect effect may differ among the foraging strategies of predators." (Authors)] Address: Takahara, T., Department of Applied Biology, Faculty of Textile Science, Kyoto Institute of Technology, Sakyo-ku, Kyoto, 606-8585, Japan. E-mail: taka02@ipc.kit.ac.jp

4761. Thaler, K. (2003): Partielle Inventur der Fauna von Nordtirol: Niedere Pterygota (Insecta: Palaeoptera, Paurometabola, Paraneoptera (p.p.)) (Fragmenta Faunistica Tirolensia - XVI). Linzer Biologische Beiträge 35 (2): 785-800. (in German, with English summary). ["Preliminary overview of the fauna of North Tyrol: Lower pterygote insects (Palaeoptera, Paurometabola, Paraneoptera (p.p.)) (Fragmenta Faunistica Tirolensia - XVI). The state of knowledge about "lower pterygote insects" of N. Tyrol is given from the relevant literature, together with some species records: Ephemeroptera (species number S=45), Odonata (S=60), Plecoptera (S ca. 71), Saltatoria (S ca. 65), Dermaptera (S=6), Blattariae (S=5), Psocoptera (S ca. 45), Thysanoptera (S ca. 54); in Phthiraptera only Anoplura parasitizing small mammals have been investigated." (Author)] Address: Thaler, K., Inst. Zool., Limnol. Univ., Techniker Str 25, A-6020, Innsbruck, Austria.

4762. Tolonen, K.T.; Hämäläinen, H.; Holopainen, I.J.; Mikkonen, K.; Karjalainen, J. (2003): Body size and substrate association of littoral insects in relation to vegetation structure. *Hydrobiologia* 499: 179-190. (in English). ["Variation in substrate association types and maximum size of aquatic insects were studied in a vegetated littoral zone of three lake basins. The basins differed from each other in trophic status, biomass of benthivorous fish, and abundance of macrophytes. Four types of substrate association - swimmers, crawlers, semisessiles and burrowers, respectively - were assumed to represent decreasing vulnerability to fish predators. Large-sized species were also hypothesised to be more vulnerable to fish predators. The distributions of species traits were examined in relation to vegetation density. Inferring from "predation hypothesis" opposite selection pressures on the species traits were expected along the vegetation density. Dense macrophyte beds were thought to be dominated by invertebrate predators and open water by fish predators, since the predation efficiency of fish decreases in complex environments. In the case of invertebrate predator domination, large size and higher activity should be favoured traits among the prey species. Distribution patterns of modes of the two studied traits were explored separately for predatory and non-predatory insects. As expected, swimmers and large-sized crawlers were characteristic of the insect assemblages of dense macrophyte beds. The densities of Odonata, Corixidae, Dytiscidae, Ephemeroptera and Sialidae were higher among macrophytes than in open water, where these insect taxa were possibly depleted by fish. On the other hand, the small-sized and fairly immobile Chironomidae were the most abundant group in open water. These results support the existence of a predator transition zone among littoral vegetation, ranging from domination of invertebrate predation among the dense beds to that of fish predation in open water." (Authors)] Address: Tolonen, K.T., Dept Ecol., Karelian Institute, University of Joensuu, FIN-80101, P.O. Box 111, Joensuu, Finland. E-mail: ktolonen@cc.joensuu.fi

4763. Tryjanowski, P.; Karg, M.K.; Karg, J. (2003): Diet composition and prey choice by the red-backed shrike *Lanius collurio* in western Poland. *Belgian Journal of Zoology* 133(2): 157-162. (in English). ["We investigated diet and prey choice in a population of *L. collurio* living in an intensively used farmland (W Poland). Diet was estimated by three methods: collars in nestlings, and pellets and prey remains in larders. Insects, mainly Coleoptera, Hymenoptera and Orthoptera con-

stituted 97.7% of the diet, with a total of 4392 prey items identified from all samples. However, during rainy and cold days vertebrates formed an important component (up to 26.5% by biomass) of the food of the red-backed shrike. Food preference - expressed in relation to availability - was estimated for five arthropod taxa. Hymenoptera, Orthoptera and Coleoptera were more preferred prey. Heteroptera and "other invertebrates", included mainly flies, dragonflies and spiders were less preferred. For rational management of the red-backed shrike in farmland, we suggest that places with available prey (in appropriate densities), small vegetation patches and perches suited to low-expenditure hunting strategy, should be preserved, as well as established." (Authors)] Address: Tryjanowski, P., Dept of Avian Biology & Ecology, Adam Mickiewicz University, Fredry 10, PL-61-701, Poznań, Poland. E-mail: ptasiek@main.amu.edu.pl

4764. Utter, K.B.; Skokan, R.D.; Rivers, D.; Quinn, P.K.; Potter, J.D.; Peter, C.R.; Lund, E.A.; Knox, J.L.; Knobelmann, J.L.; Haney, J.F.; Carlson, S.C.; Bradt, S.R.; Barry, L.M. (2003): Aquatic biosurvey of the Lovell River on UNH land. *UNH Center for Freshwater Biology Research* 5(1): 1-13. (in English). ["We assessed the physical, chemical and biological conditions at two sites along the Lovell River on University of New Hampshire (UNH) - owned conservation land.[...] Macroinvertebrate bio-indices indicated either excellent water quality with no apparent organic pollution or good water quality with possible slight organic pollution." Cordulegaster is the only odonate taxa mentioned and included into the assessing scheme.] Address: Utter, Kathleen B., Center for Freshwater Biology, Dept. of Zoology, University of New Hampshire, Durham, 03824

4765. van Huis, A. (2003): Insects as food in sub-Saharan Africa. *Insect Science & its Application* 23(3): 163-185. (in English). ["Data on insects as food in sub-Saharan Africa were collected by reviewing the literature and conducting interviews in a number of African countries. A list of about 250 edible insect species from Africa was compiled. Of these, 78 percent are Lepidoptera (30%), Orthoptera (29%) and Coleoptera (19%), and 22 percent Isoptera, Homoptera, Hymenoptera, Heteroptera, Diptera and Odonata. Insects are rich in protein, vitamins and minerals, and a good source of iron and B-vitamins. Examples of insects being toxic are given, but often traditional methods are used to remove the poison. Whether or not insects are eaten depends not only on taste and nutritional value, but also on customs, ethnic preferences or prohibitions. The harvesting of insects is often done by women. The way of collecting depends on insects' behaviour. For example, inactivity at low temperatures enables easy catching of locusts and grasshoppers in the morning. Night flyers (termites, some grasshoppers) can be lured into traps by light and some insects like palm weevils can be attracted to artificially created breeding sites. Some species (crickets, cicadas) can be located by the sound they make. A number of tools are used to facilitate capturing such as glue, sticks, nets and baskets. Because most insects are only seasonally available, preservation by drying is often practised. Some examples of how to prepare them as food are given from important insect groups. To manage insects in the interest of food security more attention should be given to environmentally sustainable harvesting methods. They should be made better available throughout the year by developing im-

proved conservation methods or by farming this minilivestock. Considering the economic, nutritional and ecological advantages of this traditional food source, its promotion deserves more attention both from national governments and assistance programmes." (Authors)] Address: Huis, A. van, Laboratory of Entomology, Wageningen University, 6700 EH, P.O. Box 8031, Wageningen, Netherlands. E-mail: arnold@vanhuis.com

4766. Warkentin, I.G.; Fisher, A.L.; Roberts, S.E. (2003): Response to clear-cut logging by northern waterthrushes. *Can. J. For. Res.* 33: 755-762. (in English, with French summary). [Examination of the distribution and foraging behaviour of northern waterthrushes (*Seiurus noveboracensis*) in recently harvested and intact landscapes of Newfoundland, Canada. Available food sources - including Odonata have been investigated on the family level.] Address: Warkentin, G.; Environmental Science Biology, Memorial University of Newfoundland, Corner Brook, NL A2H 6P9, Canada. S.P. Flemming, Gros Morne National Park of Canada, Rocky Harbour, NL A0K 4N0, Canada. E-mail: iwarkent@swgc.mun.ca

4767. Whiting, M.F.; Bradler, S.; Maxwell, T. (2003): Loss and recovery of wings in stick insects. *Nature* 421: 264-267. (in English). ["The evolution of wings was the central adaptation allowing insects to escape predators, exploit scattered resources, and disperse into new niches, resulting in radiations into vast numbers of species. Despite the presumed evolutionary advantages associated with full-sized wings (macroptery), nearly all pterygote (winged) orders have many partially winged (brachypterous) or wingless (apterous) lineages, and some entire orders are secondarily wingless (for example, fleas, lice, grylloblattids and mantophasmatids), with about 5% of extant pterygote species being flightless. Thousands of independent transitions from a winged form to winglessness have occurred during the course of insect evolution; however, an evolutionary reversal from a flightless to a volant form has never been demonstrated clearly for any pterygote lineage. Such a reversal is considered highly unlikely because complex interactions between nerves, muscles, sclerites and wing foils are required to accommodate flight. Here we show that stick insects (order Phasmatodea) diversified as wingless insects and that wings were derived secondarily, perhaps on many occasions. These results suggest that wing developmental pathways are conserved in wingless phasmids, and that reevolution of wings has had an unrecognized role in insect diversification." (Authors) *Argia vivida* and *Ophiogomphus severus* have been used as outgroup species for the phylogenetic study of the Phasmatodea.] Address: Whiting, M.F., Department of Integrative Biology, Brigham Young University, Provo, Utah, 84602, USA

4768. Wishart, M (2003): A Comparative Phylogeographic Approach Toward Defining Functional Units for the Conservation of Biodiversity in Lotic Ecosystems. Thesis, Australian School of Environmental Studies, Griffith University: XVII, 165 pp. (in English). ["The conservation of lotic ecosystems has historically focused on maintaining the structural properties and processes of river systems, considered as surrogates for the protection of biological diversity. However, the geological structure of the catchment unit and the hierarchical, longitudinal nature of the rivers that drain them impose a number of potential barriers to dispersal. This creates a mosaic of aquatic islands within a terrestrial

landscape. As such the protection of biodiversity and biological processes requires considerations that extend beyond the catchment unit. Understanding the extent to which barriers limit the movement of individuals is important in developing an integrated approach toward conservation of river systems. It is also important in understanding the role of dispersal in the process of species formation and population structure. While catchment units represent the logical social, economic and often political scale upon which to manage water resources they are increasingly being defined as the appropriate functional unit for the conservation and management of freshwater ecosystems. The aim was to determine the extent to which catchment units represent the appropriate scale for the conservation of lotic biodiversity. This was done by examining the effect of catchment units on the distribution of genetic variation and population structure in four aquatic taxa among streams in the south-western Cape, South Africa. All four taxa are part of the ancient paleoendemic Gondwanaland fauna characteristic of the Cape region and reflect relative differences in dispersal. The taxa were the freshwater fish, *Galaxias zebratus* (Teleostei: Galaxiidae); the net-winged midge *Elporia barnardi* (Diptera: Blephariceridae), which given its specialised morphology and specific habitat requirements has a very limited potential for dispersal; the stonefly *Aphanicercia capensis* (Plecoptera: Notonemouridae), a species with intermediate dispersal; and the widely distributed dragonfly *Aeshna subpupillata*, with the potential for wide dispersal. Allozyme electrophoresis and direct sequencing of a fragment of the cytochrome oxidase subunit 1 (COI) region of the mitochondrial DNA were used to examine genetic structuring within and among streams in two discontinuous mountain ranges. F statistics were calculated from allele frequencies derived from allozyme electrophoresis as a measure of population subdivision and population trees constructed. Nucleotide diversity and levels of divergence were calculated among mtDNA sequence data. Genetic distance, and the relationship among haplotypes, was examined using neighbour-joining trees and an analysis of molecular variance in order to determine the effect of catchment units on dispersal, the distribution of genetic variation and population structure. Low levels of allozyme variability were observed in all four taxa, with no variable loci resolved for the stonefly *A. capensis*. Significant population structure among all sites in the two ranges in *G. zebratus*, *E. barnardi* and *A. subpupillata* highlights the effect of discontinuous habitat (~ 0.70 , 0.39 ± 0.10 and 0.03 ± 0.01 respectively), while FST values among streams on Table Mountain reflect differences in the dispersal potential of the three species (~ 0.70 , 0.23 ± 0.04 and 0 respectively). Population trees for the Cape galaxiid *G. zebratus* and the net-winged midge *E. barnardi* revealed two highly divergent groups (Genetic Identity = 0.41 and 0.73 respectively). Both reflect poor dispersal potential, with the pattern among *G. zebratus* reflecting a pattern of connectivity between ancient drainages during periods of lower sea levels. Mitochondrial DNA data obtained from the COI region similarly revealed two highly divergent clades in populations of the Cape galaxiid *G. zebratus* ($\sim 7\%$), the netwinged midge *E. barnardi* ($\sim 5\%$) and the stonefly *A. capensis* ($\sim 7\%$). Additional data derived from the cytochrome b region for *G. zebratus* revealed five highly divergent clades from across the species range (from 7 to 17%). Congruence between monophyletic clades and catchment units in *G. zebratus* and *E. barnardi*, along with an analysis of the

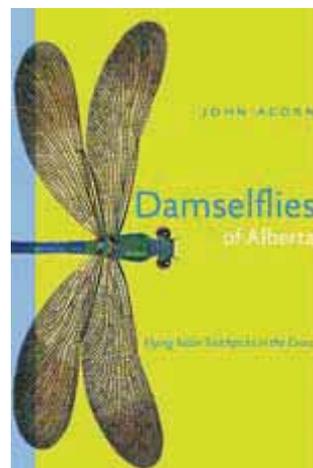
distribution of genetic variation, suggest movement is confined to within the catchment. In contrast, the distribution of haplotypes and genetic variation in *A. capensis* and *A. subpupillata* suggests movement beyond the catchment boundary. Similarities in the degree of divergence in *A. capensis* and *E. barnardi* indicate a vicariant event around 3-4 MYBP, coinciding with the erosion of the land bridge between Table Mountain and the Tottentot's Holland. Divergence among *G. zebratus*, *A. capensis* and *E. barnardi* suggests the presence of more than a single species in all three taxa. The distribution and patterns of genetic variation reflected among these taxa show general congruence with dispersal potential, thus having two important implications for conservation practices in lotic systems. The monophyletic nature of some taxa confirm the suitability of catchment based initiatives, but also suggest that current water resources developments, such as inter-basin water transfers, have the potential to undermine the evolutionary processes important in species formation. By providing a conduit for the transfer of individuals between geologically separated catchments and historically isolated populations they also provide an avenue for gene flow between genetically discrete populations, thus undermining the generation of biodiversity. For other more mobile species, the distribution of genetic variation and pattern of population sub-division indicates the effective population covers a wide geographic range such that catchment units may not represent the appropriate scale for conservation of the aquatic fauna. Results for *A. subpupillata* and *A. capensis* suggest that efforts aimed at conserving the fauna of riverine ecosystems should move beyond individual catchment considerations to incorporate reserve designs and management strategies that cover and incorporate a number of adjacent catchments. Such areas or management plans should be replicated and spread through identified phylogeographic regions. In conclusion, it is important to note that despite efforts to select taxonomically well resolved taxa, the results have revealed a number of discrete, highly divergent, genetic units in the Cape galaxiid *G. zebratus*, the net-winged midge *E. barnardi* and the stonefly *A. capensis*. The monophyletic nature and degree of sequence divergence among these units reflect populations that have experienced long periods of isolation. The levels of sequence divergence are comparable to those observed among recognized species, including the highest levels of mtDNA divergence ever recorded for an intra-specific comparison within any fish species. The results contribute to an increasing body of knowledge that recognizes the aquatic fauna of the Cape fynbos region as having a uniquely high degree of endemism, containing a large amount of as yet undescribed variation at the morphological and genetic level." (Author) This thesis is available at: <http://www4.gu.edu.au:8080/adt-root/public/adt-QGU20031125.103610/> Address: not stated

4769. Yanoviak, S.P.; Lounibos, L.P.; Weaver, S.C.; Tesh, R.B. (2003): Diversity of phytotelm fauna along a deforestation gradient in the Peruvian Amazon. Ecological Society of America Annual Meeting Abstracts. 88: 368. (in English). [Verbatim: Deforestation potentially alters the distribution and abundance of phytotelmata and their resident fauna. We surveyed phytotelm habitats along a deforestation gradient near Iquitos, Peru, as part of a larger study of arbovirus ecology. Mean phytotelm density was greater in cultivated areas ("chacra"; 174 ± 33 SD per hectare) than in secondary forest

("purma"; 28 ± 36) and primary forest ("bosque"; 25 ± 17). Fallen leaves and plant axils were the most abundant microhabitats present at all sites. Half (47%) of the colonizable microhabitats contained macroinvertebrates and mosquitoes were the most abundant occupants. In addition to the microhabitat survey, replicated phytotelm analogs (water-filled bamboo sections) were placed along the gradient and destructively sampled every two weeks. Mean species richness (ca. 3 per bamboo) and abundance (ca. 50) were similar among chacra, purma and bosque. *Trichoprosopon digitatum* was the most abundant macroinvertebrate in the bamboo sections across all sites. However, species composition of top predators differed, with *Toxorhynchites* spp. occurring more often in chacra and odonates exclusively inhabiting bosque. These differences may have cascading effects on the abundance and composition of mosquito prey along the deforestation gradient.] Address: Yanoviak, S.P., Florida Medical Entomology Lab, University of Florida, Vero Beach, FL, USA.

4770. Zhou, C.-f.; Zhou, K.-y. (2003): Status of phylogenetic research on the Palaeoptera (Insecta, Pterygota). *Acta Zootaxonomica Sinica* 28(2): 192-195. (in Chinese, with English summary). ["The phylogenetic position of the Palaeoptera in the Hexapoda and the relationship of this group with the Neoptera has been debated for a long time. There are three main point of view on this issue: Palaeoptera (= Ephemeroptera + Odonata) + Neoptera, Ephemeroptera + (Odonata + Neoptera), or Odonata + (Ephemeroptera + Neoptera). The first formula is supported by morphological, fossil and some molecular evidence. The second depends more on morphological characters, while the last is based on the least evidence. Finding more insects, discovering better fossils, and sequencing more genes and mitochondrial genomes may resolve this long debate." (Authors)] Address: Zhou C.-F., College of Life Sciences, Inst. of Genetic Resources, Nanjing Normal Univ., Nanjing, 210097, China. E-mail: cfzhou@eyou.com

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4771. Acorn, J. (2004): *Damselflies of Alberta. Flying Neon Toothpicks in the Grass.* Univ. of Alberta Press. ISBN 0-88864-419-1. 140 pp. (in English). [J. Acorn describes the 22 species that are native to the Canadian province Alberta. Exhaustively researched, yet written in an accessible, personal style, the author's enthusiasm for these 'flying neon toothpicks' is compelling. More than a field guide, this is a passionate investigation into one of nature's winged marvels of the wetlands. This fascinating book can be ordered at www.uap.ualberta.ca/UAP.asp?lid=41&bookid=512] Address: University of Alberta Press, Ring House 2, Edmonton, AB, Canada, T6G 2E1

4772. Aguirre-Leon, G.; Aquino-Cruz, O. (2004): Hábitos alimentarios de *Kinosternon herrerae* Stejneger 1925 (Testudines: Kinosternidae) en el Centro de Veracruz, Mexico. *Acta Zoológica Mexicana* (n.s.) 20(3): 83-98. (in Spanish, with English summary). ["The feeding habits of Herrera's mud turtle (*Kinosternon herrerae*) were studied from October 1999 through September 2000 in the southern limits of its range, in streams near Xalapa, Veracruz. Turtles were captured by hand and using baited traps, and stomach contents were flushed with water from 48 adults. Frequency of occurrence, numeric frequency, and volume percentage of 21 food items found by examination of stomach contents showed that this turtle primarily consumed decapod crustaceans (*Procambarus* sp.), animal material, plant material, adult anurans (*Eleutherodactylus* sp. *Rana* sp., and *Bufo marinus*), *Ficus* sp. fruits, dragonfly larvae, and anuran tadpoles. These turtles are omnivorous, but ingested a higher proportion of animal material than plant (females 92% vs. 52%; males 85.7% vs. 52.4%). *Kinosternon herrerae* is a generalist feeder throughout all seasons showing an opportunistic response in the exploitation of some food items such as anuran eggs. Trophic diversity of both sexes varied among seasons (Herrera's diversity index: 2.77 to 16.65 for females, and 3.3 to 15.24 for males), yet females showed some seasonal diet specialization during summer, and males during spring and winter, when trophic diversity values were lower for each sex. Diet similarity between males and females were measured using the simplified Morisita index was higher in summer and winter (0.67 and 0.66) compared to spring and fall (0.60 and 0.55), suggesting some seasonal resource partitioning takes place between males and females in this species." (Authors) (<http://www.ecologia.edu.mx/azm/documentos/203/F-Aguirre.pdf>) Address: Aguirre-León, G., Instituto de Ecología, A.C. Departamento de Biodiversidad y Ecología Animal. Km 2.5 Carretera Antigua a Coatepec No. 351, Congregación El Haya 91070, Xalapa, Veracruz, MÉXICO aguirreg@ecologia.edu.mx

4773. Anonymus (2004): New Conservation Status for the Dragonflies of Canada. *The Reeder* 12(3): 5. (in English). [Verbatim: The Manitoba Conservation Data Centre (MBCDC) gathers and stores information on Manitoba's plants and animals. It is part of a network that maintains information about the diversity of species in North and South America. The MBCDC has developed lists of plants, animals, and plant communities found in Manitoba. It assigns each species or community a conservation status rank. This is based on how rare the species or community is in Manitoba. It then collects detailed information on where each is found. Recently, the National General Status Working Group (NGSWG) produced new ranks for dragonflies and damselflies in Canada. The new report (Wild Species 2005) includes ranks for the same species reviewed in Wild Species 2000. Approximately 5,000 species have been added. This includes vascular plants, freshwater mussels, crayfish, tiger beetles, and marine fishes. An attempt is being made to include more invertebrates in the list. Manitoba Conservation has been helping the NGSWG prepare their Wild Species reports. The NGSWG Web site (www.wildspecies.ca) allows you to view and search the general status ranks for each province and territory and for Canada as a whole. The general status of each of the 209 species of dragonflies and damselflies (odonates) in Canada was included in the new report. Over the past few decades, hundreds of volunteers have been studying, collecting and identifying species

been studying, collecting and identifying species of dragonflies and damselflies. Results of their work were used in these assessments. This illustrates how dedicated naturalists can make a significant contribution to increase the existing knowledge about a group of species. It is noteworthy that this assessment of Canada's odonata also engaged experts from other countries - making it an international conservation effort. The dragonflies and the damselflies together make up the order odonata. The odonata are ancient and distinctive insects. They have many primitive insect features, such as unspecialized chewing mouthparts. They also have specialized body parts reflecting their way of hunting and feeding. For example, their eyes have up to 25,000 lenses that give them nearly 360-degree vision. While they beat their wings only up to 30 times per second (other insects can beat their wings more than 1,000 times per second), they have been clocked flying at more than 50 kilometres per hour and can make a 90-degree turn at full speed.] Address: Dr. James R. Duncan, Manager, Biodiversity Conservation Section, Wildlife and Ecosystem Protection Branch, Canada. E-mail: jduncan@gov.mb.ca

4774. Bass, D. (2004): Diurnal stream drift of benthic macroinvertebrates on the small Oceanic Island of Dominica, West Indies. *Caribbean Journal of Science* 40 (2): 245-252. (in English). ["An investigation was conducted to determine if invertebrate drift occurred in streams of small oceanic islands. Two nets were placed 14-15 May 2001 in midstream of the Check Hall River on the Caribbean island of Dominica. Each net was checked and its contents were emptied every three hours for a 24-hour period. Results of this study indicate that only some invertebrates are undergoing drift. Although the number of taxa present in those samples did not vary much during the 24-hour study, the number of individuals found in the samples collected during darkness was approximately four times higher than in the daylight samples, indicating diel periodicity. Common taxa captured in drift samples included Baetidae, Leptohyphes, Smicridea cariba, and Simulium. Because freshwater benthic populations on small oceanic islands are difficult to establish, they often occur in low numbers, possibly resulting in little competition for resources. In this situation, drift is greatly reduced because it is not necessary to seek other resources. The production compensation model suggests that organisms occurring in the drift represent the excess production of that population. Alternatively, tropical streams are frequently low in nutrients and unable to support large populations. This may lead to increased competition for the limited resources and that may cause invertebrates to drift to locate new resources. Losses of invertebrates through downstream drift may be balanced via upstream movement by others in the population. Further studies addressing these hypotheses are necessary to completely explain the invertebrate drift observed in this stream on Dominica." (Author) The samples include *Argia concinna*.] Address: Biology Department, University of Central Oklahoma, Edmond, Oklahoma, USA 73034. E-mail: dbass@ucok.edu

4775. Berra, E.; Forcella, M.; Giacchini, R.; Marziali, L.; Rossaro, B.; Parenti, P. (2004): Evaluation of enzyme biomarkers in freshwater invertebrates from Taro and Ticino river, Italy. *Annales de Limnologie* 40(3): 169-180. (in English). ["Benthic macroinvertebrates are an essential component of freshwater environments.

The ecotoxicological risk of benthic communities, estimated through the assay of biochemical markers, can be used as an early warning signal for environment alterations. In this work the activities of a number of enzymes, regarded as potential biomarker of exposure to pollutants (catalase, acetylcholinesterase, glutathione-S-transferase) was determined in homogenates of whole organisms. Specimens were collected in the rivers Taro and Ticino, northern Italy, in stony bottom reaches in five and three stations respectively. The orders of aquatic Insects Diptera, Plecoptera, Odonata, Ephemeroptera and Trichoptera, the Crustacea Amphipoda, and Annelida Oligochaeta were examined. Additional enzymes, such as NADP-dependent malate dehydrogenase, isocitric dehydrogenase, glucose-6-phosphate dehydrogenase, alcohol dehydrogenase, and lactate dehydrogenase were considered in the study. Results emphasize significant differences among taxa concerning the specific activity of most enzymes." (Authors)] Address: Parenti, P., Dept Environm Sci, Univ Milan, Piazza Sci 1, I-20126, Milan, Italy. E-mail: paolo.parenti@unimib.it

4776. Biggs, K. (2004): Common dragonflies of the Southwest. Azalea Creek Publishing, Sebastopol: 160 pp. (in English). [121 common odonate species represented in the six southwestern US states north of Mexico are pictured and briefly described. In addition brief notes on habitat, phenology, and distribution are given. A checklist includes all known regional species.] Address: Azalea Creek Publishing, 308 Bloomfield Rd., Sebastopol, CA 95472. azalea@sonic.net

4777. Bönsel, A. (2004): Hinweise zur Verbreitung von *Epitheca bimaculata* CHARPENTIER, 1825 (Odonata) und zu ökologischen Habitatparametern in der nordostdeutschen Jungmoränenlandschaft. Entomologische Nachrichten und Berichte 48(3/4): 191-198. (in German, with English summary). ["In 2000 to 2003, 86 lakes of different sizes in the young moraine landscape of north-eastern Germany were checked for occurrences of *E. bimaculata*. 32 waters proved to be inhabited by the species, which was autochthonous in 28 of the water bodies. Autochthonous occurrence of 19 additional species of dragonflies in the same lakes was proven. The most common species was *Brachytron pratense*, occurring in 94% of the waters, followed by *Cordulia aenea*, *Coenagrion pulchellum*, *Erythromma najas*, and *Orthetrum cancellatum*, each occurring in more than 50% of the waters. Waters with an average water surface of 9,62 ha and an average depth of 2,92 m were preferred. 89% of the waters were not thermally stratified, 46% were polytrophic, 40% eutrophic and 14% mesotrophic. In all waters submerged structures were present, in 82% of the waters consisting of the stalks of *Nuphar lutea* and *Nymphaea alba*. Calcium contents was strikingly high in all waters, with an average content of 68,79 mg/l. In the study area, negative influences such as destruction of submerged vegetation caused by air-borne acids were buffered by Ca-, Mg- and K-ions in historical as well as in recent times. Therefore, the young moraine landscape of northeastern Germany can also in future be regarded as the recent core area of *Epitheca bimaculata*." (Author)] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

4778. Brenden, T.; Murphy, B.R. (2004): Experimental assessment of age-0 largemouth bass and juvenile

bluegill competition in a small impoundment in Virginia. North American Journal of Fisheries Management 24(3): 1058-1070. (in English). ["Previous research has found that early ontogenetic stages of largemouth bass *Micropterus salmoides* and bluegills *Lepomis macrochirus* may compete for food resources in small impoundments in northern-latitudes. We experimentally assessed whether competition also might occur in a southern-latitude system by stocking fish allopatrically and sympatrically in 1.0-m³ cages within a small impoundment in Virginia and monitoring fish growth and diets. Although growth was not significantly different between bluegills stocked with and without largemouth bass, largemouth bass grew significantly larger when stocked alone than when stocked with bluegills. Although bluegills maintained similar diets in terms of sizes, numbers, and types of items consumed, largemouth bass stocked alone consumed fewer but larger items than those stocked with bluegills. Further, largemouth bass consumed higher volumetric proportions of Diptera larvae and Odonata nymphs when stocked alone than when stocked with bluegills. Of these two items, only Diptera larvae constituted a large portion of bluegill diets. Competition between largemouth bass and bluegills apparently occurs in both southern- and northern-latitude small impoundments. Competition with bluegills may result in a competitive juvenile bottleneck for largemouth bass in regions where overwinter mortality is size related, which could affect management (i.e., stocking, establishing harvest regulations) of small-impoundment fisheries." (Authors)] Address: Brenden, T., Sch. Nat. Resources & Environm., Univ Michigan, 212 Museum Annex, Ann Arbor, MI, 48109, USA. E-mail: tbrenden@umich.edu

4779. Brockhaus, T. (2004): Buchankündigung: Libellenfauna Sachsen. insecta 9: 34. (in German). [Announcement for the new book on the odonate fauna of Saxonia, Germany scheduled to be released early in 2005.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

4780. Brockhaus, T. (2004): Interspezifische Konkurrenz zwischen *Sympetrum fonscolombii* und *Orthetrum cancellatum* in Mitteleuropa? (Odonata: Libellulidae). Libellula 23(1-2): 77-86. (in German, with English summary). ["In 2003, both spp. were observed as common at the pond 'Beuthenteich' (district Stollberg/Erzgebirge, Saxony, Germany). Apart from imaginal records, also larvae of both spp. were sampled. The head widths of 80 larvae of *O. cancellatum* were measured. For seven larvae of *S. fonscolombii* the total length, the head widths and the number of abdominal segments covered by the wing cases were determined. A larva of *S. fonscolombii*, found on 31 August 2003, was damaged partially by predation. The developmental cycles of both species are discussed under the aspect of interspecific competition of the larvae. It is suggested that in 2003 the sp. had three imaginal and two larval generations. However, one can also suggest a retarded development of *S. fonscolombii* because of the presence and the predatory or competitive effect of larger *O. cancellatum* larvae in higher densities." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

4781. Brodin, T.; Johansson, F. (2004): Conflicting selection pressures on the growth/predation risk trade-off in a damselfly. Ecology 85(11): 2927-2932. (in Eng-

lish). ["Activity is an important behavioral trait that in most animals mediates a trade-off between obtaining food for growth and avoiding predation. Active individuals usually experience a higher encounter rate with food items and predators and, as a consequence, grow faster and suffer higher predation pressure than less active individuals. We investigated how predator-induced mortality and growth of the damselfly *Coenagrion hastulatum* depend on activity at the level of the genotype. Larvae from six different *C. hastulatum* families were reared in two different predator treatments: predator present or absent. Families differed in activity, and active families grew to a significantly larger size than less-active families. Within families there was a plastic response to predators. Larvae reared without predators were more active and grew larger than larvae reared with a non-lethal predator. In the presence of a lethal predator the active families experienced higher mortality than the less active families. The results illustrate that the growth/predation-risk trade-off was mediated by activity and clearly show a cost of antipredator behavior. They also suggest that variation in activity level might be genetically regulated and could explain why *C. hastulatum* are abundant in aquatic systems both with and without potential predators." (Authors)] Address: Brodin, T., Dept Ecol. & Environm. Sci., Umea Univ., S-90 187 Umea, Sweden. E-mail: tomas.brodin@eg.umu.se

4782. bsb (2004): Die Libellen und ihr Maler. Der Bund 22. Dez. 2004: 15. (in German). [Newspaper report on the exhibition of the work of Paul André Robert in Biel, Switzerland] Address: http://194.209.226.170/pdfarchiv/bund/2004/12/22/30015Kultur20_0412221.pdf

4783. Buczyński, P.; Moroz, M. (2004): *Aeshna affinis* vander Linden and *Sympetrum depressiusculum* (Selys) found in Belarus (Anisoptera: Aeshnidae, Libellulidae). *Notulae Odonatologicae* 6(4): 37-39. (in English). ["The 2 species were found in 2001 in the 'Prypyatski' National Park (southern Belarus). *S. depressiusculum* is new for the country, *A. affinis* has been recorded for the first time since a single record in 1933. Localities are described and the distribution of the species is discussed." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4784. Buczyński, P. (2004): The dragonflies (Odonata) of Polesie National Park and its protection zone: new data and the summary of studies conducted in the years 1985-2003. *Parki Narodowe i Rezerваты Przyrody* 23: 381-394. (in Polish, with English summary). [New records of 43 species are given from Polesie National Park situated north of Lublin, Poland. "Ophiogomphus cecilia and *Libellula fulva* are new for the park. Odonatological studies conducted in the years 1985-2003 are summed up. The park was studied very well and data about the protection zone are rich but incomplete. Among 56 species found in general, 52 occurred in the park. 9 species protected by law (of 15), 8 from national Red list (of 16), 8 from regional Red list (of 15), one species from the Red list of IUCN (of 1), 6 from annexes of Bern Convention and Habitats Directive (of 7) were found. The dragonfly communities of lakes, fens, peat bogs, small water bodies and ponds were the most valuable. The fauna of rivers was highly impacted due to the river regulations. Despite anthropogenic changes of the environment it can be concluded

that the current situation of the dragonfly fauna is still very good. This is the result of good preservation of some habitats and traditional use of many changed habitats: extensive agriculture, hand peat exploitation and fish breeding. Therefore, the conservation of dragonflies demands the setback of changes in natural habitats (mainly eutrophication and falling of ground water level) as well as the continuation of traditional use in habitats that are transformed or created by man." (Author) Records of the following species are briefly discussed: *Coenagrion armatum*, *Nehalennia speciosa*, *Gomphus vulgatissimus*, *Leucorrhinia albifrons*, and *L. caudalis*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4785. Buczyński, P.; Tończyk, G. (2004): The importance of national parks for the protection of dragonflies (Odonata) in Poland. *Parki Narodowe i Rezerваты Przyrody* 23: 357-380. (in Polish, with English summary). [The paper compiles data of the dragonfly fauna of the Polish National Parks (NP). It is based on literature data for 21 parks as well as on original data from 12 parks (Biebrzański, Bieszczadzki, Drawieński, Gorczański, Gór Stołowych, Kampinoski, Roztoczański, Słowiński, Świętokrzyski, Tatrzański, Wielkopolski, Wigierski NP). There are no data available about two recently created parks: Ujście Warty and Magurski NP. 70 species (97% of the national odonate fauna) of dragonflies are represented within the borders of the National Parks. Dragonfly assemblages associated with peat bogs, small water bodies, and rivers are well but not satisfactorily protected. In the most parks there are no protective activities directed to the Odonata. Only Bory Tucholskie and Drawieński NP run special studies in the framework of establishing schemes for fauna protection.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

4786. Buden, D.W. (2004): The Odonata of Pakin, Ant, Mokil, and Pingelap atolls, Eastern Caroline Islands, Micronesia. *Micronesica* 37(1): 145-155. (in English). ["Seven species of Odonata are recorded from among Pakin, Ant, Mokil, and Pingelap atolls, Eastern Caroline Islands, Micronesia - one Zygoptera (damselfly), *Ischnura aurora*; and six Anisoptera (dragonflies), including *Anax guttatus*, *Agrionoptera sanguinolenta*, *Diplacodes bipunctata*, *Pantala flavescens*, *Tholymis tillarga*, and *Tamea transmarina*. None is endemic to the islands, but *A. sanguinolenta* is known to breed only in Chuuk and Pohnpei states, east-central Micronesia; the six others are widely distributed in Oceania and the Indo-Australian region, and in some cases well beyond. The largest number of species recorded on any one of the four atolls is five each on Mokil and Pingelap-six each if unconfirmed records of *A. guttatus* are accepted. Multiple surveys on Ant and Pingelap atolls reveal differences in species composition on the two atolls, but no marked seasonal variations. Evidence of breeding was obtained for all but the two least common species (*I. aurora* and *D. bipunctata*) and data suggest that breeding occurs year-round." (Author)] Address: Buden, D.W., Division of Natural Sci. & Mathematics, College of Micronesia-FSM, P.O. Box 159, Kolonia, Pohnpei FM 96941, Micronesia. E-mail: donbuden@comfsm.fm

- 4787.** Burrial, A.T.; Ocharan, F.J. (2004): Frogs as prey of dragonflies. *Notulae Odonatologicae* 6(4): 42-44. (in English). [Anax imperator larvae were found catching and eating small, living frogs, *Rana perezi*.] Address: Burrial, A. T. Dept Biol. Organism and Sistemas, Univ. Oviedo, E-33071, Oviedo, Spain. E-mail: antoni-otb@hotmail.com
- 4788.** Buttstedt, L.; Zimmermann, W.; Kleemann, R. (2004): Erstnachweis der Feuerlibelle (*Crocothemis erythraea* Brullé, 1832) in Sachsen-Anhalt. *Pedemontanum* 5: 7-8. (in German). [C. erythraea was proofed for the first time in Sachsen-Anhalt, Germany near Katharinenrieth (Landkreis Sangershausen) between June and August 2003. The records are documented along with a list of co-occurring odonate species] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany
- 4789.** Caldwell, J.P.; de Araujo, M. C. (2004): Historical and ecological factors influence survivorship in two clades of phytotelm-breeding frogs (Anura: Bufonidae, Dendrobatidae). *Miscellaneous Publications Museum of Zoology University of Michigan* 193: 11-21. (in English). ["Throughout Amazonia, Brazil nut trees (*Lecythidaceae*, *Bertholletia excelsa*) produce a grapefruit-sized fruit with a thick, woody pericarp that is functionally indehiscent; each fruit contains 25 or more seeds (Brazil nuts). After falling to the ground, the fruit capsules are chewed open and emptied of their seeds by agoutis (genus *Dasyprocta*). The empty capsules remain on the forest floor and fill with rainwater. Five Amazonian frog species in two clades, Dendrobatidae and Bufonidae, and two insects with predaceous larvae use Brazil nut capsules for some aspects of reproduction. These small microhabitats lack some kinds of predators (fish) but have others (insects) and can have limited food and low oxygen levels. Interactions among tadpoles and insect larvae and the possible effects of food limitation and anoxia were studied at three sites in Brazil. *Bufo castaneoticus* deposits clutches of eggs that are small compared to most other species in the genus (mean number of eggs: 178 at one locality and 234 at another locality). Survivorship of eggs of *Bufo castaneoticus* at all sites was low. Mean volume of water in the capsules at two localities was 110.9 ml and 132.4 ml; thus, eggs and larvae are crowded, presumably leading to anoxia, especially in the absence of rainfall. An experiment in which tadpoles were raised with and without food revealed that metamorphosis does not occur in unfed tadpoles; thus, food limitation may decrease growth and survivorship. Damselfly larvae occur significantly more frequently with tadpoles of *Bufo* than in all capsules in the samples. These factors appear to provide a competitive release for *Bufo* tadpoles; reduction of tadpole density may increase the probability that some individuals will survive. If they are the first colonizers, the predaceous tadpoles of *Dendrobates* can eliminate predators from the capsules. More basal clades of dendrobatids have detritivorous tadpoles that are not capable of eliminating predators from the capsules. Although they primarily use small forest pools and stream edges for tadpole deposition, tadpoles of *Allobates femoralis* and *Colostethus* sp. were transported occasionally to Brazil nut capsules, where their survivorship was low compared to *Dendrobates*. The propensity of individuals in basal clades for depositing some tadpoles in phytotelmata may have led in part to the evolution of use of phytotelmata by the derived *Dendrobates* once a predaceous tadpole evolved. Occasional deposition of tadpoles in phytotelmata by basal dendrobatids may represent a transitional step from obligate tadpole deposition in forest streams or pools to facultative phytotelm tadpole deposition to obligate phytotelm deposition (*Dendrobates*)."] Address: Caldwell, Janalee, Sam Noble Oklahoma Museum Nat Hist, Univ Oklahoma, Norman, OK, 73072, USA. E-mail: caldwell@ou.edu
- 4790.** Callisto, M.; Goulart, M.; Medeiros, A.O.; Moreno, P.; Rosa, C.A. (2004): Diversity assessment of benthic macroinvertebrates, yeasts, and microbiological indicators along a longitudinal gradient in Serra do Cipó, Brazil. *Braz. J. Biol.* 64(4): 743-755. (in English, with Portuguese abstract). ["The main goals of this study were: 1) to evaluate the structure, diversity, and functional trophic group composition of benthic macroinvertebrate communities; 2) to characterize water quality in the headwaters of the Doce river watershed, based on physical, chemical, and biological parameters (benthic macroinvertebrates, fecal coliforms, heterotrophic bacteria, and yeasts); and 3) to contribute to the knowledge of the structure and function of longitudinal gradients in lotic ecosystems in Brazil. A total of 60 benthic macroinvertebrate taxa were identified, the dominant group being the aquatic insects, with 50 families distributed in 8 orders. The dry period presented higher values of taxonomic richness and total density of benthic macroinvertebrates. A decreasing gradient was observed in these variable values from the 3rd order stretch down to the 6th order stretch. The highest Shannon-Wiener diversity values were found in the rainy period in the 3rd order stretches, which presented well-developed riparian forest. Besides the 3rd order stretches, the Pielou evenness index values were also high in the 6th order stretch. The collectors, together with the scrapers, predominated in the benthic macroinvertebrate communities in all river stretches, except in the 2nd, 4th, and 5th order stretches in the rainy period, where communities were dominated by filterers. The shredders and predators presented low densities for all river stretches. All microbiological variables presented low levels. Due to the high counts of heterotrophic bacteria and coliforms, the studied river stretches presented inadequate potability but adequate balneability levels. The results suggest that the structure, diversity, and composition of the benthic macroinvertebrate communities are influenced by the trophic resource availability, seasonality, and sediment heterogeneity. The microbiological results of this study allow inferring that the waters from Serra do Cipó have excellent potential for recreational use and as future sources of water for human consumption." (Authors) The list of taxa includes Odonata on the family level.] Address: Callisto, M., Laboratório de Ecologia de Bentos, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, C.P. 486, CEP 30161-970, Belo Horizonte, MG, Brazil, e-mail: callisto@icb.ufmg.br
- 4791.** Cammaerts, R. (2004): Taxonomic studies on African Gomphidae (Odonata, Anisoptera) 2. A revision of the genus *Neurogomphus* Karsch, with the description of some larvae. *Belgian Jour. Entom.* 6(1): 91-239. (in English). ["A revision of the genus *Neurogomphus* is presented. 17 species and two distinct subspecies are recognised, i.e. *N. fuscifrons* Karsch, 1890, *N. agilis* (Martin, 1908), *N. martinus* (Lacroix, 1921), *N. uelensis* Schouteden, 1934, *N. vicinus* Schouteden, 1934, *N.*

wittei Schouteden, 1934, *N. chapini* (Klots, 1944), *N. featheri* Pinhey, 1967, *N. pallidus* Cammaerts, 1967, *N. pinheyi* Cammaerts, 1968, *N. angustisigna* Pinhey, 1971, *N. alius* sp. n., *N. paenulensis* sp. n., *N. cocytius* sp. n., *N. zambeziensis* sp. n., *N. carlcooki* sp. n., *N. chapini lamtoensis* subsp. n., *N. dissimilis* sp. n. and *N. dissimilis malawiensis* subsp. n. The genus is divided into two subgenera, of which *Mastigogomphus* (type-species: *Oxygomphus chapini* Klots, 1944) is new. Of the former described species, all but one (*Karschiogomphus ghesquierei* Schouteden, 1934) remain valid, but their names were often erroneously applied to unrelated taxa. Synonymy lists give evidence of this great amount of confusion. Nevertheless, the accurate status of five of the taxa here recognised as well as of some females (*N. sp. cf. zambeziensis* from Tanzania and sp. indet. A, B, C, D) awaits further collecting of material. Generic larval characters are specified for the first time and the larvae of some species are described, among others that of *N. alius* as well as the supposed larvae of *N. cocytius*, *N. zambeziensis* and *N. featheri*. Information about the biology of the larvae is reviewed." (Author)] Address: Cammaerts, R., Serv. Syst. and Ecol. Anim., Free Univ. Brussels, CP 160-13,50 Av FD Roosevelt, B-1050, Brussels, Belgium. E-mail: rcammaer@ulb.ac.be

4792. Chapman, L.J.; Schneider, R.J.; Apodaca, C.; Chapman, C.A. (2004): Respiratory ecology of macroinvertebrates in a swamp river system of East Africa. *Biotropica* 36 (4): 572-585. (in English). ["Hypoxia (oxygen scarcity) is widespread in tropical freshwaters, particularly in dense swamps, and may be an important factor structuring benthic macroinvertebrate communities. Macroinvertebrates show a diversity of respiratory modes ranging from atmospheric breathing to tracheal gill breathing, and these adaptations affect their ability to use hypoxic water. The objectives of this study were to (a) describe the benthic macroinvertebrate community from ten swamp and river sites in Kibale National Park, Uganda, (b) determine the degree to which dissolved oxygen explains variation in abundance of respiratory groups (taxa with a similar respiratory mode) among sites, and (c) test for significant seasonal variation in the abundance of the numerically dominant respiratory groups. Macroinvertebrates from monthly collections over a two-year period were identified to the lowest taxonomic level necessary to place them in functional respiratory groups. Across all sites, both the relative and absolute abundance of atmospheric breathers (e.g., pulmonate snails and nepids) and mantle/ctenidia breathers (primarily fingernail clams) were negatively correlated with dissolved oxygen, while the abundance of tracheal gill breathers (e.g., anisopterans and zygopterans) was positively correlated with dissolved oxygen. We did not detect significant seasonal trends in catch per unit effort of numerically dominant respiratory groups. Dissolved oxygen concentration was a good predictor of the abundance of some respiratory groups and may be a key factor in maintaining the structure and diversity of these assemblages." (Authors) Address: Chapman, Lauren J., Department of Zoology, University of Florida, Gainesville, Florida 32611, USA. E-mail: lauren.chapman@mcgill.ca

4793. Chovanec, A.; Waringer, J.; Raab, R.; Laister, G. (2004): Lateral connectivity of a fragmented large river system: assessment on a macroscale by dragonfly surveys (Insecta: Odonata). *Aquatic Conservation: Ma-*

rine & Freshwater Ecosystems 14(2): 163-178. (in English). ["1. The ecological status of floodplain areas along the Austrian section of the Danube was assessed by an approach based on dragonfly surveys. Although this river section contains a relatively high portion of the river-type-specific alluvial floodplain areas, most of them are influenced by river regulation and damming. 2. A key element of the assessment procedure, which is oriented towards the new EC Water Framework Directive, is the Odonate Habitat Index. 3. Classification of ecological status is based on the comparison between the status quo and reference conditions derived from a historical situation minimally influenced by human activities. 4. Data from 408 sites from 14 investigation areas were used. Ten of the 14 areas were ranked in class II (good ecological status) within the five-tiered system, which is the level of ecological status targeted in the directive. One area corresponds to the reference condition (class I, high ecological status), and three areas do not meet the quality objective (class III, moderate ecological status). A total of 49 species were found along the whole section, which represents 82% of the river-type-specific reference list." (Authors)] Address: Chovanec, A., c/o Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien, Austria. E-mail: chovanec@ubavie.gv.at

4794. Clausnitzer, V. (2004): Diversity and species composition of Odonata as indicators of biotope quality of East African rain forests and their replacement communities. Project ID: 01 LC 0025 (BIOTA AFRICA E07) 01.05.2001-30.04.2004: 2 pp. (in English). [Verbatim: The principal aim of this project is a comparative study of ecology, diversity and biogeography of dragonflies (Insecta: Odonata) in primary, secondary and fragmented rain forests and different wetland habitats in East Africa. To achieve this an identification key for the dragonflies of eastern Africa is prepared and distribution data as well as data on species specific habitat requirements are collected. These will be used for further applied studies, e.g. the development of indicator systems for environmental disturbances. Results: Utilising both, aquatic and terrestrial habitats, the large, predominantly diurnal dragonflies, who can be readily observed and in most cases easily identified in the field, can contribute much to the evaluation of environmental quality. They are known to be very sensitive to structural habitat quality and thus can be a valuable tool to evaluate landscape degradation and have been used as indicator species. The amphibious larvae of dragonflies are critical in regard to water quality and aquatic morphology of streams. The adults are sensitive to habitat structure and are excellent indicators of river disturbance, e.g. changes in habitat structure. Within this project a throughout inventory of East African dragonflies in various habitats and the collection of species specific ecological data is aimed at. Current activities: Data collection has been started in different areas in Kenya, Uganda and Tanzania. In most areas visited, new records for the could be made and a lot of data on various ecological aspects could be collected. The PhD student John Joseph Kisakye, (Makerere University, Kampala, funded through the BIOTA programme) works on dragonflies in different forests. In cooperation with a GEF project in southern Tanzania it is planned to have Master's projects on the impact of habitat degradation on dragonflies from 2002. Coastal forests in Kenya: During the last year coastal forests of Kenya were surveyed to a large extend. Coastal forests are listed as important areas in terms of conservation for East Africa [1]

and are a major centre of endemism in Africa [2, 3]. Coastal forest areas of Kenya and Tanzania are the primary habitat for a number of highly localised dragonfly species (endemics and/or of unique taxonomy). Detailed studies were carried out on the ecology of the two dendrolimnetic species *Coryphagrion grandis* and *Hadrothemis scabrifrons*. Dragonfly communities relative to different habitat types from indigenous forests to cultivated landscapes were described. Most of the forest species are confined to coastal forests of East Africa, being stenotopic and highly sensitive to disturbance. With increasing habitat disturbance eurytopic species which are common and widely distributed in Africa colonise the habitats. The species assemblages between different habitat types (stream, swamp, pool) in the disturbed landscape are identical, the beta-diversity being very low, although the diversity of single localities may increase after habitat disturbances. Publicity work: Species check-lists for several National Parks and other protected areas of Kenya have been prepared and were presented to the corresponding authorities. Information boards on the local dragonflies were prepared for some visitor centres (Saiwa Swamp NP, Mt. Elgon NP, Arabuke Sokoke Forest, Nairobi NP). For 2002 a small dragonfly workshop is planned in the Institute of Environmental and Natural Resources, Makerere University, Kampala. Cooperations: Dragonflies are included in a Wildlife Conservation Society (WCS) project in Tanzania "Southern Highlands Conservation Programme" and in a DANIDA funded project on IBA fs in Uganda. Within all projects national reference collections are build up and local scientists trained. First negotiations have started with Ethiopia to include dragonflies in a planned inventory of insects. Together with BIOTA S08 species assemblages in arid habitats, colonisation strategies in seasonal habitats and population genetics of species with a panafrikan distribution and different dispersal types are comparatively studied. Odonatologists working in Africa are linked through the recently started PHAON (Pinhey's Heritage African Odonata Network), which proves to be an excellent tool to exchange views and data, discuss results and present projects. In cooperation with other scientists an atlas for African Odonata and a mapping programme are long term aims. Publications The identification key of East African dragonflies will be published in 2002 or 2003. A regional report on dragonflies of Eastern Africa for the IUCN Odonata Specialist Group has been recently prepared. At least one new species waits for description, while a number of other projects need more field work. Following recent manuscripts could be finished: Clausnitzer, V. 2001a. Notes on the species diversity of East African Odonata, with a checklist of species. *Odonatologica* 30:49-66 Clausnitzer, V. 2001b. Notes on *Trithemis bifida* and *T. donaldsoni* (Odonata: Libellulidae). *International Journal of Odonatologgy* 4:179-189 Clausnitzer, V. in press. Reproductive behaviour and ecology in the dendrolimnetic *Hadrothemis scabrifrons*. *The International Journal of Odonatologgy*. Clausnitzer, V., Lindeboom, M. submitted. Natural history and description of the dendrolimnetic larvae of *Coryphagrion grandis*. Clausnitzer, V. submitted. Dragonfly communities in coastal habitats of Kenya: indication of biotope quality and the need of conservation measures. References 1. Stuart, S. N., Adams, R.J., Jenkins, M. S. 1990. Biodiversity in sub-saharan Africa and its islands - conservation, management and sustainable use. IUCN, Gland & Cambridge 2. Fjeldsa, J., and Lovett, J.C. 1997. Geographical patterns of old and young species in African

forest biota: the significance of specific montane areas as evolutionary centres. *Biodiversity and Conservation* 6: 325-346 3. Kingdon, J. 1989. *Island Africa*. Princeton University Press, Princeton] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de; <http://www.biota-africa.de/Library/abstracts/pdf/east/E07-abstract.pdf>

4795. Clopton, R.E. (2004): *Calyxocephalus karyopera* g. nov., sp. nov. (Eugregarinorida: Actinocephalidae: Aactinocephalinae) from the Ebony Jewelwing Damselfly *Calopteryx maculata* (Zygoptera: Calopterygidae) in Southeast Nebraska, U.S.A.: Implications for mechanical prey-vector stabilization of exogenous gregarine development. *Comparative Parasitology* 71(2): 141-153. (in English). ["*Calyxocephalus karyopera* g. nov., sp. nov. (Apicomplexa: Eugregarinorida: Actinocephalidae: Actinocephalinae) is described from *C. maculata* collected along Turkey Creek in Johnson County, Nebraska, U.S.A. *Calyxocephalus* gen. n. is distinguished by the form of the epimerite complex: a terminal thick disk or linearly crateriform sucker with a distal apopetalus calyx of petaloid lobes and a short intercalating diamerite (less than half of the total holdfast length). The epimerite complex is conspicuous until association and syzygy. Association occurs immediately before syzygy and is cephalolateral and biassociative. Gametocysts are spherical with a Conspicuous hyaline coat. Lacking conspicuous sporoducts they dehisce by simple rupture. Oocysts are axially symmetric, hexagonal dipyramidic in shape with slight polar truncations, bearing, 6 equatorial Spines, 1 at each equatorial vertex and 6 terminal spines obliquely inserted at each pole, 1 at each vertex created by polar truncation. The ecology of the *C. karyopera*-*C. maculata* host-parasite system provides a mechanism for mechanical prey-vector Stabilization of exogenous gregarine development and isolation." (Author)] Address: Clopton, R.E.; Dept Nat Sci, Peru State Coll, Peru, NE, 68421, USA. E-mail: rclipton@oakmail.peru.edu

4796. Costa, J.M.; Pujol-Luz, J.; Regis, L.P.B. (2004): Descrição de larva de *Zenithoptera anceps* (Odonata, Libellulidae). *Iheringia, Sér. Zool.* 94(4): 421-424 (in Portuguese, with English summary) [The larva of *Z. anceps* Pujol-Luz, 1993 is described and figured for the first time. A comparison among the known larvae of Palpopleurinae is presented. A key to the larvae of the neotropical genera of Palpopleurinae is added.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@unisys.com.br

4797. Cothran, R. (2004): Precopulatory mate guarding affects predation risk in two freshwater amphipod species. *Animal Behaviour* 68(5): 1133-1138. (in English). ["Contact mate guarding may increase predation risk in the presence of active, size-selective predators by increasing the apparent size or decreasing the escape ability of an individual. These same characteristics may, however, make paired individuals less vulnerable to sit-and-wait, non-size-selective predators. Because the costs and benefits associated with mate guarding are likely to depend on local ecological conditions, species or populations should vary in the duration of the guarding phase. In this study, I investigate whether precopulatory mate guarding increases an individual's pre-

dition risk for two freshwater amphipod species within the *Hyalella azteca* species complex that experience different predators. When larval dragonflies, *Anax junius* and *Tramea lacerata*, were used as predators in laboratory trials, single, unpaired individuals were more likely to be consumed than paired individuals. Conversely, predatory fish consumed paired females more often than single females. Therefore, the short precopulatory mate guarding duration observed in the species that co-occurs with predatory fish may be due to habitat-specific, predator-driven costs associated with precopulatory mate guarding. Furthermore, the predation cost associated with precopula was greater for females than males when predatory fish were used as predators, implying that intersexual conflict over the duration of the guarding period may be more intense for the species that co-occurs with predatory fish." (Author)] Address: Cothran, R., Dept Zool, Univ Oklahoma, Norman, OK, 73019, USA. E-mail: podman@ou.edu

4798. Cowell, B.C.; Remley, A.H.; Lynch, D.M. (2004): Seasonal changes in the distribution and abundance of benthic invertebrates in six headwater streams in central Florida. *Hydrobiologia* 522(1-3): 99-115. (in English). ["Seasonal variations in invertebrate assemblages at two sites (upstream and downstream) on six central Florida headwater streams were compared by sampling at quarterly intervals with core and dip net samplers. Two of the streams were reclaimed following phosphate mining (app. 6 yr prior to this study), two received runoff from mined lands, and two were disturbed by agriculture and/or residential developments. Physical and chemical characteristics of the reclaimed streams differed markedly from those of the non-reclaimed streams; principal differences between the streams were in current velocity, percent organic matter (POM), Mn, conductivity and alkalinity. Annual mean densities of meiofauna and smaller macrofauna for the 12 stream sites ranged from 20 896 to 175 212 m² and the mean for all sites was 56 492 m² reclaimed streams and one of the streams influenced by agriculture had annual means of less than 40 000 m²- to 5-fold lower than the other streams. Fall and winter core densities were 2.4-fold greater than those for spring or summer when drought and low dissolved oxygen prevailed. Meiofauna comprised 68-91% of the core sample invertebrates in reclaimed streams but only 43-62% in the non-reclaimed streams; principal functional groups were: gathering collectors -61.5%, predators -19.3% and filtering collectors -15%. The taxonomic composition of the reclaimed streams was predominated by crustaceans (60-71%) while chironomids and annelids were more abundant (71-92%) in the non-reclaimed streams. Dip net sampling added 21 larger macrofauna species (Odonata, Hemiptera and Coleoptera) to our list of taxa, producing a total of 209 species. Species richness and diversity (H' and N2) indices were lower in the reclaimed streams, but evenness was more variable. The Czekanowski-Dice-Sorensen similarity index showed that the reclaimed stream sites were quite similar to each other, but differed markedly from the other stream types; there was large variation both within and between seasons. For central Florida headwater streams, drought appears to have a larger influence on invertebrates than the type of land use, however this relationship should be confirmed using streams of similar hydrology." (Authors)] Address: Cowell, B., Dept Biol., Univ. S. Florida, Tampa, FL, 33620, USA. E-mail: cowell@chuma1.cas.usf.edu

4799. Czachorowski, S. (2004): Badania ważek, chrząszczy i chruścików na obszarach chronionych (Urszulim, 21-23 maja 2004 r.). *Parki Narodowe i Rezerwaty Przyrody* 23: 535-537. (in Polish). [Brief report on a meeting held in Urszulim, northeast of Lublin, Poland including some odonatological remarks] Address: Czachorowski, S., Ecology and Protection of Environment, Pl. Łódzki 3, PL-10-719, Poland

4800. De Block, M.; Stoks, R. (2004): Cannibalism-mediated life history plasticity to combined time and food stress. *Oikos* 106: 587-597. (in English). ["There is increasing awareness that combinations of biotic and time stress interact in shaping life history plasticity. Despite being widespread and abundant, the role of cannibalism in linking both types of constraints to life history plasticity has been largely neglected. Moreover, no studies disentangled direct (due to the extra meal) and indirect (due to the elimination of the competitor) life history effects of cannibalism, and little is known about their differential dependency on these constraints. We studied effects of cannibalism on the life history of the damselfly *Lestes viridis* under combinations of time stress (by manipulating the perceived time available in the growth season) and food stress. We reared larvae per two and disentangled direct and indirect effects of cannibalism by preventing cannibalism in half of the cups and by manipulating the per capita food increase after cannibalism. Cannibalism was more frequent under both time stress and food stress and our results show it may help cannibals to compensate for the negative effects of these constraints imposed on life history. Both direct and indirect benefits of cannibalism (increased development and growth rates, larger mass at emergence) were dependent on the timing of cannibalism, being more pronounced or only present when cannibalism occurred early. Moreover, we found that the ecological constraints (time stress and food stress) also differentially shaped some of the direct and indirect effects. Given the differential context-dependency of direct and indirect effects and the fact that direct and indirect life history effects may be both important in shaping life history, disentangling these effects is critical to mechanistically understand under which conditions cannibalism is expected to be adaptive or not." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4801. Dijkstra, K.-D.; Kalkman, V.J. (2004): Een odonatologische excursie naar Zuid-Nederland, een halve eeuw later. *Entomologische Berichten (Amsterdam)* 64 (5): 157-161. (in Dutch, with English summary). ["An odonatological excursion to the southern Netherlands, half a century later. From 26 August to 1 September 1951 an illustrious company of odonatologists, including P.S. Corbet, D.C. Geijskes, K. Lems, M.A. Lieftinck, C. Longfield, and L.S. Wolfe, made a bicycle tour along 'classic'-sites for dragonflies in the south of The Netherlands. In 2001, exactly 50 years later, the authors repeated this excursion. Comparison of the results of both trips illustrates nicely how half a century of changes in the Dutch landscape, environment and climate have affected the odonate fauna." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

4802. Donath, H. (2004): Neue Funde der Großen Moosjungfer (*Leucorrhinia pectoralis*) im Naturpark Nie-

derlausitzer Landrücken. Biologische Studien Luckau 33: 90-91. (in German). [8 Brandenburg, Germany; new localities with records of *L. pectoralis* are briefly documented.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

4803. Donath, H. (2004): Neue Naturschutzgebiete in der Luckauer Region. Biologische Studien Luckau 33: 5-12. (in German). [New nature conservation areas in the county Dahme-Spreewald, Brandenburg, Germany are introduced. Several references to the Odonata are made.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

4804. Dumont, H.J. (2004): Distinguishing between the East-Asiatic representatives of Paracercion Weekers & Dumont (Zygoptera: Coenagrionidae). Odonatologica 33(4): 361-370. (in English). ["Eight species occurring in Japan and continental East Asia are separated by the morphology of their male terminalia and by the structure of the female pronotum and adjacent laminae mesostigmatales. Paracercion barbatum is confirmed as a good species, probably restricted to China, where it co-occurs with *P. impar* and other species. The continental East Asian *P. v-nigrum* is suggested to share a common ancestor with the Japanese *P. sieboldii*. On chorological grounds, the latter should not exist in Taiwan. Both sexes of all species are keyed." (Author) Not included in the revision are the taxa *C. luzonicum* Asahina, 1968, *C. malayanum* (Selys, 1876), *C. pendulum* (Needham & Gyger, 1939), and *C. yunnanensis* Zhu & Han, 2000.] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

4805. Echols, K.R.; Tillitt, D.E.; Nichols, J.W.; Se-cord, A.L.; McCarty, J.P. (2004): Accumulation of PCB congeners in nestling tree swallows (*Tachycineta bicolor*) on the Hudson River, New York. Environmental Science & Technology 38(23): 6240-6246. (in English). ["Tree swallows were used as a sentinel species to monitor the contamination and bioavailability of polychlorinated biphenyls (PCBs) in the Hudson River watershed. Several tree swallow nest box colonies around and downstream from Hudson Falls, NY were studied. Tree swallow eggs, adults, and 5-, 10-, and 15-day-old nestlings were collected and analyzed for 103 PCB congeners. Emergent insects collected by net (primarily Odonata) or as a food bolus (primarily Diptera) taken from the mouths of adult tree swallows returning to the nest were analyzed in the same manner. Total PCB concentrations (wet weight) in eggs from two contaminated sites ranged from 9000 to 25 000 ng/g and accumulated to 32 000 and 96 000 ng/g in 15-day-old nestling at two contaminated sites. The congener patterns of PCBs in eggs, nestlings, and adults were compared to those found in emergent insects (Odonata and Diptera) using principal components analysis. The PCB patterns of the biota differed from that of Aroclor technical mixtures. PCB patterns in adult tree swallows were similar to those in eggs, while the patterns in dietary insects were similar to nestling tree swallows. Uptake rate constants were determined for tree swallow nestlings and compared between the two contaminated sites. The estimated PCB congener uptake rate constants were 0.008-0.02 d⁻¹ based on uptake in nestlings until day 15 post-hatch. The rate constants were comparable between the two study areas and may be used to predict nestling contamination at other locations. Our studies confirm

the utility of nestling tree swallows to evaluate localized PCB contamination." (Authors)] Address: Tillitt, D.E., Columbia Environm. Res. Ctr., US Geol. Survey, 4200 New Haven Rd, Columbia, MO, 65201, USA. E-mail: dtillitt@usgs.gov

4806. Englund, R.A.; Arakaki, K. (2004): Rapid Biological Inventories of Streams in the Ala Wai Watershed, Oahu Island, Hawai'i. Final Report prepared for: Oceanit Laboratories, Inc., 1001 Bishop Street, ASB Tower 2970, Honolulu, Hawai'i 96813, USA. Contribution No. 2004-007 to the Hawaii Biological Survey: 16 pp. (in English). [...] With a few notable exceptions, the aquatic macrofauna found within the Ala Wai watershed was comprised largely of invasive alien species. Except in the highest reaches of the Ala Wai watershed, aquatic habitats were found to be highly disturbed; this was a result of the effects of urbanization that includes stream diversions and miles of concrete channelization. The worst form of channelization found during these surveys was the flat-bottom concrete lined channels such as those found in lower Pälolo Stream, where stream temperatures were increased by 23° F because of channelization. No native aquatic species were found in concrete-lined stream channels. A complete loss of channel heterogeneity and riparian vegetation cover result in increased water temperatures that are lethal to native species. [...] (Authors) 6 (invasive) odonate species are listed.] Address: <http://hbs.bishopmuseum.org/pdf/alawai.pdf>

4807. Fenoglio, S.; Bo, T.; Cucco, M. (2004): Small-scale macroinvertebrate distribution in a riffle of a neotropical rainforest stream (Rio Bartola, Nicaragua). Caribbean Journal of Science 40(2): 253-257. (in English). ["Streams are highly heterogeneous environments in which habitat characteristics vary drastically over small distances, but little information is available in this context about Neotropical systems. In this work, we analyse the relationship between taxonomical composition and functional organization of stream benthic communities and some environmental variables in a single riffle of the Rio Bartola, Nicaragua. Current velocity, position in the streambed, and substratum composition evidently influence invertebrate density and taxonomical richness. We investigate the functional organisation of the communities, reporting that collectors are the most represented functional feeding group, while shredders are almost absent." (Authors) Four odonata taxa are listed on the genus level.] Address: University of Eastern Piedmont, Via Cavour 84 I-15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

4808. Fleck, G. (2004): La larve du genre *Cyanothemis* Ris, 1915 (Odonata: Anisoptera: Libellulidae). Consequences phylogénétiques. Ann. Soc. Ent. France 40 (1): 51-58. (in French, with English summary). ["The larva of the genus *Cyanothemis* Ris, 1915 is described and illustrated for the first time. The comparison of the larva and adult of *Cyanothemis* with those of *Lepthemis* Hagen, 1861 and *Rhodothemis* Ris, 1911 suggests that these three genera are closely related, filling a phylogenetic gap which nearly goes back a century. The genus *Acisoma* Rambur, 1842, even if more derived, has to be considered as belonging to the clade (*Cyanothemis* + *Lepthemis* + *Rhodothemis*). The genera *Nannophya* Rambur, 1842 and *Nannothemis* Brauer, 1868, put traditionally into *Brachydiplacinae* and not into *Sympetrinae*, could be the adelphotaxa of the clade

(Acisoma + Cyanothemis + Lephthernis + Rhodothemis). Studying wing venation in systematics and phylogeny was till now preponderant, but seems to be limited for the Libellulidae." (Author)] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

4809. Fleck G.; Bechly G.; Martínez-Delclòs X.; Jarzembowski E. A.; Nel A. (2004): A revision of the Upper Jurassic-Lower Cretaceous dragonfly family Tarsophlebiidae, with a discussion on the phylogenetic positions of the Tarsophlebiidae and Sieblosiidae (Insecta, Odonoptera, Panodonata). *Geodiversitas* 26(1): 33-60. (in English with French summary). ["The Upper Jurassic-Lower Cretaceous dragonfly family Tarsophlebiidae is revised. The type species of the type genus Tarsophlebia Hagen, 1866, *T. eximia* (Hagen, 1862) from the Upper Jurassic Solnhofen Limestones, is redescribed, including important new information on its head, legs, wings, anal appendages and male secondary genital apparatus. The type specimen of Tarsophlebiopsis mayi Tillyard, 1923 is regarded as an aberrant or unusually preserved Tarsophlebia eximia. One new species of Tarsophlebia and three new species of Turanophlebia are described, i.e. Tarsophlebia minor n. sp., Turanophlebia anglicana n. sp., T. mongolica n. sp., and T. vitimensis n. sp. A new combination is proposed for Turanophlebia neckini (Martynov, 1927) n. comb. The phylogenetic relationships of the Mesozoic Tarsophlebiidae are discussed on the basis of new body and wing venation characters. The present analysis supports a rather derived position for the Tarsophlebiidae, as sister group of the the Epiproctophora rather than of (Zygoptera + Epiproctophora). Also, through the present discussion, the Oligo-Miocene family Sieblosiidae seems to be more closely related to the Epiproctophora than to the Zygoptera. But the present study and previous analyses suffer of the lack of informations concerning the more inclusive groups of Odonoptera, viz. Protozygoptera, Triadophlebiomorpha, Protanisoptera, etc. The significance of the tarsophlebiid secondary male genital apparatus for the reconstruction of the evolution of odonate copulation is discussed." (Authors)] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

4810. Forbes, M.R.; Muma, K.E.; Smith, B.P. (2004): Recapture of male and female dragonflies in relation to parasitism by mites, time of season, wing length and wing cell symmetry. *Experimental and Applied Acarology* 34(1-2): 79-93. (in English). ["For aquatic mites parasitic on dragonflies, completion of their life cycle depends on their being returned to appropriate water bodies by their hosts, after completion of engorgement. We examined whether differences among hosts in timing of emergence or phenotypic attributes might affect their probability of return to an emergence pond, and hence success of mites. Parasitized males and females of the dragonfly *Sympetrum obtrusum* (Hagen) did not differ in overall recapture rates. Females that had wing cell symmetry and emerged early were more likely to be recaptured than females that emerged later or had wing cell asymmetry, but there were no consistent relations between these variables and parasitism by mites. No such relations between wing cell asymmetry, emergence date, and recapture likelihood were found for males. Using randomization tests, we found that mean intensities of *Arrenurus planus* (Marshall) mites at host emergence were the same for recaptured females and fema-

les not recaptured; however, males that were recaptured had lower mean intensities of mites at emergence than males not recaptured. Further, mature females carried more mites than mature males, and the latter had fewer mites than newly emerged males not recaptured. Biases in detachment of engorging mites do not explain the differences in parasitism between mature males and females, nor the differences in mite numbers between mature males and newly emerged males that were not recaptured. Rather, heavily parasitized males appear to disperse or die and are not recaptured, which should have implications for dispersal of mites and fitness of male hosts." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

4811. Freitag, H. (2004): Composition and longitudinal patterns of aquatic insect emergence in small rivers of Palawan Island, the Philippines. *Inter. Rev. Hydrobiol.* 89(4): 375-391. (in English). ["This study presents the first emergence trap samples from streams in the Philippines and Greater Sunda. Aquatic insect emergence from two small rivers and longitudinal patterns including estuaries are compared. A decline of total emergence towards estuaries was observed, affecting all major orders. Diptera, namely Chironomidae, dominated all sites. High abundances in Ceratopogonidae, Odonata, and Coleoptera were found, compared to other emergence studies from tropical and temperate latitudes. Ephemeroptera displayed a highly variable contribution to the emergence from Palawan as well as in other comparative studies either supported by the appropriate conditions for certain functional groups or limited by environmental variables such as pH. Trichoptera are likely to tolerate a wider range of environmental conditions and they are consequently able to fill further niches where Ephemeroptera are under-represented. Except for scarce abundances of Plecoptera observed in this and other studies from the tropics, no substantial differences in emergence composition at order level existed between temperate and tropical rivers, however, with a remarkable local variation. Components of riparian and non-aquatic insects and non-emergent fauna contributing to the collections are discussed based on trap features. [...] Odonata occurred at all sites apart from estuaries in low numbers. The highest numbers were found at PR1 (98 a -1 m -2), and CR3 (73 a -1 m -2). *Rhinocypha humeralis* SELYS, 1873 (Chlorocyphidae) was frequent in the middle course (CR3, CR4) of the CR while *Prodasineura palawana* LIEFTINCK, 1948 (Protoneuridae) was dominant in the site PR1. A third species, *Coelliccia* sp. (Platycnemididae) was trapped once at CR1 (Table 2)." (Author)] Address: Freitag, H., Martin-Luther-University Halle-Wittenberg, Institute of Zoology, D-06099 Halle, Germany. In cooperation with Western Philippines University, Puerto Princesa Campus, Aquatic Science & Technology Department, Santa Monica, Puerto Princesa City, PH 5300 Palawan, the Philippines. E-mail: hendrik.freitag@gmx.de

4812. Gade, G.; Auerswald, L.; Predel, R.; Marco, H.G. (2004): Substrate usage and its regulation during flight and swimming in the backswimmer, *Notonecta glauca*. *Physiological Entomology* 29(1): 84-93. (in English). ["The metabolites that are generally used by insects during exercise are present in quite different concentrations in the haemolymph of the backswimmer *N. glauca* L. Lipids are most abundant (between 10 and 20

mg/mL), whereas carbohydrates (2-3 mg/mL) and proline (approximately 1 mg/mL) are at very low concentrations. Injection of an extract of conspecific corpora cardiaca causes pronounced hyperlipaemia in the backswimmer. A neuropeptide with the same effect was isolated from the corpora cardiaca in a single high-performance liquid chromatography (HPLC) step; the primary sequence was deduced from mass spectrometric measurements (matrix-assisted laser desorption/ionization-time of flight and electrospray quadrupole time-of-flight mass spectrometry) of whole corpora cardiaca, and the mass was confirmed in the HPLC fraction that had adipokinetic activity. The biologically active octapeptide has the sequence pGlu-Val-Asn-Phe-Ser-Pro-Ser-Trp amide, which was characterized previously from the corpora cardiaca of *Anax imperator*, and denoted Anaim-adipokinetic hormone (AKH). The synthetic Anaim-AKH peptide causes lipid mobilization when injected at a dose of 1 pmol into *N. glauca*. When other synthetic AKH members that occur in Hemiptera are injected into *N. glauca* at the same dose, the hyperlipaemic responses are significantly lower than after injection of Anaim-AKH. Because only lipids increase upon activity, such as continuous swimming for 1 h or during a 1-h rest period after a 3-min flight episode in the laboratory, it is assumed that Anaim-AKH serves as a true adipokinetic hormone in the backswimmer during bouts of natural swimming and flight." (Authors)] Address: Gade, G., Zoology Dept, Univ. of Cape Town, Rondebosch, 7701, South Africa. E-mail: ggade@botzoo.uct.ac.za

4813. Geraeds, R.P.G.; Schaik, V.A. van (2004): The dragonfly *Onychogomphus forcipatus*, a new species for the Netherlands? Findings of a few exuvia along the river Roer. *Naturhistorisch Maandblad* 93: 33-35. (in Dutch, with English summary). ["During a dragonfly survey along the river Roer, four exuviae of *Onychogomphus forcipatus* were found at three locations along the river Roer. The first exuvium was found on 5 July, south of Melick. The second and third exuviae were found on 12 July, west of Melick, both in the same location. The fourth was found on 9 August, also south of Melick. *Onychogomphus forcipatus* is not regarded as a native species in the Netherlands. There were only two reliable observations in the Netherlands in the 20th century, viz., in 1947 and 1995. Observations of this species along the river Roer in 2000 and the new findings of the three exuviae in 2003 show that *O. forcipatus* may have established itself along the river Roer. Since the larvae take three years to develop, it is likely that the larvae that emerged in 2003 are the offspring of the animals observed in 2000." (Authors)] Address: Geraeds, R.P.G., Julianalaan 46, NL-6042 JH Roermond, The Netherlands

4814. Gewecke, M.; Odendahl, A. (2004): Der Bewegungsapparat der Antennen des Großen Blaupfeils *Orthetrum cancellatum* (Odonata: Libellulidae). *Entomologia Generalis* 27(2): 73-86. (in German, with English summary). ["The antenna of *O. cancellatum* is composed of 6 segments, scapus, pedicellus, and 4 segments of the flagellum. Only the two proximal ones can be moved actively by muscles. The axis of the caput-scapus-joint and the axis of the scapus-pedicellus-joint are nearly parallel with each other. Thus the antenna can be moved above the frontal rim of the compound eye, forward-down or backward-up. The pedicellus-flagellum-joint is as like a socket joint passively movable in all directions. During flight the relatively stiff flagellum

is pushed backward by the head wind. These movements can be perceived by the organ of Johnston within the pedicellus. The muscles and sense organs of the antenna are innervated by the antennal nerve, originating from the deutocerebrum." (Authors)] Address: Gewecke, M., Inst. Zool. Abt. Neurphysiol., Univ. Hamburg, Martin-Luther-King Platz 3, D-20146, Hamburg, Germany

4815. Gossum, H. van; Stoks, R.; De Bruyn, L. (2004): Conspicuous body coloration and predation risk in damselflies: are andromorphs easier to detect than gynomorphs? *Belg. J. Zool.*, 134(2/1): 37-40. (in English). ["The coexistence of multiple female colour morphs in damselflies remains poorly understood. Typically, one of the female morphs is coloured like the male (andromorph), while the other morphs are not (gynomorphs). Andromorphs, by resembling males, are thought to benefit from avoiding male harassment. Some authors have proposed that this benefit is offset by a higher probability of detection for andromorphs compared to gynomorphs owing to differences in body colouration. We experimentally tested detectabilities of the different female colour morphs using human observers as model predators. In contrast to expectation, detection probabilities for andromorphs and gynomorphs were equal. We discuss the use of survival probabilities to test for differences in predation rate between female morphs and consider whether human predators are representative models for the natural predator guild of the studied damselfly." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4816. Gossum, H.V.; Adriaens, T.; Dumont, H.; Stoks, R. (2004): Sex- and morph-specific predation risk: Colour or behaviour dependency? *Eur. J. Entomol.* 101(3): 373-377. (in English). ["The coexistence of discrete morphs within a species, with one morph more conspicuous than the other(s) is often thought to result from both sexual selection and predation. In many damselflies, sexual dimorphism occurs jointly with multiple female colour morphs. Typically, one morph is coloured like the male (andromorph), while the other(s) is not (gynomorph(s)). The mechanisms contributing to the maintenance of such female polymorphism in damselflies remain poorly understood, especially the role of predation. We tested the detectability of two different female colour morphs of the damselfly, *Enallagma cyathigerum*, using human observers as model predators; andromorphs were detected more frequently than gynomorphs. Field data on mortality of males and the two different female morphs due to predation or drowning were also collected, and these observations support morph-specific mortality. In natural populations predation risk was higher in males than females; gynomorphs, however, were more prone to predation than andromorphs. Differences in behaviour between morphs, rather than colour, may explain this result." (Authors)] Address: Gossum, H.V. van, Evolutionary Biology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium; e-mail: Hans.VanGossum@ua.ac.be

4817. Groenendijk, D. (2004): Dragonflies and damselflies in Dutch limestone quarries. *Naturhistorisch Maandblad* 93: 95-99. (in Dutch, with English summary). ["Marl pits in the province of Limburg are of great entomological importance. Their sheltered situation and

the continuing marl-stone extraction provide a special dynamic and warm habitat. So far, 37 dragonfly species have been recorded in these quarries, many of them relatively rare in the rest of the Netherlands. Most of these are species characteristic of poorly vegetated seepage areas or have a southern distribution. Reproduction of *Sympecma fusca*, *Cercion lindenii*, and *Crocothemis erythraea* has been observed in pools with a rich vegetation, while *Ischnura pumilio*, *Orthetrum brunneum*, and *Orthetrum coerulescens* were found to reproduce in seepage areas with shallow ponds and small streams. Most of the recorded dragonfly species need the dynamic situation found in these quarries. Conserving this special habitat and its fauna requires a tailored approach, involving the maintenance of geomorphological and hydrological processes after marl-stone extraction ends." (Author)] Address: Groenendijk, D., De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands

4818. Hachmöller, B.; Kneis, P.; Schrack, M.; Stolzenburg, U. (2004): Ein neuer Nachweis der Vogel-Azurjungfer (*Coenagrion ornatum* Selys, 1850) in Sachsen. *Mitteilungen Sächsischer Entomologen* 69: 10-12. (in German). [Germany, Sachsen, east of Meißen, August 2004; the species inhabited two ditches. Habitat and co-occurring odonate species are described.] Address: Hachmöller, B., Staatliches Umweltfachamt Radebeul, Wasastr. 50, D-01445 Radebeul, Germany.

4819. Hämäläinen, M. (2004): Caloptera damselflies from Fujian (China), with description of a new species and taxonomic notes (Zygoptera: Calopterygoidea). *Odonatologica* 33(4): 371-398. (in English). ["Based on literature records and the examination of an extensive Odonata collection made in Fujian in 1930-1940's (now in RMNH, Leiden), 21 species of Caloptera (Calopterygoidea) are recognized as occurring in Fujian province in eastern China. The Fujian Caloptera material (ca. 860 specimens of 18 species) in RMNH is enumerated. The following taxonomic decisions are presented: *Caliphaea nitens* Navas, 1934 is removed from synonymy with *Bayadera melanopteryx* Ris, 1912(!) and ranked as a valid species, distinct from *C. consimilis* McLachlan, 1894. The lectotype of *Vestalis smaragdina* Selys, 1879 is designated. *Vestalis velata* Ris, 1912 (syn. *V. virens* Needham, 1930) is ranked as a good species, while the "hyaline winged form of *V. smaragdina velata*" (sensu Asahina, 1977) is described as a new sp. *Vestalis venusta* sp. n. *Bayadera continentalis* Asahina, 1973 from Fujian and *B. ishigakiana* Asahina, 1964 from the Ryukyus are treated as full sp. and not as ssp. of *B. brevicauda* Fraser, 1928 from Taiwan. *Bayadera melania* Navas, 1934 is synonymized with *B. melanopteryx* Ris, 1912. Some preliminary taxonomic comments (to be discussed in detail elsewhere) are presented: *Calopteryx grandaeva* Selys, 1853 is a probable synonym of *C. atrata* Selys, 1853, whereas *C. atrocyana* (Fraser, 1935) is a good sp. *Matrona basilaris* Selys, 1853 and *M. nigripectus* Selys, 1879 appear to be distinct sp. *Mnais tenuis* Oguma, 1913 and *M. andersoni* McLachlan in Selys, 1873 are also better treated as separate sp. Faunistic notes include: *Libellago lineata* (Burmeister, 1839) is recorded from Fujian province for the first time. Old records of *Psolodesmus mandarinus* McLachlan, 1870 and *Euphaea compar* McLachlan, 1870 (synonym of *E. formosa* Hagen in Selys, 1869) from Amoy Island near the Fujian coast are considered doubtful." (Author)] Address: Hämäläinen M., Dept Ap-

plied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

4820. Hayashi, F.; Dobata, S.; Futahashi, R. (2004): Macro- and microscale distribution patterns of two closely related Japanese *Mnais* species inferred from nuclear ribosomal DNA, its sequences and morphology (Zygoptera: Calopterygidae). *Odonatologica* 33(4): 399-412. (in English). ["Much variation occurs in morphology and colouration among individuals of Japanese *Mnais* species. It has been noted that 2 groups of *Mnais* often cohabit a stream in western Japan. There is, however, no clear morphological difference in male appendages and penis between the 2 groups, and this makes it difficult to determine their taxonomic status. In this study, to clarify the relationships between the sympatric species on both small (along a stream) and large (across Japan) geographic scales, sequences of the internal transcribed spacers 1 and 2 (ITS 1 and 2) of nuclear ribosomal DNA are compared. Base substitutions occurred at 4 sites of 223 bps of the ITS1 region, and by their combinations, the four sequence types could be distinguished among a total of 800 individuals. In the ITS2 region (total 411 bps including 5.8S rRNA region), all examined individuals had the same sequence. The geographical distribution of each ITS1 sequence type and morphological data of wings and a pterostigma suggest that Japanese *Mnais* includes 2 distinct species, *M. strigata* Selys, 1853 and *M. costalis* Selys, 1869. Their distribution ranges overlap widely in western Japan, where *M. strigata* is usually found at smaller and upper streams than *M. costalis*." (Author)] Address: Hayashi, F., Dept Biol., Tokyo Metropolitan Univ., Minamiosawa 1-1, Tokyo, 1920397, Japan. E-mail: fhayashi@comp.metro-u.ac.jp

4821. Heidecke, F. (2004): *Aeshna mixta* (Latreille, 1805), Herbst-Mosaikjungfer. *Naturwissenschaftliche Beiträge Museum Dessau* 16: title cover, 93. (in German). [Brief characterisation of *A. mixta* on the basis of literature data.] Address: Heidecke, F., Schachtstr. 27, D-06406 Bernburg, Germany. E-mail: Libellenforscher@web.de

4822. Heidecke, F.; Lindemann, K. (2004): Die Bestandssituation der Odonatenfauna des Paupitzscher Sees im Jahre 2002. *Naturwiss. Beitr. Museum Dessau* 16: 49-62. (in German, with English summary). [Germany, Sachsen-Anhalt; 20 odonate species were collected in 2002 in a brown coal mining lake. The odonate composition of the different succession stages of the oligotrophic lake is discussed.] Address: Heidecke, F., Schachtstr. 27, D-06406 Bernburg, Germany. E-mail: Libellenforscher@web.de

4823. Heidecke, F.; Heidecke, H. (2004): Die Taufwiesenberge - ein vergessenes Schutzgebiet zwischen Kiesabbau und Renaturierung. *Pedemontanum* 5: 8-10. (in German). [Sachsen-Anhalt, Germany; 25 autochthonous species, and dispersing *Aeshna affinis* and *Libellula fulva*. Of special interest is the record of *Leucorrhinia pectoralis*.] Address: Heidecke, F., Schachtstr. 27, D-06406 Bernburg, Germany. E-mail: Libellenforscher@web.de

4824. Heidecke, F.; Lindemann, K. (2004): Erster Reproduktionsnachweis von *Crocothemis erythraea* (Bullé, 1832) (Odonata: Libellulidae) in der Goitzsche bei Bitterfeld in Sachsen Anhalt im Jahre 2003. *Naturwissenschaftliche Beiträge Museum Dessau* 16: 63-64.

(in German). [Germany, Sachsen-Anhalt, 26/05/2003; records of exuviae of *C. erythraea*. In 2004, imagines of the species were seen approx. 7 km from the above locality.] Address: Heidecke, F., Schachtstr. 27, D-06406 Bernburg, Germany. E-mail: Libellenforscher@web.de

4825. Heijligers, H. (2004): Boekbesprekingen: De nederlandse Libellen. *Natuurhistorisch Maandblad* 93: 16. (in Dutch). [book review of the book on the dutch odonata edited by the Nederlandse vereniging voor libellenstudie in 2002] Address: Heijligers, H., Godsweerderstraat 2, NL-6041 GH Roermond, The Netherlands. E-mail: bureau@nhgl.org

4826. Herberholz, J.; Sen, M.M.; Edwards, D.H. (2004): Escape behavior and escape circuit activation in juvenile crayfish during prey-predator interactions. *Journal of Experimental Biology* 207(11): 1855-1863. (in English). ["The neural systems that control escape behavior have been studied intensively in several animals, including mollusks, fish and crayfish. Surprisingly little is known, however, about the activation and the utilization of escape circuits during prey-predator interactions. To complement the physiological and anatomical studies with a necessary behavioral equivalent, we investigated encounters between juvenile crayfish and large dragonfly nymphs in freely behaving animals using a combination of high-speed video-recordings and measurements of electric field potentials. During attacks, dragonfly nymphs rapidly extended their labium, equipped with short, sharp palps, to capture small crayfish. Crayfish responded to the tactile stimulus by activating neural escape circuits to generate tail-flips directed away from the predator. Tail-flips were the sole defense mechanism in response to an attack and every single strike was answered by tail-flip escape behavior. Crayfish used all three known types of escape tail-flips during the interactions with the dragonfly nymphs. Tail-flips generated by activity in the giant neurons were predominantly observed to trigger the initial escape responses to an attack, but non-giant mediated tail-flips were often generated to attempt escape after capture. Attacks to the front of the crayfish triggered tail-flips mediated either by the medial giant neuron or by non-giant circuitry, whereas attacks to the rear always elicited tail-flips mediated by the lateral giant neuron. Overall, tail flipping was found to be a successful behavior in preventing predation, and only a small percentage of crayfish were killed and consumed." (Authors)] Address: Herberholz, J., Dept Biol, Georgia State Univ, POB 4010, Atlanta, GA, 30303, USA. E-mail: biojhh@langate.gsu.edu

4827. Hilfert-Rüppell, D (2004): Optimierung des Fortpflanzungsverhaltens: wichtige Einflussgrößen auf Territorialität und auf Paarungen von europäischen Prachtlibellenmännchen (Odonata: Zygoptera). Dissertation TU Braunschweig; <http://opus.tu-bs.de/opus/volltexte/2004/567/>: 216 pp. (in German, with English summary). ["The aim of this study was to find out, which influences contribute to the variability and optimisation of the reproductive behaviour of *C. splendens splendens* in Germany and in Southern France as well of *C. haemorrhoidalis* in Southern France. This approach allowed for the detection of variation in reproductive behaviour among species and geographic regions. In my experiments, the main determinant for the reproductive behaviour was success through copulations. Males left their territories after a unsuccessful predation attempt by

frogs or waterspiders, when they had become territorial only shortly before the attack. Males showed more site fidelity when they had courted or copulated with a female in their territory before the attack, probably because of the higher resource value. Males with or without copulation did not differ in their morphology. The amount of success of males to form a mating wheel from a tandem correlated positively with preceding courtship. After copulations, males showed more territorial flights and displayed versus other males more often. In enclosure-experiments males with an early copulation experience achieved a higher number of further copulations, while male quality (fat, size, wingspot) did not differ significantly between males with or without mating. Northern *Calopteryx splendens splendens* showed a more frequently alternative reproductive behaviour (ARB) than the southern ones. Winner of fights did not differ in their morphology from losers. The experiment showed a significant effect of preceding copulations on duration and outcome of male-male fights. Contests between the same opponents were determined more quickly after a mating than without mating experience. Males which had previously lost a fight won the contest with the same opponent after a copulation in significantly more cases." (Author)] Address: Hilfert-Rüppell, Dagmar, An der Wasserfeuchte 32, D-38162 Cremlingen, Germany

4828. Holroyd, P.A.; Bown, T.M.; Schankler, D.M. (2004): *Auroralestes*, gen. nov., a replacement name for *Eolestes* Bown and Schankler, 1982, a preoccupied name. *Journal of Vertebrate Paleontology* 24(4): 979. (in English). [Verbatim: A recent internet search revealed the homonymy of the generic name *Eolestes*, proposed by Bown and Schankler (1982:52) for the early Eocene erinaceid lipotyphlan *Eolestes simpsoni* (Bown, 1979). The erinaceid species was first described by Bown (1979:61) as *Leipsanolestes simpsoni*, and Bown and Schankler (1982) assigned it to a new genus. The generic name *Eolestes* was erected by Cockerell (1940: 104) for an Eocene dragonfly from the Florissant Formation of Colorado, *Eolestes synthetica* (Order Odonata). The generic name *Eolestes* is preoccupied, and we therefore propose the replacement name *Auroralestes* (based on the root *Aurora*, goddess of the dawn) for the erinaceid genus, giving *Auroralestes simpsoni* for *Eolestes simpsoni*. Literature cited: Bown, T.M. 1979. *Geology and mammalian paleontology of the Sand Creek facies, lower Willwood Formation (lower Eocene), Washakie County, Wyoming*. Geological Survey of Wyoming, *Memoir* 2: 1-151; Bown, T.M. & D. Schankler. 1982. A review of the Proteutheria and Insectivora of the Willwood Formation (lower Eocene), Bighorn Basin, Wyoming. *U.S. Geological Survey Bulletin* 1523: 1-79; Cockerell, T.D.A. 1940. A dragon-fly from the Eocene of Colorado; Odonata, Agrionidae. *Entomol. News* 51: 103-105.] Address: Holroyd, Patricia, Museum of Paleontology, University of California, Berkeley, California 94720 U.S.A. E-mail: pholroyd@uclink4.berkeley.edu

4829. Holusa, O.; Jeziorski, P. (2004): Bibliographie der odonatologischen Literatur der Tschechischen Republik, 1849 - 2000 (Odonata). *Libellula* 23(1-2): 53-76. (in German, with English summary). ["A list of 278 references of odonatological literature from the years 1849 to 2000 for the territory of Czech Republic is presented. The list is divided into seven different topics. Not included are articles about fossil dragonflies, unpublished diploma theses, unpublished research reports and book

reviews." (Authors)] Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké námesti 1264, CZ-738 01 Frydek-Mistek. E-mail: holusao@post.cz

4830. Hunger, H. (2004): Naturschutzorientierte, GIS-gestützte Untersuchungen zur Bestandssituation der Libellenarten *Coenagrion mercuriale*, *Leucorrhinia pectoralis* und *Ophiogomphus cecilia* (Anhang II FFH-Richtlinie) in Baden-Württemberg. Dissertation zur Erlangung des Grades des Doktors der Naturwissenschaften am Institut für Naturschutz und Umweltbildung (INU) der Hochschule Vechta. Dragonfly Research 2. ISSN 1438-034X. IX, 229 pp, Anlagen. (in German, with English summary) ["In the thesis, I focus on the current condition and trends of all known populations of *C. mercuriale*, *L. pectoralis*, and *O. cecilia* in Baden-Württemberg (southwestern Germany). These 3 Odonata species are protected under European law (listed in annex II of the habitats directive). Vector- and raster-based GIS methods play an important role in the analysis of the data. A synoptic discussion of the results leads to concrete recommendations for action plans for protection of the species. As a starting point, all accessible data on the species occurrences and population sizes were compiled and digitised. To gain additional insight into certain aspects of *C. mercuriale* population biology, field experiments were carried out using a unique method of marking the animals with UV ink and searching for them at night with a portable black light lamp. The recapture rate was 35% (140 out of 305 specimens), however, only 11 animals had moved away from the place where they had been marked. The maximum distance of their movement was 300 m. The longest period between marking and last recapture was 16 days. In three instances, marked individuals were found in copula at night. Employing the Lincoln index, the results of mark-recapture experiments showed that the actual population size was 2 to 2.5 times higher than the numbers estimated by conventional field methods. The sex ratio of animals marked was 713 males : 152 females (82:18). The recapture rate on the fifth day after marking was significantly lower for females (3%) than for males (11%). The hypothesis that fertilized females emigrate more frequently than males and thus play a key role in colonization and recolonization events is discussed. The results confirm empirical knowledge that, in the study area, *C. mercuriale* shows only very little tendency to emigrate from its home waters. In the GIS-based habitat model for *C. mercuriale*, a groundwater model and land use data for the Upper Rhine valley were employed. A preference analysis was used to detect "high density areas" with a positive electivity index and a statistically significant χ^2 deviation measure, in which the species occurs at an elevated frequency. In the natural geographic region "Freiburger Bucht" (214 km²) "high density regions" lay within grassland in which the groundwater table was 2 m or less below the surface, and within farmland where the groundwater table was 1 m or less below the surface. In the "Offenburger Rheinebene" (851 km²) they lay within grassland in which the groundwater table was 1,5 m or less below the surface; farmland, even in areas with high groundwater levels, was not to be classified as a "high density region" probably due to the predominance of corn fields. These model results were very plausible. Additional data analyses demonstrated that the model cannot be used for the adjacent natural geographic regions because these have different landscape-related characteristics. The raster-based dispersal model for *C. mercuriale*

took into consideration: on the species level, biological information (dispersal behaviour); on the patch level, information on the size of the subpopulations (emigration rate); and on the landscape level, information on the quality and spatial configuration of the matrix (definition of the cost surface). Land use data and a slope model were incorporated into the design of the cost surface. The model output allowed for a differentiated interpretation of the degree of isolation between individual subpopulations. An "optimistic scenario" (few large metapopulations) was contrasted with a "neutral scenario" (distinct size reduction and fragmentation of the metapopulations). By combining the "high density areas" of the habitat model with the dispersal model zones for *C. mercuriale*, three "suitability classes" were calculated. They indicate where measures for the stabilisation of the metapopulations are most urgent and, at the same time, promising. To document the habitats of *L. pectoralis*, biotypes were mapped in the most significant areas with species occurrences in Upper Swabia (prealpine region of South-Germany). A comparison between digital aerial photographs from 1996 and 2001 allowed the detection of habitat changes caused by vegetative succession. In order to model the long distance dispersal of *L. pectoralis*, the slope model was used as a cost surface. The possible role of cost paths as migration routes was discussed. A "cost distance matrix" was calculated to quantify the spatial relationship between the individual areas occupied by the species. For *O. cecilia*, a series of measurements taken from a data catalogue of the Landesanstalt für Umweltschutz Baden-Württemberg revealed that in many bodies of flowing water the water quality has markedly improved throughout the past two decades. This circumstance, combined with intensified search efforts and possibly climatic factors has probably led to an increase in the number of known populations during the last few years. Metapopulation structure and trends in the overall population size are described in detail in the chapter, "Current status of the studied Odonata species and recommendations for their protection". In addition, concrete recommendations for the species protection, the implementation of the monitoring programmes, and the compilation of the reports regulated by the habitats directive are given. The thesis ends with a discussion of methods, focusing on the applied approach and the GIS methods used. I conclude that, given careful planning and data evaluation, advanced GIS models, such as habitat and dispersal models, are generally of high value for issues of nature conservation." (Author) Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: Holger.Hunger@inula.de

4831. Jänicke, M. (2004): Libellen (Odonata) der Gewässer um Gera. Veröffentlichungen Museum für Naturkunde der Stadt Gera, Naturwissenschaftliche Reihe 31: 57-59. (in German). [town of Gera, Thuringia, Germany; compilation of, in most cases prior 1997-data, including some recent records of *Leucorrhinia dubia*, *L. rubicunda*, *Aeshna affinis*, and *Coenagrion lunulatum*.] Address: Jänicke, M., Am Tonteich 4, D-07607 Eisenberg, Germany

4832. Jergentz, S.; Mugni, H.; Bonetto, C.; Schulz, R. (2004): Runoff-related endosulfan contamination and aquatic macroinvertebrate response in rural basins near Buenos Aires, Argentina. Archives of Environmental

Contamination & Toxicology 46(3): 345-352. (in English). ["Information in the open literature about the fate and effects of pesticides in small streams from agricultural areas of Argentina is very rare. The objective of the present work was to study the pesticide contamination and potential biological effects in basins that have undergone intense agricultural activity, mainly related to the cultivation of soybeans. Three streams (Maguire, Helves, and Horqueta) with a low-flow discharge (0.1 and 0.2 m³/s) in March close to the city of Arrecifes were studied during the period of maximum insecticide application, between February and April 2001. Various sampling devices were installed to trap suspended: particles, runoff, and floodwater plus sediment throughout the study period. The suspended-particle samples were analyzed for the insecticides endosulfan (END), chlorpyrifos, and cypermethrin. Water chemistry and the macroinvertebrate communities were assessed on four occasions and the organismic drift was measured continuously. Following a 184-mm rainfall on March 1, 2001, beta-endosulfan concentrations up to 318 and 43 µg/kg were measured from suspended-particle samples from Horqueta and Helves, respectively. No END contamination was detected in Maguire. Chlorpyrifos and cypermethrin were not detected in any of the streams. A significant decrease in the average macroinvertebrate species density was observed in Horqueta (from 12.8±0.5 to 9±0.7 species; ANOVA, p<0.05) and Helves (from 10.8±1.7 to 3.3±1.3 species; p<0.001) following the same rainfall event at the beginning of March, while the species density in Maguire remained constant at 7.9±0.3 species. The runoff primarily reduced species abundances of Odonata and Ephemeroptera significantly (p<0.01) in Horqueta and Helves but not in Maguire. A greater drift of Smicridae (Trichoptera) and Ephemeroptera occurred in Helves and Horqueta during this runoff event, while no changes in the macroinvertebrate drift were detectable in Maguire. This study highlights the potential pesticide effects on macroinvertebrate communities in Argentinian rural streams. It is suggested that a small wetland area formed by Maguire between the agriculturally used catchment and the sampling site contributes to the absence of contamination and effects at this site." (Authors)] Address: Jergentz, S., Tech. Univ. Braunschweig, Zoological Institut, Fasanenstr. 3, D-38092, Braunschweig, Germany. E-mail: s.jergentz@tu-bs.de

4833. Joop, G.; Rolff, J. (2004): Plasticity of immune function and condition under the risk of predation and parasitism. *Evolutionary Ecology Research* 6(7): 1051-1062. (in English). ["Ecological immunology attempts to elucidate the causes of the large variation in immunity and resistance observed in natural populations. Here we report on a novel experiment that investigated how the risks of parasitism and predation altered investment in immunity and condition in insects during larval development. The study organism is the damselfly *Coenagrion puella*, the parasite is a water mite and the predators are engaged *Aeshna cyanea* dragonflies. Our experiments show that females increase their investment in a cellular as well as a humoral component of the immune system in the presence of natural enemies. By contrast, males do not show such alteration. However, males show altered condition under the risks of parasitism and predation. Our results highlight the importance of species interactions for the plasticity of immune function." (Authors)] Address: Rolff, J., Department

of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

4834. Jurzitza, G.; Roeder, L. (2004): *Thermothemis madagascariensis* (Rambur): Some observations on its habitat and reproductive behaviour (Anisoptera: Libellulidae). *Notulae Odonatologicae* 6(4): 39-42. (in English). ["The species is peculiar to Madagascar, where it is restricted to forest ponds at elevations above 900 m. Based on colour field photographs, both sexes (adult) are redescribed. The reproductive behaviour is characterized by scooping oviposition and by incidental multiple guarding. Some records of *Crocothemis striata* Lohmann are appended." (Authors)] Address: Reinmuthstr 27, D-76187, Karlsruhe, Germany. E-mail: gjurzit33@t-online.de

4835. Kadoya, T.; Suda, Shin-ichi; Washitani, I. (2004): Dragonfly species richness on man-made ponds: effects of pond size and pond age on newly established assemblages. *Ecological Research* 19(5): 461-467. (in English). ["We studied the abundance and species richness of adult dragonflies in 11 artificial ponds which were recently established (within 2 years). We found that the adult dragonfly assemblage patterns were influenced by pond size as well as pond age. The species richness was positively correlated with the pond size, which was because the distributional patterns of species were significantly nested according to pond area. The species richness was highly correlated with pond age in association with the vegetation cover within ponds. It was suggested that the species richness was enhanced by the increasing immigration rate of species which favor well-vegetated ponds." (Authors)] Address: Kadoya, T., Dept Ecosyst. Studies, Inst. Agr. and Life Sci., Bunkyo Ku, Univ. Tokyo, 1-1-1 Yayoi, Tokyo, 1138657, Japan. E-mail: aa47143@mail.ecc.u-tokyo.ac.jp

4836. Karanovic, T.; Reddy, Y.R. (2004): First record of *Phyllognathopus bassoti* Rouch, 1972 from India, with remarks on the family Phyllognathopodidae Gurney, 1932 (Crustacea, Copepoda, Harpacticoida). *Annales de Limnologie* 40(2): 121-132. (in English). ["*P. bassoti*, originally described from Long Island, Papua New Guinea, and later reported from the Philippines, is found for the first time in India. This subterranean species is redescribed and its ecology and zoogeography are discussed. Also, the systematics of the family Phyllognathopodidae is discussed and a key to genera and species is given. As a result of the taxonomic analysis, three species are here synonymized: *Phyllognathopus insularis* Chappuis, 1940 and *P. camptoides* Bozic, 1965 with *P. chappuisi* Delachaux, 1924; and *P. volcanicus* Barclay, 1969 with *P. viguieri* (Maupas, 1892). It has been observed that odonate nymphs prey on adults and copepodids of *P. bassoti*, an interaction not known until now." (Authors)] Address: Karanovic, T., Western Australian Museum, Francis Street, 6000 Perth, WA, Australia. E-mail: karanovic@museum.wa.gov.au

4837. Karlsson, T. (2004): Tva nya trollslandor (Odonata) for Ostergotland Gungflymosaikslanda (*Aeshna subarctica*) och gron mosaikslanda (*A. viridis*). *Entomologisk Tidskrift* 125(4): 201-204. (in Swedish, with English summary). ["Two new provincial records of dragonflies (Odonata) for Ostergotland – *A. subarctica* and *A. viridis*. [...] During 2004 new provincial records for *A. subarctica* and *A. viridis* have been made in Oster-

gotland, 30-40 km south of the city Linköping, Sweden. The species are likely to be found in several localities in Ostergotland. With these two new records, 48 species of dragonflies have been found in Ostergotland." Address: E-mail: tommykarlsson715@hotmail.com

4838. Karube, 2004 (2004): *Heliogomphus chaoi* spec. nov., a new dragonfly from southern Vietnam (Anisoptera: Gomphidae). *Odonatologica* 33(4): 433-436. (in English). ["The new species is described, illustrated and compared with the similar *H. selysii* Fraser. Holotype male: S Vietnam, Laidong prov., 15 km from Bao Lok to Ho-chi-minh, 6-V-1997; deposited in Kanagawa Prefectural Museum of Natural History, Odawara, Japan." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

4839. Keskinen, E. (2004): Post-embryonic growth and fine-structural organization of arthropod photoreceptors A study involving selected species of insects and crustaceans. Oulu University Press; ISBN 951-42-7560-8 (PDF) <http://herkules.oulu.fi/isbn9514275608/>: 64 pp. (in English). [Arthropod photoreceptors are versatile sense organs. Any investigation of these organs has to consider that their structure and functional limitations at the moment of fixation depend on many factors: species, sex, developmental and nutritional state of the animal, time of day and ambient light. The microscopic image of an arthropod photoreceptor is always a sample frozen in time and space. Quite often publications on arthropod photoreceptors only provide the name of the species studied, but nothing beyond that. At least the developmental status of the study animals ought to be noted, possibly even the sex and body size. Forty publications on insect and 54 on crustacean photoreceptors were checked for the information that was given about the investigated animals: Out of these papers 40% provide only information on the name of the studied species and nothing else. The aim of this thesis, thus, was to investigate, to what extent the developmental state and the sex of the animal as well as the ambient light conditions affect the structure of the eye of a given species. Five species of arthropods were chosen: (a) the semi-terrestrial isopod *Ligia exotica* and two aquatic Branchiuran fishlice, *Argulus foliaceus* and *A. coregoni*, to represent the Crustacea, and (b) the stick insect *Carausius morosus* and the spittle bug *Philaenus spumarius*, both terrestrial, to represent the Insecta. The addition of new ommatidia was studied in a paper on *L. exotica*, which also dealt with the site of newly added ommatidia. It was found that all of these species had two sessile, large compound eyes firmly positioned on their heads (but fishlouse compound eyes were bathed in haemocoelic liquid). In all species, the compound eye was found to be of the apposition type. The gross structural organization of the ommatidia stayed approximately the same during the whole postembryonic development. Lateral ocelli of the *A. coregoni* nauplius eye changed from elongated to spherical between the metanauplius and the 8th stage pre-adult. The sex of the specimens was not found to affect the structure of the eye. In all species, it turned out that the larger the animal and hence the eye, the better its sensitivity. The addition of new ommatidia in the *L. exotica* compound eye was concluded to take place in the anterior and ventral marginal areas of the eye." (Author) Several references to Odonata are made.] Address: Keskinen, Essi, Faculty of Science, Department of Bio-

logy, University of Oulu, P.O.Box 3000, FIN-90014 University of Oulu, Finland

4840. Kirti, J.S.; Singh, A. (2004): Studies on secondary male genitalia of the type species of some dragonflies (Odonata: Anisoptera: Libellulidae). *Zoos' Print* 19 (6): 1505-1511. (in English). ["The secondary male genitalic characters of 11 type species of family Libellulidae have been examined and studied in considerable details. The taxonomic significance of the genitalic features of these species has been highlighted." (Authors)] Address: Kirti, Jagbir S., Dept Zool, Punjab Univ, Patiala, Punjab, 147002, India. E-mail: archuspeak@yahoo.co.in

4841. Kjaerstad, G. (2004): Dammer med nasjonal verdi i Levanger og Verdal. Norges teknisk-naturvitenskapelige universitet Vitenskapsmuseet. *Zoologisk notat* 2004-3: 17 pp. (in Norwegian). [The fauna - including 7 odonate taxa - of four Norwegian water bodies is listed.] <http://www.ntnu.no/vmuseet/zoolavd/zoolnotat-3-04.pdf>

4842. Kohnert, S.; Perry, S.F.; Schmitz, A. (2004): Morphometric analysis of the larval branchial chamber in the dragonfly *Aeshna cyanea* Müller (Insecta, Odonata, Anisoptera). *Journal of Morphology* 261(1): 81-91. (in English). ["The aquatic larvae of anisopteran dragonflies possess tracheal gills located in the rectum. Using stereological methods, we estimated the morphometric diffusing capacity for oxygen across the gill epithelium, i.e., from rectal water to the gill tracheoles, in the larvae of *Aeshna cyanea*. A 271-mg larva has a total branchial surface area of app. 12 cm². Tracheoles make up 6% of the epithelial volume of the gills; the harmonic mean thickness of the water-tracheolar diffusion barrier is 0.27 m and consists mainly of cuticle. The calculated DMO₂ is 23.0 l min⁻¹ g⁻¹ kPa⁻¹, which, using published values for oxygen consumption in a similar species, would result in a mean driving pressure of 0.2 kPa at rest and 1.3 kPa during activity. Since these driving pressures are similar to those reported for other arthropods, we conclude that the DMO₂ of the gill is not rate-limiting for aerobic metabolism in *Aeshna cyanea* larvae." (Authors)] Address: Schmitz, Anke, Institut für Zoologie, Rheinische Friedrich-Wilhelms-Universität Bonn, Poppelsdorfer Schlo, 53115 Bonn, Germany. E-mail: ankeschmitz@uni-bonn.de

4843. LaFiandra, E.M.; Babbitt, K.J. (2004): Predator induced phenotypic plasticity in the pinewoods tree frog, *Hyla femoralis*: Necessary cues and the cost of development. *Oecologia* 138(3): 350-359. (in English). ["Predator-induced defenses can result from non-contact cues associated with the presence of a feeding predator; however, the nature of the predator cue has not been determined. We tested the role of two non-contact cues, metabolites of digestion of conspecific prey released by the predator and alarm pheromones released by attacked conspecific prey, in the development of inducible defenses by exposing pinewoods tree frog (*Hyla femoralis*) tadpoles to non-lethal dragonfly (*Anax junius*) larvae fed either inside experimental bins or removed from the bins for feeding to eliminate alarm pheromones. The costs associated with the development of the induced morphology were also investigated by providing the tadpoles with two food levels intended to provide adequate or growth limiting resources. The generalized morphological response of *H. femoralis* tadpoles to predators included the development of bo-

dies and tails that were both deeper and shorter, smaller overall body size, and increased orange tail fin coloration and black tail outline. Metabolites of digestion were sufficient to initiate development of inducible defenses; however, the combination of metabolites and alarm cue resulted in a greater response. Furthermore, growth and development were slowed in tadpoles that expressed the induced morphology; however, this growth cost was insufficient to preclude the development of the induced morphology when food resources were low. These results indicate that two aspects of the indirect predator cue work together to trigger a morphological anti-predator response." (Authors)] Address: Babbitt, Kimberly J., Department of Natural Resources, University of New Hampshire, 226 James Hall, Durham, NH, 03824, USA. ; E-mail: kbabbitt@cisunix.unh.edu

4844. Lam, E. (2004): Damselflies of the Northeast. A comprehensive identification guide to the damselflies of the Northeast, from Canada to Virginia. ISBN 6-9754015-0-5: 96 pp. (in English). [This book covers 69 species and subspecies, more than half of all North American damselflies north of Mexico. Introductory chapters are devoted to damselfly anatomy, behaviour, life cycle, identification and sampling methods. More than 300 detailed paintings, drawings and photos, range maps, and advice to similar species enable a competent identification of the species, even without the usual binomic keys which are omitted in this book. This is an absolutely lovely book, and it deserves to be in the library of anyone interested in worldwide Odonata. (Martin Schorr)] Address: Biodiversity Books, P.O. Box 353, Eastchester, NY 10709, U.S.A.

4845. Lambert, T.D.; Howard, J.; Plant, A.; Soffe, S.; Roberts, A. (2004): Mechanisms and significance of reduced activity and responsiveness in resting frog tadpoles. *Journal of Experimental Biology* 207(7): 1113-1125. (in English). ["Hatchling *Xenopus laevis* tadpoles spend most of their time attached to objects or the water surface by mucus secreted by a gland on the head. While attached, swimming activity and responsiveness to swim-initiating stimuli are reduced over long periods of time. We have investigated the mechanisms and significance of this apparent long-term inhibition. In behavioural experiments we show, firstly, that innervation of the cement gland and GABAA-mediated inhibition are necessary for attachment to reduce responsiveness, and secondly, that denervation of the cement gland increases tadpole activity and increases their predation by damselfly nymphs (Zygoptera). To investigate the neuronal pathway from the cement gland to GABAA inhibition, we have devised an immobilized, inverted tadpole preparation where a weight attached to the mucus simulates the force as it hangs. Simulated attachment reduces responsiveness and spontaneous fictive swimming activity. We have recorded the activity and responses of trigeminal neurons innervating the cement gland. They are spontaneously active and simulating attachment results in a sustained increase in this activity. We propose that hanging from a mucus strand increases firing in cement gland afferents. This leads to tonic GABA inhibition that reduces tadpole activity and responses, and leads to fewer attacks by predators." (Authors)] Address: Lambert, T., Inst. Physiol., Univ. Hohenheim, Garbenstr 30, D-70593, Stuttgart, Germany. E-mail: lambert@uni-hohenheim.de

4846. Laurila, A.; Jarvi-Laturi, M.; Pakkasmaa, S. Merila, J. (2004): Temporal variation in predation risk: stage-dependency, graded responses and fitness costs in tadpole antipredator defences. *Oikos* 107(1): 90-99. (in English). ["Temporal variation in predation risk may be an important determinant of prey antipredator behaviours. According to the risk allocation hypothesis, the strongest antipredator behaviours are expected when periods of high risk are short and infrequent. We tested this prediction in a laboratory experiment where common frog *Rana temporaria* tadpoles were raised from early larval stages until metamorphosis. We manipulated the time a predatory Aeshna dragonfly larva was present and recorded behavioural responses (activity) of the tadpoles at three different time points during the tadpoles' development. We also investigated how tadpole shape, size and age at metamorphosis were affected by temporal variation in predation risk. We found that during the two first time points activity was always lowest in the constant high-risk situation. However, antipredator response in the two treatments with brief high-risk situation increased as tadpoles developed, and by the third time point, when the tadpoles were close to metamorphosis, activity was as low as in the constant high-risk situation. Exposure to chemical cues of a predation event tended to reduce activity during the first time period, but caused no response later on. Induced morphological changes (deeper tail and shorter relative body length) were graded the response being stronger as the time spent in the proximity of predator increased. Tadpoles in the brief risk and chemical cue treatments showed intermediate responses. Modification of life history was only found in the constant high-risk treatment in which tadpoles had longer larval period and larger metamorphic size. Our results indicate that both behavioural and morphological defences were sensitive to temporal variation in predation risk, but behaviour did not respond in the manner predicted by the risk allocation model. We discuss the roles of concentration of predator chemical cues and prey stage-dependency in determining these responses." (Authors)] Address: Evolutionary Biol. Ctr. Dept Populat. Biol., Uppsala Univ, Norbyvagen 18D, SE-75236 Uppsala, Sweden. E-mail: anssi.laurila@ebc.uu.se

4847. Lederbogen, D.; Rosenthal, G.; Scholle, D.; Trautner, J.; Zimmermann, B.; Kaule, G. (2004): Allmendweiden in Südbayern: Naturschutz durch landwirtschaftliche Nutzung. *Angewandte Landschaftsökologie* 62: 469 pp, Anlagen. (in German, with English summary). [Bavaria, Germany. *Orthetrum coerulescens* and *Coenagrion mercuriale* were favoured by using pastures (comprising also calcareous fen meadows) as litter meadows rather than abandoning or grazing them. Factors influencing the survival of populations are discussed. In an appendix all odonate species of the surveyed spots are compiled. This list includes species as *Nehalennia speciosa* and *Aeshna subarctica elisabethae*.] Address: Inst. Landschaftsplanung und Ökologie, Universität Stuttgart, Keplerstr. 11, D-70174 Stuttgart

4848. Lefevre, K.L.; Muehter, V.R. (2004): Competition for mating resources in a territorial damselfly (Odonata: Calopterygidae). *Studies on Neotropical Fauna & Environment* 39(2): 159-165. (in English). ["The factors that determine contest outcomes among territorial male animals are complex and much debated. This study investigated how breeding resource availability and body size influence territorial contests of *Hetaerina miniata*.

In our marked population, some males were territory owners while others were part of a wanderer contingent. Male territoriality was not correlated with availability of oviposition substrate. We predicted that territory owners would have an advantage in disputes. Removal experiments demonstrated that owners won significantly more territorial contests than did wanderers, and whereas males were significantly larger than females, male territorial status did not depend on body size. However contest outcome was not based solely on ownership because experimentally removed individuals regained their territories from new owners (intruders). We suggest that intrinsic resource holding potential based on other morphological and physiological factors, such as energy reserves, may govern male competitive ability." (Authors)] Address: Lefevre, Kara., Dept Biol. Queen's Univ., Kingston, Canada.

4849. Lin, Q.; Zhang, S.; Huang, D. (2004): *Fuxiaeschna hsiufunia* gen. nov., spec. nov., a new Lower Cretaceous dragonfly from northwestern China (Aeshnoptera: Rudaeschnidae). *Odonatologica* 33(4): 437-442. (in English). ["The new genus and species are described and illustrated from the Luohandong Formation of Huating Co., Gansu province, P.R. China, from a single, almost complete specimen. Holotype No. 123518, probably a female, deposited at IGPAS, Nanjing, China." (Authors)] Address: Lin, Q., Nanjing Inst. Geol. and Palaeontol., Chinese Acad. Sci., 39 E Beijing Rd, Nanjing, 210008, China

4850. Lohr, M.; Proess, R.; Schorr, M.; Zimmermann, M. (2004): Reproduktionsnachweise für *Oxygastrea curtisii* am luxemburgisch-deutschen Grenzfluss Our (Odonata: Corduliidae). *Libellula* 23(3/4): 173-178. (in German, with English summary). [Documentation of reproduction of the very rare *O. curtisii* along the river Our.] Address: Lohr, M., An der Kirche 22, D-37671 Hörter, Germany. E-mail: mlohr@fh-hoexter.de

4851. Machado, A.B.M. (2004): Studies on Neotropical Protoneuridae. 14. The female of *Neoneura gaida* Racenis, 1953 (Odonata: Protoneuridae). *Lundiana* 5 (1): 41-42. ["The female of *Neoneura gaida* Racenis, 1953 is described and illustrated. It is very close to that of *N. cristina* Racenis, 1955 but can be separated from it by the shape of the posterior pterothoracic lobe." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

4852. Macías, M.; Green, A.J.; Sánchez, M.I. (2004): The diet of the Glossy Ibis during the breeding season in Doñana, Southwest Spain. *Waterbirds* 27(2): 234-239. (in English). ["We present the first detailed study of the diet of Glossy Ibis (*Plegadis falcinellus*) in Europe, from an expanding breeding colony in Doñana, southwest Spain. In 2000, fecal samples, mainly from adults, were collected from 15 nests. In 2001, 36 regurgitates were collected, mainly from large chicks. Fecal contents were dominated by aquatic beetles and dragonfly larvae, which were present in 100% and 93% of samples respectively. Regurgitates contained mainly aquatic beetles (41% by aggregate percent, mainly *Cybister* spp.), dragonfly larvae (29%, mainly *Sympetrum fonscolombii*, *Aeshna mixta*, and *Anax imperator*), Sharp-ribbed Salamanders (*Pleurodeles waltii*, 12%) and Carp (*Cyprinus carpio*, 7%). The absence of vertebrate and

other hard remains from feces was presumably due to their excretion in pellets. Thus fecal analysis is not a suitable method to investigate the food of the Glossy Ibis. The results suggest that there may be no major difference in the diet of breeding adults and their chicks, and that the recent increase in numbers of this ibis in Doñana is not explained by the abundance of introduced Red-swamp Crayfish (*Procambarus clarkii*) in the breeding area." (Authors)] Address: Green, A., Dept of Applied Biology, Doñana Biological Station, Avenida María Luisa s/n, 41013 Sevilla, Spain. E-mail: ajgreen@ebd.csic.es

4853. Maezono, Y.; Miyashita, T. (2004): Impact of exotic fish removal on native communities in farm ponds. *Ecological Research* 19(3): 263-267. (in English). ["Introduced largemouth bass (*Micropterus salmoides* spp.) and bluegill (*Lepomis macrochirus* spp.) are thought to threaten native aquatic organisms worldwide and hence their eradication has recently begun in Japan. Our previous studies suggested that the removal of largemouth bass increases native fish, shrimp, dragonflies, and exotic crayfish, but decreases macrophytes. To test this prediction, we removed the exotic fishes by draining farm ponds and compared the numbers of these organisms before and after the drain, as well as between drained and undrained ponds. The number of dragonfly *Pseudothemis zonata*, crayfish, shrimp, and goby increased rapidly after the drain, but the coverage of macrophyte declined. The reduction in macrophyte is assumed to be caused by increased herbivory by crayfish. The number of exuviae of damselfly *Cerion calamorum* and the total number of species of odonate also decreased after the drain. These decreases can be due to the reduction of macrophyte because reduced odonate species are known to use macrophytes as oviposition sites. Therefore, the removal of largemouth bass has a potential to cause negative effects on some native organisms. We propose that reduction of exotic crayfish should be considered when eradicating the exotic fishes." (Authors)] Address: Maezono, Y., Sch. Agr. and Life Sci. Lab. Biodivers. Sci., Univ Tokyo, Tokyo, 1138657, Japan. E-mail: zephyrus3@nifty.com

4854. Mahlendorf, B.; Martens, A. (2004): *Anax guttatus* (Burm.) new to the Maldives Islands, Indian Ocean (Anisoptera: Aeshnidae). *Notulae Odonatologicae* 6(4): 44. (in English). [Angagam South Ari Atoll, 3-XI-2003; on 28-XI-2003, *Tramea limbata* was photographed at light] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

4855. Mantel, S.K.; Salas, M.; Dudgeon, D. (2004): Foodweb structure in a tropical Asian forest stream. *Journal of the North American Benthological Society* 23(4): 728-755. (in English). ["A food web based on the gut contents of consumers (invertebrates and fishes) in pools of Tai Po Kau Forest Stream (TPKFS), Hong Kong (southern China), indicated the importance of periphyton and fine organic particles; coarse particulate organic matter was a less important food source despite its higher relative abundance in this shaded hillstream. Stable isotope analysis of consumer tissues was undertaken to confirm this result. IsoSource software was used to model n-isotope and >n + 1-sources, so that the relative contribution of the potential food sources could be determined. Results of an IsoSource mixed model of $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ stable isotope signatures

of primary consumers generally supported evidence from gut content analyses about the importance of autochthonous resources. Inconsistencies between the results of gut content analysis and isotope signatures of consumer tissues occurred in a few cases but could be explained either by small sample size or the wide range of feasible solutions provided by the isotopic mixed model. Both techniques were needed to resolve the trophic position of omnivores. For instance, the gut contents of balitorid loaches indicated that they were primarily herbivorous but their stable isotope signatures revealed a significant dependence on animal food. Considerable overlap in the diets of predatory fishes and invertebrates (odonates, perlid stoneflies, palaemonid shrimps) was confirmed by both gut contents and stable isotope analyses. This finding, along with a lack of intraguild predation, resulted in a short mean and maximum food-chain length, high links per species, and high connectance for the TPKFS food web when compared with literature reports of other stream food webs. Periods of spate-induced disturbance during the wet season and limited algal productivity in TPKFS might also have contributed to the short food chains. Inconsistent levels of resolution for different taxonomic groups within the food web may have generated artefacts of low linkage complexity, high predator-prey ratio, and a small number of basal and intermediate species, a pattern that has been confirmed for stream food webs elsewhere. Our study is the first example of a food web based on complementary analyses of gut contents and stable isotope signatures for any tropical stream. This combined approach is recommended for future studies of food webs, especially in habitats where omnivores are an important component of the community." (Authors)] Address: Mantel, S.K., E-mail: suhkaur@graduate.hku.hk; Dudgeon, D., Department of Ecology & Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong, China. E-mail: ddudgeon@hkucc.hku.hk

4856. Marinov, M. (2004): Dragonflies (Insecta: Odonata) of the Eastern Rhodopes (Bulgaria and Greece). In: Beron P., Popov A (eds). Biodiversity of Bulgaria. 2. Biodiversity of Eastern Rhodopes (Bulgaria and Greece). Pensoft & Nat. Mus. Natur. Hist., Sofia: 221-235. (in English). [This is a thorough review of the odonatological information on the Eastern Rhodopes. A total of 46 dragonfly species from 118 sites is given. These are about 92% of the expected 50 species, which use the region for reproduction, maturity, or during migration. At least 8 other species could be found as accidental immigrants from adjacent territories. Short zoogeographical analysis is made and a characterization of the most important habitats for preserving Odonata populations is given.] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@mail.bg

4857. Mathew, G.; Shamsudeen, R.S.M.; Chandran, R.; Brijesh, C.M. (2004): Insect fauna of Peppara Wildlife Sanctuary, Kerala, India. Zoos' Print. 19(11): 1680-1683. (in English). [Two unidentified zygopteran species are listed.] Address: Mathew, G., Div. Entomol., Kerala Forest Res. Inst., Peechi, Kerala, 680653, India. E-mail: mathew@kfri.org

4858. Matushkina, N. (2004): Comparative morphology of ovipositor in some damselflies (Odonata, Zygoptera). Vestnik Zoologii 38(3): 53-66. (in Russian, with English summary). ["Representatives of 5 Zygoptera families: *Bayadera melanopteryx* (Euphaeidae), *Chalco-*

lestes parvidens (Lestidae), *Heteragrion alienum* (Megapodagrionidae), *Platycnemis pennipes* (Platycnemididae), and *Palaemnema domina* (Platystictidae) were studied [...] aimed to reveal differences among species of these families. The table of ovipositor characters was compiled based upon the literature data and own results, which can be used for phylogenetic analysis. Possible correlations between ovipositor features and oviposition behaviour are discussed." (Authors)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

4859. Mauco, L.; Favero, M. (2004): Diet of the common tern (*Sterna hirundo*) during the nonbreeding season in Mar Chiquita Lagoon, Buenos Aires, Argentina. *Ornitologia Neotropical* 15(1): 121-131. (in English). [S. *hirundo* "breeds widely across the Northern Hemisphere in colonies all along North America, Europe and Asia. Common terns breeding in the Atlantic coast of North America migrate during the boreal winter to the Southern Hemisphere, showing a wide nonbreeding distribution that includes the Atlantic coasts of Argentina and Brazil. The coast of Buenos Aires Province (Argentina) constitutes the main wintering area of the species in South America. In Mar Chiquita Lagoon, their diet was assessed by the analysis of regurgitated casts collected on nonbreeding grounds. A total of 538 pellets were analyzed, containing 1092 prey. About 88% by number of prey were fish, 11.4% were adult insects and 0.5% were crustaceans. Adult Coleoptera, Odonata, Orthoptera, Hemiptera and Lepidoptera was the main insects found in the [...]." (Authors)] Address: Mauco, Laura, Lab, Vertebrados Dept Biol. Fac. Ciencias Exactas & Nat., Univ. Mar del Plata, Funes 3250, RA-7600, Mar Del Plata, Argentina. E-mail: lmauco@mdp.edu.ar

4860. Mauersberger, R. (2004): 15 Libellen. In: Lükkepohl, M. & M. Flade (Hrsg.): *Das Naturschutzgebiet Stechlin*. Rangsdorf. ISBN 3-9807627-8-5: 138-147. (in German). [Lake Stechlin, Brandenburg, Germany; Between 1992 and 2003, a total of 53 odonate species - 88% of all species of Brandenburg and 66% of the German odonate fauna - was recorded. *Nehalennia speciosa*, *Aeshna subarctica elisabethae*, *A. viridis*, *Onychogomphus forcipatus*, *Gomphus vulgatissimus*, *Orthetrum coerulescens*, *Crocothemis erythraea*, and *Leucorrhinia albifrons* are discussed in some detail. All species are checklisted and briefly commented in a table.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerderevereinUeckermark.Seen@t-online.de

4861. Meier, C. (2004): Artenschutzmaßnahmen für gefährdete Tierarten im Kanton Zürich. Aktionsplan Helmazurjungfer (*Coenagrion mercuriale*). Fachstelle Naturschutz, Kanton Zürich: 15 pp. (in German). [The paper compiles the conservation status and the known records of *C. mercuriale*, provides a map with regional records (Kanton Zürich, Switzerland), and make suggestions for a species action plan.] Address: www.naturschutz.zh.ch

4862. Mengelkoch, J.M.; Niemi, G.J.; Regal, R.R. (2004): Diet of the nestling Tree Swallow. *Condor* 106(2): 423-429. (in English). ["Dietary samples from nestling Tree Swallows (*Tachycineta bicolor*) in northwestern Minnesota were compared to invertebrate availability as measured by aerial tow nets. The majority of the

biomass in the nestlings' diet was adult insects with larval stages of aquatic origin (including Odonata), while absolute numbers of insects of both aquatic and terrestrial origin were similar. Orders of invertebrates in the diet and available were similar in number but not in biomass. Diet showed little variation by time of day, date of sampling or the age of the nestling. The mean number of odonates in the nestling Tree Swallows' diet increased exponentially as the percentage of open water and open water + cattail marsh increased within a 400-m foraging radius." (Authors)] Address: Niemi, G.J., Dept Biol., Univ. Minnesota, Duluth, MN, 55812, USA. E-mail: gniemi@nrri.umn.edu

4863. Mielewczyk, S. (2004): State of research and threats facing the entomofauna of Toporowe Ponds in the Tatra National Park. *Parki Narodowe i Rezerwaty Przyrody* 23: 527-534. (in Polish, with English summary). [The history of study of the Odonata, Hemiptera: Heteroptera and Coleoptera: Adepaga of the Toporowe Ponds in Tatra National Park, Poland is outlined. Special emphasis is given to the negative impacts of mallards (*Anas platyrhynchos* L.) on the entomofauna of the ponds. The mallard faeces cause the eutrophication of the ponds. The resulting intensive algal development completely eliminates Corixidae and Dytiscidae.] Address: Mielewczyk, S., Polska Akademia Nauk, Zakład Badań Środowiska Rolniczego i Leśnego, ul. Bukowska 19, 60 809 Poznań, Poland

4864. Mielewczyk, S. (2004): Study methods of aquatic entomofauna with taking protected areas into consideration. *Parki Narodowe i Rezerwaty Przyrody* 23: 519-526. (in Polish, with English summary). [Some personal annotations referring sampling methods to study Odonata, Heteroptera, and aquatic Coleoptera are made.] Address: Mielewczyk, S., Polska Akademia Nauk, Zakład Badań Środowiska Rolniczego i Leśnego, ul. Bukowska 19, 60 809 Poznań, Poland

4865. Mikolajewski, D.J.; Rolff, J. (2004): Benefits of morphological defence demonstrated by direct manipulation in larval dragonflies. *Evolutionary Ecology Research* 6(4): 619-626. (in English). ["Many prey species evolved morphological structures to hold off predators. As morphology and behaviour are frequently entwined, it is very difficult to demonstrate the assumed defence benefit of the morphological traits. Using a novel approach of directly manipulating morphological defence in larval dragonflies, we demonstrated that spines were an effective morphological defence against predatory fish. Our results showed that the survival probability of larval dragonflies being attacked from behind was four-fold higher in larvae possessing spines than in larvae without spines. However, spines were ineffective against attacks from the front. We discuss the relevance of our study for understanding inducible defence." (Authors)] Address: Mikolajewski, D.J., Zool Inst. Ökol, TU Braunschweig, Fasanenstr 3, D-38102, Braunschweig, Germany. E-mail: d.mikolajewski@tu-bs.de

4866. Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz NRW (Hrsg) (2004): *Lebensräume und Arten der FFH-Richtlinie in NRW. Beeinträchtigungen, Erhaltungs- und Entwicklungsmaßnahmen, Bewertung des Erhaltungszustandes.* Herausgeber: Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz NRW, Schwannstraße 4, D-40476 Düsseldorf, Germany; V,

170 pp. (in German). [*Leucorrhinia pectoralis* and *Coenagrion mercuriale* - listed as appendix II species of the European Habitat Directive - and found in Nordrhein-Westfalen, Germany are treated in this handbook and briefly characterised. Note that *C. ornatum* is also listed in app. II and occurring in NRW but is missing in this report.] Address: http://www.natura2000.munlv.nrw.de/ffh-broschuere/ffhbroschue_re.pdf

4867. Mishra, P.K.; Dongre, S.D.; Pathak, N.; Patel, S.; Panse, U. (2004): Bio-control of mosquito vector with special reference to dragon fly nymph *Aeschna* [sic]. *Journal of Experimental Zoology, India* 7(2): 353-355. (in English). ["Population regulation in mosquitoes can be extremely complex. Therefore there is a need to control the mosquito more effectively using environmental measures. Over forty different biocontrol agents on mosquito have been recorded till now and among them fishes, insects and parasites show promising results. The present paper reports the use of a dragonfly nymph in mosquito control programme." (Authors)] Address: Mishra, P.K., Dept Zool., JH Govt PG Coll, Betul, 460001, India

4868. Motta, R.L.; Uieda, V.S. (2004): diet and trophic groups of an aquatic insect community in a tropical stream. *Braz. J. Biol.* 64(4): 809-817. (in English, with Portuguese abstract). ["The diet and trophic groups of an assemblage of aquatic insects were studied in a tropical stream. Genera of the orders Ephemeroptera, Odonata, Plecoptera, Lepidoptera, and Hemiptera showed feeding specialization. Others, such as Trichoptera, Coleoptera, and Diptera, showed great diet variation with genera of different trophic groups. Seasonal variation of insect diet, evident only for some genera of the orders Trichoptera, Lepidoptera, Coleoptera, and Diptera, was due to the differences observed in community composition and to generalist habits of these genera. However, the seasonal comparison of trophic groups showed no significant statistical differences. The great importance of organic matter, a non-limited resource, in the diet of Ribeirão do Atalho aquatic insects may be the explanation for the trophic stability in this community organization." (Authors) Odonata are treated on the genus level.] Address: Uieda, Virginia S., Departamento de Zoologia, Instituto de Biociências, Universidade Estadual Paulista, C.P. 510, CEP 18618-000, Botucatu, SP, Brazil

4869. Mousa, S.; Abdel-Aziz, F. (2004): Seasonal activity of insect fauna associated with sweet potato and its correlation with agronomic practices in Egypt. *Journal of Entomological Research (New Delhi)* 28(2): 117-126. (in English). ["Surveys conducted over two successive seasons showed that 20 insect species belonging to orders viz, Homoptera, Lepidoptera, Hemiptera, Orthoptera, Thysanoptera, and Coleoptera attack sweet potato. The homopterans were the dominant insects. The total of beneficial insects associated were thirteen species belonging to six orders viz., Coleoptera, Odonata, Hemiptera, Diptera, Dermaptera, Neuroptera. The early planting date harboured the lowest number of insect species, while the late planting increased the population. The variety NcSu925 (Kafr El-Zyat) was the most resistant to all groups of insects studied." (Authors)] Address: Mousa, S., Plant Protect. Res. Inst., Agr. Res. Ctr., 7 Nadi El Said St, Giza, Egypt

- 4870.** Mrowiński, P.; Zawal, A. (2004): Preliminary studies of dragonflies (Odonata) of Barlinecko-Gorzowski Landscape Park. *Parki Narodowe i Rezerwy Przyrody* 23: 471-518. (in Polish, with English summary). [Poland; 39 species including *Sympecma paedisca*, *Coenagrion lunulatum*, *Cercion lindenii*, *Erythromma viridulum*, *Aeshna viridis*, *Aeshna subarctica elisabethae*, *Brachytron pratense*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Somatochlora flavomaculata*, *Epithecica bimaculata*, *Libellula fulva*, and *Leucorrhinia pectoralis* are listed. Special emphasis is given to the dominance of selected species as *Ischnura elegans* and *Platycnemis pennipes*, and a comparison with odonate records from the 1930th is made.] Address: Zawal, A., Zakład Zoologii Bezkręgowców i Limnologii, Uniwersytet, Szczeciński, ul. Wąska 14, 71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl
- 4871.** Müller, J. (2004): Literatur. pedemontanum 5: 12-14. (in German). [76 new odonatological papers are added to the list of publications referring to Sachsen-Anhalt, Germany] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.Jmueller@t-online.de
- 4872.** Müller, J.; Steglich, R. (2004): Verzeichnis (Checkliste) der Libellen (Odonata) des Landes Sachsen-Anhalt und deren Gefährdungseinschätzung - Stand: Dez. 2004. *Pedemontanum* 5: 1-6. (in German). [Sachsen-Anhalt, Germany; checklist of species; classification according Red List status.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de
- 4873.** Müller, J.; Steglich, R. (2004): Zur Entwicklung der Vorkommen der Flussjungfern (Gomphidae) in Sachsen-Anhalt. *Pedemontanum* 5: 10-12. (in German). [Update of new records of *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Stylurus flavipes* in Sachsen-Anhalt, Germany from the rivers Elbe, Saale, and Unstrut.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de
- 4874.** Ocharán, F.J.; Torralba Burrial, A. (2004): La relación entre los odonatos y la altitud: el caso de Asturias (norte de España) y la península Ibérica (Odonata). *Boletín de la Sociedad Entomológica Aragonesa* 35: 103-116. (in Spanish with English summary). [The trade-off "between the distribution of Odonata and altitude is studied for Asturias (northern Spain), by means of profiles of corrected frequencies, and is compared with bibliographical data for the rest of the Iberian Peninsula and other areas. Decreasing species richness of Odonata with increasing altitude across an altitude gradient is the general pattern. However, some species are limited to high altitude (*Sympetrum flaveolum*) or have a predominantly high-altitude distribution range (*Aeshna juncea*, *Lestes dryas*, *Lestes sponsa*). Other species live only at very low altitude (like the thermophilic *Crocothemis erythraea*) or predominantly in low areas (*Calopteryx haemorrhoidalis asturica*, *Orthetrum cancellatum*, *Onychogomphus uncatus*). Some species have a wide altitudinal range which covers the whole altitude gradient (*Pyrrhosoma nymphula*, *Coenagrion puella*, *Enallagma cyathigerum*, *Cordulegaster boltonii*, *Sympetrum striolatum*), and others seem to follow this pattern too (*Ischnura graellsii*, *Aeshna cyanea*). Habitat preferences and the relationship of some environmental factors with the altitude and the distribution of Odonata in Asturias are discussed, especially the differences with the altitudinal data known for the Iberian Peninsula. *Calopteryx virgo meridionalis* seems indifferent to altitude between 0 and 1000 m, where it disappears, thus it is not a montane species. The implications of the presence of *Aeshna juncea* at a low altitude pond (230 m above sea level) are discussed." (Authors)] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: focharan@oonreo.uniovi.es
- 4875.** Olowo, J.P.; Chapman, L.J.; Chapman, C.A.; Ogutu-Ohwayo, R. (2004): The distribution and feeding ecology of the characid *Brycinus sadleri* in Lake Nabugabo, Uganda: implications for persistence with Nile perch (*Lates niloticus*). *African Journal of Aquatic Science* 29(1): 13-23. (in English). ["Coincident with a rapid increase in numbers of introduced predatory Nile perch (*Lates niloticus*) in lakes Victoria, Kyoga, and Nabugabo of east Africa was a dramatic decline in populations of many native fishes. However, a few species, including the characid *Brycinus sadleri*, have shown remarkable resilience. This study examined how the distribution and foraging behaviour of *B. sadleri* in Lake Nabugabo may facilitate their persistence with Nile perch. Both *B. sadleri* and Nile perch were most abundant in exposed areas offshore (20m) as opposed to wetland areas. However, we found evidence for a strong diel shift in activity and modest changes in the habitat use of *B. sadleri* that may contribute to persistence with Nile perch. In general, *B. sadleri* actively foraged during the daylight hours and remained quiet during the night. Nile perch began foraging during the early evening and were more active during the night than during the day. By early morning the proportion of full stomachs in Nile perch was low, though there was evidence of a low level of feeding activity during the day. Stomach contents of *Brycinus sadleri* indicated a shift from surface to benthic feeding as light levels increased, which appears to decrease their susceptibility to predation by Nile perch during the daylight hours." (Authors) The diet includes also Odonata.] Address: Chapman, Laureem, Department of Zoology, University of Florida, Gainesville, Florida 32611, United States of America. E-mail: lchapman@zoo.ufl.edu
- 4876.** Orr, A.G.; Butler, S.G.; Hämäläinen, M.; Kemp, R.G. (2004): Insecta: Odonata. In: Yule, C.M. & Yong, H.S. (Eds.) (2004) *Freshwater Invertebrates of the Malaysian Region*. Academy of Sciences Malaysia. 861 pp. ISBN 983-41936-0-2: 409-442. (in English). [Published by: Academy of Sciences Malaysia, 902-4, Jalan Tun Ismail, 50480 Kuala Lumpur, Malaysia. www.akedemisains.gov.my] Address: Yule, Catherine, Dept Science, Monash University Malaysia, 2 Jalan Kolej, Bandar Sunway, Petaling Jaya 46150, Selangor, Malaysia. E-mail: catherine.yule@artsci.monash.edu.my
- 4877.** Ottino, P.; Giller, P. (2004): Distribution, density, diet and habitat use of the otter in relation to land use in the Araglin valley, southern Ireland. *Biology and environment: Proceedings of the Royal Irish Academy* 104B(1): 1-17. (in English). [Odonata are represented as diet, but it is not clear if this is primary food of the otters or secondary food of otter's prey as fishes, frogs or birds.] Address: Giller, P., Department of Zoology, Ecology and Plant Science, University College Cork, Lee

Maltings, Prospect Row, Cork Ireland. E-mail: p.giller@ucc.ie

4878. Parris, M.J.; Davis, A.; Collins, J.P. (2004): Single-host pathogen effects on mortality and behavioral responses to predators in salamanders (Urodela: Ambystomatidae). *Canadian Journal of Zoology* 82(9): 1477-1483. (in English, with French summary). ["Pathogens can alter host behavior and affect the outcome of predator-prey interactions. Acute phase responses of hosts (e.g., a change in activity level or behavioral fever) often signal an infection, but the ecological consequences of host behavioral changes largely are unexplored, particularly for directly transmitted (i.e., single-host) pathogens. We performed three experiments to test the hypothesis that a pathogen, *Ambystoma tigrinum* virus (ATV), alters host behavior of Sonoran tiger salamanders (*Ambystoma tigrinum* *stebbinsi* Lowe, 1954) and enhances predation. In the first experiment, salamander larvae exposed to ATV experienced 48% lower mortality from dragonfly *Anax junius* (Drury, 1773) larvae than those in controls. Second, uninfected and infected larvae exposed to the nonlethal (caged) presence of predators did not significantly differ in their distance from the predator. Infected salamanders significantly increased their activity level relative to those in controls in predator-free conditions. Finally, ATV-infected larvae preferred significantly warmer temperatures than uninfected larvae, but larvae reared at the thermal maximum for the virus all died. High host activity level yet retention of effective antipredator responses likely benefits ATV because this single-host pathogen relies on host survival for transmission. Preference for warmer temperatures may be associated with the host response to pathogens and may help fight infection."] (Authors)] Address: Parris, M., Dept Biol., Memphis State Univ., Memphis, TN, 38152, USA. E-mail: mparris@memphis.edu

4879. Parzefall, J.; Garcia, R.; Tolasch, C. (2004): Biologie, Gefährdung und Schutz der Späten Adonislilbelle *Ceriagrion tenellum* De Villers im Hamburger Raum. *Artenschutzreport* 15: 36-38. (in German with English summary). [In 2000, successful reproduction of *C. tenellum* in the Fischbeker Heide, a protected area near Hamburg, Germany, has been recorded from a 30 m long and up to 1.20 m deep bog pond, and in 2002 in an additional one of 5 x 2 m. Both habitats are fed by small sources causing a weak current in the ponds, which surface is covered with app. 90 % of *Sphagnum*. The emergence period started in mid June and ended 38 days later. The larvae climbed up to about 3 cm on stems of *Eriophorum spec.* The males exhibited short fights, but were nonterritorial. Oviposition was performed in tandem position into the *Sphagnum* mosses. The larvae concentrated in the upper part of the *Sphagnum* layers. In 2000, the larval population was calculated as 16.000 specimens.] Address: Parzefall, J., Zool. Institut & Zool. Museum der Universität Hamburg, Martin-Luther-King Platz 2, D-20146 Hamburg, Germany

4880. Pessacq, P.; Muzón, J. (2004): Description of the Final Stadium Larva of *Hetaerina rosea* Selys (Zygoptera: Calopterygidae). *Studies on Neotropical Fauna and Environment* 39(3): 239-242. (in English). [The description is based on specimens collected in Corrientes and Buenos Aires provinces, Argentina.] Address: Pessacq, P., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712,

AR-1900 La Plata, Argentina. E-mail: pessacq@ilpla.edu.ar

4881. Petrulevicius, J.F.; Nel, A. (2004): A new damselfly family from the Upper Palaeocene of Argentina. *Palaeontology* 47(1): 109-116. (in English). ["A new family of damselflies, based on *Latibasalia elongata* gen. et sp. nov. and *L. quispeae* gen. et sp. nov., is erected from the Upper Palaeocene Maíz Gordo Formation, north-western Argentina. *Latibasaliidae* fam. nov. can be included in the Zygoptera: Caloptera: Eucaloptera: Amphipterygida: Amphipterygoidea. Its phylogenetic relationships within the clade Eucaloptera Bechly, 1996 are discussed. Within Amphipterygoidea, *Latibasaliidae* could be closely related to *Pseudolestidae* or to the 'thaumatoneurid' genera *Petrolestes* and *Congqingia* because they share the absence of secondary antenodal crossveins of first and second rows and the absence of antesubnodal crossveins. These characters could be potential synapomorphies of these taxa but they are somewhat homoplastic within the Zygoptera."] (Authors)] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

4882. Petrulevicius, J.F.; Nel, A. (2004): Recognition of the first fossil lestoid damselfly in south America (Insecta: Zygoptera): Biogeographic and phylogenetic remarks. *Journal of Paleontology* 78(4): 798-801. (in English). [Argentina; *Promegalestes singularis* n. sp. is described and figured. *Promegalestes* n. gen. is the third genus of *Lestinoidea* discovered in South America. The two other lestinoid damselflies are recent "derived" *Lestidae* (*Lestes*, *Archilestes*). *Promegalestes* is not directly related to them and perhaps corresponds to a distinct family. It is the oldest and probably the "most basal" known *Lestinoidea*. No information contradicts its possible attribution as sister group of [*Megalestidae* + *Lestidae*.] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

4883. Phoenix, J.; Zinke, J. (2004): Neue Nachweise von *Cordulegaster bidentata* SELYS, 1843 (Odonata, Cordulegasteridae) im sächsischen Teil des Elbsandsteingebirges (Sächsische Schweiz). *Entomologische Nachrichten und Berichte* 48(1): 175-178. (in German, with English summary). [This is a detailed compilation of current records of *Thecagaster bidentata* in the region called Sächsische Schweiz, Saxonia, Germany.] Address: Phoenix, J., Goethestr. 22, D-01824 Königstein, Germany

4884. Polhemus, D.A.; Englund, R.A.; Allen, G.R. (2004): Freshwater Biotas of New Guinea and Nearby Islands: Analysis of Endemism, Richness, and Threats. Final Report Prepared for: Conservation International, Washington, D.C. Bishop Museum Technical Report 31, Contribution No. 2004-004 to the Pacific Biological Survey: II, 62 pp. ["Effective conservation of regional biotas requires accurate information on the distribution, endemism, local richness, and taxonomic composition of species assemblages across multiple geographic scales. This is especially true in the Melanesian region, which contains ten percent of the world's biota on its numerous islands scattered across thousands of kilometers between Fiji and the Moluccas. Although certain important biotic components within this region, such as birds, have been reasonably surveyed, many others,

particularly freshwater organisms, remain poorly understood. To this end, a systematic survey program for freshwater fishes and invertebrates on New Guinea and nearby islands was undertaken over the last 10 years, involving an array of research organizations with long-standing interests in Melanesia, including the Bishop Museum, Smithsonian Institution, the Indonesian science ministry (LIPI), the Papua New Guinea National Museum and Gallery, and Conservation International. This work has also been augmented by partnerships with private sector entities operating in the region, most notably Chevron Niugini and P. T. Freeport Indonesia. These surveys have revealed previously unsuspected levels of species richness and endemism among New Guinea freshwater organisms, and the remarkable number of new species discovered during these surveys has also highlighted the fact that similar knowledge gaps and potentially similar levels of undocumented freshwater biodiversity remain through much of the rest of Melanesia beyond New Guinea. To the extent that they are now understood, Melanesian freshwater biotas appear to be characterized by foci of high endemism clustered around tectonic provinces within individual large islands, such as New Guinea, or on geologically allied groups of smaller islands, such as the Louisiades and Solomons. In lotic systems, such as streams and rivers, this endemism frequently displays a marked turnover in species elements along the length of individual catchments, linked to segregation of individual species by altitude, water temperature, substrate, bed profile and terminal reach salinity gradients. By contrast, lentic systems often harbor suites of localized endemic species centered around individual lakes or wetland complexes. Although known in a broad sense based on scattered collections made during the past 200 years and distributed among major museums, freshwater biotas of islands in the Melanesian region remain for the most part under-surveyed and poorly characterized taxonomically. Although the overall condition of freshwater ecosystems in the New Guinea region is currently excellent, there are obvious threats to the biota that tend to manifest themselves on local rather than regional scales. These threats may be grouped into three general categories: 1.) physical alteration of habitat; 2.) utilization of biotic resources, and 3.) invasive species. Threats from habitat alteration to freshwater ecosystems include but are not limited to industrial logging, shifting cultivation, oil palm plantations, mining, petroleum development, and hydroelectric schemes. Utilization of biotic resources such as the live aquarium fish trade or the harvest of native fish for food are deemed a much lower threat. While invasive species have not yet caused large-scale perturbations to freshwater systems they are a looming threat that is becoming increasingly problematic." (Authors) Numerous colour pictures of Odonata are included.] Address: www.bishopmuseum.org/research/pbs/pdf/ci-png.pdf

4885. Popova, O.N. (2004): Intraspecific taxonomy of *Sympetrum pedemontanum* (Müller, 1766) (Anisoptera: Libellulidae). *Odonatologica* 32(2): 207-216. (in English). ["An analysis of a large series of specimens from Eurasia showed a strong morphological variability. It is of an individual, modificatory, or clinal nature, rather than a geographical one. Thus, 2 continental subspecies, *S. p. intermedium* Belyshev, 1955 and *S. p. kurentzovi* Bely., 1956, should be suppressed as they cannot be defined by any taxonomically significant differences. The insular subspecies, *S. p. elatum*, inhabiting

Sakhalin, the Kurile and the Japanese islands, however, can be separated. It is concluded that *S. pedemontanum* has only 2 subspecies: continental *S. p. pedemontanum* and the insular *S. p. elatum*." (Author) The author outlines the correct authorship of the taxon being Müller, 1766, and not Allioni, 1766.] Address: Popova, O.N., Institut Sistemati i Zkologii Zhivotnykh, 630091 Novosibirsk, Ul. Frunse 11, Russia. E-mail: pc@eco.nsc.ru

4886. Ramanujam, M.E.; Verzhutskii, B. (2004): The prey of the greater false vampire bat *Megaderma lyra* E. Geoffroy at Kaliveli, Tamil Nadu. *Zoos' Print* 19(10): 1655-1656. (in English). [Faecal analysis.] Address: Ramanujam, M.E.; Pitchandikulam Bio. Resource Ctr. Gratitude Avian Rehabilitat, ECTDEF Project, Auroville, Pondicherry, 605101, India. E-mail: tdef@auroville.org.in

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lected in 2002. Results derived from samples collected at sites A5 and B2 indicate good water quality, whereas the Invertebrate Community Index score calculated for site B3 placed water quality between the good and fair categories. The Hilsenhoff Biotic Index score and the Invertebrate Community Index score calculated for site B3 indicate that water-quality conditions are slightly degraded. The calculated scores, however, simply may reflect the relatively small drainage area of this site compared to other sampling sites in the study area and that flow periodically approaches zero." (Author) 9 odonate taxa are listed in table 2] Address: <http://water.usgs.gov/pubs/sir/2004/5010/sir20045010.pdf>

4891. Rodrigo Fonseca, A.; Moreno Sanches, N.; Moisés Quintilhiano, D.; da Fonseca, M.C.; da Silva, E.S. (2004): Levantamento de espécies de Odonata associadas à tanques de piscicultura e efeito de *Bacillus thuringiensis* var. *israelensis* sobre ninfas de *Pantala flavescens* (Fabricius, 1798) (Odonata: Libellulidae). *Acta Scientiarum. Biological Sciences* Maringá 26(1): 25-29. (in Portuguese, with English summary). ["Odonata species survey associated with pisculture tanks and *Bacillus thuringiensis* var. *israelensis* effect on *P. flavescens* (Fabricius, 1798) nymphs. Several pisculture stations that deal with fingerlings or ornamental fishes rearing have presented some problems with larvae preying, post-larvae and fingerlings by Odonata Order insect nymphs. Thus, the aim of this work was to survey the Odonata species present in fish-raising tanks in two towns of the Midwest region of Minas Gerais, and also to evaluate the effect of *Bacillus thuringiensis* var. *Barjac israelensis* on *Pantala flavescens* nymphs (Fabricius, 1798) (Odonata: Libellulidae). Fortnightly collections were performed over a three month period. The adult insects were captured with entomological nets and the nymphs with fine mesh sieves, coupled to wooden handles. The captured nymphs were taken to the laboratory where they were individualized in 2L plastic foam boxes and sealed in its upper extremity with tulle. Soon after the adults emergence, they were killed, packed into envelopes and sent to be identified. The laboratory experiments were conducted in an acclimatized room at $25 \pm 2^\circ\text{C}$, RH of $70 \pm 10\%$ and 12-hour photophase. Second instar *P. flavescens* nymphs were packed individually into plastic foam boxes containing 500mL of chlorine free water each one. When they were in the third, fifth and seventh instars, they were treated with *B. thuringiensis* var. *israelensis* through the microbial product Vectobac® in granulate formulation. The product was directly applied to the rearing container water at the concentration denoted for the control of culicidae larvae, two superior concentrations, two inferior and also another one, where the product was not applied. The evaluations were done at 24, 48 and 72 hours after the product application, recording the dead insects number in each treatment. In both experiments, the nymphs were fed with Culicidae larvae and new-born fishes of the species *Poecilia cf. vivipara* Schneider, 1801. The following species were identified: *Ischnura fluvialis* Selys, 1876; *Aphylla theodorina* (Navas, 1933); *Brachymesia furcata* (Hagen, 1861); *Erythrodiplax fusca* (Rambur, 1842); *Miathyria marcella* (Selys, 1857); *Micrathyria almeidai* Santos, 1945; *Micrathyria hesperis* Ris, 1911; *Orthemis discolor* (Burmeister, 1839); *Perithemis moorma* Kirby, 1889 and *P. flavescens*. There were no significant microbial product effects on the studied species." (Authors)] Address: Rodrigo Fonseca, A., Fundação Educacional de Divinópolis Funedi, Universidade Esta-

dual de Minas Gerais, Centro de Pós-graduação e Pesquisa, Campus Universitário, s/nº, Jardim Belvedere II, 35500-970, Divinópolis, Minas Gerais, Brasil. E-mail alysson@funedi.edu.br

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reproductive adult phase and recorded their lifetime mating success. We found positive selection on PO activity in response to an immune insult, but no selection on wing-spot quality, a trait actively displayed to females during courtship. We suggest that positive selection on PO activity in the year of study may be explained by annual fluctuations in parasite loads." (Authors)] Address: Rolff, J., Department of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

4894. Rolff, J.; Meutter, F. van de; Stoks, R. (2004): Time constraints decouple age and size at maturity and physiological traits. *American naturalist* 164(4): 559-565. (in English). ["Life-history theory predicts changes in age and size at maturity in response to constraints in animals with complex life cycles. A critical underlying assumption is that only these traits are optimized during ontogeny. However, it is not clear how altered life histories mechanistically translate into survival and fecundity. Here we present data from damselflies reared from egg to adult under day lengths mimicking the start or end (time constrained) of the season at high and low food level. These data show that an important component of immunity is suppressed under time-constrained development as well as under low food conditions and that fat storage is affected only by food availability. Intriguingly, the physiological responses are partly decoupled from age and size at maturity, which indicates that the predictive value of traits such as age and size at maturity might well be restricted." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4895. Rowe, R.J. (2004): Agonistic behaviour in final-instar larvae of *Episynlestes cristatus*, *Synlestes tropicus* and *Chorismagrion risi* (Odonata: Synlestidae), and relationships within the 'Lestioidea'. *Australian Journal of Zoology* 52(2): 169-181. (in English). ["Larval agonistic displays are reported from three sympatric synlestid damselflies: *Episynlestes cristatus*, *Synlestes tropicus* and *Chorismagrion risi*. There were strong similarities between the species in the observed displays. Repertoires of all three species contained elements otherwise known only from larval Lestidae (conventionally interpreted as a member of the sister group to the Synlestidae). In night-time observations under infrared illumination different displays, some similar to those of coenagrionids, occurred. On the basis of similarities in larval displays I conclude that *Chorismagrion risi*, regarded on adult characters as an enigmatic form, is a member of the Synlestidae and that the Synlestidae and Lestidae are closely allied." (Author)] Address: Rowe, R.J., Sch. Trop. Biol., James Cook Univ., Townsville 4811, Australia. E-mail: Richard.Rowe@jcu.edu.au

4896. Sadeghi, S.; Dumont, H. (2004): First record of *Libellula fulva pontica* Selys, 1887 (Odonata, Anisoptera) from Iran. *Zoology in the Middle East*. 32: 116-117. (in English). [4-IX-2001, Hafar-e-Sharghi, Khoozestan province, SW Iran.] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

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["The composition of yeast and macroinvertebrate communities was studied on black alder, blue gum eucalyptus and English oak leaves decaying in a stream during a six-month period. ANOVA analysis showed significantly different values ($p < 0.0001$) of yeast and macroinvertebrate densities among the three leaf litters. Some yeast species [...] were present in all litter types. Other yeasts were restricted to a specific type of litter. Macroinvertebrates were dominated by collectors-gatherers on oak and eucalyptus leaves. Shredders reached highest densities in alder leaves." (Authors) Olo river, Serra do Alvao, NE Portugal; Boyeria irene is listed in table 2.] Address: Sampaio, Ana, CETAV Depart. de Engenharia Biológica e Ambiental, University of Trás-os-Montes e Alto Douro, Apartado 1013, 5001 911 Vila Real, Portugal. E-mail: asampaio@utad.pt

4898. Samways, M.J.; Taylor, S. (2004): Impacts of invasive alien plants on Red-Listed South African dragonflies (Odonata). *South African Journal of Science* 100(1): 78-80. (in English). ["This paper gives an overview of the threats to dragonflies (including damselflies) (Odonata), globally and nationally Red-Listed by the IUCN, in South Africa. All the globally Red-Listed species are endemic to South Africa. Invasive alien plants, especially Australian Acacia trees along water-courses, are by far the most important threat to these endemic species. Removal of the invasive alien trees is likely to increase considerably the prospects for the long-term survival of these species. In contrast, the nationally Red-Listed species that are not globally Red-Listed are threatened overall more by natural vagaries of weather than by invasive alien plants." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

4899. Samways, M.J. (2004): Monopodding in *Leslinogomphus angustus* Martin (Anisoptera: Gomphidae). *Odonatologica* 33(4): 443-444. (in English). ["The long abdominal segment 10 in *L. angustus* is used as a monopod to support itself while it perches on horizontal stems and twigs in the shade of bushes or trees." (Author)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

4900. Schilder, R.; Marden, J.H. (2004): A hierarchical analysis of the scaling of force and power production by dragonfly flight motors. *Journal of Experimental Biology* 207(5): 767-776. (in English). ["Maximum isometric force output by single muscles has long been known to be proportional to muscle mass^{0.67}, i.e. to muscle cross-sectional area. However, locomotion often requires a different muscle contraction regime than that used under isometric conditions. Moreover, lever mechanisms generally affect the force outputs of muscle-limb linkages, which is one reason why the scaling of net force output by intact musculoskeletal systems can differ from mass^{0.67}. Indeed, several studies have demonstrated that force output by intact musculoskeletal systems and non-biological systems is proportional to motor mass^{1.0}. Here we trace the mechanisms that cause dragonflies to achieve a change from muscle mass^{0.67} scaling of maximum force output by single flight muscles to mass^{1.0} scaling of dynamic force output by the intact dragonfly flight motor. In eight species of dragonflies, tetanic force output by the basalar muscle during isometric contraction scaled as muscle mass-

0.67. Mean force output by the basalar muscle under dynamic conditions (workloops) that simulated in vivo maximum musculoskeletal performance was proportional to muscle mass^{0.83}, a significant increase in the scaling exponent over that of maximum isometric force output. The dynamic performance of the basalar muscle and the anatomy of its lever, consisting of the second moment of area of the forewing (d_2) and the distance between the muscle apodeme and the wing fulcrum (d_1), were used to analyze net force output by the integrated muscle-lever system (Find). The scaling of d_2 conformed closely to the expected value from geometric similarity (proportional to muscle mass^{0.31}), whereas d_1 scaled as muscle mass^{0.54}, a significant increase over the expected value from geometric similarity. Find scaled as muscle mass^{1.036}, and this scaling exponent was not significantly different from unity or from the scaling exponent relating maximum load-lifting by flying dragonflies to their thorax mass. Thus, the combined effect of a change in the scaling of force output by the muscle during dynamic contraction compared to that during isometric contraction and the departure from geometric similarity of one of the two lever arm lengths provides an explanation for how mass^{1.0} scaling of force output by the intact musculoskeletal system is accomplished. We also show that maximum muscle mass-specific net work and power output available scale as mass^{0.43} and mass^{0.24}, respectively." (Authors)] Address: Schilder, R., Department of Biology, Pennsylvania State University, 208 Mueller Laboratory, University Park, PA, 16802, USA. E-mail: rjs360@psu.edu

4901. Schilder, R.; Marden, J. (2004): Diabetic Dragonflies: hyperglycaemia and insulin response differences in *L. pulchella* dragonflies suffering from a protozoan gut parasite. *FASEB Journal* 18(4-5): Abst. 452.3.. (in English). ["We study the effects of a protozoan (gregarine) gut parasite on protein expression, metabolism and locomotory performance of *Libellula pulchella* dragonflies. Freshly caught parasitized *L. pulchella* males show significantly higher hemolymph glucose levels. This hyperglycaemia can also be induced in healthy individuals by exposing them to gregarine excretory / secretory (E/S) products. Our current working hypothesis is that the hyperglycaemia is induced by an immune-response driven insulin resistance in the flight muscles. Western blot analyses of p38-mitogen activated kinase (p38 MAPK), a protein involved in cell signaling during inflammatory responses of the immune system, show that it is chronically phosphorylated in flight muscles of parasitized individuals. Chronic activation of p38-MAPK has been shown to negatively affect insulin function in vertebrate skeletal muscle. Healthy dragonflies injected with insulin show a significant decrease in hemolymph glucose levels, while insulin treated parasitized individuals show a significant increase in hemolymph glucose levels. While the exact nature of the proposed insulin resistance needs further exploration, this host-parasite interaction shows a potential to become a model system to study possible causes and effects of type II diabetic phenotypes caused by inflammation." (Authors)] Address: Schilder, R., Biology, Penn State University, 208 Mueller labs, State College, PA, 16802, USA. E-mail: rjs360@psu.edu

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sen-Anhalt, Germany. The habitat and the behaviour of *E. bimaculata* are described in detail. Field characters to discriminate *E. bimaculata* from *Libellula quadrimaculata* are outlined and very welcome. In addition, co-occurring odonate species are listed and patterns of (regional) distribution are discussed.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

4903. Schmidt, E. (2004): Die Auswirkungen von Stauhaltungen auf die Libellen-Fauna eines ausgebauten Flachlandbaches, der Issel bei Wesel/Niederrhein (Odonata: Calopterygidae). *Entomol. Generalis* 27(2): 87-104. (in German with English summary). [Along the canalized brook of Issel (Nordrhein-Westfalen, Germany), a total of 25 odonate species was recorded within a decade from 1994 to 2003. Only *Calopteryx splendens* was abundant, while the rest of the species are immigrants or rare breeders in low abundance. *C. splendens* seems to be favoured by a dam which cascades the water and which provides therefore suitable enrichment which oxygenates and compensation of unsuitable temperatures along the stretch of the brook. An additional factor, rapid flow at temporary high flood or high water level in winter combined with lacking shelter of (dense) vegetation, seems to be tolerated by *C. splendens* only, because the larvae are able to cling close to the remaining plants.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

4904. Schneider, W. (2004): Friedrich Moritz Brauer's and Johann Jakob Kaup's types of dragonflies (Insecta: Odonata) in the Hessisches Landesmuseum Darmstadt. *Kaupia* 13: 77-87. (in English, with German summary). ["The present status of 40 type specimens of 18 nominal dragonfly taxa described by F. M. Brauer and J. J. Kaup in three publications between 1866 and 1867 is presented. These taxa - here listed according to their original generic assignment - are: *Neurobasis kaupi* Brauer, 1867, *Rhinocypha ustulata* Kaup in Brauer, 1867, *Gynacantha rosenbergi* Kaup in B., 1867, *Diplax cora* Kaup in B., 1867, *Diplax denticauda* Brauer, 1867, *D. thoracanta* Brauer, 1867, *Perithemis duivenbodei* Brauer, 1866, *Agrinoptera quatuornotata* Brauer, 1867, *Libellula pectoralis* Kaup in B., 1867, *L. coronata* Kaup in B., 1866, *Polyneura decora* Kaup in B., 1866, *P. ramburii* Kaup in B., 1866, *Neurothemis pseudosophronia* Brauer, 1867, *N. innominata* Brauer, 1867, *N. diplax* Brauer, 1867, *Celithemis pygmaea* Brauer, 1867, *Tramea loewii* Kaup in B., 1866, and *T. rosenbergi* Brauer, 1866. The types are deposited in the insect collections of the Hessisches Landesmuseum, Darmstadt (Germany) and the Natural History Museum, Vienna (Austria)."] (Author)] Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany. E-mail: w.schneider@hlmd.de

4905. Sharifi, M.; Hemmati, Z. (2004): Variation in the diet of Mehely's Horseshoe Bat, *Rhinolophus mehelyi*, in three contrasting environments in western Iran. *Zoology in the Middle East* 33: 65-72. (in English). ["The diet of *R. mehelyi* was investigated through analysis of droppings collected from three maternity roosts in northern Zagros, mid-Zagros and the northern Mesopotamian plain. Moths (Lepidoptera) dominated in all areas (34.9-69.5% volume). The second most important food items in the northern Mesopotamian plain and the mid-Zagros are beetles (Coleoptera, 12.6-28.2% volume), while in northern Zagros Homoptera (16% volume) are

the next important food items. The diet of *R. mehelyi* in northern Zagros is characterized by a low proportion of Coleoptera (10%) and the presence of more diverse prey species (12 categories). In the northern Mesopotamian plain and in mid-Zagros, the food items consist mainly of lepidopteran and coleopteran species with fewer additional prey species. Species groups occurring only in the diet of Mehely's Horseshoe Bat in the northern Zagros are Odonata, Trichoptera, Dictyoptera and Acarina." (Authors)] Address: Sharifi, M., Fac. Sci Dept Biol., Razi Univ, Kermanshah, 67149, Iran. E-mail: sharifimozafar@hotmail.com]

4906. Shukla, A. N.; Shrivastava, S. (2004): Species diversity of macrozoobenthos: A tool for monitoring water pollution of Gandhisagar Reservoir, M.P., India. *Biological Memoirs* 30(1): 7-13. (in English). ["Limnological studies on Gandhisagar Reservoir (GSR) were undertaken during July 2001 to June 2003. Species diversity index of macrozoobenthos was applied for the monitoring of water pollution of the reservoir. Total 109 species of macrozoobenthos (including Odonata) were recorded. The number, however, varied at different study sites. The order of decrease in diversity index was Dam > Rampura > Basai. Further, it gradually decreased from shallower zone to deeper profundal zone. Low macrozoobenthic diversity was observed during rainy season, which may be due to pollution inputs of run-off water and a decline in dissolved oxygen and transparency. The diversity index was greater in summer months, which may be attributed to the breeding season in nutrient rich and oxygenated habitats. Thus, GSR may be designated as beta-mesosaprobic as it exhibits fluctuating pattern a feature of moderately polluted water." (Authors)] Address: Sch. Studies Zool. Limnol. and Environm. Biol. Unit., Vikram Univ., Ujjain, Madhya Pradesh, 456010, India

4907. Simaika, J.P.; Cannings, R.A. (2004): *Lestes disjunctus* Selys and *L. forcipatus* Rambur (Odonata: Lestidae): Some Solutions for Identification. *J. Entomol. Soc. Brit. Columbia* 101: 131-139. (in English). ["Five species of the damselfly genus *Lestes* live in British Columbia, Canada, and of these, *Lestes forcipatus* Rambur and *L. disjunctus* Selys are the most similar and most difficult to separate morphologically. Females can be readily distinguished by the size of the ovipositor, but males are difficult to separate. In British Columbia, *L. disjunctus* is the more common, widespread and familiar species. Before 1998, *L. forcipatus* specimens were mistaken for those of *L. disjunctus* because the former is primarily an eastern North American species and because most *Lestes* species are usually identified using male characters. With the discovery that *L. forcipatus* is part of the western fauna, an evaluation of the relative status of the two species in British Columbia is necessary. The best method for separating the two species uses the length of the anterior lamina (part of the secondary genitalia) as a unique character or as part of ratios using other measurements. In addition, in at least western North America, *L. forcipatus* males are more pruinose than those of *L. disjunctus*, especially on the thorax. Identification using the pruinoscence pattern was tested in the field and is recommended as a simple and accurate method for western North America. Soaking Odonata specimens in acetone, a common technique used to preserve colours, damages surface pruinoscence and should not be used to preserve mature, pruinose adults, including those of *Lestes* spe-

cies. To identify *L. disjunctus* and *L. forcipatus* males treated in acetone, it may be necessary to calculate ratios based on various character measurements. Future research should investigate spatial and temporal differences between the species, as well as modes of interspecific communication." (Authors)] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street, Victoria, British Columbia, CA V8W 9W2

4908. Sohni, V.; Finch, O.-D. (2004): Die Libellen eines regenerierten Restmoores in Nordwestdeutschland (Insecta: Odonata). *Drosera* 2004: 119-135. (in German, with English summary). ["Dragonflies of a regenerated bog relict in northwest Germany (Insecta: Odonata) We examined the odonate assemblages of 11 water systems situated within a protected remnant peat bog in the north-eastern part of Cloppenburg district, Lower Saxony in summer 2001. A total of 30 species was recorded, representing half of the species known to occur between the rivers Ems and Weser. 13 species (45%) are listed in the Red Data Books of either Germany and/or Lower Saxony. Two species, *Ceriagrion tenellum* and *Aeschna subarctica*, are listed as endangered, with the former being confirmed to reproduce within the study site. Species richness at the water systems ranged from 5 to 18 species per system. Besides high densities of eurytopic species like *Lestes sponsa* and *Pyrrosoma nymphula*, we found some stenotopic species confined to acidic bogs occurring in lower numbers. The number of bog specialists found in our study area is in concordance with the situation of other bogs in early stages of regeneration. Regeneration of the investigated bog was initiated by measures in 1988. Subsequent measures like the sealing of drainages increased the ratio of bog specialists vs. generalist species in the study area. The occurrence of *Ceriagrion tenellum* and *Aeschna subarctica* justifies taking measures in the future." (Authors)] Address: Finch, O.-D., Universität Oldenburg Fk 5 / Bio-, Geo- und Umweltwissenschaften, AG Terrestrische Ökologie, D- 26111 Oldenburg, Germany. E-mail: oliver.d.finch@uni-oldenburg.de

4909. Storfer, A.; White, C. (2004): Phenotypically plastic responses of larval tiger salamanders, *Ambystoma tigrinum*, to different predators. *Journal of Herpetology* 38(4): 612-615. (in English). ["Studies of prey responses to different predators are needed to investigate costs and benefits of particular antipredator responses and to unravel community-level effects on phenotypic plasticity. We reared laboratory-bred larvae of Arizona Tiger Salamanders, *Ambystoma tigrinum nebulosum* with either of two common predators, diving beetle larvae (*Dytiscus* sp.) or dragonfly naiads (*Anax junius*). Relative to controls, salamander larvae in both predator treatments had shorter snout-vent lengths and deeper tails; these differences may be related to increased swimming ability. In addition, larvae reared with dragonfly naiads had shorter tails than those reared with diving beetle larvae, possibly in response to different predator foraging strategies or differences in strength of selection imposed by each. Salamander larvae from predator treatments weighed less than controls, with salamanders reared with dragonflies weighing the least. This suggests that salamanders respond more strongly to dragonfly naiads than diving beetles and that dragonflies may be a more important predator. Thus, salamander larvae may distinguish between different predators, highlighting the utility of studying effects of multiple predators on phenotypic plasticity of prey." (Authors)] Address: Storfer, A.T., School of Biological Sciences, Washington State University, Pullman, WA 99164, USA. E-mail: astorfer@wsu.edu

(Authors)] Address: Storfer, A.T., School of Biological Sciences, Washington State University, Pullman, WA 99164, USA. E-mail: astorfer@wsu.edu

4910. Strobbe, F.; Stoks, R. (2004): Life history reaction norms to time constraints in a damselfly: differential effects on size and mass. *Biological Journal of the Linnean Society* 83(2): 187-196. (in English). ["Optimality models predict that, under a time constraint, organisms should accelerate development, and preferably so by increasing growth rate, to keep size at emergence constant. Unfortunately, most tests did neglect genetic constraints and interchanged mass with body size which may explain mixed support for some of the models' predictions. We imposed time constraints on full sibling larvae of the damselfly *Enallagma cyathigerum* by manipulating day length regimes. Under a time constraint, larval development and growth rate based on size indeed were faster. This made it possible to keep size at emergence constant, despite the shorter development time. Interestingly, under a time constraint, growth rate based on mass was not increased and larvae had a lower mass at emergence. We see two reasons for this difference between body mass and size. First, size is fixed at emergence, while mass can still increase in many insects. Secondly, genetic constraints may have contributed to different responses for size and mass. In general, our results strongly suggest discriminating between size and mass when testing life history responses." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4911. Strong, K.F.; Robinson, G. (2004): Odonate communities of acidic Adirondack Mountain lakes. *Journal of the North American Benthological Society* 23 (4): 839-852. (in English). ["New York State's fauna is exceptionally rich in odonates, whose lengthy aquatic larval phases render them susceptible to effects of lake acidification, including the loss of fish. We used a collection of benthic macroinvertebrate samples taken by the Adirondack Lakes Survey Corporation to compare odonate communities in 460 lakes. Half were from the Adirondack Mountains, where acid neutralizing capacity (ANC) is low (mean ANC = 108.0 µg/L) and Al concentrations are high (mean Al = 111.61 µg/L), and half were from the Lower Hudson Valley, where ANC is significantly higher (mean ANC = 554.6 µg/L) and Al is significantly lower (mean Al = 0.049 µg/L). Many more lakes in the Adirondack lakes were fishless (52) compared to the lower Hudson (3), and the pH in Adirondack fishless lakes was an order of magnitude lower than the pH of Adirondack lakes with fish. Ninety-nine odonate taxa were identified (86 to species). In Adirondack samples, co-occurrence patterns were correlated with presence or absence of insectivorous fish and with acidic waters. Similar patterns were not apparent in Lower Hudson Valley samples. In Adirondack samples, richness of common taxa (found in 20 lakes) was higher in lakes with fish than in lakes without fish, regardless of pH. Loss of fish may enhance the top predator role of large larval dragonflies, causing change in odonate community structure, an interpretation consistent with previous research. Acidification of Adirondack lakes appears to promote a nonrandom subset of possible odonate communities, with negative implications for regional diversity." (Authors)] Address: Strong, Karen, Program in Biodiversity, Conservation and Policy, Dept

of Biological Sciences, State University of New York at Albany, 1400 Washington Avenue, Albany, New York 12222 USA. E-mail: klstrong@gw.dec.state.ny.us

4912. Sun, M.; Lan, S. (2004): A computational study of the aerodynamic forces and power requirements of dragonfly (*Aeshna juncea*) hovering. *Journal of Experimental Biology* 207(11): 1887-1901. (in English). ["Aerodynamic force generation and mechanical power requirements of a dragonfly (*A. juncea*) in hovering flight are studied. The method of numerically solving the Navier-Stokes equations in moving overset grids is used. When the midstroke angles of attack in the downstroke and the upstroke are set to 52degree and 8degree, respectively (these values are close to those observed), the mean vertical force equals the insect weight, and the mean thrust is approximately zero. There are two large vertical force peaks in one flapping cycle. One is in the first half of the cycle, which is mainly due to the hindwings in their downstroke; the other is in the second half of the cycle, which is mainly due to the forewings in their downstroke. Hovering with a large stroke plane angle (52degree), the dragonfly uses drag as a major source for its weight-supporting force (approximately 65% of the total vertical force is contributed by the drag and 35% by the lift of the wings). The vertical force coefficient of a wing is twice as large as the quasi-steady value. The interaction between the fore- and hindwings is not very strong and is detrimental to the vertical force generation. Compared with the case of a single wing in the same motion, the interaction effect reduces the vertical forces on the fore- and hindwings by 14% and 16%, respectively, of that of the corresponding single wing. The large vertical force is due to the unsteady flow effects. The mechanism of the unsteady force is that in each downstroke of the hindwing or the forewing, a new vortex ring containing downward momentum is generated, giving an upward force. The body-mass-specific power is 37 W kg⁻¹, which is mainly contributed by the aerodynamic power." (Authors)] Address: Sun, M., Inst. Fluid Mech., Beijing Univ. Aeronaut and Astronaut, Beijing, 100083, China. E-mail: sunmao@public.fhnet.cn.net

4913. Svensson, E.; Kristoffersen, L.; Oskarsson, K.; Bensch, S. (2004): Molecular population divergence and sexual selection on morphology in the banded demoiselle (*Calopteryx splendens*). *Heredity* 93: 423-433. (in English). ["The importance of sexual selection in population divergence is of much interest, mainly because it is thought to cause reproductive isolation and hence could lead to speciation. Sexually selected traits have been hypothesized to diverge faster between populations than other traits, presumably because of differences in the strength, mechanism or dynamics of selection. We investigated this by quantifying population divergence in eight morphological characters in 12 south Swedish populations of a sexually dimorphic damselfly, the banded demoiselle (*Calopteryx splendens*). The morphological characters included a secondary sexual character, the male melanized wing spot, which has an important function in both inter- and intrasexual selection. In addition, we investigated molecular population divergence, revealed by amplified fragment length polymorphism (AFLP) analysis. Molecular population divergence was highly significant among these Northern European populations (overall $F_{st}=0.054$; pairwise population F_{st} 's ranged from ~0 to 0.13). We found evi-

dence for isolation-by-distance ($r=0.70$) for the molecular markers and a significant correlation between molecular and phenotypic population divergence ($r=0.39$). One interpretation is that population divergence for the AFLP loci are affected by genetic drift, but is also indirectly influenced by selection, due to linkage with loci for the phenotypic traits. Field estimates of sexual and natural selection from two of the populations revealed fairly strong sexual selection on wing spot length, indicating that this trait has the potential to rapidly diverge, provided that variation is heritable and the observed selection is chronic." (Authors)] Address: Svensson, E., Sect. Animal Ecol., Dept Ecol., Lund Univ., SE-223 62 Lund, Sweden. E-mail: erik.svensson@zoekol.lu.se

4914. Taira, H.; Kuranishi, R. (2004): Freshwater benthic macroinvertebrates at the upper reaches of the Koito-gawa River. *Journal of the Natural History Museum & Institute Chiba Special Issue 7*: 47-86. [Toyofusa, Kimitsu-shi, Chiba, central Japan; field collections carried out from April 2002 through December 2003; a total of 104 taxa includes also Odonata.] Address: Taira, H., 3-30-16-403 Imai, Chuou Ku, Chiba, 2600834, Japan

4915. Taverner, J.; Cham, S.; Hold, A. (2004): *The Dragonflies of Hampshire*. Pisces Publications. ISBN 1 874357 26 9: 144 pp. (in English). [This is the first ever book devoted entirely to the dragonfly fauna of Hampshire, produced by a team of dragonfly experts, drawn largely from the county, whose knowledge and experience ensure that the information is reliable and as comprehensive as possible. The book has seven main sections: The geology and hydrology of Hampshire. The human influence on dragonflies. Habitat types. A systematic list of species covering distribution, major localities, population sizes, flight times, early and late dates. Key sites including maps. Conservation in Hampshire. Dragonfly recording in Hampshire plus a full bibliography. Photographs and distribution maps for every species. Photographs of habitat types.]

4916. Tennessen, K.J. (2004): *Cordulegaster talaria* n. sp. (Odonata: Cordulegastridae) from west-central Arkansas. *Proceedings of the Entomological Society of Washington* 106(4): 830-839. (in English). [*C. talaria* "is described from specimens collected in the Ouachita Mountains in western Arkansas. The new species is related to *C. bilineata* (Carle) and *C. diastatops* (Selys). The ventral teeth of the male cerci are separated by a larger gap in *C. talaria* (0.77-0.89 mm) than in the other species (0.52-0.73 mm). The anterolateral yellow mark on abdominal segment 4 is elongate and extends to the anterior margin whereas in *C. diastatops* it usually does not reach the anterior margin and in *C. bilineata* it is abbreviated to absent." (Author)] Address: Tennessen, K., 1949 Hickory Ave. Florence, AL 35630, USA. E-mail: ktennessen@aol.com

4917. Teplitsky, C.; Plenet, S.; Joly, P.; (2004): Hierarchical responses of tadpoles to multiple predators. *Ecology* 85(10): 2888-2894. (in English). ["The impact of multiple factors on the expression of phenotypic plasticity has been poorly studied. The simultaneous presence of factors inducing diverging responses may result either in a trade-off between the responses or in a hierarchy of responses. Inducible defenses offer a suitable model to investigate these alternatives. Inducible defenses evolve in response to variability in predation risk. Here, we investigated the impact of the nonlethal

presence of both pursuing (fish, *Gasterosteus aculeatus*) and sit-and-wait (dragonfly larvae, *Aeshna cyanea*) predators on tadpole morphology in two frogs (*Rana dalmatina* and *R. ridibunda*). Predation tests showed that *Aeshna* were the more dangerous of the two predators for the tadpoles of both species. In both species, induced responses differed according to predator type. In the presence of fish, tadpoles invested in both tail muscle depth and tail length. In the presence of dragonfly larvae, the investment was made in tail fin depth. When faced with the two types of predators simultaneously, the response was similar to that expressed in the presence of *Aeshna* alone, suggesting a hierarchy of response according to predation risk. Such a hierarchy of response could result from selection against the phenotype induced by the other predator" (Authors)] Address: Teplitsky, Celine, Dept Populat Biol, Evolut Biol Ctr, Norbyvagen 18D, SE-75236, Uppsala, Sweden. E-mail: cteplit@univ-lyon1.fr

4918. Tessier, C.; Cattaneo, A.; Pinel-Alloul, B.; Galanti, G. (2004): Biomass, composition and size structure of invertebrate communities associated to different types of aquatic vegetation during summer in Lago di Candia (Italy). *J. Limnol.* 63(2): 190-198. (in English). ["We compared the biomass, taxonomic composition, and size distribution of invertebrates (including Odonata) associated to emergent (*Schoenoplectus lacustris*), submerged (*Myriophyllum spicatum*), and floating leaved (*Trapa natans*) vegetation at two depths (surface and water column) during summer in Lago di Candia, Italy. Invertebrate biomass was positively related to epiphyton biomass (Chl-a). *M. spicatum* supported higher invertebrate biomass per unit of plant weight than *S. lacustris* whereas *T. natans* was somewhat intermediate. Depth did not affect invertebrate biomass significantly. Surface sections of *M. spicatum* and *T. natans* supported invertebrate communities with similar taxonomic composition dominated by oligochaetes and ostracods. Large hirudineans and gastropods characterized the communities on the water column sections of *M. spicatum*. *S. lacustris* and the water column sections of *T. natans* (composed of stems and aquatic roots) were supporting invertebrate communities dominated by copepod nauplii and lacking large organisms. Changes in aquatic vegetation in Lago di Candia following harvesting of *T. natans* and removal of submerged vegetation by the invasion of the rodent coypu (*Miocastor coypus*) may affect the invertebrate biomass of its littoral zone." (Authors)] Address: Cattaneo, Antonia, Département de Sciences Biologiques, Université de Montréal, C.P. 6128, succursale Centre Ville, Montréal, Québec, Canada H3C 3J7. E-mail: antonia.cattaneo@umontreal.ca

4919. Theischinger, G. (2004): Affinities and status of some genus-group taxa in Australian Gomphidae (Anisoptera). *Odonatologica* 33(4): 413-421. (in English). ["Relevant and mainly structural characters of *Austrogomphus* s. str., *Austroepigomphus* Fraser, *Pleio-gomphus* Watson, *Xerogomphus* Watson and *Zephyrogomphus* Watson, all considered by J.A.L. Watson (1991, *Invertebr. Taxon.* 5: 289-441) as subgenera of *Austrogomphus* Selys, are described and illustrated. On the basis of this information it is suggested that *Austroepigomphus* and *Zephyrogomphus* should be elevated to generic rank, that *Pleio-gomphus* should keep its position as a subgenus of *Austrogomphus*, and that *Xerogomphus* should be regarded as a subgenus of *Austroepigomphus*. Some morphological details of the

previously undescribed male of what is now *Zephyrogomphus longipositor* (Watson) are given." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

4920. Thomas, A.L.R.; Bompfrey, R.J. (2004): Dragonfly flight: free-flight and tethered flow visualizations reveal a diverse array of unsteady lift-generating mechanisms, controlled primarily via angle of attack. *Journal of Experimental Biology* 207: 4299-4323. (in English). ["Here we show, by qualitative free- and tethered-flight flow visualization, that dragonflies fly by using unsteady aerodynamic mechanisms to generate high-lift, leading-edge vortices. In normal free flight, dragonflies use counterstroking kinematics, with a leading-edge vortex (LEV) on the forewing downstroke, attached flow on the forewing upstroke, and attached flow on the hindwing throughout. Accelerating dragonflies switch to in-phase wing-beats with highly separated downstroke flows, with a single LEV attached across both the fore- and hindwings. We use smoke visualizations to distinguish between the three simplest local analytical solutions of the Navier Stokes equations yielding flow separation resulting in a LEV. The LEV is an open U-shaped separation, continuous across the thorax, running parallel to the wing leading edge and inflecting at the tips to form wingtip vortices. Air spirals in to a free-slip critical point over the centreline as the LEV grows. Spanwise flow is not a dominant feature of the flow field spanwise flows sometimes run from wingtip to centreline, or vice versa depending on the degree of sideslip. LEV formation always coincides with rapid increases in angle of attack, and the smoke visualizations clearly show the formation of LEVs whenever a rapid increase in angle of attack occurs. There is no discrete starting vortex. Instead, a shear layer forms behind the trailing edge whenever the wing is at a non-zero angle of attack, and rolls up, under Kelvin Helmholtz instability, into a series of transverse vortices with circulation of opposite sign to the circulation around the wing and LEV. The flow fields produced by dragonflies differ qualitatively from those published for mechanical models of dragonflies, fruitflies and hawkmoths, which preclude natural wing interactions. However, controlled parametric experiments show that, provided the Strouhal number is appropriate and the natural interaction between left and right wings can occur, even a simple plunging plate can reproduce the detailed features of the flow seen in dragonflies. In our models, and in dragonflies, it appears that stability of the LEV is achieved by a general mechanism whereby flapping kinematics are configured so that a LEV would be expected to form naturally over the wing and remain attached for the duration of the stroke. However, the actual formation and shedding of the LEV is controlled by wing angle of attack, which dragonflies can vary through both extremes, from zero up to a range that leads to immediate flow separation at any time during a wing stroke." (Authors)] Address: Thomas, A., Dept of Zoology, Oxford University, South Parks Road, Oxford, OX1 3PS, UK. E-mail: Adrian.thomas@zoo.ox.ac.uk

4921. Tibor, K.; Ambrus, A.; Juhász, P.; Bánkuti, K. (2004): Larval and exuvial data to the Odonata fauna of Hungary. *Folia historici naturalia musei Matraensis* 28: 97-110. (in Hungarian, with brief English summary). [54 species from 363 sampling places; records resulting from 25.05.1988 to 30.11.2002.] Address: Ambrus, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kóphá-

za, Jurisich M. u. 16, Hungary. E-mail: aambrus@yahoo.com

4922. Torralba Burrial, A.; Ocharán, F.J. (2004): Costras salinas sobre libélulas monegrinas (Odonata). Boletín de la Sociedad Entomológica Aragonesa 35: 281-282. (in Spanish with English summary). [Symptetrum fonscolombii females found at saline lakes in Los Monegros (Aragon, NE Spain) exhibited white spots of salt on their abdomens. It is concluded that after touching the abdomen on the water surface to oviposit, the water evaporates, and the remaining salt crystals form the white spots.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

4923. Torralba Burrial, A.; Ocharán, F.J. (2004): Fallo en la emergencia en *Aeshna juncea* (Odonata: Aeshnidae). Boletín de la Sociedad Entomológica Aragonesa 35: 279. (in Spanish with English summary). [peat-bogs of the Anayet (Sallent de Gállego, Huesca, NE Spain), 19-VII-2003; three of the wings were caught in the remains of the exuvia, the left hindwing was completely expanded.] Address: Torralba Burrial, A., Depart. Biol. Organismos y Sist., Univ. Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

4924. Torralba Burrial, A.; Ocharán, F.J.; (2004): Pareja heteroespecífica en el género *Lestes* Leach, 1815 (Odonata: Lestidae). Boletín de la Sociedad Entomológica Aragonesa 35: 297-298. (in Spanish with English summary). [Bandaliés, Huesca, NE Spain, 13-VII-200; a heterospecific tandem between a *Lestes sponsa* male and a *L. barbarus* female is reported.] Address: Torralba Burrial, A., Departamento de Biología, Organismos y Sistemas, Univ. Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

4925. Torralba-Burrial, A.; Ocharan, F.J. (2004): De Monstruos y Prodigios (11): Deformación abdominal en *Lestes viridis* (Van der Linden, 1825) (Odonata: Lestidae). Boln. S.E.A. 34: 274. (in Spain). [Spain; a specimen with a laterally deformed abdomen is pictured and described.] Address: Torralba Burrial, A., Depart. de Biología de Organismos y Sistemas, Univ. de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

4926. Trapero Quintana, A.D.; Naranjo López, J.C. (2004): Clave de identificación para los adultos de las especies del orden Odonata presentes en Cuba. Boln. S.E.A. 35: 171-180. (in Spanish, with English summary). ["A set of 26 updated dichotomous keys is given for the taxonomical identification of the 84 infrageneric taxa of the Odonata reported from the Cuban archipelago, following a chronological analysis of all records of species of that order from the country. The keys in general permit the identification of taxa below the order and up to the species level, including the subspecies recognised in the literature." (Authors)] Address: Trapero Quintana, A., Departamento de Biología de la Universidad de Oriente, Patricio s/n, Santiago, CP 90500, Cuba

4927. Trockur, B. (2004): Untersuchungen zur Habitatwahl von *Epitheca bimaculata* CHARPENTIER 1825. Dissertation zur Erlangung des Grades des Doktors der Naturwissenschaften am Institut für Naturschutz und Umweltbildung (INU) der Hochschule Vechta Dragonfly Research 2. ISSN 1438-034X: 291 pp. (in German, with English summary). ["The dissertation focuses on the

habitat selection of the Two-spotted Dragonfly *E. bimaculata* (Corduliidae). Important aspects of the chapter dealing with the faunistical-ecological and phenological data base are: comparison of the study sites in the Central Valley of the River Saar (esp. bayous, ponds) and the biosphere reserve Schorfheide-Chorin (small lakes), increase in the amount of newly detected occurrences in both study regions owing to an optimised and intensified search strategy, characteristics as a typical spring species (start of emergence in the first half of May) with a short emergence period and a flight period until the end of June/beginning of July, and relations between emergence and flight period and weather characteristics. The females select submersed habitat elements near the water surface in the open water of the breeding sites (floating leaf of plants such as *Nuphar lutea*, large areas with submersed plants, e.g. *Myriophyllum* spp., *Ceratophyllum* spp. and *Elodea canadensis*, reeds standing in the water, or woody debris) for the deposition of the egg strings containing more than 1,000 eggs. The analysis of the oviposition sites shows marked differences between the stem habitats. In several cases a repeated neighbouring, thus double concentrated oviposition took place and frequently it was observed on the edges of submersed vegetation just below the water surface. These parts of the water bodies used as oviposition sites are also primary triggers of habitat selection for mature males, because in most cases these males ready for reproduction use the same habitat elements for orientation within the territories, which are sometimes continuously occupied for several hours. Perching behaviour and thus habitat selection of the males can be influenced by strong wind, shadow by groves at the shoreline, or the presence of other dragonflies which occupy perching sites in a similar way and are dominant over *Epitheca*. The lack of an exact congruence of perching and oviposition sites is discussed as well as the potential correlation between differences in niche specialisation between younger and older larvae. Also, the frequently observed orientation of territorial males towards the edges of submersed vegetation is discussed. The behaviour in larval stages 1-3 is, above all, characterized by the selection of submersed, vertical habitat elements located near the water surface. Some weeks older larval stages switch to a predominantly or at least partially benthic and night-active life style. Special interest was paid to the documentation and analysis of emergence sites, and on habitat selection of the F-0-larvae, as indicated by the sites where the exuviae were found. For this purpose, quantitative, spatially precise documentation data taken over many years at the biggest population in the Saarland, the analysis of accumulations of exuviae (amount and extent), correlations between the finding sites of the exuviae and various habitat elements (positive correlation with *Nuphar lutea*) and the depth of the water bodies (negative to the maximal depth), and changes over the course of the six intensive study years are used. In addition to the comparison with other stem habitats, emergence substrates, distance from the shoreline and height of the emergence sites are treated. The duration of the larval period of usually two or three years was deduced from the analysis of potential sibling pools, the characteristics of pools of exuviae found within very short distance of each other, and the often both highly stenotope and synchronized behaviour of the emergent F-0-larvae are taken into account as well. In a comprehensive, synecological synopsis, different hypotheses about the ecological requirements of the

species are developed and discussed. In this context, the population ecological view of the known occurrences in reference to the mobility and dispersal ability is taken into consideration. Aspects of stenotopy and synchronisation are evaluated and compared with other species. The observed behaviour and the habitat selection are related to the visually identifiable habitat factors. The role of potentially effective ultimate factors in the water body is discussed. The availability of vertical habitat element near the surface and the ecological conditions in the fish dominated biocoenosis are found to be the most important factors. The negative biotopes and the observed effects of changes or systematic manipulations of the habitat configuration at some occurrences are included into these considerations. The special role of fish and the ecological adaptation of the *Epitheca* larvae to the fish-dominated biotope, the ecological comparison and the syntopy with *Leucorrhinia caudalis* and *Cordulia aenea* are discussed in the context of the synecological demands of the species. Subsequently, a new classification, exceeding the common classification of the occurrences in stem-, secondary- and male-habitats, is proposed, and the different metapopulation levels and a promising search strategy are discussed. In a separate chapter about aspects of nature conservation, the current classification in the Red List of Germany (endangered), the proposal to include the species in a nation-wide monitoring programme, the high diversity of dragonflies at the *Epitheca* waters, the function as an indicator species, the coexistence with other species, threat factors and components of the management of the species and a protection concept are treated." (Author)] Address: Trockur, B., Schulstr. 4, D-66636 Tholey-Scheuern, Germany. E-mail: Bernd-Trockur@gmx.de

4928. Ueda, T.; Kinoshita, E.; Ishihara, K. (2004): Habitat use by the Tiny Dragonfly, *Nannophya pygmaea* RAMBUR, and conservation of its habitat in a hillside marsh. *Japanese Journal of Conservation Ecology* 9: 25-36. (in Japanese, with English summary). ["To propose conservation plans for *N. pygmaea*, we investigated its habitat use in a paddy field at the bottom of a valley in the hill country around Kanazawa City, Ishikawa Prefecture, Japan. The field, which had an area of 1200 m² and was located at the top of a terraced paddy field, was plowed every spring but was not used for rice cultivation. There were four plant communities, corresponding to varying water levels on the ground, which was plowed annually. One of the four communities, which included annual plants, extended along the spring-fed hillside outside of the plowed area. Mature males primarily occupied Communities 1 and 2, and immature males and females were distributed in other terrestrial parts. The distribution of mature males was relatively similar, especially in Community 2, across the years investigated. Although emergence occurred in Community 2 every year, in Community 1, it was observed in 2002, but not in 2001 and may not in 2003. This yearly difference corresponded to the precipitation observed during the previous summer. Thus, the emergence from Community 1 may reflect larval survival, which probably depended on the degree and length of the dry period in relation to precipitation. Individuals that seemed to have dispersed from the paddy population were seen in several fallow fields up to 1.5 km away from the paddy. Based on these results, we considered *N. pygmaea* to be an opportunistic species that has adapted to small temporary marshes. We propose a con-

servation plan for *N. pygmaea* that incorporates creating biotope networks by plowing abandoned paddy fields." (Authors)] Address: Ueda, T., Ishikawa Agricultural College, Suematsu, Nonouchi, Ishikawa Pref., 921, Japan. E-mail: ueda@ishikawa-c.ac.jp

4929. Uzarski, D.G.; Burton, T.M.; Genet, J.A. (2004): Validation and performance of an invertebrate index of biotic integrity for Lakes Huron and Michigan fringing wetlands during a period of lake level decline. *Aquatic Ecosystem Health & Management* 7(2): 269-288. (in English). ["Our goal was to develop an invertebrate-based index of biotic integrity that was robust to water level fluctuations and applied to broad classes of lacustrine wetlands across wave-exposure gradients. Our objectives were to evaluate the performance and test the robustness of our preliminary index (e.g., Burton et al., 1999) at a range of water levels, eliminate any problems with the index of biotic integrity, remove the preliminary status, test the index on similar wetlands of Lake Michigan, and establish stressor: ecological-response relationships. Twenty-two sites, both open- and protected-fringing lacustrine marshes of Lake Huron and Michigan were selected for study. Correspondence analysis and Mann-Whitney U tests were used to test the robustness of existing metrics and search for additional metrics. Wilcoxon Signed Rank tests were used to determine if metrics were responding to inter-annual water level fluctuation. Principal components analysis and Pearson correlations were used to establish stressor: ecological response relationships. Analyses confirmed the utility of most of the metrics suggested in our preliminary index, but we recommended several improvements. With improvements, the index was able to place all sites in a comparable order of disturbance that we placed them a priori based on adjacent landuse/landcover, limnological parameters and observed disturbances. The improved index worked very well from 1998 through 2001 despite the substantial decreases in lake level over this time-period. Analyses of 2001 data collected from similar fringing wetlands along the northern shore of Lake Michigan suggested that the index could also be used for fringing wetlands of northern Lake Michigan. We are confident that our index is ready for implementation as a tool for agencies to use in assessing wetland condition for Lakes Huron and Michigan fringing wetlands." (Authors) The index includes Odonata. For details see: <http://www.deq.state.mi.us/documents/deq-ogl-mglpf-Burton.pdf>] Address: Uzarski, D.G., Annis Water Resources InstLake Michigan Ctr, Grand Valley State Univ, 740 W Shoreline Dr, Muskegon, MI, USA

4930. Valladares Díez, L.F.; García Criado, F.; Vega Moreno, F.J.; Carbajo, D.M. (2004): Estudio de la fauna de Odonatos de los humedales de Salburua (Vitoria-Gasteiz). Convenio de colaboración entre el Centro de Estudios Ambientales del Ayuntamiento de Vitoria-Gasteiz y el Dr. Luis Felipe Valladares Díez, del Departamento de Biología Animal de la Universidad de León (año 2003): 42 pp. (in Spanish). [27 odonate species are discussed in detail.] Address: <http://www.vitoria-gasteiz.org/ceac/siam/estudios/00-04/odonsa lb03c.pdf>

4931. Vega, F.J.; García-Criado, F.; Valladares, L.F. (2004): Odonatofauna del Espacio Natural Hoces del Alto Ebro y del Rudrón (Burgos, España). *Boln. S.E.A.* 34: 147-150. (in Spanish, with English summary). ["The paper is intended as a preliminary study of the Odonata

fauna of the Hoces of Alto Ebro y del Rudrón Nature Reserve (northern Burgos, Spain). Four sites representative of different types of aquatic habitats were sampled in the spring and summer of 2001. 22 species were collected, most of them (72.7%) in stagnant water environments. Two species, *Ceragriion tenellum* and *Gomphus pulchellus* are recorded for the first time from the province of Burgos. The Reserve can be considered as an area of special interest for the conservation of Odonata because of the high species richness values and the presence of *Coenagrion scitulum*." (Authors)] Address: Vega, F.J., Departamento de Biología Animal, Facultad de Ciencias Biológicas y Ambientales, Universidad de León. 24071 León, Spain. E-mail: dbafvm@unileon.es

4932. von der Ohe, P.C.; Liess, M. (2004): Relative sensitivity distribution of aquatic invertebrates to organic and metal compounds. *Environmental Toxicology & Chemistry* 23(1): 150-156. (in English). ["In the field, a multitude of species can be exposed to numerous toxicants; thus, the sensitivity of individual species to particular toxicants must be known to predict effects and to analyze changes in species composition. For most species, no information about their toxicant sensitivity is available. To address this limitation, we have grouped the available information to assign sensitivities to aquatic invertebrate taxa relative to *Daphnia magna*. With respect to organic compounds, most taxa of the orders Anisoptera, Basommatophora, Coleoptera, Decapoda, Diptera, Ephemeroptera, Eulamellibranchiata, Heteroptera, Hirudinea, Isopoda, Oligochaeta, Prosobranchia, Trichoptera, Tricladida, and Zygoptera are less sensitive than *D. magna*. Some taxa of the Amphipoda, Plecoptera, and Cladocera (other than *D. magna*) are significantly more sensitive. For organic compounds, approximately 22% of the investigated taxa were more sensitive than *D. magna*. Most taxa of the orders Amphipoda, Basommatophora, Diptera, Ephemeroptera, Eulamellibranchiata, Heteroptera, Isopoda, Oligochaeta, and Tricladida are significantly less sensitive than *D. magna* to metal compounds. The taxa belonging to the Crustacea, with the exception of the order Isopoda, are much more sensitive. For metal compounds, approximately 30% of the investigated taxa were more sensitive than *D. magna*. Hence, *D. magna* is among the most sensitive taxa regarding both groups of toxicants. The sensitivities for several taxa are listed, and use of the relative sensitivity distribution to link toxicant effects in mesocosm studies and field investigations is discussed." (Authors)] Address: Dept Chemical Ecotoxicology, UFZ Centre for Environmental Research, Permoserstr. 15, 04318, Leipzig, Germany. E-mail: peter.vonderohe@ufz.de

4933. Wakakuwa, M.; Ozaki, K.; Arikawa, K. (2004): Immunohistochemical localization of Papilio RBP in the eye of butterflies. *Journal of Experimental Biology* 207 (9): 1479-1486. (in English). ["We recently identified a novel retinoid binding protein, Papilio RBP, in the soluble fraction of the eye homogenate of the butterfly *Papilio xuthus*, and demonstrated that the protein is involved in the visual cycle. We now have localized the protein in the Papilio eye by light and electron microscopic immunohistochemistry using a monospecific antiserum produced against artificially expressed Papilio RBP. We found strong immunoreactivity in the primary as well as secondary pigment cells and in the tracheal cells. The pigment cells have long been regarded as an

important site of the visual cycle, and this view is further supported by the present result. Interestingly, the cytoplasm and nuclei of these cells were equally labeled, indicating that the protein exists in both the cytoplasm and the nucleus. We conducted a survey for the existence of the Papilio RBP-like proteins in other insects including several species of butterflies, dragonflies, cicadas, grasshoppers and honeybees. Anti-Papilio RBP immunoreactivity was confirmed in the proteins isolated only from butterflies belonging to the superfamily Papilionoidea and not from other species. In all insects tested, however, fluorescing proteins were clearly detected, suggesting that these insects also have similar retinol-binding proteins." (Authors)] Address: Arikawa, K., Grad. Sch. Integrated Sc.i, Yokohama City Univ, Yokohama, Kanagawa, 2360027, Japan. E-mail: arikawa@yokohama-cu.ac.jp

4934. Wang, Z.J. (2004): The role of drag in insect hovering. *Journal of Experimental Biology* 207(23): 4147-4155. (in English). ["Studies of insect flight have focused on aerodynamic lift, both in quasi-steady and unsteady regimes. This is partly influenced by the choice of hovering motions along a horizontal stroke plane, where aerodynamic drag makes no contribution to the vertical force. In contrast, some of the best hoverers - dragonflies and hoverflies - employ inclined stroke planes, where the drag in the down- and upstrokes does not cancel each other. Here, computation of an idealized dragonfly wing motion shows that a dragonfly uses drag to support about three quarters of its weight. This can explain an anomalous factor of four in previous estimates of dragonfly lift coefficients, where drag was assumed to be small. To investigate force generation and energy cost of hovering flight using different combination of lift and drag, I study a family of wing motion parameterized by the inclined angle of the stroke plane. The lift-to-drag ratio is no longer a measure of efficiency, except in the case of horizontal stroke plane. In addition, because the flow is highly stalled, lift and drag are of comparable magnitude, and the aerodynamic efficiency is roughly the same up to an inclined angle about 60degree, which curiously agrees with the angle observed in dragonfly flight. Finally, the lessons from this special family of wing motion suggests a strategy for improving efficiency of normal hovering, and a unifying view of different wing motions employed by insects." (Author)] Address: Wang, Z. Jane, Cornell Univ, Ithaca, NY, 14853, USA. E-mail: jane.wang@cornell.edu

4935. Wendzonka, J. (2004): Dragonflies (Odonata) of the Kaszuby lobelian lakes. *Parki Narodowe i Rezerwaty Przyrody* 23: 395-410. (in Polish, with English summary). [Poland; 13 lakes characterised by *Lobelia dortmanna*, *Isoetes lacustris*, and *Litorella uniflora* are surveyed for their odonate fauna. The list of 35 species includes *Brachytron pratense*, *Aeshna subarctica elisabethae*, *Epithea bimaculata*, *Leucorrhinia albifrons*, and *L. pectoralis*. The species are grouped according their dominance and frequency along the 13 lakes. *E-nallagma cyathigerum* (dystrophic lakes) and *Erythromma najas* (degraded, eutrophic lakes) are dominant species, respectively.] Address: Wendzonka, J., ul. Graniczna 17, 63 800 Gostyń, Poland. E-mail: wendzonka@wp.pl

4936. Wilson, K.D.P. (2004): New Odonata from South China. *Odonatologica* 33(4): 423-432. (in English). ["*Rhinocypha chaoi* sp. n. (holotype male Dading-

shan, Guangdong), *Megalestes discus* sp. n. (holotype male: Mangshan, Hunan). *Rhipidolestes chaoi* sp. n. (holotype male: Mangshan, Hunan), *Calicnemia chaoi* sp. n. (holotype male: Pengshan, Guangdong) and *Macromia unca* sp. n. (holotype male: Maoping, Guangdong) are described from the Shikengkong area of northern Guangdong province and Southern Hunan in Southern China." (Author)] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

4937. Wilson, K.D.P. (2004): Odonatological bibliography of Dr Hsiu-Fu Chao (Xiufu Zhao) 1946-1999. *Odonatologica* 33(4): 358-360. (in English). [53 papers are listed.] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

4938. Xylander, W.E.R.; Bender, J. (2004): Animal species and zoocoenoses of former open cast lignite mines in Eastern Germany - Aspects of mining, reclamation and conservation. *Peckiana* 3: 155-165. (in English). ["The importance of lignite mine sites for conservation in eastern Germany is considered on the basis of zoological data from terrestrial and aquatic habitats. This importance results from high species richness (e. g. dragonflies, carabid beetles) in few cases, but chiefly from secondary habitats for endangered xerophilic and psammophilic species that occur mainly on sites of early successional stages (e.g. amphibia, reptilia, birds, grasshoppers). These species (many of which are listed in the national or federal Red Data books) have become extinct in other areas due to prevention of landscape dynamics, whereas the impacts of lignite mining constitute the dynamics these species need; this is the major importance of mine sites for conservation. Dynamics, however, stops when mining activity finishes and succession proceeds; succession leads to habitat changes, resulting in many cases in the extinction of the most valuable species for conservations whereas others - less important from a conservational point of view - come up; zoological examples are given for this process. On the other hand reclamation and post-mining activities themselves may have impacts on valuable habitats and species. How reclamation is done and what targets are finally realised depend on different types of decisions; the motivation and consequences for conservation of such decisions are discussed." (Authors)] Address: Xylander, Dr. W., Staatliches Museum für Naturkunde Görlitz, PF 300154, D-02806 Görlitz, Germany. E-mail: Willi.Xylander@SMNG.SMWK.Sachsen.de

4939. Yamauchi, M.M.; Miya, M.U.; Nishida, M. (2004): Use of a PCR-based approach for sequencing whole mitochondrial genomes of insects: two examples (cockroach and dragonfly) based on the method developed for decapod crustaceans. *Insect Molecular Biology* 13(4): 435-442. (in English). ["Recent development of a PCR-based approach for sequencing vertebrate mitochondrial genomes has attracted much attention as being more rapid and economical than traditional methods using cloned mtDNA and primer walking. Such a method has not been available for insect mitochondrial genomes, despite widespread use of them for the molecular phylogenetic, biogeographical and population genetic markers. A recently developed PCR-based approach for sequencing whole mitochondrial genomes of decapod crustaceans, which included the design of

many versatile PCR primers for the latter, was applied with the same primers sets to mitochondrial genomes of two insects, smokybrown cockroach *Periplaneta fuliginosa* (Serville, 1839) and skimmer dragonfly *Orthetrum triangulare melania* (Selys, 1883). Almost the entire region of the two mitochondrial genomes was successfully sequenced. Features of the two mitochondrial genomes are described and the usefulness of this PCR-based approach for sequencing insect mitochondrial genomes demonstrated." (Authors)] Address: Yamauchi, M., Ocean Res InstNakano Ku, Univ Tokyo, 1-15-1 Minamidai, Tokyo, 1648639, E-mail: ymm@ori.u-tokyo.ac.jp

4940. Yanoviak, S.P.; Fincke, O.M. (2004): Sampling methods for water-filled tree holes and their artificial analogues. In: Leather, S. (Ed.): *Insect Sampling in Forest Ecosystems*. Blackwell. *Methods in Ecology*. 320 pp. ISBN: 0632053887: (in English). Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

4941. Yip, J.Y.; Corlett, R.T.; Dudgeon, D. (2004): A fine-scale gap analysis of the existing protected area system in Hong Kong, China. *Biodiversity & Conservation* 13(5): 943-957. (in English). ["As well as being one of the most densely populated areas on Earth, Hong Kong also has the highest percentage of protected areas (38% of the 1098 km² land area) of any administrative region in the Asia Pacific. Overlay of field records from a biodiversity survey of eight taxa (amphibians, reptiles, mammals, breeding birds, ants, butterflies, dragonflies and rare vascular plants) in 1 km grid squares with protected areas indicated that over half of the 623 species of conservation concern (globally, regionally, or locally restricted species) were under-represented. Ants, butterflies and reptiles were most poorly represented. The hotspots of different taxa also received differing levels of protection. Hong Kong's protected areas are biased towards high-altitude habitats, so the under-represented species are mostly associated with the lowland habitats (freshwater wetlands, abandoned agriculture and feng shui woods). Since the restricted species are scattered and the hotspots of different taxa do not overlap, a large protected area network will be required to represent all species. This indicates the challenge that will be encountered in the conservation of many other parts of Asia that support burgeoning human populations, and where landscapes are increasingly human-dominated." (Authors)] Address: Yip, J.Y., Department of Ecology and Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong, Hong Kong SAR, China. E-mail: yyipc@graduate.hku.hk

4942. Yoshita, S.; Minami, Y.; Ueda, T. (2004): Water chemistry of several habitats of a Tiny Dragonfly, *Nannophya pygmaea* Rambur. *Jpn. J. Environ. Entomol. Zool.* 15: 13-17. (in Japanese, with English summary). ["Marsh water was chemically analyzed in four habitats of *N. pygmaea* in Ishikawa Prefecture, Japan. Somewhat acidic water (pH 5.7-6.4) was observed in one marsh, while the others often showed a higher value of pH (6.0-10.4). This result implies that suitable pH range for a habitat of the species is fairly wide including such a higher category, rather than recognized so far. Enrichment of mineral constituents such as Ca²⁺ compared to rainwater suggested that the marsh water was mainly supplied with ground water." (Authors)] Address:

Ueda, T., Ishikawa Agricultural College, Suematsu, No-noichi, Ishikawa Pref., 921, Japan. E-mail: ueda@ishikawa-c.ac.jp

4943. Yurewicz, K.L. (2004): A growth/mortality trade-off in larval salamanders and the coexistence of intraguild predators and prey. *Oecologia* 138(1): 102-111. (in English). ["Behavioral and morphological traits often influence a key trade-off between resource acquisition and vulnerability to predation, and understanding trait differences between species can provide critical insight into their interactions with other species and their distributions. Such an approach should enhance our understanding of the criteria for coexistence between species that can interact through both competition and predation (i.e. intraguild predators and prey). I conducted a common garden experiment that revealed strong differences between three guild members (larval salamanders *Ambystoma laterale*, *A. maculatum*, and *A. tigrinum*) in behavior, morphology, and growth in the presence and absence of a shared top predator (the larval dragonfly *Anax longipes*). All three species also reduced their activity and modified their tail fin depth, tail muscle length, and body length in response to non-lethal *Anax*. Species that act as intraguild predators were more active and could grow faster than their intraguild prey species, but they also suffered higher mortality in laboratory predation trials with *Anax*. I also used survey data from natural communities to compare the distribution of *Ambystoma* species between ponds differing in abiotic characteristics and predatory invertebrate assemblages. An intraguild prey species (*A. maculatum*) was found more reliably, occurred at higher densities, and was more likely to persist late into the larval period in ponds with more diverse invertebrate predator assemblages. Taken together, these results indicate that top predators such as *Anax* may play an important role in influencing intraguild interactions among *Ambystoma* and ultimately their local distribution patterns." (Authors)] Address: Yurewicz, K., Department of Biological Sciences, University of Notre Dame, Notre Dame, IN, 46556, USA. E-mail: kyurewic@nd.edu

4944. Zawal, A. (2004): Parasitizing of dragonflies by water mite larvae of the genus *Arrenurus* in the neighbourhood of Barlinek (NW Poland). *Zoologica Poloniae* 49(1-4): 37-45. (in English with Polish summary). [25 odonate species were infected by 2218 water mite larvae of the genus *Arrenurus*. Preferred hosts - the proportion of specimens infected is noted in brackets - were *Enallagma cyathigerum* (56.5%), *Coenagrion puella* (53.6%), *Ischnura elegans* (46.9%), and *Coenagrion pulchellum* (41.9%). Only two Anisoptera species were infected (*Cordulia aenea*, 14.3%; *Sympetrum sanguineum*, 4.0%). Body parts preferred were: proximal part of metathorax (910 larvae), mesothorax (464 larvae), first abdominal segment (371 larvae), and second abdominal segment (200 larvae).] Address: Zawal, A., Department of Invertebrate Zoology and Limnology, University of Szczecin, PL-71-415 Szczecin, Waska 14, Poland. E-mail: zawal@univ.szczecin.pl

4945. Zawal, A. (2004): Synchronized adult emergence of *Cordulia aenea* (Linnaeus, 1758) (Odonata: Corduliidae). *Acta Biol. Univ. Dauigavp.* 4(2): 81-83. (in English). [On 02 May, 1999 a synchronized adult emergence of *C. aenea* was observed from 10.00 to 17.00 o'clock in the small dystrophic lake near Czermnica (Nowogard district), Poland. On an area about 50 m²,

emergence of 48 specimens was observed. "This lake is a small, interforest reservoir. Emergences has been in sedges on the sunny bank of lake. On the shady bank no emergence of this dragonfly was observed. The increase of temperature was stimulus for simultaneous emergency. During this time the temperature in the shallow sunny literal increased from 9°C to 22°C. The day after and the day before, which were cloudy days, any emergence was not observed, what showed the increase of temperature was an impulse for simultaneous emergency. The full emergence lasted five hours on an average." (Author)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

4946. Zhu, H. Q. (2004): In memory of Hsiu-Fu Chao (Xiufu Zhao) (17 May 1917 - 2 May 2001). *Odonatologica* 33(4): 355-357. (in English). Address: Zhu H.-q., Dept Biol., Shanxi University 42-38, Taiyuan 030006, Shanxi, China

2005

4947. Abbott, J.C. (2005): Dragonflies and Damselflies of Texas and the South-Central United States: Texas, Louisiana, Arkansas, Oklahoma, and New Mexico. Princeton University Press. ISBN: 0-691-11364-5 (paper) 0-691-11363-7 (cloth): VIII, 344 pp. (in English). [This guide to the Odonata of the south-central United States covers 263 species, representing more than half of the North American fauna. The area of coverage significantly overlaps with other regions of the country making this book a useful aid in identifying the dragonflies and damselflies in any part of the United States, Canada or northeastern Mexico. All 85 damselfly and 178 dragonfly species found in the region are distinguished by photographs, numerous line drawings, keys, and detailed descriptions to help with identification. Features include: Discussions of habitats, zoogeography, and seasonality Details on dragonfly and damselfly life history and conservation An introduction on studying and photographing dragonflies and damselflies An entire section devoted to the external anatomy of dragonflies and damselflies Species accounts organized by family into sections on size, regional and general distribution, flight season, identification, similar species, habitat and biology and ecology Range maps for each species, as well as an extensive bibliography and a list of resources for further study] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabott@mail.utexas.edu

4948. Anonymus (2005): Wild Corner. Porcupine 32: 25. (in English). [The feature "Wild Corner" presents some interesting sightings in Hong Kong. The following observations on Odonata are presented: "Pseudagrion microcephalum laying eggs at a rehabilitated freshwater pond of Mai Po Nature Reserve. One *Macrodiplax cora* was seen at Luk Keng marsh (near mangrove) on 29 September, and both sexes of this species were seen at Mai Po throughout October. *Gynacantha subinterrupta* was seen at Mai Po on 10 November and 5 December (both were male individuals)."]

4949. Block, M. De; Stoks, R (2005): Pond drying and hatching date shape the tradeoff between age and size at emergence in a damselfly. *Oikos* 108(3): 485-494. (in English). ["The trade off between age and size at emergence, which plays a central role in life history theory, is hypothesized to be more pronounced under stressful conditions, especially when these conditions are combined. Empirical evidence for this is equivocal. We tested the hypothesis by imposing combinations of two types of time stress (pond drying and late hatching date) in larvae of the damselfly *Lestes viridis*. Larvae from a temporary pond and a permanent pond population were reared in outdoor tubs from egg hatching until emergence. Unexpectedly, larvae did not accelerate their life history in response to simulation of pond drying. Instead, larvae reared in temporary tubs generally had a slower development and growth than larvae reared in permanent tubs. Probably deteriorating growth conditions in temporary tubs associated with higher densities and lower food levels caused this pattern. In agreement with a higher time stress in late hatched larvae, they generally had faster development and growth than larvae that hatched early in the season. Drying regime and hatching date shaped the covariation pattern between age and size at emergence, but the tradeoff was only apparent when time stress was relaxed. The tradeoff between age and size at emergence was only present in early hatched larvae, especially in permanent tubs (lowest time stress). Conversely, in late hatched larvae there was a strongly negative relationship between age and size at emergence, especially in temporary tubs (highest time stress). Our results support an alternative hypothesis that deteriorating growth conditions (i.e. pond drying) may decouple the tradeoff under time stress. The absence of a tradeoff in more time-stressed late hatched larvae can be explained by their higher intrinsic growth rates, independent of deteriorating growth conditions. We hypothesize that the pattern of less clear tradeoffs under the imposed types of time stress may be general." (Authors)] Address: De Block, Marjan, Dept of Biological Sciences, Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: marjan.deblock@dartmouth.edu

4950. Blust, M. (2005): Citrine Forktail Confirmed In VT. The Boghaunter. Occasional News about the dragonflies and damselflies of Vermont 4(1): 1,2. (in English). [*Ischnura hastata* was proved in 2004 for Vermont, USA. Three county records are briefly documented] Address: www.wingsenvironmental.com/boghaunter/Boghaunter%20-%20Vol.%204%20No.%201.pdf

4951. Bönsel, A. (2005): Ökologische Analyse der Libellen- und Heuschreckentaxozönosen (Odonata & Saltatoria) in nordostdeutschen Regenmooren und deren Umgebung - als Grundlage zur Entwicklung von Landschaftsplanungszielen. *Rostocker Materialien für Landschaftsplanung und Raumentwicklung* 6: 129 pp. (in German, with English summary). ["The first hypothesis, that in the beginning of the 21st century, disturbed rain bogs in the young moraine landscape of North-Eastern Germany are more rich in structures and species than the surrounding cultivated landscape, could be verified in this ecological analysis. 96 sites were sampled for dragonflies, 46% of which were located in rain bogs and 54 % in the surrounding cultivated landscape. Sampling for grasshoppers was conducted at 76 sites, 41 % in rain bogs and 59 % in the surrounding landscape. 37 vegetation types were mapped, on average 12 of these

occurred in rain bogs and 16 in the surrounding cultivated landscape. Disturbed rain bogs are structure-rich habitats with a closely interlocking mosaic of different ecological conditions. 35 species of dragonflies with altogether 6318 individuals, and 21 species of grasshoppers with altogether 4486 individuals could be proven. In disturbed rain bogs, more species and, above all, more individuals of dragonflies and grasshoppers were found than in the surrounding landscape. A comparison of diversity values between disturbed rain bogs and the surrounding landscape using the SHANNON-WEAVER-Index didn't show significant differences for dragonflies and grasshoppers. A comparison of larger landscape units with such indices was not of additional value, since species and individuals were not homogeneously distributed in space. No species of dragonflies or grasshoppers could be assigned to a single category of dominance over all sampling sites; the same is true for species' constancy. Frequent high abundances of individuals were reached only by highly constant species, and mainly in disturbed rain bogs. Species turnover was higher for dragonflies and grasshoppers in the surrounding landscape than in rain bogs in both years of the study, though only for dragonflies the difference was significant. Species turnover in 73 years was calculated and structural diversity was compared between historical and actual times using the work of RABELER (1931) on the „Göldenitzer Moor". In this disturbed rain bog, RABELER counted 16 vegetation types, whereas in this study 23 vegetation types were found. This difference can be used to explain species turnover rates of 32 % in dragonflies and 61 % in grasshoppers. It became clear, that today man is the dominating ecological factor, determining species richness and species poverty in the young moraine landscape of North-Eastern Germany. By extensive agrarian land use, he creates extensive landscapes poor of species and individuals, whereas in originally species-poor rain bogs, he creates habitats rich in species and individuals by changing intensities of disturbance. Most species of dragonflies showed highest abundances in eutrophic waters, grasshoppers in oligotrophic sites, and both taxa in sites with moderate disturbance intensity. It is assumed, that under those conditions interlocking of ecological conditions is optimal for all ontogenetic stages. Coincidences between presence of dragonflies or grasshoppers and vegetation type or other ecological factors could not be proven for any species, this verifying the second hypothesis. For verification of the third hypothesis, saying that species diversity on terrestrial islands such as disturbed rain bogs is less determined by area, but by duration of existence of preferred conditions and by presence of constant species with high abundances, this work gives clear indications. Abundant species might be decimated by predators and/or parasites, thereby enabling their existence. Intraspecific competition causes dismigration of numerous individuals, though resources do not have to be depleted. Specialized species can unfold undisturbed in such habitats and fill their niches completely, therefore disabling even ubiquitous species to invade them. According to the latest amendment of the Federal Law of Nature Conservation, landscape planning was assigned two completely new functions. An European network of protected areas is to be developed for sustainable conservation of Middle-European biodiversity by planning. Based on data from environmental observation, a report on the success of the employed means is to be delivered in regular intervals. From the results of this work can be derived, that

conservation of biodiversity is not necessarily combined with the development of a network of protected areas. The actual sense of the network should be understood as development of a net of ecotope mosaics, an interlocking of different ecological conditions, micro- and mesoclimata, different trophic level and disturbance intensities that are representative for a landscape unit. In future, instead of rare species and vegetation types, sites with high abundances of constant species should be criteria for conservation areas or linking biotopes. The widespread habit of focussing on rare species should be changed, since most rare species have always been rare - rareness is a natural evolutionary phenomenon. In future, landscape planning should try to link its aims with those of other planning disciplines, in order to e.g. integrate moderate disturbances within different landscape units. Overall structures with moderate disturbances occurring at regular intervals could be created by provision of areas at transition zones between different forms of land use. For those, landscape planning could develop specific measures of maintenance and development in accordance with edaphic conditions and in coordination with land owners and -users. By a restriction of planning to specific measures of revitalisation for the small number of conservation areas, and otherwise allowing succession, high costs for the maintenance of decentred conservation areas could be avoided. Extended hydrological buffer zones around intact and revitalized rain bogs lead to permanently high water levels, creating a mosaic of different stages of succession and thereby enabling existence of numerous species and, particularly, individuals. If Middle-European biodiversity is to be preserved, landscape planning will have to concentrate on area-wide measures in the long term, since this diversity is a product of land use in the Middle-European cultivated landscape. Agricultural politics and agrarian legislation will have to be altered fundamentally for realization of these aims; otherwise agriculture will stay the evident originator for losses of habitat- and species diversity." (Author)] Address: Bönsel, A., Vassenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

4952. Borchelt, K. (2005): Dragonfly. Kidhaven Press. ISBN 0-7377-1770-X: 32 pp. (in English). [Four chapters with information on Odonata are directed to kids. Nice colour photos are accompanying the text.]

4953. Case, T.J.; Holt, R.D.; McPeck, M.A.; Keitt, T.H. (2005): The community context of species borders: ecological and evolutionary perspectives. *Oikos* 108: 28-46. (in English). ["Species distributional limits may coincide with hard dispersal barriers or physiological thresholds along environmental gradients, but they may also be influenced by species interactions. We explore a number of models of interspecific interactions that lead to (sometimes abrupt) distribution limits in the presence and absence of environmental gradients. We find that gradients in competitive ability can lead to spatial segregation of competitors into distinct ranges, but that spatial movement tends to broaden the region of sympatry between the two species, and that Allee effects tend to sharpen these boundaries. We generalize these simple models to include metapopulation dynamics and other types of interactions including predator/prey and host-parasite interactions. We derive conditions for range limits in each case. We also consider models that include coevolution and gene flow and find that character displacement along environmental gradients can

lead to stable parapatric distributions. We conclude that it is essential to consider coevolved species interactions as a potential mechanism limiting species distributions, particularly when barriers to dispersal are weak and environmental gradients are gradual." (Authors) References are made to the genus *Enallagma*.] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

4954. Catling, P.M.; Cannings, R.A.; Brunelle, P.M. (2005): An annotated checklist of the Odonata of Canada. *Bulletin of American Odonatology* 9(1): 1-20. (in English). [As current as October 2004, 208 odonate species are known to occur in Canada. These species are checklisted, vernacular names in English and French are added, the occurrence of each species in one of 13 Canadian provinces is tabled, and a selected bibliography is added.] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net

4955. Clausnitzer, V.; Dijkstra, K.-D. (2005): The dragonflies (Odonata) of Ethiopia, with notes on the status of endemic taxa and the description of a new species. *Entomologische Zeitschrift* 115(3): 117-130. (in English, with German summary). ["In March 2004 the authors undertook a survey of Odonata in the highlands of central and southwest Ethiopia, as well as along some Rift Valley lakes. The endemic species were the main target, as almost no information other than descriptions existed. Some type localities were visited, as were other habitats, to gather information on the species' distribution, habitat requirements and conservation status. 29 sites were sampled and 69 species recorded. Of 11 known endemics, 9 were found, all at sites other than their type localities. One new species assumed to be endemic was found, and is described as *Paragomphus crenigomphoides* sp. nov. A revised checklist of Ethiopian Odonata is presented: 96 species have been reliably recorded. *Ischnura hilli* Pinhey, 1964 and *Enallagma caputavis* Terzani & Carletti, 1998 are considered synonyms of *I. abyssinica* Martin, 1907 and *Pseudagrion niloticum* Dumont, 1978 respectively. The taxonomy and nomenclature of an undescribed *Aeshna* species (near *A. meruensis* Sjöstedt, 1909 and *A. yemenensis* Waterston, 1985), *Notogomphus ruppeli* (Selys, 1857) (frequently spelt as *N. rueppeli*) and *Orthetrum kollmannspergeri* Buchholz, 1995 (probably confused with Asian *O. taeniolum* (Schneider, 1845)) are discussed. Ethiopia's odonate fauna is compared with that of other East African highlands: It is impoverished (especially forest species) but rich in endemics." (Authors)] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

4956. Cordero Rivera, A. (Ed.) (2005): Abstracts Book 4th WDA International Symposium of Odonatology, Pontevedra 26-30 July 2005. Vigo: 88 pp. (in English). [Oral contributions Corbet, P.S. Forests as habitats for dragonflies (Odonata): 15 Orr, A.G.: Odonata in Bornean tropical rain forest formations: diversity, endemism and implications for conservation management: 15 Samways, M.J.: Threat levels to odonate assemblages from invasive alien tree canopies: 16 Sahlen, G.: Specialists vs. generalists among dragonflies - the importance of forest environments to form diverse species pools: 17 Taylor, P.D.: Movement behaviors of odonates in heterogeneous forest landscapes: 18 Paul-

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African impressions: 20 Hadrys, H.: Historical and recent population genetics: Any news to tell us about the impact of fragmentation on afrotropical forest odonates?: 20 Thompson, D.J. & Watts, P.C.: The structure of the *Coenagrion mercuriale* populations in the New Forest, southern England: 21 Watanabe, M.: Mate location and competition for mates in relation to sunflecks of forest floors: 22 Fincke, O.M.: Lack of innate recognition of species or morph identity in *Enallagma* damselflies: 23 Van Gossum, H., Beirinckx, Kirsten, Forbes, M. & Sherratt, T.: Large-scale variation in female morph frequencies of the polychromatic damselfly *Nehalennia irene*: 23 Hilfert-Rüppell, D.: Documenting odonate behaviour by drawing from films: 24 Matushkina, N.: Ovipositor and egg-laying behaviour of Odonata: phylogenetic implications: 25 Rüppell, G.: Flashes in flight: communication between odonate males: 26 Sanchez-Guillen, Rosa Ana & Cordero Rivera, A.: Pre- and postmating mechanisms of reproductive isolation between *Ischnura graellsii* and *I. elegans* (Odonata: Coenagrionidae): 26 Schenk, K.: Does ovaries composition vary between species with different mate-guarding intensities?: 27 Olberg, R. & Worthington, Andrea: Dragonfly prey capture: Vision, decision, and flight: 27 Cordero Rivera, A.: Copulatory behaviour in hybrid matings between *Calopteryx haemorrhoidalis* and *C. splendens*: 28 Cordoba-Aguilar, A.: Sperm ejection as a cryptic female choice mechanism in odonates: 29 Serrano-Meneses, M. 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- lour intensity, are related to male success during territorial contests in *Hetaerina americana*: 62; 6. Mihokovic, N. & Slavikovski, Ana: The effect of thermal pollution on dragonfly populations: 62 7. Rodriguez-Guntin, I.; Perez-Bilbao, A.; Gonzalez, A.; Alonso, A. & Garrido, J.: Evaluation of the odonata community in Galician rivers (NW Spain) that are affected by hydroelectric power stations: 63 8. Timm, Janne & Hadrys, Heike: Comparative molecular genetic analysis of the population structures and dynamics of two aeshnid species (*Odonata*: Aeshnidae) in Namibia: 63 9. Van Gossum, H., Sanchez-Guillen, Rosa Ana & Cordero Rivera, A.: Hybridisation and inheritance of female-limited colour polymorphism in two ischnurid damselfly species (*Odonata*): 64 10. Wargel, Antonia, Giere, Sandra & Hadrys, Heike: Genetic consequences of a man-made bottleneck in *Orthetrum coerulescens*: A microsatellite system to study fine scale population dynamics: 65 11. Gonzalez de Castro, Ines, Van Gossum, H. & Cordero Rivera, A.: The effect of larval density on female polychromatism and body size in *Ischnura graellsii*: 65; 12. May, M. L.: Preliminary results of a multi-year study of phenology and development of *Anax junius* in Maryland, U.S.A.: 66 13. Sanchez-Guillen, Rosa Ana & Cordero Rivera, A.: Relative frequency of *Ischnura elegans* and *I. graellsii* (*Odonata*: Coenagrionidae) in the Galician coast: 66; 14. Alonso, A.; Garrido, J.; Perez-Bilbao, A.; Gonzalez, A. & Rodriguez-Guntin, I.: Present dragonflies in gAs Gandaras de Budinoh. Site of Community Importance (Nature 2000 Network): 67; 15. Ferreira, Sonia & Grosso-Silva, J. M.: Present knowledge on the *Odonata* of Serra da Estrela Natural Park (Portugal): 68 16. Ferreira, Sonia, Grosso-Silva, J.M., Soares-Vieira, Patricia & Sousa, P.: *Odonata* of continental Portugal: mapping the knowledge and identifying geographical gaps: 68; 17. Oppel, S.: Dragonflies and damselflies of a montane tropical rainforest in Papua New Guinea: 69; 18. Sathe, T.V.; Shinde, K.; Bhoje, P.M., Thite, H.S. & Patil, R.G.: Biodiversity of dragonflies (*Odonata*) from Western ghats of Maharashtra, India: 70; 19. Soares-Vieira, Patricia, Grosso-Silva, J.M. & Ferreira, Sonia: On the available data concerning the *Odonata* of Peneda-Geres National Park (NW Portugal): 70; 20. Azpilicueta, Monica; Rey Rano, C., Docampo Barrueco, F., Rey Muniz, X.C., Cordero Rivera, A.: A preliminary analysis of odonate species richness in Galiza (NW Spain): 71; 21. Cano-Villegas, F.J. & Ferreras-Romero, M.: Contribution to knowledge of the biology of *Onychogomphus costae* Selys, 1885 (*Odonata*: Gomphidae) in southern Spain: 71; 22. Torralba Burrial, A. & Ocharan, F.J.: Pond water regime and competition as key factors in the presence and life history of two *Lestes* damselflies (*Odonata*: Lestidae): 72; 23. Khrokalo, Lyudmyla & Matushkina, Natalia: Expansion of *Crocothemis erythraea* in Ukraine: 72; 24. Kurauchi, Yohei & Ubukata, H.: Sensitivity and economy of monitoring the environment of a large lake using adult dragonflies: 73; 25. Termaat, T., Ketelaar, R. & de Vries, H.: Flight peak trends for dragonflies from the Netherlands: 74; 26. Watanabe, Yoko: Morphological characteristics of odonate eggs and early instar larvae specific to taxa: 74 27. Ferreras-Romero, M., Cano-Villegas, F.J. & Rubio-Soler, M. Isabel: Interannual change measurement of the *Odonata* community existing in a Mediterranean river which put up with the by-product of a heavy mining accident happened in April 1998 (river Guadiamar, Andalusia, southern Spain): 75; 28. Rodriguez-Linares, G.; Garrido, J.; Bendicho, C.; Lavilla, I.: Relationships between the concentrations of heavy metals in dragonfly larvae and Louro river sediments: 76; 29. Rodriguez-Linares, G.; Garrido, J.; Bendicho, C. & Lavilla, I.: Evaluation of three species of dragonfly larvae as biomonitors of heavy metals: 77; 30. Fernandez-Martinez, M.: Dragonfly folklore in Galicia, Northwest Iberian Peninsula: 77 31. de Marmels, J.: A new genus of Coenagrionidae (*Odonata*, Zygoptera) from the Pantepui region of Venezuela, with descriptions of four new species: 78 32. Mihokovic, N.: WAPODOKEY: 79; 33. Ashok, Jagtap; Shinde, Kiran & Sathe, T.V.: A comparative study of haemocytes in male and female of the dragonfly *Crocothemis servilia* Drury: 79 Informal presentations: Hawking, J.H.: Reflections on the 2003 International Odonatology Symposium, Beechworth, Australia: 80 Author index: List of participants: 84] Address: [http://webs.uvigo.es/c04/webc04/WDA/ProgramAbstracts4thWDA Symposium.pdf](http://webs.uvigo.es/c04/webc04/WDA/ProgramAbstracts4thWDA%20Symposium.pdf)
- 4957.** Cordoba-Aguilar, A. (2005): Possible coevolution of male and female genital form and function in a calopterygid damselfly. *Journal of Evolutionary Biology* 18(1): 132-137. (in English). ["In this paper some evolutionary changes of genitalia in the damselfly *Calopteryx haemorrhoidalis* are investigated by determining their current and past function. *Calopteryx haemorrhoidalis* males stimulate females by aedeagal frictioning on a set of vaginal sensilla. The aedeagus is considerably variable and positively correlates with volumes of ejected sperm from the spermatheca. Interestingly, females show a significantly reduced sensillum number compared with other family members. Here I explore whether there existed directional selection for aedeagal width at its evolutionary onset; and whether the sensillum reduction evolved to make sperm ejection less effective. Using *C. haemorrhoidalis* aedeagi in females whose species retained the ancestral conditions (no stimulatory ability and large sensillum numbers), *Hetaerina cruentata* and *C. xanthostoma*, my results corroborated these assumptions: variation in aedeagal width inversely correlated with sperm ejection rate while sperm ejection was higher in species with high sensillum numbers. A suggested coevolutionary interpretation of these results in *C. haemorrhoidalis* is that aedeagal width was favoured which was followed by a sensillum reduction." (Author)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Univ. Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx
- 4958.** De Block, M.; Stoks, R. (2005): Fitness effects from egg to reproduction: bridging the life history transition. *Ecology* 86(1): 185-197. (in English). ["Although complex life cycles are widespread, we know little about how constraints in the larval stage influence adult fitness. Most models assume a tight coupling of larval conditions and adult fitness through size and timing of the life history transition. However, there are few empirical tests of this assumption. We combined an experimental manipulation of larval environment with a subsequent study of adult fitness, measured as lifetime mating success. Individuals of the damselfly *Lestes viridis* were followed from the egg stage to adult reproduction and death. Under time constraints, emergence occurred earlier, but in late-hatched larvae, this did not result in a lower size. Under nutritional constraints, emergence occurred later, and size was reduced. Variation in survival to maturity was better explained by larval constraints than by emergence traits, whereas both larval constraints and emergence traits explained variation in life-

time mating success. Sexes reacted differently to larval constraints, and the coupling of larval constraints to adult fitness also was sex specific. Our results indicate that larval constraints do not necessarily carry over to adult fitness through size and timing of transition, and that carryover effects may be sex specific. This may explain the existence of hidden costs that become visible after maturation and may explain part of the unexplained variation in selection studies on adults." (Authors) Address: Stoks, R., Lab. voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4959. Deliry, C. (2005): Nouvelles références. *Symptetrum piémontais* 55: 2. (in French). [France; 26 publications containing information on Odonata, nearly exclusively unpublished expertises, are compiled.] Address: Deliry, C., Chalet 37, Village des pêcheurs, F-38390 Montalieu, France. E-mail: president@symptetrum.org

4960. Dmitriew, C.; Rowe, L. (2005): Resource limitation, predation risk and compensatory growth in a damselfly. *Oecologia* 142(1): 150-154. (in English). ["Periods of poor nutrition during early development may have negative fitness consequences in subsequent periods of ontogeny. In insects, suppression of growth and developmental rate during the larval stage are likely to affect size and timing of maturity, which in turn may lead to reduced reproductive success or survivorship. In light of these costs, individuals may achieve compensatory growth via behavioural or physiological mechanisms following food limitation. In this study, we examined the effects of a temporary period of food restriction on subsequent growth and age and size at maturity in the larval damselfly *Ischnura verticalis*. We also asked whether this temporary period of reduced nutrition affected subsequent foraging behaviour under predation risk. *I. verticalis* larvae exposed to a temporary food shortage suffered from a reduced growth rate during this period relative to a control group that was fed ad libitum. However, increased growth rates later in development ensured that adult body size measurements (head and pronotum widths) did not differ between the treatments upon emergence. In contrast, adult dry mass did not catch up to that of the controls, indicating that the increased growth rates for size dimensions occur at the cost of similar gains in mass. Predators reduced foraging effort of larvae, but this reduction did not differ between control larvae and those previously exposed to poor nutrition." (Authors)] Address: Dmitriew, C., Dept Zool., Univ Toronto, Toronto, ON, M5S 3G5, CA. E-mail: dmitriew@zoo.utoronto.ca

4961. Ellenrieder, N. von; Garrison, R.W. (2005): Case 3294: *Gynacantha Rambur, 1842* and *Triacanthagyna Selys, 1883* (Insecta, Odonata): proposed conservation of usage by designation of *Gynacantha nervosa Rambur, 1842* as the type species of *Gynacantha*. *Bulletin of Zoological Nomenclature* 62(1): ?. (in English). ["The purpose of this application, under Article 70.2 of the Code, is to conserve the accustomed usage of the names *Gynacantha Rambur, 1842* and *Triacanthagyna Selys, 1883* for two genera of aeshnid dragonflies. The names are objective synonyms but are currently in use for two distinct groups of species. It is proposed that *Gynacantha nervosa Rambur, 1842* should be designated as the type species of *Gynacantha* to conserve the accustomed usage of these two

generic names." (Authors)] Address: Ellenrieder, Natalie von, Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, AR-1900, La Plata, Argentina. E-mail: ellenr@ilpla.edu.ar

4962. Erös, T.; Schmera, D.; Cser, B.; Csabai, Z.; Murány, D. (2005): Composition of macroinvertebrate assemblages in two submontane streams - The influence of stream order and riffle-pool structure. *Acta Biol. Debr. Oecol. Hung* 13: 85-94. (in Hungarian, with English summary). ["We examined the seasonal assemblage composition and biomass pattern of macroinvertebrate assemblages in two streams of the Börzsöny mountain in riffle and pool habitat types. Clear similarities and differences in species composition were found between riffles and pools. Biomass values showed significant differences between seasons. Biomass was higher in the second order stream in between stream comparisons and in riffles in between riffle-pool comparisons, although these differences were not significant in each season. Composition based on mass percentage was determined largely by Ephemeroptera, Trichoptera, Amphipoda, Coleoptera, Chironomidae, and other Diptera groups, showing large differences between seasons and habitat types. Multivariate analyses showed that riffle-pool habitat structure predominantly determined the similarity of the assemblages based on mass percentage, however seasonal and between stream differences also contributed to differences in assemblage composition." (Authors) *Calopteryx virgo*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*] Address: Erös, T., VITUKI Környezetvédelmi és Vízgazdálkodási Kutató Intézet Kht, Budapest, Hungary

4963. Foote, L.A.; Rice, C.L. (2005): Odonates as biological indicators of grazing effects on Canadian prairie wetlands. *Ecological Entomology* 30(3): 273-283. (in English). ["1. Aquatic macro-invertebrates have frequently been used as biological indicators in lotic environments but much less commonly so in lentic habitats. Dragonflies and damselflies (Order Odonata) satisfy most selection criteria for lentic bioindicators of grazing impacts. 2. Intensive cattle grazing affects most of the Canadian prairie pothole region but the effects of grazing on wetlands are poorly understood. 3. Here the vegetation structure and invertebrate community composition of 27 prairie potholes in Alberta, Canada were studied and compared. Wetlands were evenly divided into three treatments of different grazing regimes. 4. Removal of emergent vegetation by cattle grazing decreased odonate abundance and reproductive effort. Shorter *Scirpus acutus* stems resulted in significantly fewer damselflies (Suborder Zygoptera) and lower reproductive efforts. 5. Overall odonate diversity was affected by the height of key plant species, highlighting the importance of the vegetation structure of both emergent vegetation for breeding and adjacent upland vegetation for nocturnal roosts. Wetland vegetation structure was more important than vegetation composition to the life history of odonates. 6. Wetland water quality parameters of nitrogen, phosphorus, total dissolved solids (TDS), and chlorophyll-a concentration did not change due to the presence of grazing cattle at wetlands so water quality influences were rejected as mechanisms of change. 7. Larval odonate diversity and abundance was positively correlated with overall aquatic macro-invertebrate diversity and abundance, hence it was concluded that the larval odonate community can be an accurate bioindicator of intactness and diversity

of overall aquatic macro-invertebrate communities in Canadian prairie wetlands." (Authors)] Address: Lee Foote, A., Department of Renewable Resources, GSB 7-51, University of Alberta, Edmonton, Alberta T6G 2H1, Canada. E-mail: lee.foote@ualberta.ca

4964. Grimaldi, D.; Engel, M.S. (2005): Evolution of the Insects. Cambridge University Press. ISBN-13 978-0-521-82149-0 hardback: (in English). [Chapter 6 (pp 173-187) relates to the Odonatoptera.]

4965. Gysels, F.G.M.; Stoks, R (2005): Threat-sensitive responses to predator attacks in a damselfly. *Ethology* 111(4): 411-423. (in English). ["The threat sensitivity hypothesis predicts that prey species assess and adjust their behaviour flexibly in accordance with the magnitude of the threat imposed by a predator. We tested this hypothesis with regard to escape behavior and thanatosis (feigning of death to escape predation) in larvae of the damselfly *Ischnura elegans*. We manipulated the perceived predation threat of the larvae by changing three factors: lamellae autotomy (an escape strategy where animals sacrifice a body part when grasped by a predator; lamellae present or absent), kairomone type (odors released by predators; control, dragonfly kairomones or fish kairomones), and population of origin (fishpond or fishless pond). We demonstrated that thanatosis increased survival both when confronted with dragonfly and fish predators. We could show, for the first time, costs of past autotomy to be predator-dependent: larvae without lamellae suffered higher predation mortality but only in the presence of a dragonfly predator and not in the presence of a fish predator. This is in accordance with the observed reduced escape speed of larvae after autotomy, which may affect escape probability toward dragonfly predators but not to the very fast fish predators. Unexpectedly, kairomone type did not affect the escape response of the larvae. In accordance with the threat sensitivity hypothesis, after an unsuccessful attack, larvae without lamellae had a higher frequency to enter thanatosis than larvae with lamellae and larvae from the fishpond showed longer thanatosis durations than larvae from the fishless pond. Consistent with the hypothesis, the reaction of the larvae to a simulated attack depended jointly on lamellae status and population. In fishless ponds, larvae with lamellae swam away more frequently than larvae without lamellae; in fishponds both groups almost never swam away and relied mostly upon immobility. Given the obvious benefits of adaptively varying escape responses we hypothesize this threat sensitivity to be widespread. Moreover, we argue that former inconsistencies between studies with regard to escape behavior may have been partly because of such adaptive variation." (Authors)] Address: Gysels, Freya; Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

4966. Hernandez, K.M.; Reece, B.A.; McIntyre, N.E. (2005): Effects of anthropogenic land used on Odonata (dragonflies and damselflies) in Playas of the Southern High Plains. International Association of Landscape Ecology Annual Symposium (US-IALE). March 12-16, 2005 in Syracuse, New York. <http://iale.esf.edu/pdfs/IALEProgram2005.03.11.pdf>: 93. (in English). [Verbatim: Playas are ephemeral wetlands that are the only source of freshwater on the Southern High Plains, making them of vital importance to aquatic and amphibious

animals. Playas are also highly threatened from anthropogenic land use (chiefly agriculture, which decreases hydroperiod through increased sedimentation). We are examining the ecology of odonates in playas that differ in surrounding land use (cropland vs. grassland). Preliminary analyses of odonate diversity have revealed a high degree of overlap between cropland and grassland playas (not surprising in a highly mobile taxon). There appears to be a threshold playa size that supports maximal odonate richness, which may reflect a tradeoff between water depth and emergent vegetation that is required for oviposition. Since agriculture effectively reduces playa depth, this tradeoff may be mitigated, which has important implications for odonate community structure in the Southern High Plains.] Address: Hernandez, Kyle M. , Howard Hughes Medical Institute, Dept of Biological Sciences, Lubbock, Texas, 79409-3131, USA. E-mail: kyle.hernandez@ttu.edu

4967. Hickling, R.; Roy, D.B.; Hill, J.K.; Thomas, C.D. (2005): A northward shift of range margins in British Odonata. *Global Change Biology* 11: 1-5. (in English). ["Many species are predicted to shift their ranges to higher latitudes and altitudes in response to climate warming. This study presents evidence for 37 species of nonmigratory British dragonflies and damselflies shifting northwards at their range margins over the past 40 years, seemingly as a result of climate change. This response by an exemplar group of insects associated with fresh water, parallels polewards range changes observed in terrestrial invertebrates and other taxa." (Authors)] Address: Hickling, Rachael, NERC Centre for Ecology and Hydrology: Monks Wood, Abbots Ripton, Huntingdon, Cambridgeshire PE28 2LS, UK. E-mail: rhic@ceh.ac.uk

4968. Johnson, J.; Valley, S. (2005): The Odonata of Oregon. *Bulletin of American Odonatology* 8(4): 100-122. (in English). ["87 species of Odonata are listed from Oregon, USA. General distribution, habitat preference, flight period, and county records are presented for each species. A brief history of odonatological research conducted in Oregon is presented. Five species are discussed as likely additions to the odonate fauna." (Authors)] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

4969. Kutrup, B.; Çakir, E.; Yilmaz, N. (2005): Food of the Banded Newt, *Triturus vittatus ophryticus* (Bertold, 1846), at different sites in Trabzon. *Turkish Journal of Zoology* 29: 83-89. (in English, with Turkish summary). [Odonata are listed as prey of the Banded newt in Turkey.] Address: <http://journals.tubitak.gov.tr/zoology/issues/zoo-05-29-1/zoo-29-1-11-0401-7.pdf>

4970. Leipelt, K.G. (2005): Behavioural differences in response to current: implications for the longitudinal distribution of stream odonates. *Archiv für Hydrobiologie* 163(1): 81-100. (in English). ["Different longitudinal distribution patterns occur in closely related running water species. However, the mechanisms that underlie this phenomenon are poorly studied. In European Cordulegaster species (Odonata) two different longitudinal distribution patterns occur: species like *C. bidentata* and *C. insignis* are limited to springs and springbrooks, whereas species like *C. boltonii* and *C. picta* are less restricted and occur from springs to larger streams and rivulets. To find an explanation for these patterns, expe-

periments in artificial streams were carried out to reveal differences in larval response to current between species of the two types. Larval *C. bidentata* and *C. insignis* showed a higher proneness to drift compared to *C. boltonii* and *C. picta*. Furthermore, *C. bidentata* and *C. insignis* avoided renewed drifting after a forced drift event less effectively and, exposed to strong current, travelled longer distances. It is concluded that, compared to the other pair of species, the behavioural traits of *C. bidentata* and *C. insignis* are less effective to withstand strong hydraulic stress, which restricts the distribution of these species to habitats with low discharge and current velocity, namely springs and springbrooks." (Author)] Address: Leipelt, K.G., Inst. Geoökologie, Technische Univ. Braunschweig, Langer Kamp 19c, D-38106 Braunschweig, Germany. E-Mail: k.leipelt@tu-bs.de

4971. Lencioni, F.A.A. (2005): Damselflies of Brazil. 1 - Non-Coenagrionidae families. 332 pp. (in Bilingual in English and Portuguese). ["The book begins with an introductory chapter containing illustrations of all diagnostic characters, collection, preservation techniques, and identification keys for families and genera. Each species account includes original literature citation, synonymies, references to described larvae, and diagnostic illustrations, usually of the caudal appendages and/or wing scans. The last chapter includes an extensive, up-to-date bibliography and glossary. More than 1000 diagnostic illustrations (of which almost 300 are original) for the 153 species of non-Coenagrionidae species are included which should make identification of the damselfly fauna of Brazil considerably easier than was previously possible." The species are treated in a monographic style containing the following items: Data on Original description; data on imago (if male and female are described); type locality; where the types are housed; synonymy; distribution in South America; distribution in Brazil; data on larvae (described or not and where); data on revision. The glossary includes 156 entries in English and Portuguese (in Portuguese with the English word or expression) and the bibliography refers to app. 120 papers. This publication is available from the author and is priced US \$ 60 plus shipping.] Address: Lencioni, F.A.A., Rua dos Ferroviários 55, Jardim Mesquita, BR-12300-000, Jacarei, S.P., Brazil. E-mail: odonata@iconet.com.br. Orders should be directed to the following e-mail address: odonata@zygoptera.bio.br

4972. Maes, D.; Van Dyck, H. (2005): Habitat quality and biodiversity indicator performances of a threatened butterfly versus a multispecies group for wet heathlands in Belgium. *Biological Conservation* 123(2): 177-187. (in English). ["We analyzed whether a single species (i.e., the threatened Alcon Blue butterfly *Maculinea alcon*) was a useful indicator for the quality and area of wet heathlands in Belgium. During a survey of 18 wet *Erica tetralix* heathlands, we identified 624 species from 20 different taxonomic groups. Sites with the single indicator species *M. alcon* were significantly richer in typical wet heathland species and in Red List species but did not show significant differences in biotope quality (i.e., the number of different typical wet heathland biotope attributes) than sites without. In addition, we used a multispecies indicator approach including a group of nine species from five different taxonomic groups (each two birds, dragonflies, butterflies, vascular plants, and one grasshopper). High quality sites (5-9 species from the multispecies indicator group present) tended to ha-

ve more Red list species than low quality sites (0-4 species from the multispecies indicator group present) but did not expose differences in overall species richness, typical wet heathland species or in biotope quality. The number of species in this umbrella group, however, was positively correlated with both the diversity of typical wet heathland species and with biotope quality. Furthermore, the complementary information of the species in the multispecies indicator group usefully signalled distinctions in biotope area and configuration, vulnerability to fragmentation, eutrophication, desiccation and contained species of different trophic levels; this was not the case for *M. alcon* as a single indicator species. We discuss the use of a single indicator and of a multispecies group as conservation umbrella and advocate a much wider use of combined knowledge from different taxonomic groups in conservation planning and evaluation." (Authors)] Address: Van Dyck, H., Biodiversity Research Centre, Catholic University of Louvain, Unité d'Ecologie et de Biogéographie, Croix du sud 4, B-1384 Louvain-la-Neuve, Belgium. E-mail: vandyck@ecol.ucl.ac.be

4973. Maes, D.; Bauwens, D.; Bruyn, L. de; Anselin, A.; Vermeersch, G.; Landuyt, W. van; Knijf, G. de; Gilbert, M. (2005): Species richness coincidence: conservation strategies based on predictive modelling. *Biodiversity and Conservation* 14: 1345-1364. (in English). ["The present-day geographic distribution of individual species of five taxonomic groups (plants, dragonflies, butterflies, herpetofauna, and breeding birds) is relatively well-known on a small scale (5x5 km squares) in Flanders (north Belgium). These data allow identification of areas with a high diversity within each of the species groups. However, differences in mapping intensity and coverage hamper straightforward comparisons of species-rich areas among the taxonomic groups. To overcome this problem, we modelled the species richness of each taxonomic group separately using various environmental characteristics as predictor variables (area of different land use types, biotope diversity, topographic and climatic features). We applied forward stepwise multiple regression to build the models, using a subset of well-surveyed squares. A separate set of equally well-surveyed squares was used to test the predictions of the models. The coincidence of geographic areas with high predicted species richness was remarkably high among the four faunal groups, but much lower between plants and each of the four faunal groups. Thus, the four investigated faunal groups can be used as relatively good indicator taxa for one another in Flanders, at least for their within-group species diversity. A mean predicted species diversity per mapping square was also estimated by averaging the standardized predicted species richness over the five taxonomic groups, to locate the regions that were predicted as being the most species-rich for all five investigated taxonomic groups together. Finally, the applicability of predictive modelling in nature conservation policy both in Flanders and in other regions is discussed." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

4974. Mastrantuono, L.; Mancinelli, T. (2005): Littoral invertebrates associated with aquatic plants and bioassessment of ecological status in Lake Bracciano (Central Italy). *J. Limnol.*, 64(1): 43-53. (in English) ["Lake Bracciano is a large and deep volcanic lake which plays

an unquestionable role for drawing water source and for fishing and recreational activities. The existence of a project aimed at increasing the amount of water drawn from the lake suggested the advisability of undertaking an ecological analysis of the invertebrate community associated with aquatic plants in order to obtain a detailed knowledge of its composition, biodiversity and quantitative structure, and to provide a set of basic and essential information for defining the ecological status in the littoral zone and for future bioassessments in the lake ecosystem. A good water quality, approaching oligotrophy, was evidenced both from data on aquatic vegetation, which showed the extensive colonization of Charales (down to a depth of about 20 m), and from faunal parameters such as high species richness and diversity values, presence and abundance of bioindicator taxa (mainly cladocerans and gastropods), abundances of total fauna. Nevertheless, a considerable disappearance of the reed thicket due to the intense shore management for recreational purposes have negatively influenced the colonization of the more shallow and productive waters, so evidencing a negative trend of the littoral quality." (Authors) The checklist of species includes *Erythromma lindenii* and *Trithemis annulata*.] Address: Mastrantuono, Luciana, Dept. of Animal and Human Biology, Univ. "La Sapienza", Viale dell'Università 32, 00185 Rome, Italy. E-mail: luciana.mastrantuono@uniroma1.it

4975. Mauersberger, R.; Bauhaus, S.; Salm, P. (2005): Zum Vorkommen der Grünen Mosaikjungfer (*Aeshna viridis* Eversmann) im Nordosten Brandenburgs (Odonata: Aeshnidae). *Naturschutz und Landschaftspflege in Brandenburg* 14(1): 17-24. (in German). [60 sites with *A. viridis* have been found between 1987 and 2003 in a region of 3500 km² situated in Brandenburg, Germany. The habitats are characterised in detail. A rare exception of an oviposition in *Sparganium emersum* is described and discussed.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

4976. Mauffrey, B.; Beaton, G. (2005): The distribution of dragonflies and damselflies (Odonata) in Georgia. *Bulletin of American Odonatology* 9(2): 21-66. (in English). ["We present a list of 173 odonate taxa (170 species) from Georgia, USA. Four taxa are newly added to the state list: *Calopteryx amata*, *Argia fumipennis violacea*, *Enallagma caecum*, and *Gomphus australis*. Several species listed in recent publications are removed from the list: *Lestes forcipatus*, *Gomphus crassus*, *G. septima*, *Cordulegaster diastatops*, *Epitheca spinigera*, *Erythrodiplax umbrata*, *Ladona exusta*, and *Libellula jesseana*. Synonyms and unsupportable older species records are discussed." (Authors)] Address: Beaton, G., 320 Willow Glen Drive, Marietta, GA 30068, USA. E-mail: giffbeaton@mindspring.com

4977. Mikolajewski, D.J.; Brodin, T.; Johansson, F.; Joop, G. (2005): Phenotypic plasticity in gender specific life-history: effects of food availability and predation. *Oikos* 110: 91-100. (in English). ["If environmental conditions vary, plasticity in life-history traits is predicted. A recent model indicates that males and females should differ in life-history traits, because sexes differ in optimal attributes depending on species ecology. In this study we test the impact of two biotic factors in combination (presence/absence of predators and low/high

food level) on gender specific life-history traits in the damselfly *Coenagrion puella* (Odonata). Results show that predator presence and low food density decreased activity in both sexes. Additionally, individuals with less food grew more slowly, emerged later, remained smaller and had a higher mortality. At low food densities, however, and in contrast to former investigations, individuals from treatments with predator presence were the same size or larger than individuals without predators. Gender had a strong impact on larval activity and life-history traits and sexes differed in development. Females were less active and took longer to complete development, but emerged at a larger size, weight and fat content. This study highlights the importance of gender specific approaches in life-history research." (Authors)] Address: Johansson, F., Dept of Ecology & Environmental Sci., Animal Ecol. Group, Umea Univ., 90187 Limed, Sweden. E-mail: frank.johansson@eg.umu.se

4978. Nel, A.; Petrulevicius, J.F.; Gentilini, G.; Martínez-Delclòs, X. (2005): Phylogenetic analysis of the Cenozoic family Sieblosiidae (Insecta: Odonata), with description of new taxa from Russia, Italy and France. *Geobios* 38(2): 219-233. (in English with French summary). ["We describe the following Sieblosiidae: an unnamed gen. and sp. A from the Miocene of Italy, *Miostenolestes zherikhini* nov. gen., nov. sp., *Paraoligolestes stavropolensis* nov. sp., *Stenolestes fasciata* nov. sp. (all from the Miocene of North Caucasus), *Stenolestes (?) adygeianensis* nov. sp. (Oligocene of North Caucasus), and *Stenolestes cerestensis* nov. sp. (Oligocene of France). The genus *Sieblosia* Handlirsch, 1906 is restored. A new phylogenetic analysis of the Sieblosiidae is proposed. The two taxa gen. and sp. A and *Oligolestes* fall in most inclusive positions in the same clade with the Sieblosiidae. Within the Sieblosiidae sensu stricto, the two clades (*Paraoligolestes* + *Parastenolestes* + *Stenolestes*) and (*Parastenolestes* + *Stenolestes*) are the best supported. The family Sieblosiidae seems to be restricted to the Oligocene-Miocene of Europe." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

4979. Oertel, N.; Nosek, J.N.; Andrikovocs, S. (2005): Macroinvertebrates in the littoral zone of the Hungarian Danube section (1998-2000). *Acta Biol. Debr. Oecol. Hung* 13: 159-185. (in Hungarian, with English summary). [The paper lists 16 odonate taxa including *Stylurus flavipes*, *Brachytron pratense*, and *Somatochlora metallica*.] Address: Oertel, N., Hungarian Danube Research Station of the Hungarian Academy of Sciences, H-2131 Göd, Jávorka S. u. 14, Hungary

4980. Opper, S. (2005): Odonata of the Crater Mountain Wildlife Management Area, Papua New Guinea. *IDF-Report* 7: 1-28. (in English, with German summary). ["The odonate fauna of Papua New Guinea (PNG) is species rich but poorly studied. Geographic ranges, ecology, and thus conservation status of many species are unknown. In this study I provide an inventory of two sites within the largest formally protected forest area in PNG, the Crater Mountain Wildlife Management Area. I sampled odonates for a total of 112 days in a pristine forest site and for 36 days in a traditional garden village, and worked with local communities to increase the awareness of dragonflies in the area. I found a total of 78 species (60 Zygoptera, 18 Anisoptera) from 13 families, including at least six currently undescribed spe-

cies. The pristine rainforest hosted more species (61) than the village (37), and a longer sampling period was required to reach an approximately equal level of the total species richness. I calculated species accumulation curves for both areas and found that 100 sampling days were required in the pristine forest, whereas 35 sampling days appeared sufficient in the modified forest. More than two-thirds of all species recorded in the pristine forest were observed in less than half of all the sampling sessions, indicating that species might be both rare and occur only during certain times of the year. The number of species recorded per sampling session indicated some seasonality in the odonate fauna of the pristine forest, which should be considered in future studies. The study suggests that modification of tropical rainforests will lead to a loss of species richness. Conservation of odonates in PNG is therefore dependent on the preservation of primary rainforests, which requires the education of native people living in these areas. Dragonflies were well known among local people inhabiting the study area, but did not play a major role in their culture. More work on dragonflies is needed to describe the diversity of the PNG odonate fauna." (Author)] Address: Opiel, S., Wildlife Conservation Society, PO Box 277, Goroka, EHP, Papua New Guinea. E-mail: steffen.opiel@gmx.net

4981. Petrulevicius, J.F.; Nel, A. (2005): Austroperilestidae, a new family of damselflies from early eocene of Argentina (Insecta: Odonata). Phylogenetic relationships within Odonata. *Journal of Paleontology* 79(4): 658-662. (in English). ["The new dragonfly family Austroperilestidae n. fam. based on Austroperilestes hunco n. gen. and sp. is erected from early Eocene of Patagonia (Argentina). Its phylogenetic relationships within the Zygoptera (sensu Bechly, 1996) are discussed. The new family seems to be related to Perilestidae, with a Neotropical and Afrotropical recent distribution." (Authors) Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrn1.mnhn.fr

4982. Pfeifer, B. (2005): Operation Rubyspot comes to VT. The Boghaunter. Occasional News about the dragonflies and damselflies of Vermont 4(1): 6. (in English). [New records due to intensified investigation of *Hetaerina americana* in Vermont, USA are documented] Address: www.wingsenvironmental.com/boghaunter/Boghaunter%20-%20Vol.%204%20No.%201.pdf

4983. Pfeifer, B. (2005): The Vermont Ode data project. The Boghaunter. Occasional News about the dragonflies and damselflies of Vermont 4(1): 7. (in English). [Basics of a odonatological mapping scheme for Vermont, USA are outlined, and the data set necessary is briefly documented.] Address: www.wingsenvironmental.com/boghaunter/Boghaunter%20-%20Vol.%204%20No.%201.pdf

4984. Pfeifer, B. (2005): Vermont 2004 Season summary. The Boghaunter. Occasional News about the dragonflies and damselflies of Vermont 4(1): 3-4. (in English). [Noteworthy records of Odonata in 2004 are compiled and briefly commented on.] Address: <http://www.wingsenvironmental.com/boghaunter/Boghaunter%20-%20Vol.%204%20No.%201.pdf>

4985. Piorski, N.M.; Alves, J.; Machado, M.R.B.; Correia, M.M. (2005): Feeding and ecomorphology of two species of piranhas (Characiformes: Characidae)

from the Viana Lake, Maranhão state, Brazil. *Acta Amazonica* 35(1): 63-70. (in Portuguese, with English summary). [A sample composed of 249 specimens of *Serrasalmus* aff. *brandtii* and *Pygocentrus nattereri* was studied in order to identify diet composition and feeding strategies. The results indicated that fish was the main food item in the stomach contents of the two species, followed by plant material, especially in *P. nattereri*. The species use several food resources simultaneously. A multivariate analysis of the ecomorphological index indicated that the species are discriminated by swimming ability, water column position and relative prey size. Odonata are a significant part of food in both species.] Address: Piorski, N.M., Departamento de Oceanografia e Limnologia/UFMA. Campus do Bacanga. Av. dos Portugueses, s/n. CEP 65085-580, São Luís - MA. E-mail: piorski@ufma.br

4986. Purse, B.V.; Thompson, D.J. (2005): Lifetime mating success in a marginal population of a damselfly, *Coenagrion mercuriale*. *Animal Behaviour* 69(6): 1303-1315. (in English). ["In scrambling species, where males obtain matings by actively searching for females, the timing and location of mating may be more important to females than choice of males based on phenotype. Since their activity rates are constrained by climate, variation in lifetime reproductive success in marginal populations of scrambling insects may be governed primarily by stochastic processes, limiting the role of selection. Using multivariate analysis, we examined activity patterns and lifetime mating success (LMS) in a marginal British population of *Coenagrion mercuriale*, a rare, scrambling damselfly, versus that in a core population of a similarly sized scrambling congeneric. Time spent at the breeding site and mating efficiency were the most important factors explaining variation (<75% correct predictions) in LMS in both species, whereas body size, age, and day of entry to the mature population were unimportant. This suggests that LMS in these scrambling species is governed by sexual and natural selection as well as stochastic processes such as weather. However, in *C. mercuriale*, daily mating and activity rates were highly constrained by poor environmental conditions (and increased with sunlight and temperature). Breeding site visits were so curtailed that an equal distribution of LMS between the sexes was observed. Selection in marginal populations of *C. mercuriale* may operate upon traits that confer endurance ability in poor environmental conditions rather than body size, life span or age. Climatic variation across species' ranges will in turn generate geographical variation in mating behaviour, in the intensity of sexual selection and the type of traits selected." (Authors)] Address: Purse, B.V., TALA Research Group, Department of Zoology, South Parks Road, Oxford OX1 3PS, U.K.

4987. Reels, G. (2005): Book reviews: Field Guide to the Dragonflies of Hong Kong 2nd Edition. by Keith D.P. Wilson, 383 pages, softcover. Cosmos Books Ltd, Hong Kong, 2004. *Porcupine* 32: 20-21. [Verbatim: The first edition of this landmark field guide, which appeared in the shops late last year, went completely unremarked in *Porcupine*! That is unfortunate, since this book, now in its second edition, has set a new standard for field guides of the local fauna. The author, Keith Wilson, worked in Hong Kong for the Agriculture, Conservation and Fisheries Department from 1991 until 2003, and it is under the auspices of AFCD that this fine field guide has been published. The book was written in collabora-

tion with AFCD's Dragonfly Working Group, whose survey work has resulted in four new species records for Hong Kong, including one undescribed gomphid, since its establishment in 2001. However, no-one should be under any doubt that this book is first and foremost the result of one man's efforts. Wilson's first book on the subject (Hong Kong Dragonflies) was published in 1995 and listed 102 species for the territory. It was a truly ground-breaking work, with no local antecedents, but its large, floppy landscape format, coupled with the fact that species descriptions rarely appeared on the same page as their photographs, made it confoundingly unwieldy, and hopeless as a field guide. This was followed in 2002 by the mystifyingly pointless Hong Kong Flying Colour: Dragonflies booklet - another AFCD collaboration (and I beseech them not to repeat it) - which contained photographs of most Hong Kong species, but no text. The peril of producing this kind of anti-information, with no clues on habitat associations or diagnostic features of particular species, was brought sharply into relief for me when I reviewed the results of a dragonfly survey conducted in a disturbed lowland pond and marsh mosaic by an environmental consultant who had made his identifications from the photographs in Flying Colour: many dragonflies look superficially similar, and the hapless consultant had included several stream specialists and many other highly improbable species in his impressive-looking but tragically flawed list. Fortunately, such calamitous failures of identification should now be a thing of the past, as anybody armed with Field Guide to the Dragonflies of Hong Kong, and a good dose of common sense, ought to be capable of making a decent fist of putting a name to most dragonflies they encounter in Hong Kong. An impressive total of 112 species has now been recorded in the SAR, and all of them are illustrated in this 2nd edition. Good, clear photographs of adult males and females are provided in most cases, along with useful information on distinguishing features, biometrics, habitat and distribution. This information is backed up with excellent, user-friendly keys to adults at sub-order, family, genus and species levels. There is also a handy pull-out photo index, a check-list, and a section on additional species which could be expected to occur locally. The layout is compact and attractive. Best of all, it fits easily into a field bag. One could wish for a more robust, hard-back production, and a less cursory treatment of the larvae, but otherwise this has all that one might reasonably ask of a field guide to adult dragonflies.]

4988. Reinhardt, R. (2005): 1. Ergänzung zu: Reinhardt, R. & Klausnitzer, B. (2002): Bibliographie über Sachsens Insekten - ein 300jähriger Überblick. Mitteilungen Sächsischer Entomologen 57: 1-182. Mitteilungen Sächsischer Entomologen 70: 20-40. (in German). [This addition to the bibliography of the Saxonian entomological literature lists numerous unpublished odonological papers (expertices, theses etc.)] Address: Reinhardt, R., Burgstädter Str. 80a, D-09648 Mittweida, Germany. E-mail: Reinhardt-Mittw@t-online.de

4989. Relyea, R.A. (2005): The impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities. *Ecological Applications* 15(2): 618-627. (in English). ["Pesticides constitute a major anthropogenic addition to natural communities. In aquatic communities, a great majority of pesticide impacts are determined from single-species experiments conducted under laboratory conditions. Although this is an

essential protocol to rapidly identify the direct impacts of pesticides on organisms, it prevents an assessment of direct and indirect pesticide effects on organisms embedded in their natural ecological contexts. In this study, I examined the impact of four globally common pesticides (two insecticides, carbaryl [Sevin] and malathion; two herbicides, glyphosate [Roundup] and 2,4-D) on the biodiversity of aquatic communities containing algae and 25 species of animals. Species richness was reduced by 15% with Sevin, 30% with malathion, and 22% with Roundup, whereas 2,4-D had no effect. Both insecticides reduced zooplankton diversity by eliminating cladocerans but not copepods (the latter increased in abundance). The insecticides also reduced the diversity and biomass of predatory insects (including *Anax junius*) and had an apparent indirect positive effect on several species of tadpoles, but had no effect on snails. The two herbicides had no effects on zooplankton, insect predators, or snails. Moreover, the herbicide 2,4-D had no effect on tadpoles. However, Roundup completely eliminated two species of tadpoles and nearly exterminated a third species, resulting in a 70% decline in the species richness of tadpoles. This study represents one of the most extensive experimental investigations of pesticide effects on aquatic communities and offers a comprehensive perspective on the impacts of pesticides when nontarget organisms are examined under ecologically relevant conditions." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

4990. Robb, T.; Forbes, M.R. (2005): On understanding seasonal increases in damselfly defence and resistance against ectoparasitic mites. *Ecological Entomology* 30(3): 334-341. (in English). ["1. Defence against parasites and pathogens can be essential, yet not all hosts respond similarly to parasitic challenge. Environmental conditions are thought to explain variation in host responses to parasites. 2. *Lestes forcipatus* damselflies emerging later in the season have shown higher resistance to the mite, *Arrenurus planus*, than hosts emerging earlier. This study was undertaken to determine whether variation in environmental temperatures characteristic of early vs. late emergence times, degree or costs of mite parasitism, and/or size of newly emerged adults could explain seasonal variation in defence and resistance to ectoparasitic mites. 3. In this study damselflies from early vs. late emergence groups differed in size at emergence and mite intensity. In general, early hosts were larger and had more mites than later hosts. However only experimental temperatures experienced by damselflies at emergence influenced defence and resistance against mites and not host size or degree of parasitism. 4. More specifically, hosts from early and late emergence groups did not differ in defence and resistance when held at the same temperatures in incubators. Housing at a high temperature, indicative of later in the season, was associated with higher defence and resistance for damselflies from both early and late emergence groups. 5. These results indicate that daily temperatures in relation to emergence timing can account for seasonal increases in resistance for this temperate insect. Seasonal increases in resistance may be expected for other temperate insect-parasite associations and should have important implications for the phenology of parasites and for seasonal variation in parasite-mediated selection." (Authors)] Address: Robb, Tonia, Dept of Biology, 209 Nesbitt Building, Carleton

University, 1125 Colonel By Drive, Ottawa, Ontario, K1S 5B6, Canada. E-mail: trobb@connect.carleton.ca

4991. Rouquette, J.R.; Thompson, D.J. (2005): Habitat associations of the endangered damselfly, *Coenagrion mercuriale*, in a water meadow ditch system in southern England. *Biological Conservation* 123(2): 225-235. (in English). ["[...] We obtained estimates of density of mature adult *C. mercuriale* during an intensive mark-release-recapture study over 7.65 km of a water meadow ditch network in the Itchen Valley, Hampshire. Detailed habitat information was also collected, including a variety of physical variables, and data about the in-channel and bankside vegetation. *C. mercuriale* density and movement were analysed in relation to habitat variables and local population size using Generalized Linear Models. Mean adjacent population density was the single most important factor determining density. However the species was also associated with a number of habitat features, the most important of which were: a channel substrate consisting primarily of silt, wide underwater ledges (berms), in-channel emergent dicots, and bankside monocots. The presence of trees was negatively associated with damselfly density. Mean net lifetime movement was greatest from sections with low density, with smaller than average berms, and with deeper water. The causes and consequences of these findings are discussed in relation to the conservation and management of this rare species." (Author)] Address: Rouquette, J.R., The Biosciences Build., School of Biological Sciences, University of Liverpool, Crown Street, Liverpool L69 7ZB, UK. E-mail: jimrouquette@hotmail.com

4992. Ruffini, I. (2005): Donnersberg. *Pollichia-Kurier* 21(1): 26. (in German). [Brief amateur report from a tripp in the Donnersberg region, Rheinland-Pfalz, Germany with emphasis on *Aeshna affinis* and *Sympetma fusca*.] Address: not stated

4993. Savage, A.A.; Broomfield, L.C.; Whittington, R.M. (2005): Changes in the littoral macroinvertebrate assemblages of Oak Mere from 1980 to 1998. *Journal of Natural History* 39(17): 1307-1326. (in English) ["Data on the macroinvertebrate assemblages of Oak Mere, England are presented for the period 1980 to 1998. There was a marked fall in species richness and numbers of individuals associated with a fall in surface level. Correlations between surface level, areas of vegetation and aspects of the macroinvertebrate assemblages are demonstrated." (Authors) The paper includes some data on Odonata.] Address: Savage, A.A., School of Life Sciences, Keele University, Staffordshire, UK

4994. Suhling, F.; Sahlén, G.; Kasperski, J.; Gaedecke, D. (2005): Behavioural and life history traits in temporary and perennial waters: comparisons among three pairs of sibling dragonfly species. *Oikos* 108: 609-617. (in English). ["Identifying and examining traits that influence the distribution of species is crucial to the understanding of community structure. Theory predicts that traits should differ between species that live in temporary and permanent waters because of differing major environmental variables; viz drying out and predator presence, respectively. Species, however, will also be influenced by their evolutionary history, i.e. by the traits of their common ancestors. We studied differences in life history and behaviour traits in a series of laboratory experiments using pairs of dragonfly species out of

three genera of Namibian Libellulidae with one species from each type of habitat. As predicted, growth rates were significantly higher in the temporary water species compared to the permanent water species. Activity and foraging, in contrast, differed between the genera, but did not differ between the habitat types. Hence, our study implies that the behavioural traits are influenced by phylogenetic inertia rather than by the habitat variables, while growth rate is adapted to the habitat. We argue that in all three genera one species has diverged recently from a sister species that lives in the original habitat of the genus, which may be temporary waters in *Crocothemis* and in *Orthetrum*, and permanent waters in *Trithemis*. The behavioural traits may therefore be less well adapted. Rapid growth may be the more relevant trait because it is crucial to survival in temporary waters." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

4995. Tarboton, W.; Taboton, M. (2005): A fieldguide to the Damselflies of South Africa. 96 pp. (in English). [This excellent book is a companion volume to the dragonfly fieldguide which was published in 2002. It covers the 67 damselfly species found in South Africa.] Address: Tarboton, W., P.O. Box 327, Modimolle 0510, South Africa. E-mail: wtarbotn@iafrica.com

4996. Teplitsky, C.; Plenet, S.; Lena, J.-P.; Mermet, N.; Malet, E.; Joly, P. (2005): Escape behaviour and ultimate causes of specific induced defences in an anuran tadpole. *Journal of Evolutionary Biology* 18(1): 180-190. (in English). ["Induced defences, such as the predator avoidance morphologies in amphibians, result from spatial or temporal variability in predation risk. One important component of this variability should be the difference in hunting strategies between predators. However, little is known about how specific and effective induced defences are to different types of predators. We analysed the impact of both pursuing (fish, *Gasterosteus aculeatus*) and sit-and-wait (dragonfly, *Aeshna cyanea*) predators on tadpole (*Rana dalmatina*) morphology and performance (viz locomotive performance and growth rate). We also investigated the potential benefits of the predator-induced phenotype in the presence of fish predators. Both predators induced deeper tail fins in tadpoles exposed to threat of predation, and stickleback presence also induced longer tails and deeper tail muscles. Morphological and behavioural differences resulted in better escape ability of stickleback-induced tadpoles, leading to improved survival in the face of stickleback predation. These results clearly indicate that specific morphological responses to different types of predators have evolved in *R. dalmatina*. The specific morphologies suggest low correlations between the traits involved in the defence. Independence of traits allows prey species to fine-tune their response according to current predation risk, so that the benefit of the defence can be maximal." (Authors)] Address: Teplitsky, C., Dept Populat Biol, Evolutionary Biol Ctr, Norbyvagen 18D, SE-75236, Uppsala, Sweden. E-mail: celine.teplitsky@ebc.uu

4997. The IUCN Species Survival Commission (Compiler: W. Darwall, K. Smith, T. Lowe & J.-C. Vié) (2005): The Status and Distribution of Freshwater Biodiversity in Eastern Africa. Occasional Paper of the IUCN Species Survival Commission 31: 36 pp. (in English).

[Chap. 2.1.3 (page 9) is directed to the Odonata]: www.iucn.org/themes/ssc/pubs/pubs/EastAfricalowres.pdf

4998. Tuno, N.; Okeka, W.; Minakawa, N.; Takagi, M.; Guiyun, Y. (2005): Survivorship of *Anopheles gambiae sensu stricto* (Diptera: Culicidae) larvae in western Kenya highland forest. *J. Med. Entomol.* 42(3): 270-277. (in English). ["The western Kenya highland has been experiencing dramatic landuse changes in the past three decades. Landuse change has been hypothesized to be one of the mechanisms for malaria epidemics in African highlands because it can alter the physical and chemical characteristics of mosquito breeding habitats. One important landuse change in western Kenya highland is deforestation. The current study examined the effects of forestation or deforestation on the survivorship of *Anopheles gambiae* larvae and colonization of other aquatic insects in larval habitats in Kakamega forest (elevation 1,500 - 1,700 m above sea level), western Kenya. We found that the survivorship of *An. gambiae* larvae was reduced from 55 to 57% in habitats fully exposed to sunlight (open habitats) to 1 - 2% in habitats with full forest canopy coverage (forest habitats) and partial canopy coverage (forest edge habitats) in two out of three trials. The average daily water temperature of the open habitats was app. 3 - 3.4 C higher than the forest habitats. Insect species in the orders of Diptera, Coleoptera, and Odonata colonized the larval habitats, but the three habitat types differed greatly in the animal assemblage. Canonical correspondence analysis found that water temperature and amount of leaf litter were the significant variables associated with animal assemblages. Redundancy analysis revealed that openness and the presence of predatory animals were significantly related to *An. gambiae* survivorship. This result suggests that deforestation facilitates the survival of the immature stage of *An. gambiae* in the highland." (Authors)] Address: Tuno, N., Tropical Medicine, Nagasaki University, Nagasaki 852-8523, Japan

4999. Uhía, E.; Cordero Rivera, A. (2005): Male damselflies detect female mating status: importance for postcopulatory sexual selection. *Animal Behaviour* 69 (4): 797-804. (in English). ["The existence of postcopulatory sexual selection is now clearly established in many animal species. In Odonates, males remove sperm during copulation from the bursa copulatrix and (when physically accessible) from the spermatheca. We used these model organisms to test the relative importance of sperm competition and cryptic female choice for copulation duration in laboratory experiments. If long copulations evolved only because of sperm competition, males should prolong copulation with previously mated females, and use this extra time to remove/displace the stored sperm. In species without a spermatheca (or when it is physically inaccessible), copulation duration should be similar in mated and virgin females. The cryptic female choice hypothesis predicts that copulations should be prolonged (acting as copulatory courtship) when males cannot physically remove sperm from the spermatheca but not if females do not have a spermatheca. We found that male damselflies can detect the mating status of females probably using chemical sensilla in their genitalia. Copulation duration with mated females was almost twice as long as with virgins in species with a spermatheca, but this behaviour was probably not the result of sperm competition, because in our model species, males could not remove sperm from this organ. The duration of copulation did not inc-

rease in species without a spermatheca. We conclude that even in odonates, where sperm removal is widespread, females have retained control over sperm reserves in their spermatheca(e), and males prolong copulation with mated females to elicit rival sperm ejection and/or to induce females to use their sperm in fertilization." (Authors)] Address: Cordero Rivera, A., Depart. de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

5000. Van de Meutter, F.; Stoks, R.; De Meester, L. (2005): Spatial avoidance of littoral and pelagic invertebrate predators by *Daphnia*. *Oecologia* 142: 489-499. (in English). ["Studies on spatial avoidance behaviour of predators by prey often ignored the fact that prey typically face multiple predators which themselves interact and show a spatial pattern in abundance and predation rates (PRs). In a series of laboratory experiments, we investigated predation risk (PRI) and horizontal migration of the cladoceran *Daphnia magna* between open water and vegetation in response to two important invertebrate predators with a contrasting spatial distribution: pelagic *Chaoborus* and vegetation-associated *Ischnura*. As expected, PRI by *Chaoborus* was higher in open water due to higher numbers and higher PRs of *Chaoborus*, while for *Ischnura*, PRI was highest in the vegetation due to higher densities, despite lower PRs of *Ischnura*. In accordance with this, *Daphnia* moved into the vegetation in the presence of the pelagic *Chaoborus* alone. In the presence of *Ischnura* alone, however, *Daphnia* showed no response. We hypothesize this may be the result of a constitutive behaviour of *Daphnia* to avoid pelagic fish, which impedes a response to the open water. In the combined predator treatment, *Daphnia* migrated to the open water zone. The increased risk of predation in the vegetation, due to a facilitating effect of *Chaoborus* on *Ischnura* PRs is believed to have caused this migration of the *Daphnia*. This response of *Daphnia* declined through time and *Daphnia* moved toward the vegetation. A decline in the activity of the *Ischnura* larvae through time may have switched the risk balance in favour of the vegetation environment." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5001. Wallaschek, M. (2005): Beiträge zur Insektenfauna der Altmark: 4.1 Libellen (Odonata). *Entomol. Mitt. Sachsen-Anhalt* 13(1): 7-10. (in German). [Germany, Sachsen-Anhalt, 3 water bodies between Schwiesau and Zichtau; a total of 15 odonate species was recorded in 2004.] Address: Wallaschek, M., Agnes-Gosche-Str. 43, D-06120 Halle (Saale), Germany

5002. Ward, L.; Mill, P.J. (2005): Habitat factors influencing the presence of adult *Calopteryx splendens* (Odonata: Zygoptera). *European Journal of Entomology* 102(1): 47-51. (in English). ["1. In Great Britain the distribution of the riverine damselfly *C. splendens* is predominantly southern. However, the last decade has seen records of the species in previously unoccupied areas in the northeast of England, prompting speculation regarding northward range expansion. The current study is the first to quantify the physical features of the habitat that influence the presence of *C. splendens*. 2. A field survey was carried out on the physical characteristics of habitat supporting *C. splendens* along a secti-

on of the River Wharfe, West Yorkshire, U.K. Adult *C. splendens* were marked uniquely for individual identification in order to assess the occurrence of the species within different habitat patches of the study area. 3. A multiple logistic regression was used to identify the significant habitat variables in explaining the occurrence of adult *C. splendens*. 4. The most important habitat factor in determining the presence of *C. splendens* was the height of the vegetation at the edge of the river. Significant negative relationships were found between the presence of *C. splendens* and tree coverage along the bank, and between its presence and increased bank height. 5. The distribution of *C. splendens* is affected by the natural physical features of the habitat, anthropogenic disturbance and the behaviour of the species itself. 6. The importance of quantitative habitat data in species conservation, particularly with regard to range expansion, is discussed." (Authors)] Address: Mill, P., School of Biol., L.C. Miall Building, Univ. Leeds, Leeds, LS2 9JT, UK. E-mail: p.j.mill@leeds.ac.uk

5003. Wendzonka, J. (2005): Klucz do oznaczania dorosłych wazek (Odonata) Polski. Odonatrix 1, Suppl. 1: 1-26. (in Polish, with English summary). ["Identification key to the imagines of Polish dragonflies (Odonata). - The present study is a part of the project "The Atlas of distribution of dragonflies (Odonata) in Poland". It contains a key for the identification of 75 dragonfly species of which 72 ones were recorded from the area of Poland. *Coenagrion mercuriale* and *Gomphus pulchellus* were mistakenly recorded in Poland in the past, however, together with *Lestes macrostigma* they are really possible to find. Thanks to the simple structure of the key, as well as the right selection of features and notations, it is easy to use for people without experience in this field. This publication is first of all directed to them." (Author)] Address: Wendzonka, J., ul. Palacza 18B/326,60-241 Poznań, Poland. E-mail: wendzonka@wp.pl

5004. Wildermuth, H. (2005): Dragonflies of the mont Ventoux region, Provence, France (Odonata). Opusc. zool. flumin. 220: 1-12. (in English). ["An annotated list of 32 species is presented, comprising records of adults, exuviae or larvae, made in July 2000 and 2003 and in June 2004 at 16 localities in a 600 km² area N of Mont Ventoux. The dragonfly fauna of this mountainous region, characterized by large forests, vineyards and other agricultural land, comprises chiefly spp. of running waters: Along with *Onychogomphus forcipatus*, *O. uncatatus*, and *Cordulegaster boltonii*, which all develop in the few source-fed brooks and permanent rivers, *Boyeria irene* is of major importance. Most species typical for stagnant water bodies, such as *Enallagma cyathigerum*, *Anax imperator*, and *Crocothemis erythraea*, breed in a single large fish pond used for angling. *Ceragrion tenellum*, *Libellula fulva*, and *Sympetrum pedemontanum* are of special interest for this region, where stagnant waters are mostly present as man-made irrigation tanks and small reservoirs that are scattered over the area." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

5005. Wildermuth, H.; Gonseth, Y.; Maibach, A. (Hrsg) (2005): Odonata. Die Libellen der Schweiz. Fauna Helvetica 12. ISBN 2-88414-024-7: 398 pp. (in German). [This is a sophisticated and very well balanced book on the Swiss odonate fauna, which treats 84 spe-

cies and discusses additional taxa. It is a tribute to the famous Swiss artist and odonatogogist Paul André Robert, who's unpublished wonderful and detailed paintings of dragonflies are used for illustration (species, not painted by Robert are added using painting from Askew's book on the European Odonata). A brief and very readable introduction into the biology of Odonata is followed by brief characterisations of the habitats. A focus is set on the distribution of the species, which are mapped, and the turn over of species distribution. All species are treated in a monographic way highlighting the general and Swiss distribution, development of populations, emergence and phenology, habitats of imagines and larvae, threat, and conservation measures. The book is closed by an extensive odonatalogical bibliography and the list of contributors. A French edition of the book is also available. This book is a must in every odonatalogical library, even if you don't read German or French. (Martin Schorr)] Address: orders (CHF 60.-): CSCF, Terraux 14, CH-2000 Neuchâtel, Switzerland. www.cscf.ch; or: info@collection-robert.ch

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5006. Baker, R.L.; Smith, B.P. (1997): Conflict between antipredator and antiparasite behaviour in larval damselflies. *Oecologia* 109: 622-628. (in English). ["Larval damselflies resist infestation by parasitic larval mites by exhibiting behaviours such as grooming, crawling, swimming, and striking at host-seeking mites. Larval damselflies are known to increase time spent in these behaviours in the presence of mites but reduce time spent in these behaviours in the presence of fish predators. The presence of both fish and larval mites presents an obvious conflict: a larval damselfly may actively avoid parasitism by mites, thus increasing its risk of predation, or it may reduce its activity when fish are present, thus increasing its risk of parasitism. We analysed the behaviour of larval *Ischnura verticalis* in an experiment where we crossed presence and absence of fish with presence and absence of larval mites. Presence of mites induced a large increase in activity of larval *I. verticalis* but fish had no effect and there were no interpretable interactions between effects of mites and fish. Subsequent experiments indicated that larval *I. verticalis* in the presence of both mites and fish were more likely to be attacked and killed by fish than those exposed only to fish. The high activity level of *I. verticalis* larvae in the presence of both fish and mites may suggest that costs of parasitism are high, or that under field conditions it is rare for larvae to be in the immediate presence of both fish predators and potentially parasitic mites." (Authors)] Address: Baker, R.L., Dept Zool., Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6, Canada. e-mail: rbaker@credit.erin.utoronto.ca

5007. Grether, G.F. (1997): Survival cost of an intersexually selected ornament in a damselfly. *Proc. R. Soc. London (B)* 264: 207-210. (in English). ["Ornaments could evolve as honest indicators of fighting ability, provided they have costs that make deceptive signalling unprofitable. I tested for such costs by manipulating the size of the intrasexually selected wing spots of male *Hetaerina americana* and monitoring survival in the field. Males with enlarged spots had higher mortality rates than both unmanipulated and sham-manipulated controls. Natural wing spot size correlated positively with longevity, which suggests that higher quality males

develop larger spots." (Author) Available at: <http://www.eeb.ucla.edu/Faculty/Grether/PDF/Grether1997.pdf>
Address: Grether, G.F., Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara, CA 93106, USA. E-mail: lifesci.lscf.ucsb.edu

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5010. Menzel, P.; D'Aluisio, F. (1998): Man eating bugs: the art and science of eating insects. ISBN 1-58008-022-7: 192 pp. (in English). [One chapter of this fascinating book is directed to the catching and preparing as human food of dragonflies on Bali, Indonesia.]

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Meeting Street, Charleston, SC 29403; E-mail: grackler@aol.com

5012. Spencer, N.J.; Thomas, B.W.; Mason, R.F.; Dugdale, J.S. (1998): Diet and life history variation in the sympatric lizards *Oligosoma nigriplantare polychroma* and *Oligosoma lineocellatum*. *New Zealand Journal of Zoology* 25: 457-463. (in English). [Dietary preferences in the sympatric lizards *O. n. polychroma* (n= 140) and *O. lineocellatum* (n= 153) were analyzed by stomach check. There were some differences in diet, although both species consumed a wide range of prey, including Odonata. Odonata are of minor importance as prey for both lizard taxa; in app. 1% of stomachs dragonflies are represented.] Address: Spencer, N.J., Landcare Research, Private Bag 1930, Dunedin, New Zealand. E-mail: spencern@landcare.cri.nz.

1999

5013. Dickerson, D.D.; Reine, K.J.; Herrmann, K.L. (1999): Wetland turtle habitats potentially impacted by USACE reservoir operations. Technical Note EMRRP-SI-04, U.S. Army Engineer Research and Development Center, Vicksburg MS. 12 pp. (in English). [The species data sheets contain notes on Odonata as prey of two of the turtle species.] Address: Available at: <http://el.erdc.usace.army.mil/elpubs/pdf/si04.pdf>

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5015. Zivic, I.; Markovic, Z.; Brajkovic, M. (1999): A contribution to the knowledge of Odonata (Insecta: Odonata) larvae of the Pusta Reka River. *Acta entomologica serbica* 4 (1/2): 1-10. ["Over the period 1998-1999 limnological investigations of macrozoobenthos of the Pusta Reka River, the left tributary of the South Morava River, were done with special emphasis to Odonata larvae. Out of 11 localities throughout investigated river Odonata larvae were found in 7 localities of pebble-stony and muddy bottom. Dragonflies occur in the zoobenthos of the Pusta Reka River with five species (*Calopteryx splendens* Harris 1782, *Ophiogomphus cecilia*

Fourcroy 1785, *Onychogomphus forcipatus* Linne 1758, *Gomphus vulgatissimus* Linne, *Cordulegaster boltonii* Donovan 1807). The most frequent (8.04% in the whole sample) and the most numerous species was *Ophiogomphus cecilia*." (Authors)] Address: Zivic, I., Faculty of Biology, University of Belgrade, Studentski trg 16, YU-11000 Belgrade, Serbia

2000

5016. Kalbfus, W.; Kopf, W.; Seitz, G.; Butz, L. (2000): Report on the investigations of the rivers Szamos and Theiß (Hungary) after the cyanide accident. Instructed by the Bavarian State Ministry for Regional Development and Environmental Affairs. www.bayern.de/LFW/aktuelles/neuesausdemlfw/ungarn/UngarnBerichtenglisch3.pdf: 14 pp. (in English, with German summary). ["The accident on 30th of January 2000 in the AURUL goldmine near Baia Mare (Romania) caused an extraordinary decrease of the fish-fauna in the Hungarian rivers Szamos and Tisza accompanied by high economic losses. It is, however, not an easy task to assess the ecological dimension of environmental damage. The first impression implied that all life in the rivers has been extinguished by cyanide, which is extremely toxic. However about 1 month after the disaster this hypothesis could not be confirmed by the Bavarian expert group. The zoological investigation of the underwater fauna revealed living macro- and microorganisms, which were typical for these river sites. It can be assumed that these organisms survived the pollution and did not re-populate the river bottom from tributaries. The conditions of oxygen-saturation in the river Tisza indicate the existence of physiologically active phytoplankton. The water samples and the sediments of river Szamos and river Tisza had a specific ecotoxic potential. No acute toxic effect to bacteria, algae and the crustacean *Daphnia* (zooplankton, fish-fodder) could be detected. However the growth of macrophyte was proved to be strongly inhibited by the samples originated from river Szamos. The concentration of heavy metals in the water samples as well as in the sediments indicate a contamination at high to at least very high concentrations in the river Szamos, which had an effect on the downstream river Tisza. Residues of cyanides could not be detected. The analysis of some persistent organic chemicals in the sediment indicates, that Szamos and Tisza are not polluted by these substances." (Authors) The study includes notes on Odonata.] Address: Bayer. Landesamt für Wasserwirtschaft, Kaulbachstr. 37, D-80539 München, Germany

5017. Lemly, A.D.; King, R.S. (2000): An insect-bacteria bioindicator for assessing detrimental nutrient enrichment in wetlands. *Wetlands* 20(1): 91-100. (in English). ["Field and laboratory studies were conducted to evaluate the use of bacterial growth on aquatic insects as a metric for determining the existence of nutrient impacts in wetlands. Results from field investigations indicated that elevated concentrations of nitrate and phosphate were associated with growth of filamentous bacteria on insect body surfaces and that there were significantly fewer mayflies (Ephemeroptera) in the nutrient-enriched wetland. Laboratory investigations confirmed a strong linkage between bacterial growth and reduced survival of mayflies. Survival was examined for individuals with bacterial infestation ranging

from 0% to 60% body coverage. A threshold for catastrophic mortality was present at about the 25% level of coverage; there were very few survivors above that level. Based on these findings, the diagnostic endpoint for the bioindicator is 25% body coverage by bacterial growth, a level that signifies major differences in insect populations in the field and is also easy to detect visually. This study provides evidence that the insect-bacteria bioindicator is a reliable tool for assessing nutrient impacts on wetland macroinvertebrate communities. The bioindicator could be useful in the development of a Wetland Bioassessment Protocol." (Authors) Bacterial growth on Odonata is documented in table 1. Available from www.trout.forprod.vt.edu/fishpubs/lemly2000_04.pdf] Address: Lemly, A.D., United States Forest Service, Southern Research Station, Coldwater Fisheries Research Unit, Department of Fisheries and Wildlife Sciences, Virginia Tech University, Blacksburg, Virginia, USA 24061-0321

5018. Nikoh, N.; Fukatsu, T. (2000): Interkingdom host jumping underground: Phylogenetic analysis of entomoparasitic fungi of the genus *Cordyceps*. *Mol. Biol. Evol.* 17(4): 629-638. (in English). ["Most members of the ascomycetous genus *Cordyceps* are endoparasitic fungi of insects and other arthropods, but about 20 of the 300 described species are parasitic to hart's truffles, *Elaphomyces* spp. In order to understand the evolution of host specificity and the process of interkingdom host jumping in *Cordyceps*, we investigated the phylogenetic relationships of 22 representatives, including 4 truffle parasites and 18 insect parasites, based on nuclear and mitochondrial rDNA sequences. Five monophyletic groups were identified in both nuclear and mitochondrial phylogenies. In three of the five clades, the members utilized hosts from the same insect group, suggesting that the endoparasite-host connections have been conserved to some extent. On the other hand, it was also shown that major host shifts between distantly related insects must have occurred repeatedly. Notably, phylogenetic analyses strongly suggested that parasites of hart s truffles originated from parasites of cicada nymphs during the evolution of the *Cordyceps*. The common habitats of cicada nymphs and hart s truffles, deep underground and associated with tree roots, suggest that the interkingdom host jumping from Animalia to Fungi might have been promoted by the overlapping ecological niche of the unrelated hosts. This finding provides an impressive case of a drastic host shift in favor of the host habitat hypothesis." (Author) The paper has a passing reference to the Odonata.] Address: Fukatsu, T., National Institute of Bioscience and Human-Technology, Agency of Industrial Science and Technology, Tsukuba, 305-8566, Japan. E-mail: fukatsu@nibh.go.jp

5019. Soldan, T. (2000): Book review: Gorb, S. (1998): Functional morphology of the head arrester system in Odonata. *Zoologica* 148; ISBN 3-510-55035-8. *European Journal of Entomology* 97: 46. (in English). [extensive review of the book.] Address: Soldan, T., Institute of Entomology, Academy of Sciences of the Czech Republic, Branisovska 31, CZ-370 05, Ceske Budejovice Czech Republic

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5021. Bauhus, S. (2001): Vorkommen und Status der mediterranen Libellenarten *Aeshna affinis* Vander Linden und *Crocothemis erythraea* (Brullé) in Westfalen (Odonata). *Natur und Heimat* 61(3): 73-82. (in German). [Records of both species in Nordrhein-Westfalen, Germany are compiled and critically discussed in detail. Some emphasis is given to global warming as trigger for range extensions and the role of floodplains as dispersal corridor on the regional scale.] Address: Bauhus, S., Hansaplatz 9, D-48155 Münster, Germany. E-mail: bauhus.bloecher@t-online.de

5022. Felipe-Bauer, M.L.; de Oliveira, S.J. (2001): Lista dos Exemplares Tipos de Ceratopogonidae (Diptera, Nematocera) Depositados na Coleção Entomológica do Instituto Oswaldo Cruz, Rio de Janeiro, Brasil. *Mem. Inst. Oswaldo Cruz, Rio de Janeiro* 96(8): 1109-1119. ["List of the Type Species of Ceratopogonidae (Diptera, Nematocera) Deposited in the Entomological Collection of Instituto Oswaldo Cruz, Rio de Janeiro, Brazil. A list of all type specimens of the Family Ceratopogonidae, present in the Entomological Collection of Instituto Oswaldo Cruz, Rio de Janeiro, RJ, Brazil is presented. This list includes the genera *Bahiahelea*, *Culicoides*, *Dasyhelea*, *Downshelea*, *Forcipomyia*, *Leptoconops*, *Mallochohelea*, *Monohhelea*, *Neobezzia*, *Palpomyia* and *Sphaerohelea*." (Authors) *Pterobosca macfie* Costa Lima 1937 is host of Odonata.] Address: Felipe-Bauer, M.L., Laboratório de Díptera Coleção Entomológica, Departamento de Entomologia, Instituto Oswaldo Cruz-Fiocruz, Av. Brasil 4365, 21045-900, Rio de Janeiro, RJ, Brasil

5023. Garcia, M.A.; Diez, C.E.; Alvarez, A.O. (2001): The impact of Feral Cats on Mona Island wildlife and recommendations for their control. *Caribbean Journal of Science* 37(1-2): 107-108. (in English). [Puerto Rico; cats prey also on Odonata. Available at: <http://caribjsci.org/epub1/nota.pdf>] Address: Garcia, M.A., Bureau of Fisheries and Wildlife, Department of Natural and Environmental Resources P.O. Box 9066600, San Juan PR 00906-6600

5024. Greeney, H.F. (2001): The insects of plant-held waters: a review and bibliography. *Journal of Tropical Ecology* 17: 241-260. (in English). ["Phytotelmata habitats have been the focus of much research and are utilized by a wide variety of taxa. In the past 15 years numerous studies in many geographic regions and covering various types of phytotelmata have greatly increased our understanding of these unique habitats. The most recent summary of phytotelmata inhabitants included over 20 families of insects. A review of the literature and extensive work in lowland Ecuador shows the family level diversity is in fact at least twice that reported earlier. A reassessment of previous phytotelmata classification schemes, as well as an extensive bibli-

ography, is provided." (Author) The compilation includes the Odonata too.] Address: Greeney, H.F., Dept of Entomology, University of Arizona, Tucson, Arizona 85721, USA

5025. Hartung, M. (2001): Zur Zoogeographie der Odonata von Neuguinea. *Phylodrom-Journal* 1: 63-69. (in German, with English summary). [A more general introduction to the odonate fauna of New Guinea.] Address: Hartung, M., Wehnerstr. 20a, 12277 Berlin, Germany. E-mail: aeh.matthias.hartung@t-online.de

5026. Jessat, M. (Koord.) (2001): Entomologische Besonderheiten der Bergbaufolgefläche "Phönix Nord" im Altenburger Land (Odonata, Orthoptera, Hymenoptera, Coleoptera, Neuroptera, Lepidoptera, Diptera). *Mitt. Thür. Entomologenverband* 8(2): 48-57. (in German, with brief English summary). [Thuringia, Germany; *Anax parthenope*, *Anaciaeschna isoceles*, and *Sympetrum pedemontanum* are listed and discussed.] Address: Kipping, J., Ringstr. 5/6, D-04600 Altenburg, Germany. E-mail: jenskippping@hotmail.com

5027. Jordan, S.D. (2001): Molecular Systematics and Phylogeography of Hawaii's Megalagrion damselflies. Ph.D. University of Connecticut. Advisor: Dr. Chris Simon: 108 pp. (in English). [I have used mitochondrial and nuclear DNA sequence data to explore the phylogenetic relationships of species in Hawaii's marvelous Megalagrion damselfly radiation. These damselflies occupy a wide diversity of habitats. Results indicated that Megalagrion species relationships agree with some hypotheses of previous workers. In particular the monophyly of several species groups was supported by the molecular data, and traditional taxonomy appears to be adequate. However, molecular data also contradicted and clarified the established notions in several key ways. First, two sequential bursts of evolution may have been responsible for the some of the remarkable ecological diversity in the genus. Analysis of mitochondrial DNA under a local molecular clock suggested that these rapid speciation events coincided with the emerging availability of suitable habitats on Kauai and Oahu. Second, the traditional problematic phylogenetic placement of several species is probably due to the rapid pace of the radiation that produced these species, leaving few informative characters on key internal branches. The phylogeography of the species *M. xanthomelas* and *M. pacificum* was explored using mitochondrial sequence data from 157 individual damselflies. I sought to understand the demographic and historical processes responsible for the current distribution of genetic variation in these two species, and found that current patterns of female genetic diversity correspond to Pleistocene island connections. Finally, I evaluated the usefulness of three different methods for performing Nested Clade Analysis (NCA), with reference to real and theoretical examples. Data from Hawaiian damselflies indicate that Method 2 NCA is susceptible to problems when population sample sizes are small or unbalanced, and when hypothesized population boundaries vary." (Author) For more details see: <http://www.lib.umi.com/dissertations/preview/3034016>] Address: Jordan, S.D., Dept of Biol., Bucknell Univ., Lewisburg, PA 17837 USA. E-mail. sjordan@bucknell.edu, <http://www.facstaff.bucknell.edu/sdjordan/jordan.html>

5028. László, F.; Csányi, B.; Literáthy, P. (2001): Cyanide and heavy metal accidental pollution in the

Tisza River basin: Consequences on water quality monitoring and assessment. *Proceeding MTM-III - Accidental pollution in the Tisza River Basin: 65-70.* (in English). ["An accidental industrial spill of high cyanide concentration, originating - due to dike failure from a storage pond of a mining company in Baia Mare (Romania) caused disastrous pollution on 30 January 2000. The total volume of the accidental spill was approximately 100 000 m³ containing around 100 tons of cyanide. [...] On the 10th of March 2000 another serious accident occurred in the upper Tisza region in Romania. Bursting the dike of a storage pond caused the discharge of 20 000 tons of ore slurry containing high concentration of lead, copper and zinc. [...] Since the cyanide pollution has passed the Hungarian part of the river Tisza, we have found live specimens of all macro-invertebrate taxa recorded previously in the given sections. These results so far show that some of the macro-invertebrate fauna of the river Szamos and Tisza has survived the cyanide pollution. Characteristic surviving species include [...] larvae of river Odonata species (*Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Stylurus flavipes*, *Platycnemis pennipes*, *Calopteryx splendens*) [...].] Address: László, F., Water Resources Research Centre Plc. (VITUKI), H-1095 Budapest, Kvaszay J. út 1., Hungary

5029. Legrand, J. (2001): *Ordre des odonates*. In: J.-M. Elouard & F.-M. Gibon. [Eds], *Biodiversité et biotypologie des eaux commentées de Madagascar*. Inst. Rech. Develop, [etc.], Paris. ISBN none: 113-130. (in French). [This is a comprehensive review of the odonate fauna of Madagascar, including concise chapters on morphology and biology, a regional bibliography, and a checklist of the hitherto known species of Madagascar, Seychelles, Mauritius, Comores, Reunion, and Rodrigues.] Address: Legrand, J., 10, rue du Chemin de fer, F-94110 Arcueil, France

5030. Okudaira, M.; Sugimura, M.; Ishida, S.; Kojima, K.; Aoki, T. (2001): *Dragonflies of the Japanese Archipelago in Color*. Hokkaido University Press. ISBN 4-8329-0292-X: xxxvi, 641pp. (in English). [This is a fully colour-illustrated catalogue of the 197 Japanese Odonata including adults and early stages. The species are illustrated on 310 colour plates (true-to-life coloration) with specimens (contrasting photographs of male/female, teneral/mature, seasonal, and exceptional forms) and even hybrids, 42 plates of colour photos (habitats, behaviour of species), 33 pages of line drawings of the larvae, and text figures. The identification facilitated by a key and each species is treated in a monographic way: scientifique name, Japanese name, bibliographic note of the original description, description of the adult, description of the larva, distribution.] Address: Hokkaido University Press. Sapporo. Japan

5031. Pringle, L.; Marstall, B. (2001): *A Dragon in the Sky*. Orchard Books. New York. ISBN: 0531303152: 64 pp. (in English). [Pringle's "A Dragon in the Sky" is aimed at the young teen-ager, and is designed to explain the life of a typical dragonfly. The book is carefully researched and detailed in text and art. The reader follows one individual of green darner, *Anax*, from his birth in a swamp in New York to mating and death in a Florida pond. Specific incidents in his life are augmented with more general information about dragonflies and damselflies. Sidebars give facts about other creatures that share his habitats. Information on raising dragonfly

nymphs for study is added, and several web sites are suggested for further information. In Marshall's watercolor-and-oil paintings, soft greens and browns predominate.] Address: Orchard Books, 95 Madison Av., New York, NY 10016

5032. Salmoiraghi, G.; Gumiero, B.; Pasteris, A.; Prato, S.; Bonacina, C.; Bonomi, G. (2001): Breakdown rates and macroinvertebrate colonisation of alder (*Alnus glutinosa*) leaves in an acid lake (Lake Orta, N Italy), before, during and after a liming intervention. *J. Limnol.* 60(1): 127-133. (in English). [The effectiveness of the liming intervention on Lake Orta, the speed of leaves decay and of colonisation processes by macrobenthonic fauna were studied on alder leaves (*A. glutinosa*) placed on the bottom of the lake and recovered after appropriate time intervals. Experiments were performed at two sites (North and South) and two depths (-3 and 18 m), during three successive winters: 1988-1989 (pre-liming), 1989-1990 (liming), 1990-1991 (post-liming). Two main results emerged: 1) alder leaves, which are known to have a medium to high decaying speed in a number of aquatic environments, behave in Lake Orta as a low speed species. Decaying processes in the three years are significantly different only in station N3, where the mean breakdown rate in 1988-1989 is more than twice that measured in the two subsequent winters. 2) The species richness of colonising benthic fauna is low: the community is made up almost exclusively of Chironomidae, which form 70 to 100% of the whole population; among them, the genus *Phenopsectra* is always present, while *Tanytarsus* was collected only during the first year and in the less deep sampling sites. The mean population abundances were higher before liming." (Authors) The list of taxa includes "Coenagion sp.".] Address: Dipartimento di Biologia Evoluzionistica Sperimentale, Università degli Studi di Bologna, Via Selmi 3, 40126 Bologna, Italy. E-mail: salmo@ambra.unibo.it

2002

5033. Anonymus (2002): Ausstellungen: "Libellen - Faszination in Form & Farbe", fotografiert von Jens Kaiser, Gotha. Mitt. Thür. Entomologenverband 9(1): 26. (in German). [Announcement of an exhibition of dragonfly photographs in Gotha, Thuringia, Germany, 13. April - 30 June 2002.] Address: not stated

5034. Baumgartner, H. (2002): Les marais et leur protection en Suisse. Office fédéral de l'environnement, des forêts et du paysage (OFEFP) (Ed.), : 68 pp. (in Italian, French, German). [This is a lavishly illustrated handbook on the bog and mires in Switzerland with information on Odonata too. Available in Italian, French or German language: <http://www.umwelt-schweiz.ch/buwal/shop/files/pdf/phphH7pBM.pdf>] Address: Distribution: OFCL/BBL, CH-3003 Berne, Switzerland. E-Mail: verkauf.zivil@bbl.admin.ch.

5035. Berger, C. (2002): Attracting aerial acrobats to your yard - attracting dragonflies. *National Wildlife* 40(3). (in English). [For the full paper see: <http://www.nwf.org/nationalwildlife/article.cfm?issueID=42&articleID=478>]

5036. Carletti, B.; Terzani, F. (2002): Nota sul Cordulegaster *trinacriae* (Waterston, 1976) (Insecta, Odonata,

Cordulegasteridae). *Quad. Studi Star. nat. Romagna* 16 (Suppl.): 1-4. (in Italian with English summary). [Abdominal segments 8-10 of adult *C. trinacriae* and *C. b. boltonii* are figured and compared.] Address: Carletti, B., Viale Raffaello Sanzio 5, 1-50124 Firenze, Italy

5037. da Rosa, I.; Canavero, A.; Maneyro, R.; Naya, D.E.; Camargo, A. (2002): Diet of four sympatric anuran species in a temperate environment. *Bol. Soc. Zool., Uruguay* 13: 12-20. (in English with Spanish summary). [The diet of four sympatric anurans species was studied, from October 1998 to November 1999, in a temperate Neotropical environment (Espinass Stream, Maldonado, Uruguay). A total of 387 individuals were collected and their stomach prey content, examined (186 *Physalaemus gracilis*, 88 *Leptodactylus ocellatus*, 96 *Hyla p. pulchella* and 17 *Bufo gr. granulosus*). The main prey items were: coleopterans, spiders and acari for *L. ocellatus*; dipterans, spiders, coleopterans, hemipterans, and acari for *H. p. pulchella*; formicids for *B. gr. granulosus*; and collembolans, acari and formicids for *P. gracilis*. *Leptodactylus ocellatus* and *H. p. pulchella* showed the highest diet amplitude, *P. gracilis* occupied a middle position, and *B. gr. granulosus* presented the lowest diet amplitude value. According to prey items attributes, a Sit-and-wait foraging strategy is proposed for *L. ocellatus* and *H. p. pulchella*, and an active capture strategy for *B. gr. granulosus*. Seasonal analysis indicated that, except for *P. gracilis*, all the other predator species increased their diet richness during the cold season, mainly because each predator included new preys. This result, probably related to seasonal changes in prey availability, may indicate that species trophic behavior change along the year, and so, do not allow to locate a species in fixed place between generalist and specialist extremes." Odonata were captured by *L. ocellatus* and *H. p. pulchella* during the cold season.] Address: da Rosa, Inés, Section Zoología Vertebrados, Facultad de Ciencias, Universidad de la República, I-gua 4225, CP 11400, Montevideo, Uruguay, ines@fcien.edu.uy

5038. Dommangeat, J.-L.; Mashaal, M. (2002): Les libellules d'Outre-mer. *Insectes OPIE* 125(2): 8-10. (in French). [The odonate fauna (expressed as number of species/families) is compiled for the French possessions of Saint-Pierre-et-Miquelon, Guadeloupe & Martinique, Guyane, La Reunion & Mayotte, New Calédonie, Wallis-et-Futuna, Polynésie française, and Tahiti. Available at: http://www.inra.fr/Internet/Hebergement/OPIE-Insectes/pdf/i125_libellules.pdf] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5039. Fellowes, J.R.; Lau, M.W.N.; Dudgeon, D.; Reels, G.T.; Ades, G.W.J.; Carey, G.J.; Chan, B.P.L.; Kendrick, R.C.; Lee K.S.; Leven, M.R.; Wilson, K.D.P.; Yu Y.T. (2002): Wild animals to watch: terrestrial and freshwater fauna of conservation concern in Hong Kong. *Memoirs of the Hong Kong Natural History Society* 25: 123-159. (in English). [For comparable free contents see: <http://www.hku.hk/ecology/bs/pages/html/intro01.html>] Address: Dudgeon, D., Dept Ecology & Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong, China. E-mail: ddudgeon@hkucc.hku.hk]

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sone, NW Italy). *Hydrobiologia* 474: 125-130. (in English). ["Macroinvertebrates continuously redistribute themselves in the riverbed. A knowledge of the colonization mechanisms and movement patterns is very important for an understanding of processes of restoration of lotic environments, particularly of inland waters with severe pollution. We tested the colonization patterns of stream macroinvertebrates in the Visone River, a tributary of the highly contaminated Bormida River (NW Italy). We placed six groups of traps in the riverbed, each group consisting of three traps: the C trap allowed colonization from all directions, while the D and U traps allowed access only from downstream and upstream respectively. The C traps were the most colonized substrates, both in number of individuals and taxa. The U traps were more colonized than the D traps, demonstrating the great importance of movements directed downstream. We report data on taxonomic and seasonal differences in the colonization process." (Authors) Appendix 1 documents the occurrence of Odonata (e.g. *Boyeria irene*, *Cordulegaster boltonii*, *Calopteryx splendens*) in the traps.] Address: Fenoglio, S., University of Eastern Piedmont, Dept. Sciences and Adv. Tech., via Cavour 84, 15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

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5044. Joest, R. (2002): Neue Lebensräume für Libellen. Auswirkungen von Gestaltungsmaßnahmen in Feuchtwiesengebieten und Auenlebensräumen im Kreis Soest auf die Libellenfauna. *ABUinfo* 25/26: 22-33. (in German). [Nordrhein-Westfalen, Germany; detailed presentation of the monitoring results from six localities newly created starting in 1991. A total of 38 species was traced.] Address: not stated

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sity of Massachusetts Boston, USA. E-mail: fred.saintours@umb.edu

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The following translation of Odonata-related issues was made by Naoya Ishizawa: Introduction This report deals with the relation of biomechanics of flying insects, Odonata, Hymenoptera and Diptera to air flows, concentrating our aims on their wing morphology and wing beating based on authors' experience.

Symbols: c: wing span; f: Hz; fi: wing beat frequency; L: body length; l: wing length; m: body mass; P (f): power of components of wing beat frequency; S: wing area; t: time; u, v, w: speed components of each direction of x, y, z; V: three dimensions composite speed; x, y, z: frame of reference.

Devices of experiments and Methods 2.1 Microobservation of wing morphology of insects by a scanning electron microscope and a non-contact three dimensional curved surface measurement 2.2 Measurement of wing beating of insects Thoracic skeleton vibration was measured by an optical displacement detector and FFT analyzer. Wing movement in free flying insects was analyzed on three dimensions by two high-speed video cameras, synchronous device, recorders, motion grabber, monitors and personal computers. The frame of reference of x, y, x and the space of measurement had been set numerically, then insects were released in it and their free flying was analyzed. Wing beat sounds of free flying hymenopteran insects were measured by a noise-meter and frequencies and wave of the signals were analyzed through FFT analyzer. 2.3 Air flows around insects were measured with a wind tunnel (wind speed was available within 0.5-10m/sec.) and three dimensional PIV system. The test section was 200 mm*300mm made of transparent acrylic resin.

Flying organs of insects Fig. 3 shows the cross sections of costae of the forewing of *Sympetrum infuscatum*. The costae at the basal part were developed well in the direction of up and downward, due to that the power operates chiefly up and downward at the basal part in wing beating. The costae so far from the nodus toward the wing tip stick out sharply forward. This is due to the faster wing speed at the tip and decreases air resistance. Thus, costae of dragonflies are most suitable forms for cope with the power that works at each of them. Fig. 4 shows the three dimensions of upper and down side of the wing of *Sympetrum frequens*. The height of the wing surface was larger at the basal part of the wing. Roles of the wave structure of the wing were increase of strength, shock absorber and lowering of fluid resistance. The posterior edge of the wing curve toward underside at the cross section and has a camber, and the characteristic seems to be common among insects. The height difference between the basal part and the wing tip suggests that at the former rigidity works high and at the latter flexibility works most, and this brings the wings deformed easily. There are many micro spines on the wing membrane of Diptera. The spines seem to tilt toward the air flows that were generated on the surface of the wing, and have a role of libretti. In Odonata, such spines exist on wing veins, but not on the membrane. 4. Wing beat and the wing beat frequency 4.2 Wing beat frequency The wing beat frequency of *Vespa simillima xanthoptera* was 105 Hz. Valensi number $Va=S?/v=Strouhal\ number* Reynolds$

number, ($?=2\pi fi$) and kinematic viscosity of the air. It is clear that Valensi number is proportional to the body length. The equation of wing beat frequency is shown below; $fi=Km-1/6$, K is a parameter valuable by insects. 4.3 Wing beat Fig. 12 shows the trajectories of fluttering wing tips in *S. infuscatum*. It is generally known that trajectory of wing tips of insects draws the character of 8, however, especially insects of Odonata, Hymenoptera and Diptera shows remarkable diversity of the trajectory. Fig. 14 shows the composite speed and its equation is shown below; $V=(u^2+v^2+w^2)$ Wing beat of insects has a function of complicated controlling with deformation of wings. 5. Air flows around wingbeating insects We measured the changes of air speed produced by wing-beat and the changes of wingbeat at the basal part synchronously, putting a live dragonfly in a stationary air speed, which made the dragonfly beat wings. Fig. 16 shows the range of wing beat?, changes of air speed u and correlation coefficient between them $Ru?$ in *Sympetrum kunkeli* that was fluttering in the stationary air flow ($U0=1.75m/sec$). In nature, dragonflies do not always flutter in flight, they fly with repeating fluttering and gliding alternatively. Fig. 17 shows wingbeat of *Pantala flavescens* in the air flow of 2.1m/sec. It fluttered 14-15 times during 0.5-0.6sec. and glided for 0.3-0.4 sec. Speed vector in fluttering *Crocothemis servilia mariannae*, body length $L=46.6$ mm, examined with PIV system is shown in Fig. 18. The measuring points were set at 14 mm (nodus) from the basal part of left wings. The forewing is stroking downward, with the hindwing reaching the bottom. Fig. 18 (a) suggests that large speed upward air flow is a lift and the wave of speed vector backward shows the change of speed produced by fluttering. Fig. 18 (b) shows speed vector of upward stroking of wings. Thus, it is cleared that dragonflies fly with their wings deformed, changing angles of wing stroking and the phase of wing beat of fore and hind wings.] Address: Sudo, S., Faculty of Systems Science and Technology, Akita Prefectural University, Yurihonjo 015-0055 Japan. E-mail: sudou@iwakimu.ac.jp

5051. Terzani, F. (2002): Ricerche odonatologiche in Toscana. 8. La *Lindenia tetraphylla* (van der Linden, 1825) (Insecta, Odonata, Gomphidae). *Quad. Studi Star, nat. Romagna* 16 (Suppl.): 5-6. (in Italian, with English summary). ["Several specimens, taken in 1995 and 1996 at a locality between Torre del Lago Puccini and Viareggio (LU), are brought on record. The last previous record of *L. tetraphylla* in Tuscany, Italy is from 1938."] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

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- 5054.** Galina, A.B.; Hahn, N.S. (2003): Comparação da dieta de duas espécies de *Triportheus* (Characidae, Triportheinae), em trechos do reservatório de Manso e lagoas do rio Cuiabá, Estado do Mato Grosso. *Maringá* 25(2): 345-352. (in Portuguese, with English summary). [The diet of two species of *Triportheus* (Pisces) in Manso Reservoir and lagoons of Cuiabá River, Mato Grosso do Sul, Brazil contains also Odonata.] Address: Hahn, Norma Segatti, Departamento de Biologia, Nupélia, Programa de Pós-Graduação em Ecologia de Ambientes Aquáticos Continentais, Universidade Estadual de Maringá, Av. Colombo, 5790. 87020-900, Maringá, Paraná, Brasil. E-mail: hahnns@nupelia.uem.br
- 5055.** Hodgkison, S.; Hero, J.-M. (2003): Seasonal, sexual and ontogenetic variations in the diet of the 'declining' frogs *Litoria nannotis*, *Litoria rheocola* and *Nyctimystes dayi*. *Wildlife Research* 30(4): 345-354. (in English). ["Faecal analyses were used to investigate the diets of the endangered frogs *Litoria nannotis*, *L. rheocola* and *Nyctimystes dayi* in Tully Gorge, North Queensland. Comparisons of diet and food availability indicate that these species feed indiscriminately on a range of terrestrial and aquatic invertebrates (including Odonata). Changes in morphology and foraging behaviour significantly influenced diet composition and created subtle shifts in the degree of selectivity displayed in prey choice. Interspecific differences in numeric and volumetric diet composition were attributed to variations in gape size and microhabitat selection. Within the diets of *L. nannotis* and *L. rheocola*, a decline in prey selectivity observed during the dry season reflected a reduction in foraging activity. Differences in the gape size and foraging behaviour of males and females of *L. nannotis* were responsible for sex-specific differences in diet composition. *L. nannotis* also displayed an ontogenetic shift in prey size and type. As snout vent length increased, *L. nannotis* consumed fewer, but larger prey and increasingly discriminated against dipterans, dipteran larvae and hemipterans. Importantly, *L. nannotis*, *L. rheocola* and *N. dayi* demonstrated the capacity to compensate for fluctuations in food availability by feeding on less lucrative prey." (Authors) For the full paper see: [http://www.griffith.edu.au/school/asc/ppages/academic/jmhero/E ndgFrogs/docs/Hodgkinson%20%20Hero%20%20Wildlife%20Research%202003.pdf](http://www.griffith.edu.au/school/asc/ppages/academic/jmhero/E%20ndgFrogs/docs/Hodgkinson%20%20Hero%20%20Wildlife%20Research%202003.pdf) Address: Hodgkison, S., School of Environmental and Applied Sciences, Griffith University, PMB 50 Gold Coast Mail Centre, Qld 9217, Australia
- 5056.** Hofer, U.; Baur, H.; Bersier, L.-F. (2003): Ecology of three sympatric species of the genus *Chamaelo* in a tropical upland forest in Cameroon. *Journal of Herpetology* 37(1): 203-207. (in English). [At Mount Kupe, at lower transitional forests (NN 900m), 0.06 Odonata (number of individuals per hour of sampling) have been recorded. For the full paper see: <http://www.conservation.unibe.ch/dynpart/Files/Publication/44/HoferJHerp2003.pdf>] Address: Hofer, U., Dept Vertebrates, Natural History Museum, Bernastr. 15, CH-3005 Bern, Switzerland.
- 5057.** Jenkins, R.A.; Jenkins, J.M. (2003): *Triacanthagyna trifida* (Odonata: Aeshnidae): New state record of dragonfly from South Carolina, U.S.A.. *Entomological News* 114(4): 233-234. (in English). [1 female, Richland Co., Columbia, SC; 14-VIH-2003, totalling the South Carolina odonate fauna to 110 species.] Address: Jenkins, R.A., Dept Forest Resources, Clemson Univ, 261 Lehotsky Hall, Clemson, SC, 29634, USA. E-mail: robertj@clemson.edu
- 5058.** Lambrechts, J.; Guelinckx, R. (2003): Een overzicht van bijzondere waarnemingen in Zuidoost-Brabant in 2003. *Brakona Jaarboek 2003*: 21 pp. (in Dutch). [The report includes sightings of Odonata. For details see: <http://www.velpe-mene.be/files/jaarboek-2003artikeljorg&robin.pdf>] Address: Lambrechts, J., Zuurbemde 9, B-3380 Glabbeek, Belgium. E-mail: Jorg-lambrechts@hotmail.com
- 5059.** Macaulay, D. (2003): Survey of Odonata in the Canadian Shield Natural Region of Northeastern Alberta II. 2002 Survey of Colin-Cornwall Wildland Park. Prepared for the Alberta Natural Heritage Information Centre Parks and Protected Areas Division, Alberta Community Development. *Alberta Lepidopterists' Guild March 31, 2003*: 19 pp. (in English). [A total of 17 odonate species were collected during the survey of 2002 at Colin-Cornwall Wildland Park. [...] Though most species collected are common across Canada, four of them (*Calopteryx aequabilis*, *Leucorrhinia glacialis*, *Soma-tochlora albicincta*, and *S. minor*) are uncommon in Alberta. *C. aequabilis* is an uncommon species that inhabits the boreal forest, and *L. glacialis* represents a range extension from central Alberta. Both *S. albicincta* and *S. minor* are uncommon residents of the Canadian Shield ecoregion. With further sampling it is expected that several more riparian, shield and wetland specialists will likely be found." (Author) For the full paper see: <http://www.cd.gov.ab.ca/preserving/parks/anhic/docs/odonatereportcolin%20cornwallfinal.pdf>]
- 5060.** Martynov, V.V.; Martynov, A.V. (2003): Interesting finds of dragonflies (Odonata) in the south east of Ukraine. *Vestnik Zoologii* 37(2): 80. (in Russian). [Records of *Anax ephippiger*, *Onychogomphus forcipatus*, *Crocothemis erythraea*, *Sympetrum fonscolombii*] Address: not stated
- 5061.** Mesquita, D.O.; Colli, G.R. (2003): Geographical variation in the ecology of populations of some Brazilian species of *Cnemidophorus* (Squamata, Teiidae). *Copeia* 2003(2) : 285-298. (in English). [*Cnemidophorus ocellifer* and *C. parecis* prey also on Odonata.] Address: Colli, G.R., Dept. de Zoologia, Inst. de ciencias Biológicas, Univ. de Brasília, 70910-900 Brasília, Distrito Federal, Brazil. E-mail: grcolli@unb.br
- 5062.** Orizaola, G.; Brana, F. (2003): Oviposition behaviour and vulnerability of eggs to predation in four newt species (genus *Triturus*). *Herpetological Journal* 13(3): 121-124. (in English). ["Most animals develop some kind of parental care in order to protect eggs or offspring from predation. Female newts (genus *Triturus*) protect eggs from predators by wrapping them individually in plant leaves. We studied oviposition characteristics of four newt species inhabiting the northern Iberian Peninsula (marbled newt, *Triturus marmoratus*; alpine newt, *T. alpestris*; palmate newt, *T. helveticus* and Bosca's newt, *T. boscai*). All of these species are able to wrap their eggs in aquatic plants in laboratory experiments, but - whereas *T. marmoratus*; *T. alpestris* and *T. helveticus* wrapped more than 90% of their eggs - *T. boscai* covered only half of the eggs completely with leaves. *T. boscai* is found in running waters more frequently than the other species, and lays larger eggs relative to female size, as is typical of running water urodeles. A parallel experiment exposing newt eggs to

predation by larvae of the dragonfly *Aeshna cyanea*, demonstrated the protective value of wrapping behaviour. About half of the unwrapped eggs were consumed, whereas protected eggs remained almost unattacked." (Authors) Available at: <http://www.popbiol.ebc.uu.se/pdf/HerpJ2003a.pdf> Address: Orizaola, G., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, c/ Catedrático Rodrigo Uria s/n, 33071, Oviedo, Spain. E-mail: orizaola@correo.uniovi.es

5063. Roush, S.A.; Amon, J.P. (2003): Repopulation of restored wetland habitat by odonata (dragonflies and damselflies). *Ecological Restoration* 21(3): 174-179. (in English). [Usa, Ohio; "Each of the restored wetlands supported a wide variety of Odonata (Tab. 1). We found 26 species total, with nine to 15 species at each site. Eight species *Archilestes grandis*, *Argia moesta*, *Celi-themis elisa*, *Ischnura hastata*, *Lestes disjunctus australis*, *L. unguiculatus*, *Perithemis tenera*, and *Sympetrum vitinum* were collected only once in our surveys, but notably were found at restored sites. While none of the species we found are rare, the Ohio Odonata Survey notes that several, such as *A. grandis*, *I. hastata*, and *L. congener*, are not widely collected. Some species were found in only one type of restored wetland habitat. For example, *Argomphus vittosipes*, *L. congener*, *L. disjunctus australis*, and *A. moesta* occurred in the seasonal marsh and nowhere else. Five species of dragonflies *Aeshna umbrosa*, *Libellula semifaciata*, *Somatochlora tenebrosa*, *S. rubicundulum*, and *S. vitinum* were found only in the restored fens. In addition, we found [...] *Amphiagrion sautum*, *A. grandis*, and *L. unguiculatus* only in the restored fens. We found *C. elisa*, *P. tenera*, and *S. semicinctorum* only in the restored groundwater marsh. Walker & Corbet (1975) noted that species such as *S. tenebrosa*, *A. saucium*, *L. unguiculatus*, and *S. semicinctorum* are restricted to spring-fed habitats and/or temporary pools. While our data support that finding, not all species we found at our fen sites were restricted to fens." (Authors)] Address: Amon, J.P., Dept Biol. Sc., Wright State Univ., Dayton, OH 45435-0001, USA. E-mail: james.amon@wright.edu

5064. Samways, M. (2003): Southern African Invertebrate. Linking to other Specialist Groups and beyond. *Species* 40: 19. (in English). [Verbatim: [...] Among our current collaborative activities are the recent compilations on the globally red-listed Odonata of Africa and the national red list of Odonata of South Africa. Threats to the globally-threatened South African Odonata species have been identified, with invasive alien trees being the major overall threat. Luckily, this problem is being addressed through the Working for Water Programme which is removing invasive, alien trees, particularly in the Western Cape, where most endemic species occur. [...] The Group is also engaged in a mapping process. Part of this is the mapping of South African Odonata species with Steven Piper at the University of Natal as a collaborative project with the University of Stellenbosch, and using a spatialrelational database. Driven by Justin Gerlach, we are also working closely with the Seychelles Nature Protection Trust for the conservation of invertebrates in the Seychelles. [...] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

5065. Sandin, L. (2003): Benthic macroinvertebrates in Swedish streams: community structure, taxa rich-

ness, and environmental relations. *Ecography* 26: 269-282. (in English). [Odonata occurred at 97 (= 15.4%) of 628 randomly selected streams. 29 species were identified, but only *Erythromma najas* is mentioned.] Address: Sandin, L., Dept Envir. Assessment, Swedish Univ. Agric. Sci., P.O. Box 7050, SE-750 07 Uppsala, Sweden)

5066. Sinitshenkova, N.D. (2003): Main ecological events in aquatic insect history. *Acta zool. cracov.* 46 (Suppl.): 381-392. (in English). [The history of the adaptations to the aquatic life is traced from the Carboniferous to the Cretaceous. There are no Carboniferous insects with any obvious adaptations to aquatic life. The meganeurids could be proposed, but since their larvae are completely unknown, a terrestrial mode of life was suggested. In the Permian the aquatic insects became diverse and probably colonized lotic and lentic habitats. Wootton's suggestion that the insects inhabited first the running waters is questioned. Periodically flooded habitats are the most probable biotops of ancestral aquatic insects. First "aquatic odonate species" are known from the Upper Triassic of Australia.] Address: Sinitshenkova, N.D., Palaeontol. Inst., Russ. Acad. Sci., ul. Prosoyuznaya 123, RUS-117997 Moscow GSP-7, Russia. E-mail: ninasin@mail.ru

5067. Tam, T.W. (2003): Four new dragonfly records for Hong Kong. *Hong Kong Biodiversity* 5: 8-9. (in English, with brief Chinese summary). [Hong Kong, China; four new odonate species were recorded at the start of the 2003 dragonfly flying season: *Anax nigrofasciatus nigrofasciatus*, *Cephalaeschna klotsi*, *Pseudagrion prunosum frasei*, and *Trithemis pallidinervis*. The records are documented and the specimens are pictured. For details see: <http://www.hkbiodiversity.net/newsletters/HKBOnewsletter5.pdf>] Address: not stated

5068. Terzani, F. (2003): Segnalazioni faunistiche italiane: *Calopteryx haemorrhoidalis* (Vander Linden, 1825) (Odonata: Calopterygidae). *Boll. Soc. ent. ital.* 135(3): 189. (in Italian). [male, Val d'Aosta: Gressoney (alt. 1400 m), VII-1970.] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

5069. Terzani, F. (2003): Segnalazioni faunistiche italiane: *Cordulegaster bidentata* Selys, 1843 (Odonata: Cordulegasteridae). *Boll. Soc. ent. ital.* 135(3): 189. (in Italian). [1 male, Val d'Aosta: Chatillon, torr. Promiod (alt. 1750 m), 7-VII-2000.] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

5070. Thompson, D.J.; Rouquette, J.R.; Purse, B.V. (2003): Ecology of the Southern Damselfly. *Conserving Natura 2000 Rivers Ecology Series No. 8*. English Nature, Peterborough. ISBN 1 85716 714 7: 26 pp. (in English). [In UK, *C. mercuriale* "is on the northern margin of its range. It has disappeared from, or is on the edge of extinction, in seven European countries along its northern boundaries, and is declining in three others, including Britain. In Britain there are three main centres of population the heathlands of Mynydd Preseli in Pembrokeshire and the New Forest, and the water meadow ditch systems of the Itchen and Test valleys. There are also small populations on the Dorset heaths, Dartmoor, East Devon pebble beds, Gower and two fens in Ox-

fordshire and Anglesey. The species is sensitive to a number of habitat factors. A requirement for a thermally sensitive microclimate is reflected in broad-scale habitat use (for example, use of shallow, sun-exposed, permanently flowing water bodies indicated by perennial, herbaceous, aquatic vegetation), and in habitat use for oviposition and emergence. The southern damselfly is semi-voltine in Britain, with a shorter larval growth period and flight period than in mainland European populations. Seasonal regulation is probably achieved by a facultative autumn diapause in the penultimate larval instar. Dispersal distances are relatively poor, which means that the already highly fragmented British populations are likely to become even more fragmented, with implications for its conservation. The main cause of the decline in the southern damselfly in Britain has been the use of unsympathetic grazing regimes in key habitats over long periods." (Authors). Available at: www.english-nature.org.uk/lifeinukrivers/publications/damselfly%20.pdf Address: English Nature, Northminster House, Peterborough, PE1 1UA, UK

5071. Thompson, D.J.; Purse, B.V.; Rouquette, J.R. (2003): Monitoring the Southern Damselfly, *Coenagrion mercuriale*. Conserving Natura 2000 Rivers Monitoring Series No. 8, English Nature, Peterborough: 17 pp. (in English). [The report suggests monitoring methods that can be used to determine whether *C. mercuriale* populations are in favourable condition, and what conservation action is necessary for their survival. For the full paper see: www.english-nature.org.uk/lifeinukrivers/publications/damselfly%20monitoring.pdf] Address: Purse, Beth, Population and Evolutionary Biology Research Group, Nicholson Building, University of Liverpool, School of Biological Sciences, Liverpool, L69 3GS, UK. E-mail: beth.purse@bbsrc.ac.uk

5072. Vick, G.S. (2003): Biodiversity Assessment of the Odonate Fauna of Takamanda Forest Reserve, Cameroon. SI/MAB Series 8: 73-82. (in English). [The paper reports sampling efforts between 1997 and 2001 (locally wise checklist in Appendix 1), and discusses the Reserve as "diversity hotspot" and zoogeographical aspects of its odonate fauna. For the full paper see: <http://nationalzoo.si.edu/ConservationAndScience/MAB/researchprojects/appliedconservation/westafrika/Takamandabook/Chapter5.pdf>] Address: Vick G.S., Crossfields, Little London, Tadley, Hants RG26 5ET, UK

2004

5073. Anholt, B.R.; Negovetic, S.; Som, C.; Rauter, C. (2004): Predator complement determines the relative success of tadpoles of the *Rana esculenta* complex. Ecological Society of America Annual Meeting Abstracts 89: 19- [Verbatim: The hybridogenetic European waterfrog, *Rana esculenta*, is an obligate sexual parasite of its host, *R. lessonae*, across large regions of its distribution. *R. esculenta* is a superior competitor to *R. lessonae* in a wide range of conditions and is also a larger, more fecund frog than *R. lessonae*. In the absence of conditions that favour *R. lessonae* we expect that *R. esculenta* should competitively exclude *R. lessonae* and then go extinct for lack of mates. Amphibians have been found to segregate among habitats along an axis of pond permanence that determines the apex predator in the system. We therefore examined the change in frequency of the two taxa from the larval

stage to metamorphosis in water bodies that did or did not support fish. We found that in the absence of fish and the presence of large invertebrate and amphibian predators, the frequency of *R. lessonae* increased relative to *R. esculenta* from the larval stage to metamorphosis while in the presence of fish and absence of other predators, the opposite was true. This observation was supported in a laboratory experiment where we found that *R. esculenta* was more vulnerable to predation by dragonfly larvae. Differences in vulnerability were associated with differences in activity level of the two taxa in the presence of caged predators. These results suggest that the two taxa are adapted to different predator complexes and the hybridogenetic system is maintained by occasional dispersal between dissimilar water bodies.] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada. E-mail: banholt@uvic.ca

5074. Arai, Y. (2004): A countrywide survey of Red Dragonflies in 2003: Introduction, Aims of survey and methods, Results. In: Arai, Y. [Ed.]: [A countrywide survey of Red Dragonflies in 2003]. Musashino Satoyama Research Group & Institute of Agriculture and Natural Environments, Yorii-cho, Saitama: 1-18. (in Japanese, translated into English by Ishizawa, N.). [In Japan, about 20 dragonfly species are called *aka-tombo*, comprising species of the genus *Sympetrum* and *Pantala flavescens*. The survey intends to generate interest among people for dragonflies and to maintain this interest, and to get insight into the migration of species by broadening the cover of observation places in Japan. Questionnaires were circulated, analysed for the phenological data. A meeting was held on 31-I-2004, and some of the lectures are documented with special reference to relationships of farmers, rice paddy fields and dragonflies.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

5075. Arai, Y. (2004): Occurrence of *Sympetrum* frequens from Yorii-machi. In: Arai, Y. [Ed.]: [A countrywide survey of Red Dragonflies in 2003]. Musashino Satoyama Research Group & Institute of Agriculture and Natural Environments, Yorii-cho, Saitama: 23-27. (in Japanese, translated into English by Ishizawa, N.). [Population density of *S. frequens* has decreased over the past decades. Alternation of rice paddy field cultivation is responsible for the population trend.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

5076. Barbarin, J.-P. (2004): Les odonates (libellules) des tourbières du nord-est Cantalien (site NATURA 2000 FR 8301056) ecologie et recherche de *L. pectoralis* (Charpentier, 1825) sur le site du Jolan (SÉGUR-LES-VILLAS, 15). <http://www.shnao.net/Doc/Barbarin/memoireJPB.pdf>: 52 pp. (in French). [Cantal, France; detailed report referring to the rare *Leucorrhinia pectoralis* and the co-occurring odonate species.] Address: Barbarin, J.-P., Université Blaise-Pascal, Clermont II, 24, avenue des Landais, 63000 Clermont-Ferrand, France

5077. Beldon, P.A.; Downer, V.J.; Luck, J.C.; Prendergast, H.D.V.; Sadler, D. (2004): The Dragonflies of Sussex: A Guide to their Distribution and Conservation. Essendon Press. ISBN 0-9525549-1-7: 81 pp. [County faunas are becoming increasingly popular and it is

refreshing to see the publication of this new work dealing with Sussex dragonflies. The idea of local lists dealing with the Sussex fauna and flora is not new. Undoubtedly the most comprehensive early work was The Victoria County History of the Counties of England: Sussex, Volume 1, which was published in 1905. This contained extensive annotated lists of plants and animals recorded from the county, each order being assigned to a different specialist. The section on Odonata, included within the Neuroptera, was written by the well-known Hastings naturalist the Rev. E.N. Bloomfield. In his introduction to the dragonfly section he states, "We have a fair record, but to complete the possible list *Orthetrum caerulescens*, Fabr. [Keelred Skimmer], should be looked for on boggy heaths, *Aeschna juncea*, Linn. [Common Hawker], around ponds, especially in fir woods, and *Erythromma najas*, Hansem. [Red-eyed Damselfly], over sluggish water, where no doubt they await discovery; while it is quite possible that the little *Agrion mercuriale*, Charp. [Southern Damselfly], may be hiding its charms amongst the rank herbage of some boggy stream." Although Southern Damselfly *Coenagrion mercuriale* appears to be genuinely absent from Sussex, the other three have indeed been recorded from the County. This latest book essentially presents the results of a survey carried out between 1989-2003 by members of the Sussex Dragonfly Recording Group, combined with data sent in by many visiting naturalists. Pre-1989 data is also plotted on each distribution map and is discussed briefly. A map of the county shows the total number of records received, in three categories by tetrads (2 x 2km squares). Following the Contents page are chapters entitled "Foreword", "Introduction", "The Sussex scene" and "Dragonfly recording", followed by the main species accounts. This latter section occupies 75% of the book and deals with the 12 damselfly and 17 dragonfly species that are currently regarded as permanent breeding residents in the County. Each species has been allocated a double page and is accompanied by a distribution map and several colour photographs. Although not intended to be an identification guide, the photos serve to point the recorder in the right direction, but for accurate determinations it is necessary to refer to detailed descriptions elsewhere. The maps show the modern administrative boundary between East and West Sussex, but not the City of Brighton or the boundary between Watsonian Vice-counties 13 and 14. Each map shows the eight differently coloured geological zones and labelled 10km grid lines, although to determine the 100km grid square code letters (SU, SZ, TQ, TV) it is necessary to refer to the map on pages 6 or 11. The maps also show rivers with major tributaries so that species associated with the different catchment areas can be identified at a glance. Records are plotted on a 1km grid square basis and are divided into three categories, distinguished by differently coloured spots: "pre-1989", "1989-2003 present only" and "1989-2003 probable/possible breeding". Chapter 5, "Species lost and won", discusses species not currently regarded as resident and breeding, including Scarce Emerald Damselfly *Lestes dryas*, which was apparently established at Powdermill Reservoir, near Brede, during the 1940s, and several species currently regarded as migrants. The final chapter, "Acknowledgements and credits", contains a comprehensive list of more than 200 contributors and compilers. A separate chapter giving a Sussex checklist, with synonymy, would have aided the collation of species with little or no breeding history in the County. Nevertheless

it is possible to compile a list by carefully extracting data from Chapters 4 and 5. There is plenty of room for 100km grid square code letters on each distribution map and it is hard to understand why these were omitted. The absence of a general index is also somewhat frustrating. However, these are but minor points of criticism and certainly should not deter naturalists from purchasing this excellent book." Peter Hodge, *Atropos* 26: 39-40.]

5078. Bernard, B.; Buczyński, P.; Mielewczyk, S.; Tończyk, G. (2004): Odonata / Wążki. In: Głowaciński, Z. & J. Nowacki (Ed.): Polska czerwona księga zwierząt - Bezkręgowce [Polish Red Data Book of Animals - Invertebrates]. 448 pp: 52-60. (in Polish, with English introduction and summaries). [Data sheets of 5 odonate species: *Coenagrion armatum* (Buczyński, P.), *Nehalennia speciosa* (Bernard, B.), *Cordulegaster boltonii* (Bernard, B.), *Somatochlora alpestris* (Mielewczyk, S.), *S. arctica* (Buczyński, P. & G. Tończyk) are presented. Habitat, distribution (instructive maps), and threat factors for each species are outlined. Each chapter is concluded by an English summary.] Internet version available at: www/iop.krakow.pl/pckz. Address: Published and distributed by: Instytut Ochrony Przyrody, Polska Akademia Nauk, al. Adama Mickiewicza 33, 31-120 Kraków, Poland

5079. Biologische Station für den Enepe-Ruhr-Kreis (2004): Faunistische Untersuchungen 2001 - 2004 im Naturschutzgebiet Ruhraue bei Hattingen-Winz Stadt Hattingen, Ennepe-Ruhr-Kreis. Verein zur Förderung des Naturschutzes im Ennepe-Ruhr-Kreis e.V.: 62 pp. (in German). [Nordrhein-Westfalen, Germany; on pages 30 - 32, the odonate fauna of 10 sampling localities is documented in tables.] Address: Biologische Station im EN-Kreis, Loher Str. 85, D-58256 Ennepetal, Germany

5080. Böhm, K. (2004): Zur Entwicklung und Phänologie von *Crocothemis erythraea* in Nordrhein-Westfalen: Nachweis einer zweiten Jahresgeneration? (Odonata: Libellulidae). *Libellula* 23(3/4): 153-160. (in German, with English summary). ["In summer 2003 two emergence cohorts were recorded at a pond in Düsseldorf (51°12'N, 6°44'E), Germany. The first cohort emerged in May and June, and the second from the end of July to mid-September. This is interpreted as a second annual generation originating from ovipositions of the first cohort. With 513 individuals the second generation was twice as large as the first and showed an emergence peak in the first half of August." (Author)] Address: Böhm, K., Erich-Müller-Straße 6, D-40597 Düsseldorf, Germany

5081. Bogdanovic T.; Durbesic, P.; Mikuska, J. (2004): Dragonfly fauna (Odonata) of the Baranja surroundings (Croatia). PRVI KONGRES hrvatskih znanstvenika iz domovine i inozemstva (1 ; 2004 ; Zagreb, Vukovar). Zbornik sa etaka postera znanstvenih novaka, prikazanih u inozemstvu 2002., 2003. i 2004. godine / Prvi kongres hrvatskih znanstvenika iz domovine i inozemstva, Zagreb-Vukovar, 15-19. studenoga 2004.; <glavni i odgovorni urednik Zlatko Kniewald>. Zagreb : Akademija tehničkih znanosti Hrvatske, 2004. ISBN 953-7076-05-9 : 18. (in English). [48 species were recorded between 1997 - 2003 at 30 localities. Additions to the regional odonate fauna are: *Coenagrion ornatum*, *Anax ephippiger*, *Libellula fulva*, *Orthetrum coerulescens*, and *Sympetrum flaveolum*. Dominant species

are: *Aeshna mixta*, *C. puella*, *Ischnura elegans*, *O. albistylum*, *S. striolatum*, subrecent species are: *Lestes macrostigma*, *S. danae*, *S. depressiusculum*, and *S. fonscolombii*.] Address: Fac. Philosophy, University of Osijek, Croatia

5082. Bogdanovic T.; Mikuska, J. (2004): Dragonfly fauna in Repas Forest. PRVI KONGRES hrvatskih znanstvenika iz domovine i inozemstva (1 ; 2004 ; Zagreb, Vukovar). Zbornik sa etaka postera znanstvenih novaka, prikazanih u inozemstvu 2002., 2003. i 2004. godine / Prvi kongres hrvatskih znanstvenika iz domovine i inozemstva, Zagreb-Vukovar, 15-19. studenoga 2004. <glavni i odgovorni urednik Zlatko Kniewald>. Zagreb: Akademija tehničkih znanosti Hrvatske, 2004. ISBN 953-7076-05-9: 19. (in English). [Verbatim: Between June and September 2000, 6 locations of the Re-pa - forest complex were surveyed for their odonate fauna. A total of 42 species were found: *Calopteryx virgo*, *C. splendens*, *Chalcolestes viridis*, *Lestes barbarus*, *L. virens*, *L. sponsa*, *L. dryas*, *Sympecma fusca*, *Platycnemis pennipes*, *Erythromma najas*, *E. viridulum*, *Coenagrion ornatum*, *C. pulchellum*, *Enallagma cyathigerum*, *Ischnura pumilio*, *Aeshna mixta*, *A. affinis*, *A. viridis*, *Anax imperator*, *A. parthenope*, *Brachytron pratense*, *Stylurus flavipes*, *Gomphus vulgatissimus*, *Somatochlora metallica*, *S. flavomaculata*, *Epithea bimaculata*, *Libellula quadrimaculata*, *L. fulva*, *L. depressa*, *Orthetrum cancellatum*, *O. albistylum*, *O. coerulescens*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. vulgatum*, *S. meridionale*, *S. anguineum*, and *Leucorrhinia pectoralis*. Dominant species are: *Calopteryx splendens*, *Platycnemis pennipes*, *Coenagrion puella*, *Ischnura elegans*, *Anaciaeschna isosceles*; subrecent species are: *Chalcolestes viridis*, *Coenagrion ornatum*, *Brachytron pratense*, and *Stylurus flavipes*.] Address: Fac. Philosophy, University of Osijek, Croatia

5083. Bogdanovic T.; Mikuska, J.; Durbesic, P. (2004): Dragonfly fauna of Kopačkit wetlands. PRVI KONGRES hrvatskih znanstvenika iz domovine i inozemstva (1 ; 2004 ; Zagreb, Vukovar). Zbornik sa etaka postera znanstvenih novaka, prikazanih u inozemstvu 2002., 2003. i 2004. godine / Prvi kongres hrvatskih znanstvenika iz domovine i inozemstva, Zagreb-Vukovar, 15-19. studenoga 2004. <glavni i odgovorni urednik Zlatko Kniewald>. Zagreb : Akademija tehničkih znanosti Hrvatske, 2004. ISBN 953-7076-05-9: 20. (in English). [Verbatim: Between 1997 and 2001, 15 localities of the Kopački Rit Nature Park were surveyed for their odonate fauna. A total of 48 species were found, including *Coenagrion ornatum*, *Anax ephippiger*, *Libellula fulva*, *Orthetrum coerulescens*, and *Sympetrum flavolum*. Dominant species are: *Aeshna mixta*, *Coenagrion puella*, *Ischnura elegans*, *Orthetrum albistylum*, and *Sympetrum striolatum*. Subrecent species are: *Lestes macrostigma*, *Sympetrum danae*, *S. depressiusculum* and *S. fonscolombii*.] Address: Fac. Philosophy, University of Osijek, Croatia

5084. Buczyński, P. (2004): Dragonflies (Odonata) from Poland in the collection of Museum and Institute of Zoology of Polish Academy of Sciences in Warsaw. Nowy Pam. Fizjogr., Warszawa, 3 (1-2): 15-26. (in Polish, with English summary). [Four of the five collections on Odonata deposited in the Museum and Institute of Zoology of Polish Academy of Sciences (MiIZ PAN) are discussed: the specimens by KRÜGER from Szczecin and the Baltic coast (1913-21) - the part of the voucher

specimen collection for the paper of the dragonflies of Pomorze (KRÜGER 1925); 2) the material by BAZYLUK from the vicinity of Siemień in Western Polesie (1929-50), the majority was published by BAZYLUK (1947, 2002) and BUCZYŃSKI (2003); 3) unpublished material from the Srodkowomazowiecka Lowland (1954-55); 4) unpublished material from 12 regions in different parts of the country, collected by researchers of MiIZ PAN (1945-50). All localities are mapped, and in total 46 odonate species are documented and discussed. Of special interest are *Sympecma paedisca*, *Aeshna affinis*, *Orthetrum albistylum*, and *Sympetrum fonscolombii*. The specimens of *S. paedisca* from the KRÜGER collections - wrongly published as *S. fusca* - are the oldest recorded ones of this species in north-western Poland. This is another example of wrong identification of this species (cf. BUCZYŃSKI 2003). There are also some old records of species like *Erythromma viridulum*, which in the past decade has been expanding its range in some European regions, or *Lestes barbarus*, often classified as "mediterranean species".] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

5085. Buczyński, P.; Tończyk, G. (2004): Reviews: Askew, R.R. 2004: The dragonflies of Europe (revised edition). *Wiad. entomol.* 23(4): 213-214. (in Polish). [Detailed critical review of the revised edition of the classical book of Askew 1988.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

5086. Buczyński, P.; Kitowski, I.; Rozwalka, R. (2004): Submerged part of the nests of European Bittern, *Botaurus stellaris* (L.), as a substrate for benthic macroinvertebrates. *Acta biol. Univ. Daugavp.* 4(2): 77-80. (in English). [Representatives of 12 taxa - nearly all predators - were found at a pond complex in SE Poland, including *Aeshna mixta* and *Sympetrum vulgatum*. The Hirudinea (*Erpobdella octoculata*) and the Dytiscidae (Coleoptera) were dominant. Habitat conditions of the nest fauna and its forming are discussed.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

5087. Buczyński, P. (2004): The introductory estimation of the present state and the threat to the invertebrates of the Elk district. 3.1.4 Dragonflies (Odonata). In: Kistowski, M. & J. Mosdorf (Red.): *Zasoby i zagrożenia środowiska przyrodniczego w powiecie elckim i mieście Niemenczyn. Raport 2004.* Wyższa Szkoła Finansów i Zarządzania w Białymstoku, Białystok: 370-376. (in Polish and English). [Elk, Poland is a classic locality known by the work of le Roi (1911), who collected there 41 odonate species. In 2003, a new survey of 13 localities in the Elk surroundings yielded 22 odonate species, among them *Sympecma paedisca* and *Leucorrhinia caudalis*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

5088. Burbach, K.; Schiel, F.-J. (2004): Beobachtungen zur Ausbreitungsfähigkeit von *Nehalennia speciosa* (Odonata: Coenagrionidae). *Libellula* 23(3/4): 115-126. (in German, with English summary). ["In the years 2003

and 2004, *N. speciosa* was recorded at four newly created water bodies in southern Germany. The initial colonization of these habitats can probably be attributed to individuals that emigrated from larger populations at distances of up to 11.5 km. In addition, observations of single individuals aside of suitable habitats demonstrate that the species is capable of colonizing new habitats." (Authors)] Address: Burbach, K., Griesfeldstr. 5a, D-85354 Freising, Germany. E-mail: klaus.burbach@gmx.de

5089. Che Salmah, M.R.; Abu Hassan, A.; Ameilia, Z.S. (2004): Odonate communities (Odonata: Insecta) in a tropical river basin, Malaysia. *Wetland Science* 2(1): 1-9. (in Chinese, with English summary). ["Odonata larvae were sampled from 16 tributaries of Kerian River in the Kerian River Basin (KRB) using a kick sampling technique from September 1998 to May 1999 encompassing both rainy and dry seasons. The distribution of odonate genera was significantly different ($F_{15,46} = 3.99$) among rivers in both seasons ($F_{15,16} = 4.70$) at $P = 0.05$. However, no seasonal influence was detected. Protoneuridae and Libellulidae were the most dominant families in this basin. Other families Gomphidae, Coenagrionidae, Macromiidae, Chlorocyphidae and Calopterygidae, were common but Aeshnidae and Eupheidae were rare. Several common species, *Prodasineura autumnalis*, *Brachythemis contaminata*, *Macromia gerstaeckeri*, *Paragomphus*, *Orthetrum brunneum* [sic], *Rhinocypha quadrimaculata* and *Copea marginipes* were identified. The calculated values of biological indices (H', D, E, R 1 and R2) showed that the dragonfly fauna in this river basin was slightly poor. Varied physico-chemical parameters of the river possibly as a result of human activities in surrounding areas were found to influence the distribution of the dragonfly larvae in the KRB. This study showed that the KRB provided favorable habitats for Protoneuridae and Libellulidae. Two most dominant species *Prodasineura autumnalis* and *Brachythemis contaminata* were obviously favoured by slightly acidic water of the Kerian river tributaries."] Address: Che Salmah, M.R., School of Biological Sciences, University Sains Malaysia, 11800 Minden, Pulau Pinang, Malaysia

5090. Ciechanowski, M.; Kowalczyk, J.K.; Zieliński, S. (2004): Niektóre inne grupy bezkręgowców (Porifera; Turbellaria; Hirudinea; Aranei; Insecta: Odonata, Orthoptera, Heteroptera, Homoptera, Neuroptera, Coleoptera, Lepidoptera, Diptera) [Some other taxa of invertebrates (Porifera; Turbellaria;)] *Acta Bot. Cassub.* 4: 90-97. (in Polish). [6 odonate species are listed.] Address: Ciechanowski, M., Katedra Ekologii i Zoologii Kręgowców Uniwersytetu Gdańskiego, Al. Legionów 9, 80-441 Gdańsk, Poland. E-mail: mattiech@kkinet.pl

5091. Clausnitzer, V. (2004): Odonata. Species 42: 34-35. (in English). [Report of the chair of the The IUCN Odonata Specialist Group on current activities with special emphasis on the book project "Guardians of the watershed". For the full paper see: <http://www.iucn.org/webfiles/doc/SSC/SSCwebsite/Species/Species42Full.pdf>] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

5092. Corbi, J.J.; Jancso, M.A.; Trivinho-Strixino, S.; Fragoso, E.N. (2004): Occurrence of *Oligochaeta* living on larvae of Odonata from Ipeúna (Sao Paulo State, Brazil). *Biota Neotropica* 4(2): 3 pp. (in English, with

Portuguese summary). ["The occurrence of oligochaetes species living on larvae of Odonata is reported for the first time. There were found *Nais variabilis* (Piguet, 1906) (Oligochaeta: Naididae) and *Chaetogaster diastrophus* (Gruithuisen, 1828) (Oligochaeta: Naididae) living on *Elasmothermis cannaerioides* (Calvert, 1906) (Anisoptera: Libellulidae) and on *Mnesarete* (Cowley, 1934) (Zygoptera: Calopterygidae)."] (Authors)] Available at: www.biotaneotropica.org.br/v4n2/pt/abstract?short-communication+BN03304022004. Address: Corbi, J.J. Laboratório de Entomologia Aquática, Departamento de Hidrobiologia, Universidade Federal de São Carlos, C. Postal 676, São Carlos, SP, Brasil. E-mail: pjcorbi@iris.ufscar.br

5093. Cordero Rivera, A.; Andrés, J.A.; Córdoba-Aguilar, A.; Utzeri, C. (2004): Postmating sexual selection: allopatric evolution of sperm competition mechanisms and genital morphology in calopterygid damselflies (Insecta: Odonata). *Evolution* 58(2): 349-359. (in English). ["Postmating sexual selection theory predicts that in allopatry reproductive traits diverge rapidly and that the resulting differentiation in these traits may lead to restrictions to gene flow between populations and, eventually, reproductive isolation. In this paper we explore the potential for this premise in a group of damselflies of the family Calopterygidae, in which postmating sexual mechanisms are especially well understood. Particularly, we tested if in allopatric populations the sperm competition mechanisms and genitalic traits involved in these mechanisms have indeed diverged as sexual selection theory predicts. We did so in two different steps. First, we compared the sperm competition mechanisms of two allopatric populations of *Calopteryx haemorrhoidalis* (one Italian population studied here and one Spanish population previously studied). Our results indicate that in both populations males are able to displace spermathecal sperm, but the mechanism used for sperm removal between both populations is strikingly different. In the Spanish population males seem to empty the spermathecae by stimulating females, whereas in the Italian population males physically remove sperm from the spermathecae. Both populations also exhibit differences in genital morphometry that explain the use of different mechanisms: the male lateral processes are narrower than the spermathecal ducts in the Italian population, which is the reverse in the Spanish population. The estimated degree of phenotypic differentiation between these populations based on the genitalic traits involved in sperm removal was much greater than the differentiation based on a set of other seven morphological variables, suggesting that strong directional postmating sexual selection is indeed the main evolutionary force behind the reproductive differentiation between the studied populations. In a second step, we examined if a similar pattern in genital morphometry emerge in allopatric populations of this and other three species of the same family (*Calopteryx splendens*, *C. virgo* and *Hetaerina cruentata*). Our results suggest that there is geographic variation in the sperm competition mechanisms in all four studied species. Furthermore, genitalic morphology was significantly divergent between populations within species even when different populations were using the same copulatory mechanism. These results can be explained by probable local coadaptation processes that have given rise to an ability or inability to reach and displace spermathecal sperm in different populations. This set of results provides the first direct evidence of intraspecific

evolution of genitalic traits shaped by postmating sexual selection." (Authors) Available at: [http://webs.uvigo.es/adolfo.cordero/PDF/Evolutionvol58pp349-359\(2004\).pdf](http://webs.uvigo.es/adolfo.cordero/PDF/Evolutionvol58pp349-359(2004).pdf) Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

5094. David, S. (2004): The dragonflies (Insecta: Odonata) of the eastern part of the Nizké Beskydy and Poloniny Mís. (NE Slovakia). Biosférické Rezervácie na Slovensku V. (edit. R. Midriak) Zborník referátov, z 5. národnej konferencie o biosférických rezerváciách SR, konanej 29.-30. 9. 2004 v Novej Sedlici: 115-123. (in Slovakian, with English summary). [Between 1993 and 2004, a total of 33 odonate species were recorded from 43 localities situated in the regions LPA Východné Karpaty and NP Poloniny mainly, Slovakia. The dominance structure of the community is presented. *Aeshna cyanea* is present at approximately 30% of the localities; most species occur only at very few localities. Of some interest are records of *Sympetrum fonscolombii*, *Thecagaster bidentata*, *A. caerulea*, and *Somatochlora flavomaculata*.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

5095. Dijkstra, K.D. (2004): Odonates (Libellules et Demoiselles). Louette, M., Meirte, D., Jocqué, R. (Eds): La faune terrestre de l'archipel des Comores. Studies in Afrotropical Zoology 293: 251-252. (in French). [Brief introduction into the odonate fauna of the Comore Islands. 7 publications on Odonata are listed on page 426 which is less than 50% of the papers cited in Lindboom & Schorr (2004): Literaturodatenbank ODOLit Version 1.1. Dragonfly Research 2 (ISSN 1438-034X).] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nm.nl

5096. Douillard, E.; Durand, O.; Gabory, O.; Samson, N. (2004): Du nouveau sur le cycle biologique et l'état des populations de la Cordulie à corps fin (*Oxygastra curtisii* Dale, 1834) dans les Mauges (Maine-et-Loire). MAUGES NATURE Bulletin de synthèse N°6: 63-67. (in French). [Exuviae of the species have been collected and the emergence habitats are described. A total of 102 imago has been marked, ten of them could be recaptured. In addition, the paper presents phenological data and a list of co-occurring odonate species.] Address: C.P.I.E. Loire et Mauges/Carrefour des Mauges, maison de pays "La Loge", BP 25, F-49600 Beaupréau, France. E-mail: cpie-loire-et-mauges@pays-des-mauges.com

5097. Driemeyer, J. (2004): Man(n) kanns ja mal versuchen mercuriale 4: 36-37. (in German). [Pairing attempt between 2 male *Calopteryx splendens*; 31-V-2003, Emmerbach near Münster, Nordrhein-Westfalen, Germany] Address: Driemeyer, J., Falkenweg 7, D-48167 Münster, Germany. E-mail: Jdriemeyer@t-online.de

5098. Dumont, H.J. (2004): A note on dragonflies collected at light in a forest in the Ivory Coast (West Africa). Bulletin S.R.B.E./K.B. V.E. 140: 66-67. (in English). [Discussion of dragonfly specimens collected at a series of light traps, primarily designed to collect moths, in a forest in the south-east of the Ivory Coast by Dr. U. Dall'Asta (Tervuren Museum, Belgium) (23 Jan 1996-12

Feb 1996), at 13 stations across the Forêt Classée de Bossematié. 9 species have been caught, in most cases *Tholymis tillarga*. "Night-flying in dragonflies is often linked to long-distance migratory movement and is prompted at the maiden flight or occurs at a very teneral age. Some species, however, may end up in light traps after having been disturbed while roosting at night, and may not normally be night-active at all. This may apply to about half of the present species list!"] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

5099. Englund, R.A. (2004): Report for the 2003 Pacific Biological Survey, Bishop Museum. Austral Islands, French Polynesia, Expedition to Rurutu and Tubuai. Prepared for: Délégation à la Recherche, (Ministère de la Promotion des Ressources Naturelles), B.P. 20981 Papeete, Tahiti, Polynésie française.

<http://www.bishopmuseum.org/research/pbs/pdf/australs2003.pdf>: V, 38 pp. (in English, with French summary). ["From 9-28 November 2003, staff from the Pacific Biological Survey (PBS) of the Bishop Museum in cooperation with other biologists conducted biological surveys in the Austral Islands of Tubuai and Rurutu as part of an [...] inventory and evaluation of biodiversity, a research program conducted in French Polynesia [...]. The objectives of this biodiversity assessment of the Austral Islands were: 1) to assess the native aquatic insect fauna and describe the overall biodiversity of this fauna, 2) to assess the biodiversity and status of Heteroptera and other important endemic phytophagous insects in native forest areas, 3) to assess the impacts or lack of impacts of introduced aquatic species on native stream biota, 4) to qualitatively assess the impacts of introduced species, feral ungulates, urbanization, on native insects, and 5) to provide museum specimens and an information baseline for future researchers. Significant findings of these surveys include a pristine native freshwater fauna lacking introductions of non-indigenous fish, amphibians, or aquatic reptiles on Rurutu, but two harmful invasive fish species were widespread on Tubuai. Tubuai is apparently the only Austral Island currently having introduced freshwater fish species. On Tubuai, alien fish were found in all aquatic habitats sampled with only one exception at the large cascade below the Mt. Panee summit; this was the highest elevation area on Tubuai with flowing water. This cascade flowed into a series of stair-step pools that were too steep and high gradient for introduced fish to access, and was a potential refuge area for native species that could be negatively impacted by introduced fish, such as endemic damselflies. Numerous undescribed and several described aquatic insect species were found on both Rurutu and Tubuai, including new species and range extensions of Heteroptera (true bugs), Diptera (aquatic flies), and Odonata (dragonflies and damselflies), and Coleoptera (beetles). One of the most important aquatic findings during this expedition was a new species of large endemic damselfly found on Rurutu only in undiverted, forested, and fast-flowing streams. It is possible that endemic damselflies have been eliminated on Tubuai by invasive fish species, though more intensive surveys are required to verify this. Although generally uncommon and not found in many French Polynesia islands, one species of native aquatic Coleoptera (beetles), *Rhantus* new sp. near *scheneri* was found at Tamatoa Stream in the lower elevation still-water *Hibiscus tiliaceus* areas. Aquatic in-

sects in the orders Ephemeroptera, Plecoptera, and Trichoptera (EPT) orders were not found on Tubuai or Rurutu. Areas that should receive the highest conservation priority on Rurutu include the makatea forest at Plateau Papanai with a mixed *Dodonea viscosa* shrubland forest that is one of the largest and most intact in French Polynesia, harboring unique species of biogeographically important endemic insects. A gully below the summit of Mt. Taatioe with the endangered *Cyrtandra elisabethae* plants and new species of green planthopper is of world-wide conservation and biogeographic importance and contains the largest patches of remnant native upland forest remaining on Rurutu, and with it the greatest native insect biodiversity on Rurutu. This area should be immediately fenced to keep grazing cattle out, and weeding could reduce the encroaching invasive plant species. The lack of action in protecting these forest patches from grazing cattle and other feral ungulates will certainly lead to the demise of native plants on Rurutu and the extinction of the unique insects associated with them. The native species found on both islands are important on a worldwide basis, and the conservation of this rich biodiversity is a critical component of the Polynesian culture found on these islands. It is of global significance to preserve the native biodiversity found on the Austral Islands to allow a greater understanding of the natural biological processes of dispersal and colonization of the fauna to these remote and isolated island areas." (Author)] Address: Englund, R.A., Pacific Biological Survey, Bishop Museum Honolulu, Hawaii i 96817

5100. Faria, R.G.; Araujo, A.F.B. (2004): Syntopy of two *Tropidurus* Lizard species (Squamata: Tropiduridae) in a rocky cerrado habitat in central Brazil. *Braz. J. Biol.* 64(4): 775-786. (in English, with Portuguese summary). [The diet (n=255) of the lizard *Tropidurus oreadicus* also contained one Odonata individual; <http://www.scielo.br/pdf/bjb/v64n4/22977.pdf>] Address: Faria, R.G., Dept Zoologia, Inst. Biologia, Univ. de Brasília, CEP 70910-900, Brasília, DF, Brazil. E-mail: renatogf@unb.br

5101. Fleck, G. (2004): Contribution à la connaissance des Odonates de Guyane française. Les larves de *Macrothemis pumila* Karsch, 1889 et de *Brechmorhoga praedatrix* Calvert, 1909. Notes biologiques et conséquences taxonomiques (Anisoptera: Libellulidae). *Ann. Soc. entomol. Fr.* (n.s.) 40(2): 177-184. (in French, with English summary). ["The larvae of *Macrothemis pumila* Karsch, 1889 and *Brechmorhoga praedatrix* Calvert, 1909 are described and illustrated for the first time. The larva of *M. pumila* greatly differs from any other known larvae of the genus, with numerous characters not listed in the diagnosis of Ramirez & Novelo-Gutiérrez (1999). Its position within the genus is discussed. The larva of *B. praedatrix* is easily recognised from other known larvae of the genus through its prominently developed and acute dorsal hooks on abdominal segments 2 to 9. Its seems to be dependent on a waterplant of fast running water, *Mourera fluviatilis* Aublet, 1775." (Author) For a full paper see: [http://zoologie.umh.ac.be/asef/pdf/20044002/full/FleckASEF200440\(2\)177-184.pdf](http://zoologie.umh.ac.be/asef/pdf/20044002/full/FleckASEF200440(2)177-184.pdf)] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

5102. Fliedner, H. (2004): Flügel als Sonnenreflektoren bei *Lestes viridis*? (Odonata: Lestidae). *Libellula* 23

(3/4): 179-182. (in German, with Latin and English summary). ["On 19 October 2004 at noon, on the first sunny day after a rainy period, a female *Lestes viridis* was seen basking with its wings closed behind the abdomen. This unusual wing position is interpreted as due to thermoregulatory reasons." (Author)] Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany. E-mail: H.Fliedner@t-online.de

5103. Futahashi, R.; Hayashi, F. (2004): Genetic analysis on *Sympetrum frequens* based on DNA sequences. In: Arai, Y. [Ed.]: [A countrywide survey of Red Dragonflies in 2003]. Musashino Satoyama Research Group & Institute of Agriculture and Natural Environments, Yorii-cho, Saitama: 42-46. (in Japanese, translated into English by Ishizawa, N.). [34 specimens from 24 Japanese localities and 4 from 2 localities in Korea were used for mitochondrial DNA analysis. In sum, the results show that *S. frequens* is a highly dispersive species far more than expected.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozawa City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatte.net

5104. Gaines, K.H. (2004): Stable isotope analysis reveals complexity at different spatial scales in desert sinkhole food webs. *Ecological Society of America Annual Meeting Abstracts* 89: 171-172. (in English). [Verbatim: The Bitter Lake National Wildlife Refuge in southeastern New Mexico contains dozens of saline sinkholes in a desert scrub and grassland matrix. Most of these sinkholes support aquatic macroinvertebrate communities dominated by larval dragonflies and damselflies (Order Odonata), and some sinkholes also support populations of two rare fish species. In order to determine how the food webs in these sinkholes are structured, I collected fish, larval odonates and other aquatic insects, snails, amphipods, macroalgae, and macrophytes from pairs of sinkholes with and without fish in different locations in the sinkhole complex. These materials were then submitted for stable carbon and nitrogen isotope analysis. Results from these analyses suggest that superficially similar habitat patches separated by as little as twelve meters can support communities with significantly different diversities and trophic structures, and that the spatial scale at which food webs are examined may determine the degree of complexity perceived in a landscape.] Address: Gaines, Karen H., Univ New Mexico, Albuquerque, NM, 87131, USA. E-mail: kgaines@unm.edu

5105. Ghassemzadeh, F (2004): Limnological studies of Bazangan Lake, northeast Iran. *Ecological Society of America Annual Meeting Abstracts* 89: 177. (in English). [Verbatim: The Bazangan Lake is the largest natural lake in northeast Iran. It is located between 60°29 east longitudinal and 36°17 north latitudinal. This lake is in a temperate area with low rainfall (200mm). The climate is dry and hot from June to September. The mean and the maximum depth of the lake are 6 and 11 meters respectively. Its surface area is about 690,000 square meters. Major environmental factors were measured at five stations. Five samples have been collected from each station. Water and air temperatures, salinity, conductivity, pH, viscosity and soluble reactive phosphorous were measured seasonally during a period of one year. The biota of the lake was monitored by recording the abundance and distribution of zooplankton and phytoplankton. Conductivity of the water is about 20,000 umhos/cm and pH is about 8. Thermal

stratification happened from end of June to the end of July. Thermocline was occurred at 4.25 to 6 meters depth. Major groups of algae identified in the lake including Chlorophyta, Cyanophyta and Diatoms. The zooplankton of the lake was few in species, but rather large population of them are present in some stations. The main identified species were: cladocera, Diaptomus, rotifera, Hexarthra, Branchionus, Synchaeta; Cladocera, Daphnia and chironomid, Chironomus. Collembola. Corixid, Trichocorixa are found along the shore. Much less common species was harpacticoid and a few cyclopoid. The littoral region contains a relatively sparse fauna although some species are present in high numbers such as hemiptera, odonata and coleoptera. The lake is hyposaline oligotrophic with low phytoplankton and zooplankton communities. It is concluded that salinity, low food as well as viscosity are the important factors for low diversity of organisms in this lake which providing less amount of food for fish in the lake. Therefore the diversity and abundance of fishes in the lake are also low.] Address: Ghassemzadeh, F., Azad Univ Mashhad, Mashhad, Iran

5106. Gilbert, R. (2004): The Disjunctive Dragonfly: A Study of disjunctive method and definitions in contemporary English-language Haiku. *Studies in English Language and Literature* 47: 27-66. (in English). [For the full paper see: <http://www.iyume.com/research/dragonfly/DisjunctiveDragonfly.htm>] Address: not stated

5107. Gunzburger, M.S. (2004): The role of tadpole predation in the habitat distribution and hybridization of two species of treefrogs. *Ecological Society of America Annual Meeting Abstracts 89 2004*: 193. (in English). [Verbatim: Closely related species that occur sympatrically often have mechanisms to partition niche space and maintain species identity. *Hyla cinerea* and *H. gratiosa* are sister taxa that are sympatric throughout the southeastern United States. These species have different breeding habitat preferences: *H. cinerea* prefers permanent ponds while *H. gratiosa* only breeds in fishless ponds. Occasionally viable, fertile hybrids between these species form that may introgress into both parental species. The objective of this research was to evaluate the importance of tadpole predation in the habitat distribution of these two closely related species and their hybrids. Predation experiments were performed using large mesocosms to evaluate survival and behavior of *H. cinerea*, *H. gratiosa*, and hybrid tadpoles in response to permanent pond (sunfish) and temporary pond (odonate naiad) predators. Small sized tadpoles of both species have similar survival and behavior with odonates, but with sunfish predators *H. gratiosa* tadpoles hide in refuges less and suffer greater predation than *H. cinerea* tadpoles. Hybrid tadpoles showed intermediate survival values between *H. cinerea* and *H. gratiosa* with odonates, but had extremely low survival with sunfish despite the fact that they adopt appropriate antipredator behavior. These results demonstrate that tadpole predation may be the mechanism leading to the habitat distribution of *H. cinerea* and *H. gratiosa*. Hybrid introgression may be a more significant threat to populations of *H. gratiosa* than *H. cinerea* because hybrid tadpoles are more likely to survive in temporary pond habitats with *H. gratiosa* tadpoles.] Address: Gunzburger, Margaret, Florida State Univ, Tallahassee, FL, 32306, USA

5108. Hadrys, H.; Melber, A. (2004): Biodiversität und Artenschutz: Paradebeispiel Libellen. *Stiftung Tierärztliche Hochschule Hannover. Forschung fürs Leben 2004*: 32-34. (in German, with English summary). ["Biodiversity and conservation biology: dragonflies, the classic example. More than 1 million species of insects have been identified, making these animals the most successful on Earth. Insects comprise the greatest portion of biodiversity in the animal kingdom. One of the most important groups of insects used for developing conservation strategies and as a bioindicator for quality and stability of environments is the order Odonata (dragonflies and damselflies). Due to the odonates complex reproduction behaviour and very specific habitat preferences, progressive anthropogenic changes to the environment have severe consequences on many odonates. For example, numerous species exist only in small isolated populations. The genetic diversity, i.e. adaptability, of a species and the survival of single populations is much more rapidly detectable at the genotypic level than by phenotypical methods. Based on genetic information, it is also possible to quickly identify isolation processes that threaten a population. Molecular genetic methods are becoming increasingly important for animals conservation in that they provide essential information on the condition of populations, species and habitats. This is demonstrated by the following study on the biodiversity of African dragonflies." (Authors)] Address: <http://www.tiho-hannover.de/service/presse/forsch/biodiversitaetumwelt.pdf>

5109. Hammond, J.I.; Sih, A. (2004): Investigating the response in spatial distributions when predators and prey are free to interact. *Ecological Society of America Annual Meeting Abstracts 89 2004*: 202. (in English). [Verbatim: Hundreds of studies have focused on the habitat and patch usage of predators and prey, with results establishing the overall pattern that predators tend to aggregate in areas with more prey while prey tend to avoid areas with higher predation risk. Almost all of these studies have eliminated the behavior of one player (e.g. the predator) by fixing it in space and therefore constraining its ability to respond to shifts in space use by the other player (e.g. the prey). Therefore, what spatial associations emerge if predators and prey are allowed to freely interact with each other? Surprisingly, we know little theoretically or empirically about these interactions. Simple theory constructed in a world where patches only differ in the level of a prey's resource, predicts predators should aggregate in the high resource areas while prey should tend to favor those patches as well. Thus the distributions result in a positive association. Using pairs of *Aeshna* dragonfly nymphs as predators and groups of *Hyla regilla* tadpoles consisting of either middle, late, or mixed stage individuals as prey, the spatial distributions of the predator and prey were examined in isolation and together. Interesting patterns emerge with late stage tadpoles shifting their spatial distributions from high densities in the high resource area without predators to a more even distribution with predators. Middle stage tadpoles and predators tend to have similar spatial distributions when isolated and together. Furthermore when the predators and prey were together, a significant negative spatial correlation was present between late stage tadpoles and predators regardless of the prey group type, which is contrary to initial theoretical predictions.] Address: Hammond, J.I., Univ Calif Davis, Davis, CA, 95616, USA

- 5110.** Harrison, S.S.C.; Pretty, J.L.; Shepherd, D.; Hildrew, A.G.; Smith, C.; Hey, R.D. (2004): The effect of instream rehabilitation structures on macroinvertebrates in lowland rivers. *Journal of Applied Ecology* 41: 1140-1154. (in English). [The analysis of data includes "Calopterygidae"; for a full paper see: <http://www.le.ac.uk/biology/staff/cs152/JAE04.pdf>] Address: Harrison, S., Department of Zoology, Ecology and Plant Sciences, University College, Cork, Lee Maltings, Prospect Row, Cork, Ireland. E-mail: s.harrison@ucc.ie
- 5111.** Hayashi, F.; Arai, Y. (2004): Dispersal modes and population genetic structures of *Pantala flavescens*. In: Arai, Y. [Ed.]: [A countrywide survey of Red Dragonflies in 2003]. Musashino Satoyama Research Group & Institute of Agriculture and Natural Environments, Yorii-cho, Saitama: 47-58. (in Japanese, translated into English by Ishizawa, N.). ["[...] Thus, *P. flavescens* in the non-overwintering region was kept high in genetic diversity despite seasons and localities. This fact suggests that mass and frequent dispersal may occur by migrating for all directions and for a long distance immediately after emergence. It is unlikely for this species that it has fixed migration routes from overwintering regions to Japan and within Japan. Instead, they may come from all over the East Asia randomly. *P. flavescens* is also known to fly over the ocean in a great number [...]" (Authors)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net
- 5112.** Herberholz, J.; Sen, M.M.; Edwards, D.H. (2004): Escape behavior and escape circuit activation in juvenile crayfish during prey predator interactions. *J. Exp. Biol.* 207: 1855-1863. (in English). ["The neural systems that control escape behavior have been studied intensively in several animals, including mollusks, fish and crayfish. Surprisingly little is known, however, about the activation and the utilization of escape circuits during prey predator interactions. To complement the physiological and anatomical studies with a necessary behavioral equivalent, we investigated encounters between juvenile crayfish and large dragonfly nymphs in freely behaving animals using a combination of high-speed video-recordings and measurements of electric field potentials. During attacks, dragonfly nymphs rapidly extended their labium, equipped with short, sharp palps, to capture small crayfish. Crayfish responded to the tactile stimulus by activating neural escape circuits to generate tail-flips directed away from the predator. Tail-flips were the sole defense mechanism in response to an attack and every single strike was answered by tail-flip escape behavior. Crayfish used all three known types of escape tail-flips during the interactions with the dragonfly nymphs. Tail-flips generated by activity in the giant neurons were predominantly observed to trigger the initial escape responses to an attack, but non-giant mediated tail-flips were often generated to attempt escape after capture. Attacks to the front of the crayfish triggered tail-flips mediated either by the medial giant neuron or by non-giant circuitry, whereas attacks to the rear always elicited tail-flips mediated by the lateral giant neuron. Overall, tail flipping was found to be a successful behavior in preventing predation, and only a small percentage of crayfish were killed and consumed." (Authors)] Address: Herberholz, J., Department of Biology, Georgia State University, Atlanta, GA 30303, USA. E-mail: biojhh@langate.gsu.edu
- 5113.** Higler, B. (2004): Yellow-legged dragonfly. In: Bloemmen, M.; Van der Sluis, T. (Eds.): *European corridors: strategies for corridor development for target species*. ISBN 90-767662-16-3: 21-22. (in English). [Species data sheet with information on *Stylurus flavipes*] Address: ECNC, P.O. Box 90154, NL-5037 AA Tilburg, The Netherlands
- 5114.** Hunger, H. (2004): Ungewöhnliche Larven- bzw. Exuvienfunde von *Calopteryx virgo* und *Onychogomphus f. forcipatus*. *mercuriale* 4: 32-33. (in German). [A larva of the reophilous *C. virgo* was collected in a bog water (24-VII-2004) in the Federseemoor, Baden-Württemberg, Germany. (The reophilous) *O. forcipatus* did successfully develop in a dried-up water separated from a gravel pit with permanent water near Hartheim, Baden-Württemberg; 27-VII-2004.] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany
- 5115.** Huysentruyt, F.; Adriaens, D.; Teugels, G.G.; Devaere, S.; Herrel, A.; Verraes, W.; Aerts, P. (2004): Diet composition in relation to morphology in some African anguilliform clariid catfishes. *Belg. J. Zool.* 134(1): 25-30. (in English). [The fish diet includes Odonata.] Address: Huysentruyt, F., Univ. Gent, Vertebrate Morphology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: frank.huysentruyt@rug.ac.be
- 5116.** Ishizawa, N. (2004): Population dynamics and changes of maturity degree in *Sympetrum frequens* at the Okumusashi Hills. In: Arai, Y. [Ed.]: [A countrywide survey of Red Dragonflies in 2003]. Musashino Satoyama Research Group & Institute of Agriculture and Natural Environments, Yorii-cho, Saitama: 29-41. (in Japanese, translated into English by Ishizawa, N.). [This study presents very detailed results on the seasonal changes (July - October) of relative ovarian maturity degree, degree of pruinescens on ventral abdomen and smoking degree of wings in females.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net
- 5117.** Kabus, T.; Hendrich, L.; Müller, R.; Petzold, F.; Meisel, J. (2004): Nährstoffarme, basenarme Seen (FFH-Lebensraumtyp 3130, Subtyp 3131) in Brandenburg und ihre Besiedlung durch Makrophyten, ausgewählte Gruppen des Makrozoobenthos und Libellen. *Naturschutz und Landschaftspflege in Brandenburg* 13 (1): 4-15. (in German). [Characterisation of oligotrophic to mesotrophic standing waters by its faunal composition including Odonata] Address: Petzold, F., Pappelallee 73, D-10437 Berlin E-Mail: falkpetzold@web.de
- 5118.** Karube, H.; Futahashi, R.; Hayashi, F. (2004): A preliminary report on DNA analysis of the endemic dragonflies in the Ogasawara Islands. *Res. Rep. Kanagawa prefect. Mus. nat. Hist.* 12: 55-57. (in Japanese, with English title). [*Rhinocypha ogasawarensis*, *Indolestes boninensis*, *Boninagrion ezoin*, *Hemicordulia ogasawarensis*] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp
- 5119.** Karube, H.; Yakita, R. (2004): Record of *Traema basilaris burmeisteri* Kirby from Ishigaki-jima. *Tombo* 47: 11. (in Japanese, with English title). [Japan; 11.VI.1999] Address: Karube, H., Kanagawa Prefect.

Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

5120. Karube, H. (2004): Vietnamese Odonata collected in 1992-2003 surveys I. Aeshnidae. Tombo 47: 1-11. (in English). [Twenty one aeshnid species are recorded from Vietnam, with description of *Planaeschna viridis* sp. nov. from Bach Ma National Park, C. Vietnam. Females of *Planaeschna tamdaoensis* and *Planaeschna bach-maensis* are first described.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

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5122. Kitt, M. (2004): Das Makrozoobenthon der Fließgewässer im Biosphärenreservat Pfälzerwald". In: Bund für Umwelt und Naturschutz Deutschland, Landesverband Rheinland-Pfalz e.V. (Ott, J.: Hrsg): Biodiversität im Biosphärenreservat Pfälzerwald - Status und Perspektiven. Mainz. ISBN 3-9804353-4-2: 91-107. (in German, with French and English summaries). ["The running waters of the Pfälzerwald mountains (South-western Germany, bordering on France) are, with respect to their geological and structural particularities, strongly shaped by this natural geographic region. In contrast to most other German mountain brooks, they are characterized by their naturalness and by their quality of water. Unfortunately, knowledge about their invertebrate communities is sparse. This paper gives an overview of the data and facts available to date. The results are discussed briefly." (Author) The checklist of the regional rheophilous odonate fauna is definitely very incomplete.] Address: BUND; Gärtnergasse 16, D-55116 Mainz, Germany

5123. Kudela, M.; Dolny, A.; Barta, D.; Blaskovic, T., Bulankova, E. (2004): First records of *Leucorrhinia caudalis* (Odonata, Libellulidae) in Slovakia. Biologia 59(2): 152. (in English). [Slovakia, Podunajská rovina Plain: 1. Cicov, Cicivské mrtve rameno (8272 = grid reference number of the Databank of Slovak fauna), 110 m a.s.l., 28.V.2003, 2 copulae and 1 male; 29.V.2003, 186 males, 6 copulae; 1 exuvium; 5.VI.2003, 18 males. 2. Medved'ov, Opatovské jazierko (8272), 110 m a.s.l., 5-VI-2003, 1 male] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia. E-mail: Bulankova@nic.fns.uniba.sk

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dress: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

5125. Kunz, B. (2004): Hat die Mahd der umliegenden Wiesen eine Auswirkung auf die Lokalpopulation von *Coenagrion ornatum*? mercuriale 4: 33-35. (in German). [Impacts and effects of mowing habitats of the very rare *C. ornatum* are discussed in considerable detail. Some emphasis is given to the diurnal habitat use of the imagines and possible impacts by mowing in phases of reduced mobility.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

5126. Kunz, B.; Hunger, H. (2004): Phänologiedaten 2004 einiger Libellen aus Mitteleuropa. mercuriale 4: 38-40. (in German). [Notes are given to *Sympecma fusca* (emergence of the new generation while adults were still on the wing), *Coenagrion ornatum* (high abundance in 2004), *Ischnura elegans* (early emergence in Saarland), *Ischnura pumilio* (emergence in 16-V-2004), *Pyrrosoma nymphula* (very early emergence at 31-III-2004), *Boyeria irene* (two records near Friedrichshafen, Lake Constanze), *Gomphus pulchellus* (late emergence), *Gomphus vulgatissimus* (early emergence on 6-V-2005 river Elbe near Magdeburg, Sachsen-Anhalt, and river Jaagst near Hohenlohe, Baden-Württemberg), *Crocothemis erythraea*, *Libellula quadrimaculata*, *Sympetrum fonscolombii*] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

5127. Lin, W.-L.; Yeh, C.-C. (2004): Large insect diet of the Brown Hawk Owl *Ninox scutulata* in the Central Taiwan. *tè you sen wù yen jo* (Research on applied biology) 6(2): 19-26. (in English). [The brown hawk owl prefers hunting near road lamps, since a substantial number of insects are attracted under light. Odonata total to 2,2% of the biomass consumed by this owl species.] Address: www.db.tesri.gov.tw/protect/UploadPic/0470110328/047011032819/047011032819pdf.pdf

5128. Lissak, W. (2004): Ein Fund von *Orthetrum albistylum* im nördlichen Albvorland. mercuriale 4: 24-25. (in German). [Heiningen, LK Göppingen, MTB 7323/2, Baden-Württemberg, Germany, 25-VII-2004] Address: Lissak, W., Schubartstr. 12, D-73092 Heiningen, Germany. E-mail: W.Lissak@naturschutzzentrum-schopfloch.de

5129. Lissak, W. (2004): Larve von *Cicindela sylvicola* erbeutet ein Männchen von *Orthetrum brunneum* (Coleoptera: Cicindelidae; Odonata: Libellulidae). *Libellula* 23(3/4): 89-92. (in German, with English summary). ["A male *O. brunneum* was seized on its wing-tips by a larva of the tiger beetle *C. sylvicola*. Due to its size, the dragonfly could not be dragged into the narrow larval burrow and escaped after it had been picked up by the observer. A list of published records of similar interactions between Odonata and tiger beetle larvae is given."] Address: Lissak, W., Schubartstr. 12, D-73092 Heiningen, Germany. e-mail: W.Lissak@naturschutzzentrum-schopfloch.de

5130. Lopez del Castillo, P.; Naranjo Lopez, C.; Fernandez Triana, J.L.; Gonzalez Lazo, D.; Trapero Quintana, A.; Perez Ozoria, J. (2004): Insectas acuaticas del Parque nacional "La Bayamesa", Cuba. *Boln Soc. ent. aragon.* 35: 225-231. (in Spanish, with English summary). [The aquatic insect fauna (n=64), including 6 odo-

nate taxa, was surveyed at 16 localities (alt. 750 and 1752 m) in June 2003 and Feb. 2004.] Address: Lopez del Castillo, P., Empresa Nacional para La Conservación de la Flora y la Fauna, Parque Nacional Turquino, Granma, Cuba

5131. Lorenz, A., Feld, C.K.; Hering, D. (2004): Typology of streams in Germany based on benthic invertebrates: Ecoregions, zonation, geology and substrate. *Limnologica* 34(4): 379-389. (in English). ["Based on 390 benthic invertebrate samples from near-natural streams in Germany we defined eight stream type groups by Non-metric multidimensional scaling (NMS). The taxa lists were restricted to Mollusca, Ephemeroptera, Odonata, Plecoptera, Coleoptera and Trichoptera species and evaluated on presence/absence level. At genus level, streams located in the lowlands differ from streams in lower mountainous areas and the Alps, while the two latter groups were undistinguishable. At species level, a clear separation of different stream size classes is visible in the lowlands; a second gradient is related to the bottom substrate. Streams in the Alps can be distinguished from streams in lower mountainous areas at species level. Within the lower mountainous regions a size gradient is detectable, a less obvious gradient indicates catchment geology. The resulting bottom-up stream typology is compared to other stream typological systems in Germany." (Authors)] Address: Lorenz, A., University of Duisburg-Essen, Institute of Ecology, Dept of Hydrobiology, Universitätsstr. 5, D-45117 Essen, Germany

5132. Mao Sun; Shi Long Lan (2004): A computational study of the aerodynamic forces and power requirements of dragonfly (*Aeshna juncea*) hovering. *J. Exp. Biol.* 207: 1887-1901. (in English). ["Aerodynamic force generation and mechanical power requirements of a dragonfly (*Aeshna juncea*) in hovering flight are studied. The method of numerically solving the Navier Stokes equations in moving overset grids is used. When the midstroke angles of attack in the downstroke and the upstroke are set to 52° and 8°, respectively (these values are close to those observed), the mean vertical force equals the insect weight, and the mean thrust is approximately zero. There are two large vertical force peaks in one flapping cycle. One is in the first half of the cycle, which is mainly due to the hindwings in their downstroke; the other is in the second half of the cycle, which is mainly due to the forewings in their downstroke. Hovering with a large stroke plane angle (52°), the dragonfly uses drag as a major source for its weight-supporting force (approximately 65% of the total vertical force is contributed by the drag and 35% by the lift of the wings). The vertical force coefficient of a wing is twice as large as the quasi-steady value. The interaction between the fore- and hindwings is not very strong and is detrimental to the vertical force generation. Compared with the case of a single wing in the same motion, the interaction effect reduces the vertical forces on the fore- and hindwings by 14% and 16%, respectively, of that of the corresponding single wing. The large vertical force is due to the unsteady flow effects. The mechanism of the unsteady force is that in each downstroke of the hindwing or the forewing, a new vortex ring containing downward momentum is generated, giving an upward force. The body-mass-specific power is 37 W kg⁻¹, which is mainly contributed by the aerodynamic power." (Authors)] Address: Mao Sun, Institute of Fluid Mechanics, Beijing University of Aeronautics &

Aeronautics, Beijing 100083, People's Republic of China. E-mail: sunmao@public.fhnet.cn.net)

5133. Matsuzaki, Y. (2004): Aka-tombo from the western region of Saiama Prefecture. In: Arai, Y. [Ed.]: [A countrywide survey of Red Dragonflies in 2003]. *Musashino Satoyama Research Group & Institute of Agriculture and Natural Environments, Yorii-cho, Saitama: 19-22.* (in Japanese, translated into English by Ishizawa, N.). [Populations trends in the 1990th and early 21. century of 13 taxa of the genus *Sympetrum* from western region of Saiama Prefecture, Japan are reported and discussed.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

5134. Mauersberger, R. (2004): Bibliographie der Odonatologen in der DDR: die Jahre 1984 bis 1990 und Beiträge zur Libellenfauna anderer Länder (Odonata). *Libellula* 23(3/4): 137-151. (in German, with English summary). ["In the years 1984 to 1990, 154 papers on Odonata were published by odonatologists of the former German Democratic Republic (GDR). The maximum number of publications per year rised to 33 in 1989. Additionally, between 1956 and 1990 25 articles on the odonate fauna of other countries were published by those workers." (Author)] Address: Mauersberger, R., Bahnhofstraße 24, D-1 7268 Templin, Germany. E-mail: FoerdervereinUckermaerk.Seen@t-online.de

5135. Maybury, W.J.; Lehmann, F.-O. (2004): The fluid dynamics of flight control by kinematic phase lag variation between two robotic insect wings. *J. Exp. Biol.* 207: 4707-4726. (in English). ["Insects flying with two pairs of wings must contend with the forewing wake passing over the beating hindwing. Some four-winged insects, such as dragonflies, move each wing independently and therefore may alter the relative timing between the fore- and hindwing stroke cycles. The significance of modifying the phase relationship between fore- and hindwing stroke kinematics on total lift production is difficult to assess in the flying animal because the effect of wing-wake interference critically depends on the complex wake pattern produced by the two beating wings. Here we investigate the effect of changing the fore- and hindwing stroke-phase relationship during hovering flight conditions on the aerodynamic performance of each flapping wing by using a dynamically scaled electromechanical insect model. By varying the relative phase difference between fore- and hindwing stroke cycles we found that the performance of the forewing remains approximately constant, while hindwing lift production may vary by a factor of two. Hindwing lift modulation appears to be due to two different fluid dynamic phenomenons: leading edge vortex destruction and changes in strength and orientation of the local flow vector. Unexpectedly, the hindwing regains aerodynamic performance near to that of the wing free from forewing wake interference, when the motion of the hindwing leads the forewing by around a quarter of the stroke cycle. This kinematic relationship between hind- and forewing closely matches the phase-shift commonly used by locusts and some dragonflies in climbing and forward flight. The experiments support previous assumptions that active neuromuscular control of fore- and hindwing stroke phase might enable dragonflies and other functionally four-winged insects to manipulate ipsilateral flight force production without further changes in wing beat kinematics." (Authors)] Address: Lehmann,

F.-O., Department of Neurobiology, University of Ulm, Albert-Einstein-Allee 11, 89081 Ulm, Germany. E-mail: fritz.lehmann@biologie.uni-ulm.de

5136. Mayer, G. (2004): Die Kleine Zangenlibelle *Onychogomphus forcipatus* (L. 1758) am unteren Lech. *Berichte naturwissenschaftlichen Vereins für Schwaben* 108: 94-98. (in German). [Current records of *O. forcipatus* are documented from along the river Lech south of Augsburg, Bavaria, Germany.] Address: Mayer, G., Am Harfenacker 10, D.86136 Friedberg, Germany

5137. McCauley, S. (2004): The role of dispersal and habitat selection in odonate species distributions. *Ecological Society of America Annual Meeting Abstracts* 89 2004: 331. (in English). [Verbatim: Species' distributions are affected by both local conditions and regional processes, including dispersal. A transition in the top predator community from fish to invertebrate predators is a critical gradient in aquatic communities. While the local factors affecting species distributions across this gradient are well studied, there has been less work on how dispersal and habitat selection affect the development of local communities along this gradient. This study relates dispersal and habitat selection (measured by colonization rates) to species' distributional breadths across a top predator gradient. To measure dispersal and colonization, 29 artificial ponds were established in 2002 and monitored through 2003. These artificial ponds (cattle watering tanks) were placed at varying distances of up to two kilometers from three lakes with alternative top predators (sunfish, minnow, and invertebrate predators) in a landscape context where species distributions in the surrounding natural ponds had been monitored for several years. Dispersal was quantified by adult censuses. In two years of sampling, 23 species of adult dragonfly were observed at tanks. Colonization was measured by collecting and identifying larvae from the tanks in three surveys each year. Fourteen species of dragonfly larvae colonized tanks. Distance from natural lakes did not affect species richness of either dispersers or colonists at tanks. There were, however, high levels of species turn-over between tanks near lakes and far from lakes and turn-over increased with distance. Results also found dispersal rates and distances were positively related to species' habitat breadth. Habitat generalists also colonized tanks at significantly greater rates than habitat specialists. These results suggest that differential dispersal and habitat selection between habitat specialists and generalists is an important mechanism in determining species distributions.] Address: McCauley, Shannon, Univ Michigan, Ann Arbor, MI, 48109, USA.

5138. Mikolajewski, D.J.; Leipelt, K.G.; Conrad, A.; Giere, S.; Weyer, J. (2004): Schneller als gedacht: einjährige Larvalentwicklung und 'slow life style' bei *Leucorrhinia caudalis* (Odonata: Libellulidae). *Libellula* 23(3/4): 161-171. (in German, with English summary). ["Few is known about the biology of larval *L. caudalis*. In this study, we present data on the larval development, activity, and habitat selection. We sampled larvae in a lake in Brandenburg, Germany, between spring 2002 and autumn 2004 and recorded their size distribution. Additionally, we measured the activity of 70 larvae in the laboratory in presence and absence of perch, but no significant differences were found. In contrast to former studies, larval *L. caudalis* showed an univoltine life cycle, although possessing a low activity. We dis-

cuss our data in relation to the 'slow-fast life style'-concept." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

5139. Mikihiro, O. (2004): Population dynamics in *Pantala flavescens* on the Daito Islands and Tokunoshima Island. In: Arai, Y. [Ed.]: [A countrywide survey of Red Dragonflies in 2003]. Musashino Satoyama Research Group & Institute of Agriculture and Natural Environments, Yorii-cho, Saitama: 59-62. (in Japanese, translated into English by Ishizawa, N.). [Seasonal changes of abundance, reproduction and effects of typhoons are described in detail.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

5140. Müller, J.; Steglich, R. (2004): Rote Liste der Libellen (Odonata) des Landes Sachsen-Anhalt. 2. Fassung, Stand: Februar 2004. *Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt* 39: 212-216. (in German). [Sachsen-Anhalt, Germany; update of the Red list of endangered Odonata.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

5141. Müller, R.; Kabus, T.; Hendrich, L.; Petzold, F.; Meisel, J. (2004): Nährstoffarme kalkhaltige Seen (FFH-Lebensraumtyp 3140) in Brandenburg und ihre Besiedlung durch Makrophyten und ausgewählte Gruppen des Makrozoobenthos. *Naturschutz und Landschaftspflege in Brandenburg* 13(4): 132-143. (in German). [Characterisation of hard oligo-mesotrophic waters (calcareous lakes) by its faunal composition including Odonata.] Address: Petzold, F., Pappelalle 73, D-10437 Berlin E-Mail: falkpetzold@web.de

5142. Osterwalder, R. (2004): Gomphiden-Nachweise an Fließgewässern im Kanton Aargau (Schweiz) und angrenzenden Gebieten 1993-2001. *mercuriale* 4: 6-16. (in German). [The paper summarises in detail one of last runing monitoring programmes directed to European odonate species. Records of exuviae are detailed for *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Gomphus vulgatissimus*, and *G. simillimus*, and for six river stretches in Switzerland. Additional notes are made on the impact of the wash of moving boats or ships on individuals emerging near the waterline, sex-ratio, differences in species spectrum of the rivers surveyed, the longitudinal differences of records of imagines and exuviae, and recording & sampling methods. The records of the exuviae of the four species and in addition of *G. pulchellus* are mapped.] Address: Osterwalder, R., Obere Haitweiden 6, CH-5642 Mühlau, Switzerland. E-mail: r.osterwalder@mysunrise.ch

5143. Ott, J. (2004): Probleme im Biosphärenreservat Pfälzerwald aus Sicht der Entomologie. In: Bund für Umwelt und Naturschutz Deutschland, Landesverband Rheinland-Pfalz e.V. (Ott, J.: Hrg): *Biodiversität im Biosphärenreservat Pfälzerwald - Status und Perspektiven*. Mainz. ISBN 3-9804353-4-2: 108-123. (in German, with French and English summaries). [The present knowledge of the distribution and endangerment of several insect groups (among them: Odonata) in the biosphere reserve (BSR) Pfälzerwald, Rheinland-Pfalz, Germany is analysed, and their importance for all planning projects is pointed out. "A special entomological mapping of the BSR, covering all major and important groups, is lacking. There is no synopsis and evaluation

of existing data of museums, collections of universities and private persons, publications and the grey literature available. But such a general perspective is the basis and precondition of any serious assessment of the endangerment of the species and of any landscape planning, environmental impact assessment or monitoring programme (e.g. according to the EC habitats directive). Some causes of endangerment - especially focusing on insects - are listed and their consequences are pointed out. From the point of view of entomological nature conservation a more intensive data collection, their documentation in a central institution, the coordination of the activities with the French part of the BSR, more species protection programmes for highly endangered species and the integration of insects in environmental education is proposed and asked for." (Author)] Address: BUND; Gärtnergasse 16, D-55116 Mainz, Germany

5144. Pardey, A.; Rauers, H.; Weyer, K. van de; Thomas, B. (2004): Gräben in Nordrhein-Westfalen. Empfehlungen zur Unterhaltung aus naturschutzfachlicher Sicht. Mitt. LÖBF 4/04: 40-46. (in German). [The importance of ditches as habitat is outlined with special reference to ditch management measures. Prominent members of the ditch fauna in Nordrhein-Westfalen, Germany are *Coenagrion mercuriale* and *C. ornatum*. For details see: <http://www.loebf.nrw.de/Willkommen/Aktuelles/Publikationen/LOEBFMitteilungen/Mitteilung-042004/AusdemInhalt/0404pardeyrauersweyers4046.pdf>] Address: Pardey, A., LÖBF NRW, Biotopschutz und Biotopverbund, Castroper Str. 30, D-45665 Recklinghausen, Germany. E-mail: andreas.pardey@loebf.nrw.de

5145. Petzold, F.; Martin, P. (2004): *Limnochares aquatica* als Parasit von *Leucorrhinia albifrons* (Hydrachnida: Limnocharidae; Odonata: Libellulidae). *Libellula* 23(3/4): 93-97. (in German, with English summary). ["Males of *L. albifrons* were found parasitised by larvae of the water mites *Arrenurus* sp. as well as *Limnochares aquatica* in June 2003 in a fen water in northern Brandenburg, Germany. This is the first record of an anisopteran dragonfly as host of the water mite genus *Limnochares* in Central Europe." (Authors)] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany, E-mail: falkpetzold@web.de

5146. Piganeau, G.I.; Gardner, M.; Eyre-Walker, A. (2004): A broad survey of recombination in animal mitochondria. *Mol. Biol. Evol.* 21(12): 2319-2325. (in English). ["Recombination in mitochondrial DNA (mtDNA) remains a controversial topic. Here we present a survey of 279 animal mtDNA data sets, of which 12 were from asexual species. Using four separate tests, we show that there is widespread evidence of recombination; for one test as many as 14.2% of the data sets reject a model of clonal inheritance and in several data sets, including primates, the recombinants can be identified visually. We show that none of the tests give significant results for obligate clonal species (apomictic parthogens) and that the sexual species show significantly greater evidence of recombination than asexual species. For some data sets, such as *Macaca nemestrina*, additional data sets suggest that the recombinants are not artifacts. For others, it cannot be determined whether the recombinants are real or produced by laboratory error. Either way, the results have important implications for how mtDNA is sequenced and used." (Authors)] The study includes *Libellula quadrimaculata*.] Address:

Piganeau, G.I., Centre for the Study of Evolution, School of Life Sciences, University of Sussex, Brighton, UK. E-mail: gwenael.piganeau@obs-banyuls.fr

5147. Reichen-Robert, E.; Robert, A. (2004): Die Libellen und der Maler Paul-André Robert. Fondation Collection Robert, Bienne. ISBN 3-9522989-0-5: 18 pp. (in German). [This is the guide through the exhibit (5 Dec. 2004 - 10 Apr. 2005) of dragonfly illustrations of the famous Swiss artist, P.-A. Robert (1901-1977) in German language; a French edition is also available. The paper contains a brief biographic outline, annotations on his odonatological work, and some reproductions of illustrations of Odonata including colour pictures of the larvae of *Calopteryx haemorrhoidalis* and *Eitheca bimaculata*.] Address: Stiftung Sammlung Robert, 26 promenade de la Suze, CH-2501 Biel-Bienne

5148. Rodenkirchen, J. (2004): Die Libellen des Neffelbaches bei Zülpich. *Decheniana* 157: 119-125. (in German, with English summary). [Along the Neffelbach (Zülpich, North Rhine-Westphalia, Germany) seven wetlands have been created; each with different numbers of pools. They were established in the last 30 years and extend along a distance of six kilometers. The centre of the area is the Füssenicher See. In this area 39 species of Odonata have been observed, among them *Leucorrhinia pectoralis*. *Crocothemis erythraea* has been observed over a period of eleven years and has to be regarded as a native species in North Rhine-Westphalia.] Address: Rodenkirchen, J., Rövenicher Str. 3, D-50374 Erstadt-Scheuren, Germany

5149. Rust, C. (2004): Petite Camargue alsacienne, Libellenparadies in der südlichen Oberrheinebene. *mercuriale* 4: 2-5. (in German). [The current knowledge on the odonate fauna of this famous nature reserve in Alsace, France is compiled in a table. *Coenagrion mercuriale* is a new addition to the fauna, and of special concern with reference of the European network Natura 2000.] Address: Rust, C., 4, rue de l'ancre, F-688330 Huninge, France. E-mail: chrigirust@yahoo.de

5150. Safi, K.; Kerth, G. (2004): A comparative analysis of specialization and extinction risk in temperate-zone bats. *Conservation Biology* 18(5): 1293-1303. (in English). [The percent volume of Odonata in the prey of bats is compiled in appendix 1. Available at: www.zool.unizh.ch/Research/AnimalBehaviour/Koenig/Researchgroups/BatResearch/Vespertilio/j.1523-1739.2004.00-155.x.pdf] Address: Kerth, G., Universität Zürich, Verhaltensbiologie, Zoologisches Institut, Winterthurerstr. 190, CH-8057 Zürich, Switzerland

5151. Samwald, O. (2004): Die Libellenfauna eines rückgebauten Bachlaufes bei Rudersdorf im südlichen Burgenland, Österreich (Odonata). *Joannea - Zoologie* 6: 247-256. (in German, with English summary). ["The dragonfly community of the rivulet Lahn was investigated along a 750 m transect in the year 1993. The Lahnbach was formerly a straight canal and at the beginning of the 1990s this canal was more naturally formed. Between 13th May and 28th September a total of 24 Odonata species were found. The high number of species could be explained by the co-existence of running and standing water. Therefore Odonata species preferring both rivers (*Calopteryx virgo*, *C. splendens*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*) and ponds (*Erythromma najas*, *Anax imperator*, *Orthetrum cancellatum*) could be detected. *Platycnemis pennipes*

was found to be the most abundant species. Also many species (*Erythromma viridulum*, *Orthetrum albistylum*, *O. brunneum*, *Crocothemis erythraea*) with a more southerly distribution could be observed in comparatively high numbers." (Author)] Address: Samwald, O., Übersbachgasse 51c/6, A-8280 Fürstenfeld, Austria. E-mail: ottosamwald@aon.at

5152. Samways, M. (2004): Southern African Invertebrate. Species 41: 21-22. (in English). [Verbatim: [...] What has been really surprising, and encouraging, is that some species of damselfly (Odonata) that were thought to be extinct have reappeared. They must have had remnant populations in remote localities, which have been source populations to colonize areas cleared of invasive aliens. Three species of damselfly, the harlequin sprite, the cape bluet and the ceres stream damsel, have reappeared, having not been seen for decades despite intensive searches. This bodes extremely positively for the invasive alien clearing programme. [...] (Pseudagrion newtoni, Enallagma polychromaticum, Metacnemis angusta)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

5153. Schiel, F.-J.; Hessner, W.; Ebel, C. (2004): Neufunde von *Somatochlora alpestris* im Nordschwarzwald. *mercuriale* 4: 22-24. (in German). [New records of the species from the "Gründenschwarzwald", Baden-Württemberg, Germany from July 2004 are documented.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

5154. Schiel, F.-J. (2004): Spätfund kleiner *Gomphus pulchellus*-Exuvien. *mercuriale* 4: 35. (in German). [Possible explanations for a very late emergence of *G. pulchellus* at the Mindelsee, Baden-Württemberg are discussed considering aspects of a prolonged larval development due to intraspecific competition, or a far to year emergence in 2004 "scheduled" in 2005.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

5155. Schindler, S.; Kiliyas, A. (2004): Rückzug der Grünen - Beobachtungen und Schutz der Grünen Moaikjungfer. Hausarbeit am Gymnasium Templin: 44 pp. (in German). [Brandenburg, Germany; between 1999 and 2004, 26 odonate species have been recorded in a water body dominated by *Stratiotes aloides*. Generell aspects of morphology and biology of Odonata are compiled, and observations on *Leucorrhinia pectoralis* and *Aeshna viridis* are reported with some detail. This is a very interesting paper of two school leaving examen-students, and a hopefully start in an odonatological career. Available at: www.ipn.uni-kiel.de/projekte/buw/Libges.pdf] Address: not stated

5156. Schmidt, E. (2004): Klimaerwärmung und Libellenfauna in Nordrhein-Westfalen - divergente Fallbeispiele. *Entomologie heute* 16: 71-82. (in German, with English summary). [Several examples are outlined to distinguish between range extensions induced by global warming and improved availability of habitats by anthropogenic activities.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

5157. Speight, M.C.D. (2004): Insect records from the Connemara (Co. Galway) and Mayo (Co. Mayo) National Parks, western Ireland. *Bull. Ir. biogeog. Soc.* 28: 31-60. (in English). [Malaise trap; *Pyrrhosoma nymphula*, *Lestes sponsa*] Address: Speight, M.C.D., Natn. Parks & Wldl., 7 Ely Place, Dublin-2, Ireland

5158. Starr, F.; Starr, K.; Loope, L.L. (2004): New arthropod records from Kaho'olawe. Bishop museum occasional papers 79: 50-54. (in English). [Verbatim: Odonata: Aeshnidae: *Anax junius* (Drury) New island record. Previously known from all the main islands except Ni ihau and Kaho olawe (Nishida, 2002). Material examined: KAHO OLAWA: 1, Keanakeiki Beach, resting on kiawe (*Prosopis pallida*) foliage behind sand dune, 10 ft [3 m], 07 Oct 2003, Starr, Starr, King, Tokishi, & Busby 031007-2. Odonata: Libellulidae *Pantala flavescens* (Fabricius) New island record. Previously known from Kure, Midway, French Frigate Shoals, and all the main islands except Kaho olawe (Nishida, 2002). Material examined: KAHO OLAWA: 1, Kaukukapapa Beach, flying near wetland at north end of beach, 10 ft [3 m], 07 Oct 2003, Starr, Starr, King, Tokishi, & Busby 031007-1.] Address: Atarr, F., United States Geological Survey Biological Resources Division, P.O. Box 369, Makawao, Hawai'i 96768, USA

5159. Sternberg, K. (2004): Mit Küchensieb und Frisbee-Scheibe auf der Suche nach verborgenen Smaragden. *mercuriale* 4: 17-21. (in German). [The paper summarizes 30 years of experience in searching and finding(!) the rare *Somatochlora arctica* in Germany. Beside some more or less amusing stories (damaging of the car by tourists, criminalising of odonatological work, etc.), a lot of hints on efficient sampling of the larvae of *S. arctica* are given. In addition, morphological features to identify the larvae of *S. arctica* and *S. alpestris* in the field are presented in a table. This is a publication very worth reading.] Address: Sternberg, K., Schillerstr. 15, D-76297 Stutensee, Germany. E-mail: k.sternberg@t-online.de

5160. Suttle, K.B.; Power, M.E.; Levine, J.M.; McNeely, C. (2004): How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. *Ecological Applications* 14(4): 969-974. (in English). ["Although excessive loading of fine sediments into rivers is well known to degrade salmonid spawning habitat, its effects on rearing juveniles have been unclear. We experimentally manipulated fine bed sediment in a northern California river and examined responses of juvenile salmonids and the food webs supporting them. Increasing concentrations of deposited fine sediment decreased growth and survival of juvenile steelhead trout. These declines were associated with a shift in invertebrates toward burrowing taxa unavailable as prey and with increased steelhead activity and injury at higher levels of fine sediment. The linear relationship between deposited fine sediment and juvenile steelhead growth suggests that there is no threshold below which exacerbation of fine-sediment delivery and storage in gravel bedded rivers will be harmless, but also that any reduction could produce immediate benefits for salmonid restoration." (Authors) Odonata are treated on the family level.] Address: Suttle, K.B., Dept Integrative Biol., University of California, Berkeley, California 94720-3140 USA. E-mail: kbsuttle@socrates.berkeley.edu

5161. Switzer, P.V. (2004): Fighting behavior and prior residency advantage in the territorial dragonfly, *Perithemis tenera*. *Ethol. Ecol. Evol.* 16: 71-89. (in English). ["Many factors, including residency status, body size, age, and energetic reserves, have been implicated as possibly determining the winner in animal contests. In this study I investigated which of these factors were correlated with the outcomes of naturally-occurring territorial contests between male amberwing dragonflies (*P. tenera*). Amberwing contests consist of non-contact interactions and are characterized by a series of distinct stages that represent different levels of escalation. Prior residents did tend to win, but interestingly this residency advantage only occurred in interactions that were not escalated. For both non-escalated and escalated interactions, body size (wing length) did not influence the outcome. Age was correlated with outcome for escalated interactions, with the younger of the pair tending to win. Winning males had also spent less time in male-male interactions both the day of the interaction and during their entire life, suggesting that energy reserves may also affect the outcome of contests. In contrast to escalated interactions, age and time spent in male-male interactions was not related to the outcome of non-escalated interactions. The difference between the two opponents' sizes, ages, and time spent in previous male-male interactions did not correlate with duration or escalation level of contests. These results suggest that non-escalated interactions may occur when intruders are simply assessing the quality of the site. Contests that do not escalate, and thus the prior residency advantage, are probably a result of the intruder not challenging for ownership because the value of the territory is too low." (Author)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

5162. Tam, T.W.; Wilson, K.D.P.; Wong, J.K.; Kwan, B.S.P. (2004): A dragonfly species new to science found in Hong Kong. *Hong Kong Biodiversity* 7: 13. (in English, with Chinese summary). [*Fukienogomphus* sp., for details see: www.hkbiodiversity.net/newsletters/HKBOnewsletter7.pdf] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

5163. Terzani, F.; Marconi, A. (2004): Description of *Pseudagrion mascagnii* n. sp. from Sierra Leone (Insecta Odonata Coenagrionidae). *Quaderno di studi e notizie di storia naturale della Romagna* 19: 141-146. [The new species is described, illustrated, and its affinities are discussed. Holotype male, allotype female (probably in copula?): Sierra Leone, Western Area, Regent, no date; deposited in MZF, Firenze.] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

5164. Thomas, A.L.R.; Taylor, G.K.; Srygley, R.B.; Nudds, R.L.; Bomphrey, R.J. (2004): Dragonfly flight: free-flight and tethered flow visualizations reveal a diverse array of unsteady lift-generating mechanisms, controlled primarily via angle of attack. *J. Exp. Biol.* 207: 4299-4323. (in English). ["Here we show, by qualitative free- and tethered-flight flow visualization, that dragonflies fly by using unsteady aerodynamic mechanisms to generate high-lift, leading-edge vortices. In normal free flight, dragonflies use counterstroking kinematics, with a leading-edge vortex (LEV) on the fo-

rewing downstroke, attached flow on the forewing upstroke, and attached flow on the hindwing throughout. Accelerating dragonflies switch to in-phase wingbeats with highly separated downstroke flows, with a single LEV attached across both the fore- and hindwings. We use smoke visualizations to distinguish between the three simplest local analytical solutions of the Navier Stokes equations yielding flow separation resulting in a LEV. The LEV is an open U-shaped separation, continuous across the thorax, running parallel to the wing leading edge and inflecting at the tips to form wingtip vortices. Air spirals in to a free-slip critical point over the centreline as the LEV grows. Spanwise flow is not a dominant feature of the flow field spanwise flows sometimes run from wingtip to centreline, or vice versa depending on the degree of sideslip. LEV formation always coincides with rapid increases in angle of attack, and the smoke visualizations clearly show the formation of LEVs whenever a rapid increase in angle of attack occurs. There is no discrete starting vortex. Instead, a shear layer forms behind the trailing edge whenever the wing is at a non-zero angle of attack, and rolls up, under Kelvin Helmholtz instability, into a series of transverse vortices with circulation of opposite sign to the circulation around the wing and LEV. The flow fields produced by dragonflies differ qualitatively from those published for mechanical models of dragonflies, fruitflies and hawkmoths, which preclude natural wing interactions. However, controlled parametric experiments show that, provided the Strouhal number is appropriate and the natural interaction between left and right wings can occur, even a simple plunging plate can reproduce the detailed features of the flow seen in dragonflies. In our models, and in dragonflies, it appears that stability of the LEV is achieved by a general mechanism whereby flapping kinematics are configured so that a LEV would be expected to form naturally over the wing and remain attached for the duration of the stroke. However, the actual formation and shedding of the LEV is controlled by wing angle of attack, which dragonflies can vary through both extremes, from zero up to a range that leads to immediate flow separation at any time during a wing stroke." (Authors) Additional information: <http://users.ox.ac.uk/~zool0206/dragon.html>] Address: Thomas, A., Dept Zoology, Oxford Univ., South Parks Rd, Oxford, OX1 3PS, UK. E-mail: Adrian.thomas@zoo.ox.ac.uk

5165. Tończyk, G.; Pakulnicka, J. (2004): Aquatic insects (Odonata, Heteroptera, Coleoptera) of Łódź: preliminary results. In: P. Indykiewicz & T. Barczak, [Eds], *Fauna miast Europy Środkowej 21. wieku*, Logo, Bydgoszcz: 95-101. (in Polish, with English summary). [Poland; A commented checklist is presented of 41 odonate species. Of particular interest are *Aeshna affinis*, *Somatochlora arctica* and *Orthetrum brunneum*.] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii, Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland

5166. Voigt, J.; Wolf, J.; Zinke, J. (2004): *Somatochlora arctica* in der Dresdner Heide, Sachsen (Odonata: Corduliidae). *Libellula* 23(3/4): 131-136. (in German, with English summary). ["Records of *S. arctica* are provided from the hilly region of Saxony. Apart from a short characterization of the recording sites, an indication of possible additional habitats in surrounding areas is given." (Authors)] Address: Voigt, H., Grundstraße 152,

D-01324 Dresden, Germany. E-mail: voigt@nature-concept.de

5167. Vonesh, J.R. (2004): Sequential predator effects across three life-stages of the African treefrog, *Hyperolius spinigularis*. Ecological Society of America Annual Meeting Abstracts 89 2004: 525-526. (in English). [Verbatim: Due to their complex life cycles, amphibians may interact with different predators during different life-stages. These predators may occur in different habitats and thus may not interact directly. However, sequential predators in complex life histories may influence each other indirectly, through effects on prey size, density, and behavior. Here I examine the effects sequential predators on three stages (egg, larval, and post-metamorph) of the African treefrog *Hyperolius spinigularis*. This study was conducted at the Amani Nature Reserve, in the East Usambara Mountains of Tanzania. I monitored the density and survival of arboreal *H. spinigularis* clutches in the field to estimate how much egg-stage predation by another treefrog reduced the input of tadpoles into the pond. I then conducted experiments to determine; (1) how such reductions in initial larval density influence larval survival and size and age at metamorphosis in the presence and absence larval predators, dragonfly larvae, and (2) how plasticity in size/age at metamorphosis affects encounters with post-metamorphic predators, fishing spiders. Reductions in larval density by both egg- and larval-stage predators increased size at metamorphosis. Larger size had immediate benefits, as larger metamorphs had higher survival in encounters with fishing spiders. Thus, density-mediated effects of early predators gave rise to trait-mediated risk reduction in encounters with later life-stage predators.] Address: Vonesh, J.R., Dept Zool, Univ Florida, Gainesville, FL, 32611, USA

5168. Wang, Z.J. (2004): The role of drag in insect hovering. *J. Exp. Biol.* 207: 4147-4155. (in English). ["Studies of insect flight have focused on aerodynamic lift, both in quasi-steady and unsteady regimes. This is partly influenced by the choice of hovering motions along a horizontal stroke plane, where aerodynamic drag makes no contribution to the vertical force. In contrast, some of the best hoverers dragonflies and hoverflies employ inclined stroke planes, where the drag in the down- and upstrokes does not cancel each other. Here, computation of an idealized dragonfly wing motion shows that a dragonfly uses drag to support about three quarters of its weight. This can explain an anomalous factor of four in previous estimates of dragonfly lift coefficients, where drag was assumed to be small. To investigate force generation and energy cost of hovering flight using different combination of lift and drag, I study a family of wing motion parameterized by the inclined angle of the stroke plane. The lift-to-drag ratio is no longer a measure of efficiency, except in the case of horizontal stroke plane. In addition, because the flow is highly stalled, lift and drag are of comparable magnitude, and the aerodynamic efficiency is roughly the same up to an inclined angle about 60°, which curiously agrees with the angle observed in dragonfly flight. Finally, the lessons from this special family of wing motion suggests a strategy for improving efficiency of normal hovering, and a unifying view of different wing motions employed by insects." (Author)] Address: Wang, Z. Jane, Theoretical & Applied Mechanics, Cornell University, Ithaca, NY 14853, USA. E-mail: jane.wang@cornell.edu

5169. Westermann, K. (2004): Kleinräumige Unterschiede des durchschnittlichen Emergenzzeitpunktes bei *Lestes viridis* an einem Altrhein. *mercuriale* 4: 27-29. (in German). [Different insolation duration is discussed to be responsible for the phenological difference in small-scale emergence patterns of *Chalcolestes viridis* along an app. 50 m stretch of a river bank.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

5170. Wildermuth, H. (2004): *Nehalennia speciosa* in der Schweiz: ein Nachruf (Odonata: Coenagrionidae). *Libellula* 23(3/4): 99-113. (in German, with English summary). ["*N. speciosa* was recorded in Switzerland from 1867 to 1990, found at 17 localities that concentrated on the canton Zürich in the eastern Swiss Plateau. Until the first half of the seventies of the 20th century a number of small populations and some large ones were known. After 1976 they all became extinct or broke down to a large extent. Only at one locality that was monitored regularly a much reduced population survived during 14 years but never recovered. It is suggested that *N. speciosa* became extinct because of desiccation of its formerly already damaged habitats in the very long dry summer 1976 combined with changes in the vegetation due to slow eutrophication. Considering the fact that it is also extinct or highly endangered in the neighbouring countries of Switzerland and in view of the strong regressive tendencies of the sp. in Central Europe, its future in the Alpine region depends largely on the conservation of the last large populations known to exist in southern Bavaria." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

5171. Wildermuth, H. (2004): Wie haben die Libellen den trockenheißen Sommer 2003 überstanden? *mercuriale* 4: 29-31. (in German). [The impacts and effects of the hot summer 2003 on the very well known and monitored dragonfly population of the "Drumlinlandschaft" near Zürich, Switzerland is described and discussed in detail. Although, the abundance of many species decreased in 2003, none of the species disappeared. Obviously, in spite of many habitats fallen dry, microhabitats have been available which enabled some specimens to develop to imago. Conservation measures (e.g. blocking of ditches) realised in the past years have been successfully because water was retained in the locality.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

5172. Wilson, K.A.; Magnuson, J.J.; Lodge, D.M.; Hill, A.M.; Kratz, T.K.; Perry, W.L.; Willis, T.V. (2004): A long-term rusty crayfish (*Orconectes rusticus*) invasion: dispersal patterns and community change in a north temperate lake. *Canadian Journal of Fisheries and Aquatic Sciences* 61(11): 2255-2266. (in English). ["Rusty crayfish (*Orconectes rusticus*) were first observed in Trout Lake, Wisconsin, in 1979 and took 19 years to completely disperse around the littoral zone, advancing at an average rate of 0.68 km/year¹. With the invasion of rusty crayfish, we found that fishes that share prey taxa with crayfish declined in numbers over time, but piscivorous fish species did not change in abundance. Snails declined from >10 000 to <5 snails·m² in one of the first invaded areas. Mean abundance of Odonata, Amphipoda, and Trichoptera decreased significantly lake-wide. Resident crayfish species nearly disappeared,

although total crayfish abundance, driven by high abundances of rusty crayfish, continued to rise. Submerged macrophyte species richness declined by as much as 80% at some locations. Together these responses demonstrate dramatic long-term changes in the littoral zone biota of Trout Lake. Continued invasions of similar lakes in the region suggest that these impacts are occurring on a region-wide basis with potentially irreversible effects on communities and ecosystems. Only through long-term natural experiments such as this study can researchers ascertain the full extent of invasions and their impacts on community and ecosystem process that respond at spatial and temporal scales not captured in mesocosm studies.] Address: Hill, Anna, M., Dept Biology, The Univ. of Louisiana at Monroe, Monroe, Louisiana 71209. USA. E-mail: hill@ulm.edu

5173. Zawal, A.; Buczyński, P.; Pietrzak, L. (2004): Aquatic invertebrates of the lowland peatbog Krepski Bagno (northwestern Poland). In: L. Wolejko & J. Jasnowska. [Eds], The future of Polish mires. Agriculture University of Szczecin, Szczecin: 199-204. (in English, with Polish summary). [In 2003, 12 odonate species were recorded in the peatbog dominated by a vegetation of willow shrubs and reed (*Carex* sp. div.)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

5174. Zawal, A.; Buczyński, P.; Mrowiński, P. (2004): Dragonflies (Odonata) of some small water bodies in the vicinity of Nowogard (the Szczecin Coastal Region). *Wiad. entomol.* 23(4): 197-213. (in Polish, with English summary). [During 1999-2000, 33 odonate species were recorded in small water bodies in the vicinity of Nowogard (N Poland), among them *Sympetma paedisca*, *Aeshna subarctica elisabethae* and five species of the genus *Leucorrhinia*. "The composition and structure of dragonfly communities are analysed in the paper, as well as their dependence on selected natural and anthropogenic factors. The literature data about dragonflies of the Szczecin Coastal Region are summarised. Because of the occurrence of some protected and red listed dragonfly species, the setting up of a reserve is proposed at one of the localities." (Authors)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

5175. Zimmermann, W.; Kipping, J. (2004): Zur Frage des Vorkommens von *Nehalennia speciosa* in Thüringen (Odonata: Coenagrionidae). *Libellula* 23(3/4): 127-130. (in German, with English summary). ["Two published records of *N. speciosa* from E-Thuringia are critically discussed. These only known records of the species from Thuringia are considered as accidentally misidentified *Ischnura pumilio*. Consequently, *N. speciosa* has not been included in the checklist of Thuringian Odonata." (Authors)] Address: Zimmermann, W., Th.-Müntzer-Str. 5, D-99423 Weimar, Germany. E-mail: wolfgang.zimmermann.we@t-online.de

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5176. Abidemi Fabunmi, F.; Segun Salawu, A. (2005): Is Yorùbá an endangered language? *Nordic*

Journal of African Studies 14(3): 391-408. (in English). [The Yorùbá language belongs to the West Benue-Congo of the Niger-Congo phylum of African languages (Williamson and Blench 2000: 31). Apart from Nigeria with about 30 million Yorùbá speakers, Yorùbá is still spoken in Togo, Republic of Benin, Ghana, Sudan, Sierra-Leone, and Côte D Ivoire. Outside Africa, a great number of speakers of the language are in Brazil, Cuba, including Trinidad and Tobago. Yorùbá is regarded as one of the major languages of Nigeria. The Yorùbá word for dragonfly is "Lámilámi" - *Bradinopyga strachani* (Kirby 1900). For the full paper see: <http://www.njas.helsinki.fi/pdf-files/vol14num3/fabunmi.pdf>] Address: Abidemi Fabunmi, F., Obafemi Awolowo Univ., Nigeria

5177. Adite, A.; Winemiller, K.O.; Fiogbe, E.D. (2005): Ontogenetic, seasonal, and spatial variation in the diet of *Heterotis niloticus* (Osteoglossiformes: Osteoglossidae) in the So River and Lake Hlan, Benin, West Africa. *Environmental Biology of Fishes* 73: 367-378. (in English). ["The African bonytongue, *Heterotis niloticus* (Osteoglossidae), is an important fisheries and aquaculture species in West Africa. This species has frequently been characterized either as an omnivore, insectivore or detritivore, the latter, in part, because of its benthic feeding habitats and possession of a gizzard (thick-walled pyloric stomach). We examined diets of two populations of *H. niloticus* in the So River in southern Benin. A population from the river channel and seasonally flooded marginal plains was dominated by juvenile and subadult size classes. Adults size classes were common in a second population from Lake Hlan, a natural lake in the river floodplain located upstream from the channel study region. *Heterotis* of all sizes consumed a variety of food resources, ranging from aquatic invertebrates to small seeds. Aquatic invertebrates (including Odonata) composed a large proportion of the diets of juveniles, and adults consumed a mixture of aquatic invertebrates, seeds, and detritus. Seasonal dietary variation was observed in both populations, and diet breadth was not significantly different between populations. Aquatic invertebrates remained significant in diets of larger size classes; diets of fish between 100 and 200 mm began to include seeds and detritus, with a marked increase in the volumetric proportion of detritus in diets of fish between 300 and 400 mm in Lake Hlan and between 500 600 mm in the river. Relative gut length was inversely related to body size, which supports the notion that *Heterotis* is an omnivore and not a specialized detritivore. The thick-walled gizzard of *Heterotis*, which generally contained sand, probably aids digestion of seed coats. Because *Heterotis* consume mostly invertebrates and grass seeds in shallow waters of seasonal aquatic habitats and lakes in the river floodplain, foraging success and fishery production should be strongly dependent on the annual flood pulse." (Authors)] Address: Winemiller, K.O., Section of Ecology and Evolutionary Biology, Texas A&M University, 2258 TAMU, College Station, USA. E-mail: k-winemiller@tamu.edu

5178. Ameline, M.; Houard, X. (2005): Bilan cartographique. Le Bal du CERCION. Bulletin annuel de liaison du Collectif d'études régional pour la cartographie et l'inventaire des Odonates de Normandie (ISSN 1771-5288) 1: 3-17. (in French). [The distribution of 54 odonate species in the Normandy, France is mapped based on records from 1980 to 2004. In addition very brief information is given to the palaeartic distribution, the phenology, and the habitats of the species.] Address:

Liaison du Collectif d'études régional pour la cartographie et l'inventaire des Odonates de Normandie, 2bis rue Bachelet, F-76350 Oissel-sur Seine, France.

5179. Anonymus (2005): Gebänderte Prachtlibelle. Briefmarken von *Calopteryx splendens*. Insektenkurier 84: 20-21. (in German). [Brief description of *C. splendens*, and documentation of eight stamps with *C. splendens* as motive.] Address: not stated

5180. Anonymus (2005): Références bibliographiques normandes. Le Bal du CERCION. Bulletin annuel de liaison du Collectif d'études régional pour la cartographie et l'inventaire des Odonates de Normandie (ISSN 1771-5288) 1: 25-30. (in French). [Odonatological bibliography that covers published and unpublished work on the Odonata of the Normandy, France.] Address: Liaison du Collectif d'études régional pour la cartographie et l'inventaire des Odonates de Normandie, 2bis rue Bachelet, F-76350 Oissel-sur Seine, France.

5181. Anonymus (2005): Torf-Mosaikjungfer. *Aeshna juncea*. Insektenkurier 85: 33. (in German). [Brief description of *A. juncea*, and documentation of 2 stamps with *A. juncea* as motive.] Address: not stated

5182. Anonymus (2005): Wild corner: Invertebrates. Porcupine 32: 25. [Verbatim. Samson So and Fion Cheung saw a *Labrogomphus torvus* at a small tributary of Hok Tau Reservoir on 4 September 2004. This dragonfly is regarded as rare by Wilson (2003). Samson So reported the following sightings of dragonflies: *Pseudagrion microcephalum* laying eggs at a rehabilitated freshwater pond of Mai Po Nature Reserve. One *Macrodiplax cora* was seen at Luk Keng marsh (near mangrove) on 29 September, and both sexes of this species were seen at Mai Po throughout October. *Gynacantha subinterrupta* was seen at Mai Po on 10 November and 5 December (both were male individuals).]

5183. Arrington, D.A.; Winemiller, K.O.; Layman, C.A. (2005): Community assembly at the patch scale in a species rich tropical river. *Oecologia* 144(1): 157-167. (in English). ["In tropical floodplain rivers, communities associated with structurally complex habitats are disassembled and reassembled as aquatic organisms repeatedly colonize new areas in response to gradual but continuous changes in water level. Thus, a neutral model reflecting random colonization and extinction dynamics may be sufficient to predict assemblage patterns at the scale of local habitat patches. If water level fluctuations and associated patch dynamics are sufficiently predictable, however, community assembly on habitat patches also may be influenced by species-specific responses to habitat features and/or species interactions. We experimentally manipulated structural complexity and proximity to source habitat (which influences colonization rate) of simulated rocky patches in the littoral zone of a tropical lowland river and demonstrate significant effects of both factors on species density of fishes and macroinvertebrates. Interspecific variation in vagility significantly affected assemblage response to habitat complexity. In a second experiment, created habitat patches were sampled over time intervals ranging from 1 day to 36 days to examine temporal dynamics of community assembly. A null-model test revealed that assemblage structure became increasingly non-random, concomitant with increasing species density, over time. Community dynamics in newly formed habitat patches appeared to be dominated by dispersal,

whereas in older patches, abundances of individual species increasingly were influenced by habitat characteristics. These data suggest that species-specific responses to environmental variation resulted, in part, because of species interactions. We conclude that community assembly in shallow habitats of this tropical lowland river is influenced by physical habitat characteristics, the spatial distribution of habitat patches, and species interactions as habitats are saturated with individuals." (Authors) Odonata are mentioned on several occasions.] Address: Arrington, D.A.; Perry Institute for Marine Science, 100 N US Hwy 1, Jupiter, FL 33477, USA. E-mail: aarrington@perryinstitute.org

5184. Avellinese, E.; Utzeri, C. (2005): Le libellule della Riserva Naturale Regionale Monterano (Roma) (Odonata). In: Quadro delle conoscenze del territorio della Riserva Naturale Regionale "Monterano" (al settembre 2005) a cura di F.M. Mantero (direttore): 15 pp. (in Italian). [Records of 37 odonate species are documented in detail and briefly discussed. <http://www.parchilazio.it/riserva.monterano/piano/8.pdf>] Address: <http://www.parchilazio.it/riserva.monterano/doc.html>

5185. Bady, P.; Dolédec, S.; Fesl, C.; Gayraud, S.; Bacchi, M.; Schöll, F. (2005): Use of invertebrate traits for the biomonitoring of European large rivers: the effects of sampling effort on genus richness and functional diversity. *Freshwater Biology* 50: 159-173. (in English). ["1. Studies on biodiversity and ecosystem function require considering metrics for accurately describing the functional diversity of communities. The number of taxa (richness) is commonly used to characterise biological diversity. The disadvantage of richness as a measure of biological diversity is that all taxa are taken into account on an equal basis regardless of their abundance, their biological characteristics or their function in the ecosystem. 2. To circumvent this problem, we applied a recently described measure of biological diversity that incorporates dissimilarities among taxa. Dissimilarities were defined from biological traits (e.g. life history, morphology, physiology and behaviour) of stream invertebrate taxa and the resulting biological diversity index was considered as a surrogate for functional diversity. 3. As sampling effort is known to affect the number of taxa collected within a reach, we investigated how change in functional diversity is affected by sampling effort. We used stream invertebrate community data from three large European rivers to model accumulation curves and to assess the number of samples required to estimate (i.e. closeness to the maximal value) functional diversity and genera richness. We further evaluated the precision of estimates (i.e. similarity of temporal or spatial replicates) of the total functional diversity. 4. As expected, richness estimates were strongly dependent on sampling effort, and 10 replicate samples were found to underestimate actual richness. Moreover, richness estimates showed much variation with season and location. In contrast, functional diversity had greater accuracy with less sampling effort and the precision of the estimates was higher than richness both across sampling occasions and sampling reaches. These results are further arguments towards conducting research on the design of a biomonitoring tool based on biological traits." (Authors) The statistical analysis includes also Odonata ("*Calopteryx*").] Address: Bady, P., UMR CNRS 5023, LEHF, Univ. Lyon, 43 Boul. du 11 novembre 1918, F-69622 Villeurbanne Cedex, France. E-Mail: pierre.bady@univ-lyon1.fr

- 5186.** Barkov, D.V.; Kurashov, E.A. (2005): The importance of the Baikal amphipod *Gmelinoides fasciatus* (Stebb.) for the structure of the macrozoobenthos in the littoral zone of the Valaam island in Lake Ladoga. *Izledovano v Rossii* ("Researched in Russia") 2005: 820-833. (in Russian). [Five habitat types were sampled: a) surface of the littoral, b) sandy sediment, c) sediment consisting of sand/pebble, d) rock without algal growth and e) rock with algal growth. Out of the 53 species sampled in the benthos 4 were Odonata. None of them were found in e). Single individuals of *C. concinnus* are reported from samples in a), c) and d) and of *C. hastulatum* in c) and d). *Sympetrum flaveolum* was commonly found in c) and d) and *Platycnemis pennipes* commonly in d) but individually in a), b) and c). Biomass is used as a measure of the macrozoobenthic community structure. The influence of the *Gmelinoides fasciatus* on Odonata (and other taxa) is not further detailed. The Odonate identification reference is not mentioned and the meaning of the abundance classes not provided. Available from <http://zhurnal.ape.relarn.ru/articles/2005/079pdf>] Address: Barkov, D.V., Institute of lake monitoring of the RAN (possibly Russian Academy of Sciences), 191605 St. Petersburg, ul. Sevastjanova 9, Russia. E-mail: barklay@inbox.ru
- 5187.** Bellstedt, R. (2005): Buchbesprechung: Zimmermann, W., F. Petzold & F. Fritzlar (2005): Verbreitungsatlas der Libellen (Odonata) im Freistaat Thüringen. *Naturschutzreport*, Jena 22: 1-224. *Mitteilungen des Thüringer Entomologenverbandes* 12(2): 69-70. (in German). [Book review; see OAS 5334] Address: Bellstedt, R., Museum der Natur Gotha, Parkallee 15, D-99867 Gotha, Germany
- 5188.** Bemmerle, B. (2005): *Zygonyx torridus* auf La Gomera, Kanarische Inseln (Odonata: Libellulidae). *Libellula* 24(3/4): 249-256. (in German, with English summary). ["Since the first records of *Z. torridus* from La Gomera, Canary Islands, Spain, in the early 20th century, no further records had been published until now. This study compiles current records of this species from the island. Information about seven other Odonata species recorded in the island within the last 30 years are given." (Author)] Address: Bemmerle, B., Freibergstr. 1, D-71691 Freiberg, Germany
- 5189.** Bermúdez Rivas, C. (2005): Clave para los imagos de los géneros de Libellulidae (Odonata: Anisoptera) del valle del Cauca, Colombia. *Boletín del Museo de Entomología de la Universidad del Valle* 6(1): 7-22. (in Spanish, with English summary). [21 genera of the Libellulidae are keyed. Available at: <http://entomologia.univalle.edu.co/boletin/Odonata.pdf>] Address: Bermúdez Rivas, C., Universidad del Valle. Departamento de Biología. Grupo de Investigaciones Entomológicas (GIE). Cali, Colombia. E-mail: draconianfly@gmail.com
- 5190.** Bernard, R.; Wildermuth, H. (2005): Verhaltensbeobachtungen an *Nehalennia speciosa* in Bezug auf Raum, Zeit und Wetter (Odonata: Coenagrionidae). *Libellula* 24(3/4): 129-153. (in German, with English summary). ["The behaviour of *N. speciosa* was studied at five small bog lakes in NW Poland with regard to habitat use, diurnal activity and influence of the weather. In total we discerned 22 behavioural elements some of which were considered in the context of different environmental situations. The imagines stayed almost exclusively in a narrow belt of thin-leaved sedges at the edge of the open water or in corresponding vegetation of adjacent shallow water bodies. The diurnal pattern of the localization of imagines in the vertical profile of the vegetation is described, stressing their movement downwards from the late forenoon and upwards in the late afternoon. Reproductive activity started in the morning, peaked around two hours before solar noon, and decreased rapidly in the early afternoon. Generally, pre-copula and copula lasted longer in the morning than in the afternoon. Calm, warm and rather humid atmospheric conditions with subdued or sporadically interrupted insolation proved optimal for the species' activity, whereas wind, strong precipitation, and temperatures below ca 15°C as well as above ca 23-24°C with strong insolation were unsuitable. In light rain and under a cloudy sky - provided that conditions were calm and temperatures were around 20°C - activity was diminished but not completely suppressed. It is inferred that imagines of *N. speciosa* are morphologically and ecologically adapted to habitats with obtrusive obstacles to flight, a humid microclimate and small spatial compass." (Authors)] Address: Bernard, R., Institut für Umweltbiologie, Abteilung Allgemeine Zoologie, Adam-Mickiewicz-Universität, Umultowska 89, PO-61-614 Poznan, Poland. E-mail: rbernard@amu.edu.pl
- 5191.** Beutler, H. (2005): Libellenfunde in einigen CORINE-Biotopgebieten Estlands (Odonata). *Libellula* 24(1/2): 47-53. (in German, with English summary). ["22 Odonata - species, recorded in June 2001 at 8 different sites in Estonia are reported and briefly discussed. Remarkable aspects were the late emergence of *Epitheca bimaculata* and *Leucorrhinia caudalis* as well as the mass-emergence of *Libellula quadrimaculata* and *Orthetrum cancellatum* in brackish water reeds of the Baltic Sea. Furthermore, the great importance of the many peat bogs for the protection of the European dragonfly fauna within the network 'Natura 2000' is pointed out. Once again *Anax imperator* was recorded breeding in the Nigula peat bog. It is supposed that the species has been breeding there persistently at least since 1989." (Author)] Address: Beutler, H., Kirschallee 3b, D-15848 Stremmen, Germany. e-mail: horstbeutler@freenet.de
- 5192.** Block, M. de; Geenen, S.; Jordaens, K.; Bäckeljau, T.; Stoks, R. (2005): Spatiotemporal allozyme variation in the damselfly, *Lestes viridis* (Odonata: Zygoptera): gene flow among permanent and temporary ponds. *Genetica* 124(2): 137-144. (in English). ["Several insect species seem to persist not only in permanent but also in temporary ponds where they face particularly harsh conditions and frequent extinctions. Under such conditions, gene flow may prevent local adaptation to temporary ponds and may promote phenotypic plasticity, or maintain apparent population persistence. The few empirical studies on insects suggest the latter mechanism, but no studies so far quantified gene flow including both pond types. We investigated the effects of pond type and temporal variation on population genetic differentiation and gene flow in *Lestes viridis* in northern Belgium. We report a survey of two allozyme loci (*Gpi*, *Pgm*) with polyacrylamide gel electrophoresis in 14 populations from permanent and temporary ponds, and compared these results with similar data from the same permanent populations one year before. The data suggested that neither pond-drying regime, nor temporal variation have a substantial effect on population genetic structuring and did not provide evidence for stable population differentiation in *L. viridis* in nor-

thern Belgium. Gene flow estimates were high within permanent and temporary ponds, and between pond types. Our data are consistent with a source-sink metapopulation system where temporary ponds act as sinks in dry years, and are quickly recolonized after local population extinction. This may create a pattern of apparent population persistence of this species in permanent and temporary ponds without clear local adaptation." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5193. Blust, M. (2005): Six new Vermont dragonflies. VES NEWS. The Newsletter of the Vermont Entomological Society 49: 7, 15. [Vermont, USA; the sightings of the six new state records - *Nasiaeschna pentacantha*, *Enallagma laterale*, *Rhionaeschna mutata*, *Epiaeschna heros*, *Gomphus abbreviatus*, *Stylurus amnicola* - are briefly documented.] Address: www.VermontInsects.org

5194. Brauner, O. (2005): Vorkommen, Entwicklung und Verbreitung von *Aeshna affinis* in Brandenburg (Odonata: Aeshnidae). *Libellula* 24(3/4): 191-219. (in German, with English summary). ["Presence of *A. affinis* was confirmed at 147 different sites in the German federal state of Brandenburg, including two sites in Berlin. From a total number of 266 observations, 264 were made in the period between 1992 and 2005. In 2000, the reproduction of the species was confirmed for the first time in Brandenburg. Since then each year evidences of successful reproduction were observed in a total of 32 ponds. Most of these ponds were temporary and featured wide fluctuations in water level. In some ponds *A. affinis* was recorded continuously over several years. The hitherto highest abundance was reached in the year 2002. In this year the species was seen at 64 sites. A relative accumulation of observations occurred, by at this time far fewer observers, in 1994 and 1995. All records from Brandenburg are shown in a map. The 145 different observation sites since 1992 are distributed over 84 5.5x5.5 krh-squares of German topographic maps. From 1992 to 1999, records were known from 20, and after 2000 from 71, corresponding squares." (Author)] Address: Brauner, O., R.-Breitscheidstr. 62, D-16225 Eberswalde, Germany. E-mail: oliverbrauner@web.de

5195. Bried, J.T. (2005): Community and conservation ecology of dragonfly and damselfly adults in Mississippi wetlands. Thesis Submitted to the Faculty of Mississippi State University, Dept of Biological Sciences: [http://www.msstate.edu/courses/ge14/students/BriedThesis.pdf] Address: Bried, J.T., Dept Biol. Sciences, Mississippi State University, PO Box GY, MS State, MS 39762, USA. E-mail: e-mail: jtb117@msstate.edu

5196. Bried, J.T.; Ervin, G.N. (2005): Distribution of adult Odonata among localized wetlands in east-central Mississippi. *Southeastern Naturalist* 4: (in English). ["We measured species richness and composition of adult Odonata and inferred habitat preferences among man-made wetland sites and surrounding tracts of natural bottomland forest. Cumulative species richness and composition were described by proportion coefficients and beta-diversity indices. The three man-made sites provided open space resources and more species were observed in each than in the floodplain forest. Twenty-nine of 42 species documented over a four-month peri-

od were observed in only one or two of the four wetlands studied. Large differences in species assemblages between the immediately adjacent ditch and marsh sites were the best evidence for high habitat affinity because distance and structural barriers to movement were absent. Such compositional asymmetry may reflect differential vegetative and reproductive suitability of the habitats. Results suggest that the open canopy wetlands supported high relative diversity of adult Odonata and that distinct odonate assemblages were found among different habitat types in this floodplain wetland complex." (Authors)] Address: Bried, J.T., Department of Biological Sciences, Mississippi State University, PO Box GY, MS State, MS 39762, USA. E-mail: e-mail: jtb117@msstate.edu

5197. Bried, J.T. (2005): Species of adult Odonata from three natural areas in Mississippi. *Journal of the Mississippi Academy of Sciences* 50(4): 231-232. (in English). ["Altogether, 77 species were caught or seen across all natural areas in 2003-04. This total is nearly 60% of the odonates currently known to occur in Mississippi (Abbott, 2005)." Available at: www.msstate.edu/courses/ge14/BriedOdonatesJMAS.pdf] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jasonbried@hotmail.com

5198. Brownnett, A. (2005): A re-examination of the status of the Norfolk Damselfly *Coenagrion armatum* (Charpentier): a species of Odonata now presumed extinct in Britain. *J. Br. Dragonfly Society* 21(1): 21-26. (in English). [On the basis of museum specimens (n=75), published papers, and correspondence between odonatologists, the fate of *C. armatum* in Britain is analysed in great detail. Discovered in 1903, the species inhabited the British Islands at least until 1958.] Address: Brownnett, A., 28 Colesbourne Road, Brookside, Bloxham, Banbury, Oxfordshire OX15 4TB, UK

5199. Brunet, L. (2005): Observer et conserver des odonates. Le Bal du CERCION. Bulletin annuel de liaison du Collectif d'études régional pour la cartographie et l'inventaire des Odonates de Normandie (ISSN 1771-5288) 1: 20-21. (in French). [Introduction into observation and storing of odonates and their exuviae.] Address: Liaison du Collectif d'études régional pour la cartographie et l'inventaire des Odonates de Normandie, 2bis rue Bachelet, F-76350 Oissel-sur Seine, France

5200. buglife (2005): Dragonflies. www.buglife.org.uk. (in English). [This is a very nice leaflet with a poster on the backside giving a lot of general information on Odonata.] Address: Buglife, 170A Park Rd, Petersborough, Cambridgeshire, PE1 2UF, UK

5201. Carchini, G.; Domenico, M.D.; Chiarotti, F.; Tanzilli, C.; Pacione, T. (2005): Fluctuating asymmetry, body size, reproductive period and life time mating success of males of *Cercion lindeni* (Odonata: Coenagrionidae). *Eur. J. Entomol.* 102(4): 707-712. (in English). ["Mating success is linked to reproductive success in males, but parameters influencing it are poorly known. The relationships between lifetime mating success (LMS), fluctuating asymmetry (FA), body size (SIZE), reproductive period (RP) and emergence date (MD) of males of *Cercion lindeni* were investigated. Males were marked and photographed in their pre-reproductive period, and their matings monitored. RP was assumed to be the period between the MD and the last sighting of

each individual. Three different FA measures and the size of each individual were determined. The results showed that the individuals not present at the pond during the reproductive period had a higher FA (but not for meristic characters) than those present. For those individuals actually involved in reproductive activity, LMS was only positively correlated with RP, which was negatively related with MD, and this with SIZE." (Authors). Available at: <http://www.eje.cz/pdfarticles/1060/eje102-4707Carchini.pdf>] Address: Carchini, G., Dipart. di Biol., Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. E-mail: archini@utovrm.it

5202. Clausnitzer, V. (2005): Odonata Specialist Group. Species 43: 24. (in English). [Verbatim. The special issue of the International Journal of Odonatology Guardians of the watershed; Global status of dragonflies: critical species, threat and conservation, was used as a base for assessing a number of dragonflies for the IUCN Red List. Consequently nearly all dragonfly species listed previously on the IUCN Red List have been reassessed and numerous additions were made. All assessments were made, checked and submitted to the IUCN SSC Red List Programme by Dr. Frank Suhling and myself. In total, there was an increase from 155 to 350 dragonflies listed as Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened or Data Deficient. However, of previously listed species, 20 species were reassessed as Least Concern. About 6% of the global dragonflies are currently regarded as threatened. The listed species are regionally distributed as follows: 97 from Africa and the Orient, eight from islands in the Indian Ocean, 36 from North America, 10 from Hawaii, 65 from South and Middle America, 11 from Europe, 26 from Asia (excluding Japan and Sri Lanka), 32 from Japan, 20 from Sri Lanka, 25 from Australia, 19 from South Pacific islands, one from St. Helena, with the extinct species being originally from St. Helena Island. A member of the Odonata Specialist Group, Vincent Kalkman, participated in the IUCN Sampled Red List Index (SRLI) Species Selection Workshop, held at the Zoological Society of London, in March. One hundred dragonflies will be selected randomly from the global list for inclusion in the SRLI. In July there will be a meeting of the Odonata Specialist Group during the Symposium of the World Wide Dragonfly Association in Spain. Sacha Spector from the American Museum of Natural History will hopefully attend this meeting to discuss plans for a global dragonfly assessment, in co-operation with Piotr Naszkrecki of Conservation International.] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

5203. Collar, D.C.; Near, T.J.; Wainwright, P.C. (2005): Comparative analysis of morphological diversity: Does disparity accumulate at the same rate in two lineages of centrarchid fishes? *Evolution* 59(8): 1783-1794. (in English). ["Evolutionary lineages differ with regard to the variety of forms they exhibit. We investigated whether comparisons of morphological diversity can be used to identify differences in ecological diversity in two sister clades of centrarchid fishes. Species in the Lepomis clade (sunfishes) feed on a wider range of prey items than species in the Micropterus clade (black basses). [...]" (Authors) The diet of both species includes Odonata (Tab. 1)] Address: Collar, D.C., Section of Evolution and Ecology, University of California, Davis, California 95616, USA. E-mail: dccollar@ucdavis.edu

5204. Commission of zoological nomenclature (2005): OPINION 2110 (Case 3253): *Libellula aenea* Linnaeus, 1758 (currently *Cordulia aenea*) and *L. flavomaculata* Vander Linden, 1825 (currently *Somatochlora flavomaculata*; Insecta, Odonata): usage of the specific names conserved by the replacement of the lectotype of *L. aenea* with a newly designated lectotype. *Bulletin of zoological nomenclature* 62(2): 99-100. (in English). ["The Commission has ruled that the current usage of the names of two dragonfly species, *Libellula aenea* Linnaeus, 1758 (currently *Cordulia aenea*) and *L. flavomaculata* Vander Linden, 1825 (currently *Somatochlora flavomaculata*), is conserved by the replacement of the lectotype of *L. aenea* with a newly designated lectotype. In 1956, Fraser had designated one of Linnaeus's specimens as the lectotype of *L. aenea*. However, the specimen he designated was the one used by Vander Linden to denote his species *L. flavomaculata* and this action made *L. aenea* a senior objective synonym of *L. flavomaculata*." (Authors)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: r.joedicke@t-online.de

5205. Conrad, A. (2005): *Adalia bipunctata* als Beute von *Gomphus flavipes* (Coleoptera: Coccinellidae; Odonata: Gomphidae). *Libellula* 24(3/4): 237-239. (in German, with English summary). ["On 8-IX-2005 an adult male *C. flavipes* was observed and photographed consuming an adult ladybird *A. bipunctata* at the River Oder near Frankfurt (Oder), Germany." (Author)] Address: Conrad, A., Crauhöfer Straße 8, D-38640 Goslar, Germany. E-mail: axelconrad@gmx.de

5206. Crick, K. (2005): Variations in key features of the final instar larvae and exuviae of the Common Blue Damselfly *Enallagma cyathigerum* (Charpentier). *J. Br. Dragonfly Society* 21(1): 27-36. (in English). ["Some features used for species identification of final instar larvae and exuviae in published keys have proved to have levels of variability beyond that currently defined. This paper seeks to address those variations as they apply to *E. cyathigerum*, outlining in detail specific variations found through close examination of 253 individuals collected from a number of water bodies in the Blackwater Valley on the border of Hampshire and Berkshire. The features addressed include the species-specific characteristics of the caudal lamellae, the prementum and the short spine on the outer surface of the anterior palpal seta. The current published keys have proved to be very useful but their interpretation requires considerable dedication, at least when they are first put to the test. This report proposes a format for a mainly pictorial approach to an identification key for damselfly larvae." (Author)] Address: Crick, K., 29 Village Way, Yateley, Hampshire GU46 7SE, UK

5207. Crumrine, P.W. (2005): Size structure and substitutability in an odonate intraguild predation system. *Oecologia* 145(1): 132-139. (in English). ["Interactions between different size classes of predator species have the potential to influence survival of prey species in intraguild predation (IGP) systems, but few studies test for these effects. Using a substitutive design in a field setting, I measured the effects of two size classes of IG predators (large and small larvae of the dragonfly *Anax junius*) on the mortality of IG prey (larvae of the dragonfly *Pachydiplax longipennis*). I also examined whether combinations of large *A. junius* and *P. longipennis* and small *A. junius* and *P. longipennis* had sub-

stitutable effects on shared prey (larvae of the damselfly *Ischnura verticalis*). The presence of both size classes of *A. junius*, when alone and in combination with *P. longipennis*, significantly increased mortality of *I. verticalis*. In the presence of *P. longipennis*, large and small *A. junius* had similar effects on the mortality of *I. verticalis*, and effects of size-structured assemblages of *A. junius* were similar to the effects of each size class alone at the same density. The effects of the two size classes of *A. junius* on *P. longipennis* differed, and *P. longipennis* mortality was lower when exposed to size structured assemblages of *A. junius* than when exposed to only large *A. junius* at the same density. Results were similar to those in a laboratory study, although the effect of *P. longipennis* on *I. verticalis* was much lower in the field setting. These results demonstrate that interactions between different size classes of IG predators promote the survival of IG prey and highlight the importance of within-species size structure as a characteristic that may promote the coexistence of predators in IGP systems." (Author)] Address: Crumrine, P.W., Dept of Natural Sciences, Longwood University, Farmville, VA 23909, USA. E-mail: crumrinepw@longwood.edu

5208. Cuong, D.M. (2005): *Davidius monastyrskii* spec. nov., a new dragonfly from northern Vietnam (Anisoptera: Gomphidae). *Odonatologica* 34(3): 285-289. (in English). ["The male of the new species is described, illustrated and compared with the closely related *D. fruhstorferi* Martin. Holotype male: Vietnam, Bac Can province, Ba Be, IV-1997; deposited in Zoology Collection, Vietnam National University, Hanoi." (Author)] Address: Cuong, D.M., Hom thu so 16, Buu Dien 10210, 35 Thai Thinh, Hanoi, Vietnam. E-mail: cuongdm@hotmail.com

5209. Daguet, C. (2005): Dragonflies and damselflies in your garden. English nature. ISBN 1 85716 877 1: 28 pp. (in English). [<http://www.english-nature.org.uk/pubs/publication/PDF/webDragonflies.pdf>] Address: Daguet, Caroline, English Nature North Mercia Team, Attingham Park, Shrewsbury SY4 4TW, UK

5210. Daguet, C. (2005): From the conservation of a dragonfly. *Dragonfly News* 48: 3-4. (in English). [Brief reports on current activities of BDS including the preparation of two leaflets, the monitoring of *Coenagrion mercuriale*, and the participation on the colloquium on West-European Odonata near Nantes, France in June 2005.] Address: Daguet, Caroline, English Nature North Mercia Team, Attingham Park, Shrewsbury SY4 4TW, UK

5211. Daraż, B. (2005): *Owady Ziemi Dubieckiej w obiektywie* [Insects of the Dubiecko Country focused with a lens]. Kresowy Dom Sztuki, Dubiecko: 47 pp. (in Polish). [This is a small booklet lavishly illustrated with colour photos of insects, one third of them covering Odonata. Dubiecko is a village located in the floodplain of the river San in southern Poland 30 km west of Przemyśl. Of special interest is *Nehalennia speciosa*.] Address: Towarzystwo Przyjaciół Ziemi Dubieckiej, ul. Krasickiego 3, 37-750 Dubiecko, Poland. www.tpzd.republika.pl

5212. David, S.; Tóthová, G. (2005): Occurrence of dragonfly *Leucorrhinia caudalis* (Charpentier, 1840) in Slovak Republic. In: *Theory and practice in landscape ecological planning*, 21.5.2004, Nitra. ISBN 80-8050-791-0: 29-33. (in Slovakian, with English summary). [2003, *L. caudalis* was found for the first time in Slova-

kia at two localities (Danube oxbow lakes, Podunajská rovina plane). In 2004, a 3rd locality was detected in E Slovakia (Latorica oxbow lakes, Latorická rovina plane). The species is depicted, its distribution in Slovakia mapped, and the new locality / habitat described and pictured.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

5213. De Block, M.; Stoks, R.; De Bruyn, L. (2005): Egg hatching patterns within and among populations of a damselfly occupying permanent and temporary ponds. *Archiv für Hydrobiologie* 163(2): 195-209. (in English). ["Although opposing selection forces cause drastic differences in community structure between temporary and permanent ponds, some species are able to persist in both pond types. Little is known about the underlying life history strategies that enable species to do so. This is especially true for embryonic development times. Here, we describe within and among population variation in natural egg hatching patterns of the damselfly *Lestes viridis* that occurs in both pond types. In general, egg hatching was synchronous both within and among populations. A two-year field monitoring study showed consistent regional differences in egg hatching and earlier egg hatching in temporary ponds. A common garden and two full-sib experiments suggested that differences in hatching dates among populations and families were not completely driven by differences in environmental conditions, but may have a genetic basis. Although the pattern of earlier egg hatching in temporary ponds, as observed in the field monitoring, is adaptive, it was not fully repeatable in the common garden experiment. This suggests that this pattern is caused by more benign environmental conditions at the temporary ponds relative to the permanent ponds, and not an adaptation to pond type.] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5214. De Knijf, G.; Tailly, M. (2005): Ei-afleg bij de Blauwe glazenmaker (*Aeshna cyanea*): enkele merkwaardige observaties. *Gomphus* 20(1): 21-26. (in Dutch, with English and French summaries). ["Oviposition from *A. cyanea*: some remarkable observations: Three remarkable observations of oviposition by *A. cyanea* are described. 1) on rocks forming a dam in full sunshine, at an at the time of observation dry pond, 2) in dead wood and bark of an elder (*Sambucus nigra*) at more than 4 m from the waterside and 3) in moss (*Amblystegium varium*) at 0,20 m above the water in mosses at 0,30 m above and 0,40 m from the waterside. Thus *A. cyanea* seems not to be linked strictly to water for its oviposition, but shows a predilection for moist, shadowed substrats like mosses, dead plants, branches, wood, mud and soil. The water level at the moment of hatching (shortly after the winter) is generally higher, so the prolarvae are at that time already in the water or have only a short distance to go; probably they are capable of jumping or creeping some meters to reach the water if necessary." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

5215. Dodelin, C (2005): Les odonates de Normandie de Gadeau de Kerville à nos jours Le Bal du CERCION. Bulletin annuel de liaison du Collectif d'études régional pour la cartographie et l'inventaire des

Odonates de Normandie (ISSN 1771-5288) 1: 2. (in French). [Brief introduction into the history of faunistic odonatological work in the Normandy, France.] Address: Liaison du Collectif d'études régional pour la cartographie et l'inventaire des Odonates de Normandie, 2bis rue Bachelet, F-76350 Oissel-sur Seine, France

5216. Dumont, H.J.; Vanfleteren, J.R.; De Jonckheere, J.F.; Weekers, P.H.H. (2005): Phylogenetic relationships, divergence time estimation, and global biogeographic patterns of calopterygoid damselflies (Odonata, Zygoptera) inferred from ribosomal DNA sequences. *Systematic Biology* 54(3): 347-362. (in English). [The calopterygoid superfamily (Calopterygidae + Hetaeriniidae) is composed of more than twenty genera in two families: the Calopterygidae (at least 17) and the Hetaeriniidae (at least 4). Here, 62 calopterygoid (ingroup) taxa representing 18 genera and 15 outgroup taxa are subjected to phylogenetic analysis using the ribosomal 18S and 5.8S genes and internal transcribed spacers (ITS1, ITS2). The five other families of calopterygoid affinity (Polythoridae, Dictyriidae, Amphipterygidae, Euphaeidae, and Chlorocyphidae) are included in the outgroup. For phylogenetic inference, we applied maximum parsimony, maximum likelihood, and the Bayesian inference methods. A molecular phylogeny combined with a geographic analysis produced a well-supported phylogenetic hypothesis that partly confirms the traditional taxonomy and describes distributional patterns. A monophyletic origin of the calopterygoids emerges, revealing the Hetaeriniid clade as sister group to the Calopterygidae *sensu stricto*. Within Calopterygidae, seven clades of subfamily rank are recognized. Phylogenetic dating was performed with semiparametric rate smoothing by penalized likelihood, using seven reference fossils for calibration. Divergence time based on the ribosomal genes and spacers and fossil constraints indicate that Calopteryginae (10 genera, approximately 50% of all Calopterygidae taxa studied here), Vestalinae (1 genus), and Hetaeriniidae (1 genus out of 4 studied here) started radiating around 65 Mya (K/T boundary). The South American Iridictyon (without distinctive morphology except for wing venation) and Southeast Asian Noguchiphaea (with distinctive morphology) are older (about 86 My) and may be survivors of old clades with a Gondwanian range that went extinct at the K/T boundary. The same reasoning (and an even older age, ca. 150 My) applies to the amphipterygids Rimanelia and Pentaplebia (South America Africa). The extant Calopterygidae show particular species and genus richness between west China and Japan, with genera originating between the early Oligocene and Pleistocene. Much of that richness probably extended much wider in preglacial times. The Holarctic Calopteryx, of Miocene age, was deeply affected by the climatic cooling of the Pliocene and by the Pleistocene glaciations. Its North American and Japanese representatives are of Miocene and Pliocene age, respectively, but its impoverished Euro-Siberian taxa are late Pliocene-Pleistocene, showing reinvasion, speciation, and introgression events. The five other calopterygoid families combine with the Calopterygidae and Hetaeriniidae to form the monophyletic cohort Caloptera, with Polythoridae, Dictyriidae, and Amphipterygidae sister group to Calopterygoidea. The crown node age of the latter three families has an age of about 157 My, but the Dictyriidae and Polythoridae themselves are of Eocene age, and the same is true for the Euphaeidae and Chlorocyphidae. The cohort Caloptera itself, with about 197 My of age, goes back to the

early Jurassic. [Biogeography; Calopterygidae; dating; divergence times; damselflies; internal transcribed spacers; odonata; phylogeny; phylogeography; 18S and 5.8S ribosomal DNA.] (Authors) Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

5217. Dunn, R.; Budworth, D. (2005): Dragonflies in Derbyshire. Status and distribution 1977-2000. Derbyshire & Nottinghamshire Entomological Society: 52 pp. (in English). [This softback booklet contains a history of recording in Derbyshire, the status of each species, a small number of habitat and species photographs and a full set of 1 km distribution maps (22 odonate species). The booklet is a welcome contribution to an European distribution atlas of Odonata.] Address: available (£ 4,50 incl. P+P) from Mr K. Moore, 10 Montrose Court, Stapleford, Notts NG9 8LJ, UK

5218. Dyatlova, E.S. (2005): The dragonflies of the southwestern Ukraine. M.Sc. thesis, Faculty of Biology, I.I. Mechnikov University of Odessa: 80 pp, 44 pp appendix. (in Russian). [This thesis consists of two parts, a faunistic one and one with detailed investigations into the ecology and biology of selected species. Between 2002 and 2004 dragonflies were recorded from 41 sites. These sites were mainly situated in the valleys and floodplains of the major rivers and streams entering the Black Sea at its northwestern coast, including the rivers Danube and Dniestr. Forty of the previously recorded 51 Ukrainian species were found with several new county records, Lestes dryas, Coenagrion ornatum, C. scitulum, Erythromma lindenii, Anax imperator, Gomphus vulgatissimus, Libellula fulva, L. depressa, Symptetrum flaveolum, and S. pedemontanum are of special interest. All records are detailed in the appendix. Based on these new findings and a comparison of the literature, suggestions are provided for conservation priorities of the Ukrainian odonate species in the form of a risk scale. The second part provides information of several unrelated observations such as the variability of wing patterns in the Calopteryx splendens complex (including the record of androchrome females), the variation in the male genitalia of Orthetrum coerulescens anceps and a chapter on meticulously described cases of wing anomalies in Platycnemis pennipes, Ischnura pumilio and Orthetrum brunneum. There is also a chapter on population biology. It describes the seasonal variation over three months in the sex ratio and colour morph ratios of Ischnura elegans and Coenagrion pulchellum at two sites. For the analysis of the colour morphs, more than 1200 and 200 individuals, respectively, of the two species were captured, scanned and their colour identified by commercial computer software.] Address: Dyatlova, Elena Sergeyevna, Institute of Zoology, Faculty of Biology, I.I. Mechnikov University of Odessa, Odessa, Ukraine

5219. Emiliyamma, K.G.; Radhakrishnan, C.; Muhammed Jafer Palot (2005): Pictorial handbook on common dragonflies and damselflies of Kerala. Kolkata, Zoological Survey of India. ISBN 81-8171-067-3.: viii, 68 pp. [Contents: Preface. Table 1. Diversity of odonata (Insecta) in India/Kerala. Biology. Structure of an adult odonate (Imago). External Morphology. Breeding environments of odonates. Systematic account: 1. Ceriagrion cerinorubellum. 2. Ceriagrion coromandelianum. 3. Pseudagrion microcephalum. 4. Pseudagrion rubriceps ru-

briceps. 5. *Aciagrion occidentale*. 6. *Ischnura aurora aurora*. 7. *Agriocnemis pygmaea*. 8. *Copera marginipes*. 9. *Copera vittata*. 10. *Neurobasis chinensis chinensis*. 11. *Vestalis apicalis apicalis*. 12. *Vestalis gracilis gracilis*. 13. *Rhinocypha (Heliocypha) bisignata*. 14. *Libellago lineata indica*. 15. *Euphaea fraseri*. 16. *Ictinogomphus rapax*. 17. *Gynacantha dravida*. 18. *Tetrathemis platyptera*. 19. *Brachydiplax sobrina*. 20. *Cratilla lineata*. 21. *Lathrecista asiatica asiatica*. 22. *Orthetrum chrysis*. 23. *Orthetrum luzonicum*. 24. *Orthetrum pruinotum neglectum*. 25. *Orthetrum sabina sabina*. 26. *Potamarcha congener*. 27. *Acisoma panorpoides panorpoides*. 28. *Brachythemis contaminata*. 29. *Bradynopyga geminata*. 30. *Crocothemis servilia servilia*. 31. *Diplacodes trivialis*. 32. *Neurothemis fulvia*. 33. *Neurothemis intermedia intermedia*. 34. *Neurothemis tullia tullia*. 35. *Rhodothemis rufa*. 36. *Trithemis aurora*. 37. *Trithemis festiva*. 38. *Trithemis pallidinervis*. 39. *Palpopleura sexmaculata sexmaculata*. 40. *Rhyothemis variegata variegata*. 41. *Pantala flavescens*. 42. *Tramea limbata similata*. 43. *Tholymis tillarga*. 44. *Zygomma petiolatum*. 45. *Aethriamanta brevipennis*. 46. *Urothemis signata signata*. Appendix. References and further reading.]

5220. Ferreira, S.; Weihrauch, F. (2005): Annotated bibliography of Odonatological literature from continental Portugal, Madeira, and the Azores (Odonata). *Libellula* 24(1/2): 109-128. (in English, with Portuguese and German summaries). [An annotated bibliography of odonatological literature from Portugal is presented, comprising 144 references from the years 1797 to 2005.] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate em Biodiversidade e Recursos Geneticos, Universidade do Porto, Campus Agrário de Vairao, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

5221. Gäde, G.; Marco, H.G. (2005): The adipokinetic hormones of Odonata: A phylogenetic approach. *J. Insect Physiology* 51(3): 333-341. (in English). ["Adipokinetic neuropeptides from the corpora cardiaca of the major families of all three suborders of the Odonata were identified by one or more of the following methods: Isolation of the peptides from a methanolic extract of the corpora cardiaca by liquid chromatography, peak monitoring by fluorescence of the Trp residue and comparison of the retention time with those of known synthetic peptides of Odonata. Hyperlipaemic bioassays of the HPLC-generated fractions either in *Locusta migratoria* or, in a few cases, in *Anax imperator* or *Orthetrum julia*. Sequencing of the isolated, bioactive HPLC fraction by Edman degradation. Mass spectrometric measurement of the isolated, bioactive fraction. Sequence assignment revealed that the investigated Odonata species always contain only one adipokinetic peptide. This is always an octapeptide. The suborder Zygoptera contains the peptide code-named Psein-AKH, the Anisozygoptera and the families Aeshnidae, Cordulegastridae and Macromiidae of the Anisoptera contain Anaim-AKH, whereas Gomphidae, Corduliidae (with the exception of *Syncordulia gracilis*) and Libellulidae contain Libau-AKH; one species of Libellulidae has Erysi-AKH, a very conservative modification of Libau-AKH (one point mutation). When these structural data are interpreted in conjunction with existing phylogenies of Odonata, they support the following: Zygoptera are monophyletic and not paraphyletic. Anisozygoptera and Anisoptera are sister groups and contain the ancestral

Anaim-AKH which is independently and convergently mutated to Libau-AKH in Gomphidae and Libellulidae. The Corduliidae are of special interest. Only Corduliidae sensu stricto appear to contain Libau-AKH, other species placed into this family by most authorities contain the ancestral Anaim-AKH. Possibly, assignments of AKHs can untangle the paraphyly of this family." (Authors)] Address: Gäde, G.; Zoology Department, University of Cape Town, Private Bag, Rondebosch 7701, South Africa

5222. Garner, P. (2005): The Dragonflies of Herefordshire. Herefordshire Biological Records Centre: app. 70 pp. (in English). ["Herefordshire, as one of the most picturesque and unspoilt counties in lowland Britain is rich in wildlife. With magical rivers like the Wye and Lugg running through the heart of it and with an abundance of ponds and lakes it is a haven for dragonflies, and yet until 20 years ago it was largely unrecorded. This book is the product of 20 years of recording in which Peter Garner gives an intimate and personal account of Herefordshire's 27 species of which all but 3 have been proven or are likely to be breeding. "The Dragonflies of Herefordshire" will appeal to those who have a general love of the countryside, as well as dedicated dragonfly experts. Hopefully, even those who know more about dragonflies than Peter will still be interested by some of the detail of his observations, by the speculation of his hypotheses, and above all by the distribution of records from what was very likely, the least well recorded county in the country. Several records are of special note because Herefordshire is on the edge of their range: this applies to the Scarce Bluetailed Damselfly, Red-eyed Damselfly, Downy Emerald, Brown Hawker, Migrant Hawker, Golden-ringed, Black-tailed Skimmer, Ruddy and Black Darters." (Publisher)] Address: To order your copy, please send a cheque payable to "Herefordshire Council" to: The Dragonflies of Herefordshire Booklet Herefordshire Biological Records Centre, P. O. Box 144, Hereford. HR1 2YH. UK

5223. Gassmann, D. (2005): The Phylogeny of Southeast Asian and Indo-Pacific Calicnemiinae (Odonata, Platynemididae). *Bonner zoologische Beiträge* 53(1/2) (2004): 37-80. (in English). ["Phylogenetic relationships of Southeast Asian and Indo-Pacific damselflies of the subfamily Calicnemiinae (Odonata: Platynemididae) are examined by cladistic analyses using morphological characters. The strict consensus cladogram of the resulting equally most parsimonious trees supports the monophyly of the Papuan genus *Idiocnemis* Selys, the Philippine genus *Risioctnemis* Cowley and its subgenera, but leaves the basal relationships of the African genera and the Palawan genus *Asthenocnemis* Lieftinck partly unresolved. A preferred phylogenetic hypothesis is presented showing a well supported 'Indo-Pacific clade' consisting of Philippine, New Guinean and Solomon island taxa, and as sister group *Asthenocnemis*. *Risioctnemis* turns out to be a sister group of *Lieftinckia* / *Salomocnemis* (Solomon Islands), the sister taxon of those being the central New Guinean *Arrhenocnemis* Lieftinck. Together, these form a monophyletic group with the remaining Papuan taxa. *Idiocnemis leonora* Lieftinck is transferred to *Rhyacocnemis* Lieftinck comb. nov. The possible effects of taxon sampling are discussed." (Author).] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of

Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

5224. Gassmann, D. (2005): Phylogenetic systematics and historical biogeography of Malesian Calicnemiine damselflies (Odonata, Platycnemididae). Thesis Leiden University: without pagination. (in English, with Dutch summary). ["The aim of the present study was to reveal phylogenetic relationships within the damselfly subfamily Calicnemiinae (Odonata, Platycnemididae) as a basis for a historical-biogeographic scenario for the Malesian species. Beside that, taxonomic revisions at subgeneric and species-group level contribute to our knowledge of the diversity of the group. Chapter 1 and Chapter 2 together contain a taxonomic revision of the damselfly genus *Idiocnemis* Selys, 1878, from New Guinea and surrounding islands. [...] In Chapter 3, the subgenus *Ignecnemis* Hämäläinen, 1991, of the Philippine genus *Risioicnemis* Cowley, 1934, is revised. [...] In Chapter 4 the phylogenetic relationships of South-east Asian and Indo-Pacific Calicnemiinae are examined by cladistic analyses using morphological characters. A parsimony analysis, based on 88 characters and including 84 taxa, was performed resulting in 732 equally most parsimonious trees. [...] Chapter 5 places the Calicnemiinae in a context with other groups of freshwater organisms in Malesia." (Author)] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

5225. Gohmert, J.; Martens, A. (2005): Der Sonnenbarsch *Lepomis gibbosus* als Prädator von Kleinlibellen bei der Eiablage (Teleostei: Centrarchidae; Odonata: Coenagrionidae). *Libellula* 24(1/2): 55-62. (in German, with English summary). ["In the summer of 2004 at a man-made lake near Karlsruhe, Germany, predation of *L. gibbosus* on *Erythromma viridulum* and *E. lindenii* was observed and recorded with a video camera. Four out of 15 observed attacks by *L. gibbosus* were successful. In eight cases, a fish appeared all of a sudden and jumped after a tandem of damselflies during oviposition. In six cases, a fish approached very slowly until it was very close to its prey and then suddenly snapped at the damselflies. In one case, the predator approached slowly, but the tandem recognised it and escaped before the fish was able to attack it." (Authors)] Address: Gohmert, Jana, Forsthausweg 4, D-64569 Nauheim, Germany. E-mail: jana.gohmert@web.de

5226. Grossmann, M. (2005): Tiere, Pflanzen und Pilze im Nationalpark „Hainich“ - Stand und Bilanz der bisherigen Erfassungen. *Landschaftspflege und Naturschutz in Thüringen* 42(3): 92-97. (in German). [Thuringia, Germany; the wood dominated National Park harbours a total of 34 odonate species (not specified in the article), including *Leucorrhinia pectoralis* and *Crocothemis erythraea*.] Address: Grossmann, M., Verwaltung Nationalpark Hainich, Bei der Marktkirche 9, D-99947 Bad Langensalza, Germany

5227. Günther, A. (2005): *Anax ephippiger* in Europa - immer Invasionen in eine Sackgasse? (Odonata: Aeshnidae). *Libellula* 24(3/4): 241-247 (in German, with English summary) ["From the end of September to early October 2004, massive migrations of immature *A. ephippiger* were observed at the Black Sea coast of Bulgaria. Their origin from a summer generation in Eu-

rope is considered as most likely. The first and most numerous aggregations were migrating ahead of a heavy rainfall front from the north-west. During daylight, the dragonflies migrated partly at altitudes of 50 m and more. The number of individuals, the direction and the intensity of the migration make a successful return into the core area of the species plausible." (Author) Address: Günther, A., TU Bergakademie Freiberg, IÖZ, AG Biologie/Ökologie, Leipziger Str. 29, D-09599 Freiberg, Germany. E-mail: andre.guenther@ioez.tu-freiberg.de

5228. Hadrys, H.; Schroth, W.; Schierwater, B.; Streit, B.; Fincke, O. (2005): Tree hole odonates as environmental monitors: Non-invasive isolation of polymorphic microsatellites from the neotropical damselfly *Megaloprepus caerulatus*. *Conservation Genetics* 6(3): 481-483. (in English). ["Because of their complex mating behaviour and life cycle (alternating aquatic and terrestrial stages) odonates provide important model systems for environmental monitoring, evolutionary ecology, and conservation genetics. Many odonate species are endangered and call for the use of non-invasive molecular studies. In *M. caerulatus* we have identified polymorphic microsatellite loci by means of the randomly amplified microsatellite technique (RAMS; Ender et al. 1996). Using the DNA from each a single leg of three unrelated individuals we screened 63 RAPD primers for small size banding patterns. A total of 95 RAPD profiles was hybridized with digoxigenin labelled di- and trinucleotide repeats (GAn, GTn, CAn and AATn) and 36 RAPD fragments harbouring microsatellite motifs were isolated. Cloning and sequencing of positive fragments revealed five polymorphic microsatellite loci. Since *M. caerulatus* is a viable bio-indicator for primary rainforests the microsatellite system can be used to study the effects of forest fragmentation on population viability." (Authors)] Address: Hadrys, Heike, ITZ, Ecology & Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

5229. Hancox, J. (2005): Disappointing year for dragonflies. *Potteric Carr Nature Reserve. Recorder - an annual review of recording on the reserve* 8: 4. (in English). [Yorkshire, UK; 18 odonate species are briefly discussed. For a full paper see: <http://www.potteric-carr.org.uk/jan2005.pdf>] Address: Hancox, J., 57 Braithwell Road, Ravenfield, Rotherham S65 4LH, UK. E-mail to hancoxj@aol.com

5230. Hartman, K.; Kaller, M.; Howell, J.; Sweka, J. (2005): How much do valley fills influence headwater streams? *Hydrobiologia* 543(1-3): 91-102. (in English). ["Valley fill mining has the potential to alter headwater stream habitat in many areas in the eastern United States. In valley fill mining, overburden is removed to expose underlying coal seams. The overburden is then deposited in the adjacent valley. The deposited overburden from mining increases sedimentation, increases stream conductivity, and alters hydrologic regimes downstream of the fill. Changes in downstream communities are not well documented. However, it was suspected the increased sedimentation and conductivity would have deleterious effects upon the downstream macroinvertebrate communities. In southern West Virginia, four pairs of streams, each consisting of a fill and a reference stream, were selected as representative of watersheds experiencing valley fill mining. Stream pairs were selected for similar environmental conditions, with

one stream having a valley fill in its headwaters. Each stream was sampled by replicate Surber samples (n=9 per stream). Water chemistry and sediment measurements also were taken at each location. Valley fill streams experienced significantly higher specific conductance ($p < 0.01$), but did not have elevated levels of fine sediment. Fills exhibited elevated levels of Na, K, Mn, Mg, Ca, Ni and Fe relative to reference streams. Additionally, valley fill streams demonstrated significantly lower densities of Ephemeroptera, Coleoptera, Odonata, Non-insects, Scrapers, and Shredders ($p < 0.03$) than reference streams. Further, Ephemeroptera richness was negatively related to specific conductivity and many of the richness metrics were negatively related to metals, both of which were generally elevated in fill streams. It appears that at the minimum, valley fills increase specific conductance and metals in streams and this or some other unqualified factors structure the macroinvertebrate community downstream of the valley fill. However, given the level of disturbance in valley fills, it is surprising how little differences existed between fills and reference stream biota." (Authors)] Address: Hartman, Kyle, Division of Forestry, Wildlife & Fisheries Program, West Virginia University, 322 Percival Hall, Morgantown, WV, 26506-6125, USA. Email: hartman@wvu.edu

5231. Hofmann, B.; Martens, A. (2005): Eine Fang-Wiederfang-Studie zur Ortstreue und Kurzstreckenausbreitung von *Sympetrum sanguineum* (Odonata: Libellulidae). *Libellula* 24(1/2): 63-72. (in German, with English summary). ["In the summer of 2004, 117 males and three females were marked at two canals in the Upper Rhine floodplain south of Karlsruhe, Germany. 14 males (11.7%) were recaptured, one to 14 days after marking. Eleven individuals were recaptured at another canal section. The data suggest that *S. sanguineum* does not have a site fidelity." (Authors)] Address: Hofmann, Bernadette, Turnhallenstr. 1, D-77866 Rheinau-Freistett, Germany. E-mail: BernadetteHofmann@web.de

5232. Illingworth, A. (2005): Lesser Emperors ovipositing in Yorkshire. *Dragonfly News* 48: 20. (in English). [*Anax parthenope*, 23th July 2005, Farnham Gravel Pits lake Knaresborough, North Yorkshire, UK.] Address: Illingworth, A., Chelmer, Ripley R Knaresborough, North Yorkshire

5233. Ishizawa, N. (2005): The response to rotating objects by *Anotogaster sieboldii* (Selys) males, Pt 2 (Anisoptera: Cordulegastridae). *Odonatologica* 34(3): 211-218. (in English). ["It has been reported that the response to rotating objects by *A. sieboldii* males indicates recognition of the objects as females. The influences of colour, size and rotation velocity (RV) of discs on hovering ratio (HVR) were studied with experiments using a small electric rotating device. Among the rotating discs with white, yellow, orange, red, green, or blue alternating with black, the one with green elicited the highest HVR (98%), whereas the HVR to the yellow/black disc was lowest (32%). This suggests that yellow has a role as a warning coloration against predators rather than being involved in intraspecific recognition. - In the relationship of the HVR to RV of the green/black disc, the HVR reached a peak around 20-25 Hz. In relation of HVR to the size of the disc, the larger the diameter of the disc, the higher was the HVR, and when different sizes of discs were put side by side, *A. sieboldii* males had a tendency to respond to the lar-

ger disc of the pair.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

5234. Jarvis, K.J.; Haas, F.; Whiting, M.F. (2005): Phylogeny of earwigs (Insecta: Dermaptera) based on molecular and morphological evidence: reconsidering the classification of Dermaptera. *Systematic Entomology* 30(3): 442-453. (in English). ["Dermaptera (earwigs) is a cosmopolitan order of insects, the phylogenetic relationships of which are poorly understood. The phylogeny of Dermaptera was inferred from large subunit ribosomal (28S), small subunit ribosomal (18S), histone-3 (H3) nuclear DNA sequences, and 43 morphological characters. Sequence data were collected for thirty-two earwig exemplar taxa representing eight families in two suborders: Hemimeridae (suborder Hemimerina); Pygidicranidae, Anisolabididae, Labiduridae, Apachyidae, Spongiphoridae, Chelisochidae and Forficulidae (suborder Forficulina). Eighteen taxa from ten additional orders were also included, representing Ephemeroptera, Odonata, Orthoptera, Phasmida, Embiidina, Mantodea, Isoptera, Blattaria, Grylloblattodea and Zoraptera. These data were analysed via direct optimization in poyunder a range of gap and substitution values to test the sensitivity of the data to variations in parameter values. These results indicate that the epizotic Hemimerus is not sister to the remaining Dermaptera, but rather nested as sister to Forficulidae + Chelisochidae. These analyses support the paraphyly of Pygidicranidae and Spongiphoridae and the monophyly of Chelisochidae, Forficulidae, Anisolabididae and Labiduridae." (Authors)] Address: Jarvis, K.J., Dept of Integrative Biology, Brigham Young University, Provo, Utah, USA

5235. Jeffries, M.; Eales, H.T.; Storey, G. (2005): Distribution and habitat of the Banded Demoiselle *Calopteryx splendens* (Harris) in Northumberland. *J. Br. Dragonfly Society* 21(1): 1-7. (in English). [Recent range expansions of *C. splendens* in Northumberland, UK are discussed with special emphasis on methodical problems (e.g. the documentation of negative records). Analysis of habitats with positive and negative records respectively show no significant differences; thus recent climate change must be responsible for the range expansions as observed with additional (odonate) species too.] Address: Jeffries, M., Division of Environmental Management, Ellison Building, Northumbria University, Newcastle upon Tyne NE1 8ST, UK

5236. Jenkins, D.K. (2005): Population studies of the Southern Damselfly *Coenagrion mercuriale* (Charpentier) in the New Forest. Part 9. The Crockford streams, 20 years on. *J. Br. Dragonfly Society* 21(1): 8-13. (in English). ["Following detailed monitoring of *C. mercuriale* in the Crockford area of the New Forest between 1985 and 1994, a follow up survey was carried out in 2004 to assess the effect of changes to the climate and habitat over the intervening years. Population numbers in all the sections of the stream system studied were at higher levels than previously recorded and were still increasing in mid June, when poor weather intervened." (Author)] Address: Jenkins, D.K., 7 Lakewood Road, Ashurst, Southampton SO40 7DH, UK

5237. Keat, S.; Thompson, D.J.; Kemp, S.J.; Watts, P.C. (2005): Ten microsatellite loci for the Small Red-eyed Damselfly *Erythromma viridulum* (Charpentier). *Molecular Ecology Notes* 5(4): 788-790. (in English).

["*E. viridulum* is the first recorded example of a migrant damselfly establishing colonies in the British Isles. To examine the population genetic structure of *E. viridulum*, a partial genomic library enriched for CA microsatellite loci was constructed. Of the 42 loci tested, 19 amplified spurious bands and 13 were monomorphic, leaving 10 polymorphic loci that resolved distinct alleles within the expected size range. The number of alleles ranged between two (LIST14-021, LIST14-40) and eight (LIST14-002). Observed and expected heterozygosities varied between 0.000-0.698 and 0.045-0.688, respectively." (Authors)] Address: Watts, P., Animal Genomics Laboratory, The Biosciences Building, School of Biological Sciences, Liverpool University, Crown Street, Liverpool L69 7ZB, U.K. E-mail: p.c.watts@liv.ac.uk

5238. Kipping, J. (2005): Wiederfund von *Somatochlora flavomaculata* (Vander Linden, 1825) (Odonata: Corduliidae) für Thüringen. *Entomol. Nachrichten und Berichte* 49(1): 47-48. (in German). [NSG "Restloch Zechau", Thuringia, Germany, 02.07.2003 & 14.07.2004] Address: Kipping, J., Fockestr. 19, D-04275 Leipzig, Germany. E-mail: jens-kipping@t-online.de

5239. Kunz, B. (2005): *Boyeria irene* in Tunesien (Odonata: Aeshnidae). *Libellula* 24(1/2): 39-46. (in German, with English summary). ["New data from three field trips between 2000 and 2002 regarding the occurrence of the species in northern Tunisia are given, providing the first evidence that Tunisian *Boyeria* populations pertain actually to *B. irene*. Besides, a brief description of the habitats as well as some biological notes are given." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

5240. Lambrechts, J. (2005): De libellenfauna van het gebied Houterenberg-Pinnekeswijer (Tessenderlo, West-Limburg). *Gomphus* 20(1): 3-16. (in Dutch, with English and French summaries). ["In 2000 and 2001 the nature reserve Houterenberg - Pinnekeswijer (Tessenderlo, Limburg, Belgium) was inventoried for dragonflies, as part of a study to elaborate a management plan. The collected data are treated in this article, as well as a number of later collected records by warden Bart Govaere. In total 24 dragonfly species were found, from which the following six are the most interesting from a faunistic point of view: *Coenagrion lunulatum*, *Leucorrhinia rubicunda*, *Lestes virens*, *Sympecma fusca*, *Cordulia aenea* and *Ischnura pumilio*. Especially the oligotrophe "ven" 'De Pinnekeswijer' is of great interest for dragonflies, housing populations of the first 5 mentioned species." (Authors)] Address: Lambrechts, J., Zuurbemde 9, B-3380 Glabbeek, Belgium. E-mail: natuur@aeolus-milieu.be or Jorglambrechts@hotmail.com

5241. Leelapaibul, W.; Bumrungsri, S.; Pattanawiboon, A. (2005): Diet of wrinkle-lipped free-tailed bat (*Tadarida plicata* Buchanan, 1800) in central Thailand: insectivorous bats potentially act as biological pest control agents. *Acta Chiropterologica*, 7(1): 111-119. (in English). ["Insectivorous bats are major predators of nocturnal insects and have the potential to act as biological pest control agents in farmlands. The objective of the present study was to establish the diet of the guano bat, *Tadarida plicata*. The study was carried out at the Khao Chong Pran Cave, which houses 2.6 million bats, and is surrounded by rice fields. A total of 1,925 faecal pellets were collected from 385 bats during their mor-

ning return from January to December 2002. Faecal analysis indicated that *T. plicata* fed on at least nine insect orders: Homoptera (28.4%), Lepidoptera (20.8), Hemiptera (16.4), Coleoptera (14.4), Diptera (7.0), Hymenoptera (6.6), Odonata (6.0), Orthoptera (0.5) and Psocoptera (0.1). Light traps indicated that Coleoptera (41.2%), Homoptera (25.3), Hemiptera (18.8) and Diptera (12.7) were the most abundant insects in the study area. Homopterans, most of which were white-backed planthopper (*Sogatella* sp., Delphacidae) had the highest percentage frequency of occurrence in the bats diet indicating that *T. plicata* potentially plays an important role in controlling this major crop pest. The presence of macropterous planthoppers and a large proportion of moths in its diet suggests that *T. plicata* feeds on windborne migrant insects at high altitude. Female bats fed significantly more on lepidopterans and coleopterans and less on damselflies than males. The diet diversity index of lactating females was higher than pregnant females. Diet did not differ significantly between the dry and rainy seasons for either sex." (Authors)] Address: Bumrungsri, S., Department of Biology, Faculty of Science, Prince of Songkla University, Hat Yai, Songkhla, Thailand. E-mail: sara.b@psu.ac.th

5242. Lohr, M. (2005): Das Naturschutzgebiet "Auf dem Berenbruch" bei Fürstenau. *Beiträge zur Naturkunde zwischen Egge und Weser* 17: 92-97. (in German). [Nordrhein-Westfalen, Germany; 22 odonate species are listed and briefly commented. Species conservation measures directed to the tree frog (*Hylas arborea*) favoured odonate species as *Lestes dryas* and *Sympetrum flaveolum*, dwelling ephemeral waters.] Address: Lohr, M., An der Kirche 22, D-37671 Hörter, Germany. E-mail: mlohr@fh-hoexter.de

5243. Lohr, M. (2005): Libellenbeobachtungen in Südpotugal (Odonata). *Libellula* 24(1/2): 87-107. (in German, with English summary). ["During a three-weeks' trip in May 2003, the southern Portuguese districts Algarve and Baixo Alentejo were visited. At 36 investigated localities 39 spp. were recorded in total. Reproduction was proved for 31 spp. by records of exuviae. The dragonfly communities of different types of water bodies are described, and noteworthy observations concerning the geographical range of some species are presented in detail. *Selysiotthemis nigra* is new for Portugal, exuviae were found near Faro. Furthermore, remarkable records of *Lestes dryas*, *Coenagrion sdtulum*, *Gomphus graslinii*, *Macromia splendens*, and *Oxygastera curtisii* from southwestern Portugal are discussed in the context of their distribution in the Iberian peninsula. The dragonfly communities of southern Portuguese rivers are characterized by a high species diversity. The distribution of some species found in these rivers is restricted to southwestern Europe, many species mainly inhabit this area. Hence, the responsibility of Portugal for the conservation of rivers that are still unaffected by barrages is very high." (Author)] Address: Lohr, M., FH Lippe und Hörter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Hörter, Germany. E-mail: mlohr@fh-luh.de

5244. Long, R. (2005): A further Channel Islands record of Southern Migrant Hawker. *Atropos* 26: 55-56. (in English). [Jersey, UK; 8 August 2004, *Aeshna affinis*] Address: Long, R., Ozarda, Les Hammonnets, St. John, Jersey, Channel Islands, JE3 4FP, UK

5245. Loos, G. (2005): Verslag van de excursie van 12 juni 2004 naar het Vennengebied van Ravels-Poppel. *Gomphus* 20(1): 27-29. (in Dutch, with French summary). [This is a brief report from an excursion to the "Vennengebied van Ravels-Poppel", Belgium on 12-VI-2004. 21 odonate species including *Sympecma fusca* and *Leucorrhinia rubicunda* at Leiven, *Sympetrum flavolum* at Witgoor, and *Coenagrion pulchellum*, and *Brachytron pratense* at Zwart Water have been sighted.] Address: Loos, G., Kanaaldijk 1, B-2380 Revels, Belgium

5246. Luttbeg, B.; Hammond, J.; Sih, A. (2005): How predators and prey distribute themselves across space: comparing empirical data to alternative models of movement rules. ESA Annual Meeting, Montréal, Canada. August 2005: (in English). [Verbatim: While many studies have examined how prey distribute themselves in response to predators or how predators distribute themselves in response to prey, surprisingly few theoretical or empirical studies have examined how the two interact. How predators and prey distribute themselves is potentially shaped by the distributions of their 1) own species and 2) the other species, and 3) the distribution of resources and shelter across space. We present an examination of how these three factors affect the movement rules of prey (Pacific tree frog tadpoles, *Hyla regilla*) and predators (dragonfly nymphs, *Aeshna palmata*) in an experimental arena with two food patches that differ in the amount of prey's resource. Predator and prey distributions between the two patches were recorded at regular intervals over 3 hours and the minimum rates of movements between the patches were calculated. These data were compared to alternative models of how the probability of a prey or predator's switching patches depends on combinations of the proportion of prey, the proportion of predators, and the level of resources in the patch prior to individuals moving or not moving between patches. The relative evidence from the data for each of the alternative models were quantified using a model comparison approach utilizing Akaike Information Criteria. We find that prey movement between patches is primarily a positive function of the proportion of predators and prey in their current patch; i.e., that prey avoid both predators and competitors, but pay less attention to resources per se. For predators, their probability of movement decreased as the level of the prey's resource increases. That is, the predators appear to be basing their movement more on the distribution of the prey's resource than the distribution of prey and other predators. This surprising result matches a theoretical prediction that in a predator-prey race, predators should match the distribution of the prey's resource while prey should distribute themselves uniformly across patches. We compare these results to other metrics of how predators and prey are distributed, such as spatial overlap and coincidence.] Address: Luttbeg, B., University of California, Davis, Davis, CA

5247. Machado, A.B.M. (2005): *Schizocordulia* gen. nov. related to *Aeschnosoma* Selys with description of the female and additional data on the male of *Schizocordulia rustica* (Selys) comb. nov. (Odonata, Corduliidae). *Rev. Bras. Zool.* 22(3): 775-779. (in English, with Portuguese summary). ["The monotypical genus *Schizocordulia* is created for *Schizocordulia rustica* (Selys, 1871) comb. nov. known from a single male from Bahia, Brazil lacking the anal appendages. The female is described and the redescription of the male made by

GEISJKES (1970)] is completed by the description and illustration of the penis, the anal appendages and the pilose plate. The main characters separating the new genus from the closely related *Aeschnosoma* Selys, 1870 are the bifid male inferior appendage, the very long internal branch of the hamulus, the presence of a pilose plate on the male 7th abdominal segment, and the large and complex *vaivula vulvae* of the female. The study was based on 33 males and 2 females, which allowed an evaluation of the intraspecific variations in *Schizocordulia rustica*." (Author) The correct authorship of the species should be "Hagen in Selys, 1871" (Martin Schorr). For the full paper see: <http://www.scielo.br/pdf/rbzool/v22n3/26203.pdf> Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

5248. Malkmus, R. (2005): Libellen an den Bergbächen des Mount Kinabalu. *Natur und Museum* 1/2005: 6-15. (in German). [The author gives a concise description of the odonate fauna of Mount Kinabalu. Current knowledge totals the checklist of Odonata to 60 species. A brief history of dragonfly research in Mount Kinabalu is followed by a description of the faunas of different altitudes, and special emphasis is given to the riverine and the sun spot species. Many species are pictured by colour photographs. A closing chapter is directed to the relationship of the native people and dragonflies (e.g. usage as food).] Address: Malkmus, R., Schulstr. 4, D-97859 Wiesthal, Germany

5249. McCauley, S. (2005): Dispersal limitation and local performance: Interactions across life-history stages and consequences for species' distributions in anisopteran odonates.. 90th Annual Meeting in Montréal, Canada August 2005: (in English). [Verbatim: In many freshwater taxa, species' distributions are related to a habitat permanence gradient that is associated with a transition in the top predator community. Most studies of species' distributions across this gradient have focused on the role of trade-offs in local performance. However, for species which have limited abilities to withstand habitat drying, dispersal limitation may also be an important mechanism determining their ability to utilize habitats which dry regularly. I assessed the relative importance of local performance and dispersal limitation and how these processes may interact to determine species distributions in dragonfly species. I used a contrast of habitat specialist species restricted to permanent lakes with large bodied fish as top predators, and species with generalist distributions, occurring across the permanence and top predator gradient, to assess the role of local performance and dispersal limitation mechanisms in shaping species' distributions. I compared one aspect of local performance in habitat specialists and generalists - their vulnerability to alternative top predator types. I also compared larval traits expected to affect this and other aspects of local performance including larval activity levels and growth rates. I experimentally contrasted the effects of dispersal limitation in habitat specialists and generalists and related dispersal behavior to adult morphology. Dispersal limitation is a dominant mechanism structuring the breadth of species' distributions in these species. However, larval traits associated with species restricted to permanent lakes with large bodied fish predators were negatively related to adult traits that facilitate dispersal. These results suggest that traits affecting performance in diffe-

rent life-history stages may reinforce each other to shape species' distributions in this system.] Address: McCauley, Shannon, 1 University of Michigan, Ann Arbor, MI, USA

5250. McCreddie, J.W.; Ihle, D.T.; Adler, P.H. (2005): Biodiversity of larval damselflies and dragonflies (Insecta: Odonata) in the Lower Mobile/Tensaw Delta, Alabama. *Southeastern Naturalist* 4(2): 321-334. (in English). ["16 species of odonates, representing 9.2% of Alabama's odonate fauna, were collected from flowing waters 10 450 m wide in the poorly surveyed Mobile/Tensaw Delta of Baldwin County over a one-year period. The number of species was positively correlated with the number of specimens per site, with sites nearest Mobile Bay having fewer species, possibly reflecting higher salinities. Odonate assemblages in large flows of the Delta are unpredictable in terms of species co-occurrence, and fit a model of non-equilibrium community structure." (Authors)] Address: McCreddie, J., University of South Alabama, Department of Biological Sciences. E-Mail: jmccread@jaguar1.usouthal.edu

5251. Mey, D. (2005): Libellen (Odonata). In: Nationalpark Hainich Verwaltung (Hrsg.): Artenbericht 2005. Tiere, Pflanzen und Pilze im Nationalpark Hainich. Kenntnisstand zum 31.12.2004: 19-20. (in German). [Thuringia, Germany; checklist of the Odonata of the National Park Hainich. Available at: <http://www.nationalpark-hainich.de/media/downloads/AB2005Teil1.pdf>] Address: Nationalpark Hainich Verwaltung, Bei der Marktkirche 9, D-99947 Bad Langensalza, Germany

5252. Michaletz, P.; Doisy, K.; Rabeni, C. (2005): Influences of productivity, vegetation, and fish on macroinvertebrate abundance and size in Midwestern USA impoundments. *Hydrobiologia* 543(1): 147-158. (in English). ["The influences of productivity, vegetation coverage, and benthivorous fish abundance on macroinvertebrate abundance and mean size were examined in Midwestern USA impoundments. While impoundment productivity was not strongly related to total abundance and mean size of macroinvertebrates, it was related to specific taxa. As productivity increased, Ephemeroptera and Odonata abundance decreased and Diptera abundance increased. Despite the shift in taxonomic composition, mean individual size of the macroinvertebrate community varied little with changes in impoundment productivity. Relationships between macroinvertebrates and benthivorous fish were mixed. Macroinvertebrate abundance, especially Diptera, increased with increases in bluegill *Lepomis macrochirus* Rafinesque abundance and decreased with increases in channel catfish *Ictalurus punctatus* (Rafinesque) (which are stocked annually) abundance. Fish were not related to the mean size of macroinvertebrates. Macrophyte coverage was not related to macroinvertebrate abundance or mean size. Overall, macroinvertebrate abundance was mostly related to productivity and benthivorous fish in these impoundments. Mean size of macroinvertebrates did not differ with productivity, fish abundance, or macrophyte coverage." (Authors)] Address: Michaletz, P., Missouri Department of Conservation, 1110 South College Avenue, Columbia, MO, 65201, USA, Email: Paul.Michaletz@mdc.mo.gov

5253. Michels, U. (2005): Bemerkenswerte Nachweise im Makrozoobenthos der Weißen Elster. *Entomologische Mitteilungen Sachsen-Anhalt* 13(2): 79-81. (in

German). [Sachsen-Anhalt, Germany; *Calopteryx splendens*] Address: Michels, Ute, LIMNO-PLAN GbR, Bauernweg 8, D-15741 Bestensee, Germany

5254. Mitchell, F.L.; Lasswell, J.L. (2005): A Dazzle of Dragonflies. Peter N. Nevaumont Books (Texas A&M University Press). ISBN 1-58544-459-6: 224 pp. ["A Dazzle of Dragonflies" is a large, beautiful book that contains well-written information about dragonfly natural history, prehistory, and folklore. It also provides instructions on catching, collecting, rearing, photographing, and scanning odonates, as well as tips on creating a water garden to attract them. The abundant photos are in most cases exceptional, and the numerous other images, such as various wing patterns, eyes, and abdomens, are the result of scanning. These pictures are arranged or layouted as special kind of "Dragonfly Art", and as not otherwise to expect, they appear dead. But to see the wing venation is very fascinating. To scan wings is even better than to prepare black and white drawings of wing venation, cause you get the colours of the veins or pterostigma too. For me, the chapter on preserving Odonata is path breaking for the kind of documentation of specimens in collections. It is neither a field guide nor a scientific treatise: more than a hundred dragonflies are pictured in this coffee-table book, and best you browse it in your leisure time simply to enjoy our favourite beasts.

It is a little bit curious from the German point of view that Odonata are called "Hatzpferd", a name said to be still common for dragonflies among German people. The (nice) story of the Hatzpferd is told, but looking in Google for this expression, provides exactly zero hits. That's the situation: Checking Schäfer, Liselotte (1947): *Deutsche Synonymik der Libelle*. Dissertation an der Philosophischen Fakultät der Philipps-Universität zu Marburg. 303 pp., who compiled all the expressions in Germany referring to dragonflies, none hit the "Hatzpferd". There is only one quite similar from Blankenese near Hamburg: "Hetzepferd".

In spite of this: I don't want to miss this book. It is a very special one among the many books on dragonflies published in the past few years. (Martin Schorr)

5255. Moliár, A.; Ambrus, A. (2005): Odonata and aquatic beetle records from the hanság habitat reconstruction area. *Acta Biol. Debr. Oecol. Hung.* 13: 115-120. (in Hungarian, with English summary). ["The Nyirkai-Hany Habitat Reconstruction project was started in 2001 at the SE area of Hanság by the Fertő-Hanság National Park Directorate to extend and enhance the wetland habitat types of the area. The habitat reconstruction took place in three different beds successively involving 430 hectares. This paper presents the results of the Odonata monitoring started in the first year of flooding and beetle surveys of 2003-2004 years. The first years of the freshly flooded wetlands was characterized mainly by the large number of the widely distributed, generalist species, such as *Orthetrum cancellatum*, *Ischnura elegans* and later *Sympetrum vulgatum*, *Orthetrum albistylum* and *Noterus crassicornis*, *Noterus clavicornis*, *Hydrobius fuscipes* (Coleoptera). There were established small wetlands out of the directly flooded areas, by the increasing ground water table, filtered through the peat soils. These small water bodies support special, rich macroinvertebrate communities in dense vegetation and free of fish situation containing populations of such species as *Anaciaeschna isosceles*, *Brachytron pratense*, *Libellula quadrimaculata*, *Ischnura pumilio*, *Coenagrion pulchellum*, *Sympecma*

fusca (Odonata), *Hydrochus crenatus*, *Enochrus quadripunctatus* (Coleoptera)." (Authors)] Address: Ambros, A., Hortobágy National Park, Directorate, Thematic Information Centre of Nature Conservation, H-9495 Kópháza, Jurisich M. u. 16, Hungary

5256. Müller, R.; Hendrich, L.; König, B.; Schleuter, M. (2005): Das Makrozoobenthos der Unteren Havel zwischen Ketzin und Brandenburg unter besonderer Berücksichtigung der Auswirkungen des Wellenschlags. Abstracts. Jahrestagung 2005. Deutsche Gesellschaft für Limnologie. Karlsruhe: 87-88. (in German). [First results of a study along the River Havel, Brandenburg, Germany with reference of the impacts and effects of waves and the wash of moving boats or ships are presented. Records of three odonate species are checklisted but without focus on the potential impacts of boats.] Address: Schleuter, M., Bundesanstalt für Gewässerkunde, Kaiserin-Augusta-Anlagen 15-17, D-56068 Koblenz, Germany

5257. Muséum d'histoire naturelle de Nantes (2005): Program and abstracts from the oral communications of the West-European odonatological meeting, Val de la Pommeraye (France), June 24th - 27th, 2005. Muséum d'histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France: 20 pp, app. (in French and English). [The remarkable meeting under the leadership of the French odonatologists convened the representatives of the Belgian, English, French, and German dragonfly societies. The following lectures were held: P. S. CORBET - *Sympetrum*: a genus offering research opportunities; J. OTT - Dragonflies and Climatic Changes: recent observations of range expansions in Europe and their possible ecological effects.; F. HERBRECHT - Dragonflies of rock quarries in the Armorican Massif; E. DOUILLARD - Contribution to knowledge on life-cycle and population survey of *Oxygostris curtisii* (DALE, 1834) in the Mauges (department of Maine-et-Loire); A. DUBOS, J. PELLET et A. MAIBACH - Efficiency of the creation of a group of forest ponds on the Odonata community; G. De KNYF, A. ANSELIN - Some aspects of distribution of Odonata in Belgium; D. GRAND - Odonata from Corsica: latest studies and synthesis; V. KALKMAN - Towards an atlas of European Odonata; F. RAGUENES - The Dragonfly's House in Chaille-sous-Ormeaux; D. GRAND - Endemic dragonflies from New-Caledonia; P. MACHET - Dragonflies from French Guyana History, now and the future; F. MEURGEY - Characteristics of the odonotofauna and of aquatic habitats of the French West Indies, Guadeloupe & Martinique; F. MEURGEY - Odonata of French overseas territories. Synthesis of current knowledge 1999 - 2005; P. MACHET - Dragonflies from French Polynesia 1- History and now. 2- The Society Islands; K. GUERBAU - Results from six years of Odonatological survey on two pools in the Longeyroux peat bog (Correze, France); E. RISERVATO - Dragonflies larval ecology in Ticino Park (North of Italy); D. GRAND - *Sympetrum vulgatum ibericum* OCHARAN, 1985; a new taxa in France; K.-D. B. DIJKSTRA - Critical and consequent taxonomy in Odonata: the European perspective; Round table: West-European situation of *Coenagrion mercuriale* (Charpentier, 1840)] Address: Meurgey, F., Muséum d'histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5258. Muzón, J.; Garré, A. (2005): Description of the last instar larva of *Erythrodiplax paraguayensis* (Anisop-

tera: Libellulidae). *Rev. Soc. Entomol. Argent.* 64(1-2): 85-91. (in English, with Spanish summary). [The last instar larva of *E. paraguayensis* (Förster) is described and illustrated, based on Iberá (Corrientes, Argentina) specimens. A comparative analysis of all hitherto known larvae from Argentina is provided." (Authors) Available at: <http://www.scielo.org.ar/pdf/rsea/v64n1-2/v64n1-2a14.pdf>] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

5259. Nekaris, K.A.I. (2005): Foraging behaviour of the slender loris (*Loris lydekkerianus lydekkerianus*): implications for theories of primate origins. *Journal of Human Evolution* 49(3): 289-300. (in English). [Members of the Order Primates are characterised by a wide overlap of visual fields or optic convergence. It has been proposed that exploitation of either insects or angiosperm products in the terminal branches of trees, and the corresponding complex, three-dimensional environment associated with these foraging strategies, account for visual convergence. Although slender lorises (*Loris* sp.) are the most visually convergent of all the primates, very little is known about their feeding ecology. This study, carried out over 10 ½ months in South India, examines the feeding behaviour of *L. lydekkerianus lydekkerianus* in relation to hypotheses regarding visual predation of insects. Of 1238 feeding observations, 96% were of animal prey. Lorises showed an equal and overwhelming preference for terminal and middle branch feeding, using the undergrowth and trunk rarely. The type of prey caught on terminal branches (Lepidoptera, Odonata, Homoptera) differed significantly from those caught on middle branches (Hymenoptera, Coleoptera). A two-handed catch accompanied by bipedal postures was used almost exclusively on terminal branches where mobile prey was caught, whereas the more common capture technique of one-handed grab was used more often on sturdy middle branches to obtain slow moving prey. Although prey was detected with senses other than vision, vision was the key sense used upon the final strike. This study strongly supports the notion that hunting for animal prey was a key ecological determinant in selecting for visual convergence early on in primate evolution. The extreme specialisations of slender lorises, however, suggest that early primates were not dedicated faunivores and lend further support to the emerging view that both insects and fruits were probably important components of the diet of basal primates, and that exploitation of fruits may account for other key primate traits." (Authors)] Address: Nekaris, K., Oxford Brookes University, School of Social Sciences and Law, Department of Anthropology, Nocturnal Primate Research Group, Oxford OX3 0BP, United Kingdom.

5260. Nel, A.; Petrulevicius, J.F.; Gentilini, G.; Martínez-Delclòs, X. (2005): Phylogenetic analysis of the Cenozoic family Sieblosiidae (Insecta: Odonata), with description of new taxa from Russia, Italy and France. *Geobios* 38(2): 219-233. [We describe the following Sieblosiidae: an unnamed gen. and sp. A from the Miocene of Italy, *Miostenolestes zherikhini* nov. gen., nov. sp., *Paraoligolestes stavropolensis* nov. sp., *Stenolestes fasciata* nov. sp. (all from the Miocene of North Caucasus), *Stenolestes* (?) *adygeianensis* nov. sp. (Oligocene of North Caucasus), and *Stenolestes cerestensis* nov. sp. (Oligocene of France). The genus *Sieblosia* Handlirsch, 1906 is restored. A new phylogenetic ana-

lysis of the Sieblosiidae is proposed. The two taxa gen. and sp. A and *Oligolestes* fall in most inclusive positions in the same clade with the Sieblosiidae. Within the Sieblosiidae sensu stricto, the two clades (*Paraoligolestes* + (*Parastenolestes* + *Stenolestes*)) and (*Parastenolestes* + *Stenolestes*) are the best supported. The family Sieblosiidae seems to be restricted to the Oligocene Miocene of Europe." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

5261. Niehuis, M. (2005): Schlupfnachweise zweier bemerkenswerter Libellenarten (Südliche Mosaikjungfer / *Aeshna affinis* und Gemeine Keiljungfer / *Gomphus vulgatissimus*) im Süden von Rheinland-Pfalz (Odonata: Aeshnidae et Gomphidae). Fauna und Flora in Rheinland-Pfalz 10(3): 1125-1130. (in German). [*Aeshna affinis*: Jockrimer clay pits, Landkreis Germersheim, Rhineland-Palatinate, Germany, 23-VI-2005; *Gomphus vulgatissimus*, Odenbach/Glan, Landkreis Kusel, 12-V-2005; Neue Lauter, Landkreis Germersheim, 2-V-2005, both Rhineland-Palatinate, Germany.] Address: Niehuis, M., Im Vorderen Großthal, D-76857 Albersweiler, Germany. E-mail: Niehuis@t-online.de

5262. Novelo-Gutiérrez, R. (2005): La larva de *Enallagma novaehispaniae* Calvert 1902 (Odonata: Zygoptera: Coenagrionidae). Folia Entomol. Mex. 44(2): 219-224. (in Spanish, with English summary). ["A detailed description and illustration of the last instar larva of *E. novaehispaniae*, is provided. The main distinctive features exhibited by this species are: Third antennal segment less than twice as long as the first; one premental seta on each side of midline; four palpal setae; epi- and paraprocts strongly pigmented, and with tips rounded." (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

5263. Ogden, T.H.; Whiting, M.F.; Wheeler, W.C. (2005): Poor taxon sampling, poor character sampling, and non-repeatable analyses of a contrived dataset do not provide a more credible estimate of insect phylogeny: a reply to Kjer. Cladistics 21: 295-302. (in English). ["The wealth of data available for phylogenetic analysis of the insect orders, from both morphological and molecular sources, is steadily increasing. However, controversy exists among the methodologies one can use to reconstruct ordinal relationships. Recently, Kjer (2004) (Aligned 18S and insect phylogeny. Syst. Biol. 53, 506-514) presented an analysis of insect ordinal relationships based exclusively on a single source of information: 18S rDNA sequence data. Kjer claims that his analysis resulted in a more credible phylogeny for the insect orders and strongly criticized our previous phylogenetic results. However, Kjer only used a subset of the data that are currently available for insect ordinal phylogeny, misrepresented our analyses, and omitted other analyses we have published on insect ordinal phylogeny. In our estimation, Kjer did a poor job of representing the current state of affairs in insect ordinal phylogenetics. Furthermore, we examine a number of analytical issues that are relevant not only for insect phylogeny, but systematics as a science, such as: repeatability and objectivity, locating alignment boundaries, secondary structure, goodness of fit measure, epistemological coherence, practicality and homology." Odonata are refe-

renced at many occasions.] Address: Ogden, T.H., Department of Integrative Biology, 401 WIDB, Brigham Young University, Provo, Utah 84602 USA. E-mail: heathogden@byu.edu

5264. Orizaola, G.; Brana, F. (2005): Plasticity in newt metamorphosis: the effect of predation at embryonic and larval stages. Freshwater Biology 50: 438-446. (in English). ["1. Some organisms under variable predator pressure show induced antipredator defences, whose development incurs costs and may be associated with changes to later performance. This may be of especial relevance to animals with complex life histories involving metamorphosis. 2. This study examines the effect of predation environment, experienced both during embryonic and larval stages, on palmate newt (*Triturus helveticus*) metamorphosis. Newt eggs were raised until hatching with or without exposure to chemical cues from brown trout (*Salmo trutta*), and larval development was monitored in the presence or absence of the cues. 3. Exposure to predator cues during the embryonic stage resulted in higher growth rates at the larval stage, reduced time to metamorphosis and size at metamorphosis. Metamorphs also had narrower heads and shorter forelimbs than those from predator-free treatments. In contrast, exposure to predator cues during the larval stage did not affect metamorph characteristics. 4. These results indicate that developing embryos are sensitive to predator chemical cues and that the responses can extend to later stages. Reversion of induced defences when predation risk ceased was not detected. We discuss the possible adaptive significance of these responses." (Authors) Odonata are treated in the discussion of the results of the study. Available at: <http://www.popbiol.ebc.uu.se/pdf/FreshwaterBiology2005.pdf>] Address: Orizaola, G., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, c/ Catedrático Rodrigo Uria s/n, 33071, Oviedo, Spain. E-mail: orizaola@correo.uniovi.es

5265. Ott, J. (2005): Die Große Moosjungfer *Leucorrhinia pectoralis* (Charpentier, 1825) - erneuter Nachweis für Rheinland-Pfalz (Odonata: Libellulidae). Fauna und Flora in Rheinland-Pfalz 10(3): 921-926. (German, with English summary) [Eppenbrunn, Landkreis Südwestpfalz, Rhineland-Palatinate, Germany, 22-VI-2005; detailed documentation of a record of this regionally very rare dragonfly.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

5266. Ott, J. (2005): Klimaänderung - auch ein Thema und Problem für den Biodiversitätsschutz im grenzüberschreitenden Biosphärenreservat Vosges du Nord und Pfälzerwald?. Ann. Sci. Rés. Trans. Vosges du Nord-Pfälzerwald 12: 127-142. (in German, with French and English summaries). [Concise review - including some odonatological examples - of current knowledge on effects of climate change on biodiversity.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

5267. Parr, A. (2005): Dragonfly news update. Atropos 26: 26-27. (in English). [Interesting UK odonate sightings in 2005 are briefly alighted, with some emphasis to *Libellula fulva*, *Sympetrum fonscolombii*, *Anax parthenope*, and *Erythromma viridulum*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

- 5268.** Parr, A. (2005): First dates for 2005. *Dragonfly News* 48: 18. (in English). [Phenological data of odonatalogical sightings in UK (late dates for 2004, first dates for 2005).] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 5269.** Parr, A. (2005): Guides to Odonata from various regions of the world. *Dragonfly News* 48: 21-24. (in English). [compilation of dragonfly books currently available.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 5270.** Parr, A. (2005): Migrant dragonfly update. *Dragonfly News* 48: 19. (in English). [Up-to-date records in UK of *Sympetrum fonscolombii* and *Anax parthenope*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 5271.** Parr, A. (2005): Odonata records committee update. *Atropos* 26: 28. (in English). [2004 records of *Anax parthenope* and *Aeshna affinis* in UK are documented.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 5272.** Parr, A.J. (2005): Migrant and dispersive dragonflies in Britain during 2004. *J. Br. Dragonfly Society* 21(1): 14-20. (in English). ["2004 was not an outstanding year for migration, perhaps in part because of the rather variable weather during the summer. In particular *Sympetrum fonscolombii* fared poorly. Some significant arrivals were however noted, especially during the month of August. High points of 2004 included a scattering of *Anax parthenope* throughout England during the course of the summer, a small influx of *Sympetrum flavolum* to the east coast, and more spectacularly, a sighting of *Crocothemis erythraea* in Cumbria, this record complementing one from Guernsey in the Channel Islands. A *Aeshna affinis* was also seen in the Channel Islands, this time on Jersey. Perhaps the real highlight of 2004 was the continued consolidation of our new colonist species. *Erythromma viridulum* showed a major expansion of its inland range, and further immigration was also noted. While breeding has still to be proven, it is also becoming increasingly probable that *Lestes barbarus* is establishing itself both in Kent and Norfolk." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 5273.** Pix, A. (2005): Die Libellen der Ballertasche mit Gedanken zur thermischen Faunendrift. *Göttinger naturkundliche Schriften* 6: 41-54. (in German, with English summary). [Lower Saxony, Germany; the gravel pit "Ballertasche" harbours 38 odonate species. Special emphasis is given to the "succession specialists" and the "thermophilic species". The faunal composition of the gravel pits demonstrates the generally and nationally observed trend in the direction towards thermophilic species. *Orthetrum brunneum* is classified as an umbrella species for early stages of succession in gravel pits with slow running seepage waters; in the context of nature conservation measures, it is assessed as more useful as *Bombina variegata* (Amphibia), a species of priority conservation concern.] Address: Pix, A., Mönchehofstr. 1, D-34127 Kassel, Germany
- 5274.** Postler, E.; Postler, W.; Kilimann, N. (2005): Entwicklungsnachweise von *Gomphus flavipes* im Datteln-Hamm-Kanal und im Rhein-Herne-Kanal (Odonata: Gomphidae. *Libellula* 24(1/2): 83-86. (in German, with English summary). ["On 23-VII-2004 an exuvia of *G. flavipes* was found at the Datteln-Hamm-Kanal (North Rhine-Westphalia, Germany). This is the first evidence for reproduction of this species in a navigable canal. Due to intensification of the search, in addition two exuviae of *G. flavipes* were found at the Rhein-Herne-Kanal (North Rhine-Westphalia, Germany) on 29-VII and 02-VIII-2004." (Authors)] Address: Postler, Elisabeth, Hammer Straße 39, D-59174 Kamen, Germany. E-mail: w.postler@t-online.de
- 5275.** PRESSKIT (2005): Newspaper articles, reviews, author photo & bio for Common Dragonflies of California &/or Kathy Biggs and her Bigsnest Wildlife Pond. (in English). [<http://www.sonic.net/~bigsnest/Pond/dragons/presskit.html>]
- 5276.** Reels, G. (2005): Book reviews: Field Guide to the Dragonflies of Hong Kong. 2nd Edition by Keith D.P. Wilson, 383 pages, softcover. Cosmos Books Ltd, Hong Kong, 2004. *Porcupine* 32: 20-21. (in English). [The new field guide includes now 112 odonate species.] Address: not stated
- 5277.** Relyea, R.A.; Auld, J.R. (2005): Predator- and competitor-induced plasticity how changes in foraging morphology affect phenotypic trade offs. *Ecology* 86(7): 1723-1729. (in English). ["Studies of phenotypic plasticity frequently demonstrate functional trade-offs between alternative phenotypes by documenting environment-specific costs and benefits. However, the functional mechanisms underlying these trade-offs are often unknown. For example, predator-induced traits typically provide superior predator resistance but slower growth, while competitor-induced traits provide better growth but inferior predator resistance. While the mechanisms underlying predator resistance have been identified, the mechanisms underlying differential growth have remained elusive. To determine whether competitor and predator environments affect individual growth by induced changes in foraging morphology, we raised wood frog tadpoles (*Rana sylvatica*) under a factorial combination of competitors and predators (*Anax junius*) and assessed changes in mouthparts that might affect growth. In general, competitors induced relatively larger oral discs, wider beaks, and longer tooth rows, while predators induced relatively smaller oral discs, narrower beaks, and shorter tooth rows. These effects were interactive; the largest competitor-induced responses occurred under high predator density and the largest predator-induced responses occurred under low competition. Further, one of the tooth rows that commonly appeared under low predation risk was frequently absent under high predation risk. These discoveries suggest that predator and competitor environments can have profound effects on prey foraging structures and that these effects set up growth trade-offs between phenotypes that favor the evolution of phenotypically plastic responses." (Authors) Available at: <http://www.pitt.edu/~jra10/Relyea%20&%20Auld%202005.pdf>] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburg, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu
- 5278.** Rettig, K. (2005): Später Schlupftermin der Blaugrünen Mosaikjungfer (*Aeshna cyanea*) in Ostfries-

land. Beiträge zur Fauna und Flora Ostfrieslands 239: 22. (in German). [Germany, Lower Saxony; late emergence at 31-VIII-2005 from a garden pond] Address: Rettig, K., Danziger Str. 11, D-26725 Emden, Germany

5279. Riedel, F. (2005): Lepidopterenfauna im Jagsttal. Naturkundlichen Beiträge des Deutschen Jugendbund für Naturbeobachtung 35: 29-42. (in German). [Baden-Württemberg, Germany; records of the following species are briefly documented: *Onychogomphus forcipatus*, *Anax parthenope*, *Crocothemis erythraea*, and *Erythromma viridulum*.] Address: Riedel, F., Hagenbach 2, 74219 Möckmühl, Germany. E-mail: Riedel@students.uni-marburg.de

5280. Robinson, C. (2005): Life-Cycle. Dragonfly News 48: 30. (in English). [poem] Address: not stated

5281. Rohr, J.R.; Crumrine, P.W. (2005): Effects of an herbicide and an insecticide on pond community structure and processes. *Ecological Applications* 15(4): 1135-1147. (in English). ["Virtually all species live within complex food webs, and many of these organisms are exposed to contaminants. However, we know little about how community processes, such as competition and predation, influence susceptibility to contaminants or how different types of contaminants shape communities. The objective of our study was to determine how realistic concentrations of the herbicide atrazine and the insecticide endosulfan influence the structure of a pond community when the presence of common community members was manipulated. We employed a factorial design in mesocosms to evaluate the effects of pesticide treatments (25 µg/L of atrazine, 10 µg/L of endosulfan, solvent control; two pulses separated by two weeks) and the presence or absence of wood frog tadpoles (*Rana sylvatica*), adult snails (*Planorbella trivolvis*), and caged dragonfly larvae (*Anax junius*) on a freshwater community. Tadpoles, snails, and chironomid larvae, *Polypedilum* sp. (Dipterans), all competed for periphyton. As a result, tadpoles reduced the survival, mass, and reproduction of snails; snails reduced the growth, development, inactivity, and dragonfly avoidance of tadpoles; snails and tadpoles reduced the abundance of chironomid larvae; and chironomid larvae reduced snail mass. The adverse effect of snails on tadpole growth and behavior was greater in the presence of the caged tadpole predator, *A. junius*. Neither pesticide affected dragonfly survival, but endosulfan directly reduced zooplankton (*Daphnia*), and atrazine indirectly reduced chironomid abundance. Atrazine also directly decreased periphyton, and endosulfan decimated chironomid larvae, resulting in indirect increases and decreases in competition for both snails and tadpoles, respectively. Consequently, relative to endosulfan, atrazine tended to decrease snail mass and reproduction and reduce tadpole mass, development, inactivity, refuge use, and dragonfly avoidance. However, the indirect effects of pesticides depended upon the presence of heterospecifics. The indirect benefit of endosulfan on snail mass was greater in the presence of caged dragonfly larvae, and endosulfan's indirect benefit on tadpole mass was greater in the absence of snails. The effect of pesticides on tadpole activity depended on both caged dragonflies and snails. Thus, environmentally realistic concentrations of pesticides directly and indirectly shaped species responses and community composition, but the initial composition of the community influenced these pesticide effects. These results empha-

size the importance of quantifying the effects of contaminants within complex natural communities." (Authors)] Address: Rohr, J.R., 101 Morgan Building, Dept of Biology, University of Kentucky, Lexington, Kentucky 40506-0225 USA

5282. Ruf, J. (2005): Tier- und Pflanzenarten der Flutmulde Gottenheim. *Naturschutz am südlichen Oberrhein*, Beiheft 1: 27-29. (in German). [Baden-Württemberg; Germany; records of 22 odonate species including *Orthetrum albistylum* are documented] Address: Ruf, J., Belchenstr. 15, D-79115 Freiburg, Germany

5283. Sánchez-Guillén, R.A.; Van Gossum, H.; Cordero Rivera, A. (2005): Hybridization and the inheritance of female colour polymorphism in two ischnurid damselflies (Odonata: Coenagrionidae). *Biological Journal of the Linnean Society* 85(4): 471-481. (in English). ["Female-limited polychromatism is frequent in many species of Odonata. *Ischnura elegans* has three colour morphs: one male-like coloured (androchrome) and two additional gynochrome brown morphs (*infuscans* and *rufescens-obsolata* morphs). A total of 19 progenies obtained from once-mated females were reared in the laboratory in three generations. Results indicate that the colour morphs are controlled by the same genetic system as previously described for *I. graellsii*, i.e. an autosomal locus with female-limited expression and with three alleles with a hierarchy of dominance ($p_a > p_i > p^0$). Five interspecific crossings between female *I. graellsii* and male *I. elegans*, five crossings between hybrid females and male *I. elegans* and one crossing between female *I. graellsii* and a hybrid male further confirmed that the genetic system is the same in both species. A survey of morph frequencies in north-west Spain revealed that *I. elegans* shows high variability in androchrome frequency (4-91%) between nearby populations, whereas in *I. graellsii* androchromes never are the majority morph (5-40%). The highest androchrome frequency in *I. graellsii* was found in populations closest to a locality where both species have hybridized, and that now has the highest androchrome frequency of *I. elegans*. We hypothesize that *I. elegans* genes have been incorporated into the genome of *I. graellsii* resulting in increased androchrome frequency in the latter species. Low androchrome frequency in *I. elegans* seems also related to the influence of *I. graellsii* genes. Therefore, we suggest that hybridization between both taxa is contributing to the temporal maintenance of contrasting androchrome frequencies in nearby populations." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

5284. Sanderson, R. A.; Eyre, M. D.; Rushton, S. P. (2005): Distribution of selected macroinvertebrates in a mosaic of temporary and permanent freshwater ponds as explained by autologistic models. *Ecography* 28(3): 355-362. (in English). ["We investigated the aquatic macroinvertebrate fauna of 76 ponds and small pools in an urban fringe landscape, and related the presence of ten species to measures of water permanence, pond area and environmental conditions using logistic models. The incidence of all the species was strongly associated with variation in hydroperiod, but patterns were more variable with the other explanatory variables. To determine whether the presence of a species at neighbouring ponds increased its probability of occurrence at

a pond we constructed a series of autologistic models, that differed from the aspatial logistic model in that they included a spatial autocovariate in the predictor terms. The improvement of model fit on inclusion of this autocovariate, measured as the decline in deviance compared to the aspatial models, was determined across a range of lag distances. In seven of the ten species, the autologistic models explained the incidence of the species amongst the ponds better than the aspatial models. Spatial effects were typically over short distances (<200 m) before declining, but in two species appeared to reach an asymptote, and we propose that variation in dispersal ability is the most likely factor producing these spatial effects. We conclude that it is essential that some measure of spatial autocorrelation is considered when evaluating the distribution of aquatic macroinvertebrates at small or medium scales." (Authors)] Address: Sanderson, R.A., Inst. for Research in Environment and Sustainability, Devonshire Bldg, Univ. Newcastle, Newcastle upon Tyne, NE1 7RU, UK. E-mail: r.a.sanderson@newcastle.ac.uk)

5285. Sasamoto, A.; Cuong, D.M. (2005): New records of Odonata from Vietnam. *Notulae odonatologicae* 6(5): 50-51. (in English). [Records of the following species are documented: *Prodasineura coerulescens*, *Agriocnemis pygmaea*, *Ceriagrion azureum*, *Epophthalmia elegans*, *Acisoma panorpoides*, *Hylaeothemis clementia*, and *Tetrathemis irregularis*.] Address: Cuong, D.M., Hom thu so 16, Buu Dien 10210, 35 Thai Thinh, Hanoi, Vietnam. E-mail: cuongdm@hotmail.com

5286. Schader, H. (2005): Tümpelanlagen der GNOR. Positive Entwicklung in der Rheinebene östlich von Neustadt/Weinstraße. *GNOR Info* 101: 28-30. (in German). [Brief report of the 'Gesellschaft für Naturschutz und Ornithologie in Rheinland-Pfalz' (GNOR), Germany with a few notes on the odonate fauna (including *Sympetrum pedomontanum*, *Orthetrum brunneum*, *Lestes barbarus*).] Address: Schader, H., Obere Jakobstr. 5, D-67550 Worms, Germany.

5287. Schenk, K.; Söndgerath, D. (2005): Influence of egg size differences within egg clutches on larval parameters in nine libellulid species (Odonata). *Ecological Entomology* 30(4): 456-463. (in English). ["In libellulids, egg size differs between species and populations. There are also size differences within egg clutches of individual females. Past experiments suggest that there are two different types of egg clutches in libellulids. Egg size decreases significantly during oviposition in species that perform non-contact guarding during oviposition. In contrast, in species ovipositing in tandem, egg size is randomly distributed. This study deals with the possible consequences of egg size variation within the different egg clutch types. The study examined whether there is a correlation between egg development time, offspring sex or larval size and egg size. The current experiments were conducted in Namibia and Germany. Five non-contact guarding and four tandem guarding libellulid species were used. In some species larger eggs needed more time to develop, in some species no correlation between egg size and egg development time could be found, whereas in other species larger eggs developed faster. The sex ratio was biased towards females in *Leucorrhinia dubia* and in *Sympetrum striolatum* and egg size was not associated with gender. In both egg clutch types larger eggs resulted in larger larvae. In this study, evidence was found that the effects of egg size diminished with progressing larval develop-

ment under good conditions. However, it is possible that the effects may have a greater influence under harsh circumstances." Authors)] Address: Schenk, Kamilla, Zoologisches Institut, Technische Universität Braunschweig, Fasanenstraße 3, D-38092 Braunschweig, Germany. E-mail: k.schenk@tu-bs.de

5288. Scher, O.; Thiéry, A. (2005): Odonata, Amphibia and Environmental Characteristics in Motorway Stormwater Retention Ponds (Southern France). *Hydrobiologia* 551(1): 237-251. (in English). ["Water and its protection against pollution is an urgent priority for all countries around the world. In that context, France, through its Water Law in 1992 obliged the motorway companies to build stormwater retention ponds along roads in order to protect the water resource from transport pollution and to control water flow during rainstorms. We propose to evaluate how much these ponds can be attractive for aquatic species and then evaluate their role in regional biodiversity. Six retention ponds, localized in the Mediterranean region, were investigated during one year (March 2002 March 2003) for their chemical and biological characteristics such as bottom type, trace metal composition, water quality and phyto-cenose composition. These variables were recorded and correlated with species richness of amphibian and dragonfly communities. Stormwater retention ponds showed a high concentration of copper and zinc in top sediment layer and herbicides in water column. Dragonfly richness was higher in ponds with a natural bottom than ones with an artificial bottom (PEHD membrane) while amphibian richness was more sensitive to the structure of the surrounding landscape. These habitats appeared to be very attractive for Odonata species and tend to favorize uncommon species present in the survey region such as *Ischnura pumilio* and *Erythromma viridulum*. Amphibian were found to be representative of anthropophilous guild." (Authors)] Address: Scher, O., Laboratoire de Biologie Animale, Université de Provence, E.R. Biodiversité et Environnement, Case 18, F-13331 Marseille, France. E-mail: olivier.scher@net-courrier.com

5289. Schiel, F.-J.; Westermann, K. (2005): Daten der Schwarzen Heidelibelle (*Sympetrum danae*) in der südlichen Oberrheinebene. *Naturschutz am südlichen Oberrhein, Beiheft* 1: 30-31. (in German). [Regional breeding habitats of *S. danae* are situated in the higher middle range mountain of Schwarzwald, Baden-Württemberg, Germany; occasionally, the species disperses to the floodplain of River Rhine on the foothills of the Schwarzwald. Such observations are compiled.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

5290. Schmidt, B. (2005): Erste Beobachtungen von *Boyeria irene* am Bodensee (Odonata: Aeshnidae). *Libellula* 24(1/2): 31-37. (in German, with English summary). ["On 9 and 29-VI-2004, respectively, an adult male was observed for longer periods in Friedrichshafen at the shore of Lake Constance. These are the second and third record of the species in Germany. The origin of the individuals is discussed in detail but remains unknown." (Author)] Address: Schmidt, B., Alpenstraße 27, D-88045 Friedrichshafen, Germany. E-mail: b.schmidt@friedrichshafen.de

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AGBU e.V. (Hrsg.), Thema des Monats August 2005, www.bodensee-ufer.de, Konstanz.: 3 pp. (in German). [Baden-Württemberg, Germany; *Boyeria irene*, *Ophiogomphus cecilia*, *Gomphus vulgatissimus*, and *Onychogomphus forcipatus* are briefly discussed.] Address: <http://www.bodensee-ufer.de/Inhalt/TdMLibelleAug05-final.pdf>. Address: Schmidt, B., Alpenstraße 27, D-88045 Friedrichshafen, Germany. E-mail: b.schmidt@friedrichshafen.de

5292. Schmidt, E. (2005): Zur Libellenfauna eines kleinen Laubfrosch-Schutzgebietes bei Coesfeld (Westmünsterland, Nordrhein-Westfalen). *Entomologie heute* 17: 27-38. (in German, with English summary). [Germany; between 2003 and 2005, the survey of the odonate fauna of tree frog (*Hyla arborea*, Amphibia) waters resulted in a total of 28 species. Odonata with special indicatorious function are species dwelling habitats with temporary water conditions and borders with alternating water levels and reed vegetation (e.g. *Lestes dryas*).] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

5293. Schneider, T.; Brauner, O.; Reichling, A. (2005): Entwicklungsnachweis von *Crocothemis erythraea* und Funde von *Aeshna affinis* im Odertal Südostbrandenburgs (Odonata: Libellulidae, Aeshnidae). *Libellula* 24(1/2): 73-82. (in German, with English summary). ["In two ponds of a gravel pit complex near Eisenhüttenstadt the reproduction of *C. erythraea* was proved in 2004. A total of 17 exuviae were collected. In the closer surroundings of the waters imagines were observed on several occasions, with a maximum of 15 males and six females on 26-VI-2004. In addition, during surveys of the western banks of River Oder between Eisenhüttenstadt and Frankfurt/Oder up to 12 males of *A. affinis* were observed. The observations represent the second proofs of *C. erythraea* reproduction in Brandenburg. The first records of *A. affinis* in the valley of River Oder go along with numerous proofs in recent years from other regions of Brandenburg." (authors)] Address: Schneider, T., Arnold-Knoblauch-Ring 76, D-14109 Berlin/Wannsee, Germany. E-mail: karin.thomas.schneider@gmx.de

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5295. Schorr, M. (2004): Die Libellen, die Kanuten, die Bachstelze und der Tod. *mercuriale* 4: 36. (in German) [Anecdotal observation of a wagtail (*Motacilla alba*) (Aves) preying on *Calopteryx splendens*. During passages of boats, the bird was disturbed and unable to catch the damselflies. After passage of boats, it again was able to prey (successfully) on damselflies.] Address: Schorr, M., ÖSTLAP, Schulstr. 7B, 54314 Zerf, Germany. E-mail: martinschorr@onlinehome.de

5296. Schütte, C.; Joop, G.; Mikolajewski, D.J.; Mosch, E.C.; Schenk, K.; Wohlfahrt, B. (2005): Die FFH-Art *Coenagrion mercuriale* (Charpentier, 1840) (Odonata: Coenagrionidae) im Niedermoorgebiet Großes Bruch" in Niedersachsen. *Braunschweiger Naturkundliche Schriften* 7(2): 345-354. (in German, with English summary). ["In 2004 the odonate fauna of a degenera-

ted lowland moor, the Großes Bruch, was explored. This lowland moor is located at the frontier between Lower Saxony and Saxony-Anhalt in northern Germany. The dragonfly association is valued and missing species are named. 23 species were found including the Natura 2000-species *C. mercuriale*. Habitat appropriateness and the potential of dispersal of this species are discussed." (Authors)] Address: Schütte C., Zool. Inst., TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany

5297. Sherratt, T.N.; Beatty, C.D. (2005): Island of the clones. *Nature* 435: 1039-1040. (in English). [Brief introduction into the work of Adolfo Codero and co-workers on parthenogenesis of *Ischnura hastata* on the Azore Islands. Current knowledge on odonate parthenogenesis and perspectives on future work - especially on the sex reversal in the genus *Nesobasis* on the Fijian Islands - are discussed. For the full paper see: <http://chat.carleton.ca/~cbeatty/SherrattBeatty2005NatureNV.pdf>] Address: Sherratt, T.N., Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa ON, K1S 5B6, Canada. E-mail: sherratt@ccs.carleton.ca

5298. Stacey, G. (2005): An unexpected peril. *Atropos* 26: 46-47. (in English). [An unsuccessful emergence of *Libellula depressa* is described.] Address: Stacey, G., 19 Minster View, Warminster, Wiltshire, BA12 8TD, UK

5299. Stoks, R.; De Block, M.; McPeck, M.A. (2005): Alternative growth and energy storage responses to mortality threats in damselflies. *Ecology Letters* 8(12): 1307-1316. (in English). ["The role of physiology in mediating the growth/predation risk trade-off has been largely ignored. We examined effects of predation risk on relationships between growth and storage molecules in *Enallagma aspersum* and *Ischnura verticalis* damselfly larvae that differ in this trade-off. In laboratory and field experiments, both species had similar growth and mortality rates and similar concentrations of storage molecules in the absence of mortality threats. However, in the presence of dragonfly predators *Ischnura* larvae had higher mortality rates and grew faster than *Enallagma* larvae. Consistent with the difference in growth rate, *Enallagma*'s total protein concentrations decreased under predation risk while those of *Ischnura* did not. Glucose and glycogen concentrations were not affected, while triglyceride concentrations were lower under predation risk in *Enallagma* but not in *Ischnura*. Species differences at the physiological level to the presence of mortality threats may be crucial to understanding patterns in metamorphic and post-metamorphic traits." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5300. Stoks, R.; Nyström, J.L.; May, M.L.; McPeck, M.A. (2005): Parallel evolution in ecological and reproductive traits to produce cryptic damselfly species across the holarctic. *Evolution* 59(9): 1976-1988. ["The damselfly genus *Enallagma* originated in the Nearctic, and two Nearctic lineages recently underwent radiations partly associated with multiple independent habitat shifts from lakes dominated by fish predators into lakes dominated by dragonfly predators. A previous molecular study of four Palearctic morphospecies and all representative Nearctic species identified the presence of

two cryptic species sets, with each set having Palearctic and Nearctic representatives. However, the cryptic species within each set are not sibling species. Here, we present quantitative data on ecologically important larval morphologies and behaviors involved in predator avoidance and on adult male morphological structures involved in mate recognition to quantify the phenotypic relationships among these cryptic species sets. For the adult stage, our data indicate strong parallel evolution of the structures involved in specific mate recognition the male cerci. For the larval stage, morphometric analyses show that the Palearctic species evolved a nearly identical morphology to the sibling-clade members in the Nearctic that live in waters where dragonflies are the top predators. This implicates the importance of dragonfly predation in the history of the Palearctic clade. Behavioral analyses suggest population differentiation in response to the actual predator environment in the Palearctic clade, consistent with the species differentiation seen in the Nearctic. Our results suggest parallel evolution of adult traits that influence specific mate choice and larval traits that influence ecological performance underlie the striking similarity of *Enallagma* species across continents. This concurrent parallel evolution in both stages of a complex life cycle, especially when both stages do not share the same selective environment, may be a very unusual mechanism generating cryptic species." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5301. Stoks, R.; De Block, M.; Van de Meutter, F.; Johansson, F. (2005): Predation cost of rapid growth: behavioural coupling and physiological decoupling. *Journal of Animal Ecology* 74: 708-715. (in English). ["1. Despite its prominent role in life-history theory, there is no direct empirical evidence for a behaviourally mediated predation cost of rapid growth. Moreover, we know little about how digestive physiology may also influence the shape of the growth/predation risk trade-off function. 2. We determined the role of behaviour and digestive physiology in experiments in which damselfly larvae were induced to grow slowly or rapidly by manipulating photoperiod (time stress), and exposure to a fish predator. 3. We showed that larvae under time stress grew more rapidly. Rapid-growing larvae had a higher foraging activity and a higher growth efficiency. 4. Under predation risk, larvae not only had a lower foraging activity but also a lower growth efficiency. 5. Rapid-growing larvae (i.e. those under time stress) balanced the growth/predation risk trade-off differently and took more risk in the presence of a predator, which resulted in a behaviourally mediated higher predation cost compared to slow-growing larvae. Their higher growth efficiency, however, made this cost smaller compared to a completely behaviourally mediated rapid-growth strategy. 6. Our results provide the first explicit experimental proof of a behaviourally mediated predation cost of rapid growth. Besides a behavioural coupling of growth and predation risk, resulting in the well-known trade-off, we also found a partial decoupling of these two processes by digestive physiology." (Authors).] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5302. Sudo, S.; Tsuyuki, K.; Kanno, K. (2005): Wing characteristics and flapping behavior of flying insects.

Experimental Mechanics 45(6): 550-555. ["This paper is concerned with the flapping characteristics and the structure dynamics of insect wings. The flapping behavior of some insects is studied using a three-dimensional motion analysis system. The experimental system is composed of two high-speed video cameras, a motion grabber, and a personal computer. The three-dimensional representation of insect flapping can be gained by the system. The extrinsic skeleton vibration produced by insect flapping is examined with the optical displacement detector system. The structural properties of some insect wings are also studied by a three-dimensional, optical shape measurement system. Some functional principles underlying insect wing design are revealed by the measurements of surface roughness and flapping analysis." (Authors)] Address: Sudo, S., Faculty of Systems Science and Technology, Akita Prefectural University, Yurihonjo 015-0055 Japan

5303. Suhling, F. (2005): Libellen in Namib und Karoo: Welche Faktoren steuern die Zusammensetzung von Lebensgemeinschaften? Abstracts. Jahrestagung 2005. Deutsche Gesellschaft für Limnologie. Karlsruhe: 20. (in German). [Overview on current studies of the Namibian odonate fauna. For details see the many papers of F. Suhling and co-workers.] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

5304. Taily, M. (2005): Verslag van de excursie naar het Hageven en Plateaux op zondag 22 augustus 2004. *Gomphus* 20(1): 29-31. (in Dutch, with French summary). [22 August, 2004, Hageven and Plateaux (the Netherlands). A total of 22 odonate species have been observed. The list of species includes *Lestes dryas* (first record for Hageven) and *L. virens* (missed after 1981). Additional species remarkable are *Ceriagrion tenellum*, *Sympetrum depressisuculum*, and *S. pedemontanum*.] Address: Taily, M., Hoonakkerdreef 35, 8791 Waregem marc.taily@pandora.be

5305. Tetzlaff, M. (2005): Der Sommer der Trauerseeschwalben. *Der Falke* 52(12): 368-374. (in German). [Picture showing a chick of *Chlidonias niger* (Aves) fed with a *Zygoptera*.] Address: not stated

5306. Tol, J. van (2005): Revision of the Platystictidae of the Philippines (Odonata), excluding the *Drepanosticta halterata* group, with descriptions of twenty-one new species. *Zool. Med., Leiden* 79(2): 195-282. (in English). ["Thirty-one species of the family Platystictidae of the Philippines are revised, i.e. all species recognised, excluding the species of the *Drepanosticta halterata*-group. The following new taxa are described: 16 species in *Drepanosticta* Laidlaw: *D. acuta* spec. nov., *D. aurita* spec. nov., *D. centrosaunis* spec. nov., *D. dados* spec. nov., *D. flavomaculata* spec. nov., *D. furcata* spec. nov., *D. hermes* spec. nov., *D. krios* spec. nov., *D. luzonica* spec. nov., *D. malleus* spec. nov., *D. myzouris* spec. nov., *D. paruatia* spec. nov., *D. pistor* spec. nov., *D. quadricornu* spec. nov., *D. rhamphis* spec. nov., *D. trachelocele* spec. nov., two in *Protosticta* Selys, viz. *P. lepteca* spec. nov. and *P. plicata* spec. nov. and three in *Sulcosticta* gen. nov., viz. *S. striata* spec. nov., *S. pallida* spec. nov. and *S. viticula* spec. nov. The status of eleven previously described nominal taxa is established. One, *D. septima* Needham & Gyger, is doubtfully considered a synonym of *D. mylitta*.

Cowley. Based on a preliminary phylogenetic analysis, the species of Drepanosticta are divided into informal species groups. Most species of the Philippines have affinities to species of Sulawesi, the Moluccas and New Guinea. Several species confined to Palawan have sister-group relationships with species from Borneo. The affinities of various other species confined to the Sulu archipelago, are unsettled as yet. The species of Platystictidae here assigned to Protosticta Selys are presumably not closely related to the type species, *P. simplicinervis* Selys from Sulawesi. However, a better placement has to await a more detailed phylogenetic study of the family. For three species the new genus *Sulcosticta* gen. nov. is erected. These species are closely allied based on the structure of the appendages, but should have been assigned to different genera if based on the present generic definitions. Many species here described have small distributional ranges, a common phenomenon in Platystictidae. Since most forests in the Philippines are heavily under threat or have already disappeared in the last fifty years, several taxa described in this paper should be considered under threat of immediate extinction." (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

5307. Tóthová, G.; David, S. (2005): Dragonflies (Odonata) in the area of Kráľovský Chlmec (SE Slovak Republic). In: Theory and practice in landscape ecological planning, 21.5.2004, Nitra. ISBN 80-8050-791-0: 164-170. (in Slovakian, with English summary). [The study summarises the results of a Master thesis based on material collected between 2001 and 2003 in the vicinity of the town Kráľovský Chlmec. 34 sites (situated in the LPA Latorica) have been sampled resulting in a total of 36 odonate species. *Brachytron pratense*, *Epitheca bimaculata*, *Stylurus flavipes*, and *Orthetrum coerulescens* are endangered and protected in Slovakia through their inclusion in the Slovak Red List, the protected regulation and the Annex II to Bern Convention. The dragonfly community structures were described using indirect principal component analysis (PCA). Of some interested is the record of *Somatochlora meridionalis* at the northern border of its range.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

5308. Trapero Quintana, A. D.; Torres Cambas, Y.; González Soriano, E. (2005): Estudio del comportamiento de oviposición de *Protoneura capillaris* (Rambur, 1842) (Odonata: Protoneuridae). *Folia Entomol. Mex.* 44(2): 225-231. (in Spanish, with English summary). ["A study on the ovipositing behaviour of the Cuban endemic damselfly *P. capillaris* was carried out at the Dos Bocas stream, north of the city of Santiago de Cuba. The study was carried from 9 to 20 June of 2004 between 08:00 to 16:00 local time. A peak of ovipositing activity occurred between 12:30 to 13:30h. The oviposition behaviour lasts on average 54 min. During oviposition in tandem the males continued flapping their wings. Some factors affect the oviposition behavior, such as wind and intra and interspecific interference by other males and / or other tandems." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

5309. Tunmore, M. (2005): New Southern Damselfly colony discovered. *Atropos* 26: 54-55. (in English). [Sourton, Dartmoor National Park, Cornwall, UK; 11 July, 2005] Address: Tunmore, M., 36 Tinker Lane, Melt-ham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freeseerve.co.uk

5310. Turgeon, J.; Stoks, R.; Thum, R.A.; Brown, J.M.; McPeck, M.A. (2005): Simultaneous quaternary radiations of three damselfly clades across the Holarctic. *American Naturalist* 165(4): E78-E107. (in English). ["If climate change during the Quaternary shaped the macroevolutionary dynamics of a taxon, we expect to see three features in its history: elevated speciation or extinction rates should date to this time, more northerly distributed clades should show greater discontinuities in these rates, and similar signatures of those effects should be evident in the phylogenetic and phylodemographic histories of multiple clades. In accordance with the role of glacial cycles, speciation rates increased in the Holarctic *Enallagma* damselflies during the Quaternary, with a 4.25× greater increase in a more northerly distributed clade as compared with a more southern clade. Finer-scale phylogenetic analyses of three radiating clades within the northern clade show similar, complex recent histories over the past 250,000 years to produce 17 Nearctic and four Palearctic extant species. All three are marked by nearly synchronous deep splits that date to approximately 250,000 years ago, resulting in speciation in two. This was soon followed by significant demographic expansions in at least two of the three clades. In two, these expansions seem to have preceded the radiations that have given rise to most of the current biodiversity. Each also produced species at the periphery of the clade's range. In spite of clear genetic support for reproductive isolation among almost all species, mtDNA signals of past asymmetric hybridization between species in different clades also suggest a role for the evolution of mate choice in generating reproductive isolation as species recolonized the landscape following deglaciation. These analyses suggest that recent climate fluctuations resulted in radiations driven by similar combinations of speciation processes acting in different lineages." (Authors) http://www.journals.uchicago.edu/AN/journal/issues/v165n4/4_0696/40696.html] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

5311. Urgelles, R.; Dorn, N.; Trexler, J. (2005): The spatial distribution and relative abundance of larval dragonflies found in the freshwater marshes of the Florida Everglades. *ESA Annual Meeting, Montréal, Canada. August 2005:* 202. (in English). [Verbatim: Aquatic macroinvertebrates are essential tools for characterizing habitat quality since they are sensitive indicators of environmental stressors, such as altered hydrology and nutrient enrichment. Long-term monitoring of aquatic macroinvertebrates such as Anisoptera can be used to assess the progress of restoration initiatives, such as the one being conducted in the Florida Everglades. We present the first comprehensive spatial and temporal survey of dragonfly communities for Everglades freshwater marshes and use statistical methods to analyze the relationship between these assemblages and environmental variables. From 1997 to 2004, we collected and identified the naiads of 15 species of dragonfly from 20 sites (each composed of replicate ha plots) across broad spatial scales, encompassing wet and dry

season dynamics. In a preliminary analysis of two years of data, 2002 and 2003, we identified 13 dragonfly species and described their distributions and relative abundance based on their spatial extent (# of sites at which they were collected) and density (annual average # individuals/m²). Two species, *Celithemis eponina* and *Libellula needhami*, dominated the assemblage at most sites and showed considerable inter-annual dynamics. *C. eponina* annual average densities increased in 18 out of 20 sites from 2002 to 2003, while *L. needhami* decreased in density in 15 out of 20 sites. Since 2003 was a wetter year throughout the ecosystem than 2002, these shifts in dominance may indicate a greater ability by *C. eponina* to tolerate conditions associated with lengthening hydroperiod. At a site highly stressed with anthropogenic nutrient-enrichment, the normally dominant *C. eponina*, was completely absent, and *Pachydiplax longipennis*, a species that is at low densities or absent from all other sites, dominated the assemblage with extremely high densities. We are currently analyzing the remaining years and looking at longer-term responses of dragonfly assemblages to dry-down and re-wetting conditions. Address: Urgelles, R.; Dorn, N.; Trexler, J., Florida International University, Miami, FL, USA

5312. Van de Meutter, F. (2005): De Zuidelijke overlibel (*Orthetrum brunneum* Fonscolombe, 1837): een schuchtere nieuwkomer in Vlaanderen. *Gomphus* 20 (1): 16-20. (in Dutch, with English and French summaries). ["Northern expansion of *O. brunneum* in Flanders. The Southern skimmer is a recent newcomer to the Flemish fauna. Its colonization of Flanders started synchronic with other dragonfly species of Mediterranean origin, probably energized by several consecutive warm summers at the end of the last century. The colonization process itself, however, differs from that of the other newcomers by being much slower and by occurring far inland, close to the easterly border. Despite a growing number of observations, and the recent colonization of the provinces of Antwerp and Vlaams-Brabant, still reproduction could not yet be proven in Flanders." (Author)] Address: Van de Meutter, F., Laboratory of Aquatic Ecology (K.U.Leuven) Ch. De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: Frank.vandemeutter@bio.kuleuven.ac.be

5313. Van de Meutter, F.; Stoks, R.; De Meester, L. (2005): The effect of turbidity state and microhabitat on macroinvertebrate assemblages: a pilot study of six shallow lakes. *Hydrobiologia* 542: 379-390. (in English). ["Shallow lakes can occur in two alternative stable states, a clear-water state and a turbid state. This is associated with separate assemblages of fish, zooplankton and plants. Little is known about whether macroinvertebrate assemblages differ across both stable states. This study investigated this in a connected set of three turbid and three clear-water shallow lakes. To overcome confounding effects of differences in spatial structure of macrophytes in turbid and clear-water lakes, we sampled three microhabitats that occurred in both alternative stable states: open water, sago pondweed (*Potamogeton pectinatus*) and reed (*Phragmites australis*). Univariate analyses indicated no differences in the number of organisms, taxon richness or diversity between turbid and clear-water lakes. Multivariate analysis, however, showed significant differences in the macroinvertebrate community structure of both stable states. Nine taxa explained a significant amount of the va-

riation between both lake types, of which seven preferred the clear-water lakes. The number of organisms and the taxon richness were higher in reed than in the other microhabitats, but diversity and evenness did not differ among the microhabitats. Multivariate analyses could separate all three microhabitats. Eight taxa, mainly detritus feeders and collector gatherers, explained most of the variation in the data and preferred the reed microhabitat. The effects of stable state (6.8% explained variance) and microhabitat (13.1% explained variance) on the macroinvertebrate assemblages were largely independent from each other (1.5% shared variance). Although macroinvertebrates are not implemented in the initial theory of stable states, our results show clearly different assemblages across both stable states." (Authors) *Erythronema*, *Ischnura*, *Libellula*, and *Sympetrum* are treated on the genus level.] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U. Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5314. Van de Meutter, F.; De Meester, L.; Stoks, R. (2005): Water turbidity affects predator prey interactions in a fish damselfly system. *Oecologia* 144(2): 327-336. (in English). ["Community structure may differ dramatically between clear-water and turbid lakes. These differences have been attributed to differences in the cascading effect of fish on prey populations, owing to the reduced efficiency of fish predation in the presence of macrophytes. However, recent theoretical ideas suggest that water turbidity may shape predator prey interactions, and it is predicted that prey will relax its antipredation behaviour in turbid water (H1). As a result, the nature of predator prey interactions is expected to shift from both direct and indirect in clear water to dominantly direct in turbid water (H2). We tested these ideas in a fish damselfly predator prey system. In a first behavioural experiment, we looked at antipredation behaviour of damselfly larvae isolated from habitats that differ in turbidity, in the presence of fish in clear and turbid water. As predicted in H1, the larvae were more active in turbid than in clear water. In a complementary enclosure experiment, we reared larvae in a clear-water pond and a turbid pond, respectively, and manipulated the origin of the larvae (clear-water, turbid pond), fish presence (absent, present), and vegetation density (sparse, abundant). In both ponds, fish had a direct negative effect on survival of the larvae, which was mitigated in the presence of vegetation. In the fish treatment, the change in average body mass tended to be higher in the turbid pond than in the clear-water pond, suggesting indirect effects of fish were mitigated in the turbid pond. This was supported by a negative effect of fish on the effective growth rate of larvae in the clear pond, but not in the turbid pond. These results are compatible with the idea that predator prey relationships are mainly governed by direct effects in turbid water, and by direct and indirect effects in clear water." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5315. Van de Meutter, F.; De Meester, L.; Stoks, R. (2005): Water turbidity affects predator prey interactions in a fish damselfly system. *Oecologia* 144(2): 327-336. (in English). ["Community structure may differ dramatically between clear-water and turbid lakes. These differences have been attributed to differences in the cas-

cading effect of fish on prey populations, owing to the reduced efficiency of fish predation in the presence of macrophytes. However, recent theoretical ideas suggest that water turbidity may shape predator prey interactions, and it is predicted that prey will relax its antipredation behaviour in turbid water (H1). As a result, the nature of predator prey interactions is expected to shift from both direct and indirect in clear water to dominantly direct in turbid water (H2). We tested these ideas in a fish damselfly predator prey system. In a first behavioural experiment, we looked at antipredation behaviour of damselfly larvae (*Ischnura elegans*) isolated from habitats that differ in turbidity, in the presence of fish in clear and turbid water. As predicted in H1, the larvae were more active in turbid than in clear water. In a complementary enclosure experiment, we reared larvae in a clear-water pond and a turbid pond, respectively, and manipulated the origin of the larvae (clear-water, turbid pond), fish presence (absent, present), and vegetation density (sparse, abundant). In both ponds, fish had a direct negative effect on survival of the larvae, which was mitigated in the presence of vegetation. In the fish treatment, the change in average body mass tended to be higher in the turbid pond than in the clear-water pond, suggesting indirect effects of fish were mitigated in the turbid pond. This was supported by a negative effect of fish on the effective growth rate of larvae in the clear pond, but not in the turbid pond. These results are compatible with the idea that predator prey relationships are mainly governed by direct effects in turbid water, and by direct and indirect effects in clear water." (Author)] Address: Van de Meutter, F., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: frank.vandemeutter@bio.kuleuven.ac.be

5316. Van Doorslaer, W.; Stoks, R. (2005): Growth rate plasticity to temperature in two damselfly species differing in latitude: contributions of behaviour and physiology. *Oikos* 111(3): 599-605. (in English). ["Plasticity in growth rate may be driven by behavioural and physiological mechanisms. Although these underlying mechanisms have direct implications for the importance of ecological and physiological costs associated with rapid growth, the contribution of behaviour and physiology to temperature-mediated plasticity in growth rate has largely been neglected. We studied the temperature-dependence of growth rate and its underlying behavioural and physiological mechanisms in two congeneric damselfly species that differ in latitudinal distribution. Larvae were reared from the egg stage at three temperatures (17°C, 22°C and 27°C). Within each species, growth rates showed a quadratic response curve with an optimum at 22°C. Behaviour, as measured by food intake, and physiology, as measured by growth efficiency and heartbeat as proxy for metabolic rate, jointly contributed to this temperature-induced plasticity in growth rate. At each temperature, growth rates were higher in the northern species. In line with the few other studies that compared northern and southern populations, both an increased food uptake and growth efficiency caused this pattern. Together with previous studies that focused on the population level, our results tentatively suggest that not only the latitudinal patterns in growth rate but also the mechanistic basis are similar at the species and at the population level." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5317. van Doorslaer, W.; Stoks, R. (2005): Thermal reaction norms in two Coenagrion damselfly species: contrasting embryonic and larval life-history traits. *Freshwater Biology* 50(12): 1982-1990. (in English). ["1. We studied the temperature-dependence of important life-history traits both at the embryonic (egg hatching success, embryonic development time and hatchling size) and the larval stage (larval growth rate, larval survival and larval size after 100 days) using full-sib families of two congeneric damselflies, *Coenagrion hastulatum* and *Coenagrion puella*, that differ in latitudinal distribution. Larvae were reared in the laboratory from the egg stage at four temperatures (12, 17, 22 and 27°C). 2. The observed patterns of thermal plasticity in embryonic traits showed that the northern species was more successful than the southern species at lower temperatures, in line with the pattern of temperature adaptation in thermal reaction norms. 3. At the larval stage, we found no consistent pattern of latitudinal compensation. The thermal family reaction norms indicate, however, the potential for latitudinal compensation to evolve. We observed an ontogenetic shift in thermal optima for larval growth rate, with a higher optimal temperature for growth rate during the first 2 weeks of the larval stage. 4. This is the first indication of the existence of latitudinal compensation at the interspecific level in an invertebrate; it is stage-specific, being present only in the embryonic stage. We argue that compensation in the embryonic stage may be much more likely than in the larvae and stress the importance of including more than one life-history stage when drawing conclusions about the adaptiveness of patterns in thermal reaction norms." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5318. Van Gossum, H.; Stoks, R.; De Bruyn, L. (2005): Lifetime fitness components in female colour morphs of a damselfly: density- or frequency-dependent selection?. *Biological Journal of the Linnean Society* 86: 515-523. ["In many damselfly species mature females exhibit colour polymorphism: one female morph resembles the conspecific male (androchrome) while the others do not (gynochromes). Hypotheses for the maintenance of such polymorphisms differ mainly as to whether they are based on density- and/or frequency-dependent selection and on the nature of the frequency dependence. We collected lifetime fitness data (individual lifespan, number of copulations and number of ovipositions) for female morphs of the damselfly *Ischnura elegans* from 15 insectaries differing in population parameters (density, sex ratio and ratio of andro- to gynochromes). Both density and frequency affected a specific set of the studied fitness components. While morph frequency influenced lifespan, sex ratio influenced the number of copulations, and density affected lifespan and the number of ovipositions. Clearly, discrepancies among studies may be generated if the studied fitness components differ. Our final fitness estimate, the number of ovipositions, was only influenced by density, thereby not supporting frequency-based hypotheses. Contrary to expectation under the current density-based hypothesis, androchromes compared to gynochromes had a lower number of ovipositions at high density. We discuss our findings in the light of mechanisms maintaining the female polymorphism." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, Universi-

ty of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

5319. Van Gossum, H.; De Bruyn, L.; Stoks, R. (2005): Male harassment on female colour morphs in *Ischnura elegans* (Vander Linden): Testing two frequency-dependent hypotheses (Zygoptera: Coenagrionidae). *Odonatologica* 34(4): 407-414. (in English). ["In many Zygoptera species females occur in different colour morphs, with one morph coloured like the 6" (andromorph), while the others are not (gynomorph). Two hypotheses have been proposed to explain frequency-dependent harassment of female morphs. According to the first, males should prefer the more frequent of the 2 female morphs (learned-mate recognition hypothesis). According to the second, males should prefer andromorphs more if their frequency relative to male increases, but not so for gynomorphs which always should be attempted to mate with on encounter (mimicry hypothesis). Here, it is reported on a re-analysis of earlier published data on morph-specific harassment for *I. elegans*, which allows examination of the 2 proposed hypotheses. The data were collected in 8 insectaries with different ratios of males and female morphs. As reported earlier, male harassment is highest on the most common female morph supporting the learned-mate recognition hypothesis. The ratio of andromorphs to males had no morph-specific effects in amounts of male harassment, wherefore the data suggest rejection of the mimicry hypothesis." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

5320. Van Gossum, H.; De Bruyn, L.; Stoks, R. (2005): Reversible switches between male and female mating behaviour by male damselflies. *Biology Letters* 1: 268-270. (in English). ["For many animal groups, both sexes have been reported to attempt to mate with members of their own sex. Such behaviour challenges theories of sexual selection, which predict optimization of reproductive success. We tested male mate choice between opposite- and same-sex members in the damselfly *Ischnura elegans*. Binary choice experiments were conducted following exposure periods in insectaries with only males or with both sexes present. We show that switches in choice between the opposite sex and the same sex can be induced and reversed again by changing the social context. We argue that the observed reversibility in male male- and female-directed mating behaviour is maladaptive and a consequence of strong selection on a male's ability to alter choice between different female colour morphs." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

5321. Wallaschek, M. (2005): Die Libellen (Odonata) zweier Stillgewässer in Halle-Dölau. *Entomologische Mitteilungen Sachsen-Anhalt* 13(2): 88-93. (in German). [Sachsen-Anhalt, Germany; 19 species are listed for two rain storage ponds.] Address: Wallaschek, M., Agnes-Gosche-Str. 43, D-06120 Halle (Saale), Germany

5322. Waringer, J.; Chovanec, A.; Straif, M., Graf, W.; Reckendorfer, W.; Waringer-Löschenkohl, A.; Waidbacher, H.; Schultze, H. (2005): The Floodplain Index - habitat values and indication weights for molluscs,

dragonflies, caddisflies, amphibians and fish from Austrian Danube floodplain waterbodies. *Lauterbornia* 54: 177-186. (in English). ["A new method for assessing the ecological status of river/floodplain-systems is presented. The approach ("Floodplain Index") is based on the requirements of biological assessment laid down in the EU Water Framework Directive by integrating the following indicator groups: molluscs, caddisflies, dragonflies, amphibians, and fish. For these groups, the habitat values and indication weights are given and the calculation procedure is briefly discussed." (Authors)] Address: Waringer, J., Limnological Dept, Institute of Ecology and Conservation Biology, University of Vienna, Althanstr. 14, A-1090 Vienna, Austria

5323. Watts, P.C.; Kemp, S.J.; Saccheri, I.J.; Thompson, D.J. (2005): Conservation implications of genetic variation between spatially and temporally distinct colonies of the endangered damselfly *Coenagrion mercuriale*. *Ecological Entomology* 30(5): 541-547. (in English). ["1. Good conservation management is underpinned by a thorough understanding of species' historical and contemporary dispersal capabilities along with the possible adaptive or neutral processes behind any spatio-temporal genetic structuring. These issues are investigated with respect to *C. mercuriale* the only odonate species currently listed in the U.K.'s Biodiversity Action Plan in east Devon where its distribution has become fragmented. 2. The two east Devon *C. mercuriale* populations, only 3.5 km apart, have accumulated strong differences in frequencies of alleles at 14 microsatellite loci as a consequence of poor adult dispersal and drift. There is no contemporary migration between sites. 3. A genetic signature of population decline at both sites corresponds with known demographic reductions. *C. mercuriale* in east Devon are now significantly genetically less diverse than those from a population stronghold in the Itchen Valley. 4. Colonies would benefit from improved connectivity between areas and possibly by a transfer of individuals from other ecologically similar areas. 5. Because *C. mercuriale* has a semivoltine life cycle throughout the U.K., the possibility that alternate-year cohorts are reproductively isolated is explored. Genetic differentiation among cohorts is an order of magnitude less than between sites, suggesting that some larvae delay their development into adults for a year and recruit to a different cohort. 6. To our knowledge, this is the first study to document migration and gene flow between alternate-year cohorts in a species of odonate. From a conservation standpoint, the cohorts do not require separate management." (Authors)] For the full paper see: <http://www.genomics.liv.ac.uk/animal/RESEARCH/PDF/WATTS113.pdf> Address: Watts, P., Animal Genomics Laboratory, The Biosciences Building, School of Biological Sciences, Liverpool University, Crown Street, Liverpool L69 7ZB, U.K. E-mail: p.c.watts@liv.ac.uk

5324. Webb, J. (2005): Dragonfly Conservation from the BDS. *Atropos* 26: 48-49. (in English) [The relevance of Odonata as bioindicators is briefly outlined.] Address: not stated.

5325. Werth, C.; Marten, M.; Taraschewski, H. (2005): Ökologische Untersuchungen an anthropogenen Kleingewässern - Makrozoobenthos in Wechselwirkung mit Makrophyten und Fischbesatz. *Lauterbornia* 54: 149-167. (in German, with English summary). ["Investigations of water chemistry and macrozoobenthos

were performed at 19 small water bodies in Southern Palatinate (Germany) in 2001. 22 Heteroptera, 52 Coleoptera, 22 Odonata, and 18 Mollusca species were identified, among those also particularly endangered species according to the red List Germany (Binot & al. 1998), like *Dytiscus semisulcatus* (O. F. Müller 1776), *Hydrophilus piceus* (Linnaeus, 1758), *Haliplus furcatus* (Seidlitz, 1887) and *Lestes barbarus* (Fabricius, 1787). Interactions between macrozoobenthos, macrophytes and fish population are discussed." (Authors)] Address: Werth, Christine, Mittelberg 4, D-76571 Gaggenau, Germany. E-mail: C.werth@web.de

5326. Westermann, E.; Westermann, K. (2005): Erfolgreiche Fortpflanzung der Braunen Mosaikjungfer (*Aeshna grandis*) am Windfällweiher, 966 m NN. Naturschutz am südl. Oberrhein, Beiheft 1: 33. (in German). [Very little evidence of successful reproduction of *A. grandis* in the high altitudes in the southern Black Forest, Baden-Württemberg, Germany exists; on 20-VII-2003, an exuvia of the species was found and in VIII 2003, many ovipositioning females were observed.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

5327. Westermann, E.; Westermann, K. (2005): Großer Bestand der Hufeisen-Azurjungfer (*Coenagrion puella*) in Wiesengraben des NSG Elzwiesen. Naturschutz am südlichen Oberrhein, Beiheft 1: 32. (in German). [A larva of the reophilous *C. virgo* was collected in a bog water (24-VII-2004) in the Federseemoor, Baden-Württemberg, Germany. (The reophilous) *O. forcipatus* did successfully develop in a dried-up water separated from a gravel pit with permanent water near Hartheim, Baden-Württemberg; 27-VII-2004.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

5328. Westermann, K. (2005): Erfolgreiche Fortpflanzung des Frühen Schilffjägers (*Brachytron pratense*) in Wiesengraben des NSG Elzwiesen. Naturschutz am südlichen Oberrhein, Beiheft 1: 32. (in German). [Baden-Württemberg, Germany; 30-V-2004] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

5329. Westermann, K. (2005): Erfolgreicher Schlupf des Plattbauchs (*Libellula depressa*) in einem Wassertank. Naturschutz am südl. Oberrhein, Beiheft 1: 33. (in German). [Baden-Württemberg, Germany; description of a garden tank as reproduction habitat of *L. depressa*.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

5330. Wildermuth, H. (2005): Beitrag zur Larvalbiologie von *Boyeria irene* (Odonata: Aeshnidae). *Libellula* 24(1/2): 1-30. (in German, with English and French summaries). ["Larvae of *B. irene* were studied with respect to morphology, morphometry, ethology and ecology shortly before the emergence period and during the flying season in the northern Provence, France. In all larval stadia the colour pattern varied considerably; besides bright beige individuals also almost black ones existed. The last five stadia could be determined by the relative length of the wing sheaths but not by the absolute body length or head width. Ultimate stadia were present in great number in June but only sparsely in July; clearly defined cohorts could not be recognized. The larval development is supposed to take usually two years, and three years exceptionally. Emergence occur-

red at night. It is inferred that the larvae are definitely adapted to current water with respect to their behaviour but morphologically only to a restricted scale. In the northern Provence they inhabit exclusively permanent rivers, with small spring-fed streams harbouring the largest population densities. They stayed mainly among pebbles and under large stones, and only rarely in other microhabitats as submerged root felts or plant debris. The sp. was most frequently found together with *Cordulegaster boltonii*, *Onychogomphus uncatatus*, and *O. f. fordipatus*. The larval biology and the habitat preference of the Provençal populations of *B. irene* are compared with those of Switzerland where they occur at lake shores, and with those of other spp. of the genus.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

5331. Wildermuth, H. (2005): Kleingewässer-Management zur Förderung der aquatischen Biodiversität in Naturschutzgebieten der Agrar- und Urbanlandschaft. Wirkungskontrolle am Beispiel Libellen im Schweizer Mittelland. *Naturschutz und Landschaftsplanung* 37(7): 193-201. (in German, with English summary). ["The study describes how the aquatic flora and fauna could be protected and promoted by suitable shaping and management, using the example of the 'Drumlinlandschaft Zürcher Oberlauf', which is the relic of an originally wide-stretched moorland in the Swiss Midland. After abandoning the extensive use of bedding and peat around 1950 the peat cuttings and ditches became widely overgrown reducing diversity and population sizes of aquatic organisms. In the course of 35 years of protection activities peat cuttings have been regenerated and maintained according to the rotation principle; ditches have been renewed, extended and retained in spatial and temporal sections, and measures were conducted for the regeneration of raised bogs. Efficiency controls showed that the species diversity of aquatic organisms (water plants, amphibia, water insects) could be conserved to a large extent. Additionally some species could be resettled in new partial areas. Monitoring controls concentrated on dragonflies which were mapped applying semi-quantitative methods. From the 49 species identified 23 regularly and eight species sporadically reproduce in the area. In the first year up to 28 species were found around to the newly created ponds and streams. At the longer existing ponds 26 species were identified in the sampling year 2004, including species requiring advanced succession stages. Two of them, *Lestes virens* and *Leucorrhinia pectoralis*, are considered as 'threatened with extinction' in Switzerland. On the basis of the exuvia the study explains how the partial population of the metapopulation of *L. pectoralis* developed and spread out during the last 20 years. In order to sustainably maintain the study suggests to establish a regional network of regenerated peat cuttings." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

5332. Williams, L.R.; Bonner, T.H.; Hudson, J.D.; Williams, M.G.; Leavy, T.R.; Williams, C.S. (2005): Interactive effects of environmental variability and military training on stream biota of three headwater drainages in western Louisiana. *Transactions of the American Fisheries Society* 134: 192-206. (in English). ["We collected fishes and macroinvertebrates seasonally from eight headwater streams in three different drainage basins (the Red, Calcasieu, and Sabine rivers) crossing

Peason Ridge Training Area in west-central Louisiana. Peason Ridge is part of the Fort Polk military training facility. We used multivariate analyses to test the effects of physical variables (i.e., current velocity, depth, and substrate), time (seasonal variability), drainage basin, and military training activities on assemblage structure. Tributaries of the Red River had the highest gradient and were predominated by shallow, swift-flowing runs with sandy substrates. Southern tributaries of the Calcasieu and Sabine rivers were of lower stream gradient and contained deep, sluggish runs and pools with large amounts of woody debris and silt. Fish assemblages were structured primarily by military training and drainage basin. Faunal differences among drainage basins probably reflect differences in stream gradient. Fish assemblages in tributaries of the Sabine River were less diverse and showed evidence of historical degradation. Macroinvertebrate assemblages also were structured primarily by military training but had a strong seasonal component related to their short life cycles and high seasonal turnover. In contrast to fishes, macroinvertebrate assemblages were similar among drainages. Because military training was most intense in the Red River basin, its significance in these models probably represents differences in stream gradient among the basins because we found no negative effect on stream biota resulting from current training activities. Rather, historical logging and the resultant siltation coupled with isolation of populations by reservoirs." (Authors) Odonata are treated on the family level.] Address: Williams, L.R., School of Natural Resources, Ohio State University, 2021 Coffey Road, Columbus, Ohio 43210, USA

5333. Yoshimura, M.; Okochi, I. (2005): A decrease in endemic odonates in the Ogasawara Islands, Japan. *Bulletin of the Forestry and Forest Products Research Institute* 4(1) (No.394): 45-51. (in English, with Japanese summary). ["There are many endemic species in the Japanese Ogasawara Islands. However, many of these endemic species are likely to disappear as a result of reduction of habitat and the introduction of exotic species. Odonates are included within this category of species at risk. If the decrease in endemic odonates is due to a decrease in aquatic habitat, we have only to provide artificial ponds to conserve these species. In this study, we provided artificial ponds as a habitat for odonates in Chichi-jima and Ani-jima, Ogasawara Islands. We then examined the possibility of protection and enhancement of odonate populations. Endemic odonates were found in the natural ponds of Ani-jima and Ototojima. In Ani-jima, they could be collected both in the artificial and natural ponds. The artificial pond could provide habitat for endemic odonates. However, in Chichi-jima, few odonates could be collected both in the artificial and natural ponds. Here, invasive species, such as *Gambusia affinis* and *Anolis carolinensis*, are found, which considered to prey upon odonate larvae and adults. Extermination of invasive species may be necessary to conserve the endemic odonates in Chichi-jima." (Authors) Available at: <http://www.ffpri.affrc.go.jp/abs/kanko/394-3.pdf>] Address: Yoshimura, M., Kansai Research Center, Forestry and Forest Products Research Institute (FFPRI), 68 Nagaikyutaro, Momoyama, Fushimi, Kyoto 612-0855, Japan. E-mail: yoshi887@ffpri.affrc.go.jp

5334. Zimmermann, W.; Petzhold, F.; Fritzlar, F. (2005): *Verbreitungsatlas der Libellen (Odonata) im*

Freistaat Thüringen. Naturschutzreport 22: 224 pp. (in German, with English summary). [The present atlas summarises field surveys, literature reviews and reviews of museum collections of odonates in the Free State of Thuringia/Germany. The history of dragonfly faunistics in Thuringia begun in 1807. Its further development can largely be traced from museum collections and recently from detailed field surveys and faunistic publications. Field surveys were carried out mainly between 1990 and 2004. 120 people contributed to the data collection. The existing literature on Thuringian odonates (101 publications and 178 unpublished surveys) is also reviewed as are museum collections (15). Together the three sources resulted in 37,581 records from 3,296 sites distributed over 444 grid cells (scale 1:25000). This represents a coverage of 76 % (Total: 588 squares). Sixty-two dragonfly species have been recorded in Thuringia to date. Among these, several species of the highest European protection status have stable populations, such as *Somatochlora alpestris*, *Coenagrion ornatum*, and *C. mercuriale*. All data, maintained in a geographical information system at the Thuringian State Department for Environment and Geology, are available to local authorities and nature protection offices. The value of water bodies to dragonflies are analysed per landscape unit: Maps specifying the water quality in each of the landscape units of Thuringia are compared to species numbers. For each species recorded in Thuringia the following information are presented: number of records, the proportional occupancy of grid cells, habitat, basic life-history, indications of population increases or declines (status of extinction risk). Additionally, a graph is provided showing the distribution points in the periods of before 1944, 1944-1984, 1985-2005, respectively, and phenology and altitudinal distribution. Each species and its habitats are depicted in a photograph. Further chapters address faunistic problems, corrections of earlier indications, species potentially expected in Thuringia, the importance of dragonflies in nature protection, specifically under the EU Habitats Directive as well as the description of dragonfly communities in running waters, in swamps/peat bogs, ponds, drainage ditches in agricultural areas, and water bodies in gravel pits. Finally, there are chapters on the increased occurrence of southern species, on migrating dragonflies, on fossil records from Thuringia and a list of local vernacular dragonfly names.] Address: Thüringer Landesanstalt für Umwelt und Geologie, Prüssingstr. 25, D-07745 Jena, Germany. www.tlug-jena.de

5335. Zucchi, H.; Zucchi, K. (2005): Zum Einfluss verrohrter Bachabschnitte auf Drift und Aufwanderung der Limnofauna unter besonderer Berücksichtigung der Flohkrebse (Gammaridae). *Natur und Landschaft* 80 (12): 519-527. (in German, with English summary). [Breenbach, Lower Saxony, Germany, 1991; *Platycnemis pennipes* and *Enallagma cyathigerum* are listed. One specimen of *P. pennipes* was drifted downwards during the day.] Address: Zucchi, H., FH Osnabrück, Fakultät für Agrarwissenschaften und Landschaftsarchitektur, Oldenburger Landstr. 24, D-49090 Osnabrück, Germany. E-mail: H.Zucchi@fh-osnabrueck.de

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5336. Cios, S. (1997): O lipieniach Wdy. Cz. II. Pstrąg i Lipień 5(1): 1-5. (in Polish). [On the graylings of the River Wda. Part II.: The stomach content of 55 fish specimens was analysed referring to a segment of river Wda between Kasparus and Tlen in northern Poland. 5 odonate taxa including Gomphus vulgatissimus and Ophiogomphus cecilia were found. Calopteryx sp. was the dominant odonate taxa among the fish prey.] Address: not stated

5337. Kasuya, E.; Edanami, K.; Ohno, I. (1997): Territorial conflicts in males of the dragonfly *Orthetrum japonicum japonicum* (Odonata: Libellulidae): the role of body size. Zool. sci. 14(3): 505-509. (in English). ["The relationship between body size and the results of territorial conflicts was studied in males of the dragonfly, *O. japonicum japonicum*. Territorial residents were larger than intruders in body width, but not in hind wing length. Winners of territorial conflicts were larger than losers in body width, but not in hind wing length. This difference was attributed to the fact that residents were larger than intruders. The results of territorial conflicts were more strongly affected by the role of the opponents (resident or intruder) than by the difference in their body sizes. Territorial males arrived at the territorial sites earlier than non-territorial ones on a given day. The body size of males arriving at the study area earlier in a day was not larger than that of males arriving later." (Authors)] Address: Kasuya, E., Laboratory of Biology, Faculty of Education, Niigata University, 2-8050 Ikarasi, Niigata 950-21, Japan

5338. La Porta, G. (1997): Odonati delle Pozze. Biometria degli stadi pre-imaginali. *Libellula depressa*, *Aeshna cyanea*, *Anax imperator*. Corso die laurea in Scienze Biologiche. Univerità degli Studi die Perugia, Facoltà di Scienze MM.FF.NN: 91 pp. (in Italian). [Biometric study referring to *Aeshna cyanea*, *Anax imperator*, and *Libellula depressa*. For the full paper see: <http://www.bio.unipg.it/staff/gianandrea/download/pdf/Odonata.pdf>] Address: not stated

5339. Louarn, H.; Cloarec, A. (1997): Insect predation on pike fry. Journal of Fish Biology 50(2): 366-370.

(in English). ["Laboratory tests evaluated the predatory impact of the macroinvertebrates *Erythromma najas* larvae, *Notonecta glauca* (Heteroptera: Notonectidae), *Ilyocoris cimicoides* (Heteroptera: Naucoridae), *Libellula depressa* larvae, *Dytiscus marginalis* larvae (Coleoptera: Dytiscidae) and *Anax imperator* larvae on 3-, 12-, 21- and 30-day-old pike fry *Esox lucius*. All these insect predators captured and ate pike fry during the test, although the numbers killed varied among species. *Dytiscus marginalis*, *A. imperator* and *Notonecta glauca* were the most Voracious predators." (Authors)] Address: Cloarec, A., Ethologie-Evolution-Ecologie, CNRS UMR 373, Université de Rennes I, Campus de Beaulieu, 35042 Rennes cédex, France

5340. McCollum, S.A.; Leimberger, J.D. (1997): Predator-induced morphological changes in an amphibian: predation by dragonflies affects tadpole shape and color. *Oecologia* 109: 615-621. (in English). ["Predator-induced defenses are well studied in plants and invertebrate animals, but have only recently been recognized in vertebrates. Gray treefrog (*Hylachrysoxcelis*) tadpoles reared with predatory dragonfly (*Aeshna umbrosa*) larvae differ in shape and color from tadpoles reared in the absence of dragonflies. By exposing tadpoles to tail damage and the non-lethal presence of starved and fed dragonflies, we determined that these phenotypic differences are induced by non-contact cues present when dragonflies prey on *Hyla*. The induced changes in shape are in the direction that tends to increase swimming speed; thus, the induced morphology may help tadpoles evade predators. Altering morphology in response to predators is likely to influence interactions with other species in the community as well." (Authors)] Address: McCollum, S.A.; Department of Zoology, Duke University, Box 90325, Durham, NC 27708-0325, USA

5341. Nicoletti, F. (1997): American Kestrel and Merlin migration correlated with Green Darner movements at Hawk Ridge. The Loon (Winter 1996-97): 216-220. (in English). [Duluth, Minisota, USA; during September 1995, counts of dragonflies with focus on *Anax junius*, and birds of prey were made. More than 10000 individuals of *A. junius*, and 1106 of American Kestrels and 131 Merlins were counted. 28,8% of the Kestrels, and 14 % of the Merlins were seen feeding on dragonflies

as the moved from north to south. The percentage of kestrels feeding increased as the day progressed. The author outlines that dragonflies are a primary food source for migrating kestrels, especially immature oenes. Information of additional species of hawks feeding on Odonata are given.] Address: Nicoletti, F., P.O. Box 3074, Duluth, MN 55803, USA

1998

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5343. Koperski, P. (1998): Co jedzą drapieżne owady litoralne? (What do the predatory, littoral insects eat?). *Wiad. Ekol.* 44(2): 95-130. (in Polish, with English summary). [The paper compiles recent knowledge on the predator-prey interactions of animal communities in littoral habitats. It classifies predatory insects on the family or suborder scale according to life style and prey. It also discusses many studies on the order level including those on Odonata and their prey.] Address: Koperski, P., Department of Hydrobiology, Institute of Zoology, Warsaw University, Banacha 2, 02-097 Warszawa, Poland. E-mail: koper@hydro.biol.uw.edu.pl

5344. Kouamélan, P.E.; Teugels, G.G.; Gourène, G.; Ollevier, F.; Thys van den Audenaerde, D.F.E. (1998): The effect of a man-made lake on the diet of the African electric fish *Mormyrus rume Valenciennes, 1846* (Osteoglossiformes; Mormyridae). *Hydrobiologia* 380(1-3): 141-151. ["The diet of 223 specimens of *Mormyrus rume* (Mormyridae) from the Bia River on which a hydroelectric dam was built in 1959, was studied in relation to

locality, season and fish size. A feeding index was computed by combining the occurrence, numerical and weight percentages of the items identified in the stomach contents. This index showed that *M. rume* in the river ate principally invertebrates, especially chironomid larvae. In contrast, *M. rume* from the man-made lake contained mostly phytoplankton. This difference was statistically significant. In the lake, chironomid larvae and Bacillariophyceae constituted the main source of the diet of young fish. In larger specimens, *Chaoborus sp.* formed the main part of the diet. No significant temporal variation occurred in the dietary composition. The overall food composition was similar in each locality of the Bia River from one period to another." (Authors) The paper includes records of Odonata as diet of fishes.] Address: Kouamélan, P.E., Section of Ecology and Aquaculture, 1Katholieke Universiteit Leuven, B-3000 Leuven, Belgium

5345. McWilliam, H.A.; Death, R.G. (1998): Arboreal arthropod communities of remnant podocarp-hardwood rainforest in North Island, New Zealand. *New Zealand Journal of Zoology* 25: 157-169. (in English). ["Arboreal arthropod communities from three reserves of podocarp-hardwood rainforest in the North Island, New Zealand, were sampled continuously between June 1995 and May 1996 using omnidirectional window traps. Diptera made up 34% of the total number of arthropods captured, whereas Coleoptera contributed 12% and Araneae 11% to the total catch. The relative abundance and species richness of Diptera peaked in spring, Coleoptera in summer, and Araneae in autumn. Multivariate analysis of overall community structure suggests that season is the dominant determinant of community structure in the arboreal arthropod communities of these forest patches, whereas site, and to a lesser extent tree species, have minor effects. Given that 863 morphospecies were collected, the conservation value of small forest patches for forest-dwelling arthropods in New Zealand should not be underestimated." (Authors) 3 specimens of Odonata were caught in December and January in the canopy at Keebles Bush and Pakohu Scenic Reserve, New Zealand.] Address: McWilliam, H.A., Taranaki Regional Council, Private Bag 713, Stratford, New Zealand

5346. Rogers, D.C. (1998): Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. In: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*. California Native Plant Society, Sacramento, CA: 224-235. (in English). [The paper includes some odonate taxa. Available at: <http://www.vernal-pools.org/proceedings/rogers.pdf>] Address: not stated

5347. Smithers, C.N. (1998): A species list and bibliography of the insects recorded from Norfolk Island. *Technical Reports of the Australian Museum* 13: 1-55. (in English). ["Nearly 700 species of insects are listed as having been recorded from Norfolk Island and a bibliography of more than 200 papers is provided from which the records have been obtained. This paper is intended to be a working document which, it is hoped, will make it largely unnecessary for subsequent workers to repeat time-consuming literature searches." (Author) *Agriocnemis exsudans*, *Adversaeschna brevistyla*, *Ischnura aurora*, and *Hemicordulia australiae* are represen-

ted on the Norfolk Island.] Address: Smithers, C.N., Entomology Department, Australian Museum, 6 College Street, Sydney NSW 2000, Australia

1999

5348. Anonymus (1999): Flugwunder Libelle. Pico. Kinderzeitschrift der Steyler Missionare 6/1999: 36-37. (in German). [Brief popular article on dragonflies for children.] Address: Redaktion Pico, PF 2460, D-41311 Nettetal, Germany

5349. Chao, H.-f. (1999): A study of Chinese dragonflies of the family Chlorogomphidae, with descriptions of two new species and first description of the male sex of a known species (Anisoptera: Chlorogomphidae). Wuyi Sci. J. 15: 1-11. (in Chinese with English summary). [A checklist (with bibliographic annotations) of the Chinese Chlorogomphidae is provided. *Sinurogomphus montanus* sp. n., *Chloropetalia usignata* sp. n., and male allotype of *Sinurogomphus urolobatus* Chen are described and illustrated. The data on type material are not stated in the English text.] Address: Author deceased

5350. Cios, S. (1999): Wędkowanie w Finlandii. Cz. I. Lipienie z Merikarvianjoki. Pstrąg i Lipień 7(21): 10-12. (in Polish). [Fishing in Finland. Part I. Graylings of the River Merikarvian: The stomach content of six fish specimens was analysed referring the a segment of the lower course of the river Merikarvian. 14 larvae of *Onychogomphus forcipatus* were found.] Address: not stated

5351. Cios, S. (1999): Wędkowanie w Finlandii. Cz. II. Lipienie z Iijoki i Oudonjoki. Pstrąg i Lipień 7(21): 12-16. (in Polish). [Fishing in Finland. Part II. Graylings of the River Ii and Oudon: *Somatochlora* sp. is listed as prey.] Address: not stated

5352. Hong, S.-J.; Woo, H.-C.; Lee, S.-U.; Huh, S. (1999): Infection status of dragonflies with *Plagiorchis muris* metacercariae in Korea. The Korean Journal of Parasitology 37(2): 65-70. (in English). ["*Plagiorchis muris* has been found in both house and field rats as well as in humans. The infection status of the second intermediate hosts of *P. muris* is prerequisite in understanding their biological features in an ecosystem. Six species of dragonflies were caught in a wide range of areas in Korea; and they were *Sympetrum darwinianum*, *S. eroticum*, *S. pedomontanum*, *S. infuscatum*, *Pantala flavescens*, *Calopteryx atrata*, and *Orthetrum albistylum speciosum*. The occurrence of *P. muris* metacercariae in dragonflies was nationwide with various infection rates. The metacercarial burden of *P. muris* in the surveyed areas was the highest in *S. eroticum* followed by *S. darwinianum*, *S. pedomontanum*, and *C. atrata*. The highest infection rate by *P. muris* metacercariae was found in *S. darwinianum* followed by *S. eroticum*. The metacercarial burden was particularly heavy in the dragonflies found in Hamyang-gun and Kosong-gun, Kyongsangnam-do. It is, therefore, likely that dragonflies play a significant role as the second intermediate host in the life cycle of *P. muris* in Korea." (Authors)] Address: Hong, S.-J., Department of Parasitology,

Chung-Ang University Faculty of Medicine, Seoul 156-756, Korea

5353. O'Brien, M. (1999): Collecting Odonata Exuviae. Entomology Notes 26: o.P.- (in English). [Introduction into the collecting of exuviae.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfbrien@umich.edu

5354. Olsvik, H. (1999): Øyestikkervisitt i Østfold 7.-11. juli 1999. Natur i Østfold 19(1): 10-16. (in Norwegian). [For the full paper see: http://www.toyen.uio.no/botanisk/nbf/ofa/nio200001/2-oyenstikker_e.pdf] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

5355. Stoks, R.; De Block, M.; Van Gossum, H.; Valck, F.; Lauwers, K.; Verhagen, R.; Matthysen, E.; De Bruyn, L. (1999): Lethal and sublethal costs of autotomy and predator presence in damselfly larvae. *Oecologia* 120(1): 87-91. (in English). ["We studied the costs of lamellae autotomy with respect to growth and survival of *Lestes sponsa* damselfly larvae in field experiments. We manipulated predation risk by *Aeshna cyanea* dragonfly larvae and lamellae status of *L. sponsa* larvae in field enclosures and compared differences in numbers, size and mass of survivors among treatments. In the absence of a free-ranging *A. cyanea* larva, about 29% of the *L. sponsa* larvae died. This was probably due to cannibalism. The presence of a free-ranging *A. cyanea* reduced larval survival by 68% compared to treatments in which it was absent or not permitted to forage on *L. sponsa* damselflies. Across all predator treatments, lamellae autotomy reduced survival by about 20%. The mean head width and mass of survivors was lower in the enclosures with a free-ranging *A. cyanea* compared to the other two predator treatments. This suggested that larvae grew less in the presence of a free-ranging predator, indicating that increased antipredator behaviours were more important in shaping growth responses than reduced population density. Mass, but not head width, of survivors was also reduced after autotomy. The fitness consequences of these effects for the adults may be pronounced. In general, these field data strongly suggest that lamellae autotomy affects population regulation of damselflies." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5356. Teixeira, R.L.; Giovanelli, M. (1999): *Ecologia de Tropidurus torquatus* (Sauria: Tropiduridae) da Restinga de Guriri, Sao Mateus, ES. *Rev. Brasil. Biol.* 59(1): 11-18. (in Portuguese, with English summary). ["Ecological aspects of the collared lizard, *T. torquatus*, were studied monthly in a sandy coastal plain of south-eastern Brazil, from February 1996 to March 1997. We collected 108 specimens [...]. Based on the frequency of occurrence, major food items found in the stomach contents of *T. torquatus* were: ants (85.7%), beetles (32.4%), bees (31.4%), termites (22.8%), spiders (20.9%) and flowers (20.0%). Based on the relative number of prey ingested, main food items were: ants (41.2%), and termites (40.8%). Total number of prey found in the stomachs of the collared lizard was 2,903, which varied in individual stomachs from 1 to 268 (mean = 27.6; SD = 36.2). Most of the time *T. torquatus* is a sit-and-wait predator. Its opportunistic feeding behavior, including

invertebrates, small vertebrates (other lizard species), and vegetables (flowers and seeds), may contribute to the success of this lizard in colonizing a diversity of habitats." (Authors) Table 2 documents Odonata as very rare prey of female *T. torquatus*.] Address: Teixeira, R.L., Rua Bernardino Monteiro, 75, Centro, CEP 29650-000, Santa Teresa, ES, Brasil.

2000

5357. Alcántara B.F.; García T.J.; Padilla P.P.; Delgado V.C. (2000): Dosis letales de DIPTEREX 80 % P.S para el control de náyadas de *Gomphaeschna* sp., *Tramea cophysa* y *Tramea calverti* (Odonata, Aeshniidae). *Folia Amazónica* 10(1-2): 73-79. (in Spanish, with English summary). [Larvae of *Gomphaeschna* sp., *Tramea cophysa*, and *T. calverti* were manipulated in the laboratory to determine LD₅₀ of the phosphonate-based insecticide Dipterex 80 % P.S. (Trichlorfon) 0,0 dimethyl (2,2,2-trichloro-1-methylhydroxy) phosphonate. *Gomphaeschna* sp. was significantly more sensitive against the insecticide than *Tramea* spp.] Address: Instituto de Investigaciones de la Amazonía Peruana - IIAP. Programa de Investigación de Ecosistemas Acuáticos. Centro Regional de Investigaciones de Loreto. Av. Abelardo Quiñones km. 2,5. Apartado 784

5358. Buckley, T.R.; Simon, C.; Flook, P.K.; Misof, B. (2000): Secondary structure and conserved motifs of the frequently sequenced domains IV and V of the insect mitochondrial large subunit rRNA gene. *Insect Molecular Biology* 9(6): 565-580. (in English). ["We have analysed over 400 partial insect (including *Aeshna cyanea*) mitochondrial large subunit (mit LSU) sequences in order to identify conserved motifs and secondary structures for domains IV and V of this gene. Most of the secondary structure elements described by R. R. Gutell et al. (unpublished) for the LSU were identified. However, we present structures for helices 84 and 91 that are not recognized in previous universal models. The portion of the 16S gene containing domains IV and V is frequently sequenced in insect molecular systematic studies so we have many more sequences than previous studies which focused on the complete mitochondrial LSU molecule. In addition, we have the advantage of investigating several sets of closely related taxa. Aligned sequences from thirteen insect orders and nine secondary structure diagrams are presented. These conserved sequence motifs and their associated secondary structure elements can now be used to facilitate the alignment of other insect mit LSU sequences." (Authors)] Address: Buckley, T.R., Institute for Molecular Systematics, School of Biological Sciences, Victoria University of Wellington, Wellington, New Zealand. E-mail: tbuckley@duke.edu

5359. Cannings, R.A.; Cannings, S.G.; Ramsey, L. (2000): *The Dragonflies* (Insecta: Odonata) of the Columbia Basin, British Columbia: Field surveys, collections development and public education. ISBN 0-7726-4008-4: 287 pp. (in English). [Table of Contents: Overview of the Project. Introduction to the Dragonflies of the Columbia Basin. Dragonfly Habitat in the Columbia Basin. Biogeography and Faunal Elements. Systematic Review of the Fauna. Suborder Zygoptera (Damsel-flies). Suborder Anisoptera (Dragonflies). The Effects of

Human Activity on Dragonfly Populations. Recommendations for Future Inventory, Research and Monitoring. References. Appendix 1: Checklist of Columbia Basin Dragonflies. Appendix 2: Columbia Basin Odonata and Their Faunal Elements. Appendix 3: Project Participants. Species Distribution Maps and Collecting Data. This highly welcome, great publication on the Odonata of BC, Canada is free available on the internet: <http://www.livinglandscapes.bc.ca/cbasin/wwwdragon/pdf/dragonflies4.pdf>] Address: Royal British Columbia Museum, 675 Belleville Street, Victoria, British Columbia, Canada

5360. Clarke, D. (2000): Dragonflies: dashing icons of Cumbria's insect biodiversity. *Cumbrian Wildlife* No. 57: (in English). [Popular introduction into dragonflies with many very fine black & white drawings. Available at: <http://www.wildlifetrust.org.uk/cumbria/Publications/Cumbrian%20Wildlife%20Articles/CW57-Dragonflies.pdf>] Address: David Clarke, Tullie House Museum & Art Gallery, Carlisle CA3 8TP

5361. Hassan, K.S.; Habeeb, M.A.; Al-Mousawi, N.J. (2000): Occurrence of aquatic insects with algae in Basrah Province. *Marina Mesopotamica* 15(1): 137-143. (in English). ["The presence of aquatic insects together with algae was studied over a period from March - September 1997, in nine stations scattered throughout Basrah Province. 19 species of insects belonging to five orders were collected along with 32 algal species in four classes. Some of the aquatic insects were highly restricted in the nine stations, whereas others were more widely distributed throughout the area." *Anax* sp. and *Ischnura evansi* are listed.] Address: Hassan, K.S., Department of Biology, College of Science, University of Basrah, Basrah, Iraq

5362. Hussain, R.; Riaz, M. (2000): Description of the naiads of *Gomphidia t-nigrum* Selys and *Anax parthenope* Selys (Anisoptera: Odonata). *Int. Jour. Agriculture & Biology*. 2(1-2): 167-168. (in English). [The larvae of *G. t-nigrum* and *A. parthenope* collected from various localities of the Sindh Province, Pakistan are described and illustrated] Address: Hussain, R., Pest Warning and Quality Control of Pesticides, Burewala, Punjab-Pakistan, Department of Zoology, University of Azad Jammu & Kashmir, Muzaffarabad, Pakistan

5363. Moor, F.C. de; Barber-James, H.M.; Harrison, A.D.; Lugo-Ortiz, C.R. (2000): The macroinvertebrates of the Cunene River from the Ruacana Falls to the river mouth and assessment of the conservation status of the river. *African Journal of Aquatic Science* 25: 105-122. (in English). ["The proposed construction of a second hydroelectric power-generating dam on the Cunene (Kunene) River on the Namibia-Angola border, more than 100km downstream of the Ruacana hydroelectric power plant, will have a major influence on the aquatic biota of this river. In order to assess the potential impact of this impoundment a more detailed inventory of the biota in the river prior to this development was needed. Unfortunately the river presently does not represent an entirely undisturbed system as the operation of the Ruacana hydroelectric power station since 1970 has had a long-term effect on its biota. In the low-flow mid-summer season in particular, large areas of the river become irregularly inundated and exposed, sometimes on a daily basis, making them unsuitable for macroinvertebrate colonisation. There are six impound-

ments along the Cunene River upstream of the Ruacana Falls in Angola. These, however, do not have any major disruptive effects on daily flow variation in the Cunene River in Namibia although whole system biological consequences could be considerable but are unstudied. The Cunene River has a diverse freshwater fish fauna but, prior to the surveys reported here, the aquatic macroinvertebrates had been poorly studied. Surveys conducted by staff of the Department of Water Affairs (DWA) of Namibia and the Albany Museum, Grahamstown, in 1997 and 1998 have resulted in 216 aquatic macroinvertebrate species being recorded from Ruacana to the river mouth. The lower Cunene River, flowing through a very arid region, is biogeographically isolated and therefore highly vulnerable to change. The biota recorded reflects a fauna of widespread species and several elements of tropical origin. Several undescribed species may reflect some endemics but because of limited knowledge of the tropical rivers, this cannot be ascertained with certainty. From the aspect of conservation, the river contains a diversity of species with an abundance of filter-feeding species. Further surveys conducted during different seasons will undoubtedly record more taxa." (Authors) Tab. 7 includes 12 Odonata-taxa collected in 1997 and 1998.] Address: de Moor, F.C., Department of Freshwater Invertebrates, Albany Museum, Grahamstown 6139, South Africa 2111a Berg Road, Fish Hoek, Cape Town 7975, South Africa. E-mail: f.demoor@ru.ac.za

5364. Pinder, A.M.; Halse, S.A.; Shiel, R.J.; McRae, M.J. (2000): Granite outcrop pools in south-western Australia: foci of diversification and refugia for aquatic invertebrates. *Journal of the Royal Society of Western Australia* 83: 149-161. (in English). ["Pools and streams on granite outcrops in south-western Australia are reliably filled, but highly seasonal, freshwater habitats that support a diverse array of aquatic invertebrates. A recent biological survey of the wheatbelt has more than doubled the number of invertebrates, to at least 230 species, known from these habitats. Granite outcrops contribute significantly to endemism in the aquatic fauna of the inland south-west and have particular conservation value for about 50 species, mostly rotifers, microcrustaceans, phreodrilid oligochaetes and chironomid midges, restricted to them. Outcrops may also be important for the wider aquatic invertebrate fauna as a freshwater habitat, if salinity in the Western Australian wheatbelt continues to increase." (Authors) 11 odonate species are listed in the appendix.] Address: Pinder, A.M., Department of Conservation and Land Management, CALMScience, PO Box 51, Wanneroo WA 6946, Australia. E-mail: adrianp@calm.wa.gov.au

5365. Pires, A.M.; Cowy, I.G.; Coelho, M.M. (2000): Benthic macroinvertebrate communities of intermittent streams in the middle reaches of the Guadiana Basin (Portugal). *Hydrobiologia* 435: 167-175. (in English). [The order-wise abundance including Odonata is shown per sample site (n=7). An ordination diagram is presented for the Gomphidae, based on canonical correspondence analysis for these sites.] Address: Coelho, M.M., Cent. Biol. Ambiental, Depto Zool., Fac. Cienc. Lisboa, Campo Grande Bloco C2-3° Piso, PT-749-016 Lisboa, Portugal. E-mail: mmcoelho@fc.ul.pt

5366. Ramsay, L.; Cannings, R.A. (2000): Dragonflies at Risk in British Columbia. In: L. M. Darling (Ed.) *Proceedings of a Conference on the Biology and Ma-*

agement of Species and Habitats at Risk, Kamloops, B.C., 15 - 19 Feb., 1999. Volume One. B.C. Ministry of Environment, Lands and Parks, Victoria, B.C. and University College of the Cariboo, Kamloops, B.C. 490pp.: 89-93. (in English). ["In 1993, British Columbia's dragonflies and damselflies (Order Odonata) were listed and ranked as to their conservation status in the province, based upon the knowledge at the time. Inventory efforts were then focused on the species considered at risk, in order to more accurately determine their status and to identify specific sites for conservation. For 3 years, surveys were conducted in 5 regions of the province: the northeast corner, the Lower Mainland, southern Vancouver Island, the Okanagan, and the Columbia Basin. During the course of these surveys, known ranges of many species were extended, knowledge of habitat requirements increased, and 3 new species were confirmed for the province. While many of the targeted species were found only sparsely or not at all, a number of them were discovered to be more abundant than previously thought, and their conservation ranks were changed accordingly." (Authors)] Address: Ramsay, Leah R., British Columbia Conservation Data Centre, Ministry of Environment, Lands and Parks, P.O. Box 9344, STN PROV GOVT, Victoria, BC, V8W 9M1, Canada. E-mail: Leah.Ramsay@gems4.env.gov.bc.ca

5367. Reece, B.A. (2000): Early instar growth and survivorship in the common Baskettail Dragonfly *Epi-theca cynosura* (Anisoptera: Corduliidae). Thesis. Master of Science in Biological Sciences. Faculty of the Department of Biological Sciences. East Tennessee State University: 58 pp. (in English). ["Egg masses of *E. cynosura* were collected from Bays Mountain Park, Tennessee, USA, in June, 1999. Newly hatched individuals were placed into enclosures and sampled at scheduled time intervals throughout the summer. Enclosures were exposed to combinations of high and low densities and presence/absence of a second-year class *E. cynosura* predator. Survivorship, mean head widths, and mean dry masses were compared across treatments. Due to poor recovery of early-instar larvae, survivorship showed no significant differences in mortality among treatments. The predator present treatment caused significantly smaller head widths and dry masses only on days 42 and 55. The density treatment had a significant effect on larval growth from day 28 through day 86 (end of the experiment). Larvae from low density treatments had larger head widths and dry masses. The effects observed within the density treatments were likely to have resulted in a cohort split. Those individuals in the low density treatment followed a univoltine life history, and high density individuals followed a semivoltine life history. Density is probably a very important factor influencing the voltinism of *E. cynosura* at Bays Mountain Lake." (Author) available at: http://etd-submit.etsu.edu/etd/theses/available/etd-0717100-1346_55/unrestricted/ReeceB0817.pdf] Address: not stated

5368. Reeves, W.K.; Jensen, J.B.; Ozier, J.C. (2000): New faunal and fungal records from caves in Georgia, USA. *Journal of Cave and Karst Studies* 62 (3): 169-179. (in English). [George, USA; verbatim: Order Odonata. Family Cordulegasteridae. *Cordulegaster* sp. (trogloxene). Washington Co.: Tennille Lime Sinks, 24 May 2000. Comments: These sand dwelling odonates were common in the Tennille Lime Sinks stream. Family Gomphidae. *Progomphus obscurus* (Rambur) (trogloxene). Washington Co.: Tennille Lime Sinks, 24

May 2000. Comments: These sand dwelling odonates were common in the Tennille Lime Sinks stream.] Address: Reeves, W.K., Department of Entomology, 114 Long Hall, Clemson University, Clemson, SC 29634 USA. E-mail: wreeves@clemson.edu

5369. Saint-Jacques, N.; Harvey, H.H.; Jackson, D.A. (2000): Selective foraging in the white sucker (*Catostomus commersoni*). *Can. J. Zool.* 78: 1320-1331. (in English, with French summary). [The feeding ecology of the fish *C. commersoni* was surveyed; the diet also includes Odonata.] Address: Jackson, D.A. Dept Zoology, University of Toronto, Toronto, ON M5S 3G5, Canada. E-mail: jackson@zoo.utoronto.ca

5370. Vizslán, T. (2000): Anatok a Cserehát Odonata faunájához. *Folia hist. not. Mus. matraensis* 24: 133-137. (in Hungarian with English summary). [Compilation of 37 odonate species recorded from 41 Hungarian localities. The list includes records of *Coenagrion ornatum* and *C. scitulum*.] Address: Vizslán, T., Kitaibel P. u. 32/C. Fru 2, HU-9400 Sopron, Hungaria

5371. Zhou, W.; Li, Z.-z. (2000): *Scalmogomphus guizhousis* sp. nov. and *Lamelligomphus parvulus* sp. nov., two new dragonflies from China (Anisoptera: Gomphidae). *Wuyi Science Journal* 16: 18-21. (in Chinese, with English summary). [Two new species are described: *Scalmogomphus guizhousis* sp. nov.: Holotype: male, paratype: female 18-VI-2000, Guizhou, Huangguo shu. collected by Zhou Wenbao. The species is closely related to *Scalmogomphus falcatus* Chao. *Lamelligomphus parvulus* sp. nov.: Holotype: male, allotype: female paratype 1 male, 2 females. Collected by Li Zi-zhong, 10-VII-2000, Yunnan, xiaguan. The species is allied to *Lamelligomphus formosanus* (Matsumura). The type specimens are deposited in the Zhejiang Museum of Natural History.] Address: Zhou Wenbao, Zhejiang Museum of Natural History, Jiaogonglu 71, Hangzhou 310012, China

2001

5372. Acharyya, S.; Mitsch, W.J. (2001): Macroinvertebrate diversity and its ecological implications in two created wetland ecosystems. *Annual reports (Olentangy River Wetland Research Park)* : 65-76. (in English). ["The study was conducted in 2 experimental basins in a created wetland – Olentangy River Wetland Research Park at The Ohio State University, a 30-acre research facility at Columbus, Ohio, Oct. 10-29, 2000. Both the basins are 1 ha each. One of the experimental wetland basins was originally planted and the other basin was unplanted. After a period of 7 years, both the basins are under vegetated cover. The unplanted basin has a dominance of cattail or *Typha*. These are perched wetlands with water being pumped in continuously from the Olentangy River." Macroinvertebrata including Odonata are communicated on the genus level. available at: <https://kb.osu.edu/dspace/bitstream/1811/375/1/macroinvertebrate+00.pdf>] Address: not stated

5373. Davies, P.; Cook, L.; Risdon, M.; Walker, R. (2001): Stream biological research at Warra. *Tasforests* 13(1): 101-107. (in English). ["An active program of stream biological research is being pursued in the War-

ra – Southern Forests area, with several aims: characterisation of instream biological communities and processes, quantification of forestry-related impacts, development of aquatic bioassessment of forest sustainability, and development of methods to mitigate impacts. Several aspects and results of this research are described." (Authors) The species mentioned include *Austroaeschna hardyi*.] Address: Davies, P., School of Zoology, University of Tasmania, GPO Box 252-05, Hobart 7001, Tasmania

5374. Holder, H. (2001): The influence of habitat structure on peatland Odonata at local and landscape spatial scales. Thesis Master of Science (Biology), Acadia University, Spring Convocation: 179 pp. (in English). [The full paper is available at: <http://www.collectionscanada.ca/obj/s4/f2/dsk3/ftp04/MQ58426.pdf>. Of some interest are attempts to use an harmonic radar equipment to follow dispersal and to survey the mobility of *Leucorrhinia hudsonica*.] Address: Holder, M., Kingsley, Andrea, 4605 Hwy'12, Kentville, Nova Scotia B4N 3V8, Canada. E-mail: kingsley.holder@ns.sympatico.ca

5375. Johansson, F.; Nilsson, A. (2001): Trollsländor och vattenskalbaggar i Umeå uthamn. *Natur i Norr, Umeå* 20(2): 82-84. (in Swedish). [Sweden; eight odonate species are documented] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

5376. McClure, C. (2001): Abundance and distribution variation of dragonflies in a salt marsh in response to hydrology and daily ambient temperature. Undergraduate Thesis under the direction of Dr. Robert R. Christian, Department of Biology, East Carolina University: 36 pp. (in English). [Table 1 lists 15 taxa identified and counted in the Virginia Coastal Reserve Brownsville marsh USA. "The most prolific species was *Eythrodiplox berenice*. It was found in 87.5% of all samplings. The next two most common species were *Ischnura ramburii* and *Libellula lydia*, seen in 37.5% and 28.75% of samples respectively. The rest of the species were observed in 15% of samples or less." For the full paper see: <http://www.vcrlter.virginia.edu/thesis/McClure2001.pdf>] Address: not stated

5377. O'Meara, M. (2001): The Dragonflies of Waterford City & County. A catalogue and atlas of the Dragonflies of Waterford to the end of the twentieth century. *Fauna of County Waterford Series No. 4 - Odonata*. ISBN 0-9540303-3-8: 16 pp. (in English). [The 17 odonate species hitherto known from this county in the southern part of the Republic of Ireland are mapped and commented. The paper is available at: <http://www.waterfordcoco.ie/council/categories/publications/artic184/dragon.pdf>] Address: Waterford Wildlife, 153 St. John's Park, Waterford, Ireland.

5378. Salmah, M.R.C.; Hassan, S.T.S.; Hassan, A.A. (2001): Local movement and feeding pattern of adult *Neurothemis tullia* (Drury) (Odonata: Libellulidae) in a rain fed rice field. *Tropical Ecology* 41(2): 233-241. (in English). ["The movements of *Neurothemis tullia* (Drury) (Odonata: Libellulidae) adults were studied in a rain fed rice field using the mark-release-recapture technique. Both male and female dragonflies were widely distributed within their home range of approximately 30 m radii. Adult movements were highly localized and the longest distance travelled was about 130 m. Diurnal feeding

pattern was studied by examining gut contents. Some individuals had taken preys as early as 0730 hr. Feeding activity however, peaked at 1030 hr and at 1730 hr. Daily food intake was highly variable between sexes and within hours of the day. Females fed more actively in the morning and their body weights were heavier than that of males at all hours of the day. Active feeding activity of both sexes reflected effective predation." (Authors)] Address: Che Salmah Md. Rawi, Malaysia. E-mail: csalmah@usm.my

5379. Soares, C.M.; Hayashi, C.; Esper Amaro de Faria, A.C. (2001): Influência da disponibilidade de presas, do contraste visual e do tamanho das larvas de *Pantala* sp. (Odonata, Insecta) sobre a predação de *Simocephalus serrulatus* (Cladocera, Crustacea). *Acta Scientiarum Maringá* 23(2): 357-362. (in Portuguese, with English summary). ["Influence of prey availability, visual contrast and size of dragonfly (*Pantala* sp.) larvae (Odonata, Insecta) on the predation of *Simocephalus serrulatus* (Cladocera, Crustacea). The influence of prey availability, visual contrast and size of dragonfly (*Pantala* sp) larvae on the predation of cladocerans (*Simocephalus serrulatus*) is provided. Twentyfour dragonfly naiads (12.57±0.05 mm and 100.01±9.16 mg) were employed to study the relation between predation rate and availability of cladocerans and visual contrast. 5, 10, 15 and 20 cladocerans/L were placed in 1L transparent and black plastic lined aquariums. Cladocerans (1.63±0.21 mm and 0.78 mg) were counted and replaced hourly for five consecutive hours. Twenty-four naiads of different sizes were placed in 50mL recipients to study effects of size of dragonfly larvae. Each larvae received 20 cladocerans; counting and reposition of individuals consumed every ten minutes during two consecutive hours were undertaken. Quadratic effect ($p<0.02$) in predation rate was reported, with an increase in prey availability: 21.67; 39.00; 42.44 and 49.67% were reported for densities of 5, 10, 15 and 20 cladocerans/L respectively. Predation rate ($p<0.02$) was higher in dark wall aquariums (42.67%) than in those with transparent walls (33.72%). Size of dragonfly larvae had a quadratic effect on the predation of cladocerans and highest value occurred with 13.23 mm naiads. While high prey availability increases predation rate, predation is higher in aquariums with dark walls and 13.23 mm-long larvae have the highest predation rate." (Authors)] Address: Soares, C.M., Departamento de Biologia, Programa de Pós-Graduação em Ecologia de Ambientes Aquáticos Continentais, Universidade Estadual de Maringá, Av. Colombo, 5790, 87020-900, Maringá, Paraná, Brasil. E-mail: cmsouares@uem.br

5380. U.S. Fish & Wildlife Service (2001): *Somatochlora hineana*. Recovery plan. U.S. Fish & Wildlife Service, 5430 Grosvenor Lane, Suite 110, Bethesda Maryland 20814, USA.: 120 pp. [Available at: <http://www.fws.gov/midwest/Endangered/insects/hed/hedplan.pdf>]

5381. Yourth, C.P. (2001): Ecological immunology in lestad damselflies: explaining variation in immune defense against parasitic water mites. Thesis. Master of Science. Dept Zoology, University of Toronto: 75 pp. (in English). ["This thesis tests predictions of the emerging theory of ecological immunology using variation in immune expression of *Lestes dryas* Kirby, *L. forcipatus* Rambur, *L. unguiculatus* Hagen, and *L. congener* Hagen to a generalist parasitic water mite, *Arrenurus planus* Marshall. Immune responses of the four lestad species were

compared as they relate to prevalence and intensity of mite infection; these measures of parasitism did not fully explain among-species variation. Within-species variation in immunity of *L. forcipatus* was related to time of season, but not to host body size or asymmetry, measures of host condition. When *L. forcipatus* were allowed to respond to Sephadex beads at a fixed temperature across season, no seasonal pattern in immunity was observed and a positive correlation between condition and immune response in males was detected. These results implicate seasonal variation in temperature as being a major factor in determining immune responsiveness of lestad damselflies." (Author). The thesis is available at: <http://www.collectionscanada.ca/obj/s4/f2/dsk3/ftp05/MQ63244.pdf>]

5382. Zhu, H.-q. ; Zhang, X.-x. (2001): A new species of the genus *Planaeschna* from Shanxi province. China (Odonata: Aeschnidae). *Wuyi Sci. J.* 17: 6-9. (in Chinese, with English summary). [*Planaeschna shanxiensis* sp. nov. is described and illustrated. Holotype female: Xing-he (river), Yangcheng xian, Shanxi, China. 8-IX-2000; allotype male: Hou-hui gou, Ling xian, Shanxi, China. 2-VII-1986; paratypes of both sexes. The new species is compared with *P. milnei*, *P. risi*, and *P. suichangensis*. It is considered conspecific with the taxon described by J.G. Needham (1930, *Zool. sin.* [A] 11: 84-85) as "*P. milnei* Selys.] Address: Zhang, X.-x., Shanxi Acad. Agric. Sci.. Taiyuan-030006. P.R. China

2002

5383. Ali, M.H.; Anon, M.R.; Mohammed, H.H. (2002): The seasonal variations of abundance and biomass of the two odonate naiads *Ischnura evansi* Morton (Odonata: Coenagrionidae) and *Brachythemis fuscopalliata* Selys (Odonata: Libellulidae) in the Qarmat Ali region, Basrah. *Marina Mesopotamica* 17(2): 405-415. (in English). ["The abundance and biomass of the naiads of two odonate species, *Ischnura evansi* and *Brachythemis fuscopalliata*, in the Qarmat Ali region near Basrah have been investigated. Field samples were taken monthly with a plankton net for the period Dec. 1994 – Nov. 1995. During different months, the population structure may be monomodal, bimodal, or trimodal. The mean density of *I. evansi* was higher (196 individuals/m³) than that of *B. fuscopalliata* (168 individuals/m³) and two peaks of density were observed in December 1994 and in May 1995. Minimum values of density were recorded at temperature ranges above 25°C (26-34°C). The mean monthly biomass (B) for *B. fuscopalliata* was higher (869 mg dry weight/m³) than that of *I. evansi* (284 mg DW/m³)."] (Authors)] Address: Ali, M.H., Marine Science Centre, University of Basrah, Basrah, Iraq

5384. Batcher, M.S. (2002): New England Plant Conservation Program: *Saururus cernuus* L. Lizard's Tail. Conservation and Research Plan for New England. For: New England Wild Flower Society, 180 Hemenway Road, Framingham, MA 01701, USA: 1, 34 pp. (in English). [This study contains the interesting information that Odonata sometimes landed on pollen spikes of *Saururus cernuus*, and worked as pollinator in a broad sense: When struck, a flower spike would send off a cloud of pollen. Based on these observations, it is conc-

cluded that wind and insect-mediated wind pollination were the primary methods of pollinations in *S. cernuus*. For the full paper see: <http://www.newfs.org/conservation/pdf/Saururuscernuus.pdf> Address: Batcher, M.S., Consulting Ecologist and Environmental Planner, 1907 Buskirk-West Hoosick Rd., Buskirk, NY 12028

5385. Center for Biological Diversity (? (> 2002)): Candidate Petition Project: Insects. Petitions to list as federally endangered species. <http://www.biologicaldiversity.org>: 215 pp. (in English). [The US document contains the individual petitions for 27 insect species and one arachnid species to be listed as federally endangered species under the Federal Endangered Species Act. Odonata included are: *Megalagrion nigroharmatum nigrolineatum*, *M. leptodemas*, *M. nesiotas*, *M. oceanicum*, *M. xanthomelas*, and *M. pacificum*. Each of the species sheets compiles excessively all information relevant for conservation measures: Taxonomy, distribution, morphology, behaviour, habitat, population status, listing criteria, bibliography.] Address: <http://www.biologicaldiversity.org/swcbd/Programs/bdes/cp/petitions/insects.pdf>

5386. Clopton, R.E. (2002): Phylum Apicomplexa Levine, 1970: Order Eugregarinorida Léger, 1900. In: Lee, G. Leedale, D. Patterson & P. C. Bradbury (Eds.): Illustrated Guide to the Protozoa, 2nd edition. Society of Protozoologists, Lawrence, Kansas.: 205-288. (in English). [Odonate hosts of the Eugregarinorida are documented.] Address: Clopton, R.E.; Dept Nat Sci, Peru State Coll, Peru, NE, 68421, USA. E-mail: rclopton@oakmail.peru.edu

5387. Cotterill, F.P.D. (2002): Mammal collections and biodiversity conservation in the Ikelenge Pedicle, Mwinilunga district, North west Zambia. Occasional Publications in Biodiversity 10: 20 pp. (in English). ["[...] The second part of the paper highlights the biodiversity of this region and discusses its conservation. The biogeography of the Ikelenge pedicle is discussed with respect to its exceptional biodiversity. A review of indicator species of vertebrates, Lepidoptera and Odonata emphasizes the global and national significance of the area's biodiversity resulting from the dominant influence of forest species of Guineo-Congolian affinity and also from those species endemic to the area. The presence of these endemics provides evidence for a region of endemism." (Authors) Odonata with bioindicatorial value are listed in App. 1.] Address: Biodiversity Foundation for Africa, P.O. Box FM730, Famona, Bulawayo, Zimbabwe

5388. Craves, J.A. (2002): A preliminary list of the Odonata of Wayne Co.. Michigan Birds and Natural History 9(1): 7-15. (in English). [Michigan, USA; records of 48 odonate species are documented.] Address: Craves, Julie A., Rouge River Bird Observatory, Natural Areas Dept., University of Michigan-Dearborn, Dearborn, MI 48128

5389. Evans, R. (2002): Conservation assessment for selected dragonflies of the Allegheny National Forest. USDA Forest Service, Eastern Region December 2002: 35 pp. (in English). ["The objective of this document is to provide background information and review the conservation status for several odonate species in the Allegheny National Forest. These species were chosen based upon their rarity in the Allegheny National Forest and the State of Pennsylvania. The following species

are the focus of this report: *Helocordulia uhleri*, *Soma-tochlora elongata*, *Gomphus adelphus*, *G. descriptus*, *G. fraternus*, *G. quadricolor*, *G. viridifrons*, *Ophiogomphus mainensis*, and *Stylurus scudderi*. These species are found primarily in wetlands, rivers, and streams. Primary threats to these species include degradation of water quality by resource extraction, changes in riparian vegetation due to forest management practices, and sedimentation and pollution of streams from agricultural inputs into watersheds. Management considerations include protecting high quality streams in the Allegheny National Forest from future impacts. These species should continue to be monitored in Allegheny National Forest streams, and survey efforts should be expanded to document the ranges of these species." (Author) available from: http://www.fs.fed.us/r9/wildlife/tes/ca-overview/docs/insects_electeddragonflies.pdf Address: Evans, R., Western Pennsylvania Conservancy, 209 Fourth Avenue, Pittsburgh, PA 15222, USA

5390. Fourcassié, V.; Oliveira, P.S. (2002): Foraging ecology of the giant Amazonian ant *Dinoponera gigantea* (Hymenoptera, Formicidae, Ponerinae): activity schedule, diet and spatial foraging patterns. Journal of Natural History 36: 2211-2227. (in English). [The list of food items collected by workers of *Dinoponera gigantea* in Amazonian rainforest in north Brazil, in December 1999 includes one odonate specimen.] Address: Oliveira, P.S., Departamento de Zoologia, Universidade Estadual de Campinas, C.P. 6109, 13083-970 Campinas SP, Brazil. E-mail: ps@unicamp.br

5391. Holmström, N. (2002): Trip Report: La Gomera. 1-8 Dec. 2002. <http://www.seawatching.net/reports/Gomera/LaGomera2002.pdf>: 8 pp. (in English). [Verbatim: *Ischnura saharensis*: 2 – at the Park of San Sebastián 5/12. Considered by some to be a form of *Ischnura elegans*, [...] *Anax imperator*: 3 – at Playa Santiago 4/12. 6 – at the Park of San Sebastián 5/12. A colourful and heavily built dragonfly! Best viewed through binoculars rather than by eye. *Sympetrum fonscolombii*: 3 – at the Park of San Sebastián 5/12. 1 – at the La Laja area 6/12. Easier to get close to and be seen stationary than the Emperor, which is more vigilant and difficult to get close. *Orthetrum* sp.: 2 – at San Sebastián 2/12. Several at Playa Santiago 4/12. 3 – at the La Laja area 6/12. All observations were of the same species, however, we couldn't identify it. According to the literature it was an *Orthetrum* species. At La Laja we spotted one bluish male.] Address: Holmström, N., Öja Björkebo, S-640 40 Stora Sundby, Sweden. E-mail: niklas@seawatching.net

5392. Jones, C.D. (2002): NHIC participates in the national Odonata assessment workshop. Ontario Natural Heritage Information Centre-Newsletter 6(1): 8-10. (in English). [Laurentian Lodge, Algoma District, Ontario, Canada, 3 to 6-VII-2001; this is a report on the meeting with information on fieldwork (including a record of the rare *Ophiogomphus anomalus*) and some lectures.] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

5393. Li, X.-F.; Ren, D. (2002): First discovery of male *Rudialeschna limnobia* Ren, 1996 and its venational variability. Acta Zootaxonomica Sinica 27(3): 486-490. (in Chinese, with English summary). [The male *R. limnobia* is described and illustrated. The variability of wing venation at the intraspecific level is discussed. The ma-

terial studied was collected at the Late Jurassic Yixian Formation in the Liaoning Province, China.] Address: Ren, D., Dept Biology, Capital Normal University, Beijing 100037, China. E-mail: rendongprof@yahoo.com

5394. Mauersberger, R. (2002): Der Referenzzustand - Merkmale naturnaher Seen-Ökosysteme am Beispiel von NO-Deutschland. NNA-Berichte 2/2002: 65-76. (in German, with English summary). ["The former, not by man influenced situation of a glacial lake shall be equated as the reference state within the meaning of a good ecological state in the sense of the European Water Framework Directive. This reference state must not be universal for all lakes but has to be specialized for every lake as an individual. Subsequently the parameters for the determination of the reference state are listed: * Former (by geological conditions determined) hydrological lake type (original dimension of its tributary, water exchange rate, existence of surface inflows and outflow and ground water touch) * Original trophic, humic and alkalinity State * Original poison agents concentrations (in relation to the geogen level) * Hydraulic caused bank structure as a result of long term water level amplitude * Impairment by human building activities * Near natural distribution and quality of Sediments and the condition of lake associated swamps and bogs * Near natural dead tree structures in the littoral * Typical Vegetation: structures, species composition and maximum growing depth according to the original trophic, humic and alkalinity State of the lake * Near natural ichthyofauna contingent upon original hydrological lake type and trophic State * Presence of character species in the benthic fauna e.g. Odonata and Mollusca" (Author)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

5395. McGlynn, T.P.; Hoover, J.R.; Jasper, G.S.; Kelly, M.S.; Polis, A.M.; Spangler, C.M.; Watson, B.J. (2002): Resource heterogeneity affects demography of the Costa Rican ant *Aphaenogaster araneoides*. Journal of Tropical Ecology 18: 231-244. (in English). [On page 233, a passing reference of Odonata as prey / food of ants is made. Available at: www.home.sandiego.edu/~tmcglynn/documents/2002JmcGlynnAphaeno1.pdf] Address: McGlynn, T.P., University of San Diego, Department of Biology, 5998 Alcalá Park, San Diego, CA 92110, USA

5396. Mizota, K. (2002): A check list of insects in Kinkazan Island, Miyagi Pref., Northeastern Japan: A bibliographical survey. Miyagi University of Education Report of Environmental Education 5: 69-78. (in Japanese). [Japan, the list includes 8 odonate species] Address: not stated in English

5397. Olthoff, M.; Ikemeyer, D. (2002): Vorkommen von Libellen und Heuschrecken in Feuchtwiesen. Untersuchungen in ausgewählten Schutzgebieten des Kreises Borken. LÖBF-Mitteilungen 1/2002: 24-30. (in German). [Nordrhein-Westfalen, Germany; in 2000, 23 water bodies with a total of 28 species have been surveyed for their odonate fauna. Colonisation history, dragonfly succession of the ponds, effects / impacts by trampling of cattle, the importance for determining the odonate fauna of shrubs, relative near to source habitats, and altering levels of water table are discussed.] Address: Ikemeyer, D., Biologische Station Zwillbrock

e.V., Zwillbrock 10, D-48691 Vreden, Germany. E-mail: info@bszwillbrock.de

5398. Page, J. (2002): Dragonfly dramas: Desert whitetails and Flame skimmers cavort in the sinkholes of New Mexico's Bitter Lake Refuge. Smithsonian 32 (10): 20, 22. (in English). [Verbatim: "Gomphid!" someone shouted, and the little thing with the gleaming fuselage hovered, then sped away. I was standing on the whitish gypsum-rich hardpan that passes for soil in the desert about 15 miles north of Roswell, New Mexico. The air around me was filled with mostly unidentified flying objects. I now knew that this yellow-and-black creature was a Gomphid, a genus of dragonfly. But many of the dozens of other Odonata, the general scientific name for dragonflies and damselflies, which flew aerial gymnastics around me, remain nameless. This particular location—the Bitter Lake National Wildlife Refuge—hosts a great variety of these curious creatures. My expert guide, Robert R. Larsen, is a well-built man who carries a big white net as comfortably as many men carry a briefcase. By training a botanical illustrator and by preference a biological "investigator," Larsen was the scientist to whom the managers of the Bitter Lake National Wildlife Refuge turned when they identified an unusually large number of Odonata species helicoptering around the sinkholes of the refuge in 1998. With funds from the state Game and Fish Department, Larsen—a resident of Roswell who had been analyzing the plant life of the refuge—netted more than 50 species of dragonfly and some 30 species of damselfly. They included the largest dragonfly found in the United States (*Anax walsinghami*) and one of the nation's smallest damselflies (*Ischnura hastata*). An easy way to distinguish between a dragonfly and a damselfly is to observe the wings: the rear, or posterior, pair of dragonfly wings are broader than the front, or anterior, pair, while both sets of a damselfly's wings are essentially equal in size. Other distinguishing characteristics include the eyes of the damselfly, which are on opposite sides of its head, while dragonfly eyes are typically closer together, sometimes even connected. These bulging and usually colorful organs have up to 30,000 facets. Both creatures, however, enjoy expanded peripheral vision, a formidable feature for a predator, which both dragonflies and damselflies become early on in their lives. "I'm really glad the larvae aren't huge, or that I'm not really small," said Karen Gaines, a graduate student at the University of New Mexico who has been studying Odonata larvae at the refuge. Most dragonfly larvae, which are aquatic for one to two years, are utterly insatiable, eating everything they come across, including tadpoles, fish, and mosquito and other insect larvae. They even eat their own siblings. Eventually, the larva climbs out of the water; its outer "skin," or exoskeleton, splits open, it pulls its telescoped abdomen out of the casing and it gradually extends to full length. Within one to two hours, the wings clear, dry out and open up. After its wings harden, over the course of several hours to several days, the creature will become a remarkable aerialist. Some species can fly up to 35 miles per hour. Their wings work independently, so they can hover and change direction instantaneously. Some species are migratory and, with the wind's help, may travel hundreds of miles. Adult life is relatively brief, typically a matter of weeks, though some species can live for as long as a year. The time is spent voraciously feeding on mosquitoes, assorted moths and butterflies, and mating, a complex affair that turns a pair into an ac-

robotic and often airborne pretzel. Larsen reports seeing a large dragonfly carry off a minnow, a sight so remarkable that other scientists have questioned him on it. While I was standing right next to her, Karen Gaines swished her net in the air and caught a *Gomphus militaris* with the wing of a damselfly still hanging from its mouth. (Additional excellent detail about the biology of Odonata is covered in *Dragonflies of the World* by Jill Silsby, a new book published by Smithsonian Institution Press.). So why are there so many Odonata here? At first glance, their presence seems unlikely. After all, Bitter Lake lies at the northern edge of the Chihuahuan Desert, a refuge known mostly for its birdlife, especially its spectacular winter flocks of snow geese and sandhill cranes. It is a flat landscape lying west of a long low ridge called Comanche Hill. The Pecos River runs along the ridge, and the refuge itself contains many lakes left over when the river took a new course. The alkaline lakes for which the refuge is named are indeed bitter, making it the kind of place Louis L'Amour heroes steer clear of. Right where the Chihuahuan Desert meets the shortgrass prairie, Larsen told me, is an extremely diverse habitat for plant species. In addition to freshwater sloughs, ponds, marshes, springs, ditches and a half-mile-long stream known as the Lost River, the refuge contains more than 60 sinkholes. This is ideal habitat for dragonflies. Sinkholes are just as they sound—places where soluble bedrock dissolves, creating cavities or holes in the surface. Groundwater then often fills the hole. The process is typically slow, but local legend has it that one of the refuge's sinkholes formed overnight beneath a parked bulldozer. Some sinkholes here are but a few feet across, though one is large enough—about an acre—to be called (with a bit of exaggeration) Lake St. Francis, 70 feet deep with beautiful blue and Caribbean-green water. These sinkholes have become aquatic "islands" in this arid desert habitat. Sinkhole conditions differ a great deal. Some have steep, naked gypsum sides; others have reeds and grasses that grow right up to the water's edge. In some sinkholes, the water is so saline that it supports red and green algae blooms. Other sinkholes are saltier than seawater and invite species of dragonflies and damselflies usually found in estuaries, although the nearest seashore is a thousand miles away. The unique blend of conditions in each sinkhole creates entirely different ecosystems, even though one sinkhole may be only ten feet from another. As a result, each sinkhole, Gaines explained, seems to have its own special array of Odonata, and some species breed only in a single sinkhole. (Sinkholes also host the only known populations of certain other animal species, such as the last genetically pure species of the extraordinarily salt-tolerant Pecos pupfish and certain springsnails and amphipods.) "It's a natural outdoor laboratory," Gaines said. She keeps track of this confusing and colorful aerial menagerie with a little biological sleuthing. Gaines regularly places little ladders of wire mesh leading from the edge of sinkholes into the water. Because Odonata leave their larval casing on the ladder as they crawl out, she can identify which species breed in the Bitter Lake sinkholes and which migrate here after breeding elsewhere. Nearby Roswell may be a mecca for UFOs, but the dedicated scientists here at Bitter Lake have a pretty good handle on what's flying around. Already, I can spot the fluttering flight of the desert whitetail (*Libellula subornata*) and the bright red body of the flame skimmer (*L. saturata*). I was struck by how much these Odonata folk sounded like bird-watchers, singing out the name of a

dragonfly they see whizzing by for but an instant. Indeed, the common names of these creatures are just as exciting as bird names—or more so. After all, where's the poetry in spotting a crow or a snipe? But imagine spotting an Eastern amberwing, a seaside dragonlet or a Halloween pennant during a single outing at your neighborhood pond. And if your life list included the Comanche skimmer, the desert forktail and the black saddle bags, wouldn't your chest swell with pride?]

5399. Subramanian, K.A. (2002): When Dragons Fly Resonance October 2002: 69-79. (in English). [Introduction into the biology of Odonata. For a full paper see: <http://www.ias.ac.in/resonance/Oct2002/pdf/Oct2002p69-78.pdf>] Address: Subramanian, K.A., Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560 012, India. Email: subbu@ces.iisc.ernet.in

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5400. Cannings, S.G. (2003): Status of Olive Clubtail *Stylurus olivaceus* (Selys) in British Columbia. B.C. Ministry of Sustainable Resource Management, Conservation Data Centre, Victoria BC. Wildlife Bulletin No. B-112: 19 pp. (in English). ["The Olive Clubtail (*Stylurus olivaceus*) is a dragonfly of warm streams and lakes in western North America. In British Columbia, the species is restricted to a few lakes and warm streams in the Thompson, Kettle and Okanagan valleys. Recent observation or collection records are not known from the Thompson River. Little is known of the biology of the species and no real trend information is available. Possible threats include shoreline development (including loss of riparian vegetation), pesticide contamination, eutrophication and predation by introduced fish. Recommendations include more focused inventory, basic research into the species' biology, maintenance of natural shorelines where possible and control of introduced predatory fish." (Author)] Address: Cannings, S., Royal British Columbia Museum, 675 Belleville Street, Victoria, British Columbia, Canada

5401. Cannings, S.G. (2003): Status of Western River Cruiser *Macromia magnifica* McLachlan in British Columbia. B.C. Ministry of Sustainable Resource Management, Conservation Data Centre, Victoria BC. Wildlife Bulletin No. B-111: (in English). ["The Western River Cruiser, *Macromia magnifica* McLachlan, is a large, boldly patterned dragonfly of warm, clear streams and lakes in western North America. In British Columbia, the species is restricted to a few lakes and warm streams in the Fraser Valley, Shuswap Lake, Okanagan Valley and Christina Lake areas. Recent observation or collection records are not known from the Fraser Valley and Shuswap Lake. Little is known of the biology of the species and no real trend information is available. Possible threats include shoreline development (including loss of riparian vegetation), pesticide contamination, eutrophication and predation by introduced fish. Recommendations include more focused inventory, basic research into the species' biology, maintenance of natural shorelines where possible and control of introduced predatory fish."] Address: Cannings, S., Royal British Columbia Museum, 675 Belleville Street, Victoria, British Columbia, Canada

5402. Commission of Zoological Nomenclature (2003): OPINION 2037 (Cases 3120 and 3120a) - LIOCHELIDAE Fet & Bechly, 2001 (1879) (Scorpiones): adopted as a valid substitute name for ISCHNURIDAE Simon, 1879 in order to remove homonymy with ISCHNURINAE Fraser, 1957 (Insecta, Odonata). Bulletin of Zoological Nomenclature 60(2): 159-161. ["The Commission has ruled that the scorpion family name LIOCHELIDAE Fet & Bechly, 2001 (1879) is to have precedence over ISCHNURIDAE Simon, 1879, which is a homonym of the widely used damselfly name ISCHNURINAE Fraser, 1957 (Odonata). The type genus of LIOCHELIDAE is Liocheles Sundevall, 1833, which is in wide use as the valid senior subjective synonym of the long abandoned name Ischnurus C.L. Koch, 1837 (the type genus of ISCHNURIDAE Simon, 1879). ISCHNURINAE Fraser, 1957 is not to be rejected despite being a junior homonym of ISCHNURIDAE Simon, 1879." (Authors)]

5403. Conseil General des Landes; Parc naturel régional des Landes de Gascogne (2003): Bilan des inventaires entomologiques réalisés dans les forêts galeries des leyres de 1999 à 2002 (Rhopalocères, odonates et orthoptères). <http://www.cg40.fr/doc/environforetleyreentomo.pdf>: 20 pp- (in French). [The total of 35 odonate species includes also Coenagrion scitulum, C. mercuriale, Onychogomphus uncatus, Gomphus similimus, Somatochlora flavomaculata, Sympetrum meridionale, Leucorrhinia albifrons, and Leucorrhinia pectoralis. For some primary results see: <http://www.cg40.fr/doc/environforetleyre03.pdf>]

5404. De Knijf, G. (2003): Libellen (Odonata) in de provincie Antwerpen: een belangrijke taak weggelegd voor het provinciale natuurbeleid. Antwerose koepel voor natuurstudie • Jaarboek 2002: 51-63. (in Dutch). [60 of the 66 odonate species of the Flame region in Belgium have been recorded in the Antwerp province.] Address: De Knijf, G., Instituut voor Natuurbehoud en Libellenwerkgroep Gomphus, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de.knijf@instnat.be

5405. Ekestubbe, K.; Dannelid, E.; Rosén, C.; Wenngren, J. (2003): Inventering av trollsländor i Stockholms län åren 2000-2001. Södertörnsekologerna Rapport 2003:1 ISSN 1651-856X: 62 pp. (in Swedish). [Detailed documentation with tables and maps of an odonate inventarisation in the surroundings of Stockholm, Sweden. For the full paper see: <http://www.sodertornsekologerna.org/Trollslanderapporten-omslagrattadtext-20040127pluskartor.pdf>]

5406. Gainsbury, A.M.; Colli, G.R. (2003): Lizard assemblages from natural Cerrado enclaves in southwestern Amazonia: The role of stochastic extinctions and isolation. Biotropica 35(4) : 503-519. (in English, with Spanish summary). ["We used null model analyses to investigate the existence of structure in lizard assemblages from open vegetation enclaves in Rondonia, southwestern Amazonia, in relation to species richness, species co-occurrence, diet (including Odonata), and size overlap. These enclaves presumably have been isolated since the Holocene, providing a history of long-term isolation. We assumed that the presence of structure in lizard assemblages from the Rondonia enclaves is consistent with the notion that extinctions are a deterministic process, some species being more prone to extinction than others. We grouped enclaves into four

categories: latosoil cerrado, sandy cerrado, transitional forest, and rocky field. We collected 14 Cerrado lizard species, consisting of five families in all sampled areas. Analyses of species richness, co-occurrence, diet overlap, and size overlap patterns suggested lack of organization in the assemblages. The assemblages from the rocky fields of Guajará Mirim and the sandy cerrados in Vilhena were significantly structured in diet overlap, whereas the remaining assemblages lacked structure. This probably resulted from phylogenetic inertia and not from ecological interactions. Our results suggest that extinctions proceeded in a stochastic fashion and that historical factors had a dominant role in shaping lizard assemblages in detriment of present-day ecological factors. In addition, we identified endemic species in the enclaves as well as a tight association between unique ecogeographic features of the landscape and species occurrences. We propose that conservation measures in the region must adequately preserve these features to ensure the survival of the species." (Authors)] Address: Colli, G.R., Departamento de Zoologia, Universidade de Brasília, 70910-900, Brasília DF, Brazil. E-mail: gcolli@unb.br

5407. Gassmann, D. (2003): Phylogeny and distribution of the Philippine damselfly subgenus Risioecnemis (Igneoecnemis) Hämäläinen (Odonata: Platycnemididae). Fritz (ed.): 6th GfBS Annual Congress abstracts. Org. Divers. Evol. 3, Electr. Suppl. 17 (2003): 20. (in English). [Verbatim: Risioecnemis Cowley, 1934 is the largest genus of the zygopteran subfamily Calicneminae in the Indo-Pacific region. The group is endemic to the Philippines, except for the Sulu Archipelago and the Palawan island chain. Members of the group are confined to small, clear creeks in shady rainforest environment, occurring from lowland up to mid-montane forest. Two subgenera within the genus Risioecnemis are currently recognized: Risioecnemis Cowley, 1934 s. str., and Igneoecnemis Hämäläinen, 1991. A revision of the subgenus Risioecnemis was presented by Hämäläinen (1991). Mainly based on the large Roland A. Müller collection from the Philippines, which is now housed by the Natural History Museum in Leiden, a complete taxonomic revision of the subgenus Igneoecnemis has recently been completed by Gassmann & Hämäläinen (2002). In total, 20 species of sg. Igneoecnemis have been recognized, of which five were newly described. Several putative synapomorphies of Igneoecnemis species point to the monophyly of the group. However, the monophyly of the whole genus, i.e. Risioecnemis Cowley sensu lato, is less certain. Within the scope of a phylogenetic-biogeographical study on the Indo-Pacific Platycnemididae, the phylogeny of the Igneoecnemis species was reconstructed based on morphological characters. The distribution patterns of the species can be explained by Tertiary island arc connections as well as by the existence of larger islands during the Pleistocene. References: Gassmann, D. & Hämäläinen, M. (2002): A revision of the Philippine subgenus Risioecnemis (Igneoecnemis) Hämäläinen (Odonata: Platycnemididae). Tijdschr. Entomol. 145: 213-266. Hämäläinen, M. (1991): The Philippine genus Risioecnemis Cowley (Zygoptera: Platycnemididae). 1. Subgenus] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

- 5408.** Hussain, R. ; Ahmed, K.B. (2003): Damselfly naiads (Odonata: Zygoptera) of Sindh–Pakistan. *Int. Jour. Agriculture & Biology*. 5(1): 53-56. (in English). [Lestes, Pseudagrion, Ceriagrion and Ischnura spp., are described and illustrated.] Address: Ahmed, K.B., Pest Warning and Quality Control of Pesticides, Burewala, Punjab–Pakistan, Department of Zoology, University of Azad Jammu & Kashmir, Muzaffarabad, Pakistan
- 5409.** Lange, L. (2003): Die Kleine Pechlibelle *Ischnura pumilio* (Charpentier, 1825) und die Speer-Azurjungfer *Coenagrion hastulatum* (Charpentier, 1825) - zwei für die Marschen des Kreises Steinburg seltene Libellenarten. *Bombus* 3(55-57): 217-218. (in German). [Schleswig-Holstein, Germany; documentation of two records of the rare *I. pumilio* from a ditch system in the Altenmoor at 29-VIII-2000 and the lake Brake at 30-V-2002. Records of *C. hastulatum* in 2002 are discussed with reference to the high water table level in this year.] Address: Lange, L., Deichreihe 21, D-25599 Wewelsfleth, Germany.
- 5410.** López Cazorla, A.; Durán, W.; Tejera, L. (2003): Alimentación de la ictiofauna del río Sauce Grande, provincia de Buenos Aires, Argentina. *Biología Acuática* 20: 73-79. (in Spanish). [Argentina; the diet of the fishes includes 4 odonate taxa: *Ischnura* sp., *Oxyagrion hempeli*, *Andinagrion peterseni*, *Rhionaeschna bonariensis*.] Address: Departamento de Biología, Bioquímica y Farmacia, UNS. San Juan 670 (8000) Bahía Blanca, Argentina. E-mail: acazorla@criba.edu.ar
- 5411.** Macaulay, D.; Dunne, S. (2003): Survey of the odonate fauna in Caribou Mountains Wildland Park. Prepared for: Alberta Natural Heritage Information Centre, Parks and Protected Areas Division, Alberta Community Development: 24 pp. (in English). [For a full paper see: <http://www.cd.gov.ab.ca/preserving/parks/ahnic/docs/CarbouOdeRep.final.pdf>] Address: not stated
- 5412.** Norma-Rashid, Y. (2003): Some biological aspects and an unique habitat choice of damselfly *Indocnemis orang* Foerster (Odonata: Platycnemididae) from Malaysia. *Entomologia Sinica* 2003 (2): ["The hemimetabolous preliminary studies on the life cycle of *Indocnemis orang* is here reported for the first time, being completed in 6 instars for a minimum duration of 69 days. It can be classified as a stenotopic species being sensitive to biotope requirements but having tolerance towards fluctuating water qualities during its developmental process. The need for caution in the interpretation of bioindicator species for habitat assessment and biomonitoring is here both indicated and discussed." (Author)] Address: not stated
- 5413.** Prokop, J.; Fleck, G.; Nel, A. (2003): New dragonflies from the Lower Miocene (Ottunagian/Karpatian) of the Cypris Shale in western Bohemia (Odonata: Libellulidae). *Neues Jahrbuch für Geologie und Paläontologie - Monatshefte* 2003 (9): 561-576. [New libellulid dragonflies described from the Cypris Shale (Lower Miocene) of the Cheb and Sokolov basins in western Bohemia (Czech Republic), are i.e. *Prorhynchonema bubiki* n. g. et n. sp. (possibly *Rhythymistinae*) and a further new species *Onychothemis rihai* n. sp. (possibly *Onychothemistinae*.)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr
- 5414.** Reuber A. Brandão, R.A.; Garda, A.; Braz, V.; Fonseca, B. (2003): Observations on the ecology of *Pseudis bolbodactyla* (Anura, Pseudidae) in central Brazil. *Phyllomedusa* 2(1): 3-8. (in English). ["Data on diet, activity, habitat use, and anti-predator behavior are presented for a population of *Pseudis bolbodactyla* in central Brazil. The most common diet items were diurnal plant-associated insects. *Pseudis bolbodactyla* shows both diurnal and nocturnal activity and uses mainly areas with aquatic vegetation (submerged and emergent). Individuals detect predators visually and through vibrations in the water." (Authors) The discussion give information on Odonata as diet of this reptile species.] Address: Brandão, R.A., Coordenação de Assuntos Fundiários (DICRI), Diretoria de Ecosistemas (DIREC), Instituto Brasileiro do Meio Ambiente (IBAMA), Avenida L4 Norte, 70 910-900, Brasília, DF, Brazil. E-mail: reuberbrandao@yahoo.com.br.
- 5415.** Sanzone, D.M.; Meyer, J.L.; Marti, E.; Gardiner, E.P.; Tank, J.L.; Grimm, N.B. (2003): Carbon and nitrogen transfer from a desert stream to riparian predators. *Oecologia* 134: 238-250. (in English). ["Adult aquatic insects emerging from streams may be a significant source of energy for terrestrial predators inhabiting riparian zones. In this study, we use natural abundance $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values and an isotopic $\delta^{15}\text{N}$ tracer addition to quantify the flow of carbon and nitrogen from aquatic to terrestrial food webs via emerging aquatic insects. We continuously dripped labeled $\delta^{15}\text{N}\text{-NH}_4$ for 6 weeks into Sycamore Creek, a Sonoran desert stream in the Tonto National Forest (central Arizona) and traced the flow of tracer $\delta^{15}\text{N}$ from the stream into spiders living in the riparian zone. After correcting for natural abundance $\delta^{15}\text{N}$, we used isotopic mixing models to calculate the proportion of $\delta^{15}\text{N}$ from emerging aquatic insects incorporated into spider biomass. Natural abundance $\delta^{13}\text{C}$ values indicate that orbweb weaving spiders inhabiting riparian vegetation along the stream channel obtain almost 100% of their carbon from in-stream sources, whereas ground-dwelling hunting spiders obtain on average 68% of their carbon from in-stream sources. During the 6-week period of the $\delta^{15}\text{N}$ tracer addition, orb-web weaving spiders obtained on average 39% of their nitrogen from emerging aquatic insects, whereas spider species hunting on the ground obtained on average 25% of their nitrogen from emerging aquatic insects. To determine if stream subsidies might be influencing the spatial distribution of terrestrial predators, we measured the biomass, abundance and diversity of spiders along a gradient from the active stream channel to a distance of 50 m into the upland using pitfall traps and timed sweep net samples. Spider abundance, biomass and richness were highest within the active stream channel but decreased more than three-fold 25 m from the wetted stream margin. Changes in structural complexity of vegetation, ground cover or terrestrial prey abundance could not account for patterns in spider distributions, however nutrient and energy subsidies from the stream could explain elevated spider numbers and richness within the active stream channel and riparian zone of Sycamore Creek." (Authors) Figure 3 includes Zygoptera and Anisoptera.] Address: D. M. Sanzone, D.M., The Ecosystems Center, Marine Biological Lab, Woods Hole, MA 02543 USA. E-mail: dsanzone@mbl.edu
- 5416.** Shoemaker, P.; O'Carroll, D. (2003): Biological and silicon modeling of moving target detection in in-

sects. 20040050646 Tanner Research, Inc., Pasadena, CA, F49620-01-C-0030 Report No.(s): AD-A420888; AFRL-SR-AR-TR-04-0147; No Copyright; Avail: CASI; A04, Hardcopy <http://www.sti.nasa.gov/Pubs/star/star-0408.pdf>: 55 pp. (in English). ["In this project, we studied the physiology of a class of visual neurons that we have labeled small target, movement detectors (STMDs), which respond selectively to small moving visual targets. In-vivo intracellular recordings were made in several model species (the hoverfly *Eristalis tenax* and the dragonflies *Hemicordulia tau* and *Aeshna multicolor*), while subject to moving visual displays. We found some STMD neurons are capable of responding selectively to small moving targets against moving cluttered backgrounds. We characterized the receptive field properties of a class of small-field STMDs that we labeled elementary small target movement detectors' (ESTMDs), which may be an early stage in a hierarchy of STMD processing. Models were developed for aspects of the processing performed by STMD neurons, and tested in simulations. In 59 particular, a model for the ESTMD was developed and implemented in analog VLSI silicon." (Authors)] Address: to purchase from: <http://www.stormingmedia.us/88/8880/A888024.html>

5417. Sirot, L.K. (2003): The evolution of insect mating structures through sexual selection. *Florida Entomologist* 86(2): 124-133. (in English). ["Mating structures are of interest to a wide range of biologists because, in many taxa, mating structures are incredibly diverse and range widely in elaboration even between closely related species. As a result of this diversity, mating structures have been useful in species identification. Historically, the evolution of diverse mating structures has been attributed to post-zygotic selection for pre-zygotic isolation to avoid production of hybrid offspring. More recently, sexual selection has been proposed as an alternative explanation for the rapid diversification of mating structures. Mating structures could diversify between populations through sexual selection if sexual selection acted differently on mating structures in different populations. Eberhard (1985) wrote a comprehensive book explaining how sexual selection could result in the diversification of mating structures and providing examples to support the hypothesis, but none of the examples were experimental tests of the hypothesis. Since 1985, a few studies have experimentally tested this hypothesis. However, there have been no empirical studies that connect intraspecific selection with interspecific diversification. In this paper, I review the reproductive isolation and sexual selection hypotheses and two recent experimental tests of the sexual selection hypothesis. Then, I provide a description of a system that may allow one to establish a connection between sexual selection on mating structures within a species and diversification of mating structures between species." (Author) *Calopteryx haemorrhoidalis* was selected as example to test the hypothesis.] Address: Sirot, Laura, Department of Zoology, University of Florida, 223 Bartram Hall, Gainesville, FL 32611, USA

5418. Stroo, A. (2003): Het ruggengraatloze soortenbeleid. *Nieuwsbrief European Invertebrate Survey - Nederland* 36: 8-14. (in Dutch). [Critical comment on species conservation action plans politics in The Netherlands with special reference to the regulations of the European Fauna-Flora-Habitat directive. The paper includes a list of rare / red listed Odonata in The Netherlands] Address: not stated

5419. Theischinger, G. (2003): A new species of *Nannophya* Rambur from Australia (Odonata: Libellulidae). *Linzer Biologische Beiträge* 35: 661-666. (in English). ["*Nannophya paulsoni* sp. n. (male holotype: Yirrkala Mission, Arnhem Land, Northern Territory, Australia) is described after material from the type locality and from Cape York Peninsula, Queensland. The species is illustrated and compared with the described species of *Nannophya* RAMBUR."] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

5420. Theischinger, G. (2003): The larva of *Choristhemis olivei* (Tillyard) (Odonata: Synthemistidae). *Linzer Biologische Beiträge* 35: 657-660. (in English). ["The supposed larva of *C. olivei* is described from north-eastern Queensland, Australia, and compared with other Australian species of Synthemistidae."] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

5421. Wykle, K. (2003): Beautiful Dancers: West Virginia's Dragonflies. *West Virginia Wildlife Magazine Summer 2003*: (in English). [Verbatim: "Beautiful Dancers: West Virginia's Dragonflies. By Jennifer Wykle: Sometimes you don't even realize they're around. A buzz by your head or a mysterious rustle of grass is the only evidence they may give of their presence. Until one day, you're on the river fishing and one of these interesting creatures lands right on your canoe. Then there's no mistake—it's a dragonfly! Dragonflies and damselflies belong to the order of insects called Odonata. Representatives from five families of dragonflies and three families of damselflies live in West Virginia. The adults have two pairs of wings and are surprisingly maneuverable when airborne. If you have ever tried to catch one you wonder how they always seem to vanish into thin air! Of the approximately 435 species in North America, 144 of these have been documented in West Virginia. As we survey different areas and cover more ground, additional species will be added to the state list. Dragonflies and damselflies are surprisingly easy to tell apart. When perched, dragonflies hold their wings out flat to the side while most damselflies fold their wings above their body. Generally, the large eyes of the dragonflies will touch each other while damselfly eyes are smaller and spread much further apart. Dragonflies are generally larger and much stronger fliers than damselflies and can be found considerable distances from water. Damselfly flight can be very erratic and they are almost always found over water or perched on overhanging vegetation. To make discussions easier, both groups are often lumped together and called dragonflies or odonates. Dragonflies have been around a long time - about 300 million years. Fossil records reveal that some dragonflies had wingspans of nearly three feet! The dragonflies that existed with the dinosaurs 180 million years ago are virtually the same in structure as dragonflies that fly today. Like most insects, dragonflies have three life stages: the egg, larva and adult. Eggs are deposited in or around water and the larvae are fully aquatic, equipped with gills. Larvae, depending on size and food availability, prey on other insect larvae, small fish and salamanders. Depending on the species and environmental conditions, time of transformation can vary greatly. Some species may live as larvae for only a month while others may spend eight years in the water. Adult dragonflies can live from one to nine months, depending on the species. Adults are

voracious predators taking insect prey while on the wing. Adults feed on a variety of flying insects such as mosquitoes, gnats and even other dragonflies. Like most groups of animals in the state, some dragonflies are extremely common while others are rare and hard to find even in their ideal habitats. They are rare in West Virginia either due to lack of appropriate habitat (the state lies on the edge of their range) or they are rare throughout their range. One such species, the Elusive Clubtail, fits the latter description. It had been considered a historically occurring species until it was spotted last June on one of the Ohio River islands. This species is extremely rare in some areas such as Pennsylvania and Massachusetts where it is considered lost from the state's fauna. Another surprise species was discovered this past summer. A tiny bright red damselfly was found at Green Bottom Wildlife Management Area in Cabell County hovering over duckweed. Appropriately called the Duckweed Firetail, the nearest known population occurs in central Kentucky. The Spadderdock Darner is another rare species making its home in West Virginia. This one is hard to miss with its bright blue eyes and blue markings up and down its abdomen. It likes fishless ponds and wetland areas and has only been found in two areas of the state. While a number of Odonates are hard to spot, there are many common species that can be observed on a nice sunny afternoon on the river or around your backyard pond. The Common Whitetail, with its black banded wings and white abdomen, patrols nearly all still or slow-moving bodies of water in the state. Along with this species you can find the Common Green Darner, a large dragonfly with a green thorax and blue-striped abdomen. Another common species and one of the most striking, the Ebony Jewelwing damselfly, has solid black wings with an iridescent green body. As it flutters along a variety of stream habitats, its appearance is unmistakable. Because odonates are an indicator of good water quality, they provide a measure of overall stream and wetland health. Unfortunately, habitat destruction and decreased water quality are ever growing threats here in West Virginia and around the globe. We need to preserve our aquatic areas because they are necessary for the survival of not only dragonflies, but for a wide variety of plants and animals. Dragonflies and damselflies are just one of the many unique groups of animals living here in the Mountain State. Go out and enjoy their brilliant colors and interesting flight patterns. They are a part of our state's rich biodiversity and are one of many groups that help to make our outdoor experience special. Jennifer Wykle is the DNR's state Zoologist stationed in Elkins." Available at: <http://www.wvdnr.gov/Wildlife/Magazine/Archive/03Summer/BeautifulDancers.shtml>] Address: not stated

5422. Yamamoto, M.; Isogai, K.; Yamasaki, M. (2003): Measurement of unsteady aerodynamic forces acting on a tandem airfoil configuration oscillating in hover mode. 6 pp. (in English). [Available at: <http://svl-www.aero.kyushu-u.ac.jp/en/paper/workshop2003.pdf>] Address: Department of Aeronautics and Astronautics, Kyushu University, Fukuoka, Japan

5423. Zhou, W. (2003): *Rhipidolestes fascia* spec. nov. and *Rhipidolestes lii* spec. nov. two new dragonflies from Guizhou, China (Zygoptera: Megapodagrionidae). *Wuyi Journal of Science* 19: 95-98. (in English, with Chinese summary). [*R. fascia* spec. nov. (holotype male: Ghishui, Guizhou, 18-V-2000) and *R. lii* spec.

nov. (holotype male, Kishui, Guizhou, 8-VI-2000) are described and illustrated. The type specimens are deposited in the Zhejiang Museum of History, Hangzhou, China.] Address: Zhou Wenbao, Zhejiang Museum of Natural History, Jiaogonglu 71, Hangzhou 310012, China

2004

5424. Bacquet, P. (2004): Observations d'*Hemianax ephippiger* (Burmeister, 1839) dans la région de Montpellier (Département de l'Hérault) (Odonata, Anisoptera, Aeshnidae). *Martinia* 20(1): 45. (in French). [21-II-2004, Palavas-les-Flots, Hérault, France, sighting of two *A. ephippiger* cf.; 3-III-2004, Montpellier, Hérault, France, female *A. ephippiger*.] Address: Bacquet, P., 50, rue du Faubourg Boutonnet, Apt 207, F-34000 Montpellier, France

5425. Bairl, E.; Lohr, M. (2004): Nouvelles observations de *Trithemis annulata* (Palisot de Beauvois, 1805) dans le département de l'Hérault (Odonata, Anisoptera, Libellulidae). *Martinia* 20(1): 15. (in French). [Valley of the river Orb near Sévignac, Département Hérault, France, June 1999.] Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-luh.de

5426. Baker, R.L.; Leung, B.; Forbes, M.R. (2004): Diet of nymphs affects normal wing development in *Ischnura verticalis* (Odonata: Coenagrionidae). *Canadian Entomologist* 136: 749-751. (in English). ["In laboratory experiments it was shown that more than 50% of adults emerging from field-collected larvae that were since penultimate stage fed terrestrial enchytraeid worms (Haplotaxida: Enchytraeidae) had strongly curled, twisted, or only partly extended wings, and were unable to fly. The controls fed *Daphnia* were all normal. It is suggested that the diet of nothing but worms provides an insufficient amount of a particular nutrient or precursor (possibly chitin), or that it provides too much of another."] Address: Baker, R.L., Dept Zoo, Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6. Canada. E-mail: rbaker@credit.erin.utoronto.ca

5427. Bernier, C.; Guilloux, G. (2004): Évaluation du peuplement odonatologique d'un canal d'irrigation dans le nord des Bouches-du-Rhône. *Martinia* 20(1): 29-42. (in French, with English summary). [In 2003, the emergence of Odonata along the Alpines canal, Eyragues, France was surveyed. Between the 14th May and 28th August, on a length of 325 meters of the canal, 10 samples resulted in 2410 exuviae (= 3,7/m²) belonging to 5 different species (including *Calopteryx* sp. and *Platycnemis* sp.). The data referring *Gomphus similimus*, *Onychogomphus uncatus*, and *Boyeria irene* are presented by phenology and abundance. Preferred emergence habitats are described.] Address: Bernier, C., 11 rue Porteyguière, F-13630 Eyragues, France. E-mail: christophe.bernier@euziere.org

5428. Buden, D.W.; Paulson, D.R. (2004): The Odonata of Chuuk, eastern Caroline Islands, Micronesia. *Opusc. zool. flumin.* 217: 1-11. (in English). ["9 species of adult Odonata were collected from among 5 volcanic

lagoon islands and 3 atolls in Chuuk, Micronesia, during Dec. 2002-July 2003. *Anax guttatus*, *Macrodiplax cora*, and *Tramea transmarina* are reported from Chuuk for the first time, and the first odonate records are presented for Namonuito, Houk, and Satawan atolls. *Teinobasis carolinensis* is the only species endemic to these islands, but *Agrionoptera sanguinolenta*, resident also in Pohnpei, is represented in Chuuk by the endemic *A. s. pusilla*. (Authors)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

5429. Carchini, G.; Solimini, A.; Ruggiero, A. (2004): Habitat characteristics and Odonata diversity in Central Italy ponds. 1st European Pond Workshop, Geneva 28-29 October 2004: 10- (in English). [Verbatim: In Mediterranean Italy natural lakes are not abundant because of the high permeability of the rocks (mainly limestone) and to the drainage of wetlands made in the last two centuries for agricultural purposes. Therefore ponds represent an important habitat type for the conservation of the odonate fauna. Ponds have often been preserved, and in some cases newly created, for watering of game or herds, particularly in mountain areas. However, this use may conflict with the conservation of a diversified odonate fauna. The aim of this study is to report on habitat requirements of Odonata of mountain ponds of Central Italy and to compare these results with those of a similar work on flatland ponds. 31 ponds, ranging from 1014 to 2004 m a.s.l., were qualitatively sampled for odonate larvae twice during 1998 summer, and a total of 14 species were collected, ranging from 0 to six species for pond. Several physical, chemical and biotic habitat variables were measured for each pond. A multiple regression analysis showed that the species number was affected positively by the amount of pond hydrophytae coverage and negatively by the amount of NH₄ concentration. The remaining variables did not enter the regression model, but some showed significant correlations with the selected ones. Particularly, hydrophytae coverage was negatively correlated with Chl-a concentration and positively with helophytae and frog presence; ammonium concentration was positively correlated with altitude, Chl-a, frog presence and the origin of the pond (higher NH₄ values in artificial ponds). A Canonical Correspondence Analysis gave a more detailed insight into the relations between Odonata (assessed as species presence/absence) and habitat variables. The lack of Odonata in several ponds was related to increasing values of NH₄, Chl-a and altitude. Among the remaining habitat variables two main groups were identified: the first included helophytae, newt and hydrophytae and corresponded to seven odonate species, the outermost with preference for astatic ponds: *Lestes dryas* and *Sympetrum flaveolum*. The second included depth, frog and fish, and corresponded to *Cercion lindeni*, *Ischnura elegans* and *Enallagma cyathigerum*, all *Coenagrionidae* of permanent water. Combining these results with others obtained by studying a set of ponds in a flatland game reserve, we noted: 1) the mountain ponds showed less odonates species, 2) the abundance of vegetation, inside and around the pond, increased the number of species while the eutrophication decreased it, 3) the presence of fish, newt or frog did not reduce the odonate diversity strongly, 4) the intensive use of ponds for game or herd watering could damage vegetation and shift the equilibrium of the pond toward a condition of high turbidity (= high Chl-a), causing a reduction of the odonate diversity.] Address:

Carchini, G., University of Tor Vergata, Department of Biology, via della Ricerca Scientifica, 00133, Roma, Italy. E-mail: carchini@uniroma2.it

5430. Clausnitzer, V. (2004): Subproject E07: Diversity and species composition of Odonata as indicators of biotope quality of East African rain forests and their replacement communities. BIOTA East Africa. Biodiversity in conversion The influence of fragmentation and disturbance on the biodiversity of East African highland rain forests. Final Report Phase I (2001-2004): 87-100. (in English). [<http://biota-africa.de/Library/paperseast/finalreport.pdf>] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de

5431. Collectif (2004): In memoriam Lucien Kerautret, 14 octobre 1935 - 9 février 2004. *Martinia* 20(1): 3-6. (in French). [Obituary with some personal notes of different odonatologists and a bibliography of the odonatalogical work of L. Kerautret.] Address: c/o Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5432. Cornall, T.D.; Egan, G.K. (2004): Measuring horizon angle from video on a small unmanned air vehicle. 2nd International Conference on Autonomous Robots and Agents. December 13-15, 2004 Palmerston North, New Zealand: 339-344. (in English). ["This article details the work of the authors towards the goal of using video processing for autonomous flight control of small unmanned aircraft (UAVs). The work reports on procedures that were designed by the authors to determine the roll of an aircraft from video imagery of the horizon, using video and computing equipment small and light enough to be carried by the aircraft. Theory and results of tests using simulated horizon views are given and discussed. Preliminary results from real flights are also given and discussed." (Authors) Reference to Odonata is made.] Address: Cornall, T.D., Dept of Electrical and Computer Systems Engineering, Monash University, Melbourne, Australia. E-mail: terry.cornall@eng.monash.edu.au

5433. Crowhurst, R. (2004): 10. Optimal foraging in libellulid naiads. 2004 Entomological Society of Ontario Annual Meeting, Brock University: 12. (in English). [Verbatim: Optimal foraging theory predicts that an organism will attempt to maximize its energy intake by choosing prey that offer the highest caloric value per unit of handling time (time to catch and consume). I placed hungry dragonfly larvae (Odonata: Anisoptera: Libellulidae) individually in an environment with several types of naturally co-occurring prey. I observed which were the first three prey consumed, also noting the number of pursuits, strikes, as well as those prey that were within striking distance but were ignored by the naiads. Dragonfly larvae ate more isopods and amphipods relative to daphnia, clams and chironomids. Average dry mass of individual isopods and amphipods were the largest of the five prey items offered. Therefore, dragonfly nymphs appear to select larger prey items. However, isopods and amphipods also took the greatest length of time to catch and consume, and thus handling time does not appear to determine prey choice. However, prey choice did not follow a fixed pattern. Rather, prey choice varied between individual dragonflies and also within individuals from one replicate to the next. Keywords: Odonata, optimal foraging theory,

predation] Address: Crowhurst, Rachel, Brock University, 500 Glenridge Ave., St. Catharines, ON, Canada

5434. d'Aguilar, J. (2004): Les descriptions originales des odonates d'Europe, 11. Burmeister, Hermann Carl Conrad (1807-1892). *Martinia* 20(3): 150-158. (in French). [Brief information on Burmeister and reproduction of some pages of the "Handbuch der Entomologie" with odonatalogical content.] Address: d'Aguilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet, France

5435. de Oliveira Roque, F.; Trivinho-Strixino, S.; Jancso, M.; Fragoso, E.N. (2004): Records of Chironomidae larvae living on other aquatic animals in Brazil. *Biota Neotropica*. 4 (2): 1-9. (in English, with Portuguese summary). [Commensalism of Chironomidae including three cases on *Argia* sp. are compiled] Address: Trivinho-Strixino, Susana, Universidade Federal de São Carlos, Departamento de Hidrobiologia, Laboratório de Entomologia aquática, C.P. 676, CEP 13565-905, São Carlos, SP, Brasil

5436. Deschanel, M. (2004): Observations d'Odonates dans la montagne ardéchoise. *Martinia* 20(4): 196. (in French). [France, brief list of taxa recorded on altitudes between 1200 and 1500 m a.s.l.] Address: Deschanel, M., Banne, F-07510 Mazan-l'Abbaye, France.

5437. Dijkstra, K.-D.; Hämäläinen, M.; Kalkman, V.J. (2004): PHAON and ECHO: communicating about Odonata of the Old World tropics. *Agrion* 8(2): 22-28. (in English). [incl. long list of records from Peninsular Malaysia] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nm.nl

5438. Dommanget, J.-L. (2004): Analyse d'ouvrage. *Martinia* 20(3): 159-160. (in French). [Review of the second edition of Askews book "The Dragonflies of Europe".] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5439. Dommanget, J.-L. (2004): *Calopteryx haemorrhoidalis* (Vander Linden, 1825) dans le département de l'Aveyron (Odonata, Zygoptera, Calopterygidae). *Martinia* 20(4): 204. (in French). [13-VI-2003, Saint-Romede-Tarn, France] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5440. Dommanget, J.-L.; Brusseau, G. (2004): Découverte en Corse d'un individu mort de *Cordulegaster boltonii* (Donovan, 1807) (Odonata, Anisoptera, Cordulegasteridae). *Martinia* 20(4): 179. (in French). [Ile of Corsica, France; the record of *C. boltonii* (10-VIII-1995, Sainte Lucie de Porto Vecchio) is a new addition to the Corsian odonate Fauna.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5441. Dommanget, J.-L. (2004): In memoriam Marc Bernard. *Martinia* 20(3): 120. (in French). [Obituary for one of the founding members of the Société française d'odonatologie.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5442. Dommanget, J.-L. (2004): Reconnaissance d'*Anax junius* (Drury, 1773) et note sur sa récente découverte en France (Odonata, Anisoptera, Aeshnidae). *Martinia* 20(1): 17-20, 52. (in French, with English summary). [Identification features for *A. junius* and *A. imperator* are compared in a table and illustrated.]

Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5443. Dommanget, J.-L. (2004): Rubrique bibliographique. *Martinia* 20(4): 206-210. (in French). [References from 2001 - 2004 referring to the Odonata in France are compiled.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5444. Faton, J.-M.; Deliry, C. (2004): Surveillance de la population de *Coenagrion mercuriale* (Charpentier, 1840) dans la Réserve naturelle nationale des Ramiers du Val de Drôme (Odonata, Zygoptera, Coenagrionidae). *Martinia* 20(4): 163-179. (in French, with English summary). [Between 1995 and 2003 a population of *C. mercuriale* was monitored in southeastern France. The data are presented with reference to phenology and the importance of selected stretches / habitats for the survival / persistence of the regional metapopulation.] Address: Deliry, C., 20, rue de la Manine, F-38510 Morestel, France. E-mail: president@sympetrum.org

5445. Fleck, G.; de Marmels, J.; Grand, D. (2004): La larve de *Tholymis citrina* Hagen, 1867 (Odonata, Anisoptera, Libellulidae). *Bull. Soc. ent. Fr.* 109(5): 455-457. (in French, with English summary). ["The last instar larva is described and illustrated. The differences with *T. tillarga* are listed. A generic diagnosis is proposed." (Authors)] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

5446. Grand, D. (2004): *Anax tristis* Hagen, 1876, le géant de Mayotte. *Martinia* 20(2): 77-82. (in French, with English summary). [Mayotte, Comoros Islands, was visited between 20 and 22-I-2003; new additions to the odonate fauna are: *Philonomon luminans*, *Anax tristis*, *Agriocnemis exilis*, and *Ischnura senegalensis*.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

5447. Grand, D. (2004): *Calopteryx h. haemorrhoidalis* (Vander Linden, 1825), une espèce accidentelle du département du Doubs (Odonata, Zygoptera, Calopterygidae). *Martinia* 20(4): 205. (in French). [17-VII-2004, Chapelle-des-Bois, France. The brief note also contains information on two addition habitats with e.g. *Aeshna subarctica elisabethae* and *Leucorrhinia albifrons*.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

5448. Grand, D. (2004): *Calopteryx haemorrhoidalis occasi* Capra, 1945 Le grand retour lyonnais (Odonata, Zygoptera, Calopterygidae). *Martinia* 20(1): 43-45. (in French, with English summary). ["After more than 150 years, *C. haemorrhoidalis occasi* has reappeared in the east of Lyon region (France). A population counting tens of individuals was discovered in August 2003 on the Rizan stream, north of Meyzieu city." (Author)] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

5449. Grand, D. (2004): Compte rendu odonatalogique d'un voyage à l'île de la Réunion. *Martinia* 20(2): 67-75. (in French, with English summary). [January 2003, record of 17 Odonata species at 18 spots on the island of Réunion. Brief comments are given referring to biology and distribution. More detailed observations focus on the egg-laying and emergence of *Coenagrion reuniensis*, on the larval habitats, mating and ovi-

position of *Pantala flavescens* and, finally, on the territorial behaviour and eggs-laying of *Tholymis tillarga*. (Author)] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

5450. Grand, D. (2004): *Neurothemis stigmatizans* (Fabricius, 1775) un nouveau libellulidé néocalédonien. *Martinia* 20(3): 140. (in French). [New Caledonia, Jan. 1984, deposited in the collection of the Muséum d'Histoire naturelle de Lyon, France.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

5451. Grand, D. (2004): Quelques libellules de la Principauté d'Andorre. *Martinia* 20(3): 131-132. (in French, with English summary). ["While visiting Andorra in summer 2003, the author recorded 10 species at altitudes between 1780 m and 2380 m a.s.l. *Cordulegaster b. boltoni* was seen on a stream at about an altitude of 1000 m. Breeding of *Ischnura pumilio*, *Libellula depressa* and *Aeshna cyanea* is confirmed at 1780 m, while the two latter species were also observed at 2380 m.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

5452. Guerbaa, K.; Olive, M. (2004): Les odonates de la Réserve naturelle de la torbière des Duges: résultats de l'étude menée en 2003 (dépt de la Haute-Vienne). *Martinia* 20(3): 133-139. (in French, with English summary). ["From May to August 2003, an odonatological survey of Duges peat bog natural reserve was realized, with two main objectives : a global inventory of species and studies on population sizes of *Somatochlora arctica* (Zetterstedt, 1840)."] (Authors)] Address: Guerbaa, K., Société Limousine d'Odonatologie, 11, rue Jauvion, F-87000 Limoges, France

5453. Gurliat, P. (2004): Contribution à la connaissance des odonates de l'Erdre et de ses affluents. *Martinia* 20(3): 125-130. (in French, with English summary). [The odonate fauna of the river Erdre was surveyed along a stretch of 85 km in the Départements Maine-et-Loire and Loire-atlantique, France. At 57 localities, a total of 48 species was found.] Address: Gurliat, P., 11 rue André Clément, F-44100 Nantes, France

5454. Horth, L. (2004): Predation and the persistence of melanic male mosquitofish (*Gambusia holbrooki*). *Journal of evolutionary biology* 17: 672-679. (in English). ["The empirical reasons for the persistent rarity of a genotype are typically complex and tedious to identify, particularly in nature. Yet rare morphs occur in a substantial fraction of phenotypic polymorphisms. A colour polymorphism has persisted for decades in the eastern mosquitofish, yet why this is so remains obscure. Here, I report the results of (1) intensive sampling at 45 natural sites to obtain the frequency distribution of the melanic (black) mosquitofish morph in Florida, (2) predation trials, conducted independently in mesocosms, with three different predatory species and (3) two mark-recapture studies, conducted in nature. This work (1) documents the rarity of melanic mosquitofish in nature, (2) demonstrates that melanic males experience a selective advantage over silver males in the presence of predators, (3) indicates no difference in the colour morphs survival at a natural site essentially devoid of these predators, although suggesting a higher rate of recapture for melanic males at a site rife with predators. Overall, selective predation appears to contribute to the persistence of the melanic morph, despite its rarity in

nature." (Author) An libellulid species (not determined) was used to conduct the experiments. Dragonfly larvae consumed highly significantly more silver than black males.] Address: Horth, Lisa, Section of Evolution and Ecology, University of California Davis, 1 Shields Ave., Davis, CA 95616, USA. E-mail: lahorth@ucdavis.edu

5455. Ilbert, N.; Menegaux, J. (2004): Observations d'Odonates en Guadeloupe (Petites Antilles françaises). *Martinia* 20(4): 180. (in French). [In Dec. 2001, 11 odonate species resp. taxa were recorded at 8 localities on Guadeloupe, Lesser Antilles, France.] Address: Ilbert, N., 14 rue des Bleuets, F-40100 Dax, France. E-mail: nilbert@nomade.fr

5456. Isogai, K.; Fujishiro, S.; Saitoh, T.; Yamamoto, M.; Yamsaki, M.; Matsubara, M. (2004): Unsteady three-dimensional viscous flow simulation of a dragonfly hovering. *AIAA Journal* 42(10): 2053-2059. ["In order to clarify the basic aerodynamic mechanisms of the hovering flight of the dragonfly, numerical simulations of the unsteady viscous flow around a tandem wing configuration have been performed using a three-dimensional Navier-Stokes code. The flow simulations are conducted for *Anax parthenope julius* as a typical dragonfly model. The total lifting force and specific necessary power predicted by the present simulation show close agreement with those observed experimentally for the present dragonfly model. The present code is further validated by comparing the results of the simulation with the experimental values of total lift and stroke-plane angle obtained using a robot." (Authors)] Address: Isogai, K., Kyushu University, Fukuoka 812-8581, Japan

5457. Jourdain, B. (2004): Découverte de *Macromia splendens* (Pictet, 1843) en Gironde (Odonata, Anisoptera, Macromiidae). *Martinia* 20(4): 194-196. (in French, with English summary). [18-VI-2004, river Dronne, Chamadelle, Gironde, France] Address: Jourdain, B., Les Vergers, 8, rue du Docteur Roux, F-33320 Esyennes, France. E-mail: jourdainbr@aol.com

5458. Jourde, P. (2004): Densités remarquables d'Odonates en val de Seugne (Département de Charente-Maritime). *Martinia* 20(1): 7-12. (in French, with English summary). [Founding on a sample of exuviae, population densities of *Sympetrum sanguineum* / meridionale, *Aeshna mixta*, and *Libellula fulva* were estimated. A total of app. 1.8 Million specimens for the locality (app. 370 ha) was calculated] Address: Jourde, P., LPO, La Corderie Royale, BP 263, F-17305 Rochefort Cedex, France

5459. Kauhala, K.; Saeki, M. (2004): 5.4 Raccoon dog *Nyctereutes procyonoides* (Gray, 1834). Least concern (2004). In: Sillero-Zubiri, C., M. Hoffmann & D.W. Macdonald (Eds.): Status Survey and Conservation Action Plan Canids: Foxes, Wolves, Jackals and Dogs. IUCN/SSC Canid Specialist Group: 136-142. (in English). [The diet of raccoon dogs occasionally also includes Odonata.] Address: <http://www.canids.org/species/Raccoondog.pdf>

5460. Kefford, B.J.; Papas, P.J.; Metzeling, L.; Nuggeoda, D. (2004): Do laboratory salinity tolerances of freshwater animals correspond with their field salinity?. *Environmental Pollution* 129(3): 355-362. (in English). ["The degree to which laboratory derived measures of salinity tolerance reflect the field distributions of fresh-

water biota is uncertain. In this paper we compare laboratory-derived acute salinity tolerance (LC50 values) of freshwater macroinvertebrates (range 5.5–76 $\mu\text{S}/\text{cm}$) and fish (range 2.7–82 $\mu\text{S}/\text{cm}$) from southeastern Australia with the salinity from which they have been collected in the field. Only 4% of the macroinvertebrates were collected at salinity levels substantially higher than their 72-h LC50 obtained from directly transferring animals from low salinity water to the water they were tested (direct transfer LC50). This LC50 value was correlated with the maximum salinity at which a species had been collected. For common macroinvertebrates, the maximum field salinity was approximated by the direct transfer 72-h LC50. For adult freshwater fish, 21% of species were collected at salinities substantially greater than their acute direct transfer LC50 and there was a weak relationship between these two variables. Although there was a weak correlation between the direct transfer LC50 of early life stages of freshwater fish and the maximum field salinity, 58% of the field distribution were in higher than their LC50 values. In contrast, LC50 determined from experiments that acclimated adult fish to higher salinity (slow acclimation) provided a better indication of the field distribution: with only one fish species (7%) being in conflict with their maximum field salinity and a strong positive relationship between these variables. This study shows that laboratory measures of acute salinity tolerance can reflect the maximum salinity that macroinvertebrate and fish species inhabit and are consistent with some anecdotal observations from other studies." (Authors) Odonata accounted 12% of the total of 49 macroinvertebrate taxa available with laboratory LC50 and MFD. "Capsule": Acute laboratory salinity tolerances relate to maximum salinity where organisms occur in nature.] Address: Kefford, B.J., Department of Biotechnology and Environmental Biology, RMIT University, PO Box 71, Bundoora, 3083, Victoria, Australia. E-mail: ben.kefford@rmit.edu.au

5461. Kjer, K.M. (2004): Aligned 18S and insect phylogeny. *Syst. Biol.* 53(3): 506-514. (in English). ["The nuclear small subunit rRNA (18S) has played a dominant role in the estimation of relationships among insect orders from molecular data. In previous studies, 18S sequences have been aligned by unadjusted automated approaches (computer alignments that are not manually readjusted), most recently with direct optimization (simultaneous alignment and tree building using a program called "POY"). Parsimony has been the principal optimality criterion. Given the problems associated with the alignment of rRNA, and the recent availability of the doublet model for the analysis of covarying sites using Bayesian MCMC analysis, a different approach is called for in the analysis of these data. In this paper, nucleotide sequence data from the 18S small subunit rRNA gene of insects are aligned manually with reference to secondary structure, and analyzed under Bayesian phylogenetic methods with both GTR+I+G and doublet models in MrBayes. A credible phylogeny of Insecta is recovered that is independent of the morphological data and (unlike many other analyses of 18S in insects) not contradictory to traditional ideas of insect ordinal relationships based on morphology. Hexapoda, including Collembola, are monophyletic. Paraneoptera are the sister taxon to a monophyletic Holometabola but weakly supported. Ephemeroptera are supported as the sister taxon of Neoptera, and this result is interpreted with respect to the evolution of direct sperm transfer and the evolution of flight. Many other relationships are

well-supported but several taxa remain problematic, e.g., there is virtually no support for relationships among orthopteroïd orders. A website is made available that provides aligned 18S data in formats that include structural symbols and Nexus formats." (Author) The analysis also includes Odonata.] Address: Kjer, K.M., Department of Ecology Evolution and Natural Resources, 14 College Farm Road, Cook College, Rutgers University, New Brunswick, NJ 08901, USA. E-mail: kjer@aesop.rutgers.edu

5462. Knijf, G. de (2004): *Somatochlora arctica* (Zetterstedt, 1840) espèce nouvelle pour la Picardie (Odonata, Anisoptera, Corduliidae). *Martinia* 20(1): 21-23. (in French, with english summary). ["A female of *S. arctica* was captured in June 2003 in the "Marais de la Souche", an alkaline peat moor near the city of Laon (Aisne Département, North France). There is no proof of a local population but this should not be excluded, given the inaccessibility of the biggest part of the "Marais"." (Author) In addition, some remarkable species as *Leucorrhinia caudalis*, *L. pectoralis*, *Somatochlora flavomaculata*, *Libellula fulva*, *Anaciaeschna isocoela*, *Ceragrion tenellum*, and *Coenagrion pulchellum* were collected too] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

5463. Leroy, T. (2004): Les Odonates du département du Cantal: état des connaissances. *Martinia* 20(4): 181-193. (in French, with English summary). ["This article makes an assessment of 2752 observations realized from 1994 to 2003. For each of the 63 species (65 taxa) recorded, data such as the number of records, the number of localities, the frequency and the distribution are given. Comments are more detailed for about 40 species. The Cantal department appears to have rich and diverse Odonata populations, in relation to its geographical situation and its well conserved natural habitats." (Author) Address: Leroy, T., Le Bourg, F-63210 Heume-l'Eglise, France. E-mail: thierry-leroy@caramail.com

5464. Leroy, T.; Giraud, A. (2004): *Platycnemis latipes* Rambur, 1842 et *Gomphus graslinii* Rambur, 1842: deux nouvelles espèces pour la région Auvergne (Odonata, Zygoptera, Platycnemididae, Anisoptera, Gomphidae). *Martinia* 20(1): 25-28. (in French, with English summary). [France, records of both species from 2003 are documented and discussed.] Address: Leroy, T., Le Bourg, F-63210 Heume-l'Eglise, France. E-mail: thierry-leroy@caramail.com

5465. Leroy, T. (2004): Sur la présence de *Platycnemis acutipennis* (Sélys, 1841) en altitude dans le Massif Central. *Martinia* 20(3): 107-113. (in French, with English summary). [*P. acutipennis* prefers habitats (in most cases running waters or habitats in flood plains) in lower altitudes. A survey in the Massif Central, France found 30 localities situated higher than 600 m a.s.l.. Stagnant water bodies are preferred, but population density is low. The results of the study are compared with literature data.] Address: Leroy, T., Le Bourg, F-63210 Heume-l'Eglise, France. E-mail: thierry-leroy@caramail.com

5466. Libois, R.; Laudelout, A. (2004): Food niche segregation between the Malachite Kingfisher, *Alcedo cristata*, and the Pied Kingfisher, *Ceryle rudis*, at Lake Nokoué, Bénin. *Ostrich* 75(1&2): 32-38. (in English).

[Dragonflies belong to the diet of the Pied kingfisher.] Address: Libois, R., Unité de recherches zoogeographiques, Institut de Zoologie, Université de Liege, Quai Van Beneden 22, B-4020 Liege, Belgium. E-mail: Roland.Libois@ulg.ac.

5467. Lin, S.-C.; Chen, C.-S. (2004): Egg and larval developments of the Taiyal Darner *Aeshna petalura taiyal* Asahina (Odonata, Aeshnidae) at the Mt. Hohuan. *Endemic Species Research* 6(1): 29-38. (in Chinese, with English summary). ["*A. petalura taiyal* Asahina, 1938 is an endemic subspecies of dragonfly in Taiwan. It occurs widely in the mountain areas above 1,500m in elevation. Its larval habitat has been adversely affected by human activities, such as pond construction, water pollution, and fish releasing. This study was conducted between 1997-2000 to study egg and larval developments of the Taiyal darner in the Mt. Hohuan area. The results showed that the period of egg stage was about ten months. Eggs were laid at the end of summer, overwintered in a diapause condition, and hatched in the following spring. The larval voltinism showed univoltine or semivoltine at the two different sampling sites of the study area. The egg and larval stages were fairly long, and its habitat consisted of both aquatic and terrestrial environments, easily disturbed by human activities. For conservation of the Taiyal darner, it is recommended to protect whole lake and its adjacent environments." (Authors)] Address: Lin, S.-C., Endemic Species Research Institute, Chichi, Nantou, Taiwan

5468. Liu, Y.; Gao, X.-T.; Yuan, F.; Wang, C.; Guo, D.-S. (2004): Faunal analysis and distribution of dragonflies in Beijing area. *Journal of Beijing Normal University (Natural Science)* 40(3): 375-379. (in Chinese, with English summary). [China; between 2001 and 2003, a total of 50 odonate species was recorded.] Address: Liu, Y., Ministry of Education, Key Laboratory for Biodiversity and Engineering, Beijing Normal University, 100875, Beijing, China.

5469. Luglia, M.; Luglia, T. (2004): *Sympetrum fonscolombii* (Sélys, 1840) victime de *Gerris costae* Herrich-Schaeffer, 1853 dans un lac alpin (Odonata, Libellulidae; Hemiptera, Gerridae). *Martinia* 20(3): 141-144. (in French, with English summary). [17-VII-2003, Achard lake, Isère, France; a female *S. fonscolombii* was preyed by *Gerris costae*.] Address: Luglia, M., La Fontaine de Durefort, F-84390 Sault, France

5470. Machet, P. (2004): Liste actualisée des odonates de la Guyane française. *Martinia* 20(3): 145-149. (in French, with English summary). ["Following a study begun in 1985 with 96 recorded species, examination of thousands of specimens and detailed analysis of the bibliography, the author presents an up-dated list of French Guyana Odonata. This list counts 246 known species. Some taxa remain unidentified at the species level." (Author)] Address: Machet, P., L'être Delangle, F-61140 La Chapelle d'Andaine, France

5471. Machet, P.; Duquef, M. (2004): Un visiteur inattendu, et de taille! ... *Hemianax ephippiger* (Burmeister, 1839) capturé à la Guyane française. *Martinia* 20(3): 121-124. (in French, with English summary). [*A. ephippiger* "has been found in February 2003 in French Guiana. It is the first record of this cosmopolitan species in South America and for the whole American Continent. The note relates the adventure involved in capturing this Darner and briefly presents the originality of

this discovery." (Authors)] Address: Machet, P., L'être Delangle, F-61140 La Chapelle d'Andaine, France

5472. Makihara, H.; Kitajima, H.; Goto, H.; Kato, T.; Makino, S. (2004): An evaluation of predation impact of the introduced lizard *Anolis carolinensis* on the endemic insect fauna of the Ogasawara Islands based on insect collection records and feeding experiments, with special reference to longicorn beetles (Insecta: Coleoptera: Cerambycidae). *Bulletin of the Forestry and Forest Products Research Institute* 3(2) (No.391): 165-183. (in Japanese, with English summary). ["In the Ogasawara Islands, [...] the population of the invasive lizard *Anolis carolinensis* has been growing since it was artificially introduced in the 1960s. As the lizard is diurnal and preys upon various small animals, there is rising concern that it endangers the survival of endemic insect species. In order to estimate the impact of *A. carolinensis* on the insect fauna, observations were made on the feeding behavior of the lizard under field or captive conditions. Of the insects provided as food, relatively small species (e.g. beetles smaller than 2 cm in body length) were eaten by the caged lizard, while larger species escaped predation. In Hahajima Is., where the lizard proliferated in the 1990s, we compared the numbers of longicorn beetles collected during our research trips before (in 1983, 1985 and 1986) and after (in 1995, 1996, and 1997) the proliferation. None of the 11 nocturnal species surveyed showed a marked decline in the number of collected specimens in 1995 to 1997. In contrast, we collected no specimens of three out of five diurnal species in the same period. These results suggest that the invasive lizard is responsible for a recent, marked decline of the population of at least some diurnal small insects by intensively feeding on them." (Authors) The study includes also feeding experiments with dragonflies.] Address: Makihara, H., Dept of Global Forest Research, Forestry & Forest Products Research Institute (FFPRI), 1 Matsunosato, Tsukuba, Ibaraki 305-8687, Japan. E-mail: makihara@ffpri.affrc.go.jp

5473. Mantel, S.K.; Dudgeon, D (2004): Effects of *Macrobrachium hainanense* predation on benthic community functioning in tropical Asian streams. *Freshwater Biology* 49(10): 1306-1319. (in English). ["1. *Macrobrachium hainanense* is a large predatory palaemonid shrimp, present at high densities in pools of low-order forested streams in Hong Kong. The present study investigated the impacts of *M. hainanense* on benthic community structure and functions in pools of two streams: Tai Po Kau Forest Stream and Tai Shing Stream. 2. Repeated whole-pool experiments involving shrimp density manipulations (removal, control and addition) were conducted in both streams between October 2000 and April 2002, and included a wet (May to September) and two dry (October to April) seasons. The three objectives of the study were to determine the effects of *M. hainanense* predation on benthic macroinvertebrate (including Odonata) abundance and species richness, rates of leaf litter breakdown because of effects on detritivores, and periphyton standing stocks by way of an effect on herbivores. 3. Wet season results showed consistent reductions in benthos densities and species richness following heavy rainfall, irrespective of shrimp manipulation. These results suggested that spate-induced disturbances might override biotic effects and play a dominant role in structuring benthic communities in stream pools in Hong Kong. 4. No significant, reproducible effects on any of the response variables

measured in either stream were found during the dry season. Litter breakdown was reduced in the absence of shrimps during one experiment only, suggesting it might be a type I error. These results signified no effect of shrimp removal on benthic communities, or on the functional processes of litter breakdown, or on periphyton accumulation. The large scale of the experimental units (8–40 m²), refuge availability, and the presence of benthic predatory fishes that cropped excess prey made available by removal of *M. hainanense*, may have contributed to the lack of any effect, despite the abundance of the predatory shrimps." (Authors)] Address: Dudgeon, D., Department of Ecology and Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong SAR, China. E-mail: ddudgeon@hkucc.hku.hk

5474. Medianero, E.; Samaniego, M. (2004): The community of aquatic insects associated with contaminated waters in the Rio Curundú, Republic of Panama. *Folia Entomol. Mex.* 43(3): 279-294. (in Spanish, with English summary). ["From March 2000 to March 2001, samples of aquatic insects and of physicochemical variables were obtained from the riverbed of Rio Curundú (Panama). The objectives of the study were (1) to identify aquatic insects resident in waters of different levels of contamination; (2) to assess the diversity of insect communities from the source to the estuary of the river; and (3) to evaluate the effects of rainfall on annual patterns of insect abundance. Fifty-seven taxa were collected. Most of insects were associated with levels of biochemical need of oxygen (BNO) between 7.4 and 13.05 mg/l. However, some insect genera were associated with BNO levels of 62.5 and 188.5 mg/l. There was a relation between BNO and insect genera (chi-squared = 1674, $p < 0.007$). The diversity of insect communities decreased from the source to the estuary of the river. There was also a negative linear relation between rainfall and insect abundance ($F = 10.49$, $p < 0.0078$, $r = -0.70$)."] (Authors) Odonata are treated at the family / genus level.] Address: Samaniego, M., Instituto Smithsonian de Investigaciones Tropicales. Apartado 169, Balboa, Ancón, República de Panamá. E-mail: samaniem@tivoli.si.edu

5475. Meurgey, F.; Dommaget, J.-L. (2004): *Erythrodiplax berenice* (Drury, 1770) nouvelle espèce pour la Guadeloupe. *Martinia* 20(2): 58. (in French). [Female, Le Moule, 10-XII-1973] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5476. Meurgey, F.; Levasseur, M. (2004): Note sur quelques Odonates de République Dominicaine (Grandes Antilles). *Martinia* 20(1): 16. (in French). [II-2001; seven species are listed. *Scapanea frontalis* is a road kill.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5477. Meurgey, F. (2004): Nouvelle localité marocaine pour *Sympetrum meridionale* (Sélys, 1841). *Martinia* 20(1): 28. (in French). [Marocco, region Essaouira, w Talmost, 2 males, 3 & 6-IX-2002] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5478. Meurgey, F. (2004): Nouvelles données pour *Triacanthagina caribbea* Williamson, 1923 en Guade-

loupe (Antilles françaises). *Martinia* 20(3): 114. (in French). [In March 2004, a female and an exuvia of the species were collected. Habitat and co-occurring odonate species are briefly outlined.] Address: Meurgey, F., Muséum d'Hist. nat. Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5479. Meurgey, F. (2004): Observations sur la reproduction de *Rhionaeschna psilus* (Calvert, 1947), *Tramea binotata* (Rambur, 1842) et *Lestes tenuatus* Rambur, 1842 en Guadeloupe. *Martinia* 20(2): 59-65. (in French, with English summary). [Documentation of the reproduction behaviour of the mentioned three species.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5480. Meurgey, F. (2004): Première observation d'*Anax junius* (Drury, 1773) en France (Odonata, Anisoptera, Aeshnidae). *Martinia* 20(1): 13-15. (in French, with English summary). [First record of *A. junius* for the continental Europe and for France; Pointe St Gildas, 14-IX-2003] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5481. Meurgey, F. (2004): Reproduction d'*Anax concolor* Brauer, 1865, d'*A. longipes* Hagen 1861 et d'*A. amazili* (Burmeister, 1839) en Guadeloupe (Basse-Terre). *Martinia* 20(2): 55-58. (in French, with English summary). ["Some informations are given about the breeding status of *A. concolor* in Guadeloupe, as well as about a first record of *A. amazili* and *A. longipes* for this island. Exuviae belonging to *A. longipes* have also been collected on the Basse-Terre part ; this is also the first record of this species in Guadeloupe.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5482. Meurgey, F. (2004): Sur la collection d'Odonates de Guyane française du Muséum d'Histoire Naturelle de Nantes. *Martinia* 20(4): 197-198. (in French, with English summary). ["The author presents a list of Odonata collected in French Guiana in 2003, as well as a revized list of specimens belonging to an old collection of Nantes natural history museum." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5483. Meurgey, F. (2004): Sur une petite collection d'odonates de Polynésie française. *Martinia* 20(2): 83-84. (in French, with English summary). [6 taxa, in most cases from Tahiti, some from Faaa and Moorea, preserved in the odonate collection of the Natural History Museum in Nantes, France are documented.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5484. Meurgey, F. (2004): *Tramea calverti* Muttkowski, 1910 nouvelle espèce pour la Guadeloupe. *Martinia* 20(2): 66. (in French). [31-III-2004, Sainte Rose, Basse-Terre.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

- 5485.** Mikat, M.; Mocek, B.; Zamecnik, J. (2004): Results of entomological research of the locality "Slavikovy ostrovy" near Pfelouc town (eastern Bohemia, Czech Republic). *Acta Mus. reginaehradecensis* (A) 30: 101-121. (in Czech, with English summary). [Checklist of 23 odonate species recorded in 2000 and 2001.] Address: Mikat, M., Muz. vychodnich Cech, Eliscino nabr. 465, CZ-500 01 Hradec Kralove, Czech Republic
- 5486.** Mora, A.; Csabai, Z.; Müller, Z. (2004): Contribution to the dragonfly, aquatic beetle and caddisfly fauna of the Jászság, Hungary (Odonata, Coleoptera: Hydradephaga and Hydrophiloidea, Trichoptera). *Folia historico naturalia musei Matraensis* 28: 149-156. (in English). [A total of 17 odonate species is documented.] Address: Mora, A., Univ. Debrecen, Dept Hydrobiol., H-4032 Debrecen, Egyetem sq. 1., Hungary. E-mail: mar-nold@dragon.klte.hu
- 5487.** Mortensen, L.M.; Richardson, J.M.L. (2004): 26. The effects of chemical cues on the foraging of damselfly larvae *Enallagma antennatum* (Odonata: Zygoptera). 2004 Entomological Society of Ontario Annual Meeting Brock University: 20. (in English). [Verbatim: The trade-off between foraging rate and minimizing predation risk is ubiquitous in nature. To achieve an optimal balance in this trade-off, potential prey must have a method of predator detection that allows discrimination between risky and non-risky environments. Damselfly larvae typically respond to the presence of a predator by reducing foraging rates. In this study, we explore the way in which larvae of *Enallagma antennatum* use visual and chemical cues effects to assess predation risk. In trials comparing visual and chemical cues, damselfly larvae reduced foraging only in response to chemical cues. Further experiments revealed that damselfly larvae respond to chemical cues from predators that have recently fed on conspecific or familiar heterospecific prey items damselflies also reduced foraging in the presence of cues from injured conspecifics. Thus, damselfly larvae are able to distinguish between different chemical cues and appear to respond to these different chemical cues in a manner consistent with associated risk.] Address: Mortensen, L.M., Department of Biological Sciences, Brock University, 500 Glenridge Ave., St. Catharines, ON, Canada
- 5488.** Mrowiński, P.; Zawal, A. (2004): Preliminary studies of dragonflies (Odonata) of Barlinecko-Gorzowski Landscape Park. *Parki Narodowe i Rezerваты Przyrody* 23(2): 471-480. (in Polish, with English summary). [Poland; samples in 2000 totaled to 5471 specimens representing 39 odonate species. Dominance and locality-frequency for each species are documented in a table. The dominant species is *Ischnura elegans*, a representative of eurytopic species which, in general, dominated the water bodies surveyed. Mesotrophic lakes are characterised by *Platycnemis pennipes*. A comparison with the paper of MÜNCHBERG (1932) shows no significant changes of regional faunal composition. *Sympetma paedisca*, *Ophiogomphus cecilia*, *Aeshna viridis*, *Leucorrhinia pectoralis*, *Erythromma lindenii*, and *Cordulegaster boltonii* are of special interest to dragonfly conservation in Poland.] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl
- 5489.** Njiru, M.; Okeyo-Owuor, J.-B.; Muchiri, M.; Cowx, I.G. (2004): Shifts in the food of Nile tilapia, *Oreochromis niloticus* (L.) in Lake Victoria, Kenya. *African Journal of Ecology* 42: 163-170. (in English, with French summary). ["Studies of the food of introduced Nile tilapia, *Oreochromis niloticus* (L.) with respect to size, habitat and season were conducted between November 1998 and October 2000 in Kenyan waters of Lake Victoria. Stomach contents of 1980 specimens collected by demersal trawl and seining were analysed. Nile tilapia originally known to be herbivorous, feeding mostly on algae has diversified its diet to include insects, fish, algae and plant materials. The major diet of fish <5 cm total length was zooplankton whereas bigger fish included a wider range of food items in their diet. There was spatial variation in diet with insects and algae dominating in the gulf and open water habitats respectively. There was no seasonal variation in the food items ingested and diel feeding regime indicated that *O. niloticus* is a diurnal feeder. The shift in diet could be due to ecological and environmental changes in Lake Victoria, which have been associated with changes in composition and diversity of fish and invertebrate fauna, emergence and dominance of different flora including water hyacinth *Eichhornia crassipes* (Mart.) Solms-Laub., and algae communities. The feeding habit of *O. niloticus* is discussed in the context of changes occurring in the lake." (Authors) Odonata comprise 1.1% of the gut content of 1980 Nile tilapia analysed during the period Nov. 1998 to Oct. 2000.] Address: Njiru, M., Kenya Marine and Fisheries Research Institute (KMFRI), PO Box 1881, Kisumu City, Kenya. E-mail: rmnjiru2002@yahoo.com
- 5490.** Palmer, C.G.; Muller, W.J.; Gordon, A.K.; Scherman, P.A.; Davies-Coleman, H.D.; Pakhomova, L.; de Kock, E. (2004): The development of a toxicity database using freshwater macroinvertebrates, and its application to the protection of South African water resources. *South African Journal of Science* 100: 643-650. (in English). [reference on *Enallagma* sp. in table 1.] Address: Muller, W.J., Unilever Centre for Environmental Water Quality, Institute for Water Research, Rhodes University, P.O. Box 94, Grahamstown 6140, South Africa. E-mail: nikite@iwr.ru.ac.za
- 5491.** Pont, B. (2004): Contribution à la connaissance des Odonates de Guadeloupe et de Martinique. *Martinia* 20(4): 199-204. (in French, with English summary). ["Odonatological observations realized in Martinique and Guadeloupe in October 2003 are presented. The habitats visited are described. Fifteen species, already known in French West Indies, were recorded. Behaviour and population size are reported for each of them." (Author)] Address: Pont, B., Montée du village, F-38150 Anjou, France
- 5492.** Prévost, O.; Moncomble, M. (2004): Nouvelles données sur les odonates du département de la Vienne. *Martinia* 20(3): 115-119. (in French, with English summary). [The list of odonate species in the Département Vienne, France counts 60 species including the new additions *Epitheca bimaculata* and *Sympetrum danae*. These species, and *Platycnemis latipes*, *Ischnura pumilio*, *Sympetrum vulgatum*, and *Sympetrum fonscolombii* are commented on.] Address: Prévost, O., 28, rue de Poitiers, F-86130 Jaunay-Clan, France

- 5493.** Ramsay, L.; Cannings, R.A. (2004): Determining the status of British Columbia's dragonflies. T.D. Hooper, editor. Proceedings of the Species at Risk 2004 Pathways to Recovery Conference. March 2-6, 2004, Victoria, B.C. Species at Risk 2004 Pathways to Recovery Conference Organizing Committee, Victoria, B.C.: 1-12. (in English). ["To demonstrate how inventory provides information for assigning conservation status ranks, we looked at the changes in these ranks over a nine-year period. Preliminary conservation status ranks were assigned to British Columbia's dragonflies and damselflies (Class Insecta: Order Odonata) in 1993. Subsequently, we focused inventory efforts on the species considered to be at risk in order to more accurately determine their status. From 1996 to 2003, concentrated surveys were conducted throughout much of the province. During these surveys, known ranges of many species were extended, knowledge of habitat requirements increased, and five new species were confirmed for the province. Many of the targeted species were more abundant than previously thought, and their conservation ranks were changed accordingly. Others were found only rarely or not at all. Ranking poorly known species is challenging, particularly if samples are small or habitats are difficult to access. By increasing our knowledge of these species and their requirements, we can assign them more accurate ranks, thus ensuring that conservation efforts will target the species and habitats that truly require them." (Authors)] Address: Ramsay, Leah, British Columbia Conservation Data Centre, Ministry of Sustainable Resource Management, 395 Waterfront Crescent, Box 9358, Stn Prov Govt, Victoria, BC, V8W 9M2, Canada. E-mail leah.ramsay@gems4.gov.bc.ca
- 5494.** Santos Ferreira Peruquetti (2004): Odonata (Libélulas) do município de Luís Antônio, São Paulo, Brasil: Relação com o uso do solo e riqueza faunística. Tese. Universidade Federal de São Carlos: 49 pp- (in Portuguese, with English summary). [The odonate fauna of a sugarcane monoculture and a more natural area are compared; faunal similarity between both areas is low.] Address: not stated
- 5495.** Silsby, J. (2004): Grand places. *Agrion* 8(2): 18-19. (in English). [reminiscences from odonatological overseas trips] Address: Silsby, Jill., 37, Astoria House, 116 Hight Street, Purley, Surrey CR8 2XT, UK. E-mail: Jillsilsby1@btinternet.com
- 5496.** Srinivasan, M.V.; Zhang, S. (2004): Visual motor computations in insects. *Annual Review of Neuroscience* 27: 679-696. (in English). ["With their relatively simple nervous systems and purpose-designed behaviors and reflexes, insects are an excellent organism in which to investigate how visual information is acquired and processed to guide locomotion and navigation. Flies maintain a straight course and monitor their motion through the environment by sensing the patterns of optic flow induced in the eyes. Bees negotiate narrow gaps by balancing the speeds of the images in their two eyes, and they control flight speed by holding constant the average image velocity as seen with their two eyes. Bees achieve a smooth landing on a horizontal surface by holding the image velocity of the surface constant during approach, thus ensuring that flight speed is automatically close to zero at touchdown. Foraging bees estimate the distance that they have traveled to reach a food source by integrating the optic flow experienced en route; this integration gives them a visually driven "odometer." Insects have also evolved sophisticated visuomotor mechanisms for pursuing prey or mates and possibly for concealing their own motion while shadowing objects of interest." (Authors) Dragonflies are referred to several occasions, especially in the context of motion camouflage.] Address: Srinivasan, M.V., Center for Visual Science, Research School of Biol. Sciences, Australian National University, P.O. Box 475, Canberra, A.C.T. 2601, Australia. E-mail: M.Srinivasan@anu.edu.au
- 5497.** Svidersky, V.; Plotnikova, S. (2004): On structural-functional organization of dragonfly mushroom bodies and some general considerations about purpose of these formations. *Journal of Evolutionary Biochemistry and Physiology* 40(6): 608-624. (in English). ["Anatomy as well as (for the first time) the fine structure have been studied of the mushroom bodies located in protocerebrum of the supraesophageal ganglion of dragonflies the most ancient flying insects on Earth. Used in the work are larvae of the last age (prior to winging), in which the mushroom body structure has already been completely formed and corresponds to that in imago. The total organization of the dragonfly mushroom bodies has been established to be more primitive than that of other insects studied so far. This involves both the number of interneurons (Kenyon cells) present in the mushroom bodies and the character of anaptic connections formed by these cells. There is confirmed the absence in dragonflies of the mushroom body calyces that in opinion of some authors are obligatory input gates into these structures. Peculiarities of the neuropil structure in the area of the absent calyces are studied in detail. For the first time in insects there are revealed the direct (without additional synaptic switching) pathways forming the afferent input from optic lobes into the mushroom body calyx area. Also detected are the direct pathways going from the mushroom bodies to the abdominal chain (efferent output). A possible functional significance of these findings as well as the general role of mushroom bodied in control of some forms of insect behavior are discussed." (Authors)] Address: Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia
- 5498.** Thakoor, S.; Morookian, J.M.; Chahl, J.; Butler Hine, B.; Zornetzer, S. (2004): BEES: Exploring Mars with Bioinspired Technologies. *Computer* 37(9) (ISSN: 0018-9162): 38-47. (in English). [To enable autonomous flight, the authors apply bioinspired engineering of exploration systems technology to the development of bioinspired visual navigation sensors integrated on small flyers. They drew their inspiration for these BEES designs from insects, which use ingenious strategies, including optic flow, for navigating successfully in three dimensions. Distilling these principles from biology enables the development of efficient, compact, yet sophisticated autopilots for robotic aircraft embarking on planetary exploration missions. Their bioinspired sensor suite consists of dragonfly-inspired ocelli for flight stabilization and attitude referencing; honeybee-inspired optic flow for terrain following, lateral-drift containment, and localization; and sun and sky polarization-based compassing." (Authors)] Adresse: not stated
- 5499.** Torralba-Burrial, A.; Ocharan, F.J. (2004): Costras salinas sobre libélulas monegrinas (Odonata). *Boln. S.E.A.* 35: 281-282. (in Spanish). ["Sympetrum

fonscolombii females found at saline lakes in Los Mo-negros (Aragon, NE Spain) showed white spots of salt on their abdomens, due to water evaporation. This species touches the water surface with its abdomen to ovi-posit, and when the water evaporates the salt forms the white spots." (Authors)] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

5500. Wada, S.; Wada, Y. (2004): The first records of the migratory species, *Sympetrum fonscolombii* from Fukui Prefecture, Japan. Bull. Fukui City Mus. Nat. His. 51: 65-66. (in Japanese with English summary). ["In Oc-tober and November 2004, some adults of the migrato-ry species, *S. fonscolombii* were found at coastal ponds in Fukui City, Fukui Prefecture, Honshu, Japan. [...]"] (Authors)] Adress: not stated in English

5501. Wolski, L.F.; Trexler, J.C.; Nelson, E.B.; Philip-pi, T.; Perry, S.A. (2004): Assessing researcher impacts from a long-term sampling program of wetland com-munities in the Everglades National Park, Florida, U.S.A.. *Freshwater Biology* 49(0): 1381-1390. (in Eng-lish). ["1. Long-term monitoring requires repeated visits to a study site, greatly increasing the potential for cu-mulative visitation effects. For ecological studies in ge-neral, and for monitoring in particular, data must be evaluated for confounding artefacts from researcher presence. We compared aquatic communities at long-term sampling plots (nine sites, each with three plots, studied continuously from 6 to 22 years) in the Everglades National Park to previously unsampled reference plots adjacent to them to assess the effects of resear-cher visitation on the flora and fauna. 2. We identified two criteria that are sensitive to local habitat heteroge-neity for assessment of visitation impacts. First, the long-term plots must differ from adjacent reference plots by a magnitude that exceeded variation among plots separated by equal or greater distance (i.e. the difference is greater than expected by scaling of com-munity change proportional with distance); and second, multiple reference plots must consistently differ in direc-tion (e.g. greater abundance or less abundance) from adjacent long-term plots. We also tested for increased heterogeneity among samples from long-term plots compared with those not previously visited. 3. We found no evidence of researcher effects on fish or macroinver-tebrates, and only weak evidence for alteration of e-mergent plants and periphyton floating mats. Our failure to document visitor impacts may result from either low visitation rate or the dynamic nature of the wetlands studied." (Authors) The paper also includes information on different odonate species.] Address: Trexler, J., De-partment of Biological Sciences, Florida International University, Miami, FL, U.S.A. 2: South Florida Natural Resources Center, Everglades National Park, State Road, Homestead, FL, U.S.A. E-mail: trexlerj@fiu.edu

5502. Yang, L.; Gao X.; Yuan, F.; Wang, C.; Guo D. (2004): Faunal analysis and distribution of dragonflies in Beijing. *Journal of Beijing Normal University (Natural Science)* 40(3): 375-370. (in Chinese, with English summary). [According to the survey of dragonflies in Beijing from 2001-2003, a total of 50 species of Odonata were reported, belonging to 2 suborders, 8 families and 25 genera. 29 species are Palaearctic (58 %); 10 species (20 %) to the Oriental realm; the remaining 11 species are cosmopolitan (22 %). Three distribution ty-

pes of Odonata in this area are classified based on ha-bitat differences of hydrological features, water quality and aquatic vegetation in Beijing. They are plain type, mountain type and widespread.] Address: Yang, Liu, Ministry of Education Key Laboratory for Biodiversity and Engineering, Beijing Normal University, 100875, Beijing, China

5503. Yanoviak, S.P.; Fincke, O.M. (2004): Sampling methods for water-filled tree holes and their artificial analogues. In: Leather, S. (Ed.): *Insect Sampling in Fo-rest Ecosystems*. Blackwell. *Methods In Ecology*. 320 pp. ISBN: 0632053887: (in English). ["In summary, wa-ter-filled tree holes are tractable habitats for ecological and behavioral studies; sampling their insect fauna is a relatively simple process, and the use of artificial holes is an inexpensive way to increase sample size and control multiple factors for experiments. The extent to which inferences from tree hole data have a more ge-neral application for freshwater systems remains to be seen. Nevertheless, given their important ecological ro-le, these aquatic microhabitats merit much more atten-tion than they have received, especially in tropical fo-rests." (Authors)] Address: Fincke, O.M., Dept Zool., U-niv. Oklahoma, 730 Van Vleet Oval, Room 314, Nor-man, OK 73019, USA. E-mail: fincke@ou.edu

5504. Zhang, D.-Z.; Zheng, Z.-M. (2004): Research progress and status on Odonata of China. *Journal of Shaanxi Normal University (Natural Science Edition)* 32 (Suppl.): 97-100. (in Chinese, with English summary). [The paper provides a Chinese focus on the increase of odonatological knowledge.] Address: Zhang, D.-z., Col-lege of Life Science, Shaanxi Normal University, Xi'an 710062, Shaanxi, China

5505. Zhou, X.; Zhou, W.-b. (2004): A new species of the genus *Heliocypha* from Yunnan province of Chi-na (Odonata: Chlorodyphidae). *Wuyi Journal of Science* 20: 136-138. (in Chinese, with English summary). [*Heli-ocypha yunnanensis* sp. nov. is described from a holo-type male, Malipo County, Wenshan Miaozu Autono-mous Region, Yunnan Province, 20-VII-2003; paratype female: same data as holotype male.] Address: Zhou Wenbao, Zhejiang Museum of Natural History, Jiao-gonglu 71, Hangzhou 310012, China

2005

5506. Abbott, J.; Svensson, E.I. (2005): Phenotypic and genetic variation in emergence and development time of a trimorphic damselfly. *J. Evol. Biol.* 18: 1464-1470. (in English). ["Although colour polymorphisms in adult organisms of many taxa are often adaptive in the context of sexual selection or predation, genetic correlations between colour and other phenotypic traits expressed early in ontogeny could also play an important role in polymorphic systems. We studied phenotypic and genetic variation in development time among female colour morphs in the polymorphic damselfly *Ischnura elegans* in the field and by raising larvae in a common laboratory environment. In the field, the three different female morphs emerged at different times. Among laboratory-raised families, we found evidence of a significant correlation between maternal morph and larval development time in both sexes. This suggests that the phenotypic correlation between

phenotypic correlation between morph and emergence time in the field has a parallel in a genetic correlation between maternal colour and offspring development time. Maternal colour morph frequencies could thus potentially change as correlated responses to selection on larval emergence dates. The similar genetic correlation in male offspring suggests that sex-limitation in this system is incomplete, which may lead to an ontogenetic sexual conflict between selection for early male emergence (protandry) and emergence times associated with maternal morph." (Authors)] Address: Svensson, E., Section for Animal Ecology, Ecology Building, Lund University, SE-223 62 Lund, Sweden. E-mail: erik.svensson@zoekol.lu.se.

5507. Aguilar, J. d' (2005): Les descriptions originales des Odonates d'Europe 12. Brullé, Gaspard Auguste (1809 - 1873). *Martinia* 21(4): 81-88. (in French, with English summary). ["This 12th article is devoted to Hermann Gaspard Auguste Brullé who did much work on arthropods. Notably, he described *Crocothemis erythraea* and the subspecies *Calopteryx virgo festiva* and *Platycnemis pennipes nitidula*." (Author)] Address: d'Aguilar, J., 7, rue Adrien Lejeune, F-93170 Bagnolet

5508. Allen, E.W.; Prepas, E.E.; Gabos, S.; Strachan, W.M.; Zhang, W. (2005): Methyl mercury concentrations in macroinvertebrates and fish from burned and undisturbed lakes on the Boreal Plain. *Canadian Journal of Fisheries and Aquatic Sciences* 62(9): 1963-1977. (in English, with French summary). ["Methyl mercury (MeHg) concentrations in macroinvertebrates (including Odonata, e.g. *Cordulia shurtleffi*) and fish were compared among five lakes in burned catchments and five reference lakes on the western Canadian Boreal Plain to determine the influence of forest fire on MeHg bioaccumulation. Two years after fire, MeHg concentrations in five of six aquatic taxa were similar in burned and reference lakes. Among a larger set of 12 lakes, MeHg concentrations in biota were negatively correlated with lake water pH, trophic status, and hardness, reflecting a pre-existing gradient in water chemistry. Bio-magnification of MeHg (as determined by regression of MeHg concentration on baseline-adjusted $\delta^{15}N$) was negatively correlated with lake water chlorophyll a concentration. A subsequent logging experiment interrupted by fire provided an opportunity to compare pre- and post-fire MeHg concentrations in aquatic biota. Three months after fire, biota MeHg concentrations had decreased by 32%–50%, and lake water ammonium concentrations had increased 11-fold relative to the previous year. In this nutrient-rich setting, fire may lower MeHg concentrations in aquatic biota over the short-term by inducing an increase in lake productivity that dilutes MeHg at the base of the food web." (Authors)] Address: unknown

5509. Anholt, B.R.; Negovetic, S.; Rauter, C.; Som, C. (2005): Predator complement determines the relative success of tadpoles of the *Rana esculenta* complex. *Evolutionary Ecology Research* 7: 733-741. (in English). ["Question: Does the identity of the apex predator in a system predict the relative success of closely related amphibian larvae? Organisms: Larvae of the hybridogenetic European frog, *Rana kl. esculenta*, and its sexual host, *R. lessonae*. Site: Three ponds supporting predatory fish and four ponds without fish but containing large invertebrate (dragonflies) and amphibian predators in northern Switzerland. Background: *Rana*

esculenta is a better competitor than *R. lessonae* in a wide range of conditions and is also a larger, more fecund frog than *R. lessonae*. Under most conditions, models predict competitive exclusion of *R. lessonae* followed by extinction of *R. lessonae*. Methods: In the field, we measured the change in frequency of the two taxa from the larval stage to metamorphosis. In the laboratory, we measured the activity of the two taxa and measured their vulnerability to odonate predators. Conclusions: In the presence of fish, the frequency of *R. lessonae* declined relative to *R. esculenta* from the larval stage to metamorphosis. In the absence of fish and presence of other predators, the opposite was true. *Rana esculenta* was more active than *R. lessonae* and more vulnerable to predation. The two taxa are adapted to different predator complexes and the hybridogenetic system is maintained by occasional dispersal between dissimilar water bodies.] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada. E-mail: banholt@uvic.ca

5510. Anonymus (2005): Blauflügel-Prachtlibelle. *Calopteryx virgo*. *Insektenkurier* 86: 31-32. (in German). [Brief description of *C. virgo*, and documentation of 8 stamps with *C. virgo* as motive.] Address: Sabish, J., Adolf-Damaschke-Str. 3, 73037 Göppingen

5511. Anonymus (2005): Wild Corner: Invertebrates. *Porcupine* 33: 23. (in English). [Luk Keng marsh, Hong Kong, China, 2005; records of *Macrodiplax cora*, *Paracercion calamorum dyeri*, *Pseudagrion microcephalum*] Address: not stated

5512. Barbarin, J.-P.; Boitier, E.; Bronnec, F. (2005): Observations récentes de *Libellula fulva* dans le département du Puy-de-Dôme (Odonata: Libellulidae). *Arvernensis* 35-36: 9-12. (in French). [The distribution of *L. fulva* in the Auvergne, France with special emphasis on historical and recent records in the Department Puy-de-Dôme is outlined.] Address: Barbarin, J.-P., Société d'Histoire naturelle Alcide-d'Orbigny, 12 place des Écoles, F-63160 Billom, France. E-mail: jpbarbarin@shnao.net

5513. Bernard, R.; Wildermuth, H. (2005): *Nehalennia speciosa* (Charpentier, 1840) in Europe: a case of a vanishing relict (Zygoptera: Coenagrionidae). *Odonatologica* 34(4): 335-378. (in English). ["Based on all available data, the former and present distribution in Europe is presented and critically analysed. The sp. is extinct or has only survived at single or small clustered and isolated localities in many parts of the western borderlands of its former Eurasian area that extended from Belgium to Japan. It is continuously declining, especially W and S of the line running through the Baltic States, N and E Poland and S Belarus. The attached basic data from Asia reveal incomplete knowledge, but probably indicate a better situation in the eastern part of the range. The main aspects of the ecology and biology are outlined and discussed. Special attention is paid to the elements helpful in understanding the deep regress of the sp., i.e. to its habitat on a macro- and microscale as well as to its life-strategy. The high level of stenotopy and the highly specialized habitat-related behaviour, resulting in successful use of a narrow niche, are emphasized. These aspects make the sp. vulnerable in the face of high anthropogenic pressure in Europe. Limited dispersal abilities augment the danger of local extinction. The main threats are presented and some essential conser-

vation measures are proposed." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

5514. Bernard, R.; Wildermuth, H. (2005): Verhaltensbeobachtungen an *Nehalennia speciosa* in Bezug auf Raum, Zeit und Wetter (Odonata: Coenagrionidae). *Libellula* 24(3/4): 129-153. (in German, with English summary). ["The behaviour of *N. speciosa* was studied at five small bog lakes in NW Poland with regard to habitat use, diurnal activity and influence of the weather. In total we discerned 22 behavioural elements some of which were considered in the context of different environmental situations. The imagines stayed almost exclusively in a narrow belt of thin-leaved sedges at the edge of the open water or in corresponding vegetation of adjacent shallow water bodies. The diurnal pattern of the localization of imagines in the vertical profile of the vegetation is described, stressing their movement downwards from the late forenoon and upwards in the late afternoon. Reproductive activity started in the morning, peaked around two hours before solar noon, and decreased rapidly in the early afternoon. Generally, precopula and copula lasted longer in the morning than in the afternoon. Calm, warm and rather humid atmospheric conditions with subdued or sporadically interrupted insolation proved optimal for the species' activity, whereas wind, strong precipitation, and temperatures below ca 15°C as well as above ca 23-24°C with strong insolation were unsuitable. In light rain and under a cloudy sky - provided that conditions were calm and temperatures were around 20°C - activity was diminished but not completely suppressed. It is inferred that imagines of *N. speciosa* are morphologically and ecologically adapted to habitats with obstrusive obstacles to flight, a humid microclimate and small spatial compass." (Authors)] Address: Bernard, R., Institut für Umweltbiologie, Abteilung Allgemeine Zoologie, Adam-Mickiewicz-Universität, Umultowska 89, PO-61-614 Poznan, Poland. E-mail: rbernard@amu.edu.pl

5515. Blakely, T.J.; Chadderton, W.L.; Harding, J.S. (2005): The effect of rotenone on orchard-pond invertebrate communities in the Motueka area, South Island, New Zealand. DOC Research & Development Series 220. Department of Conservation, Wellington: 26 pp. ["Rotenone is a naturally derived (organic) fish toxicant used widely in fisheries management. However, because of the non-specific nature of rotenone, nontarget animals may also be poisoned. The aim of this study was to determine whether past rotenone poisoning has had detectable effects on pond invertebrate communities and, if so, whether there is any evidence of community recovery. Water-chemistry parameters and invertebrate and plankton communities were investigated in a one-off survey of 18 orchard ponds around Motueka, South Island, New Zealand. Ponds were classified as either rotenone-free (pest fish present or pest fish absent) or rotenone addition, where rotenone had been used to eradicate pest fish species 6 months, 1 year and 3 years prior to our survey. We found few differences in water chemistry, physical conditions, or invertebrate taxonomic richness between groups of ponds. pH was circumneutral in all ponds, while conductivity ranged from 112-193 µS25/cm. Zooplankton diversity did not differ between groups: a total of 35 macroinvertebrate taxa were recorded from the 18 ponds, with 12-15 taxa found in each treatment group. However, there were subtle differences in macroinvertebrate and zooplank-

ton community composition. Our results indicated that invertebrate communities in the poisoned study-ponds were able to recover quickly; however, the impact of rotenone on benthic invertebrates is still uncertain, and the results of this study should be interpreted with caution as they were confounded by other variables, such as adjacent land-uses. Ponds in this study were dominated by pollution-tolerant taxa, and were already subjected to a cocktail of chemicals used on the adjacent orchards. Thus, the effect of rotenone may be undetectable in our ponds but more severe in pristine systems." (Authors) The study includes / discusses results from *Xanthocnemis zealandica* and *Austrolestes colenonis*. An additional three species are listed in appendix I and II.] Address: http://www.doc.govt.nz/Publications/004~Science-and-Research/D_OC-Research-and-Development-Series/PDF/drds220.pdf

5516. Bo, T; Fenoglio, S. (2005): Sulla presenza di alcuni macroinvertebrati bentonici rari o interessanti nei torrenti e fiumi dell'Appennino piemontese. *Riv. Piem. St. Nat.* 26: 123-128. (in Italian, with English summary). [Italy; *Cordulegaster boltonii*] Address: Bo, T., Dipartimento di Scienze dell'Ambiente e della Vita, Università del Piemonte Orientale, via Bellini 25, I-15100 Alessandria, Italy

5517. Bolnick, D.I.; Preisser, E.L. (2005): Resource competition modifies the strength of trait-mediated predator-prey interactions: a meta-analysis. *Ecology* 86: 2771-2779. (in English). ["Only a fraction of the individuals in a given prey population are likely to be killed and consumed by predators. In contrast, nearly all individuals experience the chronic effects of predation risk. When threatened by predators, prey adopt defensive tactics whose costs can lead to reduced growth, maturation rates, survivorship, fecundity, or population density. This nonconsumptive impact of predation risk on prey is known as a "trait-mediated interaction" (TMI) because it results from changes in prey traits such as behavior or physiology. Ecological theory suggests that the strength of TMI effects will reflect a balance between the conflicting demands of reproduction vs. predator avoidance. Competitor density and resource availability are expected to alter the balance between these conflicting forces. We conducted a meta-analysis of experimental studies that measured TMI effect size while varying competitor and/or resource density. The threat of predation had an overall negative effect on prey performance, but the strength of this effect varied with the level of competition. High competition exacerbated the negative effect of intimidation on prey density but moderated the negative effect of intimidation on prey life history and growth. We discuss these results in light of previously published theoretical expectations. Our results highlight the variable and context-dependent nature of interspecific interactions." (Authors) The study includes odonatological material. For details see: <http://www.esapubs.org/archive/ecol/E086/149/appendix-A.htm>] Address: Bolnick, D.I., Sect. Integrative Biology, University of Texas at Austin, Austin, Texas 78712 USA

5518. Boudot, J.-P. (2005): Die Prachtilibellen Europas. Gattung *Calopteryx*. Par Georg Rüppell, Dagmar Hilfert-Rüppell, Gunnar Rehfeldt & Carsten Schütte. *Martinia* 21(3): 135-136. (in French). [book review] Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Notre-Dame de Pauvres, B.P. 5, F-54501

Vandoeuvre-lès-Nancy, France. e-mail: boudot@cpb.cnrs-nancy.fr

5519. Bowman, N. (2005): Reports from Coastal stations - 2004: Eccles-on-Sea, Norfolk. *Atropos* 24: 70-71. (in English). [Verbatim: The year was similarly rather dull for Odonata with the exception of Small Red-eyed Damselfly *Erythromma viridulum* records. Apart from the resident population there were a number of waves of immigrants; the largest of these peaked on 4 September when c.100 individuals were present. Of the damselflies present on 4 September over 90% were unattached males and just five pairs were in tandem. This contrasted markedly with the 2001 immigration, when of the 170 present at its peak some 90% was accounted for by pairs in tandem with spare males representing the remaining 10%.] Address: not stated

5520. Bried, J.T.; Krotzer, S. (2005): New species records for Mississippi: An expected dragonfly and an unexpected damselfly. *Journal of the Mississippi Academy of Sciences* 50(4): 233-234. (in English). [USA; detailed documentation of the records of *Arigomphus lentulus* and *Lestes forcipula*. Winds associated with Hurricane Ivan on 16.IX.2004 are supposed to be responsible for the records of *L. forcipula*.] Address: Bried, J.T., Mississippi State University, Mississippi State, MS 39762, USA

5521. Cade, M. (2005): Reports from Coastal stations - 2004: Portland, Dorset. *Atropos* 24: 54-55. (in English). [A single *Sympetrum fonscolombii* at 16-VI-2004 was the only immigrant dragonfly recorded during the year.] Address: not stated

5522. Cai, D.; Liu G.; Li D. (2005): Discriminant analysis of 3 genera of Odonata by nonparametric methods. *Journal of south China University of tropical agriculture* 11(4): 15-19. (in Chinese, with English summary). ["Using the length of abdomen, hindwing, pterostigma of hindwing, superior appendage, inferior appendage, and the 10th abdomen as quantitative variables, a discriminant analysis of the adult of *Nannophopsis*, *Orthetrum*, and *Pantala* (Odonata, Libellulidae) was carried out by nonparametric methods. The results showed that nonparametric discriminant analysis was very effective in separating the adults of these three genera, and the total error count estimate was 0.0095 either by cross validation or by resubstitution." (Authors)] Address: Cai, D., Coll. of Environment & Plant Protection, SCUTA, Danzhou, Hainan, 571737, China.

5523. Cannings, R.A.; Simaika, J.P. (2005): *Lestes disjunctus* and *L. forcipatus* (Odonata: Lestidae): An evaluation of status and distribution in British Columbia. *J. entomol. Soc. Brit. Columbia* 102: 57-63. (in English). ["Of the five species of the damselfly genus *Lestes* that live in British Columbia, *Lestes forcipatus* Rambur and *L. disjunctus* Selys are the most difficult to separate morphologically. Females can be readily distinguished by the size of the ovipositor, but males are difficult to separate. In British Columbia, *L. disjunctus* is more common, widespread and familiar. Before 1998, when it was first reported in BC, specimens of *L. forcipatus* were misidentified as *L. disjunctus* because the former is known mainly from eastern North America and most *Lestes* species are usually most readily identified using male characters. The identities of museum specimens of the two species were checked and corrected by us as necessary. Ecological and behavioural observations

and up-dated distribution maps of the species are presented. Throughout its range in BC, *L. forcipatus* is mostly sympatric with *L. disjunctus* but lives in a narrower range of habitats and localities mostly cool sedge marshes and fens. The two species show some temporal and behavioural separation." (Authors)] Address: Cannings, R., Royal British Columbia Museum, 675 Belleville Street, Victoria, British Columbia, Canada

5524. Carchini, G.; Solimini, A.G.; Ruggiero, A. (2005): Habitat characteristics and odonate diversity in mountain ponds of central Italy. *Aquatic Conservation: Marine and Freshwater Ecosystems* 15(6): 573-581. (in English). ["1. In central Italy mountain ponds represent an important habitat for the conservation of dragonflies; however, human disturbance of these fragile environments is threatening the stability of their biodiversity. 2. Thirty-one ponds, ranging in altitude from 1014 to 2004 m, were qualitatively sampled for odonate larvae twice during 1998. On each occasion a range of physical, chemical and biotic habitat variables were also measured. 3. The mountain ponds sampled had fewer species of Odonata than lowland ponds, and there was a large presence of pioneer species. 4. Multiple regression analysis showed that the number of odonate species was positively affected by the amount of macrophyte coverage of the pond surface and negatively affected by increasing ammonium concentration. 5. A Canonical Correspondence Analysis revealed that species number decreased with altitude, chlorophyll a and phosphorus concentrations. The presence/absence of each odonate species was weakly related to the habitat variables. 6. The intensive use of ponds for livestock watering results in damage to the peripheral vegetation, which tends to cause high turbidity and lower macrophyte coverage of the pond water. The inevitable outcome in these situations is a reduction of the odonate diversity." (Authors)] Address: Carchini, G., University of Tor Vergata, Department of Biology, via della Ricerca Scientifica, 00133, Roma, Italy. E-mail: carchini@uniroma2.it

5525. Chazal, A.C. (2005): Lepidoptera and Odonata surveys of Colonial National Historical Park, James City, Surry, and York counties, Virginia. Natural Heritage Technical Report 05-05. Virginia Dept of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. Unpublished report submitted to Colonial National Historical Park. May 2005 : 49 pp. (in English). ["[...] Between May-July 2003 and April-October 2004, DCR-DNH conducted surveys over 18 days covering 17 different habitats, which were categorized into 6 habitat types: developed areas, fields, forested uplands, forested wetlands, marshes, and water (i.e. freshwater ponds). [...] 42 species of Odonata were observed. [...] The field habitats also had the highest species diversity and second highest totals (forested wetlands had higher totals) for Odonata. [...] 5 watch-listed species were observed: Aaron s Skipper (*Poanes aaroni*), *Anax longipes*, *Sympetrum ambiguum*, *Ischnura prognata*, and *Telebasis byersi*. All of these watch-listed species are considered common to very common and secure across their global ranges. The results of this survey represent 37 new county records for Lepidoptera and 26 for Odonata. Species accumulation curves indicate that further surveys for Lepidoptera and Odonata may increase the known fauna of COLO." (Author)] Address: <http://www.nps.gov/applications/nature/documents/1Report%20Odonates%20COLO.pdf>

- 5526.** Clancy, S. (2005): Reports from Coastal stations - 2004: Dungeness area, Kent. *Atropos* 24: 60-62. (in English). [*Anax parthenope*, *Sympetrum fonscolombii*, *Calopteryx splendens*, strong colony (max. 250 individuals, 30 couples) of *Erythromma viridulum* with continuing colonisation of new habitats.] Address: not stated
- 5527.** Clausnitzer, V.; Dijkstra, K.D. (2005): Honouring Nobel Peace Prize winner Wangari Maathai: *Notogomphus maathaiae* sp. nov., a threatened dragonfly of Kenya's forest streams (Odonata: Gomphidae). *International Journal of Odonatology* 8(2): 177-182. (in English). ["*Notogomphus maathaiae* sp. nov. (holotype male: Kenya, Western Province, Mt Elgon District, Mt Elgon, Rongai River, 2,361 m a.s.l., 1°02'19.4"N, 34°45'20.5"E, 06 vi 2000) is described from a series of 8 males and 3 females collected at montane forest streams in Kenya. The status and biogeography of this and other montane species are discussed." (Authors)] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@gmx.de
- 5528.** Córdoba Aguilar, A.; Cordero Rivera, A. (2005): Evolution and ecology of Calopterygidae (Zygoptera: Odonata): Status of knowledge and future research perspectives. *Neotropical Entomology* 34(6): 861-879. (in English, with Portuguese summary). ["We review the studies of evolution and ecology in the Calopterygidae. Adults are easily distinguished for their pigmented wings and territorial behaviour. Three genera have been well studied: *Hetaerina*, *Calopteryx* and *Mnais*. Larvae develop in riverine aquatic environments. Selection operates at this stage to produce large muscle mass for adults. The adult spends some days until sexually ready. During this time, it feeds extensively to produce muscle fat for egg production and flight. However, gregarine parasites may ingest the fat reserves. Males may use two mating tactics or strategies that may be genetically (*Mnais*) or environmentally (*Calopteryx* and *Hetaerina*) determined: territoriality and nonterritoriality. In *Mnais*, these strategies appear balanced in fitness terms. Males of *Calopteryx*, *Mnais* and *Phaon* show a precopulatory courtship that is not the case for *Hetaerina*. Male wing pigmentation seems to signal how good the male is to deal immunologically with parasites to females during the male courtship. During copulation, males displace the sperm the female has stored in the storage organs from previous matings. There is an enormous variation in male sperm displacement mechanisms and ability, and in genitalic morphology in both sexes. This variation possibly results from a coevolutionary game between the sexes to control stored sperm. After copulation, males guard females apparently to avoid that other males take the female in copulation. Our review suggests sources for research in this family." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx
- 5529.** Costa, J.M. (2005): *Chalcopteryx machadoi* sp. n. da região norte do Brasil (Zygoptera: Polythoridae) with a key to the species of the genus. *Lundiana* 6(suppl.): 37-40. (in Portuguese, with English summary). ["*C. machadoi* n. sp. from northern Brasil (Zygoptera, Polythoridae). A new species, is described and illustrated from a single male collected in the state of Pa-
- ra, Brazil (holotype male : Santo Antonio do Taua, 8.I.1999) and deposited in the Museu Nacional, Rio de Janeiro, Brazil. This species can be distinguished from others by the colour pattern of the wings. In *Chalcopteryx machadoi* sp. n. the four wings are hyaline. An identification key is provided for the species of the genus." (Author)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@univsys.com.br
- 5530.** Cottureau, V. (2005): Recherche d'une relation entre Odonates, pratiques piscicoles et végétation. *Martinia* 21(3): 91-107. (in French, with English summary). [In the Brenne Natural Regional Park, France, 24 ponds with different intensity levels of fish farming were studied for the trade-offs between farming practise, vegetation structure and odonate fauna. Nutrient deposition and hydrophytic plants are the most important parameters influencing odonatological communities.] Address: Cottureau, Valérie, 34 rue Henride montherlant, F-56000 Vannes, France. E-mail: lierre@netcourrier.com
- 5531.** Daguet, C. (2005): Dragonfly Conservation from the BDS. Key sites. *Atropos* 25: 70-71. (in English). [Brief report on the current activities of the British Dragonfly Society to document Odonata data sets from monitored localities.] Address: Daguet, Caroline, English Nature North Mercia Team, Attingham Park, Shrewsbury, Shropshire SY4 4TW, UK. E-mail: caroline.daguet@english-nature.org.uk
- 5532.** Darblade, S.; Ducout, B. (2005): Première observation de *Trithemis annulata* (Palisot de Beauvois, 1805) dans le département des Landes (Odonata, Anisoptera, Libellulidae). *Martinia* 21(3): 123-125. (in French, with English summary). [2-VII-2005; at two localities several males and immature males of *T. annulata* were observed. This note on a most recent range extension of the species in France contains also a brief description of the habitats and a checklist of the co-occurring species.] Address: Darblade, Stéphanie, 4 allée des Mimosas, F-40140 Soustons, France. E-mail: s.darblade@tiscali.fr
- 5533.** Dayton, G.H.; Saenz, D.; Baum, K.A.; Langerhans, R.B.; DeWitt, T.J. (2005): Body shape, burst speed and escape behavior of larval anurans. *Oikos* 111: 582-591. ["Variation in behavior, morphology and life history traits of larval anurans across predator gradients, and consequences of that variation, have been abundantly studied. Yet the functional link between morphology and burst-swimming speed is largely unknown. We conducted experiments with two divergent species of anurans, *Scaphiopus holbrookii* and *Rana sphenoccephala*, to examine how behavior and morphology influence predator (*Anax junius*) vulnerability, and whether tadpole shape is related to burst-swimming performance. *S. holbrookii*, a species that typically uses ephemeral pools, was more active, exhibited slower burst speeds, and was more susceptible to predation than *R. sphenoccephala*, a species associated with more permanent aquatic sites. Our analysis of morphology and burst speed defined a shared axis of shape variation associated with burst-swimming speed regardless of species. Tadpoles with a deeper tail fin and muscle and a smaller body produced faster speeds. The nature and breadth of the morphology /speed relationship suggests

it may represent a generalized ecomorphological paradigm for larval anurans." (Authors)] Address: Dayton, G.H., Section of Ecology and Evolutionary Biology, Dept of Wildlife and Fisheries Sciences, Texas A&M Univ., Tamus 2258, College Station, TX 77843-2258, USA. E-mail: gdayton@tamu.edu

5534. De Marco, P.; Vianna, D.M. (2005): Distribuição do esforço de coleta de Odonata no Brasil – subsídios para escolha de áreas prioritárias para levantamentos faunísticos. *Lundiana* 6 (suppl.): 13-26. (in Portuguese, with English summary). ["Distribution of Odonata sampling effort in Brasil – basis for choosing priority areas for faunistic inventories: There is an urgent need to prioritize conservation areas, so that the invested resources protect as much biodiversity as possible, especially in developing countries. A way to select such areas is to estimate the biodiversity distribution but this strategy is constrained by the lack of knowledge and/or by the inaccessibility of the available information on species distribution. Based on a database on Odonata distribution in Brazil, it is shown that the sampling-effort and the largest numbers of recorded odonate species and genera are concentrated in areas with large number of researchers. The 6203 records employed here are distributed in only 29% of the national territory. The species richness is concentrated mainly in the states of Rio de Janeiro, Minas Gerais and São Paulo, in the Amazon River varzea and in some isolated points, such as Cuiabá (Mato Grosso state). We suggest that the sampling and inventory efforts are increased for Odonata, especially in the Brazilian northeast and areas in the Brazilian and Guyana Shields, for which there is practically no information available." (Authors)] Address: De Marco, P., Laboratório de Ecologia Quantitativa, Universidade Federal de Viçosa, 36570-000, Viçosa, MG, Brasil. E-mail: pdemarco@ufv.br

5535. De Marco, P.; Latini, A.O.; Resende, D.C. (2005): Thermoregulatory constraints on behavior: Patterns in a neotropical dragonfly assemblage. *Neotropical Entomology* 34(2): 155-162. (in English, with Portuguese summary). ["Odonate species are classified in terms of their thermoregulatory behavior into flier and percher categories. Larger perchers could be more efficient thermoregulators in sunny sites and smaller perchers depend more on air temperature. In this paper, an analysis of the behavioral temporal budget of an odonate neotropical assemblage was performed to determine the role of body size on territorial defense and general behavioral strategies. This analysis revealed three groups based on time budget. The first and second groups contained the species that remained perched for most of the activity time, but species of the first group differ from the second group by the larger proportion of transition flights. The third group contained species which were usually observed patrolling or in reproductive activities. The larger species spent more time in patrol and territorial defense activities, while smaller species remained perched. Larger dragonflies, with better thermoregulatory abilities could spend more time in reproductive activities. The behavioral classification of fliers and perchers is considered extremely useful but could oversimplify the behavioral patterns among species that have a wide body size variation. It is proposed that a behavioral continuum associated with the body size variation in perchers could explain some patterns of species interactions in odonate communities." (Au-

thors)] Address: De Marco, P., Depart. Biologia Geral, Universidade Federal de Viçosa, Minas Gerais, Brazil

5536. De Marmels, J.; Garrison, R.W. (2005): Review of the genus *Leptagrion* in Venezuela with new synonymies and descriptions of a new genus, *Bromeliagrion*, and a new species, *B. rehni* (Zygoptera: Coenagrionidae). *Canadian Entomologist* 137: 257-273. (in English, with French and Spanish summaries). ["Type material of poorly known taxa currently placed under the genera *Leptagrion* Selys and *Tagrion* Selys is reviewed, illustrated, and correctly associated with currently known specimens in collections. The following changes are made: *Leptagrion beebeanum* Calvert and *Leptagrion fernandezianum* Racenis are placed and keyed in a new genus, *Bromeliagrion* De Marmels gen. nov.; *Bromeliagrion rehni* Garrison sp. nov. is described from Ecuador. The following synonymies are proposed: *Leptagrion auriceps* St. Quentin is a junior synonym of *Leptagrion macrurum* (Burmeister); *Leptagrion autazensis* Sjöstedt is a junior synonym of *Aeolagrion flammeum* (Selys); *Leptagrion rufum* Selys is a junior synonym of *Anisagrion inotatum* (Selys); and *Leptobasis tenax* St. Quentin is a junior synonym of *Tagrion longum* Selys." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5537. Deans, M. (2005): Reports from Coastal stations - 2004: Basdsey Peninsula, Suffolk. *Atropos* 24: 68-69. (in English). ["Odonata were poorly represented with one *Aeshna mixta* and *Sympetrum striolatum* occasionally trapped at MV light (singles on 12, 17 & 26 September)."] Address: not stated

5538. Deliz Quiñones, K.Y. (2005): Water quality assessment of a tropical freshwater marsh using aquatic insects. Thesis M.S., Biology, University of Puerto Rico, Mayagüez Campus: 127 pp. (in English, with Spanish summary). [Laguna Cartagena, located in the municipality of Lajas, is the only natural freshwater lagoon of Puerto Rico. The lagoon gives refuge to many animal and plant species, some of them endemic and endangered. Agriculture in contiguous lands has caused sedimentation and eutrophication, affecting not only the hydrology of the lagoon but also its capacity to sustain a high diversity of aquatic life. To restore the lagoon, its actual condition was assessed based on the physical-chemical [...] and biological characteristics (aquatic insects) of two sites on the southwestern section of the lagoon. A total of 67 insect species in 33 families were collected, including 17 odonate taxa. For the full paper see: <http://grad.uprm.edu/tesis/delizquinones.pdf>] Address: Deliz Quiñones, Katherine Y., no further details

5539. Della Bella, V.; Bazzanti, M.; Chiarotti, F. (2005): Macroinvertebrate diversity and conservation status of Mediterranean ponds in Italy: water permanence and mesohabitat influence. *Aquatic Conserv. Mar. Freshw. Ecosyst.* 15: 583-600. (in English). ["1. In Italy small water bodies, especially temporary ones, have been little studied. As a consequence, their conservation value as a biodiversity resource is often overlooked despite Mediterranean temporary waters being listed as a priority habitat in the Habitats Directive (92/43/EEC). 2. A monitoring programme was designed to determine which factors influence pond species richness,

and to analyse the variation in macroinvertebrate community structure within and among ponds. Three main contrasting mesohabitats (macrophyte beds, littoral sediments and central sediments) were defined within 21 ponds (8 permanent and 13 temporary) along the Tyrrhenian coast of Italy near Rome, from which invertebrate macrofauna was collected in March, May and June 2002. 3. The main environmental factors influencing the number of species in ponds were hydroperiod length, depth, surface area, dissolved oxygen concentration and macrophyte species richness. Temporary ponds contained a smaller number of taxa than permanent ponds, but both types of ponds supported similar numbers of rare and threatened species. The total number of species, and in particular Coleoptera, Odonata, and Hemiptera, was higher in macrophyte beds than in both littoral and central sediments. 4. Multivariate analysis (non-metric multidimensional scaling) showed that the overall variation in assemblage composition was greater between temporary and permanent ponds than among mesohabitats, suggesting that environmental variables, such as hydroperiod, have a stronger effect on macroinvertebrate communities than substratum type. 5. In terms of species of conservation interest, this study suggests that both pond types and all mesohabitats should be considered in order to obtain a correct evaluation of pond conservation value." (Authors) The list of Oonata includes 16 species.] Address: Valentina Della Bella, Department of Animal and Human Biology, University of Rome La Sapienza, Viale dell'Universita` 32, 00185 Rome, Italy. E-mail: valentina.dellabella@uniroma1.it

5540. Dewick, S. (2005): Reports from Coastal stations - 2004: Bradwell-on-Sea, Essex. *Atropos* 24: 65-67. (in English). [United Kingdom; a list of 19 odonate species is communicated including *Erythromma najas*, *E. viridulum* ("well down in numbers from the extreme abundance in 2003"), and *Brachytron pratense* ("better than recent years".] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

5541. Dijkstra, K.-D.; Branson, A.; Lewington, R. (2005): A proposal for European standard names for the Odonata of Europe, Turkey and north-west Africa. *Atropos* 25: 37-43. [Existing and proposed British and Irish, and American names of the regional odonate fauna are compared in a table.] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5542. Dijkstra, K.D. (2005): A review of continental Afrotropical *Ceriagrion* (Odonata, Coenagrionidae). *J. Afrotrop. Zool.* 2: 3-14. ["The taxonomy of the *Ceriagrion* species of continental tropical Africa is discussed and a key provided. *C. annulatum* is not synonymous with *C. sanguinostigma*, but *Argiocnemis umbargae* is considered a junior synonym of *C. annulatum*, and *C. platystigma* with *C. sanguinostigma* of *C. varians*. The oriental genus *Argiocnemis* does not occur in Africa. The identities of *C. citrinum* and *C. ignitum* are clarified and the first records of *C. ignitum* and *C. mourae* since their descriptions are provided. The taxonomy of the complex of species including *C. hamoni*, *C. moorei*, *C. sakejii*, *C. suave* and possibly some Malagasy species remains unresolved, although at least *C. hamoni* and *C. moorei* are suspected to be conspecific with *C. suave*. The variability of *C. glabrum* is addressed in relation to the taxon *longispinum*." (Author)] Address: Dijkstra,

K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5543. Dijkstra, K.-D. (2005): Taxonomy and identification of the continental African *Gynacantha* and *Heliaeschna* species (Odonata: Aeshnidae). *International Journal of Odonatology* 8(1): 1-32. (in English). ["The taxonomy of the *Gynacantha* and *Heliaeschna* species from continental Africa is problematic, and available keys are unsatisfactory. 'Traditional' characters such as venation and 'innovative' ones like abdominal denticulation are evaluated and their variability is measured and discussed. *G. quadrina* is a synonym of *G. africana* and not of *G. vesiculata*, *G. ochraceipes* is regarded a synonym of *G. vesiculata*, *G. victoriae* of *G. bullata*, *G. flavipes* and *G. sevastopuloi* of *G. nigeriensis*, *G. zuluensis* of *G. usambarica*, and *H. ukerewensis* of *H. trinervulata*. Analysis of the complex of large *Heliaeschna* species provides no basis for separating species and *H. lanceolata*, *H. libyana* and *H. mymondi* are treated as synonyms of the single variable species *H. fuliginosa*. The first records of *G. immaculifrons* and of specimens near *H. longfieldae* since their descriptions are provided. The probable male of *H. longfieldae* is diagnosed. Remarkable heterogeneity of characters in *G. manderica*, *G. villosa* and *H. longfieldae* is described. This may have taxonomic relevance, but study of more specimens is required. Afrotropical *Gynacantha* species can be assigned to three groups: the *africana*-, *bispina*- and *bullata*-groups. It is suggested that *Gynacantha* and *Heliaeschna* may not be monophyletic and that the *africana*-group may be more closely related to African *Heliaeschna* than to the other *Gynacantha* groups. Keys to the species of *Gynacantha* and *Heliaeschna* are provided for both sexes. Identification is still tentative for females of some species." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5544. Dinger, E.C.; Cohen, A.E.; Hendrickson D.A.; Marks, J.C. (2005): Aquatic invertebrates of Cuatro Ciénegas, Coahuila, México: Natives and exotics. *Southwestern Naturalist* 50: 237-281. (in English, with Spanish summary). [A recent survey of benthic macroinvertebrates of the Cuatro Cienegas basin found 118 species in the 21 sites collected. Four exotic macroinvertebrates that could threaten the native biota were found within or near the basin. The list includes 24 taxa, in most cases identified on the species level] Address: Dinger, E.C., Merriam-Powell Center for Ecological Research, Department of Biology, Northern Arizona University, Box 5640, Flagstaff, AZ 86011, USA. E-mail: ecd2@dana.ucc.nau.edu

5545. Dobson, C. (2005): Odonata names. *Atropos* 24: 82. (in English). [Contribution to the discussion of vernacular names in Odonata.] Address: Dobson, C., 3 St. Hugh's Drive, Langworth, Lincoln, LN3 5DB, UK

5546. Dommanget, J.-L. (2005): Analyse d'ouvrage: Odonata. *Les Libellules de Suisse*. *Martinia* 21(4): 77-79. (in French). [Extensive review of Wildermuth, H. et al. (2005) (see OAS 5005).] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5547. Dommanget, J.-L.; Meurgey, F. (2005): Rencontres odonatologiques ouest-européennes, Nantes, Vallet (Loire-Atlantique, France), 24-27 juin 2005. Premier bilan. *Martinia* 21(3): 123-129. (in French, with English summary). [Report of the west European mee-

ting held in Nantes and Vallet, France between 24 and 27 June, 2005. The paper includes some records from field trips] Address: Dommaget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5548. Dommaget, J.-L. (2005): Une population de *Coenagrion mercuriale* (Charpentier, 1840) à proximité de Saint-Affrique (Département de l'Aveyron) (Odonata, Zygoptera, Coenagrionidae). *Martinia* 21(4): 69-75. (in French, with English summary). ["A population of *C. mercuriale* has been discovered and studied in the neighbourhood of Saint-Affrique, France. The habitat consists of a main brook flowing through a meadow and of a brooklet flowing along the edge of a road. The main features of the odonatological population are presented, and the possible influence of a busy road that separates this population in two parts is discussed." (Author)] Address: Dommaget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

5549. Dudley, S. (2005): Vernacular names for British and European dragonflies. *Atropos* 24: 80-82. (in English). [Extensive outline on vernacular names in Odonata.] Address: Dudley, S., 3 Crowtree Cottages, Farcet Fen, Huntingdonshire, PE7 3DL, UK

5550. Duncan, J.R. (2005): Manitoba Dragonfly Survey. Citizen's Monitoring Guide. <http://www.naturenorth.com/dragonfly/MB%20Dragonfly%20Survey%20Guide%202005%20all.pdf>: 40 pp. (in English). [Handbook directed to coworkers in the the Manitoba (Canada) dragonfly survey project including a checklist of the regional odonate fauna, colour pictures, advise on morphological important features etc.] Address: Wildlife & Ecosystem Protection Branch, Manitoba Conservation Box 24, 200 Saulteaux Crescent, Winnipeg, MB R3J 3W3

5551. Eldredge, N.; Thompson, J.N.; Brakefield, P. M.; Gavrillets, S.; Jablonski, D.; Jackson, J.B.C.; Lenski, R.E.; Lieberman, B.S.; McPeck, M.A.; Miller III, W. (2005): The dynamics of evolutionary stasis. *Paleobiology* 31(2): 133-145. (in English). ["The fossil record displays remarkable stasis in many species over long time periods, yet studies of extant populations often reveal rapid phenotypic evolution and genetic differentiation among populations. Recent advances in our understanding of the fossil record and in population genetics and evolutionary ecology point to the complex geographic structure of species being fundamental to resolution of how taxa can commonly exhibit both short-term evolutionary dynamics and long-term stasis." (Authors) The paper contains a section on *Enallagma*.] Address: Eldredge, N., Division of Paleontology, American Museum of Natural History, Central Park West at Seventy-ninth Street, New York, New York 10024. E-mail: epunkeek@amnh.org

5552. Ellenrieder, N. von; Garrison, R.W. (2005): A synopsis of the South American genus *Gomphomacromia* (Odonata: Gomphomacromiinae). *International Journal of Odonatology* 8(1): 81-96. (in English). ["*Gomphomacromia mexicana* is shown to be a junior synonym of *G. chilensis* based on a comparison of the holotype male with the original description of *G. chilensis* and specimens identified as that species from Chile. Examination of a large series of specimens from central and southern Chile and Argentina identified both as *G. paradoxa* and *G. etcheverryi* shows the proposed diagnostic characters for the two taxa variable, thus *G. etcheverryi* is considered a junior synonym of *G. para-*

doxa. Illustrated keys, distribution maps and a cladistic analysis for the four known species of the genus are provided." (Authors)] Address: Ellenrieder, Natalie von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

5553. Ellenrieder, N. von (2005): Taxonomy of the South American genus *Phyllopetalia* (Odonata: Austropetaliidae). *International Journal of Odonatology* 8(2): 311-352. (in English). ["This synopsis of adult *Phyllopetalia* includes the synonymy of four genera (*Phyllopetalia* senior subjective synonym of *Rheopetalia*, *Odontopetalia*, *Eurypetalia* and *Ophiopetalia*), four species and one subspecies (*P. apicalis* senior subjective synonym of *Rheopetalia rex* and *R. apicalis decorata*, and *P. pudu* senior subjective synonym of *Ophiopetalia araucana*, *O. auregaster* and *O. diana*). *P. excrescens* and *F. alta-rensis* are redescribed, and a neotype is designated for the latter. Keys to adults, illustrations of all diagnostic characters, and distribution maps of all species are provided." (Author)] Address: Ellenrieder, Natalie von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

5554. Ferreras-Romero, M.; Fründ, J.; Márquez-Rodríguez, J. (2005): Sobre la situación actual de *Lestes macrostigma* (Eversmann, 1836) (Insecta: Odonata) en el área de Doñana (Andalucía, sur de España). *Boln. Asoc. esp. Ent.* 29(3-4): 41-50. (in Spanish, with English summary). ["In recent years, in the Doñana protected area (southern Spain), true or apparent extinction of several dragonfly and damselfly populations have taken place. *L. macrostigma*, was frequently recorded in the recent past, and considered common in some localities. Possible causes of the present state are briefly discussed." (Authors)] Address: Ferreras-Romero, M., Departamento de Ciencias Ambientales (Zoología), Universidad Pablo de Olavide, Ctra. de Utrera km. 1, 41013 Sevilla, Spain. E-mail: ferreras@teleline.es

5555. Fincke, O.M.; Jödicke, R.; Paulson, D.R.; Schultz, T.D. (2005): The evolution and frequency of female color morphs in Holarctic Odonata: why are male-like females typically the minority? *International Journal of Odonatology* 8(2): 183-212. (in English). ["We compiled data on the occurrence and frequency of distinct female variants among Holarctic Odonata and interpreted the data in light of harassment-based hypotheses. The major source of male confusion for male mimicry hypotheses is predicted to be signal similarity between andromorphs and male distractors; for the learned mate recognition hypothesis (LMR), it is predicted to be variation in female signals. Mapping morphism state onto molecular phylogenies of *Ischnura* and *Enallagma* failed to resolve the general ancestral female condition. However, it appeared that the andromorphic state may be ancestral in one case, and that blue structural colors were ancestral to orange and green pigmentations. Of the polymorphic species surveyed, 13% had more than two morphs, 4% had multiple heteromorphs but no andromorph, and 7% of 'monomorphic' congeners were functionally polymorphic because developmental variants mate. Such female signal variation lies beyond the scope of simple male mimicry, but nevertheless should exacerbate a male's problem in searching for mates. Andromorphs were the majority morph in at least some populations of 17% of the species for

which data were available. Andromorph frequencies of *Enallagma* species were generally higher than in *Ischnura* species, as expected if *Ischnura* andromorphs have higher signal apparency. Andromorph frequency varied significantly across habitats and species, as expected if per capita harassment and signal apparency vary among habitats. Quantification of signal apparency and per capita harassment across populations and among species is required to more rigorously test the extent to which variation in signal crypsis can explain observed variation in morph frequencies." (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

5556. Fischer, U. (2005): Entomofaunistisches Monitoring im Rahmen der Umsetzung der EU-FFH-Richtlinie im Freistaat Sachsen - Untersuchungszeitraum 2004/2005. Mitt. Sächs. Entomol. 72: 20-24. (in German). [Sachsen, Germany; brief assessment of the current status of *Stylurus flavipes* and *Leucorrhinia albifrons*.] Address: Fischer, U., Anton-Günther-Str. 12, D-08340 Schwarzenberg, Germany

5557. Forrest, P.J. (2005): Southern Emerald Damselfly *Lestes barbarus* (Fabr.) at Sandwich Bay, Kent. *Atropos* 24: 24-25. (in English). [*L. barbarus* was intensively surveyed throughout July and August 2004 at Sandwich Bay, Kent, UK. The population accounted at least 15 specimens on 5-VIII-2004.] Address: Forrest, P.J., Flat 3, No. 8 Chandos Square, Broadstairs, Kent, CT10 1QN, UK

5558. Gaedecke, D.; Kasperski, J. (2005): Die natürlichen Grundwasseraustritte in der Naukluft und ihrer Umgebung (Namibia): Hydrogeologische Situation und ökologische Bewertung. Diplomarbeit. Institut für Umweltgeologie. Technische Universität Carolo-Wilhelmina zu Braunschweig: 12 + 92 pp. (in German, with English summary). ["The study of permanent spring discharges with special focus on the hydrogeological situation and ecological valuation, took place in the karstified Naukluft and Tsaris Mountains (central Namibia). In a total area of about 2500 km² 31 effluent seepages were sampled and investigated. The inspected springs varied from small water filled pools without vegetation to large spring brooks, stretching for several kilometres, and fringed by a forest. All analysed water samples fulfilled the Namibian standards for drinking water and held no risk to health. This classification only refers to the physico-chemical characteristics of the water samples, as a bacterial investigation did not yet take place. Referring to the Namibian guideline for the evaluation of drinking water (1991) six samples were of excellent water quality, the other 25 samples were of good quality. According to the WHO (2004) 23 samples fulfilled the requirements of drinking water. Applying the German drinking water decree (TVO, 2003) only nine water samples can be declared as drinkable. We suppose that all examined springs are fed by groundwater from aquifers which lay just below the surface. These aquifers seemed to have a low retention capacity and are mainly influenced by air temperature. In addition the aquifers consist of at least two groundwater levels which are probably not connected with each other. The inferior groundwater level might be fossil (boreholes up to 120 m). In order to test the suitability of Odonata as bioindicators for the quality of Namibian springs its distribution was correlated with test results and the local factors.

The potential diversity of the Odonata consists of nine Zygoptera and 21 Anisoptera species. During the field work 25 of these species were identified in the investigation area which can be deemed to be an isolated habitat. The physico-chemical properties of the spring waters did not seem to be a limiting factor for the distribution of the Odonata. Due to the almost unknown relations between environmental factors and the occurrence of species respectively communities no bioindicator could be defined. To strengthen the results of this study a hydrogeological, climatical and biological monitoring is needed." (Authors)] Address: c/o Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

5559. Gamble, D.L.; Washburn, S.W.; Mitsch, W.J. (2005): Macroinvertebrate abundance and diversity in two ten-year-old created wetlands. 2004 Annual report (Olentangy River Wetland Research Park): 109-124. (in English). [For details see: <https://kb.osu.edu/dspace/bitstream/1811/5903/1/%2804%29+2.13+Macroinverts.pdf>] Address: not stated

5560. Garrison, R.W.; Ellenrieder, N. von (2005): *Neuragrion mysticum* (Odonata: Megapodagrionidae) demystified. *Canadian Entomologist* 137: 169-173. (in English, with French summary). ["Based on circumstantial evidence, *Neuragrion mysticum* Karsch, 1891 is considered a junior synonym of *Heteropodagrion sanguinipes* Selys, 1885. Annotated wing scans for *H. sanguinipes* and *Mesagrion leucorrhinum* Selys, 1885, species originally compared to *N. mysticum*, are provided." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5561. Gawroński, A. (2005(2004)): New localities of dwarf dragonfly *Nehalennia speciosa* (Odonata: Coenagrionidae) in northern Poland. *Przegląd Przyrodniczy* 15(1-2): 126-127. (in Polish, with English summary). [Two new localities (Bytów, Chojnice) with records from 2003 and 2004 of *N. speciosa* in Poland are documented. The habitats are briefly described.] Address: not stated

5562. González-Soriano, E. (2005): The female of *Paltothermis cyanosoma* Garrison (Odonata: Libellulidae). *Folia Entomol. Mex.* 44 (Suppl. 1): 107-110. (in English, with Spanish summary). [The female of *P. cyanosoma* is described and illustrated. A key to separate all species of *Paltothermis* is given.] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@ibiologia.unam.mx

5563. Grand, D. (2005): *Calopteryx haemorrhoidalis asturica* Ocharan, 1983: Nouvelle sous-espèce pour la faune de France (Odonata, Zygoptera, Calopterygidae). *Martinia* 21(4): 180. (in French). [Records of the subspecies of *C. haemorrhoidalis asturica* are documented, and the subspecific status is discussed with reference to wing coloration variability and "intermediate" forms between *C.H. asturica* and *C.h. occasi*.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France

- 5564.** Grand, D. (2005): Nouvelles observations en France de *Trithemis annulata* (Palisot de Beauvois, 1805) (Odonata, Anisoptera, Libellulidae). *Martinia* 21 (4): 167-168. (in French, with English summary). [Report on the spreading of *Trithemis annulata* to Pyrénées-Atlantiques, Landes and Languedoc regions, in the south of France.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France
- 5565.** Grebe, B.; Baierl, B.; Baierl, E. (2005): Libellen der Flusstäler Nordost-Griechenlands. Erstnachweis von *Somatochlora borisi* für Griechenland (Odonata: Corduliidae). *Libellula Supplement* 6: 1-14. (in German, with English summary). ["In late May 2001, forty species were recorded from a total of 30 localities in NE Greece, mainly from the catchment of the River Evros. *S. borisi* was recorded from three localities in the E Rhodopes. The species occurred in shady natural rivers with slowly running water." (Authors)] Address: Grebe, B., Oberdorfallee 7a, D-53909 Zülpich, Germany. E-mail: burkhard.grebe@t-online.de
- 5566.** Gregory, M.B. (2005): Microhabitat preferences by aquatic invertebrate influence bioassessment metrics in piedmont streams of Georgia and Alabama. Proceedings of the 2005 Georgia Water Resources Conference, held April 25–27, 2005, at the University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, The University of Georgia, Athens, Georgia.: 6 pp. (in English). ["The U.S. Geological Survey analyzed macro-invertebrate samples from woody debris and riffle habitats in 10 small Piedmont streams in Georgia and Alabama to determine if habitat preferences influence commonly used invertebrate community metrics. Eighty-seven commonly used metrics were compared, and 11 (13%) were found to be significantly different between habitats. Woody debris habitat had slightly higher taxa richness, whereas riffles had higher overall abundances and densities. Abundance metrics that differed significantly were Ephemeroptera, Plecoptera, and Trichoptera (EPT), Trichoptera, Corbicula, collector-gatherer, filtering-collector, and total abundance. Richness metrics that were significantly different were midge, Diptera, omnivore, and shredder. Corbicula richness (1 species) was the only richness metric that scored higher in riffle habitats. These results indicate that Piedmont biomonitoring studies that do not sample riffle habitat may underestimate sensitive EPT taxa because of a lack of habitat availability rather than changes in water-quality conditions. Furthermore, this study indicates the possible need for a correction factor to be applied to ecological condition metrics used by the State of Georgia that adjusts for the presence or absence of riffle habitat in Piedmont streams." (Author) The study includes a record of *Boyeria vinosa*.] Address: Gregory, M.B., U.S. Geological Survey, 3039 Amwiler Road, Suite 130, Peachtree Business Center, Atlanta, Georgia 30360-2824
- 5567.** Günther, A. (2005): Nachweise von in den Anhängen der Fauna-Flora-Habitat-Richtlinie gelisteten Libellenarten im Kreis Freiberg. *Mitteilungen des Naturschutzinstitutes Freiberg* 1: 29-34. (in German). [Saxonia, Germany; all the available data of *Ophiogomphus cecilia*, *Leucorrhinia albifrons*, and *L. pectoralis* are compiled.] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstraße 10, D-09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de
- 5568.** Guerbaa, K.; Lolive, N. (2005): Redécouverte de *Somatochlora flavomaculata* (Vander Linden, 1825) dans le département de la Haute-Vienne (Odonata, Anisoptera, Corduliidae). *Martinia* 21(3): 108. (in French). [Crouzille, Saint-Sylvestre, France, 1 male, 7/2003; Roussac, larva, 2003; Pioffray, Blond, 7/2004, autochthonous population of *S. flavomaculata*.] Address: Guerbaa, K., Société Limousine d'Odonatologie, 11, rue Jauvion, F-87000 Limoges, France
- 5569.** Gusztak, R.W.; MacArthur, R.A.; Campbell, K. L. (2005): Bioenergetics and thermal physiology of American water shrews (*Sorex palustris*). *Jour. Comp. Physiol. B* 175: 87-95. (in English). ["Rates of O₂ consumption and CO₂ production, telemetered body temperature (T_b) and activity level were recorded from adult and subadult water shrews (*Sorex palustris*) over an air temperature (T_a) range of 3–32 °C. Digesta passage rate trials were conducted before metabolic testing to estimate the minimum fasting time required for water shrews to achieve a postabsorptive state. Of the 228 metabolic trials conducted on 15 water shrews, 146 (64%) were discarded because the criteria for inactivity were not met. Abdominal T_b of *S. palustris* was independent of T_a and averaged 38.64±0.07 °C. The thermoneutral zone extended from 21.2 C to at least 32 C. Our estimate of the basal metabolic rate for resting, postabsorptive water shrews (96.88±2.93 J g⁻¹ h⁻¹ or 4.84±0.14 ml O₂ g⁻¹ h⁻¹) was three times the mass-predicted value, while their minimum thermal conductance in air (0.282±0.013 ml O₂ g⁻¹ h⁻¹) concurred with allometric predictions. The mean digesta throughput time of water shrews fed mealworms (*Tenebrio molitor*) or ground meat was 50–55 min. The digestibility coefficients for metabolizable energy (ME) of water shrews fed stickleback minnows (*Culaea inconstans*) and dragonfly nymphs (*Anax* spp. and *Libellula* spp.) were 85.4±1.3% and 82.8±1.1%, respectively. The average metabolic rate (AMR) calculated from the gas exchange of six water shrews at 19–22 °C (208.0±17.0 J g⁻¹ h⁻¹) was nearly identical to the estimate of energy intake (202.9±12.9 J g⁻¹ h⁻¹) measured for these same animals during digestibility trials (20 °C). Based on 24-h activity trials and our derived ME coefficients, the minimum daily energy requirement of an adult (14.4 g) water shrew at T_a = 20 °C is 54.0 kJ, or the energetic equivalent of 14.7 stickleback minnows.] Address: Gusztak, R.W., Department of Zoology, University of Manitoba, Winnipeg, Manitoba, R3T 2N2, Canada. E-mail: campbelk@ms.umanitoba.ca
- 5570.** Han, B.-y. (2005): Differences in composition and dynamic of insect and mite community among three types of tea gardens. *Journal of Tea Science* 25: 249-254. (in Chinese, with English summary). ["From July 2002 to July 2003, a survey on the species richness and abundance of insects and mites in the tea plant, the aerial space above the tea plant and on the ground from organic, non-pollution and common tea gardens were conducted in Magushan Mountains in the Southern Anhui Province. In total, 29018 individuals of 79 species from 41 families were recorded from a common tea garden, 35117 individuals of 81 species from 41 families were recorded from a non-pollution tea garden, and 12727 individuals of 102 species from 57 families were recorded from an organic tea garden. The tea green leafhopper, *Empoasca vitis*, abundance and its percentage accounted for the total abundance in organic, non-pollution and common tea garden were 5176

and 40%, 14049 and 40% as well as 17590 and 60%, respectively. Wasps, ground beetles, tiger beetles, rove beetles and ladybugs are the major natural enemies in tea gardens, whose species richness and abundance in organic, non-pollution and common tea garden were 40 and 2620, 33 and 1898 as well as 29 and 1610, respectively. In all the three types of tea gardens, species richness was higher from March to April and from September to October, and was lower from late November to middle January. Insect and mite abundance was high from April to June and from September to October, and was lower from July to August due to the warm weather as well as from December to January due to the cold weather. The abundance in the common tea garden fluctuated more than in other two types of tea gardens. Though the Insect and mite abundance was highest in the non-pollution tea garden, the pests did not cause serious damage because of the appropriate forecast and control. In the organic tea garden, the abundance was the lowest, while the species richness was the highest, and the energy paths were complicated and the community may be stable. At the present stage, most of the organic tea gardens in China are established among the mountains where vegetation is flourishing and biodiversity is high, such ecosystems may enhance natural control." (Author) Table 1 also contains "Libellulidae".] Address: HAN Bao-yu, Key Laboratory of Tea Chemical Engineering of Ministry of Agriculture; Tea Research Institute, Chinese Academy of Agricultural Sciences, Hangzhou 310008, China

5571. Hanschitz-Jandl, W. (2005): Erstfund von *Gomphus flavipes* an der bayerischen Donau (Odonata: Gomphidae). *Libellula* 24(3/4): 227-232. (in German, with English summary). ["On 20-VI-2005 the species was found for the first time emerging at the Bavarian section of River Danube. The locality and the circumstances of the record are described. Further records of Gomphidae are given from the River Danube and its floodplain in the Deggendorf district of Lower Bavaria, where now all five Gomphid species occurring in Bavaria have been recorded." (Author)] Address: Hanschitz-Jandl, W., Edenhofenstraße 7, D-94469 Deggendorf, Germany. E-mail: hanschitz-jandl@web.de

5572. Harris, A.; Foster, R. (2005): Vascular plant and odonate survey. Voyageurs National Park. Prepared for: The Great Lakes Network Inventory and Monitoring Program. Great Lakes Network Report GLKN/2005/01: 48 pp. (in English). [Minnesota, USA; "In 2004 we conducted surveys for odonate and vascular plant species in Voyageurs National Park. [...] 31 species of odonates (dragonflies and damselflies) were observed in the park. A preliminary list of potential species for the park was developed which includes odonate species known to occur in the park plus those expected to occur. We estimate that approximately 23-31% of 101-133 potential species is known from the park. Georeferenced locations of new and significant species are provided, as is a revised checklist of the vascular plants of Voyageurs National Park. A preliminary list of potential odonate species for the park is provided as well." (Authors) Available at: <http://www1.nature.nps.gov/im/units/glkn/Vascular%20Plant%20and%20Odonate%20Survey%20of%20Voyageurs%20National%20Park.pdf>]

5573. Harvey, R. (2005): Reports from Coastal stations - 2004: Minsmere RSPB Nature Reserve, Suffolk.

Atropos 24: 69-70. (in English). [*Anaciaeschna isoceles*, *Erythromma viridulum*] Address: not stated

5574. Hayashi, F.; Dobata, S.; Futahashi, R. (2005): Disturbed population genetics: Suspected introgressive hybridization between two *Mnais* damselfly species (Odonata). *Zoological Science* 22: 869-881. (in English). ["*Mnais costalis* and *M. pruinosa* are damselflies (Odonata: Calopterygidae) with low dispersal abilities, both during their aquatic stream-living immature stage and their flying adult stage. A previous nuclear DNA (nDNA) sequencing and morphology study showed that these two species are very closely related, and cohabit widely in western Japan. The two species, however, segregate microhabitats along a stream: *M. costalis* lives in the lower reaches, and *M. pruinosa* in the upper reaches. In this study, our analyses were based on mitochondrial DNA (mtDNA), which usually mutates faster and is more variable among individuals than nDNA, and which is inherited maternally. We found that most COI haplotypes were shared between the two species, and that for most study sites interspecific riverine genetic structures were not clarified by mtDNA analysis. Incongruent population genetic structures based on nDNA and mtDNA suggested hybridization and introgression of mtDNA between the two species." (Authors)] Address: Hayashi, F., Department of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji, Tokyo 192-0397, Japan. E-mail: fhayashi@comp.metro-u.ac.jp

5575. Helb, H.-W. (2005): Faunistische Untersuchungen im Aschbach-Tal des nördlichen Pfälzerwaldes bei Kaiserslautern - Erfassung der Libellen (Odonata), der Heuschrecken (Saltatoria), der Laufkäfer (Coleoptera, Carabidae) und der Vögel (Aves) als Beitrag zum Gewässerpflege- und -entwicklungsplan. *Annales scientifiques de la Réserve de Biosphère transfrontalière* 12 (2004-2005): 43-75. (in German, with French and English summaries). [Rhineland-Palatinate; 15 taxa are listed including *Ceriatrigon tenellum* which is recommended to be verified] Address: Helb, H.-W., Technische Universität Kaiserslautern, Fachbereich Biologie, Abt. Ökologie, Postfach 3049, D-67653 Kaiserslautern, Germany

5576. Helfrich-Förster, C. (2005): Organization of endogenous clocks in insects. *Biochemical Society Transactions* 33(5): 957-961. (in English). ["Insect and mammalian circadian clocks show striking similarities. They utilize homologous clock genes, generating self-sustained circadian oscillations in distinct master clocks of the brain, which then control rhythmic behaviour. The molecular mechanisms of rhythm generation were first uncovered in the fruit fly *Drosophila melanogaster*, whereas cockroaches were among the first animals where the brain master clock was localized. Despite many similarities, there exist obvious differences in the organization and functioning of insect master clocks. These similarities and differences are reviewed on a molecular and anatomical level." (Author) The paper includes references to Odonata resp. *Ischnura elegans*.] Address: Helfrich-Förster, Charlotte, Institut für Zoologie, Universität Regensburg, Universitätsstr. 31, D-93040 Regensburg, Germany. E-mail: charlotte.foerster@biologie.uni-regensburg.de

5577. Hoess, R. (2005): Libellen. *Berner Naturschutz* 7/2005: 8 pp. (in German). [Introduction into the regional odonate fauna and habitats of the region Bern,

Switzerland with focus on threats and conservation measures.] Address: Hoess, R., Normannenstrasse 35, CH-3018 Bern, Switzerland

5578. Hoess, R.; Rezbanyai-Reser, L. (2005): Libellen aus der Sammlung des Natur-Museum Luzern, insbesondere über Funde von zehn Arten an Lichtfanganlagen (Insecta: Odonata). Entomologische Berichte Luzern 54: 61-68. (in German). [The paper compiles 32 odonate species stored in the collection of the Natur-Museum Luzern, Switzerland. 10 species were caught by light traps, one (*Libellula quadrimaculata*) was caught in a pitfall trap. The records by traps are discussed in some detail.] Address: Hoess, R., Normannenstr. 35, CH-3018 Bern, Switzerland. E-mail: ReneHoess@1st.ch

5579. Hofmann, T.A.; Mason, C.F. (2005): Habitat characteristics and the distribution of Odonata in a lowland river catchment in eastern England. Hydrobiologia 539(1): 137-147. (in English). ["The influence of habitat characteristics on the distribution of larval and adult Odonata communities in a lowland river in eastern England was studied. There was a longitudinal distribution of Odonata, with larval assemblages being influenced directly by marginal flow velocity, biochemical oxygen demand (BOD) and phosphate concentrations and indirectly by shade and cover of floating vegetation. Adult populations responded directly to shade, reed cover, amenity-managed land use and bank height, and indirectly to BOD and ammonia concentrations. Distribution patterns were strongly associated with both natural changes along the river system and management impacts. River management practices locally disrupted the natural displacement of species along the river, but whilst some forms of human interference on river systems were beneficial to species richness, the effects on stenotopic species were disadvantageous. To conserve Odonata management emphasis should be on the maintenance of suitable conditions for river specialists." (Authors)] Address: Hofmann, Tanja, Department of Biological Sciences, University of Essex, Wivenhoe Park, Colchester, Essex, CO4 3SQ, UK. E-mail: tahofmp@essex.ac.uk

5580. Hopeman, M.M.; Abramson, Z.R. (2005): Sexual dimorphism in the Dark-winged damselfly *Calopteryx maculata*. University of Michigan Undergraduate Research Forum 2: 28-38. (in English). ["Pronounced sexual dimorphisms are suggestive of sexual selection. In *C. maculata*, a pronounced sexual dimorphism is seen in the degree of wing pigmentation; males have significantly darker wings than females. Territoriality in *C. maculata* makes it difficult to discern the function of sexual dimorphism. Previous studies have suggested that the degree of male wing pigmentation in a related species *C. haemoroidalis* may serve as a sexual signal to females or other males indicating their genetic quality. Various studies have shown that males of the species *C. haemoroidalis* with a higher degree of wing pigmentation are more likely to defend a territory, obtain more matings, have fewer gut parasites, and have larger fat reserves. In contrast, we found that there is no correlation between the degree of wing pigmentation and male mating or territorial success in *C. maculata*. We found that females were selective of territories but not of males. Our results suggest that the degree of wing pigmentation may play a role in species recognition by females." (Authors)] Address: Hopeman, Margare

ret, c/o Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

5581. Houard, X.; Archeray, C. (2005): Première observation en Normandie de *Sympetrum pedemontanum* (Allioni, 1766) à Lyons-la-Forêt (Eure) dans le bassin de l'Andelle (Odonata, Anisoptera, Libellulidae). *Martinia* 21(4): 151-156. (in French, with English summary). [The record of a *S. pedemontanum* specimen (21-VII-2005), "in Lyons-la-Forêt" in the "Eure" department (Northern Normandy, France), represents an outstanding event worthy enough to feed the debate on the climate change issue and the species dispersion. The new record of this species in Normandy should motivate the norman odonatologists in their regional atlas project." (Authors)] Address: Houard, X., CREN de Haute-Normandie, rue Pierre de Coubertin, BP424 76850 S'-Etienne-du-Rouvray Cedex, France. E-mail: x.houard@cren-haute-normandie.com

5582. Hunter, I. (2005): Reports from Coastal stations - 2004: Elms Farm, Icklesham, East Sussex. *Atropos* 24: 59-60. (in English). [A first record of *Erythromma viridulum* at the locality with a population peak of 140 individuals is documented.] Address: not stated

5583. Jacquemin, G. (2005): A propos de l'identification à distance des Odonates adultes. *Martinia* 21(4): 47-50. (in French, with English summary). ["Many current odonatological surveys are led by naturalists coming from birdwatching, trying to use the same visual identification methods. Considering the dangers of identification with binoculars in odonatology, the author stresses the necessity to make absolutely reliable identifications, by "catching-releasing" the specimens, everytime it is possible. Identification with binoculars must be used very carefully, only when capture has not been possible, and only by very experienced odonatists. Identification keys with binoculars are therefore useless, and even dangerous for inexperienced people." (Author)] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

5584. Jarman, N. (2005): Reports from Coastal stations - 2004: Kingsdown Beach and St. Margaret's at Cliffe, Kent. *Atropos* 24: 62-63. (in English). [A female *Erythromma viridulum* was observed at 29-VIII-2004 on the ornamental pond in the grounds of Walmer Castle.] Address: not stated

5585. Jeschke, J.M.; Tollrian, R. (2005): Effects of predator confusion on functional responses. *Oikos* 111: 547-555. (in English). ["When confronted with a swarm of their prey, many predators become confused and are less successful in their attacks. To shed light on the ecological, ethological and evolutionary consequences of predator confusion, we here investigate its effects on predator functional responses. We develop the first functional response model that considers confusion and compare it (1) qualitatively as well as (2) quantitatively to empirical data from two predator / prey systems, *Aeshna cyanea* / *Daphnia magna* (Crustacea) and *Chaoborus obscuripes* (Diptera) / *Daphnia obtusa*. (1) The qualitative comparisons show that, contrary to common belief, confusion does not necessarily lead to a dome-shaped functional response. The response can alternatively remain qualitatively unchanged and be affected only quantitatively. A non-dome-shaped respon-

se is thus no indication for the absence of predator confusion. The same is true for other swarming effects reducing foraging success, such as early warning of approaching predators. Our results hence question studies that have equated the absence of a dome-shaped response with the absence of a swarming effect. Our results also resolve the apparent paradox that swarming effects are quite common while dome-shaped functional responses are rather uncommon. (2) There is a good quantitative match between a parameterized version of our model and the empirically measured functional response in the *Chaoborus-Daphnia* system, suggesting that all crucial factors in this system are captured by the model." (Authors)] Address: Jeschke, J.M., Inst. of Ecosystem Studies, P.O. Box AB, Millbrook, NY 12545-0129, USA E-mail: jonathan.jeschke@gmx.net

5586. Jödicke, R. (2005): Bemerkungen zu *Coenagrion intermedium* (Odonata: Coenagrionidae). *Libellula Supplement 6*: 15-24. (in German, with English summary). ["The taxonomic history of this inhabitant of the island of Crete, Greece, is reviewed. During a fieldtrip to Crete in the second half of May 2000 I recorded *C. intermedium*, which was widespread and abundant. Additional measurements as well as notes on coloration, niche specificity and reproductive behaviour are given." (Author)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: IJOediting@aol.com

5587. Johansson, F.; Crowley, P.; Brodin, T (2005): Sexual size dimorphism and sex ratios in dragonflies (Odonata). *Biological Journal of the Linnean Society* 86(4): 507-513. (in English). ["Sexual size dimorphism and biased sex ratios are common in animals. Rensch's rule states that sexual size dimorphism (SSD) would increase with body size in taxa where males are larger than females and decrease with body size in taxa where females are larger. We tested this trend in dragonflies (Odonata) by analysing body size of 21 species and found support for Rensch's rule. The increase in SSD with increasing size among species can be explained by sexual selection favouring large males. We also estimated the slope of the relationship between sex ratio and size ratio in populations of the 21 species. A negative slope would suggest that the larger sex suffers from high mortality in the larval stage, consistent with riskier foraging. The slope of this relationship was negative, but after correcting for phylogenetic non-independence with independent contrasts the relationship was no longer statistically significant, perhaps because of phylogenetic inertia or low sample size." (Authors)] Address: Johansson, F., Dept of Ecology & Environmental Science, Animal Ecology Group, Umea Univ., 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

5588. Jordan, S.; Simon, C.; Foote, D.; Englund, R. A. (2005): Phylogeographic patterns of Hawaiian Megalagrion damselflies (Odonata: Coenagrionidae) correlate with Pleistocene island boundaries. *Molecular Ecology* 14: 3457-3470. (in English). ["The Pleistocene geological history of the Hawaiian Islands is becoming well understood. Numerous predictions about the influence of this history on the genetic diversity of Hawaiian organisms have been made, including the idea that changing sea levels would lead to the genetic differentiation of populations isolated on individual volcanoes during high sea stands. Here, we analyse DNA sequence data

from two closely related, endemic Hawaiian damselfly species in order to test these predictions, and generate novel insights into the effects of Pleistocene glaciation and climate change on island organisms. *Megalagrion xanthomelas* and *Megalagrion pacificum* are currently restricted to five islands, including three islands of the Maui Nui super-island complex (Molokai, Lanai, and Maui) that were connected during periods of Pleistocene glaciation, and Hawaii island, which has never been subdivided. Maui Nui and Hawaii are effectively a controlled, natural experiment on the genetic effects of Pleistocene sea level change. We confirm well-defined morphological species boundaries using data from the nuclear EF-1 α gene and show that the species are reciprocally monophyletic. We perform phylogeographic analyses of 663 base pairs (bp) of cytochrome oxidase subunit II (COII) gene sequence data from 157 individuals representing 25 populations. Our results point to the importance of Pleistocene land bridges and historical island habitat availability in maintaining inter-island gene flow. We also propose that repeated bottlenecks on Maui Nui caused by sea level change and restricted habitat availability are likely responsible for low genetic diversity there. An island analogue to northern genetic purity and southern diversity is proposed, whereby islands with little suitable habitat exhibit genetic purity while islands with more exhibit genetic diversity." (Authors)] Address: Englund, R.A., Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA. E-mail: englund@bishopmuseum.org

5589. Jourdain, B. (2005): Première mention de *Trithemis annulata* (Palisot de Beauvois, 1805) en Gironde (Odonata, Anisoptera, Libellulidae). *Martinia* 21(3): 114. (in French). [new range extension of *T. annulata* in France; 26-VI-2005, Villenave-d'Ornon, 3 males one female.] Address: Jourdain, B., Les Vergers, 8, rue du Docteur Roux, F-33320 Esyines, France. E-mail: jourdainbr@aol.com

5590. Kalkman, V.J. (2005): On the distribution of the genus *Ceriagrion* in the Balkans, including *C. georgifreyi*, a species new for the European fauna (Odonata: Coenagrionidae). *Libellula Supplement 6*: 25-32. (in English, with German summary). ["The distribution of *Ceriagrion* taxa occurring in the Balkans is presented. A diagnostic key for separating *C. tenellum* from *C. georgifreyi* is provided. The latter was recorded from Greece for the first time, and is an addition to the European fauna." (Author)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

5591. Kantzaris, V; Iliopoulou-Beorgudaki, J. (2005): A comparative study of the aquatic insects' fauna of four rivers in Greece. *Frensenius Environmental Bulletin* 14: 1097-1104. (in English). [The study includes Odonata on the genus level resp. *Calopteryx virgo*.] Address: Dept of Biology, Section of Animal Biology, University of Patras, 26500 Patras, Greece

5592. Kefford, B.J.; Papas, P.J.; Nugegoda, D. (2005): Relative salinity tolerance of macroinvertebrates from the Barwon River, Victoria, Australia. *Marine and Freshwater Research* 54(6): 755-765. (in English). ["Salinity levels are rising in many freshwater environments, yet there are few direct measurements of salinity tolerance of organisms likely to be salt sensitive. The relative salinity tolerance to artificial seawater of macroinver-

tebrates from the Barwon River in Victoria, Australia, was assessed by measuring the 72-h lethal concentrations required to kill 50% of individuals (LC50). LC50 values ranged from an electrical conductivity of 5.5 to 76 $\mu\text{S cm}^{-1}$ (mean 31 $\mu\text{S cm}^{-1}$, $n = 57$) and followed a log-normal distribution. The most salt-sensitive groups tested were Baetidae (LC50 value range: 5.5–6.2 $\mu\text{S cm}^{-1}$), Chironomidae (10 $\mu\text{S cm}^{-1}$) and several soft-bodied non-arthropods (Oligochaeta, Gastropoda, Nematomorpha, Tricladida and Hirudinea; 9–14 $\mu\text{S cm}^{-1}$). Other groups, from least to most tolerant, were non-baetid Ephemeroptera (>12.6–15 $\mu\text{S cm}^{-1}$), Plecoptera (>12.6–>20 $\mu\text{S cm}^{-1}$), Trichoptera (9–>26 $\mu\text{S cm}^{-1}$), Corixidae (18–26 $\mu\text{S cm}^{-1}$), non-corixid Hemiptera (33–44 $\mu\text{S cm}^{-1}$), Coleoptera (19–54 $\mu\text{S cm}^{-1}$), Hydracarina (39 $\mu\text{S cm}^{-1}$) and Odonata (30–55 $\mu\text{S cm}^{-1}$), and macrocrustaceans (Decapoda, Isopoda and Amphipoda; 38–76 $\mu\text{S cm}^{-1}$)." (Authors)] Address: Kefford, B.J., Department of Biotechnology and Environmental Biology, RMIT University, PO Box 71, Bundoora, 3083, Victoria, Australia. E-mail: ben.kefford@rmit.edu.au

5593. Kern, D. (2005): Les Libellules des manuscrits enluminés du Moyen Âge. *Martinia* 21(1): 35-42. (in French, with English summary). ["Following researches on representations of dragonflies in medieval manuscripts, the author presents 16 illustrations executed between 1234-40 and 1503-08. The descriptions of the representations are accompanied by some comments, the names of the species and the signification of these images." (Authors)] Address: Kern, D., Taxusweg 2, D-27232 Sulingen, Germany

5594. Kilimann, N.; Tomec, M. (2005): Die Libellen des Waldteichgeländes in Oberhausen. *Elektronische Aufsätze der Biologischen Station Westliches Ruhrgebiet* 1.9: 1-6. (in German). [Nordrhein-Westfalen, Germany; 26 odonate species are listed and some are discussed.] Address: Kilimann, N., Vinckestr.91, 44623 Herne, Germany. E-Mail: NKilimann@aol.com

5595. Knill-Jones (2005): Reports from Coastal stations - 2004: Isle of Wight. *Atropos* 24: 55-56. (in English). [*Erythromma viridulum* was recorded at 5 new locations; second record of *E. najas*; in addition, records of *Brachytron pratense*, *Orthetrum cancellatum*, *Sympetrum fonscolombii*, and *Anax parthenope* are documented.] Address: Knill-Jones, S.A., 2 School Green Road, Freshwater, Isle of Wight, PO40 9AL, UK

5596. Koch, K.; Suhling, F. (2005): Do behavioural and life-history traits vary with mate-guarding intensity in libellulid odonates? *Canadian Journal of Zoology* 83 (12): 1631-1637. (in English). ["It has been demonstrated that in libellulid dragonflies the distribution of eggs during oviposition and the offspring size vary with the type of mate guarding during oviposition (non-contact guarding and contact guarding). In this study, we investigated the hypothesis that oviposition behaviour and life-history traits also differ between these two guarding types. Therefore, we studied oviposition behaviour and life-history traits in six species of a dragonfly assemblage of the Namib Desert. Among the oviposition behaviours, oviposition duration and number of pond changes differed significantly between the guarding types. Clutch size did not differ between the guarding types, whereas some offspring characters, namely egg width, temperature sum to hatch, and larval head width, differed between the guarding types. Eggs of tan-

dem species (those performing contact guarding) were larger, which might explain differences in all other offspring characters studied; bigger eggs need a lower temperature sum for egg development, result in bigger larvae, and have a faster growth rate, all traits that might be seen as an adaptation to temporary waters, which are major habitats of the tandem species. This observation is discussed in the light of different dispersal strategies between the species performing different guarding types." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

5597. Kraft, P.G.; Wilson, R.S.; Franklin, C.E. (2005): Predator-mediated phenotypic plasticity in tadpoles of the striped marsh frog, *Limnodynastes peronii*. *Austral Ecology* 30(5): 558-563. (in English). ["We tested the phenotypic responses of larval striped marsh frogs (*Limnodynastes peronii*) to the odonate nymph predator, *Aeshna brevistyla*. When reared in the presence of dragonfly nymphs feeding upon conspecifics of *L. peronii* larvae the tadpoles showed a strong change in morphology. Morphological changes included an increase in total tail height, but also an unexpected marked change in head-body shape. In addition, we examined how tadpole development, as well as mass and length at metamorphosis, was affected by exposure to dragonfly nymphs. Larval development of *L. peronii* was strongly influenced by exposure to the predatory behaviour of dragonfly nymphs. Predator-induced tadpoles had significantly slower developmental rates than control larvae. Although metamorphs of non-exposed *L. peronii* were approximately 33% lighter than predator-exposed metamorphs and possessed lower jump distances, after adjusting for mass there was no difference in jump distance. The newly described morphological response may assist in more accurately relating morphological plasticity to fitness." (Authors)] Address: Wilson, R.S., Physiological Ecology Laboratory, School of Integrative Biology, The University of Queensland, St. Lucia, Queensland 4072, Australia. Email: rwilson@uq.edu.au

5598. Krisp, H.; Maier, G. (2005): Consumption of macroinvertebrates by invasive and native gammarids: a comparison. *J. Limnol.* 64(1): 55-59. (in English). ["The Ponto-Caspian gammarids *Dikerogammarus villosus* SOVINSKIJ and *Echinogammarus ischnus* STEBBING have invaded Central-European streams in the early 1990s. Declines in macroinvertebrates have been observed since the arrival of invasive species. To elucidate the predatory impact of gammarids on the macroinvertebrate community, we conducted laboratory experiments with macroinvertebrate prey taxa and native and invasive gammarids as predators. *Dikerogammarus villosus*, which is known to be a strong predator, consumed more and a broader range of prey than *E. ischnus* or the native gammarids, *Gammarus pulex* L. and *Gammarus roeseli* GERVAIS. *Echinogammarus ischnus* consumed a somewhat higher amount of prey organisms than *G. pulex* and a higher number and a broader range than *G. roeseli*. Adult *D. villosus* consumed up to 25 mg macroinvertebrate biomass (wet weight) per day which corresponds to approximately 1/3 of their own biomass. Chironomid larvae were preferred by all gammarids tested. Taking into account that gammarids density may surpass 1000 ind m^2 , our results suggest that the predatory behaviour of invasive gam-

marids, in particular of *D. villosus*, may have contributed to the decline of some macroinvertebrate taxa in some European streams." (Authors)] Address: Maier, G., Department of Experimental Ecology of Animals, University of Ulm, Albert-Einstein-Allee 11, 89069 Ulm, Germany. E-mail: gerhard.maier@biologie.uni-ulm.de

5599. Laister, G. (2005): *Pantala flavescens* auf Rhodos, mit einem Überblick über den Status der Art in Europa (Odonata: Libellulidae). *Libellula Supplement* 6: 33-40. (in German, with English summary). ["On 29 August 2001, a teneral female was recorded near Apolakia on Rhodes (36°02'N, 27°47'E). This represents the first record for Greece. In the Mediterranean records are extremely rare, which is in contrast to the big number of records from most parts of Asia and from North America on a similar geographical latitude. On the one hand this may reflect the barrier effect of the Sahara, i.e., prevalent wind and aridity. On the other hand it is assumed that, on the basis of a comparison with similar latitudes in Australia, *P. flavescens* is unable to survive the winter north of the Sahara. In addition, all reports on records or hints of *P. flavescens* in Europe are compiled." (Author)] Address: Laister, G., Naturkundliche Station, Neues Rathaus, Hauptstr. 1-5, A-4041 Linz, Austria. E-mail: Gerold.Laister@mag.linz.at

5600. Lasso, D.; Jarrín-V., P. (2005): Diet variability of *Micronycteris megalotis* in pristine and disturbed habitats of Northwestern Ecuador. *Acta Chiropterologica* 7(1): 121-130. (in English). [Odonata as diet of the bat *M. megalotis* are discussed.] Address: Jarrín-V., P., Boston University, Department of Biology, #5 Cummington Street, 02215 MA, USA. E-mail: jarrin@bu.edu

5601. Lehmann, A.W. (2005): Annotated bibliography of the dragonflies of Greece (Odonata). *Libellula Suppl.* 6: 85-104. (in German, with English summary). ["An annotated bibliography of Odonatological literature from Greece is presented, comprising 212 references from the years 1832 to 2004." (Author)] Address: Lehmann, A.W., Friedensallee 37, D-14532 Stahnsdorf, Germany. E-mail: gerlind.lehmann@t-online.de

5602. Leipelt, K.G.; Suhling, F. (2005): Larval biology, life cycle and habitat requirements of *Macromia splendens*, revisited (Odonata: Macromiidae). *International Journal of Odonatology* 8(1): 33-44. (in English). ["Information on larval biology of *Macromia splendens* was compiled and supplemented by hitherto unpublished data. Larvae inhabit mainly calm river stretches, sometimes artificial impoundments, and lentic margins of lotic sections. From the majority of records it is concluded that the larvae mainly dwell in sandy substrates in shallow water, which sometimes contains little leaf litter. Larvae occur in smaller numbers on substrates dominated by coarse detritus or on bedrock in deeper water. Larvae of *M. splendens* are able to burrow in sand, but such burrowing takes a long time, and sometimes parts of their body remain uncovered. Therefore, they are considered shallow burrowers. Based on head-width frequency distributions recorded at the Garden de Miallet, southern France, the species is believed to require two years per generation." (Authors)] Address: Leipelt, K.G., Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c, D-38106 Braunschweig, Germany. E-Mail: k.leipelt@tu-bs.de

5603. Lemcke, C. (2005): Phänotypische Plastizität bei Kaulquappen des Europäischen Laubfrosches *Hyla*

arborea. Dissertation der Fakultät für Biologie der Ludwigs-Maximilian-Universität München: 87 pp. (in German and English). [For the full paper see: <http://e-doc.uni-muenchen.de/archive/00004866/01/LemckeClaudia.pdf>] Address: Lemcke, Claudia, Ludwigs-Maximilian-Universität München, Fachb. Biologie II, Großhadernerstr. 2, D-82152 Planegg/Martinsried, Germany

5604. Leroy, T. (2005): Nouvel inventaire des Odonates des tourbières du Cézallier en Auvergne (Départements du Cantal et du Puy-de-Dôme). *Martinia* 21(1): 3-15. (in French, with English summary). ["20 years after the first survey, a second study was realized on 8 peat-bogs of Cézallier plateau. In this five years' survey, 39 species were recorded, with 26 species breeding certainly and 6 probably. Several species untypical of peat-bogs and of southern affinity seem to have appeared since the first survey, and this raises some questions : was the sampling of the first survey not complete enough, or is this a consequence of the climate warming?" (Author)] Address: Leroy, T., Le Bourg, F-63210 Heume-l'Eglise, France. E-mail: thierry-leroy@caraimail.com

5605. LÖBF (2005): Natur und Landschaft in Nordrhein-Westfalen 2005. Grundlagen - Zustand - Entwicklung. *LÖBF-Mitt.* 4/05: 283 pp. (in German). [On page 142, a map with the present distribution of *Coenagrion mercuriale* in Nordrhein-Westfalen, Germany, is presented.] Address: LÖBF, Leibnitzstr. 10, 45659 Recklinghausen, Germany

5606. Lohr, M. (2005): *Selysiotemis nigra* (Vander Linden), new for Portugal (Anisoptera: Libellulidae). *Notulae odonatologicae* 6(6): 57-58. (in English). [9 exuviae, 23-V-2003, Faro Algarve province, Portugal.] Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-lulh.de

5607. Lopau, W. (2005): Bisher unveröffentlichte Libellenbeobachtungen aus Griechenland III (Odonata). *Libellula Supplement* 6: 49-84. (in German, with English summary). ["More than 850 Odonata records provided by 14 workers are listed. The data, 54 of the 76 species now known from Greece, were recorded between 01-VIM 992 and 01-IX-2001." (Author)] Address: Lopau, W., Kuhstedtermoor 26, D-27442 Gnarrenburg, Germany. E-mail: lopi-@t-online.de

5608. Macauley, D. (2005): Survey of the odonate fauna in Birch Mountains Wildland Park. Prepared for the Alberta Natural Heritage Information Centre. Parks and Protected Areas Division. Alberta Community Development: 22 pp. (in English). ["A total of 20 odonate species were found during the 2004 survey of the Birch Mountains WP. This represents 15 species from the Suborder Anisoptera and 5 from the Suborder Zygoptera. Most species in the area were common ones that have wide distributions across Canada. Several species, however, were rare or uncommon or are known to have restricted ranges in Alberta. Some of the uncommon species were *Calopteryx aequabilis*, *Somatochlora albicincta* and *Somatochlora minor*. *C. aequabilis* and *S. minor* were found along slow-moving streams whereas *S. albicincta* preferred isolated bog ponds. Three of the *Somatochlora* species were rare discoveries – *S. forcipata*, *S. franklini* and *S. kennedyi*. All three were

collected in boggy wetlands. One species, *Somatochlora kennedyi*, was a new discovery for the province. It was collected beside a beaver pond north of Gardiner Lake. With further sampling, it is expected that several more riparian, peatland and river specialists could be found." (Author) Available at: <http://www.cd.gov.ab.ca/preserving/parks/anhic/docs/odonatesbirch%20mts-finalmacaulay.pdf>] Address: not stated

5609. Machado, A.B.M. (2005): *Lauromacromia bedei* sp. nov. from the State of Minas Gerais, Brazil (Odonata, Corduliidae). *Revista Brasileira de Entomologia* 49(4): 453-456. (in English, with Portuguese summary). [L. *bedei* is described and illustrated from a single male specimen collected in VI 2004 from a river within the Rio Preto State Park. The species is compared in detail with its Brazilian congeners.] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc, Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

5610. Machado, A.B.M. (2005): Studies on Neotropical Protoneuridae. 18. *Epipleoneura janirae* sp. n. from the Amazonian region of Brazil (Odonata: Protoneuridae). *Lundiana* 6 (suppl.): 47-48. ["*Epipleoneura janirae* n.sp. from the Amazonian region of Brazil (Belterra, State of Pará) is described and illustrated. This new species is related to *E. uncinata* De Marmels, 1989 for its structural characters and differs from all known species of the genus for its predominantly pale thoracic colour." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc, Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

5611. Matsubara, K.; Tojo, S.; Suzuki, N. (2005): Age-related changes in flight muscle mass, lipid reserves and flight capacity during adult maturation in males of the territorial damselfly *Calopteryx atrata* (Odonata: Calopterygidae). *Zoological Science* 22: 587-592. (in English). ["In the territorial damselfly *Calopteryx atrata* Selys, length of the hindwing, the wing areas and the aspect ratio did not differ significantly among age classes during the pre-reproductive period, while the body mass of males increased about 2.5 times. This is due primarily to increase in mass of thorax and abdomen. The flight muscle mass accounted for the great part of the thorax mass, and began to increase from early in the pre-reproductive period and continued increasing until sexual maturation. The average flight muscle mass of sexually matured males was about 2.4 times of that of the youngest immature ones. On the other hand, the abdomen mass and total lipids increased remarkably in the latter half of the pre-reproductive period. The average total lipid content of mature males was about tenfold of that of the youngest immature ones. The maximum lift production per flesh body mass was positively correlated with the flight muscle mass and total lipid content. Such an increase in flight muscle mass and lipid reserves resulted in the increase of maximum lift force, and probably enhanced flight performance." (Authors)] Address: Matsubara, K., Department of Applied Biological Sciences, Faculty of Agriculture, Saga University, Honjo 1, Saga 840-8502, Japan. E-mail: mkd0335@hotmail.com

5612. Mauersberger, R. (2005): Erste Libellennachweise von der Insel Aigina (Odonata). *Libellula Suppl.*

6: 41-42. (in German, with English summary). ["As a small mountainous island near Athens, Aigina has no standing perennial waters. In October 2002 all brooks of the island were visited. Only three of them showed residual water puddles in the mouth region, at which records of six Odonata species were taken." (Author)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerderevereinUeckermark.Seen@t-online.de

5613. May, M.L.; Carle, F.L. (2005): *Pamita hannahdaltonae* gen. nov., sp. nov. from Baltic amber (Odonata: Amphipterygida). *International Journal of Odonatology* 8(2): 213-221. (in English). ["The first known amphipterygid-like zygopteran from amber is described. Although its provenance is not known with certainty, we feel confident in attributing it to the Baltic amber deposits of northern Europe. It thus represents the first Old World Tertiary amphipterygid and substantially extends the known geographic range of the taxon. Based on current knowledge its phylogenetic position cannot be ascertained reliably, but its possible relationships are discussed. It shares a mixture of characters with extant species including Amphipterygidae, Diphlebiidae, Thaumatoneurinae and Lestoideinae." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

5614. McCauley, S. (2005): Differential dispersal propensities between individuals in male *Leucorrhinia intacta* (Odonata: Libellulidae). *International Journal of Odonatology* 8(2): 223-232. (in English). ["I compared males of *L. intacta* collected at two permanent and two previously dried ponds to assess whether males colonizing formerly dried sites differed in morphology or level of mite parasitism from males at permanent sites. Males colonizing sites that had local extinctions in the previous year due to pond drying were more similar to each other in body size and levels of parasitism than to males at sites which had not dried. Males at the two permanent sites differed significantly from each other in body size and these differences appear to reflect different local conditions. Comparison of males at two adjacent sites, one permanent and one which previously dried, found that the males colonizing the previously dried site were larger, in better condition, and had lower rates and numbers of mite parasites than males at the permanent site. Results from this study suggest two non-exclusive hypotheses about dispersal and colonization in this species. First, dispersal is condition dependent in this species with size and body condition positively correlated and mite parasitism negatively correlated with dispersal. Second, some permanent sites produce more males with the characteristics associated with dispersal than other potential source populations and therefore may contribute greater numbers of individuals to the dispersal pool." (Authors)] Address: McCauley, Shannon, 830 N. University, Dept of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, MI, USA. E-mail: mccaule@umich.edu

5615. McCauley, S.J. (2005): Relationship between habitat distribution, growth rate, and plasticity in congeneric larval dragonflies. *Canadian Journal of Zoology* 83: 1128-1133. (in English). ["The relationship between habitat distribution, growth rate, and plasticity was examined in the larvae of three species of dragonfly in

the genus *Libellula* L., 1758. Growth rates were compared under three conditions: in the absence of predation risk, in the presence of sunfish (*Lepomis macrochirus* Rafinesque, 1819; Pisciformes: Centrarchidae), and in the presence of invertebrate predators. I assessed how the habitat distributions of the three species of dragonfly, specifically how commonly they occur with fish, were related to growth rates and to the level of growth plasticity under different levels of perceived predation risk. There was a negative relationship between growth rate and the frequency with which species coexist with sunfish. Growth-rate plasticity was limited and does not appear to be important in determining the ability of species to coexist with alternative top predator types. Only one species exhibited growth-rate plasticity, decreasing growth in response to the predator with which it most commonly coexists but not to the species which poses the greatest predation risk. A comparison of growth rates and activity levels in the presence and absence of these predators suggests that growth and activity level parallel each other in these species." (Author) Erratum: Relationship between habitat distribution, growth rate, and plasticity in congeneric larval dragonflies, S.J. McCauley: Ref.: Can. J. Zool. 83: 1128-1133 (2005). "In the above paper on pages 1130 and 1131, the last sentence of the captions to Figs. 2, 3, and 4 should have read Species are indicated as follows: *L. pulchella* (black), *L. luctuosa* (light gray), *L. incesta* (dark gray).]" Address: McCauley, Shannon, Department of Ecology and Evolutionary Biology, University of Michigan, 830 North University Avenue, Ann Arbor, MI 48109-1048, USA. E-mail: mccaule@umich.edu

5616. McGeeney, A. (2005): Identification of red darters (part 2). *Atropos* 25: 34-36. (in English). [*Sympetrum vulgatum*, *S. meridionale*, *S. pedemontanum*, and *S. depressiusculum* are described and illustrated on colour plates. Morphological features suitable for identification of the taxa are compared in a table.] Address: McGeeney, A., 12 Lincolns Field, Epping, CM16 5DY, UK

5617. Medland, J. (2005): Reports from Coastal stations - 2004: Guernsey, Channel Islands. *Atropos* 24: 47-48. (in English). [*Crocothemis erythraea* is an addition to the Guernsey list of Odonata. Additional 10 odonate species are briefly discussed] Address: not stated

5618. Meurgey, F. (2005): Contribution à la connaissance des Odonates de l'archipel guadeloupéen IV. Faune de l'île de Marie-Galante (Antilles françaises). *Martinia* 21(4): 51-58. (in French, with English summary). ["The Odonata fauna of Marie-Galante is not well known. The author presents the results of prospectings realized there in 2004. 19 species were recorded, among them four that are rare or unfrequent: *Lestes tenuatus*, *Anax amazili*, *Micrathyrina didyma*, and *Tholymis citrina*." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5619. Meurgey, F. (2005): Complément à l'identification d'*Anax junius* (Drury, 1773) après sa récente observation en France métropolitaine. *Martinia* 21(1): 31-34. (in French, with English summary). ["The main identification criteria are recalled for this species, and their limits of use are discussed in comparison with *A. imperator*. A criterion for female identification is given." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

(Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5620. Meurgey, F.; Weber, G. (2005): Eléments d'écologie et de répartition de *Tholymis citrina* Hagen, 1861 dans l'archipel Guadeloupéen (Antilles françaises). *Martinia* 21(3): 109-114. (in French, with English summary). [new distribution map of *T. citrina* in Guadeloupe; new record of *T. citrina* on the island of Marie-Galante; description of the habitat, copulation, and a "wedding flight" after meeting of the mates.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5621. Meurgey, F. (2005): Étude faunistique des odonates de Martinique. DIREN Martinique/ONCFS Martinique / Société française d'odonatologie, Mai 2005: 105 pp. (in French). [The Odonata of Martinique/Lesser Antilles/France were surveyed in 2005 at 72 localities. Each locality is pictured and briefly described; the odonate species are listed locality-wise. Each species is briefly commented. Older records are included into the study too. For the full paper see: <http://www.martinique.ecologie.gouv.fr/telecharge/Etude%20faunistique%20des%20odonates%20de%20Martinique.pdf>] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5622. Meurgey, F. (2005): Impact de la fréquentation dans un parc urbain sur une population de *Coenagrion mercuriale* (Charpentier, 1840) (Département de la Loire-Atlantique). *Martinia* 21(1): 16. (in French). [A population of *C. mercuriale* in a park of the town Procé, France established at a rivulet is impacted by pedestrians with dogs and cyclists. Small tracks cross the rivulet at several places. In spite of a permanent perturbation of the running water between March and September, and in spite of a disarrangement of adults up to 30 meter beside the rivulet, the population of the rare *C. mercuriale* seems to be stable over the period of 2001 to 2004.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5623. Meurgey, F. (2005): Nouvelle observation de *Sympetrum vulgatum ibericum* Ocharan, 1983 en France (Pyrénées-Orientales). *Martinia* 21(3): 134-135. (in French). [Recent records in 2003 of *S. vulgatum ibericum* in the French pyrenees are documented. The distribution and dispersal ability of the taxon in Andorra and the French Pyrenees are discussed.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5624. Meurgey, F. (2005): Observation de la ponte d'*Aeshna isocles* (Müller, 1767) dans une rivière de Charente-Maritime (Odonata, Anisoptera, Aeshnidae). *Martinia* 21(4): 80. (in French). [France; emergence of *A. isocles*, 11-VII-2004] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5625. Meurgey, F. (2005): Annexes: Liste provisoires des odonates des départements et territoires d'Outre-mer français. *Martinia* 21(4): 85-105. (in French).

[Check-lists of Odonata in French overseas departments and territories: Guadeloupe and Martinique, French Guiana, Réunion, Mayotte, New-Caledonia, French Polynesia, and Saint Pierre and Miquelon.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5626. Meurgey, F.; Weber, G. (2005): *Tauriphila australis* (Hagen, 1867), *Macrothemis* sp., espèce nouvelle et genre nouveau pour la Martinique (Odonata, Anisoptera, Libellulidae). *Martinia* 21(4): 157-166. (in French, with English summary). ["In a study ordered by nature authorities of Martinique in March 2005, 22 species were recorded. One species and one genus were new for the island. The species are presented with brief comments." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5627. Mill, P. (2005): Dragonfly conservation from the BDS. *Atropos* 24: 87-88. (in English). [Detailed report on the Rody Nature Reserve Dragonfly Pond project.] Address: Mill, P., School of Biology, L.C. Miall Building, University of Leeds, Leeds, LS2 9JT, UK. E-mail: p.j.mill@leeds.ac.uk

5628. Mill, P.; Taylor, P.; Parr, A. (2005): English names for British and European dragonflies - the British Dragonfly Society's perspective. *Atropos* 25: 57-59. (in English). [comment on current discussion on English names of Odonata] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK. E-mail: ptaylor@acle.norfolk.sch.uk

5629. Mitre, M. (2005): Profile: Professor Angelo Machado: The remarkable deeds of a polyvalent mind. *Lundiana* 6 (suppl.): 5-10. (in English). ["Life history" of A. Machado, Brazil, one of the most profiled south American odonatologists of current times.] Address: Maya Mitre. E-mail: mayamitre@yahoo.com.br

5630. Morgan, L. (2005): Reports from Coastal stations - 2004: Skomer Island NNR, Pembrokeshire. *Atropos* 24: 74-75. (in English). [Coenagrion puella is new to the island.] Address: not stated

5631. Muddeman, J. (2005): Some comments on the proposed new names for Odonata. *Atropos* 25: 55-56. (in English). [comments on the vernacular European English names of Odonata.] Address: Muddeman, J., C/Los Alamillos 4 esc. 23°F, ES-28260 Galapogar, Madrid, Spain

5632. Müller, O.; Clausnitzer, V.; Grabow, K.; Vick, G.; Suhling, F. (2005): Description of the final stadium larvae of African Gomphidia (Odonata: Gomphidae). *International Journal of Odonatology* 8(2): 233-241. (in English). ["Descriptions and illustrations of the final stadium larvae of Gomphidia bredoi, G. gamblesi and G. quarrel are presented, based on exuviae collected in Ivory Coast, Cameroon, Kenya and Namibia. The three species can be separated by the presence / absence and shape of an abdominal dorsal spine on segment 9, by the numbers of abdominal lateral spines and by several characteristic processes on the head." (Authors)] Address: Müller, O., Birkenweg 6d, D-15306 Libbenichen, Germany. E-mail: olemueller@bioscience-art.de

5633. Muzón, J.; Spinelli, G.R.; Pessacq, P.; Von Ellenrieder, N.; Estevez, A.L.; Marino, P.I.; Pérez Goodwin, P.J.; Angrisano, E.B.; Díaz, F.; Fernández, L.A.; Mazzucconi, S.; Rossi, G.; Salomón, O.D. (2005): Insectos acuáticos de la Meseta del Somuncura, Patagonia, Argentina. *Inventario preliminar. Revista de la Sociedad Entomológica Argentina* 64: 47-67. (in Spanish, with English summary). ["A preliminary inventory of the aquatic insects from the Somuncura plateau and its area of influence (Patagonia, Argentina) is presented. It was done on the basis of the study of collections and previous records of species belonging to the orders Ephemeroptera, Odonata, Hemiptera (Heteroptera), Trichoptera, Diptera (families Ceratopogonidae, Culicidae, and Psychodidae) and Coleoptera. Different kinds of environments were surveyed in 14 localities. 78 species grouped in 51 genera and 26 families were registered, and 33 species are new records for the area. 83 % of the registered genera are widely distributed (neotropical, american or cosmopolitan), while 41 % of the species exhibit patagonic or andean distribution." (Authors) The list includes 12 odonate species.] Address: Ellenrieder, Natalie von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

5634. Navarrete-Heredia, J.L.; Gómez Flores, V.H. (2005): Aspectos etnoentomológicos acerca de sp. (Coleoptera: Staphylinidae) en Mascota, Jalisco, México. *Dugesiana* 12(1): 9-18. (in Spanish, with English summary). ["We provide an overview of the medical importance of (Coleoptera: Staphylinidae: Paederinae) adults from Mascota, Jalisco, México. In this region, these insects are called panchos and produce dermatological lesions due to the pederin toxins from the hemolymph. A list of home remedies is provided." (Authors) Some experimentees to check for recognising Paederus sp. take them for Odonata. Address: Navarrete-Heredia, J. L., Entomología, Centro de Estudios en Zoología, CUCBA, Universidad de Guadalajara. Apdo. Postal 234, Zapopan, Jalisco 4510, México. E-mail: glenusmx@yahoo.com.mx,

5635. Novelo-Gutiérrez, R.; Gómez-Anaya, J.A. (2005): Description of the larva of *Telebasis digiticollis* (Odonata: Zygoptera: Coenagrionidae). *Canadian Entomologist* 137: 61-66. (in English). ["A detailed description and illustrations of the larva of *Telebasis digiticollis* Calvert, 1902 are provided. A comparison with other larvae of the genus is made. *Telebasis digiticollis* is distinguished by 1 premental seta, 6-7 setae on the labial palp, a well-developed and convex ligula, 7-8 spiniform setae on the lateral margins of the prementum, and forceps-like male gonapophyses. The larva of *T. digiticollis* is more like that of *T. boomsmae* Garrison, 1994 than like other larvae of the genus. Larvae were found living in a lagoon densely covered by aquatic phanerogams such as *Eichhornia* sp. (Pontederiaceae) and *Typha* sp. (Typhaceae)."] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

5636. Odin, N. (2005): Reports from Coastal stations - 2004: landguard Bird Observatory, Suffolk. *Atropos* 24: 67-68. (in English). [5 odonate species are briefly documented] Address: not stated

5637. Oertli, B.; Auderset Joye, D.; Castella, E.; Juge, R.; Lehmann, A.; Lachavanne, J.-B. (2005): PLO-CH: a standardized method for sampling and assessing the biodiversity in ponds. *Aquatic Conserv: Mar. Freshw. Ecosyst.* 15: 665-679. (in English). ["1. As ponds are now recognized as freshwater habitats clearly distinct from lakes and running waters, there is a need for standardized tools for assessing their ecological integrity and status, and particularly their biodiversity. 2. A standardized method was developed for sampling and assessing the species richness of ponds. Experiences accumulated in previous studies, together with data gathered from 80 Swiss ponds, provided the basis of the proposed method. 3. Five taxonomic groups were chosen as complementary representatives of pond inhabitants: aquatic plants, aquatic Gastropoda, aquatic Coleoptera, adult Odonata and Amphibia. 4. To sample aquatic flora, quadrats are located along transects perpendicular to the longest axis of the pond. The number of quadrats is calculated from a relationship with pond area. A nonparametric estimator (Jackknife-1) is used to estimate the true species richness from the observed richness. 5. Aquatic invertebrates (Gastropoda, Coleoptera) are collected with a hand net. Sampling is stratified within the dominant habitats. The number of samples is calculated from a relationship with pond area. As with the vegetation, the Jackknife-1 estimator is used to estimate the true species richness. 6. The species richness of adult Odonata is assessed using a standardized field survey method combining observations from early and late summer. The species richness is corrected with an abundance-based estimator (Chao1). The species richness of Amphibia is obtained from an exhaustive inventory. 7. For the assessment of biodiversity, species richness values derived from measurements are compared to values predicted for conditions that enable a high species richness. Generalized Additive Models are used to predict species richness from environmental predictors characterizing the pond. The ratio of measured richness to predicted richness allows the allocation of a quality status to each pond. Results are divided into five biological quality classes, as recommended in the EC Water Framework Directive (WFD).] Address: Oertli, B., Department of Nature Management, University of Applied Sciences of Western Switzerland, EIL HES de Lullier-Geneva, 150 route de Présinge, CH-1254 Jussy, Switzerland. E-mail: beat.oertli@etat.ge.ch

5638. Olberg, R.M.; Worthington, A.H.; Fox, J.L.; Bessette, C.E.; Loosemore, M.P. (2005): Prey size selection and distance estimation in foraging adult dragonflies. *Journal of Comparative Physiology A: Sensory, Neural, and Behavioral Physiology* 191(9): 791-797. (in English). ["To determine whether perching dragonflies visually assess the distance to potential prey items, we presented artificial prey, glass beads suspended from fine wires, to perching dragonflies in the field. We videotaped the responses of freely foraging dragonflies (*Libellula luctuosa* and *Sympetrum vicinum*) to beads ranging from 0.5 mm to 8 mm in diameter, recording whether or not the dragonflies took off after the beads, and if so, at what distance. Our results indicated that dragonflies were highly selective for bead size. Furthermore, the smaller *Sympetrum* preferred beads of smaller size and the larger *Libellula* preferred larger beads. Each species rejected beads as large or larger than their heads, even when the beads subtended the same visual angles as the smaller, attractive beads. Since bead size cannot be determined without referen-

ce to distance, we conclude that dragonflies are able to estimate the distance to potential prey items. The range over which they estimate distance is about 1 m for the larger *Libellula* and 70 cm for the smaller *Sympetrum*. The mechanism of distance estimation is unknown, but it probably includes both stereopsis and the motion parallax produced by head movements." (Authors)] Address: Olberg, R.M., Department of Biological Sciences, Union College, Schenectady, NY 12308, USA. Email: olberg@union.edu

5639. Olias, M.; Günther, A. (2005): Erster Nachweis von *Lestes (viridis) viridis* für Griechenland (Odonata: Lestidae). *Libellula Supplement* 6: 43-47. (in German, with English summary). ["At a mountain rivulet in the Halkidiki peninsula, the semispecies *L. (viridis) viridis* and *L. (v.) parvidens* were shown to occur in syn-topic populations. This is the first secure record of *L. (v.) viridis* for Greece." (Authors)] Address: Olias, M., Humboldtstraße 29, D-09599 Freiberg, Germany. E-mail: markoolias@aol.com

5640. Opiel, S. (2005): Habitat associations of an Odonata community in a lower montane rainforest in Papua New Guinea. *International Journal of Odonatology* 8(2): 243-257. (in English). ["I sampled odonates in pristine lower montane rainforest in Papua New Guinea over several months, recording habitat characteristics for all encounters with adult odonates. Using ordination techniques such as cluster analysis and canonical correspondence analysis I then classified the odonate fauna into assemblages correlated with environmental factors. Within the 2.5 km² study area I found 61 species and a very high ratio of Zygoptera vs Anisoptera. Cluster analysis identified seven distinct assemblages associated with permanent rivers and creeks, temporary streams, puddles, or permanent standing water. Shading, water speed and water permanence were important factors distinguishing the assemblages. Anisoptera were absent from three habitats in the forest interior with temporary water sources. Species associated with temporary water sources and other microhabitats in the forest interior are presumed to be reliant on the high and aseasonal rainfall and the humid conditions of the rainforest. These species are likely to be very intolerant towards deforestation or other disturbance, and should be regarded as indicators for intact rainforest ecosystems. 40% of all species were considered as rare, and local endemism might be high, further stressing the importance of intact rainforest for the survival of many species of Odonata." (Author)] Address: Opiel, S., Department of Biology and Wildlife, 211 Irving 1, University of Alaska Fairbanks, Fairbanks, AK 99775, USA. E-mail: steffen.opiel@gmx.net

5641. Orr, A.G. (2005): Pocket Guide to Dragonflies of Peninsular Malaysia. Natural History Publications: VI + 127 pp. (in English). ["Dragonflies are among the most beautiful of insects. Peninsular Malaysia and Singapore are home to more than 230 species. [...] This book figures 98.7% of species known from Peninsular Malaysia and Singapore. For most, coloured drawings of the whole insect (omitting one pair of wings) are provided. Where necessary, coloured or monochrome drawings showing diagnostic features are also included. For some species, especially small Zygoptera, only detailed structures are figured, as the general resemblance between close species is strong. A wide range of larval types is also figured."] Address: Orr, A.G., Coope-

rative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

5642. Ott, J. (2005): Klimaänderung - auch ein Thema und Problem für den Biodiversitätsschutz im Grenzüberschreitenden Biosphärenreservat Vosges du Nord und Pfälzerwald?. *Annales scientifiques de la Réserve de Biosphère 12 transfrontalière* 12 (2004-2005): 127-142. (in German, with French and English summaries). [The review also contains some references on climate change and dragonflies.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.-GmbH@t-online.de

5643. Parr, A. (2005): Scarlet darters *Crocothemis* spp., in Britain. *Atropos* 25: 43-46. (in English). [Since 1995, there have been approximately six sightings of *C. erythraea* in UK, which are documented. As the possibility exists that *C. servilia* may occur in UK, this species is compared with *C. erythraea*. As *C. servilia* occurs as close as Turkey, "it is not inconceivable that natural vagrancy to Western Europe might also occur at some stage in the future."] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

5644. Parr, A.J. (2005): Migrant dragonflies in 2004 including recent decisions and comments by The Odonata Records Committee. *Atropos* 24: 31-35. (in English). [Records of the following species are documented: *Calopteryx splendens*, *Lestes barbarus*, *Pyrrhosoma nymphula*, *Erythromma najas*, *E. viridulum* (including a map with records of 1999-2004), *Aeshna mixta*, *Anax parthenope*, *Libellula quadrimaculata*, *L. fulva*, *Crocothemis erythraea*, *Sympetrum striolatum* (some caught at a light trap), *S. fonscolombii*, *S. flaveolum*, *S. sanguineum* (caught at a light trap), and *S. danae*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

5645. Pennington, M. (2005): Reports from Coastal stations - 2004: Shetland. *Atropos* 24: 72-73. (in English). [An immigrant *Pyrrhosoma nymphula* was photographed at a garden pond. *Libellula quadrimaculata* and *Libellula* sp. are the only additional Odonata recorded in 2004.] Address: not stated

5646. Pfau, H.-K. (2005): Structure, function and evolution of the 'glans' of the anisopteran vesica spermalis (Odonata). *International Journal of Odonatology* 8(2): 259-310. (in English). ["Comparative investigations of the distal part of the vesica spermalis ('glans') of the anisopteran male secondary copulatory apparatus reveal three different 'solutions' of combining the emptying-mechanism of the sperm-reservoir with a 'washing out' of sperm of the male predecessor. The responsible apparatus of the glans - actually driven by pressure-changes inside the erectile organ, which is a part of the whole vesica spermalis - is shortly apostrophized as 'two-way tap' (Gomphaeschnidae, Aeshnidae), pressure-suction pump (Austropetaliidae, Gomphidae, Petaluridae, Chlorogomphidae, Neopetaliidae, Cordulegastridae) and suction-pressure pump ('Corduliidae', Cordulephidae, Gomphomacromiidae, Synthemistidae, Libellulidae). The two types of sperm-pump are interpreted to effectuate an intensification of the sperm-jet and to serve as auxiliary devices in emptying the sperm-reservoir. On account of the opposite co-ordination of

extension and compression, the two types of sperm-pump are interpreted as alternative; no possibility could be detected to form evolutionary transitions without total loss of functions. This indicates two monophyletic groups: Petaluroidea and Libelluloidea. The phylogenetic relationships between these groups and the Gomphaeschnidae and Aeshnidae remained questionable. The different stages of evolution of the glans, which reflect phylogenetic splittings, are reconstructed. It is assumed that at the beginning a pre-gomphaeschnoid glans (or a gomphaeschnoid 'two-way tap' with tongue?) used two functional pores of ejaculation and scattered sperm on account of the erectile organ-coupled movements of the glans. Advanced glans-types of the Petaluroidea execute a three-phased delivery of sperm portions, the sperm transfer and displacement falling into the compression phase. Instead, in the Libelluloidea the sperm-transmission is two-phased and sperm-transfer and displacement are performed in the decompression phase." (Author)] Address: Pfau, H.-K., Rathenaustr. 14, D-65326 Aarbergen, Germany. E-mail: clauspfau@web.de

5647. Picard, L.; Meurgey, F. (2005): Découverte d'une population de *Lestes macrostigma* (Eversmann, 1836) dans le département de Loire-Atlantique (Odonata, Zygoptera, Lestidae). *Martinia* 21(3): 122. (in French). [12/13-VI-2005, Guérande, France.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5648. Picard, L.; Meurgey, F. (2005): *Lestes macrostigma* (Eversmann, 1836) dans les marais saumâtres de Loire-Atlantique (Odonata, Zygoptera, Lestidae). *Martinia* 21(4): 139-150. (in French, with English summary). ["*L. macrostigma* is a rare Odonate in France (Dommanget, 1994). This species reproduces in salt-water marshes and more particularly in *Scirpus maritimus* formations. Although it is actually known in Vendée department, it was never found in Loire-Atlantique. Its presence is however suspected, and a deepened research in the department seemed necessary (Machet, 1990; Meurgey et al., 2000). This study was undertaken within the framework of a report of first year of Master research for Geography, heading "Terres et mers atlantique" (IGARUN, University of Nantes). The biogeographical aspect was preferred to the purely faunistic aspect. Thus, rather than to seek the species, the prospection was primarily centered on the research of the standard potential habitat, the formations with *Scirpus maritimus* (L)." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5649. Reinhardt, K. (2005): Sperm numbers, sperm storage duration and fertility limitation in the Odonata. *International Journal of Odonatology* 8(1): 45-58. (in English). ["The status of the Odonata as a model taxon for studying the evolution and diversity of reproductive behaviours is shown here to have declined relative to crickets and *Drosophila*. Very few available data on ejaculate size, the number of sperm stored by females and the duration of sperm storage reveal poor knowledge of these areas in the Odonata. Some observations tentatively suggest that species without direct sperm removal transfer larger numbers of sperm. Observations on the fertilization success of eggs laid by

sexually isolated females and the temporal variation in paternity were used to assess the longevity of the sperm population in the female. The generality of the claim that female odonates have full fecundity after a single mating can not be upheld. In addition, it is not clear whether any possible decrease in fertilization ability in isolated females is due to decreasing sperm quantity or quality. Costs and benefits of sperm longevity, sperm storage and multiple mating are discussed for both sexes. It is proposed that mating frequency and sperm storage duration may be linked in the Odonata. Testable predictions and ideas related to sperm biology are put forward in which odonates may be used to address general questions of evolutionary biology." (Author)] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

5650. Reinhardt, R.; Klaus, D. (2005): Bericht über die Tagung Sächsischer Entomologen am 8. Oktober 2005 in Chemnitz. Mitt. Sächs. Entomol. 72: 31-32. (in German). [The report includes a brief abstract of a lecture by Thomas Brockhaus on the odonatological activities in Saxonia, Germany.] Address: Reinhardt, R., Burgstädter Str. 80a, D-09648 Mittweida, Germany. E-mail: Reinhardt-Mittw@t-online.de

5651. Richter, O.; Söndgerath, D.; Suhling, F.; Braune E. (2005): Impact of climate change on population dynamics and temporal patterns of benthic assemblages of rivers. In: Zerger, A. & R.M. Argent (eds.) MODSIM 2005 International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand. ISBN 0-9758400-1-0.: 531-537. (in English). ["Seasonal cycles of temperature, water regime and day length act as "Zeitgeber" (timer) triggering stage transitions in the life cycle of organisms provoking temporal patterns of communities at different levels of organization. Climate change is both affecting temperature forcings and water regime. Mathematical models are set up to investigate the mechanisms for the change of temporal patterns in aquatic invertebrates as brought about by climate change. Based on temperature data from rivers in Northern Germany a stochastic time series model was set up. This model combines a deterministic seasonal trend, a long term linear trend and an ARMA model for the stochastic component. The model is used to generate input temperature data for population dynamic models. Based on the scenarios for climate change of the IPCC, both an elevation of temperature and alterations of parameters of the stochastic process were taken into account. Biological populations are structured by age, size and stage. Two mathematical approaches were employed. For the simulation of long term time patterns in dragonfly populations, a projection matrix model is devised, i.e. the life cycle graph is mapped into a population matrix. The model yields emergence curves of larvae and adults. Figure 1 shows a simulation example of the projection matrix model. For the simulation of the time course of length density distributions of *Gammarus pulex*, a partial differential equation was employed. Transition probabilities and growth rates were devised as a function of temperature. The models are applied to the population dynamics of two common lotic invertebrates, *Gomphus vulgatissimus* and the amphipod *Gammarus pulex*. Most global change scenarios predict temperature rises especially in higher latitudes affecting the north-south temperature gradient. The model predicts that indications of global

change should imply both a shift of geographical extension of *G. vulgatissimus* and a shift to longer cycle lengths to higher latitudes. The emergence of temporal patterns and the synchronizing effect of temperature forcing are studied in a model system comprising a predator and a prey population which are under the control of different timers. If the development of the prey is controlled by day length and temperature and the development of the predator only by temperature a desynchronisation occurs." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

5652. Roach, J. (2005): Dragonfly migration tracked with tiny radio tags. National Geographic News, October 12, 2005: (in English). [Brief report in the popular science magazine National Geographic on current attempts to get insight to dragonfly (*Anax junius*) migration. The National Geographic Society is funding this study which uses radio tags. For a pdf of this article contact Bernd Kunz: E-mail: kunzFOTOGRAFIE@t-online.de] Address: <http://news.nationalgeographic.com/news/2005/10/1012051012dragonfly.html>

5653. Rudisill, T.; Bass, D. (2005): Macroinvertebrate community structure and physicochemical conditions of the Roman Nose spring system. Proc. Okla. Acad. Sci. 85: 33-42. (in English). ["Roman Nose State Park is located approximately 12 km north of Watonga, Oklahoma, in Blaine County in the Gypsum Hills of the Central High Plains ecoregion. Aquatic macroinvertebrate samples were collected and physical-chemical conditions were measured from the park's freshwater spring system during alternate months from January 2002 through November 2002. Water quality parameters measured included water temperature, dissolved oxygen, pH, alkalinity, turbidity, conductivity, nitrogen ammonia, nitrite, nitrogen, nitrate nitrogen, and phosphate. Water quality was always within acceptable parameters to support aquatic life during this period. However, possible contamination from agricultural activities and increasing human usage negatively impacted water quality. A total of 21,268 individuals from 64 taxa were collected and identified from three springs. Little Spring was the most populated both in the overall number of taxa (47) and the number of individuals (10,689). Middle Spring had significant differences in the number of individuals in the upper and lower sites. The month of November had both the highest number of individuals and taxa. Species diversity values were generally low: the values were always under 2.00 and usually increased at the lower sites. Significant differences in species diversity values were found over time in Little Spring and Middle Spring. Species similarity values were over 0.60 between springs for the combined collection times and over 0.45 between upper and lower sites of each spring for the collection times. Total species richness ranged from 37 to 47. Aquatic insects were the dominant group of invertebrates encountered throughout the study and included dipterans, ephemeropterans, odonates, coloeopterans, hemipterans, trichopterans, and collembolas. Continued work on this spring system is important to further inventory the invertebrates present and to determine if any patterns exist throughout the years, as well as to monitor the water quality trends of the springs." (Authors)] Address: Rudisill, Tracy, Department of Environmental Quality, 707, N. Robinson, Oklahoma City, OK 73101, USA

- 5654.** Russell, R.W. (2005): Interactions between migrating birds and offshore oil and gas platforms in the northern Gulf of Mexico. Final Report. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2005-009: 348 pp- (in English). ["The Gulf of Mexico is a major ecological barrier confronted by hundreds of millions of migrating birds each spring and fall. Trans-Gulf migrations evolved in the absence of natural islands that could serve as stopover sites; thus, the installation of an artificial archipelago of nearly 4000 oil and gas production platforms in the northern Gulf over the past five decades has introduced a novel and potentially important component into the en route environment of trans-Gulf bird migrants. From 1998-2000, my research group at LSU studied the ecology of trans-Gulf migration and the influence of platforms on migrants using a team of field biologists stationed on an array of platforms across the northern Gulf. [...] The objectives of this study were to quantify spring and fall trans-Gulf migrations and to evaluate the influence of offshore platforms on trans-Gulf migrating birds. [...]"] (Authors) The paper also contains references to Odonata and collecting data on Odonata (see tab. 13.4) observed in the framework of the ornithological study. For the full paper see. <http://www.gomr.mms.gov/homepg/regulate/environ/studies/2005/2005-009.pdf>] Address: U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, Public Information Office (MS 5034), 1201 Elmwood Park Boulevard, New Orleans, LA 70123-2394, USA
- 5655.** Rutherford, J.C.; Kefford, B.J. (2005): Effects of salinity on stream ecosystems: improving models for macroinvertebrates. CSIRO Land and Water Technical Report 22/05: 76 pp. (in English). ["Tab. 6. Summary of maximum salinity tolerance by lowest level of identification (species, genus or family) estimated from field observations of presence/absence using logistic regression. MFD = maximum salinity at which animal was observed in the field, outlier = salinity at which observations were ignored, 95%, 50% and 5%ile = salinity at which P = 95%, 50% and 5% of Po, count = total number of individuals in all samples, Po, á and â = model coefficients, 95%CI = confidence interval on 50%ile salinity, rms = root mean square error in predicted P" includes detailed data of 19 odonate taxa including the following species: *Ischnura heterosticta*, *Xanthagrion erythroneurum*, *Austrolestes analis*, *A. annulosus*, *Adversaeschna brevistyla*, *Hemianax papuensis*, *Austrogomphus australis*, *Hemicordulia tau*, *Diplacodes bipunctata*, *D. haematodes*, and *Orthetrum caledonicum*.] Address: Kefford, B.J., Dept Biotechnology & Environmental Biology, RMIT Univ., PO Box 71, Bundoora, 3083, Victoria, Australia. E-mail: ben.kefford@rmit.edu.au
- 5656.** Sahlen, G.; Hedström, I. (2005): The larva of *Mecistogaster linearis*, with notes on its abundance in lowland rainforest of Costa Rica (Odonata: Pseudostigmatidae). *International Journal of Odonatology* 8(1): 59-66. (in English). ["The larva of *Mecistogaster linearis* is described and illustrated from specimens collected within or near the Rio Dantas Wildlife Refuge at the north-western border of the Barbilla National Park on the Costa Rican Caribbean slope. Characters of F-0 larvae permit easy separation from *Megaloprepus caerulatus*, a species coexisting with *M. linearis*. Diagnostic characters include overall colour, shape of head, prementum and caudal gills. Exuviae may be determined using shape of mandibles. Two types of branched setae are present on tibiae and tarsi. Most are 3-branched but on front tarsi they are instead feather-shaped. It is suggested that these setae are used for eye-cleaning. *M. linearis* was a relatively rare but regularly occurring species in the study area throughout the 3-year study period."] (Authors) Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@set.hh.se
- 5657.** Schneider, A. (2005): Die Libellenfauna des Großen Serrahnsees und des Schweingartensees (Müritz-Nationalpark) - Inventarisierung und naturschutzfachliche Bewertung. *Naturschutzarbeit in Mecklenburg-Vorpommern* 48(2): 41-49. (in German). [Mecklenburg-Vorpommern, Germany, the publications intends to compare the present species spectrum with that of an inventarisation in the late 1960th, and to set a base-ment for a monitoring of the odonate fauna in the next years. A total of 32 species were recorded including *Leucorrhinia pectoralis*, *Epitheca bimaculata*, *Brachytron pratense*, *Coenagrion pulchellum*, *Anaciaeschna isocoles*, and *Somatochlora flavomaculata*.] Address: Schneider, Anne, Neuendorfer Str. 2c, D-17373 Uecker-münde, Germany
- 5658.** Scott, D.A. (2005): Reports from Coastal stations - 2004: Dursey Island, C. Cork. *Atropos* 24: 75-76. (in English). [*Sympetrum striolatum*] Address: not stated
- 5659.** Scott, M.A.; Scott, W.J.; Scott, T.R. (2005): Reports from coastal stations 2004: Longstone heritage Centre, St Mary's, Isles of Scilly. *Atropos* 25: 50-51. (in English). [UK; poor year for Odonata with only four species observed] Address: not stated
- 5660.** Solly, F. (2005): Reports from Coastal stations - 2004: Isle of Thanet. *Atropos* 24: 64-65. (in English). [*Sympetrum fonscolombii*, 16-VII-2004] Address: not stated
- 5661.** Sparmberg, H.; Kopetz, A.; Bößneck, U. (2005): Fauna und Flora des Feuchtgebietes zwischen Luisenhall, Nöda und Stotternheim (Stadt Erfurt und Landkreis Sömmerda/Thüringen). *Thüringer Faunistische Abhandlungen* 10: 43-101. (in German, with English summary). [Thuringia, Germany; 14 odonate species are listed from a salt meadow habitat complex. The date are compared with those of Rapp (1943), and include records of *Sympetrum flaveolum* and *Coenagrion mercuriale*.] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Stauffenbergallee 18, D-99084 Erfurt, Germany
- 5662.** Spence, B. (2005): Reports from Coastal stations - 2004: The Spurn Area, East Yorkshire. *Atropos* 24: 71-72. (in English). [Five odonate species including *Sympetrum fonscolombii* are briefly commented.] Address: not stated
- 5663.** Srivastava, D.S.; Melnychuk, M.C.; Ngai, J.T. (2005): Landscape variation in the larval density of a bromeliad-dwelling zygopteran, *Mecistogaster modesta* (Odonata: Pseudostigmatidae). *International Journal of Odonatology* 8(1): 67-79. (in English). ["In the premon-tane rain forests of northwest Costa Rica, patches of secondary forest can contain high densities of large *Vriesea* spp. bromeliads. Such patches contain an average of $6,470 \pm 1,080$ (s.e.) larvae ha⁻¹ of the bromeli-

ad-dwelling pseudostigmatid, *M. modesta*, ca 36x higher than larval densities that we previously reported for adjacent primary forest. Using a new method to partition landscape variation in populations, we show that secondary forest has higher larval densities than primary forest because of higher bromeliad abundance (13% of effect), greater bromeliad size (33%), and greater larval abundance in bromeliads of similar size (54%). The last effect reflects additional effects of forest type after accounting for differences in the quantity of larval habitat. We use surveys of prey communities in bromeliads and adult densities in the two forest types to show that these additional effects of forest type are more likely due to adult behaviour, not larval resource limitation. This study demonstrates that certain areas of secondary forest can be disproportionately important for *M. modesta* populations, and has implications for estimating effects of forest loss and conversion on *M. modesta*." (Authors)] Address: Srivastava, Diane S., Dept. of Zoology, University of British Columbia, 6270 University Boulevard, Vancouver, B.C. Canada V6T 1Z4. E-mail: srivast@zoology.ubc.ca

5664. Subramanian, K.A. (2005): Dragonflies and Damselflies of Peninsular India - A Field Guide. Project Lifescape. Indian Academy of Sciences. Bangalore: 119 pp- (in English). ["The Indian subcontinent is one of the biologically richest regions of the world. Two global biodiversity hot spots, namely the eastern Himalayas and the Western Ghats, are in this region. Another biologically rich region, Sri Lanka, is just to the south of the subcontinent. The subcontinent is rich in odonates (damselflies and dragonflies); about 500 species are known. The dragonflies of the region are taxonomically well described thanks to the monumental work of Fraser. However, the natural history and distribution of most of the species is barely known. This lacuna is largely due to the lack of user-friendly field guides for amateur naturalists and students. As an initiative to generate interest in dragonflies among naturalists and students, Indian Academy of Sciences is publishing a field guide on the odonates of Peninsular India. The book is being published as part of Project Lifescape of the Academy. This project aims at producing user-friendly field guides and other resources to encourage field-based biology research among students. The book is divided into three parts. The first part gives a detailed account of the natural history of Odonata. The second part gives keys for the identification of odonate families for larval and adult stages. The third section gives species accounts for 26 damselflies and 34 dragonflies of Peninsular India. The book is lavishly illustrated with colour photographs or specimen scans of all the species described. In addition, the book also provides a checklist of odonates for the region (178 species) and a glossary of technical terms. The novelty of the book is provision of common English names of all species. The first edition of this book is entirely downloadable freely from this website." (Editor) The book is downloadable in three parts, each a PDF file: <http://www.ias.ac.in/initiat/scied/lifescape/odonates.html>].

5665. Suh, A.N.; Samways, M.J. (2005): Significance of temporal changes when designing a reservoir for conservation of dragonfly diversity. *Biodiversity and Conservation* 14(1): 165-178. (in English). ["While there has been much focus in biodiversity conservation that transcends place, few studies transcend time. Yet an appreciation of vegetational and hydrological successi-

on is essential for maintaining a habitat that has been created with the aim of conserving a particular group of organisms. This is a study of changes in a dragonfly assemblage over a period of 13 years at a biodiversity-rich, southern hemisphere reservoir. A total of 30 dragonfly species were recorded in this study, compared to 12 species before the reservoir was constructed in 1988, and 26 species in 1993, with 25 species resident in both 1993 and 2001. Two of these are local endemics. One other endemic was lost to succession in 1993 but reappeared in 2001. Three other species never reappeared after succession in 1993, yet six other species appeared after this date. Multivariate analyses identified structural and compositional vegetation, especially marginal forest, percentage vegetation cover, percentage shade, as the most important environmental variables determining dragonfly species composition. Other important environmental variables were grasses of tall, medium and short height categories, submerged vegetation, water flow and amount of open water. Not surprisingly, successional changes in vegetation physiognomy and in water conditions significantly increased Odonata species richness and diversity over the years. More importantly, the study shows that to maintain both high species richness, including endemics, it is essential to maintain a variety of biotopes using selective management of the marginal vegetation without allowing succession to proceed to a point where overgrowth of the bank and silting of the bottom begin to impoverish the fauna." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

5666. Svensson, E.I.; Abbott, J. (2005): Evolutionary dynamics and population biology of a polymorphic insect. *J. Evol. Biol.* 18: 1503-1514. (in English). ["Conspicuous heritable polymorphisms are useful to address the question if morph frequencies are stable or whether they fluctuate between generations. Ecological geneticists have studied colour polymorphisms in the past, but there are few long-term studies of genetic dynamics across multiple generations. We studied morph-frequency dynamics and female fecundity in the trimorphic blue-tailed damselfly (*Ischnura elegans*). The morphs include a male-coloured (androchrome) type of female, which is thought to be maintained by frequency-dependent sexual conflict. Morph frequencies changed significantly between years across all populations. There was evidence for directional frequency change since androchrome females increased in 9 of 10 populations across a 4-year period. There was heterogeneity between populations in their evolutionary trajectories, partly caused by population age: androchrome frequencies were initially high in young populations but gradually decreased and approached the level of old populations. We discuss the possible causes of morph-frequency fluctuations, and the role of morph-specific fecundity, dispersal and other forces influencing evolutionary dynamics in this system." (Authors)] Address: Svensson, E., Section for Animal Ecology, Ecology Building, Lund University, SE-223 62 Lund, Sweden. E-mail: erik.svensson@zoekol.lu.se

5667. Svensson, E.I.; Abbott, J.; Härdling, R. (2005): Female polymorphism, frequency dependence, and rapid evolutionary dynamics in natural populations. *The American Naturalist* 165(5): 567-576. (in English). ["Rapid evolutionary change over a few generations has

been documented in natural populations. Such changes are observed as organisms invade new environments, and they are often triggered by changed interspecific interactions, such as differences in predation regimes. However, in spite of increased recognition of antagonistic male-female mating interactions, there is very limited evidence that such intraspecific interactions could cause rapid evolutionary dynamics in nature. This is because ecological and longitudinal data from natural populations have been lacking. Here we show that in a color-polymorphic damselfly species, male-female mating interactions lead to rapid evolutionary change in morph frequencies between generations. Field data and computer simulations indicate that these changes are driven by sexual conflict, in which morph fecundities are negatively affected by frequency- and density-dependent male mating harassment. These frequency-dependent processes prevent population divergence by maintaining a female polymorphism in most populations. Although these results contrast with the traditional view of how sexual conflict enhances the rate of population divergence, they are consistent with a recent theoretical model of how females may form discrete genetic clusters in response to male mating harassment." (Authors)] Address: Svensson, E., Section for Animal Ecology, Ecology Building, Lund University, SE-223 62 Lund, Sweden. E-mail: erik.svensson@zoekol.lu.se

5668. Tarr, T.L.; Baber, M.J.; Babbitt, K.J. (2005): Macroinvertebrate community structure across a wetland hydroperiod gradient in southern New Hampshire, USA. *Wetlands Ecology and Management* 13(3): 321-334. (in English). ["We conducted a field study to examine the influence of hydroperiod and concomitant changes in abiotic (wetland size, pH, conductivity, dissolved oxygen and water temperature) and biotic (predatory fish presence) characteristics on macroinvertebrate communities in isolated wetlands in southern New Hampshire. Invertebrates were sampled using dipnet sweeps in 42 wetlands with short (<4 months), intermediate (4–11 months) or long (permanent) hydroperiods in 1998 and 1999. We found that invertebrate genera richness, and to a lesser degree abundance, increased linearly along the hydrological gradient, and in response to temperature and dissolved oxygen. Relative abundance of genera also differed markedly with respect to hydroperiod. Most notably, invertebrate communities changed from Acilius-dominated communities to Notonecta-dominated communities. Invertebrate relative abundances in permanent wetlands also differed with respect to the occurrence of predatory fish. Some genera (e.g., Libellula, and Dytiscus) were more likely to occur in permanent wetlands without fish, whereas other genera (e.g., Buena, and Basiaesha) were more likely to occur in wetlands with predatory fish. Because aquatic invertebrate communities differed markedly with respect to wetland hydroperiod, and in relation to the occurrence of predatory fish, it is essential to retain a diversity of wetlands in the landscape to ensure the long-term persistence of aquatic invertebrate biodiversity." (Authors)] Address: Babbitt, K. J., Email: kbabbitt@cisunix.unh.edu

5669. Teixeira, R.L.; Roldi, K.; Vrcibradic, D. (2005): Ecological comparisons between the sympatric lizards *Enyalius bilineatus* and *Enyalius brasiliensis* (Iguanidae, Leiosaurinae) from an Atlantic rain-forest area in southeastern Brazil. *Journal of Herpetology* 39(3): 504-509. (in English). ["Aspects of the ecology of the semi-

arboreal lizards *E. bilineatus* and *E. brasiliensis* were studied in a montane Atlantic forest region of Espírito Santo State, southeastern Brazil. Individuals of *E. bilineatus* were collected mainly in a coffee plantation, whereas *E. brasiliensis* was found only in the forest proper. *Enyalius brasiliensis* was significantly larger (up to 106 mm snout vent length, SVL) than *E. bilineatus* (up to 90 mm SVL). Both species were sexually dimorphic in body size, with females larger than males. The two species consumed a broad spectrum of prey but differed quantitatively in their diet composition. Ants and orthopterans dominated the diet of *E. bilineatus*, whereas *E. brasiliensis* preyed mainly on cockroaches and caterpillars. Clutch size of *E. bilineatus* varied from 2–6 (mean 5.44) and that of *E. brasiliensis* from 8–14 (mean 5.115). Ecological differences between the two species may result in differential susceptibilities to habitat perturbation, with *E. bilineatus* being more tolerant of disturbed areas and perhaps even benefitting from anthropic action, unlike the forest-dependent *E. brasiliensis*." (Authors) In table 2, one case of odonate prey in *E. bilineatus* is documented.] Address: Teixeira, R.L., Museu de Biologia Prof. Mello Leitao, Av. José Ruschi 4, 29650-000, Santa Teresa, ES, Brazil

5670. Ternois, V. (2005): *Leucorrhinia caudalis* (Charpentier, 1840): espèce nouvelle pour le Parc naturel régional de la Forêt d'Orient et l'Aube (Odonata, Anisoptera, Libellulidae). *Martinia* 21(3): 115-121. (in French, with English summary). [28-V-2004; documentation of the record, description of the habitat, and discussion of the regional distribution in northern France (Champagne-Ardenne).] Address: Ternois, V., CPIE du Pays de Soulaines, Domaine de Saint-Victor, F-10200 Soulaines-Dhuys, France. E-mail: cpie.pays.soulaines@wanadoo.fr

5671. Ternois, V.; Barande, S. (2005): *Oxygastra curtisii* (Dale, 1834) en région Champagne-Ardenne (Odonata, Anisoptera, Corduliidae). *Martinia* 21(1): 17-30. (in French, with English summary). [The authors present new records of *O. curtisii* from the Département Aube, France.] Address: Barande, S., ECOSPHERE, 3 bis rue de Remises, F-94100 St-Maur-des-Fossés, France. E-mail: ecosphere@wanadoo.fr

5672. Ternois, V. (2005): Sur la présence d'*Orthetrum albistylum* (Sélys, 1848) dans le Parc naturel régional de la Forêt d'Orient et le Nord-Est aubois (Odonata, Anisoptera, Libellulidae). *Martinia* 21(4): 59-68. (in French, with English summary). ["*O. albistylum* is considered as absent from Aube department. Nevertheless, observations of this species multiplied since 1998, and the author presents them.] Address: Ternois, V., CPIE du Pays de Soulaines, Domaine de Saint-Victor, F-10200 Soulaines-Dhuys, France. E-mail: cpie.pays.soulaines@wanadoo.fr

5673. Thirion, J.-M.; Beau, F.; Moncomble, M.; Couturier, S. (2005): Répartition de *Calopteryx haemorrhoidalis* *ocasi* Capra, 1945 dans le département de la Charente-Maritime (Odonata, Zygoptera, Calopterygidae). *Martinia* 21(4): 169-174. (in French, with English summary). [*C. haemorrhoidalis* *ocasi* was recorded in Charente-Maritime, France for the first time in June 1997. Since then, 44 new sites, mainly in the south half of the department, were found. An increase of the distribution area in the Poitou-Charentes region is interpreted as a probable consequence of climate warming.]

Address: Thirion, J.-M., Nature Environnement 17, avenue de Bourgogne, Groupe scolaire Descartes, Port Neuf, F-17000 La Rochelle, Frankreich

5674. Tourenq, C.; Barcelo, I.; Kumari, A.; Drew, C. (2005): The terrestrial mammals, reptiles and invertebrates of Al Wathba Wetland Reserve – A species list and status report. Terrestrial Environment Research Centre, Environmental Research & Wildlife Development Agency, P.O. Box 45553, Abu Dhabi: 29 pp. [A total of 9 species have been recorded at Al Wathba. Appendix 2 lists the following species: *Anax imperator*, *A. ephippiger*, *Pantala flavescens*, *Orthetrum sabina*, *Crocothemis erythraea*, *Diplacodes lefebvrei*, *Selysiothemis nigra*, *Trithemis annulata*, and *Ischnura evansi*.]

5675. Troake, P. (2005): Reports from coastal stations 2004: Gibraltar Point NNR, Lincolnshire. *Atropos* 25: 51- (in English). [UK; *Brachytron pratense* is listed without any comment] Address: not stated

5676. Tunmore, M. (2005): Adventures in the field: Holland and back. *Atropos* 25: 46-48. (in English). [Records of Lepidoptera and Odonata from an trip to the Netherlands in early August 2004 are briefly documented. *Enallagma cyathigerum* and *Ischnura elegans* have been attracted by light traps.] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freeseerve.co.uk

5677. Tunmore, M. (2005): Reports from Coastal stations - 2004: Lizard Peninsula, Cornwall. *Atropos* 24: 49-50. (in English). [2000 was a poor season for Odonata; only few records of *Sympetrum fonscolombii*.] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freeseerve.co.uk

5678. Urrutia, M. X. (2005): Riqueza de especies de Odonata zigoptera por unidades fisiográficas en el departamento del Valle del Cauca. *Boletín del Museo de Entomología de la Universidad del Valle* 6(2): 30-36. (in Spanish, with English summary). [Colombia; a total of 40 odonate taxa is documented, including 18 new for the department of Valle del Cauca.] Address: Urrutia, Maria Ximena, Entomología de la Universidad del Valle, Departamento de Biología, A.A. 25360 Cali, Colombia. E-mail: mxurrutia@gmail.com

5679. Vamosi, S.M. (2005): On the role of enemies in divergence and diversification of prey: a review and synthesis. *Can. J. Zool.* 83: 894-910. (in English, with French summary). ["Understanding the contribution of ecological interactions to the origin and maintenance of diversity is a fundamental challenge for ecologists and evolutionary biologists, and one that is currently receiving a great deal of attention. Natural enemies (e.g., predators, parasites, and herbivores) are ubiquitous in food webs and are predicted to have significant impacts on phenotypic diversity and on speciation, and extinction rates of their prey. Spurred by the development of a theoretical framework beginning in the late 1970s, there is now a growing body of literature that addresses the effects of enemy-prey interactions on the evolution of prey. A number of theoretical models predict that enemies can produce phenotypic divergence between closely related species, even in the absence of interspecific competition for resources. Effects on diversification of prey are more variable, and enemies may either en-

hance or depress speciation and extinction rates of their prey. Empirical evidences from a number of study systems, notably those involving predators and prey in aquatic environments and interactions between insects and flowering plants, confirm both predictions. There is now considerable evidence for the role of enemies, especially those that are size-selective or use visual cues when identifying suitable prey, on phenotypic divergence of sympatric and allopatric taxa. Enemies may spur diversification rates in certain groups under some circumstances, and hinder diversification rates in other cases. I suggest that further research should focus on the role of enemies in diversification of prey, with significant insights likely to be the product of applying traditional experimental approaches and emerging comparative phylogenetic methods." (Author) The paper compiles the results of Mark McPeck's studies related to the genus *Enallagma* in North America.] Address: Vamosi, S.M., Dept Biological Sciences, University of Calgary, 2500 University Drive NW, Calgary AB T2N 1N4, Canada. E-mail: smvamosi@ucalgary.ca

5680. van Kleef, J.; James, A.C.; Stange, G. (2005): A spatiotemporal white noise analysis of photoreceptor responses to UV and green light in the dragonfly median ocellus. *J. Gen. Physiol.* 126(5): 481-497. (in English). ["Adult dragonflies augment their compound eyes with three simple eyes known as the dorsal ocelli. While the ocellar system is known to mediate stabilizing head reflexes during flight, the ability of the ocellar retina to dynamically resolve the environment is unknown. For the first time, we directly measured the angular sensitivities of the photoreceptors of the dragonfly median (middle) ocellus. We performed a second-order Wiener Kernel analysis of intracellular recordings of light-adapted photoreceptors. These were stimulated with one-dimensional horizontal or vertical patterns of concurrent UV and green light with different contrast levels and at different ambient temperatures. The photoreceptors were found to have anisotropic receptive fields with vertical and horizontal acceptance angles of 15° and 28°, respectively. The first-order (linear) temporal kernels contained significant undershoots whose amplitudes are invariant under changes in the contrast of the stimulus but significantly reduced at higher temperatures. The second-order kernels showed evidence of two distinct nonlinear components: a fast acting self-facilitation, which is dominant in the UV, followed by delayed self- and cross-inhibition of UV and green light responses. No facilitatory interactions between the UV and green light were found, indicating that facilitation of the green and UV responses occurs in isolated compartments. Inhibition between UV and green stimuli was present, indicating that inhibition occurs at a common point in the UV and green response pathways. We present a nonlinear cascade model (NLN) with initial stages consisting of separate UV and green pathways. Each pathway contains a fast facilitating nonlinearity coupled to a linear response. The linear response is described by an extended log-normal model, accounting for the phasic component. The final nonlinearity is composed of self-inhibition in the UV and green pathways and inhibition between these pathways. The model can largely predict the response of the photoreceptors to UV and green light." (Authors)] Address: Stange, G., Centre for Visual Sciences, Research School of Biological Sciences, Australian National University, Canberra, ACT 2601, Australia. E-mail: gert.stange@anu.edu.au

- 5681.** Vasilenko, D.V. (2005): New damselflies (Odonata: Synlestidae, Hemiphlebidae) from the mesozoic Transbaikalian locality of Chernovskie Kopi. *Paleontological Journal* 39(3), translated from *Paleontologicheskii Zhurnal*, No. 3, 2005, pp. 55-58: 280-283. (in English). ["Two new genera and two new species, *Gaurimacia sophiae* gen. et sp. nov. (Synlestidae) and *Mersituria ludmilae* gen. et sp. nov. (Hemiphlebidae), are described from the Mesozoic locality of Chernovskie Kopi in eastern Transbaikalia. The Odonata assemblage of Chernovskie Kopi is analyzed." (Author)] Address: Vasilenko, D.V., Chita State University, ul. Aleksandro-Zavodskaya 30, Chita, 672039 Russia. E-mail: lab@palaeoentomolog.ru
- 5682.** Villa, D. (introduced by) (2005): A bill for an act entitled: "An act designating the Western Meadowhawk, *Sympetrum occidentale*, as the official insect of the State of Montana." Authorized Print Version - HB 390; <http://data.opi.state.mt.us/bills/2005/BillPdf/HB0390.pdf>: 1 pp- (in English). ["59th Legislature HB0390.01 HOUSE BILL NO. 390: "WHEREAS, the western meadowhawk combats other insect pests, and in so doing combats the spread of diseases like West Nile virus; and WHEREAS, the western meadowhawk is a master aviator of the Big Sky, able to fly forward, backward, sideways, and diagonally; and WHEREAS, this dragonfly is native to Montana, predating all human life here; and WHEREAS, to Indians the western meadowhawk symbolizes pure water and is included in Indian drawings of water; and WHEREAS, in other cultures the western meadowhawk represents durability, adaptability, power, and freedom, all of which are apt symbols of Montana, be it enacted by the legislature of the State of Montana. NEW SECTION. Section 1. State insect. The dragonfly known as the western meadowhawk, *Sympetrum occidentale*, as preferred by a vote of Montana schoolchildren, is the official Montana state insect. NEW SECTION. Section 2. Codification instruction. [Section 1] is intended to be codified as an integral part of Title 1, chapter 1, part 5, and the provisions of Title 1, chapter 1, part 5, apply to [section 1]. END"]
- 5683.** Vogelkundlicher Arbeitskreis und Arbeitskreis für Ornithologie und Naturschutz der Volkshochschule Ludwigshafen am Rhein (2005): Bisher registrierte Tiere und Pflanzen im Bereich des "Hansenbusch" unter besonderer Berücksichtigung des "Schleusenloch" an der Nordgrenze der Stadt Ludwigshafen. Eine Bestandsaufnahme für die Zeit von 1985 bis 2005. 40 Jahre Vogelkundlicher Arbeitskreis und Arbeitskreis für Ornithologie und Naturschutz der Volkshochschule Ludwigshafen am Rhein: 23 pp. (in German). [On pages 15 to 16, the brochure contains a checklist of the Odonata (34 species, compiled by Jürgen Ott, Trippstadt.)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de
- 5684.** Wang, J.-K.; Sun, M. (2005): A computational study of the aerodynamics and forewing-hindwing interaction of a model dragonfly in forward flight. *The Journal of Experimental Biology* 208: 3785-3804. (in English). ["The aerodynamics and forewing-hindwing interaction of a model dragonfly in forward flight are studied, using the method of numerically solving the Navier-Stokes equations. Available morphological and stroke-kinematic parameters of dragonfly (*Aeshna juncea*) are used for the model dragonfly. Six advance ratios (J); ranging from 0 to 0.75) and, at each J , four forewing-hindwing phase angle differences (δ ; 180°, 90°, 60° and 0°) are considered. The mean vertical force and thrust are made to balance the weight and body-drag, respectively, by adjusting the angles of attack of the wings, so that the flight could better approximate the real flight. At hovering and low J ($J=0, 0.15$), the model dragonfly uses separated flows or leading-edge vortices (LEV) on both the fore- and hindwing downstrokes; at medium J ($J=0.30, 0.45$), it uses the LEV on the forewing downstroke and attached flow on the hindwing downstroke; at high J ($J=0.6, 0.75$), it uses attached flows on both fore- and hindwing downstrokes. (The upstrokes are very lightly loaded and, in general, the flows are attached.) At a given J , at $\delta=180^\circ$, there are two vertical force peaks in a cycle, one in the first half of the cycle, produced mainly by the hindwing downstroke, and the other in the second half of the cycle, produced mainly by the forewing downstroke; at $\delta=90^\circ, 60^\circ$ and 0° , the two force peaks merge into one peak. The vertical force is close to the resultant aerodynamic force [because the thrust (or bodydrag) is much smaller than vertical force (or the weight)]. 55-65% of the vertical force is contributed by the drag of the wings. The forewing-hindwing interaction is detrimental to the vertical force (and resultant force) generation. At hovering, the interaction reduces the mean vertical force (and resultant force) by 8-15%, compared with that without interaction; as J increases, the reduction generally decreases (e.g. at $J=0.6$ and $\delta=90^\circ$, it becomes 1.6%). A possible reason for the detrimental interaction is as follows: each of the wings produces a mean vertical force coefficient close to half that needed for weight support, and a downward flow is generated in producing the vertical force; thus, in general, a wing moves in the downwash-velocity field induced by the other wing, reducing its aerodynamic forces.] Address: Sun, M. Ministry-of-Education Key Laboratory of Fluid Mechanics, Institute of Fluid Mechanics, Beijing University of Aeronautics and Astronautics, Beijing 100083, People's Republic of China. E-mail: m.sun@263.net
- 5685.** Webb, J. (2005): Dragonfly Conservation from the BDS. *Atropos* 26: 48-49. (in English). [The relevance of Odonata as bioindicators is briefly outlined.] Address: not stated
- 5686.** Wildermuth, H.; Horvath, G. (2005): Visual deception of a male *Libellula depressa* by the shiny surface of a parked car (Odonata: Libellulidae). *International Journal of Odonatology* 8(1): 97-105. (in English). ["A male *L. depressa* was observed to mistake a dark-green passenger coach for a water body thus establishing his territory over the surface of the vehicle and using the radio antenna as perch. A videopolarimetric analysis of the car body showed that the light reflected from the bonnet was highly and horizontally polarized with rather similar polarizational characteristics in the red, green and blue part of the spectrum. It is concluded that the insect was deceived by the reflected horizontally polarized light resembling the corresponding pattern at a plane water surface." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch
- 5687.** Wilson, K.D.P. (2005): Odonata of Guangxi Zhuang Autonomous Region, China, part II: Anisoptera. *International Journal of Odonatology* 8(1): 107-168. ["Taxonomic and faunistic information is provided on the Anisoptera of Guangxi Zhuang Autonomous Regi-

on, China. The genus *Atratothermis* is established to receive a newly discovered libellulid species *A. reelsi* sp. nov. belonging to the subfamily Pantalinae. *Oligo-aeschna aquilonaris* sp. nov., *Periaeschna rotunda* sp. nov., *Petaliaeschna gerrhoni* sp. nov. and *Asiagomphus giza* sp. nov. are described. The first males of *Stylurus erectocornis* and *Nihonogomphus huangshaensis* and the first female of *Macrogomphus guilinensis* are described. *Diplacodes bipunctata* and *Idionyx unguiculata* are recorded from mainland China for the first time. *Somatochlora taiwana* is synonymised with *S. dido*. (Author)] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

5688. Wilson, K.D.P. (2005): The Dragon Hunter. National Geographic Explorer September 2005: 4-9. (in English). [This is an introduction to dragonflies for kids. For details see: <http://magma.nationalgeographic.com/ngexplorer/0509/articles/mainarticle.html>. Additional material for teachers is available at: <http://magma.nationalgeographic.com/ngexplorer/0509/ax/teachersguide0509.pdf>] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

5689. Wilson, R.S.; Kraft, P.G.; Van Damme, R. (2005): Predator-specific changes in the morphology and swimming performance of larval *Rana lessonae*. *Functional Ecology* 19(2): 238-244. (in English). ["1. We investigated the morphological responses of larval *Rana lessonae* to the presence of two predators with substantially different prey-detection and capture techniques; larval dragonflies (*Aeshna cyanea*) and the Pumpkinseed Sunfish (*Lepomis gibbosus*). 2. We also examined the functional implications of any predator-induced morphological variation on their swimming ability by assessing performance during the initial stages of a startle response. 3. We found the morphological responses of larval *R. lessonae* were dependent on the specific predator present. Tadpoles raised in the presence of dragonfly larvae preying upon conspecific tadpoles developed total tail heights 5.4% deeper and tail muscles 4.7% shallower than tadpoles raised in a non-predator environment, while tadpoles raised with sunfish possessed tails 2% shallower and tail muscles 2.5% higher than non-predator-exposed tadpoles. 4. Predator-induced morphological variation also significantly influenced swimming performance. Tadpoles raised with sunfish possessed swimming speeds 9.5 and 14.6% higher than non- and dragonfly predator groups, respectively. 5. Thus, the expression of these alternative predator-morphs leads to a functional trade-off in performance between the different environments." (Authors)] Address: Wilson, R.S., School of Integrative Biology, The University of Queensland, St. Lucia, QLD 4072, Australia. E-mail: rwilson@zen.uq.edu.au

5690. Worthington, A.; Haggert, K.; Loosemore, M. (2005): Seasonality of prey size selection in adult *Sympetrum vicinum* (Odonata: Libellulidae). *International Journal of Odonatology* 8(1): 169-176. (in English). ["*S. vicinum* is a sit and wait predator, which takes off and pursues small flying insects during its long flying season (July to November). We investigated whether foraging individuals become less discriminating regarding prey size selection during the fall season because the changeable fall weather has an impact on the prey population. To investigate the seasonality of prey size se-

lection, we videotaped prey capture flights of females and teneral males chasing artificial prey of known sizes (1-8 mm beads) from September to October in 2002 and 2003 in upstate New York, USA. We calculated the probability of pursuit for each bead size and measured the distance of the bead at the time of takeoff (213 presentations in 2002 and 383 presentations in 2003). We found that 2 mm beads had the highest probability of eliciting takeoff in both years and throughout the study periods. Weather conditions, especially the early first hard frost in 2003, reduced prey abundance. *S. vicinum* opportunistically pursued a wide variety of prey sizes. The probability of pursuit of larger beads (3-5 mm) increased in late fall, but *S. vicinum* never pursued 8 mm beads. The mechanism of distance perception and therefore size detection is not known in Odonata and yet *S. vicinum* in this study is showing a preference for 2 mm beads no matter what the distance of the bead from the perch." (Authors)] Address: Worthington, Andrea, Department of Biology, Siena College, Loudonville, NY 12211, USA. E-mail: Worthington@siena.edu

5691. Zha, L.S.; Zhang, D.-Z.; Zheng, Z.M. (2005): The genus *Gomphidia* Selys in China (Odonata, Gomphidae). *Acta Zootaxonomica Sinica* 30(4): 812-814. (in English, with Chinese summary). [The paper deals with 4 species (*G. confluens*, *G. kelloggi*, *G. kruegeri*) and 1 subspecies (*G. kruegeri fukiensis*) of the genus *Gomphidia* Selys in China. *Gomphidia interruptistria* is described as new to science. The type specimen (male, 24-VII-2004, Yaoqu, Mengla, Yunnan, China) is deposited at the Institute of Zoology, Shaanxi Normal University, Xi'an, China. A key to the Chinese species of the genus is provided.] Address: Zha, L.-S., Institute of Zoology, Shaanxi Normal University, Xi'an 710062, China. E-mail: lingshengzha@stu.snnu.edu.cn

5692. Zhang, D.-Z.; Zheng, Z.-M. (2005): Application of molecular genetic marker technique in Odonata studies. *Chinese Bulletin of Entomology* 42(2): 123-127. (in Chinese, with English summary). ["The techniques of molecular biology were used extensively in insects systematics in recent years. There are decades of molecular genetic markers, some of which have been used in Odonata systematics. The methods used in this aspect include Isozyme, AFLP, RAPD, DNA sequencing and DNA probe etc." (Authors)] Address: Zhang, D.-Z., 11 College of Life Sciences, Ningxia University, Yinchuan, 750021, China. E-mail: zhangdazhi22443@163.com

5693. Zhou, X.; Zhou, W.-b (2005): A new species of the *Indolestes* from Guizhou province of China (Odonata: Lestidae). *Wuyi Journal of Science* 21: 13-15. (in Chinese, with English summary). ["Type specimens" of *Indolestes guizhouensis* sp. nov. are deposited in the Zhejiang Museum of Natural History. "Measurements (mm): male Abd + app. 38mm, hind wing. 28mm. The new species is similar to *Indolestes gracilis* (Hagen), but can be easily separated from the latter by: 1) outer side of the hinder ocelli with two small triangular green spots; 2) abdomen azure blue marked with black, segments 3 and 4 with the apical quarter black, segment 5 with the apical third black, segment 6 with the two fifth black, segments 7 to 9 almost entirely black." (Authors)] Address: Zhou, X., Zhejiang Museum of Natural History, Hangzhou, Zhejiang 310012, China

5694. Zhou, X.; Zhou, W.-b.; Lu, S.-x. (2005): Two new species of Onychogomphinae (Odonata: Gomphidae) from Yunnan province, China. *Entomotaxonomia* 27(1): 1-4. (in Chinese, with English summary). [Nychnogomphus lui Zhou, Zhou & Lu 2005: Holotype: male, Malipo County, Wenshan Miaozu Autonomous Prefecture, Yunnan Province, 28-V-2000, coll. LU Sheng-xian; Paratypes: 2 males same data as holotype.; *Scalmogomphus wenshanensis* Zhou, Zhou & Lu 2005: Holotype: male, Malipo County, Wenshan Miaozu Autonomous Prefecture, Yunnan Province, 28-V-2000, coll. LU Sheng-xian; Paratype: female, same data as holotype.] Address: Zhou, W.-b., Zhejiang Mus. Nat. Hist., Gushan, Hanzhou-310012, P.R. China

5695. Zhu, H.-q.; Chen, S. (2005): A new species of the genus *Macromia* Rambur (Odonata: Corduliidae) from Beijing area, China. *Entomotaxonomia* 27(3): 161-164. (in Chinese, with English summary). ["*Macromia beijingensis* sp. nov. is described and illustrated from Beijing China. It is similar to *M. amphigena* fraenata Martin, different from the latter as follows: 1) base of labrum marked with a light yellow spot, and without dorsal spot on the antefrons; 2) abdominal segment X with a pair of dorsal conical spines in the male; 3) the "head" and "neck" of posterior hamulus rather robust. and with a longer apical claw; 4) abdominal segment II with the yellow stripe and lateral stripe more or less interrupted in the female, and both of the stripes on abdominal segments III, IV are always confluence. Holotype: male, Zhuijiuyu, Changping Region, Beijing, 21-VI-2002, leg. CHEN Si; Paratypes: 1 female, 05-V-2004, 1 male 25-VII-2004, Zhuijiuyu, Changping Region, Beijing City, leg. CHEN Si." (Authors)] Address: Zhu Hui-qian, Shanxi University, 42-38, Taiyuan, Shanxi 030006, China

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5696. Abbott, J. (2006): Dragonflies and Damselflies (Odonata) of Texas, Volume I. Lulu. Press. ISBN: 1-4116-6525-2: 328 pp. (in English). [Damselflies and Dragonflies (Odonata) of Texas is an indispensable reference to the 223 species of odonates distributed throughout the Lone Star state. Included in this volume are detailed species distribution and seasonality information arranged so that users can quickly and easily search by scientific name, county name, or flight season. A variety of articles are also included on the natural history, collection and preservation, and diversity of Texas odonates. Whether using the book to find new species records in the deserts of west Texas or perusing articles in the comfort of your home, this volume is an essential guide for both life-long and budding odonatologists alike. The following contributions are written by John Abbott: "Collection Guidelines for the Odonata Survey of Texas", "The Dragonfly Society of the Americas Guidelines for Collecting", "Specific Collecting & Preservation Instructions", "Guidelines for Field Notes & Data Recording", "History of Odonata Study in the South-central U.S.", "Odonata Field Guides, Resources, Societies, & Suppliers", "Life History & Morphology of Odonata", "Seasonality of Odonata in Texas", "Statistical Summary of Odonata in Texas", "Abundance & Distribution of Texas Odonata", "Diversity of Texas Odonata by County", "Checklist of Dragonflies & Damselflies

of Texas", "Dragonflies & Damselflies of Texas Listed by County", "Distribution Maps of Texas Odonata", "Glossary of Terms Relating to Odonata", and "Index to Maps". The following papers are from different authors: "OdonataCentral.com: A model for the Web-based Delivery of Natural History Information and Citizen Science (J.C. Abbott & D. Broglie)", "Hornsby Bend - It's Not Just Birds (G.W. Lasley)", "Turquoise-tipped Darner (*Rhionaeschna psilus*): Backyard Surprise, D. Hardy)", "The Odonata of Kerr County and the Guadalupe River System of Texas (T. Gallucci)". This competently written book is a solid basement for all future odonatological study in Texas, USA. The missing information - basically a bibliography on the Texan Odonata - will come soon, I am quite sure. (Martin Schorr)] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

5697. AK Libellen NRW (2006): Libellen in Deutschland. 25. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO) e.V.. 17.-19. März 2006, Essen. <http://www.nua.nrw.de/oeffentl/publikat/pdfs/nuaheft18.pdf>: 53 pp. (in German, some in English). [Abstracts of the 25 meeting of the Society of German-speaking Odonatologists in Essen, 17.-19 March 2006. Free available at: <http://www.nua.nrw.de/oeffentl/publikat/pdfs/nuaheft18.pdf>] Address: Conze, K.-J., Listerstr. 13, D-45147 Essen, Germany. E-mail: Klaus-Juergen.Conze@t-online.de

5698. Amjad, H. (2006): Dragonflies of West Virginia. Lulu-Press. ISBN: 978-1-4116-8145-3: 163 pp. (in English). [The dragonflies of West Virginia called a "Festschrift dedicated to Carl Cook" is less a book than a collection of brief notes on dragonfly biology and other dragonfly affairs, and pictures of the species in any quality available. Compared with alternative treatises on the odonate state fauna in USA, this books lacks in nearly everything what makes a usefull contribution to odonatology: no maps, no checklists, no competent bibliography, many insufficient pictures and colour photos etc. I am very sorry, but the book on the West Virginian Odonata first has to be written. This attempt is not more than a very first draft to a solid regional fauna. (Martin Schorr) More usefull is the e-book from the same author: <http://www.wvdragonfly.us/wvdragonfly.pdf>] Address: <http://books.lulu.com/content/218176>

5699. Baird, I.R.C.; Ireland, C. (2006): Upright emergence in *Petalura gigantea* (Odonata: Petaluridae). *International Journal of Odonatology* 9(1): 45-50. (in English). ["During the 2003/2004 summer flying season, upright emergence of a male *Petalura gigantea* was observed and photographed in the Blue Mountains of New South Wales during an extensive survey for the species. This observation differed from the only previous illustration of a hanging back emergence style, and is compared with observations of emergence style for the other Petaluridae. While the earliest accounts illustrated or suggested a hanging back emergence style in *P. gigantea*, *Uropetala chiltoni* and *Tanypteryx hageni*, upright emergence has subsequently been documented in *T. pryeri*, *U. carovei* and *Tachopteryx thoreyi*. The observation of upright emergence in *P. gigantea* reported in this paper further suggests that upright emergence may be the norm for all petalurids. However, additional observations will be necessary to resolve the question of emergence style within the Petaluridae."]

(Authors)] Address: Baird, I.R.C., 3 Waimea St, Ka-toomba NSW 2780, Australia. E-mail: ianbaird@mountains.net.au

5700. Beckemeyer, R.J. (2006): Hind wing fragments of Meganeuropsis (Protodonata: Meganeuridae) from the Lower Permian of Noble County, Oklahoma. *Bulletin of American Odonatology* 9(3/4): 85-89. (in English). ["Meganeurid Protodonata of the genera Meganeura (Carboniferous: Commentry, France) and Meganeuropsis (Permian: Wellington Formation, USA) are the largest insects known to have ever flown, with wing lengths equal to or greater than 300 mm. Specimens of such wings are relatively rare. A fragment of a 38 mm by 75 mm portion of the anal region of the hind wing of a Meganeuropsis griffenfly from the Wellington Formation of Noble County, Oklahoma, is figured and described." (Author)] Address: Beckemeyer, R.J., Research Associate, Johnston Geology Museum, Emporia State University, Emporia, KS 66801, USA. E-mail: royb@southwind.net

5701. Bogunski, G. (2006): Ergebnisse der entomologischen Untersuchungen im LSG „Koberbachgrund“ bei Langenreinsdorf / Crimmitschau im Kreis Zwickauer Land im Jahre 2003. *Mitt. Sächs. Entomol.* 73: 24-40. (in German). [Sachsen, Germany; 17 odonate species are listed and briefly commented.] Address: Bogunski, G., Gartenstr. 10, 08141 Reinsdorf, Germany

5702. Brodin, T.; Mikolajewski, D.J.; Johansson, F. (2006): Behavioural and life history effects of predator diet cues during ontogeny in damselfly larvae. *Oecologia* 148(1): 162-169. (in English). ["A central issue in predator-prey interactions is how predator associated chemical cues affect the behaviour and life history of prey. In this study, we investigated how growth and behaviour during ontogeny of a damselfly larva (*Coenagrion hastulatum*) in high and low food environments was affected by the diet of a predator (*Aeshna juncea*). We reared larvae in three different predator treatments; no predator, predator feeding on conspecifics and predator feeding on heterospecifics. We found that, independent of food availability, larvae displayed the strongest anti-predator behaviours where predators consumed prey conspecifics. Interestingly, the effect of predator diet on prey activity was only present early in ontogeny, whereas late in ontogeny no difference in prey activity between treatments could be found. In contrast, the significant effect of predator diet on prey spatial distribution was unaffected by time. Larval size was affected by both food availability and predator diet. Larvae reared in the high food treatment grew larger than larvae in the low food treatment. Mean larval size was smallest in the treatment where predators consumed prey conspecifics, intermediate where predators consumed heterospecifics and largest in the treatment without predators. The difference in mean larval size between treatments is probably an effect of reduced larval feeding, due to behavioural responses to chemical cues associated with predator diet. Our study suggests that anti-predator responses can be specific for certain stages in ontogeny. This finding shows the importance of considering where in its ontogeny a study organism is before results are interpreted and generalisations are made. Furthermore, this finding accentuates the importance of long-term studies and may have implications for how results generated by short-term studies can be used." (Authors)] Address: Brodin, T.,

Department of Ecology and Environmental Science, Animal Ecology, Umeå University, 90187 Umeå, Sweden. Email: tomas.brodin@emg.umu.se

5703. Buczyński, P.; Buczyńska, E.; Kasjaniuk, A. (2006): Dragonflies (Odonata) and caddisflies (Trichoptera) of the nature reserve "Magazyn" (Western Polesie). *Parki nar. Rez. Przyr.* 24(2005): 117-130. (in Polish, with English summary). ["The nature reserve "Magazyn", with valuable aquatic and peat bog vegetation, protects the belt of marshes on the edge of the Sobibór Forests and the River Bug valley. Thirty three dragonfly species and sixteen caddisfly species were recorded within the reserve in the years 1999, 2002 and 2003. The most important habitat for the development of aquatic insects in the reserve was the permanent dystrophic water body dammed by the dike. The fauna of this habitat was similar to the fauna of peat bog lakes. The remaining habitats were of astatic character and they dried out in dry summers. The species richness of dragonfly fauna (46% of Polish fauna and 49% of the Lublin region) was associated with the following facts: many species were recognized as highly acid tolerant and the populations of the reserve were supplied with specimens from species-rich surface water that surrounds the area. The poverty of caddisfly fauna (6% of Polish fauna and 15% of the Lublin region one) results probably from specific water chemistry and poor variation in habitats. The nature reserve "Magazyn", important for the protection of flora and some groups of animals (leeches, aquatic beetles, fish, reptiles), has small significance for the protection of the examined insect groups. Nevertheless, it may play the role of an important component of the water network of middle-eastern Poland with well preserved types of marshy and aquatic habitats." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

5704. Corbet, P.S.; Suhling, F.; Soendgerath, D. (2006): Voltinism of Odonata: a review. *International Journal of Odonatology* 9(1): 1-44. (in English). ["We classified 542 records of voltinism for 275 species and subspecies of Odonata according to three variables: geographical latitude, systematic position and habitat type. We sorted records according to voltinism – categories being three or more generations per year, two generations per year, one generation per year, one generation in two years and one generation in three or more years. We sought to correlate the voltinism of each record with latitude of the study site, thus demonstrating an overall negative correlation between voltinism and latitude. After allowing for phylogenetic similarity a negative correlation remains, although it decreases in strength after removal of taxonomic correlates, mainly between family and genus levels. A negative correlation exists at the species level within most families, with the exception of Lestidae. In genera for which we lacked data for latitudes 0-31°N/S no significant correlation between latitude and voltinism exists. In temporary waters most species complete at least one generation per year; most species in lentic perennial waters complete one generation or fewer; and the majority of species in lotic waters complete half a generation or less. We discuss the roles of exogenous and endogenous factors in influencing voltinism and identify those that may be affecting the correlation that the data reveal. We suggest projects that could improve un-

derstanding of voltinism in the context of seasonal regulation and the main types of odonate life cycle so far recognised." (Authors)] Address: Corbet, P.S., Crean Mill, St. Buryan, Cornwall TR19 6HA, UK. E-mail: mail@pcorbet.vispa.com

5705. Diaz de Pascual, A.; Guerrero, C. (2006): Diet of *Rana catesbeiana* (Shaw 1802: Ranidae: Amphibia) introduced into the Andes of Venezuela. 2006 Joint Meeting of Ichthyologists and Herpetologists July 12-17, 2006 : (in English). [Verbatim: Considering the predation of this invasive frog species on native amphibian population, we identified prey items in the diet of *Rana catesbeiana* in the Andes of Merida. During March to June of 2001, frogs were collected in a private Lagoon located at 3300 m of altitude by hand, nets and air-rifle. In total 337 stomach contents were examined. 474 prey items were found in their stomach content. This frog was deliberately introduced into the Andes of Merida, Venezuela in the decade of 1990 s without knowing up till now the purpose of its introduction. By the time of the preparation of this report, dense populations of the species occupy more than 20 freshwater habitats such as ponds, marshes, ditches and irrigation canals between an altitude of 1800 to 2600 m. Their population is spreading rapidly occupying all aquatic habitats available within a ratio of 4.3 Km from the dispersion center (Diaz de Pascual and Chacon-Ortiz, 2002). Individuals of this species were examined for the presence of *Batrachochytrium dendrobatidis* (Chytridomycosis) and 96% of the recently metamorphosed individuals were positive for the fungal disease (Hanselman R. et al, 2004). Frogs were dissected to get their stomachs and place the gut content on formalin 10%. They were divided in four age categories based on size as: Recently metamorphosed, juveniles, sub-adults and adults. We presented the data in terms of percentage of preys per each group category. The bullfrog diet varied among age groups: Stomachs of Recently metamorphosed individuals contained mainly Hymenoptera and Odonata, made up the proportion of 29.03% each, Diptera larvae (20.96%), Coleoptera unidentified (9.67%) and snails from Planorbidae family (8.06%). Juvenile diet consisted of Coleoptera (28.29%), Hymenoptera (22.36%), Odonata (9.21%), Homoptera (9.87%) and fish (5.26%). Sub-adult diet was composed of Coleoptera (34.26%), Hymenoptera (13.48%), Odonata (12.35%), Diptera (6.18%) and bullfrog juveniles (2.24%) and fish (6.18%). Adult bullfrogs contained juvenile and tadpoles of its own species (31.70%), fish from the species *Poecilia reticulata* (7.32%), Coleoptera (17.76%) and Odonata (14.63%). Diet differences] Address: Diaz de Pascual, Amelia, Universidad de Los Andes, Dept. Biología, Merida, Venezuela, 5101

5706. Dijkstra, K.-D.; Vick, G.S. (2006): Inflation by venation and the bankruptcy of traditional genera: the case of *Neodythemis* and *Micromacromia*, with keys to the continental African species and the description of two new *Neodythemis* species from the Albertine Rift (Odonata: Libellulidae). *International Journal of Odonatology* 9(1): 51-70. (in English). ["The Afrotropical 'neodythemistine' genera are an example of venation-biased classification in Odonata. This example is used to argue the bankruptcy of some traditional classifications in the order, particularly in the Libellulidae, and the need to apply alternative characters to define genera. Two groups of Afrotropical 'neodythemistines' are identified by male and female genitalia, supported by colour

patterns, and these correspond to the only two genera which we retain: *Micromacromia* and *Neodythemis*. A new classification is proposed on this basis: *Eothemis* and *Monardithemis* are synonyms of *Micromacromia*; *E. zygoptera* and *M. flava* are transferred to *Micromacromia*; *Neodythemis scalarum* is a synonym of *M. zygoptera*. *Allorrhizucha* and *Mesumbethemis* are synonyms of *Neodythemis*; *A. campioni*, *A. klingi*, *A. preussi*, *M. takamandensis* and *Micromacromia afra* are transferred to *Neodythemis*; *N. africana* and *N. gorillae* are synonyms of *N. afra*. A checklist of Afrotropical 'neodythemistine' species and a key to the continental species is provided. Two new *Neodythemis* species are described from the Albertine Rift; *N. munyaga* sp. nov. (holotype male: Uganda, Bwindi Impenetrable National Park, Buhoma, Munyaga Valley, alt. ca 1,600 m a.s.l., 17 v 2003) and *N. nyungwe* sp. nov. (holotype male: Rwanda, Nyungwe National Park, Karamba, alt. ca 1,500 m a.s.l., 28 x 1985)." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5707. Endersby, I. (2006): Bibliography of Victorian Dragonflies (Insecta: Odonata). Arthur Rylah Institute for Environmental Research, Technical Report Series 157. Dept Sustainability & Environment, Melbourne. ISBN 1 74152 439 3: 33 pp. (in English). [166 papers with reference to Odonata in Victoria, Australia are compiled in this study. The literature is divided into a number of periods ranging from 'Pre-1900' to 2001-2005, and documenting in a table the progress that was made on different subjects in the regional odonatology (taxonomy, biology etc.). Each of the periods briefly focused on significant studies or odonatologists. The second part of the study lists the regional species and their relevant citations in chronological order. Part 3 lists all publications / references on Victorian Odonata.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@mira.net

5708. Ferro, M.L.; Sites, R.W. (2006): Description of the larva of *Gomphidictinus perakensis* (Laidlaw) (Odonata: Gomphidae), with distributional notes. *Proceedings of the Entomological Society of Washington* 108 (1): 76-81. (in English). ["The final instar of *G. perakensis* is described and figured from exuviae and larval specimens collected in Chiang Mai, Kanchanaburi, Prachuap Khiri Khan, and Surat Thani provinces in Thailand. This large species is flattened, subovate, and the posterolateral corners of abdominal segments III-IX have an elongate, broadly-recurved flange. Distributional information is given concerning additional collections of adults, larvae, and exuviae from Thailand." (Authors)] Address: Ferro, M.L., Enns Entomology Museum, Department of Entomology, University of Missouri, Columbia, Missouri 65211, U.S.A. E-mail: spongy-mesophyll@gmail.com

5709. Fleck, G.; Orr, A.G. (2006): Une larve du genre remarquable *Nannophyopsis* Lieftinck, 1935. Importance pour la phylogénie de la famille (Insecta: Odonata: Anisoptera: Libellulidae). *Ann. Naturhist. Mus. Wien* 107 B: 121-130. (in French, with English and German summaries) ["A remarkable larva of the penultimate stadium of the genus *Nannophyopsis* Lieftinck, 1935, tentatively attributable to *Nannophyopsis chalcosoma* Lieftinck, 1935, is described and illustrated. It is briefly compared with that of *N. clara* (Needham, 1930). Several highly derived characters present in this larva are al-

so present in the larvae of *Diastatops Rambur*, 1842, suggesting a close relationship between these two genera presently placed in different subfamilies." (Authors)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

5710. Flint, O.S.; Bastardo, R.H.; Perez-Gelabert, D.E. (2006): Distribution of the Odonata of the Dominican Republic. *Bulletin of American Odonatology* 9(3/4): 67-84. (in English). ["The Dominican Republic is known to support 19 species of damselflies (Zygoptera), of which four are endemic to the island, and 48 species of dragonflies (Anisoptera) of which three are endemic to the island. We present 173 new provincial records for 49 of the 67 known insular species. All newly reported provincial records are given with full data. For all species a complete list of reported provinces is provided. Study of the species of *Sympetrum* on the island reveals that it is *S. gilvum* not *S. illotum*. Due to lack of substantiated records we question the presence of *Hypolestes clara*, *Progomphus integer*, and *Erythemis atala* on the island." (Authors)] Address: Flint, O.S., Department of Entomology MRC-169, National Museum of Natural History, Washington, DC, 20013-7012, USA. E-mail: flinto@si.edu

5711. Gyssels, F.; Robby, S. (2006): Behavioral responses to fish kairomones and autotomy in a damselfly. *Journal of Ethology* 24: 79-83. (in English). ["The threat-sensitivity hypothesis predicts that prey species assess and adjust their behavior in accordance with the magnitude of the threat posed by a predator. A largely overlooked characteristic of a prey that will affect its sensitivity to predators is its history of autotomy. We studied threat-sensitive behavior to fish kairomones in larvae of *Ischnura elegans* damselflies, which had undergone autotomy, from a fishpond and from a fishless pond. In agreement with their higher perceived risk, larvae from the fishpond showed fewer rigid abdomen bends, foraged less and walked more slowly than larvae from the fishless pond. In line with their higher vulnerability to predators, larvae without lamellae spent less time foraging than larvae with lamellae. There was a decrease in swimming activity in the presence of fish kairomones except for larvae with lamellae from the fishless pond. This may reflect differences in vulnerability of larvae without lamellae between pond types. Such context-dependent responses in activity to kairomones should be kept in mind when evaluating the ability of a prey to recognize kairomones." (Authors)] Address: Gyssels, Freya c/o Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robbystoks@bio.kuleuven.ac.be

5712. Hasegawa, E.; Kasuya, E. (2006): Phylogenetic analysis of the insect order Odonata using 28S and 16S rDNA sequences: a comparison between data sets with different evolutionary rates. *Entomological Science* 9(1): 55-66. (in English). ["Molecular phylogenetic analyses were conducted for the insect order Odonata with a focus on testing the effectiveness of a slowly evolving gene to resolve deep branching and also to examine: (i) the monophyly of damselflies (the suborder Zygoptera); and (ii) the phylogenetic position of the relict dragonfly *Epiphlebia superstes*. Two independent molecular sources were used to reconstruct phylogeny: the 16S rRNA gene on the mitochondrial genome and the 28S rRNA gene on the nuclear genome. A comparison of

the sequences showed that the obtained 28S rDNA sequences have evolved at a much slower rate than the 16S rDNA, and that the former is better than the latter for resolving deep branching in the Odonata. Both molecular sources indicated that the Zygoptera are paraphyletic, and when a reasonable weighting for among-site rate variation was enforced for the 16S rDNA data set, *E. superstes* was placed between the two remaining major suborders, namely, Zygoptera and Anisoptera (dragonflies). Character reconstruction analysis suggests that multiple hits at the rapidly evolving sites in the 16S rDNA degenerated the phylogenetic signals of the data set." (Authors)] Address: Hasegawa, E., Department of Ecology and Systematics, Graduate School of Agriculture, Hokkaido University, Kita-ku, Sapporo, 060-8587, Japan. Email: ehase@res.agr.hokudai.ac.jp

5713. Hof, C.; Brändle, M.; Brandl, R. (2006): Lentic odonates have larger and more northern ranges than lotic species. *Journal of Biogeography* 33(1): 63-70. (in English). ["Aim: We analysed latitudinal range, centres of distribution and northern range boundaries of Odonata occurring in Europe and North America with respect to larval habitat (standing water = lentic and running water = lotic). As lentic water bodies are thought to be less predictable in space and time than lotic habitats, species adapted to standing waters depend on effective dispersal ability for long-term survival. If species occurring in lentic habitats have a higher propensity for dispersal, then larger range sizes in lentic than in lotic species, as well as an increase in the proportion of lentic species with latitude, would be expected. Location: Europe, North America. Methods: Distributional and habitat data were collected from published sources for all odonates of Europe and North America. Species were assigned to lentic and lotic habitats according to the habitat of the larvae. From distribution maps we estimated the latitudinal range, centre of distribution and northern range boundary of each species. Differences in these distribution variables between lentic and lotic species were evaluated using ANOVA. We related the proportion of lentic species by latitudinal interval in Europe, and by political unit (state, province) in North America, to area, altitudinal range, longitude (only for North America) and latitude by means of generalized linear models. Results: Lentic damselflies and dragonflies had larger latitudinal spans, and more northern distribution centres and range boundaries, than lotic species. The proportion of lentic species increased with latitude. These findings were consistent between continents. Main conclusions: Our results support previous findings that distribution patterns of freshwater species depend on habitat preference. Evolution of dispersal propensity according to habitat characteristics is the most likely explanation. However, at present, alternative explanations, such as an increase in lentic habitats with latitude, cannot be ruled out." (Authors)] Address: Hof, C., Dept of Animal Ecology, Faculty of Biology, Philipps-University of Marburg, Karl-von-Frisch-Str., D-35032 Marburg, Germany. E-mail: christian-hof@web.de

5714. Hornung, C.; Pacas, C. (2006): Investigating damselfly populations at springs in Banff National Park, Canada, with special focus on *Argia vivida*, *Amphiargia abbreviatum*, and *Ischnura cervula* (Odonata: Coenagrionidae). *Aquatic Ecology* 40(1): 49-58. (in English). ["The objective of this study was to estimate *Argia vivida* populations, identify breeding habitat, and investigate movement of adults within Banff National Park, Al-

berta, Canada, during the summer of 2003. Mark-recapture techniques and standardized dip-net surveys were used to monitor *Argia vivida* at various life stages. A reproductive index identified which sites *Argia vivida* recognized as suitable breeding habitat, and exuvia surveys confirmed breeding sites. The basic structure of emergent and surrounding vegetation was measured to investigate the importance of available ovipositing or roosting sites and the condition of the matrix habitat. Data was recorded for *Amphiagrion abbreviatum* and *Ischnura cervula* (both Odonata: Coenagrionidae) to determine if these spring-associated damselflies were successfully breeding within Banff National Park. Comparisons were made between the highly protected Middle Springs and the heavily altered Cave & Basin Springs. Additional surveys at the Vermilion Lake cool spring and Middle Springs Bog investigated their use as breeding habitat for *Amphiagrion abbreviatum* and *Argia vivida*, respectively. Results suggest the ecological value of thermal springs extends beyond their origin to outflows and downstream pools. Conservation of *Argia vivida* must recognize the value of unobstructed thermal outflows, and consider the condition of the forested habitat surrounding springs with regard to its potential use as nocturnal roosts and dispersal corridors. *Amphiagrion abbreviatum* was confirmed breeding within Banff National Park, while no sign of breeding activity was recorded for *Ischnura cervula*." (Authors)] Address: Hornung, Christine, University of Alberta, 751 GSB, T6G 2H1, Edmonton, AB, Canada. E-mail: crhornung@hotmail.com

5715. Ilmonen, J.; Suhonen, J. (2006): Intraguild predation, cannibalism, and microhabitat use in *Calopteryx virgo* and *Somatochlora metallica* larvae: a laboratory experiment. *Aquatic Ecology* 40(1): 59-68. (in English). ["Intraguild predation (IGP) and cannibalism among co-occurring lotic odonate species was studied in Central Finland. A laboratory experiment was performed to assess the microhabitat use and cannibalism between intermediate and late instars of *C. virgo* larvae and predation by larger *S. metallica* larvae on the intermediate *C. virgo* instars. The experiment was run in small running-water aquaria where the larvae were able to divide their mutual habitat vertically by clinging onto artificial perches or crawling on the bottom. Life span of the small *C. virgo* larvae and attack rate on them were compared between the cannibalism and IGP treatments. The effect of predation on the activity, habitat use and spatial distribution of the small *C. virgo* larvae was examined. The IGP rate was 36%. The prey larvae spent the most of their time on the perches, whereas the *S. metallica* preferred the substrate. The large *C. virgo* larvae did not cannibalise smaller conspecifics. The presence of a predator (*S. metallica*) had no effect on the habitat use or activity of the prey (*C. virgo*) larvae. Habitat use differed more between those species than between conspecifics of different size classes of *C. virgo*. The spatial distribution between *S. metallica* and *C. virgo* showed a completely random pattern, whereas the two size classes of *C. virgo* aggregated in the vegetation. Absence of cannibalism and behavioural observations indicate that *C. virgo* may have a low tendency for intraspecific aggressions." (Authors)] Address: Email: jari.ilmonen@ymparisto.fi

5716. Joop, G.; Mitschke, A.; Rolff, J.; Siva-Jothy, M.T. (2006): Immune function and parasite resistance in male and polymorphic female *Coenagrion puella*.

BMC Evolutionary Biology 2006, 6:19. 10 pp. (in English). ["Background: Colour polymorphisms are widespread and one of the prime examples is the colour polymorphism in female coenagrionid damselflies: one female morph resembles the male colour (andromorph) while one, or more, female morphs are described as typically female (gynomorph). However, the selective pressures leading to the evolution and maintenance of this polymorphism are not clear. Here, based on the hypothesis that coloration and especially black patterning can be related to resistance against pathogens, we investigated the differences in immune function and parasite resistance between the different female morphs and males. Results: Our studies of immune function revealed no differences in immune function between the female morphs but between the sexes in adult damselflies. In an experimental infection females infected shortly after emergence showed a higher resistance against a fungal pathogen than males, however female morphs did not differ in resistance. In a field sample of adult damselflies we did not find differences in infection rates with watermites and gregarines. Conclusion: With respect to resistance and immune function 'andromorph' blue females of *Coenagrion puella* do not resemble the males. Therefore the colour polymorphism in coenagrionid damselflies is unlikely to be maintained by differences in immunity." (Authors)] Address: Joop, Gerrit, Zoologisches Institut, AG Ökologie, Technische Universität Braunschweig, Braunschweig, Germany. Email: g.joop@tu-bs.de;

5717. Joop, G.; Siva-Jothy, M.; Rolff, J. (2006): Female colour polymorphism: Gender and the eye of the beholder in damselflies. *Evolutionary Ecology* 20(3): 259-270. (in English). ["Damselflies provide a classic example of female colour polymorphism. Usually, one female morph resembles the blue male colour (andromorph) while one, or more, female morphs are seen as typically female (gynomorph). Damselfly species fall in two distinct groups with respect to recent developments in mimicry theory: in some species females are perfect, they match male colouration and black patterning, and in other species they are supposed to be imperfect mimics, only matching male colouration. However, the underlying assumption of one female morph looking male-like is mostly based on human vision. Therefore we investigated the black patterning and colour of the three female morphs in *Coenagrion puella*, an imperfect mimic, using image analysis. In *C. puella* the blue female morph is perceived as male-like. We found that the black patterning of such females cannot be distinguished from the other female morphs, and is clearly different from males. Furthermore, the blue colour of andromorph females differs from the blue colour of males. Intriguingly, however, the red content did not differ between blue males and females." (Authors)] Address: Rolff, J., Department of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

5718. Kefford, B.J.; Zaluzniak, L.; Nuggeoda, D. (2006): Growth of the damselfly *Ischnura heterosticta* is better in saline water than freshwater. *Environmental Pollution* 141: 409-419. (in English). ["Increasing salinity has the potential to affect freshwater organisms. Yet sub-lethal effects of salinity on macroinvertebrates are poorly understood. Growth and development of *I. heterosticta* was experimentally shown to be faster in 5–20 mS/cm than 0.1–1 mS/cm, while in 35 mS/cm all indivi-

duals died. In 30 mS/cm about half died and growth was similar to the 0.1 mS/cm treatment. The salinity-growth relationship cannot be explained indirectly, that is salinity affecting the survival of their prey. Tissue content and concentration of Ca, Mg, Na and K in emerged adults showed no evidence of deficiencies at low salinity. Heart beat rate was similar across treatments, except at 35 mS/cm, where it was slower. Respiration and feeding were similar at 0.1, 10 and 30 mS/cm. While there are similarities in *I. heterosticta* and other species' salinity response, there are differences and studies on more species are urgently needed." (Authors)] Address: Kefford, B.J., Department of Biotechnology and Environmental Biology, RMIT University, PO Box 71, Bundoora, 3083, Victoria, Australia. E-mail: ben.kefford@rmit.edu.au

5719. Kiyoshi, T.; Sota, T. (2006): Differentiation of the dragonfly genus *Davidius* (Odonata: Gomphidae) in Japan inferred from mitochondrial and nuclear gene genealogies. *Zoological Science* 23(1): 1-8. (in English). ["To infer the differentiation of Japanese *Davidius* dragonflies, we investigated the genealogies of the mitochondrial cytochrome oxidase subunit I gene (COI) and the nuclear ribosomal RNA gene region encompassing 18S, ITS1, 5.8S, and ITS2 sequences for three species endemic to Japan-*Davidius nanus*, *D. fujijama*, and *D. moiwanus* -as well as *D. lunatus* from the Korean Peninsula. According to the mitochondrial and nuclear gene genealogies, *D. nanus* and *D. moiwanus* are closely related and are sister to the continental species *D. lunatus*, whereas *D. fujijama* differentiated from an ancestor of the other three species. Although the mitochondrial DNA data did not resolve the relationships between *D. nanus* and three *D. moiwanus* subspecies, the nuclear DNA data indicate the monophyly of *D. moiwanus* and its subspecies. The nuclear gene genealogy suggests that isolated wetlands used by larval *D. moiwanus* derive from the ancestral riverine habitats of *D. nanus* and other *Davidius* species. The COI sequence divergence among local populations was much greater in *D. moiwanus* than in *D. nanus*, which may be the result of differences in the dispersal ranges associated with the habitat types of these species." (Authors)] Address: Takuya, K., Department of Zoology, Graduate School of Science, Kyoto University, Japan. E-mail: kiyoshi@zoo.zool.kyoto-u.ac.jp

5720. Klaus, D.; Kaiser, C. (2006): Aktuelle Funde der Gemeinen Keiljungfer (*Gomphus vulgatissimus* [Linnaeus, 1758]) im Südraum Leipzig. *Mitt. sächs. Entomol.* 73: 19-20. (in German). [The latest known records of *G. vulgatissimus* from the environs of Leipzig, Sachsen, Germany dated from 1922. In 2005, along the river Pleiße near Rötha the species was rediscovered.] Address: Klaus, D., Heimstätten 10, D-04571 Rötha, Germany

5721. Koch, K. (2006): Effects of male harassment on females' oviposition behaviour in Libellulidae (Odonata). *International Journal of Odonatology* 9(1): 71-80. (in English). ["I investigated whether the level of male harassment affects females' oviposition behaviour, such that females oviposit unguarded under suboptimal conditions and/or vary oviposition duration, dip number, dip frequency or number of oviposition site changes. The study species were the libellulids *Crocothemis erythraea*, *Orthetrum chrysostigma*, *Pantala flavescens*, *Sympetrum fonscolombii*, *Trithemis annulata* and *T. kir-*

byi ardens. Only a few ovipositions under suboptimal conditions were observed and females hovered lower under high male harassment. However, in only a few species studied oviposition behaviour differed with the level of harassment. No evidence for a special female strategy to avoid the negative effects of males' harassment was found. Due to the great intraspecific variability females seemed to be able to react flexibly to current conditions, such as changing male density and the level of male harassment." (Author)] Address: Koch, Kamilla, Max-Planck-Institut für Limnologie Plön, August-Thienemann-Straße 2, 24306 Plön, Germany. E-mail: koch@mpil-ploen.mpg.de

5722. Krupp, F.; Apel, M.; Hamoud, A.; Schneider, W.; Zajonz, U. (2006): Zoological survey in the Red Sea coastal zone of Yemen. *Fauna of Arabia* 21: 11-32. (in English, with Arabian summary). [13 odonates species are documented.] Address: Schneider, W., Hess. Landesmus., Zool. Abt., Friedensplatz 1, D-64283 Darmstadt, Germany. E-mail: w.schneider@hlmd.de

5723. Mazerolle, M.J.; Poulin, M.; Lavoie, C.; Rochefort, L.; Desrochers, A.; Drolet, B. (2006): Animal and vegetation patterns in natural and man-made bog pools: implications for restoration. *Freshwater Biology* 51(2): 333-350. (in English). ["1. Peatlands have suffered great losses following drainage for agriculture, forestry, urbanisation, or peat mining, near inhabited areas. We evaluated the faunal and vegetation patterns after restoration of a peatland formerly mined for peat. We assessed whether bog pools created during restoration are similar to natural bog pools in terms of water chemistry, vegetation structure and composition, as well as amphibian and arthropod occurrence patterns. 2. Both avian species richness and peatland vegetation cover at the site increased following restoration. Within bog pools, however, the vegetation composition differed between natural and man-made pools. The cover of low shrubs, Sphagnum moss, submerged, emergent and floating vegetation in man-made pools was lower than in natural pools, whereas pH was higher than in typical bog pools. Dominant plant species also differed between man-made and natural pools. 3. Amphibian tadpoles, juveniles and adults occurred more often in man-made pools than natural bog pools. Although some arthropods, including Coleoptera bog specialists, readily colonised the pools, their abundance was two to 26 times lower than in natural bog pools. Plant introduction in bog pools, at the stocking densities we applied, had no effect on the occurrence of most groups. 4. We conclude that our restoration efforts were partially successful. Peatland-wide vegetation patterns following restoration mimicked those of natural peatlands, but 4 years were not sufficient for man-made pools to fully emulate the characteristics of natural bog pools." (Authors) The detailed analysis of invertebrates also includes the Odonata.] Address: Mazerolle, M.J., USGS Patuxent Wildlife Research Center, 12100 Beech Forest Road, Laurel, MD 20708-4017, U.S.A. E-mail: mmazerolle@usgs.gov

5724. McCarhy, J.M.; Hein, C.L.; Olden, J.D.; vander Zanden, J.M. (2006): Coupling long-term studies with meta-analysis to investigate impacts of non-native crayfish on zoobenthic communities. *Freshwater Biology* 51(2): 224-235. (in English). ["1. Biological invasions are widely recognised as a significant component of human-caused environmental change and a primary

threat to native biodiversity. The negative impacts of species invasions are particularly evident for freshwater crayfish faunas. 2. This study provides novel insight into the ecological effects of native and non-native crayfish on zoobenthic communities (with emphasis on the non-native rusty crayfish, *Orconectes rusticus*) across broad scales by combining a meta-analysis of small-scale experimental studies with a long-term observational study conducted over a 24 year period in Sparkling Lake, Wisconsin, U.S.A. (46°00'N, 89°42'W). 3. The meta-analysis summarised quantitatively the results of cage experiments for seven species of crayfish spanning four continents. We found that total zoobenthos densities (primarily Gastropoda and Diptera) were significantly lower in treatments containing crayfish relative to controls; a result that was significant for non-native crayfish but not for crayfish in their native range, perhaps owing to a small sample size. In contrast to other species, rusty crayfish were also negatively associated with Ephemeroptera. 4. Results from the time series analysis comparing temporal trends in rusty crayfish and invertebrate abundances from Sparkling Lake were consistent with the findings from the meta-analysis. Rusty crayfish were negatively correlated with the abundance of total zoobenthos, Diptera, Ephemeroptera and Odonata, as well as families of Trichoptera. 5. By coupling the results from short and long-term research, our study offers greater insight into the nature of crayfish-invertebrate interactions in aquatic systems, revealing consistent effects of invasive crayfish on native fauna. The control and management of invasive species is facilitated by the knowledge that well executed small-scale studies may be extrapolated to understand larger-scale ecological interactions." (Authors)] Address: McCarthy, Julia M., Dept Biology, Colorado State University, Fort Collins, CO 80523-1878, U.S.A. E-mail: juliamc@lamar.colostate.edu

5725. Meyer, M.; Proess, R.; Schneider, N. (2006): Entomologische Notizen aus Luxemburg, 2000–2004. Bull. Soc. Nat. luxemb. 106: 105-112. (in German, with English summary). [Records of *Oxygastra curtisii*, *Orthetrum coerulescens*, *Coenagrion mercuriale*, and *Lesites virens* from Luxembourg are documented.] Address: Meyer, M., Musée national d'histoire naturelle, section zoologie des invertébrés, 25 rue Munster, L-2160 Luxembourg. E-mail: zool.invert1@mnhn.lu

5726. Mitra, A. (2006): Current status of the Odonata of Bhutan: A checklist with four new records. Journal of renewable natural resources Bhutan 2(1): 136-143. (in English) ["Specimens of dragonflies were collected from Trashiyangtse and Pemagatshel districts of eastern Bhutan during the months of July and September 2003. One specimen of *Neurothemis fulvia* was collected on 5th September 2004 SamdrupJongkhar district. Altogether 61 specimens of Odonata belonging to 16 species and subspecies under 13 genera and four families were listed during the present study, which revealed four new records of odonates for Bhutan viz., *Orthetrum s. sabinana*, *Acisoma p. panorpoides*, *Brachythemis contaminata* and *Neurothemis fulvia*. An up-to-date checklist of 31 species and subspecies of odonates known till date from Bhutan had also been made. However, since the collection period was too short and didn't spread over the whole year, the above list of odonata from the concerned localities remained incomplete. The survey did not cover the southern, western and central districts of Bhutan and thus does not represent a complete check-

list of Odonates of Bhutan. An extensive Odonatological survey needs to be carried out to explore the rich diversity of these elegant insects and come up with a representative checklist of Odonates for Bhutan." (Author)] Address: Mitra, A., Department of Zoology, Sherubtse College, Kanglung, Bhutan.

5727. Nützel, R.; Wittmann, R. (2006): Libellen in München. Herausgeber: Bund Naturschutz, Kreisgruppe München: 18 pp. (in German). [Leaflet with information on dragonflies in Munich, Germany, directed to a more broad in nature interested public. Available at: <http://www.bn-muenchen.de/service/publikationen/libellenflyer.pdf>] Address: Bund Naturschutz, Kreisgruppe München, Pettenkoferstr. 10a, 80336 München

5728. Oppel, S. (2006): Comparison of two Odonata communities from a natural and a modified rainforest in Papua New Guinea. International Journal of Odonatology 9(1): 89-102. (in English). ["The Odonata fauna of Papua New Guinea is species-rich, but human population growth and resulting modification of primary rainforests may lead to a loss of valuable habitat and species diversity. In this study, I compared the odonate assemblages of a natural tropical rainforest and a modified forest in order to assess the loss that could result from human forest alteration. I collected odonates and recorded habitat use at both study sites for several weeks. The assemblages were compared with similarity indices, and total species richness was estimated using a jackknife procedure. The natural forest community, with 61 species, had both a higher diversity and evenness than the village community, with 38 species. Altogether I found 78 species of 13 families, of which 21 were shared between the two areas. Among the families with more than one species, Megapodagrionidae and Libellulidae had the highest similarity between the two sites, whereas Coenagrionidae and Platynemididae had fairly dissimilar community composition. Three families occurred only in the natural forest. The most important habitats in the village were open sunny areas, artificial ditches, and small permanent creeks, compared to most running waters and the forest interior in the natural forest. Based on habitat preferences in the natural forest, species inhabiting temporary water sources under closed canopy rainforests are most vulnerable to forest modification. They comprised a third of the forest community, and I estimate that approximately 25% of natural rainforest species will disappear following human-induced forest alteration." (Author)] Address: Oppel, S., Dept Biology & Wildlife, 211 Irving 1, University of Alaska, Fairbanks, Fairbanks, AK 99775, USA. E-mail: steffen.oppel@gmail.com

5729. Oppel, S. (2006): Using distance sampling to quantify Odonata density in tropical rainforests. International Journal of Odonatology 9(1): 81-88. (in English). ["Quantitative data are essential for many aspects of ecological research. Several methods exist to quantify odonate abundance, but complications may arise when abundances in different habitats need to be compared. In this study, I explored a technique that can overcome the variable detectability of odonates in habitats with different visibility. Distance sampling is briefly introduced and the main assumptions are listed. I conducted line transect surveys using distance sampling protocol over several weeks in a rainforest locality in Papua New Guinea to assess the usefulness of distance sampling. The results suggested that estimates of encounter rate

and density of odonates are substantially higher when distance sampling is employed. Density in habitats with poor visibility, like the forest interior, is severely underestimated by traditional sampling methods, and this can lead to a misclassification of habitats. Distance sampling is a very useful technique for quantitative odonate sampling, but the sampling effort required for precise estimates is very high. For the rainforest locality in this study at least 15 months of intensive sampling would be required. Further limitations of distance sampling are discussed." (Author)] Address: Opiel, S., Department of Biology and Wildlife, 211 Irving 1, University of Alaska, Fairbanks, Fairbanks, AK 99775, USA. E-mail: steffen.opiel@gmail.com

5730. Paulson, D.R. (2006): Openwing perching in some Zygoptera (Odonata): a response to Klaus Reinhardt. *International Journal of Odonatology* 9(1): 111-118. (in English). ["Herein I respond to a critique of my paper on wing positions in Zygoptera. The author of that critique suggested that most of the hypotheses presented in that paper were flawed and questioned some of the facts brought to bear on them. In addition, he presented his own ideas in support of hypotheses I had rejected. I take this opportunity to clarify my reasoning further. Although I did not elaborate sufficiently in some cases, no statement made in my paper was incorrect. My critic and I are in agreement that this is a complicated matter, and all hypotheses continue to be worth further testing." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

5731. Principe, R.E.; del Corigliano, M.C. (2006): Benthic, drifting and marginal macroinvertebrate assemblages in a lowland River: temporal and spatial variations and size structure. *Hydrobiologia* 553(1): 303-317. (in English). ["Aquatic macroinvertebrates living in anastomosing lowland rivers use different habitats and respond differently to the hydrological regime. In this paper, the structure and composition of benthic, drifting and marginal macroinvertebrate assemblages are analyzed in the lowland river Ctlamochita (Córdoba, Argentina). The assemblages were studied in an annual cycle; a comparison among the composition of benthos, drift and marginal fauna was carried out; and size structure of the assemblages was characterized. Samples were obtained from two sites: a rural and an urban site. In total 73 taxa of aquatic macroinvertebrates were collected. Benthos was characterized by Chironomidae and Oligochaeta; marginal fauna was mainly constituted by Coleoptera, Heteroptera, Decapoda, the Trichoptera *Nectopsyche* sp., Ephemeroptera and Odonata. Drifting assemblage was composed by macroinvertebrates from local and remote upstream benthos, and from the marginal zone. Marginal fauna diversity was higher than benthos and drift. Total biomass of the assemblages pooled together was relatively equitably among size classes. Larger size classes consisted of organisms from the marginal zone whereas the smallest ones were composed by benthic and drifting organisms. In the study area there is habitat partitioning in the lateral dimension of the river. Marginal fauna was more diverse due to the asymmetry of transport and deposit processes, which generate a heterogeneous habitat in the bankside. The relation between fine substrate and high current velocity determines an unstable habitat in the central channel, which makes colonization by benthic macroinvertebrates difficult." (Authors)] Ad-

dress: Principe, Romina Elizabeth, Departamento de Ciencias Naturales, Universidad Nacional de Río Cuarto, A.P. No. 3, X5804 Río Cuarto, BYA, Argentina. E-mail: principe@exa.unrc.edu.ar

5732. Proess, R. (2006): Verbreitungsatlas der Libellen des Großherzogtums Luxemburg. *Ferrantia* 47: 164 pp. (in German, with English and French summaries). ["The distribution atlas summarizes the knowledge of the dragonfly fauna in the Grand Duchy of Luxembourg. The current (after 1980) and historical distribution of the 62 species are presented in distribution maps using squares of 5 x 5 km. For each species the ecological requirements, the current and the historical distribution are discussed. The different dragonfly-habitats existing in Luxembourg are presented, and information regarding the preservation of the dragonflies are given." (Author)] Address: Proess, R., ECOTOP, 6, rue Gustave Kahnt, L-1851 Luxembourg, Luxembourg. E-mail: ecotop@pt.lu available from: Musée national d'histoire naturelle, 25, rue Münster, L-2160 Luxembourg, Luxembourg

5733. Raab, R.; Chovanec, A.; Pennerstorfer, J. (2006): *Libellen Österreichs*. Springer. Wien. ISBN 3-211-28926-7: X, 345 pp. (in German). [This book on Austrian Odonata, produced in collaboration with several co-authors, is characterised by a high-quality presentation, and furnished with many colour photographs, graphs and maps. Eleven chapters comprise highly readable contributions: A special recommendation should be given to the introduction into the biology of Odonata written by Johann Waringer which contains some original ideas and sketches about the eggs and the embryology of Odonata, or the respiration of the larvae. Interesting are the description of the local fauna of several regions in Austria, and the chapter on the function of dragonflies as bio-indicators. Brief accounts are given to the threat and conservation of Odonata in Austria, the data sources, and a general introduction into the climatic and geographical conditions in Austria. The 77 odonate species recorded in Austria to date are treated in a monographic style. On two or three pages a compact treatment of the Austrian Odonata is presented: The distribution in Austria is briefly described, and all available records are mapped with time-scale details. Additional information is given to the altitudinal distribution, emergence period, and phenology. The part on the habitat and biology of the species is based - in most cases - on the the book of Sternberg & Buchwald on the dragonflies of Baden-Württemberg, Germany. Only few species are treated with original data resulting from studies in Austria (e.g. *Coenagrion hylas* and [in Chapter 7.3] *Cordulegaster heros* and *Thecagaster bidentata*). Threat and conservation measures are also outlined for each species. In summary, this book is a highly welcome contribution to the knowledge of the central European Odonata. (Martin Schorr) Available at: Springer-Verlag, Tiergartenstrasse 17, D-69 121 Heidelberg, Germany. <http://www.springer.com/dal/home/life+sci?SGWID=1-10027-22-76448852-0>

5734. Reinhardt, K. (2006): Open questions in the evolution of openwing perching in the Zygoptera (Odonata): a comment on Dennis Paulson. *International Journal of Odonatology* 9(1): 103-110. (in English). ["In a recent paper D.R. Paulson (2004; IJO 7: 505-515) presented five hypotheses concerning the way wings are held in the Zygoptera during perching. A critical ex-

amination suggests that most of them have substantial flaws that prevent their testing. Based on Bechly's phylogeny (1998; <<http://www.bechly.de/system.htm>>) I suggest that the wing perching mode in the Odonata has changed five or six times, depending on whether the ancestral situation in the Odonata was closedwing or openwing perching, respectively. Combining parts of Paulson's hypotheses into a more plastic cost-benefit framework is suggested as an alternative approach, such as the investigation of possible trade-offs between thermoregulatory and foraging benefits and costly predation risk." (Author)] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

5735. Salur, A.; Kiyak, S. (2006): An interesting dragonfly record, *Pseudagrion syriacum* (Selys, 1887), from Turkey (Odonata: Coenagrionidae). *Munis Entomology & Zoology* 1(1): 171-172. (in English). ["Material examined: 1 male, Hatay, Iskenderun (Arsuz-Kepirce), small stream, 5 m, 36°29'N 35°59' E, 15.V.2003; 6 males, 1 female, same loc. 19.V.2004 (leg. & det. A. Salur). Examined material was deposited at the Zoological Museum of Gazi University (ZMGU)."] (Authors)] Address: Salur, A., Gazi University, Çorum Sciences and Arts Faculty, Department of Biology, 19030 Çorum, Turkey. E-mail: alisalur@gazi.edu.tr

5736. Samways, M.J. (2006): Insect extinctions and insect survival. *Conservation Biology* 20(1): 245-246. (in English). [*Pseudagrion citricola* from South Africa is used to exemplify how improved knowledge alters the effort put into status assessment (this species was removed from the Red List). *Metacnemis angusta* - believed extinct - was rediscovered following improved field-search methods.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

5737. Schader, T. (2006): Tümpelanlagen der GNOR: Positive Entwicklung in der Rheinebene östlich von Neustadt/Weinstraße. *GNOR Info* 101: 28-30. (in German) [Some passing results from an amphibian based monitoring of newly created waters in Rhineland-Palatinate, Germany including the rare *Sympetrum pedemontanum*.] Address: Schader, H., Obere Jakobstr. 5, 67550 Worms, Germany

5738. Sformo, T.; Doak, P. (2006): Thermal ecology of interior Alaska dragonflies (Odonata: Anisoptera). *Functional Ecology* 20(1): 114-123. (in English). ["1. We examined the thermal ecology of Interior Alaska dragonflies (Odonata: Anisoptera). The relationships between mass and passive cooling rate, wing loading, minimum flight temperature (MFT) and thermoregulating ability were examined. These properties were also compared between the behavioural classes: perchers and fliers. All factors with the addition of seasonal and daily flight activity were related to generalized thermal strategies. 2. Passive cooling rate decreased while wing loading and MFT increased with mass. 3. While all species were able to elevate thoracic temperature, larger species were better able to maintain a constant temperature. 4. Both the smallest and largest species of dragonflies were capable of activity at ambient temperatures of approximately 14 °C by employing different thermal strategies: low MFT and physiological heat production, respectively. 5. For small species active in cool conditions low MFT may be favoured

cool conditions low MFT may be favoured even if accompanied by poor thermoregulating ability. By contrast, thermoregulation and specialization for high-temperature performance may be favoured in both small and large species during the warmer summer flight season. 6. The smallest and largest dragonflies in Interior Alaska have the shortest and longest daily activity periods, respectively. However this pattern does not hold for the intermediate-sized dragonflies. Thermal strategy displays no clear relationship to daily activity pattern." (Authors)] Address: Sformo, T., Department of Biology and Wildlife and Institute of Arctic Biology, University of Alaska, Fairbanks, AK 99775, USA. E-mail: rfts@uaf.edu

5739. Slos, S.; Stoks, R. (2006): Behavioural correlations may cause partial support for the risk allocation hypothesis in damselfly larvae. *Ethology* 112(2): 143-151. (in English). ["Prey animals are often confronted with situations that differ in predation risk. According to the risk allocation hypothesis, prey animals should adaptively allocate antipredator behaviour in accordance with the magnitude and frequency of those risk situations. According to the first prediction prey animals should increase foraging in the safe situations and decrease foraging in the dangerous situations as these situations become relatively more dangerous. The second prediction is that with increased time spent in the dangerous situations, progressively more foraging effort is shown in both the dangerous and safe situations, especially in the safer ones. Prey animals may, however, show maladaptive behaviour due to behavioural correlations across risk situations. Here we test for the first time both predictions generated by the risk allocation hypothesis while considering behavioural correlations. We reared larvae of the damselfly *Ischnura elegans*, from the egg stage, under five rearing risk conditions: (i) in isolation, (ii) in the presence of conspecific larvae, (iii) in the presence of one fish, (iv) in the presence of two fish, and (v) in the presence of two fish for 50% of the time. For each rearing risk condition, we scored their behaviour in the absence and in the presence of fish. In accordance with the first prediction, in the absence of a predator, larvae reared under increasing risk conditions increased their level of foraging. In accordance with the second prediction, in the absence of a predator, larvae that were more frequently exposed to fish during rearing, increased foraging. However, opposite to the predictions from the risk allocation hypothesis, foraging increased both with increasing rearing risk, and with increased predator exposure frequency. The observed positive behavioural correlation of foraging activity across test situations with and without fish, may generate the combination of adaptive patterns in the absence of fish and the maladaptive patterns in the presence of fish. Former studies of the risk allocation hypothesis also found, at best, mixed support, and we hypothesize that behavioural correlations across risk situations, if present, will likely cause partial deviations from model predictions.] Address: Slos, Stefanie; Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

5740. Sokolova, Y.Y.; Kryukova, N.A.; Glupov, V.V.; Fuxa, J.R. (2006): *Systemostrema alba* Larsson 1988 (Microsporidia, Thelohaniidae) in the dragonfly *Aeshna viridis* (Odonata, Aeshnidae) from south Siberia: Morphology and molecular characterization. *Journal of Eu-*

karyotic Microbiology 53(1): 49-57. (in English). ["An octospore microsporidium was found in the nymphs of *Aeshna viridis*, collected in intermittent streams near Novosibirsk, Siberia, Russia in 2003. Spores were uniloculate and measured $6.1 \pm 0.07 \times 3.0 \pm 0.04$ μm on fresh smears. The polar filament was anisofilar having 10-11 anterior coils (thicker filament diam.) and 10-11 posterior (thinner filament diam.) coils. Sporophorous vesicles were persistent and measured $12.3 \pm 0.23 \times 11.9 \pm 0.20$ μm . The infection was restricted to the adipose tissue and caused the formation of whitish "cysts" containing mature octospores. Based on ultrastructural similarity we consider this Siberian isolate to be *Systenostrema alba*, a species described from *Aeshna grandis* collected in Sweden (Larsson 1988). Maximum likelihood, neighbor joining, and maximum parsimony analyses of the small subunit rDNA all placed *Systenostrema alba* (Accession no. AY953292) as the sister taxon to a clade consisting of *Thelohania solenopsae*, *Tubulinosema ratisbonensis*, and *T. acridophagus*." (Authors)] Address: Sokolova, Y., Institute of Cytology, Russian Academy of Sciences, St. Petersburg, 194064, Russia. E-mail: jumicro@yahoo.com

5741. Suhling, F.; Sahlen, G.; Martens, A.; Marais, E.; Schütte, C. (2006): Dragonfly assemblages in arid tropical environments: a case study from western Namibia. *Biodiversity and Conservation* 15: 311-332. (in English). ["Dragonflies have been proposed as indicators for the ecosystem health of freshwater wetlands. For their useful functioning as indicators it is, however, necessary to identify species compositions in specific habitats and species-habitat associations, particularly in the tropics, where such knowledge is still weak. We examined the dragonfly species composition of 133 localities in the arid environment of western Namibia. An analysis of nestedness indicated that distinct, and predictable patterns of species associations can be expected. Discriminant analyses revealed that most of the nine habitat types separated by structural and hydrological parameters are well discriminated by their dragonfly assemblages. Spring brooks in particular host a specific assemblage, which is threatened due to the habitat restriction of several species, as well as by recent habitat loss and degradation. Using a hierarchical method of several criteria we demonstrated the selection of a set of potential indicator species from the species set, most of these being useful indicators for spring brook assemblages. The conservation status of certain habitats and species is discussed. We propose that dragonflies will have a high indicator potential for threatened freshwater wetlands in such areas and may also serve as an indication of the sustainable use of water resources including evaluating measures to rehabilitate environments." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

5742. Trockur, B.; Didion, A. (2006): Libellen im Bereich der Steinkohlen-Bergehalde der Grube Reden. *Abh. DELATTINIA* 30: 187-190. (in German, with English and French summaries). [11 dragonfly species were recorded in the area of the hard-coal mine tip Reden on the day of species diversity, July 5th 2003. 22 species are known from the Region altogether, 18 of them are indigenous. Typical for the biotops concerned are the Red List species *Ischnura pumilio*, *Orthetrum brunneum* and *Sympecma fusca*.] Address: Trockur, B.,

Schulstr. 4, D-66636 Tholey-Scheuern, Germany. E-mail: BerndTrockur@gmx.de

5743. Trockur, B. (2006): Zum aktuellen Kenntnisstand der Libellenfauna im Bereich Heinitz (Saarland). *Abh. DELATTINIA* 31: 57-78. (in German, with English and French summaries). ["The present evidence of nativity of *Aeshna affinis*, for the first time for the Saarland in the area of Heinitz, among other new records, is reason to look again intensely at the Odonata-fauna of the area and to summarize the results with periods of earlier investigations. It was possible to record seven new species for the Saarland of faunistical and ecological importance in the area within eight years from 1998 to 2005, all except two with proof of reproduction. With altogether 47 known species now, the area, already recognized as extremely valuable for the Saarland since the eighties, climbs to a top position in respect of the Odonata-fauna.] Address: Trockur, B., Schulstr. 4, D-66636 Tholey-Scheuern, Germany. E-mail: BerndTrockur@gmx.de

5744. Tynkkynen, K.; Kotiaho, J.S.; Luojumäki, M.; Suhonen, J. (2006): Interspecific territoriality in *Calopteryx damselflies*: the role of secondary sexual characters. *Animal Behaviour* 71(2): 299-306. ["Interspecific territoriality is usually interpreted to result from interspecific interference competition, although it may also originate from mistaken species recognition. In the latter case, it may be based on similarity of secondary sexual characters. In the damselfly *Calopteryx splendens*, males have pigmented wing spots as a sexual character, and males with the largest spots resemble males of another species, *Calopteryx virgo*. Probably because of this resemblance, *C. virgo* males are more aggressive towards large- than small-spotted *C. splendens* males. We examined whether wing spot size of *C. splendens* males affects territorial interactions between the species. In a removal experiment, the number of territorial *C. splendens* increased after *C. virgo* males were removed. However, interspecific territoriality was incomplete since before the removal the territories of the species partially overlapped. Wing spot size of *C. splendens* seemed to affect interspecific territoriality: before the removal territorial and nonterritorial *C. splendens* males had similar spot sizes and the distance to the nearest *C. virgo* territory increased with wing spot size of *C. splendens*. In addition, after the removal of *C. virgo*, the relation between wing spot size and the distance to the nearest old *C. virgo* territory disappeared. Our results suggest that mistaken species recognition may account for the interspecific territorial behaviour in the two species. Furthermore, interspecific territoriality may cause negative selection on wing spot size and thus may explain character displacement in wing spot size of *C. splendens* males." (Authors)] Address: Tynkkynen, K., Department of Biological and Environmental Science, P.O. Box 35, FIN-40014, University of Jyväskylä, Finland. E-mail

5745. Watts, P.C.; Saccerril, I.J.; Kemp, S.J.; Thompson, D.J. (2006): Population structure and the impact of regional and local habitat isolation upon levels of genetic diversity of the endangered damselfly *Coenagrion mercuriale* (Odonata: Zygoptera). *Freshwater Biology* 51(2): 193-205. (in English). ["1. *C. mercuriale* is one of Europe's most threatened damselflies. There is concern for the long-term persistence of many of its U.K. colonies because adult lifetime movement is limited, making

isolated populations susceptible to extinction. 2. Using 14 microsatellite loci we characterised levels of genetic diversity, evidence for a recent decline and the spatial genetic structure for *C. mercuriale* population in Wales, U.K. 3. Spatial isolation is not an absolute predictor of low genetic diversity at either local or regional scales. 4. One population inhabiting a remote, edge of range site is genetically impoverished with levels of variability (at microsatellite loci) among the lowest reported for any insect species. 5. Agricultural land and high ground are physical barriers to dispersal by adults. 6. Consistent with work from elsewhere, movement by mature *C. mercuriale* in Pembrokeshire is sufficient to prevent significant genetic differentiation throughout a habitat matrix of some 3-4 km if the suitable habitat sites are <2 km apart and lack barriers to movement. Even within a good habitat matrix, however, genetic isolation by distance develops within 10 km." (Authors)] Address: Watts, P.C., School of Biological Sciences, The Biosciences Building, Crown Street, University of Liverpool, Liverpool, L69 7ZB, UK. E-mail: p.c.watts@liv.ac.uk

5746. Wohlfahrt, B.; Mikolajewski, D.J.; Joop, G.; Suhling, F. (2006): Are behavioural traits in prey sensitive to the risk imposed by predatory fish?. *Freshwater Biology* 51: 76-84. (in English). ["1. Behavioural differences among prey species may result from evolutionary adaptations that facilitate coexistence with different predators and influence vulnerability to predators. It has been hypothesised that prey species modify their behaviour in relation to the risk posed by particular predators. 2. We examined the relationship between anti-predator behaviour and predation risk in five species of larval odonates in combination with three predatory fish species (perch, gudgeon and rudd) that differ in foraging behaviour. The odonates, *Platycnemis pennipes*, *Coenagrion puella*, *Lestes sponsa*, *Sympetrum striolatum* and *Libellula depressa*, differ with regard to their life cycle and habitat, including water depth, occurrence in temporary ponds and co-existence with fish. 3. The odonate species differed in their response to fish: (i) Two species showed a flexible response. Larval *C. puella* reduced activity in the presence of fish, regardless of species, whereas *L. depressa* altered their activity only in the presence of gudgeon. (ii) Independent of fish species, all odonates except *L. depressa* exhibited spatial avoidance of fish. This was interpreted as a more general anti-predator response. (iii) In some cases the odonates showed no response to predators and their behaviour was thus independent of predation risk. 4. Our results confirm that all odonates responded to the presence of at least some predatory fish, and that some odonate species discriminated between fish species. However, we found no significant correlation between behavioural modifications and predation risk, indicating that anti-predator responses and predation risk depend on the particular predator and the species being preyed on." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

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aquatic insects were made at Fort Sill, Lawton, Oklahoma, between 2002 and 2004. Ephemeroptera, Plecoptera, Trichoptera, Odonata, Coleoptera, aquatic Heteroptera, Neuroptera, and Megaloptera were targeted. Additional records are included from a survey that took place in 1999. More than 11,000 specimens from more than 290 collections were examined. Based on the current understanding of aquatic insect systematics, 276 taxa distributed over 8 orders, 46 families, and 141 genera were identified. Twenty-three of the 276 taxa [...] are reported from Oklahoma for the first time. The three most diverse orders included Coleoptera (86 species), Odonata (67 species) and Trichoptera (59 species), and the remaining taxa were distributed among Heteroptera, (30 species), Ephemeroptera (21 species), Plecoptera (6 species), Megaloptera (4 species), and Neuroptera (3 species). Based on previous published records, many of the species collected during this study were expected to be found at Fort Sill; however, 276 taxa of aquatic insects identified from such a small geographic area is noteworthy, especially when considering local climatic conditions and the relatively small size of Fort Sill (38,300 ha). Despite agricultural practices in Oklahoma, the dust bowl days, and the development of water-based recreation at Fort Sill, a high percentage of the total known aquatic insect fauna of Oklahoma can be found in a small geographic area." (authors)] Address: Zuellig, R.E., U. S. Geological Survey, Denver Federal Center, MS 415, Denver, Colorado 80225

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test for behavioural adaptations in tadpoles to these different levels of predation. *B. bombina* tadpoles are significantly less active than *B. variegata*, both before and after the introduction of a predator to an experimental arena; this reduces their vulnerability as many predators detect prey through movement. Behavioural differences translate into differential survival: *B. variegata* suffer higher predation rates in laboratory experiments with three main predator types (*Triturus* sp., *Dytiscus* larvae, *Aeshna* nymphs). This differential adaptation to predation will help maintain preference for alternative breeding habitats, and thus serve as a mechanism maintaining the distinctions between the two species." (Authors)] Address: Kruuk, Loeske, Institute of Cell, Animal and Population Biolog., Uni. of Edinburgh, West Mains Road, Edinburgh EH9 3JT, UK. E-mail: loeske@tattoo.ed.ac.uk

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urea. The guanine-plus-cytosine content of the DNA was 29.61 mol%. The genome size was 780 kbp, the smallest genome size in the genus *Spiroplasma*. Strain PALS-1 (5 ATCC 51748) is designated the type strain of a new species, *Spiroplasma platyhelix*." (Authors)] Address: Williamson, D.L., Department of Anatomical Sciences, State University of New York, Stony Brook, New York 117941, USA

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de Pesquisas da Amazônia, Entomologia, Caixa postal 478, 69.011-970, Manaus, AM, Brasil.

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and the extension of the dry season was considered the primary regulation factor acting on this population." (Authors) Address: De Marco, P., Lab. Ecologia Quantitativa, DBG, Universidade Federal de Viçosa, 36571-000, Viçosa, MG, Brazil. E-mail: pdemarco@mail.ufv.br

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sions of the vein pattern is presented." (Authors)] Address: Seino, M. & Kakazu, Y., Faculty of Science, University of the Ryukyus, Okinawa 903-0213, Japan

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kudan-cho, Tsuna-gun, Hyogo, Japan. E-mail: tomohiroichinose@yahoo.co.jp

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ry). ["A contribution on records and status for the Danish Red List dragonflies and damselflies (Odonata). This publication presents Danish records and status reviews since 1764 for the 21 species of Odonata in the Danish 1997 Red List. Records earlier than 2000 and some additional from 2000-2001 have been included. It has been compiled from studies of some major collections, literature and archived notes and by several private contributions of records. However, some additional records no doubt also exist, as not all relevant collections have been studied and not all information on Danish Odonata records have been available for this publication. Since 1991, at least 4 species have been recorded for the first time from Denmark, but their status and localities are not presented, as they are not in the 1997 Red List and at least partly would appear less relevant for the list. A brief review on previous surveys of Danish Odonata is provided." (Author) Available at: <http://hem.passagen.se/trollslaenda/nof/pdf/odroe.pdf>] Address: Holmen, M., Gadeledsvej 48, Gadevang, DK.-3400 Hillerod, Denmark. E-mail: ma@fa.dk

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5768. Ichinose, T.; Morita, T. (2002): Factors influencing the distribution of dragonflies (Odonata) in the agricultural landscape in Hokudan-cho, Hyogo prefecture. *Journal of the Japanese Institute of Landscape Architects* 65: 501-506. (in English). ["There is a huge number of small irrigation ponds in the agricultural landscape of the north of Awaji Island, Hyogo Prefecture. Recently, managements of many ponds have been abandoned. However, these ponds are used as habitat by many organisms. They have an important role to maintain biodiversity in this area. Odonata were surveyed in 24 irrigation ponds in Hokudan-cho, the north of Awaji Island. Thirty-seven species were caught and/or observed from June to September 2000. The number of dragonfly species had no relation with water body area of irrigation ponds. Twenty-four ponds were classified to five types by TWINSPAN (Two-way Indicator Species Analysis). The classification of TWINSPAN was analyzed by Classification and Regression Trees using explanatory variables about environmental factors of irrigation ponds. The results showed that altitude, neighboring woodlots, water body area and water quality influenced the component of dragonfly species. Especially, it was important for species preferring edge and/or inside of woodlot that over 45 percents of pond surroundings were adjacent to woodlots. It was also suggested that surrounding land uses influenced the distribution of dragonfly species." (Authors)] Address: Ichinose, T., Lab. of Landscape Planning, Awaji Landscape Planning and Horticulture Academy (ALPHA), Institute of Natural and Environmental Science, University of Hyogo, Nojimatokiwa 954-2, Hokudan-cho, Tsuna-

gun, Hyogo, Japan. E-mail: tomohiroichinose@yahoo.co.jp

5769. Larivière, S. (2002): *Lutra maculicollis*. Mammalian species No. 712: 1-6. (in English). [Odonata are among the prey of the Spotted-necked Otter, Africa.] Address: not stated

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5771. Ma, Z.-m.; Yang, Z.-z.; Mao, B.-y. (2002): A new record species of *Aristocypha Laidlaw* (1950) (Odonata: Libellaginidae) [sic] from China. *Entomotaxonomia* 24(3): 170. (in Chinese., with English title). [A. hylaryae (Fraser), 2 females, locality not transliterated, alt. 1650 m, 26-VII-1998.] Address: Ma, Z.-m., Dali Medical Coll., Dali, Yunnan-67000, China

5772. Svidersky, V.L.; Plotnikova, S.I. (2002): Insects and vertebrates: Analogous structures in higher integrative centers of the brain. *Journal of Evolutionary Biochemistry and Physiology* 38(5): 627-639. (in English). ["This work deals with studies on anatomical relationships, neuronal composition, and some synaptic connections that exist in the central complex (CC) in the suprasophageal ganglion in larva of dragonfly g. *Aeshna*. It has been shown that CC contains protocerebral bridge of an elongated and slightly curved cylindrical shape, fan-shaped and ellipsoid bodies of a bean-like shape and two small roundish noduli. There were revealed (stained) neurons providing both internal connections of CC and its connections with other CNS regions. Connections with tritocerebrum, the higher center of the autonomic nervous system, and subesophageal ganglion, an intermediate relay between supraesophageal ganglion and truncal brain, have been established. The existence of connections of CC with nuclei of abdominal nervous chain is suggested. Connection of ocelli with the CC has been traced. Unipolar neurons of the same type have been revealed, each of them giving collaterals to protocerebral bridge and ending as bushy terminals that form the main part of glomerule in the fan-

shaped and ellipsoid bodies. Glomeruli are arranged in rows, in which cross connections have been found. It has been established that the structure of neuropils of the fan-shaped and ellipsoid bodies represent a shielding structure described in the cerebral cortex, midbrain cortex, and cerebellar cortex of vertebrates. Thus, in insects, like in vertebrates, the shielding structures developed not only in optic centers, but also in structures performing higher integrative functions. A possible functional role of the central complex is discussed." (Authors)] Address: Svidersky, V.L., Plotnikova, S.I., Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia

5773. Takeyama, H.; Kamihogi, A.; Sato, H. (2002): The plan and design of a biotope at a school based on behavior of butterflies and dragonflies. *Journal of the Institute of Landscape Architecture, Annual Scientific Research Meeting Abstracts* 65: 32. (in English). [Verbatim: Even the role as property of the environment of the city is expected in the biotope space at the school that was established aiming at study position where understands the ecosystem of the area into the school site. We grasped the action characteristic of the dragonfly and butterfly by the 1 individual follow-up at the elementary and junior high school of the city area which possesses the biotope space at the school and periphery environment, and searched the plan and design of biotope space at the school. As the result, the case like the following became clear: it is effective to establish the biotope space at the school including the vegetable garden and swimming pool where four sides of the school sites in the school building without existing the place, to create the big tree, to plant trees in the wall of the structure, grassland with rough control is secured.] Address: Takeyama, H., Museum of Nature and Human Activities, Hyogo, Japan

5774. Tsachalidis, E.P.; Goutner, V. (2002): Diet of the White Stork in Greece in relation to habitat. *Waterbirds* 25(4): 417-423. (in English). ["Prey taken by breeding White Storks (*Ciconia ciconia*) were studied using pellets collected from 1993 to 1995 within its breeding area in Greece. Prey consisted of orthopterans, coleopterans, other insects, mollusks and vertebrates. The difference in the proportions of these taxa was significant among major foraging habitats (lakes, rivers, deltas and dry habitats). With the exception of the rivers, major habitats tended to group together in clusters, suggesting that similar prey types were available to the storks in common habitat types." (Authors) Odonata must be of minor importance as prey for *C. ciconia*, but are not quantified in detail.] Address: Tsachalidis, E.P., Technological Education Institute, Department of Forestry, Laboratory of Ecology and Wildlife Management, GR-66100 Drama, Macedonia, Greece. E-mail: etsaxal@teikav.edu.gr

5775. Wang, H.; Zeng, L.; Yin, C. (2002): Measuring the body position, attitude and wing deformation of a free-flight dragonfly by combining a comb fringe pattern with sign points on the wing. *Meas. Sci. Technol.* 13: 903-908. (in English). ["The simultaneous measurements of the body position, attitude and the wing kinematics of a free-flight insect are very important for analysing the flight performance. In this paper, a method based on combining a comb fringe pattern with sign points on the dragonfly wing has been developed to im-

prove the accuracy in body position and attitude measurement or in construction of a local body-fixed coordinate system. Meanwhile, the wing kinematics can be measured simultaneously by the comb fringe pattern method. The method has been used successfully in the measurement of a free-flight dragonfly." (Authors)] Address: Wang, H., State Key Laboratory of Precision Measurement Technology and Instruments, Department of Precision Instruments, Tsinghua University, Beijing 100084, China. E-mail: wanghao@post.pim.tsinghua.edu.cn

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5776. Albertoni, E.F.; Palma-Silva, C.; Esteves, F.A. (2003): Natural diet of three species of shrimp in a tropical coastal lagoon. *Brasilian archives of biology and technology* 46(3): 395-403. (in English, with Portuguese summary). ["The gut content of 495 specimens of *Farfantepenaeus brasiliensis*, 131 of *F. paulensis* (Penaeidae) and 102 of *Macrobrachium acanthurus* (Palaemonidae) were analyzed to establish the composition of their diets. *F. brasiliensis* had as the most important feeding items in its diet larvae of Chironomidae, Polychaeta and *Heleobia australis* (Mollusca). For *F. paulensis*, the most important items were the same as for *F. brasiliensis*, but the order of importance of *H. australis* and Polychaeta was inverted. *M. acanthurus* had detritus as the most important item, followed by Chironomidae larvae, Odonata nymphs, and fragments of the macroalgae *Chara*. The results showed that the three species were omnivorous, with a varied diet including both components of macrofauna of benthos and associated to the macroalgae *Chara* and plant fragments and detritus." (Authors)] Address: Albertoni, Edélti Faria, Fundação Universidade Federal do Rio Grande; Departamento de Ciências Morfo-Biológicas; Laboratório de Ecologia; Campus Carreiros; Av. Itália Km 8; 96201-900; Rio Grande, RS, Brazil

5777. Brux, H. (2003): Sager Meere, Heumoor, Wehsandgebiete und Lethetal - Ergebnisse und Bilanz aus sechs Jahren Untersuchungen in einem kaum bekannten Gebiet. *Natur- und Umweltschutz (Zeitschrift Mellumrat)* 2(1): 24-33. (in German, with English summary). [Niedersachsen, Germany, "In 1996-2001 investigations on flora and vegetation, birds, bats, fishes, reptiles, amphibia, grasshoppers and dragonflies were carried out. 68 red-data-book-species were recorded so far. Eutrophication and draining led to a strong decrease particularly of peat bog and submersed water plants. Appropriate countermeasures are challenging because only a small part is protected as nature reserve. However, this area is exceptionally well-suited for nature education and nature based recreation." (Author) A total of 26 odonata species including *Ceriatrigon tenelleum* and *Sympetrum depressissculum* are listed.] Address: Brux, H., IBL-Umweltplanung, Unterm Berg 39, 26123 Oldenburg, Germany

5778. Cannings, S.G. (2003): Status of Western River Cruiser (*Calopteryx aequabilis* Say) in British Columbia. B.C. Ministry of Sustainable Resource Management, Conservation Data Centre, Victoria BC. *Wildlife Bulletin* No. B-110: VII, 10 pp. (in English). ["Because this species is known to occur along only one short watercour-

se in the province (Christina Creek) and because this site is not secured, I recommend maintaining the provincial ranking of S1 (BCCDC 2003) and consequent Red-listing. Although there is a possibility that other populations exist, especially along the Kettle River, the probability is very small that these populations would be large or extensive enough to change the rank to another value. The threats posed by exotic fish and Eurasian water-milfoil, inappropriate recreation use, potential riparian development and pollution are also of concern in this unique stream system." (Author)] Address: Cannings, S., A68, BC Cons. Data Ctr., Resource Inven. Branch, P.P. Box 9344, Stn Prov. Govt, Victoria BC V8W 9M1, Canada

5779. Carchini, G.; die Domenico, M.; Pacione, T., Solimini, A.G.; Tanzilli, C. (2003): Species distribution and habitat features in lentic Odonata. *Ital. J. Zool.* 70: 39-46. (in English). ["The relationships between species assemblages and pond characteristics were investigated in a well preserved Mediterranean coastal woodland. Data on adult abundance were collected fortnightly. Pond area and depth, shade, riparian vegetation, presence of four classes of aquatic plants, presence of fish and both the distances from pond to pond and from pond to sea were considered as pond features. Results showed the presence of 23 Odonata species on 23 ponds. A Mantel test showed that the matrices of pond to pond topographic distances and that of pond to pond faunistic similarity were independent, which supports the hypothesis that the adult Odonata actively choose their breeding site. A stepwise multiple regression showed that only pond size, minimum water level and riparian vegetation had significant effects (all positive) on the total number of Odonata species in each pond. On the other hand, a canonical correspondence analysis showed that the composition of Odonata species assemblages was sensitive to almost all variables. From the point of view of Odonata conservation, both the moderate effect of *Gambusia holbrooki* and the positive effect of the riparian vegetation on the number of Odonata species appear particularly interesting for restoring or creating Odonata habitats." (Authors)] Address: Carchini, G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. E-mail: archini@utovrm.it

5780. de Bruyn, U.; Sinning, F. (2003): Kompensationsmaßnahme "Wümme-Nordarm" Bestandsaufnahme ausgewählter Insektengruppen 2002. Gutachten im Auftrag des Wasser- und Schifffahrtsamt Bremerhaven, SKN-14m Ausbau der Außenweser. Büro für Ökologie, Naturschutz und räumliche Planung, Oldenburg: 11 pp. (in German). [Niedersachsen, Germany; 19 odonata species including *Sympetrum pedemontanum* were recorded. For details see: <http://www.wsa-bremerhaven.wsv.de/kompensation/komppdf/WuemmeInsekten02.pdf>] Address: Büro für Ökologie, Naturschutz und räumliche Planung, Dipl.-Ing., Dipl.-Biol. Frank Sinning, Elisabethstr. 23, 26135 Oldenburg

5781. Fabbri, R.; Pavesi, M. (2003): Prima segnalazione per la Lombardia di *Chalcolestes parvidens* (Artobolovski, 1929) (Odonata, Lestidae). *Ann. Mus. civ. St. nat. Ferrara* 6: 95-96. (in Italian, with English summary). [Detailed documentation of four Italian records of *C. parvidens*] Address: Fabbri, R., Museo Civico die Storia Naturale, via De'Pisis, 24-44100 Ferrara, Italy. E-mail: r-fabbri@libero.it

5782. Geschke, S. (2003): Libellenkundliche Bestandsaufnahme im Kasanka National Park 12.03. bis 27.05.2003. Ein Beitrag zur Odonatenfauna Zambias. <http://www.fh-luh.de/fb9/fileadmin/archiv/StudiengangLA/ablauf/Praktikantenamt/Contents/Berichte/Ausland/LibellenZambiaStephanGeschkeklein.pdf>: 60 pp. (in German, with English summary). [Inventory of the Odonata of the Kasanka National Park, Zambia; a total of 72 species was recorded including some more related to the Congo basin. For the full paper see: <http://www.fh-luh.de/fb9/fileadmin/archiv/StudiengangLA/ablauf/Praktikantenamt/Contents/Berichte/Ausland/LibellenZambiaStephanGeschkeklein.pdf>] Address: Geschke, S., Heinrichstr. 8, 32479 Hille, Germany. E-mail: SGeschke@gmx.de

5783. Holly, M. (2003): Monitoring of small ponds faunal colonisation of the Bieszczady National Park. *Roczniki Bieszczadzkie* 11: 249-257. (in Polish, with English summary). [Poland; preliminary results of the monitoring of the faunal succession in five small ponds established in 1999 - 2000 are presented. Data from 2001 and 2003 also document seven (common) odonate species.] Address: Holly, M., Ośrodek Naukowo-Dydaktyczny Bieszczadzkiego Parku Narodowego, ul. Belska 7, 38-700 Ustrzyki Dolne, Poland. E-mail: marekholly@wp.pl

5784. Kravitz, E.A.; Hubery, R. (2003): Aggression in invertebrates. *Current Opinion in Neurobiology* 13: 736-743. (in English). ["Invertebrates are outstanding model systems for the study of aggression. Recent advances and promising new research approaches are bringing investigators closer to the goal of integrating behavioral findings with those from other disciplines of the neurosciences. The presence of highly structured, easily evoked behavioral systems offer unique opportunities to quantify the aggressive state of individuals, to explore the mechanisms underlying the formation and maintenance of dominance relationships, to investigate the dynamic properties of hierarchy formation, and to explore the significance of neural, neurochemical and genetic mechanisms in these behavioral phenomena. [...] Dominance enhances feeding opportunities in dragonflies [Baird J.M., May, M.L.: Fights at the dinner table: agonistic behavior in *Pachydiplax longipennis* (Odonata: Libellulidae) at feeding sites. *J. Insect Behav.* 16:189-216] but few physiological studies that relate specifically to aggression have been carried out using these models." (Authors)] Address: Kravitz, E.A., Department of Neurobiology, Harvard Medical School, 220 Longwood Avenue, Boston, MA 02115, USA. E-mail: edwardkravitz@hms.harvard.edu

5785. Laranjeiro, A.J. (2003): Estabilidade da entomofauna num mosaico de plantação de eucalipto e áreas naturais de conservação. Tese de Doutorado, Escola Superior de Agricultura Luiz de Queiroz (ESALQ), Universidade de São Paulo: XX, 142 pp. (in Portuguese, with English summary). ["Stability of the entomofauna in a region composed by eucalypt plantations and conservation areas. Due to the large spreading of commercial forests in Brazil, in the last decades, one can detect a enormous pressure from the environmentalists and the governmental agencies for evaluation studies and environmental monitoring of forestry enterprises. On the other hand, the forestry enterprises are concerned with the stability of such forests in order to ensure the goals of this agribusiness. The recent spreading of forest

planted areas give chance to a number of pests, either native or introduced ones, to start a process of colonization and adaptation. And one knows that the environmental equilibrium is fundamental for the integrated forest pest management. Therefore this research was carried out to determine the interactions among the main environments of the ecosystem where the plantations are located, as well as the influence of the silvicultural management on the insect communities of the eucalypt plantation and the neighboring natural reservoirs. The entomofauna was monitored by using light and Malaise traps in a watershed of a region with high silvicultural activity, located in the north of the State of Espírito Santo, Brazil, from 1994 to 2002." (Author) Odonata are treated on the family level. For the full paper see: <http://www.teses.usp.br/teses/disponiveis/11/11146/tde-14072003-083640/> Address: Laranjeiro, Alberto Jorge. E-mail, ajl.equilibrio@uol.com.br

5786. Miserendino, M.L. Pizzolon, .A. (2003): Distribution of macroinvertebrate assemblages in the Azul-Quemquemtreu river basin, Patagonia, Argentina. *New Zealand Journal of Marine and Freshwater Research* 37: 525-539. (in English). ["Longitudinal and seasonal changes in physical and chemical variables, and macroinvertebrate community structure-function were examined in the Azul-Quemquemtreu river system in the subantarctic forest of Patagonia, Argentina. Patagonian mountain streams have a marked seasonal discharge pattern and may have high suspended sediment loads because of forestry and other land-use practices. The main physical differences among sites were in substrate size (boulder-pebble/ sand), mean width (3–37 m), discharge (<math><1-80\text{ m}^3\text{ s}^{-1}</math>), total alkalinity (275–1210 meq litre⁻¹) and conductivity (31–137 $\mu\text{S cm}^{-1}$). Species richness and Ephemeroptera, Plecoptera, and Trichoptera richness decreased from upstream sites to the mouth of the river system and were affected by land use. Macroinvertebrate assemblages were influenced by physical (substrate size, width, discharge, current velocity) and chemical (alkalinity and conductivity) variables, and mean density of macroinvertebrates was significantly higher at the Quemquemtreu sites than the Azul sites. Canonical Correspondence Analysis indicated that seasonal trends in macroinvertebrate community composition were related to changes in environmental characteristics of the river, especially water temperature and discharge. The composition of benthic communities in rivers of the Patagonian Andes largely reflect characteristics related to stream size, but factors at the reach scale best explain variation in abundance data. Collector-gatherers were the dominant functional feeding group at all sites. Faunas have similarities with those of New Zealand in taxonomic-functional composition, with a predominance of Chironomidae (Diptera), Leptophlebiidae (Ephemeroptera), and Gripopterygidae (Plecoptera)." (Authors) The only odonate species – *Rhinoeschna variegata* – is reported from one of the six localities sampled for macroinvertebrates.] Address: Miserendino, Laura, Laboratorio de Ecología Acuática, Universidad Nacional de la Patagonia, Sarmiento 849, 9200 Esquel, Chubut, Argentina. E.-mail: mlau@ar.inter.net

5787. Mochizuki, H.; Komaki, H.; Morita, M.; Kusamichi I. (2003): Observation of dragonfly flying in air and flow. *Transactions of Visualization Society of Japan* 23(12): 115-121. (in Japanese, with English summary). ["The flapping of a dragonfly, *Pantala flavescens*, hori-

zontally flying in a field was observed with a high speed video camera. As a result, it was clarified that a frequency of the flapping with maximum amplitude in the observation was the same order as one of the flapping in a wind tunnel. Also, it was observed that vortices regularly occurred every one cycle by flapping with large amplitude in the wind tunnel and diverged downstream with combining each other. The flow upstream of the dragonfly flapping was induced in three forms of curved flow lines into the region around the body. Furthermore, wakes were generated in horizontal, downward and upward directions according to these forms." (Authors)] Address: Mochizuki, H., Faculty of Agriculture, Kagoshima University

5788. Samson, N. (2003): Étude du degré de dispersion et des facteurs favorables à la reproduction de la Cordulie à corps fin, *Oxygastra curtisii* (Dale, 1834), dans les Mauges (49). Centre Permanent d'Initiatives pour l'Environnement Loire et Mauges, Maison de Pays « La Loge, F-49600 Beaupreau: 73 pp. (in French). ["L'espèce *Oxygastra curtisii* (Dale, 1834) est présente en France sur l'ensemble du territoire mais sa fréquence est moindre dans le nord. Le CPIE Loire et Mauges s'intéresse à cette espèce d'intérêt patrimonial car sa présence dans les Mauges est marquée. De cette observation est née la volonté de mener une étude plus poussée sur la Cordulie à corps fin. La problématique de cette étude est double. Il s'agit de cerner les conditions favorables à la reproduction de l'espèce ainsi que son degré de dispersion dans le paysage bocager des Mauges. Pour répondre à cette problématique, les recherches ont porté sur les lieux d'émergence et de vie des larves, le comportement des imagos ainsi que leurs déplacements dans le maillage bocager. La méthodologie mise en place a eu pour but d'aborder le plus d'étapes possibles du cycle biologique: l'émergence, par une recherche des exuvies sur des plaquettes de suivi choisies pour leurs caractéristiques favorables à la présence d'*Oxygastra curtisii*, d'après la bibliographie étudiée, les imagos matures, par la technique de capture/marquage qui permet de récolter des informations à l'échelle de la population, des sexes et de l'individu. Le suivi a lieu dans le paysage bocager, dans le but d'étudier leur comportement et le degré de dispersion, et en contexte aquatique pour observer les comportements liés plus précisément à la reproduction. 115 exuvies ont été récoltées, 102 imagos ont été marqués (80 mâles et 22 femelles), 10% de ces imagos ont été contrôlés et des comportements sexuels ont été constatés (comportements territoriaux, accouplements et pontes). La recherche des exuvies a permis de prouver la reproduction de l'espèce sur l'Evre, de déterminer la période d'émergence et les caractéristiques des sites d'émergence. Le suivi des imagos a permis de préciser le cycle biologique de l'espèce Le but final de cette étude est de prendre en compte la présence d'*Oxygastra curtisii* lors de travaux sur le bocage et les ripisylves." (L'auteur)] Address: Centre Permanent d'Initiatives pour l'Environnement Loire et Mauges, Maison de Pays « La Loge, F-49600 Beaupreau, France

5789. Sukhacheva, G.A.; Kryukova, N.A.; Glupov, V.V. (2003): On the roles of morphological and biochemical criteria in species identification: An example of dragonfly larvae of the genus *Aeshna*. *Biology Bulletin* 30(1): 63-68. (in English). ["Dragonflies belong to the group of organisms with numerous well-differentiated

species-specific characters at the adult stage, on the one hand, and a significantly smaller number or even the absence of such characters at the early ontogenetic stages. An example of the genus *Aeschna* is used to show difficulties in revealing morphological and biochemical characters allowing identification of larval dragonflies belonging to closely related species of the family. Distinct morphometric characters can be found only in late-instar larvae. The presence of species-specific proteins in the homogenates of thoracic muscles provides the possibility of using biochemical tests for species identification of larvae. Infestation by parasites has no effects on the biochemical parameters studied. Species identification of the early-instar dragonfly larvae is still problematic." (Authors)] Address: Sukhacheva, G.A., Siberian Division, Russian Academy of Sciences, Institute of Animal Systematics and Ecology, ul. Frunze 11, Novosibirsk, 630091, Russia. Email: mi@eco.nsc.ru

5790. Sutcliffe, K.E. (2003): The conservation status of aquatic insects in south-western Australia. PhD Thesis, Murdoch University: ["Freshwater ecosystems in south-western Australia have been extensively altered over the last two centuries as a result of human activities. The effect this has had on aquatic fauna, particularly invertebrates, is largely unknown because of inadequate knowledge of the pre-existing fauna. Future changes in the composition of aquatic fauna will also go undetected unless current distributions of existing species are well documented. This thesis addresses the problem by investigating the current distributions and conservation status of aquatic insects in south-western Australia from three orders: Odonata, Plecoptera and Trichoptera. Extensive distributional data was collected by identifying larval specimens from a large number of samples collected throughout the south-west as part of an Australia-wide macroinvertebrate bioassessment project. In addition, a database created from a species-level biological study of the wheatbelt region of Western Australia was utilised, and previously published records of occurrence for species within the south-west were compiled. These results were then used to assess the conservation status of each species using the IUCN red list criteria. Environmental parameters measured at time of sampling were also examined using logistic regression to determine which factors are important in influencing the distributions of aquatic insects in south-western Australia. The conservation value of sites based on Odonata, Plecoptera and Trichoptera compositions was also determined and the degree of protection provided for sites of high conservation value investigated. The high rainfall forested region of the south-west was found to be important for a large number of species, including the majority of those found to be rare and/or restricted. Overall, 37% of species were found to be threatened, with the Trichoptera containing both the greatest number and highest proportion of threatened species. Logistic regression results generally agreed with the distributions obtained for each species, with rainfall and other parameters indicative of streams in the headwaters of forested catchments being positively associated with species found to be restricted to the high rainfall region. Two parameters known to be affected by human disturbance in the south-west, conductivity and nutrient concentrations, were found to be important in determining the occurrence of many species and this could have important consequences for aquatic insect conservation. Widespread species occurring within the low rainfall region of the south-west did not show as

many significant relationships to measured environmental parameters, possibly due to their greater ecological tolerances and adaptations which allow them to persist in a low rainfall environment. The implications of results are discussed, and recommendations for the conservation and management of aquatic insects in south-western Australia are given." (Author)] see: <http://www.lib.murdoch.edu.au/adt/browse/view/adt-MU20040430.153605>

5791. Taborton, W. (2003): Dragonflies. Lajuma Synthesis Workshop, 9–10 May 2003; <http://www.soutpansberg.com/workshop/>: 2 pp. (in English). [Checklist of the Odonata of the Soutpansberg-region, South-Africa.]

5792. Tanida, Y. (2003): Locomotion by Tandem and Parallel Wings (A Note on the Flight of Dragonflies and Beetles). *JSME International Journal Series B* 46(2): 244-249. (in English). ["A two-dimensional analysis was carried out on the locomotion by tandem and parallel wings in relation to the free flight of dragonflies and beetles, remarking the mutual interference between fore and hind wings. The results obtained are summarized as follows: In the case of tandem wings, (1) High thrust and propulsive efficiency can be achieved when the forewing oscillates with a definite phase lag behind the hindwing, as in the case of real dragonflies, (2) Somewhat smaller amplitude of hindwing leads to optimum condition for work sharing of two wings, (3) The hard forewing does not serve for the thrust and propulsive efficiency, whereas the hard hindwing does for the augmentation of them; In the case of parallel wings, (4) The hard wing placed near the soft wing acts nearly as an infinite plate, as for the ground effect, increasing both thrust and propulsive efficiency." (Author)] Address: Tanida, Y., Univ. Tokyo, 7-17-33 Konan-dai, Konan-Ku, Yokohama 234-0054, Japan. E-mail: taniday@docomo.ne.jp

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5793. Argerich, A.; Puig, M.A.; Pupilli, E. (2004): Effect of floods of different magnitude on the macroinvertebrate communities of Matarranya stream (Ebro river basin, NE Spain). *Limnetica* 23(3-4): 103-114. (in English, with Spanish summary). ["In October 2000, the Matarranya River suffered an extraordinary flood with a measured flow rate of approximately 450 m³/s in the town of Vall-de-roures and a return period of about 500 years, according to the Ebro Hydrographic Confederation. The objective of this study was to determine the influence of the consequent perturbation on the structure and composition of the macroinvertebrate community and its subsequent recovery. To this end, two sites in the headwaters of the river, about which information from previous studies was available, were chosen as sampling sites. The Parrissal station, 8 km from the source with a practically natural flow regime, and at Vall-de-roures, 18 km from the source and from which part of the flow has been deviated, to be returned in summer from the waters collected in the reservoir on the Pena River. Sampling was carried out one, five and fifteen months after the flood and the data was compared with that obtained before the perturbation, (December, 1998 and February, 1999). On the other hand, we analyzed the effects of smaller floods occurring in October 1984

(Parrissal) and June 1986 (Vall-de-roures). The results point to different patterns of recovery in the two sampling points after the 2000 flood, the community density recovering more rapidly in the site less affected by anthropic intervention (Parrissal), while the biological quality of the stretch studied in Vall-de-roures involved increased taxonomic richness and greater structuring of the community. The flood events of lesser magnitude did not seem to affect the community structure in Parrissal, while in Vall-de-roures the abundance of the predominant groups varied." (Authors) Odonata are treated on the order level.] Address: Argerich, A., Departamento de Biogeoquímica Acuática. Centre d'Estudis Avançats de Blanes, CSIC. Acc. Cala Sant Francesc 14, 17300 Blanes, Spain. E-mail: alba@ceab.csic.es

5794. Broomhall, S.D. (2004): Egg temperature modifies predator avoidance and the effects of the insecticide endosulfan on tadpoles of an Australian frog. *Journal of applied ecology* 41: 105-113. (in English). ["1. Attention is shifting from simplistic explanations of global amphibian declines that posit a single cause (such as climate change, pesticide contamination or disease) to more complex scenarios that involve interactive effects. Temperature is a pervasive influence on frog development, particularly during the egg and larval stages. However, the effect of temperatures experienced early in ontogeny on later larval behaviour or response to agrochemicals is little known. 2. Eggs of the Australian frog *Limnodynastes peronii* were reared at two temperatures that simulate naturally occurring cool and warm temperature regimes ($14\pm 3^{\circ}\text{C}$ and $20\pm 3^{\circ}\text{C}$). Tadpoles were then exposed to sublethal concentrations of the organochlorine insecticide endosulfan, at a common temperature. Endosulfan often contaminates aquatic environments, yet its effects on Australian frogs are unknown. Tadpoles reduced feeding after 48 h of exposure to endosulfan concentrations that occur in the field (both $0.03\mu\text{g l}^{-1}$ and $1.3\mu\text{g l}^{-1}$). Feeding remained depressed at $1.3\mu\text{g l}^{-1}$ endosulfan up to 9 days after tadpoles were transferred to endosulfan-free water. 3. Egg-rearing temperature and endosulfan interacted to affect tadpole length. Further, tadpoles exposed to endosulfan were significantly shorter than control tadpoles. They were also more vulnerable to capture by an invertebrate (odonate) predator than controls of the same size when tested 9 days after transfer to clean water. While warm egg-rearing temperatures significantly decreased vulnerability to capture, tadpoles were proportionally more adversely affected by endosulfan. Thus, egg-rearing temperature altered predator avoidance and changed the way in which endosulfan affected growth. Moreover, endosulfan significantly decreased feeding, growth and predator avoidance. 4. Synthesis and applications: Not only can short-term exposure to endosulfan at levels within regulatory guidelines and frequently reported in natural waterbodies influence tadpole viability, but the sensitivity of the tadpoles to this effect depends upon the thermal regimes that they encounter over their first few days of life. These data therefore suggest that existing water quality prescriptions may not provide adequate protection, while also illustrating how aspects of climate and thermal regimes might interact with pesticides to have cumulative effects on amphibian fitness." (Author)] Address: Broomhall, Sara, Richard Shine Laboratory, Biological Sciences, Heydon Laurence Building, University of Sydney, NSW 2006, Australia

5795. Cale, D.J.; Halse, S.A.; Walker, C.D. (2004): Wetland monitoring in the Wheatbelt of south-west Western Australia: site descriptions, waterbird, aquatic invertebrate and groundwater data. *Conservation Science W. Aust.* 5(1): 20-135. (in English). ["The Wheatbelt of south-west Western Australia contains a range of wetland types with varying salinity, including many naturally saline lakes and playas. The increase in salinity of most wetlands during the last 50 years as a result of land-clearing is a major threat to wetland biodiversity. As part of the State Salinity Strategy, a wetland monitoring program began in 1997 at 25 wetlands from locations throughout the wheatbelt. The aim of the monitoring program was to document trends in biodiversity at the 25 wetlands and relate these trends to physical conditions in the wetlands and patterns of surrounding landuse. This report summarizes existing information on the wetlands and provides, as baseline conditions, results of initial waterbird, aquatic invertebrate and groundwater monitoring. It documents the monitoring methods used and highlights the need for a long-term program. There was a strong negative relationship between aquatic invertebrate species richness and salinity. A negative relationship also existed for waterbird richness, although other factors determined numbers of species in many wetlands with salinity being a constraint on maximum potential waterbird richness rather than a determinant of the actual number of species. Further salinization is likely to change detrimentally both invertebrate and waterbird communities. Such changes are apparent in historical waterbird data from some wetlands. The ultimate cause of increased salinity in wetlands is rising groundwater, although sometimes wetlands are more directly affected by the increased surface run-off that results from high watertables in the catchment than by groundwater beneath the wetland." (Authors) The following odonate species are tabled: *Ilschnura aurora aurora*, *Ilschnura heterosticta heterosticta*, *Austroagrion coeruleum*, *Xanthagrion erythroneurum*, *Austrolestes annulosus*, *A. aridus*, *A. analis*, *A. io*, *A. psysche*, *Hemianax papuensis*, *Aeshna brevistyla*, *Hemicordulia tau*, *Procordulia affinis*, *Orthetrum caledonicum*, *Diplacodes bipunctata*, and *Agrioptera insignis allogenae*.] Address: Cale, D.J., Science Division, Department of Conservation and Land Management, PO Box 51 Wanneroo Western Australia 6956. Email: davidca@calm.wa.gov.au

5796. Campos, R.E.; Fernández, L.A.; Sy, V.E. (2004): Study of the insects associated with the floodwater mosquito *Ochlerotatus albifasciatus* (Diptera: Culicidae) and their possible predators in Buenos Aires Province, Argentina. *Hydrobiologia* 524: 91-102. (in English). ["Insects associated with the floodwater mosquito *Ochlerotatus albifasciatus* (Diptera: Culicidae) were studied from intermittent puddles in temperate Argentina in an attempt to detect the main predators. 41 taxa occurred in the puddles from spring to fall. Coleoptera and Diptera were dominant and diverse. Ephemeroptera and Odonata were scarce in numbers and species, and Heteroptera occurred in low numbers of species and high abundance of individuals. The main predators of immature *O. albifasciatus* were detected on the basis of relative abundance (ISA index), ecological dominant groups, and species association ("I" index). *Liodessus* sp. and *Rhantus signatus signatus* (Coleoptera: Dytiscidae) were the most abundant predators in the puddles and *Liodessus* sp., *Lancetes marginatus* (Dytiscidae) and *Psorophora ciliata* (Culicidae) were the

most frequent. *Liodes* sp. and *O. albifasciatus* were the best associated species in all seasons.[...]" (Authors)] Address: Campos, R.E., Instituto de Limnología "Dr. Raúl A. Ringuelet", Universidad Nacional de La Plata, CC 712 (1900) La Plata, Buenos Aires, Argentina. E-mail: rcampos@ilpla.edu.ar

5797. Chen, X.-L. (2004): An annotated list of the name bearing type specimens of species-group names in Odonata in the Insect Collection of the Institute of Zoology, Chinese Academy of Sciences. *Pan-Pacific Entomologist* 80: 81-90. (in English). ["Species-group names of the order Odonata, including Aeshnidae, Calopterygidae, Coenagrionidae, Cordulegastridae, Euphaeidae, Gomphidae, Libellulidae, Megapodagrionidae, Platycnemididae and Synlestidae, deposited in the insect collection of the Institute of Zoology, Chinese Academy of Sciences, are listed alphabetically by species names published originally, along with an abbreviated citation to the original description, museum specimen number, sex, locality data, collector, collecting date, specimen condition and remarks where available. The type collection includes 71 name-bearing types of Odonata consisting of 39 holotypes, 10 allotypes, 12 paratypes, 1 neotype and 9 syntypes, and includes 50 species described by S. J. Navas, H. F. Chao and M. A. Lieftinck." (Author)] Address: Xiao-Lin Chen, Insect Collection, Institute of Zoology, The Chinese Academy of Sciences, Beijing, 100080, P.R.China. E-mail: xlchen@ioz.ac.cn

5798. Deer, L.A.; Gertz, L.; Kelley, C.; Osterrieder, K.; Rice, T.M. (2004): Dragonfly larvae (Insecta:Odonata) have high tolerance to acute metal exposure. Poster presentation at the 25th annual meetings of the Society of Environmental Toxicology and Chemistry, Portland, OR: (in English). [Verbatim. Odonates (Insecta: Odonata; dragonflies and damselflies) occupy important trophic levels in freshwater systems. They have a biphasic lifecycle, with aquatic predatory larvae and aerial terrestrial predatory adults. Additionally, odonates can reach high levels of abundance in some habitats and are important food items of both aquatic and terrestrial predators. Therefore, odonates could be exposed to aquatic toxicants from a variety of sources and could then transfer bioaccumulated toxicants to their predators. Despite their presence and importance in aquatic ecosystems, there is very little field or laboratory data regarding the impact that environmental chemicals have on odonates. We have developed methods for the laboratory maintenance and testing of odonate larvae collected from the Mobile, Alabama region. In acute toxicity tests primarily with *Erythemis simplicicollis* (Libellulidae), larvae approximately 10 mm in length were exposed in individual containers to amounts of copper and cadmium above 100 mg/L. Using immobility as the endpoint, larvae were able to tolerate high levels of both metals, with EC50 values above 25 mg/L. This species of odonate appears to be extremely resistant to metals compared in general to other common aquatic test species (e.g. *Daphnia*, *Xenopus*). High resistance to metal pollution could make odonate larvae a potential indicator of poor water quality in contaminated habitats. Their ability to withstand and accumulate high levels of metals might also put their predators at risk from ingestion of contaminated larvae or adults. We are continuing our laboratory tests with other species and other chemicals, and we are also investigating the use of these organisms as field indicators of water quality from watersheds such as the Mobile Delta.]

5799. Frydrychová, R.; Grossmann, P.; Truba, P.; Vítková, M.; Marec, F. (2004): Phylogeny of TTAGG telomeric repeats in insects. *Genome* 47: 163-178. (in English). ["We examined the presence of TTAGG telomeric repeats in 22 species from 20 insect orders with no or inconclusive information on the telomere composition by single-primer polymerase chain reaction with (TTAGG)₆ primers, Southern hybridization of genomic DNAs, and fluorescence in situ hybridization of chromosomes with (TTAGG)_n probes. The (TTAGG)_n sequence was present in 15 species and absent in 7 species. In a compilation of new and published data, we combined the distribution of (TTAGG)_n telomere motif with the insect phylogenetic tree. The pattern of phylogenetic distribution of the TTAGG repeats clearly supported a hypothesis that the sequence was an ancestral motif of insect telomeres but was lost repeatedly during insect evolution. The motif was conserved in the "primitive" apterous insect orders, the Archaeognatha and Zygentoma, in the "lower" Neoptera (Plecoptera, Phasmoda, Orthoptera, Blattaria, Mantodea, and Isoptera) with the exception of Dermaptera, and in Paraneoptera (Psocoptera, Thysanoptera, Auchenorrhyncha, and Sternorrhyncha) with the exception of Heteroptera. Surprisingly, the (TTAGG)_n motif was not found in the "primitive" pterygotes, the Palaeoptera (Ephemeroptera and Odonata). The Endopterygota were heterogeneous for the occurrence of TTAGG repeats. The motif was conserved in Hymenoptera, Lepidoptera, and Trichoptera but was lost in one clade formed by Diptera, Siphonaptera, and Mecoptera. It was also lost in Raphidioptera, whereas it was present in Megaloptera. In contrast with previous authors, we did not find the motif in Neuroptera. Finally, both TTAGG-positive and TTAGG-negative species were reported in Coleoptera. The repeated losses of TTAGG in different branches of the insect phylogenetic tree and, in particular, in the most successful lineage of insect evolution, the Endopterygota, suggest a backup mechanism in the genome of insects that enabled them frequent evolutionary changes in telomere composition." (Authors)] Address: Marec, F., Institute of Entomology ASCR, Branišovská 31, CZ-370 05, České Budejovice, Czech Republic. E-mail: marec@entu.cas.cz

5800. Hämäläinen, M.; Hulden, L.; Karjalainen, S. (2004): Etelänukonkorenon (*Aeshna mixta* Latreille, 1805) vaellukset Suomeen 2002-2003 (Odonata, Aeshnidae). *Sahlbergia* 8(2) (2003): 49-54. (in Finnish, with English summary; title not stated in English). ["Migrant individuals of *Aeshna mixta* were recorded for the first time in Finland in August-September 2002 and again in August-October 2003. Confirmed observations from several sites along the southern coast of the country (in N: Porvoo, N: Helsinki, N: Espoo, N: Kirkkonummi, Ab: Pohja, Ab: Karjaa) and from Åland archipelago (Al: Lemland) are listed. Most records were made in bays by the sea, but a few also at a distance of 4-6 km from the coast. The distribution *A. mixta* and its migratory tendency are briefly discussed. The nearest autochthonous populations occur in the Riga region in Latvia, and this area might be the source of the migration to Finland. Records made by Doppler weather radar show that very large insects flew from Estonia towards Helsinki in many occasions at the end of July and the beginning of August in 2002, in afternoons when south-eastern winds prevailed; apparently these insects were migrant *A. mixta*." (Authors)] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02330 Espoo, Finland

5801. Hardersen, S. (2004): The dragonflies: species, phenology, larval habitats (Odonata). In: Cerretti, P., S. Hardersen, F. Mason, G. Nardi, M. Tisato, M. Zapparoli (2004, Eds): *Invertebrati di una foresta della Pianura Padana, Bosco della Fontana*. Secondo contributo Conservazione Habitat Invertebrati, 3. Cierre Grafica Editore, Verona, 304 pp. ISBN 88-8314-335-3: 29-50. (in English, with Italian summary). ["The Odonata of the nature reserve "Bosco della Fontana" (Lombardy, Italy) were studied with special regard to their phenology. A total of 31 species were recorded. For many of these, larval habitats were identified. *Lestes sponsa* and *Aeshna affinis* were found for the first time at the nature reserve "Bosco della Fontana". The presence of *Oxygastra curtisii* [...] was reconfirmed. However, the population of this species appears to be small. The observed flight period of a number of species clearly differed from data in the literature." (Author)] Address: Hardersen, S., Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, I-46045 Marmirolo (MN), Italy. E-mail: s.hardersen@libero.it

5802. Keeley, C.; Gertz, L.; Osterrieder, K.; Rice, T.M. (2004): Use of dragonfly larvae (Insecta:Odonata) in toxicological tests. Poster presentation at the 25th annual meetings of the Society of Environmental Toxicology and Chemistry, Portland, OR: (in English). [Verbatim: Odonates (Insecta: Odonata; dragonflies and damselflies) are important members of freshwater ecosystems as both predators and prey. They have an aquatic predatory larval stage and an aerial terrestrial predatory adult stage. Additionally, odonates can be very abundant in certain habitats and are preyed upon by a variety of aquatic and terrestrial predators. Despite their presence and importance in aquatic ecosystems, there is very little field or laboratory data regarding the impact that environmental chemicals have on odonates. Odonate larvae could be useful test organisms in toxicological research because many species are easily collected in large numbers and are of a reasonable size. However, before laboratory experiments such as acute and chronic tests can be conducted, methods for the maintenance of odonates need to be established. We have developed methods for housing and feeding odonate larvae. Using primarily *Erythemis simplicicollis* (Libellulidae), we hold larvae in individual ventilated plastic cups in order keep track of individuals and to keep food items in close proximity. Cups are contained in a filtering, recirculation system with reconstituted hard water under a 12L:12D photoperiod regime at 22°C. Larvae are fed small fish or tadpoles as food every few days. We have found that larvae can survive in these conditions and continue to grow and molt for several weeks. They require only infrequent feeding and produce little waste. We prefer that larvae spend at least one week and have one meal under these conditions before being used in toxicity tests. Our system is easy to construct and maintain and should be useful for anyone interested in maintenance of odonates or animals with similar habits.]

5803. Laufer, H. (2004): Zum Beutespektrum einer Population von Ochsenfröschen (Amphibia: Anura: Ranidae) nördlich von Karlsruhe (Baden-Württemberg, Deutschland). *Faunistische Abhandlungen, Dresden* 25: 139-150. (in German, with English summary). [The bullfrog (*Rana catesbeiana*), introduced in the Upper Rhine area (Baden-Württemberg, Germany), is a neo-

zoon suggested by some researchers to having negative effects on native amphibians. To examine this statement the diet was examined of 44 bullfrogs (22 males, 21 females, one young specimen) captured in the field. A total of 12 vertebrates and 65 invertebrates including two Anisoptera was found. The vertebrates were four mammals, two birds, two reptiles, three amphibians and a goldfish. A preference of native amphibians, especially of edible frog as prey could not be verified. These results prove that the bullfrog is an opportunistic omnivore eating all living animals that are smaller than itself and that it can capture.] Address: Laufer, H., Büro für Landschaftsökologie, Friedenstrasse 28, 77654 Ofenburg, Germany. E-mail: bfl.laufer @ t-online.de

5804. Lehmann, F.-O. (2004): The mechanisms of lift enhancement in insect flight. *Naturwissenschaften* 91: 101-122. (in English). ["Recent studies have revealed a diverse array of fluid dynamic phenomena that enhance lift production during flapping insect flight. Physical and analytical models of oscillating wings have demonstrated that a prominent vortex attached to the wings leading edge augments lift production throughout the translational parts of the stroke cycle, whereas aerodynamic circulation due to wing rotation, and possibly momentum transfer due to a recovery of wake energy, may increase lift at the end of each half stroke. Compared to the predictions derived from conventional steady-state aerodynamic theory, these unsteady aerodynamic mechanisms may account for the majority of total lift produced by a flying insect. In addition to contributing to the lift required to keep the insect aloft, manipulation of the translational and rotational aerodynamic mechanisms may provide a potent means by which a flying animal can modulate direction and magnitude of flight forces for manoeuvring flight control and steering behaviour. The attainment of flight, including the ability to control aerodynamic forces by the neuromuscular system, is a classic paradigm of the remarkable adaptability that flying insects have for utilising the principles of unsteady fluid dynamics. Applying these principles to biology broadens our understanding of how the diverse patterns of wing motion displayed by the different insect species have been developed throughout their long evolutionary history." (Author) Many references to Odonata are made.] Address: Lehmann, F.-O., Department of Neurobiology, University of Ulm, Albert-Einstein-Allee 11, 89081 Ulm, Germany. E-mail: fritz.lehmann@biologie.uni-ulm.de)

5805. Peterson, K.J.; Lyons, J.B.; Nowak, K.S.; Takacs, C.M.; Wargo, M.J.; McPeck, M.A. (2004): Estimating metazoan divergence times with a molecular clock. *Proceedings of the National Academy of Sciences U S A*. 101(17): 6536-6541. (in English). ["Accurately dating when the first bilaterally symmetrical animals arose is crucial to our understanding of early animal evolution. The earliest unequivocally bilaterian fossils are approximately 555 million years old. In contrast, molecular clock analyses calibrated by using the fossil record of vertebrates estimate that vertebrates split from dipterans (*Drosophila*) approximately 900 million years ago (Ma). Nonetheless, comparative genomic analyses suggest that a significant rate difference exists between vertebrates and dipterans, because the percentage difference between the genomes of mosquito and fly is greater than between fish and mouse, even though the vertebrate divergence is almost twice that of the dipteran. Here we show that the dipteran rate of molecular

evolution is similar to other invertebrate taxa (echinoderms and bivalve molluscs) but not to vertebrates, which significantly decreased their rate of molecular evolution with respect to invertebrates. Using a data set consisting of the concatenation of seven different amino acid sequences from 23 ingroup taxa (giving a total of 11 different invertebrate calibration points scattered throughout the bilaterian tree and across the Phanerozoic), we estimate that the last common ancestor of bilaterians arose somewhere between 573 and 656 Ma, depending on the value assigned to the parameter scaling molecular substitution rate heterogeneity. These results are in accord with the known fossil record and support the view that the Cambrian explosion reflects, in part, the diversification of bilaterian phyla." (Authors) The analysis includes *Enallagma aspersum* and *Lestes congener*. For a full text version of the paper see: <http://www.pubmedcentral.gov/articlerender.fcgi?tool=pubmed&pubmedid=15084738> Address: Peterson, K.J., Dept of Biological Sciences, Dartmouth College, Hanover, NH 03755, USA. E-mail: kevin.peterson@dartmouth.edu.

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5806. Bechly, G. (2005): A new fossil dragonfly (Anisoptera: Corduliidae) from the Paleocene Fur Formation (Mo clay) of Denmark. *Stuttgarter Beiträge zur Naturkunde - Serie B* 358: 1-7. (in English, with German summary). ["A new fossil dragonfly genus and species, *Molercordulia karinae* n. gen. n. sp. (Anisoptera: Corduliidae), is described from the Paleocene Fur Formation (Mo clay) in Denmark. Considering the rarity of Paleocene odonate fossils and the stratigraphic proximity to the important K-T boundary, this fossil, even though only fragmentarily preserved, represents an interesting contribution to our knowledge of the odonate fauna in the Early Tertiary. The new taxon is identified as oldest fossil record of Corduliidae (sensu Bechly 2002). A new character (post-oblique-vein-gap) that seems to be quite useful in dragonfly systematics is described and is proposed as independently acquired autapomorphy in Macromiidae and Haplohamulida." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

5807. Bößneck, U. (2005): Fauna des Stadtgebietes von Erfurt, Teil I: Libellen. *Veröff. Naturkundemus Erfurt* 24: 109-145. (in German, with English summary). [oas 19.; Thuringia, Germany; "During a local faunistic investigation, 1500 new records of dragonflies were summarized and viewed critical. From 44 species a distribution map and remarks to population development and ecology in the city area of Erfurt are given. The most important habitat of dragonflies in the city area are the clay pits near Mittelhausen (north part of the city) with current records of 33 species." (Author)] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Stauffenbergallee 18, D-99084 Erfurt, Germany

5808. Brodin, T. (2005): Predator effects on behaviour and life-history of prey. Doctoral thesis, Department of Ecology and Environmental Science, S-901 87 Umeå, Sweden. ISBN: 91-7305-964-1: 34 pp. (in English). ["In

this thesis I investigate predator-induced effects on behavioural and life-history characteristics of prey. At any moment a given predator is capable of attacking a small number of prey. However, the mere presence of a predator may impact a much larger number of individuals, as prey implement various behavioural and developmental mechanisms to reduce the risk of predation. It has become increasingly clear that predator induced responses have the potential to affect patterns of species abundance and distribution as well as individual fitness of prey. I study these responses by incorporating field surveys, semi-field experiments and laboratory experiments. All experiments were done in an aquatic environment using fish or large odonate larvae as predators and damselfly-or diving beetle larvae as prey. My work highlights the importance of monitoring prey behaviour when studying life-history characteristics. I show that fish presence is an important factor for determining species abundance and distribution of odonates, and that prey behaviour may be a good predictor for fish vulnerability. Larval damselflies react behaviourally to predator presence by reducing activity and/or restricting habitat use. I confirm that such anti-predator responses have positive effects on prey survival in the presence of a predator but negative effects on growth and development of prey. In addition, my results suggest that the increase in per capita food resources for surviving prey following a predation episode (i.e. thinning) can have a stronger positive effect on prey growth and development than the negative effect of anti-predator responses. I also show that the strength of an anti-predator response is dependent on resource availability of the prey, with prey responding less strongly when resources are scarce. My results also indicate that the strength of the anti-predator response of damselfly larvae depends on predator diet and larval age. Predators feeding on prey conspecifics induce a stronger behavioural response in young larva than predators that feed on prey heterospecifics do. This diet-effect was not found in larvae late in ontogeny, due to an increased activity of larva where predators consumed damselflies. Such increased larval activity can be explained as a reaction to a time-constraint. Finally, I found that activity of damselfly larvae is genetically determined and that this has led to a behavioural syndrome that might limit larval plasticity to a certain activity-range. This phenomenon may have implications for how well larvae are able to react to both biotic and abiotic changes in the environment." (Author)] Address: Brodin, T., Animal Ecology, Department of Ecology and Environmental Science, Umea University, 90187 Umea, Sweden. E-mail: tomas.brodin@eg.umu.se

5809. Buttstedt, L.; Zimmermann, W. (2005): Über Entwicklungsnachweise der Feuerlibelle, *Crocothemis erythraea* (Brülle, 1832), in Thüringen und Sachsen-Anhalt (Odonata). *Entomologische Nachrichten und Berichte* 49(3-4): 171-179. (in German, with English summary). ["An overview of the 24 localities of *C. erythraea* known in Sachsen-Anhalt and Thuringia, Germany in 2005 is provided. In 2003 and 2004, the authors studied six of the inhabited water bodies in detail. Development of the species at one site in Thuringia and at two sites in Sachsen-Anhalt is confirmed. The two sites with the largest number of exuviae are briefly characterized. Observations on biology and behaviour made at the rain water collection basin at Artern are communicated and discussed. The temporal pattern of emergence is documented from 69 exuviae collected in 2004. Variati-

ons in size and pigmentation of the same exuviae are described. Our records of confirmed reproduction are at approximately 51°20'N which agrees reasonably with records from Hesse, Lower Saxony, Sachsen-Anhalt, and Brandenburg." (Authors)] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

5810. Carnier (2005): Gemeine Winterlibelle *Sympetma fusca* und Gebänderte Heidelibelle *Sympetrum pedemontanum* im Kreis Wesermarsch. Beitr. Naturk. Nieders. 58: 41-42. (in German). [Niedersachsen, Germany; *S. fusca*: 15-IX-1995; *S. pedemontanum*: 22-VIII-2002] Address: Carnier, T., Haasenstr. 7, D-26919 Brake, Germany

5811. Catling, P.M. (2005): A Potential for the Use of Dragonfly (Odonata) Diversity as a Bioindicator of the Efficiency of Sewage Lagoons. *Canadian Field-Naturalist* 119(2): 233-236. (in English). ["In order to determine whether a relationship existed between water quality and odonate fauna in sewage ponds, data were gathered at each of six ponds of similar construction and equal size and depth in an adjacent series of improving water quality at a lagoon system near Embrun in eastern Ontario. Numbers of nymphs of different species of Odonata were recorded in spring and fall, and similar data was collected on adults in June and July. The data on species presence and abundance for each of three pairs of cells in the sequence was then compared with the corresponding chemical data which included biological oxygen demand, total phosphorus, total nitrogen and suspended solids. Water quality improved through the system and species diversity in the final ponds was twice that of the ponds receiving wastewater. Numbers of individuals also increased through the system. Occurrence of *Anax junius*, *Enallagma civile* and *Ischnura verticalis* alone was associated with poorer water quality. Higher diversity including *Lestes disjunctus*, *Leucorrhinia* spp. and *Erythemis simplicicollis*, indicates higher water quality. A potential exists for Odonata species diversity, numbers of individuals and occurrence of particular species to be used as a bioindicator of water quality and a means of evaluating efficiency of a lagoon system. Advantages include data that reflects a time period rather than a point in time and also low costs." (Author)] Address: Catling, P.M., Biology, University of Ottawa, 30 Marie Curie, Ottawa, Ontario K1N 6N5 Canada; catlingp@em.agr.ca

5812. Céréghino, R.; Cayrou, J. (2005): Life-cycle phenology of some aquatic insects: implications for pond conservation. *Aquatic Conserv: Mar. Freshw. Ecosyst.* 15: 559-571. (in English). ["1. Life-cycles and growth patterns were determined for 21 dominant aquatic insect species in small permanent ponds in an arid, karstic region (SW France, site fr7300909 of the Natura 2000 conservation network). The species studied are widely distributed throughout Europe, but some life-cycle patterns are reported here for the first time. 2. The life-history patterns of the 21 species can be divided into five main types: (i) a semivoltine cycle spreading over 2 years; (ii) slow univoltine cycles; (iii) fast univoltine cycles; (iv) multivoltine life-cycles with a long winter generation and two or three summer generations per year; and (v) bivoltine life-cycles with two fast generations per year. Growth was either exponential over the whole developmental period for a given cohort, or divided into two or three successive periods during each of which

the growth rate was fairly constant. 3. Biodiversity estimates strongly depend on the temporal and spatial scale over which observations are made. Ponds thus provide useful models to show how life-history patterns enable many temporally segregated populations to utilize small ecosystems. Conservation frameworks should therefore carefully consider the time-frame needed to survey ponds, as many species with fast cycles could be overlooked. The spatial scale needed to manage threatened habitats and thus preserve pond networks must be broadened, rather than attempting to target individual water bodies for particular management actions." (Authors) The following Odonata are treated: *Coenagrion scitulum*, *Chalcolestes viridis*, *Libellula depressa*, *Anax imperator*.] Address: Céréghino, R., Laboratoire d'Ecologie des Hydrosystèmes, UMR 5177, Université Paul Sabatier, 118 route de Narbonne, 31062 Toulouse cedex 4, France. E-mail: cereghin@cict.fr

5813. Cheng, P.; Hu, J.; Zhang, G.; Xu, B.; Wu, X. (2005): The measurement of the flight gesture and the wing deformation of dragonfly in free flight. *Proceedings of SPIE -- Volume 5852 Third International Conference on Experimental Mechanics and Third Conference of the Asian Committee on Experimental Mechanics*, Chenggen Quan, Fook Siong Chau, Anand Asundi, Brian Stephen Wong, Chwee Teck Lim, Editors: 879-885. (in English(?)). ["Using the phase shifting and the grating projection method, the kinematical parameters of dragonfly in free flight were measured. In our experiment, during projecting parallel sine fringes on the dragonfly's wings with a projector, the high speed CCD TV camera (1000 frames per second) recorded the dragonfly and the fringes projected on the dragonfly's wing, then the shape of the dragonfly's wings in every frame could be gutted using SCPM (Spatial-Carrier Phase Measurement) method. According to this data, we designed a program which can show the change of the gesture of the dragonfly's wing, the 3-D figure, the contour line and the curve of any transversal of the dragonfly's wing at any given time. From the figures of the 3-D deformation, we also can see that the deformation is not completely negative, it must could be control by the dragonfly via the veins on the wing." (Authors)] Address: Cheng, P., University of Science and Technology of China, Key Laboratory of Mechanical Behavior and Design of Materials, CAS, Hefei 230027, China.

5814. Clistenes de Alcântara Santos, A. (2005): Feeding ecology of the Molé Trachelyopterus galeatus Linnaeus, 1766 (Siluriformes, Auchenipteridae) in the lower course of the São José and Santo Antônio Rivers (Chapada Diamantina, Bahia). *Sitientibus Série Ciências Biológicas* 5(2): 93-98. (in Portuguese, with English summary). ["The São José and Santo Antônio Rivers are representative affluents of the Paraguaçu River, although they have demonstrated different physiographic conditions and differ in their degrees of anthropogenic disturbance. In this work, the feeding ecology of *T. galeatus* was described, as well as the possible effects of the alterations previously caused by former diamond mining on the São José bed and margins. Feeding was analyzed through the Frequency of Occurrence and by the Volumetric method combined in an Alimentary Index. The niche width was then calculated. The results indicate a lesser contribution of allochthonous items in the São José River. This may be due to the effects of deforestation along its margins, which would influence species that are dependent upon

those resources. Among the parameters analyzed, the lesser proportion of allochthonous items in the diet of fish from the São José River was marked and can be considered an indirect result of previous mining activity in the area." (Authors) The diet also includes Odonata.] Address: Clisteres de Alcântara Santos, A., Laboratório de Ictiologia, Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, Km 03, BR 116, 44031-460, Feira de Santana, Bahia, Brasil. E-mail: clister@ig.com.br

5815. Cordero Rivera, A.; Lorenzo Carballa, M.O.; Utzeri, C.; Vieira, V. (2005): Parthenogenetic *Ichnura hastata* (Say), widespread in the Azores (Zygoptera: Coenagrionidae). *Odonatologica* 34(1): 1-9. (in English). ["Literature and personal information on the distribution of *I. hastata* and other odon. spp. in the Azores is reported. *I. hastata* and *I. pumilio* are recorded for the first time from the islands of Corvo and Sao Jorge, respectively. *I. hastata* appears the most common and abundant sp. and its population is formed by only females (no males were ever recorded). The asexual reproduction of these populations was demonstrated by means of laboratory rearing during several generations. The dispersal ability of this sp. and the possible origin of parthenogenesis after its colonisation of the Azores are briefly discussed. The possible causes of threat are identified and the need for conservation measures is outlined." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidad de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

5816. Costa, J.M.; Oldrini, B.B. (2005): Diversity and distribution of Odonata (Insecta) in the State of Espírito Santo, Brazil. *Publ. Avul. Mus. Nac.*, Rio de Janeiro 107: 3-15. (in Portuguese, with English summary). [The paper lists 180 odonate species for the State of Espírito Santo, Brazil, and includes notes on some species and a basic bibliography.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jacosta@acd.ufrj.br

5817. Culhane, F. (2005): The impact of forest disturbance on Odonata communities and the potential use of Odonata as indicators of environmental disturbance, Buton Island, Indonesia. Department of Zoology, Trinity College Dublin, Moderation Thesis 2005: 105 pp. (in English). ["Odonata have been shown to be sensitive and reliable indicators of environmental disturbance (e.g. Stewart & Samways, 1998). A forest stream is influenced by the nature of the catchment and reflects aspects of forest quality and disturbance. Macroinvertebrate assemblages including Odonata larvae, in streams and rivers, have been used extensively as bioindicators of forest disturbance. The aim of this project was to look at the impact of forest disturbance on communities of Odonata and the implications that might have for use of Odonata in bioindication. Seven sites on Buton Island, Indonesia were sampled over a period of five weeks in autumn 2004. GIS data were used to classify sites into disturbed or undisturbed forest. Odonata larvae were collected by kick sampling in two kinds of habitat at each site. Assessment of environmental variables of forests was carried out at the study sites. Larvae were identified to family level and then divided into morphospecies. The length of each larva was mea-

sured. Differences in species composition, diversity measures, functional groups and size frequency distribution were used to show differences between disturbed and undisturbed sites. Thirty-four morphospecies in nine families of Odonata were found. Species richness and diversity differed among sites and were lower at disturbed sites. It was found that the distribution of Zygopteran larvae differed between habitats, and between disturbed and undisturbed sites based on caudal appendage morphology, implying a potential use for caudal appendage type in biomonitoring. The width of size frequency distribution was lower at disturbed sites. Most sites contained morphospecies which were unique to it, thus, a range of habitats from pristine to moderately disturbed would conserve the greatest number of Odonata species." (Author) For the full paper see: <http://www.opwall.com/Library/Indonesia/Indonesia%20Terrestrial/Invertebrates/Fiona%20Culhane%20The%20impact%20of%20forest%20disturbance%20on%20Odonat%85.pdf>

5818. DuBois, B. (2005): Damselflies of the North Woods. Kollath-Stensaas Publishers. ISBN 0-9673793-7-7: 132 pp. (in English). [This fieldguide is the damselfly companion to Kurt Mead's Dragonflies of the North Woods (see OAS 3740). Like this book, it is appropriate for a far larger area than the "north woods". It will be appropriate to large areas of Ontario in Canada, Minnesota, Wisconsin, Michigan, and Iowa. The book starts with a long, well-illustrated section on morphology, behaviour, and life history of damselflies. The 39 species recorded (plus a further 7 which may appear in the region) are individually discussed and illustrated on a two-page spread with very good photos. Diagnostic characters or structures are specifically indicated by arrows. Information is also provided on the life cycles. A graph of the flight and a range map are also given for each species. The focus of the field guide is more on colour patterns than structures. (Martin Schorr)] Address: Kollath-Stensaas Publishers. 394 Lake Avenue South, Suite 406, Duluth, MN 55802, USA

5819. Fabbri R.; Pavesi M. (2005): First record for Lombardy of *Chalcolestes parvidens* (Artobolevski, 1929) (Odonata Lestidae). *Ann. Mus. civ. St. nat. Ferrara* 6: 95-96. (in Italian, with English summary). [Records of *C. parvidens* are reported from Brescia and Mantova Provinces, Italy. In addition, some information on the distribution and ecology of the species are given.] Address: Fabbri, R., Museo Civico di Storia Naturale, via De' Pisis, 24 - 44100 Ferrara, Italy. E-mail: r-fabbri@libero.it

5820. García, A.; Báez, M.; Cabrera, A. (2005): Odonata. In: Arechavaleta, M.; Zurita, N.; Marrero, M.C., Martin, J.L. (eds.) (2005): Lista preliminar de especies silvestres de Cabo Verde. Hongos, plantas y animales terrestres. Consejería de Medio Ambiente y Ordenación Territorial, Gobierno de Canarias. ISBN 84-89729-25-5: 155 pp. (in Portuguese and Spanish). [On page 68, the Odonata of the Capverdian Islands are checklist island-wise.] Address: <http://www.gobiernodecanarias.org/cmayot/interreg/atlantico/documentos/LPESCaboVerde.pdf>

5821. Hayashi, F.; Tsuchiya, K. (2005): Functional association between female sperm storage organs and male sperm removal organs in calopterygid damselflies. *Entomological Science* 8(3): 245-252. (in English). ["Fe-

male damselflies in the family Calopterygidae have two sperm storage organs: a spherical bursa copulatrix and a tubular spermatheca. Male flies have a peculiar aedeagus with a recurved head with which to remove bursal sperm, and lateral spiny processes to remove spermathecal sperm. The lateral processes differ among species and populations in terms of their width relative to the spermathecal duct: the narrower processes are physically able to access spermathecal sperm, while the wider ones are not. In the present study, sperm storage patterns and aedeagal structures were compared between two calopterygid species with different spermathecal structures –*Calopteryx cornelia* and *Mnais pruinosa*– with respect to not only sperm quantity (number) but also sperm quality (viability), by using a recently developed method based on live/dead dual fluorescence. *Calopteryx cornelia* is a typical spermathecal sperm remover. In this species, viability was similar between bursal and spermathecal sperm. In contrast, in *M. pruinosa*, the spermatheca was much smaller than the bursa and often contained no sperm. Even when the spermatheca of this species did contain sperm, a high percentage of it was dead. Although the spermatheca of *M. pruinosa* has such atrophic tendencies, males have nevertheless developed long and spiny lateral processes similar to those of *C. cornelia*, suggesting the processes have functions other than spermathecal sperm removal. They possibly function as stoppers or guides for manipulating the aedeagal head to remove the sperm mass from the bursa." (Authors)] Address: Hayashi, F., Department of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji, Tokyo, 192-0397 Japan. Email: fhayashi@comp.metro-u.ac.jp

5822. Huber, A.; Kovacs, T.; Olajos, P. (2005): Data to the Odonata fauna of North-East Hungary II. *Folia historico naturalia musei Matraensis* 29: 111-122. (in Hungarian, with English summary). ["The authors present the results of their dragonfly collecting carried out in the territory enclosed by the river Hernád, river Sajó and the state border Hungary and Slovakia. The collecting took place between 25.06.1999 and 31.08.2004. The data come mainly from the valley of the Sajó and Hernád rivers, from the Putnok-hills and from the lowland between the Sajó and Hernád rivers. We found 47 dragonfly species in this area, 39 as larva, 37 as exuvium and 44 as imago. The following species are new in larval and exuvial form to the territory: *Sympetma fusca*, *Sympetrum pedemontanum*." (Authors)] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

5823. Hufnagel, L.; Gaal, M. (2005): Seasonal dynamic pattern analysis in service of climate change research: A methodical case-study. Monitoring and simulation based on an aquatic insect community. *Applied ecology and environmental research* 3(1): 79-132. (in English). ["Our aim was to approach an important and well-investigable phenomenon – connected to a relatively simple but real field situation – in such a way, that the results of field observations could be directly comparable with the predictions of a simulation model-system which uses a simple mathematical apparatus and to simultaneously gain such a hypothesis-system, which creates the theoretical opportunity for a later experimental series of studies. As a phenomenon of the study, we chose the seasonal coenological changes of aquatic and semiaquatic Heteroptera community. Ba-

sed on the observed data, we developed such an ecological model-system, which is suitable for generating realistic patterns highly resembling to the observed temporal patterns, and by the help of which predictions can be given to alternative situations of climatic circumstances not experienced before (e.g. climate changes), and furthermore; which can simulate experimental circumstances. The stable coenological state-plane, which was constructed based on the principle of indirect ordination is suitable for unified handling of data series of monitoring and simulation, and also fits for their comparison. On the state-plane, such deviations of empirical and model-generated data can be observed and analysed, which could otherwise remain hidden." (Authors) The analysis also includes Odonata.] Address: Hufnagel, L., Department of Mathematics and Informatics, Corvinus University of Budapest, H-1118 Budapest, Villanyi ut 29.43, Hungary. E-mail: levente.hufnagel@uni-corvinus.hu

5824. Ichinose, T.; Morita, T.; Ishii, J. (2005): Characteristics of dispersing Odonata species on irrigation ponds of the northern part of Awaji Island, central Japan. 2 pp. (in Japanese, with English summary). ["From the beginning of July to the end of October 2003, 7 damselfly species of 3368 individuals were captured and marked on 6 irrigation ponds of the northern part of Awaji Island, central Japan. Seven species of 465 individual were recaptured or sighted on the other days. *Lestes sponsa* stayed on the same ponds significantly longer than *Copera annulata*. Three species of 72 individuals moved to the other ponds or rice paddies. The longest dispersal of *Lestes sponsa* was around 150 m. The moving period of *Lestes sponsa* was significantly later than that of *Copera annulata*." (Authors) For the full paper see: <http://www.geocities.jp/tomohiroichinose/presentation/rural-ichinose.pdf>] Address: Ichinose, T., Lab. of Landscape Planning, Awaji Landscape Planning and Horticulture Academy (ALPHA), Institute of Natural and Environmental Science, University of Hyogo, Nojimatokiwa 954-2, Hokudan-cho, Tsuna-gun, Hyogo, Japan. E-mail: tomohiroichinose@yahoo.co.jp

5825. Jenrich (2005): Die Libellenfauna im Naturschutzgebiet Rotes Moor. *Beiträge zur Naturkunde in Osthessen* 41: 25-40. (in German, with English summary). [Hessen, Germany; the 17 odonate species of the bog are briefly characterised by morphology and ecology. The development of the odonate fauna (population trends), based on investigations in 1982-1985, 2002, and 2004, is discussed. Of special interest are records of *Coenagrion hastulatum*, *Aeshna juncea*, *A. subarctica elisabethae*, *Somatochlora arctica*, *S. flavomaculata*, *Sympetrum danae*, and *Leucorrhinia dubia*. *L. pectoralis* seems to have been extinct since the 1980th.] Address: Jenrich, J., Fliegerstr. 11, D-36129 Gersfeld, Germany

5826. Joop, G. (2005): Maintenance of female colour polymorphism in the coenagrionid damselfly *Coenagrion puella*. Dissertation, Fachbereich für Biowissenschaften und Psychologie der technischen Universität Carolo-Wilhelmina zu Braunschweig: 116 pp. (in English, with German summary). ["How colour polymorphisms are maintained is still an unresolved question. Selection should favour the morph best adapted (Moran 1992). Furthermore, the maintenance of a polymorphic system is supposed to be costly, therefore it seems only profitable under quickly or steadily changing envi-

ronmental conditions (Moran 1992). Colour polymorphism is a common trait in damselflies, especially in female coenagrionids (Odonata: Zygoptera). This has been discussed in literature for more than 100 years and several hypotheses to explain these polymorphisms have been developed (Fig. 1). As a model organism I chose the azur damselfly, *Coenagrion puella*. In this species males are blue while females show three colour morphs, green, blue and intermediate. The question is how these female colour morphs are maintained. The focus of the presented work to answer this question is on differences in and colouration on thorax and abdomen of male and polymorphic female *C. puella*, furthermore on differences in immune parameters and reproductive strategies. For black content no differences between the female morphs were found. Males however have a smaller black content than females. In colour composition it was found that blue females are of a different blue than males, and all three female morphs differ in colour composition. The haemolymph's haemocyte numbers and Phenoloxidase activity (PO) and their regulation under the risk of predation and parasitism in the larval stage were investigated as immune parameters. Here differences between the sexes were found. This led to the question, whether there are similar differences between the female morphs. Therefore haemocyte numbers and PO in adult male and polymorphic females were investigated. Furthermore differences in mortality in the presence of a newly introduced entomopathogenic fungi and parasite numbers in the field were examined. For all this parameters no differences between the female morphs were found but differences between the sexes. For reproductive strategies it is discussed, which impact the between the morphs differing egg shapes could have on the choice of oviposition substrate. From these results the question, how this polymorphism evolved and if it evolved parallel in all coenagrionid species, arose. To answer this a new molecular phylogenetic tree of the coenagrionids was build. So far it seems that the female colour polymorphism evolved several times within this group. In summary, I conclude that none of the in figure 1 presented factors maintains this polymorphism alone, but rather a combination of all of them. If I included, that the polymorphism might have evolved several times within the coenagrionids under differing selection pressures, the question of the maintaining factors becomes even more complex." (Author)] Address: Joop, Gerrit, Zoologisches Institut, AG Ökologie, Technische Universität Braunschweig, Braunschweig, Germany. Email: g.joop@tu-bs.de

5827. Jourde, P. (2005): Les libellules de Charente-Maritime. Bilan de sept années de prospection et d'étude des Odonates 1999-2005. Annales de la Société des Sciences Naturelles de la Charente-Maritime, supplément, décembre 2005: 144 pp. [This regional fauna directed to the Département Charente-Maritime at the central western (Atlantic) border of France, impresses by a clear layout presenting each of the 62 species on one page. There, you find information on the distribution (with detailed maps), habitats, ecology, conservation status, phenology, and also the vernacular names in French, English, and German, and an explanation of the Latin names. As usual, and necessary for a regional fauna, the general reader is introduced by a brief biology of the Odonata, the geography of the region, and a detailed treatment of all relevant odonatological publications referring to the department. Also appended are a bibliography, checklists, an index, and many impressive

colour photos of habitats and species. The fine resolution of the maps is quite fascinating and some apparently very common European species as *Lestes sponsa*, *Aeshna cyanea*, or *Sympetrum vulgatum* appear not so common after all! This is a very sophisticated presentation of a regional fauna, and it is highly recommended to everyone interested in the Odonata of France or the distribution of the species in Europe. (Martin Schorr)] Address: Société des Sciences naturelles de Charente-Maritime, Muséum d'Histoire naturelle, 28 rue Albert 1er, F-17000 La Rochelle Prix : 20 € (+ 3 € shipping).

5828. Khrokalo, L.K. (2005): Annotated bibliography of the odonatological papers of Ukraine. IDF-Report 9: 1-51. (in English). [261 papers of the Odonata of Ukraine are compiled and annotated. Names of Ukrainian journals and titles are translated into English. Copies are available from IDF.] Address: Khrokalo, Lyudmila, P.O. Box 23, Kyiv-118, Ukraine 03118. E-mail: lkhrokalo@mail.ru

5829. Klausnitzer, B. (2005): Buchbesprechungen: Wildermuth et al (2005): Die Libellen der Schweiz. Entomologische Nachrichten und Berichte 49(3-4): 193-194. (in German). [Review of the book reviewed as OAS 5005.] Address: Klausnitzer, B., PF 202731, D-01193 Dresden, Germany

5830. Kövecses, J.; Sherwood, G.D.; Rasmussen, J. B. (2005): Impacts of altered benthic invertebrate communities on the feeding ecology of yellow perch (*Perca flavescens*) in metal-contaminated lakes. Can. J. Fish. Aquat. Sci. 62: 153-162. (in English, with French summary). ["Metal contamination can disrupt trophic links in food webs by altering the taxonomic composition and size structure of benthic macroinvertebrate communities. Benthic macroinvertebrates and yellow perch (*Perca flavescens*) were collected from six lakes along a gradient of cadmium (Cd) and copper (Cu) contamination in Quebec, Canada. The two most contaminated lakes had significantly lower densities of several benthic macroinvertebrate taxa and significantly lower Shannon's index than less contaminated lakes. The stomach contents of perch from the most contaminated lakes were less diverse, with a greater reliance on chironomids and (or) zooplankton than perch from other study lakes. The size of prey in perch from the most contaminated lakes did not increase with age and the mean prey size was smaller than in other, less contaminated lakes. Perch from lakes with medium to low levels of contamination weighed significantly more than perch from lakes with high levels of contamination. This reduction in growth is attributed to the increased costs of foraging on a simplified prey base in metal-contaminated systems." (Authors)] Address: Kövecses, Jennifer, Department of Biology, McGill University, 1205 Dr. Penfield, Montreal, QC H3A 1B1, Canada. E-mail: Jennifer.kovecses@elf.mcgill.ca

5831. Krauss, V.; Pecyna, M.; Kurz, K.; Sass, H. (2005): Phylogenetic mapping of Intron positions: A case study of translation initiation factor eIF2y. Molecular Biology and Evolution 22: 74-84. (in English). ["Eukaryotic translation initiation factor 2 (eIF2) is a G protein that delivers the methionyl initiator tRNA to the small ribosomal subunit and releases it upon GTP hydrolysis after the recognition of the initiation codon. eIF2 is composed of three subunits, a, b, and c. Subunit c shows the strongest conservation, and it confers both

tRNA and GTP/GDP binding. Using intron positioning and protein sequence alignment, here we show that eIF2y is a suitable phylogenetic marker for eukaryotes. We determined or completed the sequences of 13 arthropod eIF2y genes. Analyzing the phylogenetic distribution of 52 different intron positions in 55 distantly related eIF2y genes, we identified ancient ones and shared derived introns in our data set. Obviously, intron positioning in eIF2y is evolutionarily conserved. However, there were episodes of complete and partial intron losses followed by intron gains. We identified 17 clusters of intron positions based on their distribution. The evolution of these clusters appears to be connected with preferred exon length and can be used to estimate the relative timing of intron gain because nearby precursor introns had to be erased from the gene before the new introns could be inserted. Moreover, we identified a putative case of intron sliding that constitutes a synapomorphic character state supporting monophyly of Coleoptera, Lepidoptera, and Diptera excluding Hymenoptera. We also performed tree reconstructions using the eIF2y protein sequences and intron positioning as phylogenetic information. Our results support the monophyly of Viridiplantae, Ascomycota, Homobasidiomyceta, and Apicomplexa." (Authors) The study includes *Enallagma cyathigerum*.] Address: Krauss, V., Dept of Genetics, Uni. Leipzig, Leipzig, Germany. E-mail address: krauss@rz.uni-leipzig.de

5832. Kuki, N.; Okubo, K. (2005): Relationship between dragonfly communities and environmental conditions at paddy field areas in the Kamiina district, Nagano Prefecture, Central Japan. *Journal of The Japanese Institute of Landscape Architecture* 68(5): 579-584. ["The purpose of this study was to study the relationship between dragonflies in paddy areas and their environmental condition. We selected five study areas which differed in their environment (two non-consolidated paddy areas in hilly and mountainous areas, one consolidated paddy area in hilly and mountainous area, one non-consolidated paddy area in urbanized area, one consolidated paddy area in urbanized area.) in the Kamiina district, Nagano Prefecture. The number and behaviour of dragonflies were recorded by the route census method. The survey of land utilization was carried out on these areas. The number of all of the species was twenty-three. The number of species and individuals were higher in 3 hilly and mountainous areas than in 2 urban areas. Five study areas were classified into 3 hilly and mountainous area region and 2 urban areas by TWINSpan. Dragonfly communities were classified to seven types. Each type corresponded different environment conditions of waterside, forest and others. It was confirmed that the environmental selection and behaviour of mature dragonflies corresponded to the each species character. The environmental selection of mature dragonflies were different between hilly and mountainous area and urban area. It was clear that dragonfly communities were affected by consolidation and urbanization." (Authors)] not stated in English

5833. Kuki, N.; Kumiko, O. (2005): Relationship between dragonfly communities and the environmental conditions at paddy field area in Kamiina district, Nagano Prefecture, Central Japan. *Journal of the Institute of Japanese Landscape Architecture, Annual Scientific Research Meeting Abstracts Vol. 2005*: 122. (in English). ["The purpose of this study was to know relationship between dragonflies in paddy area and envi-

ronmental condition. We selected five various condition study areas (two non-consolidated paddy areas in hilly and mountainous areas, one consolidated paddy area in hilly and mountainous area, one non-consolidated paddy area in urbanized area, one consolidated paddy area in urbanized area.) in the Kamiina district, Nagano Prefecture. The number and behavior of dragonflies were recorded by route census method. The survey of land utilization was carried out on these areas. The number of all of the species was twenty-three. The number of species and individuals were higher in 3 hilly and mountainous areas than in 2 urban areas. Five study areas were classified into 3 hilly and mountainous area region and 2 urban areas by TWINSpan. Dragonfly communities were classified to seven types. Each type corresponded different environment conditions of waterside, forest and others. It was confirmed that the environmental selection and behavior of mature dragonflies corresponded to the each species character. The environmental selection of mature dragonflies were different between hilly and mountainous area and urban area. It was clear that dragonfly communities were affected by consolidation and urbanization." (Authors)] Address: Kuki, N., Graduate School of Agricultural Sciences, Shinshu University, Japan

5834. Kurosawa, N.; Handa, M.; Imai, K.; Sasaki, Y.; Itoh, H.; Urato, H. (2005): A study on the environmental factors of nursery ponds for naiads of the rare damselfly *Coenagrion terue* in consideration of its feeding habit. *Journal of The Japanese Institute of Landscape Architecture* 68 (5): 575-578. (in Japanese, with English summary). ["C. terue living in Sawada Springs in Hitachi Seaside Park, Japan is a rare population as its habitat is near the shore while most other populations of this species are distributed in high lands. Office of Hitachi Seaside Park has been trying to conserve this population by placing ponds and repairing existing ponds in this area. We thought that providing optimal food supply for the larvae was one of the important means to maintain this population and the strength of sunlight was also an important environmental factor for nursery ponds for the naiads. In this study, to clarify which were actual species of prey on larvae and the relationship between food supply and the degree of sunlight, we examined gut contents of larvae, meiobenthos as prey in ponds, the strength of sunlight and the density of larvae. The main prey of larvae were benthic Arthropoda. Body widths of prey were limited to 100-500µm and the maximum body widths of prey were proportional to the head widths of larvae. Not only the density of larvae, but also the number of species and the density of prey tended to be lower in dark ponds than those in bright ponds." (Authors)] Address: not stated in English

5835. Lai, W.; Yan, J.; Motamed, M.; Green, S. (2005): Force Measurements on a Scaled Mechanical Model of Dragonfly in Forward Flight. 12th Int'l Conf. Advanced Robotics (ICAR), Seattle, Washington, USA, July 18-20, 2005: 6 pp. (in English). ["A dynamically scaled flapping-wing model has been developed to investigate the aerodynamic phenomena and flight performance of insect-scale flapping wings. The mechanism consists of two wings, each having 3 rotational degrees of freedom, mounted on a linear stage to permit translation in a fluid-filled tank. Each wing is equipped with a sensor for instantaneous measurement of the time-varying forces and torques. The setup permits one wing to be designated as the forewing and the o-

ther as the hindwing so that interactions between them can be analysed to understand flight for four-winged insects. The apparatus is versatile enough to explore a range of wing morphologies as well as operational wing trajectory parameters." (Authors)] Address: Motamed, M., Electrical and Computer Engineering Department, University of British Columbia, Vancouver, BC, Canada. E-mail: mehramm@ece.ubc.ca

5836. Lefebvre, F.; Poulin, R. (2005): Progenesis in digenean trematodes: a taxonomic and synthetic overview of species reproducing in their second intermediate hosts. *Parasitology* 130: 587-605. (in English). ["Precocious egg production, i.e. progenesis, has been documented for a number of species in scattered reports throughout the trematode literature. The last 2 extensive studies on the subject date from Buttner in the early 1950s (in French) and from Tang in the early 1980s (in Chinese). Overall, 43 species were then known for their ability to produce eggs at the metacercarial stage while still in the second intermediate host. Here, we update the list, and document the existence of progenesis in a total of 79 digenean trematode species, for which we provide information on the taxonomy of the hosts (including Odonata), the facultative or obligate character of progenesis, relevant references, as well as some other pertinent biological information. We then review the subject by asking 7 questions of fundamental evolutionary importance. These include: What favours progenetic development? What are the associated costs and benefits? How are progenetic eggs released from the host? While exposing the various opinions of previous authors, we attempt to give a synthetic overview and stress on the importance of the metacercarial cyst wall (whether it is present, and if so its thickness) in the evolution and the adoption of a progenetic life-cycle." (Authors)] Address: Lefebvre, F., Department of Zoology, University of Otago, P.O. Box 56 Dunedin, New Zealand

5837. Machado, A.B.M. (2005): Studies on neotropical Protoneuridae: 19. Two new species of *Neoneura* from Southern Brazil (Odonata, Protoneuridae). *Iheringia, Sér. Zool.*, 95(4): 405-409. (in English, with Portuguese summary). ["*Neoneura anaclara* sp. nov. and *Neoneura leonardo* sp. nov. are described and illustrated from specimens collected in Southern Brazil. These two species are unique in the genus *Neoneura* by the structure of their anal appendages." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

5838. Machida, K.; Shimanuki, J. (2005): Structure analysis of the wing of a dragonfly. *Proceedings of SPIE 5852, Third International Conference on Experimental Mechanics and Third Conference of the Asian Committee on Experimental Mechanics*, Chenggen Quan, Fook Siong Chau, Anand Asundi, Brian Stephen Wong, Chwee Teck Lim, Editors: 671-676. (in English). ["It is considered that wing corrugation increases not only the warping rigidity but also the flexibility. The wing of a dragonfly has some characteristic structures, such as "Nodus", "Stigma". Nodus is located in the center of the leading edge, and stigma like a mark is located near the end of the wing. It is considered that these structures not only increase the flexibility of the wing, but also prevent fatigue fracture of wings. Therefore, to investigate the mechanism of dragonfly's wing, the configura-

tion of wing used for analyses was measured using an optical coordinate profile measuring machine and a laser microscope. Moreover, several 3-D models of the dragonfly's wing were made, and calculated by the 3-D finite element method." (Authors)] Address: Machida, K., Department of Mechanical Engineering, Tokyo University of Science 2641 Yamazaki, Noda-shi, Chiba, 278-8510, Japan

5839. Móra, A.; Csépes, E.; Tóth, M.; Dévai, G. (2005): Changes in spatial and temporal distribution of benthic macroinvertebrates at a cross-section of the River Tisza between Tiszamogyorós and Lónya. *Acta Biol. Debr. Oecol. Hung* 13: 131-139. (in Hungarian, with english summary). ["In 2003 benthos samples were taken six times (from March to November) at a cross-section of the River Tisza between Tiszamogyorós and Lónya, Hungary. Three sampling site were assigned within the cross-section based on the water depth and water velocity conditions: (1) at the main flow, (2) at midbed: at the half of the distance between the right and left bank and (3) close to the left bank. The changes in the spatial and temporal distribution of the assemblages of the benthic macroinvertebrates are described. The most diverse assemblages was detected at spring. The chironomids dominated the benthic fauna especially in summer. Our results show the importance of the habitats near the bank for the benthic macroinvertebrates." (Authors) Table 1 includes *Stylurus flavipes*.] Address: Móra, A., Department of Hydrobiology, University of Debrecen, H-4032 Debrecen, Egyetem tér 1., Hungary

5840. Nel, A.; Petrulevicius, J.F.; Martínez-Delclòs, X. (2005): New Mesozoic Protomyrmeleontidae (Insecta: Odonoptera: Archizygoptera) from Asia with a new phylogenetic analysis. *Journal of Systematic Palaeontology* 3(2): 187-201. (in English). ["The following damselfly-like protomyrmeleontid Odonoptera are described from the Mesozoic of Eurasia: *Ferganagrion kirghiziensis* gen. et sp. nov., *Paraobotritagrion* gen. nov. for *Paraobotritagrion tenuiformis* (Zessin, 1991), *Mongolagrion shartegensis* gen. et sp. nov., *Protomyrmeleon pumilio* sp. nov., *Protomyrmeleon kazakhstanensis* sp. nov., *Protomyrmeleon karatauensis* sp. nov., *Protomyrmeleon grandis* sp. nov. The wing venations of protomyrmeleontid genera are homologised and the high morphological disparity in this family suggests that the Protomyrmeleontidae had very different modes of flight and consequently occupied a wide range of palaeoenvironments. A new phylogenetic analysis suggests that the fossil record is too scarce and incomplete to solve the phylogeny of the Protomyrmeleontidae. In particular, the current division of Protomyrmeleontidae in Triassagrioninae and Protomyrmeleontinae is only weakly supported." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

5841. Oldrini, B. B.; Mascarenhas, Bernardo, J. de A. (2005): Description of the larva of *Idiataphe longipes* (Odonata, Libellulidae, Trameini). *Iheringia, Sér. Zool.*, 95(4): 431-433. (in Portuguese, with English summary). ["The larva of *I. longipes* (Hagen, 1861) is described from five exuviae with associated teneral adults collected in Concórdia Pond, Valença, Rio de Janeiro, Brazil." (Authors)] Address: Oldrini, Barbara B., Departamento de Entomologia, Museu Nacional, Universidade Federal

do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, 20940-040 Rio de Janeiro, Brasil

5842. Reinhardt, K. (2005): Buchbesprechungen: Brockhaus T & Fischer, H. (2005): Die Libellen Sachsens und Zimmermann et al (2005): Verbreitungsatlas der Libellen im Freistaat Thüringen.. Entomologische Nachrichten und Berichte 49(3-4): 255-257. (in German). [Detailed review of two regional publications on the Odonata of Thuringia and Saxonia, Germany.] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

5843. Rychła, A. (2005): Dragonflies -Odonata- of standing waterbodies from the Landscape Park "Łuk Mużakowa" (district Luuskie) covering species diversity and their protection. *Chrońmy Przyrodę Ojczyzną* 61(6): 67-79. (in Polish, with English summary). ["This paper summarizes the investigation of dragonflies in the Landscape Protection Area (LPA) "Luk Muzakowa" in Poland. 39 species were found in 28 anthropogenic waterbodies. These waterbodies varied significantly in their physio-chemical water properties and were at different succession stages. 25 of the species developed in the investigated waterbodies. The reproductive behaviour of 3 species (*Aeshna isosceles*, *Libellula depressa* and *Orthetrum coerulescens*) was observed, but the occurrence of neither larvae nor exuviae could be found. The images of 7 species (*Calopteryx splendens*, *C. virgo*, *Sympecma fusca*, *Gomphus flavipes*, *Syrmpetrum flaveolum*, *S. pedemontanum* and *S. striolatum*) were observed. The highest species diversity (30 species) was noted in the southern part of the "Luk Muzakowa" (group E, with the youngest waterbodies). In the northern part of the LPA (group A, with the oldest waterbodies), 19 species were found. The high habitat diversity in the studied area supports the occurrence of dragonflies with various ecological requirements. Of the species documented, 3 (*G. flavipes*, *Leucorrhinia albifrons* and *L. pectoralis*) are protected by the Polish legislation and the European FFH-directive. The *L. albifrons*, *A. juncea* and *O. coendescens* are included in the Red List of dragonflies in Poland." (Author)] Address: Rychła, Anna, ul. Osiedlowa 12, Płoty, PO-66-016 Czerwieńsk, Poland. E-Mail: rychlan@op.pl

5844. Srinivasulu, B.; Srinivasulu, C. (2005): Diet of the Black-bearded Tomb Bat *Taphozous melanopogon* Temminck, 1841 (Chiroptera: Emballonuridae) in India. *Zoos' print journal* 20(8): 1935-1938. (in English). ["The dietary composition of *T. melanopogon* from two different habitats was analyzed following faecal pellet analysis method. Representatives of 11 insect orders and spiders (Araneidae) contributed to the diet. Forest bats fed on 1-9 insect orders and araneids indicating opportunistic feeding behaviour, while the semi-urban bats fed on 3-8 insect orders and araneids indicating selective feeding behaviour. Although both the forest bats and semi-urban bats fed on the same spectrum of insect prey they showed differential use of them. Forest bats fed predominately on Coleoptera, Homoptera, Lepidoptera, Hemiptera, Orthoptera, Odonata and Araneidae, while the semi-urban bats preferred Lepidoptera, Coleoptera, Diptera, Orthoptera, Odonata, Hemiptera, Araneidae and Homoptera. Variation in terms of consumption of a particular kind of insect prey between the sexes was evident only among the semi urban bats only with respect to the most significant prey items - coleop-

terans, lepidopterans and dipterans." (Authors)] Address: Srinivasulu, B., Wildlife Biology Section, Zoological Dept, Osmania University, Hyderabad, Andhar Pradesh 500007, India. E-mail: bharisrini@yahoo.co.in

5845. Stone, M.L.; Whiles, M.R.; Webber, J.A.; Williard, K.W.J.; Reeve, J.D. (2005): Macroinvertebrate communities in agriculturally impacted southern Illinois streams: Patterns with riparian vegetation, water quality, and in-stream habitat quality. *Journal of environmental quality* 34(3): 907-917. (in English). ["Relationships between riparian land cover, in-stream habitat, water chemistry, and macroinvertebrates were examined in headwater streams draining an agricultural region of Illinois. Macroinvertebrates and organic matter were collected monthly for one year from three intensively monitored streams with a gradient of riparian forest cover (6,22, and 31% of riparian area). Bioassessments and physical habitat analyses were also performed in these three streams and 12 other nearby headwater streams. The intensively monitored site with the least riparian forest cover had significantly greater percent silt substrates than the sites with medium and high forest cover, and significantly higher very fine organics in substrates than the medium and high forested sites. Macroinvertebrates were abundant in all streams, but communities reflected degraded conditions; noninsect groups, mostly oligochaetes and copepods, dominated density and oligochaetes and molluscs, mostly *Sphaerium* and *Physella*, dominated biomass. Of insects, dipterans, mostly Chironomidae, dominated density and dipterans and coleopterans were important contributors to biomass. Collector-gatherers dominated functional structure in all three intensively monitored sites, indicating that functional structure metrics may not be appropriate for assessing these systems. The intensively monitored site with lowest riparian forest cover had significantly greater macroinvertebrate density and biomass, but lowest insect density and biomass. Density and biomass of active collector-filterers (mostly *Sphaerium*) decreased with increasing riparian forest. Hilsenhoff scores from all 15 sites were significantly correlated with in-stream habitat scores, percent riparian forest, and orthophosphate concentrations, and multiple regression indicated that in-stream habitat was the primary factor influencing biotic integrity. Our results show that these drainage ditches harbor abundant macroinvertebrates that are typical of degraded conditions, but that they can reflect gradients of conditions in and around these streams." (Authors) The paper also contains a few remarks on Odonata. For details see: <http://jeq.scijournals.org/cgi/reprint/34/3/907.pdf>] Address: Stone, Mandy L., Dept of Zoology, Southern Illinois University, Carbondale, IL 62901-6501, USA. E-mail: mlstone@siu.edu

5846. Sy, T.; Schulze, M. (2005): Erstnachweis der Helm-Azurjungfer (*Coenagrion mercuriale*) in Sachsen (Odonata, Coenagrionidae). *Entomologische Nachrichten und Berichte* 49(3-4): 215-219. (in German, with English summary). [oas 19;The first definite record of *C. mercuriale* in Saxony, Germany is reported. On 24-VI-2005, a small population of the species was found in the Augraben ditch near Dölzig (Delitzsch district).] Address: Sy, T., RANA-Büro für Ökologie und Naturschutz, Am Kirchtor 27, D-06108 Halle (Saale), Germany. E-mail: info@rana-halle.de

5847. Vonesh, J.R. (2005): Sequential predator effects across three life stages of the African tree frog,

Hyperolius spinigularis. *Oecologia* 143(2): 280-290. (in English). ["While theoretical studies of the timing of key switch points in complex life cycles such as hatching and metamorphosis have stressed the importance of considering multiple stages, most empirical work has focused on a single life stage. However, the relationship between the fitness components of different life stages may be complex. Ontogenetic switch points such as hatching and metamorphosis do not represent new beginnings—carryover effects across stages can arise when environmental effects on the density and/or traits of early ontogenetic stages subsequently alter mortality or growth in later stages. In this study, I examine the effects of egg- and larval-stage predators on larval performance, size at metamorphosis, and post-metamorphic predation in the African tree frog *Hyperolius spinigularis*. I monitored the density and survival of arboreal *H. spinigularis* clutches in the field to estimate how much egg-stage predation reduced the input of tadpoles into the pond. I then conducted experiments to determine: (1) how reductions in initial larval density due to egg predators affect larval survival and mass and age at metamorphosis in the presence and absence of aquatic larval predators, dragonfly larvae, and (2) how differences in mass or age at metamorphosis arising from predation in the embryonic and larval environments affect encounters with post-metamorphic predators, fishing spiders. Reduction in larval densities due to egg predation tended to increase per capita larval survival, decrease larval duration and increase mass at metamorphosis. Larval predators decreased larval survival and had density-dependent effects on larval duration and mass at metamorphosis. The combined effects of embryonic and larval-stage predators increased mass at metamorphosis of survivors by 91%. Larger mass at metamorphosis may have immediate fitness benefits, as larger metamorphs had higher survival in encounters with fishing spiders. Thus, the effects of predators early in ontogeny can alter predation risk even two life stages later." (Author)] Address: Vonesh, J.R., Tyson Research Center, Washington University at St. Louis, P.O. Box 258, Eureka, MO 63025, USA

5848. Walloch, M.; Bellstedt, R.; Weise, R. (2005): Der Felchtaer Bach, südlich Mühlhausen, verbindendes Element zwischen dem Hainich und der Unstrut. *Mühlhäuser Beiträge* 28: 7-16. (in German). [Thuringia, Germany; the occurrence of *Calopteryx splendens* and *Coenagrion mercuriale* is briefly discussed. The latter species is probably not autochthonous in the Felchtaer Bach, but larvae were found in a ditch running into the F. Bach.] Address: Weise, R., Kräuterstraße 4, 99974 Mühlhausen, Germany. E-mail: info@naturfoto-weise.de

5849. Watts, P.C.; Daguet, C.; Thompson, D.J., Kemp, S.J. (2005): Exuviae as a reliable source of DNA for population-genetic analysis of odonates. *Odonatologica* 34: 183-187. (in English). ["Genetic analyses are widely used for a variety of ecological research, especially to aid species' conservation programs. Where genetic material is required from rare endangered species it is essential that the samples be collected non-destructively, the ultimate goal should be to develop reliable DNA extraction protocols that may be used with non-invasively collected samples. In this paper, we describe and compare three methods of DNA extraction (DNeasy tissue kit, proteinase-K/TNES and Chelex-100) that use odonate (*Coenagrion mercuriale*) exuviae

as a non-invasive source of genetic material. DNA extracted from exuviae produced consistent genotypes at five polymorphic microsatellite loci for all of the samples processed using the DNeasy tissue kit and proteinase-K/TNES methods and 4 out of the 6 exuviae treated with Chelex-100. Exuviae offer an effective source of genetic material from endangered odonates and also highly mobile species that are too difficult to catch in significant numbers. As such, we expect DNA extracted from exuviae to be widely applied to odonatological genetic research." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

5850. Wichard, W. (2005): Zeitzegen eines alttertiären Waldes. Wasserinsekten im Baltischen Bernstein. *Biologie in unserer Zeit* 35(2): 83-89. (in German). [Odonata are relatively rarely represented in Baltic amber collections but this is little quantified. An analysis of a large collection showed that of all aquatic insects Odonata represented only 0.6% in the collection." Address: Wichard, W., Institut für Biologie und ihre Didaktik, Universität Köln, Gronewaldstr. 2, D-50931 Köln, Germany.

5851. Yuejin, H.; Hongqi, L. (2005): Food web and fluid in pitchers of *Nepenthes mirabilis* in Zhuhai, China. *Acta Bot. Gallica* 152(2): 165-175. (in English). [Pitchers of *Nepenthes mirabilis* in Zhuhai, Guangdong Province, China were reported to contain "Coenagrion".] Address: Yuejin Huae, Jin Hai-An High School, Zhuhai, 519041, China

5852. Knight, T.M.; McCoy, M.W.; Chase, J.M.; McCoy, K.A.; Holt, R.D. (2005): Trophic cascades across ecosystems. *Nature* 437: 880-883. (in English). ["Predation can be intense, creating strong direct and indirect effects throughout food webs. In addition, ecologists increasingly recognize that fluxes of organisms across ecosystem boundaries can have major consequences for community dynamics. Species with complex life histories often shift habitats during their life cycles and provide potent conduits coupling ecosystems. Thus, local interactions that affect predator abundance in one ecosystem (for example a larval habitat) may have reverberating effects in another (for example an adult habitat). Here we show that fish indirectly facilitate terrestrial plant reproduction through cascading trophic interactions across ecosystem boundaries. Fish reduce larval dragonfly abundances in ponds, leading to fewer adult dragonflies nearby. Adult dragonflies consume insect pollinators and alter their foraging behaviour. As a result, plants near ponds with fish receive more pollinator visits and are less pollen limited than plants near fish-free ponds. Our results confirm that strong species interactions can reverberate across ecosystems, and emphasize the importance of landscape-level processes in driving local species interactions." (Authors)] Address: Knight, Tiffany, Department of Zoology, University of Florida, Gainesville, Florida 32611, USA

5853. Anjos-Santos, D.; Costa, J.M. (2006): A revised checklist of Odonata (Insecta) from Marambaia, Rio de Janeiro, Brazil with eight new records. *Zootaxa* 1300: 37-50. (in English, with Portuguese summary). ["A list of 77 species in 37 genera and 10 families recorded in Marambaia, Rio de Janeiro, Brazil is presented. Eight species (*Hetaerina brighthwelli*, *Lestes tricolor*, *Ischnura*

fluviatilis, Leptagrion andromache, Triacanthagyna nympha, T. septima, Zonophora campanulata campanulata, and Micrathyrta borgmeieri) have been recorded for the first time for the region, enlarging the knowledge about Odonata species of Rio de Janeiro State. Comments about new records and additional relevant literature are discussed." (Authors)] Address: Anjos-Santos, Danielle, Museu Nacional, Universidade Federal do Rio de Janeiro, Departamento de Entomologia, Setor de Insetos, Aquáticos, Quinta da Boa Vista, São Cristóvão 20940-040, Rio de Janeiro, Brazil. Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

5854. Anwander, H. (2006): Libellen (Odonata) im Kalkquellmoor "Benninger Ried" bei Memmingen, Bayern. *Lauterbornia* 57: 107-112. (in German, with english summary). [Germany, Bavaria; "The mapping of dragonflies took place in the years 1997, 2000, and 2003 in connection with the faunistic monitoring for the EU-LIFE-Project Benninger Ried. During this time the focus was especially upon the development of population density of *Coenagrion mercuriale* and *Orthetrum coerulescens*, because these species are characteristic inhabitants of springs and swamps in this area. Altogether 27 species were found during the research. The extremely dry summer in 1998 was the reason for a strong decrease of *Coenagrion mercuriale* after the first mapping. Since that time the population density has been recovered - not least by damming measures, which were carried out in this time." (Author)] Address: Anwander, H., Am Sandberg 7, D-89358 Ettenbeuren, Germany

5855. Audet, G.N.; Blust, M.H. (2006): Odonata of the Poultney River. Abstracts of the Northeast Natural History Conference IX. April 20 – April 21, 2006. N.Y. State Mus. Circ. 70. ISBN: 1-55557-233-2: 22. (in English). [Verbatim: From September to November 2005, a study was conducted to find, identify, and map Odonate nymphs in the Poultney River of Vermont and New York. Samples were taken at various sites, from the headwaters to approximately twenty-five miles downstream, in an effort to identify the different species of Odonata that occupy the main waterway and its tributaries. Habitats included small rocky brooks, medium sized rocky rivers, and slow moving shallow reaches with silt and clay. Over three hundred individual nymphs were collected, representing more than twenty genera. Portions of the Poultney River form the border between NY State and Vermont. *Enallagma divagans*, which had previously been undocumented in the state of Vermont or nearby counties of NY, was found in this border stretch. Diversity and distribution of species will be discussed.] Address: The University of the State of New York, The State Education Department, ALBANY, NY 12230, USA; <http://www.nysm.nysed.gov/nhc/nhcabstracts2006.pdf>

5856. Azrina, M.Z.; Yap, C.K.; Ismail, A.R.; Ismail, A.; Tan, S.G. (2006): Anthropogenic impacts on the distribution and biodiversity of benthic macroinvertebrates and water quality of the Langat River, Peninsular Malaysia. *Ecotoxicology and Environmental Safety* 64(3): 337-347. (in English). ["A study of the impacts of anthropogenic activities on the distribution and biodiversity of benthic macroinvertebrates and water quality of the

Langat River (Peninsular Malaysia) was conducted. Four pristine stations from the upstream and 4 stations at the downstream receiving anthropogenic impacts were selected along the river. For 4 consecutive months (March–June 1999), based on the Malaysian DOE (Malaysia Environmental Quality Report 2000, Department of Environment, Ministry of Science, Technology and Environment Malaysia. Maskha Sdn. Bhd. Kuala Lumpur, 86pp; Malaysia Environmental Quality Report 2001, Department of Environment, Ministry of Science, Technology and the Environment Malaysia) water quality index classes, the upstream stations recorded significantly ($P < 0.05$) higher Biological Monitoring Working Party scores and better water quality indices than those of the downstream. The total number of macrobenthic taxa and their overall richness indices and diversity indices were significantly ($P < 0.05$) higher at the upstream stations (54 taxa) than at the downstream stations (5 taxa). The upstream of the Langat River was dominated by Ephemeroptera and chironomid dipterans while other orders found in small quantities included Trichoptera, Diptera, Plecoptera, Odonata, next term Ephemeroptera, Coleoptera, and Gastropoda. On the other hand, the downstream of the river was mainly inhabited by the resistant Oligochaeta worms *Limnodrilus* spp. and *Branchiodrilus* sp. and Hirudinea in small numbers. The relationships between the physicochemical and the macrobenthic data were investigated by Pearson correlation analysis and multiple stepwise regression analysis. These statistical analyses showed that the richness and diversity indices were generally influenced by the total suspended solids and the conductivity of the river water. This study also highlighted the impacts of anthropogenic land-based activities such as urban runoff on the distribution and species diversity of macrobenthic invertebrates in the downstream of the Langat River. The data obtained in this study supported the use of the bioindicator concept for Malaysian rivers. Some sensitive (Trichopteran caddisflies and Ephemeroptera) and resistant species (Oligochaeta such as *Limnodrilus* spp.) are identified as potential bioindicators of clean and polluted river ecosystems, respectively, for Malaysian rivers.] Address: Yap, C.K., Department of Biology, Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. E-mail: yapckong1973@yahoo.com.sg

5857. Bao, I.; Hu, J.-.; Yu, Y.-I.; Cheng, P.; Xu, B.-q.; Tong, B.-g. (2006): Viscoelastic constitutive model related to deformation of insect wing under loading in flapping motion. *Applied Mathematics and Mechanics* 27(6): 741-748. (in English). ["Flexible insect wings deform passively under the periodic loading during flapping flight. The wing flexibility is considered as one of the specific mechanisms on improving insect flight performance. The constitutive relation of the insect wing material plays a key role on the wing deformation, but has not been clearly understood yet. A viscoelastic constitutive relation model was established based on the stress relaxation experiment of a dragonfly wing (in vitro). This model was examined by the finite element analysis of the dynamic deformation response for a model insect wing under the action of the periodical inertial force in flapping. It is revealed that the viscoelastic constitutive relation is rational to characterize the biomaterial property of insect wings in contrast to the elastic one. The amplitude and form of the passive viscoelastic deformation of the wing is evidently depen-

dent on the viscous parameters in the constitutive relation." (Authors)] Address: Email: tongbg@gucas.ac.cn

5858. Batista de Pinho, J.; Esteves Lopes, L.; De Moraes, D.H.; Mendes Fernandes, A. (2006): Life history of the Mato Grosso Antbird *Cercomacra melanaria* in the Brazilian Pantanal. *Ibis* 148(2): 321-329. (in English). [In 2 of 24 stomachs of *C. melanaria*, food items of Odonata were found.] Address: Batista de Pinho, J., Núcleo de Pesquisa Ecológica do Pantanal – Instituto de Biociências, Universidade Federal de Mato Grosso, 78075-960, Cuiabá, MT, Brazil. Email: pinho@cpd.ufmt.br

5859. Beauger, A.; Lair, N.; Reyes-Marchant, P.; Peiry, J.-L. (2006): The distribution of macroinvertebrate assemblages in a reach of the River Allier (France), in relation to riverbed characteristics. *Hydrobiologia* 571: 63-76. (in English). ["Macroinvertebrate assemblages of large alluvial streams are poorly documented. This study identified the physical characteristics affecting the macroinvertebrates community distribution in a large alluvial river devoid of major anthropogenic impacts. It was oriented towards the influence of the characteristics of the physical habitat (velocity, depth, grain-size classes of mineral substrates, macrophytes) on macroinvertebrates (richness, density, body size, feeding habits), with particular attention to the pollution-sensitive taxa. The study was carried out in June during a period of hydrological stability. The effects of water velocity, depth and substrates on taxa were evaluated with multivariate analyses. Mineral substrates were most abundant while macrophytes accounted for only 3% of sampled habitat. Invertebrates that were present were those characteristics of the transition zone between upper and middle life reaches. Among the 63 taxa sampled, 14 were abundant. In relation to the characteristics of the physical environment, the macroinvertebrate assemblages were discriminated by substrate, velocity, and depth. Habitat exploitation, however, appeared complex. The highest community richness, EPT richness, and density were found in various substrates where the velocity ranged between 30 and 120 cm s⁻¹, depths ranged from 16 to 50 cm. The most pollution-sensitive taxa preferred riffle habitats with velocities >70 cm s⁻¹ and substrate >64 mm. This suggests that rapid bioassessment programmes should be carried out in the mineral substrates of the geomorphological unit riffles where richness is high and density sufficient to represent the macroinvertebrate community, including pollution-sensitive taxa." (Authors) The study includes data on *Onychogomphus* and *Ophiotomphus*.] Address: Beauger, A., Laboratoire de Géographie Physique et Environnementale. GEOLAB, UMR 6042 CNRS, Uni. Clermont-Ferrand, France. E-mail: aude.beauger@univ-bpclermont.fr

5860. Bedjanic, M.; Conniff, K.; de Silva Wijeyeratne, G. (2006): Dragonflies of Sri Lanka and southern India. *Jetwing Eco Holidays*. Colombo. ISBN 955107908-6: 28 pp. (in English). [78 of the 117 Odonata of Sri Lanka are pictured. For the full paper see: [http://www.jetwingco.com/images/GPB%20Dragonflies%20of%20Sri%20Lanka%20\(1st%20Ed\)%202006%2005.pdf](http://www.jetwingco.com/images/GPB%20Dragonflies%20of%20Sri%20Lanka%20(1st%20Ed)%202006%2005.pdf)]

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539-547. (in English). ["Sex-biased dispersal is well known for birds and mammals, typically by females and males, respectively. Little is known about general patterns of sex-biased dispersal in other animal taxa. We reviewed return rates for a model group of invertebrates (damselflies) and explored putative costs and benefits of dispersal by males and females. We used published capture-mark-recapture data and examined whether a sex bias existed in likelihood of recapture at least once, at both emergence and/or breeding sites. We assessed whether this metric of likelihood of recapture was indicative of dispersal or philopatry, and whether any emerging pattern(s) were consistent across damselfly families. Using a meta-analysis, we found a higher likelihood of recapture at least once for males than for females at both natal sites and breeding sites, which seemed attributable to higher female-biased dispersal, although female-biased mortality cannot be discounted particularly for some species. Sex biases in dispersal among damselflies may be understood based on sex differences in maturation rate and foraging behaviour, both of which should affect the costs and benefits of dispersing. This hypothesis may be useful for explaining patterns of dispersal in other animal taxa." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

5862. Bena, W. (2006): Die Natur der Puszcza Zgorzelecka (Görlitzer Heide). *Berichte der naturforschenden Gesellschaft der Oberlausitz* 14: 1001-105. (in German). [The author gives an introduction into the heath and woodlands situated on both sites of the Polish/German border, originally known as "Görlitzer Heide". Facts are compiled more general and organized in three chapters: Situation and history of forestry, flora, and fauna. The chapter on the fauna also contains some odonate highlights, but without any detailed data.] Address: Bena, W., ul. Olszewskiego, PL-59-900 Zgorzelec, Poland. E-mail: benawald@gazeta.pl

5863. Bernard, R.; Buczyński, P.; Tończyk, G. (2006): Historical materials: Dr. Stefan Mielewicz (1933-2005). *Wiad. entomol.* 25(1): 43-54. (in Polish, with English summary). [Obituary and bibliography of the leading Polish odonatologist of the last four decades in the 20th century.] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

5864. Bernard, Y. (2006): *Trithemis annulata* (Palisot de Beauvois, 1805), nouvelle espèce pour le département des Hautes-Pyrénées (Odonata, Anisoptera, Libellulidae). *Martinia* 22(3): 133-134. (in French, with English summary). [France; in summer 2005, two male *T. annulata* were caught at the Lourdes lake. Obviously, the range extension of the species in southwestern France is not restricted to the Atlantic coast.] Address: Bernard, Y., 13 chemin de Gourion, Domaine de Peyre, F-33360 Lignan de Bordeaux. France. E-mail: ybernard@biotope.fr

5865. Bernauer, D.; Grabow, K.; Martens, A. (2006): Fang von Libellenlarven durch Elektrofischung (Odonata: Cordulegastridae). *Libellula* 25(3/4): 165-169. (in German, with English summary). ["On 10-X-2006, at a shallow stream near Wachenheim in the Palatinate Fo-

rest, Germany, the recording of dragonfly larvae by electrofishing was tested successfully. At two 10 m-stretches, ten and 45 larvae of *Cordulegaster boltonii*, respectively, were caught by using the standard techniques for larvae of lampreys." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

5866. Berry, R.; Stange, G.; Olberg, R.; van Kleef, J. (2006): The mapping of visual space by identified large second-order neurons in the dragonfly median ocellus. *Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology*: 1-19. (in English). ["In adult dragonflies, the compound eyes are augmented by three simple eyes known as the dorsal ocelli. The outputs of ocellar photoreceptors converge on relatively few second-order neurons with large axonal diameters (L-neurons). We determine L-neuron morphology by iontophoretic dye injection combined with three-dimensional reconstructions. Using intracellular recording and white noise analysis, we also determine the physiological receptive fields of the L-neurons, in order to identify the extent to which they preserve spatial information. We find a total of 11 median ocellar L-neurons, consisting of five symmetrical pairs and one unpaired neuron. L-neurons are distinguishable by the extent and location of their terminations within the ocellar plexus and brain. In the horizontal dimension, L-neurons project to different regions of the ocellar plexus, in close correlation with their receptive fields. In the vertical dimension, dendritic arborizations overlap widely, paralleled by receptive fields that are narrow and do not differ between different neurons. These results provide the first evidence for the preservation of spatial information by the second-order neurons of any dorsal ocellus. The system essentially forms a one-dimensional image of the equator over a wide azimuthal area, possibly forming an internal representation of the horizon. Potential behavioural roles for the system are discussed." (Authors)] Address: Berry, R., Centre for Visual Sciences, Research School of Biological Sciences, Australian National University, PO Box 475, Canberra, ACT 2601, Australia. E-mail: rberry@rsbs.anu.edu.au

5867. Bönsel, A. (2006): Schnelle und individuenreiche Besiedlung eines revitalisierten Waldmoores durch *Leucorrhinia pectoralis* (Odonata: Libellulidae). *Libellula* 25(3/4): 151-157. (in German, with English summary). ["In 2003 a drained forest mire in Mecklenburg-Pomerania, Germany, was revitalized by damming up the water to a maximum depth of 1.3 m. Three years later a large indigenous population of *L. pectoralis* was recorded at the new water body. In spite of the cryptic situation of the revitalized habitat many individuals must have found it promptly. Forests around the habitats do not constitute dispersal barriers for the sp., which is endangered in central Europe, and large occurrences nearby are not a prerequisite for colonizing new habitats. As in this region the revitalisation of mires is associated with few conflicts of interest and only little financial support is needed, this measure is recommended for the protection and promotion of *L. pectoralis*." (Author)] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

5868. Boyero, L.; Rincón, P.A.; Bosch, J. (2006): Case selection by a limnephilid caddisfly [*Potamophylax*

latipennis (Curtis)] in response to different predators. *Behavioral Ecology and Sociobiology* 59(3): 364-372. (in English). ["Some organisms use morphological structures obtained by behavioural processes to lower mortality by predation. We test whether larvae of the limnephilid caddisfly *Potamophylax latipennis* (Curtis) vary their responses to the presence of different predators (*Cordulegaster boltonii*, fire salamander larvae or brown trout) by choosing organic or mineral cases. We offered both case types to larvae, and simulated differences in predation risk using water conditioned with chemicals from the different predators. Our results show that *Potamophylax* larvae detect and discriminate predators using water-borne chemical cues and alter their choice of case type according to the perceived predation risk. Moreover, the distribution of larvae bearing cases of different anti-predator value matches the spatial variation in predation risk in the field." (Authors)] Address: Boyero, L., Museo Nacional de Ciencias Naturales (CSIC), Madrid, Spain. E-mail: luz.boyero@jcu.edu.au

5869. Boyero, L.; Rincón, P.A.; Bosch, J. (2006): Case selection by a limnephilid caddisfly [*Potamophylax latipennis* (Curtis)] in response to different predators. *Journal Behavioral Ecology and Sociobiology* 59(3): 364-372. (in English). ["Some organisms use morphological structures obtained by behavioural processes to lower mortality by predation. We test whether larvae of the limnephilid caddisfly *Potamophylax latipennis* (Curtis) vary their responses to the presence of different predators (dragonfly naiads [*Cordulegaster boltonii*], fire salamander larvae or brown trout) by choosing organic or mineral cases. We offered both case types to larvae, and simulated differences in predation risk using water conditioned with chemicals from the different predators. Our results show that *Potamophylax* larvae detect and discriminate predators using water-borne chemical cues and alter their choice of case type according to the perceived predation risk. Moreover, the distribution of larvae bearing cases of different anti-predator value matches the spatial variation in predation risk in the field." (Authors)] Address: Boyero, L., Museo Nacional de Ciencias Naturales (CSIC), Madrid, Spain. E-mail: luz.boyero@jcu.edu.au

5870. Brauner, O. (2006): Einjährige Entwicklung von *Leucorrhinia pectoralis* und *Brachytron pratense* in einem Kleingewässer Nordostbrandenburgs (Odonata: Libellulidae, Aeshnidae). *Libellula* 25(1/2): 61-75. (in German, with English summary). ["In a kettle hole near Brodowin, Brandenburg, Germany in the dry and warm summer of 2001, the water body was observed to dry up completely for almost five months. Regular measurements of water conditions showed that the water reached a minimal level of less than 50 cm below ground during that time. In 2003 ten exuviae of *L. pectoralis* and five exuviae of *B. pratense* were found at this water body, indicating univoltine development for at least part of the population of both species. From similar observations at three different localities of the same region, it is likewise inferred that both species may be partly univoltine." (Authors)] Address: Brauner, O., R.-Breitscheidstr. 62, D-16225 Eberswalde, Germany. E-mail: oliverbrauner@web.de

5871. Bressler, D.W.; Stribling, J.B.; Paul, M.J.; Hicks, M.B. (2006): Stressor tolerance values for benthic macroinvertebrates in Mississippi. *Hydrobiologia* 573: 155-

172. (in English). ["Conceptually, tolerance values represent the relative capacity of aquatic organisms to survive and reproduce in the presence of known levels of stressors. Operationally, they represent the relative abundance and colocation of organisms and stressors. These numeric values are then used for calculating tolerance metrics. Defensibility of biological assessments using tolerance metrics is compromised if the origins of the tolerance values or technical foundations of metrics are unknown. To minimize circularity and maximize objectivity, we define stressed conditions using physical and chemical factors. Also, since single, isolated stressors in stream systems are rare, we used an approach that combines multiple physical and chemical characteristics into a single general stressor gradient. In this paper, we describe development of tolerance values for benthic macroinvertebrate taxa collected from 455 wadeable stream sites throughout Mississippi, USA, except the Alluvial Plain. Principal components analysis (PCA) was used to develop a gradient that incorporated direct (instream physical and chemical) and indirect (land use) stressors, which was then scaled from 0 to 10. Weighted averaging of the relative abundance of each taxon was used to assign tolerance values based on the point of greatest relative abundance along the stressor gradient. Tolerance values were derived for 324 (including Odonata on the genus level) of the 567 taxa collected from the study sites, and primarily represented sensitivity to agricultural influences including degradation of physical habitat and nutrient enrichment, the dominant stressors within the state. We suggest that this approach could be used in other areas of the country to develop new tolerance values, refine existing ones, and may be a useful approach for other taxonomic groups." (Authors)] Address: Bressler, D.W., Tetra Tech, Inc., 400 Red Brook Blvd., Suite 200, Owings Mills, MD, 21117-5159, USA. E-mail: dave.bressler@tetratech.com

5872. Bried, J.T.; Ervin, G.N. (2006): Abundance patterns of dragonflies along a wetland buffer gradient. *Wetlands* 26: 878-883. (in English). ["Local abundance of animals with aquatic and terrestrial life stages may be useful to determine criteria for protective buffers around wetlands. Maiden flights and daily commutes of adult Odonata occur between wetland breeding area and adjacent upland habitat used for foraging, maturation, and nocturnal roosting. We measured abundance of dragonflies adjacent to a wetland in Mississippi, USA to determine if abundance varied with distance from water. Sexually mature males and combined females/prereproductive adult males (females-immatures) were recorded 10–160 m from the littoral edge of a 185 ha shallow reservoir. The number of dragonflies was dominated by *Celithemis eponina* throughout the study period. Mean abundance did not change with distance from water out to 160 m, both for all species combined and for each of three dominant species. In the assemblage, mature males outnumbered females-immatures in the 10–40 m distance, whereas the reverse occurred in the 130–160 m distance. At the species-level, there was a mixed response in the mature male: female-immature ratio, with little resemblance to the assemblage pattern. Results of this study suggest that wide buffer zones around wetlands may be essential to protect Odonata assemblages, especially females and sexually immature adults. Furthermore, odonate flight behavior may serve as a useful bio-criterion to determine the width of ecologically significant wetland buffers." (Authors)] Address: Bried, J., The Nature Conservancy Eastern New York Chapter & Albany Pine Bush Preserve Commission, 195 New Karner Road, Albany, New York, USA 12205-4605. E-mail: jbried@tnc.org

5873. Buchanan, G.M.; Grant, M.C.; Sanderson, R.A.; Pearce-Higgins, J.W. (2006): The contribution of invertebrate taxa to moorland bird diets and the potential implications of land-use management. *Ibis* 148(4): 615-628. (in English). [A meta analysis of the diet of 14 British bird species was carried out. Odonata played a minor role as food. The results differed between the species considered (in most cases small Passeriformes which are known to prey very rarely on Odonata), and with habitat preferences, which makes encounters between dragonflies and birds quite unlikely. Personal annotation: moorland Odonata are known to be preyed upon selectively by e.g. Hobby (*Falco subbuteo*).] Address: Buchanan, G.M., Royal Society for the Protection of Birds, Dunedin House, 25 Ravelston Terrace, Edinburgh EH4 3TP, UK. E-mail: graeme.buchanan@rspb.org.uk

5874. Buczyński, P.; Lewandowski, K.; Wissig, N. (2006): Materials to the knowledge of dragonflies (Odonata) of the River Narew valley in the vicinity of Drozdowo (north-eastern Poland). *Drozdowskie Zeszyty Przyrodnicze* 3: 5-12. (in Polish, with English summary). [Odonatological surveys in 1985-1987 and 2003 and 2004 at 32 water bodies resulted in 33 dragonfly species: of special interest are *Coenagrion lunulatum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Aeshna juncea*, and *A. viridis*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

5875. Bur, S. (2006): Une nouvelle espèce d'Odonate pour le département de l'Oise: *Leucorrhinia caudalis* (Charpentier, 1840) dans le Marais de Bourneville à Marolles (Odonata, Anisoptera, Libellulidae). *Martinia* 22(2): 73-82. (in French, with English summary). ["A *L. caudalis* population was discovered in 2003 in Oise department, France. It is the first and unique record of this species for this department. The site and the context of the discovery are briefly presented, and the observations described. The author gives a brief synthesis of the distribution of the species in Picardie region and neighbouring areas and discusses the possible origin of the population discovered." (Author)] Address: Bur, S., Conservatoire des sites naturels du Limousin, 6 ruelle du Theil, F-87510 Saint-Gence, France. E-mail: sbur@conservatoirelimousin.com

5876. Burmeister, E.-G. (2006): Im Regenwald am Fuß der Anden. *Mitteilungen des Thüringer Entomologenverbandes* 13(1): 72-81. (in German, with English summary). [The author reports from several of his trips to the cloud forest of Panguana, Peru. On page 75 he notes 27 odonate species without details from the locality. This forest is the type locality of *Polythore spaeteri*, whose larvae have ventral abdominal gills. This is interpreted as an adaption to fluctuating water tables and changing oxygen conditions of the habitat, small rivulets. Some general remarks on oviposition of the Mesostigmatidae are added as is a list of dragonflies caught by light traps. Additional material (unpublished): V. Etscher: »Die Larve von *Polythore spaeteri* Burmeister & Börzsöny, 2003, (Insecta: Odonata: Zygopte-

ra: Polythoridae). Ein Beitrag zur anatomischen Strukturanalyse basaler Libellen und zur Artzuordnung auf molekularer Ebene« (seit April 2004) - LMU. Betreuung: E.-G. Burmeister.] Address: Burmeister, E.-G., Zoologische Staatssammlung München, Münchhausenstraße 21, D-81247 München, Germany. E-mail: Burmeister@zsm.mwn.de.

5877. Butler, R.G.; de Maynadier, P. (2006): Significance of littoral and shoreline habitat integrity to lacustrine damselfly conservation. Abstracts of the Northeast Natural History Conference IX. April 20 – April 21, 2006. N.Y. State Mus. Circ. 70. ISBN: 1-55557-233-2: 23. (in English). [Verbatim: Shoreline development can have significant impacts on native lacustrine biota including a variety of aquatic macroinvertebrate groups. In an effort to better understand the habitat associations and sensitivities of lacustrine damselflies (Odonata: Zygoptera), we sampled adults in littoral macrophyte habitat during two flight periods at 35 randomly selected pond and lake sites in southern Maine during 2000 and 2001. Habitat data were collected during the same period to help characterize water body, shoreline disturbance, and aquatic vegetation at each study site. Non-metric multidimensional scaling was used for ordination of damselfly assemblages, and resulting coordinates from the most stable three-axis solution were related to site variables using forward stepwise multiple regression. Our results suggest that the diversity and composition of damselfly assemblages were related to the abundance and richness of littoral zone macrophytes, extent of riparian habitat conversion, benthic substrate granularity, and habitat productivity; all variables subject to anthropogenic degradation on excessively developed waterbodies. Additionally, we developed a Habitat Tolerance Index useful for distinguishing between relative habitat specialists and generalists from among a diverse community of 19 lacustrine species. Finally, species-specific damselfly associations with multiple genera of floating and emergent macrophytes were assessed using both nonparametric correlation and multiplicative regression yielding significant relationships for 17 species, including two damselflies of regional conservation concern, *Enallagma laterale* and *E. pictum*. We conclude that the protection of littoral habitat integrity, with special emphasis on emergent and floating macrophytes, is critical to the conservation of a diverse lacustrine damselfly fauna.] Address: University of the State of New York, The State Education Dept, ALBANY, NY 12230, USA; <http://www.nysm.nysed.gov/nhc/nhcabstracts2006.pdf>

5878. Carvalho, A.L.; Souza, P.H.R.; Calil, E.R. (2006): Description of the larvae of *Castoraeschna colorata* (Martin, 1908) and *C. longfieldae* (Kimmins, 1929) (Insecta: Odonata: Aeshnidae), with a key to the known larvae of the genus. *Zootaxa* 1296: 19-28. (in English). ["The ultimate instar larvae of *C. colorata* and *C. longfieldae* are described and illustrated based on reared specimens from Parque Nacional das Emas, GO, and Chapada dos Guimarnes, MT, Brazil, respectively. A comparative table and an identification key for all described larvae of *Castoraeschna* (in addition: *C. castor*, *C. decurvata*, *C. tepuica*) are also presented." (Authors)] Address: Carvalho, A.L., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

5879. Castillo, L.E.; Martínez, E.; Ruedert, C.; Savage, C.; Gilek, M.; Pinnock, M.; Solis, E. (2006): Water quality and macroinvertebrate community response following pesticide applications in a banana plantation, Limon, Costa Rica. *Science of The Total Environment* 367(1): 418-432. (in English). ["Pesticides used in banana production may enter watercourses and pose ecological risks for aquatic ecosystems. The occurrence and effects of pesticides in a stream draining a banana plantation was evaluated using chemical characterization, toxicity testing and macrobenthic community composition. All nematicides studied were detected in the surface waters of the banana plantation during application periods, with peak concentrations following applications. Toxicity tests were limited to the carbofuran application and no toxicity was observed with the acute tests used. However, since pesticide concentrations were generally below the lowest LC50 value for crustaceans but above calculated aquatic quality criteria, there remains a risk of chronic toxicity. Accurate ecological assessments of pesticide use in banana plantations are currently limited by the lack of local short-term chronic toxicity tests and tests using sensitive native species. Relatively constant levels of four pesticides (imazalil, thiabendazole, chlorpyrifos and propiconazole), which had toxic effects according to the 96h hydra and 21d daphnia chronic test, were recorded in the effluent of the packing plant throughout the study, indicating that the solid waste trap used in this facility was not effective in eliminating toxic chemicals. Certain taxa, such as *Heterelmis* sp. (Elmidae), *Heteragrion* sp. (Megapodagrionidae, Odonata), *Caenis* sp. (Caenidae, Ephemeroptera), and *Smicridea* sp. (Hidropsychidae, Trichoptera), were more abundant at reference sites than in the banana farm waters, and may be good candidates for toxicity testing. Multivariate analyses of the macroinvertebrate communities clearly showed that the banana plantation sites were significantly different from the reference sites. Moreover, following the pesticide applications, all the banana plantation sites showed significant changes in community composition, with the same genera being affected at all sites and for all pesticides (terbufos, cadusafos and carbofuran). Consequently, the results presented here show that multivariate analysis of community composition was more sensitive in distinguishing pesticide effects than the toxicity tests and richness and composition measures used. We conclude that monitoring macroinvertebrate communities can be a powerful tool in the assessment of ecological effects of banana production." (Authors)] Address: Castillo, Luisa Eugenia, Sonia Miner Salari, Central American Institute for Studies on Toxic Substances (I-RET), Universidad Nacional, Heredia, Costa Rica. E-mail: lcastill@una.ac.cr

5880. Césard, N. (2006): Des libellules dans l'assiette: les insectes consommés à Bali. *Insects* 160: 3-6. (in French). [This is an impressively illustrated article on Odonata as food of people in Bali, Indonesia. For details see: <http://www.inra.fr/internet/Hebergement/OPIE-Insectes/pdf/i140cesard.pdf>] Address: E-mail: ncesard@wanadoo.fr

5881. Che Salmah, M.R.; Wardhani Tribuana, S.; Abu Hassan, A. (2006): The population of Odonata (dragonflies) in small tropical rivers with reference to asynchronous growth patterns. *Aquatic Insects* 28(3): 195-209. (in English). ["The odonate larval communities in three small rivers in Penang Island were studied. Mo-

re species of dragonflies were found in the Botanical Garden and Titi Teras rivers (13 and 11 respectively) of relatively similar environmental parameters. Fewer (nine) dragonfly species were collected from the Youth Park River which has a lower dissolved oxygen (DO) and a higher biological oxygen demand (BOD), conductivity and turbidity. A mixture of sand, gravel and pebble substrate of Botanical Garden River with dense growth of submerged *Hydrilla*, grasses and *Cladias* (Araceae) provided suitable habitats for the dragonflies. The sandy substrate and relatively fast flowing water of Titi Teras River was highly preferred by gomphids. In the Youth Park River, the small community of dragonfly larvae was dominated by tolerant *Pseudagrion rubriceps*, *P. microcephalum*, *Orthetrum chrysis* and *Crocothemis servilia*. Based on the larval instar distribution of *Ictinogomphus decoratus* and *O. chrysis*, very asynchronous populations of these dragonflies occurred in each river. Young larvae were continuously introduced into the populations resulting in undulating growth rate curves. The growth rates of these two species were higher in the Titi Teras River when compared to those in other rivers. Density-dependent mortality, asynchronous cannibalism and fish predation could play important roles in regulating the larval dragonfly population in these rivers." (Authors)] Address: Che Salmah, M.R., School of Biological Sciences, Universiti Sains Malaysia, Penang, Malaysia

5882. Chelmick, D. (2006): Some observations of *Macromia splendens* (Pictet) in Andalusia, Spain (Anisoptera: Macromiidae). *Notulae Odontologicae* 6(7): 69-72. (in English). ["The occurrence of *M. splendens* in southern Spain is discussed; it appears to be well established on the Guadiaro river system in Andalusia. Adult, exuviae and larval observations are included. Its status on other southern Spanish river systems remains uncertain and more research work is required." (Author)] Address: Chelmick, D., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, United Kingdom. E-mail: dgc@davidchelmick.com

5883. Commission of Zoological Nomenclature (2006): OPINION 2148 (Case 3294). *Bulletin of Zoological Nomenclature* 63(2): 136-137. (in English). ["The Commission has ruled that the usage of the names *Gynacantha Rambur*, 1842 and *Triacanthagyna Selys*, 1883 for two genera of aeshnid dragonflies is conserved by the designation of *Gynacantha nervosa Rambur*, 1842 as the type species of *Gynacantha*." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5884. Conze, K.-J. (2006): *Libellenkartierung in der Stadt Essen. Elektronische Aufsätze der Biologischen Station Westliches Ruhrgebiet* 6.12: 1-3. (in German). [Brief introduction into current activities in mapping the odonate fauna of the town of Essen, Nordrhein-Westfalen, Germany. The paper includes a brief commented checklist of the Odonata hitherto recorded.] Address: Conze, K.-J., Listerstr. 13, D-45147 Essen, Germany. E-mail: Klaus-Juergen.Conze@t-online.de

5885. Córdoba-Aguilar, A. (2006): Sperm ejection as a possible cryptic female choice mechanism in Odonata (Insecta). *Physiological Entomology* 31(2): 146-153. (in

English). ["The few odonate studies of sperm use suggest that females spend apparently more sperm than appears necessary during oviposition (sometimes females may have their sperm stores reduced to 50% after a single oviposition episode). Furthermore, some studies document that females eject sperm during and after copulation. This raises the question of whether sperm reduction may be interpreted as a cryptic female choice mechanism. Using two zygopterans, *Ischnura denticollis* Burmeister and *Enallagma praevarum* Hagen, and one anisopteran, *Pantala flavescens* Fabricius, it is shown that females mate more than once, show a marked reduction in stored sperm, and that this is by ejection of sperm before to oviposition. The extent of sperm reduction is inversely related to the number of eggs laid. When mated to the same male, females show similar reductions in sperm stores and egg load and only rarely does the vaginal duct contain sperm. This suggests that marked sperm reduction is common in this insect order and is not explained by an excess of sperm obstructing the egg passage. It is suggested that female's sperm shortage is better explained as a cryptic female choice mechanism aimed at favouring the sperm of some males. This study provides exciting research avenues for future studies of female choice in an animal taxa whose sexual biology is otherwise regarded as controlled by males." (Author)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

5886. Costa, J.M.; De Souza, L.O.; Muzon, J. (2006): Descriptions of three new species of Odonata from Brazil. *Zootaxa* 1314: 53-68. (in English). ["Three new species are described here: *Oxyagrion zielmae* sp. nov. (Coenagrionidae) from one male collected at Costa Rica, Mato Grosso do Sul state; *Lestes fernandoi* sp. nov. (Lestidae) from a pair from Imperatriz, Maranhão state and *Perithemis capixaba* sp. nov. (Libellulidae) from one male from Mutum Preto, Espírito Santo state, all deposited at Museu Nacional, Rio de Janeiro, Brazil. *Oxyagrion zielmae* is similar to *O. pavidum* Selys, 1876 but differs by having cerci and paraprocts the same size, pterostigma long and narrow and terminal segment of genital ligula with the two lobes larger than in *O. pavidum*. *Lestes fernandoi* is compared with *L. auritus* Hagen in Selys, 1862; *L. bipupillatus* Calvert, 1909; *L. dichrostigma* Calvert, 1909; *Lestes falcifer* Sjöstedt, 1918; *L. forficula* Rambur, 1842; *L. minutus* Selys, 1862 and *L. paulistus* Calvert, 1909. The new species is most similar to *Lestes falcifer* and *L. paulistus*, but differ by the peculiar color of pterothorax, caudal appendages and genital ligula. *Perithemis capixaba* is similar to *P. mooma* Kirby, 1889 but differs by having the first segment of vesica spermalis slowly rounded, in *P. mooma* this structure is trapezoidal. Illustrated keys to new species are included." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

5887. Coupry, Y.; Nepoux, V. (2006): *Tauriphila australis* (Hagen, 1867), nouvelle espèce pour la Guyane. *Martinia* 22(3): 108. (in French). [French Guyana, 11-VIII-2002] Address: Coupry, Y., allée des Glycines, F-70170 Port sur Saône Allée des Marcassins, F-60360 Lamorlaye, France

5888. Couteyen, S. (2006): Effets de l'introduction de la truite arc-en-ciel (*Oncorhynchus mykiss* Walbaum, 1792) sur les populations larvaires de deux espèces de Zygoptères de l'Île de la Réunion. *Martinia* 22(2): 55-63. (in French, with English summary). ["The effect of predation by rainbow trout on the larval populations of *Coenagrion reuiniensis* (Fraser, 1957) and *Enallagma glaucum* (Burmeister, 1839) has been studied. Faced with the predator, the two species react differently: a local extinction of *C. reuiniensis* has been observed as the larval density has shifted from over 4 larvae per square metre to 0, while no significant impact of the predator on the *E. glaucum* has been recorded. The fact that 7 larvae of *C. reuiniensis* were discovered in the analysis of 30 trout stomachs' contents whereas no larva of *E. glaucum* was found, confirms the greater susceptibility of *C. reuiniensis* to the predation. These two types of response can be explained by the different larval ways of life. The larvae of *C. reuiniensis*, an endemic species, are epibenthic and usually colonise vegetationless habitats. On the contrary, the larvae of *E. glaucum*, which can also be found in Africa, hide in underwater grass-banks. This makes them difficult to reach for a predator moving in free water." (Author)] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France. E-mail: couteyensf@vanadoo.fr

5889. Danks, H.V. (2006): Key themes in the study of seasonal adaptations in insects II. Life-cycle patterns. *Applied Entomology and Zoology* 41(1): 1-13. (in English). ["Recent work on selected topics of particular interest for understanding insect life-cycles is reviewed, including habitat patterns, kinds of variation, the spreading of risk and prolonged diapause, trade-offs and developmental plasticity, circannual rhythms, the concept of life cycles as developmental choices, and development or delay as the default response. Seasonal adaptations have a wider range of components than has often been appreciated. Variation in life-cycle traits, including the duration of development and the timing of emergence, can be wide, narrow, or discontinuous. Trade-offs encompass multiple simultaneous traits and are not always structured as might be expected. Diapause, cold hardiness, reproductive pattern, and other traits have evolved many times independently. Such complex interactions can be understood only by examining the detailed features of a species' habitat, because how developmental decisions are made and whether continuous development or delays are programmed reflect the predictability of habitats and the environmental signals they supply. Ecological context is important, not just mechanisms of adaptation. Therefore, although most previous studies have paid more attention to insect response than to habitat, interpreting the seasonal relevance of life-cycle patterns requires measurement and analysis for individual species of habitat characteristics and their variation, on a range of temporal and spatial scales, in much more detail than has been customary." (Author) Reference is given to *Aeshna viridis*.] Address: Danks, H.V., Group of Insect Physiology and Molecular Biology, Research Institute for Bioresources, Okayama University; Kurashiki, 710-0046, Japan

5890. De Knijf, G.; Anselin, A.; Goffart, P.; Tailly, M. (2006): *De Libellen van België. Verspreiding. Evolutie. Habitats.* Libellenwerkgroep Gomphus. ISBN 90-403-0249-9: 369 pp. (in Dutch, with English and German summaries). [Long years of intensive work finally resul-

ted in this impressive compilation of the knowledge on the Belgian Odonata. On approximately 150 pages, the distribution of the 69 Belgian species is documented in detail and mapped in different time scales. In a monographic style and condensed on two pages, the range of each species, the present distribution, and range extensions or range contractions are discussed extensively. Information on habitat and the phenology are added. Plenty of additional information like a history of Belgian odonatology, habitats and their characteristic Odonata, Red Lists, monitoring schemes, and an outlook on future developments of the regional odonata fauna, and many many impressive pictures and graphs which helps to interpret the data are included into this book. Vernacular names, a bibliography and very extensive summaries in English (Adrian Parr) and German (Martin Schorr) are added. This review is a brief one, but it refers to a very big book on a regional odonate fauna, and a significant contribution to the knowledge of the European Odonata. The book is recommended to everyone interested in European Odonata. Congratulations!! (Martin Schorr) Address: www.gomphus.be

5891. Deubel, T.; Wanke, S.; Weber, C.; Wedekind, F. (2006): Modelling and manufacturing of a dragonfly wing as basis for bionic research. design 2006 - 9th International Design Conference, Dubrovnik / Kroatien, 15.-18.05.2006. "Design Society", DS 36: Proceedings of the Design 2006 (D. Marjanovic, ed.), S. Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb 2006: 215-220. (in English). ["In nature we find many examples for highly optimised principles and solutions. The wing of the dragonfly is such a structure. The wing is very light and at the same time very stiff and has impressive aerodynamic properties. In order to understand how nature could achieve such opposed properties it was necessary to build an enlarged model to carry out further research into the aerodynamics of the single wing on the one hand and into the effects of the interferences between the four wings on the other hand in a wind tunnel. The enlarged model of the dragonfly wing was derived from cross cut sections of an actual dragonfly wing using the CAD/CAM/NC solution CATIA V5 and a NC-milling machine. In the future the findings may be useful to develop light aircraft which have a high fuel efficiency and great manoeuvrability." (Authors)] Address: Wanke, S., Saarland University, Institute of Engineering Design/CAD, Building A 4.2, POB 15 1150, D-66041 Saarbrücken, Germany. E-mail: wanke@cad.uni-saarland.de

5892. Dijkstra, K.-D. (2006): African Diplacodes: the status of the small species and the genus *Philonomon* (Odonata: Libellulidae). *International Journal of Odonatology* 9(2): 119-132. (in English). ["The small African species of *Diplacodes* have been confused for a long time, in part because the black mature males are difficult to separate. The holotype of *D. deminuta* belongs to the species commonly known as *D. okavangoensis*, the former name taking priority, while its paratypes belong to that known erroneously as *D. deminuta*, which is described as the new species *D. pumila*. *Philonomon* is considered a junior synonym of *Diplacodes* and the sole species, *P. luminans*, is transferred accordingly. Species identification relative to sex and developmental state is clarified: some specimens, either very old or young, will be difficult to separate without reference material." (Author)] Address: Dijkstra, K.D., Gortestraat 11,

NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5893. Dijkstra, K.-D.; Lewington, R. (2006): Field guide to the dragonflies of Britain and Europe. British Wildlife Publishing. ISBN-0-953-1399-4-8 (paperback): 320 pp. (in English). [This guide to the European and north African dragonflies, drawing on the knowledge of experts from throughout Europe, brings together much of the latest thinking on identifying the region's 160 species of dragonflies. Illustrated by Richard Lewington with his superb artwork, as well as more than 100 photographs, this guide is intended to enable dragonfly-watchers to identify any species they might encounter. The book has been designed to allow rapid comparison of similar species, and in most cases the artwork and text for each species are placed together. There is a general introduction, including a full glossary of terms and simple keys and tables to families and genera. A full checklist is also included at the end of the guide. In addition to the identification material there is a country-by-country section, written by regional experts. The text on each country provides a summary of the main geographical features relating to dragonfly habitats, followed by a more detailed 'tour' of some of the best places to see dragonflies. Such section is necessarily full of omissions and personal tastes, and if one would use the information, it would often not be sufficiently precise to find the relevant localities. Appendix 1 contains a discussion platform on taxonomic problems. This is a highly welcomed contribution to the debate, but it may prove less useful for a general reader of the book. On the other hand some problems are "solved" "en passant" such as *Aeshna serrata* - *A. ossiliensis* and *Coenagrion mercuriale* - *C. castellani* without discussion among the European odonatologists or any publication on this subject known to me. Appendix 2 relates to "vernacular names" - the English ones. What about the vernacular names in, say, Polish? No odonatologist in Europe is using other names than the Latin ones, otherwise it definitely would be impossible to talk about the same species. For someone outside Britain it is also difficult to understand why 'Britain' is treated separately from Europe (A Field guide to the Dragonflies of Britain and Europe), while on the other hand a large part of Europe, Russia till the Ural mountains is missing. Likewise, the north African countries and Turkey (in most parts) belong to the continents of Africa or Asia. Dear publisher: welcome in Europe! However including the species of Turkey - what of course is welcome, as for the African ones! - would have made it necessary also to include *Pseudagrion syriacum* (Selys, 1887) and *Ischnura intermedia* Dumont 1974. When I used this book and tried to identify a dragonfly from the Canary island from some brilliant photographs, I ended up with female of *Diplacodes lefebvrei* - which does not occur on the Canaries. An expert in the Canary odonate fauna by contrast, identified the specimen as a female of *Trithemis arteriosa* (which regrettably is not pictured laterally in the book). So it was not always possible to make a correct identification. Trying to read the labels of the illustrations, and even some of the text made me hope that the publisher will prepare a larger-sized edition to be used on the desk top. Yes, I think this book isn't perfect. But it is great! Nowhere you will find as much information on identification European, north African, and Turkish Odonata as in this book, including many species most of us never have seen pictured anywhere. The detailed descriptions of the species and the brilliant

colour pictures will enable you to determine most of the species without any problems. This book is indispensable for everyone interested in the European odonate fauna. Thanks KD and co-workers, Thanks Richard Lewington, Thanks dear publisher! (Martin Schorr)] Address: British wildlife Publishing, The Old Dairy, Milton on Stour, Gillingham, Dorset, SP8 5PX, UK

5894. Dijkstra, K.-D.; Suhling, F.; Müller, O. (2006): Review of the genus *Zygonoides*, with description of the larvae and notes on 'zygonychine' Libellulidae (Odonata). *Tijdschrift voor Entomologie* 149: 275-292. (in English). ["*Zygonoides* Fraser, 1957 – formerly considered a subgenus of *Olpogastra* Karsch, 1895 – is reinstated as a genus. It comprises *Z. fuelleborni* (Grünberg, 1902), *Z. fraseri* (Pinhey, 1956), *Z. lachesis* (Ris, 1912) and *Z. occidentis* (Ris, 1912). The latter was formerly considered a subspecies or form of *Z. fuelleborni*, but is found to be a good species near *Z. fraseri*. The larvae of *Z. fuelleborni*, *Z. fraseri* and *Z. occidentis* are described. Adult and larval characters are compared with those of the other 'zygonychine' genera *Celebothemis*, *Olpogastra*, *Onychothemis*, *Zygonychidium* and *Zygonyx*. Identification, distribution and ecology of the species are outlined." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5895. Dijkstra, K.-D. (2006): The *Atoconeura* problem revisited: taxonomy, phylogeny and bio-geography of a dragonfly genus in the highlands of Africa (Odonata, Libellulidae). *Tijdschrift voor Entomologie* 149: 121-144. (in English). ["The genus *Atoconeura* previously comprised two species; one with five subspecies. Principal Component Analysis of 33 characters of 148 specimens and cladistic analysis of 28 characters revealed six discrete taxa, partly with narrowly overlapping ranges. Subspecies *aethiopica*, *kenya* and *pseudeudoxia* of *biordinata* are raised to specific rank; the synonymy of *chirinda* with *biordinata* is confirmed; *A. luxata* sp. n. is described from West Africa. A key to the species is provided and the poorly known behaviour, ecology and biogeography are discussed. The author has not witnessed oviposition; one report suggests that it may be perched, solitary and epiphytic, which is unusual within the family. The species are largely restricted to streams above 1000 m, except *A. luxata* sp. n. that is only known below that altitude, but always at the foot of highlands. Four species demonstrate a distribution pattern recalling a 'ring species' in highlands, circling Lake Victoria and the dry north of Tanzania. The phylogeny suggests an expansion of the genus from the western lowlands to the eastern highlands, or vice versa, followed by an expansion through the Albertine Rift and Eastern Arc Mts to the Kenyan and ultimately Ethiopian highlands. Especially in the case of a western origin there appears to have been a tendency of the species to occur at increasing altitudes in the course of their evolution." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5896. Dijkstra, K.-D.B. (2006): Taxonomy and biogeography of *Porpax*, a dragonfly genus centred in the Congo Basin (Odonata, Libellulidae). *Tijdschrift voor Entomologie* 149: 71-88. (in English). ["The tropical African genus *Porpax* is revised, five species are recognised, including the new species *P. sentipes* from Congo-Kinshasa. All species are fully diagnosed for both sexes

and new records are included. A key to the species and illustrations of important characters are provided. The peculiarities of the genus are discussed, but little is known of its ecology. *P. garambensis* and *P. sentipes* sp. n. are confined to the Congo Basin, while *P. asperipes* is also present in the adjacent Lower Guinean forest. *P. risi* is spread out across highlands in south-central Africa. *P. bipunctus* is known from four disjunct rainforest regions from Liberia to eastern Congo and has different markings in each region. This distribution coincides with Africa's main rainforest refugia and is the best example of such disjunction seen in Afrotropical Odonata so far. The species' isolation appears to be linked to an ephemeral habitat, confining it to areas with perennial and predictable rainfall." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5897. Dijkstra K.-D.; Clausnitzer, V.; Vick, G.S. (2006): Revision of the three-striped species of *Phyllogomphus* (Odonata, Gomphidae). *Tijdschrift voor Entomologie* 149: 1-14. (in English). ["The taxonomy of the *Phyllogomphus* species occurring from Cameroon eastwards, characterised by three-striped sides of the thorax, has been confused by misinterpretation of the identity of the most widespread species, *P. selysi*, and substantial variation in the species. Of sixteen named taxa, only four are considered valid species after clarifying the identity of *P. selysi*, matching females to the correct males, and accounting for variation, particularly of size, colour and the morphology of the vulvar scale: *P. annulus* is not a synonym of the true *P. selysi* but of Fraser's interpretation of the latter species; *P. dundomajoricus* and *P. dundominusculus* are junior synonyms of *P. annulus*; *P. montanus*, *P. hartwigi*, *P. perisi* and *P. margaritae* of *P. coloratus*; *P. orientalis*, *P. edentatus*, *P. latifasciae*, *P. symoensi*, *P. brunneus* and *P. corbettae* of *P. selysi*. Keys to the species and distribution maps are provided, and the taxonomy of the genus is discussed." (Authors)] Address: Dijkstra, K.D., Gortestr. 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

5898. Donath, H. (2006): Blaüfögel-Prachtlibelle (*Calypteryx virgo* L.) besiedelt die Schuge. *Biologische Studien*, Luckau 35: 82-86. (in German). [The regional situation of *C. virgo* is outlined in some detail. Management of local running waters resulted in the colonisation by *C. virgo* of a few stretches along the river Schuge, Brandenburg, Germany. The factors enabling this recolonisation of the stream are discussed: primarily an alteration of the vegetation by shading.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

5899. Donath, H. (2006): Die Südliche Heidelibelle (*Sympetrum meridionale* (SELYS 1841)): Erstnachweis für das Land Brandenburg. *Biologische Studien*, Luckau: 86-87. (in German). [Records of *S. meridionale* from five localities in Brandenburg, Germany from August and September 2006 are documented. These are the first records for this Federal State.] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

5900. Dyatlova, E.S. (2006): *Orthetrum coerulescens anceps* (Odonata, Libellulidae) in Odessa and its vicinities (Ukraine). *Vestnik zoologii* 40(3): 275-278. (in Ukrainian, with English summary). ["The absence of *O. c. coerulescens* (Fabricius, 1798) and the presence of *O. c. anceps* (Schneider, 1845) in Odessa and its vicini-

ties are shown. Some morphological characteristics of males are discussed." (Author)] Address: Dyatlova, E.S., Frantsuzkij bul'var 37, kv. 3, UKR-65044 Odessa, Ukraine

5901. Ellenrieder, N. von; Muzón, J. (2006): The genus *Andinagrion*, with description of *A. garrisoni* sp. nov. and its larva from Argentina (Odonata: Coenagrionidae). *International Journal of Odonatology* 9(2): 205-223. (in English). ["This study includes the description of a new species of the genus *Andinagrion*, *A. garrisoni* (holotype: Argentina, Río Caldera, Salta prov., 11 xi 2005, deposited at MLP), both from its adult and larval stages, a diagnosis of all known species, including a key to adults, synonymic lists, illustrations of diagnostic characters, and distribution maps." (Authors)] Address: Ellenrieder, Natalie von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

5902. Esquivel, C. (2006): *Libélulas de Mesoamérica y el Caribe - Dragonflies and damselflies of Middle America and the Caribbean*. ISBN 9968-927-13-9: 319 pp. (in Bilingual in Spanish and English). ["With an estimated total of over 500 species, Middle America and the Caribbean is one of the richest dragonfly regions in the world. However, there is very little information about them available to the general reader. For the first time ever, this book presents easy-to-read descriptions of the morphology, habitat, behaviour, larvae, and geographical distribution of all the 16 families occurring here, plus accounts on the natural history of more than 75 of their commonest species illustrated with color-photos, some of them pictured for the first time. Also included is a user-friendly Illustrated Key to all the families of this region and up-to-date, per country lists of all the species. Given the wide geographical distribution of the species treated here, both scientists and amateurs working with odonates in North and South America will also find valuable, novel information in this book." (Publisher)] Address: INBio, Santo Domingo, Heredia, Costa Rica. www.inbio.ac.cr

5903. Evenhuis, N.L.; Polhemus, D.A. (2006): Checklist of Odonata of Fiji. *Bishop Museum Technical Report* 35(15): 3 pp. (in English). [45 species resp. 46 taxa are listed.] Address: Polhemus, D., Dept. of Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

5904. Feng, H.-Q.; Wu, K.-M.; Ni, Y.-X.; Cheng, D.-F.; Guo, Y.-Y. (2006): Nocturnal migration of dragonflies over the Bohai Sea in northern China. *Ecological Entomology* 31(5): 511-520. (in English). ["A sudden increase and subsequent sharp decrease of catches of dragonflies in a searchlight trap, with *Pantala flavescens* predominating, observed at Beihuang Island in the centre of the Bohai Gulf, in 2003 and 2004, indicated a seasonal migration of these insects over the sea during the night in China. The movements were associated with the onset of fog. 2. Simultaneous radar observations indicated that the nocturnally migrating dragonflies generally flew at altitudes of up to 1000 m above sea level, with high density concentrations at about 200-300 or 500 m; these concentrations were coincident with the temperature inversion. 3. During early summer, the dragonflies oriented in a downwind direction, so that the displacement direction varied between different altitudes. In contrast, during late summer, the dragonflies

were able to compensate for wind drift, even headwind drift, so as to orient south-westward no matter how the wind changed, and thus the displacement direction was towards the south-west. 4. The duration of flight, estimated from the variation of area density derived from radar data and hourly catches in the searchlight trap through the night, was about 9–10 h. The displacement speed detected using radar was $\sim 5\text{--}11\text{ m s}^{-1}$. Therefore, the dragonflies might migrate 150–400 km in a single flight. 5. The dragonflies were thought to originate in Jiangsu province and they migrated into north-east China to exploit the temporary environment of paddy fields in early summer. Their offspring probably migrated back south during late summer and autumn." (Authors)] Address: Wu, Kong-Ming, State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing 100094, PR China. E-mail: wkm@caas.cose.net.cn

5905. Fichet, V. (2006): Compte-rendu de l'excursion du 14 mai dans l'Avesnois "à la découverte d'*Epitheca bimaculata*". *Gomphus* 20(2): 39-40. (in French). [A large population of *E. bimaculata* is reported from an expedition to northern France.] Address: Fichet, Violaine, bservatoire de la Faune, de la Flore et des Habitats, Centre de Recherche de la Nature, des Forêts et du Bois, Avenue Maréchal Juin, 23, B-5030 Gembloux, Belgium. E-mail: V.fichet@mrw.wallonie.be

5906. Fichet, V. (2006): Compte-rendu des observations d'espèces prioritaires d'Odonates en Wallonie durant les saisons 2003, 2004 et 2005, dans le cadre du programme d'Inventaire et Surveillance de la Biodiversité (ISB). *Gomphus* 20(2): 13-28. (in French, with English and Dutch summaries). ["This report give an account of the observations made in 2003, 2004 and 2005 by the Gomphus Working Group collaborators about Odonata priority species, pointed out in the "Biodiversity Survey and Monitoring" program in Wallonie because of their great rarity and/or decline. It also present collected informations dealing with southern species. New populations were discovered for the following species: *Lestes virens*, *Sympetma fusca*, *Coenagrion hastulatum*, *C. mercuriale*, *C. pulchellum*, *Ceragrion tenellum*, *Aeshna subarctica*, *Brachytron pratense*, *Gomphus vulgatissimus*, *Somatochlora arctica*, *Libellula fulva*, *Orthemtrum coerulescens*, *Sympetrum pedemontanum*, and *Leucorrhinia pectoralis*. Moreover, new data on scarce southern species have been collected: *Lestes barbarus*, *Coenagrion scitulum*, *Aeshna affinis*, *Anax parthenope*, *Orthemtrum brunneum*, *Crocothemis erythraea*, and *Sympetrum fonscolombii*." (Author)] Address: Fichet, Violaine, bservatoire de la Faune, de la Flore et des Habitats, Centre de Recherche de la Nature, des Forêts et du Bois, Avenue Maréchal Juin, 23, B-5030 Gembloux, Belgium. E-mail: V.fichet@mrw.wallonie.be

5907. Finch, J.M.; Samways, M.J.; Hill, T.R.; Piper, S.E.; Taylor, S. (2006): Application of predictive distribution modelling to invertebrates: Odonata in South Africa. *Biodiversity and Conservation* 15(13): 4239-4251. (in English). ["The application of distributional modelling techniques to invertebrates has seldom been explored, primarily due to a lack in adequate distributional data for these taxa. Here, we have selected a simple modelling approach for the generation of distribution maps from a limited dataset, as a first step to the atlas-ing of Odonata in South Africa. The BIOCLIM-type ap-

proach was selected for this purpose, as it requires minimal data for model building and validation procedures. BIOCLIM partitions an area climatically prior to survey, and predicts species distributions on a bioclimatic basis. Conservative deterministic models were developed using point presence/absence data for each of the regions' 160 described species. These models were validated by cross-validation, and the Jaccard coefficient of similarity was used as an index of model performance. A sensitivity analysis investigated the influence of extreme values and errors in the data on predictive ability. Models identified disjunct distribution patterns and accurately predicted the restricted ranges of habitat-specialist species. However, models overstated the distribution of habitat generalists and species with distinct outlier records. For accurate predictions of broad-ranging species, it is suggested that a probabilistic approach be adopted. Nevertheless, basic distribution patterns generated through this conservative approach can be further applied to the investigation of species richness and issues relating to conservation, such as reserve design. The BIOCLIM-type approach provided a means of predicting species distributions, allowing for broad-scale atlassing and thereby providing the first step towards Odonata conservation in South Africa." (Authors)] Address: Finch, Jemma M., Discipline of Geography, University of KwaZulu-Natal, Scottsville, Pietermaritzburg, Private Bag X01, 3209, South Africa. Email: finch@sai.co.za

5908. Fishar, M.R.; Williams, W.P. (2006): A feasibility study to monitor the macroinvertebrate diversity of the River Nile using three sampling methods. *Hydrobiologia* 556: 137-147. (in English). ["The River Nile (Africa) is one of the world's major rivers. Its' catchment in Egypt has a population of 75,000,000. River flow is highly regulated and there are known discharges of pollutants. 1035 km of the river downstream of the Aswan high dam was studied to test the hypothesis that representative qualitative samples can be used to estimate macroinvertebrate biodiversity. Benthic macroinvertebrates are difficult to sample in large rivers and a reliable sampling strategy is required to evaluate their ecological status. Three methods for sampling have been investigated. Ekman Grab, macrophyte sweep netting and Artificial Substrate Samplers (ASS) were used to sample 15 sites from Aswan to Cairo between September 2001 and June 2002. Organisms were identified to species level where possible. Taxon accretion curves indicated that the all taxa present at a site should be collected using either 15 grab samples, 10 macrophyte samples or 5 ASS. The best time to sample was May–June. The biodiversity of macroinvertebrates in the Nile was recorded as 50 taxa with values of 7–31 at individual bank-side sites. Mid-stream biodiversity was much lower (0–19). Lowest biodiversity occurred at sites with known pollution inputs whilst highest occurred at sites with high levels of sedimentation. A regular programme for biomonitoring is recommended which will allow current status to be confirmed and future changes detected." (Authors) The mentioning in table 5 of *Neurocordulia* sp., *Amphiagrion* sp., *Plathemis* sp., *Perithemis* sp., and *Celithemis* sp. indicates that from an odonological point of view this study is not very useful.] Address: Williams, P., Department of Life Sciences, King's College, University of London, Franklin Wilkins Building, 150 Stamford Street, SE1 9NN, UK. E-mail: peter.williams@kcl.ac.uk

5909. Fleck, G.; Brenk, M.; Misof, B. (2006): DNA Taxonomy and the identification of immature insect stages: the true larva of *Tauriphila argo* (Hagen 1869) (Odonata: Anisoptera: Libellulidae). *Ann. soc. entomol. Fr.* (n.s.) 42(1): 91-98. (in English, with French summary). ["For many insect taxa, larval morphology plays a decisive role in various fields like taxonomy, phylogeny or ecology. However, species identification is usually based on imaginal characters and the identification of larvae depends upon an established link to unequivocally identified imagines. This taxonomic correspondence of larvae and imagines is far from being established in many odonate species. We have employed a molecular approach to link larval and adult specimens in *Tauriphila argo* (Hagen, 1869). The sequenced mt SSU gene fragments of the reared female, supposedly a *T. argo* female, and a clearly identified male specimen of the species were identical. However, the larva of the reared female clearly differed from the described *T. argo* larva, previously matched to the species. From this observation, we conclude that the previously described larva of *T. argo* does not belong to this species because of too many phenotypic differences that far exceed the generally observed intraspecific variation. It can be foreseen that the molecular approach will prove to be effective in identifying unknown larvae in many insect species. Additionally, the discrimination of sibling species or the linkage of allotypes and holotypes will become feasible with this approach." (Authors)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

5910. Flenner, I.; Olne, K. (2006): Differences in exocuticle thickness in *Leucorrhinia dubia* (Odonata) larvae from habitats with and without fish. Halmstad University, School of Business and Engineering, Degree project in Biology 10p, Supervisor: Göran Sahlén, 2006-05-31: 14 pp. (in English). ["Many prey species are able to develop different morphological structures as defence against for example predators. Some of these structures are induced only by individuals exposed to a predator. This phenomenon is called phenotypic plasticity. In this paper we examine whether cuticle thickness in *L. dubia* larvae differed between specimens caught in fish containing lakes and fish-free lakes respectively. We measured the thickness of the cuticle from four different parts of the larvae; profemur, pronotum, ninth segment sternite and ninth segment tergite. Our results showed a significantly thicker exocuticle on profemur in larvae with a head width bigger than 4.5 mm caught in lakes with fish. The smaller larvae showed a tendency to have thinner exocuticle on profemur in presence of fish. We discuss the probability that the differences in exocuticle thickness on profemur could be some kind of trade-off situation. The results also showed a tendency among the large larvae; the large individuals from lakes containing fish had a slightly thicker exocuticle on pronotum than the bigger individuals from fish-free lakes." (Authors) For the full paper see: <http://dSPACE.HH.se/dspace/bitstream/2082/422/1/C-uppsatspdf.pdf>] Address: not stated

5911. Fliedner, H. (2006): Die wissenschaftlichen Namen der Libellen in Burmeisters 'Handbuch der Entomologie'. *Virgo - Mitteilungsblatt des Entomologischen Vereins Mecklenburg e.V.* 9: 5-23. (in German). ["This paper gives some information on the odonatological activities of Hermann Burmeister (1807-1897) and his sources and explains the meaning of the actual scienti-

fic names of the dragonflies, which are described in his 'Handbuch der Entomologie, Vol. II'. " (Author) An English version of the paper is available from the author.] Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany. E-mail: H.Fliedner@t-online.de

5912. Frank, M. (2006): Erstfund der Feuerlibelle (*Crocothemis erythraea*) in Mecklenburg-Vorpommern (Odonata, Libellulidae). *Virgo, Mitteilungsblatt des entomologischen Vereins Mecklenburg* 9(1): 69-70. (in German). [Schönberg, Mecklenburg-Vorpommern, Germany; the northern most German record of *C. erythraea* dated 31-VII - 03-VIII 2006 is discussed.] Address: Frank, M., Lion-Feuchtwanger-Str. 25, 55129 Mainz, Germany. E-mail: mikel.frank@gmx.de

5913. Garrison, R.W. (2006): A synopsis of the genera *Mnesarete* Cowley, *Bryoplathanon* gen. nov., and *Ormenophlebia* gen. nov. (Odonata: Calopterygidae). *Contributions to Science, Natural History Museum of Los Angeles County* 506: 1-84. (in English, with Spanish summary). ["This synopsis of the exclusively South American genus *Mnesarete* includes keys to both sexes based primarily on morphology of the caudal appendage in males and the posterior margin of the prothorax and intersternite in females, diagnoses, distribution maps, and diagnostic illustrations. Two new genera, *Bryoplathanon* (type species: *Lais globifer* Hagen in Selys) and *Ormenophlebia* (type species: *Lais imperatrix* McLachlan) are described. The following nomenclatural changes are proposed: *M. regina* (Ris), *M. rollinoti* (Martin), and *M. saltuum* (Ris) are transferred to *Ormenophlebia*; and *Hetaerina borchgravi* Selys and *H. fuscibasis* Calvert are transferred to *Mnesarete*. Seven new species (*M. drepane*, *M. epibippium*, *M. lencionii*, *M. loutoni*, *M. machadoi*, *M. rhopalon*, and *M. williamsoni*) are described. A generic key to all New World Calopterygidae and a discussion of the generic concepts of *Hetaerina* and the 24 species of *Mnesarete* are presented, and descriptions for the last larval stadium of *M. grisea* and *O. imperatrix* are provided." (Author)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5914. Garrison, R.W.; Ellenrieder, N. von; Louton, J.A. (2006): Dragonfly genera of the New World. An illustrated and annotated key to the Anisoptera. The John Hopkins University Press, Baltimore: vii + 368pp. (in English). [Until now there has been no reliable means to identify the New World genera of Odonata. Now, this volume provides fully illustrated and up-to-date keys for all anisopteran genera with descriptive text for each genus, accompanied by more than 1,600 diagnostic illustrations, including wing patterns and characteristics of the genitalia, and 124 distribution maps, and covering all genera of Anisoptera occurring in North, Middle, and South America. A brief introduction into morphology of Anisoptera with excellent drawings of all morphologically relevant structures necessary to use this book, is followed by a key to the anisopteran families. Following this, each family is briefly characterized by distribution areal, number of known genera and species, and diagnostic characters. The status of family classification is compiled, indicating the current status of the discussion on its phylogenetic position. On the genus basis males and females are keyed separately. Then, each genus is briefly introduced by all information necessary

for nomenclature and taxonomic work, and listing all known species. This is followed by key references, and the distribution of the genus, including a map. The genus is described in detail using morphological structures which are illustrated. This is followed by identifying the "unique characters" of the genus. The current status on phylogenetic classification is outlined, also the potential for new species. The genus section is closed by condensed information on the habitat of the species. The volume ends with an extensive bibliography, a list of the 1626 figures with locality information, and a table with distribution information on genera by country. *Dragonfly Genera of the New World* is a beautifully illustrated and comprehensive guide to the taxonomy and ecology of dragonflies in North, Central, and South America. A reference of the highest quality, this book reveals their striking beauty and complexity. It is a real monumental work on odonate taxonomy and identification, and indispensable for every one working with the Odonata of the Americas. A great book. Congratulation to the authors!!! (Martin Schorr) Address: The John Hopkins University Press, 2715 North Charles Street, Baltimore, Maryland 21218-4363, USA. www.press.jhu.edu

5915. Garrison, R.W.; Ellenrieder, N. von (2006): Generic diagnoses within a closely related group of genera: *Brechmorhoga*, *Gynothemis*, *Macrothemis*, and *Scapania* (Odonata: Libellulidae). *Canadian Entomologist* 138(3): 269-284. (in English, with French and Spanish summaries). ["Based on examination of most species of *Brechmorhoga*, *Gynothemis*, *Macrothemis*, and *Scapania*, these four genera are re-diagnosed, resulting in the following taxonomic changes: *Brechmorhoga archboldi* (Donnelly, 1970) comb. nov., *Gynothemis pumila* (Karsch, 1890) comb. nov., *Macrothemis heteronycha* (Calvert, 1909) comb. nov., and *Macrothemis calliste* (Ris, 1913) comb. nov. The male of *M. calliste* is described and illustrated for the first time." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

5916. Gassmann, D. (2006): *Artenvielfalt philippinischer Libellen*. *Naturwissenschaftliche Rundschau* 59 (11): 617-618. (in German). [Brief account on the biogeography of the Philippinean (odonate) fauna, endemism, and threat of odonate biodiversity.] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

5917. Ghose, K.; Horiuchi, T.K.; Krishnaprasad, P.S.; Moss, C.F. (2006): Echolocating bats use a nearly time-optimal strategy to intercept prey. *PLoS Biology* 4(5) (e108): 865-873. (in English). ["Acquisition of food in many animal species depends on the pursuit and capture of moving prey. Among modern humans, the pursuit and interception of moving targets plays a central role in a variety of sports, such as tennis, football, Frisbee, and baseball. Studies of target pursuit in animals, ranging from dragonflies to fish and dogs to humans, have suggested that they all use a constant bearing (CB) strategy to pursue prey or other moving targets. CB is best known as the interception strategy employed by baseball outfielders to catch ballistic fly balls. CB is a time-optimal solution to catch targets moving along a straight line, or in a predictable fashion—such as a ballistic baseball, or a piece of food sinking in

water. Many animals, however, have to capture prey that may make evasive and unpredictable maneuvers. Is CB an optimum solution to pursuing erratically moving targets? Do animals faced with such erratic prey also use CB? In this paper, we address these questions by studying prey capture in an insectivorous echolocating bat. Echolocating bats rely on sonar to pursue and capture flying insects. The bat's prey may emerge from foliage for a brief time, fly in erratic three-dimensional paths before returning to cover. Bats typically take less than one second to detect, localize and capture such insects. We used high speed stereo infra-red videography to study the three dimensional flight paths of the big brown bat, *Eptesicus fuscus*, as it chased erratically moving insects in a dark laboratory flight room. We quantified the bat's complex pursuit trajectories using a simple delay differential equation. Our analysis of the pursuit trajectories suggests that bats use a constant absolute target direction strategy during pursuit. We show mathematically that, unlike CB, this approach minimizes the time it takes for a pursuer to intercept an unpredictably moving target. Interestingly, the bat's behavior is similar to the interception strategy implemented in some guided missiles. We suggest that the time-optimal strategy adopted by the bat is in response to the evolutionary pressures of having to capture erratic and fast moving insects." (Authors) The paper is available at: <http://biology.plosjournals.org/archive/1545-7885/4/5/pdf/10.1371journal.pbio.0040108-S.pdf> Address: Ghose, K., Neuroscience and Cognitive Science Program, University of Maryland, College Park, Maryland, USA. E-mail: kaushik.ghose@gmail.com

5918. Giere, S.; Hadrys, H. (2006): Polymorphic microsatellite loci to study population dynamics in a dragonfly, the libellulid *Trithemis arteriosa* (Burmeister, 1839). *Molecular Ecology Notes* 6(3): 933-935. (in English). ["One of the most widely distributed dragonfly species in Africa is the red-veined-drooping *Trithemis arteriosa*. It is an indicator for permanent water bodies, which are freshwater ecosystems of high environmental value especially in arid regions. For studies to determine population structures, assess species viability and monitor environmental changes, a panel of 10 polymorphic microsatellite loci was developed. The number of alleles per locus ranged from four to 12, with an observed heterozygosity ranging from 0.149 to 0.843." (Authors)] Address: Hadrys, Heike, ITZ, Ecology and Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

5919. Glotzhober, R.C. (2006): Life history studies of *Cordulegaster erronea* Hagen (Odonata: Cordulegasteridae) in the laboratory and the field. *Bulletin of American Odonatology* 10(1): 1-18. (in English). ["The life history of *C. erronea* was studied for ten years utilizing field observations of adults and both field and laboratory studies of larvae. The documented adult flight period in Ohio is from 1 June to 3 September. Adult patrolling and larval habitat utilized consists of persistent but very narrow and shallow headwater streams, fed by seeps or springs in densely forested areas. Stream areas utilized have no fish and almost no other Odonata. The only aquatic predators observed were salamander larvae and an occasional very small crayfish. Adult males patrol regular beats during the heat of mid-day, flying low over the streamlets. Multiple males patrol the same streamlets. Adult females are uncommonly seen on the

streams. Oviposition was observed between 18 June and 2 August and females made up to 370 oviposition thrusts in a single event. The author was able to establish criteria to recognize larval instars between F0 and F4 with a 92% confidence level. The larval period appears to be typically three to four years long. Some discussion and tentative hypothesis are made concerning egg development, but there is a need for direct study of the timing of hatching." (Author)] Address: Glotzhober, R., Ohio Natural history society, 1982 Velma Ave., Columbus OH 43211-2497, USA. E-mail: bglotzhober@ohiohistory.org

5920. Goffart, P.; Paternoster, T. (2006): Redécouverte du Leste verdoyant (*Lestes virens*) en Wallonie. *Gomphus* 20(2): 29-38. (in French, with English and Dutch summaries). ["A small population of *Lestes virens* has been found in the Hainaut county, Belgium during the summer 2005 (July to September), after more than 50 years without certified record of the species in Wallonia. It is established on three oligotrophic and acid pools on a sandy substrate lying within the forest massif to the north of the Haine valley (often called "Campine hennuyère"). Counts' tentatives gave a maximum of 14 males and 7 females, namely 21 individuals, on the 31th of August. All the females were grasped by male in tandem position and where egg-laying in *Juncus effusus* twig tips. One recently emerged male has been observed on the 11th of July. This population might have been present since a long time and been overlooked despite former prospects. Though less probable a priori, it could also result of a recent colonisation event, from populations living in neighbouring regions. The closest known, in Flanders and France, lie however at a distance of one hundred kilometres from the Hainaut site, but other populations could have been overlooked in a shorter radius." (Authors)] Address: Goffart, P., Observatoire de la Faune, de la Flore et des Habitats, Centre de Recherche de la Nature, des Forêts et du Bois, Avenue Maréchal Juin, 23, 5030 Gembloux, Belgium. E-mail: p.goffart@mrw.wallonie.be

5921. Grebe, B.; Hofland, R.; Rodenkirchen, J. (2006): Neue Nachweise von *Coenagrion scitulum* in Nordrhein-Westfalen (Odonata: Coenagrionidae). *Libellula* 25(1/2): 19-26. (in German, with English summary). ["More than 40 years after the first record in 1961, *C. scitulum* has been rediscovered in North Rhine-Westphalia, Germany. New records are reported from the Nonnenbach valley in the northern Eifel in 2002, and from the Neffelbach valley near Zülpich where the species was observed several times in 2005. The new localities are in the southern part of the country, at a distance of approximately 35 km between them. Unlike historical observations in Germany, which all comprised only one individual at a time, several males and ovipositing tandems were observed. Current records of *C. scitulum* from Belgium, Luxembourg and The Netherlands indicate that the sp. is expanding northwards in western Europe. Hence, an increased occurrence of *C. scitulum* in Germany and its permanent settlement in suitable habitats seems to be in prospect." (Authors)] Address: Grebe, B., Oberdorfallée 7a, D-53909 Zülpich, Germany. E-mail: burkhard.grebe@t-online.de

5922. Günther, A. (2006): Reproductive behaviour of *Neurobasis kaupi* (Odonata: Calopterygidae). *International Journal of Odonatology* 9(2): 151-164. (in English). ["The reproductive behaviour of *Neurobasis kaupi* was

studied for the first time in Central and South Sulawesi. The species was recorded in a wide variety of clear and fast flowing creeks, streams and rivers, mostly in forested areas. The males were territorial and defended potential oviposition sites, a limited resource. Territory owners demonstrated their presence by brief synchronized flashings of their hindwings as well as by regular inspection flights. Intruders were first driven off by short chasing flights. Longer lasting conflicts led to three different types of threatening flights, depending on the number of males involved and the level of excitation. As in other Calopterygidae males of *N. kaupi* led receptive females to potential oviposition sites. In courtship flight the male presented the upper sides of his stationary, depressed, quivering hindwings, with the hind margins broadly touching the water surface. Oviposition substrates were mostly submerged floating root mats or plants, optimally floating loosely at a depth of 5-15 cm below the water surface. The general patterns of behaviour of *N. kaupi* correspond to the known behaviour of other *Neurobasis* species. However, within this general framework there are clear differences between this species and others, especially *N. chinensis*." (Author)] Address: Günther, A., TU Bergakademie Freiberg, AG Biologie/Ökologie, Leipziger Str. 29, 09599 Freiberg, Germany. E-mail: andre.guenther@ioez.tu-freiberg.de

5923. Günther, A.; Olias, M.; (2006): Rote Liste Libellen Sachsens. Sächsisches Landesamt für Umwelt und Geologie (Ed.) Materialien zu Naturschutz und Landschaftspflege: 22 pp. (in German). [Sachsen, Germany; red list of Odonata.] Address: Herausgeber: Sächsisches Landesamt für Umwelt und Geologie, Zur Wetterwarte 11, 01109 Dresden, Germany. E-Mail: Abteilung4@lflug.smul.sachsen.de

5924. Gupta, N.; Anthwal, A.; Bahuguna, A. (2006): Biodiversity of Mothronwala Swamp, Doon Valley, Biodiversity of Mothronwala Swamp, Doon Valley, Uttarakhand. *The Journal of American Science*, 2(3): 33-40. (in English). [India; "Enallagma" and "Agrion" are listed.] Address: Gupta, N., Ecology and Environment Division, Forest Research Institute, Dehradun, Uttarakhand, 248006, India. E-mail: nutangupta100@rediffmail.com

5925. Hacet, N.; Aktaş, N. (2006): The Odonata of Gökçeada Island, Turkey: a biogeographical assessment. *Entomological news* 117(4): 357-368. (in English). ["This study was conducted in the years 1998, 1999 and 2003, and it is the first one on the Odonata fauna found in Gökçeada Island (northern Aegean Sea, Turkey). During the study period, 29 taxa were collected, or observed, and identified. One of the species observed on Gökçeada Island, *Lindenia tetraphylla*, is also found on the mainland of Turkey (Anatolian Peninsula, but only in five areas, Köyceğiz, Marmaris, Adıyaman, Sanliurfa and N of Hatay). As far as Aegean islands are concerned *L. tetraphylla* is found only in Island Thasos. *Onychogomphus forcipatus albotibialis* and *Pantala flavescens*, whose distribution range in the Aegean Islands is unclear, are other zoogeographically noteworthy records. Biogeographical data is congruent with island biogeography theory (Mac Arthur and Wilson, 2001)." (Authors)] Address: Aktaş, N., Trakya University, Faculty of Arts and Sciences, Department of Biology, Tr-22030 Edirne, Turkey. E-mails: nhacet@hotmail.com; nihata@trakya.edu.tr

- 5926.** Hämäläinen, M.; Sasamoto, A.; Karube, H. (2006): Description of *Devadatta cyanocephala* sp. nov. from Vietnam (Zygoptera: Amphipterygidae). Tombo 48: 1-6. (in English). ["A new amphipterygid damselfly species, *Devadatta cyanocephala* sp. nov. (holotype male from Vietnam, Thua Thien Hue Province, Bach Ma), is described and illustrated in both sexes and compared with other In-dochinese taxa in the genus." (Authors)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi
- 5927.** Hall, M. (2006): Dragonflies. Capstone Press. Mankato. ISBN 0-7368-4252-7: 24 pp. (in English). [Book for children resp. first reading.]
- 5928.** Hansch, W.; Mailänder, S.; Riexinger, W.D.; Rosendahl, W.; Simon, T. (2006): Frankenbacher Schotter. Die Kiesgrube Ingelfinger als Geotop und Biotope - ein geplantes Naturschutzgebiet bei Heilbronn. ISBN-10: 3-00-019821-0: 46 pp. (in German). [The dragonflies are treated on pages 32 / 33; ten species are noted.] Address: Riexinger, S., Stadt Heilbronn, PF 3440, D-74024 Heilbronn, Germany. E-mail: Wolf-Dieter.Riexinger@stadt-heilbronn.de
- 5929.** Hayashi, M.; Fujiwara, J.; Shimada, T.; Yoneda, Y.; Muguruma, K.; Narita, Y. (2006): A list of insects collected from Dogo, Oki Islands, Shimane Prefecture, Japan, with notes on new records of Coleoptera and the Other Orders from the Island. Bull. Hoshizaki Green Found. 9: 245-263. (in Japanese, with English summary). [A survey from the first decade of August 2005 resulted in 305 insect species including *Paracercion calamorum*, *P. sieboldii*, and *Anotogaster sieboldii*.] Address: Hayashi, M., Hoshizaki Green Foundation, Okinoshima, 1659-5, Sono, Izumo, Shimane Pref., 691-0076, Japan
- 5930.** Hayashi, M. (2006): Aquatic Insects of Syakunouchi Park, Un'nan City, Shimane Prefecture, Japan. Bull. Hoshizaki Green Found. 9: 113-119. (in Japanese, with English summary). [42 species of aquatic insects were recorded from seven sites including 10 odonate species] Address: Hayashi, M., Hoshizaki Green Foundation, Okinoshima, 1659-5, Sono, Izumo, Shimane Pref., 691-0076, Japan
- 5931.** Heckman, C.W. (2006): Encyclopedia of South American Aquatic Insects: Odonata - Anisoptera. ISBN: 978-1-4020-4801-2 : VIII, 725 pp. ["Anisoptera, the first of two volumes on the Odonata in the series Encyclopedia of South American Aquatic Insects, encompasses the large dragonfly species. A brief review of the biology of the group includes illustrations of the main morphological features as well as explanations of alternative systems for naming the wing veins and other structures. The review is then followed by keys to facilitate identification of the adult dragonflies and the known larvae, allowing the user a high probability of identifying his specimens correctly. In addition to anatomical features, the keys include the known ranges of the species, synonyms, and citations of literature in which more information about each individual species can be obtained. These citations are compiled in an extensive bibliography. To provide the user with the best possible opportunity to distinguish the species, the keys are richly illustrated with pen and ink drawings of thousands of individual morphological structures, arranged in 797 figures." (Publisher)]
- 5932.** Herbrecht, F.; Dommange, J.-L. (2006): Sur le développement larvaire d'*Oxygastra curtisii* (Dale, 1834) dans les eaux stagnantes (Odonata, Anisoptera, Corduliidae). *Martinia* 22(2): 89-94. (in French, with English summary). [Compilation of old (literature) and new records with reproduction of *O. curtisii* in stagnant waterbodies.] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 5933.** Hernandez, K.M.; Reece, B.A.; McIntyre, N.E. (2006): Effects of anthropogenic land use on Odonata in Playas of the southern high plains. *Western North American Naturalist* 66(3): 273-278. (in English). ["Playas are ephemeral wetlands that are the only source of aboveground freshwater in the southern Great Plains, making them of vital importance to aquatic and amphibious animals. Playas are also highly threatened from anthropogenic land use (chiefly agriculture, which decreases hydroperiod through increased sedimentation). We examined community structure of adult odonates (dragonflies and damselflies) in playas differing in the 2 main regional forms of surrounding land use (cropland vs. grassland). Analysis of odonate diversity revealed high overlap between cropland and grassland playas. Traditional species-area theory did not fit observed patterns, as there appears to be a threshold playa size that supports maximal odonate diversity; this nonlinear response may reflect a tradeoff between hydroperiod and availability of emergent vegetation that is required for perching and oviposition. Since agriculture effectively reduces playa depth but not size of the overall playa watershed, this may mean that cropland playas serve as "ecological traps." This property has important implications for regional odonate diversity." (Authors)] Address: McIntyre, Nancy, Dept of Biological Sciences, Purdue University, 915 W State St, West Lafayette, IN 4790, USA; E-mail nancymcintyre@ttuedu
- 5934.** Hoang, D.H.; Bae Y.J. (2006): Aquatic insect diversity in a tropical Vietnamese stream in comparison with that in a temperate Korean stream. *Limnology* 7: 45-55. (in English). ["A comparative investigation on aquatic insect diversity was conducted in a tropical stream in Southeast Asia (the Dak Pri stream in southern Vietnam; stream orders II-V, two sites per stream order) with a reference temperate stream in Northeast Asia (the Gapyeong stream in central Korea) in March 2001 and April 2000, respectively. The numbers of aquatic insect taxa in Dak Pri stream (268 species, mostly undescribed, 230 genera, 91 families, and 9 orders; 110.5 ± 17.1 species per site) were about twice those in Gapyeong stream (133 species, 98 genera, 51 families, and 8 orders; 60.3 ± 8.5 species per site). Coleoptera, Trichoptera, Ephemeroptera, and Diptera were the major aquatic insect orders with high taxonomic richness, and Coleoptera, Odonata, and Hemiptera contributed to the higher degree of aquatic insect diversity in Dak Pri stream. The species diversity indices of Dak Pri stream (4.37 ± 0.19) were higher than those of Gapyeong stream (3.73 ± 0.42), whereas the dominance indices of Dak Pri stream (0.195 ± 0.046) were lower than those of Gapyeong stream (0.346 ± 0.113). Collector-gatherers were predominant in both streams; shredders were more abundant in Dak Pri stream while scrapers were more abundant in Gapyeong stream. Factors affecting the higher degree of aquatic insect diversity in Dak Pri stream are discussed." (Authors) Odonata are identified on the genus level.] Address: Bae, Yeon Jae, Department of Biology, Seoul Women's University, 126

Gongneungdong, Nowon-gu, Seoul 139-774, Korea. E-mail: yjbae@swu.ac.kr

5935. Hölker, M.; Wagner, T. (2006): Nahrungsökologie der Wiesenweihe *Circus pygargus* in der ackerbaulich intensiv genutzten Feldlandschaft der Hellwegbörde, Nordrhein-Westfalen. *Vogelwelt* 127: 37-50. (in German, with English summary). [Germany, Nordrhein-Westfalen; A population of *C. pygargus* (Aves) was studied between 1993 and 2002. Only in 2000 a single "Aeshna spec." was among the prey observed.] Address: Hölker, M., Auf'm Alten Garten 17, D-595005 Bad Sassendorf, Germany. E-mail: manfredhoelker@freenet.de

5936. Hooper, I.R.; Vukusic, P.; Wootton, R.J. (2006): Detailed optical study of the transparent wing membranes of the dragonfly *Aeshna cyanea*. *Optics Express* 14(11): 4891-4897. (in English). ["The optical properties of transparent single membranes on the wings of *A. cyanea* have been investigated. These membranes comprise one central thick cuticular layer covered dorsally and ventrally with typical odonatan wax pruinosity. Optical characterisation of individual membranes reveals they can support optical guided modes comprising differential polarisation reflection. We suggest this may offer an intraspecific signalling channel. The guided modes' characteristics depend on membrane thickness and the nature of the wax pruinosity. We accurately modelled multiple optical data sets simultaneously, thereby inaugurally quantifying the roughness of the pruinosity and the complex refractive indices of the wax and the odonatan cuticle." (Authors)] Address: Hooper, I.R., School of Physics, University of Exeter, Exeter, EX4 4QL, UK. e-mail: i.r.hooper@exeter.ac.uk

5937. Hoshizaki Green Foundation (2006): Records on Invertebrate and Vertebrate of Reservoirs in Hirata Area, Izumo City, Shimane Prefecture, Japan. *Bull. Hoshizaki Green Found* 9: 1-12. (in Japanese, with English summary). [Between 2001 and 2003, 214 reservoirs in Hirata Area, Izumo City, Shimane Prefecture, Japan were surveyed. The list includes 35 odonate taxa, 5 of them are briefly commented: *Trigomphus melampus*, *Oligoaeschna pryleri*, *Aeschnophlebia longistigma*, *Aeshna nigroflava*, *Anaciaeschna martini*, and *Epitheca marginata*.] Address: Hoshizaki Green Foundation, Okinoshima, 1659-5, Sono, Izumo, Shimane Pref., 691-0076, Japan

5938. Hottenbacher, N.; Koch, K. (2006): Influence of egg size on egg and larval development of *Sympetrum striolatum* at different prey availability (Odonata: Libellulidae). *International Journal of Odonatology* 9(2): 165-174. (in English). ["Egg size differences might have an important influence on reproductive success because they may lead to different offspring conditions, hatching date or larval size. We presumed that egg size in odonates positively correlates with egg development time, and larger eggs lead to larger larvae. However, we assumed that the size benefit could only be maintained under harsh, but not under good conditions. Harsh and good conditions were simulated by different diets with specific feeding intervals; high prey level fed every day, low prey level fed every second day. The prey organisms used were *Artemia salina* and *Chironomus riparius*. The study was conducted with the libellulid *Sympetrum striolatum*. Our results showed that larger eggs caused a longer development time. Larger eggs resul-

ted in significantly larger first instar larvae. However, larger larvae maintained their size benefit only in the high prey level with *C. riparius*. We found no significant differences between low prey and high prey level within the two prey types. We therefore assume that the differences between the two prey levels in this study were not large enough. In general, *A. salina* seems to be more nutritious than *C. riparius* for the first larval stadia." (Authors)] Address: Hottenbacher, N., Zoologisches Institut, Technische Universität Braunschweig, Spielmannstraße 8, 38102 Braunschweig, Germany. E-mail: n.hottenbacher@tu-bs.de

5939. Hovmöller, R. (2006): Molecular phylogenetics and taxonomic issues in dragonfly systematics (Insecta: Odonata). Doctoral thesis. Stockholm University, Department of Zoology. ISBN: 91-7155-282-0: VI, 59 pp. (in English, with Swedish summary). ["Dragonflies (Odonata) are one of the ancestral groups of extant insects. They represent one of the three most basal branches in the phylogeny of winged insects. The other two groups are the Ephemeroptera, mayflies, and Neoptera, the latter which covers the remaining winged insects. The first paper is about the phylogenetic position of Odonata in relation to the other basal insect clades using 18S and 28S rDNA sequences. It was demonstrated that there are under certain parameters a strong statistical support for a sister-group relationship between Odonata and Neoptera forming the group Palaeoptera. The second paper is about the phylogeny of the Holarctic dragonfly *Leucorrhinia*. Dragonfly larvae are frequently equipped with spines on the abdomen, with great variation in spinyness between species. From an analysis of sequences of ITS and 5.8S rDNA it was found that spines have been lost at least twice in *Leucorrhinia*, in the European *L. rubicunda* and again in a clade of North American species. The third paper is on the subfamily Ischnurinae (Odonata: Coenagrionidae), a group dominated by the two larger genera *Ischnura* and *Enallagma* along with several mono- or oligotypic genera. From the presented molecular study, using mitochondrial 16S rDNA and COII sequences, it is demonstrated that Ischnurinae, and *Ischnura* are monophyletic. *Enallagma* is not monophyletic, and the genus name *Enallagma* should be restricted to the *E. cyathigerum* clade. The fourth paper is a catalogue of the genus *Coenagrion*, with full information on synonymy, type material and bibliographical data. The fifth paper is an appeal to the International Commission on Zoological Nomenclature to suppress the genus group name *Agrion*. The letter of appeal elucidates the priority of *Agrion*, and demonstrates why it has fallen out of use. A case if made for why *Agrion* should be placed on the list of unavailable names, and *Calopteryx* given full validity." (Author)] Address: Hovmöller, R., Dept of Entomology, Swedish Museum of Natural History and Dept of Zoology, Stockholm University, P.O. Box 500 07, 10405 Stockholm, Sweden

5940. Hunger, H.; Schiel, F.-J. (2006): Rote Liste der Libellen Baden-Württembergs und der Naturräume, Stand November 2005 (Odonata). *Libellula Suppl.* 7: 3-14. (in German, with English summary). ["The herewith presented Red List of the Odonata of Baden-Württemberg, Germany and its biogeographic regions is based on digital data analyses of about 80.700 data sets and the classification method of the German Federal Agency for Nature Conservation. Compared to the previous version of the Red List, the number of species

listed has declined considerably. The reasons for this have to be discussed carefully and can be contributed to three main factors: First, the classification method has become more objective and more concise; second, increased knowledge about some species leads to a more optimistic evaluation of their population vulnerability; and third, the improved water quality of rivers has simultaneously led to an improved habitat quality. Nevertheless, the Red List of Odonata of Baden-Württemberg still includes more than half of the species, with two species being extinct, 12 critically endangered and 11 endangered." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INU-LA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

5941. Hunger, H.; Schiel, F.-J.; Kunz, B. (2006): Verbreitung und Phänologie der Libellen Baden-Württembergs (Odonata). *Libellula Suppl.* 7: 15-188. (in German, with English summary). ["Distribution maps for all Odonata species currently or formerly known from the German federal state of Baden-Württemberg are presented in an ordinance map grid resolution of ca 6 x 6 km for the periods 1980-1995 and 1996-2005. The seasonal activity pattern of each species is shown as a diagram in 10-day-periods, with differentiation between observations of imagines, observations of reproductive activities, and records of exuviae or emergence. The vertical distribution is, likewise, differentiated between the described observation types, and shown in a diagram with 100-m-classes. The steps towards the Red List category assigned to each species are made transparent by tables. Short descriptions of preferred habitat, noteworthy observations in the five biogeographical regions, and the situation with special respect to the Red List status, vertical distribution, and phenology are given for each species." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INU-LA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

5942. Inberga-Petrovska, S.S. (2006): Sparu daudzveidiba. <http://www.biosfera.gov.lv/docgef/SabMR101-117-spares.pdf>: 16 pp. (in Latvian). [At <http://www.biosfera.gov.lv/indexEng.htm> (<http://www.biosfera.gov.lv/docgef/SabMR101-117-spares.pdf>) an identification key for the dragonflies of the North Vidzeme Biosphere Reserve, Latvia is available.]

5943. Jakubik, B.; Kufel, L.; Lewandowski, K. (2006): Macrobenthos differentiation among ox-box lakes of the river Bug within the Bug River Valley Landscape Park. *Teka Kom. Ochr. Kszt. Środ. Przyr.* 3: 55-59. (in English, with Polish summary). [With focus on Mollusca, the macrozoobenthos of six ox-bow lakes of varied hydrological regimes - ranging from lakes connected with the river to lakes isolated from the channel - was studied in the Bug River floodplain, NE Poland. Odonata are treated on the sub-order level.] Address: Jakubik, Beata, Inst. Biol., Univ. Podlasie, B. Prusa str. 12., PL-08-110 Siedlce, Poland. E-mail: bjakubik@ap.siedlce.pl

5944. Jara, F.G.; Perotti, M.G. (2006): Variación ontogenética en la palatabilidad de los renacuajos de *Bufo spinulosus papillosus* Philippi, 1902 (Anura, Bufonidae). *Cuadernos de Herpetología* 19(2): 37-42. (in Spanish, with English summary). ["We evaluated the ontogenetic variation in the palatability of *B. spinulosus papillosus* tadpoles exposed to odonate larvae of *Rhinoaeshna*

variegata. We exposed tadpoles to direct predation and determined the number of consumed tadpoles in 4 developmental categories. *B. spinulosus papillosus* tadpoles of categories I (stages 24-26) and II (stages 32-34) were unpalatable, while categories III (stages 38-40) and IV (stages 42-45) were progressively palatable. We observed a post-capture rejection behavior when they caught unpalatable tadpoles in categories I and II. The palatability pattern observed in *B. spinulosus papillosus* was different from related *Bufo* species (Brodie & Formanowicz, 1987; Kehr & Schnack, 1991; Lawler & Hero, 1997)."] Address: Jara, F.G., Laboratorio de Fotobiología, CRUB-UNCOMA (CONICET), Quintral 1250, (8400) San Carlos de Bariloche, Río Negro, Argentina. E-mail: fjara@crub.uncoma.edu.ar

5945. Johansson, F.; Englund, G.; Brodin, T.; Gardfjell, H. (2006): Species abundance models and patterns in dragonfly communities: effects of fish predators. *Oikos* 114(1): 27-36. (in English). ["We investigated if dragonfly larvae community composition and species abundance curves are sensitive to variation in predation intensity, and whether the fit to a particular niche partitioning model could be used to make inferences about mechanisms structuring communities. The approach taken was to compare communities in lakes either having or lacking fish predation. Dragonfly species classified as active, strongly dominated the dragonfly communities in fishless lakes, and low active species dominated fishless lakes. As activity level is known to correlate with susceptibility to fish predation this indicates that these communities are structured by fish predation. Fitting relative abundance data to five niche partitioning models showed that the same model fitted data from both types of habitats (fish/no fish). This means that the observed differences in relative abundances were substitutive, i.e. the relative abundance of a rank stayed constant, even though the identity of the species having this rank changed. The best fit to data from both types of lakes was found for the random assortment model, which is usually interpreted as an indication that the community is not structured by within-guild interactions. This interpretation for fishless lakes did not seem to agree with other community measures (i.e. lowered diversity and evenness and no relationship between species richness and dragonfly biomass), which indicate that the community is structured by within-guild interactions. Moreover, a detail in the fitting procedure, the number of species included in the analysis, affected which model that fitted data best. Thus, we question if fitting niche partitioning models to data can provide mechanistic understanding of how resources are partitioned in natural communities." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

5946. Jourde, P.; Hussey, R. (2006): Première mention de *Trithemis annulata* (Palisot de Beauvois, 1805) en Charente-Maritime (Odonata, Anisoptera, Libellulidae). *Martinia* 22(2): 71-72. (in French, with English summary). [*T. annulata* has recently been mentioned from the Gironde Department, France. On 18.IX.2005, a single male was discovered along the estuary of the Gironde, in Charente-Maritime (Western France). This seems to be the present northernmost record for this expanding species.] Address: Jourde, P., LPO, La Cor-

derie Royale, BP 90263, F-17305 Rochefort, France. E-mail: philippe.jourde@lpo.fr

5947. Jourde, P.; Perret, B. (2006): *Sympetrum flaveolum* (L., 1758), nouvelle donnée pour le Poitou-Charentes et statut récent dans les plaines de l'Ouest de la France (Odonata, Anisoptera, Libellulidae). *Martinia* 22(3): 135-142. (in French, with English summary). ["Following sightings of this species in Charente-Maritime, a literature search was conducted to investigate its supposed presence across the low-lying regions of Western France. At present, distribution maps, published in many works for the identification of dragonflies, show a large distribution of *S. flaveolum* in France. It appears that the species is very rare in these areas, with the majority of observations being of vagrants. Consequently, species distribution maps should differentiate geographically those regions where the populations are known to breed regularly from those regions where the species is only occasional." (Authors)] Address: Jourde, P., LPO, La Corderie Royale, BP 90263, F-17305 Rochefort, France. E-mail: philippe.jourde@lpo.fr

5948. Juillerat, L.; Wildermuth, H. (2006): Landmilben als Libellenparasiten: Befall von *Orthetrum coerulescens* mit *Leptus* sp. (Odonata: Libellulidae; Parasitengona: Erythraeidae). *Libellula* 25(3/4): 171-184. (in German, with English and French summaries). ["During the 2001 flying season 110 mites of the genus *Leptus* were recorded on adults in five of six local populations of *O. coerulescens* in the Swiss Jura mountains. Of the host individuals 72.8 % were teneral, 24.3 % immature, and 2.9 % mature. On average 29 % of the tenerals bore mites, this proportion varying between 0 and 53 % within six local populations. The parasite load amounted to one to five mites per individual; it averaged 1.57 and did not differ significantly between sexes. Almost two thirds of the host individuals bore a single mite. Most parasites were attached to the host's legs. Infested hosts survived an average of 18.1 days from emergence and non-infested hosts 28.0 days. The observed infestation of *O. coerulescens* by terrestrial mites may reflect the superposition of the host's and parasite's preferred habitats, namely spring mires comprising mosaics of tiny seepages and streams intimately intermingled with extensively grazed fen vegetation." (Authors)] Address: Juillerat, J., Fahys 21, CH-2000 Neuchâtel, Schweiz. E-mail: juillerat.l@bluewin.ch

5949. Kalkman, V.; Lopau, W. (2006): Identification of *Pyrrhosoma elisabethae* with notes on its distribution and habitat (Odonata: Coenagrionidae). *International Journal of Odonatology* 9(2): 175-184. (in English). ["*Pyrrhosoma elisabethae* is one of the rarest and least known odonate taxa in Europe and is often considered to be a subspecies of *P. nymphula*. The taxon is known from eight localities, four on the Peloponnisos, Greece, three on Kérkira (Corfu), Greece, and one in southern Albania. We describe structural differences between *P. elisabethae* and *P. nymphula* in both males and females, and present a key that distinguishes these two taxa. These structural differences, combined with the lack of intermediates, suggests that *P. elisabethae* should be treated as a full species. Notes on habitat associations and flying season of *P. elisabethae* are also given." (Authors)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nlk

5950. Karle-Fendt, A. (2006): Erstnachweis von *Coenagrion scitulum* in Bayern (Odonata: Coenagrionidae). *Libellula* 25(3/4): 129-134. (in German, with English summary). ["In July 2006, *C. scitulum* was discovered for the first time in Bavaria, Germany. Two exuviae of the species were found in the Felmer Moos, Oberallgäu district, situated in the southwestern part of Bavaria near the border to Austria and Switzerland. These records as well as one in the Swiss-Austrian Rhine valley (2001) may indicate a recent expansion of the species to southern Germany. Possible migration routes are discussed." (Authors)] Address: Karle-Fendt, A., Hofener Straße 49, D-87527 Sonthofen, Germany

5951. Karube, H.; Ozono, A. (2006): Biogeography of Odonata in the Ryukyu Archipelago. *Insect and nature* 41(4): 23-29. (in Japanese, with English translation of the title). [The distribution of *Planaeschna* is mapped.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

5952. Kasangaki, A.; Babaasa, D.; Efitre, J.; McNeillage, A.; Bitariho, R. (2006): Links between anthropogenic perturbations and benthic macroinvertebrate assemblages in Afromontane forest streams in Uganda. *Hydrobiologia* 563: 231-245. (in English). ["Relationships between environmental variables and benthic macroinvertebrate assemblages were investigated among several sites that varied in disturbance history in Bwindi Impenetrable National Park, an Afromontane site in East Africa. Environmental variables were correlated with the level of past catchment disturbance – logging, agricultural encroachment, and present tourism activity. For example, sites in medium and high disturbance categories had higher values of specific conductance and lower water transparency than low disturbance category sites, these environmental variables may therefore act indicators of ecological quality of rivers. Environmental variables such as conductivity and water transparency were found to be good predictors of benthic macroinvertebrate assemblages, with anthropogenically stressed sites having lower diversity than the reference sites. Impacted sites were dominated by tolerant taxa such as chironomid and leeches, while 'clean water' taxa such as Ephemeroptera, Plecoptera and Trichoptera dominated at minimally impacted sites. Comparison of sites with different disturbance histories provided evidence for differences in benthic macroinvertebrate communities that reflect the state of forest restoration and recovery. We recommend quarterly monitoring of water quality to act as an early warning system of deterioration and tracking ecological recovery of previously impacted sites." (Authors) Odonata are treated on the family level.] Address: Kasangaki, A., Institute of Tropical Forest Conservation, Mbarara University of Science & Technology, PO Box 44, Kabale, Uganda. E-mail: kasangaki@itfc.org

5953. Kawano, K.; Nakano, H.; Hayashi, M.; Yamachi, T. (2006): Aquatic Insects in the Ponds of Hirata Area (Izumo City) in Shimane Prefecture, Japan. *Bull. Hoshizaki Green Found.* 9: 13-37. (in Japanese, with English summary). [The aquatic insect fauna of irrigation ponds was surveyed in the Hirata Area of Izumo City, Shimane Prefecture, Japan between 2001 and 2003. A total of 218 ponds was sampled resulting in 108 species. The list of species includes 34 odonate species.] Address: The Firefly Museum of Toyota Town, Naka-

mura, 50-3 Toyota, Shimonoseki, Yamaguchi Pref., 750-0441, Japan

5954. Kéry, M.; Muñoz Lopez, S. (2006): Reconfirmation of *Gomphus graslinii*, Rambur, 1842, in Navarra and *Onychogomphus costae*, Sélys, 1885, in Aragón in 2006 (Odonata: Gomphidae). *Boletín Sociedad Entomologías Aragonesa* 39: 138. (in English, with Spanish summary). [Spain; *G. graslinii*: 13 VII 2006, Rio Salazar immediately at the upriver edge of the village of Lumbier, Navarra, at about 420 m a.s.l.. *O. costae*: 11 VII 2006, Rio Alcanadre at Ontiñena, Aragón.] Address: Kéry, M., Swiss Ornithological Institute, 6204 Sempach, Switzerland. E-mail: marc.kery@vogelwarte.ch

5955. Khodabandeh, S. (2006): Na⁺,K⁺-ATPase in the gut of larvae of the zygopteran, *Ischnura elegans*, and the Anisoptera, *Libellula lydia*, (Odonata): Activity and immunocytochemical localization. *Zoological Studies* 45(4): 510-516. (in English). ["Na⁺,K⁺-ATPase activity and immunolocalization were demonstrated in the gut of *Ischnura elegans* and *Libellula lydia* larvae. Localization was performed through immunofluorescence light microscopy using the IgGa5 mouse monoclonal antibody. The Na⁺,K⁺-ATPase activity was significantly higher in the hindgut than in the foregut-midgut in both species. In *I. elegans*, Na⁺,K⁺-ATPase activities were 29.44 and 5.12 iM Pi/mg/protein/h in the hindgut and foregut-midgut, while in *L. lydia*, the activities were 16.24 and 1.98 iM Pi/mg/protein/h in the hindgut and foregut-midgut, respectively. No specific fluorescence staining was observed in the cells of the foregut or midgut regions in either species. Na⁺,K⁺-ATPase was found in the malpighian tubules and rectal pad epithelium in *I. elegans*, and in the epithelium of the basal pads of the rectal gill lamellae in *L. lydia*. A consistently high immunoreactivity was observed in the sides of the lumen of malpighian tubule cells, and a positive and strong fluorescence signal was found in the basolateral sides of the pads of epithelium cells. These findings show that as in crustaceans, this antibody is useful for locating of Na⁺,K⁺-ATPase and ionocytes in insect osmoregulatory tissues. A high concentration of Na⁺,K⁺-ATPase activity in these tissues confirms their participation in osmoregulation through active ion exchange." (Author)] Address: Khodabandeh, Saber, Department of Marine Biology, Faculty of Marine Sciences, University of Tarbiat Modarres, Mazandaran, Noor, PO Box 46414-356, Iran. E-mail: surp78@yahoo.com

5956. Khrokalo, L. A.; Sheshurak, P. M. (2006): Flight seasonality of dragonflies (Insecta, Odonata) in northeastern Ukraine. *Vestnik Zoologii* 40(2): 145-154. (in English, with summary). [Data on seasonal flight periods of Odonata in Northeastern Ukraine (Kyiv, Chernigiv, Sumy, Chekasy and Kharkiv administrative regions) based on field observations and a review of material collected during 1992–2004 are provided. Field data by the authors (numbers of species occurring during the six seasons as adults) were compared with literature data. The study resulted in new resp. amended insights into the regional phenology of *Chalcolestes parvidens*, *Coenagrion armatum*, *Brachytron pratensis*, *Aeshna affinis*, *Anax imperator*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Cordulia aenea*, *Epitheca bimaculata*, *Sympetrum danae*, *Leucorrhinia rubicunda*, and *L. caudalis*. Flight seasonalities are depicted of 13 frequently occurring species. The regional total of 55 species can be grouped in six phenological groups.] Address: Khro-

kalo, Lyudmila, P.O. Box 23, Kyiv-118, Ukraine 03118. E-mail: lkhrokalo@mail.ru

5957. Kipping, J. (2006): Globalisierung und Libellen: Verschleppung von exotischen Libellenarten nach Deutschland (Odonata: Coenagrionidae, Libellulidae). *Libellula* 25(1/2): 109-116. (in German, with English summary). ["Recent records from Germany of four exotic dragonfly species are provided. One individual of the Asian *Ceragrion cerinorubellum* (Brauer) was probably imported accidentally with aquatic plants to Leipzig, Saxony. Two species, including *Ischnura senegalensis* (Rambur), definitely reached Dessau, Saxony-Anhalt in the same way, whereas an adult *Pantala flavescens* (Fabricius) was brought into Saxony with bananas from Ecuador." (Authors)] Address: Kipping, J., BioCart – Ökologische Gutachten & Studien, Albrecht-Dürer-Weg 8, D-04425 Taucha, Germany. E-mail: BioCartKipping@web.de

5958. Kishida, O.; Nishimura, K. (2006): Flexible architecture of inducible morphological plasticity. *Journal of Animal Ecology* 75: 705-712. (in English). ["Predator-induced morphological defences are produced in response to an emergent predator regime. In natural systems, prey organisms usually experience temporal shifting of the composition of the predator assemblage and of the intensity of predation risk from each predator species. Although, a repetitive morphological change in response to a sequential shift of the predator regime such as alteration of the predator species or diminution of the predation risk may be adaptive, such flexible inducible morphological defences are not ubiquitous. We experimentally addressed whether a flexible inducible morphological defence is accomplished in response to serial changes in the predation regime, using a model prey species which adopt different defensive morphological phenotypes in response to different predator species. *Rana pirica* (Matsui) tadpoles increased body depth and tail depth against the predatory larval salamander *Hynobius retardatus* (Dunn); on the other hand, they only increased tail depth against the predatory larval dragonfly *Aeshna nigroflava* (Martin). *Rana pirica* tadpoles with the predator-specific phenotypes were subjected to removal or exchange of the predator species. After removal of the predator species, tadpoles with each predator-specific phenotype changed their phenotype to the nondefensive basic one, suggesting that both predator-specific phenotypes are costly to maintain. After an exchange of the predator species, tadpoles with each predator-specific phenotype reciprocally, flexibly shifted their phenotype to the now more suitable predator-specific one only by modifying their body part. The partial modification can effectively reduce time and energy expenditures involved in repetitive morphological changes, and therefore suggest that the costs of the flexible morphological changes are reduced." (Authors)] Address: Kishida, O., Graduate School of Fisheries Sciences, Hokkaido University, Hakodate 041-8611, Hokkaido, Japan. E-mail: kishida@fish.hokudai.ac.jp

5959. Kraft, P.G.; Franklin, C.E.; Blows, M.W. (2006): Predator-induced phenotypic plasticity in tadpoles: extension or innovation? *Journal of Evolutionary Biology* 19(2): 450-458. (in English). ["Phenotypic plasticity, the ability of a trait to change as a function of the environment, is central to many ideas in evolutionary biology. A special case of phenotypic plasticity observed in many

organisms is mediated by their natural predators. Here, we used a predator-prey system of dragonfly larvae and tadpoles to determine if predator-mediated phenotypic plasticity provides a novel way of surviving in the presence of predators (an innovation) or if it represents a simple extension of the way noninduced tadpoles survive predation. Tadpoles of *Limnodynastes peronii* were raised in the presence and absence of predation, which then entered a survival experiment. Induced morphological traits, primarily tail height and tail muscle height, were found to be under selection, indicating that predator-mediated phenotypic plasticity may be adaptive. Although predator-induced animals survived better, the multivariate linear selection gradients were similar between the two tadpole groups, suggesting that predator-mediated phenotypic plasticity is an extension of existing survival strategies. In addition, nonlinear selection gradients indicated a cost of predator-induced plasticity that may limit the ability of phenotypic plasticity to enhance survival in the presence of predators." (Authors)] Address: Kraft, P.G., School of Integrative Biology, University of Queensland, Brisbane, Australia. E-mail: pkraft@zoology.uq.edu.au

5960. Krauss, V.; Fassl, A.; Fiebig, P.; Patties, I.; Sass, H. (2006): The evolution of the histone methyltransferase gene *Su(var)3-9* in metazoans includes a fusion with and a re-fission from a functionally unrelated gene. *BMC Evolutionary Biology* 2006, 6:18: 15 pp. (in English). ["Background: In eukaryotes, histone H3 lysine 9 (H3K9) methylation is a common mechanism involved in gene silencing and the establishment of heterochromatin. The loci of the major heterochromatic H3K9 methyltransferase *Su(var)3-9* and the functionally unrelated α subunit of the translation initiation factor eIF2 are fused in *Drosophila melanogaster*. Here we examined the phylogenetic distribution of this unusual gene fusion and the molecular evolution of the H3K9 HMTase *Su(var)3-9*. Results: We show that the gene fusion had taken place in the ancestral line of winged insects and silverfishes (Dicondylia) about 400 million years ago. We cloned *Su(var)3-9* genes from a collembolan and a spider where both genes ancestrally exist as independent transcription units. In contrast, we found a *Su(var)3-9*-specific exon inside the conserved intron position 81-1 of the eIF2 α gene structure in species of eight different insect orders. Intriguingly, in the pea aphid *Acyrtosiphon pisum*, we detected only sequence remains of this *Su(var)3-9* exon in the eIF2 α intron, along with an eIF2 α -independent *Su(var)3-9* gene. This reveals an evolutionary re-fission of both genes in aphids. *Su(var)3-9* chromo domains are similar to HP1 chromo domains, which points to a potential binding activity to methylated K9 of histone H3. SET domain comparisons suggest a weaker methyltransferase activity of *Su(var)3-9* in comparison to other H3K9 HMTases. Astonishingly, 11 of 19 previously described, deleterious amino acid substitutions found in *Drosophila Su(var)3-9* are seemingly compensable through accompanying substitutions during evolution. Conclusion: Examination of the *Su(var)3-9* evolution revealed strong evidence for the establishment of the *Su(var)3-9/eIF2 α* gene fusion in an ancestor of dicondylid insects and a re-fission of this fusion during the evolution of aphids. Our comparison of 65 selected chromo domains and 93 selected SET domains from *Su(var)3-9* and related proteins offers functional predictions concerning both domains in *Su(var)3-9* proteins." (Authors) The study includes *Enallagma cyathigerum*.] Address: Krauss, V.,

Dept of Genetics, Institute of Biology II, University of Leipzig, Johannisallee 21–23, 04103 Leipzig, Germany. Email: krauss@rz.uni-leipzig.de

5961. Kumar, R.; Hwang, J.-S. (2006): Larvicidal efficiency of aquatic predators: A perspective for mosquito biocontrol. *Zoological Studies* 45(4): 447-466. (in English). ["Biological control of mosquito larvae with predators and other biocontrol agents would be a more-effective and eco-friendly approach, avoiding the use of synthetic chemicals and concomitant damage to the environment. Manipulating or introducing an auto-reproducing predator into the ecosystem may provide sustained biological control of pest populations. The selection of a biological control agent should be based on its self-replicating capacity, preference for the target pest population in the presence of alternate natural prey, adaptability to the introduced environment, and overall interaction with indigenous organisms. In order to achieve an acceptable range of control, a sound knowledge of various attributes of interactions between a pest population and the predator to be introduced is desirable. Herein, we qualitatively review a wide range of literature sources discussing the ability of different aquatic predators to control mosquito larval populations in environments where mosquitoes naturally breed. Different predators of mosquito larvae include amphibian tadpoles, fish, dragonfly larvae, aquatic bugs, mites, malacostracans, anostracans, cyclopoid copepods, and helminths. The most widely used biocontrol agents of mosquito populations are the western mosquito fish, *Gambusia affinis*, and the eastern mosquito fish, *G. holbrooki*. The effect of these fishes on native faunal composition and their inability to survive in small containers, tree holes etc., which are ideal breeding sites of vectorially important mosquitoes, make them inefficient in controlling mosquito populations. On the basis of larvicidal efficiency, the ability to produce dormant eggs, the hatchability of dormant eggs after rehydration, faster developmental rates, and higher fecundity, various tadpole shrimp can be considered to mosquito ideal control agents in temporary water bodies and rice paddy fields. Among various predators of mosquito larvae, the cyclopoid copepods are efficient, found naturally, are safe for human beings, and are also economical in their application. The mosquito larval selectivity patterns of many cyclopoids, their adaptability to variable aquatic environments which are ideal breeding sites for mosquitoes, their resistance to starvation, and their day-night prey detection ability using hydromechanical signals make them an ideal biocontrol agent. Therefore, there is a need to test the feasibility of cyclopoid copepods by putting them into operational use as ecocompatible means of biocontrol." (Authors)] Address: Hwang, Jiang-Shiou, Institute of Marine Biology, National Taiwan Ocean University, 2 Pei-Ning Rd., Keelung, Taiwan 202, R.O.C.

5962. Kunz, B. (2006): Entwicklung von *Onychogomphus forcipatus unguiculatus* in einer Kiesgrube in der Provence (Odonata: Gomphidae). *Libellula* 25 (3/4): 147-150. (in German, with English and French summaries). ["On 15-V-2006 an emerging female and another exuvia were found in a gravel pit situated close to the left bank of river Durance, west of the airfield of Vinon-sur-Verdon in the Var district, southern France. This is the first record of successful development for this taxon in standing waters in France, and the second in Europe." (Author)] Address: Kunz, B., Hauptstr. 111, D-

74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5963. Kunz, B.; Seidenbusch, R. (2006): Erfolgreiche Larvalentwicklung bei *Sympetrum sinaiticum* trotz erheblicher Missbildung der Fangmaske (Odonata: Libellulidae). *Libellula* 25(1/2): 77-82. (in German, with English summary). ["During the analysis of a collection of final-stadium exuviae from Tunisia, a specimen of *S. sinaiticum* was detected with the left labial palp missing. Only a small part of the labial palp had begun to regenerate. Obviously the larva had been able successfully to feed, moult and emerge, in spite of this impairment." (Authors)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5964. Kunz, B.; Wildermuth, H. (2006): Prädation zwischen Libellen und Heuschrecken (Odonata; Saltatoria). *Libellula* 25 (3/4): 199-208. (in German, with English summary). ["Reciprocal predation of dragonflies and grasshoppers (Odonata, Saltatoria) — On 14-VI--1998 a nearly full-grown larva of *Tettigonia viridissima* was observed catching a flying male *Calopteryx splendens*, and on 12-VI-2005 a male *Ischnura elegans* was photographed devouring a young larva of *Phaneroptera falcata*. The hitherto available records of corresponding predation events available to us are compiled and the nutritional interrelation between Odonata and Saltatoria (Ensifera, Caelifera) is discussed." (Authors)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5965. Kunz, B.; Ober, S.V.; Jödicke, R. (2006): The distribution of *Zygonyx torridus* in the Palaearctic (Odonata: Libellulidae). *Libellula* 25(1/2): 89-108. (in English, with German summary). ["*Z. torridus* is an Oriental-Afrotropical species, whose range also covers the southern margin of the Palaearctic. All known records from the latter region are listed, mapped and discussed. Records from single localities covering a longer period of time are available for the Canary Islands, the Jordan Valley, and Spain. The known occurrence in northern Africa is restricted to Morocco and Tunisia. In southern Europe the species is rare, and several populations seem to have been lost recently. Records are known from Portugal, Spain and Italy. One visual observation originates from southwestern Turkey. A record from Iran indicates a bridge to the population on the Indian subcontinent. The species is new to the fauna of Italy, Tunisia and Turkey." (Authors)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunj.de

5966. Lambrechts, J.; Guelinckx, R. (2006): De balans na het natuurherstel in Het Vinne te Zoutleeuw (Vlaams-Brabant): in één jaar van 7 naar 27 libellensoorten. *Gomphus* 20(2): 3-12. (in Dutch, with English and French summaries). ["The results after the restoration of the Vinne at Zouleeuw (province of Vlaams-Brabant) as a natural lake in Flanders: in 1 year from 7 to 27 of Odonata species. This contribution gives an overview of the dragonfly fauna (Odonata) of Het Vinne, a site in the extreme south eastern part of the province of Vlaams-Brabant (Belgium). Het Vinne was the only natural lake (> 100 hectares) in Flanders, but disappeared completely 150 years ago due to land reclamation. A nature restoration project has been undertaken by the Flemish land Agency (VLM) in 2004. As a result, the species poor plantations of poplar disappeared in fa-

vor of open water and reed marshes. The dragonfly survey undertaken in 2005 resulted in a list of 27 species for this site. The most interesting species are *Lestes dryas*, *Sympecma fusca* and *Orthetrum coerulescens*. Because of its relatively isolated location in the dry loamy region of Belgium many more species are unexpected. Worth mentioning are the big populations of *Ischnura pumilio* and *Libellula quad-rimaculata*. Also the following southern species were notified: *Lestes barbarus*, *Erythromma lindenii* and *Crocothemis erythraea*." (Authors)] Address: Lambrechts, J., Zuurbemde 9, B-3380 Glabbeek, Belgium. E-mail: Jorglambrechts@hotmail.com

5967. Lambrechts, J.; De Knijf, G. (2006): Libellen in het Nationaal Park Hoge Kempen. *Likona* jaarboek 2005 – n°15: 50-57. (in Dutch, with English summary). ["Since 1990, 50 dragonfly species (with populations of 45 species) or 83% of all recent Flemish species have been observed in the National Park Hoge Kempen. 14 from the 17 Red List species have been noted, and with populations of 9 species. Also all the 3 species belonging to the category 'rare' are present. We can conclude that this National Park is a real biodiversity hotspot for dragonflies in Flanders. Nearly all Red List species characteristic for oligotrophic and running waters (brooks and rivulets) are present in high numbers. Only the species typical for meso-eutrophic standing waters are lacking, due to the nearly complete absence of this habitat type in the Park. The Park is also of international importance due to the presence of *Leucorrhinia pectoralis*, a species mentioned in the Annexes II and IV of the Habitat Directive. Within the Park, the Vallei van de Zijpbeek is the most important site for dragonflies. Gravel pits can be of great importance for Odonata, also for Red List species, if they were reshaped after exploitation." (Authors)] Address: Lambrechts, J., Milieu-adviesbureau AEOLUS, Vroentestraat 2b, B-3290 Diest, Belgium. E-mail: natuur@aeolus-milieu.be

5968. Landwer, B.; Sites, R.W. (2006): Variability in larval characters states used to distinguish between species of *Pantala* Hagen (Odonata: Libellulidae). *Florida Entomologist* 89(3): 354-360. (in English). ["Despite widespread distributions and abundance, previously published diagnoses of the larvae of the two species of the dragonfly genus *Pantala* often were contradictory or confusing. Morphometric analysis of mensural characters and qualitative analysis of relative character states were used to determine the ability of previously published characterizations to accurately distinguish larvae of the two species. We found that many published characterizations were inaccurate or insufficient, and their use in making species level determinations would result in frequent misidentifications. In distinguishing between the two species, the most useful and reliable characteristic was the palpal setal count. However, in specimens where this count is intermediate, other characteristics may need to be evaluated." (Authors)] Address: Landwer, Brett, Enns Entomology Museum, Division of Plant Sciences, University of Missouri, Columbia, Missouri 65211, USA. E-mail: brett.landwer@mdc.mo.gov

5969. Latty, T.M. (2006): Flexible mate guarding tactics in the dragonfly *Sympetrum internum* (Odonata: Libellulidae). *Journal of Insect Behavior* 19(4): 469-477. (in English). ["Mate guarding—a behaviour prevalent in odonates—is a post copulatory association during which males prevent females from re-mating. Some species

use two forms of guarding: contact mate guarding, which is energetically costly but highly effective and non-contact mate guarding, which is less costly but less effective. This study aimed to determine if male *S. internum* adjust the duration of contact mate guarding according to environmental, temporal and physiological factors. There was a significant interaction between male density and season on duration of contact mate guarding. Early in the season males increased the duration of contact guarding as the density of rivals increased. Later in the season males guarded mates longer irrespective of male density. Wind and temperature did not detectably alter the duration of contact mate guarding, suggesting that the trade-off between current and future reproductive success was more important than were physiological costs." (Author)] Address: Latty, Tany, Department of Biological Sciences, University of Calgary, 2500 University drive, Calgary, Alberta, Canada T2N 1N4. E-mail: tmlatty@ucalgary.ca.

5970. Laurila, A.; Pakkasmaa, S.; Merilä, J. (2006): Population divergence in growth rate and antipredator defences in *Rana arvalis*. *Oecologia* 147(4): 585-595. (in English). ["Growth and development rates often differ among populations of the same species, yet the factors maintaining this differentiation are not well understood. We investigated the antipredator defences and their efficiency in two moor frog *Rana arvalis* populations differing in growth and development rates by raising tadpoles in outdoor containers in the nonlethal presence and absence of three different predators (newt, fish, dragonfly larva [*Aeshna*']), and by estimating tadpole survival in the presence of free-ranging predators in a laboratory experiment. Young tadpoles in both populations reduced activity in the presence of predators and increased hiding behaviour in the presence of newt and fish. Older tadpoles from the slow-growing Gotland population (G) had stronger hiding behaviour and lower activity in all treatments than tadpoles from the fast-growing Uppland population (U). However, both populations showed a plastic behavioural response in terms of reduced activity. The populations differed in induced morphological defences especially in response to fish. G tadpoles responded with relatively long and deep body, short tail and shallow tail muscle, whereas the responses in U tadpoles were often the opposite and closer to the responses induced by the other predators. U tadpoles metamorphosed earlier, but at a similar size to G tadpoles. There was no evidence that growth rate was affected by predator treatments, but tadpoles metamorphosed later and at larger size in the predator treatments. G tadpoles survived better in the presence of free-ranging predators than U tadpoles. These results suggest that in these two populations, low growth rate was linked with low activity and increased hiding, whereas high growth rate was linked with high activity and less hiding. The differences in behaviour may explain the difference in survival between the populations, but other mechanisms (i.e. differences in swimming speed) may also be involved. There appears to be considerable differentiation in antipredator responses between these two *R. arvalis* populations, as well as with respect to different predators." (Authors)] Address: Laurila, A., Population Biology/ Department of Ecology and Evolution, Evolutionary Biology Center, Uppsala University, Norbyvägen 18d, 75236 Uppsala, Sweden. Email: Anssi.Laurila@ebc.uu.se

5971. Lencioni, F.A.A. (2006): Damselflies of Brazil. 2 - Coenagrionidae families. ISBN 85-7718-034-4: 419 pp. (in English and Portuguese). ["This is the second volume of the guide to the species of Zygoptera of Brazil. This volume is organized as was the first volume, treating all 154 described species of Brazilian Coenagrionidae, and includes the following four appendices: 1. species of non-Coenagrionidae described since the publication of the 1st volume, 2. illustrations of 46 described larvae, 3. a description of the larva of *Mecistogaster asticta* Selys, 1860, including notes on its biology, 4. 43 colored images (photos and specimen scans) of Brazilian species. The book has 1570 illustrations of which 380 are original. Dr. R.W. Garrison, at my request, examined the male syntype of *Leptagrion? obsoletum* Selys, 1876, and determined this to be a senior synonym of *Helveciagrion chirihuanum* (Calvert, 1909). The status of *Leptagrion auriceps* St. Quentin, originally relegated to synonymy is re-examined and illustrated here." (Author)] Address: Lencioni, F.A.A., Rua dos Ferroviarios 55, Jardim Mesquita, BR-12300-000, Jacarei, S.P., Brazil. E-mail: odonata@iconet.com.br. Orders should be directed to the following e-mail address: odonata@zygoptera.bio.br

5972. Leroy, T. (2006): Évolution du peuplement d'Odonates adultes au cours d'une saison sur les rives d'un lac-tourbière d'Auvergne (France). *Martinia* 22(3): 109-118. (in French, with English summary). ["A survey of adult Odonata along the banks of a peaty lake, 1100 m a.s.l., in the Cézallier Plateau, Auvergne region, was performed from spring to autumn in 2000 and 2001. Although the specific richness in adult Dragonflies reached about 15 species during three months, from June to August, the density was high only from June to the beginning of July. *Enallagma cyathigerum* is by far the most abundant species and represents 50 to 75 % of the adult community present within the breeding locality. This prevalence is obvious from June to August so that the community appears poorly diversified and unbalanced, although the specific richness is high. The apparent population of September (autumn species) differed greatly from that of end May (spring species)." (Author)] Address: Leroy, T., Le Bourg, F-63210 Heume-l'Eglise, France. E-mail: thierry-leroy@caramail.com

5973. Levasseur, M. (2006): Le comportement d'immersion partielle brève et répétée en vol chez les Odonates. *Martinia* 22(3): 143-144. (in French, with English summary). ["The author comments on a few observations of male Anisoptera, touching three times the water surface in flight. This behaviour is briefly described and explanations are proposed (action not correlated to egg-laying)." (Author)] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France.

5974. Levasseur, M. (2006): Prospection odonatologique de quelques milieux intéressants de la Martinique. *Martinia* 22(2): 83-88. (in French, with English summary). ["On a journey allowing the visit of 3 wetland spots in Martinique, 15 species have been recorded. After a brief description of the sites, a synthetic table - listing the species, their behaviour and numbers - is presented. Remarks in relation with identification of some taxa and conservation of sites follow." (Author)] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France

- 5975.** Lieckweg, T.; Niedringhaus, R. (2006): Eine neue Sammlung westafrikanischer Odonaten des Überseemuseums Bremen. *Jahrbuch des Überseemuseum Bremen* 13: 67-88. (in German, with English summary). [In 2004, a collection of West African Odonata was handed over to the Überseemuseum at Bremen (Germany) to be permanently housed there. This collection of more than 2000 specimens of 131 species (60 Zygoptera, 71 Anisoptera) was acquired by U. Bröring and R. Niedringhaus between 1980 and 1983 at different localities in the West African countries of Ghana, Togo, Benin, Nigeria, and Cameroon. The present paper provides the identifications of all specimens and a brief description of the localities sampled.] (Authors)] Address: Niedringhaus, R., Carl-von-Ossietzky-Universität Oldenburg, Fakultät 5, Institut für Biologie- und Umweltwissenschaften, Postfach 2503, 26111 Oldenburg, Germany; rolf.niedringhaus@uni-oldenburg.de
- 5976.** Loewen, N.; Peterson, R. (2006): Dancing dragonflies. *Dragonflies in your backyard*. Picture Window Books. Minneapolis. ISBN 1-4048-1142-7: 24 pp. (in English). [Introduction into dragonflies for kids.]
- 5977.** Lohr, M. (2006): Libellenbeobachtungen in Südpotugal (Odonata). *Libellula* 25(1/2): 117-118. (in German, with English summary). ["Due to not specifiable problems, figure 2a of this article, formerly published in *Libellula* 24 (2005), contained three erroneous givings. The correct presentation of this map with hitherto published records of *Gomphus graslinii* in Portugal is given." (Author)] Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-luh.de
- 5978.** Longcore, J.R.; McAuley, D.G.; Pendelton, G.W.; Reid Bennatti, C.; Mingo, T.M.; Stromborg, K.L. (2006): Macroinvertebrate abundance, water chemistry, and wetland characteristics affect use of wetlands by avian species in Maine. *Hydrobiologia* 567: 143-167. (in English). ["Our objective was to determine use by avian species (e.g., piscivores, marsh birds, waterfowl, selected passerines) of 29 wetlands in areas with low (<200 $\mu\text{eq l}^{-1}$) acid-neutralizing capacity (ANC) in southeastern Maine. We documented bird, pair, and brood use during 1982-1984 and in 1982 we sampled 10 wetlands with a sweep net to collect invertebrates. We related mean numbers of invertebrates per wetland to water chemistry, basin characteristics, and avian use of different wetland types. Shallow, beaver (*Castor canadensis*)-created wetlands with the highest phosphorus levels and abundant and varied macrophyte assemblages supported greater densities of macroinvertebrates and numbers of duck broods (88.3% of all broods) in contrast to deep, glacial type wetlands with sparse vegetation and lower invertebrate densities that supported fewer broods (11.7%). Low pH may have affected some acid-intolerant invertebrate taxa (i.e., Ephemeroptera), but high mean numbers of Insecta per wetland were recorded from wetlands with a pH of 5.51. Other Classes and Orders of invertebrates were more abundant on wetlands with pH>5.51. All years combined use of wetlands by broods was greater on wetlands with pH \leq 5.51 (77.4%) in contrast to wetlands with pH>5.51 that supported 21.8% of the broods. High mean brood density was associated with mean number of Insecta per wetland. For lentic wetlands created by beaver, those habitats contained vegetative structure and nutrients necessary to provide cover to support invertebrate populations that are prey of omnivore and insectivore species. The fishless status of a few wetlands may have affected use by some waterfowl species and obligate piscivores." (Authors) Odonata are treated on the family level.] Address: Longcore, J., U.S. Geological Survey, Patuxent Wildlife Research Center, 5768 South Annex A, Orono, ME 04469, USA. E-mail: JerryLongcore@usgs.gov
- 5979.** Luo, G.; Sun, M. (2006): The effects of corrugation and wing planform on the aerodynamic force production of sweeping model insect wings. *Acta Mechanica Sinica* 21(6): 531-541. (in English). ["The effects of corrugation and wing planform (shape and aspect ratio) on the aerodynamic force production of model insect wings in sweeping (rotating after an initial start) motion at Reynolds number 200 and 3500 at angle of attack 40° are investigated, using the method of computational fluid dynamics. A representative wing corrugation is considered. Wing-shape and aspect ratio (AR) of ten representative insect wings are considered; they are the wings of fruit fly, cranefly, dronefly, hoverfly, ladybird, bumblebee, honeybee, lacewing (forewing), hawkmoth and dragonfly (forewing), respectively (AR of these wings varies greatly, from 2.84 to 5.45). The following facts are shown. (1) The corrugated and flat-plate wings produce approximately the same aerodynamic forces. This is because for a sweeping wing at large angle of attack, the length scale of the corrugation is much smaller than the size of the separated flow region or the size of the leading edge vortex (LEV). (2) The variation in wing shape can have considerable effects on the aerodynamic force; but it has only minor effects on the force coefficients when the velocity at r^2 (the radius of the second moment of wing area) is used as the reference velocity; i.e. the force coefficients are almost unaffected by the variation in wing shape. (3) The effects of AR are remarkably small: when AR increases from 2.8 to 5.5, the force coefficients vary only slightly; flow-field results show that when AR is relatively large, the part of the LEV on the outer part of the wings sheds during the sweeping motion. As AR is increased, on one hand, the force coefficients will be increased due to the reduction of 3-dimensional flow effects; on the other hand, they will be decreased due to the shedding of part of the LEV; these two effects approximately cancel each other, resulting in only minor change of the force coefficients." (Authors)] Address: Luo, G.y.; Sun, M., Ministry of Education Key Laboratory of Fluid Mechanics, Institute of Fluid Mechanics, Beihang University, Beijing, 100083, China
- 5980.** Machida, K.; Oikawa, T.; Shimanuki, J. (2006): The effect of the costal vein configuration of the wings of a dragonfly. *Key Engineering Materials* 326-328: 819-822. (in English). ["In generally, it is known that structures of living thing are optimized. The wings of a dragonfly are thin and light. Although it is having the structure of bearing the load produced in the case of an advanced flight such as "Flapping flight", "Glide", and "Hovering". The wings of a dragonfly are made by veins and membranes. In addition, the wings of a dragonfly have some characteristic structures, such as "Nodus". Thus, the wings of dragonfly have many complicated structures. The configuration of costal vein of the wings is different from them of other insects. So, we paid attention to the configuration of costal vein of the wings. Therefore, in this study, we researched about the effect

of costal vein. As a result, it was showed that the configuration of costal vein became bending and torsional deformation small. In addition, it was showed that the configuration of costal vein related to nodus. In this study, several 3-D models of the dragonfly's wing were made and calculated by the 3-D finite element method." (Authors)] Address: Machida, M., Tokyo University of Science, 2641 Yamazaki, Noda-shi, Chiba, 278-8510, Japan. E-mail: mac@rs.noda.tus.ac.jp

5981. Macken, J.E. (2006): The life cycle of a dragonfly. Milwaukee. ISBN 0-8368-6388-7 (softcover): 24 pp. (in English). [Book for children resp. first reading.]

5982. Marshall, J.C.; Steward, A.L.; Harch, B.D. (2006): Taxonomic resolution and quantification of freshwater macroinvertebrate samples from an Australian dryland river: the benefits and costs of using species abundance data. *Hydrobiologia* 572: 171-194. (in English). ["In studies using macroinvertebrates as indicators for monitoring rivers and streams, species level identifications in comparison with lower resolution identifications can have greater information content and result in more reliable site classifications and better capacity to discriminate between sites, yet many such programmes identify specimens to the resolution of family rather than species. This is often because it is cheaper to obtain family level data than species level data. Choice of appropriate taxonomic resolution is a compromise between the cost of obtaining data at high taxonomic resolutions and the loss of information at lower resolutions. Optimum taxonomic resolution should be determined by the information required to address programme objectives. Costs saved in identifying macroinvertebrates to family level may not be justified if family level data can not give the answers required and expending the extra cost to obtain species level data may not be warranted if cheaper family level data retains sufficient information to meet objectives. We investigated the influence of taxonomic resolution and sample quantification (abundance vs. presence/absence) on the representation of aquatic macroinvertebrate species assemblage patterns and species richness estimates. The study was conducted in a physically harsh dryland river system (Condamine-Balonne River system, located in south-western Queensland, Australia), characterised by low macroinvertebrate diversity. Our 29 study sites covered a wide geographic range and a diversity of lotic conditions and this was reflected by differences between sites in macroinvertebrate assemblage composition and richness. The usefulness of expending the extra cost necessary to identify macroinvertebrates to species was quantified via the benefits this higher resolution data offered in its capacity to discriminate between sites and give accurate estimates of site species richness. We found that very little information (<6%) was lost by identifying taxa to family (or genus), as opposed to species, and that quantifying the abundance of taxa provided greater resolution for pattern interpretation than simply noting their presence/absence. Species richness was very well represented by genus, family and order richness, so that each of these could be used as surrogates of species richness if, for example, surveying to identify diversity hot-spots. It is suggested that sharing of common ecological responses among species within higher taxonomic units is the most plausible mechanism for the results. Based on a cost/benefit analysis, family level abundance data is recommended as the best resolution for resolving pat-

terns in macroinvertebrate assemblages in this system. The relevance of these findings are discussed in the context of other low diversity, harsh, dryland river systems." (Authors) The study includes Odonata.] Address: Marshall, J.C., Qld Department of Natural Resources and Mines, 120 Meiers Road, 4068, Indooroopilly, QLD, Australia. E-mail: marshallj@nrm.qld.gov.au, jonathan.marshall@nrm.qld.gov.au

5983. Martens, A. (2006): Gomphidenlarven als Substrat für Wohnröhren des Flohkrebsses *Chelicorophium robustum*? (Odonata: Gomphidae; Amphipoda: Corophiidae). *Libellula* 25(1/2): 83-87. (in German, with English summary). ["*Chelicorophium robustum* is a semi-sessile amphipod of Ponto-Caspian origin which has recently spread rapidly through Central Europe. Under laboratory conditions, adults settled on final-stadium larvae of *Gomphus vulgatissimus*, *Ophiogomphus cecilia* and *Onychogomphus forcipatus*. By using other particles they built dwelling tubes similar to those of caddisfly larvae on the ventral side of the abdomen of the dragonfly larvae. This represents the first reported example of an amphipod living sporadically as an epizoon on dragonfly larvae, an association not yet recorded from the wild." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

5984. Mauersberger, R. (2006): Verbreitung und Phänologie des Zweiflecks, *Epitheca bimaculata* Charpentier, 1825 (Odonata, Corduliidae), im Norden Brandenburgs. *Entomologische Nachrichten und Berichte* 50(1-2): 45-53. (in German). [Germany; "The author recorded *E. bimaculata* at 551 occasions in the study area between Prenzlau, Schwedt, Eberswalde and Rheinsberg (about 3500 km²), at 140 localities listed in this paper. From 1987 to 2006, breeding was observed in 88 water bodies in this lake landscape shaped during the Pleistocene. It represents the centre of distribution of the species in Germany. At the lake with the largest breeding colony, up to 394 exuviae in a year were found. The greatest recorded abundance of the species in this region was 193 exuviae along 80 meters of lake shore. *E. bimaculata* reaches a frequency of at least 29 % in 216 lakes with a water surface of more than one hectare existing in the UNESCO-biosphere reserve „Schorfheide-Chorin“ in the eastern part of the study area. The cornerstone data of adult phenology in the period 1992-2004 were as follows: earliest emerging adults, 11 May; peak emergence, 16 May; first males appearing in their territory over the water surface, 25 May; last living specimens, 24 June." (Author)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

5985. May, B.; Blumenkamp, K. (2006): Erstnachweis einer Brut des Bienenfressers *Merops apiaster* im Kreis Mettmann 2005. *Charadrius* 41(4) (2005): 208-213. (in German, with English summary). [Germany, Nordrhein-Westfalen; 2005; Anisoptera are among the preferred prey of *M. apiaster* (Aves).] Address: May, B., Schildheider Str. 126b, D-40699 Erkrath, Germany. E-mail: buero@naturschutzzentrum-bruchhausen.de

5986. McCauley, S.J. (2006): The effects of dispersal and recruitment limitation on community structure of odonates in artificial ponds. *Ecography* 29(4): 585-595.

(in English). [“I examined the effects of isolation on the structure of both adult and larval dragonfly (Odonata: Anisoptera) communities forming at physically identical artificial ponds over two years. Isolation, whether measured by distance to the nearest source habitat or by connectivity to multiple sources, was significantly negatively related to the species richness of dragonflies observed at and collected in these ponds. These results indicate that dispersal and recruitment limitation acted as filters on the richness of communities at these artificial ponds. The richness of larval recruits in artificial ponds was lower than the richness of adult dispersers observed at ponds, and distance from a source habitat explained a greater fraction of the variation in larval than adult richness (83 and 50%, respectively). These results and a male biased sex-ratio in adults observed at artificial ponds suggest that isolated habitats may be more recruitment limited than observations of dispersers would suggest. A Mantel test indicated there was a spatial component to the composition of communities forming in tanks, and that distance between tanks and community dissimilarity (1-Jaccard's) were significantly positively related ($r=0.52$). This pattern suggests that their position with respect to alternative source environments influenced the composition of the communities that recruited into these ponds. These results provide further evidence of recruitment limitation in this system. Results from this study highlight the importance behaviorally limited dispersal may have in taxa morphologically capable of broad dispersal and suggest that the role of dispersal and recruitment limitation may be critical in shaping community structure across habitat gradients that include variation in habitat duration.” (Author)] Address: McCauley, S. J., Center for Population Biology, One Shields Avenue, 2320 Storer Hall, Univ. of California, Davis, CA 95616, USA. E-mail: sjmccauley@ucdavis.edu

5987. McGuffin, M.A.; Baker, R.L.; Forbes, M.R. (2006): Detection and avoidance of fish predators by adult *Enallagma damselflies*. *Journal of Insect Behavior* 19(1): 77-91. (in English). [“Reproductive success of iteroparous insects depends on their own survival as well as that of their offspring and thus adults should consider risk of predation to both themselves and their offspring when selecting a suitable place to lay eggs. We surveyed species composition of *Enallagma damselflies* from sites in eastern Ontario and found that, similar to studies in Michigan, USA, *Enallagma boreale* does not co-exist with fish, whereas *E. signatum* is apparently restricted to sites with fish. *E. ebrium* is found at fish and fishless sites. Laboratory experiments on these species showed no effect of chemical cues of fish presence on propensity to oviposit or number of eggs released. By using field enclosures, we found adult *E. ebrium* could detect and avoid fish during visits to a site, but females visiting fish sites did not significantly reduce oviposition duration.” (Authors)] Address: Baker, R.L., Dept Zoo], Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6. Canada. e-mail: rbaker@credit.erin.utoronto.ca

5988. McMillan, V.E. (2006): Preliminary observations of reproductive behavior in *Arigomphus villosipes* (Selys) (Anisoptera: Gomphidae). *Bulletin of American Odonatology* 10(1): 19-22. (in English). [“I studied the behavior of the *A. villosipes* (Unicorn Clubtail) at a small artificial pond in New York State from 6 June-8 July 2002. Throughout the day males adopted perch sites

along the shoreline, typically 3 m or farther apart. Most of their time was spent perching, interrupted by brief patrols or chases of other males. Marking records showed that most males (79%) returned to the pond on one or more subsequent days. Individual males displayed only weak attachment to perch sites, often occupying two or more different areas along the shoreline over several hours on a given day. Female visits to the pond were brief and infrequent; pair formation occurred at the water, whereupon the pair left the pond to mate. Females oviposited by flying slowly over shallow water, dipping the abdomen once or twice at multiple sites; mate-guarding was never observed. Suggestions are given for future studies of this species.” (Author)] Address: McMillan, Vicky, Colgate Univ., Dept. Biol., 13 Oak Dr. Hamilton, NY 13346-1398, USA . E-mail: vmcmillan@mail.colgate.edu

5989. Meurgey, F. (2006): A possible economic impact of libellulid larvae on production of freshwater shrimps in Guadeloupe, French West Indies (Anisoptera: Libellulidae). *Notulae Odonatologicae* 6(7): 79-80. (in English). [“Tentatively impacts of *Pantala flavescens* - larvae on shrimp farming are reported.”] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5990. Meurgey, F. (2006): Les Odonates du département de Loire-Atlantique Nouvelles espèces et observations récentes. *Martinia* 22(2): 65-70. (in French, with English summary). [“Since the publication (2000) of a survey of Loire-Atlantique department odonata fauna (France), new records resulting from prospecting carried out from 2000 to 2005 are presented. Three species are new for the department (*Anax junius*, *A. parthenope* and *Lestes macrostigma*) and for eight others, previously known, our knowledge on their status and distribution increased.” (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5991. Meurgey, F. (2006): Présence ancienne de *Sympetrum danae* (Sulzer, 1776) dans le département de Loire-Atlantique (Odonata, Anisoptera, Libellulidae). *Martinia* 22(2): 82. (in French). [France; a historic record of *S. danae* is documented and discussed.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5992. Meurgey, F. (2006): Richesse et diversité des Odonates de 51 mares de l'archipel guadeloupéen. Extrait du rapport de mission Muséum Nantes 2004. *Martinia* 22(3): 119-132. (in French, with English summary). [“A study carried out in March-April 2004 on 51 ponds of Guadeloupe archipelago, shows that 22 species of dragonflies breed regularly in this type of habitat. In a context of regular dryness and increasing urbanization, ponds of Guadeloupe tend to rarefy. A typology based on the uses and the general environment is proposed as a working tool for the future surveys.” (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5993. Meurgey, F. (2006): Signalement de *Sympecma fusca* (Vander Linden, 1820), *Gomphus vulgatissimus* (L., 1758) et *Libellula fulva* (Müller, 1764) dans le dé-

partement des Pyrénées-Orientales. *Martinia* 22(2): 64. (in French). [France; records of the three species are documented. These records update the regional list to 52 species.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

5994. Meurgey, F. (Coord. & Red.) (2006): Les Odonates des Départements et Collectivités d'Outre-mer français. Société française d'odonatologie. ISBN: 2950729169: 144 pp. (in French, with English summary). ["France counts 10 overseas territories distributed around the world. Mainly located in the Tropics, these territories relate to a great diversity of habitats and species. In 1999, the "Société Française d'Odonatologie" created a study group on dragonflies fauna of the French overseas territories. This group is in charge to contribute to the advance of knowledge on faunas still imperfectly known, as well from a systematic point of view as of biology and ecology. The level of knowledge of each department or territory of Overseas is not equal, since is subjected to various constraints such as the surface, accessibility and also number of species to be considered. The Nantes Museum of Natural History takes part in these studies in various manners, such as conservation of collections, missions in West Indies, publications. Since the creation of this group, 42 papers were published (31 in *Martinia* review), solely or included in a supplement (2001), and two thematic issues (2002, 2004). 179 new species could be added to the lists of the geographical areas by the members of this Group. The French Overseas departments and territories currently gather 363 species. France gathers 8% of world dragonfly fauna, and thus has an important responsibility as regards conservation of the species and their habitats." (Author)] Address: Société française d'odonatologie (SFO), 7, rue Lamartine, F-78390 Bois d'Arcy, France

5995. Michalski, J. (2006): *Neurobasis awamena* sp. nov. from New Guinea, with a discussion of the Sulawesi and Papuan species in the genus (Odonata: Calopterygidae). *International Journal of Odonatology* 9 (2): 185-195. (in English). [*N. awamena* "from the southern highlands of New Guinea (holotype: Pimaga area, 6°30'S, 143°30'E, 27 vii 1994, deposited at Naturalis, Leiden) is described and figured. It is distinguished from the widespread *N. australis* by its longer legs, irregular teeth on the male cerci, and the sharp demarcation of the iridescent color on the male hindwings. Its combined characters prompted a re-examination of the variability of *N. australis* throughout its range, and of the characters formerly used to distinguish the species of *Neurobasis* occurring from Sulawesi to the Bismarck Archipelago. A table comparing these species, a key, and a distribution map of the New Guinean species are provided." (Author)] Address: Michalski, J., 223 Mount Kemble Avenue, Morristown New Jersey 07960, USA. E-mail: jmichalski@easthanoverschools.org

5996. Mikolajewski, D.J.; Johansson, F.; Wohlfahrt, B.; Stoks, R. (2006): Invertebrate predation selects for the loss of a morphological antipredator trait. *Evolution* 60(6): 1306-1310. (in English). ["Antagonistic selection by different predators has been suggested to underlie variation in morphological antipredator traits among and within species. Direct empirical proof is equivocal, however, given the potential interrelationships of morphological and behavioral traits. Here, we tested whether

spines in larvae of the dragonfly *Leucorrhinia caudalis*, which are selected for by fish predators, are selected against by invertebrate aeshnid predators. Using a manipulative approach by cutting spines instead of making comparisons among species or inducing spines, we were able to decouple the presence of spines from other potentially covarying morphological antipredator traits. Results showed survival selection for the loss of spines imposed by invertebrate predation. Moreover, spined and nonspined larval *L. caudalis* did not differ in the key antipredator behaviors, activity level, and escape burst swimming speed. The observed higher mortality of spined larvae can therefore be directly linked to selection by aeshnid predation against spines." (Authors)] Address: Mikolajewski, D.J., Laboratory for Aquatic Ecology, Katholieke Universiteit Leuven, Charles de Bériotstr. 32, B-3000 Leuven, Belgium. E-mail: d.mikolajewski@tu-bs.de

5997. Miller, E.; Miller, J. (2006): Beobachtungen zum winterlichen Verhalten von *Sympecma fusca* (Odonata: Libellula 25(3/4): 119-128. (in German, with English summary). ["In the region of Starnberg (Bavaria, Germany) we found that in autumn most individuals disappeared from the surroundings of a pond and probably moved by stages to their hibernation site. They first stayed at forest edges and subsequently moved to a sunny clearing where they foraged until the first cold snap. During periods with frost and snow they were found perched on plants close to the ground and stayed immobile during snowfall. In cold they were able to move on plant stems up to temperatures of -4°C. Some individuals died because they were trapped in thawing snow, unable to climb higher. Dead individuals were recognized by their brown-red eyes." (Authors)] Address: Miller, Elfi, Miller, J., Leharstraße 6c, D-861 79 Augsburg, Germany

5998. Mitra, T.R. (2006): Handbook on Common Indian Dragonflies : Insecta: Odonata . ISBN 8181710886: 136 pp. (in English). [119 odonate species are described and in most cases pictured with (colour) photographs and/or hand-made paintings. In addition, some brief information of habitat, habits, and distribution are outlined. The following species are treated: 1. *Matrona basilaris basilaris* Selys. 2. *Neurobasis chinensis chinensis* Linnaeus. 3. *Vestalis smaragdina smaragdina* Selys. 4. *Vestalis gracilis* (Rambur). 5. *Vestalis apicalis apicalis* Selys. 6. *Echo margarita margarita* Selys. 7. *Euphaea cardinalis* (Fraser). 8. *Euphaea guerini masoni* Selys. 9. *Euphaea ochracea ochracea* Selys. 10. *Bayadera indica* (Selys). 11. *Anisopleura comes* Selys. 12. *Anisopleura subplatystyla* Fraser. 13. *Rhinocypha cuneata* Selys. 14. *Rhinocypha immculata* Selys. 15. *Rhinocypha bisignata* Selys. 16. *Rhinocypha bifasciata* Selys. 17. *Rhinocypha trifasciata* Selys. 18. *Rhinocypha unimaculata* Selys. 19. *Rhinocypha ignipennis* Selys. 20. *Rhinocypha spuria* Selys. 21. *Rhinocypha quadrimaculata* Selys. 22. *Rhinocypha fenestrella fenestrella* Rambur. 23. *Libellago lineata* (Burmeister). 24. *Disparoneura quadrimaculata* (Rambur). 25. *Caconeura gomphoides* (Rambur). Family Platygnemididae 26. *Cocliccia bimaculata* Laidlaw. 27. *Copera marginipes* (Rambur) 28. *Copera vittata serapica* (Selys). 29. *Copera vittata assamensis* Laidlaw. 30. *Copera ciliata* (Selys). 31. *Calicnemia miniata* (Selys). 32. *Calicnemia miles* Laidlaw. 33. *Calicnemia eximia* Selys. 34. *Lestes elatus* Hagen. 35. *Lestes viridulus* Rambur. 36. *Lestes nodalis* Selys. 37. *Lestes umbrinus*

Selys. Family Synlestidae 38. *Megalestes major* Selys. 39. *Pseudagrion microcephalum* (Rambur). 40. *Pseudagrion decorum* (Rambur). 41. *Pseudagrion rubriced* Selys. 42. *Pseudagrion hypermelas* Selys. 43. *Pseudagrion australasiae* Selys. 44. *Ceriagrion coromandelianum* (Fabricius). 45. *Ceriagrion cerinorubellum* (Brauer). 46. *Ceriagrion olivaceum* Laidlaw. 47. *Ischnura senegalensis* Rambur. 48. *Ischnura forcipata* Morton. 49. *Ischnura aurora aurora* (Brauer). 50. *Rhodischnura nursei* (Morton). 51. *Agriocnemis femina femina* (Brauer). 52. *Agriocnemis lacteola* Selys. 53. *Agriocnemis pygmaea pygmaea* (Rambur). 54. *Onychargia atrocyana* Selys. 55. *Enallagma parvum* Selys. 56. *Cercion malayanum* (Selys). 57. *Aciagrion azureum* Fraser. 58. *Aciagrion hisopa hisopa* (Selys). 59. *Aciagrion approximans* (Selys). 60. *Aciagrion pallidum* Selys. 61. *Macrogomphus montanus* Selys. 62. *Paragomphus lineatus* (Selys). 63. *Stylogomphus inglisi* Fraser. 64. *Phaenandrogomphus aureus* (Laidlaw) 65. *Onychogomphus striatus* Fraser. 66. *Ictinogomphus rapax* (Rambur). 67. *Hemianax ephippiger* (Burmeister) 68. *Anax parthenope parthenope* Selys. 69. *Anaciaeschna jaspædia* (Burmesister). 70. *Anax guttatus* (Burmeister). 71. *Gynacantha dravida* Lieftinck. 72. *Gynacantha bainbriggei* Fraser. 73. *Gynacantha bayadera* Selys. 74. *Gynacantha basiguttata* Selys. 75. *Chlorogomphus preciosus preciosus* Fraser. 76. *Chlorogomphus atkinsoni* (Selys). 77. *Anotogaster nipalensis* Selys. Family Corduliidae 78. *Epophthalmia vittata vittata* Burmeister. 79. *Macromia moorei moorei* Selys. 80. *Macrodiplax cora* (Brauer). 81. *Potamarcha congener* (Rambur). 82. *Acisoma panorpoides panorpoides* Rambur. 83. *Lathrecista asiatica asiatica* (Fabricius). 84. *Neurothemis tullia tullia* (Drury). 85. *Neurothemis fluctuans* (Fabricius). 86. *Neurothemis intermedia intermedia* (Rambur). 87. *Neurothemis fulvia* (Drury). 88. *Brachydiplax farinosa* Kruger. 89. *Brachydiplax chalybea chalybea* Brauer. 90. *Brachydiplax sobrina* (Rambur). 91. *Indothemis carnatica* (Fabricius). 92. *Tramea basilaris burmeisteri* Kirby. 93. *Tramea virginia* Rambur. 94. *Pantala flavescens* (Fabricius). 95. *Tholymis tillarga* (Fabricius). 96. *Zyxomma petiolatum* Rambur. 97. *Diplacodes trivialis* (Rambur). 98. *Diplacodes nebulosa* (Fabricius). 99. *Urothemis signata signata* Rambur. 100. *Aethriamanta brevipennis brevipennis* (Rambur). 101. *Nannophya pygmaea* Rambur. 102. *Orthetrum pruinosum neglectum* (Rambur). 103. *Orthetrum subina sabina* (Drury). 104. *Orthetrum trianguläre trianguläre* (Selys). 105. *Orthetrum chrysis* Selys. 106. *Orthetrum glaucum* (Brauer). 107. *Orthetrum taeniolatum* (Schneider). 108. *Orthetrum cancellatum cancellatum* (Linnaeus). 109. *Orthetrum japonicum internum* MacLachlan. 110. *Orthetrum luzonicum* (Brauer). 111. *Palpopleura sexmaculata sexmaculata* (Fabricius). 112. *Crocothemis servilia servilia* (Drury). 113. *Bradinopyga geninata* (Rambur). 114. *Brachythemis contaminata* (Fabricius). 115. *Sympetrum hypomelas* (Selys). 116. *Trithemis pallidinervis* (Kirby). 117. *Trithemis aurora* (Burmeister). 118. *Trithemis festiva* (Rambur). 119. *Rhyothemis variegata variegata* (Linnaeus).] Address: Mitra, T.R., Zoological Survey of India, M-Block, New Alipore, Kolkata-70053, India

5999. Müller, J. (2006): Libellen als Nachhaltigkeitsindikatoren für die ökologische Gewässerqualität. halophila, Mitt.-Bl. FG Faun. u. Ökol. Staßfurt 50: 6-7. (in German). [Sachsen-Anhalt, Germany; indicator system for habitat characterisation by Odonata.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

6000. Müller, J.; Steglich, R.; Lotzing, J.; Hahn, W. (2006): Vorläufige Mitteilung über bemerkenswerte Beobachtungen im Jahre 2005 (Odonata, Saltatoria; Aves). 1. Erneuter Fund der Gestreiften Quelljungfer *Cordulegaster bidentata* im Harz; 2. Erstnachweise von Grüner Flußjungfer *Ophiogomphus cecilia* und Feuerlibelle *Crocothemis erythraea* in der Bodeniederung als Schwalben-Nahrung. halophila, Mitt.-Bl. FG Faun. u. Ökol. Staßfurt, 49: 9-10, (in German). [1. On August 2, 2006, larvae of *Thecagaster bidentata* were recorded in the NSG Großer Ronneberg-Bielstein (Harz mountains), Wolfsbach, Sachsen-Anhalt, Germany. 2. In June 29, 2006, nestlings of *Hirundo rustica* (Aves) were tried to be fed in vain with large dragonfly imagines. Among these have been *Calopteryx splendens*, *Ophiogomphus cecilia* (Beleg in coll. JM), *Orthetrum cancellatum*, and *Crocothemis erythraea*. The latter record is the third proof of this range extending species in Sachsen-Anhalt, Germany.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.Jmueller@t-online.de

6001. Nel, A.; Arillo, A. (2006): The first Baltic amber dysagrionine damselfly (Odonata: Zygoptera: Thaumato-neuridae: Dysagrioninae). Ann. soc. entomol. Fr. (n.s.) 42(2): 179-182. (in English, with French summary). [Poland; "A new genus and species *Electrophenacolestes serafini* is described. It is the first Thaumato-neuridae recorded from an amber deposit and the second record of the family in the European Paleogene. A comparison with related genera and families is done." (Authors)] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

6002. Novelo-Gutiérrez, R.; Gómez-Anaya, J.A. (2006): A description of the larva of *Argia funcki* (Selys, 1854) (Odonata: Zygoptera: Coenagrionidae). Proceedings of the Entomological Society of Washington 108(2): 261-266. (in English, with Spanish summary). ["The last instar larva of *Argia funcki* (Selys) is described and illustrated. A comparison to its closest relative, *Argia lugens* (Hagen), is provided. The scalelike setae on sternite 8 and gonapophyses, and the bluntly-tipped gonapophyses easily separate *A. funcki* larva from that of *A. lugens*. The larva of *A. funcki* belongs to the group of species with ligula very prominent and one palpal seta; it is the largest of all known larvae of the genus." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

6003. Nuckowska, K.; Krzyżanowska, I. (2006): Fauna and flora in two city-centre water reservoirs in Gorzów Wielkopolski. Teka Kom. Ochr. Kszt. Środ. Przyn. 3: 153-159. (in English, with Polish summary). [Poland; 2003, 7 taxa of generally common species are listed from the two water bodies.] Address: Nuckowska, Kinga, State School of Higher Vocational Education in Gorzów, Teatralna str. 25, PL-66-400 Gorzów Wielkopolski, Poland. E-mail: kinianuc@wp.pl

6004. Ott, J. (2006): Der Zweifleck - *Epithea bimaculata* (Charpentier, 1825) - nun auch am Gelterswoog bei Kaiserslautern (Insecta: Odonata: Corduliidae). Fauna Flora Rheinland-Pfalz 10(4): 1339-1347. (in German, with English summary). ["*E. bimaculata* is an endange-

red corduliid dragonfly which is listed in the federal state and national red list of dragonflies, but presently obviously increasing its range. A new population from the Gelterswoog (a lake near Kaiserslautern/Rhineland-Palatinate, Germany, which is part of a nature reserve and an area according to the EC habitats directive) is reported. The circumstances of this observation are discussed as well as some nature conservation problems concerning the lake which is also used for recreation purposes." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.-GmbH@t-online.de

6005. Ott, J. (2006): Die Arktische Smaragdlibelle - *Somatochlora arctica* (Zetterstedt, 1840) - in der Pfalz: übersehen oder kurz vor dem Aussterben? (Insecta: Odonata: Corduliidae). Fauna Flora Rheinland-Pfalz 10 (4): 1323-1338. (in German, with English summary). ["*S. arctica* is one of the rarest dragonflies in the Palatinate and presently only one autochthonous population south of Trippstadt (near Kaiserslautern / Rhineland-Palatinate, Germany) is known to be existing. Several former breeding sites of the species were degraded or destroyed in the past but there is still in principal the possibility of a resettlement from populations of the French sites in the Northern Vosges; presently however the biotope conditions for the species in most of the waters are not adequate due to the lack of water and also effects of climatic changes. As the species could have been overlooked in some areas due to not being conspicuous an intensive mapping in the remaining 'good' biotopes is recommended which should take place as part of a special species protection programme for mooreland dragonflies in the Palatinate." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.-GmbH@t-online.de

6006. Ott, J. (2006): Die Südliche Binsenjunger – *Lestes barbarus* (Fabricius, 1798) - erobert den Pfälzerwald (Insecta: Odonata: Lestidae). Fauna Flora Rheinland-Pfalz 10(4): 1315-1321. (in German, with English summary). ["In 2005 *L. barbarus* was discovered for the first time in the central Palatinate forest at the nature reserve „Pfälzerwoog“ near Fischbach/Dahn (Rhineland-Palatinate, Germany), where the species meanwhile is breeding, as in 2006 a big population was registered. The reasons for settling at the water are the new and extensive open shores with a scarce *Juncus*-vegetation as a consequence of the decrease of the water table in the lake and general climatic changes in the area. The origin of the population is probably the „Bienwald“, a nature reserve situated east of the area in a distance of 20 kilometers, separated by more or less dense forests. Another new locality of *Lestes barbarus* was recently discovered near Kaiserslautern, which is located about 35 km north of the Fischbach population and 30 km west of the „Haardtrand“ or „Donnersberg“ populations." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.-GmbH@t-online.de

6007. Ott, J. (2006): Libellen im Bienwald -Ergebnisse der Untersuchungen im Rahmen des Naturschutzgroßprojektes - Vortrag von Dr. Jürgen Ott im Rahmen des AK Pfalz-Treffen am 11.03.2006. GNOR Info 102: 10. (in German). [Brief introduction and assessment of the odonate fauna of the Bienwald region in southern Rhineland-Palatinate, Germany.] Address: Ott, J., Friedhof-

str. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.-GmbH@t-online.de

6008. Parr, A. (2006): Views and Reviews: Field guide to the Dragonflies of Britain and Europe.. *Atropos* 29: 59-60. (in English). [Review of Dijkstra & Lewington 2006; see OAS 5893.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

6009. Peacor, S.D. (2006): Behavioural response of bullfrog tadpoles to chemical cues of predation risk are affected by cue age and water source. *Hydrobiologia* 573: 39-44. (in English). ["When confronted by signals of predators presence, many aquatic organisms modify their phenotype (e.g., behaviour or morphology) to reduce their risk of predation. A principal means by which organisms assess predation risk is through chemical cues produced by the predators and/or prey during predation events. Such responses to predation risk can directly affect prey fitness and indirectly affect the fitness of species with which the prey interacts. Accurate assessment of the cue will affect the adaptive nature, and hence evolution, of the phenotypic response. It is therefore, important to understand factors affecting the assessment of chemical cues. Here I examined the effect of the age of chemical cues arising from an invertebrate predator, a larval dragonfly (*Anax junius*), which was fed bullfrog tadpoles, on the behavioural response (activity level and position) of bullfrog tadpoles. The bullfrog response to chemical cues declined as a function of chemical cue age, indicating the degradation of the chemical cue was on the order of 2–4 days. Further, the decay occurred more rapidly when the chemical cue was placed in pond water rather than well water. These results indicate a limitation of the tadpoles to interpret factors that affect the magnitude of the chemical cue and hence accurately assess predation risk. These findings also have implications for experimental design and the adaptation of phenotypic responses to chemical cues of predation risk." (Author)] Address: Peacor, S.D., Department of Fisheries and Wildlife, Michigan State University, 13 Natural Resources Building, East Lansing, MI 48824-1222, USA. E-mail: Peacor@msu.edu

6010. Pelný, H.-J. (2006): Erster Nachweis von *Anax parthenope* auf dem Madeira-Archipel (Odonata: Aeshnidae). *Libellula* 25(1/2): 27-30. (in German, with English summary). [30.VIII. 2005; island of Porto Santo, Madeira archipelago, Portugal] Address: Pelný, H.-J., Zieritz 2, D-29597 Stötze, Germany. E-mail: hans.pelný@web.de

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6012. Petzold, F. (2006): Parasitierung von Libellen durch Wassermilben an einem Moorsee in Nordbrandenburg (Odonata; Hydrachnidia). *Libellula* 25(3/4): 185-198. (in German, with English summary). ["All those odonate species of which numerous individuals from the locality were investigated proved to be infested by

water mite larvae. The infestation rate of the different species amounted to 0.24 to 0.98 (mean: 0.65). In all species half of the infested individuals bore less than 15 mites. Occasionally, heavy parasite load was found, the maximum value per individual being 278 for Zygoptera (*Pyrrhosoma nymphula*) and 1136 for Anisoptera (*Corulia aenea*). With respect to the attachment sites of the mites on the dragonfly body clear differences between Zygoptera and Anisoptera were found. While in the former the parasites clung to the underside of the thorax and abdomen, in the latter they were attached ventrally to the abdomen, preferentially to S7-S9. Both, non-infested and infested as well as formerly heavily parasitized individuals participated in tandem formation in a proportion corresponding to that in the whole population. Compared with non-infested individuals, infested individuals exhibited no impairment of their reproductive behaviour." (Author)] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

6013. Piksa, K.; Wachowicz, B.; Kwarcńska, M. (2006): Dragonflies (Odonata) of some small anthropogenic water bodies in Cracow City. *Fragmenta faunistica* 49(2): 81-89. (in English with Polish summary). [A survey of the Odonata of small anthropogenic water bodies in Cracow (southern Poland) in the years 2001–2004 resulted in records of 38 species. Of special interest are many southern and southeastern species e.g. *Aeshna affinis*, *Orthetrum albistylum*, *Sympetrum fonscolombii*, and *Crocothemis erythraea*, and tyrphobiontic and tyrphophilous species as *Coenagrion hastulatum*, *Lestes sponsa*, *S. danae*, *Leucorrhinia dubia*, and *L. rubicunda*. The importance of these secondary habitats for the conservation of dragonflies is discussed.] Address: Piksa, K., Cracow Pedagogical University, Institute of Biology, ul. Podbrzezie 3, 31-054 Kraków, Poland. E-mail: krzychu@ap.krakow.pl

6014. Plotnikova, S.I.; Isavnina, I.L. (2006): Data in favor of possible olfactory function of the antennal nerve and lateral lobe of protocerebrum of larva of the dragonfly *Aeshna grandis*. *Journal of Evolutionary Biochemistry and Physiology* 42(3): 338-341. (in English). ["Using staining with methylene blue of larvae of dragonflies of the genus *Aeshna* sp. (2000 animals) the antennal nerve was shown to be connected with the lateral lobe of protocerebrum with a septum, through which sensory fibers enter the lobe. Near the lateral lobe of the antennal nerve, two enlargements are found, which contain motor neurons of antennal muscle as well as the incoming sensory fibers of antennal receptors and descending lateral bundles of fibers of lobes of mushroom bodies. In the lateral lobe of protocerebrum there is revealed arborization of neurons with terminal apparatuses similar to endings of the descending neuron of the glomerular antennal tract of the domestic fly. Original Russian Text published in *Zhurnal Evolyutsionnoi Biokhologii i Fiziologii*, 2006, Vol. 42, No. 3, pp. 269–272." (Authors)] Address: Plotnikova, S.I., Isavnina, I.L., (1) Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia

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from several Late Mesozoic sites in eastern Transbaikalia (Ukurei, Tergen', Glushkovo, and Byankino formations), new genera and species are described: *Xeta olivica*, *Dahurium draco*, and *Sinitia sophia*. The insect-bearing deposits are dated Late Jurassic according to analysis of their odonofauna." (Author)] Address: Pritykina, L.N., Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow 117997, Russia. E-mail: lab@palaeoentomolog.ru

6016. Proess, R. (2006): Rote Liste der Libellen Luxemburgs. 3. Fassung, 2006 (Insecta, Odonata). *Bulletin de la Société des naturalistes luxembourgeois* 107: 123-130. (in German, with English summary). ["The third, updated Red Data List including all 62 species of dragonflies (Odonata) so far recorded in Luxembourg is presented. 12 species are considered to be Regionally Extinct (RE), 1 is Critically Endangered (CR), 2 are Endangered (EN), 2 are Vulnerable (VU), 2 are Near Threatened (NT), 6 are Extremely Rare (R) and 35 others (56%) may be considered safe (LC)." (Author)] Address: Proess, R., Umweltplanungsbüro Ecotop, 6, rue Gustave Kahnt, L-1851 Luxembourg. E-mail: ecotop@pt.lu

6017. Reece, B.A. (2006): Growth and development of a model research organism (*Enallagma civile*, Insecta: Odonata) in Playa lakes of the southern high plains, TX. Texas Tech University, Department of Biological Sciences. Graduate Student Forum. Program and Abstracts. April 10-14, 2006: (in English). [Verbatim: Cropland agriculture and grazing grassland represent the two major land uses for the Southern High Plains of Texas. These different land uses have varying impacts on surrounding biological systems. Playa lakes (the only source of aquatic habitat in a region over 100,000 km² in area) are greatly affected by these forms of land use. In particular, hydroperiod has been shown to be significantly shortened in cropland regions due to increased sedimentation. The impacts of this disturbance have been hypothesized to affect the rate of growth of larval damselflies in playa lakes surrounded by cropland. Like many other amphibious organisms, damselflies exhibit phenotypic plasticity in growth rate in response to environmental cues about habitat longevity or quality, resulting in a tradeoff between rapid growth and large body size at adult emergence. However, this tradeoff has not been examined as a function of anthropogenic land use surrounding playas. The impacts of different surrounding forms of land use were investigated using a model organism (*Enallagma civile*) placed in field enclosures in a transfer experiment in a replicated series of playa lakes. Growth and development parameters were estimated as well as various environmental correlates such as temperature, turbidity, pH, dissolved oxygen, and prey availability. Results to date suggest that growth and development are influenced by at least some these environmental correlates. Because various population and community parameters are dictated by adult body size (such as fitness), an understanding of how human land use affects individual ontogeny can shed light on higher-order ecological properties.] Address: <http://www.orgs.ttu.edu/biologistassociation/TTUABGradForum2006.pdf>

6018. Reels, G.T.; Dow, R. (2006): Underwater oviposition behaviour in two species of Euphaea in Borneo and Hong Kong (Odonata: Euphaeidae). *International Journal of Odonatology* 9(2): 197-204. (in English).

["Submerged oviposition behaviour by female *Euphaea decorata* and *E. subcostalis* is reported. *E. decorata* descended to within 10 cm of the stream bottom and oviposited endophytically for a total of 59 min. An *E. subcostalis* female descended 3 cm to dead leaves at the stream bottom and stayed submerged for 20-25 s. Noncontact guarding by the male was observed in both cases. Submerged oviposition into substrates near to the stream bottom may be common behaviour for members of the Euphaeidae." (Authors)] Address: Reels, G.T., 1C-6-26, Fairview Park, Yuen Long, N.T., Hong Kong. E-mail: gtreels@asiaecol.com.hk

6019. Rollinger, F. (2006): Feuchtgebiete und Rote Listen: *Gomphus flavipes* und *Libellula fulva*. *Regulus* 11: 9. (in German). [*Stylurus flavipes* is reported as extinct in Luxembourg. In 2006, *L. fulva* established along the rivers Alzette and Kiemelbach near Schiffingen a quite strong population.] Address: Rollinger, Françoise, c/o *Regulus*-Redaktion, Kräizhaff, route de Luxembourg, L-1899 Kockelscheuer, Luxemburg

6020. Rouquette, J. (2006): Itchen Navigation Odonata & Butterflies Survey 2006. <http://www.hwt.org.uk/files/odonata%20and%20butterfly%20survey%202006.pdf>: 32 pp. (in English). ["The Itchen Navigation Heritage Trail Project is a major Lottery funded scheme to restore and enhance the historic, cultural and wildlife value of this historic waterway. Major engineering works will shortly be undertaken to improve the structural integrity and the wildlife value of the Navigation. This study was therefore commissioned to carry out a comprehensive survey for Odonata (dragonflies and damselflies) and butterflies. The main aims were to provide information on the existing status of the Navigation and to make recommendations on habitat enhancement to guide the engineering works. The survey has focussed particular attention on the Southern Damselfly (*Coenagrion mercuriale*), a BAP priority species that is listed on the EC Habitats Directive. The Itchen valley contains an internationally important population of this endangered species and much of the valley has been designated as an SAC with the Southern Damselfly as a key interest feature. The entire length of the Navigation was divided into 500m sections and surveyed in July 2006. The key findings are: • The Southern Damselfly was recorded at one location on the Navigation (Section 22) and a review of previous surveys has revealed that it has been recorded in low numbers at 3 further locations (Sections 14, 16 and 20). • 9 other species of Odonata were recorded, with *Calopteryx splendens* (the Banded Demoiselle) the most common species present. • 20 species of butterfly were seen. None of these are restricted to habitat in or around the Navigation, but the Navigation still has an important role to play in providing nectar sources, shelter and foodplants. None of the Itchen Navigation provides optimal habitat for the Southern Damselfly at present, but many sections could be improved with sympathetic management works. Furthermore, the Navigation can act as a corridor providing vital links between existing colonies, and as a water source for rewetting the surrounding meadows. Detailed management recommendations for the Southern Damselfly and other species are provided. Principally this involves the creation of wide shallow margins at the edge of the Navigation where broad leaved emergent vegetation can flourish. Re-profiling of the banksides is required in many places, along with tree and scrub clearance in some areas to reduce the amount of shading."] Address: Rou-

quette, J.R., 3 Arreton Close, Leicester LE2 3PP, UK. E-mail: jimrouquette@hotmail.com

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6023. Salur, A.; Kryak, S. (2006): Additional records for the Odonata fauna of east mediterranean region of Turkey. *Munis Entomology & Zoology* 1(2): 239-252. (in English). [52 species and subspecies are documented with details from the Turkish provinces Mersin, Adana, Hatay, Kahramanmars and Osmaniye in the east mediterranean region and collected in July-September 2002 and April-August 2003. *Ischnura intermedia* is a new record for the regional fauna.] Address: Salur, A., Hitit University, Arts & Sciences Fac. of Corum, Biology Dept, 19030 Corum. Turkey. E-mail: alisalur@gmail.com

6024. Schiel, F.-J.; Hunger, H. (2006): Bestandssituation und Verbreitung von *Ophiogomphus cecilia* in Baden-Württemberg (Odonata: Gomphidae). *Libellula* 25 (1/2): 1-18. (in German, with English summary). ["From 2003 to 2005, 185 sections of 81 running waters in Baden-Württemberg, Germany were surveyed for the presence of *O. cecilia*. Prior to 2003, only 19 waters were known to harbour this species. In 2005, this number had risen to 35. In at least 28 (80 %) of these waters with a total length of 188 km, *O. cecilia* was indigenous. Larger populations existed exclusively in a few waters in the region of Nordbaden, at altitudes of less than 150 m above sea level, where the density of colonised waters was also the highest in Baden-Württemberg, and in the High Rhine. All other populations were small and more or less isolated. The positive trend of the species coincides with an improvement of water quality since the 1970s. With the exception of the High Rhine

upstream of the mouth of River Aare, 'moderately contaminated' and 'critically contaminated' waters were colonised equally well. In spite of this positive population trend, the sp. is still subject to various threats: intensive management as well as inappropriate restoration of water courses, especially establishment of dense woody vegetation along the shores, and eutrophication." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

6025. Schiel, F.-J. (2006): Nachweis einer zweiten Jahresgeneration von *Erythromma najas* (Odonata: Coenagrionidae). *Libellula* 25(3/4): 159-164. (in German, with English summary). ["At a pond southwest of Karlsruhe (Upper Rhine valley, Germany), which was created in December 2005, eight exuviae of *E. najas* were recorded on 19-VII and 03-VIII-2006. Exuviae of *E. lindenii*, *Ischnura elegans*, *Anax imperator*, *Crocothemis erythraea* and *Sympetrum fonscolombii* were also found at this site in 2006. The pond was created in December 2005, had no connection with other waterbodies and no hydrophytes were introduced. Therefore, the exuviae collected could only have originated from eggs laid in May and June 2006. So this is the first record of bivoltine development of *E. najas* under natural conditions and the first central European record of a bivoltine life cycle of *E. lindenii* and *A. imperator*. Probably part of the population of central European coenagrionids has two generations per year, while the main cohort emerges one year after oviposition." (Author)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

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6027. Serrano Meneses, M.A. (2006): Sexual size dimorphism in damselflies, dragonflies and birds: function and development. A thesis submitted for the degree of Doctor of Philosophy, University of Bath, Department of Biology and Biochemistry: 35 pp. (in English). [For the full paper see. <http://www.bath.ac.uk/bio-sci/biodiversity-lab/sexualconflict11.pdf>] Address: not stated

6028. Simaika, J.P.; Cannings, R.A. (2006): The Odonata of Hamilton Marsh. Vancouver Island, British Co-

lumbia, Canada. *Notulae Odonatologicae* 6(7): 72-79. (in English). ["Specimen and sight records of Odonata from Hamilton Marsh, a small wetland on the east coast of Vancouver Island, British Columbia, are presented. Thirty-three species [...] are listed. The biogeography of the fauna is discussed - the site lies at a crossroads of several faunal elements - and notes on behaviour, ecology, habitat structure and succession are included." (Authors)] Address: Simaika, J.P., No. 323-3969 Shelbourne Street, Victoria, British Columbia, V8N 6J5, Canada

6029. Srivastava, D.S. (2006): Habitat structure, trophic structure and ecosystem function: interactive effects in a bromeliad-insect community. *Oecologia* 149 (3) : 493-504. (in English). ["Although previous studies have shown that ecosystem functions are affected by either trophic structure or habitat structure, there has been little consideration of their combined effects. Such interactions may be particularly important in systems where habitat and trophic structure covary. I use the aquatic insects in bromeliads to examine the combined effects of trophic structure and habitat structure on a key ecosystem function: detrital processing. In Costa Rican bromeliads, trophic structure naturally covaries with both habitat complexity and habitat size, precluding any observational analysis of interactions between factors. I therefore designed mesocosms that allowed each factor to be manipulated separately. Increases in mesocosm complexity reduced predator (damselfly larva) efficiency, resulting in high detritivore abundances, indirectly increasing detrital processing rates. However, increased complexity also directly reduced the per capita foraging efficiency of the detritivores. Over short time periods, these trends effectively cancelled each other out in terms of detrital processing. Over longer time periods, more complex patterns emerged. Increases in mesocosm size also reduced both predator efficiency and detritivore efficiency, leading to no net effect on detrital processing. In many systems, ecosystem functions may be impacted by strong interactions between trophic structure and habitat structure, cautioning against examining either effect in isolation."(Author)] Address: Srivastava, Diane S., Department of Zoology and Biodiversity Research Centre, University of British Columbia, 6270 University Blvd., Vancouver, BC, Canada, V6T 1Z4. Email: srivast@zoology.ubc.ca

6030. stax (2006): Die Kleinen Boten des Klimawandels. Die Umschichtung der Lebensräume hat begonnen. In der Pfalz beobachtet der Biologe Jürgen Ott die Auswirkungen des Klimawandels an der Ausbreitung der Feuerlibelle. *Die Rheinpfalz* 242: pp? (in German). [Newspaper report on the bioindication of climatic change in the Pfälzerwald-region, Rhineland-Palatinate, Germany stressing Odonata, and the research activities of Dr. Jürgen Ott, chair of the society of the German speaking odonatologists.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O. GmbH@t-online.de

6031. Steglich, R.; Müller, J. (2006): Südliche Heidelibelle *Sympetrum meridionale* 2006 auch in der Magdeburger Elbaue. *halophila*, Mitt.-Bl. FG Faun. u. Ökol. Staßfurt 50: 24. (in German). [Magdeburg, Sachsen-Anhalt, Germany; Sept. 2006] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

- 6032.** Tennesen, K.J. (2006): Description of the larva of *Gomphus sandrius* Tennesen (Odonata: Gomphidae). Proceedings of the Entomological Society of Washington 108(2): 381-388. (in English). ["The final stadium larva of *Gomphus sandrius* Tennesen is described based on reared specimens from Tennessee. The larva is distinct from *G. exilis* Selys and *G. lividus* Selys (the only species in the subgenus *Gomphus* sympatric with *G. sandrius*) by the greater width to length ratio of abdominal segment 9 venter (mean 1.82, range 1.69–1.96 in *G. sandrius* vs. mean 1.43, range 1.23–1.57 in *G. lividus* and mean 1.40, range 1.26–1.52 in *G. exilis*). It differs further from *G. lividus* in the narrower prementum (2.40–2.90 mm vs. 3.00–3.75 mm and shorter antennal segment 3 (1.15–1.35 mm vs. 1.50–1.90 mm). The larva of *G. sandrius* is most similar to the allopatric *G. graslinellus* Walsh, but antennal segment 3 is shorter (*G. sandrius*: mean 1.25 mm, range 1.15–1.35 mm; *G. graslinellus*: mean 1.45 mm, range 1.35–1.55 mm)."] (Author)] Address: Tennesen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennesen@centurytel.net
- 6033.** Ternois, V. (2006): Sur la présence d'*Oxygastra curtisii* (Dale, 1834) dans le Parc naturel régional de la Forêt d'Orient et le département de l'Aube (Odonata, Anisoptera, Corduliidae). *Martinia* 22(3): 99-107. (in French, with English summary). [New records of *O. curtisii* in the Champagne-Ardenne region are presented from 2005 for the Département Aude, France.] Address: Ternois, V., CPIE du Pays de Soulaïnes, Domaine de Saint-Victor, F-10200 Soulaïnes-Dhuys, France. E-mail: cpie.pays.soulaïnes@wanadoo.fr
- 6034.** Theischinger, G.; Hawking, J. (2006): The complete field guide to dragonflies of Australia. CSIRO Publishing. ISBN 0 643 09073 8 (paperback). 366 pp. (in English) [The book covers all 30 families, 110 genera and 324 species found in Australia. Features: Full colour images of all species. Distribution maps for all species. Separate identification keys for both adults and larvae. Contents: Introduction; Species guide - Zygoptera, Species guide - Epiproctophora/Anisoptera; illustrated glossary; keys to adults; keys to larvae; checklist of species; references and further reading; index of scientific names; index of common names.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia
- 6035.** Torralba-Burrial, A.; Ocharan, F.J. (2006): Dispersión y proporción sexual en la emergencia en una población de *Sympecma fusca* (Odonata, Lestidae) en Huesca (NE de España). *Bol. R. Soc. Esp. Hist. Nat. (Sec. Biol.)*, 101 (1-4): 29-36. (in Spanish, with English summary). ["Dispersal is a life-history key trait, which is usually due to the adult flight in Odonata. A population of *S. fusca*, inhabiting a temporary pond in the NE of Iberian Peninsula, was analysed by mark-recapture methods. 236 individuals (101 males, 135 females) were marked between July and October of 2000. Sex ratio at emergence was not significantly different from 1:1 and both sexes dispersed equally. They left the pond upon emergence, and returned neither to it nor its surrounding area in summer. Any marked individual was found neither in the nearest ponds (< 3 km) nor in other ponds of the shire. Overwintering individuals were observed amid the vegetation at pond edge, however there was not any marked one among them. This suggests a total absence of philopatry in this species, unlike behaviour observed in other lestid damselflies, what is discussed." (Authors)] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es
- 6036.** Tsubaki, Y.; Kato, C.; Shintani, S. (2006): On the respiratory mechanism during underwater oviposition in a damselfly *Calopteryx corneria* (Selys). *Journal of Insect Physiology* 52: 499-505. (in English). ["*C. cornelia* females oviposit almost exclusively underwater in forest streams. Field observation showed that the duration of uninterrupted submerged oviposition ranged between 20 and 120 min and the number of eggs laid was linearly related to the time spent underwater. By holding a damselfly under water in a small jar, we measured the maximum 'submergence potential', which was defined as the time elapsed between placing the insect underwater and asphyxiation. A series of experiments showed that there was no gender difference in the submergence potential. This was about 120 min if a damselfly was allowed to change its position while under water. The submergence potential was shorter if the damselflies were kept motionless, if air bubbles trapped on the wing surfaces were removed by coating with Vaseline or if the water was hypoxic. By contrast, submergence potential was longer if a part of the wings were kept above the water surface, or if the water was agitated using a magnetic stirrer. These results suggest that ovipositing *C. cornelia* females depend for oxygen on the physical-gill action of the thin air layer trapped on the body and wing surfaces. Respiration capacity under water is not likely to be a limiting factor for ovipositing females during the production of a single clutch." (Authors)] Address: Tsubaki, Y., Biodiversity Conservation Research Group, National Institute for Environmental Studies, Tsukuba 305-8506, Japan. E-mail: tsubaki@nies.go.jp
- 6037.** Tsuyuki, K.; Sudo, S.; Tani, J. (2006): Morphology of insect wings and airflow produced by flapping insects. *Journal of Intelligent Material Systems and Structures* 17(8-9): 743-751. ["This article describes the results of some experiments concerning wing morphology and flight performance of some flying insects: cicadas, dragonflies, and gadflies. First, the wing structures of these insects are measured down to the minutest detail by a three-dimensional curve-shaped measuring system. The surface shapes of the insect wings are mapped by distinct three-dimensional images. From the three-dimensional images, correlation coefficients are calculated by comparisons of the distribution of undulation on the wings. The surface shapes and the correlation coefficients show a difference in functions for flapping flight between each wing. Second, the distribution of velocity fields around a flapping cicada and a flapping dragonfly are visualized with a PIV system to identify the airflow generated by the wings. The distribution of velocity vectors for one stroke of a dragonfly wing is explained in the article. Additionally, the difference of airflow around the wings of a dragonfly and a cicada are revealed. It is found that the flapping forewing of the dragonfly carries out an important motion in its highly efficient flight." (Authors)] Address: Tsuyuki, K., Dept of Mechanical Systems and Design Engineering, Iwaki Meisei University, Iino 5-5-1, Chuohdai, Iwaki 970-8551, Japan. E-mail: koji@iwakimu.ac.jp

- 6038.** Wallace, I.D.; Lawson, N.J.; Harvey, A.R.; Jones, J.D.C.; Moore, A.A.J. (2006): High-speed photogrammetry system for measuring the kinematics of insect wings. *Applied Optics* 45(17): 4165-4173. (in English). ["We describe and characterize an experimental system to perform shape measurements on deformable objects using high-speed close-range photogrammetry. The eventual application is to extract the kinematics of several marked points on an insect wing during tethered and hovering flight. We investigate the performance of the system with a small number of views and determine an empirical relation between the mean pixel error of the optimization routine and the position error. Velocity and acceleration are calculated by numerical differencing, and their relation to the position errors is verified. For a field of view of 40 mm x 40 mm, a rms accuracy of 30 µm in position, 150 µm/s in velocity, and 750 µm/s² in acceleration at 5000 frames/s is achieved. This accuracy is sufficient to measure the kinematics of hoverfly flight." (Authors) The paper contains many references to Odonata.] Address: Moor, A.J., School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, EH14 4AS, United Kingdom. E-mail: a.moore@hw.ac.uk
- 6039.** Wang, Y.P.; Wang, Y.H.; Lu, P.; Zhang, F.; Li, Y. (2006): Diet composition of post-metamorphic bullfrogs (*Rana catesbeiana*) in the Zhoushan Archipelago, Zhejiang Province. *Biodiversity Science* 14(5): 363-371. (in Chinese, with English summary). ["Bullfrogs are listed as one of the 100 worst invasive alien species in the world. They are generalist predators and thus may affect native species through predation. However, in previous diet studies, the food contents of bullfrogs were mostly examined at a single site. From June 30 to August 11 in 2005, we examined the diet composition of post-metamorphic bullfrogs on eight islands (Daishan, Liheng, Xiushan, Fodu, Taohua, Xiashi, Cezi, and Putuoshan) in the Zhoushan Archipelago, Zhejiang Province, with the stomach flushing method. A total of 391 bullfrogs were measured during the study period, including 113 adults and 278 juveniles. Analyses of stomach contents showed that, for adult bullfrogs, the most important prey items (by diet volume) overall were Decapoda, Coleoptera, Odonata, Mesogastropoda, Raniformes, and Cypriniformes; while for juvenile bullfrogs, they were Decapoda, Coleoptera, Cypriniformes, Odonata, Orthoptera, Hymenoptera, Lepidoptera larvae, Mesogastropoda, and Raniformes. Moreover, prey size and diet volume increased with the body size of both adult and juvenile bullfrogs. The diet composition of primary preys of bullfrogs was significantly different among different islands. The results indicate that bullfrogs exert different predatory influences on native fauna at different sites, and that bullfrogs are generalist predators with extensive ecological impacts on native fauna." (Authors)] Address: Li, Yiming, Key Laboratory of Animal Ecology and Conservation Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing, 100080, China. E-mail: liym@ioz.ac.cn
- 6040.** Weihrauch, F. (2006): Der Zahnkärppling *Gambusia holbrooki* als Prädator von Libelleneiern (Teleostei: Poeciliidae; Odonata: Libellulidae). *Libellula* 25 (3/4): 209-214. (in German, with English summary). ["At an irrigation ditch NE of El Rocío, Huelva province, Andalusia, Spain, on 18 and 21-IX-2006 repeated egg predation by swarms of *C. holbrooki* was observed during the exophytic oviposition of two *Crocothemis* erythraea females and seven *Sympetrum fonscolombii* tandems into open water. Other, endophytically ovipositing Odonata species were not bothered, as well as *C. erythraea* females that were hidden from the fish by carpets of algae or duckweed during oviposition. During all observed interactions, swarms of approximately 20-30 *C. holbrooki* chased the dragonflies immediately after the first dips, attacking the tip of the female's abdomen in a number of cases, and obviously struggling for each sinking egg. The dragonflies responded to these attacks by changing their behaviour from a chain of subsequent dips into the water to single or, at most, triple dips that were followed by rapid changes of oviposition sites. In one exactly noted case, a *S. fonscolombii* tandem performed 42 dips and 25 changes of place in almost two minutes. However, this avoidance behaviour was not successful due to the high fish density in the ditch. Judging from swallowing movements and other reactions of the fish, most eggs seen to be laid were consumed." (Author)] Address: Weihrauch, F., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de
- 6041.** Weihrauch, F.; Weihrauch, S. (2006): Records of protected dragonflies from Rio Tera, Zamora province, Spain (Odonata). *Boletín Sociedad Entomológica Aragonesa* 38: 337-338. (in English, with Spanish summary). ["Breeding records of *Gomphus graslinii*, *Macromia splendens*, and *Oxygastra curtisii* are provided from Rio Tera, the outlet of Lago de Sanabria, in Zamora province, Castilla y León. With 1000 m a.s.l. this site is the highest altitude at which the three spp. have hitherto been recorded. This is most probably due to the exceptionally warm waters feeding Rio Tera at the outlet that are provided by the summer stratification of the lake." (Authors)] Address: Weihrauch, F., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de
- 6042.** Wennemann, L. (2006): Kulturelle Entomologie: Insektenterminologie in der deutschen Sprache. *Mitt. dtsh. Ges. allg. angew. Ent.* 15: 435-438. (in German, with English summary). ["German articles in newspapers (Ruhr Nachrichten, Westdeutsche Allgemeine Zeitung, Frankfurter Allgemeine Zeitung, Die Zeit) and general journals (Audimax, Bunte, DB Mobil, Focus, DLG Mitteilungen etc.) were analyzed for their colloquial language containing entomological terms and phrases. Some examples are given here: The German term 'Fliegenfänger' (fly catcher) is used when a goalkeeper has a bad day allowing the opponent team to score avoidable goals. This example is put into the category 'Diptera' whereby the second example 'einmotten' (to put in mothballs) is put into the category 'Lepidoptera'. 'Moskitos Essen' is the name of an ice hockey team from the town Essen (Germany) and is categorized under 'Diptera'. Results show that sayings and entomological terms are often used and found in printed matters. It is obvious that terms associated with the holometabol insect orders such as Hymenoptera, Lepidoptera und Diptera are most frequently used in contrary to hemi- or paurometabol insect orders such as Blattodea, Orthoptera and Odonata. Preliminary explanations are given why certain insect orders are more frequently used than others. This paper should be a new approach to put cultural entomology into focus and to advertise for his diverse, interesting and fascinating scientific topic within the field of entomology." (Author)] Address: Wennemann, L., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Wennemann.L@t-online.de

mann, L., Napoleonsweg 39, 45721 Haltern am See, Germany. E-mail: ludger.wennemann@t-online.de

6043. Westermann, K. (2006): Die Eiablagegehölze der Gemeinen Weidenjungfer (*Lestes viridis*) am südlichen Oberrhein und im Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(2): 239-244. (in German, with English summary). [Baden-Württemberg, Germany; *Chalcolestes viridis* "lays its eggs into the twigs of woody plants. Until now, I have recorded 49 woody plant species used for oviposition in the southern Upper Rhine plains, and 13 species in the Black Forest. Out of these, 14 species have not been mentioned in the literature before." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6044. Westermann, K.; Schiel, F.-J. (2006): Einwanderungsversuche der Schwarzen Heidelibelle (*Sympetrum danae*) in die Oberrheinebene. *Naturschutz am südlichen Oberrhein* 4(2): 245-250. (in German, with English summary). ["From 1976 to 2005, 80 observations of *S. danae* were recorded for the Upper Rhine Valley in the administrative districts Rastatt, Ortenaukreis, Emmendingen, Breisgau-Hochschwarzwald, Freiburg, and Lörrach (federal state of Baden-Württemberg, SW Germany). In six cases, successful reproduction had taken place. In contrast to former times, the species is not autochthonous in the Upper Rhine Valley, but immigrates from the Black Forest and maybe from the Vosges Mountains and the Jura Mountains. The main reason for this decline is probably the almost complete loss of small waters due to hydraulic engineering. swamplands, small ephemeral depressions and ponds, can be created and managed with reasonable effort and therefore should be recreated systematically." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6045. Westermann, K. (2006): Erster Bodenständigkeitsnachweis der Westlichen Keiljungfer (*Gomphus pulchellus*) für den höheren Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(2): 235-237. (in German, with English summary). ["In the year 2005, we discovered the first evidence of successful reproduction of *G. pulchellus* in higher elevations of the Black Forest at a naturally-looking pond in a park in Hinterzarten at 880 m a.s.l. (Baden-Württemberg, SW Germany). This locality is the highest known reproductive site in central Europe." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6046. Westermann, K. (2006): Strategien frisch geschlüpfter *Lestes viridis* zur Vermeidung von Regenschäden (Odonata: Lestidae). *Libellula* 25(1/2): 47-60. (in German, with English summary). ["In detailed daily studies of the emergence of *L. viridis* it was found that newly emerged imagines use several strategies to minimize damage from rain. The most effective one is the ability of the larvae to postpone emergence during rainy or cool weather for up to 14 hours at the emergence site, or by at least one day in the water. In early and late stages of emergence, imagines are relatively insensitive to rain. Larvae attach to the emergence support at angles between 90 and 180 degrees, which frequently provides the imagines with a degree of protection from rain under leaves and oblique stems. In case of sudden onset of heavy rain, imagines are able to climb, flutter

or fly to more protected sites. It is remarkable that in case of rain most larvae choose better protected sites for emergence. Losses caused by rain were approximately 1 % of the total number of imagines emerging." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6047. Westermann, K.; Westermann, E. (2006): Zur Phänologie der Gebänderten Heidelibelle (*Sympetrum pedemontanum*) im NSG „Elzwiesen“ in den Jahren 2003 bis 2005. *Naturschutz am südlichen Oberrhein* 4(2): 251-257. (in German, with English summary). ["Our results show that the periods of emergence and flight activity of *S. pedemontanum* in Baden-Württemberg, Germany are much more extended than formerly known. In most cases, emergence was not notably synchronised. Reproductive activities lasted almost until the end of the flight period. The maximum life span of imagoes of *S. pedemontanum* was determined as at least 56 days." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6048. Wikelski, M.; Moskowitz, D.; Adelman, J.S.; Cochran, J.; Wilcove, D.S.; May, M.L. (2006): Simple rules guide dragonfly migration. *Biology letters* 3(2): 325-329. (in English). ["Every year billions of butterflies, dragonflies, moths and other insects migrate across continents, and considerable progress has been made in understanding population-level migratory phenomena. However, little is known about destinations and strategies of individual insects. We attached miniaturized radio transmitters (ca 300 mg) to the thoraxes of 14 individual dragonflies (common green darners, *Anax junius*) and followed them during their autumn migration for up to 12 days, using receiver-equipped Cessna airplanes and ground teams. Green darners exhibited distinct stopover and migration days. On average, they migrated every 2.9G0.3 days, and their average net advance was 58G11 km in 6.1G0.9 days (11.9G2.8 kmdL1) in a generally southward direction (186G528). They migrated exclusively during the daytime, when wind speeds were less than 25 km hL1, regardless of wind direction, but only after two nights of successively lower temperatures (decrease of 2.1G0.6 8C in minimum temperature). The migratory patterns and apparent decision rules of green darners are strikingly similar to those proposed for songbirds, and may represent a general migration strategy for long-distance migration of organisms with high self-propelled flight speeds." (Authors)] Address: Wikelski, M., Department of Ecology and Evolutionary Biology, and 4Woodrow, Wilson School, Princeton University, Princeton, NJ 08544, USA. E-mail: wikelski@princeton.edu

6049. Wildermuth, H. (2006): Reciprocal predation involving Odonata, Asilidae and Saltatoria. *International Journal of Odonatology* 9(2): 225-234. (in English). ["A singular observation of an adult *Tettigonia viridissima* (*Tettigoniidae*) that captured a female *Eutolmus rufibarbis* (*Asilidae*) sucking a male *Lestes sponsa* (*Lestidae*) is reported. The reciprocal predation of Odonata, Asilidae, and Saltatoria (*Ensifera*, *Caelifera*) hitherto recorded in Europe is compiled and augmented by unpublished data on asilids as predators of odonates. Heavy predation by robberflies may occur only on grasshoppers and dragonflies; all other reciprocal predation events are occasional." (Author)] Address: Wildermuth,

H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

6050. Wildermuth, H. (2006): Verhaltensgesteuerte Thermoregulation bei *Somatochlora flavomaculata* (Odonata: Corduliidae). *Libellula* 25(1/2): 31-46. (in German, with English summary). ["The species is a 'flier' that typically regulates its body temperature by physiological means. In a field study on the Alpine foothills it was shown that it also thermoregulates behaviourally. The flight activity ranged from 19 to 35°C ambient temperature. Below 28°C males patrolled exclusively in the sun, and basking individuals achieved optimal incident insolation by adopting an appropriate posture. Above 32.5°C active males stayed completely in the shade of trees and bushes. Between 28 and 32.5°C all transitions existed: more than half of the males patrolled partly in the shade, while the others flew either completely in the sun or entirely in the shade. As ambient temperatures rose, on their patrol stretches, males had a tendency to stay longer in the shade than in the sun. At high temperatures they often perched on the shaded side of a plant stem with their body axis pointing towards the sun. The results are discussed in the context of the relation between physiological and behavioural thermoregulation by 'fliers', especially Corduliidae." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

6051. Worthen, W.B.; Jones, C.M. (2006): Relationships between body size, wing morphology, and perch height selection in a guild of Libellulidae species (Odonata). *International Journal of Odonatology* 9(2): 235-250. (in English). ["Ten common libellulid species perch along the shoreline of lakes and ponds in South Carolina, USA. We collected individuals at five ponds throughout summer 2005, weighed them in the field, and calculated wing loading ($N \cdot m^{-2}$) and wing aspect ratios from digital photographs. We measured the perch-height preferences of these species in 'low perch' (10, 20, 30, and 40 cm) and 'high perch' (20, 40, 60 and 80 cm) experiments. Flywheel anemometers recorded wind speeds at each perch height. Species differed significantly in mean body mass, spanning nearly an order of magnitude from *Perithemis tenera* (67 mg) to *Libellula vibrans* (633 mg). There were also significant differences in wing morphology that correlated with mean mass; larger species had greater wing loadings and greater wing aspect ratios than smaller species. Species also differed significantly in their perch-height preferences in both experiments, in a manner correlating with body mass and hindwing aspect ratios. *Erythemis simplicicollis* and *P. tenera* preferred short perches, *Celithemis fasciata*, *Pachydiplax longipennis* and *Platthemis lydia* used perches of intermediate height, and *Libellula auripennis*, *L. cyanea*, *L. incesta*, *L. luctuosa*, and *L. vibrans* preferred the tallest perches. Because mean wind speed and maximum wind speed also increased with perch height, larger species may prefer taller perches to experience greater wind speed and generate more compensatory lift to offset their larger wing loadings. However, it is also possible that correlations between body mass and perch height are the result of large species competitively restricting smaller species to lower perches." (Authors)] Address: Worthen, W.B., Biology Department, Furman University, Greenville, SC 29613, USA. E-mail: worthen@furman.edu

6052. Xu, Q-h. (2006): A New Species of the Genus *Cephalaeschna* (Odonata: Aeshnidae) from Fujian Province, China. *Entomotaxonomia* 28(2): 94-96. (in Chinese, with English summary). [*Cephalaeschna shaowuensis*, sp. nov. is described and illustrated (Abdomen: female 54 mm, hindwing female 50 mm.). It "is closely similar to *Cephalaeschna risi* Asahina in frons/head ratio, ovipositor processes and colour pattern of synthorax, but different from the latter and other species of *Cephalaeschna* as follows: 1) body form larger; 2) ground colour of body black; 3) dorsal stripes shorter and smaller; 4) venation closer; 5) base of wing amber-yellow; 6) the abdominal colour pattern is very distinct, namely, on dorsum only segments I-II have stripes, but on sides there are different markings on segments I-IX." Holotype: female, Shaowu City, Fujian Province, 19-VII-2004, coll. XU Qi-han. The type specimen is deposited in Zhangzhou Education College, Fujian, China.] Address: Xu Qi-han, Zhangzhou Education College, Zhangzhou, Fujian 363000, China

6053. Xu, Q.-h. (2006): *Coeliccia mingxiensis* sp. nov. from Fujian, China (Odonata: Platycnemididae). *International journal of odonatology* 9(2): 251-254. (in English). [*Coeliccia mingxiensis* Xu, 2006; holotype male: 26-VIII-2004, Mingxi County, Fujian Province, China; deposited at Zhangzhou Education College, Fujian, China.] Address: Xu, Qi-han, Zhangzhou Education College 363000, Fujian, China. E-mail: qihanx@yahoo.com.cn

6054. Xu, Q.-H. (2006): The genus *Prodasineura* Cowley in China (Odonata, Protoneuridae). *Acta Zootaxonomica Sinica* 31(4): 807-810. (in English, with Chinese summary). [Nine species of the genus *Prodasineura* from China are dealt with and keys for their identification are given. *Prodasineura fujianensis* Xu, 2006 is described.] Address: Xu, Qi-han, Zhangzhou Education College 363000, Fujian, China. E-mail: qihanx@yahoo.com.cn

6055. Xu J.; Zhao C.; Zhang, Y.; Zhang, Y. (2006): Effect of flapping trajectories on the dragonfly aerodynamics. *Chinese Science Bulletin* 51(7): 777-784. (in English). ["The effects of translational, figure-eight and double-figure-eight flapping trajectories on the dragonfly aerodynamics were numerically studied by solving the Navier-Stokes equations. There is a common characteristic regarding the lift/drag force coefficients that the downstroke flapping provides the lift forces while the upstroke flapping creates the thrust forces for different flapping trajectories. The maximum lift force coefficient exceeds five for the translational trajectory. It is greater than six for the figure-eight and double-figure-eight flapping trajectories, which is sufficiently larger than unity under the steady state flight condition. The ellipse and double-figure-eight flapping trajectories yield the decrease of the lift force, while the figure-eight flapping trajectory yields higher lift force as well as the thrust force than the translational flapping one. During the insect flight, the wing flapping status should be changed instantaneously to satisfy various requirements. Study of the flapping trajectories on the insect aerodynamics is helpful for the design of the Micro-air-vehicles (MAVs)." (Authors)] Address: Xu, Jinliang, Micro Energy System Laboratory, Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences, Guangzhou, 510640, China. Email: xujl@ms.giec.ac.cn

- 6056.** Yang, G.-H.; Mao, B.-Y.; Zhang, D.-Z. (2006): A new species of the genus *Asiagomphus* *Asahina* from Yunnan, China (Odonata, Gomphidae). *Acta Zootaxonomica Sinica* 31(4): 811-812. (in Chinese, with English summary). [*Asiagomphus gongshanensis* sp. nov. is described and depicted. The new species is similar to *A. personatus* (Selys), but differs from the latter by its rather smaller size; 2) the lack of an antehumeral stripe on the synthorax and 3) a black anteclypeus with a central yellow spot. The specimen is deposited in the Department of Science and Chemistry, Dali College, Yunnan. Etymology: The new species is named after its type locality. Holotype male, Mt. Gaoligong, Baoshan, Yunnan, China, 31 July 2005, leg. Mao Ben-Yong] Address: Yang, Guo-Hui, Department of Science and Chemistry, Dali College, Yunnan 671000, China. E-mail: yanggh727@sina.com
- 6057.** Yeh, W.-C., (2006): Three dragonflies (Odonata) newly recorded in Taiwan. *Formosan Entomol.* 26: 187-195. (in English). [*Sinolestes edita*, *Zyxomma obtusum*, and *Macromidia ishidae* are reported from Taiwan for the first time. Morphological diagnosis of both sexes of the three species is provided, including descriptions of their habitats and ecological habits.] Address: Yeh, Wen-Chi, Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nanhai Road, Taipei 100, Taiwan. E-mail: wcyeh@tfri.gov.tw
- 6058.** Yusa, Y.; Sugiura, N.; Wada, T. (2006): Predatory potential of freshwater animals on an invasive agricultural pest, the apple snail *Pomacea canaliculata* (Gastropoda: Ampullariidae), in southern Japan. *Biological Invasions* 8: 137-147. (in English). ["The apple snail *Pomacea canaliculata* is an invasive species and a serious pest of rice in many Asian countries. We studied predatory activities of various animals living in Japanese freshwater habitats, by keeping each individual of a potential predator species with 36 snails of various sizes for three days in the aquarium. Forty-six species were tested, and 26 in eight classes fed on small snails. A species of leech, crabs, the common carp, turtles, the mallard duck and the Norway rat attacked even adult snails of 20–30 mm in shell height. These findings will be helpful in identifying effective predators for biological control of the pest snail. In addition, most of the animals attacking snails are reported to be common in rivers or ponds, but few live in modernized paddy fields having little connections with natural water systems. This may be a reason why this snail maintains large populations in paddy fields but not in other freshwater habitats." (Authors) *Sieboldius albardae*, *Anotogaster sieboldii*, *Anax parthenope*, *Macromia amphigena*, and *Pantala flavescens* were tested for their predatory potential. They seem to be of minor importance as predators of the snails, and if, only for early stages of the snails.] Address: Yusa, Yoichi, Faculty of Science, Nara Women's University, Kitaouya-Nishimachi, Nara 630-8506, Japan. E-mail: yusa@cc.nara-wu.ac.jp
- 6059.** Zessin, W. (2006): Zwei neue Insektenreste (Megasecoptera, Odonoptera) aus dem Westfalium D (Oberkarbon) des Piesberges bei Osnabrück, Deutschland. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 9(1): 37-45. (in German, with English summary). ["Two new fossil insects, one belongs to the Megasecoptera: *Brodidiidae*, *Pyobrodia janseni* n. sp., the other to the Odonoptera: *Meganeuridae*, *Piesbergitupinae* n. subfam., *Piesbergitupus hielscheri* n. gen. et sp. from Westphalian D (Upper carboniferous) beds of the Piesberg quarry in the north of Osnabrück (Lower Saxony, Germany) are described. For *Stephanotypus schneideri* Zessin, 1983 (Odonoptera, Meganeuroptera) a new subfamily *Stephanotypinae* n. subfam. is erected." (Author)] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zooschwerin.de
- 6060.** Zhang, B.; Ren, D.; Zhou, Ch.-q.; Pang, H. (2006): New genus and species of fossil dragonflies (Insecta: Odonata) from the Yixian Formation of Northeastern China. *Acta Geologica Sinica* 80(3): 327-335. (in English). ["Two well-preserved fossil dragonflies from the Late Mesozoic Yixian Formation, Liaoning Province, China are described and assigned to a new genus, *Sopholibellula* gen. nov. in *Arapelibellulidae* Bechly, 1996, closely related to the type genus *Arapelibellula*. This new genus differs from *Arapelibellula* in the following characters: origins of RP and MA distinctly separated at arculus in both pairs of wings; anal loop wider and shorter, with Y-shaped veins inside; MA and IR2 not zigzag; several small intercalary veins present in the postdiscoidal area of hindwing; cells smaller and much more dense, especially in the apex and hind margin; bigger in size. Structures, including head, abdomen and parts of legs, were first described in details of this family." (Authors)] Address: Ren Dong, College of Life Sciences, Capital Normal University, Beijing 100037, China. E-mail: rendong@mail.cnu.edu.cn
- 6061.** Zhang, B.-L.; Fleck, G.; Huang, D.Y.; Nel, A.; Ren, D.; Cheng, X.-D.; Lin, Q.B. (2006): New isophlebioid dragonflies (Odonata: Isophlebioptera: Camptero-phlebiidae) from the Middle Jurassic of China. *Zootaxa* 1339: 51-68. (in English). ["Three new representatives of the Odonata *Camptero-phlebiidae* are described from the Middle Jurassic of Daohugou (Inner Mongolia, China), i.e. *Amnifleckia guttata* n. gen., n. sp., *Amnifleckia splendida* n. sp., and *Parabrunetia celinea* n. gen., n. sp. Their close affinities with the genus *Pteropteron* (Dogger of Kirgizia) support a similar age for the Daohugou fauna." (Authors)] Address: Ren, D., College of Life Science, Capital Normal University, 105 Xisanhuanbeilu, Haidian District, Beijing, 100037, P.R.China, China. E-mail: rendong@mail.cnu.edu.cn
- 6062.** Zhang, Zh.; Hong, Y.; Lu, L.; Fang, X.; Jin, Y. (2006): *Shenzhousia qilianshanensis* gen. et sp. nov. (Protodonata, Meganeuridae), a giant dragonfly from the Upper Carboniferous of China. *Progress in Natural Science* 16(3): 328-330. (in English). ["A new dragonfly of family *Meganeuridae* *Shenzhousia qilianshanensis* gen. et sp. nov., discovered from Ningxia Hui Autonomous Region in North China, is described in the present paper. It has an estimated wingspan of about 450–500 mm and may be the largest fossil insect in Late Carboniferous Namurian Stage discovered by far. The new species is referred to *Meganeuridae* because of the presence of the characteristic oblique vein between anterior branch of radius (RA) and posterior branch of radius (RP) near the base of RP2. It differs from other genera within the family in the following characteristics: Precostal area short and not extending to the midwing; posterior branch of subcostal vein short, merging into costal vein near the level of originating point of IR2; RP forking earlier than anterior branch of media basally; RP1+2 and RP3+4 parallel and close to each other for a long distance, and then diverge gradually surpass

midwing." (Authors)] Address: Zhang Zhijun, Department of Palaeontology, The Geological Museum of China, Beijing, 100034, China

6063. Zhou, X.; Zhou, W.-b. (2006): Two new species of the family Chlorocyphidae (Odonata) from China. *Entomotaxonomia* 28(1): 13-16. (in Chinese, with English summary). ["The paper reports two new species of the Family Chlorocyphidae. *Heliocypha huai*, sp. nov.: Measurements (mm): Male abdomen+anal appendages 23, hind wing 24. This species is similar to *Heliocypha malanensis* (Zhou et Bao), but differs from the latter as follows: 1) labrum black; 2) a narrow distal stripe just below the second lateral suture on thorax; 3) 2nd abdomen segment with a middorsal orange marking. Holotype: male, Jianfengling, Hainan Province, 2I-IX-1981, Coll. HUA Li-zhong; Paratype: 1 male, same date as holotype. *Indocypha chishuiensis*, sp. nov.: Measurements (mm): Male abdomen+anal appendages 24, hind wing 25. This species is closely allied to *Indocypha katharina* (Needham), but easily distinguishable by the following characters: 1) 1 reddish yellow "+" shaped marking in dorsal center of 2nd abdomen segment; 2) 1 large triangular marking on 3rd abdomen segment; 3) a pair of subapical transverse spots on 4th abdomen segments. Holotype: male, Jinshagou, Chishui City, Guizhou Province, 31-VII-2000, Coll. LI Zi-zhong. The type specimens are deposited in the Zhejiang Museum of Natural History, China." (Authors)] Address: Zhou, X., Zhejiang Museum of Natural History, Hangzhou, Zhejiang 310012, China

6064. Živic, I.; Markovic, Z.; Brajkovic, M. (2006): Influence of the temperature regime on the composition of the macrozoobenthos community in a thermal brook in Serbia. *Biologia, Bratislava* 61(2): 179-191. (in English). ["In contrast to cold and eurythermal waters, benthic communities of warm brooks in temperate regions have been inadequately studied. In order to investigate the effects of water thermal regime on the benthic communities of warm waters and their relationships with those of cold and eurythermic ones, the macrozoobenthos was studied at eight sites in the Toplica River, and at four sites in its tributary, the Termalni brook. Investigations were carried out seasonally from April 2000 to January 2001. Warm waters of the Termalni brook were characterized by specific macrozoobenthos assemblages that exhibited significant differences to the populations of eurythermal and cold waters of the Toplica River. The dominant taxa in the macrozoobenthos community of warm waters were mainly Gastropoda species. Moreover, benthic communities of warm waters were characterized by lower diversity and greater biomass in comparison with those of cold and eurythermal waters. The gradient of average annual temperatures represented the main ecological factor influencing changes of diversity and biomass along the course of the investigated Termalni brook. Inflow of warm waters at site T6 lead to a decrease in macrozoobenthos abundance and changes in qualitative and quantitative composition of the benthocoenosis of a highland stream, but did not significantly alter diversity." (Authors) Odonata are referred on the order-level at several occasions. In the appendix are documented records of *Cordulegaster boltonii*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, and *Orthetrum albistylum*.] Address: Zivic, Ivana, Faculty of Biology, University of Belgrade, 11000 Belgrade, Serbia and Montenegro. E-mail: ivanas@bf.bio.bg.ac.yu

6065. Zuanon, J.; Bockmann, F.A.; Sazima, I. (2006): A remarkable sand-dwelling fish assemblage from central Amazonia, with comments on the evolution of psammophily in South American freshwater fishes. *Neotropical Ichthyology* 4(1): 107-118. (in English). [The night-time forager, *Gymnorhamphichthys rondoni* (Rhamphichthyidae), preys on Gomphidae larvae.] Address: Zuanon, J., CPBA, Caixa Postal 478, INPA-Instituto Nacional de Pesquisas da Amazônia, 69083-970 Manaus, Amazonas, Brazil. E-mail: zuanon@inpa.gov.br

6066. Zuellig, R.E.; Kondratieff, B.C.; Schmidt, J.P.; Durfee, R.S.; Ruitter, D.E.; Prather, I.E. (2006): An annotated list of aquatic insects of Fort Sill, Oklahoma, excluding Diptera with notes on several new state records. *Journal of the Kansas Entomological Society* 79(1): 34-54. (in English). ["Qualitative collections of aquatic insects were made at Fort Sill, Lawton, Oklahoma, between 2002 and 2004. Ephemeroptera, Plecoptera, Trichoptera, Odonata, Coleoptera, aquatic Heteroptera, Neuroptera, and Megaloptera were targeted. Additional records are included from a survey that took place in 1999. More than 11,000 specimens from more than 290 collections were examined. Based on the current understanding of aquatic insect systematics, 276 taxa distributed over 8 orders, 46 families, and 141 genera were identified. Twenty-three of the 276 taxa [...] are reported from Oklahoma for the first time. The three most diverse orders included Coleoptera (86 species), Odonata (67 species) and Trichoptera (59 species), and the remaining taxa were distributed among Heteroptera, (30 species), Ephemeroptera (21 species), Plecoptera (6 species), Megaloptera (4 species), and Neuroptera (3 species). Based on previous published records, many of the species collected during this study were expected to be found at Fort Sill; however, 276 taxa of aquatic insects identified from such a small geographic area is noteworthy, especially when considering local climatic conditions and the relatively small size of Fort Sill (38,300 ha). Despite agricultural practices in Oklahoma, the dust bowl days, and the development of water-based recreation at Fort Sill, a high percentage of the total known aquatic insect fauna of Oklahoma can be found in a small geographic area." (Authors)] Address: Zuellig, R.E., U. S. Geological Survey, Denver Federal Center, MS 415, Denver, Colorado 80225, USA

6067. Clarke, G.M.; Spier-Ashcroft, F. (2006(?)): A review of the conservation status of selected Australian non-marine invertebrates. <http://www.deh.gov.au/biodiversity/threatened/action/non-marine-invertebrates/index.html>: III, 142 pp. (in English). [This review represents a first attempt to objectively assess the conservation status of a selected suite of the over 300000 Australian non-marine invertebrates. Any attempt to provide a detailed and comprehensive overview of the conservation status of such a large and diverse group is obviously impractical. The authors have taken a selection of 25 taxa (including 'Petalura species': *P. gigantea* and *P. litorea* on pages 90-94) that are representative of the diversity of our invertebrate fauna, their geographic distribution, different habitat requirements and associations and potential threats. For each selected species the following information is provided: General taxonomic status of the species, including an illustration; 2. Species survival status; 3. Species distribution – a map of current distribution is provided at the end of each synopsis overlaid with Conservation and Protected Areas; 4. Ha-

bitat details; 5. Biological overview; 6. Significance – details of the biological, ecological, and scientific significance of the species which have contributed to its inclusion in the plan; 7. Threats; 8. Conservation objectives; 9. Conservation actions already initiated for the taxon; 10. Conservation actions required for long-term conservation of the species. This section is subdivided into research and management needs. 11. A list of relevant experts who provided information. Available at: <http://www.deh.gov.au/biodiversity/threatened/action/non-marine-invertebrates/index.html>]

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6068. Brooks, S. (2007): The dragonflies of Europe. *Zoological Journal of the Linnean Society* 149(1): 139. (in English) [Review of the second edition of the classic book of Askew (see OAS 4113).] Address: Brooks, S.J., Entomology, The Natural History Museum, Cromwell Road, London, SW7 5BD, United Kingdom

6069. Burgmer, T.; Hillebrand, H.; Pfenninger, M. (2007): Effects of climate-driven temperature changes on the diversity of freshwater macroinvertebrates. *Oecologia* 151: 93-103 (in English) ["Increasing temperatures due to climate change were found to influence abundance and timing of species in numerous ways. Whereas many studies have investigated climate-induced effects on the phenology and abundance of single species, less is known about climate-driven shifts in the diversity and composition of entire communities. Analyses of long-term data sets provide the potential to reveal such relationships. We analysed time series of entire communities of macrozoobenthos in lakes and streams in Northern Europe. There were no direct linear effects of temperature and climate indices (North Atlantic Oscillation index) on species composition and diversity, but using multivariate statistics we were able to show that trends in average temperature have already had profound impacts on species composition in lakes. These significant temperature signals on species composition were evident even though we analysed comparatively short time periods of 10–15 years. Future climate shifts may thus induce strong variance in community composition." [...] "Species correlated with high Trend-Temp, and thus likely to increase both in abundance and range, were: ... *Coenagrion* sp./Zygoptera, Libellulidae indet./Anisoptera, ..."] (Authors) Address: Burgmer, Tanja; Aquatic Ecology, Institute for Botany, University of Cologne, Gyrhofstr. 15, 50931 Köln, Germany. E-mail: tanja.burgmer@uni-koeln.de

6070. Cordero Rivera, A. (Ed.) (2007): Forests and Dragonflies (4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005). Pensoft Series Faunistica 61, ISSN 1312-0174: 300pp. (in English). ["Over the world, forests provide diverse habitats for a range of organisms, including dragonflies and other animals, that at a first sight seem not to depend on forests. For instance, *Macromia splendens*, one of Europe's most endangered dragonflies, uses forest roads as hunting places, and larvae are sometimes found amongst tree roots. As the authors of this book show, dragonflies are highly dependent on forest cover and composition, and this is true from the boreal forests to the tropics. The aim of this book is therefore to explore the ways in

which forests affect dragonfly life, and to show that forests are much more than places where timber is produced." (Publisher) Table of content: Adolfo Cordero Rivera: Introduction: Dragonflies as forest-dependent animals 7; Corbet, P.S.: Forests as habitats for dragonflies (Odonata) 13; Graga, M.: Allochthonous organic matter as a food resource for aquatic invertebrates in forested streams 37; The Importance of Forests for Dragonflies in Different Continents: Orr, A.G.: Odonata in Bornean tropical rain forest formations: diversity, endemism and implications for conservation management 51; Paulson, D.: The importance of forests to neotropical dragonflies 79; Fincke, O.M.: Use of forest and tree species, and dispersal by giant damselflies (Pseudostigmatidae): future prospects in fragmented forests 103; Dijkstra, K.-D. & Clausnitzer, V.: Thoughts from Africa: how can forest influence species composition, diversity and speciation in tropical Odonata? 127; Sahlin, G.: Specialists vs. generalists among dragonflies - the importance of forest environments in the formation of diverse species pools 153; Tsubaki, Y. & Tsuji, N.: Dragonfly habitat maps based on landcover and habitat relation models 181; Conservation and Behavioral Issues: Samways, M.: Threat levels to odonate assemblages from invasive alien tree canopies 209; Taylor, P.: Movement behaviours of a forest odonate in two heterogeneous landscapes 225; Thompson, D.J. & Watts, Ph.C.: The structure of the *Coenagrion mercuriale* populations in the New Forest, southern England 239; Watanabe, M.: Mate location and competition for mates in relation to sunflecks of forest floors 259; Cordoba-Aguilar, A. & Contreras-Garduño, J.: Differences in immune ability in forest habitats of varying quality: dragonflies as study models 269; Hadrys, H.: The present role and future promise of conservation genetics for forest Odonates 279] Address: www.pensoft.net

6071. Dallas, H.F.; Day, J.A. (2007): Natural variation in macroinvertebrate assemblages and the development of a biological banding system for interpreting bioassessment data—a preliminary evaluation using data from upland sites in the south-western Cape, South Africa. *Hydrobiologia* 575: 231-244 (in English): ["The variability of macroinvertebrate assemblages - (including Odonata on the family level) - was investigated at 27 upland reference sites in the south-western Cape, South Africa. Multivariate analyses showed that sites did not group on the basis of geomorphological zonation, i.e. mountain stream and foothill-cobble bed. When separate analyses were undertaken for mountain stream (n = 21) and foothill-cobble bed sites (n = 6), assemblages formed three and two groups, respectively. Similarity amongst groups ranged from 47% to 52%, while within-group similarity was between 54% and 67%. Environmental variables shown to contribute to this variability included distance from source, cation ratio ($([Na^+]+[K^+])/([Na^+]+[K^+]+[Ca^{2+}]+[Mg^{2+}])$), pH, longitude and stream width. Whilst overall variability in the metrics of the biotic index, SASS (South African Scoring System), is high at reference sites, the interpretation of monitoring-site data using biological bands derived from a range of reference sites, ensured that variability was taken into account and that detection of disturbance at a monitoring site was not impeded. A biological banding system has been developed for upland sites in the south-western Cape, together with a list of reference or expected SASS-taxa. This list includes details pertaining to seasonality and biotope preferences. The ability to define reference conditions that take

intrinsic variability amongst reference sites into account is important for the accurate interpretation of bioassessment data." (Authors) Address: Dallas, Helen, Department of Zoology, University of Cape Town, Private Bag Rondebosch, Cape Town, Western Cape 7700, South Africa. E-mail: hdallas@botzoo.uct.ac.za

6072. Groeneveld, L.F.; Clausnitzer, V.; Hadrys, H. (2007): Convergent evolution of gigantism in damselflies of Africa and South America? Evidence from nuclear and mitochondrial sequence data. *Molecular Phylogenetics and Evolution* 42(2): 339-346 (in English) [Extreme large body size is rare in modern Zygoptera (damselflies). Only the South and Central American damselfly family Pseudostigmatidae and one African species, *Coryphagrion grandis*, share the morphological trait of gigantism. By means of phylogenetic analyses using two mitochondrial markers (16S rDNA and ND1) and one nuclear marker (EF1) in combination with an existing morphological data set, we trace the evolution of gigantism in damselflies. Individual and combined data sets were analyzed using the maximum parsimony, minimum evolution and maximum likelihood algorithms. Regardless of the algorithm used and the data set analyzed all principal tree topologies support a monophyly of the damselfly taxa displaying giant body size. This supports the view that the evolution of gigantism in damselflies from Africa and South America is not the result of convergent evolution due to strikingly similar habitat preferences, but rather the result of close genealogical relationship. Because modern odonates evolved before the split of Africa from Gondwanaland, the proposed phylogeny suggests that *C. grandis* represents a Gondwana relict.] Address: Hadrys, Heike, ITZ, Ecology and Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

6073. McCauley, S.J. (2007): The role of local and regional processes in structuring larval dragonfly distributions across habitat gradients. *Oikos* 116(1): 121-133. (in English). ["Despite the importance of community-structuring processes operating at both local and regional scales, there is relatively little work examining both forces within a single system. I used a combination of observational and experimental approaches to examine the processes structuring larval dragonfly distributions in lentic habitats that encompass a gradient of both permanence and top predator type. I compared the relative vulnerability of species to predators from different portions of this gradient to assess the role of predation as a local force structuring communities. I also assessed the role of regional processes on species' distributions by examining species' propensity to disperse to and colonize artificial ponds distributed across a landscape. In both studies I contrasted habitat specialist species, which had larvae restricted to permanent lakes, with habitat generalist species, which had larvae that occur broadly across the habitat permanence and top predator transition. Results from this work suggest that dispersal and colonization behavior were critical mechanisms restricting the distributions of habitat specialist species, but that predation may act to reinforce this pattern. The habitat specialists dispersed less frequently, colonized artificial ponds less often when they did reach them, and most moved shorter distances than the habitat generalist species. Habitat specialists were also more vulnerable than habitat generalists to an invertebrate top predator with which they do not co-exist.

Results from these studies suggest that species distributions can be shaped by processes operating at both regional and local spatial scales. The role of dispersal and recruitment limitation may be generally underestimated as a force shaping species distributions and community structure across habitat gradients in which there is a transition in both the biotic interactions and the disturbance interval across that gradient." (Author)] Address: McCauley, S. J., Center for Population Biology, One Shields Avenue, 2320 Storer Hall, Univ. of California, Davis, CA 95616, USA. E-mail: sjmccauley@ucdavis.edu

6074. Moseley, M. (2007): Acadian biospeleology: composition and ecology of cave fauna of Nova Scotia and southern New Brunswick, Canada. *International Journal of Speleology* 36(1): 1-21. (in English) ["The vertebrate and invertebrate fauna, environment and habitats of caves and disused mines in Nova Scotia and southern New Brunswick are provisionally catalogued and described, based on field collections made over many years. The area was glaciated and the subterranean fauna consists of non-troglobites all of which have arrived and colonised the caves during or following final recession of the Pleistocene glaciers. The statistical composition of the fauna at the higher taxonomic level is similar to that in Ontario, but is less species rich and there are some notable ecological and other differences. Porcupine dung accumulations are an important habitat in the region, constituting a cold-temperate analogue of the diverse guano habitats of southern and tropical caves. Parietal assemblages are, as in other cold temperate regions, an important component of the invertebrate fauna but here include species derived directly from dung communities: another parallel with tropical guano caves. An unanticipated finding is the number of non-indigenous species now utilising local caves. These appear to have colonised unfilled ecological niches, suggesting that post-glacial recolonisation of the subterranean habitat in Nova Scotia has been relatively delayed. Finally the general and regional significance of the subterranean fauna is briefly discussed." (Author) *Aeshna umbrosa* nymphs, *Aeshna* sp. indet. nymphs, *Cordulegaster maculata* imago, and *Macromia illinoensis* nymphs are compiled as records from the surveyed caves.] Address: Moseley, M., Research Associate, Nova Scotia Museum of Natural History, 1747 Summer Street, Halifax, Canada B3H 3A6. E-mail: moleslei@yahoo.ca

6075. Munyuli, M.B.T.; Luther, G.C.; Kyamanywa, S. (2007): Effects of cowpea cropping systems and insecticides on arthropod predators in Uganda and Democratic Republic of the Congo. *Crop Protection* 26(2): 114-126 (in English) ["Knowledge of the distribution, abundance, species diversity and effectiveness of indigenous natural enemies of cowpea pests in Uganda and the Democratic Republic of the Congo (DRC) is poor. Similarly, effects of insecticides commonly used by cowpea farmers on arthropod predators are not well documented in these countries, so effects of insecticides on these natural enemies were monitored in field trials with cowpea grown solely and in association with sorghum or greengram. The abundance of predators (Coccinellidae, Staphylinidae, Syrphidae, Anthocoridae, Mantidae, Dermaptera, ground beetle, predatory mite, lygaeid bugs, Anthocoridae, dragonflies and spiders) were considerably affected by insecticides and the cropping system. Polyculture had a higher index of di-

versity than monocultures. In terms of species diversity supported, there was no significant difference between cowpea/greengram and cowpea/sorghum. There was a seasonal variation in similarity (MS=0.71, long rains; MS=0.77, short rains) of the predator community supported by the cowpea cropping system, between Mulungu (DRC) and Kumi (Uganda) habitats. Lower pests pressure on cowpea crop, higher abundance of predators and higher cowpea yields were observed to be associated with cowpea/greengram cropping systems. Therefore cowpea/greengram should be promoted among other biological control conservation strategies, aiming at enhancing natural enemies in cowpea systems, through habitat manipulation. This study indicated that generalist predators, through their activities might be important natural enemies of cowpea pests in Uganda and in DRC." (Authors) Address: Munyuli, M.B.T., Makerere University Institute of Environment and Natural Resources, P.O. Box 7062, Kampala, Uganda. E-mail. tmunyuli@yahoo.com

6076. Nummelin, M.; Lodenius, M.; Tulisalo, E.; Hirvonena, H.; Alanko, T. (2007): Predatory insects as bioindicators of heavy metal pollution. *Environmental Pollution* 145(1): 339-347 (in English) ["Heavy metal concentrations of different predatory insects were studied near by a steel factory and from control sites. Waterstriders (Gerridae), dragon fly larvae (Odonata), antlion larvae (Myrmeleontidae) and ants (Formicidae) were analyzed by AAS. In most cases the metal concentrations were higher near the factory, but e.g. waterstriders had higher cadmium concentrations in control area. Discriminant analysis clearly reveals that all these insect groups can be used as heavy metal indicators. However, the commonly used ants were the least effective in indicating the differences between the factory and control sites. Waterstriders are good in detecting differences in iron and manganese, but seem to be poor in accumulating nickel and lead. Antlions are efficient in detecting differences in iron. Antlions and ants are effective in accumulating manganese; as well antlions are efficient in accumulating cadmium. Waterstriders are poor in accumulating lead, but antlions and ants are effective." (Authors). Address: Nummelin, M., Dept for Development Policy, Ministry for Foreign Affairs, P.O. Box 176, FIN-00161 Helsinki, Finland

6077. Schorr, M. (2007): Vorläufige Bibliographie der Veröffentlichungen zu den Libellen (Insecta: Odonata) in Deutschland mit Registern zu den Bundesländern und Arten (Arbeitsstand: 02. Februar 2007). *Dragonfly Research* 4: 1-246. (In German, with English abstract) [About 3600 publications referring to the German fauna of Odonata are compiled in a bibliography and keyworded by species and geography.] Address: Schorr, M., Schulstr. 7B, 54314 Zerf, Germany. E-mail. martinschorr@onlinehome.de

6078. Salur, A.; Mesci, S. (2007): Additional records for the Odonata fauna of Çorum province (Turkey). *Munis Entomology & Zoology* 2(1): 169-170. (in English). [Records from 7 localities representing 20 odonate species are documented.] Address: Salur, A., Hitit University Arts and Sciences Faculty Department of Biology, 19030, Corum, Turkey. E-mails: alosalur@gmail.com

6079. Salur, A.; Kiyak, S. (2007): Additional records for the Odonata fauna of South-Western Anatolia - Part I: Anisoptera. *Munis Entomology & Zoology* 2(1): 63-78.

(in English). [43 species and subspecies of Anisoptera were collected in the provinces of Antalya, Aydın, Burdur, Denizli, Isparta and Muğla in South-Western Anatolia, April-September between 2000 - 2002. These records are documented in detail.] Address: Salur, A., Hitit University Arts and Sciences Faculty Department of Biology, 19030, Corum, Turkey. E-mails: alosalur@gmail.com

6080. Shostell, J.M.; Williams, B.S. (2007): Habitat complexity as a determinate of benthic macroinvertebrate community structure in cypress tree reservoirs. *Hydrobiologia* 575: 389-399 (in English). ["We analyzed benthic samples (n = 128) collected from four cypress-tree population areas within a large, shallow Arkansas reservoir over a 2-year period to investigate macroinvertebrate community distribution patterns and their relation to physical and chemical parameters. The calculated biomass, abundance and diversity of the benthic macroinvertebrate community varied significantly both temporally and spatially. Variations of these variables are most likely explained by significant differences in the concentration of carbon and nitrogen in sediments across lake sites, and on a smaller scale, the presence or absence of cypress trees. Benthic macroinvertebrate abundance, biomass, and diversity significantly decreased with distance from tree." (Authors) Tab. 2 lists as an odonate species "Cynacantha sp." (sic). Address: Shostell, J.M., Department of Biology, Penn State University-Fayette, Route 119N, Uniontown, PA 15401, USA. E-mail: jms88@psu.edu

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1997

6081. Anholt, B.R. (1997): Sexual size dimorphism and sex-specific survival in adults of the damselfly *Lestes disjunctus*. *Ecological Entomology* 22(2): 127-132. (in English). ["(1.) A population of adult *Lestes disjunctus* (Odonata: Lestidae) was studied in eastern Ontario, Canada. Mass at sexual maturity and activity rates of individuals were measured. Population density was estimated on transects, while survival rates and population size were estimated using mark-recapture methods. (2.) There was no difference in mass of mated and unmated males. Females were more than 50% heavier than males, and were also more active than males. (3.) Males were almost eight times more abundant on transects than females, but Manly-Parr estimates of male population size were only a maximum of 2.5 times larger than estimates for females. (4.) Males were 2.5 times more likely to be resighted after marking than were females. This accounts for much of the discrepancy between transect estimates and mark-recapture estimates of relative population size. (5.) Daily survival rates of sexually mature females were not significantly less than those of males, and therefore cannot account for a change in sex-ratio from 1 : 1 at emergence to more males than females in sexually mature adults. (6.) Differences in mortality must occur prior to sexual maturity, coincident with the time during which differences in mass gain are also taking place." (Author)] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada; e-mail: banholt@uvic.ca

6082. Asahina, S. (1997): Records of Northern Vietnamese Odonata taken by the expedition members from the National Science Museum, Tokyo. 6. Platystictidae, Megapodagrionidae, Lestidae and Synlestidae. *Bull. natn. sci. mus. Tokio Ser. A.* 23(2): 107-113. (in English). ["Seven species of northern Vietnamese damselflies are classified into four families, Platystictidae (1 new species and 1 new subspecies), Megapodagrionidae (1 new species and 1 species previously known from Lower Burma and Laos), Lestidae (1 common South Asiatic species), and Synlestidae (2 species pre-

viously known from Southwest China, etc.)." (Author) *Drepanosticta vietnamica*, *Rhipidolestes owadai*] Address: Asahina, S., 4-4-24 Takadanobaba, Shinjuku-ku, Tokyo 169, Japan

6083. Beschovski, V.L.; Gashtarov, V. (1997): *Selysiotthemis nigra* (Vander Linden, 1825) - a new genus and species for the Bulgarian fauna (Odonata: Anisoptera: Libellulidae). *Ent. Zschr.* 107(7): 309-310. (in English, with German summary). [First record of *S. nigra* in Bulgaria. One male specimen on 4-VI-1996 in the small floodplain of the river Melnishka, a left affluent of the river Struma near the town of Melnik.] Address: Beschovski, V.L., Inst. Zool., Bulgarian Acad. Sci., Boul. Tzar Osvoboditel 1, 1000 Sofia, Bulgaria

6084. Goutner, V.; Furness, R.W. (1997): Mercury in feathers of Little Egret *Egretta farzetta* and Night Heron *Nycticorax nycticorax* Chicks and in their prey in the Axios Delta, Greece. *Archives of environmental contamination and toxicology* 32(2): 211-216. (in English). ["Mercury concentrations were measured in feathers of little egret and night heron chicks and in their prey in the Axios Delta, Greece. Significantly higher concentrations occurred in night heron than in little egret in 1993. In the night heron the mercury content of feathers was negatively correlated to the size of chicks, possibly due to inhibition of growth. Mercury concentrations were higher than reported for heron feathers in seriously polluted sites in North America and Japan, but the toxic hazard is unclear. Diets differed considerably between the two species due to use of different foraging habitats and this seems responsible for different mercury contents of feathers. Mercury concentrations in the pumpkinseed sunfish *Lepomis gibbosus*, goldfish *Carrassius auratus*, and in dragonfly Odonata larvae were the highest among the prey categories. Frogs and water beetles *Dytiscidae* had moderate concentrations whereas saltwater fish and terrestrial prey had very low mercury concentrations. The implication is that the deltaic marshes are the habitat most polluted with mercury. Night heron chick feathers, freshwater fish and dragonfly larvae could be used to monitor mercury contamination in this region, but use of bird feathers alone could give misleading results if changes in diet occurred." (Authors)] Address: Goutner, V., Dept of Zoology, Aristotle-

lian University of Thessaloniki, GR-540 06, Thessaloniki, Greece

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6087. Proess, R. (1997): Erstnachweis der Gabel-Azurjungfer (*Coenagrion scitulum* Rambur, 1842) in Luxemburg (Insecta, Odonata, Coenagrionidae). *Bull. soc. nat. luxemb.* 98: 129-131. (in German, with English summary). [First record of *C. scitulum* on 24.07.1996 in Luxembourg.] Address: Proess, R., ECOTOP, 6, rue Gustave Kahnt, L-1851 Luxembourg, Luxembourg. E-mail: ecotop@pt.lu

6088. Saugestad, T. (1997): Stor torvlibelle *Leucorrhinia pectoralis* (Charpentier, 1825) funnet i Hordaland. *Insekt-Nytt* 22(4): 15-17. (in Norwegian, with English summary). [The genus *Leucorrhinia* is represent in Norway with five species, of which only *L. dubia* is common. Two males of the endangered *L. pectoralis* were recorded on 19.07. and 22.07.1997, at Leirvikvatn, Tysnes, HOY. This is the first record from West-Norway. In addition, 10 taxa also recorded at the locality are listed.] Address: Saugestad, T., Gamle Kalvedalsvei 12B, N-5019 Bergen, Norway

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6090. Yabu, S.; Nakashima, A. (1997): Ecological studies on the conservation of *Nannophya pygmaea*

Rambur populations and habitats. *Journal of the Japanese Institute of Landscape Architecture* 60(4): 324-328. (in Japanese, with English summary). [Habitat parameters of *N. pygmaea* in the surroundings of Motegi town, Tochigi Pref., Japan were surveyed. Vegetation and microhabitats within the vegetation preferred by the imagines are outlined. For details see: <http://nels.nii.ac.jp/els/contentdisp.php?id=ART0006477726>] Address: not transliterated into English

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6092. Sudo, S.; Tsuyuki, K.; Ikohagi, T.; Ohta, F.; Shida, S.; Tani, J. (1998): Wing structure of dragonfly: 2nd report, wing and flight. *Transactions of the Japan Society of Mechanical Engineers*. C 64(No.625): 3526-3533. (in Japanese, with English summary). ["This paper is concerned with the wing structure and the aerodynamic characteristics of a flying dragonflies. The structural properties of dragonfly wings were studied through the measurements of some morphological parameters. The scanning electron microscopic observation showed the morphological characteristics of the dragonfly wing. Dragonflies (*Sympetrum infuscatum*, *S. kunkeli*) were examined in a small low-turbulence wind tunnel. In the experiment on the measurements of wing flapping, an optical displacement detector was used to measure the displacement of the dragonfly wing. In the experiment on the measurements of the velocity fluctuation, a hot-wire anemometer was used to measure the velocity field. The spectrum of dragonfly flight was revealed by the measurement of velocity fluctuation." (Authors)] Address: Sudo, S., Faculty of Systems Science and Technology, Akita Prefectural University, Yurihonjo 015-0055 Japan

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6093. Ellington, C.P. (1999): The novel aerodynamics of insect flight: applications to micro-air vehicles. *J. exp. Biol.* 202: 3439-3448. (in English). ["The wing motion in free flight has been described for insects ranging from 1 to 100 mm in wingspan. To support the body weight, the wings typically produce 2-3 times more lift than can

be accounted for by conventional aerodynamics. Some insects use the fling mechanism: the wings are clapped together and then flung open before the start of the downstroke, creating a lift-enhancing vortex around each wing. Most insects, however, rely on a leading-edge vortex (LEV) created by dynamic stall during flapping; a strong spanwise flow is also generated by the pressure gradients on the flapping wing, causing the LEV to spiral out to the wingtip. Technical applications of the fling are limited by the mechanical damage that accompanies repeated clapping of the wings, but the spiral LEV can be used to augment the lift production of propellers, rotors and micro-air vehicles (MAVs). Design characteristics of insect-based flying machines are presented, along with estimates of the mass supported, the mechanical power requirement and maximum flight speeds over a wide range of sizes and frequencies. To support a given mass, larger machines need less power, but smaller ones operating at higher frequencies will reach faster speeds." (Author) The paper deals mainly with Diptera, Hymenoptera and Lepidoptera, and contains only passing references to Protodonata and Odonata.] Address: Ellington, C.P., Dept of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, UK. E-mail: c.ellington@zoo.cam.ac.uk

6094. Morse, D.H. (1999): Choice of hunting site as a consequence of experience in late-instar crab spiders. *Oecologia* 120(2): 252-257. (in English). ["Earlier experiences may play an important role in the choice of hunting sites, but their effects on the foraging repertoire of most animals remain poorly understood. I tested the role of previous flower choices (hunting sites) by penultimate-instar female crab spiders *Misumena vatia* in making subsequent patch-choice decisions. *M. vatia* is a sit-and-wait predator, and the two flower species used, ox-eye daisy *Chrysanthemum leucanthemum* and common buttercup *Ranunculus acris*, are important hunting sites. Spiders with different immediate experience showed similar abort-term (<1 day) giving-up times on the two flower species, independent of their previous substrate. However, four-fifths of the individuals that remained a day or longer tended to leave buttercups sooner than daisies, especially if they had previously occupied daisies. Thus they may directly assess the quality of a potential hunting site, perhaps in response to prey abundance, but previous experience may play a minor role as well. Of spiders that made several consecutive choices of hunting sites, those on daisies often confined these runs to daisies (one of two years); those on buttercups did not exhibit comparable fidelity. Spiders molting into the adult stage almost always subsequently chose the same flower species (either daisy or buttercup) as the one on which they molted. Thus, juvenile experiences may influence adults, the critical stage when virtually all of the spiders' reproductive resources are gathered, even if this resulted from imprinting on their molt sites rather than carrying information over the molt." (Authors)] Address: Morse, D.H., Brown Univ., Dept Ecol, & Evolutionary Biol., Box G-W, Providence RI 02912; USA. e-mail: dmorse@brown.edu

6095. Paulson, D. (1999): Dragonflies of Washington. Seattle Audubon Society. ISBN 0-914516-15-9: 32 pp. (in English). [This is a very condensed fieldguide with 84 colour pictures and brief information on the Odonata of Washington, USA. The species text chapters contain information on geographic distribution in Washington, their phenology, and habitat. A key, and some informa-

tion on morphology, dragonfly photography, finding and collecting dragonflies, rearing larvae, dragonfly conservation, and a glossary are added.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

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6096. Ishii, M.; Kanata, T.; Kobayashi, K.; Michishita, Y. (2000): Vegetation and species diversity of aquatic insects in the Ziou marsh, northern Osaka. Scientific report of the College of Agriculture, Osaka Prefecture University 52: 29-41. (in Japanese, with English summary). ["Vegetation and species diversity of aquatic insects were investigated in the Ziou Marsh in Nose Town, northern Osaka Prefecture, central Japan from April to November, 1998. A total of 60 species of vascular plants belonging to 40 families were found in the marsh. Dominant species were *Isachne globossa*, *Scirpus fuirenooides*, *Potamogeton fryeri*, *Juncus effusus* var. *decipiens*, *Haloragis micrantha*, etc. A total of 52 species of aquatic insects were observed in the water. In 20 (39%) and 22 (42%) out of the 52 species, only larvae and adults were observed respectively. Dominant species were *Notonecta triguttata*, Chironomidae sp.1, *Sigara* spp., *Gerris latiaabdominis*, and Chironomidae sp.2, *Cloeon* sp., and *Aeshna nigroflava*, representing about 80% of the total number of aquatic insects observed in this marsh. As for adult Odonata, a total of 29 species from 9 families were found in this marsh. Dominant species were *Sympetrum kunkeli*, *Nannophya pygmaea*, *Indolestes peregrinus*, *S. darwinianum*, and *Cercion calamorum*, representing about 60% of the total individuals found. Adults of the tiny dragonfly, *N. pygmaea*, were observed from May to August in this marsh, though females disappeared about half a month earlier." (Authors)] Address: Ishii, M., College of Agriculture, Osaka Prefecture University, Japan

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pest, Pázmány Péter sétány 1, Hungary. E-mail: gh@arago.elte.hu

6099. Bönsel, A. (2001): Hat *Aeshna subarctica* (Walker 1908) in Nordostdeutschland eine Überlebenschance? Die Entwicklung zweier Vorkommen im Vergleich zum gesamten Bestand in Mecklenburg-Vorpommern. *Natur und Landschaft* 76(6): 257-261. (in German, with English summary). [Exuviae of *A. subarctica* have been recorded since 1995 in the Göldenitzer Moor mire in the German regional state of Mecklenburg/Western Pomerania. The abundance declined from 322 to 12 emerged individuals within 6 years. This was associated with the simultaneously observed disappearance of *Sphagnum* species. The loss of *Sphagnum* plants is due to intensive drainage and elevated nutrient availability. In the Horster Moor mire, a presumably extinct population re-established itself after restoration measures as an abundant and autochthonous population. Restoration of the Horster Moor site, where peat had previously been extracted industrially, commenced in 1986 by waterlogging of this ombrogenous bog. At first, *Sphagnum* cover developed slowly. However, a stand of *Eriophorum* species developed in shallow flooded areas with mossy bog ponds. In areas where manual peat-digging was practised, flooded *Sphagnum* grew again after the water level rose. Consequently, after 14 years of re-vegetation, *A. subarctica* has re-established itself with a major autochthonous population. However, this population remains endangered by eutrophication of its larval waters. In Mecklenburg/Western Pomerania there are currently 9 further occurrences of *A. subarctica*. These are all similarly severely endangered. Therefore, medium-term extinction of this dragonfly in north-eastern Germany appears likely.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

6100. Derka, T.; Kováčová, J.; Bulánková, E. (2001): Substrate importance for selected macrozoobenthic communities in Rudava river. *Folia faunistica Slovaca* 6: 59-68. (in Slovakian, with English summary). ["The macroinvertebrate communities inhabiting different substrate types were investigated in a small sandy bottom river in SW Slovakia. Special attention was paid to macroinvertebrates associated with wood debris and submersed root mats of riparian trees. A total of 57 taxa of temporal fauna were recorded at two sites; the lowest number of taxa was found on the sandy substrate. The muddy substrate with detritus was also inhabited relatively poorly, whereas the most diverse was the community on the woody debris (35 taxa collected). At all substrate types, the highest biomass values were found in amphipods. Trichoptera were important on debris and the habitats associated with roots. Densities were highest on muddy habitats with detritus but the biomass was lower than that on the roots and debris. Sandy bottom showed the lowest values of densities and biomass. Woody debris and submersed roots were found to be essential for the maintenance of diversity and abundance of macroinvertebrate community." (Authors) The paper includes notes on *Calopteryx splendens*.] Address: Bulankova, Eva, Institute of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B-II, SK-84215 Bratislava., Slovakia; tel.+ 421-7-728 922, e-mail: Bulankova@fns.uniba.sk

6101. Han, F.-y. (2001): Study on the significant variation in the abdominal spot patterns in the male adult

Coenagrion barbatum Needham. *J. Shanxi Univ. (Nat. Sci.)* 24(4): 341-343. (in Chinese, with English summary). [Spot variability in the abdominal segments 2 and 8-10 was studied.] Address: Han, F.-y., Dept Life Sciences, Shanxi University, Taiyuan 030006, China

6102. Nakamoto; Sekioka (2001): Construction of ponds to make the environment more suitable for plants and animals. *Journal of the Japanese Society of Revegetation Technology* 27(1): 355-356. (in Japanese, with English translation of the title). [no abstract available] Address: not stated

6103. Papavero, N.; Ibanez-Bernal, S.I. (2001): Contributions to a Mexican history of dipterology, part 1. Entomologists and their works before the *Biologica Centrali Americana*. *Acta zoologica Mexicana (N.S.)* 84: 115-173. (in English). [This paper contains an interesting "life history" of the well known odonatologist Friedrich Moritz Brauer, Austria. A few additional information are given to Carl Eduard Adolph Gerstäcker, author of a few papers on Odonata.] Address: Ibanez-Bernal, S., Instituto de Ecología, A.C. Departamento de Entomología, km 2,5 carretera antigua a Coatepec No 351, Congregación El Haya, 91070 Xalapa Veracruz, Mexico

6104. Pliuraite, V. (2001): Seasonal changes of the abundance, biomass, species composition of macrozoobenthos in the rivers Merkys and Svventoji. *Ekologija* 2001(4): 16-30. (in Lithuanian, with English summary). [Lithuania, *Calopteryx splendens*, *Gomphus vulgatissimus*, and *Libellula quadrimaculata* are listed from different stretches of the rivers.] Address: Pliuraite, V., Ekologijos institutas, Akademijos g.2, LT-2600 Vilnius, Lietuva

6105. Ramos Elorduy, J.; Pino, J.M. (2001): Contenido de vitaminas de algunos insectos comestibles de México. *Revista de la Sociedad Química de México* 45(2): 66-76. (in Spanish, with English summary). ["The concentrations of Vitamins A, C, D, and B (thiamine, riboflavin and niacin) in 35 species of edible insects were determined. It is noted the role of these substances for the development and growth of the human organism, as well as for health. The concentrations obtained for the edible insects studied were compared with those of conventional edible products rich in these micronutrients, noting that in many cases certain species surpass the vitaminic content of various common edible products, therefore, some edible insects species can be considered as a good vitaminic source. This is the case of *Periplaneta americana* (adults) in vitamin A, *Latebraria amphipyrioides* (larvae) in vitamin C, *Achea domestica* (nymphae) in vitamin D, and *Copestylum anna* and *C. haggi* (larvae) in thiamine, riboflavin, and niacin. It is observed that the insects species studied possess more content in vitamins of the B group, It is pointed out the importance of the presence of these vitamins for the diet of peasants of the rural area of Mexico, who regularly consume insects, and even store and commercialize them." (Authors) Exclusively vitamin B was found - in low concentrations - in the larvae of *Anax* sp.] Address: Ramos-Elorduy, Julieta, Instituto de Biología, Universidad Nacional Autónoma de México. Circuito Exterior, Ciudad Universitaria, Ap. Postal 70-153, Mexico 04510, D.F.

6106. Schlüpmann, M. (2001): Der Plattbauch (*Libellula depressa* LINNAEUS, 1758) – Insekt des Jahres 2001 – in Hagen. Homepage des Umweltamtes

2001 – in Hagen. Homepage des Umweltamtes der Stadt Hagen 2001: www.umweltamt.hagen.de/umwelttipps/tippstexte/Plattbauch.pdf: 13 pp. (in German). [This is a "blueprint" of *Libellula depressa* with special emphasis on the situation in the town Hagen, Nordrhein-Westfalen, Germany. The habitat selection of the species is stressed.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, German. E-mail: martin-schluemann@t-online.de

6107. Sibl, J. (2001): Contribution to the knowledge of dragonflies (Insecta: Odonata) of the National Park Muránska planina (Slovakia). *Folia faunistica Slovaca* 6: 53-58. (in Slovakian, with English summary). ["The dragonfly fauna at 36 localities was studied in the national park Muránska planina (central Slovakia) and its surroundings. The occurrence of 16 dragonfly species was recorded, or 27 when including literature records. The occurrence of *Leucorrhinia pectoralis*, which is considered rare in Slovak republic, as well as in some other European countries, was confirmed in the study area. 8 species - *Pyrrhosoma nymphula*, *Ischnura pumilio*, *Sympecma fusca*, *Leucorrhinia pectoralis*, *Crocothemis erythraea*, *Orthetrum cancellatum*, *Cordulia aenea*, *Aeshna cyanea* - were for the first time recorded from the study area." (Author)] Address: Sibl, J., J. Stanislava 15, SK 84105 Bratislava, Slovakia. E-mail: sibl@changenet.sk

6108. Torres, L.; Onore, G. (2001): Diversidad de Odonata en ríos del bosque nublado Otonga y sus alrededores. In: Nieder, J. & W. Barthlott (Eds.): *Epiphytes and canopy fauna of the Otonga rain forest (Ecuador). Results of the Bonn - Quito epiphyte project, funded by the Volkswagen Foundation (Vol. 2 of 2)*. ISBN: 3-8311-1858-2: 275-300. (in Spanish, with English summary). ["Ten rivers were selected at similar altitudes: six located within the Otonga Reserve and four in agricultural areas. One semi-quantitative sampling of aquatic macro-invertebrates, in winter and summer, was undertaken, and physical and chemical parameters were measured for each river. A qualitative sampling of Odonata nymphs and adults was carried out for each river. All adult specimens were captured. Six nymphs genera and five adults genera were collected in or close the rivers studied. No correlation among the river characteristics, aquatic macro-invertebrates, and species and families of Odonata found in the rivers was observed. Although human activity exists around the rivers, this study demonstrated that those in agricultural regions were not sources of contamination that affect the macro-invertebrate fauna. The paucity of taxa in the rivers is probably due to a low percentage of organic matter." (Authors)] Address: Torres, Leticia, Museo QCAZ, Departamento de Ciencias Biológicas; Pontificia Universidad Católica del Ecuador; Avenida 12 de Octubre y Veintimilla; Apartado 17-01-2184; Quito, Ecuador

6109. Wheeler, W. (2001): Homology and the optimization of DNA sequence data. *Cladistics* 17: S3-S11. (in English). ["Three methods of nucleotide character analysis are discussed. Their implications for molecular sequence homology and phylogenetic analysis are compared. The criterion of inter-data set congruence, both character based and topological, are applied to two data sets to elucidate and potentially discriminate among these parsimony-based ideas." The study includes *Libellula pulchella* and *Dorocordulia lepida*.] Address: Wheeler, W., Division of Invertebrate Zoology,

American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024-5192

2002

6110. Armbruster, P.; Hutchinson, R. A.; Cotgreave, P. (2002): Factors influencing community structure in a South American tank bromeliad fauna. *Oikos* 96: 225-234. (in English). ["We examined factors influencing the structure of naturally replicated, taxonomically unrestricted communities inhabiting South American tank bromeliads. We measured aspects of plant physical structure and collected the entire macroscopic fauna of 209 bromeliads from the Yasuní Scientific Reserve in lowland eastern Ecuador. We collected a total of 11 219 individuals of 354 morphospecies. The morphospecies abundance distribution of our sample was approximated by a log-series distribution dominated by rare morphospecies (57% of the morphospecies were represented by a single individual). Six methods for estimating the total number of bromeliad associated morphospecies in our study area gave results which varied by a factor of three, illustrating that caution should be exercised in interpreting the results of any single estimator. Variation in plant volume, number of leaves, detritus content, and water volume explained 62% of the variation in morphospecies richness among plants. Finally, there was a quadratic relationship between body mass and both individual abundance and morphospecies richness in our sample. These results illustrate an important role of both biotic and abiotic factors influencing the structure of taxonomically unrestricted, ecologically defined natural communities." (Authors) 16 Odonata specimens from 8 morphospecies have been collected.] Address: Armbruster, P., Dept of Biology, 321 Marsh Life Sciences Bldg., Uni of Vermont, Burlington, VT 05405-0086, USA. E-mail: parmbus@zoo.uvm.edu

6111. Ido, T.; Goto, H. (2002): A study on the establishment and use about a school biotope - a case study on the eco-up enterprise by Dragonfly pool at Yokohama city. *J. Arch. Plann. environ. engineering* 554: 213-218. (in Japanese, with English summary). [Proposals for the improvement of environmental education on schools by dragonfly ponds are outlined.] Address: Ido, T., Dept of Architecture (Prof. Dr. Eng), Faculty of Engineering, Waseda University, Japan

6112. Raab, R.; (2002): Quelljungfern - Österreichs Insektenarten des Jahres 2002. *Entomologica Austriaca* 6: 3-4. (in German). ["The dragonflies of the genus *Cordulegaster* have been chosen as Austrian "Insects of the Year 2002". They are indicator species for clear springs and brooks. These animals are especially noticed because of their remarkable size and the longevity of their larvae." (Authors)] Address: Raab, R., Anton Bruckner-Gasse 2/2, A-2232 Deutsch-Wagram, Austria. E-mail: rainer.raab@gmx.at

6113. Sauseng, M.; Pabst, M.-A.; Kral, K. (2002): Das Lauerverhalten von *Libellula quadrimaculata* (Linnaeus, 1758) (Libellulidae, Odonata). *Entomologica Austriaca* 6: 14-15. (in German, with English summary). [The visually controlled ambush behaviour of *Libellula quadrimaculata* (Linnaeus, 1758) (Libellulidae, Odonata): *L. quadrimaculata* belongs to a group of dragonflies which

"employ a special hunting strategy, exhibiting the so-called „perching" behaviour. The males perch in the sun on vegetation near the shore, waiting in ambush for potential mates or items of prey. Initial findings indicated that males settling on the perch in the morning oriented the longitudinal axes of their bodies in such a way as to have the sun behind them, and accordingly were looking away from the sun. This also happened in the afternoon. A central topic of the investigation were visual factors significant for the dragonfly when perching. In order to ascertain this, the dragonfly's line of vision relative to the sun and to the visual environment was investigated." (Authors)] Address: Sauseng, Manuela Institut für Zoologie und Institut für Histologie und Embryologie, Karl-Franzens—Universität Graz, Universitätsplatz 2, 8010 Graz, Austria. E-mail: manuela.sauseng@kfunigraz.ac.at

6114. Tsuyuki, K.; Sudo, S. (2002): Three-dimensional structure of a wing and flow field around a flapping dragonfly with the PIV system. Transactions of the Japan Society of Mechanical Engineers. B 68 (No.676) : 3392-3399. ["In the present paper, studies of dragonfly wing revealed the structural morphology and the aerodynamic characteristics. Some experimental studies on dragonfly wings were performed with a scanning electron micrograph, a three-dimensional curved shape measuring system and a Particle Image Velocimetry (PIV) system. Firstly, the scanning electron micrograph observed the cross section shape of a dragonfly wing. Secondly, the system for the measurement of surface shape measured the surface roughness of a dragonfly wing with μm order accuracy. The results of surface shape measurement revealed there are three regions on a dragonfly wing, which had different function for a wing. Lastly, the PIV system measured the flow characteristics around the dragonfly wing and the flapping dragonfly. The analysis of two-dimensional velocity fields with the PIV system clarified the existence of the large velocity areas over a dragonfly wing and the specific flows around a flapping dragonfly." (Authors)] Address: Tsuyuki, K. Department of Mechanical Engineering, IWaki Meisei University, Japan

2003

6115. Clausnitzer, V. (2003): Ecology and biogeography of the dendrolimnetic *Coryphagrion grandis*. 2. Symposium der A. F. W. Schimper-Stiftung: 1-13. (in English). ["A study on the ecology of the dendrolimnetic damselfly *C. grandis* was undertaken in coastal forests of East Africa. The results are compared with other dragonfly species, known to breed in phytotelmata as well. These ecological and additional morphological and genetic results of this study show, that the monotypic *Coryphagrion grandis*, which was placed for conveniences within the Megapodagriidae, belongs to the otherwise South and Central American Pseudostigmatidae. Although the separation from the neotropical Pseudostigmatidae occurred at least 100 million years ago, the morphology and biology *Coryphagrion grandis* is still very similar to the former. These findings support biogeographical considerations about historical forest distribution in Africa, stability of East African coastal forests and the species loss due to extinctions in West and Central Africa. Since the future of *Coryphagrion*

grandis depends on the survival of the last coastal and lower Eastern Arc forests in East Africa, a short conservation chapter is added in the end." (Author)] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@t-online.de

6116. Davis, S.; Golladay, S.W.; Vellidis, G.; Pringle, C.M. (2003): Macroinvertebrate biomonitoring in intermittent coastal plain streams impacted by animal agriculture. J. Environ. Qual. 32: 1036-1043. (in English). ["Little attention has been given to the ecology of intermittent coastal plain streams in the southeastern United States, and it is not known whether available macroinvertebrate biomonitoring methods reliably detect degradation in these streams. This study compared differences in biomonitoring metrics between reference and agricultural streams, and between the flow period (January–April) and the intermittent flow period (May–December). Percentages of crustaceans, isopods, and Ephemeroptera–Plecoptera–Trichoptera (EPT) were significantly higher at the reference site than the two most impacted sites during the flow period, probably resulting from the abundance of leaf litter and lower temperatures. During this same period, the agriculturally impacted sites had a significantly higher percentage of dipterans—a group that thrives in the silty, nutrient-rich waters. Four metrics (percent Crustacea, Isopoda, Diptera, and EPT) had no overlap between values for the most impacted and the least impacted sites during the flow period, but no metrics were able to detect more discrete differences among sites. Sites were physically and biologically similar during the intermittent period when natural stresses (i.e., stagnant water, high temperatures, low dissolved oxygen) were high, with many metrics such as percentages of dominant family, burrowers, chironomids and dipterans becoming similar at all sites. Our findings indicate that development of a better understanding of invertebrate fauna in reference conditions and of the natural variation in intermittent streams is necessary to develop effective biomonitoring programs for these systems." (Authors) The study includes a passing reference to "Odonata".] Address: S.W. Golladay, J.W. Jones Ecological Research Center, Route 2, Box 2324, Newton, GA 31770, USA. E-mail: sgollada@jonesctr.org

6117. Donnelly, T.W.; Parr, M.J. (2003): Odonata, Dragonflies and Damselflies. In: Goodman, S.M. & J.P. Benstead (Eds): The Natural history of Madagascar. ISBN 0-226-30306-3: 645-654. (in English). [12 of the 52 genera, and 132 of the 181 species currently known from Madagascar are endemic. The authors give a brief introduction into the regional fauna, checklist the species, and discuss them on the family level. *Ceriatagrion suave*, *Parazyxomm flavicans*, *Urothemis edwardsi*, *Trithemis haematima*, *Orthetrum austeni*, and *Pantala flavescens* are added as new to the regional checklist. Also *O. chrysostigma* (page 653) is assessed as new to Madagascar, but not checklisted. In addition, a checklist of the Odonata from the Comoro Islands is included.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

6118. Enomoto, H.; Hamamoto, M.; Hisada, T.; Hara, K.; Ohta, Y. (2003): Free-flight simulation of *Sympetrum frequens* hovering. The Computational Mechanics Conference 2003, No.16: 83-84. (in Japanese, with English translation of the title and key words). [flapping flight,

free-flight hovering, fluid-structure, interaction analysis, shell element] Address: not transliterated

6119. Gusenleitner, F. (2003): Die Entwicklung der Entomologischen Sammlungen am Biologiezentrum Linz im Zeitraum 1993 bis 2002. Beitr. Naturk. Oberösterreichs 12: 89-128. (in German, with English summary). [The Biology Centre of the Upper Austrian Museums started in 1993. Since this time 1,5 million specimens have been added to the entomological collections. The most important persons, related to the collections in this period are mentioned in short biographies. The collection also harbours Odonata.] Address: Gusenleitner, F., Biologiezentrum der Oberösterreichischen Landesmuseen, J.-W.-Klein-Str. 73, A-4040 Linz /Dornach, Austria. E-mail: f.gusenleitner@landesmuseum-linz.ac.at

6120. Gusenleitner, F.; Aeschl, E. (2003): Bibliographie der Wirbellosen Tiere (Vertebrata) Oberösterreichs (1991-2002). Beitr. Naturk. Oberösterreichs 12: 521-618. (in German). [Austria; 66 papers with odonological content are compiled.] Address: Gusenleitner, F., Biologiezentrum der Oberösterreichischen Landesmuseen, J.-W.-Klein-Str. 73, A-4040 Linz/Dornach, Austria. E-mail: f.gusenleitner@landesmuseum-linz.ac.at

6121. Gusenleitner, F.; Aeschl, E. (2003): Neu beschriebene Taxa in den Publikationen des Biologiezentrums Linz (1993–2002). Beitr. Naturk. Oberösterreichs 12: 299-345. (in German, with English summary). [2236 new taxa, including 1 order, 1 suborder, 4 families, 1 subfamily, 7 tribes, 8 sections, 7 subsections, 96 genera, and 22 subgenera, have been established in four journals of the Biology Centre of the Upper Austrian Museums, the "Linzer biologische Beiträge" (= LBB), "Stapfia", "Beiträge zur Naturkunde Oberösterreichs" (= BNO) and "Denisia". This number is composed of 119 botanical, 223 ciliate, 1 nemertine, 3 annelid, 24 arachnid, and 1866 insect names." (Authors) Some of the Odonata described as new to science have been published in the LBB.] Address: Gusenleitner, F., Biologiezentrum der Oberösterreichischen Landesmuseen, J.-W.-Klein-Str. 73, A-4040 Linz/Dornach, Austria. E-mail: f.gusenleitner@landesmuseum-linz.ac.at

6122. Osawa, S.; Katsuno, K. (2003): The relationship between the distribution of a vulnerable species *Ludwigia peploides* ssp. *stipulacea* and an inhabitation of Coenagrionidae in urban river. Journal of the Japanese society of revegetation technology 29(2): 343-351. (in Japanese with English summary). [The importance of *Ludwigia peploidea*. *Raven* ssp. *stipulacea* *Raven*, a vulnerable species locally distributed along the Kashio River in east Kana-gawa (Japan), as habitat for *Ischnura senegalensis*, *I. asiatica*, and *Cercion hieroglyphicum* was surveyed. *C. hieroglyphicum* and *I. asiatica* developed high abundances over *L. peploidea* ssp. *stipulacea*. Larvae density was high in sites on the slower running stream stretches with *Ludwigia*. The authors conclude that *Ludwigia* stands are of significant importance as microhabitat for the larvae. Mark-recapture investigations indicated that the max. distance of immigration was about 700 m, and nearly all of recapture individuals stayed on the identical sandbar; it is not possible to get any information from the summary which species are referred to. It is proposed to "design an arrangement of *L. peploidea* ssp. *stipulacea* community at

intervals of some hundred meters" along the Kashio River with the function as an ecological corridor for Coenagrionidae in urban areas.] Address: Osawa, S., Coll. of Bioresource Sci., Nihon Univ., Japan

6123. Schwarz-Waubke, M.; Schwarz, M.; Gusenleitner, F.; Gusenleitner, J.; Malicky, M.; Malicky-Ruzicka, H.; Vogtenhuber, P. (2003): Insekten-Typen am Biologiezentrum Linz. Teil I. Beitr. Naturk. Oberösterreichs 12: 407-450. (in German, with English summary). [The insect types deposited in the Biology Centre Linz (Austria) represent 1765 taxa, of which 11 taxa belong to the Odonata, all described by Günther Theischinger, some in cooperation with J.A. Watson.] Address: Schwarz-Waubke, Maria, Eben 21, A-4202 Kirchsschlag, Austria. E-Mail: schwarz-entomologie@utanet.at

6124. Tsuda, K., Watanabe, M.; Tominaga, S., Onjo, M.; Ichitani, K. (2003): The biogeography of the insect fauna of the Ulithi Islands, Micronesia. Kagoshima University Research Center for the Pacific Islands Occasional Papers No.39, Section 2, Report 7. The Progress Report of the 2000 and 2001 Survey of the Research Project "Social Homeostasis of Small Islands in an Island-zone": 73-75. (in English). ["Ulithi Atoll in Yap State is located in the western zone of the Federated States of Micronesia and comprises 49 islets. In a survey of Ulithi Atoll, we visited its four inhabited islands, Asor, Falalop, Fassarai, and Mogmog. Insects were collected both by day and night, and 262 species of insects from nine orders were recorded. In order to estimate the species richness and natural environment of each island, the number of species in each taxonomic order was considered. Fassarai had the greatest species richness of the four islands, while Mogmog had the least. This suggests that human inhabitation affects insect species richness, because most of Mogmog Island was used as living space." (Authors) A total of 6 odonate taxa are labelled but without any details with the exception of the number of taxa recorded on each island.] Address: Tsuda, K., Faculty of Agriculture, Kagoshima University, Kagoshima 890-0065, Japan

2004

6125. Bechev, D.N.; Stojanova, A.M. (2004): Geographic localities of invertebrates of conservation importance in the Rhodopes (Bulgaria). Trav. Sci. Univ. Plovdiv, Animalia 40(6): 19-25. (in Bulgarian, with English summary). ["Information about 21 invertebrates of conservation importance is presented. Some of the distributional data are recorded herein for the first time, while some others confirmed published localities before. The faunistic data concerned invertebrate species from the lists of: IUCN Red List, Habitat Directive DCE 92/44/EEC, Bern Convention, ESC Red List, CORINE biotopes Check-list and Law for Biodiversity of Bulgaria." (Authors) Four odonate species are considered: *Somatochlora flavomaculata*, *Coenagrion hastulatum*, *Lestes dryas*, *Cordulegaster heros*.] Address: Bechev, D.N., Department of Zoology, University of Plovdiv, 24 Tzar Assen Str., BG-4000 Plovdiv, Bulgaria. E-mail: bechev@pu.acad.bg, stanelia@pu.acad.bg

6126. Gentilini, G.; Bagli, L. (2004): Fossil Zygoptera and Anisoptera from the Upper Miocene of Monte

Castellaro (Pesaro, Marches, Central Italy) (Insecta Odonata Coenagrionidae, Lestidae, Sieblosiidae, Calopterygidae, Libellulidae). *Quaderno di studi e notizie di storia naturale della Romagna* 19: 17-44. (in English, with Italian language). [Seven fossil wings of zygopteran Odonata from the Upper Miocene of Monte Castellaro, Pesaro, Italy, are discussed and figured. *Deielia sarae* and *Trapezostigma barbaresii* are described as new.] Address: Gentilini, G., via Adriatica 78, I-47843 Misano Adriatico (RN), Italy. E-mail: ggentilini.adsl2003@libero.it

6127. Glendinning, P. (2004): The mathematics of motion camouflage. *Proc. R. Soc. Lond. B* 271(1538): 477-481. (in English). ["Motion camouflage is a strategy whereby an aggressor moves towards a target while appearing stationary to the target except for the inevitable change in perceived size of the aggressor as it approaches. The strategy has been observed in insects (including Odonata), and mathematical models using discrete time or neural-network control have been used to simulate the behaviour. Here, the differential equations for motion camouflage are derived and some simple cases are analysed. These equations are easy to simulate numerically, and simulations indicate that motion camouflage is more efficient than the classical pursuit strategy ('move directly towards the target')."] (Author)] Address: Glendinning, P., Department of Mathematics, UMIST, PO Box 88, Manchester M60 1QD, UK. E-mail: p.a.glendinning@umist.ac.uk

6128. Kvacek, Z.; Rajchl, M.; Böhme, M.; Dvůrák, Z.; Mach, K.; Prokop, J.; Konzalová, M. (2004): Early Miocene freshwater and swamp ecosystems of the Most Basin (northern Bohemia) with particular reference to the Bilina Mine section. *Journal of the Czech Geological Society* 59(1-2): 1-40. (in English). [Czech Republic; the paper includes information to fossil Odonata] Address: Prokop, J.; Department of Zoology, Charles University, Vinicna 7, CZ-128 44, Praha, 2, Czech Republic; E-Mail: jprokop@natur.cuni.cz

6129. Matsui, A.; Satoh, M. (2004): Distribution of aquatic animals in the drainage systems created by paddy farmland consolidation in Shimodate City, Ibaraki Prefecture, Japan. *Japanese journal of conservation ecology* 9: 153-163. (in Japanese, with English summary). ["Conventional paddy farmland consolidation in Japan, which aims to increase farming efficiency by improving the drainage conditions of paddy fields and independently creating irrigation and drainage canals, is thought to have negative impacts on biodiversity in rural areas. The Land Improvement Act of Japan was amended in June 2001 and requires agricultural and rural development projects to be harmonized with the environment. It is widely recognized that transforming concrete irrigation and drainage canals into earthen canals and minimizing the differences in elevation between paddy plots and drainage canals aid in the preservation of aquatic animals. However, most paddy fields that have been consolidated using conventional standards will inevitably remain intact, thus continuing to have a substantial influence on the regional environment. Therefore, at least the minimum environmental measures should be effectively implemented in consolidated paddy fields. To this end, the distribution of the aquatic animals associated with these fields requires clarification. In addition, this knowledge will be useful in determining how to effectively distribute water during the non-

irrigation season. The purpose of this study was to clarify the distribution of aquatic animals in the canal systems of main, lateral, and farm drains in the consolidated paddy fields, with a special focus on canal structure and year-round water flow in the canals. A field survey at six sites, which were selected for their different canal levels, was carried out in Shimodate City, Ibaraki Prefecture, Japan (36°21'N, 139°59'E). Sampling was conducted at monthly intervals from April 2001 to March 2002. A survey of fishes revealed that *Zacco platypus* (Oikawa) was concentrated in the main drains, while *Misgurnus anguillicaudatus* (Dojou) was found mainly in the lateral and farm drains. Among aquatic insects, *Calopteryx atlata* (Hagurotombo) was concentrated in the lateral drains, while *Onhetrum albistylum speciosum* (Shiokaratombo) was observed primarily in the farm drains. *Z. platypus* preferred gravel-bottom main drains to those made of concrete. *C. atlata* and *O. albistylum speciosum* preferred year-round water flow to seasonal flow in lateral and farm drains, respectively. In contrast, *Sympetrum infuscatum* (Noshimetombo) preferred seasonal water flow to year-round flow in farm drains. The drainage systems in the consolidated paddy fields are clearly composed of different levels of drains with peculiar physical conditions, e.g., water depth and flow velocity, each of which attracts certain aquatic animals. To enrich the biodiversity of the paddy fields, our results suggest the importance of year-round water flow and natural materials for canal beds." (Authors)] Address: Masayoshi Satoh, M., Graduate School of Life and Environmental Sciences, University of Tsukuba, I-1-I, Tennodai, Tsukuba City, Ibaraki 305-8572, Japan. E-mail: massa@sakura.cc.tsukubii.ac.jp

6130. Matsu'ura, S.; Watanabe, M. (2004): Dynamics of reed community artificially established for conservation of the endangered damselfly *Mortonagrion hirosei* and odonate larvae inhabiting the community. *Japanese Journal of Conservation Ecology* 9: 165-172. (in Japanese, with English summary). ["To conserve the brackish water damselfly *Mortonagrion hirosei*, a reed community was artificially established adjacent to a small natural habitat in Mie Prefecture, Japan, in 2003. From April to November, we measured the dynamics of the reed community as well as the changes in abiotic factors in the understory of the community in which *M. hirosei* adults were active. Reeds that emerged in the artificial community were thinner and shorter than those in the natural habitat, however reed density did not differ between the two habitats. Therefore, the established reed community provided a more open habitat for *M. hirosei* adults compared to the natural habitat. Although adults of many odonate species were observed flying over both reed communities, only larvae of *Ischnura senegalensis* were collected in November in addition to those of *M. hirosei*. Because a predator of *M. hirosei* is *I. senegalensis* that should be excluded from the community, maintaining a dense reed community must be important for the conservation of *M. hirosei*." (Authors)] Address: Matsu'ura, S., Graduate School of Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: s0323562@ipe.tsukuba.ac.jp

6131. Nadobnik, J.; Agapow, L.; Korościński, B. (2004): The importance of the "Santockie Zakole" nature Reserve for preservation of biological diversity and tourism. *Teka Kom. Ochr. Kszt. Srod. Przyn.* 2004(1): 157-161. (in Polish, with English summary). [Poland, ri-

ver Warta, river Noteć; 5 species of odonata are listed.] Address: Nadobnik, J., Katedra Przyrodniczych Podstaw Kultury Fizycznej, Akademia Wychowania Fizycznego w Poznaniu, Zamiejskowy Wydział Kultury Fizycznej w Gorzowie Wlkp., ul. Bsikowskiego 13, Poland. E-mail: nadobnik@ncostrada.pl

6132. Palot, M.J.; Radhakrishnan, C. (2004): A note on the mock-mating behaviour in damselflies (Odonata: Insecta). *Zoos' Print Journal* 19: 1431. (in English). [India; 6-IX-2001, a male *Coperia marginipes* and a female *Ceriatagrion cerinorubellum* were found in the wheel position for about 40 minutes before freeing themselves.] Address: Palot, M.J., Zoological Survey of India, Western Ghats Field Research Station, Kozhikode, Kerala 673002, India.

6133. Relyea, R.A. (2004): Fine-tuned phenotypes: tadpole plasticity under 16 combinations of predators and competitors. *Ecology* 85(1): 172-179. (in English) ["It is now well appreciated that most organisms can alter their phenotypes when faced with environmental variation. Decades of empirical investigations have documented hundreds of examples of phenotypic plasticity, yet most studies have focused on the presence or absence of a single environmental factor. As a result, we know little about how organisms respond to gradients of environmental factors (i.e., threshold responses vs. continuous responses), nor do we understand how organisms respond to combinations of environmental variables. I examined how larval wood frogs (*Rana sylvatica*) altered their behavior, morphology, and growth in response to combined gradients of predation and competition. Increased predation risk induced lower activity, deeper tails, and shorter bodies, which collectively caused slower growth. Increased competition caused slower growth which induced higher activity, shallower tails, and longer bodies. For both environmental gradients, the responses were frequently continuous rather than threshold responses. Moreover, predation and competition had interactive effects. Responses to predators were always larger under low competition than under high competition. Responses to competition were larger under low predation risk when predation and competition induced traits in the same direction, but larger under high predation risk when predation and competition induced traits in opposite directions. The results demonstrate that responses to phenotypically plastic traits can be fine-tuned to a wide variety of environmental combinations." (Author) *Anax junius* is a classic predator in anurans and test organism in laboratory.] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

6134. Saito, Y.; Owada, M. (2004): Dragonflies (Odonata) of the Toikiwamatsu Imperial Villa, Tokyo, Central Japan. *Mem. natn. Sci. Mus.*, Tokyo 39: 431-438. (in Japanese, with English summary). [Between 2002 and 2004, the Odonata fauna of the garden pond of the villa was surveyed. A total of 18 species including *Anaciaeschna martini*, *Anax nigrofasciatus*, and *Rhyothemis fuliginosa* was recorded.] Address: Owada, M., Dept Zool., Natn. Sci. Mus., 3-23-1 Hyakunincho, Shinjuku-ku, Tokyo, 169-0073, Japan. E-mail: owada@kahaku.go.jp

6135. Sato, M. (2004): Relationship between the life cycle of dragonfly (*Usubakitombo*, *Pantala flavescens*)

and the paddy field of early-season rice culture in south Kyushu. *Rep. Kyushu Br. Crop Sci. Soc.* 70: 111-113. (in Japanese, with English translation of the title). [no abstract available] Address: Sato, M., Kagoshima Pref. Agric. Res. Cent., Okinawa Subtrop. Stn., Jpn. Int. Res. Center for Agric. Sci.

6136. Schindler, H. (2004): Bewertung der Auswirkungen von Umweltfaktoren auf die Struktur und Lebensgemeinschaften von Quellen in Rheinland-Pfalz. Dissertation am Institut für Naturwissenschaften der Universität Koblenz-Landau, Abt. Biologie: 266 pp. (in German). [Rheinland-Pfalz, Germany; a few records of *Thecagaster bidentata*, *C. boltonii*, and *Pyrrhosoma nymphula* are documented. see: http://deposit.d-nb.de/cgi-bin/dokserv?idn=978166191&dokvar=d1&dokext=pdf&filename=97_8166191.pdf] Address: not stated

6137. Schulz, R. (2004): Field studies on exposure, effects, and risk mitigation of aquatic nonpoint-source insecticide pollution: a review. *J. Environ. Qual.* 33: 419-448. (in English). ["Recently, much attention has been focused on insecticides as a group of chemicals combining high toxicity to invertebrates and fishes with low application rates, which complicates detection in the field. Assessment of these chemicals is greatly facilitated by the description and understanding of exposure, resulting biological effects, and risk mitigation strategies in natural surface waters under field conditions due to normal farming practice. More than 60 reports of insecticide-compound detection in surface waters due to agricultural nonpoint-source pollution have been published in the open literature during the past 20 years, about one-third of them having been undertaken in the past 3.5 years. Recent reports tend to concentrate on specific routes of pesticide entry, such as runoff, but there are very few studies on spray drift-borne contamination. Reported aqueous-phase insecticides concentrations are negatively correlated with the catchment size and all concentrations of 10 g/L (19 out of 133) were found in smaller-scale catchments (100 km²). Field studies on effects of insecticide contamination often lack appropriate exposure characterization. About 15 of the 42 effect studies reviewed here revealed a clear relationship between quantified, non-experimental exposure and observed effects in situ, on abundance, drift, community structure, or dynamics. Azinphos-methyl, chlorpyrifos, and endosulfan were frequently detected at levels above those reported to reveal effects in the field; however, knowledge about effects of insecticides in the field is still sparse. Following a short overview of various risk mitigation or best management practices, constructed wetlands and vegetated ditches are described as a risk mitigation strategy that have only recently been established for agricultural insecticides. Although only 11 studies are available, the results in terms of pesticide retention and toxicity reduction are very promising. Based on the reviewed literature recommendations are made for future research activities." (Author) The study also refers to some studies of insecticide exposures on Odonata in rice fields, but they are said to have not provided clear evidence for a relationship between population parameters and insecticide exposures.] Address: Schulz, R., Zoological Institute, Technical University, Fasanenstrasse 3, D-38092, Germany. E-mail: R.Schulz@tu-bs.de

6138. Abbott, J.C.; Broglie, D. (2005): *OdonataCentral.com*: A model for the web-based delivery of natural

history information and citizen science. *American Entomologist* 51(4): 240-243. (in English). [Presentation and introduction into an internet page which aims to focus the North American odonatological activities.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

2005

- 6139.** Abro, A. (2005): The accessory glands of the female genital tract in *Aeshna juncea* (L.) and *A. grandis* (L.) (Anisoptera: Aeshnidae). *Odonatologica* 34(2): 103-110. (in English). ["The micro-anatomy of the female accessory glands in adult *A. juncea* and *A. grandis* is similar but the size of the *A. grandis* glands is clearly larger than that of *A. juncea*. The secretory cells constitute a simple columnar epithelium surrounding a cuticle-lined lumen. The glandular epithelium is provided with a peculiar system of deep, narrow, intercellular crypts bordered with microvillar cell membranes. Lipids released to the crypt lumen are presumably forced into the central gland lumen by contractions of the muscular network attached to the outside of the gland. The efferent duct of each gland that opens to the distal part of the vagina has a complicated muscular apparatus, probably serving as a pump. The secreted substances accumulate in the central gland cavity mainly during the pre-reproductive phase, which the dragonflies spend away from water. The secretion contains substances with wax-like properties and becomes darkened by osmication. Secretory cells appear to possess a limited life span; scattered cells in process of dying occur already during the early reproductive phase. In the late reproductive phase most of the glandular epithelium presents a disintegrated appearance. There is no cell renewal in the gland in the course of adult life. The pattern of cell death indicates a decomposition by apoptosis. Besides contributing to investment of the eggs, the glands presumably intervene also in other aspects of the reproductive processes." (Author)] Address: Abro, A., Division of Anatomy, Departments of Biomedicine, University of Bergen, Jonas Lies vei 91, N-5009 Bergen, Norway
- 6140.** Bauer, S. (2005): Das Zielartenkonzept im Landkreis Ravensburg. *mercuriale* 5: 9-13. (in German). [Odonata are an important factor to identify targets of nature conservation tasks and to operationalise these. The Landkreis Ravensburg, Germany has developed a key stone species concept which will guide future nature conservation measures.] Address: Bauer, S., Im Tobel, 88353 Immenried, Germany. E-mail: Josef.Bauer@Landkreis-Ravensburg.de
- 6141.** Boy, G (2005): Maathai's Clubtail. SWARA October-December 2005: 8-9. (in English). [This is an extensive report on the discovery of *Notogomphus maathaiae* in Kenya in 2000, and the succeeding work to describe and name the species.] Address: via Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@t-online.de
- 6142.** Bried, J.T.; Bennett, L.W.; Ervin, G.N. (2005): Live mass and length-mass allometry of adult odonates collected in east-central Mississippi, United States. *Odonatologica* 34(2): 111-122. (in English). ["Live mass was recorded for over 290 adult Odonata during peak flight season in Mississippi. Total live mass is reported for 19 species, along with a quantitative species subset analysis of inter- and intraspecific sex partitioned mass. Fresh mass was significantly correlated with species and sex in Anisoptera ($p = 0.021$) and Zygoptera ($p = 0.001$), based on separate species-level analyses of the Libellulidae ($n = 6$ species) and Coenagrionidae ($n = 4$ species), respectively. Total live mass also was correlated with total body length in the libellulid dragonflies ($r^2 = 0.59-0.94$, $p < 0.0001-0.03$) and length-mass slopes were not significantly different among species. Limitations and cautions of mass prediction via proportionate size dimension(s) are discussed, some advantages of working with adults as opposed to larvae and measuring fresh mass as opposed to dry mass are described, and further study of length-mass relationships in adult Odonata is encouraged." (Authors)] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jasonbried@hotmail.com
- 6143.** Canales-Lazcano, J.; Contreras-Garduno, J.; Cordoba-Aguilar, A. (2005): Fitness-related attributes and gregarine burden in a non-territorial damselfly *Enallagma praevarum* Hagen (Zygoptera: Coenagrionidae). *Odonatologica* 34(2): 123-130. (in English). ["Odonata are usually infected with intestinal gregarines. Using *E. praevarum* adults, it was investigated whether: (a) both sexes differed in the degree of parasitism and immune ability (as shown by melanization of artificial, nylon-based implants in the thoracic region); and, (b) gamete production, survival and fat reserves correlated with gregarine burden. 2 sets of in-copula (to control for age) animals were used. One was used for estimation of egg and sperm, and the other for fat reserves. Survival was monitored as the time that field-captured insects survived under laboratory conditions in the absence of food. Gregarines were counted by dissection of the gut. Despite the case that females had more parasites than males, both sexes did not differ in immune ability. Eggs, but neither sperm nor fat reserves in both sexes, correlated negatively with parasite number. Survival in both sexes also correlated inversely with gregarine burden. This, however, held only for males when the analysis was performed by sex. These results are discussed in terms of the detrimental effects of gregarine on Zygoptera hosts." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx
- 6144.** Clausnitzer, V. (2005): An updated checklist of the dragonflies (Odonata) of the Kakamega Forest, Kenya. *Journal of East African Natural History* 94(2): 239-246. (in English). ["A comprehensive checklist of dragonflies occurring in the Kakamega Forest, Kenya is given and shortly discussed. A total of 72 dragonfly species, representing 42 % of Kenya's dragonfly fauna, has been recorded from the forest. Three of these are based on literature records only. The habitat preference and affiliation with other African regions is listed for all species. Twenty species are of national importance for Kenya, since they are only found at this site within the country. For these species habitat affiliations in the Kakamega Forest are given more in detail. The dragonfly fauna of the Kakamega Forest is impoverished compa-

red to more western Guineo-Congolian rain forest areas. The effects of forest fragmentation and isolation hindering any immigration from western rain forest patches is shortly Addressed." (Author)] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@t-online.de

6145. Contreras Garduño, J.; Córdoba Aguilar, A.; Peretti, A.V. (2005): La elección femenina. *Ciencias* 77: 40-47. (in Spanish). [Review paper on female mate choice.] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

6146. Costa, J.M.; Regis, L.P.R.B. (2005): Description of the last instar larva of *Perithemis lais* (Perty) and comparison with other species in the genus (Anisoptera: Libellulidae). *Odonatologica* 34(1): 51-57. (in English). [The external morphology is described, illustrated and compared with that of the congeners. A note on the habitat of *P. lais* and a list of co-occurring odonate species is appended.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

6147. Daigle, J.J. (2005): *Heteragrion bickorum* spec. nov. from Ecuador (Zygoptera: Megapodagrionidae). *Odonatologica* 34(2): 165-168. (in English). ["The new species is described and illustrated (holotype male and allotype female [pair in tandem]: Ecuador, Napo province, Limoncocha, 28-VIII-1980). The holotype and allotype are deposited in the Florida State Collection of Arthropods, Gainesville, Florida, USA." (Author)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

6148. Dijkstra, K.-D.B. (2005): The identity of some widespread and variable *Phyllomacromia* species, with a revised grouping of the genus (Anisoptera: Corduliidae). *Odonatologica* 34(1): 11-26. (in English). ["Many *Phyllomacromia* species appear to be more variable than was hitherto realised. This has led to the description of paler and darker forms as distinct species. Fortunately, the genus is rich in morphological characters in both sexes. *P. melania* and *P. overlaeti* were described from females and both have been allied with non-conspecific males, leading to great confusion. *P. melania* is the female of the species known as *P. funicularia* rather than that of *P. contumax*, while *P. overlaeti* matches and not *P. subtropicalis* and not *P. schoutedeni*. With the identity of these females clarified and the variation considered, many synonyms arise: *R. funicularia*, *P. bredoi* and *P. martorelli* are synonyms of *P. melania*; *P. biflava*, *P. nyanzana*, *P. bifasciata*, *P. reginae*, *P. halei* and *P. leoni* of *P. contumax*; and *P. onerata* and *P. clymene* of *P. monoceros*; and *P. subtropicalis*, *P. paludosa* and *P. royi* of *P. overlaeti*. *P. paludis* is not synonymous with *P. contumax* but with *P. paula*. The taxonomy of this large genus is briefly discussed and a new species grouping is proposed." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6149. Dumont, H.J.; Haritonov, A.Yu.; Kosterin, O.E.; Malikova, E.I.; Popova, O. (2005): A review of the Odonata of Kamchatka Peninsula, Russia. *Odonatologica*

34(2): 131-153. (in English). ["All knowledge of the odonate fauna of Kamchatka Peninsula (NE Asia) is reviewed, using literature data, miscellaneous collections and the results of an expedition by the authors in July 2003. In total, 27 species have become known, with *Lestes dryas*, *Coenagrion hastulatum*, *Aeshna serrata*, *Epithea bimaculata*, *Somatochlora exuberata*, *S. alpestris*, and *Leucorrhinia intermedia* here reported for the first time. *Aeshna palmata* is dismissed; *Anax junius*, twice reported in the 19th century is an American migrant that rarely reaches Kamchatka; the southern migrants. *Pantala flavescens* and *Sympetrum frequens*, are represented by one old record each, with specimens still preserved in Zool. Inst., St Petersburg. Very few more species may be expected in future, and it is concluded that the fauna is of an impoverished boreal extraction. This lack of endemism is understandable, since dragonflies could only begin reinvading the peninsula around 13,000 BP 7 species are Holarctic, 1 is SE Palaearctic, 5 are NE Palaearctic, 1 is an American vagrant, 1 is a sub-cosmopolitan migrant, and the remainder are transpalaearctic." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

6150. Dumont, H.J.; Verschuren, D. (2005): Odonata from the Ennedi and Ounianga regions of northern Chad, with a note on the status of *Orthetrum kollmannspergeri* Buchholz, and a checklist of species currently known from the Republic of Chad. *Odonatologica* 34(3): 291-297. (in English). ["A hydrobiological survey of scarce permanent aquatic environments in the Ennedi and Ounianga regions of northern Chad yielded a small collection of 7 odonate species. It adds 3 new species to the known fauna of Chad: *Ischnura senegalensis*, *Pseudagrion hamoni*, and *Orthetrum sabina*. The presence of *O. sabina* at Ounianga represents the westernmost record of this oriental species in N. Africa. Another oriental element, *O. taeniolum*, may not exist in Africa W of the Nile, possibly being replaced there by the closely related *O. kollmannspergeri* Buchholz. The 44 species hitherto reported from the Republic of Chad likely represent only a third or less of those to be expected in the country." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

6151. Dyatlova, E.S. (2005): Novye svedeniya o faune strekoz (Odonata) Odessy i ee okrestnostey [New data on Odonata fauna of Odessa and its environs]. *Zagal'na i prykladna entomologiya v Ukraini. Tezy dopovidey naukovoi entomologichnoi konferentsii prysvyachenoj pam'yati chlenacorrespondenta NAN Ukrainy professora V. G. Dolina* [General and applied entomology in Ukraine. Transactions of the scientific entomological conference devoted to the memory of Prof. V. G. Dolin] L'viv: 79-81. (in Russian). ["A short historic review of the odonatological investigation of Odessa and its surroundings (SW Ukraine) was presented. An annotated list of 37 species collected by the author in this region during 2003-2004 contained 14 that were newly discovered for Odessa and its surroundings: *Lestes dryas* first for the Odessa region, *Coenagrion scitulum* and *Orthetrum coerulescens* concepts for the SE Ukraine. (Khrokalo L. (2005): Annotated bibliography of the odonatological papers of Ukraine. IDF-Report 8:1-51)"] Address: Dyatlova, Elena Sergeevna, Institute of Zoo-

logy, Faculty of Biology, I.I. Mechnikov University of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

6152. Dyatlova, E.S. (2005): Novye svedeniya o faune strekoz (Odonata) Odessy i ee okrestnostey [New data on Odonata fauna of Odessa and its environs]. *Zagal'na i prykladna entomologiya v Ukraini. Tezy dopovidey naukovoï entomologichnoi konferentsii prysvyachenoï pam'yati chlenacorrespondenta NAN Ukrainy profesora V. G. Dolina* (General and applied entomology in Ukraine. Transactions of the scientific entomological conference devoted to the memory of Prof. V. G. Dolin) L'viv: 79-81. (in Russian). ["A short historic review of the odonatological investigation of Odessa and its surroundings (SW Ukraine) was presented. An annotated list of 37 species collected by the author in this region during 2003-2004 contained 14 that were newly discovered for Odessa and its surroundings: *Lestes dryas* first for the Odessa region, *Coenagrion scitulum* and *Orthetrum coerulescens anceps* for the SE Ukraine." (Khrokalo L.)] Address: Dyatlova, Elena Sergeyevna, Institute of Zoology, Faculty of Biology, I.I. Mechnikov University of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

6153. Emiliyamma, K.G. (2005): On the Odonata (Insecta) fauna of Kottayam district, Kerala, India. *Zoos' Print Journal* 20(12): 2108-2110. (in English). [31 species from 12 localities are documented] Address: Emiliyamma, K.G., Western Ghats Field Research Station, Zoological Survey of India, Annie Hall Road, Kozhikode, Kerala 670002, India

6154. Faucheux, M. J. (2005): Vibrorécepteurs et osmorécepteurs sur les lamelles caudales de la larve de *Lestes sponsa* (Hansemann, 1823) (Odonata, Zygoptera, Lestidae). *Bulletin de la Société des Sciences naturelles de l'Ouest de la France* 27(4): 203-206. (in French, with English summary). [The caudal lamellae in the larva of *Lestes sponsa* (Odonata, Zygoptera) bear sensilla filiformia and sensilla campaniformia, which are described by means of scanning electron microscope. These sensillar types are observed for the first time on the larval caudal appendages of Odonata. The sensilla filiformia, which are stimulated by the vibrations in the water, are mecanoreceptors which detect the presence and position of predators in the space surrounding each of caudal lamellae. The sensilla campaniformia, whose function is proprioceptive, are true osmoreceptors which allow to larva to be adapted for live in waters with suitable osmotic pression." (Author)] Address: Faucheux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Université de Nantes, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex 03, France. E-mail: faucheux.michel@free.fr

6155. Faucheux, M.J.; Meurgey, F. (2005): Ontogenèse de l'appareil stridulant des larves d'*Epiophlebia superstes* (Sélys, 1889) (Odonata: Anisozygoptera: Epiophlebiidae). *Bull. Soc. Sc. Nat. Ouest de la France, nouvelle série* 27(4): 183-195. (in French, with English summary). ["The development of the stridulatory apparatus has been studied in three larval stages of *Epiophlebia superstes* (Odonata, Zygoptera), using scanning electron microscopy. The pars stridens is made up of triangular zones consisting of a transverse series of ridges placed on each of the abdominal tergites 3-5 (stage A), 3-6 (stage B), 3-7 (stage C). The inner edge of the

femur of the metathoracic legs serves as a plectrum. Contrary to the general case in Insects, it is the pars stridens (abdomen) which rubs against the plectrum (femur). The stridulation has been observed in the 3 larval stages when they outside the aquatic element and are in a state of catalepsy. One may suppose that the sound emission serves an agonistic and spacing function among conspecifics." (Authors) Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

6156. Faucheux, M.J.; Meurgey, F.; El Wahbi, Y. (2005): Odonates des environs d'Essaouira (Maroc méridional). *Bull. Soc. Sc. Nat. Ouest de la France, nouvelle série* 27(3): 122-130. (in French, with English summary). ["11 species of Odonata in the region of Essaouira (Morocco) are presented together with a few related ecological elements. The presence of *Sympetrum méridionale* (Sélys, 1841) has been pointed out for the first time in South-Western Morocco." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

6157. Fenoglio, S.; Bo, T.; Cucco, M. (2005): Winter prey preference of *Perlodes microcephalus* (Pictet, 1833) (Plecoptera, Perlodidae) nymphs in an Apenninic creek, northwestern Italy. *Entomological news* 116(4): 245-252. (in English). [The feeding habits of *P. microcephalus* nymphs have been investigated in Caramagna. "This large species is one of the most representative carnivorous stonefly nymphs in this area, where it is a top-bottom predator in many fishless creeks. Despite its ecological importance, little is known about its trophic ecology. In this study, we examined the gut contents of 35 nymphs during the winter of February 2005. We detected an evident trophic preference for the following taxa: Chironomidae (Diptera) as well as Psychomidae, Glossosomatidae, Hyporhyacophila sp., and other Trichoptera. This preference appears to be independent of the prey's availability in the substratum. Rheostenic taxa, also abundant and widespread in the substratum, were almost absent or seldom found in the diet of *P. microcephalus*. These results suggest that the trophic preferences of *P. microcephalus* are more dependent on prey microhabitat preference than on prey abundance." (Authors) Odonata are not represented as prey while they ("*Calopteryx* sp., *Onychogomphus* sp., *Orthetrum* sp.") are co-occurring with *P. microcephalus*.] Address: Fenoglio, S., University of Piemonte Orientale, Dipartimento di Scienze dell'Ambiente e della Vita, Via Bellini n. 25, 15100 Alessandria, Italy. E-mails: fenoglio@unipmn.it

6158. Ferreira, S.; Grosso-Silva, J.M.; Sousa, P. (2005): A contribution to the knowledge of the odonata of Montesinho Natural Park (NE Portugal). *Boletín Sociedad Entomológica Aragonesa* 37: 249-250. (in English, with Portuguese summary). [14 Odonata species are documented including *Coenagrion mercuriale*.] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate) em Biodiversidade e Recursos Geneticos, Universidade do Porto, Campus Agrário de Vairao, P-4485 -661 Vairão, Portugal. E-mail: hiporame@gmail.com

6159. Ferreira, S.; Grosso-Silva, J. M.; Soares-Vieira, P. (2005): Miscellaneous records of dragonflies and damselflies (Insecta, Odonata) from Continental Portu-

gal. Boln. S.E.A., 36: 275-277. (in English, with Portuguese summary). [Knowledge on the distribution of twenty Odonata species in continental Portugal is broadened. Five species are recorded for the first time from the Peneda-Gerês National Park.] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate) em Biodiversidade e Recursos Geneticos, Universidade do Porto, Campus Agrário de Vairao, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

6160. Frank, K.-S. (2005): Juwel unserer Kulturlandschaft - der Mindelsee bei Radolfzell. *mercuriale* 5: 20-25. (in German). [The fauna and flora of lake Mindelsee situated near Lake Konstanz, Baden-Württemberg, Germany, is briefly characterised. Dragonflies currently account to 49 species; these are listed.] Address: Frank, K.-S., Naturschutzzentrum Möggingen, Mühlbachstr. 2, D-78315 Radolfzell-Möggingen, Germany. E-mail: kai-steffen.frank@bund.net

6161. Gonzalez-Soriano, E.; Cordoba-Aguilar, A. (2005): Male behaviour in the male dimorphic damselfly *Paraphlebia quinta* Calvert (Zygoptera: Megapodagrionidae). *Odonatologica* 34(4): 379-385. (in English). ["*P. quinta* is a tropical species with 2 male morphs: the black-winged (BW) male and the hyaline-winged (HW) male; here their sexual behaviour is described. In general, males seem to spend relatively little time in flying activities. This may be explained either by the inability to recognise conspecifics and, hence, engage in social interactions, or by the reduced energetic reserves that prevent them from engaging in expensive activities. BW males were more aggressive and site-faithful than HW males. BW defended spaces containing debris (plant and wood) against conspecifics while HW did not. BW-BW, BW-HW and HW-HW aggressive encounters were common. Despite their non-aggressive nature toward BW males, HW males behaved aggressively when faced by HW males. The distance flown by each morph from male grasping of the male until she started oviposition was measured: HW flew longer distances than BW. These differences between male morphs are compared to those found in *Mnais p. pruinosa*, another male dimorphic zygopteran. Similar to what happens in that species, both tactics in *P. quinta* are possibly maintained due to the similar reproductive and energetic costs accrued by and benefits paid to each morph." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

6162. Hermans, J. (2005): Review: Askew, R.R. (2004): *The Dragonflies of Europe*, revised & second edition. *Natuurhistorisch Maandblad* 94: 142. (in Dutch). [Review of the second edition of the classic book of Askew (see OAS 4113).] Address: Hermans, J.T.; Herestraat 21, NL-6067 ER Linne, The Netherlands

6163. Hofmann, T.A.; Mason, C.F. (2005): Competition, predation and microhabitat selection of zygoptera larvae in a lowland river. *Odonatologica* 34(1): 27-36. (in English). ["The microdistribution of 4 lotic species was investigated in the field. Microhabitat selection of *Calopteryx splendens* and *Erythromnia najas* was further examined in the laboratory, individually at different larval densities and in the presence of the other species and a predator. *E. najas*, *Ischnura elegans* and *Platycnemis pennipes* showed significant preferences

for particular aquatic macrophytes compared to others in the field, whereas *C. splendens* did not discriminate between the investigated plant species. Only limited spatial separation was apparent between the larvae of different species, as preferences for the same macrophyte species were found. When kept separate and at low densities, larvae of *C. splendens* and *E. najas* inhabited significantly different microhabitats in the laboratory. At high intraspecific abundances, spatial overlap between the two species became apparent as both increasingly occupied less preferred substrata, which is in concurrence with the ideal free distribution model of habitat selection. *E. najas* showed no change in perch selection in the presence of *C. splendens* at high densities. In this instance, intraspecific competition therefore appeared to be more important than interspecific competition with other Zygoptera in determining the microdistribution of *E. najas*. In the field, the niches of the two species may be more adequately separated on the basis of prey selection or hunting behaviour. *E. najas* also actively reacted to the presence of a predator, indicating some flexibility of response regarding perch selection." (Aurhors)] Address: Hoffmann, T.A., Dept Biol. Sci., Univ. Essex, Wivenhoe Park, Colchester, Essex, C04 3SQ, UK. E-mail: tahofmp@essex.ac.uk

6164. Hunger, H. (2005): Von Versuchung, Bruchlandung und eisenhaltigem Schlupfsubstrat. *mercuriale* 5: 45. (in German). [Baden-Württemberg, Germany; (1) 01-VI-2005: a male *Brachytron pratense* tried to copulate with a female *Cordulia aenea*. (2) A female *Sympetrum vulgatum* was accidentally "caught" by the strings of algae, which winded around the caput of the female. (3) *A. imperator* was found emerging 10 m away from the shore towards the open water of a lake, which suggests that larvae also can exist among the submerse vegetation in the centre of a lake.] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

6165. Hunger, H. (2005): Langstreckenmarsch schlüpfbereiter *Orthetrum cancellatum*-Larven. *mercuriale* 5: 40-41. (in German). [Baden-Württemberg, Germany; a long distance emergence of *O. cancellatum* is described in detail. Measured from the shore line the distance was app. 15-16 m.] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

6166. Ishida, K. (2005): Reclassification of *Rhipidolestes okinawanus* Asahina, 1951, Occurring in the Ryukyus (Odonata, Megapodagrionidae). *Japanese journal of systematic entomology* 11: 167-181. (in English). ["*Rhipidolestes okinawanus* Asahina, 1951 is reclassified into 3 species, *R. okinawanus*, *R. shozoi* sp. nov., and *R. amamiensis* sp. nov.. *R. amamiensis* inhabiting the Amami Islands is divided into 2 subspecies, *R. amamiensis amamiensis* occurring in Amami-Oshima and *R. amamiensis tokunoshimensis* subsp. nov. in Tokunoshima." (Author)] Address: Ishida, K., Seisho High-school, Gifu, Japan

6167. Jaletzke, M.; Walter, B. (2005): Zur Flora, Vegetation und Fauna von Karpfenzuchtanstalten in Westfalen. *Abhandlungen aus dem Westfälischen Museum für Naturkunde* 67(3): 75-90. (in German, with English summary). [A total of 27 odonate species is said to oc-

cur at two carp breeding water body complexes in Westfalia, Germany, but no details are given (for details see: Schmidt, E. (1993): Die ökologische Nische von *Sympetrum depressiusculum* (Selys) im Münsterland (Naturschutzgebiet Heubachwiesen). *Libellula* 12(3/4): 175-198.] Address: Jaletzke, Martina, Klinkenhagen 52, D-48653 Coesfeld, Deutschland

6168. Kandibane, M.; Raguraman, S.; Ganapathy, N. (2005): Relative abundance and diversity of Odonata in an irrigated rice field of Madurai, Tamil Nadu. *Zoos' Print Journal* 20(11): 2051-2052. (in English). [Nine Anisoptera and three Zygoptera were recorded during 2000 in an irrigated rice field of Madurai India. *Pantala flavescens*, *Diplocodes trivialis*, *Crocothemis servilia*, *Tramea limbata*, and *Agriocnemis femina femina* were the dominant species recorded in weeded and partially weeded ecosystems. They were more abundant in partially weeded rice ecosystem than in weeded rice ecosystem. Rare species like *Orthetrum sabina*, *Rhyothemis variegata*, *Neurothemis tullia*, *Anax guttatus*, and *Trithemis* sp. occurred only at the tillering stage of crop growth.] Address: Kandibane, M., Krishi Vigyan Kendra, Vriddhachalam, Tamil Nadu 606001, India

6169. Kikuchi, R.M.; Uieda, V.S. (2005): Composition and distribution of macroinvertebrates in different types of substrate of a stream in the Municipal District of Itatinga, São Paulo, Brazil. *Entomol. Vect.* 12(2): 193-231. (in Portuguese, with English summary). [Relationships between habit, physical conditions of the habitat (substrate, flow, turbulence) and food availability of the fauna of a tropical stream were surveyed in a tributary of the Basin of Paranapanema, located in the municipal district of Itatinga, São Paulo. Comparing substrates dominated by vegetation, rocky and sandy structures the authors found a larger density of fauna in the rocky substrate and larger diversity in the vegetation substrate. In all substrates, Insecta, and mainly Diptera, prevailed in abundance and diversity of species. In most cases, Odonata are treated on the family level.] Address: Kikuchi, Regina Mayumi, Programa de Pós-graduação em Ecologia e Recursos Naturais, Universidade Federal de São Carlos, Caixa postal 676, Rodovia Washington Luís, Km 235, CEP: 13565-905, São Carlos, SP, Brasil. E-mail: rmkikuchi@yahoo.com.br

6170. Koch, H.-M. (2005): Herbstschlupf von *Lestes sponsa*. *mercuriale* 5: 41-42. (in German). [A record of late emergence at *L. sponsa* near Reutlingen, Baden-Württemberg, Germany is documented. The possibility of a bivoltine development in 2005 is discussed] Address: Koch, H.-M., Krämerstr. 40, D-72764 Reutlingen, Germany. E-mail: koch.druckerei@t-online.de

6171. Konogaya, S.; Kobayshi, H (2005): An effect of irrigation and cultivation system on food chain in paddy water environment. *Journal of rural planning association* 24(special issue): S49-S54. (in Japanese, with English summary). ["For the purpose of examining on role of irrigation and cultivation system to paddy ecosystem, we study species and number of Odonata larvae and analyze the stable isotope ratios of the Odonata larvae and the plankton/detritus in water of paddy fields and irrigation ponds. As a results, cultivation system clearly effects to composition of species and number of Odonata larvae. $\delta^{13}C$ indicates that *Orthetrum albistylum speciosum* larvae and *Coenagrionidae* spp. larvae which are dominant species in paddy water, de-

pend on specified food sources, each other. $\delta^{15}N$ shows that the trophic level of Odonata larvae is higher than that of the plankton/detritus in paddy water. It is considered that analyze the stable isotope ratios application is effective to examine water ecosystem and food web in paddy." (Authors)] Address: Konogaya, S., Graduate School of Agriculture, IBARAKI Univ., Japan

6172. Kosterin, O.E. (2005): Western range limits and isolates of eastern odonate species in Siberia and their putative origins. *Odonatologica* 34(3): 219-242. (in English). ["*Macromia amphigena*, *Shaogomphus postocularis*, and *Sympetrum croceolum*, ranging in NE China, Korea and Japan, have isolates at the NE margins of the Altai-Sayan mountain system: all 3 in SE West Siberia, *M. amphigena* and *S. postocularis* also in southern Central Siberia and *M. amphigena* in E Kazakhstan and W Mongolia. *Ophiogomphus obscurus*, *Nihonogomphus ruptus*, and *Calopteryx japonica* have continuous ranges protruding to the West from E. Asia to the Ob ' River basin and to 60 degrees N latitude. *Coenagrion ecornutum* has a similar range but extends N in Siberia to 65 degrees N and has an isolate in the S Ural Mts. *C. lanceolatum*, *C. hylas* and *Somatochlora graeseri* reach 70 degrees N and also extend westward to the Ob ' River basin, but *C. hylas* has isolates in the Polar Urals and Bavaria, while *S. graeseri* is probably isolated in the Ural Mts. Of 4 other eastern spp. in Siberia, 2 reach 70 degrees N, but *Somatochlora exuberata* extends westwards only to the sources of the Yenisey River and *Coenagrion glaciale* to Lake Baikal, while *Cercion v-nigrum* and *Anisogomphus maacki* just penetrate into SE Transbaikalia. Thus, 11 eastern odonate species have their western limits in Siberia (defined in a narrow sense, not including the Far East). In addition, 4 have more westerly isolates, 3 in the Urals and 1 in Bavaria. Siberia also includes the eastern limits of 21 western species 24 transpalaeartic species spread far to the N and 10 species occupy S Siberia only (or just occur locally), 2 Central Asian species barely penetrate into S. Siberia. *Aeshna viridis* is a doubtful amphipalaeartic species. Numerous palaeopalynological reconstructions suggest that during the Holocene climatic optimum, a continuous belt of broad-leaved forest was restored in Siberia, providing conditions for a recolonization of Siberia by Odonata. Westward migrations of eastern species were favoured by the optimum occurring earlier in the east than in the west. Hence, many western species had no time to occupy all of Siberia and today the eastern limits of their ranges lie within the region. *M. amphigena*, *S. postocularis* and *S. croceolum* perhaps were the most stenotopic of those E. Asian species that colonized Siberia during the Holocene, and after the optimum, their ranges shrank to the peri-Altaian refugium. Their isolates there should be dated no earlier than 5-6 thousand yrs ago. *C. v-nigrum* and *A. maacki* are perhaps the least mobile of the eastern species in Siberia." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

6173. Kunz, B. (2005): *Überschätzt. mercuriale* 5: 43. (in German). [Baden-Württemberg, Germany, 15-VI-2005; a male *Ischnura pumilio* tried to copulate with a male *Platycnemis pennipes*.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de

- 6174.** Kunz, B. (2005): Entwurf eines Metapopulationsmodells anhand zahlreicher aktueller Funde von *Sympetrum flaveolum* in der Region Hohenlohe im Jahr 2005. *mercuriale* 5: 26-32. (in German). [Baden-Württemberg, Germany; a metapopulation model for *S. flaveolum* based on an intensive survey of the local dragonfly fauna in the past two decades and including 22 localities is presented and discussed.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de
- 6175.** Kunz, B. (2005): Guten Appetit!. *mercuriale* 5: 42. (in German). [Baden-Württemberg, Germany, 31-VII-2005; a female *Enallagma cyathigerum* was devouring a male *Coenagrion puella*.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: kunzFOTOGRAFIE@t-online.de
- 6176.** Machado, A.B.M. (2005): *Neocordulia matuensis* spec. nov. from Brazil (Anisoptera: Corduliidae). *Odonatologica* 34(3): 299-302. (in English). ["The new species (male holotype: Aiuruoca, Minas Gerais, Brazil, 30-XII-1999; deposited in A.B.M. Machado collection) is described. It differs from all the congeners by having the sternal protuberance of segment 8 conical whereas in other species it is either absent or biconical." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil
- 6177.** Machado, A.B.M. (2005): *Forcepsioneura grossiorum* spec. nov. from Brazil (Zygoptera: Protoneuridae). *Odonatologica* 34(2): 169-172. (in English). ["The new species (holotype male: Nova Friburgo, Rio de Janeiro, Brasil, 25-VII-2002; deposited in the author's collection in Belo Horizonte) is described, illustrated and compared with its congeners. It differs from all congeners by the unique structure of the posterior prothoracic lobe." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil
- 6178.** Machado, A.B.M. (2005): *Peruviogomphus bellei* spec. nov. from the Amazonian region of Brazil (Anisoptera: Gomphidae). *Odonatologica* 34(1): 59-63. (in English). ["The new species is described and illustrated (holotype male: Brazil, Amazonas, Tefé, I-1958, A.L. Carvalho leg., deposited in collection A.B.M. Machado). By its size, colour and structure of the anal appendages, *P. bellei* sp. n. is closest to *P. moyobambus* Klots, 1944, but it can be separated mainly by the presence of a well-developed expansion on abdominal segment 8. It differs from the other 2 congeners by the presence of a denticulated area in the mid-part of the inner hindwing margin. The significance of this character for gomphid taxonomy is discussed." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil
- 6179.** Mancî, C.O. (2005): Studiu preliminar asupra distributiei libelulelor (Insecta: Odonata) în Padurea Verde (Timisoara) si zona imediat apropiata. *Bul. inf. Entomol.* 16: 83-88. (in Romanian, with English summary). [Romania; 35 species of Odonata have been recorded in 1999, and some in 2000 and 2005.] Address: Mancî, C.O., Acad. Remus Radulet 13, bl. 119, ap. 7, Timisoara 300281, Timis County, Romania. E-mail: cosminovidiu@yahoo.com
- 6180.** Matsubara, K.; Hironaka, M. (2005): Postcopulatory guarding behaviour in a territorial damselfly, *Pseudagrion p. pilidorsum* (Brauer), for submerged ovipositing females (Zygoptera: Coenagrionidae). *Odonatologica* 34(4): 387-396. (in English). ["The postcopulatory mate guarding behaviours by territorial and non-territorial males for submerged ovipositing females were investigated in the field. After copulations, females in tandem began to oviposit at the water surface and thereafter they usually submerged completely underwater. The female often repeated the submergence and emergence at several oviposition sites. When the female submerged completely, the male released her without submergence and rested above the water surface during oviposition (non-submerged guarding), or the male submerged completely and remained in tandem, whether only at first or for the duration of the oviposition (submerged guarding). Territorial males always performed non-submerged guarding when the female oviposited inside their territories. The non-submerged guarding inside the territory might allow the territorial male both to guard the ovipositing female and to maintain his territory. On the other hand, when the female oviposited inside another male's territories, territorial and non-territorial males exhibited both non-submerged guarding and submerged guarding. Thus, *P. p. pilidorsum* males may adopt either submerged guarding or non-submerged guarding in response to change in the probability of a takeover of the emerged female by rival males inside another male's territory." (Authors)] Address: Matsubara, K., Department of Applied Biological Sciences, Faculty of Agriculture, Saga University, Honjo 1, Saga, 840-8502, Japan
- 6181.** McBean, M.C.; White, S.A.; MacGregor, J.A. (2005): Foraging behaviour of the damselfly larva *Pyrrhosoma nymphula* (Sulzer) in response to predator presence (Zygoptera: Coenagrionidae). *Odonatologica* 34(2): 155-164. (in English). ["The trade of between foraging and predator avoidance was studied. In the presence of a larva of the predatory *Aeshna juncea*, *P. nymphula* was found to reduce foraging activity significantly reduced foraging activity in response to chemical stimuli from *P. nymphula*. *A. juncea* but not in response to visual stimuli. Foraging activity was further reduced when the diet of *A. juncea* was changed from chironomid larvae to *P. nymphula*. This suggests that predators are detected chemically and are chemically labelled by their diet. Foraging activity was found to increase with starvation level after 48 h without access to food, with a further increase after 72 h of starvation. The presence of chemical stimuli from conspecific fed predators delayed the increase in foraging activity until 72 h of starvation. These results have implications for larval survival and adult reproductive fitness." (Authors)] Address: White, S.A., Division of Environmental and Evolutionary Biology, Inst. Biomed. & Life Sciences, Univ. Glasgow, Glasgow G12 8QQ, Scotland. E-mail: s.white@bio.gla.ac.uk
- 6182.** McKee, D.; Harvey, I.F.; Thompson, D.J.; Sherratt, T.N. (2005): Frequency of female colour morphs in populations of four coenagrionid damselflies (Zygoptera: Coenagrionidae). *Odonatologica* 34(1): 37-49. (in English). ["Knowledge of naturally occurring andromorph and gynomorph frequencies in populations of

coenagrionid damselflies is important for understanding the evolution of female-limited polymorphism. Here are reported the frequencies of andromorphs and gynomorphs in populations of *Coenagrion puella*, *C. mercuriale*, *Xanthocnemis zealandica* and *Ischnura fluviatilis* and a review is presented of the literature for other coenagrionid spp. It is shown that ratios of andromorphs to gynomorphs are often unequal with andromorphs generally being the uncommon morph. Significant inter- and intra-population variation in morph frequency sometimes occurs but is of low magnitude. No evidence was found for spatial segregation of andromorphs and gynomorphs. Andromorph frequency could not be significantly related with sex ratio or male density.] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

6183. Mitchell, A.; Samways, M.J. (2005): The morphological 'forms' of *Palpopleura lucia* (Drury) are separate species as evidenced by DNA sequencing (Anisoptera: Libellulidae). *Odonatologica* 34(2): 173-178. (in English). ["*P. lucia* is a widespread African species with a checkered taxonomic history. Currently 2 'forms' or subspecies, *P.l. lucia* and *P.l. portia* are recognized, although debate over the taxonomic status of these taxa has hardly let up over the last 230 years. The 2 'forms' show distinctive wing pattern differences although other aspects of their morphology are very similar. They can occur highly sympatrically at some localities in southern Africa, as well as elsewhere, thus raising the question of whether they are two species or one perhaps with balanced polymorphism. DNA sequence data from the ITS2 and COI genes were collected from specimens of both these 'forms' to assess more rigorously the taxonomic status of these taxa. The closely related *P. deceptor* (Calvert) and *P. jucunda* (Rambur) were included in the data set to provide a baseline for comparisons. Specimens from all 4 taxa were from pools of the flood plain of the Sabie R., Kruger National Park, South Africa, and were potentially able to interbreed. Both phylogenetic analyses and comparisons of sequence divergence levels strongly support the hypothesis that the 2 'forms' of *P. lucia* are reproductively isolated and should be accorded full species status as *P. lucia* (Drury, 1773) and *P. portia* (Drury, 1773)."] (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6184. Miyata, T.; Kojo, T. (2005): 419 Flight characteristics of *Pantala flavescens*. JSME Bioengineering Conference and Seminar Vol. 2004, No.17: 169-170. (in Japanese, with English translation of the title). [*Pantala flavescens* aspect ratio flight characteristics distortion of wings] Address: not transliteration into English

6185. Muzon, J.; Pessacq, P. (2005): Description of the last larval instar of *Ischnura ultima* Ris (Zygoptera: Coenagrionidae). *Odonatologica* 34(3): 303-306. (in English). ["The description is based on a female specimen from Argentina (Mendoza prov.) and the morphology is compared with the other *Ischnura* larvae known from Argentina, viz. *I. capreola* and *I. fluviatilis*. In addition *I. ultima* is reported here for the first time from Chile."] (Authors)] Address: Muzón, J., Inst. Limnol. "Dr.

R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

6186. Muzon, J.; Lozano, F. (2005): *Acanthagrion hartei* spec. nov. from Ecuador (Zygoptera: Coenagrionidae). *Odonatologica* 34(2): 179-182. (in English). ["The new species is described and illustrated. Holotype male: Ecuador, Morona, Santiago prov., Bomboiza, 20-IX-1990, deposited in USNM, Washington. It is assigned to the apicale-group, and differs from the other species of that group by characters of the male terminalia and genital ligula."] (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

6187. Naraoka, H. (2005): Larval development of *Coenagrion terue* (Asahina) (Odonata: Coenagrionidae) at a lowland in Aomori Prefecture, Japan. *New Entomol.* 54(1/2): 11-16. (in Japanese, with English summary). ["Larval development of *C. terue* was investigated at a lowland marsh (23m, a. s. l.) in Aomori Prefecture, Japan, during 2003 and 2004. The larvae were sampled 2-4 weeks periodically at a marsh. The rearing also was done from egg stage. *C. terue* has 10 larval instars. The larvae wintered at 7-9 instars, and the final instar appeared at next April. The duration of life cycle was 1 year (univoltine)."] (Author)] Address: Hirozi, N., 36-71 Motoizumi, Fukunoda, Itayanagi-cho, Kitatsugurugun, Aomori Pref., 038-3661, Japan

6188. Novelo-Gutiérrez, R. (2005): Five new *Erpetogomphus* Hagen in Selys larvae from Mexico, with a key to the known species (Anisoptera: Gomphidae). *Odonatologica* 34(3): 243-257. (in English). ["The final instars of *Erpetogomphus* bothrops *E. elaps*, *E. eutainia*, *E. liopeltis*, and *E. viperinus* are described and illustrated. Most of these are similar in many features, except *E. eutainia* which is notoriously different. A key for the separation of all known *Erpetogomphus* larvae is included."] (Author) Additional figures are provided for *E. compositus*, *E. crotalinus*, *E. lampropeltis* *matrix*, *E. agkistrodon*, *E. erici*, *E. tristani*, *E. constrictor*, *E. boa*, *E. cophias*, *E. sabaeticus*, and *E. elaps*.] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparato Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

6189. Obolewski, K. (2005): Epiphytic macrofauna on water soldiers (*Stratiotes aloides* L.) in *Slupia* river oxbows. *Oceanological and Hydrobiological Studies* 34(2): 37-54. (in English). ["The taxonomic composition and biomass of phytophilous macrofauna dwelling on water soldiers in two *Slupia* River oxbows, Konski Staw (KS) and Osokowy Staw (OS), were determined in two periods (April 1 - July 23, 1981; April 20 - July 20, 2001). The KS water soldier macrofauna studied in the 1980s was comprised of 22 invertebrate taxa, while 25 to 28 taxa were recorded in 2001. The macrofauna of the two periods was dominated by gastropods and mining chironomid larvae (1981) and hirudineans (2001). The OS macrofauna studied in the springsummer of 2001 consisted of 25 taxa. The OS macrofauna was dominated in both periods by gastropods, and trichopterans were the subdominants." The list of species contains four Odonata taxa, only *Aeshna grandis* on the species level.] Address: Obolewski, K., Department of Ecology and Protection of the Sea, Pomeranian Peda-

gological University, ul. Arciszewskiego 22b, 76-200 Stupsk, Poland. E-mail: Obolewsk@pap.edu.pl

6190. Pardey, A.; Conze, K.-J.; Rauers, H.; Schwartz, M. (2005): Flora, Vegetation und Fauna ausgewählter Kleingewässer in der Westfälischen Bucht. Abhandlungen aus dem Westfälischen Museum für Naturkunde 67(3): 163-190. (in German, with English summary). ["Since the end of the 1970s in the Westphalian Bay (in the north of North Rhine-Westphalia, Germany) a lot of ponds had been built or reconstructed mainly for biotope and species protection purposes. In the years between 1989 and 2003 hydrochemistry, flora and vegetation of 14 ponds were examined to estimate biotope development of man made ponds and the efficiency of biotope management measures. Furthermore one or two times amphibians, dragonflies, water beetles, water bugs, mussels and water snails were recorded to get a better idea of biotope qualities. The results clarify, that every pond is an individual habitat with its special species inventory and nature protection importance, which needs individual concepts for management. On the other hand some general guidelines for management and building of ponds as nature protection areas were deduced. The comparison of data of different years makes clear, that eutrophication leads to an acceleration of succession and therefore to decreasing numbers of plant species and species of the red data list. Because of these facts the management of ponds will be a permanent task of nature protection activities." (Authors) A total of 24 odonate species was observed.] Address: Conze, K.-J., Listerstr. 13, D-45147 Essen, Germany. E-mail: Klaus-Juergen.Conze@t-online.de

6191. Paulson, D.R.; Von Ellenrieder, N. (2005): Synonymy of *Subaeschna* Martin, 1908 with *Gynacantha* Rambur, 1842, and a new species of *Gynacantha* from Peru (Anisoptera: Aeshnidae). *Odonatologica* 34(1): 65-72. (in English) ["*Subaeschna* Martin, 1908, is synonymized with *Gynacantha* Rambur, 1842, and its only sp., *S. francesca* Martin, 1909, becomes *Gynacantha francesca* (Martin). *G. bartai* sp. n. is described from 5 specimens (holotype male and allotype female; Peru, Madre de Dios, Explorer's Inn; deposited in the NMNH, Washington, DC, USA) from southern Peru. It is characterized by very small size, unmarked thorax, straight cerci, and abdomen constricted in male and unconstricted in female." (Authors)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu.

6192. Pessacq, P.; Muzon, J.; Von Ellenrieder, N. (2005): Description of the last larval instar of *Acanthagrion ablutum* Calvert (Zygoptera: Coenagrionidae). *Odonatologica* 34(1): 73-76. (in English). ["The final larval instar is here described for the first time and it is compared with the other known *Acanthagrion* larvae. It differs from them mainly in the number of palpal and premental setae and shape of head posterolateral margin." (Authors)] Address: Ellenrieder, Natalie von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

6193. Rackow, H., (2005): Beobachtungen zum Paarungs- und Eiablageverhalten von *Ophiogomphus cecilia* an der Lauter (Rheinland Pfalz). *mercuriale* 5: 5-8. (in German). [Rheinland-Pfalz, Germany, Alsace, France; the phenology of oviposition (bias in the afternoon)

and the mating of *O. cecilia* are described and discussed.] Address: Rackow, H., Hohenstoffelstraße 73, D-78224 Singen, Germany. E-mail: HartmutRackow@web.de

6194. Relyea, R.A (2005): The heritability of inducible defenses in tadpoles. *J. Evol. Biol.* 18: 856-866. (in English) ["The evolution of plastic traits requires phenotypic trade-offs and heritable traits, yet the latter requirement has received little attention, especially for predator-induced traits. Using a half-sib design, I examined the narrow-sense heritability of predator-induced behavior, morphology, and life history in larval wood frogs (*Rana sylvatica*). Many of the traits had significant additive genetic variation in predator (caged *Anax longipes*) and no-predator environments. Whereas most traits had moderate to high heritability across environments, tail depth exhibited high heritability with predators but low heritability without predators. In addition, several traits had significant heritability for plasticity, suggesting a potential for selection to act on plasticity per se. Genetic correlations confirmed known phenotypic relationships across environments and identified novel relationships within each environment. This appears to be the first investigation of narrow-sense heritabilities for predator-induced traits and confirms that inducible traits previously shown to be under selection also have a genetic basis and should be capable of exhibiting evolutionary responses." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

6195. Saito, Y.; Owada, M.; Kato, S. (2005): Dragonflies (Odonata) of the Akasaka Imperial Gardens, Tokyo, Central Japan. *Mem. natn. Sci. Mus.*, Tokyo 39: 419-429. (in Japanese, with English summary). [Between 2002 and 2004, a total of 24 Odonata species was recorded.] Address: Owada, M., Dept Zool., Natn. Sci. Mus., 3-23-1 Hyakunincho, Shinjuku-ku, Tokyo, 169-0073, Japan. E-mail: owada@kahaku.go.jp

6196. Schlüpmann, M.; Feldmann, R.; Belz, A. (2005): Stehende Kleingewässer im südwestfälischen Bergland: Charakteristik und Fauna am Beispiel der Libellen und der Wirbeltiere. *Abhandlungen aus dem Westfälischen Museum für Naturkunde* 67(3): 201-222. (in German, with English summary). [M. Schlüpmann provides a condensed account on some general distribution patterns of the Odonata in the middle mountain ranges of Nordrhein-Westfalen, Germany. Distribution maps of *Aeshna cyanea*, *A. mixta*, and *A. juncea* highlight some ecological/climatic factors responsible for the distribution patterns.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, German. E-mail: martin-schluempmann@t-online.de

6197. Schmidt, B. (2005): Gartenfreuden mit blauen Drachen. *mercuriale* 5: 42-43. (in German). [Baden-Württemberg, Germany; (1) a tandem between a male *Aeshna cyanea* and an recently emerged male *A. affinis* is described. Attempting to get the latter into the wheel position for 30 minutes, the abdomen of *A. cyanea* finally broke between the 7th and 8th abdominal segment. (2) Catching *A. affinis* by a cat is described in detail. (3) A female *A. cyanea* tried to oviposit into the back of a *Bombina variegata* male (Amphibia).] Address: Schmidt, B., Amt für Umwelt und Naturschutz, Eckenerstr. 11, 88046 Friedrichshafen. E-Mail: b.schmidt@friedrichshafen

- 6198.** Schmidt, E. (2005): Libellen als Nutznießer von Laubfrosch-Schutzgewässern im Kreis Coesfeld/Westmünsterland. *Abhandlungen aus dem Westfälischen Museum für Naturkunde* 67(3): 223-240. (in German, with English summary). [Habitat creating and management measures directed to the tree-frog (*Hyla arborea*) in Westphalia (Nordrhein-Westfalen, Germany) also favoured dragonflies. A total of 34 species was recorded at six habitats including several rare species, and species of an early succession stage in vegetation development.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany
- 6199.** Schneider, B. (2005): Wenn das Ende naht: Schwarz vs Groß. *mercuriale* 5: 44. (in German). [Switzerland, 16-X-, 15-XI-2005; interspecific copulations between a male *Sympetrum danae* and a female *S. striolatum* resp. *S. vulgatum* are described.] Address: Schneider, B.; Wolfbühlstr. 34a, CH-8408 Winterthur, Germany. E-mail: b.schneider@libellen.li
- 6200.** Schoeppner, N.A.; Relyea, R.A. (2005): Damage, digestion, and defence: the roles of alarm cues and kairomones for inducing prey defences. *Ecology Letters* 8: 505-512. (in English). ["Inducible defences are widely used for studying phenotypic plasticity, yet frequently we know little about the cues that induce these defences. For aquatic prey, defences are induced by chemical cues from predators (kairomones) and injured prey (alarm cues). Rarely has anyone determined the separate and combined effects of these cues, particularly across phylogenetically diverse prey types. We examined how tadpoles (*Hyla versicolor*) altered their defences when 10 different prey were either crushed by hand or consumed by predators. Across all prey types, crushing induced only a subset of the defences induced by consumption. Consuming vs. crushing produced additive responses for behaviour but synergistic responses for morphology and growth. Moreover, we discovered the first extensive evidence that prey responses to different alarm cues depends on prey phylogeny. These results suggest that the amount of information available to the prey affects both the quantitative and qualitative nature of the defended phenotype." (Authors) The laboratory study involves experiments with *Abax* sp., *Sympetrum* sp., and *Lestes* sp..] Address: Schoeppner, Nancy, Department of Biological Sciences, University of Pittsburgh, Pittsburgh, PA 15260, USA. E-mail: nschoepp@pitt.edu
- 6201.** Sipkay, C.S.; Hufnagel, L.; Gaal, M. (2005): Zoocoenological state of microhabitats and its seasonal dynamics in an aquatic macroinvertebrate assembly (Hydrobiological case studies on Lake Balaton No. 1). *Applied ecology and environmental research* 3(2): 107-137. (in English). ["In the years 2002, 2003 and 2004 we collected samples of macroinvertebrates on a total of 36 occasions in Badacsony bay, in areas of open water (in the years 2003 and 2004 reed-grassy) as well as populated by reed (*Phragmites australis*) and cattail (*Typha angustifolia*). Samples were taken using a stiff hand net. The sampling site includes three microhabitats differentiated only by the aquatic plants inhabiting these areas. Our data was gathered from processing 208 individual samples. The quantity of macroinvertebrates is represented by biovolume value based on volume estimates. We can identify taxa in abundant numbers found in all water types and ooze; as well as groups associated with individual microhabitats with various aquatic plants. We can observe a notable difference between the years in the volume of invertebrate macrofauna caused by the drop of water level, and the multiplication of submerged macrophytes. There are smaller differences between the samples taken in reeds and cattail stands. In the second half of 2003 – which was a year of drought – the *Najas marina* appeared in open waters and allowed to support larger quantities of macroinvertebrates. In 2004 with higher water levels, the *Potamogeton perfoliatus* occurring in the same area has had an even more significant effect. This type of reed-grass may support the most macroinvertebrates during the summer. From the aspect of diversity relations we may suspect different characteristics. The reeds sampling site proved to be the richest, while the cattail microhabitat is close behind, open water (with submerged macrophytes) is the least diverse microhabitat." (Authors)] Address: Sipkay, C.S., Dept of Systematic Zoology and Ecology, Eötvös Loránd University, H-1117 Budapest, Pázmány P. sétány 1/c, Hungary. E-mail: cssipkay@yahoo.com
- 6202.** Sonnenburg, H.; Hannig, K. (2005): Die Libellen (Insecta, Odonata) des Truppenübungsplatzes Haltern-Platzteil Lavesum (Kreis Recklinghausen und Kreis Borken). *Abhandlungen aus dem Westfälischen Museum für Naturkunde* 67(3): 65-75. (in German). [Nordrhein-Westfalen, Germany; the odonate fauna of the military training area totals in 31 species. Each species is briefly commented on.] Address: Sonnenburg, H., Am Gollung 100, D-37671 Hötter, Germany
- 6203.** Sonntag, H. (2005): Schlupfbiologische Freilanduntersuchungen an *Sympecma paedisca*. *mercuriale* 5: 2-5. (in German). [Tirol, Austria; emergence phenology, sex ratio, and emergence habitat of 2729 exuviae of *S. paedisca* are figured or briefly discussed. Emergence and oviposition habitat vary clearly, therefore it is supposed that the larvae must be mobile and must have dispersed by themselves.] Address: Sonntag, H., Tagwalterstr. 8/4, A-6111 Volders, Austria. E-mail: hermann.sonntag@chello.at
- 6204.** Switzer, P.V. (2005): Possible settlement benefits related to site fidelity for the territorial dragonfly, *Perrithemis tenera* (Say) (Anisoptera: Libellulidae). *Odonatologica* 34(4): 397-405. (in English). ["Site fidelity, the tendency to return to a previously occupied breeding location, is commonly observed in animals and yet often the benefit to such behavior is unclear. In this study, possible settlement benefits to site fidelity for *P. tenera* are examined. Males defend small mating territories on ponds and lakes to which they typically, but not always, return the following day. In an observational study, it was found that males did not become territorial earlier in the day when site-faithful than when switching territories. However, males switching territories were more likely to be seen examining oviposition sites (other than the site they ultimately defended) prior to becoming territorial than site-faithful males. In an experimental study, it was controlled for differences in territory and oviposition site structure, time of day, evictions and disturbance, and found that site-faithful males spent significantly less time settling on a territory prior to defending that territory than males settling at a site for the first time. Because males examining sites are probably more at risk from predators, this study suggests that site-faithful males may experience lowered settlement costs than males returning to their original territory." (Author)]

Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

6205. Taketo, A. (2005): Discovery of *Sympetrum vulgatum imitans* Selys from the Noto Peninsula, Japan. *Memoirs of the Fukui Institute of Technology* 35: 205-207. (in English). [Mature males of *S. vulgatum imitans* were recorded for the first time in the Noto Peninsula, Central Japan, on 29 September, 2002.] Address: not stated

6206. Theischinger, G.; Richards, S.J. (2005): Two new species of *Drepanosticta* Laidlaw from Papua New Guinea (Zygoptera: Platystictidae). *Odonatologica* 34 (3): 307-312. (in English). [*D. antilope* sp. n. (holotype male: East New Britain, Wanui Camp, 17-III-2000) and *D. taurulus* sp. n. (holotype male: Eastern Highlands prov., Herowana, 13-XI-2001) are described. The holotypes are deposited in South Australian Museum, Adelaide. Diagnostic characters of the adults are illustrated and the affinities of both species are discussed." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

6207. Tynkkynen, K. (2005): Interspecific interactions and selection on secondary sexual characters in damselflies. *Jyväskylä Studies in Biological and Environmental Science* 151: 26 pp. (in English). ["Interspecific interactions related to species recognition can cause selection and affect the evolution of secondary sexual characters. Such interactions include for example avoidance of maladaptive hybridization and interspecific aggression. In this thesis, I focus especially on interspecific aggression and on selection which it may cause on sexual characters of the damselfly, *Calopteryx splendens*. Males of *C. splendens* have pigmented wing spot as a sexual character in the middle of their wings. Large-spotted *C. splendens* males resemble another species *Calopteryx virgo*, males of which have almost completely pigmented wings. I observed character displacement in *C. splendens* males such that the wing spot size decreased with increasing relative abundance of *C. virgo*. Territorial *C. virgo* males reacted more aggressively and from greater distance towards large- than small-spotted *C. splendens* males. This suggests that the character displacement may have evolved because of the interspecific aggression arising from mistaken species recognition. Interspecific aggression causes negative survival selection on wing spot size of *C. splendens* males. In addition, interspecific aggression leads to interspecific territoriality in which large-spotted *C. splendens* males seem to have reduced ability to obtain or keep a territory. Reduced territory holding ability may have negative effects on mating success of large-spotted *C. splendens* males. This is because in contrast to other studies with *Calopteryx* species, in wild sympatric populations females did not mate with large-spotted males. My results clearly show that interspecific aggression is able to cause selection on sexual characters and thus has potential to affect the evolution of secondary sexual characters." (Author)] Address: Tynkkynen, Katja, Department of Biological and Environmental Science, P.O. Box 35, FI-40014 University of Jyväskylä, Finland

6208. Vanappelghem, C. (2005): Statut de *Sympetrum flaveolum* (L., 1758) (*Sympète* jaune) dans la région Nord-Pas-de-Calais. *Le Héron* 38(1-2): 107-113. (in French). [Detailed presentation of data and maps on

the distribution of *S. flaveolum* in north-western France.] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

6209. Villanueva, R.J. (2005): *Amphicnemis braulitae* spec. nov. from Camiguin Island, the Philippines (Zygoptera: Coenagrionidae). *Odonatologica* 34(1): 77-81. (in English). ["The new species is described, illustrated and compared with the other 3 species of the *Amphicnemis forcipata* Brauer-group. Holotype male: Philippines, Camiguin, Guinsiliban, Lilob, 30-IV-2003; deposited in RMNH, Leiden. A few notes on the ecology are provided." (Author)] Address: Villanueva, R.J., Biology Department, Ateneo de Davao University, 8000 Davao City, Philippines. E-mail: reaganjoseph@lycos.com

6210. Wahizatul Afzan, A.; Che Salmah, M.R. (2005): Adult dragonfly communities (Odonata: Insecta) in a tropical rivers of the northern peninsular Malaysia: species composition, biotope and host plant preferences. *Wetland Science* 3(3): 167-175. (in English). [A collection of Odonata in the catchment of the rivers Saleh, Setul and Serdan (district Bandar Baru, Kedah, Malaysia) resulted in 29 species. The communities are dominated by Libellulidae. The families of Coenagrionidae, Platycnemididae, and Calopterygidae were also common while Gomphidae and Chlorocyphidae were rather rare. *Neurothemis fluctuans*, *Trithemis aurora*, *Crocotthemis servilia*, *T. festiva*, and *Orthetrum chrysis* were widely distributed in shaded, muddy areas, and among the Zygopteran, *Pseudagrion pruinatum* was the most dominant species in such habitats *Agriocnemis femina*, *Ictinogomphus rapax*, *Crutilla lineata*, *Lathrecista asiatica*, *Neurothemis tullia*, *Tholymis tillarga*, and *Copera ciliata* were exclusively found at Saleh River implying their preference for smaller, slow moving and polluted river with floating microphytes and a poor border vegetation. *Neurobasis chinensis* and *Vestalis gracilis* were only found in open, undisturbed, fast flowing waters of Setul and Serdang rivers.] Address: She Salmah, M.R., School of Biological Sciences, University Sains Malaysia, 11800 Minden, Penang, Malaysia. E-mail: csalmh@usm.my

6211. Watanabe, M.; Matsuoka, H.; Susa, K.; Taguchi, M. (2005): Thoracic temperature in *Sympetrum infuscatum* (Selys) in relation to habitat and activity (Anisoptera: Libellulidae). *Odonatologica* 34(3): 271-283. (in English). ["The thoracic temperature of adults in a forest-paddy field complex in the cool temperate zone of Japan was measured. After emergence, individuals moved into the forest gaps, where all sexually immature adults remained on perches. Both males and females controlled their thoracic temperatures against a radiant heat load in a similar manner. After maturation, some of the individuals were seen to fly in tandem over the rice paddy fields under direct sunlight for oviposition. This study evaluated the impact of the thermal environment on the perching behaviour in the forest gaps and flying behaviour in tandem in the rice paddy fields. Mean thoracic temperatures of adults were consistently higher than ambient temperatures. The difference between the high thoracic and low ambient temperature was lower among flying individuals in the rice paddy fields than in perching individuals living in the forest gaps. The control of thoracic temperature in response to ambient and radiant temperature in perching mature adults was similar to that in immature adults. In the rice paddy fields, the flying in tandem resulted in a smaller difference

rence between thoracic over radiation temperature in females than in males in tandem. The high degree of thermoregulation clearly allowed mature adults to be active under direct sunlight. The role of perching in the forest gaps is discussed with regard to thermoregulation." (Authors)] Address: Watanabe, M., Department of Biology, Faculty of Education, Mie University, Tsu, Mie 514-8507, Japan. E-mail: watanabe@edu.mie-u.ac.jp

6212. Westermann, K.; Westermann, E. (2005): Künstliche Flutmulden im NSG "Elzwiesen" als Habitat seltener Libellen. *mercuriale* 5: 33-35. (in German). [Baden-Württemberg, Germany; Groundwater feeded temporary water bodies have a specialized dragonfly fauna, which became rare in the past decades due to melioration of floodplains and meadows. In the framework of high-flood protection measures, some newly created water bodies helped to retain higher portions of discharge from the running waters. In most years they dried out due to high evaporation, but in 2005 a rainy summer season provided suitable habitats for specialized dragonflies. Records and/or evidence of reproduction were given for *Ischnura pumilio*, *Aeshna affinis*, *Sympetrum danae*, *S. flaveolum*, *S. fonscolombii*, and *S. pedemontanum* and discussed.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6213. Wildermuth, H. (2005): Beobachtungen zur Spätherbst- und Winteraktivität der Gemeinen Winterlibelle (*Sympecma fusca*). *mercuriale* 5: 35-39. (in German). [Switzerland; several records of *S. fusca* between 2002 and 2005 are documented with special emphasis on the microdistribution of temperatures on hibernation habitat compared with air temperatures.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

6214. Zessin, W. (2005): Hund als Eiablageplatz einer Edellibelle (Insecta, Odonata, Aeshnidae). *Virgo*, Mitteilungsblatt des Entomologischen Vereins Mecklenburg, 8(1): 67. (in German). [Mecklenburg-Vorpommern, Germany; in July 2004, a female *Aeshna cyanea* (unsuccessfully) tried to oviposit into the black shining fleece of a dog.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

6215. Paunovic, M.; Simic, V.; Jakovcev-Todorovic, D.; Stojanovic, B. (2005.): Results of investigating the macroinvertebrate community of the Danube river on the sector upstream from the Iron Gate (km 1083-1071). *Arch. Biol. Sci.*, Belgrade, 57(1): 57-63. (in English, with Serbian summary). ["The present work cites results of investigating aquatic macroinvertebrates of the Danube River on the sector upstream from the Iron Gate (KM 1083-1071). The investigated part is interesting from the hydrobiological standpoint above all due to differences of faunal composition in relation to higher sections that could be expected in view of differences in overall characteristics of the river. A rich macroinvertebrate community (84 taxa) was observed. The diversity of taxa is primarily a result of habitat diversity within the given stretch. Oligochaeta and Mollusca were the principal components." (Authors) *Pyrhosoma nymphla*, *Stylurus flavipes*, and *Onychogomphus forcipatus* are listed.] Address: Paunovic, M., Siniša Stankovic Institute for Biological Research, 11000 Belgrade, Serbia and Montenegro

6216. Baker, R.A. (2006): Mites on Odonates: Some early accounts and records (to 1950) from Britain. *J. Br. Dragonfly Society* 22(2): 54-57. (in English). ["Parasitic larval mites are found on the wings and bodies of odonates and exploit their hosts for food and dispersal. This has been known for over 250 years although early records show that the true relationship was misunderstood. Dragonfly and damselfly hosts are recorded from early records." (Author) This paper also contains some very interesting notes on the biography of Robert McLachlan and Robert John Tillyard] Address: Baker, R.A., Faculty of Biological Sciences, University of Leeds, Leeds, West Yorkshire LS2 9JT, UK

6217. Barrera Escorcia, H.; Villeda-Callejas, M.P.; Lara-Vázquez, J.A. (2006): El vuelo de las libéllulas y su utilización en la tecnología. *Revista Chapingo Serie Ciencias Forestales y del Ambiente* 12(1): 31-37. (in Spanish, with English summary). ["Dragonflies' flight, characterized by its peculiar pace and strength, has developed a particular interest in the study of their thoracic muscular structure and it's wings' constitution and shape. Due to these features, the advances in the analysis of their flight have significantly contributed to aeronautical and robotic technology." (Authors)] Address: Villeda-Callejas, M.P., Laboratorio de Zoología2; FES-Iztacala, UNAM. Av. de los Barrios Núm. 1, Los Reyes Iztacala. C. P. 54090

6218. Barreto, A.P.; Aranha, J.M.R. (2006): Diet of four species of Characiforms in an Atlantic Forest stream, Guaraqueçaba, Paraná, Brazil. *Rev. Bras. Zool.* 23(3): 779-788. (in Portuguese, with English summary). ["In the present study we analyzed seasonal changes in the diet, feeding behavior and food resource partitioning between juveniles and adults of four characiform species in an Atlantic Rainforest stream of the northern coast of the State of Paraná, Brazil. Samples were collected monthly between September, 1999 and August, 2000 using a variety of capture techniques and underwater observations. In general, full stomach contents were more common in juveniles than in adults. *Deuterodon langei* Travassos, 1957 was classified as an omnivorous species, with a tendency toward herbivory, *Characidium lanei* Travassos 1967 was classified as an insectivore, with a tendency toward larvophagy, *Hyphessobrycon griemi* Hoedeman, 1957 was classified as an omnivore, and *Mimagoniates microlepis* Steindachner, 1876 was classified as an insectivore, with a predominance of allochthonous insects. Juveniles and adults of all studied species showed low selectivity and high opportunism in their food selection. The high frequency of allochthonous food items in stomach contents underscores the importance of marginal vegetation in their diets, being essential for the integrity of these environments and for the preservation of coastal stream fish communities." (Authors) *C. lanei* and *M. microlepis* also feed on Odonata larvae.] Address: Barreto, A., Pontifícia Universidade Católica do Paraná, Campus Toledo, Avenida da Uniao 500, Jardim Coopagro, 85902-532 Toledo, Paraná, Brasil. E-mail: almirbarreto@pucpr.br

6219. Beutel, R.G.; Gorb, S.N. (2006): A revised interpretation of attachment structures in Hexapoda with special emphasis on Mantophasmatodea. *Arthropod*

Systematics and Phylogeny 64(1): 3-35. (in English). [Characters of hexapod attachment structures were analysed cladistically together with 110 additional morphological characters of immatures and adults. The results suggest the monophyly of Hexapoda, Ellipura, Diplura + Ectognatha, and Dicondylia. Lepidothrichidae is either the sister group of the remaining Dicondylia or part of a clade Zygentoma. Odonata is the sister group of Neoptera, and Plecoptera possibly the sister group of the remaining neopteran orders. [...]] (Authors)] Address: Gorb, S., Max-Planck-Institut für Entwicklungsbiologie, Spemannstr. 35, D-72076 Tübingen, Germany. E-mail: stas.gorb@tuebingen.mpg.de

6220. Bond, J. G.; Novelo-Gutiérrez, R.; Ulloa, A.; Rojas, J. C.; Quiroz-Martínez, H.; Williams, T. (2006): Diversity, abundance, and disturbance response of Odonata associated with breeding sites of *Anopheles pseudopunctipennis* (Diptera: Culicidae) in southern Mexico. *Environmental Entomology* 35 (6): 1561-1568. (in English). ["Odonate nymphs are important predators of the immature aquatic stages of mosquitoes. Populations of the malaria vector *Anopheles pseudopunctipennis* Theobald (Diptera: Culicidae) can be efficiently reduced by extraction of filamentous algae from river pools in southern Mexico. Here, we examined the influence of this intervention on the diversity of odonates associated with mosquito breeding pools after annual extractions of algae from river pools in a 3-km section of the Coatán River, over a period of 2 yr. Odonate sampling was performed at monthly intervals in control and treated sections of the river for 4-5 mo after extraction in both years and before extraction in 1 yr. In total, 16 species, 10 genera, and 6 families of odonates were collected. Shannon diversity index values declined significantly during a period of 1 mo in 2001 and >5 mo in 2002. However, the abundance of odonates captured was not affected by algal extraction. In contrast, year-to-year variation in the diversity and abundance of the odonate community was strongly influenced by precipitation and river volume. Despite the importance of algae in river ecology, we conclude that the mosquito control intervention resulted in minimal impact on the odonate community in southern Mexico." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparato Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

6221. Boudot, J.-P. (2006): Mise au point concernant la publication de François Meurgey sur la faune des Odonates du département des Pyrénées-Orientales. *Martinia* 22(4): 191-193. (in French, with English summary). [France; the author rectifies and completes, on the basis of data already published, the informations presented by F. Meurgey in an article mentioning new species in Pyrénées-Orientales department (*Martinia* 22(2) : 64). This refers to *Sympetma fusca* and *Libellula fulva*.] Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Notre-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. e-mail: boudot@cpb.cnrs-nancy.fr

6222. Buczyńska, E.; Buczyński, P. (2006): Aquatic insects (Odonata, Coleoptera, Trichoptera) of the central part of the "Krowie Bagno" marsh: the state before restoration. *Annales Universitatis Mariae Curie-Skłodowska Lublin - Polonia LXI, 2 Sectio C*: 71-88. (in English, with Polish summary). ["In 2003 the assemblages

of selected aquatic insects (dragonflies, beetles, caddisflies) were studied within two lakes surrounded by a transitional peat bog» and a canal and ditches situated in the meliorated fen» The influence of melioration and peat bog degradation on entomofauna, its present status and the role of "Krowie Bagno" as a refugium of special care species were analysed. Thirty-seven dragonfly species, 75 beetle species, 21 caddisfly species were found. 12 special care and 8 indicator species were recorded. The fauna of lakes was typical of polyhumic ones, however, the changes associated with drying out and early stage of eutrophication were clearly seen in case of caddisfly assemblages. Melioration ditches turned out to be a refuge for the species connected with completely vanished at the study area sedge bogs. Deep and rich in vegetation canal was the main habitat for lacustrine caddisfly species. Such fauna is the result of natural water recession» transformation of the remaining ones as well as creating anthropogenic waters. "Krowie Bagno" is still the refuge of many valuable species and assemblages typical of dystrophic waters. Nevertheless, they are still endangered, some of them are partially on the wane. The aim of the «naturalization activities like free cutting, raising the level of irrpoundage conducted after 2003 is to prevent the fauna, In several years, the next planned inventory of entomofauna will discover whether such activities improve ecological relationships of the studied area or not." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

6223. Buczyński, P.; Dijkstra, K.D.; Mauersberger, R.; Moroz, M.D. (2006): Review of the Odonata of Belarus. *Odonatologica* 35(1): 1-13. (in English) ["The literature on the Belarussian Odonata is summarised and a checklist of 60 species is provided. The record of *Coenagrion mercuriale* is not accepted as it probably pertains to a misidentified larva. The occurrence of the listed species is specified for the 6 provinces of the state. The fauna contains 3 boreal elements, *Coenagrion johanssoni*, *Aeshna caerulea* and *A. crenata*. 14 species are listed as potential additions, some of these, almost exclusively southern species, have been recorded so close to the border that their presence in Belarus is almost certain. Belarus is expected to be a stronghold for many species, which are threatened in western Europe." (Authors) Address: Buczyński, P., Dept Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

6224. Cham, S. (2006): Aspects of dragonfly flight behaviour revealed by digital still photography. *J. Br. Dragonfly Society* 22(2): 41-53. (in English). ["Photography of free flying dragonflies reveals aspects of their behaviour that are not possible under controlled conditions. By using modern digital still cameras, with high resolution and rapid autofocusing, new opportunities for flight photography can be realised in the field." (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

6225. Cham, S. (2006): In-flight cleaning behaviour by male Migrant Hawkers, *Aeshna mixta* Latreille. *J. Br. Dragonfly Society* 22(2): 33-35. (in English). [The author describes the use of the abdomen and legs as

part of a sequence of cleaning behaviour performed by male *A. mixta* while flying.] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

6226. Cham, S. (2006): Development and hatching of eggs of the Common Darter, *Sympetrum striolatum* (Charpentier). *J. Br. Dragonfly Society* 22(2): 36-40. (in English). ["Eggs of *S. striolatum* develop and hatch in less than two weeks. During this time they are protected by a gel-like mass that surrounds them. Differences in the process of hatching are described." (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

6227. Chang, J.-p.; Sun, Z.-s. (2006): New taxa of Gomphidae (Insecta: Odonata) in Jehol Biota from western Liaoning, China. *Global geology* 25(2): 105-111, 1 plate. (in Chinese, with English summary). [The authors describe and figure a new genus and species *Liaoningianthis latus* gen. et sp. nov., and *Liaoninglanthus* sp.. In addition, *Liogomphus yixianensis* Ren et Gao, 1996 is described in detail. All the insect fossils are collected from the lower part of the Yixian Formation (uppermost Jurassic" lower Cretaceous) in Huangbanjigou of Beipiao, western Liaoning, China.] Address: Chang, J.-p., College of Earth Sciences, Jilin University, Changchun 130061, Jilin, China

6228. Clausnitzer, V. (2006): Dragonflies (Odonata) of Rufiji district, Tanzania with new records for Tanzania. *Journal of East African Natural History* 95(2): 139-162. (in English) ["The dragonfly fauna of the Rufiji District was studied during several field trips in 2001–2003 covering the rainy and the dry season. A total of 73 species was recorded by capture with net and visual identification of imagos. *Ceriagrion mourae* was seen for the first time since its description from Mozambique in 1969. *Ceriagrion mourae*, *Teinobasis alluaudi*, *Gynacantha immaculifrons*, *Paragomphus magnus* and *Paragomphus sabcicus* are first records for Tanzania. *Coryphagrion grandis*, *Ceriagrion mourae*, *Teinobasis alluaudi* and *Hadrothemis scabrifrons* are globally endangered habitat specialists confined to coastal forests of Eastern Africa. The majority of the species are common and widespread and inhabits the Rufiji River and its floodplains, while a smaller proportion are only found in permanent streams draining into the Rufiji or in forest habitats. The high overall species richness is a result of the variety of habitats and their connectivity, combined with the dynamics of the floods. The habitat specialists found in Ngumburuni forest and in the forests of the Kichi and Kiwengoma Hills are globally endangered species and require special attention with regard to conservation." (Author)] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@t-online.de

6229. Corbet, P.S. (2006): Forests as habitats for dragonflies (Odonata). In: Rivera, AC (Ed). 2006. Forests and Dragonflies. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. Pensoft Series Faunistica 61: 13-36. (in English). ["The ways in which forests can be inferred, or shown, to meet the habitat requirements of dragonflies are reviewed globally. The relationship between dragonflies and forests is examined along a latitude spectrum in the Northern Hemisphere, from the Arctic Circle to the equator, a tran-

sect along which species diversity progressively increases, and the microclimate within forest becomes steadily more permissive for occupancy by the several stages in the dragonfly life history. In mid-temperate latitudes dragonflies use forests mainly for aestivation as pre-reproductive adults, a strategy functionally similar to the siccation exhibited by tropical dragonflies in seasonal-rainfall regions. Tropical rainforest is the planet's most diverse terrestrial ecosystem, with regard to species and habitats. It provides habitats for many species of dragonflies, for some or all of their life- history stages. Many such species, and their behaviour and ecology, remain undescribed. For biologists, including odonatologists, the foremost challenge of our time is that this irreplaceable storehouse of biological information faces imminent threat of destruction before its contents can be placed on record." (Author)] Address: Corbet, P.S., Crean Mill, Crean, St Buryan, Cornwall, TR19 6HA, UK. E-mail: philipcorbet@yahoo.co.uk

6230. Cordero Rivera, A. (Ed.) (2006): Forest and Dragonflies, 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. ISBN: 9546422789. Faunistica 60: 300 pp. [Contents: Cordero Rivera, A.: Introduction - Corbet, P.S.: Forests as habitats for dragonflies (Odonata) - Graca, M.: Allochthonous organic matter as a food resource for aquatic invertebrates in forested streams. The importance of forests for dragonflies in different continents - Orr, A.G.: Odonata in Bornean tropical rain forest formations: diversity, endemicity and implications for conservation management - Paulson, D.: The importance of forests to neotropical dragonflies - Fincke, O.M.: Use of forest and tree species, and dispersal by giant damselflies (Pseudostigmatidae): future prospects in fragmented forests - Dijkstra, K.-D. & Clausnitzer, V.: Thoughts from Africa: how can forest influence species composition, diversity and speciation in tropical Odonata? - Sahlen, G.: Specialists vs. generalists among dragonflies - the importance of forest environments in the formation of diverse species pools - Tsubaki, Y. & N. Tsuji: Dragonfly habitat maps based on landcover and habitat relation models. Conservation and behavioral issues - Samways, M.: Threat levels to odonate assemblages from invasive alien tree canopies - Taylor, Ph.: Movement behaviours of a forest odonate in two heterogeneous landscapes - Thompson, D.J. & Watts, Ph.C.: The structure of the *Coenagrion mercuriale* populations in the New Forest, southern England - Watanabe, M.: Mate location and competition for mates in relation to sunflecks of forest floors - Cordoba-Aguilar, A. & Contreras-Garduno, J.: Differences in immune ability in forest habitats of varying quality: dragonflies as study models - Hadrys, H. The present role and future promise of conservation genetics for forest Odonates.] Address: Pensoft Publishers, Geo Milev Str. No. 13a, 1111 Sofia, Bulgaria. <http://www.pensoft.net>

6231. Dijkstra, K.D.; Clausnitzer, V. (2006): Thoughts from Africa: how can forest influence species composition, diversity and speciation in tropical Odonata?. Forests and Dragonflies. Fourth WDA International Symposium of Odonatology, Pontevedra (Spain), July 2005: 127-151. (in English). ["We introduce tropical African forests and their Odonata, and speculate how climatic oscillations and associated large-scale habitat shifts may have governed speciation across the forest-savanna ecotone, presenting several hypothetical scenarios. Ecological traits of forest species and possible reasons for their disappearance when forest is opened up are

discussed. We believe that low insolation in forest habitats and interspecific competition are key factors segregating forest and non-forest species. While openland species cannot cope with low insolation inside the forest, forest species have evolved a slow lifestyle to cope with the forest environment, but are out-competed by more aggressive non-forest species beyond forest borders. Casual field observations support this hypothesis, although the reality is likely to be more complex. Phylogenetic reconstruction of groups that straddle the habitat divide, linked to ecological observations, may elucidate evolutionary reactions to landscape change. The reaction of odonate assemblages to forest loss is studied easily in Africa's imperilled forests. Because many of these forests are believed to be relatively young and highly forest-adapted species may have very low dispersal capacities, comparative ecological research of 'forest-dependent' odonate assemblages inside and outside ancient forest refugia is recommended." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6232. Dommaget, J.-L. (2006): Rubrique bibliographique. *Martinia* 22(4): 194-196. (in French). [Titles from 2004 to 2006 on French odonatology are considered.] Address: Dommaget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

6233. Dyatlova, E.S. (2006): The Odonata of southwestern Ukraine. *Opusc. zool. flumin.* 221: 1-15. (in English). ["Based on literature and on the 2002-2005 surveys, 54 species are listed from 43 localities. New records are provided for 43 species. *Coenagrion scitulum* and *Sympetrum pedemontanum* are new to the region. The occurrence of *Calopteryx splendens ancilla* on the lower Danube (cf. A.N. Bartenev, 1912, *Ezhegod. zool. muz. imp. Akad. Nauk* 17: 281-288) is confirmed. *Erythromma lindenii*, hitherto known from the lower Danube, is recorded also from the Dnieper and Dniester basins. The SW Ukrainian populations of *Orthetrum coerulescens* are referable to *O. c. anceps*." (Author)] Address: Dyatlova, Elena, Department of Zoology, Faculty of Biology, Odessa National University, Dvoryanskaya 2, UKR-65026 Odessa, The Ukraine. E-mail: odonata@ukr.net

6234. Ellenrieder, N. von; Garrison, R.W. (2006): Rediscovery of *Oxyagrion bruchi* Navás from Argentina, with a description of its larva (Odonata: Zygoptera: Coenagrionidae). *The Pan-Pacific Entomologist* 83(3/4): 362-374. (in English, with Spanish and French summaries). ["*O. bruchi* is redescribed, illustrated, and diagnosed. A neotype is designated. The larva is described and compared with other known sympatric species of the genus." (Authors)] Address: Ellenrieder, Natalie von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

6235. Faucheux, M.J. (2006): Les organes sensoriels des antennes larvaires de Libellules: les propriocepteurs et les vibrorécepteurs d'*Erythromma lindenii* (Sélys, 1840) (Odonata Zygoptera: Coenagrionidae). *Bull. Soc. Sc. Nat. Ouest de la France, nouvelle série* 28(3): 153-159. (in French, with English summary). ["The larval antennae of *E. lindenii* are short and made up of a scape, a pedicel and a fourth-segmented flagellum. They bear four types of aporous and exclusively

mechanoreceptive sensilla: spatula-shaped sensilla chaetica, curved sensilla chaetica, sensilla filiformia and sensilla campaniformia. The curved sensilla chaetica are proprioceptors which monitor the relative position of the 3rd and 4th flagellomeres. Sensilla filiformia are vibration receptors which play the major role in prey detection. The unique sensillum campaniformium on the pedicel is a proprioceptor which informs the larva of the position of the flagellum relative to the pedicel. Spatula-shaped sensilla chaetica are tactile receptors distributed on the scape and the pedicel. No chemoreceptive sensilla has been observed on the antennae." (Author) Address: Faucheux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Université de Nantes, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex 03, France. E-mail: faucheux.michel@free.fr

6236. Faucheux, M.J.; Meurgey, F. (2006): L'antenne larvaire de *Chalcolestes viridis* Van der Linden, 1825 (Insecta: Odonata: Zygoptera: Lestidae): morphologie et sensilles, comparaison avec les autres Zygoptères. *Bull. Soc. Sc. Nat. Ouest de la France, nouvelle série* 28(3): 160-167. (in French, with English summary). ["The larval antenna of *C. viridis* is made up of a scape, a pedicel and a flagellum comprising 5 segments. It bears two types of aporous sensilla: the sensilla filiformia and the curved sensilla chaetica. The sensilla filiformia appear with the scape; they are numerous on the two surfaces of the pedicel and the 5 flagellomeres. These mechanoreceptive sensilla, of different lengths, react to the slightest vibrations produced in the water by the appearance of prey; they are vibrorécepteurs. It is the second time that the curved sensilla chaetica, whose role is proprioceptive, are observed in the zygopteran larvae, these sensilla being unknown in other insects, whether larvae or adults. In *C. viridis*, they are located on the distal parts of flagellomères 1,2,3 and 4, and they record the relative position of the flagellomere with regard to one another. A comparison is carried out with the larval sensory equipment of *Erythromma lindenii* which has been previously studied." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

6237. Ferreira, S.; Grosso-Silva, J.M.; Sousa, P. (2006): Miscellaneous records of dragonflies (Odonata) from continental Portugal - II. *Boletín Sociedad Entomológica Aragonesa* 38: 321-322. (in English, with Spanish summary). ["The known distribution of 34 dragonfly species is extended in continental Portugal. Six species are recorded for the first time from Alvão Natural Park, *Diplacodes lefebvrei* is recorded for the first time from Sudoeste Alentejano and Costa Vicentina Natural Park, and *Coenagrion mercuriale* from Douro Internacional Natural Park." (Authors)] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate) em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairão, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

6238. Ferreira, S.; Grosso-Silva, J.M. (2006): On the dragonflies of Portugal - Study of a collection from the 1980s (Insecta, Odonata). *Boln. Asoc. esp. Ent.* 30 (3-4): 11-23. (in English, with Spanish summary). ["This work presents data regarding 42 species of dragonflies collected in various regions of Portugal in the 1980s. Comments are given on the relevance of the records based on current knowledge of the country's Odonata."]

(Authors)] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate) em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairao, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

6239. Ferreira, S.; Grosso-Silva, J.M.; Lohr, M.; Weihrauch, F.; Jödicke, R. (2006): A critical checklist of the Odonata of Portugal. *International Journal of Odonatology* 9(2): 133-150. (in English). ["The Odonata checklist of continental Portugal, Madeira and the Azores includes 65 species. Besides *Sympetrum nigrifemur*, an endemic of Madeira and the Canary Islands, and the unique population of the Nearctic *Ischnura hastata* in the Azores, the species composition reflects a higher proportion of western Mediterranean and Ethiopian elements than any other European country. An isolated occurrence of *Coenagrion pulchellum* was confirmed. Due to obvious misidentifications and to the loss of voucher specimens of questionable species, 22 taxa were rejected. Future records of additional species are predicted." (Authors)] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate) em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairao, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

6240. Fincke, O.M. (2006): Use of forest and tree species, and dispersal by giant damselflies (*Pseudostigmatia*): future prospects in fragmented forests. In: Rivera, AC (ED). 2006. *Forests and Dragonflies*. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. *Pensoft Series Faunistica* 61: 103-125. (in English). ["Phytotelmata, or water-filled plant containers, provide an important aquatic habitat in tropical forests typically depauperate of permanent ponds and lakes. As top predators in these microhabitats, species of *Pseudostigmatidae* offer a rare opportunity to measure the effects of forest plant species on the abundance and distribution of their aquatic occupants. Like the specialists of bromeliads, which depend on the presence of a small group of epiphytic plants, odonates ovipositing in water-filled tree holes and fruit husks require a non-random assortment of tree sizes and species. The size and density of microhabitats ultimately affect larval abundance, although, for most species, it remains unclear how closely adult recruitment tracks larval survivorship. Within its geographic range, *Megaloprepus* relies more heavily on primary forests than do species of *Mecistogaster* that are adapted to dryer conditions and hence are more tolerant of secondary and highly disturbed forests. An experiment with *Megaloprepus* revealed that it exhibited relatively low flight endurance, particularly in females, which rarely dispersed across open areas. Recent comparative work challenges the status of *Megaloprepus* as a monospecific genus, and suggests that many *pseudostigmatid* populations may be highly structured genetically. The larval ecology and adult behavior of *Megaloprepus* suggest that its populations should be more highly structured than those of the more vagile tree-hole aeshnids. Collectively, the data reviewed here suggest that forest fragmentation, exacerbated by less predictable threats from global warming, may pose a greater threat to *Megaloprepus* and similar species such as *Microstigma rotundatum*, than to species of *Mecistogaster*. The fate of all *pseudostigmatids* is intimately tied to that of the plant species harboring them. As predators of phytotelm mosquito larvae, some of which are disease vectors, the demise of pseudo-

stigmatids may affect not only forest food chains, but also human health." (Author)] Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

6241. Guerbaa, K.; Lolive, N. (2006): Redécouverte de *Libellula fulva* Müller, 1764 en Limousin (Odonata, Anisoptera, Libellulidae). *Martinia* 22(4): 172. (in French). [France; 4 VI 2005 Cromac; 9 VI 2005 Razès] Address: Guerbaa, K., Société Limousine d'Odonatologie, 11, rue Jauvion, F-87000 Limoges, France

6242. Hämäläinen, M. (2006): *Vestalaria vinnula* spec. nov. from southern Vietnam (Odonata: Calopterygidae). *Zool. Med. Leiden* 80(4): 87-90. (in English). ["*Vestalaria vinnula* spec. nov.; holotype male, southern Vietnam, Lam Dong province, Biao, 1962) is described in both sexes and compared with other species of *Vestalaria* May, 1935 (= *Vestalis smaragdina*-group), which is ranked as valid genus." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

6243. Hämäläinen, M. (2006): Suppusiipisestää pikkutyöstäkö uusi liito-orava? *Luonnon Tutkija* 110(3): 101-104. (in Finnish). [A critical discussion of the status of *Sympetma paedisca* as a species listed in the EU's Habitats Directive, given its widespread occurrence in Eastern Europe and recent northward dispersal in the Baltic States. In Finland migrant specimens, being able to overwinter successfully, have been recorded frequently along the southern coastline since 2004. The first confirmed record was made in August 2002. Most likely *S. paedisca* will become established in southern Finland in the near future. The controversy of the EU Habitat Directive requirements and the local 'non-redlisted' status of some other Finnish dragonfly species is pointed out. The absence of *Nehaeniina speciosa* from the listed EU's Habitats Directive species is queried. The text and illustrations of this article are available at <http://korento.net/Suppusiipisesta.pdf>. Matti Hämäläinen] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

6244. Honcu, M.; Roztočil, O. (2006): Faunistic finds of dragonflies (Odonata) made during the excursions of the VIII. allstate meeting of odonatologists in Juni 2005 in the Žďárské vrchy – hills (Czech Republic). *Vážky 2005 : sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších: seminár usporádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lípě / editor sborníku Lubomír Hanel. - Vyd. 1. - Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 7-14. (in Czech, with English summary). [Records of 26 species including *Leucorrhinia pectoralis*, *Somatochlora arctica*, *Leucorrhinia rubicunda*, and *Coenagrion hastulatum* are documented.] Address: Honcu, M., Vlastivedné muzeum v České Lípě, náměstí Osvobození 297, 470 01 Česká Lípa, Czech republic. E-mail: honcu@muzeum.clnet.cz*

6245. Hooper, R.E.; Plaistow, S.J.; Tsubaki Y. (2006): Signal function of wing colour in a polymorphic damselfly, *Mnais costalis*. *Odonatologica* 35(1): 15-22. (in English). ["*Mnais costalis* males exist in 2 forms specialised for the demands of 2 distinct strategies, territorial fighters and non-territorial sneaks, which give approxi-

mately equal fitness payoffs. Territorial males have orange wings, whereas typical non-territorial males are clear-winged. By simulating agonistic encounters between males it is shown that the 2 morphs showed distinct responses to the signal from orange wings: territorial orange-winged males always tried to enter contests, while clear-winged males always avoided them. On the other hand, the 2 morphs showed similar responses to the signal from clear wings: both morphs tried to attack models. Also presented are 'painted clear models' which were clear-winged males whose wings had been painted orange, and both morphs responded as if they were orange-winged models. These observations indicate that males discriminate between fighter and sneaker morphs using the colour of wings, and shows different styles of agonistic responses toward fighter and sneaker morphs. It is likely that non-territorial sneaks may gain an advantage from non-signalling because clear wings increase crypsis on another male territory, increasing their success in stealing copulations. No indication was found that clear-winged males are female mimics, or that having clear wings reduced the level of aggression directed towards them by territorial orange-winged males.] Address: Tsubaki, Y., Biodiversity Conservation Research Group, National Institute for Environmental Studies, Tsukuba 305-0053, Japan. E-mail: tsubaki@nies.go.jp

6246. Ishizawa, N. (2006): Changes of body temperatures in *Sympetrum frequens* (Selys) reproductive pairs (Anisoptera: Libellulidae). *Odonatologica* 35(1): 23-29 (in English) [The reproductive behaviour was divided into four phases: perching (phase I), less than 1 min from the start of copulation (phase II), more than 3 min from the start of copulation (Phase III) and more than 1 min from the start of oviposition (phase IV). The body temperature (Tb) of the male was highest in phase III, while in the female Tb was not significantly different among phases. The changes of Tb are different between the sexes, however, they are both influenced largely by the wind as well as by the air temperature, and particularly in the male the effect seems to be larger than in the ♀, possibly because of its smaller body size."(Author). Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: isizawa7@ri-vo.mediatti.net

6247. Jacquemin, G. (2006): The use of binoculars to identify adult Odonata. *J. Br. Dragonfly Society* 22(1): 29-32. (in English). ["Many current odonatological surveys are carried out by naturalists with a background in ornithology who employ the same visual identification methods as used by many birdwatchers. Identifications based solely on observation through binoculars must be treated cautiously and, whenever possible, should be supported by checking diagnostic features on captured specimens, which subsequently can be released. Identification keys designed for use with binoculars are of limited value and, considering the risk of misidentification, records based solely on binocular observation by inexperienced observers cannot be relied upon." (Author)] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

6248. Johannson, F.; Strasevicius, D. (2006): Trollsländor i helgolandsfällan på Stora Fjäderägg hösten 2005. *Natur i Norr* 25(1): 25-26. (in Swedish). [Sweden; in September 2005, *Aeshna juncea*, *A. caerulea*, *A.*

grandis, *Sympetrum vulgatum*, and *S. danae* were caught in Heligoland traps.] Address: Johannson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

6249. Jourde, P.; Lалуque, O. (2006): Comportement territorial et ponte en milieu lentique chez *Macromia splendens* (Pictet, 1843) dans le centre-ouest de la France (Odonata, Anisoptera, Macromiidae). *Martinia* 22(4): 187-190. (in French, with English summary). ["*M. splendens* is a recent discovery in Charente-Maritime. Its breeding habitats are currently under investigation in the central west region of France, which appears to be the most northernly limit for the species. During the study, a breeding site in lentic conditions was identified, whereas the species is generally considered only to reproduce in lotic environments." (Authors)] Address: Jourde, P., LPO, La Corderie Royale, BP 90263, F-17305 Rochefort, France. E-mail: philippe.jourde@lpo.fr

6250. Jovic, A.; Paunovic, M.; Stojanovic, B.; Milosevic, S.; Nikolic, V. (2006): Aquatic invertebrates of the Ribnica and Lepenica rivers: composition of the community and water quality. *Arch. Biol. Sci., Belgrade* 58 (2): 115-119. (in English). ["Results of investigating the community of aquatic invertebrates in the Ribnica and Lepenica Rivers (Kolubara River drainage area) are given in the present work. Forty-three taxa are recorded. In relation to other studied streams in Serbia, the investigated rivers are characterized by high diversity of macroinvertebrates. Cluster analysis indicates that the locality on the Lepenica stands apart from those on the Ribnica, which is a consequence of the difference of habitats found at them. Results of saprobiological analysis of the macrozoobenthos in the given rivers indicate that their waters belong to quality classes I and II." (Authors) Three odonate taxa are listed: *Gomphus vulgatisimus*, *Calopteryx virgo*, and *Calopteryx* sp.] Address: Jovic, A., Siniša Stankovic Institute for Biological Research, 11060 Belgrade, Serbia and Montenegro

6251. Knijf, G. de (2006): Libellen in België. Nieuwe kennis voor een beter beheer van hun leefgebieden. *Natuur.focus* 5(4): 129-134. (in Dutch). ["In this contribution we report on some results of the recently published book on Belgian Odonata, which is based on >65.000 observations. After setting the historical context, we first present some general results for the 69 Belgian species, e.g. the overall coverage and some changes in species composition. Especially the strong increase in several southern species is striking. The Campine region is the area with the highest species density and the only region in Flanders where nearly all Red List species occur. This list contains 17 species (or 26%) which fit into the categories 'endangered by extinction', 'endangered', and 'vulnerable'. Most Red list species live either in moderately base-rich or meso-eutrophic waters and in poor or oligotrophic fens. In a next part we give some recommendations for a better proper management of aquatic habitats. Finally we stress on the urgent necessity to start with a monitoring scheme for dragonflies in Flanders." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

6252. Kognitzki, S.; Westermann, K. (2006): Erste Bodenständigkeitsnachweise der Fledermaus-Azur-

jungfer (*Coenagrion pulchellum*) im höheren Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(2): 227-228. (in German, with English summary). ["At two ponds situated in the southeastern Black Forest at elevations of 730 resp. 830 m a.s.l., we discovered the first evidence of reproduction of *C. pulchellum* in higher elevations of the Black Forest. These are also the highest known occurrences in Baden-Württemberg, Germany." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6253. Kosterin, O.E.; Vikhrev, N.E. (2006): Odonata seen for three days in a populated lowland part of Cambodia. *Malangpo* 21: 212-217. (in English). ["A report about Odonata met during three day long trips to the Siem Reap area of Cambodia on January 7-9, 2006 is given in a form of field notes. 24 species were met with, of which *Heliocypha biforata* (Selys, 1859), *Lestes concinnus* Hagen in Selys, 1862, *Aciagrion borneense* Ris, 1911, *Agriocnemis minima* Selys, 1877, *A. nana* (Laidlaw, 1914), *Ceriagrion praetermissum* Lieftink, 1929, *Diplacodes trivialis* (Rambur, 1842), *Brachydiplax chalybea* Brauer, 1868, *Brachythemis contaminata* (Fabricius, 1793), *Crocothemis servilia* (Drury, 1770), *Neurothemis tullia* (Drury, 1773), *Rhodothemis rufa* (Rambur, 1842) have not been reported for Cambodia in literature (although the published records are very scarce per se)."] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

6254. Kriska, G.; Csabai, Z.; Boda, P.; Malik, P.; Horvath, G. (2006): Why do red and dark-coloured cars lure aquatic insects? The attraction of water insects to car paintwork explained by reflection-polarization signals. *Proc. R. Soc. B* (2006) 273: 1667-1671. (in English). ["We reveal here the visual ecological reasons for the phenomenon that aquatic insects often land on red, black and dark-coloured cars. Monitoring the numbers of aquatic beetles and bugs attracted to shiny black, white, red and yellow horizontal plastic sheets, we found that red and black reflectors are equally highly attractive to water insects, while yellow and white reflectors are unattractive. The reflection-polarization patterns of black, white, red and yellow cars were measured in the red, green and blue parts of the spectrum. In the blue and green, the degree of linear polarization p of light reflected from red and black cars is high and the direction of polarization of light reflected from red and black car roofs, bonnets and boots is nearly horizontal. Thus, the horizontal surfaces of red and black cars are highly attractive to redblind polarotactic water insects. The p of light reflected from the horizontal surfaces of yellow and white cars is low and its direction of polarization is usually not horizontal. Consequently, yellow and white cars are unattractive to polarotactic water insects. The visual deception of aquatic insects by cars can be explained solely by the reflection-polarizational characteristics of the car paintwork." (Authors) The paper includes references to Odonata.] Address: Horvath, G., Biooptics Laboratory, Department of Biological Physics, Loránd Eötvös University, 1117 Budapest, Pázmány Péter sétány 1, Hungary. E-mail: gh@arago.elte.hu

6255. Leroy, T. (2006): *Coenagrion lunulatum* (Charpentier, 1825) en France: répartition, abondance, élé-

ments d'écologie et de conservation (Odonata, Zygoptera, Coenagrionidae). *Martinia* 22(4): 151-166. (in French, with English summary). ["Based on a bibliographical analysis and field work realized between 2000 and 2005, this article describes what we know about *C. lunulatum* in France. This mountaneous, shy and rare species is mostly present in Auvergne region, with a short and precocious flight period. The conservation state of these populations, which are of European importance, seems reasonable, although this is a very fragile species and a number of threats remain." (Author)] Address: Leroy, T., Le Bourg, F-63210 Heumeil-Eglise, France. E-mail: thierry-leroy@caramail.com

6256. Levasseur, M. (2006): Découverte d'un *Paragomphus* sp. sur l'île d'Anjouan Archipel des Comores (Odonata, Anisoptera, Gomphidae). *Martinia* 22(4): 183-186. (in French, with English summary). ["During a short consulting mission on behalf of the Comorian government (form. Islamic Federal Republic, now Comorian Union), the author had the opportunity to prospect several communal water intakes. One of them located at a small dam on a "mro" (little stream) in Anjouan, supported 3 exuviae, 2 of them being immediately attributable to gomphids. After bibliographical search and inquiry to dragonfly specialists of the region, it appears that these exuviae belong to a *Paragomphus* sp. and are the first data concerning gomphids in the Comorian archipelago. To date, these exuviae are still not identified and could be those of a new species for science." (Author)] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France. E-mail: levasseur@magic.fr

6257. Lingenfelder, U. (2006): Beobachtung der Arktischen Smaragdlibelle - *Somatochlora arctica* (ZETTERSTEDT, 1840) - im südlichen Pfälzerwald (Odonata: Corduliidae). *Fauna Flora Rheinland-Pfalz* 10(4): 1211-1218. (in German, with English summary). ["In 2003, *S. arctica* has been recorded in the southern part of the Palatinate Forest for the first time. Two males of the species could be observed at a valleycomplex southwest of Eppenbrunn near the border to France. The observation is described and locality and date of the observation are briefly discussed." (Author)] Address: Lingenfelder, U., Seebergstraße 1, D-67716 Heltersberg, Germany. E-mail: u.lingenfelder@vr-web.de

6258. Lingenfelder, U. (2006): Nachweise des Zweifelflecks - *Epiptera bimaculata* (CHARPENTIER, 1825) - im Pfälzerwald (Odonata: Corduliidae). *Fauna Flora Rheinland-Pfalz* 10(4): 1219-1247. (in German, with English summary). ["*E. bimaculata* [...] has been recorded at six localities in the Palatinate Forest since 2001. Reproduction evidences were provided at two waters. At one of these localities *E. bimaculata* is established for at least six years. Additional observations of the species in the Palatinate were reported recently from the natural areas „Nördliche Oberrheinebene“ and „Kaiserslauterner Senke“. All known recordings in Rhineland-Palatinate are compiled, findings in the Palatinate region are shown in a distribution map. A short survey of the distribution of the species in adjoining regions is also given here. In conclusion, habitats, distribution and status in the Palatinate Forest are discussed shortly as well as problems in recording the species, of dispersal and threats." (Author)] Address: Lingenfelder, U., Seebergstraße 1, D-67716 Heltersberg, Germany. E-mail: u.lingenfelder@vr-web.de

- 6259.** Lolive, P., Kleefstra, V (2006): Découverte d'une nouvelle population à *Epitheca bimaculata* (Charpentier, 1825) en Limousin (Odonata, Anisoptera, Corduliidae). *Martinia* 22(4): 166. (in French). [21 V 2006, near Thouron (87), France, 4 exuviae; the next known locality is situated 34 km north of Thouron.] Address: Lolive, P., Société Limousine d'Odonatologie, 11 rue Jauvion, F-87000 Limoges, France.
- 6260.** Machado, A.B.M. (2006): Three new species of Heteragrion Selys, from Brazil with redescription of the holotype of *H. dorsale* Selys (Odonata, Megapodagrionidae). *Revista Brasileira de Zoologia* 23(4): 1062-1070. (in English, with Portuguese summary). [*Heteragrion luizfelipei* sp. nov. from Santa Catarina, *H. gracile* sp. nov. from Minas Gerais, and *H. mantiquireae* sp. nov. from São Paulo are described and illustrated. The color and structural characters that distinguish these species from those of Selys group 2 are discussed. The holotype of *H. dorsale* Selys, 1862 is redescribed and illustrated." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br
- 6261.** Machado, A.B.M.; Bede, L.C. (2006): *Heteragrion tiradentense* spec. nov. from the state of Minas Gerais, Brazil (Zygoptera: Megapodagrionidae). *Odonatologica* 35(1): 47-54. (in English) ["The new species (holotype male: Brazil, Minas Gerais, Tiradentes, 1-XI-1999) is described and illustrated. It belongs in the group 1 of *E. de Selys-Longchamps* (1862, *Bull. Acad. Belg.* [III] 14: 5-44) and differs from the other species of the group by its small size and by the color, shape and size of its mesepisternal spot." (Authors)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br
- 6262.** Mancu, C.O. (2006): Investigations on the dragonflies (Insecta: Odonata) occurring in Mures Floodplain Natural Park. *Scientific annals of the Danube delta institute, Tulcea - Romania*, 2006: 69-74. (in English, with Romanian summary). [Romania; in 2004 and 2005, the distribution of Odonata (n=36 species) in the Mures Floodplain Natural Park was mapped. Each species is presented on 2x2 km UTM-squares. *Coenagrion ornatum*, *Ophiogomphus cecilia* and *Stylurus flavipes* are of special interest as they are listed in the Habitat Directive 92/43/EEC] Address: Mancu, C.O., Acad. Remus Radulet 13, bl. 119, ap. 7, Timisoara 300281, Timis County, Romania. E-mail: cosminovidiu@yahoo.com
- 6263.** Meurgey, F. (2006): *Protoneura romanae* spec. nov. from Guadeloupe, French West Indies (Zygoptera: Protoneuridae). *Odonatologica* 35(4): 369-373. (in English). ["The new sp. is described and compared with its closest relative, *P. ailsa* Donnelly. Holotype male and allotype female: Guadeloupe, Basse-Terre, Rivière Salee, Source Sul-fureuse de Sofaïa, 1 -11-2006; both deposited in Museum of Natural History, Nantes, France." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 6264.** Meurgey, F.; Fauchaux, M.J. (2006): Vibroreceptors and proprioceptors on the larval antennae of *Erythromma lindenii* (Selys) (Zygoptera: Coenagrionidae). *Odonatologica* 35(3): 255-264. (in English). ["The larval antennae of *E. lindenii* are short and made up of a scape, a pedicel and a fourth-segmented flagellum. They bear four types of aporous and exclusively mechanoreceptive sensilla: spatula-shaped sensilla chaetica, curved sensilla chaetica, sensilla filiformia and sensilla campaniformia. The curved sensilla chaetica are proprioceptors which monitor the relative position of the 3rd and 4th flagellomeres. Sensilla filiformia are vibration receptors which play the major role in prey detection. The unique sensillum campaniformium on the pedicel is a proprioceptor which informs the larva of the position of the flagellum relative to the pedicel. Spatula-shaped sensilla chaetica are tactile receptors distributed on the scape and the pedicel. No chemoreceptive sensilla has been observed on the antennae." (Authors)] Address: Fauchaux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Université de Nantes, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex 03, France. E-mail: fauchaux.michel@free.fr
- 6265.** Meurgey, F.; Fauchaux, M. (2006): Organes sensoriels des antennes de la larve de *Chalcolestes viridis* (Van der Linden, 1825) (Odonata, Zygoptera, Lestidae). *Martinia* 22(4): 167-171. (in French, with English summary). ["The larval antenna of *Chalcolestes viridis* bears two types of mechanoreceptive sensilla: sensilla filiformia and curved sensilla chaetica. Sensilla filiformia play a major role in prey detection, as vibration receptors. Curved sensilla chaetica are proprioceptors which monitor the relative position of the flagellomere which follows the one that bears them, and permit antennal positioning. The sensory equipment of *C. viridis* is compared to that of *Erythromma lindenii* (Selys, 1840) previously studied." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 6266.** Meurgey, F. (2006): La collection d'Odonates de Monsieur Max Thibault. *Martinia* 22(4): 173-182. (in French, with English summary). ["The author presents the inventory of Max Thibault's collection of Odonata, recently acquired by the Natural history museum of Nantes. A list is given with, if necessary, some brief comments about the status of some species." (Author)] Records result from the following French Départements: Finistère (29), Île-et-Vilaine (35), Maine-et-Loire (49), Morbihan (56), Sarthe (72), Île-de-France (78), Hérault (34), Alpes Maritimes (06), Rhône-et-Loire (71), Haute-Savoie (74), and haute-Corse.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 6267.** Mocek, B.; Mikat, M.; Cip, D. (2006): Significant and interesting findings of dragonflies (Insecta, Odonata) in East Bohemian Region (Czech Republic). *Vážky 2005 : sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších : seminár usporádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lípě / editor sborníku Lubomír Hanel. - Vyd. 1. - Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 15-48.* (in Czech, with English summary). [280 new faunistic data obtained mostly by the authors' entomological research during the past 5 years are presented. Data from 102 localities of East Bohemia refer to 24 species of Odonata. Of special interest are the findings of Leu-

corrhinia rubicunda, Orthetrum albistylum, and Sympetrum meridionale which have been recorded for the first time in the region of East Bohemia. Records of Coenagrion ornatum, Stylurus flavipes, Ophiogomphus cecilia, and Leucorrhinia pectoralis are also noteworthy. Special emphasis is given to recent range extensions of species in East Bohemia.] Address: Mocek, B., Muzeum východních Čech v Hradci Králové, Elišcino nábřeží 465, 500 01 Hradec Králové, Czech Republic. E-mail: b.mocek@muzeumhk.cz

6268. Moroz, M.D.; Czachorowski, S.; Lewandowski, K.; Buczyński, P. (2006): Aquatic Insects (Insecta: Plecoptera, Ephemeroptera, Odonata, and Trichoptera) of the Rivers in the Berezinskii Biosphere Reserve. Entomological Review 86(9): 987-994. (in English). ["The fauna of aquatic insects was studied in the rivers of the Berezinskii Biosphere Reserve. A total of 108 species of 4 orders were found: Plecoptera (10 species), Ephemeroptera (24), Odonata (25), and Trichoptera (49). The aquatic fauna is abundant and includes some species rare in Belarus and Europe." (Authors) [English Translation of Entomologicheskoe Obozrenie 85(4): 749-757.]] Address: Buczynski, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczynski@biotop.umcs.lublin.pl

6269. Müller, J.; Lotzing, J.; Steglich, R.; (2006): Zu Nahrungsökologie und Brutbiologie der Rauchschnalbe *Hirundo rustica*. Ornith. Ner. Mus. Heineanum 24: 101-108. (in German, with English summary). [Unseburg, Sachsen-Anhalt, Germany; the food for nestling of *Hirundo rustica* (Aves) included also Odonata. Food analysis was a quite good method to detect rare regional odonate species including *Ophiogomphus cecilia* and *Crocothemis erythraea*.] Address: Müller, J., Frankfurterstr. 28, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

6270. Ott, J. (2006): Die Auswirkungen der Klimaänderung auf die Libellenfauna - aktuelle Ergebnisse aus Untersuchungen in Deutschland und Italien. BfN-Skripten 180: 45. (in German). [This is a brief summary on activities to document and analyze climate change effects on the odonate fauna including some studies lasting more than 10 years. In general, bog dwellers are effected by drying out of their habitats, while species as *Crocothemis erythraea* and *Orthetrum cancellatum* benefit from alterations of the water tables of the ponds induced by climate change.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

6271. Parr, A. (2006): Odonata attracted to artificial light. Atropos 29: 29-38. (in English). [The author compiles records of 15 odonate species found at light sources or attracted by light with focus on UK. Species most attracted in UK seem to be *Aeshna mixta*, *Sympetrum sanguineum*, and *S. striolatum*. The possible migration of these species is discussed.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

6272. Parr, A. (2006): Dragonfly news, summer 2006. Atropos 29: 45-47. (in English). [The brief report highlights some migrant species and range extensions (e.g. *Erythromma viridulum*, *Orthetrum cancellatum*). *Aeshna affinis* was found for the second and third time in the UK.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bu-

ry St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

6273. Parr, A.J. (2006): Migrant and dispersive dragonflies in Britain during 2005. J. Br. Dragonfly Society 22(1): 13-18. (in English). ["The 2005 season was a rather mixed one for migrant and dispersive dragonflies, with the autumn in particular being relatively uneventful. There were, however, several highlights during the main part of the year. Most notably, *Anax parthenope* appeared in record numbers and, with ovipositing reported from at least three sites in England (as well as one in Ireland), the species is perhaps now starting to reliably colonize our area. Following a quiet season in 2004, *Sympetrum fonscolombii* was once again recorded quite widely and a limited amount of oviposition was observed, although no observations of the autumn emergence of locally-bred individuals following rapid larval development took place. In addition to sightings of unusual species, there was also evidence of the continuing range expansion of a number of our resident species such as *Aeshna mixta*, *Libellula depressa*, *L. fulva*, and *Orthetrum cancellatum*. On the negative side, following sightings during 2002—2004, there were no reports of the *Lestes barbarus* during the season, suggesting that the possible colonization of Britain by this species has been temporarily halted." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

6274. Perotti, M.G.; Fitzgerald, L.A.; Moreno, L.; Puenta, M. (2006): Behavioral responses of *Bufo arenarum* tadpoles to odonate naiad predation. Herpetological Conservation and Biology 1(2): 117-120. (in English). ["In the presence of predators (*Pantala* sp.), anuran tadpoles often exhibit behavioral plasticity, which in turn reduces predation risk. We evaluated indirect effects of odonate larva predation on activity of *Bufo arenarum* tadpoles. We reared intact and tail-damaged larvae in three different predator treatments: (1) caged predators fed tadpoles; (2) caged predators that were starved; and (3) no predators. Both intact and damaged tadpoles were significantly less active when exposed to predator cues. There were no differences in activity between tadpoles with damaged and intact tails, however significant differences were observed between fed and starved predator treatments. Our results are consistent with other studies that have shown bufonid tadpoles reduce activity when exposed to predator cues and Address a novel contribution of southern-hemisphere bufonid, expanding the knowledge of that family in ecological experiments." (Authors)] Address: Perotti, Maria, Laboratorio de Fotobiología, Centro Regional Universitario Bariloche, Universidad Nacional del Comahue-CONICET, Quintral 1250, (8400) San Carlos de Bariloche, Río Negro, Argentina. E-mail: perottigaby@yahoo.com

6275. Phillips, J., (2006): Dragonflies in the Forest of Dean 1996—2005. J. Br. Dragonfly Society 22(1): 19-28. (in English). [Between 1996 and 2005, 27 Odonata species were recorded at 27 sites in and around of the Forest of Dean, West Gloucestershire (Vice County 34), UK. The result are briefly discussed. Emphasis is given to the odonatological diversity of the site.] Address: Phillips, J., Yorkleigh Cottage, Pope's Hill, Newnham, Gloucestershire GL14 1LD, UK

- 6276.** Reimer, B. (2006): Notes on distribution of Odonata at A'Subaitah. Emirates Natural History Group Al Ain Chapter Newsletter December 2006: 5-6. (in English). [UAE; 17-XI-2006; records of *Paragomphus sinaiticus*, *Trithemis kirbyi ardens*, *T. arteriosa*, *Orthetrum sabina*, *Crocothemis erythraea*, *Arabicnemis caerulea*, and probably *Arabineura khalidi* are briefly reported] Address: not stated
- 6277.** Reinhardt, R. (2006): Nachtrag der sächsischen entomofaunistischen (odonatologischen) Bibliographie (bis zum Jahre 1999) nach Erscheinen der Libellenfauna Sachsens. Mitt. Sächs. Entomol. 73: 41-42. (in German). [Additions to the Saxonian odonatological bibliography.] Address: Reinhardt, R., Burgstätter Str. 80a, D-09648 Mittweida, Germany. E-mail: Reinhardt-Mittw@t-online.de
- 6278.** Renshaw, C.E.; Bostick, B.C.; Feng, X.; Wong, C.K.; Winston, E.S.; Karimi, R.; Folt, C.L.; Chen, C.Y. (2006): Impact of land disturbance on the fate of arsenical pesticides. J. Environ. Qual. 35: 61-67. (in English). ["Increasing development of historic farmlands raises questions regarding the fate of pesticides applied when these land were in cultivation. We quantified As and Pb budgets in field soils in two orchards where arsenical pesticides were applied in the early 20th century and a third uncontaminated control field. Sequential extractions and X-ray analyses also were used to determine mineral phases. In addition, we measured metal loads in drainages adjacent to the fields and in two common macroinvertebrate (Chironomidae, Libellulidae) taxa within the wetland at the outlet of the drainages. We find that the applied As and Pb have undergone little vertical redistribution; concentrations of As and Pb in the top 25 cm of contaminated orchard soils are higher than in the uncontaminated control field. However, none of the applied lead arsenate (PbHAsO₄) remains in its original mineral phase. Instead, the metals are now primarily adsorbed onto fine silt and clay-sized amorphous oxides and organic matter. Further, physical erosion associated with tilling and replanting appears to have mobilized the fine-particulate-bound As and Pb in one orchard. The remobilized metals are found in sediments in the stream channel draining the tilled orchard. It is unclear if the As and Pb transported sediments are biologically active; average macroinvertebrate metal burdens in the wetland are not elevated above those observed elsewhere in the region. However, little of the mobilized metals may have reached the wetland. These results demonstrate that land use change can significantly impact the retention of arsenical pesticides." (Authors)] Address: Renshaw, C.E., Dep. of Earth Sciences, Dartmouth College, Hanover, NH 03755, USA. E-mail: Carl.Renshaw@Dartmouth.edu
- 6279.** Robb, T.; van Gossum, H.; Forbes, M.R. (2006): Colour variation in female *Lestes disjunctus* Selys: a second example of a polymorphic lestad (Zygoptera: Lestidae). Odonatologica 35(1): 31-39. (in English) ["Coexistence of discrete female colour morphs is a common characteristic of many odon. species. Surveys have found that for some North American and European genera, half or more of the spp. show female-limited polymorphism, while in other genera, female polymorphism appears far less common among spp. One such genus is *Lestes* with reportedly only one species (*L. sponsa*) being polymorphic. Here are described andromorphs and heteromorphs for *L. disjunctus*. Female-limited polymorphism might be more common, even in this genus, than is perceived currently. female morph frequencies were estimated for 4 consecutive years: andromorphs constitute approximately 16% of mature females sampled and this proportion is fairly consistent between years. Similar to other published reports on other species, andromorphs and heteromorphs in this study population did not differ in wing length or mass. Seasonal patterns in representation of different morphs suggest that further research should be done on timing of emergence of andromorphs versus heteromorphs in this and perhaps other species." (Authors) Address: Robb, Tonia, Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, K1S 5B6, Canada. E-mail: trobb@connect.carleton.ca
- 6280.** Šácha, D. (2006): Results of the dragonflies (Odonata) occurrence mapping in mountains of the Liptov and Spiš regions during years 2000-2004. Folia faunistica Slovaca 11(8): 43-48. (in English). ["A research of 25 wetland localities was carried out in mountain ranges surrounding the Podtatranská kotlina valley in years 2000–2004. There were 27 species of dragonflies reported, among them 6 are protected and 12 are listed in the Slovak Red List. *Coenagrion hastulatum*, *Aeshna grandis*, *A. juncea*, *A. subarctica*, *Cordulegaster bidentata*, *Somatochlora alpestris*, *S. arctica*, *Sympetrum danae*, *Leucorrhinia dubia*, and *L. rubicunda* are among the most interesting findings. Exuvium of *L. rubicunda* is the first record of this species in the Tatra Mts." (Author)] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@pobox.sk
- 6281.** Šácha, D. (2006): Contribution to the knowledge of dragonflies (Odonata) at the lower Liptov region. Folia faunistica Slovaca 11(8): 69-73. (in English). ["A research of 12 wetland localities was carried out in surroundings of Ružomberok in years 2001-2005. 22 species of dragonflies are reported, among them 4 are protected and 7 appear in Slovak Red List. *Sympetma fusca*, *Aeshna juncea*, *Cordulegaster bidentata*, *Orthetrum brunneum*, *O. coerulescens* and *Sympetrum danae* are among the most interesting findings. *Sympetma fusca*, *Orthetrum brunneum* and *O. coerulescens* are first time reported from Liptov. *Calopteryx splendens* is documented from surroundings of Ružomberok after more than 100 years." (Author)] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@pobox.sk
- 6282.** Šácha, D. (2006): New data on dragonflies (Odonata) in the Poprad region. Folia faunistica Slovaca 11(8): 49-54. (in English). ["A research of 10 wetland localities was carried out in surroundings of Poprad in years 1999-2004. There were 31 species of dragonflies reported, 5 of them are protected and 12 listed in the Slovak Red List. *Coenagrion hastulatum*, *Somatochlora alpestris*, *S. arctica*, *Aeshna juncea*, *A. grandis*, *Crocothemis erythraea*, *Orthetrum brunneum*, *Sympetrum danae*, *S. fonscolombii*, and *S. pedemontanum* are among the most interesting findings. The study is bringing the first data on the occurrence of larva of *S. fonscolombii* in the Podtatranská kotlina valley. *Lestes virens*, *O. brunneum* and *S. fonscolombii* are first time reported from the Popradská kotlina valley." (Author)] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@pobox.sk

- 6283.** Šácha, D. (2006): Results of the investigation on dragonflies (Odonata) at the region of upper and central Liptov (Slovakia). *Folia faunistica Slovaca* 11(8): 75-80. (in English). [A research of 31 wetland localities was carried out in Liptovský Mikuláš district in years 1998-2004. 31 species of dragonflies are reported, 5 of them are protected and 11 appear in Slovak Red List. *Erythromma viridulum*, *Somatochlora alpestris*, *S. arctica*, *Aeshna juncea*, *A. grandis*, *Anax parthenope* (not collected), *Crocothemis erythraea*, *Sympetrum danae* and *S. pedemontanum* are among the most interesting findings. These are brings the first data on *Lestes virens*, *Erythromma najas*, *E. viridulum* and *Anax parthenope* in Podtatranská kotlina.] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@pobox.sk
- 6284.** Saito, Y.; Owada, M.; Kato, S.; Inoue, S. (2006): Monitoring Survey (2001-2005) of Dragonflies (Odonata) of the Imperial Palace, Tokyo, Central Japan. *Memoirs of the National Science Museum* 43: 383-406. (in Japanese, with English summary). ["Monitoring investigations on the fauna of Odonata were made at the gardens of the Imperial Palace, Tokyo, ca. 115 ha, central Tokyo, from 2001 to 2005. A total of 33 species belonging to 8 families were recorded. Similar research were carried out at the same place from 1996 to 2000, and 27 species in 8 families were recorded (Tomokuni & Saito, 2000). The following six species are recorded from the Imperial Place for the first time: *Aeschnophlebia anisoptera* Selys, *Polycanthagyna melanictera* (Selys), *Anaciaeschna martini* (Selys) (Fig. 30) and *Anax nigrofasdatus nigrofasciatus* Oguma (Fig. 31), *Libellula quadrimaculata asahinai* Schmidt (Fig. 35) and *Sympetrum kunckeli* (Selys). Three endangered species in Tokyo urban areas, *Ceriagrion nipponicum* Asahina (Figs. 9-10), *Trigomphus melampus* (Selys) (Figs. 19-21) and *Aeschnophlebia longistigma* Selys (Figs. 27-29) were discovered by the former study (Tomokuni & Saito, 2000), and they are still abundant in the Palace. *Rhyothemis fuliginosa* Selys (Fig. 41), which had also been very scarce in the urban Tokyo, was gradually increase its number from 2002-2004, and we were able to observe its outbreak in the summer of 2005." (Authors)] Address: Owada, M., Dept Zool., Natn. Sci. Mus., 3-23-1 Hyakunincho, Shinjuku-ku, Tokyo, 169-0073, Japan. E-mail: owada@kahaku.go.jp
- 6285.** Schneider, K. (2006): Hermann Burmeister (1807-1892). *Hallescher Gelehrter von Weltrang. Ent. Nachr. Ber.* 50: 248-253. (in German). [This is a concised compilation on vita and work of Hermann Burmeister from Halle, Germany, author of the "Handbuch der Entomologie", 1832, and also significantly engaged in Odonata.] Address: Schneider, Karla, Inst. Biol., Zool. Samml., Domplatz 4, D-06099 Halle (Saale), Germany. E-mail: karla.schneider@zoologie.uni-halle.de
- 6286.** Sears, J. (2006): Dragonfly conservation from the BDS. RSPB and Southern Damselfly *Coenagrion mercuriale* Conservation. *Atropos* 29: 70-71. [The author reports on activities to preserve populations of *C. mercuriale* in the UK by means of habitat management. The success of conservation efforts is monitored.] Address: not stated
- 6287.** Sinu, P.A.; Nasser, M.; Rajan, P.D. (2006): Feeding fauna and foraging habits of Tiger beetles found in agro-ecosystems in western Ghats, India. *Biotropica* 38(4): 500-507. (in English). ["Libellulidae" were found as natural enemies of *Cicindela* (*Calochroa*) *whithilli* (Hope) and *Cicindela* (*Calochroa*) *flavomaculata* Hope (*Cicindelidae*: *Coleoptera*).] Address: Sinu, P. A., Ashoka Trust for Research in Ecology and the Environment (ATREE), # 659, 5 A Main, Hebbal, Bangalore 24, India. E-mail: sinu@atree.org
- 6288.** Stoks, R.; McPeck, M.A. (2006): A tale of two diversifications: Reciprocal habitat shifts to fill ecological space along the pond permanence gradient. *The American Naturalist* 168: 50-72. (in English). ["The *Enallagma* and *Lestes* damselflies have both diversified and adapted over the past 1015 million years to the various ecological milieus found along the pond permanence gradient among North American ponds and lakes. Previous articles have explored this diversification process for *Enallagma*. In this article, we present a phylogenetic hypothesis for the North American *Lestes*, use this hypothesis to reconstruct *Lestes* diversification, and compare the diversification processes inferred for *Lestes* and *Enallagma*. The results of this study suggest that *Lestes* began in temporary ponds where large dragonflies are the top predators, while *Enallagma* began in permanent lakes where fish are the top predators. Starting from these different ancestral habitats, both genera have invaded and adapted to habitats already occupied by the other genus. Moreover, these adaptive habitat shifts involved substantial convergence on the behaviors used to deal with fish and dragonfly predation in both genera and a major life-history shift from diapausing to directly developing eggs in *Lestes*. However, in *Lestes* lineages invading fish lakes, swimming speed and morphology did not change to match those of *Enallagma* species, illustrating that reciprocal shifts between alternative selection regimes are not necessarily evolutionary opposites. Also, the greater sizes and growth rates of *Lestes* species compared to *Enallagma* species, which should impart substantial ecological advantages in competition between the genera, were shown to result from phylogenetic inheritance and not from adaptive diversification. This historical analysis of diversification raises new questions about the relationship between the macroevolutionary mechanisms driving lineage diversification and the ecological mechanisms structuring local food webs and regional species assemblages." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be
- 6289.** Takahara, T.; Kohmatsu, Y.; Maruyama, A.; Yamaoka, R. (2006): Specific behavioral responses of *Hyla japonica* tadpoles to chemical cues released by two predator species. *Current Herpetology* 25(2): 65-70. (in English). ["We experimentally examined the anti-predator behaviors of tadpoles of the Japanese tree frog, *Hyla japonica*, to chemical cues released by a cyprinid fish, *Gnathopogon elongatus elongatus*, and a dragonfly nymph, *Anax parthenope julius*. Tadpoles exposed to these chemical cues exhibited a similar reduction in activity level. In the presence of the fish chemical cues, however, the tadpoles spent more time in the bottom water layer compared to controls, but did not change their microhabitat choice in the presence of dragonfly nymph chemical cues. These findings suggest that tadpoles of *H. japonica* have predator-specific behaviors in response to chemical cues from different predators with differential foraging strategies." (Authors)]

Address: Takahara, T., Graduate School of Science and Technology, Kyoto Institute of Technology, Sakyo, Kyoto 606-8585, Japan. E-mail: taka02@kit.ac.jp

6290. Takemon, Y.; Yamamoto, A.; Nakashima, M.; Tanida, K.; Kishi, M.; Kato, M. (2006): Isolation of sperm vesicles from adult male mayflies and other insects to prepare high molecular weight genomic DNA samples. *Molecular Biology Reports*, Volume 33, Number 1: 65-70. (in English). ["We describe here a simple and efficient protocol for genomic DNA isolation from adult males of insects: e.g., Ephemeroptera, Odonata, Orthoptera and Dictyoptera. To minimize contamination of external DNA source, the sperm vesicles were isolated from male individuals from which high molecular weight genomic DNA was extracted. According to this protocol, the genomic DNA samples obtained were high quality (intact), and abundant enough for genotyping analyses and molecular cloning. The protocol reported here enables us to process a huge number of individuals at a time with escaping from cross-contamination, and thus it is quite useful for conducting genetic studies at least in some species of insects. The large yield of high molecular weight DNA from single individual may be advantageous for non PCR-based experiments. As a case study of the protocol, partial coding sequences of histone H3 and EF-1a genes are determined for some insects with PCR-amplified DNA fragments." (Authors) *Mnais costalis* *Pantala flavescens*] Address: Kata, M., Department of Biological Science, Osaka Prefecture University Graduate School of Science, Sakai 599-8531, Japan. E-mail: mkato@b.s.osakafu-u.ac.jp

6291. Taylor, P. (2006): Vagrant Emperor Anax (*Hemianax*) *ephippiger* (Burmeister, 1839) - a new breeding species for Bulgaria. *J. Br. Dragonfly Society* 22 (2): 64-68. (in English). ["In July 2004 the first British Dragonfly Society trip to Bulgaria took place, led by Dave Smallshire. The trip was hosted by Bulgarian dragonfly expert Milen Marinov and Stoyan Beshkov. On the last day, at the last site visited (a complex of river, streams and ponds near Novo Konopladi in the south-west of the country) I collected several exuviae, one of which was later identified as *Anax* (*Hemianax*) *ephippiger*. This represents the first proof of breeding for this species in Bulgaria. The history of *A. ephippiger*, with particular reference to Bulgaria, is discussed." (Author)] Address: Taylor, Pam, Decoy Farm, Decoy Road, Potter Heigham, Norfolk NR29 5LX, UK

6292. Thorne, A.D.; Pexton, J.J.; Dytham, C.; Mayhew, P.J. (2006): Small body size in an insect shifts development, prior to adult eclosion, towards early reproduction. *Proc. R. Soc. B* 273: 1099-1103. (in English). ["Life-history theory has suggested that individual body size can strongly affect the allocation of resources to reproduction and away from other traits such as survival. In many insects, adults eclose with a proportion of their potential lifetime egg production that is already mature (the ovigeny index). We establish for the solitary parasitoid wasp *Aphaereta genevensis* that the ovigeny index decreases with adult body size, despite both initial egg load and potential lifetime fecundity increasing with body size. This outcome is predicted by adaptive models and is the first unequivocal intraspecific demonstration. Evidence suggests that a high ovigeny index carries a cost of reduced longevity in insects. Our results therefore contribute to the emerging evidence that small body size can favour a developmental shift in

juveniles that favours early reproduction, but which has adverse late-life consequences. These findings are likely to have important implications for developmental biologists and population biologists." (Authors) The paper also refers to *Coenagrion puella*.] Address: Mayhew, P.J., Department of Biology (Area 18), University of York, PO Box 373, York YO10 5YW, UK. E-mail: pjm19@york.ac.uk

6293. Tsubaki, Y.; Tsuji, N. (2006): Dragonfly habitat maps based on landcover and habitat relation models. In: Rivera, AC (ED). 2006. *Forests and Dragonflies*. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. *Pensoft Series Faunistica* 61: (in English). ["We constructed dragonfly distributional models (logistic regression models) based on occurrence records collected in the national recording scheme of Japan. Such occurrence records have several shortcomings in that they only record what is present and not what is absent, and sampling efforts are highly variable among recording grid-squares (about 10x10 km). Moreover, the accuracy of logistic regression models is strongly influenced by the presence/absence prevalence. We developed two data screening methods to select 'reliable' species presence/absence data sets from presence-only species assemblage records: exclusion of grid-squares without enough survey efforts, and exclusion of grid-squares out of temperature range in each species. Then we tried to find out landcover-occurrence relationships within the temperature range based on logistic regression models. We obtained statistically significant models for 98 species among all dragonflies inhabiting the main four islands of Japan (128 species). Goodness-of-fit tests showed that some landcover types significantly affected the occurrence of each species. Area of broad-leaved forests within a grid-square (10x10 km) had positive effects on the occurrence of 57 species, indicating that at least 50% of dragonflies depend on forests. Our analysis also showed that landcover heterogeneity (Shannon-Wiener's H') had positive effects on the occurrence of most species (73 among 98 species). We showed three examples of habitat maps generated by the logistic model together with actual occurrence records. We discussed how the model performance might change in relevance to the data screenings we applied." (Authors)] Address: Tsubaki, Y., National Institute for Environmental Studies, Tsukuba, 305-8506 Japan

6294. Van Gossum, H.; Beatty, C.; Sherratt, T. (2006): The Zygoptera of Viti Levu and Vanua Levu, the two larger islands in the Fiji archipelago. *IDF-Report* 9: 1-14. (in English). ["In 2005 we started a study of the ecology and evolutionary history of damselflies of the genus *Nesobasis*, endemic to Fiji. In addition we made account of the species of Zygoptera present at our study sites, and made notes on the Anisoptera. In general, the odonate fauna of the Fiji archipelago is poorly studied. Here, we provide an historical overview of the knowledge on this fauna and give details of the species we encountered in August - September 2005. We made observations and collected voucher specimens for 2 species of the genus *Ischnura*, 2 of the genus *Agriocnemis*, 1 of the genus *Austrolestes*, 7 of the genus *Melanesobasis* and 25 of the genus *Nesobasis*. For *Melanesobasis* we also made account of an additional subspecies. Further, we discovered 2 species of damselfly new to science, 1 on Viti Levu and 1 on Vanua Levu, both belonging to the genus *Nesobasis*." (Au-

thors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6295. Van Swaay, C.A.M., Groenendijk, D. & Plate, C. (2006): Vlinders en libellen geteld. Jaarverslag 2005. Rapport VS2006.020, De Vlinderstichting, Wageningen.: 31 pp. (in Dutch). [Monitoring butterflies and dragonflies in the Netherlands in 2005 De Vlinderstichting (Dutch Butterfly Conservation) and CBS (Statistics Netherlands) coordinate the monitoring schemes for butterflies and dragonflies in the Netherlands. The butterfly scheme started in 1990, the dragonfly scheme in 1997. Method: Butterflies and dragonflies are counted using a line-transect method. Butterfly transects are visited every week, dragonfly transects once every fortnight. The length of the transects is variable and depends on habitat quality and availability. In addition, single species transects are exclusively counted for a specific threatened butterfly or dragonfly. Indices were calculated using the computer program TRIM (Trends and Indices for Monitoring Schemes). This program was developed by CBS for the analysis of time series of counts with missing observations. The butterfly indices are calculated using a weighting procedure and 1992 is now used as the first year in the trend calculation and set to a reference value of 100. The dragonfly indices are not weighted yet and 1999 is used as the first year in the trend calculation and, therefore, set to a reference value of 100. Results of 2005: [...] Again, also in 2005 dragonflies were counted every fortnight between May and September at 328 sites (figure 5). The average number of dragonflies per transect was a bit higher than in most previous years (table 2; figure 10). Like in most other years *Enallagma cyathigerum* was the most common species (over 70,000 individuals). *Ischnura elegans*, with nearly 20,000 individuals, was the most widespread species. It was seen on about 90% of the plots (table 2). For some species indices are presented (chapter 8). Again, an alarming decreasing trend was detected for *Aeshna viridis* and *Coenagrion hastulatum*. Another Red List species, *Calopteryx virgo*, still shows a positive trend. Scientific names and the Dutch vernacular names for all dragonfly species are given in chapter 10." (Authors)] Address: De Vlinderstichting, Postbus 506, 6700 AM Wageningen, Niederlande. Email: info@vlinderstichting.nl

6296. Wahizatul-Afzan, A.; Julia, J.; Amirrudun, A. (2006): Diversity and distribution of dragonflies (Insecta: Odonata) in Sekayu Recreational Forest, Terengganu. *Journal of Sustainability Science and Management* 1(2): 97-106. (in English). ["A rich collection of 593 individuals belonging to 44 species from 11 families of Odonata were successfully identified at Sekayu Recreational Forest, Terengganu from September until December 2005. Zygopterans (393 individuals) were found to be more abundant than anisopterans (200 individuals). However, Libellulidae (suborder Anisoptera) made up the most dominant family collected with 31.9% of total individuals recorded. *Euphaea ochracea* and *Rhincocypha limbata* were found to be the most abundant species recorded in this study. More individuals were collected from middle stream (MS) of Sungai Sekayu followed by lower stream (LS) and upper stream (US). However, ANOVA does not show significant difference among the individuals represented at each study sites as all the study areas consist of similar microhabitats."

(Authors)] Address: Wahizatul-Afzan, A., Department of Biological Science, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu D. I. Malaysia

6297. Ward, L.; Mill, P.J. (2006): Diel activity patterns in the adult Banded Demoiselle, *Calopteryx splendens* (Harris), and the effect of weather variables. *J. Br. Dragonfly Society* 22(2): 58-63. (in English). ["Diel activity patterns of the territorial zygopteran *C. splendens* were studied in a well-established breeding population on the River Wharfe in northeast England. The effect of weather on the activity of the species was investigated. A bimodal activity curve was observed in both males and females, albeit rather more pronounced in the males. Male activity was largely influenced by reproductive behaviour, more specifically territory selection and defence, with short feeding flights within the immediate vicinity of the perch. Conversely, the activity patterns of the females incorporated more defined periods of foraging activity, quite distinct from periods of reproductive activity. The activity of the species significantly increased with increase in ambient air temperature and solar energy, whereas a significant negative relationship was found between the number of *C. splendens* in flight and increase in cloud cover, rainfall and wind speed. The observed activity patterns are discussed with reference to maximum profitability of specific activities, the physical condition of an individual and the recorded weather variables. There are implications for the long-term reproductive success of individuals where weather conditions suppress activity." (Authors)] Address: Mill, P.J., Fac. Biol. Sciences, University of Leeds, Leeds, West Yorkshire LS2 9JT, UK. E-mail: p.j.mill@leeds.ac.uk

6298. Westermann, K.; Westermann, E. (2006): Zum Status der Blauen Federlibelle (*Platycnemis pennipes*) im höheren Schwarzwald. *Naturschutz am südlichen Oberrhein* 4(2): 229-234. (in German, with English summary). [Baden-Württemberg, Germany; "In the higher elevations of the Black Forest, there exists an autochthonous population of *P. pennipes*, which consists of at least three large subpopulations that have been discovered so far: near Hinterzarten at 880 m a.s.l., near Titisee at 859 m a.s.l. and near Lenzkirch at 832 m a.s.l. Most waters of the southern and central Black Forest at elevations above 800 m a.s.l. are not colonized by the species. From the Upper Hotzenwald and the southeastern Black Forest, no records of the species have come to our notice." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6299. Westermann, K. (2006): Auswirkungen des winterlichen Abbaus von drei Teichen des höheren Schwarzwaldes auf Libellenbestände und Makrophyten. *Naturschutz am südlichen Oberrhein* 4(2): 219-226. (in German, with English summary). [Baden-Württemberg, Germany; "In three ponds of the southern and southeastern Black Forest, the effects of partial or complete winter water discharge on the dragonfly and aquatic plant populations were studied. The fact that many species cannot tolerate regular annual discharge was confirmed. The ecological function of the nature reserve "Schluchtsee" is profoundly disturbed by the partial winter discharge, which has been conducted for several years." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

6300. White, D. (2006): The Keeled Skimmer *Orthetrum coerulescens* (Fabricius) at Holt Lowes, Norfolk: History and habitat use. *J. Br. Dragonfly Society* 22(1): 1-12. (in English). [The paper presents detailed results of a mark-recapture study on *O. coerulescens*, outlining flight season, fate of marked males, maturation period, non-reproductive adults, territoriality of males, size of territory, and habitat characters. Suggestions of conservation suitable habitats for the species are also outlined.] Address: White, D., 48 Caernarvon Road, Norwich, Norfolk NR2 3HX, UK

6301. Yanoviak, S.P.; Lounibos, L.P., Weaver, S.C. (2006): Land use affects macroinvertebrate community composition in phytotelmata in the Peruvian Amazon. 1172: 1181. (in English, with Spanish summary). ["Patches of forest in the western Amazon often are converted to small-scale subsistence plantations (chacras), which become early successional forest (purma) when abandoned. Differences in abiotic conditions and phytotelm characteristics among chacras, purmas, and adjacent forest likely influence the distribution of phytotelm colonists. We sampled the contents of natural water-filled tree holes in the three habitat types and quantified differences in the abundance, species richness and composition of their macroinvertebrate communities. We additionally placed experimental tree-hole analogs (water-filled bamboo [*Guadua* sp.] internodes) in each of the habitat types and sampled their macroinvertebrate communities over 110 d. The species composition of macroinvertebrates in both tree holes and bamboo sections differed among habitats. Larvae of damselflies and crane flies, both important predators of mosquitoes, were replaced by larvae of the predatory mosquito *Toxorhynchites* spp. in chacras. Several mosquito species were relatively more abundant in chacra habitat. Macroinvertebrate abundance and species richness were correlated with water volume in tree holes and varied over time in bamboo sections. Species richness in bamboo did not differ among the three focal habitat types, but forest tree holes contained more species than tree holes in chacras. Differences in species composition between the two types of phytotelmata largely were attributed to the short duration of the bamboo experiment." (Authors)] Address: Yanoviak, S.P., Center for Biodefense and Emerging Infectious Diseases, University of Texas Medical Branch, 301 University Blvd., Galveston, TX 77555. USA.

6302. Yu, X.; Bu, W. (2006): A study on Odonata from Tianjin. *Acta scientiarum Naturalium Universitas Nankaiensis* 39(4): 83-90. (in Chinese, with English summary). [Records of 30 species resulting from 17 localities in Tianjin, China are documented. The study includes more recent studies and museum specimens.] Address: Yu, X., Inst. Entomol., Nankai Univ., Tianjin 300071, China

6303. Zawal A., Dyatlova E.S. (2006): Preliminary data for parasitizing on *Ischnura elegans* (Vander Linden, 1820) (Odonata, Coenagrionidae) by *Arrenurus* (Acari: Hydrachnidia) larvae from Odessa province (southwestern Ukraine). II International Symposium of Ecologists of Montenegro – Proceedings of the Symposium : 17-20. (in English). ["Of 256 specimens (160 males and 96 females) of *Ischnura elegans* from the Odessa province, 37 specimens were found with two parasitic water mite species: *Arrenurus claviger* and *A. papillator*. The prevalence (7.4%) and the intensity of infestation (1-6)

was smaller than in *Ischnura elegans* collected in Poland. The parasites preferred the metathorax and mesothorax of their hosts. In Odessa, the largest number of parasiting larvae were collected in September, later than in Poland [...]" (Authors)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

6304. Zhang, D.; Yang G.; Zheng, Z. (2006): Phylogenetic relationship of some species of Libellulinae inferred from sequences of mitochondrial cytochrome b gene (Odonata: Libellulidae). *Journal of Ningxia University (Natural Science Edition)* 27(3): 255-259. (in Chinese, with English summary). ["Partial nucleotide sequences of mitochondrial DNA cytochrome b gene from 7 species of 3 genera of Libellulinae in China were amplified by PCR and directly sequenced by silver-staining sequencing technique. The sequences were parts of Cyt b gene of mtDNA (576 base pairs in length), and in the obtained sequences, the average of A + T was about 70.2%. From every amino acid codon, the average of A + T in the third site was higher (85.4%) than the other two sites. The sequence data revealed considerable variation in 180 nucleotide sites (about 31.25%) among the analyzed individuals from 3 genera, *Orthetrum*, *Lyriothemis* and *Libellula*. We obtained homologous nuclear sequence of *Mnais maclachlani* for outgroup. The phylogenetic trees were constructed with neighbour-joining method, maximum parsimony method and Bayesian inference. The confidence of nodes in the trees was evaluated by 1 000 replicates bootstrap. The phylogenetic relationship of mitochondrial DNA suggested that *Orthetrum* was more evolutionary than *Lyriothemis* and *Libellula*. The phylogenetic relationships of the 3 genera was *Libellula* -> *Lyriothemis* -> *Orthetrum*." (Authors)] Address: Zhang, Dazhi, School of Life Science, Ningxia University, Yinchuan 750021, China

6305. Zhang, D.-z.; Dai, J.-x.; Zheng, Z.-m. (2006): Phylogeny of Libellulidae based on mitochondrial cytochrome b nucleotide sequences (Odonata: Anisoptera). *Sichuan Journal of zoology* 25(4): 695-699. (in Chinese, with English summary). ["In this study, fragments of mitochondrial DNA cytochrome b gene (each 576 base pairs in length) have been characterized from twenty individuals belong to 9 species from 6 genera of Libellulidae in China. These sequences were parts of Cyt b gene of mtDNA, and in the obtained sequences, A % + T % was about 69.12 %. From every amino acid codon, A % + T % in the third site was higher (86.15 %) than the other two sites. The sequence data revealed considerable variation in 216 nucleotide sites (about 37.15 %) among the analyzed individuals from 6 genera. We obtained homologous nuclear sequence of *Megalestes m aai* (damselfly) for outgroup. The phylogenetic trees were constructed with neighbour-joining method, maximum likelihood method and maximum parsimony method. The confidence of nodes in the trees was evaluated by 1000 replicates bootstrap. The phylogenetic relationship of mitochondrial DNA suggested that the Libellulidae was a monophyletic group. *Orthetrum* was more evolutionary than other genera. The phylogenetic relationships of the 6 genera was : *Pantala* and *Sympetrum* -> *Lyriothemis* -> *Acisoma* and *Crocothemis* -> *Orthetrum*." (Authors)] Address: Zhang, Dazhi, School of Life Science, Ningxia University, Yinchuan 750021, China

6306. Abbott, J.C. (Ed.) (2007): Dragonflies and Damselflies (Odonata) of Texas. Vol. 2. ISBN 978-0-6151-4063-6: 311 pp. (in English). [The book is a reference to the 223 species of odonates distributed in Texas, USA. Included in Volume 2 are updated and detailed species distribution and seasonality accounts arranged so that users can search by scientific name, county name, or flight season. A variety of articles are also included on the natural history, collection and preservation, and diversity of Texas odonates. Lasley, G.W.: Digital odonate photography: My personal techniques ■ Behrstock, R.A., Rose, J.S. Abbott, J.C.: First Texas record and second U.S. occurrence of the Pale-green Darner, *Triacanthagyna septima* (Selys in Sagra, 1857) (Odonata: Aeshnidae) ■ Thomas, B.: Williamson County Gold: Chandler Creek ■ Matthews, J.: What do we know about dragonfly migration on the Texas coast? ■ Hatfield, I.: The dragonflies and damselflies of the Llano Estacado: In search of new species records on the Panhandle South Plains ■ Schappert, P.: New Odonata for Bastrop County and the Stengl "Lost Pines" Biological Station ■ Statistical Summary of Odonata in Texas ■ Abundance & Distribution of Texas Odonata, J.C. Abbott ■ Diversity of Texas Odonata by County ■ Checklist of Dragonflies & Damselflies of Texas, J.C. Abbott ■ Seasonality of Odonata in Texas, J.C. Abbott ■ Dragonflies & Damselflies of Texas Listed by County; Distribution Maps of Texas Odonata ■ Appendix: Collection Guidelines for the Odonata Survey of Texas, J.C. Abbott ■ The Dragonfly Society of the Americas Guidelines for Collecting; Specific Collecting & Preservation Instructions, J.C. Abbott ■ Guidelines for Field Notes & Data Recording, J.C. Abbott ■ Odonata Field Guides, Resources, Societies, & Suppliers ■ Glossary of Terms Relating to Odonata, J.C. Abbott ■ Index to Maps] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

6307. Baker, R.L.; McGuffin, M.A. (2007): Technique and observer presence affect reporting of behavior of damselfly larvae. *Journal of the North American Benthological Society* 26(1): 145-151. (in English). ["We experimentally tested for systematic biases in techniques commonly used to study behavior of larval aquatic insects. We determined whether larval Zygoptera responded to the presence of an observer and whether live observation missed some behaviors. We found significant differences between behaviors recorded during live observations and behaviors videotaped in the absence of an observer. All behaviors, except Rotate, were exhibited less frequently in the presence of an observer. These results suggest that larvae respond to the presence of observers as if they were predators. Live observation also missed some behaviors. The duration of Crawl Forward, which can be very subtle, and the frequency of Rotate, which can be very rapid and is easily missed, were greater when recorded from the videotape than by a live observer. Wherever possible, use of video recording systems is preferable over reliance on live observations." (Authors)] Address: Baker, R.L., Dept Zoo], Erindale Coll., Univ. Toronto, Mississauga, ON, L6L 2C6. Canada. e-mail: rbaker@credit.erin.utoronto.ca

6308. Baptista, D.F.; Buss, D.F.; Egler, M.; Giovanelli, A.; Silveira, M.P.; Nessimian, J.L. (2007): A multimetric index based on benthic macroinvertebrates for evaluation of Atlantic Forest streams at Rio de Janeiro State, Brazil. *Hydrobiologia* 575: 83-94. (in English). ["This study describes the application of a protocol for biological assessment of water quality at first to third order streams at Serra dos Órgãos, an area covered by Atlantic Forest in Rio de Janeiro State, Brazil. Major impacts in the region are domestic effluents and deforestation. Our main objective is to establish biocriteria for the establishment of the Serra dos Órgãos Multimetric Index (SOMI) based on benthic macroinvertebrates. We used data from previous studies, sampled by experienced biologists, from 1999 through 2002. The benthic macroinvertebrate community was sampled in 12 reference sites and seven impaired sites in three river basins: Guapimirim, Macaé and Grande, all from the same bioregion. From the 22 tested metrics, 6 were included in the SOMI (% Diptera, % Coleoptera, Family Taxa, EPT Taxa, BMWP-CETEC and % Shredders). Scores (5, 3 or 1) were developed for these metrics to allow for aggregation into the index. Seven intermediately impaired sites were used for evaluating the applicability of the multimetric index. We concluded that the SOMI is a robust easy-to-apply tool for biomonitoring programs in the Serra dos Órgãos region, south-east Brazil." (Authors) Odonata are included into the study at several parts.] Address: D. F. Baptista, D.F., Laboratório de Avaliação e Promoção da Saúde, Ambiental – FIOCRUZ/IOC, Av. Brasil, 4365, Manguinhos, Rio de Janeiro, RJ, Brasil. E-mail: darcilio@ioc.fiocruz.br

6309. Barta, D. (2007): Discovering the dragonfly wealth of Kerala - the God's own land - in South India: a travelogue. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 363-366. (in English). [Brief narrative report on a trip through Kerala, India in December 2004 aiming to photograph Odonata.] Address: Barta, D., Havanska 8, Prague -7, 170 00, Czech Republic. E-mail: dnlbrt@seznam.cz

6310. Beattie, R. (2007): The geological setting and palaeoenvironmental and palaeoecological reconstructions of the Upper Permian insect beds at Belmont, New South Wales, Australia. *African Invertebrates* 48 (1): 41-57. (in English). ["The entomofauna of the Tatarian insect beds within the Newcastle Coal Measures at Belmont, north of Sydney, was described many years ago. A new collection contains some undescribed species, particularly beetles; a new exposure of the fossiliferous deposits is now documented. The Newcastle Coal Measures consist of sandstones, conglomerates, shales, coal and tuffs, which were deposited in the Hunter Trough. The depositional environment consisted of a series of very shallow, stagnant freshwater pools along a gravel river channel system within a regional coal swamp. A volcanic event produced a volcanic ash dump, causing a "snapshot" kill of insects, validating possible interpretation of percentages of insect fossils in ecological modelling. The pool community included Conchostraca, Permosyne beetles and extremely rare insect larvae. A community on swamp banks adjacent to the water courses was comprised of Glossopteris-dominated flora and Phyllothea, with an insect-dominated, first-level consumer community of phloem-feeding Hemiptera and possibly pollenivorous Mecoptera. A leaf-litter and bark-dwelling community included Pro-

telytroptera, Psocoptera and archostematan Coleoptera. Neuroptera, extremely rare Trichoptera, and ancestors of the Orthoptera were also present in small numbers. Adult Neuroptera fossils suggest the presence of their predatory larvae and this group, along with the Odonata, are considered to have been the predatory components within this environment. No chelicerates, tetrapods or other potential top predators have been found in this, or proximal, facies. Disruptive colour patterns in some of the insects may indicate predator-prey relationships. Of interest also is the identification of a number of Glossopteris leaves with chewed margins. If these observations are correct, they would represent one of the earliest records of this kind of ichnofossil in Australia." (Author)] Address: Beattie, R., Dept of Earth & Marine Sciences, The Australian National University, Canberra, ACT 0200 Australia, P.O. Box 320, Berry, NSW 2535 Australia. E-mail: Robert.beattie@anu.edu.au

6311. Beckemeyer, R.J.; Hall, J.D. (2007): The entomofauna of the Lower Permian fossil insect beds of Kansas and Oklahoma, USA. *African Invertebrates* 48(1): 23-39. (in English). ["The Lower Permian Wellington Formation fossil beds of mid-continent North America are known best for the famous Elmo, Kansas locality. The Elmo site has produced tens of thousands of specimens from which more than 150 species of insects have been described. Equally productive and more widespread geographically, but less well-known, are the Midco, Oklahoma beds located some 270 km south of Elmo. The Midco beds have also yielded tens of thousands of specimens, but the material has been less well studied, and only half as many species have been identified from there. Renewed attention has been given in recent years to both the geology and palaeontology of the Wellington Formation. The history of these insect beds is recounted and the insect faunal composition is briefly reviewed. There are nearly 200 species in 106 genera, 53 families and 21 orders. Sizes (as measured by mean forewing length) range from 1.9 mm to 330 mm, with a mean of 22 mm and a median of 12 mm. Ten of 13 species with fore wings greater than 50 mm in length are Protodonata. Most species are known from one or a few specimens (abundance ranges from 1 to just under 400 specimens per species). Of ten species for which 50 or more specimens are known, eight are Grylloblattida (and six of these Grylloblattida: Lemmatophorina), indicating that these taxa were either quite abundant or were preferentially preserved, or both. When reviewing the holotype/neotype specimens used to describe the Wellington Formation species, we find that 62% consist of fore wings, while 9% are complete specimens. However, when considering all known specimens, 48% of the species are known only by their fore wings, while 13% are now represented by complete specimens, indicating the importance of continued collecting and review of Wellington Formation insect fossils." (Authors)] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

6312. Beukema, J. (2007): Are the observed dispersal capacities in damselfly species sufficient to cope with the ongoing rapid shift of climate zones?. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 175-182. (in English). ["To keep up with present polewards shifts in climate zones, species have

to expand their distribution areas in polewards direction with an average speed of several kilometers per year. Therefore, their dispersal capacities and the use they make of these deserve special interest. Both results of mark-recapture studies as well as records of the time course of colonization of new water bodies would point to remarkably small proportions of populations of Zygopteran species actually moving over such distances within a flying season. Reasons are given why these observations may underestimate true dispersal capacities. Records of range shifts reveal that most Odonate species appear to be able to the present speed of polewards climate shift." (Author)] Address: Beukema, J., Royal Netherlands Institute for Sea Research, P. O. Box 59, 1790AB Den Burg, Texel, The Netherlands. E-mail: janb@nioz.nl

6313. Blaustein, L.; Chase, J. (2007): Interactions between mosquito larvae and species that share the same trophic level. *Annual Review of Entomology* 52: 489-507. (in English). [Ecological theory predicts, and empirical research shows, that species sharing the same trophic level as a target species (hereafter controphic species) can have large direct and indirect effects on the target species by sharing resources and/or by serving as alternative prey to predators. Yet, the roles of controphic species of mosquito larvae in affecting mosquito populations have received little attention. Published empirical evidence, although scarce, suggests that controphic species such as zooplankton and anuran larvae compete with mosquito larvae, can positively affect mosquito larvae by consuming bacteria that are pathogenic to mosquito larvae, reduce predation on mosquito larvae by serving as alternative prey, and ultimately cause increased predation on mosquito larvae by causing a numerical response in the predator. We conclude that more extensive theoretical and empirical studies in elucidating the roles of controphic species will better allow us to predict mosquito population dynamics and allow for better management of mosquitoes." (Author) The review includes data on Odonata.] Address: Blaustein, L., Community Ecology Laboratory, Institute of Evolution, Faculty of Sciences, University of Haifa, Haifa 31905, Israel. E-mail: leon@research.haifa.ac.il

6314. Boano, G.; Sindaco, R.; Riservato, E.; Fasano, S.; Barbero, R. (2007): *Atlante degli odonati del Piemonte e della Valle d'Aosta*. Memorie della Associazione Naturalistica Piemontese 6: 160 pp. (in Italian, with English summary). [Italy; "Atlas of the Odonata of Piedmont and Valle d'Aosta. Based on an exhaustive review of the literature, the study of several local entomological collections, and extensive unpublished data, we have written an atlas of the Odonata of Piedmont and Valle d'Aosta which presents up-to-date information on the geographic (using a 10km UTM grid) and altitudinal distribution, ecological preferences, and phenology of these insects in the two regions in question. We have analysed and mapped over 6200 records, of which about 2000 were already published in approximately fifty different sources, while the remaining 4200 (87.5%) were unpublished; these were for the most part gathered by the authors over the last 15 years. Bibliographical data is quite scattered: only 6 publications contain more than 50 records, and of these only 3 were published after Capra and Galletti's (1978) fundamental reference work. We confirmed the presence of 63 species (72 % of the national total), all of which have been recorded in the last 15 years except for Erythromma na-

jas. We report the first records of *Coenagrion coerulescens* for the well-investigated region of Piedmont, along with 14 new records for Valle d'Aosta: *Calopteryx splendens*, *Ischnura pumilio*, *Erythromma lindenii*, *Coenagrion tenellum*, *Aeshna mixta*, *Anax parthenope*, *Cordulia aenea*, *Libellula depressa*, *Orthetrum cancellatum*, *Crocothemys erythraea*, *Sympetrum fonscolombii*, *S. sanguineum*, *S. striolatum* and *S. vulgatum*. The rarest species (< 10 UTM squares) are (in parenthesis we indicate the ratio of total UTM squares / post-1990 UTM squares): *Erythromma najas* (1/0), *Coenagrion caerulescens* (2/2), *Leucorrhinia dubia* (3/3), *Sympetrum flavolum* (4/2), *Brachytron pratense* (4/1), *Somatochlora meridionalis* (5/3), *Aeshna grandis* (4/4), *Sympetrum vulgatum* (5/2), *Coenagrion mercuriale* (5/5), *Gomphus flavipes* (8/6), *Sympecma paedisca* (8/1), *Somatochlora alpestris* (9/9), *Oxygastra curtisii* (10/6), *Onychogomphus uncatatus* (9/9). Given the importance of protecting suitable habitats for the conservation of Odonates, we have felt it useful to provide an overview of the knowledge related to the Odonates present in Sites of Community Interest and in the protected areas of Piedmont and Valle d'Aosta." (Authors)] Address: Riservato, Elisa, Dipartimento di Biologia Animale, Università di Pavia, Piazza Botta 9, 27100 Pavia, Italy. E-mail: elisa.riservato@unipv.it

6315. Bogliani, G.; Hardersen, S.; Riservato E. (ed.) (2007): Riassunti delle comunicazioni presentate al "Convegno: Le libellule in Italia. Recherche e conservazione". Cascina Picchetta, Cameri. 11 e 11 febbraio 2007: 25 pp. [Abstracts of the meeting "Dragonflies in Italy. Research and conservation" held on February 11 and 11, 2007 in Cascina Picchetta, Cameri, Italy: Saluti delle autorità; Bogliani, G., Hardersen, S., Riservato, E. (Organizzatori); Saluti e obiettivi del convegno; Panella, M.: Il monitoraggio di habitat e specie nelle aree protette gestite dal Corpo Forestale dello Stato) ■ Balestrazzi, E.: Tributo a E. Bucciarelli ■ Utzeri, C.: L'odonatologia italiana: breve storia, situazione e prospettive ■ Ott, J.: Odonati e odonatologia in Germania ■ Kalkmann, V.: The European Atlas Project ■ Boano, G., Fasano, S., Riservato E., Sindaco, R.: Gli Odonati del Piemonte e della Valle d'Aosta: lo stato dell'arte ■ Balestrazzi, E., Pavesi, M.: Gli Odonati in Lombardia ■ Caroioli, M., Maiolini, B.: Odonati in Trentino ■ Festi A.: Gruppo studi odonatologici LIBELLA: storia, esperienze e risultati di 3 anni d'attività in Provincia di Bolzano ■ Terzani, F., Carletti, B.: Lo stato attuale delle conoscenze odonatologiche in Toscana ■ Hardersen, S.: Attuali conoscenze sulle libellule della Direttiva Habitat - Proposta per una collaborazione ■ Maddalena, T., Mattei-Roesli, M., Patocch, N., Pierallini, R.: La protezione degli Odonati nel Cantone Ticino (Svizzera): scelta delle specie prioritarie e elaborazione di programmi d'azione specifici ■ Riservato, E.: Ecologia degli Odonati del Parco Regionale della Valle del Ticino ■ Bogliani, G., Garavaglia, R.: Evoluzione e fenologia della comunità odonatologica in un ambiente ripristinato; APERITIVO E CENA: Con presentazione: Foto (Peèls, F.) e Filmati (Rore, M.) ■ Salamun, A., Bedjanic, M.: *Cordulegaster heros* Theischinger 1979, specie nuova per la fauna d'Italia; Carchini, G.: Colonizzazione di uno stagno per acquacoltura da parte degli Odonati ■ Fabbri, R.: Modificazioni nella comunità odonatologica nell'oasi di Punte Albere, Parco del Delta del Po ■ Di Già, I.: Risultati del monitoraggio degli odonati e dei culicidi adulti (check-list delle specie) in due zone umide della Provincia di Cuneo (Oasi di Crava Morozzo e Oasi La Madonnina) - anno

2006 ■ Ferri, V., Soccini, C.: La comunità di Odonati presenti nella Riserva naturale Monticchie di Somaglia: quindici anni di monitoraggio e di iniziative di conservazione (Lombardia, provincia di Lodi) ■ Macagno, A.L.M.: Demografia di *Libellula fulva* nel Parco fluviale del Po - Tratto Torinese ■ Buchwald, R.: Le relazioni fra libellule e vegetazione - esempi di ricerche biocenologiche ■ Hardersen, S.: Telemetria di Libellule neofarfallate (Odonata: Anisoptera) ■ Terzani, F., Zinetti, F.: Odonati raccolti in alcune aree protette della provincia di Arezzo (Toscana) ■ Riservato, E.: Le libellule in Provincia di Novara. For details see: <http://www.odonata.it/pages/Abstract.pdf>

6316. Bots, J.; De Bruyn, L.; Adriaens, T.; Dumont, H.; Stoks, R.; Van Gossum, H. (2007): Seasonal and diurnal variation in the proportions of female morphs of the damselfly *Enallagma cyathigerum*. *Animal Biology* 57(2): 217-230. (in English). ["In many damselfly species a female-limited colour polymorphism is encountered which is assumed to be the result of sexual conflict. Typically, one morph resembles the male's body colouration (andromorph), while the other is dissimilar (heteromorph). Little is known about the extent of temporal variation in female morph proportions at the water where mating occurs. Knowledge about such variation should help to identify the factors that affect female morph proportion and the scales at which these factors operate. The objective of this study is to assess the occurrence of diurnal and seasonal variation in female morph proportions at the water for the damselfly *Enallagma cyathigerum*. Diurnal variation was evaluated at six nearby populations, while seasonal variation was examined at one of these populations. Furthermore, we considered temporal variation in female morph proportion in relation to proxies of male harassment (i.e., male density and operational sex ratio). Our findings indicate that female morph proportion varies throughout a day but is uniform on a seasonal scale. Variation in female morph proportions could not be explained by concomitant variation in male density or operational sex ratio. We suggest future study of male mate choice may consider temporal variation in female morph proportions at the water." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

6317. Brockhaus, T.; Butler, S.G.; Kemp, R.G.; Vick, G.S. (2007): The dragonfly fauna of the Shivapuri Hills, Nepal (Odonata: zygoptera, Anisozygoptera, anisoptera). In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 63-72. (in English, with German summary). [26 species of Odonata are placed on record from the Shivapuri mountains, Kathmandu, Nepal, nine of them are briefly discussed with notes on habitats.] Address: Brockhaus, T., An der Morgensterne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

6318. Buczyńska, E.; Buczyński, P.; Lechowski, L. (2007): Selected aquatic insects (Odonata, Heteroptera, Coleoptera, Trichoptera) of Narwiański National Park - results of preliminary studies. *Parki nar. Rez. Przyr.* 26(1): 25-40. (in Polish, with English summary). [Poland; in July 2002, 172 aquatic insect species were recorded, among them 36 Odonata species. Drought is discussed as a factor responsible for reduced regional

species diversity and abundance in 2002.] Address: Buczynski, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

6319. Buczyński, P.; Ciechanowski, M.; Kowalczyk, J.K.; Kukwa, M. (2007): Walory przyrodnicze projektowanego rezerwatu „Torfowiska źródłkowe nad Jeziorom Jaczno”. – [Nature values of the projected nature reserve „Spring peat bogs at the Lake Jaczno”]. In: W. Fałtynowicz, M. Rant-Tanajewska, T. Świerubska (Eds), Kraina Hańczy. XXXV lat Suwalskiego Parku Krajobrazowego. Materiały konferencyjne „Parki krajobrazowe w krajowym systemie ochrony obszarowej” (Szczegół 28-29 września 2006). Stowarzyszenie Miłośników Suwalskiego Parku Krajobrazowego, Malesowizna-Turtul: 41-48. (in Polish). [For odonatological details of the paper see OAS 2357.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pbuczyns@biotop.umcs.lublin.pl

6320. Buden, D.W.; Paulson, D.R. (2007): Odonata of Yap, Western Caroline Islands, Micronesia. Pacific Science 61(2): 267-277. (in English). [“Fifteen species of Odonata are recorded from Yap, Micronesia—two Zygoptera and 13 Anisoptera. None is endemic to Yap. *Hemicordulia lulico* occurs elsewhere only in Palau, whereas most of the other species are widespread in the western Pacific and Indo-Australian regions. *Macrodiplox cora* and *Tramea loewi*, both recorded by Lief-tinck in 1962, were the only species not encountered during this study; *Tramea loewi* remains known in Micronesia only from a single male collected in Yap by R. J. Goss in 1950. Six of the breeding species in Yap that are widespread in Indo-Australia occur no farther east in the Caroline Islands except possibly as unusual extralimital records in the cases of *Agriocnemis femina* and *Neurothemis terminata*; the four other species reaching only as far east as Yap are *Anaciaeschna jaspidea*, *Agrionoptera insignis*, *Orthetrum serapia*, and *Rhyothemis phyllis*. *Orthetrum serapia* is reported from Micronesia for the first time, although a very old single specimen record of *O. sabina* from Tobi Island may possibly pertain to *O. serapia*. The odonate fauna of the outer islands of Yap State is poorly known; only six species have been recorded from among four of the 15 island groups. In addition, *Tramea transmarina euryale* rather than *T. t. propinqua* was found to be the subspecies occurring in the Chuuk Islands, contrary to earlier publications.” (Authors)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

6321. Cannings, R.A.; Ramsay, L.R.; Cannings, S.G. (2007): Odonata inventories in British Columbia, Canada: determining the conservation status of odonata species. In: Tyagi, B.K. (Ed.): Odonata : Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 137-151. (in English). [“The Order Odonata in British Columbia, Canada, is reasonably well known but, before 1996, systematic inventories were confined to small areas or even single localities. From 1996 to 2006, concentrated surveys were conducted annually throughout much of the province. The main goals of these surveys were to determine the status and habitat needs of Odonata, with an emphasis on the species considered to be at risk; to increase public awareness of dragonflies, their ecology

and conservation; and to encourage interest in dragonfly monitoring and research in the various regions. Each year, public lectures about dragonflies were given in local communities around the province and volunteer collectors from these places participated in the project. To demonstrate how such inventory provides information for assigning conservation status ranks to dragonfly species, the changes in these ranks over a nine-year period were examined. Preliminary conservation status ranks were assigned to British Columbia's Odonata species in 1993. Subsequently, inventory efforts focused on those species considered rare or at risk in order to determine more accurately their status and habitat requirements. During these surveys, the geographical distributions of many species were expanded, our knowledge of habitat preferences increased and five species were added to the provincial list. Many of the targeted species were found to be more abundant than previously thought and their conservation ranks were changed accordingly. Others were recorded only rarely or not at all. Accurately ranking poorly known species is challenging, particularly if samples are small or if much of their range is inaccessible. By increasing our knowledge of these dragonflies and their habitats, we can assign species ranks more with more confidence, thus ensuring that conservation efforts will target the species and habitats that truly require them.” (Authors)] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca

6322. Cannings, R.A. (2007): Book review: Garrison, R.W., von Ellenrieder, N. & J.A. Louton (2006): Dragonfly Genera of the New World. An Illustrated and Annotated Key to the Anisoptera. Johns Hopkins Univ. Press, Baltimore, MD. xi+368 ppp. Hardback, ISBN 0-8018-8446-2, \$99.00. Florida Entomologist 90(1): 270-271. (in English). [Extensive book review.] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street, Victoria, BC, Canada V8W 9W2

6323. Carballa, O.L.; Giere, S.; Cordero, A.; Hadrys, H. (2007): Isolation and characterization of microsatellite loci to study parthenogenesis in the citrine forktail, *Ischnura hastata* (Odonata: Coenagrionidae). Molecular Ecology Notes (OnlineEarly Articles). : (in English). [“The citrine forktail, *Ischnura hastata*, is an American damselfly species, widely distributed, with only-female populations also found at the Azores islands. Here we report the development of nine microsatellite loci for this species. The number of alleles per locus ranged from six to 11, with an observed heterozygosity ranging from 0.245 to 0.737. Eight of the nine loci successfully amplified in a sample of parthenogenetic females from the Azores. The developed microsatellite system will be a useful tool to investigate population structure, as well as the number of clones, the type of parthenogenesis and the origin of the parthenogenetic populations of this species.” (Authors)] Address: Carballa, Olalla Lorenzo, Evolutionary Ecology Group, Department of Ecology and Animal Biology, Universidad de Vigo, EUIT Forestal, Campus Universitario, 36005, Pontevedra, Spain. E-mail: olalla.lorenzo@uvigo.es

6324. Chang, X.; Zhai, B.; Liu, X.; Wang, M. (2007): Effects of temperature stress and pesticide exposure on fluctuating asymmetry and mortality of *Copera annulata* (Slys) (Odonata: Zygoptera) larvae. Ecotoxicology and

Environmental Safety 67(1): 120-127. (in English). ["Although there have been some investigations into the effects of insecticide on the level of fluctuating asymmetry (FA) of adult damselflies, the cooperative effects of environmental factors on FA of larval damselflies were known little. This paper explored effects of exposure to temperature and pesticide on larval development of the damselfly *Coperla annulata* (Selys). A conventional life history trait (mortality) and developmental instability (estimated by calculating fluctuating asymmetry of bilaterally symmetrical structures) were used to measure stresses in this paper. The results showed that temperature and different concentrations of pesticide produced significant effects only on developmental stability of some characters. The FA values of three traits decreased at lower concentrations, then increased slowly with increased insecticide doses. The FA values of four traits decreased slowly with increased temperatures. However, the interaction between different concentrations of insecticide and temperature was complicated and only produced significant effects on five traits. Insecticide treatment did not significantly affect mortality of the larvae of damselfly. However, mortality was significantly positively associated with temperature. There were significantly negative associations between mortality and the FA values of three traits. These results may be caused by higher mortality and short rearing time although we did not find the significant effects of concentrations on mortality. Therefore, we speculate FA may be induced if larval damselflies were treated during longer term and FA has potential as a more specific bioindicator of stresses if we guarantee enough longer rearing time without higher mortality under stressful environment." (Authors) Address: ZHAI Baoping, PhD, Professor, Department of Entomology, Nanjing Agricultural University, Weigang, Nanjing 210095, P.R. China. E-mail: bpzhai@njau.edu.cn

6325. Crick, K. (2007): Observations on final instar damselfly caudal lamellae with little or no evidence of secondary tracheae. *J. Br. Dragonfly Society* 23(1): 10-13. (in English). ["In the summer of 2006, 457 exuviae were collected from localities in Hampshire, and they produced an anomaly that occurred in four species, *Enallagma cyathigerum*, *Coenagrion puella*, *Erythromma najas* and *Pyrrhosoma nymphula*. Thus samples collected from three sites before the first week in June produced 29 exuviae that exhibited little or no evidence of secondary tracheae in their caudal lamellae. [...] One of the sites did suffer a significant increase in phosphate, which caused a dropping of dissolved oxygen level. "The apparent cause of the phosphate increase was due to slurry from cows entering the water. The cows are used as a grassland management tool and had remained on site longer than planned, resulting in the need to import feed. This feed was laid out adjacent to the polluted area of water, resulting in a prolonged concentration of cattle in a confined area of the reserve." (Author)] Address: Crick, K., 29 Village Way, Yateley, Hampshire GU46 7SE, UK

6326. Cuffney, T.F.; M. D. Bilger, M.D.; Haigler, A.M. (2007): Ambiguous taxa: effects on the characterization and interpretation of invertebrate assemblages. *J. N. Am. Benthol. Soc.* 26(2): 286-307. (in English). ["Damaged and immature specimens often result in macroinvertebrate data that contain ambiguous parent-child pairs (i.e., abundances associated with multiple related levels of the taxonomic hierarchy such as *Baetis pluto*

and the associated ambiguous parent *Baetis* sp.). The choice of method used to resolve ambiguous parent-child pairs may have a very large effect on the characterization of invertebrate assemblages and the interpretation of responses to environmental change because very large proportions of taxa richness (73–78%) and abundance (79–91%) can be associated with ambiguous parents. To Address this issue, we examined 16 variations of 4 basic methods for resolving ambiguous taxa: RPKC (remove parent, keep child), MCWP (merge child with parent), RPMC (remove parent or merge child with parent depending on their abundances), and DPAC (distribute parents among children). The choice of method strongly affected assemblage structure, assemblage characteristics (e.g., metrics), and the ability to detect responses along environmental (urbanization) gradients. All methods except MCWP produced acceptable results when used consistently within a study. However, the assemblage characteristics (e.g., values of assemblage metrics) differed widely depending on the method used, and data should not be combined unless the methods used to resolve ambiguous taxa are well documented and are known to be comparable. The suitability of the methods was evaluated and compared on the basis of 13 criteria that considered conservation of taxa richness and abundance, consistency among samples, methods, and studies, and effects on the interpretation of the data. Methods RPMC and DPAC had the highest suitability scores regardless of whether ambiguous taxa were resolved for each sample separately or for a group of samples. Method MCWP gave consistently poor results. Methods MCWP and DPAC approximate the use of family-level identifications and operational taxonomic units (OTU), respectively. Our results suggest that restricting identifications to the family level is not a good method of resolving ambiguous taxa, whereas generating OTUs works well provided that documentation issues are Addressed." (Authors) The analysis contains some data on "*Argia* sp.".] Address: Cuffney, T.F., US Geological Survey, 3916 Sunset Ridge Rd., Raleigh, North Carolina 27607 USA. E-mail: tcuffney@usgs.gov

6327. Cuong, D.M. (2007): *Coeliccia hoanglienensis* spec. nov., a new platynemid damselfly from Hoang Lien mountains in the North of Vietnam (Zygoptera: platinemididae). In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 343-348. (in English). ["The new species (male holotype: Vietnam, Lao Cai Prov., Sa Pa, Cong Troi, Hoang Lien National Park, 1945 m alt., 15.VII.2005; deposited in Do M. Cuong Collection) of genus *Coeliccia* is described with illustrations and a photo in nature." (Author)] Address: Cuong, D.M., Horn thu so 16, Buu Dien 10210 - 35 Thai Thinh, Ha Noi, Vietnam. E-mail: cuongdm@hotmail.com

6328. Czerniawska-Kusza, I. (Ed.) (2007): XIV Ogólnopolskie Warsztaty Bentologiczne "Hydromorfologiczna ocena ekosystemów wodnych", Opole - Turawa 2007. ISBN 83-920464-1-2. Lanko, Opole: 74 pp.- (in Polish). [The following papers/abstracts contain some passing references on "Odonata": DOMEK P., DON-DAJEWSKA R., GOŁDYN R.: Makrozoobentos zbiornika Antoninek narzece Cybinie. - [Makrozoobentos of the dam reservoir 'Antoninek' on the River Cybinia]. Pp. 15-16. - KOPERSKI, P.: Obecność i presja ryb jako czynnik decydujący o składzie fauny bezkręgowców. -

[The presence and pressure of fish as factor determining the composition of invertebrate fauna]. Pp. 39-40. - KRZYŻANOWSKA, I.: Roznorodność biologiczna rzeki Pełcz na podstawie makrobentosu. - [Biodiversity in the River Pełcz basing on macrobenthos]. P. 46. - NUCKOWSKA, K.: Ocena jakości wód rzeki Santocznej a różnorodność organizmów występujących w jej wodach. - [The evaluation of the water quality of the River Santoczna and the diversity of organisms occurring in its waters]. Pp. 52-53.] Address: Czerniawska-Kusza, Izabela, Uniwersytet Opolski, Katedra Ochrony Powierzchni Ziemi, ul. Oleska 22, PL-45-052 Opole, Poland

6329. Dijkstra, K.-D.; Groeneveld, L.F.; Clausnitzer, V.; Hadrys, H. (2007): The Pseudagrion split: molecular phylogeny confirms the morphological and ecological dichotomy of Africa's most diverse genus of Odonata (Coenagrionidae). *International Journal of Odonatology* 10(1): 31-41. (in English) ["The continental African representatives of the genus *Pseudagrion* fall into two groups (A and B) based on their ecology and larval and adult morphology. While the B-group species are found in generally warmer habitats, which are more sunny, lentic or low-lying, the A-group representatives occur more in cooler habitats. We compared molecular genetic and ecological data of twelve species representing both groups. Mitochondrial DNA sequence analyses strongly support their segregation into two major clades and suggest the monophyly of each. High bootstrap support confirms the deep phylogenetic split. Overall, only a minority of species have been studied for each group. However, genetic distances of the species within each clade indicate that they are significantly more closely related to each other than to species of the opposite clade. We conclude that the observed ecological and morphological similarities are due to common ancestry, suggesting two independent radiations within the continental African *Pseudagrion* species. The biogeographic and palaeoecological history of the two clades remains unresolved." (Authors)] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@t-online.de

6330. Dijkstra, K.D.; Samways, M.J.; Simaika, J.P. (2007): Two new relict *Syncordulia* species found during museum and field studies of threatened dragonflies in the Cape Floristic Region (Odonata: Corduliidae). *Zootaxa* 1467: 19-34. (in English). ["Red List assessments often require the verification of records and taxonomy in museum collections and the field. Such research during an assessment of threatened dragonflies in the Cape Floristic Region (CFR) biodiversity hotspot, led to the discovery of two new narrow-range endemic *Syncordulia* species, bringing the known total to four in the genus. The new species, *Syncordulia legator* and *S. serendipator*, are described with emphasis on their identification, ecology and biogeography. Morphological diversity within the genus and the absence of obvious close relatives suggest an ancient and isolated presence in the CFR, emphasizing the uniqueness and conservation importance of the region's endemic odonate fauna." (Authors)] Address: Simaika, J.P., Centre for Invasion Biology, Dept of Conservation Ecology and Entomology, Stellenbosch University, P Bag X1, Matieland 7602, South Africa. E-mail: simaika@sun.ac.za

6331. Dijkstra, K.D.; Clausnitzer, V.; Martens, A. (2007): Tropical African *Platycnemis* damselflies (Odonata: Platycnemididae) and the biogeographical signifi-

cance of a new species from Pemba Island, Tanzania. *Systematics and Biodiversity* 5(2): 187-198. (in English). ["The damselfly, *Platycnemis pembipes* sp. nov., is described from Pemba Island (Ngezi Forest, Tanzania) and its affinities with Guineo-Congolian and Malagasy congeners are examined. For this purpose the identity and distribution of Afrotropical *Platycnemis* is reviewed, especially the taxonomically confused continental species. The Pemba species is nearly identical to some species of the Malagasy radiation of *Platycnemis*, but distant from the Guineo-Congolian species that have tropical Asian affinities. It is argued that the species is a long-distance wind-borne arrival from Madagascar, which survived due to favourable climatic conditions on Pemba. Habitats on the mainland, only 50 km further, are or have been drier and therefore seem unsuitable. The new species, living proof of a remarkable colonisation event, is under immediate threat, confined to a single stream in an imperilled forest, over 1000 km from its nearest relatives. The holotype of the enigmatic *P. mauriciana*, not recorded on Mauritius after its description, cannot originate from the island as it pertains to the European *P. latipes*. Five species recalling the Asian genus *Copera* are known in the male sex from central and western Africa; all were confused to some degree with *P. congolensis* and a key is given. The lectotype of *P. congolensis* is designated and its identity is clarified. *Platycnemis flavipes* and *P. xanthopus* are junior synonyms of *P. nyansana*. Discovery of the *P. rufipes* female showed that *P. escherichi*, known only from the female holotype, is a junior synonym of it. The generic classification of *Platycnemis* and *Copera* is not resolved, but data and hypotheses that should aid future analysis are provided." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.

6332. Dijkstra, K.-D. (2007): The name-bearing types of Odonata held in the Natural History Museum of Zimbabwe, with systematic notes on Afrotropical taxa. Part 1: introduction and Anisoptera. *International Journal of Odonatology* 10(1): 1-29. (in English). ["Orthographic details of 118 name-bearing types of Odonata are provided in two parts: the first and present paper deals with Anisoptera, the second with Zygoptera. 58 types pertain to good species, although the taxonomy of at least four is problematic. The details of 11 'holotypes' of forms are also provided, although these and their names have no nomenclatory status. The taxonomy of the Afrotropical members of *Microgomphus* is discussed, as are the supinus-group of *Onychogomphus*, the fritillarius-group of *Paragomphus*, the genus *Tragomomphus*, and the basitinctagroup of *Trithemis*. *Microgomphus bivittatus* is transferred to *Lestinogomphus*, and *Tragomomphus seydeli* to *Onychogomphus*. *Heliaeschna longfieldae* is a junior synonym of *H. sembe*; *Microgomphus mozambicensis* and probably *M. schoutedeni* of *M. nyassicus*; *Onychogomphus quirikii* and *O. septemflavum* of *O. seydeli*; *Paragomphus dicksoni* of *P. cognatus*; *Aethiothemis watulikii* of *A. basilewskyi*; *Eleuthemis quadrigutta* of *E. buettikoferi*; *Malgassophlebia aequatoris*, *M. longistipes* and *M. nigeriae* of *M. bispina*; *Tetrathemis bifida* and *T. sulci* of *T. camerunensis*; *Trithemis jacksoni* of *T. arteriosa*. It was confirmed that *Gynacantha ochraceipes* is a junior synonym of *G. vesiculata*; *Macromia paludosa* of *Phyllomacromia overlaeti*; *Trithemis falconis* of *T. aequalis*; *Zygonyx ikomae* of *Z. natalensis*." (Author)] Address: Dijkstra, K.D., Gortestraat 11,

NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6333. Dijkstra, K.D. (2007): Gone with the wind: westward dispersal across the Indian Ocean and island speciation in Hemicordulia dragonflies (Odonata: Corduliidae). *Zootaxa* 1438: 27-48. (in English). ["The taxonomy and biogeography of the western representatives of the largely Papuan-Australian genus Hemicordulia are discussed and compared with other alate fauna including butterflies, birds, bats and other dragonflies. Specimens from Malawi, Mozambique, Réunion, South Africa, Tanzania and Uganda were compared with Indian specimens of *H. asiatica*, with which they were previously regarded conspecific. They are found to be distinct and are described as the continental *H. africana* n. sp. and those from Réunion as *H. atrovirens* n. sp. The three species were compared with *H. similis* of Madagascar and *H. virens* of Mauritius. Insufficient material of the Seychelles taxon *H. similis delicata* was available; it may represent another insular endemic species. The distribution of Hemicordulia is discussed in the light of the dispersal capacity of Odonata and the biogeography of taxa with similar distributions in the region, with an emphasis on the survival of 'oceanic' species on the continent. Recent (i.e. in the last few million years) trans-oceanic airborne dispersal aided by westward storms, is the most likely explanation for the distribution of the genus in Africa and the Indian Ocean islands, as well as for other winged animals of Asian affinities in the region. The world range of Hemicordulia is largely insular, broadly excluding continents, and *H. africana* n.sp. demonstrates 'inverted insularity': all continental sites are in proximity to large water bodies, such as the great African lakes. This pattern may be related to the climatological instability of these sites, which offer suitable cool habitat where competition is (temporarily) reduced. Hemicordulia prefer cool conditions, but may be vulnerable to overheating and competition with more warm-adapted species." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6334. Dijkstra, K.D.; Pilgrim, E.M. (2007): Trithetrum, a new genus of African dragonflies formerly placed in Sympetrum (Odonata, Libellulidae). *Journal of Afrotropical Zoology* 3: 77-81. (in English). ["Based on many morphological differences, the genus Trithetrum is described as distinct from Sympetrum Newman. The genus contains Trithetrum congoense (Aguesse) and T. navasi (Lacroix), both formerly placed in Sympetrum. Two males from Congo-Kinshasa constitute the first records of T. congoense since its description from Congo-Brazzaville." (Authors)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6335. Dmitriew, C.; Cooray, M.; Rowe, L. (2007): Effects of early resource-limiting conditions on patterns of growth, growth efficiency, and immune function at emergence in a damselfly (Odonata: Coenagrionidae). *Can. J. Zool.* 85(3): 310-318. (in English, with French summary). ["Periods of restricted growth during early development are expected to have detrimental effects on subsequent metrics of fitness, most prominently increases in age and decreases in size at maturity. However, in some cases, animals may compensate by altering foraging effort, growth efficiency, or patterns of re-

source allocation between critical traits prior to maturation. Yet, even when compensation for age and size is complete, brief periods of restricted growth may carry costs persisting in the long term, and compensatory tactics may themselves be costly. We investigated the long-term costs of early growth restriction and mechanisms of compensatory growth in the damselfly *Ischnura verticalis* (Say, 1839). Larvae were temporarily exposed to one of three feeding regimes in the early stages of development, after which food levels were restored. In the period of unrestricted growth prior to emergence, partial compensation for structural size in the lowest food treatment was observed, while both resource-limited groups accelerated mass gain relative to controls. Changes in food consumption and food conversion efficiency were ruled out as mechanisms for accelerating growth following diet restriction. We tested for changes in resource allocation patterns that could explain the observed compensatory growth and found that adult body shape may depend on early growth conditions in females. There was no evidence of detrimental effects on immune function at emergence, although males tended to have higher phenoloxidase activity (a measure of immunocompetence) than females." (Authors)]

6336. Dumont, H.J. (2007): Dragonflies from the Okavango swamps (Botswana, Southern Africa) in winter. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 45-50. (in English). ["Geographic situation and altitude of the Okavango swamps combine to create a distinctly seasonal climate, with an outspoken cool season. The local dragonfly fauna in winter is distinctly less species-rich than in summer. Although low abundances (rare species) may slightly complicate the situation, it is probably fair to estimate the faunal impoverishment at a factor 2 to 4 (17 species were censused in July 2006, against c. 70 known from all seasons combined). The composition of the winter fauna is dominated by wide-ranging species, tolerant of strong variations in environmental conditions, but at least two Pseudagrion species (*P. deningi*, *P. coelestis*) appear to have taken advantage of the void created by the austral winter, and have their adult population peak in winter." (Author)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

6337. Fincke, O.M.; Fargevielle, A.; Schultz, T.D. (2007): Lack of innate preference for morph and species identity in mate-searching Enallagma damselflies. *Behav. Ecol. Sociobiol.* 61: 1121-1131. (in English). ["Insect mate recognition is often viewed as stereotypic, innate, and species-specific. However, male damselflies can learn to identify female-specific color morphs as potential mates. A suite of male mimicry hypotheses assume that heteromorphic females, which differ from males in color pattern, are more easily recognized as "female" and thus lack the inherent, anti-harassment advantage that the more male-like signal provides for andromorphs. Using two measures of male preference, we investigated whether naïve males have a preexisting sensory bias for a given morph color in *Enallagma civile*, a species that appeared to exhibit extreme plasticity in morph expression across generations within a breeding season. *E. civile* males raised in the absence of females exhibited no preference for either morph, whereas males raised with one female type ex-

hibited a learned sensory bias for that morph. Male *Enallagma* also lacked a bias toward conspecific females over a congeneric sister species. In a naturally naïve population of *Enallagma ebrium*, males reacted sexually to both morphs of *Enallagma hageni* as often as they did to conspecific females, whose thoracic spectra were nearly identical with those of *E. hageni*. Moreover, despite the similar thoracic spectra of males and andromorphs, both of which reflected UV, males rarely reacted sexually to other males. Our results falsified implicit assumptions of male mimicry hypotheses, supported learned mate recognition, and suggested a scenario for speciation via sexual conflict." (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

6338. Fleck, G.; Grand, D.; Boudot, J.-P. (2007): Description of the last stadium larva of *Somatochlora borisi*, with comparison to that of *Somatochlora metallica meridionalis* (Odonata: Corduliidae). *International Journal of Odonatology* 10(1): 43-52. (in English). ["The last instar larva of *S. borisi* is described and illustrated from a set of exuviae. It is compared to that of *S. metallica meridionalis*, which is morphologically close and syntopic. A key is provided which allows the determination of the exuviae of all West Palaearctic *Cordulia* and *Somatochlora* species." (Authors)] Address: Fleck, G., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

6339. Gassmann, D. (2007): Wanderverhalten von Libellen. *Naturwissenschaftliche Rundschau* 60(1): 38-39. (in German). [On the basis of the paper of Wikelski, M. et al (2006): Simple rules guide dragonfly migration. *Biology letters* 3(2): 325-329 (see OAS 6048) the current knowledge on dragonfly migration is briefly reviewed.] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

6340. Gillingham, P.K.; Harvey, I.F.; Kay, S.M.; Lowe, C.D.; Narraway, C.L.; Moran, R.J.; Sudworth, S.; Watts, P.C.; Thompson, D.J. (2007): On the odonates of Queen Elizabeth Country Park, Hampshire, with emphasis on the Azure Damselfly, *Coenagrion puella* (L.). *J. Br. Dragonfly Society* 23(1): 14-19. (in English). ["13 species of odonate were recorded in the summers of 2005 and 2006 from an artificial pond at Queen Elizabeth Country Park, Hampshire, in an area of the South Downs considered to be odonatologically depauperate. Surprising visitors included both *Calopteryx* species (frequently) and a single *Sympetrum fonscolombii*. All individuals of *C. puella* were individually marked and details of their arrivals as mature individuals at the pond were recorded. The study is unique in providing, as near as possible, exact numbers of *C. puella* attempting to breed at the same site in consecutive years." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j. thompson@liv.ac.uk

6341. Gonzalez Soriano, E.; Novelo Gutierrez, R. (2007): Odonata of Mexico revisited. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scien-

tific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 105-136. (in English). ["Odonata of Mexico, comprising one of the greatest biodiversity regions in the world, is discussed with as many as 19 species, including also one of the hitherto unrecorded genus *Ophiogomphus*, enlisted since 1996. A large number of taxonomic, geographic and other features associated with many of these species in different ecosystems are also elaborated." (Authors)] In an appendix, all taxa are listed according the Mexican states] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

6342. Grand, D.; Boudot, J.-P. (2007): *Les Libellules de France, Belgique et Luxembourg*. ISBN : 2 - 914817 - 05 - 3: 480 pp. [This remarkable book presents in six chapters a sound introduction to the phylogeny, morphology, biology, and biogeography of Odonata, as well as information on predators, parasites, ecology, habitats and the relationship of Odonata to human beings and their culture. All these texts are illustrated with excellent photographs, which holds true also for the rest of the book. Chapter 5 deals with the identification of imagos and exuviae, presenting full keys for the 100 taxa treated in the book. These keys are remarkable from the didactical point of view: Important and significant morphological characters are highlighted in the drawings or photographs. The key to the imagines is definitively a genuine contribution and improvement to identification of European dragonflies and will, enable even beginners to make correct identifications. An important feature is the key to the exuviae of all species. In most cases morphological relevant structures are presented as black and white photographs, a few lacking contrast (due to poor printing quality?). Structures relevant for identification are marked with arrows, and structural/morphometric relationships ("ratios") are documented by bars. In some cases, drawings are added to help in identification. This new key will certainly improve and facilitate the identification of dragonfly exuviae. Chapter 6, providing monographs of all species treated, is the most voluminous of the book. All chapters include brilliant photographs, notes on morphological characters, possible confusions with related species, distribution maps (Europe; France on the basis of the Départements, and regions in Belgium and Luxembourg), as well information on ethology, habitat, and phenology. The appendix contains plates with the wings of the species, and a selected bibliography. This remarkable book is a must in the library of every European odonatologist. At the same time, being a concise introduction to one of Europe's most interesting faunal regions, it is of major importance to odonatologists worldwide. (Martin Schorr)] Address: Biotope SIEGE SOCIAL : 22, Boulevard Maréchal Foch - BP58 - 34140 Mèze, France. Email : siegesocial@biotope.fr

6343. Grant, P.B.C.; Samways, M.J. (2007): Montane refugia for endemic and red listed dragonflies in the Cape floristic region biodiversity hotspot. *Journal Biodiversity and Conservation* 16(3): 787-806. (in English). ["One of the features of many endemic organisms is that they are highly spatially restricted, and habitat specialists. The Kogelberg Biosphere Reserve (KBR) is a major centre of plant endemism within a global hotspot, the Cape Floristic Region (CFR). Dragonflies in this botanical hotspot have a range of habitat specialization from narrow-range specialists to widespread genera-

lists, with an unusually strong bias towards the specialists. A huge 53% of dragonfly individuals and 26% of taxa recorded are national endemics, and three species are Red Listed. Thus, a group of predatory insects, which are largely not dependent on plant composition, mirrors the level of habitat specialization and restricted distributions of the plants at the spatial scale of the whole reserve. Although some studies caution the use of one taxon as a surrogate for another, the results here show that at the reserve scale in this global hotspot there can be remarkable concordance, suggesting further studies on other taxa should be carried out to determine the full extent of taxonomic concordance in this irreplaceable area." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6344. Grozeva, M.; Marinov, M. (2007): Cytogenetic study of *Somatochlora borisi* Marinov, 2001 (Odonata: Corduliidae), and three relative species. *Acta zool. bulg.* 59(1): 53-56. (in English, with Bulgarian summary). ["The recently described species *Somatochlora borisi* Marinov, 2001 (Odonata: Corduliidae), combines morphological characters of two relative corduliide genera, *Somatochlora* and *Cordulia*. In the present study its karyotype was studied for the first time. Routine and differential (C-banding and DNA binding fluorochrome staining) cytogenetic techniques were applied. The chromosome formula of *S. borisi* includes $2n=20+XX/XY$. For comparison, the male karyotype of *S. metallica* (from Finland), *S. meridionalis* and *C. aenea* (from Bulgaria) were also examined. In a larva of *S. meridionalis*, the spermatogonial metaphases showed 25 chromosomes confirming $2n=24+X$ reported earlier for the species. Some polymorphism of the chromosome size had been observed in the populations examined, but this problem needs a special study. For *S. metallica* and *C. aenea* previously reported for these species the karyotype $2n=24+X$ and the telomeric localization of C-heterochromatin were confirmed. All the data obtained are discussed in comparison to literature cytogenetic data on the genera *Somatochlora* and *Cordulia*. The cytogenetic data confirm that *S. borisi* deviates widely from the other *Somatochlora* and *Cordulia* species and provide an additional argument to separate it in a new genus." (Authors)] Address: Grozeva, Snezana M., Institute of Zoology, 1 Tsar Osvoboditel Blvd., BG-1000 Sofia, Bulgaria. E-mail: sgrozeva@yahoo.com

6345. Hannon, E.R.; Hafernik, J.E. (2007): Reintroduction of the rare damselfly *Ischnura gemina* (Odonata: Coenagrionidae) into an urban California park. *Jour. Insect. Conserv.* 11(2): 141-149. (in English). ["Habitat degradation led to local extinction of the San Francisco forktail damselfly (*Ischnura gemina*) in Glen Canyon Park, San Francisco, California. In this study, we reintroduced *I. gemina* into Glen Canyon after the damselfly's habitat was restored. Upon release, we carried out a mark-release-recapture study to monitor the damselfly's population dynamics. Our data were compared to two "baseline" studies on *I. gemina*, conducted in the park prior to the damselfly's demise. Our recapture rates were significantly lower than the prior studies due to a large initial decline in marked individuals upon release. Despite a lower recapture rate, the reintroduction was initially successful since the damselflies reproduced throughout the summer and the following year. However, the population failed to persist during the se-

cond year when the habitat became degraded with excess vegetation. Future success is contingent on the continual management and upkeep of the habitat." (Authors)] Address: Hannon, E.R., Dept of Entomology, Washington State University, P.O. Box 646382, Pullman, WA 99164, USA. E-mail: hannon@mail.wsu.edu

6346. Hardersen, S. (2007): *Le libellule di Bosco della Fontana*. Cierre Edizioni, Verona. ISBN 978-88-8314-396-0: 64 pp. (in Italian). [The book introduces in the 32 Odonata known from the "Bosco della Fontana", Italy, giving a brief introduction into ecology and ethology of the species. All species, with the exception of *Anax parthenope*, are shown in brilliant colour photographs. Of special interest is the chapter related to telemetry using harmonic radar to follow dispersing specimens.] Address: Hardersen, S., Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, I-46045 Marmirolo (MN), Italy. E-mail: s.hardersen@libero.it

6347. Haritonov, A.Y. (2007): The composition and history of Siberian odonate fauna. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 73-87. (in English). ["Based on literature analysis and the latest special researches the more precise list of dragonflies taxons of Asian part of Russia, counted 129 species, is presented. The species are distributed among 7 geographical regions: Ural and Transural, West-Siberian Plain, Altai and Sayan, North of East Siberia, South of East Siberia, North of Far East, South of Far East. The ancient autochthonous odonate fauna of south part of Russian Far East is the most rich of species and is a member of Subholarctic faunistic region. The rest of territory is a member of Holarctic faunistic region and to divide into two parts: Euro-Siberian and Siberian subregions. Their odonate fauna is not rich, young and allochthonous." (Author) The paper contains the results of several taxonomic studies (dissertations in Russian language) resulting in synonymies of several taxa.] Address: Haritonov, A.Y., Institute of Animal Systematics and Ecology, Siberian Division of Russian Academy of Sciences, Frunze str. 11, Novosibirsk 630091, Russia e. mail: pc@eco.nsc.ru

6348. Harris, W.; Parry, G.S.; Forman, D.W. (2007): Predation of odonate larvae by Otters (*Lutra lutra*). *J. Br. Dragonfly Society* 23(1): 20-24. (in English). ["The occurrence of odonate larval remains in the faeces (spraints) of Eurasian otters (*Lutra lutra*) was assessed between March and April 2006 in two Welsh rivers. Spraints were collected individually during detailed field surveys every two weeks. Odonate remains identified as *Aeshna mixta* and *Cordulegaster boltonii* were found in 61 % (11/18) of the spraints analysed and a minimum number of 66 individual larvae (45 *Aeshna mixta* and 21 *Cordulegaster boltonii*) were estimated in these spraints. This study clearly illustrates that vertebrate predators such as otters have the potential to consume large numbers of odonate larvae and highlights the need for applied research in this neglected area of odonate and otter ecology." (Authors)] Address: Harris, W., Institute of Environmental Sustainability, School of the Environment and Society, Swansea University, Singleton Park, Swansea SA2 8PP, UK

6349. Hartley, M.K.; Rogers, W.E.; Siemann, E. (2007): Responses of prairie arthropod communities to

fire and fertilizer: balancing plant and arthropod conservation. *Am. Midl. Nat.* 157: 92-105. (in English). ["Fire is an important tool for limiting woody plant invasions into prairies, but using fire management to maintain grassland plant communities may inadvertently reduce arthropod diversity. To test this, we established twenty-four 100 m² plots in a tallgrass prairie in Galveston County, Texas, in spring 2000. Plots were assigned a fire (no burn, one time burn [2000], two time burn [2000, 2001]) and fertilization treatment (none, NPK addition) in a full factorial design. Fertilization treatments allowed us to examine the effects of fire at a different level of productivity. We measured plant cover by species and sampled arthropods with sweep nets during the 2001 growing season. Path analysis indicated that fertilization reduced while annual fires increased arthropod diversity via increases and decreases in woody plant abundance, respectively. There was no direct effect of fire on arthropod diversity or abundance. Diptera and Homoptera exhibited particularly strong positive responses to fires. Lepidoptera had a negative response to nutrient enrichment. Overall, the negative effects of fire on the arthropod community were minor in contrast to the strong positive indirect effects of small-scale burning on arthropod diversity if conservation of particular taxa is not a priority. The same fire regime that minimized woody plant invasion also maximized arthropod diversity." (Authors) Odonata are represented, but have been excluded from analysis.] Address: Siemann, Eviann, Department of Ecology and Evolutionary Biology, Rice University, 6100 Main St., Houston, Texas 77005 USA. E-mail: siemann@rice.edu

6350. Hassall, C.; Thompson, D.J.; French, G.C.; Harvey, I.F. (2007): Historical changes in the phenology of British Odonata are related to climate. *Global Change Biology* 13(5): 933-941. (in English). ["Responses of biota to climate change take a number of forms including distributional shifts, behavioural changes and life history changes. This study examined an extensive set of biological records to investigate changes in the timing of life history transitions (specifically emergence) in British Odonata between 1960 and 2004. The results show that there has been a significant, consistent advance in phenology in the taxon as a whole over the period of warming that is mediated by life history traits. British odonates significantly advanced the leading edge (first quartile date) of the flight period by a mean of 1.51 ± 0.060 (SEM, $n = 17$) days per decade or 3.08 ± 1.16 (SEM, $n = 17$) days per degree rise in temperature when phylogeny is controlled for. This study represents the first review of changes in odonate phenology in relation to climate change. The results suggest that the damped temperature oscillations experienced by aquatic organisms compared with terrestrial organisms are sufficient to evoke phenological responses similar to those of purely terrestrial taxa." (Authors)] Address: Hassall, C., Population and Evolutionary Biology Research Group, The Biosciences Building, School of Biological Sciences, University of Liverpool, Crown Street, Liverpool L69 7ZB, UK. E-mail: c.hassall@liverpool.ac.uk

6351. Hedström, I.; Sahlen, G. (2007): The dry season governs the reproduction of three pseudostigmatid zygopterans in Costa Rica (Odonata: Pseudostigmatidae). *International Journal of Odonatology* 10(1): 53-63. (in English). [*Megaloprepus caerulatus*, *Mecistogaster linearis*, and *M. ornata* "were surveyed during five

years, and striking differences in their reproduction patterns were shown: (1) At two study sites in seasonal, tropical semi-dry forests in Pacific Costa Rica, adult *M. ornata* could be observed throughout the year, occasionally during the dry season up to 24 individuals at one time. Larvae were found from the middle to the end of the wet season suggesting a generation time of one year. (2) At two other study sites in aseasonal tropical wet forest in Caribbean Costa Rica, adults of *M. caerulatus* were observed year round, often in rather low numbers. Larvae of this species as well as *M. linearis* appeared throughout the year. While dry periods and rainfall certainly are key factors in governing the reproductive patterns of these species in relation to the climatic regimes of their preferred life zones, it is also concluded that competition from other container dwellers, including tadpoles of poison arrow frogs, may be additional factors in explaining their seasonal variation. It is also argued that all three species seem to have a high plasticity in their life cycles and hence are able to adapt to local conditions rather than displaying the same behaviour throughout their range." (Authors)] Address: Hedström, I., Nairi Foundation, Apdo. postal 150-4021 Orotina, Costa Rica. E-mail: ingemar.hedstrom@skutan.smf.se

6352. Hoess, R. (2007): *Prodasineura doisuthepensis* sp. nov. from Thailand (Odonata: Protoneuridae). *International Journal of Odonatology* 10(1): 65-69. (in English). ["*Prodasineura doisuthepensis* sp. nov. from Thailand is described and figured. The holotype and two paratypes were collected by the author on 11 May 2002 on the slopes of Doi Suthep, Chiang Mai Province, Thailand (18°48'N, 98°56'E). The material will be deposited at the Naturhistorisches Museum Basel (NHMB). The female is unknown. This is the only known species of the genus with the dorsum of the synthorax almost entirely azure-blue." (Author)] Address: Hoess, R., Normannenstr. 35, 3018 Bern, Switzerland. E-mail: ReneHoess@1st.ch

6353. Horrigan, N.; Dunlop, J.E.; Kefford, B.J.; Zava-hir, F. (2007): Acute toxicity largely reflects the salinity sensitivity of stream macroinvertebrates derived using field distributions. *Marine and Freshwater Research* 58(2): 178-186. (in English). ["Two types of salinity tolerance information are commonly used for assessing salinity risk to freshwater organisms. These are data from laboratory experiments, usually acute (=96-h LC50) values, and field distributions. Both approaches have advantages and limitations, and their applicability to the formation of guidelines and assessment of risks is not clear. In the present study, the acute lethal tolerances (72-h LC50) and acute tolerance scores (ATS) of 37 macroinvertebrate families from Queensland, Australia, were compared with maximum field conductivities and previously derived salinity sensitivity scores (SSS). LC50 values were significantly correlated with maximal field conductivities and SSS. To investigate this relationship further, the changes in community structure related to an increase in salinity were assessed. A salinity index (SI) (based on cumulative SSS) and acute salinity index (ASI) (based on cumulative ATS) were calculated using an independent data set from south-east Queensland (429 samples) and compared with each other and actual conductivity levels. Both indices were significantly correlated with each other and followed a similar trend when plotted against actual conductivity. These results support the notion that salinity sensitivity of mac-

roinvertebrates derived from acute toxicity experiments reflects sensitivities derived using field distributions. Definition of this relationship will allow the two sources of salinity sensitivity to be combined in a weight-of-evidence approach, resulting in a more robust data set with which to estimate safe salinity concentrations." (Authors) The paper also includes data on Odonata.] Address: Dunlop, J.E., Department of Natural Resources and Water, 120 Meiers Road, Indooroopilly, Qld 4068, Australia. E-mail: jason.dunlop@nrm.qld.gov.au

6354. Hursthouse, D. (2007): Red-veined Darters *Sympetrum fonscolombii* at Lound, Nottinghamshire in 2006. *J. Br. Dragonfly Society* 23(1): 1-9. (in English). ["684 *S. fonscolombii*, 94 mature adults and 590 second generation adults, were recorded at the Lound gravel pits complex, Nottinghamshire, from 25 June to 23 October 2006. All except 20 were recorded from around a shallow pit." (Author)] Address: Hursthouse, D., 22 Rose Avenue, Clowne, Derbyshire S43 4NU, UK

6355. Irusta, J.B.; Araujo, A. (2007): Adaptationist approach of reproductive behaviour in Libellulidae: a case report on *Diastatops obscura* Fabricius. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 223-240. (in English). ["In this chapter we discuss three topics related to reproductive behaviour in Libellulidae, specifically theoretical aspects based on data obtained from the species *Diastatops obscura* (Fabricius, 1775) in its natural environment in Northeast Brazil. First, we studied reproductive strategies, with emphasis on intrasexual competition among males in territorial areas and the interconnection and synchronism of the behaviours of both sexes. Second, we analysed the females' choice of mate, a subject of lively discussion today among odonatologists throughout the world. Finally, we studied the possible relation between male body size and reproductive success. It was shown that males compete for areas of greatest access to sexually mature females, and that females select dominant males over the satellites. In competition among males, it was observed that larger individuals are more likely to achieve more copulations than smaller and medium-size males. It was also shown that larger individuals accomplish oviposition of the females inseminated by them more often and in greater numbers, and are territorial for more days than their smaller counterparts. Accordingly, we discuss aspects related to female choice and stabilizing selection." (Authors)] Address: Irusta, J.B., Programa de Pós-Graduação em Psicobiologia, Departamento de Fisiologia - Centro de Biociências, Universidade Federal do Rio Grande do Norte. Caixa Postal 1511 - Campus Universitário, 59078-970 Natal, RN, Brasil. E-mail: banuelos@ufrnet.br

6356. Irusta, J.B.; Araújo, A. (2007): Reproductive tactics of sexes and fitness in the dragonfly, *Diastatops obscura*. *Journal of Insect Science* 7:24, available online: insectscience.org/7.24: 10 pp. (in English). ["The sexual selection strategies of territorial Odonata that do not present courtship behavior is still not completely understood, especially the role of the females. *Diastatops obscura* Fabricius (Odonata: Libellulidae) females participate in mate selection in a passive manner, allowing copulation with the first male that captures them and afterwards choosing whether to oviposit or not. This study introduces the idea of female passive choice as an adaptative tactic in intersexual selection. Also

discussed is the adaptative value of this tactic and its flexibility according to environmental conditions and reproductive strategies adopted by the males. A natural population of *Diastatops obscura* was observed in the Pitimbu River of northeast Brazil. Focal continuous and ad libitum techniques were used to record attempted copulation, copulation, and oviposition behavior, in addition to registering male territoriality. An estimate of individual reproductive success (IRS) was obtained by recording 187 reproductive events. Territorial males, mainly occupying areas near the river margin, achieved greater copulation and oviposition success (IRS = 0.371) than did satellite males (IRS = 0.028). Females that copulated with territorial males experienced, for the most part, only one copulation and oviposition event, while those that copulated with satellite males fled or performed a second copulation with a territorial male. Thus, the best tactic adopted by the *D. obscura* males was to occupy a territory providing the greatest access to females, while the females used passive choice for fitness optimization." (Authors)] Address: Irusta, J.B., Sector of Psychobiology, Department of Physiology, Federal University of Rio Grande do Norte (UFRN), Caixa Postal 1511 – Campus Universitário, 59072-970, Natal-RN, Brazil

6357. Joop, G.; Gillen, A.; Mikolajewski, D.J. (2007): Colour polymorphism in female *Coenagrion puella*: differences in egg shape (Odonata: Coenagrionidae). *International Journal of Odonatology* 10(1): 71-80. (in English). ["The maintenance of female colour polymorphism in coenagrionids is still an open issue. Here we ask if the three different female morphs of *C. puella* represent different reproductive traits in terms of clutch and egg size. Therefore clutch size and egg morphometry of the three female colour morphs were examined. We found that female colour morphs did not differ in clutch or egg size. However, we also found that the female morphs differ in egg shape, with the intermediate morph having more elongated eggs compared to the hetero- and andromorphic females. Our results are discussed in terms of potential different preferences in oviposition substrate." (Authors)] Address: Joop, Gerrit, Institute of Integrative Biology, Experimental Ecology, ETH Zürich, Universitätsstraße 16, ETH Zentrum, CHN J 12.2, 8092 Zürich, Switzerland. E-mail: g.joop@env.ethz.ch

6358. Jovic, M. (2007): About the odonata ethnic names in the Serbian linguistic area. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 357-362. (in English). ["Vernacular names of Odonata in Serbian linguistic area are given and discussed. There are only few known expressions for odonates in the central part of Balkans. These names generally correspond with Odonata names in other European languages but it is interesting that extremely frightful associations were absent. Small number of common names of dragonflies and damselflies in the named area might be result of poorly exploration of the area, small significance of odonates in everyday life of local communities or misplacing during time." (Author)] Address: Jovic, M., Natural History Museum Belgrade, 11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.org.yu

6359. Juen, L.; Ramos Cabette, H.S.; De Marco, P. (2007): Odonate assemblage structure in relation to ba-

sin and aquatic habitat structure in Pantanal wetlands. *Hydrobiologia* 579: 125-134. (in English). ["Structural properties of aquatic habitats are the basis of several theories produced to explain the functioning of aquatic environments. We predicted a longitudinal change of ecosystem properties along the river, and also that potamal areas of the river are similar to lakes. In rivers with periodic floods we also expect a high degree of similarity due to increased environmental similarity and increase dispersal of component species. Otherwise, rivers must be conceived as a landscape element with an intrinsic hierarchical nature and dispersal among its parts are constrained by this structure. Under this view, we also could expect that different basin or different "micro-basin" could present communities that are historically different in their general properties. Here, we aimed to describe odonate larval communities in the Pantanal Mortes-Araguaia river basin in Brazil comparing the composition, species richness and community structure between lakes and rivers, and also the possible differences among river basins. The field work was done in three rivers and three lakes chosen to conform to a paired experiment, each pair in a different river basin. An aggregated sampling unit was used based on Ekman dredge and D-nets replicated on each site. We sampled 936 individuals distributed in 30 genera and a total of 34 morphotypes. There was no difference in species richness among lakes and rivers, but a marked difference among basins. Samples from the same basin present a higher similarity of the species abundance relations than among river or lake samples. We also did not observed differences in composition and community structure between large rivers and lakes, in the same basin. The results supported the concept of structural similarity between large rivers and lakes and the differences observed among basins could indicate historical events in colonization that are shaping communities characteristics." (Authors)] Address: De Marco Jr., P., Laboratório de Ecologia Teórica e Síntese, Departamento de Biologia Geral, Universidade Federal de Goiás, 74001-970 Goiânia, Goiás, Brasil. E-mail: pdemarco@icb.ufg.br

6360. Khodabandeh, S. (2007): Ultrastructure and osmoregulatory function of the branchial chamber in the larvae of dragonfly, *Libellula lydia* (Odonata). *Journal of agricultural science and technology* 9(2): (in English). ["The ultrastructure of the cells, Na⁺, K⁺-ATPase activity and immunolocalization were examined in the branchial chamber of *L. lydia* larvae. Na⁺,K⁺-ATPase activity and localization were performed through biochemical techniques and immunofluorescence light microscopy using a mouse monoclonal antibody IgGa5, respectively. The branchial chamber possesses six pair gills lamellae that extend into the rectal lumen. A thickened epithelial layer and a modified fat body cells layer are present at the base of the each gill lamella. Epithelial cells covered by a thin cuticle and they possess apical microvilli and baso-lateral membrane infoldings associated with mitochondria. The cytoplasm of the modified fat body cells is filled with mitochondria, glycogen and a few lipid droplets. The Na⁺,K⁺-ATPase activity was significantly higher (15.36 μM Pi mg⁻¹ protein h⁻¹) in the branchial chamber. Na⁺,K⁺-ATPase immunofluorescence staining was observed in the epithelial layer cells of the basal pads of the rectal gill lamellae, with a consistently high immunoreactivity. These findings show that the epithelial cells present cytological features of the ionocytes, a high activity and concentration

of Na⁺,K⁺-ATPase, confirming their participation in osmoregulation through active ion exchanges." (Author)] Address: surp78@yahoo.com

6361. Kiran, C.G.; Kakkassery, F.K. (2007): Observations on mating and oviposition behaviour of *Tetratemis platyptera* Selys, 1878. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 349-355. (in English). ["A detailed study was carried out of the mating and unusual oviposition behaviour of *T. platyptera* during October 2005. It was revealed that unlike other dragonflies, the female *T. platyptera* lays eggs on the twigs or leaves of plants hanging on to the water bodies, a special strategy for their larval development, and hatched nymphs were dropped into water for their further development. The total time of courtship, tandem position and wheel position are also discussed in this paper." (Authors)] Address: Kiran, C.G., Mayoaram, Pulari Nagar, Kodunganoor, P.O, Thiruvananthapuram, Kerala, India 695 013. E-mail: cgkiran@gmail.com

6362. Kononova, S.V.; Fursov, V.N. (2007): A Review of the Genera *Calotelea*, *Calliscelio*, and *Oxyscelio* (Scelioninae, Scelionidae, Proctotrupeoidea) from the Palaearctic Fauna. *Entomological Review* 87(1): 92-105. (in English). [*Calotelea shimurai* from Japan parasitizes eggs of *Aeshna nigroflava*, *Planaeschna milnei*, and *Boyeria maclachlani*.] Address: Fursov, V.N., Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine, Kiev, 01601 Ukraine. E-mail: root@iz.freenet.kiev.ua

6363. Krech, M. (2007): Reproduktionsnachweise der Asiatischen Keiljungfer (*Gomphus flavipes* Charpentier 1825) für den Unter- und Mittellauf der Unstrut in Sachsen-Anhalt und Thüringen (Odonata: Gomphidae). *Mitteilungen des Thüringer Entomologenverbandes* 14(1): 2-5. (in German). [Sachsen-Anhalt, Thüringen, Germany; a systematic survey of 20 stretches of the river Unstrut resulted in 8 new localities of the rare *Stylurus flavipes*. These records are discussed in the framework of current range extensions of this species. Some habitat characters are also discussed. In a table additional records of rheophilous species as *Calopteryx splendens*, *Gomphus vulgatissimus*, and *Ophiogomphus cecilia* are presented.] Address: Krech, M., Auf der Großen Mühle 7, D-99198 Erfurt, Germany

6364. Lasley, G.W. (2007): Digital odonate photography: My personal techniques. Abbott, J.C. (Ed.): *Dragonflies and Damselflies (Odonata) of Texas*. Vol. 2: 1-4. (in English). [Introduction into digital dragonfly photographing] Address: Lasley, G.W., 305 Loganberry Ct., Austin, Texas 78745, USA. E-mail: glasley@earthlink.net

6365. Lawniczak, M.K.N.; Barnes, A.I.; Linklater, J.R.; Boone, J.M.; Wigby, S.; Chapman, T. (2007): Mating and immunity in invertebrates. *Trends in Ecology and Evolution* 22(1): 48-55. (in English). ["Mating and immunity are intimately linked to fitness. In both vertebrates and invertebrates, recent investigations into mate choice for immunity, tradeoffs between reproduction and immunity, and the relationships between post-mating processes and immune function have revealed that mating and immunity are also intimately linked to each other. Here, we focus on invertebrates and critically examine the evidence that immunity is under se-

xual selection, both pre- and post-mating, and explore other hypotheses linking mating and immunity. We find little evidence for a consensus regarding which theories best account for the accumulating empirical data. However, we suggest that progress can quickly be made by exploiting the intrinsic strengths of invertebrate model systems." (Authors) The paper also refers to some recent odonatological papers.] Address: Lawniczak, Mara, Department of Biology, Darwin Building, University College London, London, WC1E 6BT, UK. E-mail: marakat@ucl.ac.uk

6366. Lin, Q.-B.; Huang, D.-Y.; Nel, A. (2007): A new family of Cavilabiata from the Lower Cretaceous Yixian Formation, China (Odonata: Anisoptera). *Zootaxa* 1469: 59-64. (in English). ["A new genus *Nodalula* gen. nov. and species *Nodalula dalingshensis* gen. et sp. nov. is described on the basis of a nearly complete specimen from the Lower Cretaceous of North-east China. Its special pattern of wing venation differs from those of the known Mesozoic Cavilabiata genera and allows us to include it in the new family Nodalulidae within the Neobrachystigmata." (Authors)] Address: Lin, Q.-B., State Key Laboratory of Palaeobiology and stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing, 210008, People's Republic of China

6367. Machado, A.B.M. (2007): Studies on neotropical Protoneuridae. 2. *Neoneura kiautai* spec. nov. from Southeastern Brazil (Zygoptera, Protoneuridae). In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 25-32. (in English). ["*Neoneura kiautai*, sp.n. is described and illustrated. It is close to *N. ethela* but differs mainly by the shape of the decumbent process of cercus and the colour of abdominal segments 7-10." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil

6368. Malkmus, R. (2007): Libellen im Tangkoko-Reservat auf Sulawesi. *Natur und Museum* 137(1/2): 12-19. (in German). [Due to its geological surface with highly permeable volcanic soils, only very few water bodies exist in the nature reserve of Tangkoko, Sulawesi, Indonesia. With the exception of phytotelmatic species, the odonate fauna is said concentrating along the single permanently running brook, the Batuputik which is situated on the northern border of the reserve. In 2002, nine for Sulawesi endemic species were recorded at this stream; these are briefly discussed and some are depicted in colour photographs. A brief introduction into historical and current odonatological research activities is given, and the Sulawesian Odonata are compared with those of Borneo and Sumatra. The following species are shown: *Neurobasis kaupi*, *Libellago xanthocyana*, *Rhinocypha frontalis*, *Celebargiolestes cinctus*, *Nososticta flavipennis*, *Pseudagrion ustum*, *Protosticta simplicinervis*, *Diplacodes trivialis*, and *Celebothemis delectollei*.] Address: Malkmus, R., Schulstr. 4, D-97859 Wiesthal, Germany

6369. Marinov, M.; Grebe, B.; Kutsarov, Y. (2007): *Cordulegaster insignis* (Schneider, 1845) in Bulgaria with notes on its biology and ecology. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-

7233-482-6: 51-61. (in English). ["Bulgarian *C. insignis* finding places are summarized and mapped. Special attention on its biotope is given with emphasis on species' biology and ecology. New records from Bulgaria enlarge *C. insignis* distribution to the west. Its possible existence in even westernmost areas, like Serbia & Montenegro, is briefly discussed." (Authors)] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@mail.bg

6370. Martens, A.; Sahlen, G.; Marais, E. (2007): Abstracts - 5th WDA International Symposium of Odonatology. 43 pp: (in English). [Contents: Beatty, C.D., J.A. Andrés & T.N. Sherratt: Conspicuous coloration in males of the damselfly *Nehalennia irene* (Zygoptera: Coenagrionidae): do males signal their unprofitability to other males? (Oral) ■ Bechly, G.: New fossil Odonata from the Lower Cretaceous Crato Formation of Brazil (Oral) ■ Bots, J., B. Van Den Brande, T. Snijders, L. De Bruyn, K. Van De Vijver, W. De Coen & H. Van Gossum: Impact evaluation of a chemical contaminant (PFOS) on the survival of damselfly larvae (Poster) ■ Bots, J., H., Van Gossum, R. Smolders, W. De Coen, L. de Bruyn & S. Van Dongen: Seasonal variation in energy storage compounds between female colour morphs of the damselfly, *Enallagma cyathigerum* (Oral) ■ Bouwman, J.: An overview of the present knowledge and protection of the isolated population of *Coenagrion armatum* in the Netherlands (Oral) ■ Cannings, R.A.: Odonata inventories in British Columbia, Canada: determining the conservation status of Odonata species (Oral) ■ Clausnitzer, V.: Global Dragonfly Assessment - What do we have already and what is needed? (Plenary Seminar) ■ Contreras-Garduño, J., B. Buzatto, M.A. Serrano-Meneses & A. Córdoba-Aguilar: The red wing spot of *Hetaerina americana* males as a heightening condition dependent ornament (Oral) ■ Conze, K.-J.: Odonata in North Rhine-Westphalia, Germany (Oral) ■ Cordero-Rivera, A. & R.A. Sánchez-Guillén: Androchrome females are not preferred by males of *Ischnura elegans* even when they are the majority morph (Oral) ■ Darwall, W.: Global Biodiversity Assessments: what is their purpose and what do they involve? (Plenary Seminar) ■ De Knijf, G. & A. Anselin: Predicting the distribution of *Calopteryx splendens* in Flanders (Belgium), based on a habitat (Oral) ■ Dijkstra, K.-D.B.: Demise and rise: the biogeography of the Odonata of tropical Africa (Oral) ■ Dolný, A., P. Drozd, P. Buczynski, M. Veselý & E. Bulánková: Distribution and habitat preferences of peat-bog and fen dragonfly species in Central Europe (Oral) ■ Dow, R.A. & G.T. Reels: Preliminary results of recent faunal survey work in Sarawak, Malaysian Borneo (Oral) ■ Flenner, I., K. Olne, G. Sahlén & F. Suhling: Predator induced spine length and cuticle thickness in *Leucorrhinia dubia* - a trade-off? (Poster) ■ Garrison, R.W.: Research on the Neotropical Odonata: current results and challenges ahead (WDA Award lecture) ■ Garrison, R.W. & N. von Ellenrieder: Will the real *Argia difficilis* please stand up? (Poster) ■ Gennard, D.E. & T. Winder: Conservation value for Odonata: an intra site investigation at Gibraltar Point NNR, Skegness, UK (Oral) ■ Gorb, S.N.: Dragonfly morphology revisited: its relevance for taxonomy, ecology and bionics (Plenary Talk) ■ Groenendijk, D. & J. Bouwman: From zero to full protection in five years: the case of *Somatochlora arctica* in the Netherlands (Oral) Groenendijk, D., C. Plate, J. Bouwman & T. Termaat: The use of dragonfly trends from the Dutch Monitoring Scheme in a broader context (Oral) ■ Günther, A.: The

ornaments are similar but something is different - threat display in Sulawesi Rhinocypha and Heliocypha perforata (Oral) ■ Hardersen, S.: Telemetry of freshly emerged dragonflies (Anisoptera) (Oral) ■ Hardersen, S., E. Riservato & G. Bogliani: The congress: Dragonflies in Italy - Research and Conservation (Poster) ■ Hawking, J.H.: Larval ecology and morphology as determinants of the spatial distribution of gomphids (Odonata) in streams of northern Victoria, Australia (Oral) ■ Hilfert-Rüppell, D. & G. Rüppell: Why do not males catch up with females in pursuing flight in Calopteryx splendens? (Oral) ■ Holuša, O.: Notes to the diurnal activity of adults of Cordulegaster bidentata (Oral) ■ Holuša, O.: Notes to the distribution of Cordulegaster spp. in Central Europe (Poster) ■ Holuša, O.: Shift of the northern limit of Somatochlora meridionalis (Odonata: Corduliidae) in the Central Europe? (Poster) ■ Honkanen, M.: The impact of area, productivity and forestry on dragonfly species richness in small boreal forest lakes (Poster) ■ Iwasaki, H. & M. Watanabe: Factors affecting egg load in relation to food intake for Sympetrum infuscatum females in forest gaps during interval oviposition (Poster) ■ Johansson, F.: Coping with stress: Strategies to deal with different conditions along environmental gradients (Plenary Talk) ■ Joop, G.: Stressed damselflies: Effects of natural enemies on immunity (Oral) Kalkman, V.: Mapping European dragonflies (Oral) ■ Kalkman, V.: Studies on Old World Megapodagrionidae (Poster) ■ Karlsson, M., K. Koch & G. Sahlén: Ovariole arrangements in Libellulidae (Poster) Kipping, J.: Long-term changes in dragonfly communities of the Okavango Delta, Botswana (Oral) ■ Kjer, K., F.L. Carle & M.L. May: Odonata phylogeny: update and prospects (Plenary Talk) ■ Koch, K.: Natural selection: a major impetus for the evolution of two reproductive strategies in Libellulidae? (Oral) ■ Malikova, E.: Odonata of the Amur River (Far East of Russia) and the problem of their conservation (Oral) ■ Martens, A.: Dragonfly larvae with scoop-shaped labium as effective predators of adult dytiscid beetles: from field data on strict habitat segregation on a tropical island to experimental evidence (Oral) ■ May, M.L. & P.S. Corbet: Fliers and perchers among Odonata: dichotomy or continuum? A reappraisal (Plenary Talk) ■ Mensing, V.: Increase of Sympetrum pedemontanum in the Netherlands: the knowledge of volunteers incorporated in local water board management (Oral) ■ Müller, O.: The use of digital techniques for providing scientific drawings in arthropod taxonomy (Poster) ■ Novelo-Gutiérrez, R. & J.A. Gómez-Anaya: Odonata diversity in western Mexico (Poster) ■ Odanga, J.J.: A preliminary study of impact of anthropogenic disturbance on dragonflies' habitats along Nairobi River (Poster) ■ Oertli, B.: Prediction of Odonata diversity: a tool for the assessment of freshwater biodiversity (Oral) ■ Osawa, H. & H. Ubukata: The influence of the change in the social environment of children on their recognition of dragonflies (Poster) ■ Ott, J.: Recent effects of climatic changes on the waters of the biosphere reserve "Palatinat Forest" and consequences for the web Natura 2000 (Oral) ■ Ott, J., M. Schorr, B. Trockur & U. Lingenfelder: Species protection programme for Oxygastra curtisii in Germany (Oral) ■ Pritchard, G.: The colonization of temperate latitudes by Neotropical Zygoptera (Oral) ■ Raatikainen, K., K. Tynkkynen, E. Haukilehto, M. Häkkinen & J.S. Kotiaho: Hybridization in Calopteryx damselflies: the role of male alternative mating tactics (Oral) ■ Sahlén, G., I. Flenner & K. Olne: Forestry and dragonfly diversity: the uncertain long-time survival of specialist species in Central Sweden (Oral) ■ Sánchez-Guillén, R. A. & A. Cordero-Rivera: Con-

specific sperm precedence in Odonata (Oral) ■ Schneider, W.: Odonata of the Arabian Peninsula (Oral) ■ Schütte, K.: Biogeography of Odonata in SE Madagascar (Poster) ■ Sherratt, T.N., H. Van Gossum, C.D. Beatty, A. Rashed & J. Skevington: Female-biased sex ratios and putative sex role reversal in an island community of damselflies (Oral) ■ Simaika, J.P.: What are they to us? Valuing dragonflies as service providers (Oral) ■ Suhling, F. & O. Richter: Predicting life cycle alterations due to climate change along thermal gradients: a case study on Gomphus vulgatissimus (Oral) ■ Svensson, E.I.: Selective predation on wing colouration and sexual isolation in calopterygid damselflies (Oral) ■ Tajima, Y. & M. Watanabe: Changes in the number of spermatozoa in sperm storage organs of Ischnura asiatica female during copulation (Oral) ■ Takahashi, Y. & M. Watanabe: Frequency-dependent mating attempt to female color dimorphism in Ischnura senegalensis during diurnal oviposition activity (Oral) ■ Teramoto, Y. & M. Watanabe: Population increase of the threatened damselfly, Mortonagrion hirosei, inhabiting an artificially established reed community (Oral) ■ Termaat, T., D. Groenendijk & J. Bouwman: How to protect endangered Red List species in the Netherlands: from ecological research to conservation (Oral) ■ Termaat, T., V. Kalkman & J. Bouwman: Trends in ranges of dragonflies in the Netherlands: does climate change play a role? (Poster) ■ Termaat, T., V. Mensing, D. Groenendijk & J. Bouwman: Dragonfly protection in the Netherlands: a stepwise approach (Poster) ■ Theischinger, G.: The Gondwanan aeshnids of Australia (Oral) ■ Thompson, D.J.: Movement in dragonflies (Plenary talk) ■ Ubukata, H.: Effectiveness of the evaluation of freshwater bodies using odonate assemblage in a management project of a wetland under the stress of regional development (Oral) ■ von Ellenrieder, N. & R.W. Garrison: Dragonfly guardians of the southern wing of the Yungas mountain rain forest (Poster) ■ von Ellenrieder, N. & J. Muzón: An updated checklist of the Odonata from Argentina (Poster) ■ Ware, J.L., M.L. May & K.M. Kjer: The most speciose group of dragonflies, Libelluloidea: phylogeny, dating and phylogeography (Oral) ■ Watanabe, M.: Changes in spatial distribution and species composition of larval dragonflies in the artificial reed community established as a habitat for Mortonagrion hirosei, an endangered brackish water damselfly (Oral) ■ Wikelski, M., D. Moskowitz & M.L. May: Tracking migratory Green Darner dragonflies with radiotelemetry (Poster) ■ Wildermuth, H.: Evolutionary traps for dragonflies in man-modified landscapes - old and new facts to polarization vision (Oral) Wilson, K.D.P.: Seasonal emergence observations of odonates in tropical forest streams at Endau-Rompin, Malaysia (Poster) ■ Zessin, W. Overview of the "giant dragonflies" of the Paleozoic (Oral) ■ Zessin, W. Some German Paleozoic Meganisoptera (Odonoptera) and their finding places (Poster)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

6371. Matthews, J. (2007): What do we know about dragonfly migration on the Texas coast?. In: Abbott, J.C. (Ed.): Dragonflies and Damselflies (Odonata) of Texas. Vol. 2: 9-11. (in English). [The author reports in detail on several occurrences of dragonfly migration (in most cases Anax junius) in Texas, USA or the Gulf of Mexico, and outlines some basics for future study of dragonfly migration in Texas.] Address: Matthews, J.,

Section of Integrative Biology, 1 University Station #C0930, The University of Texas at Austin, Austin, Texas 78712, USA. E-mail: johoma@mail.utexas.edu

6372. Michalski, J.; Oppel, S. (2007): *Papuagrion carcharodon* sp. nov. from southern New Guinea (Odonata: Coenagrionidae). *International Journal of Odonatology* 10(1): 81-86. (in English). ["*Papuagrion carcharodon*, a new coenagrionid from the rainforest of Papua New Guinea's Simbu Province, is described (holotype: 06°43'S, 145°05'E; 900 m a.s.l., 27 March 2004, to be deposited at Naturalis, Leiden). This new species is similar to *P. ekari* and *P. pesechem* but may be distinguished from both by the tooth-shaped lower branch of the male cerci, and the position of the tubercles on the female pronotum." (Authors)] Address: Michalski, J., 223 Mount Kemble Avenue, Morristown New Jersey 07960, USA. E-mail: jmichalski@easthanoverschools.org

6373. Mikolajewski, D.J.; Joop, G.; Wohlfahrt, B. (2007): Coping with predators and food limitation: testing life history theory for sex-specific larval development. *Oikos* 116(4): 642-649. (in English). ["For animals with complex life cycles, recent models of sexual size-dimorphism at maturity assume three key variables to optimise larval life history: activity in the larval stage, development time, and size at maturation. However, model predictions remain largely untested. In the territorial dragonfly *Libellula depressa* (Odonata) exhibiting a flexible development time we tested for male-biased sexual size-dimorphism and sex differences in larval activity, development time, and growth rate. Based on models we predicted that males achieved their larger size compared to females by a longer development rather than being more active. Results revealed that males took longer to develop and achieved a larger size than females but were not more active. Compared to males, females exhibited a higher growth rate which was not achieved by an activity-mediated increased food intake. We conclude that sexual size-dimorphism in species with a flexible development time is mediated by differences in developmental length but not activity. Furthermore, sexes differ in their plastic responses to food availability and predator presence making it necessary to consider sex-specific differences in testing further life history responses." (Authors)] Address: E-mail: bwohlfah@ucalgary.ca

6374. Miller, P.L. (2007): Dragonflies of the Madurai Kamaraj University Campus (Tamil Nadu, India). In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 273-322. (in English). ["Twenty five odonate species were observed on the Madurai Kamaraj University campus during the periods September 1987 and February 1988. Of these, proof of breeding on the campus was obtained for sixteen species and there was strong, circumstantial evidence of breeding in at least a further two species. Five bred only in permanent habitats and seven only in temporary habitats, the remainder probably doing so in both types. Sixteen species were sexually active at the largest habitat, a seasonal lake. Five further species, although commonly present, showed no sexual activity at campus sites." (Author) Special emphasis is given to oviposition behaviour.] Address: author diseased

6375. Mitra, A. (2007): Larval and adult behavioural patterns of some odonata species from Dehradun Valley. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 323-341. (in English). ["Different behavioural patterns of five odonata species have been studied in and around Asan reservoir, Dehradun, India from May 1995 to April 1997. The odonate imago feeds only on living prey and predominantly on flying insects. *Orthetrum s. sabina* has been seen to detect the perching prey more accurately. The mature males of all the five species arrive at the rendezvous earlier in the season during the day than females and form the territory. Only except *Brachythemis contaminata*, the males of other four species either show aggressive behaviour and chase display (in Anisoptera) or show threat display by 'abdomen raising' or 'wing opening' (in Zygoptera). Before wheel tandem lasts for a few seconds in *Crocothemis s. servilia* and *Brachythemis contaminata* while it lasts from 2-5 minutes in *Orthetrum s. sabina*. Comparatively, in zygoptera, before wheel tandem lasts longer and intramale sperm translocation occurs at that time. The copulatory wheel generally lasts for 6-22 seconds in *Crocothemis s. servilia*; 4-15 seconds in *Brachythemis contaminata*; 15-25 minutes in *Orthetrum s. sabina*; 10-15 minutes in *Ischnura a. aurora* and 35-45 minutes in *Ceriagrion coromandelianum*. All the three anisoptera oviposit by frequent dipping of their abdomen under water surface, whereas, the two zygopterans oviposit endophytically. Among the five species, only *Ceriagrion coromandelianum* oviposits in tandem. The duration of oviposition varies from 20-30 seconds in *Crocothemis s. servilia*; 3-6 minutes in *Orthetrum s. sabina*; 4-6 minutes in *Brachythemis contaminata*; 20-25 minutes in *Ischnura a. aurora* and 20-30 minutes in *Ceriagrion coromandelianum*. Odonata larvae are generalized predators and early instars prefer *Paramoecium* spp., *Daphnia* spp., diatoms etc., while later instars prey on chironomid larvae and pupae, mosquito larvae, ephemeropteran nymphs, *Branchiura* spp., *Limnodrilus* spp. and some nematodes. *Orthetrum s. sabina* larvae shows cannibalism. The last instar of all the five species stop feeding 2-3 days before emergence. Emergence occurs in *Crocothemis s. servilia* and *Orthetrum s. sabina* during 5.00 to 7.00 hours at a height of 6-25 cm and 10-30 cm from the water level, respectively. In *Brachythemis contaminata* emergence occurs during 12.30 to 2.00 hours at a height of 2.5-10 cm. Emergence occurs in *Ischnura a. aurora* during 12.00-2.00 hours and in *Ceriagrion coromandelianum* during 3.00-5.00 hours at a height of 8-12 cm and 10-15 cm from the water level, respectively." (Author)] Address: Mitra, A., Senior Lecturer, Sherubtse College, Kanglung, Bhutan. E-mail: amitodonata@yahoo.com

6376. Mola, L.M. (2007): Cytogenetics of American Odonata. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 153-173. (in English). ["The current knowledge of the cytogenetics of American odonates is reviewed. Chromosome studies have been performed in nearly 830 species and subspecies of 9 Zygoptera and 6 Anisoptera families. The species analysed were collected in 15 countries: Canada, the US and Mexico from North America; Guatemala and Costa Rica from Central America; Dominica and Jamaica from the Caribbean; and Venezuela, Surinam, Brazil, Peru, Bolivia, Chile, Argentina and Uruguay from South America. The proportion of species ana-

lysed differs from one country to another. Although the most frequent haploid numbers are 12, 13 and 14, there is a wide variation from $n=3$ in *Macrothemis hemichlora* from Bolivia and Brazil to $n=21$ in *Orthemis nodiplaga* from Argentina. Two distinctive characters of the order are the presence of holokinetic chromosomes and the post-reductional type of meiosis. The most frequent sex chromosome mechanism is XX/XO (female/male), the derived neo-XY system occurs in approximately 5.5% of the species, and the X1X1X2X2/X1X2Y multiple system is only present in *Micrathyrina unguolata*. The presence of a small pair of chromosomes, the m-chromosomes, is found in nearly 80% of the species. Studies of the distribution and composition of the heterochromatin are scarce. C-banding showed that autosomes usually have heterochromatic blocks in the telomeric regions, and that, in general, the sex chromosome in males is completely expositive, or shows an intermediate staining. In the few species analysed with fluorochromes, the heterochromatin seems to have a heterogeneous molecular composition. Odonata shows a high degree of karyotypic constancy at both intra- and inter-specific levels. However, polytypisms for the number of autosomes, the sex chromosome mechanism, and the size of the m-chromosomes were described in some species. Inter-specific variation in the chromosome number and/or in the sex chromosome mechanism were seen in some genera. Fusions and, less frequently, fragmentations are the main chromosome rearrangements involved in karyotype evolution." (Author)] Address: Mola, Liliana, Laboratorio de Citogenética y Evolución; Depto Ecología, Genética y Evolución; Facultad de Ciencias Exactas y Naturales; Universidad de Buenos Aires. Int. Güiraldes 2620, Ciudad Universitaria, Pabellón II, 4° Piso. (C1428EHA) Ciudad Autónoma de Buenos Aires. E-mail: limola@ege.fcen.uba.ar

6377. Monroy, L.P.D.; Realpe, E. (2007): Local assemblage patterns of odonates in Central Choco, Colombian Pacific. In: Tyagi, B.K. (Ed.): Odonata : Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 183-199. (in English). ["The dragonfly community in Central Chocó region was sampled with the aim of detecting patterns of local distribution and its relationship with the habitats' configuration. The Chocóan odonatofauna shows strong relationship with the presence of pluvial forest and it is postulated as a landscape condition for this ecological distribution pattern. The community shows relationship with variables like vegetation architecture associated to classified habitats, characteristics of aquatic environment, habitat's maturity and human impact. The species adaptability categorization is presented and features of specificity related to the habitats. Pluvial forest fragmentation, technified mining, the excessive logging constitute the main threats for the stenotopic species (*Archilestes nov. sp.*, *Leptobasis sp.*, *Metaleptobasis sp.*, *Philogenia cristallina*, *Palaemnema dentata*, *Heteragrion erythrogastrum*, *Perissolestes emotus*, *Neocordulia batesi*). These species were related with the presence of mature forest, and their abundances were always the lowest. The eurytopic species (*Erythrodiplax andagoya*, *E. famula lativittata*, *Micrathyrina dictynna*, *Zenithoptera americana*, *Ischnura hastata*) are related with lentic systems with strong anthropic intervention and their abundances showed to be much higher. For the first time, a preliminary list of 38 species for the odonatofauna of Central Chocó is presented." (Authors)] Address: Monroy, L. P.D. Zoology and Eco-

logy Aquatic Laboratory LAZOEIA Biologie Sciences Department, Universidad de los Andes Bogota, Colombia. E-mail: le-perez@uniandes.edu.co

6378. Needham, K.; Kenner, R. (2007): Chapter 14: Aquatic Insects. In: Davis, Neil and Rose Klinkenberg (editors). 2007. A Biophysical Inventory and Evaluation of the Lulu Island Bog, Richmond, British Columbia. Ecology Committee, Richmond Nature Park Society, Richmond, BC. Available on-line at <http://www.geog.ubc.ca/richmond/city/inventory2002.htm>: 5 pp. (in English).

6379. Novelo-Gutiérrez, R. (2007): The larva of *Aeshna williamsoniana* (Odonata: Anisoptera: Aeshnidae). Canadian Entomologist 139: 195-200. (in English, with French summary). ["The larva of *A. williamsoniana* Calvert, 1905 is described in detail, illustrated, and compared with other larvae of the genus and family. It is distinguished from its congeners by its granular integument, body mostly lacking hairlike setae, cerci with a row of spiniform setae along the lateroexternal margins, and dorsomedial margin of female epiproct with a row of spiniform setae. It does not particularly resemble any other larva of *Aeshna* or related genera described to date. The larval habitat is described for the first time." (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

6380. Ott, J. (2007): The expansion of *Crocothemis erythraea* (Brulle, 1832) in Germany - an indicator for climatic changes. In: Tyagi, B.K. (Ed.): Odonata : Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 201-222. (in English). [In this paper a detailed account of the northward expansion of *C. erythraea* in Germany is presented. While only a few decades ago the species was rare even in southern Germany, it is now found in nearly every federal state, in most of them autochthonous. The species conquered Germany from south to north, parallel to climatic changes in the country; similar expansions of this species are recorded in other European countries, as well as northward expansions of other southern species. The main reason for this range expansion are climatic changes, some consequences of which are discussed." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

6381. Ott, J.; Schorr, M.; Trockur, B.; Lingenfelder, U. (2007): Artenschutzprogramm für die Gekielte Smaragdlibelle (*Oxygastra curtisii*) in Deutschland an der Our. Invertebrate Ecology and Conservation Monographs 3: 130 pp. (in German, extended (5 pp.) English & French summaries). [This is a detailed documentation of a two year study of the single German population of *O. curtisii* with special emphasis on data necessary to conserve and monitor the population.] Address: Pensoft Publishers, Geo Milev Str. No. 13a, 1111 Sofia, Bulgaria. <http://www.pensoft.net>

6382. Paillisson, J.-M.; Reeber, S.; Carpentier, A., Marion, L. (2007): Reproductive parameters in relation to food supply in the whiskered tern (*Chlidonias hybrida*). Journal of Ornithology 148(1): 69-77. (in English, with German summary). [France; dragonflies and beetles belong to the most commonly eaten invertebrate

prey of *C. hybrida*. Address: Paillisson, J.-M., UMR-CNRS 6553 Ecobio, Biologie des Populations et de la Conservation, Campus de Beaulieu, Université de Rennes 1, Av. du Général Leclerc, 35042 Rennes, France. Email: jean-marc.paillisson@univ-rennes1.fr

6383. Penalva, R.; Costa, J.M. (2007): *Garrisionia aurindae* gen. and spec. nov. from the State of Bahia, Brazil (Anisoptera: Libellulidae). *Zootaxa* 1453: 33-40. (in English). ["*Garrisionia* gen. nov. is established for *Garrisionia aurindae* sp. n. (type species, holotype male and allotype female : Brazil: Bahia, Salvador, in Museu Nacional, Rio de Janeiro). Diagnoses and illustrations are given for similar genera of the region."] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

6384. Pessacq, P.; Costa, J.M. (2007): Three New Species of *Peristicta* Hagen in Selys (Odonata: Zygoptera: Protoneuridae) from Brazil. *Neotropical Entomology* 36(1) : 46-52. (in English, with Portuguese summary). ["Three new species of *Peristicta* Hagen in Selys from Brazil are described and illustrated: *P. janiceae* from Minas Gerais State (Diamantina, Gouvêa, Lagoa Santa, Serra do Caraça, Serra do Cipó, Urobotanga), *P. jalmosi* from Goiás State (Chapada dos Veadeiros, Reserva da Universidade de Brasília) and Minas Gerais State (Urobotanga, Lagoa Santa, Ponte Nova, São João del Rey,) and *P. muzoni* from Mato Grosso State (Serra da Bodoquena). An identification key for males of *Peristicta* is presented." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

6385. Popova, O.N. (2007): The dragonflies of forest-steppe in West Siberia: fauna, ecology and biology. In: Tyagi, B.K. (Ed.): *Odonata : Biology of Dragonflies*. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 89-104. (in English). ["Results of studying fauna, zoogeography, ecology and biology of Odonata in forest-steppe zone of West Siberia are discussed. In forest-steppe 68 species of dragonflies have been found, which is the richest in species landscape in Siberia. The highest species diversity is noted in the remote parts - the Urals and Prislair ones. The number of species common for the whole area is 44. Stationary study (in the Baraba part of West Siberian forest-steppe) of local dragonfly population made possible to obtain data on its species composition, number, biotopical distribution and structure of larvae and imago dominance and to ascertain life cycles of several mass species." (Author)] Address: Popova, O., Institute of Animal Systematics and Ecology, Siberian Division of Russian Academy of Sciences, Frunze str. 11, Novosibirsk 630091, Russia e. mail: pc@eco.nsc.ru

6386. Prasad Rao, R.S.; Girish, M.K.S. (2007): Road kills: Assessing insect casualties using flagship taxon. *Current Science* 92(6): 830-837. (in English). ["Roads and traffic are the central features of human development, but a severe threat to forest and wildlife. In this study we have assessed the extent of insect road kills in two national parks and a suburb-scrubland. The diversity and abundance of insect casualties were enumerated and compared across sites. Dragonflies and

butterflies were the major insect kills with higher casualties on Sunday, which is associated with increased traffic load. Butterfly road kills were represented by high species diversity. This study reveals severity of invertebrate/insect casualties on road, conservation needs and surprising new frontiers of road ecology." (Authors)] Address: R. Shyama Prasad Rao, Geen Club, No. 1456, E&F Block, Ramakrishna Nagar, Mysore 570 022, India. E-mail: rsprao101@yahoo.co.in

6387. Prokop, J.; Prikryl, T.; Dostal, O.; Nel, A. (2007): *Oligaeschna kvaceki* sp. nov., a new fossil dragonfly (Odonata: Aeshnidae) from the middle Oligocene sediments of northern Moravia (Western Carpathians). *Geologica Carpathica* 58(2): 181-184. (in English). ["A new species of fossil dragonfly *Oligaeschna Piton et Theobald*, 1939 (*O. kvaceki* sp. nov.) is described from Middle Oligocene strata of northern Moravia and compared with all closely related species. The current record documents a rather broad distribution and probably also high abundance of *Oligaeschna* in Eurasia during the Oligocene and Miocene." (Authors)] Address: Prokop, J., Department of Zoology, Charles University in Prague, Vinicna 7, CZ-128 44 Praha 2, Czech Republic. E-mail: jprokop@natur.cuni.cz

6388. Querino, R.B.; Pinto, J.D. (2007): A new *Hydrophylita* (Hymenoptera: Trichogrammatidae) from the Neotropics, with a key to species. *Zootaxa* 1437: 47-54. (in English). ["*Hydrophylita neusae* n. sp. is described and illustrated. *Hydrophylita* is a small genus of Trichogrammatidae which now includes four species, all known to attack eggs of damselflies (Odonata: Zygoptera). A key to species is included and those known from the Neotropics are illustrated." (Authors)] Address: Querino, R.B., Embrapa Roraima, BR 174 Km 8, Distrito Industrial, 69301-970, Boa Vista, Roraima, Brasil. E-mail: ranyse@cpafrr.embrapa.br

6389. Raab, R.; Chovanec, A.; Pennerstorfer, J. (2007): *Libellen Österreichs*. X, 345 pp: ISBN: 978-3-211-33856-8. (in German). [The expensive hard cover version of this book was reviewed in OAS 5733. It was clear after its publication that the price of the book would limit its distribution among European odonatologists. With no change in contents, Springer Publishers have released a paper back edition of the book. The price was reduced to a third of the hard cover version, and there is now no longer a reason not to buy this book. (Martin Schorr)] Address: Springer Verlag GmbH, Sachsenplatz 4-6, A-1201 Wien, Austria. www.springer.at

6390. Röbbelen, F. (2007): *Libellen in Hamburg*. Rote Liste und Artenverzeichnis 2. Fassung. Herausgeber: Freie und Hansestadt Hamburg, Behörde für Stadtentwicklung und Umwelt, Hamburg: 23 pp. (in German). [Hamburg, Germany; red list of threatened Odonata.] Address: Herausgeber: Freie und Hansestadt Hamburg, Behörde für Stadtentwicklung und Umwelt, Stadthausbrücke 8, 20355 Hamburg. E-mail: www.bsu.hamburg.de

6391. Rouquette, J.R.; Thompson, D.J. (2007): Roosting site selection in the endangered damselfly, *Coenagrion mercuriale*, and implications for habitat design. *Jour. Insect. Conserv.* 11(2): 187-193. (in English). ["A successful conservation strategy for an insect species should Address the habitat requirements of all life stages and all activities performed by those life stages. In

this paper the night-time roosting habitat and behaviour of the endangered damselfly *C. mercuriale* was investigated by marking damselflies with UV fluorescent paint. Night-time observations revealed that individuals did not roost together and those that were recorded on more than one occasion did not return to the same spot each night. There was no apparent preference for roosting close to the watercourses. *C. mercuriale* roosted towards the top of the vegetation and this vegetation was considerably taller than the mean height of the vegetation in the study area. Adults were strongly associated with two tussock-forming monocots, *Juncus inflexus* and *Deschampsia cespitosa*. Differences in the abundance of these plants were shown to result in large differences in the numbers of *C. mercuriale* roosting in different parts of the site. The importance of providing these structural elements of habitat as part of a wider conservation strategy for this species is discussed." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

6392. Rundle, S.D., Bilton, D.T.; Abbott, J.C.; Foggo, A. (2007): Range size in North American *Enallagma* damselflies correlates with wing size. *Freshwater Biology* 52(3): 471-477. (in English). ["(1.) Cross-species macroecological comparisons in freshwater invertebrates have been restricted by a lack of large-scale distributional data, and robust phylogenies. Here, we use data from the Odonata Central database to explore body length-range size and wing length-range size relationships in damselflies from the genus *Enallagma*; the recent publication of a phylogeny for this group meant that, as well as a cross-species analysis, we were able to assess relationships in a phylogenetically controlled manner. (2.) For cross-species comparisons, only wing length showed significant (positive) regression relationships with range size and occupancy, although the inclusion of body length in multiple regressions increased the fit of the models. Damselflies with larger wings relative to their body length had larger distributions, a result confirmed by a significant positive relationship between range size and residuals from the regression of wing size on body size. (3.) For the phylogenetically controlled analyses, only wing length contrast scores were significantly related to distribution patterns and entered into regression models; the significant positive relationships between wing length contrasts and both range size and occupancy contrasts suggested that evolutionary increases in wing length had occurred alongside range expansions. (4.) Together these results suggest that species of *Enallagma* with larger wings (both absolute and relative to body length) tend to be more widely distributed in North America and that the evolution of wing size may have played a role in range expansion. No such relationships were evident for body size. We discuss the potential importance of wing morphometrics for studying the evolutionary ecology of freshwater insects." (Authors)] Address: Rundle, S., Marine Biology and Ecology Research Centre, School of Biological Sciences, University of Plymouth, Plymouth, PL4 8AA, U.K. E-mail: srundle@plym.ac.uk

6393. Schappert, P. (2007): New Odonata for Bastrop County and the Stengl "Lost Pines" Biological Station. In: Abbott, J.C. (Ed.): *Dragonflies and Damselflies (Odonata) of Texas*. Vol. 2: 12-16. (in English). [Some an-

necdotal reports on dragonfly searching in times of the 2005/2006 drought in central Texas, USA, with emphasis on colonisation of ponds after heavy rainfall. E.g. 3 *Pachydiplax longipennis* were seen before rainfall, while only 4 hours after the rain had stopped, more the 600 specimens were observed at a pond filled again with water.] Address: Schappert, P., Stengl "Lost Pines" Biological Station, University of Texas, 401 Old Antioch Road, Smithville, TX 78957, USA. E-mail: philjs@mail.utexas.edu

6394. Schlotmann, F. (2007): Die Libellen (Insecta: Odonata) des Guntersblumer Unterfeldes. *Mainzer naturwiss. Archiv / Beiheft* 30: 76-87. (in German, with English summary). [Rheinland-Pfalz, Germany; "With the shift of drinking water wells in the "Unterfeld Guntersblum" by the Water Supply Rhinehesse GmbH the dragonflies of the area were monitored in the years 1994 and 1997 to 2001 as a check of compensation measures. Altogether 34 species were found under which numerous are endangered in Rhineland-Palatinate. The occurrence of *Lestes barbarus*, *Anax parthenope* and *Leucorrhinia caudalis* has to be especially pointed out. The installation of numerous small ponds as a compensation measure led to the stabilization of the dragonfly populations as well as to the new settlement of several species." (Author)] Address: Schlotmann, F., Weserstr. 11, D-55296 Harxheim, Germany. Email: frank.schlotmann@gmx.net

6395. Seidenbusch, R.; Heidemann, H. (2007): An experimental key for the differentiation of the exuviae of the Southern Darter *Sympetrum meridionale* (Sélys) and the Common Darter *S. striolatum* (Charpentier), with notes on the Ruddy Darter *S. sanguineum* (Müller). *J. Br. Dragonfly Society* 23(1): 25-32. (in English). ["A study was carried out to develop a diagnostic key for identification of the exuviae of [...] *S. meridionale* and *S. striolatum*. Until now, no reliable key has existed to differentiate the exuviae of these very similar species. Previous keys have suggested that they can be discriminated using dorsal and lateral spines, features which in our experience have proved to be very variable and unreliable. Therefore, we propose an experimental key which separates these species without reference to such spines. About two thirds of the exuviae of *S. meridionale* and *S. striolatum* can be separated by the ratio of the width of the submentum to the length of the mentum. The remaining third fall into an intermediate section but can be separated by using further ratios of morphological measurements. In our experience, using all the diagnostic features presented in this paper will allow exuviae of these species to be separated reliably." (Authors)] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany. E-mail: seidenbusch@freenet.de

6396. Soldan, T.; Zeleny, J. (2007): Book Review: Wildermuth et al: *Odonata. Die Libellen der Schweiz. Fauna Helvetica* 12. *Eur. J. Entomol.* 104(2): 284. (in English). [Review of the book abstracted as OAS 5005.] Address: not stated

6397. Stav, G.; Kotler, B.P.; Blaustein, L. (2007): Direct and indirect effects of dragonfly (*Anax imperator*) nymphs on green toad (*Bufo viridis*) tadpoles. *Hydrobiologia* 579(1): 85-93. (in English). ["We conducted an artificial pond experiment to assess the direct and indirect effects of predation on *Bufo viridis* tadpoles. We ran

three treatments: free Anax (unrestrained predatory dragonfly nymph Anax imperator), caged Anax (non-consumptive effects), and control (no Anax). Anax showed both strong consumptive and non-consumptive effects on Bufo tadpoles. Free Anax eliminated all of the tadpoles within six days. Tadpoles preferred the shady side of the ponds. Caged Anax caused tadpoles to increase their spatial preferences. Tadpoles avoided the center of the pond, and in the presence of the caged predator, they were found in the center even less. Tadpoles also showed a strong preference for crowding together, and in the presence of a caged Anax, they tended to crowd more. Moreover, Bufo metamorphosed earlier and at a larger size in the caged Anax ponds, possibly by providing extra food resources due to the extra organic matter excreted by the predators." (Authors)] Address: Stav, G., Jacob Blaustein Institute for Desert Research, Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev, Sede-Boqer Campus, 84990 Negev, Israel. Email: gstav@tulane.edu

6398. Stoks, R.; De Block, M. (2007): Causes and costs of lamellae autotomy in damselfly larvae: a review. In: Tyagi, B.K. (Ed.): Odonata : Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 241-255. (in English). ["Autotomy, the amputation of a body part at a breakage plane, is a well-known escape mechanism when animals are caught by a predator. Here, we review the ecological causes, field occurrence, and costs of lamellae autotomy in damselfly larvae. Lamellae autotomy is widespread in nature and is an important escape mechanism when caught by invertebrate predators and small fish, but has no survival advantage against large fish. However, associated with the other functions of lamellae, autotomy carries short-term costs in the form of a reduced ability to withstand low oxygen levels and high temperatures, and an increased vulnerability to conspecific and heterospecific predation. To deal with the latter, larvae show threat-sensitive antipredator behaviour after autotomy. The resulting reduced food intake together with their increased predator-induced stress, may explain negative effects on mass and size at emergence and wing asymmetry. Based on the known short-term costs, long-term costs on adult fitness and a regulatory role of autotomy in population regulation are likely, but await experimental proof." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

6399. Subramanian, K.A. (2007): Endemic odonates of the Western Ghats: habitat distribution and conservation. In: Tyagi, B.K. (Ed.): Odonata : Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 257-271. (in English). ["The habitat distribution of endemic odonates of Western Ghats is studied based on field work and published literature. One hundred and seventy six species of odonates with 68 endemics are reported from the Western Ghats. The breeding habitats of 50 endemic species are known. The current field survey discovered new populations of three monotypic species from the region. Most of the endemic species are restricted to riverine habitats as compared to non-endemics. Streams flowing through evergreen forests and Myristica swamps support high diversity of endemics. Draining of Myristica swamps, diversion of streams for agricultu-

re and structural alterations are major threats to the conservation of endemic species of the region. Long term conservation of endemic odonate fauna of region should focus on conservation of riverine habitats of the region." (Author)] Address: Subramanian, K.A., Centre for Ecological Sciences, Indian Institute of Science, Bangalore- 560 012, India. E-mail: subbu@ces.iisc.emet.in

6400. Theischinger, G.; Richards, S.J. (2007): Three new damselfly species from Papua New Guinea (Zygoptera: Megapodagrionidae, Coenagrionidae). In: Tyagi, B.K. (Ed.): Odonata : Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 33-43. (in English). ["Three species of damselflies from Eastern Highland Province, Papua New Guinea are described as new. They are: Argiolestes angulatus sp. n. (Holotype male: Mamaifu, 21-XI-1997), Argiolestes fornicatus sp. n. (Holotype male: Mamaifu, 29-XI-1997) and Austroagrion kiautai sp. n. (Holotype male: montane lake behind Mamaifu, 27-XI-1997). Diagnostic characters of the adults are illustrated and the affinities of the species are discussed. All type material is deposited at the South Australian Museum, Adelaide." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

6401. Thomas, B. (2007): Williamson County Gold: Chandler Creek. Abbott, J.C. (Ed.): Dragonflies and Damselflies (Odonata) of Texas. Vol. 2: 7-8. (in English). [USA, Texas, checklist of odonate records resulting ongoing from 2004] Address: E-mail: Rthomas5@austin.rr.com

6402. Toms, R.B. (2007): Rooting the phylogenetic tree for winged insects: independent adaptations to terrestrial life. African Invertebrates 48(1): 203-211. (in English). ["Although numerous articles have been published on insect phylogeny using a great variety of techniques, there is no consensus on the nature of the first winged insects, the ancestors of holometabolous insects or the causes for the origin of metamorphosis. This discord has resulted in the lack of secure foundations within entomological theory. However, several recent articles provide key information which may help to resolve some of the long-standing disputes. Some biologists have argued that the first winged insects might have been amphibiotic rather than terrestrial and that metamorphosis might have originated as an adaptation to amphibiotic life. Thus entomological theory may now be passing through a paradigm shift where, for the first time, the phylogenetic tree for all insects may be firmly rooted." (Author) The paper includes references to the Odonata.] Address: Toms, R.B., Indigenous Knowledge Systems, Transvaal Museum, Northern Flagship Institution, P.O. Box 413, Pretoria, 0001 South Africa. E-mail: toms@nfi.co.za

6403. Tyagi, B.K.; Kiauta, M.A.J.E. (2007): Professor Bastiaan Kiauta - an extraordinary and outstanding odonatologist. In: Tyagi, B.K. (Ed.): Odonata : Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: 1-24. (in English). [(1) Brief account on the odonatological vita of B. Kiauta with emphasis to Indian odonatology. (2) Odonatological bibliography of B. Kiauta covering 1954 - 2006.] Address: Kiauta, M., P.O. Box 256, NL-3720 AG Bilthoven, The Netherlands. E-mail: mb.kiauta@12move.nl

6404. Tyagi, B.K. (2007): Odonata: Biology of Dragonflies. Jodhpur, Scientific Pub., 2007, xx, 368 pp., tables, figs., ISBN 81-7233-482-6: xx, 368 ppp. (in English). [Festschrift dedicated to Prof. Dr. B. Kiauta. Contents: Foreword/Preface by Norman Moore and Kiyoshi Inoue. Acknowledgements. 1. Professor Bastiaan Kiauta - an extraordinary and outstanding odonatologist/B.K. Tyagi and M.A.J.E. Kiauta. 2. Studies on neotropical protoneuridae. 2. *Neoneura Kiautai* spec. nov. from Southeastern Brazil (Zygoptera, Protoneuridae) /Angelo B.M. Machado. 3. Three new damselfly species from Papua New Guinea (Zygoptera: Megapodagrionidae, coenagrionidae)/G. Theischinger and S.J. Richards. 4. Dragonflies from the Okavango swamps (Botswana, Southern Africa) in winter/Henri J. Dumont. 5. *Cordulegaster insignis* (Schneider, 1845) in Bulgaria with notes on its biology and ecology/Milen Marinov, Burkhard Grebe and Yordan Kutsarov. 6. The dragonfly fauna of the Shivapuri Hills, Nepal (Odonata: Zygoptera, Anisozygoptera, Anisoptera)/T. Brockhaus, S.G. Butler, R.G. Kemp and G.S. Vick. 7. The composition and history of Siberian odonate fauna/A.Yu. Haritonov. 8. The dragonflies of forest-steppe in West Siberia: fauna, ecology and biology/O.N. Popova. 9. Odonata of Mexico revisited/E. Gonzalez Soriano and R. Novelo Gutierrez. 10. Odonata inventories in British Columbia, Canada: determining the conservation status of odonata species/Robert A. Cannings, Leah R. Ramsay and Sydney G. Cannings. 11. Cytogenetics of American Odonata/Liliana M. Mola. 12. Are the observed dispersal capacities in damselfly species sufficient to cope with the ongoing rapid shift of climate zones?/J. Beukema. 13. Local assemblage patterns of odonates in Central Choco, Colombian Pacific/L. Perez. D. Monroy and E. Realpe. 14. The expansion of *crocothemis erythraea* (Brulle, 1832) in Germany - an indicator for climatic changes/J. Ott. 15. Adaptationist approach of reproductive behaviour in Libellulidae: a case report on *Diastatops obscura* Fabricius/J.B. Irusta and A. Araujo. 16. Causes and costs of lamellae autotomy in damselfly larvae: a review/R. Stoks and M. De Block. 17. Endemic odonates of the Western Ghats: habitat distribution and conservation/K.A. Subramanian. 18. Dragonflies of the Madurai Kamaraj University Campus (Tamil Nadu, India)/P.L. Miller. 19. Larval and adult behavioural patterns of some odonata species from Dehradun Valley/Amit Mitra. 20. *Coellicia hoanglienensis* spec. nov., a new platynemid damselfly from Hoang Lien mountains in the North of Vietnam (Zygoptera: Platynemididae)/Do Manh Cuong. 21. Observations on mating and oviposition behaviour of *Tetrathemis platyptera* Selys, 1878/Kiran C.G. and F.K. Kakkassery. 22. About the odonata ethnic names in the Serbian linguistic area /Milos Jovic. 23. Discovering the dragonfly wealth of Kerala - the God's own land - in South India: a travelogue/Dan Barta.] Address: Tyagi, B.K., Centre for Research in Medical Entomology (ICMR), 4-Sarojini Street, Chinna Chokkikulam, Madurai 625005 (Tamil Nadu), India. E-mail: bkjyagi@sify.com

6405. Wagner, H.; Ott, J. (2007): Naturschützer: Insekten sind erste Opfer. Libellen bilden ein Frühwarnsystem für Klimaänderungen. Bestand im Pfälzerwald gefährdet. Rheinzeitung vom 7.3.2007: (in German). [Interview with Jürgen Ott on Odonata as indicators of climatic change in a German newspaper.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

6406. Ward, L.; Mill, P.J. (2007): Long range movements by individuals as a vehicle for range expansion in *Calopteryx splendens* (Odonata: Zygoptera). Eur. J. Entomol. 104(2): 195-198. (in English). ["(1.) Flight activity in zygopterans is generally restricted to short-range movements associated with foraging, reproductive activity and escape. Indeed, previous studies have suggested that *Calopteryx* species, including *C. splendens*, are relatively sedentary species, with a low tendency for long distance movements. (2.) Recent observations suggest that *C. splendens* is expanding its northern range in the UK; in the northeast the species is now well established in Northumberland and, in the northwest, has recently spread into south-west Scotland. The current study aimed to investigate the mobility and dispersal tendency of *C. splendens* in a well-established breeding population in NE England. (3.) A mark-release-recapture study was carried out on a population of *C. splendens* along a section of the River Wharfe, West Yorkshire, UK. 831 adult *C. splendens* were marked uniquely for individual identification in order to monitor the day-to-day, and overall, distance and direction of movement for each individual. Of these 381 were recaptured at least once. (4.) The majority of males (85%) and females (88%) moved a distance of 100 m or less and only five of the recaptured individuals (1.3%) moved a minimum distance in excess of 500 m. Although the median distance moved by males was greater than that for females, this was not significant. In addition, there was no significant difference in the number of either males or females moving upstream as opposed to downstream. (5.) The results are compared with those from other studies on calopterygid movement. Although most individual *C. splendens* stay within a suggested home range of approximately 300 m, clearly individuals have the potential to cover relatively long distances, and it is these latter movements that play a fundamental role in increasing the range of the species." (Authors)] Address: Mill, P.J., Fac. Biological Sciences, L.C. Miall Building, University of Leeds, Leeds, LS2 9JT, UK. E-mail: p.j.mill@leeds.ac.uk

6407. Watts, P.C.; Rousset, F.; Saccheri, I.J.; Leblois, R.; Kemp, S.J.; Thompson, D.J. (2007): Compatible genetic and ecological estimates of dispersal rates in insect (*Coenagrion mercuriale*: Odonata: Zygoptera) populations: analysis of 'neighbourhood size' using a more precise estimator. *Molecular Ecology* 16(4): 737-751. (in English). ["Genetic and demographic estimates of dispersal are often thought to be inconsistent. In this study, we use *C. mercuriale* as a model to evaluate directly the relationship between estimates of dispersal rate measured during capture-mark-recapture fieldwork with those made from the spatial pattern of genetic markers in linear and two-dimensional habitats. We estimate the 'neighbourhood size' (N_b) - the product of the mean axial dispersal rate between parent and offspring and the population density - by a previously described technique, here called the regression method. Because *C. mercuriale* is less philopatric than species investigated previously by the regression method we evaluate a refined estimator that may be more applicable for relatively mobile species. Results from simulations and empirical data sets reveal that the new estimator performs better under most situations, except when dispersal is very localized relative to population density. Analysis of the *C. mercuriale* data extends previous results which demonstrated that demographic and genetic estimates of N_b by the regression method are

equivalent to within a factor of two at local scales where genetic estimates are less affected by habitat heterogeneity, stochastic processes and/or differential selective regimes. The corollary is that with a little insight into a species' ecology the pattern of spatial genetic structure provides quantitative information on dispersal rates and/or population densities that has real value for conservation management." (Authors)] Address: Watts, P. C.; School Biological Sciences, The Biosciences Building, Crown Street, University of Liverpool, Liverpool, L69 7ZB, UK. E-mail: p.c.watts@liv.ac.uk

6408. Watts, P.C.; Thompson, D.J.; Allen, K.A.; Kemp, S.J. (2007): How useful is DNA extracted from the legs of archived insects for microsatellite-based population genetic analyses?. *Journal of Insect Conservation* 11(2): 195-198. (in English). ["DNA obtained from museum specimens provides a historical perspective on levels of genetic diversity. Archived samples are irreplaceable so it is desirable that only parts of the specimens are used, which constrains the amount of DNA obtained from small taxa. However, at present there are no quantitative data on yields of DNA from such samples. In this paper we determine the amount of DNA that may be extracted from the legs of museum-archived specimens of the damselfly *Coenagrion mercuriale* (Charpentier) and the suitability of this DNA for PCR-amplification of nuclear genetic loci (microsatellites). We find that (i) the yield of DNA correlates with the genotyping success rate and (ii) the amount of DNA obtained from the legs decreases with time since sample collection until 1954, before which no DNA could be detected (although DNA may be present in very low quantities). This cut-off point for successful DNA extraction corresponds with the date until reliable genotypes could be obtained by routine PCR. Thus, air-dried insect legs more than 50 years old appear to have limited usefulness for studies that seek to amplify many nuclear loci without the use of other techniques that may be used to increase the possible low-quantities of template DNA present." (Authors)] Address: Watts, P.C., Marine and Freshwater Biology Research Group, The Biosciences Building, School of Biological Sciences, Liverpool University, Crown Street, Liverpool, L69 7ZB, UK. E-mail: phill@liv.ac.uk

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lopteryx atrocyana is confirmed from Chinese territory. Keys are provided for the identification of males of all known species of Rhipidolestes and Chinese Megalolestes." (Authors)] Address: Wilson, K.D.P., 118 Chatsworth Road, Brighton, BN1 5DB, UK. E-mail: kdpwilson@gmail.com

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ger, J., Limnological Department, Institute of Ecology and Conservation Biology, University of Vienna, Althanstr. 14, A-1090 Vienna, Austria

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darstvennyi Universitet) Series Chemistry, Biology and Pharmaceutics 2003(2): 108-115. (in Russian). [Diet overlap and other food interactions of four species of amphibians and reptiles were studied in the town of Voronezh (Russia). The stomach contents of *Bufo viridis*, *Pelobates fuscus*, *Rana ridibunda*, *Lacerta agilis* were examined. Odonata are mentioned to occur in all but *Bufo viridis*, in *Rana ridibunda* they were found in more than 20% of the stomach contents investigated. Odonata larvae were treated as a separate category and were only found in *Rana ridibunda*, again in more than 20% of the individuals. For Odonata and odonate larvae combined this figure varied between 10 and 27% from June to September.] Address: no details stated

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6440. Giberson, D.J.; Dobrin, M. (2003): Species composition, distribution, and seasonal patterns of dragonflies and damselflies of Prince Edward Island National Park. Parks Canada - Technical Reports in Ecosystem Science Report 37: IV, 30 pp. (in English, with French summary). ["Thirty-eight species of Odonata [...] were found near ponds and streams in Prince Edward Island National Park of Canada between 1997 and 1999. This figure represents about 2/3 of the species so far reported from Prince Edward Island. The Brackley to Dalvey region of the park showed the highest diversity with 36 species, compared to only 19 species in the Cavendish to Rustico area and 13 species in the Greenwich area. This diversity pattern reflects the high diversity of aquatic habitats in the Brackley to Dalvey area, compared to other park regions. The primary flight period for adult odonates was July and August, with 31 of the species found during this period, but several species were found in early June and as late as October."] (Authors) Address: Prince Edward Island National Park, 2 Palmer's Lane, Charlottetown, PEI, c1a 5v6, Canada

6441. Kandibane, M.; Mahadevan, N.R.; Gunathilagaraj, K. (2003): Odonata in irrigated rice ecosystem of Madurai, Tamil Nadu. *Zoos' Print* 18(7): 1155-1156. (in English). [India; 12 Odonata species are listed and briefly commented.] Address: Kandibane, M., Agricultural College and Research Institute, Madurai, TN, 625104, India India

6442. Roque, F.O.; Trivinho-Strixino, S.; Strixino, G.; Agostinho, R.C (2003): Benthic macroinvertebrates in streams of the Jaragua State Park (Southeast of Brazil) considering multiple spatial scales. *Journal of Insect Conservation* 7(2): 63-72. (in English). ["The study of the distribution of macroinvertebrates, considering multiple hierarchic scales and incorporating different spatial dimensions to assess the role of disturbance in aquatic environments, can contribute to conservation, environmental evaluation and improvement of analytical tools in ecology. The object of this study was to evaluate the diversity of macroinvertebrates in streams of the Jaraguá State Park (SP-Brazil), considering three spatial scales: mesohabitats, segments, and hydrographic basins with different land use parameters (forest, mixed agriculture, organic pollution and deforestation). The samples, collected with a Surber collector, were taken

in the beginning of the dry season of 1998. Analysis of data through multiple correspondence analysis showed the importance of variables in macroscale (land use) for the distribution of the fauna in general and the relevance of variability in mesoscale for some taxa in particular. The work points to the necessity of considering different levels of spatial heterogeneity for the conservation of biodiversity in the streams of the park." (Authors) Odonata are considered on the genus level.] Address: Roque, F.O., Programa de Pós Graduação em Ecologia e Recursos Naturais UFSCar, Brazil. E-mail: pfor@iris.ufscar.br

6443. Schulz, D. (2003): Ein weiteres Vorkommen der Östlichen Moosjungfer (*Leucorrhinia albifrons* (Burmeister 1839)) in Mecklenburg-Vorpommern. Mitteilungen der Naturforschenden Gesellschaft West-Mecklenburg 3(1): 73-74. (in German). [Landkreis Uecker-Randow, south of Torgelow, Germany; records of a few specimens in 1999, no records in 2001.] Address: Schulz, D., Paul-Holz-Ring 18, 17309 Pasewalk, Germany. E-mail: DEWSchulz@aol.com

6444. Staniczek, A.H. (2003): Neufund der Steinfliege *Capnopsis schilleri* Plecoptera: Capniidae in Baden-Württemberg. Mitt. ent. Ver. Stuttgart 38: 9-12. (in German, with English summary). [Baden-Württemberg, Germany, the paper contains a passing reference to *Calopteryx virgo*.] Address: Staniczek, A.H., Staatliches Museum für Naturkunde, Rosenstein 1, 70191 Stuttgart, Germany. E-mail: staniczek.smns@naturkundemuseum-bw.de

2004

6445. Akamatsu, F.; Toda, H.; Okino, T. (2004): Food source of riparian spiders analyzed by using stable isotope ratios. Ecological Research 19: 655-662. (in English). ["We analyzed the food source of riparian spiders in a middle reach of the Chikuma River, Japan, by using stable isotope ratios of carbon and nitrogen. The carbon and nitrogen isotope ratios of attached algae were higher than those of terrestrial plants, reflecting a large carbon isotope fractionation in terrestrial plants and a difference in nitrogen sources. The carbon isotope ratios of terrestrial insects were similar to those of the terrestrial plants, and the ratios of aquatic insects were scattered between those of the terrestrial plants and the attached algae. The carbon and nitrogen isotope ratios of spiders were intermediate between those of the terrestrial and aquatic insects. The two-source mixing model using the carbon isotope ratio showed that the web-building spiders utilized both the terrestrial and aquatic insects, with large contribution by the aquatic insects (54% on average with a maximum of 92% among spider's taxa collected in each zone), in the riparian area in a middle reach of the Chikuma River. The large contribution of the aquatic insects was often observed for the spiders collected near river channel (<5 m) and for the horizontal web-building spiders collected across the riparian area. The relative contribution of the aquatic insects might be related with food availability (distance from river channel) and spider's food preference reflected in their web types (horizontal vs. vertical). Our results showed that organic materials produced in the river channel, in the riparian area, and in the

terrestrial area surrounding the riparian area were mixed at the carnivorous trophic level of riparian spiders." (Authors) "The $\delta^{13}\text{C}$ of Odonata (*Calopteryx japonica*) were lower than the average $\delta^{13}\text{C}$ of the other aquatic insects."] Address: Toda, H., Department of Environmental Sciences, Faculty of Science, Shinshu University, 3-1-1 Asahi, Matsumoto 390-8621, Japan. Email: h-toda@gipac.shinshu-u.ac.jp

6446. Bechev, D.N.; Stojanova, A.M. (2004): Geographic localities of invertebrates of conservation importance in the Rhodopes (Bulgaria). Trav. Sci. Univ. Plovdiv, Animalia 40(6): 19-25. (in Bulgarian, with English summary). [With focus on the invertebrate species from the lists of: IUCN Red List, Habitat Directive DCE 92/44/EEC, Bern Convention, ESC Red List, CO-RINE biotopes Check-list and Law for Biodiversity of Bulgaria, several records are documented including *Lestes dryas*, *Coenagrion hastulatum*, *Cordulegaster heros*, and *Somatochlora flavomaculata*.] Address: Bechev, D.N., Department of Zoology, University of Plovdiv, 24 Tzar Assen Str., BG-4000 Plovdiv, Bulgaria. E-mail: bechev@pu.acad.bg

6447. Boyce, D.C. (2004): A review of the invertebrate assemblage of acid mires. English Nature Research Reports Number 592: 110 pp. (in English). [A briefly commented checklist of British acid mire species is presented including the Odonata which are represented by *Ceragrion tenellum*, *Coenagrion meruriale*, *Leucorrhinia dubia*, *Aeshna juncea*, *Sympetrum danae*, and *Orthetrum coerulescens*. Surprisingly, *A. caerulea* and *Somatochlora arctica* are not considered.] Address: D C Boyce, D.C., 1 Rosemary Lane, Dulverton, Somerset, TA22 9DP, UK

6448. Burkart, G.; Burkart, W. (2004): Nya trollsländeobservationer (Odonata) på Gotland. Körkmacken 40: 4-5. (in Swedish). [Current records of *Sympecma fusca* and *Anax imperator* are documented and mapped.] Address: Burkart, W., Am Emel 7, D-27412 Willstedt, Germany. E-mail: weguburkart@gmx.de

6449. Colon-Gaud, J.-C.; Kelso, W.E.; Rutherford, D.A. (2004): Spatial distribution of macroinvertebrates inhabiting Hydrilla and Coontail beds in the Atchafalaya basin, Louisiana. J. Aquat. Plant Manage. 42: 85-91. (in English). ["Hydrilla [*Hydrilla verticillata* (L.f.) Royle] became established in the Atchafalaya River Basin (ARB) in south central Louisiana during the 1970s, and now dominates the submergent macrophyte community. We examined the potential effects of this shift in macrophyte composition on the distribution of phytomacrofauna by comparing water quality and macroinvertebrate assemblage structure in canopy and sub-canopy habitats at edge and interior locations within hydrilla and native coontail (*Ceratophyllum demersum* L.) beds during the latter stages of the 2001 flood pulse. Both plant species exhibited similar water quality characteristics during the study, with significantly higher temperature, dissolved oxygen, and pH levels in canopy habitats. Principal components analysis of log-transformed macroinvertebrate densities identified four assemblages that together accounted for 63.5% of the variation in the density data. The Gastropoda-Hydrachnida assemblage exhibited higher densities in coontail during May-June (declining river stages), and was more abundant at interior locations in both macrophyte beds during July (stable river stages). The Hemiptera-Amphipoda as-

semblage exhibited higher densities in the canopies of the two plants during both sampling periods, as did the Decapoda-Odonata assemblage in July. The Diptera-Coleoptera assemblage showed a similar trend in vertical distribution, as well as marginally higher densities in hydrilla beds. The continued spread of hydrilla throughout the ARB has reduced the diversity of macrophyte habitats available to phytophilous macroinvertebrates, and has resulted in pervasive hypoxia in the macrophyte sub-canopy over large portions of available littoral habitat, with significant impacts on the vertical distribution of littoral macroinvertebrates." (Authors)] Address: Colon-Gaud, J.-C., Department of Zoology, Southern Illinois University Carbondale, Carbondale, IL 62901-6899, USA

6450. De Armas, L.F. (2004): Nuevo registro de *Ceclithemis eponina* (Drury, 1773) para Cuba (Odonata: Libellulidae). Boln Soc. ent. aragon. 34: 228-229. (in Spanish, with English summary). [1 male, Bacunayagua, Matanzas prov., 9-III-2004. This is the 7th record of the N. American *C. eponina* for Cuba, and the 2nd for the province.] Address: De Armas, L.F., P.O. Box 4327, San Antonio de los Baños, La Habana-32500, Cuba

6451. Dogan Bora, N.; Gül, A. (2004): Feeding biology of *Silurus glanis* (L., 1758) living in Hirfanli Dam lake. Turk. J. Vet. Anim. Sci. 28: 471-479. (in English). [Stomach contents and feeding features of the European catfish, *S. glanis* living in Hirfanli Dam Lake were investigated. Recognizable organisms were found in the stomachs of 91 *S. glanis* out of 162 caught between September 1996 and August 1997. The following prey items were found: Gammarus (21.87%), Odonata (19.79%), Sander lucioperca (19.79%), Tinca tinca (18.76%), *Silurus glanis* (1.04%), and Gastropoda (1.04%). In addition, it was noted that 1.04% of the organisms found in the stomachs of *S. glanis* were Homoptera and 2.08% were the parasite Platyhelminthes.] Address: Gül, A., Department of Biology Education, Gazi Faculty of Education, Gazi University, 06500 Teknik Okullar, Ankara, Turkey.

6452. Hadrys, H.; Melber, A. (2004): Biodiversität und Artenschutz: Paradebeispiel Libellen. TiHo - Forschung fürs Leben. Das Forschungsmagazin der Stiftung Tierärztliche Hochschule Hannover. 2004: 32-34. (in German, with English summary). ["Biodiversity and conservation biology: dragonflies, the classic example." [...] One of the most important groups of insects used for developing conservation strategies and as a bioindicator for quality and stability of environments is the order Odonata. Due to the odonates' complex reproduction behaviour and very specific habitat preferences, progressive anthropogenic changes to the environment have severe consequences on many odonates. For example, numerous species exist only in small isolated populations. The genetic diversity, i.e. adaptability, of a species and the survival of single populations is much more rapidly detectable at the genotypic level than by phenotypical methods. Based on genetic information, it is also possible to quickly identify isolation processes that threaten a population. Molecular genetic methods are becoming increasingly important for animals conservation in that they provide essential information on the condition of populations, species and habitats. This is demonstrated by the following study on the biodiversity of African dragonflies." (Authors)] Address: Hadrys,

Heike, Institut für Tierökologie und Zellbiologie, Bunteweg 17, D-30559 Hannover, Germany. E-Mail: heike.hadrys@tiho-hannover.de

6453. Iwata, S.; Watanabe, M. (2004): Saline tolerance of young zygopteran larvae inhabiting the emergent plants community established in estuaries. Japanese journal of entomology. New series 7(4): 133-141. (in Japanese, with English summary). ["Eggs and young larvae of the endangered brackish water damselfly, *Mortonagrion hirosei*, were reared under various concentration of saline water, comparing with those of *Ischnura senegalensis*, *I. asiatica* and *M. selenion*, all of which inhabited the abandoned rice paddy fields near the habitat of *M. hirosei*, reed community. The hatchability of each species under high concentration of saline was low, and 20.PERMIL. of saline water did not allow to hatch in *I. asiatica* and *M. selenion*. The mortality of young larvae of each species was also increased with the concentration of saline, and 15.PERMIL. of saline water was harmful to survive for both *I. asiatica* and *M. selenion*. Saline seemed to affect the moulting of the young larvae. On the other hand, *M. hirosei* and *I. senegalensis* had similar saline tolerance at egg and young larval stages. Both species were considered to survive under brackish water, and then *M. hirosei* might be a prey of *I. senegalensis* when they co-existed in the fields. The conservation strategy for *M. hirosei* was discussed in view point of the artificially established reed community for the larval habitat." (Author)] Address: Watanabe, Mamoru, Professor of Conservation Ecology, Graduate School of Life and Environmental Sciences, University of Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

6454. Langheinrich, U.; Tischew, S.; Gersberg, R.M.; Lüderitz, V. (2004): Ditches and canals in management of fens: opportunity or risk? A case study in the Drömling Natural Park, Germany. Wetlands Ecology and Management 12: 429-445. (in English). ["Up until the present, canals and ditches in Europe have been used to drain and thus devastate fens (lowland moors). However, in many cases, their function can be changed from drainage to irrigation and re-wetting of previously drained areas. These systems of canals and ditches are characteristic elements of the historically developed cultural landscape. Therefore, management and development plans should be oriented towards their continual maintenance. Despite the density of canals and ditches in many regions of Germany, especially of Eastern Germany, there are only a few studies to evaluate these systems of waterways, and an integrated approach towards their assessment has been totally absent. Existing approaches for typology and assessment of flowing waterbodies have been investigated in the Drömling Natural Park with regard to their applicability to such artificial canals and ditches. Special attention is given to the composition of macroinvertebrate fauna and the assessment of factors that determine it. Surprisingly, most water sectors have a high conservation value. High total numbers of species correlated well with the occurrence of endangered species. Among the macroinvertebrates, limnophilic and phytophilic species were dominant, but rheophilic fauna were also commonly present. This was caused by the intermediate status of canals and ditches, since they are neither completely flowing nor completely stagnant waterbodies. Habitat quality of these waters is determined by a small number of morphological parameters: bank

steepness, depth of bottom, substrate diversity, hydraulic structures, and the structure of surroundings. In the framework of management and development measures, they should be maintained and improved for the future. To assess water quality, the Saprobic index and the Chemical index were appropriate, but for indication of trophic status, the Macrophyte-trophic index was adequate. Estimation of ecological integrity by a multi-metric index using macroinvertebrates indicates that waterbodies are in a good status according to the demands of the European Water Framework Directive." (Authors) The study includes a regional checklist of Odonata..] Address: Langheinrich, Uta, Dept of Water Management, University of Applied Sciences Magdeburg, Breitscheidstr. 2, D-39114 Magdeburg, Germany. E-mail: uta.langheinrich@wasserwirtschaft.hs-magdeburg.de

6455. Maeto, K.; Sato, S. (2004): Odonata habitats in the Shimanto River Basin - *Aquabiology* 26(6): 522-527. (in Japanese, with English summary). ["We studied the habitat of Odonata in the Shimanto River basin in Shikoku, Japan. We conducted a correspondence analysis (CA) of 88 species observed at 455 grid sites (ca. 0.5km*0.5km). Multiple regression analyses of the two main axes of the CA ordination on the geographical features (altitude, relief) and vegetation of grid sites indicated that the degree of relief and the areal proportion of paddy fields were the main determinants of the species distribution of Odonata. The Odonata species appearing in the Red Data Book of Kochi Prefecture were evaluated based on their recent tendency of occurrence. Several indicator species for environmental monitoring were selected on three landscapes (i.e. mountain, hill foot and plain) according to the endangered level and the requirement of water quality of each species. (Author)] Address: Maeto, K., Laboratory of Entomology, Faculty of Agriculture, Kobe University, Rokkodai-cho 1-1, Nada-ku, Kobe, 657-8501, Japan

6456. Nakagawa, M.; Motobayashi, T.; Arai, Y.; Nishimura, T. (2004): Ecology of eggs of *Gynacantha japonica* Bartenev in paddy fields. *Transactions of the Japanese Society of Irrigation, Drainage and Reclamation Engineering* 72(1): 71-77. (in Japanese, with English summary). ["*G. japonica* often inhabits paddy fields and passes the winter at the egg stage in soil of paddy fields. It had been seen often, but a marked decrease in density has been reported. In this paper, dormancy and hatching conditions were studied in eggs of *G. japonica*. Diapause eggs showed relatively high tolerance against drying condition, while post-diapause eggs in spring were sensitive to drying history. Hatching of the post-diapause eggs was promoted by receiving light stimulus under ponding condition. It was considered that changes in physical conditions, especially moisture condition, of paddy fields by farm land consolidation and increase in number of fallow paddy fields may result in decrease of number in *G. japonica*." (Author)] Address: not stated in English

6457. Pankratius, U. (2004): Moosjungfern im Aischgrund und im Nürnberger Reichswald. *Galathea* 20(2): 75-110. (in German, with English summary). [Bavaria, Germany; *Leucorrhinia dubia*, *L. pectoralis*, and *L. rubicunda* were studied at more than 120 water bodies. Special emphasis was given to records of exuviae. The results are compared to older published regional records. Conservation measures are discussed ex-

tensively.] Address: Pankratius, U., Allensteiner Straße 6, D-90766 Fürth, Germany

6458. Penalver, E.; Delclos, X. (2004): Insectos del Mioceno inferior de Ribesalbes (Castellón, España). *Interacciones planta-insecto*. *Treb. Mus. Geol. Barcelona* 12: 69-95. (in Spanish, with English summary). ["This paper carries out the study of ichnofossils originated by insects found in the Lower Miocene locality of "La Rinconada", near Ribesalbes (Province of Castellón, Spain). The main fossil record is integrated by plant-insect interactions that are observed in leaves and leaflets: ovipositions, mines and a chew mark. The insect ovipositions, on leaves of *Laurophyllum*, *Caesalpinniaceae* and *Populus*, show ovate to oblong eggs with 0.9-1.1 mm length and 0.2-0.3 mm width. They occur in eccentric arcs, sometimes with a zigzagged pattern. These ovipositions were produced by damselflies of the family *Coenagrionidae*. Insect mines are reported in leaves of *Laurophyllum* and *Celtis?*, and show a blotch shape in *Laurophyllum* sp., with a channel-structure, and a linear shape in *Celtis* sp.? Insect larvae, which were endophytophagous, i.e. internal plant parasites, produced these channel marks of leaf-mines. The mine patterns observed in *Laurophyllum* leaf are similar to those produced by the recent larvae of the *Nepticulidae* (Lepidoptera). Such a diverse set of plant-insect interactions are uncommon in the fossil record. In addition, one level with bioturbation, possibly produced by aquatic larval chironomids, is also described here." (Authors)] Address: Delclos, X., Dept d'Estratigrafia, Paleontologia i Geociències marines. Fac. Geologia, Martí i Franquès s/n, Universitat de Barcelona, E-08028 Barcelona. Spain. E-mail: xdelclos@geo.ub.es

6459. Saito, S. (2004): Nakaikemi, a miraculous Japanese peatland. How has it been saved?. *Peatlands International* 1/2004 : 36-39. (in English). [In this account directed to a more general readership, 70 odonate species are said to occur in the Nakaikemi peatland; *Anax nigrofasciatus* and *Rhyothemis fuliginosa* are depicted.] Address: Saito, S., Wo-2-1-101 Takamatsu, Kahoku City, Ishikawa Pref., 929-1215, Japan

6460. Schweighofer, W. (2004): Neues von den Quelljungfern (Libellen). *Lanius-Information* 13: 13. (in German). [Brief account on the occurrence of *Cordulegaster bidentata*, *C. boltonii*, and *C. heros* in the Kremsregion, Austria.] Address: LANIUS – Forschungsgemeinschaft für regionale Faunistik und angewandten Naturschutz, Hafnerplatz 12, A-3500 Krems, Austria. www.lanius.at

6461. Werle, S.F.; Klekowski, E.; Smith, D.G.129 (2004): Inversion polymorphism in a Connecticut River *Axarus* species (Diptera: Chironomidae): biometric effects of a triple inversion heterozygote. *Can. J. Zool.* 82: 118. E. (in English, with French summary). [*Gomphus* (*Hylogomphus*) *abbreviata* associated with varve clays in the Connecticut River may be *A. sp. varvestris* ("dwelling in varves") predators.] Address: Werle, S.F., Graduate Program in Organismic and Evolutionary Biology, University of Massachusetts, Amherst, MA 01003, U.S.A. E-mail: swerle@bio.umass.edu

6462. Zivic, I.; Markovic, Z.; Brajkovic, M. (2004): Impact of waste-waters from mind „Lece“ on diversity of macrozoobenthos in the Gazdarska Reka River, right-hand tributary of the Jablanica Reka River. *Proceedings of the 2nd Congress of Ecologists of the Republic of*

Macedonia with International Participation, 25-29.10.2003, Ohrid. Special issues of Macedonian Ecological Society, Vol. 6, Skopje: 247-251. (in English). ["Investigations of impact of wastewaters from mind „Lece“ on diversity of macrozoobenthos in the Gazdarska reka River (a right-hand tributary of the Jablanica reka River) were conducted during years 2001 and 2002. The bottom fauna was composed of 14 groups of macroinvertebrates with 73 determined taxa. The most varied groups were the insect orders Trichoptera (17 taxa), and Diptera (13), Plecoptera (11), Coleoptera (10) and Ephemeroptera (9), while the most uniform were insects belonging to classes Hirudinea, order Odonata and family Ancilidae Larvae belonging to insect orders Ephemeroptera, Plecoptera and Trichoptera were dominant in benthocenosis at first and second localities. These localities were characterized by highest values of diversity index, 3.2 and 3.0 respectively. Due to emptying of wastewater from mind „Lece“ at third locality value of diversity index abruptly dropped to 0.1 due to capacity of the river for self-purification, the variety of benthocenosis increases at localities downstream from locality 3." (Authors)] Address: Zivic, I., Faculty of Biology, University of Belgrade, 11000 Belgrade, Studentski trg 16, Serbia and Montenegro. E-mail: ivanas@bf.bio.bg.ac.yu

2005

6463. Bechly, G. (2005): A re-description of "*Stenophlebia*" casta (Insecta: Odonata: Parastenophlebiidae n. fam.) from the Upper Jurassic Solnhofen Limestone in Germany. *Stuttgarter Beiträge zur Naturkunde - Serie B* 359: 1-12. (in English, with German summary). ["The enigmatic fossil dragonfly "*Stenophlebia*" casta from the Upper Jurassic Solnhofen Limestone in Germany is re-described and its wing venation figured for the first time, based on several new specimens, including a very well-preserved specimen with perfect wing venation. Previously this taxon had to be considered as a nomen dubium within Odonata incertae sedis, because the holotype is lost and the original description is insufficient. Now, its previous attribution to the genus *Stenophlebia* and the family *Stenophlebiidae* can be clearly rejected. The species is here attributed to a new family (Parastenophlebiidae n. fam.) and genus (Parastenophlebia n. gen.) of Heterophlebioptera - Heterophlebioidea, representing a basal branch close to Liassophlebiidae." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

6464. Beketov, M.A. (2005): Interesting records of *Nihonogomphus ruptus* (Sel.) in Novosibirsk province, western Siberia, Russia (Anisoptera: Gomphidae). *Notul. odonatol.* 6(5): 49. (in English). [In 2003 and 2004, seven adults of *N. ruptus* "were collected near the Inya River, at the Otgonka railway station (Toguchinskii district), viz. 1 teneral male (4-VI-2003), 2 males and 3 females (17-VI-2003), and 2 males (12-VI-2004). In addition, on 17-VI-2003, 7 males were caught and set free." (Author)] Address: Beketov, M.A., P.O. Box 156, RUS-630048 Novosibirsk, Russia. E-mail: mbeke-tov@mail.ru

6465. Beynon, T.G.; Daguet, C. (2005): Creation of a large pool for colonisation by white-faced darter *Leucorrhinia dubia* dragonflies at Chartley Moss NNR, Staffordshire, England. *Conservation Evidence* 2: 135-136. (in English). ["At a nature reserve in central England, after failure of smaller pools dug to provide long-term white-faced darter *Leucorrhinia dubia* breeding habitat, a larger 7 x 7m pool was created in 1992. Breeding by white-faced darters was confirmed in 1995 and they have since bred annually with 54 individuals recorded in 2003." (Authors)] Address: Daguet, Caroline, English Nature North Mercia Team, Attingham Park, Shrewsbury, Shropshire SY4 4TW, UK. E-mail: caroline.daguet@english-nature.org.uk

6466. Brockhaus, T. (2005): Verbreitung und Schutz in Mooren lebender Libellen in Sachsen (Insecta: Odonata). *Telma* 35: 111-122. (in German, with English summary). [The paper gives an overview on the current known distribution of odonate bog species in Saxonia, Germany. Distribution maps of *Aeshna subarctica* and *Somatochlora alpestris* can be correlated with present bog habitat distribution in this Federal State. In addition, the general importance of bogs as habitat of rare species and centres of dispersal is outlined.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

6467. Cannings, R.A.; Cannings, S.G.; Ramsay, L.R.; Hutchings, G.E. (2005): Four species of Odonata new to British Columbia, Canada. *Notulae odonatologicae* 6: 45-49. (in English). ["Between 1998 and 2000, 5 odonate species were added to the list of British Columbia. The collection data for one of these, *Somatochlora kennedyi*, have been previously published by R.D. Kenner (2000, *J. ent. Soc. Br. Columb.* 97:47-49). The present known distribution, status and habitat of *Calopteryx aequabilis*, *Lestes forcipata*, *Somatochlora brevicincta*, and *S. forcipata* are discussed. *C. aequabilis* is recorded from only one locality in the extreme south of the province; it is a red-listed species of management concern. *L. forcipatus* is common in certain types of rich fens across the province; it had been overlooked previously because of its close similarity to the widespread and abundant *L. disjunctus*. *S. brevicincta* and *S. forcipata* are known mainly from eastern North America; in British Columbia each is recorded from a handful of localities in mountain and northern peatlands." (Authors)] Address: Ramsay, Leah, British Columbia Conservation Data Centre, Ministry of Sustainable Resource Management, 395 Waterfront Crescent, Box 9358, Stn Prov Govt, Victoria, BC, V8W 9M2, Canada. E-mail leah.ramsay@gems4.gov.bc.ca

6468. Cicort-Lucaciu, A.-S.; Ardeleanu, A.; Cupsa, D.; Naghi, N.; Dale (2005): The trophic spectrum of a *Triturus cristatus* (Laurentius 1768) population from Plopiis Mountains area (Bihor County, Romania). *North-Western Journal of Zoology* 1(1): 31-39. (in English). [Crested newts eat mainly invertebrates, but may also ingest vegetal particles, amphibian eggs or shed skins. Besides the shed skins of conspecific individuals, we have also identified shed skins of *Bombina variegata*, and even of *Lacerta agilis*. Due to the particular morphology of the habitat, the warm season brings about differences in the accessibility of different prey categories from one part to another of the Sinteu pond. This difference in the potential food spectrum alters the newts' diet, leads to a change into the "sit-and-wait"

feeding strategy, increase the number of hungry individuals, and indicates a decrease in the preying capacity of newts that prepare to leave the aquatic environment. Quantitatively, the most important prey taxa to the studied population are tadpoles and Nematocera larvae." (Authors) Larvae of Odonata account up to 16.75% of food items.] Address: Cicort-Lucaciu, A.-S.; University of Oradea, Faculty of Science, Romania, alfredcicort@yahoo.com

6469. DeWalt, R.E.; Favret, C.; Webb, D.W. (2005): Just how imperiled are aquatic insects? A case study of stoneflies (Plecoptera) in Illinois. *Ann. Entomol. Soc. Am.* 98(6): 941-950. (in English). ["Nearly 5,000 historical and contemporary specimen records of stoneflies (Plecoptera) from Illinois demonstrated that this fauna is highly imperiled, boding poorly for aquatic insect communities in North America and elsewhere. Losses include two extinctions of endemics and 20 extirpations of 77 total species, a rate of loss that is higher than for either mussels or fish in Illinois. Another 19 species (24.7%) were designated as critically imperiled, being known from five or fewer locations. Two families, Perlidae and Perlodidae, experienced the greatest number of losses. Species lost were mostly those with longer life cycles and direct egg hatch. Three historically hyperdiverse regions were identified and losses in all 14 natural divisions were documented. Large river habitats and historically prairie regions have experienced the greatest proportional losses of species. This scenario probably follows for Ephemeroptera, Trichoptera, and Odonata in the Midwest and in other areas with similar glacial and cultural histories." (Author) The paper contains some references to the Odonata.] Address: DeWalt, R.E., Illinois Natural History Survey, Center for Biodiversity, 607 E. Peabody Drive, Champaign, IL 61820

6470. Geraeds, R.P.G.; van Schaik, V.A. (2005): Vondst van een larvenhuidje van de Gewone bronlibel langs the Roer. *Natuurhistorisch maandblad* 94(12): 274-275. (in Dutch). [On 23-VII-2005, an exuvia of *Cordulegaster boltonii* was found at the river Roer, The Netherlands.] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

6471. Hubenov, Z. (2005): Entomofaunistic diversity of Bulgaria. *Acta ent. bulg.* 11(1/2): 118-132. (in Bulgarian, with English summary). [Compilation of Hexapoda diversity of Bulgaria including Odonata] Address: Hubenov, Z., Inst. Zool., Bulg. Acad. Sci., Blvd Car Osvo-boditel 1, BG-1000 Sofia, Bulgaria

6472. Kuprian, M.; Winkel, S.; Angersbach, R.; Flügel, H.J.; Eckstein, (2005): Monitoringprojekt Vogelsbergteiche - Erste faunistische Ergebnisse. *Jahrbuch Naturschutz in Hessen* 9: 186-2003. (in German). [Five ponds in the submontane region of Vogelsberg, Hessen, Germany, have been surveyed for their Odonata between 1989 and 2004. 25 odonate species were found; *Ischnura pumilio*, *Erythromma viridulum*, *E. najas*, *Sympetrum danae*, and *S. fonscolombii* are briefly discussed.] Address: Winkel, Sibylle, Pommernstr. 7, D-63069 Offenbach, Germany. E-mail: Si-winkel@t-online.de

6473. Kurstjens, G.; Gerats, R.; Hoogveld, J. (2005): Peat marsh returns to the Hamert Reserve. Restoration of the first part of the Heerenveen fenland. *Natuurhistorisch Maandblad* 94(11): 243-247. (in Dutch, with Eng-

lish summary). ["Between 1999 and 2001, the first part (36 ha) of the former Heerenveen fenland area in the De Hamert national park was restored. This fenland lies between old river dunes along the river Meuse and old sediments deposited by the river Rhine. It was part of an extensive fenland area along the Dutch-German border between the towns of Venlo and Genneep. Reclamation for agricultural purposes started about a century ago by drainage and peat harvesting. Opportunities for restoration seemed favourable because groundwater flows from the Rhine terrace are largely intact. Problems of water pollution from nearby agricultural fields were not to be expected because of the upstream position of the area. The Heerenveen fen was restored by removing the top layer of fertilised soil. Drainage was stopped by filling in ditches. The flora and fauna in the restoration area were surveyed between 2000 and 2003. Typical plants of soft water habitats, like the rare *Ranunculus ololeucos*, returned. Many amphibian species benefited from the large area of new wetland." (Authors) At least 23 Odonata species could be found. Species of early succession states of habitat development as *Ischnura pumilio* and *Sympetrum fonscolombii* are stressed.] Address: Kurstjens, G., Ecologisch adviesbureau, Col. Ekmanstr. 15, NL-6573 BM Beek-Ubbergen, The Netherlands

6474. Liley, D. (2005): Tree and scrub clearance to enhance habitat for the southern damselfly *Coenagrion mercuriale* at Creech Heath, Dorset, England. *Conservation Evidence* 2: 131-132. (in English). ["Scrub and trees were removed from overgrown clay pits at a nature reserve in southern England. Prior to management the maximum counts of southern damselfly *Coenagrion mercuriale* was 40-70 adults annually, but this increased to around 150-200 adults after management opened up the pools." (Author)] Address: Liley D., Footprint Ecology, Court House, Binnegar Lane, East Stoke, Wareham, Dorset BH20 6AJ, UK

6475. Martens, A.; Suhling, F. (2005): *Microgomphus* new to the South African Odonata fauna (Anisoptera: Gomphidae). *Notul. odonatol.* 6(5): 49-50. (in English). [Odonata exuviae were collected at the Umzimkulwana River in the Oribi Gorge Nature Reserve, Natal (KwaZulu-Natal, RSA; 30°42'S, 30°16'E) resulting in one exuvia, collected on 8-IV-1988 from a rocky, fast flowing section of the Umzimkulwana River, and showing the distinct characters of the genus *Microgomphus* Selys. Due to lack of descriptions of larvae of relevant *Microgomphus* species, it is not possible to determine the exuvia on the species level.] Address: Martens, A., Pädagogische Hochschule Karlsruhe, PF 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

6476. Nagy, B.; Székely, A.; Szállassy, A. (2005): Site fidelity and fluctuating asymmetry in males of *Libellula fulva* (Odonata: Libellulidae). *Entomol. rom.* 10: 59-64. (in English, with Romanian summary). ["During two seasons (2002-2003), a closed *Libellula fulva* (Müller, 1764) population was studied along a small, canalized creek in Eastern Hungary. The territorial behaviour of males was observed with the mark-recapture method. A number of 169 males were marked in 2002, and 186 males in 2003. The movement of marked males was observed with binoculars, and was recorded along a 350 meter natural section of the stream that was marked every five meters with numbered sticks. The site fi-

delity of males was studied with the localisation index (LI) and site fidelity index (SFI). We found that the SFI of males that simultaneously defended three territories was high, while the LI was highest in the case of males that protected only one area. The purpose of the study was to see if male's site fidelity is related to wing asymmetry and body size. There was no correlation between male's site fidelity and the measure of wing asymmetry in 2002. In 2003, however, a significant correlation was found in the case of males which defended only one territory. There was no correlation between body size and SFI." (Authors)] Address: Nagy Beáta, Department of Taxonomy and Ecology, Babeş-Bolyai University, RO-400006 Cluj Napoca, Clinicilor str. 5-7, Romania. E-mail: nagy.beata@gmail.com

6477. Ozono, A.; Sakuratani, Y. (2005): The Odonata fauna in Nara prefecture, Western Honshu, Japan in 1998-2003. *Memoirs of the Faculty of Agriculture of Kinki University* 38: 71-155. (in Japanese, with English summary). [The survey of the Odonata fauna in the Nara Prefecture, western Honshu, Japan, investigated in 1998-2003, resulted in 91 species. These are mapped and listed for every municipality in which they occur.] Address: Ozono, Akira, Department of Agriculture, Kinki University 2Department of Agriculture, Kinki University

6478. Quiroz-Martinez, H.; Rodriguez-Castro, V.A.; Solis-Rojas, C.; Ma (2005): Predatory capacity and prey selectivity of nymphs of the dragonfly *Pantala hymenaea*. *J. Am. Mosq. Control. Assoc.* 21(3): 328-330. (in English). ["Predatory capacity and prey selectivity of nymphs of *P. hymenaea* were evaluated on larvae of the mosquito *Culex quinquefasciatus* (Diptera: Culicidae) and larvae of the midge *Chironomus plumosus* (Diptera: Chironomidae) as prey. With functional response methodology, 7 larval densities were exposed to predator individuals in a glass jar under laboratory conditions. The study was performed in 2 experiments. The 1st was a test system with each prey species alone. The 2nd tested a mixture of both prey species in a 1:1 ratio. Prey selectivity and prey capacity were significantly greater on midge larvae than on mosquito larvae." (Authors)] Address: Quiroz-Martinez, H., Laboratorio de Entomologia Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo Leon, San Nicolas de los Garza, Nuevo Leon, Mexico

6479. Robb, T.; Forbes, M.R. (2005): Success of ectoparasites: how important is timing of host contact?. *Biology Letters* 1: 118-120. (in English). ["Hosts often differ in their degree of parasitism and their expression of resistance. Yet very little is known about how the availability (and allocation) of resources to parasites at pre-infective stages influences their success in initiating parasitism, or in inducing and succumbing to resistance from hosts. We studied a damselfly-mite association to address how experimental variation in the age of first contact with hosts (timing) influenced subsequent parasite fitness. We demonstrate that timing influenced the ability of larval mites to make the transition to parasitism, but was not associated with measures of physiological resistance by hosts. Timing presumably relates to the availability of resources remaining for individuals to exploit their hosts. More research is needed on the importance of such factors, from variation in host resistance and parasite success and, ultimately, to the numbers and distributions of parasites on hosts." (Authors)] Address: Robb, T., Department of Biology, 209

Nesbitt Building, Carleton University, 1125 Colonel By Drive, Ottawa, Ont., Canada K1S 5B6. trobb@connect.carleton.ca

6480. Southwood, R.; Taylor, P.; Daguet, C. (2005): Creation of dykes on grazing marshes and effects on the Norfolk hawk Aeshna isosceles dragonfly at Ludham and Potter Heigham Marshes NNR, Norfolk, England. *Conservation Evidence* 2: 137-138. (in English). ["At a National Nature Reserve in the Norfolk Broads (eastern England), between 1986 and 1998, 1,600 m of new dykes were excavated in the winter months. Seven of these 12 dykes were subsequently colonised by Norfolk hawk Aeshna isosceles dragonflies (a UK species of conservation concern)." (Authors)] Address: Taylor, P., The British Dragonfly Society, Decoy Farm, Decoy Road, Potter Heigham, Norfolk NR29 5LX, UK

6481. Strätz, C.; Schlumprecht, H.; Potrykus, W.; Frobel, K. (2005): Veränderungen der Libellenfauna im oberen Maintal. Vergleich zwischen 1979 und 2003. *Ber. naturforsch. Gesell. Bamberg*: 145-186. (in German). [Between 1979 and 1993 the Odonata fauna of the river Main, Bayern, Germany intensively was surveyed. Starting in 1992, measurements to improve ecological situation of the river were realised. Thus, approximately 25 years later, the development of the regional Odonata fauna was remapped. New additions to the regional fauna are *Erythromma lindenii*, *Ophiogomphus cecilia*, *Onychogomphus forcipatus*, *Crocothemis erythraea*, and *Sympetrum fonscolombii*. Positive development should be powered by habitat improvement measures, improvement of water quality and climatic conditions. Species with significant increase of frequency are *Erythromma viridulum*, *Gomphus pulchellus*, *G. vulgatissimus*, *Calopteryx virgo*, *Pyrrhosoma nymphula*, *Brachytron pratense*, *Anax imperator*, *A. parthenope*, and *Libellula quadrimaculata*. Species of habitats in early succession status as *Ischnura pumilio* and *Orthetrum brunneum* shifted their regional distribution according to available habitats.] Address: Schlumprecht, H., Büro für ökologische Studien, Oberkonnersreuther Straße 6a, D-95448 Bayreuth, Germany. E-Mail kontakt @bfoes.de

6482. Szymkowiak, P.; Tryjanowski, P.; Winięcki, A.; Grobelny, S.; Kon (2005): Habitat differences in the food composition of the wasp-like spider *Argiope bruennichi* (Scop.) (Aranei: Araneidae) in Poland. *Belg. J. Zool.*, 135(1): 33-37. (in English). ["During the last few decades the wasp-like spider *Argiope bruennichi* Scopoli, 1772 expanded its wide geographical distribution in Europe. In this paper we describe and test differences in the diet composition of the wasp-like spider inhabiting a river valley (traditional habitat) and xerothermic grassland (new habitat) in Poland. From a total of 163 webs of *A. bruennichi*, 430 prey items were found, mainly insects: Coleoptera, Diptera, Homoptera, Heteroptera, Hymenoptera, Lepidoptera, Mecoptera, Odonata, Orthoptera and Neuroptera. Moreover, a semi digested specimen of the common frog *Rana temporaria* was recorded. Habitats differed significantly in the percentage distribution of eleven general food categories. Among potential influencing factors the number of caught prey was correlated only with the height of the web hub above the ground. The wasp-like spider is ecologically flexible in the use of novel food spectra and this probably allows the colonisation of new localities, as well as habitats." (Authors) The most numerous spe-

cies caught in the webs of the river valley population of *A. bruennichi* was *Ischnura elegans*. *Sympetrum sanguineum* was also among the prey of the spider.] Address: Szymkowiak, P., Department of Animal Taxonomy and Ecology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland. E-mail: szymko-wi@amu.edu.pl

6483. Thomas, J.A. (2005): Monitoring change in the abundance and distribution of insects using butterflies and other indicator groups. *Phil. Trans. R. Soc. B* (2005) 360: 339–357. (in English). ["Conservative estimates suggest that 50–90% of the existing insect species on Earth have still to be discovered, yet the named insects alone comprise more than half of all known species of organism. With such poor baseline knowledge, monitoring change in insect diversity poses a formidable challenge to scientists and most attempts to generalize involve large extrapolations from a few well-studied taxa. Butterflies are often the only group for which accurate measures of change can be obtained. Four schemes, used successfully to assess change in British butterflies, that are increasingly being applied across the world are described: Red Data Books (RDB) list the best judgements of experts of the conservation status of species in their field of expertise; mapping schemes plot the changing distributions of species at scales of 1–100 km²; transect monitoring schemes generate time series of changes in abundance in sample populations of species on fixed sites across the UK; and occasional surveys measure the number, boundaries and size of all populations of a (usually RDB) species at intervals of 10–30 years. All schemes describe consistent patterns of change, but if they are to be more generally useful, it is important to understand how well butterflies are representative of other taxa. Comparisons with similarly measured changes in native bird and plant species suggest that butterflies have declined more rapidly than these other groups in Britain; it should soon be possible to test whether this pattern exists elsewhere. It is also demonstrated that extinction rates in British butterflies are similar to those in a range of other insect groups over 100 years once recording bias is accounted for, although probably lower than in aquatic or parasitic taxa. It is concluded that butterflies represent adequate indicators of change for many terrestrial insect groups, but recommended that similar schemes be extended to other popular groups, especially dragonflies, bumblebees, hoverflies and ants. Given institutional backing, similar projects could be employed internationally and standardized. Finally, a range of schemes designed to monitor change in communities of aquatic macro-invertebrates is described. Although designed to use invertebrates as a bio-indicator of water quality for human use, these programmes could be extended to monitor the 2010 biodiversity targets of the World Summit on Sustainable Development." (Author)]. Address. not stated.

6484. van Buggenum, H.J.M.; Hannen, J.; Hermans, J.T.; Heijligers, H.W (2005): Fauna and water table drawdown in Limburg. *Natuurhistorisch maandblad* 94 (11): 253–258. (in Dutch, with English summary). ["Water table drawdown is one of the main causes of the extinction and decline of animal species in wet environments. Paradoxically, however, raising water levels to combat drawdown is currently causing a further decline of several species. For a long time, it was thought that re-establishment of the former vegetation would auto-

matically lead to a return of the original fauna. Unfortunately, the relation between the environment and the presence of animal species seems much more complex than was thought. The restoration of areas that had become desiccated in the past has often involved measures being taken over a large area and within a short time. An example is the Mariapeel, a wetland in the west of the province of Limburg, where drastic large-scale restoration measures have caused breeding and foraging areas for birds to disappear. Fortunately, fauna is now beginning to receive more attention. The article discusses the relation between measures to combat water table drawdown and water-dependent shrews, birds, dragonflies, amphibians, reptiles and land snails." (Authors) The article stresses on *Cordulegaster boltonii*, and gives a map with distribution data of *C. boltonii*, *Calopteryx virgo*, and *Orthetrum coerulescens* in the Limburg province, The Netherlands.] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands

6485. van Schaik, V.A.; Geraeds, R.P.G. (2005): Yellow-legged clubtail along the river Roer. The settlement of a new population in the province of Limburg. *Natuurhistorisch maandblad* 94(2): 33–36. (in Dutch, with English summary). ["Dragonflies along the river Roer have been monitored since 1999. Surveys in 2000 resulted in three sightings of *Stylurus flavipes*. The first exuviae of the species were found during a survey by boat in 2002. This was the first time that this species was proved to have reproduced in the river Roer. During 2002 and 2003, 46 exuviae were collected. These results show that the species has established itself along the river Roer. The dispersion of *S. flavipes* is associated with the lower reaches of larger streams. Since the river Roer is a small river, the habitat is different from those where this species is usually found in the Netherlands." (Authors)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

6486. Verbeek, P.J.M.; Scherpenisse-Gutter, M.C. (2005): Restoration of flora and fauna at the Haselaarsbroek Nature Reserve. *Natuurhistorisch maandblad* 94(11): 232–237. (in Dutch, with English summary). ["Restoration measures taken in 1996 have transformed the Haselaarsbroek, a nature reserve in the province of Limburg, The Netherlands from an artificially forested woodland to a very rich nature reserve, whose appearance resembles its original state before the afforestation. The measures have led to a highly valuable vegetation. The seepage zone is especially interesting, featuring several hectares of newly developed peatland. Many red-listed plant species have colonised the new area. Because of its many types of water body, the area is now very rich in dragonfly species. It is probably among the richest dragonfly areas in the Netherlands, and the seepage zone is particularly important for several endangered species. Further management of the area will be crucial. A major problem is that of encroachment by tree saplings. Management in the coming years will be improved by increasing the number of grazing cattle and cutting down trees and shrubs." (Authors) 44 Odonata species are listed in Table 2.] Address: Verbeek, P.J.M., Bureau Natuurbalans-Limes divergens BV, Postbus 31070, NL-6503 CB Nijmegen, The Netherlands

6487. Wang, J.Z. (2005): Dissecting insect flight. *Annual Review of Fluid Mechanics* 37: 183–210. (in

English). ["What force does an insect wing generate? Finding answers to this enduring question is an essential step toward our understanding of interactions of moving objects with fluids that enable most living species such as insects, birds, and fish to travel efficiently and us to follow similar suit with sails, oars, and airfoils. We give a brief history of research in insect flight and discuss recent findings in unsteady aerodynamics of flapping flight at intermediate range Reynolds numbers (10–104). In particular, we examine the unsteady mechanisms in uniform and accelerated motions, forward and hovering flight, as well as passive flight of free-falling objects. The results obtained by "taking the insects apart" helped us to resolve previous puzzles about the force estimates in hovering insects, to elucidate basic mechanisms essential to flapping flight, and to gain insights about the efficiency of flight." (Author). This review article includes many notes on dragonflies.] Address: Wang, Z. Jane, Theoretical and Applied Mechanics, Cornell University, Ithaca, New York 14853, USA. E-mail: z.jane.wang@cornell.edu

6488. Williams, D.D. (2005): Temporary forest pools: can we see the water for the trees?. *Wetlands Ecology and Management* 13: 213-233. (in English). ["Temporary waters, in general, are fascinating habitats in which to study the properties of species adapted to living in highly variable environments. Species display a remarkable array of strategies for dealing with the periodic loss of their primary medium that sets them apart from the inhabitants of permanent water bodies. Survival of individuals typically depends on exceptional physiological tolerance or effective migrational abilities, and communities have their own, distinctive hallmarks. This paper will broadly overview the biology of temporary ponds, but will emphasize those in temperate forests. In particular, links will be sought between aquatic community properties, the nature of the riparian vegetation, and forestry practices. Quite apart from their inherent biological interest, temporary waters are now in the limelight both from a conservation perspective, as these habitats come more into conflict with human activities, and a health-control perspective, as breeding habitats for vectors of arboviruses. Traditionally, many temporary waters, be they pools, streams or wetlands, have been considered to be 'wasted' areas of land, potentially convertible to agriculture/silviculture once drained. In reality, they are natural features of the global landscape representing distinct and unique habitats for many species – some that are found nowhere else, others that reach their maximum abundance there. To be effective, conservation measures must preserve the full, hydroseral range of wetland types." (Author) The study includes Odonata.] Address: Williams, D.D., Surface & Groundwater Ecology Research Group, Department of Life Sciences, University of Toronto at Scarborough, 1265 Military Trail, Scarborough, Ontario, Canada M1C 1A4. E-mail: williamsdd@utsc.utoronto.ca

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6489. Abellán, P.; Sánchez-Fernández, D.; Millán, A.; Botell, F.; Sánc (2006): Irrigation pools as macroinvertebrate habitat in a semi-arid agricultural landscape (SE Spain). *Journal of Arid Environments* 67(2): 255-269. (in English). ["The intensification of agriculture has

resulted in the loss of many aquatic ecosystems in southern Europe. Despite this, the construction of irrigation pools and reservoirs to retain the water necessary for intensive cultivation may also provide new habitats for macroinvertebrates. The biotic and abiotic attributes of 40 such reservoirs in south-eastern Spain were studied to determine the presence of macroinvertebrates, and to discover if there is such a thing as an optimal design of an artificial pond for maximizing macroinvertebrate richness. A total of 72 macroinvertebrate taxa (including Odonata) belonging to 38 families were recorded from the pools examined. Pools constructed with low-density polyethylene covered with sand and stones contained a significantly greater species richness, abundance and diversity of macroinvertebrates than those constructed with high-density plastic materials. The treatment with algicide, and the presence of emergent and submerged vegetation, accounted for most of the deviance when modelling species richness by means of logistic regression." (Authors)] Address: Departamento de Ecología e Hidrología, Universidad de Murcia, Campus de Espinardo, 30100 Murcia, Spain. E-mail: pabellan@um.es

6490. Alberto Martinez, J.; Ocharan, F.J. (2006): The Odonata of the upper Narcea river (Asturias, northern Spain). *Boletín de la S.E.A.* 38: 279-285. (in Spanish, with English summary). ["In a study of the odonates of the upper reaches of the Narcea River we found 20 species, five of them previously unrecorded from the area. The populations of *Enallagma cyathigerum*, *Coenagrion puella* and *Cordulegaster boltonii* show extensive inter-individual chromatic variation. Several species show differences in the altitudinal distribution and the length of the flying season when compared with other Asturian populations. The flying season is usually shorter in the area." (Authors)] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: focharan@oonreo.uniovi.es

6491. Alvarez, D.; Nicieza, A.G. (2006): Factors determining tadpole vulnerability to predators: can prior experience compensate for a suboptimal shape?. *Evolutionary Ecology* 20(6): 523-534. (in English). ["We investigated the role of constitutive morphology and previous experience in predator avoidance in two anuran species associated with different larval habitats. In *Rana temporaria*, deeper tails and larger body size conferred selective advantage against dragonfly (*Aeshna cyanea*) predation. Previous experience with predators had a positive influence on the survival of *R. temporaria* tadpoles equivalent to predator selection. By contrast, survival in *Bufo bufo* seems unrelated to tail shape or experience. This suggests that *B. bufo* lacks constitutive morphological defenses against insect predators, and that morphological and behavioral defenses could result more effective than chemical deterrents for these insect predators. A key novelty of this study is the observation that *Rana* tadpoles having prior experience with predators have an enhanced success in further encounters, and this occurs before the morphological induced defense has been established. This induced modification for *R. temporaria*, and its lack of for *B. bufo*, may be an important determinant of larval survival." (Authors)] Address: Nicieza, A.G., Univ Oviedo, Dept Funct Biol, E-33071 Oviedo, Spain. E-mail: agnic@uniovi.es

- 6492.** Andrew, R.J.; Kodhe, L.; Kurup, S.S. (2006): Fine-structural changes in the egg chorion of *Bradinyopyga geminata* (Rambur) induced by paper mill effluent (Anisoptera: Libellulidae). *Odonatologica* 35(2): 187-192. (in English). ["The egg chorion of the *B. geminata* undergoes major structural changes when incubated in paper mill effluent. The exochorion becomes blemished, marred and perforated. It bunches into a granular condition and loses its jelly-like original identity. The endochorion develops cracks and is pitted with holes. The hexagonal demarcations of the endochorion plates are obliterated and replaced by a network of angular surface reticulations. The micropylar stalk and the circular basal ridge dissolve and distort the micropylar apparatus." (Authors)] Address: Andrew, R.J., Hislop Coll., Dept Zool., Civil Lines, Nagpur 440001, Maharashtra, India. E-mail: rajuaandrew@yahoo.com
- 6493.** Andrew, R.J.; Balmik, E.; Kodhe, L. (2006): Effect of paper mill effluent on the cephalic neurosecretory and midgut protease activities in the last instar larva of *Bradinyopyga geminata* (Rambur) (Anisoptera: Libellulidae). *Odonatologica*. 35(3): 225-231. (in English). ["The last instar larvae were treated with sublethal concentrations of paper mill effluent (PME) for 5 days. PME inhibits the synthesis of neurohormones in the A-type cells of the medial group of the brain and in the intrinsic neurosecretory cells of the corpora cardiaca. PME also causes histomorphological changes in the corpora allata and suppress protease activity of the midgut. These findings suggest that various metamorphic and intermediary metabolic alterations caused by the PME treatment is modulated by the changes in the synthesis and secretion of the neurohormones of the cephalic neurosecretory complex." (Authors)] Address: Andrew, R.J., Hislop Coll, Dept Zool, Nagpur 440001, Maharashtra, India
- 6494.** Anonymus (2006): Libellen in Limburg: Waarnemingen gevraagd. *Natuurhistorisch maandblad* 94(4): ?. (in Dutch). [Announcement of the working atlas of the Odonata of the province Limburg, The Netherlands, and request for cooperation in the mapping work.] Address: Natuurhistorisch Genootschap, GroenHuis, Godswederstraat2, Roermond, The Netherlands
- 6495.** Anonymus (2006): *Tamea* Hagen, 1861 (Insecta, Odonata): conserved. *Bulletin of Zoological Nomenclature* 63(3): 209-210. (in English). ["The Commission has ruled that the name *Tamea* Hagen, 1861 is conserved for a group of common and widespread dragonflies by suppression of the senior objective synonym *Trapezostigma* Hagen, 1849. In addition, it is ruled that all previous fixations of type species for the nominal genus *Tamea* Hagen, 1861 before that by Kirby (1889) of *Libellula carolina* Linnaeus, 1763 are set aside." (Author)] Address: not stated
- 6496.** Anteau, M.J.; Afton, A.D. (2006): Diet shifts of lesser scaup are consistent with the spring condition hypothesis. *Canadian Journal of Zoology* 84(6): 779-786. (in English). ["We compared diets of lesser scaup (*Aythya affinis* (Eyton, 1838)) in the springs of 2000 and 2001 to those reported in the 1970s and the 1980s to determine whether forage quality has declined as predicted by the spring condition hypothesis. In Minnesota, we found that the current aggregate percentage of Amphipoda (an important food item) in lesser scaup diets was 94% lower than that reported from the same locations in the 1980s. Current mean individual prey mass of Amphipoda and *Bivalvia* in Minnesota were 86.6% and 85.1% lower than historical levels, respectively. In Manitoba, current aggregate percentages of Trichoptera and Chaoboridae in lesser scaup diets (1% and 0%, respectively) were lower than those reported from the same location in the 1970s (14% and 2%, respectively), whereas the percentage of Chironomidae (40%) was higher than that of historical levels (19%). Current mean individual prey mass of all insects, seeds, Chironomidae, and Zygoptera in Manitoba were 63.5%, 65.4%, 44.1%, and 44.9% lower than those of historical levels, respectively. The observed dietary shift from Amphipoda to less nutritious prey in Minnesota, coupled with lower mean individual prey mass in both locations, likely constitutes lower forage quality in lesser scaup diets, which is consistent with the spring condition hypothesis." (Authors)] Address: Anteau, M., US Geol Survey, No Prairie Wildlife Res Ctr, 8711 37th St SE, Jamestown, ND 58401 USA. E-mail: MAnteau@usgs.gov
- 6497.** Baixeras, J. (coord.) (2006): *Les Libèl·lules de la comunitat Valenciana*. Generalitat Valenciana. ISBN 84-482-4248-3: 170 pp. (in Spanish, with English, Portuguese and Catalan summaries). [This book "is the result of a two years study funded by the Conselleria de Territori i Habitatge of the Valencian Government in Spain. The main research institutions involved have been the Cavanilles Institute of Biodiversity and Evolutionary Biology of the University of Valencia, the Iberoamerican Center for Biodiversity of the University of Alicante and the Department of Biology of Organisms and Systems of the University of Oviedo as well as a remarkable number of external collaborators. The aims of the project have been to produce a checklist of the Valencian insects of the order Odonata, study the distribution and detect problems of conservation that may be affecting the populations. The first data of odonates of the Valencian Community correspond to works by Boscá (1916), Navás (1922) and Pardo (1942). Some species of great interest are recorded for the first time in some of these works. It is the case of *Macromia splendens*, just recorded in 1923 and *Lindenia tetraphylla*, never recorded since 1965. Later works by Docavo Alberti (1983), Navarro et al. (1988), Bonet Betoret (1990) and Domingo Calabuig (2002) gather a total number of 42 species, whose records are mainly concentrated in the province of Valencia. The present work increases the list in 16 species, completing a catalogue of 58 species that presumably will be increased in the future. During the years 2003 and 2004, 225 localities of the three Valencian provinces (Castellon, Valencia and Alicante) were visited. More than 3.000 specimens of 53 species were examined; five species known from the area were not found. Different habitats were targeted for the selection of the sampling localities, from high mountains to lowlands, from streams to lakes. Some of the species deserved some attention. It is the case of protected or scarce species like *Calopteryx virgo*, *Coenagrion mercuriale*, *C. puella*, *Gomphus simillimus*, *G. graslini*, *Oxygastra curtisii*, *Orthetrum nitidinerve* and *Zygonyx torridus*. Two interesting species, previously recorded from the area have not been found, it is the case of *Lindenia tetraphylla* and *Macromia splendens*. Some sections devoted to habitat and conservation problems in the species have been included in the book. The habitats of low altitude, mainly represented by marshes and river mouths are the aquatic ecosystems more polluted and

the occurring fauna is composed by poorly demanding species. The study confirms the expansion of *Trithemis annulata* and *Selysiothemis nigra*, at present two relatively frequent species. The conservation of the middle courses of the rivers is much better. This is the Level that shows the highest degree of transitions. Typical species associated to this habitat are *Calopteryx haemorrhoidalis*, *C. xanthostoma*, *C. caerulescens*, *Ischnura elegans*, *Ceragrion tenellum*, *Platycnemis iatipes*, *Pyrrhosoma nymphula*, *Cordulegaster bottonii*, *Onychogomphus forcipatus*, *O. uncutus*, *G. graslinii*, *G. similimus* and *Orthetrum coerulescens*. It is also possible to find a wide range of species in connection with inland pools or stagnant waters. Typical species of this group are: *Enallagma cyathigerum*, *Coenagrion caerulescens*, *C. scitulum*, *Lestes virens*, *L. barbarus*, *L. viridis*, *L. dryas*, *Ischnura graellsii*, *I. pumilio*, *Libellula depressa*, *Orthetrum cancellatum*, *Crocothemis erythraea*, *Symptetrum meridionale* and *S. striolatum*. Finally the best preserved area is found between 500 and 1.000 m altitude. This is a range only found in deep inland areas, and includes species like *I. graellsii*, *C. mercuriale*, *C. xanthostoma*, *C. virgo*, *P. latipes*, *P. nymphula*, *O. uncutus*, *O. forcipatus*, *A. affinis*, *A. cyanea*, *O. curtisii*, *O. brunneum* and *Boyeria irene*. The core of this work is represented by a collection of files devoted to the 58 species occurring in the Valencian Community. The inclusion of the species in red books and the legal status is indicated for every species. Every species includes some comments on morphology and biology, distribution, habitat and present situation of the populations, threats and conservation actions recommended by the authors when necessary. A distribution map in UTM squares of 100 km² (10x10 km) is given for every species. The records based in bibliographical data are indicated by a blue dot, the records based in our own material are indicated by a red square. The text finished with an exhaustive list of references on the theme." (Author) Address: Baixeras Almela, J., Institut Cavanilles de Biodiversitat i Biologia Evolutiva, Universitat de Valencia, Apartat de correus 2085, 46071 Valencia, Spain. E-mail: joaquin.baixeras@uv.es

6498. Bal, D.; Groenendijk, D. (2006): Consequences of the Habitats Directive for the legal protection of dragonflies in The Netherlands. *Brachytron* 9(1-2): 38-48. (in Dutch, with English summary). ["The European Habitats Directive offers an import framework for national legislation concerning nature conservation. Several species of dragonflies (Odonata) have been incorporated in the annexes of this directive. Of the twelve dragonfly species of Annex IV eight species are indigenous in The Netherlands. In accordance with the directive these eight species are protected by the Dutch Flora Fauna Act. Of the nine dragonfly species of Annex II, four species are indigenous in The Netherlands, but only two have populations at the moment: *Leucorrhinia pectoralis* and *Ophiogomphus cecilia*. Therefore, only for these two species Special Protection Areas will be assigned under the Nature Conservation Act, as part of the European Natura 2000 network. The conservation status of both species is 'unfavourable - bad', so measures have to be taken to ensure that the status will become 'favourable'. Several other dragonfly species will be selected as 'typical species' of habitat types and, therefore, will become an important indicator for the quality of many Dutch Nature 2000 sites." (Author)] Address: Groenendijk, D., Minist. LNV, Postbus 482, NL-

6710 BL Ede, Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

6499. Balik, I.; Cubuk, H.; Karasahin, B.; Ozkok, R.; Uysal, R.; Alp, (2006): Food and feeding habits of the pikeperch, *Sander lucioperca* (Linnaeus, 1758), population from Lake Egirdir (Turkey). *Turkish Journal of Zoology* 30(1): 19-26. (in English, with Turkish summary). ["The stomach contents of 986 pikeperch, collected from Lake Egirdir in Turkey were investigated between March 2001 and February 2002. Thirteen taxonomic categories were identified from the 1745 prey items analysed. It was determined that the diet of pikeperch in Lake Egirdir consisted of some fish species (*Knipowitschia* sp., *Aphanius anatoliae* *anatoliae*, *Gambusia affinis*, *Nemacheilus lendli*, *Carassius gibelio*, and *Sander lucioperca*), odonats (*Calopteryx splendens*), mysids (Mysis), amphipods (*Gammarus*) and dipterans (*Chironomus*). Of these prey categories, fish was more important than the others. In particular, *Knipowitschia* sp. and *A. a. anatoliae* were the primary prey for the pikeperch. The proportions of vertebrates and invertebrates in the diet composition of pikeperch in the 150-190 mm length class were found roughly equal. The importance of vertebrates (especially prey fish) in the diet of the pikeperch in Lake Egirdir increased with increasing body size of fish, but, at the same time, the importance of invertebrates decreased. Pikeperch longer than 300 mm consumed only fish, frogs and odonats. The cannibalism rate was 0.6%. In addition, it was found that the diet of the pikeperch in Lake Egirdir considerably changed from season to season." (Authors)] Address: Balik, I., Fisheries Res Inst, TR-32500 Egirdir, Isparta, Turkey

6500. Beutler, H.; Petrick, S.; Zimmermann, F. (2006): Neue Lebensräume und Arten der Anhänge 1 und 2 der Fauna-Flora-Habitat (FFH)-Richtlinie in Brandenburg. *Naturschutz und Landschaftspflege in Brandenburg* 3/2006: 76-84. (in German). [fact sheet referring to *Coenagrion ornatum*] Address: Beutler, H., Kirschallee 3b, D-15848 Stremmen, Germany. E-mail: horstbeutler@freenet.de

6501. Bonada, N.; Rieradevall, M.; Prat, N.; Resh, V.H. (2006): Benthic macroinvertebrate assemblages and macrohabitat connectivity in Mediterranean-climate streams of northern California. *Journal of the North American Benthological Society* 25(1): 32-43. (in English). ["Drought leads to a loss of longitudinal and lateral hydrologic connectivity, which causes direct or indirect changes in stream ecosystem properties. Changes in macrohabitat availability from a riffle-pool sequence to isolated pools are among the most conspicuous consequences of connectivity loss. Macroinvertebrate assemblages were compared among 3 distinct stream macrohabitats (riffles [R], pools connected to riffles [Pc], disconnected pools [Pd]) of 19 Mediterranean-climate sites in northern California to examine the influence of loss of habitat resulting from drought disturbance. At the time of sampling, 10 sites were perennial and included R and Pc macrohabitats, whereas 9 sites were intermittent and included only Pd macrohabitats. Taxa richness was more variable in Pd, and taxa richness was significantly lower in Pd than in Pc but not R. These results suggested a decline in richness between Pc and Pd that might be associated with loss of connectivity. Lower Ephemeroptera, Plecoptera, and Trichoptera (EPT) richness relative to Odonata, Coleoptera, and Heteroptera (OCH) richness was observed for Pd than

R and Pc macrohabitats. Family composition was more similar between R and Pc than between R or Pc and Pd macrohabitats. This similarity may be associated with greater connectivity between R and Pc macrohabitats. Correspondence analysis indicated that macroinvertebrate composition changed along a gradient from R to Pc and Pd that was related to a perennial-intermittent gradient across sites. High variability among macroinvertebrate assemblages in Pd could have been related to variability in the duration of intermittency. In cluster analysis, macroinvertebrate assemblages were grouped by macrohabitat first and then by site, suggesting that the macrohabitat filter had a greater influence on macroinvertebrate assemblages than did local site characteristics. Few taxa were found exclusively in Pc, and this macrohabitat shared numerous taxa with Rand Pd, indicating that Pc may act as a bridge between R and Pd during drought. Drought is regarded as a ramp disturbance, but our results suggest that the response of macroinvertebrate assemblages to the loss of hydrological connectivity among macrohabitats is gradual, at least in Mediterranean-climate streams where drying is gradual. However, the changes may be more dramatic in and and semiarid streams or in Mediterranean-climate streams if drying is rapid." (Authors)] Address: Bonada, Nuria, Univ Lyon 1, CNRS Ecol Hydrosyst Fluviaux, F-69622 Villeurbanne, France. E-mail: nuria.bonada@univ-lyon1.fr

6502. Borisov, S.N. (2006): Adaptations of dragonflies (Odonata) under desert conditions. *Zoologicheskii Zhurnal* 85(7): 820-829. (in Russian, with English summary). ["Different types of adaptation in dragonflies directed to the selection of optimal habitats in the desert zone in the southern part of central Asia were revealed. The most favourable habitats for the development of larval phases are flowing and semi-flowing water bodies of irrigation systems. The life cycles in dragonflies are synchronous with seasonal climatic changes; their reproductive period is restricted to the time of optimal hygrothermal conditions. The time of flying in monovoltine species may be reduced and shifted to spring time (*Libellula q. quadrimaculata*, *Anaciaeschna isocles antehumeralis*) or, on the contrary, it becomes longer due to the prereproductive diapause, when dragonflies fly away to mountains (*Sympetrum arenicolor*, *Aeshna m. mixta*, *Sympecma gobica*, *S. paedisca*, and *S. fusca*). The vernal and autumnal peaks in the number with its significant decrease in mid-summers are characteristic of bivoltine species (*Ischnura elegans* and *I. evansi*). Species with the long imaginal state due to the asynchronous seasonal development of populations are numerous only in spring (*Anax p. parthenope* and *Lindenia tetraphylla*). The labile diurnal rhythms in the activity of dragonflies allow to avoid effects of unfavourable weather conditions. Emergence for many species takes place at night." (Author)] Address: Borisov, S.N., Russian Acad. Sci., Inst. Animal. Systemat. and Ecol., Novosibirsk 610091, Russia. E-mail: mu4@eco.nsc.ru

6503. Borisov, S.N. (2006): Ecological niches of species of the genus *Ischnura* (Odonata, Coenagrionidae) in oases of the Pamir-Alai. *Zoologicheskii Zhurnal* 85(8): 935-942. (in Russian, with English summary). ["With development of irrigation and oases, new habitats suitable for dragonflies appeared. In artificial reserves, unique Odonata complexes were formed. In the oases zone of the Pamiro-Alai, species of the genus *Ischnura* predominate among Zygoptera. The co-occur-

rence of *Ischnura fontainei*, *I. evansi*, *I. elegans*, *I. forcipata*, and *I. pumilio* was investigated. The divergence of ecological niches of these species is due to their adaptation to different habitats. The species that dominate in the same habitat demonstrate complementation, that is different time of its use. Hygrothermal preferences of species determine the differences in circadian rhythms and microspatial distribution of imagoes." (Author) The English version was published in. *Entomological Review*, 2006, Vol. 86, No. 6, pp. 623–631.] Address: Borisov, S.N., Russian Acad. Sci., Inst. Animal. Systemat. and Ecol., Novosibirsk 610091, Russia. E-mail: mu4@eco.nsc.ru

6504. Bouwman, J.H.; Kalkman, V.J. (2006): Status of the Odonata of the habitat directive in The Netherlands. *Brachytron* 9(1-2): 3-13. (in Dutch, with English summary). ["In 2004 special attention was given to the distribution of five species of Odonata - *Sympecma paedisca*, *Aeshna viridis*, *Ophiogomphus cecilia*, *Leucorrhinia pectoralis* and *Gomphus flavipes* - present on the Habitat Directive of the EU. Of the first four species all square kilometres where the species was found between 1980-2000 but not after 2000 were revisited. For *Gomphus flavipes* a search was conducted in each 5 km squares in the flood plains. The work resulted in up to date information on the distribution of the species. *Sympecma paedisca*: The reproduction takes place in the Weerribben and Kuinderplas. In the provinces of Friesland and Drenthe the individuals are seen at many different sites each autumn but until now no successful reproduction is proven. *Aeshna viridis*: The distribution of this dragonfly overlaps with that of Water soldier (*Stratiotes aloides*). In The Netherlands there are two core-areas where large stands of this plant occur and where *A. viridis* is found: in the western and northern part of the country. *A. viridis* disappeared from a few localities, but it was discovered at several new localities. The overall impression is that the species is stable. *Gomphus flavipes*: After an absence of more than 90 years the species was rediscovered in 1996. Since then the species colonised all larger rivers in the Netherlands. It is especially common along the Waal and Merwede and less so along the Lek and Nederrijn. Prior to 2004 the species was known from a few records along the IJssel. During fieldwork in 2004 it was shown that it is present along the full length of the IJssel though in low numbers. The species is largely absent from the river the Maas. This river lacks the groynes and the adjacent sandbanks which are deposited behind the groynes and which probably form the larval habitat in other rivers. Remarkable a small population is present along the Roer, a small river, which runs into the Maas. *Ophiogomphus cecilia*: The only reproduction site in The Netherlands is the river Roer. In 2002 and 2003 in total 105 exuviae were found making clear that this population is well established. Searches along the Geleenbeek, where the species was seen in 1995 and 1996 were not successful. *Leucorrhinia pectoralis*: This species is rare in most of Europe but relatively common in parts of The Netherlands. Large populations occur in the lowland peat marshes of De Weerribben and De Wieden and the Lonnerkermeer (all in the province of Overijssel). A small population is found in the lowland peat marshes in the province of Utrecht and Noord-Holland (nature reserve Het Hol). Apart from these populations the species is found at several localities in the east and south of the Netherlands and at one locality in the dunes. However, none of these localities seem to hold stable

populations." (Authors)] Address: Bouwman, J.H., Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

6505. Brockhaus, T. (2006): Verbreitung und Bestandsentwicklung der nach der EU-FFH-Richtlinie besonders geschützten Libellenarten in Sachsen (Insecta: Odonata). Beitr. Ent. 56(2): 433-441. (in German, with English summary). [8 out of 16 protected after law European Odonata species are occurring in Sachsen, Germany. These species are briefly introduced.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

6506. Buczyński, P.; Stachyra, P. (2006): Libellen im Nahrungsspektrum europäischer Bienenfresser (*Meropis apiaster* L.) in südostpolnischen Brutkolonien gegen Ende der Brutzeit. Poster. 25. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen, Essen: 1 p. (in German). [Odonata accounted for 42,6% of the food items in *M. apiaster* (Aves) against terminal breeding season in a south eastern Polish breeding colony near Gródek. 17 Odonata species, exclusively Anisoptera, were preyed. Preferred hunting habitats were closely situated to the breeding places, further situated water bodies were more lessly frequented.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

6507. Butler, S.G.; Chelmick, D.G.; Vick, G.S. (2006): Descriptions of the last instar larvae of *Neodythemis hildebrandti* Karsch and *N. afra* (Ris) with comments on the status of the genus and subfamily (Anisoptera : Libellulidae, Tetrathemistinae). Odonatologica 35(3): 233-241. (in English). ["The larvae of *N. hildebrandti* (from Nosy Be, Madagascar) and *N. afra* (from Mt Kupe, Cameroon) are described, illustrated from exuviae, and compared with the larva of *N. (Allorrhizucha) klingi* (Karsch) from W Africa. Differences between the larva of *Neodythemis* and that of other known African Tetrathemistinae genera (*Malgassophlebia*, *Notiothemis* and *Tetrathemis*) are highlighted, and it is suggested that this provides support for the view that *Neodythemis* (including *Allorrhizucha*) and *Micromacromia* form a natural group, the 'neodythemistines', and that they are only distantly related to other genera in the subfamily. This provides additional evidence for the view that Tetrathemistinae is not a phylogenetically homogenous grouping within the Libellulidae." (Authors)] Address: Butler, S.G., 31 High Beech Lane, Haywards Hlth RH16 1SQ, W Sussex, UK. E-mail: sgbutler15@btopenworld.com

6508. Calle, P.; Kurstjens, G.; Peters, B. (2006): Dragonflies of the Gelderse Poort. Natural river landscape richer in biodiversity than expected. Brachytron 9(1-2): 49-57. (in Dutch, with English summary). ["In 2003 fieldwork was carried out to learn about the dragonfly biodiversity in the Gelderse Poort. In this area floodplain restoration projects were realised on a large scale (ca. 800 ha) since 1990. The nature reserves in the Gelderse Poort consists of floodplains with some alluvial forests and river dunes, as well as (reed) marshes in former floodplains. In total 43 species have been observed since 2000 of which 37 have populations in the area. Seven Dutch Red Listed species occur in the Gelderse Poort: *Aeshna isocelis*, *Brachytron pratense*,

Gomphus flavipes, *G. vulgatissimus*, *Lestes virens*, *Libellula fulva* and *Sympetma fusca*. This investigation shows the high species richness in dragonflies of natural floodplains. Recently this phenomenon was not well known in The Netherlands. The popular opinion was a rather low biodiversity in dragonflies due to regular flooding and bad water quality. Also the presence of Beavers (*Castor fiber*) has positive effects on the habitats of some species, for example on *Libellula fulva*. Males of this species use dead branches cut by Beavers as perches." (Authors)] Address: Kurstjens, G., Ecologisch adviesbureau, Col. Ekmanstr. 15, NL-6573 BM Beek-Ubbergen, The Netherlands

6509. Chazal, A.C. (2006): Lepidoptera and Odonata Surveys of Colonial National Historic Park, James City, Surry, and York Counties, Virginia. Technical Report NPS/NER/NRTR-2006/063: 102 pp. (in English). ["In 2003, the United States Department of the Interior, National Park Service contracted with the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) to conduct an inventory of the diurnal Lepidoptera and Odonata on Colonial National Historical Park (COLO), located in James City, Surry, and York counties, Virginia. Between May-July 2003 and April-October 2004, DCR-DNH conducted surveys over 18 days covering 17 different habitats, which were categorized into six habitat types: developed areas, fields, forested uplands, forested wetlands, marshes, and water (i.e. freshwater ponds). 75 species of Lepidoptera and 42 species of Odonata were observed. The field habitat, primarily classified as Planted / Cultured / Cultivated Herbaceous Vegetation, had the highest species diversity and highest total numbers for Lepidoptera. The field habitats also had the highest species diversity and second highest totals (forested wetlands had higher totals) for Odonata. The globally rare skipper, *Problemata bulenta* (Rare Skipper G2G3 S1), was reconfirmed at an existing site on COLO, but no further occurrences were found during targeted surveys for that species. Five watchlisted species were observed: Aaron's Skipper (*Poanes aaroni*), *Anax longipes*, *Sympetrum ambiguum*, *Ischnura prognata*, and *Telebasis byersi*. All of these watchlisted species are considered common to very common and secure across their global ranges. The results of this survey represent 37 new county records for Lepidoptera and 26 for Odonata. Species accumulation curves indicate that further surveys for Lepidoptera and Odonata may increase the known fauna of COLO." (Author)] Address: Chazal, Anne, Virginia Department of Conservation and Recreation, Division of Natural Heritage, 217 Governor Street, Richmond, VA 23219, USA

6510. Chazal, A.C. (2006): Lepidoptera and Odonata Surveys of George Washington Birthplace National Monument, Westmoreland County, Virginia. Technical Report NPS/NER/NRTR--2006/062: 82 pp. (in English). ["In 2003, the United States Department of the Interior, National Park Service contracted with the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) to conduct an inventory of the diurnal Lepidoptera and Odonata on George Washington Birthplace National Monument (GEWA), Westmoreland County, Virginia. Between May-July 2003 and April-September 2004, DCR-DNH conducted surveys over 13 days covering thirteen habitats which were categorized into six habitat types: beach/shoreline, developed areas, field, forest, marsh, and water (i.e., fresh-

water ponds). Fifty-one species of Lepidoptera and 37 species of Odonata were observed. The field habitats, primarily classified as Planted/Cultured/Cultivated Herbaceous Vegetation, had the highest species diversity and highest total numbers for Lepidoptera. The marsh habitats, primarily comprised of Tidal Oligohaline Marsh, had the highest species diversity and totals for Odonata. No rare, threatened, or endangered species were observed. Three watchlisted species were observed: Aaron's Skipper (*Poanes aaroni*), *Anax longipes*, and *Lestes inaequalis*. All of these species are considered common to very common and secure across their global ranges. The results of this survey represent 24 new county records for Lepidoptera and 23 for Odonata. The species accumulation curve for Lepidoptera indicates that further surveys may increase the known fauna of GEWA; however, the same type of curve for Odonata leveled off by the eighth survey indicating that further surveys may have low probability of recording new species." (Author)] Address: Chazel, Anne, Virginia Department of Conservation and Recreation, Division of Natural Heritage, 217 Governor Street, Richmond, VA 23219, USA

6511. Cicek, K.; Mermer, A. (2006): Feeding biology of the Marsh Frog, *Rana ridibunda* Pallas 1771, (Anura, Ranidae) In Turkey's lake district. North-Western Journal of Zoology 2(2): 57-72. (in English). ["We examined the food composition of the marsh frog, *Rana ridibunda*, populations inhabiting Turkey's Lake District. Stomach contents of 82 (32 males, 50 females) adult individuals were investigated. It was found that the species mainly fed on invertebrates and especially on terrestrial preys belonging to arthropod groups (75.17%). The most frequently consumed preys with respect to numeric proportion were Diptera (19.85%), Coleoptera (12.72%) and Hymenoptera (10.02%). There are no differences in diet between sexes and among the populations examined." (Authors) Odonata accounted for approximately 25% of food items.] Address: Cicek, K., Ege University, Faculty of Science, Biology Department, Zoology Section, TR-35100, Izmir, Turkey. E-mail: kerim.cicek@ege.edu.tr

6512. Cifuentes-Ruiz, P.; Vrsansky, P.; Vega, F.; Cevallos-Ferriz, S.R (2006): Campanian terrestrial arthropods from the Cerro del Pueblo Formation, Difunta Group in northeastern Mexico. *Geologica Carpathica* 57(5): 347-354. (in English). ["The Campanian assemblage of arthropods from the Cerro del Pueblo Formation in northeastern Mexico display some primitive characteristics. It consists of a small spider, a dragonfly assigned to the Libelluloidea, and cockroach *Xonpepetla rinconensis* Cifuentes-Ruiz et Vransky gen. et sp. nov..." (Authors)] Address: Cifuentes-Ruiz, Paulina, Univ. Nacl. Autonoma Mexico, Inst. Biol., Ciudad Univ., Mexico City 04510, DF, Mexico E-mail: paulina.cifruz@yahoo.com.mx

6513. Contreras-Garduno, J.; Canales-Lazcano, J.; Cordoba-Aguilar, A. (2006): Wing pigmentation, immune ability, fat reserves and territorial status in males of the rubyspot damselfly, *Hetaerina americana*. *Journal of Ethology* 24(2): 165-173. (in English). ["An explanation for courting traits is that they convey information about the bearer's condition to conspecifics, more specifically immune ability. Here we test a series of immune-based assumptions in the territorial damselfly *H. americana*, whose males bear wing pigmentation patterns,

which are maintained via male-male competition. *H. americana* males emerge and take some time to mature sexually, after which, depending on their fat reserves, may start defending territories where females arrive at for copulation. Territorial males are eventually defeated and lose their territories. This loss is a consequence of a reduction in muscular fat reserves. We tested whether: (a) territorial males had more pigmented wings, more intense melanine-based immune response (encapsulation response to a nylon filament implant) and higher fat reserves than non-territorial males; (b) pigmentation is related to immunity and fat reserves; (c) the immune response held constant in two different episodes (3 days between each) in the same male during territorial tenure; and (d) immune response and fat reserves decreased after experimentally simulated fighting event. Our results agree with current views of immune ability and courting traits: (1) territorial males had more wing pigmentation, higher immune responses and fat reserves than non-territorial males; (2) pigmentation was also correlated with immunity and fat reserves; and (3) immune response was similarly intense in the two episodes during territorial tenure. However, this response and fat reserves were considerably lower after fighting compared to that of territorial males and non-territorial males. Our work points out a link between fat reserves and immune ability which agree with previous studies in insects. Given, however, that in this species the use of wing pigmentation via male-male competition is more likely to provide information about current fat reserves than immunity, it is suggested that immune ability is only indirectly selected and may not be the information that pigmentation would convey to conspecifics." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

6514. Cordoba-Aguilar, A.; Contreras-Garduno, J.; Peralta-Vazquez, H.; (2006): Sexual comparisons in immune ability, survival and parasite intensity in two damselfly species. *Journal of Insect Physiology* 52(8): 861-869. (in English). ["Recent evolutionary studies have suggested that females have a more robust immune system than males. Using two damselfly species (*Hetaerina americana* and *Argia tezpi*), we tested if females produced higher immune responses (as phenoloxidase and hydrolytic enzymes) had a higher survival (using a nylon implant inserted in the abdomen and measuring survival after 24 h) and fewer parasites (gregarines and water mites) than males. We also tested whether immune differences should emerge in different body areas (thorax vs. abdomen) within each sex with the prediction that only females will differ with the abdomen having a higher immune response than their thorax since the former area, for ecological and physiological reasons, may be a target zone for increased immune investment. Animals were adults of approximately the same age. In both species, females were more immunocompetent than males, but only in *H. americana* females were immune responses greater in the abdomen than in the thorax. However, there were no differences in survival and parasite intensity or the probability of being parasitised between the sexes in either of the two species. Thus, this study]ends partial support to the principle that females are better at defending than males despite the null difference in parasitism and survival." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigacio-

nes Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

6515. Cordoba-Aguilar, A.; Mendez, V. (2006): Immune melanization ability and male territorial status in *Erythemis vesiculosa* (Fabricius) (Anisoptera: Libellulidae). *Odonatologica* 35(2): 193-197. (in English). ["Using a nylon filament implant inserted in the thorax, it was tested whether there were immune ability and size differences between territorial and nonterritorial male male that gather in lentic aquatic sites. It was found that territorial male male mounted a larger melanin-based immune response than nonterritorial male male. This is coherent with current results in other odon. and is interpreted as territorial male male being in better condition than nonterritorial male male - However, there was no size difference between the territorial and nonterritorial individuals. This suggests that size may be a poor predictor of immune ability." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

6516. Couteyen, S.; Papazian, M. (2006): Contribution à la connaissance des Odonates de l'île de la Réunion 7. Description de la larve de *Pseudagrion punctum* (Rambur, 1842) (Odonata Zygoptera Coenagrionidae). *L'Entomologiste* 62(3-4): 97-100. (in French, with English summary). [The larva of *P. punctum*, a species from Madagascar and the Mascareignes islands, is described and compared to the larva of the continental species *P. massaicum*. Information on the biology of the species is added.] Address: Couteyen, S., Assoc Reunionnais Ecol, 188 Chemin Nid Joli, F-97430 Le Tampon, Reunion. E-mail: couteyensf@wanadoo.fr

6517. Couteyen, S. (2006): Évolution de la taille de *Coenagrioncnemis reuniensis* Franser, 1957, en fonction de l'altitude à l'île de la Réunion (Odonata, Coenagrionidae). *Bulletin de la Société entomologique de France* 111(4): 439-444. (in French, with English summary). ["Temperature and photoperiod influence growth and development of Odonata. Adult size is a good assessment of weight at metamorphosis. The adult size of endemic species of La Reunion, *C. reuniensis*, varies with altitude. In the island, thermal gradient is closely related with altitudinal gradient, whereas the photoperiod can be highly regarded anywhere as a regular evolution. Individuals *C. reuniensis* that who live in the higher altitude where temperature is lower, are larger and have a longer development time than individuals living in lower altitude. The possibility that these differences in growth and development could allow a sympatric speciation is discussed." (Author)] Address: Couteyen, S., Assoc Reunionnais Ecol, 188 Chemin Nid Joli, F-97430 Le Tampon, Reunion. E-mail: couteyensf@wanadoo.fr

6518. Craves, J.A. (2006): First Michigan specimens of *Libellula vibrans* Fabricius (Odonata: Libellulidae). *The Great Lakes Entomologist* 91: 91-93. (in English). [In 2005, two small populations were found in Wayne County, Michigan, USA.] Address: Craves, Julie, 115911 Andover Drive, Dearborn, MI 48120, USA. E-mail: jcraves@umich.edu

6519. Creed, R.P. (2006): Predator transitions in stream communities: a model and evidence from field studies. *Journal of the North American Benthological*

Society 25(3): 533-544. (in English). ["The role of predators (particularly top predators such as fish) in structuring stream communities has been debated for 2 decades. Much of the debate may have been caused by the lack of a conceptual framework for evaluating predator effects in stream communities. First, I propose a general conceptual model of the factors (abiotic, such as stream permanence and disturbance regime; biotic, such as predation) that can influence community structure, and the conditions in which these various factors would be expected to be important. Hydrologic permanence and disturbance transitions separate streams where abiotic factors are most important in determining community structure from streams with relatively benign disturbance regimes where predation may be more important. Second, I focus on the potential effect of predators in perennial streams with relatively benign disturbance regimes. Such streams are divided longitudinally into sections where different types of predators might be important in determining community structure. Large invertebrates (stoneflies, dragonflies, shrimp, and crayfish) and salamanders may be the dominant benthic predators affecting species composition in small perennial fishless streams. A transition from invertebrate. and amphibian-dominated to fish-dominated systems may occur in larger, downstream sections (predator transition 1). In addition, longitudinal transitions in fish-assemblage structure from upstream tributaries to downstream main-channel fish assemblages (predator transition 2) may affect community structure. I present evidence supporting the above model and suggest experimental approaches to test the model. This conceptual framework may help in understanding the role of specific predators in determining prey distributions in many stream communities." (Author)] Address: Creed, R.P., Appalachian State Univ, Dept Biol, Boone, NC 28608 USA. E-mail: creedrp@appstate.edu

6520. Crumrine, P.W. (2006): Age specific behavioral responses of odonate larvae to chemical and visual cues from predators. *Journal of Freshwater Ecology* 21(1): 9-16. (in English). ["Many aquatic organisms possess the ability to detect and respond to visual and chemical cues from predators and injured conspecifics, but relatively few studies have investigated if those responses change during development in odonates. In a laboratory experiment, I exposed 8(th) and 12(th) instar larvae of the dragonfly *Anax junius* to (1) the presence of a free-swimming fish predator (*Lepomis macrochirus*); (2) water that recently contained *L. macrochirus*; (3) water that contained crushed conspecifics; (4) water that recently contained living conspecifics; and (5) charcoal filtered tap water that contained no visual or chemical stimuli. The 12(th) instar *A. junius* moved more often, spent more time moving and spent less time perched on artificial aquatic vegetation than did 8(th) instar *A. junius*. *A. junius* moved less in the presence of fish chemical cues relative to the control. Although 8(th) and 12(th) instar *A. junius* differed in their responses to stimuli from predators, the overall response of *A. junius* to predators was not strong. The characteristic high activity level of *A. junius*, which is an advantage in fishless habitats, may limit success of this species in habitats with insectivorous fish." (Author)] Address: Crumrine, P.W., Department of Natural Sciences, Longwood University, Farmville, VA 23909, USA. E-mail: crumrinepw@longwood.edu

- 6521.** Das, P.K.; Sivagnaname, N.; Amalraj, D.D. (2006): Population interactions between *Culex vishnui* mosquitoes and their natural enemies in Pondicherry, India. *Journal of Vector Ecology* 31(1): 84-88. (in English). ["Population interactions among mosquitoes in the *Culex vishnui* subgroup, which are vectors of Japanese Encephalitis, and their natural enemies were studied in Pondicherry, India. We tested the hypothesis that the breakdown of interactions between the larvae and their natural enemies due to drought followed by rain was responsible for the sudden increase in the vector population above the threshold for disease transmission during the heavy rainy period. We randomly sampled mosquito larvae and their predators in different breeding habitats and subjected the mean densities of prey, predator, and mosquito larvae infected with parasites/pathogens to covariate analysis to understand the interaction between prey and their natural enemies in relation to environmental factors. In rice fields, neither prey nor predator showed any positive correlation with temperature, RH, or the number of rainy days. However, the pathogen/parasite of mosquito immatures showed a positive correlation with RH. Among the mosquito predators, notonectids exhibited a significant positive correlation with *Cx. vishnui* larvae. The parasitic *Romanermis iyengari* and pathogenic *Coelomomyces anopheliscus* also showed positive correlations with immatures. No parasites and pathogens of mosquito larvae were recorded in shallow water pools (SWP) or cement tanks (CT) during the study period. Important predators recorded in SWP were notonectids, damselfly nymphs, *Diplonychus indicus*, and hydrophilids. Dragonfly nymphs, Gerrids, and tadpole shrimps were recorded in CT. In CT, prey and their predators were positively correlated with RH and rainy days. In SWP, there was a highly significant correlation between prey, predators and environmental factors. We conclude that rice fields are a stable ecosystem where regular interaction occurs between larvae and their natural enemies and a sudden increase in mosquito populations is uncommon. In transient habitats, no such stability is present and they become more important as breeding habitats in terms of seasonality and number. Shallow water pools should be seriously considered for the control of these vectors." (Author)] Address: Das, P.K., Indian Council Med Res, Vector Control Res. Ctr, Indira Nagar, Pondicherry 605006, India
- 6522.** de Boer, E.P.; Wasscher, M.T. (2006): Rediscovery of *Leucorrhinia albifrons* in The Netherlands. *Brachytron* 9(1-2): 14-20. (in Dutch, with English summary). ["In late June 2005, several specimens of *Leucorrhinia albifrons* were seen on the Dellebuursterheide, a nature reserve in the province of Friesland, The Netherlands. This rare species was thought to be extinct in the Netherlands. The last record dates from 1994, also in Friesland. In the days following the rediscovery a suitable reproduction site was found where the species was seen regularly until July 12, with a maximum number of ten individuals on a single day. In addition to the sighting of several ovipositing females, a larval skin was found, thus proving successful reproduction at this site. The habitat of the reproduction site consists of a shallow oligotrophic lake of 200x100 meter in a lightly wooded heath landscape. Except for a submerged blanket of peat moss (*Sphagnum*, sp.) the vegetation is rather poor in species and indicates moderately acid circumstances. Before the nineties, this site was completely cleared of overgrown vegetation and the enriched soil was removed by the local conservation body within the framework of a recovery program. It is therefore likely that *L. albifrons* has not colonised the lake until after 1990, since the habitat previous to the undertaken recovery measurements, is considered to have been unsuitable for the species. Therefore, the origin of this population still remains unclear. In 2006 further investigation will take place to discover possible other reproduction sites, and to provide a species protection program." (Authors)] Address: It Fryske Gea, Postbus 3, NL-9244 ZN Beetsterzwag, Netherlands. E-mail: e.p.de.boer@fryskegea.nl. Wasscher, M. T. E-mail: marcel.hilair@12move.nl
- 6523.** Di Domenico, M.; Clausnitzer, V.; Carchini, G. (2006): Larval morphology of three species of the genus *Hadrothemis* Karsch (Anisoptera: Libellulidae). *Odonatologica* 35(2): 117-125. (in English). ["The larval morphology of *H. scabrifrons*, *H. coacta* and *H. camarensis* is described for the first time from specimens collected in East Africa, and a comparison among the species is given."] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@t-online.de
- 6524.** Dommange, J.-L. (2006): Préambule à l'hommage à René Martin. *Martinia* 22(1): 3-6. (in French). [Introduction into a special issue of the French odonatological journal 'Martinia', named after the famous odonatologist René Martin (1846-1925).] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 6525.** Dommange, J.-L. (2006): René Martin au Blanc, hier et aujourd'hui (Département de l'Indre). *Martinia* 22(1): 45-52. (in French, with English summary). [Information referring to René Martin; the author followed some "footsteps" Martin has left in the town Blanc, France, where R. Martin had lived for approximately 35 years.] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 6526.** Dommange, J.-L. (2006): Essai bibliographique sur les travaux entomologiques de René Martin (1846-1925). *Martinia* 22(1): 37-44. (in French, with English summary). [Introduction to and bibliography of René Martin covering the whole work of this author.] Address: Dommange, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 6527.** D'Antonio, C.; Zeccolella, D. (2006): Nuovi insetti presenti nella Riserva Naturale di Stato "Isola di Vivara". <http://www.isoladivivara.it/press/newinsects.pdf> - 14 maggio 2006: 4 pp. (in Italian). [Italy; records of *Anax ephippiger*, *A. imperator*, and *Aeshna cyanea* are documented.] Address: D'Antonio, C., Via A. Falcone 386/b, I-80127 Napoli, Italy. E-mail: constantino.d@tin.it
- 6528.** Ellenrieder, N. von (2006): The larvae of *Teinopodagrion decipiens* De Marmels and *T. meridionale* De Marmels (Zygoptera: Megapodagrionidae). *Odonatologica* 35(3): 281-287. (in English). ["The larvae of 2 species are described and illustrated: *T. decipiens*, based on specimens from the Bolivian Yungas, and *T. meridionale*, based on specimens from the Argentine Yungas. A key to all known larvae is provided." (Author)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

- 6529.** Etscher, V.; Miller, M.A.; Burmeister, E.-G. (2006): The larva of *Polythore spaetheri* Burmeister & Börsöny, with comparison to other polythorid larva and molecular species assignment (Zygoptera: Polythoridae). *Odonatologica* 35(2): 127-142. (in English). ["The larva from the area of Panguana (Huanuco prove, Peru) is described. This constitutes the first description of a *Polythore*. P-distance measuring of a 790 bp long fragment of the mitochondrial COI gene was used as a tool for the assignment of the larva. The low degree of sequence divergences between larval and imaginal COI sequences leaves no doubt about conspecificity. The use of scanning electron microscopy gives an impression of some morphological characters not mentioned so far concerning polythorid larvae. Comparison of the *P. spaeteri* larva with the few Currently available descriptions of polythorid larvae shows that characterisation of the larvae at generic level is not possible until more larval specimens of the family are examined." (Authors)] Address: Etscher, V., Zool Staatssammlung München, Münchhausenstr 21, D-81247 München, Germany. E-mail: zsm@zsm.mwn.de
- 6530.** Ferreira-Peruquetti, P.S.; Fonseca-Gessner, A.A. (2006): Spatial distribution and seasonality of *Heliogaris amazona* Selys in a Cerrado area of Sao Paulo State, Brazil (Zygoptera : Dictyodidae). *Odonatologica* 35(1): 41-46. (in English). ["The study was conducted on 2 nature reserves in NE Sao Paulo State, SE Brazil. *H. amazona* populations naturally occur in low densities. 25 male, 2 female and 23 larvae were recorded, only at streams with riparian vegetation. All larvae were collected during the dry season and adults only during the wet season. The highest number of larvae was collected in pools having litter as substrate, but they were also found in slow and moderate velocity water. Due to their patched distribution, *H. amazona* may face high risk of local extinction and such a possibility should be taken into account in the management of both studied nature reserves." (Authors)] Address: Ferreira-Peruquetti, P.S., Praca Jardineira 24, Jardim Asteca, BR-29104500 Villa Velha, ES, Brazil. E-mail: pperuquetti@yahoo.com.br
- 6531.** Fischer, O.A. (2006): Common darter (*Sympetrum striolatum*) at a field dung yard of the riding club Eliot in Brno Bystrc (Moravia, Czech Republic). *Vážky 2005: Sborník referátů VIII. celostátního semináře o donatologii ve Žďárských vrších, ZO ĚSOP Vlašim*: 175-178. (in Czech, with English summary). ["A small swarm of dragonflies (about 30 individuals) occurred at a field dung yard containing remainders of horse stable manure in Brno-Bystrc (Moravia, Czech Republic) on September 29th, 2002. Capture of flies and oviposition by the dragonflies have been observed. Although two fishponds with cleaner water were near by available, a small pool with dark brown water in the dung yard was preferred by the dragonflies for their oviposition. Two males and one female were captured and determined as the common darter (*Sympetrum striolatum* Charpentier). Another two males of this species were captured in the following year (November 8th, 2003). The common darter had never been observed near two fishponds with cleaner water and its presence as well as its oviposition were limited to the dung yard with eutrophic water only." (Author)] Address: Fischer, O.A., Boží 3, 644 00 Brno, Czech Republik. E-mail: o.a.fischer@svscr.cz
- 6532.** Fleck, G.; Legrand, J. (2006): The larva of the genus *Nesocordulia* McLachlan, 1882, phylogenetic consequences (Odonata, Anisoptera, Corduliidae). *Revue Francaise d'Entomologie (Nouvelle Serie)* 28(1): 31-40. (in French, with English summary). ["The larva of the genus *Nesocordulia*, determined after the examination of the larval wing-pads venation, is described and illustrated for the first time. The study of the larval stage suggests that this genus is related to the African genus *Idomacromia* Karsch, 1896. A close relationship with the neotropical genus *Neocordulia* Selys, 1882 is less probable. It shares some derived characters of the head with the remarkable archaic South-American genus *Lauromacromia* Geijskes, 1970. A generic diagnosis is proposed." (Authors)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr
- 6533.** Foster, S.E.; Soluk, D.A. (2006): Protecting more than the wetland: The importance of biased sex ratios and habitat segregation for conservation of the Hine's emerald dragonfly, *Somatochlora hineana* Williamson. *Biological conservation* 127: 158-166. (in English). ["Within species habitat use may depend on age, season or sex of an individual. The distribution of males and females may vary both temporally and spatially due to differences in the costs of reproduction and the distribution of critical resources. Conservation of a species requires knowledge of the habitat use of both sexes in order to predict the population size and protect all habitats that a species requires. Adult dragonfly populations often have highly male-biased sex ratios at the breeding habitat. This bias has been attributed to females using alternative habitats to avoid male harassment, or to high female mortality. We monitored adult *S. hineana* populations, in breeding and non-breeding habitats in Door County, Wisconsin and found significant differences in habitat use between males and females. Males primarily used wetland habitats, while females primarily used dry meadows and marginal breeding habitats, only coming into wetlands to lay-eggs or find mates. We assessed food resources in the different habitats and found that high quality insect prey (primarily adult Diptera) were more available in the wetland habitat, indicating that these areas were likely a more productive foraging area for adult dragonflies. The fact that females appear to avoid the wetland habitat is consistent with the hypothesis that male harassment alters female distribution patterns. Consideration of the patterns of habitat use by *S. hineana* indicates the need to develop a broader understanding of the importance of non-wetland areas in the conservation of wetland species." (Authors)] Address: Foster, S.E., Department of Biology, University of Toronto at Mississauga, 3359, Mississauga Road, Mississauga, Ont., Canada L5L 1C6. E-mail: sfoster@utm.utoronto.ca
- 6534.** Gapud, V.P. (2006): Checklist of Philippine Odonata. *Asia Life Sciences* 15(2): 183-198. (in English). [254 species of Philippine Odonata are check-listed, representing 154 damselflies and 100 dragonflies.] Address: Gapud, V.P., Univ. Philippines, Coll. Agr., Pest. Biol. and Biodivers. Div., Los Banos 4031, Philippines
- 6535.** Geraeds, R.P.G.; van Schaik, V.A. (2006): The skimmers of the Blankwater Reserve. A survey of the emergence of three species of skimmer. *Natuurhistorisch maandblad* 95(6): 141-146. (in Dutch, with English summary). ["The Blankwater is a nature reserve located

east of the town of Roermond, The Netherlands near the German border, which includes two large pools. In 2004, a 20 m transect on the north bank of the southern pool was surveyed for the emergence of three skimmer species, *Orthetrum cancellation*, *O. coerulescens* and *O. brunneum* in this still water body. The presence of three skimmer species in the same habitat is rare in the Netherlands. In the period of May 11 to September 4, all exuviae of emerged skimmers were collected two to three times a week. This resulted in 176 exuviae of *O. cancellation*, 246 *O. coerulescens* and 5 of *O. brunneum*. Exuviae were found on 22 different plant species, most of them on Jointed rush (*Juncus articulatus*). *O. cancellation* mostly emerged at low height in the land vegetation, with exuviae found up to 10 m from the waterline. *O. coerulescens* also emerged at low heights in the land vegetation, but nearer the waterline. The five exuviae of *O. brunneum* were found in the water vegetation, again at low heights. In total, 25 dragonfly species were observed during the survey. Exuviae of seventeen species were found along the transect." (Authors)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

6536. Geraeds, R.P.G.; van Schaik, V.A. (2006): Dragonflies in the valley of the river Roer. Part II, true dragonflies (Anisoptera). *Natuurhistorisch maandblad* 95(11): 246-253. (in Dutch, with English summary). ["In the 2000-2005 period, the river Roer and 80 stagnant water bodies in the valley of the Roer were surveyed for the presence of dragonflies.[...]. The survey revealed the presence of 25 true dragonfly species. Very common species included *Gomphus vulgatissimus*, *Orthetrum cancellation*, *Anax imperator*, *Sympetrum sanguineum* and *S. striolatum*. *G. vulgatissimus* bred only in flowing water, while the other very common species bred in still waters. One larva of *O. cancellation* was caught in the river Roer. Common species included *Ophiogomphus cecilia*, *Stylurus flavipes*, *Gomphus pulchellus*, *Aeshna grandis*, *A. cyanea*, *A. mixta* and *Libellula depressa*. *O. cecilia* and *S. flavipes* bred only in flowing water, while exuviae of *G. pulchellus* were found at both streaming and still water bodies. The other common dragonfly species bred only in still waters. Rare species in the valley included the *Onychogomphus forcipatus*, *Somatochlora metallica*, *Cordulia aenea*, *Orthetrum coerulescens*, *Crocothemis erythraea*, *Libellula quadrimaculata*, *S. danae* and *S. vulgatum*. The river Roer is the only place where *O. forcipatus* breeds. *S. metallica* bred in slow flowing and still waters. Although no exuviae were found, it is likely that *S. metallica* breeds in a former meander of the Roer. The species was observed by this water body in several years. *C. aenea*, *C. erythraea*, *L. quadrimaculata* and *S. vulgatum* bred only in a few still waters. It is likely that *O. coerulescens* breeds in the Holsterbeek, as mating behaviour was observed there. It is uncertain whether *S. danae* is breeding in the valley of the river Roer. It is likely that the occasionally observed animals were migrants from the nearby Meinweg nature reserve. Very rare species in the survey included *Sympetrum flaveolum*, *Brachytron pratense*, *Somatochlora flavomaculata*, *Orthetrum brunneum* and *Cordulegaster boltonii*. Except for *C. boltonii* exuviae of these species were never found. A few imagos of *S. flaveolum* were spotted almost every year. *B. pratense* was spotted twice. A male (2003) and a female (2005) were seen at two different former meanders of the Roer, water bodies which look like suitable habitats for this species. *S. flavomaculata*

was also observed twice, near a stagnant water body and along the Holsterbeek brook. *O. brunneum* was observed only once along the Roer, in 2003. This was most likely a migrant from the Blankwater nature reserve. In 2005, an exuvium of *C. boltonii* was found along the Roer near Roermond. Since the river is not a suitable habitat for this species, it is most likely that this was a larva that had drifted in from upstream sections of the river in Germany. Over the 2000-2005 period, a total of 40 Odonata species were observed in the valley of the river Roer. Twenty-nine of these were observed along the river, while 26 species were mostly observed at stagnant water bodies. The largest water bodies (the former meanders of the river Roer) generally hosted the most dragonfly species. Nevertheless the stagnant water body with the largest number of species was a small pond. The Roer hosts the only population of *O. forcipatus* and one of the two populations of *O. cecilia* in the Netherlands, making this river one of the most important dragonfly habitats in the country." (Authors)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

6537. Geraeds, R.P.G.; van Schaik, V.A. (2006): Dragonflies in the valley of the river Roer. Part I, damselflies (Zygoptera). *Natuurhistorisch maandblad* 95(9): 197-203. (in Dutch, with English summary). ["Between 2000 and 2005, the valley of the river Roer was surveyed for the presence of dragonflies. [...]. The Dutch part of the river Roer is a meandering stream with a length of 21 km, its valley including 91 stagnant water bodies. The six-year dragonfly survey covered the river and 80 of these stagnant waters. A total of 15 species of damselfly were found in the area. Very common species included *Calopteryx splendens*, *Platycnemis pennipes*, *Erythromma lindenii*, *Coenagrion puella*, *Ischnura elegans* and *Pyrrhosoma nymphula*. *C. splendens* bred only in flowing water, while *P. pennipes* and *E. lindenii* bred in flowing and still waters. The other very common damselfly species bred in still waters. Common species included *Chalcolestes viridis*, *Erythromma najas* and *E. viridulum*. Although *E. najas* and *E. viridulum* were frequently observed along the river, all three species bred only in still waters. Rare species in the Roer valley included *Sympetma fusca*, *Lestes sponsa*, *Coenagrion pulchellum* and *Enallagma cyathigerum*; they were only observed along still waters. Although a breeding site was found only for *L. sponsa*, breeding by the other three rare species is likely because they were observed at the same location in different years, or their mating and oviposition behaviour was observed. *Lestes virens* and *Ceragrion tenellum* were very rare. *L. virens* was observed at three locations, being seen at the same two ponds in 2004 and 2005. During these years, mating and oviposition behaviour were observed. The *C. tenellum* was seen only once during the survey period; two males were found by a former meander of the river Roer." (Authors)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

6538. Gonzalez-Soriano, E.; Novelo-Gutierrez, R. (2006): *Elasmothermis aliciae* spec nov, a new dragonfly from Mexico, Belize and Costa Rica with a description of its larva and a key to the known larvae of the genus (Anisoptera : Libellulidae). *Odonatologica* 35(3): 243-253. (in English). ["The new species and its larva are described and illustrated from specimens collected in Mexico (states of San Luis Potosi and Veracruz), Belize (Toledo distr.) and Costa Rica (Heredia prov.). Holotype

male and allotype female (in copula): Mexico, Veracruz state, Rio La Palma, 25 km N of Catemaco, 28-VIII-1988; deposited at UNAM, Mexico. The species is closely related to *E. cannacrioides* Calv. with which it was formerly confused. Adults of the former are larger than those of the latter. The larva is also easily distinguished from *E. cannacrioides* by its larger size and differences in the shape of the dorsal protuberances. Notes on biology and distribution are provided and the known larvae of the genus *Elasmothemis* Westfall are keyed." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

6539. Haas, F. (2006): Evidence from folding and functional lines of wings on interordinal relationships in Pterygota. *Arthropod Systematics & Phylogeny* 64(2): 149-158. (in English). ["The fundamental difference between palaeopteran (*Aeshna* sp., Odonata) and neopteran (*Perla* sp., Plecoptera) Pterygota is exemplified with by two recent representatives. When sitting, the *Aeshna* sp. needs quite some space, neither fore nor hind wing are protected and its silhouette is perfectly visible from all directions. The plecopteran protects its hind wings with the fore wings and may completely disappear behind a plant stalk. Evidently, neopteran insects need less space when at rest." (Author)] Address: Haas, F., Staatliches Museum für Naturkunde Stuttgart, Rosenstein 1, 70191 Stuttgart, Germany. E-mail: FabianHaas@gmx.net; www.earwigs-online.de

6540. Hanel, L. (2006): New species of dragonflies (Odonata) protected by the Czech law. *Vážky 2005: Sborník referátů VIII. celostátního semináře donatologů ve Žďárských vrších, ZO ĚSOP Vlašim*: 190-191. (in Czech, with English summary). ["At present, the law no.114/1992 Sb. on nature and landscape protection (amended as no. 460/2004 Sb.) is the most important tool in the protection of Czech nature and landscape. This law has been provided with a public notice no.396/1992 Sb. which, among other things, contains of particularly protected species including dragonflies. In this notice is only a single species (*Aeshna subarctica*) implicated to the category „endangered species“. This public notice was amended as no. 175/2006 Sb. In this amendment (effective from 8th May 2006) there is the list of protected dragonflies registered in the category „strongly endangered“: *Sympecma braueri*, *Ophiogomphus cecilia*, *Stylurus flavipes*, *Leucorrhinia albifrons*, *L. pectoralis*, and *L. caudalis*. (Author)] Address: Hanel, L., Správa Chráněné krajinné oblasti Blaník, Loučovice pod Blaníkem 8, 257 06, Czech Republic. E-mail: lubomirhanel@seznam.cz

6541. Hardersen, S. (2006): Sexual dimorphism in wing cell patterns in *Xanthocnemis zealandica* McLachlan (Zygoptera: Coenagrionidae). *Odonatologica* 35(2): 143-149. (in English). ["In many odonate species males and females differ phenotypically; the most commonly noticed characters which exhibit sexual dimorphism are size, and body, and wing colouration. Although the odonate wing venation has been studied intensively, very limited data on sexual dimorphism exist. In this study distinct cell groups in the wings of *X. zealandica* were compared between males and females. Of the 6 cell groups studied two were sexually dimorphic. Reasons for the observed differences are discussed." (Author)] Address: Hardersen, S., Centro Nazionale per lo Studio

e la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, I-46045 Marmirolo (MN), Italy. E-mail: s.hardersen@libero.it

6542. Heijligers, H.W.G.; van Buggenum, H.J.M. (2006): *Sympetrum meridionale*: new findings in the province of Limburg. *Natuurhistorisch maandblad* 95 (10): 225-227. (in Dutch, with English summary). ["On 29 July 2006, *S. meridionale* was discovered for the first time in the province of Limburg, The Netherlands. It was observed at two locations, one in the Zwartwater (Venkoelen) nature reserve north of the town of Venlo and one in the Haeselaarsbroek nature reserve near the village of Echt. The species had already been found in the Zeeuws-Vlaanderen region (2004) and the province of Noord-Brabant (2005)." (Authors)] Address: Heijligers, H.W.G., Lottumseweg 27, NL-5872 AA Broekhuizen, The Netherlands

6543. Heijligers, H.W.G. (2006): *Boekbesprekingen: Libellen in Nederland*. *Natuurhistorisch maandblad* 95 (12): 273. (in Dutch). [Review of the DVD from Reindoud, W. and Groot, T. de (2006): *Libellen in Nederland*. Utrecht, KNNV Uitgeverij, 2006. DVD (70 min.). ISBN 9050112315. <http://library.wur.nl>] Address: Heijligers, H.W.G., Lottumseweg 27, NL-5872 AA Broekhuizen, The Netherlands

6544. Hobson, C.S. (2006): Marl Pennant (*Macrodiplox baiteata*), a new coastal dragonfly in Virginia. *Banisteria* 28: 53. (in English). [Grandview Beach in Hampton, Virginia, USA, 13 July 2006] Address: Christopher S. Hobson Virginia Department of Conservation and Recreation Division of Natural Heritage 217 Governor Street Richmond, Virginia 23219

6545. Höttinger, H. (2006): Wiederfund der Vogel-Azurjungfer (*Coenagrion ornatum* SELYS, 1850) in Niederösterreich (Odonata, Coenagrionidae). *Beiträge zur Entomofaunistik* 7: 151-154. (in German). [At 14.6.2006, along a ditch („Waldäckergraben“ between Au and Hof; Niederösterreich, Austria) (16°34'27"E / 47°55'51"N - 16°34'23"E / 47°55'59"N; 220 m asl), two males and two females of *C. ornatum* were recorded. Additional unpublished regional records of this rare Austrian species are briefly documented.] Address: Höttinger, H., Universität für Bodenkultur Wien, Institut für Zoologie, Gregor Mendel-Straße 33, A-1180 Wien, Austria. E-mail: helmut.hoettinger(at)boku.ac.at

6546. Hudson, J.; Armstrong, R.H. (2006): *Dragonflies of Alaska*. ISBN: 1-57833-302-4: 48 pp. (in English). [This book may be considered as the expanded version of Armstrong et al (2007) (see OAS 6624) dedicated to the grown-up beginner in Odonata (in fact, the opposite is right because the children's book was developed from this book). A general introduction into biology and morphology of Odonata, is followed by brief monographs of the 32 Alaskan species so far known resp. represented in the book, and a general treatment on the family level. Each species is pictured by fine colour photographs, is briefly described, and the biology and habitat are very briefly outlined. Identification is facilitated by a colour photo accompanied by black & white drawings or close up photos. On a more general level the distribution ("where to expect a species in Alaska") is also outlined.] Address: www.alaskabooks-andcalendars.com

- 6547.** Huerta, H. (2006): Nuevo registro de *Forcipomyia* (*Pterobosca*) *incubans* (Macfie) (Diptera: Ceratopogonidae) como parásito de Odonata. *Acta Zoológica Mexicana* (nueva serie): 157-158. (in Spanish, with English summary). ["This is the first record of *Forcipomyia* (*Pterobosca*) *incubans* (Macfie) on *Dythemis sterilis* Hagen (Libellulidae, Odonata) from Veracruz State, Mexico." (Author)] Address: Herón, Huerta, Lab. Entomología, INDRE, Carpio 470, Col. Santo Tomás, 11340, Mexico D.F. E-mail: cerato2000@yahoo.com
- 6548.** Huskens, K. (2006): Sierlijke witsnuitlibel op Sint-Pietersberg. Laaste waarneming uit 1970, ook uitgestorven in België. *Natuurhistorisch maandblad* 95(7): 177-178. (in Dutch). [*Leucorrhinia caudalis*, extinct in Belgium, and recorded in the Netherlands for the last time in 1970 was found near Sint-Pietersberg, a hill near Maastricht, The Netherlands on 6-VI-2006.] Address: not stated
- 6549.** Irusta, J.B.; Araujo, A. (2006): Reproductive behaviour of *Diastatops obscura* (Fabricius) in a riverine environment (Anisoptera: Libellulidae). *Odonatologica* 35(3): 289-295. (in English). ["The reproductive behaviour of this neotropical dragonfly is described in a riverine environment in NE Brazil. In areas used for reproduction, the males behave like territorial perchers in order to defend the territories that will be used by females during their oviposition. The preferences of the males in reproductive territorial selection and the variation of their reproductive strategies are analyzed from an adaptationist point of view." (Authors)] Address: Irusta, J.B., Univ Fed Rio Grande Norte, Sect. Psychobiol., Dept Physiol., Caixa Postal 1511, Campus Univ, BR-59072970 Natal, RN, Brazil. E-mail: banuelos@ufrnet.br
- 6550.** Iwamoto, H.; Inoue, K.; Yagi, N. (2006): Evolution of long-range myofibrillar crystallinity in insect flight muscle as examined by X-ray cryomicrodiffraction. *Proc. R. Soc. B* 273: 677-685. (in English). ["Insect flight muscle is known for its crystal-quality regularity of contractile protein arrangement within a sarcomere. We have previously shown by X-ray microdiffraction that the crystal-quality regularity in bumble-bee flight muscle is not confined within a sarcomere, but extends over the entire length of a myofibril (O1000 sarcomeres connected in series). Because of this, the whole myofibril may be regarded as a millimetre-long, natural single protein crystal. Using bright X-ray beams from a synchrotron radiation source, we examined how this long-range crystallinity has evolved among winged insects. We analysed O4600 microdiffraction patterns of quick-frozen myofibrils from 50 insect species, covering all the major winged insect orders. The results show that the occurrence of such long-range crystallinity largely coincides with insect orders with asynchronous muscle operation. However, a few of the more skilled fliers among lower-order insects apparently have developed various degrees of structural regularity, suggesting that the demand for skilful flight has driven the lattice structure towards increased regularity." (Authors) (*Copera annulata*) (*Colopteryx cornelia*) (*Pseudothemis zonata*) (*Macromia amphigena*)] Address: Iwamoto, H., Research and Utilization Division, SPring-8, Japan Synchrotron Radiation Research Institute, 1-1-1 Kouto, Sayo-cho, Sayo-gun, Hyogo 679-5198, Japan. E-mail: iwamoto@spring8.or.jp
- 6551.** Jinguji, H.; Tashiro, T.; Sato, T.; Tsuyuzaki, H.; Kondo, T. (2006): Effect of cultivation methods in a controlled mixing tillage of plow layer on habitat condition of the genus *Sympetrum*. *Transactions of the Japanese Society of Irrigation, Drainage and Reclamation Engineering* 74(1): 133-140. (in Japanese, with English summary). ["The study was conducted in no-till, no-puddling and conventional cultivation method rice field, respectively. We investigated larval development, emergence species and emergence patterns of *Sympetrum* in each rice field. The following results were obtained: 1. larval dragonfly populations in no-till and no-puddling rice field were higher than those in conventional rice field. 2. During 5 year period, the number of exuviae collected per 50m² in no-till, conventional, no-puddling cultivation methods were 751, 4,422, 4,272 respectively. Especially *Sympetrum frequens* was the most abundant species in no-puddling rice field. 3. Larval composition of each dominant species (*S. infuscatum*, *S. frequens*, *S. darwinianum*) in conventional and no-puddling cultivation method was characterized by a constant percentage throughout 5 years. *S. frequens* were dominant species in no-till cultivation rice field at first year, but after two years *S. infuscatum* became the most abundant species. We have shown that disturbance for puddling decreased larvae of *Sympetrum* and individuals of *S. frequens* decrease in no-till cultivation rice field." (Authors)] Address: Jinguji, H., Akita Prefectural Coll Agr, 2-2 S Ohgata Mura, Akita 0100044, Japan
- 6552.** Jinguji, H.; Tsuyuzaki, H.; Sato, T. (2006): Effect of temperature and light on egg hatching of *Sympetrum frequens*. *Transactions of the Japanese Society of Irrigation, Drainage and Reclamation Engineering* 74(3): 79-84. (in Japanese, with English summary). ["The aim of the present study is to obtain quantitative information on egg hatching with respect to temperature and light to clarify the effect of cultivation methods on *Sympetrum frequens*. Eggs of the species were collected on October in 2004 at Akita prefecture located at north of Japan, and the eggs had been laid on soil surface of paddy field till April in 2005. The eggs (3 trays with 30 eggs each) were held under four constant temperature (5°C., 10°C., 15°C. and 20°C.) with a photoperiod (L:D, 14:10; relative light intensity, 3000 Lux) and 20°C. in the dark. Cumulative hatching percentage under 20°C. with and without light was 98.9% and 95.6% respectively. The percentage under 15°C., 10°C. and 5°C. were 95.6%, 88.9% and 84.4%, respectively. These results suggest that the dragonfly do not require light for hatching, and hatching is suppressed by low temperature such as 5°C. Mean hatching days with light under 20°C., 15°C., 10°C. and 5°C. were 3.5, 4.8, 11.6 and 41.0 respectively. Reciprocal of variance of hatching day under these conditions were 0.15, 0.09, 0.03 and 0.02 respectively. These results indicate that the eggs under 20°C. and 15°C. hatched faster and more uniformly than those under 10°C. and 5°C. Based on these results, theoretical lower thermal threshold and thermal constants for hatching were estimated at 4.9°C. and 54.6 degree-days. According to these results, the effects of cultivation methods on hatching of this species were discussed." (Author)] Address: Jinguji, H., Akita Prefectural Coll, 2-2 S Ohgata Mura, Akita 0100444, Japan
- 6553.** Kaiser, M. (2006): Bemerkenswerte faunistische Beobachtungen in der Lippeaue nördlich von Bentfeld, Kreis Paderborn (Nordrhein-Westfalen) (In-

secta: Odonata, Saltatoria, Coleoptera, Lepidoptera). *Mitt. ArbGem. westf. Entomol.* 22(1): 7-18. (in German). [Germany; records of *Sympecma fusca*, *Anaciaeschna isoceles*, and *Gomphus vulgatissimus* are documented.] Address: Kaiser, C., Elise-Rüdiger-Weg 1, 48147 Münster, Germany. E-mail: matthias.kaiser@faunistik.de

6554. Kalkman, V.J. (2006): Key to the dragonflies of Turkey including species known from Greece, Bulgaria, Lebanon, Syria, the trans-caucasus and Iran. *Brachytron* 10(1): 3-82. (in English). ["A key and checklists is provided to the species occurring Turkey, Greece, Bulgaria, Lebanon, Syria, Armenia, Georgia, Azerbaijan and Iran. Except for a few poorly known subspecies and species all taxa occurring in this region are keyed and illustrated. Notes on taxonomic problems and information on distribution, flight period and habitat of each species is given." (Author)] Address: Kalkman, V. J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

6555. Kalkman, V.J.; van Pelt, G.J. (2006): New records of rare or uncommon dragonflies in Turkey (Odonata). *Brachytron* 10(1): 154-162. (in English). ["More than 130 new records are published of 29 species known to be rare or uncommon in Turkey, including the following species: *Aeshna cyanea*, *Anax immaculifrons*, *Brachythemis leucosticta*, *Ceragrion georgifreyi*, *Coenagrion lunulatum*, *C. ponticum*, *C. pulchellum*, *C. scitulum*, *Cordulia aenea*, *Crocothemis servilia*, *Gomphus davidi*, *G. vulgatissimus*, *Ischnura fontaineae*, *Lestes macrostigma*, *Leucorrhinia pectoralis*, *Libellula pontica*, *L. quadrimaculata*, *Lindenia tetraphylla*, *Onychogomphus assililis*, *O. lefebvrii*, *Pantala flavescens*, *Paragomphus lineatus*, *Pyrhosoma nymphula*, *Selysiothemis nigra*, *Sympetrum depressiusculum*, *S. pedemontanum* and *Trithemis arteriosa*. In addition, records from eastern Turkey of species predominantly known from western Turkey (being *Gomphus schneiderii* and *Cordulegaster picta*) are included. All records add important information on the distribution of these species within Turkey." (Authors)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

6556. Kalkman, V.J.; Van Pelt, G.J. (2006): The distribution and flight period of the dragonflies of Turkey. *Brachytron* 10(1): 83-153. (in English). ["Based on a database containing 9150 records (a species on a day on a locality) distribution maps and flight histograms are presented for all Turkish dragonflies. Notes are given for a small number of species." (Authors)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

6557. Kalkman, V.J.; Koese, B. (2006): Rediscovery of a population of the Common goldenring (*Cordulegaster boltonii*) near Venlo. *Brachytron* 9(1-2): 58-60. (in Dutch, with English summary). ["On March 27 2006 a larva of *C. boltonii* was caught at the brook Aalsbeek (also called Molenbeek), just east of Belfeld (AC: 207-368). This is the fifth Dutch locality where *C. boltonii* is known to reproduce. The species was already known from this locality from records made by Maus Lieftinck in 1921, 1922, 1923, 1924, 1926 and 1951 and from a record by Dirk Geijskes in 1967. It is likely that the species has been present ever since but has been overloo-

ked." (Authors)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

6558. Kalnins, M. (2006): The distribution and occurrence frequency of Gomphidae (Odonata: Gomphidae) in river Gauja. *Acta Universitatis Latviensis* 710, Biology: 17-28. (in English, with Latvian summary). ["The article contains data on four gomphid dragonfly species known in Latvia – *Gomphus flavipes*, *G. vulgatissimus*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia* and the latest data on their distribution, occurrence frequency and density of individuals. Gomphidae were obtained from macrozoobenthos samples in 1998. In total 280 quantitative and 65 qualitative samples were collected in the River Gauja from the town Taurene upstream to below Carnikava. For complete analyses, observations of adults individuals were also used based on a bibliography, unpublished (personal) observations and data from 1933 to 2005. Three species of Gomphidae, *G. vulgatissimus*, *O. forcipatus* and *O. cecilia* were recorded. Data with regard to observations of larvae / exuviae / imago stages showed that all gomphid species are encountered throughout Latvia. *G. flavipes* is infrequent for Latvia and this species has been recorded only in the Gauja. Gomphids occurred in 13.2% of obtained samples, *G. vulgatissimus* in 10%, *O. forcipatus* in 5% and *O. cecilia* in 0.7%. Ecological analysis of bottom substrate showed that *O. forcipatus* prefers a hard substrate situated in the rhithral stretches or in the rapids. The density of *G. vulgatissimus* reached 0.919 ind. m⁻², and *O. forcipatus* 0.514 ind. m⁻²." (Author)] Address: Kalniņš, M., Department of Zoology and Animal Ecology, Faculty of Biology, University of Latvia, Kronvalda Bulv. 4, Riga LV-1586, Latvia. E-mail: martins.kalnins@dap.gov.lv

6559. Karlsson, T. (2006): Two new provincial records of dragonflies (Odonata) for Ostergötland - *Coenagrion johanssoni* and *Leucorrhinia caudalis*. *Entomologisk Tidskrift* 127(1-2): 35-38. (in Swedish, with English summary). [During 2005 new provincial records for *C. johanssoni* and *L. caudalis* have been made in Ostergötland, 30-40 km south of the city Linköping, Sweden. "The finding of *C. johanssoni* strengthen indications of that this species occurs further south in Sweden than previously known. The finding of *L. caudalis* fills up a gap in the known Swedish distribution. With these two new records, 50 species of dragonflies have been found in Ostergötland." (Author)] Address: Karlsson, T., Lansstyrelsen Ostergötland, Miljövårdsenheten, S-58186 Linköping, Sweden. E-mail: tommy.karlsson@e.lst.se

6560. Kefford, B.J.; Nuggeoda, D.; Metzeling, L.; Fields, E.J. (2006): Validating species sensitivity distributions using salinity tolerance of riverine macroinvertebrates in the southern Murray-Darling Basin (Victoria, Australia). *Canadian Journal of Fisheries & Aquatic Sciences* 63(8): 1865-1877. (in English). ["Species sensitivity distributions (SSDs) are commonly used in risk assessment and in setting water quality guidelines, yet their predictions have not been validated against loss of species with increasing pollutant concentrations in nature. We used a rapid toxicity testing method to determine the acute salinity tolerance (72 h LC50 values (concentration of salinity lethal to 50% of individuals)) of 110 macroinvertebrate taxa from the southern Murray-Darling Basin in central Victoria, Australia, and con-

struct an SSD. This SSD was compared with loss of riverine macroinvertebrates species from increasing salinity in Victoria. Macroinvertebrate species richness per individual sample, when salinity was < 9.9 mS center dot cm(-1), was invariant of salinity. However, when species richness was calculated across multiple samples above about 0.3-0.5 mS center dot cm(-1), it declined with increasing salinity. This decline was predicted from the SSD after application of a variable safety factor calculated from an exponential or quadratic equation. Our findings confirm that SSDs can predict the loss of freshwater macroinvertebrate species from increases in salinity. This suggests that SSDs may be useful more generally for other aquatic organisms, other stressors, and toxicants." (Authors) The study includes Odonata.] Address: Kefford, B.J., RMIT Univ., Sch. Appl. Sci., POB 71, Bundoora, Vic 3083, Australia. E-mail: ben.kefford@rmit.edu.au

6561. Ketelaar, R. (2006): Pattern and rapidity of the colonisation of *Erythromma viridulum* in The Netherlands. *Brachytron* 9(1-2): 33-37. (in Dutch, with English summary). ["*E. viridulum* is one of the southern Odonata quickly colonising large parts of Europe. The species was a very rare damselfly in The Netherlands until 1970. After 1980 it rapidly colonised The Netherlands and has become one of the most common species. It is suggested in this article that the expansion of *E. viridulum* took place via three routes an expansion northwards from Belgium, an expansion north-westwards via the Rhine valley and a possible expansion from an outpost in the north of The Netherlands. The first two routes can be tested by a close examination of German and Belgian records; the latter will probably remain suggestive." (Author)] Address: Ketelaar, R., Wilslaan 27, NL-6708 RW Wageningen, Netherlands. E-mail: whydah@wx.nl

6562. Matushkina, N. (2006): New records of rare Odonata in Ukraine (Insecta). *Proceedings of Zoological Museum*, 2006, Vol. 4: 155-161. (in English, with Ukrainian and Russian summaries). [Records of the following species are documented: *Calopteryx splendens taurica*, *C. sp. ancilla*, *C. intermedia*, *C. virgo*, *Chalcolestes parvidens*, *L. macrostigma*, *Coenagrion armatum*, *Erythromma lindenii*, *Stylurus flavipes*, *Crocothemis erythraea*, *Leucorrhinia rubicunda*, *L. albifrons*, *Sympetrum pedemontanum*, *S. fonscolombii*, *Libellula fulva*, and *Orthetrum coerulescens*. A questionable specimen from the *Calopteryx splendens* group is considered *C. intermedia* (this would be an addition to the species list of Ukraine), but it also may be a phenotype of *Calopteryx splendens ancilla*. Intermediate female specimens of *Chalcolestes viridis/parvidens* are documented and depicted.] Address: Matushkina, N., Kyiv National Taras Shevchenko University, biological faculty, department of zoology, Volodymyrs'ka str. 64, 01033 Kyiv, Ukraine

6563. Mikat, M. (2006): The atypical tandems of the dragonflies (Odonata: Lestidae) observed in the protected locality Na Plachtí (Hradec Králové, Eastern Bohemia). *Vážky 2005: Sborník referátů VIII. celostátního semináře odonatologů ve Žďárských vrších, ZO ĚSOP Vlašim: 182-189.* (in Czech, with English summary). [Atypical tandems among six species of Lestidae from Na Plachtí (Eastern Bohemia, Czech Republic) are presented: The following interspecific tandems were noticed during 2004-2005: male *Lestes barbarus* + female *L.*

dryas, male *L. sponsa* + female *L. virens*, male *L. viridis* + female *L. dryas*, and male *L. sponsa* + female *Erythromma najas*. Moreover tandems among conspecific males were confirmed in *L. viridis*, in *Sympetma fusca*, and among heterospecific males in *L. sponsa* + *L. dryas*, *L. dryas* + *L. sponsa*, and *L. sponsa* + *L. barbarus*. In addition a tandem formed by a male of *L. sponsa* and a dead immature male of *L. viridis* is described. A triplicate tandem (male *L. sponsa* with the tandem *L. viridis*) was observed, too.] Address: Mikát, M., Pekařova 670, CZ-500 09 Hradec Králové, Czech Republic. E-mail: marmulak.hk@tiscali.cz

6564. Mirza, R.S.; Ferrari, M.C.O.; Kiesecker, J.M.; Chivers, D.P. (2006): Responses of American toad tadpoles to predation cues: behavioural response thresholds, threat-sensitivity and acquired predation recognition. *Behaviour* 143(7): 877-889. (in English). ["Predation is one of the most important selective forces acting on prey animals. To respond adaptively to predation threats and increase their chances of survival, prey animals have to be able to recognize their potential predators. Even though a few studies demonstrated innate predator recognition, the vast majority of animals have to rely on learning to acquire this information. Often aquatic prey animals can learn to recognize predators when they detect conspecific alarm cues associated with cues from a novel predator. In this study, we exposed American toad (*Bufo americanus*) tadpoles to varying concentrations of chemical alarm cues (cues from injured conspecifics). We identified a concentration of cues which caused an overt antipredator response (supra-threshold concentration) and a lower concentration for which the prey failed to exhibit a response (sub-threshold concentration). In a second experiment, we attempted to condition the tadpoles to recognize the odour of larval dragonflies (*Anax* sp.) by pairing the dragonfly odour with either the sub-threshold concentration or the supra-threshold concentration of alarm cues. In both cases, the tadpoles learned to recognize the predator based on this single pairing of alarm cues and predator odour. Moreover, the intensity of the learned response was stronger for tadpoles conditioned with the supra-threshold concentration of alarm cues than the sub-threshold concentration. This is the first documented case of this mode of learning in anuran amphibians. Learned recognition of predators has important implications for survival." (Authors)] Address: Ferrari, Maud, Univ Saskatchewan, Dept Biol, 112 Sci Pl, Saskatoon, SK S7N 5E2, Canada. E-mail: maud.ferrari@usask.ca

6565. Mourek, J. (2006): Challenge to the participation on the monitoring of insect species of community interest. *Vážky 2005: Sborník referátů VIII. celostátního semináře odonatologů ve Žďárských vrších, ZO ĚSOP Vlašim: 154-161.* (in Czech, with English summary). ["The long term monitoring of species and habitats according to the EU Council Directive 92/43/EEC (On the conservation of natural habitats and of wild fauna and flora) is organized by the Agency for Nature Conservation and Landscape Protection of the Czech Republic. This contribution informs about the aims and the system of monitoring of insect species and summarizes the methods of monitoring for particular species. It is also intended as a challenge for the professional as well as non-professional entomologists to participate in the monitoring." (Author) References are made to the Odonata.] Address: Mourek, J., Agentura ochrany přírody a

krajiny ČR, Kališnická 4-6, 130 23 Praha 3, Czech Republic. E-mail: janmourek@nature.cz

6566. Muzon, J.; Pessacq, P.; Von Ellenrieder, N. (2006): Description of the female and larva of *Phyllogomphoides joaquina* Rodrigues Capitulo, 1992 (Anisoptera: Gomphidae). *Odonatologica* 35(1): 55-60. (in English). ["The female and last larval instar are described and illustrated based on specimens from Argentina (Buenos Aires province). The female is unique in the possession of a subapical tooth on each lobe of the vulvar scale, and it can be besides distinguished from *P. andromeda*, the only other *Phyllogomphoides* species found in Argentina, by the pterothoracic colour pattern. The larva differs from all known South American *Phyllogomphoides* larvae by the crenate inner margin of the labial palp." (Authors)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

6567. Niba, A.S.; Samways, M.J. (2006): Development of the concept of 'core resident species' for quality assurance of an insect reserve. *Biodiversity & Conservation* 15(13): 4181-4196. (in English). ["Awareness in the eyes of the public is important for involving the wider community in conservation. A dragonfly awareness trail was developed and implemented in the year 2000 at a national botanical garden in South Africa. Such a trail is not likely to always have the same number of dragonfly species either throughout the year or from one year to the next. The aim was to assess dragonfly assemblage changes that occurred along the trail over 3 years, so as to fine-tune expectations that the public may have as regards species to be seen at any particular time. A cumulative species variance for species and species-environmental relations, strongly indicated that certain measured site variables were responsible for the main variation in dragonfly species patterns over time. Habitat requirements of an odonate species may be defined primarily in terms of marginal grasses, floating and submerged vegetation, marginal herbs, sedges and reeds, and pH. Additional variables were percentage shade, exposed rock, marginal forest and water flow characteristics. Both dragonfly species richness and abundance changed over the 3 years. One of the reasons for this was a single, major disturbance, in the form of dredging the reservoir site to reverse ecological succession in 2002. Despite an impact such as this, and after accounting for vagrancy, there were in all 24 'core resident species' still to be seen along the trail from January to May. Another 11 species, including two migrants and one species lost temporarily to dredging disturbance, can be considered only as 'possibilities' on any one visit. Assurance that the 24 core species can be seen in the summer months (although only three in winter) is essential for maintaining the bona fide of such a trail, and hence conservation awareness, in the eyes of the public." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6568. Niba, A.S.; Samways, M.J. (2006): Remarkable elevational tolerance in an African odonata larval assemblage. *Odonatologica* 35(3): 265-280. (in English). ["The spatial patterns in species richness and abundance were investigated here at a series of reservoirs at different elevations, to establish which factors

determine species distributions along this topographic gradient. Larvae of 18 species were sampled in small reservoirs across a 1250 m elevational gradient at one latitude. Most species occurred throughout all elevations indicating that this subtropical odonate assemblage as a whole is remarkably tolerant of elevational changes. Although Anisoptera larval species richness and abundance increased significantly with increasing elevation, there was no change in Zygoptera species richness, while Zygoptera abundance decreased significantly. Species-site-variable triplots for Anisoptera and Zygoptera larvae indicated that no measured site variable on an individual basis clearly accounted for larval species assemblage distribution patterns. Nevertheless, canonical axes and their respective intra-set correlation coefficients showed that some measured site variables e.g. floating/submerged vegetation, turbidity, pH, water temperature (resulting from sunny or shade habitat conditions), marginal grasses, water depth as well as elevation to some extent, explained the main variation in species assemblage composition/distribution in a broadly similar manner for both suborders. Generally, the reservoirs recruited species from the regional pool, irrespective of the elevation of the pool. These species were all geographically widespread species that took advantage of the presence of these man-made reservoirs, and included only one national endemic. Although these artificial water bodies are not increasing the 'extent of species occurrence', they play a major role in increasing 'area of occupancy'. Furthermore, these species are remarkably vagile, habitat-tolerant, as well as elevationally-widespread. A reasonable explanation is that this assemblage is the historical survivor over many millennia of oscillating wet/dry periods and natural selection. The present-day species are those that readily recolonise pools after drought has been broken, and are pioneering residents of new water bodies over a wide elevational range." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6569. Nicieza, A.G.; Álvarez, D.; Atienza, E.M.S. (2006): Delayed effects of larval predation risk and food quality on anuran juvenile performance. *Journal of Evolutionary Biology* 19: 1092-1103. (in English). ["Metamorphosis can disrupt the correlation structure between juvenile and adult traits, thus allowing relatively independent evolution in contrasting environments. We used a multiple experimental approach to investigate how diet quality and larval predation risk affected the rates of growth and development in painted frogs (*Discoglossus galganoi*), and how these changes influence post-metamorphic performance. A high-energy diet entailed growth advantages only if predation risk did not constrain energy acquisition, whereas diet quality affected primarily the extension of the larval period. Predation risk influenced juvenile shape, most likely via the effects on growth and differentiation rates. Juvenile frogs emerging from predator environments had shorter legs and longer bodies than those from the nonpredator tanks. However, these morphological changes did not translate into differences in relative jumping performance. Neither size-adjusted lipid storage nor fluctuating asymmetry was significantly influenced by food quality or predation risk. Our data suggest that the post-metamorphic costs of predator avoidance during the larval phase are mostly a consequence of small size at metamorphosis." (Authors)] The experimental design

includes *Aeshna cyanea*.] Address: Nicieza, Al., Univ Oviedo, Dept Funct Biol, E-33071 Oviedo, Spain. E-mail: agnic@uniovi.es

6570. Novelo-Gutierrez, R. (2006): The larva of *Macrothemis ultima* Gonzalez-Soriano, 1992 (Odonata: Anisoptera: Libellulidae). *Transactions of the American Entomological Society* 132(1-2): 151-156. (in English). ["A detailed description and illustration of the larva of *M. ultima* is provided, based upon larvae reared until emergence. Its main features are: body dark brown, integument mostly bare, premental setae 7+3 or 8+4, ligula prominent, palpa setae 6, dorsal protuberances on abdomen well developed and high on 2-5, low, spine-like on 6-9, total length 15.8-16.5 mm. It appears more closely related to the larva of *M. aurimaculata* Donnelly than to others." (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

6571. Novelo-Gutierrez, R.; Che Salmah, M.R. (2006): The larva of *Macromia cincta* Rambur, with a key to the known *Macromia* larvae of the Malaysian Peninsula (Anisoptera : Macromiidae). *Odonatologica* 35(1): 61-66. (in English). ["A female final instar larva (reared) from the Malaysian Peninsula is described and illustrated in detail. A comparison to other larvae of the genus inhabiting this Peninsula is made, and a key is provided. The unique features in the larva of *M. cincta* are: premental setae 4+2 or 4+3, dorsal protuberances on abdominal segments 3-10, increasing gradually to the rear but suddenly reduced on 10, and the presence of a basal tubercle on the inner margin of the galeolacina." (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

6572. Olofsson, F. (2006): Nya provinsfynd av trolsländor från södra Norrland. *Natur i Norr*, Umeå 25(2): 107-109. (in Swedish). [Records of *Pyrhosoma nymphula*, *Cordulegaster boltonii*, *Cordulia aenea*, and *Sympetrum vulgatum* are briefly commented. A table with additional 15 regional species is added to the publication.] Address: Olofsson, F., Miljöavdelningen, Länsstyrelsen Västernorrlands län, 871 86 Härnösand, Sweden. E-mail: frans.olofsson@y.lst.se

6573. Oppel, S. (2006): Site fidelity and dispersal of adult *Neurobasis awamena* Michalski in tropical rainforest streams in Papua New Guinea (Zygoptera: Calopterygidae). *Odonatologica* 35(4): 331-339. (in English). ["The species inhabits swift mountain streams at montane elevations of southern Papua New Guinea. In this study the duration for which adult male and female remained at a given site in rainforest streams was determined, and the dispersal distance and direction of marked individuals leaving the site of initial observation was assessed. Territorial defence was non-exclusive and male held territories for up to 45 days. On average, male remained 9 days, female 11 days at a given site. Both sexes stayed significantly longer at sites with suitable oviposition substrates than at a site without. Mating occurred only twice during the study period, and the scarcity of mating events might explain long territory holding times. On a

daily basis male moved larger distances than female, suggesting that female remain at a site for a longer period before moving a long distance. Both sexes showed similar lifetime dispersal distances (1000-1300m), and dispersal was predominantly directed upstream. It is concluded that this unidirectional dispersal of adults may compensate for downstream drift of larvae in rapid flowing streams." (Author)] Address: Oppel, S., Univ Alaska, Dept Biol and Wildlife, 211 Irving 1, Fairbanks, AK 99775 USA. E-mail: steffen.oppel@gmail.com

6574. Pass, G.; Gereben-Krenn, B.-A.; Merl, M.; Plant, J.; Szucsich, N (2006): Phylogenetic relationships of the orders of Hexapoda: Contributions from the circulatory organs for a morphological data matrix. *Arthropod Systematics & Phylogeny* 64(2): 165-203. (in English). ["Discussions of phylogenetic studies based on morphological data focus mainly on results of the cladistic analysis while selection and evaluation of characters themselves are often underrepresented. Our paper seeks to address this with a survey of characters of the circulatory organs to contribute to the analysis of phylogenetic relationships of hexapod orders. The survey is based on examination of literature and includes, in addition, numerous unpublished data. Of 38 variable traits of the dorsal vessel and the various accessory circulatory organs, we selected 11 which are potentially informative at supraordinal level. They are critically discussed and coded as characters for use in comprehensive future cladistic analyses employing greater sets of morphological data. It must be stated that many features of circulatory organs for higher systematic categories are still based on one or few species for most orders of hexapods; this deficiency is due to the great methodological effort required to investigate internal organs. In general, circulatory organs of hexapods are simply organized making it difficult to discriminate homology from convergence. In addition to phylogeny, general aspects of the evolution of the circulatory system are outlined. In an appendix we provide comprehensive information on the traits, characters and the species in which they occur." (Authors)] Address: Pass, G., Department of Evolutionary Biology, University of Vienna, Althanstraße 14, 1090 Vienna, Austria. E-mail: guenther.pass@univie.ac.at

6575. Patankar, N.V.; Tembhare, D.B. (2006): Immunocytochemical demonstration of some vertebrate peptide hormone-like substances in the midgut endocrine cells in *Tramea virginia* (Rambur) (Anisoptera: Libellulidae). *Odonatologica* 35(2): 151-158. (in English). ["The present immunocytochemical study reveals the presence of well-defined endocrine cells, intermingled with the columnar cells of the epithelium in the midgut region of the alimentary canal of *T. virginia*. The midgut endocrine cells are of 2 types, the open-type midgut endocrine cells (OMEC) with a long tubule opening into the lumen of the midgut and close-type midgut endocrine cells (CMEC) which are spherical in shape and devoid of extending tubules. Various gastrointestinal hormone-like substances are localized in respective types of midgut endocrine cells in different regions of the midgut i.e. anterior, middle and posterior. The NPY, FMRFamide and P-endorphin were localized in the open-type while substance P, gastrin, CCK and VIP in the close-type midgut endocrine cells. The midgut endocrine cells in *T. virginia* differ from each other in their location, cytomorphological and immunocytochemical cha-

racteristics representing different types of endocrine cells. Functional significance of these myotropic and vertebrate gastrointestinal hormone-like substances in the midgut endocrine cells of *T. virginia* is discussed." (Authors)] Address: Patankar, N.V., 44 Vijaya Nagar, S Ambazari Rd, Nagpur 440022, Maharashtra, India. E-mail: entonitishapatankar@rediffmail.com

6576. Pedroso, N.E.; Santos-Reis, M. (2006): Summer diet of Eurasian Otters in large dams of South Portugal. *Hystrix It. J. Mamm. (n.s.)* 17(2): 117-128. (in English). [Odonata are represented in the diet of otters (*Lutra lutra*) by 0,5% of all food items.] Address: Pedroso, N. Universidade de Lisboa, Centro de Biologia Ambiental, Faculdade de Ciências da Universidade de Lisboa. Edifício C2, Campo Grande, 1749-016 Lisboa, Portugal. E-mail: nmpedroso@fc.ul.pt

6577. Phoenix, J.; Hentschel, W. (2006): Neue Nachweise von *Aeshna subarctica elisabethae* Djakonov, 1922 und *Somatochlora alpestris* (Selys, 1840) aus dem Böhmischem Teil des Erzgebirges [Krušné hory]. *Vážky 2005: Sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších, ZO CSOP Vlašim, 2006: 167-174.* (in German, with Czech summary). [New records of *Aeshna subarctica elisabethae* Djakonov, 1922 and *Somatochlora alpestris* (Selys, 1840) from the Bohemian part of the Erzgebirge mountains. "The two bogdwelling dragonfly species *Aeshna subarctica elisabethae* and *Somatochlora alpestris* occur as well in the Saxonian as in the Bohemian part of the Erzgebirge [Krušné hory]. As far as we know today, the only reproductive habitats of *Aeshna s elisabethae* are restricted to a small, cross-border area in the western part of the Erzgebirge (bogs north of the village Prebuz [Frühbuss]). Concerning the distribution of *S. alpestris* in the bohemian part of the Erzgebirge there are only records from the bogs near the village Boží Dar [Gottesgab] and the bog Malé jerábí jezero [Kleiner Kranichsee] known. Because of more extended occurrence in the saxonian part (actually 16 localities, some of them in cross-border habitats) some additional still undetected localities are supposed in the bohemian part too. Therefore a special search for *S. alpestris* in suitable habitats in the higher mountain region of the Erzgebirge is suggested." (Authors)] Address: Phoenix, J., Goethestr. 22, D-01824 Königstein, Germany. E-mail: juergen.phoenix@t-online.de

6578. Pintor, L.M.; Soluk, D.A. (2006): Evaluating the non-consumptive, positive effects of a predator in the persistence of an endangered species. *Biological Conservation* 130(4): 584-591. (in English). ["Failure to consider both the consumptive and non-consumptive effects of predators on prey can lead to erroneous conclusions about the net effect of the relationship. The predatory devil crayfish, *Cambarus diogenes* Girard functions as an ecosystem engineer constructing extensive burrow systems through aquatic habitats. Despite crayfish posing a serious predation threat, preliminary data indicate that the federally endangered Hines Emerald dragonfly larvae, *Somatochlora hineana* Williamson regularly inhabit crayfish burrows. During late summer, *S. hineana* larval habitat dries up; leaving crayfish burrows as some of the only wetted habitats. Thus, *C. diogenes* can affect *S. hineana* through both direct, negative and indirect positive effects. We examined the positive role of crayfish burrows as drought refuges, and the threat of predation by *C. diogenes* on *S. hineana* larvae.

Monthly field sampling indicated that *S. hineana* use open channel areas in spring and early summer moving into burrow systems in mid summer when channel areas normally dry. Laboratory experiments and field observations confirmed that crayfish prey on *S. hineana* larvae. Adult crayfish were a larger predation threat than juvenile crayfish. Despite their negative predatory impact, removal of crayfish from burrows in the field did not enhance densities of *S. hineana* larvae. Although *S. hineana* may face the threat of predation in burrows, they face a greater risk of desiccation if they remain in the open channel. These results lead to the counterintuitive conclusion that the maintenance of a predator is important for conserving an endangered prey species." (Authors)] Address: Pintor, Lauren, Univ. Calif. Davis, Dept Environm. Sci. and Policy, 1 Shields Ave, Davis, CA 95616 USA. E-mail: Impintor@ucdavis.edu

6579. Poopathi, S.; Tyagi, B.K. (2006): The challenge of mosquito control strategies: from primordial to molecular approaches. *Biotechnology and Molecular Biology Review* 1(2): 51-65. (in English). ["Mosquito control programs worldwide have been evaluating the feasibility to implement biological control strategies by using *Bacillus sphaericus* (Bs) and/or *B. thuringiensis* serovar israelensis (Bti). A comprehensive review is presented here to assess the potentiality of biological control agents in mosquito control operation. Vector control is primordial and very essential means for controlling transmission of filariasis, malaria, Japanese encephalitis and dengue in human society. Over the last few decades, there is growing realization that alternate methods to synthetic chemical control needs to be studied and perfected. In the last decade the bacilli based mosquito larvicides popularly known as biological larvicides are becoming more popular in vector management program the world over. The toxicity to mosquito larvae is due to crystal toxins encoded by specific genes. The major advantages of these biolarvicides are reduced application cost, safety to environment, human beings, animals and other non-target organisms. This special review paper explores the importance of bacterial toxin in controlling vector mosquitoes and the tactics for managing resistance to the mosquitocidal bacteria which include rotating different mosquitocidal strains and using genetic engineering to produce new combinations of toxins. This paper also provides a focus on continuous research toward identification of novel mosquitocidal toxins suitable for use if resistance to existing toxins." (Authors) The paper refers to Singh, R.K., Dhiman, R.C. & Singh, S.P. (2003): Laboratory studies on the predatory potential of dragonfly nymphs on mosquito larvae. *Commun. Dis.* 35 : 96-101] Address: Poopathi, Subbiah, Centre for Research in Medical Entomology (Indian Council of Medical Research), Ministry of Health and Family Welfare, Govt of India, Chinna Chokkikulam, Madurai. 625002, Tamil Nadu, India.

6580. Rabosky, D.L. (2006): LASER: A maximum likelihood toolkit for detecting temporal shifts in diversification rates from molecular phylogenies. *Evolutionary Bioinformatics Online* 2006: 257-260. (in English). ["Rates of species origination and extinction can vary over time during evolutionary radiations, and it is possible to reconstruct the history of diversification using molecular phylogenies of extant taxa only. Maximum likelihood methods provide a useful framework for inferring temporal variation in diversification rates. LASER is a package for the R programming environment that imple-

ments maximum likelihood methods based on the birth-death process to test whether diversification rates have changed over time. LASER contrasts the likelihood of phylogenetic data under models where diversification rates have changed over time to alternative models where rates have remained constant over time. Major strengths of the package include the ability to detect temporal increases in diversification rates and the inference of diversification parameters under multiple rate-variable models of diversification. The program and associated documentation are freely available from the R package archive at <http://cran.r-project.org>." (Author) Example: Holarctic Damselfly Radiation; Turgeon et al. (2005). Available at: <http://la-press.com/crdata/files/fEBO-2-Rabosky-et-al178.pdf>] Address: Rabosky, D.L., Corson Hall, Cornell University, Ithaca, NY 14853-2701, USA. Email: DLR32@cornell.edu

6581. Rangde, P. (2006): Étude biographique sur la vie et l'œuvre de René Martin (1846-1925). *Martinia* 22(1): 13-35. (in French, with English summary). [The paper refers to private documents and an obituary of P.P. Calvert to give some detailed insight into life and activities of René Martin.] Address: not stated

6582. Reichling, A. (2006): Faunistische Besonderheiten am südlichen Randbereich des Flugplatzes Finow und am Walpurgisbruch. *Naturschutz und Landschaftspflege in Brandenburg* 3/2006: 93-97. (in German). [Brandenburg, Germany; a total of 38 odonate species includes 29 breeding and 2 probably autochthonous species. Of special reference are records of *Leucorrhinia caudalis*, *L. albifrons*, and *L. pectoralis*.] Address: not stated

6583. Reinhardt, K. (2006): *Macromia illinoiensis* Walsh males use shade boundaries as landmarks (Anisoptera : Macromiidae). *Odonatologica* 35(4): 389-393. (in English). ["*M. illinoiensis* males were most actively engaged in territory patrolling during noon. They were observed to avoid areas on the water surface that were shaded. Areas on the water surface that were not avoided by males were artificially shaded upon which such areas were avoided. It is concluded that males of *M. illinoiensis* may use the shade-sun boundary on the water surface as a cue of its territory boundary." (Author)] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

6584. Richardson, J.L. (2006): Novel features of an inducible defense system in larval tree frogs (*Hyla chrysoscelis*). *Ecology* 87(3): 780-787. (in English). ["Organisms in aquatic ecosystems must often tolerate variable environmental conditions, including an uncertain risk of predation. Individuals that can maintain plastic defenses against predation will increase their survival when predators are present, but will not incur the costs of these defenses when the risk of predation is low and the defense is not induced. Larvae of the pond-breeding anuran *Hyla chrysoscelis* develop a conspicuous phenotype in the presence of predators consisting of a brightly colored tail and a deeper tail fin. In this study, I attempted to identify the source of the chemical signal that induces this defensive morphology in this species. I tested whether metabolites alone, originating from the prey but passing through the predator, were able to induce the same morphological response as the combination of alarm signals released directly by at-

tailed conspecifics, and metabolites. I used morphometric and tail conspicuousness data to assess tadpole response to the perceived risk of predation by larval odonate predators (*Anax junius*). I also tested whether this inducing cue could be recognized across species by measuring the morphological response of *H. chrysoscelis* tadpoles exposed to cues emitted when tadpoles of a closely related genus (*Pseudacris crucifer*) were consumed. Tadpoles exhibited a clean morphology in response to all cues corresponding to their relative reliability as indicators of a risk of predation. *H. chrysoscelis* tadpoles were also able to respond to cues emitted when tadpoles of a closely related genus were consumed by predators. These results illustrate that tadpoles of this species are able to respond to metabolites alone without alarm signals, and that interspecific chemical communication is a primary mechanism for predator avoidance in this inducible defense system." (Author)] Address: Richardson, J.L., Univ. Washington, Dept Biol. Struct., Box 357420, Seattle, WA 98195 USA

6585. Richardson, J.M.L.; Gunzburger, M.S.; Travis, J. (2006): Variation in predation pressure as a mechanism underlying differences in numerical abundance between populations of the poeciliid fish *Heterandria formosa*. *Oecologia* 147(4): 596-605. (in English). ["We explored whether a variation in predation and habitat complexity between conspecific populations can drive qualitatively different numerical dynamics in those populations. We considered two disjunct populations of the least killifish, *Heterandria formosa*, that exhibit long-term differences in density, top fish predator species, and dominant aquatic vegetation. Monthly censuses over a 3-year period found that in the higher density population, changes in *H. formosa* density exhibited a strong negative autocorrelation structure: increases (decreases) at one census tended to be followed by decreases (increases) at the next one. However, no such correlation was present in the lower density population. Monthly census data also revealed that predators, especially *Lepomis* sp., were considerably more abundant at the site with lower *H. formosa* densities. Experimental studies showed that the predation by *Lepomis gulosus* occurred at a much higher rate than predation by two other fish and two dragonfly species, although *L. gulosus* and *L. punctatus* had similar predation rates when the amount of vegetative cover was high. The most effective predator, *L. gulosus*, did not discriminate among life stages (males, females, and juveniles) of *H. formosa*. Increased predation rates by *L. gulosus* could keep *H. formosa* low in one population, thereby eliminating strong negative density-dependent regulation. In support of this, changes in *H. formosa* density were positively correlated with changes in vegetative cover for the population with a history of lower density, but not for the population with a history of higher density. Our results are consistent with the hypothesis that the observed differences among natural populations in numerical abundance and dynamics are caused in part by the differences in habitat complexity and the predator community." (Authors)] Address: Richardson, J.M.L., Brock Univ., Dept Biol. Sci., 500 Glenridge Ave, St Catharines, ON L2S 3A1, Canada. E-mail: Jean.Richardson@brocku.ca

6586. Rifai, L.; Amr, Z.S. (2006): Diet of the Stripe-Necked Terrapin, *Mauremys rivulata*, in Jordan. *Russian Journal of Herpetology* 13(1): 41-46. (in English). ["Stomach contents of *Mauremys rivulata* were analy-

zed by stomach flushing technique. *Mauremys rivulata* is an omnivorous species, with food items including aquatic insects and their larvae, amphibians and plants. Juvenile turtles were strictly carnivorous and larger ones shifted to a more herbivorous diet. Animal remains found in juveniles were more diverse, consisting of at least six different species of insects and amphibians, while larger animals consumed at the most three different animal species." (Authors) Odonata, preferably Anisoptera, Libellulidae represent approximately 25% of food items in adult *M. rivulata*. Juvenile terrapins also consumed adult Zygoptera.] Address: Amr, Zuhair S., Jordan Univ. Sci. & Technol., Dept Biol., POB 3030, Irbid, Jordan. E-mail: amrz@just.edu.jo

6587. Robb, T.; Forbes, M.R. (2006): Sex biases in parasitism of newly emerged damselflies. *Ecoscience* 13(1): 1-4. (in English, with French summary). ["There are several examples of sex-biased parasitism of invertebrate hosts. Sex biases in parasitism could be explained by differences between males and females either in exposure to or susceptibility to parasites. Our results show that for the common spreadwing damselfly, *Lestes disjunctus*, there was a female bias in mean intensity of parasitism by larval *Arrenurus pollictus* mites for newly emerged individuals sampled over emergence periods in both 2002 and 2003. This bias could not be explained by host body size and timing of emergence, factors thought to influence exposure of host larvae to larval mites. We suggest a novel explanation for sex-biased parasitism based on differences in developmental trajectories of larval male and female hosts, which should influence frequency of contact by larval mites. This explanation may help explain female-biased parasitism in other lestad damselflies, which should be exaggerated for early emerging species with compressed emergence periods. Further work is needed to test this novel explanation and determine whether it is applicable to other invertebrate host-parasite associations where parasites first come into contact with immature stages of hosts." (Authors)] Address: Robb, Tonia, Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario K1S 5B6, Canada. E-mail: trobb@connect.carleton.ca

6588. Robb, T.; Forbes, M.R. (2006): Age-dependent induction of immunity and subsequent survival costs in males and females of a temperate damselfly. *BMC Ecology* 6: 13 pp. (in English). ["Background: To understand variation in resistance to parasites within host populations, researchers have examined conditions under which immunity is induced and/ or is costly. Both host sex and age have been found to influence immune expression and subsequently are likely factors influencing the costs of resistance. The purpose of this study was to examine immune expression and associated survival costs for two age groups (newly emerged and sexually mature individuals) of the damselfly, *Enallagma boreale* Selys. Survival was assessed for experimentally challenged and control damselflies, housed initially at 22°C and then subjected to low temperatures (15°C) associated with reduced foraging activity and food deprivation. Experimental conditions emulated natural local variation in bouts of good weather followed by inclement weather (successions of days with hourly mean temperatures around 15°C and/ or rainy weather). Results: At least one of three immune traits was induced to higher levels for both newly emerged and mature *E. boreale* challenged by Lippopolysaccha-

ride (LPS) relative to saline-injected controls, when housed at 22°C. The immune traits assayed included haemocyte concentration, Phenoloxidase activity and antibacterial activity and their induction varied among ages and between males and females. For matures, those injected with LPS had lowered survivorship compared to saline-injected controls that were housed initially at 22°C and subsequently at 15°C. Newly emerged LPS-injected damselflies did not show reduced survivorship relative to newly-emerged controls, despite showing immune induction. Conclusion: Reduced longevity following induction of immunity was observed for reproductively mature damselflies, but not for newly emerged damselflies. Costs of resistance depend only partly on the immune trait induced and more on the age (but not sex) of the host. In four years, we often observed bouts of inclement weather following good days and these bouts occurred primarily during the emergence periods, but also during the flight periods, of *E. boreale*. The duration of these bouts appear sufficient to compromise survival of mature damselflies that responded immunologically to LPS challenge. We further suggest the environmental conditions likely experienced by different ages of damselflies, following resistance expression, has influenced optimal immune investment by individuals in different age classes and the likelihood of detecting costs of resistance." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

6589. Samways, M.J. (2006): Regional response of Odonata to river systems impacted by and cleared of invasive alien trees. *Odonatologica* 35(3): 297-303. (in English). ["Invasive alien organisms are a major threat to indigenous biodiversity. Invasive alien trees (IATs) are a component of this threat to South African odonates. IATs shade out the habitat of the sun-loving odonate species. A national programme to remove IATs from river systems has been initiated in South Africa. Results from widely-separated sites show that the impacts of IATs are the same in different physiognomic areas. In turn, removal of the IATs is beneficial to a range of species from narrow endemics to widespread generalists. Indications are that this nation-wide IAT-removal programme is beneficial across a wide geographical area, leading to rapid and significant odonate assemblage recovery. The IAT-removal programme must also consider removal of alien seedlings so as not to reverse the recovery programme." (Author)] Address: Samways, M. J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6590. Samways, M.J.; Tarboton, W. (2006): Rediscovery of *Metacnemis angusta* (Selys) in the Western Cape, South Africa, with description of male and redescription of female (Zygoptera: Platycnemididae). *Odonatologica* 35(4): 375-378. (in English). ["*M. angusta* was described from a female type in 1863, which has since been lost. The only other specimen is another female taken in 1920 in the Western Cape, South Africa. The species was feared extinct, but a population was discovered in November 2003. The male is described here as a neotype, along with a redescription of the female as a paratype. Although the conservation status of the species has improved, it is still threatened, principally by invasive alien trees." (Authors)] Address:

Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6591. Samways, M.J. (2006): Open and banded wings: Hypotheses on damselfly wing position (Zygoptera). *Odonatologica* 35(1): 67-73. (in English). ["Zygoptera species either perch with their wings open or closed. The alternatives do not appear to be phylogenetically constrained, as there are sexual differences in *Ecchlorolestes peringueyi*, and population variation and individual variation in *Pseudagrion sublacteum*. Open wings would appear to be more conspicuous to predators (Shiny Wing Hypothesis). Yet there is a difference between clear and coloured, banded wings in *Chlorolestes* species. Clear wings appear to be associated with crypsis, either in open or forest habitats. For species that have banded wings (and banded bodies), those individuals that are banded are aggressively territorial to clear-winged conspecifics and are sexually more attractive to female female. Open-winged perching behaviour is associated with perching on tips of shoots and rapid escape from ground predators, supporting the Quick Takeoff Hypothesis. Conspicuous open-winged perching for banded-wing individuals appears to be a tradeoff between territorial superiority on the one hand and predation from aerial predators, particularly birds, on the other. Predation however, appears to be minor relative to the advantages gained by conspicuousness." (Author)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6592. Samways, M.J. (2006): National red list of South African Odonata. *Odonatologica* 35(4): 341-368. (in English). ["Using the IUCN categories and criteria, the conservation status of the South African dragonfly fauna has been assessed. IUCN recommendations for adjusting the global categories and criteria for national red listing have been taken into consideration. A total of 40 taxa are listed as threatened or near-threatened, which is 25% of the national total (160 species and subspecies). The precautionary rather than evidentiary approach is taken throughout, especially as many sp. are marginal and although not threatened globally are highly threatened locally. Nevertheless, it is clear that locally the South African odonate fauna is under severe threat, especially the stream sp. Many of the threats are synergistic, both with natural drought/flood cycles, and with other threats. Restoration of hydrological regimes and riparian conditions are promoting conservation of this odonate assemblage." (Author)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6593. Schilder, R.J.; Marden, J.H. (2006): Metabolic syndrome and obesity in an insect. *Proc. Natl. Acad. Sci. USA* 103(4): 18805-18809. (in English). ["Dragonflies infected with noninvasive gregarine gut parasites (Microsporidia, Apicomplexa) have reduced flight-muscle performance, an inability to metabolize lipid in their muscles, twofold elevated hemolymph carbohydrate concentrations, and they accumulate fat in their thorax in a manner analogous to mammalian obesity. Gregarine infection is associated with inappropriate responses of hemolymph carbohydrate concentration to insulin and with chronic activation in the flight muscles of p38 MAP kinase, a signaling molecule involved in

immune and stress responses. Short-term exposure to gregarine excretory/secretory products caused elevated blood carbohydrate and p38 MAPK activation in healthy individuals. These characteristics comprise a set of symptoms and processes that are known in mammals as metabolic syndrome but which have not previously been described in other animal taxa. In addition to expanding the known taxonomic breadth of metabolic disease, these results indicate that insects may be useful experimental models for studying its underlying biology and mechanisms." (Authors)] Address: Schilder, R.J., Department of Biology, 208 Mueller Laboratory, Pennsylvania State University, University Park, PA 16802

6594. Schmidt, E. (2006): Ein dunkelflügliges Weibchen von *Calopteryx splendens* bei Wesel/Niederrhein mit Diskussion der östlichen ssp. *ancilla* (Selys, 1853). *Beitr. Ent.* 56(2): 422-432. (in German, with English summary). [The status of *Calopteryx splendens ancilla* (Selys, 1853) is discussed in detail based on a record of a dark-winged female of the taxon near Wesel, Nordrhein-Westfalen, Germany.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

6595. Sniegula, S.; Johansson, F. (2006): Två nya trollsländor för Västerbotten: *Coenagrion pulchellum* och *Somatochlora flavomaculata*. *Natur i Norr* 25(2): 103-104. (in Swedish). [*Coenagrion pulchellum*: Nydalasjön, ca 4 km east of centrala Umeå (63°49'N, 20°21'E), 27-07-2006. *Somatochlora flavomaculata*: Simon in Lomtjärn, ca 1,5 km öster om Nydalasjön, 8-07-2006.] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

6596. Steffens, W.P.; Smith, W.A. (2006): Description of the larva of *Somatochlora incurvata* Walker (Anisoptera: Corduliidae). *Odonatologica* 35(4): 379-383. (in English). ["The last larval instar is described and illustrated from material collected in central and southeast Wisconsin, United States, and the larval habitat is described. The larva differs from related species in the arctica group of *Somatochlora* in having a greater head width and in the dorsolateral setal patterns on abdominal tergites VI-IX. Segment IX has distinct paired dorsolateral tufts, and VIII, VII, and VI have progressively less defined to absent paired tufts. These characters distinguish the species from the most similar species, *S. forcipata*, and all others of the arctica group." (Authors)] Address: Steffens, W.P., 1993 Holm Rd, Two Harbors, MN 55616 USA. E-mail: stef0077@d.umn.edu

6597. Stoks, R.; De Block, M. (2006): Physiological costs of compensatory growth in a damselfly. *Ecology* 87(6): 1566-1574. (in English). ["Little is known about physiological costs of rapid growth. We successfully generated compensatory growth to time stress and transient food stress in the damselfly *Lestes viridis* and studied the physiological correlates of the resulting reduced ability to cope with starvation. We found evidence for both mechanisms proposed to underlie the physiological trade-off: compensatory growth was associated with (1) a higher metabolic rate, as indicated by a higher oxygen consumption and a faster depletion of energy storage molecules (glycogen and triglycerides), and (2) a smaller investment in energy storage. The former may also explain why storage molecules after emergence were negatively affected by time stress and

food stress, despite the successful compensation before emergence. These deferred physiological costs of rapid growth have the potential to couple larval stresses to adult fitness irrespective of age and size at emergence, and they may partly explain why many animals do not show their maximum achievable growth rate." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

6598. Stoks, R.; De Block, M.; Slos, S.; Van Doorslaer, W.; Rolff, J. (2006): Time constraints mediate predator-induced plasticity in immune function, condition, and life history. *Ecology* 87(4): 809-815. (in English). ["The simultaneous presence of predators and a limited time for development imposes a conflict: accelerating growth under time constraints comes at the cost of higher predation risk mediated by increased foraging. The few studies that have addressed this tradeoff have dealt only with life history traits such as age and size at maturity. Physiological traits have largely been ignored in studies assessing the impact of environmental stressors, and it is largely unknown whether they respond independently of life history traits. Here, we studied the simultaneous effects of time constraints, i.e., as imposed by seasonality, and predation risk on immune defense, energy storage, and life history in lepid damselflies. As predicted by theory, larvae accelerated growth and development under time constraints while the opposite occurred under predation risk. The activity of phenoloxidase, an important component of insect immunity, and investment in fat storage were reduced both under time constraints and in the presence of predators. These reductions were smaller when time constraints and predation risk were combined. This indicates that predators can induce sublethal costs linked to both life history and physiology in their prey, and that time constraints can independently reduce the impact of predator-induced changes in life history and physiology." (Authors)] Address: Rolff, J., Department of Animal and Plant Sciences, University of Sheffield, S10 2TN Sheffield, UK. E-mail: JOR@sheffield.ac.uk

6599. Stübing, S. (2006): Bemerkenswerte Bestandsentwicklung einiger seltener Libellenarten in der südhessischen Rheinebene. *Collurio* 24: 69-71. (in German). [Hessen, Germany; significant population trends of formerly very rare river Odonata are documented and briefly discussed: *Stylurus flavipes*, *Ophiogomphus cecilia*, and *Onychogomphus forcipatus*: A few notes are added to *Aeshna affinis*, and *Crocothemis erythraea*.] Address: Stübing, S., Eckhardtstr. 33a, 64289 Darmstadt, Germany. E-mail: stefan.stuebing@gmx.de

6600. Svensson, E.I.; Eroukhmanoff, F.; Friberg, M. (2006): Effects of natural and sexual selection on adaptive population divergence and premating isolation in a damselfly. *Evolution* 60(6): 1242-1253. (in English). ["The relative strength of different types of directional selection has seldom been compared directly in natural populations. A recent meta-analysis of phenotypic selection studies in natural populations suggested that directional sexual selection may be stronger in magnitude than directional natural selection, although this pattern may have partly been confounded by the different time scales over which selection was estimated. Knowledge about the strength of different types of selection is of general interest for understanding how selective forces

affect adaptive population divergence and how they may influence speciation. We studied divergent selection on morphology in parapatric, natural damselfly (*Calopteryx splendens*) populations. Sexual selection was stronger than natural selection measured on the same traits, irrespective of the time scale over which sexual selection was measured. Visualization of the fitness surfaces indicated that population divergence in overall morphology is more strongly influenced by divergent sexual selection rather than natural selection. Courtship success of experimental immigrant males was lower than that of resident males, indicating incipient sexual isolation between these populations. We conclude that current and strong sexual selection promotes adaptive population divergence in this species and that premating sexual isolation may have arisen as a correlated response to divergent sexual selection. Our results highlight the importance of sexual selection, rather than natural selection in the adaptive radiation of odonates, and supports previous suggestions that divergent sexual selection promotes speciation in this group." (Authors)] Address: Svensson, E.I., Section for Animal Ecology, Ecology Building, Lund University, SE-223 62 Lund, Sweden. E-mail: erik.svensson@zoekol.lu.se

6601. Tarkowska-Kukuryk, M. (2006): Water soldier *Stratiotes aloides* L. (Hydrocharitaceae) as a substratum for macroinvertebrates in a shallow eutrophic lake. *Pol. J. Ecol.* 54(3): 441-451. (in English). ["The importance of water soldier (*Stratiotes aloides* L.) as a colonization substratum for epiphytic and mining fauna has been investigated in the shallow, eutrophic lake in East Poland. Samples were taken in May, July and October in 2000–2001. Studies focused on abundance and species diversity of phytophilous fauna of *Stratiotes aloides*, in particular on the relation between epiphytic and mining organisms and their seasonal changes. The studied zoocenosis differed significantly in terms of density and taxa number. In all studied seasons fauna inhabiting *Stratiotes aloides* showed higher abundance and species diversity than mining invertebrates. Both zoocenosis were predominated by Chironomidae larvae. The percentage of midges in epiphytic fauna decreased slightly during vegetation period, the mining fauna showed the opposite pattern. Epiphytic Chironomidae were dominated by four taxa (*Dicrotendipes* sp., *Glyptotendipes* sp., *Paratanytarsus austriacus*, *Psectocladus* sp.). The mining fauna was represented mainly by *Glyptotendipes* sp. larvae. Density and biomass of epiphytic fauna showed the positive correlation with water soldier biomass." (Author) Odonata are included into the study on the suborder level.] Address: Tarkowska-Kukuryk, Monika, Department of Hydrobiology and Ichthyobiology, University of Agriculture in Lublin, Akademicka 13, 20-950 Lublin, Poland. E-mail: monika.kukuryk@ar.lublin.pl

6602. Theischinger, G.; Richards, S.J. (2006): Two new species of *Nososticta* Hagen in Selys from Papua New Guinea (Zygoptera: Protoneuridae). *Odonatologica* 35(1): 75-79. (in English). ["*N. conifera* sp. n. (holotype male: Gulf prov., Lakekamu, Ivimka Camp adjacent Sapoi R., 1-XII-1996) and *N. smilodon* sp. n. (holotype male: Gulf prov., Dark-End Lumber, 5-X-1999) are described. The holotypes are deposited in South Australian Museum, Adelaide. Diagnostic characters of the adults are illustrated and the affinities of both species are discussed." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia

lia. E-mail: gunther.theischinger@environment.nsw.gov.au

6603. Theischinger, G.; Richards, S.J. (2006): Two new Zygoptera species from Papua New Guinea (Protonuridae, Coenagrionidae). *Odonatologica* 35(2): 199-204. (in English). ["*Nososticta acudens* sp. n. and *Papuagrion nigripedum* sp. n. from Papua New Guinea are described, both from lowland rainforest in Gulf province (Dark-End Lumber 3-X-1999). Holotype male male are deposited at SAMA, Adelaide, Australia. Diagnostic characters of the adult male are illustrated and the affinities of both species are discussed." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: gunther.theischinger@environment.nsw.gov.au

6604. Theischinger, G.; Richards, S.J. (2006): *Argiolestes indentatus* spec. nov from Papua New Guinea (Zygoptera: Megapodagrionidae). *Odonatologica* 35(4): 385-388. (in English). ["The new species is described, diagnostic characters of the adult male are illustrated and the affinities of the sp. are discussed. Holotype male: Papua New Guinea, Golf prov., Lakekamu: lowland forest (120 m a.s.l.), 25-XI-1996; deposited in South Australian Museum, Adelaide." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

6605. Thomas, E.J.; John, J. (2006): Diatoms and macroinvertebrates as biomonitors of mine-lakes in Collie, Western Australia. *Journal of the Royal Society of Western Australia* 89(3): 109-117. (in English). ["Several voids created through open-cut coal mining occur near the town of Collie in the south-west of Western Australia. After mining, the voids fill with fresh water and form mostly acidic wetlands. Five of these mine-lakes were monitored in 1999 using macroinvertebrates and diatoms. On the basis of acidity and water chemistry two groups of wetlands were identified using multivariate analyses; wetlands with low pH (< 4.5), and those with comparatively higher pH (> 4.8). Distinct macroinvertebrate and diatom assemblages were characteristic of each of the wetland groups. Macroinvertebrates including *Orthetrum caledonicum* and *Megaporus solidus* were associated with the Group 1 wetlands (pH < 4.5) while *Sternopriscus browni* and *Micronecta* sp. were two of the most abundant macroinvertebrates in the Group 2 wetlands (pH > 4.8). In the Group 1 wetlands *Nitzschia paleaeformis* and *Pinnularia microstauron* were among the dominant diatom species. *Eunotia curvata* and *Tabellaria flocculosa* were two of the diatom species commonly found in the Group 2 waterbodies. While pH was one of the factors primarily responsible for the distribution of both biomonitors, diatoms appeared to be more sensitive than macroinvertebrates to acidity." (Authors)] Address: Thomas, E.J., Curtin Univ. Technol., Dept Environm. Biol., GPO Box U1987, Perth, WA 6845, Australia. E-mail: erin.thomas@postgrad.curtin.edu.au

6606. Thompson, D.J.; Watts, Ph.C. (2006): The structure of the *Coenagrion mercuriale* populations in the New Forest, southern England. In: Rivera, AC (ED). 2006. Forests and Dragonflies. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. *Pensoft Series Faunistica* 61: 239-258. (in English). [UK; *C. mercuriale* "is a poor disperser and susceptible to habi-

tat fragmentation/loss. It is protected by European legislation. An analysis of Capture-Mark-Recapture (CMR) data indicated that the population network on Beaulieu Heath in the New Forest comprised some 40 000 individuals. A nationwide genetic study indicates that the New Forest is a principal reservoir of genetic diversity for UK *C. mercuriale*. The New Forest is, however, presently best characterised as five genetic units. We found that several small, isolated populations of *C. mercuriale* in the New Forest showed substantial genetic differentiation from the principal populations on Beaulieu Heath, Setley Plain and Mill Lawn Brook. Isolation is brought about by preventing dispersal across intervening areas of unsuitable habitat such as forest, farmland or road. Although habitat loss is a principal concern for the persistence of this species, the pattern of limited movement to proximate sites highlights the need for a network of suitable habitat patches. This will also help to slow the rate of genetic erosion at peripheral sites." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

6607. Timm, H.; Möls, T.; Timm, T. (2006): Effects of long-term non-point eutrophication on the abundance and biomass of macrozoobenthos in small lakes of Estonia. *Proc. Estonian Acad. Sci. Biol. Ecol.* 55(3): 187-198. (in English). ["The effects of eutrophication on macrozoobenthos were studied in small Estonian lakes. Altogether, 380 sites of 107 lakes sampled repeatedly before and during/after significant n-point eutrophication were compared. The data of 1951. 167 were considered the reference samples, and the data of 1972-1995 were used as the test samples. A total of 66 macro. and megazoobenthic variables were studied. The individual weight of chironomid larvae, as well as the abundance and biomass of several animal groups, had changed significantly between the two periods. The possible reasons for the changes are briefly discussed." (Authors) "Odonata" are also treated.] Address: Timm, H., Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, 61101 Rannu, Tartumaa, Estonia. E-mail: ttimm@zbi.ee

6608. Van de Meutter, F.; Stoks, R.; De Meester, L. (2006): Rapid response of macroinvertebrates to drainage management of shallow connected lakes. *Journal of Applied Ecology* 43(1): 51-60. (in English). ["1. Shallow lakes throughout the world are subject to drainage, either for fish harvesting or lake restoration. Lake drainage of fish lakes is known to improve macrophyte and zooplankton diversity, but the effect on the macroinvertebrate community is poorly known. 2. In the present study, we investigated temporal trends in the macroinvertebrate community following drainage of six shallow connected lakes. Diversity increased for all macroinvertebrates (family level). Recolonization of the lakes occurred within the first year after the drainage and was supplemented with a set of species that were previously rare or did not occur in the lakes. Changes in the abiotic conditions of the lakes were small and transient, except for the decline in fish. The rapid recolonization by the species occurring before drainage is attributed to the high connectivity of our system. The appearance of supplementary species may relate to lowered fish predation, suggesting that fish were a dominant factor in shaping the communities. 3. Synthesis and applicati-

ons. Lake drainage has a positive effect on the diversity and richness of macroinvertebrates in shallow connected lakes. This positive effect may be due to a decline in fish predation following lake drainage in combination with a high rate of recolonization among others via connections to non-drained lakes. Lake drainage, therefore, is probably the most cost-effective lake restoration tool in shallow connected lakes. Other restoration tools may be preferable in isolated lakes where recolonization is constrained." (Authors) The analysis includes Odonata.] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

6609. Vonieka, P. (2006): The occurrence of dragonfly *Leucorrhinia pectoralis* (Odonata: Libellulidae) in the Jizerské hory Mountains (Northern Bohemia). *Vážky 2005: Sborník referátů VIII. celostátního semináře odonatologů ve Žďárských vrších, ZO ĚSOP Vlašim: 162-164.* (in Czech, with English summary). [Czech Republic; "The occurrence of *L. pectoralis* (1 male) in the Jizerské hory Mts. was confirmed. The species was found in peat bog Na Kotli on 14.VI.2005 (no. of mapping quadrat 5157). It is the first record of *Leucorrhinia pectoralis* in the Jizerské hory Mts. The occurrence in 930 m asl. is unusual." (Author)] Address: Vonieka, P., Severoèeské muzeum, Masarykova 11, 460 01 Liberec, Czech Republic. E-mail: pavel.vonicka@muzeumlb.cz

6610. Wada, S.; Wada, Y. (2006): Recent records of Odonata in Fukui and Ishikawa Prefectures, Japan. *Bull. Fukui City Mus. Nat. His.* 53: 117-128. (in Japanese, with English summary). [Documentation of records from 37 taxa, and hybrids of *Mnais costalis* & *M. pruniosa*, *Sympetrum eroticum* and *Sympetrum baccha matutinum* Ris, 1911, as well as *Sympetrum frequens* and *S. depressiusculum*] Address: Wada, S., 3-8-18 Nishikida, Fukui 918-8004, Japan

6611. Walsh, E.J.; Salazar, M.; Ramirez, J.; Moldes, O.; Wallace, R.L. (2006): Predation by invertebrate predators on the colonial rotifer *Sinantherina socialis*. *Invertebrate Biology* 125(4): 325-335. (in English). ["Colonies of the freshwater colonial rotifer *Sinantherina socialis* (Monogononta, Flosculariidae) have been shown to be unpalatable to a variety of small-mouthed, zooplanktivorous fishes. To test whether invertebrate predators ingest the rotifer *S. socialis*, we conducted two types of experiments: (1) Microcosm experiments-in separate experiments, four invertebrate predators (i.e., dragonfly nymphs, damselfly nymphs, notonectids, and Hydra) were offered prey either singly or in combination. Prey were comprised of *S. socialis*; *Epiphanes senta*, a solitary, free-swimming rotifer; and *Daphnia magna*, a microcrustacean. In each experiment, the percent of prey surviving after 12, 18, and 24 h was recorded. (2) Paired-feeding experiments-in separate experiments, predators were offered prey in a pairwise fashion, in which members of *D. magna* were alternated with a rotifer, either *S. socialis* or *E. senta*. The results of the microcosm experiments showed that, after 24 h, 60-100% prey items of *S. socialis* survived the predators, but significantly fewer individuals of *E. senta* (6-89%) and *D. magna* (< 25%) survived. When offered rotifers and individuals of *D. magna* simultaneously, predators tested consistently consumed more specimens of *Daphnia*. However, predators significantly reduced percent survival in *E. senta* but not in *S. socialis*. Preda-

tors, given a choice between the two rotifer species, all consumed significantly more specimens of *E. senta* than *S. socialis* after 24 h. In the paired-feeding experiments, three of the four predators captured members of *S. socialis*, but these colonies were frequently released rather than ingested, although in some cases colony structure was seriously disrupted. Our results suggest that the unpalatable nature of members of *S. socialis* to certain fishes extends to several invertebrate predators, but the nature of the putative factor(s) responsible for this remains unknown." (Authors)] Address: Walsh, Elizabeth J., Univ. Texas, Dept Biol. Sci., El Paso, TX 79968 USA. E-mail: ewalsh@utep.edu

6612. Wasscher, M.T. (2006): From NLO to NVL, 35 years of organized dragonfly study in The Netherlands. *Brachytron* 9(1-2): 21-32. (in Dutch, with English summary). ["Before 1970 some people in The Netherlands were studying dragonflies, but there was no higher organisation with newsletters and/or meetings. Since the start of the NLO on 7 March 1970, three periods of 'official' dragonfly activity can be recognised. These periods were separated by intervals of lesser activity, where no meetings were organised and few, if any, official newsletters were published. In those intervening periods, there were always youth federation members studying dragonflies, and those dragonfly lovers would then start the next period of official dragonfly study in The Netherlands. The first period commenced with the formation of the NLO during 1970, under the leadership of Bastiaan Kiauta. This period ended with the foundation of the international SIO in 1974. The second period lasted from 1979 to 1992 and was started by Marian Verdonk, with Marcel Wasscher gradually taking over her tasks. The final period, which is still on-going, started in 1994, though already in 1992 youth federation members of the NJN had started a 'Dragonfly Project' which would result in increased interest in dragonflies in The Netherlands. In 1997 both the NLO and the Dragonfly Project merged into a new dragonfly organisation, the NVL. In 2002 the Dutch Atlas was published, a milestone in dragonfly study in The Netherlands. Over the last decade, dragonflies have become an important group for nature study and nature management. This is illustrated by an official Red List, two field guides in Dutch, 22 regional and provincial study groups and over 400 members of the NVL, some of whom are also professional dragonfly workers." (Author)] Address: Wasscher, M.T., Minstr 15, NL-3582 CA Utrecht, Netherlands. E-mail: marcel.hilair@12move.nl

6613. Watanabe, M.; Matsu'ura, S. (2006): Fecundity and oviposition in *Mortonagrion hirosei* Asahina, *M. selenion* (Ris), *Ischnura asiatica* (Brauer) and *I. senegalensis* (Rambur), coexisting in estuarine landscapes of the warm temperate zone of Japan (Zygoptera : Coenagrionidae). *Odonatologica* 35(2): 159-166. (in English). ["Adults of the 4 species, inhabiting an estuarine landscape that includes reed communities and rice paddy fields established on water of varying saline concentration in Mie prefecture, Japan, were studied. The fecundity of *Ischnura* species was higher than that of *Mortonagrion* species. *I. senegalensis* contained the largest number of mature, submature, and immature eggs with the smallest mature egg size, whereas *M. selenion* contained the smallest number of immature eggs with the largest mature egg size. During a 3-day laboratory oviposition experiment without food, all female developed eggs, resulting in a greater number of mature

eggs than was originally contained. Most of the eggs that developed to maturity were laid by *M. selenion* and *L. asiatica*, while *M. hirosei* laid only half of the number laid by either of these. The oviposition process of the 4 species is discussed from the viewpoint of their larval habitat selection." (Authors)] Address: Watanabe, M., Univ Tsukuba, Grad Sch Life and Environm Sci, Tsukuba, Ibaraki 3058572, Japan. E-mail: watanabe@kanryo.envr.tsukuba.ac.jp

6614. Winkel, S.; Kuprian, M. (2006): Die Libellenfauna neu angelegter Flachgewässer im Süden der Stadt Offenbach. Jahrbuch Naturschutz in Hessen 10: 34-39. (in German). [Near the town of Offenbach, Hessen, Germany, in 1998 two shallow waters were realised as mitigation measures. These water bodies were casually monitored in 2005 and 2006 by 6 surveys. A total of 27 Odonata including many rare or threatened regional species were found. Records of *Lestes virens*, *Anaciaeschna isoceles*, *Aeshna affinis*, and *Leucorrhinia pectoralis* are stressed. Measures to protect the habitats for species of early succession stages of water bodies are outlined, including the so called rotation model.] Address: Winkel, Sibylle, Pommernstr. 7, D-63069 Offenbach, Germany. E-mail: Si-winkel@t-online.de

6615. Yanybaeva, V.A.; Dumont, H.J.; Haritonov, A.Yu.; Popova, O.N. (2006): The Odonata of south ural, Russia, with special reference to *Ischnura aralensis* Haritonov, 1979. *Odonatologica* 35(2): 167-185. (in English). ["The odonate fauna of S. Ural (Russia), as known from literature data and new collections, is composed of 59 species. *Coenagrion ecornutum*, *Ischnura pumilio*, *Somatochlora graeseri* and *Selysiothemis nigra* are first records for S. Ural; the presence of *Ischnura aralensis* Haritonov, 1979 (syn. *I. haritonovi* Dumont, 1997), *Aeshna cyanea*, *Anax imperator* and *Libellula depressa* is confirmed, but that of *Pyrrhosoma nymphula*, *Sympetma fusca*, *Cordulegaster boltonii* and *Libellula fulva* is not. *Aeshna undulata* Bartenev, 1909 is a probable synonym of *A. juncea* Linnaeus, 1758. *I. aralensis*, *C. ecornutum*, *Enallagma cyathigerum risi* and *S. graeseri* were found W as well as E of the Ural River, and thus are part of the fauna of Europe. Several western species reach their limit of eastward extent in S. Ural and, conversely, several eastern (Siberian) species reach their limit of westward extent there too. The range of *I. aralensis* is discussed in the light of the contractions and expansions of the Caspian-Aral lakes during the Late Pleistocene. The current disjunct positions of its colonies is understood as the result of the present phase of aridity in middle Asia." (Authors)] Address: Yanybaeva, V. A., Bashkirian State Nat Reserve, RUS-453592 Sargaya, Bashkortostan R, Russia. E-mail: bashart@bashnet.ru

6616. Yuan, H.-W.; Burt, D.B.; Wang, L.-P.; Chang, W.-L.; Wang, M.-K.; (2006): Colony site choice of blue-tailed bee-eaters: influences of soil, vegetation, and water quality. *Journal of Natural History* 40(7-8): 485-493. (in English). ["All bee-eaters (Family Meropidae) are cavity nesters, excavating terrestrial burrows in sites ranging from flat ground, to small mounds of soil, steep earthen banks seen in road clearings, eroded cliff faces, and river gorges. However, very little is known concerning the environmental factors that influence nest site selection in bee-eaters. We addressed abiotic and biotic issues associated with colony site choice in blue-tailed bee-eaters (*Merops philippinus*) nesting on Kin-

men Island, off mainland China, from 2000 to 2002. About 89% of the colonies were located on slopes with soils of sandy loam and the other 11% on sandy clay loam. No colony was found on clay loam, which covered 20% of the island. The sandy loam and sandy clay loam had lower soil pressure, density and moisture, which, presumably, were easier for bee-eaters to excavate and provided better drainage and ventilation for nest cavities. Bee-eaters avoided placing nest cavities in areas with dense vegetation and abandoned colony sites when they became overgrown. Vegetation would impede excavation and decrease the detectability of predators. Bee-eaters may prefer colony sites near water bodies showing water chemistries indicative of more biological productivity, especially in relation to the diversity and abundance of their major prey, dragonflies." (Authors) 13 Odonata species are listed in table 3.] Address: Ding, Tzung-Su, Natl Taiwan Univ, Sch Forestry and Resource Conservat, Taipei, Taiwan. E-mail: ding@ntu.edu.tw

6617. Yutaka, Y.; Sato, N. (2006): The influences of the application of organic matters as the substitution of chemical fertilizers and the reduction of agricultural chemicals on the growth and yield of rice plant and the frowning wings of Red dragonflies. *Bulletin of the Fukushima Prefecture Agricultural Experiment Station* 37: 28-39. (in Japanese, with English summary). ["The influences of the chemical fertilizers, the agricultural chemicals and the organic matters on the growth and yield of rice plant and the growing wings of red dragonflies were investigated in the cold and highland areas, especially Inawashiro Town, where the resident has an interest in the environment. The yield of brown rice in the use of organic matters, such as cattle or chicken manures and strained lees of rapeseed oil, as the substitution chemical fertilizers decreased around 10% compared with those of the popular cultivation. The reduction of yield was associated with a lower number of ears, which was caused by the suppression of tiller number on the initial growing stage. The reduction of agricultural chemicals did not affect the growth and yield of rice plant except to herbicide. However, the yield of brown rice in the field not applied herbicide was almost 30% less than that of the popular cultivation by the propagation of weed on the 3 years later. Red dragonflies grew wings from the beginning to end in July, and the peak of the number of growing wings was shown in the mid-July. The number of red dragonflies grown wings evidently decreased by the midterm drainage, and it decreased by the surface spread of the dried cattle manure used for the purpose of the constraint of weed. Then, it was suggested that the growing wings of red dragonflies was not affected by the application of chemical fertilizer and agricultural chemicals except to insecticide, but decreased by the application of an insecticide." (Author)] Address: Yutaka, Y., Fukushima Prefecture Agricultural Experiment Station, Japan

6618. Zawal, A. (2006): Phoresy and parasitism: water mite larvae of the genus *Arrenurus* (Acari: Hydrachnidia) on Odonata from Lake Binowskie (NW Poland). *Biological Letters* 43(2): 257-276. (in English). ["Larvae of the genus *Arrenurus* parasitize Odonata, Diptera and Coleoptera. This work describes relationships between *Arrenurus* larvae and Odonata (imagines, larvae and exuviae) in a Polish lake. The mites examined were found on 2349 adult odonates (277 female and 872 male), 805 larvae (356 female and 449 male) and 395 e-

xuviae of 34 species from Lake Binowskie and its vicinity. In total, 1128 larval water mites were collected from adult odonates, 556 from larvae, and 165 from exuviae. Water mite larvae were found on imagines of 9 species, on larvae of 12 species, and on exuviae of 9 species. Among adult of odonates only damselflies (Zygoptera) were parasitized, and a high prevalence (up to 77.8%) and intensity (up to 195 parasites per host) of parasitism were recorded. Adult females were more frequently infested than males, the preferred body parts being the thorax and the ventral side of the middle segments of the abdomen. Both phoretic and parasitic larvae of water mites were found on odonate larvae. Phoretic larvae constituted 25.8% of the total number of water mite larvae on odonate larvae. The occurrence of water mite larvae on exuviae shows their mortality when mites fail to move onto the eclosing adult odonate or when mites do not get detached from odonate larvae before their emergence from water." (Author)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

6619. Zinke, J. (2006): *Cordulegaster bidentata* (Odonata) im Lausitzer Bergland (LUŽICKÉ HORY, Tschechische Republik). Erster Bodenständigkeitsnachweis an Hand von Larvenfunden. *Vážky 2005: Sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších, ZO CSOP Vlašim, 2006: 165-166.* (in German, with Czech summary). [first proof of *C. bidentata* breeding by larval records; brief account on historical regional records of *C. bidentata* in the German/Czech border region, and documentation of larval records on 30.08.2005] Address: Zinke, J., Rietschelstraße 23, D-01069 Dresden, Germany

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6620. Abbott, J.C.; Mynhardt, G. (2007): Description of the larva of *Somatochlora margarita* (Odonata: Corduliidae). *International Journal of Odonatology* 10(2): 129-136. (in English). ["The larva of *Somatochlora margarita* is described from a specimen reared from the egg to the final stadium. The larva, previously unknown, is morphologically similar to the larvae of *S. calverti*, *S. filosa*, *S. ozarkensis*, and *S. provocans*. Combinations of diagnostic characters are given for distinguishing these species. Growth of this species is discussed with respect to other species of *Somatochlora* and Odonata." (Authors)] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

6621. Abdel-Salam Shaalan, E.; Canyon, D.V.; Muller, R.; Wagdy Faried (2007): A mosquito predator survey in Townsville, Australia, and an assessment of *Diplonychus* sp. and *Anisops* sp. predatorial capacity against *Culex annulirostris* mosquito immatures. *Journal of Vector Ecology* 32 (1): 16-21. (in English). ["A twelve-month survey for mosquito predators was conducted in Townsville, Queensland, Australia, which is located in the arid tropics. The survey revealed the presence of five predaceous insects but only *Anisops* sp. (backswimmers) and *Diplonychus* sp. were common. Predatorial capacity and factors influencing this capaci-

ty were then assessed for adult *Anisops* sp. and adult and nymph stages of *Diplonychus* sp. against *Culex annulirostris* mosquito immatures under laboratory conditions. Predatorial capacity bioassays showed that adult *Diplonychus* sp. preyed upon both larval and pupal stages of *Cx. annulirostris* quite successfully. Nymphs of *Diplonychus* sp. proved to be more successful with smaller prey immatures, and *Anisops* sp adults did not prey successfully on any prey pupae. Increasing the foraging area and introducing aquatic vegetation significantly reduced the predatorial capacity of *Diplonychus* sp. nymphs, while only vegetation and not foraging area had a significant effect on adult *Diplonychus* sp. predation capacity. Overall, adult *Diplonychus* sp. proved to be a more efficient predator than *Anisops* sp., and field trials are now recommended to further assess the potential of *Diplonychus* sp. as a biocontrol agent." (Authors) Odonata are treated on the order resp suborder level.] Address: Abdel-Salam Shaalan, E., Zoology Department, Aswan Faculty of Science, South Valley University, Aswan, Egypt

6622. Adomssent, M. (2007): Erstnachweis der Schabrackenlibelle *Anax ephippiger* (Burmeister, 1839) für Niedersachsen (Odonata). *Entomologische Nachrichten und Berichte* 51(2): 137-139. (in German). [documentation of a record of *A. ephippiger* from 26.V-2007 along the river Ilmenau south of Bad Beversen, Niedersachsen, Germany.] Address: Adomßent, M., Universität Lüneburg, Institut für Umweltkommunikation, D-21332 Lüneburg, Germany

6623. Araujo, Y.; Beserra, P. (2007): Diversity of invertebrates consumed by the Yanomami and Yekuana communities from the alto Orinoco, Venezuela. *Inierciercia* 32(5): 318-323. (in Spanish, with English and Portuguese summaries). ["Invertebrates represent a rich and tempting food for the indigenous people and play an important role in the diet of these populations. The aim of this work was to make the taxonomic identification of the invertebrate species consumed by the indigenous communities Yanomami and Yekuana from the Alto Orinoco region, Amazonas State, Venezuela. Open interviews were carried out and behavioral observation made of 27 males and 9 females from 12 to 70 years old. Larvae and adult specimens of invertebrates indicated and validated as eatable were collected alive and later identified. The Yanomami consume 20 and the Yekuana 28 species of invertebrates. The Yanomami eat mainly caterpillars, larvae of scarabs and wasps, termites, ants and spiders, while the Yekuana consume earthworms, shrimps, oysters and a variety of aquatic insects. The proximity of the Yekuana communities to rivers and streams has possibly contributed to the specialization of their rich diet in aquatic insects "(including Odonata)", unlike the Yanomami communities that consume mainly terrestrial invertebrates of forest origin. The strategy of the natives in the consumption of these small animals indicates that they have a detailed knowledge of their environment and of the use and manipulation of the forest resources, to provided food to the human populations without affecting biodiversity." (Authors)] Address: Araujo, Yelinda, Bióloga, Universidad Central de Venezuela (UCV). Magíster en Ecología, Instituto Nacional de Pesquisas da Amazonia (INPA), Brasil. Investigadora, Instituto Nacional de Investigaciones Agrícolas del Estado Mérida (INIA-Mérida), Venezuela. Dirección: Apartado Postal 425, Avenida Urdaneta,

Urdaneta, Mérida, Estado Mérida, Venezuela. E-mail: yaraujo@inia.gov.ve

6624. Armstrong, R.H.; Hudson, J.; Hermans, M. (2007): *Dragons in the Ponds*. Nature Alaska Images (Juneau, Alaska). ISBN 978-1-57833-362-2: 32 pp.. (in English). [This book is directed towards encouraging a child's interest in Odonata. It provides a general overview of the adult and nymphal morphology, outlines the number of species, and introduce all the major North American families providing examples. This is followed by presenting the dragonflies, which were chosen as Official State Insects: Alaska - *Libellula quadrimaculata* and Washington - *Anax junius*. The majority of the book is dedicated to the life history of Anisoptera. It is full of colour photos showing nymphs feeding, adults emerging, mating, laying eggs, being preyed upon, and a number of flight shots as well (including Zygoptera). Some of these photos are really impressive. (Martin Schorr)] Address: www.alaskabooksandcalendars.com

6625. Baker, R.A. (2007): What was the British list like 120 years ago? Robert McLachlan's 1884 list of Odonata compared with today's lists. *J. Br. Dragonfly Society* 23(2): 52-57. (in English). ["A comparison is made between the list of Odonata from Britain recorded in 1884 and those published recently. Robert McLachlan, who published the nineteenth century list, relied on his own observations and earlier accounts, together with records of museum and private collections. The species which have become extinct and those recorded for the first time in Britain since McLachlan's paper was published, are of particular interest." (Authors)] Address: Baker, R.A., Faculty of Biological Sciences, University of Leeds, Leeds LS2 9JT, UK

6626. Baker, R.A.; Mill, P.J.; Zawal, A. (2007): Mites on Zygoptera, with particular reference to *Arrenurus* species, selection sites and host preferences. *Odonatologica* 36(4): 339-347. (in English). ["Larval mites of several *Arrenurus* species are found as parasites on Zygoptera. Data from Poland on prevalence, loads, and host specificity are presented. The larval mites are identified and their site selection and host preferences recorded. 7 Zygoptera species and 7 species of *arrenurid* mite have been studied. Particular attention has been paid to *Coenagrion puella* and its parasites. New host records are included." (Authors)] Address: Baker, R.A., School of Biological Sciences, University of Leeds, Leeds LS2 9JT, UL. E-mail: pabrab@leeds.ac.uk

6627. Beaton, G. (2007): *Dragonflies and Damselflies of Georgia and the Southeast*. Wormsloe Foundation Nature Book. University of Georgia Press. ISBN-13: 978-0820327952 : 355 pp. (in English). ["... Organized for easy use in the field, this abundantly illustrated guide, with more than 400 color photographs, is the first to cover Georgia's Odonata. It details more than 150 species - species that are also the ones most likely to be seen throughout the U.S. Southeast north of Florida. The guide first explains dragonfly and damselfly body parts, taxonomy, life cycles, and habitats; discusses conservation issues; and offers tips on observing and photographing odonates. Later chapters, organized according to the ten odonate families, such as spreadwings, darners, spiketails, and emeralds, provide general family information followed by accounts of individual species. The beautifully illustrated species accounts

describe general appearance and key identification features, distribution, habitats, life history and behavior, and conservation. Supplementary materials include suggestions for the best places to watch odonates in Georgia, a comparative listing of species' level of endangerment, and the date range during which each species can be seen... - Included in species accounts are: beautiful, detailed photos that show odonates from angles important to determining species, sex, or age; common and scientific names; important features for field identification, with tips on distinguishing between similar-looking species; typical behavior of the species, including breeding and feeding habits; occasional commentary on taxonomy or other notable features; and, colorful quick guide, with a range map, incidence information, sizing graphics, and flight period information. Additional features include: listing of twenty ideal sites around the state for odonate watching; notes on infrequently sighted species; ratings for each odonate's conservation status, from most critically imperiled to most stable species; chronological listing of flight dates; listing of additional resources: books, organizations, Web sites, and equipment suppliers; and, a glossary and index. (Publisher)] Address: E-mail. giffbeaton@mindspring.com

6628. Berry, R.; van Kleef, J.; Stange, G. (2007): The mapping of visual space by dragonfly lateral ocelli. *Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology* 193: 495-513. (in English). ["We study the extent to which the lateral ocelli of dragonflies are able to resolve and map spatial information, following the recent finding that the median ocellus is adapted for spatial resolution around the horizon. Physiological optics are investigated by the hanging-drop technique and related to morphology as determined by sectioning and three-dimensional reconstruction. L-neuron morphology and physiology are investigated by intracellular electrophysiology, white noise analysis and iontophoretic dye injection. The lateral ocellar lens consists of a strongly curved outer surface, and two distinct inner surfaces that separate the retina into dorsal and ventral components. The focal plane lies within the dorsal retina but proximal to the ventral retina. Three identified L-neurons innervate the dorsal retina and extend the one-dimensional mapping arrangement of median ocellar L-neurons, with fields of view that are directed at the horizon. One further L-neuron innervates the ventral retina and is adapted for wide-field intensity summation. In both median and lateral ocelli, a distinct subclass of descending L-neuron carries multi-sensory information via graded and regenerative potentials. Dragonfly ocelli are adapted for high sensitivity as well as a modicum of resolution, especially in elevation, suggesting a role for attitude stabilisation by localization of the horizon." (Authors)] Address: Berry, R., Research School of Biological Sciences, Australian National University, PO Box 475, Canberra, ACT 2601, Australia. E-mail: rberry@rsbs.anu.edu.au

6629. Berry, R.P.; Stange, G.; Warrant, E.J. (2007): Form vision in the insect dorsal ocelli: An anatomical and optical analysis of the dragonfly median ocellus. *Vision Res.* 2007: 1394-1409. (in English). ["Previous work has suggested that dragonfly ocelli are specifically adapted to resolve horizontally extended features of the world, such as the horizon. We investigate the optical and anatomical properties of the median ocellus of *Hemicordulia tau* and *Aeshna mixta* to determine the ex-

tent to which the findings support this conclusion. Dragonfly median ocelli are shown to possess a number of remarkable properties: astigmatism arising from the elliptical shape of the lens is cancelled by the bilobed shape of the inner lens surface, interference microscopy reveals complex gradients of refractive index within the lens, the morphology of the retina results in zones of high acuity, and the eye has an exceedingly high sensitivity for a diurnal terrestrial invertebrate. It is concluded that dragonfly ocelli employ a number of simple, yet elegant, anatomical and optical strategies to ensure high sensitivity, fast transduction speed, wide fields of views and a modicum of spatial resolving power." (Authors)] Address: Berry, R.P., Research School of Biological Sciences, Australian National University, P.O. Box 475, Canberra, ACT 2601, Australia. E-mail: rberry@rsbs.anu.edu.au

6630. Beschovski, V.; Marinov, M. (2007): Fauna, ecology, and zoogeography of dragonflies (Insecta: Odonata) of Bulgaria. *Monographiae Biologicae* 82. Biogeography and Ecology of Bulgaria. ISBN-978-1-4020-4417-5: 199-232. (in English). [68 dragonfly species have been reported from Bulgaria. "According to their larval habitat, they are divided in two ecological complexes: rheophilous and limnophilous. Adaptations of both complexes are discussed. Zoogeographical characteristics are given at the genus and species level. Their vertical and horizontal distribution is outlined. Seven phenological groups are established. Their habitats are divided in 12 groups; for each group, key species and co-occurring species are listed." (Authors)] Address: Marinov, M., P.O. Box 134, BG-1000 Sofia, Bulgaria. E-mail: mgmarinov@mail.bg

6631. Blanke, A. (2007): The dragonfly assemblage of Santa Teresa – patterns of behaviour and habitat use in a tropical environment. Diplomarbeit. Mathematisch-Naturwissenschaftlichen Fakultät der Rheinischen Friedrich-Wilhelms-Universität Bonn: V, 124 pp. (in English, with German summary). [Brasil; "This study has focused on the role of several factors for behaviour of four Neotropical dragonfly assemblages close to each other. It was shown that in areas with identical climate, the microhabitat severely influences the diel activity pattern of some species. Theories stating interspecific changes of behaviour in relation to body size, failed to explain the great behavioural changes observed for the same species. Every species has behaved differently in each area. Some behavioural differences were significant, and lead to the assumption that microhabitat changes (i.e. spatial structure) sometimes superpose the influences of body size and species assemblage. Some observed species even showed the typical activity patterns expected from the other group, that is perching or flight respectively. A wide perceptive horizon, which is stated for the larger species in this study, seems to demand flexible behaviour, enabling the species to adapt to as many habitats as possible. Species with a narrow perceptive horizon (i.e. generalists) are also able to colonize many areas, because their requirements to the environment allow a wider spectrum of habitats. A stricter and perch-orientated behaviour pattern is supposed to be characteristic for these species." (Author)] Address: Blanke, A., Section Lower Arthropods, Alexander Koenig Research Institute and Museum of Zoology - Leibniz Institute for Terrestrial Biodiversity - Adenauerallee 160, D-53113 Bonn,

Germany. E-mail: alexander.baronrothschild@googlemail.com

6632. Bönsel, A.; Matthes, J.; Matthes, H.; Runze, M. (2007): Erfolgskontrollen nach Revitalisierungen von Feldsöllen in Mecklenburg-Vorpommern. Auswirkungen auf Rotbauchunke, Laubfrosch und Libellen. *Natur und Landschaft* 82: 129-136. (in German, with English summary). [The article reports on measures taken from 2001 to 2004 to revitalize 19 kettle ponds in north-eastern Germany. After revitalization measures, a zone designed to sequester nutrients was set up around each kettle pond, and partly planted with woody plants. Recolonization by *Bombina bombina*, *Hyles arborea* (both Amphibia) and dragonflies was recorded in the first vegetation period immediately after the measures, and again in 2005. The documentation shows that the nutrient sequestration zone did not prevent eutrophication. Only the revitalized ponds surrounded with peaty soil were protected sufficiently from non-point nutrient inputs, and remained mesotrophic. *B. bombina* and *H. arborea* colonized ponds regardless of eutrophication processes. Species losses were recorded between initial and follow-up monitoring only when there had been anthropogenic fish stocking, or if ponds were temporary. "Of the 34 dragonfly species recorded, most were autochthonous, and their numbers high in mesotrophic waters. Pioneer species disappeared quickly or remained only in the mesotrophic waters, with small numbers of individuals. Such dynamics were recorded in a range of rural areas. If filtering capacity and thus groundwater protection and the promotion of the two amphibian species listed in Annexes II and IV of the Habitats Directive are the targeted functional utility of kettle ponds, then the revitalization measures were a success. If, however, the goal is to maintain species-rich dragonfly populations over several years, it is essential to prevent non-point nutrient inputs via drainage water. Establishing protective planted zones did not prove successful in this regard. While this measure did prevent erosion, drainage always introduces unfiltered, nutrient-rich water. Targeted filtration of drainage water is the key requirement for kettle pond revitalization in rural landscapes." (Authors)] Address: Bönsel, A., Vasenbusch 15, 18337 Gresenhorst, Germany. E-mail: Andre.Boensel@gmx.de

6633. Bolek, M.G.; Janovy, J. Jr. (2007): Small frogs get their worms first: The role of nonodonate arthropods in the recruitment of *Haematoloechus coloradensis* and *Haematoloechus* complexus in newly metamorphosed Northern Leopard frogs, *Rana pipiens*, and Woodhouse's toads, *Bufo woodhousii*. *Jour. Parasitol.* 93(2): 300-312. (in English). ["Studies on the life cycles and epizootiology of North American frog lung flukes indicate that most species utilize odonates as second intermediate hosts; adult frogs become infected by ingesting odonate intermediate hosts. Newly metamorphosed frogs are rarely infected with these parasites, predominantly because they are gape-limited predators that cannot feed on large intermediate hosts such as dragonflies. We examined the role of the frog diet and potential intermediate hosts in the recruitment of the frog lung fluke, *Haematoloechus coloradensis*, to metamorphosed *Rana pipiens*, *Bufo woodhousii*, and bullfrogs (*R. catesbeiana*) from western Nebraska. Because of the uncertain validity of *H. coloradensis* as a distinct species from *Haematoloechus* complexus, morphological characters of both species were reevaluated.

ated and the life cycles of both species were completed in the laboratory. The morphological data on *H. coloradensis* and *H. complexus* indicate that they differ in their oral sucker to pharynx ratio, uterine loop distribution, and placement of vitelline follicles. However, in terms of their life cycles, both species are quite similar in their use of physid snails as first intermediate hosts, a wide range of nonodonate and odonate arthropods as second intermediate hosts, and leopard frogs and toads as definitive hosts. These results indicate that *H. coloradensis* and *H. complexus* are generalists at the second intermediate host level and might be able to infect newly metamorphosed leopard frogs and toads by using small nonodonate arthropods more commonly than other frog lung fluke species. Comparisons of population structure of adult flukes in newly metamorphosed leopard frogs indicate that the generalist nature of *H. coloradensis* metacercariae enables it to colonize young of the year leopard frogs more commonly than other *Haematoloechus* spp. that only use odonates as second intermediate hosts. In this respect, the generalist nature of *H. coloradensis* and *H. complexus* at the second intermediate host level is an avenue for the colonization of young of year frogs." (Authors) The paper contains fascinating pictures of the *H. coloradensis* cercarial attachment, creeping, and penetration behaviour on *Ischnura verticalis*.] Address: Bolek, M.G., School of Biological Sciences, University of Nebraska-Lincoln, Lincoln, Nebraska 68588, USA. E-mail: mbolek@unlserve.unl.edu

6634. Bolek, M.G.; Janovy, J. Jr. (2007): Evolutionary avenues for, and constraints on, the transmission of frog lung flukes (*Haematoloechus* spp.) in dragonfly second intermediate hosts. *Jour. Parasitol.* 93(3): 593-607. (in English). ["Metacercariae survival patterns and their distribution in second intermediate odonate hosts were examined for 4 species of frog lung flukes. Surveys of aquatic larvae and recently emerged teneral dragonflies and damselflies indicated that prevalence and mean abundance of *Haematoloechus* spp. metacercariae were significantly lower in teneral dragonflies than larval dragonflies, while there was no significant difference in prevalence or mean abundance of *Haematoloechus* spp. metacercariae among larval and teneral damselflies. Experimental infections of dragonflies indicated that metacercariae of *Haematoloechus coloradensis* and *Haematoloechus complexus* were located in the head, thorax, and branchial basket of dragonflies, whereas metacercariae of *Haematoloechus longiplexus* and *Haematoloechus parvipleus* were restricted to the branchial basket of these hosts. Metacercariae of *H. coloradensis*, *H. complexus*, and *H. longiplexus* infected the head, thorax, and abdomen of damselflies, but these insects were resistant to infection with *H. parvipleus*. Subsequent metamorphosis experiments on experimentally infected dragonflies indicated that most metacercariae of *H. longiplexus* were lost from the branchial basket during metamorphosis, but most metacercariae of *H. coloradensis*, *H. complexus*, and *H. parvipleus* survived dragonfly metamorphosis. These observations suggest that the observed ecological host specificity of *H. longiplexus* in semiterrestrial leopard frogs may be due to few metacercariae of *H. longiplexus* reaching these frogs in a terrestrial environment. Because of the uncertain validity of *Haematoloechus variopleus* as a distinct species from its synonym *H. parvipleus*, their morphological characters were reevaluated. The morphological data on *H. variopleus* and

H. parvipleus indicate that they differ in their acetabulum length and width, ovary shape, testes length, and egg length and width. Experimental infections of plains leopard frogs, northern leopard frogs, and bullfrogs with worms from bullfrogs indicate that the synonymy of *H. parvipleus* with *H. variopleus* is not warranted, and that these flukes are distinct species, i.e., *H. parvipleus* in bullfrogs and *H. variopleus* in plains leopard frogs and northern leopard frogs." (Authors)] Address: Bolek, M.G., School of Biological Sciences, University of Nebraska-Lincoln, Lincoln, Nebraska 68588, USA. E-mail: mbolek@unlserve.unl.edu

6635. Bouwman, J.; Groenendijk, D. (2007): New records of *Somatochlora arctica* in northwestern Lower Saxony (Odonata: Corduliidae). *Libellula* 26(1/2): 35-40. (in German, with English summary). ["During two visits to the German side of the borderland of the Province Groningen (Netherlands) and the Emsland district (western Lower Saxony, Germany) in June and July 2006 we recorded *S. arctica* at three new localities. All records pertain to adult males, up to seven at a time. These findings point to the possibility that this enigmatic and regionally rare dragonfly may be present at more sites in the northwest of Germany and the northeast of the Netherlands than hitherto supposed." (Authors)] Address: Groenendijk, D., Dutch Butterfly Conservation, P.O. Box 506, NL-6700 AM Wageningen, The Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

6636. Braccia, A.; Voshell, J.R.; van Christman, D. (2007): The Odonata of newly constructed ponds with life history and production of dominant species. *Aquatic Insects* 29(2): 115-130. (in English). ["The species composition of an odonate assemblage from six new ponds in Virginia, USA, was documented, and life histories and production of three dominant odonate taxa (*Anax junius*, *Gomphus exilis*, and *Enallagma civile*) were determined. The assemblage consisted of 19 species and was numerically dominated by *A. junius*, *G. exilis*, *E. civile*, and libellulids. Production of *A. junius*, *G. exilis*, and *E. civile* was 795 mg DW m⁻² yr⁻¹, 27 mg DW m⁻² yr⁻¹, and 236 mg DW m⁻² yr⁻¹, respectively. Coefficients of variation for production of each species were 50.77%, which suggests that variance should be considered in production estimates, especially if results are to be compared across studies or habitats. Low density and production of the dominant species in this study may be a result of inadequate densities of food items and limited availability of preferred habitat in the newly created ponds." (Authors)] Address: Braccia, Amy, Department of Entomology, Blacksburg, Virginia, USA; E-Mail rvoshell@vt.edu

6637. Brauner, O. (2007): Winterbeobachtungen von Libellen auf La Gomera und La Palma, Kanarische Inseln (Odonata). *Libellula* 26(3/4): 213-232. (in German, with English summary). ["In February of the years 2001, 2004 and 2007 Odonata were observed in La Gomera, and in February 2000 and November/ December 2005 in La Palma. During these journeys, ten species were recorded at 49 sites in La Gomera, and nine species at 26 sites in La Palma. Compared to the published literature, in La Palma the first records of *Ischnura saharensis*, *Anax ephippiger*, *Sympetrum nigrifemur* and *Trithemis arteriosa* were taken. In addition, the first record of *Anax parthenope* from this island taken in June 2006 is presented. Concerning La Gomera, two new sites of *Zygonyx torridus* in the island are presented, inc-

cluding the first observations of larvae and exuviae, and *A. ephippiger* is recorded from there also for the first time. With the exception of *Z. torridus*, all recorded Odonata species were observed during February in the adult stage. In six species emergence was observed between December and February. Annotations on the phenology of the species are given." (Authors)] Address: Brauner, O., R.-Breitscheid-Straße 62, D-16225 Eberswalde, Germany. E-mail: oliver.brauner@gmail.com

6638. Bried, J.T.; Herman, B.D.; Ervin, G.N. (2007): Umbrella potential of plants and dragonflies for wetland conservation: a quantitative case study using the umbrella index. *Journal of Applied Ecology* 44(4): 833-842. (in English). [" 1. Shortcuts to measuring biodiversity enable prioritization of conservation effort in the face of limited time, personnel and funding. The conservation umbrella approach focuses management effort according to individual species that may confer protection to a larger community. This approach can help guide the management agenda towards attainable goals by maximizing conservation returns per unit effort. The development of the umbrella index has shown promise in identifying umbrella species in terrestrial ecosystems but has received little attention with respect to the management of wetland ecosystems. 2. We used the umbrella index to assess the umbrella potential of vascular plants and dragonflies (Odonata) from 15 wetland impoundments in northern Mississippi, USA. The presence of adult odonates was determined by repeated visual surveys and plant lists were compiled from 50 plots per site. 3. Umbrella schemes, or the sites occupied by top umbrella species, missed large numbers of beneficiary species and occurrences. With one exception, umbrella schemes failed to optimize conservation returns relative to randomized schemes in both assemblages. Also, umbrella schemes approximately equalled the performance of non-umbrella schemes both overall and for species with a low rate of occurrence. Low occurrence rates in both assemblages may have hindered umbrella index performance because the index assumes that species with moderate occurrence rates have the most umbrella potential. 4. Cross-taxon analyses (Mantel tests and McNemar tests) suggested transferability of plant and dragonfly umbrella schemes, and non-random association between the plants and dragonflies in these wetlands. 5. Synthesis and applications. Despite the questionable performance of umbrella schemes in our study, the use of a quantitative ecological tool such as the umbrella index instead of political or popularity criteria is strongly recommended for future selection of umbrella species. The results of cross-taxon analyses supported growing evidence for spatial and functional relationships between wetland macrophytes and adult odonates. We suggest that the more easily measured assemblage can be used to set priorities for wetland conservation planning in circumstances where human resources are constrained." (Authors)] Address: Jason T. Bried, J.T., The Nature Conservancy Eastern New York Conservation Office and Albany Pine Bush Preserve Commission, 195 New Karner Road, Albany, NY 12205-4605, USA. E-mail jtbried@tnc.org

6639. British Dragonfly Society (2007): The newsletter of the British Dragonfly Society Autumn 2007. *Dragonfly News* 52: 1-32. (in English). ["Message from the President Peter Mill; Farewell to Caroline Daguet Tim Beynon; From the Conservation Officer Katharine Parr;

kes; Migrant Dragonfly Update 2007 Adrian Parr; Bonjour from Across the Pond Caroline Daguet; First Dates for 2007 Adrian Parr; BD S Diary of Events, Call for Field Meetings for 2008, BDS Members' Day 2007, York.; Conservation Projects. a Practical Example and some Useful Principles 8; Hot news'. fresh from the BDS Web Site; From the Dragonflies in Focus Officer Graham French; Broad-bodied Chaser Survey 2007 Graham French; Report of the Dragonfly Conservation Group Pam Taylor; Favourite Places: Wilson's Pits, Northamptonshire Mark Tyrrell; Field Meeting Reviews: River Dee around Aldford & Churton, Cheshire - 20th April 2007, Larvae Identification Workshop, Brandon Marsh, Warwickshire. 21st April 2007. River Nene, Northants. 26th May 2007, Spinningdale Bog, Highland, Scotland. 3rd June 2007, Garrick and Calrossie Woods, Highland, Scotland. 6th June 2007, Rubha Mor, Coigach, Scotland. 9th June 2007, A Weekend with Dragonflies'at Juniper Hall. 15-17* June 2007, Adult Identification Workshop, Brandon Marsh Warwickshire. 16th June 2007, Chartley Moss, Shropshire. 16th June 2007. "In search of the White-faced Darter", Mointeach nan Lochain Dubha, Skye - 16th June 2007, Elvetham Heath, Hants. 17th June 2007, Loch Caol, Skye. 17th June 2007, Logierait Woods, Pitlochry, Perthshire. 21st June 2007, Countess Wear, Exeter, Devon. 22nd June 2007, Glovers Pond, Chobham Common, Surrey. 23rd June 2007, Grand Western Canal, Devon. 23rd June 2007, Upton Fen, Norfolk. 23 June 2007, Stover CP and Bovey Heathfield Devon WT Reserve - 24th June 2007, Tanera Mor, the Summer Isles, Scotland. 7th July 2007, Warren Heath, Hartley Witney, Hampshire. 15th July 2007, Tithe Farm, Marton, Warwickshire. 28th July 2007; Members' Letters & Observations: On the Reliability of Binoculars for Identification Keith Lovegrove; Golden-ringed may eat veg as well! Dave Dana, Britain's Largest Dragonfly attacks Europe's Smallest Bird Brian Easlea, Ruddy Explosion! Dave Dana; Publications & Reviews: Gossamer Wings. Mysterious Dragonflies Dagmar Hilfert-Rüppell & Georg Rüppell, 'Dragonflies' Steve Brooks, The Dragonflies of Essex Ted Benton & John Dobson, Field Guide to the Larvae and Exuviae of British Dragonflies Steve Cham; BDS Business: The Board of Trustees, BDS votes for by-law changes, Proposed change to By-laws, You Can Help!, Help needed with a new National Atlas, Site photographs wanted."] Address: BDS, c/o Hepper, D., 12 Three Stiles Rd, Farnham, Surrey GU9 7DE, UK. E-mail: David.Hepper@Local-Software.co.uk

6640. Brockhaus, T. (2007): Überlegungen zur Faunengeschichte der Libellen in Europa während des Weichselglazials (Odonata). *Libellula* 26(1/2): 1-17. (in German, with English and Swedish summary). ["In contrast to other aquatic insect groups, no relevant discussion on the faunal history of the Odonata during the Ice Age exists. In the present paper I examine previous hypotheses regarding the postglacial settlement of dragonflies in Europe. I include a short overview of the processes during the Ice Age. Especially I write about the present state of knowledge of the climate, countryside and habitats during the Weichsel Glacial Stage. There are in East Germany extensive findings from about 33,000 years ago. But there is no fossil evidence of dragon flies from that time. In addition, in the context of present knowledge of the ecology, morphology, physiology and dispersal of Odonata, I develop a hypothesis regarding the possible dragon fly fauna of the tundra of that time. It is possible that both coldstenothermic

and eurythermic species belong to this periglacial fauna. I offer further suggestions regarding the treatment of this question that may contribute to a better understanding of ecological findings and to the history of dispersion and zoogeography of Palaearctic dragonflies." (Authors)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

6641. Buczyński, P.; Zawal, A. (2007): Dragonflies (Odonata) of the "Szare Lake" nature reserve. *Parki Narodowe i Rezerваты Przyrody* 26(4): 79-91. (in Polish, with English summary). [28 species of Odonata were recorded in 2004 in the "Szare Lake" nature reserve (NW Poland, West Pomeranian Lake District). Dragonfly assemblages of aquatic habitats in the reserve were analysed. Particular attention was paid to Szare Jake which is a well preserved representative of lobelian lakes. The importance of lobelian lakes for dragonfly conservation in Poland and Europe is discussed.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

6642. Burkart, G.; Burkart, W. (2007): Die Libellenfauna der Ostseeinsel Gotland (Odonata). *Libellula* 26 (1/2): 119-142. (in German, with English and Swedish summary). ["During 17 trips between 1982 and 2006 to Gotland, we investigated 126 sites regarding the occurrence of Odonata. Altogether we recorded 36 species of Odonata in the island. Since 1998 four species, *Sympecma fusca*, *S. paedisca*, *Aeshna mixta* and *Anax imperator*, were recorded as new for Gotland. We could not confirm the presence of *Nehalennia speciosa* and *Calopteryx splendens*, which had been reported from Gotland in earlier studies." (Authors)] Address: Burkart, Gudrun, Am Emel 7, D-27412 Wilstedt, Germany. E-mail: weguburkart@gmx.de

6643. Butler, S.G. (2007): The larva of *Gomphidia tinigrum* Selys from Nepal (Anisoptera: Gomphidae). *Odonatologica* 36(4): 399-403. (in English). ["The final instar exuviae from the Phewa Tal lake at Pokhara, Nepal is described and illustrated and comparison is made with *Ictinogomphus rapax* larvae, inhabiting the same water body. Mention is made of the more noted differences between the SE Asian *Lindeniinae* genera." (Author)] Address: Butler, S.G., Red Willow, All Stretton, Shropshire SY6 6HN, UK. E-mail: sgbutler15@btopenworld.com

6644. Calle, P.; Knijf, G. de; Kurstjens, G.; Peters, B. (2007): Actuele en historische libellenfauna van de grensmaas. *Natuurhistorisch maandblad* 96(10): 269-277. (in Dutch, with English summary). ["Present and historic biodiversity of dragonflies in the Grensmaas floodplain: The stretch of the river Meuse between Maastricht (NL) and Maaseik (B), known as the Grensmaas, is unique to the Netherlands and Flanders because of its rapidly flowing water, gravel banks and islands. This article discusses the historic and present value of this floodplain for dragonfly species. In 2006, extensive research was done in several nature reserves along the river and in the summer streambed of the river itself, to assess the consequences for flora and fauna of 10-15 years of habitat restoration work in this floodplain. In this context, the dragonfly fauna was also surveyed, with special attention being paid to the strictly protected *Gomphus flavipes*. Data are presented for

four different periods. Before 1950, about 28 species occurred, including several typically rheophile species, like *Gomphus vulgatissimus*, *Ophiogomphus cecilia* and *Onychogomphus forcipatus*. Between 1950 and 1989, the diversity of dragonflies fell severely, due to water pollution and habitat destruction (canalisation and agricultural activities). From 1990 onwards, the dragonfly diversity increased again, due to floodplain restoration, reduced pollution and climate change. In the most recent period (1998-2006), more than 38 species were recorded in the Grensmaas floodplain, including several Red List species like *Libellula fulva* and *Sympecma fusca*. Currently, *G. stylurus* does not have a stable population in the river, but occurs as a summer migrant. Another 11 species are currently also most likely to be migrants, since their specific breeding habitat is lacking. It is expected that the dragonfly diversity will increase slightly and population sizes will grow as a result of a new large-scale floodplain restoration project, in which the width of the river bed will be enlarged to the size it had around 1850. Another major improvement will be the smaller amounts of silt in the riverbed, as silt has a negative impact on the habitat of larvae of rheophile species. Most of the silt originates from these waste which was until recently discharged untreated by the city of Liège in Belgium." (authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

6645. Carchini, G.; Della Bella, V.; Solimini, A.G.; Bazzanti, M. (2007): Relationships between the presence of odonate species and environmental characteristics in lowland ponds of central Italy. *Ann. Limnol... Int. J. Lim.* 43(2): 81-87. (in English). ["A set of 21 ponds was sampled three times for odonate larvae during spring 2002. At the same time 17 environmental variables were recorded including area, wet phase duration, total nitrogen, total phosphorus, aquatic macrophytes and land use. A total of 16 odonate species belonging to Lestidae, Coenagrionidae, Aeshnidae and Libellulidae were recorded, and the total number of species per pond varied from zero to six. The relationships between species richness, assemblages and environmental variables were studied by simple and multiple correlation and by Canonical Correspondence Analysis (CCA). The results showed that permanent ponds were larger, deeper, had more macrophyte species, had more extensive macrophytes cover and lower concentrations of nitrogen and phosphorus than temporary ponds. Multiple regression analysis showed that the number of odonate species was positively affected firstly by the number of macrophyte species, and then by pond depth. However, pond depth appeared to be interchangeable with several others variables, such as pond area and water duration and negatively correlated with nitrogen concentration, variables which are all linked with the permanent or temporary status of the ponds. CCA analysis indicated that odonate species presence was linked with a few environmental variables, showing a tendency of Odonata to avoid ponds with higher nitrogen concentrations, with the exception of *Lestes barbarus*, a species typical of temporary water in central Italy. At the same time, the majority of species were linked with longer water phase duration and with greater macrophyte species richness. A comparison with previous studies, and in particular with those carried out in central Italy, confirmed the positive influence of macrophytes, water duration, and also the negative effect of nutrient load. However, several other variables,

in particular land use, shade, presence of fish, which were influential in other studies, were not significant in this study." (Authors)] Address: Carchini, G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. E-mail: archini@utovrm.it

6646. Carvalho, A.L. (2007): Recomendações para a coleta, criação e colecionamento de lavras de Odonata. Arquivos do Museu Nacional, Rio de Janeiro 65(1): 3-15. (in Portuguese, with English summary). ["Recommendations for collecting, rearing, and storing larvae of Odonata. The taxonomy of the dragonfly larvae of Neotropical Region is still very poor. Manuals or guides about this subject are not available yet. So, it is necessary to breeding unknown larvae for their correct identification, based on the related emerged adults, and posterior description. Methods for all the steps of the work related to the manipulation of these forms in the field and in the laboratory, specially the rearing, are presented in detail. Each procedure is discussed and associated with biological data. Alternative materials, cheap and easy to find, are preferentially indicated." (Author)] Address: Carvalho, A.L., Museu Nacional / UFRJ, Departamento de Entomologia. Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, RJ, Brasil.

6647. Catling, P.M. (2007): Variation of hind-wing colour and length in *Sympetrum internum* (Odonata: Libellulidae) from the Canadian prairie provinces. Canadian Entomologist 139(6): 872-880. (in English, with French summary). ["Amber coloration, called saffroning, extends from 1 to 15 mm across the hind-wing base in females of *S. internum* from the prairie provinces but extends only from 2 to 3 mm in males. There are no substantial differences in hind-wing length between the sexes. A significant correlation was found between hind-wing length and the extent of saffroning for both males and females. Regressions of these characters against latitude and longitude revealed that (1) there is a significant decrease in hind-wing length northward for both sexes; (2) there is a significant decrease in saffroning northward that is more significant for females; (3) there is no significant effect of longitude on hind-wing length; and (4) saffroning in females significantly increases westward but there is no similar effect in males, and the trend in females is much less significant than the latitudinal trend. Within the prairie provinces, extensive saffroning is confined to the Prairie Ecozone and moderate saffroning occurs around the edges of this ecozone. The surrounding Boreal Plains Ecozone is characterized by females with very limited saffroning. There is generally extensive variation in the extent of saffroning within some Prairie Ecozone locations, ranging from limited to moderate or extensive, but limited and moderate saffroning were more frequent at most locations in the Prairie Ecozone. Various explanations for saffroning are considered. Since limited, moderate, and extensive saffroning occur together throughout an extensive area, and occur within many populations and within a group emerging at the same time, formal taxonomic recognition of individuals with moderate or extensive saffroning seems unwarranted." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net

6648. Cham, S. (2007): Field Guide to the Larvae and Exuviae of British Dragonflies. Volume 1: Dragonflies (Anisoptera). British Dragonfly Society. ISBN-13: 9780955647109: 80 pp. (in English). ["This field guide aids the identification of dragonfly larvae and exuviae without the need for keys. It is fully illustrated with close-up colour photographs of all the key distinguishing features. Includes information on where to find larvae and exuviae and emergence periods for each species." (Publisher)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

6649. Chang, X.; Zhai, B.; Wang, M.; Wang, B. (2007): Relationship between exposure to an insecticide and fluctuating asymmetry in a damselfly (Odonata, Coenagrionidae). Hydrobiologia 586(1): 213-220. (in English). ["In this study, we explored the effects of pesticide on fluctuating asymmetry (FA) levels and mortality of *Ceriagrion* sp. larvae. The results showed that the mortality of larval damselflies treated with pesticide was significantly higher than that treated with tap water which had been aerated for 48 h, but there were no significant differences among mortality of larvae treated with different concentrations of pesticide. Meanwhile, we found that the level of FA of the first tibia length, one of the seven bilaterally symmetrical traits (First femur length, First tibia length, Second femur length, Second tibia length, Third femur length, Third tibia length and Prementum width), differed significantly with different treatments, whereas the others did not show any significant differences. The Bonferroni (Dunn) *t* Tests revealed that FA of the first tibia length at 15×10^{-9} mg l⁻¹ was significantly higher than that at 1.5×10^{-9} mg l⁻¹ and control. There was no significant relationship between trait size and the absolute difference between their right and left sides. There was also no significant relationship between body size and the absolute difference between right and left sides. Trait size was significantly positively correlated with body size. FA was not associated with mortality. Therefore, we concluded that FA of the first tibia length of *Ceriagrion* sp. larvae may be induced by sublethal doses of pesticides. That is to say, its FA may be regarded as an indicator of reflecting the level of pesticide stress." (Authors)] Address: E-mail: bpzhai@njau.edu.cn

6650. Chaplina, I.A.; Dumont, H.J.; Haritonov, A.Yu.; Popova, O.N. (2007): A review of the Odonata of Kazakhstan. Odonatologica 36(4): 349-364. (in English). ["The odonate fauna of Kazakhstan (86 species) is reviewed, using literature data, miscellaneous collections and the results of an expedition by the authors in July 2004. *Aeshna caerulea*, *A. subarctica*, *Somatochlora graeseri* (all from the S Altai mountains), *Macromia amphigena fraenata* (Sibinskie Lakes near Ust'-Kamenogorsk), *Calopteryx samarcandica*, *Coenagrion hyalas*, and *Anormogomphus kiritchenkoi* (all based on specimens in Zool. Inst. Russ. Acad. Sei., St. Petersburg) are first records for the country." (Authors) *Calopteryx maracandica* Bartenef 1913 and *Calopteryx unicolor* Bartenef 1912 are classified as synonyms of *Calopteryx samarcandica* Bartenef 1912.] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

6651. Chaput-Brady, A.; Pays, O.; Lodé, T.; Secondi, J. (2007): Morphological clines in dendritic landscapes.

Freshwater Biology 52(9): 1677-1688. (in English). ["1. In complex landscapes such as river networks, organisms usually face spatio-temporal heterogeneity and gradients in geomorphological, water, ecological or landscape characteristics are often observed at the catchment scale. These environmental variables determine developmental conditions for larval stages of freshwater insects and influence adult phenotypic characteristics. Environmental clines are therefore expected to generate morphological clines. Such a process has the potential to drive gradual geographical change in morphology-dependent life history traits, such as dispersal. 2. We studied the influence of aquatic and terrestrial environmental factors on morphological variations in *Calopteryx splendens* across the Loire drainage. To investigate these effects we took explicitly into account the hierarchical structure of the river network. 3. We analysed eight morphological traits. Results showed significant body size variation between tributaries and the presence of a morphological cline at the drainage scale. We observed an effect of pH and water temperature on body size. Individuals in downstream sites were larger than individuals in upstream sites, and adults whose larval stages were exposed to alkaline pH and high temperatures during summer were larger. 4. Body size affects flight abilities in insects. Thus, our results suggest that morphological clines may generate an asymmetric dispersal pattern along the downstream-upstream axis, downstream populations dispersing farther than upstream ones. Such a process is expected to influence population genetic structure at the drainage scale if larval drift and floods do not balance an asymmetrical dispersal pattern of adults along the downstream-upstream gradient. To assess the influence of environmental gradients on the variation of life history traits it is important to understand the population biology of freshwater insects, and more generally of riverine organisms. It is also essential to integrate such data in conservation or restoration programmes." (Authors)] Address: Chaput-Bardy, Audrey, Laboratoire Paysages et Biodiversité, UFR Sciences, 2 Bd Lavoisier, 49045 Angers cedex 01, France. E-mail: audrey.chaput-bardy@univ-angers.fr

6652. Chatterjee, S.N.; Ghosh, A.; Chandra, G. (2007): Eco-friendly control of mosquito larvae by *Brachytron pratense* nymph. *Journal of Environmental Health* 69(8): 44-48. (in English). ["The study reported here revealed the biocontrol efficacy of aquatic nymphs of the dragonfly *Brachytron pratense* against larvae of the mosquito *Anopheles subpictus*. It was found that during a 24-hour study period, a nymph of *B. pratense* would consume (mean value of three observations) 66 fourth-instar *An. subpictus* larvae released in a water bowl containing 3 liters of pond water. The consumption rate was significantly higher ($p < .05$) during the lights-on phase of the experiment than during the lights-off phase ($t = 2.15$). Under field conditions, a significant decrease ($p < .05$) in larval density in dipper samples was observed 15 days after the introduction of dragonfly nymphs (10 individuals) in concrete tanks. The biocontrol potential of the nymphs under field conditions was also indicated by a significant increase ($p < .05$) in the density of mosquito larvae 15 days after the removal of nymphs. In the control tanks (where no nymphs were introduced), mean larval-mosquito density did not differ significantly throughout the study period ($p > .05$)."] (Authors).] Address: Chatterjee, S.N., Department

of Zoology, University of Burdwan, Mosquito Research Unit, Rajbati, Bardhaman, West Bengal, India

6653. Chelmick, D. (2007): Further observations of *Macromia splendens* (Pictet) in Andalusia, Spain (Anisoptera: Macromiidae). *Notul. odonatol.* 6(10): 109-112. (in English). ["Chelmick (2006, *Notul. odonatol.* 6: 69-72) provided information on the status of *M. splendens* in Andalusia. This paper outlines further information on the distribution, habitat and behaviour of this species in southern Spain. The paper concludes with discussion on the conservation and threats to the habitat of this internationally important species." (Author) In addition, records are documented of *Oxygastra curtisii* and *Gomphus graslinii*, species likewise protected by law.] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

6654. Cicek, K.; Kermer, A. (2007): Food composition of the Marsh Frog, *Rana ridibunda* Pallas, 1771, in Thrace. *Turkish Journal of Zoology* 31(1): 83-90. (in English, with Turkish summary). [An analysis of the stomach contents of 53 (19 males, 34 females) adult individuals of *Rana ridibunda* was performed. The frog diet consisted of a wide variety of arthropods; Diptera (42.62%) and Coleoptera (21.84%) were especially prominent. Aquatic forms did not contribute much to the frog diet; Odonata were represented with less than 1% of all prey items. The prey items identified indicate that individuals of this species, like other ranids, are generalist opportunistic predators whose diet is most strongly influenced by prey availability.] Address: Cicek, K., Ege University, Faculty of Science, Biology Department, Zoology Section, TR-35100, Üzmir, Turkey

6655. Clausnitzer, H.-J.; Clausnitzer, C.; Hengst, R. (2007): Ergänzungen zur Ökologie von *Ceriagrion tenellum* in der südlichen Lüneburger Heide (Odonata: Coenagrionidae). *Libellula* 26(3/4): 157-160. (in German, with English summary). ["After the mild winter of 2006/2007 featuring only very few days with temperatures below 0°C, during summer 2007 *C. tenellum* was found in numbers at several ponds without flowing water, even emerging from a garden pond. The absence of frost during the preceding winter apparently enabled the development to take place in these waters." (Authors)] Address: Clausnitzer, H.-J., Eichenstraße 11, D-29348 Eschede, Germany. E-mail: H.-J.Clausnitzer@t-online.de

6656. Clausnitzer, H.-J.; Clausnitzer, C.; Hengst, R. (2007): Zur Ökologie von *Ceriagrion tenellum* im Bereich der nordöstlichen Verbreitungsgrenze in Niedersachsen (Odonata: Coenagrionidae). *Libellula* 26(1/2): 19-34. (in German, with English summary). ["*C. tenellum* has a south-western European distribution; hence the populations in Lower Saxony are near its north-eastern limit. These populations were surveyed from 1990 to 2006. The species lives mainly in primary habitats heathy peatlands and creeks with paludification but there are also some populations in artificial habitats. It was found in 60 localities, but not throughout the period. In the last 15 years 19 new cases of colonisation of bogs and ponds were observed. This positive trend coincided with the renaturation of the small rivers Lutter and Lachte, and with moderately cold winters. The larvae are susceptible to frost and therefore large populations are associated with running water. After the winter

of 2005/2006 that had led to a longer freezing up of many waters, there were strong losses in ponds without, or with only very small, water current up to the total extinction of a local population. Winter cold forms the limiting factor for this species in the northeastern part of its range." (Authors)] Address: Clausnitzer, H.-J., Eichenstraße 11, D-29348 Eschede, Germany. E-mail: H.-J.Clausnitzer@t-online.de

6657. Conn, A.T.; Burgess, S.C.; Ling, C.S. (2007): Design of a parallel crank-rocker flapping mechanism for insect-inspired micro air vehicles. Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science 221(10): 1211-1222. (in English). ["In the current paper, a novel micro air vehicle (MAV) flapping mechanism for replicating insect wing kinematics is presented. Insects flap their wings in a complex motion that enables them to generate several unsteady aerodynamic mechanisms, which are extremely beneficial for lift production. A flapping wing MAV that can reproduce these aerodynamic mechanisms in a controlled manner is likely to outperform alternative flight platforms such as rotary wing MAVs. A biomimetic design approach was undertaken to develop a novel flapping mechanism, the parallel crank-rocker (PCR). Unlike several existing flapping mechanisms (which are compared using an original classification method), the PCR mechanism has an integrated flapping and pitching output motion which is not constrained. This allows the wing angle of attack, a key kinematic parameter, to be adjusted and enables the MAV to enact manoeuvres and have flight stability. Testing of a near-MAV scale PCR prototype using a high-speed camera showed that the flapping angle and adjustable angle of attack both closely matched predicted values, proving the mechanism can replicate insect wing kinematics. A mean lift force of 3.35 g was measured with the prototype in a hovering orientation and flapping at 7.15 Hz." (Authors) Fig. 2 presents a simplified two-dimensional rigid-body linkages representing the mechanics of the Odonata wing joint.] Address: Burgess, S.C., Department of Mechanical Engineering, University of Bristol, Queen's Building, University Walk, Bristol BS8 1TR, UK. E-mail: s.c.burgess@bris.ac.uk

6658. Cordero-Rivera, A.; Sánchez-Guillén, R.A. (2007): Male-like females of a damselfly are not preferred by males even if they are the majority morph. *Animal Behaviour* 74(2): 247-252. (in English). ["Animals searching for prey and males searching for mates share similar problems of detection if their targets are diverse in colour or physical appearance. There is good evidence for predators switching their preferences for prey in a frequency-dependent way; predators focus on the most common form, and the decreased predation on rarer forms allows multiple forms to survive. Frequency-dependent mate selection has also been proposed to explain the maintenance of several female colour morphs in damselflies. However, the fact that one of the female morphs is coloured like a male (androchrome) and behaves similarly to males suggests the phenomenon of male mimicry in this system as an alternative explanation for the polymorphism. We compared androchrome frequencies in populations and mating pairs in *Ischnura elegans*, over a range of androchrome frequencies (8–90%). In 22 of 23 samples androchromes mated less often than expected (significantly in 13 samples). We found no evidence for males switching their preferences in a frequency-dependent way. A test

of male preference for female morphs in a population with 85% androchromes indicated that males behaved indiscriminately and did not prefer the commonest (male-like) morph. Our results support androchrome male mimicry rather than learned mate recognition by males (a purely frequency-dependent model) as the main mechanism behind the maintenance of this sex-limited colour polymorphism." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidad de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

6659. Czerniawska-Kusza, I. (Ed.) (2007): 14 O-gólnopolskie Warsztaty Bentologiczne: Hydromorfologiczna ocena ekosystemów wodnych. Opole-Turawa. Lanko, Opole: 74 pp. [The following odonatological papers are presented: Domek, P., R. Dondajewska & R. Góldyn: Macrozoobenthos of the Antoninek reservoir on the Cybinia river (pp. 15-16); — Koperski, P.: The presence and pressure of fish as a factor determining the composition of invertebrate fauna (pp. 39-40); - Krzyżanowska, I.: The Pełcz river biodiversity based on macrobenthos (p. 46); - Nuckowska, K.: Water quality assessment of the Santoczna river and the diversity of organisms occurring in the water (pp. 52-53).] Address: not stated

6660. Daguet, C. (2007): Odonata as indicators of climate change. *Atropos* 32: 26-28. (in English). [General account on Odonata and climate change with focus on UK.] Address: Daguet, Caroline, English Nature North Mercia Team, Attingham Park, Shrewsbury, Shropshire SY4 4TW, UK. E-mail: caroline.daguet@english-nature.org.uk

6661. Dana, D., (2007): Unusual thoracic marking on Common Blue Damselfly *Enallagma cyathigerum*. *Atropos* 32: 58. (in English). [Colour structures of the thorax of a male *E. cyathigerum*, Isle of Wight, UK, 6-VI-2007] Address: Dana, D., 38 Yarborough Road, Wroxall, Ventnor, Isle of Wight, PO38 3EA, UK

6662. De Marmels, J. (2007): Una nueva especie de Heteragrion Selys, 1862, endémica de la Cordillera de la Costa, Venezuela (Odonata, Zygoptera: Megapodagrionidae). *Memorias XX Congreso Venezolano de Entomología*, San Cristobal 22 al 26 de Julio 2007: 68-69. (in Spanish, with English translation of the title). [Record of *Heteragrion* n.sp. from the "Nenri Pittier" national Park, Edo. Aragua, Venezuela. The species is similar to *H. palmichale* Hartung, 2002. The taxon is to be published in a scientific journal.] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

6663. Dechant, G.; Klaus, S. (2007): Erfolgreiches Brüten des Bienenfressers (*Merops apiaster* L., 1758) im Saale-Holzland-Kreis (Thüringen). *Landschaftspflege und Naturschutz in Thüringen* 44(3): 136-137. (in German). [Current records of *M. apiaster* (Aves) in Thüringen, Germany are documented together with a note on habitat choice factors as nearby situated water bodies as food resource. A picture with an odonate prey is given, and a general note on the importance of Odonata as food for the eat eater is made.] Address: Klaus, S., Lindenhöhe 5, D-07749 Jena, Germany. E-mail: siegi.klaus@gmx.de

6664. Dehghani, R.; Miranzadeh, M.B.; Yosefzadeh, M.; Zaman, S. (2007): Fauna aquatic insects in sewage maturation ponds of Kashan University of Medical Science 2005. *Pakistan Journal of Biological Sciences* 10(6): 928-931. (in English). [9 samples in 2005 resulted in 1032 specimens of diverse taxa. Dominance was as follows: Diptera (52%), Hemiptera (24%), Ciclopodidae (12%), Hydroacarinae (9.5%), Coleoptera (0.77%), Aranidae (0.67%), Hymenoptera (0.58%), and Odonata (0.48%).] Address: Dehghani, R., Kashan Medical Sciences University, Iran department of Environmental Health, Kashan Medical Sciences University, Kashan, Iran

6665. Dijkstra, K.-D. (2007): Dragonflies and Damselflies (Odonata) of Lokutu. *RAP Bulletin of Biological Assessment* 46: 21-36. (in English). [68 mostly Guineo-Congolian running-water species were found, with remarkable range extensions, as well as new species of *Platycypha*, *Elatoneura* and *Mesocnemis*. The results indicate a healthy watershed in the Lokutu surroundings, with limited degrees of pollution and streambed erosion. If forest cover and natural stream morphology are retained, the rich dragonfly fauna will be as well. The obtained species list is especially long considering the paucity of stagnant water species and the absence of certain Congolian endemics. This is explained by the absence of their habitat and possibly by the barrier that the extensive forest surrounding Lokutu (still) poses to the dispersal of open land species. The observed richness is probably typical of the Congo Basin as a whole and other areas are expected to be even richer. Therefore the Lokutu area does not require specific conservation action. Unlike other groups traditionally surveyed in RAPs, Odonata are invertebrates, strongly tied to freshwater, that are not actively exploited by humans. This RAP proved that it is possible to rapidly obtain a clear picture of Odonate diversity, even allowing a partial description of their ecology. The rich and apparently largely natural Odonate fauna found contrasts with the impoverished and imperiled status of the other groups studied. Therefore it is recommended to use Odonata more frequently to supplement biodiversity assessments of traditional groups, especially in the Congo Basin, where sampling Odonata may show whether existing conservation priorities also protect watersheds and freshwater biodiversity." (Author)] Address: Dijkstra, K. D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6666. Dijkstra, K.D. (2007): The name-bearing types of Odonata held in the Natural History Museum of Zimbabwe, with systematic notes on Afrotropical taxa. Part 2: Zygoptera and descriptions of new species. *International Journal of Odonatology* 10(2): 137-170. (in English). [Orthographic details of 118 name-bearing types of Odonata and 11 'holotypes' of forms, without nomenclatural status, are provided in two parts: the second and present paper deals with Zygoptera. The taxonomy of the gracilis-group of *Chlorocypha* and the Afrotropical members of *Prodasineura* and *Aciagrion* are discussed. *Chlorocypha fabamacula* is removed from synonymy with *C. wittei*; *Pseudagrion superbum* from *P. serrulatum*. *Chlorocypha basilewskyi* and possibly *C. hasta* are junior synonyms of *C. tenuis* – their treatment as a subspecies of *C. jacksoni* and *C. molindica* respectively is rejected; *Elatoneura tropicalis* of *E. cellularis*; *Agriocnemis dissimilis* of *A. palaeforma*; *Pseudagrion quadriculatum* of *P. superbum*; *Pseudagrion williamsi* of *P.*

kersteni; *Teinobasis malawiensis* of *T. alluaudi*. It was confirmed that *Chlorocnemis rossii* is a junior synonym of *C. flavipennis*; *Aciagrion congoense* of *A. africanum*; *Agriocnemis aligulae* of *A. maclachlani*; *Agriocnemis umbargae* of *Ceriagrion annulatum*; *Ischnura hilli* of *I. abyssinica*. *Africocypha ntaali* is definitely a junior synonym of *A. greyi*, but their synonymy with '*Libellago*' *lacuselephantum* must be investigated. *Chlorocnemis montana maccleeryi* is nearer *C. abbotti* than nominotypic *C. montana*, and is raised to species level. *Aciagrion heterosticta karamoja* is nearer *A. gracile* than nominotypic *A. heterosticta*, and is raised to species level pending further revision. *Aciagrion dondonsense* sp. nov., a species formerly confused with *A. zambiensis* and *A. congoense* (see above) is described. *Africallagma sinuatum* f. *fugax* pertains to a good species and is described as *A. pallidulum* sp. nov. The possible specific status of *Platycypha caligata* f. *lacus* requires further study. *Trithemis integra* sp. nov., a species formerly confused with *T. basi tincta* (see Part 1), is described. The spelling *Pseudagrion sjoestedti* (versus *P. sjostedti*) is advocated." (Author)] Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6667. Dijkstra, K.-D. (2007): Dragonflies and damselflies (Odonata) of the Atewa Range. In: McCullough, J., L.E. Alonso, P. Naskrecki, H.E. Wright & Y. Osei-Owusu (Editors). A rapid biological assessment of the Atewa Range Forest Reserve, Eastern Ghana. *RAP Bulletin of biological assessment* 47: 50-54 (report),-137-142 (appendix). (in English). [Ghana; "A total of 72 species were found in the streams and rivers that have their headwaters within the reserve (and associated standing water habitats), although only 31 (43%) were found strictly within the reserve's boundaries. Eight species were recorded in Ghana for the first time, of which six (75%) were recorded inside the reserve. Of these, *Atoconeura luxata* is the most significant discovery because: (1) it had not been described at the time and material taken during the RAP was included in its recently published description; (2) it is the only regionally threatened odonate found, being Red-listed as Vulnerable in western Africa; and (3) it confirms the nationally unique 'montane' character of the site. The results indicate a healthy watershed in the forest reserve and the surrounding area, with limited pollution and streambed erosion. This is confirmed by the presence of forest species even in more disturbed landscapes. If forest cover and natural stream morphology are retained, the present dragonfly fauna is expected to persist. However, if development activities were to entail the removal of vegetation or mineral deposits from the range, its capacity to store, buffer and filter rainwater would be seriously compromised, jeopardizing the reliable discharge of freshwater into the region's rivers; an essential resource for millions of Ghanaians and a rich biodiversity." (Author) Appendix 3 provides a checklist of Odonata recorded from Ghana.] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

6668. Dijkstra, K.-D. (2007): Rapid survey of dragonflies and damselflies (Odonata) of North Lorma, Gola and Grebo National Forests, Liberia. *RAP Bulletin of Biological Assessment* 44: 25-28-79-85. (in English). [During a rapid survey of the North Lorma, Gola and Grebo National Forests, 93 species of dragonflies and

damselflies were found. Seven species (*Paragomphus nigroviridis*, *Phyllogomphus moundi*, *Nesciothemis minor*, *Palpopleura deceptor*, *Tetrathemis polleni*, *Tramea limbata* and *Trithemis monardi*) were recorded in Liberia for the first time. Numbers of species and individuals seemed low, probably because the survey was at the end of the wet season, rather than towards the start. The results nonetheless indicate a healthy watershed in each forest, with limited pollution and streambed erosion. If forest cover and natural stream morphology are retained, the present dragonfly faunas are expected to persist. The most interesting species assemblage was recorded in Gola National Forest, including two species (*Sapho fumosa*, *Trithemis africana*) of conservation concern. Gola National Forest is a major diamond mining area, and the possible beneficial and detrimental impacts of these activities are discussed. Harboring typical examples of a rich Upper Guinea fauna, each forest, and especially Gola National Forest, deserves to be conserved." (Author) Address: Dijkstra, K.D., Gortestraat 11, NL-2311 MS Leiden, The Netherlands. E-mail: Dijkstra@naturalis.nnm.nl

6669. Dolný, A.; Pavlík, P. (2007): A phenologically interesting record of *Sympetrum striolatum* (Charp.) (Anisoptera: Libellulidae). *Notul. odonatol.* 6(9): 108. (in English). [6 January 2005, active adult *S. striolatum* female in Stramberk Botanical Garden and Arboretum (alt. 353 m), Czech Republic (49°35'20"N, 18°07'29"E)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

6670. Donath, H. (2007): Die Entwicklung der Odonatenfauna im Gebiet des früheren Braunkohlentagebaus Schlabendorf-Süd (Land Brandenburg, Niederlausitz) über drei Jahrzehnte (Odonata). *Entomologische Nachrichten und Berichte* 51(1): 7-14. (in German, with English summary). [Germany; "From 1977 to 1991, the brown coal mine South Schlabendorf covered an area of 3269 hectare in the Lower Lusatia. The dragonfly fauna in the water-rich western part was studied before devastation from 1976 until 1982. Of the 31 species found 28 were autochthonous, 8 of which are included in the Red List of Brandenburg. Recolonisation was surveyed since 1992. Presently, 22 species reproduce in the area, among which 5 to 7 from the Red List. Before mining, summer-cool brooks and moorland were important habitats, but today springs and littoral zones of lakes in areas of open-cast mining are valuable dragonfly habitats. Compared to the situation before mining, the share of Mediterranean species rose from 2 % to 32 %, while the Eurosiberian group decreased from 54 % to 32 %." (Authors)] Address: Donath, H., Caule Nr. 1, D-15926 Zieckau, Germany

6671. Dow, R.A.; Choong, C.Y.; Orr, A.G. (2007): Two new species of *Chalybeothemis* from Malaysia, with a redefinition of the genus (Odonata: Libellulidae). *International Journal of Odonatology* 10(2): 171-184. (in English). ["*Chalybeothemis chini* sp. nov. from Pahang, Peninsular Malaysia, and *C. pruinosa* sp. nov. from Sarawak, Malaysian Borneo, are described from the male sex. The new species necessitate some redefinition of the previously monotypic genus, which is provided. The quiescent penis of *Chalybeothemis* is illustrated for the first time. Differences between *C. chini*, *C. fluviatilis* and *C. pruinosa* are discussed and tabulated. *C. fluviatilis* is

reported from Sarawak for the first time. Relationships of *Chalybeothemis* within the Libellulidae are discussed." (Authors)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

6672. Dumont, H.J.; Vierstraete, A.; Vanfleteren, J.R. (2007): A revised molecular phylogeny of the Calopterygidae (Zygoptera: Calopterygidae). *Odonatologica* 36(4): 365-372. (in English). ["An updated version of an JTS-based phylogeny of the Calopteryginae, using sequences of 31 ingroup taxa, is given. The subfamily consists of 3 main clades, each with 2 subclades. Only clade 1 (*Calopteryx* s. s.) is not exclusively Asian but extends to Europe and North America. In the East-Asian clade 2, the genus *Matrona* is found to be descended from an *Atrocalopteryx*-like ancestor. Several so-called South-East Asian *Calopteryx* probably either belong to *Atrocalopteryx* or to as yet unnamed genera near *Atrocalopteryx*. *Archineura* consists of 2 species, limited to China and Indo-China, and is rather basal to clade 3. The subclade *Neurobasis-Matronoides* is worthy of further analysis." (Authors)] Address: Dumont, H. J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@rug.ac.be

6673. Dyatlova, E.S. (2007): On the occurrence of abnormalities in venation of dragonflies (Insecta, Odonata). *Vestnik zoologii* 41(3): 219-225. (in Russian(?), with English summary). [South-western Ukraine; abnormal wings of *Platycnemis pennipes*, *Ischnura pumilio*, *Orthetrum brunneum*, *Aeshna mixta*, and *Crocothemis erythraea* are figured and described. Possible causes of the wing abnormalities are discussed. The frequency of occurrence of aberrant veins in wings of males of *Calopteryx splendens* is described.] Address: Dyatlova, Elena Sergeevna, Institute of Zoology, Faculty of Biology, I.I. Mechnikov University of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

6674. Eda, S.; Ubukata, H. (2007): Obituary: Imato Sonehara. *Odonatologica* 36(4): 415-419. (in English). ["A brief biography of I. Sonehara (28 January 1921-12 May 2000), a science teacher and the author of "The life history of *Epitheca bimaculata sibirica* on Mt. Yatsugatake" is followed by his odonatological bibliography (1962-1996; 66 titles)." (Authors)] Address: Ubukata, H., Hokkaido University of Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

6675. Ellenrieder, N. von (2007): The larva of *Hetaerina mendezii* Jurzitza, with comments on *H. rosea* Seelys (Zygoptera: Calopterygidae). *Odonatologica* 36(4): 405-414. (in English). ["*H. mendezii* larva is described and illustrated for the first time based on specimens from Misiones Province, Argentina. Larvae of *H. rosea* from NW Argentina are found to partially differ from its original larval description, and that species is re-diagnosed. A comparative table for all known larvae of *Hetaerina* and related calopterygid genera is provided." (Author)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odo_nata@hotmail.com

6676. Ellenrieder, N. von; Garrison, R.W. (2007): Dragonflies of the Yungas (Odonata). A Field Guide to the Species from Argentina. Libelulas de las Yungas (Odonata) Una guía de campo para las especies de Argentina. Pensoft Series Faunistica 67, ISSN 13120174, Pensoft Publishers, Sofia-Moscow: 168 pp.. (bilingual in English and Spanish). [The Yungas are highly biodiverse cloud forests extending from Venezuela south through NW Argentina, and are considered one of the biodiversity 'hot spots' in South America. This bilingual (Spanish/English) pocket field guide, the first of its kind for any region in South America, is accompanied by 280 illustrations including detailed diagnostic drawings and numerous colour photos of live Odonata. It covers 102 taxa found in the Argentine Yungas (a relative small part of the bioregion Yungas), representing over a third of all species known from the country. The species are treated monographically providing information on identification (description of the taxa, sometimes with advise to sibling species), distribution and habitat, and behaviour. It is a little bit confusing to find in a book for identification Odonata of a relative small area five unidentified taxa: *Argia* sp. (later described as *A. yungensis*), *Triacanthagyna* sp., *Limnetron* sp., *Micrathyria* sp., and *Erythrodiplax* sp. Following the illustrations of the book "Dragonfly genera of the New World" by the same authors, *Micrathyria* sp. should be *M. divergens*. It would be very useful to untangle these shortcomings by a leaflet added to the book. My personal opinion is that many of the colour pictures are reproduced in a scale insufficiently for an identification book, or the intended didactic information. Even using a magnifying glass it is nearly impossible to see what you should see indicated by arrows! (e.g. fig. 8, differences in male and female genitalia). In general the type size of the settings is too small for odonatologists getting older and older, and whose eyes getting more worse and worse. The effectiveness of some of the pictures is quite limited (e.g. *Rhinoaeschna pallipes*, *Tramea calverti*). The numerous black & white drawings are fine. In spite of shortcomings the book is very welcome because it will help to enlarge interest in our favourite beasts among the people in South America. To stimulate dragonfly research, Pensoft offers a free shipment of the book to any private customer in South America. (Martin Schorr)] Address: Pensoft Publishers, Geo Milev Str., No 13a, 1111 Sofia, Bulgaria. www.pensoft.net

6677. Ellenrieder, N. von; Garrison, R.W. (2007): Untangling some taxonomic riddles on damselfly genera (Zygoptera) from the neotropical region. IDF-Report 11: 1-34. (in English) ["Examination of type material deposited in the IRSNB (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) and in the BMNH (British Museum of Natural History, London, Great Britain) allowed us to solve taxonomic riddles regarding several damselfly (Zygoptera) genera from the neotropical region. We provide notes on the status of several types, and introduce the following new synonymies: *Argia huallaga* Fraser, 1946 = *A. adamsi* Calvert, 1902; *Argia makoka* Fraser, 1946 = *A. kokama* Fraser, 1946; *Argia mollusca* Fraser, 1946 = *A. collata* Selys, 1865; *Argia trifoliata* Fraser, 1946 = *A. variegata* Förster, 1914; *Argia umbriaca* Fraser, 1946 = *A. indicatrix* Calvert, 1902; *Amphiagrion amphion* Selys, 1876 = *Ischnura verticalis* (Say, 1840); a new combination: *Oxyagrion cardinalis* Fraser, 1946 to *Leptobasis cardinalis* (Fraser, 1946); and three lectotype designations (for *Acanthagrion gra-*

cile race? *lancea* Selys, 1876, *Acanthagrion trimaculatum* Selys, 1876, and *Leptagrion flammeum* Selys, 1876)." (Authors). Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odo_nata@hotmail.com

6678. Englund, R.; Polhemus, D.A. (2007): *Argiolestes kula*, a new species of damselfly from eastern New Guinea (Odonata: Megapodagrionidae). Journal of the New York Entomological Society 114(3): 95-107. (in English). ["*Argiolestes kula* n. sp. is described from eastern new Guinea and nearby offshore islands (Sariba, Basilaki, Fergusson), and a comparison is provided to the closely related species *Argiolestes sidonia* Martin. Figures of the male abdominal appendages, wing venation and breeding habitat are provided, accompanied by a distribution map. A checklist of *Argiolestes* species is also included." (Authors)] Address: Englund, R.A., Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA. E-mail: englund@bishopmuseum.org

6679. Evenhuis, N.L. (2007): The Godeffroy Museum Catalogs in relation to Fiji terrestrial arthropods. Part I: Introduction and review of Myriapoda, Diptera, Odonata, and smaller Hexapod orders. Fiji Arthropods VII Edited by Neal L. Evenhuis & Daniel J. Bickel. Bishop Museum Occasional Papers 91: 17-28. (in English). ["Catalogs of the Godeffroy Museum in Hamburg are reviewed in relation to their listings of Fijian terrestrial arthropods. A table of names of Fijian terrestrial arthropods listed in the catalogs available for study is presented with discussion of the nomenclatural and taxonomic implications. The names of arthropods in the Blattodea, Dermaptera, Diptera, Neuroptera, Myriapoda, Odonata, Phasmida, and Trichoptera are tabulated." (Authors)] Address: Evenhuis, N.L., Pacific Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawaii 96817, USA. E-mail: neale@bishopmuseum.org

6680. Fleck, G.; Costa, J. (2007): Replacement name for a homonymous dragonfly generic name (Odonata). Zootaxa 1542: 68. (in English). ["Costa and Santos (1992) proposed the genus *Santosia* with type species *Santosia marshalli* by original designation from Brazil in the dragonfly family Corduliidae (Odonata: Anisoptera). The generic name is preoccupied by *Santosia* Stål (1858) with type species *Reduvius maculatus* Fabricius, 1781 by subsequent designation in the heteropteran family Reduviidae. Thus *Santosia* Costa and Santos, 1992 is invalid under the law of homonymy, being a junior homonym of *Santosia* Stål, 1858. In accordance with article 60 of the International Code of Zoological Nomenclature, fourth edition (1999), we substitute the junior homonym *Santosia* Costa and Santos, 1992 with *Cordulisantasia* nom. nov." (Authors)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleck@mnhn.fr

6681. Flenner, I. (2007): Forest lakes affected by forestry - how resilient are dragonfly communities to logging in Central Sweden? Halmstad University. School of Business and Engineering. Masters project 20p. Supervisor: Göran Sahlén. 2007-05-30: 16 pp. (in English). ["The main cause of environmental disturbance in the Fennoscandian boreal forests today is forestry. Natural disturbances are important to maintain diversity, but anthropogenic disturbance, such as forestry, differs

in many ways from the natural ones. Forestry is a big industry in Sweden and only a small remnant of old-growth forest is left. Several studies have shown an initial decrease in e.g. dragonfly diversity a few years after logging, followed by an increase up to numbers comparable with the original species number. In this study I examined whether the new, quite diverse, species composition is similar to the one present before the logging or if some species are disappearing and are replaced with other, maybe opportunistic species. Other factors such as ongoing changes in climate also will be considered. A resampling of 34 (and an additional 4) lakes that also were sampled in 1996-97 was done during summer of 2006. Analyses of data from the two sampling occasions were done. I found that even if the diversity is just temporarily affected (or not affected at all), it is not always the same species involved. This means that the diversity in a single lake can appear to be high, but the total diversity in Sweden, or Scandinavia, is declining. I also found some interesting new species for the area, such as *Nehalennia speciosa*, *Sympetma fusca* and *Aeshna mixta*." (Author) For the full paper see: <http://dSPACE.HH.SE/dSPACE/bitstream/2082/1152/1/Forest%20lakes.pdf> Address: not stated

6682. Fliedner-Kalies, T.; Fliedner, H. (2007): Schwyzer Moore im Wandel. 10. Libellen. Berichte der Schwyzerischen Naturforschenden Gesellschaft 15: 75-91. (in German). [Kanton Schwyz, Switzerland; the paper compiles records of Odonata from 1878 to 2006 from 22 localities with focus on records between 2001 and 2006 in eleven selected fens and bogs. A total of 49 odonate species is documented. The habitats are briefly characterized with emphasis on typical or rare species and conservation measures.] Address: Fliedner, Traute, Louis-Seegelken Str., D-28717 Bremen, Germany. E-mail: traute.fliedner@bluewin.ch

6683. Frank, M. (2007): Erneute Beobachtung der Feuerlibelle (*Crocothemis erythraea*, BRULLÉ 1832) in Nordwest-Mecklenburg. *Virgo*, Mitteilungsblatt des Entomologischen Vereins Mecklenburg, 10(1): 69-70. (in German). [Schönberg, Mecklenburg-Vorpommern, Germany, 08. August 2007] Address: Frank, M., Lion-Feuchtwanger-Str. 25, 55129 Mainz, Germany. E-mail: mikel.frank@gmx.de

6684. Fuhrmann, K.; Jödicke, R. (2007): Die Libellensammlung im Landesmuseum für Natur und Mensch (Insecta: Odonata). *Museumsjournal für Natur und Mensch – Naturkunde – Kulturkunde – Museumskunde*, Oldenburg 2 (2006): 19-33. (in German, with English summary). [The collection contains 2293 specimens, which mainly represent species from the Weser-Ems-region, Niedersachsen, Germany. The history of the collection is outlined. An extension of the stock of regional species is intended for the next years. The paper contains some information on *Coenagrion pulchellum* in Portugal, *Orthetrum coerulescens* aniceps from Sardinia, Italy, *Sympetrum vulgatum*, and some specimens probably from Brasil.] Address: Fuhrmann, K., Landesmuseum für Natur und Mensch, Damm 38-44, D-26135 Oldenburg, Germany. E-mail: kay.fuhrmann@natur-undmensch.de

6685. Fulan, J.A.; Henry, R. (2007): Temporal distribution of immature Odonata (Insecta) on *Eichhornia azurea* stands in the Camargo Lake, Paranapanema River, São Paulo. *Revista Brasileira de Entomologia*

51(2): 224-227. (in Portuguese, with English summary). ["This study aimed to record the abundance and richness of Odonata on *E. azurea* stands, from March 2004 to March 2005, in the Camargo Lake, lateral to the Paranapanema River, São Paulo, Brasil after an extreme flood pulse, and also to investigate the controlling environmental factors on the distribution of Odonata abundance. The greatest abundance and richness occurred in the dry period, and Coenagrionidae was the most abundant and with greater genus richness during the whole study period. This high abundance possibly occurred due to its behavior, as endophytic posture and climbing behavior. Aeshnidae and Libellulidae presented low abundance especially in the dry period. The main environmental factors that affected the distribution of Odonata abundance were water surface temperature, pluviosity, and *Eichhornia azurea* biomass." (Authors)] Address: Fulan, J.A., Departamento de Zoologia, Instituto de Biociências – UNESP - Caixa Postal 510 - 18618-000 Botucatu-SP, Brasil. E-mail: joaofulan@ig.com.br

6686. Fuselier, L.; Decker, P.; Lunski, J.; Mastel, T.; Skolness, S. (2007): Sex differences and size at emergence are not linked to biased sex ratios in the common green darner, *Anax junius* (Odonata: Aeshnidae). *Journal of Freshwater Ecology* 22(1): 107-117. (in English). ["Many species of dragonflies exhibit sexual dimorphism and biased sex ratios in adult populations. It is predicted that, in species with territorial adults, males should be larger than females at emergence. Larger male size should elevate foraging rate and lead to increased predation risk and higher male mortality during the larval stage. We tested these predictions for a territorial dragonfly, *A. junius*, using laboratory and field experiments. We measured differences in growth and foraging activity between the sexes, determined sex ratios at emergence, and measured size at emergence for female and male dragonflies. Males gained more mass than females and males spent more time in motion and moved longer distances than females in foraging trials. Males were larger than females at emergence in natural populations, but sex ratios at emergence were not significantly different from 1:1. Sex-specific growth strategies in the larval stage did not result in biased sex ratios at emergence but may be important to the reproductive success of this territorial dragonfly." (Authors)] Address: Fuselier, Linda, Biosciences Department, 1104 7th Ave South, Minnesota State University, Moorhead, Moorhead, MN, 56563, USA. E-mail: fuselier@mnstate.edu

6687. Gaino, E.; Piersanti, S.; Reborja, M. (2007): Ultrastructural organization of the larval spiracles in *Libellula depressa* L. (Anisoptera: Libellulidae). *Odonatologica* 36(4): 373-379. (in English). ["In the last larval instar (F-0) of *L. depressa*, 2 paired spiracles, in the form of elongated eye-shaped structures, are located in the anterior region of the mesothorax segment. A fine structural analysis of these spiracles under the scanning and electron microscopes reveals that each spiracle consists of a well-developed cuticular peritreme with a dorsal-anterior lip bearing a thin laminar coat and a ventral-posterior lip bearing a filter apparatus. The filter apparatus derives from a series of folds forming discrete groups adhering to one another to delimit empty spaces and producing a honeycomb-like structure. This structure is coherent with the need to avoid entry of water when the larva is submerged. The function of these spi-

racles during the insect development is discussed, noting that in anisopteran larvae the rectal epithelium, forming the so called branchial basket, is the main respiratory organ." (Authors)] Address: Gaino, Elda, Dipartimento di Biologia Cellulare e Ambientale, Università degli Studi di Perugia, Via Elce di Sotto, 1-06123 Perugia, Italy. E-mail: gaino@unipg.it

6688. Garrison, R.W.; von Ellenrieder, N. (2007): The true *Argia difficilis* Selys, 1865, with the description of *Argia yungensis* sp. nov. (Odonata: Coenagrionidae). Transactions of the American Entomological Society 133(1/2): 189-204. (in English). ["*Argia yungensis* sp. nov., a new species close to *Argia difficilis*, is described. Both species are illustrated and diagnosed and their distributions mapped. They can be distinguished by the morphology of male tori, cerci and paraproct, and female prothorax. Their distributions are allopatric, with *Argia yungensis* distributed along the foothill jungle of the Yungas rain forest from NW Argentina to Peru, and *A. difficilis* from Peru and Brazil to Venezuela across the lowland Amazon forest. *Argia extranea* forficula Fraser is synonymized with *A. difficilis*, and the latter is redescribed." (Authors)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

6689. Garrison, R.W. (2007): *Kalocora*, a junior synonym of *Cora* (Odonata: Polythoridae). International Journal of Odonatology 10(2): 185-188. (in English, with Spanish summary). ["Supplementary specimens of the monotypic genus *Kalocora* show that diagnostic characters employed by Kennedy, based on the original description of *Cora aurea* are too variable, and therefore *Kalocora* is here relegated to synonymy under *Cora*." (Author)] Address: Garrison, R.W., Associate Insect Biostatistician, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

6690. Göcking, C.; Menke, N. (2007): Blauhelme zwischen Ems und Emmerbach. Naturzeit im Münsterland 4(8): 29. (in German). [Generell report on the presence of *Coenagrion mercuriale* in Nordrhein-Westfalen, Germany with focus on the Münsterland-region and habitat requirements.] Address: Göcking, C., Zum Hiltruper See 9, D-48161 Münster, Germany. E-mail: gockinc@uni-muenster.de

6691. Goodger, D.T. (2007): Book review: The Dragonflies of Europe (revised edition) by R. R. Askew. Great Horkesley, Colchester, UK: Harley Books, 2004. 308 pp. 513 text figures, 219 colour figures. ISBN-13 978 0946589753. Zoological Journal of the Linnean Society 151(1): 218. (in English). [review] Address: not stated

6692. Groll, E.K. (2007): Besprechungen: WILDERMUTH, H: Die Falkenlibellen Europas - Die Libellen Europas Bd. 5... Hohenwarsleben: Westarp Wissenschaften, 2007... 540 S., 163 Schwarzweiß- und 11 Farb-Abb. (Die Neue Brehm-Bücherei; 653). ISBN: 3-89432-896-7. Beiträge zur Entomologie 57(1): 176. (in German). [Brief review of the book. This is a review of a book that until yet not has been published!!!] Address: Groll, E.K., ZALF, Eberswalder Str. 84, D-15374 Müncheberg, Germany. E-mail: groll@zalf.de

6693. Günther, A.; Kipping, J. (2007): Nachweise der Südlichen Heidelibelle *Sympetrum meridionale* (Selys, 1841) in Sachsen und Südostbrandenburg (Odonata: Libellulidae). Sächsische Entomologische Zeitschrift 2: 9-12. (in German, with English summary). ["During year 2006 a strong invasion of *S. meridionale* has been observed in parts of Germany. This also led to observations of this species in Saxony and southeastern Brandenburg. Seven records from Saxony and four from Brandenburg are presented here. Oviposition has been observed at two localities, but so far there is no evidence for successful development in the region." (Authors)] Address: Naturschutzinstitut Freiberg, Waisenhausstr. 10, 09599 Freiberg, Germany. E-Mail: andre.guenther@ioez.tu-freiberg.de

6694. Haacks, M.; Peschel, R. (2007): Die rezente Verbreitung von *Aeshna viridis* und *Leucorrhinia pectoralis* in Schleswig-Holstein – Ergebnisse einer vierjährigen Untersuchung (Odonata: Aeshnidae, Libellulidae). Libellula 26(1/2): 41-57. (in German, with English summary). ["During 2003 to 2006 the distribution and status of *L. pectoralis* and *A. viridis* in Schleswig-Holstein, Germany were surveyed. Within the framework of an obligatory monitoring protocol that has been set by the European Habitat Directive, the research was carried out by authority of the Minister for Agriculture, Environment and Rural Areas. As a result, localities of both species were found in each natural landscape. Furthermore, with respect to the two biogeographical regions, the records were almost equally distributed. Throughout Schleswig-Holstein 27 recent sites were discovered for *L. pectoralis* and 36 for *A. viridis*. So far threats for *L. pectoralis* could not be detected, whereas the loss of Water-soldier, *Stratiotes aloides*, poses the main threat for *Aeshna viridis*. However, the preconditions to conserve habitats of *A. viridis* by the protection and introduction of *S. aloides* are promising." (Authors)] Address: Haacks, M., Planungsbüro leguan gmbh, Brandstücken 20, D-22549 Hamburg, Germany. E-mail: m.haacks@leguan.com

6695. Hadrys, H.; Timm, J.; Streit, B.; Giere, S. (2007): A panel of microsatellite markers to study sperm precedence patterns in the emperor dragonfly *Anax imperator* (Odonata: Anisoptera). Molecular Ecology Notes 7(2): 296-298. (in English). ["Odonates were the first group of organisms where sperm competition and last male sperm precedence have been identified. With the development of 10 microsatellites for the emperor dragonfly *Anax imperator*, the function and priority patterns of the multiple sperm storage organs of females can be studied and compared between species in natural populations. In addition, two microsatellite loci developed for the sister species *Anax parthenope*, are also highly polymorphic in *A. imperator*. For the presented 12 microsatellite loci, the number of alleles per locus ranged from two to 24. Observed heterozygosity ranged from 0.07 to 0.88." (Authors)] Address: Hadrys, Heike, ITZ, Ecology and Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

6696. Hadrys, H.; Wargel, A.; Giere, S.; Kraus, B.; Streit, B. (2007): A panel of microsatellite markers to detect and monitor demographic bottlenecks in the riverine dragonfly *Orthetrum coerulescens* F. Molecular Ecology Notes 7(2): 287-289. (in English). ["Odonates are important indicators for monitoring anthropogenic

impacts on freshwater ecosystems. We developed a panel of microsatellite loci for the keeled skimmer *Orthetrum coerulescens*, a libellulid dragonfly inhabiting small streams. By using two different isolation techniques, nine microsatellite loci have been isolated. Screening of 209 individuals resulted in an overall number of 88 alleles, ranging from three to 19 alleles per locus. The observed heterozygosity ranged from 0.37 to 0.83. One locus showed significant deviation from Hardy-Weinberg equilibrium" (Authors)] Address: Hadrys, Heike, ITZ, Ecology and Evolution, TiHo Hannover, Bunteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

6697. Hammond, J.I.; Luttbeg, B.; Sih, A. (2007): Predator and prey space use: dragonflies and tadpoles in an interactive game. *Ecology* 88(6): 1525-1535. (in English). ["Predator and prey spatial distributions have important population and community level consequences. However, little is known either theoretically or empirically about behavioral mechanisms that underlie the spatial patterns that emerge when predators and prey freely interact. We examined the joint space use and behavioral rules governing movement of freely interacting groups of odonate (dragonfly) predators and two size classes of anuran (tadpole) prey in arenas containing two patches with different levels of the prey's resource. Predator and prey movement and space use was quantified both when they were apart and together. When apart from predators, large tadpoles strongly preferred the high resource patch. When apart from prey, dragonflies weakly preferred the high resource patch. When together, large prey shifted to a uniform distribution, while predators strongly preferred the high resource patch. These patterns qualitatively fit the predictions of several three trophic level, ideal free distribution models. In contrast, the space use of small prey and predators did not deviate from uniform. Three measures of joint space use (spatial correlations, overlap, and co-occurrence) concurred in suggesting that prey avoidance of predators was more important than predator attraction to prey in determining overall spatial patterns. To gain additional insight into behavioral mechanisms, we used a model selection approach to identify behavioral movement rules that can potentially explain the observed, emergent patterns of space use. Prey were more likely to leave patches with more predators and more conspecific competitors; resources had relatively weak effects on prey movements. In contrast, predators were more likely to leave patches with low resources (that they do not consume) and more competing predators; prey had relatively little effect on predator movements. These results highlight the importance of investigating freely interacting predators and prey, the potential for simple game theory models to predict joint spatial distributions, and the utility of using model choice methods to identify potential key factors that govern movement." (Authors)] Address: Hammond, J.I., Department of Environmental Science and Policy, One Shields Avenue, University of California, Davis, California 95616, USA. Jhammond@ucdavis.edu

6698. Hardersen, S. (2007): Telemetry of Anisoptera after emergence – first results (Odonata). *International Journal of Odonatology* 10(2): 189-202. (in English). ["The behaviour of Anisoptera during the period between emergence and the onset of sexual activity is poorly known, mainly because freshly emerged adults are hard to follow. In the present study the system

RECCO[®] Transmitter/Receiver and custombuilt tags made from Schottky diodes and copper wire were used to monitor freshly emerged Anisoptera. The system had an average maximum detection distance of ca 85 m. Ten individuals of *Libellula fulva* were successfully tracked for up to five consecutive days. They almost exclusively utilized trees or shrubs as perches at heights ranging from 1.8 to ca 31 m. Open meadows or open river bank vegetation, which were present close to the release site, were never used for perching. Considering that human observers can reasonably detect adult anisopteran up to a height of 3 m, 92.5% of all registered perch sites were "out of reach". The maximum distances covered on the first day averaged 37.7 m and 31.1 m for males and females, respectively. Two individuals, followed for four and five days respectively, remained in relatively small areas of 480 m² - 2,500 m² for three and four consecutive days. Five tagged individuals of *Aeshna mixta* showed a very different behaviour from *L. fulva*. Already in the first hours after release, all flew distances of more than 200 m and were lost. The telemetry system used was not suitable to study this species immediately after emergence." (Authors)] Address: Hardersen, S., Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, I-46045 Marmirolo (MN), Italy. E-mail: s.hardersen@libero.it

6699. Hays, J. J.; Clopton, R. E.; Cook, T. J.; Cook, J. L. (2007): Revision of the genus *Nubenocephalus* and description of *Nubenocephalus secundus* n. sp. (Apicomplexa: Actinocephalidae) parasitizing adults of *Argia sedula* [sic] (Odonata: Zygoptera: Coenagrionidae) in the primitive Texas Big Thicket, U.S.A. *Comparative Parasitology* 74(2): 286-293. (in English). ["*N. secundus* n. sp. (Apicomplexa: Eugregarinida) is described from adults of *A. sedulum* collected from Harmon Creek, Sam Houston State University Center for Biological Field Studies, Walker County, Texas, U.S.A. This is the second species described in the genus and confirms the generic hypothesis of *Nubenocephalus*. The generic diagnosis of *Nubenocephalus* is revised to reflect common characters of its constituent species and a previously described Asian gregarine, *Nubenocephalus mutabilis* n. comb. (= *Ancyrophora mutabilis*) is recognized as a member of the genus." (Authors)] Address: Hays, Joanna, Department of Biological Sciences, Sam Houston State University, Huntsville, Texas, U.S.A. 77341. E-mail: biotjc@shsu.edu

6700. Hilfert-Rüppell, D.; Rüppell, G. (2007): *Juwelenschwingen / Geheimnisvolle Libellen. Gossamer Wings / Mysterious Dragonflies*. Splendens-Verlag. ISBN-13: 9783000203893: 168 pp. (Bilingual in English and German). [In the past years, we have seen some brilliant books on Odonata, many of them furnished with impressive photography. I am tempted to write none of them is as brilliant and eye catching as this book. 264 detailed digital photos (and a few illustrations) demonstrate the life history of dragonflies with focus on the imaginal stage, and the damselflies (Calopterygidae). Hereby the authors use the didactic concept to comment on each of the pictures with brief but precise biological information, remembering a little bit of information provided to comment documentation films. The chapters are covering the following topics: Appearance, From Water to Air, Flight, Prey Capture, Threatening and Fighting, Courting, Mating Tactics, Danger, Mating, Oviposition, Larvae, Roosting. The book is written both

in German and English. Ola Fincke has written the preface, giving some insight into her odonatological vita. This book is far more than a coffee table book, nevertheless it would be very useful as gift to persons you want to convince that dragonflies are beasts worth to settle this earth. (Martin Schorr) Address: Splendens-Verlag, An der Wasserfurche 32, 38162 Cremlingen, Germany. www.splendens-verlag.de

6701. Hörnschemeyer, T.; Willkommen, J. (2007): The contribution of flight system characters to the reconstruction of the phylogeny of the Pterygota. *Arthropod Systematics & Phylogeny* 65(1): 15-23. (in English). ["The ability to fly is an important factor for the evolutionary success of insects. Their flight apparatus contains numerous sclerites and muscles, which represent valuable characters for phylogenetic analysis. We present a summary of the current state of knowledge on autapomorphies of the flight system of high-level taxa of the Pterygota. To date, no formal phylogenetic analysis based on flight system characters with the exception of wing venation has been presented. Nevertheless, this review shows that the wing base and the flight muscles contain valuable characters that can help to resolve current open questions of phylogenetic relationships among the Pterygota. It also becomes apparent that there are still many taxa without comprehensive descriptions of the wing base morphology." (Authors)] Address: Hörnschemeyer, T., Institut für Zoologie und Anthropologie, Abteilung Morphologie & Systematik, Berliner Str. 28, 37073 Göttingen, Germany. E-mail: thoerns@gwdg.de

6702. Hoess, R. (2007): War *Coenagrion scitulum* (Rambur, 1842) (Odonata: Coenagrionidae) einst in der Schweiz heimisch? *Mitteilungen der Entomologischen Gesellschaft Basel* 57(1): 2-9. (in German, with English summary). ["A male and a female specimen of *C. scitulum* were detected in old material of the „Zoologische Anstalt der Universität Basel“, deposited in the „Naturhistorisches Museum Basel“. They were captured in Liestal BL in 1919 (probably by A. Portmann) and the identity remained unsolved up to now. As the specimens were collected in different months and for other reasons it seems possible that the species was indigenous to Liestal at that time. New records from the cantons of Jura, Berne and Obwalden are presented. Morphological details are provided to facilitate recognition." (Author)] Address: Hoess, R., Normannenstr. 35, 3018 Bern, Switzerland. E-mail: ReneHoess@1st.ch

6703. Holdt, E. von (2007): Bemerkenswerte Libellenfunde im Sommer 2006. *HVV-info* 1/2007 (Hannoverscher VogelschutzVerein): 23. (in German). [Niedersachsen, Germany. *Aeshna affinis*, 20-VII-2007, Hannover, Lahe; *Erythromma lindenii*, 26-VI., 11-VII-2006, Hannover, Herrenhäuser Gärten; *Crocothemis erythraea*, several localities Hannover, Ricklinger Teiche; *Orthetrum brunneum*, 2006, Hannover-Badenstedt.] Address: not stated

6704. Holt, C. (2007): Two female Emporax *Anax imperator* "Facing-Off". *Atropos* 32: 52. (in English). [UK; picture of two ovipositing *A. imperator*.] Address: Holt, C., 21 Aspen Gardens, Ashord, Middlessex, TW15 1ED, UK

6705. Hope, P. (2007): The Dragonflies of Eastern Mugla Province, Southwest Turkey. ISBN-13: 9789750196317: 232 pp. (in English). ["The province of

Mugla is situated in Southwest Turkey. 56 species of dragonfly have been recorded for this area. This book describes the species, their habitats and locations, and includes colour photos, hand-drawn location maps and distribution maps." (Publisher)]

6706. Horvath, G.; Malik, P.; Kriska, G.; Wildermuth, H. (2007): Ecological traps for dragonflies in a cemetery: the attraction of *Sympetrum* species (Odonata: Libellulidae) by horizontally polarizing black gravestones. *Freshwater Biology* 52: 1700-1709. (in English). ["1. We observed that the dragonfly species *Sympetrum flaveolum*, *S. striolatum*, *S. sanguineum*, *S. meridionale* and *S. danae* were attracted by polished black gravestones in a Hungarian cemetery. 2. The insects showed the same behaviour as at water: (i) they perched persistently in the immediate vicinity of the chosen gravestones and defended their perch against other dragonflies; (ii) flying individuals repeatedly touched the horizontal surface of the shiny black tombstones with the ventral side of their body; (iii) pairs in tandem position frequently circled above black gravestones. 3. Tombstones preferred by the dragonflies were in the open and had an area of at least 0.5 m² with an almost horizontal, polished, black surface and with at least one perch in their immediate vicinity. 4. Using imaging polarimetry, we found that the black gravestones, like smooth water surfaces, reflect highly and horizontally polarized light. 5. In double-choice field experiments with various test surfaces, we showed that the dragonflies attracted to shiny black tombstones display positive polarotaxis and, under natural conditions, detect water by means of the horizontally polarized reflected light. This, and the reflection-polarization characteristics of black gravestones, explain why these dragonflies are attracted to black tombstones. 6. If females attracted to the black gravestones oviposit on them, the latter constitute ecological traps for dragonflies that are not close to water." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

6707. Huth, J. (2007): Zur Libellenfauna der Braunkohlen-Bergbaufolgelandschaft Sachsen-Anhalts (Odonata). *Entomologische Nachrichten und Berichte* 51(2): 111-122, 160. (in German, with English summary). ["Altogether 135 stretches of water in 20 areas of brown coal post-mining landscape of Sachsen-Anhalt, Germany were studied for their odonatan fauna from 1996 to 2001. A total of 47 species of dragonflies was found (= 73 % of the recorded species of Sachsen-Anhalt). Typical species of different types of post-mining waters, ecological preferences of selected species, threat and supporting measures of dragonfly-habitats are described. Occurrence and forecast of population development for selected species are shown." (Author)] Address: Huth, J., Bürogemeinschaft MILAN, Georg-Cantor-Str. 31, D-06108 Halle (Saale). E-mail: info@milan-halle.de

6708. Ishizawa, N. (2007): Energy expenditure in patrolling males of *Cordulia aenea amurensis* Selys (Anisoptera: Corduliidae). *Odonatologica* 36(4): 381-397. ["The males hover frequently during patrolling flight, and fiercely chase rival males. Their patrolling flight was videotaped and analyzed. The average net-patrol flight speed (except hovering) was 161.6±30.6 cm/s faster in the morning and the evening than during the day. Also, hovering frequency was more frequent and the duration

of hovering bouts was longer in the morning and the evening than during the day. and was synchronized with patrolling flight speed. However, chasing flight was not related to patrolling or hovering and the duration of chasing bout was about 4-5 seconds with an average flight speed of 274.6±64.7cm/s. The body temperatures of patrolling flight and chasing flight were significantly different; the former, 39.8±1.4°C, the latter was 40.4±1.0°C. The time budget of patrolling males based upon video pictures was calculated and the relative energy expenditure of patrolling males was estimated by standardizing the average net-patrolling flight speed as 1. Energy expenditure of the males was greater in the morning and the evening than during the day. It is assumed that energy expenditure was affected by ambient temperatures, with males changing the flight speed and duration of hovering. The males are inferior in their sex recognition and it is assumed that their frequent hovering with concurrent large energy expenditure is to enable males to distinguish females.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

6709. Ishizawa, N. (2007): Morphological variations in relation to maturation in *Pantala flavesens* (Fabricius) in central Japan (Anisoptera: Libellulidae). *Odonatologica* 36(2): 147-157. (in English). ["*P. flavesens* was investigated in open fields in a deciduous forest in an inland part of the Kanto region for 3 months from late June 2003. The sp. was estimated to be bivoltine from summer to late autumn. The size of the adults was unchanged throughout the season. The sex ratio of the population skewed towards females. Maturity degree (MD), shown as the value of body weight divided by the cube of wing length, shifted upwards until the second half of August, after which it decreased sharply. Similarly the wing loading (WL) (calculated by dividing body weight by wing area) increased until the second half of August, and decreased from September, and in early October it was not significantly different between males and females. As the relationship of body temperature to ambient temperature showed no difference between mature and immature individuals, or between sexes, with both correlation coefficients and regression coefficients being large for a flyer type species, they seemed to be easily affected by the ambient temperature." (Author)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

6710. Iwami, T.; Kishida, O.; Nishimura, K - (2007): Direct and indirect induction of a compensatory phenotype that alleviates the costs of an inducible defense. *PLoS ONE* 2(10): e1084. doi:10.1371 / journal.pone.0001084: (in English). ["Organisms often exhibit phenotypic plasticity in multiple traits in response to impending environmental change. Multiple traits phenotypic plasticity is complex syndrome brought on by causal relations in ecological and physiological context. Larvae of the salamander *Hynobius retardatus* exhibit inducible phenotypic plasticity of two traits, when at risk of predation by dragonfly larvae (*Aeshna nigroflava*). One induced phenotype is an adaptive defense behaviour, i.e., stasis at the bottom of water column, directly triggered by the predation risk. Another one is a compensatory phenotype, i.e., enlarged external gills, for an unavoidable cost (hypoxia) associated with the induced defense. We identified two ways by which this compensa-

tory phenotype could be induced. The compensatory phenotype is induced in response to not only the associated hypoxic conditions resulting from the induced defense but also the most primary but indirect cause, presence of the predator." (Authors)] Address: Iwami, T., Center for Ecological Research, Kyoto University, Otsu, Shiga, Japan. E-mail: kinya@fish.hokudai.ac.jp

6711. Jödicke, R. (2007): Die Verbreitung von *Ceragrion tenellum* in Deutschland, mit Hinweisen auf sein aktuelles Vorkommen in Westniedersachsen (Odonata: Coenagrionidae). *Libellula* 26(3/4): 161-188. (in German, with English summary). ["A compilation of all known records of *C. tenellum* from Germany up to 1997 demonstrated a main area of distribution in the north-western part of the country. In the Weser-Ems region of western Lower Saxony the species currently proved to be widely distributed and very abundant. NW Germany is, in connection with the adjacent Netherlands and N Belgium, the main centre of distribution under the Atlantic climate. Here *C. tenellum* prefers peatland bogs and heathy lakes, which are common habitats in this region. With the tendency towards milder winter temperatures, population density and abundance increased. New colonizations and the presence at waters unsuitable for the species' reproduction demonstrated a high potential of expansion. There was a record of individuals dispersing as far as 780 m away from the nearest reproductive site. The flying season in 2007 began in the last third of May and lasted until mid October. In western Lower Saxony, the most frequent female colour morph was *f. erythrogastrum* at frequencies between 70.0% and 97.5%. It is argued that the species is not endangered in the northwestern parts of Germany and should therefore be removed from the Red Lists of Lower Saxony, North Rhine-Westphalia and BRD." (Author)] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: reinhard.joedicke@ewetel.net

6712. Jonsson, M.; Johansson, F.; Karlsson, C.; Brodin, T. (2007): Intermediate predator impact on consumers weakens with increasing predator diversity in the presence of a top-predator. *Acta Oecologica* 31 (1): 79-85. (in English). ["Adding or removing a top-predator is known to affect lower trophic levels with potentially large, indirect effects on primary production. However, little is known about how predator diversity may affect lower trophic levels, or how adding or removing a top-predator influences the effects of predator diversity. Using aquatic mesocosms containing three and four trophic levels, we tested whether intermediate predator diversity affected predation on consumers and if top-predator presence influenced such effects. We found that the presence of intermediate predators suppressed the consumer population and that this suppression tended to increase with increased intermediate predator diversity when the top-predator was absent. However, with the top-predator present, increased intermediate predator diversity showed the opposite effect on the consumers compared to without a top-predator, i.e. decreased suppression of consumers with increased diversity. Hence, in our study, the loss of intermediate predator species weakened or strengthened predator-prey interactions depending on if the top-predator was present or not, while loss of the top-predator only strengthened the predator-prey interactions. Therefore, the loss of a predator species may render different, but perhaps predictable effects on the functioning of a system depending on from which trophic level it is lost and on

on the initial number of species in that trophic level." (Authors)] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

6713. Jordan, S.; Barluet, E.; Olaf, M.; Parsons, B.; Simon, C. (2007): Blue hawaiiense and beyond: conservation genetics and comparative phylogeography of four Hawaiian Megalagrion damselfly species (Odonata: Coenagrionidae). Proceedings of the Symposium on the Biology of Hawaiian Streams and Estuaries: Bishop Museum Bulletin in Cultural and Environmental Studies 3: 247-260. (in English). ["Hawaii's endemic Megalagrion damselflies are rivaled in their beauty and diversity only by the degree of threat posed to them by anthropogenic disturbance. In this preliminary study of phylogeography and conservation genetics, we have sequenced about 660 base pairs (bp) of the mitochondrial COII gene from 191 damselflies from four species, including 31 populations that span a gradient of endangerment. We applied phylogeographic analyses in order to understand their biogeographic history. Unlike Megalagrion xanthomelas and *M. pacificum*, *M. calliphya* and *M. hawaiiense* rarely share haplotypes between populations and between islands, even within the larger Maui Nui superisland, suggesting that these latter two species do not disperse as well across land or water. Their phylogenies also better reflect the geological history of the islands. We applied conservation genetic analyses in order to understand their genetic health. Under a conservation genetic paradigm, populations with low genetic diversity are generally considered to be at greater risk of decline and extinction than populations with high genetic diversity. Applying this principle to Megalagrion populations gave both expected and surprising results. Expected results included measurements of high diversity in most populations of *M. calliphya*, *M. hawaiiense*, and Hawaii'i Island populations of *M. xanthomelas*. Low diversity was observed in populations known to be bottlenecked or relictual, including O'ahu and Maui *M. xanthomelas*, and *M. pacificum*. Surprising results included low genetic diversity in O'ahu Ko'olau and Hawaii'i Onomea *M. hawaiiense*, Moloka'i *M. pacificum*, and West Maui *M. calliphya*. We propose that these latter three populations be monitored and managed to maximize their long-term genetic health." (Authors)] Address: Jordan, S.D., Department of Biology, Bucknell University, Lewisburg, PA 17837 USA. E-mail: sdjordan@bucknell.edu

6714. Juillerat, L. (2007): *Neoneura angelensis* sp. nov. from French Guyana (Odonata: Protoneuridae). International Journal of Odonatology 10(2): 203-208. (in English). ["*Neoneura angelensis* sp. nov. is described and illustrated from two males collected in French Guyana. The holotype was collected by the author on 29 December 2003 on Crique Angèle near Saut Athanase, an affluent of Approuague River and is deposited in Muséum d'Histoire naturelle in Neuchâtel (MHNN). On the basis of the structure of the cercus, this species belongs to the rubriventris-group and is close to *N. ethela*, *N. kiautai* and *N. sylvatica*, from which it is diagnosed." (Author)] Address: Juillerat, L., Suchiez 50, 2000 Neuchâtel, Switzerland. E-mail: juillerat.l@bluewin.ch

6715. Jung, K.-S. (2007): Odonata of Korea. Dragonflies. ISBN: 978-89-958060-3-6: 512 pp. (in Korean). [Regrettably, this opulent handbook on the Odo-

nata of Korea is completely written in Korean language. Thus, for those uninitiated to the Korean language, there is rarely more to use than the brilliant colour photos of species and habitats, and the excellent pictures of freshly killed specimens for identification. Significant morphological characters are shown by arrows, and the Korean names of the species are accompanied by the Latin ones. I suppose, this part of the book is considering exclusively the species from South-Korea, while the monographic chapter covers all Korean species, but providing no pictures from those North-Korean species not available for photographing and not occurring in South-Korea (e.g. *Leucorrhinia dubia*). The book is completed by chapters on morphology with brilliant figures, fascinating histological sections, biology, and stunning flight studies. The monographic part of the books covers 125 species on approximately 300 pages. The photography is a kind of art work, with some really great photographs. It is a pity that I can't read this book. Definitely, and in spite of this: I am really happy to have it in my library. (Martin Schorr) Copies can be purchased from the author.] Address: Jung, Kwangsu, 102-601., Dalvitmaul apt., Hwajung-dong, Koyangsi, 412-270, Gyunggido, Korea. E-mail: tootootoo@korea.com

6716. Kalcounis-Rueppell, M.C.; Payne, V.H.; Huff, S.R.; Boyko, A.L. (2007): Effects of wastewater treatment plant effluent on bat foraging ecology in an urban stream system. Biological Conservation 138(1-2): 120-130. (in English). ["Wastewater treatment plant (WWTP) effluent in the Cape Fear River Basin headwaters in North Carolina, USA, has influenced stream water quality and aquatic components of the stream food web. To examine effects of WWTP effluent on terrestrial predators in this system we determined prey availability, bat community structure, and bat foraging and commuting behavior at sites above and below WWTPs. We predicted an effect of effluent in the riparian habitat specialist *Perimyotis subflavus* but not the habitat generalists *Eptesicus fuscus*, *Lasiurus borealis*, or *Nycticeius humeralis*. Nocturnal insect abundance was higher upstream of the WWTPs. There were more Diptera, Coleoptera, and Lepidoptera upstream of the WWTPs whereas there were more Odonata downstream of the WWTPs. There were more *E. fuscus* upstream of the WWTPs and more *P. subflavus* downstream of the WWTPs. Despite the difference in bat community structure up-and downstream of the WWTPs, bat commuting and foraging activity levels were the same; there was no difference in the total number of echolocation sequences we recorded per night up. and downstream of the WWTPs nor was there a difference in the proportion of those sequences that contained a feeding buzz. Our results suggest the effect of anthropogenic nutrients in the stream persists through higher food web trophic levels as we found impacts on nocturnal flying insects as well as two common species of insectivorous bats. *Perimyotis subflavus* and *E. fuscus* may serve as easily tractable terrestrial bioindicators of water quality as influenced by WWTP effluent in this, and other, urban watersheds." (Authors)] Address: Kalcounis-Rueppell, M.C., Department of Biology, University of North Carolina at Greensboro, Greensboro, NC 27402, USA. E-mail: mckalcou@uncg.edu

6717. Kaller, M.D.; Kelso, W.E. (2007): Association of macroinvertebrate assemblages with dissolved oxygen concentration and wood surface area in selected subtropical streams of the southeastern USA. Aquatic

Ecology 41: 95-110. (in English). ["Woody debris (CWD) is an important habitat component in northern Gulf of Mexico coastal plain streams, where low gradients and low flows allow accumulation of CWD and promote low dissolved oxygen (DO) concentrations. We tested the influences of CWD and DO on stream macroinvertebrates experimentally by placing two surface area CWD treatments each in three concentrations of ambient DO in two streams in Louisiana, USA, with macroinvertebrates collected from ambient woody debris used as a control. We also sampled macroinvertebrates in benthic and woody debris habitats in three streams twice yearly over 2 years to examine the applicability of the experimental results. Total abundance, richness (generic), and Shannon–Wiener diversity were all higher in lower DO conditions during the experiment, and total abundance was higher in the larger CWD treatment. Stream sampling corroborated the relationship between higher diversity and low DO in both benthic and woody debris habitats, but the relationship between richness and low DO only was supported in benthic habitats. Few taxa correlated with DO or CWD in the experiment (5 of 21 taxa) or stream survey (2 of 54 taxa). Whereas most taxa were uncorrelated with experimentally manipulated and in-stream measured variables, we suggest these taxa respond as generalists to stream habitat and physicochemistry. Based on this experiment and stream sampling, we believe the majority of macroinvertebrates in these streams are tolerant of seasonally low DO conditions." (Authors) The taxa list includes *Argia* spp. and *Dromogomophus* spp.] Address: Kaller, M.D., School of Renewable Natural Resources, Louisiana Agricultural Experiment Station, LSU Agricultural Center, Louisiana State University, Baton Rouge, LA 70803, USA. E-mail: mkallel@lsu.edu

6718. Kandibane, M.; Raguraman, S.; Mahadevan, N.R. (2007): Diversity and community structure of aquatic arthropods in an irrigated rice ecosystem of Tamil Nadu, India. *Asian Journal of Plant Sciences* 6(5): 741-748. (in English). ["Inventory, diversity and community structure of aquatic arthropods between weeded and partially weeded rice ecosystems were studied in a field experiment under irrigated condition during Rabi, 2000. The research revealed that a total of 12, 2, 6 and 3 species of Odonata, Ephemeroptera, Hemiptera and Coleoptera aquatic insects were recorded, respectively. *Agriocnemis femina femina*, *Pantala flavescens*, *Crocothemis servilia*, and *Diplocodes trivialis* were the dominant species in both the ecosystems, but were significantly more dominant in partially weeded rice ecosystem. *Trithemis* sp., *Rhyothemis variegata*, *Anax guttatus* and *Lethocerus indicus* (Heteroptera) were absent in weeded rice ecosystem and rest of the species occurred in both the ecosystems. Aquatic beetles, water strider and water scorpion evinced perfect similarity through out the season. But, damselfly, backswimmer and mayfly expressed more than 0.80 similarity and perfect similarity (1.00) during early and maturity stages of crop and showed less stability during the 2nd, 3rd and 4th week. The guild of aquatic arthropods revealed the dominance of predatory groups in partially weeded rice ecosystem through out the season. Same group of aquatic arthropods had not dominated in all the weeks of crop growth, but the group of aquatic arthropods changed during various stages of crop. A total of 18 weed species were recorded in partially weeded plots." (Authors)] Address: Kandibane, M., Dept Agricult. En-

tomol., Tamil Nadu Agricultural Uni., Coimbatore. 641003, Tamil Nadu, India

6719. Keats, R.A.; Osher, L.J. (2007): The macroinvertebrates of *Ruppia* (Widgeon Grass) beds in a small Maine estuary. *Northeastern Naturalist* 14(3): 481-491. (in English). ["Little information exists on macroinvertebrate community composition in small, micro-tidal, *Ruppia maritima* (widgeon grass)-dominated Maine estuaries. Qualitative and quantitative assessments of the macroinvertebrate fauna of widgeon grass beds in Northeast Creek estuary (Acadia National Park, ME) are presented here. The community was dominated by euryhaline freshwater invertebrates including midge larvae (Chironomidae: *Dicrotendipes*, *Cricotopus*, *Chironomus*), oligochaetes, damselfly larvae (Coenagrionidae: *Enallagma*), amphipods (Gammaridae: *Gammaurus*), gastropods (Hydrobiidae: *Hydrobia*), ostracods (Cytheridae: *Cyprideis*), and water boatmen (Corixidae: *Trichocorixa*). Macroinvertebrate abundances at the sampled sites were 35,100 individuals/m² in both August and September, and 22,200 individuals/m² in October. This study provides baseline faunal-community data that can be used in future monitoring studies." (Authors)] Address: Osher, Laurie, Department of Plant, Soil and Environmental Sciences, 5722 Deering Hall, University of Maine, Orono ME 04469-5722, USA. E-mail: laurie@maine.edu

6720. Kishida, O.; Trussell, G.C.; Nishimura, K. (2007): Geographic variation in a predator-induced defense and its genetic basis. *Ecology* 88(8): 1948-1954. (in English). ["Predator-induced morphological defenses are a well-known form of phenotypic plasticity, but we continue to have a limited understanding of geographic variation in these responses and its genetic basis. Here we examine genetic variation and geographic differentiation in the inducible defenses of tadpoles (*Rana pirica*) in response to predatory salamander larvae (*Hynobius retardatus*). To do so, we crossed male and female frogs from a "mainland" Japanese island having predaceous salamanders and a more isolated island not having predaceous salamanders and raised resulting offspring in the presence and absence of *H. retardatus*. Mainland tadpoles exhibited a higher capacity to express the inducible morphology (a more bulgy body) than those from the predator-free island, and expression of the bulgy morph in mainland–island hybrids produced phenotypes that were intermediate to those produced by pure crosses. In addition, parental sex had no effect on expression of the bulgy morph. Our results support the hypothesis that geographic variation in inducible defenses is linked to the additive effects of autosomal alleles that are shaped by differences in historical exposure to the inducing predator." (Authors) Odonata are referred on several times in introduction.] Address: Kishida, O., Graduate School of Fisheries Sciences, Hokkaido University, Hakodate 041-8611, Hokkaido, Japan. E-mail: kishida@fish.hokudai.ac.jp

6721. Kohl, S. (2007): *Cordulegaster boltonii* als Beute der Gerandeten Jagdspinne *Dolomedes fimbriatus* (Odonata: Cordulegasteridae; Araneae: Pisauridae). *Libellula* 26(3/4): 203-206. (in German, with English summary). ["In an overgrown ditch of a fen in northeastern Switzerland a female *C. boltonii* was found that was exsanguinated by a female *D. fimbriatus*. The anisopteran female constitutes by far the largest dragonfly prey of this hunting spider species hitherto documen-

ted." (Authors)] Address: Kohl, S., Seestr. 107, CH-8610 Uster, Switzerland. E-mail: stefan.kohl@bluewin.ch

6722. Kosterin, O.E. (2007): The first record of *Anax* on the West Siberian Plain: *A.p.parthenope* Selys in Omsk (Anisoptera: Aeshnidae). *Notul. odonatol.* 6(10): 112-115. (in English). ["A freshly emerged female was collected in the city of Omsk (55°57'N, 73°22'E) on 8-VI-2007 at an oxbow of the Irtysh River, Russia influenced by sinks of a deep ground mineral water. This is the northernmost *A. parthenope* record in Siberia and the first record in the West Siberian Plain. Perhaps presently the species is colonizing Siberia from the South. At the same locality, *Cordulia aenea* was also recorded, which was previously reported for Omsk by S.D. Lavrov (1927, *Proc. sib. Inst. Agric. Forestry* 8/3: 51-100), but it was not found there in the 1970-80s by O.E. Kosterin (1996, *Acta hydroent. latvicai*: 10-21)." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

6723. Kunz, B. (2007): *Coenagrion hastulatum* in Hohenlohe: Fallbeispiel für das regionale Verschwinden einer Libellenart (Odonata: Coenagrionidae). *Libellula* 26(1/2): 93-106. (in German, with English summary). ["Since the beginning of faunistic work on Odonata in the Hohenlohe region (northeastern Württemberg, Germany) in the year 1984, *C. hastulatum* was on the species list. From the 1990s onwards, it became scarce. The hitherto last individual was found in 2005. In 2004, the two main habitats were included in a species protection programme of the Government of Baden-Württemberg. Activities for the local retrieval of *C. hastulatum* started in autumn 2006. Habitat changes during the last 20 years are documented and variable reasons for the decrease of the populations of *C. hastulatum* in the region are discussed." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunz.de

6724. Laister, G. (2007): Die Libellenfauna der Linzer Donauauen. Entwicklung und aktuelle Situation. *Berichte f. Ökologie u. Naturschutz der Stadt Linz* 1: 65-123. (in German, with English summary). ["The dragonfly fauna of the Danube floodplains of Linz, Austria was investigated in the first half of the 1990s (Laister 1994, 1996a, 1998). This study was repeated in 2002/2003 to ascertain the current status of the populations and to detect any changes. Although the floodplains of Linz are "old" and now only manifest weak hydrodynamics, their dragonfly fauna must be regarded as very valuable. In a current mapping 39 dragonfly species could be shown to occur there, of which 32 are considered long-established. In relationship to the first mapping clear improvements could be demonstrated in regard to the species that inhabit the stretches of running water as well as in respect to those which are bound to silted up areas covered by reeds. The metapopulation concept as expanded by Sternberg (1995, 1999) for dragonflies might enable us to enhance our understanding of the high turnover rates which were registered." (Author)] Address: Laister, G., Botanischer Garten und Naturkundliche Station, Stadtgärten Linz, Roseggerstr. 20-22, 4020 Linz, Austria. E-mail: Gerold.Laister@mag.linz.at

6725. Larison, B. (2007): Environmental heterogeneity and alternative mating tactics in the damselfly *Protoneura amatoria*. *Behavioral Ecology* 18: 1021-1028. (in English). ["Conditional male mating strategies have been studied extensively in relation to male attributes, such as size and resource-holding potential, but few studies have considered the effects of environmental heterogeneity on the use of alternative mating tactics. In some systems, environmental heterogeneity may be the key to understanding the evolution and maintenance of such polyphenisms. I examined the influence of the physical environment on the use of alternative tactics by the damselfly *Protoneura amatoria*. Male *P. amatoria* reversibly use 2 tactics to gain matings: 1) sit and wait in the canopy for passing females or 2) hover over the water and attempt to grab females that are ovipositing in floating debris. Observations in 3 streams indicated that the use of the hovering tactic was greater under high-light than low-light conditions and at higher densities of ovipositing females. The density of ovipositing females was correlated with both the light conditions and the availability of oviposition substrate, indicating that physical factors exert indirect as well as direct influences on tactic use. Experimental manipulations showed that both males and females responded directly to light conditions and suggested that males responded directly to the density of ovipositing females. These results can be explained largely in terms of the cues and constraints inherent in different light environments. Thus, the conditional mating strategy of *P. amatoria* appears to have evolved in response to, and been maintained by, fine-scale variation in the physical environment. These findings are discussed in relation to flight dynamics and predation risk." (Author)] Address: Larison, Brenda, Department of Ecology and Evolutionary Biology, University of California, Los Angeles, 621 Charles E. Young Drive South, Los Angeles, CA 90095, USA. E-mail: blarison@ucla.edu.

6726. Lin, R.-S.; Yao, C.-T.; Lee, P.-F. (2007): The diet of Fairy Pitta *Pitta nympha* nestlings in Taiwan as revealed by videotaping. *Zoological Studies* 46(3): 355-361. (in English). [The nestling diet of the Fairy Pitta (*Aves*) in west-central Taiwan was studied by videotaping 8 broods from 2000 to 2002. Prey items also include Odonata.] Address: lee, P.-F., Institute of Ecology and Evolutionary Biology, and Department of Life Science, National Taiwan University, Taipei 106, Taiwan. E-mail: leepf@ntu.edu.tw

6727. Lingenfelder, U.; Ott, J.; Schorr, M.; Trockur, B. (2007): Die Libellenfauna (Odonata) der Our zwischen Dasburg und Wallendorf (Rheinland-Pfalz / Luxemburg). *Mainzer naturwissenschaftliches Archiv* 45: 283-311. (in German, with English summary). [In the course of a species protection programme for the Orange-spotted emerald (*Oxygastra curtisii*) ordered by the federal state of Rhineland-Palatinate, the dragonfly fauna of the river Our, which forms the border between Germany and Luxembourg, was investigated in the years 2005 and 2006 between the villages of Dasburg and Wallendorf. Altogether 26 species were found, including *O. curtisii* which currently is known in Germany and Luxembourg only at this river section of the Our. Out of these 26 dragonflies in total 12 were autochthonous in the river, for seven other species it is very likely. As one more dragonfly species was found along the Our in the 1980ies, in total 27 species have been recorded in this river section until today.] Address: Lin-

genfelder, U., Seebergstr. 1, D-67716 Heltersberg, Germany. E-mail: u.lingenfelder@vr-web.de

6728. Liria, J. (2007): Fitotelmata fauna on the bromeliads *Aechmea fendleri* André y *Hohenbergia stellata* Schult of the San Esteban Nacional Park, Venezuela. Rev. peru. biol. número especial 14(1): 33-38. (in Spanish, with English summary). ["In the present work, we characterize the associations of mosquitoes species and other invertebrates on bromeliads from San Esteban Nacional Park in Carabobo State, Venezuela. Eighteen plants of *Aechmea fendleri* (11) and *Hohenbergia stellata* (7) were sampled in rainy (September 2004) and dry (March 2005) seasons. A total of 2020 macroinvertebrates were collected. The most important was the Diptera Order, with the Families Chironomidae (43%), Chaoboridae (25%) and Culicidae (6%), and the Coleoptera, Scyrtidae (5%). In Culicidae the most abundant species were *Culex consolator* (31%), *C. neglectus* (27%) and *Wyeomyia celaenocephala* (17%). The highest abundance and richness was in dry season, when Culicidae diversity increases. The diversity and evenness was similar among season and it was highest in *H. stellata*." (Author) "Coenagrionidae" counted for 1% of total athropod abundance.] Address: Liria, J., Departamento de Biología, Facultad de Ciencias y Tecnología, Universidad de Carabobo. Campus Barbuja, Valencia, Estado Carabobo, Venezuela. E-mail: jliria@uc.edu.ve

6729. Lockwood, M. (2007): Rediscovery of *Symptetrum pedemontanum* (Müller in Allioni) and *S. vulgatum* (L.) in Catalonia, NE Spain (Anisoptera: Libellulidae). Notul. odonatol. 6(10): 115-118. (in English). ["The 2 species were rediscovered in an area of irrigated hay meadows in La Cerdanya (Catalonia, NE Iberian Peninsula) in August 2005, the first confirmed record for the former species from the Iberian Peninsula since 1959 and the first ever record for the latter for Catalonia. In 2006, a much fuller survey of the whole potential breeding area of the 2 species was carried out and in the whole area only one small breeding colony (of both species) was located. This is thought to be the only known population of *S. pedemontanum* in the Iberian Peninsula. Details of the habitat and threats to the species are given." (Author)] Address: Lockwood, M., La Devesa, 3, 1", E-17850 Besalu, Spain. E-mail: mike@walkingcatalonia.net

6730. Lohr, M.; Weihrach, F.; Wildermuth, H. (2007): Buchbesprechung: Grand & Boudot (2006): Les libellules de France, Belgique et Luxembourg. ISBN 2-914817-05-3. Libellula 26(3/4): 273-277. (in German). [expanded, self-important book review] Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-luh.de

6731. Lotzing, K. (2007): Massenvorkommen der Gebänderten Prachtlibelle (*Calopteryx splendens* Harris, 1782) (Insecta: Odonata) im Bereich des Mühlengrabens zwischen Tarthun und der Mündung in die Bode bei Unseburg innerhalb des Landkreises Aschersleben - Staßfurt (Sachsen-Anhalt). Entomol. Mitt. Sachsen-Anhalt 15(1): 33-36. (in German, with English summary). [In 1996, *C. splendens* was a rare species in the catchment of the river Bode, Sachsen-Anhalt, Germany. 10 years later, it belongs to the typical fauna of running waters perhaps because of the improvement of

water quality. Along the Mühlengraben, a tributary of the river Bode, a large population was found with abundances of up to 45 males per 100 m shore line.] Address: Lotzing, K., Am Hollschen Bruch 4c, D-39435 Unseburg, Germany

6732. Lowe, C.D.; Kemp, S.J.; Harvey, I.F., Thompson, D.J.; Watts, P.C (2007): Variable microsatellite loci isolated from the azure damselfly, *Coenagrion puella* (L.) (Zygoptera; Coenagrionidae). Molecular Ecology Notes 7(5): 880-882. (in English). ["We isolated and characterized 10 polymorphic microsatellite loci from *C. puella* as part of a study assessing reproductive success and genetic structure in an isolated population of this species. Levels of genetic diversity were assessed in 50 individuals collected from Queen Elizabeth Country Park, Hampshire, UK. The number of alleles per microsatellite loci ranged from three to 22 and the observed and expected heterozygosities varied between 0.26 and 0.84 and between 0.23 and 0.91, respectively. Two loci showed significant ($P < 0.05$) heterozygote deficits, likely because of null (non-amplifying) alleles; one pair of loci was in linkage disequilibrium." (Authors)] Address: Lowe, C., Population and Evolutionary Biology Group, The Biosciences Building, School of Biological Sciences, University of Liverpool, Crown Street, Liverpool, L69 7ZB UK. E-mail: clowe@liv.ac.uk

6733. Machado, A.B.M. (2007): *Leptagrion afonsoi* sp.n. from the state of Minas Gerais, Brazil (Odonata: Coenagrionidae). Lundiana 7(2) (2006): 125-126. (in English). ["*Leptagrion afonsoi* sp.n. is described and illustrated from a single male (holotype; Caraça, Belo Horizonte, Santa Barbara). It is close to *L. dispar* Selys, 1876 and *L. elongatum* Selys but differs from them by having bifid cercus." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, MG, Brazil, Caixa Postal 31270-901. E-mail: angelo@icb.ufmg.br

6734. Marinov, M.; Seidenbusch, R. (2007): *Corduliochlora* gen. nov. from the Balkans (Odonata: Corduliidae). IDF-Report 10: 1-13. (in English). ["The adult morphology of the recently established species *Somatochlora borisi* Marinov, 2001 is outlined. The species has a unique combination of features, especially when compared to representatives of the two closest European genera, *Cordulia* Leach, 1815 and *Somatochlora* Selys, 1871 but also compared to other Holarctic genera and species within the Corduliinae (sensu Garrison et al. 2006). The extent of these morphological differences suggests that the species can not be assigned to any of the extant genera, and therefore the new genus *Corduliochlora* is being established." (Authors)] Address: Marinov, M., 80 Brookside Tce, Bryndwr, Christchurch, New Zealand. E-mail: mgmarinov@mail.bg

6735. Marinov, M. (2007): Odonata of the Western Rhodopes, with special reference to the wetlands North of the town of Smolyan, South Bulgaria. Notul. odonatol. 6(9): 97-108. (in English). ["A revised list is presented of 52 species from 90 localities in Bulgaria and Greece. *Lestes barbarus*, *L. macrostigma*, *Erythromma najas*, *Cordulegaster bidentata*, *Sympetrum flaveolum* and *S. vulgatum* are new for the region. Taxonomic notes are provided on *Calopteryx splendens* and on the status of the *Somatochlora metallica*-*S. merionalis* complex." (Author)] Address: Marinov, M., 80 Brookside

Tce, Bryndwr, Christchurch, New Zealand. E-mail: mgmarinov@mail.bg

6736. Mathew, G.; Shamsudeen, R.S.M.; Brijesh, C.M. (2007): Fauna of Protected Areas - 32: Insect fauna of Neyyar Wildlife Sanctuary, Kerala, India. *Zoos' Print Journal* 22(12): 2930-2933. (in English). [236 taxa of insects were recorded, of which 215 species have been identified. The list includes 6 anisopteran taxa.] Address: Mathew, G., Div. Entomol., Kerala Forest Res. Inst., Peechi, Kerala, 680653, India. E-mail: mathew@kfri.org

6737. Matthews, J.H.; Boles, S.; Parmesan, C.; Juenger, T. (2007): Isolation and characterization of nuclear microsatellite loci for the common green darner dragonfly *Anax junius* (Odonata: Aeshnidae) to constrain patterns of phenotypic and spatial diversity. *Molecular Ecology Notes* 7(5): 845-847. (in English). ["Fourteen polymorphic microsatellite loci were developed from an enriched genomic library of the widely distributed migratory North American [...] *Anax junius*. For a group of 22 larvae, these loci averaged 16 alleles, with individual loci ranging from nine to 29 alleles. Observed heterozygosity averaged 0.784 per locus." (Authors)] Address: Matthews, J.H., Postdoctoral Research Associate, USGS/Oregon State University, 541/738-0386, USA. E-mail: johoma@gmail.com

6738. Matushkina, N.; Gorb, S. (2007): Mechanical properties of the endophytic ovipositor in damselflies (Zygoptera, Odonata) and their oviposition substrates. *Zoology* 110(3): 167-175. (in English). ["Damselfly females use their ovipositor valves to saw aquatic plants in order to insert their eggs into the plant tissues. Stiffness of the plant substrata is therefore an important parameter for oviposition substrate choice by females. Using a force transducer combined with a motorised micromanipulator, the bending stiffness of the ovipositor at the axial compressional load was studied in seven European damselfly species and compared to the local stiffness of seven preferred plant substrates. The puncture force of tested plant samples ranged from 105 to 1500 mN, and their local stiffness ranged from 208 to 1776 N/m. The bending stiffness of the ovipositor was estimated as 173–409 N/m depending on the damselfly species. Using original and literature data, a significant positive correlation between mechanical properties of the ovipositor and preferred oviposition substrates was demonstrated. Possible behavioural adaptations to overcome high stiffness of plant tissues during oviposition are discussed." (Authors)] Address: Gorb, S., Evolutionary Biomaterials Group, Department Arzt, Max Planck Institute for Metals Research, Heisenbergstr. 3, D-70569 Stuttgart, Germany. E-mail: stas.gorb@tuebingen.mpg.de

6739. Matushkina, N. (2007): Regular egg-positioning by an aeshnid species (Odonata, Aeshnidae) with comments on its phylogenetic value. *Vestnik Zoologii* 41(5): 457-462. (in English, with Ukrainian summary). ["Prolarvae and first-instar larvae of an aeshnid anisopteran, probably *Aeshna* sp. or *Anaciaeschna isocetes*, were reared from an endophytic egg-clutch with eggs positioned in line and zigzag orders in stems and flowerstems of *Myriophyllum spicatum* in central Ukraine. Descriptions of the prolarva and the first-instar larva, the distance between neighbouring eggs in the clutch, as well as discussion on evolution of the entophytic

egg-laying behaviour in Odonata, are provided." (Author)] Address: Matushkina, Nataly, Department of Zoology, Biological Faculty, Kiev National University, Glushkov Avenue, 2, Building 12, Kiev K680, Ukraine

6740. Matushkina, N.A. (2007): *Selysiothemis nigra* (Vander L.) new for the fauna of the Ukraine (Anisoptera: Libellulidae). *Notul. odonatol.* 6(10): 118-119. (in English). [15 and 22-VII-2006, Karadag Nature Reserve, Crimea province, Feodosiya district, 45°00' N, 35°15'E. In fact, Tytar (2007) found the species on 20-VII-2002 already new for Ukraine (see OAS 6795).] Address: Matushkina, N.A., Dept Zool., Fac. Biol., Kyiv National Taras Shevchenko University, Volodymyr'ska 64, UKR-01033, Kyiv, Ukraine

6741. Mauersberger, R. (2007): Erstnachweis von *Ceragrion tenellum* in Mecklenburg-Vorpommern (Odonata: Coenagrionidae). *Libellula* 26(3/4): 151-156. (in German, with English summary). [In 2007, a large population of *C. tenellum* was found near Mirow in the lakeland of northeastern Germany. The distance to the nearest known breeding habitat in Saxony-Anhalt and Lower Saxony was more than 100 km. The particular zoogeographic and ecological significance of this northeasternmost record of *C. tenellum* in Central Europe is discussed.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

6742. Mauersberger, R.; Schneider, T. (2007): Schlupfbereite Larven von *Epithea bimaculata* als Opfer des Straßenverkehrs (Odonata: Corduliidae). *Libellula* 26(3/4): 193-202. (in German, with English summary). ["We report on 31 larvae of *E. bimaculata* that had been run over by cars on a road close to a forest lake in the Uckermark, northeastern Brandenburg, Germany. Almost exclusively larvae of *E. bimaculata* were affected among all Odonata species breeding in this lake, because their emergence sites were frequently situated at long distances from the water's edge, up to 22 m in our study. The mortality of larvae on their way to suitable emergence supports reached 30 % in the shore section running parallel to the road. However, under consideration of the total emergence of *E. bimaculata* in this region, we assume that the metapopulation is not currently endangered by road traffic." (Authors)] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerdervereinUeckermark.Seen@t-online.de

6743. Müller, J.; Steglich, R. (2007): Zum aktuellen Vorkommen der Hauben-Azurjungfer *Coenagrion armatum* westlich Vilhelmina/Asele Lappmark in Schwedisch Lappland (Odonata). *Entomologische Nachrichten und Berichte* 51(2): 128-130. (in German). [16.06.1999 and 07.06.2002, Malgoviken near Malgovik, approximately 10 km west of Vilhelmina, Sweden. Some diagnostic key factors are outlined.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

6744. Müller, J.; Steglich, R. (2007): Gehören *Coenagrion armatum* und *Onychogomphus forcipatus* (Odonata) zur Libellenfauna Sachsen-Anhalts? *Entomol. Mitt. Sachsen-Anhalt* 15(1): 28-30. (in German). [The paper stresses the historical development of the Federal State Sachsen-Anhalt, Germany as prerequisite of proper localisation of ancient odonate records, some of which may be hidden in the files of adjacend Federal

States and resulting from collections prior the corrections of the frontiers between the states. A focus is set on the long lasting wrong interpretation of a "record" of *Coenagrion armatum* in Sachsen-Anhalt and the unknown status of *Onychogomphus forcipatus*. A few notes on records of *O. forcipatus* along the river Jagst, Baden-Württemberg are added.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

6745. Nakahara, M.; Tsubaki, Y. (2007): Function of multiple sperm-storage organs in female damselflies (*Ischnura senegalensis*): Difference in amount of ejaculate stored, sperm loss, and priority in fertilization. *Journal of Insect Physiology* 53(10): 1046-1054. (in English). ["We studied changes in the number of sperm within two kinds of female sperm-storage organ in the damselfly *Ischnura senegalensis* (Odonata: Coenagrionidae): the bursa copulatrix and the spermatheca. We counted the number of sperm within each storage organ and tested their viability after a single copulation in female damselflies kept for seven days with and without oviposition. We also counted sperm and tested their viability in females that underwent an interrupted second copulation after the sperm-removal stage, and after subsequent oviposition. Our results showed that the bursa copulatrix and spermatheca have different sperm storage roles. Immediately after copulation, most eggs appear to have been fertilized with bursal sperm, which were positioned near the fertilization point. By seven days after copulation, a greater proportion of spermathecal sperm were used for fertilization, as the number of bursal sperm had decreased. We hypothesize that female damselflies use the spermatheca for long-term storage and the bursa copulatrix for short-term storage: bursal sperm are more likely to be used for fertilization but may have a higher risk of mortality due to sperm removal by a competing male and/or sperm expelling by the female, whereas spermathecal sperm are safer but will be used for fertilization only after their release from the spermatheca." (Authors)] Address: Tsubaki, Y., Biodiversity Conservation Research Group, National Institute for Environmental Studies, Tsukuba 305-0053, Japan. E-mail: tsubaki@nies.go.jp

6746. Nel, A.; Huang, D.-Y.; Lin, Q.-B. (2007): A new genus of isophlebioid damsel-dragonflies (Odonata: Isophlebioptera: Campteroptelebiidae) from the Middle Jurassic of China. *Zootaxa* 1642: 13-22. (in English). ["*Sinokaratawia prokopi* gen. nov., sp. nov. is the fifth representative of the Campteroptelebiidae from the Chinese Middle Jurassic Jiulongshan Formation, which corresponds to one of the most diverse fauna of isophlebioid damsel-dragonflies. The synapomorphies for the Campteroptelebiidae and Isophlebiidae are discussed." (Authors)] Address: Huang, D.-Y., Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing, 210008, P.R. China. E-mail: huangdiying@sina.com

6747. Niemann, U. (2007): Große Künstler der Verwandlung. Libellen bringen Farbe in Sommer. *Wormser Zeitung* vom 26.6.2007: (in German). [General account on dragonflies in regional, German newspaper.] Address: not stated

6748. Olberg, R.M.; Seaman, R.C.; Coats, M.I.; Henry, A.F. (2007): Eye movements and target fixation during dragonfly prey-interception flights. *Journal of Com-*

parative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology 193: 685-693. (in English). ["The capture of flying insects by foraging dragonflies is a highly accurate, visually guided behavior. Rather than simply aiming at the prey's position, the dragonfly aims at a point in front of the prey, so that the prey is intercepted with a relatively straight flight trajectory. To better understand the neural mechanisms underlying this behavior, we used high-speed video to quantify the head and body orientation of dragonflies (female *Erythemis simplicicollis* flying in an outdoor flight cage) relative to an artificial prey object before and during pursuit. The results of our frame-by-frame analysis showed that during prey pursuit, the dragonfly adjusts its head orientation to maintain the image of the prey centered on the "crosshairs" formed by the visual midline and the dorsal fovea, a high acuity streak that crosses midline at right angles about 60° above the horizon. The visual response latencies to drifting of the prey image are remarkably short, ca. 25 ms for the head and 30 ms for the wing responses. Our results imply that the control of the prey-interception flight must include a neural pathway that takes head position into account." (Authors)] Address: Olberg, R.M., Department of Biological Sciences, Union College, Schenectady, NY 12308, USA. E-mail: olbergr@union.edu

6749. Olias, M.; Weihrauch, F.; Bedjanic, M.; Hacet, N.; Marinov, M.; (2007): *Lestes parvidens* and *L. viridis* in southeastern Europe: a chorological analysis (Odonata: Lestidae). *Libellula* 26(3/4): 243-272. (in German, with English summary). ["In order to clarify the actual distribution and the overlap of ranges of *Lestes parvidens* and *L. viridis* in Europe, all available and credible information from records of the two species in southern and southeastern Europe was compiled. This compilation includes all literature references that clearly distinguish between the two species, which usually was not the case prior to the mid-1990s, records taken personally by the authors, and the review of museum specimens. The hitherto researched distributional range of *L. parvidens* in Europe extends from Asia minor to Corsica and Sicily in the west, and to Austria, Slovakia and the Ukraine in the north. On the other hand, the range of *L. viridis* extends from western, central and southern Europe, where it is common, to the southeast as far as the southern Greek mainland and the Black Sea coast. The first records of *L. viridis* from Turkey are documented from Turkish Thrace. In the area of overlapping ranges, which from north to south extends over more than 1,000 km in Italy as well as the Pannonian lowlands and the Balkans, numerous cases of syntopic occurrences were recorded. Although in these hybridization is not uncommon, the reproductive isolation between *L. parvidens* and *L. viridis* has reached an extent that does not allow a complete amalgamation of the two taxa any more. In conclusion, the results of our chorological analysis substantiate the status of *L. parvidens* and *L. viridis* as clearly separated, good species." (Authors)] Address: Olias, M., Humboldtstr. 29, D-09599 Freiberg, Germany. E-mail: markoolias@aol.com

6750. Osterwalder, R. (2007): Gomphiden-Exuvienfunde an renaturierten Uferabschnitten und neu angelegten Seitenarmen zweier Schweizer Flüsse (Odonata: Gomphidae). *Libellula* 26(1/2): 77-92. (in German, with English summary). ["Along the rivers Reuss and Aare the colonization of recently revitalized sections and newly created side branches by dragonflies, was in-

vestigated in the first years after the completion of the construction works. The study focussed on the evidence of development by exuviae findings of gomphids on eight stretches between 140 and 900 m in length where the bank reinforcements were removed or new watercourses were built in the period from 1998 to 2005 and on corresponding unchanged river sections for comparison. Exuviae of *Onychogomphus forcipatus*, *Ophiogomphus cecilia* and *Gomphus vulgatissimus* were found in varying numbers and distribution on the different sections. From these findings it is concluded that the revitalized and regenerated areas were rapidly colonized by gomphid larvae that drifted or moved actively into these habitats." (Author)] Address: Rudolf, R., Departement Bau, Verkehr und Umwelt des Kantons Aargau, Abt. Landschaft und Gewässer, Sektion Natur und Landschaft, Allmendstrasse 3, CH-8919 Rottenschwil, Switzerland. E-mail: rudolf.osterwalder@ag.ch

6751. Ott, J. (2007): The expansion of Mediterranean dragonflies in Europe as an indicator of climatic changes — Effects on protected species and possible consequences for the NATURA 2000 web. In: Secretariat of the Convention on Biological Diversity (2007). Emergins issues for biodiversity conservation in a changing climate. Abstracts of Poster Presentations at the 12th Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity. Montreal, Technical Series no. 29, i - viii + 112pp: 32-34. (in English). ["The invasion of southern and eurytopic species becomes obviously a general process in Germany and Middle and Northern European countries indicating the disturbance of the waters, as well as the lack of water in many countries and regions (Italy, Spain – Germany: e.g. the federal state of Brandenburg). Consequently strong changes within the European dragonfly fauna could be expected. Especially the species of moorland biotopes, springs, small brooks and alpine regions will face a strong decrease and in some regions also extinction. In the longer term this process will lead more to a decrease of biodiversity than to an increase and to a devaluation of the web NATURA 2000." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

6752. Parkes, K. (2007): Dragonfly Conservation from the BDS. Online surveys - A success story Banded Demoiselle Survey 2006. *Atropos* 32: 62. (in English). [1300 records of *Calopteryx splendens* were received by internet in 2006. These data are mapped. 200 records, those accompanied by photographs were added to the National Dragonfly Database.] Address: Parkes, Katharine, BDS Conservation Officer, c/o Natural England (West Mids), Attingham Park, Shrewsbury SY4 4TW, UK. E-mail: katharine.parkes@naturalengland.org.uk

6753. Parr, A.J. (2007): Migrant and dispersive dragonflies in Britain during 2006. *J. Br. Dragonfly Society* 23(2): 40-51. (in English). ["The 2006 season saw some of the most spectacular movements of migrant dragonflies ever recorded in Britain, perhaps even exceeding those of the famous summer of 1995. In terms of sheer numbers, the highlight of the year was the profusion of *Sympetrum fonscolombii* that were reported. Approaching a thousand individuals — the highest annual total for Britain by some long way — were observed during the summer months, with many staying to

breed. Autumn emergents were later noted at over a dozen sites, some as far north as Lancashire and East Yorkshire. *Anax parthenope* also had a record-breaking year, with some 90 individuals being observed and oviposition being noted from five different areas. *Erythromma viridulum* similarly had an eventful season, showing a very major expansion of range, at least some of which seemed to involve fresh immigration. Other notable events included a major influx of *S. flaveolum* and the discovery of a female *Lestes barbarus* at an inland site on the Somerset/ Gloucestershire border. No less than four *Aeshna* affinis were also reported from southern England, there having only ever been one previous confirmed British record of this species." (Authors)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bsrc.ac.uk

6754. Peters, G.; Theischinger, G. (2007): Die gondwanischen Aeshniden Australiens (Odonata: Telephlebiidae und Brachytronidae). *Denisia* 20: 517-574. (in German, with English summary). ["Studying the relationships of the genus *Dendroaeschna* Tillyard led to a phylogenetic analysis of the genus *Austroaeschna* Selys, the family Telephlebiidae Cockerell and the clade Euaeshnida Bechly. Autapomorphies and synapomorphies are listed sequentially for each taxa involved, details are discussed and illustrated in three phylogenies. The taxa *Pulchraeschna* subgen. nov. (type species: *Austroaeschna unicornis pulchra* Tillyard) and *Notoaeschnini* trib. nov. (type genus: *Notoaeschna* Tillyard) are formally established. Australian „brachytronine aeshnids" (*Panbrachytronoda* tax. nov.: Telephlebiidae s. nov. and *Dendroaeschna* Tillyard) are characterized in terms of their chorology and ecology. Numerous photographs of live dragonflies and prepared specimens document the diversity of morphology and coloration found among these insects." (Authors)] Address: Peters, G., Museum für Naturkunde, Institut für Systematische Zoologie, Invalidenstraße 43, D-10115 Berlin, Germany. E-mail: guenther.peters@freenet.de

6755. Petrovicová, K.; David, S. (2007): Dragonflies (Odonata) of the upper reaches of the Kysuca river (NW Slovakia). 8. vedecká konferencia doktorandov a mladých vedeckých pracovníkov, 18.-19. 4. 2007, FPV UKF Nitra: 391-403. (in Slovakian, with English summary). ["The dragonfly fauna of the typical water habitats of the Kysuca River was characterised based on a three-year field study (2003-2005). We collected 873 dragonfly specimens (703 imagoes, 65 larvae and 5 exuviae and so confirmed the presence of 39 species at 16 sample sites in the study area. We distinguished 3 types of water habitats inside the Kysuca inundation area: epipotamal, hyporithral and temporary small lakes in inundated area. Taxon richness and Shannon diversity (H') did not differ between localities different part of stretches of the Kysuca River. There was an average of 4 dragonfly species per locality. The value of diversity was low $H' = \pm 1.4$, but the upper limit of $H_{max} = \pm 1.9$. Upper limits of evenness of samples were $e = \pm 0.9$. Total abundance, taxon richness and H' of the small lakes in flood plane of the dragonflies were significantly higher. Taxon diversity of the dragonflies was significantly higher from the habitats with vegetation. Ordination of the species composition revealed that the fauna of the River Kysuca is clearly separated from the temporary small lakes water bodies. The lotic species assemblages from the Kysuca River *Calopteryx splendens*, *C. virgo*, *Onychogomphus forcipatus* and

virgo, *Onychogomphus forcipatus* and *Platycnemis pennipes* can be regarded as streams dragonfly communities *Gomphus - Calopteryx splendens* (virgo) although the cenobiotic species *Gomphus vulgatissimus* was not recorded by the authors." (Authors)] Address: Petrovièová, Kornélia, Hlavná 83; 95195 Obyce, Slovakia. E-mail: mefik@post.sk

6756. Petrulevicius, J.F.; Nel, A. (2007): Enigmatic and little known Odonata (Insecta) from the Paleogene of Patagonia and Northwest Argentina. *Ann. Soc. Entomol. fr. (N.S.)* 43(3): 341-347. (in English, with French summary). ["The findings of new specimens of Latibalsaliidae and Frenguelliidae in Northwest and Patagonia Argentina are noteworthy for the knowledge of these little known families and the explanation of their systematic position. The new findings confirm the phylogenetic position of these families. The morphology of the discoidal cell in both fore and hind wings of *Frenguelia* corresponds to the most basal epiproctophoran damsel-dragonflies, implying a Triassic age for the particular lineage of this family. The absence of any fossil record between Triassic and Eocene could be related to a highly specialized biology for these animals, maybe related to mountain rainforests as for *Epiophlebia*, unique surviving damsel-dragonfly. Lastly, the middle Eocene Italian dragonfly family Bolcathemidae Gentilini 2002 is considered as a junior synonym of the Paleocene Argentinean family Palaeomacromiidae Petrulevicius et al. 1999 supporting faunistic contact between Europe and South America during the late Cretaceous." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

6757. Petrulevicius, J.F.; Nel, A.; Rust, J.; Bechly, G.; Kohls, D. (2007): New Paleogene Epallagidae (Insecta: Odonata) recorded in North America and Europe. Biogeographic implications. *ALAVESIA* 1: 15-25. (in English). ["Three new fossil Epallagidae: *Eodichrominae* are described, viz. *Labandeiraia* n. gen. with the two species *L. americaborealis* n. sp. (Eocene of USA), and *L. europae* n. sp. (Paleocene/Eocene of Denmark), and *Litheuphaea coloradensis* n. sp. (Eocene of USA). The pattern of distribution of this damselfly group in the Paleogene of North America and Europe is the same as for the damselfly subfamily *Thaumatoneuridae*: *Dysagrioninae* and the neuropteran *Polystoechotidae*. This pattern could correspond to Paleocene/Eocene land bridges between these continents via Greenland or Bering or to ancient Late Cretaceous groups." (Authors)] Address: Petrulevicius, J.F., Div. Cient. Paleozoología Invertebrados, Museo de La Plata, Fac. Cs. Nat., UNLP and CONICET Argentina. E-mail: levicius@museo.fcnym.unlp.edu.ar

6758. Piersanti, S.; Rebor, M.; Salerno, G.; Gaino, E. (2007): Behaviour of the larval dragonfly *Libellula depressa* (Odonata Libellulidae) in drying pools. *Ethology Ecology & Evolution* 19: 127-136. (in English). ["Numerous papers report that dragonfly larvae are able to survive dry periods in temperate areas. In this study, we investigated, in experimental field conditions in woodland, the behaviour of the larvae of *L. depressa*, belonging to the penultimate stadium (F-1), in a drying pond and the ability of these larvae to seek for water in dry conditions. Larval behaviour in a drying pond was studied using a small artificial pond that enabled water to flow out. Most of the larvae left the pond and, of the-

se, a higher percentage left the pool after the formation of puddles. The ability of the dragonfly larvae to move towards a nearby pond was investigated by placing them 5 m away from a natural pond, with the freedom to walk on the ground. More of the larvae released nearest the low edge of the pond, where a humidity gradient was present, were able to reach water than of those released nearest the high edge, where no humidity gradient was present. The ecological significance of the behaviour of the larvae of *L. depressa* is discussed in relation to the typical habitat of this species, represented by small, shallow ponds, and to the presence of hygrosensors in dragonfly larvae." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

6759. Pilgrim, E.M.; Dohlen, C.D., von (2007): Molecular and morphological study of species-level questions within the dragonfly genus *Sympetrum* (Odonata: Libellulidae). *Annals of the Entomological Society of America* 100(5): 688-702. (in English). ["This study combines morphological and molecular data to address several questions of species validity within the dragonfly genus *Sympetrum*. We compared morphological characters (genitalia and other putatively diagnostic characters) and DNA sequences from mitochondrial cytochrome oxidase I (COI) and nuclear internal transcribed spacer (ITS) regions between these disputed taxa and their close relatives. Specimens of *Sympetrum nigrescens* Lucas shared COI haplotypes with *Sympetrum striolatum* (Charpentier), and no morphological characters consistently diagnosed *S. nigrescens*, which therefore becomes a junior synonym of *S. striolatum*. Similarly, *Sympetrum occidentale* Bartenev shared identical COI and ITS sequences with *Sympetrum semicinctum* (Say), and the supposed diagnostic morphological characters overlapped with the intraspecific variation within *S. semicinctum*. *Sympetrum occidentale* becomes a junior synonym of *S. semicinctum*. In a third case, the genetic distance between *Sympetrum signiferum* Cunnings & Garrison and *Sympetrum vicinum* (Hagen) was lower than that found between most undisputed species. However, the morphological characters that distinguish *S. signiferum* from *S. vicinum* were distinct and consistent, and they supported the retention of *S. signiferum* as a valid species. In the fourth case, neither morphological nor genetic data were able to distinguish *Sympetrum janeae* Carle consistently from *Sympetrum internum* Montgomery, or *Sympetrum rubicundulum* (Say); in addition, genetic distances between individuals of *S. internum* and *S. rubicundulum* were small or nonexistent. Further studies are necessary to test the species status of *S. janeae* and its close relatives." (Authors)] Address: Pilgrim, E., NERL Student Services Contractor, Molecular Ecology Research Branch, US EPA, 26 Martin Luther King Drive Cincinnati, OH 45268, USA. E-mail: Pilgrim.Erik@epamail.epa.gov

6760. Rebor, M.; Piersanti, S.; Salerno, G.; Gaino, E. (2007): Water deprivation tolerance and humidity response in a larval dragonfly: a possible adaptation for survival in drying ponds. *Physiological Entomology* 32: 121-126. (in English). ["Water deprivation tolerance is investigated in the last larval stadium of *Libellula depressa* under various conditions of relative humidity (60 – 100% relative humidity; RH). Most of the larvae maintained at 100% RH emerge and, at lower RH levels

show some resistance to dehydration because they die after a mean period ranging from 1.4 days at 60% RH up to 6.7 days at 90% RH. In dual-choice chambers with humidity gradients from 63–74% RH and from 68–84% RH, larvae spend most of the time in the moist side of the chamber. In a Y-tube olfactometer, the larvae reveal a positive hygrotaxis to two airstreams carrying different amounts of water vapour (98% vs. 50%) and spend most of their time in the 'humid' arm. The ecological significance of desiccation tolerance and hygropositive response in the last larval stadium of *L. depressa* is discussed in relation to the presence of hygroreceptors in dragonfly larvae." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

6761. Rebor, M.; Piersanti, S.; Almaas, T.J.; Gai, E. (2007): Hygroreceptors in the larva of *Libellula depressa* (Odonata: Libellulidae). *Journal of Insect Physiology* 53: 550-558. (in English). ["Ultrastructural and electrophysiological (single-cell recordings) investigations were carried out on the coeloconic sensilla borne by the apical antenna of the larvae of *L. depressa*. These sensilla appear as pegs located in pits. One of them is a compound sensillum constituted of two fused pegs in a common pit and the other two are single pegs located in separated pits close to each other. Coeloconic sensilla show position and ultrastructural details very similar to those described in insect hygroreceptors. The electrophysiological recordings on the apical antennae of the last larval instar of *L. depressa* clearly show the presence of moist and dry cells responding antagonistically to humidity changes. This study gives the first evidence of hygroreceptors in dragonfly larvae and represents the first electrophysiological approach to larval sensilla of aquatic insects. The presence of hygroreceptors in *L. depressa* larvae is in agreement with the hygropositive response shown by these insects in laboratory and field behavioural experiments." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

6762. Roddis, S. (2007): Southern Hawker *Aeshna cyanea* attracted to light. *Atropos* 32: 59. (in English). [The same (?) female was caught by a moth-trap on 7 and 15-VIII-2006.] Address: Roddis, S., The Hollies, Station Road, Darley Dale, Matlock, Derbyshire, DE4 2EQ, UK

6763. Rouquette, J.R.; Thompson, D.J. (2007): Patterns of movement and dispersal in an endangered damselfly and the consequences for its management. *Journal of applied ecology* 44(3): 692-701. (in English). ["1. *Coenagrion mercuriale* is one of Europe's rarest and most threatened damselflies. It is listed in the European Community (EC) Habitats and Species Directive and is the only odonate currently given priority status in the UK Biodiversity Action Plan. Information regarding patterns of movement and dispersal in this species is required to guide conservation and management programmes. Management is currently geared towards habitat restoration of isolated subpopulations, with little attention paid to the metapopulation and landscape context. 2. A multisite mark–release–recapture project was carried out in the valley of the River Itchen in southern England to determine the extent of movement and the factors affecting movement of mature adults of this

endangered damselfly. A total of 8708 individuals was marked. 3. The species was found to be extremely sedentary, with dispersal limited to an area of contiguous habitat. The median net lifetime movement was 31.9 m and 66% of individuals moved less than 50 m in their lifetime. Movements of greater than 500 m were rare and the longest recorded movement was 1.79 km. This makes it the most sedentary odonate that has been studied in the UK. 4. The highest recapture rates and the lowest movement distances were recorded at the most isolated site. Time between capture and recapture, and day in season had an effect on movement, and individuals travelled further on their first than on subsequent moves. There was no consistent effect of age or sex on distance moved. 5. There was strong evidence for inverse density-dependent movement, with individuals moving further in low-density than high-density populations. This is the first time that inverse density-dependent movement has, to our knowledge, been observed in a natural population of odonates. 6. Synthesis and applications. *Coenagrion mercuriale*, along with many other invertebrate species of conservation concern, lives in a management-dependent mid-successional habitat. However, the species is highly sedentary. Furthermore, patterns of movement and dispersal are strongly affected by landscape structure and population density. This means that it is unable to recolonize isolated sites and requires 'stepping stone' habitats to improve its chances of survival in the medium to long term. Suitable habitat management between sites that are beyond the dispersal distance of individuals can be used to connect or reconnect populations. Within existing sites only small sections of habitat should be managed in any one year and new areas should be created close to existing populations. The long-term persistence of *C. mercuriale* and other invertebrate species requires a landscape approach to management, with connectivity an important part of management planning. It is clear that carefully conducted studies of movement and dispersal are key components in guiding invertebrate conservation strategies." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

6764. Salur, A.; Kiyak, S. (2007): Additional records for the Odonata fauna of South-Western Anatolia - Part II: Zygoptera. *Munis Entomology & Zoology* 2 (2): 499-510. (in English). [Records of 20 zygopteran Odonata collected between April-September in 2000. 2002 are documented in detail. The records originate from the Turkish provinces Antalya, Aydin, Burdur, Denizli, Isparta, and Mugla.] Address: Salur, A., Hitit Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, 19030 Çorum, Turkey. E-mail: alisalur@gmail.com

6765. Samways, M.J.; Grant, P.B.C. (2007): Honing Red List assessments of lesser-known taxa in biodiversity hotspots. *Biodiversity and Conservation* 16(9): 2575-2586. (in English). ["Red Listing organisms is an iterative process involving two variables. First, the conservation status of a taxon becomes clearer as more information becomes available, and secondly, the actual status changes as the taxon becomes more threatened or less threatened. Using a 20-year database of South African dragonflies has enabled us to hone conservation assessments and to arrive at a realistic appraisal of their true conservation status. Changes in the evaluati-

on of taxa came about through improved knowledge of habitat and particularly from information on the exact flight period. This background improved the apparency of the taxa so enabling accurate conservation assessments. The temporal shortcoming was addressed in detail by focusing on the core of the Cape Floristic Region global biodiversity hotspot, and recording the phenology of species. We found that there were large differences in emergence times. While flight times may not be a source of error in the temperate northern hemisphere, they can be a major issue in low and southern latitudes. Indeed, the error can be so great that species thought to be extinct were effectively resurrected. Temporal shortcomings can only be overcome by first undertaking a presence/absence survey over time to determine the appropriate time of year for making rigorous Red List assessments. This is not a criticism of the Red Listing process per se, which, for this taxon, we found to be largely sound. However, the results do emphasize that a critical approach to methodology is a necessary foundation when searching for trend indicators from the Red List with regards to lesser-known taxa." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6766. Schilder, R.J.; Marden, J.H. (2007): Parasites, proteomics and performance: effects of gregarine gut parasites on dragonfly flight muscle composition and function. *Journal of Experimental Biology* 210(24): 4298-4306. (in English). ["In previous work, we found that dragonflies infected with gregarine gut parasites have reduced muscle power output, loss of lipid oxidation in their flight muscles, and a suite of symptoms similar to mammalian metabolic syndrome. Here, we test the hypothesis that changes in muscle protein composition underlie the observed changes in contractile performance. We found that gregarine infection was associated with a 10-fold average reduction in abundance of a 155 kDa fragment of muscle myosin heavy chain (MHC; 206 kDa intact size). Insect MHC gene sequences contain evolutionarily conserved amino acid motifs predicted for calpain cleavage, and we found that calpain digestion of purified dragonfly MHC produced a peptide of 155 kDa. Thus, gut parasites in dragonflies are associated with what appears to be a reduction in proteolytic degradation of MHC. MHC155 abundance showed a strong negative relationship to muscle power output in healthy dragonflies but either no relationship or a weakly positive relationship in infected dragonflies. Troponin T (TnT) protein isoform profiles were not significantly different between healthy and infected dragonflies but whereas TnT isoform profile was correlated with power output in healthy dragonflies, there was no such correlation in infected dragonflies. Multivariate analyses of power output based on MHC155 abundance and a principal component of TnT protein isoform abundances explained 98% of the variation in muscle power output in healthy dragonflies but only 29% when data from healthy and infected dragonflies were pooled. These results indicate that important, yet largely unexplored, functional relationships exist between (pathways regulating) myofibrillar protein expression and (post-translational) protein processing. Moreover, infection by protozoan parasites of the midgut is associated with changes in muscle protein composition (i.e. across body compartments) that, either alone or in combination with other unmeasured changes, alter muscle contractile performance." (Authors)] Address:

Schilder, R.J., School of Biological Sciences, 348 Manner Hall, University of Nebraska, Lincoln, NE 68588, USA. E-mail: rschilder2@unl.edu

6767. Schirrmacher, K.; Schiel, F.-J.; Martens, A. (2007): Einjährige Entwicklung von *Gomphus pulchellus* und *Leucorrhinia caudalis* in einem neu angelegten Gewässer (Odonata: Gomphidae, Libellulidae). *Libellula* 26(3/4): 189-192. (in German, with English summary). ["In April and May 2007, three exuviae of *G. pulchellus* and five exuviae of *L. caudalis* were recorded at a big pond that had been created in November/December 2005 in the former floodplain of the River Rhine near Karlsruhe, Germany. This is the first proof of univoltine development of both species in central Europe." (Authors)] Address: Schirrmacher Kristin, Karpfenweg 12, D-76189 Karlsruhe, Germany. E-mail: Kristin-Schirrmacher@gmx.de

6768. Schmitz, M. (2007): Beobachtung der Keilflecklibelle (*Aeshna isosceles*) in der Heisinger Ruhraue (Essen) - Erstnachweis im Ballungsraum Ruhrgebiet. *Natur und Heimat* 67(2): 59-63. (in German). [Nordrhein-Westfalen, Germany; 6 and 27-VI-2004 and 9-VI-2006] Address: Schmitz, M., Birkenhang 37, 42555 Velbert-Langenberg, Germany. E-mail: mich.schmitz@gmx.de

6769. Schneider, B.; Wildermuth, H. (2007): Erstnachweis von *Sympecma fusca* als Wirt parasitischer Wassermilben (Odonata: Lestidae; Hydrachnidia). *Libellula* 26(1/2): 113-117. (in German, with English summary). ["Five larvae of an unidentified water mite attached to the thorax of a mature male *S. fusca* were photographed on 2-vi-2006 at a pond near Winterthur, Switzerland. The observation is described in detail and we discuss the possibility that this lestad, because it hibernates in the imaginal stage, has to be regarded as an unsuitable host." (Authors)] Address: Schneider, B.; Wolfbühlstrasse 34a, CH-8408 Winterthur, Switzerland. E-mail: b.schneider@libellen.li

6770. Schwarz, M.; Schwarz-Waubke, M.; Laister, G. (2007): Die Grüne Keiljungfer [*Ophiogomphus cecilia* (FOURCROY 1785)] (Odonata, Gomphidae) in den Europaschutzgebieten Waldaist, Naarn, Maltsch, Tal der Kleinen Gusen, Böhmerwald und Mühltäler (Österreich, Oberösterreich). *Beiträge zur Naturkunde Oberösterreichs* 17: 257-279. (in German, with English summary). ["*O. cecilia* has been found in all of the investigated Natura 2000 areas (Waldaist-Naarn, Maltsch, Tal der Kleinen Gusen, Böhmerwald und Mühltäler, Austria). At the river Große Mühl only one specimen was found in 2006, and it is uncertain if *O. cecilia* breeds there. Whereas the rivers Kleine Mühl, Kleine Gusen, Maltsch, Waldaist, Kleine Naarn and Naarn proved to be important habitats for this species. In some sections of the rivers Maltsch, Waldaist, Kleine Naarn and Naarn *O. cecilia* occurs in high densities. In the investigated areas no threatening could be found. Steps for protecting *O. cecilia* are listed." (Authors)] Address: Schwarz, M., Eben 21, A-4202 Kirchschlag, Austria. E-Mail: schwarz-entomologie@utanet.at

6771. Schwarz, M. (2007): Wiederfund von *Somaechloria arctica* (ZETTERSTEDT 1840) (Odonata, Corduliidae) in Oberösterreich (Österreich). *Beiträge zur Naturkunde Oberösterreichs* 17: 303-307. (in German, with English summary). [5-VII-2006, S. arctica was found in the nature reserve "Rote Auen", Austria, and

for the first time in Upper Austria north of the Danube ("Mühlviertel"). Additional species of Odonata found at the same site are listed.] Address: Schwarz, M., Eben 21, A-4202 Kirchschlag, Austria. E-Mail: schwarz-entomologie@utanet.at

6772. Scoggins, M.; McClintock, N.L.; Gosselink, L. (2007): Occurrence of polycyclic aromatic hydrocarbons below coal-tar-sealed parking lots and effects on stream benthic macroinvertebrate communities. *J. N. Am. Benthol. Soc.* 26(4): 694-707. (in English). ["Parking-lot pavement sealants recently have been recognized as a major source of polycyclic aromatic hydrocarbons (PAHs) in urban stream sediments in Austin, Texas. Laboratory and field studies have shown that PAHs in sediments can be toxic to aquatic organisms and can degrade aquatic communities. After identifying increases in concentrations of PAHs in sediments below seal-coated parking lots, we investigated whether the increases had significant effects on stream biota in 5 Austin streams. We sampled sediment chemistry and biological communities above and below the point at which stormwater runoff from the parking lots discharged into the streams, thus providing 5 upstream reference sites and 5 downstream treatment sites. Differences between upstream and downstream concentrations of total PAH ranged from 3.9 to 32 mg/kg. Analysis of the species occurrence data from pool and riffle habitats indicated a significant decrease in community health at the downstream sites, including decreases in richness, intolerant taxa, Diptera taxa, and density. In pool sediments, Chironomidae density was negatively correlated with PAH concentrations, whereas Oligochaeta density responded positively to PAH concentrations. In general, pool taxa responded more strongly than riffle taxa to PAHs, but riffle taxa responded more broadly than pool taxa. Increases in PAH sediment-toxicity units between upstream and downstream sites explained decreases in taxon richness and density in pools between upstream and downstream sites." (Authors)] Address: Scoggins, M., Watershed Protection and Development Review Department, City of Austin, 505 Barton Springs Road, 11th Floor, Austin, Texas 78767 USA. E-mail: mateo.scoggins@ci.austin.tx.us

6773. Seidenbusch, R.; Heidemann, H. (2007): Ein neues Merkmal zur Identifikation der Larven von *Diplacodes lefebvrii* unter den paläarktischen Libellulidae (Odonata). *Libellula* 26(1/2): 107-112. (in German, with English summary). ["We present a hitherto ignored distinctive feature to separate larvae and exuviae of *D. lefebvrii* from other palaeartic Libellulidae. This feature concerns a long, strong seta on the mediobasal surface of each of the two pronotal lobes, close to the median ecdysial line. We hypothesize that this seta may probably be a genus-specific characteristic for larval *Diplacodes*. In addition, we present a new, additional distinctive feature to separate *Crocothemis* species and *S. fonscolombii* by the number of mesosternal setae." (Authors)] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany. E-mail: seidenbusch@freenet.de

6774. Serrano-Meneses, M.A.; Azpilicueta-Amorin, M.; Szekely, T.; Cord (2007): The development of sexual differences in body size in Odonata in relation to mating systems. *Eur. J. Entomol.* 104(3): 453-458. (in English). ["Adult body size is the result of important environmental, maternal and/or genetic effects acting on

animals during development. Here we investigate how sexual size dimorphism (SSD) develops in seven species of Odonata: *Anax imperator*, *Cordulegaster boltonii*, *Onychogomphus uncatas*, *Oxygastra curtisii* (Anisoptera), *Cercion lindeni*, *Ischnura graellsii* and *Platycnemis acutipennis* (Zygoptera). SSD of both the last larval and adult stages of the same individuals, which were reared under laboratory conditions, was measured. The aims were to investigate (i) whether SSD develops during the larval stage, (ii) the direction of larval and adult SSD, and (iii) whether the direction of adult SSD can be predicted by the mating system of a given species (e.g. males of territorial species being larger than females and the opposite for non-territorial species). We found that although larval differences in size may be present between the sexes, these are not necessarily shown in the adult stage (they may change or disappear). Also, the mating system was not related to patterns of adult SSD. Differences in SSD in larvae may be caused by differential use of resources via differential niche-utilisation or sex-specific growth patterns. We highlight the fact that sexual selection favouring large male size and fecundity selection, which selects for large females may be acting on the observed patterns in SSD in adults." (Authors)] Address: Serrano-Meneses, M.A., Department of Biology and Biochemistry, University of Bath, Claverton Down, Bath BA2 7AY, UK. E-mail: mserrano@miranda.ecologia.unam.mx

6775. Serrano-Meneses, M.A.; Córdoba-Aguilar, A.; Méndez, V.; Layen, S. (2007): Sexual size dimorphism in the American rubyspot: male body size predicts male competition and mating success. *Animal Behaviour* 73 (6): 987-997. (in English). ["Sexual differences in body size are widespread among animals, and various explanations for the evolution and maintenance of sexual size dimorphism have been proposed. We investigated the effects of sexual selection and fecundity selection on the sizes of males and females, respectively, in American rubyspots, *Hetaerina americana*. Males are larger than females and have large red spots at the base of each wing that are sexually selected via male-male contests. Mating success is determined by the ownership of a territory. Large males held territories for longer and sustained longer territorial fights than small males. Territorial males obtained more copulations than nonterritorial ones. Large males also had more wing pigmentation and mated with large females. Large territorial males had high energy reserves, whereas nonterritorial males appeared to have depleted reserves. Selection analyses of body size showed disruptive selection acting on male body size, suggesting that both small and large males may be favoured in terms of mating success. We also tested whether fecundity selection acts on female size. However, female body size was unrelated to the number of eggs carried. Taken together, our results suggest that in this territorial damselfly species male-biased size dimorphism is driven by large male size in male-male competition being selectively advantageous in territory acquisition and/or maintenance. We also suggest that small size is advantageous in nonterritorial males to improve their agility in courting (or subduing) females." (Authors)] Address: Serrano-Meneses, M.A., Department of Biology and Biochemistry, University of Bath, Claverton Down, Bath BA2 7AY, UK. E-mail: mserrano@miranda.ecologia.unam.mx

- 6776.** Sethy, P.G.S.; Siddiqi, S.Z. (2007): Fauna of Protected Areas - 31: Observations on odonates in Similipal Biosphere Reserve, Mayurbhanj, northern Orissa. *Zoos' Print Journal* 22(11): 2893-2894. (in English). [India; 16 species of Odonata from 39 sampling sites are brought on record.] Address: Sethy, P.G.S., S/o-Gandharba Sethy, At-Kadei, Po-Uchapada, Via-Kotsahi, Dist.-Cuttack, Orissa 754022, India. E-mail: mail4pgs@yahoo.co.in
- 6777.** Shieh, S.-H.; Hsu, C.-B.; Wang, C.-P.; Yang, P.-S. (2007): Leaf breakdown in a subtropical stream riffle and its association with macroinvertebrates. *Zoological Studies* 46(5): 609-621. (in English). ["The relationships between the quality of leaves of 3 trees (*Machilus thunbergii*, *Schefflera octophylla*, and *Ficus erecta*) and the assemblages of macroinvertebrates were studied at a riffle section of a 3rd-order subtropical forest stream in northern Taiwan. Macroinvertebrate taxon richness and density that colonized bags of leaves of the 3 tree species did not significantly differ. Macroinvertebrate assemblages were dominated by collectors, such as non-Tanyponinae Chironomidae, Prosimulium spp., and Baetis spp., which constituted > 79% of the total fauna. Results of a principal component analysis (PCA) showed that the macroinvertebrate assemblages were associated with the incubation time of the litter bags in the stream and the fine particulate organic matter (FPOM) trapped by the leaf bags, but not with the variables of leaf litter quality. Shredders, predominantly small nemourids, accounted for only 5.7%, 7.1% and 10.8% of the total macroinvertebrate assemblages on *M. thunbergii*, *S. octophylla*, and *F. erecta*, respectively, suggesting that macroinvertebrates played only a minor role in leaf litter breakdown in this subtropical 3rd-order stream. However, the density of shredders on *F. erecta*, as a function of the weight of the leaf litter remaining, was significantly higher than that of *M. thunbergii*, possibly because of the preference of shredders for high-quality food resources. In a comparison with the temperate zone systems, the dominant taxa of shredders that colonized the leaf litter were similar, but their relative abundances were much less in this subtropical forest stream riffle." (Authors) *Calopteryx* sp. and *Mnais* sp. are very rarely present.] Address: Yang, P.-S., Department of Ecology, Providence University, 200 Chung-Chi Rd., Shalu, Taichung 433, Taiwan. E-mail: psyang@ccms.ntu.edu.tw
- 6778.** Smith, J.; Samways, M.J.; Taylor, S. (2007): Assessing riparian quality using two complementary sets of bioindicators. *Biodivers. Conserv.* 16: 2695-2713. (in English). ["Biological indicators are being increasingly used to rapidly monitor changing river quality. Among these bioindicators are macroinvertebrates. A shortcoming of macroinvertebrate rapid assessments is that they use higher taxa, and therefore lack taxonomic resolution and species-specific responses. One subset of invertebrate taxa is the Odonata, which as adults, are sensitive indicators of both riparian and river conditions. Yet adult Odonata are not necessarily an umbrella taxon for all other taxa. Therefore, we investigated whether the two metrics of aquatic macroinvertebrate higher taxa and adult odonate species might complement each other, and whether together they provide better clarity on river health and integrity than one subset alone. Results indicated that both metrics provide a similar portrait of large-scale, overall river conditions. At the smaller spatial scale of parts of rivers, Odonata were highly sensitive to riparian vegetation, and much more so than macroinvertebrate higher taxa. Odonate species were more sensitive to vegetation structure than they were to vegetation composition. Landscape context is also important, with the odonate assemblages at point localities being affected by the neighbouring dominant habitat type. Overall, benthic macroinvertebrates and adult Odonata species provide a highly complementary pair of metrics which together provide large spatial scale (river system) and small spatial scale (point localities) information on the impact of stressors such as riparian invasive alien trees. As adult Odonata are easy to sample and are sensitive to disturbance at both small and large spatial scales, they are valuable indicators for rapid assessment of river condition and riparian quality." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za
- 6779.** Sniegula, S. (2007): New records of protected dragonflies (Odonata) – *Aeshna viridis* EVERSM. and *Leucorrhinia pectoralis* (CHARP.), in the Drawsko Lake District. *Wiad. entomol.* 26(1): 57-58. (in Polish). [Poland; brief documentation of records of *Aeshna viridis* and *leucorrhinia pectoralis* recorded in 2005.] Address: not stated
- 6780.** Song, D.; Wang, H.; Zeng, L.; Yin, C. (2007): Microstructure and nanomechanical properties of the wing membrane of dragonfly. *Materials Science and Engineering A* 457: 254-260. (in English). ["Detailed investigations on the microstructure and the mechanical properties of the wing membrane of the dragonfly were carried out. It was found that in the direction of the thickness the membrane was divided into three layers rather than as traditionally considered as a single entity, and on the surfaces the membrane displayed a random distribution rough microstructure that was composed of numerous nanometer scale columns coated by the cuticle wax secreted. The characteristics of the surfaces were accurately measured and a statistical radial distribution function of the columns was presented to describe the structural properties of the surfaces. Based on the surface microstructure, the mechanical properties of the membranes taken separately from the wings of living and dead dragonflies were investigated by the nanoindentation technique. The Young's moduli obtained here are approximately two times greater than the previous result, and the reasons that yield the difference are discussed." (Authors)] Address: Song, F., State Key Laboratory of Nonlinear Mechanics (LNM), Institute of Mechanics, Chinese Academy of Sciences, Beijing 100080, People's Republic of China. E-mail: songf@lnm.imech.ac.cn
- 6781.** Strange, A.M.; Griffiths, G.H.; Hine, S.; Young, K.; Holloway, (2007): Habitat associations of the Small Red Damselfly (*Ceriatagrion tenellum*) (De Villiers) in heathland in southern England (Zygoptera: Coenagrionidae). *Journal of Insect Conservation* 11(3): 241-249. (in English). ["*C. tenellum* is classed as vulnerable (Shirt, British Red Data Book, Nature Conservancy Council, Peterborough, UK, 1987) throughout the UK, and is included in certain Local Biodiversity Action Plans (LBAPs) in the south. A large proportion of any Biodiversity Action Plan is concerned with the requirement of conservation and management programmes. In order to guide them, information about the habitat pre-

ferences of the species concerned is vital. Detailed habitat information was collected to include a variety of physical parameters particularly vegetation, both in-channel and bankside. The species was found to be primarily associated with in-channel emergent broad-leaved plants, bankside grasses and rushes, and shallow, narrow channels with dark organic substrate. The consequences of these findings are discussed in relation to the conservation and management of *C. tenellum*." (Authors)] Address: Strange, Alison M., The Landscape & Landform Research Group Department of Geography, The University of Reading, PO Box 227, Whiteknights, Reading RG6 6AB, UK. E-mail: a.m.strange@reading.ac.uk

6782. Strobl, P. (2007): Interessante Insektenfunde in der Altmark. (Heteroptera, Odonata, Lepidoptera, Coleoptera). Entomologische Mitteilungen Sachsen-Anhalt 15(2): 54-56. (in German) [Mahlpfluher Fenn, MTB-3536/4, Sachsen-Anhalt, Germany; a male *Cordulegaster boltonii* was recorded at 23-VI-2005.] Address: Strobl, P., Schulstr. 34, 39576 Stendal, Germany, E-mail: strobl-angepe@web.de

6783. Stübing, S.; Stübing, N. (2007): Flussuferläufer erbeuten Großlibellen. Der Falke 54: 272. (in German). [Los Llanos de Aridane, La Palma, Canary Islands, Spain; on 21.11.2004, Common sandpipers, *Actitis hypoleucos* (Aves) were preying on emerging *Anax imperator* and *Sympetrum fonscolombii*. Odonata as prey of the genus *Actitis* are discussed.] Address: Stübing, S., Eckhardtstr. 33a, 64289 Darmstadt, Germany. E-mail: stefan.stuebing@gmx.de

6784. Stübing, S.; Stübing, N. (2007): Notizen zur Entwicklung von *Anax imperator* und *Sympetrum fonscolombii* auf La Palma, Kanarische Inseln (Odonata: Aeshnidae, Libellulidae). *Libellula* 26(3/4): 233-241. (in German, with English summary). ["During late 2004, we checked altogether 19 of approximately 250 artificial irrigation reservoirs in the western part of La Palma for the occurrence of Odonata. In only two adjacent reservoirs were noteworthy numbers of *S. fonscolombii* and *A. imperator* recorded. The emergence of both species occurred on the completely homogeneous surface of the reservoir wall. About half of all *S. fonscolombii* emerged at heights of 70 to 115 cm above water level. In *A. imperator* the majority emerged at heights of 80 to 120 cm, six individuals emerging at heights of more than 400 cm to at most 520 cm above water level. Predation of Common Sandpiper *Actitis hypoleucos* on emerging dragonflies was observed repeatedly." (Authors)] Address: Stübing, S., Im Feldchen 1a, D-61209 Echzell, Germany. E-mail: stefan.stuebing@gmx.de

6785. Suhling, F.; Martens, A. (2007): Dragonflies and damselflies of Namibia. Gamsberg Macmillan. ISBN 978-99916-0-764-1: 280 pp. (in English). [The book describes the 127 species recorded in Namibia providing information on their distribution range, habitat, ecology and behaviour. The identification keys not only cover the Namibian species, but also those of neighbouring Botswana and southern Angola, so that 149 species are covered. The general overview of dragonfly biology and the species descriptions are extensively illustrated with 174 photographs, 27 plates with line drawings and 125 distribution maps. Each species is treated in a monographic way, providing information on identification characters and sibling species, meaning of

scientific name, distribution, ecology and behaviour, threats and conservation. A general, concise introduction on 66 pages provides information on morphology, physiology, ecology and behaviour, biogeography, regional dragonfly habitats and typical species of these habitats, and surveying of dragonflies. Closing sections of the book are a short key of dragonfly larvae, checklists of Odonata from Namibia, Botswana, and Angola, and selected bibliography, and a species index. Of course, this book is indispensable for everyone travelling through south-western Africa for odonatological reasons. (Martin Schorr)] Address: Suhling, F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de; Publisher: Gamsberg Macmillan Publishers. P.O. Box 22830, Windhoek, Namibia

6786. Svensson, E.I.; Friberg, M. (2007): Selective predation on wing morphology in sympatric damselflies. *The American Naturalist* 170: 101-112. (in English). ["Although predation is thought to affect species divergence, the effects of predator-mediated natural selection on species divergence and in nonadaptive radiations have seldom been studied. Wing melanization in *Calopteryx* damselflies has important functions in sexual selection and interspecific interactions and in species recognition. The genus *Calopteryx* and other damselfly genera have also been put forward as examples of radiations driven by sexual selection. We show that avian predation strongly affects natural selection on wing morphology and male wing melanization in two congeneric and sympatric species of this genus (*Calopteryx splendens* and *Calopteryx virgo*). Predation risk was almost three times higher for *C. virgo*, which has an exaggerated degree of wing melanization, than it was for the less exaggerated, sympatric congener *C. splendens*. Selective predation on the exaggerated species *C. virgo* favored a reduction and redistribution of the wing melanin patch. There was evidence for nonlinear selection involving wing patch size, wing patch darkness, and wing length and width in *C. splendens* but weaker nonlinear selection on the same trait combinations in *C. virgo*. Selective predation could interfere with species divergence by sexual selection and may thus indirectly affect male interspecific interactions, reproductive isolation, and species coexistence in this genus." (Authors) *Motacilla flava* *Motacilla alba* *Motacilla cinerea* as predators] Address: Friberg, M., Department of Zoology, Stockholm University, SE-106 91 Stockholm, Sweden E-mail: magne.friberg@zoologi.su.se

6787. Switzer, P.V. (2007): Using dragonflies as common, flexible and charismatic subjects for teaching the scientific process. *American Biology Teacher* 69(3): 158-164. (in English). ["Biology laboratories are usually designed around convenient and available subjects. For example, for animal laboratories "*Daphnia magna*," "*Drosophila melanogaster*," frogs, rats, and mice are common animals that are relatively easy to obtain, relatively cheap, and consequently lend themselves well to laboratory experimentation. On many campuses, however, a body of water exists - either in the form of a creek or small pond - and this water attracts numerous animals that have tremendous potential as subjects for teaching and learning. Chief among these animals are the dragonflies and damselflies. In this paper, focusing primarily on dragonflies, the author explains why dragonflies make great subjects, gives some practical advice for using them in teaching, and provides a few

specific examples of how he has used them in his introductory zoology, upper-division animal behaviour, and non-majors environmental life science classes." (Author)] Address: Switzer, P.V., Eastern Illinois Univ., Dept Biol, Sci., Charleston IL 61920; USA. E-mail: cfpvs@eiu.edu

6788. Tol, J. van (2007): The Platystictidae of the Moluccas and Misool (Odonata). *Deutsche Entomologische Zeitschrift* 54(1): 3-26. (in English). ["The Platystictidae of the Moluccas and Misool (Indonesia) are revised. All species are assigned to *Drepanosticta* Laidlaw. Representatives of this genus are known from the larger islands in the region, viz. Halmahera, Bacan, Obi, Ambon, Buru, Seram, and from the Kai island group. Aru is poorly studied for odonates, and no platystictids are known. Nine new species are described, viz. *Drepanosticta halmahera* sp. n., *D. rudicula* sp. n., *D. sembilanensis* sp. n. and *D. siu* sp. n., all from Halmahera; *D. bifida* sp. n. and *D. psygma* sp. n. from Bacan; *D. misoolensis* sp. n. from Misool; *D. amboinensis* sp. n. from Ambon and *D. obiensis* sp. n. from Obi. Two previously described species, *D. robusta* Fraser (Kai) and *D. moluccana* Lieftinck (Buru), are redescribed and illustrated. A key to all species is provided, as well as preliminary notes on phylogenetic relationships and biogeography. Halmahera platystictids show sister-group relationships with species from Bacan or, remarkably, Misool. The Moluccan *Drepanosticta* species are assigned to the *D. lymetta* and *D. megametta* species groups, which are also known from the Philippines and the Papuan region, and the *D. moluccana* group, presumably confined to the southern Moluccas. The role of the middle Eocene South Caroline Arc in the distributional history of the *Drepanosticta* species is discussed. (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

6789. Tol, J. van (2007): The Odonata of Sulawesi and adjacent islands. Part 7. Libellago and Sclerocypha (Chlorocyphidae). *International Journal of Odonatology* 10(2): 209-248. (in English). ["The Sulawesi species of the genera *Libellago* and *Sclerocypha* are revised. *L. asclepiades*, *L. rufescens*, *L. xanthocyana* and *S. bisignata* are redescribed, and three species of *Libellago* – one with four subspecies – are described as new to science, viz. the closely allied *L. daviesi* sp. nov. from the northern arm of Sulawesi and *L. manganitu* sp. nov. from Sangihe Island, north of Sulawesi, and a complex of four mainly parapatric subspecies allied to *L. rufescens*, viz., *L. celebensis* sp. nov. from W part of Central Sulawesi, and nominotypical subspecies, *L. celebensis anoa* ssp. nov. from NE part of South Sulawesi, *L. celebensis dorsonigra* ssp. nov. from NE part of South Sulawesi, and *L. celebensis orientalis* ssp. nov. from extreme E part of South Sulawesi, E part of Central Sulawesi and Southeast Sulawesi. The status of the genus *Sclerocypha* is discussed. A key to the species of Chlorocyphidae (except *Rhinocypha*) known from Sulawesi, is provided." (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

6790. Tol, J. van (2007): Book reviews. *Tijdschrift voor Entomologie* 150: 30, 38. (in English). [Reviews of the following two books: Charles W. Heckman, 2006. *Encyclopedia of South American aquatic insects: Odonata – Anisoptera*. Illustrated keys to known families,

genera, and species in South America. – Springer, Dordrecht. viii + 725 pp., 793 figures. ISBN 978-1-4020-4801-2. Price USD 299.00. Rosser W. Garrison, Natalia von Ellenrieder & Jerry A. Louton, 2006. *Dragonfly genera of the New World*. An illustrated and annotated key to the Anisoptera. – Johns Hopkins University Press, Baltimore. xiv + 368 pp., 1626 figures, 124 maps, 8 colour plates. ISBN 0801884462. Price GBP 66.00] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands. E-mail: tol@nmm.nl

6791. Tonczyk, G.; Jaskula, R.; Socha, G. (2007): *Platycnemis pennipes* (Pall.) as a prey of *Neoitamus cyanurus* (Loew) (Zygoptera: Platycnemididae; Diptera: Asilidae). *Notul. odonotol.* 6(10): 119. (in English). [documentation of a first known asilid predation on *Odonata* in Poland.] Address: Tonczyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i hydrobiologii, Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland

6792. Trigal, C.; García-Criado, F.; Alaez, C.-F. (2007): Macroinvertebrate communities of mediterranean ponds (North Iberian Plateau): importance of natural and human-induced variability. *Freshwater Biology* 52(10): 2042-2055. (in English). ["1. The effects of natural and human-induced variability on the composition of macroinvertebrate communities of 28 ponds located in the North Iberian Plateau (Spain) were studied to determine the best predictors of community structure. 2. Constrained ordination was used to identify the main factors explaining the among-pond variance in abundance (as catch per unit effort) of total macroinvertebrate and Chironomidae assemblages and trophic structure (functional feeding groups). 3. Variance partitioning showed that human disturbance (represented by a pond condition index, total phosphorus concentration and pesticides) was the best predictor of macroinvertebrate community structure, whereas factors, such as habitat and biotic variables were of secondary importance. Factors controlling the chironomid community were broadly similar to those acting on the whole community of macroinvertebrates. In contrast, trophic structure was mainly determined by habitat and biotic variables. 4. Our results show that macroinvertebrates may be used as effective indicators of the ecological status of Mediterranean ponds. The Chironomidae deserve special attention because they were the dominant group in the study ponds and the strongest explanatory variable for their distribution was degradation." (Authors) *Coenagrionidae* and *Libellulinae* are considered.] Address: Trigal, Cristina, Inst. för miljöanalys/ Dept. of Environmental Assessment, SLU/ Swedish University of Agricultural Sciences, Box 70 50, 750 07 Uppsala, Sweden. Email: christina.trigal@ma.slu.se

6793. Turner, A.M.; Chislock, M.F. (2007): Dragonfly predators influence biomass and density of pond snails. *Oecologia* 153: 407-415. (in English). ["Studies in lakes show that fish and crayfish predators play an important role in determining the abundance of freshwater snails. In contrast, there are few studies of snails and their predators in shallow ponds and marshes. Ponds often lack fish and crayfish but have abundant insect populations. Here we present the results of field surveys, laboratory foraging trials, and an outdoor mesocosm experiment, testing the hypothesis that insects are important predators of pulmonate snails. In laboratory foraging

trials, conducted with ten species of insects, most insect taxa consumed snails, and larval dragonflies were especially effective predators. The field surveys showed that dragonflies constitute the majority of the insect biomass fishless ponds. More focused foraging trials evaluated the ability of the dragonflies *Anax junius* and *Pantala hymenaea* to prey upon different sizes and species of pulmonate snails (*Helisoma trivolvis*, *Physa acuta*, and *Stagnicola elodes*). *Anax junius* consumed all three species up to the maximum size tested. *Pantala hymenaea* consumed snails with a shell height of 3 mm and smaller, but did not kill larger snails. *P. acuta* were more vulnerable to predators than were *H. trivolvis* or *S. elodes*. In the mesocosm experiment, conducted with predator treatments of *A. junius*, *P. hymenaea*, and the hemipteran *Belostoma flumineum*, insect predators had a pronounced negative effect on snail biomass and density. *A. junius* and *B. flumineum* reduced biomass and density to a similar degree, and both reduced biomass more than did *P. hymenaea*. Predators did not have a strong effect on species composition. A model suggested that *A. junius* and *P. hymenaea* have the largest effects on snail biomass in the field. Given that both pulmonate snails and dragonfly nymphs are widespread and abundant in marshes and ponds, snail assemblages in these water bodies are likely regulated in large part by odonate predation." (Authors)] Address: Turner, A.M., Department of Biology, Clarion University, Clarion, PA 16214, USA. E-mail: aturner@clarion.edu

6794. Tyrrell, M. (2007): Maintenance of the female androchrome colour polymorph in the Blue-tailed Damselfly *Ischnura elegans* (Vander Linden). *J. Br. Dragonfly Society* 23(2): 33-39. (in English). ["In order to explain the maintenance of the male-like androchrome colour form in female Zygoptera, a form that would otherwise suffer severe disadvantages through lack of recognition by males, a number of theories have been developed. Cordero & Andres (1996) reviewed these theories and concluded that a "Density Dependence" theory offered the most likely explanation. This paper reports on research into the implications for female androchrome colour forms in both low and high density populations as a test of the Density Dependence theory, and was applied to the Blue-tailed Damselfly *Ischnura elegans* (Vander Linden) in Northamptonshire. For the low and high density populations studied, mating success was found to be directly related to the proportion of each colour form in the population as a whole, with no one colour form exhibiting preferential advantages or disadvantages. Similarly there was found to be no significant difference between the mating frequencies in the two populations. These observations suggest that the female androchrome in *Ischnura elegans* is not a perfect male mimic and that the male is readily able to recognize this colour form as female." (Author)] Address: Tyrrell, M., 8 Warwick Close, Raunds, Welingtonborough, Northamptonshire NN9 6JH, UK

6795. Tytar, V.M. (2007): *Selysiotthemis nigra* - a new species of dragonflies for the fauna of Ukraine. *Vestnik Zoologii* 41(2) : 122. (in Ukrainian, with English summary). [20.VII.2002, a female of *S. nigra* was discovered on the western part of Pokrovka (Kovalevka) village, Ochakov district, Mykolayivs'ka Oblast' (Province) (46.28.36N 31.39.33E) on the bank of Chirnino lake.] Address: Tytar, V.M., Schmalhausen Institute, University of Kiev, Ukraine

6796. Uboni, C.; Bessi, N.; Colla, A. (2007): Una popolazione urbana di *Cordulegaster heros* Theischinger, 1979 in Italia (Odonata, Cordulegasteridae). *Atti Mus. Civ. Stor. Nat. Trieste* 53 (2006): 207-211. (in Italian, with English summary). ["An urban population of *C. heros* in Italy - We underline the importance of a population of *C. heros* near the city of Trieste (NE Italy). This population of *C. heros* is: (i) up to now, one of the few in Italy; (ii) locally valuable since *C. heros* is listed in the annex II and IV of the Habitat Directive; (iii) situated in a very peculiar relict and urbanized habitat where *C. heros* co-occur with *C. bidentata* and *Calopteryx virgo*." (Authors)] Address: Uboni, Costanza, Museo Civico di Storia Naturale - Piazza Hortis, 4 - 34123 Trieste, Italy. E-mail: sportellonatura@comune.trieste.it

6797. van der Poorten, N. (2007): A note on the existence of androchrome females in *Crocothemis servilia* (Dru.) (Anisoptera: Libellulidae). *Notul. odonatol.* 6(10): 120. (in English). [20-X-2006; Hammaliya Estate, Bandarakoswatte near Kurunegala, Sri Lanka.] Address: van der Poorten, N., Hammaliya Estate, Bandarakoswatte-60424, Sri Lanka. E-mail: infor@srilanka-insects.net

6798. Van Gossum, H.; Beatty, C.D.; Charlat, S.; Waqa, H.; Markwell, (2007): Male rarity and putative sex-role reversal in a Fijian Islands community of damselflies (Odonata). *Journal of Tropical Ecology* 23: 591-598. (in English). ["Behavioural sex-role reversal occurs when males and females exchange their standard roles in territorial defence or parental care. One circumstance under which sex-role reversal may occur is when males are a limiting resource, so that females have to compete for access to mates. Here we report on male rarity and male and female behaviour of species within the damselfly genus *Nesobasis*, endemic to Fiji. Earlier reports suggested that, in some members of this genus, males were seldom observed and that females of these species were consequentially territorial, a phenomenon described as 'sex-role reversal'. Quantitative estimation of the ratio of adult males to females at 15 localities in 13 *Nesobasis* species (1489 individuals) indicated that males were extremely rare in some species, yet common in others. This interspecific variability in male rarity cannot be explained by elevation or habitat. Formal observations of three species with abundant males revealed that males of these species were highly territorial: they physically challenged intruders while remaining within a confined area. By contrast, in three species where males were consistently rare or absent, females were not territorial: instead, they moved widely and were primarily engaged in oviposition. While we do not know the underlying reason for the unusual rarity of males at oviposition sites in some species, it is clear that this rarity has not provided sufficient selection pressure to generate genuine sex-role reversal." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6799. Van Gossum, H.; Beirinckx, K.; Forbes, M.R.; Sherratt, T.N. (2007): Do current hypotheses explain continental and seasonal variation in female morph frequencies of the damselfly, *Nehalennia irene*? *Biological Journal of the Linnean Society* 90(3): 501-508. (in English). ["Female-limited colour polymorphism occurs in many damselfly species, where one morph re-

sembles the male (andromorph) and the other is dissimilar (gynomorph). Explanations for this phenomenon vary, but most assume that andromorphism has arisen in odonates, as a response to excessive male harassment. Here, we quantify the extent of continental and seasonal variation in female morph frequencies in a widely-distributed damselfly and ask whether the spatiotemporal patterns in andromorph frequency can be understood on the basis of sexual harassment theory. We sampled the damselfly, *Nehalennia irene* (Hagen) among regions across Canada, and at several sites, over the reproductive season, within Central Canada. Andromorph frequencies ranged from 0 to > 90% across Canada. In particular, sites in Western Canada had consistently high andromorph frequencies, whereas andromorph frequencies among Central sites were lower and variable and, among Eastern sites, were lower still (except one site) and relatively invariant. For populations in Central Canada, both andromorph frequencies and population densities varied significantly over time, reaching a peak mid-season. As expected, morph frequency covaried significantly with estimates of male harassment in some cases, but estimates of male harassment did not consistently account for variation in morph frequencies within all regions. Additional factors such as genetic drift may influence morph frequency at the edge of a species' range. Future work also should test, and attempt to explain causation, for seasonal variation in morph frequency." (Author)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6800. Van Gossum, H.; Beirinckx, K.; Forbes, M.R.; Sherratt, T.N. (2007): Continental and seasonal variation in female morph frequencies of the damselfly, *Nehalennia irene*. *Biological Journal of the Linnean Society* 90: 501-508. (in English). ["Female-limited colour polymorphism occurs in many damselfly species, where one morph resembles the male (andromorph) and the other is dissimilar (gynomorph). Explanations for this phenomenon vary, but most assume that andromorphism has arisen in odonates, as a response to excessive male harassment. Here, we quantify the extent of continental and seasonal variation in female morph frequencies in a widely-distributed damselfly and ask whether the spatiotemporal patterns in andromorph frequency can be understood on the basis of sexual harassment theory. We sampled the damselfly, *Nehalennia irene* (Hagen) among regions across Canada, and at several sites, over the reproductive season, within Central Canada. Andromorph frequencies ranged from 0 to > 90% across Canada. In particular, sites in Western Canada had consistently high andromorph frequencies, whereas andromorph frequencies among Central sites were lower and variable and, among Eastern sites, were lower still (except one site) and relatively invariant. For populations in Central Canada, both andromorph frequencies and population densities varied significantly over time, reaching a peak mid-season. As expected, morph frequency covaried significantly with estimates of male harassment in some cases, but estimates of male harassment did not consistently account for variation in morph frequencies within all regions. Additional factors such as genetic drift may influence morph frequency at the edge of a species' range. Future work also should test, and attempt to explain causation, for seasonal variation in morph frequency." (Authors)] Address: Gossum, H. van,

Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6801. Van Gossum, H.; Beirinckx, K.; Forbes, M.R.; Sherratt, T.N. (2007): Reproductive interference between *Nehalennia* damselfly species. *Ecoscience* 14: 1-7. (in English, with French summary). ["We tested the hypotheses that reproductive interference between 2 congeneric damselfly species influences their local population densities and the female morph ratios in one of the species. *Nehalennia irene* has 2 female types (andromorph and gynomorph), whereas *N. gracilis* exhibits only one female type. Andromorphic *N. irene* females not only resemble conspecific males in body coloration, but also resemble heterospecific females of *N. gracilis*. We predicted male *N. irene* to be most attracted to gynomorphs of *N. irene* and male *N. gracilis* to be least attracted to them. Further, if *N. gracilis* males harass andromorphic *N. irene* females excessively, then they may reduce andromorph frequencies of *N. irene* locally. Our results indicate hybridization to be prevented by a "lock-and-key" mechanism, but male *N. irene* often attempt mating with female *N. gracilis*. Contrary to prediction, andromorph frequency in *N. irene* did not depend on whether *N. irene* populations were in sympatry or allopatry with *N. gracilis*. As predicted, *N. irene* males attempted tandem formation most frequently with conspecific gynomorphs, while *N. gracilis* males made most heterospecific tandem attempts on *N. irene* andromorphs. Collectively, our results suggest that *N. gracilis* females may be frequently harassed by *N. irene* males, and that this may help explain the relative rarity of *N. gracilis*." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6802. Van Gossum, H., Beirinckx, K.; Forbes, M.R., Sherratt, T.N. (2007): Do current hypotheses explain continental and seasonal variation in female morph frequencies of the damselfly, *Nehalennia irene*?. *Biological Journal of the Linnean Society* 90: 501-508. (in English). ["Female-limited colour polymorphism occurs in many damselfly species, where one morph resembles the male (andromorph) and the other is dissimilar (gynomorph). Explanations for this phenomenon vary, but most assume that andromorphism has arisen in odonates, as a response to excessive male harassment. Here, we quantify the extent of continental and seasonal variation in female morph frequencies in a widely-distributed damselfly and ask whether the spatiotemporal patterns in andromorph frequency can be understood on the basis of sexual harassment theory. We sampled the damselfly, *Nehalennia irene* (Hagen) among regions across Canada, and at several sites, over the reproductive season, within Central Canada. Andromorph frequencies ranged from 0 to > 90% across Canada. In particular, sites in Western Canada had consistently high andromorph frequencies, whereas andromorph frequencies among Central sites were lower and variable and, among Eastern sites, were lower still (except one site) and relatively invariant. For populations in Central Canada, both andromorph frequencies and population densities varied significantly over time, reaching a peak mid-season. As expected, morph frequency covaried significantly with estimates of male harassment in some cases, but estimates of male harassment did not consistently account for variation in

morph frequencies within all regions. Additional factors such as genetic drift may influence morph frequency at the edge of a species' range. Future work also should test, and attempt to explain causation, for seasonal variation in morph frequency." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6803. Walia, G.K. (2007): Cytomorphological studies on *Gynacantha milliardi* Fraser of the family Aeschnidae (Anisoptera: Odonata). *Cytologia* 72: 57-62. (in English). ["Male germ cell complement of *Gynacantha milliardi* belonging to family Aeschnidae has been investigated. Specimens were collected from Karnataka (Mangalore) state of South India. Chromosome analysis shows 2 types of spermatogenetic cycles viz., 2n male=27m; n male=14m and 2n male=25; n male=13 with XO sex determining mechanism. Karyotypic evolution of m chromosomes has been observed in the species. Meiotic behaviour of autosomes and sex chromosome has also been studied. *Gynacantha milliardi* is described for the first time in odonate cytotaxonomy." (Author)] Address: Walia, G.K., Department of Zoology, Punjabi University, Patiala-147 002 (Punjab), India. E-mail: gurinderkaurwalia@yahoo.co.in

6804. Wang, Z.J.; Russell, D. (2007): Effect of forewing and hindwing interactions on aerodynamic forces and power in hovering dragonfly flight. *Physical Review Letters* 99(148101): 1-4. (in English). ["Dragonflies are four-winged insects that have the ability to control aerodynamic performance by modulating the phase lag (ϕ) between forewings and hindwings. We film the wing motion of a tethered dragonfly and compute the aerodynamic force and power as a function of the phase. We find that the out-of-phase motion as seen in steady hovering uses nearly minimal power to generate the required force to balance the weight, and the in-phase motion seen in takeoffs provides an additional force to accelerate. We explain the main hydrodynamic interaction that causes this phase dependence." (Authors)] Address: Wang, Jane, Itasca Consulting Group, Inc., Minneapolis, MN 55401, USA. E-mail: zw24@cornell.edu

6805. Wappler, T.; Petrulevicius, J.F. (2007): *Priscalestidae*, a new damselfly family (Odonata: Lestinoidea) from the Middle Eocene Eckfeld maar of Germany. *ALAVESIA* 1: 69-73. (in English). ["We describe *Priscalestes germanica* Petrulevicius & Wappler, a new genus and species of Lestinoidea Calvert (1901) (sensu Bechly 1996) from the Eocene of Germany. The new genus represents a new family, *Priscalestidae* Petrulevicius & Wappler fam. nov., with close relationship to *Megalestidae*, *Lestidae* and the genus *Promegalestes* Petrulevicius & Nel 2004 from the late Paleocene of Argentina. The new family seems to be in a basal position with respect to the *Lestidae* because of the lack of their synapomorphies, i. e. MA strongly zigzagged and the area between IR2 and RP3/4 distally strongly widened with three rows of cells between these two veins instead of only one. The new family differs also from *Lestidae* and *Megalestidae* in the presence of two autapomorphies, i.e. (1) all secondary longitudinal veins (except IR1 and IR2) suppressed, resulting in presence of unicellular rows between IR1 and RP2, RP2 and IR2, RP3 and MA; and (2) the midfork closer to the subnodus than to the arculus. The sharing of last character with *Promegalestes* let us thinking in a close relations-

hip of these two genera." (Authors)] Address: Wappler, T., Institut für Paläontologie, Nussalle 8, 53115, Bonn, Germany. E-mail: twappler@uni-bonn.de

6806. Ward, L.; Mill, P.J. (2007): Spacing behaviour in larval Banded Demoiselle *Calopteryx splendens* (Harris). *J. Br. Dragonfly Society* 23(2): 58-62. (in English). ["The widely held view is that *C. splendens* larvae tend to inhabit aquatic vegetation growing on a silt substrate where they use the roots and stems for shelter and as emergence supports. However, considering the patchy distribution of aquatic vegetation in a river and the semivoltine nature of the larval life cycle this could potentially result in serious overcrowding of larvae at oviposition sites. In the current study the spacing behaviour of *C. splendens* larvae was investigated, under experimental conditions, with regard to the density of an emergent support. ... A shift in *C. splendens* from a random, approaching contagious, distribution towards a more regular pattern with increased density of dowels was observed in the current study." (Authors)] Address: Ward, Louise, Askham Bryan College, Askham Bryan, York, YO23 3FR, UK

6807. Ware, J.; May, M.; Kjer, K. (2007): Phylogeny of the higher Libelluloidea (Anisoptera: Odonata): An exploration of the most speciose superfamily of dragonflies. *Molecular phylogenetics and evolution* 45(1): 289-310. (in English). ["Although libelluloid dragonflies are diverse, numerous, and commonly observed and studied, their phylogenetic history is uncertain. Over 150 years of taxonomic study of Libelluloidea Rambur, 1842, beginning with Hagen (1840), [Rambur, M.P., 1842. *Neuropteres. Histoire naturelle des Insectes*, Paris, pp. 534; Hagen, H., 1840. *Synonymia Libellularum Europaeorum. Dissertation inauguralis quam consensu et auctoritate gratiosi medicorum ordinis in academia albertina ad summos in medicina et chirurgia honores.*] and Selys (1850), [de Selys Longchamps, E., 1850. *Revue des Odonates ou Libellules d'Europe* [avec la collaboration de H.A. Hagen]. Muquardt, Bruxelles; Leipzig, 1-408.], has failed to produce a consensus about family and subfamily relationships. The present study provides a well-substantiated phylogeny of the Libelluloidea generated from gene fragments of two independent genes, the 16S and 28S ribosomal RNA (rRNA), and using models that take into account non-independence of correlated rRNA sites. Ninety-three ingroup taxa and six outgroup taxa were amplified for the 28S fragment; 78 ingroup taxa and five outgroup taxa were amplified for the 16S fragment. Bayesian, likelihood and parsimony analyses of the combined data produce well-resolved phylogenetic hypotheses and several previously suggested monophyletic groups were supported by each analysis. *Macromiinae*, *Corduliidae* s. s., and *Libellulidae* are each monophyletic. The corduliid (s.l.) subfamilies *Synthemistinae*, *Gomphomacromiinae*, and *Idionychinae* form a monophyletic group, separate from the *Corduliinae*. *Libellulidae* comprises three previously accepted subfamilies (*Urothemistinae*, a very restricted *Tetrathemistinae*, and a modified *Libellulinae*) and five additional consistently recovered groups. None of the other previously proposed subfamilies are supported. Bayesian analyses run with an additional 71 sequences obtained from GenBank did not alter our conclusions. The evolution of adult and larval morphological characters is discussed here to suggest areas for future focus. This study shows the inherent problems in using poorly defined

and sometimes inaccurately scored characters, basing groups on symplesiomorphies, and failure to recognize the widespread effects of character correlation and convergence, especially in aspects of wing venation." (Authors)] Address: Ware, Jessica, Department of Entomology, Rutgers University, 93 Lipman Drive, New Brunswick, NJ 08901, USA. E-mail: jware42@rci.rutgers.edu

6808. Watts, P.C.; Saccheri, I.J.; Kemp, S.J.; Thompson, D.J. (2007): Effective population sizes and migration rates in fragmented populations of an endangered insect (*Coenagrion mercuriale*: Odonata). *Journal of Animal Ecology* 76: 790-800. (in English). ["1. Effective population sizes (N_e) and migration rates (m) are critical evolutionary parameters that impact on population survival and determine the relative influence of selection and genetic drift. While the parameter m is well-studied in animal populations, N_e remains challenging to measure and consequently is only rarely estimated, particularly in insect taxa. 2. We used demographic and genetic methods to estimate N_e and m in a fragmented population of the endangered damselfly *C. mercuriale* to better understand the contrast between genetic and field estimates of these parameters and also to identify the spatial scale over which populations may become locally adapted. 3. We found a contrast between demographic and genetic-based estimates of these parameters, with the former apparently providing overestimates of N_e , owing to substantial underestimation of the variance in reproductive success, and the latter overestimating m , because spatial genetic structure is weak. 4. The overall N_e of sites within the population network at Beaulieu Heath, the largest *C. mercuriale* site in the UK, was estimated to vary between approximately 60 and 2700. 5. While N_e was not correlated with either the total numbers of adults (N) or the area of habitat, this parameter was always less than N , because of substantial variance in reproductive success. The ratio N_e / N varied between 0.006 and 0.42 and was generally larger in smaller populations, possibly representing some 'genetic compensation'. 6. From a simple genetic model and these data on N_e and m , it seems that populations of *C. mercuriale* have the potential to respond to localized spatial variation in selection and this would need to be considered for future genetic management of this endangered species." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

6809. Webb, T.J.; Freckleton, R.P. (2007): Only half right: Species with female-biased sexual size dimorphism consistently break Rensch's Rule. *PLoS ONE* 2(9): e897. doi:10.1371/journal.pone.0000897. (in English). ["Background: Most animal species display Sexual Size Dimorphism (SSD): males and females consistently attain different sizes, most frequently with females being larger than males. However the selective mechanisms driving patterns of SSD remain controversial. 'Rensch's rule' proposes a general scaling phenomenon for all taxa, whereby SSD increases with average body size when males are larger than females, and decreases with body size when females are larger than males. Rensch's rule appears to be general in the former case, but there is little evidence for the rule when females are larger than males. Methodology/Principal

Findings: Using comprehensive data for 1291 species of birds across 30 families, we find strong support for Rensch's rule in families where males are typically larger than females, but no overall support for the rule in families with female-biased SSD. Reviewing previous studies of a broad range of taxa (arthropods, reptiles, fish and birds) showing predominantly female-biased SSD, we conclude that Rensch's conjecture is the exception rather than the rule in such species. Conclusions/Significance: The absence of consistent scaling of SSD in taxa with female-biased SSD, the most prevalent direction of dimorphism, calls into question previous general evolutionary explanations for Rensch's rule. We propose that, unlike several other ecological scaling relationships, Rensch's rule does not exist as an independent scaling phenomenon." (Authors) The study also includes "dragonflies and damselflies".] Address: Webb, T.J., Department of Animal and Plant Sciences, University of Sheffield, Sheffield, United Kingdom. E-mail: t.j.webb@sheffield.ac.uk

6810. Wildermuth, H. (2007): *Leucorrhinia pectoralis* in der Schweiz – aktuelle Situation, Rückblick und Ausblick (Odonata: Libellulidae). *Libellula* 26(1/2): 59-76. (in German, with English summary). ["The species was recorded from 1835 to 2006 at 64 localities of which 61 are situated in the Central Plateau, mainly between 400 and 600 m a.s.l., and three in the Jura mountains. It does not occur in the Alpine region. From 2000 to 2006 *L. pectoralis* was still found at twelve localities, but only four vigorous populations existed in this period: three in the canton Zürich and one in the canton Fribourg. Primary cause for the decline was the destruction of bogs by peat extraction and reclamation of agricultural land. From ca 1950 onwards the species disappeared successively in many remaining and currently protected mires because the peat cuttings became increasingly overgrown. The future existence of *L. pectoralis* in Switzerland depends on the management of small water bodies in partly exploited mires. It is necessary to regenerate overgrown peat cuttings and to maintain them at early and medium succession stages. Regeneration of partly destroyed bogs by raising the water table can also be helpful." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

6811. Wildermuth, H. (2007): Anheftung der parasitischen Landmilbe *Leptus* sp. an *Orthetrum coerulescens* (Parasitengona: Erythraeidae; Odonata: Libellulidae). *Libellula* 26(3/4): 207-212. (in German, with English summary). ["In north-eastern Switzerland a population of *O. coerulescens* was found in which four individuals were infested with terrestrial mite larvae. One freshly emerged dragonfly bore 15 mites. Their attachment and behaviour was studied in the laboratory. Some mites were attached on peripheral body parts that are hardly supplied with hemolymph, and no growth could be noted in any individual during three days of observation. It is discussed to what extent the mite's object of attachment is alimentary or possibly mainly phoretic." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

6812. Wildermuth, H. (2007): Polarotaktische Reaktionen von *Coenagrion puella* und *Libellula quadrimaculata* auf Erdbeerkulturen als ökologische Falle (Odonata: Coenagrionidae, Libellulidae). *Libellula* 26(3/4): 143-

150. (in German, with English summary). ["In north-eastern Switzerland, *C. puella* and *L. quadrimaculata* were found in numbers in July 2006 away from water bodies on a large strawberry field that was covered with shiny black plastic sheets between the plant rows. Both sexes exhibited typical elements of the species-specific reproduction behaviour including oviposition attempts. Obviously, they took the plastic sheets for ponds because such surfaces attract dragonflies like the similarly polarized light reflected from water surfaces. As the dragonflies lost time, energy and possibly also genetic material by their maladaptive habitat choices, they got caught in an ecological trap. In 2007 only few individuals of *C. puella* and no *L. quadrimaculata* were found on the same strawberry field. During sporadic checks of other fields with plastic sheets in the region no dragonflies were observed. Hence, such surfaces obviously attract reproductively active individuals in numbers only under special conditions, perhaps at high population densities. It is assumed that the negative effects of black shiny surfaces on dragonfly populations in a man-modified landscape is probably negligible." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

6813. Wildermuth, H.; Martens, A. (2007): The feeding action of *Forcipomyia paludis* (Diptera: Ceratopogonidae), a parasite of Odonata imagines. *International Journal of Odonatology* 10(2): 249-255. (in English). ["Females of *Forcipomyia paludis* were studied microscopically during their feeding action on Odonata wings where they were mostly attached to main veins in the basal half of the wings. In some individuals rhythmic nodding of the head was noted. Conspicuously many midges lifted the abdominal tip every one or two minutes and from the anus fast growing gas bubbles appeared that burst after about half a second. We suppose that the insects, having punctured the host's veins with their stout proboscis, sucked much air (as well as haemolymph) from the tracheae which they had to get rid of afterwards. From these observations, combined with further indications, it is inferred that *F. paludis* acts as a true parasite of Odonata and that the association is not only phoretic as previously assumed." (Authors)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

6814. Willigalla, C. (2007): Zusammensetzung der Libellenfauna der Stadt Mainz im Zeitraum der letzten 30 Jahre (Insecta: Odonata). *Fauna Flora Rheinland-Pfalz* 11(1): 175-190. (in German, with English summary). [Rheinland-Pfalz, Germany; "In 2006 the NABU-project "Biomonitoring" researched the dragonfly species of the lentic and lotic waters in the city of Mainz. The 18 waters studied served as habitats for 36 dragonfly species. Until now, 23 species had been found in Mainz. Most of the newly detected species can be classified as mediterranean. As representatives of this group *Aeshna affinis*, *Crocothemis erythraea*, *Orthetrum brunneum*, *Sympetrum fonscolombii* and *Sympetrum meridionale* were found in 2006. Whereas there are known populations of the first four species from other regions in Rhineland-Palatinate the record of the Southern Darter is the first rediscovery of this species in Rhineland-Palatinate since 1993. Mediterranean species contribute the main proportion to the dragonfly coenosis (60%). *Aeshna affinis* and *Crocothemis erythraea* also showed the highest abundance at some waters studied. In addition to the mediterranean group, species

typical of lotic waters were observed, e. g. *Gomphus vulgatissimus*, *Gomphus flavipes* and *Onychogomphus forcipatus*. The increased number of species found in 2006 was probably caused by the improved quality of the river Rhine in terms of structure and water chemistry, climatic change and increased intensity of data collection." (Author)] Address: Willigalla, C., Willigalla - Ökologische Gutachten, Am großen Sand 22, D-55124 Mainz, Germany. E-mail: christoph@willigalla.de

6815. Wojtal, A.; Frankiewicz, P.; Andziak, M.; Zaleski, M. (2007): The influence of invertebrate predators on *Daphnia* spatial distribution and survival in laboratory experiments: Support for *Daphnia* horizontal migration in shallow lakes - *Internat. Rev. Hydrobiol.* 92(1): 23-32. (in English). ["The behavioural response of *Daphnia cucullata* to the presence of the pelagic invertebrate predator *Leptodora kindtii*, and the predation rate of littoral dragonfly nymphs on this species were investigated under laboratory conditions. Results of this study revealed a strong hiding response of *Daphnia cucullata* in the presence of the predatory cladoceran, *L. kindtii*, which was similar to the response of *Daphnia* in the presence of juvenile perch. This suggests that pelagic invertebrate predators may cause *Daphnia* to hide in the littoral zone which could result in increased exposure to predation by littoral invertebrates. A strong influence of dragonfly nymphs on *D. cucullata*, both in the presence and absence of macrophytes, was found. The average predation rate of Odonata larvae was about 5 prey ind⁻¹h⁻¹ and did not differ significantly between treatments. Quantification of dragonfly pressure on *Daphnia* populations will require cross-verification with field experiments since in the natural conditions *Daphnia* seeks a shelter in the vegetation stands against predation by *Leptodora*, despite the occurrence of odonates." (Authors)] Address: Wojtal, Adrianna, Dept of Applied Ecology, University of Łódź, 90-237 Łódź, Banacha 12/16 Str. Poland. E-mail: adwoj@biol.uni.lodz.pl

6816. Worthen, W.B. ; Jones, C.M. (2007): The effects of wind speed, competition, and body size on perch height selection in a guild of Libellulidae species (Odonata). *International Journal of Odonatology* 10(2): 257-272. (in English). ["For eleven species of sympatric libellulids, male mean mass was positively correlated with wing aspect ratio, wing loading, and mean perch height. We tested the hypotheses that perch height selection was governed by interspecific competition or biomechanical responses to increased wind speed at higher perches. Although larger odonates might prefer higher perches to offset their increased wing loading, species' mean perch height did not correlate with changes in mean or maximum wind speeds. Rather, perch height selection is best explained by competitive interactions. Mean mass (log10 transformed) of these species are distributed in a significantly non-random manner, consistent with community-wide character displacement. Also, observations of aggressive interactions and the response to decoys of three abundant species revealed a competitive hierarchy based on body size. *Libellula luctuosa*, the largest species, avoided stations with conspecific decoys but was attracted to stations with the decoys of two smaller species. *L. incesta* avoided stations with larger *L. luctuosa* decoys, but was attracted to stations with smaller *Pachydiplax longipennis* decoys. *P. longipennis* avoided stations with conspecific and *L. incesta* decoys. *L. luctuosa* was also more successful in displacing perchers (82.4%) than *L.*

incesta (68.9%) and *P. longipennis* (46.6%). In pairwise contrasts, the larger species was always more successful at displacing the smaller species. Finally, *P. longipennis* was attacked at significantly higher rates when it perched on high perches than when it perched at lower perches. We conclude that interspecific competition causes niche partitioning of perch height in this community." (Authors)] Address: Worthen, W.B., Dept of Biology, Furman University, Greenville, SC29613 USA. E-mail: worthen@furman.edu

6817. Yalçın-Özdilek, S.; Solak, K. (2007): The feeding of European eel, *Anguilla anguilla* L. in the river ASI, Turkey. *Electronic Journal of Ichthyology* 1: 26-34. (in English). ["The feeding behaviour of European eel in the eastern limit of the distribution attained in the river Asi was investigated. Fish were dominant food organisms of eels especially if they are larger than 40 cm in total length. Trichoptera and Odonata larvae were also consumed by eels in the River Asi. It was observed that summer and also spring days are important feeding period for eels in the River Asi. Fish were consumed mostly in rainy seasons when river discharge is remarkably high. However, aquatic invertebrates were consumed mostly in summer days." (Authors)] Address: Yalçın-Özdilek, S., Canakkale Onsekiz Mart University, Education Faculty, Anafartalar Campus, 17100 Çanakkale, Turkey. Email: yalcin.ozdilek@gmail.com

6818. Yeh, W.-C.; Chiou, H.-i.; Tang, H.-C.; Wu, J.-H.; Chen, S.-L. (2007): Three species of dragonflies newly recorded to Taiwan. *Endemic species research* 9(2): 53-62. (in Chinese, with English summary). [The paper reports *Sympetrum cordulegaster*, *S. depressiusculum*, and *Rhyothemis fuliginosa*, new to Taiwan. Morphological characters, behaviour, and habitats are briefly described. In addition, colour photographs and identification keys to the species of the genera *Sympetrum* and *Rhyothemis* in Taiwan are provided.] Address: Tang, H.-C., Education Division, Taipei Zoo, Taipei, Taiwan

6819. Yu, W.-Y.; Li, Z.-H.; Huang, C.; et al. (2007): The species diversity of Odonata in Lushan, Jiangxi. *Chinese bulletin of entomology* 44(1): 110-115. (in Chinese, with English summary). [China, Lushan and Jiangzi provinces; 52 species were recorded in 2004 and 2005.] Address: Yu, W.-Y., Department of Life Science, Nanjing, Xiaozhuang University, Nanjing, Jiangsu 210017, China. E-mail: ywy138519@1261.com

6820. Yu, X.; Bu, W. (2007): Two new species of *Coenagrion* Kirby, 1890, from China (Odonata: Zygoptera: Coenagrionidae). *Zootaxa* 1664: 55-59. (in English). ["Two new species of *Coenagrion* Kirby (*Coenagrion aculeatum*, sp. nov., holotype male, China, Chongqing, Jiangjin, 23-V-2001, deposited in Life Sciences College of Hebei University, Baoding, China; and *C. tengchongensis*, sp. nov., holotype male, China, Yunnan, Tengchong, Zhengding, 1800m, 15-VIII-2006, deposited in Institute of Entomology, Nankai University, Tianjin, China) are described, and diagnostic figures of caudal appendages and genital ligulae are provided." (Authors)] Address: Bu, W., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, 300071 China. E-mail: wenjunbu@nankai.edu.cn

6821. Zessin, W. (2007): Bericht über das 17. Internationale Symposium der Odonatologie in Hongkong, China, vom 31. Juli bis 9. August 2006. *Virgo*, Mitteilungsblatt des Entomologischen Vereins Mecklenburg,

10(1): 5-16. (in German). [extensiv report of the symposium including a documentation of the lectures] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

6822. Zhou, X.; Zhou, W.-b. (2007): A new species of Protoneuridae and a new species of Coenagrionidae (Odonata) from China. *Entomotaxonomia* 29(1): 1-5. (in Chinese, with English summary). ["The type specimens are deposited in the Zhejiang Museum of Natural History. 1. *Prodasineura huai*, sp. nov.: Measurements (mm): Male: Abdomen+app length 29, hindwing length 18. This species is similar to *Prodasineura theebawi* Fraser, but differs from the latter as follows: 1) labrum blue; 2) abdomen segments 2-7 with complete basodorsal annules; 3) abdomen segments 2-5 with longitudinal yellow stripes on each side. The species is closely allied to *Prodasineura hanzhongensis* Yang, from which it differs by the labrum, base of mandible and genae blue, and antehumeral stripe narrow, not extending to the antear sinus, and penile tips with pair of long horns, and the side of the penile with pair short horns. Holotype: male, Dapu, Cuangdong Province, 08-VII-2004, coll. By ZHOU Wenbao. Etymology: The new species named to honor Prof. Dr. HUA Li-zhong. 2. *Pseudagrion daponshanensis*, sp. nov.: Measurements (mm): Male: Abdomen+app length 30, hindwing length 20. Female: Abdomen+app length 31, hindwing length 23. This species is similar to *Pseudagrion microcephalum* (Rambur), and can be distinguished from the latter by: thorax black on dorsum, with blue a narrow antehumeral stripe; superior anal appendages shorter than inferiors. Holotype: male, Dapanmount, Zhejiang Province, 08-VII-2005, 1 100 m; Paratypes: 3 males, 1 female, same data as holotype." (Authors)] Address: Zhou, W.-b., Zhejiang Museum of Natural History, Hangzhou, Zhejiang 310012, China

6823. Zhu, H.-q.; Yang, G.-h.; Wu, T. (2007): A new species of the genus *Perissogomphus* Laidlaw (Odonata: Gomphidae) from Yunnan, China. *Entomotaxonomia* 29(2): 81-84. (in Chinese, with English summary). [Type specimens are deposited in the Dali College, Dali, Yunnan, 671000, China. *Perissogomphus asahinai*, sp. nov.: "The new species is allied to *P. stevensi*, but differs in the following characters: 1) occiput black and with a middle yellow spot; 2) prothorax with the middle lobe black and the yellow spots at middle and side; 3) synthorax grass-green on dorsum and with a black middle stripe, but without a broad M-shaped marking; 4) abdominal segment 10 yellow and with the basal half black on dorsum; 5) superior anal appendages terminal armed with 7-8 small black spines. Length of abdomen: male: 43.0 mm, female: 42.0 mm; length of hind wing: male: 36.5 mm, female: 40.0 mm. Holotype: male, Yang-bi river, Dali City, Yunnan Province, 07-VIII-1999, leg. Yang, Zi-zhong; Paratype: 1 female: Cangshan Mountain, Dali City, Yunnan Province, 03-VI-1998, leg. No. 6. Etymology. The new species is named asahinai in honour of Dr. Syoziro Asahina." (Authors)] Address: Zhu, H.-q., Shanxi University, 42-38, Taiyuan, Shanxi 030006, China

6824. Braune, E.; Richter, O.; Sönderath, D.; Suhling, F. (2008): Voltinism flexibility of a riverine dragonfly along thermal gradients. *Global Change Biology* 14: 1-13. (in English). ["Potential effects of future warming should be reflected in life history patterns of aquatic organisms observed in warmer climates or in habitats that are different in ambient temperature. In the special case of the dragonfly *Gomphus vulgatissimus* (L.) (Odonata: Gomphidae) previous research suggests that voltinism decreases from south to north. We analysed data on voltinism from 11 sample sites along a latitudinal gradient from about 44°N to 53°N, comprising small streams to medium-sized rivers. Furthermore, to simulate different conditions and to allow projections for future climate change scenarios, we developed a population dynamic model based on a projection matrix approach. The parameters of the model are dependent on temperature and day length. Our field results indicate a decrease in voltinism along the latitudinal gradient from southern to northern Europe and a corresponding increase of voltinism with higher temperatures. An increase in voltinism with width of the running water implies an effect of varying habitat temperature. Under the impact of global warming, our model predicts an increased development speed, particularly in the northern part of the latitudinal gradient, an extension of the northern range limit and changes in phenology of *G. vulgatissimus*, leading to an extension of the flight season in certain regions along the gradient." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

6825. Butler, R.G.; deMaynadier, P. (2008): The significance of littoral and shoreline habitat integrity to the conservation of lacustrine damselflies (Odonata). *J. Insect Conserv.* 12(1): 23-36 (in English) ["Human development of pond and lake shorelines may significantly impact native lacustrine biota including a variety of aquatic macroinvertebrate groups. In an effort to better understand the habitat associations and sensitivities of lacustrine damselflies, we sampled adults in littoral macrophyte habitat during two flight periods at 35 randomly selected pond and lake sites in southern Maine during 2000 and 2001. Data were also collected to help characterize water body, shoreline disturbance, and aquatic vegetation at each study site. Nonmetric multidimensional scaling was used for ordination of damselfly assemblages, and coordinates from the most stable solution were related to site variables using forward stepwise multiple regression. Our results suggest that the diversity and composition of damselfly assemblages is related to the abundance and richness of littoral zone macrophytes, extent of riparian disturbance, benthic substrate granularity, and lake productivity; all variables subject to anthropogenic degradation on excessively developed waterbodies. Additionally, we developed a Habitat Tolerance Index useful for distinguishing between relative habitat specialists and generalists from among a diverse assemblage of 19 lacustrine species. Finally, species-specific damselfly associations with multiple genera of floating and emergent macrophytes were assessed using both nonparametric correlation and multiplicative regression yielding significant relationships for 17 species, including two damselflies of

global conservation concern (*Enallagma laterale* and *E. pictum*). We conclude that the protection of littoral and shoreline habitat integrity, with special emphasis on emergent and floating macrophytes, is critical to the conservation of lacustrine biodiversity." (Authors)] Address: Butler, R.G., Department of Natural Sciences, University of Maine at Farmington, 173 High Street, Farmington, Maine 04938, USA. E-mail: butler@maine.edu

6826. Campero, M.; De Block, M.; Ollevier, F.; Stoks, R. (2008): Correcting the short-term effect of food deprivation in a damselfly: mechanisms and costs. *Journal of Animal Ecology* 77(1): 66-73. (in English). ["1. Mass at emergence is a life-history trait strongly linked to adult fitness. Therefore, when faced with transient food shortage in the larval stage, mass-correcting mechanisms are common. 2. These correcting mechanisms may carry costs with them. On one hand, these costs may be overestimated because they can be confounded with the direct effects of the transient food shortage itself. On the other hand, costs may be underestimated by ignoring physiological costs. Another largely neglected topic is that correcting mechanisms and costs may critically depend upon other stressors that often co-occur. 3. Here, we identify the mass-correcting mechanisms and their associated costs at emergence in the damselfly *Coenagrion puella*, after being stressed by a transient period of starvation and a subsequent exposure to pesticide stress during the larval stage. We introduce path analysis to disentangle direct costs of starvation and the mass-correcting mechanisms in terms of immune response. 4. As predicted, we found no differences in mass at emergence. Starvation directly resulted in a costly delayed emergence and a decreased immune response at emergence. Mass-correcting mechanisms included a prolonged post-starvation period, reduced mass loss at emergence and compensatory growth, although the latter only in females under pesticide stress. 5. The mass-correcting mechanisms were associated with beneficial effects on investment in immune response, but only in the absence of pesticide stress. Under pesticide stress, these beneficial effects were mostly undone or overruled, resulting in negative effects of the mass-correcting mechanisms in terms of immune response. 6. Our results stress the importance of and introduce a statistical way of disentangling direct costs of starvation and the mass-correcting mechanisms themselves, and the importance of including physiological endpoints in this kind of studies." (Authors)] Address: Campero, Melina, Laboratory of Aquatic Ecology, University of Leuven, Ch. Debériotstraat 32, B-3000 Leuven, Belgium. E-mail: melina.campero@gmail.com

6827. Chaves, M.L.; Rieradevall, M.; Chainho, P.; Costa, J.L.; Costa, M.J.; Prat, N. (2008): Macroinvertebrate communities of non-glacial high altitude intermittent streams. *Freshwater Biology* 53(1): 55-76 (in English) ["1. Macroinvertebrate assemblages of five non-glacial intermittent high altitude headwater streams (above 1400m - Serra da Estrela, Portugal), with dry periods of different lengths (0-3?months), were investigated in nearly undisturbed conditions to (i) examine spatial differences and identify environmental variables responsible for the observed invertebrate patterns, (ii) assess the association of dry period length with invertebrate community structure and (iii) determine the influence of using different taxonomic identification levels

(order, family and genus) to assess invertebrate community patterns. 2. More than 100 macroinvertebrate genera were identified. Insects clearly dominated these communities with more than 95% of total captures and around 95% of the total richness. Diptera were the most rich and abundant group with chironomid occurrences comprising over 70% of macroinvertebrate captures. 3. The highest taxon richness, diversity, EPT (Ephemeroptera+Plecoptera+Trichoptera) and OCH (Odonata+Coleoptera+Heteroptera) genus richness, the greatest number of exclusive and characteristic taxa identified by the Indicator Value (IndVal), and a distinct community structure shown by Canonical Correspondence Analyses (CCA), were found in the only stream that was never totally dry, with pools lasting over summer. Environmental gradients that spatially structured the macroinvertebrate communities were always related to flow variations. 4. Over time, the highest abundances found in these systems were also related to flow variations and maximum genus richness occurred in the connected pools or in isolated pools. Streams with longer dry periods presented a distinct recolonization phase, with higher abundance of the stonefly larvae *Nemoura* sp. and the presence of the chironomid larvae *Krenosmittia* sp., possibly arriving from the hyporheos. 5. Taxonomic level of invertebrate identification was vital for recognizing the characteristic taxa (IndVal) of streams yet was not critical for identifying streams with the highest macroinvertebrate richness/diversity or structuring environmental gradients. 6. Overall, this study emphasizes the variability of high altitude intermittent streams macroinvertebrate communities, despite spatial proximity. This variability was probably related to flow intermittency and hydrologic permanence, different vegetation covers and riverbed substrata. Consequently, the establishment of reference conditions should involve long-term data collections and more detailed physical characterization. Also, these findings have significant implications for accurately predicting the ecological consequences of future climate change in high altitude scenarios." (Authors)] Address: Chaves, M.L., Universidade de Lisboa, Faculdade de Ciências, Instituto de Oceanografia, Lisboa, Portugal 2: Departament d'Ecologia, Universitat de Barcelona, Barcelona, España

6828. Dijkstra, K.-D. (2008): The Systematist's Muse. two new damselfly species from 'Elisabetha' in the Congo Basin (Odonata: Chlorocyphidae, Platycnemididae). *Zoologische Mededelingen* 82: 15-27. (in English). ["*Platycypha eliseva* spec. nov. and *Mesocnemis saralisa* spec. nov. are described from Lokutu (formerly Elisabetha) in the Democratic Republic of Congo. The taxonomy and distribution of *Platycypha* and *Mesocnemis* are discussed and keys are provided for the males." (Author)] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

6829. Huang, D.-Y.; Nel, A. (2008): Oldest 'libelluloid' dragonfly from the Middle Jurassic of China (Odonata: Anisoptera: Cavilabiata). *Neues Jahrbuch für Geologie und Paläontologie - Abhandlungen* 246(1): 63-68 (in English) ["*Juralibellula ningchengensis* gen. nov., sp. nov., type species of the new family *Juralibellulidae*, is the oldest record of the clade Cavilabiata. As sister group of the *Neobrachystigmata* in the new clade *Paraneobrachystigmata*, it demonstrates the presence of this relatively much derived subclade in the Middle Ju-

assic, suggesting a great antiquity for the Cavilabiata." (Authors)] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

6830. Kadoya, T.; Suda, S.; Tsubaki, Y.; Washitan, I. (2008): The sensitivity of dragonflies to landscape structure differs between life-history groups. *Landscape Ecology* 23(2): 149-158 (in English) ["Contrasting life-history strategies of long versus short pre-reproductive phases are known in adult dragonflies of temperate regions. Because the long-phase species spend a longer time in terrestrial habitats such as grasslands or woodlands during their pre-reproductive phase, we hypothesized that long-phase species would be more sensitive to landscape structure than short-phase species. To test this hypothesis, we conducted periodic censuses of adult dragonflies at small man-made ponds. We compared the two above functional groups in terms of the degree to which species occurrence depended on landscape structure. The difference among the two groups was not significant, but occurrence of long-phase species tended to depend on landscape structure. Long-phase species responded to landscape structure at larger spatial scales and showed stronger spatial autocorrelation in their occurrence among sampling ponds than short-phase species." (Authors)] Address: Kadoya, T., Department of Ecosystem Studies, Institute of Agriculture and Life Science, The University of Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan. Email: kadoya@e-mail.jp

6831. Kalkman, V.; Clausnitzer, V.; Dijkstra, K.D.; Orr, A.G.; Paulson, D.R.; Tol, J. van (2008): Global diversity of dragonflies (Odonata) in freshwater. *Hydrobiologia* 595(1): 351-363 (in English) ["Larvae of almost all of the 5,680 species of the insect order Odonata are dependent on freshwater habitats. Both larvae and adults are predators. The order is relatively well studied, and the actual number of species may be close to 7,000. Many species have small distributional ranges, and are habitat specialists, including inhabitants of alpine mountain bogs, seepage areas in tropical rain forests, and waterfalls. They are often successfully used as indicators for environmental health and conservation management. The highest diversity is found in flowing waters in rain forests of the tropics, the Oriental and Neotropical regions being the most speciose. This paper discusses diversity, summarises the biogeography of dragonflies in the different biogeographical regions and gives the total number of species and genera per family per biogeographical region. Examples are given of areas of particular diversity, in terms of areas of endemism, presence of ancient lineages or remarkable recent radiations but no well-based review of areas with high endemism of dragonflies is available so far. The conservation status of dragonflies is briefly discussed. Species confined to small remnants of forest in the tropics are most under threat of extinction by human activities." (Authors)] Address: Kalkman, V.J., Oude Rijnsburgerweg 28, NL-2342 BC Oegstgeest, The Netherlands. E-mail: Kalkman@naturalis.nnm.nl

6832. McCauley, S. (2008): Slow, fast and in between: habitat distribution and behaviour of larvae in nine species of libellulid dragonfly. *Freshwater Biology* 53(2): 253-263. (in English). ["1. Activity and microhabitat use are important factors determining species performance in habitats that differ in permanence and spe-

cies composition of top predators. This study examined the relationship between the distribution across a gradient of habitat permanence and an associated transition in the composition of top predators and the behaviour of species of larval dragonflies. It also assessed the relationship between larval behaviour, body size and the duration of the larval stage. In laboratory mesocosms the mobility of the different species was measured, as was the extent to which they associated with artificial vegetation. 2. Species mobility was positively related to their natural occurrence in habitats in which invertebrates or small-bodied fish were the top predators, and negatively related with the frequency with which species co-existed with large-bodied fish, the permanence of the habitat and the length of the larval stage. 3. Rather than falling into strict low and high mobility categories, habitat generalists that occurred across the habitat gradient, co-existing with different top predators, had variable mobility levels. In these generalists, mobility was positively related to how frequently they were found in natural habitats in which invertebrates were the top predators. 4. The extent to which species utilized the artificial vegetation in mesocosms was associated with the length of the larval period but was not associated with mobility or species habitat distribution in the field." (Autho)] Address: McCauley, S.J., Center for Population Biology, 2320 Storer Hall, One Shields Ave., University of California, Davis, CA 95616, U.S.A. E-mail: sjmccauley@ucdavis.edu

6833. Mellado Diaz, A.; Suarez Alonso, M.L.; Vidal-Abarca Gutierrez, M.R. (2008): Biological traits of stream macroinvertebrates from a semi-arid catchment: patterns along complex environmental gradients. *Freshwater Biology* 53(1): 1-21 (in English) ["1. The relationships between biological traits of macroinvertebrates and environmental characteristics were investigated in streams with contrasting physical, chemical or landscape level attributes. We used an ordination technique, RLQ analysis, which links an environmental table (R) with traits table (Q) through an abundance table (L) to investigate the relationship between habitat characteristics and biological traits. 2. A major environmental axis explaining the distribution of species and their distinctive biological features was obtained. This axis included variables of anthropogenic pressure (agricultural and urban uses) and natural variability (climatic and geologic) that are strongly intercorrelated in the study area, with a clear spatial component. 3. The attributes of species from frequently disturbed systems (small size, multivoltinism, diapause, ovoviviparity, etc.) were associated with semi-arid areas whereas traits common in more stable and favourable environments (large body size, semi-voltinism, isolated eggs, etc.) were found in upland forested areas. 4. The natural climatic variation was proposed as a disturbance axis of a theoretical habitat templet (driven by the intense hydrological disturbances typical of semi-arid streams), while anthropogenic pressure (mainly intensive agriculture) and high salinity, a natural consequence of geology, was proposed as an adversity axis. Different life-histories associated with contrasting environmental features were superimposed in this habitat templet. 5. The ecological–evolutionary scenario in which stream macroinvertebrates have evolved and by which their communities are organized, is closely linked to disturbance, environmental harshness and human pressure." (Authors) Odonata are treated on the genus level.] Address: Mellado Diaz, A., Departamento de Ecología e Hidrología, Universi-

dad de Murcia, CP 30100 Murcia, Spain. E-mail: amel-lado@um.es

6834. Miroglu, A.; Kartal, V. (2008): Additional Notes on the Odonata Fauna of Kurupelit (Samsun, Turkey). *Turk. J. Zool.* 32: 33-41. (in English). [A total of 27 species was collected in the vicinity of Kurupelit, Samsun, Turkey, - situated at the southern slope of Black Sea - between May and October 2002-2005. *Coenagrion scitulum*, *Ischnura elegans ebneri*, *Aeshna affinis*, *Anaciaeschna isosceles antehumeralis*, *Anax parthenope*, *A. ephippiger*, *Libellula depressa*, *L. fulva*, and *Orthetrum brunneum* are new additions to the Odonata fauna of Samsun.] Address: Miroglu, A., Ondokuz Mayıs University, Faculty of Science and Arts, Department of Biology, 55139, Kurupelit, Samsun, Turkey

6835. Nakahara, M.; Tsubaki, Y. (2008): Sperm mortality, insemination and fertilization in the damselfly *Ischnura senegalensis*: comparisons between wild and inbred populations. *Journal of Ethology* 26(1): 145-151 (in English) ["Inbreeding can have deleterious effects on individual or population fitness. To avoid fitness reduction, individuals may adopt behavioral or physiological mechanisms to reduce their investment in the production of offspring with genetically similar mates. We examined whether insemination by inbred males introduced more dead sperm than insemination by wild males by counting sperm in female *Ischnura senegalensis* (Rambur) sperm storage organs. If inbred males inseminated fewer or lowerquality sperm, females would avoid inferior sperm. Our results revealed three features of damselfly inbreeding: insemination failed in a larger proportion of inbred pairs than in wild pairs, inbred pairs showed significantly reduced fertility, and the numbers of live and dead sperm in an inbred female's sperm storage organs did not differ from those in wild females. These results suggested that neither sperm quantity nor sperm quality was responsible for low fertility to a significant extent, but some kind of female quality, such as sperm usage or storing ability, was. Although inbred pairs had lower fertility, there were no significant differences between inbred and wild pairs in the total numbers of live or dead sperm. It thus seemed that female choice at the insemination stage was responsible for low fertility rather than sperm quantity or quality measured by live-to-dead ratio." (Authors)] Address: Nakahara, Miri, National Institute for Environmental Studies, 16-2 Onogawa, Tsukuba, Ibaraki 305-8506, Japan. E-mail: nakahara.miri@nies.go.jp

6836. Nel, A.N.; Fleck, G.; Garrouste, R.; Gand, G. (2008): The Odonatoptera of the Late Permian Lodève Basin (Insecta). *Journal of Iberian Geology* 34(1): 115-122. (in English, with Spanish summary). ["The discovery of numerous and very diverse Odonatoptera in the Red Late Permian Lodève Basin questions its current reconstructions of a dry to very dry palaeoclimate and palaeoenvironment. It rather suggests the presence of more or less permanent water bodies, surrounded by a diversity of terrestrial biotas. The discovery of large to very large Meganeuridae contradicts the alleged relations between the decrease of body and wing sizes of the insects during the late Permian as a direct consequence of the decrease of the oxygen atmospheric concentrations at that time." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

6837. Pilgrim, E.M.; von Dohlen, C.D. (2008): Phylogeny of the Sympetrinae (Odonata: Libellulidae): further evidence of the homoplasious nature of wing venation. *Systematic Entomology* 33(1):159-174 (in English) ["Sympetrinae is the largest subfamily of the diverse dragonfly family Libellulidae. This subfamily, like most libellulid subfamilies, is defined currently by a few wing venation characters, none of which are synapomorphies for the taxon. In this study, we used DNA sequence data from the nuclear locus elongation factor-1a and the mitochondrial loci 16S and 12S rRNA, together with 38 wing venation characters, to test the monophyly of the Sympetrinae and several other libellulid subfamilies. No analysis recovered Sympetrinae as monophyletic, partly because of the position of Leucorrhinia (of the subfamily Leucorrhiniinae) as a strongly supported sister to Sympetrum (of Sympetrinae) in all analyses. The subfamilies Brachydiplactinae, Leucorrhiniinae, Trameiinae and Trithemistinae were also found not to be monophyletic. Libellulinae was the only subfamily supported strongly as monophyletic. Consistency indices and retention indices of wing venation characters used to define various subfamilies were closer to zero than unity, showing that many of these characters were homoplasious, and therefore not useful for a classification scheme within Libellulidae." (Authors)] Address: Pilgrim, E., U.S. Environmental Protection Agency, Molecular Ecology Research Branch, 26 Martin Luther King Drive, Cincinnati, OH 45268, U.S.A. E-mail: pilgrim.erik@epa.gov

6838. Trapero-Quintana, A.D.; Reyes-Rur, B. (2008): Description of the last instar larva of *Erythrodiplax fervida* (Erichson, 1848) (Anisoptera: Libellulidae), with notes on the biology of the species. *Zootaxa* 1672: 66-68. (in English). [The last stage larvae of the genus *Erythrodiplax* have been described for all species from Cuba except for *E. fervida*. The description of the species in this paper is based on records from 17 August, 2007 (an ultimate stage female larva which after eclosion was determined as *E. fervida*) in the outlet of Chalons basin, located north of Santiago de Cuba (20° 04' 13" N / 75° 48' 47" W), and on exuviae from 4 females and 2 males, collected on 4, 5 and 17, August 2007 at the margins of Chalons basin.] Address: Trapero-Quintana, A.D., Departamento de Biología. Universidad de Oriente. Ave. Patricio Lumumba. Santiago de Cuba 90500. Cuba. E-mail: atrapero@cnu.edu.cu

6839. van Gossum, H.; Sherratt, T.N. (2008): A dynamical model of sexual harassment in damselflies and its implications for female-limited polymorphism. *Ecological Modelling* 210:1/2: 212-220. (in English). ["Female-limited polymorphism is a widespread phenomenon in damselflies. Typically, one female morph resembles the male (the andromorph), while the alternative morph(s) does not (the gynomorph(s)). Contemporary explanations for the phenomenon vary, but they generally assume that the polymorphism has arisen as a consequence of frequency-dependent selection on females to avoid excessive male harassment. Here, we quantitatively characterise two hypotheses, the learned-mate recognition hypothesis (LMR) and the male mimicry (MM) hypothesis. The LMR proposes that males learn more quickly to attack the more commonly encountered female morph in the population, so that rarer female phenotypes are harassed relatively less. By contrast, the MM proposes that when andromorphs are initially rare compared to males, then they are harassed

less than gynomorphs, due to their morphological similarity to males. We present a parameterised dynamical model of the mating system as a way of quantifying the rate of male harassment of females. We then use this information in a multi-generational model that includes selection via the differential harassment of morphs and genetic drift, as well as between-year variability in damselfly density and sex ratio. The proportions of andromorphs at selective equilibria were analytically identified. While both the LMR and the MM versions of the model predict no consistent change in the equilibrium proportion of andromorphic females with increasing damselfly density, only the MM predicts that the equilibrium proportion of andromorphs should increase with sex ratio. Under low harassment rates (e.g. low population densities and/or low male search rates) selection is absent and female morph frequencies are free to drift. The potential applications of this form of dynamical model for other systems involving sexual harassment are discussed." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6840. Zhang, B.; Ren, D.; Pang, H. (2008): *Telmaeshna paradoxica* gen. et sp. nov., a new fossil dragonfly (Insecta: Odonata: Anisoptera) from the Yixian Formation, Liaoning, China". *Zootaxa* 1681: 62-68. (in English). ["*Telmaeshna paradoxica* gen. et sp. nov., is described from the Upper Jurassic to Lower Cretaceous Yixian Formation, near Chaomidian Village, Beipiao City, Liaoning Province, China. It is included in the Anisoptera: Aeshnoptera: Aeshnomorpha: Panaeshnida, on the basis of the following characters: strongly elongated pterostigma; well-defined anal loop and Rspl; undulated RP2, RP3/4 and MA; divided hypertriangle and discoidal triangle; and prolonged gaff. It cannot be assigned to any described extant or extinct family of Panaeshnida, but we refrain from erecting a new family to accommodate it until more features (forewing, body characters) are known. Consequently, this new genus is provisionally retained as family uncertain. Its phylogenetic relationships within Anisoptera are discussed." (Authors)] Address: Ren, Dong, College of Life Sciences, Capital Normal University, Beijing 100037, China. E-mail: rendong@mail.cnu.edu.cn

6841. Zhang, B.; Ren, D.; Pang, H. (2008): New dragonflies (Insecta: Odonata: Gomphaeschnidae) from the Yixian Formation in Inner Mongolia, China. *Progress in Natural Science* 18: 59-64. (in English). ["Two fossil dragonflies from the Upper Jurassic to Lower Cretaceous Yixian Formation in Liutiaogou Village, Ningcheng County, Inner Mongolia, China are described and illustrated. They are assigned to two new genera and species, i.e., *Sophoaeschna frigida* gen. et sp. nov. and *Falsisophoaeschna generalis* gen. et sp. nov. within the family Gomphaeschnidae Tillyard & Fraser, 1940. This is the first report of Odonata from Yixian Formation in Inner Mongolia and the second record of fossil Gomphaeschnidae from China." (Authors)] Address: Ren Dong, College of Life Sciences, Capital Normal University, Beijing 100037, China. E-mail: rendong@mail.cnu.edu.cn

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1997

6842. Clark, T.E.; Samways, M.J. (1997): Sampling arthropod diversity for urban ecological landscaping in a species-rich southern hemisphere botanic garden. *Journal of insect conservation* 1: 221-234. (in English). ["Arthropods were sampled using pitfall traps, sticky traps, sweep netting, Malaise traps and visual sampling at a national botanic garden, KwaZulu-Natal, South Africa, where the taxonomic impediment is great. The aims were to compare two sites, one of native vegetation and the other of mainly exotic plants, to determine the possible localized extent of biodiversity change across the land mosaic, and to test and compare methodologies and indicator taxa and to make recommendations for ecological landscaping of a botanic garden. Species richness and evenness varied considerably with sampling technique used. From results of a single replicate of data from all trapping methods including 821 arthropod species and 3831 individuals, a number of conclusions could be drawn. Trapping procedures such as sweep netting and pitfall traps, which focus on species with restricted mobility and/or host plant requirements, indicated greatest differences in diversity between two closely located sites. Taxa varied in sensitivity to microlandscape, again depending on the extent of their mobility. Cicindelid and carabid beetles were particularly good indicators of habitat disturbance and type. The management recommendations are that in a species-rich urban botanic garden such as this, as many ecotopes as possible should be preserved or created. These should vary in topography, landscape characteristics and vegetation composition, with as much connectivity as possible. This is a feasible blanket approach to give home to a large number of nameless species and morphs. Patches of different ecotopes should not be separated by more than a few metres by expanses of mown lawn which isolates much of the fauna." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6843. Donnelly, T.W. (1997): A hybrid *Ophiogomphus*. *Argia* 9(4): 7. (in English). [A female hybrid between likely *Ophiogomphus rupinsulensis* (Walsh 1862) and *O. carolus* Needham 1897 from Massachusetts, USA is

discussed.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

6844. Forbes, M.; Leung, B.; Schalk, G. (1997): Fluctuating asymmetry in *Coenagrion resolutum* (Hagen) in relation to age and male pairing success (Zygoptera: Coenagrionidae). *Odonatologica* 26(1): 9-16. (in English). ["Recent evidence suggests that fluctuating asymmetry (FA) of characters may index either stress during development of organisms, or be related to fitness of individuals following development. The Authors tested whether wing FA of *C. resolutum* was related to damselfly age and to male pairing success. It was predicted younger individuals should have higher FA on average as compared to older individuals if FA was related to damselfly survival. It was found that younger individuals had higher FA than older individuals over all sampling dates combined. However, this relation was due to the inclusion of one of three comparisons between pre-reproductive and mature insects, and was not a general phenomenon. Wing FA was not related to male pairing success. The results suggest that character FA can be related to fitness measures of damselflies, but not in a highly repeatable way. Data are also provided on seasonal changes in mite parasitism and body size that may relate to our finding FA-fitness relations restricted to one period of the flight season." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

6845. Forbes, M.R.; Schalk, G.; Miller, J.G.; Richardson, J.M.L. (1997): Male-female morph interactions in the damselfly *Nehalennia irene* (Hagen). *Can. J. Zool.* 75(2): 253-260. (in English, with English and French summaries). ["Several hypotheses concerning factors that favour coexistence of female morphs in damselflies invoke differential attraction to (or harassment of) female morphs from mate-searching ♂♂. We designed experiments to determine whether ♂♂ were differentially attracted to either of two discrete female morphs in *N. irene*. One female morph was similar in colour and pattern to the conspecific male ("androchrome") and the other was dissimilar ("gynochrome"). ♂♂ were indiscriminate in their mating attempts. Overall, ♂♂ were more attracted to gynochrome ♀♀; however, ♂♂ that showed high response intensity to model ♂♂ were

equally likely to grasp models of the gynochrome and androchrome ♀♀. During male–female encounters in the field, androchrome ♀♀ were more likely to chase ♂♂, whereas gynochrome ♀♀ showed more refusal displays. Other direct and indirect evidence suggests that gynochrome ♀♀ may be greater targets of sexual aggression than androchrome ♀♀ while at the pond's edge, but that androchrome ♀♀ more often frequent the pond's edge. Whether or not these differences in behaviour translate into differential costs and benefits of being a particular morph is unknown." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada

6846. Land, M.F. (1997): Visual acuity in insects. *Annual Review of Entomology* 42: 147-177. (in English). ["The acuity of compound eyes is determined by interommatidial angles, optical quality, and rhabdom dimensions. It is also affected by light levels and speed of movement. In insects, interommatidial angles vary from tens of degrees in Apterygota, to as little as 0.24 in dragonflies. Resolution better than this is not attainable in compound eyes of realistic size. The smaller the interommatidial angle the greater the distance at which objects — prey, predators, or foliage — can be resolved. Insects with different lifestyles have contrasting patterns of interommatidial angle distribution, related to forward flight, capture on the wing, and predation on horizontal surfaces." (Author) Minimum interommatidial angles for *Anax junius*, *Sympetrum striolatum*, *Austrogomphus guerini*, *Zyxomma obtusum*, *Aeshna grandis*, and *Xanthagrion erythronurum* are documented.] Address: Land, M.F., Sussex Centre for Neuroscience, School of Biological Sciences, University of Sussex, Brighton BN1 9QG, UK

6847. Leung, B.; Forbes, M.R. (1997): Fluctuating asymmetry in relation to indices of quality and fitness in the damselfly, *Enallagma ebrium* (Hagen). *Oecologia* 110: 472-477. (in English). ["Fluctuating asymmetry (FA) refers to random deviations from symmetry of otherwise bilaterally symmetric traits. Researchers have hypothesized that FA should be inversely related to individual quality or fitness. In this study, we tested for FA-quality and FA-fitness relations in the damselfly, *Enallagma ebrium* (Hagen). We used wet mass of an individual as a measure of its quality and longevity as a measure of its fitness. Contrary to predictions, we found no relation between FA and quality or fitness, even after we controlled for possible confounding factors, such as measurement error and inadequate sample size." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

6848. Proess, R.; Baden, R. (1997): Die Libellen der Fließgewässer Luxemburgs. 1. Norden und Westen des Landes (Insecta, Odonata). *Bull. soc. nat. luxemb.* 98: 113-128. (in German, with English summary). [25 localities along of eight rivers in Luxembourg were investigated in 1996. In total, 15 species were recorded.] Address: Proess, R., ECOTOP, 6, rue Gustave Kahnt, L-1851 Luxembourg, Luxembourg. E-mail: ecotop@pt.lu

6849. Trockur, B. (1997): Bemerkenswerte Libellenfunde im Kiesweihergebiet bei Remerschen: Wiederfund

von *Epitheca bimaculata* und Erstnachweis von *Anax parthenope* für Luxemburg (Insecta, Odonata). *Bull. soc. nat. luxemb.* 98: 105-112. (in German, with English summary). [A total of 25 species in the gravel pit region near Remerschen, Luxembourg includes *A. parthenope* new to Luxembourg and *E. bimaculata* not recorded since the 1960ies.] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: Bernd-Trockur@gmx.de

1998

6850. Ashkenazi, S.; Dimentman, C. (1998): Foraging, nesting, and roosting habitats of the avian fauna of the Agmon wetland, northern Israel. *Wetlands Ecology and Management* 6: 169-187. (in English). ["The foraging, nesting and roosting habitats of the avian fauna of a newly created Agmon wetland and surrounding cultivated peat land (5 km²) in the Hula Valley, northern Israel, were evaluated (January 1996–February 1997) to assess the value as a habitat and for wildlife tourism. We recorded 180 bird species [...] in different habitats (the lake, shores, cattail and reed-bed stands, trees, temporary inundated areas). The most heavily used habitat for foraging, breeding, and roosting was a large cattail stand in the southern third of the lake. The foraging habitat and diet data of 97 avian species were determined. [...]"] (Authors), and includes *Brachythemis leucosticta*, *Crocothemis erythraea*, *Zygoptera*, and *Calopteryx syriaca*.] Address: Ashkenazi, S., Ecology and Nature Conservation, P.O. Box 1057, Rosh Pinna 12100, Israel

6851. Matsura, T.; Nomura, K.; Komatsu, K. (1998): Ecological studies of odonate larvae living in artificial ponds in an urban area: Occurrence of larval *Sympetrum striolatum imitoides* and its life history in primary school swimming pools. *Japanese Journal of Ecology* 48(1): 27-36. (in Japanese, with English summary). ["As a part of a research program on the ecology of odonate larvae inhabiting artificial ponds, we surveyed outdoor swimming pools of primary schools in Kyoto City every late spring. During a 4 year period, 11 species of odonate larvae (*Libellulidae*, *Aeshnidae*, *Gomphidae* and *Coenagrionidae*: 7, 1, 1 and 2 species, respectively) were collected. Only larval *Sympetrum striolatum imitoides* predominated at most swimming pools. We took samples from 4 schools every late spring for 4 years and obtained the annual changes in the numbers of their larvae. This survey revealed that while larval *S. striolatum imitoides* was common in the school pools in Kyoto City, density varied from year to year. To clarify why only larvae of *S. striolatum imitoides* were dominant in the pools, their life cycle was examined at one pool. Larvae of chironomids, mayflies (*Cloeon* dipterum), water bug (*Anisops ogasawarensis*) and diving beetles as well as larval *S. striolatum imitoides* coexisted among detritus on the bottom. Especially chironomid larvae, which are preferred by larval *S. striolatum imitoides*, were present at high density. Most eggs of *S. striolatum imitoides* laid in Autumn hatched by mid winter, then the larvae reached the final instar in late May. We estimated that one third of them became adult before mid June, when the water was drained for pool-cleaning. As a reason for the dominance of larval *S. striolatum imitoides*, the following three traits may have been responsible: (i) their life cycle coincides with the off-sea-

son for the pool, (ii) ♀♀ oviposit directly into the water, and (iii) larval *S. striolatum imitoides* prey on smaller larvae of other species of dragonflies because their eggs hatch earlier than other species." (Authors)] Address: Matsura, T., Department of Biology, Kyoto University of Education, Japan

1999

6852. Ermolenko, V. (1999): Description of rare Odonata species. In: Zagorodniuk, I. (Ed.): Invertebrate animals of Ukraine, protected by the Bern Convention. Kyiv. ISBN 966-02-1380-8: 15-24. (in Ukrainian, with English translation of titles). [Blueprints of *Sympecma paedisca*, *Aeshna viridis*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, *Ophiogomphus cecilia*, and *Stylurus flavipes* are presented together with quite rough maps of distribution of the species in Ukraine. For details see: <http://www.lucanus.org.ua/articles/inverte/bern4-invert.pdf>] Address: not stated

6853. Kury, D. (1999): Faszination Libellen. Veröffentlichungen aus dem Naturhistorischen Museum Basel 27: 81 pp. (in German). [The book provides an easy-to-read introduction into biology and ecology of Odonata with some brilliant, original drawings. 78 west and central European species are monographically treated: A colour picture is accompanied by information on morphology, phenology, life cycle, habitat, distribution, and threat.] Address: Naturhistorisches Museum Basel, Augustinerstrasse 2, CH-4001 Basel, Schweiz

2000

6854. Catling, P.M.; Brownell, V.R. (2000): Damselflies and dragonflies (Odonata) of Ontario: Resource guide and annotated list. ISBN 0-9682013-1-8: 200 pp. (in English). ["The importance of damselflies and dragonflies in biodiversity protection and environmental monitoring in the province of Ontario required an update to the currently available literature. To satisfy this need, an annotated list of the 168 damselfly and dragonfly taxa recorded in Ontario is presented. For each taxon, notes are provided on conservation status, flight period, habitat, distribution by county and district, and identification. In some cases, ecological and taxonomic information is provided. Temporal and geographic occurrence is discussed and county/district distribution maps are included. Keys and illustrations are included to assist in identification of species recently added to the Ontario fauna. Sources of information are outlined, and a list of references is included that covers Ontario and surrounding regions. Potential additions to the Odonata fauna of Ontario are discussed. Information necessary for participation in counts, surveys and research projects is also presented. This guide is designed to assist both the novice and experienced researcher. It includes information available up to 1999 and the publication of Ontario Odonata, vol. I in 2000, but it does not take into account information published in the latter source." (Authors) Available at: <http://www.ontarioinsects.org/resource%20guide%202000.pdf>] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6855. Dommangeat, J.-L. (2000): Document technique No 28: La conservation des couleurs et la préparation des libellules destinées à la collection de référence. Bulletin de l'entomofaune 22: 7 pp. (in French). [Advice is provided on the preparation and conservation of colours of voucher specimens.] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

6856. Palot, M.J.; Soniya, V.P. (2000): Odonata from Courtallam, Tamil Nadu, southern India. Zoos' Print Journal 15: 301-303. (in English). [4-8 February 2000, Courtallam (Kuttralam, Western Ghats, 8°50' and 9°0' N. and 77° 10' and 77°20' E.), 14 species of Odonata were recorded, and are documented.] Address: Palot, M.J., Zoological Survey of India, Freshwater Biological Station, 1-1-300/B, Ashok Nagar, Hyderabad, Andhra Pradesh 500020, India

6857. Polhemus, D. (2000): Aquatic insects of the Wapoga River Area, Irian Jaya, Indonesia. Conservation International. Rapid Assessment Program 14: 37-42. (in English). [In April 1988, 25 Zygoptera species at 18 stations were sampled. These are listed in the appendix 7 of the publication.] Address: Polhemus, D., Dept. of Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

6858. Strong, A.M. (2000): Divergent foraging strategies of two neotropical migrant warblers: implications for winter habitat use. The Auk 117(2): 381-392. (in English). [Jamaica; Ovenbirds (*Seiurus urocapillus*) also preyed - rarely - on Odonata.] Address: Strong, A.M., Dept of Ecology, Evolution and Organismal Biology 310, Dinwiddie Hall, Tulane University, New Orleans, Louisiana 70118, USA

2001

6859. Booth, A.J.; McKinlay, B.W. (2001): Spatial aspects of the reproductive and feeding biology of the striped robber, *Brycinus lateralis* (Pisces: Characidae), in the Okavango Delta, Botswana. African zoology 36(1): 31-40. (in English). [Okavango Delta, Botswana. Aspects of the reproductive and feeding biology of two allopatric populations of the striped robber, *Brycinus lateralis* were investigated. *B. lateralis* is an opportunistic micro-carnivore with immature fish feeding predominantly on *Daphnia* species and adults being largely insectivorous. The diet also includes adult and larval Odonata.] Address: Booth, A.J., Dept Ichthyology & Fishery Science, Rhodes University, P.O. Box 94, Grahamstown, 6140 South Africa. E-mail: t.booth@ru.ac.za

6860. Efitre, J.; Chapman, L.J.; Makanga, B. (2001): The inshore benthic macroinvertebrates of Lake Nabugabo, Uganda: seasonal and spatial patterns. African zoology 36(2): 205-216. (in English). ["Lake Nabugabo, Uganda, is a lake of particular interest because of the unusual nature of its benthic macroinvertebrate community. In this study we quantified the spatial and temporal distribution of benthic macroinvertebrates within the lake with a focus on habitat associations in inshore areas. We focused on four inshore habitats: *Nymphaea lotus* / *Nymphaea caerulea* (water lily), *Miscanthidium violaceum*, *Vossia cuspidata* (hippo grass) and forest edge. The most notable characteristic of the Nabugabo fauna was the absence of bivalves and crustaceans and the scarcity of gastropods that made up only 1.8%

of the numerical abundance of the benthos. The numerically dominant taxa were ephemeropterans (77.7%) and dipterans (11.1%). Annelids (5.4%), odonates (2.8%) and trichopterans (1.3%) comprised a much smaller component of the benthic assemblage. Total invertebrate abundance and the abundance of major taxa did not vary significantly across months, but habitat effects were evident. The water-lily habitat was very depauperate, which may reflect the low levels of dissolved oxygen near the sediments in this habitat. Lake Nabugabo is extremely poor in salts, mean conductivity in inshore sites ranging from 22.3 to 26.4 $\mu\text{S}/\text{cm}$ and 22.6 to 37.9 $\mu\text{S}/\text{cm}$ (K25) for surface and bottom waters, respectively. The low conductivity (low concentrations of ions) in Lake Nabugabo may limit colonization by molluscs and crustaceans that, with their calcareous shells or exoskeletons, may require water with a higher mineral content." (Authors)] Address: Chapman, L.J., Dept Zoology, University of Florida, Gainesville, Florida, 32611, USA. E-mail: ljchapman@zoo.ufl.edu

6861. El-Moursy, A.; El-Hawagry, M.; Abdel-Dayem, M.; Fadl, H. (2001): Insect diversity in Zaranik Protected Area, North Sinai, Egypt. *The Egyptian Journal of Natural History* 3: 62-80. (in English). [Ischnura senegalensis, Anax parthenope, and Crocothemis erythraea are listed.] Address: El-Moursy, A., Entomology Dept, Faculty of Science, Cairo University Gisa, Egypt

6862. Goyaud, C. (2001): Atlas de répartition des Libellules (Odonata) de Vendée (1985-2000). *Le naturaliste Vendéen* 1: 19-35. (in French, with English summary). [40 naturalists contributed to an atlas on the Odonata of the Vendée, France. A map is locating each of the 58 species of Odonata.] Address: Goyaud, C., Coordonnateur de l'Atlas des odonates de Vendée, La Haute Chevallonnaire, F-85310 La Chaize-le-Vicomte, France. E-mail: Christian.goyaud@free.fr

2002

6863. Emiliyamma, K.G., Radhakrishnan, C. (2002): Additions to the Odonata (Insecta) of Thiruvananthapuram District, Kerala. *Zoos' Print Journal* 17: 914-917. (in English). ["Peters (1981) reported 26 species of Odonata from Thiruvananthapuram District of Kerala State, southern India. The present study is based on the Odonata collections made from this district, during the faunistic surveys conducted by Zoological Survey of India (Western Ghats Field Research Station, Calicut and Southern Regional Station, Chennai) in 1997, 1998 and 2001. As a result of these surveys, 27 species and subspecies of Odonata belonging to 17 genera and seven families could be collected and identified. Of these, 17 species and subspecies are new additions to the Odonata fauna of Thiruvananthapuram District. Accordingly, till date a total of 43 species and subspecies of Odonata are known from this district. A systematic list of all the 43 species recorded from the district and a systematic account of the species collected during the current surveys are provided. The specimens studied are deposited in the faunal depository of the Zoological Survey of India, Kozhikode." (Authors)] Address: Emiliyamma, K.G.

6864. Kopij, G. (2002): Food of the Lesser kestrel (*Falco naumanni*) in its winter quarters in South Africa. *Raptor Research* 36(2): 148-152. (in English). [In total, 2050

pellets were collected from Nov. 1997-Feb. 1998. The diet of *F. naumanni* during the non-breeding season was dominated by sun spiders. Orthopterans and beetles were also an important component, together forming 27.5% of the total number of prey items identified and 44.4% of the total wet biomass. Other arthropod groups, such as earwigs, termites, cockroaches, dragonflies (n = 2 specimens) and scolopendras constituted supplementary food. Only a few vertebrate items represented by small mammals were found.] Address: Kopij, G., Raczkka 13, 49-137, Korfantow, Poland.

6865. Lingenfelder, U. (2002): Untersuchungen zur Libellenfauna im Stadtverband Saarbrücken. Gutachten im Auftrag des Umweltamtes des Stadtverbandes Saarbrücken: 75 pp. (in German). [23 waterbodies in the southern region of the German Federal State of Saarland were investigated in 2001 resulting in a total of 30 odonate species.] Address: Lingenfelder, U., Seebergstraße 1, D-67716 Heltersberg, Germany. E-mail. u.lingenfelder@vr-web.de

6866. Rowe, C.; Hopkins, W.A.; Congdon, J.D. (2002): Ecotoxicological implications of aquatic disposal of coal combustion residues in the United States: a review. *Environmental Monitoring and Assessment* 80: 207-276. (in English). ["We provide an overview of research related to environmental effects of disposal of coal combustion residues (CCR) in sites in the United States. Our focus is on aspects of CCR that have the potential to negatively influence aquatic organisms and the health of aquatic ecosystems. We identify major issues of concern, as well as areas in need of further investigation. Intentional or accidental release of CCR into aquatic systems has generally been associated with deleterious environmental effects. A large number of metals and trace elements are present in CCR, some of which are rapidly accumulated to high concentrations by aquatic organisms. Moreover, a variety of biological responses have been observed in organisms following exposure to and accumulation of CCR-related contaminants. In some vertebrates and invertebrates, CCR exposure has led to numerous histopathological, behavioural, and physiological (reproductive, energetic, and endocrinological) effects. Fish kills and extirpation of some fish species have been associated with CCR release, as have indirect effects on survival and growth of aquatic animals mediated by changes in resource abundance or quality. Recovery of CCR-impacted sites can be extremely slow due to continued cycling of contaminants within the system, even in sites that only receive CCR effluents for short periods of time. The literature synthesis reveals important considerations for future investigations of CCR-impacted sites. Many studies have examined biological responses to CCR with respect to Se concentrations and accumulation because of teratogenic and reproductively toxic effects known to be associated with this element. However, the complex mixture of metals and trace elements characteristic of CCR suggests that biological assessments of many CCR-contaminated habitats should examine a variety of inorganic compounds in sediments, water, and tissues before causation can be linked to individual CCR components. Most evaluations of effects of CCR in aquatic environments have focused on lentic systems and the populations of animals occupying them. Much less is known about CCR effects in lotic systems, in which the contaminants may be transported downstream, diluted or concentrated in downstream areas, and accumulated

by more transient species. Although some research has examined accumulation and effects of contaminants on terrestrial and avian species that visit CCR-impacted aquatic sites, more extensive research is also needed in this area. Effects in terrestrial or semiaquatic species range from accumulation and maternal transfer of elements to complete recruitment failure, suggesting that CCR effects need to be examined both within and outside of the aquatic habitats into which CCR is released. Requiring special attention are waterfowl and amphibians that use CCR-contaminated sites during specific seasons or life stages and are highly dependent on aquatic habitat quality during those periods." (Authors) References to odonates *Libellula* sp., *Enallagma* species, and *Plathemis lydia* are made.] Address: 1 University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, Solomons, Maryland, U.S.A.; 2 University of Georgia, Savannah River Ecology Laboratory, Aiken, South Carolina, USA. E-mail: Rowe@cbl.umces.edu)

6867. Storozhenko, S.Yu.; Lelej, A.S.; Kurzenko, N.V.; Tshistjakov, Yu.A.; Sidorenko, V.S. (2002): Insect biodiversity of the Russian far east. *Far Eastern Entomologist* 109: 1-28. (in English, with Russian summary). [Biodiversity at the family level is documented for the Russian far east. Diversity differed across the regions. 84 odonate species are known from Russian far east.] Address: Storozhenko, S.Yu., Institute of Biology and Soil Sciences, Far Eastern Division of the Russian Academy of Sciences, Vladivostok-22, 690022, Russia

6868. Vaslin, M. (2002): Reproduction de l'*Anax napolitain*, *Anax parthenope* Sélys 1839, en Vendée. *Le naturaliste Vendéen* 2: 97-98. (in French, with English summary). [A freshly emerged *Anax parthenope* was observed June 17, 2001 on a sand dune in Noirmoutier island, Vendée, France.] Address: Vaslin, M., 7, chemin de l'Agas, 85690 Notre-Dame-de-Monts, France. E-mail: m.vaslin@wanadoo.fr

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6869. Balik, I.; Karasahin, B.; Özkök, R.; Çubuk, H.; Uysal, R. (2003): Diet of Silver Crucian Carp *Carassius gibelio* in Lake Egirdir. *Turkish Journal of Fisheries and Aquatic Sciences* 3: 87-91. (in English). [The diet of *C. gibelio* was investigated from 265 guts collected between March 2001 and March 2002. The 3998 food items were dominated by benthic and planktonic invertebrates such as Gastropods, Dipterans, Cladocerans, Copepods, and Ostracods. *Daphnia* sp. was found in 42.6% of the non-empty gut-samples. *Onychogomphus forcipatus* is said to belong to the gut content.] Address: Balik, I., Fisheries Research Institute, 32500 Egirdir, Isparta, Turkey. E-mail: i.balik@esuae.gov.tr

6870. Emiliyamma, K.G., Radhakrishnan, C. (2003): Fauna of protected areas - 4: Odonata (Insecta) of Indira Gandhi Wildlife Sanctuary and National Park, Tamil Nadu. *Zoos' Print Journal* 18: 1264-1266. (in English). [The Indira Gandhi Wildlife Sanctuary and National Park (10°13'08"-10°33'27"N & 76°49'02"-77°21'07"E), occupies an area of 958km² at an elevation of 340-2400m along the eastern slope of the Western Ghats in Coimbatore District, Tamil Nadu, India. Fraser (1931) reported 41 species and subspecies of Odonata from Anamalai and Mudis hills. Later, in his Fauna of British

India (1933, 1934 & 1936), Fraser added eight more species of Odonata occurring in the area. The present note deals with 22 species and subspecies of Odonata collected from these protected areas through our surveys. Of these, 10 species and one subspecies are new additions to the Odonata fauna of the area. Thus, altogether 60 species and subspecies are currently known to occur in the Park. A systematic list of all the species of Odonata known till date from this Sanctuary, and a systematic account of the 22 species and subspecies collected during our surveys are provided below. The materials studied are deposited in the faunal depository of the Zoological Survey of India, Southern Regional Station, Chennai." (Authors)] Address: Emiliyamma, K.G., Western Ghats Field Research Station, Zoological Survey of India, Kozhikode, Kerala 673002, India

6871. McHattie, S.D.J. (2003): Analysis of data on dispersal in southern damselflies (*Coenagrion mercuriale*). University of Liverpool BSc Zoology BIOL630: Honours Project: 41 pp. (in English). ["*Coenagrion mercuriale* is a rare species within the UK, of particular interest to conservationist groups. It is known that the damselfly is both a poor coloniser and the range over which it will travel is known to be very short. A good understanding of both how good a coloniser this species is and what distance it will travel to achieve this will help to induce more productive conservation of this endangered species; helping to recolonise nearby areas. The main objective of this study was to find correlations between size of area and movement of individuals at ten sites distributed around the Hampshire area in the South of England. Other correlations that were hoped to show relevance were that between population density and movement of individuals; correlations with rate of movement and comparisons between ♂♂ and ♀♀ with respect to distances travelled and rates of movement. It is also intended to bring light upon the issue of how far *C. mercuriale* will travel around its habitat to discover further habitats and breeding grounds. The results show that there are definitely correlations between population density and distances travelled (activity) but there are no significant differences between the studied sites with respect to rates of travel by *C. mercuriale*. It was also shown that there the sex of the individual has a significant effect on the activity of the insect but not on the rate of travel. Also, it was noted that individuals crossed the road between Upper and Lower Crockford with great hesitancy and on no occasion was an individual seen travelling further than just over one and a half kilometres. With this knowledge, and the prospect of further investigation, it is possible to ensure that the conservation of *C. mercuriale* can be maximised and habitats of suitable nature only attempted to be conserved if they are within suitable range of existing habitats." (Author)] Address: http://www2.warwick.ac.uk/fac/sci/sbdtc/students/2006/stuart_mchattie/liverpool.pdf

Potter, J.F. (2003): Book Reviews: Oaks, dragonflies and people: creating a small nature reserve and relating its story to wider conservation issues, Norman W. Moore, 2002. Harley Books, Colchester, UK. 132 pp., ISBN 0-946589-71-2, £15.95 (paperback). *The Environmentalist* 23: 193. (in English). [review] Address: not stated

6872. Rothfels, C. (2003): Royal Botanical Gardens odonate count 2003. *Ontario Insects* 9(1): 11-13. (in English). [List of 28 species (556 individuals), sighted on

25-VII-2003, Ontario, Canada.] Address: Rothfels, C.J.; crothfels@rbg.ca

6873. Staton, S.K.; Dextrase, A.; Metcalfe-Smith, J.L.; Di Mai, J.; Nelson, M.; Parish, J.; Kilgour, B.; (2003): Status and trends of Ontario's Sydenham river ecosystem in relation to aquatic species at risk. *Environmental Monitoring and Assessment* 88: 283-310. (in English). ["The Sydenham River in southwestern Ontario is located in the Mixedwood Plains Ecozone, which supports the greatest diversity of flora and fauna in Canada. The river historically supported a rich aquatic community that included 80 fishes and 34 species of freshwater mussels. Fourteen aquatic species native to the river (8 fishes, 5 mussels and 1 turtle) have been designated as endangered, threatened, or of special concern by the Committee on the Status of Species at Risk in Canada (COSEWIC). A multi-agency Recovery Team was formed in 1999 to ensure the continued survival of these and other rare species in the river. The Sydenham River Recovery Team is the first in Canada to adopt an ecosystem approach to recovery planning for aquatic species. Information on land use patterns, water quality trends, the physical condition of the river, and the distributions of aquatic species at risk was synthesized to gain an understanding of the overall health of the river and its major anthropogenic stresses. Seven of the species at risk have declined in distribution or abundance, and three may be extirpated. The main threat to fishes and mussels is heavy loadings of sediment, nutrients, and possibly pesticides to the river via tile drainage and overland runoff from agricultural lands. A strategy that incorporates four overall approaches (management, stewardship, research and monitoring, and awareness and outreach) was developed to recover and protect this globally significant freshwater ecosystem." (Authors) Eight species of Odonata considered to be rare in the Province of Ontario are occurring, but are not specified.] Address: Staton, Shawn, Great Lakes Laboratory for Fisheries and Aquatic Sciences, Department of Fisheries and Oceans, 867 Lakeshore Road, Burlington, ON, Canada. E-mail: StatonS@DFO-MPO.GC.CA

6874. Valladolid, M.; Przybylski, M. (2003): Feeding ecology of *Cobitis paludica* and *Cobitis calderoni* in Central Spain. *Folia biol. (Kraków)* 51 (Suppl.): 135-141. (in English). ["In total, 253 specimens of *Cobitis paludica* and 163 *Cobitis calderoni* were collected in the Lozoya River (Madrid, Spain) in April, May, July, September and December 1990. Both species showed high percentages of empty guts in all months. *C. paludica* fed mainly on detritus and invertebrates while *Cobitis calderoni* fed on invertebrates and unicellular algae. Preferred prey items were the larvae of Dipterans (Chironomidae, Simuliidae) and microcrustaceans, with Ephemeroptera (Caenis) in summer. *Cobitis calderoni* fed on the most abundant prey except in April and July, when it selected invertebrates. *C. paludica* selected invertebrates throughout all the months. Diet overlapping (Horn's Index) was complete except in September, when the abundance of invertebrates in both diets was similar. For the remaining months, food type (invertebrates, unicellular algae and detritus) abundance differed, minimizing the interspecific competition." (Authors) Benthos samples include *Calopteryx* sp., *Ischnura* sp., *Coenagrion mercuriale*, *Platycnemis acutipennis*, *Aeshnidae*, *Anax* sp., *Cordulegaster* sp., and *Gomphus* sp. Odonata play a minor role as diet.] Address: Valladolid, Maria, Department of Biodiversity and Evolutionary Bio-

logy, National Museum of Natural History (CSIC), c/ Jose Gutierrez Abascal 2, 28006 Madrid, Spain. E-mail: marval@mncn.csic.es

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6875. Anonymous (2004): Additional Observations of Odonata in Ontario during 2002. *Ontario Odonata* 5: 29-35. (in English). [The table contains 334 records in addition to those reported in *Ontario Odonata* 4.] Address: not stated

6876. Bracken, B.; Lewis, C. (2004): Odonata of the Britannia Conservation Area (Ottawa-Carleton), Ontario. *Ontario Odonata* 5: 15-22. (in English). ["An annotated checklist of the Odonata of the Britannia Conservation Area (BCA), Canada and immediate environs is presented for the 50 species recorded mainly from 1996 - 2003. This represents a remarkable diversity for such a small geographical area. The conservation area is much less than 1 km² with a wetland occupying approx. one fifth of this. It is situated within an urban residential landscape bordered by housing on the west and south sides and the Ottawa River to the north and east, and is 9 km. from Parliament Hill. The proximity to urban development makes this location even more interesting in that 47.2% of the 106 species recorded for Ottawa-Carleton County (OCC) have occurred here during these eight years. Six new records were added in 2003. The majority of species that have been found are common to uncommon in OCC." (Authors)] Address: Bracken, B., 711-1435 Morisset Ave. Ottawa, ON K1Z8H4, Canada. E-mail: gomphid@hotmail.com

6877. Bree, D. (2004): Notes on the Odonates of Petroglyphs Provincial Park and area for 2003. *Ontario Odonata* 5: 23-26. (in English). ["Updates to the checklist of the Odonata found at Petroglyphs Provincial Park, Canada during the 2003 field season are presented. Documented are 5 additional species, bringing the total to 78. Included among these five are the provincially uncommon (all ranked S3) *Argomphus furcifer*, *Cordulegaster diastatops*, *Somatochlora walshii*, and *Nannothemis bella*. Additional documentation of other uncommon and rare species in and near the park is made, including the first confirmed breeding in Ontario of the provincially rare *Progomphus obscurus* (S1). New late and early flight dates for Peterborough County are also presented." (Author)] Address: Bree, D., Box 123, Bloomfield, ON. KOK 1G0, Canada. E-mail: dbree@post.kosone.com

6878. Carmichael, I.; MacKenzie, A.; Steinburg, B. (2002; Second edition 2004): Photo field guide to the Dragonflies and Damselflies of southwestern Ontario. The Friends of Pinery Park. ISBN 1-895212-06-5: 72 pp. (in English). [Spiral bound, soft cover, 4x7 inches, 72 pages each with 2 or 3 colour photos, 28 dragonflies and 31 damselflies illustrated. Colour-coded index, checklist, list of species not illustrated. CDN \$8.95, bulk orders \$5.00 each.] Address: The Friends of Pinery Park at: R.R. 2, Grand Bend, Ontario NOM 1T0, Canada. E-mail: fopp@oxford.net.

6879. Casacuberta, R.M. (2004): Odonatos de Cataluña: catálogo y análisis geográfico. *Boln. Asoc. esp. Ent.* 28(1-2): 55-69. (in Spanish, with English summary). ["Odonata of Catalonia: catalogue and geogra-

phic analysis - This work consists of a critical catalogue of the 65 species of Odonata so far recorded from Catalonia, Spain. The most recent records of five species date back to the first half of the 20th century and the presence of these species in Catalonia, 50 years later, requires confirmation. A zoogeographical analysis was carried out along the lines proposed by St. Quentin and Ocharan. The former states that the Odonata of Catalonia are characterized by western Mediterranean (23.07%), Holomediterranean elements (21.53%) and autochthonous forms with a centre of dispersal in the eastern Mediterranean (15.38%), whilst the latter calculates the proportions as follows: Holomediterranean (23.07%), Ibero-Maghreb (23.07%), Pontic-Oriental (18.46%) and Eurosiberian (13.84%) elements.] Address: not stated

6880. Catling, P.M. (2004): Why are Hagenius brevistylus nymphs so distinctive? Ontario Odonata 5: 27. (in English). [Observations made 4 May 2003 along the shores of Burns Lake (45.3120° N -77.0856° W) in Griffith Tp., Renfrew Co., Canada are documented. H. brevistylus known as a "hider" was found under dead birches leaves giving some protection against visual detecting by predator. The flattened body is also interpreted as morphological adaptation to use shelter as leaves.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6881. Catling, P.M.; Jones, C.D.; Pratt, P. (2004): Introduction to the year 2003. Ontario Odonata summary; Observations of Odonata in Ontario during 2003. Ontario Odonata 5: 36-122. (in English). [82 observers contributed 4332 records.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6882. Corbet, P.S. (2004): Foreword. Askew R.R. (2004): The Dragonflies of Europe (revised ed.). Harley Books, Colchester. ISBN: 0946589755: 6. (in English). [The foreword highlights some current odonatological events at the beginning of the third millennium.] Address: deceased

6883. Czerniawska-Kusza, I. (2004): Use of artificial substrates for sampling benthic macroinvertebrates in the assessment of water quality of large lowland rivers. Polish Journal of Environmental Studies 13(5): 579-584. (in English). [The paper presents the results of a comparative study between two different sampling techniques, i.e. nettings filled with brick as artificial substrates and handnet sampling. Using the Belgian Biotic Index (BBI) method along a stretch of the lower Nysa Kłodzka river (Poland) the method is said to demonstrate water quality changes of the river ecosystem in Poland. Odonata are presented on the genus level. Abstracters note: Considering the different habitat choice of Gomphidae species larvae and considering comparable studies which demonstrate that artificial substrates are rarely used by Gomphidae, it is questionable that this method is sufficient to demonstrate relationships between water quality parameters and Odonata.] Address: Czerniawska-Kusza, Izabela, Uniwersytet Opolski, Katedra Ochrony Powierzchni Ziemi, Oleska 22, PL-45-052 Opole, Poland. E-mail: Izabela.Kusza@uni.opole.pl

6884. Hayashi, F.; Dobata, S.; Futahashi, R. (2004): Larval morphology of the Japanese Mnais damselflies

(Odonata: Calopterygidae) distinguished by nuclear DNS (ITS 1) sequences. Tombo 47: 13-24. [A recent phylogenetic study of the Japanese Mnais damselflies (Odonata: Calopterygidae) based on DNA sequences of a nuclear ribosomal internal transcribed spacer 1 (ITS 1) and adult morphology suggested that this genus consists of two closely related species, M. strigata Selys, 1853 and M. costalis Selys, 1869 (Hayashi et al., 2004). In the present paper, we determined the ITS 1 sequence types and compared morphology of larvae. Apparent differences were found only in the shape of the lateral caudal gills, the end of which was greatly protruded in M. costalis (Figs. 1, 2), while only slightly pointed in M. strigata (Figs. 3, 4). In a population of M. strigata (from the Izu Peninsula in Shizuoka Prefecture to southern Yamanashi Prefecture) which has a unique ITS 1 sequence type, the shape of caudal gill ends was variable among individuals and often intermediate between the two species (Fig. 5). Therefore, this population of M. strigata may have a hybrid nature with M. costalis. In the larvae with regenerated gills, however, interspecific differences became unclear, and we must pay attention to identify them (Fig. 6). In the two species, the increase in gill length was greater than that in gill height, and so that larger larvae tended to have more elongated gill lamellae than smaller ones (Fig. 7). (Author)] Address: Hayashi, F., Dept of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji, Tokyo 192-0397, Japan. E-mail: fhayashi@comp.metro-u.ac.jp

6885. Hildrew, A.G.; Woodward, G.; Winterbottom, J.H.; Orton, S. (2004): Strong density dependence in a predatory insect: large-scale experiments in a stream. Jour. Animal Ecology 73: 448-458. [1. Empirical information about the intergenerational dynamics of stream insects is scarce, and most field experiments are conducted at small temporal and spatial scales that are inappropriate for assessing effects upon population dynamics. We performed a large-scale, intergenerational population manipulation of an abundant, stream-dwelling predator, the alderfly *Sialis fuliginosa*, by altering its recruitment over 3 consecutive years (it has a 2-year life cycle). 2. Experimental treatments were assigned to three contiguous 150-m stretches. Each year at least 92% of *S. fuliginosa* eggs, that are laid on the streamside vegetation, were removed from an upstream 'removal' stretch and transferred below an adjacent 'control' stretch to a downstream 'addition' stretch, where recruitment was thus effectively doubled. 3. Although manipulations were successful initially, the effects were transient. Strong density-dependent survival stabilized the population at a similar density in all three stretches within the first 4 months of life for the 1997 cohort and somewhat later for the 1998 cohort. Survey data suggested that intraguild predation (including cannibalism) and/or starvation, particularly early in the life cycle, might be regulating the *S. fuliginosa* population. 4. It is intriguing that this abundant predator, which is linked very richly within the complex Broadstone Stream food web, has a strongly stabilized population, even in the face of such a dramatic perturbation in recruitment." (Authors) The study includes many references to *Cordulegaster boltonii*.] Address: Hildrew, A.G., School of Biological Sciences, Queen Mary University of London, London E1 4NS, UK. E-mail: A.Hildrew@qmul.ac.uk

6886. Johanning, J. (2004): Libellen im Dinklager Becken. Utkiek (Mitteilungsblatt des Heimatvereins Dinklage von 1934) 31: 28-34. (in German). [Niedersachsen,

Germany; 28 species are briefly commented and some notes on regional human impacts on the odonate fauna are given (including a reference to grass carps). Interesting notes are records of *Erythromma viridulum*, *Gomphus pulchellus*, *Sympetrum fonscolombii*, and *S. flaveolum* covering a period with generally low odonatological activities in Germany.] Address: not stated

6887. Jones, C.D.; Burke, P.S. (2004): Mocha Emerald (*Somatochlora linearis*), new to Ontario and Canada. *Ontario Odonata* 5: 1-4. (in English). ["*S. linearis* is reported from several sites within the Sydenham River watershed in southwestern Ontario, representing the first records for Ontario and Canada. All of the sites where *S. linearis* was found are consistent with the species' preferred habitat elsewhere in its range, suggesting that it is an overlooked resident of the province, rather than a vagrant. This species should be looked for elsewhere in southwestern Ontario, particularly in the extreme southwest and in the Niagara Peninsula region." (Authors)] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

6888. Kostiuk, B. (2004): Review - "Photo field guide to the Dragonflies and Damselflies of southwestern Ontario". *Ontario Odonata* 5: 28. (in English). [review] Address: Kostiuk, Brenda, 170 Sanford Ave. Ottawa, Ontario K2C 0E9, Canada

6889. Mathews, J.H. (2004): Report on Common Green Darner (*Anax junius*) emergence in Caledon, Ontario, during 2003. *Ontario Odonata* 5: 12-14. (in English). ["A survey of ponds in the Caledon area of southern Ontario, Canada in 2003 did not produce any overwintering *Anax junius* larvae, contrary to expectation based on earlier reports from studies in the 1960s. However overwintering larvae were discovered 70 km to the east. It appears that in some years overwintering may not occur, or may occur to a very limited extent, in parts of southern Ontario." (Author)] Address: Matthews, J.H., University of Texas, Austin, USA. E-mail: johoma@mail.utexas.edu

6890. Orr, A.G.; Butler, S.G.; Hämäläinen, M.; Kemp, R.G. (2004): *Insecta: Odonata*. C.M. Yule & Y.H. Sen (eds.): *Freshwater Invertebrates of the Malaysian Region*. ISBN 9834193602: 409-442. (in English). [Concise introduction into morphology of Odonata stressing regional species, and key to larvae and imagines on the family level.] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

6891. Peacor, S.D.; Werner, E.E. (2004): How dependent are species pair interaction strengths on other species in the food web? *Ecology* 85(10): 2754-2763. (in English). ["In ecological theory species interaction strengths are typically described by constants or functions that depend on the densities of the two interacting species. However, if species' traits (phenotypes) are plastic, then modifications in these traits (induced by the presence of another species) could affect interaction strengths of the focal species with a number of other species in the system. The magnitudes of such higher-order effects on interaction strengths have not been reported and are not straightforward to measure. We present a methodology to quantify changes in consumer-resource interaction coefficients (a metric of in-

teraction strength) due to effects of predators on consumer (i.e., the prey of the predator) phenotype (e.g., nonlethal or trait-mediated effects). Application of this method to studies in diverse systems indicates that predators can strongly reduce consumer-resource interaction coefficients, often in the range of 20-80%. We use analytic and simulation models to show that effects on interaction coefficients of this magnitude can lead to trait-mediated effects that contribute more strongly than density-mediated effects to the net effects of predators on consumers and their resources, and even qualitatively change model predictions. Our results strengthen previous claims that trait-mediated effects strongly influence species interactions and suggest that recent calls to quantify interaction strengths must be broadened to include examination of the variation in interaction strengths due to their dependence on densities of other species (most notably predators) in food webs." (Authors) The study includes Odonata.] Address: Werner, E.E., Department of Biology, University of Michigan, Ann Arbor, MI, 48109 USA.

6892. Ramanujam, M.E.; Verzhutskii, B. (2004): Prey of the Indian pipistrelle bat *Pipistrellus coromandra* (Gray) at Auroville, Southern India. *Zoos' Print* 19(12): 1720. (in English). [Odonata contributed 0.74% of the diet of *P. coromandra*.] Address: Ramanujam, M.E.; Pitchandikulam Bio. Resource Ctr. Gratitude Avian Rehabilitation, ECTDEF Project, Auroville, Pondicherry, 605101, India. E-mail: tdef@auroville.org.in

6893. Rothfels, C.J. (2004): Unicorn Clubtail (*Arigomphus villosipes*: Gomphidae): new records and summary of status in Ontario. *Ontario Odonata* 5: 5-11. (in English). [Canada; "Six new 2003 records of *A. villosipes* are presented, including new regional records for Halton and York. These new records, combined with new records from 2002, represent an approximate doubling of the known extant or historical records of this rare species in Ontario. These observations are of interest because *A. villosipes* has been considered extremely rare in Ontario and a recent evaluation suggested that it had declined. All known Ontario records are summarized, as are the identification issues and habitat preferences of this *Arigomphus*. Possible explanations for the influx of new records are discussed." (range extension as a result of climatic change) (Author)] Address: Rothfels, C.J.; crothfels@rbg.ca

6894. Silva-Santos, P.M.; Oliveira, S.V.; Cortes, R.M. V.; Albuquerque, A.C. (2004): Natural and anthropogenic variations in a channelized water course in Centre of Portugal. *Limnetica* 23(3-4): 257-270. (in English). ["The present study took place in the Mondego River, located in the Centre of Portugal. The lower sector of the river (Lower Mondego) is largely man-made due to regularization and rectification of the channel. The objective was to assess the impacts on the aquatic communities (fishes and benthic invertebrates). Fauna inventories were performed in June and September of 2000 and 2001, together with habitat characterization. Three sampling sites were selected in this segment and compared to a reference site located upstream. It is concluded that the presence of structures such as submerged weirs and riprap, promoted the diversity, due to the physical complexity, which they introduced into the system. The dramatic flood peaks that occurred in the winter of 2000/01 also caused substantial changes in the fluvial dynamics and in the habitats: the large amount of suspended

solids transported resulted in a riverbed of unstable fine materials, and in a subsequent biological impoverishment. However, both communities displayed a high resilience to these changes; the inter-annual differences being obscured by the seasonal ones on macroinvertebrate communities." (Authors) 12 odonate taxa are listed in the appendix.] Address: Silva-Santos, P.M., Lab. Ecologia Aplicada (LEA), Universidade de Trás-os-Montes e Alto Douro, Quinta de Prados, 5000-911, Vila Real, Portugal. Email: pedross@utad.pt

6895. Soininen, J.; Könönen, K. (2004): Comparative study of monitoring South-Finnish rivers and streams using macroinvertebrate and benthic diatom community structure. *Aquatic Ecology* 38: 63-75. (in English). ["In southern Finland, most of the rivers are turbid and suffer from eutrophication and leaching of suspended solids from diffuse sources. We first related benthic diatom and macroinvertebrate structure to environmental factors using direct ordination. Second, benthic diatoms and macroinvertebrates were simultaneously sampled in several South-Finnish rivers and streams to compare two monitoring methods. The study sites constituted of some large, moderately nutrient rich rivers and some smaller, less eutrophic streams situated on the south coast of Finland. Diatom species distribution was most affected by conductivity, total P and latitude. Species distribution of macroinvertebrates was mostly related to channel width, conductivity and pH. For diatoms, separation of community structure between sampling stations was clear, but corresponding macroinvertebrate communities were more similar to each other. Correlation between diatom and macroinvertebrate pollution indices was rather low and insignificant $r = 0.28$. As a whole, variation of macroinvertebrate index values CV 4.7% among replicate samples was slightly lower than for diatom index CV 6.0%. On the contrary, community similarity between the replicate samples was slightly lower among macroinvertebrates $r = 0.770$ due probably to their larger local scale spatial variation, sampling of more habitats and lower density compared to diatoms $r = 0.874$. In conclusion, multiple pressures affecting the river ecosystems at different spatial and temporal scales should lead to choosing more than one biological monitoring method with clearly identifiable responses." (Authors) *Calopteryx virgo* is included into the analysis.] Address: Soininen, J., Dept of Limnology & Environmental Protection, P.O. Box 65 (Biocenter 3, Viikki), FIN-00014 University of Helsinki, Finland. E-mail: janne.soininen@helsinki.fi

6896. Sutherland, D.A.; Oldham, M.J.; Jones, C.D.; Pratt, P.D. (2004): Odonata of Ontario's Hudson Bay Lowland. *Ontario Odonata* 6: 1-11. (in English). [Canada; historical and current data amount the known odonate fauna to 48 species.] Address: Pratt, P.D., 7100 Matchette Rd, La Salle, ON, Canada, N9C 2S3. E-mail: prairie@netcore.ca

6897. Urban, M.C. (2004): Disturbance heterogeneity determines freshwater metacommunity structure. *Ecology*, 85(11): 2971-2978. (in English). ["Metacommunity theories, which consider communities as interacting species assemblages connected by dispersal, differ in their assumptions about the importance of interspecific adaptations and environmental heterogeneity as controls of assemblage composition. I assess the relative importance of regional (dispersal) and local (abiotic and biotic environmental variation) processes in explaining

the structure of a freshwater pond metacommunity. Results did not support the hypothesis that dispersal was limited by interpatch distance. Instead, community diversity, composition, and trophic structure were best explained by local environmental variation associated with pond permanence. Many taxa were restricted either to temporary or semipermanent ponds, an outcome that suggests species trade off adaptations to disturbance with those to biotic interactions (species-sorting model) and that refutes the neutral model of interspecific equivalence. However, evidence for high dispersal rates, low-fitness habitats, and high temporal environmental variability indicated that interpatch dispersal also may influence local dynamics through mass effects. These results suggest that integrating the species-sorting and mass-effect niche assembly frameworks will provide a necessary step in the successful application of metacommunity theory.... Both odonates found in the study, *Sympetrum* and *Lestes*, only occurred in ponds containing high (>45%) macrophyte cover. Thus, habitat selection by mobile taxa may be an important means through which species track changes in pond permanence over time." (Author)] Address: Urban, M.C., School of Forestry and Environmental Studies, Yale University, 370 Prospect Street, New Haven, Connecticut 06520 USA. E-mail: urban@nceas.ucsb.edu

2005

6898. Anonymus (2005): Additional observations of Odonata in Ontario over the period 2001 - 2003. *Ontario Odonata* 6: 43-71. (in English). [Table with detailed record information on app. 100 Canadian species.]

6899. Bracken, B.; Lewis, C. (2005): Additions to the Odonata study area of the Britannia Conservation Area, Ottawa, ON. *Ontario Odonata* 6: 14-15. (in English). [Ontario, Canada; new additions are: *Calopteryx aequabilis*, *Enallagma geminatum*, *Gomphus fraternus*, and *Stylurus notatus*.] Address: Bracken, B., 711-1435 Morriset Ave, Ottawa, ON, K1Z 8H4, Canada. E-mail: gomphidbracken@yahoo.ca

6900. Bree, D. (2005): Odonate range fluctuations as illustrated by occurrence records of three species from Prince Edward County, Ontario. *Ontario Odonata* 6: 16-20. (in English). [Canada; "The appearance and disappearance of *Ischnura hastata*, *Perithemis tenera*, and *Enallagma anna* in Prince Edward County between 1999 and 2004 is documented. Appropriate habitat for all three species occurs in Prince Edward but the County was beyond the known geographic range of all as of the year 2000. Their sporadic appearance there illustrates odonate occurrence patterns for species at the edge of their range. All three species exhibit very different dispersal characteristics. *I. hastata* routinely appears and disappears at localities, even within its core range. *P. tenera*, while common within its range, is sedentary and was not known to occur outside the Carolinian zone in Ontario prior to 2001. The *E. anna* has been experiencing a recent and rapid range expansion north-eastward. All three species have shown a similar occurrence pattern within Prince Edward County - sudden, unprecedented appearance in suitable habitat, sometimes in numbers suggesting a stable breeding population, then disappearance. It is speculated that winter temperatures may be the deciding factor in preventing permanent colonization of these species in Prince Ed-

ward." (Author)] Address: Bree, D., Box 123, Bloomfield, ON. K0K 1G0, Canada. Email: dbree@kos.net

6901. Cating, P.M.; Jones, C.D.; Pratt, P. (2005): Introduction to the year 2004 Ontario Odonata Summary. Observations of Odonata in Ontario during 2004. Ontario Odonata 6: 72-180. (in English). [5831 records of Odonata from 2004 are documented in the database] Address: Cating, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6902. Catling, P.M.; Kostiuk, B.; Conner, F. (2005): Odonata collected in the vicinity of the Queen's University Biology Station at Chaffey's Lock. Ontario Odonata 6: 21-30. (in English). [A baseline collection of Odonata for future monitoring was made around Queens University Biology Station, 35 N of Kingston, Ontario, Canada. At present 54 species are known from the region. They are documented in detail.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6903. Catling, P.M. (2005): More on Zebra Mussels on exuviae. Ontario Odonata 6: 40. (in English). [A Zebra Mussel attached to an exuvium of *C. cynosura* was collected downstream from the Outlet River bridge in Sandbanks Provincial Park (43.89198 N, -77.21731 W), Canada on 29 Aug. 2003. The mussel is 8 mm long and suggests that the larvae may have spent a relatively long time in the final stage. The specimen is now in the national collection (CNC).] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6904. Catling, P.M. (2005): Observations of possible migration of Common Baskettail, *Epiptera cynosura* (Say), in Ontario and New York. Ontario Odonata 6: 12-13. (in English). [An unidirectional movement of approximately 500 *E. cynosura* was observed on 17-V-1998 on Walpole Island in Lambton County, Ontario, Canada. On June 5, 2004 an additional major northward movement of this species was recorded near Waddington, Louisville County, New York, USA. Some of the migrating specimens were hit by cars when crossing the highway.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6905. Catling, P.M. (2005): Global warming a potential explanation for the extension of known range of *Hetaerina americana*. Ontario Odonata 6: 40-41. (in English). [Four criteria are outlined to assess range changes of Odonata with regard to climatic warming: (1) the possibility of the species having been overlooked should be small. (2) the species should not be strongly associated with new or man-made habitats. (3) the range expansion should not be part of a poorly understood and very broad scale invasion. (4) the geographic distribution of data and loss or alteration of habitat should minimally influence the patterns. Range alterations of *Hetaerina americana* and *Ischnura hastata* are briefly discussed.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6906. Cocroft, R.B.; Rodriguez, R.L. (2005): The behavioral ecology of insect vibrational communication. *BioScience* 55(4): 323-334. (in English). ["Vibrational communication is widespread in insect social and ecological interactions. Of the insect species that communicate using sound, water surface ripples, or substrate

vibrations, we estimate that 92% use substrate vibrations alone or with other forms of mechanical signaling. Vibrational signals differ dramatically from airborne insect sounds, often having low frequencies, pure tones, and combinations of contrasting acoustic elements. Plants are the most widely used substrate for transmitting vibrational signals. Plant species can vary in their signal transmission properties, and thus host plant use may influence signal divergence. Vibrational communication occurs in a complex environment containing noise from wind and rain, the signals of multiple individuals and species, and vibration-sensitive predators and parasitoids. We anticipate that many new examples and functions of vibrational communication will be discovered, and that study of this modality will continue to provide important insights into insect social behaviour, ecology, and evolution." (Authors) Odonata are classified as insect not using vibrations for communication.] Address: Cocroft, R.B., Biological Sciences, University of Missouri-Columbia, Columbia, MO 65211, USA. E-mail: cocrofr@missouri.edu

6907. De Marmels, J. (2005): La larva de *Progomphus dorsopallidus* Byers, 1934, (Odonata: Gomphidae), con una clave para identificar las larvas de otras especies del género del norte del Río Orinoco, Venezuela. *Entomotropica* 20(3): 235-238. (in Spanish, with English summary). ["The last instar larva of *Progomphus dorsopallidus* is described and illustrated based on six exuviae obtained from reared specimens. A key to the larvae of six of the eight species of the genus recorded so far from north of the Orinoco River is given." (Author)] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

6908. Earley, C. (2005): Gray Jay catching and eating dragonflies. Ontario Odonata 6: 40. (in English). ["A Gray Jay flew onto my still-outstretched hand grabbed the darner that I had captured and took off with it! It ate the dragonfly right in front of us." (Author): Address: E-mail: cearley@uoguelph.ca

6909. Foster, R.F. (2005): Review - "Damselflies of the Northeast: A guide to the species of eastern Canada and the northeastern United States". Ontario Odonata 6: 42. (in English). [Review of the book covered as OAS 4844.] Address: Foster, R.F., Northern Bioscience, 363 Vashn Horne Street, Thunder bay, Ontario Canada, P7A 3G3. E-mail: rfoster@tbaytel.net

6910. Hanrahan, S.A. (2005): Boris Ivan Balinsky (10 September 1905 – 1 September 1997). *African Entomology* 13(2): 390-392. (in English). [This memorial is attributed to one of the leading South-African odonatologists who in the 1950th and 1960th contributed several important papers to the knowledge of Odonata in southern Africa.] Address: Hanrahan, S.A., Animal, Plant and Environmental Sciences, University of the Witwatersrand, Johannesburg, South Africa. E-mail: shirley@gecko.biol.wits.ac.za

6911. Hutchinson, R.; Catling, P.M. (2005): The Canadian National Collection of Dragonflies. Ontario Odonata 6: 31-39. (in English). ["With the increasing focus on dragonflies as environmental indicators, the dragonfly section of the Canadian National Collection is assuming increasing importance. Started in 1886, the collection has grown rapidly and steadily since the 1940s as a

result of a well informed policy of general collecting by a large group of entomologists. The collection includes 14,060 mostly adult specimens on pins and 14,615 polypropylene envelopes with adults and 4,291 larval specimens preserved in alcohol for a grand total of at least 32,966 specimens. Although the collection is 95% Canadian, there is a good representation of material from other parts of the world and it is the best teaching collection in Canada. Within Canada, Ontario, the prairie provinces and Northwest Territories are particularly well represented. Principal collectors are B.E. Bowen (Ontario, Quebec), P.M. Catling (all Canada), D.F.J. Hilton (all Canada), R. Hutchinson (Quebec), J.E.H. Martin (all Canada), M.J. Oldham (Ontario) J.R. Vockerth (all Canada), E.M. Walker (all Canada) and J.B. Wallis (all Canada). Numerous publications are based on material in the collection, and some actively used databases have been largely derived from collection material. With very broad and extensive Canadian representation, and classification by several experts and some type and cited material, the collection is a major research tool." (Authors) Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6912. Kosterin, O.E.; Dubatolov V.V. (2005): A dragonfly (Odonata) collection from the Bol'shekhkhtsirskii State Nature Reserve (Khabarovskii Krai, Russia). *Animal World of the Far East* 5. Fauna of Russian Far East: collected research papers. Volume 5 - Blagoveshchensk State Pedagogical University, Blagoveshchensk: 9-14. (in Russian). [25 species of Odonata are reported for the Bol'shekhkhtsirskii State Natural Reserve and the Bolshoi Ussuriiskii Island (the environs of Khabarovsk). *Sympetrum infuscatum* (Selys, 1883) is for the first time recorded for Khabarovskii Krai Province. In June-September 2004, the second author undertook an expedition to Khabarovskii Krai, mostly in the Bol'shekhkhtsirskii State Nature Reserve, aimed to inventarise the butterfly fauna of this Reserve. Along with butterflies and moths, he collected also Odonata. It should be noted that he did not specially explore any water reserve, collecting took place in woody area and concerned foraging dispersed individuals, mostly ♀♀. Some individuals were attracted by light at night. However, just 66 specimens collected appeared to represent 25 species. This is not many, but any information on exact distribution of odonate species in the southern Far East of Russia is still to be accumulated to correctly outline species ranges, and especially the data on the fauna of Nature reserves are important in view of the goal of Nature protection. So the list of materials collected is published herewith. The specimens are kept in the collection of the Institute of Systematics and Ecology of Animals of the Siberian Division of the Russian Academy of Sciences, Novosibirsk (SZMN)." (Authors) The paper also includes a brief, critical discussion of the species status of the taxon *Cordulia amurensis*.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

6913. Piscart, C.; Moreteau, J.-C.; Beisel, J.-N. (2005): Biodiversity and structure of macroinvertebrate communities along a small permanent salinity gradient (Meurthe River, France). *Hydrobiologia* 551: 227-236. (in English) ["Changes in the macroinvertebrate community were investigated over 10 months at four sites along a

19 km salinity gradient (0.21–2.60 g l⁻¹) in a sixth-order stream, the Meurthe River, northeastern France. Abiotic characteristics other than salinity were similar between the sites. Macroinvertebrate taxonomic richness decreased by 30% downstream of the 1.4 g l⁻¹ sites while diversity, evenness or total abundance of taxa did not change along the gradient. In terms of functioning, a slight change in relative abundances of invertebrate feeding groups followed the salinity gradient. Eight invertebrate assemblages occurred within specific salinity distributions were identified. The exotics *Gammarus tigrinus*, *Dreissena polymorpha*, *Corbicula fluminalis* and *Corophium curvispinum*, were more abundant at the highest salinity site. These results suggest that rising salinity concentrations drastically affect the species composition, including favouring exotic species." (Authors)] Address: Beisel, J.-N., UFR SciFA, Laboratoire BFE, Université de Metz, Campus Bridoux, Av. du Général Delestraint, 57070, Metz, France. E-mail: beisel@sciences.univ-metz.fr

6914. Rennie, M.D.; Collins, N.C.; Purchase, C.F.; Tremblay, A. (2005): Predictive models of benthic invertebrate methylmercury in Ontario and Quebec lakes. *Can. J. Fish. Aquat. Sci.* 62: 2770-2783. (in English, with French summary). ["Multivariate analyses on benthic invertebrate methylmercury concentrations (MeHg) and water chemistry from 12 Quebec water bodies were used to guide the construction of simple, predictive models of benthic invertebrate [MeHg] in 23 lakes in Ontario and Quebec. Separate predictive models for collector–shredder and predatory benthic invertebrates were constructed using multiple regression and were assessed for their predictive utility by crossvalidation. Predatory benthic invertebrate [MeHg] was negatively related to pH and positively related to dissolved organic carbon (DOC) concentration (cross-validation $r^2 = 0.31$). Collector–shredder [MeHg] was positively related to [DOC] only (cross-validation $r^2 = 0.13$). Predictive utility of our models is similar to or surpasses that observed in previously published zooplankton MeHg models tested against independently collected data. Significant environmental variables and their contribution to the overall explanatory power of benthic invertebrate MeHg models are similar to those found in zooplankton models, suggesting that in both pelagic and benthic food webs, pH and DOC are important indicators of MeHg bioavailability. Although seasonal patterns in invertebrate [MeHg] were examined, none was detected. These models represent an effective means of identifying water bodies of interest for researchers and for reconstructing past benthic invertebrate [MeHg] patterns using archived water chemistry data." (Authors) "Anisoptera" are considered in this study.] Address: Rennie, M.D., Dept of Biology, University of Toronto at Mississauga, 3359 Mississauga Road N., Mississauga, ON L5L 1C6, Canada. E-mail: mrennie@utm.utoronto.ca

6915. Rothfels, C.; Catling, P.M. (2005): Major dragonfly migration at Hamilton. *Ontario Odonata* 6: 40. (in English). [*Anax junius*, 7-IX-2004, Hamilton, Ontario, Canada] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6916. Santovac, S.; Jovic, M.; Andus, L. (2005): *Sympetrum depressiusculum* (Selys, 1841) new species in the Odonata fauna of Serbia. *Arch. Biol. Sci., Belgrade*, 57 (3): 15-16. (in English). ["A single male of this spe-

cies was collected in the village of Hajdukovo on the banks of the rivulet Kireš near Lake Ludaš (N Serbia) by the first author in July, 2002. During an inspection of the Odonata collection in the Natural History Museum in Belgrade, a female of *S. depressiusculum* was identified. This specimen (NHM 600 Beo 595.7333) was collected by Aleksandra Mladenoviæ on Lake Vlasina in 1990." (Authors)] Address: Santovac, S., City Museum, 23000 Zrenjanin, Serbia and Montenegro

6917. Szczęsny, B. (2005): Some groups of benthic invertebrates and the physico-chemical conditions in the streams of the Magurski National Park in the Beskid Niski Mts (Northern Carpathians). *Nature Conservation* 61: 9-27: 9-27. (in English). [Poland; in the framework of a hydrochemical survey between 2001-2003 at 32 sites in the Wisloka river drainage basin (330-790 m a.s.l.) in the Magurski National Park benthos was sampled. The taxa list includes *Gomphus* sp.] Address: Szczęsny, B., Institute of Nature Conservation, Polish Academy of Sciences, Mickiewicza 33, 31-120 Krakow, Poland. E-mail: szczesny@iop.krakow.pl

6918. Zessin, W. (2005): Eindrücke vom XVI Internationalen Symposium der Odonatologie (S.I.O.) vom 26. Juli bis 4. August 2004 in Banzkow/Schwerin, Deutschland. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 8(1): 5-18. (in German). [The author and organiser of the symposium highlights some impressions from the symposium held in Germany. The paper also includes a list of species caught in the framework of the symposium field trips.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

6919. Zivic, I.; Markovic, Z., Ilic, J. (2005): Composition, structure and seasonal dynamics of macrozoobenthos in the Temska and Visocica Rivers (Serbia). *Archives of Biological Sciences* 57(2): 107-118. (in English). ["We investigated macrozoobenthos communities in the Temska and Visocica Rivers at 10 localities during the summer and autumn of 2001. In 46 samplings of quantitative and 10 of qualitative analysis, 101 taxa from 17 groups of macrozoobenthos are identified. The most diverse group is the order Trichoptera (28 species from nine families). Less diverse with (only one species) are Nematomorpha, Hirudinea, Odonata, and Megaloptera. At all of the chosen localities, the most common species are *Elmis aenea* (70.00%), *Ancyclus fluviatilis*, and *Baetis* sp. (60.00%). All those localities on the Visocica and Temska Rivers are very similar. The index of similarity varies from 12.5% (between Vi0 and Te0) to 70.7% (between Te1 and Te2). In the Temska River the Shannon-Weaver diversity index varies from 1.80 (at Te3) to 2.45 (at Te0). In the Visocica River, the highest diversity of macrozoobenthos is at the Vi3 locality (2.59), the lowest at Vi0 (1.40). Less diverse macrozoobenthos communities are found at the Vi0 and Te3 localities. At the same time, these localities have the highest values of Simpson's index (0.35 and 0.34, respectively)." (Authors)] Address: Živic, Ielena, Faculty of Biology, University of Belgrade, 11000 Belgrade, Serbia and Montenegro

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6920. Bennemann, S.T.; Capra, L.G.; Galves, W.; Shibatta, O.A. (2006): Trophic dynamic of Plagioscion

squamosissimus (Perciformes, Scianidae) in stretches under influence of the Capivara dam (Paranapanema and Tibagi rivers). *Iheringia Serie Zoologia* 96(1): 115-119. (in Portuguese, with English summary). ["*P. squamosissimus* was studied in five stretches in Paranapanema and Tibagi rivers under the influence of the Capivara reservoir. The samplings were made on a monthly basis during the 1992/1993 and 1994/1995 periods and seasonally during the 2001/2002 period. [...] A total of 993 specimens had their stomach analyzed. [...] The diet composition was compared among sampling periods and among stretches by the similarity analysis using the Bray-Curtis' coefficient. The results indicated that the consumption of food items was uniform in all periods and stretches analysed. The food items found were grouped in six categories: fishes, shrimp, Odonata, Ephemeroptera, other insect groups and "others" (plant material, detritus and rarely-found organisms). In all stretches and during all the studied periods, *P. squamosissimus* presented a carnivorous diet, and during the 2001/2002 period the item shrimp (*Macrobrachium amazonicum*) represented the largest portion of the diet. [...]"] (Authors)] Address: Bennemann, Sirlei T., Univ Estadual Londrina, Ctr Ciencias Biol, Dept Biol Anim. & Vegetal, Program Posgrad Ciencias Biol, BR-86051990 Londrina, PR, Brazil. E-mail: sirlei@uel.br

6921. Castillo, L.E.; Martinez, E.; Ruepert, C.; Savage, C.; Gilek, M.; Pinnock, M.; Solis, E. (2006): Water quality and macroinvertebrate community response following pesticide applications in a banana plantation, Limon, Costa Rica. *Science of the Total Environment* 367(1): 418-432. (in English). ["Pesticides used in banana production may enter watercourses and pose ecological risks for aquatic ecosystems. The occurrence and effects of pesticides in a stream draining a banana plantation was evaluated using chemical characterization, toxicity testing and macrobenthic community composition. All nematicides studied were detected in the surface waters of the banana plantation during application periods, with peak concentrations following applications. Toxicity tests were limited to the carbofuran application and no toxicity was observed with the acute tests used. However, since pesticide concentrations were generally below the lowest LC50 value for crustaceans but above calculated aquatic quality criteria, there remains a risk of chronic toxicity. Accurate ecological assessments of pesticide use in banana plantations are currently limited by the lack of local short-term chronic toxicity tests and tests using sensitive native species. Relatively constant levels of four pesticides (imazalil, thiabendazole, chlorpyrifos and propiconazole), which had toxic effects according to the 96h hydra and 21d daphnia chronic test, were recorded in the effluent of the packing plant throughout the study, indicating that the solid waste trap used in this facility was not effective in eliminating toxic chemicals. Certain taxa, such as *Heterelmis* sp. (Elmidæ), *Heteragrion* sp. (Megapodagrionidae, Odonata), *Caenis* sp. (Caenidae, Ephemeroptera), and *Smicridea* sp. (Hidropsychidae, Trichoptera), were more abundant at reference sites than in the banana farm waters, and may be good candidates for toxicity testing. Multivariate analyses of the macroinvertebrate communities clearly showed that the banana plantation sites were significantly different from the reference sites. Moreover, following the pesticide applications, all the banana plantation sites showed significant changes in community composition, with the same genera being affected at all sites and for all pesticides (terbufas, cadusafos and car-

bofuran). Consequently, the results presented here show that multivariate analysis of community composition was more sensitive in distinguishing pesticide effects than the toxicity tests and richness and composition measures used. We conclude that monitoring macroinvertebrate communities can be a powerful tool in the assessment of ecological effects of banana production." (Authors)] Address: Castillo, Luisa Eugenia, Univ. Nacl. Cent. Amer. Inst. Studies Tox. Subst. IRET, Heredia, Costa Rica. E-mail: lcastill@una.ac.cr

6922. Catling, P.M.; Hutchinson, R.; Brunelle, P.M. (2006): Use of saltmarsh by dragonflies (Odonata) in the Baie des Chaleurs region of Quebec and New Brunswick in late summer and autumn. *Canadian Field-Naturalist* 120(4): 413-420. (in English). [nv; "During late summer and autumn, in the Baie des Chaleurs region of Quebec, 18 species of adult dragonflies were recorded during one or more visits of at least 2 hours each to 14 salt marshes. Three species, *Aeshna canadensis*, *Sympetrum danae* and *S. internum*, were present in more than half of the sites. The most abundant species was *S. internum* with over 100 seen at some locations. Adults of several species, including *Aeshna canadensis*, *A. umbrosa*, *Enallagma civile*, *E. hageni*, *Ischnura verticalis*, *Lestes disjunctus*, *Libellula quadrimaculata*, *Sympetrum danae*, *S. internum* and *S. obtusum*, occurred in relatively high frequencies in both Baie des Chaleurs salt marshes and in those elsewhere in Acadia. Within Baie des Chaleurs observations of emergence and/or presence of larvae, as well as regional abundance, were recorded for *Aeshna canadensis*, *A. umbrosa*, *Ischnura verticalis*, *Sympetrum costiferum*, *S. internum* and *S. vicinum*. Oviposition in salt marsh pools was recorded for *Aeshna canadensis*, *Enallagma civile*, *E. hageni*, *Ischnura verticalis*, *Lestes congener* and *Sympetrum danae*. The salt marsh dragonfly fauna of Baie des Chaleurs is significantly different from that of the rest of Acadia based on frequencies predicted from the latter region. To a large extent this difference is a result of significantly increased use of salt marsh habitat by adults of six species including *Lestes congener*, *Sympetrum danae*, *Aeshna canadensis*, *S. costiferum*, *Lestes disjunctus*, and *S. internum* (in order of decreasing significance) in Baie des Chaleurs in comparison with salt marshes elsewhere in Acadia. Local amelioration of salty conditions in certain salt marshes, superimposed on regional amelioration as a result of protection from storms and saltwater dilution in the Baie des Chaleurs estuary, may contribute to an environment where adaptation can occur or where already tolerant species can exist. Dragonflies use salt marsh habitat on the northeast coast of North America more extensively than is currently documented." (Authors)] Address: Hutchinson, R., 12 Ch. de la Savane, Apartment 12, Gatineau, Québec J8T 1P7 Canada. E-mail: Raymond.hutchinson@sympatico.ca

6923. Hevers, J. (2006): Die entomologischen Sammlungen des Staatlichen Naturhistorischen Museums in Braunschweig. *Braunschweiger Naturkundliche Schriften* 7(3): 697-757. (in German, with English summary). ["14 entomological collections of the State Museum of Natural History which can be attributed to specific collectors and 2 collections arranged in 1946-1949 are characterized by origin, amount, and composition: 10 collections concern Lepidoptera, 2 Coleoptera, 2 Diptera, 1 Hymenoptera, and 1 Odonata. This article also gives a short history of the entomological associations

of Braunschweig and presents 18 collectors with their biographies." (Author)] Address: Hevers, J., Staatliches Nat. Hist. Museum, Pockelsstr 10, D-38112 Braunschweig, Germany

6924. Hicks, B.J.; Bannon, H.J.; Wells, R D.S. (2006): Fish and macroinvertebrates in lowland drainage canals with and without grass carp. *Journal of Aquatic Plant Management* 44: 89-98. (in English). ["Diploid grass carp (*Ctenopharyngodon idella* L.) were introduced to a lowland Waikato drainage canal at an initial density of 40-80 kg ha⁻¹ (83-167 fish ha⁻¹) to control aquatic macrophytes and improve water flow. A near-by canal was left without grass carp to act as an untreated control. After 7 months, macrophytes occupied 17% of the water column in the treated canal compared to 78% in the untreated canal. Fish and macroinvertebrates in both canals were examined before and after the release of grass carp by sampling with replacement by fyke netting on seven occasions. Brown bull-head catfish (*Ameiurus nebulosus* (Lesueur)) and shortfinned eels (*Anguilla australis* Richardson) comprised most of the resident fish biomass in both canals; however, before grass carp stocking, eels were more abundant than catfish in the treated canal. There was no change in the abundance of resident fish after stocking, but young-of-the-year catfish had greater mortality and grew faster in the treated canal than in the untreated canal. Macroinvertebrates were primarily associated with aquatic macrophytes. Grass carp reduced aquatic macrophyte abundance in the treated canal by about 80%, which by inference reduced the abundance of associated macroinvertebrates, but there was no observed impact of grass carp stocking on the resident fish assemblage. We examined the relationship between head width and fish length, and from this determined that 70% of the grass carp could have escaped through the downstream retention screen. Despite this possibility, grass carp remained in the canal and effectively controlled aquatic macrophytes for 18 months." (Authors) Damselflies were included into the analysis, identifying them in one case as *Xanthocnemis zealandica*. Grass carp ingest macroinvertebrates probably as vicarious intake with the plants on which the macroinvertebrates live.] Address: Hicks, B.J. , Univ. Waikato, Sch. Sci. & Engn, Dept Biol. Sci., Ctr Biodivers. and Ecol. Res., Private Bag 3105, Hamilton, New Zealand. E-mail: b.hicks@waikato.ac.nz

6925. Hortwitz, R.J.; Flinders, C. (2006): Bioassessment Integration Study: Systems Ecology evaluation of US EPA Rapid Bioassessment Protocols in New Jersey (Macroinvertebrates, periphyton, fish, and habitat). Patrick Center Project #830, Project Final Report 06-06; submitted to Thomas Belton, Project Manager, New Jersey Department of Environmental Protection, Division of Science, Research and Technology, 401 East State Street, PO Box 409, Trenton, NJ 08608-1501, USA. March 6, 2006: 226 pp. (in English). ["The purpose of this project was to analyze existing fish, macroinvertebrate, and algal data to develop new methods for integrated stream bioassessment protocols. [...] 105 odonate species were seen at sampling stations (Table 3.7.1). *Calopteryx maculata* was the most common species present in 67 of the 68 samples. *Boyeria vinosa*, *Argia moesta*, *Ischnura verticalis*, and *Argia fumipennis* were present in more than 30 samples. All 61 sites had adult odonates present, although only 33 and 38 sites, respectively, had mating and ovipositing species.

Larvae were identified at 17 sites and exuvia at 25 sites. [...] *Cordulegaster obliqua*, *Ophiogomphus mainensis*, *Enallagma recurvatum*, *Stylurus scudderi*, *Libellula auripennis*, *Macromia alleghaniensis*, *E. pictum* were classified as Special Concern, while three species (*Gomphus apomyius*, *Ophiogomphus aspersus*, *Epitheca spinosa*) were classified as threatened. Most species with conservation concerns were collected from fewer than five sites, with only *M. alleghaniensis* and *E. pictum* (special concern) collected from eight sites each. Although the models were not significant ($p > 0.23$), macroinvertebrate metrics and land use variables accounted for 39.3% and 47.6% of the variation in Odonate adult and larvae richness, respectively. Odonate Adult Richness was positively associated with EPA Habitat Scores (Fig. 3.7.1) ($p=0.087$) and Odonate Larvae Richness was positively associated with the abundance of collector-gatherers ($p=0.098$) and scrapers ($p=0.073$) (Fig. 3.7.2). Both richness measures showed positive relationships with normalized macroinvertebrate family richness and Simpson's diversity metrics ($p=0.040-0.061$) (Figs. 3.7.3 and 3.7.4). Regression models predicting species richness of exuvia, oviposition, and mating accounted for 23.9%, 22.3%, and 19.1%. Like larvae richness, exuvia richness was positively associated with scraper abundance while both oviposition and mating richness metrics were positively related to Chiro: EPT metrics. With the exception of odonate adult richness, regression of macroinvertebrate PCs against odonate richness metrics were not significant and did not account for much variation in odonate richness. There was a significant positive relationship between odonate adult richness and MPCA3 ($p=0.003$) and MPCA4 ($p=0.049$) (Fig. 3.7.5) with the model accounting for 18.6% of variation among samples ($p=0.012$). Remaining odonate metric-MPCA regressions were not significant and accounted for less than 8% of variation." (Authors) Address: Horwitz, R.J., Flinders, Camille, Patrick Center for Environmental Research, The Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, PA 19103-1195, USA

6926. Joshi, P.C. (2006): Anthropogenic encroachments and population dynamics of insects in a moist deciduous forest in Uttaranchal, India. *Journal of Applied Bioscience* 32(1): 32-37. (in English). ["The species composition and community structure of insect fauna vis-a-vis various anthropogenic activities in selected habitats of a moist deciduous forest in Uttaranchal, India were studied for a period of two years. Four sites situated at an altitude ranging between 260 to 480 m from mean sea level with a range of anthropogenic activities, viz. a site with no ongoing disturbances, a naturally recovering site (deforested and replanted 25 years back), a moderately disturbed site (lightly grazed by cattle) and a severely disturbed site (artificially reforested and heavily grazed by live stock) were selected. The former three sites were mixed forests, dominated by *Shorea robusta* Gaertn. F and *Mallotus philippinensis* Muell.-Arg., and the latter site was a plantation of *Tectona grandis* Linn. F. All these sites supported a total of 150 species of insects belonging to 48 families and 9 orders. Order Lepidoptera was the most dominant order in terms of number of species and number of individuals recorded. *Eurema hecabe* Linnaeus was the most abundant species. The other abundant species included *Catopsila pomona* Fabricius (Lepidoptera), *Crocothemis servilia* (Drury) (Odonata), *Mylarbis* sp. (Heteroptera), *Catantops humilis humilii* Serv. and *Oxya ve-*

lox Fabricius (Orthoptera). *Udaspes folus* Cramer (Lepidoptera: Hesperidae) was the most rare species recorded from the naturally recovering site with no ongoing disturbances. The diversity, evenness, and richness of the sites tracked the intensity of the disturbances, the greatest value being associated with undisturbed site, followed by the naturally recovering site, the moderately disturbed site and, severely disturbed site. In all ecological measures, the effects of disturbances were much greater than the changes associated with seasonality. Thus it appears that insect communities are sensitive to anthropogenic disturbances and their community structure may be a viable diagnostic tool in assessing environmental conditions." (Author)] Address: Joshi, P.C., Gurukula Kangri Univ, Dept Zool & Environm Sci, Haridwar 249404, India. E-mail: prakash127@yahoo.com

6927. Kalka, M.; Kalko, E.K.V. (2006): Gleaning bats as underestimated predators of herbivorous insects: diet of *Micronycteris microtis* (Phyllostomidae) in Panama. *Journal of Tropical Ecology* 22: 1-10. (in English). [Anisoptera constituted >10% each of numbers of prey specimens and of biomass of the diet of *M. microtis*.] Address: Kalka, Margareta, University of Berlin (Freie Universität), Department of Zoology, Königin-Luise-Str. 1-3, D-14195 Berlin, Germany

6928. Kano, K. (2006): Some notes on dragonflies at Hong Kong. *Yosegaki* 122: 68-69. [*Brachythemis contaminata* and *Orthetrum sabina* displayed a polarotactic reaction along a wet asphalt road by holding territories. Taken from: *Digest Jap. Odonatol. Short Coms.* No. 20, January, 2007]

6929. Koperski, P.; Gołub, M. (2006): Application of new regional biotic index APODEMAC, in environmental quality assessment of lowland streams. *Polish Journal of Ecology* 54(2): 311-320. (in English). [This Polish index considers *Calopteryx* sp. and Gomphidae. Address: Koperski, P., Inst. Environm. Protect., Kolektorska 4, PL-01692 Warsaw, Poland. E-mail: Koper@hydro.biol.uw.edu.pl

6930. Kovacs, T.; Ambrus, A.; Juhasz, P. (2006): Lárva és exuvium adatok Magyarország Odonata faunájához II.. *Folia historico naturalis musei matraensis* 30: 167-179. (in Hungarian, with English summary). [Larval and exuvial data to the Odonata fauna of Hungary II.] This paper provides 1333 records of 49 species from 228 sites sampled between 2003 and 2006.] Address: Kovacs, T., Matra Mus., Kossuth u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

6931. Kraft, P.G.; Wilson, R.S.; Franklin, C.E.; Blows, M.W. (2006): Substantial changes in the genetic basis of tadpole morphology of *Rana lessonae* in the presence of predators. *Journal of Evolutionary Biology* 19(6): 1813-1818. (in English). ["Predator-induced morphological plasticity is a model system for investigating phenotypic plasticity in an ecological context. We investigated the genetic basis of the predator-induced plasticity in *Rana lessonae* by determining the pattern of genetic covariation of three morphological traits that were found to be induced in a predatory environment. Body size decreased and tail dimensions increased when reared in the presence of preying dragonfly larvae. Genetic variance in body size increased by almost an order of magnitude in the predator environment, and the first genetic principal component was found to be highly significantly different between the two environ-

ments. The across environment genetic correlation for body size was significantly below 1 indicating that different genes contributed to this trait in the two environments. Body size may therefore be able to respond to selection independently in the two environments to some extent." (Authors)] Address: Wilson, R.S., Univ. Queensland, Sch. Integrat. Biol., Brisbane, Qld 4072, Australia. E-mail: r.wilson@uq.edu.au

6932. Miller, S.E. (2006): 4.3. Insects of Papua. Marshall, A.J. & Beehler, B.M. (eds.): The Ecology of Papua. Singapore. Periplus Editions: 515-531. (in English). [This is a general account on insect biodiversity of Papua. Odonata are treated citing Lieftinck 1949.] Address: not stated

6933. Muenz, T.K.; Golladay, S.W.; Vellidis, G.; Smith, L.L. (2006): Stream buffer effectiveness in an agriculturally influenced area, southwestern Georgia. Responses of water quality, macroinvertebrates, and amphibians. *J. Environ. Qual.* 35: 1924-1938. (in English). ["To determine useful metrics for assessing stream water quality in the Southeastern Coastal Plain, we examined differences among two buffered and three unbuffered streams in an agricultural landscape in southwestern Georgia. Potential indicators included amphibian diversity and abundance, aquatic macroinvertebrate populations, riparian vegetative structure, water quality, and stream physical parameters. Variability among sites and treatments (buffered vs. unbuffered) existed, with sites in the same treatment as most similar, and disturbances from a nearby eroding gully strongly affecting one unbuffered site. Of the invertebrate metrics examined, percentages of clingers, Ephemeroptera-Plecoptera-Trichoptera (EPT), Elmidae (Coleoptera), Crustacea (Decapoda and Amphipoda), and dipterans were found to be possible indicators of stream health for perennial streams within this region. Overall, buffered sites showed higher percentages of sensitive invertebrate groups and showed lower and more stable concentrations of nitrate N, suspended solids, and fecal coliforms (FCs). Percent canopy cover was similar among sites; however, riparian vegetative coverage and percent leaf litter were greatest at buffered sites. No differences in amphibian abundance, presence, and absence within the riparian area were apparent between sites; however, instream larval salamanders were more abundant at buffered streams. In this study, stream buffers appeared to decrease nutrient and sediment loads to adjacent streams, enhancing overall water quality. Selected benthic macroinvertebrate metrics and amphibian abundance also appeared sensitive to agricultural influences. Amphibians show potential as indicator candidates, however further information is needed on their responses and tolerances to disturbances from the microhabitat to landscape levels." (Author) A total of 23840 individual organisms were collected at the five sites including 4 odonate taxa.] Address: Muenz, Tara, J.W. Jones Ecological Research Center, Route 2 Box 2324, Newton, GA 39870, USA. E-mail: tmuenz@jonesctr.org

6934. Samways, M. (2006): Astonishing recovery of rare and threatened dragonflies. *Faculty of AgriSciences Newsletter (University of Stellenbosch)* 27: 1-2. (in English). [The rich endemic dragonfly fauna of South Africa has been under threat from invasive alien trees, particularly eucalypts, wattles and pines. The trees shade out the habitat, making it unsuitable for the sun-

loving, endemic species. To deal with the threats from these alien trees, a huge, nation-wide programme has been launched to remove these trees. [...]. Among the species that have made a come-back is *Syncordulia venator*, last recorded on the mountain in 1934. The remarkable *Ecchlorolestes peringueyi*, which has the strange habit of sitting perfectly camouflaged on lichen-covered boulders, has also appeared." (Author) Colour photos of both species are presented.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6935. Samways, M. (2006): Astonishing recovery of rare and threatened dragonflies. *Rostrum* 68: 1. (in English). [Table Mountain, South Africa, *Syncordulia venator*, *Ecchlorolestes peringueyi*] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6936. Suzuki, K.; Kawashima, I. (2006): The insects illustrated in Gen'ichiro Narasaka's "Chûgyo-Zufu". *Bull. Nagoya Univ. Museum* 22: 211-247. (in Japanese, with English summary). [Insects treated in the "Chûgyo-Zufu" and illustrated by the anatomist Gen'ichiro NARASAKA (June 15, 1854 - March 19, 1934) include 21 odonate species (immatures and in some cases larvae). These were identified as well as the handwritten Japanese text was annotated by the authors. The following Odonata species were identified: *Ceriagrion melanurum*, *Ischnura senegalensis*, *Mnais nawai*, *Asiagomphus melaenops*, *Gomphus postocularis*, *Nihonogomphus viridis*, *Sinictinogomphus clavatus*, *Trigomphus citimus tabei*, *Trigomphus interruptus* or *T. ogumai*, *Anax nigrofasciatus nigrofasciatus*, *Anax parthenope julius*, *Polycanthagyna melanictera*, *Epithecina marginata*, *Epophthalmia elegans*, *Libellula angelina*, *Lyriothemis pachygastra*, *Nannophya pygmaea*, *Orthetrum albistylum speciosum*, *Orthetrum japonicum japonicum*, *Pseudothemis zonata*, and *Rhyothemis fuliginosa*.] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

6937. Ternois, V. (2006): L'Orthétrum à stylets blancs *Orthetrum albistylum* (Selys, 1848) dans le Parc naturel régional de la Forêt d'Orient et le Nord-Est aubois: quelques précisions. *Naturelle* 1: 51-54. (in French). [Aube Dept, France; records of *O. albistylum* and *O. cancellatum* between 1998 and 2005 in the "Parc naturel régional de la Forêt d'Orient" are mapped.] Address: Ternois, V., CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.pays.soulaines@wanadoo.fr

6938. Tosh, C.R.; Ruxton, G.D. (2006): Artificial neural network properties associated with wiring patterns in the visual projections of vertebrates and arthropods. *American Naturalist* 168(2): E38-E52. (in English). ["We model the functioning of different wiring schemes in visual projections using artificial neural networks and so speculate on selective factors underlying taxonomic variation in neural architecture. We model the high connective overlap of vertebrates (where networks have a dense mesh of connections) and the less overlapping, more modular architecture of arthropods. We also consider natural variation in these basic wiring schemes. Generally, arthropod networks are as efficient or more efficient in functioning compared to vertebrate networks.

They do not show the confusion effect (decreasing targeting accuracy with increasing input group size), and they train as well or better. Arthropod networks are, however, generally poorer at reconstructing novel inputs. The ability of vertebrate networks to effectively process novel stimuli could promote behavioural sophistication and drive the evolution of vertebrate wiring schemes. Vertebrate networks with less connective overlap have, surprisingly, similar or superior properties compared to those with high connective overlap. Thus, the partial connective overlap seen in real vertebrate visual projections may be an optimal, evolved solution. Arthropod networks with and without whole-cell neural connections within neural layers have similar properties. This indicates that neural connections mediated by offshoots of single cells (dendrites) may be fundamental to generating the confusion effect." (Authors) The paper includes some references to Odonata. Address: Tosh, C.R., Division of Environmental and Evolutionary Biology, Institute of Biomedical and Life Sciences, University of Glasgow, Glasgow G128QQ, UK

6939. Toth, S. (2006): The occurrence of the rare *Corulegaster heros* in the Zselic Hill (South Transdanubian Region). *Natura Somogyiensis* 9: 141-144. (in Hungarian, with English summary). [*C. heros* is known from Soproni, Mecsek Mountains and the Őrségi Hills. The new locality in the Zselic Hills expands the known Hungarian distribution significantly.] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

6940. Tulonen, T.; Pihlström, M.; Arvola, L.; Rask, M. (2006): Concentrations of heavy metals in food web components of small, boreal lakes. *Boreal environment research* 11(3): 185-194. (in English). ["The concentrations of heavy metals in different food web components, such as zooplankton, benthic invertebrates and fish, were examined in small humic lakes from southern Finland. Variation in metal concentrations in zooplankton was observed between different lakes and in benthic invertebrates between different animal groups. We found a significant relationship between lakewater pH and Cd concentration in isopods (*Asellus aquaticus*), while no relationship between the humic content of lakewater and Cd or Hg concentrations was observed. Annual variation in Cd, studied over a six-year period, was correlated with the amount of discharge, which indicated the importance of the annual loading of Cd from the catchment in determining accumulation in isopods. The metal concentrations in perch (*Perca fluviatilis*) were higher in a humic and acid lake than in a slightly humic lake and may partly be explained by the varying dietary regime of perch." (Authors) Cd, Cr, and Pb load in Odonata (Coenagrionidae, Libellulidae, Aeshnidae) is documented.] Address: Tulonen, Tiina, University of Helsinki, Lammi Biological Station, Pääjärvent. 320, 16900 Lammi, Finland. E-mail: tiina.tulonen@helsinki.fi

6941. Tyagi, P.; Arora, M.P.; Akolkar, P.; Tyagi, R.; Arora, A. (2006): Occurrence of benthic macro-invertebrate families encountered in River Hindon in Uttar Pradesh (India). *Journal of Experimental Zoology India* 9: 209-216. (in English). ["The study includes Odonata."] Address: Tyagi, P., Mahanand Miss Harijan Coll, Dept Zool, Ghaziabad 201001, India

6942. Urban, M.C.; Skelly, D.K.; Burchsted, D.; Price, W.; Lowry, S. (2006): Stream communities across a rur-

al-urban landscape gradient. *Diversity and Distributions* 12: 337-350. (in English). ["Rapid urbanization throughout the world is expected to cause extensive loss of biodiversity in the upcoming decades. Disturbances associated with urbanization frequently operate over multiple spatial scales such that local species extirpations have been attributed both to localized habitat degradation and to regional changes in land use. Urbanization also may shape stream communities by restricting species dispersal within and among stream reaches. In this patch-dynamics view, anthropogenic disturbances and isolation jointly reduce stream biodiversity in urbanizing landscapes. We evaluated predictions of stream invertebrate community composition and abundance based on variation in environmental conditions at five distinct spatial scales: stream habitats, reaches, riparian corridors and watersheds and their spatial location within the larger three-river basin. Despite strong associations between biodiversity loss and human density in this study, local stream habitat and stream reach conditions were poor predictors of community patterns. Instead, local community diversity and abundance were more accurately predicted by riparian vegetation and watershed landscape structure. Spatial coordinates associated with instream distances provided better predictions of stream communities than any of the environmental data sets. Together, results suggest that urbanization in the study region was associated with reduced stream invertebrate diversity through the alteration of landscape vegetation structure and patch connectivity. These findings suggest that maintaining and restoring watershed vegetation corridors in urban landscapes will aid efforts to conserve freshwater biodiversity." (Authors) Nine Odonata genera/taxa are listed in the appendix.] Address: Urban, M.C., School of Forestry and Environmental Studies, Yale University, 370 Prospect Street, New Haven, Connecticut 06520 USA. E-mail: urban@nceas.ucsb.edu

6943. Werner, E.E.; Peacor, S.D. (2006): Lethal and nonlethal predator effects on an herbivore guild mediated by system productivity. *Ecology* 87(2): 347-361. (in English). ["Indirect effects propagated through intervening species in a food web have important effects on Community properties. Traditionally, these indirect effects have been conceptualized as mediated through density changes of the intervening species, but it is becoming increasingly apparent that those mediated through trait (phenotypic) responses also can be very important. Because density- and trait-mediated indirect effects have different properties, it is critical that we understand the mechanisms of transmission in order to predict how they will interact, and when or where they will be important. In this study, we examined the mechanisms and Consequences of the lethal (density-mediated) and, nonlethal (trait-mediated) effects of a larval odonate predator on a guild of four herbivore species (a larval anuran and three species of snails) and their resources. We also manipulated system productivity in order to explore the effects of environmental context on the transmission of these two types of indirect effects. We show that trait-mediated effects arising from the predator can be very strong relative to density-mediated effects on both the competing herbivores and the species composition and production of their resources. A number of these indirect effects are shown to be contingent on productivity of the system. We further present evidence that trait- and density-mediated indirect effects originating from a predator may be transmitted inde-

pendently through different routes in a food web, particularly when spatial responses of the transmitting prey are involved. Finally, effects on prey growth due to trait responses to the predator varied from negative to positive in predictable ways as a function of time and indirect effects oil the larger food web. These results indicate the important role that trait-mediated indirect effects can play in trophic cascades and keystone predator interactions, and we discuss how the mechanisms involved can be incorporated in theory." (Authors)] Address: Werner, E.E., Dept of Biology, University of Michigan, Ann Arbor, MI, 48109 USA. E-mail: eewerner@umich.edu

6944. Wilson, K.D.P.; Tam, R.-w. (2006): *Fukienogomphus choifongae* spec. nov. from Hong Kong and a new record of *Cephalaeschna klotsi* Asahina (Anisoptera: Gomphidae, Aeshnidae). *Odonatologica* 35(1): 81-87. (in English). ["The new species is described from NE New Territories of Hong Kong. (Holotype ♂: Wu Kau Tang, Hong Kong, 14-IV-2004; deposited with the Biodiversity Conservation Division, Agriculture, Fisheries and Conservation Department, Hong Kong). It is compared with the congeners, and notes on larval habitat are given. New records and illustrations of both sexes and exuviae of *C. klotsi* are provided from Ng Tung Chai, central Hong Kong." (Authors)] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton BN1 5DB, E Sussex, UK. E-mail: wilsonkd@ntlworld.com

6945. Wissinger, S.A.; McIntosh, A.R.; Greig, H.S. (2006): Impacts of introduced brown and rainbow trout on benthic invertebrate communities in shallow New Zealand lakes. *Freshwater Biology* 51(11): 2009-2028. (in English). ["1. Brown and rainbow trout have been introduced to many inland waters in New Zealand, but research on the impacts on native communities has focused mainly on streams. The purpose of this study was to compare the benthic communities of trout and troutless lakes. Based on previous studies in North America and Europe, we predicted that the benthic biomass, and especially the abundance of large invertebrates, would be lower in lakes with trout as compared to those without. We surveyed the invertebrate fauna of 43 shallow, high-elevation lakes (26 with and 17 without trout) in four geographic clusters on the central South Island and then conducted a detailed quantitative study of invertebrate biomass and community structure in 12 of these lakes. 2. Benthic community composition and diversity of lakes with and without trout were nearly identical and biomass was as high or higher in the lakes with as without trout. There was no evidence that trout have caused local extinctions of benthic invertebrates. Although the proportional abundance of large-bodied aquatic was slightly lower in lakes with than without trout, the abundance of several groups of large-bodied benthic taxa (dragonflies, caddisflies and water bugs) did not differ. 3. Our findings are in contrast to those in North American and Europe where trout introductions into previously troutless lakes have led to declines in the abundance of benthic invertebrates, especially large-bodied taxa. We propose that the modest effects of trout in New Zealand could be explained by (i) the high areal extent of submergent vegetation that acts as a benthic refuge, (ii) low intensity of trout predation on benthic communities and/or (iii) characteristics of the benthic invertebrates that make them relatively invulnerable to fish predation. 4. Regardless of the relative importance of these hypotheses, our results emphasise

that the same invertebrates occurred in all of the lakes, regardless of size, elevation and presence of trout, suggesting habitat generalists dominate the benthic fauna in shallow New Zealand lakes." (Authors)] Address: Wissinger, S.A., Allegheny Coll., Dept Biol., Meadville, PA 16335 USA. E-mail: swissing@allegheny.edu

6946. Azpilicueta Amorín, M.; Rey Rañó, C.; Docampo Barrueco, F.; Rey Muñiz, X.L.; Cordero River (2007): A preliminary study of biodiversity hotspots for Odonates in Galicia (NW Spain). *Odonatologica* 36(1): 1-12. (in English). ["The analysis of distribution data of Odonata in NW Spain indicates the presence of 49 species *Macromia splendens*, *Oxygastra curtisii*, *Gomphus graslini* and *Coenagrion mercuriale* are protected under the European Habitats Directive and Spanish Law. Localities of specimens collected between 1978 and 2004 were situated in UTM squares of 10x10 km to produce a map of species richness for the region. Additionally, all localities (UTM 1 x 1 km) where protected and rare species were found are introduced in a GIS system, on a map of the Natura 2000 network of the region. The results indicate that *O. curtisii* and *C. mercuriale* are common in NW Spain. As local rare taxa are identified *Brachytron pratense*, *Aeshna affinis* and *Erythromma viridulum*, because they were found in less than 10 squares, and are also relatively rare in the Iberian peninsula. As areas of special interest are selected those that include all known populations of *M. splendens*, *G. graslinii*, and *B. pratense*, all localities with at least 2 of the 4 protected species, and areas with more than 20 species. This gives a list of 24 hotspots, most of them (15) at least partially included in the Natura 2000 network. Unfortunately the analysis also reveals that the knowledge of this group is clearly fragmentary, with most records concentrated on the coastal region, and very few squares sampled more than 20 times, the minimum to obtain reliable data. Therefore a systematic sampling of the region is needed to properly identify areas with high species richness." (Authors)] Address: Cordero Rivera, A., Depto de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

6947. Barbarin, J.-P.; Bronnec, F.; Boitier, E. (2007): Observations de libellules rares dans le Puy-de-Dôme au cours de la saison 2006 et 2007. *Arvernis* 39-40: 13-20. (in French). [Auvergne, France; records of the following taxa are documented: *Lestes virens vestalis*, *Libellula fulva*, *Anax parthenope*, *Anaciaeschna isoceles*, *Cordulegaster bidentata*, *Leucorrhinia pectoralis*, and *Onychogomphus uncatatus*.] Address: Barbarin, J.-P., Société d'Histoire Naturelle Alcide d'Orbigny, 12 place des écoles, F-63160 Billom, France. E-mail: jp-barbarin@shnao.net

6948. Beatty, C.D.; van Gossum, H.; Sherratt, T.N. (2007): *Nesobasis* (Odonata: Zygoptera) species diversity and abundance: notes on an endemic damselfly genus of the island group of Fiji. *Odonatologica* 36(1): 13-26. (in English). ["Compared to other regions in the world, the islands scattered over the south-western Pacific Ocean remain largely unstudied with respect to damselfly biology. Only a few studies have been undertaken and these have been mainly of a taxonomic nature. Here, an overview is presented of the diversity, abundance, distribution and field diagnostic characteristics of species within the Fijian genus *Nesobasis*, one

of the most speciose odonate genera found in any oceanic island group in the world. 24 species (2 undescribed) were encountered during a 2-month visit in the dry season of 2005, collected from Viti Levu and Vanua Levu. This brings the total number of species currently known for the genus to 31 (of which only 21 are at present formally described). Information is provided on species diversity and abundances at the major collecting sites. For both islands the most speciose location harboured 8 species. Abundant species tended to be widespread, while less abundant species were usually restricted in occurrence to a few sites. Included are basic species descriptions and observations on reproductive activities." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

6949. Bedjanic, M.; Conniff, K.; & deSilva Wijeyeratne, G. (2007): Dragonflies of Sri Lanka. Eco Holidays, Colombo. ISBN 978-955-1079-15-4: 248 pp. (in English). [A 248 page, A6 sized book, with colour plates for 91 of the 118 species of Dragonflies in Sri Lanka. Free download: <http://www.jetwingeco.com/index.cfm?mid=6&id=57&sid=57&iid=6§ion=freedom&list=0>] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

6950. Bengen, E.; Ritzau, C.; Johanning, J. (2007): Es tanzt die schöne Libelle: Libellen zwischen Weser und Ems. Schriftenreihe des Landesmuseums für Natur und Mensch Oldenburg 54: 110 pp. (in German). [This book covers a regional dragonfly fauna of 41 species bordered by the rivers Ems and Weser, Niedersachsen, Germany. Each of the species is depicted with a colour photo and locality dates. Some rather traditional introductory information is given, but enriched by some special information on the regional dragonfly names and the origin of these names. Uniquely, each species is accompanied by a poem regarding dragonflies. The lyrics is contributed by Annette von Droste-Hülshof, Goethe, Rilke and many others. This is a quite nice coffee table book, including a few faunistic relevant species (e.g. on *Erythromma viridulum* and *Sympetrum fonscolombii*).] Address: Isensee Verlag, Haarenstr. 20, 26122 Oldenburg

6951. Bergou, A.J.; Xu S.; Wang Z.J. (2007): Passive wing pitch reversal in insect flight. *J. Fluid Mech.* 591: 321-337. (in English). ["Wing pitch reversal, the rapid change of angle of attack near stroke transition, represents a difference between hovering with flapping wings and with a continuously rotating blade (e.g. helicopter flight). Although insects have the musculature to control the wing pitch during flight, we show here that aerodynamic and wing inertia forces are sufficient to pitch the wing without the aid of the muscles. We study the passive nature of wing pitching in several observed wing kinematics, including the wing motion of a tethered dragonfly, *Libellula pulchella*, hovering fruitfly, hovering hawkmoth and simplified dragonfly hovering kinematics. To determine whether the pitching is passive, we calculate rotational power about the torsion axis owing to aerodynamic and wing inertial forces. This is done using both direct numerical simulations and quasi-steady fluid force models. We find that, in all the cases studied here, the net rotational power is negative, signifying that the fluid force assists rather than resists the wing pitching. To further understand the generality of these res-

ults, we use the quasi-steady force model to analyse the effect of the components of the fluid forces at pitch reversal, and predict the conditions under which the wing pitch reversal is passive. These results suggest the pitching motion of the wings can be passive in insect flight." (Authors)] Address: Wang, Jane, Dept of Theoretical and Applied Mechanics, Cornell University, Ithaca, NY 14853 USA

6952. Bogut, I.; Vidakovic, J.; Palijan, G.; Cerba, D. (2007): Benthic macroinvertebrates associated with four species of macrophytes. *Biologia, Bratislava* 62(5): 600-606. (in English). ["Benthic macroinvertebrates associated with four species of macrophytes (*Nymphoides peltata*, *Ceratophyllum demersum*, *Polygonum amphibium* and *Carex* sp.) were investigated during two growing seasons (2001 and 2002) in the slow-flowing Eonakut Channel in the Kopački rit Nature Park in Croatia. A total of 31 macroinvertebrate taxa were found. *C. demersum*, a submerged plant with dissected leaves, supported the highest macroinvertebrate abundance, almost seven times more than *N. peltata*, a floating plant with undisseminated leaves, which harboured the lowest abundance during the research period. Chironomidae larvae (50–83%) and Oligochaeta (14–46%) were the most abundant groups recorded on all macrophyte species. Water-level fluctuation, because of its influence on the appearance and growth of aquatic vegetation, and the trophic state of water within the macrophyte stands seemed to be the main factors which affected the taxonomic composition and abundance of macroinvertebrates." (Authors) With the exception of *Carex*, all vegetation types were inhabited by odonate larvae.] Address: Bogut, Irella, Department of Biology, University of J. J. Strossmayer, Trg Ljudevita Gaja 6, HR-31000 Osijek, Croatia. E-mail: ibogut@ffos.hr

6953. Botelho, M.L.L.A.; Gomiero, L.M.; Braga, F.M.S. (2007): Feeding of *Oligosarcus hepsetus* (Cuvier, 1829) (Characiformes) in the Serra do Mar State Park - Santa Virginia Unit, São Paulo, Brazil. *Braz. J. Biol.* 67: 741-748. (in English, with Portuguese summary). [Odonata contribute significantly to the diet of the fish *O. hepsetus* in the Paraíba and Grande rivers in the basin of the Paraíba do Sul River.] Address: Gomiero, L.M., Depto de Zoologia, Instituto de Biociências, Universidade Estadual Paulista – UNESP, Av. 24-A, n. 1515, CP 199, CEP 13506-900, Rio Claro, São Paulo, Brazil. E-mail: leanmg@rc.unesp.br

6954. Bried, J.T.; Ervin, G.N. (2007): Intraspecific models and spatiotemporal context of size–mass relationships in adult dragonflies. *J. N. Am. Benthol. Soc.* 26(4): 681-693. (in English). ["Length–mass equations are valued for their efficiency and reliability because many animals, including aquatic macroinvertebrates, show predictable correlations between mass and linear body dimensions. Our paper explores overlooked aspects of length–mass applications, including relationships for adult aquatic insects, intraspecific variation, and spatiotemporal context. We analyzed the length–mass relationship in 5 species of adult dragonfly (Anisoptera: Libellulidae: *Erythemis simplicicollis*, *Libellula incesta*, *Lydia*, *Pachydiplax longipennis*, *Perithemis tenera*) during 2 collection periods (early and late summer flight) at 3 study locations in northern Mississippi, USA. Despite narrow ranges in body and wing length, and given that dragonflies gain postemergence mass without associated changes in skeletal size, both body and wing

length showed potential for estimating individual dry mass ($R^2 = 0.5$ in most cases). We also found strong associations between dry and wet length and consistent variation in individual dry mass as a percentage of individual wet mass (65% water content) in these samples. Species-level mass estimates from independently derived species-level equations were far more accurate than estimates based on previously published equations for use at higher taxonomic levels (family, order). Patterns of individual mass per unit length generally differed among study locations and, especially, collection periods. Regression models with similar slopes (i.e., similar individual differences in mass per unit length) were susceptible to length-adjusted location or time effects (i.e., elevation differences in the best-fit lines). Our study underscores the importance of intraspecific variation, taxonomic resolution, and spatiotemporal context in length-based modelling of adult dragonfly mass." (Authors)] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jbried@TNC.ORG

6955. Buczyńska, E.; Buczyński, P.; Lechowski, I.; Stryjecki, R. (2007): Fish pond complexes as refugia of aquatic invertebrates (Odonata, Coleoptera, Heteroptera, Trichoptera, Hydrachnidia): a case study of the pond complex in Zalesie Kańskie (Central-East Poland). *Nature Conservation* 64: 39-55. (in English). ["In the years 2000 and 2001 selected groups of aquatic invertebrates were studied in the fishpond complex in Zalesie Kańskie (E of Lublin, central-eastern Poland), an area well-known for its nature values. The following taxa were recorded: 45 dragonfly species, 25 waterbug species, 99 beetle species, 35 caddisfly species and 55 water mite species. Based on the groups studied, the aquatic insect fauna occurring in the ponds and in other water bodies and habitats associated with them was characterised. The occurrence of legally protected species included in appendices of the Bern Convention and the Habitats Directive, as well as from Red Lists of Poland and the Lublin region, was analysed – 5, 4, 2, 8, 14 and 13 species were recorded respectively. Based on this data, it was concluded that the fishpond complex in Zalesie Kańskie can serve as a model of an area where fish-breeding does not destabilize the balance of ecosystems – on the contrary, it helps to maintain high natural values and biological diversity. Ways of exploiting this area in a nature-friendly manner were also indicated." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

6956. Buktenica, M.W.; Girdner, S.F.; Larson, G.L.; McIntire, C.D. (2007): Variability of kokanee and rainbow trout food habits, distribution, and population dynamics, in an ultraoligotrophic lake with no manipulative management. *Hydrobiologia* 574: 235-264. (in English). [Oregon, USA; "Crater Lake is a unique environment to evaluate the ecology of introduced kokanee and rainbow trout because of its otherwise pristine state, low productivity, absence of manipulative management, and lack of lotic systems for fish spawning. Between 1986 and 2004, kokanee displayed a great deal of variation in population demographics with a pattern that reoccurred in about 10 years. We believe that the reoccurring pattern resulted from density dependent growth, and associated changes in reproduction and abund-

ance, driven by prey resource limitation that resulted from low lake productivity exacerbated by prey consumption when kokanee were abundant. Kokanee fed primarily on small-bodied prey from the mid-water column; whereas rainbow trout fed on large-bodied prey from the benthos and lake surface. Cladoceran zooplankton abundance may be regulated by kokanee. And kokanee growth and reproductive success may be influenced by the availability of *Daphnia pulicaria*, which was absent in zooplankton samples collected annually from 1990 to 1995, and after 1999. Distribution and diel migration of kokanee varied over the duration of the study and appeared to be most closely associated with prey availability, maximization of bioenergetic efficiency, and fish density. Rainbow trout were less abundant than were kokanee and exhibited less variation in population demographics, distribution, and food habits. There is some evidence that the population dynamics of rainbow trout were in-part related to the availability of kokanee as prey." (Authors) Odonata were confined to the stomachs of rainbow trout.] Address: Buktenica, M.W., U.S. National Park Service, Crater Lake National Park, PO Box 7, Crater Lake, OR 97604, USA. E-mail: markbuktenica@nps.gov

6957. Butler, S.G. (2007): The larva of *Idionyx stevensi* Fraser from Nepal (Anisoptera: Corduliidae). *Odonatologica* 36(3): 285-290. (in English). ["The ♂ larval exuviae is described and illustrated from a freshly emerged individual observed in situ (Shivapuri Hills, Nepal). Comparison is provided with a larva of the same species and exuviae of *I. yolanda* (Malaysia). A note is made on the unusual arrangement of labial setae, which appears to be typical of the genus." (Author)] Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, UK. E-mail: sgbutler15@btopenworld.com

6958. Campero, M.; Ollevier, F.; Stoks, R. (2007): Ecological relevance and sensitivity depending on the exposure time for two biomarkers. *Environmental Toxicology* 22(6): 572-581. (in English). ["Biomarkers are widely used to assess pesticide stress, but their ecological relevance and exposure time dependent sensitivity is still heavily debated. We studied both aspects in larvae of the damselfly *Coenagrion puella*, comparing the impact of low doses of atrazine, carbaryl, and endosulfan on two key biomarkers (acetylcholinesterase [AChE] activity and fluctuating asymmetry [FA]) and their relationship with life history traits (mortality, development time, growth rate, and body size). Larvae exposed to the pesticides had, in general, longer development times. Size, growth rate, and mortality were not affected by any of the pesticides. In the long-term exposure, AChE activity was diminished by atrazine treatments and stimulated by carbaryl treatments, and was not affected in the endosulfan treatments. FA decreased with increasing endosulfan concentrations and showed no reaction to atrazine or carbaryl. Overall, short-term exposure tended to overestimate the results of long-term exposure decreasing growth rates and enhancing inhibition of AChE activity in atrazine and carbaryl treatments. In line with its ecological relevance, relationship between biomarkers and life history traits showed that AChE inhibition was positively correlated with mortality, while FA was traded off with size. These results show that caution should be exerted when using these biomarkers to assess pesticide pollution in field situations." (Authors)] Address: Campero, Melina, Katholieke Universiteit Leuven, Laboratory of Aquatic Ecology, Char-

les Deberiotstraat 32, B-3000, Leuven, Belgium. E-mail: camperop@supernet.com.be

6959. Catling, P.M.; Kostiuk, B.; Lewis, C.; Bracken, B. (2007): Observations on local field trips (Arnprior area) - Annual Meeting of the Dragonfly Society of the Americas, 2005. *Ontario Odonata* 7: 16-23. (in English). [The paper reports detailed field data of the local field trips that took place on 10 and 11 July 2005 covering 11 habitats in the counties Ottawa-Carleton, Lanark, and Renfrew, Ontario, Canada. [condensed versions of this article appeared in *Trail and Landscape* 40(1): 9-20 and *Argia* 17(3): 9-11].] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

6960. Chakona, A.; Marshall, B.; Brendonck, L. (2007): The effect of fish predation on benthic macroinvertebrates in a seasonal stream in north-western Zimbabwe. *African Journal of Aquatic Science* 32(3): 251-257. (in English). ["The cumulative impact of the entire fish assemblage on benthic macroinvertebrate assemblages was investigated over four months in a removal experiment in isolated pools that persist through the dry season, in an intermittent stream in north-western Zimbabwe. Macroinvertebrate taxonomic richness did not differ significantly between sampling dates, indicating that fish removal had no effect on the zoobenthos taxa richness but led instead to large increases in the densities of certain macroinvertebrates. There was a progressive increase in the body size of Odonata in fishless pools 34 and 55 days after treatment and, by 78 days post-treatment, the proportion of large-sized odonates was significantly higher in fishless than in control pools. Peak densities of predaceous invertebrates coincided with a sharp decline in macroinvertebrate densities in the fishless pools about three months after fish removal. The values for Strauss's food selection index were low (range -0.220 to 0.180) for all macroinvertebrates, indicating random feeding by fish. Results indicate that, although fish may be important predators, they are not keystone predators because the macroinvertebrate community structure in this temporary habitat was found to be influenced by the assemblages of both vertebrate and invertebrate predators, rather than by a single keystone predator." (Authors)] Address: Chakona, A., University Lake Kariba Research Station, PO Box 48, Kariba, Zimbabwe. Email: achakona@yahoo.com

6961. Cuevas-Yanez (2007): Los odonatos (Insecta: Odonata) de la Hidroeléctrica de Patla (El Pozo) y del Río Tecpatlán, Zihuateutla, Puebla, México. *Dugesiana* 14(2): 83-91. (in Spanish, with English summary). ["A study of Odonata was conducted in two localities of the Municipality of Zihuateutla, Puebla, Mexico: Patla's hydroelectric facility (El Pozo) and Tecpatlán River, by monthly samplings from March 2002 to March 2003. A total of 1728 specimens (645 adults and 1083 larvae) belonging to 51 species, 31 genera and 10 families were obtained. The more abundant family, genus and species were Coenagrionidae, *Argia*, and *Palaemnema* sp., respectively. Highest richness and diversity were found at El Pozo. Two families and 14 species represent new records for Puebla state: *Mecistogaster ornata*, *Megalopterus caeruleus*, *Pseudostigma aberrans*, *Protoneura cara*, *Argia cuprea*, *A. oculata*, *Gynacantha helenga*, *Remartinia luteipennis*, *Erpetogomphus constrictor*, *E. elaps*, *Brechmorhoga praecox*, *Cannaphila insularis*, *Libellula herculea*, and *Micrathyria didyma*." (Author)] Ad-

dress: Cuevas-Yañez, Karina, Facultad de Ciencias. Univ. Autónoma del Estado de México. Instituto Literario No. 100. Col. Centro. Toluca, México, México, C. P. 50200

6962. Czerniawska-Kusza, I.; Szoszkiewicz, K. (2007): Biological and hydromorphological assessment of running waters: an example of the Mała Panew River. *Katedra Ochrony Powierzchni Ziemi, Uniwersytet Opolski*. ISBN: 83-920464-1-2: 71 pp. (in Polish, with English summary). [In the framework of the European Union Water Directive, the Mała Panew River in Poland was surveyed for its macrozoobenthos. Three taxa of Odonata are listed, of which *Onychogomphus* sp. is questionable according Pawel Bucziński.] Address: Czerniawska-Kusza, Izabela, Uniwersytet Opolski, Katedra Ochrony Powierzchni Ziemi, Oleska 22, PL-45-052 Opole, Poland. E-mail: Izabela.Kusza@uni.opole.pl

6963. Daigle, J.J. (2007): *Macrothemis meurgeyi* sp. n. from Guadeloupe (Anisoptera Libellulidae). *Odonatologica* 36(2): 191-195. (in English) ["The new species is described and figured from specimens of both sexes, collected from Guadeloupe in the Caribbean Sea. Holotype ♂: Guadeloupe, Basse Terre, Habitation Deravin, SE of Pigeon, 9-II-2006; deposited at FSCA, Gainesville/FL, USA. The species is closely related to *M. imitans* Karsch from eastern South America. The all-black abdomen can readily separate it from *M. imitans*." (Author)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

6964. Daigle, J.J. (2007): *Telagrion boliviensis* sp. nov. from Bolivia (Zygoptera: Coenagrionidae). *Odonatologica* 36(2): 291-294 (in English) ["The new species is described and illustrated (holotype ♂ and allotype ♀: Bolivia, Beni Department, Cercado prov., forest around Lago Los Lagartos, 2 km N of Loma Suarez, 22-VIII-2003). The flavescent/brownish wings will separate the new species from all other *Telagrion* species, which have hyaline wings. The holotype and allotype are deposited in Universidad Autonoma "Gabriel Rene Moreno" (UAGRM) in Santa Cruz, Bolivia." (Author)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

6965. Dakou, E.; D'Heygere, T.; Dedecker, A.P.; Goethals, P.L.M.; Lazaridou-Dimitriadou, M.; De P (2007): Decision tree models for prediction of macroinvertebrate taxa in the river Axios (Northern Greece). *Aquatic Ecology* 41: 399-411. (in English). ["In this study, decision tree models were induced to predict the habitat suitability of six macroinvertebrate taxa: Asellidae, Baetidae, Caenidae, Gammaridae, Gomphidae and Heptageniidae. The modelling techniques were applied on a dataset of 102 samples collected in 31 sites along the river Axios in Northern Greece. The database consisted of eight physical-chemical and seven structural variables, as well as the abundances of 90 macroinvertebrate taxa. A seasonal variable was included allowing the description of potential temporal changes in the macroinvertebrate taxa. Rules relating the presence/absence of six benthic macroinvertebrate taxa with the 15 physical-chemical and structural river characteristics and the seasonal variable were induced using the J48 algorithm. In order to improve the performance and the interpretability of the induced models, three optimisation techniques were applied: tree-pruning, bagging and boosting. The predictive performance of the decision

tree models was assessed on the basis of the percentage of Correctly Classified Instances (CCI) and the Cohen's kappa statistic. The results of the present study demonstrated that although the models had a relatively high predictive performance, noise in the dataset and inappropriate input variables prevented to some extent, the models from making reliable predictions. Although tree-pruning did not improve significantly the reliability of the induced models, it reduced considerably the tree complexity and in this way increased the transparency of the trees. Consequently, the induced models allowed for a correct ecological interpretation. The effect of bagging and boosting on the other hand varied considerably between the different models, as well as within different repetitions of 10-fold cross-validation in an individual model. In some cases the predictive performance was improved, in others stable or even worsened. The effect of bagging and boosting seemed to be strongly dependent on the dataset on which the two techniques were applied. Tree-pruning thus proved to have a high potential when applied in models used for decision-making of river] Address: Goethals, P.L.M., Department of Applied Ecology and Environmental Biology, Laboratory of Environmental Toxicology and Aquatic Ecology, Ghent University, J. Plateaustraat 22, B-9000 Ghent, Belgium. E-mail: peter.goethals@UGent.be

6966. De Knijf, G.; Anselin, A.; Goffart, P.; Taily, M. (2007): Some aspects of Odonata distribution in Belgium. In: Levasseur, M. Dommangot G. & Jolivet, S. (eds.). Actes des Rencontres odonatologiques Ouest-Européennes 2005. Société française d'odonatologie (SFO), Bois-d'Arcy: 73-78. (in English). ["Some results of the Belgium atlas project are presented here. More than 65,000 records have been collected by 500 volunteers. Distribution data are presented for three periods in 10 x 10 km UTM squares : < 1950, 1950-1979 and >1980, and for the period 1990-2000 (the major part of the records) in 5 x 5 km squares. Due to special efforts in the '90's to obtain a high and detailed coverage of the whole country, 93.5% of all 10 x 10 km UTM squares have been investigated. During this recent period, also 63% of all 5 x 5 km squares have records. In general, Flanders, the northern part, is much better investigated than the southern part, Walonia. In total, 69 species were ever observed in Belgium, 66 of them present in the '90's. Only 2 species, *Nehalennia speciosa* and *Leucorrhinia caudalis* are now extinct. For ten species, records were missing during one of the periods. For each species, we mention the status, based on the number of occupied grid cells (5 x 5 km) since 1990. The highest species diversity can be found in the north-east of Belgium, the Campine region. Other regions with a high diversity are localised in the extreme south, the Lorraine. A map of the recent distribution is given five species. We hope that the information in this atlas will be helpful for conservation measures and as a starting point for more detailed research and monitoring." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

6967. De Marmels, J. (2007): Thirteen new Zygoptera larvae from Venezuela (Calopterygidae, Polythoridae, Pseudostigmatidae, Platystictidae, Protoneuridae, Coenagrionidae). *Odonatologica* 36(1): 27-51. (in English). ["The ultimate instar larvae or exuviae of the following species and subspecies are described and illustrated: *Hetaerina medinae* Racenis, *Euthore f. fasciata* (Hagen),

E. f. plagiata Selys, *E. f. fastigiata* (Selys), *Microstigma rotundatum* Selys, *Palaemnema clementia* Selys, *Epileoneura metallica* Racenis, *Neoneura fulvicollis* Selys, *Acanthagrion imeriense* De Marmels, *A. vidua* Selys, *Argia adamsi* Calvert, *Cyanallagma laterale* (Selys), and *C. tamaense* De Marmels. A key to the known larvae of Polythoridae found in Venezuela is included. The larva of each species/subspecies is diagnosed against similar larvae of other taxa, and notes on the larval habitat are added.] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

6968. Dumont, H. (2007): Odonata from the Mouydir Plateau (North Central Sahara, Algeria). *Bulletin S.R.B. E./K.B. V.E.* 143: 164-168. (in English). ["Nine species of Odonata are reported from the Mouydir, a little researched desert plateau north of the Ahaggar Mountains (Algeria), and a tenth one from the Ahaggar itself. A population of *Pseudagrion hamoni* was discovered on a permanent aguelman (=lakelet) at the oasis of Tadjmut, extending the known range of that species in the central Sahara by about 500 km to the West; one old ♂ was seen at Guelta Affilal on the Assekrem plateau. *Orthetrum ransonneti* was widespread, with *Trithemis arteriosa* the most common species, and *Trithemis kirbyi* a close second, on any type of desert water. *Sympetrum sinaiticum* was not found in the Mouydir in May, but was freshly emerging from Ahaggar waters above 2000 m." (Author)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@ugent.be

6969. Eda, S. (2007): Critically endangered situation of the white-winged *Mnais pruinosa*, an endemic form to Boso Peninsula. 21: 25. (in Japanese). [Collection pressure on the white winged form of *Mnais pruinosa* endemic to the Boso Peninsula, Japan as threat factor is outlined.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

6970. Ellenrieder, N. von (2007): Some Libellulidae-larvae from the Yungas forest, Argentina: *Macrothemis hahneli* Ris, *Brechmorhoga nubecula* (Rambur) and *Dasythemis mincki clara* Ris (Anisoptera). *Odonatologica* 36(3): 263-273. (in English). ["A first description of the larva of *M. hahneli* is provided. The larva of *B. nubecula*, previously described based on a single specimen of doubtful identity, is here redescribed based on bona fide specimens belonging to that species. The larva of *D. mincki clara* is found to agree overall with that of *D. m. mincki*, differing only on some minor details probably due to geographic variation." (Author)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@g-mail.com

6971. Ellenrieder, N. von (2007): The larva of *Argia joergenseni* Ris (Zygoptera: Coenagrionidae). *Odonatologica* 36(1): 89-94. (in English). ["The larva of *A. joergenseni* is described and illustrated for the first time, based on specimens from NW Argentina, and compared to the sympatric larva of *A. translata*." (Author)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2,

Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

6972. Ellenrieder, N. von (2007): Comentario bibliográfico: Dijkstra, K-D.B. & R. Lewington. 2006. Field Guide to the Dragonflies of Britain and Europe. British Wildlife Publishing, 320 pp. ISBN 0 9531399 4 8. Rev. Soc. Entomol. Argent. 66 (1-2): 191. (in Spanish). [review] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

6973. Ellenrieder, N. von (2007): Composition and structure of aquatic insect assemblages of Yungas mountain cloud forest streams in NW Argentina. Rev. Soc. Entomol. Argent. 66(3-4): 57-76. (in English, with Spanish review). ["Thirty three lotic environments in the Yungas mountain cloud forest of NW Argentina were sampled both in undisturbed forest areas and sites altered by human activities. Aquatic insects of 143 taxa in 55 families were collected. Cluster analysis suggested altitude as one of the main structuring variables of aquatic insect communities in these streams, and its importance was confirmed by non-metric multidimensional scaling (NMS); the environmental parameters measured that were best correlated with the ordination were altitude, water temperature, latitude and channel variables (width, percentage of large and small woody debris, of undercut banks, cobble and coarse gravel). Multi response permutation procedures (MRPP) showed streams in well preserved areas to significantly differ in their composition from streams in disturbed areas. Proportion of Elmidae and of Plecoptera individuals and number of Trichoptera taxa were the biological metrics best correlated with the local disturbance gradient, suggesting that an 'EIPT' index could be a useful component in the evaluation of the ecological status of these environments. Indicator species analyses identified some potential indicators of stream condition and disturbance factors affecting these streams." (Author) The analysis includes 23 odonate taxa.] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

6974. Englund, R.A.; Wright, M.G.; Polhemus, D.A. (2007): Aquatic insect taxa as indicators of aquatic species richness, habitat disturbance, and invasive species impacts in Hawaiian streams. Bishop Museum Bulletin in Cultural and Environmental Studies 3: 207-232. (in English). ["In this study we provide a synthesis of numerous stream assessments in the Hawaiian Islands that began in the early 1990s and have continued to the present. Data from numerous sites within the five major high Hawaiian Islands with flowing streams (excluding Lāna'i, which lacks flowing waters) were used to assess native and introduced aquatic insect communities, the impacts of various invasive freshwater species and the threats from habitat disturbance. The primary objective of this study was to provide the first comprehensive analysis of aquatic insect populations in various urbanized and virtually pristine stream reaches on the five major Hawaiian Islands, and to assess if various suites of introduced aquatic species may be impacting aquatic insect populations. We were also interested in assessing the suitability of native aquatic insects as key indicator, flagship, or umbrella species regarding the overall health of Hawaiian aquatic ecosystems. If key indicator species can be found, then aquatic habitats with high

native biodiversity can be identified and management efforts can be made to ensure this high level of biodiversity persists. These indicator species could also be used for monitoring future rehabilitation programs on disturbed streams." (Authors) The study includes Odonata and focuses on the endemic genus *Megalagrion* demonstrating impacts of introduced Amphibia and fishes on Odonata.] Address: Englund, R.A., Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i 96817, USA, E-mail: englund@bishopmuseum.org

6975. Fahd, K.; Florencio, M.; Keller, C.; Serrano, L. (2007): The effect of the sampling scale on zooplankton community assessment and its implications for the conservation of temporary ponds in south-west Spain. Aquatic Conservation 17(2): 175-193. (in English). ["1.) The zooplankton (rotifer and microcrustacean) assemblages of temporary ponds in the Dohana National Park (south-west Spain) have been compared in two surveys of contrasting scales that resulted in the same number of samples: an extensive survey of 36 ponds sampled in May 1998 (or widespread survey) and a survey of nine ponds sampled four times over 2 years (or cumulative survey). 2.) [...] 3.) The presence of invertebrates (Coleoptera, Odonata, Heteroptera and crayfish) and aquatic vertebrates (fish and salamanders) was recorded as an estimate of potential predator impact on zooplankton. Several pond features (water depth, conductivity, pH, chlorophyll a concentration, distance to the nearest permanent pond and to the marsh) were also measured in both surveys.[...]"] (Authors)] Address: Serrano, Laura, Department of Plant Biology and Ecology, University of Seville, PO Box 1095, E-41080 Seville, Spain E-mail: serrano@us.es

6976. Feulner, G.R.; Reimer, R.W.; Hornby, R.J. (2007): An updated illustrated checklist of dragonflies and damselflies of the UAE. Tribulus 17: 37-62. (in English). [The checklist of Giles (1998) (OAS 594) is updated by six additions: *Ceragrion glabrum*, *Pseudagrion decorum*, *Ischnura senegalensis*, *Sympetrum fonscolombii*, *Crocothemis sanguinolenta*, and *Orthetrum ransonneti*. The species are illustrated by - in some times stunning - photographs. Advice to determination, information on distribution and on habitats are additionally given.] Address: Reimer, B., UAE University - UGRU - ITS, P.O. Box 17172, Al Ain, United Arab Emirates. E-mail: bob.reimer@uaeu.ac.ae

6977. Futahashi, R. (2007): Recent state on taxonomy of Japanese *Mnais* species. The Nature & Insects 42(9) (Special issue: Recent trends of Odonatology): 4-7. (in Japanese). [Translation by Naoya Ishizawa: "Introduction: Genus *Mnais* is one of the most difficult group for classification. So far hypotheses of one species to four species of the genus have been advocated (Table I), and no collective view was made among researchers. The reason of confusion is based on the morphology of external reproductive organs and wing veins, which contain wide variation and overlap within the genus. Reproductive isolation was expected to be clarified indirectly by DNA analysis. Author and colleagues conducted analyses of nuclear DNA and mitochondria DNA on 900 specimens from all over Japan, and we advocated that Japanese genus *Mnais* is composed of two species, and lastly classified into *Mnais costalis* Selys, 1869 and *Mnais pruinosa* Selys, 1853. The former was named as *Nihon-kawatombo* in Japanese and the latter

was named as *Asahina-kawatombo* after Dr. Asahina. Comparison between the new hypothesis and the former hypotheses Analysis of ITS region of nuclear DNA on Japanese *Mnais* species shows 4 types of base sequence, A, B, C, D. A type is distributed widely from Hokkaido to Kagoshima Prefecture, while, other three types were distributed allotopically to western Japan. The head of A type is relatively longer for its wing length than those of other types and also its pterostigma was more slender than others. Tips of anal gill of the larvae of A type are characteristically triangular. In the western Japan A type is distributed sympatrically with other types, however, at the same river A type is distributed to lower reach and other types are to upper reach. Thus, by the morphological differences and their habitat segregation A type was classified as the different species from other types, namely, A type was named *Nihon-kawatombo*, *M. costalis* and others, B, C, D were named *Asahina-kawatombo*, *M. pruinosa* (see Table I). Translators' notice: as to problems of comparison between the new hypothesis and the former hypotheses, the following literature may be useful. Hayashi, F., Dobata, S. & Futahashi, R. 2004. Macro- and microscale distribution patterns of two closely related Japanese *Mnais* species inferred from nuclear ribosomal DNA, ITS sequences and morphology (Zygoptera: Calopterygidae). *Odonatologica*, 33: 399-412. Hayashi, F., Dobata, S. & Futahashi, R. 2005. Disturbed population genetics: suspected introgressive hybridization between two *Mnais* damselfly species (Odonata). *Zoological Science*, 22: 869-881. Address: Futahashi, R., National Institute of Sericultural & Entomological Science, Japan

6978. Gniatkowski, J. (2007): *Ważki* (Odonata) w okolicach Częstochowy. *Biuletyn Częstochowskiego Koła Entomologicznego* 6: 7-8. (in Polish, with English summary). [In the surroundings of Częstochowa, Poland, 23 odonate species - including *Leucorrhinia albifrons* - were recorded between 2005 and 2007.] Address: Gniatkowski, J., ul Oskara Lange 7/97, Częstochowa, Poland

6979. Grant, P.B.C.; Samways, M.J. (2007): Ectoparasitic mites infest common and widespread but not rare and red-listed dragonfly species. *Odonatologica* 36(2): 255-262. (in English) ["Freshwater ectoparasitic mites negatively alter host population dynamics by reducing survivorship, mating success, fitness and altering activity patterns. Hosts commonly include dragonflies. The Kogelberg Biosphere Reserve, South Africa, is a major hotspot for endemic dragonflies. All 38 dragonfly species in the reserve were sampled for ectoparasitic mites, but only 2 common, widespread species of Zygoptera, *Ischnura senegalensis* and *Ceriatagrion glabrum*, were infested with *Arrenurus* or *Leptus* mite species. None of the endemic or red-listed dragonflies were infested. Parasitism level was 3.5% for *C. glabrum* and 38% for *I. senegalensis*. Intensity of ectoparasites on individuals was high, with about eight ectoparasitic larva per individual. Larval mites preferentially associated with individual hosts already harbouring mites. High levels of species-specific parasitism likely reflects shared environmental requirements, preferential species selection, and lack of defensive behaviours to resist infestation. Characteristic scars from previous mite attachment observed on older individuals of *I. senegalensis* indicate that a much larger percentage of the population was actually parasitized, but detached as the individual aged. That the rare and red-listed species were apparently

immune from infestation is a positive note for their conservation." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

6980. Grehan, J.R. (2007): A brief look at Pacific biogeography: The trans-oceanic travels of *Microseris* (Angiosperms: Asteraceae). Ebach, M.C. & Tangney, R. (Eds.): *Biogeography in a Changing World*, CRC Press, Boca Raton. Systematics Association Special Volume Series: 83-94. (in English). ["The modern revolution in biogeography did not begin with plate tectonics. It began two decades earlier when Leon Croizat established geographic distributions as the empirical foundation of evolutionary biogeography. Comparative map analysis reveals patterns that are not accessible through other methods. The biogeography of *Microseris* (Angiosperms: Asteraceae) is used to illustrate the power of geographic analysis to provide unique insights into the biogeographic distributions and relationships of organisms. Explanations of dispersal as physical movement for *Microseris* are shown to be problematic by the congruent distributions and Pacific homology of this genus with groups of diverse means of dispersal such as daisies, dragonflies, millipedes, eyebrights, and seaweeds. The role of tectonics and the historical implications of *Microseris* biogeography for molecular clock theory are briefly discussed." (Author) The chapter contains several references to dispersal of Odonata. see: <http://www.sciencebuff.org/ftponly/microseris.pdf>]

6981. Herath, B.; Johnson, B.; Lunski, J.; Fuselier, L. (2007): Sex-specific antipredator response in *Anax junius*, a migratory dragonfly. Abstracts: North Central Branch of the Entomological Society of America: <http://esa.ent.iastate.edu/confreg/?gridaction=viewonepresentation&year=2007&presnum=044>. (in English). [Verbatim: Odonate populations often exhibit skewed adult population sex ratios that are likely tied to sex-specific life history strategies expressed by individuals when they are aquatic larvae. Differences in mortality between the sexes of the larvae can explain skewed adult population sex ratios. In dragonflies with female-biased sex ratios at emergence, ♂♂ likely assume a higher predation risk and hence, higher mortality. Further, predation risk is directly and positively related to activity levels. We investigated whether *Anax junius* larvae show sex-specific responses to predation risk in a series of laboratory experiments. We hypothesized that ♂♂ would assume greater predation risk compared to ♀♀ when faced with either a conspecific or a fish predator. Preliminary results indicate that the sexes respond similarly to a caged predator but that ♂♂ are more active than ♀♀ in the presence of a free-swimming predator. ♀♀ are more likely to strike at the predator and ♂♂ will feed more in the presence of a predator than will ♀♀. We are expanding this project to include response to chemical cues and additional species of odonates.] Address: Fuselier, Linda, Biosciences Department, 1104 7th Ave South, Minnesota State University, Moorhead, Moorhead, MN, 56563, USA

6982. Jeschke, J.M.; Tollrian, R. (2007): Prey swarming: which predators become confused and why?. *Animal Behaviour* 74: 387-393. (in English). ["When confronted with a swarm of their prey, many predators become confused and are less successful in their attacks. Despite the general notion that this confusion effect is a

major reason for prey swarm formation, it is largely unknown how widespread it is and which predator or prey traits facilitate or impede it. We carried out experiments with four predator-prey systems: *Aeshna cyanea* and *Chaoborus obscuripes* larvae, but not *Libellula depressa* and *Triturus alpestris* larvae, became confused when confronted with high *Daphnia* densities. When combining this result with literature data, we found that predators became confused in 16 of the 25 predator-prey systems studied to date. Tactile predators appear to be generally susceptible, whereas visual predators are susceptible mainly when their prey is highly agile. This difference probably results from the superiority of the visual sensory system. However, while our study is an important step towards the mechanistic understanding of predator confusion, it also reveals how poor this understanding currently is." (Authors)] Address: Tollrian, R., Dept of Animal Ecology, Evolution and Biodiversity, Biological Sciences and Biotechnology, Ruhr-University Bochum, Universitätsstr. 150/ND05, D-44780 Bochum, Germany. E-mail: tollrian@rub.de

6983. Jiang, Y.-H.; Wang, T. (2007): Description of the larva of *Cordulegaster pekinensis* Selys from China (Anisoptera: Cordulegasteridae). *Odonatologica* 36(2): 197-200. (in English). ["The ♀ ultimate instar larva from Beijing area, China, is described and illustrated. It shares some characters with the *Cordulegaster boltonii*-group, and others with the *C. bidentata*-group, but the anal pyramid is longer than in both." (Authors)] Address: Jiang, Y.-H., Lianyungang City Yuntaixiang Culture Station, Jianguo-222064, China. E-mail: jiangyh26@yahoo.com.cn

6984. Jocque, M.; Graham, T.; Brendonck, L. (2007): Local structuring factors of invertebrate communities in ephemeral freshwater rock pools and the influence of more permanent water bodies in the region. *Hydrobiologia* 592: 271-280. (in English). ["We used three isolated clusters of small ephemeral rock pools on a sandstone flat in Utah, USA to test the importance of local structuring processes on aquatic invertebrate communities. In the three clusters we characterized all ephemeral rock pools (total: 27) for their morphometry, and monitored their water quality, hydrology and community assemblage during a full hydrocycle. In each cluster we also sampled a set of more permanent interconnected freshwater systems positioned in a wash, draining the water from each cluster of rock pools. This design allowed additional testing for the potential role of more permanent water bodies in the region as source populations for the active dispersers and the effect on the community structure in the rock pools. Species richness and community composition in the rock pools correlated with level of permanence and the ammonia concentration. The length of the rock pool inundation cycle shaped community structure, most probably by inhibiting colonization by some taxa (e.g. tadpoles and insect larvae) through developmental constraints. The gradient in ammonia concentrations probably reflects differences in primary production. The more permanent water bodies in each wash differed both environmentally and in community composition from the connected set of rock pools. A limited set of active dispersers was observed in the rock pools. Our findings indicate that aquatic invertebrate communities in the ephemeral rock pools are mainly structured through habitat permanence, possibly linked with biotic interactions and primary production." (Authors) Larvae of "*Corduliidae*" and "*Coenagrionidae*"

were sampled at the more permanent pools.] Address: Jocque, Merlijn, Laboratory of Aquatic Ecology, K.U. Leuven, de Bériotstraat 32, 3000 Leuven, Belgium. E-mail: Merlijn.Jocque@bio.kuleuven.ac.be

6985. Jones, C.D. (2007): Observations on "northern" field trips (upper Ottawa Valley) - Annual Meeting of the Dragonfly Society of the Americas, 2005. *Ontario Odonata* 7: 24-27. [During the 2005 DSA meeting in Arnprior, Ontario, Canada on 10 & 11 July 2005 areas north of Arnprior were visited. Field trip records from the six localities are reported and documented in a table. Of special interest was a *Neurocordulia michaeli*, a very rare species, and new, verified addition to the Ontario odonate fauna.] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

6986. Jordan, S.; Barruet, E.; Olaf, M. (2007): Blue hawaiiense and beyond: Conservation genetics and comparative phylogeography of four Hawaiian Megalagrion damselfly species (Odonata: Coenagrionidae). *Bishop Museum Bulletin in Cultural and Environmental Studies* 3: 247-260. (in English). ["Hawaii's endemic *Megalagrion* damselflies are rivaled in their beauty and diversity only by the degree of threat posed to them by anthropogenic disturbance. In this preliminary study of phylogeography and conservation genetics, we have sequenced about 660 base pairs (bp) of the mitochondrial COII gene from 191 damselflies from four species, including 31 populations that span a gradient of endangerment. We applied phylogeographic analyses in order to understand their biogeographic history. Unlike *Megalagrion xanthomelas* and *M. pacificum*, *M. calliphya* and *M. hawaiiense* rarely share haplotypes between populations and between islands, even within the larger Maui Nui superisland, suggesting that these latter two species do not disperse as well across land or water. Their phylogenies also better reflect the geological history of the islands. We applied conservation genetic analyses in order to understand their genetic health. Under a conservation genetic paradigm, populations with low genetic diversity are generally considered to be at greater risk of decline and extinction than populations with high genetic diversity. Applying this principle to *Megalagrion* populations gave both expected and surprising results. Expected results included measurements of high diversity in most populations of *M. calliphya*, *M. hawaiiense*, and Hawai'i Island populations of *M. xanthomelas*. Low diversity was observed in populations known to be bottlenecked or relictual, including O'ahu and Maui *M. xanthomelas*, and *M. pacificum*. Surprising results included low genetic diversity in O'ahu Ko'olau and Hawai'i Onomea *M. hawaiiense*, Moloka'i *M. pacificum*, and West Maui *M. calliphya*. We propose that these latter three populations be monitored and managed to maximize their long-term genetic health." (Authors)] Address: Jordan, S., Department of Biology, Bucknell University, Lewisburg, Pennsylvania 17837, USA. E-mail: sdjordan@bucknell.edu

6987. Kadoya, T. (2007): Procedure for predicting the potential of species recovery using a database: dragonflies as indicator taxon in a wetland restoration. *Nature & Insects* 42(9) (Special issue: Recent trends of Odonatology): 8-11. (in Japanese). [Pre-monitoring and assessing the species potential at the surroundings of a pond to restore enables to estimate the species pool that will recover a pond.] Address: Kadoya, T., Dept

Ecosyst. Studies, Inst. Agr. & Life Sci., Bunkyo Ku, University Tokyo, 1-1-1 Yayoi, Tokyo, 1138657, Japan. E-mail: aa47143@mail.ecc.u-tokyo.ac.jp

6988. Kalkman, V.J. (2007): *Archboldargia scissorhandsi* sp. n. from Papua, Indonesia (Zygoptera: Coenagrionidae). *Odonatologica* 36(2): 201-206. (in English) ["The new species is described, based on a single ♂. Holotype ♂: Indonesia: Papua (formerly Irian Jaya), Pass Valley, Ibem R., 13/20-V-1999; deposited in ZMAN, Amsterdam. A key to the *Archboldargia* ♂♂ is given and some notes on the distribution of the genus are provided." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

6989. Kalkman, V.J. (2007): *Argiolestes celebensis* sp. n. from Sulawesi, Indonesia (Zygoptera: Megapodagrionidae). *Odonatologica* 36(2): 295-299 (in English) ["The new species is described from a single ♂ (holotype ♂: Indonesia, SW Sulawesi, W of Palopo, Puncak Palopo, X-1993; deposited in RMNH, Leiden). It is the first known representative of the genus on Sulawesi." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

6990. Kühnapfel, K.-H. (2007): Zur Vogelwelt der Kläranlage Kamen (Westfalen). *Charadrius* 42(3) (2006): 120-155. (in German). [Germany, Nordrhein-Westfalen, on page 153, *Motacilla flava* (Aves) is depicted preying upon Zygoptera.] Address: Kühnapfel, K.-H., Heidestr. 25, 59174 Kamen, Germany

6991. Lajeunesse, M.J. (2007): Ectoparasitism of damselflies by water mites in Central Florida. *Florida Entomologist* 90(4): 643-649. (in English). ["Little is known about the frequency of water mite ectoparasitism (Acari: Hydrachnida) within and among damselfly species of Central Florida. Here I present a field survey of the assemblage of damselflies and their water mite parasites at the Archbold Biological Station (Lake Placid, FL) during late Mar, 2006. During this period, 4 species of damselfly were abundant: *Ischnura hastata* (Say) and *Nehalennia gracilis* Morse captured only at pond sites; and *Argia fumipennis atra* Gloyd and *Ischnura ramburii* (Selys) captured at a lake site. Only pond damselflies had water mites, and 12.2% and 12.5% of *I. hastata* and *N. gracilis* were parasitized, respectively. These are 2 novel and unreported odonate-acari associations for this area. I also examined within-species differences in ectoparasitism by sex, body size, and wing-cell fluctuating asymmetry. However, these factors did not relate to the prevalence and intensity of parasitism in the field. My study indicates that brief surveys of odonates in Central Florida will likely generate novel, unreported associations with parasitic water mites—this information is important to Address the gap in natural history for southeastern distributions of North American water mites." (Author)] Address: Lajeunesse, M.J., Dept of Ecology and Evolutionary Biology, Cornell Univ., Ithaca, NY 14853-2701, USA.

6992. Lawal, O.A.; Banjo, A.D. (2007): A checklist of pests and visitors of *Apis mellifera adansonii* (honeybee) in the six states of southwestern Nigeria. *Apiacta* 42: 39-63. (in English). [Among a quantitative data collection of pests, visitors, and parasites from nineteen

selected bee farms in south-western Nigeria located in the three main ecological zones (Lowland Rain Forest, Savannah and Mangrove forest) also one specimen of *Aeshna* sp. was recorded.] Address: Lawal, O.A. Dept Plant Science & Applied Zoology, Olabisi Onabanjo University, Ago Iwoye, P.M.B 2002, Ogun State, Nigeria. E-mail: olusegunlawal@yahoo.co.uk

6993. Leitao, S.; Pinto, P.; Pereira, T.; Brito, M.F. (2007): Spatial and temporal variability of macroinvertebrate communities in two farmed Mediterranean rice fields. *Aquatic Ecology* 41: 373-386. (in English). ["The spatial and temporal variation of macroinvertebrate assemblages was studied in two Portuguese commercial rice agroecosystems under the effect of field management involving the application of pesticides and fertilizers. A faunal succession of organisms was observed on both fields. Grazers were the first to colonize the paddies after a dry period when pesticides were applied, followed by development into nymphs and by an increase in the abundance of the species after the application of fertilizers. At the end of the season when no pesticides or fertilizers were applied, the communities changed with the presence of adult predators as a result of an increase in prey. Insecticide application revealed specific taxa increase due to the lack of competition with the target organism. Macroinvertebrates tended to prefer infested field margins with aquatic, submerged vegetation, revealing a spatial distribution along the paddies. Two different sampling devices were used and proved necessary in documenting the macroinvertebrate communities (grab for benthic and hand-net for pelagic organisms)." (Authors) Records of *Crocothemis erythraea*, *Orthetrum brunneum*, *Sympetrum fonscolombii*, *Ischnura elegans*, *Libellulidae*, and *Coenagrionidae* are analysed.] Address: Leitao, S., Laboratório de Referência do Ambiente, Instituto do Ambiente, 2611-865 Amadora, Portugal. E-mail: saraleitao@yahoo.com

6994. Lemelin, R.H. (2007): Finding beauty in the dragon: The role of dragonflies in recreation and tourism. *Journal of Ecotourism* 6(2): 139-145. (in English). ["In some Asian countries such as China and in Japan, Odonata (dragonflies, damselflies) have a long history of being involved in recreation and leisure activities. In contemporary Japan, dragonfly enthusiasts, much like birders elsewhere, pride themselves on recognizing many different types of Odonata. In fact, numerous symposia, festivals, and sanctuaries provide Japanese dragonfly enthusiasts with the opportunity to practice and perfect their skills (Primack et al., 2000). Dragonfly gatherings (e.g., counts, educational outings) in North America and Europe are also increasing in popularity. Facilitating the growth of these recreation activities, but more specifically the viewing of dragonflies, are the availability of books and field guides (Corbet, 1999; DuBois, 2005; Dunkle, 2000; Mead, 2003; Nikula et al., 2002), associations (e.g., Dragonfly Society of the Americas, Worldwide Dragonfly Association), and websites (e.g., Digital Dragonflies). This article examines discussion surrounding insect-human relationships while highlighting the contribution of one particular insect order – Odonata (Mitchell & Lasswell 2005; Moore 1997), and the role of this flagship species in socio-cultural norms (Samways 2005) in recreational and tourism activities." (Authors)] Address: Lemelin, R. Harvey, School of Outdoor Recreation, Parks and Tourism, Lakehead Univ., Ontario, Canada

- 6995.** Leroy, T. (2007): Un nouvel Odonate remarquable en Auvergne: *Macromia splendens* (Pictet, 1843) (Odonata, Anisoptera, Macromiidae). *Martinia* 23(1): 9-11. (in French, with English summary). [Two specimens of *M. splendens* in Lot gorges in July 2006 represent the first record of this species in the Auvergne, France.] Address: Leroy, T., Le Bourg, F-63210 Heme-l'Eglise, France. E-mail: thierry-leroy@caramail.com
- 6996.** Lockwood, M.; Soler i Monzó, E.; Müller, P. (2007): Primera cita de *Cordulia aenea* Leach 1815 [sic] (Odonata: Corduliidae) para España. *Boln. S.E.A.* 41: 471-472. (in Spanish, with English summary). [The first Spanish record (Catalonia, Aran valley) of *C. aenea*, is presented. A total of 12 exuviae was found in June 2007 and then 15 days later, in July 2007, a female was captured. The situation of *Somatochlora metallica* in the area is also discussed.] Address: Lockwood, M., Grupo Oxygastra, Institució Catalana d'Història Natural, Carrer del Carme, 47; 08001 Barcelona, Spain. E-mail: mike@walkingcatalonia.net
- 6997.** Lohr, M. (2007): Sur l'habitat et la répartition de *Macromia splendens* (Pictet, 1843) et *Gomphus graslinii* (Rambur, 1842) dans la rivière de l'Hérault (département de l'Hérault). LEVASSEUR, M., DOMMANGET, G. & S. JOLIVET (Coordinateurs): Actes des Rencontres odonatalogiques Ouest-Européennes 2005. Société française d'odonatologie, Bois-d'Arcy: 115-124. (in French, with English and German summaries). ["The distribution of *M. splendens* and *G. graslinii* as well as the Odonata communities have been studied in the catchment of the Hérault River (Southern France) during two excursions realized in June / July 1999 and 2002. The two species colonize the lower and middle course of the Hérault River almost completely. *M. splendens* has also been found at the superior course, more upstream than supposed before. Distribution and ecology data of these two species in the catchment of the Hérault River are discussed in the context of their known distribution limits and published habitat preferences. The remarkable diversity of the odonate fauna and very important populations of three species appearing in the appendix 2 of the FFH directive - besides *M. splendens* and *G. graslinii* it is *Oxygastra curtisii* - underline the high ecological value of the Hérault and the importance of the protection of this watercourse." (Author) Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlohr@fh-luh.de
- 6998.** Lorenzo Carballa, L.; Cordero Rivera, A. (2007): Are parthenogenetic and sexual *Ischnura hastata* damselflies equally fertile? Testing sexual conflict theories. *Ethology, Ecology & Evolution* 19(4): 291-298. (in English). ["Recent theories of sexual selection stress the importance of conflicts over reproduction in shaping the reproductive traits of ♂♂ and ♀♀. Except when the reproductive interests of both sexes coincide, which only occurs under strict monogamy, there is a conflict of interests between the sexes over the number of matings and reproductive decisions. It has been suggested that ♂♂ are selected to "harm" ♀♀ if this increases male reproductive success, even at the expenses of female fitness. One prediction of such an hypothesis is that sperm is selected to maximize the probability of fertilization, and this sometimes can cause a decrease in fertility due to polyspermy, genetic incompatibility, toxic seminal products that harm ♀♀, etc. We have tested this hypothesis by comparing the fertility rates of parthenogenetic and sexual *Ischnura hastata* populations. Our results show that sexual ♀♀ are less fertile than parthenogenetic ones, which is in agreement with the sexual conflict predictions tested in this study." (Authors)] Address: Cordero Rivera, A., Depto de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es
- 6999.** Lozano, F.; Garre, A.; Pessacq, P. (2007): Descripción del último estadio larval de *Acanthagrion aepiolum* (Odonata: Coenagrionidae). *Rev. Soc. Entomol. Argent.* 66(1-2): 1-4. (in Spanish, with English summary). ["The Neotropical genus *Acanthagrion* Selys is composed by 41 species, eight of which have the last instar larva described. In this contribution the last instar larva of *A. aepiolum* is described based on material collected in Corrientes (Argentina) and it is compared with the larvae known for Argentina." (Authors)] Address: Lozano, F., Instituto de Limnología «Dr. Raúl A. Ringuelet» (ILPLA), C. C. 712, 1900 La Plata, Argentina. E-mail: lozano@ilpla.edu.ar
- 7000.** Malikova, E.I.; Kosterin, O.E.; Dubatolov V.V. (2007): A dragonfly (Odonata) collection from the Bolshkekhtsirskii State Nature Reserve (Khabarovskii krai, Russia). II. Seasons 2006 and 2007. *Animal World of the Far East (Blagoveshchensk)* 6: 5-9. (in English, with Russian summary). [41 odonate species from the Bolshkekhtsirskii State Nature Reserve and its close surroundings (app. 48°17-18' N 134°48-50' E) were caught in 2006 and 2007. *Stylurus occultus* (Sel., 1878) is reported for the first time for the Russian territory. *Shaogomphus schmidtii* (Asahina, 1956) was collected in 2005 outside the Reserve. Some emphasis is given to *Anisogomphus maackii* (Selys, 1872), *Trigomphus citimus* (Needham, 1931), *Shaogomphus postocularis e-pophthalmus* (Selys, 1872), *Sympetrum risi* Bartenev, 1914, *Macromia daimoji* Okumura, 1949, *Stylurus flavipes* (Charpentier, 1825), and *Stylurus occultus* (Selys, 1878).] Address: Malikova, E.I.; Department of Zoology, Blagoveshchensk State Pedagogical University, Lenina Street 104, RUS-675000 Blagoveshchensk, Amurskaya oblast, Russia. E-mail: helen@amur.ru
- 7001.** Marczak, L.B.; Richardson, J.S.; Classen, M.-C. (2007): Life history phenology of *Cordulegaster dorsalis* in an ephemeral habitat in southwestern British Columbia, Canada (Odonata: Cordulegasteridae). *Canadian Field-Naturalist* 120(3): 347-350. (in English). ["The life cycle of *C. dorsalis* was studied over one year by systematic sampling of larvae in three intermittent headwater streams in southwestern British Columbia. We determined that larvae normally take three years to reach maturity, emerging throughout July and August. There is limited evidence suggesting a split cohort development, with early emergence after two years. Additionally, we tested whether larval instars were distributed randomly or if they occupied different sediment microhabitats. Smaller animals tend to be associated with smaller grained organic sediments, although there was high variation between the streams." (Authors)] Address: Marczak, Laurie, Department of Forest Sciences, University of British Columbia, 3041-2424 Main Mall, Vancouver, British Columbia V6T 1Z4 Canada. E-mail: laurie@interchange.ubc.ca

- 7002.** Marinov, M. (2007): Dragonflies of non-lotic Bulgarian wetlands. In: Michev, T.M. & M. P. Stoyneva (Eds.): Inventory of Bulgarian wetlands and their biodiversity. Part 1: Non - lotic biodiversity. 364 pp, 1 CD-ROM. (093536). ISBN 978-954-9941-09-3: 202-204. (in English). [This is an introductory treatment into the Bulgarian Odonata fauna with some emphasis to rare and threatened species, impacts on biodiversity, and activities on inventarisation of the regional fauna.] Address: Marinov, M., 80 Brookside Tce, Bryndwr, Christchurch, New Zealand. E-mail: mgmarinov@mail.bg
- 7003.** McCauley, S.J.; Wehrly, K.E. (2007): Zebra mussel, *Dreissena polymorpha* (Pallas), attachment to Odonata larvae. *Odonatologica* 36(1): 63-69. (in English). ["The attachment of zebra mussels to anisopteran larvae in a lake where the mussels have recently invaded was documented. Fifty-one larvae were collected and the majority (63%) had been colonized by one or more zebra mussels. Some dragonfly larvae were heavily infested, carrying up to 8 zebra mussels and more than their own mass in attached zebra mussels. Potential ramifications of zebra mussel attachment on larval dragonflies are discussed and a framework for future research on these effects is suggested." (Authors)] Address: McCauley, S.J., Center for Population Biology, University of California, Davis, CA 95616, USA. E-mail: sjmccauley@ucdavis.edu
- 7004.** McPeck, M.; Brown, J.M. (2007): Clade age and not diversification rate explains species richness among animal taxa. *The American Naturalist* 169(4): E97-E106. (in English). ["Animal taxa show remarkable variability in species richness across phylogenetic groups. Most explanations for this disparity postulate that taxa with more species have phenotypes or ecologies that cause higher diversification rates (i.e., higher speciation rates or lower extinction rates). Here we show that clade longevity, and not diversification rate, has primarily shaped patterns of species richness across major animal clades: more diverse taxa are older and thus have had more time to accumulate species. Diversification rates calculated from 163 species-level molecular phylogenies were highly consistent within and among three major animal phyla (Arthropoda, Chordata, Mollusca) and did not correlate with species richness. Clades with higher estimated diversification rates were younger, but species numbers increased with increasing clade age. A fossil-based data set also revealed a strong, positive relationship between total extant species richness and crown group age across the orders of insects and vertebrates. These findings do not negate the importance of ecology or phenotype in influencing diversification rates, but they do show that clade longevity is the dominant signal in major animal biodiversity patterns. Thus, some key innovations may have acted through fostering clade longevity and not by heightening diversification rate." (Authors) The data set includes Odonata.] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu
- 7005.** Meurgey, F.; Daigle, J.J. (2007): New status for *Orthemis macrostigma* (Rambur, 1842) from the Lesser Antilles (Anisoptera: Libellulidae). *Odonatologica* 36(1): 71-78. (in English). ["*Orthemis macrostigma* (Ramb.) is elevated to full species status and the Selys ♀ type specimen housed in the IRSNB in Brussels, Belgium, is designated as the lectotype. Additional descriptions of the mature ♂, mature ♀, immature ♂ adult, and the larval exuviae are provided. Diagnoses with *O. ferruginea* (Fabr.) and other related *Orthemis* species are included. Notes on behaviour, habitat, and range distribution are provided." (Authors)] Address: Meurgey, F., Mus. d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 7006.** Morgenstern, B. (2007): Great Lakes Odonata Meeting 2005 - A huge success. *Ontario Odonata* 7: 8-9. (in English). [Close to 50 dragonfly enthusiasts attended the Great Lakes Odonata Meeting in July 2005 in Fort Frances, Ontario, Canada. During the meeting, more than 50 regional Odonata were recorded.] Address: Morgenstern, B., 430 Second Street East, Fort Frances, Ontario P9A 1V9, Canada. E-mail: bill@earthmoodsphoto.com
- 7007.** Muise, C.; Langdon, K.R.; Shiflett, R.P.; Trently, D.; Hoff, A.; Super, P.; Mayor, A.; Nichols, B.J. (2007): Preliminary odonate checklist of the Smokies. *South-eastern Naturalist* (Special Issue 1): 207-214. (in English). ["The fauna and flora of Great Smoky Mountains National Park is being systematically studied and documented for the first time as part of the Smokies' All Taxa Biodiversity Inventory (ATBI). With direction from scientific authorities and Park staff, a team of citizen volunteers has undertaken a survey of odonates (dragonflies and damselflies). The survey is focused on adults and includes curated specimens, catch-and-release records, and reliable sight identifications. To date, 93 taxa (63 dragonflies, 30 damselflies) are reported from the Park. However, the habitat-, geographic-, and temporal-survey coverage is far from complete, and records from neighbouring areas suggest the Park may contain more than 130 odonate species. All of the information is being stored in the online ATBI database." (Authors)] Address: Nichols, Becky, Great Smoky Mountains National Park, 1314 Cherokee Orchard Road, Gatlinburg, TN 37738, USA. E-mail: beckynichols@nps.gov.
- 7008.** Muzon, J. (2007): *Comentario bibliografico: Charles W. Heckman. 2006. Encyclopedia of South American Aquatic Insects: Odonata - Anisoptera. Illustrated Keys to Known Families, Genera, and Species in South America. Springer, Dordrecht, The Netherlands. viii+ 725 pp.. Rev. Soc. Entomol. Argent. 66(1-2): 193 - 194. (in Spanish). [book review.]* Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AUZ-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar
- 7009.** Nolan, L.; Hogg, I.D.; Sutherland, D.L.; Stevens, M.I.; Schnabel, K.E. (2007): Allozyme and mitochondrial DNA variability within the New Zealand damselfly genera *Xanthocnemis*, *Austrolestes*, and *Ischnura* (Odonata). *New Zealand Journal of Zoology* 34: 371-380. (in English). ["We collected larval damselflies from 17 sites in the North, South and Chatham Islands, and tested the hypotheses that: (1) genetic markers (e.g., allozymes, mtDNA) would successfully discriminate taxa; and (2) the dispersal capabilities of adult damselflies would limit differentiation among locations. Four species from three genera were identified based on available taxonomic keys. Using 11 allozyme loci and the mitochondrial cytochrome c-oxidase subunit I (COI) gene, we confirmed that all taxa were clearly discernible. We found evidence for low to moderate differentiation among locations based on allozyme (mean $F_{ST} = 0.09$)

and sequence (COI) divergence (<0.034). No obvious patterns with respect to geographic location were detected, although slight differences were found between New Zealand's main islands (North Island, South Island) and the Chatham Islands for *A. colsonis* (sequence divergence 0.030–0.034). We also found limited intraspecific genetic variability based on allozyme data (Hexp < 0.06 in all cases). We conclude that levels of gene flow/dispersal on the main islands may have been sufficient to maintain the observed homogeneous population structure, and that genetic techniques, particularly the COI gene locus, will be a useful aid in future identifications." (Authors)] Address: Hogg, I.D., Centre for Biodiversity & Ecology Research, Dept of Biological Sciences, Univ. of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. E-mail: hogg@waikato.ac.nz

7010. Novelo-Gutierrez, R. (2007): *Progomphus marcellae* spec. nov. from western Mexico. *Odonatologica* 36 (1): 79-84. (in English). ["The new species is described, illustrated and its affinities are pointed out. Holotype ♂: Mexico, Pinolapa, State of Michoacan, alt. 616 m asl, 19°00.524N; 103°01.456W, 7-XI-2005; deposited in IEXA, Xalapa. It appears closely related to the pygmaeus-delicatus group of *Progomphus*, from which it can be distinguished by the shape of the anterior hamuli and epiproct lobes. The female and larva are unknown.] Address: Novelo-Gutierrez, R., Departamento de Entomología, Instituto de Ecología, A.C. Apartado Postal 63, MX-91070 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

7011. Ocharan, F.J.; Torralba Burrial, A.; Outomuro, D. (2007): *Brachytron pratense* (Müller, 1764) en la Península Ibérica (Odonata, Aeshnidae). *Boln. S.E.A.* 41: 307-312. (in Spanish, with English summary). ["The distribution of *B. pratense* in the Iberian Peninsula is revised. Its current presence in Asturias (northern Spain) is confirmed with a new population. New data about ecological requirements, pond invertebrate community, phenology and ethology are given. The Iberian populations are considered scarce and fragmented, and therefore the species has been proposed as EN "endangered" in Spain and as CR "critically endangered" in Asturias." (Authors)] Address: Torralba Burrial, A., Depto de Biol. de Organismos y Sistemas, Univ. de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

7012. Oldham, M.J. (2007): Spatterdock Darner (*Rhionaeschna mutata*) in Ontario. *Ontario Odonata* 7: 10-15. (in English). [R. *mutata* is reported for the first time at Long Point National Wildlife Area, Canada on the north shore of Lake Erie, based on a specimen collected in 2005. Previous Ontario records are discussed and information on the identification, taxonomy, habitat, distribution, and status of the species is provided.] Address: Oldham, M.J., Ontario Natural Heritage Information Centre (NHIC), Biodiversity Section, Fish & Wildlife Branch, Ministry of Natural Resources, 300 Water Str., 2nd Floor, North Tower, P.O. Box 7000, Peterborough, Ontario K9J 8M5, Canada. E-mail: michael.oldham@ontario.ca

7013. Olias, M.; Günther, A. (2007): Alpen-Smaragdlibelle (*Somatochlora alpestris*) bodenständig im Hochmoor bei Deutscheinsiedel im Osterzgebirge – Entwicklung der Libellenfauna des Deutscheinsiedler Moores nach Revitalisierungsmaßnahmen. *Mitteilungen des Naturschutzes Freiberg* 3: 40-45. (in German).

[Sachsen, Germany; blocking of a ditch resulted in the development of *Sphagnum* mats suitable for colonisation by *S. alpestris*. Oviposition occurred an estimated five years after starting the measures.] Address: Günther, A., Naturschutzzentrum Freiberg, Waisenhausstraße 10, D-09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

7014. Olomukoro, J.O.; Ezemonye, L.I.N. (2007): Assessment of the macro-invertebrate fauna of rivers in southern Nigeria. *African Zoology* 42(1): 1-11. (in English). ["This study evaluated the macro-invertebrate fauna in water bodies of southern Nigeria spanning the rainforest and derived savanna ecozones. The benthic macro-invertebrate fauna of Edo Ecozone comprises 55 taxa, belonging to 13 major groups. The abundance of major taxonomic groups varied considerably among the surveyed aquatic ecosystems. Chironomidae (Diptera) were well represented and dominant in 11 of the 20 water bodies surveyed. Most rare and restricted species were gastropods (Mollusca), one such species, *Mutela* cf. *dibia*, being endemic to the catchment. The overall abundance was maximal (97) at Okomu River in the lowland forest and minimal (5) at Avielle River in derived savanna, respectively. The human impact on macro-invertebrate biodiversity is documented, including changes in benthic fauna distribution patterns." (Authors) The identification of Odonata was made on the genus level, using Needham & Needham (1982): *A Guide to the Study of Freshwater Biology*. Holden-Day, San Francisco, and therefore exclusively considers North American taxa.] Address: Olomukoro, J.O., Department of Animal and Environmental Biology, University of Benin, P.M.B. 1154, Benin City, Nigeria. E-mail: olomsjo@yahoo.com

7015. Peretti, A.; Córdoba-Aguilar, A. (2007): On the value of fine-scaled behavioural observations for studies of sexual coercion. *Ethology Ecology & Evolution* 19: 77-86, 2007: 77-86. (in English). [For the full paper see: <http://ejour-fup.unifi.it/index.php/eee/article/view-File/1121/1066>] Address: Peretti, A., Cátedra de Diversidad Animal I, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Avda. Vélez Sarsfield 299, C.P. 5000, Córdoba, Argentina. E-mail: aperetti@com.uncor.edu

7016. Perez-Gutierrez, L.A. (2007): The larvae of *Teinopodagrion caquetanum* De Marmels and *T. vallengatum* De Marmels (Zygoptera: Megapodagrionidae). *Odonatologica* 36(3): 307-313. (in English). ["The last instar larvae are described and illustrated. They are diagnosed against the congeners on the basis of published descriptions. The principal diagnostic features are found in caudal gills, cerci and protuberances of occipital lobes. A key to the known *Teinopodagrion* larvae is provided." (Author)] Address: Perez-Gutierrez, L.A., Lab. de Zoología y Ecología Acuática, Depto de Ciencias Biológicas, Universidad de Los Andes, Carrera 1 N° 18A 10, Bogotá, Colombia. E-mail: le-perez@uniandes.edu.co

7017. Polhemus, D.A. (2007): Biology Recapitulates Geology: the Distribution of Megalagrion Damselflies on the Ko'olau Volcano of O'ahu, Hawai'i. *Bishop Museum Bulletin in Cultural and Environmental Studies* 3: 233-246. (in English). ["Populations of endemic *Megalagrion* damselflies breeding in upland streams have exhibited a progressive decline in both range and num-

bers on O'ahu since the late 1970s, based on analysis of historical collection data and results of recent surveys. In particular, conservation status surveys conducted from 1991 onward determined that the 4 upland stream-breeding taxa on the island, 3 of which are endemic to O'ahu, have disappeared from many catchments they formerly inhabited, particularly in the Wai'anāe Mountains and on the leeward side of the Ko'olau Mountains. The remaining populations on the island are now disproportionately concentrated on windward slopes of the latter range, where they are clustered around exposures of the core dike complex of the Ko'olau volcano. This geological formation traps groundwater in dike-segregated compartments, thereby producing permanent surface flow in the upper reaches of many windward Ko'olau gulches, coupled with naturally interrupted midreaches immediately below that block the upstream migration of invasive species. The discovery of this correlation between geology and damselfly distributions has allowed predictive location of additional colonies by using geological maps, permitting future surveys to be more accurately targeted, and providing an objective basis for the delimitation of habitat critical to the survival of these species." (Author)] Address: Polhemus, D.A., Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, 1151 Punchbowl St., Honolulu, Hawai'i 96813, USA. E-mail: bugman@bishopmuseum.org.

7018. Preston, D.J.; Englund, R.A.; Mcs Hane, M.K.K. (2007): Translocation and monitoring efforts to establish a second population of the rare *Megalagrion xanthomelas* (Sélvs-Longchamps) on O'ahu, Hawai'i (Zygoptera: Coenagrionidae). *Bishop Museum Bulletin in Cultural and Environmental Studies* 3: 261-276. (in English). ["The last remaining population of *M. xanthomelas* resides in a 100 meter reach of stream located on the grounds of Tripler Army Medical Center, O'ahu. Because actions may be taken that might jeopardize this only known O'ahu population, it has been considered imperative to establish a second population to prevent *M. xanthomelas* from going extinct on O'ahu. An attempt to establish this species at a stream in the Dillingham area of O'ahu was made in 1998, but unfortunately was unsuccessful. Because the Tripler population is so small and restricted in distribution, a second effort at translocation was attempted at a new location. We estimated the population size of *M. xanthomelas* at the Tripler site in 1997 and again in 2003 by mark-recapture and concluded that the Tripler population was stable and could withstand the removal and translocation of a small number of adults and larvae. A stream site located in Makiki Valley was selected for its lack of alien predators such as crayfish, prawns, and mosquito fish, and a number of adults and immatures were translocated to the Makiki site in August 2004. Monitoring of the Tripler and the Makiki sites is ongoing and an additional translocation of *M. xanthomelas* to Makiki is planned. Future conservation plans should also include the assistance of from the general public through avenues such as stocking of backyard ponds with *M. xanthomelas*." (Authors)] Address: Preston, D.J., Hawai'i Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i 96817, USA. E-mail: davidp@bishopmuseum.org

7019. Prud'homme, E.; Suarez, D. (2007): Deux nouvelles especes pour le departement de la Charente: *Epitheca bimaculata* (Charpentier, 1825) et *Macromia splendens* (Pictet, 1843) (Odonata, Anisoptera, Cordu-

liidae, Macromiidae). *Martinia* 23(2): 43-51. (in French, with English summary). [France, Charente department; *E. bimaculata* is new and *M. splendens* was rediscovered.] Address: Prud'homme, E., Rue des Colporteurs, 16230 Nanclars, Franc. E-mail: eric.pmdhomme6@wanadoo.fr

7020. Ridei, N.; Khrokalo, L.; Pavlusenko, I. (2007): National Ecological Network of Ukraine and the state of research on odonatafauna in protected territories. *Wiad. entomol.* 26(4): 237-249. (in English). ["An analysis of Odonata check-lists of protected species and territories of national and international significance have been carried out within the framework of a biodiversity data base of Ukrainian National Ecological Network's key areas. Summarised and updated information on 11 protected areas is reported. For five natural reserves, such as "Ielanetskyi steppe", "Kazantyp", "Cheremskyi" and "Karadagskyi" Nature Reserves and one branch of Ukrainian Steppe Reserve the check-lists of dragonflies are presented for the first time." (Authors)] Address: Khrokalo, Lyudmila, P.O. Box 16, Kyiv-118, Ukraine 03118. E-mail: lkhrokalo@mail.ru

7021. Robillard, A.L. (2007): Seasonal dynamics of a riparian food web in the Oregon coast range mountains. M.Sc Thesis, Fisheries Science, Oregon State University: 14 + 100 pp. (in English). ["Riparian areas are ecotones where aquatically- and terrestrially-derived insect biomass is exchanged between habitats, presenting consumers with new sources of energy, and resulting in a reciprocal subsidy. The relative contribution of energy exchange and the resulting impacts on vertebrate riparian consumers, such as fish or birds, remains poorly understood. We explored this reciprocal exchange within Honeygrove watershed--an alder dominated riparian system within the Oregon Coast Range. Diet samples were collected from birds and fish along with a suite of insect samples during the summer and fall of 2003 and spring 2004. We detected seasonal differences in the abundance and biomass of terrestrial and aquatic insects available to riparian consumers. Spring provided the most adult aquatic insect biomass, and biomass was similar in summer; the fall emergence was an order of magnitude less than the other seasons. Prey sources differed between salmonids. Salmonid diet varied in biomass consumption by season and prey type. Coho salmon (*Oncorhynchus kitsutch*) on average, consumed more benthic aquatic biomass than adult aquatic insect biomass regardless of season. Despite the availability of externally derived prey, this species depended more on stream-derived resources in summer and fall but not during spring. In all sampling seasons, co-occurring cutthroat trout (*Oncorhynchus clarkii*), consumed more terrestrial invertebrate biomass than aquatic biomass, on average. Only in summer, cutthroat trout ate more adult aquatic than benthic aquatic biomass. In fall, their consumption of adult and benthic insect biomass was equal. During spring, cutthroat trout consumption, on average, consisted of more benthic aquatic biomass than adult aquatic biomass. Bird diet samples obtained from commonly encountered species such as Swainson's thrush, Song Sparrow, and Pacificslope Flycatcher, showed more terrestrial derived than aquatic prey during the summer sampling season. These data provided evidence of a reciprocal subsidy occurring in the Honeygrove watershed. There is potentially a seasonal synchrony between the two habitats such that when prey availability is low in one habitat, it is subsid-

ized by the other's high productivity." (Author) Both, the diet of Pacific-slope Flycatcher and the two fish species contained few Odonata.] Address: not stated

7022. Rodríguez, A.; Rodríguez, B.; Rumeu, B.; Nogales, M. (2007): Seasonal diet of the Grey Heron *Ardea cinerea* on an oceanic island (Tenerife, Canary Islands): indirect interaction with wild seed plants. *Acta Ornithol.* 42: 77–87. (in English). ["In 199 pellets analyzed a total of 7460 prey items were counted, 96.2% of which were arthropods. Aeshnidae larvae made up 66.1 % of the total prey items and were the main invertebrate group. Vertebrates constituted 3.8%, with reptiles and mammals being the main prey of this type (1.8% each). Despite the small size of the invertebrates, this group reached > 60% in terms of biomass. All the main prey items varied significantly among seasons. Odonata was the most important group in all seasons, reaching its maximum value in summer. In the case of vertebrates, reptiles were captured mainly in spring, mammals in winter. With regard to indirect interaction with seeds, a total of 901 seeds associated with lizard remains were found in 77 pellets, indicating that they had previously been consumed by these reptiles. External visual damage of seeds was low and only 1.1% was destroyed. No seeds germinated after the four-month germination experiment and practically all of them were unviable. In conclusion, these results indicate that Grey Heron diet on islands varies in comparison with continental zones, including an important number of invertebrates and reptiles. Furthermore, this bird acts as an opportunistic secondary seed disperser, although its ecological effect does not seem to be very significant for the dynamics of the Canary Island ecosystems." (Authors)] Address: Rodríguez, A., Island Ecology and Evolution Research Group, Instituto de Productos Naturales y Agrobiología (IPNA-CSIC), Astrofísico Francisco Sánchez 3, 38206 La Laguna, Tenerife, Canary Islands, Spain. E-mail: airamrquez@ipna.csic.es

7023. Rodríguez-Barrios, J.; Ospina-Torres, R.; Gutierrez, J.D.; Ovalle, H. (2007): Density and biomass of drifting aquatic macroinvertebrates in a tropical mountain creek at Bogotá, Colombia. *Caldasia* 29(2): 397-412. (in Portuguese, with English summary). ["The variation of drift density of aquatic macroinvertebrates and biomass contribution of different immature and imago stages were estimated on a stream segment of a first order tropical stream in Eastern hills of Bogotá – Colombia, during high and low rainfall periods. A total of 96 taxa were collected; Simulium was the most abundant with 194 individuals (total abundance). Drift density and biomass contributions, were greater during the dry period. Dipterans (chironomids) and mites showed the mayor drift density; trichopterans (Triplectides) showed the greater biomass to the drift. Significant differences in diel drift pattern between the day and the night ($K-S=1.86$, $p=0.002$, $n=185$), but not in biomass contribution in drift, were observed." (Authors) Odonata are treated at the order level.] Address: Ospina-Torres, R., Laboratorio de Invertebrados Acuáticos, Universidad Nacional de Colombia, Bogotá, D.C., Colombia. E-mail: rospinat@unal.edu.co

7024. Samways, M.J. (2007): Insect conservation: A synthetic management approach. *Annual Review of Entomology* 52: 465-487. (in English). ["Threats to insect diversity range from habitat loss and invasive alien organisms to environmental contamination and biological

control. Many of the threats are synergistic, with the joint impact of habitat loss and global climate change being highly adversely synergistic. Recent research on insect conservation has elucidated some basic principles for conservation management. There are six basic principles that are interrelated and together provide guidelines for synthetic conservation management of insects. They are maintain reserves (principle 1), maintain as much quality landscape heterogeneity as possible (principle 2), reduce contrast between remnant patches and neighbouring disturbed patches (principle 3), outside reserves, introduce land sparing (principle 4), simulate natural conditions and disturbance (principle 5), and connect similar patches of quality habitat (principle 6). These six principles constitute a coarse-filter, landscape approach. Permeating all six is the principle of maintaining healthy population levels, which require the combined support of the metapopulation trio of large patch (habitat) size, good patch quality, and reduced patch isolation. In addition to these six coarse-filter principles is an overlay of the fine-filter, species approach, in which particular species are given focused attention and management." (Author) The paper includes references to Odonata.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7025. Schiefenhövel, P. (2007): Libellen- und Köcherfliegengemeinschaften im Naturpark Soonwald-Nahe. Diplomarbeit, Lehrstuhl für Tierökologie und Tropenbiologie, Julius-Maximilians Universität Würzburg: 133 pp. (in German, with English summary). ["More and more natural habitats and landscapes are getting disturbed. Animals and plants that populated these habitats disappeared or could switch to secondary habitats. Such secondary biotopes can be found in the Soonwald which can be characterized by boggy environment. Species living in forest ponds in the Soonwald are diverse and some of them are seldom. I investigated the diversity and composition of Odonata and Trichoptera communities in 22 of these small water bodies. The impact of several environmental factors (pond volume, water temperature, isolation, vegetation of the water bodies and the shorelines, underground of the water bodies) on the two aquatic insect orders was examined. Habitat selection of five endangered dragonflies (*Leucorrhinia dubia*, *Aeshna juncea*, *Sympetrum danae*, *Lestes dryas*, *L. virens vestalis*) was investigated and I tried to find out what kind of composition of environmental factors were responsible to their distribution. Diversity and composition of dragonflies were strongly influenced by the environmental factors and shade next to six other factors (altitude, vegetation cover of emergent, submerged or reeded plants, abundance of peat-bogs and pond volume) was the most important factor. The dragonfly community was not influenced by factors characterizing the boggy environment of the ponds. However, the occurrence and the reproductive success of three endangered dragonflies was influenced by environmental factors (abundance of peat-bogs, trophic level, water temperature) which usually characterize bog ponds. The diversity and composition of caddisflies were influenced by individual analysed parameters namely by water temperature, sediment depth and pond volume. Reproductive success of caddisflies could not be analysed because emergence traps used in this study could not sample the entire pond area. Finally, advantages and disadvantages of this sampling method

are discussed. Furthermore, recommendations for habitat conservation and establishments of boggy ponds are given." (Author)] Address: not stated

7026. Sipkay, C.S.; Hufnagel, L.; Révbesz, A.; Petrányi, G. (2007): Seasonal dynamics of an aquatic macroinvertebrate assembly (Hydrobiological case study of Lake Balaton No. 2). Applied ecology and environmental research 5(2): 63-78. (in English). ["In 2002, 2003 and 2004, we took macroinvertebrate (including some Odonata taxa) samples on a total of 36 occasions at the Badacsony bay of Lake Balaton. Our sampling site was characterised by areas of open water (in 2003 and 2004 full of reed-grass) as well as by areas covered by common reed (*Phragmites australis*) and narrowleaf cattail (*Typha angustifolia*). Samples were taken both from water body and benthic ooze by use of a stiff hand net. We have gained our data from processing 208 individual samples. We took samples frequently from early spring until late autumn for a deeper understanding of the processes of seasonal dynamics. The main seasonal patterns and temporal changes of diversity were described. We constructed a weather-dependent simulation model of the processes of seasonal dynamics in the interest of a possible further utilization of our data in climate change research. We described the total number of individuals, biovolume and diversity of all macroinvertebrate species with a single index and used the temporal trends of this index for simulation modelling. Our discrete deterministic model includes only the impact of temperature, other interactions might only appear concealed. Running the model for different climate change scenarios it became possible to estimate conditions for the 2070-2100 period. The results, however, should be treated very prudently not only because our model is very simple but also because the scenarios are the results of different models." (Authors)] Address: Sipkay, C.S., Dept Mathematics & Informatics, Corvinus University of Budapest H-1118 Budapest, Villányi út 29-33, Hungary. E-mail: cssipkay@yahoo.com

7027. Smith-Patten, B.D.; Patten, M.A.; Dreiling, M.J.; Fisher, J. (2007): Phenology and new county records of Odonata of northeastern Oklahoma. Publications of the Oklahoma Biological Survey 2nd Series Vol. 8: 1-13. (in English) ["We summarize status, seasonality, and distribution of 69 species (plus three hypotheticals) of Odonata recorded in Osage, Tulsa, and Washington Counties, Oklahoma. To the 28 species listed in Abbott (2005) for this tricounty area, we add 45 species, including 27 new species for Osage, 54 for Tulsa, and 39 for Washington. These additions bring the county totals to 55, 55, and 40 species, respectively. We also present phenologies for all species that are common or uncommon in this area and for a few that occur rarely but with a distinct seasonality. Provided they continue to be gathered, detailed phenological data may prove helpful for monitoring predicted effects of global climate change." (Authors)] Address: Smith-Patten, Brenda, Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma 73072, USA. E-mail: argia@ou.edu

7028. Stübing, S.; Cloos, T.; Korn, M.; Patzich, R.; Roland, H.-J. (2007): Arbeitskreis Libellen in Hessen: Aktuelle Entwicklungen und Verbreitungsatlas der Libellen Deutschlands. Jahrbuch Naturschutz in Hessen 11: 30-35. (in German). [The paper reports on current activities to map the Odonata in the federal state of Hessen,

Germany, and outlines some interesting records.] Address: Dtübing, S., Im Feldchen 1a, 61209 Echzell, Germany. E-mail: stefan.stuebing@gmx.de

7029. Suda, S. (2007): The bringing-in case of the dragonfly from the outside of Japan which accompanies the carriage of the aquatic plants. Nature & Insects 42 (9) (Special issue: Recent trends of Odonatology): 12-15. (in Japanese). [The problems of artificial introduction of water plants from remote regions for population genetics of Odonata are discussed.] Address: Suda, S., Graduate School of Agricultural and Life Sciences, The University of Tokyo, Japan

7030. Susa, K.; Watanabe, M. (2007): Egg production in *Sympetrum infuscatum* (Selys) ♀♀ living in a forest-paddy field complex (Anisoptera: Libellulidae). Odonatologica 36(2): 159-170. (in English). ["Although the larval habitats of *S. infuscatum* are paddy fields, all adults leave the paddy fields for forest gaps after emergence, and remain there during their sexually immature stages. In late summer when they have matured, some visit the paddy fields in tandem flight for oviposition. However, many ♀♀ remain perching in the forest gaps, where no mating behaviour is observed. To evaluate the habitat selection of *S. infuscatum* ♀♀ in the forest gaps, fecundity was examined by means of dissection. In the morning, the ♀♀ re♀♀ in the forest gaps loaded fewer mature eggs (ca 100) than did ovipositing ♀♀ in the paddy fields (ca 300). ♀♀ remaining in the forest gaps throughout the day were not willing to visit the paddy fields for oviposition due to the low egg number loaded. This could be because these ♀♀ were developing their eggs, having loaded more sub-mature eggs (ca 60) than ovipositing ♀♀ in the paddy fields (ca 30). As a result, in the evening, ♀♀ that had developed nearly 500 eggs appeared. In an artificial oviposition experiment, the ♀♀ in the paddy fields released their eggs significantly faster (60 eggs/min) than did those in the forest gaps (16 eggs/min), and released almost all of their eggs, while the ♀♀ in the forest gaps retained a considerable number of eggs in their ovaries. Although ♀♀ load ovarioles irrespective of their age, the number of immature eggs per ovariole decreased with age. Consequently, a ♀♀ might have laid more than 2000 eggs in her life span. ♀♀ must visit the paddy fields cyclically several times in a single month and stay in the forest gaps during the other days." (Authors)] Address: Susa, K., Graduate School of Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan

7031. Theischinger, G.; Richards, S.J. (2007): *Teinobasis kiautai* spec. nov., a new species from Papua New Guinea (Zygoptera: Coenagrionidae). Odonatologica 36 (1): 85-88. (in English). ["The new species is described, diagnostic characters of the adult ♂ are illustrated and the affinities of the species are discussed. Holotype ♂: Papua New Guinea, Eastern Highlands province, Herowana, 24-XI-2001; deposited at South Australian Mus., Adelaide. *T. kiautai* sp. n. is most similar to *T. scintillans*, but dramatically differs from it in the shape of the ♂ pronotum." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

7032. Theischinger, G. (2007): The final instar larvae of *Gynacantha rosenbergi* KAUP and *Antipodogomphus proselythus* (MARTIN) (Odonata, Aeshnidae & Gomphidae). Linzer Biologische Beiträge 39(2): 1233-1237. (in

English). ["The Australian dragonflies *Gynacantha rosenbergi* Kaup and *Antipodogomphus proselythus* (Martin) were bred out. Their larvae are described from final instar exuviae and compared with their closest allies. They were previously undescribed." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

7033. Torralba Burrial, A.; Ocharan, F.J. (2007): Composicion biogeografica de la fauna de libelulas (Odonata) de la Peninsula Iberica, con especial referencia a la aragonesa. *Boln. S.E.A.* 41: 179-188. (in Spanish, with English summary). ["The check-list of the Odonata of the Iberian Peninsula is updated, with a total of 76 species. Distribution areas and estimated secondary centres of origin and dispersal are analysed. Species are assigned to biogeographical elements: Holarctic, Euro-siberian, Pontic-Eastern, Holomediterranean, West Mediterranean, Ibero-Maghrebian and Ethiopian; previous classifications are modified. The Iberian dragonfly fauna is composed of Mediterranean (66%, mainly Ibero-Maghrebian), northern (21% Eurosiberian and Holarctic) and some Ethiopian (13%) elements. The Aragonese dragonfly fauna is biogeographically analysed and compared with the fauna of Odonata of other Iberian regions." (Authors)] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniob@hotmail.com

7034. Tupinambas, T.H.; Callisto, M.; Santos, G.B. (2007): Benthic macroinvertebrate assemblages structure in two headwater streams, south-eastern Brazil. *Revista Brasileira de Zoologia* 24(4): 887-897. (in English, with Portuguese summary). ["From December 2003 to September 2004, benthic macroinvertebrates (BM), fishes, water and sediment were collected quarterly at six stations in two streams of the upper São Francisco River basin, south-eastern Brazil. We evaluated the ecological conditions, habitat diversity, water quality, composition and structure of BM communities, as well as the food habits of the local fish fauna. [...] We found 45 BM taxa, and Chironomidae (68%), Oligochaeta (10%) and Elmidae (8.5%) showed the highest abundances. From the stomach contents analysis of 13 fish species, 26 BM taxa were found, including four that were not collected in the sediment samples, being Chironomidae the dominant group (> 60%). Our results show that human activities such as forest clearing, agriculture and cattle rising have altered the habitat diversity in freshwater ecosystems in a process that affects the aquatic biota and thus the food availability to the fish fauna. The results also highlight the importance of the fish stomach contents analysis as a complementary tool in BM inventories." (Authors) Reference is made to "Odonata (Libellulidae, Coenagrionidae, Gomphidae)" without further details.] Address: Tupinambas, T. H., Laboratório de Ecologia de Bentos, Depto de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais. Caixa Postal 486, 30161-970 Belo Horizonte, Minas Gerais, Brasil. E-mail: taynanh@yahoo.com.br

7035. Ubukata, H.; Kurauchi, Y. (2007): Assessment of lake environment using dragonfly assemblage. A case study at Lake Takkobu, Kushiro Marsh, northern Japan. *Japanese Journal of Limnology* 68: 131-144. (in Japanese, with English summary). ["A periodical census of

mature dragonflies (Odonata) was conducted at 11 investigation sites along the shore of Lake Takkobu, Kushiro Marsh, Hokkaido in 2004, resulting in a record of 2,572 individuals of 18 species belonging to six families. Dragonfly abundance is analyzed in relation with the following five environmental factors: i.e., width of reed bed, water depth, coverage of aquatic macrophytes, ratios of gravels(=2mm) and silt(=0.075mm). The two-dimensional pattern in the dispositions of investigation sites observed on a detrended correspondence analysis (DCA) diagram of dragonflies broadly coincided with that of an actual pattern on the map, whereas this was not the case for that of a DCA diagram of the environmental factors. As the result of a canonical correspondence analysis (CCA) using both dragonfly and environmental data, the investigation sites were separated into four clusters: i.e., deep sites with rich aquatic macrophytes and wide reed beds; deep sites scarce in macrophytes; shallow sites with poor macrophytes and narrow reed beds; and shallower sites with an abundance of macrophytes. Based on the results of the CCA, most dragonfly species are selected as possible indicators of the environmental conditions of the lake: e.g., *Cercion calamorum* (Ris), *Enallagma circumlatum* Selys and six other species as those preferring sites rich in aquatic macrophytes, *E. circumlatum*, *Epitheca bimaculata sibirica* and five others as those favouring wider reed beds and deeper water; *Sympetrum striolatum imitoides* Bartenef, *Trigomphus melampus* (Sel.) and three others as those preferring sites scarce in macrophytes; *Orthetrum albistylum speciosum* (Uhler) preferring the shallowest water with the fewest macrophytes and reed beds; and *T. melampus* and *Sympetrum croceolum* (Sel.) favouring deeper water. Finally, some other factors that may influence the microdistribution of dragonflies in the lake are discussed." (Authors)] Address: Ubukata, H., Hokkaido Univ. Education at Kushiro, Dept Science Education, Shiroyama 1-15-55, Kushiro, 085, Japan. E-mail: ubukata@kus.hokkyodai.ac.jp

7036. Urban, M.C. (2007): Predator size and phenology shape prey survival in temporary ponds. *Oecologia* 154: 571-580. (in English). ["Theoretical efforts suggest that the relative sizes of predators and their prey can shape community dynamics, the structure of food webs, and the evolution of life histories. However, much of this work has assumed static predator and prey body sizes. The timing of recruitment and the growth patterns of both predator and prey have the potential to modify the strength of predator-prey interactions. In this study, I examined how predator size dynamics in 40 temporary ponds over a 3-year period affected the survival of spotted salamander (*Ambystoma maculatum*) larvae. Across communities, gape-limited predator richness, but not size, was correlated with habitat duration (pond permanence). Within communities, mean gape-limited predator size diminished as the growing season progressed. This size reduction occurred because prey individuals grew into a body size refuge and because the largest of the predators left ponds by mid-season. Elevated gape-limited predation risk across time and space was predicted by the occurrence of two large predatory salamanders: marbled salamander larvae (*Ambystoma opacum*) and red-spotted newt adults (*Notophthalmus viridescens*). The presence of the largest gape-limited predator, *A. opacum*, predicted *A. maculatum* larval survival in the Weld. The distribution of large predatory salamanders among ponds and across time is expected to lead to differing community dynamics and to gener-

ate divergent natural selection on early growth and body size in *A. maculatum*. In general, a dynamic perspective on predator size often will be necessary to understand the ecology and evolution of species interactions. This will be especially true in frequently disturbed or seasonal habitats where phenology and ontogeny interact to determine body size asymmetries. [...] The most abundant predator taxa were the caudates *Notoptthalmus viridescens* adults and *Ambystoma opacum* larvae, the anuran *Rana clamitans*, odonate larvae, including *Sympetrum*, *Aeshna*, *Pachydiplax*, and *Leucorhinia*, the coleopteran *Dytiscus*, the hemipterans *Lethocerus* and *Notonecta*, and the megalopteran *Chauliodes*." (Authors)] Address: Urban, M.C., School of Forestry & Environmental Studies, Yale University, 370 Prospect Street, New Haven, Connecticut 06520 USA. E-mail: urban@nceas.ucsb.edu

7037. Vadadi-Fülöp, C.S.; Meszaros, G.; Jablonsky, G.Y.; Hufnagel, L. (2007): Ecology of the Rackeve-Soroksar Danube - a review. *Applied ecology and environmental research* 5(1): 133-163. (in English). ["Present paper is a review on the Rackeve-Soroksar Danube in ecological standpoint. The goal of this study is to collect and evaluate all of available publications (including two with Odonata) - in that conception, concerning this Danube arm. Phytoplankton, zooplankton, macroinvertebrates, vertebrates, macrophytes and also water chemistry, water management, geographical description are presented. The review comprises the main studies beginning with the earliest faunistic publications up to the recent ecological, multidisciplinary investigations. Spatial and temporal patterns likewise water quality are considered as important. Additionally checklist of aquatic invertebrate and vertebrate fauna are given based on data from literature." (Authors)] Address: Vadadi-Fülöp, C.S., Eötvös Loránd University, H-1117 Budapest, Pazmany P. setany 1/c, Hungary. E-mail: vadfulcsab@gmail.com

7038. Van Gossum, H.; Beatty, C.D.; Charlat, S.; Waqa, H.; Markwell, T.; Skevington, J.H.; Tuiwawa, (2007): Male rarity and putative sex-role reversal in Fijian damselflies (Odonata). *Journal of Tropical Ecology* 23: 591-598. (in English). ["Behavioural sex-role reversal occurs when ♂♂ and ♀♀ exchange their standard roles in territorial defence or parental care. One circumstance under which sex-role reversal may occur is when ♂♂ are a limiting resource, so that ♀♀ have to compete for access to mates. Here we report on male rarity and male and female behaviour of species within the damselfly genus *Nesobasis*, endemic to Fiji. Earlier reports suggested that, in some members of this genus, ♂♂ were seldom observed and that ♀♀ of these species were consequentially territorial, a phenomenon described as 'sex-role reversal'. Quantitative estimation of the ratio of adult ♂♂ to ♀♀ at 15 localities in 13 *Nesobasis* species (1489 individuals) indicated that ♂♂ were extremely rare in some species, yet common in others. This interspecific variability in male rarity cannot be explained by elevation or habitat. Formal observations of three species with abundant ♂♂ revealed that ♂♂ of these species were highly territorial: they physically challenged intruders while remaining within a confined area. By contrast, in three species where ♂♂ were consistently rare or absent, ♀♀ were not territorial: instead, they moved widely and were primarily engaged in oviposition. While we do not know the underlying reason for the unusual rarity of ♂♂ at oviposition sites in some

species, it is clear that this rarity has not provided sufficient selection pressure to generate genuine sex-role reversal." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

7039. von Ellenrieder, N.; Garrison, R.W. (2007): Dragonflies and Damselflies (Insecta: Odonata) of the Argentine Yungas: Species composition and identification. *Scientific Reports* n. 7, Publisher Società Zoologica "La Torbiera", Italy: 103 pp. (Bilingual in English and Spanish). ["The Argentine mountain cloud forests, known as Yungas, house a high biodiversity, second only to the Amazon forest in the country. Their Odonata have not yet been documented or extensively studied, and in this contribution a preliminary inventory of their species, as well as keys allowing for identification of adults and all known larvae are provided." (Authors)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: odonata@hotmail.com

7040. Watanabe, M.; Iwata, S. (2007): Evaluation of line transect method for estimating *Mortonagrion hirosei* *Asahina* abundance in a dense reed community (Zygoptera: Coenagrionidae). *Odonatologica* 36(3): 275-283. (in English). ["The results of the mark and recapture method for estimating the number of *M. hirosei* adults were compared to those of census counts using the line transect method carried out in the same habitat, a dense reed community established in brackish water. The mark and recapture method gave a daily estimate of about 1000 and 800 individuals of each sex at the peak population in early July of 2003 and 2004, respectively. These results did not agree with the estimate from the census counts, giving 600 S at that time in the same habitat. Some limitations of the line transect method were discussed for estimates of adults perching in the understory of the dense reed community. However, a relationship was observed with regard to daily population estimates of the line transect method and the mark and recapture method, indicating that the line transect method can be an effective tool for monitoring populations of the endangered damselflies inhabiting such a dense plant community." (Authors)] Address: Watanabe, M., Graduate School of Life and Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

7041. Winkel, S.; Kuprian, M. (2007): Seltener Schnappschuss von der Zweigestreiften Ouelljungfer (*Cordulegaster boltonii*) am Hainbach bei Offenbach. *Jahrbuch Naturschutz in Hessen* 11: 41. (in German). [Hessen, Germany; photographs of oviposition of *C. boltonii*, without detailed record dates.] Address: Winkel, Sibylle, Pommernstr. 7, 63069 Offenbach, Germany. E-mail: si.winkel@t-online.de

7042. Winkel, S.; Kuprian, M. (2007): Begleitendes Monitoring der Libellenfauna des FFH- und Naturschutzgebietes „Hölle von Rockenberg“ im Rahmen des Hessischen Wiederansiedlungsprojektes Europäische Sumpfschildkröte. *Jahrbuch Naturschutz in Hessen* 11: 36-40. (in German). [Hessen, Germany; 23 odonate species were recorded between 2004 and 2007] Address: Winkel, Sibylle, Pommernstr. 7, 63069 Offenbach, Germany. E-mail: si.winkel@t-online.de

7043. Winkel, S.; Schroth, M.; Bressler, W.; Flöber, E.; Kuprian, M. (2007): Wiederfund der Kleinen Zangenlibelle im Natura 2000-Gebiet 5818-401 „Main bei Mühlheim und NSG Rumpfenheimer & Bürger Kiesgruben“ und Rückkehr der Art an den Untermain. *Insecta* 10: 123-128. (in German). [The paper compiles several new and unpublished records of *O. forcipatus* in Hesse, Germany from the period 1992 to 2006.] Address: Winkel, Sibylle, NABU LAG Naturentwicklung & Biodiversität, Pommernstraße 7, D-63069 Offenbach am Main, Germany. E-Mail: si.winkel@t-online.de

7044. Wohlfahrt, B.; Mikolajewski, D.J.; Joop, G.; Vamosi, S.M. (2007): Ontogenetic changes in the association between antipredator responses and growth variables. *Ecological Entomology* 32(5): 567-574. (in English). ["1. An organism's growth parameters are expected to depend on environmental constraints, such as predation risk and food supply. However, antipredator responses, food intake, and thus growth of an animal may be mediated by behavioural traits, which are likely to differ among developmental stages. In this study, it was investigated how the relationship between growth and behavioural antipredator responses changes during ontogeny in the time-constrained dragonfly species *Libellula depressa*, and which factors influenced specific behavioural decisions at different points in ontogeny. 2. The results revealed that behavioural strategies differed between larval developmental stages, depending on associations between larval growth, food supply, and predation risk. Early in ontogeny, faster development was correlated with high larval activity and high food supply. This resulted in high activity levels under high food conditions irrespectively of predator presence, and under low food supply in predator absence only. In the intermediate stage of development, all larvae displayed a high activity level, which was correlated in general with fast development. However, growth later in ontogeny was not only influenced by the activity level, but also by predator presence and food supply, with larvae reared under high food supply and/or in presence of predators attaining a higher final mass. Thus, not only the way in which larval growth parameters and behaviour are related changed during development, but also whether the factors influenced larval growth and behaviour. Once the larvae reached the ultimate stage of development, in which they overwinter, behavioural patterns observed were consistent with model predictions. 3. It is advocated that behavioural plasticity of prey organisms in different developmental stages should be analysed in the context of associated growth variables." (Authors)] Address: Mikolajewski, D.J., Laboratory for Aquatic Ecology, Katholieke Universiteit Leuven, Charles de Bériotstraat 32, B-3000 Leuven, Belgium. E-mail: d.mikolajewski@tu-bs.de

7045. Xu, Q.-h. (2007): *Periaeschna zhangzhovensis* sp. n. from Fujian, China (Anisoptera: Aeshnidae). *Odonatologica* 36(3):315-318 (in English) ["The new species is described, illustrated and compared with the congeners (holotype ♂, China, Fujian, Huaan co., 3-VIII-2004; deposited at Zhangzhou Education College, China). It is similar to *P. flinti* Asahina, from which it is distinguished by longer inferior appendages, an obtusely tipped dentigerous plate and by different colour patterns of the synthorax and abdomen." (Author)] Address: Xu, Q.-h., Zhangzhou Education College, Zhangzhou 363000, Fujian, China. E-mail: qihanx@yahoo.com.cn

7046. Abbott, J.K.; Bensch, S.; Gosden, T.P.; Svensson, E.I. (2008): Patterns of differentiation in a colour polymorphism and in neutral markers reveal rapid genetic changes in natural damselfly populations. *Molecular Ecology* 17(6): 1597-1604. (in English). ["The existence and mode of selection operating on heritable adaptive traits can be inferred by comparing population differentiation in neutral genetic variation between populations (often using F_{ST} values) with the corresponding estimates for adaptive traits. Such comparisons indicate if selection acts in a diversifying way between populations, in which case differentiation in selected traits is expected to exceed differentiation in neutral markers [F_{ST} (selected) > F_{ST} (neutral)], or if negative frequency-dependent selection maintains genetic polymorphisms and pulls populations towards a common stable equilibrium [F_{ST} (selected) < F_{ST} (neutral)]. Here, we compared F_{ST} values for putatively neutral data (obtained using amplified fragment length polymorphism) with estimates of differentiation in morph frequencies in the colour-polymorphic damselfly *Ischnura elegans*. We found that in the first year (2000), population differentiation in morph frequencies was significantly greater than differentiation in neutral loci, while in 2002 (only 2 years and 2 generations later), population differentiation in morph frequencies had decreased to a level significantly lower than differentiation in neutral loci. Genetic drift as an explanation for population differentiation in morph frequencies could thus be rejected in both years. These results indicate that the type and/or strength of selection on morph frequencies in this system can change substantially between years. We suggest that an approach to a common equilibrium morph frequency across all populations, driven by negative frequency-dependent selection, is the cause of these temporal changes. We conclude that inferences about selection obtained by comparing F_{ST} values from neutral and adaptive genetic variation are most useful when spatial and temporal data are available from several populations and time points and when such information is combined with other ecological sources of data." (Authors)] Address: Abbott, J.K., Department of Biology, Queen's University, Kingston, Ontario, Canada K7L 3N6. E-mail: abbottj@queensu.ca

7047. Abbott, J.K.; Svensson, E.I. (2008): Ontogeny of sexual dimorphism and phenotypic integration in heritable morphs. *Evol. Ecol.* 22: 103-121. (in English). ["In this study we investigated the developmental basis of adult phenotypes in a non-model organism, a polymorphic damselfly (*Ischnura elegans*) with three female colour morphs. This polymorphic species presents an ideal opportunity to study intraspecific variation in growth trajectories, morphological variation in size and shape during the course of ontogeny, and to relate these juvenile differences to the phenotypic differences of the discrete adult phenotypes; the two sexes and the three female morphs. We raised larvae of different families in individual enclosures in the laboratory, and traced morphological changes during the course of ontogeny. We used principal components analysis to examine the effects of Sex, Maternal morph, and Own morph on body size and body shape. We also investigated the larval fitness consequences of variation in size and shape by relating these factors to emergence success. ♀♀ grew faster than ♂♂ and were larger as adults, and there was sexual dimorphism in body shape

in both larval and adult stages. There were also significant effects of both maternal morph and own morph on growth rate and body shape in the larval stage. There were significant differences in body shape, but not body size, between the adult female morphs, indicating phenotypic integration between colour, melanin patterning, and body shape. Individuals that emerged successfully grew faster and had different body shape in the larval stage, indicating internal (non-ecological) selection on larval morphology. Overall, morphological differences between individuals at the larval stage carried over to the adult stage. Thus, selection in the larval stage can potentially result in correlated responses in adult phenotypes and vice versa." (Authors)] Address: Abbott, Jessica K., Section for Animal Ecology, Lund University, Ecology Building, 223 62 Lund, Sweden. E-mail: Jessica.Abbott@zooekol.lu.se

7048. Adebote, D.A.; Oniye, S.J.; Muhammed, Y.A. (2008): Studies on mosquitoes breeding in rock pools on inselbergs around Zaria, northern Nigeria. *J. Vector. Borne Dis.* 45: 21-28. (in English). ["Background & objectives: Rainwater often collects in depressions on rocks to form pools that are ideal breeding sites of mosquito vectors of diseases. Knowledge on the existence of disease vectors in these remote and relatively inaccessible locations could improve epidemiologic understanding and control capabilities. This study identifies mosquito species, their relative abundance and physicochemical characteristics of breeding microhabitats in rock pools on four inselbergs in northern Nigeria. Methods: Soup ladle dipper was used to obtain representative samples of larval mosquitoes breeding in 141 rock pools on four inselbergs. Physicochemical parameters (depth, electrical conductivity, pH, surface area, temperature and total dissolved solids) of the pools were determined. Larvae were preserved in 70% alcohol and identified microscopically to species using taxonomic keys. Statistical correlation analysis and ANOVA were used to test the associations between physicochemical parameters and mosquito abundance, and for differences amongst inselbergs. Results: Of 2991 larvae, five species of mosquito distributed in three genera (*Anopheles*, *Aedes* and *Culex*) including *Ae. vittatus* (92.88%), *An. ardensis* (0.13%), *An. distinctus* (1.67%), *An. wilsoni* (0.13%) and *Cx. ingrami* (5.18%) bred in the rock pools. Up to five species occurred per pool in various conspecific and heterogeneric combinations. Except for *Ae. vittatus*, the physicochemical parameters of the pools correlate significantly with species abundance. Conclusion: *Ae. vittatus*, a potential vector of yellow fever in Nigeria breeds profusely in rock pools on inselbergs around Zaria. For comprehensive vector implication vector implication and control, rock pools should be amongst the habitats of focus in yellow fever epidemiology." (Authors) The discussion contains references to Odonata as predators of mosquitoes.] Address: Adebote, D.A, Department of Biological Sciences, Ahmadu Bello University, Zaria, Nigeria

7049. Baskinger, G.M.; Ware, J.L.; Kornell, D.D.; May, M.L.; Kjer, K.M. (2008): A phylogeny of *Celithemis* inferred from mitochondrial and nuclear DNA sequence data and morphology (Anisoptera: Libellulidae). *Odonatologica* 37(2): 101-109. (in English). ["The dragonfly genus *Celithemis* consists of 8 species, some of them common and brightly coloured, that are confined largely to eastern North America. Several species have been used in behavioural, ecological, and morphological stu-

dies, but their intrageneric phylogeny is unclear. In this paper is provided a phylogeny based on morphology and on data from mitochondrial and nuclear DNA sequences of multiple individuals of each species. The genus appears to be monophyletic, with one nested species pair (*C. amanda*+*C. martha*) receiving strong bootstrap support by both parsimony or maximum-likelihood criteria as well as high Bayesian posterior probability. A second group (*C. bertha*, *C. elisa*, *C. ornata* and *C. fasciata*) is well-supported in Bayesian analysis but only weakly by parsimony and maximum-likelihood bootstrap values. *C. verna* and *C. eponina* are probably basal to both these groups, but their relationship to each other is unclear. All individuals assigned to a species recognized on morphological grounds were recovered as monophyletic. The problematic taxa, *C. monomalaena* and *C. bertha leonora*, are shown definitively to be synonyms of *C. fasciata* and *C. bertha*, respectively." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

7050. Bedjanic, M. (2008): Notes on the synonymy, distribution and threat status of *Elatoneura oculata* (Kirby, 1894), an endemic damselfly from Sri Lanka (Zygoptera: Protoneuridae). *Odonatologica* 37(2): 145-150. (in English). ["Based on an examination of the material in the Natural History Museum in London, *Elatoneura bigemmata* Lieftinck, 1971 is a junior synonym of *E. oculata* (Kirby, 1894). A map of the currently known distribution of the species is provided. According to the IUCN criteria, due to its very small area of occupancy in SW Sri Lanka and pressure on its habitat, *E. oculata* is to be classified as globally endangered (EN)." (Author)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjaz.bedjanic@guest.arnes.si

7051. Bernard, R.; Kosterin, O.E. (2008): Field notes of two hunters for *Nehalennia speciosa* in boggy Vasyugan Plain, West Siberia. *IDF-Report* 12: 1-34. (in English). ["One important result of our expedition is the picture of the summer aspect of the odonate fauna in these mostly primeval and remote boggy areas. In total, 34 odonate species were recorded, that is quite a few for an area of that size situated at such latitudes in Siberia and having a rather narrow spectrum of habitats predominated by large complexes of *Sphagnum* bogs and fens, and specific rivers bringing peaty waters. Our supposition that the boggy areas of the Vasyugan Plain in the West Siberian Lowland are a huge reservoir of *N. speciosa* was confirmed splendidly. It is worth noticing, however, that, although seemingly omnipresent in pools of *Sphagnum* bogs, it is not so abundant there. Possibly we visited this area near the end of the flight period of *N. speciosa* there, but nevertheless, the pattern of the species occurrence in the plain seems to be based on very numerous and dense but small local populations. Therefore, taking into account the total size of this giant boggy area, the population numbers in the Vasyugan Plain is certainly enormous. However, it is a rather recent picture, since the bogs are 5200 years old at most in some restricted areas, while the peatmoss prevailing stage of their development began just some 1500 years ago. Generally, the complex of peat-moss bog species is flourishing in the studied area. Along with *N. speciosa*, in all such habitats we recorded tyrphobiontic *Aeshna subarctica*, the records of which had hitherto

also been scarce in Siberia. The species is certainly very abundant in the Vasyugan Plain and is well separated spatially from two other co-occurring aeshnids in Sphagnum bogs – *A. juncea* and *A. crenata*. The picture we have drawn of the spatial, temporal and behavioural segregation between these aeshnids confirmed and developed earlier observations from Europe (Bernard 2002, unpublished data). One of the members of the mentioned complex of species, *C. johanssoni*, abundant in primary habitats – small bog water bodies – is completely missing in large oxbows and man-made large ponds. This absence seems to be related to higher nutrient levels and inappropriate or too poor vegetation. One mystery of peat-moss complexes remained undisclosed: this is the breeding places of the generally very abundant *S. arctica*. According to our observations the majority of so numerous individuals ceased their maturation period and disappeared, most probably to their breeding places. However, despite visiting various places in the peat-moss complexes, we failed to observe a single territorial male or ovipositing female. This resembles the situation described by Dijkstra & Koese (2001) from the Belarussian Polesse, where huge numbers of immature *arctica* were observed while at the same time there was no observation of true *arctica* reproduction or its original habitats. It seems that the original, stem habitats of this species may be situated in more central, largely flooded or more sinking parts of large Sphagnum complexes, may be also in large areas of mesotrophic fens overgrown with *Caricetum lasiocarpae*. The study area brought an interestingly high percentage of androchrome ♀♀ of *Calopteryx splendens* and dark-winged *Somatochlora* individuals, especially noteworthy in *S. flavomaculata*. Worth noticing was also the spatially separated occurrence of two subspecies (species?) of *Enallagma cyathigerum*: *cyathigerum* and *risi*. The records of *Gomphus vulgatissimus* and *Shaogomphus postocularis* extended the known range of these species 170–225 km and 185 km north, respectively. The former species, earlier known in Siberia from the only group of localities near Novosibirsk, turned out to be widely distributed and fairly abundant in the area of studies, and the latter was for the first time found west of the Ob'. From the zoogeographical point of view, records of *Leucorrhinia albifrons* and *L. pectoralis* were also very interesting, shifting their known northern range limits significantly to the north. As our studies showed, *Lestes virens*, *Coenagrion puella*, *C. pulchellum*, *Somatochlora flavomaculata* and *Sympetrum sanguineum* also reach or cross their hitherto known northern range limits in the studied area (cf. Belyshev 1973). To conclude, some absences should be stressed, both of the typical northern (boreal-alpine) species, such as *Aeshna caerulea* and *Somatochlora alpestris* (although theoretically they could be recorded, see Belyshev 1973) and some species which are common 200 km to the south, at Novosibirsk, such as *Aeshna mixta* or *Sympetrum pedemontanum* (Kosterin et al. 2001). We quite expected to meet *Aeshna serrata*, which is known even more northerly (Belyshev 1973), but there seemed to be no suitable habitats for it." (Authors)] Address: Bernard, R., Dept General Zool., Adam Mickiewicz Univ., Umultowska 89, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

7052. Bernard, R.; Ivinskis, P.; Daraz, B. (2008): *Lestes barbarus* (Fabricius), a forgotten species in the fauna of Lithuania (Zygoptera: Lestidae). *Notul. odonatol.* 7(1): 1-2. (in English). ["*L. barbarus* is added to the odonate

fauna of Lithuania based on a forgotten note and 3 new records. The Lithuanian localities are among the northernmost sites in the *L. barbarus* distribution. Their situation is considered in the context of the pulsating nature of the northern border of its range with relation to climatic changes and wandering tendencies of the species. The new localities are briefly described, special attention is given to the site of a breeding population." (Authors)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

7053. Buczyński, P. (2008): Extremely northern records of *Sympetrum depressiusculum* (Sel.) in Poland (Anisoptera: Libellulidae). *Notulae odonatologicae* 7(1): 11-12. (in English). [Records from three localities from northern Poland are given: (1) Nature reserve "Bielawa" ad Ostrowo (54°47'32,6"N, 18°14'17,1"E), 11-VIII-2006, (2) Grotowo (54°18'22,3"N, 20°19'13,9"E) 10-VIII-2007, (3) Chmielnik ad Kętrzyn (54°07'12,6"N, 2°12'13,2"E), 11-VIII-2007.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

7054. Bybee, S.M.; Ogden, T.H.; Branham, M.A.; Whiting, M.F. (2008): Molecules, morphology and fossils: a comprehensive approach to odonate phylogeny and the evolution of the odonate wing. *Cladistics* 24: online first. (in English). ["We undertook a comprehensive morphological and molecular phylogenetic analysis of dragonfly phylogeny, examining both extant and fossil lineages in simultaneous analyses. The legitimacy of higher-level family groups and the phylogenetic relationship between families were tested. Thirteen families were supported as monophyletic (Aeshnidae, Calopterygidae, Chlorocyphidae, Euphaeidae, Gomphidae, Isostictidae, Lestidae, Libellulidae, Petaluridae, Platystictidae, Polythoridae, Pseudostigmatidae and Synthemitidae) and eight as non-monophyletic (Amphipterygidae, Coenagrionidae, Corduliidae, Megapodagrionidae, Protoneuridae and Synlestidae), although Perilestidae and Platycnemididae were recovered as monophyletic under Bayesian analyses. Nine families were represented by one species, thus monophyly was not tested (Epiophlebiidae, Austropetaliidae, Chlorogomphidae, Cordulegastriidae, Macromiidae, Chorismagrionidae, Diphlebiidae, Lestoideidae and Pseudolestidae). Epiprocta and Zygoptera were recovered as monophyletic. *Ditaxinera* is supported as the sister lineage to Odonata, Epiophlebiidae and the lestid-like damselflies are sister to the Epiprocta and Zygoptera, respectively. Austropetaliidae + Aeshnidae is the sister lineage to the remaining Anisoptera. *Tarsophlebia*'s placement as sister to Epiprocta or as sister to Epiprocta + Zygoptera was not resolved. Refinements are made to the current classification. Fossil taxa did not seem to provide signals crucial to recovering a robust phylogeny, but were critical to understanding the evolution of key morphological features associated with flight. Characters associated with wing structure were optimized revealing two wing character complexes: the pterostigma–nodal brace complex and the costal wing base & costal–ScP junction complex. In turn, these two complexes appear to be associated; the pterostigma–nodal brace complex allowing for further modification of the wing characters comprised within the costal wing base & costal–ScP junction complex leading the modern odonate wing." (Authors)] Address: Bybee, S., Graduate Research Assistant: Branham Labor-

atory, Dept Entomology & Nematology, Univ. of Florida. Natural Area Drive, P.O.Box 110620, Gainesville, FL 32611-0620, USA. E-mail: seth.bybee@gmail.com

7055. Bybee, S.M. (2008): Description of the female and nymph of *Philogenia mangosisa* from southern Ecuador (Odonata: Megapodagrionidae). *Zootaxa* 1787: 63-68. (in English). ["The previously unknown ♀ and nymph of *Philogenia mangosisa* are described, illustrated, and compared with similar species." (Authors)] Address: Bybee, S., Branham Lab., Univ. Florida, Dept of Entomology & Nematology, Natural Area Drive, PO Box 110620, Gainesville, Florida 32611- 0620, USA. E-mail: seth.bybee@gmail.com

7056. Carle, F.L.; Kjer, K.M.; May, M.L. (2008): Evolution of Odonata, with special reference to Coenagrionoidea (Zygoptera). *Arthropod Systematics & Phylogeny* 66(1): 37-44. (in English). ["A phylogeny including 26 families of Odonata is presented based on data from large and small subunit nuclear and mitochondrial ribosomal RNAs and part of the nuclear EF-1a. Data were analyzed using Bayesian methods. Extant Zygoptera and Anisoptera are monophyletic. The topology of Anisoptera is ((Austropetalidae, Aeshnidae) (Gomphidae (Petaluridae ((Cordulegastridae (Neopetalidae, Chlorogomphidae)) ((Synthemistidae, Gomphomacromiidae) (Macromiidae (Cordulidae s.s., Libellulidae)))))). Each of the major groups among anisopterans is well supported except the grouping of Neopetalia with Chloropetalia. Lestidae and Synlestidae form a group sister to other Zygoptera, and Coenagrionoidea are also monophyletic, with the caveat that Isostictidae, although well supported as a family, was unstable but not placed among other coenagrionoids. Calopterygoidea are paraphyletic and partly polytomous, except for the recovery of (Calopterygidae, Hetaeriniidae) and also (Chlorocyphidae (Epallagidae (Diphlebiinae, Lestoidinae))). Support for Epallagidae as the sister group of a clade (Diphlebiinae, Lestoideinae) is strong. Within Coenagrionoidea, several novel relationships appear to be well supported. First, the Old World disparoneurine protoneurids are nested within Platycnemididae and well separated from the protoneurine, *Neoneura*. The remaining coenagrionids are divided into two well-supported subdivisions. The first includes Pseudostigmatinae, stat. nov., Protoneurinae, a group of coenagrionids mostly characterized by having an angulate frons, and Argiinae (Argia). The second division includes typical Coenagrionidae." (Authors) Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

7057. Catling, P.M.; Kostiuk, B. (2008): Post conference field trip - Annual Meeting of the Dragonfly Society of the Americas, 2005. *Ontario Odonata* 7: 28-32. (in English). [On 12 July 2005 about 20 people started to 11 localities in the counties Nipissing, Timiskaming, and Cochrane. Result of the trip are 58 odonate species, which are listed in a table.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7058. Catling, P.M. (2008): Why are dragonflies important? *Ontario Odonata* 7: 49-50. (in English). [The note focuses on the ecosystem function of Odonata, their role as bioindicators, their contribution to pest control, and their importance for research.] Address: Catling,

P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7059. Catling, P.M.; Jones, C.D.; Pratt, P. (2008): Introduction to the year 2005 Ontario Odonata Summary Records. *Ontario Odonata* 7: 51-208. (in English). ["The 2005 summary of Ontario Odonata includes 8556 records. The database, which contains more information and fields than the appendix table, will be stored at the Natural Heritage Information Centre (NHIC) and will be available to cooperators from the NHIC, (NHIC, Ontario Ministry of Natural Resources, Box 7000, 300 Water Street, Peterborough, Ontario K9L 1C8, email: colin.jones@dmnr.gov.on.ca) and the TEA (www.ontarioinsects.org/)." (Authors)] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7060. Catling, P.M.; Hughes, M. (2008): Variation in Canadian *Gomphus fraternus* (Odonata: Gomphidae) in relation to the recognition of subspecies *manitobanus*. *Canadian Entomologist* 140: 327-337. (in English, with French summary). ["Seven characters were evaluated in 146 specimens of *G. fraternus*, including both subspecies, *G. f. fraternus* (Say) and *G. f. manitobanus* Walker, to clarify their circumscription and geographic occurrence in Canada. Specimens corresponding to subspecies *manitobanus* were all from the Assiniboine and Red rivers and formed a discrete group in a principal components analysis, supporting their taxonomic recognition. Their distribution in Canada suggests a separation of subspecies near the boundary of the prairie ecozone in central southern Manitoba. In subspecies *fraternus* the extensor surfaces of the tibiae are largely black, with pale areas often lacking and rarely up to 50% of the segment length. Similarly the dorsal surface of abdominal segment 9 is largely black. If there is a pale area, it is <1 mm long. In subspecies *manitobanus* the extensor surfaces of the tibiae have pale markings on =50% of their lengths and the dorsal surface of abdominal segment 9 has a dorsal yellow spot =1.4 mm long. Widespread dragonflies in western North America are paler in drier climates and the increased pale colouration in the western subspecies *manitobanus* corresponds to this trend. Currently known only from Manitoba, subspecies *manitobanus* may occur in prairie habitats of the Midwestern United States, based on reports of pale individuals in that region." (Authors)] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7061. Chakona, A.; Phiri, C.; Magadza, C.H.D.; Brendonck, L. (2008): The influence of habitat structure and flow permanence on macroinvertebrate assemblages in temporary rivers in northwestern Zimbabwe. *Hydrobiologia* 607(1): 199-209. (in English). ["Temporary rivers within the Nyaodza-Gachegache subcatchment in northwestern Zimbabwe were investigated to examine the role of flow permanence and habitat structure on macroinvertebrate community composition. Macroinvertebrate communities of intermittent and ephemeral rivers displayed significant differences in the number of taxa, macroinvertebrate abundance, Shannon & Simpson diversity indices and in size class structure. Intermittent sites were characterised by higher numbers of taxa, diversity and Ephemeroptera and Trichoptera richness compared to ephemeral sites. The fauna of ephemeral sites was dominated by a single taxon (Afrobaetodes) (Eph., Baetidae) whilst larger sized taxa (e.g.

Elassoneuria (Eph., Oligoneuriidae), Dicroptilum (Eph., Baetidae), Aethaloptera (Trichoptera, Hydropsychidae), Pseudagrion (Odonata, Coenagrionidae) and Tholymis (Od., Libellulidae) were exclusively restricted to intermittent sites. Clear differences were observed between sand, gravel, cobble and vegetation habitats. Vegetation and cobbles supported distinct communities, with some taxa exclusively restricted either to vegetation (e.g. Pseudagrion, Leptocerina (Trich., Leptoceridae), Cloeon (Eph., Baetidae), Afronurus (Eph., Heptageniidae) and Povilla (Eph., Polymitarcidae) or cobble (e.g. Aethaloptera & Dicroptilum) habitats. In terms of ensuring optimum diversity within the subcatchment, we consider conservation of critical habitats (cobbles and vegetation) and maintenance of natural flows as the appropriate management actions." Address: Chakona, A., Univ. Lake Kariba Research Station, PO Box 48, Kariba, Zimbabwe. E-mail: achakona@yahoo.com

7062. Chelmick, D.C.; Pickess, B.P. (2008): Trithemis kirbyi Selys in southern Spain (Anisoptera: Libellulidae). Notulae odonologicae 7(1): 4-5. (in English). [The common African dragonfly, T. kirbyi, is recorded from southern Spain on 29 May 2007 near Manilva. As far as the authors can ascertain this is the first time this species has been observed in mainland Europe.] Address: Chelmick, D.C., High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@davidchelmick.com

7063. Collier, K.J.; Lill, A. (2008): Spatial patterns in the composition of shallow-water macroinvertebrate communities of a large New Zealand river. New Zealand Journal of Marine and Freshwater Research 42: 129-141. (in English). ["Identifying the environmental factors influencing biotic patterns in large rivers will assist with extrapolating biological monitoring results to broader scale conclusions about river condition. In the present study, we collected macroinvertebrates and physico-chemical data at 47 shallow-water (<1-m deep) sites, including nine sites at major tributary junctions, during summer along the lower Waikato River, North Island, New Zealand. Macroinvertebrate communities were dominated by a few relatively abundant and widespread taxa. Upper site samples were characterised by high relative abundances of Diptera, but the significance of this group declined further downstream where Crustacea became more dominant. Overall, more taxa (36) were found at tributary junctions than at mainstem sites within four hydrogeomorphic zones (22-31 taxa per zone). Significant differences among faunal groups identified in a cluster analysis on relative abundance data were detected for the percentage of wood sampled, and for water conductivity which increased downstream at mainstem sites and was high at some junction sites. Non-metric multidimensional scaling of percentage abundance data revealed differences in community composition among zones, and among some mainstem and tributary junction sites. Geographic position (eastings and northings) was significantly correlated with taxa richness and community evenness (Pielou) at mainstem sites (excluding tributary junctions), reflecting an increase in sample diversity and less equitable taxonomic dominance with distance down river. Overall, these results point to an interplay between habitat patchiness and successional and hydrogeomorphic processes influencing macroinvertebrate community composition in the lower Waikato River. Such multiscale variations need to be accounted for in the design of invertebrate biomoni-

oring programmes if they are to represent the ecological condition of large river environments." (Authors) The list of taxa includes Austrolestes colenonensis, Xanthocnemis zealandica, and Anisoptera sp.. X. zealandica builds comparable high abundances in most of the sample localities especially the upper reaches of the river.] Address: Collier, K.J., Environment Waikato, P. O. Box 4010, Hamilton, New Zealand. E-mail: kevin.collier@ew.govt.nz

7064. Contreras-Garduno, J.; Cordoba-Aguilar, A.; Peralta-Vazquez, H.; Jimenez-Cortes, J.G.; Luna (2008): Differences in immune ability do not correlate with parasitic burden in two Zygoptera species (Calopterygidae, Coenagrionidae). Odonatologica 37(2): 111-118. (in English). ["Differences in phenoloxidase (PO) and hydrolytic enzymes (HE) activity, two key components in insect immune ability, were investigated in Hetaerina americana and Argia tezpi, to see if they are correlated with patterns of gregarine and mite infection. The prediction was that the species with the more robust immune responses would show a less intense parasitic burden. Fully mature adults of both sexes were used. No clear pattern was found: H. americana had higher PO activity while A. tezpi had higher HE activity but the latter species had a higher parasitic load for both parasites. Several possible explanations are discussed. However, it seems most likely that either the immune responses measured may be traded-off with other non-immune functions in which both species differ in investment or that both immune components may be traded-off with each other." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

7065. Cook, J. (2008): Williamsonia fletcheri - new to Grenville. Ontario Odonata 7: 50. (in English). [Ontoria, Canada. Verbatim: On 21-VI-2004 a specimen of W. fletcheri was collected beside Kemptville Creek at 44.8608°N, -75.7223°W, in Wolford Tp. The specimen is in my personal collection and was not reported in the 2004 summary.] Address: not stated

7066. Costa, J.M.; Ravanello, C.T.; Souza-Franco, G. M. (2008): Description of a new species of Neocordulia Selys, 1882 (Odonata: Libellulidae, Corduliinae) from southern Brazil. Zootaxa 1704: 64-68. (in English). ["Neocordulia santacatarinensis sp. n. is described and illustrated based on a reared ♂ and its exuviae collected at Irani river, Ponte Serrada, Santa Catarina State, Brazil. Holotype is deposited in the Museu Nacional, Rio de Janeiro, Brazil." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

7067. De Block, M.; Slos, S.; Johansson, F.; Stoks, R. (2008): Integrating life history and physiology to understand latitudinal size variation in a damselfly. Ecography 31(1): 115-123. (in English). ["Our understanding of latitudinal life history patterns may benefit by jointly considering age and mass at maturity and growth rate. Additional insight may be gained by exploring potential constraints through pushing growth rates to their maximum and scoring physiological cost-related variables. Therefore, we reared animals of a univoltine Spanish

and Belgian population and of a semivoltine Swedish population of the damselfly *Enallagma cyathigerum* (spanning a latitude gradient of ca 2350 km) in a common environment from the eggs until adult emergence and exposed them to a transient starvation period to induce compensatory growth. Besides age and mass at maturity and growth rate we also scored investment in energy storage (i.e. triglycerides) and immune function (i.e. total activity of phenoloxidase). At emergence, body mass was greater in Spain and Sweden and lower in Belgium, suggesting a genetic component for the U-shaped latitudinal pattern that was found also in a previous study based on field-collected adults. The mass difference between univoltine populations can be explained by the shorter development time in the Belgian population, and this despite a higher growth rate, a pattern consistent with undercompensating countergradient variation. In line with the assumed shorter growth seasons, Belgian and Swedish animals showed higher routine growth rates and compensatory growth after transient starvation. Despite a strong link with metabolic rates (as measured by oxygen consumption) populations with higher routine growth rates had no lower fat content and had higher immune function (i.e. immune function decreased from Sweden to Spain), which was unexpected. Rapid compensatory growth did, however, result in a lowered immune function. This may contribute to the absence of perfect compensating countergradient variation in the Belgian population and the lowest routine growth rates in the Spanish population. Our results underscore the importance of integrating key life historical with physiological traits for understanding latitudinal population differentiation." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U. Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

7068. De Block, M.; Campero, M.; Stoks, R. (2008): Developmental costs of rapid growth in a damselfly. *Ecological Entomology* 33(2): 313-318. (in English). ["1. Developmental costs of rapid growth in terms of increased fluctuating asymmetry are expected to contribute to the widespread occurrence of growth rates below the physiological maximum, but have rarely been demonstrated. Here, these costs are studied for the first time in an invertebrate, *Lestes viridis*, using a rearing experiment where early- and late-hatched larvae of both sexes were reared at decreasing or permanent water levels. 2. Late-hatched animals were more asymmetrical than early-hatched animals except for ♂♂ in the drying treatment. Also, ♀♀ were more asymmetrical than ♂♂ except in early-hatched animals in the drying treatment. 3. The data presented suggest that in ♀♀ but not in ♂♂ treatment groups with higher growth rates have more asymmetrical wings. However, at the individual level no relationship between growth rate and asymmetry was present. 4. Possible reasons why the suggested trade-off between growth and developmental instability was not present at the individual level, and at the group level only in ♀♀, are discussed." (Authors)] Address: De Block, M., Laboratory of Aquatic Ecology, University of Leuven, Ch. Debériotstraat 32, B-3000 Leuven, Belgium. E-mail: marjan.deblock@bio.kuleuven.be

7069. De Block, M.; McPeck, M.; Stoks, R. (2008): Stronger compensatory growth in a permanent-pond *Lestes* damselfly relative to temporary-pond *Lestes*. *Oikos* 117(2): 245-254. (in English). ["Compensatory growth where animals compensate for time stress or

transient nutritional or thermal stress by accelerating their growth rate is widespread. We know, however, relatively little about the evolution and ecological correlates of compensatory growth. For this we need studies on congeneric species with known phylogenetic relationships that also focus on the associated largely understudied costs. Here we tested for compensatory growth and associated costs in response to time stress (manipulated by photoperiod) and a transient period of starvation or cooling in larvae of the permanent-pond damselfly *Lestes eurinus*, and compare the results with former studies on temporary-pond *Lestes*. Larvae showed full compensation in body mass at emergence for all combinations of time stress and starvation or cooling. Unexpectedly, compensatory growth to starvation or cooling was not stronger under time stress. Instead, ♂♂ under time stress delayed emergence after these transient stressors. In line with a stronger compensatory growth response to time stress than to the other stressors, physiological costs in terms of a reduced investment in immune response (measured as phenoloxidase activity) and energy storage (measured as fat content) were detected only under time stress. Compared to temporary-pond *Lestes*, *L. eurinus* showed stronger compensatory growth to time stress. We hypothesize that the stronger compensatory (growth) response in permanent-pond *Lestes* co-evolved with their derived slower lifestyle when they invaded permanent ponds." (Authors)] Address: Stoks, R., Lab. Aquat. Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.ku.leuven.ac.be

7070. De Marco, P.; Vital, M.V. (2008): Ecology of *Tigriagrion aurantinigrum* Calvert in response to variations in environmental conditions (Zygoptera: Coenagrionidae). *Odonatologica* 37(1): 1-11. (in English). ["The daily activity patterns, behaviour and population dynamics in Zygoptera are thought to be affected by the physical conditions of the environment. How and why the species reacts to those conditions is determined mainly by its bionomic characteristics. Here, an auto-ecological study is performed of *T. aurantinigrum*, in an attempt to clarify its responses to physical conditions. It is suggested that *T. aurantinigrum* could fit, with a few assumptions, in the "female-control" classification of odonate mating system. Some interactions were observed between individuals, but it is assumed that these play a role in sex recognition, rather than in territorial contests. The results indicate that this species is affected by the following physical conditions: the monthly rain fall, which has a positive effect on the abundance (with the possible exception of the heavy rain months); the water flow velocity, which seems to define a limit of its occurrence; and the daily variation in temperature, which seems to induce the species to restrict its activity to the hottest period of the day, as expected from a "thermal conformer". *T. aurantinigrum* appears to be affected by small scale variations of environmental variables, as observed by the differences of its abundance at the 3 different sites of this study. Under conditions of the current "forest-to-pasture" conversion that is common in the Brazilian Atlantic Forest region, the species is expected to increase its abundance and to broaden its geographical range, although water body alterations could limit this process." (Authors)] Address: De Marco, P., Laboratorio Ecologia Teorica e Sintese, Depto de Biologia Geral, Universidade Federal de Goias, BR-74001-970, Goiania, GO, Brazil. E-mail: pdemarco@icb.ufg.br

7071. De Marmels, J. (2008): The larva of *Progomphus dorsopallidus* Byers, 1934, (Odonata: Gomphidae), with a key to larvae of other species of the genus found north of the Orinoco River, Venezuela. *Entomotropica* 20(3) (2005): 235-238. (in Spanish, with English summary). ["The last instar larva of *P. dorsopallidus* is described and illustrated based on six exuviae obtained from reared specimens. A key to the larvae of six of the eight species of the genus recorded so far from north of the Orinoco River is given." (Author) The paper was issued in Jan. 2008 according authors information to the editors of OAS.] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

7072. De Marmels, J. (2008): *Neocordulia caudacuta* sp. nov. from the Coastal Cordillera, Venezuela (Odonata: Corduliidae). *International Journal of Odonatology* 11(1): 15-20. (in English). ["♂, ♀ and larva of *Neocordulia caudacuta* sp. nov. (holotype: Río Castaño, Aragua State, Venezuela; 21 VI 2007; deposited in MIZA) are described and illustrated. The new species belongs in the subgenus *Mesocordulia*. Male *N. caudacuta* differs from *N. batesi* in details of hamule and penis, and in possessing a sharp, erect dorsomedian spine on abdominal segment 10. Female *N. caudacuta* has strongly outcurved cerci and is comparatively larger than its congeners. The larva of *N. caudacuta* differs from that of *N. batesi* longipollex in having larger occipital tubercles, higher number of premental and palpal setae, and in the presence of lateral spines on abdominal segment 9." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

7073. De Marmels, J. (2008): *Heteragrion archon* spec. nov. from the coastal Cordillera of Venezuela (Zygoptera: Megapodagrionidae). *Odonatologica* 37(2): 151-155. (in English). ["The new species is described and illustrated from a single ♂, which is compared with the holotype male of *H. palmichale* Hartung. The two differ in colour pattern of head and shape of cerci. A map showing distribution of all four species of *Heteragrion* Sel. occurring north of the Orinoco River is provided." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

7074. De Marmels, J. (2008): Three new libelluline dragonflies from southern Venezuela, with new records of other species (Odonata: Libellulidae). *Int. Jour. Odonatology* 11(1): 1-13. (in English). ["*Elasmothemis rufa* sp. nov. (holotype: Venezuela, Amazonas, Río Cataniapo), *Macrothemis taurepan* sp. nov. (holotype: Venezuela, Bolívar, El Pauji), and *Oligoclada garrisoni* sp. nov. (holotype: Venezuela: Amazonas, San Fernando de Atabapo) are described and illustrated. All holotypes are deposited at MIZA. *Macrothemis heteronycha* and *Micrathyria paruensis* are recorded from Venezuela for the first time, and *Micrathyria dunklei* for the second. Some of their features are illustrated. Distribution maps of all these species are also presented." (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

7075. Dingemanse, N.J.; Kalkman, V.J. (2008): Changing temperature regimes have advanced the phenology of Odonata in the Netherlands. *Ecological Entomology* 33(3): 394-402. (in English). ["1. Responses of biota to climate change have been well documented for a restricted number of taxa. This study examined shifts in phenology of 37 species of the aquatic insect order Odonata in the Netherlands over the last decade. 2. The present study shows that adults of the Dutch dragonflies and damselflies have advanced their flight dates over recent years due to complex effects of changing temperature regimes on the timing of adult flight dates. 3. Flight dates did not respond to changes in autumn/winter temperatures, advanced with increases in spring temperatures of the focal and previous year, and delayed with increases in summer temperatures of the previous year. Climate change consequently advanced the flight dates of the Odonata because only spring temperatures have increased during the study period. 4. The findings imply that climate change can evoke strong phenological responses in aquatic insects. Moreover, shifts in phenology due to climate change are likely to vary both spatially or temporally, depending on the exact nature of climate change." (Authors)] Address: Dingemanse, N.J., Animal Ecology Group, Centre for Ecological and Evolutionary Studies, University of Groningen, PO Box 14, 9750 AA Haren, The Netherlands. E-mail: n.j.dingemanse@rug.nl

7076. Djikanovic, V.; Jakakovcv-Todorovic, D.; Nikolic, V.; Paunovic, M.; Cacic, P. (2008): Quantitative composition of communities of aquatic macroinvertebrates along the course of the Golijska Moravica river (west-central Serbia). *Arch. Biol. Sci., Belgrade* 60(1): 133-144. (in English). ["As the largest and most significant river of the Moravica region, the Golijska Moravica River arises below the highest peaks of the Golija Mountains. Faunistic-ecological research on aquatic macroinvertebrates was carried out during 2003 and 2004. Macrozoobenthos communities of the Golijska Moravica had not previously been the subject of any hydrobiological studies, and this was the main reason why we conducted their systematic and complex investigation. A list of taxa of aquatic macroinvertebrates is presented and their qualitative composition analyzed. During the period of investigation, a total of 13 groups and 147 taxa were found." (Authors) The list of taxa includes *Gomphus vulgatissimus*.] Address: Djikanovic, V., Siniša Stankovića Institute for Biological Research, 11060 Belgrade, Serbia

7077. Do Manh, C. (2008): *Noguchiphaea mattii* sp. nov. from southern Vietnam (Odonata: Calopterygidae). *International Journal of Odonatology* 11(1): 21-26. (in English). ["*Noguchiphaea mattii* sp. nov. (Hon Ba Nature Reserve, 12°23'N, 109°08'E, Khanh Hoa Province, southern Vietnam, leg. 29 IV 2006, to be deposited in Zoology Collection, Hanoi University of Science) is described from the ♂ sex and compared with *N. yoshikoeae*, a species collected for the first time in Vietnam in Tam Dao, Vinh Phuc Province. Photos of male and female specimens of *N. yoshikoeae* taken in nature are provided." (Author)] Address: Do Manh, C., Hom thu so 16, Buu Dien 10210, 35 Thai Thinh, Hanoi, Vietnam. E-mail: docuong@gmail.com

7078. Doi, H. (2008): Delayed phenological timing of dragonfly emergence in Japan over five decades. *Bio-logical letters* 4(4): 388-391. (in English). ["Recent increa-

ses in air temperature have affected species phenology, resulting in the earlier onset of spring life-cycle events. Trends in the first appearance of adult dragonflies across Japan were analysed using a dataset consisting of observations from 1953 to 2005. Dynamic factor analysis was used to evaluate underlying common trends in a set of 48 time series. The appearance of the first adult dragonfly has significantly shifted to later in the spring in the past five decades. Generalized linear mixing models suggested that this is probably the result of increased air temperatures. Increased summer and autumn temperatures may provide longer bivoltine periods and a faster growth rate; thus, the second generation, which previously hatched in summer, can emerge in the autumn causing the size of the population of dragonflies that emerge in spring to decrease. It is also possible that reduced dragonfly populations along with human development are responsible for a delay in the first observed dragonflies in the spring. However, human population density did not appear to strongly affect the appearance date. This study provides the first evidence of a delay in insect phenological events over recent decades." (Author)] Address: Doi, H., LAFWEDY, Faculty of Agriculture, Ehime University, 3-5-7, Tarumi, Matsuyama, 790-8566 Ehime, Japan

7079. Dow, R.A.; Hämäläinen, M. (2008): *Libellago orri* sp. nov. from northern Borneo (Odonata: Chlorocyphidae). *International Journal of Odonatology* 11(1): 27-34. (in English). ["*L. orri* sp. nov. (holotype ♂: Borneo, Sarawak, Bahagian Bintulu, Samarakan, Sg. Gagak, 06 iii 2006, to be deposited in BMNH) from Malaysian Borneo is described from the ♂ sex and compared with *L. hyalina*, which co-occurs at the same sites. ♀♀ of the two species can not be reliably separated at present." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

7080. Ellenrieder, N. von (2008): Revalidation of *Argentagrion* and redefinition of *Homeoura*, with the description of *H. obrieni* n. sp. (Odonata: Coenagrionidae). *Rev. Soc. Entomol. Argent.* 67(1-2): 81-106. (in English, with Spanish summary). ["*Argentagrion* Fraser, currently considered a synonym of *Homeoura* Kennedy, is revalidated; both genera are rediagnosed and their species illustrated, keyed and mapped. *Ischnura sobrina* Schmidt is transferred to *Homeoura*, and a new species, *H. obrieni* is described, resulting in 5 species being included in *Homeoura* (*H. chelifera*), *H. lindneri*, *H. nepos*, *H. obrieni* sp. n. and *H. sobrina* comb. nov.) and two in *Argentagrion* (*A. ambiguum* and *A. silviae*.)] Address: Ellenrieder, N. von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7081. Ellenrieder, N. von; Muzon, J. (2008): An updated checklist of the Odonata from Argentina. *Odonatologica* 37(1): 55-68. (in English). ["An updated checklist of the Odonata species known to occur in Argentina is presented along with distributional information by province. 27 species are removed from previous listings, and 32 new records are added, bringing the total number of species to 271. Of the new records, 14 correspond to new species currently under description. The distribution of the 17 species presently known to be endemic to Argentina is mapped." (Authors)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7082. Fagundes, C.K.; Behr, E.R.; Kotzian, C.B. (2008): Diet of *Iheringichthys labrosus* (Siluriformes, Pimelodidae) in the Ibicuí River, Southern Brazil. *Iheringia, Sér. Zool., Porto Alegre*, 98(1): 60-65. (in English, with Portuguese summary). ["The diet of the benthic-feeding fish *Iheringichthys labrosus* (Lütken, 1874) was analyzed. Samples were taken bimonthly from December 1999 to January 2002, in three sites of the Ibicuí River, a tributary of Uruguay River basin (Rio Grande do Sul, Brazil). In each sampling point the specimens were collected in lentic and lotic environments. Gillnets and trammel nets were examined every 6 hours (6h, 12h, 18h and 24h). Diet description was based on the frequency of occurrence and the volume of each food item to obtain the Alimentary Index (IAi). The average stomach fullness was adopted to detect variations in the feeding activity according to the season, the circadian rhythm and the environment. Chironomids were the most important food item, followed by molluscs, and feeding activity was highest in summer, during daylight (6h and 12h), and in the lotic environment of the second sampling point." (Authors)] Address: Fagundes, Camila, Programa de Pós-Graduação em Biodiversidade Animal, Universidade Federal de Santa Maria, Campus Universitário, Faixa de Camobi, km 9, 97105-900 Santa Maria, RS, Brazil. E-mail: milakurzmann@yahoo.com.br

7083. Fenoglio, S.; Bo, T.; Czekaj, A.; Roeciszewska, E. (2008): Feeding habits, fine structure and microhabitat preference of *Euthyplocia hecuba* (Hagen, 1861) (Ephemeroptera: Euthyplociidae) nymphs from Honduras. *Folia biol. (Kraków)* 56: 43-49. (in English). [Benthic invertebrates found in the stream stretch inhabited by *E. hecuba* nymphs are *Macrothemis* sp., *Miathyria* sp., *Argia* sp., *Palaemnema* sp., and *Haeterina* sp.] Address: Fenoglio, S., Tiziano BO, Univ. of Piemonte Orientale, Dept of Life & Environment Science, Via Bellini 25, 15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

7084. Fincke, O.M.; Hedström, I. (2008): Differences in forest use and colonization by Neotropical tree-hole damselflies (Odonata: Pseudostigmatidae): Implications for forest conversion. *Studies on Neotropical Fauna and Environment* 43(1): 35-45. (in English). ["Differential habitat use in primary and secondary forests was documented for two genera of giant damselflies (Pseudostigmatidae), important predators of tree-hole breeding mosquitoes in tropical forests. In a lowland moist forest of Panama, adults moved between old primary (>400 years old) and contiguous secondary forest (>60 years old) and reproduced seasonally in both types. However, the two *Mecistogaster* species were more common in secondary forest, whereas *Megaloprepus caerulatus* was most common in primary forest. These differences in landscape use were reflected in differential colonization of tree-hole analogs (plastic pots) in primary forest and highly altered secondary growth (<20 years old) in a lowland wet forest in Costa Rica where reproduction of both species was aseasonal. Larvae of *Mecistogaster linearis* were commonly found in pots at both habitat types, whereas *Megaloprepus*, the majority species, rarely colonized pots in altered sites. Our results suggest that *Megaloprepus* is particularly susceptible to forest conversion, and call for increased focus on the dispersal ability of all pseudostigmatids. In tropical moist and wet forests that harbour water-filled tree holes, the presence of the conspicuous *Megaloprepus* and similar species may serve as bio-indicators of a healthy predator guild, the loss of which may adversely

impact human health." (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

7085. Fomekong, A.; Messi, J.; Kekeunou, S.; Tchuen-guem-Fohouo, F.-N.; Tamesse, J.L. (2008): Entomofauna of *Cucumeropsis mannii* Naudin, its impact on plant yield and some aspects of the biology of *Dacus bivittatus* (Diptera: Tephritidae). *African Journal of Agricultural Research* 3(5): 363-370. (in English). [*C. mannii* (Cucurbitaceae) is cultivated in Africa for its important seeds used as food and in the traditional medicine. This work carried out in Yaoundé (Cameroon) focuses on the study of the entomofauna of *C. mannii*, on the impact of insects on plant yield; we studied also some aspects of the biology of *Dacus bivittatus*, main pest of this plant. Insect captured, breeding and identification were conducted from March to August 2001. The results permitted us to note that on *C. mannii* the entomofauna included 36 families. Within this fauna, there were various pests, predators, pollinators and nectarivorous. Among the 36 families recorded, 30 were collected on the leaves, 6 on the stems, 6 on the flowers and 2 on the fruits. [...] (Authors) The taxa list includes Odonata on the family level.] Address: Fomekong, A., Dept of Animal Biology and Physiology, Faculty of Science, University of Yaounde Cameroon

7086. Gassmann, D.; Hämäläinen, M. (2008): *Asthenocnemis linnaei*, a new damselfly species from Dumaran island, Philippines (Odonata, Platycnemididae). *Zoologische Mededelingen* 82(5): 35-41. (in English). [*Asthenocnemis linnaei* spec. nov. is described from the Philippine island of Dumaran in the northeastern Palawan subregion. Notes on the taxonomic history of the genus *Asthenocnemis* are provided.] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

7087. Günther, A. (2008): Vergleichende Untersuchungen zum Reproduktionsverhalten südostasiatischer Chlorocyphidae und Calopterygidae (Odonata: Zygoptera). Dissertation an der TU Bergakademie Freiberg, Institut für Biowissenschaften: 228 pp. (in German, with English summary). [*Comparative study of the reproductive behaviour of Southeast-Asian Chlorocyphidae and Calopterygidae* (Odonata: Zygoptera): Many species of Jewels (Chlorocyphidae) and Demoiselles (Calopterygidae) exhibit highly complex and specialized reproductive behaviour, involving territoriality based on limitation of resources. ♂♂ display specialized, species-specific agonistic behaviour, and in most species mating is preceded by ritualized courtship of ♀♀ by ♂♂. In both cases visual communication involving ritualised display of ornamentation is of great importance. Inter- and intra-sexual signals are potentially part of mate recognition systems, which have evolved within communities of syntopic species. This thesis examines the possibilities of using knowledge of reproductive behaviour to differentiate taxa and to help reconstruct their phylogenetic relationships. The study was based on the analysis of behaviour in different parts of Southeast Asia and New Guinea, involving direct observation, partially supported by video footage. Sufficiently replicated and representative behavioural data for quantitative analysis was available for a total of 17 taxa of Jewels of the genera *Aristocypha*, *Disparocypha*, *Heliocypha*, *Libellago*

and *Rhinocypha* and for *Neurobasis kaupi*. For 14 of the 18 taxa no behavioural data had been hitherto published except by the present author. For a further 13 chlorocyphids and 4 *Neurobasis* species supplementary data was available. This account provides information on courtship behaviour and on territorial and oviposition behaviour, circadian activity and habitat requirements. Chlorocyphidae: All taxa studied showed a strong preference for lotic habitats. No reproduction in lakes and ponds or in tidal influenced streams was observed. A conspicuous feature of their habitat preference was the close association with forests, at least gallery forests fringing the streams. Most observations were from streams and rivers in closed forest habitats. The most common oviposition sites contained a wide range of plant substrates such as dead, rotting logs, small pieces of driftwood or petioles of fallen large leaves lying in the water. Mostly oviposition took place at the level of the water surface. An exception was exhibited by the three taxa of the *Libellago rufescens* complex. In these, eggs were laid in logs and robust pieces of driftwood with the female totally submerged. The ♀♀ of *Disparocypha biedermani* differed from all other Jewels by ovipositing in steep river banks, large logs lying over a stream well above the water and in the mossy bark of trees, some distance from the stream bed. *Heliocypha perforata limbata* and *Libellago semiopaca* provided examples of ♀♀ being able to assess an oviposition site based on the intensity of disturbance experienced during preceding days, with less disturbed sites preferred. ♂♂ of all species tried to defend small territories around oviposition sites and to monopolize this resource. Against rivals, a species-specific, ritualised threat behaviour could be observed. Agonistic behaviour was sometimes found to occupy most of the daily activity schedule. Physical contact was avoided strictly during aggressive interactions. Escalated displays included several ritualised flight patterns, including the motionless presentation of the terminally pigmented forewings (*Libellago*), a frontal presentation of the entire, largely iridescent wing surface by turning forward all wings simultaneously (*Aristocypha*, *Heliocypha*, *Rhinocypha*), the motionless presentation of the hindwings (*Aristocypha*, *Heliocypha*) and an alternating wing beat with intensified frequency (*Aristocypha*, *Disparocypha*, *Heliocypha*). In many cases, such as *Heliocypha perforata limbata*, the threat display obviously served to defend resources, and successful ♂♂ gained more mates. However this simple and obvious explanation, that the threat display of the male serves just to defend resources, was not sufficient to explain the results for three well-studied Sulawesi species of the *Rhinocypha tinctoria*-complex. In contrast to ♂♂ of *Heliocypha perforata limbata* the *Rhinocypha* ♂♂ did not increase their mating success by obtaining and defending a distinct territory. There was at least for two of the three species a negative correlation between the duration of threatening flights on a particular day and the numbers of successful matings for this day. The results support the hypothesis that threatening flights in long-time territorial species serve not only for the territory defence but rather to signal the presence of ♂♂ to arriving ♀♀. In most of the species mating behaviour was characterised by a preliminary courtship display by the male. A significant feature was the display of the legs in a species-specific way. In *Libellago stigmatizans* and *L. semiopaca* all 6 legs were included in the display, and were thrust forward exposing the white-pruinose inner faces of the tibiae. *L. semiopaca* displayed the morphologically unspecialized legs in a unique see-

mingly limp hanging posture. *Aristocypha fenestrata*, *Heliocypha biforata*, *H. fenestrata cornelii*, *H. perforata limbata* and the taxa of the *Rhinocypha tinctoria*-complex presented only the pruinosed middle and posterior legs in the courtship display. In all taxa the ♀♀ were encouraged to oviposit within ♂♂ territory by a postmating courtship display, and the female was, for a time, guarded. Remarkably, no alternative mating tactics without courtship were ever observed in any case in any of these species. The members of the *Libellago rufescens*-complex showed no courtship behaviour. In these taxa ♀♀, after mating, were led in tandem flight to the oviposition site. They avoided harassment by other ♂♂ by submerged oviposition. Similarly there was no courtship behaviour in *Disparocypha biedermanni*. ♂♂ of this taxon guarded small areas around especially attractive oviposition sites at the streams. The ♀♀ appeared at these rendezvous sites for mating but oviposition took place mostly outside these territories. In total four mating systems could be differentiated: "Long territoriality", "Short territoriality", "Male aggregations" and "Weak control". Based on all available information, i.e. the newly acquired and previously published results, the ritualised flight types and the mode of presentation of the legs by ♂♂ were found to be sufficiently stable in an evolutionary sense to reconstruct phylogenetic relationships. With these results a phylogenetic tree based on ethological data could be developed in Odonata for the first time. This is of special significance for the family Chlorocyphidae, as, despite extensive speciation, the different species show little structural morphological differentiation, especially in primary and secondary sexual organs, possibly as a result of species recognition systems strongly mediated by the display of visual ornaments. *Neurobasis kaupi* (Calopterygidae): The reproductive behaviour of *Neurobasis kaupi* was studied for the first time in Central and South Sulawesi. The species was recorded in a wide variety of clear and fast flowing creeks, streams and rivers, mostly in forested areas. The ♂♂ were territorial and defended potential oviposition sites, a limited resource. Territory residents demonstrated their presence by brief synchronized flashings of their iridescent blue hindwings as well as by regular inspection flights. Intruders were first driven off by short chasing flights. Longer lasting conflicts led to three different types of threatening flights, depending on the number of ♂♂ involved and the level of excitation. As in other Calopterygidae, ♂♂ of *N. kaupi* led receptive ♀♀ to potential oviposition sites. In courtship flight the male presented the iridescent upper sides of his stationary, depressed, quivering hindwings, with the hind margins broadly touching the water surface. Oviposition substrates were mostly submerged floating root mats or plants, optimally floating loosely at a depth of 5-15 cm below the water surface. The general patterns of behaviour of *N. kaupi* correspond to the known behaviour of other *Neurobasis* species. However, within this general framework there are clear differences between this species and others, especially *N. chinensis*. These involved distinct differences in pre and post courtship displays and in agnostic displays between ♂♂. The use of ethologic features in systematic-phylogenetic analysis seems promising for *Demoiselles* too. Due to the morphologically less differentiated ornamentation more intense observation seeking behavioural differences is needed, especially if differences in wing beat frequency and phase relationship of the wings in the display flights are to be analysed." (Author)] Address: Günther, A., Naturschutzzentrum Freiberg, Waisenhausstraße 10,

D-09599 Freiberg, Germany. E-mail: a.guenther@abo-freiberpresse.de

7088. Hacet, N.; Aktaç, N. (2008): Two new records of Odonata (Gomphidae) for Turkey, *Gomphus flavipes* (Charpentier, 1825) and *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785), with distributional notes on *G. flavipes* and *G. ubadschii* Schmidt, 1953. *Entomological News* 119(1): 81-89. (in English). ["In this paper, we demonstrate the occurrence of *G. flavipes* in Turkey. The single European Turkish record of this taxon was until now confused with the closely related Asiatic species *G. ubadschii*, therefore it could be said that *G. flavipes* is new to Turkey. The distribution of the two species in Turkey is evaluated. Besides, *O. cecilia*, a species which was previously reported from Anatolia based on a misidentification, now for the first time is recorded for Turkey, in the Turkish Thrace." (Authors)] Address: Hacet, N., Trakya University, Faculty of Arts and Sciences, Department of Biology, Tr-22030 Edirne, Turkey. E-mail: nhacet@hotmail.com

7089. Hämäläinen, M. (2008): Philogangidae versus Diphlebiidae: nomenclatoric note on a family-group name (Zygoptera). *Not. Odonat.* 7(1): 12. (in English). [Verbatim: D.A.L. Davies & P. Tobin (1984, *The dragonflies of the world, a systematic list of the extant species of Odonata*, Vol. 1: Zygoptera, Anisozygoptera, Soc. Int. Odonatol., Utrecht) introduced the new family, Diphlebiidae, to house a single genus *Diphlebia* Selys, 1896. Presently in some publications, e.g. in G. Bebbly (1996, *Petalura Special-Volume 2*), G. Theischinger & J. Hawking (2006, *The complete field guide to dragonflies of Australia*, Collingwood) and in *World Odonata list* by Schorr et al., available on internet at <http://www.ups.edu/x6140.xml>, two genera *Diphlebia* and *Philoganga* Kirby, 1890 are included in the family called Diphlebiidae. R. Novelo-Gutierrez (1995, *Odonatologica* 24: 73-87) included also *Lestodea* Tillyard, 1913 in this family (but in a separate subfamily *Lestoideinae*). As already pointed out by J. Van Tol (1995, *Odonatologica* 24: 245-248) there exist available family-group names introduced on all three genera *Diphlebia*, *Philoganga* and *Lestoidea*, viz. (in chronological order) *Lestoidinae* [sic!] by Munz (1919, *Mem. am. ent. Soc.* 3: 1-78), *Philoganginae* (by C.H. Kennedy, 1920, *Ohio J. Sci.* 21: 19-29) and *Diphlebiidae* (Davies & Tobin, 1984, see above). Based on the principles of nomenclature, Van Tol concluded as follows "The correct family-group name for a group made of *Diphlebia*, *Philoganga* and *Lestoidea* is thus based on *Lestoidea*, introduced by Munz (1919): *Lestodeidae*. Novelo-Gutierrez also distinguishes two subfamilies, one including *Diphlebia* and *Philoganga*, the other *Lestoidea* only. Their correct names are *Philoganginae* and *Lestoideinae* respectively." Consequently, if the two genera *Diphlebia* and *Philoganga* alone are ranked as a family, its correct name is *Philogangidae* Kennedy, 1920. The present Code (International Commission on Zoological Nomenclature, 1999, *International Code of Zoological Nomenclature*, London) rules in Article 35.5. as follows: "Precedence for names in use at higher taxa. If after 1999 a name in use for a family-group taxon [...] is found to be older than a name in prevailing usage for a taxon at higher rank in the same family-group taxon [...] the older name is not to displace the younger name." However, this more liberal practice cannot be applied in this case, since the mutual priority of the family-group names based on these three genera was documented already in 1995 by van Tol (see

above.)] Address: Hämäläinen M., Dept Applied Zool., P.O. Box 27, FIN- 00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

7090. Hassall, C.; Thompson, D.J.; Harvey, I.F. (2008): Wings of *Coenagrion puella* vary in shape at the northern range margin (Odonata: Coenagrionidae). *International Journal of Odonatology* 11(1) 2008: 35-41. (in English). ["A previous study has shown that wing size in *C. puella* varied considerably along a latitudinal gradient in the UK. Using landmark data from wing images, patterns of shape variation were also determined along the same transect by geometric morphometric analysis of wing shape. Wing shape was uniform at all sites other than those closest to the range margin, which differed significantly. The potential mechanisms that might have generated such between-population variation are discussed." (Authors)] Address: Hassall, C., Population and Evolutionary Biology Research Group, Biosciences Building, School of Biological Sciences, University of Liverpool, Crown Street, Liverpool L69 7ZB, UK. E-mail: c.hassall@liv.ac.uk

7091. Heino, J. (2008): Patterns of functional biodiversity and function–environment relationships in lake littoral macroinvertebrates. *Limnol. Oceanogr.* 53(4): 1446-1455. (in English). ["I examined variability in the abundances of functional groups, functional diversity measures, and functional structure of littoral macroinvertebrate communities in relation to the environmental features of boreal lakes. The most important environmental variables shaping variation in the abundances of functional groups and functional structure were lake surface area, macrophyte cover, total phosphorous, and water hardness. The same environmental variables (i.e., lake surface area, macrophyte cover) accounted for variability in functional richness and functional diversity, while functional evenness was related to different environmental variables (i.e., hardness, colour). Lake surface area and macrophyte cover comprised the most important axes of habitat templates shaping the functional trait structure and biodiversity in boreal lakes: lake area mirrors habitat differences between smaller and larger lakes, and macrophyte cover portrays the effects of habitat structural complexity on functional biodiversity. Functional biodiversity measures were also strongly correlated to species-level measures, and the correlation between similarity in functional and taxonomic structure was strong. Functional and taxonomic measures of macroinvertebrate communities thus provide rather similar information about littoral communities and ecosystem functioning." (Authors) Odonata are mentioned at the genus level only.] Address: Heino, J., Finnish Environment Institute, Research Programme for Biodiversity, P.O. Box 413, FI-90014 University of Oulu, Oulu, Finland

7092. Hornung, J.P.; Foote, A.L. (2008): Comparing dietary preferences of Bufflehead ducklings in Western Canada through gut content and stable isotope analysis. *Aquatic Ecology* 42: 61-70. (in English). ["Aquatic invertebrates are essential for duckling growth and development. We present results on the trophic status and dietary analysis of Bufflehead (*Bucephala albeola*) ducklings from the boreal breeding grounds of western Canada. We estimated dietary preference by comparing invertebrates found in Bufflehead diets to those identified in standardized dip net samples at their wetland feeding sites. Stable isotope ratios of Bufflehead

and their prey were used as a second estimator of trophic position. Bufflehead ducklings preferentially foraged for larval Dytiscidae (predaceous diving beetles; 46% of total dietary biomass), Zygoptera larvae (damselflies; 14%) and non-Dytiscidae adult Coleoptera (5%; mainly Haliplidae). Results from stable isotope analyses supported these results; the separation between primary and secondary invertebrate consumers and ducklings was significant for all possible contrasts when considering nitrogen isotope ratios (Tukey HSD; $P < 0.001$). We iteratively explored all possible combinations of $\delta^{15}N$ and $\delta^{13}C$ data to generate a proportional range over which each food source may contribute to Bufflehead stable isotope signatures; these results suggested larval Zygoptera and larval Dytiscidae figure prominently in diets when accounting for isotope fractionation. The incorporation of prey availability into the metric of dietary preference, as opposed to the tabulation of ingested items alone, reduces the importance of invertebrate groups such as adult Dytiscidae as highlighted in previous studies." (Authors)] Address: Hornung, J.P., Dept of Renewable Resources, University of Alberta, 751 General Services Building, Edmonton, AB, Canada T6G 2H1. E-mail: jon.hornung@ualberta.ca

7093. Jiang, Y.-h.; Li, Z.-h.; Yu, W.-y. (2008): *Macromidia shiehae* sp. n., a new dragonfly from Jiangxi, China (Anisoptera, Corduliidae). *Odonatologica* 37(2): 157-160. (in English). ["The new species is described and illustrated. Holotype ♂: China, Jiangxi: Lushan Mt (Haihui), 31-V-2004; deposited in Nanjing Forestry Univ., Nanjing, China. It is related to *M. ellenae* Wilson and *M. hangzhouensis* Zhou & Wei, but it is differentiated from these by having the postclypeus with yellow on anterior margins, the median lobe of the prothorax with four fine, pale yellow streaks, thorax with 5 yellow stripes, and nodal index of fore- and hindwings lower than in any of the other 4 *Macromidia* species described from China." (Authors)] Address: Jiang, Y.-h., Yuntaixiang Culture Station, Xinpu district, Lianyungang City, Jiangsu-222064, China. E-mail: jiangyh26@yahoo.com.cn

7094. Jones, C.D. (2008): Skillet Club tail (*Gomphus ventricosus*) in Ontario. *Ontario Odonata* 7: 49. (in English). [Verbatim: In February 2007, I visited the insect collection at the University of Guelph to examine the two specimens of Skillet Clubtail (*Gomphus ventricosus*), the records of which are contained in the Ontario Odonata Database, housed and maintained at the Natural Heritage Information Centre (NHIC). One was collected at Ignace on July 7, 1978 and the other was collected at Forest on June 18, 1979. Given that this is such a rare species and that clubtails can be challenging to identify, I was interesting in examining the specimens. As it turned out, the specimen from Ignace is actually *G. exilis* (a ♂) and the one from Forest is actually *G. graslinellus* (a ♀). They are both pinned specimens and did not have any species labels on them but were simply in the unit tray labelled *G. ventricosus*. So, it would appear that the only known location we have for this species in Ontario is the historical (1924) record from "Ottawa", presumably from the Ottawa River.] Address: Jones, C.D., Box 182, Lakefield, Ontario, K0L 2H0, Canada. E-mail: colin.jones@mnr.gov.on.ca

7095. Joshi, P.C.; Kumar, K.; Arya, M. (2008): Assessment of insect diversity along an altitudinal gradient in Pinderi forests of Western Himalaya, India. *Journal of Asia-Pacific Entomology* 11(1): 5-11. (in English). ["In-

sect diversity, richness and abundance were evaluated at different altitudes in three forest habitats in the Western Himalayas. The habitats studied were all situated between 2100 and 3500 m and included a site with no disturbances, a site with a moderate level of disturbance and a site with a very high level of disturbance. The species composition and diversity of insects varied at all the three study sites, which demonstrates the effect of altitude and disturbances, as well as the effects of other ecological and climatic parameters on insect populations. The site at lowest altitude, which contained a moderate level of disturbance, supported the highest number of species (108), whereas the site at the highest altitude, which contained the maximum level of disturbance, supported the lowest number of species (77). When all of the sites were considered, 122 species of insects belonging to 43 families and 8 orders were recorded. Lepidoptera was the most dominant insect order recorded, with 46 species being observed. This was followed by Hymenoptera (20), Coleoptera (18), Orthoptera (12), Hemiptera (10), Odonata (9), Diptera (5) and Dermeptera (2). The most abundant species were *Vanessa cashmirensis* (Lepidoptera: Nymphalidae), *Pieris canidia indica* (Lepidoptera: Pieridae), *Apis laboriosa* (Hymenoptera: Apidae), *Anomala dimidiata* (Coleoptera: Scarabidae), *Chorthippus* sp. (Orthoptera: Acrididae), *Crocothemis servilia servilia* (Odonata: Libellulidae) and *Syrphus fulvifacies* (Diptera: Syrphidae). The site at the lowest altitude and the sites with the longest rainy seasons had the highest Shannon–Wiener Diversity." (Authors) The following odonate species are also listed: *Palpopleura sexmaculata*, *Sympetrum commixtum*, *Orthetrum sabina*, *O. glaucum*, *O. pruinatum neglectum*, *Anax immaculifrons*, *Cephalaescha orbifrons*, and *Macromia moorei*.] Address: Joshi, P.C., Dept Zool. & Environ. Sci., Gurukul Kangri Univ., Haridwar – 249404, India. E-mail Address: prakash127@yahoo.com

7096. Jovice. M.; Andjus, L.; Bedjanic, M.; Santovac, S. (2008): Review of the Odonata fauna of Montenegro. *Opusc. zool. flumin.* 224: 1-27. (in English). ["The 57 hitherto known species are listed along with the locality data and bibliographic references, where applicable. *Coenagrion pulchellum*, *Erythromma najas*, *Anaciaeschna isosceles*, *Anax parthenope*, *Brachytriton pratense*, *Cordulegaster heros*, and *Selysiotthemis nigra* were not previously recorded from Montenegro. The biogeographic composition of the fauna is analyzed. Observations on *Somatochlora metallica* from Mt Durmitor are briefly discussed, and a comprehensive bibliography on the odonate fauna of Montenegro is appended." (Authors)] Address: Jovic, M., Natural History Museum Belgrade, Njegoševa 51, P.O. Box 401, YU-11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.org.yu

7097. Kalkman, V.J. (2008): Two new dragonfly species from Yapen and Biak, Papua (Irian Jaya), Indonesia (Odonata). *Zoologische Mededelingen* 82(11): 81-89. (in English). ["During fieldwork on the island of Yapen (Indonesia, Papua (Irian Jaya)), conducted in July 2006, several undescribed species of Odonata were collected. Two of these are described based on material from Yapen and Biak (Papua (Irian Jaya), Indonesia): *Teinobasis sjupp* spec. nov. (type locality: Yapen Island) and *Macromia holthuisi* spec. nov. (type locality: Biak Island)." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517,

2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

7098. Kalkman, V.J. (2008): Argiolestes in the Bismarck and the Solomon Archipelagos. Notes on Old World Megapodagrionidae 2 (Odonata). *International Journal of Odonatology* 11(1): 43-57. (in English). ["*Argiolestes aurantiacus*, endemic to the Bismarck Archipelago, is redescribed and three new species of *Argiolestes* from the Solomon Archipelago are described: *A. bougainville* sp. nov. (holotype ♂: Papua New Guinea, Bougainville, North Solomons, 02 I 1970), *A. gizo* sp. nov. (holotype ♂: Solomon Islands, Western Province, Gizo Island, alt. 1-100 m, 02 VII 1959) and *A. malaita* sp. nov. (holotype ♂: Solomon Islands, Malaita, Tagatalau, east of Auki, alt. 200 m, 27 IX 1957). The holotypes are deposited in the RMNH." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

7099. Kalkman, V.J.; Clausnitzer, V.; Dijkstra, K.D.; Orr, A.G.; Paulson, D.R.; van Tol, J. (2008): Global diversity of dragonflies (Odonata) in freshwater. *Developments in Hydrobiology* 198: 351-363. (in English). ["Larvae of almost all of the 5,680 species of the insect order Odonata (dragonflies and damselflies) are dependent on freshwater habitats. Both larvae and adults are predators. The order is relatively well studied, and the actual number of species may be close to 7,000. Many species have small distributional ranges, and are habitat specialists, including inhabitants of alpine mountain bogs, seepage areas in tropical rain forests, and waterfalls. They are often successfully used as indicators for environmental health and conservation management. The highest diversity is found in flowing waters in rain forests of the tropics, the Oriental and Neotropical regions being the most speciose. This paper discusses diversity, summarises the biogeography of dragonflies in the different biogeographical regions and gives the total number of species and genera per family per biogeographical region. Examples are given of areas of particular diversity, in terms of areas of endemism, presence of ancient lineages or remarkable recent radiations but no well-based review of areas with high endemism of dragonflies is available so far. The conservation status of dragonflies is briefly discussed. Species confined to small remnants of forest in the tropics are most under threat of extinction by human activities." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

7100. Khan, B.; Colbo, M.H. (2008): The impact of physical disturbance on stream communities: lessons from road culverts. *Hydrobiologia* 600: 229-235. (in English). ["This study examined the impact of physical disturbance from long-established road culverts on stream macroinvertebrate communities. Three streams within a 6 km section of highway on the Avalon Peninsula, Newfoundland, Canada, were sampled. Streams had the entire upstream watershed and at least 100 m downstream of the road with natural boreal forest/barren vegetation and all had, within the sampled reaches, similar physical streambed characteristics. The fauna on stones from riffles was sampled at two upstream and three downstream sites, i.e., from 50 m above to about 100 m below the road in each stream. A total of 33 taxa

were identified among the streams, with differences limited to a few rare taxa. The sample site communities did not significantly differ from each other with respect to the taxa present. Total macroinvertebrate abundance by site, for combined data of all streams, indicated the site at the exit of culvert plunge pool (site 3) had significantly elevated abundances. Analysis of individual taxa showed this was primarily due to very high numbers of *Simulium* species. The other most notable changes were a decrease in numbers of *Hydropsyche* species and *Elmidae* below the road. The abundances of the remaining taxa were more variable among all sites. The study indicated that longstanding point source physical disturbance primarily impacted taxa abundance rather than community present/absent data, which will recolonize the disturbed zone by downstream drift. The differences in abundance are probably the result of the cleaning of substrate by abrasion, movement of substrate and reduction of detritus during each spate." (Author) The study includes "Aeshna sp.".] Address: Colbo, M.H., Dept Biology, Memorial Univ. Newfoundland, St. John's, NL, Canada A1B 3X9. E-mail: mcolbo@mun.ca

7101. Kiyoshi, T. (2008): Differentiation of golden-ringed dragonfly *Anotogaster sieboldii* (Selys, 1854) (Cordulegastridae: Odonata) in the insular East Asia revealed by the mitochondrial gene genealogy with taxonomic implications. *Journal of Zoological Systematics and Evolutionary Research* 46(2): 105-109. (in English, with German summary). ["Molecular phylogeographical analyses of *A. sieboldii* were conducted to reveal the differentiation process of insular populations. The gene genealogy based on 845 bp of the mitochondrial genes (cytochrome oxidase subunit I and subunit II) indicated that *A. sieboldii* includes two deeply separated lineages. These two major lineages seem to have differentiated in Miocene before the formation of the insular East Asia. One lineage includes three inner clades that correspond to the populations of northern area (the Japanese main islands, Korean Peninsula, Yakushima), Amamioshima and Okinawajima. Populations of Central Ryukyu, including Amamioshima and Okinawajima, might have been divided from the northern populations in early Pleistocene. The other major lineage includes populations of the Yaeyama Group, Taiwan and East China. The former two populations were reconstructed as a reciprocal monophyletic group. Populations of Taiwan and Yaeyama Groups would have been separated from the continental ones in Pleistocene. These two highly divergent lineages should be recognized as distinct species. Furthermore, the mitochondrial lineages revealed six genetically distinct and geographically isolated assemblages: (1) northern populations, (2) Amamioshima, (3) Okinawajima, (4) Yaeyama Group, (5) Taiwan and (6) East China." (Author)] Address: Kiyoshi, T., Dept of Zoology, Graduate School of Science, Kyoto University, Kyoto, Japan. E-mail: kiyoshi@zoo.zool.kyoto-u.ac.jp

7102. Klass, K.-D. (2008): The female abdomen of ovipositor-bearing Odonata (Insecta: Pterygota). *Arthropod Systematics & Phylogeny* 66(1): 45-142. (in English). ["The exoskeleton and musculature of the middle and posterior abdomen in female *Calopteryx virgo* are described (segments IVff), including parts of the midabdominal nervous system. Based on a sample of 16 species of Odonata with a plesiomorphic morphology of the ovipositor (various Zygoptera, Epiophlebia, and Aeshnidae) the range of variation in the abdominal exoskel-

eton is documented, and a preliminary list and table of 79 characters are assembled. Abdominal muscles in Odonata are surveyed based on data from the literature. Topographic homologies between Odonata and other Insecta are discussed, with a focus on the female genitalic region and the terminal abdomen, and with consideration of previous ontogenetic studies. The results are used for including outgroup scorings into the character list for Odonata. Odonata conform with many Neoptera (e.g., Notoptera, pygidicranid Dermaptera) in the location of the female genital opening between or behind the gonapophyses VIII bases, contrasting with the VIIIth-segmental openings in other Neoptera (e.g., Dictyoptera, Ensifera, 'advanced' Dermaptera), Archaeognatha, and Zygentoma. The gonangulum in most Odonata consists, like in Archaeognatha and some Dermaptera, of two separate sclerites; this contrasts with the one-piece condition of the gonangulum in other Diptera and Epiophlebia. The interpretation of terminal appendages in Odonata as the true cerci is supported by musculature data, and it is shown that previous counter-arguments are invalid. While Epiophlebia is in many characters highly peculiar among Odonata, the abdominal characters provide no resolution for the relationships between Epiophlebia, Zygoptera, and Anisoptera. The monophyly of Zygoptera receives considerable support." (Author) Address: Klass, K.-D., State Natural History Collections Dresden, Museum of Zoology, Königsbrücker Landstraße 159, 01109 Dresden, Germany. E-mail: klaus.klass@snsd.smwk.sachsen.de]

7103. König, R.; Suzin, C.R.H.; Restello, R.M.; Hepp, L.U. (2008): Qualidade das águas de riachos da região norte do Rio Grande do Sul (Brasil) através de variáveis físicas, químicas e biológicas. *Pan-American Journal of Aquatic Sciences* 3(1): 84-93. (in Portuguese, with English summary). [Water quality of streams in the north region of Rio Grande do Sul (Brazil) is assessed by the use of physical, chemical and biological variables. - The taxa - including Odonata - are treated on the family level.] Address: Hepp, L.U., Programa de Pós-Graduação em Biodiversidade Animal, Universidade Federal de Santa Maria - RS. Av. Roraima, 1000. Santa Maria - RS. 97105-900. Brasil. E-mail: lhepp@uri.com.br

7104. Kone, T.; Kouamélan, E.P.; Yao, S.S.; N'Douba, V.; Ollevier, F. (2008): First results of a study of the feeding habits of *Synodontis comoensis* (Siluriformes: Mochokidae) in a West African river (Comoé River, Comoé National Park, Côte d'Ivoire). *Aquatic Ecology* 42: 35-42. (in English). ["The feeding habits of *S. comoensis* have been studied for the first time. Specimens caught in the Comoé River (Comoé National Park, Côte d'Ivoire) had fed on different types of food including insects (Diptera, Ephemeroptera, Hymenoptera, and Isoptera), molluscs (gastropods and bivalves), oligochaetes, and macrophytes. The food items most frequently found in the stomach contents were chironomid larvae, oligochaetes, vegetable detritus, fruit, and gastropods. Correlation studies based on the index of preponderance of food items revealed noticeable variation in *S. comoensis* diet composition with fish size and season. Preferred food items of young fish were oligochaetes in the rainy season and vegetable detritus in the dry season. Food items preferred by larger fish were fruit and gastropods in the rainy season and chironomid larvae in the dry season." (Authors) *Phyllomacromia* sp. is the only taxon found in the diet of this fish.] Address: Koné, T., Laboratoire d'Hydrobiologie, UFR Biosciences, Uni-

versite' de Cocody, 22 BP 582 Abidjan, Ivory Coast. E-mail: Ktidiani@yahoo.fr

7105. Królak, E.; Korycińska, M. (2008): Taxonomic composition of macroinvertebrates in the Liwiec river and its tributaries (Central and Eastern Poland) on the basis of chosen physical and chemical parameters of water and season. *Polish Journal of Environmental Studies* 17(1): 39-50. (in English). ["The taxonomic composition of macroinvertebrates in the Liwiec River and its tributaries situated in central and eastern Poland was studied during three seasons (spring, summer and autumn). Simultaneously, physical and chemical parameters of water were measured. Water parameters were different in each study period. Macroinvertebrates samples collected in summer and autumn were much more diversified than the samples collected in spring. In the spring samples a greater EPT diversity was observed, while in the samples collected in autumn Odonata, Coleoptera and Heteroptera were more diversified. The values of the BMWP-PL index were slightly higher for the summer and autumn samples than for the spring ones. Correlation between the concentration of oxygen in water and the number of individuals of Plecoptera and Trichoptera larvae was noted. The negative correlation between the values of BOD5, the concentration of nitrate ions and conductivity, and the number of macroinvertebrate families was observed. A negative correlation also was noted between nitrate and phosphate ion concentrations and the number of individual insect larvae." (Authors)] Address: Królak, E., Dept of Ecology & Environmental Protection, University of Podlasie, Prusa 12, 08-110 Siedlce, Poland

7106. Krotzer, R.S.; Bried, J.T.; Krotzer, M.J. (2008): The Odonata Of Mississippi. *Bulletin of American Odonatology* 10(4): 65-91. (in English). ["An annotated faunal list of the Odonata occurring in Mississippi is presented, totalling 144 species (100 Anisoptera, 44 Zygoptera). Five species - *Enallagma davisii*, *Gomphus (Hylogomphus) geminatus*, *Epithea (Tetragoneuria) spinosa*, *Neurocordulia alabamensis*, and *Miathyria marcella*, are documented from the state for the first time. The presence in Mississippi of *Celithemis bertha* Williamson, previously reported from the state based on a misidentification, is confirmed. Four species from earlier Mississippi lists are removed, and nine potential additions to the state's fauna are discussed. A brief history of odonatological inventory in Mississippi is given, along with a discussion of the state's physiography and aquatic resources, relationships of its odonate fauna to that of its neighbouring states, and potential conservation measures that could benefit odonates and their habitats." (Authors)] Address: Krotzer, S., 2238 Haysop Church Road, Centreville, AL 35042, USA. E-mail: rskrotze@southernco.com

7107. Kukalova-Peck, J. (2008): Phylogeny of higher taxa in insecta: Finding synapomorphies in the extant fauna and separating them from homoplasies. *Evol. Biol.* 35: 4-51. (in English). ["Most currently applied systematic methods use post-groundplan character states to reconstruct phylogenies in modern higher Insecta/Arthropoda taxa. But, this approach is unable to separate synapomorphies from frequently occurring homoplasies. Conflicting, unresolved and unrealistic higher-level phylogenies result. The reasons are analyzed. A contrasting "groundplan" method, long used in Vertebrata and found to be superior in resolving higher-level

phylogenies, is described. This method, as used for insects, uses a highly diversified morphological organ system (such as limb/wing), identifies its homologues in all subphyla and classes, records the full history of its character transformation series in all lineages from the shared Paleozoic ancestor to modern times, pursues the full homologization of its character states in all modern orders, and verifies these data with evidence from other fields of biology. Only such an extremely broad dataset provides the complex information needed to identify and homologize the groundplan character states in modern orders and other higher taxa in the insect /arthropod fauna. After this is accomplished, the gate to recognizing higherlevel synapomorphies is open. Only groundplan-level character states include distinct synapomorphies, since homoplasies are either absent or easily detectable. Examples are given. The interpretations of higher phylogenies and evolutionary processes in Hexapoda, based on the unpredictable and often misleading post-groundplan character states found in extant, Tertiary and Mesozoic fauna, are critically compared with those based on the evolution of organ systems, by using the groundplan method." (Author) The paper includes many references to Odonata.] Address: Kukalova-Peck, Jarmila, Earth Sciences, Carleton University, Ottawa, ON, Canada K1S 5B6. E-mail: jarmilapeck@carleton.ca

7108. Lowe, C.D.; Harvey, I.F.; Thompson, D.J.; Watts, P.C. (2008): Strong genetic divergence indicates that congeneric damselflies *Coenagrion puella* and *C. pulchellum* (Odonata: Zygoptera: Coenagrionidae) do not hybridise. *Hydrobiologia* 605: 55-63. (in English). ["Coenagrionid damselflies are in general decline in the British Isles. Numerous factors have been implicated in the loss of these species including recent speculation that hybridisation between congeners may result in species decline. Here we use a panel of 12 microsatellite loci to examine levels of genetic divergence and the likely occurrence of hybridisation in five populations of *Coenagrion puella* and *C. pulchellum* using samples from four sites in south-east England. *C. puella* and *C. pulchellum* were highly genetically divergent, and there was no evidence of hybridisation between any of the populations examined, even where *C. puella* and *C. pulchellum* were sympatric. There was some suggestion that *C. pulchellum* was less genetically diverse than *C. puella*, though this may have been a result of ascertainment bias associated with cross-species application of microsatellite markers. We conclude that there is no evidence that hybridisation between *C. puella/pulchellum* could be responsible for the on-going demographic decline in *C. pulchellum*. Nevertheless, further genetic studies such as this one are likely to provide estimates of diversity, population structure and dispersal capacity that will be invaluable in future conservation management strategies for coenagrionid damselflies." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

7109. Mahato, M.; Kennedy, J.H. (2008): Field experimental approach to detect urban impact on *Erpetogomphus designatus* Hagen in Selys larvae (Anisoptera: Gomphidae). *Odonatologica* 37(1): 13-28. (in English) "This study attempted to design and conduct an in situ field experiment using *E. designatus* larvae collected from the reference site and then exposed at 4 poten-

tially impacted urban sites; all in the sub-watersheds of the city of Denton, Texas, USA. Before placing them in the urban site enclosures, head width, total width, wing pad length and wet weight were measured. The surviving larvae were retrieved after 6 weeks and all parameters were measured again in order to assess the difference between the reference and urban sites. No survival was observed at 2 urbanized sites in both spring and summer, and at another urbanized site in spring. The differences in survival of the larvae may be influenced by the differences in hydrology and water quality, especially during the summer experimental period. In the spring, a statistically significantly higher growth rate ($p < 0.05$) occurred at one of the urban sites compared to the reference site. The difference in growth rate may have been influenced by less fluctuation and higher minimum water temperature at the urban site. Although the experiment was only partially successful, it did indicate that the local common odonate taxa found at the reference site could be used for field biomonitoring experiments to assess water quality of urban sites. If fully successful, this type of in situ field experiment may indicate actual impacts rather than attempting to apply conclusions based on either laboratory microcosm or mesocosm-based toxicity tests." (Authors)] Address: Mahato, M., URS Corporation, Dallas, TX 75234, USA. E-mail: Mmahato@gmail.com

7110. Mandal, S.K.; Ghosh, A.; Bhattacharjee, I.; Chandra, G. (2008): Biocontrol efficiency of odonate nymphs against larvae of the mosquito, *Culex quinquefasciatus* Say, 1823. *Acta Tropica* 106(2): 109-114. (in English). ["An estimation of the predatory efficiency of the nymphs of 5 coexisting odonate species *Aeshna flavifrons*, *Coenagrion kashmirum*, *Ischnura forcipata*, *Rhinocypha ignipennis* and *Sympetrum durum* using the fourth-instar larvae of *Culex quinquefasciatus* as prey, was made under laboratory and semi-field conditions. The daily feeding rate varied among the odonate species, at laboratory conditions. The mean number of IV instars *Cx. quinquefasciatus* larvae killed per day, ranged between 14 and 64 (64 mosquito larvae for *I. forcipata*, 57 for *A. flavifrons*, 45 for *R. ignipennis*, 25 for *S. durum* and 14 for *C. kashmirum*). The prey consumption was linearly related to the number of predators and prey available but inversely related with space. It was also noted that the feeding rates varied significantly between dark and light conditions, in all the odonate species. The presence of nymphs in semi-field conditions significantly lowered the mosquito larval density in dipper samples after 15 days from the introduction, followed by a significant increase of larval mosquito density after 15 days from the withdrawal of the nymphs. The results of the present observations are suggestive of the use of odonate nymphs in temporary pools or larger habitats where they can be a potential biological resource in regulating the larval population of the vector and pest mosquitoes." (Authors)] Address: Mosquito Research Unit, Department of Zoology, The University of Burdwan, Burdwan, Golapbag 713104, West Bengal, India

7111. Markwell, K.A.; Fellows, C.S. (2008): Habitat and biodiversity of on-farm water storages: A case study in southeast Queensland, Australia. *Environmental Management* 41: 234-249. (in English). ["On-farm water storages (locally known as farm dams or farm ponds) are an important part of many agricultural landscapes, as they provide a reliable source of water for irrigation and stock. Although these waterbodies are artificially

constructed and morphologically simple, there is increasing interest in their potential role as habitat for native flora and fauna. In this article, we present results from a case study which examined the habitat characteristics (such as water physical and chemical parameters, benthic metabolism, and macrophyte cover) and the macrophyte and macroinvertebrate biodiversity of 8 farm ponds on 4 properties in the Stanley Catchment, Southeast Queensland, Australia. Each landowner was interviewed to allow a comparison of the management of the ponds with measured habitat and biodiversity characteristics, and to understand landowners' motivations in making farm pond management decisions. The physical and chemical water characteristics of the study ponds were comparable to the limited number of Australian farm ponds described in published literature. Littoral zones supported forty-five macroinvertebrate families, with most belonging to the orders Hemiptera, Coleoptera, Odonata, and Diptera. Invertebrate community composition was strongly influenced by littoral zone macrophyte structure, with significant differences between ponds with high macrophyte cover compared to those with bare littoral zones. The importance of littoral zone macrophytes was also suggested by a significant positive relationship between invertebrate taxonomic richness and macrophyte cover." (Authors)] Address: Fellows, Christine, Australian Rivers Institute, Griffith School of Environment, Nathan QLD 4111, Australia. E-mail: c.fellows@griffith.edu.au

7112. Martens, A.; Ehmann, H.; Peitzner, G.; Peitzner, P.; Wildermuth, H. (2008): European Odonata as hosts of *Forcipomyia paludis* (Diptera: Ceratopogonidae). *International Journal of Odonatology* 11(1): 59-70. (in English). ["The biting midge *F. (Pterobosca) paludis* is the only ceratopogonid species known to parasitise Odonata imagines in Europe. In this study, based mainly on the analysis of about 200 photographically documented cases, data on host species, parasite load and undisturbed position on the odonate body were analysed. The list of hitherto known hosts is extended significantly to include 55 Odonata species. The records date from mid-May to the beginning of August. Most data originate from southern France, Switzerland, Germany, and Austria, with a few from Sweden and Croatia. Only ♀♀ of *F. paludis* were found on Odonata, attached to both sides of the wings with a preference for their basal half, and mostly facing the wing base. In Calopteryx species the midges were likewise present on the wing tips. In a few cases midges were also found on the odonate's thorax and abdomen." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, PF 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

7113. Matushkina, N.A. (2008): Skeletomuscular development of genital segments in the dragonfly *Anax imperator* (Odonata, Aeshnidae) during metamorphosis and its implications for the evolutionary morphology of the insect ovipositor. *Arthropod Structure & Development* 37(4): 321-332. (in English). ["The skeleton-muscular organisation of abdominal segments 7-9 in female *A. imperator* was examined in the stages of ultimate larva, teneral imago, and mature imago, with special emphasis on the transformation of the muscle arrangement. The absence of certain muscles in the genital segments compared to the 7th pre-genital segment was noted on all studied stages. Reductions of certain muscles in adults compared to those in larvae are re-

ported. Some of ovipositor's muscles appear already in larvae. Attachment sites of larval muscles are retained in freshly emerged ♀♀ concurrently with integument transformations. This situation allows for precise determination of the borders of newly differentiated genital sclerites and, therefore, of the possible origin of certain ovipositor elements in odonates. All changes in the segmental sets of studied abdominal muscles during metamorphosis are tabulated, and displacements of muscles are documented and illustrated. Schematic figures illustrating homologies between the parts of larval and imaginal abdominal sclerites are provided. The origins of the components of the endophytic ovipositor in Odonata as well as their implications for the evolutionary morphology of the insect ovipositor are discussed." (Author)] Address: Matushkina, Natalia A., Dept of Zoology, Biol. Faculty, National Taras Shevchenko University of Kyiv, vul. Volodymirs'ka, 64, Kyiv UA- 01033, Ukraine

7114. Matushkina, N.A. (2008): The ovipositor of the relic dragonfly *Epiophlebia superstes*: a morphological re-examination (Odonata: Epiophlebiidae). *International Journal of Odonatology* 11(1): 71-80. (in English). ["The morphology of the endophytic ovipositor in *E. superstes* was studied with light and electron microscopy with special emphasis made on the musculature and micro-sculpture of the exoskeleton. Structural characters are described and illustrated. The musculature of the ovipositor has many similarities with zygopterans. The ovipositor and 10th abdominal segment bear groups of setae and campaniform sensilla, which probably contact the plant surface during egg laying. A group of campaniform sensilla on the base of the stylus may be responsible for the zigzag sequence of egg disposition in *E. superstes*. The phylogenetic significance of the microstructure of the ovipositor in *E. superstes* can be evaluated only after a systematic examination of representatives of other ovipositor-bearing Odonata." (Author)] Address: Matushkina, Natalia A. Department of Zoology, Biological Faculty, Kyiv National University, vul. Volodymirs'ka, 64, Kyiv, 01033, Ukraine. E-mail: odonataly@gmail.com

7115. Medina, F.M.; López-Darias, M.; Nogales, M.; García, R. (2008): Food habits of feral cats (*Felis silvestris catus* L.) in insular semiarid environments (Fuerteventura, Canary Islands). *Wildlife Research* 35: 162-169. (in English). ["In this study, we present the first data on diet and impacts of feral cats on a semiarid island (Fuerteventura, Canary Islands). A total of 614 prey was identified in the 209 scats analysed. Introduced mammals, especially rabbits and mice, were the most consumed vertebrate prey and constituted more than 90% of biomass. Barbary ground squirrels, Algerian hedgehogs, and rats were preyed upon less even though they were abundant on the island. Invertebrates, mainly Orthoptera, Coleoptera, Hymenoptera and Odonata, were the second most important prey items (in terms of actual numbers) but they contributed only minimally with respect to biomass (<1.1%). The presence of terrestrial molluscs in the diet was interesting because they are a rare prey in an insular context. Birds and reptiles occurred at a low frequency. A total of 677 seeds was counted, mainly belonging to *Lycium intricatum* (Solanaceae) and two unidentified plant species. Levin's niche breadth was narrow due to the high consumption of mammals. Morisita's index showed a similar trophic overlap in diet with respect to the other xeric habitats of the Canary archipelago. Considering

that more than 90% of biomass corresponded to introduced mammals, we conclude that feral cats are not having a large direct impact on the native prey species." (Authors) The diet contains *Anax imperator* and indeterminate Odonata remains.] Address: Medina, F.M., Unidad de Medio Ambiente, Cabildo Insular de La Palma, Avenida Los Indianos 20, 2º, 38700 Santa Cruz de La Palma, Canary Islands, Spain. E-mail: felix.medina@cablalpalma.es

7116. Meurgey, F. (2008): Description of the adult male and larva of *Brechmorhoga archboldi* (Donnelly) from the French West Indies (Anisoptera: Libellulidae). *Odonatologica* 37(2): 161-166. (in English). ["*Scapania archboldi* (Donnelly), known only from the holotype ♀ from Dominica, was recently transferred to *Brechmorhoga* (Garrison & von Ellenrieder, 2006, *Can. Ent.* 138: 269-284). Here, its ♂ and larva are described from Guadeloupe and Martinique; some behavioural and habitat notes, and distribution for this species are included. *B. grenadensis* Kirby is considered to be a distinct species and not a subspecies of *B. praecox* (Hagen)." (Author)] Address: Meurgey, F., Mus. d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

7117. Mikolajewski, D.J.; Stoks, R.; Rolff, J.; Joop, G. (2008): Predators and cannibals modulate sex-specific plasticity in life-history and immune traits. *Functional Ecology* 22(1): 114-120. (in English). ["1. In organisms with complex life cycles, optimality models predict age and size at transition to translate larval condition into adult fitness. Recent studies, however, revealed that only a proportion of fitness is explained by age and size at transition. Moreover, sexes differ in the linkage of larval condition and adult fitness. 2. In this study, we tested the hypothesis that immune traits may be partly decoupled from age and size at habitat transition and therefore contribute to the sex-specific linkage of larval condition and adult fitness. 3. We reared larvae of the damselfly *Coenagrion puella* under the threat of predators and cannibals. We then examined sex-specific patterns in two life-history traits as well as two immune traits and tested for independency of the plastic responses among life-history and immune traits. 4. Results revealed immune traits to be partly decoupled from life-history traits. Moreover, the sexes differed in the plasticity of life-history as well as immune traits. Our results give strong evidence that sex-specific translation of larval condition into adult fitness may be linked to immune traits as well as age and size at transition." (Authors)] Address: Mikolajewski, D.J., Dept of Animal and Plant Sciences, Univ. of Sheffield, Western Bank, Sheffield, S10 2TN, UK. E-mail: d.mikolajewski@tu-bs.de

7118. Molineri, C. (2008): Impact of rainbow trout on aquatic invertebrate communities in subtropical mountain streams of northwest Argentina. *Ecologia Austral* 18: 101-117. (in English). ["The present study was conducted to assess the effect of rainbow trout introduction on benthic invertebrate communities, stratified as epibenthos and infauna. Two main questions are explored: 1) do the trout-invaded streams show a different community structure than the streams with autochthonous fish?, and 2) does the presence of trout affect differentially the epibenthos and the infauna? Epibenthic and infaunal samples, drift samples and fish stomach content were sampled four times from three stations to assess the impact of rainbow trout (*Oncorhynchus my-*

kiss) on the invertebrate aquatic fauna. Only one species of native fish was recorded in the studied sites, the siluriform *Trichomycterus corduvense*. Both fish species were found always in allopatry. The trout-invaded site has a different community structure than the other streams with a much lower abundance of large and active epibenthic taxa (e.g., *Perlidae*, *Gripopterygidae*, *Hydropsychidae*, *Leptoceridae*, *Elmidae* adults) and an increase in the importance of infaunal organisms (*Chironomidae*, *Oligochaeta*). Diversity indices showed alternating and opposite high and low values along time in trout-free and invaded sites." (Author) The analysis includes *Aeshnidae*.] Address: Molineri, C., INSUECONICET, Facultad de Ciencias Naturales e IML, M. Lillo 205, San Miguel de Tucumán, 4000, Tucumán, Argentina. E-mail: cmolineri@csnat.unt.edu.

7119. Mora, A.; Csepes, E.; Toth, M.; Devai, G. (2008): Spatio-temporal variations of macroinvertebrate community in the Tisza river (NE Hungary). *Acta Zoologica Academiae Scientiarum Hungaricae* 54(2) : 181-190. (in English). [The analysis of macrozoobenthos includes *Stylurus flavipes*. Address: Móra, A., Hungarian Academy of Sciences, Balaton Limnological Research Institute, Klebelsberg Kuno 3, H-8237 Tihany, Hungary. E-mail: marnold@tres.blki.hu

7120. Mortensen, L.; Richardson, J.M.L. (2008): Effects of chemical cues on foraging in damselfly larvae, *Enallagma antennatum*. *Journal of Insect Behavior* 21(4): 285-295. (in English). ["Animals experiencing a trade-off between predation risk and resource acquisition must accurately predict ambient levels of predation risk to maximize fitness. We measure this trade-off explicitly in larvae of the damselfly *E. antennatum*, comparing consumption rates in the presence of chemical cues from predators and injured prey. Damselflies distinguished among types of chemical cues based on species of prey injured or eaten. Injured coexisting heterospecific and unknown heterospecific chemical cues did not reduce foraging relative to starved predator cues, while cues arising from predators eating a coexisting heterospecific did decrease foraging. This study shows a cost in terms of reduced foraging in response to chemical cues and further defines the ability of prey to respond discerningly to chemical cues." (Authors)] Address: Richardson, J.M.L., Dept Biological Sciences, Brock University, 500 Glenridge Ave., St. Catharines, ON, L2S 3A1, Canada. Email: jr Richardson@brocku.ca

7121. Muzon, J. (2008): *Commentario bibliografico: Garrison, R.W., N. von Ellenrieder & J.A. Louton. 2006. Dragonfly Genera of the New World. An illustrated and annotated key to the Anisoptera. The Johns Hopkins University Press, Baltimore, 368 páginas, 1626 figuras y 8 láminas color. Rev. Soc. Entomol. Argent. 65 (3-4) (2006): 18. (in Spanish). [book review.] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar*

7122. Neiss, U.G.; Lencioni, F.A.A.; Hamada, N.; Ferreira-Keppler, R.L. (2008): Larval redescription of *Microstigma maculatum* Hagen in Selys, 1860 (Odonata: Pseudostigmatidae) from Manaus, Amazonas, Brazil. *Zootaxa* 1696: 57-62. (in English, with Portuguese summary). ["The last-instar larva of *Microstigma maculatum* Hagen in Selys, 1860 is redescribed and illustrated based on a reared larva collected in a water-filled hole of a fallen tree trunk within an urban forest fragment in

Manaus, Amazonas, Brazil." (Authors)] Address: Lencioni, F.A.A., Rua dos Ferroviários 55, Jardim Mesquita, BR- 12300-000, Jacarei, S.P., Brazil. E-mail: odonata@iconet.com.br

7123. Nel, A.; Néraudeau, D.; Perrichot, V.; Gomez, B. (2008): A new dragonfly family in the Upper Cretaceous of France (Insecta: Odonata: Aeshnoptera). *Acta Palaeontologica Polonica* 53(1): 165-168. (in English). ["The new aeshnopteran family *Enigmaaeshnidae* is proposed for *Enigmaaeshna deprei* gen. et sp. nov., the first fossil insect collected as imprint in the Earliest Cenomanian clay of the Puy-Puy quarry at Tonnay-Charente (Charente-Maritime, SW France). The bed bearing *E. deprei* was previously known for its highly diversified fossil plant assemblage. Although this taxon belongs to the much derived clade *Aeshnodea*, it is characterized by several unique hind wing venation characters, never found in other Aeshnoptera, viz. part of MAb distal of the trigonal planate very long, and presence of five posterior branches of AA directed towards posterior wing margin." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

7124. Ohba, S.; Miyasaka, H.; Nakasuji, F. (2008): The role of amphibian prey in the diet and growth of giant water bug nymphs in Japanese rice fields. *Population Research* 50(1): 9-16-121-122. (in English). ["Predatory insects that depend upon particular prey animals are commonly regulated by the prey animal's abundance. Nymphs of the giant water bug *Kirkaldyia (=Lethocerus) deyrolli* (Heteroptera: Belostomatidae) are predators regarded as specialists in feeding on tadpoles. We studied the ontogenetic diet shift of aquatic nymphs by quantifying instar abundance and by analyzing captured prey and prey relative abundance during the period of rice irrigation in three localities. We also evaluated the contribution of major prey items (tadpoles, frogs, and Odonata nymphs) on specific growth rates of each nymphal stage in a rearing experiment. First to third-instar nymphs of *K. deyrolli* fed mainly on tadpoles, regardless of differences in prey availability. Nymphs of subsequent fourth and fifth instar stages shifted from tadpoles to other prey animals within each rice field. A rearing experiment demonstrated that giant water bug nymphs provided with tadpoles had greater specific growth rates at all nymphal stages, except for the final stage, than nymphs fed other prey (frogs and Odonata nymphs). The emergence of young *K. deyrolli* nymphs seemed to coincide with the period during which tadpoles became abundant in the rice fields. Consumption of tadpoles seems important to allow the nymph to complete its larval development in an unstable temporary habitat." (Authors)] Address: Ohba, S., Laboratory of Insect Ecology, Graduate School of Environmental Science, Okayama University, Tsushima, Okayama 700-8530, Japan. E-mail: oobah8ag@yahoo.co.jp

7125. Patankar, N.V.; Tembhare, D.B. (2008): Immunocytochemical localization of some aminergic and peptidergic neurosubstances in the cephalic neurosecretory system of the dragonfly, *Tramea virginia* (Rambur) (Anisoptera: Libellulidae). *Odonatologica* 37(2): 119-130. (in English). ["An immunocytochemical study showed the presence of 7 neurosubstance-like materials: FMR-Famide, neuropeptide-Y (NPY), substance-P, serotonin, gastrin, chole-cystokinin (CCK) and vasoactive intestinal peptide (VIP) in the median, lateral, ventral and optic

neurosecretory cells groups (MNC, LNC, VNC and ONC, respectively) in the brain and in the corpora cardiaca (CC) of the adult, *T. virginia*. In the MNC cell type A showed NPY- and serotonin- while B and C cell types showed NPY-, serotonin-, substance P- and CCK-like positive immunoreaction. The B cell type in LNC showed FMRFamide-, NPY- and serotonin- and the C cell type showed only NPY and serotonin-like positive immunoreaction. In VNC group, the B cell type showed substance P- and gastrin-, while the C cell type showed substance P- and gastrin- and VIP- like positive immunoreaction. B and C cell types of ONC group showed substance P- and serotonin-like positive immunoreaction. The CC showed only NPY-like positive immunoreactive intrinsic neurosecretory cells. The functional significance of these myotropic and vertebrate gastrointestinal hormone-like substances in the cephalic neurosecretory system of *T. virginia* is discussed." (Authors)] Address: Tembhare, D.B., 44 Vijaya Nagar, South Ambazari Road, Nagpur-440 022, India. E-mail: dr.nitisha@gmail.com

7126. Polhemus, D.A.; Michalski, J.; Richards, S.J. (2008): *Pseudagrion fumipennis*, a remarkable new species of damselfly from New Guinea (Odonata: Zygoptera: Coenagrionidae). *Tijdschr. Ent.* 151(1): 51-56. (in English). ["*Pseudagrion fumipennis* sp. n. is described from widely separated localities in the lowlands of New Guinea and immediately adjacent islands. It is the first known coenagrionid from the Papuan region to possess brown-tinted apices on all four wings. The new species appears to be structurally most similar to *P. farinicolle* from New Guinea and *P. ustum* from Sulawesi, but its precise relationships are obscure." (Authors)] Address: Polhemus, D., Dept. Entom., MRC 105, Smith. Inst., Wash., D.C. 20560, USA. Email: bugman@bpbm.org

7127. Rach, J.; DeSalle, R.; Sarkar, I.N.; Schierwater, B.B.; Hadrys, H. (2008): Character-based DNA barcoding allows discrimination of genera, species and populations in Odonata. *Proc. R. Soc. (B)* 275: 237-247. (in English). ["DNA barcoding has become a promising means for identifying organisms of all life stages. Currently, phenetic approaches and tree-building methods have been used to define species boundaries and discover 'cryptic species'. However, a universal threshold of genetic distance values to distinguish taxonomic groups cannot be determined. As an alternative, DNA barcoding approaches can be 'character based', whereby species are identified through the presence or absence of discrete nucleotide substitutions (character states) within a DNA sequence. We demonstrate the potential of character-based DNA barcodes by analysing 833 odonate specimens from 103 localities belonging to 64 species. A total of 54 species and 22 genera could be discriminated reliably through unique combinations of character states within only one mitochondrial gene region (NADH dehydrogenase 1). Character-based DNA barcodes were further successfully established at a population level discriminating seven population-specific entities out of a total of 19 populations belonging to three species. Thus, for the first time, DNA barcodes have been found to identify entities below the species level that may constitute separate conservation units or even species units. Our findings suggest that character-based DNA barcoding can be a rapid and reliable means for (i) the assignment of unknown specimens to a taxonomic group, (ii) the exploration of diagnosability of conservation units, and (iii) complement-

ing taxonomic identification systems." (Authors)] Address: Hadrys, Heike, ITZ, Ecology & Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

7128. Ren, D.; Nel, A.; Prokop, J. (2008): New early griffenfly, *Sinomeganeura huangheensis* from the Late Carboniferous of northern China (Meganisoptera: Meganeuridae). *Insect Syst. Evol.* 38: 223-229 (in English) ["New griffenfly *Sinomeganeura huangheensis* gen. n., sp. n. (Meganeuridae) is described from Upper Carboniferous (Namurian) of the Tupo Formation in northern China (Ningxia Hui Autonomous Region). This taxon exhibits unique structure of the wing venation pattern. It is highly interesting in reference to the Namurian age known for the occurrence of two meganeurids until present (Namurotypus Brauckmann & Zessin, 1989 and Shenzhousia Zhang & Hong, 2006) as well as the palaeogeographical position of the locality far from all sites in Laurussia. We demonstrate that meganeurids with relatively small wings already co-existed with large species in the Namurian, as for the Stephanian and the Late Permian. Thus, *Sinomeganeura* demonstrates that the meganeurid diversity and wing venation disparity were comparable during the Namurian and the Stephanian, suggesting that this group already had a long history in the Early Carboniferous. Odonatoptera were probably the main, if not unique predators of the flying insects during the Late Paleozoic." (Authors)] Address: Ren Dong, College of Life Sciences, Capital Normal University, Beijing 100037, China. E-mail: rendong@mail.cnu.edu.cn

7129. Rice, T.M. (2008): A review of methods for maintaining odonate larvae in the laboratory, with a description of anew technique. *Odonatologica* 37(1): 41-54. (in English). ["Many studies on odonate larvae require the maintenance and rearing of specimens in the laboratory. A wide variety of methods have described the types of containers used and foods provided in raising these larvae. The present discourse is a review of the literature concerning housing and rearing of odonate larvae under laboratory conditions. Furthermore, a new design for short-term maintenance of libellulid larvae is described. Future scientists who desire to use odonate larvae in laboratory settings should benefit from having access to a synopsis of all previous methods in one review." (Author)] Address: Rice, T.M., Dept Biol. Sciences, University of South Alabama, Mobile, AL 36688, United States. E-mail: trice@jaguarl.usouthal.edu

7130. Rothfels, C. (2008): The Comet Darner (*Anax longipes*: Aeshnidae): possibly breeding in Canada. *Ontario Odonata* 7: 38-41. (in English). ["We captured and photographed a male *A. longipes* from the Crieff area, in southern Wellington County, during the 2005 Hamilton Odonate Count. It was in suitable breeding habitat for this species, and may have emerged at the site, although searches for reproductive evidence later in the season were unsuccessful. There are three previous Canadian records for *A. longipes* — this is the first Canadian record likely to represent a breeding population. Its presence at Crieff, with a rich assemblage of other odonate species, emphasizes the importance of Ashless aquatic habitats for the maintenance of odonate diversity in Ontario." (Author)] Address: Rothfels, C.J.; crothfels@rbg.ca

- 7131.** Rothfels, C. (2008): Dense darner swarm in Algonquin Provincial Park: observations and questions. *Ontario Odonata* 7: 42. (in English). [1-VIII-2005, dense darner swarm on the Carcajou Creek to Carcajou Bay portage (45.83N, -77.77W), Algonquin Park, Canada including at least *Aeshna canadensis*, *A. tuberculifera*, *A. clepsydra*, and *A. interrupta* preying on ants.] Address: Rothfels, C.J.; crothfels@rbg.ca
- 7132.** Rothfels, C. (2008): Three years of the Hamilton Odonate Count. *Ontario Odonata* 7: 43-48. (in English). ["The first three years of the Hamilton Odonate Count have been full of surprises. The count now boasts a cumulative species tally of 70, a one-day high of 62 species, and has had a significant positive effect on the study of odonates in the Hamilton region. This article provides an overview of the three count years, and a discussion of the role of the Hamilton Odonate Count (and insect counts in general) within the broader study of Odonata." (Author)] Address: Rothfels, C.J.; crothfels@rbg.ca
- 7133.** Rothfels, C. (2008): Odonata of Halton region, Ontario. *Ontario Odonata* 7: 33-37. (in English). [87 od. taxa are checklisted from the Halton, region, Ontario, Canada] Address: Rothfels, C.J.; crothfels@rbg.ca
- 7134.** Ruggiero, A.; Céréghino, R.; Figuerola, J.; Marty, P.; Angélibert, S. (2008): Farm ponds make a contribution to the biodiversity of aquatic insects in a French agricultural landscape. *Comptes Rendus Biologies* 331(4): 298-308. (in English, with French summary). ["Man made ecosystems provide a variety of resources that have strong economic values. We assessed the importance of 37 farm ponds for the biodiversity of Odonata in an agricultural landscape lacking natural wetlands in southwestern France. Farm ponds captured 40% of the regional species pool, including both common and rare species. The species assemblages were not correlated with pond use (e.g., cattle watering, duck farming, etc.) or to landscape variable. Species richness was correlated with pond area, suggesting that community diversity was primarily driven by autoecological processes. Farm ponds thus made a positive contribution to the maintenance of aquatic biodiversity. This added value for biodiversity should be considered when calculating the costs and benefits of constructing water bodies for human activities." (Authors)] Address: Angélibert, S., Laboratoire d'écologie fonctionnelle (EcoLab), UMR 5245, Université Paul-Sabatier, 118, route de Narbonne, 31062 Toulouse cedex 9, France
- 7135.** Sato, M.; Kohmatsu, Y.; Yuma, M.; Tsubaki, Y. (2008): Population genetic differentiation in three sympatric damselfly species in a highly fragmented urban landscape (Zygoptera: Coenagrionidae). *Odonatologica* 37(2): 131-144. (in English). ["The Amplified Fragment Length Polymorphism technique was used to compare the levels of genetic diversity and differentiation among *Paracercion calamorum*, *Ischnura senegalensis* and *I. asiatica* and to compare the genetic structure of populations found in highly fragmented urban habitats to populations in relatively continuous rural habitats. For all 3 species, high genetic diversity was found in both areas. However, population genetic differentiation among urban populations was approximately twice that of rural populations, indicating that movements between habitat patches are more restricted in urban areas, probably due to human disturbances that may function as barriers. Interspecific differences regarding genetic diversity and differentiation are further discussed in terms of habitat specificity." (Authors)] Address: Sato, M., Center for Ecological Research, Kyoto University, 509-3, Hirano 2, Otsu, Shiga, 520-2113, Japan. E-mail: Mayumi Sato, msato@ecology.kyoto-u.ac.jp
- 7136.** Scanlon, A.T.; Petit, S. (2008): Biomass and biodiversity of nocturnal aerial insects in an Adelaide City park and implications for bats (Microchiroptera). *Urban Ecosyst.* 11: 91-106. (in English). ["Temporal variation of insect communities in urban environments is poorly known and mechanisms driving these changes are unclear, as are the implications for insectivorous predators. We examined the relationships between season and nocturnal aerial insect biomass and biodiversity, and between temperature and insect biomass in the Adelaide zoological gardens from December 2005 to September 2006. We also compared the effectiveness of two insect trap types and used a bat detector to assess bat activity in relation to insect biomass. During the study, 9,939 insects from 13 orders were collected at the Adelaide zoo with a Malaise trap and a light trap. Mass and diversity of insects were highest during warm months, as was bat activity, and bat activity was positively correlated with insect biomass. Winter-active insects consisted predominantly of Diptera and Lepidoptera, which may provide an important winter food resource for insectivorous bats. The Malaise trap attracted fewer insect orders and biomass than did the light trap, and insects congregated within 6 m of artificial lights, so bats that forage at lights may have an advantage in urban areas. A strong need for the inclusion of urban insects to biodiversity inventories exists in the context of bat conservation." (Authors) Odonata were also trapped, but biomass was as low to be further processed.] Address: Petit, Sophie, School of Natural and Built Environments, University of South Australia, Mawson Lakes, South Australia 5095, Australia. E-mail: sophie.petit@unisa.edu.au
- 7137.** Schmidt, C.; Hachmöller, B.; Kühfuss, M. (2008): *Coenagrion ornatum* Selys, 1850 (Odonata: Zygoptera: Coenagrionidae) im Landschaftsschutzgebiet „Nassau“ bei Meißen / Sachsen. *Faunistische Abhandlungen* (Dresden) 26: 119-135. (in German, with English summary). ["*C. ornatum* has been rediscovered 2004 in Saxony. In the next year started a detailed survey in the period of May to August. The result of this survey was a total amount of 16 distinct habitats along the investigated ditches. The most ditch sections with proof of *C. ornatum* are characterized by a flow speed of 0.1–0.3 m/s, a dark ditch bottom and a high intensity of insolation. Typical species of the emers vegetation are *Nasturtium microphyllum*, *Sparganium erectum* and *Berula erecta*. The vegetation of the ditch banks is mostly influenced by the adjacent arable land. Often dominant species are *Urtica dioica* and *Galium aparine*. The main cause of endangering is seen in the early grow over which is supported by a very high nitrate content of the ditches. That's why is the cut of the nitrate content and a adapted ditch maintenance necessary for the preservation and stabilization of *C. ornatum* in the landscape protection area 'Nassau'." (Authors)] Address: Hachmöller, B., Regierungspräsidium Dresden, Umweltfachbereich, Wasastr. 50, 01445 Dresden, Germany. E-Mail: Bernard.Hachmoeller@rpdd.sachsen.de

7138. Schmidt, E.G. (2008): *Sympetrum depressiusculum* (Selys), a southern continental dragonfly depending on artificial habitats in atlantic northwestern Germany (State of Northrhine-Westphalia) (Anisoptera: Libellulidae). *Notulae odonatologicae* 7(1): 5-10. (in English). ["In the atlantic northwest of central Europe, *S. depress.* is confined to shallow artificial ponds with a particular aquatic vegetation, clear water, rich food supply (zooplankton, zoobenthos) for the larvae, and - due to drying up during winter - with reduced negative impact by fish. Essentially, water temperature has to rise above the average level typical for this region. Carp breeding ponds offer these conditions, favouring *S. depressiusculum* outside of its original area. The artificial carp breeding ponds provide invaluable chances for species conservation in this geographical region, furthering the state's official nature conservation management. Some lead water ponds near the Dutch-Belgian border (in the vicinity of Lommel) seem to provide similar habitat conditions. It is assumed, though still an open question, that *S. depressiusculum* is relying on the same ecological conditions in fish ponds in more continental areas of central Europe (e.g. the Lausitz district near the Oder; the Fränkisches Weihergebiet in the hilly zone of northern Bavaria). This paper should promote the verification of this assumption." (Author)] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

7139. Solimini, A.G.; Bazzanti, M.; Ruggiero, A.; Carchini, G. (2008): Developing a multimetric index of ecological integrity based on macroinvertebrates of mountain ponds in central Italy. *Hydrobiologia* 597: 109-123. (in English). ["The lack of biological systems for the assessment of ecological quality specific to mountain ponds prevents the effective management of these natural resources. In this article we develop an index based on macroinvertebrates sensitive to the gradient of nutrient enrichment. With this aim, we sampled 31 ponds along a gradient of trophic and with similar geomorphological characteristics and watershed use in protected areas of the central Apennines. A bioassessment protocol was adopted to collect and process benthic samples and key-associated physical, chemical, and biological variables during the summer growth season of 1998. We collected 61 genera of macroinvertebrates belonging to 31 families. We calculated 31 macroinvertebrate metrics based on selected and total taxa richness, richness of some key groups, abundance, functional groups and tolerance to organic pollution. The gradient of trophic was quantified with summer concentrations of chlorophyll *a*. We followed a stepwise procedure to evaluate the effectiveness of a given metric for use in the multimetric index. Those were the pollution tolerance metric ASPT, three metrics based on taxonomic richness (the richness of macroinvertebrate genera, the richness of chironomid taxa, and the percentage of total richness composed by Ephemeroptera, Odonata, and Trichoptera), two metrics based on FFG attributes (richness of collector gatherer taxa and richness of scraper taxa) and the habit based metric richness of burrowers. The 95th percentile of each metric distribution among all ponds was trisected for metric scoring. The final Pond Macroinvertebrate Integrity Index ranged from 7 to 35 and had a good correlation ($R^2 = 0.71$) with the original gradient of environmental degradation." (Authors) Odonata are treated on the genus level.] Address: Solimini, A.G., European Commission, Joint Research Centre, Institute for Environment and

Sustainability, TP 290, 21027 Ispra, Italy. E-mail: angelo.solimini@jrc.it

7140. Solomon, C.T.; Carpenter, S.R.; COLE, J.J.; Pace, M.L. (2008): Support of benthic invertebrates by detrital resources and current autochthonous primary production: results from a whole-lake ^{13}C addition. *Freshwater Biology* 53(1): 42-54. (in English). ["1. Secondary production of benthic invertebrates in lakes is supported by current autochthonous primary production, and by detritus derived from a combination of terrestrial inputs and old autochthonous production from prior seasons. We quantified the importance of these two resources for the dominant benthic insects in Crampton Lake, a 26 ha, clear-water system. 2. Daily additions of $NaH^{13}CO_3$ to the lake caused an increase in the stable carbon isotope ratios ($d^{13}C$) of the current primary production of phytoplankton and periphyton. We measured the response of four insect groups (taxon-depth combinations) to this manipulation, quantifying their current autochthony (% reliance on current autochthonous primary production) by fitting dynamic mixing models to time series of insect $d^{13}C$. 3. The $d^{13}C$ of all four groups increased in response to the manipulation, although the magnitude of response differed by taxon and by depth, indicating differences in current autochthony. Odonate larvae (Libellulidae and Corduliidae) collected at 1.5 m depth derived 75% of their C from current autochthonous primary production. Chironomid larvae collected at 1.5, 3.5 and 10 m depths derived, respectively, 43%, 39% and 17% of their C from current autochthonous primary production. 4. Both taxon-specific diet preferences and depth-specific differences in resource availability may contribute to differences in current autochthony. Our results demonstrate significant but incomplete support of insect production by current autochthony, and indicate that allochthonous inputs and old autochthonous detritus support a substantial fraction (25–83%) of insect production." (Authors)] Address: Solomon, C.T., Center for Limnology, University of Wisconsin, Madison, WI 53706, U.S.A. E-mail: ctsolomon@wisc.edu

7141. Squires, Z.E.; Bailey, P.C.E.; Reina, R.D.; Wong, B.B.M. (2008): Environmental deterioration increases tadpole vulnerability to predation. *Biology letters* 4(4): 392-394. (in English). ["Human-induced environmental change is occurring at an unprecedented rate and scale. Many freshwater habitats, in particular, have been degraded as a result of increased salinity. Little is known about the effects of anthropogenic salinization on freshwater organisms, especially at sublethal concentrations, where subtle behavioural changes can have potentially drastic fitness consequences. Using a species of Australian frog (*Litoria ewingii*), we experimentally examined the effects of salinization on tadpole behaviour and their vulnerability to a predatory dragonfly nymph (*Hemianax papuensis*). We found that tadpoles exposed to an ecologically relevant concentration of salt (15% seawater, SW) were less active than those in our freshwater control (0.4% SW). Tadpoles in elevated salinity also experienced a higher risk of predation, even though the strike rate of the predator did not differ between salt and freshwater treatments. In a separate experiment testing the burst-speed performance of tadpoles, we found that tadpoles in saltwater were slower than those in freshwater. Thus, it would appear that salt compromised the anti-predator response of tadpoles and made them more susceptible to being captured.

Our results demonstrate that environmentally relevant concentrations of aquatic contaminants can, even at sublethal levels, severely undermine the fitness of exposed organisms." (Authors)] Address: Squires, Zoe E., School of Biological Sciences, Monash University, Victoria 3800, Australia

7142. Takahara, T.; Kohmatsu, Y.; Yamaoka, R. (2008): Predator-avoidance behavior in anuran tadpoles: a new bioassay for characterization of water-soluble cues. *Hydrobiologia* 607: 123-130. (in English). ["In freshwater systems, little is known about the characteristics of chemical cues derived from predators which induce defensive responses in prey species. To elucidate traits of predator chemical cues, we examined chemical cues originating from water incubated by the nymph of the dragonfly *Anax parthenope julius*, which induces low activity as predator-avoidance behaviour in tadpoles of two anuran species, the Japanese tree frog *Hyla japonica* and the wrinkled frog *Rana (Rugosa) rugosa*. *H. japonica* exhibited a reduction in tail movement time as low activity in response to both untreated incubation water and incubation water that had volatile substances removed by freeze-drying. The response threshold of *R. rugosa* to chemical cues was determined to be one dragonfly nymph in a water volume between 500 and 5,000 ml. We found that chemical cues inducing predator-avoidance behaviour in anuran tadpoles have water-soluble non-volatile characteristics. In this study, we devised both the bioassay to assess the effects of chemical cues and the method to enrich the cues by freeze-drying, which can serve as a tool in the process of identification of unknown chemical cues in freshwater predator-prey interaction." (Authors)] Address: Takahara, T., Venture laboratory, Graduate School of Science and Technology, Kyoto Institute of Technology, Matsugasaki-gosyokaido, Sakyo, Kyoto 606-8585, Japan. E-mail: taka02@kit.ac.jp

7143. Takougang, I.; Barbazan, P.; Tchounwou, P.B.; Noumi, E. (2008): The value of the freshwater snail dip scoop sampling method in macroinvertebrates bioassessment of sugar mill wastewater pollution in Mbandjock, Cameroon. *International Journal of Environmental Research and Public Health* 5(1): 68-75. (in English). ["Macroinvertebrates identification and enumeration may be used as a simple and affordable alternative to chemical analysis in water pollution monitoring. However, the ecological responses of various taxa to pollution are poorly known in resources-limited tropical countries. While freshwater macroinvertebrates have been used in the assessment of water quality in Europe and the Americas, investigations in Africa have mainly focused on snail hosts of human parasites. There is a need for sampling methods that can be used to assess both snails and other macroinvertebrates. The present study was designed to evaluate the usefulness of the freshwater snail dip scoop method in the study of macroinvertebrates for the assessment of the SOSUCAM sugar mill effluents pollution. Standard snail dip scoop samples were collected upstream and downstream of the factory effluent inputs, on the Mokona and Mengoala rivers. The analysis of the macroinvertebrate communities revealed the absence of Ephemeroptera and Trichoptera, and the thriving of Syrphidae in the sections of the rivers under high effluent load. The Shannon & Weaver diversity index was lower in these areas. The dip scoop sampling protocol was found to be a useful method for macroinvertebrates collection. Hence, this

method is recommended as a simple, cost-effective and efficient tool for the bio-assessment of freshwater pollution in developing countries with limited research resources." (Authors) Odonata are treated on the family level.] Address: Takougang, I., Dept of Public Health, Faculty of Medicine & Biomedical Sciences, University of Yaounde I, P.O. Box 1364, Cameroon. E-mail: itakougang@yahoo.com

7144. Theischinger, G.; Richards, S.J. (2008): *Argiolestes trigonalis* spec. nov., a new species from Papua New Guinea (Zygoptera: Megapodagrionidae). *Odonatologica* 37(2): 167-171. (in English). [The new species is described from lowland rainforest in Gulf Province, Papua New Guinea. Holotype ♂; PNG, Gulf province, Dark-End Lumber, 2-X-1999; deposited at SAMA, Adelaide. Diagnostic characters of the adult ♂ are illustrated and the affinities of the species with *A. pectitus* and *A. lamprostomus* are discussed.] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: gunther.theischinger@environment.nsw.gov.au

7145. Touchon, J.C.; Warkentin, K.M. (2008): Fish and dragonfly nymph predators induce opposite shifts in color and morphology of tadpoles. *Oikos* 117(4): 634-640. (in English). ["Many prey species, including amphibian larvae, can adaptively alter colouration and morphology to become more or less conspicuous to predators. Despite abundant research on predator-induced plasticity in tadpoles, the combination of colour and morphological responses to predators remains largely unexplored. We measured predator-induced morphological and colour plasticity in tadpoles. We reared tadpoles of the neotropical treefrog *Dendropsophus ebraccatus* with dragonfly nymph or fish predators, or in a predator-free control. After 10 days, we digitally photographed tadpoles and measured eight morphometric variables and five tail colour variables. Tadpoles reared with nymphs developed the largest and reddest tails, but incurred a developmental cost, being the smallest overall. Cues from fish induced an opposite tail phenotype in tadpoles, causing shallow achromatic tails. Control tadpoles developed intermediate tail phenotypes. This provides the first experimental evidence that tadpoles can shift both colour and morphology in opposite, predator-specific directions in response to a fish and an odonate predator. Despite mean differences, however, there was substantial variation in the degree of phenotype induction across treatments. Tail redness was correlated with tail spot size, but not perfectly, indicating that colour and morphology may be partially decoupled in *D. ebraccatus*. Balancing selection from multiple conflicting predators may result in genetic variation for developmental plasticity." (Authors)] Address: Touchon, J.C., Dept of Biology, Boston Univ., 5 Cummington St., Boston, MA 02215, USA. E-mail: jtouchon@bu.edu

7146. Trisnawati, I.; Nakamura, K. (2008): Abundance, diversity and distribution of above-ground arthropods collected by window traps from Satoyama in Kanazawa, Japan: an order level analysis. *Far Eastern Entomologist* 181: 1-23. (in English, with Russian summary). ["Satoyama, the traditional rural landscape of Japan, has been paid much attention because, beside its many important roles, it is a key to biodiversity conservation in Japan. The effects of habitat heterogeneity and restoration activities on the abundance and diversity of above-ground arthropod assemblages were studied using win-

dow traps in a "satoyama area" within Kanazawa University's Campus, Kanazawa, Japan in 2005 and 2006. Monthly samples were taken at upper and ground levels from nine sites, including forested areas and valley areas with paddies under restoration. A total of 93,134 individuals from 24 orders, including 18 Insecta orders, 3 Arachnida, 2 Crustacea and 1 Chilopoda, were collected during the study, and an order level analysis was carried out. At the upper level, Diptera was the dominant order (about 70%), followed by Homoptera and Coleoptera (5-10 %), and at ground level, Diptera (about 40%), Collembola (10%), and ants (8%) were dominant. DCA ordination revealed a clear separation of arthropod order compositions among different habitat types and between upper and ground levels, but the separation was less apparent between years. DCA ordination of 18 orders revealed the variation of spatial distribution of these orders in accordance with habit ("flying" or "non-flying") and habitat preference ("forests" or "cultivated valley" sites)." (Authors) The taxa list also includes Odonata, which are very rarely sampled.] Address: Nakamura, K., Division of Biodiversity, Institute of Nature & Environmental Technology, Kanazawa University, Kakuma, Kanazawa, 920-1192, Japan. E-mail: koji@kenroku.kanazawa-u.ac.jp

7147. Tsuchiya, K.; Hayashi, F. (2008): Surgical examination of male genital function of calopterygid damselflies (Odonata). *Behavioral Ecology and Sociobiology*: 1417-1425. (in English). ["Male genitalia show rapid and divergent evolution. It is rarely determined whether variation in male genital morphology influences male reproductive success. Male damselflies possess a unique aedeagus with a re-curved head and spiny lateral processes, and most ♀♀ have two sperm storage organs, a spherical bursa copulatrix and a tubular spermatheca. Previous studies have indicated that the re-curved head may remove bursal sperm, whereas the lateral processes remove spermathecal sperm. However, we need more direct evidence of these functions. We compared sperm number in female sperm storage organs by interrupting copulation to examine sperm removal by the male. In *Calopteryx cornelia*, ♂♂ removed almost all bursal sperm but only partially removed spermathecal sperm. In contrast, ♀♀ of *Mnais pruinosa* store sperm primarily in the bursa, and ♂♂ removed only bursal sperm. To examine the functions of male spiny lateral processes, we compared mating behaviour between control and experimental ♂♂ from which we removed (cut) the lateral processes. In *C. cornelia*, cutting of the lateral processes resulted in a decreased number of abdominal movements during copulation and no removal of spermathecal sperm. The amount of bursal sperm removed during copulation also decreased in experimental ♂♂ compared to the unmanipulated ♂♂. However, in *M. pruinosa*, the experimental removal of male lateral processes did not decrease the abdominal movements and little affected the removal of bursal sperm. Interspecific differences between *C. cornelia* and *M. pruinosa* may be caused by variation in the strategies of female sperm storage." (Authors)] Address: Tsuchiya, K., Department of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji Tokyo, 192-0397, Japan. E-mail: tsuchiya-kaori@ed.tmu.ac.jp

7148. Vadadi-Fülöp, C.S.; Hufnagel, L.; Sipkay, C.S.; Verasztó, C.S. (2008): Evaluation of climate change scenarios based on aquatic food web modelling. *Applied ecology and environmental research* 6(1): 1-28.

(in English). ["In the years 2004 and 2005 we collected samples of phytoplankton, zooplankton and macroinvertebrates in an artificial small pond in Budapest, Hungary. We set up a simulation model predicting the abundance of the cycloids, *Eudiaptomus zacharias* and *Ischnura pumilio* by considering only temperature as it affects the abundance of population of the previous day. Phytoplankton abundance was simulated by considering not only temperature, but the abundance of the three mentioned groups. This discrete-deterministic model could generate similar patterns like the observed one and testing it on historical data was successful. However, because the model was overpredicting the abundances of *Ischnura pumilio* and *Cyclopoida* at the end of the year, these results were not considered. Running the model with the data series of climate change scenarios, we had an opportunity to predict the individual numbers for the period around 2050. If the model is run with the data series of the two scenarios UKHI and UKLO, which predict drastic global warming, then we can observe a decrease in abundance and shift in the date of the maximum abundance occurring (excluding *Ischnura pumilio*, where the maximum abundance increases and it occurs later), whereas under unchanged climatic conditions (BASE scenario) the change in abundance is negligible. According to the scenarios GFDL 2535, GFDL 5564 and UKTR, a transition could be noticed." (Authors)] Address: Vadadi-Fülöp, C. S., Dept Syst. Zoology and Ecology, Eötvös Loránd University, H-1117 Budapest, Pázmány P. sétány 1/c, Hungary. E-mail: vadfulcsab@gmail.com

7149. Vargas, A.; Mittal, R.; Dong, H. (2008): A computational study of the aerodynamic performance of a dragonfly wing section in gliding flight. *Bioinspiration & Biomimetics* 3: 1-13. (in English). ["A comprehensive computational fluid-dynamics-based study of a pleated wing section based on the wing of *Aeshna cyanea* has been performed at ultra-low Reynolds numbers corresponding to the gliding flight of these dragonflies. In addition to the pleated wing, simulations have also been carried out for its smoothed counterpart (called the 'profiled' airfoil) and a flat plate in order to better understand the aerodynamic performance of the pleated wing. The simulations employ a sharp interface Cartesian-grid-based immersed boundary method, and a detailed critical assessment of the computed results was performed giving a high measure of confidence in the fidelity of the current simulations. The simulations demonstrate that the pleated airfoil produces comparable and at times higher lift than the profiled airfoil, with a drag comparable to that of its profiled counterpart. The higher lift and moderate drag associated with the pleated airfoil lead to an aerodynamic performance that is at least equivalent to and sometimes better than the profiled airfoil. The primary cause for the reduction in the overall drag of the pleated airfoil is the negative shear drag produced by the recirculation zones which form within the pleats. The current numerical simulations therefore clearly demonstrate that the pleated wing is an ingenious design of nature, which at times surpasses the aerodynamic performance of a more conventional smooth airfoil as well as that of a flat plate. For this reason, the pleated airfoil is an excellent candidate for a fixed wing micro-aerial vehicle design." (Authors)] Address: Mittal, R., Dept of Mechanical & Aerospace Engineering, The George Washington University, Washington DC 20052, USA. E-mail: mittal@gwu.edu

7150. Walther, D.A.; Whiles, M.R. (2008): Macroinvertebrate responses to constructed riffles in the Cache River, Illinois, USA. *Environmental Management* 41(4): 516-527. (in English). ["Stream restoration practices are becoming increasingly common, but biological assessments of these improvements are still limited. Rock weirs, a type of constructed riffle, were implemented in the upper Cache River in southern Illinois, USA, in 2001 and 2003–2004 to control channel incision and protect high quality riparian wetlands as part of an extensive watershed-level restoration. Construction of the rock weirs provided an opportunity to examine biological responses to a common in-stream restoration technique. We compared macroinvertebrate assemblages on previously constructed rock weirs and newly constructed weirs to those on snags and scoured clay streambed, the two dominant substrates in the unrestored reaches of the river. We quantitatively sampled macroinvertebrates on these substrates on seven occasions during 2003 and 2004. Ephemeroptera, Plecoptera, and Trichoptera (EPT) biomass and aquatic insect biomass were significantly higher on rock weirs than the streambed for most sample periods. Snags supported intermediate EPT and aquatic insect biomass compared to rock weirs and the streambed. Nonmetric multidimensional scaling (NMDS) ordinations for 2003 and 2004 revealed distinct assemblage groups for rock weirs, snags, and the streambed. Analysis of similarity supported visual interpretation of NMDS plots. All pair-wise substrate comparisons differed significantly, except recently constructed weirs versus older weirs. Results indicate positive responses by macroinvertebrate assemblages to in-stream restoration in the Cache River. Moreover, these responses were not evident with more common measures of total density, biomass, and diversity." (Authors)] Address: D. A. Walther (&) M. R. Whiles Dept of Zoology & Center for Ecology, Southern Illinois University Carbondale, Carbondale, IL 62901-6501, USA. E-mail: denise.walther@yahoo.com

7151. Wang, Y.; Wang, Y.; Lu, P.; Zhang, F.; Li, Y. (2008): Diet composition of post-metamorphic bullfrogs (*Rana catesbeiana*) in the Zhoushan archipelago, Zhejiang Province, China. *Frontiers of Biology in China* 3(2): 219-226. (in English). ["Bullfrogs (*Rana catesbeiana*) are listed as one of the 100 worst invasive alien species in the world. They are generalist predators and thus may affect native species through predation. In previous studies, the food contents of bullfrogs were mostly examined at a single site. In the present study, the diet composition of post-metamorphic bullfrogs on eight islands (Daishan, Liheng, Xiushan, Fodu, Taohua, Xiashi, Cezi, and Putuoshan) in the Zhoushan Archipelago, Zhejiang Province of China, were examined by using the stomach flushing method from June 30 to August 11 in 2005. A total of 391 individual frogs were measured, including 113 adults and 278 juveniles. The analysis of the stomach contents shows that, for adult bullfrogs, the most important prey (by diet volume) overall were Decapoda, Coleoptera, Odonata, Mesogastropoda, Raniformes, and Cypriniformes. For juvenile bullfrogs, these were Decapoda, Coleoptera, Cypriniformes, Odonata, Orthoptera, Hymenoptera, Lepidoptera larvae, Mesogastropoda, and Raniformes. Moreover, the prey size and diet volume increased with the body size of both adult and juvenile bullfrogs. The diet composition of primary preys of bullfrogs was significantly different among the islands. The results indicate that bullfrogs exert different predatory influences on native

fauna at different sites and that bullfrogs are generalist predators with extensive ecological impacts on native fauna." (Authors)] Address: Li, Y., Key Lab. of Animal Ecology and Conservation Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing, 100080, China. Email: liym@ioz.ac.cn

7152. Ward, L.; Mills, P.J. (2008): Substrate selection in larval *Calopteryx splendens* (Harris) (Zygoptera: Calopterygidae). *Odonatologica* 37(1): 69-77. (in English). ["Under experimental conditions, the relationship between substrate composition, with and without the presence of an emergence support, and larval distribution was investigated. Results revealed that *C. splendens* larvae showed a clear preference for a pebble substrate as opposed to sand or silt, when all 3 substrates were equally available. However, the substrate type decreased in importance as the density of the emergence support increased. Results suggest that the morphological adaptations of *C. splendens* larvae, to cling to a substrate, can be utilised equally in a vegetated habitat and a habitat predominated by pebbles and cobbles. This has implications for the dispersal of *C. splendens* to areas containing, traditionally, less favoured habitat. Range expansion of *C. splendens* on its northern borders, where aquatic habitat characteristics can differ markedly from waterways in lowland southern England, is discussed." (Authors)] Address: Ward, Luise, Askham Bryan College, Askham Bryan, York, YO23 3FR, UK

7153. Watanabe, M.; Matsu'ura, S.; Fukaya, M. (2008): Changes in distribution and abundance of the endangered damselfly *Mortonagrion Hirosei* Asahina (Zygoptera: Coenagrionidae) in a reed community artificially established for its conservation. *Journal of Insect Conservation*: (in English). ["Population trends of the brackish water damselfly, *Mortonagrion Hirosei* were studied for 4 years in the reed community artificially established for conservation of this endangered species. Because of difficulty with mark-and-recapture experiments on this small damselfly with weak wings in the large dense reed community, census counts using the line transect method were performed to estimate the population parameters. The reed rhizomes were transplanted in January of 2003. A few adults immigrated to the community in the flying season of this year, but they were restricted near the original habitat. The number of adults throughout the flying season was estimated at 1,000. In 2004, the population included both the immigrants from the original habitat and the emergences from the established habitat, and the total population was estimated at 10,000, and the daily density in peak flight season was 20% that in the original habitat. An estimated 23,000 individuals were found all over the established habitat in 2005. In 2006, the estimated number of adults in the established habitat was 45,600, and the population density increased almost equal to that in the original habitat. Therefore we can conclude that the damselfly had settled in the established habitat.] Address: Watanabe, Mamoru, Graduate School of Life & Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8577, Japan. E-mail: watanabe@kan-kyo.envr.tsukuba.ac.jp

7154. Wayland, M.; Headley, J.V.; Peru, K.M.; Crosley, R.; Brownlee, B.G. (2008): Levels of polycyclic aromatic hydrocarbons and dibenzothiophenes in wetland sediments and aquatic insects in the oil sands area of Northeastern Alberta, Canada. *Environ. monit. assess.*

136(1-3): 167-182. (in English). ["An immense volume of tailings and tailings water is accumulating in tailings ponds located on mine leases in the oil sands area of Alberta, Canada. Oil sands mining companies have proposed to use tailings- and tailings water-amended lakes and wetlands as part of their mine remediation plans. Polycyclic aromatic hydrocarbons (PAHs) are substances of concern in oil sands tailings and tailings water. In this study, we determined concentrations of PAHs in sediments, insect larvae and adult insects collected in or adjacent to three groups of wetlands: experimental wetlands to which tailings or tailings water had been purposely added, oil sands wetlands that were located on the mine leases but which had not been experimentally manipulated and reference wetlands located near the mine leases. Alkylated PAHs dominated the PAH profile in all types of samples in the three categories of wetlands. Median and maximum PAH concentrations, especially alkylated PAH concentrations, tended to be higher in sediments and insect larvae in experimental wetlands than in the other types of wetlands. Such was not the case for adult insects, which contained higher than expected levels of PAHs in the three types of ponds. Overlap in PAH concentrations in larvae among pond types suggests that any increase in PAH levels resulting from the addition of tailings and tailings water to wetlands would be modest. Biota-sediment accumulation factors were higher for alkylated PAHs than for their parent counterparts and were lower in experimental wetlands than in oil sands and reference wetlands. Research is needed to examine factors that affect the bioavailability of PAHs in oil sands tailings- or tailings water-amended wetlands." (Authors)] Address: Wayland, M., Environment Canada, Prairie & Northern Wildlife Research Centre, 115 Perimeter Rd., Saskatoon, SK S7N 0X4, Canada. E-mail: mark.wayland@ec.gc.ca

7155. Westermann, K. (2008): Sex ratio in a population of *Lestes viridis*: spatial and temporal variability at emergence (Odonata: Lestidae). *International Journal of Odonatology* 11(1): 115-129. (in English). ["In a large population of *L. viridis* inhabiting a complex, extended system of channels in the floodplain of the Upper Rhine River near Weisweil (Baden-Württemberg, Germany) detailed samples of exuviae were collected from several subpopulations. For each sample the sex ratio was determined. For statistical reasons only samples with at least 700 exuviae were considered. These samples sometimes differed highly significant in the sex ratio at emergence. The sex ratio was sitespecific, but differed significantly for different subpopulations with variation in water temperature. Thus, damselfly larvae showed sex-dependent habitat preferences. The frequency of ♂♂ ranged from 49.4% to 57.5%. Statistically significant small-scale differences in sex ratio, which have not previously been described, could not be attributed to different preferences of the sexes with respect to larval habitat and emergence site. No coherent explanation for this phenomenon could be advanced. ♀♀ on average emerged earlier than ♂♂; in one of the samples the median emergence date differed by four days." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhhausen, Germany. E-mail: fosor@t-online.de

7156. Williams, P.; Whitfield, M.; Biggs, J. (2008): How can we make new ponds biodiverse? A case study monitored over 7 years. *Hydrobiologia* 597: 137-148. (in English). ["A new pond complex, designed to enhance

aquatic biodiversity, was monitored over a 7-year period. The Pinkhill Meadow site, located in grassland adjacent to the R. Thames, proved unusually rich in terms of its macrophyte, aquatic macroinvertebrate and wetland bird assemblages. In total, the 3.2 ha mosaic of ca. 40 permanent, semi-permanent and seasonal ponds and pools was colonized by approximately 20% of all UK wetland plant and macroinvertebrate species over the 7-year survey period. This included eight invertebrate species that are Nationally Scarce in the UK. The site supported three breeding species of wading bird and was used by an additional 54 species of waders, waterfowl and other wetland birds. The results from four monitoring ponds investigated in more detail showed that these ponds significantly supported more plant and macroinvertebrate species than both minimally impaired UK reference ponds, and other new ponds for which compatible data were available. Comparisons of the physico-chemical, hydrological and land-use characteristics of the Pinkhill pools with those of other new ponds showed that the site was unusual in having a high proportion of wetlands in the near surrounds. It also had significantly lower water conductivity than other ponds and a higher proportion of (non-woodland) semi-natural land in its surroundings. Given that ponds are known to contribute significantly to UK biodiversity at a landscape level, and that several thousand new ponds are created each year in the UK alone, the findings suggest that well designed and located pond complexes could be used to significantly enhance freshwater biodiversity within catchments." (Authors) The supplementary material to this paper contains a list of 13 odonate species observed at Pinkhill.] Address: Williams, P., Pond Conservation: The Water Habitats Trust, Oxford Brookes University, Gypsy Lane, Headington, Oxford OX3 0BP, UK. E-mail: pwilliams@brookes.ac.uk

7157. Yang, G.-h.; Mao, B.-y.; Xu, J.-s.; Yang, Z.-z. (2008): A preliminary report on the investigation of dragonflies from Cangshan Nature Reserve of Yunnan. *Journal of Dali University* 7(2): 9-11. (in Chinese, with English summary). [Checklist of Odonata from Cangshan National Nature Reserve of Yunnan, China. 1 species is said to be a new addition to the Chinese list, and 5 species were newly recorded in Yunnan. *Ischnura mildredae*, *I. senegalensis*, *Ceragrion fallax*, *Somatochlora dido*, *Epophthalmia elegans*, *Cephalaeschna magdalena*, *Anisogomphus maacki*, *Mesopodagrion tibetanum*, *Sympetrum darwinianum*, *S. fonscolombii*, *Pantala flavescens*, *Crocothemis servilia*, *Orthetrum japonicum* *internum*, and *O. sabina* are outlined in the discussion, and therefore should contain the new additions.] Address: Yang, G.-h., College of Life Science and Chemistry, Dali University, Dali, Yunnan, 671000, China

7158. Yu, X.; Yang, G.H.; Bu, W.-J. (2008): A study of the genus *Pyrrhosoma* from China with description of a new species (Odonata, Coenagrionidae). *Acta Zootaxonomica Sinica* 33(2): 358-362. (in Chinese, with English summary). ["The present paper sums up the research history of *Pyrrhosoma* Charpentier, with emphasis on diagnostic characters of the genus. Besides the red body colour, one important diagnostic character for *Pyrrhosoma* is the presence of distinct hook-like projection between male cerci and paraprocts, called the ventral branch by Kalkman (2006), which extended from the very base of cerci. As Asahina (1973) pointed out, Needham (1930) had confused *Pyrrhosoma tinctipenne* with *Calicnemia* sp. from China, however, his unique

figure about this species (Needham, 1930. p. 191 Fig. 12[5]) was right about *P. tinctipenne*. *Pyrhosoma latiloba* sp. nov. (Holotype ♂, Zhongdian, Yunnan, China, 4 Aug. 2005, YANG Guo-Hui leg., Paratype 1 ♀, ditto.) Type specimens will be deposited in the Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, China. The new species is similar to *P. tinctipenne* from China. The differences between these two species were listed in a table. The new species can be distinguished from two European species by colour pattern and the shape of ligula." (Authors)] Address: Yu, X., Inst. Entomology, College of Life Sciences, Nankai University, Tianjin 300071, China

7159. Zampella, R.A.; Bunnell, J.F.; Procopio, N.A.; Bryson, D.E. (2008): Macroinvertebrate assemblages in blackwater streams draining forest land active and abandoned cranberry bogs. *Wetlands* 28(2): 390-400. (in English). ["Cranberry agriculture is a major land use in parts of the New Jersey Pinelands, USA. We compared the composition of genus-level macroinvertebrate assemblages collected from three habitats (muck, vegetated muck, and woody debris) in 12 New Jersey Pinelands blackwater streams draining forest, abandoned-cranberry bogs, and active-cranberry bogs and evaluated whether variations in macroinvertebrate assemblages were related to differences in land uses within the associated drainage basins. All 12 streams were relatively slow moving and acidic, with low conductance values and dissolved oxygen concentrations. Muck was the dominant substrate at most stream sites. Many of the taxa that we encountered are adapted to lentic habitats, slow-moving lotic habitats, or low-oxygen environments. Macroinvertebrate composition differed significantly between the active-cranberry streams and the other two stream types and was associated with a complex environmental gradient represented by variations in dissolved oxygen, temperature, specific conductance, stream width, and woody debris. Overall, the effect of stream type appeared to overshadow that of the three different habitats. Although we cannot conclude that subtle between-site differences in dissolved oxygen were responsible for variations in community composition, many of the genera associated with the forest and abandoned-bog/active-cranberry ends of the community gradient are reported to have contrasting tolerances to low-oxygen levels. The relationship between reduced canopy cover and both lower woody-debris cover and higher stream temperatures, which can influence dissolved-oxygen levels, was most likely related to forest-canopy removal associated with historic and active-cranberry agriculture." (Authors) The study includes records of *Ischnura* sp.] Address: Zampella, R.A., Pinelands Commission, P.O. Box 7, New Lisbon, New Jersey, USA 08064. E-mail: zampella@njpinelands.state.nj.us

7160. Zessin, W.; Zolohar, J.; Hitij, T. (2008): A new fossil dragonfly (Insecta, Odonata, Libellulidae) of the Miocene (Lower - Sarmatian) of the Tunjice Hills, Slovenia. *Virgo* 11(1): 86-96. (in English, with German summary). [*Sloveniatrum robici* n. gen. n. sp. "corresponds to the Upper Serravallian of the Mediterranean scale and covers a time span of approximately 1.1 Ma between ~11.6 and ~12.7 Myr before present) in the Sarmatian deposits of the Tunjice Hills, Slovenia is described." (Authors)] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

7161. Zhang, B.-L.; Pang, H.; Jia, F.-L.; Liang, G.-Q., Ren, D. (2008): Cluster analysis of Zygoptera (Odonata: Zygoptera) fauna in parts of southern China. *Journal of Environmental Entomology* 30(1): 24-32. (in Chinese, with English summary). ["41 genera of Zygoptera located in 8 infra-regions in Guangdong, Hainan, Hongkong, Taiwan and Macao were analyzed by distance coefficient average clustering and nearest neighbour clustering. The result of distance coefficient average clustering shows that Nanling group is the farthest group from the polymer converged stage by stage of the other groups. According to the nearest neighbour clustering, Nanling, Heishiding and Jianfengling converged to a group; Pearl River plain, Hongkong and Taiwan converged to another group; the third group converged by Macau and Neilingding Island is the farthest one. As result, the former shows the latitudinal aggregation and the latter shows the aggregation based on altitude." (Authors)] Address: Zhang, B.-L., College of Life Science, Capital Normal University, Beijing 100037, China

7162. Zhou, X.; Zhou, W.-b (2008): A new species of the genus *Megalestes* (Odonata: Chlorolestidae) from China. *Entomotaxonomia* 30(1): 1-3. (in Chinese, with English summary). [*Megalestes palaceus* sp. nov. is described, figured and compared with the similar *M. distans* and *M. hui*. Holotype: ♂, Xiaodanjiang, Leigong Mountain, Guizhou Province, China, 20.IX-2005.] Address: Zhou, W.-b, Zhejiang Museum of Natural History, Hangzhou, Zhejiang 310012, China

7163. Rigotti, M.; Costa, J.M. (oJ): Artigo científico: Comunidade de insetos aquáticos imaturos da ordem Odonata associados às caixas de empréstimo ao longo da rodovia que liga o Buraco das Piranhas a Corumbá (trecho Buraco das Piranhas - Curva do Leque, 45 km) no Pantanal da Sub-Região do Miranda - Mato Grosso do Sul. Online publication of the "Portal da Horticultura", Brazil (<http://br.geocities.com/horticultura1/index.htm>), Publication No 9: 1-7. (in Portuguese). [<http://br.geocities.com/horticultura1/Artigo9.pdf>] Address: rigottims@fca.unesp.br.

7164. Carvalho, A.L. (2008): On some paintings of Odonata from the late middle ages (14th and 15th centuries). *Odonatologica* 36(3): 243-253. (in English). ["Painted representations of Odonata from the 14th and 15th centuries, found in the masterpieces cited below, are described and commented on: "Belleville Breviary", Paris (J. Pucelle, ca 1323-1326); "Allegory of Good Government", Siena (A. Lorenzetti, ca 1338-1340); "The Two Lovers", Southern Germany (anonymous, ca 1470) and "Hastings Hours", Flandres (anonymous, ca 1480). The symbolic meaning of the Odonata representation in each work seems to be different. The damselfly painted in the "Belleville Breviary", probably based on a male *Calopteryx* specimen, represents the oldest known European representation of Odonata yet." (Author)] Address: Carvalho, A.L., Depto de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br



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7165. Riddiford, N.; Mayol, J. (1997): Els odonats del Parc natural de s'Albufera. Butll. Parc Albufera 3: 63-67. (in Catalan, with English summary) ["This paper summarises the data on Odonata collected study by Earthwatch Europe Project s'Albufera teams since 1989, in spring, summer and autumn. It also includes the few bibliographic data available. Especially noteworthy are the observations of *Sympetrum sanguineum* not previously recorded in the Balearic Islands, and new records of the rare species *Selysiothemis nigra*. Some spectacular concentrations of *Aeshna mixta* occur in autumn. In all, the Park list stands at 17 species (15 from our own observations) of 26 known for the Islands, making s'Albufera a key site for the biodiversity of this group in the Balearics." (Authors)] Address: not stated

7166. Samways, M.J.; Stewart, D.A.B. (1997): An aquatic ecotone and its significance in conservation. *Biodiversity and Conservation* 6: 1429-1444. (in English) ["Aquatic invertebrates were sampled throughout an area of transition between a well-established reservoir and a perennial stream in the KwaZulu-Natal Midlands of South Africa. The visibly obvious separation of stream and reservoir was not reflected by the invertebrates. Communities overlapped in species, ranging from fast-flowing stream and moderate-flowing stream, through a transitional ecotone, which ran along the exposed reservoir edge and stream edges, to sheltered edges of reservoir and stream then to open reservoir. These features reflected the degree of water movement (whether from waves or ripples) and type of substratum, rather than visibly lotic or lentic conditions. The main aquatic ecotone between the open reservoir and the main stream was therefore not at the mouth of the stream but along the edges of both systems. The centre of the reservoir and centre of the stream, although physically connected, were quite different in their invertebrates and were separate 'patches' with a sharp boundary. They were faunistically connected through the communities of the edge ecotone. The ecotone acted like a semi-permeable membrane to the drifting stream fauna with movement back again apparently mostly in the air, suggesting a 'patchy metapopulation' model. Both the river continuum and boundary concepts were

applicable to this multi-system. The ecotone did not show any edge effect and accords more with the 'variegation' than 'fragmentation' model. The great difference in patterns of pelagic, littoral and terrestrial communities has important implications for zoning of water bodies for different conservation and recreation activities." (Authors) Odonata are listed or treated at several occasions.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7167. Turner, A.M.; McCarty, J.P. (1997): Resource availability, breeding site selection, and reproductive success of red-winged blackbirds. *Oecologia* 113(1): 140-146. (in English) [oas 23;"Red-winged blackbirds are polygynous and show strong breeding site preferences, but it is unclear which environmental factors regulate their reproductive success and are ultimately responsible for shaping their patterns of habitat selection and their mating system. We evaluated the effect of variation in insect emergence rates on the reproductive success of male and female redwings nesting on replicate ponds. The number of male and female redwings that settled on a pond varied two- to three-fold among ponds, but was not related to insect emergence rates. Insect emergence rates had a positive effect on the number of nestlings successfully fledged by females, the number of nestlings fledged from male territories, and on the mass of nestlings at fledging. *Typha* stem density also varied widely among ponds, and was positively related to male and female settling density and mass of nestlings at fledging, but not to the number of nestlings fledged by females or males. We conclude that alternative breeding sites differ in their ability to support redwing reproduction, and that the availability of emerging odonates is an important environmental factor influencing the reproductive success of both male and female red-winged blackbirds." (Authors)] Address: Turner, A.M., Kellogg Biological Station and Department of Zoology, Michigan State University, Hickory Corners, MI 49060, USA.

1998

7168. Bacetti, N.; Chelazzi, L.; Colombini, I.; Serra, L. (1998): Preliminary data on the diet of migrating Ruffs *Philomachus pugnax* in northern Italy. *International Wa-*

der Studies 10: 361-364. (in English, with Russian summary) [Odonata larvae contributed sparsely to the diet of Ruffs in northern Italy.] Address: Bacetti, Nicola, INFS, Via Ca Fornacetta 9, I-40064 Ozzano Emilia BO, Italy

7169. Carvalho, A.L.; Nessimian, J.L. (1998): Odonata do Estado do Rio de Janeiro, Brasil: habitats e hábitos das larvas. Ecol. Insetos Aquát. Rio de Janeiro, 5 (Série Oecologia Brasiliensis): 3-38. (in Portuguese, with English summary) ["Odonata from Rio de Janeiro State, Brazil: habitats and habits of the larvae - Rio de Janeiro State is located in southeastern Brazil, occupying only 0,52% (44,268 Km²) of the total area of the country. Species of 77 genera and 12 families are currently known to occur in this State: Calopterygidae (2 gen.); Dictyrididae (1 gen.); Lestidae (1 gen.); Megapodagrionidae (2 gen.); Perilestidae (1 gen.); Coenagrionidae (14 gen.); Protoneuridae (5 gen.); Pseudosligmatidae (1 gen.); Aeshnidae (10 gen.); Gomphidae (11 gen.); Corduliidae (2 gen.); Libellulidae (27 gen.). Information about habitat preferences and habits of larvae of 133 species of 62 genera were considered in this study, being 19 of them registered for the first time. It was observed that species of 27 genera are lotic dwellers and those of 27 others associated with lentic habitats. Species of 8 genera occur both in lentic and lotic waters. There is no information about larvae of 15 genera yet. In relation to the habits of the larvae it was observed that the majority of Zygoptera from lentic habitats behave as climbers (e.g. *Acanthagrion* spp., *Idioneura ancilla*, *Ischnura* spp., *Leptagrion* spp., *Telebasis* spp.), as the major part of Aeshnidae too (e.g. *Aeshna* spp., *Coryphaeschna* spp., *Gynacantha* spp., *Neuraeschna costalis*, *Remartinia lutetpennis*). Representatives of these two groups become clingers in lotic habitats (e.g. *Argia* spp., *Hetaerina* spp., *Heteragrion* spp., *Limnetron* spp., *Oxyagrion* spp., *Staurophlebia reticulata*). Some Zygoptera has been classified secondarily as swimmers (e.g. *Lestes* spp., *Perilestes fragilis*). Almost all of the species of Gomphidae behave as burrowers. From the other side, the Libellulidae and Corduliidae have been considered as sprawlers in almost their totality." (Author)] Address: Carvalho, A.L., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

7170. De Marco, P.; Latini, A.O. (1998): Estrutura de guildas e riqueza de espécies em uma comunidade de larvas de anisoptera (Odonata). Oecologia Brasiliensis 5(1): 101-112. (in Portuguese, with English summary) ["Guild structure and species richness in an Anisoptera (Odonata) larval community" - Odonate larvae are important components of the littoral systems in lakes. They are considered food generalises and interact among themselves by a complex of competition and predation of the early upon the late breeders. Here, we determine the guild structure for odonates sampled in Lugon Carioca. Parque Estadual do Rio Doce (PERD), MG, Brasil based on microhabitat use. We only found two species of the macrophyte-dweller guild to seven bottom-dweller species. Using a jackknife procedure, we found that the species richness of the areas with macrophytes were higher than the areas where the macrophytes are absent.] Address: De Marco, P., Laboratório Ecologia Teórica e Síntese, Departamento de Biologia Geral, Universidade Federal de Goiás, BR-74001-970, Goiania, GO, Brazil. E-mail: pdemarco@icb.ufg.br

7171. Mitchell, F. (1998): Flying dragons in the backyard. Pond & Garden May/June 1998: 30-35. (in English) [Introduction to water gardening for Odonata.] Address: Mitchell, F.L., Texas Agricultural Experiment Station, Texas Agricultural Extension Service, The Texas A&M University System, Route 2, Box 00, Stephenville, TX 76401, USA. E-mail: f-mitchell@tamu.edu

7172. Rask, M.; Nyberg, K.; Markkanen, S.-L.; Ojala, A. (1998): Forestry in catchments: effects on water quality, plankton, zoobenthos and fish in small lakes. Boreal Environmental Research 3: 75-86. (in English) [Odonata in the diet of perch (*Perca fluviatilis*) varied significantly with locality and year.] Address: Rask, M., Finnish Game & Fisheries Research Inst., Evo Fisheries Research and Aquaculture, FIN-16970 Evo, Finland

1999

7173. Ax, P. (1999): Das System der Metazoa II. Ein Lehrbuch der phylogenetischen Systematik. G. Fischer Verlag. ISBN 3-437-35528-7: 384 pp. (in German) [Odonata pp. 277-280]

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2000

7175. Kishi, K. (2000): [Tholymis tillarga collected in Fujisawa, Kanagawa prefecture]. Gekkan-Mushi 357: 45-46. (in Japanese) [1 male, 2 females, Fujisawa City, 12/15-IX-1999.] Address: Kishi, K., A-101, Mistral Shonan, 488-1, Ishokawa, Fujisawa. Kanagawa. 252-0815, Japan

7176. Martin, R. (2000): Una excursión odonológica al Pirineos de Lérida. Boln. S.E.A. 27: 23-26. (in Spanish, with English summary) [11 species from a total of 20 species regionally known, were recorded in July 1997 at nine lakes and ponds of the Lerida's Pyrenees (El Valle de Aran, La Alta Ribagorza, Paliars Sobirà).] Address: Martin, R., Avda. Marti Pujol, 250,3o 4a. 08911 Badalona (Barcelona), Spain

7177. Ponta, U. (2000): Makrozoobenthische Bestandsaufnahme an zwei Kärntner Bächen (Wölfnitz und Wimitz) und deren Analyse. Carinthia II 190/110: 635-640. (in German) [Austria; the paper includes records of *Calopteryx splendens* and *Onychogomphus forcipatus* which are not further specified.] Address: Ponta, Ursula, Kärntner Institut für Seenforschung, Verein für angewandte Gewässerökologie, Fiatschacherstraße 70, 9020 Klagenfurt, Austria.

7178. Reichholf, J. (2000): Früheres Vorkommen der beiden Quelljungfer-Arten *Cordulegaster bidentatus* und *Cordulegaster boltonii* an den "Dachlwänden" am unteren Inn. Mitt. zool. Ges. Braunau 7(4): 327-328. (in German) [The author reports local records from 1969 and 1971 referring to both species of *Cordulegaster* in Bavaria, Germany which are regional rare and threatened.] Address: Reichholf, J.H., Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany

7179. Werren, J.H.; Windsor, D.M. (2000): *Wolbachia* infection frequencies in insects: evidence of a global equilibrium? Proc. R. Soc. Lond. B 267: 1277-1285. (in English) ["*Wolbachia* are a group of cytoplasmically inherited bacteria that cause reproduction alterations in arthropods, including parthenogenesis, reproductive incompatibility, feminization of genetic males and male killing. Previous general surveys of insects in Panama and Britain found *Wolbachia* to be common, occurring in 16-22% of species. Here, using similar polymerase chain reaction methods, we report that 19.3% of a sample of temperate North American insects are infected with *Wolbachia*, a frequency strikingly similar to frequencies found in two other studies in widely separated locales. The results may indicate a widespread equilibrium of *Wolbachia* infection frequencies in insects whose maintenance remains to be explained. Alternatively, *Wolbachia* may be increasing in global insect communities. Within each of the three geographic regions surveyed, Hymenoptera are more frequently infected with A group *Wolbachia* and Lepidoptera more frequently infected with B group *Wolbachia*.] Address: Werren, J.H., Department of Biology, University of Rochester, Rochester, NY 14627, USA

2001

7180. Huang, D.; Nel, A. (2001): New 'hemeroscopid' larvae from the lower cretaceous of China: Systematic and phylogenetic implications (Anisoptera). Odonatologica 30(3): 341-344. (in English) ["A large number of fossil dragonfly larvae have been collected in Lushangfen Formation (Lower Cretaceous), SW of Beijing, China. All the well-preserved specimens are closely similar to the larvae attributed by L.N. Pritykina (1977, Trans. Soviet-Mongol paleontol. Exped. 4:81-96) to *Hemeroscopus baissicus* Pritykina, 1977, particularly for the labial mask structures." (Authors)] Address: Huang, D.,

Nanjing Institute of Geology and Palaeontology, Academia Sinica, Nanjing, 210008, China. E-mail: huangdiy-ing@sina.com

7181. Perron, J.M.; Ruel, Y. (2001): Addition à la faune odonologique du territoire du marais Léon-Provancher, Neuville, Québec. Le naturaliste Canadien 125(1): 37-38. (in French) [*Calopteryx amata*, *C. maculata*, *Enallagma ebrium*, *Aeshna tuberculifera*, *Cordulegaster maculata*, *Cordulia shurtleffi*, *Leucorrhinia frigida*, and *Libellula luctuosa* are added to the regional list amounting the number of species to 50.] Address: not stated

7182. Skilsky, I.V.; Klitin, A.N. (2001): Trophic relations of the Little Bittern in the Prut-Dniester interfluvium of Ukraine. Ecologia, Berkut 10(2): 203-206. (in Ukrainian, with English summary) [Contents of 17 stomachs of *Ixobrychus minutus*, collected since 1940s, were analysed. Insects prevailed (56,3 %), and body parts of fishes amounted to 25,0 %. During the spring and early summer the birds feed on invertebrates (water Coleoptera and Ephemeroptera predominate), in the summer-autumn period they prey on vertebrates (small fishes and amphibia). *Aeshna grandis* is the only Odonata recorded as food of the Little Bittern.] Address: Skilsky, I.V., P.O. Box 532, 58001 Chernivtsi, Ukraine

2002

7183. Fumi Kumagai, A. (2002): Os Ichneumonidae (Hymenoptera) da Estação Ecológica da Universidade Federal de Minas Gerais, Belo Horizonte, com ênfase nas espécies de Pimplinae. Revista Brasileira de Entomologia 46(2): 189-194. (in Portuguese, with English summary) [A few Odonata were caught by accident in malaise traps.] Address: Fumi Kumagai, Alice, Departamento de Zoologia, Universidade Federal de Minas Gerais. Caixa Postal 486, 31.270-901 Belo Horizonte-MG, Brasil. Endereço eletrônico: acfk@icb.ufmg.br

7184. Kalnins, M. (2002): Banded Darner, *Sympetrum pedemontanum* (Allioni, 1766) (Odonata: Libellulidae), a new dragonfly in the fauna of Latvia. Latvian Entomologist 39: 44-45. (in English with Latvian summary) [1 adult male, gravel pit near Kangarnieki, Riga district, 15-VII-2001.] Address: Kalnins, M., Ent. Soc. Latvia, 4 Kronvald Blvd, LV-1586 Riga, Latvia

Karube, H. (2002): *Watanabeopelalia* gen nov., a new genus of the dragonflies (Odonata, Cordulegasteridae, Chlorogomphina). Nabesania, Special Bull. Jap. Soc. Coleopterol. 2002(5): 67-85. (in English) ["The new genus is erected to include *Orogomphus atkinsoni* Sel. (type species), *Chlorogomphus uenoi* Asahina and *Chloropetalia usignata* Chao. The *Chloropetalia* Carle is redefined and downgraded to the rank of a tribe that includes the genus *Chloropetalia* and *Watanabeopelalia* gen. n.; the pertaining species are redescribed and illustrated." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

7185. Lang, H.; Lang, C.; Raab, R. (2002): Insekt des Jahres 2002: Steckbrief Quelljungfer *Cordulegaster* sp. (Odonata: Cordulegasteridae. Beiträge zur Entomofaunistik 3: 192-193. (in German) [Profile of the insect of the year 2002 in Austria, considering *Cordulegaster bol-*

tonii, C. heros, and Thecagaster bidentata.] Address: Raab, R., Technisches Büro für Biologie, Quadenstraße 13, A-2232 Deutsch-Wagram, Austria. E-mail: rainer.raab@gmx.at

7186. Petillon, J.; Dusoulier, F. (2002): Liste commentée d'Invertébrés récoltés dans le bassin rennais en 2000/2001. LOMBRIC A BRAC n°46: 16-25. (in French) [*Ischnura elegans* was recorded in a gravel pit near Lormandière (Chartres-de-Bretagne), France, 05-V-2001.] Address: Petillon, J., 111, Boulevard de l'Europe, 29200 Brest, France. E-mail: j.petillon@voila.fr

2003

7187. Appleton, C.C.; Curtis, B.A.; Alonso, L.E.; Kipping, J. (2003): Freshwater invertebrates of the Okavango delta, Botswana. In: Alonso, L.E. & Nordin L.-A. (2003): A rapid biological assessment of the aquatic ecosystems of the Okavango Delta, Botswana: High water survey. RAP Bulletin of Biological Assessment 27, Conservation International, Washington DC: 58-68. (in English) ["Selected invertebrate taxa, including Hirudinea, Decapoda, Heteroptera, Ephemeroptera, Odonata, Gastropoda, and Bivalvia, were collected semi-quantitatively in four focal areas of the Okavango Delta. The invertebrate fauna was found to be relatively uniform in all four areas and there was little evidence that it changed as habitat diversity increased from the Panhandle to the seasonal part of the Delta. A largely different fauna was found in ephemeral rainpools isolated from the deltaic habitats in the Moremi and Chief's Island areas. More species would probably have been recorded had the expedition taken place during the summer months, i.e. November to March, when the water would have been warmer and the depth shallower. Several new species and new records for the Delta were found." (Authors)] Address: Kipping, J., BioCart - Ökologische Gutachten & Studien, Albrecht-Dürer-Weg 8, D-04425 Taucha, Germany. E-mail: BioCartKipping@web.de

7188. Carneiro Vital, M.V.; De Marco Júnior, P. (2003): Padrão Diário de Atividade de *Tigriagrion aurantinigrum* (Odonata: Coenagrionidae). VI Congresso de Ecologia do Brasil, Fortaleza: 305. (in Portuguese) [Diel activity patterns are outlined. For details see: [http://www.biologia.ufrj.br/labs/labvert/Artigos/VICongEcol\(MVVi eira\).pdf](http://www.biologia.ufrj.br/labs/labvert/Artigos/VICongEcol(MVVi eira).pdf)] Address: Carneiro Vital, M.V., Mestrando em Biologia, Universidade Federal de Goiás, Brasil. E-mail: mvcvital@hotmail.com

7189. Ferreras-Romero, M.; Cano-Villegas, F.J.; Salamanca-Ocaña, J.C. (2003): Valoración de la cuenca del río Guadiamar (sur de España), afectada por un vertido minero, en base a su odonofauna. *Limnetica* 22(3-4): 53-62. (in Spanish, with English summary) ["We analysed the Odonata community in the area of the river Guadiamar catchment (southern Spain) affected by a mining spill which occurred in April 1998. Compared to other Andalusian catchments, the number of species found (18) was not particularly low, although a significant proportion (55.5%) belonged to the family Libellulidae. Absence of some species common in Iberian rivers belonging to typically rheophilous families (e.g. Gomphidae and Calopterygidae) was significant. This fact highlights the current bad ecological conditions of this part of the catchment. In addition, zoogeographical analysis showed that a high proportion of elements are

of North-African origin." (Authors)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain. E-mail: ferreras@teleline.es

7190. Gilbert, G.; Tyler, G.; Smith, K.W. (2003): Nestling diet and fish preference of Bitterns *Botaurus stellaris* in Britain. *Ardea* 91(1): 35-44. (in English) ["We provide quantitative information on the diet of nestling Bitterns, examine the factors influencing diet composition and determine whether adult females are choosing particular species and size of prey. Sixty regurgitate samples from 44 broods were examined during visits to Bittern nests made at nine sites in England from 1996 to 2001. Compositional analysis was used to assess influence of age, season and year effects on diet. The fish component of the diet was compared with species found to be generally available within each site from electro fishing data. Eel *Anguilla anguilla* and Rudd *Scardinius erythrophthalmus* made up the greatest proportion of biomass of the diet and this proportion did not significantly change with the age of the chicks. [...]" (Authors) Libellulidae contributed only rarely to the diet of the chicks.] Address: Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL; E-mail: Gillian.Gilbert@rspb.org.uk

7191. Mukhtar, M.; Herrel, N.; Amerasinghe, F.P.; Ensink, J.; van der Hoek, W.; Konradsen, F. (2003): Role of wastewater irrigation in mosquito breeding in south Punjab, Pakistan. *Southeast Asian jour. trop. med. public health* 34(1): 72-80. (in English) ["Mosquito breeding within the wastewater irrigation system around the town of Haroonabad in the southern Punjab, Pakistan, was studied from July to September 2000 as part of a wider study of the costs and benefits of wastewater use in agriculture. The objective of this study was to assess the vector-borne human disease risks associated with mosquito species utilizing wastewater for breeding. Mosquito larvae were collected on a fortnightly basis from components of the wastewater disposal system and irrigated sites. In total, 133 samples were collected, about equally divided between agricultural sites and the wastewater disposal system. [...] The prevalence of established vectors of human diseases such as *An. stephensi* (malaria), *Cx. tritaeniorhynchus* (West Nile fever, Japanese encephalitis) and *Cx. quinquefasciatus* (Bancroftian filariasis, West Nile fever) in the wastewater system indicated that such habitats could contribute to vector-borne disease risks for human communities that are dependent upon wastewater use for their livelihoods. Wastewater disposal and irrigation systems provide a perennial source of water for vector mosquitoes in semiarid countries like Pakistan. Vector mosquitoes exploit these sites if alternative breeding sites with better biological, physical, and chemical conditions are not abundant." (Authors) The paper also contains a few notes on Odonata specified on the genus level.] Address: Mukhtar, M., International Water Management Institute (IWMI), 12 Km Multan Road, Chowk Thokar Niaz Baig, Lahore 53700, Pakistan. E-mail: m.mukhtar@cgiar.org

7192. Perez, A.J.; Morales, E.; Oromi, P.; Lopez, H. (2003): Fauna de artrópodos de Montaña Clara (islas Canarias) II: Hexápodos (no coleópteros). *Vieraea* 31: 237-251. (in Spanish, with English summary) [*Anax ephippiger* and *Sympetrum fonscolombii* were recorded

during fieldwork carried out in Montaña Clara between 2000 and 2002.] Address: Pérez, A.J., Depto. de Biología Animal, Universidad de La Laguna, 38206 La Laguna, Tenerife, Spain

7193. Prokop, J. (2003): Remarks on palaeoenvironmental changes based on reviewed Tertiary insect associations from the Krušné hory piedmont basins and the Ěeské stědohoří Mts in northwestern Bohemia (Czech Republic). *Acta zoologica cracoviensia*, 46 (suppl. - Fossil Insects): 329-344. (in English) ["Cenozoic insect fauna of northwestern Bohemia is preserved in fluviolacustrine deposits of the Krušné hory piedmont basins and the Ceské stredohorí Mts. The fossil insect assemblages are correlated with palaeobotanical results. The local palaeoenvironmental conditions such as the distance from the shoreline or water depth are interpreted. A reflection of changes in distribution of fossil entomofaunas is compared with relevant world localities of different palaeoenvironments. The sparse fossil insect taphocoenoses fill a gap in record of significant diverse non-marine invertebrate communities and serve for reconstruction of terrestrial palaeoecosystems. The selected fossil sites demonstrate insect taphocoenoses formed under conditions of the palaeoenvironment of a diatomaceous lake with subtropical forests (Kuěln), lowlands of riparian and mesophytic forests (Kundratice - Seifhennersdorf), warm-temperate swamp to riparian forests (Bilina mine) and lake sedimentation near mixed mesophytic forests (Mokřina). The aim is to compare fossil entomofaunas from several periods within Tertiary in northwestern Bohemia and search for analogous palaeoenvironmental conditions in other areas. The results are correlated with the previously proposed palaeobotanical models." (Author) Many references to Odonata are made.] Address: Prokop, J. Department of Palaeontology, Faculty of Science, Charles University, Albertov 6, CZ-128 43 Prague 2, Czech Republic. E-mail: jprokop@natur.cuni.cz

7194. Vieira, V.,; Borges, P.A.V.; Karsholt, O.; Wunderlich, J. (2003): La fauna de artrópodos de la isla de Corvo (Azores): lista actualizada de las especies incluyendo nuevos. *Vieraea* 31: 145-156. (in English, with Spanish summary) [Portugal; Anax imperator: Vila do Nova do Corvo: 12.IX.02 - One specimen at Porto da Casa, one observed flying at Pico João de Moura.] Address: Vieira, V., Universidade dos Açores, Departamento de Biologia, CIRN, Rua da Mãe de Deus, PT - 9501-801 Ponta Delgada, Açores, Portugal. E-mail: vvieira@notes.uac.pt

7195. Wada, S. (2003): Scientific Report of Nakaikemi Marsh, Tsuruga, Fukui Prefecture. Chapter 8 Insect Fauna of Nakaikemi Marsh and its neighboring areas. (4) The Odonata fauna in Nakaikemi and its current status. Research Report from the National Institute for Environmental Studies, Japan 176: 291-307. (in Japanese) ["In this report, *Sympetrum pedemontanum elatum* (Selys, 1872) is added to the Odonata fauna of Nakaikemi, and the total number of the Odonata species recorded there reached 70 (belonging to 10 families), which attains approximately 35% of the Japanese Odonata fauna (total 197 species). The biodiversity of Odonata in Nakaikemi reflects the diversity of the aquatic environments there, but the abandonment of paddy cultivation and the construction of the road in the wetland in recent years have caused some drastic changes in the aquatic environment, such as the succession of the

wetland, water pollution, the disappearance of several species of aquatic plants, and a marked increase in the number of the American crawfish in almost every canal and wetland in Nakaikemi. These changes have caused fatal damage to the habitats of many Odonata species. The number of larvae of the inhabitants of the canals and wetlands has remarkably decreased, and two vulnerable species, *Aeschnophlebia longistigma* Selys, 1883 and *Aeschnophlebia anisoptera* Selys, 1883, which are typical wetland inhabitants, have not been recorded in Nakaikemi for more than five years." (Author)] Address: Wada, S., National Inst. Environmental Studies, Japan

2004

7196. Anonymus (2004): Tricks of the trade. *Williamsonia* 8(3): 4-5. (in English) [Tips to improve the equipment of field odonatologists are provided.] Address: not stated

7197. Bambaradeniya, C.N.B.; Edirisinghe, J.P.; De Silva, D.N.; Gunatilleke, C.V.S.; Ranawana, K.B.; Wijekoon, S. (2004): Biodiversity associated with an irrigated rice agro-ecosystem in Sri Lanka. *Biodiversity and Conservation* 13: 1715-1753. (in English) ["Irrigated rice fields are temporary wetland agro-ecosystems, managed with a variable degree of intensity. A survey was carried out in Sri Lanka to document the overall biodiversity associated with this unique agro-ecosystem, using a combination of sampling techniques to document different groups of fauna and flora. The total number of biota recorded and identified from the rice field ecosystem during the entire study period consisted of 494 species of invertebrates belonging to 10 phyla and 103 species of vertebrates, while the flora included 89 species of macrophytes, 39 genera of microphytes and 3 species of macrofungi. Of the total species documented, 15 species of invertebrates and one weed species are new records to Sri Lanka. Arthropods were the dominant group of invertebrates (405 species), of which 55 species were rice pest insects, and 200 species were natural enemies of pest insects. The fauna and flora recorded from the rice field were observed to follow a uniform pattern of seasonal colonization and succession during successive rice cultivation cycles. The biodiversity of the irrigated rice agro-ecosystem interests both agroecologists and conservation biologists. Therefore, the integrated efforts of these two groups can result in the formulation of strategies based on biodiversity as an organizing principle in the sustainable management of the rice field agro-ecosystem." (Author) 19 Odonata taxa are listed.] Address: Bambaradeniya, C.N.B., IUCN - The World Conservation Union, Sri Lanka Country Office, No. 53, Horton Place, Colombo 07, Sri Lanka. E-mail: cnb@iucnsl.org

7198. Dijkstra, K.-D. (2004): Dragonflies (Odonata) of Mulanje Mountain, Malawi. *Nyala* 22: 3-8. (in English) ["Sixty-five species of Odonata are recorded from Mulanje and its slopes. Only eight species dominate on the high plateau. Among them are two relict species of conservation concern: The endemic *Oreocnemis phoenix* (monotypic genus) and the restricted-range species *Chlorolestes elegans*. The absence of mountain marsh specialists on the plateau is note-worthy. Mulanje's valleys, of which Likabula and Ruo are best known, have a rich dragonfly fauna. The Eastern Arc relict *Nepogom-*

phoides stuhlmanni is common here." (Author)] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

7199. Giribet, G.; Edgecombe, G.D.; Carpenter, J.M.; d'Haese, C.A.; Wheeler, W.C. (2004): Is Ellipura monophyletic? A combined analysis of basal hexapod relationships with emphasis on the origin of insects. *Organisms, Diversity & Evolution* 4: 319-340. (in English) ["Hexapoda includes 33 commonly recognized orders, most of them insects. Ongoing controversy concerns the grouping of Protura and Collembola as a taxon Ellipura, the monophyly of Diplura, a single or multiple origins of entognathy, and the monophyly or paraphyly of the silverfish (Lepidotrichidae and Zygentoma s.s.) with respect to other dicondylous insects. Here we analyze relationships among basal hexapod orders via a cladistic analysis of sequence data for five molecular markers and 189 morphological characters in a simultaneous analysis framework using myriapod and crustacean outgroups. Using a sensitivity analysis approach and testing for stability, the most congruent parameters resolve Tricholepidion as sister group to the remaining Dicondylia, whereas most suboptimal parameter sets group Tricholepidion with Zygentoma. Stable hypotheses include the monophyly of Diplura, and a sister group relationship between Diplura and Protura, contradicting the Ellipura hypothesis. Hexapod monophyly is contradicted by an alliance between Collembola, Crustacea and Ectognatha (i.e., exclusive of Diplura and Protura) in molecular and combined analyses." (Authors) Many references are made to Odonata; Anax junius and Libellula pulchella are represented in the analyses.] Address: Giribet, G., Dept of Organismic & Evolutionary Biology, Museum of Comparative Zoology, Harvard University, 16 Divinity Avenue, Cambridge, MA 02138, USA. E-mail ggiribet@oeb.harvard.edu

7200. Mbabazi, D.; Orach-Meza, F.L.; Makanga, B.; Hecky, R.E.; Baliwa, J.S.; Ogotu-Ohwayo, R.; Verburg, P.; Namulemo, G.; Muhumuza, E.; Luvisa, J. (2004): Trophic structure and energy flow in fish communities of two lakes of the Lake Victoria basin. *Uganda journal of agricultural science* 9: 348-359. (in English) [Odonata are included in the study of fish diet in Lake Victoria, Uganda.] Address: Mbabazi, D., Lake Victoria Environmental Management Project. P.O. Box 5. Entebbe. Uganda

7201. McCoy, M.W.; Savitzky, A.H. (2004): Feeding ecology of larval *Ambystoma mabeei* (Urodela: Ambystomatidae). *Southeastern Naturalist* 3(3): 409-416. (in English) ["*A. mabeei* is listed as threatened in Virginia due to its rarity and susceptibility to urbanization and poor forestry practices. The purposes of this study were to determine the composition of the diet of larval *A. mabeei* and to compare larval diet in different geographic regions to gain insights into the ecology of Virginia populations. Ninety-eight percent (N = 75) of all *A. mabeei* larvae dissected contained food items. Virginia samples harbored higher loads of gastric parasites (Nematodes) than individuals from other locations. Furthermore, prey species found in the stomachs of Virginia specimens were different than those of conspecifics from more southern locations. Higher loads of gastric parasites in Virginia animals may be related to their diet, which in turn is related to the forest cover over natural ponds.

Habitat disturbance and parasite prevalence may have major implications both for larval survival and for the long-term persistence of *A. mabeei* populations in this portion of their range." (Author) Odonata contributed to the diet of salamanders as follows: North Carolina: 12.2% and Virginia: 11.1%.] Address: McCoy, M., Dept of Zoology, University of Florida, PO Box 118525, Gainesville, FL 32611-8525, USA. E-mail: mmccoy@zoo.ufl.edu.

7202. Murphy, G.W. (2004): Uptake of mercury and relationship to food habits of selected fish species in the Shenandoah river basin, Virginia. Thesis, Master of Science, Fisheries and Wildlife Sciences, Faculty of the Virginia Polytechnic Institute and State University: 221 pp. (in English) [Mercury poses significant challenges to human health and fisheries management. Historical industrial practices in Waynesboro, Virginia left portions of the Shenandoah River basin contaminated with mercury and stringent health advisories for fish consumption. I investigated processes affecting the bioaccumulation of mercury in *Catostomus commersoni*, *Ictalurus punctatus*, *Lepomis auritus*, and *Micropterus dolomieu* by studying food habits, total mercury and methylmercury in common prey items, and bioaccumulation dynamics of methylmercury in the mercury contaminated South River and South Fork of the Shenandoah River and uncontaminated North River. Additionally, I evaluated sexual and seasonal variations of total mercury in *M. dolomieu* in the South Fork of the Shenandoah River. Algae, aquatic insects, crayfish, detritus, and fish accounted for 75-97% of the diet. Total mercury in aquatic invertebrates and forage fish in contaminated rivers ranged from 66.7-398.3 and 198.0-594.9 ng/g wet weight, while total mercury in aquatic invertebrates and forage fish in the reference river were 4.4 and 29.3 ng/g. Model simulations indicated that dietary pathways accounted for 87% of methylmercury uptake by fish in contaminated rivers, but only 57% in the reference river. Total mercury in *M. dolomieu* was 19-20% higher in females than males and 14-21% higher during spring than summer and fall. Results of this study indicate that bioenergetics based bioaccumulation models are valuable tools for evaluating field data, identifying processes critical to contaminant accumulation, and comparing outcomes of alternative management options associated with pollution control, ecosystem management, and/or restoration activities for management guidance prior to costly expenditures." (Author) Odonata are treated on the order level. Predacious aquatic invertebrates (e.g., Odonata) normally exhibited higher concentrations of total mercury than herbivorous and detritivorous invertebrates.] Address: not stated

7203. O'Brien, M. (2004): *Aeshna subarctica*, a historical oddity?. *Williamsonia* 8(3): 2-3. (in English) [The author re-examines "records" of *A. subarctica* from Michigan, USA, and states that the species should be eliminated from the state list.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

7204. O'Brien, M. (2004): *Epitheca costalis* in Michigan: update. *Williamsonia* 8(3): 1-2. (in English) [A re-examination of *Epitheca* specimens from Michigan, USA resulted in the addition of *E. cynosura* to the state list.] Address: O'Brien, M., Insect Division, Museum of Zoo-

logy, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

7205. O'Brien, M. (2004): An unusual mode of contraception. *Williamsonia* 8(3): 5. (in English) [12VII-2003, Michigan, USA. One male *Gomphus quadricolor* was collected with the terminal abdominal segments of a female still attached to the male's penis.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

7206. Poulton, B.C. (2004): Chapter 4. Aquatic invertebrates of Lisbon Bottom Wetlands. Ecological dynamics of wetlands at Lisbon Bottom, Big Muddy National Fish and Wildlife refuge, Missouri: 83-113. (in English) ["Aquatic macroinvertebrates were sampled both qualitatively and quantitatively from March-July 1999 to characterize the community composition and density in different types of wetlands at Lisbon Bottom based on water source, permanence, available vegetation structure, and timing of flood pulses. Twelve wetlands were sampled 1-2 times per month to document species richness (timed sweep-net sample), and eight wetlands were sampled at least once every two weeks for measuring macroinvertebrate density (0.24-m dia. stovepipe). From this study and previous macroinvertebrate research including adjacent riverine habitats (Lisbon Chute, mainstem Missouri River, etc.). a total of 260 species are known to exist in the Lisbon area, over half of which are unique to the flood-plain wetland complex. Richness of Odonata, Coleoptera, Hemiptera, and Ephemeroptera was high in vegetated areas of most wetlands: however, richness of Diptera was lower than that reported in other studies and the Trichoptera were nearly absent. Temporary wetlands held water throughout the winter months due to the fall 1998 flood, and the invertebrate community was dominated by overwintering species and groups of pioneer taxa that were available for dispersal to other basins after flooding occurred in mid-April. Species richness was lowest in deep scours, and highest in seasonal wetlands. Both species richness and density (#/m²) were highest when margin vegetation was inundated, which corresponds with a period of 2-3 weeks after the flood pulse. Richness and density were also highest in seasonal wetlands: scours had lowest species richness throughout the early part of the study, but increased by late spring and summer periods. In all but the deep scours, the ratio of predator / herbivore-detritivores gradually declined during the study period, and the ratio of benthic / pelagic invertebrates peaked during the post-flood period. Both of these indicators appear to correspond with changes in the availability of organic matter due to flooding. Recommendations and goals for managing flood-plain wetlands for maximization of wildlife value will also maximize the availability and productivity of macroinvertebrate food sources for other wildlife species, while increasing biodiversity.] Address: <http://infolink.cr.usgs.gov/Science/Lisbon/4Invertebrates.pdf>

7207. Puyshkin, V.B., Yevstafiev, A.I., Gromenko, V.M. & Ruybka, T.S. (>2004?): *Insecta* [sic!], Odonata. Biodiversity of the Crimean Peninsula: 131-135. (in Russian) [Based on 11 of the papers that deal with odonate fauna of the Crimean Peninsula a list is compiled showing the distribution and abundance of the 49 recorded species across 12 steppe and 9 mountain landscape units. The species are then explicitly listed again under

three distribution headings: i) species restricted to a certain distribution zone, ii) species typical for one zone but also found in the other, iii) species with azonal distribution and again under four abundance groups (massive, common, rare, very rare). It is concluded that the dragonfly fauna of the Crimean Peninsula is heterogeneous, that several species should be included in the Red Data Book and that further investigations are necessary. Abstracter's note: Caution might be necessary in adopting even these very general conclusions as the large number of misspellings and taxonomic mistakes and the incomplete literature treatment suggests this survey is not exhaustive.] Address: not stated

7208. Reash, R.J. (2004): Dissolved and total copper in a coal ash effluent and receiving stream: Assessment of in situ biological effects. *Environmental Monitoring and Assessment* 96(1-3): 203-220. (in English) ["An in situ chemical and biological study was conducted in the lower Muskingum River (southeast Ohio, U.S.A.) to evaluate potential effects of copper (Cu) discharged from a coal ash effluent. Effluent total Cu, dissolved Cu, TSS and pH measurements were performed monthly during January-December 1995. Benthic macroinvertebrates were sampled at five river locations using artificial substrate samplers, and in situ Cu analyses were conducted. Effluent Cu (total) ranged from 8 to 142 µg L⁻¹ (mean = 58 µg L⁻¹), but dissolved Cu never exceeded 78 µg L⁻¹ (mean = 20 µg L⁻¹). The mean ratio of dissolved Cu to total Cu in these samples was 32%. Total Cu concentrations at the biological sampling sites adjacent to the effluent discharge were higher than levels at ambient sites, but dissolved Cu levels were similar among all sites. The macroinvertebrate community proximal to the coal ash effluent had the highest number of taxa and total number of individuals; a high number of mayfly and caddis fly taxa; and the highest Invertebrate Community Index score. The high water velocity of the discharge (which likely contained particulate organic matter) apparently created a favorable microhabitat that, combined with Cu-complexing constituents in the discharge, superceded potential adverse effects of high Cu levels. This study emphasizes the importance of instream biological data when obtained in conjunction with chemical analyses." (Author) Macroinvertebrate taxa collected in Hester-Dendy samplers at five locations on the Muskingum River, August-September 1995 include *Boyeria vinosa*, *Argia tibialis*, *Coenagrion* sp., *Neurocordulia molesta*, *Celithemis* sp., and *Macromia taeniolata*] Address: Reash, R.J., American Electric Power, Water and Ecological Resource Services, Columbus, Ohio, U.S.A. E-mail: rjreash@aep.com

7209. Relyea, R.R.; Auld, J.R. (2004): Having the guts to compete: how intestinal plasticity explains costs of inducible defences. *Ecology Letters* 7: 869-875. (in English) ["Predators commonly induce phenotypic changes that make prey better at surviving predation at the cost of reduced growth. While we have a good understanding of how trait changes affect predation risk, we lack a mechanistic understanding of why predator induced phenotypes differ in growth. Using two mesocosm experiments, we combined phenotypic plasticity theory with predictions from optimal digestion theory to demonstrate that intra- and interspecific competition induced relatively long guts while predators induced relatively short guts. The longer guts induced by competition appear to be an adaptive response that allows more efficient digestion and more rapid growth whereas the

shorter guts induced by predators appear to result from a tradeoff of building larger tails in predator environments at the cost of smaller bodies. By combining these two bodies of theory, we now have a much better understanding of the mechanisms that cause the phenotypic trade-offs that select for inducible defences." (Authors) The predator used was a late instar *Anax junius* naiad.] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

7210. Russell, A.J.M.; Storch, I. (2004): Summer food of sympatric red fox and pine marten in the German Alps. *Eur. J. Wildl. Res.* 50: 53-58. (in English) [Based on fecal analyses, summer diet composition and trophic niche breadth for the sympatric red fox *Vulpes vulpes* (n=55 scats) and pine marten *Martes martes* (n=64) in the foothills of the German Alps (Bavaria) were compared. Odonata play a minor role as food for pine marten, obviously only using the "windows of opportunity".] Address: Storch, Ilse, Linderhof Research Station, Technische Universität München, 82488 Ettal, Germany. E-mail: ilse.storch@t-online.de

7211. Smith, A.T. (2004): Natural and sexual selection in three species of odonates. Thesis, MSc., Department of Biology, University of Victoria: IX, 114 pp. (in English) ["Evolution is driven mainly by natural and sexual selection, which can be confounded by sex, mating system and environmental influences. Odonates have three important selective episodes during the adult life stage: survival to sexual maturity; survival after sexual maturity and mating success. Using mark-recapture and logistic regression, I examined natural selection in adult males and females of two species of non-territorial damselflies, *Lestes congener* and *L. disjunctus* and one species of territorial dragonfly, *Sympetrum pallipes* in two successive years at Galiano Island, B.C. Females gained more mass over the maturation period than males, but the difference was smaller in territorial *S. pallipes*. Sexual size dimorphism was therefore greater at maturity than emergence but less so in *S. pallipes*. Female survival was lower than male survival over the maturation period and survival over the maturation period was lower than survival after maturity in some groups. Before maturity, small male *L. congener* survived better and male *S. pallipes* with small wing loading values survived less well. No measurable difference was found between female and male survival after maturity in any species and wing loading was a better predictor of survival than body size. I also tested for sexual selection on males of all three species. As predicted, selection on body size was not detectable in both *Lestes* species. In male *S. pallipes*, small males had a mating advantage early in the season but large males had an advantage late in the season. This was attributed to density or weather effects. Large male *S. pallipes* had greater territorial success, but were not more likely to achieve mating success. There were large differences in body size between years in all groups, but the direction of change did not correspond with the direction of selection. The importance of measuring selection over more than one generation and improved observational methods are discussed further.] Address: not stated

7212. Suttle, K.B.; Power, M.E.; Levine, J.M.; McNeely, C. (2004): How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. *Ecological Applications* 14(4): 969-974. (in English) ["Although excessi-

ve loading of fine sediments into rivers is well known to degrade salmonid spawning habitat, its effects on rearing juveniles have been unclear. We experimentally manipulated fine bed sediment in a northern California river and examined responses of juvenile salmonids and the food webs (treated on the family level and including Odonata) supporting them. Increasing concentrations of deposited fine sediment decreased growth and survival of juvenile steelhead trout. These declines were associated with a shift in invertebrates toward burrowing taxa unavailable as prey and with increased steelhead activity and injury at higher levels of fine sediment. The linear relationship between deposited fine sediment and juvenile steelhead growth suggests that there is no threshold below which exacerbation of fine-sediment delivery and storage in gravel bedded rivers will be harmless, but also that any reduction could produce immediate benefits for salmonid restoration." (Authors)] Address: Suttle, K.B., Dept of Integrative Biology, University of California, Berkeley, California 94720-3140 USA. E-mail: kbsuttle@socrates.berkeley.edu

7213. Talling, J. (2004): The development of freshwater science in Britain and British contributions abroad, 1900 - 2000. *Freshwater forum* 20: 22-80. (in English) [This brief history of British freshwater science of the past century contains only a few references to Odonata, and focusing on the work of Philip Corbet.] Address: Talling, J., Dr J.F. Talling, Freshwater Biological Association, Ambleside, Cumbria LA22 0LP, UK.

7214. Thomas, M.; Wagner, D. (2004): Connecticut highlights – 2003. *Ode News* XI(1): 4-6. (in English) [A summary of some of the more noteworthy finds (n = 20) during the 2003 season is provided. The paper includes a road kill record of *Somatochlora williamsoni*.] Address: not stated

7215. Torralba Burrial, A.; Ocharan, F.J. (2004): Tandem heterospecifico en el género *Onychogomphus* Sélys, 1854 (Odonata: Gomphidae). *Boletín. Asoc. esp. Ent.* 28 (3-4): 181-183. (in Spanish) [31-VII-2003, river Garga, near Gillué (Huesca, NE Spain, 30TYM3298); heterospecific tandem between a male *Onychogomphus forcipatus unguiculatus* and a female *O. uncatus*.] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

7216. Tsuyuki, K.; Kobayashi, T.; Sudo, S. (2004): Function of dragonfly wings for the raindrop collision. *Nihon Kikai Gakkai Nenji Taikai Koen Ronbunshu* 6: 163-164. (in Japanese, with English summary) ["This paper presented the results of an experimental investigation of droplet impacting on dragonfly wings. The collision characteristics of dragonfly wings are studied with a digital high speed camera system. The results are presented for different impact velocities and different impact locations on dragonfly wings. The results show the marvelous structure of dragonfly wings for the rain drop collision. It was found that dragonfly wings have the flexible response and the water repellency for the water drop collision. The drop collision phenomena on dragonfly wings are also revealed." (Author)]

7217. Vornicu B.; Ion, I. (2004): Nutrition of some species of fish in the middle basis of Moldova river. *Analele Stiintifice ale Universitatii „Al.I.Cuza” Iasi, s. Biologie animala* 50: 223-227. (in English) [Odonata are listed as prey of some fish species.] Address: not stated

7218. Acuna, V.; Munoz, I.; Giorgi, A.; Omella, M.; Sabater, F.; Sabater, S. (2005): Drought and postdrought recovery cycles in an intermittent Mediterranean stream: structural and functional aspects. *J. N. Am. Benthol. Soc.* 24(4): 919-933. (in English) ["The effects of the intensity of seasonal droughts on stream ecosystems were studied in the Fuirosos, an intermittent forested Mediterranean stream. Macroinvertebrate community structure and stream ecosystem metabolism were measured during seasonal summer droughts in 2001, 2002, and 2003. Ecosystem metabolism was profoundly affected by stream intermittency. Organic matter that accumulated during the dry period enhanced ecosystem respiration during the postdrought recovery. Highest biotic diversity was found at low water levels as the stream dried and contracted. Macroinvertebrate community response to drying was stepped and apparently defined by thresholds of transition from drying to cessation of flow and from the dry phase to restoration of flow. Environmental conditions changed markedly with cessation of flow, causing large changes in community structure during 2001 and 2003 (dry years). Drying caused an increase in macroinvertebrate density that peaked in isolated pools soon after flow ceased, but then decreased rapidly because of the physicochemical changes associated with fragmentation of the watercourse. The macroinvertebrate community at the end of the summer dry phase (when flow resumed) differed from the community that had been present before drying began. Differences in community structure during the summer dry period were not as marked in 2002 (a wet year) as in 2001/2003. The influence of drought on the macroinvertebrate community differed across substrata. Drying led to significant changes in density on cobbles and leaves, but not on sand. Few taxa resisted drying, and resilience to drying was the dominant response to disturbance in the Fuirosos." (Authors) The list of macroinvertebrate taxa from the Fuirosos includes *Calopteryx* sp. and *Onychogomphus* sp.] Address: Acuna, V., Department of Biology, University of New Mexico, Albuquerque, New Mexico 87131, USA. E-mail: vicenc@sevilleta.unm.edu

7219. Cano, E.; Jiménez, A. (2005): Evolución de las poblaciones de insectos en una tabla de arroz de las marismas del bajo Guadalquivir. *Limnetica* 24(1-2): 61-66. (in Spanish, with English summary) [Spain; "In the lower Guadalquivir river marshes, rice is grown with a flow-through system, which keeps the water oxygenated and with mild temperatures around 20-25 °C. Traditional farming workings are used in this area. Individuals collected belong to the Order Diptera [...], Order Odonata (Fam. Libellulidae and Fam. Calopterygidae) [...]. Quantitatively the different groups are represented in a very heterogeneous way, however, the most numerous are the dipterans, in particular, the Chironomidae. There are important variations in the insect community of a rice field. These variations can be due to pesticide treatments applied to the rice, and water level oscillations." (Authors)] Address: Cano, E., Dpto. de Fisiología y Zoología. Fac. de Biología. Universidad de Sevilla. Avda. Reina Mercedes, 6. 41012 Sevilla, Spain. E-mail: ecano@us.es

7220. Cano Villegas, F.J. (2005): Localizada una nueva zona de cria de *Lestes dryas* Kirby, 1890 (Odonata, Lestidae) en Andalucía. *Boletín de la sociedad entomológica Aragonesa* 36: 262. (in Spanish) [Encantada (alt. 450 m.s.n.m., UTM 30S 03 3827 42 0483), Sierra Morena, Spain; larvae: 31-XII-2003, imagos: 5-IV-2004] Address: Cano Villegas, F.J., Departamento de Ciencias Ambientales, Área de Zoología, Universidad Pablo de Olavide, 41013 (Sevilla). E-mail: fcanovi1@wana-doo.es

7221. Fonnesu, A.; Deiana, A.M.; Basset, A. (2005): Effetti della siccità sull'abbondanza e distribuzione dei macroinvertebrati. *Rendiconti Seminario Facoltà Scienze Università Cagliari* 75(1-2): 9-25. (in Italian, with English summary) [The role of disturbance on structuring animal communities is a central subject in the ecological research. In particular in the intermittent systems river, the drought event seems to determine the macroinvertebrate community structure. In such context, we analysed the macrobenthos of a Sardinia (Italy) intermittent stream (Rio Pula, Cagliari). The study was carried out on 16 sites in 3 years (from 2000 to 2002) with seasonal samplings (spring and autumn) of the macroinvertebrate community. The results have shown a temporal stability of community and a spatial change of community structure along the river basin determined by drought frequency. Finally, patterns of spatial change in the guild composition seem to be partly in contrast with the River Continuum concept." (Authors) The list of taxa includes 11 Odonata species.] Address: Fonnesu, A., Dipartimento di Biologia Animale ed Ecologia, Università degli Studi di Cagliari, viale Poetto 1, 09126 Cagliari, Italia. E-mail: alessio.fonnesu@unica.it.

7222. Ivinskis, P.; Rimsaite, J. (2005): Baltic seashore as a unique habitat for insects. *Acta Zoologica Lituanica* 15(2): 115-118. (in English, with Lithuanian summary) ["The Baltic seashore is one of important sites of insect biodiversity in Lithuania. Seashore habitats, such as dunes, dry grasslands, sand heaths, are unique and unstable. Research on insect fauna was carried out in seashore habitats of the Curonian Spit and Klaipėda-Ķventoji zone in 1974 - 2004. The whole list embraced more than 2,000 species of insects. 90% of them were common for all Lithuania, but the remaining part of species were dwelling exclusively in seashore habitats or on special plants. New, often southern species firstly establish in Lithuanian seashore habitats and only later spread all over Lithuania." (Authors) The paper also refers to four odonate species protected by the European Fauna-Flora-Habitat Directive: *Aeshna viridis*, *Leucorrhinia albifrons*, and *L. caudalis*, *L. pectoralis*.] Address: Ivinskis, P., Institute of Ecology of Vilnius University, Akademijos 2, LT-08412 Vilnius-21, Lithuania. E-mail: entlab@centras.lt

7223. Jahn, P. (2005): Rote Liste und Gesamtartenliste der Libellen (Odonata) von Berlin. In: *Der Landesbeauftragte für Naturschutz und Landschaftspflege / Senatsverwaltung für Stadtentwicklung (Hrsg.): Rote Listen der gefährdeten Pflanzen und Tiere von Berlin. CD-ROM.*: 28 pp. (in German, with English summary) [Up to 2004, 58 species of Odonata are recorded from the area of Berlin, Germany. These species are classified according to their present status and category of threat. Abundance and distribution are characterized for a part of these species and for six additional species, only known from the surroundings of Berlin. Moreover, changes in various biotopes and their implications for the characteristic dragonfly fauna are described. Of some interest is an hitherto unpublished record of *Coenagrion ornatum*

in the Prignitz-region.] Address: Jahn, P., Schillerpromenade 30, 12049 Berlin, Germany

7224. Johansson, F.; Stoks, R. (2005): 11 Adaptive plasticity in response to predators in dragonfly larvae and other aquatic insects. In: M.D.E. Fellowes; G.J. Holloway; J. Rolff (Eds.): *Insect evolutionary ecology*; Proceedings of the Royal Entomological Society's 22nd Symposium. ISBN10: 0851998127: 347-370. (in English) ["In this chapter, examples of adaptive plasticity in morphology and life history traits as a way of avoiding predators in dragonfly larvae and other aquatic insects are described. The 4 prerequisites for the evolution of plasticity are discussed. Avenues for further research are suggested."] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

7225. Landmann, A.; Lehmann, G.; Mungenast, F.; Sonntag, H. (2005): Die Libellenfauna Tirols - eine Übersicht. *mercuriale* 5: 13-19. (in German) [This is a concise presentation of the book on the dragonflies of Tirol, Austria] Address: Landmann, A., Karl-Kapfere-Str. 3, A-6020 Innsbruck, Austria. E-mail: Armin.Landmann@uibk.ac.at

7226. Leconte, N.B.M.; Leconte, L.; Leconte, J. (2005): Constatación de la reproducción de *Somatochlora metallica* (Van der Linden, 1825) (Odonata, Corduliidae) en la Península Ibérica. *Boletín de la sociedad entomológica Aragonesa* 36: 240. (in Spanish) [20-VII-2004, Salardu, Lérida, 42° 37' 54"N, 0° 55' 30"E, Spain. Successful reproduction is recorded of *S. metallica* from the Iberian Peninsula.] Address: Leconte, M., Quartier du Caü, F-64260 Arudy, France

7227. Legrand, J.; Fleck, G. (2005): La larve de *Tragomphus tenaculatus* (Fraser, 1926) (Odonata, Anisoptera, Gomphidae). *Revue Française d'Entomologie* 27(2): 73-76. (in French, with English summary) ["The last instar larva of *Tragomphus tenaculatus* (Fraser, 1926) is described and illustrated for the first time. The larva is morphologically close to those of the genera *Ophiogomphus* Selys, 1854 and *Lamelligomphus* Fraser, 1922 and related to the larvae of the European species of the genus *Onychogomphus* Selys, 1854. A generic diagnosis is proposed."] Address: Legrand, J., 10, rue du Chemin de fer, F-94110 Arcueil, France

7228. Ocharan, F.J.; Torralba Burrial, A. (2005): Comportamiento de búsqueda de hembras inmaduras como estrategia reproductiva en machos de *Aeshna juncea* (Linnaeus, 1758) (Odonata: Aeshnidae). *Boletín de la SEA* 36: 123-126. (in Spanish, with English summary) ["The behaviour of males searching for immature, teneral females is described from a Pyrenean population of *Aeshna juncea*. Males were seen to hover over aquatic vegetation and to try to grasp emergent females amid vegetation, before the females' maiden flight. This is interpreted as mate-searching behaviour. Usual mating behaviour was observed in nearby ponds when mature females were present. The consequences on male reproductive success and their dispersal and colonization capacity are commented upon. This occurrence is related to previous reports of immature aeshnid females showing signs of having mated." (Author)] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

7229. Ocharan, F.J.; Torralba Burrial, A. (2005): Larga distancia recorrida en una emergencia fallida en *Aeshna cyanea* (Odonata: Aeshnidae). *Boletín de la SEA* 36: 236. (in Spanish, with English summary) ["A emergent female of *A. cyanea* was found dead at 10 m upslope of lake Ordicuso (2090 m alt., Panticosa, Huesca, north-eastern Spain). This is the largest known distance travelled from the water before emergence by an aeshnid dragonfly." (Authors)] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

7230. Padilla, D.P.; Nogales, M.; Pérez, A.J. (2005): Seasonal diet of an insular endemic population of Southern Grey Shrike *Lanius meridionalis koenigi* on Tenerife, Canary Islands. *Ornis Fennica* 82: 155-165. (in English) ["The diet and prey selection of *L. meridionalis koenigi* was studied in one of the scarce insular environments where it is present, the xeric coastal area of Tenerife (Canary Islands), Spain. The main aim of this study was to compare the general trophic patterns with respect to continental populations of Northern Grey Shrike (*Lanius excubitor*) and Southern Grey Shrike. The material analysed consisted in 440 pellets collected during the four seasons of the year in the period April 2003–March 2004. A total of 5,112 prey items were identified, 85.4% corresponding to beetles (mainly Curculionidae and Tenebrionidae) and the rest consisted of other arthropods (including few Odonata) and vertebrates. Biomass mainly constituted of vertebrates, especially lizards (64.0%). [...]"] (Authors)] Address: Padilla, D.P., Island Ecology and Evolution Research Group (IPNA-CSIC), La Laguna 38206, Tenerife, Canary Islands, Spain. E-mail: dpadilla@ipna.csic.es

7231. Pérez-Bote, J.L.; García Jiménez, J.M.; Ferri Yáñez, F.; Torrejón Sanromán, J.M. (2005): Los odonatos de los parques naturales de Cornalvo y Monfragüe (Extremadura, España). *Boletín Sociedad Entomológica Aragonesa* 36(1): 247-249. (in Spanish, with English summary) [In 2004, a total of 32 Odonata species was recorded in the Natural Parks of Monfragüe and Cornalvo (Extremadura, Spain) (28 in Monfragüe and 22 in Cornalvo).] Address: Área de Zoología, Facultad de Ciencias, Universidad de Extremadura, 06071 Badajoz, Spain. E-mail: jlperez@unex.es

7232. Revenga, C.; Campbell, I.; Abell, R.; de Villiers, P.; Bryer, M. (2005): Prospects for monitoring freshwater ecosystems towards the 2010 targets. *Phil. Trans. R. Soc. B* 360: 397-413. (in English) ["Human activities have severely affected the condition of freshwater ecosystems worldwide. Physical alteration, habitat loss, water withdrawal, pollution, overexploitation and the introduction of nonnative species all contribute to the decline in freshwater species. Today, freshwater species are, in general, at higher risk of extinction than those in forests, grasslands and coastal ecosystems. For North America alone, the projected extinction rate for freshwater fauna is five times greater than that for terrestrial fauna—a rate comparable to the species loss in tropical rainforest. Because many of these extinctions go unseen, the level of assessment and knowledge of the status and trends of freshwater species are still very poor, with species going extinct before they are even taxonomically classified. Increasing human population growth and achieving the sustainable development targets set forth in 2002 will place even higher demands

on the already stressed freshwater ecosystems, unless an integrated approach to managing water for people and ecosystems is implemented by a broad constituency. To inform and implement policies that support an integrated approach to water management, as well as to measure progress in halting the rapid decline in freshwater species, basin-level indicators describing the condition and threats to freshwater ecosystems and species are required. This paper discusses the extent and quality of data available on the number and size of populations of freshwater species, as well as the change in the extent and condition of natural freshwater habitats. The paper presents indicators that can be applied at multiple scales, highlighting the usefulness of using remote sensing and geographical information systems technologies to fill some of the existing information gaps. Finally, the paper includes an analysis of major data gaps and information needs with respect to freshwater species to measure progress towards the 2010 biodiversity targets." (Authors) The paper also includes a few notes referring Odonata.] Address: Revenge, C., Global Priorities Group, The Nature Conservancy, 4245 North Fairfax Drive, Arlington, VA 22203, USA

7233. Torralba Burrial, A.; Ocharan, F.J. (2005): Primera cita de *Sympetrum vulgatum ibericum* Ocharan, 1985 (Odonata, Libellulidae) para la provincia de Zaragoza. Boletín de la sociedad entomológica Aragonesa 36: 350. (in Spanish) [First records of *Sympetrum vulgatum ibericum* in the province Zaragoza, Spain are mapped.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

7234. Torralba Burrial, A.; Ocharan, F.J. (2005): Primera cita de *Ischnura elegans* (Van der Linden, 1820) y *Ceriagrion tenellum* (Villers, 1789) (Odonata, Coenagrionidae) para Teruel (N. E. de España). Boletín de la sociedad entomológica Aragonesa 36: 284. (in Spanish) [Spain; *Ischnura elegans*: Aguilar de Alfambra, río Alfambra, Spain; *Ceriagrion tenellum*: Fuentes de Rubielos, río Rodeche] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

7235. Trapero Quintana, A.D. (2005): *Gynacantha ereagris* (Gundlach, 1888), un endémico antillano (Odonata). Boletín de la sociedad entomológica Aragonesa 36: 353-354. (in Spanish, with English summary) [*G. ereagris* is a West Indian odonate which had only been recorded from the Bahamas and the western and central regions of Cuba. It is here recorded from the eastern part of the archipelago, and some aspects of the behavior and morphology of the taxon are analysed." (Author)] Address: Trapero Quintana, A., Depto de Biología de la Universidad de Oriente, Patricio s/n, Santiago, Cuba, CP 90500, Cuba. E-mail: atrapero@cnt.uo.edu.cu

7236. van der Winden, J. (2005): Fish and amphibians as calcium source for Black Terns *Chlidonias niger* feeding in acid bogs. *Vogelwelt* 126(3): 235-241. (in English, with German summary) [Malipe bog near Valkenswaard, The Netherlands; Odonata contribute significantly to the food of adult Black terns, and provide app. 50% of the biomass of chick food.] Address: van der Winden, J., Dantelaan 119, 3533 VC Utrecht, The Netherlands. E-mail: jvdwinden@hetnet.nl

7237. Verberk, W.; van Kleef, H.; Dijkman, M.; van Hoek, P.; Spierenburg, P.; Esselink, H. (2005): Seasonal changes on two different spatial scales: response of aquatic invertebrates to water body and microhabitat. *Insect Science* 12: 263-280. (in English) ["Knowledge about the spatial and temporal scales of both habitat use and the functional significance of different adaptations is essential for an understanding of the population dynamics of invertebrate assemblages. This fundamental knowledge is not only interesting from an academic point of view, but is sorely lacking and needed in the field of restoration ecology. Many species are threatened due to degradation. Knowing what environmental conditions are needed during the life cycle of these species is important in the design of restoration measures which aim to lift existing bottlenecks for threatened species. To assess the relative importance of water type and microhabitat in structuring the invertebrate assemblage during different seasons, invertebrates were sampled in three water bodies differing in trophic level and acidity. Different parts within a water body (microhabitats) were sampled separately and each water body was sampled in all four seasons. Results show that water body is an important factor structuring the invertebrate assemblage early in the season, whereas microhabitat became more important later in the season. Structural complexity of microhabitats was related to the type of locomotion employed by invertebrates. Seasonal differences could be related to population dynamics (reproduction, mortality). Moreover, fluctuations in resource availability were expected to differ between the water bodies, with highest fluctuations in the eutrophic water body and with fluctuations becoming less predictable later in the season. This was confirmed by the data: species synchronization to pulses in food availability was strongest in the eutrophic water body. Moreover, synchronization was strongest in summer, while in autumn waters were invaded by dispersive species. Based on these results a synthesis is presented on the functioning of the different waters during the different seasons." (Authors) 16 Odonata taxa are treated.] Address: Verberk, W., Bargerveen Foundation, c/o Dept of Environmental Studies, Faculty of Science, Mathematics and Computing Science, Radboud University of Nijmegen, PO Box 9010, 6500 GL Nijmegen, The Netherlands. E-mail: w.verberk@science.ru.nl

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7238. Batista, J.D. (2006): Longitudinal distribution of adult Odonata in Cerrado streams: an ecophysiological hypothesis. Dissertação apresentada à Universidade Federal de Viçosa, como parte das exigências do Programa de Pós-Graduação em Entomologia, para obtenção do título de Magister Scientiae. Viçosa. Minas Gerais. Brasil: VIII, 41 pp. (in Portuguese, with English summary) ["The longitudinal distribution of adult Odonata was examined in streams of different channel width in the Pindaíba River Basin, in the municipalities of Barra do Garças and Nova Xavantina. The general purpose was to evaluate the existence of environmental gradients that affect the longitudinal distribution of Odonata. and to establish testable predictions to this predator group regarding the River Continuum Concept. Two hypotheses were tested: (1) increasing channel width longitudinally along the basin causes an increase of light input, and. assuming restraints and distinct abilities,

there would be a decrease of Zygoptera and increase of Anisoptera species richness. (2) Dragonflies are affected by the gradient generated through river continuum mechanisms, increasing species richness in medium-sized streams. I sampled 19 sites in rivers and streams from 1 to 6 orders, and in each site I sample once in the dry and once in the rainy seasons. Quantitative survey was conducted through scan method in fixed areas, counting visually on Odonata adults along 100 meters of the waterbody, divided into 20 stretches of 5 meters each. Channel width and depth measures were taken at the beginning, middle, and end of each 20-meter region. A total of 549 individuals were collected, distributed in one family, 13 genera and 17 species of Anisoptera, and six families, 15 genera and 30 species of Zygoptera. The abundance and proportion of Zygoptera species decrease while Anisoptera increase with channel width and mean depth of rivers and streams. The channel width was considered the best predictor of Odonata species distribution. The distribution of Odonata species richness, did not corroborate the hypotheses of higher species richness in the middle courses of streams. The results obtained in this study confirm the thermoregulation hypothesis as a determining factor in the distribution of Odonata species in the system." (Author) For details see: <http://www.tede.ufv.br/tesesimplificado/tdearquivos/11/TDE-2006-11-08T092832Z-69/Publico/texto%20completo.pdf>

7239. Braune, E. (2006): Spatially explicit models for interacting populations in a changing landscape: A case study on Namibian dragonflies (Odonata). Dissertation, Fakultät für Physik und Geowissenschaften, Technische Universität Carolo-Wilhelmina zu Braunschweig: 134 pp., Anhang. (in English) ["I have developed a model system, which allows the modelling of the responses of the three major ecological groups of dragonflies in arid Namibia under current and future climatic conditions. The habitat models that were introduced in Chapter 2 served to distinguish the three groups regarding their ecological preferences. Especially the use of the habitat web was valuable for the evaluation of the relative habitat preferences. Additionally it allowed estimating the different preferences of the species regarding the landscape layers, which were included in the landscape model (Chapter 4.2). The population dynamic model, which refined the extended Leslie matrix approach for age and size structured populations via the introduction of inter- and intraspecific interactions, showed the importance of the colonisation sequence of the dragonflies at the habitat. The model indicated that local extinctions due to size differences of larval stages are possible between the two species types "migrant" and "resident". The chosen mathematical approach did reproduce the pattern of multivoltinism, which is typical for tropical centred dragonflies, very well (Chapter 3). The construction of the landscape and especially its inherent dynamic was another crucial aspect of this work. The use of satellite images for the derivation of the ecological relevant landscape parameters combined with indispensable expert knowledge about the processes and characteristics of the landscape sectors facilitated to change the model's scale (Chapter 4.2.2). The larger scale led to new insights for the explanation of occurring spatial distribution patterns of the dragonflies. The dynamic change of the landscape showed that in more arid regions the residential species with longer duration of their larval stages were impeded by the smaller number of habitats and a higher level of habitat variability in

terms of continuity (Chapter 4.2.3). The combination of landscape dynamics with the dispersal abilities of the modelled species made the impact of landscape fragmentation in the more arid regions apparent (Chapter 4.3.3). Theoretical scenarios were used to get first results of the model's performance in an explicit spatial context. These scenarios showed the general importance of habitat structures preferred by the residents as a refuge and source habitat, but also as an obstacle for dispersal and consequently the colonisation of habitats in larger distance. The migrant, defined as a habitat generalist, was able to establish at least small subpopulations in the most distant habitats (Chapter 4.3.4). The results of the scenarios based on the real landscape sections in the Swakop River catchment were compared with the survey data from the wetland below the S. von Bach dam. This validation showed that the results of the spatially explicit model reproduced the patterns observed in reality very well (Chapter 4.3.5.2). The coexistence of two residential species in a community seems to be difficult to realise as the results have shown competitive exclusion of the weaker disperser (Chapter 4.3.5.1). Therefore species with equal life-history parameters are supposed to use other mechanisms to coexist in the same habitat. One possible factor, which may promote coexistence despite of the same life-cycle or competitive advantage of one species, may be resource partitioning in the freshwater habitat. Furthermore, the habitat preferences, which were confirmed by the HSM, were also reflected by the spatial patterns produced by the model. Regarding aspects of conservation biology, the model clearly indicated the importance of permanent and well vegetated habitats for the residential species with certain habitat preferences. In the model, these habitats were represented by the outlets of the dams but also permanent springs may provide the required properties and should therefore be regarded as valuable for conservation. The application of climate change scenarios based on IPCC forecasts showed that the mean metapopulation densities in the investigated landscape sections will potentially decrease. Fragmentation of the landscape regarding the presence of freshwater habitats will increase and affect especially the species with poorer dispersal abilities. However, the survival of this species was possible despite of the aggravation of the habitats. Nevertheless, the theoretical scenarios have shown that extreme fragmentation may lead to isolation of a species, which enhances the risk of a complete extinction of a metapopulation (Chapter 4.3.5.3). More empirical data concerning the construction of the landscape and its dynamic are just as desirable as more information on the parameters which drive the local population dynamics. Both would lead to an improved model whose accuracy would increase regarding the predictions of changes in the water balance. Another factor promoting the model's accuracy would be the linkage between the cellular automata to model the far distance dispersal. This would certainly improve the results especially for the migrant species. A refinement of the scale of the cellular automaton on the locality level would also add accuracy. To minimise the proximate extension of calculation time this should only be done in regions with high water densities, where a multitude of single but linked freshwaters exist. The model approach, which was presented in this work, allows making predictions of the spatial patterns of dragonfly communities in the arid regions of Namibia. A change in the lifehistory parameters of the species may allow modelling of other species or communities,

respectively. Furthermore, the implementation of other ecologically relevant properties of the landscape is possible if the information for the construction of the landscape layer exists. Hence, other dragonfly communities can be modelled with little effort. The presented model system can be used as a tool for the assessment of biodiversity of Odonata and may help to identify and emphasise valuable regions for freshwater conservation management." (Author)] Address: Braune, Eva, Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c, D-38106 Braunschweig, Germany. E-mail: e.braune@tu-bs.de

7240. Brooks, S. (2006): Book review: Askew, R.R.: *The Dragonflies of Europe* (revised edition). Harley Books, Martins, Great Horkeley, Colchester, Essex C06 4AH (2004). ISBN 0 946589 75 5. J. Br. Dragonfly Society 21(2): 68. (in English) [Review] Address: Brooks, S.J., Entomology, The Natural History Museum, Cromwell Road, London, SW7 5BD, United Kingdom

7241. Budha, P.B. (2006): *Dragonfly biodiversity: Important management tool for providing safe drinking. Biodiversität und Naturlandschaft im Himalaya - Biodiversity and Natural Heritage of the Himalaya II.* - ISBN 10: 3-00-019541-6: (in English) ["Nepal is located in the center of the Himalayas that makes it a transitional zone between the palaerctic and Indo-Malayan biogeographical regions creating a unique and rich biodiversity. In view of species diversity, Nepal occupies the 25th global position however proper estimation of the most diverse insects has yet to be done at national level. Dragonfly biodiversity of Nepal includes about 171 reported dragonfly species from different altitudinal range from 130m to the highest elevation 6300m, however, intensive studies in several unexplored locations of the country can produce many new records to science. Three species of dragonflies; *Epiophlebia laidlawi*, *Caliphaea confusa* and *Philoganga montana*, which are included in priority species of Oriental biodiversity, and IUCN/SCC-Dragonfly Action Plan are found in Nepal but their conservation strategies are not yet developed. A relict dragonfly *E. laidlawi* is rare and listed as a 'threatened' species in the Red Data List of IUCN. Furthermore, distribution of this indicator species for healthy environment and rivers of the Himalayas, is restricted to Shivapuri National Park, the nearest national park from capital city, the Kathmandu. Shivapuri is the most important watershed area in Nepal, which supplies more than 40 percent drinking water to people of the capital but it is always in pressure due to increasing activities for recreation, hiking and trekking by many foreigners and people of Kathmandu. Pollutants may rise from a wide range of deliberate waste disposal loaded with sediments, nutrients and toxins that are flushed in from the altered watersheds. *in situ* conservation of *E. laidlawi* including other dragonflies is an important tool for watershed management and its monitoring but also implies for safe drinking water supply initiatives to Kathmanduities." (Author)] Address: Bahadur Budha, P., Central Department of Zoology, Tribhuvan University, Kathandu, Nepal. E-mail: prembudha@yahoo.com

7242. Choong, C.Y. (2006): *Dive.Dive.Dive. Oviposition behaviour of Euphaea impar.* Malaysian Naturalist 59 (1): 46-48. (in English) [Verbatim: [...] The female lifted herself, and hovered over the stream at a height of 15-20cm. Suddenly, she dived at high speed into the stream against the current at an angle of 45-70 de-

grees. She failed to break the water surface, however, as the running water was too fast. She then retreated to her original perch, [...] but after five minutes, she tried diving again into the same spot. This time she successfully penetrated the water. [...] In the water, she clung to the slime-covered rocks and plant roots at the bottom of the stream, which was 5-10cm deep. Slowly, she crawled forwards and backwards, ovipositing eggs. All the time her head was against the water current so that her body and wings were anti-parallel to the water flow. After she had finished depositing her eggs, she suddenly released her legs, allowing the current to push her out of the water. She then vanished into the forest. The entire underwater process took 30 minutes. Corbet (1983) described submerged oviposition as a slow backing down into the water. Therefore, my observation of flight-dive oviposition has not yet been recorded in odonates [John Truemen, pers. comm.]. Most members of the family Euphaeidae breed in running water (Silsby 2001), so it is not surprising to note that *E. impar* chooses to oviposit in fast-running forest streams. The flight-dive oviposition behaviour with the absence of any male might explain Silsby's (2001) comment that copulation and oviposition has rarely been witnessed in Euphaeidae. [...] Address: Choong, C.Y., School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Room: 4107, Banguan Sains Biologi, malaysia. E-mail: cychoong@ukm.my

7243. Dijkstra, K.-D (2006): *The blue-eyed damselfly: Why "Cercion" should be called Erythromma lindenii.* Brachytron 8(2): 20-24. (in Dutch, with English summary) ["Weekers & Dumont (2004) proved through molecular studies what Heidemann & Seidenbusch (1993) already suggested by larval characters: *Cercion* is a synonym of *Erythromma*. Compared to European *Coenagrion* and *Enallagma* species. *Erythromma* with the inclusion of *E. lindenii* differs by: (1) Numerous bristles on the larval stemites. (2) Similarities in DNA. (3) Elongated cerci with bifid tip and large basal tooth; paraprocts reduced to small points. (4) Subcostal cells distal of pterostigma often duplicated, especially in hindwing. (5) Reduced postocular spots. (6) Completely black dorsum of abdominal segment 2. (7) Blue abdominal tail-light' shifted distally to segments 9-10. (8) Eyes brightly coloured without blackish dorsum, contrasting with black dorsum of bead. (9) Reproductive activity on emergent and floating vegetation away from the shore. The blue body and eyes of *lindenii* possibly represent a reversal to a plesiomorphic character state. This relatively minor difference with other *Erythromma* species has led to the traditional association of *E. lindenii* with taxa that are merely superficially similar (like *Coenagrion*) and the oversight of its true identity." (Author)] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

7244. Gibson, V. (2006): *A study of the copulatory behaviour of three pairs of the Migrant Hawker Aeshna mixta Latreille in the wheel position.* J. Br. Dragonfly Society 21(2): 47-54. (in English) [Old Moor, South Yorkshire, UK; three uninterrupted recordings from September 2003 of pairs of *A. mixta* in the "wheel position" are described in detail.] Address: Gibson, V., 45 St George's Court, Beet Street, Sheffield S3 7GF, UK

- 7245.** Huang, D.-y.; Nel, A.; Shen, Y.; Selden, P.A.; Lin, Q.-b. (2006): Discussions on the age of the Daohugou fauna - evidence from invertebrates. *Progress in natural science* 16(Special Issue): 308-312. (in English) ["Volcanic tuff deposits near Daohugou village, Ningcheng County of Inner Mongolia have yielded many well-preserved fossils. Here we briefly introduce our recent findings of invertebrates from the Daohugou fauna: mainly insects, conchostracans, anostracans, and spiders. The age of the Daohugou fauna is considered to be Middle Jurassic on the basis of an analysis of various invertebrates especially insects and conchostracans, showing strong similarities to the Yanliao fauna of north China and the Karatau fauna of Kazakhstan." (Authors) Odonata are represented by isophlebioid species. A few species of *Aktassia* are also recorded, which are nearly identical to the type species from Karatau.] Address: Huang, D.-y., Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China. E-mail: huangdiy-ing@sina.com
- 7246.** Humala, A.E. (2006): On the insect fauna of "Kivach" Nature Reserve. *Proceedings of Karelian Research Centre of the Russian Academy of Science* 10: 153-159. (in Russian, with English summary) [23 Odonata species are listed.] Address: not stated
- 7247.** Juen, L. (2006): Distribution of Odonata species and beta diversity pattern among streams of Central Amazonia. *Dissertação apresentada à Universidade Federal de Viçosa, como parte das exigências do Programa de Pós-Graduação em Entomologia, para obtenção do título de Magister Scientiae*. Viçosa. Minas Gerais. Brasil: VIII, 64 pp. (in Portuguese, with English summary) ["The Amazon region has the largest drainage basin of the world, which is constituted by a diversity of waterbodies, and almost all of them are resulting from the junction of small streams ("igarapes") that drain the forest. The igarapes present acid, nutrient-poor waters, and their food chains are dependent on allochthonous materials provided by the forest that fall into the igarape, as pollen, flowers, fruits, leaves, branches, insects and spiders. In spite of that, the Terra-Firme system in the Amazon is recognized as the ecosystem of higher species diversity on the planet. This work aimed to describe the distribution and the beta diversity pattern of the species comprising the Odonata communities present in the Adolfo Ducke Forest Reserve river basins. It also objectives to provide information about determining factors of the fauna similarity among sites, in order to select viable units for Odonata conservation. Samples were carried out in 24 igarapes (eleven of 15', eight of 2U and five of 31 order) distributed in four river basins, and in each basin it was conducted samples in six igarapes. The samples constituted on visual counting of adult individuals of Odonata present in 100 meters along each waterbody, divided into 20 stretches of 5 meters. The sampling time constituted of one hour duration on average. The total fauna of Odonata founded in the Ducke Reserve was of 17 species observed and 23 (= 4,77) estimated. The cluster analysis of the abiotic data demonstrated high similarity among the igarapes. The micro-drainage basins were compared in relation to species richness and they were similar statistically, and the same result was also obtained for beta diversity. The low value of beta diversity index demonstrated high fauna similarity among the igarapes. The relationship of beta diversity between the environmental data and the distance among the igarapes was highly non-significant. The low values of beta diversity index may be attributed to the high similarity of the environmental data, which presented small variation in the abiotic data, and also to the distance scale of this study, which may be small enough to not represent a barrier to Odonata dispersion. Another factor that may have contributed to these values is the occurrence of a long period of environmental stability in the Amazon that allowed the species distribution in the environment, even those with low dispersion capacity. The basic environmental variables (channel width and depth) were related to species richness increase. These results are important to species conservation, and indicate the necessity of including intermediate-size streams, with higher variation in depth and channel width, to be used as one selection criteria in the choice of environmental protection areas.] Address: not stated
- 7248.** Kalnins, M. (2006): An investigation of dragonfly (Odonata) ecology at the Titmanu oxbow, Gauja National Park, Latvia. *Acta Biol. Univ. Daugavp.* 6(1-2): 103-108. (in English, with Latvian summary) [In 2005, 29 species of dragonfly were recorded from Titmaiju oxbow, Latvia, namely: *Aeshna cyanea*, *A. grandis*, *A. juncea*, *Brachytron pratense*, *Calopteryx splendens*, *C. virgo*, *Coenagrion hastulatum*, *C. puella*, *C. pulchellum*, *Enallagma cyathigerum*, *Erythromma najas*, *Cordulia aenea*, *Somatochlora arctica*, *S. flavomaculata*, *S. metallica*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Lestes sponsa*, *Sympetrum paedisca*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, *L. rubicunda*, *Libellula quadrimaculata*, *Sympetrum danae*, *S. flaveolum*, *S. sanguineum*, *S. vulgatum*, and *Platycnemis pennipes*. *Aeshna viridis* recorded previously was not confirmed. Special emphasis is given to the phenology of the species.] Address: Kalniņš, M., Department of Zoology and Animal Ecology, Faculty of Biology, University of Latvia, Kronvalda Bulv. 4, Riga LV-1586, Latvia. E-mail: martins.kalnins@dap.gov.lv
- 7249.** Koch, V. (2006): Escargot et libellule. *MalaCo* 2: 33. (in French) [A mollusc (Succineidae) was attached to the abdomen of a just emerged *Crocothemis erythraea* (2-VI-2005, 1 km south of Mouzon, Ardennes, France). *C. erythraea* took flight to a near perch, and after 5 to 8 minutes the mollusc dropped down to the ground.] Address: not stated
- 7250.** Koops, R.-J.; Schut, D.; Groenendijk, D. (2006): Ecological differences between *Leucorrhinia dubia* and *L. rubicunda* in The Netherlands. *Brachytron* 8(2): 3-11. (in Dutch, with English summary) ["The population trend of *L. dubia* is negative, whereas the abundance rate of *L. rubicunda* showed a slight increase during the same period. However, in general both species share the same type of habitat and therefore it was questioned what the reason might be for this difference in abundance rates. The aim of this study was to assess the ecological differences between these two dragonfly species. In total 24 mostly acidic soft water shallow lakes were sampled on *Leucorrhinia* larvae. Two or more transects were placed in different parts of the pools. From each transect different measurements were taken, like pH, conductivity, water depth, detritus layer and vegetation composition. The results suggest that *L. dubia* has a smaller pH-range in comparison to *L. rubicunda*. Both *Leucorrhinia* species prefer heathland above forest in the direct surrounding of a shallow lake. The

vegetation surveys show that both dragonfly species are strongly correlated with the presence of peat moss (*Sphagnum* sp.). The results also indicate that *L. rubicunda* has a wider ecological niche than *L. dubia*. The habitats of both species are acid or slightly acidic, oligo- to mesotrophic moorland pools with *Sphagnum* vegetation; however, *L. rubicunda* range includes a lower pH. Therefore it may be more resistant to acidification." (Authors)] Address: Groenendijk, D., De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

7251. Mattei, D.; Cataudella, S.; Mancini, L.; Tancioni, L.; Migliore, L. (2006): Tiber river quality in the stretch of a sewage treatment plant: Effects of river water or disinfectants to *Daphnia* and structure of benthic macroinvertebrates community. *Water Air Soil Pollut.* 177: 441-455. (in English) [oas 23; The evaluation of Tiber River quality, in a stretch including a sewage treatment plant, has been carried out by the contemporary evaluation of water effect on *Daphnia* and benthic macroinvertebrates community structure. To achieve a good status of a river water by the end of 2015, as provided in the Water Framework Directive (WFD) 2000/60/EC, is necessary to know the quality starting point. To this end, several endpoints are expected by the WFD, including *Daphnia* toxicity test and macroinvertebrate community analysis. River water sampling was conducted in the four seasons, from upstream to downstream a sewage treatment plant. I endpoint. At the outfall of the sewage treatment plant, river water showed very high acute toxicity to *Daphnia* only in summer; some toxic effect can be found also upstream in spring. Results at the outfall were consistent with the hypothesis that disinfectants, mainly used in summer to treat discharging waters, are responsible of river water acute toxicity: *Daphnia* tests with each disinfectant (NaClO, PAA, ClO₂) showed high toxicity. River waters were also utilized in *Daphnia* reproduction tests. Samples at the outfall (excluding the summer one, undoubtedly toxic) caused slight reduction in survival and fecundity. Disinfectants were also checked in reproduction tests. Still at NOEC_{24h}, they caused a significant toxicity on both death rate and reproduction. II endpoint. Macroinvertebrate benthic community composition (including *Ischnura*, *Pyrrosoma*, *Platycnemis*, and *Orthetrum*) was evaluated upstream and downstream the sewage treatment plant, on these data Extended Biotic Index (EBI), was determined to get a score as quality class. A reduction of water quality score was found downstream the plant, one season delayed (autumn) respect the acute test on *Daphnia*. Effect of disinfectant discharge, river dilution capability on a short spatial scale and use of different endpoints are discussed in term of river stretch quality.] Address: Migliore, Luciana, Dipartimento di Biologia, Università "Tor Vergata", Via della Ricerca Scientifica I-00133 Roma, Italy. E-mail: luciana.migliore@uniroma2.it

7252. Moore, N.W. (2006): Use of the herbicide Glyphosate to control Common Reed (*Phragmites australis*) and its effects on dragonfly populations. *J. Br. Dragonfly Society* 21(2): 37-42. (in English) ["Conclusions: Spraying the encroaching reed bed on my pond in August 2003 succeeded in killing off all the reeds. One pair of Reed Warblers lost their habitat and disappeared. Otherwise there was no evidence of harm to Moorhens, Grass Snakes, Smooth Newts and dragonflies; on the contrary, the increase of suitable habitat allowed

the populations of adult insects to increase. It is just possible that some Smooth Newts and some larvae of *Pyrrosoma nymphula*, which were sprayed in the first year of their development, were adversely affected. In the instance of my pond, spraying was clearly beneficial. To what extent is my experience generally applicable? The toxicity of a herbicide can be affected by concentration levels and formulations; the effects in the field can be affected by weather and the date of spraying. Nevertheless when the choice is between losing most if not all of the dragonflies and relatively small risks attendant on any herbicide application, the risk is obviously worth taking. The experience of others in similar circumstances would be valuable." (Author)] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, United Kingdom

7253. Nedbalová, L.; Vrba, J.; Fott, J.; Kohout, L.; Kopáček, J. (2006): Biological recovery of the Bohemian Forest lakes from acidification. *Biologia*, Bratislava, 61/Suppl. 20, Section Zoology: S453-S465. (in English) [Czech Republic; Bavaria, Germany. "A limnological survey of eight small, atmospherically acidified, forested glacial lakes in the Bohemian Forest (Šumava, Böhmerwald) was performed in September 2003. Water chemistry of the tributaries and surface layer of each lake was determined, as well as species composition and biomass of the plankton along the water column, and littoral macrozoobenthos to assess the present status of the lakes. The progress in chemical reversal and biological recovery from acid stress was evaluated by comparing the current status of the lakes with results of a survey four years ago (1999) and former acidification data since the early 1990s. Both the current chemical lake status and the pelagic food web structure reflected the acidity of the tributaries and their aluminium (Al) and phosphorus (P) concentrations. One mesotrophic (Plešné jezero) and three oligotrophic lakes (Ěrné jezero, Ěrtovo jezero, and Rachelsee) are still chronically acidified, while four other oligotrophic lakes (Kleiner Arbersee, Prášílské jezero, Grosser Arbersee, and Laka) have recovered their carbonate buffering system. Total plankton biomass was very low and largely dominated by filamentous bacteria in the acidified oligotrophic lakes, while the mesotrophic lake had a higher biomass and was dominated by phytoplankton, which apparently profited from the higher P input. In contrast, both phytoplankton and crustacean zooplankton accounted for the majority of plankton biomass in the recovering lakes. This study has shown further progress in the reversal of lake water chemistry as well as further evidence of biological recovery compared to the 1999 survey. While no changes occurred in species composition of phytoplankton, a new ciliate species was found in one lake. In several lakes, this survey documented a return of zooplankton (e.g., Cladocera: *Ceriodaphnia quadrangula* and Rotifera: three *Keratella* species) and macrozoobenthos species (e.g., Ephemeroptera and Plecoptera). The beginning of biological recovery has been delayed for ~20 years after chemical reversal of the lakes." (Authors) The list of taxa includes eight Odonata species.] Address: Nedbalová, Linda, Biology Centre AS CR, Institute of Hydrobiology, Na Sádkách 7, CZ-37005 Ěeské Budjovice, Czech Republic

7254. Osenimskiy, B.I. (2006): [Short results of inventory of the fauna of the "Jagorlyk" reserve]. In: I.D. Trombitskiy, T.D. Sharapovskaya (Eds). Reserve "Jagorlyk". *Eco-TIRAS*, Tiraspol: 28-36. (in Russian) [Moldova; Ca-

lopteryx splendens, Ischnura elegans, Playcnemis pennipes, Aeshna juncea, and Sympetrum vulgatum are listed.] Address: E-mail: ecotiras@mtc.md; www.ecotiras.org

7255. Ramberg, L.; Hancock, P.; Lindholm, M.; Meyer, T.; Ringrose, S.; Sliva, J.; van As, J.; VanderPost, C. (2006): Species diversity of the Okavango Delta, Botswana. *Aquatic Sciences* 68: 310-337. (in English) ["Pinhey recorded a total of 92 species in the Delta. 25 years later Kipping found one species new for the area and one new for science. On the other hand he could only find 70 out of the 92 species found by Pinhey, although his sampling intensity compares well with that of Pinhey both in time and space. Nine of the "missing" species are Zygoptera and seven of them had been recorded from three or more localities in the Delta. Out of the 13 Anisoptera that could not be found again, five had been found in three or more localities. For the species found in only 1–2 localities the problems of sampling rare species arise. However, when there are indications that species which were fairly wide spread up to the mid-seventies are now absent, there are reasons to look for other explanations. There has been a gradual decline in flooding of the Delta since the mid-seventies which could have resulted in a loss of suitable aquatic habitats for the larvae or in a loss of suitable flying prey for hunting adults. Another factor is the aerial spraying against tsetse flies in the Delta which took place during the eighties and then again 2001–02. During the first period fairly potent insecticides such as dieldrin were used but over smaller areas in each year. In the recent spraying, however, the entire Delta south of the Panhandle was sprayed; the northern part in 2001 and the southern part in 2002; totaling to about 17,000 km². Deltamethrin was used which has some good properties such as its short half-life in nature and its specificity for invertebrates. Adult Odonata experienced high mortality during the spraying of deltamethrin and the same results were recorded for larvae of the families living on the sediment surface or on vegetation." (Author).] Address: Ramberg, L., Harry Oppenheimer Okavango Research Centre, University of Botswana, P. Bag 285, Maun, Botswana. E-mail: ramberg@mopipi.ub.bw

7256. Schultz, H.; Hess, M.; Graf, W.; Janecek, B.; Reusch, H. (2006): Das Makrozoobenthos der Natura 2000-Gebietes St. Lorenzener Hochmoor (Andertal, Kärnten) unter besonderer Berücksichtigung der Libellenfauna (Insecta: Odonata). *Carinthia II* 196/116/2: 343-358. (in German, with English summary) ["During the years 2003 and 2004 131 taxa of benthic macroinvertebrates (including 9 Odonata species) were collected at the Natura 2000 site St. Lorenzener Hochmoor in Carinthia, Austria. The occurrence of *Coenagrion hastulatum*, *Aeshna juncea*, *Leucorrhinia dubia*, and *Somatochlora alpestris* indicates a typical coenosis of peatbogs. This Odonata community is documented for Carinthia at Andertal only and represents therefore supra-regional importance. The evidence of *Leucorrhinia pectoralis* is top-ranking." (Authors)] Address: Schultz, Heike, Theodor-Kramer-Straße 12/1/14, A-1220 Wien, Austria. E-Mail: heschu@gmx.at

7257. Sell, M.; Viebahn, H. (2006): Von Prachtjungfern, Eintagsfliegen und Teichmuscheln. In: Von Eisvögeln, Prachtjungfern und Gänsesägern. Natur an der Ruhr. Herausgeber: das ruhrtal & Regionalverband Ruhrgebiet, Essen. Klartext Verlag, Essen. ISBN 3-89861-560-

X: 69-71. (in German) [General on nature and landscape in the Ruhrgebiet-region, Nordrhein-Westfalen, Germany, with emphasis on Odonata.]

7258. Sintupachee, S.; Milne, J.R.; Poonchaisri, S.; Baimai, V.; Kittayapong, P. (2006): Closely related *Wolbachia* strains within the pumpkin arthropod community and the potential for horizontal transmission via the plant. *Microbial Ecology* 51: 294-301. (in English) ["Phylogenetic studies have implicated frequent horizontal transmission of *Wolbachia* among arthropod host lineages. However, the ecological routes for such lateral transfer are poorly known. We surveyed the species of two arthropod communities, one on pumpkin and the other on loofah plants, for *Wolbachia*, constructed *wsp* gene phylogenies of those *Wolbachia* strains found to infect community members, and established ecological links among infected members. Four taxonomically diverse insects in the pumpkin arthropod community contained very closely related *Wolbachia* *wsp* sequences (G1.5% divergence by Kimura-2-parameter distances). These insects, namely, the whitefly *Bemisia tabaci*, the planthopper *Nisia nervosa*, the flea beetle *Phyllotreta* sp., and the fleahopper *Halticus minutus*, were all collected from pumpkin leaves. They were ecologically linked through feeding on the same leaf substrate. Unlike other infected leaf insects, the whitefly population appeared to have a permanent breeding relationship with pumpkin plants, and high and stable, but not fixed, monthly *Wolbachia* infection rates. Our findings suggest potential roles for the plant in *Wolbachia* transmission and for whiteflies in being an infection source for other pumpkin leaf-feeding insects." (Authors) The tests included *Ischnura* sp.] Address: Milne, J.R., Department of Biology, Faculty of Science, Mahidol University, Rama VI Road, Bangkok 10400, Thailand. E-mail: frjm@mahidol.ac.th

7259. Skilsky, I.V.; Khlus, L.N.; Meleshchuk, L.I. (2006): Trophic relations of Stonechat of the Prut-Dniester interfluvium of Ukraine and Bukovinian Carpathians. *Ecologia, Berkut* 15(1-2): 132-137. (in Russian, with English summary) [Stomach contents of 24 stonechats (*Saxicola torquata*) collected in Chernivtsi region (West Ukraine) during the second half of the XXth century contained remnants of at least 50 species of invertebrates. Small Coleoptera (50.6 %) and Hymenoptera (21.5 %) dominate. The diet is more diverse during spring and summer. *Coenagrion hastulatum*, *Aeshna cyanea*, and *Gomphus vulgatissimus* are listed as prey of *S. torquata*.] Address: Skilsky, I.V., P.O. Box 532, 58001 Chernivtsi, Ukraine. E-mail: bwasil@chv.ukrpack.net

7260. Strayer, D.L. (2006): Challenges for freshwater invertebrate conservation. *J. N. Am. Benthol. Soc.* 25(2): 271-287. (in English) ["Freshwater invertebrate conservation faces 5 important challenges. First, 10,000 species of freshwater invertebrates around the world may already be extinct or imperiled. Second, human pressures on freshwater resources are intense and will increase in the coming decades, putting yet more species at risk. Third, scientific knowledge about freshwater invertebrates, although substantial and useful for many groups, is far less than for the vertebrates for which much of contemporary conservation biology was designed. Even the best-known freshwater invertebrates that have achieved legal protection are perhaps 1% as well studied as the typical vertebrate. Fourth, becau-

se freshwater ecosystems are downhill from and embedded in their watersheds, freshwater conservation usually has to manage entire watersheds rather than small local sites where imperiled species occur. Fifth, society spends only modest amounts of money for freshwater invertebrate conservation. The median expenditure in Fiscal Year 2003 for freshwater invertebrate species on the US Endangered Species List was only US\$24,000, and only a small minority of imperiled species is listed and receives even this modest attention. Considering these serious challenges, I believe that we need to think deliberately about the best approaches for conserving freshwater invertebrate biodiversity. The best solution may be to move away from a species-based approach that is largely derived from a terrestrial model towards broader, regional approaches that try to satisfy legitimate human needs for fresh water while preserving as much biodiversity as possible." (Author) Unionoid mussels are said to have in USA a higher degree of endemism than dragonflies (Anisoptera).] Address: Strayer, D.L., Institute of Ecosystem Studies, P.O. Box AB, Millbrook, New York 12545 USA. E-mail: strayerd@ecostudies.org

7261. Tyrrell, M. (2006): Observations on emergence and duration of adult life of the Hairy Dragonfly *Brachytron pratense* (Müller). *J. Br. Dragonfly Society* 21(2): 43-46. (in English) [*B. pratense* expanded its range in Northamptonshire, UK over the last eight years. During the 2005 flight season, regular visits were made to observe emergence behaviour at two breeding sites that support large numbers of *B. pratense*: Ditchford Takes and Meadows Local Nature Reserve (British National Grid Reference SP 934682) and Wilson's Pits (SP 945683). Exuviae were collected, measured and the sex was determined. The emergence patterns for both sexes are presented both as a bar chart and as a cumulative percentage of the total emergence.] Address: Tyrrell, M., 8 Warwick Close, Raunds, Wellingborough, Northamptonshire NN9 6JH, UK

7262. Ward-Smith, J. (2006): Population expansion of Small Red Damselfly *Ceriatagrion tenellum* (Villers) in south-east Berkshire. *J. Br. Dragonfly Society* 21(2): 55-67. (in English) ["Since the early 1990s, as a result of a number of conservation measures, there has been a substantial increase in the population and local distribution of *C. tenellum* in the area around Bracknell in south-east Berkshire, UK. Here, details of the sites at which the species has recently been recorded are presented. To provide a context for the changed status of the species, historical records are discussed and the influence of habitat management considered." (Authors)] Address: Ward-Smith, J. 11 The Ridgeway, Bracknell, Berkshire RG12 9QU, UK DS: 26 Moffats Close, Sandhurst, Berkshire GU47 9EN, UK

7263. Yasuoka, J.; Levins, R.; Mangione, T.W.; Spielman, A. (2006): Community-based rice ecosystem management for suppressing vector anophelines in Sri Lanka. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 100: 995-1006. (in English) ["Sri Lanka is one of the Asian countries most affected by mosquito-borne diseases, especially malaria. This 18-month study assessed the effectiveness of a new community-based ecosystem management programme to control mosquito vectors in the country's rice ecosystem. Farmers in a malaria-prone village were educated and motivated to engage in source reduction as well as

measures to restore and maximise rice ecosystem functions. Over the course of the programme, the impact of farmers' ecosystem management on local mosquito ecology was also examined. Although little impact was detected on *Culex* and *Aedes* densities, adult *Anopheles* density was significantly suppressed in the south-west monsoon season. Rice farmers who manage their ecosystems can reduce the burden of *Anopheles* mosquitoes, interrupt malaria transmission and prevent the destruction of ecosystems." (Authors) Aquatic insect samples include dragonfly nymphs (Aeshnidae, Gomphidae, Libellulidae).] Address: Yasuoka, J., Dept of Population and International Health, Harvard School of Public Health, Building I, Room 1219, 665 Huntington Avenue, Boston, MA 02115, USA. E-mail: jyasuoka@post.harvard.edu

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7264. Barbarin, J.-P. (2007): Sur la présence de *Leucorrhinia pectoralis* (Charpentier, 1825) dans le Cantal tourbière du Jolan - Segur-les-Villas. *Arvernis* 39-40: 1-8. (in French) [France, history of records/proofs of the species and the local habitat of *L. pectoralis* are outlined in detail.] Address: Barbarin, J.-P., Société d'Histoire Naturelle Alcide d'Orbigny, 12 place des écoles, F-63160 Billom, France. E-mail: jpbarbarin@shnao.net

7265. Brockhaus, T. (2007): Bildet der Jenissei eine pleistozän entstandene Faunengrenze? Eine Diskussion am Beispiel der paläarktischen Libellenfauna (Odonata). *Entomol. rom.* 12(1): 41-59. (in German, with English summary) ["The current distribution of many palaeartic dragonflies can be explained by a hypothetic peri-glacial fauna that existed through the entire ice age. This amends the established hypotheses claiming the sole re-immigration from refugia in post-glacial times. The peri-glacial dragonfly fauna may be the cold-tolerant part of a pre-glacial pliocene fauna. With the new hypothesis the following types of distribution of palaeartic dragonflies can be explained: • species with a trans-palaeartic east to west distribution, e. g. *Lestes sponsa*, *Sympetrum danae* • species with a trans-palaeartic east to west distribution, centring in the boreal zone, e. g. *Aeshna crenata*, *Somatochlora sahlbergi* • western and eastern palaeartic distributions of subspecies and closely related species, e. g. *Leucorrhinia rubicunda* and *L. intermedia* • cold-tolerant species with a disjunctive distribution, e. g. *Coenagrion hylas*, *Somatochlora alpestris* More types of distribution are presented, such as western and eastern palaeartic ranges and ranges which are the results of refugia (*Coenagrion mercuriale*, *Somatochlora meridionale*, *Ischnura aralensis*). During the peak of the Saale glacial period when even western Siberia was covered by an icesheet parts of the peri-glacial fauna were probably subdivided into eastern and western populations. This may have happened near the Jenissei river or further east around the Jenissei, Western and Eastern Sajon mountain ranges. The genetic differentiation of these populations led to their current status as subspecies or species. The ranges of some cold-tolerant species disintegrated after the ice-age leading to boreo-montane and other disjunctions." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

- 7266.** Cannings, R.A. (2007): Recent range expansion of the Praying Mantis, *Mantis religiosa* Linnaeus (Mantodea: Mantidae), in British Columbia. *J. entomol. soc. British Columbia* 104: 73-80. (in English) [*M. religiosa*, "was introduced into eastern North America in the 1890s and is now a common species throughout much of the eastern United States and southern Ontario and Quebec. It was introduced from Ontario into the southern interior of British Columbia to control grasshoppers in 1937 and 1938. These introductions became established only in the southern Okanagan Valley where populations have persisted from Okanagan Falls south to Osoyoos. Since the late 1990s, the species' range has expanded from the South Okanagan north at least to Kamloops and east to Nelson. In addition, in the core of its traditional British Columbia range, the South Okanagan, this mantid has become more commonly encountered during the past decade. *M. religiosa* has also been collected on Vancouver Island. Specimen, photograph and sight records that document this change in status are listed and discussed and a distribution map is included. Characters used to distinguish *M. religiosa* from the native Ground Mantis, *Litaneutria minor*, and the exotic Chinese Mantis, *Tenodera aridifolia sinensis*, which is available commercially as a bio-control agent, are summarized." (Author) The paper includes a photograph of a preying mantid on *Sympetrum obtrusum*.] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca
- 7267.** Costa, J.M.; Machado, A.B.M. (2007): Two new species of *Neocordulia* Selys, 1882 from southern Brazil (Anisoptera: Corduliidae). *Lundiana* 8(2): 143-146. (in English) ["Two new species of *Neocordulia* Selys, 1882 — *N. fiorentini* sp. n. and *N. gaucha* sp. n. — both from Rio Grande do Sul, Brazil, are described and illustrated. They differ from other species of the genus mainly by the shape of anal appendages, sternal protuberance of abdominal segment 8 and sternum of abdominal segment 9." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br
- 7268.** Craves, J.A.; O'Brien, D.S. (2007): *Erythrodiplax umbrata* (Odonata: Libellulidae): new for Michigan. *The Great Lake Entomologist* 40(1/2): 95-97. (in English) [*E. umbrata*, collected in Wayne County, Michigan, USA on 6-X-2007 represents "the first records for this genus and species in the state, as well as the northernmost record for the species. They were found during a period in which many individuals were seen or photographed in Ohio, which prior to 2006, had only two records." (Authors)] Address: Craves, Julie, 2Rouge River Bird Observatory, University of Michigan-Dearborn, Environmental Interpretive Center, Dearborn, MI 48128, USA. E-mail: jcraves@umd.umich.edu
- 7269.** Dallas, H.F. (2007): The influence of biotope availability on macroinvertebrate assemblages in South African rivers: implications for aquatic bioassessment. *Freshwater Biology* 52: 370-380. (in English) ["1. Macroinvertebrate biotope preferences and the influence of differences in the availability of biotopes on individual taxa, macroinvertebrate assemblages and a biotic index, the South African Scoring System (SASS), were investigated in two regions of South Africa. 2. Among biotope differences in individual taxa and macroinvertebrate assemblages resulted in differences in SASS scores, with differences in assemblages being greater among biotopes than between sites. 3. All three metrics studied (SASS score, number of taxa and average score per taxon, ASPT), differed significantly among biotopes, with highest scores consistently recorded in the stones biotope, while lowest SASS scores and fewest taxa were recorded in the sand biotope. 4. SASS score and number of taxa were positively, while ASPT was negatively correlated with number of biotopes sampled. 5. The observed biotope differences highlight the importance of sampling and comparing data from sites separately for each biotope." (Author) Odonata are treated on the family level.] Address: Dallas, Helen, Department of Zoology, University of Cape Town, Private Bag Rondebosch, Cape Town, Western Cape 7700, South Africa. E-mail: hdallas@botzoo.uct.ac.za
- 7270.** David, A.; Cicort-Lucaciu, A.-S.; Szabo, A.L.; Ciuca, A.S.; Cserved, K. (2007): Feeding of a *Triturus vulgaris* population from Teuz Valley area, Arad county, Romania. *Biharean Biologist* 1: 57-61. (in Romanian, with English summary) [Odonata were found in the diet of the Common newt.] Address: Cicort-Lucaciu, A.-S., Babes-Bolyai University, Faculty of Biology and Geology, Cluj-Napoca, Romania
- 7271.** Dudley, S.; Dudley, C.; Mackay, A. (2007): *Watching British Dragonflies*. Subbuteo Natural History Books. ISBN-13: 9780856611124: 341 pp. (in English) ["Contents: Quick ID Guide: A 14 page section with side by side comparison of each regular British species by family. Species accounts: covers 46 species. All British breeding species receive a 2 page spread (vagrants receive a single pages) with specially commissioned artwork opposite concise species accounts. Site Guide: featuring 94 of Britain's top dragonfly watching sites. All sites get at least a full page (some key sites such as Thurlsey Common in Surrey receive 2 pages) with full access details, species to look for, best time to visit and a site map. Gazetteer: 95 pages of sites to visit in England, Wales, Scotland and Northern Ireland." (Publisher) For a critical review see: http://www.amazon.co.uk/review/product/0856611123/ref=dptopcmcra_crtx/278-6594008-2625421?%5Fencoding=UTF8&showViewpoints=1
- 7272.** Evenhuis, N.L. (2007): The Godeffroy Museum catalogs in relation to Fiji terrestrial arthropods. Part I: Introduction and review of Myriapoda, Diptera, Odonata, and smaller Hexapod orders. *Bishop Museum Occasional Papers* 91 (Fiji Arthropods VII Edited by Neal L. Evenhuis & Daniel J. Bickel): 17-28. (in English) ["Catalogs of the Godeffroy Museum in Hamburg are reviewed in relation to their listings of Fijian terrestrial arthropods. A table of names of Fijian terrestrial arthropods listed in the catalogs available for study is presented with discussion of the nomenclatural and taxonomic implications. The names of arthropods in the Blattodea, Dermaptera, Diptera, Neuroptera, Myriapoda, Odonata, Phasmida, and Trichoptera are tabulated." (Author)] Address: Evenhuis, N.L., Pacific Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawaii 96817, USA. E-mail: neale@bishopmuseum.org
- 7273.** Figueira Van de Koken, A.; Ribeiro Matos, F.A.; Lemes Martins, R. (2007): *Comportamento de Pantala*

flavescens (Odonata, Anisoptera, Libellulidae) e perda do investimento reprodutivo em áreas antropizadas. Boletim do Museu de Biologia Prof. Mello Leitao (Nova Série) 21: 7-18. (in Portuguese, with English summary) ["Behaviour of *P. flavescens* and waste of reproductive investment in urban areas - *P. flavescens* is an exophytic, territorial and migratory dragonfly. Due to its migratory behaviour, this species is commonly recorded in dry areas. However, the presence of *P. flavescens* in parking areas and the occurrence of ovipositions over reflective automobile hood surfaces are not well understood. This work presents data on the behaviour of *P. flavescens* in different areas with and without vehicles to evaluate the reproductive investment of this species in parking areas. There was correlation between the frequency of *P. flavescens* captures and the number of parked vehicles. We also recorded preference for thermoregulation activities over light-colored cars (higher light reflection indexes). Focal observation indicates that common behaviours at parking areas were similar to those registered at flooded areas and very distinct from those observed over pasture, where we registered only foraging behaviour. Eggs collected over car hood were fecundated and viable, indicating some waste of reproductive investments. Results suggest that parking areas could favour the occurrence of *P. flavescens* at urban areas. However the loss in reproductive efforts could be selecting against the animals showing this behaviour." (Authors)] Address: Figueira Van de Koken, Antonia, FAESA – Faculdade de Saúde e Meio Ambiente. Rua Serafim Derenzi 3115 Campus II, São Pedro, CEP 29053-250, Vitória – ES, Brasil. E-mail: antoniafigueira@gmail.com

7274. Gligorovic, B.; Pesic, V. (2007): Contribution to knowledge of the dragonflies (Odonata) from Lake Skadar's drainage basin (Montenegro). *Acta entomologica serbica* 12(2): 1-16. (in English) ["An updated list of the Odonata of the Lake Skadar's drainage basin is given, including 45 species and subspecies. Two of them - *Sympecma fusca* and *Ceriagrion tenellum* are new for the fauna of Odonata of Montenegro, while *Brachytron pratense* and *Aeshna isosceles* are recorded for the first time in the Lake Skadar's basin. Findings of *Orthetrum coerulescens* are of the particular interest having in mind distribution of *O. coerulescens* subspecies in this part of Europe." (Authors)] Address: Gligorovic, B., Dept of Biology, Faculty of Sciences, Univ. of Montenegro, Cetinjski put b.b., 81000 Podgorica, Montenegro, E-mail: bogic1@cg.yu

7275. Gunzburger, M.S. (2007): Evaluation of seven aquatic sampling methods for amphibians and other aquatic fauna. *Applied herpetology* 4: 47-63. (in English) ["To design effective and efficient research and monitoring programs researchers must have a thorough understanding of the capabilities and limitations of their sampling methods. Few direct comparative studies exist for aquatic sampling methods for amphibians. The objective of this study was to simultaneously employ seven aquatic sampling methods in 10 wetlands to compare amphibian species richness and number of individuals detected with each method. Four sampling methods allowed counts of individuals (metal dipnet, D-frame dipnet, box trap, crayfish trap), whereas the other three methods allowed detection of species (visual encounter, aural, and froglogger). Amphibian species richness was greatest with froglogger, box trap, and aural samples. For anuran species, the sampling methods by

which each life stage was detected was related to relative length of larval and breeding periods and tadpole size. Detection probability of amphibians varied across sampling methods. Box trap sampling resulted in the most precise amphibian count, but the precision of all four count-based methods was low (coefficient of variation > 145 for all methods). The efficacy of the four count sampling methods at sampling fish and aquatic invertebrates was also analyzed because these predatory taxa are known to be important predictors of amphibian habitat distribution. Species richness and counts were similar for fish with the four methods, whereas invertebrate species richness and counts were greatest in box traps." Odonata accounted most significantly to this result. "An effective wetland amphibian monitoring program in the southeastern United States should include multiple sampling methods to obtain the most accurate assessment of species community composition at each site. The combined use of frogloggers, crayfish traps, and dipnets may be the most efficient and effective amphibian monitoring protocol." (Author)] Address: Gunzburger, Margaret, United States Geological Survey, Florida Integrated Science Center, 7920 NW 71st Street, Gainesville, FL 32653-3701, USA. E-mail: mgunzburger@usgs.gov

7276. Guo, T. (2007): Design and prototype of a hovering ornithopter based on dragonfly flight. Bachelor of Science, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge: 31 pp. (in English) ["Hovering is normally achieved using a horizontal wing path to create lift; bees, wasps and helicopters use this technique. Dragonflies hover using a unique method, by flapping along an inclined stroke plane. This seems to create a higher efficiency than is possible for normal hovering. The aim of this project is to build a mechanical model to mimic the aerodynamic properties and hovering motion of dragonflies. Through the design and evaluation of this model, we can evaluate the mechanical feasibility of reproducing the wing path using single motor control and establish whether the difference in stroke plane is advantageous for the dragonfly. By adjusting the initial angle of attack of the ornithopter's wings, we can artificially recreate varying stroke planes. A comparison of the resultant lift generated from different stroke planes showed that greater lift forces were generated with non-zero stroke planes as demonstrated in normal hovering." (Author)] Address: Guo, Theresa, Massachusetts Institute of Technology, Department of Mechanical Engineering, 77 Massachusetts Avenue, Room 3-173, Cambridge, Massachusetts 02139, USA

7277. Hutchinson, R.; Menard, B. (2007): First observations on larvae of *Epiaeschna heros* (Odonata: Aeshnidae) in Quebec, Canada. *Ontario Odonata* 7: 1-7. (in English, with French summary) [Discovery of the first larvae of *E. heros* in Quebec prompted nine visits to the habitat between May 29 and November 5, 2005, so that it could be described. The small, dark swamp where the larvae were found was dominated by Black Ash (*Fraxinus nigra*). It is located within 183 m of Lac Beauchamp (45.4923 °N, -75.6235 °W) in Gatineau, Quebec. The swamp was devoid of water for over two months in the middle of the Odonata flight season. Four relatively large larvae of *E. heros* were found and two were reared in an aquarium to adulthood. Furthermore, 20 exuviae were collected, as well as one moult. Fourteen other species of Odonata (exuviae, larvae or adults) were col-

lected in the swamp or in the immediate vicinity." (Authors.) Address: Hutchinson, R., 12, chemin de la Savane, apt. 12, Gatineau (Quebec) J8T 1P7, Canada. E-mail: raymond.hutchinson@sympatico.ca

7278. Jabłońska-Barna, I. (2007): Macroinvertebrate benthic communities in the macrophyte-dominated Lake Luknajno (northeastern Poland). *Oceanological and hydrobiological studies* 36 (Suppl. 4): 29-37. (in English) [The study includes samples of *Ischnura elegans* and *Enallagma cyathigerum*.] Address: Jabłońska-Barna, Izabela, Faculty of Environment Sciences and Fisheries, University of Warmia and Mazury, ul. Oczapowskiego 5, 10-957 Olsztyn, Poland. E-mail: ijpb@uwm.edu.pl

7279. John, H.; Günther, A.; Reißmann, R.; Tolke, D.; Heilmeyer, H. (2007): Bedeutung und Schutz des FFH-Lebensraumtyps „Fließgewässer mit Unterwasservegetation“ im Gebiet der oberen Freiburger Mulde. *Mitteilungen des Naturschutzes Freiberg* 3: 56-83. (in German) [In summer 2003, a heavy high flood impacted the Freiburger Mulde, Sachsen Germany. The recolonisation with submerse vegetation (focus on *Ranunculus peltatus*), fish, and Odonata was studied along the river at 20 sampling sites between summer 2003 and summer 2005. A total of 15 species including *Ophiogomphus cecilia* was recorded.] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstr. 10, 09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

7280. Kalkman, V.J. (2007): *Archboldargia scissorhandsi* spec. nov. from Papua, Indonesia ((Zygoptera: Coenagrionidae). *Odonatologica* 36(2): 201-206. (in English) ["The new species is described, based on a single male. Holotype male: Indonesia: Papua (formerly Irian Jaya), Pass Valley, Ibem R., 13/20-V-1999; deposited in ZMAN, Amsterdam. A key to the *Archboldargia* males is given and some notes on the distribution of the genus are provided." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

7281. Kalnins, M. (2007): Protected aquatic insects of Latvia – *Leucorrhinia pectoralis* (CHARPENTIER, 1825) (Odonata: Libellulidae). *Latvijas entomologs* 44: 26-32. (in English) ["Published data, collections, data collected during the project „Analysis of the Specially Protected Nature Territories in Latvia and Establishing of EMERALD/Natura 2000 Network“ and material collected by Latvian entomologists have all been used in the analysis of the distribution of this species. The distribution of *L. pectoralis* was mapped using a basic grid of 5x5 km squares in the Baltic grid system. In total, *L. pectoralis* is recorded from 98 squares in Latvia. The most known localities are concentrated in central and northern Latvia. The majority of localities of *L. pectoralis* in Latvia have been recorded in the natural eutrophic lakes with Magnopotamion- or Hydrocharition-type vegetation (21 records) and oxbow lakes (44 records). Other *L. pectoralis* habitats are hard oligo-mesotrophic lakes with benthic vegetation of *Chara* spp. (3 localities), natural dystrophic lakes and ponds in active raised bogs or transition mires (15 localities), dystrophic water bodies also (11 localities). Only in a few cases species have been observed in ponds (2 localities) and oligotrophic to

mesotrophic standing waters with *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea* vegetation (3 localities)." (Author)] Address: Kalnins, M., Nature Protection Board, Eksporta iela 5, LV-1010 Riga, Latvia. E-mail: martins.kalnins@dap.gov.lv

7282. Ketelaar, R.; Bouwman, J.H.; Felix, R.P.W.H. (2007): Notes on the habitat of *Sympecma paedisca* in Buryatia, Southeast Siberia, Russia. *Brachytron* 11(1): 91-96. (in Dutch, with English summary) ["In June 2007 the authors visited the federal subject Buryatia of the Russian Federation. On four localities populations of *S. paedisca* were found. In this article a short description and photographs are published. Two localities are more or less comparable to the habitat in The Netherlands, with dense helophyte vegetations of *Phragmites australis*. The two other habitats are different from the European reference: a small sweet water brook floating in a saline lake in the steppe region and helophyte vegetation in the summerbed of a broad river." (Authors)] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

7283. Ketelaar, R.; Manger, R.; Ruiter, E.J.; Uilhoorn, H.M.G.; de Boer, E.P. (2007): Analysis of the distribution of *Sympecma paedisca* in the Netherlands. *Brachytron* 11(1): 5-20. (in Dutch, with English summary) ["[...] Prior 1970, *S. paedisca* was a rather common damselfly in the northern part of the Netherlands. A negative trend started, leading to the virtually disappearance around 1980. A long period followed with only a few records, and no known populations. In 1997 however, the species was rediscovered in De Weerribben, one of the largest mesotrophic peat moors in the Netherlands. Since then a remarkable recovery followed with a strong increase in number in De Weerribben and also reproduction at a second site, the Kuinderplas. At the end of summer numbers of *S. paedisca* are also increasing on heaths and dry forest edges in the provinces of Drenthe, Friesland and Overijssel, sometimes over eighty kilometres away from the reproduction sites. In spring no sign of reproduction has been seen here so far. It is documented in this article that this remarkable pattern already existed before 1970, when *S. paedisca* was still a rather common species. Reproduction occurs in more or less mesotrophic to eutrophic waters with abundant vegetation. After emergence, a large part of the population departs to drier areas. It is hypothesized in this article that these individuals do not return to their sites of origin, but wander around searching for possible reproduction sites. The fact that no new reproduction sites at these sandy soils have been found (neither have been in the past), suggest that these areas are not suitable and that all these individuals do starve without having reproduced." (Authors)] Address: Ruiter, E., Cornelis Houtmanstraat 10, 8023 EA Zwolle, The Netherlands. E-mail: e.j.ruiter@plajiet.nl

7284. Ketelaar, R.; Ruiter, E.J.; Uilhoorn, H.M.G.; Manger, R.; de Boer, E.P. (2007): Habitat choice of *Sympecma paedisca* in the Netherlands. *Brachytron* 11(1): 21-33. (in Dutch, with English summary) ["In the Netherlands, reproduction of *S. paedisca* occurs in marshes with mesotrophic to eutrophic water. The presence of vegetation succession stadia with abundant *Typha angustifolia*, *T. latifolia* and *Phragmites australis* is essential. Eggs are predominantly deposited in floating dead leaves, stems and roots of these plants. Reproduction

sites are mostly sheltered against wind and cold and warm up easily in early spring when oviposition takes place. *S. paedisca* is very scarce at localities that are too open and on sites with encroachment of trees that became too shady. The most important reproduction site in the Netherlands is the peat reserve De Weerribben in the province of Overijssel. After emergence, a part of the population stays within the nature reserve and hibernates in moist forests in tussocks of *Molinia caerulea*. Another part migrates to drier heath lands, sometimes at tens of kilometres distance where they hibernate in either *Molinia caerulea* or *Calluna vulgaris*. After hibernation, the first active individuals of *S. paedisca* were seen on February 27th. Along the edges of the woods and on sheltered sites small insects are caught and eaten, providing energy for the reproduction period from March-May." (Authors) The paper also includes habitat analysis from Baden-Württemberg and Bavaria, Germany, and Poland.] Address: Ruiter, E., Cornelis Houtmanstraat 10, 8023 EA Zwolle, The Netherlands. E-mail: e.j.ruiter@plajiet.nl

7285. Kosterin, O.E. (2007): Strekozy (Insecta, Odonata) Akademgorodka [Dragonflies (Insecta, Odonata) of Akademgorodok]. In: Priroda Akademgorodka: 50 let spustya [The Nature of Akademgorodok: 50 years passed], . I. F. Zhimulev (ed.), SO RAN Publishing House, Novosibirsk: 74-91. (in Russian) [For details see: <http://pisum.bionet.nsc.ru/kosterin/academicodonata.htm>] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

7286. Liu, T. (2007): Design of a flapping mechanism for reproducing the motions at the base of a dragonfly wing. Bachelor of Science, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge: 50 pp. (in English) ["Insect flight is being studied to aid in the development of micro-air vehicles that use the flapping wing model in an attempt to achieve the high levels of maneuverability that insects have. The flight of the dragonfly has been chosen to be modeled because of its exceptional flight capabilities. This thesis addresses the flapping mechanism designed for the root of each wing. The prototype of the mechanism, built at a scale of four times the size of a dragonfly having a wingspan of 150 mm, is able to create motions in the wing of flapping and feathering, and can vary the stroke plane. The coning angle can be set between tests. The design process began with considering two methods of actuation, a four-bar transmission mechanism used in the Micromechanical Flying Insect developed in the UC Berkeley Biomimetic Millisystem Lab, and by pivoting the wing support directly with cables or rigid links. The second design was chosen to be developed further. A functional prototype was built from acrylic and parts made using stereo lithography." (Author)] Address: Liu, Teresa, Massachusetts Institute of Technology, Department of Mechanical Engineering, 77 Massachusetts Avenue, Room 3-173, Cambridge. Massachusetts 02139. USA

7287. López-Casas, S.; Jiménez-Segura, L.F. (2007): Reproduction and feeding of *Nicuro Pimelodus blochii* (Valenciennes, 1840) (Pisces: Pimelodidae) in Vachimnero floodplain lake, Magdalena river basis, Colombia. *Actual Biol.* 29(87): 193-201. (in Spanish, with English summary) [In *Pimelodus blochii* stomachs contents of

aquatic and terrestrial animal fragments of at least 16 taxa (including Odonata) were found suggesting that this species has a wide trophic niche and an opportunistic omnivorous feeding behaviour.] Address: López-Casas, Silvia, Laboratorio de Ictiología. Instituto de Biología. Universidad de Antioquia. Medellín (Antioquia), Colombia. E-mail: silvilopezcasas@yahoo.com

7288. Maillard, O. (2007): Observaciones sobre el nido, polluelos y cuidado parental de *Bucco macrodactylus* en el norte de Bolivia. *Kempffiana* 2007 3(2): 25-27: 25-27. (in Spanish) [Based on accidental observations, the diet of the Chestnut-capped Puffbird (*Bucco macrodactylus*) also includes nine dragonfly specimens.] Address: Maillard, O., Museo de Historia Natural Noel Kempff Mercado, Universidad Autónoma Gabriel René Moreno. Avenida Irala 565, Casilla postal 2489, Santa Cruz de la Sierra, Bolivia. E-mail: hylopezus@gmail.com

7289. Mancic, C.O. (2007): Inventory of the dragonfly collection from Iron Gate Museum, Drobeta Turnu-Severin. *Drobeta, Seria St.Naturii XVII*: 172-183. (in English) [The material deposited in the Iron Gate Museum, Drobeta Turnu-Severin consists of 815 specimens of 43 species. *Coenagrion ornatum* is very important from the Natura 2000 viewpoint and *Lestes macrostigma* is a scarce species in Romania *Chalcolestes parvidens*, *Pyrrhosoma nymphula*, and *Stylurus flavipes* are also note worthy.]

7290. Manger, R. (2007): Exterior characteristics of *Sympecma paedisca* in the Netherlands. *Brachytron* 11(1): 63-74. (in Dutch, with English summary) ["In this article a description of the exterior aspects of a hibernating population of *S. paedisca* in the Netherlands is provided. The average body length of the hibernating winter damsel was 37.0 mm. The population studied showed some variation in colour and markings at the thorax. Ten percent of the population showed reduced markings and another thirteen percent showed still bright background colour in the hibernation period from October to April. During the three to four months of hibernation no colour changes appeared. In the reproductive period the individuals became more dull and darker coloured." (Author) The paper also includes remarks and pictures of *Sympecma gobica* from Kazakhstan, and from *S. fusca*.] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

7291. Manger, R.; Dingemanse, N.J. (2007): Survival and biotope selection of *Sympecma paedisca* in a winter habitat in the Netherlands. *Brachytron* 11(1): 52-62. (in Dutch, with English summary) ["This article provides a description of the habitat, behaviour and survival of adults of *S. paedisca* during wintertime. The study was conducted between 2003 and 2006 in the province of Drenthe, the Netherlands. The habitat consisted of heather (*Calluna vulgaris*, *Erica tetralix*) and purple moorgrass (*Molinia caerulea*), surrounded by pine forest (*Pinus*). Capture-recapture techniques were used to study behaviour and survival during wintertime. Hibernating adults were highly philopatric and only moved over small distances within the study area. Recaptures of adults marked elsewhere showed that wintering individuals reached the wintering habitat using stopover-sites. Monthly survival rates (December through March) were high (winter 2004/2005: 75%; 2005/2006: 100%).

Nevertheless, 58% of the hibernating adults did not survive the winter of 2004/2005. The area was used only for hibernation; reproductive behaviour was never observed and reproduction sites were not found. Based on the descriptions of habitat, behaviour and survival during winter, it is suggested that variation in winter survival plays an important role in the population dynamics of this species." (Author)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

7292. Manger, R. (2007): Both *Sympecma paedisca* and *Sympecma fusca* in the same breeding habitat. *Brachytron* 11(1): 83-86. (in Dutch, with English summary) ["In 2007 for the first time reproduction of *S. paedisca* was observed outside the well known reproduction sites in the Netherlands. The distance from this peat hole to the peat bogs in De Weerribben is about 17 kilometers. It was also the first time both *S. paedisca* and *S. fusca* were observed together within the reproduction period for at least five weeks. The observations include both reproduction activity of Siberian winter damsel and Common Winter Damsel. The reproduction site is located along a stream and includes several mesotrophic ponds." (Author)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

7293. Markovic, G.S.; Simic, V.M.; Ostoji, A.M.; Simic, S.B. (2007): Seasonal variation in nutrition of chub (*Leuciscus cephalus* L., Cyprinidae, Osteichthyes) in one reservoir of west Serbia. *Proc. Nat. Sci, Matica Srpska Novi Sad* 112: 107-113. (in English) ["*L. cephalus* is abundantly present fish species in the Balkan freshwaters, which indicates a good adaptation to the environmental conditions existing in the most of reservoirs. The fish species is abundant in the Meduvršje reservoir situated on the Zapadna Morava river (West Serbia, the Danube basin) as the only predator found here. In the period from 1996 to 2002, the intestinal content of 88 individuals of different age was analyzed. The zoophytophage character of diet was found to be largely shared with plant components all the year round. The differences in the trophic spectrum over the various seasons existed between the individuals of different age with high individual variations being found, too." (Authors) Odonata are the most frequent prey of *L. cephalus*. Larvae of *Lestes* sp. *Aeshna* sp. *Anax imperator*, *Gomphus vulgatissimus*, and *Brachytron pratense* are mentioned.] Address: Simic, V., Faculty of Sciences Kragujevac, University of Kragujevac, R. Domanovića 16, 34000 Kragujevac, Serbia. E-mail: goranmsv@tfc.kg.ac.yu

7294. McGeoch, M.A. (2007): Insects and bioindication: Theory and progress. *The Royal Entomological Society 2007. Insect Conservation Biology* (eds A.J.A. Stewart, T.R. New and O.T. Lewis): 144-174. (in English) ["The search for broad, repeatable patterns and the development of theory should be the major goal of biological disciplines, where theory is defined as 'empirically based mechanistic explanation of pattern in nature' (Price, 1991; Price et al., 1995). The state of bioindication is now at the point where the framework for developing a theory of bioindication has been well established. The process of theoretical development in bioindication may be considered to include: (i) delineation of objectives and the empirical collection of facts supporting the identity of species responsive, or related, to the EP of inte-

rest; (ii) the generation of hypotheses regarding these responses or relationships; (iii) independent testing of these hypotheses and acceptance or rejection of putative bioindicators; and finally (iv) further development of selected bioindicators to facilitate their use and maximize their suitability for conservation management and policy. The current primary weakness in this framework, at least for insect bioindicators, is the dearth of studies that have established robust bioindicators, and the narrow set of bioindication scenarios and geographic regions addressed by those that have. Insects have contributed substantially to the development of new methods for bioindication, and patterns are beginning to emerge of those insect taxa best suited to bioindication with different objectives, in different environments and geographical regions. However, in spite of an enormous groundswell flagging the importance of bioindication and the potential of insect bioindicators, only a handful of rigorous, fully developed insect bioindication systems have been realized. Perhaps there is a dichotomy between the desired role of indicators and realistic constraints on that role. Alternatively, perhaps the incentive and demand for insect bioindicators have not been sufficiently great. Optimistically, the field has perhaps merely required time to mature, develop methods and establish sufficient direction, and the next decade will see a proliferation of robust insect bioindication systems, as well as their widespread adoption in policy and management." (Author) Odonata contributed app. 5% to the frequency of bioindication publications involving different taxa.] Address: McGeoch, Melodie, Centre for Invasion Biology, Department of Conservation Ecology & Entomology, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa.

7295. Mertens, J.; Beladjal, L.; Janssens, F.; Matthys, P. (2007): Pitfall trapping in flooding habitats: a new technique reveals *Archisotoma pulchella* (Collembola: Isotomidae) as new to the Belgian fauna. *Belg. J. Zool.* 137(2): 177-181. (in English) ["Flooding habitats are unique ecosystems with complex land-water interactions. Research on their terrestrial component is seriously hindered by the lack of an adequate and efficient technique for pitfall trapping. This paper focuses on three consecutive items: (1) the description of a new type of trap, developed for use in temporarily submersed areas; (2) evaluation of its potential usefulness by a literature search of pitfall trapping in diverse environments (1998-2003); (3) its application in the trapping of arthropods inhabiting a salt marsh. The literature search demonstrates a bias towards forests, neglecting flooding biotopes. Beetles and spiders are by far the prominent taxa studied that way. Apart from some Diptera, *Archisotoma pulchella*, a new species of Collembolan for the Belgian fauna, is the only arthropod species trapped by the described sampling technique on the mud flats of the intertidal zone of the Ijzer estuary (Belgium), albeit in very high numbers. Additional sampling provided records from the Schelde estuary, and allows reconstructing some characteristics of its population dynamics." (Authors) Literature search of pitfall trapping resulted in records of trapped Odonata; these are not specified.] Address: Mertens, J., Terrestrial Ecology Unit, Ghent University, Ledeganckstraat 35, B-9000 Ghent, Belgium. E-mail: Johan.Mertens@UGent.be

7296. Muranyi, D. (2007): Contribution to the Odonata fauna of Albania. *Folia entomologica hungarica* 68: 41-53. (in English) ["New records of 34 species collected in

Albania during nine collecting trips between 2002 and 2006 are given. Distributional or taxonomical notes are given for 14 species. *Somatochlora meridionalis* and *Sympetrum depressiusculum* are new to the fauna of Albania. The first record of *Somatochlora flavomaculata* for Albania is given based on material from the Natural History Museum, London. The number of known species of Albanian Odonata accounts to 55." (Author)] Address: Muranyi, D., Department of Zoology, Hungarian Natural History Museum, H-1088 Budapest, Baross u. 13, Hungary. E-mail: muranyi@zool.nhmus.hu

7297. Muzon, J.; Pessacq, P.; Ramos, L. (2007): Odonata type specimens preserved in the Museo de la Plata, Argentina. *Odonatologica* 36(2): 301-306. (in English) ["Type collection preserved at Museo de La Plata includes 105 specimens of Odonata (6 holotypes, 1 neotype, 6 allotypes and 96 paratypes), representing 13 names belonging to Coenagrionidae (5), Lestidae (1), Megapodagrionidae (1), Aeshnidae (4), Gomphidae (1) and Libellulidae (1). Preservation status and label details of primary types are stated." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

7298. Niehuis, M (2007): Siegmars Ohliger zum 70. Geburtstag. *Fauna und Flora in Rheinland-Pfalz* 11(1): 233-240. (in German) [S. Ohliger is one of the odonatological pioneers in Rheinland-Pfalz, who contributed many faunistic data to the distribution of the dragonflies in this federal state of Germany.] Address: Niehuis, M., Im Vorderen Großthal, D-76857 Albersweiler, Germany. E-mail: Niehuis@t-online.de

7299. Novelo-Gutiérrez, R. (2007): *Progomphus lambertoi* (Odonata: Anisoptera: Gomphidae) a new species from Mexico. *Proceedings of the Entomological Society of Washington* 109(4): 791-797. (in English, with Spanish summary) ["*Progomphus lambertoi*, n. sp. (holotype from La Chichihua, State of Michoacán, México) (1,127 m asl; 18° 44.812 N; 103° 13.379 W), is described and illustrated. It appears closely related to *P. borealis* McLachlan, from which it can be distinguished by its smaller stature, paler coloration, enlarged and carinated hook of the posterior hamule, and male cerci not basoventrally carinated." (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparato Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx; rodolfo.novelo@inecol.edu.mx

7300. Oliveira, L.B.; Conte, C.O.; Favero, S. (2007): Diversidade e abundância de Odonata (Insecta) em uma região do Pantanal do Negro, Mato Grosso do Sul. *Anais do VIII Congresso de Ecologia do Brasil*, 23 a 28 de Setembro de 2007, Caxambu - MG: 1-2. (in Portuguese) [For details see: <http://www.seb-ecologia.org.br/viiiceb/pdf/945.pdf>] Address: Oliveira, L. B., Laboratório de Pesquisa em Entomologia- Universidade para o Desenvolvimento do Estado e da Região do Pantanal - UNIDERPAv. Alexandre Herculano, 1400 - Campo Grande - MS, Brasil

7301. Orr, B.; Hämäläinen, M. (2007): The Metalwing Demoiselles (*Neurobasis* and *Matronoides*) of the Eastern Tropics. *Natural History Publications*. ISBN-13: 9789838121231: 115 pp-["The metalwing demoiselles of the eastern tropics include 14 species in two genera

of calopterygid damselflies, distributed from Pakistan and Sri Lanka in the west, to southern China and New Guinea in the east. With their brilliant iridescent hindwings, the males of *Neurobasis* are among the most conspicuous and well-known inhabitants of clear forest streams throughout the region. The renowned odonatologist M.A. Lieftinck was so impressed by their beauty he called them the 'Birds of Paradise' among Odonata. A lifetime goal of Lieftinck, and before him Friedrich Ris, was to produce a full taxonomic revision of the group. Sadly, both died before their aims could be realised. This book provides this revision. Patterns of speciation are discussed in their zoogeographical context and in the light of recent molecular studies of the higher classification of the Calopterygidae. The book also includes a detailed historical account of the study of metalwings, beginning with the description of '*Libellula chinensis*' by Carl von Linné, the father of taxonomy, from a decorative coloured drawing in a book on rare birds, published in 1750. In the past few decades, a good deal of work has focussed on the biology of these insects, including analyses of their complex mating behaviour and of the physical basis for their brilliant colours. This book summarises all published information on all aspects of metalwing biology, and includes also many original observations on their ecology and behaviour, based on the authors' personal experiences." (Publisher)]

7302. Papazian, M.; Dumont, H.J.; Mary-Sasal, N.J. (2007): The Odonata of the Pacific ocean islands of Wallis and Futuna, with special reference to speciation in *Ischnura aurora* (Brauer). *Odonatologica* 36(1): 53-62. (in English) ["A collection of adult specimens made during a hydrobiological mission (5-23 X 2004) to the French Pacific Island Territories of Wallis and Futuna is studied. It constitutes the first odonate inventory from this archipelago, and is composed of 10 species (8 Anisoptera, 2 Zygoptera), all of which were known from the Pacific before. Pacific island material of *Ischnura a. aurora* (Brauer, 1865) is compared with specimens from the western part of the range of this species. These represent a good subspecies *I. a. rubilio* Selys, 1876. Furthermore, 2 new synonyms of *I. aurora* are proposed."] Address: Papazian, M., Le Constellation Bat A, 72 Avenue des Caillols, F-13012 Marseille, France

7303. Paunovic, M.M.; Jakovcev-Todorovic, D.G.; Simic, V.M.; Stojanovic, B.D.; Cacic, P.D. (2007): Macroinvertebrates along the Serbian section of the Danube River (stream km 1429-925). *Biologia, Bratislava* 62/2: 214-221. (in English) [Results of the investigation of the aquatic macroinvertebrate fauna along a 504 km stretch of the Danube River in Serbia are presented. A total of 74 macroinvertebrate taxa (including: *Gomphus vulgatissimus* and *Pyrrhosoma nymphula*) were observed during a survey in 2001.] Address: Paunovic, Momir, Institute for Biological Research "Sinisa Stankovic", Despota Stefana 142 Blvd, 11000 Belgrade, Serbia. E-mail: mpaunovi@ibiss.bg.ac.yu

7304. Prokop, J.; Fikacek, M. (2007): An annotated list of early oligocene insect fauna from Seiffenhensdorf (Saxony, Germany). *Acta musei nationalis Pragae, Series B - Historia Naturalis* 63(2-4): 209-217. (in English) ["The present study provides an annotated list of the Early Oligocene entomofauna from the diatomite of Seiffenhensdorf (Saxony, Germany). This study summarizes published and unpublished material gathered during the past four decades, concerning more than 30

insect specimens housed in two institutional and several private collections. The studied specimens were assigned to 11 families of seven insect orders. Trace fossils of two insect groups, i.e. damselfly egg-sets (Odonata: Zygoptera) and caddisfly larval cases (Trichoptera), were also examined. All taxa were compared to the previously described material from other Oligocene localities in the České středohorí Mts. These results were then correlated with those of paleobotanical research." Address: Fikáček, M., Charles University in Prague, Faculty of Science, Department of Zoology, Viničná 7, CZ-128 44, Praha 2, Czech Republic; email: MFikacek@seznam.cz

7305. Ruiter, E.J. (2007): Encounter with a Siberian winter damselfly [*Sympecma paedisca*] after hibernation. *Brachytron* 11(1): 89-90. (in Dutch, with English summary) ["In early spring 2007 a marked *S. paedisca* was seen on a reproduction location. The way of marking showed that this individual was marked in the fall of 2006 on a well known hibernation spot about 7 km away from the reproduction area. This incidental encounter maybe an indication that some individuals manage to return the long way home to the reproduction area after hibernation." (Author)] Address: Ruiter, E., Cornelis Houtmanstraat 10, 8023 EA Zwolle, The Netherlands. E-mail: e.j.ruiter@plajiet.nl

7306. Ruiter, E.J.; de Boer, E.P. (2007): Some observations on the behaviour of *Sympecma paedisca*. *Brachytron* 11(1): 75-80. (in Dutch, with English summary) [During a long-term research on *S. paedisca*, a lot of sightings on behaviour were recorded in several notebooks. In this article several kinds of behaviour, such as territorial behaviour, reproduction, hibernation and hunting, are described.] Address: Ruiter, E., Cornelis Houtmanstraat 10, 8023 EA Zwolle, The Netherlands. E-mail: e.j.ruiter@plajiet.nl

7307. Ruiter, E.J.; Manger, R. (2007): Hibernation in the Netherlands, not quite easy for *Sympecma paedisca*. *Brachytron* 11(1): 42-49. (in Dutch, with English summary) ["Until 2002 it was unknown where *S. paedisca* hibernated in the Netherlands. With research first winter sightings were established which enabled the researchers to monitor the hibernating damselflies during wintertime. *S. paedisca* hibernates in the drier areas near the reproduction sites, but also on similar areas far from De Weerribben. They hibernate till 60 cm above ground level in free hanging position often on *Calluna vulgaris* and *Molinia caerulea*, but also on *Rubus fruticosus* and young trees like *Betula* and *Quercus robur*. Cryptical hibernation as known from abroad, could not be established." (Authors)] Address: Ruiter, E., Cornelis Houtmanstraat 10, 8023 EA Zwolle, The Netherlands. E-mail: e.j.ruiter@plajiet.nl

7308. Ruiter, E.J.; Uilhoorn, H.M.G.; Manger, R.; Keteleer, R.; de Boer, E.P. (2007): Recapture of *Sympecma paedisca* over great distance. *Brachytron* 11(1): 34-41. (in Dutch, with English summary) ["From 2002 till 2004 hundreds *S. paedisca* were marked on behalf of a capture-mark-recapture experiment. Short range recapture showed that several individuals stayed on the same area for weeks. Three individuals were recaptured on places far away from the reproduction site, a unique result. Thanks to these recaptures we can establish that the *S. paedisca* damselfly migrates on purpose to places where they hibernate. The reason for this migration is

not known yet. Probably they search for new reproduction sites. Part of the population hibernates within the boundaries of the reproduction site (De Weerribben), but a significant number migrates to heath lands in the provinces of Friesland, Drenthe and Overijssel where they hibernate. After wintertime they disappear; where they go to still remains uncertain." (Authors)] Address: Ruiter, E., Cornelis Houtmanstraat 10, 8023 EA Zwolle, The Netherlands. E-mail: e.j.ruiter@plajiet.nl

7309. Sato, M.; Riddiford, N. (2007): A preliminary study of the Odonata of S'Albufera Natural Park, Mallorca: status, conservation priorities and bio-indicator potential. *Journal of Insect Conservation* 12(5): 539-548. (in English) ["This study obtained baseline information for adult Odonata and assessed their conservation priorities and suitability as biological indicators in S'Albufera Natural Park in Mallorca, Spain. At this site, human activities in and around the wetland have raised concerns about their impact on the ecosystem. Investigations on adult diversity produced records of 14 species (four Zygoptera and 10 Anisoptera) and included the first record of *Erythromma viridulum* for the park. Detrended Correspondence Analysis (DCA) ordination categorised study sites according to their geographical locations in the park and showed clustering of the sites around particular species based on these locations. This pattern might reflect the differences in brackishness in water supplied by different water sources. Canonical Correspondence Analysis (CCA) indicated that some environmental factors were related to particular species. Water flow, vegetation, and depth and size of a water body could discriminate stenotopic species from eurytopic species. Only a few species appeared to be tolerant to the sites with high salinity and low oxygen concentration. The ordination results can be useful for establishing conservation priorities with information of species diversity, abundance, distribution and flight period. Although, with the current limited basic information, the use of Odonata species as biological indicators seems to be difficult, some clear relationships between environmental factors and particular species indicate the great potential of using adult Odonata as biological indicators in the park." (Authors)] Address: Sato, Mayumi, Center for Ecological Research, Kyoto University, Otsu 520-2113, Japan. E-mail: m-sato@ecology.kyoto-u.ac.jp

7310. Sharma, G.; Joshi, P.C. (2007): Diversity of Odonata (Insecta) from Dholbaha Dam (Dist. Hoshiarpur) in Punjab Shivalik, India. *Journal of Asia Pacific Entomology* 10(2): 177-180. (in English) ["Study on the species diversity of the order Odonata was carried out during 2002 - 2004 at Dholbaha dam, which has a moist deciduous forest surrounding it in district Hoshiarpur, Punjab, India. A total of 30 species belonging to 7 families of order Odonata were recorded during the study period. The family Libellulidae, represented by 18 species was the most dominant followed by Coenagrionidae (6 species), Aeshnidae (2 species) and Calopterygidae, Chlorocyphidae, Euphaeidae and Gomphidae each having 1 species. In terms of total number of individuals, family Libellulidae constituted maximum with 64.36% followed by Coenagrionidae (28.50%), Chlorocyphidae (1.83%), Gomphidae (1.62%), Euphaeidae (1.56%), Calopterygidae (1.38%) and Aeshnidae (0.75%). *Pantala flavescens* (Fabricius), a migratory species was the most dominant in number of individuals constituting 17.12% of the total. The least dominant species included *Anax immaculifrons* Rambur (0.38%) and *Anax*

parthenope parthenope (Selys) (0.36%). Shannon-Wiener index of species diversity of Odonata was 2.988 and 3.029 during 2002-2003 and 2003-2004, respectively. Seven new species have also been reported from the Dholbaha dam during this study period thus increasing the total species number of odonates so far recorded from this area from 29 to 36." (Authors)] Address: Sharma, G., Division of Entomology, Indian Agricultural Research Institute, Pusa campus, New Delhi-110012, India. E-mail: gauravpandit2@rediffmail.com

7311. Svensson, E.I.; Karlsson, K.; Friberg, M.; Eroukhanoff, F. (2007): Gender differences in species recognition and the evolution of asymmetric sexual isolation. *Current Biology* 17: 1943-1947. (in English) ["Closely related sympatric species are expected to evolve strong species discrimination because of the reinforcement of mate preferences. Fitness costs of heterospecific matings are thought to be higher in females than in males, and females are therefore expected to show stronger species discrimination than males. Here, we investigated gender and species differences in sexual isolation in a sympatric species pair of *Calopteryx* damselflies. The genus *Calopteryx* is one of the classic examples of reproductive character displacement in evolutionary biology, with exaggerated interspecific differences in the amount of dark wing coloration when species become sympatric. Experimental manipulation of the extent of dark wing coloration revealed that sexual isolation results from both female and male mate discrimination and that wing melanization functions as a species recognition character. Female choice of conspecific males is entirely based on wing coloration, whereas males in one species also use other species recognition cues in addition to wing color. Stronger species discrimination ability in males is presumably an evolutionary response to an elevated male predation risk caused by conspicuous wing coloration. Gender differences in species discrimination and fitness costs of male courtship can thus shed new light on the evolution of asymmetric sexual isolation and the reinforcement of mate preferences." (Authors)] Address: Svensson, E., Sect. Animal Ecology, Ecology Building, Lund University, SE-223 62 Lund, Sweden. E-mail: erik.svensson@zoekol.lu.se

7312. Tol, J. van; Gassmann, D. (2007): Zoogeography of freshwater invertebrates of southeast Asia, with special reference to Odonata. In: Renema, Willem (Ed.): *Biogeography, Time and Place - Distributions, Barriers and Islands. Topics in Geobiology, Vol. 29.* Dordrecht (Springer): 45-91. (in English) [oas 23, Present patterns in the distribution of the regional freshwater invertebrates are the result of complex historical and ecological processes. Many orders of aquatic insects are known in the fossil record from as early as the Early Permian, while the earliest fossils of Odonata date from the Middle Carboniferous. Thus, the breakup of Gondwana, that started in the Late Jurassic, is relevant to our understanding of the present distributional patterns. The geological history of Southeast Asia is extremely complex. The separation of India / Seychelles and Madagascar from Africa at 130 Ma, the subsequent breakup of India / Seychelles and Madagascar at 88 Ma, and the collision of India with Asia at 65-56 (or 43) Ma, significantly changed the western part of the area discussed. The southeastern part of the area changed under the influence of the northward rafting Australian plate from 85 Ma. The southwest directed subduction of the Pacific plate formed several arc-systems at the western margin

of that plate. A very important reorganisation of plate boundaries occurred at 25 Ma, when the New Guinea passive margin collided with an island arc including the eastern Philippine, Halmahera and South Caroline arc-systems, and when the northwestern corner of the Australian plate collided with Southeast Asia in the Sulawesi region. Information on the subaerial history of the respective terranes is still fragmentary. Diversity and distribution of most groups of freshwater invertebrates of Southeast Asia are still underexplored, while phylogenetic reconstructions including taxa of South America or Africa are virtually absent. Various examples from the literature are discussed. A phylogenetic reconstruction and a historical-biogeographic scenario of the Platycnemididae, which special reference to the Calicnemiinae, is presented as one of the first examples of such an analysis of a widespread group. The Calicnemiinae of Southeast Asia are derived from African Platycnemididae. The sister-group of the Southeast Asian taxa is *Leptocnemis cyanops* Selys, a species confined to the Seychelles. The Malesian Calicnemiinae are derived from ancestors on the mainland of Asia, and may have dispersed along the Izu-Bonin arc at the subduction zone of the Pacific plate along the Philippine plate at 40-50 Ma, but alternatively, the Late Cretaceous 'Inner Melanesian Arc' (Mindanao to New Zealand) sensu Polhemus (1995) may have been the route of dispersal. A clade of the genera *Lieftinckia* and *Risocnemis*, confined to the Solomon islands and the Philippines, respectively, represents a more recent westward dispersal of the Calicnemiinae, using the Caroline and Philippine Arcs during the Oligocene. Various other small-scale phylogenetic reconstructions and biogeographical analyses are discussed in Odonata and other freshwater invertebrates. Phylogenetic studies of aquatic and semi-aquatic Heteroptera significantly contribute to our understanding of the areas of endemism and their relationships in Southeast Asia. The areas of endemism in New Guinea are generally congruent with geological entities recognized, e.g. the northern New Guinea terranes, as well as the central New Guinea terranes which are associated with an 'Inner Melanesian Arc'. Special attention is paid to the fauna of Sulawesi. Areas of endemism in Odonata and Heteroptera are generally congruent. Area cladistic reconstructions based on distribution patterns and phylogenetic reconstructions of e.g., *Protosticta* Selys (Odonata, Platystictidae) and genera and species of Chlorocyphidae (Odonata), show a pattern of (Northern arm(Southwest arm(Central ++ Southeast arm))), which is a reflection of the geological history of the island. The biogeographical patterns recognized in freshwater invertebrates of Malesia do not principally differ from those found in strictly terrestrial taxa. The distribution of land and water is responsible for the composition of the biotas during the Cenozoicum. It is not clear whether rafting of biotas on the various island arcs, or congruent patterns in dispersal, are to be considered the underlying principle. The extreme habitat requirements and poor dispersal power of many freshwater organisms, make a dispersal scenario unlikely. However, recent studies show that such habitat specialization may develop rapidly." (Authors)] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

7313. van Sejen, R.; Hofstra, A. (2007): Records of *Sympetma paedisca* in Germany, near Meppen. Bra-

chytron 11(1): 87-88. (in Dutch, with English summary) [On 22-X- 2006 a male and female of *S. paedisca* were found at Hoogmoor Ringe, about 21 km west-southwest of Meppen, Niedersachsen, Germany. These records are in line with the recent expansion in the Netherlands. However, *S. paedisca* is very scarce in northern Germany and the record is therefore extraordinary.] Address: van Seijen, R.; Hofstra, Atmeke, Ee 56, 9201 BJ Drachten, The Netherlands. E-mail: ronaldbonne@hotmail.com

7314. Veraghtert, W.; Vogels, B. (2007): De zuidelijke heidelibel (*Sympetrum meridionale*) in Bospolder te Ekeren. Antenne 1(1): 8-9. (in Dutch) [*S. meridionale*, 13-VIII-2006, Bospolder te Ekeren (UTM ES 97 82), Belgium.] Address: Veraghtert, W., Dennenlaan 13, 2500 Lier, Belgium. E-mail: wim.veraghtert@natuurpunt.be

7315. Vogt, T.E.; Cashatt, E.D. (2007): Survey site identification for Hine's Emerald Dragonfly (*Somatochlora hineana*) in Illinois: Final report. Submitted to: Illinois Department of Natural Resources, Division of Wildlife Resources, One Natural Resources Way, Springfield, Illinois 62702-1271, USA: 45 pp. (in English) [For the full paper see: http://www.museum.state.il.us/research/entomology/hines/2007ILHE_Dfinalreport.pdf] Address: Cashatt, E.D., Illinois State Museum, 1920 10 1/2 St., Springfield, IL 62703, USA. E-mail: cashatt@museum.state.il.us

7316. Yasuoka, J.; Levins, R. (2007): Ecology of vector mosquitoes in Sri Lanka – Suggestions for future mosquito control in rice ecosystems. Southeast Asian J. trop. med. public health 38(4): 646-657. (in English) ["Mosquito-borne diseases are a major public health threat in Asia. To explore effective mosquito control strategies in rice ecosystems from the ecological point of view, we carried out ecological analyses of vector mosquitoes in Sri Lanka. During the 18-month study period, 14 *Anopheles*, 11 *Culex*, 5 *Aedes*, 2 *Mansonia*, and 1 *Armigeres* species were collected, most of which are disease vectors for malaria, filariasis, Japanese encephalitis, or dengue in Sri Lanka and elsewhere in Asia. The density and occurrence of *Anopheles* and *Culex* species were the highest in seepage pools and paddy fields, where the majority of niche overlaps between larval mosquito and aquatic insect species were observed. All 7 aquatic insect species - identified in case of Odonata as Aeshnidae, Gomphidae, Libellulidae -, which are larval mosquito predators, overlapped their niche with both *Anopheles* and *Culex* larvae. This suggests that conserving these aquatic insect species could be effective in controlling mosquito vectors in the study site. Correlations between several climatic factors and mosquito density were also analyzed, and weather conditions, including higher temperature, lower relative humidity, and higher wind velocity, were found to affect mosquito oviposition, propagation, and survival. These findings deepen our understanding of mosquito ecology and will strengthen future mosquito control strategies in rice ecosystems in Asia." (Authors)] Address: Yasuoka, Junko, Department of Population and International Health, Harvard School of Public Health, Boston, MA, USA. E-mail: jyasuoka@post.harvard.edu

7317. Zessin, W. (2007): Reproduktionsnachweis der Feuerlibelle (*Crocothemis erythraea*) in Mecklenburg-Vorpommern 2007 am Kraaker Waldsee, Landkreis

Ludwigslust. Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 10(1): 63-64. (in German) [8.6.2007, Mecklenburg-Vorpommern, Germany; the paper includes a record of the locally rare *Anaciaeschna isocelus*.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

7318. Zhang, H.-j.; Yang, Z.-d. (2007): Study of Chinese dragonflies of the family Chlorogomphidae (Odonata). Journal of Shaanxi University of Technology 23(1): 73-76. (in Chinese, with English summary) [14 species and one subspecies of the family Chlorogomphidae in China are keyed.] Address: Zhang, H.-j., Shaanxi Bioresource Key Laboratory, Shaanxi Technology University, Hanzhong 723000, China

7319. Zhou, C.F. (2007): The bracing and fusing pattern of longitudinal veins at base in living mayflies (Insecta: Ephemeroptera). Acta Entomologica Sinica 50(1): 51-55. (in English, with Chinese summary) ["The bracing and merging pattern of basal longitudinal veins plays an important role in phylogeny reconstruction within Pterygota. Unfortunately, the basal venation pattern of living mayflies has changed from the ancestral state in most species' but in very rare cases' the origins of some longitudinal vein bases are preserved and visible. The wing base of *Siphuriscus chinensis* has an independent subcostal brace partial stem of the media' visible stem of the cubitus' and indications of the origins of MA and Rs. This kind of wing base plus those of *Ephemera rufomaculata* and *Chromarcys magnifica* show the venation groundplan of modern Ephemeroptera (stem of M parallel to or fused with R basally' MA and Rs fused together for certain distance then separate Cu independent at base). This pattern seems close to that of Neoptera while different from Odonata. In the latter, the M fused with Cu basally. The hypothesized function of subcostal brace in mayflies is to strengthen the connection between distantly separated longitudinal veins because of sclerite plate at radius vein base. This hypothesis also can be used to explain complicated and unique venation of Odonata." (Author)] Address: ZHOU Chang-Fa, Jiangsu Key Laboratory for Bioresource Technology, College of Life Sciences, Nanjing Normal University, Nanjing 210097, China. E-mail: zhouchangfa@njnu.edu.cn

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7320. Almeida, D.; Almodovar, A.; Nicola, G.G.; Elvira, B. (2008): Feeding tactics and body condition of two introduced populations of pumpkinseed *Lepomis gibbosus*: taking advantages of human disturbances?. Ecology of Freshwater Fish 2008: 1-9. (in English) [Odonata played only a minor role in the diet of 166 pumpkinseed from Cabaneros National Park, Spain.] Address: Elvira, B., Department of Zoology and Physical Anthropology, Faculty of Biology, Complutense University of Madrid, E-28040 Madrid, Spain. E-mail: belvira@bio.ucm.es

7321. Anholt, B.R. (2008): Chapter 13. Fitness landscapes, mortality schedules, and mating systems. In: Dragonflies: Model Organisms for Ecological and Evolutionary Research, ed. A. Córdoba-Aguilar. Oxford University Press: 167-175. (in English) ["Acquiring the resources for reproduction comes at the risk of death. After emergence, females of most odonate species gain

more mass than males and concomitantly suffer higher mortality rates. Differences in adult mortality rates affect the operational sex ratio. The expected number of future matings for males affects whether males should defend territories or contact guard mates. Where females gain much more mass than males and suffer higher mortality as a result, a male with a mate has a very low expectation of additional matings and should contact guard a mate to maximize reproductive success. When the operational sex ratio is less male-biased, a male with a mate may have additional opportunities to mate and can maximize his reproductive success by territorial behaviour." (Publisher)] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada. E-mail: banholt@uvic.ca

7322. Arimoro, F.O.; Iwegbue, C.M.A.; Enemudo, B.O. (2008): Effects of cassava effluent on benthic macroinvertebrate assemblages in a tropical stream in southern Nigeria. *Acta Zoologica Lituanica* 18(2): 147-156. (in English, with Latvian summary) ["Extraction of starch from cassava roots (*Manihot esculenta*, woody shrub of the Euphorbiaceae) requires large amounts of water. After separation of starch and fiber, residual water contains small amounts of starch, proteins and hydrocyanic acid. When this water is released directly into streams and rivers, residual starch can cause rapid growth of bacteria, resulting in oxygen depletion and detrimental effects on aquatic life. Cassava generally contains cyanogens and glycosides that are easily hydrolyzed into hydrogen cyanide. Toxicological effects of cyanide on organisms have been documented by various authors. [...] The study of the effect of cassava effluents on macroinvertebrates along downstream reaches of the Orodo River, the Niger Delta was carried out monthly from January to June 2006. Three study stations were selected along the river course (upstream of the cassava impacted site, the cassava-impacted site, and downstream of the cassava impacted site). The study showed that cassava effluents caused a decrease in dissolved oxygen and pH and an increase in biochemical demand (BOD) and nitrates. Significant differences in these parameters were established among the stations sampled. A post hoc test indicated that station II (the cassava impacted site) was the cause of the observed differences. A total of 55 benthic macroinvertebrate taxa with a mean of 6,116 individuals were collected from the three stations along the river. The analysis showed that the overall density of fauna differed significantly among the stations. Cassava effluents permitted the dominance of oligochaetes and dipterans at station II and this resulted in a decline and total elimination of other benthic macroinvertebrates, which are intolerant of the effects of effluents. These preliminary data suggest that the response of benthic macroinvertebrates is important in the study of impacted aquatic systems and that macroinvertebrates have a great capacity to recover from the cassava effluent impact in terms of taxonomic diversity." (Authors) Odonata were represented by members of four families, and were found in comparable low abundance at stations I and III.] Address: Arimoro, F.O., Dept of Zoology, Delta State University, P. M. B. 1, Abraka, Nigeria. E-mail: fransarimoro@yahoo.com

7323. Baker, R.A.; Mill, P.J.; Zawal, A. (2008): Ectoparasitic water mite larvae of the genus *Arrenurus* on the damselfly *Coenagrion puella* (Linnaeus) (Zygoptera: Coenagrionidae). *Odonatologica* 37(3): 193-202. (in English) ["Parasitic larval mites of the genus *Arrenurus*

have been found on *C. puella*. *A. bicuspidator*, *A. cuspidator* and *A. maculator* make up over 80% of the total mites identified. The other species found were *A. bruzei*, *A. claviger* and members of the *A. affinis* complex. Mites are found mainly between the second and third pairs of legs and behind the third pair. *A. bicuspidator* and *A. cuspidator* share these sites with numbers spread roughly equally on both sites. *A. maculator* is found almost exclusively behind the third pair of legs and on the first abdominal segment of the host. Smaller numbers are found on the abdominal segments where *A. claviger* is the dominant species. The larval mites show a preference for female hosts. Size differences between the *Arrenurus* spp. are considered." (Authors)] Address: Zawal, A., Dept Invertebrate Zoology and Limnology, University of Szczecin, Waska 13, PO-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

7324. Bechly, G.; Wichard, W. (2008): Damselfly and dragonfly nymphs in Eocene Baltic amber (Insecta: Odonata), with aspects of their palaeobiology. *Palaeodiversity* 1: 37-73. (in English, with German summary) ["All seven previously known damselfly larvae in Baltic amber are revised and eight new specimens are described. Some of these can be attributed to the recent family group taxa Calopterygidae: Calopteryginae, Hypolestidae: Hypolestini, Megapodagrionidae: Argiolestinae, Synlestidae, and Lestida (= Lestinoidea sensu Fraser 1957), while others can only be attributed to different unidentified species of the paraphyletic "megapodagrionid" grade of damselflies. A further new specimen is a rather strange odonate larva, which seems to represent the first genuine Anisoptera larva in amber (probably Aeshnidae). Various taphonomic, palaeoecological and palaeobiological aspects of these amber inclusions are discussed. The relative abundance of damselfly larvae with sacroid caudal gills suggests the presence of well-oxygenated and fast flowing habitats." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: bechly@gmx.de

7325. Behrstock, R.A. (2008): Dragonflies & Damselflies of the Border Southwest. Rio Nuevo Publishers, Tucson. ISBN 1-933855-14-2: 80 pp. (in English) ["This book is an introduction to 73 (about 1/3) of the 200+ plus Odonata found in the southwest US. It is a photo guide meant to present a sampling of the species to anyone with a casual or beginning interest in this insect family. Each of the species is shown with one small photograph. Just over a dozen of the species have two photos. These photos are good quality, however, the small size of the photos takes away not only some of their luster, but makes it difficult to see some of the features or markings on the subject. Each species is briefly characterized by some basic information on length, phenology, and occurrence in the federal states. A larger paragraph focusses on the habitats and gives advice to identification and differentiation from sibling species not treated in the book."] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@cox.net

7326. Benken, T.; Raab, R. (2008): Die Libellenfauna des Seewinkels am Neusiedler See: Häufigkeit, Bestandsentwicklung und Gefährdung (Odonata). *Libellula* 27(3/4): 191-220. (in German, with English summary) ["In the 'Seewinkel' area, east of Lake Neusiedl, Austria, 49 odonate species have been hitherto recorded. Of

special importance is the autochthonous occurrence of *Lestes macrostigma*. The population trends of the various Odonata species have been analysed since 1970, and the species are classified in categories of how endangered they are in terms of a Red List, according to the criteria of the German Federal Agency for Nature Conservation. Recently, the species from the 'Lacken' - characteristic, temporary shallow pools with a high soda concentration - have become especially endangered. On the other hand, the species that chiefly live in secondary habitats like drains, ditches and gravel pits show positive population trends. These species benefit from the improvement of water and habitat quality." (Authors)] Address: Benken, T., Landesmedienzentrum BW, Moltkestraße 64, D-76133 Karlsruhe, Germany. E-mail: theodor@benken-online.net

7327. Bernard, R.; Buczyński, P. (2008): Conservation status and habitat selection of *Nehalennia speciosa* (Charpentier, 1840) in Poland. *Odonatrix* 4(2): 43-60. (in Polish, with English summary) [The paper updates the current knowledge on the distribution and habitat of *N. speciosa* in Poland. 65 localities of *N. speciosa* have been discovered in Poland so far, including 31 ones presented in the first synthesis (Bernard 1998). Some corrections and completions to several of these 'old' localities are added. The increase in number of known localities is mostly the result of intensified odonatalogical exploration during the last ten years. However, a colonization of new sites is also possible on a small scale as Brzeziczno Lake (colonized after 1997) shows.] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznan, Poland; E-mail: rbernard@main.amu.edu.pl

7328. Bernotiene, R.; Bartninkaite, I.; Višinskiene, G. (2008): Diffusion of *Bacillus thuringiensis* bacteria and their effect on aquatic invertebrates in the Nemunas River after using VectoBac 12AS preparation. *Ekologija* 54(2): 93-97. (in English) ["Blackfly control with the microbiological preparation VectoBac 12AS was started in Lithuania in 1999. This preparation is based on bacterium *Bacillus thuringiensis* var. *israelensis*. The VectoBac 12AS is applied at a single point from a bank prominence from the year 2000. Investigations were carried out in April-June of 2006 and 2007. The bacteria were found in the Nemunas River 164 km downstream the point of application of the larvicide 3 days after the application. This showed that VectoBac 12AS reached this segment of the river in 3 days. The density of *B. thuringiensis* bacteria decreased downstream from the point of application of the preparation. The highest density of bacteria was found in blackfly larvae, lower densities were found in the ground and on water plants. The effect of VectoBac 12AS on nontarget invertebrates was estimated in study sites from the point of application up to Druskininkai. Using the method of application from one point, this distance of the river was affected by the highest doses of preparation, and its effect on nontarget organisms could be seen in this part of the river. The usage of the preparation had no effect on nontarget invertebrates in the Nemunas River. Significant differences in Chironomid density were detected only in one study site, 6 km downstream the point of application of the larvicide. At a distance of 14 km from the point of application and downstream the river, no differences in the density of Chironomid larvae were detected." (Authors) Three Odonata taxa were identified but are not specified.] Address: Bernotiene, Rasa, Institute of Eco-

logy of Vilnius University, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: rasab@ekoai.lt

7329. Beynon, T. (2008): Quest for the Bulgarian Emerald. *Dragonfly News* 54: 18-21. (in English) [Extensive report from a trip to Bulgaria in early 2008.] Address: Beynon, T.G.; 34 Church Lane, Checkley, Stoke-on-Trent, Staffordshire ST10 4NJ, United Kingdom

7330. Blanke, A.F.R. (2008): Four new Odonata records for the state of Espirito Santo, Brazil: *Heteragrion petiense* Machado, *Lestes forcicula* Rambur, *Orthemis ambinigrata* Calvert and *Erythrodiplax clitella* Borror (Zygoptera: Megapodagrionidae, Lestidae; Anisoptera: Libellulidae). *Notulae odonatologicae* 7(2): 13-15. (in English) ["The 4 species were discovered during a 3-month field trip in 2006. *L. forcicula* and *E. clitella* are represented by a single male adult each, *H. petiense* and *O. ambinigrata* were found several times. The measurements of the specimens and brief descriptions of the habitats are provided." (Author)] Address: Blanke, A.F.R., Section of Lower Arthropods, Alexander Koenig Research Institute and Museum of Zoology, Leibniz Institute for Terrestrial Biodiversity, Adenauerallee 160, D-53113 Bonn, Germany. E-mail: blanke@uni-bonn.de

7331. Boudot, J.-P. (2008): *Selysiothemis nigra* (Vander Linden, 1825), nouveau pour le Maroc, et autres observations sur les Odonates du Maghreb nord-occidental (Odonata: Anisoptera: Libellulidae). *Martinia* 24(1): 3-29. (in French, with English summary) ["During a 2007 summer odonatalogical trip in Morocco, carried out with the intention to gain additional information on some threatened and endemic species in the NW Maghreb, allowed us to record and document *Selysiothemis nigra* (Vander Linden, 1825) for the first time in this country. The latter was present in a significant number at a temporary lake on the border of the Sahara. The occurrence of such a very mobile species on a temporary water body is typical for species well adapted to desert environments, for which a rapid and opportunistic colonization of recent ephemeral water bodies is crucial to reproduce. Dense populations of *Pyrrhosoma nymphula* (Sulzer, 1776), an European species confined in Africa to scarce Moroccan highlands and regarded as a last glacial relict, were found in small habitats within the NE end of the Middle Atlas, about 100 km apart from the previously known localities. Additionally, *Ischnura fontaineae* Morton, 1905 was discovered on a permanent salty river in a subdesertic environment, at the margin of the Sahara, 350 km SW from the previously known locality. This is the single place where this species is known in the western half of Morocco. *Cordulegaster princeps* Morton, 1915, a Moroccan endemic confined to the Middle and High Atlas ranges, remains well established on middle and high elevation rivers and brooks, up to 2600 m a.s.l., and was found to reproduce even in small spring areas with poor seepage water. Some middle and low elevation populations have been found to turn extinct, however, due to excessive water use and stream drying up in agricultural and urban areas. *Calopteryx exul* Selys, 1853, a Maghrebian endemic extending from Morocco to Tunisia in the Atlas ranges, was found only in one locality. Its conservation status is worrying, in Morocco as well as in any other Maghrebian country. Altogether, 34 species were brought on record, among which *Onychogomphus costae* Selys, 1885 is more widely distributed than currently believed. The IUCN category is indicated for every threatened

species." (Author)] Address: Boudot, J.-P., Centre de Pédologie Biologique, 17, rue Notre-Dame de Pauvres, B.P. 5, F-54501 Vandoeuvre-lès-Nancy, France. e-mail: boudot@cpb.cnrs-nancy.fr

7332. Bouwman, J.; Ketelaar, R. (2008): New records of *Coenagrion armatum* in Schleswig-Holstein (Odonata: Coenagrionidae). *Libellula* 27(3/4): 185-190. (in English, with German summary) ["In early May 2008 a short survey was carried out to search for *C. armatum* in Schleswig-Holstein, Germany. On 06-V-2008, we found the species at two localities: Möwensee near Süderlügum, and Jardelunder Moor on the German-Danish border. Some details are provided on composition and structure of the vegetation. It is stated that *C. armatum* has always been present in Schleswig-Holstein but has largely been overlooked in the past years." (Authors)] Address: Bouwman, J., Dutch Butterfly Conservation, P.O. Box 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.Bouwman@vlinderstichting.nl

7333. Bouwman, J.H.; Kalkman, V.J.; Abbingh, G.; de Boer, E.P.; Geraeds, R.P.G.; Groenendijk, D.; Ketelaar, R.; Manger, R. Termaat, T. (2008): An update of the distribution of dragonflies in The Netherlands. *Brachytron* 11(2): 103-198. (in Dutch, with English summary) ["Dutch dragonflies are winners, the number of observers and the number of records keep increasing and in addition many of the species are also showing an increase. The latter is largely due to the improved water quality and the climate change which is favoring many southern species. As a result the distribution patterns shown in the book 'The Dutch Dragonflies' (NVL, 2002) are already out-dated. The 10 year anniversary of the Dutch Society for Dragonfly research (NVL), the 25 year anniversary of the Dutch Butterfly Conservation and the 33 1/3 anniversary of the European Invertebrate Survey Netherlands was used as an nice excuse to make a new overview of the Dutch dragonfly fauna. This review deals with 67 species. Four species known only from records prior to 1990 are not discussed (*Coenagrion mercuriale*, *Nehalennia speciosa*, *Epithea bimaculata* and *Oxygastra curtisii*). The distribution of the species is presented for two periods: 1990-1997 and 1998-2007. The first period is the same as in the book 'The Dutch Dragonflies' (NVL, 2002). About three times the number of records was available for the second period (308.000) compared to the first (101.000). The increase shown by many species can partly be explained by the increase in records. However many species now occur in areas where they were absent in the first period although these areas were well investigated during that period. This shows that the increase of these species is genuine and not merely a artifact of the increased research activity. Besides maps also a histogram of the flight-period for the period 1998-2007 is given. The histogram is based on unique records (a species, on one day in a square kilometer). The recorded numbers have therefore no influence on the histogram. The text of each species discusses the distribution, habitat and flight-period but the latter two only when new information became available since the publication of the former atlas (NVL, 2002). The Dutch Butterfly Conservation and Dutch Statistics Netherland (CBS) are organizing the Dutch Dragonfly Monitoring Scheme since 1998. In this project dragonflies are counted largely by volunteers using a standardized method. This has made it possible to calculate trends for 33 of the 67 species. For these species also a trend graphic is presented."

(Authors)] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

7334. British Dragonfly Society (2008): *Dragonfly News* 54 Autumn 2008. *Dragonfly News* 54: 1-38. (in English) [The President's View Pam Taylor; "The BDS appoints the best - and makes them even better!"; From the Conservation Officer; Field Meeting Reports 2008; Field Meetings: Safety Issues and Getting Involved - National Dragonfly Week 2009; Overseas Tours with 'Quest for Nature'; First Dates for Spring 2008; Overseas Tours with 'Greentours' and 'Naturetrek'; Report of the Dragonfly Conservation Group; BDS Members' Day 2008; BDS at the British Birdwatching Fair; An interview with our new Patron Pam Taylor interviews Sir David Attenborough; Dragonflies in Focus Officer; Migrant Update and Other News for Early 2008; Quest for the Bulgarian Emerald; Notes & Observations; Sri Lanka: Dragonflies and Other Wildlife, October 2007; Digital cameras as a naturalist's aid; Photographing Dragonflies in Illinois; Dragonflies in the Media; Wicken Fen, the BDS and Partnerships; Molecular Conservation of Dragonflies: Scarce Chaser Survey, 2008; Peter Miller Schools Pond Fund - Sutton First School; You Can Help; Volunteer enthusiasts needed, Cambridgeshire Change the Editor!; The Great Fen Project; Publications & Reviews: New Naturalist: Dragonflies by Corbet & Brooks, reviewed by Peter Mill; Dragonflies and Damselflies of Hertfordshire reviewed by Peter Allen; Comments On A Recent Book On The Dragonflies ... of Hertfordshire; Tillyard "The Biology of Dragonflies" facsimile reprint; BDS Business; Annual General Meeting; Election of a Trustee and Nominations for Vice-President; Proposed change to By-laws; BDS Local Groups; BDS Memberships - New Officer: Lynn Curry; BDS Shop.] Address: BDS, Secretary Henry Curry, 23 Bowker Way, Whittlesey, Petersborough, PE7 1PY, UK. BDSSecretary@dragonflysoc.org.uk

7335. Buczyński, P. (2008): Dragonflies (Odonata) of the Kozłowieckie forests. *Odonatrix* 4(2): 33-42. (in Polish, with English summary) [Lublin region (south-eastern Poland); "The studies were conducted in the years 1999-2006 (mainly 2004-2006) at 35 study sites. 45 dragonfly species were found. The fauna of Kozłowieckie Forests is typical of forest areas under moderate anthropoppression (meliorations, regulations, water pollutions, fish pond management in river valleys). The activity of a human being had double impact on the fauna: either negative or positive. From one hand tyrphobionts have disappeared, the number of some tyrphophiles and rheophiles has decreased or vanished. Lacustrine species and odonatocenoses have appeared as well as the conditions for the development of thermophilous refugial species like *Lestes barbarus*, *Erythromma viridulum*, *Aeshna affinis*, *Anax imperator*, *Orthetrum albistylum*, *Sympetrum depressiusculum*, and *S. fonscolombii*. Kozłowieckie Forests are not the area of great importance for dragonfly protection. They can be treated as the refugium of species diversity for the central part of the Lublin region [...]" (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: paw-bucz@gmail.com

7336. Buczyński, P.; Moroz, M.D. (2008): Notes on the occurrence of some Mediterranean dragonflies (Odonata) in Belarus. *Polish journal of entomology* 77: 67-74.

(in English) ["*Sympecma fusca*, *Lestes viridis* and *Orthetrum albistylum* have been recorded for the first time in Belarus, *Erythromma viridulum* and *Orthetrum brunneum* have been found for the second time in this country. These records are analysed and discussed against Middle and East European data on the expansion of Mediterranean dragonfly species." (Authors)] Address: Moroz, M.D., Institute of Zoology, National Academy of Sciences, Akademichnaya 27, 220072 Minsk, Belarus. E-mail: mdmoroz@bk.ru

7337. Buczyński, P. (2008): Polish and dedicated to Poland odonatalogical papers. 6. The year 2007 and additions to the year 2006. *Odonatrix* 4(2): 61-64. (in Polish, with English summary) [The author presents a list of odonatalogical publications referring to Poland. The list includes 28 books and papers, 2 M. Sc. and 1 B. Sc. theses written in 2007. Six additions to the year 2006 were given, too. The list does not contain the papers published in *Odonatrix*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

7338. Caputo, F.P.; Vogt, R.C. (2008): Stomach flushing vs. fecal analysis: The example of *Phrynops rufipes* (Testudines: Chelidae). *Copeia* 2008(2): 301-305. (in English) ["We successfully stomach flushed all 31 adult turtles captured and collected feces from ten of the flushed turtles. Our results show that only an integrated approach using both techniques is able to provide a comprehensive picture of *P. rufipes* diet. Trichoptera larvae were the most eaten item in numeric terms and in frequency of occurrence, but shrimp contributed the greatest volume of invertebrates. [...]"] (Authors) Odonata occurred with a frequency of 29% in the samples.] Address: Caputo, F.P., Via Gabrio Serbelloni 115, 00176 Rome, Italy. E-mail: francescopaolo.caputo@uniroma1.it.

7339. Carchini, G.; Die Domenico, M. (2008): The last instar larva of *Gynacantha villosa* Gruenberg and *G. manderica* Gruenberg (Anisoptera: Aeshnidae). *Odonatologica* 37(3): 257-264. (in English) [The larval morphology of the 2 species is described for the first time from specimens collected in Uganda, East Africa, and a comparison between the species is given.] Address: Carchini, G., Dipartimento di Biologia, Università "Tor Vergata", Viale della Ricerca Scientifica, I-00133 Roma, Italy. E-mail: archini@utovrm.it

7340. Carvalho, A.L.; Sagado, L.G.V.; Fleck, G. (2008): Description of the larva of *Lauromacromia pinguaba* Carvalho, Salgado & Werneck-de-Carvalho 2004, with a key to the genera of Corduliidae larvae occurring in South America (Odonata: Anisoptera). *Zootaxa* 1848: 57-65. (in English) ["The ultimate stadium larva of *Lauromacromia pinguaba* Carvalho, Salgado & Werneck-de-Carvalho is described and illustrated based on reared specimens from Pinguaba, Ubatuba, São Paulo state, Brazil, some of which belong to the type-series. All material is deposited in the Instituto de Biologia, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro. General notes on larval biology and the breeding habitat are provided. A generic key for South American Corduliidae larvae is appended." (Authors)] Address: Carvalho, A., Caixa Postal 68044, BR 21944-970, Cidade Universitária, Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

7341. Carvalho Braga, A.L.; dos Santos Pompeu, P.; Flósculo Carvalho, R.; Lopes Ferreira, R. (2008): Diet and morphometric relationships of the *Synbranchus marmoratus* (Bloch, 1975) (Pisces, Synbranchiformes) during the pre-estivation period in an oxbow lake in São Francisco Basin, Minas Gerais, Brazil. *Revista Brasileira de Zoociências* 10(2): 133-138. (in Portuguese, with English summary) [Insecta including Odonata contribute very few to the diet of *S. marmoratus*.] Address: Carvalho Braga, A.L., Programa de Pós Graduação em Ecologia Aplicada, Universidade Federal de Lavras, Lavras - MG. Cep 37200000, Brazil. E-mail: bragaalc@hotmail.com

7342. Castellanos, P.M.; Serrato, C. (2008): Diversidad de macroinvertebrados acuáticos en un nacimiento de río en el Páramo de Santurbán, Norte de Santander. *Rev. Acad. Colomb. Cienc.* 32(122): 79-86. (in Spanish, with English summary) [From September 2005 to February 2006, a study to determine the diversity of aquatic macroinvertebrates in a headwater stream in the Moorland of Santurbán, Norte de Santander Colombia was carried out. The macroinvertebrate community consisted of 63 taxa, including "Aeshna sp.".] Address: Castellanos, P.M., Universidad Industrial de Santander. Bucaramanga Colombia. E-mail: pablouis@gmail.com

7343. Céréghino, R.; Ruggiero, A.; Marty, P.; Angélibert, S. (2008): Biodiversity and distribution patterns of freshwater invertebrates in farm ponds of a south-western French agricultural landscape. *Hydrobiologia* 597: 43-51. (in English) ["We assessed the importance for biodiversity of man-made farm ponds in an agricultural landscape in SW France lacking natural wetlands. The ponds were originally created to provide a variety of societal services (irrigation, visual amenity, water for cattle, etc.). We also assessed the environmental factors influencing invertebrate assemblages in these ponds. Only 18 invertebrate taxa out of 114 taxa occurring in the study area were common to ponds and rivers indicating that the contribution of farm ponds to freshwater biodiversity was potentially high. A Self-Organizing Map (SOM, neural network) was used to classify 36 farm ponds in terms of the 52 invertebrate families and genera they supported, and to specify the influence of environmental variables related to land-use and to pond characteristics on the assemblage patterns. The SOM trained with taxa occurrences showed five clusters of ponds, most taxa occurring only in 1-2 clusters of ponds. Abandoned ponds tended to support higher numbers of taxa, probably because they were allowed to undergo a natural succession. Nevertheless, abandoned ponds were also amongst the largest, so that it remained difficult to separate the effects of pond size and abandonment, although both factors were likely to interact to favour higher taxon richness. The invertebrate communities in the ponds appeared to be influenced mainly by widely acting environmental factors (e.g. area, regionalization of assemblages) with little evidence that pond use (e.g. cattle watering, amenity) generally influenced assemblage composition. Our results support the idea that agricultural landscapes containing man-made ponds make a significant contribution to freshwater biodiversity indicating that protection of farm ponds from threats such as in-filling and pollution can make a positive contribution to the maintenance of aquatic biodiversity. This added value for biodiversity should be considered when calculating the economic costs and benefits of constructing water bodies for hu-

man activities." (Authors) Odonata are treated but without details.] Address: Céréghino, R., EcoLab, UMR 5245, Université Paul Sabatier, 118 route de Narbonne, 31062 Toulouse cedex 9, France. E-mail: cereghin@cict.fr

7344. Chakona, A.; Phiri, C.; Magadza, C.H.D.; Brendonck, L. (2008): The influence of habitat structure and flow permanence on macroinvertebrate assemblages in temporary rivers in northwestern Zimbabwe. *Hydrobiologia* 607(1): 199-209. (in English) ["Temporary rivers within the Nyaodza-Gachegache subcatchment in northwestern Zimbabwe were investigated to examine the role of flow permanence and habitat structure on macroinvertebrate community composition. Macroinvertebrate communities of intermittent and ephemeral rivers displayed significant differences in the number of taxa, macroinvertebrate abundance, Shannon and Simpson diversity indices and in size class structure. Intermittent sites were characterised by higher numbers of taxa, diversity and Ephemeroptera and Trichoptera richness compared to ephemeral sites. The fauna of ephemeral sites was dominated by a single taxon (*Afrobaetodes*) (Eph., Baetidae) whilst larger sized taxa (e.g. *Elassoneuria* (Eph., Oligoneuriidae), *Dicentropilum* (Eph., Baetidae), Aethaloptera (Tri., Hydropsychidae), *Pseudagrion* (Odonata, Coenagrionidae) and *Tholymis* (Odonata, Libellulidae) were exclusively restricted to intermittent sites. Clear differences were observed between sand, gravel, cobble and vegetation habitats. Vegetation and cobbles supported distinct communities, with some taxa exclusively restricted either to vegetation (e.g. *Pseudagrion*, *Leptocerina* (Tri., Leptoceridae), *Cloeon* (Eph., Baetidae), *Afronurus* (Eph., Heptageniidae) and *Povilla* (Eph., Polymitarciidae) or cobble (e.g. Aethaloptera and *Dicentropilum*) habitats. In terms of ensuring optimum diversity within the subcatchment, we consider conservation of critical habitats (cobbles and vegetation) and maintenance of natural flows as the appropriate management actions." (Authors)] Address: Chakona, A., University Lake Kariba Research Station, PO Box 48, Kariba, Zimbabwe. Email: achakona@yahoo.com

7345. Cham, S. (2008): Underwater tandem formation in Common Blue Damselfly *Enallagma cyathigerum* and the need for contact guarding. *J. Br. Dragonfly Society* 24(1): 24-31. (in English) ["Observations on a large population of *E. cyathigerum* show competition for females between males to be very high at high population densities. This results in a number of aggressive tactics used by males to try to win over females by displacing the tandem male." (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

7346. Cocksedge, B.; Parr, A. (2008): Atypical Black Scarce Chaser *Libellula fulva* in Hampshire. *Atropos* 35: 63. (in English) [Verbatim: On the afternoon of 11 June 2008 Brian Cocksedge visited Blashford Lakes Nature Reserve, near Ringwood in Hampshire, UK. The weather was warm with little wind. Along the small track between the car park and the Wildlife Trust centre an unusual black dragonfly was seen. Normally the only all-black species in the UK is the (male) Black Darter *Sympetrum danae*, but this dragonfly was clearly not that species. The general body shape and heavy black mark at the base of the hindwing, coupled with a dark streak near the base of the forewing, indicated that the dra-

gonfly was instead a Scarce Chaser *Libellula fulva*. This species is occasionally reported from Blashford Lakes, and old females are known to become rather dull and dark in colouration. Typically in such females there is, however, still some indication of the row of triangles along the mid-line of the abdomen that is normally a distinctive identification feature. The Blashford dragonfly was, however, very dark all over, with a featureless abdomen. Close examination of photos taken revealed that despite the brown eyes, darkened wing-tips and other aspects of the general appearance, the individual was a male. The end of the abdomen was thus more tapered than in females, and the anal appendages were not the expected short, widely-spaced, female cerci but instead stouter, more centrally-placed male claspers. The dragonfly thus seems to be a male Scarce Chaser which had developed beyond its initial immature colouration, but which somehow lacked the normal blue abdominal pruinescence and blue tint to the eyes seen in mature males. Some rubbing off of the waxy pruinescence, so revealing a black background colour to the abdomen, frequently occurs in males after mating—apparently caused by the grip of the female—but the total lack of blue (even on the eyes) in the present individual seems exceptional. Advanced abrasion of the pruinescence as a factor of age seems unlikely given the relatively early date. Perhaps something like a mutation, or possibly weather conditions, interfered with the normal development of the blue pruinescence. (Authors)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

7347. Conniff, K.L.; van der Poorten, N.E. (2008): First description of female *Elatoneura caesia* (Selys, 1860) and amended description of male *E. caesia* and male and female *E. centralis* (Selys, 1860) from Sri Lanka, with notes on behaviour, habitat, and distribution and field identification characters. *Odonatologica* 37(4): 361-366. (in English) ["The female of *E. caesia* is described and figured for the first time. In earlier publications, *E. caesia* and *E. centralis* were confused with each other (cf. F.C. FRASER, 1933, The fauna of British India including Ceylon and Burma: Odonata, vol. 1, pp. 238-241, Taylor & Francis, London). Amended descriptions of the male of *E. caesia* and of both sexes of *E. centralis* are provided. Key phenotypic differences between the 2 species are illustrated, and additional notes are given on behaviour, habitat and distribution." (Authors)] Address: Conniff, K.L., 11WMI, RO. Box 2075, Colombo-1, Sri Lanka. E-mail: karoconniff@gmail.com

7348. Contreras-Garduño, J.; Buzattob, B.A.; Serrano-Menesesa, M.A.; Nájera-Cordero, K.; Córdoba-Aguilera, A. (2008): The size of the red wing spot of the American rubyspot as a heightened condition-dependent ornament. *Behavioral Ecology* 19: 724-732. (in English) ["We investigated an ornamental trait known to reflect male fighting ability and tested whether it shows heightened condition dependence compared with nonornamental traits in the American rubyspot (*Hetaerina americana*). Adult males bear red wing spots, the size of which is sexually selected: large-spotted and fatter males are more successful in territorial competition and obtain more matings than are nonterritorial males. First, to see whether spot area may signal fighting ability at a particular age (to discriminate animals that are unlikely to compete), we investigated the age at which males engaged more in fighting and compared their fat reser-

ves and muscle mass at 3 ages (young, middle aged, and old) and territorial status. Middle-aged males showed the highest fat and muscle values, engaged more in fighting, and were predominantly territorial. Second, we looked for traits not shaped by sexual selection: we compared red chroma and brightness of spot and thorax, spot area, muscle mass, and fat reserves in winner and loser males after a territorial contest. The only difference was that winners had larger spot areas and higher fat reserves. Finally, an immune challenge-based experiment was performed during the development of spot area and its color properties (chroma and brightness). Compared with a control (unchallenged) group, the results revealed that area decreased, brightness increased, and there was no change in red chroma, muscle mass, and fat reserves in challenged animals. Thus, spot area is a stress-sensitive, energy-reflecting trait that is likely to be used for communication during territorial competition in these damselflies" (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

7349. Corbet, P.S.; May, M.L. (2008): Fliers and perchers among Odonata: dichotomy or multidimensional continuum? A provisional reappraisal. *International Journal of Odonatology* 11(2): 155-171. (in English) ["We revisit the hypothesis, first advanced in 1962, that, with regard to their means of thermoregulation and overt behaviour, two types of Odonata can be recognised: fliers, when active (during reproductive activity, primarily, or foraging) remain on the wing, whereas perchers, when similarly engaged, spend most of the time on a perch from which they make short flights. First, in light of the available data, we restrict the hypothesis to apply primarily to activity at the rendezvous. Next, we review evidence, including direct measurements of body temperature coupled with activity budgets, to test the proposition that the hypothetical classification constitutes a dichotomy rather than a continuum. We conclude: (1) that there is merit in retaining the dichotomous classification into fliers and perchers, together with the thermoregulatory capabilities assigned to each category; (2) that the distinction between fliers and perchers is sufficiently discrete to be a useful predictor of the suite of thermoregulatory strategies and energy demands characteristic of representatives of each category; and (3) that, within each category a continuum exists such that the capacity to heat the body by irradiation (i.e. ectothermally) or by metabolic heat production (endothermy) increases with body size. Some departures from expectation based on the percher/flier dichotomy reflect the increased flight activity that occurs at the rendezvous under conditions of heightened conspecific or interspecific interference. Other apparent anomalies are identified as topics for potentially fruitful research." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

7350. Corbet, P.S. (2008): Foreword. In: Wildermuth, H.: *Die Falkenlibellen*. ISBN: 3-89432-896-7. 496 pp. *Die Neue Brehm-Bücherei* 653: 5. (in English) [The late P.S. Corbet gives a brief introduction into Hansruedi Wildermuth' outstanding book on the European Corduliidae: "I commend this book to its fortunate readership. It

sets a new, high standard for monographs in odonate biology".]

7351. Corbet, P.S. (2008): WDA Archivist's Report No.1. The origin and development of WDA: the first ten years, 1997-2007. *Agrion* 12(1): 30-36. (in English) [This is an extensive, well balanced report on the first ten years of the Worldwide Dragonfly Association.]

7352. Corbi, J.J.; Jancso, M.A.; Trivinho-Strixino, S.; dos Santos, A. (2008): Environmental evaluation of metals in sediments and dragonflies due to Sugar Cane cultivation in Neotropical streams. *Water, Air, & Soil Pollution* 195: 325-333. (in English) ["The use of fertilizers, containing different metals ions such as lead(II), chromium(III), cadmium(II), copper(II) and zinc(II), in the soil, for sugar cane cultivation, may cause impacts on the hydric resources of the adjacent areas. The scope of this study was to evaluate the impacts of sugar cane cultivation based on metal concentrations in sediments and dragonflies (Odonata). The bioavailability of such metals was determined in ten Neotropical streams. Six streams were located on areas with sugar cane cultivation, without riparian vegetation (classified as impacted area) and four streams were located on forested areas (reference sites). The results showed that there are high concentrations of metals in the sediments and dragonflies in streams located on impacted areas. The contamination by metals of aquatic insects of terrestrial adult life cycle, as Odonata organisms, represents a dangerous link for the transference of metals to upper trophic levels, as fishes, reptiles, birds and mammals." (Authors)] Address: Corbi, J., Departamento de Hidrobiologia, Universidade Federal de São Carlos, CP 676, 13560-970 São Carlos, SP, Brazil. Email: julianocorbi@yahoo.com.br

7353. Cordero-Rivera, A.; Stoks, R. (2008): Chapter 2. Mark-recapture studies and demography. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 7-21. (in English) ["Population ecologists track wild animals over their lifetimes using mark-recapture methods. Odonates are easily marked and remain near water bodies, allowing for high recapture rates. In recent years, the focus in mark-recapture models has switched from population size estimates to survival and recapture rate estimation, and from testing hypotheses to model selection and inference. This chapter presents a review of the literature on mark-recapture studies, with a suggestion of areas where more research is needed. These include the effect of marking on survival and recapture rates, differences in survival between sexes and female colour morphs, the relative importance of processes in the larval and the adult stage in driving population dynamics, and the contribution of local and regional processes in shaping metapopulation dynamics." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

7354. Cordoba-Aguilar, A (2008): Chapter 1: Introduction. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 1-5. (in English) ["Despite their relative small number, compared with other insects, dragonflies and damselflies have been extensively used as study subjects in ecological and evolutionary research.

The few books on these organisms, however, have been more interested in the animals per se than in the scientific questions where they have been used as study subjects. This is the essence of this book: to show how these animals have been used to answer questions and have thus helped to construct ecological and evolutionary theory." (Author)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

7355. Cordoba-Aguilar, A.; Cordero-Rivera, A. (2008): Chapter 15. Cryptic female choice and sexual conflict. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 189-203. (in English) ["Females may choose their male mates. However, both sexes may engage in a kind of dispute not to be coerced into mating (for females) and to be chosen (for males). These two hypotheses (called female choice and sexual conflict, respectively) are currently in vogue in studies of sexual reproduction. This chapter highlights some instances where both can be tested in odonates. These instances are: during copula invitation by males, for the duration of copulation, and during the male post-copulatory displays preceding and during oviposition. There are four other aspects that may be investigated to see the prevalence of each hypothesis: the differences of genitalic diversity across populations, the genitalic complexity at the multiple species level, the female benefits when mating with 'attractive' males, and the costs to evade superfluous matings." (Publisher)] Address: Cordero Rivera, A., Depto de Ecologia e Biologia Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

7356. Córdoba-Aguilar, A. (Ed.) (2008): *Dragonflies and Damselflies - Model Organisms for Ecological and Evolutionary Research*. ISBN-13: 978-0-19-923069-3: 256 pp. (in English) ["Dragonflies and Damselflies documents the latest advances in odonate biology and relates these to a broader ecological and evolutionary research agenda. Despite being one of the smallest insect orders, dragonflies offer a number of advantages for both laboratory and field studies. In fact, they have been crucial to the advancement of our understanding of insect ecology and evolution. This book provides a critical summary of the major advances in these fields. Contributions from many of the leading researchers in dragonfly biology offer new perspectives and paradigms as well as additional, unpublished, data. The editor has carefully assembled a mix of theoretical and applied chapters (including those addressing conservation and monitoring) and achieves a balance of emerging and established research topics, providing suggestions for future study in each case.

7357. This accessible text is not about dragonflies per se but an essential source of knowledge that describes how different sets of evolutionary and ecological principles/ideas have been tested on a particular taxon. It will therefore be suitable for graduate students and researchers in entomology, evolutionary biology, population and behavioural ecology, and conservation biology. It will of course be of particular interest and use to those working on insects and an indispensable reference text for odonate biologists." (Publisher)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Uni-

versidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

7358. Correia, A.M.; Anastacio, P.M. (2008): Shifts in aquatic macroinvertebrate biodiversity associated with the presence and size of an alien crayfish. *Ecological Research* 23: 729-734. (in English) ["To investigate the effects of *Procambarus clarkii* on macroinvertebrate diversity, we conducted a mesocosm experiment simulating small pools in rice field pads after the rice season. We hypothesized that crayfish predation would negatively impact macroinvertebrate diversity, and the magnitude of this impact should vary with the size of *P. clarkii*. We conducted a short-term mesocosm experiment to determine macroinvertebrate diversity in the presence of three size classes and in the absence of crayfish, as well as the diet composition of crayfish from the three size classes. At the end of the experiments, the diet of crayfish was composed of the most available taxa (Culicidae, Chironomus, Tanytarsini and Orthocladinae). These results also show evidence that, in confined areas, crayfish are important predators of major rice pests such as rice Chironominae larvae. Macroinvertebrate diversity was negatively affected by crayfish presence, but the effect was inversely proportional to crayfish size. The highest diversity index was obtained in the absence of *P. clarkii*, and juvenile crayfish significantly reduced macroinvertebrate diversity. Thus, the impact of *P. clarkii* on aquatic macroinvertebrates is size dependent and may be relevant in small pools formed in rice field pads from early autumn to late winter. Overall, our findings suggest that the negative effects of *P. clarkii* on macroinvertebrate diversity may be particularly strong in local natural assemblages confined to puddles of water or small ponds in wetland areas." (Authors) "Aeshna" plays a minor role as food of crayfishs] Address: Correia, A.M., Department of Zoology and Anthropology, National Natural History Museum (MNHN), Center for Environmental Biology (CBA), University of Lisbon, Rua da Escola Politécnica 58, 1269-102 Lisbon, Portugal. E-mail: amcorreia@fc.ul.pt

7359. Costa, J.M.; Ravello, C.T.; Souza-Franco, G.M. (2008): The larva of *Argia croceipennis* Selys (Zygoptera: Coenagrionidae). *Odonatologica* 37(3): 265-271. (in English) ["The larva is described and illustrated for the first time, based on a specimen from southern Brazil. The features separating *A. croceipennis* from *A. insipida*, *A. pulla* and *A. sordida* are outlined." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

7360. Costa, J.M.; Machado, A.B.M. (2008): Two new species of Corduliidae Selys, 1882 from southern Brazil (Anisoptera: Corduliidae). *Lundiana* 8: 143-146. (in English) ["Two new species of *Neocordulia* Selys, 1882 — *N. fiorentini* sp. n. and *N. gaucha* sp. n. — both from Rio Grande do Sul, Brazil, are described and illustrated. They differ from other species of the genus mainly by the shape of anal appendages, sternal protuberance of abdominal segment 8 and sternum of abdominal segment 9." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

7361. Cremona, F.; Planas, D.; Lucotte, M. (2008): Assessing the importance of macroinvertebrate trophic dead ends in the lower transfer of methylmercury in littoral food webs. *Can. J. Fish. Aquat. Sci.* 65(9): 2043-2052. (in English, with French summary) ["Total mercury and methylmercury concentrations ([THg], [MeHg]) were measured in littoral macroinvertebrates from Lake St. Pierre, Quebec, Canada. Functional groups (detritivore, grazer, edible predator, inedible predator) explained the greatest fraction of [MeHg] variation compared with time (year, month), and space (station and shore). Greatest [THg] and [MeHg] were found in inedible predators mostly from families of heteropterans and coleopterans. Detritivores and grazers exhibited the lowest Hg concentrations, while edible predators were intermediate. Inedible predators also had the highest percentage of MeHg ([MeHg]/[THg]), with some taxa close to 100%. Such high percentages are seldom observed in freshwater organisms other than piscivorous fish. MeHg burden (concentrations × biomass) in inedible predators accounted for 10% of the MeHg pool for the whole invertebrate community. These large quantities of MeHg are sequestered in aquatic "trophic dead ends" and could partly explain the low [MeHg] measured in fish, compared with [MeHg] of macroinvertebrates from Lake St. Pierre and other freshwater ecosystems with large littoral zones. We recommend taking into account the inedible organisms in Hg cycling models to avoid a possible overestimation of the MeHg pool available to fish." (Authors) The paper contains some references to Odonata.]

7362. Crumrine, P.W.; Switzer, P.V.; Crowley, P.H. (2008): Chapter 3. Structure and dynamics of odonate communities: accessing habitat, responding to risk, and enabling reproduction. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 21-39. (in English) ["This chapter highlights the key abiotic and community-level interactions that influence odonate community structure. Three important life-history based issues central to odonate communities are developed: habitat access, response to risk during the larval stage, and emergence and reproduction. Each issue is addressed by considering relevant ecological theory and identifying and reviewing empirical studies with odonates that address hypotheses raised by theoretical studies. Although numerous short-term studies at relatively small spatial scales have been conducted with odonate larvae, very little is known about the relative impacts of competition, cannibalism, predation, intraguild predation and size structure on odonate population dynamics, and community structure in natural systems. Long-term studies at multiple life history stages and levels of organization are required to generate a more complete understanding of odonate communities, and ecological communities in general." (Publisher)] Address: Crumrine, P., Dept Nat. Sciences, Longwood Univ., Farmville, VA 23909, USA. E-mail: crumrinepw@longwood.edu

7363. Daguet, C.A.; French, G.C.; Taylor, P. (eds) (2008): *The Odonata Red Data List for Great Britain. Species Status Assessment No 11.* Joint Nature Conservation Committee, Peterborough.: 34 pp. (in English) [For the full paper see: <http://www.jncc.gov.uk/pdf/pub08speciesstatus11.pdf>] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK. E-mail: ptaylor@acle.norfolk.sch.uk

7364. Davies, G.B.P. (2008): Book review. 'Dragonflies and damselflies of South Africa.' Michael J. Samways Sofia/Moscow: Pensoft Publ., 2008. 297 pp. Softcover. ISBN 978-954-642-330-6. Price: 39 Euro. Pensoft Online Bookshop: <http://www.pensoft.net/>. *African Invertebrates* 49(2): [Verbatim: As attractive, generally large, diurnal, predatory insects, the Odonata have long attracted research interest from entomologists. In our region, a firm foundation for odonatology was laid by Elliot Pinhey, Boris Balinsky and others. This research mantle has been carried forward by Michael Samways and his students, who have devoted the last two decades to their study, firstly in KwaZulu-Natal, and more recently in the Western Cape. 'Dragonflies and damselflies of South Africa' (hereafter 'DDSA') is the culmination of much of Samways's investigation into our dragonfly fauna, and it is unequivocally a significant milestone for South African (and African) odonatology. As the Odonata are aquatic insects, it is instructive to remember that South Africa is largely an arid country, with vast areas of western South Africa falling below the 600 mm isohyet. Consequently, our dragonfly fauna is small (ca 158 species) relative to tropical Africa, but it does have the advantage of mixing dazzling tropical forms like *Anax tristis* with endemic, localized temperate taxa like the *Ecchlorestes* species. 'DDSA' is a most attractive volume and, although running to nearly 300 pages, the book is nevertheless compact and lightweight. I am not sure whether the author and the publishers intended this as a field-guide or a more formal handbook. The Preface (p. 5) does mention the words field guide, but I get the impression from its large mass of text and data that 'DDSA' is, in fact, a hybrid between the two. This 'schizophrenic' nature is perhaps the book's weakest aspect. As I will discuss below, there are some features that detract from the book's effectiveness as a classic field-guide, while others mar its handbook status. The book begins with concise chapters on dragonfly biology and ecology. These notes highlight many interesting facets of South African dragonfly biology, e.g. that certain taxa (such as *Sympetrum fonscolombii*) are migratory, or that Western Cape Odonata divide into two phenological categories, 'spring species' and 'autumn species'. Regrettably, Samways is unable to expand on such interesting topics, and, perhaps even worse, none of the statements in these opening chapters is referenced, making it difficult to trace the primary source of a particular conclusion or result. There are also tips on conservation (a field that Samways has been especially active in), photographing, collecting and even rearing dragonfly larvae and building a 'dragonfly pond' for one's garden. I was interested to learn that pinning specimens with spread wings has fallen out of favour with odonatologists, who now prefer to accession material by placing specimens in plastic envelopes. There are two keys in the book: one to major groupings and a longer key to species. The latter is liberally illustrated with drawings of genitalia, wings, etc. I have not had an opportunity to test the keys, but they appear comprehensive and well-written. The species accounts include notes on identification, a description of the entire insect (face, eyes, prothorax, synthorax etc.), distribution (with map, but provincial boundaries are not indicated), habitat, behaviour and comparison with similar species. Usefully, there are also two bar graphs for each account, one showing phenology (flight period) and the other a 'dragonfly biotic index', which shows sensitivity to pollution, habitat disturbance etc. Most accounts have two colour photographs, generally of male and female, although

occasionally only one sex is illustrated. All 416 photographs of dragonflies and damselflies are of a high standard, but some appear to have been reproduced too darkly. Samways deserves much credit for successfully photographing all the South African Odonata taxa. Given the often wary nature of dragonflies, this is a most praiseworthy achievement. Sketches of genitalia and wing photos also appear, these duplicating the images from the species key. It is evident, therefore, that a large amount of information is incorporated into each species account. This is welcome on one level for comprehensiveness, but for field-guide purposes it is a daunting torrent of data to wade through. This abundance of text and data gives Samways's book a rather cramped and 'busy' feel; a definite negative feature. Possibly as a result of the cramped nature of the individual species accounts, on pp. 204-213 a section entitled 'Additional photographs' appears. It is wonderful to have these additional photos, but something of an oddity to have them divorced from the respective accounts. Why not just insert the relevant photos after each account as an extra page for the particular species? Inevitably, Samways's book invites comparison with the two-volume field guides privately published by Warwick and Michèle Tarboton (Tarboton & Tarboton 2002, 2005). Those two excellent books broke new ground in being the first field guides to South African Odonata. 'DDSA' has an obvious edge in that the dragonflies and damselflies are all in one volume. 'DDSA' is brim-full of information, as mentioned, and scores points over the Tarboton guides, which were marked by their concision. Samways's colour photos of live or freshly killed individuals also means that the true colours of the insects comes across clearly in his book. The Tarbotons in some cases had to use old museum specimens. A striking example of this is *Lestiniogomphus angustus*: Samways's photograph (p. 125) shows this stunning dragonfly with its vibrant yellow and black coloration and reddish abdominal apex to great advantage, whereas the same insect in Tarboton is a dried-out, dull, brown husk. On the other hand, the text-heavy feel of 'DDSA' contrasts negatively with the neat, uncluttered layout of the Tarboton guides, which also gave maximum space to the dragonflies themselves rather than to the text. 'DDSA' is finished off with a check-list providing Latin and vernacular names of Odonata and references to relevant pages. The check-list is followed by a glossary of mostly morphological terms, an extensive bibliography that lists 118 publications on taxonomy, ecology and conservation of Afrotropical dragonflies and damselflies, and by a five-page general index. Like butterflies, all South African Odonata now have English common names, but problematically many differ between Samways and the Tarbotons. There is no correct answer to what is a subjective decision on which name to use, but the differences between the books may cause frustration amongst users. To sum up, 'Dragonflies and Damselflies of South Africa' is an admirable volume which is a credit to author and publisher. 'DDSA' is highly recommended to established entomologists and novices, as well as to ecologists, conservation specialists, naturalists, etc. South African scientific community is immeasurably strengthened by having this book available, and the order now begins to rival the butterflies for sumptuous and accessible coverage. References Tarboton, W. & Tarboton, M. 2002. A fieldguide to the dragonflies of South Africa. Modimolle, South Africa: privately published. -2005. A fieldguide to the damselflies of South Africa. Modimolle, South Africa: privately published.]

7365. De Block, M.; Stoks, R. (2008): Short-term larval food stress and associated compensatory growth reduce adult immune function in a damselfly. *Ecological Entomology* 33(6): 796-801. (in English) [" 1. In animals with a complex life cycle, larval stressors may carry over to the adult stage. Carry-over effects not mediated through age and size at metamorphosis have rarely been studied. The present study focuses on the poorly documented immune costs of short-term food stress both in the larval stage and after metamorphosis in the adult stage. 2. The present study quantified immune function [number of haemocytes, activity of prophenoloxidase (proPO) and phenoloxidase (PO)] in an experiment where larvae of the damselfly *Lestes viridis* were exposed to a transient starvation period. 3. Directly after starvation, immune variables were reduced in starved larvae. Levels of proPO and PO remained low after starvation, even after metamorphosis. In contrast, haemocyte numbers were fully compensated by the end of the larval stage, yet were lower in previously starved animals after metamorphosis. This can be explained as a cost of the observed compensatory growth after starvation. Focusing only on potential costs of larval stressors within the larval stage may therefore be misleading. 4. The here-identified immunological cost in the adult stage of larval short-term food stress and associated compensatory growth strongly indicates that physiological costs may explain hidden carry-over effects bridging metamorphosis. This adds to the increasing awareness that the larval and adult stages in animals with a complex life cycle should be jointly studied, as trade-offs may span metamorphosis." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

7366. De Block, M.; McPeck, M.A.; Stoks, R. (2008): Life-history evolution when *Lestes* damselflies invaded vernal ponds. *Evolution* 62: 485-493. (in English) ["We know little about the macroevolution of life-history traits along environmental gradients, especially with regard to the directionality compared to the ancestral states and the associated costs to other functions. Here we examine how age and size at maturity evolved when *Lestes* damselflies shifted from their ancestral temporary pond habitat (i.e., ponds that may dry once every decade or so) to extremely ephemeral vernal ponds (ponds that routinely dry completely each year). Larvae of three species were reared from eggs until emergence under different levels of photoperiod and transient starvation stress. Compared to the two temporary-pond *Lestes*, the phylogenetically derived vernal-pond *Lestes dryas* developed more rapidly across photoperiod treatments until the final instar, and only expressed plasticity in development time in the final instar under photoperiod levels that simulated a later hatching date. The documented change in development rate can be considered adaptive and underlies the success of the derived species in vernal ponds. Results suggest associated costs of faster development are lower mass at maturity and lower immune function after transient starvation stress. These costs may not only have impeded further evolution of the routine development rate to what is physiologically maximal, but also maintained some degree of plasticity to time constraints when the habitat shift occurred." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

7367. De Marmels, J. (2008): Buchbesprechung: Ellenrieder & Garrisson. *Entomologische Zeitschrift* 118(1): 22. (in German) [Review of the book referred as OAS 6676] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

7368. Deng, X.; Hu, Z. (2008): Wing-wing interactions in dragonfly flight. *The Neuromorphic Engineer* 10.2417/1200811.1269: 1-3. (in English) [A pair of robotic wings have been used to investigate why dragonflies use different phase angles for different flight modes.] Address: Xinyan Deng and Zheng Hu; Mechanical Engineering, University of Delaware, Newark, DE, USA

7369. Dorn, N.J. (2008): Colonization and reproduction of large macroinvertebrates are enhanced by drought-related fish reductions. *Hydrobiologia* 605: 209-218. (in English) ["Aquatic predators and habitat permanence can jointly affect benthic invertebrate biomass and community composition. In 2006 I sampled fish and invertebrates in ten ponds embedded in a seasonal wetland before and after a natural drought. Drought reduced fish biomass and density leaving some ponds in a fishless condition when rains returned in July. In July, large aquatic insects and crayfish colonized and reproduced in the ponds, but did not colonize all of the ponds equally. Using measurements of fish abundance and other environmental parameters of the ponds, I conducted linear regression analyses to explore potential drivers of variable invertebrate biomass in July. Fish biomass had a negative effect on invertebrate biomass and it explained more of the variation in total invertebrate biomass and total non-shrimp biomass than fish abundance (number of fish caught). Dissolved oxygen and pond depth were both correlated with fish biomass, but were poorer predictors of invertebrate biomass. Ponds with few or no fish had 209 greater total biomass and 2009 more non-shrimp biomass than ponds with high fish biomass. Shrimp dominated the invertebrate composition, and were only found in the two deepest ponds with the highest fish biomass; predatory insects and crayfish dominated the other eight ponds. When taxa were analyzed separately, fish biomass explained a large portion of the variation for predatory insects (Coleoptera, Hemiptera, and Odonata) and crayfish (*Procambarus allenii*), but dissolved oxygen was the best predictor of larval stratiomyid (order Diptera) biomass. These results are generally consistent with studies demonstrating negative effects of fish on large predatory invertebrates, but also suggest that more severe local droughts can seasonally enhance insect and crayfish populations by generating fishless or nearly fishless conditions." (Author)] Address: N. J. Dorn, N.J.; Department of Biological Sciences, Florida Atlantic University, Davie, FL 33314, USA. E-mail: ndorn1@fau.edu

7370. Dümpelmann, C.; Kern, D. (2008): Die Besiedlung der hessischen Lahn durch *Onychogomphus f. forcipatus* (Odonata: Gomphidae). *Libellula* 27(3/4): 147-161. (in German, with English summary) ["From 1999 onwards, the colonisation of the River Lahn in Hesse, Germany, by *O. forcipatus* has been documented by 82 records of adults, larvae and exuviae at 39 different localities. We show that *O. forcipatus* is currently a well established part of the limnofauna of the River Lahn in Hesse, at the northern limit of its range, where it had not been recorded yet. The occurrence of the species is

strongly connected to natural or restored sections of the river. The colonisation possibly originated from the upper parts of the River Eder where a big population has been known for many years. In addition, an overview on all known records of *O. forcipatus* from Hesse is given." (Authors)] Address: Dümpelmann, C., Zeppelinstr. 33, D-35039 Marburg/Lahn, Germany. E-mail: duempelc@staff.uni-marburg.de

7371. Dyatlova, E.S.; Kalkman, V.J. (2008): Massive migration of *Aeshna mixta* and *Sympetrum meridionale* in the Ukrainian Danube delta (Odonata-Anisoptera: Aeschnidae, Libellulidae). *Entomologische berichten* 68(5): 188-190. (in English, with Dutch summary) [18-VIII-2006, Taranov kut, about 16 km NE of Vylkove in the Ukrainian part of the Danube delta (45°29.523' N, 029°45.307'E); the number of specimens was estimated along 20 m of beach and by extrapolating this number to the 1 km explored. The authors estimated that there were at least 40,000 specimens of *A. mixta* and 30,000-50,000 specimens of *S. meridionale* present. *A. mixta* males (69%) outnumbered females (31%); in *S. meridionale* the sex ratio was 56% males and 44% females, but the ratio differed if catching flying or resting specimens. None of the specimens had freshly emerged, but no visible damage on the wings could be seen either, so probably the specimens were a few days to one or two weeks old.] Address: Dyatlova, Elena, Department of Zoology, Faculty of Biology, Odessa National University, Dvoryanskaya 2, UKR-65026 Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

7372. Dyatlova, E.S.; Kalkman, V.J. (2008): The Odonata of southwestern Ukraine, with emphasis on the species of the EU Habitats Directive. *Libellula* 27(3/4): 275-290. (in English, with German summary) ["From 2006 to 2008 a database with records of Odonata from southwestern Ukraine - the provinces of Odessa, Mykolaiv and Kherson - was built. This database holds records from literature, collections and fieldwork and contains over 1500 records. Distribution maps of all species have been made available on the Internet. In total 48 of the 74 Ukrainian species were recorded from this area. The area has a relatively low diversity of aquatic habitats and a large percentage of freshwater habitats consist of large lakes or large rivers characterised by high flood events in winter and spring. These habitats generally have a low diversity of Odonata, although densities can be very high. Species in the Habitats Directive occurring in the area are *Coenagrion ornatum*, *Gomphus flavipes* and *Sympecma paedisca*. Based on their occurrence and the presence of species of the Ukrainian Red List and species rare in southwestern Ukraine, six 'Important Dragonfly Areas' were selected: Reservoirs in a lower part of Khadzhibejski Liman, the basins of Southern Bug and Ingul rivers, the Lower Dniestr with tributaries and lakes and Dniestrovski Liman, the Kinburn Peninsula, the Dniepr delta, and the Lower Danube with the pre-Danube region. Large areas of southwestern Ukraine are poorly studied, and more field-work will undoubtedly result in the recognition of more areas with a high importance for Odonata." (Authors)] Address: Dyatlova, Elena, Odessa National I. I. Mechnikov University, Biological Faculty, Department of Zoology, Shampanski pereulok, 2, UA-Odessa, 65058, Ukraine. E-mail: lena.dyatlova@gmail.com

7373. Ellenrieder, N. von (2008): *Phoenicagrion* gen. nov. for *Leptagrion flammeum*, with description of a new

species, *P. paulsoni*, from Peru (Odonata: Coenagrionidae). *International Journal of Odonatology* 11(1): 81-93. (in English, with Spanish summary) ["The placement of *Leptagrion flammeum* in *Aeolagrion* is confirmed to be incorrect; comparison with all other described genera of New World Coenagrionidae shows that this species does not belong in any of them. A new genus, *Phoenicagrion* (type species *L. flammeum*), is here described to include *L. flammeum* and a new species, *P. paulsoni* (holotype male: Peru, Loreto department, Río Napo 50 km above Río Amazonas, 3°12'S, 72°57'W, 22 iii 2004, in UMMZ). A generic characterization, diagnoses, illustrations and distribution maps are provided." (Author) Address: Ellenrieder, Natalia von, Mus. Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7374. Ellenrieder, N. von; Garrison, R.W. (2008): The genus *Oligoclada* in Argentina, with description of *O. rubribasalis* sp. nov. (Odonata: Libellulidae). *International Journal of Odonatology* 11(2): 249-260, pl. IV. (in English, with Spanish summary) ["A new species (holotype male in MLP: Argentina, Formosa province, Parque Nacional Río Pilcomayo, Laguna Blanca, marshes next to pond, 25°10'29"S, 58°07'44"W, 74 m a.s.l., 16/17 ii 2008, leg. NvE, RWG) is described, diagnosed and illustrated, and a key, diagnostic illustrations, and distribution maps are provided for the three species of the genus occurring in Argentina. The combination of well defined orange– red dorsal spots on S2-3 in mature specimens, well developed supplementary tooth in pre-tarsal claws, shape of occipital triangle of female, and of vesica spermalis, genital lobe, posterior hamule, and cercus of male diagnose the new species." (Authors)] Address: Ellenrieder, Natalia von, Mus. Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7375. Ellenrieder, N. von; Garrison, R.W. (2008): *Drepanoneura* gen. nov. for *Epipleoneura letitia* and *Protoneura peruviana*, with descriptions of eight new *Protoneuridae* from South America (Odonata: Protoneuridae). *Zootaxa* 1842: 1-34. (in English, with Spanish summary) ["A new genus, *Drepanoneura* (type species *Drepanoneura loutoni* sp. nov.), is described to include *Epipleoneura letitia* Donnelly, *Protoneura peruviana* Fraser, and six new congeneric species from South America: *D. donnellyi*, *D. flinti*, *D. janirae*, *D. loutoni*, *D. muzoni*, and *D. tennesse*. *Drepanoneura* is similar to *Epipleoneura* and *Epipotoneura* in venational characters, but differs from them in morphology of male cercus, genital ligula, female pronotum, and epiproct. A new species of *Epipleoneura* from Venezuela, *E. demarmelsi*, and a new species of *Epipotoneura* from Brazil, *E. machadoi*, are described, and diagnostic illustrations for the poorly known *Epipotoneura nehalennia* Williamson are also presented. A generic characterization, diagnoses, and keys for species of *Drepanoneura* are provided, as well as diagnostic illustrations and distribution maps for all involved species." (Authors)] Address: Ellenrieder, Natalia von, Mus. Ciencias Naturales, Univ. Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7376. Ellenrieder, N. von; Garrison, R.W. (2008): *Oreiallagma* gen. nov. with a redefinition of *Cyanallagma* Kennedy 1920 and *Mesamphiagrion* Kennedy 1920, and the description of *M. dunklei* sp. nov. and *M. ecuatoriale* sp. nov. from Ecuador (Odonata: Coenagrionidae).

Zootaxa 1805: 1-51. (in English, with Spanish summary) ["In this paper we re-evaluate *Cyanallagma* Kennedy 1920, which currently includes 15 species, and we address another five species that share diagnostic characters with some of them but are currently placed within *Leptagrion* Selys 1876, *Mesamphiagrion* Kennedy 1920, and *Telagrion* Selys 1876. A new genus, *Oreiallagma*, is described to include 5 species originally placed in *Acanthagrion* Selys 1876, *Cyanallagma*, and *Telagrion*. These species are *O. thelakterion* (De Marmels 1997) (type species), *O. acutum* (Ris 1918), *O. oreas* (Ris 1918), *O. prothoracicum* (Kimmins 1945), and *O. quadricolor* (Ris 1918). The last stadium larva of *O. quadricolor* is described. The remaining species currently included in *Cyanallagma* are allocated to two separate genera: *Cyanallagma sensu stricto* and *Mesamphiagrion*. *Cyanallagma sensu stricto* comprises southern South American species including the type species, *Cyanallagma interruptum* (Selys 1876). *Mesamphiagrion* Kennedy 1920 includes a cluster of species from northwestern South America that are considered congeneric with the type species *Mesamphiagrion occultum* (Ris 1918). Two new species from Ecuador, *M. dunklei* and *M. ecuatoriale*, are described and *Argia hebdomatica* Navás 1934 is found to be a junior synonym of *M. ovigerum* (Calvert 1909). Synonymic lists, diagnoses, illustrations, keys, and distribution maps for the three genera are provided." (Authors) (Authors)] Address: Ellenrieder, Natalia von, Mus. de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7377. Faraone, F.P.; Lillo, F.; Giacalone, G.; Lo Valvo, M. (2008): The large invasive population of *Xenopus laevis* in Sicily, Italy. *Amphibia-Reptilia* 29: 405-412. (in English) ["The worldwide spread of invasive species is considered to be one of the main causes of global amphibian declines and the loss of bio diversity in general. The African Clawed Frog, *Xenopus laevis*, shows a strong ability to establish populations and invade various geographic regions. In 2004 *X. laevis* was found in Sicily for the first time. The Sicilian population is probably the largest in Europe with a range of about 225 km² in an area characterized by numerous agricultural ponds. This high density of ponds has potentially facilitated the dispersal of *X. laevis*. The frogs can move far from rivers or watercourses by utilizing the ponds as suitable "islands". The analysis of their diet shows that the aquatic larvae of nektonic insects comprise the major portion in terms of mass while small planktonic crustaceans are the most numerous component. There is a significant difference between the diet of adults and juveniles." (Authors) Odonata contribute significantly to the diet of *X. laevis*.] Address: Lo Valvo, M., Dipartimento di Biologia Animale "G. Reverberi", Università degli Studi di Palermo, Via Archirafi 18, I-90123 Palermo, Italy. E-mail: mlovalvo@unipa.it

7378. Ferland-Raymond, B.; Murray, D.L. (2008): Predator diet and prey adaptive responses: Can tadpoles distinguish between predators feeding on congeneric vs. conspecific prey? *Can. J. Zool.* 86(12): 1329-1336. (in English, with French summary) ["Predator diet can play an important role in facilitating detection of predation risk among prospective prey, and such detection should have adaptive significance in reducing mortality in environments where not all predators confer similar risk. In the laboratory, we tested behavioural and morphological responses of tadpoles from two congeneric

frog species (bullfrog (*Rana catesbeiana* Shaw, 1802) and mink frog (*Rana septentrionalis* Baird, 1854)) to cues from an odonate predator (genus *Aeshna* Fabricius, 1775). In a separate experiment we found that both frog species had similar baseline vulnerability to *Aeshna* predation, implying that species' responses to predators feeding on conspecific vs. congeneric prey also would be similar. Both species reduced their activity in the presence of predators feeding on tadpoles of either species vs. those fed invertebrates (*Libellulidae*) or not subjected to predators (controls). Bullfrog tadpoles grew bigger than controls when exposed to predators fed mink frog tadpoles only, whereas mink frogs failed to show a comparable response. Neither species exhibited changes in shape that were attributable to predator diet. Our results suggest that closely related frog species do not distinguish between predators feeding on conspecific vs. congeneric prey, implying that selection favours generalized antipredator responses when prey species are subject to similar predation risk." (Authors)] Address. not accessible.

7379. Fleck, G.; Brenk, M.; Misof, B. (2008): Larval and molecular characters help to solve phylogenetic puzzles in the highly diverse dragonfly family *Libellulidae* (Insecta: Odonata: Anisoptera): The *Tetrathemistinae* are a polyphyletic group. *Organisms Diversity and Evolution* 8(1): 1-16. (in English) ["The systematics of the dragonfly family *Libellulidae* remains an unsolved puzzle. The classification into subfamilies relies primarily on wing venational characters, as is the case for most systematic hypotheses on dragonflies. In this study, we show that the discovery of unknown libellulid larvae can change tremendously our views on phylogenetic relationships. The larvae of the genera *Micromacromia* Karsch, 1889 and *Allorhizucha* Karsch, 1889 are described and illustrated. They are briefly compared with the larva of *Neodythemis* Karsch, 1889. The larvae of *A. klingi* Karsch, 1889 and *N. africana* Fraser, 1954 are extremely similar. The larva of *M. camerunica* Karsch, 1889 displays well developed dorsal hooks on abdominal segments 4-8, which distinguishes it from other closely allied genera. *Micromacromia*, *Allorhizucha* and *Neodythemis* are traditionally placed within the *Tetrathemistinae*, but their larvae strongly resemble those in the subfamily *Libellulinae*. Larval morphological studies and a molecular analysis based on mitochondrial SSU, LSU and tRNA valine imply that *Micromacromia*, *Allorhizucha* and *Neodythemis* have to be placed in the subfamily *Libellulinae*. Consequently, the subfamily *Tetrathemistinae* becomes a polyphyletic group. Our analysis suggests that imaginal characters, and in particular wing venation, are much more often prone to homoplasious evolution than previously anticipated. Taxonomic or systematic works predominantly based on wing venation might be in need of substantial revision, at least within this dragonfly family, presumably even in the whole suborder Anisoptera, based on independent character sets like larval and molecular data." (Authors)] Address: Misof, B., Department of Entomology, Zoologisches Forschungsmuseum A. Koenig, Adenauerallee 160, D-53113 Bonn, Germany E-mail: b.misof.zfmk@uni-bonn.de

7380. Fleck, G.; Ullrich, B.; Brenk, M.; Wallnisch, C.; Orland, M.; Bleidissel, S.; Misof, B. (2008): A phylogeny of anisopterous dragonflies (Insecta, Odonata) using mtRNA genes and mixed nucleotide/doublet models. *Journal of Zoological Systematics and Evolutionary Re-*

search 46(4): 310-322. (in English) ["The application of mixed nucleotide/doublet substitution models has recently received attention in RNA-based phylogenetics. Within a Bayesian approach, it was shown that mixed models outperformed analyses relying on simple nucleotide models. We analysed a mt RNA data set of dragonflies representing all major lineages of Anisoptera plus outgroups, using a mixed model in a Bayesian and parsimony (MP) approach. We used a published mt 16S rRNA secondary consensus structure model and inferred consensus models for the mt 12S rRNA and tRNA valine. Secondary structure information was used to set data partitions for paired and unpaired sites on which doublet or nucleotide models were applied, respectively. Several different doublet models are currently available of which we chose the most appropriate one by a Bayes factor test. The MP reconstructions relied on recoded data for paired sites in order to account for character covariance and an application of the ratchet strategy to find most parsimonious trees. Bayesian and parsimony reconstructions are partly differently resolved, indicating sensitivity of the reconstructions to model specification. Our analyses depict a tree in which the damselfly family *Lestidae* is sister group to a monophyletic clade *Epiophlebia* + Anisoptera, contradicting recent morphological and molecular work. In Bayesian analyses, we found a deep split between *Libelluloidea* and a clade 'Aeshnoidea' within Anisoptera largely congruent with Tillyard's early ideas of anisopteran evolution, which had been based on evidently plesiomorphic character states. However, parsimony analysis did not support a clade 'Aeshnoidea', but instead, placed *Gomphidae* as sister taxon to *Libelluloidea*. Monophyly of *Libelluloidea* is only modestly supported, and many interfamily relationships within *Libelluloidea* do not receive substantial support in Bayesian and parsimony analyses. We checked whether high Bayesian node support was inflated owing to either: (i) wrong secondary consensus structures; (ii) under-sampling of the MCMC process, thereby missing other local maxima; or (iii) unrealistic prior assumptions on topologies or branch lengths. We found that different consensus structure models exert strong influence on the reconstruction, which demonstrates the importance of taxon-specific realistic secondary structure models in RNA phylogenetics." (Authors)] Address: Misof, B., Department of Entomology, Zoologisches Forschungsmuseum A. Koenig, Adenauerallee 160, 53113 Bonn, Germany. E-mail: b.-misof.zfmk@uni-bonn.de

7381. Fleck, G.; Nel, A.; Bechly, G.; Delclòs, X.; Jarzembowski, E.A.; Coram, R.A. (2008): New Lower Cretaceous 'libelluloid' dragonflies (Insecta: Odonata: Cavilabiata) with notes about estimated divergence dates for this group. *Palaeodiversity* 1: 19-36. (in English, with German summary) ["Several new fossil Lower Cretaceous Cavilabiata ('*Libelluloidea*') are studied. In the *Araripelibellulidae*, the male of *Araripelibellula martinnetoi* Nel & Paicheler, 1994, *Araripelibellula britannica* n. sp. from the UK and *Rencordulia sinica* n. gen., n. sp. from PR China are described. A further specimen of *Cretaneophya strevensi* Jarzembowski & Nel, 1996 is adding new information on its wing venation. In the *Chlorogomphida*, *Mesochlorogomphus crabbi* n. gen., n. sp. from the UK and *Hispanochlorogomphus rossi* n. gen., n. sp. from Spain are also described and placed in the new family *Mesochlorogomphidae*. The estimated divergence dates for the libelluloid dragonflies based on molecular data are disputed on the basis of the fossil

record. The Cavilabiata ('Libelluloidea') probably appeared during the Early to Middle Jurassic and greatly diversified during the Early Cretaceous." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

7382. Flenner, I.; Sahlen, G. (2008): Dragonfly community re-organisation in boreal forest lakes: rapid species turnover driven by climate change?. *Insect Conservation and Diversity* 1: 169-179. (in English) ["1. Climate change affects many ecosystems on earth. If not dying out or migrating, the species affected have to survive the altered conditions, including changes in community structure. It is, however, usually difficult to distinguish changes caused by a changing climate from other factors. 2. Forestry is considered to be the major disturbance factor in Swedish forests. Here, we use forest lake data sets from 1996 and 2006 which include species abundance data for dragonfly larvae, water plant structure, forest age and forestry measures during a period of 25 years: from 1980 to 2005. Hence, we were able to discriminate between forestry effects and changes in species composition driven by recent climate change. 3. We explored effects on regional species composition, species abundance and ecosystem functions, such as changes in niche use, utilising dragonflies (Odonata) as model organisms. 4. Our results show that dragonflies react rapidly to climate change, showing strong responses over such a short time span as 10 years. We observed changes in both species composition and abundance; former rare species have become more frequent and now occur in lakes of a wider quality range, while former widespread species have become more selective in their choice of waters. The new communities harbour about the same number of species as before, but seen from a regional perspective, diversity is reduced. 5. We predict that the altered species composition and abundance might raise new demands in conservation planning as well as altering the ecological functions of the aquatic systems." (Authors)] Address: Flenner, Ida, Ecology and Environmental Sciences, Halmstad University, PO Box 823, SE-30118 Halmstad, Sweden. E-mail: ida.flenner@hh.se

7383. Forbes, M.R.; Robb, T. (2008): Chapter 14: Testing hypotheses about parasite-mediated selection using odonate hosts. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research* edited by Alex Córdoba-Aguilar. Oxford University Press.: 175-189. (in English) ["Parasites are thought to select for host traits, such as elaborate ornaments and intricate immune systems. Dragonflies have proven useful hosts for studying parasite-mediated selection. This chapter summarizes whether parasites exert fitness costs on their dragonfly hosts and affect signals and the mating success of males. It also reviews determinants of resistance against ectoparasitic mites, which is present in many dragonfly species and introduces recent work suggesting that host gender and age influence immunological responses to bacterial and artificial challenges. The chapter highlights that the likelihood of demonstrating parasite-mediated selection might depend on whether or not the species being considered is a generalist parasite. New ideas on elucidating how dragonfly prey species should deal with threats from multiple enemies, such as predators and parasites, are considered." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive,

Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

7384. French, G.; Smallshire, D. (2008): Criteria for determining key Odonata sites in Great Britain. *J. Br. Dragonfly Soc.* 24(2): 54-61. (in English) ["This article describes the development of criteria for the determination of key Odonata sites in Britain. By emphasising the importance of proof of breeding and estimation of population size, the criteria build upon the approach taken within the national Odonata recording scheme's Key Sites Project, promoting the continuation of recording breeding and abundance evidence and complementing the conservation agencies' criteria for the determination of SSSI designation (NCC, 1989)." (Authors)] Address: French, G., JNCC, Monkstone House, City Road, Peterborough, PE1 1JY, UK

7385. Gaino, E., Piersantia, S.; Rebor, M. (2008): Egg envelope synthesis and chorion modification after oviposition in the dragonfly *Libellula depressa* (Odonata, Libellulidae). *Tissue and Cell* 40(5): 317-324. (in English) ["*Libellula depressa* (Odonata, Libellulidae) is an exophytic dragonfly ovipositing eggs in clutches on the surface of floating plants and algae. The present work investigates, at ultrastructural level, the gradual differentiation of the egg envelopes and the chorionic changes after egg deposition in water. The ovary of the mature female of *L. depressa* is composed of numerous strings of panoistic ovarioles, where the eggshell formation takes place gradually throughout the activity of the follicle cells. The present data show that the egg envelopes are constituted of a very thick electron-dense vitelline envelope, a thin endochorion and an extremely thick exochorion composed of a fibrillar matrix resting on a thin electron-dense layer. After deposition in water, *L. depressa* eggs, initially white and almost transparent, gradually become brown spots in a semitransparent jelly coat, rich of incorporated debris. The jelly coat enveloping the eggs of *L. depressa* derives exclusively from the exochorion, constituted of a fibrillar matrix, which swells at contact with water. The jelly-like coat performs an adhesive function and presumably a protective role during egg segmentation and ensuing larval hatching." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

7386. Gama, G.; Francis, F. (2008): Etude de la biodiversité entomologique d'un milieu humide aménagé: le site du Wachnet, le long du Geer à Waremme (Province de Liège, Belgique). *Faunistic Entomology – Entomologie faunistique* 61(1-2): 33-42. (in French, with English summary) [Wachnet in Waremme, Wallonia, Belgium; between June and August 2007, 13 Odonata taxa are reported, mostly common species.] Address: Francis, F., Unité d'Entomologie fonctionnelle et Evolutive (Prof. E. Haubruge), Faculté Universitaire des Sciences Agronomiques de Gembloux, Belgium. E-mail: entomologie@fsagx.ac.be

7387. Garré, A.; Muzón, J.; Ardohain, D.M. (2008): Description of the final instar larvae of *Erythrodiplax atroterminata* Ris and *E. corallina* (Brauer) (Odonata: Libellulidae). *Zootaxa* 1896: 45-50. (in English) ["The final stage larva of *Erythrodiplax atroterminata* and *E. corallina* are described and illustrated based on reared specimens from Argentina. A comparative analysis of all known larvae of *Erythrodiplax* from Argentina is provi-

ded" (Authors)] Address: Garré, Analia, Instituto de Limnología "Dr. Raúl A. Ringuelet" (CCT-CONICET- La Plata) C.C. 712, 1900 La Plata, Argentina. E-mail: analiagarre@hotmail.com

7388. Garrison, R.W.; Ellenrieder, N. von (2008): *Dolonagrion* nov. gen. for *Telagrion fulvellum* from South America (Odonata: Coenagrionidae). *International Journal of Odonatology* 11(2): 173-183. (in English, with Spanish summary) ["Based on examination of the syntype female of *Telagrion fulvellum* which we designate as lectotype, and its comparison with additional male and female specimens from Peru, this species is assigned to a new genus, *Dolonagrion*, and both sexes are redescribed, diagnosed, and illustrated." (Authors) Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

7389. Gassmann, D.; Richards, S.J. (2008): Description of *Idiocnemis patriciae* spec. nov. from Papua New Guinea (Odonata: Platycnemididae), with new distributional records of other *Idiocnemis* species. *Zool. Med. Leiden* 82(47): 581-593. (in English) ["*Idiocnemis patriciae* sp. n. is described from lowland rainforests of the Dark-End Lumber and Lakekamu regions in Gulf Province, Papua New Guinea. Biogeographically, the new species is near-endemic to the Papuan Gulf Coastal Lowlands area of endemism. Notes on the habitat of the new species and on a female specimen from the Lakekamu Basin tentatively assigned to it, are included. The distributions of *I. australis* Gassmann, *I. chloropleura* Lieftinck and *I. kimminsi* Lieftinck are updated. *I. chloropleura* is recorded from Yapen island for the first time. A revised key to the males of the *Idiocnemis inornata* species-group is provided." (Authors)] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nm.nl

7390. Giacomini, H.C.; De Marco, P. (2008): Larval ecomorphology of 13 Libellulidae (Anisoptera, Odonata) of the Middle Rio Doce Valley, Minas Gerais, Brazil. *Braz. J. Biol.* 68(1): 211-219. (in English, with Portuguese summary) ["In the lakes of the Middle Rio Doce, Minas Gerais (MG), two groups of larval Libellulidae are distinguished by preferences of habitat use: one uses mainly aquatic macrophytes and the other uses the bottom substrate. The goal of this work was to verify if there is a morphological distinction between the two groups of species. Thirteen body measures were taken from the larvae and analyzed. No difference was found between the two groups of species regarding the body size, but shape differences were observed for two morphological variables. The species that use mainly macrophytes tend to have larger relative measures of the labium and smaller measures of the abdomen width. Advantages in resource obtainment and in vulnerability to predation are probably the explanations for the morphological divergence among these larval groups." (Authors) The paper considers the following taxa: *Erythrodiplax* sp., *Idiataphe amazonica*, *Miathyria simplex*, *Micrathyria* sp. 1 and M. sp. 2, *Tauriphila australis*, *Traemea binotata*, *Erythemis peruviana*, *Brachymesia furcata*, *Diastatops obscura*, *Orthemis discolor*, *Perithemis mooma*, and *Dythemis multipunctata*.] Address: Giacomini, H.C., Departamento de Ecologia, Campus de Rio

Claro, Universidade Estadual Paulista "Júlio de Mesquita Filho", Av. 24-A, 1515, CEP 13506-900, Rio Claro, SP, Brazil. E-mail: hgjacomini@gmail.com

7391. Gligorovic, B.; Pešic, V.; & Zekovic, A. (2008): Contribution to the knowledge of the dragonflies (Odonata) of the river Zeta (Montenegro). *Natura Montenegrina* 6: 73-89. (in English) ["An updated list of the dragonflies (Odonata) of the River Zeta (Montenegro) is given, including 27 species. Three of them: *Aeshna affinis*, *Lestes barbarus*, and *Gomphus vulgaticismus* are new for fauna of Montenegro." (Authors)] Address: Gligorovic, B., Department of Biology, Faculty of Sciences, University of Montenegro, Cetinjski put b.b., 81000 Podgorica, Montenegro, E-mail: bogic1@cg.yu

7392. Gligorovic, B.; Pesic, V.; Zekovic, A. (2008): A contribution to the knowledge of dragonflies (Odonata) from the area of Gornji Crnci - Piperi (Montenegro). *Acta entomologica serbica*. 13(1/2): 1-7. (in English, with Serbian summary) [In this work, an updated list is provided of 14 species of Odonata of the area Gornji Crnci-Piperi (Montenegro), an area of soft karst. Among the species is *Cordulegaster picta*, the first record for Montenegro.] Address: Gligorovic, B., Department of Biology, Faculty of Sciences, University of Montenegro, Cetinjski put b.b., 81000 Podgorica, Montenegro, E-mail: bogic1@cg.yu

7393. Goertzen, D. (2008): Industriebrachen im Ruhrgebiet - Lebensraum für Libellen? (Odonata). *Libellula* 27(3/4): 163-184. (in German, with English summary) ["Wastelands generated by industry offer secondary habitats for many plant and animal species. The capacity of wastelands of the coal and steel industry in the Ruhr as a habitat for Odonata was studied at twelve wasteland sites, among them mining waste heaps, factory premises and storage areas. At all study sites altogether 36 species of Odonata were recorded, of which 20 were red list species and 29 indigenous at least at one site. Compared to artificially structured sites, at habitats with semi-natural structures significantly more threatened species were recorded. Due to high diversity in typology, water level and vegetation, water bodies on mining waste heaps and on storage areas can be considered as habitats of high value, also for endangered species. In contrast, factory premises with different kinds of basins were colonised chiefly by ubiquitous species."] Address: Goertzen, Diana, Dornröschenweg 27, D-44339 Dortmund, Germany. E-mail: diana.goertzen@rub.de

7394. Gomiero, L.M.; Manzatto, A.G.; Braga, F.M.S. (2008): The role of riverine forests for food supply for the omnivorous fish *Brycon opalinus* Cuvier, 1819 (Characidae) in the Serra do Mar, Southeast Brazil. *Braz. J. Biol.* 68(2): 321-328. (in English) [The diet of the fish *Brycon opalinus* (Characidae) was studied along three rivers (Paraibuna, Ipiranga and Grande) in the basin of the Paraibuna, southeast Brazil. Odonata contribute to the diet.] Address: Gomiero, L.M., Depto de Zoologia, Instituto de Biociências, Universidade Estadual Paulista – UNESP, Av. 24-A 1515, CEP 13506-900, CP 199, Rio Claro, SP, Brasil. E-mail: leanmg@rc.unesp.br

7395. Gonzalez-Soriano, E. (2008): Odonata from some west-coast Mexican islands. *Notulae odonologicae* 7(2): 15-18. (in English) ["Occasional collections in 14 islands brought about 130 specimens belonging to 16 species. As expected, the most wide ranging spe-

cies belong to strong fliers of the suborder Anisoptera. *Pantala hymenaea* and *P. flavescens* were the most widespread species, occurring at 8 and 6 islands, respectively. *P. flavescens* was the only species recorded from Isla Clarion, the farthest Mexican island." (Author)] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

7396. Gonzalez-Soriano, E.; Noguera, F.A.; Zaragoza-Caballero, S.; Morales-Barrera, M.A.; Ayala-Barajas, R.; Rodriguez-Palafox, A.; Ramirez-Garcia, E. (2008): Odonata diversity in a tropical dry forest of Mexico, 1. Sierra de Huautla, Morelos. *Odonatologica* 37(4): 305-315. (in English) ["A study of the fauna of Odonata of a tropical deciduous forest is presented. Collections were made monthly during a 1-yr period (Nov. 1995-Oct. 1996) during 5 days each month. A total of 2595 adult specimens were collected, belonging to 57 species, 33 genera and 8 families. Estimated richness value using the non-parametric estimator ICE was 76.28." (Author)] Address: Gonzalez-Soriano, E., Depto Zoologia, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

7397. Gossum, H. van; Sherratt, T.N.; Cordero-Rivera, A. (2008): Chapter 17. The evolution of sex-limited colour polymorphism. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 219-231. (in English) ["Species that exhibit genetic colour polymorphism are ideal for studying the micro-evolutionary forces that maintain genetic variation in nature. One very intriguing polymorphism is the coexistence of several discrete morphs within only one sex, with one morph often resembling the opposite sex in colour and sometimes behaviour. In males, this resemblance often allows access to receptive females, while in females the polymorphism appears related to avoiding excessive male sexual harassment. One might wonder why natural selection does not simply give rise to a single best male and female type for each species. The phenomenon of sex-limited polymorphisms provides an important opportunity to test contemporary ideas relating to sexual selection and sexual conflict, and the diversity of polymorphisms that have arisen in odonates clearly offers one of the best natural systems for among species and population comparative research." (Publisher)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

7398. Günther, A. (2008): *Pracht- und Juwelenlibellen Südostasiens (Calopterygidae und Chlorocyphidae)*. Eigenverlag. André Günther, Freiberg: 80 pp. (in German) [This is a wonderful coffee table book with plenty of stunning photographs from jewelwing Odonata from the Philippines, Indonesia, Bali, New Guinea, Malaysia, Thailand, and China, and covering the following species: *Archineura incarnata* (Karsch 1891), *Neurobasis chinensis* (Linnaeus 1758), *Neurobasis kaupii* Brauer 1867, *Rhinocypha fenestrella* (Rambur 1842), *Disparocypha biedermani* Ris 1916, *Rhinocypha biforata* Selys 1859, *Rhinocypha perforata* (Percheron 1835), *Libellago asclepiades* Ris 1916, *Libellago aurantiaca* (Selys 1859), *Libellago rufescens* (Selys 1873), *Libellago lineata* (Burmeister 1839), *Libellago semiopaca* (Selys

1873), *Libellago stigmatizans* (Selys, 1869), *Libellago xanthocyana* (Selys 1869), *Rhinocypha chaoi* Wilson, 2004, *Rhinocypha humeralis* Selys 1873, *Rhinocypha monochroa* Selys 1873, *Rhinocypha pelops* Laidlaw 1936, *Rhinocypha phantasma* Lieftinck 1935, *Rhinocypha tinctoria* (Rambur 1842), *Neurobasis luzoniensis* Selys 1879.] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstraße 10, D-09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

7399. Hämäläinen, M. (2008): *Calopteryx splendens* (Harris, 1780) — a note on the publication date of the description of the Banded Demoiselle. *J. Br. Dragonfly Society* 24(1): 19-23. (in English) ["The correct citation of the scientific name of the Banded Demoiselle is *Calopteryx splendens* (Harris, 1780). The description was published in the first edition of Moses Harris' *An exposition of English Insects*, which was issued in three or four parts in 1776—1780. In odonatological literature the date 1782, which refers to the publication of the second edition of the book, has been traditionally, but incorrectly, used for this species. The first available synonymic name of *C. splendens* is *Libellula ludovicea* Kourcroy, 1785.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

7400. Hao, S.-l.; et al. (not transliterated) (2008): Preliminary report on Odonata in Baxianshan Natural Reserve in Tianjin. *Journal of Anhui Agri. Sci.* 36(23): 10000-10001. (in Chinese, with English summary) [14 Odonata species are listed.] Address: HAO Shu-lian, Tianjin Natural History Museum, Tianjin 300074, China

7401. Harabis, F.; Dolny, A. (2008): Red list of dragonflies (Odonata) of the Czech part of Silesia [2008]. *Cas. Slez. Muz. Opava (A)*, 57: 31-36. (in English, with Czech summary) [27 species of the regional 65 dragonfly species are red listed.] Address: Harabiš, F., Department of Ecology and environment, Faculty of Environmental sciences, Czech university of life sciences Prague, Kamýcká 129, CZ-165 21 Prague 6, Czech Republic.

7402. Hardersen, S. (2008): Dragonfly (Odonata) communities at three lotic sites with different hydrological characteristics. *Italian Journal of Zoology* 75(3): 271-283. (in English) ["At the nature reserve "Bosco della Fontana" (Lombardy, Italy) the communities of larval and adult dragonflies were studied at three sites in small streams. The larval communities were investigated by collecting exuviae. Site 1, a stream section which falls dry in March–April due to human intervention, had a community of larval dragonflies where species typical of running water were almost absent. Here *Ischnura elegans* was the dominant species, accounting for more than 64% of the total number of exuviae. Additionally, other species typical for stagnant water were present. However, reproductively active adults of rheophilous species were dominant when flowing water was abundant at this site in summer. In contrast, at the two other sites, where flowing water is present throughout the entire year, rheophilous species were dominant in the larval community and in the adult communities. It is concluded that streams with a highly modified hydrology may represent "ecological traps" for specialized species and that dragonfly surveys solely based on the observation of adults can be misleading." (Author)] Address: Hardersen, S., Centro Nazionale per lo Studio e

la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, I-46045 Marmirolo (MN), Italy. E-mail: s.hardersen@libero.it

7403. Hassall, C.; Thompson, D.J.; Harvey, I.F. (2008): Latitudinal variation in morphology in two sympatric damselfly species with contrasting range dynamics (Odonata: Coenagrionidae). *Eur. J. Entomol.* 105: 939-944. (in English) ["Geographic range expansion is one of the best documented macroecological consequences of climate change. A concomitant change in morphology has been demonstrated in some species. The relationship between latitudinal variation in morphology (e.g. Bergmann's rule) and the morphological consequences of microevolutionary pressures at expanding range margins have received little attention in the literature. Here we compare morphology of males of two Palearctic damselfly species, *Coenagrion puella* and *Pyrrosoma nymphula*. *C. puella* has recently expanded its range from the north of England into Scotland. *P. nymphula* does not exhibit a range margin in the United Kingdom and has established populations in northern Scotland. We demonstrate evidence for spatially correlated variation in body size across the sampling sites between the two species but a deviation in patterns of dispersal-related morphology. *P. nymphula* exhibited very weak relationships between dispersal-related morphology (wing loading and thorax : abdomen mass ratio) and latitude. However, the more southerly distributed *C. puella* exhibited strong relationships between mass investment in dispersal-related morphology and latitude. These trends appear to indicate compensatory growth patterns in cooler environments like those demonstrated for other species. The limits of this compensation for conditions that are close to the limits of a species' tolerance may contribute to the determination of the range margin. Greater variation in morphology towards the range margin has been observed in previous studies in Odonata. As such, the location of the sampling sites relative to the range margin of each species (closer in *C. puella* than *P. nymphula*) is highlighted as a potential contributing factor to the variation observed.] Address: Hassall, C., Biosciences Building, Crown Str., University of Liverpool, L69 7ZB Liverpool, UK. E-mail: c.hassall@liv.ac.uk

7404. Hassall, C.; Thompson, D.J. (2008): The effects of environmental warming on Odonata: a review. *Int. Journal of Odonatology* 11(2): 131-153. (in English) ["Climate change brings with it unprecedented rates of increase in environmental temperature, which will have major consequences for the earth's flora and fauna. The Odonata represent a taxon that has many strong links to this abiotic factor due to its tropical evolutionary history and adaptations to temperate climates. Temperature is known to affect odonate physiology such as developmental rate, phenology and seasonal regulation as well as immune function and the production of pigment for thermoregulation. A range of behaviours are likely to be affected which will, in turn, influence other parts of the aquatic ecosystem, primarily through trophic interactions. Temperature may influence changes in geographical distributions, through a shifting of species' fundamental niches, changes in the distribution of suitable habitat and variation in the dispersal ability of species. Finally, such a rapid change in the environment results in a strong selective pressure towards adaptation to cope and the inevitable loss of some populations and, potentially, species. Where data are lacking

for odonates, studies on other invertebrate groups will be considered. Finally, directions for research are suggested, particularly laboratory studies that investigate underlying causes of climate-driven macroecological patterns." (Authors)] Address: Thompson, D. J., Population Biology Research Group, School of Biol. Sciences (Nicholson Building), Univ. of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

7405. Hein, A.T.; Kunz, B. (2008): Kleinlibellen erbeuten Spinnentiere (Odonata: Coenagrionidae; Arachnida). *Libellula* 27(3/4): 253-257. (in German, with English summary) ["Damselflies as predators of arachnids (Odonata: Coenagrionidae; Arachnida) — In 2007 and 2008 three observations were documented photographically, during which zygopterans actively preyed on arachnids: *Pyrrosoma nymphula* on an orb weaver *Mangora acalypha* (Araneae: Araneidae), *Ischnura elegans* on a small undetermined spider and *Coenagrion puella* on a har-vestman (Opiliones: Phalangidae). The damselflies gleaned their prey from vegetation or directly from the spider's web. Except for the Neotropical family of the Pseudostigmatidae, this interaction hitherto has only rarely been described." (Authors)] Address: Hein, A.T., Ackerstraße 109, D-13355 Berlin, Germany. E-mail: andreas.hein1961@arcor.de

7406. Hercut, R.; Purtan, S.; Balog, B. (2008): Contributions to the study of the macrozoobenthic invertebrate communities from two habitats in Dobrudja (Romania). *Bihorean Biologist* 2: 21-26. (in Romanian, with English summary) [*Ischnura elegans*, *Coenagrion hastulatum*, *C. puella*, *Crocothemis erythraea*, and *Orthetrum coerulescens* are listed as species found in two permanent ponds from Dobrudja, one situated at Sarighiol de Deal in Tulcea County and the other at Dobromir de Deal in Constanta County.] Address: Hercut, Ramona, anul IV Biologie-Chimie, Univ. Oradea, Facultatea de Stiinte, Romania

7407. Hercut, R.; Cupsa, D.; Purtan, S.; Balog, B. (2008): Studies upon the structure of the macrozoobenthic invertebrate communities in three habitats from Arginesti surroundings (Mehedinti County, Romania). *Bihorean Biologist* 2: 14-20. (in Romanian, with English summary) [9 taxa were recorded in three ponds including one odonate species identified as *Anaciaeschna isosceles*.] Address: Cupsa, D., Univ. Oradea, Facultatea de Stiinte, Catedra de Biologie, str. Universitatii nr. 1, 410087, Oradea, Romania. E-mail: dcupsa@uoradea.ro

7408. Hoess, R. (2008): Kampf an der Wasserlinie: *Anax imperator*-Larve attackiert Weibchen von *Aeshna juncea* bei der Eiablage (Odonata: Aeshnidae). *Libellula* 27(3/4): 263-266. (in German, with English summary) ["At a pond in Berne, Switzerland, a female *A. juncea* was attacked by a male F-0 larva of *Anax imperator*. The female was obviously caught while ovipositing in front of the larva. Several escaping attempts of the female were futile. The larva consumed parts of segment 8 of its victim before letting it go abruptly." (Author)] Address: Hoess, R., Normannenstr. 35, 3018 Bern, Switzerland. E-mail: ReneHoess@1st.ch

7409. Hoffmann, J.; Schorr, M. (2008): Nachruf: Prof. Dr. Philip Steven Corbet, geb. 21. Mai 1929 in Kuala Lumpur, Malaysia, gest. 13. Februar 2008 in Truro, Cornwall, Großbritannien. *IDF-Report* 14: 1-46. (in German) [Obituary P.S. Corbet 21-05-1929 - 13-II-2008.]

Address: Hoffmann, J., Haldesdorfer Str. 21, 22179 Hamburg, Germany. E-mail: hoffmann.joa@t-online.de

7410. Holusa, O. (2008): Raupen des Fichtennestwicklers *Epinotia tedella* (Lepidoptera: Tortricidae) als Beute von *Aeshna cyanea* (Odonata: Aeshnidae). *Libellula* 27(3/4): 259-262. (in German, with English summary) ["On 30-VIII-2002, on the Massiv of Kaznicov near Hukvaldy in the eastern part of the Czech Republic (district of Frydek-Mfstek, 49°38'N, 18°14'E), a hunting male of *A. cyanea* was observed. In this forest, which chiefly consisted of *Fagus sylvatica* mixed with younger *Picea abies*, the dragonfly hovered approximately 5 cm from a caterpillar of *Epinotia tedella* hanging on a long thread from the lower branches of *P. abies*, at a height of approximately 1.2 m above ground. The dragonfly approached the caterpillar, seized it with its legs, tore it off the thread and devoured it while flying. This foraging behaviour was observed three times altogether. It is classified as midair foraging, and is suggested to be more widespread in the species." (Author)] Address: Holusa, O., Bruzovská 420, CZ-738 01 Frydek-Mistek, Czech Republic. E-mail: holusao@email.cz

7411. Hope, P. (2008): The Vagrant Emperor *Anax ephippiger* (Burmeister, 1839): proof of breeding in Turkey. *J. Br. Dragonfly Society* 24(1): 32-36. (in English) [Mugla province, 50m from the Mediterranean Sea at Cahs (near Fethiye), Turkey; 17-XI-2004, *A. ephippiger* settled at the base of a stem of *Typha angustifolia*. The following year exuviae collected from the location were identified to be *A. ephippiger*. This is the first proof of breeding for this species in Turkey.] Address: Hope, P., English Bridge Court, Wyle Cop, Shrewsbury, Shropshire SY1 1XH, UK

7412. Hope, P. (2008): Balkan Emerald *Somatochlora meridionalis* (Neilson, 1935) — A remarkable extension of the distribution range in Turkey. *J. Br. Dragonfly Society* 24(1): 14-18. (in English) ["Whilst working on a United Nations (Development Project) biodiversity study at Gokova in southwest Turkey in 2003 (Hope, 2004), I caught a metallic green dragonfly at a stream in the Cetibeli Forest. Although initially assumed to be a Brilliant Emerald *Somatochlora metallica*, the specimen was sent to Dr R. R. Askew for positive identification. He informed me that it was in fact a Balkan Emerald *Somatochlora meridionalis* and, according to him, not recorded in Asian Turkey. Later correspondence with odonatologists from the Natural History Museum (European Invertebrate Survey, Nederland) in Leiden, The Netherlands, confirmed that it was scarce to fairly common in Thrace (European Turkey) and had been recorded in the adjacent Asian Turkey just over the Bosphorus. My discovery put it some 900km to the south of any previous records, a remarkable extension of its distribution range." (Author)] Address: Hope, P., 2 English Bridge Court, Wyle Cop, Shrewsbury, Shropshire SY1 1XH, UK

7413. Hunger, H.; Schiel, F.-J. (2008): Erstnachweis von *Gomphus flavipes* am deutsch-schweizerischen Hochrhein (Odonata: Gomphidae). *Libellula* 27(3/4): 221-228. (in German, with English summary) ["At 29-VI, 23-VII, 27-VIII and 09-VIII-2008, four exuviae of *Stylurus flavipes* were found on the High Rhine east of Basle, three on the German bank and one on the Swiss bank. This is the first confirmed record of *S. flavipes* in Switzerland, although a previous occurrence of the species in the Canton of Vaud is regarded as likely. The fin-

dings are described and briefly discussed." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

7414. Ishizawa, N. (2008): Factors in the selection of oviposition mode in *Sympetrum infuscatum* (Selys) (Anisoptera: Libellulidae). *Odonatologica* 37(4): 317-328. (in English) ["The study was conducted at rice paddies in the cool temperate area of central Japan. The oviposition time period was limited to between ca 10:00 a.m. and 14:00 p.m. with a peak around noon. At an ambient temperature (T_a) below 30°C most pairs oviposited in tandem (TO) but at a T_a above 30°C in mid-summer most pairs separated shortly after the start of TO. The females continued to oviposit while being escorted by their partners. The regression coefficient of male body temperature (T_b) in ovipositing pairs was characteristically greater than that of the female, and it is suggested that the male is more dependent on T_a than is the female. Although the duration of oviposition was a little longer in pairs that separated after the start of oviposition, this difference was not significant. The reason why *S. infuscatum* starts oviposition in such a hot season of summer seems to be due to the morphological feature of its slender abdomen, which decreases abdominal light absorption at low T_a in the autumn." (Author)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozavva City, Saitama Pref., Japan. E-mail: isizawa7@rivo.mediatti.net

7415. Jacobsen, D.; Marin, R. (2008): Bolivian Altiplano streams with low richness of macroinvertebrates and large diel fluctuations in temperature and dissolved oxygen. *Aquatic Ecology* 42: 643-656. (in English) ["We sampled benthic macroinvertebrates and recorded oxygen and temperature regime during 2-day periods in 12 stream sites at an altitude of 3,800–4,000 m a.s.l. on the Bolivian Altiplano, during low flow conditions at the end of the dry season. Eight of the sites were relatively unpolluted, while the remaining four sites were affected by domestic/industrial sewage. Compared to other Andean streams, the fauna was poor with a total of 28 and a mean of 11 taxa (mostly families) in the unpolluted sites. The entire EPT group was represented by just five families. Of these, only Baetidae and Hydroptilidae were common. At all sites, the dominant taxa were found among just four taxa (Elmidae, Chironomidae, Oligocheata and Hyallellidae). Mean water temperature was 12.9 C°, while mean diel amplitude was 13.4 C° and the maximum range 17.4 C°. Ten richness and biotic indices were used to analyse for effects of temperature and oxygen on the fauna. Most measures of fauna richness were negatively correlated with mean and max temperature (even excluding the four polluted sites), while biotic indices were mostly uncorrelated with temperature. Thus, the large fluctuations in temperature seemed to exclude taxa, thereby reducing overall diversity of Altiplano streams. Oxygen saturation also varied considerably, with a mean diel range of 48% and a maximum range of 93%. Richness measures were uncorrelated with oxygen %, while all biotic indices were positively correlated with either mean or min oxygen %. Most measures of faunal composition showed a marked shift at levels of 10–30% min oxygen saturation. Earlier studies of high Andean streams in Ecuador have shown a major shift in faunal composition at 50–60% oxygen saturation. The fauna in the Altiplano streams may be

adapted to the large fluctuations in oxygen saturation, and therefore more robust towards low oxygen saturations. The implications for biotic assessment of Altiplano streams are discussed." (Authors) A few Aeshnidae were collected.] Address: Jacobsen, D., Freshwater Biological Laboratory, Institute of Biology, University of Copenhagen, Helsingørsgade 51, Hillerød 3400, Denmark. E-mail: Djacobsen@bi.ku.dk

7416. Jara, F.G. (2008): Tadpole–odonate larvae interactions: influence of body size and diel rhythm. *Aquatic Ecology* 42(3): 503-509. (in English) ["Several studies have shown that prey and predator body size may affect the outcome of predator–prey interactions. However, few studies have taken in account the changes on predator–prey interactions over 24 h. In a tropical freshwater system I evaluated how predator and prey size, and their diel rhythm in activity influenced the interaction between *Physalaemus pustulosus* tadpoles and dragonfly larvae. Tadpoles of different size classes were exposed to two size classes of the dragonfly larvae *Rhionaeschna spec.* Feeding trials were conducted during day and night. Tadpole activity showed a diel rhythm and affected size-selective predation of the smallest dragonfly larvae, but not of the larger ones. Predator and prey size had a significant effect on the prey survivorship and prey size had a significant effect on the preference of the predator. The interaction between both factors was significant, indicating that they did not operate independently. I conclude that the predator–prey interactions between odonate larvae and anuran tadpoles were mainly affected by the size of the prey and the predator, and less by the diel activity pattern of the prey." (Author)] Address: Jara, F.G., Laboratorio de Fotobiología, Centro Regional Bariloche, Universidad Nacional del Comahue, Quintral 1250, San Carlos de Bariloche, Rio Negro 8400, Argentina. E-mail: fjara@crub.uncoma.edu.ar

7417. Jiang, Y.-H.; Zhang, H.-M. (2008): Descriptions of the full-grown *Cephalaeschna patrorum* Needham and *Planaeschna shanxiensis* Zhu & Zhang larvae from China (Anisoptera: Aeshnidae). *Odonatologica* 37(3): 273-277. (in English) ["The male and female ultimate instar larvae of the 2 species from the Beijing area are described and illustrated. Differential characters with other species from Taiwan, Hong Kong, China and Japan are summed up." (Authors)] Address: JIANG, Y.-h., Yuntai-xiang Culture Station, Xinpu District, Lianyungang City, Jiangsu-222064, China. E-mail: jiangyh26@yahoo.com.cn

7418. Johansson, F.; Mikolajewski, D.J. (2008): Chapter 10. Evolution of morphological defences. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 127-139. (in English) ["Understanding the ecology and evolution of morphological defences in animals and plants may help us to understand and protect biodiversity. Several species of dragonfly larvae express lateral and dorsal abdominal spines. In some species these spines seem to be fixed, and in others they are induced by the presence of predatory fish. Larger spines are adaptations to reduce predation risk by fish, but incur a cost because large spines are associated with a higher predation risk by invertebrate predators. The difference in vulnerability to different predators has the potential to affect temporal and spatial variation in the morphology of dragonfly larvae, and may ultimately re-

sult in speciation. Future focus on the joint evolution of correlated defensive traits such as morphology and behaviour and their plasticity might be fruitful for a better understanding of the development of animal diversity." (Authors)] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

7419. Jovic, M. (2008): Report on Adriatic Montenegro 2007 project - Odonata. IDF-Report 15: 1-25. (in English) [In 2007, field work was carried out in the wetlands of the Adriatic shore in Montenegro and in the vicinity of the Lake of Skadar. 36 Odonata species were recorded from 39 localities. The records are documented and briefly discussed. The species list includes *Gomphus schneiderii*, *Lindenia tetraphylla*, and *Selysiothemis nigra*.] Address: Miloš, J., M., Natural History Museum in Belgrade, Njegoševa 51, 11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.org.yu

7420. Jovic, M.; Santovac, S.; Andjz, L. (2008): *Leucorrhinia caudalis* (Charpentier, 1840) - a new or an ex dragonfly species in Serbian fauna? *Bulletin of the Natural History Museum Belgrade* 1: 161-171. (in English, with Serbian summary) ["The discovery of 11 specimens (4males, 7females) of *L. caudalis* in the entomological collection of the National Museum in Zrenjanin is presented. This material from the early 1970's represents the first reliable data about the occurrence of this species in Serbian territory and should, therefore, be considered a new species of Serbian fauna. Contemporary literature data about this endangered species in the region are discussed. Attempts to find a present population in the locality cited on the specimen's labels remained unsuccessful. Both the original list of the species collected together with the specimens *L. caudalis* and the list of those collected in the same locality thirty-five years later are given and commented upon. Remarks about habitat destruction and the possibilities of survival of this species in N Serbia are also presented." (Authors)] Address: Jovic, M., Natural History Museum Belgrade, Njegoševa 51, P.O. Box 401, YU-11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.org.yu

7421. Jung, S.W.; Hguyen, V.V.; Nguyen, Q.H.; Bae, Y.J. (2008): Aquatic insect faunas and communities of a mountain stream in Sapa Highland, northern Vietnam. *Limnology* 9(3): 219-229. (in English) ["Aquatic insect communities were investigated from the Muonghoa Stream in the Sapa Highland (highest peak 3,143 m), a subtropical mountain stream in northern Vietnam. Field investigations for quantitative (Surber net 50 cm 9 50 cm, mesh size 0.2 mm, riffle and pool/run) and qualitative (hand net, mesh size 1 mm) sampling were conducted at nine sites along the watercourse between 27 November and 2 December 2005. As a result, a total of 216 species (the majority of them undescribed) belonging to 139 genera, 61 families, and nine orders were recognized: 53 Ephemeroptera species (24.5%), nine Odonata species (4.2%), 15 Plecoptera species (6.9%), seven Hemiptera species (3.2%), 35 Coleoptera species (16.2%), one Megaloptera species (0.5%), 29 Diptera species (13.4%), 66 Trichoptera species (30.6%), and one Lepidoptera species (0.5%). Trichoptera, Ephemeroptera, and Coleoptera represented the major aquatic insect groups with regard to taxonomic and individual richness, whereas Hemiptera and Odonata were relatively less diverse and abundant than in studies of

other tropical Southeast Asian streams. The dominance, richness, and diversity indices (H0) fell within the following ranges [mean \pm standard deviation (SD)]: 0.18–0.76 (0.42 \pm 0.19), 4.13–9.19 (7.06 \pm 1.45), and 1.61–3.22 (2.67 \pm 0.55), respectively. Riffle habitats generally yielded numbers of aquatic insect species and individuals approximately twice that sampled in pool/run habitats. Shredders were relatively larger in proportion within the headwater reach, whereas scrapers and collector-gatherers were more abundant in the middle and lower stream reaches. This functional feeding group composition is characteristic of temperate streams in East Asia. The results of detrended correspondence analysis and Bray–Curtis cluster analysis indicated that aquatic insect compositions at the sampling sites were very reflective of the reach characteristics, which evidence gradual changes with altitude and stream order along the stream watercourse. This is the first comprehensive investigation of aquatic insects in highland Southeast Asian regions." (Authors) Odonata are treated on the genus level.] Address: Y. J. Bae (&) Lab of Animal Systematics and Ecology, Division of Life Sciences and Biotechnology, Korea University, 1 Anam-dong, Seongbuk-gu, Seoul 136-701, South Korea e-mail: yjbae@korea.ac.kr

7422. Kadoya, T.; Suda, S.; Nishihiro, J.; Washitani, I. (2008): Procedure for predicting the trajectory of species recovery based on the nested species pool information: Dragonflies in a wetland restoration site as a case study. *Restoration Ecology* 16(3): 397-406. (in English) ["Restoration of seminatural habitats in the rural agricultural landscape has become an urgent matter in environmental conservation. We propose here a procedure for predicting the trajectory of species recovery and for specifying the priority of habitat types for restoration of a rural agricultural landscape. We then apply it as a case study to the recovery of dragonfly species in the Azame restoration project that began in 2003 in northern Kyushu, Japan. We examined the nestedness of the regional distribution of dragonflies using a national database on wildlife distribution and listed the recorded species in order of their prevalence in the region. We also conducted a census of adult dragonflies currently found at the restoration site to assess species richness. By comparing these data, we identified species potentially capable of inhabiting the restoration site and, based on their habitat requirements, suggest what type of habitat (e.g., bogs and marshes, ponds, and bodies of slow-moving water) should be restored preferentially. We observed significant nestedness in the presence–absence matrix for dragonfly species and thus predict that species recovery at the restoration site will follow the regional order of prevalence of the species. The required habitat types did not differ significantly between the currently observed species and the potential species, which indicates that all these habitat types should be restored in the project." (Authors)] Address: Kadoya, T., Department of Ecosystem Studies, Graduate School of Agricultural and Life Sciences, The University of Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan. E-mail kadoya@e-mail.jp

7423. Kalkman, V. (2008): Records of dragonflies from Borneo, Star Mountains, Papua, Indonesia (Odonata). *Entomologische berichten* 68(2) : 45-52. (in English, with Dutch summary) ["In Borneo, a village on the lower northern slopes of the Star Mountains, New Guinea, almost a week fieldwork was conducted by four affiliates

of the Entomology Department of the Cenderawasih University, Abepura, Indonesia, in collaboration with two Dutch entomologists. This article presents an impression of the work and focuses on observations on dragonflies. A total of 37 species from 13 families were recorded. Information on the distribution, habitat and ecology of dragonflies in New Guinea is scarce and despite the small number of field days much new information was gathered. Comparing the results with other studies from Papua New Guinea generates the prediction that at least 70 species are present in the area." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

7424. Kalkman, V.J. (2008): Taxonomy, behaviour, and habitat of *Mesopodagrion* and *Sinocnemis*. Notes on Old World Megapodagrionidae 3 (Odonata). *International Journal of Odonatology* 11(2): 185-193; pls I, II. (in English) ["Published records of *Mesopodagrion* are reviewed and the distributions of *M. tibetanum* and *M. yachowensis* are given. *Sinocnemis henanese* is considered a junior synonym of *S. yangbingi*. Based on morphological and behavioural characters *Sinocnemis* is removed from *Platycnemididae* and placed in *Megapodagrionidae*. Species of *Sinocnemis* show a general resemblance to species of *Mesopodagrion* but it is not clear if the two genera are closely related. Adults of both *Mesopodagrion* and *Sinocnemis* rest with open wings, and show a preference for perching on horizontal surfaces, keeping their thorax and abdomen close to the surface of their perch. This behaviour may have a thermoregulatory function." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

7425. Kalnins, M. (2008): Protected aquatic insects of Latvia – *Leucorrhinia albifrons* (BURMEISTER, 1839) and *L. caudalis* (CHARPENTIER, 1840) (Odonata: Libellulidae). *Latvijas Entomologs* 45: 5-13. (in English) ["Published data, collections, data collected during the project „Analysis of the Specially Protected Nature Territories in Latvia and Establishing of EMERALD/Natura 2000 Network” and material collected by Latvian entomologists have all been used in the analysis of the distribution of this species. The distribution of *L. albifrons* and *L. caudalis* were mapped using a basic grid of 5x5 km squares in the Baltic grid system. In total, *L. albifrons* is recorded from 96 squares and *L. caudalis* - from 80 squares in Latvia. The most known localities are concentrated in central and northern Latvia. The majority of localities of *L. albifrons* in Latvia has been recorded in natural eutrophic the Lakes with Magnopotamion or Hydrocharition – type vegetation and in natural dystrophic the Lakes and ponds, in active raised bogs or transition mires. Other *L. albifrons* habitats are polytrophic the Lakes and polytrophic oxbow the Lakes with Magnopotamion or Hydrocharition type vegetation, hard oligo-mesotrophic the Lakes with benthic vegetation of *Chara* spp. The majority of localities of *L. caudalis* in Latvia has been recorded in natural eutrophic the Lakes with Magnopotamion or Hydrocharition – type vegetation, polytrophic the Lakes and polytrophic oxbow the Lakes with Magnopotamion or Hydrocharition type vegetation. Other *L. albifrons* habitats are hard oligo-mesotrophic the Lakes with benthic vegetation of *Chara*

spp., natural dystrophic the Lakes and ponds, in active raised bogs or transition mires." (Author)] Address: Kalnins, M., Nature Protection Board, Eksporta iela 5, LV-1010 Riga, Latvia. E-mail: martins.kalnins@dap.gov.lv

7426. Keil, P.; Simova, I.; Hawkins, B.A. (2008): Water-energy and the geographical species richness pattern of European and North African dragonflies (Odonata). *Insect Conservation and Diversity* 1(3): 142-150. (in English) ["1. Environmental correlates of broad-scale patterns of Odonata species richness were studied in Europe and part of northern Africa using 220 × 220-km gridded data. Relationships with 11 environmental variables were tested using multiple regression. 2. Two models were constructed: (i) for the entire data set covering both Europe and northern Africa, and (ii) only for Europe. 3. Across both regions, actual evapotranspiration had the strongest relationship with richness, followed by weaker associations of potential evapotranspiration (a concave polynomial) and summer vegetation index (a positive linear relationship). Within Europe the strongest predictor was a concave polynomial of potential evapotranspiration, followed by vascular plant species richness (a positive relationship) and annual precipitation (a concave polynomial). 4. A test of metabolic theory identified strong non-linearity in the temperature-richness relationship, and geographically weighted regression indicated consistency with the theory in a very limited part of Europe. 5. The results are most consistent with the hypothesis that broad-scale species richness patterns are primarily determined by water-energy balance, similar to many fully terrestrial insect groups." (Authors)] Address: Keil, P., Dept of Ecology, Faculty of Science, Charles University, Vinicna 7, Prague 2, Czech Republic. E-mail: pkeil@seznam.cz

7427. Kiatanova, D.; Slavevska Stamenkovic, V.; Kostov, V.; Marinov, M. (2008): Contribution to the knowledge of dragonfly fauna of the Bregalnitsa river, Macedonia (Insecta: Odonata). *Natura Montenegrina* 7(2): 169-180. ["Six Odonata species have been established as possibly breeding in Bregalnitsa River during a hydrobiological research conducted from the source region to the lower part of the watercourse. Dragonfly larvae are found in seven out of thirteen sampling points. Other six species have been discovered during faunistic research performed in the adjacent area and added to the overall dragonfly check-list for the region. All together are discussed according to their autochthony, habitat specialisation and zoogeographical affiliation." (Authors) Of special interest are records of *Coenagrion ornatum* and *Stylurus flavipes*.] Address: Kiatanova, Despina, Macedonian Ecological Society, Blvd. Kuzman Josifovski Pitu 28/3-7; 1000 Skopje, Macedonia. E-mail: kitanova@mes.org.mk

7428. Koenig, W.D. (2008): Chapter 12. Lifetime reproductive success and sexual selection theory. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 153-167. (in English) ["This chapter summarizes studies of lifetime reproductive success (LRS) conducted on odonates. Such studies have focused on many characters, but have typically concluded that survivorship — the main component of natural selection, is more important than mating efficiency — a primary component of sexual selection, in determining LRS. They have also frequently found that environmental fac-

tors are important and that selection and the opportunity for selection vary considerably depending on density, sex ratio, and community composition. LRS studies have been most successful when focused on specific traits and when complemented by experimental manipulations. Progress in understanding the current actions of natural and sexual selection is thus most likely to involve long-term LRS work combined with experimental or comparative approaches. Particularly desirable are studies that incorporate the larval stage in fitness calculations, perform parentage analyses to determine realized fitness, and consider the role of non-breeding behaviours such as foraging efficiency." (Publisher)] Address: Koenig, W.D., Hastings Reservation, University of California Berkeley, 38601 E. Carmel Valley Road, Carmel Valley, CA 93924, USA. E-mail: koenigwd@berkeley.edu

7429. Kosterin, O.E.; Vikhrev, N.E. (2008): Odonatological field notes of two January trips to SE Thailand, in 2005 and 2006. *Malangpo* 22: 222-236. (in English) ["A report about Odonata met during two trips to SE Thailand (Chon Buri, Rayong and Chanthaburi Provinces) in January 2005 and January 2006 is given in a form of field notes of the former author, along with his impressions of a Siberian first time occurred in tropics. Few data of the second author's visit in November 2006 and December 2007 are added. The shortened version of the text concerning the trip in 2005 has been already published in *WDA's Agrion* 10(1): 5-7. Observations of 2005 and 2006 are compared. *Aciagrion borneense*, *A. pallidum*, *Onychargia atrociana*, *Pseudothemis jorina*, *Anax guttatus*, *Epophthalmia* were for the first time recorded in Chon Buri Province; *Aristocypha fenestrella*, *Heliocypha biforata*, *Prodasineura autumnalis*, *Coelicia yamasakii* Asahina, 1984, *Brachythemis contaminata*, *Brachydiplax farinosa*, *Trithemis aurora*, *Neurothemis intermedia atalanta* in Rayong Province, and *Ceriagrion praetermissum* and *Hydrobasileus croceus* in Chanthaburi Province, but all these records except for *A. borneense* and *A. guttatus* for Chon Buri Province has been already published in the mentioned publication of the first author. For these species, a list of the collected or observed specimens is provided." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

7430. Kosterin, O.E. (2008): Observations on the crepuscular flight in *Aeshna viridis* Eversman in Omsk province, West Siberia (Anisoptera: Aeshnidae). *Notulae odonotologicae* 7(2): 18-20. (in English) ["Observations of the crepuscular trophic flight of *A. viridis* (20:10-20:50 to 21:20-21:40) for the period of August 4-15, 1978 in northern Omsk province. West Siberia are presented. Upon the day of appearance, the moths *Loxostege sticticalis* L. were the main prey." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

7431. Królak, E.; Korycińska, M. (2008): Taxonomic composition of macroinvertebrates in the Liwiec River and its tributaries (Central and eastern Poland) on the basis of chosen physical and chemical parameters of water and season. *Polish Journal of Environmental Studies* 17(1): 39-50. (in English) [The composition of ma-

croinvertebrates - measured on the family level - was studied during spring, summer and autumn. "Simultaneously, physical and chemical parameters of water were measured. Water parameters were different in each study period. Macroinvertebrates samples collected in summer and autumn were much more diversified than the samples collected in spring. In the spring samples a greater EPT diversity was observed, while in the samples collected in autumn Odonata, Coleoptera and Heteroptera were more diversified. The values of the BMWP-PL index were slightly higher for the summer and autumn samples than for the spring ones. ... The results of the studies show that samples used for the biotic assessment of the quality of waters of moderately polluted lowland rivers typical of central and eastern Poland should be collected in autumn, not in spring." (Authors)] Address: Królak, E., Dept Ecol. & Environmental Protection, University of Podlasie, Prusa 12, 08-110 Siedlce, Poland. E-mail: kruell@o2.pl

7432. Krotzer, R.S.; Bried, J.T.; Krotzer, M.J. (2008): The Odonata of Mississippi. *Bulletin of American Odonatology* 10(4): 65-91. (in English) ["An annotated faunal list of the Odonata occurring in Mississippi is presented, totaling 144 species (100 Anisoptera, 44 Zygoptera). Five species - *Enallagma davisii*, *Gomphus (Hylonomphus) geminatus*, *Epitheca (Tetragoneuria) spinosa*, *Neurocordulia alabamensis*, and *Miathyria marcella* - are documented from the state for the first time. The presence in Mississippi of *Celithemis bertha* Williamson, previously reported from the state based on a misidentification, is confirmed. Four species from earlier Mississippi lists are removed, and nine potential additions to the state's fauna are discussed. A brief history of odonatological inventory in Mississippi is given, along with a discussion of the state's physiography and aquatic resources, relationships of its odonate fauna to that of its neighboring states, and potential conservation measures that could benefit odonates and their habitats." (Authors)] Address: Krotzer, S., 2238 Haysop Church Road, Centreville, AL 35042, USA. E-mail: rs-krotze@southernco.com

7433. Kuńka, A.; Hebda, G.; Łęgowski, D.; Świerad, R. (2008): Faunistical data on selected species of dragonflies (Insecta: Odonata) in the Opole Province (Southwest Poland). *Opole Scientific Society Nature Journal* 41: 101-105. (in English) [Records of 28 Odonata species, rare, endangered, threatened with extinction or protected by law from the Opole province, Poland are presented.] Address: Kuńka, A., Fieldorfa 14/308, 45-273 Opole, Poland. E-mail: akunka@o2.pl

7434. Kunz, B. (2008): Anfänge der Libellenkunde in Württemberg (Odonata). *Libellula* 27(3/4): 229-252. (in German, with English summary) [Germany; "Literature investigations and a check of the collection of the 'Staatliches Museum für Naturkunde Stuttgart' (SMNS) revealed a number of early Odonata records from Württemberg that had been hitherto unknown or neglected. As the oldest faunistic work from this region, the 1802 publication of «Verzeichniss der Halbkaefer, Netzflügler, Wespen, ungeflügelten Insekten, Wanzen und Fliegen, welche um den Ursprung der Donau und des Neckars, dann um den untern Theil des Bodensees vorkommen» by the naturalist Friedrich Roth von Schreckenstein, was identified. Considering several other newly evaluated historic publications, such as the, 'Oberamtsbeschreibungen' or the 'Jahreshefte des Ver-

eins für vaterländische Naturkunde in Württemberg' (1844-1900), the first steps of odonatology in the 19th century in Württemberg are documented. Apart from describing the start of Odonata species listing from Württemberg, hitherto neglected data concerning species that today are regarded as rare or extinct - *Leucorhinia albifrons* and *L. caudalis* - are presented." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunz.de

7435. Lencioni, F.A.A. (2008): *Angelagrion* gen. nov. with description of *A. nathaliae* sp. nov. and *A. fredericoi* sp. nov. from Brazil (Odonata: Coenagrionidae). *Zootaxa* 1968: 23-32. (in English, with Spanish summary) ["A new genus of Coenagrionidae is described from Brazil, *Angelagrion* (type species *Angelagrion fredericoi* sp. nov.) including two new species, *A. fredericoi* sp. nov. and *A. nathaliae* sp. nov.. The new genus is characterized by an enormous and modified internal fold of genital ligula, abdominal segments S8-10 dark brown or black contrasting with mostly bluish abdomen, sternum of S8 in males with a circular bluish-white spot, and short CuA." (Author)] Address: Lencioni, F.A.A., Rua Anibal, 216 – Jardim Coleginho – Jacareí – São Paulo – Brazil - CEP (ZIP) 12310-780. E-mail: odonata@zygoptera.bio.br

7436. Lieckweg, T. (2008): Die Libellenfauna der Ostfriesischen Inseln (Odonata). Dokumentation des aktuellen Artenbestandes anhand von Literaturdaten. *Schriftenreihe Nationalpark Niedersächsisches Wattenmeer* 11: 141-144. (in German, with English summary) ["The East Frisian dune islands off the German coast of the North Sea with their 350 limnic and 200 brackish ponds harbour 39 species of dragonfly, 26 of which are currently considered indigenous to the islands. This amounts to about 33 % of all dragonfly species known from Germany and to 43 % known from Lower Saxony. Nine of the dragonfly species native to the islands are listed as threatened in Germany or Lower Saxony. Breeding waters favoured by dragonflies are freshwater ponds in grey dune sites and in wet dune slacks, but slightly brackish waters of less than 5 ‰ salinity are tolerated by 15 species. Having almost invariably been created by human activity, today most of the islands' water bodies are threatened with being filled up by sedimentation and by excessive scrub encroachment, which severely impairs their functioning abilities as habitats for dragonflies." (Author)] Address: Lieckweg, T., Carl-von-Ossietzky-Universität, Fakultät V, Institut für Biologie und Umweltwissenschaften, D-26111 Oldenburg, Germany. E-mail: tammo.lieckweg@gmx.de

7437. Lingenfelder, U. (2008): Die Gabel-Azurjungfer – *Coenagrion scitulum* (Rambur, 1842) – erobert die Pfalz (Odonata: Coenagrionidae). *Fauna und Flora in Rheinland-Pfalz* 11(2): 377-408. (in German, with English summary) [In Rhineland-Palatinate, Germany, *C. scitulum* "was recorded for the first time in 2006 in the north of the federal state. Now, the species has been found also in the Palatinate, the southern part of the federal state, at eleven localities in the western part of the region between Kaiserslautern and Homburg/Saar. Reproduction evidence was provided by the observation of newly emerged or immature specimens at five of these waters. The localities are predominantly flat and relatively warm and include seven rain storage basins, three waters in old sand pits and one pond. One additional observation of the species in the eastern part of

the Palatinate was reported recently from the area around Ludwigshafen by J. Ott. In this article, the observations of *C. scitulum* in the Palatinate are described. A short survey of the distribution of the species in adjoining regions is also given here. In conclusion, dispersal/distribution, habitats, and status in the Palatinate are discussed." (Author)] Address: Lingenfelder, U., Seebergstr. 1, 67716 Heltersberg. Germany. E-mail: U.Lingenfelder@VR-web.de

7438. Lingenfelder, U. (2008): Pfalz-Eroberung von 2 Seiten. Boten des Klimawandels: Libellenart Gabel-Azurjungfer ist „neu“ in der Pfalz. Die Rheinpfalz. Markt-platz Regional. Nr. 264 vom 12.11.2008: (in German) [Brief but sound report on the current (2008) discoveries of *Coenagrion scitulum* in Rheinland-Pfalz, Germany.] Address: Lingenfelder, U., Seebergstr. 1, 67716 Heltersberg. Germany. E-mail: U.Lingenfelder@VR-web.de

7439. Lok, A.F.S.L. (2008): The biology and distribution in Singapore of *Lestes praemorsus decipiens* Kirby, 1893. *Nature in Singapore* 1: 27-30. (in English) [The paper includes some general information on distribution, habitat, and wing morphology of the taxa.] Address: Lok, A., Dept Biol. Sciences, National University Singapore, 14 Science Drive 4, Singapore 117543, Republic of Singapore. E-mail: dbsloks@nus.edu.sg

7440. Lok, A.F.S.L. (2008): The biology and distribution in Singapore of *Prodasineura humeralis* Selys, 1860. *Nature in Singapore* 1: 51-53. (in English) [V-2008, 2 km from Chestnut Track area, Upper Seletar Reservoir, Singapore. The paper includes some general information on distribution, habitat, and wing morphology of the species.] Address: Lok, A., Dept Biol. Sciences, National University Singapore, 14 Science Drive 4, Singapore 117543, Republic of Singapore. E-mail: dbsloks@nus.edu.sg

7441. Lotzing, K. (2008): Liste der seit 1980 nachgewiesenen Libellen (Insecta: Odonata) im Bereich der Bode und ihrer Nebenarme innerhalb des ehemaligen Landkreises Aschersleben-Staßfurt (Sachsen-Anhalt) mit Einschätzung ihres Vorkommens und ihrer aktuellen Bestandssituation. *Entomol. Mitt. Sachsen-Anhalt* 16(2): 66-80. (in German, with English summary) [Between 1980 and 2007, the dragonfly-fauna of the River Bode and its tributaries within the administrative boundaries of the former administrative district Aschersleben - Staßfurt, now part of "Salzlandkreis", Sachsen-Anhalt, Germany was investigated. A total of 29 species was recorded including the regional interesting species *Calopteryx splendens*, *Lestes barbarus*, *L. dryas*, *L. virens*, *Coenagrion pulchellum*, *Ophiogomphus cecilia*, *Brachytron pratense*, *Anaciaeschna isoceles*, *Crocothemis erythraea*, *Sympetrum pedemontanum*, and *S. striolatum*.] Address: Lotzing, K., Am Hollschen Bruch 4c, 39435 Unseburg, Germany

7442. Lytle, D.A.; Olden, J.D.; McMullen (2008): Drought-escape behaviors of aquatic insects may be adaptations to highly variable flow regimes characteristic of desert rivers. *The Southwestern Naturalist* 53(3): 399-402. (in English, with Spanish summary) ["We document how two species of desert aquatic insects use positive rheotaxis to escape drought in desert rivers. We observed ca. 3,600 adults of the long-toed water beetle *Postelichus immsi* (Coleoptera: Dryopidae) crawling upstream concurrent with upstream recession of

surface water in the Santa Maria River, La Paz and Mohave counties, Arizona. At the same time, we observed larvae of the gray sanddragon *Progomphus borealis* (Odonata: Gomphidae) burrowing and swimming upstream in large densities (690 larvae/m²). Both taxa moved with sufficient speed to arrive at perennial reaches of the river before being overtaken by drought." (Authors)] Address: Department of Zoology, Oregon State University, Corvallis, OR 97331 (DAL, LEM) School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA 98195, USA. E-mail: lytle@science.oregonstate.edu

7443. Ma, J.; Liang, B.; Zhang, S.; Metzner, W. (2008): Dietary composition and echolocation call design of three sympatric insectivorous bat species from China. *Ecol. Res.* 23: 113-119. (in English) ["By examining an extensive data set covering a period of 2 years, the present study identifies the dietary composition of three sympatric insectivorous bat species in rural areas of Beijing municipality. Each species clearly has different preferences for particular food items. Greater horseshoe bats, *Rhinolophus ferrumequinum*, preferred to catch nocturnal, actively flying insects, mostly moths (Lepidoptera), and to a lesser percentage flies (Diptera), beetles (Coleoptera), and flying ants and termites (Hymenoptera). Other nocturnal insects which do not exhibit any perceptible wing movements, such as true bugs (Homoptera), or strictly diurnal insects that hardly ever fly in the dark, such as grasshoppers (Orthoptera) and dragon- and damselflies (Odonata), were never found in droppings of horseshoe bats. Large mouse-eared bats, *Myotis chinensis*, preferentially glean relatively large terrestrial prey of the order Coleoptera (mostly carabid beetles) and Orthoptera, whereas greater tube-nosed bats, *Murina leucogaster*, consume predominantly smaller, diurnal Coleoptera (mostly soldier beetles, *Cantharidae*, and ladybugs, *Coccinellidae*). Our findings also indicate previously not described, significant spectro-temporal differences in the echolocation signals of *M. chinensis* and *M. leucogaster*. The results suggest that in our study area the dramatic differences in the dietary composition of these three bat species are mainly based upon differences in their foraging behaviors, including differences in their echolocation signal structure. The dietary data provide important background information for conservation efforts, such as habitat protection." (Authors)] Address: Metzner, W., Dept of Physiological Science, University of California, 621 Charles E. Young Dr. S., Box 951606, Los Angeles, CA 90095-1606, USA. E-mail: metzner@ucla.edu

7444. Macagno, A.L.M.; Boano, G.; Palestini, C.; Stasi, M.; Rolando, A. (2008): Movement and demographics of *Libellula fulva* (Odonata, Libellulidae). *Environ. Entomol.* 37(5): 1145-1153. (in English) ["Many capture-recapture studies on adult dragonflies have found male-biased sex ratios. However, few have estimated survivorship of males and females separately from data on frequency of recaptures in the field. Even when daily survival and capture probabilities are estimated separately, controversies can arise on whether sex biases in local survival are to be attributed to mortality or permanent emigration from the study site. The knowledge of male and female movements, assessed on an appropriate scale (i.e., within and outside the breeding site), can help address this issue. In this paper, we performed a 4-yr capture-recapture study of two *L. fulva* populations in northwest Italy. Cormack-Jolly-Seber models

were used to get unbiased estimates of demographic parameters (daily survival and capture probabilities, sex ratio, mean life span, and population size). Movement parameters were measured directly by georeferencing encounters. Moderate differences in survival, with males surviving better than females, were found in one population and not in the other, suggesting that these differences are not an inherent characteristic of the species. In the population with lower female survival, females were not more vagile than males, thus indicating their lower survival was caused by actual mortality rather than to emigration. In the population with no survival differences between males and females, marked males outnumbered females, but estimated sex ratios were 1:1 or female biased. Therefore, raw field data were misleading because they led to underestimates of the more elusive sex and overestimates of the more detectable one (males). Survival and movement differences detected in the two populations are discussed in the framework of local environmental and demographic factors." (Authors)] Address: Macagno, Anna, Dipartimento di Biologia Animale e dell'Uomo, Università degli Studi di Torino, Via Accademia Albertina 13, 10123 Torino, Italy. E-mail: anna.macagno@unito.it

7445. Malkov, N.P. (ed.) (2008): Krasnaya Kniga Respubliki Altai. Zhivotnye [Red Data Book of Altai Republic. Animals]. Gorno-Altaysk: 47-58. (in Russian) [O. E. Kosterin: *Sympetrum croceolum* Selys, 1883 (p. 47-50); *Anax parthenope* Selys, 1839 (p. 50-52); *Ischnura pumilio* Charpentier, 1825 (p. 52); *Nehalennia speciosa* Charpentier, 1840 (p. 53-56); A.Y. Haritonov, O.E. Kosterin: *Macromia amphi-gena fraenata* Martin, 1906 (p. 56-58). For more details see: <http://pisum.bionet.nsc.ru/kosterin/redbookaltai.htm>] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

7446. Marden, J.H. (2008): Chapter 19: Dragonfly flight performance: a model system for biomechanics, physiological genetics, and animal competitive behavior. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 249-261. (in English) ["Adult dragonflies are heavily dependent on their flight muscles and flight ability for nearly all of their adult activities. This chapter reviews research that presents dragonflies as model organisms for examining mechanisms that underlie variation in flight performance within and between species, molecular mechanisms by which muscle performance is adjusted within individuals, and how these physiological traits affect territorial and mating success. Results of these studies in dragonflies have provided fundamental new knowledge that informs the theoretical bases of a number of fields: biomechanics of animal locomotion, physiological genetics, and game theory approaches to animal contests. New insights that cross the boundaries of these disparate fields demonstrate the payoff for performing integrative research." (Author)] Address: Marden, J.H., Dept Biol., Pennsylvania St. University, 208 Mueller Laboratory, University Park, PA 16802, USA. E-mail: jhm10@psu.edu

7447. Martens, A.; Wildermuth, H. (2008): The biting midge *Forcipomyia paludis* as a parasite on dragonfly wings: a species not recorded from Britain for more than 70 years (Diptera: Ceratopogonidae). *J. Br. Dragonfly Society* 24(2) : 88-90. (in English) [*F. paludis*

"has only been recorded from British odonates in the first half of the last century. All known records are from the type locality, Wicken Fen, Cambridgeshire, the last in June 1936. It is suggested that a useful approach for gathering further information is to check odonate photographs. Special attention should be drawn to oval brownish spots on odonate wings." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

7448. Martens, A.; Suhling, F.; Weihrauch, F. (2008): In memoriam Philip S. Corbet (21. Mai 1929 - 13. Februar 2008). *Libellula* 27(3/4): 291-295. (in German, with English summary) ["Corbet was beyond doubt one of the most important odonatologists of the 20th and early 21st century. A brief obituary acknowledges his life's work, especially from the perspective of the Society of German-speaking Odonatologists (GdO). The strong ties between Philip Corbet and the GdO with its journal 'Libellula' are emphasized." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

7449. May, M.L.; Matthews, J.H. (2008): Chapter 6. Migration in Odonata: a case study of *Anax junius*. In: Alex Córdoba-Aguilar (Editor): *Dragonflies and damselflies: Model organisms for ecological and evolutionary research*. Oxford Scholarship Online Monographs: 63-79. (in English) ["Migration by Odonata may illuminate patterns and evolution of insect migration in general. As aquatic/aerial carnivores dragonflies differ from most migratory insects, and because they are large and diurnal, observational techniques are available that are impossible in most other insects. Geographic analysis of genetic structure and stable and radiogenic isotope composition and use of newly developed radio-tracking techniques has been applied to migration in the North American dragonfly, *Anax junius*. Southbound migrants move up to 2,800 km. Developmental phenology suggests early ('resident') and late ('migrant') cohorts at most sites, but these groups appear genetically identical, and the species is essentially panmictic in eastern North America. Apparently environmental cues and physiological responses to photoperiod and temperature engender migratory behaviour. Successful radio-tracking of individual *A. junius* has revealed alternating periods of migration and energy replenishment, and responses to wind and temperature similar to avian migration." (Authors)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

7450. McCauley, S.J.; Davis, C.J.; Relyea, R.A.; Yurewicz, K.L.; Skelly, D.K.; Werner, E.E. (2008): Metacommunity patterns in larval odonates. *Oecologia* 158: 329-342. (in English) ["The growth of metacommunity ecology as a subdiscipline has increased interest in how processes at different spatial scales structure communities. However, there is still a significant knowledge gap with respect to relating the action of niche- and dispersal-assembly mechanisms to observed species distributions across gradients. Surveys of the larval dragonfly community (Odonata: Anisoptera) in 57 lakes and ponds in southeast Michigan were used to evaluate hypotheses about the processes regulating community structure in this system. We considered the roles of both niche- and

dispersal-assembly processes in determining patterns of species richness and composition across a habitat gradient involving changes in the extent of habitat permeance, canopy cover, area, and top predator type. We compared observed richness patterns and species distributions in this system to patterns predicted by four general community models: species sorting related to adaptive trade-offs, a developmental constraints hypothesis, dispersal assembly, and a neutral community assemblage. Our results supported neither the developmental constraints nor the neutral-assemblage models. Observed patterns of richness and species distributions were consistent with patterns expected when adaptive tradeoffs and dispersal-assembly mechanisms affect community structure. Adaptive trade-offs appeared to be important in limiting the distributions of species which segregate across the habitat gradient. However, dispersal was important in shaping the distributions of species that utilize habitats with a broad range of hydroperiods and alternative top predator types. Our results also suggest that the relative importance of these mechanisms may change across this habitat gradient and that a metacommunity perspective which incorporates both niche- and dispersal-assembly processes is necessary to understand how communities are organized." (Authors)] Address: McCauley, S.J., Dept of Ecology & Evolutionary Biology, Univ. of Michigan, Ann Arbor, MI 48109-1048, USA. Email: mccaule@umich.edu

7451. McKay, T.; Herman, T. (2008): Thermoregulation in three species of damselflies, with notes on temporal distribution and microhabitat use (Zygoptera: Lestidae). *Odonatologica* 37(1): 29-39. (in English) ["Thermoregulation in *Lestes d. disjunctus*, *L. rectangularis*, and *L. dryas* was investigated at the Old Mill Pond, Pictou Landing, Nova Scotia, Canada between 30 July and 3 Sept. 1994. *L. dryas* was more dependent on ambient temperature than *L. disjunctus* and *L. rectangularis*. *L. disjunctus* and *L. dryas* had different temporal distributions and they varied in their microhabitat use. *L. disjunctus* was the first species to begin activity during the day (0900 to 1200 h), while *L. dryas* was only active during the afternoon (1200 to 1600 h). *L. disjunctus* perched in full sun in open areas with low grassy vegetation. *L. dryas* was found in shady regions where shrubs were dominant. It had slightly lower thoracic and abdominal temperatures than the other 2 species." (Authors)] Address: McKay, T., Dept of Biological Science, Arkansas State University, P.O. Box 599, State University, AR 72467, USA. E-mail: tmckay@astate.edu

7452. McNulty, S. (2008): Rare dragonfly found on HWF. The Spruce Moose, Adirondack Ecological Center, Fall 2008: 10. (in English) [In June 2006, a male *Gomphus quadricolor* was captured near the Military Pond/Rianu Meadow area of southern Huntington Wildlife Forest (HWF), New York, USA.] Address: McNulty, Stacy, Adirondack Ecological Center, 6312 State Route 28N, Newcomb, NY 12852, USA. E-mail: aechwf@esf.edu

7453. McPeck, M.A. (2008): Chapter 5. Ecological factors limiting the distributions and abundances of Odonata. In: Alex Cordoba-Aguilar (Editor): *Dragonflies and damselflies: Model organisms for ecological and evolutionary research*. Oxford Scholarship Online Monographs: 51-63. (in English) ["This chapter reviews the ecological processes that define and limit the distributions and abundances of many odonate species across eco-

logical environments. Distributions of species among standing bodies of water seem to be limited mainly by the distributions of their predators in the larval stage (e.g., larger dragonflies and fish). Although species also show restricted distributions among flowing water habitats, much less is known about the ecological processes that constrain their distributions. Many different types of species interactions (e.g., resource abundances, competitors, predators, parasites) contribute to the limitation of local abundances. Directions for potential future research are suggested." (Publisher)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

7454. McPeck, M.A.; Shen, L.; Torrey, J.Z.; Farid, H. (2008): The tempo and mode of 3-dimensional morphological evolution in male reproductive structures. *American Naturalist* 171(5): E158-E178. (in English) ["Various evolutionary forces may shape the evolution of traits that influence the mating decisions of males and females. Phenotypic traits that males and females use to judge the species identity of potential mates should evolve in a punctuated fashion, changing significantly at the time of speciation but changing little between speciation events. In contrast, traits experiencing sexual selection or sexually antagonistic interactions are generally expected to change continuously over time, because of the directional selection pressures imposed on one sex by the actions of the other. To test these hypotheses, we used spherical harmonic representations of the shapes of male mating structures in reconstructions of the evolutionary tempo of these structures across the history of the *Enallagma* damselfly clade. Our analyses show that the evolution of these structures is completely consistent with a punctuated model of evolutionary change, and a constant evolutionary rate throughout the clade's history. In addition, no interpopulation variation in shape was detected across the range of one species. These results indicate that male mating structures in this genus are used primarily for identifying the species of potential mates and experience little or no selection from intraspecific sexual selection or sexual antagonism. The implications of these results for speciation are discussed." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

7455. McPeck, M.A. (2008): The ecological dynamics of clade diversification and community assembly. *American Naturalist* 172: E270-E284. (in English) ["Clades diversify in an ecological context, but most macroevolutionary models do not directly encapsulate ecological mechanisms that influence speciation and extinction. A data set of 245 chordate, arthropod, mollusk, and magnoliophyte phylogenies had a majority of clades that showed rapid lineage accumulation early with a slowing more recently, whereas a small but significant minority showed accelerated lineage accumulation in their recent histories. Previous analyses have demonstrated that macroevolutionary birth-death models can replicate the pattern of slowing lineage accumulation only by a strong decrease in speciation rate with increasing species richness and extinction rate held extremely low or absent. In contrast, the metacommunity model presented here could generate the full range of patterns seen in the real phylogenies by simply manipulating the degree of ecological differentiation of new species at the

time of speciation. Specifically, the metacommunity model predicts that clades showing decelerating lineage accumulation rates are those that have diversified by ecological modes of speciation, whereas clades showing accelerating lineage accumulation rates are those that have diversified primarily by modes of speciation that generate little or no ecological diversification. A number of testable predictions that integrate data from molecular systematics, community ecology, and biogeography are also discussed." (Author) Many references to *Enallagma* sp. are made.] Address: McPeck, M., Department Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

7456. Meurgey, F. (2008): Description of the larva of *Protoneura ailsa* Donnelly (Zygoptera: Protoneuridae). *Odonatologica* 37(3): 279-282. (in English) ["The last instar larva is described and illustrated for the first time based on specimens from Martinique in the Lesser Antilles. Additional notes on its ecology and larval habitat are included." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

7457. Micevski, N.; Micevski, B.; Bedjanic, M. (2008): *Aeshna cyanea* and *A. juncea*, new for the fauna of Macedonia (Odonata: Aeshnidae). *Libellula* 27(3/4): 267-274. (in English, with German summary) ["At the elevated wetland Begovo Pole near the village of Gornojabolciste (Mt. Jakupica, central Macedonia, 1980 m a.s.l.), two adult males of *A. juncea* and an emerging male of *A. cyanea* were recorded on 13-VII-2008. Additionally, a dozen males of *A. cyanea* were recorded at lake Lokuv near the village of Trebiste (Mt. Desat, W Macedonia, 1560 m a.s.l.) on 07-VIII-2008. The occurrence of both species in the Balkans and south-eastern Europe is outlined and a short zoogeographical discussion is provided." (Authors)] Address: Micevski, Nikola, Bulevar ASNOM 58 - 2/4, MZ-Skopje 1000, Macedonia. E-mail: brankom@ukim.edu.mk

7458. Mill, P. (2008): Publications & Reviews: New Naturalist: Dragonflies by Philip Corbet & Stephen Brooks. The New Naturalist Library. 454 pp. Published by Collins, London, 2008. *Dragonfly news* 54: 32. (in English) [Extensive review.]

7459. Moore, N.W. (2008): The Norfolk Hawker *Aeshna isosceles* and Water Soldier *Stratiotes albidus*: a study of their relationship at Castle Marsh, Suffolk and elsewhere in the Broads 1991-2004. *J. Br. Dragonfly Society* 24(2) : 71-87. (in English) ["The relationship between *S. aloides* and *A. isosceles* was studied at the Suffolk Wildlife Trust Nature Reserve at Castle Marsh, 1991 to 2004. During that period *S. aloides* was affected by saline pollution of the northern part of the reserve and by changes in management. It decreased slightly and then increased considerably. The numbers of territorial male *A. isosceles* remained fairly similar throughout the period. *A. isosceles* was mainly, but not only, found on dykes with thick monocultures of *S. aloides*. The presence of territorial males on dykes with little or no *S. aloides* was possibly due to their being driven out of the better habitats by more successful individuals. The situation at Castle Marsh was found to be typical of most of the Broadland area. However, *A. isosceles* occurred in the upper Waveney valley and on the Hundred River where

the water courses had no *S. aloides* but which did have thick growths of other aquatic plants, notably Common Bladderwort *Utricularia vulgaris* and Frogbit *Hydrocharis morsus-ranae*. *A. isosceles* occurred at densities broadly similar to those in 5. *aloides* dykes, its preferred habitat. Interspecific aggression between *A. isosceles* and the males of six other species was studied. It mainly occurred with *A. grandis* and with *L. quadrimaculata*; although it occurred frequently it had no discernible effect on the distribution of the species concerned. Both *S. aloides* and *A. isosceles* are under the threat of extinction from rising sea levels caused by climate change. The natural recolonisation of the Fens, where both species are now extinct, is shown to be unlikely. Therefore an experimental study at Wicken Fen NNR — the most suitable fenland site - has been initiated. *S. aloides* has been reintroduced. If the reintroduction is successful, and if it is necessary, *A. isosceles* will also be reintroduced." (Author)] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, UK

7460. Müller, O. (2008): Larval habitats and life history of the Crete Island endemic *Boyeria cretensis* (Odonata: Aeshnidae). *International Journal of Odonatology* 11(2): 195-207. (in English) ["*Boyeria cretensis* belongs to the most threatened European dragonfly species. It is restricted to some isolated permanent streams on the island of Crete. The streams have a pronounced gallery vegetation and are situated in a narrow belt of altitude between 50 and 400 m. We understand very little about the biology of this species so information is required to develop effective conservation measures. The life cycle and spatial distribution of the larvae were studied at a small perennial stream in the central part of Crete during three consecutive years. The larvae showed a preference for calcareous sinter mineral substrate associated with organic material such as roots, leaves and wood. This microhabitat selection is supposed to be mainly an antidrift strategy, since *B. cretensis* lives in habitats with a dynamic hydrology during the rainy period in winter. On the other hand, it may also be a strategy to avoid predation from fish and crabs. The last seven larval stadia were determined by wing sheath length and head width. Based on data of head width frequency distributions, a univoltine or semivoltine life cycle is discussed." (Author)] Address: Müller, O., Birkenweg 6d, D-13206 Libbenichen, Germany. E-mail: olemueller@bioscience-art.de

7461. Müller, R.; Haybach, A.; Schönfelder, J. (2008): Erstnachweis von *Baetis nexis* Navás, 1918 (Ephemeroptera: Baetidae) für Brandenburg. *Lauterbornia* 62: 59-64. (in German, with English summary) [*Gomphus vulgatissimus* and *Orthetrum coerulescens* are reported from two localities in Brandenburg, Germany.] Address: Müller, R., Planungsbüro Hydrobiologie, Augustastr. 2, 12203 Berlin, Germany. E-Mail: hydrobiologie@t-online.de

7462. Muzón, J.; von Ellenrieder, N.; Pessacq, P.; Lozano, F.; Garré, A.; Lambruschini, J.; Ramos, L.; Weigel Muñoz, M.S. (2008): Odonata from Iberá Wetlands (Corrientes, Argentina): preliminary inventory and biodiversity. *Rev. Soc. Entomol. Argent.* 67(1-2): 59-67. (in English, with Spanish summary) ["A preliminary inventory of the Odonata from Iberá Wetlands and their area of influence (Corrientes, Argentina) is presented. Different kinds of environments were surveyed in seven lo-

calities. Seventy five species grouped in 33 genera and seven families were registered, from which three genera and 10 species are new records for the country. The localities belonging to the Iberá Wetland system show low endemism and a high faunistic relationship with the Paraná basin." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

7463. Nagy, B.H.; Szalassy, N.; Devai, G. (2008): Site fidelity, satellite tactics and mating success in *Libellula fulva* (Müller) (Anisoptera: Libellulidae). *Odonatologica* 37(3): 203-211. (in English) ["The site fidelity and satellite behaviour in relation to mating success were investigated in *L. fulva* males during 2 reproductive seasons (2002-2003) in eastern Hungary. There was no difference in mating success in males that were faithful to 1, 2 or 3 independent territories. Those that were site-faithful had a higher mating success than non site-faithful males. Site-faithful males showed satellite behaviour more frequently than non site-faithful ones. Males used both of the 2 tactics and this switching ability was independent of male body size. The better mate-rewarding tactic appears to show site fidelity and satellite behaviour alternatively." (Authors)] Address: Nagy, B.H., Department of Hydrobiology, University of Debrecen, Egyetem ter 1, HU-4032 Debrecen, Hungary. E-mail: nagy.beata@gmail.com

7464. Nel, A.; Garrouste, R.; Roques, P. (2008): A new griffenfly genus from the Late Carboniferous of northern France (Odonoptera: Meganeuridae). *Insect Systematics & Evolution* 39: 231-239. (in English) ["*Gallotopus oudardi*, new genus and species of Meganeuridae is described from the Late Carboniferous of Northern France. Potential phylogenetic implications of two wing venation structures present in meganeurids are discussed on the basis of this new fossil. The most basal antenodal brace Ax0 could be a potential synapomorphy of the Meganeuridae with the Odonatoclauda. The 'subnodus' could have been a structure related to larval tracheation in meganeurids, exapted as a part of the complex nodal structure in modern Odonata, related to the flight. Lastly the shortly petiolated wing of *Gallotopus* is analogous to similar wing shapes of several Mesozoic, Cenozoic, and modern nodalatan lineages." (Authors)] Address: Roques, P., allée des Myosotis, F-93330 Neuilly sur Marne, France. E-mail: patrick.roques93@wanadoo.fr

7465. Nel, A.; Huang, D.-y.; Lin, Q.-b. (2008): A new genus of isophlebioid damselfly-like dragonflies with "calopterygid"-like wing shape from the Middle Jurassic of China (Odonata: Isophlebioidea: Campteropterygidae). *Eur. J. Entomol.* 105(4): 783-787. (in English) ["*Zygotarawia reni*, a new campteropterygid genus and species is described from the Middle Jurassic of China. This fossil has a wing shape unique for this clade, i.e. a fore- and hind wing of the same width and very shortly petiolated, and hind wing cubito-anal area nearly as narrow as that of the forewing. This wing shape is convergently similar to that of recent Zygoptera: Calopterygidae, as well as to several other Cenozoic zygopteran clades, suggesting similar styles of flight and habits, i.e. predation on small insects and flight along trees of river banks.] Address: Nel, A., CNRS UMR 5202, CP 50, Entomologie, Muséum National d'Histoire Naturelle, 45 Rue Buffon, F-75005, Paris, France; e-mails: anel@mnhn.fr;

7466. Niven, J.E.; Graham, C.M.; Burrows, M. (2008): Diversity and evolution of the insect ventral nerve cord. *Annual Review of Entomology* 53: 253-271. (in English) ["Is the remarkable diversity in the behaviour of insects reflected in the organization of their nervous systems? The ventral nerve cords (VNCs) have been described from over 300 insect species covering all the major orders. Interpreting these data in the context of phylogenetic relationships reveals remarkable diversity. The presumed ancestral VNC structure is rarely observed; instead the VNCs of most insects show extensive modification and substantial convergence. Modifications include shifts in neuromere positions, their fusion to form composite ganglia, and, potentially, their separation to revert to individual ganglia. These changes appear to be facilitated by the developmental and functional modularity of the VNC, a neuromere for each body segment. The differences in VNC structure emphasize trade-offs between behavioural requirements and the costs incurred while maintaining the nervous system and signaling between its various parts. The diversity in structure also shows that nervous systems may undergo dramatic morphological changes during evolution." (Authors) The analysis includes *Petalura gigantea*, *Lesites tenuatus*, and *Anax junius*.] Address: Niven, J.E., Department of Zoology, University of Cambridge, Cambridge CB2 3EJ, UK. E-mail: nivenj@si.edu; jen22@cam.ac.uk

7467. Norma-Rashid, V.; Cheoug, L.F.; Lua, H.K.; Murphy, D.H. (2008): The Dragonflies (Odonata) of Singapore: Current status, records and collections of the Raffles Museum of Biodiversity Research. *Raffles Museum of Biodiversity Research, Department of Biological Sciences, 6 Science Drive 2. #03-01, Faculty of Science, National University of Singapore, Singapore 117546, Republic of Singapore: 1-20.* (in English) ["To date, few publications have been solely devoted to the Singapore odonate fauna. This publication attempts to fill this gap and encourage in-depth studies into this remarkable fauna. To date, including 11 new records presented here, 117 species of odonates are known from Singapore. An annotated checklist of the Odonata specimens held in the Raffles Museum of Biodiversity Research. National University of Singapore, is presented. Historical records from museum collections are also discussed." (Authors)] Address: Norma-Rashid, Y. Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: norma@zoology.um.edu.my

7468. Noronha, C.R.S.; Barbosa, J.F.; Quadros, A.M. (2008): Método de controle de Odonatas na piscicultura. *PUBVET, Londrina, V. 2, N. 45, Art#443: 6 pp.* (in Portuguese, with English summary) [The paper refers methods to eliminate dragonfly larvae from fish ponds in Brazil.] Address: Noronha, C.R.S., Professor do Centro Federal de Educação Tecnológica de Bambuí – CEFET-BAMBUÍ, Rodovia Bambuí/Medeiros, km 37, Zona Rural. CEP: 39.800.000. CAIXA POSTAL 05, Bambuí – Minas Gerais. Brasil

7469. Novelo-Gutierrez, N. (2008): Description of the last instar of *Argia barretti* Calvert (Zygoptera: Coenagrionidae). *Odonatologica* 37(4): 367-373. (in English) ["The larva of *A. barretti* is described for the first time and compared with those of *A. harknessi* from Mexico and *A. joergenseni* from Argentina. Based upon larval characters these 3 species appear closely related,

mainly by features such as: similar colour pattern of antennae, femora and caudal lamellae; mandibular formula; size of ligula; one palpal seta; shape of male and female gonapophyses, and the presence of claviform setae on abdominal sternite 8 and gonapophyses." (Authors)] Address: Novelo-Gutiérrez, R., Depto de Entom., Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

7470. Novelo-Gutiérrez, R. (2008): Description of the larva of *Paraphlebia zoe* Selys in Hagen, 1861 (Odonata: Megapodagrionidae). *Zootaxa* 1876: 29-34. (in English, with Spanish summary) ["The larva of *P. zoe* is described, this being the first for the genus *Paraphlebia*. It is compared to all other known neotropical megapodagrionid larvae from which it can be distinguished by following combination of characters: antenna shorter than length of head; second antennomere the longest; prementum slightly wider than long; male gonapophyses absent; gills strongly inflated with a thick caudal filament. The larva inhabits seepages." (Author)] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A.C. Depto Entomología, Apartado Postal 63, 91070 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

7471. Oertli, B. (2008): Chapter 7. The use of dragonflies in the assessment and monitoring of aquatic habitats. In: Alex Cordoba-Aguilar (Editor): *Dragonflies and damselflies: Model organisms for ecological and evolutionary research*. Oxford Scholarship Online Monographs: 79-97. (in English) ["Odonata constitute a valuable tool for various types of bioassessment and biomonitoring of aquatic habitats, such as the measure of biodiversity, the appraisal of waterbody health or integrity (including water quality and ecosystem function), the monitoring of management or restoration practices, and the detection and prediction of biological impacts of climate warming. Furthermore, they have already provided excellent data sets for hypothesis testing in ecology or evolution. An efficient sampling method for Odonata should account for the three live stages, i.e., larvae, exuviae, and adults. However, as this approach may be too expensive, most existing methods only focus on one stage. In applied issues, the adult stage is surveyed at a low cost, and is therefore useful for rapid assessments; it can serve for preliminary screening, for example when identifying local hotspots of diversity or, on the contrary, to mark degraded sites." (Publisher)] Address: Oertli, B., Dept of Nature Management, Univ. of Applied Sciences of Western Switzerland - EIL, 1254 Jussy, Geneva, Switzerland. E-mail: beat.oertli@hesge.ch

7472. Oertli, B.; Indermuehle, N.; Angélibert, S.; Hinden, H.; Stoll, A. (2008): Macroinvertebrate assemblages in 25 high alpine ponds of the Swiss National Park (Cirque of Macun) and relation to environmental variables. *Hydrobiologia* 597: 29-41. (in English) ["High-altitude freshwater ecosystems and their biocoenosis are ideal sentinel systems to detect global change. In particular, pond communities are likely to be highly responsive to climate warming. For this reason, the Swiss National Park has included ponds as part of a long-term monitoring programme of the high-alpine Macun cirque. This cirque covers 3.6 km², has a mean altitude of 2,660 m a.s.l., and includes a hydrographic system composed of a stream network and more than 35 temporary and permanent ponds. The first two steps in the

programme were to (i) make an inventory of the macroinvertebrates of the waterbodies in the Macun cirque, and (ii) relate the assemblages to local or regional environmental variables. Sampling was conducted in 25 ponds between 2002 and 2004. The number of taxa characterising the region (Macun cirque) was low, represented by 47 lentic taxa. None of them was endemic to the Alps, although several species were cold stenothermal. Average pond richness was low (11.3 taxa). Assemblages were dominated by Chironomidae (Diptera), and Coleoptera and Oligochaeta were also relatively well represented. Other groups, which are frequent in lowland ponds, had particularly poor species richness (Trichoptera, Heteroptera) or were absent (Gastropoda, Odonata, Ephemeroptera). Macroinvertebrate assemblages (composition, richness) were only weakly influenced by local environmental variables. The main structuring processes were those operating at regional level and, namely, the connectivity between ponds, i.e. the presence of a physical connection (tributary) and/or small geographical distance between ponds. The results suggest that during the long-term monitoring of the Macun ponds (started in 2005), two kinds of change will affect macroinvertebrate assemblages. The first change is related to the natural dynamics, with high local-scale turnover, involving the metapopulations characterising the Macun cirque. The second change is related to global warming, leading to higher local and regional richness through an increase in the number of colonisation events resulting from the upward shift of geographical ranges of species. At the same time the cold stenothermal species from Macun will be subject to extinction." (Authors)] Address: Oertli, B., Dept of Nature Management, University of Applied Sciences of Western Switzerland - EIL, 1254 Jussy, Geneva, Switzerland. E-mail: beat.oertli@hesge.ch

7473. Okajima, R. (2008): The controlling factors limiting maximum body size of insects. *Lethaia* 41(4): 423-430. (in English) ["The purpose of this study is to consider the controlling factors limiting maximum body size of insects. For this analysis, we set up and quantitatively verify the following working hypothesis: insect body sizes can be explained only by the historical changes in the oxygen supply. The present study focuses on the body size of the Protodonata and Odonata. The amount of oxygen needed and that of oxygen entering the insect body was calculated using allometric equations. The theoretical maximum sizes at each geologic time were estimated from palaeo-atmospheric oxygen partial pressure and compared with the maximum size of known fossilized insects. The historical change in fossilized insect sizes was much larger than that in theoretical sizes. Additionally, from the Jurassic, despite an increase in the partial pressure of oxygen, which would theoretically increase maximum size, the maximum size of fossilized insects became smaller. These findings are inconsistent with the expectations of the working hypothesis. Oxygen supply is likely to partially limit the maximum size of insects with additional factors." (Author)] Address: Okajima, Ryoko, Department of Ecology and Evolutionary Biology, Graduate School of Life Sciences, Tohoku University, Aoba-yama, Sendai 980-8578, Japan. E-mail: okajima@mail.tains.tohoku.ac.jp

7474. Ott, J. (2008): Die Kleine Pechlibelle – *Ischnura pumilio* (Charpentier, 1925) (Odonata: Coenagrionidae) in der Pfalz: ein Profiteur von Regenrückhaltebecken, Naturschutzgewässern und der Klimaänderung. Main-

zer naturwiss. Archiv 46: 233-261. (in German, with English summary) [*I. pumilio* "was not very common in Rhineland-Palatinate (Germany) during the last decades; in particular it was rare in the central part of the biosphere reserve "Palatinate Forest". Outside the Palatinate Forest *I. pumilio* was found more often, e.g. in the Rhine Valley (e.g. Rhinehesse, Bienwald), or along the Haardtrand at lower altitudes. Here it is mainly present in young and shallow waters, mostly in ponds created for nature conservation measurements (protection of amphibians). Another habitat it typically inhabits are water retention ponds near roads. Both types are maintained (road authorities, nature conservation organisations) and kept in early successional stages. In 2007 the species was found in several waters in the Palatinate Forest for the first time, also with indigenous populations. The species was profiting of lower water tables – a consequence of climatic changes in the area. To arrive at these waters the species must have crossed at least several kilometres of dense forest which is a remarkable fact. The possible ways of the colonisation are discussed in relation to its larval development and voltinism. The larvae of this species, being obviously a generalist, can live in a wide range of abiotic conditions: some of these waters had a pH of only 3.3 and the conductivity varied between 13 and 9109 µS/cm. Larvae were found to survive a period of about 3 weeks in a dried out pond. Finally, aspects of nature conservation and the classification of *I. pumilio* in Red Lists are discussed." (Author)] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

7475. Ott, J. (2008): Wandler zwischen den Welten. Rote Liste der Libellen entsteht in Worms. Worms 2009. Heimatjahrbuch für die Stadt Worms 4: 224-226. (in German) [General account on dragonflies in a popular local yearbook with special emphasis on the German Red list on Odonata and a meeting of the German Red list experts in Oktober 2007 in the rooms of the "Rheingütestation" situated in Worms, Rheinland-Pfalz, Germany.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

7476. Parr, A.; Smallshire, D. (2008): Identification of the UK species of emerald damselflies *Lestes* spp.. *Atropos* 34: 3-9. (in English) [Morphological identification characters of imagos and larvae of *Lestes barbarus*, *L. dryas*, *L. sponsa*, and *Chalcolestes viridis* are depicted and discussed.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

7477. Parr, A. (2008): Dragonfly news for spring and early summer 2008. *Atropos* 35: 54-55. (in English) [Verbatim: The first half of 2008 saw many insect groups well down in numbers, no doubt reflecting in part the poor summer the year before. While dragonflies were perhaps less affected than many groups, the early 2008 season still turned out to be relatively uneventful, though fortunately with a few highlights. A period of warm weather in the first half of May, associated with a lengthy spell of easterlies, probably came too early in the season to be highly productive. As the weather turned later in the month, some spectacular counts of *Libellula quadrimaculata* at Dungeness in Kent (where there were morning roosts of 650 on 17 May and 700 on 22 May) were thought to result from mass emergences. The very end of May through to 1 July saw a scattering of reports of *Sympetrum fonscolombii* from

south coast sites (Cornwall, Devon, Hampshire, Sussex and Kent), as well as singletons at the traditional sites of Spurn, East Yorkshire, and Middleton, Lancashire. There was also one record from Co. Wexford, Ireland. These various sightings probably relate largely, though perhaps not entirely, to local breeding since many individuals were immatures, and an exuvia was found at Rye Harbour in Sussex on 30 June. Given the very low numbers seen at most sites the fate of many of these breeding colonies remains unclear, though it is possible that some additional individuals went unrecorded given the largely indifferent weather. In addition to Red-veined Darter there was also one record of *S. flaveolum* during the spring—from Carvey Wick, Essex, on 25 June. Probably the major highlight of May /June was the continuing good fortunes of *Libellula fulva*. Numbers at many established sites, including some areas only recently colonised, were high. Large numbers were, for example, seen at sites along the Great Ouse between St Ives, Cambridgeshire, and Roxton, Bedfordshire, on 18 May, with 'hundreds' together near Brampton, Cambridgeshire. After an apparent absence of a decade or more, good numbers were also seen in the Sandwich Bay area of Kent. More dramatically still there were several reports from entirely new areas, including the Isle of Wight, the Somerset Levels, and even sites in the Attingham area of Shropshire. These latter sightings represent the most north-westerly in Britain. It is hoped to provide a more detailed analysis of the on-going range expansion of Scarce Chaser in a future issue. July was rather quiet, despite a hot spell and generally southeasterly winds during the last third of the month. A total of three records of *Anax parthenope* seemed unexpectedly low given recent trends, but one (a male on 24 July) was at least from the probable breeding site of Maxey Gravel Pits, Cambridgeshire, where oviposition was seen in 2007. The other records came from Sandwich, Kent (12 July), and near Havenstreet, Isle of Wight (28 July). No reports have as yet been received from likely breeding sites besides Maxey but the implications of this are still unclear, not least because there is some potential flexibility in the length of the lifecycle in Britain. The month ended with small numbers of Red-veined Darter at Keyhaven, Hampshire, on 30 July." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

7478. Parr, A.J. (2008): Migrant and dispersive dragonflies in Britain during 2007. *J. Br. Dragonfly Society* 24(2) : 62-70. (in English) ["The 2007 dragonfly season was one of contrast. April 2007 was the warmest April on record, but although resident species started flying unusually early, little of note was reported on the migrant front. Mid-summer was often wet to very wet, with temperatures somewhat lower than in many recent summers. Some short spells of hot settled weather were however observed, and these were often associated with migratory influxes and/or enhanced internal dispersal. Although there was no repetition of the dramatic migrations of 2006, the year was thus far from uneventful. *Sympetrum fonscolombii* once again occurred in good numbers, and *Anax parthenope* also maintained a strong presence. Several unusual 'one-off' sightings were similarly made — notably a Norfolk Hawker *Aeshna isosceles* reported from Hampshire and a female *Lestes viridis* reported from Suffolk. This latter record is only the third report of the species from Britain in the last hundred years." (Author)] Address: Parr, A.J., 10

Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

7479. Paunovic, M.M.; Slavica, S.; Borkovic, S.Z.; Pavlovic, Z.S.; Saicic, Z.S.; Cakic, P.D. (2008): Results of the 2006 Sava project - Aquatic macroinvertebrates. Arch. Biol. Sci., Belgrade 60(2): 265-271. (in English, with Serbian summary) [The paper presents results of the 2006 Sava survey. The investigation was carried out at four locations along 188 km of the Serbian stretch of the Sava River. Sixty-two taxa were identified including *Gomphus vulgatissimus* and *Platycnemis pennipes*. Molluscs and oligochaetes were the most diverse groups of macroinvertebrates. The results support the hypothesis that the Sava River is an important bio-invasion trajectory, a part of the Southern Invasive Corridor of Europe. Five alien macroinvertebrate taxa were identified, some of which (*Corbicula fluminea*, *Branchyura sowerbyi*, and *Anodonta woodiana*) were found to be important components of the macroinvertebrate community.] Address: Paunovic, M.M., Siniša Stankovića Institute for Biological Research, University of Belgrade, 11060 Belgrade, Serbia

7480. Peretti, D.; Andrian, I.F. (2008): Feeding and morphological analysis of the digestive tract of four species of fish (*Astyanax altiparanae*, *Parauchenipterus galeatus*, *Serrasalmus marginatus* and *Hoplias aff. malabaricus*) from the upper Paraná River floodplain, Brazil. Braz. J. Biol. 68(3): 671-679. (in English, with Spanish summary) [Odonata contributed to the diet of the insectivorous fish *Parauchenipterus galeatus*.] Address: Peretti, D.D, Depto de Ciências Biológicas, Programa de Pós-Graduação em Ecologia de Ambientes Aquáticos Continentais, Universidade Estadual de Maringá – UEM, Av. Colombo, 5790, Campus Universitário, Bloco G90, CEP 87020-900, Maringá, Paraná, Brazil. E-mail: perettidani@gmail.com

7481. Pessacq, P. (2008): Phylogeny of Neotropical Protoneuridae (Odonata: Zygoptera) and a preliminary study of their relationship with related families. Systematic Entomology 33: 511-528. (in English) ["A cladistic analysis of Neotropical Protoneuridae was performed on a data matrix of 48 morphological characters and 43 terminal taxa. Representatives of Paleotropical Protoneuridae, Platycnemididae and Isostictidae were included to test their relationships with Neotropical Protoneuridae. Coenagrionidae was chosen as the outgroup, but alternative analyses with Platycnemididae as the outgroup were also performed. Protoneuridae appears as a polyphyletic clade, with its Paleotropical component being more closely related to Platycnemididae and Isostictidae. Neotropical Protoneuridae appear as a monophyletic clade; included genera considered monophyletic or valid monotypic taxa are *Epipleoneura* Williamson, 1915; *Idioneura* Selys, 1860; *Junix* Rácenis, 1968; *Neoneura* Selys, 1860; *Peristicta* Hagen in Selys, 1860; *Roppaneura* Santos, 1966; and *Lamproneura* De Marmels, 2003. A key to the Neotropical Protoneuridae genera is included." (Author)] Address: Pessacq, P., CONICET, Laboratorio de Investigaciones en Ecología y Sistemática Anima, Universidad Nacional de la Patagonia San Juan Bosco, Esquel, Chubut, Argentina. E-mail: pablopessacq@yahoo.com.ar

7482. Petrulevicius, J.F.; Wappler, T.; Wedmann, S.; Rust, J.S.; Nel, A. (2008): New megapodagrionid damselflies (Odonata: Zygoptera) from the Paleogene of

Europe. Journal of Paleontology 82(6): 1173-1181. (in English) ["Three fossil taxa of megapodagrionid damselflies are described and figured from the Paleogene localities in Europe on the basis of isolated wings. *Eckfeldia superstes* (Wappler, 2003) gen. nov. is described from the laminated mudstones of middle Eocene age from Eckfeld Maar, Germany. *Furagrion jutlandicus* (Henriksen, 1922) gen. nov. is recorded from the laminated claystones of lowermost Eocene age from the Ølst and Fur-Formation, Denmark, and an undetermined megapodagrionid damselfly is recognized from middle Eocene strata. Taphonomy and color preservation in the fossils are briefly considered. Characters used for phylogenetic analyses in extant and fossil Megapodagrionidae are discussed. The biogeographic and paleoecological implications of the new European fossils are briefly discussed." (Authors)] Address: Petrulevicius, J.F., Departamento Científico Paleozoología Invertebrados, Museo de La Plata, Paseo del Bosque, s/n. 1900 La Plata, and CONICET, Argentina. E-mail: levicius@museo.fcnym.unlp.edu.ar

7483. Pott, C.; Labandeira, C.C.; Krings, M.; Kerp, H. (2008): Fossil insect eggs and ovipositional damage on bennettitalean leaf cuticles from the Carnian (Upper Triassic) of Austria. Jour. Paleontol. 82(4): 778-789. (in English) ["Two types of evidence for insect ovipositional activity (i.e., actual egg chorions and ovipositional damage) occur on Nilssoniopteris (bennettitalean foliage) leaf cuticles from the Carnian of Austria and provide a rare direct insight into insect egg morphology and oviposition in the Late Triassic. The egg chorions have exclusively been found on *N. haidingeri* leaves, where they are attached to the outer surface of the abaxial cuticle; one specimen suggests that the eggs were arranged in circles. It is impossible at present to determine the affinities of the eggs; possible producers may be beetles, dragonflies, sawflies, or other allied basal Hymenoptera. Ovipositional damage occurs on *N. angustiarum* leaves in the form of lenticular egg impressions surrounded by a narrow, elevated margin. The impressions are visible on the ad- and abaxial cuticle, and coincide when both cuticles are superimposed, which indicates that the eggs producing these impressions were injected into the interior of the leaf. Producers of eggs that may have caused these damages are perhaps dragonflies or damselflies. The restricted occurrence of the two types of ovipositional activity suggests that some kind of host specificity existed, perhaps related to specific preferences in larval diet." (Authors)] Address: Pott, C., Forschungsstelle für Paläobotanik am Geologisch-Paläontologischen Institut, Westfälische Wilhelms-Universität Münster, Hindenburgplatz 57, D-48143 Münster, Germany. E-mail: christian.pott@uni-muenster.de

7484. Prentice, S. (2008): Dragonfly conservation from the BDS. Dragonflies in focus: A new national dragonfly atlas. Atropos 34: 65-66. (in English) [A new project for the Atlas of Odonata distribution in Britain, Ireland, and the Channel Islands is introduced. Work should be done between 2008 and 2012.] Address: Prentice, S., c/o Natural England (West Midlands), Attingham Park, Shrewsbury, SY4 4TW. E-mail: stephan.prentice@naturalengland.org.uk

7485. Principe, R.E. (2008): Taxonomic and size structures of aquatic macroinvertebrate assemblages in different habitats of tropical streams, Costa Rica. Zoological Studies 47(5): 525-534. (in English) ["Taxonomic

and size structures of macroinvertebrate assemblages associated with different habitats of tropical streams of Costa Rica were analyzed. Surber samples were taken in riffle and run habitats in 2 streams. Invertebrates were identified and measured, and the biomass was estimated. The taxonomic richness and total abundance were higher in riffle habitats. Correspondence analysis showed a clear separation between riffle and run samples. The IndVal method identified the characteristic assemblages in each habitat type. Tricladida, Hydrachnidia, Leptophlebiidae, Hydropsychidae, Simulium sp., Corynoneurini, Orthoclaudiinae, and Empididae showed significant indicator values for riffle habitats; whereas Bivalvia, Tanyptodinae, and Chironomini were the characteristic taxa from runs. The length-frequency distribution of riffles differed from that in runs in both streams as measured by Kolmogorov-Smirnov tests. The largest organisms were found in run habitats, with macroinvertebrates belonging to the 1st size class being the most abundant in riffles. Although larger organisms were found in runs, differences in total biomass between habitats were not observed due to the high number of small invertebrates collected in riffles. The size spectrum for the entire benthic community showed that the total biomass was relatively equitably distributed among the size classes, although a peak was suggested for medium size classes. When the size spectrum was separately analyzed in each habitat, a peak was also suggested in riffles. Differences in the physical attributes of riffles and runs were clearly reflected in the taxonomic composition of the size spectra. Patterns observed in taxonomic and size structures may indicate different ecological functioning at the habitat level in the tropical streams studied." (Author)] Address: Principe, Romina E., La Selva Biological Station, Organization for Tropical Studies, Puerto Viejo de Sarapiquí, Heredia, 41001, Costa Rica. E-mail: rprincipe@exa.unrc.edu.ar

7486. Pritchard, G. (2008): The life history of a temperate zone dragonfly living at the edge of its range with comments on the colonization of high latitudes by Neotropical genera of Zygoptera (Odonata). *International Journal of Odonatology* 11(2): 209-223. (in English) ["Of the many Zygopteran genera that occur in the Neotropics, only five (Hetaerina, Archilestes, Lestes, Argia, and Ischnura) are represented north of 40°N in North America, and only three of these (Hetaerina, Archilestes, and Argia) probably had a tropical origin. In the two genera of Lestidae (Archilestes and Lestes) the life history of temperate-zone populations is usually regulated by an egg diapause, whereas in the two genera of Coenagrionidae (Argia and Ischnura) larval diapause synchronizes life histories with seasonal temperature changes. This paper presents data on the life history of a northern population of a species in the first genus, Hetaerina americana living in a geothermally influenced stream near to the northern edge of the species' range in western North America. Larval growth is affected by temperature and differs between warmer and cooler years, but generally larvae appear to grow very rapidly during summer and even grow over winter. Two peaks of larval recruitment each year and a decrease in final stadium size over the summer may be evidence for bivoltinism, and the absence of final stadium larvae in October, November, and December indicates a short-day regulatory diapause in F-1 larvae. A long-day diapause which prevents autumnal metamorphosis of larvae appears not to be present. It is not known whether the tactics that allow New World species of Zygoptera to survi-

ve at mid- to high-temperate latitudes are also present in their tropical congeneric relatives, but it does appear that diapause expression has been associated with speciation in the temperate zone." (Author)] Address: Pritchard, G., Department of Biological Sciences, University of Calgary, Calgary, Alberta, Canada T3A 1K9. E-mail: gpritcha@ucalgary.ca

7487. Radwell, A.J.; Brown, A.V. (2008): Benthic meiofauna assemblage structure of headwater streams: density and distribution of taxa relative to substrate size. *Aquatic Ecology* 42: 405-414. (in English) ["Permanent meiofauna taxa and portions of the population of other invertebrates that are temporarily in the meiofauna size class are often precluded from stream studies and assessments. This study was designed to determine the identity, density, and distribution of major meiofauna taxa relative to substrate size in a set of similar headwater streams. Using a coring technique, meiofauna (80 mm–1 mm) and substrate samples were collected from 11 Ozark headwater streams in the Boston Mountain ecoregion of Arkansas, USA. Mean meiofauna density among streams was 1739 ± 436 organisms per l. Permanent meiofauna taxa (Copepoda, Cladocera, Ostracoda, Rotifera, Nematoda, Hydrachnida, and Tardigrada) comprised 22.5% of the organisms collected with a mean density of 394 ± 233 organisms per l; temporary meiofauna taxa (Oligochaeta, Turbellaria, Hydroidea, Chironomidae, Ephemeroptera, and other insects - including Odonata) comprised the remainder with a density of 1346 ± 308 organisms per l. [...] The potential value of inclusion of meiofauna in stream environmental assessments is discussed." (Authors)] Address: Radwell, Andrea, Department of Biological Sciences, University of Arkansas, Sci-Eng Room 601, Fayetteville, AR 72701, USA. E-mail: aradwell@uark.edu

7488. Raihani, G.; Serrano-Meneses, M.A.; Córdoba-Aguilar, A. (2008): Male mating tactics in the American rubyspot damselfly: territoriality, nonterritoriality and switching behaviour. *Animal Behaviour* 75(6): 1851-1860. (in English) ["Odonates exhibit a wide range of territorial and nonterritorial mating tactics and are ideal for investigating alternative reproductive behaviours. We studied male mating tactics in the American rubyspot damselfly, Hetaerina americana, a species that exhibits red wing spots that have been suggested to have evolved as a consequence of male–male contests. In this species mating success is enhanced by the ability of males to defend territories along streams and rivers, which depends on the amount of thoracic fat reserves available. Previous studies on this species have distinguished between territorial and nonterritorial males, in which the former obtain significantly more matings than the latter. In our study, however, we found a third reproductive tactic: switching. Switcher males exhibit both territorial and nonterritorial tactics and a mating success similar to that of territorial and nonterritorial males, although this result may be confounded by the small sample size used for this analysis. We suggest that the different mating tactics may be condition determined: territorial males contained the highest fat reserves, nonterritorial males had the least fat content and switchers had intermediate fat loads. We also show that there were no age differences between males using these tactics. Our results suggest that territorial behaviour is extremely plastic in this species. Finally, we discuss the implications of our study and directions for future work on territorial and nonterritorial reproductive tactics in odona-

tes." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

7489. Rebora, M.; Piersantia, S.; Gaino, E. (2008): The antennal sensilla of the adult of *Libellula depressa* (Odonata: Libellulidae). *Arthropod Structure & Development* 37(6): 504-510. (in English) ["An ultrastructural investigation (SEM, TEM) on the antennal flagellum of the adult of the dragonfly *Libellula depressa* (Odonata: Libellulidae) revealed sensilla located in pits on the lateral-ventral side of the antenna. These sensilla are represented by sensilla coeloconica and by deeply sunken sensilla. The sensilla coeloconica are innervated by three unbranched dendrites, which enter the peg and show a dendrite sheath ending at the base of the peg. The peg has no socket and its cuticle is irregular with wide pore-like structures at the base of which actual pores are visible. The structure of these coeloconic sensilla is in agreement with that reported for single-walled insect chemoreceptors. The deeply sunken sensilla are represented by two kinds of sensilla styloconica, named type-1 and type-2, located at the bottom of deep cavities appearing as simple openings on the antennal surface. These sensilla are no-pore sensilla with inflexible socket and unbranched dendrites and, notwithstanding their structural differences, share common features typical of thermo/hygroreceptors. The presence of chemoreceptors in adult dragonflies sheds light on evolutionary trends in insect perception; the previously unknown occurrence of thermo/hygroreceptors in dragonflies is very important in view of the reported ability of Odonata to thermoregulate heliothermally." (Authors)] Address: Rebora, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebora@unipg.it

7490. Reece, B.A.; McIntyre, N.E. (2008): Dragonfly (Odonata: Anisoptera) holdings of the Museum of Texas Tech University. *Occasional Papers, Museum of Texas Tech University* 279: 1-13. (in English) ["Specimens of dragonflies held in the Museum of Texas Tech University were reviewed. Prior to our work, this collection had only been partially sorted and not cataloged. Most specimens are from the state of Texas, with fewer individuals having been collected from other states and countries. The holdings for Texas include some undersampled areas. A total of 54 new county records were uncovered for the state of Texas." (Authors) The collection also includes same species from the Philippines, and undetermined specimens.] Address: Reece, B.A., Museum of Texas Tech. University, Lubbock, TX 79409-3191, USA

7491. Reinhardt, K. (2008): *Besprechungen: Gilbert, P.: A source book for biographical literature on Entomologists.* - Leiden: Backhuys Publishers, 200, VII, 694 p. - ISBN 978-90-5782-186-8. *Beiträge zur Entomologie* 58(1): 179, 190. (in English) [Book review, containing critical remarks on abundant incorrect information and spelling of odonatologists.] Address: Reinhardt, K., Dept Animal & Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

7492. Reinhardt, K. (2008): Zur Libellenfauna nordost-deutscher Flüsse (Odonata). *Entomologische Nachrichten und Berichte* 52(2): 109-114. (in German, with Eng-

lish summary) ["On the dragonfly fauna of rivers in northeastern Germany. Three rivers in northeastern Germany (Tollense, Peene, Uecker) were investigated during a seven-day kajak trip. Twelve species were found at 5 to 7 of the seven river-days and so considered typical for this area. These include the significant records of *Anax imperator*, *A. parthenope*, *Aeshna isosceles*, *Gomphus vulgatissimus* and *Libellula fulva* for which previous records are rare in northeastern Germany. Noteworthy are also the records of *Crocothemis erythraea*, a possible new arrival to that area and the near-absence of the usually abundant species *L. quadrimaculata*. Other observations include a detailed protocol of the copulatory behaviour of *A. isosceles*, the emergence of *Calopteryx splendens* of 6 m away from the banks as well as the finding of eggs, presumably from snails, attached to an exuvia of *G. vulgatissimus*. It is also concluded that kajaking might be an important means to study the dragonfly of rivers because some species may be detected that are hard to observe from the river banks." (Author)] Address: Reinhardt, K., Dept Animal & Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

7493. Remsburg, A.J.; Olson, A.C.; Samways, M.J. (2008): Shade alone reduces adult dragonfly (Odonata: Libellulidae) abundance. *Journal of Insect Behavior* 21(6): 460-468. (in English) ["We demonstrate that physical habitat conditions influence adult dragonfly (Odonata: Anisoptera) riparian site selection. In naturally treeless riparian areas of South Africa, invasive trees create shade and reduce native vegetation. We hypothesized that most breeding odonates select riparian areas (1) without shade, and (2) with high density and variety of understory perch structures. In two experiments at reservoir shorelines, we varied shade and perch structures. Dragonfly abundances (predominantly *Trithemis* species) were lower at sites with high (75%) or moderate (55%) shade cover than at sites with no shade, and lower at bare sand sites than sites containing stick perches. Perch density and variety (variety of heights and diameters) did not affect dragonfly abundance. These results indicate that shade alone directly reduces dragonfly habitat selection, isolating one aspect of habitat change that can alter insect behaviours." (Authors)] Address: Remsburg, Alysa, Dept of Zoology, University of Wisconsin, 430 Lincoln Dr., Madison, WI 53706, USA. E-mail: aremsburg@unity.edu

7494. Ren, D., Nel, A. & Prokop, J. (2008): New early griffenfly, *Sinomeganeura huangheensis* from the Late Carboniferous of northern China (Meganisoptera: Meganeuridae). *Insect Systematics & Evolution* 39: 223-229. (in English) ["New griffenfly *Sinomeganeura huangheensis* gen. n., sp. n. (Meganeuridae) is described from Upper Carboniferous (Namurian) of the Tupo Formation in northern China (Ningxia Hui Autonomous Region). This taxon exhibits unique structure of the wing venation pattern. It is highly interesting in reference to the Namurian age known for the occurrence of two meganeurids until present (*Namurotypus Brauckmann & Zessin, 1989* and *Shenzhousia Zhang & Hong, 2006*) as well as the palaeogeographical position of the locality far from all sites in Laurussia. We demonstrate that meganeurids with relatively small wings already co-existed with large species in the Namurian, as for the Stephanian and the Late Permian. Thus, *Sinomeganeura* demonstrates that the meganeurid diversity and wing venation disparity were comparable during the Na-

murian and the Stephanian, suggesting that this group already had a long history in the Early Carboniferous. Odonoptera were probably the main, if not unique predators of the flying insects during the Late Paleozoic." (Authors)] Address: Ren, D., College of Life Sciences, Capital Normal University, 105 Xisanhuanbeilu, Haidian District, Beijing 100037, P. R. China. E-mail: rendong@mail.cnu.edu.cn

7495. Resende, D.C.; De Marco, P. (2008): Residence and territorial characteristics of Libellulidae species in a neotropical assemblage (Anisoptera). *Odonatologica* 37(3): 213-220. (in English) ["During territorial behaviour, aggressive attacks among heterospecific odonate males are common and may cause a separation of niches, based on the preferred sites for territorial defence. Here, territorial behaviour and the characteristics of territories in males of *Erythrodiplax media*, *Micrathyrina catenata* and *M. hesperis* are described and their territorial fidelity, capturing and marking of males are discussed. In all species studied, there was a clear distinction among the microhabitats defended as territories. In both *Micrathyrina* species, males seem to defend territories with defined resources. In *E. media*, the defended resources are less evident. Its males are highly aggressive and show high territorial fidelity but, apparently, they lose the territory if they stay away from water for at least one day.] Address: De Marco, P., Laboratório Ecologia Teórica e Síntese, Depto de Biologia Geral, Universidade Federal de Goiás, BR-74001-970, Goiania, GO, Brazil. E-mail: pdemarco@icb.ufg.br

7496. Reynolds, A.; Gladwin, T.; Shepperson, C. (2008): Dragonflies and Damselflies of Hertfordshire. ISBN 978-0-9521685-6-0. 142 pp. (in English) [Sections on all 19 breeding species including: description and colour photo, distribution maps covering all 458 tetrads in Herts, flight charts specific to Herts both based on 14,600 records between 2000 and 2006.] Address: Hertfordshire Natural History Society, HNHS, 24 Mandeville Rise, Welwyn Garden City, AL8 7JU, UK. E-mail: herts.naturalhistorysociety@ntlworld.com

7497. Rudolf, V.H.W.; Armstrong, J. (2008): Emergent impacts of cannibalism and size refuges in prey on intraguild predation systems. *Oecologia* 157 : 675-686. (in English) ["Many organisms undergo ontogenetic niche shifts due to considerable changes in size during their development. These ontogenetic shifts can alter the trophic position of individuals, the type and strength of ecological interactions across species, and allow for cannibalism within species. In this study we ask if and how the interaction of a size refuge and cannibalism in the prey alters the dynamics of intraguild predation (IGP) systems. By manipulating the composition of large cannibalistic (*Aeshna umbrosa*) and predatory (*Anax junius*) dragonfly larvae in mesocosms we show that the interaction of cannibals and predators was non-linear and increased the survival of prey. The structure of the final resource community shared by prey and predator differed between small and large dragonfly treatments but not within size classes across species. In general, the small prey stage showed similar shifts in microhabitat use and refuge use when exposed to either conspecific cannibals or predators, while large cannibals showed no clear anti-predator response. However, further behavioral experiments revealed that specific behavioral components, such as distances between individuals or number of movements, differed when individuals

were exposed to either cannibals or predators. This indicates that individuals discriminated between conspecific or heterospecific predators. Furthermore, in similar experiments large cannibals and predators showed different behaviors when exposed to conspecifics rather than to each other. These changes in behavior are consistent with the observed increase in prey survival. In general, the results indicate that cannibalism and ontogenetic niche shifts can result in behavior-mediated indirect interactions that reduce the impact of the predator on the mortality of its prey and alter the interactions of IGP systems. However, they also indicate that size is not the sole determinant and that we also need to account for the species identity when predicting the dynamics of communities." (Authors)] Address: Rudolf, V., Mountain Lake Biological Station, Pembroke, VA, USA. E-mail: volker.rudolf@rice.edu

7498. Rudolf, V.H.W. (2008): The impact of cannibalism in the prey on predator-prey system. *Ecology* 89: 3116-3127. (in English) ["Cannibalism is ubiquitous in natural communities and has the potential to alter the functional relationship of predator-prey interactions. Although cannibalistic species are frequently subject to predation, the consequences of cannibalism in the prey for predator-prey interactions are poorly understood. Using a dragonfly larvae system, I provide the first experimental evidence that cannibalism in the prey creates behaviour- and density-mediated indirect effects that result in nonlinear predator-prey interactions. As a consequence, cannibalism in the prey altered the functional relationship of the predator and its prey and reduced the impact of the predator on prey mortality by 47%. By parameterizing a mechanistic predation model, I show that the nonlethal interaction between cannibals and predators reduced cannibalism rates, which explained almost two times more of the observed mortality reduction than the consumption of cannibals. However, only a model that accounted for both behavioural interactions and the consumption of cannibals could predict 100% of the observed mortality. Using the mechanistic model, I discuss the long-term effects of cannibalism on community dynamics and how they can differ from effects of simple density-dependent mortality. In general, these results demonstrate the importance of accounting for the trophic structure in cannibalistic populations and the resulting nonlinear interactions to predict predator-prey dynamics." (Author)] Address: Rudolf, V., Dept of Ecology and Evolutionary Biology, Rice University, Houston, Texas 77005 USA. E-mail: volker.rudolf@rice.edu

7499. Rust, J.; Petrulevicius, J.F.; Nel, A. (2008): The first damselflies from the lowermost eocene of Denmark, with a description of a new subfamily (Odonata, Zygoptera, Dysagrionidae). *Palaeontology* 51(3): 709-713. (in English) ["*Eodysagrion mikkelsenii* gen. et sp. nov., type species of the new subfamily Eodysagrioninae, and the dysagrionine *Primorilestes madseni* sp. nov., the first thaumatoneurid damselflies from the lowermost Eocene of Denmark, are described. They confirm the presence of this American family in the Palaeogene of Western Europe." (Authors)] Address: Rust, J., Inst. of Palaeontology, University of Bonn, Nussallee 8, 53115 Bonn, Germany. E-mail: jrust@uni-bonn.de

7500. Sahlén, G.; Haase, S.; Suhling, F. (2008): Morphology of dragonfly larvae along a habitat gradient: interactions with feeding behaviour and growth (Odonata: Libellulidae). *International Journal of Odonatology* 11

(2): 225-240. (in English) ["It has been shown that life history, behavioural as well as morphological traits vary with the habitats occupied by odonate larvae. Here we ask the following questions: (1) Are the morphological traits, which are associated with perception and foraging, related to the larval habitat? (2) Do these traits influence foraging success and growth rate? We analysed the morphology of species pairs belonging to the genera *Crocothemis*, *Orthetrum* and *Trithemis*; one species in each pair occurring in perennial spring-fed streams, the other able to develop in temporary waters. A PCA reveals four principal components of morphological characters which may be expressed as PC1: prey handling, PC2: visual perception, and PC3 and PC4: density of long and short setae on the feet. The variances of PC1, PC2 and PC3 were affected by phylogeny. PC1, PC2 and PC4 differed between habitats. Species of perennial springs had larger values for visual perception. These waters are clear and larger eyes should be beneficial. But, a high PC2 value was associated with low growth rate and did not affect foraging success. We therefore conclude that investment in better sight made by perennial water species may reflect the need of avoiding predators. Development in temporary waters mainly requires rapid growth and species may not be capable to invest also in visual perception. PC1 was negatively correlated with foraging behaviour and PC3 was positively so. This indicates the importance of prey capture mode to foraging success, which may, however, not translate into a higher growth rate." (Authors)] Address: Sahlén, G., Syst. Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@set.hh.se

7501. Salvini-Plawen, L.; Svojtka, M. (2008): *Fische, Petrefakten und Gedichte: Rudolph Kner (1810 - 1869)*. Denisia 24. 132 pp. (in German, with English summary) [The exhaustive biography of the Austrian R. Kner, first appointed professor in zoology in Austria, also presents pictures of his collection of fossils including *Mesuropetalia koehleri* (Hagen, 1848) from Solnhofen, Bavaria, Germany.] Address: Svojtka, M., Universität Wien, Institut für Paläontologie, Althansstr. 14, 1090 Wien, Austria. E-mail: a9701546@unet.univie.ac.at

7502. Samways, M.J.; Grant, P.B.C. (2008): Elephant impact on dragonflies. *Journal of Insect Conservation* 12(5): 493-498. (in English) ["African elephants and other indigenous megaherbivores have a major impact on local vegetation structure, including aquatic communities, as their big feet and large mass pound the fringes of water bodies. This disturbance is likely to have a profound influence on the structure and composition of insect assemblages in these habitats. We investigated which dragonfly (Odonata) species were tolerant of trampling by elephants and other game. Assemblage composition differed according to extremely high, very high or high disturbance levels. Dragonfly abundance was greatest where impact was high, and decreasing when disturbance became very high or extremely high. Several odonate species are well-adapted to fairly high levels of disturbance, although too much is impoverishing. Medium and low impact sites were geographically separated, and this, combined with much lower disturbance levels, had a considerable influence on promoting regional dragonfly diversity. Several regional specialist species only occurred in the geographically separated, low-impact sites. The full complement of dragonflies is present only when there is a combination of va-

rious disturbance levels combined with spatial variation. Elephant impact is similar to that of humans, with too much of either or both, leading to a species-poor, habitat-generalist dragonfly assemblage." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7503. Samways, M.J. (2008): Chapter 8. Dragonflies as focal organisms in contemporary conservation biology. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 97-109. (in English) ["Freshwater ecosystems worldwide are highly threatened. As a consequence, many dragonfly species are also threatened. The threats to them are many and varied, including invasive alien plants and habitat loss. Global climate change is also beginning to affect them, with some species changing their geographical ranges. Worldwide assessments are being made of dragonfly conservation status. They are one of the highest profile invertebrates in conservation awareness, planning, and action. One reason for this is that they are highly valued, being iconic, aesthetic, and sensitive bioindicators of landscape change. They are both important subjects in their own right as well as important role players in overall biodiversity conservation." (Publisher)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7504. Schiel, F.-J.; Rademacher, M. (2008): Artenvielfalt und Sukzession in einer Kiesgrube südlich Karlsruhe. *Ergebnisse des Biotopmonitoring zum Naturschutzgebiet „Kiesgrube am Hardtwald Durmersheim“*. *Naturschutz und Landschaftsplanung* 40(3): 87-94. (in German, with English summary) [The study presents the results of a six year monitoring programme, carried out between 1993/94 and 2005 in a gravel pit in the Upper Rhine Valley south of Karlsruhe (Germany, Federal State of Baden-Württemberg). The gravel pit shows a very high biodiversity of plants and animals, also including 34 dragonfly species. A few species of shallow, temporary water bodies are listed. "From 2000 onwards extensive management measures have been carried out to preserve the characteristic habitats and the species diversity of the gravel pit, focussing on the conservation of the pioneer habitats 'dune vegetation' and 'open temporary water zones' and on the control of neophytes." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INU-LA.de

7505. Schultz, T.D.; Anderson, C.N.; Symes, L.B. (2008): The conspicuousness of colour cues in male pond damselflies depends on ambient light and visual system. *Animal Behaviour* 76(4): 1357-1364. (in English) ["The colours of male coenagrionid damselflies have been interpreted by some as intraspecific signals that reduce intrasexual harassment by advertising the unprofitability of pursuing conspecific males as potential mates. As visual cues, male colours should be conspicuous to other males under the specific light environments where males search for females. We tested this prediction by using spectroradiometry and two models of damselfly colour vision to determine the chromatic and achromatic contrast of males from six species of *Enallagma* damselflies with pond backgrounds under

the ambient light conditions when each species was most active. The males of five species were active at the time when their colour was most conspicuous against aquatic vegetation. Three blue species were most active and attained their highest levels of contrast during midday, while species that became active in late afternoon or evening reflected longer wavelengths and increased in brightness contrast under low sun angles. A sixth species, *Enallagma pictum*, departed from this pattern. We propose that colour may serve as a signal of both sexual and species identity among males." (Authors) *E. aspersum*, *E. basidens*, *E. geminatum*, *E. signatum*, *E. vesperum*] Address: Schultz, T.D., Department of Biology, Denison University, Granville, Ohio, USA. E-mail: schultz@denison.edu

7506. Seidenbusch, R. (2008): Three-winged Southern Hawker, *Aeshna cyanea* (Müller, 1767). *J. Br. Dragonfly Society* 24(2) : 51-53. (in English) ["In June 2007 about two dozen Southern Hawkers *Aeshna cyanea* emerged from my small garden pond. One of the emerged specimens was missing its left forewing and, although the other three were fully formed, it was unable to fly. It is suggested that the damage to the larval wing sheath occurred at a late stage in larval development thereby allowing too little time for sufficient regeneration to take place." (Author)] Address: Seidenbusch, R., Klenze Str. 5, D-92237 Sulzbach-Rosenberg, Germany. E-mail: seidenbusch@freenet.de

7507. Serrano-Meneses, M.A.; Córdoba-Aguilar, A.; Székely, T. (2008): Chapter 18. Sexual size dimorphism: patterns and processes. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 231-249. (in English) ["Odonates provide excellent model organisms for testing functional explanations of sexual size dimorphism (SSD) because of their wide variety of habitats, morphology, development, feeding behaviour, and mating strategies. This chapter discusses three major functional hypotheses of SSD and uses data on 133 odonate species to describe their patterns of SSD. It shows that SSD centres around monomorphism in dragonflies, whereas SSD is mostly male-biased in damselflies. Interestingly, phylogenetic comparative analyses suggest that damselflies — but not dragonflies — exhibit allometry consistent with Rensch's rule. Sexual selection acts mainly on males, whereas fecundity selection appears to influence female body size. Further tests, however, are essential, in particular of fecundity selection and the differential niche-utilization." (Publisher)] Address: Serrano-Meneses, M.A., Department of Biology and Biochemistry, University of Bath, Claverton Down, Bath BA2 7AY, UK. E-mail: mserrano@miranda.ecologia.unam.mx

7508. Serrano-Meneses, M.A.; Sanchez-Rojas, G.; Córdoba-Aguilar, A. (2008): Sexual selection as the possible underlying force in calopterygid wing pigmentation: comparative evidence with *Hetaerina* and *Calopteryx* (Zygoptera: Calopterygidae). *Odonatologica* 37(3): 221-233. (in English) ["Five hypotheses for the evolution of conspicuous male wing pigmentation have been proposed: sexual selection, differential niche utilization, predator warning, social badge and ecological character displacement. Here, the sexual selection and ecological character displacement hypotheses are compared. First, the coefficients of variation (CVs) of pigmentation were compared against the CVs of a selec-

ted set of other animals' traits that are known to be maintained by either natural or sexual selection. *Hetaerina americana*, *H. vulnerata*, *Calopteryx aequitabilis*, *C. haemorrhoidalis* and *C. xanthostoma* were used in order to compare CVs. Second, it was predicted that pigmentation should not differ in species whose populations are in sympatry (compared to allopatry) if sexual selection is driving the evolution of pigmentation (compared, for example, to an ecological character displacement hypothesis in which pigmentation between spp. should differ). Here, the pigmentation of sympatric and allopatric populations of *H. americana* and *H. vulnerata* were compared. The study produced 2 main results. First, the CVs of pigmentation were not different from the CVs of sexually selected traits in other animals; nevertheless, they were different from those of naturally selected traits. Second, the pigmentation of the 2 species in sympatry did not differ significantly. The same was true for allopatric populations. Taken together, these results suggest that sexual selection is the main mechanism of maintenance of pigmentation in these animals. Other alternative hypotheses for the evolution of pigmentation (differences in habitat use in both sexes, warning to predators by males and ecological character displacement) are discussed in the light of these results." (Authors)] Address: Serrano-Meneses, M.A., Dept Biology and Biochemistry, University of Bath, Claverton Down, Bath BA2 7AY, UK. E-mail: mserrano@miranda.ecologia.unam.mx

7509. Sharma, A.; Sharma, R.C.; Anthwal, A. (2008): Surveying of aquatic insect diversity of Chandrabhaga river, Garhwal Himalayas. *Environmentalist* 28(4): 395-404. (in English) ["Aquatic insect diversity in the Chandrabhaga, an important headwater stream of Garhwal Himalayas, was surveyed for a period of twelve months (October 1999 to September 2000). All the important physico-chemical environmental variables (temperature, water velocity, hydromedian depth, transparency, turbidity, total dissolved solids, pH, alkalinity, dissolved oxygen, free CO₂, nitrates, phosphates, sodium and potassium) of the aquatic ecosystem were measured monthly for one year. Aquatic insects were sampled from three sites (S1, S2 & S3) of the headwater stream Chandrabhaga. Aquatic insects of Chandrabhaga were represented by the members of the orders of Ephemeroptera, Trichoptera, Coleoptera, Diptera, Plecoptera and Odonata. The maximum density of aquatic insects was recorded in the month of March (4,165 ind. m⁻²) and minimum in the month of August (680 ind. m⁻²). The annual contribution of Trichoptera (38%) and Ephemeroptera (32%) was observed to be maximum, while Odonata contributed minimum (2%) to the total aquatic insect density. The present study on the relationship between physico-chemical environmental variables and the density of aquatic insects revealed that the velocity of water, hydromedian depth, turbidity and dissolved oxygen in addition to composition and texture of the bottom substrates have significant impact on benthic aquatic insects' density and their diversity. The ecological relevance of the measured hydrological attributes was investigated by composing their degree of correlation with insects density and diversity. The diversity index (Shannon-Weiner) of aquatic insects dwelling in the Chandrabhaga river ranged from 2.54 to 3.86. Some of the natural and anthropogenic environmental factors contributing towards the degradation of the watershed of the Chandrabhaga have been identified, and ameliorative measures for the conservation of the aquatic in-

sect diversity have been suggested." (Authors)] Address: Sharma, A., Dept of Environmental Sciences, H.N.B Garhwal University, P.O. Box 67, Srinagar, Garhwal, 246174, Uttarakhand, India. Email: drrameshcs-harma@yahoo.com

7510. Shcherbakov, D.E. (2008): On Permian and Triassic insect faunas in relation to biogeography and the Permian–Triassic crisis. *Paleontological Journal* 42(1): 15-31. (in English) [„The taxonomic diversity dynamics of pterygote insects in the Permian and Triassic at the family/age level are considered. Different metrics of taxonomic diversity are compared. Biogeographic and taphonomic aspects of changes in the composition of insect faunas in the Permian and about the P–T transition are discussed. Some changes in the Permian insect faunas are of a biogeographic nature and do not indicate global changes in diversity. Insects with aquatic immatures (including Odonata) were rather common in the Permian and Early Triassic, but these immatures are well represented in only few localities." (Author) Address: Shcherbakov, D.E., Paleontological Inst., Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117997 Russia. E-mail: dshh@narod.ru

7511. Simaika, J.P.; Samways, M.J. (2008): Chapter 9. Valuing dragonflies as service providers. In: Alex Cordoba-Aguilar (Editor): *Dragonflies and damselflies: Model organisms for ecological and evolutionary research*. Oxford Scholarship Online Monographs: 109-125. (in English) [„Valuing the services provided by ecosystems and their components is emerging as a new, practical tool for conservation of biodiversity. One such framework for quantifying those components of biodiversity and their attributes, which are important for the diversity of ecosystem services, is the Service Providing Unit (SPU). This framework provides a conceptual link between ecosystem services and the role of populations of different species in providing these services. Dragonflies provide several ecosystem services to humanity at the population level. Their role as SPUs encompasses most of the 28 ecosystem services, directly or indirectly, as recognized by the Millennium Ecosystem Assessment, in the categories of provisioning, cultural, supporting, and regulating services. Service provision by dragonflies can be quantified, for example, in pest control and riparian restoration. As the SPU concept, as a value metric, has considerable currency with dragonflies, there is merit in investigating its application to other invertebrate taxa and ecosystems." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7512. Skalskaya, I.A.; Bakanov, A.I.; Flerov, B.A. (2008): Study on zooperiphyton and zoobenthos of a small river. ISSN 1995-0829, *Inland Water Biology*, 2008, Vol. 1, No. 1, pp. 84–92. © Pleiades Publishing, Ltd., 2008. Original Russian Text © I.A. Skalskaya, A.I. Bakanov, B.A. Flerov, 2008, published in *Biologiya Vnutrennikh Vod*, No. 1, 2008, pp. 89–98: (in English) [„The special traits of zooperiphyton and zoobenthos structures in a small river were studied. Under conditions of maximal proximity of niches, these groups of invertebrates retain taxonomic and ecological heterogeneity. Differences in zooperiphyton and zoobenthos taxonomic structures are most pronounced in terms of presence of dipterans, oligochetes, and molluscs. In the periphyton, the dominant groups are chironomid (orthocladines, chi-

ronomines, and tanitarsines) larvae, oligochetes of Naididae and molluscs of Limnaeidae. In the benthos chironomid (chironomines and tanirodines), oligochetes of Tubificidae, and molluscs of Pisidiidae are dominant. On average, the bottom invertebrates are considerably larger than fouling organisms. At similar abundance values, the biomass of benthos is by an order of magnitude higher compared to zooperiphyton. Ranging of average biomasses of zooperiphyton and zoobenthos revealed that the leader common for both communities is the large and mobile predatory leech, *Erpobdella octoculata*. The anthropogenic impact and zoogenic (beavers) impact upon the river biota are comparable to each other." (Authors) Aeshna cyanea] Address: Skalskaya, I.A., Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences, Borok, Nekouzskii raion, Yaroslavskaia oblast, 152742 Russia. E-mail: skalskaya@ibiw.yaroslavl.ru

7513. Skvortsov, V.E.; Matyokhin, A.V. (2008): *Cordulegaster boltonii* (Donovan) found at the polar circle in Karelia, NW Russia (Anisoptera: Cordulegastridae). *Notulae odonatologicae* 7(2): 22-24. (in English) [„2 new C. boltonii localities, located near the Peninga estuary (63°40'50"N, 31°13'50"E) and at the Chornaya Guba bay on the White Sea coast (66°31'03"N, 32°55'35"E), are brought on record. The latter site is situated 4.5 km S of the Polar Circle, therefore, technically, the species is (as yet) not to be included on the Arctic fauna list. This is the northernmost locality known for the family in Eurasia. All the previously published C. boltonii records from Russia are discussed.] Address: Skvortsov, V.E., Dept of Biological Evolution, Faculty of Biology, Moscow State University, RUS-119992 Moscow, GSP-1, Russia. E-mail: west-urnus@yandex.ru

7514. Skvortsov, V.E. (2008): Some Odonata records from the transpolar area in north-eastern European Russia. *Notulae odonatologicae* 7(2): 20-22. (in English) [„9 species collected from 4 localities in the Nenetskiy Autonomous District (NAD, Russia), 66°38'N - 69°50'N probably represent the northernmost Odonata records in eastern Europe and the first reliable data on the odonate fauna of NAD and of the transpolar European Russia. *Aeshna grandis* and *Leucorrhinia rubicunda* are new additions to the Russian transpolar fauna. A most unusual dragonfly occurrence on an arctic isle (Dodgii Island in the Barents Sea), where *Aeshna caerulea* and *A. juncea* were discovered, is discussed in some detail." (Author) The additional species are *Coenagrion hastulatum*, *Aeshna subarctica elisabethae*, *Somatoclora arctica*, *S. metallica*, and *Sympetrum flaveolum*.] Address: Skvortsov, V.E., Dept of Biological Evolution, Faculty of Biology, Moscow State University, RUS-119992 Moscow, GSP-1, Russia. E-mail: west-urnus@yandex.ru

7515. Smallshire, D. (2008): Sri Lanka: Dragonflies and other wildlife, October 2007. *Dragonfly News* 54: 24-25. (in English) [Report from a trip to Sri Lanka.] Address: Smallshire, D., 8, Twindle Beer, Chudleigh, Newton Abbot, Devon, TQ13 0JP, UK. E-mail: davesmall@supanet.com

7516. Starmore, A. (2008): Submerged oviposition behaviour in the Large Red Damselfly *Pyrrhosoma nymphula* (Sulzer) on the Isle of Lewis. *J. Br. Dragonfly Society* 24(2) : 45-50. (in English) [P. nymphula "was observed and photographed in oviposition at two locations

on the Isle of Lewis in the summer of 2007. The usual method was for the male, with the female in tandem, to land on a stem of the Bogbean *Menyanthes trifoliata* and then, with both grasping the stem, the female to start laying eggs in the stem, progressing downwards until her abdomen was about half submerged, while always holding her wings clear of the surface. On one occasion a female grasped a leaf with the abdomen three quarters submerged and the wing tips immersed. On 1 July the female of a pair became completely submerged. In all cases the male remained in the sentinel position while contact guarding the female." (Author)] Address: Starmore, Alice, Hedmark, 42 Gress, Isle of Lewis HS2 ONB, UK

7517. Stevens, L.E.; Bailowitz, R.A. (2008): Odonata of Ash Meadows National Wildlife Refuge, Southern Nevada, USA. *Journal of the Arizona-Nevada Academy of Science* 40(2): 128-135. (in English) ["The Odonata of Ash Meadows National Wildlife Refuge (AMNWR) in southern Nevada were studied bimonthly in 2004 and 2005, revealing 32 species, a moderately high level of diversity for this relatively small, semi-isolated southern Nevada valley. *Enallagma civile* was the most regularly encountered species, followed by *Rhionaeschna multicolor*, *Argia sedula*, and *Pachydiplax longipennis*. Fourteen species were detected at three or fewer sites. The assemblage was co-dominated by taxa with ranges centered in North America and western North America, and 25% of the fauna were Mexican-neotropical. We report *Macrodiplax balteata* as new to Nevada's Odonata list, and six other new Nye County records. Odonata larval density/m² and overall species richness (but not Shannon-Weiner diversity) were highest in the largest AMNWR wetlands, regardless of whether they were natural or anthropogenic, and were greater in two restored springs. Several of the most regularly detected larval Anisoptera (i.e., *Erpetogomphus compositus* and *Erythemis collocata*) were benthic ooze dwellers that have a flattened body morphology, which may allow them to avoid predation by non-native *Procambarus clarki* crayfish. Geomorphic restoration of springs may increase Odonata production, while augmentation of habitat area may increase species richness." (Authors)] Address: Stevens, L.E., Museum of Northern Arizona, 3101 N. Ft. Valley Rd, Flagstaff, AZ 86001, USA

7518. Stoks, R.; Johansson, F.; De Block, M. (2008): Chapter 4. Life-history plasticity under time stress in damselfly larvae. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 39-51. (in English) ["Animals often face time stress because they have to reach a certain stage before a certain time horizon (e.g., the onset of winter or pond drying). Damselflies react to time stress with a shortening of their development time, and often show compensatory growth to avoid a smaller size at metamorphosis. Behaviour (increased foraging) and digestive physiology (increased growth efficiency) underlie this life history plasticity. Both ecological and physiological costs of this accelerated life history have been shown: time-stressed larvae are less responsive to predators and hence suffer higher mortality by predation, and show larger mass loss during starvation and reduced investment in immune function and in energy storage. These costs may explain why time-stressed larvae suffer a reduced lifetime mating success in the adult stage." (Publisher)] Address: Stoks, R., Laboratorium voor Aquatische Ecolo-

gie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

7519. Strand, K.A.; Chipps, S.R.; Kahara, S.N.; Higgins, K.F.; Vaa, S. (2008): Patterns of prey use by Lesser scaup *Aythya affinis* (Aves) and diet overlap with fishes during spring migration. *Hydrobiologia* 598: 389-398. (in English) [Odonata, like additional insects, occurred infrequently within diet of Lesser scaup *Aythya affinis*, and contributed little to consumed mass.] Address: Chipps, S.R., U.S. Geological Survey, South Dakota Cooperative Fish and Wildlife Research Unit, Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, South Dakota 57007, USA. E-mail: Steven.Chipps@sdstate.edu

7520. Suhonen, J.; Rantala, M.J.; Honkavaara, J. (2008): Chapter 16. Territoriality in odonates. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 203-219. (in English) ["This chapter discusses causes and consequences of territorial behaviour in odonates. In territorial species, males may use two mating tactics or strategies that may be environmentally or genetically determined: territoriality and non-territoriality. The tactic a male exhibits in each particular case is determined by the cost-benefit ratio of territorial and non-territorial behaviours. The main benefit of territoriality is increased access to females, and the costs may accumulate due to e.g., predation, injuries, and/or energy loss due to territorial contests. Moreover, density of both males and females as well as sex-ratio at breeding sites both contribute to the costs and benefits of each tactic. Interspecific aggression by heterospecific males may also influence the profitability of these tactics." (Publisher)] Address: Rantala, M.J., Dept of Biology, University of Turku, FIN-20024 Turku, Finland. E-mail: markus.rantala@utu.fi

7521. Szallassy, N. (2008): Preliminary data on the Odonata fauna of the backwaters of River Tur. *Bihorean Biologist, Supplement (Flora si fauna rezervatiei "Râul Tur")*: 51-54. (in Romanian, with English summary) [18 species were found including "*Crocothemis servillia*"]. Address: Szallassy, Noémi, Fac. de Biologie si Geologie, Universitatea Babeş-Bolyai, Romania

7522. Takahara, T.; Kohmatsu, Y.; Yamaoka, R. (2008): Predator-avoidance behavior in anuran tadpoles: a new bioassay for characterization of water-soluble cues. *Hydrobiologia* 607(1): 123-130. (in English) ["In freshwater systems, little is known about the characteristics of chemical cues derived from predators which induce defensive responses in prey species. To elucidate traits of predator chemical cues, we examined chemical cues originating from water incubated by the nymph of the dragonfly *Anax parthenope julius*, which induces low activity as predator-avoidance behaviour in tadpoles of two anuran species, the Japanese tree frog *Hyla japonica* and the winkled frog *Rana (Rugosa) rugosa*. *H. japonica* exhibited a reduction in tail movement time as low activity in response to both untreated incubation water and incubation water that had volatile substances removed by freeze-drying. The response threshold of *R. rugosa* to chemical cues was determined to be one dragonfly nymph in a water volume between 500 and 5,000 ml. We found that chemical cues inducing predator-avoidance behaviour in anuran tadpoles have water-soluble non-volatile characteristics. In this

study, we devised both the bioassay to assess the effects of chemical cues and the method to enrich the cues by freeze-drying, which can serve as a tool in the process of identification of unknown chemical cues in freshwater predator-prey interaction." (Authors)] Address: Takahara, T., Chemical Ecology laboratory, Graduate School of Science and Technology, Kyoto Institute of Technology, Matsugasaki-gosyokaido, Sakyo Kyoto, 606-8585, Japan. Email: taka02@kit.ac.jp

7523. Tang, H.B. (2008): A new record of *Heliaeschna uninervulata* Martin (Odonata: Gynacanthini: Aeshninae) in Singapore. *Nature in Singapore* 1: 1-3. (in English) [12-IV-2008, Central Catchment Nature Reserve, Singapore] Address: Tang, H.B., Blk442, Ming Ave, '18-423, Singapore 570442. E-mail: tanghungbun@yahoo.com

7524. Taylor, P. (2008): Comments on The Odonata Red List for Great Britain. *J. Br. Dragonfly Society* 24(1): 37-44. (in English) ["The background to the recent Odonata Red List (Daguet et al., 2008) is presented. Four British species are evaluated as 'Endangered', two as 'Vulnerable' and six as 'Near Threatened'. Of the remainder, 27 are of 'Least Concern', two recently established species have not been evaluated and there is insufficient data available for one. Red List status is not applicable for the 11 species that are occasional migrants. This list is compared with the previous one (Shirt, 1987)."] (Author) For the Red list see: <http://www.jncc.gov.uk/pdf/pub08speciesstatus11.pdf> Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK. E-mail: ptaylor@acle.norfolk.sch.uk

7525. Tennessen, K.J. (2008): Gynandromorphs in the genera *Ophiogomphus* Selys, 1854 and *Ischnura* Charpentier, 1840 (Odonata: Gomphidae, Coenagrionidae). *Insecta mundi* 37: 1-3. (in English) ["A gynandromorph of *O. smithi* from Wisconsin and a gynandromorph of *I. hastata* from Alabama are described. The specimens appear to be bilateral in that they display mostly left/right separation of male and female characters.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

7526. Theischinger, G. (2008): *Austroaeschna ingrid* sp. nov. from Victoria, Australia (Odonata: Telephlebiidae). *International Journal of Odonatology* 11(2): 241-247, pl. III. (in English) ["*Austroaeschna ingrid*, a new telephlebiid from the Grampians in Victoria, Australia, is described (holotype: McKenzie Falls, 21-23 January 2008, to be deposited in Museum of Victoria, Melbourne). This species is most similar to *A. christine*, *A. multipunctata* and *A. obscura* but may be distinguished by the length and slenderness of the male anal appendages, particularly the long and narrow appendix inferior, by the pointed female occiput and by the small yellow pattern elements on the front of the synthorax. The larva of *A. ingrid* stands out by the very slender elements of the anal pyramid."] (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

7527. Torreias, S.R. da S.; Neiss, U.G.; Hamada, N.; Ferreira-Keppler, R.L.; Lencioni, F.A.A. (2008): Description of the larva of *Bromeliagrion rehni* (Odonata: Coenagrionidae) with bionomic notes concerning its phytotelmic habitat in central Amazonas, Brazil. *Rev.*

Bras. Zool. 25(3): 479-486. (in English, with Portuguese summary) ["The last-stage larva of *Bromeliagrion rehni* Garrison in De Marmels & Garrison, 2005 is described and illustrated and bionomics and habitat information on this species are provided. The study was conducted in the Reserva Florestal Adolpho Ducke, located near Manaus, state of Amazonas, Brazil. Twelve samplings were done between April, 2003 and April, 2005: six in the rainy season and six in the dry season. In each sampling month, 12 bromeliads (*Guzmania brasiliensis* Ule, 1907, Bromeliaceae) were collected, six of which were terrestrial and six epiphytic, yielding 144 samples. A total of 75 specimens of *B. rehni* were collected. The relationship between larval *B. rehni* abundance and the measured environmental parameters (volume (ml), pH, season and stratum) was significant (ANCOVA, $F = 5.296$, d.f. = 130, $p < 0.001$). Larvae were most abundant in the rainy season ($p < 0.01$) and water volume was positively related to the abundance of *B. rehni*. Larvae of *B. rehni* can be distinguished from those of *B. fernandezianum* (the only species in the genus with described larvae) by the number of setae in the prementum and by the color of the apical region of the femur. The association of this species with phytotelmata of *G. brasiliensis* is reported here for the first time."] (Authors)] Address: Torreias, Sharlene R. da S., Divisão de Curso de Entomologia, Coordenação de Pesquisas em Entomologia, Instituto Nacional de Pesquisas da Amazônia. Caixa Postal 478, 69011-970 Manaus, Amazonas, Brasil. E-mail: robertatorreias@hotmail.com

7528. Trockur, B.; Didion, A. (2008): In: Rote Liste gefährdeter Pflanzen und Tiere des Saarlandes: XV Rote Liste und Faunenliste der Libellen (Odonata) des Saarlandes (3. Fassung). Ministerium für Umwelt und DE-LATTINIA (Hrsg.); Atlantenreihe Band 4: 485-498. (in German, with French and English summaries) ["In correlation with new methodic proposals regarding the compilation of red lists in Germany and the actualization of the data bank for the extension of the species- and biotope-protection-programme for the Saarland, the knowledge on the dragonfly fauna of the Saarland at the end of 2004 was analyzed and, based on this knowledge, the actual draft of the red list was outlined. The improved knowledge of the last years leads to a decrease of so-called "D-species" (data deficient) in the present red list. Although several species could be released from the red list, leading to an absolute red list-number of only 17 species, the conditions have not really improved. Thus the increase of extremely rare species (category R) from earlier one to now five species has to be noticed and nine percent of the species are ranked into the new category V (near threatened). In comparison to 1997, species released from the red list and of which the red list category was improved respectively, are noted in a blue list. For the species actually remaining in the red list, their threat-reasons are discussed."] (Authors)] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: Bernd-Trockur@gmx.de

7529. Tynkkynen, K.; Grapputo, A.; Kotiaho, J.S.; Rantala, M.J.; Väänänen, S.; Suhonen, J. (2008): Hybridization in *Calopteryx damselflies*: the role of males. *Animal behaviour* 75: 1431-1439. (in English) ["Females are often considered responsible for hybridization between two species because usually they are the choosier sex and their cooperation is needed for successful copulation. However, males can also be responsible for hybridi-

zation, for example in species in which males are able to force copulation. We studied the pattern of hybridization in two congeneric damselfly species, *Calopteryx splendens* and *Calopteryx virgo*, and provide evidence that F1 hybrids between the two damselfly species occur in the wild. According to mitochondrial DNA analysis, hybridization is reciprocal: five of seven hybrids were sired by *C. splendens* and two by *C. virgo* males. We conducted an experiment that revealed that males of both species have surprisingly poor premating reproductive isolation in that they accept heterospecific females, but *C. splendens* males were less discriminating against con- and heterospecific females than were *C. virgo* males. Moreover, our data on the number of hybrids sired by either species in the wild are congruent with the results of the discrimination experiment, supporting the conclusion that males may be responsible for the hybridization. Our results suggest that the males' role in hybridization studies should no longer be neglected." (Authors)] Address: Tynkkynen, Katja, Dept of Biological and Environmental Science, University of Jyväskylä, P.O. Box 35, FIN-40014 Jyväskylä, Finland. E-mail: katynkky@bytl.jyu.fi

7530. Tynkkynen, K.; Kotiaho, J.S.; Svensson, E. (2008): Chapter 11. Interspecific interactions and premating reproductive isolation. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 139-153. (in English) ["Two species can interact in several ways: there may occur interspecific competition or aggression, the two species may hybridize or they may interact indirectly through different predator-prey interactions. One consequence of these interactions is the evolution of premating reproductive isolation between the two species. For example, there may be divergent selection on male secondary sexual characters, which results in enhancement of premating reproductive isolation of two closely related species. This chapter focuses on two questions: firstly, how do interspecific hybridization, aggression and predation, affect premating reproductive isolation? Secondly, is reproductive isolation a direct target of selection or does it evolve as a correlated response to selection on other traits? This chapter uses *Calopteryx* damselflies as model organisms in this discussion, which have been under intensive study concerning these topics." (Publisher)] Address: Tynkkynen, Katja, Dept of Biological and Environmental Science, University of Jyväskylä, P.O. Box 35, FIN-40014 Jyväskylä, Finland. E-mail: katynkky@bytl.jyu.fi

7531. Uhl, A. (2008): Ergebnisse einer Nachsuche nach den Libellenarten Südliche Binsenjungfer (*Lestes barbarus*), Gefleckte Heidelibelle (*Sympetrum flaveolum*) und Südliche Heidelibelle (*Sympetrum meridionale*). *Naturschutz südl. Oberrhein, Beiheft 2* (2008): 33-38. (in German) [Baden-Württemberg, Germany. Records from 2004 and 2005 of *L. barbarus*, *S. flaveolum*, and *S. meridionale* are documented in detail.] Address: Uhl, A., Ritterstr. 26, D-77746 Schutterwald, Germany

7532. Usherwood, J.R.; Lehmann, F.-O. (2008): Phasing of dragonfly wings can improve aerodynamic efficiency by removing swirl. *J. R. Soc. Interface* 5: 1303-1307. (in English) ["Dragonflies are dramatic, successful aerial predators, notable for their flight agility and endurance. Further, they are highly capable of low-speed, hovering and even backwards flight. While insects have repeatedly modified or reduced one pair of wings, or

mechanically coupled their fore and hind wings, dragonflies and damselflies have maintained their distinctive, independently controllable, four-winged form for over 300 Myr. Despite efforts at understanding the implications of flapping flight with two pairs of wings, previous studies have generally painted a rather disappointing picture: interaction between fore and hind wings reduces the lift compared with two pairs of wings operating in isolation. Here, we demonstrate with a mechanical model dragonfly that, despite presenting no advantage in terms of lift, flying with two pairs of wings can be highly effective at improving aerodynamic efficiency. This is achieved by recovering energy from the wake wasted as swirl in a manner analogous to coaxial contra-rotating helicopter rotors. With the appropriate fore-hind wing phasing, aerodynamic power requirements can be reduced up to 22 per cent compared with a single pair of wings, indicating one advantage of four-winged flying that may apply to both dragonflies and, in the future, biomimetic micro air vehicles." (Authors)] Address: Lehmann, F.-O., BioFuture Research Group, University of Ulm, Albert-Einstein-Allee 11, 89081 Ulm, Germany. E-mail: fritz.lehmann@uni-ulm.de

7533. Van Gossum, H.; Robb, T.; Forbes, M.R.; Rasmussen, L. (2008): Female-limited polymorphism in a widespread damselfly: morph frequencies, male density, and phenotypic similarity of andromorphs to males. *Can. J. Zool.* 86(10): 1131-1138. (in English, with French summary) ["In several animal species, one male type coexists with two to several female types, a polymorphism often explained in the context of sexual selection. Where it occurs, one female morph typically resembles the conspecific male phenotype, but the degree of resemblance varies across species. Here, we question whether the degree of phenotypic similarity between male-like females and males varies within species. Phenotypic resemblance is hypothesized to depend on the potential for frequency- and density-dependent selection on male and (or) female phenotypes. We studied six populations of *Nehalennia irene* that differed widely in estimates of morph frequency and male density. Male-like females resemble males more than another female type resembles males, across populations, when comparisons are based on abdominal patterns. Abdomen phenotype does matter in male-female interactions of damselflies. Furthermore, male-like females were more similar to males at low and high density sites compared with sites with intermediate densities, contrary to the hypothesis that the potential for male harassment influences the degree of phenotypic similarity. Additionally, male-like females of most populations converged on the abdominal phenotype of males of one population rather than on that of syntopic males; a problem that has not received any attention." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, Univ. of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

7534. van Gossum, H.; Beatty, C.D.; Tokota'a, M.; Sherratt, T.N. (2008): The Fijian Nesobasis: a further examination of species diversity and abundance (*Zygoptera: Coenagrionidae*). *Odonatologica* 37(3): 235-245. (in English) ["Recently, an overview of the diversity, abundance, distribution and morphological characteristics of species of the genus *Nesobasis*, endemic to Fiji, was presented for species occurring on the 2 largest islands of the archipelago: Viti Levu and Vanua Levu. Here, this

knowledge is extended by providing more extensive diversity and abundance data for the island of Vanua Levu, as well as for 4 smaller islands in Fiji: Taveuni, Koro, Ovalau and Kadavu. Previous research indicated that the *Nesobasis* species inhabiting Viti Levu and Vanua Levu are unique, with these islands having no species in common. The new data confirm this proposal and also show that smaller islands in proximity to these 2 larger islands usually contain a subset of the large island's *Nesobasis* fauna. The island of Koro, however, is unusual in that, while its *Nesobasis* species are predominantly those found on Vanua Levu, it also harbours *N. rufostigma*, a species occurring on Viti Levu. Further, *N. recava* is endemic to Kadavu and is not found on Viti Levu, the nearest large island. Species richness is higher on large than small islands while mean species abundances were consistently higher on large islands compared to small islands. The pattern of distribution and speciation in this genus is quite complex, and is the subject of ongoing research." (Authors)] Address: Gossium, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvogossium@ruca.ua.ac.be

7535. van Kleef, H.; van der Velde, G.; Leuven, R.S.E.W.; Esselink, H. (2008): Pumpkinseed sunfish (*Lepomis gibbosus*) invasions facilitated by introductions and nature management strongly reduce macroinvertebrate abundance in isolated water bodies. *Biol. Invasions* 10: 1481-1490. (in English) ["*L. gibbosus*, originates from Eastern North America and was introduced to the Netherlands in 1902 as an aquarium and garden pond fish. At present the pumpkinseed is widely spread throughout the Netherlands and occurs in a variety of aquatic habitats. It is especially abundant in moorland pools, fishing ponds and urban waters. Strong population development of the pumpkinseed appears to be facilitated by nature management practices in existing ponds (the removal of accumulated organic matter and macrophytes) and by creating new ponds. These measures enhance suitable breeding habitats that are free of competitors and predators. Isolated waters harbouring pumpkinseed were more often situated close to human habitation and infrastructure than could be expected based on the distribution of randomly selected isolated waters, identifying introductions as an important dispersal mechanism. In order to minimize the chances of introductions, planning of nature management practices should be done at distances over 250 m from human habitation and 100 m from infrastructure. Macroinvertebrate (including Odonata) abundance in pools populated by pumpkinseed was eighty three percent lower than in pools without pumpkinseed, probably due to opportunistic feeding and high pumpkinseed abundances. Currently there is little experience with pumpkinseed control. However, options to be explored include: decreasing depth of colonized waters by filling them with soil allowing them to occasionally dry up, introducing native competitors and predators and the use of biodegradable piscicides. In addition, limitation of the sale of pumpkinseed is required as well as public education on the consequences of introducing exotic species." (Authors)] Address: van der Velde, G., National Museum of Natural History, Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: g.vandervelde@science.ru.nl

7536. van Tol, J. (2008): Notes on some species of the genus *Protosticta* from Vietnam (Odonata, Platystictidae). *Zool. Med. Leiden* 82(21): 217-234. (in English)

["Based on a study of various recent collections of *Protosticta* Selys from Vietnam, the dragonfly species *P. grandis* Asahina and *P. khaosoidaoensis* Asahina (sensu stricto) are reported from Vietnam for the first time. New records are provided for *P. satoi* Asahina (new status), and the affinities of *P. satoi* and *P. beaumonti* Wilson are discussed. The status of a very dark form of *Protosticta satoi* found in Tam Dao (northern Vietnam) is also discussed. Two species from Chu Yang Sin National Park (southern Vietnam, Dak Lak province) are described as new to science, viz. *P. caroli* spec. nov. and *P. linnaei* spec. nov." (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

7537. Vasilenko, D.V. (2008): Insect ovipositions on aquatic plant leaves *Quereuxia* from the Upper Cretaceous of the Amur region. *Paleontological Journal* 42(5): 514-521. (in English) ["New form taxa of insect ovipositions on aquatic plant leaves *Quereuxia* from the Campanian locality of Udurchukan (Amur Region) are described. Endophytic ovipositions *Paleoovoidus flabelatus* sp. nov. and *P. arcuatus* sp. nov. do not differ in shape from ovipositions of recent damselflies. Exophytic ovipositions *Palaexovoidus ovoideus* gen. et sp. nov., *P. catenulatus* sp. nov., *P. multus* sp. nov., and *P. amplus* sp. nov. belong to insects that develop in the water, probably dragonflies of the suborder Anisoptera. A new family *Palaexovoididae* fam. nov. is erected." (Author) The original Russian text was published in *Paleontologicheskii Zhurnal*, 2008, No. 5, pp. 60-66.] Address: Vasilenko, D.V., Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117997, Russia. Email: lab@palaeoentomolog.ru

7538. Vercauteren, T.; Wouters, K. (2008): *Proasellus coxalis* sensu auctorum (Crustacea, Isopoda) in de bovenloop van de Raambeek te Heist-op-den-Berg: eerste vaststelling van deze zoetwaterpissebed in België. *Antenne* 2(4): 12-16. (in Dutch, with English and French summaries) [The freshwater isopod *Proasellus coxalis* sensu auct. has been discovered in a lowland brook, the Raambeek, at Heistopden-Berg in N.E.-Belgium in 2005. The species name *P. coxalis* sensu auct. is preferred since there is no decisive conclusion on the definition of the species (*P. coxalis* or *P. banyulensis*) and the different subspecies. The locality is situated in the upper reach of the lowland brook. At the site the brook has been transformed into a ditch. De water is very slow to stagnant, brownish, circumneutral (pH 7-7,5) and poor in oxygen ($\pm 2,5$ mg O₂/l). The bottom is covered with a thick layer of litter and silt. The water vegetation is, apart from floating conglomerates of filamentous algae, restricted to a few *Iris pseudacorus* and *Juncus effusus*. Other macro-invertebrates, besides *Asellus aquaticus* and *P. coxalis*, are: Gastropoda as *Physella acuta*, *Galba truncatula*, *Radix balthica* and Anisoptera vortex; larvae of *Cloeon dipterum* (Ephemeroptera), *Ischnura elegans* and *Aeshna mixta* (Odonata); Coleoptera as *Hydroporus palustris*, *Aclilius canaliculatus* and *A. sulcatus*, *Rhantus suturalis*; Heteroptera as *Nepa cinerea*, *Notonecta viridis* and *Sigara striata* and Diptera as *Chaoborus pallidus*, *Chironomus luridus* and *Psectrotanypus varius*.] Address: Vercauteren, T., Provinciaal Instituut voor Hygiëne, Kronenburgstraat 45, 2000 Antwerpen, Belgium. E-mail: thierry.vercauteren@pih.provant.be

- 7539.** Wan, Y.I.; Cong, Q.; Wang, X.-j.; Yan, Z. (2008): The wettability and mechanism of geometric non-smooth structure of dragonfly wing surface. *Journal of Bionic Engineering* 5 (Supplement 1): 40-45. (in English) ["Scanning electron microscope and optical contact angle measuring instruments were used to investigate the microstructure and wettability of geometric non-smooth structure of dragonfly wing surface. Results show that the geometric non-smooth structure of dragonfly wing surface is one part of epicuticle, some organic solvents can effectively dissolve the main ingredient of non-smooth structure. The hydrophobicity of dragonfly wing surface is induced by the co-coupling of the non-smooth structure and the waxy layer covering." (Authors)] Address: Cong, Q., Key Laboratory of Terrain-Machine Bionics Engineering (Ministry of Education, China), Jilin University, Changchun 130022, P. R. China. E-mail: congqian@jlu.edu.cn
- 7540.** Ware, J.L.; Ho, S.Y.; Kjer, K. (2008): Divergence dates of libelluloid dragonflies (Odonata: Anisoptera) estimated from rRNA using paired-site substitution models. *Molecular Phylogenetics and Evolution* 47: 426-432. (in English) ["Conclusions: The results of our analyses here, coupled with the general desirability of utilizing evolutionary models that are biologically realistic, suggest that it is very important to take stem pairing into account during analyses of rRNA data sets. The impact of using paired-sites substitution models on divergence time estimates is not easily predictable, particularly when explicit models of among-lineage rate heterogeneity are used in conjunction with partitioned analyses of complex data. Paired-sites models apparently do not lead to uniformly lower dating estimates, although it is necessary to investigate a wider range of data sets before further inferences can be made. Accordingly, it is prudent to assess the effects of model selection on resulting date estimates, as well as on the consequent ecological and biogeographic interpretations." (Authors)] Address: Ware, Jessica, Department of Entomology, Rutgers The State University of New Jersey, New Brunswick, NJ, USA
- 7541.** Waterkeyn, A.; Grillas, P.; Vanschoenwinkel, B.; Brendonck, L. (2008): Invertebrate community patterns in Mediterranean temporary wetlands along hydroperiod and salinity gradients. *Freshwater Biology* 53: 1808-1822. (in English) ["1. Temporary aquatic habitats often are inhabited by a unique fauna and flora and contribute significantly to regional diversity. Temporary wetlands around the world are disappearing rapidly. The individual and interacting impacts of factors influencing community structure and dynamics in temporary wetlands are not always well known. 2. Camargue wetlands are mainly characterized by variable salinity and hydroperiod. The individual and combined impacts of these local factors, together with regional variables, on invertebrate communities remain unknown. We therefore characterized and sampled invertebrates in 30 temporary wetlands along salinity and hydroperiod gradients in the Camargue (Southern France) 3, 5 and 7 months after inundation. 3. Over the three sampling occasions, a total of 17 cladoceran species and 49 macroinvertebrate taxa were identified. Hydroperiod and salinity were the most important variables explaining variation in taxonomic composition and can be considered key factors shaping the invertebrate communities in Camargue wetlands. The impact on taxon richness was significantly positive for hydroperiod but significantly negative for salinity. Regional factors had no significant effect on the structure of the studied invertebrate communities, suggesting that dispersal was not limiting and that species sorting was the most important structuring process. 4. The results of this study suggest that the combined and interacting effects of salinization and hydrological modification of Mediterranean temporary wetlands (due to water management, climate change, etc.) can result in reduced diversity in large numbers of Mediterranean wetlands and induce a considerable decline in regional diversity of aquatic invertebrates." (Authors) Odonata were identified to genus level.] Address: Waterkeyn, Aline, Laboratory of Aquatic Ecology and Evolutionary Biology, Katholieke Universiteit Leuven, Ch. Deberiotstraat 32, B-3000 Leuven, Belgium. E-mail: aline.waterkeyn@bio.kuleuven.be
- 7542.** Weitzel, M. (2008): Untersuchungen zur Libellenfauna des NSG „Mattheiser Wald" in Trier. *Dendrocoptes* 35: 75-79. (in German) [34 Odonata species were recorded between 2001 and 2007 near Trier, Rheinland-Pfalz, Germany.] Address: Weitzel, M., Graf-Reginard-Straße 43, 54294 Trier, Germany
- 7543.** Wellmann, H. (2008): Die fliegenden Diamanten. *tv14* 16: 18-21. (in German) [Popular account on dragonflies published in a German television guide.] Address: not stated
- 7544.** White, D. (2008): The territorial behaviour of the Keeled Skimmer *Orthetrum coerulescens* (Fabricius) at Holt Lowes, Norfolk. *J. Br. Dragonfly Society* 24(1): 1-13. (in English) ["A population of the dragonfly *Orthetrum coerulescens* (Fabricius) was observed at four wetland zones at Holt Lowes, Norfolk between 26 May and 1 8 September 2003. Territories occurred in discrete areas throughout the wetland zones of the site. The territories of 40 marked males were described and measured. Males averaged 59.6 ± 14.4 flights per hour and the mean number of matings was 1.1 ± 1.1 per hour with the males which held larger territories achieving more matings. It is suggested that this may be due to the arrangement and density of territories rather than size per se. The mean territory size was $5.75 \pm 10.16\text{m}^2$ with, on average, almost 50 per cent of the territory over water. The mean height of the vegetation within each territory was 356mm (range 50 - 600mm). Males spent on average 5.9 ± 2.0 min h⁻¹ in flight, or about 10 per cent of their time. Habitat quality is discussed in relation to competition and territory fidelity. A case is argued for the site north of the Northern Mire being the area of highest habitat quality; it was occupied first, it was tiarest to the approaching females and there was some evidence that competition was highest in this zone. It was also where the males showed the greatest territory fidelity. The relationship between territory holders and wandering males is discussed." (Author)] Address: White, D., Centre for Ecology, Evolution & Conservation, School of Biological Sciences, University of East Anglia, Norwich, NR4 7TJ, UK
- 7545.** Wik, A.; Lycken, J.; Dave, G. (2008): Sediment quality assessment of road runoff detention systems in Sweden and the potential contribution of tire wear. *Water Air Soil Pollut.* 194: 301-314. (in English) ["Sediments from 18 different road runoff detention systems, located on the Swedish West Coast, were assessed for their ecological hazard potential. Thirteen of the sites were detention ponds, three were manholes within the

same sedimentation construction, and two were detention basins handling wash water from road tunnels. Sediments from all sites were analysed for a range of physico-chemical parameters and contaminants, and screened for acute toxicity using *Hyalella azteca* (sediment), *Daphnia magna* (elutriate), and *Ceriodaphnia dubia* (elutriate) as the test organisms, and for chronic toxicity using *C. dubia* as the test organism. The benthic fauna (including "Odonata") of the thirteen detention ponds was also studied. Sediment quality guidelines probable effect levels were exceeded for one or several contaminants at half of the sites, and one third revealed toxicity in some of the bioassays. Most of the detention ponds were dominated by tolerant taxa indicating low biological quality. Relationships between contaminant concentrations, toxicity in bioassays, and benthic fauna were, however, found to be weak. Extractable organic Zn, which was used as a tire wear marker, correlated with Zn, Cu, presumably from brake linings, and W, a common component of tire studs. The highest concentration, which was found in the manholes (14 mg kg⁻¹ ds), corresponds to a tire wear concentration of 11 g kg⁻¹ ds. The results of the present study have shown that traffic related contaminants accumulate in the studied runoff treatment systems, and, therefore, the maintenance of them is crucial in order to prevent contamination of surrounding waters.] Address: Wik, Anna, Department of Plant- and Environmental Sciences, University of Gothenburg, Box 461, 405 30 Gothenburg, Sweden. E-mail: anna.wik@dpes.gu.se

7546. Wildermuth, H. (2008): Habitat requirements of *Orthetrum coerulescens* and management of a secondary habitat in a highly man-modified landscape (Odonata: Libellulidae). *International Journal of Odonatology* 11(2): 261-276. (in English) ["Due to the destruction of its primary habitats, the West Palaearctic libellulid *Orthetrum coerulescens* has suffered much decline in central Europe. However, at the regional scale it has survived in a variety of secondary habitat, such as draining ditches. In order to find adequate measures for its conservation and promotion, habitat use and habitat recognition of *O. coerulescens* were investigated by description and experimentation at fenland ditches in a small nature reserve in the Swiss Plateau. This breeding habitat, which harbours a viable population, had been restored and maintained for 25 years. The most densely populated sites comprised small ditches between 40-70 cm wide, with rather sparse vegetation of narrow-leaved plants and that had parts of the water surface uncovered; the peaty, mud ground was partly overgrown with submerged pads of stonewort (*Chara* spp.). Water was mainly supplied by seepage springs with a mixture of local slow flow that were hardly recognizable and shallow sites, which were used for oviposition. In hot summer spells the water temperature could exceed 30°C. Some freezing occurred in winter, but the mud was permanently ice-free. The development of the breeding population, which comprised more than 200 individuals in 2006, was followed over two subsequent years. My data indicate that conservation and promotion of *O. coerulescens* populations in small ditches can be achieved by relatively simple habitat maintenance, such as a rotational strategy of clearing ditches, using of small weirs to prevent or protract desiccation and annual cutting of the surrounding litter meadows." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

7547. Wildermuth, H. (2008): Konstanz und Dynamik der Libellenfauna in der Drumlinlandschaft Zürcher Oberland. Rückblick auf 35 Jahre Monitoring. *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich* 153(3/4): 57-66. (in German, with English summary) ["In the «Drumlin Landscape Zurich Oberland» (47°19'N, 08°48'E), a nature reserve consisting of fragmented and disturbed bogs, fens and woodland with a variety of small water bodies, 51 dragonfly (Odonata) species had been recorded during ca. 1000 monitoring days from 1973 to 2007. Regular reproduction was found in 27 species, all the others reproduced sporadically or occurred as vagrants. *Nehalennia speciosa* became extinct, and three species have colonized the reserve permanently since 2005. Quantitative exuviae collections of the Anisoptera on six focus peat ponds during 24 years revealed strong spatial differences and temporal fluctuations of the annual population size of all species. These dynamics were considered in the mode of peat pond management that was especially aimed at *Leucorhinia pectoralis*. In the course of the monitoring period fruitful interactions between research and water management arose, resulting in successful conservation and promotion of the local dragonfly fauna. The indigenous populations can only be preserved and promoted by creating new water bodies and by sophisticated management of the extant waters. The results of this long-term study underline the importance of the moorland reserve as a biodiversity hotspot in a highly man-modified landscape." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

7548. Willkommen, J. (2008): The morphology of the pterothorax of Ephemeroptera, Odonata and Plecoptera (Insecta) and the homology of wing base sclerites and flight muscles. *Stuttgarter Beiträge zur Naturkunde A, Neue Serie* 1: 203-300. (in English, with German summary) ["The ability to fly was the decisive factor for the evolutionary success of the most diverse group of insects, the Pterygota. Nevertheless, the ground plan of the functionally important wing base has not been sufficiently clarified. The aim of this study is to homologise the wing base sclerites of Ephemeroptera, usually regarded as sister group of the remaining Pterygota, with that of other basal pterygote lineages and to reconstruct the ground plan of the wing base of Pterygota. The pterothoracic musculature of representatives of the three basal lineages of Pterygota (Ephemeroptera, Odonata and Neoptera) is also described and discussed. Contrary to previous hypotheses, it is shown that most elements of the neopteran wing base are also present in Ephemeroptera and Odonata. The wing base in the ground plan of Pterygota is presumably composed of three axillary sclerites. The proximal median plate is probably also present in the ground plan of Pterygota. The first axillary is provided with two muscles. The third axillary is equipped with a short muscle that originates from the epimeron. This muscle is interpreted as another ground plan character of Pterygota. In Plecoptera a second muscle inserts at the third axillary sclerite. It originates from the episternum and is most likely an autapomorphic character of Neoptera. The results imply that the wing base of the Plecoptera is close to the pterygote ground plan. It is assumed that the wing base of Ephemeroptera and Odonata is secondarily stiffened. The so-called basalare and its associated muscles in Ephemeroptera and Odonata are probably not homologous to the basalare and respective muscles in Neoptera.

The enlarged subalare and associated muscles, the large dorsal longitudinal muscle, the small metathorax and shortened hind wings in Ephemeroptera suggest that mayflies have a derived flight apparatus in many respects. The Odonata on the other hand show different specialisations, namely a synthorax, large direct flight musculature, and a fusion of second and third axillary with the proximal median plate. Though the wing base in both taxa is secondarily stiffened, the specialisations of Ephemeroptera and Odonata may have evolved independently from each other." (Author)] Address: Willkommen, Jana, Staatl. Museum für Naturkunde, Abt. Entomologie, Rosenstein 1, 70191 Stuttgart, Germany. E-mail: willkommen.smns@naturkundemuseum-bw.de

7549. Wilson, A.L.; Watts, R.J.; Stevens, M.M. (2008): Effects of different management regimes on aquatic macroinvertebrate diversity in Australian rice fields. *Ecological Research* 23(3): 565-572. (in English) ["The maintenance of invertebrate diversity within agricultural environments can enhance a number of agronomically important processes, such as nutrient cycling and biological pest control. However, few Australian studies have been undertaken which specifically address the effects of commercial management regimes on rice field biodiversity. In this study, we compared aquatic macroinvertebrate communities within Australian rice fields cultivated under three commercial management regimes: conventional-aerial (agrochemicals applied, aerially sown), conventional-drill (agrochemicals applied, directly drill-sown) and organic-drill (agrochemical-free, directly drill-sown). These comparisons were undertaken using a combination of community assessment approaches, including morphospecies richness, abundance, diversity and community composition. In general, greater biodiversity existed within macroinvertebrate communities that developed under organic management regimes than under conventional regimes (i.e., higher morphospecies richness and Shannon diversity). Although there were significant differences in several parameters across management regimes early in the rice-growing season, as the growing season progressed the invertebrate communities that developed in the different management regimes became more similar. Only community composition analyses showed significant differences late in the growing season, with functional differences across aquatic faunal assemblages suggested by increased predator abundance in communities sampled from the organic management regime. In order to improve biodiversity within these aquatic environments, management techniques need to be examined individually and the most disruptive processes identified. Alternative management procedures can then be developed that minimise biodiversity loss whilst still delivering required agronomic outcomes." (Authors) List of morphospecies includes Odonata.] Address: Wilson, A.L., Inst. Land, Water & Society, School of Environmental Sciences, Charles Sturt University, Locked Bag 588, Wagga Wagga, NSW 2678, Australia. E-mail: awilson@csu.edu.au

7550. Wilson, K.D.P.; Xu, Z. (2008): Aeshnidae of Guangdong and Hong Kong (China), with descriptions of three new *Planaeschna* species (Anisoptera). *Odonatologica* 37(4): 329-360. (in English) ["Taxonomic information is provided on the Chinese aeshnid fauna from Guangdong and Hong Kong, based on surveys completed from 1998 to 2005. *Planaeschna haui* sp. n. (holotype: male, Shimentai, Guangdong), *P. nanlingensis* sp. n. (holotype: male, Nanling, Guangdong) and *P. skiaperipola* sp. n. (holotype: male, Shimentai, Guangdong) are described. *Periaeschna rotunda* Wilson is synonymised with *Cephalaeschna klotsi* Asahina. *Petaliaeschna gerrhon* Wilson is combined with the genus *Periaeschna* Martin and the first female described. *Boyeria karube* Yokoi is newly recorded from China. Keys are provided for the determination of Oriental Brachytronini genera and identification of Chinese species of male *Cephalaeschna* Selys, *Periaeschna* Martin and *Petaliaeschna* Fraser. A total of 25 aeshnids are recorded from Guangdong, including 3 new species, and 3 new provincial records. 12 aeshnids are recorded from Hong Kong, including *Planaeschna skiaperipola* sp. n. (paratype: female, Wu Kau Tang, Hong Kong)." (Authors)] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

7551. Wilżak, T.; Żurawlew, P. (2008): Przyroda. Powiatu Pleszewskiego. Pleszew: 82-84. (in Polish) [In a book referring to the fauna of the county Pleszew, Poland, 28 odonate species are listed. A few locality data concerning rarer species are added. 13 species are depicted.] Address: not stated

7552. Wootton, R.J.; Newman, D.J.S. (2008): Chapter 20. Evolution, diversification, and mechanics of dragonfly wings. In: *Dragonflies: Model Organisms for Ecological and Evolutionary Research*, ed. A. Córdoba-Aguilar. Oxford University Press: 261-290. (in English) ["This chapter shows how the patterns of evolution and diversification of odonatoids, and by implication those of other flight-active taxa can be illuminated by studying their flight mechanics. The relationships between flight capabilities and wing and body design are discussed; and the functional significance of familiar wing characters and character states are investigated and compared in a range of extant and extinct odonates, using simple physical models. Convergence in wing shape and in some other characters is shown to be widespread, reflecting similarities in flight behaviour and performance in different taxa throughout the long history of the Superorder. Anagenesis — evolutionary 'improvement' — is also widely recognizable. Three important areas for future research are identified: detailed comparative investigations of flight performance; comparative morphometric analysis of functionally interpretable wing and body characters; and detailed Finite Element modelling of selected wing characters, rather than superficial analyses of complete wings." (Publisher)] Address: Wootton, R.J., School of Biol. Sciences, Univ. of Exeter, Hatherly Laboratories, Prince of Wales Road, Exeter EX4 4PS, UK. E-mail: r.j.wootton@exeter.ac.uk

7553. Xu, Q.-H. (2008): Notes on the Chinese *Sarasaeschna*, with description of a new species from Fujian (Odonata, Aeshnidae). *Acta Zootaxonomica Sinica* 33 (3): 480-483. (in English, with Chinese summary) [Six species of the genus *Sarasaeschna* Karube & Yeh occurring in China are treated. *Sarasaeschna zhuae* sp. nov. is described and illustrated from a single male. A key to the Chinese species of the genus is provided.] Address: Xu, Qi-Han, Zhangzhou City University, Fujian 363000, China

7554. Xu, Qi-han; Liu Chang-ming (2008): Classification and new records of Fujian Corduliidae (Insecta: Odonata). *Journal of Fujian College of Forestry* 28(3): 237-239. (in Chinese, with English summary) [The paper treats 9 corduliid species in Fujian. *Macromia septima* is

recorded in China for the first time; *M. unca* and *M. flavocolorata* are newly to Fujian. *Macromidia hangzhouensis* Zhou et Wei is synonymised with *Macromidia kelloggi* Asahina.] Address: Xu Qi-han, Zhangzhou City University, Zhangzhou, Fujian 363000, China

7555. Yakubovich, V.S. (2008): To the fauna of dragonflies (Insecta, Odonata) of the lower Amur region. A.I. Kurentsov's Annual Memorial Meetings 19: 96-102. (in Russian, with English summary) [The list of Odonata from the lower Amur valley amounts to 53 species.] Address: Institute of Water and Ecological Problems FEB RAS, Khabarovsk

7556. Yu, X.; Bu, W. (2008): A study of the genus *Calicnemia* Stand in China, with the description of two new species (Zygoptera: Platycnemididae). *Odonatologica* 37(3): 247-255. (in English) ["*C. gulinensis* sp. n. (holotype male: Gulin, Sichuan, China, 2-VII-2001), *C. porcata* sp. n. (holotype male: Mt Emei, Sichuan, China, 4-VH-1957), are described and a brief synopsis of the Chinese spp. of the genus *Calicnemia* Strand, 1928 is presented." (Authors)] Address: Bu, W., Inst. of Entomology, College of Life Sciences, Nankai University, Tianjin, 300071 China. E-mail: wenjunbu@nankai.edu.cn

7557. Zhang, H.-j.; Yang, Z.d. (2008): *Calicnemia zhuae* spec. nov. from Shaanxi, China (Zygoptera: Platycnemididae). *Odonatologica* 37(4): 375-379. (in English) ["Both sexes of the new sp. are described and illustrated. Holotype male and allotype female: China, Shaanxi prov., Langao co., Mt Dubashan, alt. 1200 m, 28-VII-2006; both deposited with the Shaanxi Bioresource Key Laboratory, Hanzhong, China. The pattern of the head and synthorax are similar to *C. miles* (Laidl.), from which the new species differs in pattern of the top of the abdomen and in the structure of anal appendages and penile organ." (Authors)] Address: Zhang, H.-j., Shaanxi Bioresource Key Laboratory, Shaanxi University of Technology, Hanzhong-723000, Shaanxi, China. E-mail: hjzhang663@sohu.com

7558. Zoller, J. (2008): Das Naturschutzgebiet Altenrhein im Schweizerischen Rheindelta. *Schr. Ver. Gesch. Bodensee* Bd. 126: 231-248. (in German) [Switzerland; the paper includes a note on *Sympetrum depressiusculum*] Address: Zoller, J., AG Bodenseeufer e. V., Promenadenstrasse 53, CH-9400 Rorschach, Switzerland. E-mail: j.zoller@bluewin.ch

2009

7559. Brodin, T. (2009): Behavioral syndrome over the boundaries of life—carryovers from larvae to adult damselfly. *Behavioral Ecology* 20(1): 30-37. (in English) ["Activity is an important behavioral trait that mediates a trade-off between obtaining food for growth and avoiding predation. Active individuals usually experience a higher encounter rate with food items and suffer higher predation pressure than less active individuals. I investigated how activity of the damselfly *Lestes* congener is affected by larval state and predator presence and if larval behavioral type (BT) can be used to predict larval boldness, foraging success, and adult BT. Activity level of individual larvae was studied without predator at 2 different physiological states (hungry and fed) and in 2 predator treatments: familiar predator cues and unfamiliar predator cues. Larvae did not adjust their activity

depending on state or when subjected to unfamiliar predator cues, but a general reduction in activity was seen in the familiar predator treatment. Hence, active individuals remained active compared with their conspecifics, independent of state or predator treatment. Active individuals were also bolder and more efficient foragers than their less active conspecifics. Furthermore, both adult activity and boldness were correlated with larval BT. The results illustrate that BT of a larvae is carried over many different situations keeping active larvae active even in maladaptive situations, demonstrating how a behavioral syndrome may constrain behavioral plasticity. Furthermore, results showed that behavioral syndromes can carry over from larvae through metamorphosis and dictate the BT of the adult." (Author)] Address: Brodin, T., Dept Ecol. and Environ. Science, Umeå Univ. S-90187 Umeå, Sweden. E-mail: tomas.brodin@emg.umu.se

7560. Brooks, S.J. (2009): Aren't dragonflies great study organisms? *Trends in Ecology and Evolution* 24(1): 6-7. (in English) [Book review of: *Dragonflies & Damselflies: Model Organisms for Ecological and Evolutionary Research* edited by Alex Córdoba-Aguilar, Oxford University Press, 2008, US \$130 (288 pages) ISBN 978-0-199-23069-3] Address: Brooks, S.J., Entomology, The Natural History Museum, Cromwell Road, London, SW7 5BD, United Kingdom

7561. Chang, X.; Zhai, B.; Wang, B.; Sun, C. (2009): Effects of the mixture of avermectin and imidacloprid on mortality and developmental stability of *Copera annulata* (Odonata: Zygoptera) larvae. *Biological Journal of the Linnean Society* 96(1): 44-50. (in English) ["The present study explored the effects of mixture of avermectin and imidacloprid on the level of fluctuating asymmetry (FA) and mortality of *Copera annulata* larvae. The results showed that the mortality of larval damselflies treated with different concentrations of insecticide did not differ significantly. However, we found that the levels of FA of two traits were significantly different with different treatments but the others did not show any differences. Explicitly, FA of two traits increased with increasing pesticide concentration. There was a significantly negative relationship between first femur length and the absolute difference between its right and left sides. There was no relationship with respect to the absolute difference between the right and left sides of all traits and their body size. FA was not associated with mortality. Our results emphasized that insecticide had potential effects on bilaterally symmetrical traits of damselfly larvae, although they were no longer treated with insecticide during the last rearing." (Authors)] Address: not accessible.

7562. Fraker, M.E. (2009): The effect of prior experience on a prey's current perceived risk. *Oecologia* 158(4): 765-774. (in English) ["The prior experience of prey may influence how they assess the level of predation risk associated with an information source. Here, I present the results from a set of experiments that demonstrate how the prior experience of green frog (*Rana clamitans*) tadpoles can influence their risk assessment during exposure to the chemical cue of predatory larval dragonflies (*Anax* spp.) consuming conspecific tadpoles. At the short-term scale, green frog tadpoles perceived a higher level of risk when consecutive cue exposures overlapped, but only when the total chemical cue concentration was weak. Weaker chemical cue concen-

trations may be less reliable than stronger cue concentrations, and overlapping cue exposures may increase the degree of certainty that tadpoles have in their perceived risk. When consecutive cue exposures did not overlap, tadpoles assessed the risk associated with each cue exposure independently. Predator-conditioned tadpoles responded longer during exposure to the *Anax* chemical cue than nonconditioned tadpoles, which suggests that a tadpole's long-term experience eventually does influence its risk assessment. In general, the results suggest that a prey's prior experience may influence its current perceived risk by influencing either the degree of certainty in or the level of its perceived risk. Understanding how the prior experience of prey influences their current risk assessment requires that the rate of decay of the value of prior experience should be identified at two timescales as an indicator of the current level of predation risk." (Author)] Address: Fraker, M.E., Dept of Ecology and Evolutionary Biology, University of Michigan, 830 North University, Ann Arbor, MI 48109-1048, USA. E-mail: mfraker@umich.edu

7563. Ghahari, H.; Tabari, M.; Sakenin, H.; Ostovan, H.; Imani, S. (2009): Odonata (Insecta) from Northern Iran, with comments on their presence in rice fields. *Munis Entomology & Zoology* 4(1): 148-154. (in English) [During 2003 and 2006, in rice fields and additional sites located in northern Iran (Mazandaran Province) 30 Odonata species were collected.] Address: Ghahari, H., Department of Entomology; College of Agriculture, Islamic Azad University, Science and Research Branch, P.O.Box 14515/775; Poonak; HesarakTehran; Iran. E-mail: hghahhari@yahoo.com

7564. Hassall, C.; Thompson, D.J.; Harvey, I.F. (2009): The impact of climate-induced distributional changes on the validity of biological water quality metrics. *Environmental Monitoring and Assessment*: (in English) ["We present data on the distributional changes within an order of macroinvertebrates used in biological water quality monitoring. The British Odonata (dragonflies and damselflies) have been shown to be expanding their range northwards and this could potentially affect the use of water quality metrics. The results show that the families of Odonata that are used in monitoring are shifting their ranges poleward and that species richness is increasing through time at most UK latitudes. These past distributional shifts have had negligible effects on water quality indicators. However, variation in Odonata species richness (particularly in species-poor regions) has a significant effect on water quality metrics. We conclude with a brief review of current and predicted responses of aquatic macroinvertebrates to environmental warming and maintain that caution is warranted in the use of such dynamic biological indicators." (Authors)] Address: Hassall, C., School of Biol. Sciences, Biosciences Building, Univ. of Liverpool, Crown Str., Liverpool, L69 7ZB, UK. E-mail: c.hassall@liv.ac.uk

7565. Kaliszewicz, A.; Uchmański, J. (2009): Damage released prey alarm substances or predator odours? Risk assessment by an aquatic oligochaete. *Hydrobiologia* 618(1): 57-64. (in English) ["Although the abilities of prey to detect and respond to chemical substances associated with a predator have been widely reported, the factors promoting the evolution of responses to prey alarm cues vs. predator odours are still vague. In this article, we combined field research with laboratory experiments to explore which chemical substance asso-

ciated with predator activity (predator odour, conspecific or heterospecific alarm substances) induces defence responses in the aquatic oligochaete *Stylaria lacustris*, which is vulnerable to common littoral predators. The field results indicated that predators injure the oligochaetes and a great proportion, up to 45% of individuals in the population, were found to be damaged. The results of the laboratory experiments revealed that chemical odours from damselfly larvae feeding on *S. lacustris* did not induce the defence response in the oligochaetes. On the contrary, oligochaetes detected and responded to alarm substances from damaged conspecifics alone and substances from damaged cladoceran *Daphnia magna*. We discussed conditions favouring the responses to damage released prey alarm cues instead of predator odours in *Stylaria lacustris*. Our data suggest that the selection of responses to alarm cues from damaged prey vs. predator odours may be dependent on three factors: (1) non-species-specific predation, (2) divergence of food niche of the different stages of the predator and (3) complex food web with multiple predators." (Authors)] Address: Kaliszewicz, Anita, Centre for Ecol. Research, Polish Academy of Sciences, 05-092 Lomianki, Poland. E-mail: a.kaliszewicz@cbe-pan.pl

7566. Leunda, P.M.; Oscoz, J.; Miranda, R.; Arino, A.H. (2009): Longitudinal and seasonal variation of the benthic macroinvertebrate community and biotic indices in an undisturbed Pyrenean river. *Ecological Indicators* 9: 52-63. (in English) ["The present work aims to analyze the spatio-temporal variability in benthic macroinvertebrate assemblages and biotic indices in an undisturbed and unpolluted Pyrenean river. Samples were collected seasonally over 2 year-cycles (2001–2002) at fifteen sampling sites along the Erro River (Ebro River Basin, Spain) during a exhaustive biomonitoring program following the IBMWP–IASPT scoring system protocol routinely applied in Iberia. Despite absolute values of the biotic indices showed high spatio-temporal variation, the IBMWP–IASPT scoring system proved useful because water quality classes were consistent throughout seasons and years as well as along-river. The original macroinvertebrate families' presence/absence data matrix was reduced in a number of ways to conduct different statistical procedures in order to detect and separate the underlying near-natural spatial and temporal gradients of the assemblage composition in the Erro River. Along-river, spatial variation of the macroinvertebrate community composition was well assessed by similarity analysis, which clearly detected physical features on the river (drought-affected reach, gorge, towns and flow gauging weirs). Categorical principal component analysis (CATPCA) synthesized and jointly ordered macroinvertebrate samples in a spatio-temporal gradient in the factorial map defined by the first two principal components providing a parsimonious way to assess the assemblages' variation. These two variation gradients throughout the macroinvertebrate families' occurrence data were subsequently confirmed separately by several correspondence analyses and revealed additional information, as the representative families for each sampling site group and season could be identified. Furthermore, these spatio-temporal gradients were discussed and put in relation with changes in the aquatic habitat (water temperature, conductivity, total dissolved solids, water velocity, channel width, canopy cover, etc.). The near-natural functioning of the Erro River promoted us to emphasize that conservation efforts should aim to maintain the free-flowing as a permanent source

of variability." (Authors) Odonata are treated on the family level.] Address: Leunda, P.M.; Dept Zool. & Ecol., Univ. of Navarra, PO Box 177, E-31080, Pamplona/Iruña, Navarra, Spain. E-mail: pedro.leunda@gavrn.com

7567. Lorion, C.M.; Kennedy, B.P. (2009): Relationships between deforestation, riparian forest buffers and benthic macroinvertebrates in neotropical headwater streams. *Freshwater Biology* 54(1): 165-180. (in English) ["1. Few studies have evaluated the effectiveness of riparian buffers in the tropics, despite their potential to reduce the impacts of deforestation on stream communities. We examined macroinvertebrate assemblages and stream habitat characteristics in small lowland streams in southeastern Costa Rica to assess the impacts of deforestation on benthic communities and the influence of riparian forest buffers on these effects. Three different stream reach types were compared in the study: (i) forested reference reaches, (ii) stream reaches adjacent to pasture with a riparian forest buffer at least 15 m in width on both banks and (iii) stream reaches adjacent to pasture without a riparian forest buffer. 2. Comparisons between forest and pasture reaches suggest that deforestation, even at a very local scale, can alter the taxonomic composition of benthic macroinvertebrate assemblages, reduce macroinvertebrate diversity and eliminate the most sensitive taxa. The presence of a riparian forest buffer appeared to significantly reduce the effects of deforestation on benthic communities, as macroinvertebrate diversity and assemblage structure in forest buffer reaches were generally very similar to those in forested reference reaches. One forest buffer reach was clearly an exception to this pattern, despite the presence of a wide riparian buffer. 3. The taxonomic structure of macroinvertebrate assemblages differed between pool and riffle habitats, but contrasts among the three reach types in our study were consistent across the two habitats. Differences among reach types also persisted across three sampling periods during our 15-month study. 4. Among the environmental variables we measured, only stream water temperature varied significantly among reach types, but trends in periphyton abundance and stream sedimentation may have contributed to observed differences in macroinvertebrate assemblage structure. 5. Forest cover was high in all of our study catchments, and more research is needed to determine whether riparian forest buffers will sustain similar functions in more extensively deforested landscapes. Nevertheless, our results provide support for Costa Rican regulations protecting riparian forests and suggest that proper riparian management could significantly reduce the impacts of deforestation on benthic communities in tropical streams." (Authors) Ephemeroptera and Diptera were much less important in terms of total insect biomass, while Odonata and Coleoptera were more prominent, particularly in riffle habitats in the forest reaches.] Address: Lorion, C., Oregon Department of Fish and Wildlife, Corvallis Research Lab, 28655 Hwy 34, Corvallis, OR 97333, USA. E-mail: chrislorion@vandals.uidaho.edu

7568. Luttbeg, B.; Hammond, J.I.; Sih, A. (2009): Dragonfly larvae and tadpole frog space use games in varied light conditions. *Behavioral Ecology* 20(1): 13-21. (in English) ["Predators and prey often engage in a game where predators attempt to be in areas with higher prey densities and prey attempt to be in areas with lower predator densities. A few models have predicted the resulting distributions of predators and prey, but litt-

le empirical data exist to test these predictions and to examine how abiotic and biotic factors shape the distributions. Thus, we observed how *Anax* dragonfly nymphs and Pacific tree frog tadpoles (*Pseudacris regilla*) either together or separately distributed themselves in an arena with a high- and a low-prey resource patch. Trials were conducted in high- and low-light conditions to manipulate predation risk and to view the effects of this abiotic factor. Counter to the model predictions, we found that predators were not more abundant in high-resource (HR) patches, and they thus did not force prey toward being uniformly distributed. Using a model selection approach to assess what factors affected predator and prey patch-switching movement, we found that prey more often left patches that had more predators present, but predators surprisingly more often left patches with more prey present. Light levels did not affect predation risk; however, in the dark with the associated reduction in visual information predators preferred HR patches. This caused a lower coincidence of prey and predators in patches. Predators also switched patches less often when they occupied the same patch as the other predator. This suggests that predator distributions, and indirectly prey distributions, are affected by the risk of intraguild predation." (Authors)] Address: Luttbeg, B., Dept of Zoology, 430 Life Sciences West, Oklahoma State University, Stillwater, OK 74078, USA. E-mail: luttbeg@okstate.edu.

7569. Samways, M.J. (2009): Book review: Rosser W. Garrison, Natalia von Ellenrieder and Jerry A. Louton, *Dragonfly Genera of the New World: An Illustrated and Annotated Key to the Anisoptera* The John Hopkins University Press, Baltimore MS, USA, 2006, Hardback, US\$99.00, ISBN: 0-8018-8446-2, 368 pp.. *Journal of Insect Conservation* 13(1): 137-138. (in English) [Book review related to OAS 5914] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7570. Sharma, R.C.; Rawat, J.S. (2009): Monitoring of aquatic macroinvertebrates as bioindicator for assessing the health of wetlands: A case study in the Central Himalayas, India. *Ecological Indicators* 9: 118-128. (in English) ["The present contribution encompasses the first case study on the aquatic macroinvertebrates as bioindicators for assessing the health of Asan wetland (area 3.2 km²), located in the foothills of Central Himalayas, India. Monthly sampling from all the sampling sites in five replicates was made for a period of 12 months (July 2002–June 2003) at 9:00–11:00 h. A total of 32 species of macroinvertebrates were found with the Ephemeroptera and Gastropoda being the most abundant component of invertebrates communities. The Shannon–Wiener diversity index calculated for macroinvertebrates ranged from 3.50 to 4.61. Seasonal fluctuations in the density of macroinvertebrates revealed maximum density (451–503 ind m²) during winter and minimum (126–143 indm²) during monsoon season. The density of macroinvertebrates was influenced by the anthropogenic disturbances and water level fluctuations causing disturbance in the littoral zone of the wetland. The statistical relationships between turbidity, transparency, dissolved oxygen and water temperature and macroinvertebrates of Asan wetland were also computed for assessing the impact of anthropogenic disturbances on macroinvertebrates." (Authors) The monthly density of larvae/m² for the following species is documented: *Enall-*

lagma parvum, Onychogomphus duaricus, Crocothemis s. servilia, and Ceriagrion cerinorubellum.] Address: Ramesh, C., Dept of Environmental Sciences, H.N.B. Garhwal University, Post Box 67, Srinagar-Garhwal 246174, Uttarakhand, India. E-mail address: drramesh-csharma@yahoo.com

7571. Tollett, V.D.; Benvenuti, E.L.; Deer, L.A.; Rice, T.M. (2009): Differential toxicity to Cd, Pb, and Cu in dragonfly larvae (Insecta: Odonata). Archives of Environmental Contamination and Toxicology 56(1): 77-84. (in English) ["Odonate larvae are important organisms in aquatic ecosystems but have been rarely studied in laboratory toxicity tests. Only a few previous studies have been conducted on odonates and their responses to heavy metals. We exposed two species of libellulid larvae (Pachydiplax longipennis, Erythemis simplicicollis) to equimolar concentrations of cadmium, lead, or copper in 7-day survival tests. Larvae were tolerant of high concentrations of cadmium and lead, as no significant decrease in survival was observed at exposures as high as 0.893 and 2.232 mM, respectively. In contrast, larvae were more sensitive to copper exposure, demonstrating significantly decreased survival to exposures as low as 2.360 µM. In whole animal samples, larvae accumulated very high concentrations (>1000 µg/g dry weight) of all three metals in an exposure-related manner. Much of this accumulation could probably be attributed to adsorption or accumulation of metal within the exoskeleton, because odonate larvae are known to sequester metals into this material. Our results were generally consistent with previous observations indicating that odonates are tolerant to metal exposures, even in comparison with other aquatic invertebrates. However, there are few studies that have used odonates in toxicity tests and compared these organisms to other aquatic life. Based on their abundance and their simple requirements in the laboratory, we believe that odonate larvae can be useful toxicological model organisms." (Authors)] Address: Rice, T.M., Department of Biological Sciences, University of South Alabama, Mobile, AL 36688, USA. Email: trice@jaguar1.usouthal.edu

7572. Whiteman, N.K.; Sites, R.W. (2009): Aquatic insects as umbrella species for ecosystem protection in Death Valley National Park. J. Insect Conserv. 12(5): 499-509. (in English) ["Under the United States Endangered Species Act (ESA), critical habitat for listed species is also protected. Many aquatic insects protected under the ESA are habitat-restricted, mainly to springs. Some of these species do not co-occur with ostensibly more charismatic vertebrates, and have the potential to act as umbrella species for aquatic ecosystems. We suggest that the flightless creeping water bug Ambrysus funebris La Rivers (Insecta: Heteroptera: Naucoridae) has the potential to be such a species. Endemic to a spring system in Death Valley National Park, it co-occurs with eight other endemic aquatic invertebrate species, but with no vertebrates. Therefore, its protection would facilitate protection of this desert oasis. [...]."] (Authors) Aquatic or semiaquatic insect species currently protected or proposed as candidates for protection under the US Endangered Species Act are compiled in a list; this includes seven Odonata species.] Address: Whiteman, N.K., Department of Organismic and Evolutionary Biology, Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, MA 02138, USA. E-mail: nwhiteman@oeb.harvard.edu

7573. Yamanaka, T.; Tanaka, K.; Hamasaki, K.; Nakatani, Y.; Iwasaki, N.; Sprague, D.S.; Bjørnstad, O.N. (2009): Evaluating the relative importance of patch quality and connectivity in a damselfly metapopulation from a one-season survey. Oikos 118(1): 67-76. (in English) ["The area-and-isolation paradigm, which has been the primary focus of metapopulation research, may not hold in some animal metapopulations if within-patch preference is more important than patch area or connectivity. Recently, regression analyses have been used to evaluate the effect of patch connectivity and various patch qualities including area. However, their relative importance is not easy to determine, because patch qualities and connectivity are often spatially autocorrelated. In this paper, we try to evaluate the relative importance of within-patch quality, patch connectivity and spatial autocorrelation using variation partitioning methods from community ecology. We constructed three regression models: within-patch quality, PCNM (principal coordinates of neighbor matrices) and patch connectivity based on a one-season survey of a damselfly Copera annulata metapopulation. The contribution of within-patch quality was larger than that of connectivity. There was no prominent effect of patch area. We conclude that the area-and-isolation paradigm is not applicable to this C. annulata metapopulation. The spatial autocorrelation extracted by PCNM had the largest contribution; it contained almost all of the variation of connectivity and overlapped with variation explained by within-patch quality. Connectivity corresponded most closely to medium-scale spatial structure captured by PCNM (ca 640 m). The mean effective dispersal scale was estimated to be 53 m. Within-patch quality, debris accumulation and vegetation cover in the pond corresponded with the medium and small (ca 201m) spatial scales from PCNM, though we could not clearly explain the cause of this correspondence. We believe that our method will contribute to quick and effective evaluation of spatial and non-spatial aspects of metapopulation." (Authors)] Address: Yamanaka, Takehiko, Biodiversity Division, National Inst. for Agro-Environmental Sciences, 3-1-3 Kannondai, Tsukuba, JP-305-8604 Ibaraki, Japan. E-mail: apple@affrc.go.jp

Thanks to all who contributed to this issue of OAS!!!



<http://bluebison.net/sketchbook/2008/0308/turtle-and-dragonfly.png>

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1997

7574. He, J.-r.; Jiang B.-h.; Chen, T.-s. (1997): The aquatic insects of Rainbow Lake. *Conservation Quarterly*, summer quarterly, June, 1997, 18: 37-41. (in Chinese) [Rainbow Lake is an alpine Lake in Taiwan. The paper provides brief information on *Aeshna petalura* and *Polycanthagyna erythromelas*. (Abstract by Haomiao Zhang)]

7575. Liebherr, J.K.; Polhemus, D.A. (1997): R.C.L. Perkins: 100 years of Hawaiian entomology. *Pacif. Sci.* 51(4): 343-355, 1 pl. (in English) ["R. C. L. Perkins comprehensively surveyed the insect fauna of the Hawaiian Islands one century ago, initially as the collector for the Fauna Hawaiiensis survey project and subsequently as an entomologist with the Hawaiian Sugar Planters' Association. The Hawai'i he observed was in a period of rapid transformation. Thus, he has the unique distinction of being the first and last person to record the habits of many native Hawaiian species. The islands on which he collected were already heavily impacted by exotic herbivores-including goats, cattle, sheep, and pigs-yet he was able to sample remnant pockets of native vegetation that are now lost in a jungle of exotic introductions. His broad understanding of insect natural history allowed him to document ably the habits of insect groups that we are only beginning to understand 100 yr later. Moreover, his collections and extensive taxonomic contributions afford us a firm foundation for future taxonomic and evolutionary studies of the uniquely rich and highly endemic Hawaiian insect biota." (Authors) The Odonata of Hawaii were revised of Perkins (1899) and (1910)] Address: Polhemus, D., Dept. Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

7576. Valenti, M.A.; Ferrell, G.T.; Berryman, A.A. (1997): Insects and related arthropods associated with greenleaf manzanita in montane chaparral communities of northeastern California. *Gen. Tech. Rep. PSW-GTR-167*. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Dept. Agriculture: 26 pp. (in English) ["Specimens representing 19 orders and 169 arthropod families (mostly insects) were collected from greenleaf manzanita brushfields in northeastern California and identified to species whenever possible. More

than 500 taxa below the family level were inventoried, and each listing includes relative frequency of encounter, life stages collected, and dominant role in the greenleaf manzanita community. Specific host relationships are included for some predators and parasitoids. Herbivores, predators, and parasitoids comprised the majority (80 percent) of identified insects and related taxa." (Authors) The list of Odonata includes the following taxa: *Aeshna palmata*, *Anax junius*, *Cordulegaster dorsalis*, *Libellula* sp., *Pantala hymenea*, *Tarnetrum corruptum*, *Lestidae* species undet., and *Coenagrionidae* species undet.] Address: <http://www.fs.fed.us/psw/publications/documents/pswgtr167/pswgtr167.pdf>

7577. Yeh, W.-c. (1997): The Lindeninae dragonflies of Taiwan. *Conservation Quarterly*, summer quarterly, June, 1997, 18: 32-36. (in Chinese) [Four species in three geni of Lindeninae are known from Taiwan, including *Ictinogomphus pertinax*, *Sinictinogomphus clavatus*, *Gomphidia confluens*, and *Gomphidia kruegeri fukienensis*. They can be distinguished by their large size, venation and structure of caudal appendages. The structural features, distribution, habitat, behaviour and flight period of each species are described. A key to the larvae is also provided. (Translation of the original Chinese summary thanks to Haomiao Zhang)] Address: Yeh, Wen-Chi, Division of Forest Protection, Taiwan Forestry Research Institute, 53 Nanhai Road, Taipei 100, Taiwan. E-mail: wcyeh@tfri.gov.tw

1998

7578. Bennett, B.L. (1998): Land use influences on benthic invertebrate assemblages in southern Appalachian agricultural streams. MSc Thesis, Dept Biology, Faculty of the Virginia Polytechnic Institute and State University Blacksburg: VIII, 98 pp. (in English) ["I investigated the role of land use in structuring benthic invertebrate assemblages in agricultural streams in the French Broad River drainage in western North Carolina. I sampled six agricultural streams (3 with cleared headwaters and 3 with forested headwaters) at three points along a gradient (headwaters, a midpoint, and a downstream site). At each site, I measured a variety of physico-chemical parameters, including temperature, chlorophyll a, discharge, nutrients, and suspended solids.

Invertebrates were sampled at all sites in October 1996 and April 1997. Riparian vegetation was assessed for each site at multiple spatial scales using GIS data from the 1950s, 1970s, and 1990s. Forested agricultural (FA) streams had more riparian vegetation than cleared agricultural (CA) streams in both the 1950s and the 1970s. Cleared agricultural streams had less organic matter, more primary production, higher nitrates, and warmer temperatures than FA streams. Total and EPT taxa richness was greater in FA streams. Pollution-sensitive Plecoptera were relatively more abundant in FA streams, while tolerant Diptera were more abundant in CA streams. High diversity and Plecoptera abundance was related to high habitat quality, more riparian vegetation, low nitrates, and low summer temperatures. Higher invertebrate diversity was related to the land use 25-50 years as well as the current land use (forested, moderate agriculture, or heavy cattle impact). These results indicate a long-term legacy of agricultural influences on stream invertebrate assemblages." *Boyeria grafiana*, *B. vinosa*, *Gomphus lividia*, *Lanthus parvulus*, and *Ophiogomphus mainensis* are listed.] Address: Bennett, Barbara Loraine, Dept Biology, Virginia Polytechnic Institute and State University Blacksburg, VA 24061-0406, USA

1999

7579. Riaz, H.; Riaz, M. (1999): The naiads of *Acisoma panorpoides panorpoides* and *Brachythemis contaminata* [Libellulidae: Odonata]. *Int. J. Agriculture & Biology* 1(3): 147-148. (in English) [Description of the two taxa and documentation of localities the specimens were sampled.] Address: Riaz H., Pest Warning and Quality Control of Pesticides, Pakpattan, Pakistan. E-mail: riazhussain37@hotmail.com

7580. Riaz, H.; Riaz, M. (1999): Description of last instar naiads of *Rhyothemis variegata variegata* Linnaeus and *Pantala flavescens* (Fabricius) (Anisoptera: Odonata). *Int. Jour. Agriculture & Biology* 1(3): 145-146. (in English) [The larvae of *R. variegata* and *P. flavescens* collected from various localities of the Sindh Province, Pakistan are described and illustrated.] Address: Riaz, H., Pest Warning and Quality Control of Pesticides, Pakpattan, Pakistan. E-mail: riazhussain37@hotmail.com

7581. Wust, E.; Alge, R. (1999): Libellen und wirbellose Wassertiere des Naturschutzgebietes Gsieg-Obere Mahder, Lustenau (Vorarlberg). *Vorarlberg. Naturschau* 6: 111-120. (in German) [A commented list of 35 odonate species from a Nature Reserve near Lustenau, Vorarlberg, E Austria. The list includes *Sympecma paeidisca*, a species protected by the European law.] Address: Wust, E., Elserweg 3a, A-6714 Niiziders, Austria

2000

7582. Chae, J.-S.; Pusterla, N.; Johnson, E.; Derock, E.; Lawler, S.P.; Madigan, J.E. (2000): Infection of aquatic insects with nematode metacercariae carrying *Ehrlichia risticii*, the cause of Potomac Horse Fever. *J. Med. Entomol.* 37(4): 619-625. (in English) ["We provide evidence of *Ehrlichia risticii* Holland, the agent of Potomac horse fever, in trematode stages found in

aquatic insects collected from a pasture stream in northern California, using nested polymerase chain reaction (PCR) amplification and sequence analyses of the 16S rRNA, 51 kDa major antigen and groEL heat shock protein genes. *E. risticii* was detected in metacercariae found in the immatures and adults of the following insects: Trichoptera, Ephemeroptera, Odonata (Zygoptera and Anisoptera), and Plecoptera. The prevalence of *E. risticii* was 31.9% (n 5 454 individuals) in aquatic insects (13 of 17 species were positive). Prevalence within orders was as follows: 43.5% (n 5 207) in caddisflies, 15.2% (n592) in mayflies, 13.9% (n5115) in damselflies, 10.0% (n510) in dragonflies, and 80.0% (n 5 30) in stoneflies. This study demonstrates a broad intermediate host range for trematodes that act as vector for *E. risticii*. Insects are likely to play an important role in the epidemiology of this disease." (Authors)] Address: Chae, J.-S., College of Veterinary Medicine, Chonbuk National University, Chonju, Chonbuk 561-756, Korea

7583. Triapitsyn, S.V.; Beardsley, J.W. (2000): A review of the Hawaiian species of *Anagrus* (Hymenoptera: Mymaridae). *Proc. Hawaiian Entomol. Soc.* 34: 23-48. (in English) ["A brief historical account of the use of *Anagrus* Haliday (Hymenoptera: Mymaridae) in biological control in the Hawaiian Islands is given. Twelve species of *Anagrus*, ten of them named, are keyed and descriptive notes are provided. [...] Two of the named *Anagrus* species, *A. insularis* Dozier and *A. oahuensis* n. sp., are not known outside the Hawaiian Islands. The former species has been reared from eggs of Odonata and the host is an endemic Megalagrion species (Coenagrionidae). This species of *Anagrus* may be endemic to the Hawaiian Islands although it is morphologically close to the European species *Anagrus brocheri* Schulz. Possibly a complex of *Anagrus* species is associated with the eggs of Megalagrion, but additional research is needed to demonstrate this." (Authors)] Address: Triapitsyn, S.V., Department of Entomology, University of California, Riverside, California 92521, USA

2001

7584. Alvarez, M.; Pardo, I.; Moya, G.; Ramon, G.; Martinez-Taberner, A. (2001): Invertebrate communities in Temporary streams of the island of Majorca: a comparison of catchments with different land use. *Limnetica* 20(2): 255-266. (in English, with Spanish summary) ["This study compares the invertebrate communities in two catchments in the Mediterranean island of Majorca, Spain. The Soller catchment is highly urbanised, with areas of intensive agriculture. The catchment of stream Sant Jordi is covered in a large part by a mature forest of Mediterranean Quercus. Upper and middle reaches of the latter were chosen as reference sites of well-preserved environmental conditions. Diptera was the richest taxon in both catchments, followed by Coleoptera and Trichoptera in the Sant Jordi catchment, and by Mollusca in Soller. Overall, invertebrate species richness was similar in the two catchments. Species composition and representation differed and Crustacea were proportionally more abundant in the Sant Jordi catchment sites than in Solier. In the latter catchment, Diptera (mainly Chironomidae) and Oligochaeta were more abundant than in the Sant Jordi catchment. Main factors influencing community structure in both catchments were identified, i.e. allochthonous organic inputs

from riparian vegetation and land use effects on this, local wastewater discharge, length of the dry period, saltwater intrusion and watertable lowering due to increasing groundwater extraction at downstream sites." (Authors) Odonata are also treated on the family level.] Address: Moya, G., Departament de Biologia Ambiental, Universitat de les Illes Balears, 0707 1 Palma de Mallorca, Spain

7585. Boix, D.; Sala, J.; Moreno-Amich, R. (2001): The faunal composition of Espolla pond (NE Iberian Peninsula): the neglected biodiversity of temporary waters. *Wetlands* 21(4): 577-592. (in English) ["The faunal composition, richness, and their determinant factors were analyzed in a Mediterranean temporary pond located in NE Spain. The aquatic community was sampled weekly over 7 periods of flooding during 4 years (1996–1999). Composition of the pond community was found to be influenced by duration of the hydroperiod and, secondarily, by seasonality. Insects and crustaceans were the most well-represented types of fauna. The small numbers of species captured over all hydroperiods spend the dry periods in situ or have an important dispersal capacity. Comparison of the faunal composition of several temporary ponds of temperate latitudes confirms the great diversity of faunal groups found in temporary aquatic environments, and this richness is comparable to that found in permanent water bodies. The richness of these temporary ponds is related to flooded surface and to hydroperiod duration. The peculiarity of the fauna of temporary waters, together the deteriorating condition of those habitats, make it necessary for more active policies of preservation to be pursued." (Authors) In tab. 2 larval records of *Chalcolestes viridis* and *Anax imperator* are listed.] Address: Boix, D., Institute of Aquatic Ecology and Dept. of Environmental Sciences, University of Girona, Campus de Montilivi, Faculty of Sciences, 17071—Girona, Catalunya, Spain

7586. Malikova, E.I.; Ivanov, P.Yu. (2001): Fauna strekoz (Insecta, Odonata) Primorskogo kraja. - [Dragonfly (Odonata) fauna of the Primorye region]. *Chteniya V.L. Levanidov bienn. mem. Meetings 1*: 131-143. (in Russian) [Far East, Russia; the Odonata fauna of the region is critically reviewed and a checklist (with 80 species) is provided. The regional occurrence of *Enallagma cyathigerum*, *Aeshna viridis*, *Trigomphus anormolobatus*, and *Neurothemis fluctuans* requires confirmation.] Address: Malikova, E.I., Studencheskaya 25/1-5, RUS-675027 Blagoveshchensk, Amur Region. Russia

7587. Nguyen, V.V.; Hoang, D.H.; Cao, T.K.T.; Nguyen, X.Q.; Bae, Y.J. (2001): Altitudinal distribution of aquatic insects from Tarn Dao National Park in northern Vietnam. In: Bae, Y.J., [Ed.], 2001. *The 21st century and aquatic entomology in East Asia*. [Proc. 1st Symp. Aquat. Entomologists E Asia], Korean Soc. Aquat. Ent., Seoul, viii+146 pp.: 123-133. (in English) [Odonata on pp. 126 and 130; 26 taxa are listed on the genus level.] Address: Nguyen, V.V., Department of Biology. Seoul Women's University. Seoul 139-774, Korea

2002

7588. Abbott, J.; Beckemeyer, R.J.; Donnelly, T.W.; Gonzalez-Soriano, E.; Harp, G.L. (2002): Odonata collected in Nicaragua. *Notul. Odonatol.* 5: 125-128. (in English) [During 29 July through 3 Aug. 2001, 71 spe-

cies were collected and 4 additional species were positively identified, from 12 localities in Jinotega and Matagalpa Departments. 25 species are new records for Nicaragua, raising the total number of species for this country to 124." (Authors)]

7589. Antipova, L.F.; Baikova, T. V. (2002): Invertebrates of the Pskov District. Pskov State University Press: (in Russian) [A list of invertebrates from the Pskov Oblast is provided. For the Odonata this includes general remarks on the biology (mostly restricted to the family or genus level) and the list of 46 species of Odonata. *Aeshna viridis* and *Anax imperator* are very rare. Photographs of some species are presented.] Address: not stated

7590. Bracken, B.; Lewis, C. (2002): Black saddlebags (*Tramea lacerata*): First records for Ottawa-Carleton and Prescott-Russell counties and possible range expansion. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 16-18. (in English) [*T. lacerata* was recorded in September 2001 approximately 180 km northeast of the main southwestern Ontario range of *T. lacerata*. This expansion might be attributed to the unusually warm weather in 2001. Records prior to 2001 are mapped.] Address: Bracken, B., 711-1435 Morisset Ave., Ottawa, ON, K1Z 8H4, Canada. E-Mail: brackensworld@hotmail.com, weewa@primus.ca

7591. Bree, D. (2002): Notes on the Odonata of Prince Edward County, Ontario - 2001. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 14-15. (in English) ["Three new county records are reported for Prince Edward County bringing the county list to 73 species. Additions reported are *Aeshna clepsydra*, *Cordulia shurtleffi*, and *Perithemis tenera*. The latter represents a significant northeastern range extension. In addition county late and early flight dates are reported, as are records of the uncommonly encountered *Aeshna canadensis*, *A. umbrosa*, *A. verticalis*, and *Baisiaeschna janata*. Included is an update on the Sandbanks Pannes wetland and the disappearance of *Ischnura hastata* from that habitat. The annual autumn build-up of darners (*Aeshnidae*) was again noted and may be associated with many of the uncommon *Aeshna* species that appear in the county at that time." (Author)] Address: Bree, D., Box 123, Bloomfield, ON, K0K 1G0, Canada; E-Mail: dbree@post.kosone.com

7592. Bree, D. (2002): Summary of the Odonata of Petroglyphs Provincial Park in 2001. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): *Ontario Odonata*, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 5-10. (in English) ["An annotated list is presented including 60 species of Odonata found in 2001 at Petroglyphs Provincial Park located on the extreme southern edge of the Canadian Shield at 44° 37'N, 78° 03'W. *Progomphus obscurus* is reported for the third time in Canada. A number of uncommon species are also reported including; *Macromia illinoiensis*, *Cordulegaster maculata*, *Gomphaeschna furcillata*, *G. lividus*, *Somatochlora williamsoni*, *Stylogomphus albistylus*, and *Stylurus scudderi*. *Gomphus adelphus* and *Somatochlora kennedyi* are added to the Peterborough County list bringing the total to 101 and late and early flight dates for the county are noted. Recommendations are made to provide special conservation status to Jack's Creek

and the calcareous-rich waters of McGinnis lake and a nearby pond." (Author)] Address: Bree, D., Box 123, Bloomfield, ON, K0K 1G0, Canada; E-Mail: dbree@post.kosone.com

7593. Catling, P.M.; Brownell, V.R. (2002): Additions to the Odonata of Lanark County, Ontario.. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 4-5. (in English) ["Notes are provided on seven species which are additions to the reported fauna of Lanark County, Ontario. Included are *Enallagma vernale*, *Gomphaeschna furcillata*, *Gomphus quadricolor*, *Ophiogomphus rupinsulensis*, *Williamsonia fletcheri*, *Nannothemis bella*, and *Pantala flavescens* bringing the county list to 87 species." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7594. Catling, P.M. (2002): A new identification problem in field surveys: *Tamea lacerata* and *Epitheca princeps*. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 58-61. (in English) [Field identification characters are outlined to discriminate *Tamea lacerata* and *Epitheca princeps*.] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7595. Catling, P.M.; Brownell, V.R. (2002): Observations of Odonata in Ontario made in 1996, 1997 and 1998. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 63-190. (in English) ["The observations in the following table totaling 1937, were recorded prior to the concept of a major Odonata survey in Ontario. Many were collected during a study of the ecology of gravel pit ponds. Others were collected during floristic surveys. In general the emphasis was on Zygoptera in connection with ecological studies. Very few records of larvae are included. The lack of data on numbers and sexes, and the way in which the data was collected places some limitations on its use in the analysis of trends. It is useful in contributing to an understanding of geographic occurrence, flight periods and in connection with regional studies. Many of the observations are supported by voucher specimens in the collection of the observers and/or in the Ontario Survey collection at CNC (Agriculture and Agri-Food Canada, Ottawa). As with the summary data produced in volumes 1-3 of Ontario Odonata, these observations are part of a limited access database maintained by the Toronto Entomologists Association and the Natural Heritage Information Center (NHIC) in Peterborough. Among the noteworthy species listed in the following summary is *Hetaerina titia* originally discovered in Ontario by P. Pratt and Jo Barton in 1985 (see Great Lakes Entomologist 31 (3-4): 205-208. 1998). The male of *H. titia* is longer, more slender and darker than the male of *H. americana* and has conspicuous dark colouration at the wing tips especially the hindwing." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7596. Catling, P.M.; Brownell, V.R. (2002): Notes on the Odonata of Murphys Point Provincial Park, Lanark County, Ontario.. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomolo-

gist's Association, Toronto, Ontario: 20-23. (in English) ["Forty-six species of Odonata are reported for Murphys Point Provincial Park in Lanark County, on the Frontenac Axis of the Canadian Shield, approx. 50 km NNE of Kingston, Ontario. Less common Ontario species present included *Enallagma geminatum*, *E. vesperum*, *Lestes forcipatus*, *L. vigilax*, and *Celithemis eponina*. *Pachydiplax longipennis*, and *Celithemis eponina* reach their northern limit in the general region of the park, and provide an example of the pattern of disjunction from the Carolinian zone of extreme southwestern Ontario into the Frontenac Axis." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7597. Catling, P.M. (2002): An evaluation of some characters separating male *Lestes disjunctus* and *Lestes forcipatus* in Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 51-58. (in English) ["Using scatter diagrams and analysis of variance, five characters were evaluated in ninety-three males of *L. forcipatus* and *L. disjunctus* throughout Ontario. The analysis included the morphological characters: (1) relative length of abdominal segments 2 and 3; (2) shape of the penis vesicle; (3) relative size of distal tooth of superior appendage; (4) length of the anterior lamina; and (5) proximity of basal swelling to basal tooth of the superior appendage. Also included were the colour pattern characters: (1) extent of dark colour on side of thorax above metapleural suture; and (2) colour of ventral surface of abdominal segment 10. The length of the anterior lamina discriminated groups well but is a difficult field character. Size of distal tooth on superior appendage along with coloration are recommended to distinguish the two species since both are highly correlated with length of anterior lamina and are also easy to use." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7598. Catling, P.M.; Brownell, V.R. (2002): A preliminary assessment of changes in status of Ontario dragonflies since Walker's published survey in 1941. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 36-48. (in English) ["To elucidate changes in status of Ontario Odonata, the number of records for each of 164 species in Walker's published survey was compared with the number of records for the same species in the year 1999 and year 2000 seasonal summaries. Based on criteria established for reasonable evidence, 29 species have declined and 14 have increased. The result of a greater number of declining species suggests that the threat to dragonfly biodiversity has increased. Species for which there was particularly good evidence of decline, based on meeting 2 of the 3 numeric sub-criteria, included *Somatochlora minor*, *Epiaeschna heros*, *Aeshna verticalis*, and *Somatochlora kennedyi*. Species for which there was particularly good evidence for increase (based on meeting 2 of the 3 numeric sub-criteria) included *Tamea lacerata*, *Argia apicalis*, *Erythemis simplicicollis*, *Celithemis elisa* and *Enallagma civile*. Significantly more than expected of the declining species are currently considered to be at risk and thus rarity criteria that provide a basis for assigning risk are supported. Although based largely on rarity, S-ranks are often indicative of decline. Significantly more than expected of the declining species were associated

with good water quality while significantly more of the increasing species are associated with poor water quality. Thus deteriorating water quality over the past 50 years is implicated as a factor in status change. Species for which there was significant evidence of increase were more often than expected associated with ponds and lakes, than with rivers and streams. A significantly larger than expected proportion of the increasing species had a southern Carolinian or Carolinian Subunit distribution pattern, and a significantly smaller than expected proportion of the decreasing species had such a pattern. This provides further evidence for an increase in "southern" species associated with climate warming. An increase in the numbers of most migratory and/or wandering species is correlated with the recent northward extension of this group, also likely attributable to climatic warming." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7599. Catling, P.M. (2002): Checklist of Ontario Odonata. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 33-35. (in English) ["Following is an update to the checklist of Ontario Odonata (including 166 species, one with 2 subspecies) (Catling and Brownell 2000: Damselflies and Dragonflies of Ontario: Resource Guide and Annotated List. ProResources, 2326 Scrivens Drive, Metcalfe, Ontario, Canada. 200 pp.). That list included additions made after 1975 to the list that could be generated from publications of Dr. E.M. Walker (Walker 1953, 1958, Walker and Corbet 1975). These additions included: *Dromogomphus spoliatus*, *Gomphaeschna furcillata*, *Enallagma anna*, *E. basidens*, *E. triviatum westfalli*, *Hetaerina titia*, *Macromia taeniolata*, *Ophiogomphus mainensis*, *Progomphus obscurus*, *Stylurus amnicola*, and *Stylurus laurae*. The changes made in this edition of the checklist include the dropping of *Sympetrum janeae* which appears too indistinct to warrant recognition (e.g. Donnelly 2001, pp. 9-10), the dropping of *Sympetrum occidentale* following the suggestion of Dr. N. Donnelly upon whose authority and collections it was originally included (see also Donnelly 2001, p. 10), the listing of *Lestes australis* as a species (Donnelly 2001) and the addition of *Ischnura kellicotti*, discovered in 2001." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7600. Catling, P.M.; Brownell, V.R. (2002): Ebony Jewelwing (*Calopteryx maculata*) in northwestern Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 18-19. (in English) ["*C. maculata* is reported from two locations in Kenora district of northwestern Ontario, representing a range extension of 600 km to the northwest within the province, and another example a disjunction north of Lake Superior which is characteristic of 17 of the 166 species (167 taxa) of Odonata occurring in Ontario." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7601. Catling, P.M.; Brownell, V.R. (2002): Rapids Clubtail (*Gomphus quadricolor*) in eastern Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 1-4. (in English) ["*G. quadricolor* is reported from two locations on the Mississippi River in eastern

Ontario. This represents a 320 km northeastern disjunction from the nearest locations in southwestern Ontario, and is 340 km north of the nearest location in New York State. These sites represent the fourth and fifth localities for Ontario. This globally vulnerable species has not been seen since 1939 at two of the five Ontario sites. Only males were observed and only in the very restricted areas of rapids along a relatively slow moving river. All of the known provincial records are summarized in an accompanying table." (Authors)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, ON, K0A 2P0, Canada; E-Mail: brownell@achilles.net

7602. Heideman, N.J.L. (2002): A comparison of the breeding and nonbreeding season diets of *Agama aculeata* and *Agama planiceps* (Reptilia: Agamidae) in Windhoek, Namibia. *Journal of Herpetology* 36(3): 515-520. (in English) [Odonata contributed to the diet of these reptiles, but according an Index of relative importance (IRI) of prey items in the diet of both species during the breeding and nonbreeding seasons, Odonata are assessed as quite irrelevant as diet.] Address: Heideman, N.J.L., School of Life Sciences, University of the North (Qwa-Qwa campus), Private Bag X13, Phuthadithjaba 9866, South Africa. E-mail: heideman@uniqwa.ac.za

7603. Jones, C.D. (2002): Additional records of the River Bluet (*Enallagma anna*) in Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 49-50. (in English) ["Three new sites for *E. anna* from Ontario are described, including new county records for Hamilton, Wentworth, and Wellington counties. Habitats include a small, cool, mucky-bottomed stream, a seepage creek passing through a fen, and a rapid river bordering a seepage fen. The fact that it has now been recorded at two sites on the Credit River that have received relatively good coverage in the past suggests that it is a recent immigrant to Ontario." (Authors)] Address: Jones, C.D., Natural Heritage Information Centre, Ontario Ministry of Natural Res, 300 Water Street, P.O. Box 7000, Peterborough, ON, K9J 8M5, Canada. E-Mail: colin.jones@mnr.gov.on.ca

7604. Jones, C.D.; Bree, D.; Difruscia, R. (2002): Further additions to the Odonata list of Peterborough County, Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 10-12. (in English) [Three new county records are reported for Peterborough County, Ontario from the 2001 field season. They are: *Gomphus adelphus*, *Somatochlora kennedyi*, and *Trautmanella lacerata*. In addition, *Macromia illinoensis*, formerly overlooked in earlier published lists, is "officially" added to the county list. The total species list for the county now stands at 101 species, among the highest counties for Odonata diversity in Ontario. Two of these species are considered provincially rare." (Authors)] Address: Jones, C.D., Natural Heritage Information Centre, Ontario Ministry of Natural Res, 300 Water Street, P.O. Box 7000, Peterborough, ON, K9J 8M5, Canada. E-Mail: colin.jones@mnr.gov.on.ca

7605. Jones, C.D.; Burke, P.S. (2002): Mass multiple species aggregation of dragonflies at Morris Island, Ottawa River. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 31-32. (in English) ["A

multiple species aggregation of several hundred Odonata is reported from Morris Island, Ottawa River, Ontario, Canada. The aggregation appeared to be an overnight roosting site, from which the individuals had not yet dispersed. The aggregation was comprised of one species in the Libellulidae (*Libellula quadrimaculata*) and seven species in the Corduliidae (*Cordulia shurtleffi*, *Dorocordulia libera*, *Epitheca cynosura*, *E. spinigera*, *Helocordulia uhleri*, *Somatochlora forcipata*, and *S. kennedyi*). It is suspected that individuals involved in the aggregation had emerged from ponds and wetlands on Morris Island (or elsewhere nearby) and that the edge of the Ottawa River provided a particularly good foraging site due to a concentration of prey and the topography of the land. The record of *Helocordulia uhleri* is notable in that it may represent the first record of this species from the Ottawa River." (Authors)] Address: Jones, C.D., Natural Heritage Information Centre, Ontario Ministry of Natural Res, 300 Water Street, P.O. Box 7000, Peterborough, ON, K9J 8M5, Canada. E-Mail: colin.jones@mnr.gov.on.ca

7606. Kauppinen, J. (2002): Relative importance of different coloration, smell and shape in the predation of wasps: field experiments on hunting dragonflies (Odonata: *Aeshna grandis*). Master of Science thesis, Dept Biological and Environmental Science Ecology and Environmental Management, University of Jyväskylä: 18 pp. (in English) ["Aposematism is a phenomenon, where poisonous or acrid prey signal their unprofitability to potential predators with conspicuous colouration or some other feature. The mechanisms of aposematism have – excluding a small number of exceptions – been studied from the vertebrate predators' (especially birds) point of view. In contrast, the possible impact of invertebrate predators to the evolution of aposematism has gained only little interest. Dragonflies are a numerous group of invertebrate predators that feed mainly on flying insects and exercise prey selection by vision. Although it has been reported that colours do work as cues in the mating systems of dragonflies no studies have been carried out tackling the question whether dragonflies use their colour vision when exercising prey selection. In the present field experiments I investigated whether hunting *Aeshna grandis* avoid attacking on wasps (Hymenoptera: *Vespula norvegica*), that are a highly unprofitable group of prey for most predators. Further, I was interested in finding out which features of the wasp – colouration, smell and shape – affect the attack rates of hunting dragonflies. To tackle these questions I carried out four field experiments. In the wasp avoidance experiment I offered four different types of living prey (black flies, black-and-yellow flies, black wasps and black-and-yellow wasps) to the hunting dragonflies. I stunned the prey items with carbon dioxide and manipulated all of them either with black or yellow paint. According to the results, the dragonflies avoided the wasps over the flies. Within the flies the black-and-yellow coloured individuals were significantly avoided over the black ones suggesting that aposematic colouration on harmless fly provided a selective advantage against invertebrate predators. Interestingly, there was no significant difference in the reactions towards the black and the black-and-yellow wasps indicating that some other feature in wasps might work as well as an aposematic signal. In the next three experiments I studied the relative importance of the possible aposematic signals: coloration, shape and smell in wasps. First, I tested whether hunting dragonflies react differ-

ently on solid black, black-and-yellow striped and solid yellow artificial prey items. In accordance with the wasp experiment dragonflies clearly avoided the black-and-yellow artificial prey items over the solid black or solid yellow ones. In the second experiment I used two artificial prey types (prey item soaked in mashed wasps and prey item soaked in mashed flies) to test if the smell of the prey alone causes different reactions against the prey. The results suggest that smell of the prey did not have any influence on the dragonfly hunting reactions. In the third experiment I offered artificial wasp shaped and a fly shaped prey item to free flying dragonflies. According to the results there was a slight but not significant difference suggesting that dragonflies were more reluctant in attacking the wasp shaped items than the fly shaped ones. My results suggest that most likely the typical black-and-yellow striping combined with shape makes wasps highly intimidating to dragonflies. Since black-and-yellow striping alone significantly decreased attack rate, even profitable prey species (Batesian mimics) are able to exploit the dragonflies' avoidance to certain colours and colour patterns. It is a task for future work to investigate whether these avoidances are learned or whether they have a genetical basis." (Author)] Address: Kauppinen, J., Vehntie 23, FIN-04400 Järvenpää, Finland

7607. Laking, B.J.; Holt, M.; Falls, J.B. (2002): An annotated checklist of the Odonata of Manitoulin District, Ontario. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 23-31. (in English) [An annotated checklist of the Odonata of Manitoulin District, Ontario is provided with records for 67 species (22 Zygoptera, and 45 Anisoptera). Forty new species have been discovered since 1991. The dragonfly fauna indicates a tension zone with some southern species at or near to their northern limits including *Calopteryx maculata*, *Ischnura posita*, *Nasiaeschna pentacantha* and *Libellula pulchella*, and some northern species at or near their southern limits such as *Aeshna sitchensis* and *Ophiogomphus colubrinus*. The high level of biological significance of the Misery Bay area is further supported by a relatively high odonate diversity including 6 species in various threat categories." (Authors)] Address: Laking, Brend., 9 Glenwood Drive, Huntsville, ON, P1H 1B8, Canada; E-Mail: huntsvilledragonlady@hotmail.com

7608. Pratt, P.D. (2002): *Ischnura kellicotti* (Lilypad Forktail) new to Canada. In: Catling, P.M., C.D. Jones & P. Pratt (Eds): Ontario Odonata, vol. 3. Toronto Entomologist's Association, Toronto, Ontario: 12-13. (in English) [Canada, Ontario; *I. kellicotti* was discovered at Lake Pond, Point Pelee National Park (41°58'N 82°31'W) on 13-VII-2001, and was found to be relatively common in the extensive open beds of *Nuphar* and *Nymphaea* water lilies.] Address: Pratt, P.D., Ojibway Nature Centre, 5200 Matchette Road, Windsor, ON, N9C 4E8, Canada. E-Mail: ppratt@city.windsor.on.ca

7609. Rosalino, L.M.; Santos-Reis, M. (2002): Feeding habits of the common genet *Genetta genetta* (Carnivora: Viverridae) in a semi-natural landscape of central Portugal. *Mammalia* 65: 195-205. (in English, with French summary) [The feeding habits of *G. genetta* (Linnaeus, 1758) were studied in Sintra-Cascais Natural Park, a semi-natural landscape where the mountain contrasts with the surrounding plains. The analysis of

588 scats resulted in the identification of 1926 items among seven main food categories (mammals, birds, reptiles, arthropods, gastropods, fruits and carrion garbage), and also included one adult and odonate larva.] Address: Rosalino, L.M., Centra de Biologia Ambiental, Faculdade de Ciencias, Universidade de Lisbon, Ed. C2, 3ºPiso, Campo Grande, 1749-016 LISBOA Portugal

7610. Taber, B. (2002): Spring dragonfly (Odonata) and butterfly (Lepidoptera) fallout at the Chesapeake Bay Bridge-tunnel. *Banisteria* 19: 26-27. (in English) [Virginia, Maryland, USA. Report from a "frontal boundary and radar visible migration" of dragonflies along the East Coast of USA in end of may and beginning June 3 June 2000. Nine odonate taxa were observed involved in the grounding to escape an approaching thunderstorm.] Address: Taber, B., Coastal Virginia Wildlife Observatory, P.O. Box 912, Eastville, Virginia 23347, USA

2003

7611. Cano Villegas, F.J. (2003): Aportación al conocimiento de la fauna de odonatos (Insecta: Odonata) en una cuenca fluvial costera: río Fuengirola (Málaga, Sur de España). *Boletín de la Sociedad Andaluza de Entomología* 7: 7-15. (in Spanish, with English summary) [Spain; faunistic data about twenty species of Odonata observed in a Mediterranean coastal basin are shown. Zoogeographical analysis shows a high presence of African elements in this basin including *Orthetrum trinacria*, *O. chrysostigma*, *Brachythemis leucosticta*, *Trithemis annulata*, and *Zygonyx torrida*.] Address: Cano Villegas, F.J., Área de Zoología. Departamento de Ciencias Ambientales, Universidad Pablo de Olavide, Ctra. de Utrera Km 1. 41013 Sevilla, Spain. E-mail: fjcarnovil@wanadoo.es

7612. Riaz, H.; Khawaja Basharat, A. (2003): Damselfly naiads (Odonata: Zygoptera) of Sindh-Pakistan. *International journal of agriculture & biology* 5(1): 53-56. (in English) [Larvae belonging to the geni of *Lestes*, *Pseudagrion*, *Ceriagrion* and *Ischnura* are figured.] Address: Riaz, H., Pest Warning and Quality Control of Pesticides, Pakpattan, Pakistan. E-mail: riazhussain37@hotmail.com

7613. Wang, L.-p. (2003): Breeding habitat selection and breeding biology of Blue-tailed Bee-eaters (*Merops philippinus*) on Kinmen Island. Department of Forestry, National Taiwan University, Taipei. Adviser: Yuan Hsiao-Wei: 52 pp. (in Chinese, with English summary) ["I studied habitat selection and breeding biology of blue-tailed bee-eaters (*Merops philippinus*) on Kinmen Island from 2000 to 2002. Blue-tailed bee-eaters were found to only build nest holes on Kinmen layer and sandy soils, which both had lower clay content. On the 822 Blue-tailed bee-eater individuals observed, 84% of them built nest holes on natural cliffs and 16% used artificial habitats, and 92% built nest holes into one-side open colony and only 8% built radical colony. Scan observations revealed the major diet of Blue-tailed bee-eaters were insects that were mostly Odonata (49%), Homoptera (17%), Diptera (13%) and Lepidoptera (12%). I compared the water quality of nearest water bodies of six nest colonies, no significant difference in dissolved oxygen, BOD, pH value and some nutrients nutrients (PO₄-3, NO₃-, N, Cl-, SO₄-2, NH₄+, HCO₃-, CO₃-, Ca, Mg, Na, K). was found between retained and abandoned

nest colonies. Nevertheless, the nearest water bodies of abandoned nest colonies had lower electro-conductivity, which positively correlated with abundance and species richness of dragonflies, the main diet of Blue-tailed bee-eaters. I found that Blue-tailed bee-eaters preferred to build nest holes on cliffs with lower vegetation. We suggested lower vegetation structure might increase their ability to detect nest predators and thus decrease the chance of nest predation. Blue-tailed bee-eaters were mainly colonial breeding and monogamy in Kinmen during the study period. In the breeding season of 2001, 83% of the chicks hatched within a period of nine days, suggesting Blue-tailed bee-eaters might be synchrony breeding. We also found 16 nests had more than two adults jointly feeding chicks, which suggests Blue-tailed bee-eaters might adapt cooperative breeding." (Author)] Address: not transliterated

7614. Wust, E. (2003): Die Libellen des Frastanzer Riedes (Insecta: Odonata) (Vorarlberg, Österreich). In: Stadler, G. & Staub, R. (Red): *Naturmonographie Frastanzer Ried*. Vorarlberger Naturschau - forschen und entdecken, 13. Dornbirn: 195-210. (in German, with English summary) [Austria; 18 Odonata species are autochthonous, 10 are allochthonous species. Compared with studies from 1994, a decrease of species was registered between 2000 - 2002, probably as a consequence of water pollution and sedimentation from highwater floods of the river Ill in 1999.] Address: Wust, E., Elserweg 3a, A-6714 Nüziders, Austria. E-mail: office@wust.at

7615. Zhu, C.-j.; Muraoka, J.; Mizuno, H. (2003): Visual simulation of dragonflies based on aerodynamics. *The Journal of the Society for Art and Science* 2(4): 146-155. (in Japanese, with English summary) ["A dragonfly is a familiar insect by which the sense of season can be shown. The expression of a dragonfly by CG can be expected as an element improving the sense of season in landscape simulation, virtual reality, etc. This paper proposes the flight model of a dragonfly based on aerodynamics. In this model, a dragonfly can be made to fly in real time considering the force caused by the flapping of the wings, performing flight characteristics including steep rise, sudden stop, hover and rapid turn. Furthermore, the flight route of a dragonfly can be easily established depending on the control-points placed in the space." (Authors)] Address: Mizuno, H., hmizuno@tohtech.ac.jp

2004

7616. Brown, T.G.; Winchell, P.; Postans, N. (2004): Benthic community of Shuswap Lake's foreshore. *Can. Manuscr. Rep. Fish. Aquat. Sci.* 2693: iv + 33 pp. (in English, with French summary) ["Substrate trays and a benthic pump were employed to collect samples of the benthic community from the foreshore of Shuswap Lake, British Columbia, Canada. The majority of samples were collected in June and July (1999-2001) from depths of less than two meters. The most numerous benthic invertebrates were: Cladocera, Chironomidae (larvae), Ostracods, Oligochaeta, Calanoida and Nematoda. [...]. The list of samples includes three Odonata taxa: *Aeshna umbrata*, *Enallagma* sp., and *Enallagma cyathigerum*.] Address: Brown, T.G., Fisheries and Oceans Canada Science Branch, Pacific Region, Pa-

cific Biological Station, Nanaimo, BC V9T 6N7, Canada.
E-mail: browntg@pac.dfo-mpo.gc.ca

7617. Cano Villegas, F.J. (2004): Los odonatos del monumento natural de los Sotos de la Albolafia, río Guadalquivir (Córdoba, Andalucía). Boletín de la Sociedad Andaluza de Entomología 11: 7-13. (in Spanish, with English summary) [7 Odonata species were recorded from August of 2002 until August of 2004. *Onychogomphus costae* was found breeding in the area.] Address: Cano Villegas, F.J., Área de Zoología. Departamento de Ciencias Ambientales, Universidad Pablo de Olavide, Ctra. de Utrera Km 1. 41013 Sevilla, Spain. E-mail: fjcanovil@wanadoo.es

7618. Goncalves, J.F.; Santos, A.M.; Esteves, F.A. (2004): The influence of the chemical composition of *Typha domingensis* and *Nymphaea ampla* detritus on invertebrate colonization during decomposition in a Brazilian coastal lagoon. *Hydrobiologia* 527: 125-137. (in English) [The aims of this study were to investigate the structure and composition of the invertebrate community during the detritus decomposition (colonization features) of the two most abundant aquatic macrophytes *T. domingensis* and *N. ampla* in Jurubatiba Lagoon and verify if the chemical composition of the substratum has any influence on invertebrate colonization and which are the functional groups possibly affected by these compounds. The substratum *T. domingensis* had higher percentages of cell wall fraction ($F = 108.33$; $p < 0.0001$) and organic matter ($F = 225.77$; $p < 0.0001$), while nitrogen ($F = 408.61$; $p < 0.0001$) and phosphorus ($F = 224.59$; $p < 0.0001$) contents were higher in *N. ampla*. These differences in the chemical composition of the substrata influenced the decomposition rate, and the detritus of *N. ampla* (4.37% DW day⁻¹) decomposed approximately 26 times faster than the *T. domingensis* (0.17% DW day⁻¹) detritus. The main groups of invertebrates that colonized both substrate were Chironomidae, with more than 50% of the total, followed by Oligochaeta, Nematoda, Copepoda and Cladocera. The results showed that the slow breakdown rate of *T. domingensis* detritus provided a higher probability for colonization and that the main driving force structuring the invertebrates' community was degradative ecological succession (DES).] (Authors) *T. domingensis* was colonized by odonate larvae after 9 days (Libellulidae, Aeshnidae) with a strong increase of abundance/biomass after app. 60-90 days. *N. ampla* was colonized earlier by larvae of Libellulidae and Gomphidae (in high abundances after 9 resp. 16 days).] Address: Gonçalves Jr., J.F., Dept of General Biology, Benthic Ecology Laboratory, Federal University of Minas Gerais, ICB, 486, CEP: 30161-970 Belo Horizonte, MG, Brazil. E-mail: jfjunior@mono.icb.ufmg.br

7619. Komposch, B.; Brunner, H.; Holzinger, W.E. (2004): Wiederfund der Zwerglibelle (*Nehalennia speciosa*) und weitere bemerkenswerte Libellen-Nachweise aus Kärntner Mooren (Insecta: Odonata). *Carinthia II* 194/114: 495-502. (in German, with English summary) [2002; investigations of Odonata in 20 peat bogs in Carinthia, Austria provided records of 16 endangered species, including the first record of *Nehalennia speciosa* for 70 years.] Address: Brunner, Helwig, ÖKO-TEAM, Bergmannsgasse 22, 8010 Graz, Austria. E-mail: office@oekoteam.at

7620. Kuki, N.; Okubo, K. (2004): The relationship between dragonfly communities and environmental conditions in paddy field area on Kamiina district, Nagano prefecture. Abstracts of the Annual Meeting of the Ecological Society of Japan 51: 365. (in English) ["The purpose of this study was to know relationship between dragonflies in paddy area and environmental condition. We selected five various condition study areas (two non-consolidated paddy areas in hilly and mountainous areas, one consolidated paddy area in hilly and mountainous area, one non-consolidated paddy area in urbanized area, one consolidated paddy area in urbanized area.) in the Kamiina district, Nagano Prefecture. The number and behaviour of dragonflies were recorded by route census method. The survey of land utilization was carried out on these areas. The number of all of the species was twenty-three. The number of species and individuals were higher in 3 hilly and mountainous areas than in 2 urban areas. Five study areas were classified into 3 hilly and mountainous area region and 2 urban areas by TWINSpan. Dragonfly communities were classified to seven types. Each type corresponded different environment conditions of waterside, forest and others. It was confirmed that the environmental selection and behaviour of mature dragonflies corresponded to the each species character. The environmental selection of mature dragonflies were different between hilly and mountainous area and urban area. It was clear that dragonfly communities were affected by consolidation and urbanization."] (Authors) Address: Okubo, K., Department of Forest Science, Faculty of Agriculture, Shinshu University, Japan.

7621. Riaz, H.; Khawaja, B.A. (2004): Damselfly naiads (Odonata: Zygoptera) of Sindh-Pakistan. *International Journal of Agriculture & Biology* 5(1): 53-56. (in English) [The genera *Lestes*, *Pseudagrion*, *Ceragrion* and *Ischnura* taxa are considered.] Address: Khawaja, B.A., Department of Zoology, University of Azad Jammu & Kashmir, Muzaffarabad

2005

7622. Béthoux, O.; Papier, F.; Nel, A. (2005): The Triassic radiation of the entomofauna. *Comptes Rendus Palevol* 4(6-7): 609-621. (in English, with French summary) ["Assessing the insect evolution around the Permian/Triassic boundary faces various pitfalls. The taxonomic and phylogenetic frames are not consensually established, and diverse evidences suggest that the record is incomplete. Nevertheless, extensive studies in progress on the super-ordinal clades Archaeorthoptera and Odonoptera reveal common trends. Several important lineages get extinct, and groups underrepresented or absent in Late Permian became major components of the entomofauna in Middle Triassic. In addition, the radiation of the Diptera and the diversification of the Coleoptera in the Triassic also support the hypothesis of an important renewal of the entomofauna at the Permian/Triassic boundary."] (Authors) Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

7623. Bezmaternykh, D.M. (2005): Composition, structure and quantitative characteristic of zoobenthos of the Lake Chany in 2001. *Sibirskii ekologiceskii shurnal* 2: 249-254. (in Russian) [3 Odonata species were recorded (out of a total of 70 benthic invertebrate spe-

cies). Odonata represented ca. 3% of species richness in 2001 but about 10% between 1973-1982. Coenagrion hastulatum was particularly abundant.] Address: Bezmaternykh, D.M., Institute for aquatic and ecological problems, Sibir Branch of the Russian Academy of Sciences, 656038 Barnaul, ul. Molodjeshnaja 1, Russia

7624. Harman, W.N.; Hingula, L.P.; Macnamara, C.E. (2005): Does long-term macrophyte management in lakes affect biotic richness and diversity?. *J. Aquat. Plant Manage.* 43: 57-64. (in English) ["We hypothesize that the richness and diversity of the biota in Lake Moraine (42°50'47"N, 75°31'39"W) in New York have been negatively impacted by 60 years of macrophyte and algae management to control Eurasian watermilfoil (*Myriophyllum spicatum* L.) and associated noxious plants. To test this hypothesis we compare water quality characteristics, richness and selected indicators of plant diversity, zooplankton, benthic macroinvertebrates and fish in Lake Moraine with those in nearby Hatch Lake (42°50'06"N, 75°40'67"W). The latter is of similar size and would be expected to have similar biota, but has not been subjected to management. Measurements of temperature, pH, oxygen, conductivity, Secchi transparency, calcium, total phosphorus and nitrites + nitrates are comparable. Taxa richness and the diversity indices applied to the aquatic macrophytes are similar in both lakes. The greatest disparity is the lack of Eurasian watermilfoil and Canadian waterweed (*Elodea canadensis* Michx.) in the main basin of Lake Moraine. The elimination of the former was the intent of a 2001 application of fluridone (1-methyl-3-phenyl-5-(3-(trifluoromethyl) phenyl)-4(1H)-pyridinone[C₁₉H₁₄F₃NO]) and the loss of the latter was a related consequence. Zooplankton richness is similar in both lakes. The diversity of benthic macroinvertebrates is similar; however, richness at the genus level is quite different. There is a paucity of species collected in Lake Moraine that are intolerant to winter lowering of water levels. Fish species richness in both lakes is similar, but there are differences in specific taxa and percent abundance directly related to stocking and the balance between forage fish populations and piscivorous fish populations in the two lakes. That phenomenon also appears responsible for some of the variation in the zooplankton communities in both lakes. Overall, taxonomic richness and diversity in Lake Moraine and Hatch Lake are remarkably similar. Annual winter drawdown of water levels is implicated as having greater effect on the biota than long-term herbicide utilization. The hypothesis is rejected." (Authors) Odonata accounted to app. 20% of genus-diversity, but to less than 1% of biomass.] Address: Harman, W.N., SUNY College at Oneonta, Biological Field Station (BFS), 5838 ST HWY 80, Cooperstown, NY 13326.

7625. Hua, Y.; Li, H. (2005): Food web and fluid in pitchers of *Nepenthes mirabilis* in Zhuhai, China. *Acta Bot. Gallica* 152(2): 165-175. (in English, with French summary) [*N. mirabilis* "attracts ants and flying insects with floral and extrafloral nectaries, color of pitcher and flower, and possibly flower odor. Its slippery rim and collar trap preys, but some wasps can hold legs on the outside of the rim. Its preys include arthropods in four classes (with nine orders in insect class), plus very few snails and lizards. Fresh fluid sinks, kills, and digests preys (including lizards) quickly, but allows frogs to live in; while old fluid allows mosquitoes to hatch in it. Fluid reaches its maximum amount at pitcher opening. Then, the pH decreases gradually from 6 to 1.9, as the color

changes slowly from colorless to yellow, and finally both pH and color reverse as pitchers dying. Proteinase nepenthesins could be resulted in these special conditions through long evolutionary adaptation." (Authors) The prey includes Coenagrionidae; regrettably it is not outlined if this records are by accident or occur regularly.] Address: Li, H., Biology Department, Frostburg State University, MD 21532, USA. E-mail: hli@frostburg.edu

7626. Johnson, K.E.; Eidiētis, L. (2005): Tadpole body zones differ with regard to strike frequencies and kill rates by dragonfly naiads. *Copeia* 2005(4): 909-913. (in English) ["We assessed *Anax junius* dragonfly naiad strike frequencies and kill probabilities against *Rana sylvatica* (Wood Frog) tadpoles. Strikes fell into five categories according to their placement on the tadpole body: anterior head/body, posterior head/body, head/body-tail intersection, anterior tail, and posterior tail. The kill probability was calculated for each category as the number of kills divided by the number of contacts made in that category. These probabilities varied; a higher probability was found for both the anterior and posterior head/body, and values declined for successively posterior categories. Neither the kill probability nor the size of the body zone influenced the number of strikes to that zone. Surprisingly, the dragonfly naiads struck most frequently at the relatively narrow region of the head/body-tail intersection, suggesting that dragonfly naiads may aim at a specific target." (Authors)] Address: Eidiētis, Laura, Univ. michigan, Dept Ecology & Evolutionary Biology, Kraus Natural Science Cuilding, Ann Arbor, Michigan 48109-1048, USA. E-mail: leidiēti@umich.edu.

7627. Ketelaar, R.; Groenendijk, D.; Joop, P. (2005): Soortbeschermingsplan Hoogveenglanslibel - Species Protection Plan *Somatochlora arctica* 2006-2010. Directie Kennis, Ministerie van Landbouw, Natuur en Voedselkwaliteit, Rapport DK nr. 2005/033: 56 pp. (in Dutch, with English summary) ["*Somatochlora arctica* is a characteristic species of bogs and wet heaths. In the Netherlands, it declined during the last century, and at the moment, only four populations are left. These are situated in the eastern and southern parts of the country (figure 2). The Moorland Emerald can be characterised by its ability to survive in extreme environments. The female deposits her eggs in small, very shallow pools with an overgrowth of *Sphagnum* moss, and therefore hardly any visible water. The larvae are well able to survive prolonged drought and freezing. However, competition with larvae of other dragonfly species is a limiting factor. Adults display a leisurely flight in open woods, tree tops and at woodland edges, where they feed on small insects, and also copulate. As the adults only visit the aquatic breeding sites briefly, it is difficult to establish the species' presence. Aims: During the time allotted to this Species Protection Plan, the aims are: • to know more about the ecology of the Moorland Emerald and the measures required for its conservation, and to convey this knowledge to those concerned with nature conservation in the field; • to integrate this new knowledge into hydrological parts of peat restoration projects and into scientific visions on the functioning of peat ecosystems. Bottlenecks: The future of the Moorland Emerald in the Netherlands is precarious. Important causes are: • desiccation of peatland habitat due to agricultural and forestry practices, excessive usage of ground water, and reduction of

slightly buffered water supply from seepage. • eutrophication of its habitats by nitrogen from agriculture and traffic. Shifts in plant communities may occur, in particular, *Betula pubescens* and *Molinia caerulea* dominance on peat bogs and wet heaths. • habitat loss and fragmentation, reducing population size and isolating populations. • lack of knowledge concerning the ecology of the Moorland Emerald and the hydrology of wet heaths and peat bogs. This lack of knowledge exists also at the level of practical management, illustrating the difficulty of assessing the probability and possibility of raised bog restoration in the Netherlands. • climate change may also affect this species negatively, but measures taken to minimise any of its effects are beyond the scope of this Species Protection Plan. Measures: To ensure that there are sustainable populations of the Moorland Emerald in the Netherlands, the following measures need to be taken: • counter desiccation on both small and large scales by preventing surface drainage and designating buffer zones. For at least two locations, agreements have to be made with nature conservation bodies in neighbouring countries. • reduce eutrophication by taking local measures; these measures should also be supported by national policy. • enlarge and improve present and potential habitats during the term of this Species Protection Plan. • set up research on the ecology of the Moorland Emerald, with particular attention to its breeding sites. At the same time, set up monitoring of all known populations in order to evaluate the effect of local measures. All appropriate measures for the Moorland Emerald in the Netherlands are summed up in an Action Plan. The main purpose of this Species Protection Plan is to increase the current knowledge and subsequently, to apply the new knowledge at the level of practical management, so that effective measures can be taken. The implementation of these measures is the responsibility of the Ministry of Agriculture, Nature and Food Quality, the provinces of Gelderland, Noord-Brabant, Limburg and Overijssel, together with the different owners of nature reserves where the Moorland Emerald occurs. Furthermore, local water boards should also play a crucial role when hydrology plays an important part in a peat restoration project. As these measures take the whole ecosystem into account, they fit into the framework of the so-called "Survival Plan for Forest and Nature". In the case of at least two populations, the co-operation of German or Belgium local authorities needs to be sought." (Authors)] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

7628. Kobayashi, H.; Toda, H. (2005): Life history of a water mite (*Piona carnea*) in Lake Shirakomaiké. 11-15. (in Japanese, with English summary) ["Life history of *P. carnea* was studied in a mountain humic lake (Lake Shirakomaiké) in Nagano prefecture, Japan from May in 1999 to February in 2000. *P. carnea* appeared in plankton assemblage from late May to late October. Females having eggs were observed between late May and late July. They attached their eggs on aquatic plants in the west coast of the lake from late June to late July. In the coastal area, the first larval stage (larvae) appeared from early July to early August, and parasitized the 2nd and 3rd-year larvae of Odonata. The second larval stage (nymphs) was observed in a plankton assemblage from early July to mid September. In mid September the second pupae were observed on aquatic plants in the west coast. New recruitments of adults

appeared in late September. *P. carnea* disappeared from plankton assemblage until the end of October, and accumulated in the lake bottom from November to probably April. A dense population was found on 18 November (267 individuals nr2) and on 7 February (281 individuals nr2) in the bottom at the lake center. *P. carnea* completes its life history each year in Lake Shirakomaiké." (Authors)] Address: Toda, H., Dept of Environmental sciences Faculty of Science, Shinshu University

7629. Mello, M.J. (2005): Inventory of macrolepidoptera and other insects in the Boston Harbor Islands National Park area. *Northeastern Naturalist* 12 (Special Issue 3): 99-144. (in English) [Maine, USA; 10 Odonata species are reported from fourteen islands within the Boston Harbor Islands national park area. Although sampling was limited, the paucity of odonates may be related to the lack of fresh water within the park; however, feeding swarms of the larger, migratory odonates were expected over the fields of Worlds End. The taxa are documented in Appendix IV.] Address: Mello, M.J., Lloyd Center for Environmental Studies, 430 Potomska Road, Dartmouth, MA 02748, USA E-mail: research@thelloydcenter.org.

7630. Nicoara, A.; Nicoara, M.; Bianchini, F. (2005): Diet composition during breeding period in populations of *Bufo viridis*, *Pelobates fuscus* and *Rana esculenta* complex from Ciric river's basin (Iasi, Romania). *Analele Sinfice ale Universitatii "Al.I. Cuza" Iasi, s. Biologie animala*, LI: 179-187. (in English) [In March-June 2004, 1263 prey specimens were identified in the 143 anuran individuals collected of three anuran species. In *B. viridis* 95.25% of the preys were insects, 2% arachnids. In *P. fuscus*, insects represented 74.19% and arachnids 16.12%, while in *R. esculenta* complex, 82.52% were insects and 10.22% crustaceans. Odonata (one specimen) exclusively were represented in the diet of *P. fuscus*.] Address: not stated

7631. Nogami, K.; Takeyama, H. (2005): A study on relation between the appearance of butterflies and dragonflies, and the temperature environment of a big tree. *Papers on Environmental Information Science*, No.19 (The 19th Conference on Environmental Information Science): 19-24. (in Japanese, with English summary) [Verbatim: "In this research, it aimed at clarifying relation between the appearance of butterflies and dragonflies, and the temperature environment of a big tree. A result is shown in the following; 1) Even if it was one big tree, when meeting conditions with various temperature environments, it was able to observe that a big tree was important as a habitat of a butterflies and dragonflies. 2) The big tree is functioning as a stepping stone for a butterfly or a dragonfly. 3) A big tree, water, wood, a vegetable garden, etc. are designed in one, and the appearance of a butterfly and a dragonfly increases by making temperature environment various." (Authors)] Address: Takeyama, H., The Museum of Nature and Human Activities, Hyogo, Japan

7632. Pennuto, C.M.; Lane, O.P.; Evers, D.C.; Taylor, R.T.; Loukmas, J. (2005): Mercury in the Northern Crayfish, *Orconectes virilis* (Hagen), in New England, USA. *Ecotoxicology* 14: 149-162. (in English) ["Biologists and policy makers continue to seek environmental correlates of mercury bioavailability in aquatic ecosystems. In this study, we assessed the effects of drainage basin, habitat type, size class, and sex on mercury con-

centrations in *O. virilis*. Drainage basin, habitat type, and size class had significant effects on mercury concentration in crayfish tail muscle even though animals from roughly half the sites examined had mean mercury values at or below expected background levels. The low observed mercury values in crayfish tail muscle indicate a low consumptive risk. Contrary to expectations, crayfish from brooks had higher mercury concentrations than animals from other habitat types, possibly as a result of point source contamination or varying diet compositions among habitats. We suggest that crayfish represent a good indicator of mercury bioavailability in aquatic ecosystems and provide a synthesis for lower food webs. Our understanding of mercury dynamics in lower food webs has been hindered by an under appreciation of the complexity in foraging habits of macroinvertebrates. Further studies focusing on benthos with well-understood life histories and foraging behaviour are essential to improve our understanding of mercury transfer and bioavailability through aquatic systems." (Authors) Patterns in total mercury concentration of benthic macroinvertebrates in lake and river habitats are compared between orders, and including Odonata.] Address: Pennuto, C.M., Dept of Biology & Center for Great Lakes Research, Buffalo State College, Buffalo, NY, USA, 14222. E-mail: pennutcm@buffalostate.edu

7633. Smith, M.J.; Drew, M.M.; Peebles, M.; Summers, K. (2005): Predator cues during the egg stage affect larval development in the Gray Treefrog, *Hyla versicolor* (Anura: Hylidae). *Copeia* 2005(1): 169-173. (in English) ["The presence of predators can induce changes in the morphology and behaviour of the potential prey. In this study, we examined the effects of different predator induced changes in water chemistry experienced during the egg stage on larval development in the Gray Treefrog. The potential predators of amphibian eggs and tadpoles used in this study included larval odonates (Aeshnidae), crawfish, and leeches. Tadpoles from eggs exposed to leech-induced changes in water chemistry were consistently smaller throughout their larval development than the tadpoles in the control and other potential predator treatments. Size at metamorphosis did not differ significantly among treatments, but the tadpoles in the leech treatment were significantly older at metamorphosis than tadpoles in the other treatments. These results highlight some of the potential fitness consequences for larval *H. versicolor* that received predator cues during the egg stage." (Authors) Nested analysis of variance showed a significant effect of predator treatment on age at metamorphosis. Tadpoles exposed to the leech treatments were significantly older at metamorphosis than the tadpoles in the control ($P < 0.05$), crawfish ($P < 0.05$), and odonate ($P < 0.08$) treatments. All other treatments did not differ significantly from each other in age at metamorphosis.] Address: not stated

7634. Stoks, R.; Nystrom, J.L.; May, M.L.; McPeck, M.A. (2005): Parallel evolution in ecological and reproductive traits to produce cryptic damselfly species across the Holarctic. *Evolution* 59(9): 1976-1988. (in English) ["The damselfly genus *Enallagma* originated in the Nearctic, and two Nearctic lineages recently underwent radiations partly associated with multiple independent habitat shifts from lakes dominated by fish predators into lakes dominated by dragonfly predators. A previous molecular study of four Palearctic morphospecies and all representative Nearctic species identified

the presence of two cryptic species sets, with each set having Palearctic and Nearctic representatives. However, the cryptic species within each set are not sibling species. Here, we present quantitative data on ecologically important larval morphologies and behaviours involved in predator avoidance and on adult male morphological structures involved in mate recognition to quantify the phenotypic relationships among these cryptic species sets. For the adult stage, our data indicate strong parallel evolution of the structures involved in specific mate recognition - the male cerci. For the larval stage, morphometric analyses show that the Palearctic species evolved a nearly identical morphology to the sibling-clade members in the Nearctic that live in waters where dragonflies are the top predators. This implicates the importance of dragonfly predation in the history of the Palearctic clade. Behavioural analyses suggest population differentiation in response to the actual predator environment in the Palearctic clade, consistent with the species differentiation seen in the Nearctic. Our results suggest parallel evolution of adult traits that influence specific mate choice and larval traits that influence ecological performance underlie the striking similarity of *Enallagma* species across continents. This concurrent parallel evolution in both stages of a complex life cycle, especially when both stages do not share the same selective environment, may be a very unusual mechanism generating cryptic species." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U. Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

7635. Stolen, E.D. (2005): Great Egrets gleaning dragonflies. *Florida Field Naturalist* 33(1): 15-16. (in English) ["Although mainly piscivorous, the Great Egret (*Ardea alba*) takes a variety of food items including dragonflies (McCrimmon et al. 2001, Hancock and Kushlan 1984, Palmer 1962). Clark (1980) described gleaning of dragonflies from low salt marsh vegetation by Tricolored Herons (*Egretta tricolor*) near a nesting colony. Gleaning of insects is noted as a foraging behaviour of Great Egrets in Kushlan (1978), but I could find no published description of gleaning behaviour for the Great Egret. On the morning of 24 March 2003, I was measuring foraging rates of wading birds feeding in impounded salt marsh habitat along the Black Point Wildlife Drive on Merritt Island National Wildlife Refuge near Titusville, Florida. Between 10:30 and 12:00 I observed four Great Egrets gleaning dragonflies which were perched on the ends of stems of sand cord grass (*Spartina bakeri*) and salt grass (*Distichlis spicata*). From my observation point 35 m away, the length of each dragonfly's body appeared to be less than one-quarter of the length of a Great Egret bill, which is typically in the range of 11 cm (Palmer 1962). Two of the Great Egrets that gleaned dragonflies were foraging in a loose mixed species foraging aggregation (individuals separated by 15-50 m) including four Great Egrets, and one Tricolored Heron. The other two Great Egrets observed eating dragonflies were foraging solitarily (greater than 100 m to the nearest other wading bird). During the time the birds were observed gleaning dragonflies, the birds were moving slowly through the vegetation with the neck extended in an upright posture and body angled away from the ground. The dragonflies were captured with rapid strikes of the head and neck and were swallowed immediately. One of the birds captured six fish and one dragonfly during the three minutes I observed its foraging behaviour; two others captured only dragon-

flies during the three minutes (one and three dragonflies captured). The last individual observed gleaning dragonflies was not observed long enough to quantify its foraging behavior. Thus, dragonfly gleaning behaviour appeared to be a foraging strategy rather than incidental or opportunistic captures during foraging for other prey. The weather was typical of early spring in Florida, with clear skies and air temperature around 22°C with a light wind around 11 km/h. On numerous occasions while conducting monthly aerial surveys of wading bird foraging habitat use during the past six years, I have noticed small groups of Great Egrets foraging in non-flooded *Spartina bakeri* salt marsh during the winter dry season. These groups typically consist of 2-10 individuals separated by 10-100 body lengths. Individuals appear to be standing upright and are stationary or moving slowly within the tall (1-2 m) grass. Accounts of Great Egrets taking various small mammals (Palmer 1962) led me to assume that the birds were foraging for terrestrial vertebrates, but clearly they may have been foraging for insects." (Authors)] Address: Stolen, E.D., Dynamac Corp., Mail Code: DYN-2, Kennedy Space Center, FL 32899, USA

7636. Sudo, S.; Tsuyuki, K.; Kobayashi, T. (2005): Experimental study on the collision of a droplet with a dragonfly wing. *Journal of the Japanese Society for Experimental Mechanics* 5(3): 272-279. (in Japanese, with English summary) ["The collision dynamics of a water droplet on a wing surface of live dragonfly were studied using a high-speed video camera system. The high-speed video camera system is composed of two video cameras, two video cassette recorders, motion grabber, two video monitors, and a personal computer. This experimental study focused mainly on the function of the dragonfly wings for the droplet collision. The dynamic response of dragonfly wing was studied for two impact velocities of water droplet. It was found that live dragonfly wings have excellent shock absorption and deformability for the rain droplet collision." (Authors)] Address: Sudo, S., Faculty of Systems Science and Technology, Akita Prefectural University, Ebinokuchi 84-4, Yurihonjo 015-0055, Japan

7637. Tennessen, K.J. (2005): The larvae of *Enallagma davisii* Westfall and *E. recurvatum* Davis (Odonata: Coenagrionidae). *J. New York Entomol. Soc.* 113(3-4): 205-211. (in English) ["Larvae of *E. davisii* and *E. recurvatum* have round gill tips similar to *E. minusculum* but final stadia are significantly larger (total length 11.4-13.8 mm for *davisii* and *recurvatum* combined vs. 9.5-9.7 mm for *minusculum*) and the lateral carinae of abdominal segments 2-7 have distinct stout setae. The prementum of *E. davisii* (length 1.85-2.30 mm, width 1.56-1.80 mm; n=10) is slightly larger than that of *E. recurvatum* (length 1.75-1.85 mm, width 1.48-1.53 mm; n=5). The cerci of *E. davisii* in lateral view are wider than long in males and about as wide as long in females; in *E. recurvatum* the cerci are longer than wide in both sexes." (Author)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

7638. Van de Meutter, F. (2005): Local and regional processes in macroinvertebrate communities in shallow lakes. Proefschrift voorgedragen tot het behalen van de graad van Doctor in de Wetenschappen. Katholieke Universiteit Leuven. Faculteit Wetenschappen. Departement Biologie. Laboratorium voor Aquatische Ecologie:

205 pp. (in English, with Dutch summary) ["This thesis consists of three major parts. A first part deals with the interaction of the local factors turbidity and predation with lake macroinvertebrates and macroinvertebrate community structure in lakes. In the second part we investigate to what extent the presence of littoral invertebrate predators may interfere with horizontal migration behaviour of *Daphnia*. Finally, in the third part we focus on the effects of the regional process dispersal and the interaction between dispersal and the drainages of the lakes, on structuring lake macroinvertebrate (meta)communities." (Author) Odonata are studied in many cases, especially in Chapter 2 (Water turbidity affects predator-prey interactions in a fish-damselfly system), Chapter 3 (Behavioural linkage of pelagic prey and littoral predators: microhabitat selection by *Daphnia* induced by damselfly larvae), and Chapter 4 (Spatial avoidance of littoral and pelagic invertebrate predators by *Daphnia*). *Summaries: Chapter I: The effect of turbidity state and microhabitat on macroinvertebrate assemblages: a pilot study of six shallow lakes.* Shallow lakes can occur in two alternative stable states, a clear-water state and a turbid state. This is associated with separate assemblages of fish, zooplankton and plants. Little is known about whether macroinvertebrate assemblages differ across both stable states. This study investigated this in a connected set of three turbid and three clear-water shallow lakes. To overcome confounding effects of differences in spatial structure of macrophytes in turbid and clear-water lakes, we sampled three microhabitats that occurred in both alternative stable states: open water, sago pondweed (*Potamogeton pectinatus*) and reed (*Phragmites australis*). Univariate analyses indicated no differences in the number of organisms, taxon richness or diversity between turbid and clear-water lakes. Multivariate analysis, however, indicated a trend towards differences in the macroinvertebrate community structure of both stable states. Two taxa explained a significant amount of the variation between both lake types, both of which preferred the clear-water lakes. The number of organisms and the taxon richness were higher in reed than in the other microhabitats, but diversity and evenness did not differ among the microhabitats. Multivariate analyses separated all three microhabitats. Four taxa, mainly detritus feeders and collector-gatherers, explained most of the variation in the data and preferred the reed microhabitat. The effects of turbidity state (11.8 % explained variance) and microhabitat (24 % explained variance) on the macroinvertebrate assemblages were largely independent from each other (2 % shared variance). Although macroinvertebrates are not implemented in the initial theory of stable states, our results indicate different assemblages across both stable states. *Chapter II: Water turbidity affects predator-prey interactions in a fish-damselfly system.* Community structure may differ dramatically between clear-water and turbid lakes. These differences have been attributed to differences in the cascading effect of fish on prey populations, due to the reduced efficiency of fish predation in the presence of macrophytes. However, recent theoretical ideas suggest that water turbidity may shape predator-prey interactions, and it is predicted that prey will relax its antipredation behaviour in turbid water (H1). As a result, the nature of predator-prey interactions is expected to shift from both direct and indirect in clear water to dominantly direct in turbid water (H2). We tested these ideas in a fish-damselfly predator-prey system. In a first behavioural experiment, we looked at antipredation behaviour of damselfly lar-

vae isolated from habitats that differ in turbidity, in the presence of fish in clear and turbid water. As predicted in H1, the larvae were more active in turbid than in clear water. In a complementary enclosure experiment, we reared larvae in a clear-water pond and a turbid pond, respectively, and manipulated the origin of the larvae (clear-water, turbid pond), fish presence (absent, present), and vegetation density (sparse, abundant). In both ponds, fish had a direct negative effect on survival of the larvae, which was mitigated in the presence of vegetation. In the fish treatment, the change in average body mass tended to be higher in the turbid than the clear pond, suggesting indirect effects of fish were mitigated in the turbid pond. This was supported by a negative effect of fish on effective growth rate of larvae in the clear pond, but not in the turbid pond. These results are compatible with the idea that predator-prey relationships are mainly governed by direct effects in turbid water, and by direct and indirect effects in clear water.

Chapter III: Behavioural linkage of pelagic prey and littoral predators: microhabitat selection by Daphnia induced by damselfly larvae. Only recently ecologists started treating the previously separately considered benthic, littoral and pelagic zones of lake ecosystems as closely connected compartments. Here we study a link between organisms belonging to a different compartment - namely the pelagic and the littoral - through behaviour in a series of laboratory experiments. Waterfleas of the genus *Daphnia* are inhabitants of the pelagic zone and suffer a high predation pressure from syntopic vertebrate predators (mainly fish). Presumably to escape this predation, they sometimes migrate in the day to the littoral to seek refuge within macrophytes and return to the pelagic at night. Zygopterans from the genus *Ischnura* do commonly co-occur in ponds with *Daphnia* and are known as opportunistic predators of *Daphnia*. In two initial experiments in microcosms in the lab we showed that *Ischnura* larvae are littoral predators strongly associated with macrophytes. Although we found that predation rates of individual *Ischnura* larvae on *Daphnia* are approximately 1.5 fold lower in macrophytes compared to open water, total predation from *Ischnura* on *Daphnia* per unit area is tenfold higher within macrophytes than in open water, making the open water a safer place for *Daphnia* with regard to *Ischnura* predation. In a third microcosm experiment we monitored horizontal distribution of *Daphnia* in the absence, presence and odour only of *Ischnura* larvae. After 2 hours, on average 10 % less *Daphnia* remained within the vegetation when *Ischnura* larvae or only their odour were present compared to when *Ischnura* or *Ischnura* odour were absent. We interpret this as a behavioural anti-predation response of *Daphnia* to the presence of *Ischnura* larvae that seems primarily chemically mediated. The observed horizontal migration of the pelagic prey driven by the littoral predator may couple both lake compartments and may interact with the predator-prey relationships within the pelagic.

Chapter IV: Spatial avoidance of littoral and pelagic invertebrate predators by Daphnia. Studies on spatial avoidance behaviour of predators by prey often ignored the fact that prey typically face multiple predators which themselves interact and show a spatial pattern in abundance and predation rates. In a series of laboratory experiments we investigated predation risk and horizontal migration of the cladoceran *Daphnia magna* between open water and vegetation in response to two important invertebrate predators with a contrasting spatial distribution: pelagic *Chaoborus* and vegetation-as-

sociated *Ischnura*. As expected, predation risk by *Chaoborus* was higher in open water due to higher numbers and higher predation rates of *Chaoborus*, while for *Ischnura*, predation risk was highest in the vegetation due to higher densities but despite lower predation rates of *Ischnura*. In accordance with this, *Daphnia* moved into the vegetation in the single presence of the pelagic *Chaoborus*. In the single presence of *Ischnura*, however, *Daphnia* showed no response. We hypothesize this may be the result of a constitutive behaviour of *Daphnia* to avoid pelagic fish, which impedes a response to the open water. In the combined predator treatment, *Daphnia* migrated to the open water zone. The increased risk of predation in the vegetation, due to a facilitating effect of *Chaoborus* on *Ischnura* predation rates is believed to have caused this migration of the *Daphnia*. This response of *Daphnia* declined through time and *Daphnia* moved toward the vegetation. A decline in the activity of the *Ischnura* larvae through time may have switched the risk balance in favour of the vegetation environment.

Chapter V: Lake-to-lake dispersal of lentic macroinvertebrates through lake outlets. Little is known on dispersal of lentic macroinvertebrates. We quantified dispersal of lentic macroinvertebrates through lake connections in a highly connected lake system, and investigated the role of connection properties and timing (day, night) on dispersal rate. Furthermore, by comparing dispersing macroinvertebrate assemblages with the macroinvertebrate assemblages of source lakes, we tested whether dispersal was neutral or a taxon-specific process. Many taxa dispersed through the lake connections, probably mainly by passive transport. Taxon richness of the dispersing macroinvertebrate assemblage was proportional to taxon richness in the source lakes. The number of individuals that dispersed, however, was not related to source lake densities, possibly because of the highly patchy distribution of lentic macroinvertebrates within lakes and the relatively short sampling time. Baetidae, Chironomidae and Physidae exhibited higher dispersal rates, corrected for source pond densities, than a selection of seven other macroinvertebrate families, indicating that the extent of dispersal may be taxon-specific. None of the physical properties of the connections affected dispersal. The number of dispersing macroinvertebrates was higher during the night than during daytime. Of seven frequently dispersing families, Chaoboridae and Chironomidae showed higher dispersal during the night, probably resulting from diel vertical migration behaviour. Dispersal rates of actively and passively over-land dispersers through lake connections did not differ. Since over-land dispersal probably is more frequent in active dispersers compared to passive dispersers, dispersal through lake-outlets in connected lake systems may generate different spatial patterns compared to over-land dispersal with regard to the composition of communities and the genetic structure of populations.

Chapter VI: Rapid response of macroinvertebrates to drainage management of shallow lakes. Shallow lakes throughout the world are subject to drainages, either as part of fish farming practices to harvest the fish, or as part of lake restoration projects. Lake drainages of fish lakes are known to improve macrophyte and zooplankton diversity, but the effect on the macroinvertebrate community is poorly known. In this study, we investigated temporal trends in the macroinvertebrate community following lake drainage in six shallow connected lakes. We evaluated drainage effects for all macroinvertebrates at the family level and for Coleoptera, Hemi-

ptera and Odonata at the genus or species level. After the drainages, diversity increased for all macroinvertebrates at the family level, Hemiptera and Odonata. Taxon richness increased for Coleoptera, Hemiptera and Odonata. Recolonization of the lakes by the former inhabitants occurred within the first year after the drainages and was supplemented with a set of species that previously were rare or did not occur in the lakes. Changes in the environmental conditions of the lakes were small and transient, except for the decline in fish. The fact that species that occurred in the lakes before the drainages rapidly recolonized the lakes is attributed to the high connectivity in our study system. The occurrence of supplementary species probably was linked to the decline in fish predation, suggesting fish was a dominant factor in shaping the communities. In summary, lake drainage has a positive effect on the diversity and richness of macroinvertebrates in shallow connected lakes. This positive effect seems largely due to a combination of a decline in fish predation following lake drainage and the high rate of recolonization amongst others via connections to nondrained lakes. Lake drainage therefore probably is the most cost-effective lake restoration tool in shallow connected lakes. Other restoration tools may be more favourable in isolated lakes where recolonization may be constrained.

Chapter VII: Metacomunity structure of lentic macroinvertebrates: contrasting active and passive dispersers. Macroinvertebrates inhabiting ponds and lakes can be categorized as active or passive dispersers. Because dispersal over land is assumed to be very limited in passive dispersers, connections between lakes may provide important additional dispersal corridors between lakes. Active dispersers can easily fly from lake to lake over land, and the additional contribution of dispersal via lake connections to dispersal may be negligible. As a result, metacomunities of active and passive macroinvertebrate dispersers may be differentially affected by lake connectivity and hence show different spatial structures. We investigated this hypothesis in a system of 34 connected lakes. In agreement with our expectations, we found that communities of passively dispersing macroinvertebrates were regionally structured according to a spatial model that incorporated the connections among the lakes, while active dispersers were not. Active dispersers, and surprisingly also passive dispersers, were also strongly structured conform the spatial model of Euclidian distances among the lakes, possibly suggesting that over-land dispersal as well was an important dispersal mechanism. These results confirm the importance of connectivity among habitats for metacomunity structure and dynamics, but also indicate that the net effect of connectivity on metacomunity structure depends on the prevailing mode of dispersal of the organisms.

Chapter VIII: Habitat selection drives macroinvertebrate community turnover along the hydroperiod gradient. Community turnover along the hydroperiod gradient is generally assumed to result from local selective mechanisms, abiotic limitation and species sorting, while the possibility of habitat selection behaviour is largely ignored. In this study, the colonizing assembly of macroinvertebrates in small, fishless habitats deviated strongly from that observed in a surrounding large set of fish lakes. By studying distance-similarity relationships, we could show that fish lakes did not act as sources for the colonization of the fishless habitats. We argue that neither abiotic limitation, nor species sorting due to invertebrate predators in the fishless habitats or due to fish in the fish lakes were able to

explain the observed patterns. Our results indicate that strong habitat selection may substantially contribute to community turnover along environmental gradients observed in nature, thereby offsetting a direct role for abiotic limitation and species sorting.] Address: Van de Meutter, F., Laboratorium voor Aquatische Ecologie, K.U. Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: frank.vandemeutter@bio.kuleuven.ac.be

7639. Vega, F.J.; García-Criado, F.; Miguélez, D.; Valladares, L.F. (2005): Diversidad de odonatos en los humedales rehabilitados del Parque Natural de Salburua (Álava). *Estudios del Museo de Ciencias Naturales de Álava* 20: 107-114. (in Spanish, with English summary) ["Adult Odonata were sampled from May to September 2003 in Salburua Natural Park (Álava, Basque Country, Spain) with the aim of characterising the diversity of this group in the area. The specimens were actively captured from 7 sampling stations using hand nets. 27 species (16 Zygoptera and 11 Anisoptera) were recorded. One of them, *Sympetrum meridionale*, is cited for the first time from the province of Álava and its presence in the Basque Country is confirmed. The richness value can be considered high when compared with studies conducted in other areas. This fact, together with the presence of some threatened species, specially *Coenagrion mercuriale* (National Catalogue of Threatened Species and Annex II of the Habitat Directive) and *Coenagrion scitulum* (designated as vulnerable in Europe by some authors), allow us to consider Salburua as an area of special interest for odonate conservation in the Basque Country." (Authors)] Address: Vega, F.J., Depto de Biología Animal, Facultad de Ciencias Biológicas y Ambientales, Universidad de León. 24071 León, Spain. E-mail: dbafvm@unileon.es

7640. Venturelli, P.; Tonn, W.M. (2005): Invertebrate communities of littoral macroinvertebrates in small boreal lakes. *J. N. Am. Benthol. Soc.* 24(4): 904-918. (in English) [Canada, Alberta; "Recent comparative studies suggest that macroinvertebrates in small Boreal Plains lakes respond to large fluctuations in fish densities caused by winterkill and subsequent recovery even when such fluctuations involve the normally piscivorous northern pike (*Esox lucius*). We introduced pike into a boreal lake made fishless by a past winterkill to isolate experimentally the effects of pike on littoral macroinvertebrates. We compared postmanipulation macroinvertebrate data from the experimental lake (EXP) to premanipulation data from the same lake, to parallel data from 2 unmanipulated reference lakes (R1 and R2) containing pike, and to data from mesocosms within EXP. Pike in all 3 lakes preyed heavily upon macroinvertebrates; diets consisted predominantly of the amphipod *Gammarus lacustris* in R1 and R2 and erpobdellid leeches in EXP. Principal components analysis (PCA) of macroinvertebrate communities distinguished between systems with and without fish and detected a shift in the macroinvertebrate community of EXP and predator-exposed control mesocosms away from large conspicuous taxa (e.g., odonates, coleopterans, and leeches) toward less-conspicuous taxa such as dipterans and trichopterans following manipulation. Responses of individual taxa were generally in agreement with PCA; erpobdellid leeches and odonates showed consistent negative responses to pike. Our study provides experimental evidence at the whole-lake scale that northern pike can affect littoral macroinvertebrates in small boreal lakes, and demon-

strates the sensitivity that littoral food webs in these systems can have to changes in the density of fish." (Authors)] Address: Venturelli, P., Dept Biological Sciences, University of Alberta, Edmonton, Alberta, Canada T6G 2E9

7641. Wu, Z.-j.; Li, Y.-m.; Wang, Y.-p.; Adams, M.J. (2005): Diet of introduced bullfrogs (*Rana catesbeiana*): Predation on and diet overlap with native frogs on Daishan Island, China. *Journal of Herpetology* 39(4) : 668-674. (in English) [The authors examined the diet of introduced *Rana catesbeiana* and three native frog species (*R. limnocharis*, *R. nigromaculata*, and *Bufo bufo gargarizans*) co-occurring at a group of ponds on Daishan Island, east of China, to gain insight into the nature of potential interactions between Bullfrogs and native frog species. The three most important diet items for juveniles bullfrogs were *Cambaridae* (33.60%), *Bassomatophore* (12.57%), and *Odonata* (11.35%). The diet of female bullfrogs and *Bufo bufo gargarizans* didn't include *Odonata*."] Address: Wu, Z.-j., Institute of Zoology, Chinese Academy of Sciences, 25 Beisihuanxi Road, Haidian, Beijing 100080, China

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7642. Aowphol, A.; Thirakhupt, K.; Nabhitabhata, J.; Voris, H.K. (2006): Foraging ecology of the Tokay gecko, *Gekko gekko* in a residential area in Thailand. *Amphibia-Reptilia* 27: 491-503. (in English) ["The foraging behaviour of *G. gekko* was observed at the visitor complex of the Khao Khiao Open Zoo at the Khao Khiao-Khao Chomphu Wildlife Sanctuary in Chon Buri Province, Thailand. Foraging parameters of *G. gekko* (foraging period, time spent moving, foraging attempts, foraging success, prey size consumed, and foraging distance) did not vary significantly between males, females, and juveniles. Individuals foraged between 18:01 and 09:00 hrs. Peak emergence time was between 18:01 and 20:00 hrs. Peak retreat time was between 04:01 and 07:00 hrs. Major food items included insects of the orders *Lepidoptera*, *Orthoptera*, and *Coleoptera*. Prey sizes of males, females, and juveniles were not significantly different, indicating no prey size selection. This may have been due to low insect availability in the habitat. *G. gekko* tended to be a sit-and-wait forager spending most of the time waiting for active prey. However, it sometimes foraged more actively when insect abundance was relatively high. Foraging behavior of males tended to be more variable than females and juveniles. In addition, variation in foraging parameters among individuals was noted. Foraging strategies of *G. gekko* observed in this study are interpreted in the context of optimal foraging theory." (Authors) *Odonata* are preyed, but seem to play a minor role as food source compared with other insect orders.] Address: Thirakhupt, K., Dept Biology, Faculty of Science, Chulalongkorn University, Pathumwan, Bangkok, 10330 Thailand. E-mail: Kumthorn@sc.chula.ac.th

7643. Aygen, D.; Emslie, S.D. (2006): Royal Tern (*Sterna maxima*) Chick Diet at Fisherman Island National Wildlife Refuge, Virginia. *Waterbirds* 29(3): 395-400. (in English) [In 2003, chick diet of Royal Tern included one undetermined dragonfly.] Address: Emslie, S.D., University of North Carolina, Department of Biology and Marine Biology, 601 S. College Road, Wilmington, NC 28403, USA. E-mail: emslies@uncw.edu

7644. Bartninkaite, I.; Bernotiene, R.; Pakalniškis, S.; Žygiutienė, M. (2006): Control of bloodsucking black fly (*Simuliidae*) populations in Lithuania. *Ekologija* 4: 70-75. (in English) ["The outbreak of bloodsucking black flies began in the 70s of the 20th century in the south-eastern part of Lithuania. By 1990, the biting activity of bloodsucking black flies increased and had become a serious problem. The bloodsucking insects caused losses of cattle and domestic birds and tormented holiday-makers in the Druskininkai health-resort. Biological larvicide based on *Bacillus thuringiensis* var. *israelensis* was used for bloodsucking black fly control in 1999–2005. The larvicide was introduced into the Nemunas River stream in one point directly from the river bank. A sufficient efficacy was achieved in a 164 km long segment of the river every year." (Authors) No effects on *Odonata* are observed.] Address: Bernotiene, Rasa, Institute of Ecology of Vilnius University, Akademijos 2, LT-08421 Vilnius, Lithuania. E-mail: rasab@ekoi.lt

7645. Bedjanic, M. (2006): Current status of taxonomy, research and conservation of dragonfly fauna (*Insecta: Odonata*) of Sri Lanka. *Bambaradeniya, C.N. B. (Ed): Fauna of Sri Lanka. Status of Taxonomy, Research and Conservation. IUCN: 20-34.* (in English) ["Altogether 116 described odonate species are known from Sri Lanka. The level of endemism is high - 53 taxa or 45.7 % are confined to the island. The families *Chlorocyphidae*, *Euphaeidae*, *Protoneuridae*, *Platystictidae*, *Gomphidae* and *Corduliidae* consist of almost exclusively endemic taxa. Additionally, four new endemic species are currently being described, bringing the actual number of dragonfly taxa to a total of 120 and the number of endemic representatives to a total of 57 taxa or 47.5 %. The odonate fauna of Sri Lanka is still insufficiently known. The knowledge on distribution, biology and taxonomy of adults and especially larval forms is very poor. Destruction of primary and secondary rainforests, destruction of forest corridors along streams, pollution and other pressures on streams and rivers in the southwestern and central parts of Sri Lanka are the major threats to the exceptionally rich endemic dragonfly fauna. More than 80% of the species confined to Sri Lanka are classified as endangered. Altogether 20 highly threatened endemic dragonfly species from Sri Lanka are currently proposed for inclusion on the new IUCN Global Red List of Threatened Animals. The paper elaborates on future research priorities with recommendations for the conservation of odonate fauna in Sri Lanka." (Author)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjazbedjanic@yahoo.com

7646. Casas, J.J.; Gessner, M.O.; Langton, P.H.; Calle, D.; Descals, E.; Salinas, M.J. (2006): Diversity of patterns and processes in rivers of eastern Andalusia. *Limnetica* 25(1-2): 155-170. (in English, with Spanish summary) ["We document the outstanding diversity of fluvial ecosystems in eastern Andalusia, mostly attributable to the high environmental heterogeneity of the region. [...] Fluvial communities respond to this spatial heterogeneity with marked qualitative and quantitative changes among rivers and along the upstream-downstream continuum, generally exhibiting a great decrease in taxonomic and functional diversity as human impacts increase towards the lower reaches. Discharge fluctuations add heterogeneity on the temporal scale and are an additional essential determinant of biological diversity. Climatic, geological and hydrological charac-

teristics profoundly affect the structure of the riparian vegetation, which in turn strongly conditions the community structure of benthic macroinvertebrates and organic matter turnover in fluvial ecosystems." (Authors) Macroinvertebrates including Odonata are treated on the order level.] Address: Casas, J., Departamento de Biología Vegetal y Ecología, Universidad de Almería, 04120-Almería, Spain. E-mail: jjcasas@ual.es

7647. De Marmels, J. (2006): Una pequeña colección de libélulas (Odonata) de Colombia. *Entomotropa* 21(1): 69-71. (in Spanish, with English summary) [A list of 31 species from the Quindío Department is presented.] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

7648. Govindarajulu, P.; Price, S.; Anholt, B.R. (2006): Introduced Bullfrogs (*Rana catesbeiana*) in western Canada: Has their ecology diverged? *Journal of Herpetology* 40(2): 249-260. (in English) ["Organisms can diverge in life history when introduced outside their native range due to release from predators, competitors, and parasites, and also due to genetic drift and local adaptation. We studied the ecology of *R. catesbeiana* in its introduced range in British Columbia (BC). To assess differences between introduced and native populations, we compared the population ecology of BC bullfrogs to published life-history parameters from the bullfrog's extensive native range in eastern North America. [...] Terrestrial insects were the primary prey item of bullfrogs < 150 g, whereas frogs were the primary prey item of larger bullfrogs. The life-history parameter values estimated for BC bullfrogs were within the range observed for bullfrogs in their native habitats. Due to milder weather conditions in southwestern BC, the seasonal pattern and growth rate of bullfrogs were similar to lower latitude populations in Kentucky and Missouri. We found no evidence to support the hypothesis that when released from native predators and parasites bullfrogs build up to unusually high population densities or attain significantly larger sizes in their introduced range." (Authors) Passing references to Odonata are made.] Address: Govindarajulu, P., Department of Biology, University of Victoria, Victoria, British Columbia, V8W 3N5, Canada. E-mail: purnimap@uvic.ca

7649. Graca, M. (2006): Allochthonous organic matter as a food resource for aquatic invertebrates in forested streams. The importance of forests for dragonflies in different continents. In: Rivera, AC (ED). 2006. *Forests and Dragonflies*. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. Pensoft Series Faunistica 61: 37-47. (in English) ["This paper summarises the role of organic matter in the ecology of forested low order streams. Forests are among (lie most productive systems on Earth. More than 90% of forest primary production will end in detrital pathways, in soil and water. The amount of energy in the form of plain litter entering forested low order streams is several times higher than the energy synthesized by aquatic producers: therefore leaves produced in the riparian zones are a main energy source and decomposition is an important ecological process in those systems. Decomposition is mainly a biological process initiated by aquatic fungi and shredding invertebrates. Those organisms promote the transformation of leaves into fine particles used by bacteria, collectors and filter-feeding invertebrates. There-

fore, much of the energy allocated into secondary production in streams has an allochthonous origin. Nutrients liberated as a result of decomposition are used further downstream, in lakes or estuaries by primary producers. The rate at which leaf litter is decomposed is controlled by intrinsic leaf properties (nutrient content, plant chemical and physical defences) as well as environmental factors (e.g. nutrients in water). Disturbances of riparian zones and eutrophication can affect decomposition and, for this reason, changes in decomposition rates could be used as a functional parameter to assess stream health. Given that the standing stock of leaf litter has a positive effect on leaf consumers, allowing high biomass and diversity, it is likely to also affect top invertebrate predators including odonates: however, the literature on this subject is still scarce." (Author)] Address: Graça, M.A., IMAR, Depto de Zoologia, Univ. Coimbra. 3004-517 Coimbra. Portugal. E-mail: mgracailci.uc.pt

7650. Harzsch, S. (2006): Neurophylogeny: Architecture of the nervous system and a fresh view on arthropod phylogeny. *Integrative and Comparative Biology Advance Access* published February 28, 2006. doi: 10.1093/icb/iccj011: 1-33. (in English) ["The phylogenetic relationships within the Arthropoda have been controversial for more than a century. Today, comparative studies on the structure and development of the nervous system contribute important arguments to this discussion, so that the term "neurophylogeny" was coined for this discipline. The large number of recent studies on the nervous system in various nonmodel arthropods indicates that we are far advanced in the process of analyzing the cellular architecture of the arthropod nervous system in a depth that will ultimately provide characters at a level of resolution equal or even superior to that of characters traditionally used in morphological phylogenetic studies. This article sets out to summarize the current state of the discussion on arthropod phylogeny (including Odonata) and briefly evaluates the morphological characters that have been used as arguments in favour of the traditional Tracheata hypothesis. Then, a thorough overview is given of characters derived from structure and development of the arthropod brain and the ventral nerve cord from the cellular level to the level of larger neuropil systems. These characters support the new Tetraconata hypothesis suggested by Dohle and provide evidence for a clade that unites malacostracan and remipede crustaceans with the Hexapoda." (Author)] Address: Harzsch, S., Universität Ulm, Abt. Neurobiologie & Sektion Biosystematische Dokumentation, Albert-Einstein-Str. 11, D-89081 Ulm, Germany. E-mail: steffen.harzsch@uni-ulm.de

7651. Hoess, R. (2006): Catalogue of type material in the Odonata collection of the Natural History Museum Basel. *Entomologica Basiliensia et Collectionis Frey* 28: 1-31. (in English) ["A list of all types, apart from topotypes, present in the Odonata collection of the Natural History Museum, Basel is provided, whether they are indicated in the literature or not. The respective original descriptions are also listed. The type status, method of conservation, state of preservation, and the content of labels is given for each of the 111 specimens, belonging to 57 taxa, as well as additional information e.g. on other types of the respective taxon. The collection holds types of about 1% of the extant species of Odonata, thus being one of the more important Odonata collections worldwide; 37 taxa are represented by their primary types, and seven genera by type material of the

respective type species. Most specimens have been collected on expeditions made by non-specialist odonatologists." (Author)] Address: Hoess, R., Normannenstr. 35, 3018 Bern, Switzerland. E-mail: ReneHoess@1st.ch

7652. Honcu, M. (2006): Dragonflies (Odonata) of Kokorínsko Protected Landscape Area. Bohemia centralis 27: 231-239. (in Czech, with English summary) [In the past 15 years, a total of 33 Odonata species was registered in the Kokorínsko Protected Landscape Area (Central and Northern Bohemia, Czech Republic), representing 46,5 % of all dragonflies living in the Czech Republic. "Common species prevail, owing to the low altitude the sub-mountain and mountain species were not found. Very surprising is the occurrence of Ophiogomphus cecilia, Leucorrhinia pectoralis and two mediterranean species Crocothemis erythraea and Aeshna isosceles. Noteworthy is the occurrence of Lestes dryas, Brachytron pratense, Gomphus vulgatissimus, Somatochlora flavomaculata, Sympetrum danae, and S. flaveolum. The population of G. vulgatissimus found in the Pšovka brook is one of the most abundant in Northern Bohemia." (Author)] Address: Honcu, M., Vlastivídné muzeum a galerie Ěeská Lípa, Nám. Osvození 297, CZ - 470 01 Česká Lípa, Czech Republic. E-mail: honcu@muzeum.clnet.cz

7653. Ihssen, G. (2006): Bemerkenswerte Wiederfunde zweier Fließwasser-Libellenarten im Osten Hamburgs. Bombus 70/71: 291-292. (in German) [Germany, Hamburg; Stylurus flavipes: 24.6.2006, river Elbe near Lange Grove (Neuengamme); Cordulegaster boltonii: 9.7.2006, brook Bille.] Address: Ihssen, G., Timm-Kröger-Weg 6, 22335 Hamburg, Germany

7654. Kennedy, J.H. (2006): Book review: Dragonflies and damselflies of Texas and the southcentral United States. J. C. Abbott. ISBN 0-691-11364-5. Princeton University Press. J. N. Am. Benthol. Soc. 25(2): 531-532. (in English) ["In summary, this book does an outstanding job of fulfilling its goal of providing a comprehensive reference for adult dragonflies found in the southcentral US. It is a beautiful and well-produced field guide." (Author)] Address: Kennedy, J.H., Dept of Biology, University of North Texas, Denton, Texas, USA

7655. Kosterin, O.E.; Korsun, O.V. (2006): A collection of odonata from the Argun' (Hailar) River basin in Transbaikalia, east Siberia, Russia. Notulae Odonatologicae 6(8): 81-85. (in English) [B.F. BELYSHEV (1973, Strekozy (Odonata) Sibiri, Vol. 1, pts 1 & 2, Nauka, v Novosibirsk) noted 25 species for PriArgun'ye, that is the western catchment basin of the Argun' (Hailar) River within Chita province of Russia, E Transbaikalia. Additional material, especially that collected by the first author in 1997, increased the list to 32 species. The absence of any records of Calopteryx and Orthetrum from Transbaikalia is discussed. Coenagrion bifurcatum Zhu & Ou-yan, 2000 is synonymized with C. johanssoni (Wallengren, 1894).] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

7656. Krebs, A. (2006): Räuber der Lüfte. Natürlich 7-2006: 40-45. (in German) [General account on Odonata in a Swiss journal directed to people interested in nature.] Address: not stated

7657. Martens, A. (2006): Buchbesprechungen: Schorr, M. & M. Lindeboom (eds) 2004: Dragonfly Research 2. Lauterbornia 56: 40. (in German) [Review of Version 2 of the odonatological literature database. In the meantime Version 6 of this data and pdf repository was published with more than 26500 titles and more than 4000 pdf.] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

7658. Mauffray, B. (2006): Additional records of Georgia (United States) Odonata from the B.E. Montgomery archives. Notulae Odonatologicae 6(8): 86-87. (in English) ["In 2006, the B.E. Montgomery archives, housed at the International Odonata Research Institute, Gainesville, Florida, USA, was sorted. A number of county records omitted from Mauffray & Beaton (2005, Bull. Am. Odonatol. 9[2]: 21-66) are listed here with a few notes on "doubtful" and "expected" species." (Author)] Address: Mauffray, B., 4525 N.W. 53rd Lane., Gainesville, FL 32653, USA. E-mail: iori@afn.org

7659. McPeck, M.A.; Gavrillets, S (2006): The evolution of female mating preferences: Differentiation from species with promiscuous males can promote speciation. Evolution 60(10): 1967-1980. (in English) ["Females of many species are frequently courted by promiscuous males of their own and other closely related species. Such mating interactions may impose strong selection on female mating preferences to favor trait values in conspecific males that allow females to discriminate them from their heterospecific rivals. We explore the consequences of such selection in models of the evolution of female mating preferences when females must interact with heterospecific males from which they are completely postreproductively isolated. Specifically, we allow the values of both the most preferred male trait and the tolerance of females for males that deviate from this most preferred trait to evolve. Also, we consider situations in which females base their mating decisions on multiple male traits and must interact with males of multiple species. Females will rapidly differentiate in preference when they sometimes mistake heterospecific males for suitable mates, and the differentiation of female preference will select for conspecific male traits to differentiate as well. In most circumstances, this differentiation continues indefinitely, but slows substantially once females are differentiated enough to make mistakes rare. Populations of females with broader preference functions (i.e., broader tolerance for males with trait values that deviate from females' most preferred values) will evolve further to differentiate if the shape of the function cannot evolve. Also, the magnitude of separation that evolves is larger and achieved faster when conspecific males have lower relative abundance. The direction of differentiation is also very sensitive to initial conditions if females base their mate choices on multiple male traits. We discuss how these selection pressures on female mate choice may lead to speciation by generating differentiation among populations of a progenitor species that experiences different assemblages of heterospecifics. Opportunities for differentiation increase as the number of traits involved in mate choice increase and as the number of species involved increases. We suggest that this mode of speciation may have been particularly prevalent in response to the cycles of climatic change throughout the Quaternary that forced the assembly

and disassembly of entire communities on a continent-wide basis." (Authors) References to damselflies (Enallagma) are made.] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

7660. Meurgey, F. (2006): A possible economic impact of libellulid larvae on production of freshwater shrimps in Guadeloupe, French West Indies (Anisoptera: Libellulidae). *Notulae Odonatologicae* 6(7): 79-80. (in English) ["It seems, the odonate presence in shrimp farming ponds has a negative effect on shrimp production. As recorded at Pointe Noire, an approx. 20% decrease of post-larvae production was noticed for several years, mainly due to *Pantala flavescens* predation on shrimps. There are two rearing basins at this site, the largest of these has a surface of ca 100 m². During two days, 2302 exuviae were collected there and numerous final instar larvae were observed." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

7661. Michael, J.L.; Batzer, D.P.; Fischer, J.B.; Gibbs, H.L. (2006): Fate of the herbicide sulfometuron methyl (Oust) and effects on invertebrates in drainages of an intensively managed plantation. *Can. J. Forest. Res.* 36: 2497-2504. (in English, with French summary) ["The off-site movement and impacts on water quality and aquatic ecosystems of sulfometuron methyl applied as the herbicide Oust to catchments in short-rotation plantations in the coastal plain of South Carolina were studied. Sulfometuron methyl was applied at the rate of 0.053 kg active ingredients ha⁻¹ to 5.4- and 5.9-ha catchments (C5 and C6, respectively). Off-site movement of sulfometuron methyl in drainage ditches was observed between application on 14 March 2001 and 14 June 2001 for the first five flow-producing rain events on C5 and the first four events on C6. The maximum observed concentrations (24 µg L⁻¹ on C5 and 23 µg L⁻¹ on C6) occurred during the first storm. Subsequent maximum concentrations for flow-producing storms were 10.0, 5.0, 0.5, and 0.1 µg L⁻¹ on C5 and 15.1, 6.7 and 0.5 µg L⁻¹ on C6. Pulsed inputs of sulfometuron methyl to stormflow were ephemeral and the maximum concentration for each storm event lasted 15 min or less. The faunal communities observed in these drainage ditches were dominated by a diversity of invertebrates typical of wetland habitats, such as midges, mosquitoes, water beetles, physid snails, and water fleas. Negative effects of sulfometuron methyl treatment on these communities in treated watersheds were not observed." (Authors) Tab. 2 lists a few Odonata on the genus level.] Address: Michael, J.L., Forestry Sciences Laboratory, Southern Research Station, USDA Forest Service, 520 DeVall Drive. Auburn. AL 36849. USA. E-mail: michajl@auburn.edu

7662. Mola, L.M.; Papeschi, A.G. (2006): Holokinetic chromosomes at a glance. *Journal of Basic & Applied Genetics* 17(1): 17-33. (in English) ["Current knowledge on holokinetic chromosomes is reviewed in this work. Their distribution in the different kingdoms is compiled and updated. The main criteria for their recognition are provided and discussed, from basic morphology and behaviour (ascertained by light microscopy) to a more precise characterization by means of immunofluorescence techniques and ultrastructural studies. The two modes of meiosis (pre- and post-reductional) ecounte-

red in holokinetic systems are described as well as other topics related to the meiotic process. The principal mechanisms of karyotype evolution (fusion1 simplicity, fragmentation/agmatoploidy, translocation, poliploidy) and their occurrence and frequency in the different taxa are summarized. Finally, the different hypotheses about the origin of holokinetic chromosomes are described." (Authors) Odonata are referred as an example within the group of arthropods for which holokinetic chromosomes are typically.] Address: Mola, Liliana Maria, Laboratorio de Citogenética y Evolución, Dpto. Ecología, Genética y Evolución, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires. Int. Giiiraldes 2620, Ciudad Universitaria, Pabellon II, 4^o Piso. (C1428EHA) Ciudad Autónoma de Buenos Aires, Argentina. E-mail: limola@ege.fcen.uba.ar

7663. Naraoka, H. (2006): Landing of *Epiophlebia superstes* (Sel.) larvae on snow-covered slopes (Epiophlebiota: Epiophlebiidae). *Notulae Odonatologicae* 6(8): 92-93. (in English) [Nurukawa, Aomori prefecture, Japan; "larvae were seen crawling up on steep snow walls during 3-27 April with a peak in the second half of April. With the approach of the spring season in April, the snow-covered stream opens up here and there, and the larvae crawled up through the openings and moved slowly on the snow during 09:00-14:30 h. ... The walking larvae entered the cavities around the tree roots or the crevices in the snow that was still covering the steep banks, and found shelter under the dead leaves. Probably they remain under the leaves until emergence. The latter commences at this locality in mid May, meaning the larvae may be able to survive on land during almost a month." (Author)] Address: Naraoka, H., 36-71 Fukunoda, Kitatsugaru, Aomori 0383661, Japan

7664. Nelson, C.R. (2006): Brook review: Introducing the Dragonflies of British Columbia and the Yukon. 2002. Robert A. Cannings. Royal British Columbia Museum, Victoria, British Columbia, Canada. \$12.95, paperback, 96 pages. ISBN 0-7726-4637-6. *Western North American Naturalist* 66(1): 136. (in English) [Book review, see also OAS 2901.] Address: Nelson, C.R., Department of Integrative Biology, Brigham Young University, Provo, Utah 84602, USA

7665. Nijboer, R.; Verdonschot, P.; Piechocki, A.; Tomczyk, G.; Klukowska, M. (2006): Characterisation of pristine Polish river systems and their use as reference conditions for Dutch river systems. *Alterra-rapport* 1367, ISSN 1566-7197: 221 pp. (in English) ["A central feature of the European Water Framework Directive are the reference conditions. The ecological quality status is determined by calculating the distance between the present situation and the reference conditions. To describe reference conditions the natural variation of biota in pristine water bodies should be measured. Because pristine water bodies are not present in the Netherlands anymore, water bodies (springs, streams, rivers and oxbow lakes) in central Poland were investigated. Macrophytes and macroinvertebrates were sampled and environmental variables were measured. The water bodies appeared to have a high biodiversity and a good ecological quality. They contain a high number of rare macroinvertebrate species. There are only few species that can not occur in the Netherlands, but their abundances were low. The Polish water bodies are suitable to describe reference conditions for similar Dutch water types. The data resulting from this project can be used

to update the descriptions of reference conditions in the 'Handboek Natuurdoeltypen' or to develop the descriptions for the Water Framework Directive types." (Authors) Odonata are part of the water body indicator system. The list of taxa also includes *Aeshna viridis*, *Stylurus flavipes*, and *Ophiogomphus cecilia*] Address: Alterra, P.O. Box 47; 6700 AA Wageningen; The Netherlands. E-mail: info.alterra@wur.nl

7666. Orlova, M.I.; Telesh, I.V.; Berezina, N.A.; Antsulevich, A.E.; Maximov, A.A.; Litvinchuk, L.F. (2006): Effects of nonindigenous species on diversity and community functioning in the eastern Gulf of Finland (Baltic Sea). *Helgol. Mar. Res.* 60: 98-105. (in English) ["An increase of xenodiversity in plankton and benthos in the eastern Gulf of Finland was observed from 1998 to 2004. Nonindigenous species account for 4.8% of all species found and up to 96% of total biomass. Invasive benthic omnivores, the alien amphipods *Gmelinoides fasciatus* and *Pontogammarus robustoides* and the predaceous fish *Perccottus glenii* with their versatile diets strongly affect the community structure. Invasive sessile seston-feeders that directly (through grazing and water clearance) and indirectly (through recycling of nutrients) interact with other ecosystem components, are mainly represented by the zebra mussel *Dreissena polymorpha*, which affect the structure of benthic and planktonic communities as well as benthicpelagic coupling. The invasive predatory cladocerans *Cercopagis pengoi* and *Evadne anonyx* and larvae of *D. polymorpha* are only temporary components in the zooplankton, which is limiting their overall effect. Alien benthic bioturbators, the polychaetes *Marenzelleria neglecta* and the oligochaete *Tubificoides pseudogaster* account for a high proportion of total abundance and biomass but their effects on native species need further research." (Authors) The content of stomachs of *Perccottus glenii* included Odonata.] Address: Orlova, Marina, Laboratory of Freshwater and Experimental Hydrobiology, Zoological Institute of the Russian Academy for Sciences, Universitetskaya Emb., 1., 199034 St. Petersburg, Russia. E-mail: marinaorlova@rambler.ru

7667. Orr, A.G. (2006): Odonata in Bornean tropical rain forest formations: Diversity, endemism and applications for conservation management. In: Cordero Rivera A (Ed.) *Forest and Dragonflies. Fourth WDA International Symposium of Odonatology*, Pontevedra (Spain), July 2005. Sofia-Moscow: Pensoft: 51-78. (in English) ["The island of Borneo was originally almost completely covered by closed canopy tropical rainforest. Owing to an aseasonal, hot, perhumid climate and high rainfall, forests were well supplied with streams and standing water. Consequently the rich, largely endemic odonate fauna must have evolved in association with these forests, and non-forest species, common today in disturbed land, must formerly have been rare opportunists in forest gaps or localised lacustrine species, it is estimated that at least 70 % of the fauna is presently confined to forest habitats and probably depends on forest for its survival. This study relates odonate distribution to a mosaic of complex tropical rain forest formations in Brunei. The tiny sultanate of Brunei still enjoys about 80% forest cover, representative of all the seven major formations found on the island and a great many of the 30+ sub-formations, and results from a nation-wide survey of odonates from most habitats are considered to be broadly applicable to the entire island of Borneo and many other parts of equatorial

south-east Asia. Greatest odonate diversity, both a and b, and greatest endemism, is found in the primary lowland mixed dipterocarp forests, especially those growing in highly dissected landscapes such as occur at the KBFSC. at the edges of the central uplands. High diversity and endemism is also found in swamp forest, especially freshwater swamp, with certain endangered peat swamp formations also important. The highly vulnerable kerangas forest harbours fewer species, none uniquely, and the mangrove fauna is still more depauperate, with only a single wide-ranging specialist restricted to this habitat. Secondary dipterocarp forest is certainly less rich in odonates than primary forest, but lack of sites for parallel comparisons makes it difficult at present to state how serious this effect is. These results emphasise the importance of conserving a wide range of primary forest formations to achieve satisfactory odonate conservation, a strategy congruent with the conservation of charismatic land-based vertebrates and forest peoples." (Author)] Address: Orr, B., 26 Currimundi Rd, Caloundra, Q4551, Australia

7668. Park, H.-h.; Lee, J.-h. (2006): Arthropod trophic relationships in a temperate rice ecosystem: A stable isotope analysis with ^{13}C and ^{15}N . *Environ. Entomol.* 35(3): 684-693. (in English) [Korea; "Arthropod trophic relationships in temperate rice fields during the growing season were explored in 2000 and 2001 by measuring signatures of naturally occurring carbon and nitrogen stable isotopes. ^{13}C and ^{15}N values for rice plants, soil, and arthropods varied slightly between both years, and the values were rather distinctive according to functional groups. Isotopic changes in rice plants affected values for herbivorous insects. Seasonal changes in ^{13}C and ^{15}N values for predators indicated that prey composition of their diets changed seasonally. Early in the season, there were two distinct clusters: (1) rice plants-herbivorous insects-parasitoids cluster and (2) filter-feeders/detrivores and predators cluster. The correlations in each case suggest interactions. During mid-season, the rice plants-herbivorous insects-parasitoids interaction was maintained, and herbivorous insects such as planthoppers were linked to predators. Also, detrivores such as Entomobryidae spp. seemed to be linked. During the late season, close interactions occurred at all trophic levels. Our study provided isotopic evidence that filter feeders/detrivores such as Chironomidae and Entomobryidae play a valuable role in maintaining the predator complex in the rice ecosystems during the rice-growing season. Also, fundamental data of stable carbon and nitrogen isotopes acquired in this study would be of value for use in advanced community studies for rice fields." (Authors) Table 1 includes Aeshnidae and Lestidae, and the means of carbon and nitrogen stable isotope ratios of sampled specimens.] Address: Park, H.-h., Entomology Program, School of Agricultural Biotechnology, College of Agriculture and Life Sciences, Seoul National University, San 56-1, Shillim-dong, Gwanak-gu, Seoul 151-921, Republic of Korea

7669. Prunier, F. (2006): Sex ratio y Biometría en tres poblaciones de libélulas de Sierra Morena: *Anax imperator*, *Boyeria irene*, *Cordulegaster boltoni immaculifrons* (Insecta: Odonata). *Boletín de la Sociedad Andaluza de Entomología* 13(2005): 67-71. (in Spanish, with English summary) [Total length and sex ratio were measured in three Andalusian (Spain) populations.] Address: E-mail: florent.prunier@netcourrier.com

7670. Reinhardt, K. (2006): A note on emergence and oviposition of *Paragomphus nyasicus* Kimmins at Lake Malawi, Malawi (Anisoptera: Gomphidae). *Notulae Odonatologicae* 6(8): 88-90. (in English) ["In the night of 22 to 23 Sept. 2001, emergence of the species was observed at Chembe village, Lake Malawi. About one individual per 1 metre beach emerged on a strip of 50 m length, all exuviae were very close to the waterline. Most individuals emerged after midnight, 6 to 9 h after sunset which is later than previously reported for tropical gomphids. This emergence delay may either be typical for *P. nyasicus* or be caused by human activity at the beach which lasted until well after dusk. The sex ratio was equal. Females oviposited by abdomen dipping onto the sand that has just been touched by the tiny lake waves. The dipping frequency appeared to be correlated to the frequency by which these little wavelets would roll onto the sand. Males patrolled or perched on the sand very close to the waterline but did not appear to show territorial activity." (Author)] Address: Reinhardt, K., Dept Animal & Plant Sciences, Univ. Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

7671. Tailly, M.; Zampieri, D (2006): *Crocothemis servilia* added to the Armenian fauna and new records of *Lindenia tetraphylla* and *Selysiotthemis nigra* from Azerbaijan (Anisoptera: Gomphidae, Libellulidae). *Notulae Odonatologicae* 6(8): 93-94. (in English) [*Crocothemis servilia*: 18-VI-2004, vicinity of Meghri in southern Armenia, close to the border of Iran (38°53.443'N, 46°15.926'E; 516 m asl). *Lindenia tetraphylla*, 1 ♀, 23-VI-1958, Mingeçaur (40°46'12"N, 47°2' 56"E). *Selysiotthemis nigra*, 1 ♂, 1 ♀, both from Mingeçaur, dated 29-VI-1958 and 23-VI-1958, respectively.] Address: Tailly, M., Hoonakkerdreef 35, B-8791 Waregem, Belgium. E-mail: marc.tailly@pandora.be

7672. Tol, J. van (2006): The status of seven nomina nova introduced by H. Steinmann (1997). *Notulae Odonatologicae* 6(8): 94-95. (in English) ["[...] As will be explained below, it has appeared that all new names are unnecessary replacement names. It is considered worthwhile to publish the arguments, since such catalogues may have long-lasting impact on the use of scientific names. The names are in alphabetical order of species-group names. A general remark can also be made. Steinmann argues for all names to be replaced that they are junior secondary homonyms; they are actually junior primary homonyms.

**cancer* Steinmann, 1997b: 172, *Onychogomphus*. — Replacement name for *Gomphus* (*Onychogomphus*) *ruptus* Selys, 1858 (nee Selys, 1857). STEINMANN (1997b) includes two nominal taxa in his catalogue, viz. *Nihonogomphus ruptus* Selys, 1857, and *Onychogomphus ruptus* Selys, 1858. For the latter he proposes *O. cancer* as a replacement. However, both nominal taxa refer to the same taxonomic species. The references of Steinmann to Selys (1857, *Monogr. Gomph.*: 393), and to Selys (1858, *Mem. Soc. r. Set, Liege* 11: 653) pertain to the same publication (E. de SELYS, 1858, *Monographic des Gomphines*, Muquardt, Bruxelles).

**johnsoni* Steinmann, 1997b: 12, *Aeshna* — Replacement name for *Aeshna gigas* Bartenev, 1909 (nee Rambur, 1842). *Aeshna gigas* Bartenev is considered a junior synonym of *Aeshna crenata* Hagen, 1856 (B.F BELYSHEV, 1973: 405, *The dragon/lies of Siberia*, Vol. 1, part 2, Nauka, Novosibirsk), so a replacement name was unnecessary.

**kiautai* Steinmann, 1997a: 201, *Argia*. — Replacement name for *Argia apicalis* Matsumura, 1913 (nee Say, 1839). The status of *Argia apicalis* Matsumura was ascertained by ASAHINA (1951: 15, *Kontyu* 19: 15-22), when he introduced the name *Rhipidolestes okinawana* sp. n. [recte: *okinawanus*] for this species.

**schmidti* Steinmann, 1997a: 259, *Enallagma*. — Replacement name for *Enallagma risi* Pinhey, 1962 (nee Schmidt, 1961). The homonymy of *Enallagma risi* Pinhey was already recognised by PINHEY (1966: 9, *Arnoldia* 2(33): 1-24), who introduced *Enallagma angolicum* nom. nov. for this species. Presently assigned to *Pinheyagrion*.

**secundus* Steinmann, 1997b: 112, *Gomphurus*. — Replacement name for *Gomphus septima* Westfall, 1956 (nee Needham, 1930). Both nominal taxa *Septimus* Needham, 1930 and *septima* Westfall, 1956 were indeed described in *Gomphus* (contra e.g. BRIDGES, 1991: VII. 190, *Catalogue of the family-group, genus-group and species-group names of the Odonata of the World*, Privately published, Urbana). These names should, however, not be considered homonyms. *Septimus* is an adjective, but *septima* appears to be a noun in apposition. 'This species is named for Dr Septima Smith ...' (WESTFALL, 1956: 253, *Quart. J. Fla. Acad. Sci.* 19: 251-258). Both names cannot be considered 'variant spellings' of the same name. Since a difference of one letter is sufficient to prevent homonymy (*Int. Comm. Zool. Nomenclature*, 1999, *International Code of Zoological Nomenclature*, London: Article 57.6), *Gomphurus secundus* Steinmann is an unnecessary replacement name.

**vilma* Steinmann, 1997b: 52-53, *Gynacantha*. — Replacement name for *Aeschna viridis* Rambur, 1842 (nee Eversmann, 1836). This name has not been used as a valid name for a taxonomic taxon since RAMBUR (1842, *Histoire naturelle des Insectes. Neuropteres*. Roret, Paris). The status is thus uncertain, and should be considered a nomen oblitum. Based on the same type, the name *Gynacantha vilma* has to be considered a nomen oblitum as well." (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

7673. Tolasch, T. (2006): *Wiederfund von Gomphus flavipes* (Charpentier, 1825) in Hamburg nach über 70 Jahren. *Bombus* 70/71: 292. (in German) [Germany; *Stylurus flavipes*, 1.8.2003, Elbe, S Altengamme.] Address: Tolasch, T., Universität Hohenheim, Inst. Zoologie, Fg Tierkunde 220c, Garbenstr. 30, D-70593 Stuttgart, Germany. E-mail: tolasch@uni-hohenheim.de

7674. Utzeri, C.; Belfiore, C.; Peels, F. (2006): Some new records of *Lindenia tetraphylla* (Vander Linden) in Italy (Anisoptera: Gomphidae). *Notulae Odonatologicae* 6(8): 90-92. (in English) ["A new site for *L. tetraphylla* from Sardinia and 4 from Tuscany are put on record. Some of these apparently harbour reproductive populations. *Selysiotthemis nigra* is for the first time recorded from Tuscany." (Authors)] Address: Utzeri, C., Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza". Viale dell'Università 32, 1-00185 Roma, Italy. E-mail: carlo.utzeri@uniroma1.it

7675. Vega, F.J.; García-Barrera, P.; del Carmen Perrilliat, M.; Coutiño, M.A.; Mariño-Pérez, R. (2006): El Espinal, a new plattenkalk facies locality from the Lower Cretaceous Sierra Madre Formation, Chiapas, south-eastern Mexico. *Revista Mexicana de Ciencias Geológicas*

gicas 23(3): 323-333. (in English, with Spanish summary) [A new plattenkalk facies locality with plants, invertebrates and vertebrates in laminar dolomitic limestones from the Albian of the lower part of the Sierra Madre Formation in central Chiapas is reported. The finding also include a zygopteran larvae, which is described and figured. Abstracters note: The figured specimen belongs to an anisopteran genus.] Address: Vega, F.J., Instituto de Geología, Universidad Nacional Autónoma de México, Ciudad Universitaria, Delegación Coyoacán, 04510 México D.F., Mexico. E-mail: vegver@servidor.unam.mx

7676. Ward, P.; Labandeira, C.; Laurin, M.; Berner, R.A. (2006): Confirmation of Romer's Gap as a low oxygen interval constraining the timing of initial arthropod and vertebrate terrestrialization. *Proceedings of the National Academy of Sciences of the USA* 103(45): 16818-16822. (in English) ["The first terrestrialization of species that evolved from previously aquatic taxa was a seminal event in evolutionary history. For vertebrates, one of the most important terrestrialized groups, this event was interrupted by a time interval known as Romer's Gap, for which, until recently, few fossils were known. Here, we argue that geochronologic range data of terrestrial arthropods show a pattern similar to that of vertebrates. Thus, Romer's Gap is real, occupied an interval from 360 million years before present (MYBP) to 345 MYBP, and occurred when environmental conditions were unfavorable for air-breathing, terrestrial animals. These model results suggest that atmospheric oxygen levels were the major driver of successful terrestrialization, and a low-oxygen interval accounts for Romer's Gap. Results also show that terrestrialization among members of arthropod and vertebrate clades occurred in two distinct phases. The first phase was a 65-million-year (My) interval from 425 to 360 MYBP, representing an earlier, prolonged event of complete arthropod terrestrialization of smaller-sized forms (425-385 MYBP) and a subsequent, modest, and briefer event of incipient terrestrialization of larger-sized, aquatic vertebrates (385-360 MYBP). The second phase began at 345 MYBP, characterized by numerous new terrestrial species emerging in both major clades. The first and second terrestrialization phases bracket Romer's Gap, which represents a depauperate spectrum of major arthropod and vertebrate taxa before a major Late Paleozoic colonization of terrestrial habitats." (Authors) Fig. 1 includes Odonata.] Address: Berner, R.A., Department of Geology and Geophysics, Yale University, New Haven, CT 06520-8109, USA. E-mail: robert.berner@yale.edu.

7677. Yermokhin M.V.; Yevdokimov N.A. (2006): Rare and disappearing species of freshwater invertebrates in the Red Book of Saratov region. *Povolshskii ekologiceskii shurnal* 2006, Special issue C: 41-46. (in Russian) [The Red Data Book status of some rare and disappearing species in the Saratov region is listed. Seven species are mentioned, *Calopteryx splendens*, *C. virgo*, *Anax imperator*, *Aeshna grandis*, *A. cyanea*, *A. juncea*, *Sympetrum pedemontanum*. Whilst the conservation status of some species is mentioned as having changed compared to the 1996 Red Data Book, the empirical basis of this comparison is not given.] Address: Yermokhin M.V., Saratov State University N.G. Tschernyshevskii, 410012 Saratov, Astrachanskaja 83, Russia

7678. Banaduc, D. (2007): Sibiu National History Museum hydrobiological collections. *Brukenthal. Acta Musei* 3: 185-186. (in English) [The Odonata collection - the oldest specimen dates back to 1849 - includes a total of 1608 specimens, collected in Europe, Africa, Asia, and North and South America. Material sampled in Europe and especially in Romania is prevalent. The most important material originates from Hans Plattner, Transylvanian Society for Natural Sciences of Sibiu, Worell and Hannenheim.] Address: Banaduc, D., Muzeul de Istorie Naturala Sibiu, Str. CetaNii, nr. 1, Sibiu, RO - 550160, Romania. E-mail: doru.banaduc@brukenthal-museum.ro

7679. Bernotiene, R., Višinskiene, G. (2007): The diversity of benthic invertebrates in three rivers in Lithuania. *Acta Biol. Univ. Daugavp.* 7(2): 87-96. (in English) [6 odonate taxa were recorded. These are not specified with the exception of *Ophiogomphus cecilia*] Address: Bernotiene, R., Institute of Ecology of Vilnius University, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: rasab@ekoi.lt

7680. Bogacka-Kapusta, E.; Kapusta, A. (2007): The diet of Roach, *Rutilus rutilus* (L.) and Bleak, *Alburnus alburnus* (L.) larvae and fry in the shallow littoral zone of a heated lake. *Archives of Polish Fisheries* 15: 401-413. (in English, with Polish summary) [Odonata biomass contributed significantly to the diet of roach and bleak inhabiting Lake Goslawskic, Poland. The dietary composition of fish changes over time. Species richness (invertebrate taxa including Odonata) in the diets of roach and bleak larvae and fry was high. The variety of the dietary composition of early developmental stages of roach and bleak was strictly correlated to body length.] Address: Bogacka-Kapusta, Elzbieta, Dept of Ichthyology, The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn, ul. Oczapowskiego 10, 10-719 Olsztyn, Poland. E-mail: ela@infish.com.pl

7681. Bogacka-Kapusta, E.; Kapusta, A.; Duda, A.; Szczepkowski, M.; Kolman, R. (2007): Evaluation of the suitability of samples collected in vivo for investigations of juvenile sturgeon stomachs. *Archives of Polish Fisheries* 15: 165-170. (in English, with Polish summary) [32 stomachs of sturgeon (*Acipenser* different species, taxa, hybrids) were analysed for diet contents; Odonata were represented in 25% of the stomachs.] Address: Bogacka-Kapusta, Elzbieta, Dept of Ichthyology, The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn, ul. Oczapowskiego 10, 10-719 Olsztyn, Poland. E-mail: ela@infish.com.pl

7682. Briliute, A.; Budrys, E. (2007): New record of damselfly *Lestes barbarus* in the south of Lithuania (Odonata: Lestidae). *New and Rare for Lithuania Insect Species. Records and Descriptions* 19: 10-12. (in English, with Lithuanian summary) [Two specimens are documented and discussed in some detail. This records rise the number of Lithuanian Odonata to a total of 62 species. "One of these species, *Sympetrum eroticum* (Selys, 1883), collected by A. Stanionyte in 1988 (Stanionyte, 1989), most probably has been accidentally introduced to Lithuania from the Amur river basin together with grass carp fry. Obviously, it did not establish, as it was never found here later. Therefore, *S. eroticum* must be removed from the check-list of Odonata of the Lithuanian fauna. Currently, the latter should include 61

species.]" Address: Budrys, E., Department of Zoology of Vilnius University, M.K.Ciurlionio g. 21/27, LT-03101 Vilnius, Lithuania. E-mail: ebudrys@ekoi.lt

7683. Buidin, C.; Rochepaulte, Y. (2007): Inventaire des odonates de Minganie. *Le Naturaliste Canadien* 131(2): 10-16. (in French) [Golf du Saint-Laurent, Quebec, Canada; 39 odonate species were recorded at 13 localities. The records of the following species are treated with more detail: *Nehalennia irene*, *Anax junius*, *Cordulegaster maculata*, *Somatochlora franklini*, *S. kennedyi*, *S. septentrionalis*, *S. walshii*, *Pantala flavescens*, and *P. hymenaea*.] Address: E-mail: balbu1@globetrotter.net

7684. Cecala, K.K.; Price, S.J.; Dorcas, M.E. (2007): Diet of larval Red Salamanders (*Pseudotriton ruber*) examined using a nonlethal technique. *Journal of Herpetology* 41(4): 741-745. (in English) [North Carolina, USA; "Because larval stream salamanders are more abundant within streams than adults, feed and forage throughout the year, and may spend multiple years in streams before transformation, larvae may play a more important role than adults in trophic interactions within streams. We conducted a study using larval *P. ruber* to determine (1) the prey composition of larval salamanders, (2) whether feeding rates are affected by stream water temperature, (3) whether larval size affects the diversity of prey items, and (4) whether nonlethal stomach flushing is an effective technique for examining the diet of larval salamanders. We found that larvae consumed a wide diversity of prey items including individuals of the families Chironomidae (36.52% of prey items) and Sphaeriidae (15.17%) as well as terrestrial prey (7.87%) and other salamanders (2.25%). We also found that feeding rates were negatively correlated with stream water temperature, and larger larvae consumed a wider diversity of prey items than smaller individuals. Our results also suggest that nonlethal stomach flushing did not affect survivorship. These findings suggest that larval Red Salamanders are generalist predators that can play important trophic roles in stream ecosystems." (Authors) Odonata contributed 0.56% to the prey items; 1.47% of the salamanders had preyed on Odonata.] Address: Cecala, Kristen, Department of Biology, Davidson College, Davidson, North Carolina 28035-7118, USA

7685. Clopton, R.E.; Cook, T.J.; Cook, J.L. (2007): Revision of *Geneiorhynchus* Schneider, 1875 (Apicomplexa: Eugregarinida: Actinocephalidae: Acanthosporinae) with recognition of four new species of *Geneiorhynchus* and description of *Geneiorhynchus manifestus* n. sp. Parasitizing naiads of the Green Darner, *Anax junius* (Odonata: Aeshnidae) in the Texas Big Thicket. *Comp. Parasitol.* 74(2): 273-285. (in English) ["*Geneiorhynchus manifestus* n. sp. (Apicomplexa: Eugregarinida) is described from the naiads of *Anax junius* collected from the Big Sandy Creek Unit of the Big Thicket National Preserve, Polk County, Texas, USA. The genus *Geneiorhynchus* is revised and its constituent species reviewed. Descriptions are provided for 2 previously named species, *Geneiorhynchus monnieri* from naiads of *Libellula depressa* collected from Bayreuth, Germany and Roscoff, France and *Geneiorhynchus aeshnae* from naiads of *Aeshna constricta* and *Aeshna* sp. collected from Pennsylvania, USA., and Cheboygan County, Michigan, USA.; and 3 previously reported taxa recognized as new species: *Geneiorhynchus desportesi*

n. sp. from naiads of *A. cyanea* collected from Montpellier, France, *Geneiorhynchus baudoini* n. sp. from naiads of *A. grandis* collected from Vincennes and Besse-et-Saint-Anastaise, France, and *Geneiorhynchus shtei* n. sp. from naiads of *A. cyanea* and *Aeshna* sp. collected from Lakes Pert and Svyat, Karelian Republic, Russian Federation and both Hersbruck and Bamberg, Germany." (Authors)] Address: Clopton, R.E., Dept Natural Science, Peru State College, Peru, Nebraska, U.S.A. 68421. E-mail: rclopton@oakmail.peru.edu

7686. Danks, H.V. (2007): The elements of seasonal adaptations in insects. *Canadian entomologist* 139: 1-44. (in English, with French summary) ["The many components of seasonal adaptations in insects are reviewed, especially from the viewpoint of aspects that must be studied in order to understand the structure and purposes of the adaptations. Component responses include dispersal, habitat selection, habitat modification, resistance to cold, dryness, and food limitation, trade-offs, diapause, modifications of developmental rate, sensitivity to environmental signals, life-cycle patterns including multiple alternatives in one species, and types of variation in phenology and development. Spatial, temporal, and resource elements of the environment are also reviewed, as are environmental signals, supporting the conclusion that further understanding of all of these seasonal responses requires detailed simultaneous study of the natural environments that drive the patterns of response." (Author) Some references to Odonata are made.] Address: Danks, H.V., Biological Survey of Canada (Terrestrial Arthropods), Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4. E-mail: hdanks@mus-nature.ca

7687. de Drago, I.; Marchese, M.; Montalto, L. (2007): 10. Benthic Invertebrates. In: M.H. Iriondo, J.C. Paggi, and M.J. Parma (Eds.): *The Middle Paraná River: Limnology of a subtropical wetland*. Springer-Verlag. Berlin Heidelberg: 251-275. (in English) [This review includes a few remarks on Odonata (*Aphylla* sp.).] Address: de Drago, Ines, Instituto Nacional de Limnología, INALI (CONICET-UNL). José Maciá 1933, 3016 Santo Tomé, Argentina. E-mail: inesezcurra@arnet.com.ar

7688. Dechruksa, W.; Krailas, D.; Ukong, S.; Inkapatanakul, W.; Koonchornboon, T. (2007): Trematode infections of the freshwater snail family Thiaridae in the Khek river, Thailand. *Southeast Asian J. trop. med. public health* 38(6): 1016-1028. (in English) ["The freshwater snail family Thiaridae was studied at five different locations: water sources for the Khek River, Thailand. Snail samples were collected by hand using counts per unit of time sampling method between December 2004 and October 2005. The physico-chemical quality of the water changed with the seasons and affected the sampling areas during both the dry season and the flood season. A total of 9,568 snail samples comprised of 14 species were found. These were 284 *Tarebia granifera*, 24 *Melanoides tuberculata*, 86 *Thiara scabra*, 3,295 *Paracrostoma pseudosulcospira pseudosulcospira*, 736 *P. paludiformis paludiformis*, 3,266 *P. paludiformis ubiosa*, 117 *P. morrisoni*, 304 *Brotia* (*Brotia*) *binodosa binodosa*, 1,250 *B. (Brotia) microsculpta*, 146 *B. (Senckenbergia) wykoffi*, 1 *B. (Brotia) pagodula*, 5 *B. (Brotia) binodosa spiralis*, 5 *B. (Brotia) insolita* and 49 *B. (Brotia) manningi*. The cercariae were investigated

using shedding and crushing methods where they were categorized into two types and five species. The first type, Parapleurolophocercous cercariae, were comprised of Haplorchis pumilio Looss, 1899 and Centrocestus formosanus Nishigori, 1924. The second type, Xiphidiocercariae were comprised of Acanthatrium hitaense Koga, 1953, Loxogenoides bicolor Kaw, 1945 and Haematoloechus similis Looss, 1899. The cercarial infection rates in the above 5 species were 0.1% (5 : 9,568), 0.2% (15:9,568), 0.3% (24:9,568), 0.4% (37 : 9,568) and 0.1% (5: 9,568), respectively. 5 species of snails were susceptible to trematode infections. They were T. granifera, M. tuberculata, T. scabra, P. paludiformis paludiformis and B. (Senckenbergia) wykoffi; infections were found in 26.1% (74:284), 33.3 % (8:24) , 1.2% (1:86), 0.3% (2:736) and 0.7% (1:146), respectively." (Author) A passing reference to Odonata is made.] Address: Krailas, Duangduen, Dept of Biology, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand. E-mail: kduang@su.ac.th

7689. Driessen, M. (2007): Review: The Complete Field Guide to Dragonflies of Australia by Günther Theischinger and John Hawking, CSIRO Publishing, 2006, paperback, 366 pages. The Tasmanian Naturalist 129: 84-85. (in English) [Review, with a little focus on Tasmanian Odonata.] Address: Driessen, M., Kingston Beach, Tasmania 7050, Australia. Email: michael.driessen@dpiw.tas.gov.au

7690. Evenhuis, N.L. (2007): Field Notes of E.H. Bryan, Jr. on the Whitney South Seas Expedition (February – November 1924). Compiled by Neal L. Evenhuis. Bishop Museum Technical Report 37: 334 pp. (in English) [This report documents the journals written by Bishop Museum curator Edwin Horace Bryan, Jr. (1898–1985) as he participated on one of the Whitney South Seas Expedition trips to the South Pacific. These notes span most of the year 1924 (February through November). He traveled from Honolulu to Samoa including the northern Cooks and Fiji. Many brief but general notes on dragonflies are made, and in a few cases the folk names of Odonata are noted (Savaii Island: Odonata - semu. Dragonflies - mataga).] Address: Evenhuis, N.L., Pacific Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i 96817, USA. E-mail: neale@bishopmuseum.org

7691. Ferletic, U. (2007): Small red damselfly Ceragrion tenellum (Insecta: Odonata) in Slovenia. Graduation Thesis (University studies), Biotechnical faculty, Department of biology, University of Ljubljana: XI, 88 pp. (in Slovenian, with English summary) [C. tenellum is rare and endangered in Slovenia. "It is found only in Iskra and the Vipava valley. From May to October 2004 I checked 17 localities for presence of the species, number of individuals and habitat characteristics. On four localities present plant species were determined and on two localities population size was estimated. C. tenellum was found on 10 localities, only 4 of which support numerous and stable populations, while on others few specimens were occasionally observed. Two populations sizes were estimated with 209±109 and 51±20 specimens respectively in July and 179±78 and 43±17 specimens in August. Four plant species were found on all four localities. To preserve C. tenellum in Slovenia the four localities with the strongest populations should be kept in the present state, whereas for the other localities long term monitoring would be needed." (Author)]

Address: Ferletic, Urška, University of Ljubljana, Biotechnical faculty, Večna pot 111, Department of biology, SI-1000 Ljubljana, Slovenia

7692. Giraudo, A.R.; Arzamendia, V.; López, S.M. (2007): 14 Reptiles. In: M.H. Iriondo, J.C. Paggi, and M.J. Parma (Eds.): The Middle Paraná River: Limnology of a Subtropical Wetland: 341-362. (in English) [Argentina; Odonata larvae belong to the diet of water turtles.] Address: Giraudo, A.R., Instituto Nacional de Limnología, CONICET-UNL, José Maciá 1933 (3016) Santo Tomé, Santa Fe, Argentina. E-mail: alejandrogiraudo@hotmail.com

7693. Griffis-Kyle, K.L.; Ritchie, M.E. (2007): Amphibian survival, growth and development in response to mineral nitrogen exposure and predator cues in the field: an experimental approach. Oecologia 152: 633-642. (in English) ["Mineral nitrogen (N) has been suggested as a potential factor causing declines in amphibian populations, especially in agricultural landscapes; however, there is a question as to whether it remains in the water column long enough to be toxic. We explored the hypothesis that mineral N can cause both lethal and sublethal toxic effects in amphibian embryos and larvae in a manipulative field experiment. We sampled 12 ponds, fertilizing half with ammonium nitrate fertilizer early in the spring, and measured hatching, survival, development, growth, and the incidence of deformities in native populations of wood frog (*Rana sylvatica*) and eastern tiger salamander (*Ambystoma tigrinum tigrinum*) embryos and larvae held in situ enclosures. We found that higher ammonium concentrations negatively affect *R. sylvatica* more strongly than *A. tigrinum*. *R. sylvatica* tended to have lower survival as embryos and young tadpoles, slowed embryonic development, and an increased proportion of hatchlings with deformities at experimentally elevated ammonium. *A. tigrinum* did not experience significantly reduced survival, but their larval development was slowed in response to elevated ammonium and the abundance of large invertebrate predators. Variable species susceptibility, such as that shown by *R. sylvatica* and *A. tigrinum*, could have large indirect effects on aquatic community structure through modification of competitive or predator-prey relationships. Ammonium and nitrate + nitrite concentrations were not correlated with other measures that might have affected amphibians, such as pH, pond area, depth, or vegetation. Our results highlight the potential importance of elevated ammonium on the growth, development and survival of amphibians, especially those that breed in surface waters receiving anthropogenic N inputs." (Authors) Odonata are treated on the order level.] Address: Griffis-Kyle, K.L., Department of Fishery and Wildlife Sciences, New Mexico State University, MSC 4901, P.O. Box 30003, Las Cruces New Mexico 88003, USA. E-mail: kerrygk@nmsu.edu

7694. Hämmerle, E. (2007): Ergänzungen zur Libellenfauna des Naturschutzgebietes Gsieg – Obere Mähder (Lustenau, Vorarlberg, Österreich). Vorarlberger Naturschau 20: 313-318. (in German, with English summary) [Compared with Wust & Alpe (1999), 7 new species for the Odonata fauna Gsieg – Obere Mähder, Austria now increased to 42 species. The new additions are Calopteryx virgo, Coenagrion mercuriale, Gomphus pulchellus, Brachytron pratense, Somatochlora arctica, Crocothemis erythraea, and Libellula fulva.] Address:

Hämmerle, E., St. Antoniusstraße 18, A-6890 Lustenau, Austria

7695. Hicham, K.; Lotfi, A. (2007): The dynamics of macroinvertebrate assemblages in response to environmental change in four basins of the Etueffont landfill Leachate (Belfort, France). *Water Air Soil Pollution* 185: 63-77. (in English) ["We investigated the relationships between the composition and structure of macroinvertebrate communities and some environmental variables over a year in four basins of the Etueffont landfill leachate (Belfort, France) using co-inertia analysis. Culicidae larvae were the dominant macroinvertebrate group in the studied basins, contributing to 87% of the total zoobenthos density, followed by Corixidae (8.8%), Chironomids (2.5%) and other larvae (each <1%). The lowest density of chironomid larvae was recorded in the first basin which is used as a discharge system for the leachate produced by the landfill. In basin 4, however, the Baetidae, Orthocladiinae (*Orthocladius* spp., *Chaetocladius* spp. and *Isocladius* spp.) and Tanyptodinae (*Psectrotanyptus* spp.) developed favoured by low levels in ammonia, COD, BOD, EC, metals and high oxygen concentrations. The co-inertia analysis illustrated both temporal and spatial variabilities in the basins and revealed a strong relationship between environmental conditions and benthic macroinvertebrates assemblages. This ordination technique showed that the chironomid community structure might be used successfully to differentiate between sites with different levels and types of pollution." (Authors) Gomphidae and Zygoptera are rarely represented.] Address: Lotfi, A., Laboratoire de Biologie Environnementale, INRA 3184, Université de Franche-Comté, 1, Place Leclerc, 25030 Besançon Cedex, France. E-mail: lotfi.aleya@univ-fcomte.fr

7696. Höser, N.; Klaus, D. (2007): Egon Jungmann zum 70. Geburtstag. *Entomologische Nachrichten und Berichte* 51(3-4): 245-246. (in German) [E. Jungmann contributed several papers to the Odonata fauna of the Federal State Thuringia, Germany.] Address: not stated

7697. Huang, H.; Sun, M. (2007): Dragonfly forewing-hindwing interaction at various flight speeds and wing phasing. *AIAA Jour.* 45(2): 508-511. (in English) ["Dragonflies are accomplished fliers. Scientists have always been fascinated by their flight. Experimental and computational studies on a single airfoil in dragonfly hovering mode were conducted by Freymuth [1] and Wang [2], respectively. They showed that large vertical force was produced during each downstroke. In each downstroke, a vortex pair was created; the large vertical force was explained by the downward two-dimensional jet induced by the vortex pair [2]. Recently, due to the advances in computational and experimental techniques and facilities, researchers are beginning to study dragonfly aerodynamics and forewing-hindwing interactions using three-dimensional model wings [3-5]. Sun and Lan [3] studied the aerodynamics and the forewing-hindwing interaction of a dragonfly in hover flight, using the method of computational fluid dynamics (CFD). Maybury and, Lehmann [4] and Yamamoto and Isogai [5] conducted experimental studies on the forewing-hindwing interaction at hovering conditions. Wang and Sun [6] extended the computational study of Sun and Lan [3] to the case of forward flight. In most of these studies, only hovering flight was considered. Only Wang and Sun [6] investigated the effects of forward flight speed, but the investigation was limited to a few phase

differences ($\gamma(d) = 0, 60, 90, \text{ and } 180 \text{ deg}$; $\gamma(m)$ denotes the difference in phase angle between the forewing and the hindwing stroke cycles, positive when the hindwing leads the forewing and negative when the forewing leads the hindwing). Because the distance of a wing from the wake of another wing depends on the flight speed and the relative motion of the fore- and hindwings, it is expected that the forewing-hindwing interaction is strongly influenced by the flight speed and the relative phase difference. Therefore, it is desirable to study the forewing-hindwing interaction by systematically varying the flight speed and the phase angle. Moreover, in the above studies [3-6], attention was mainly paid on whether or not the aerodynamic forces were changed by the forewing-hindwing interaction, while how the interaction occurred was not well understood. It is of interest to make further investigation on the flow field of the wing wake to reveal how the forewing-hindwing interaction occurs. In the present study, we address the above questions by numerical simulation of the flows of model dragonfly wings. The phasing and the flight speed are systematically varied. Advance ratio (the nondimensional flight speed) ranges from 0 to 0.6. At each advance ratio, eight phase differences, $-180, -135, -90, -45, 0, 45, 90, \text{ and } 135 \text{ deg}$, are considered." (Authors)] Address: Huang, H., Beijing Univ. of Aeronautics & Astronautics, 100083 Beijing, China

7698. Kalnins, M. (2007): Brown Orthetrum Orthetrum brunneum (Fonscolombe, 1837) - a new dragonfly species in Latvia. *Acta Biol. Univ. Daugavp.* 7(2): 109-111. (in English) [teneral male specimen, 12-VII-2005 in the Klanu Nature reserve, Latvia] Address: Kalniņš, M., Department of Zoology and Animal Ecology, Faculty of Biology, University of Latvia, Kronvalda bulv. 4, Riga, LV-1586, Latvia. E-mail: martins.kalnins@dap.gov.lv

7699. Karjalainen, S. (2007): Sudenkorentojen (Odonata) uudet maakuntahavainnot 2002–2007 [New provincial records of Finnish dragonflies (Odonata) in 2002–2007]. *Sahlbergia* 13: 13-25. (in Finnish, with English summary) ["This paper presents 48 new provincial records of Finnish dragonflies made in 2002–2007. In this period two species new to the Finnish fauna have been found, viz. *Aeshna mixta* and *Sympetma paedisca*. By 2007, both of them are already distributed in a large area adjacent to the southern coast. Also *Coenagrion puella*, *Sympetrum sanguineum*, and *Leucorrhinia pectoralis* have become more common and are currently distributed in a wider area than before. The large number of new provincial records result from greatly increased interest in dragonflies in Finland and widened distribution pattern of some species. An updated version of a distribution table of Finnish dragonflies by biogeographical provinces is presented." (Author)] Address: Karjalainen, S., Neidonpuistontie 6 D 8, FI-02400 Kirkkonummi, Finland. Email: sk@korento.net

7700. Kawase, N.; Natuhara, Y. (2007): Suitable habitats and the habitat network of a threatened aeshnid dragonfly, *Aeschnophlebia longistigma* Selys (Odonata: Aeshnidae) in suburban areas of Sakai City, Osaka Prefecture, Japan. *Jpn. J. Environ. Entomol. Zool.* 18(3): 123-131. (in Japanese, with English summary) ["Suitable habitats (ponds or marshes that are well covered by tall aquatic plants) of the threatened *A. longistigma* were identified by observing aerial photographs of suburban area of Sakai City. Field surveys were then

carried out to find adult dragonflies in those identified habitats. Although 19 suitable habitats were found in the area investigated, adult dragonflies were found only in 10 of the 19 habitats. Additionally, only 3 of 10 habitats were regarded as suitable breeding habitats or sources by determining the existence of larval exuviae or teneral adults. In the 3 habitats, a tall-growing aquatic plant *Phragmites australis* was seen to dominate. As a result of analyzing the distances of the 10 habitats, adults dragonflies found in the 7-sink habitats were traveling $2,260 \pm 841$ m from the nearest 3-source habitats." (Authors)] Address: Kawase, N., Osaka Prefecture University, Graduate School of Life and Environmental Sciences, 1-1 Gakuen-cho, Sakai, Osaka 599-8531, Japan

7701. Kratzer, E.B.; Batzer, D.P. (2007): Spatial and temporal variation in aquatic macroinvertebrates in the Okefenokee swamp, Georgia, USA. *Wetlands* 27(1): 127-140. (in English) ["Aquatic macroinvertebrates of the Okefenokee Swamp have been largely overlooked despite their ecological importance and value as water quality indicators. In a two-year study we analyzed taxon richness and abundances of individual macroinvertebrate taxa in the Okefenokee Swamp to assess temporal variation among seasons and spatial variation among five plant community habitats (marsh prairies, cypress forest, scrub-shrub thickets, deepwater lakes, and boat trails) and across six areas of the Okefenokee. Chironomid and ceratopogonid midges and water mites numerically dominated the macroinvertebrate community, and chironomids, dytiscid beetles, and libellulid dragonflies had the greatest generic richness. Multivariate analysis of macroinvertebrate community structure did not show clear patterns among seasons, habitats, or areas. Furthermore, few individual taxa had either spatial or temporal variation in abundance. Wetland macroinvertebrate communities were relatively homogenous across the Okefenokee Swamp possibly because conditions important to these organisms did not vary dramatically among habitats or seasons. Alternatively, most resident taxa might be ecological generalists able to exploit a broad range of conditions." (Authors)] Address: Kratzer, Erika, Dept of Entomology University of Georgia, Athens, Georgia, USA 30602. E-mail: ekratzer@vt.edu

7702. Mahan, R.D.; Johnson, J.R. (2007): Diet of the Gray Treefrog (*Hyla versicolor*) in relation to foraging site location. *Journal of Herpetology* 41(1): 16-23. (in English) [Missouri, USA; using a stomach-flushing technique, stomach contents of *H. versicolor* also resulted in one prey item identified as a mandible of a "Coenagrionidae". "Despite growing concern over habitat destruction, little is known regarding the activities of pond-breeding amphibians in the terrestrial environment. Yet, because most pond-breeding amphibian species spend the majority of their time in terrestrial habitats, it is important to understand what role terrestrial habitat plays in their life history. We examined the stomach contents of the Gray Treefrog (*Hyla versicolor*) in central Missouri using a stomach-flushing technique. Treefrogs were stomach-flushed; stomach contents were dried and weighed; and prey items were counted and identified for frogs caught in both artificial arboreal refugia and at breeding ponds. The majority of prey consisted of ants (41.2%) and beetles (29.6%). Both males and females caught in artificial refugia contained greater stomach content mass than those caught at breeding

ponds. There was a positive correlation between mass of stomach contents and distance from breeding ponds, with the average number of beetles per stomach increasing with distance from ponds. There was also greater stomach content mass in frogs found in artificial refugia on white oaks than red oaks or sugar maples, but there was no relationship between tree diameter and stomach content mass. These results demonstrate the importance of protecting terrestrial habitat to maintain foraging areas for treefrogs." (Authors)] Address: Mahan, Rachel, Division of Biological Sciences, University of Missouri, Columbia, Missouri 65201, USA. E-mail: MahanRD@gmail.com

7703. Miller, J. (2007): Mantis religiosa frisst Anax parthenope. mercuriale 7: 43. (in German) [Photo of *M. religiosa* preying on *A. parthenope*; 19-09-2004, Salin de Giraud, Camargue, France.] Address: Miller, J., Leharstraße 6c, 86179 Augsburg, Germany

7704. Ramsey, J.B.; White, D.S.; Jin, H.-S. (2007): Spatial distribution of benthic macroinvertebrates in a sidearm embayment of Kentucky Lake. *Journal of the Kentucky Academy of Science* 68(1): 50-58. (in English) ["The macrobenthos of Ledbetter Embayment, Kentucky Lake, were sampled monthly (January 2005 through July 2006) to determine community structure with focus on the physical and chemical factors influencing spatial distribution and density. We collected 38 species, including 27 insects, four molluscs, two crustaceans, and three annelids. Species composition was similar to that observed in other midwestern reservoirs except that some taxa, typically rare in other systems, were very abundant. Mean density was 1158 m² and density increased with water depth. Macroinvertebrate distribution was patchy. Profundal collector-gatherers were associated with depositional zones created by flow patterns within the embayment driven by the main stem current. Most littoral species showed associations with allochthonous input or substrate heterogeneity provided by incoming streams. The physical structure of Kentucky Lake embayments and commensurate patterns of organic matter deposition, depth, and substrate composition appear to be the primary factors structuring the macrobenthos." (Authors) Four odonate taxa are listed on the genus level.] Address: Ramsey, J., Hancock Biological Station and Center for Reservoir Research, 561 Emma Drive, Murray, Kentucky 42071

7705. Richards, L.A.; Windsor, D.M. (2007): Seasonal variation of arthropod abundance in gaps and the understorey of a lowland moist forest in Panama. *Journal of Tropical Ecology* 23: 169-176. (in English) ["Treefalls gaps contribute to the habitat heterogeneity of tropical forest floors. Previous studies have shown that these gaps play an important role in plant and bird communities, however less is known about their role in arthropod communities. Using eight Malaise traps we investigated the difference in arthropod abundance of 19 taxonomic groups between gaps and understorey for 21wk during the rainy season and 8wk in the dry season on Barro Colorado Island, Panama. More (33.8%) arthropods were collected in gaps during the rainy season and 32.2% more in the understorey during the dry season. To assess the possible factors contributing to these differences we measured light, plant densities and young leaf densities, as indicators of abiotic factors and food resources for insect herbivores. Arthropod abundance was negatively correlated with light in the dry season.

Thus, abiotic stress may explain the pattern of abundance in the dry season. While there was no correlation with light in the rainy season, predator abundance was positively correlated with herbivore abundance. The plant and young leaf density data suggest that there is significantly higher food availability for herbivores in gaps. Thus, less stressful abiotic conditions and more food resources may contribute to more herbivores followed by more predators in gaps during the rainy season." (Authors) Odonata capture rate in gaps was higher than in understory both in rainy and dry season.] Address: Richards, Lora, Dept of Biology, Univ. of Utah, 257 S. 1400 E., Salt Lake City UT 84112, USA. E-mail: lrichards@bio.mq.edu.au

7706. Rodrigues Fernandes, F.; Dominici Cruz, L.; Ferreira Rodrigues, A.A. (2007): Diet of the Gray-Breasted Martin (Hirundinidae: *Progne chalybea*) in a wintering area in Maranhão, Brazil. *Revista Brasileira de Ornitologia* 15(3): 445-447. (in English, with Portuguese summary) [*P. chalybea* is a Neotropical migrant that reproduces in southern Brazil and migrates to northern South America during the non-breeding period in April to September, where it occupies urban areas. This study presents some preliminary data on diet of the population of *P. chalybea* that winters in Presidente Dutra. A total of 27 stomachs were analyzed, 17 from May, and 10 from August. The analyses of stomach contents resulted in the identification of 4,599 individual preys, belonging to nine insect Orders. Hymenoptera was the most abundant, being found in all stomachs, and contributing to 69.9% of all prey items. Odonata contribute with 0,1 % of prey items found in 2 of the 27 stomachs.] Address: Ferreira Rodrigues, A.A., Universidade Federal do Maranhão, Departamento de Biologia, Av. dos Portugueses, s/n, Campus Universitario do Bacanga, CEP 65080.040, Sao Luis, MA, Brasil. E-mail: agosto@ufma.br

7707. Sage, W. (2007): ZGB-Exkursion in Kroatien vom 30. 04. - 06. 05. 2005. Artenliste der festgestellten Reptilien, Amphibien, Schmetterlinge, Insekten und Spinnentiere. *Mitt. Zool. Ges. Braunau* 9(3): 215-220. (in German) [Croatia; records of *Crocothemis erythraea* from the Island of Pag (environment of Vela Blata) and *Orthetrum albystylum* from lake Vrana are listed.] Address: Sage, W., Seibersdorfer Str. 88 a, D-84375 Kirchdorf/Inn, Germany.

7708. Schotthoefer, A.M.; Labak, M.; Beasley, V.R.; (2007): *Ribeiroia ondatrae* cercariae are consumed by aquatic invertebrate predators. *J. Parasitol.* 93(5): 1240-1243. (in English) ["Trematodes amplify asexually in their snail intermediate hosts, resulting in the potential release of hundreds to thousands of free-living cercariae per day for the life of the snail. The high number of cercariae released into the environment undoubtedly increases the probability of transmission. Although many individual cercariae successfully infect another host in their life cycle, most fail. Factors that prevent successful transmission of cercariae are poorly understood. Microcrustaceans and fish have been observed to eat cercariae of some species, although the possibility that predation represents a significant source of mortality for cercariae has been largely unexplored. We tested the cercariophagic activity of several freshwater invertebrates on *Ribeiroia ondatrae*, a trematode that causes limb deformities in amphibians. Individuals of potential predators were placed into wells of multiwell

plates with 10–15 cercariae, and numbers of cercariae remaining over time were recorded and compared with numbers in control wells that contained no predators. Of the species tested, *Hydra* sp., damselfly (Odonata, Coenagrionidae) larvae, dragonfly (Odonata, Libellulidae), larvae, and copepods (Cyclopoida) consumed cercariae. In some cases, 80–90% of the cercariae offered to damselfly and dragonfly larvae were consumed within 10 min. In most cases, predators continued to consume cercariae at the same average rates when offered cercariae together with individuals of an alternate prey item. *Hydra* sp. ate fewer cercariae in these trials. Our findings suggest the need for field and laboratory studies to further explore the effects of predators on transmission of *R. ondatrae* to amphibian larvae. In addition, the results suggest that conservation of the biodiversity and numbers of aquatic predators may limit adverse impacts of trematode infections in vertebrate hosts." (Authors)] Address: Schotthoefer, Anna, The Metropolitan State College of Denver, Dept of Biology, Campus Box 53, P.O. Box 173362, Denver, Colorado 80217. E-mail: schottho@gmail.com

7709. Takegawa, Y.; Fukuda, H.; Totsuka, K.; Kimoto, H.; Taketo, A. (2007): Phylogenetic relationship among several Japanese Odonate species inferred from mitochondrial DNA sequences. *Memoirs Fukui Institute of Technology* 37: 235-242. (in English) ["Using mitochondrial DNA sequences, phylogenetic relationships were studied on several odonate species occurring in Honshu, Japan. A calopterygid damselfly, *Mnais pruinosa* was roughly classified into two groups: *subspecies nawai* and others which were subdivided into *subspecies pruinosa* and *costalis*. On the other hand, the nucleotide sequences of COI region in *Somatochlora viridiaenea* were identical between *subspecies viridiaenea* and *atrovirens*. The sequence of *Sympetrum frequens* differed from that of *S. depressiusculum* in a single nucleotide, but this change was synonymous, and thought to be within individual variation or polymorphism." (Authors)] Address: Kimoto, H., Department of Bioscience, Fukui Prefectural University, Japan

7710. Tol, J. van (2007): The Odonata of Sulawesi and adjacent islands, part 6. Revision of the genus *Drepanosticta* Laidlaw (Zygoptera: Platystictidae). *Odonatologica* 36(2): 171-189. (in English) ["The genus *Drepanosticta* Laidlaw is revised for Sulawesi and adjacent islands. *D. ephippiata* Lieftinck is redescribed, and *D. bicolor* sp. n. (Buton Island), *D. hamulifera* sp. n. (Kabana Island), *D. penicillata* sp. n. (central Sulawesi) and *D. watuwilensis* sp. n. (SE Sulawesi) are described as new to science. A key to the males is provided. Based on the structure of posterior margin of the pronotum, *D. ephippiata* presumably represents a monophyletic clade with the *D. lymetta* and *D. megametta* species-groups, including species from the mainland of New Guinea. This group is distributed from Mindanao (Philippines) eastward to the northern Moluccas, northern New Guinea and the Solomon Islands. The newly described species are morphologically quite diverse; they are presumably most closely related to species occurring SE of Sulawesi." (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

7711. Tsuyuki, K.; Sudo, S.; Igarashi, S. (2007): Flow characteristics around a dragonfly wing obtained using liquid particles and numerical simulation. *Journal of the*

Japanese Society for Experimental Mechanics 7(3): 240-246. (in Japanese, with English summary) ["This paper describes the application of liquid particles to the measurement of the airflow around the forewing of the dragonfly, *Sympetrum frequens*. The particles with the diameter of approximately 10 µm were obtained by heating a mixture of glycols and distilled water. They were scattered as tracer particles in a wind tunnel. A PIV system was used to analyze the airflow around the dragonfly forewing with $Re = 1.1 \times 10^3$. On the other hand, a three-dimensional dragonfly forewing model was constructed for a numerical simulation. This simulation was used to obtain the velocity distributions around the model as well as the aerodynamic characteristics such as lift and drag coefficients. The experimental velocity results were in a good agreement with those of the simulation. Therefore, it was confirmed that the use of liquid particles comprising glycols was suitable for the analysis of low Reynolds number flows by the PIV system." (Authors)] Address: Sudo, S., Faculty of Systems Science and Technology, Akita Prefectural University, Ebinokuchi 84-4, Yurihonjo 015-0055, Japan

7712. Ueuma, Y.; Sagawa, T. (2007): A preliminary report of Odonata and such liek [sic] faunas of Hangando moor in Mt. Hakusan. Annual Report of The of Hakusan Nature Conservation Center 34: 31-33. (in Japanese, with English translation of the title) [Highland bogs are not known until now from the Hakusan Mountains. However, it is said that such a bog was located upper reach of the Myodani river at Hakuho, Hakusan city, Ishikawa prefecture (Matsumura et. al, 1980), and the precise location was not clear. This time we conducted a preliminary investigation of the bog on July 19, 2007. The bog was located at a height of ca. 1400 m a. s. l., and as the area was called Hangando for a long time, we named the bog Hangando moor. The vegetation of the area is Japanese beech, Japanese oak trees, cedars and bamboo grass and low bushes. The moor was divided by a small stream on the east and the west, in the former with three bog pools and the latter, one bog, wider and deeper than the east bogs, and small pools. The moor was covered with bog moss, and surrounded by grassy field of dew grass and lilies. We could not find such a proof of a high moor there as Matsumura et. al. indicated. Table 1 shows our findings from the two areas. At the west area rather a lot of *Leucorrhinia dubia*, the first specimen from Ishikawa prefecture; formerly only photos of the species were recorded, were sighted (Photo 3). Others are *Cordulia aenea amurensis*, the first specimen from the Hakusan Mountains in Ishikawa prefecture, *Coenagrion lanceolatum*, seemingly exuvia of *Aeshna juncea* and *Sympetrum frequens*. In the water salamanders and water beetles were found and 5 species of birds were seen. At the east, *L. dubia* (>10) and *Ceriagrion melanurum* were sighted. It is noticeable that such a lot of *L. dubia* were found from the Hakusan Mountains, and also the location of *L. dubia* and *C. a. amurensis* there seems to be the western limit in Japan. (Naoya Ishizawa)] Address: Ueuma, Yasuo, Hakusan Nature Conservation Center, Japan

7713. Wiesenborn, W.D.; Heydon, S.L. (2007): Diets of breeding Southwestern willow flycatchers in different habitats. *The Wilson Journal of Ornithology* 119(4): 547-557. (in English) ["We identified arthropods in fecal samples from 56 Southwestern Willow Flycatchers (*Empidonax traillii extimus*) at three localities in Nevada

and Arizona, USA with different plant communities during the 2004 breeding season. We concurrently collected arthropods in flight with Malaise traps and on different plant species by sweep net. These potential prey were identified to Order and counted. Fecal samples contained 57 taxa of spiders and insects including 32 families in 8 Orders. Flycatchers consumed similar diversities (numbers of taxa), but different taxonomic compositions (abundances in Orders) of arthropods among localities." (Authors) Odonata were more abundant in fecal samples at Topock Marsh than at Pahrana-gat Lake or Virgin River. They comprised 20% of arthropods in fecal samples at Topock Marsh and included Anisoptera and Zygoptera.] Address: Wiesenborn, W. D., U.S. Bureau of Reclamation, Lower Colorado Regional Office, P. O. Box 61470, Boulder City, NV 89006, USA. E-mail: wwiesenborn@lc.usbr.gov

7714. Zessin, W.; Ludwig, R. (2007): Intraspezifische Aggression unter Libellen (Odonata) auf Zerstörung der Flügel gerichtet. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 10(1): 67-68. (in German) [Two specimens of *Aeshna mixta* accidentally fixed by a spider clues tried to free in vain from their trap. With increasing failure they directed their aggression against the opposite specimen biting into the wings.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

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7715. Aistleitner, E.; Barkemeyer, W.; Lehmann, G.; Martens, A. (2008): A checklist of the Odonata of the Cape Verde Islands. *Mitt. internat. entomol. Ver. Frankfurt a.M.* 33(1/2): 45-57. (in English) ["To date, 14 species of Odonata have been recorded from the archipelago. The checklist is based on previously published records, unpublished details from the historical collection of Leonardo FEA and collections made on 8 trips from 1998 to 2007. The dragonfly fauna comprises species typical for arid conditions, being widespread in Africa and known from several other African islands." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

7716. Almeida Andrade, H.T. de; Santiago, A.S.; Fernandes Medeiros, J. (2008): Estrutura da comunidade de invertebrados bentônicos com enfoque nos insetos aquáticos do Rio Piranhas-Assu, Rio Grande do Norte, nordeste do Brasil. *EntomoBrasilis* 1(3): 51-56 (): 51-56. (in Portuguese, with English summary) ["The aim of this work was to verify the benthonic invertebrates, and to identify the functional trophic groups that exist in the Piranhas-Assu, in Alto do Rodrigues municipality, Rio Grande do Norte State. The samples were carried taken on May (rain season), July and September (dry season) from 2002, in different sites in the river. The measurements of water speed, wide, temperature and river deep where made. It was collected 3525 individuals of Insecta and other classes (Malacostraca, Gastropoda, Bivalvia, Arachnida, Ostracoda and Copepoda). Insecta showed a higher abundance in September (dry season). The river discharge showed significant correlation with Insecta classe abundance, and the superficial water speed had correlation with other classes. The insects showed a highest abundance of predators, followed by collectors, in the other classes, the scappers

were the most abundant." (Authors) Odonata are treated on the family level.] Address: Fernandes Medeiros, J., Coordenação de Pesquisas em Ciências da Saúde, Instituto Nacional de Pesquisas da Amazônia, e-mail: imedeiro@inpa.gov.br

7717. Azar, D.; Nel, A. (2008): First Baltic amber megapodagrionid damselfly (Odonata: Zygoptera). *Ann. soc. entomol. Fr. (n.s.)* 44(4): 451-457. (in English, with French summary) ["*Electropodagrion szwedoi* n. gen., n. sp., first Baltic amber megapodagrionid damselfly, is described. The European and North American fossils document a very high diversity and a much wider distribution of this group of damselflies during the Cenozoic than today. A checklist of described fossil species of damselflies of the family Megapodagrionidae is given." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

7718. Balzan, M.V. (2008): The distribution of *Orthetrum trinacria* Selys, 1841 and *Trithemis annulata* Palisot de Beauvois, 1807 in the Maltese Islands (Odonata: Libellulidae). *Bulletin of the Entomological Society of Malta* 1: 91-96. (in English) ["Two recently recorded dragonfly species, *Orthetrum trinacria* and *Trithemis annulata*, were observed over several bodies of water in Gozo. The distribution of these species is documented. Moreover, it is suggested that the introduction of these species could have been favoured by changes in the climate, in the light of similar observations made throughout Southern Europe." (Author)] Address: Balzan, M.V., International Environment Institute, Univ. of Malta, 3rd Floor, Chemistry Building, Room 311, Msida, Malta. E-mail: balzanmv@gmail.com

7719. Bellstedt, R.; Kaiser, J. (2008): Zur Limnofauna der Kiesgruben Herrenhof/Georgenthal im Landkreis Gotha Thüringen unter besonderer Berücksichtigung der Libellen (Insecta, Odonata). *Abh. Ber. Mus. Nat. Gotha* 25: 57-62. (in German) [35 odonate species - including the protected by law species *Leucorrhinia albifrons* - were sampled in the gravel pits of Herrenhof/Georgenthal, Landkreis Gotha, Thüringen, Germany.] Address: Bellstedt, R., Brühl 2, D-99867 Gotha, Germany

7720. Böke, R. (2008): Die Libellen (Odonata) im Landkreis Holzminden (Niedersachsen). *Braunschweiger Naturkundliche Schriften* 8(1): 151-171. (in German, with English summary) [Germany; "In the district of Holzminden, situated in the south of Lower Saxony, 49 of the 81 dragonfly species occurring in Germany have been found. 38 species are indigenous in at least one of the 161 investigated locations. 27 species are listed with threat category 1 to 3 in the Red Data List of Germany (20), Lower Saxony (22), or Northrhine-Westphalia - "Weserbergland" region (17). Specific valuable biotopes are located in the Soiling mountains with their upland moors, in the Weser valley, and in the mountainous regions with natural brooks and their headwaters. While the trend of the population of many species is negative, supported by the climatic changes the southern species *Erythromma lindenii* and *E. viridulum* are expanding also in the district of Holzminden." (Author)] Address: Böke, R., Viktoria-Luise-Weg 12, 37603 Holzminden, Germany

7721. Boros, E.; Forro, L.; Gere, G.; Kiss, O.; Vörös, L.; Amdrikovics, S. (2008): The role of aquatic birds in

the regulation of trophic relationships of continental soda pans in Hungary. *Acta Zoologica Academiae Scientiarum Hungaricae* 54 (Suppl. 1): 189-206. (in English) ["The aim of this study was to estimate the population sizes, food resources, food selection and trophic regulation of aquatic birds in these soda pans. We classified the estimated density of birds into 3 simple nutrient cycling guilds: net-importer, exporter-importer and the net-exporter. The most important aquatic bird guild was the net-importer guild (51–70%), and the second was the exporter-importer guild (41–27%), while the relative densities of the net-exporter guild was the lowest (8–3%) in the investigated 2 pans. The captive foraging experiment demonstrated that the filter-feeder wildfowl (*Anas* species) could successfully remove the microcrustacean plankton and invertebrate nekton from the water. The biomass of planktonic crustaceans was significantly more by an order of magnitude than the biomass of the other invertebrates (benthos [including Odonata], nekton). The relatively simple trophic relationships demonstrate the bottom up function of some keystone herbivore aquatic bird species, while the top down control is determined by several wildfowl and wader species. The external nutrient load of the aquatic birds causes hypertrophic level of inorganic nutrient resources for the algae, while the planktonic primary production varied only between oligotrophy and mesotrophy because of the extreme physical conditions of these waters. The observed net heterotrophy and several trophic relationships seem to be regulated by aquatic birds." (Authors)] Address: Boros, E., Naturglob Ltd., H-1196 Budapest, Kossuth L. u. 76, Hungary. E-mail: drborose@gmail.com

7722. Bots, J.; de Bruyn, L.; van Damme, R.; van Gossum, H. (2008): Effects of phenotypic variation onto body temperature and flight activity in a polymorphic insect. *Physiological Entomology* 33: 138-144. (in English) ["According to biophysical principles, colour and size are important phenotypic factors that may influence body temperature and activity in ectothermic insects. In taxa showing female-limited polymorphism, males and female morphs differ in body colour, size and activity pattern. However, no previous study has evaluated whether such phenotypic and behavioural variation relates to differences between males and female morphs in thermal properties. In the present study, the relationships between body colour, size, activity and body temperature are examined under laboratory and field conditions, for the polymorphic damselfly *Enallagma cyathigerum*. Contrary to expectation, males and female colour morphs of this species do not differ in thermal properties (i.e. heating characteristics or field body temperatures). When questioning phenotype and activity, temperature does not appear to be relevant for understanding the maintenance of female-limited polymorphism." (Authors)] Address: Bots, Jessica, Evolutionary Ecology Group, Department of Biology, University of Antwerp, Groenenborgerlaan 171, B-2020, Antwerp, Belgium. E-mail: jessica.bots@ua.ac.be

7723. Brown, J.W.; Bahr, S.M. (2008): The insect (Insecta) fauna of Plummers Island, Maryland: Brief collecting history and status of the inventory. *Bulletin of the Biological Society of Washington* 15: 54-64. (in English) ["Plummers Island, a small site situated along the northern shore of the Potomac River in Montgomery County, Maryland, has been the research home of the Washington Biologists' Field Club for more than 100 years. Field

work conducted by club members from 1901 to about 1925 resulted in the accumulation of thousands of insect specimens of all orders from the Island, most of which are deposited in the collections of the National Museum of Natural History, Smithsonian Institution. Little collecting was conducted from ca. 1930–1950. In the 1960s sampling by Karl Krombein focused on bees and wasps and that by Terry Erwin on carabid beetles. Since 1998 the Lepidoptera fauna, leaf beetles (Chrysomelidae), and darkling beetles (Tenebrionidae) all have been the subject of investigations. In 2005 and 2006 Malaise traps were deployed to sample other orders (e.g., Trichoptera, Diptera, Hymenoptera). While the four major insect orders (i.e., Coleoptera, Diptera, Lepidoptera, and Hymenoptera) are represented by large numbers of historical specimens, only Lepidoptera have been surveyed thoroughly in recent times; notable exceptions include specific families: carabid beetles, leaf beetles, darkling beetles, sawflies, and bees and wasps. Based on an examination of the insect collection of the National Museum of Natural History and a review of relevant literature, we document 3012 insect species in 253 families, encompassing 18 insect orders: Collembola, Odonata, Dermaptera, Blattodea, Phasmatodea, Orthoptera, Psocoptera, Thysanoptera, Hemiptera, Neuroptera, Megaloptera, Coleoptera, Mecoptera, Trichoptera, Lepidoptera, Diptera, Siphonaptera, and Hymenoptera.] Address: Brown, J.W., Systematic Entomology Laboratory, P.S.I., Agricultural Research Service, U.S. Department of Agriculture, National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, Washington, D.C. 20013-7012, USA. E-mail: john.brown@ars.usda.gov;

7724. Caillouët, K.A.; Carlson, J.C.; Wesson, D.; Jordan, F. (2008): Colonization of abandoned swimming pools by larval mosquitoes and their predators following Hurricane Katrina. *J. Vector Ecol.* 33(1): 166-172. (in English) ["Thousands of flooded swimming pools were abandoned in New Orleans following Hurricane Katrina and provided a natural experiment to examine colonization of a novel aquatic habitat by mosquito larvae and their aquatic predators. We conducted a randomized survey of flooded swimming pools in two neighborhoods in January 2006 and found that 64% contained mosquito larvae, 92% contained predatory invertebrates, and 47% contained fishes. We collected 12,379 immature mosquitoes representing five species, primarily *Culiseta inornata*, and secondarily, the arboviral vector *Culex quinquefasciatus*. Dragonfly nymphs in the families Aeshnidae and Libellulidae were the most common predatory invertebrates collected among a total of 32 non-mosquito invertebrate species. Eleven species of fishes were collected, with *Gambusia affinis* accounting for 76% of the catch. Diversity of fishes in swimming pools was positively correlated with proximity to a levee breach and the fish assemblage found in swimming pools was similar to that found along shorelines of Lake Pontchartrain and drainage canals that flooded the study area. Mosquito larvae were rare or absent from pools containing fishes; however, path analysis indicated that the presence of top predators or abundant competitors may somewhat mitigate the effect of *Gambusia affinis* on mosquito presence." (Authors)] Address: Caillouët, K.A., Dept of Tropical Medicine, Tulane Univ., New Orleans, LA 70112, USA.

7725. Chen, J.-S.; Chen, J.Y.; Chou, Y.F. (2008): On the natural frequencies and mode shapes of dragonfly

wings. *Journal of Sound and Vibration* 313: 643-654. (in English) ["A base-excitation modal testing technique is adopted to measure the natural frequencies and mode shapes of dragonfly wings severed from thoraxes. The severed wings are glued onto the base of a shaker, which is capable of inducing translational motion in the lateral direction of the wing plane. Photonic probes are used to measure the displacement history of the shaker base and the painted spots of the wing simultaneously. A spectrum analyzer is employed to calculate the frequency response functions, from which the natural frequencies and the associated mode shapes of the wing structure can be extracted. Our experimental results show that the fundamental natural frequency of dragonfly wings is in the order of 170 Hz when it is clamped at the wing base. The average flapping frequency 27 Hz of dragonflies is about 16% of the fundamental natural frequency. At this frequency ratio, the inertial force of the wing is negligible compared to the elastic force. In other words, the wing deformation during flapping flight is solely due to the balance between the external aerodynamic force and the elastic force of the wing structure. The wing structures are generally lightly damped, with damping ratio in the order less than 5%." (Authors) Study species are *Orthetrum pruinosum* and *O.sabina*.] Address: Chen, J.-S., Department of Mechanical Engineering, National Taiwan University, Taipei 10617, Taiwan. E-mail: jschen@ntu.edu.tw

7726. Craig, C.N.; (2008): Nestedness in Playa odonates as a function of area and surrounding land use. *Wetlands* 28(4): 995-1003. (in English) ["As degradation of wetlands continues to occur as a result of human activities, it is important to identify aquatic and amphibious species' extinction risks and the relative hospitalities of sites to support intact biotic communities; one such technique involves comparing the nestedness of assemblages as an assay of predictability and stability. We measured the degree of nestedness of odonate communities in the playa wetland complex of the Texas panhandle (data from 23 species in 73 playas in the summers of 2003–05) under current conditions as well as four simulations of future socioeconomic and climate change. Compared to randomized (null model) assemblages, significant nestedness was found for the system as a whole as well as for each year separately and for playas within each of the two dominant regional forms of land cover (cropland and grassland). Cropland and grassland playas were further split into three size categories, based on natural size breaks. Although departures from nestedness (idiosyncrasy) were unrelated to playa size or surrounding land use, larger playas surrounded by cropland displayed lower nestedness than did smaller ones whereas grassland playas showed the opposite pattern. This relationship between playa area and surrounding land-use type showed that there is lower stability in odonate community composition in even large playas if those playas are surrounded by agriculture. Departures from nestedness mainly consisted of unexpected species presences rather than absences, with idiosyncratic species being larger in total body length and including two range extensions. Under simulations of playa losses, community patterns were similar to contemporary data, suggesting that the ephemeral and dynamic nature of playas may already expose the odonate community to selective pressures possible under future land conversion." (Authors)] Address: Craig, Crystal, Dept Biol. Scien., Texas Tech Univ. Lubbock, Texas, USA 79409. E-mail: nancy.mcintyre@ttu.edu

- 7727.** Czirok, A.; Horvai, V.; Sarfi, N. (2008): Faunistic data from the littoral zone of the Hungarian reach of river Drava. *Acta Biol. Debr. Oecol. Hung* 18: 27-36. (in Hungarian, with English summary) ["Between 2005 and 2007 we took macroinvertebrate samples at 4 sites on river Drava, and we identified 110 taxa. The Hungarian-Croatian reach of river Drava can be divided into two sections according to hydromorphological features. We examined, whether our samples had reflected this phenomenon. We also investigated how the results were affected by the local habitat features, the low number of sampling sites and sample number." (Authors) 10 Odonata taxa are listed including *Stylurus flavipes* and *Ophiogomphus cecilia*.] Address: Czirok, A., South Transdanubian Regional Environmental Nature Conservation and Water Management Inspectorate, Laboratory, Pécs H-7621, Papnövelde u. 13., Hungary
- 7728.** Dapkus, D.; Tamutis, V. (2008): Protected species of insects in conservation areas of central Lithuania recorded in 2007. New and rare for Lithuania insect species 20: 58-63. (in English, with Lithuanian summary) [Lithuania; records of *Ophiogomphus cecilia* are documented.] Address: Dapkus, D., Department of Zoology, Vilnius Pedagogical University, Studentu 39, LT-08106 Vilnius, Lithuania. E-mail: daldap@vpu.lt
- 7729.** Davis, C.A.; Bidwell, J.R. (2008): Response of aquatic invertebrates to vegetation management and agriculture. *Wetlands* 28(3): 793-805. (in English) ["Wetland managers rely on a variety of vegetation management techniques to set back plant succession, enhance seed production, create hemi-marsh conditions, and reduce the coverage of invasive plants in wetlands. We evaluated the effects of vegetation management techniques (prescribed burning, cattle grazing, mowing, and disking) on aquatic invertebrate communities in seasonal wetlands in the Rainwater Basin Region of Nebraska, USA. Because many of these wetlands are embedded in an agricultural landscape, we also evaluated the effects of agriculture on aquatic invertebrates. We conducted the study in 24 wetlands during spring 2004 and 2005. In general, aquatic invertebrate richness and diversity were similar among wetlands subjected to different management regimes. However, richness and diversity were highest in grazed wetlands and lowest in disked wetlands. Regardless of the management regime, total benthic and nektonic invertebrate biomasses were higher in managed wetlands than unmanaged wetlands. In 2004, naidid oligochaete biomass was highest in farmed wetlands. Cattle grazing, mowing, and prescribed burning seemed to have the greatest influence on individual taxa; 12, eight, and seven of the taxa (out of 32) had higher biomasses in grazed, mowed, and burned wetlands, respectively. Within mowed wetlands, the biomasses of some taxa (*Gyraulus*, *Lymnaea*, and *Physa*) were lower in managed areas than unmanaged areas, emphasizing the need to leave some areas unmanipulated to provide cover. Because of high spatial and temporal variability in wetlands and aquatic invertebrate communities, the response of aquatic invertebrates to vegetation management techniques was not consistent and no management regime offered a particular advantage in enhancing aquatic invertebrate communities. However, managers should be aware that some type of physical manipulation of aquatic vegetation in wetlands is still warranted on a regular basis to reduce nuisance vegetation, enhance seed production, and create optimal habitat conditions for migratory waterfowl and other wetland-dependent birds. [...] Each of the Odonata taxa differed among treatments. *Enallagma* biomass was highest in grazed wetlands, while *Lestes* biomass was highest in farmed wetlands. *Libellula* biomass was higher in grazed and reference wetlands than in mowed and farmed wetlands." (Authors)] Address: Davis, C.A., Natural Resource Ecology and Management Department, 008C Agricultural Hall, Oklahoma State University, Stillwater, Oklahoma, USA 74078. E-mail: craig.a.davis@okstate.edu
- 7730.** Davis, R.S.; Peterson, R.K.D. (2008): Effects of single and multiple applications of mosquito insecticides on nontarget arthropods. *Journal of the American Mosquito Control Association* 24(2): 270-280. (in English) ["Mosquito management plans have been implemented in the United States and globally to manage mosquito vectors of West Nile virus and many other diseases. However, there is public concern about ecological risks from using insecticides to manage mosquitoes. Two studies were conducted during the late summers of 2004 through 2006 at Benton Lake National Wildlife Refuge near Great Falls, MT. The first experiment was conducted in 2004 and 2005 to assess acute impacts of mosquito adulticides (permethrin and d-phenothrin) and larvicides (*Bacillus thuringiensis israelensis* and methoprene) on nontarget aquatic and terrestrial arthropods after a single application. The second experiment was conducted in 2005 and 2006 to assess longer-term impacts of permethrin on nontarget terrestrial arthropods after multiple repeated applications. For aquatic samples, in the first study, no overall treatment effects were observed despite a potentially deleterious effect on amphipods on sample date 1 in 2004. During the same study, 1 of 54 responses had a significant overall treatment effect for sticky-card samples. Many of the responses for stickycard samples suggested significant time effects and time 3 treatment effects. Three response variables were associated with fewer individuals present in the insecticide-treated plots in a multivariate analysis. For the multiple-spray study conducted in 2005 and 2006, 6 of the response variables collected via sticky cards exhibited significant overall treatment effects, but none was associated with fewer individuals in the insecticide-treated plots. None of the responses collected using sweep-net sampling suggested overall treatment effects. Time and time 3 treatment effects were prevalent in 2005, but no discernable pattern was evident. In general, nearly all of the responses evaluated for either study indicated few, if any, deleterious effects from insecticide application. [...] Interactions between treatment and time were significant for Odonata. Samples had relatively lower counts of odonates for the larvicide-treated plots on the first sampling date followed by a slight increase on date 2. Each of the adulticide-treated plots and the control plots started with relatively more odonates on date 1, followed by a decrease on date 2. Power to detect multivariate overall treatment effects was generally low for stickycard samples during 2004 (0.05–0.717), with some exceptions within certain dates, including Araneae, Coleoptera, and the large size class in the eastern plots, as well as Bombyliidae, Ceratopogonidae, Chironomidae, Hymenoptera, Odonata, and predators in the western plots (.0.85)." (Authors)] Address: Davis, R.S., Department of Land Resources and Environmental Sciences, 334 Leon Johnson Hall, Montana State University, Bozeman, MT 59717-3120, USA

- 7731.** De Marco Júnior, P. (2008): Libellulidae (Insecta: Odonata) from Itapiracó Reserve, Maranhão, Brazil: New Records and Species Distribution Information. *Acta Amazonica* 38(4): 819-822. (in English) ["In this work, I apply a simple protocol to species occurrence inventory of Odonata in a region of Maranhão state, Brazil which has very few distributional records. Some relations between species occurrence and environmental characteristics are discussed, mainly in relation to the high occurrence of *Erythemis*. Eighteen new records are presented discussing the role of this approach to generate useful information for conservation purposes." (Author)] Address: De Marco, P., Laboratório Ecologia Teórica e Síntese, Depto de Biologia Geral, Universidade Federal de Goiás, BR-74001-970, Goiânia, GO, Brazil. E-mail: pdemarco@icb.ufg.br
- 7732.** Degabriele, G. (2008): An annotated catalogue of the Odonata collection of Guido Lanfranco at the National Museum of Natural History in Malta. *Bulletin of the Entomological Society of Malta* 1: 85-89. (in English) ["An annotated list (n = 10 properly labelled species, and one exuvium) of the Odonata collection of Guido Lanfranco, is provided. The specimens were captured between 1952 and 1971, and may be the oldest surviving specimens caught and still available in local collections from Malta. Almost all locally occurring species are represented, with some specimens collected in sites and habitats that have since been destroyed by urban development. A portion of the specimens bear no data labels and do not contribute to the knowledge of the distribution of the species. During the cataloguing process, specimens in poor condition were restored." (Author)] Address: Degabriele, G., Centifolja, Triq it-Tank, Siggiewi, SGW 3412, Malta. E-mail: gergo@euroweb.net.mt
- 7733.** Duan, X.-d.; Wang, Z.-y. (2008): Experimental study on the effect of habitat isolation on river ecology. In: *Advances in Water Resources and Hydraulic Engineering – Proceedings of 16th IAHR-PAD Congress and 3rd Symposium of IAHR-ISHS (Vol.VI: Hydropower Hydraulics)*. Eds.: Changkuan Zhang & Hongwu Tang. ISBN: 978-7-302-18662-5: 86-91. (in English) ["The field investigations and an experiment were conducted in the Juma river in the suburbs of Beijing (China) to study the effect of habitat fragmentation on river ecology, using benthic macro-invertebrates as indicator species. Three experimental plots were isolated from a relatively undisturbed stream habitat with sheet iron. The benthic assemblages and water parameters were measured by sampling periodically. The results indicate that the abundance, taxa richness and bio-diversity of invertebrates significantly decrease in the experimental plots owing to the habitat isolation. The smaller the experimental habitat plot, the more significantly these biotic indices decrease. The contents of the dissolved oxygen in the studied plots present the inconsistent variations. The comparison of the benthic communities shows that the relative abundances of Ephemeroptera and Diptera reduces significantly in the isolated plots, and that of the Odonata and Lamellibranchia increase significantly. It is also found that the benthic communities need some time to stabilize after isolation, and then present apparent variation over time. There is a relatively high degree of taxa turnover between isolated plots and the non-isolated reach, which can be attributed to the flight and dispersal of many aquatic insects in their adult stage. However, the benthic communities in isolated plots are not nested subsets in the natural non-isolated stream. This paper also gives some suggestions of the river restoration and the preservation of river ecological integrity based on the study and the present status of the rivers in China." (Authors)] Address: not stated
- 7734.** Fidelis, L.; Nessiman, J.L.; Hamada, N. (2008): Spatial distribution of aquatic insects communities in small streams in Central Amazonia. *Acta Amazonica* 38(1): 127-134. (in Portuguese, with English summary) ["Small streams, at the Biological Dynamics of Fragmented Forest Project – INPA ca. 80 Km north from the city of Manaus (Amazonas, Brazil), were studied concerning the composition of the aquatic insects communities in different substrates. In each one of the 20 stretches, four samples of the principal biotopes were collected: leaf litter in riffle areas, leaf litter deposited on the bottom of the stream, sand and roots/vegetation on marginal banks. The aim of this study were to evaluate the aquatic insect fauna and relate it with specific substrates inside the igarapé. Leaf litter in riffle presented high richness number (106) while sand showed the lowest value (55). Higher similarity values occurred between leaf litter deposited on the bottom and marginal roots/vegetation. Lower values occurred between leaf litter in riffle and sand substrates. Some collected taxa were considered indicators of one type of substrate, but there were some taxa that showed no preference. The indicator taxa occurred in riffle litter were found in deposited leaf litter in Southeast streams of Brazil. This indicates the current velocity may be responsible for the community established. The size of the stream is related to the order and flow regime. In this study bigger streams (presenting higher values of flow and order) showed more distinct communities in each substrate than the smaller ones." (Authors) The samples include "Progomphus".] Address: Fidelis, Luana, INPA / DCEN, Caixa Postal 478, CEP: 69070-970, Manaus – AM. E-mail: luafidelis@uol.com.br
- 7735.** Fliedner, H.; Martens, A. (2008): The meaning of the scientific names of Seychelles dragonflies (Odonata). *Phelsuma* 16: 49-57. (in English) ["The meaning of the scientific names of all Odonata species known from the Seychelles is explained in detail. The basis of many scientific names is ancient Greek or Latin describing characters of the insects or names of important researchers. Understanding the meaning of these names should offer an additional approach for being familiar with these insect species. Additionally, it is a good approach to understand research history of tropical insects - in which the Seychelles play an important role just from the beginning." (Authors)] Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany. E-mail: H.Fliedner@t-online.de
- 7736.** Gliwa, B.; Seškauskaitė, D. (2008): Rare species of Lepidoptera and Odonata recorded from the environments of Lake Praviršulis (Central Lithuania) in 2007–2008. New and rare for Lithuania insect species 20: 64-68. (in English, with Lithuanian summary) [*Ischnura pumilio*, *Leucorrhinia pectoralis*, *Ophiogomphus cecilia*] Address: Gliwa, B., University of Latvia, Chair of Baltic Linguistics, Visvalžu 4a, LV-1050 Riga, Latvia. E-mail: berndgliwa@yahoo.de
- 7737.** Gniatkowski, J. (2008): Wazki (Odonata) w okolicach Częstochowa. Część II. *Biuletyn Częstochow-*

skiego Kola Entomologicznego 7: 8-9. (in Polish, with English summary) [In the surroundings of Czeszochowa, Poland, 23 odonate species - including *Aeshna subarctica* and *Leucorrhinia dubia* - were recorded between 2005 and 2007.] Address: Gniatkowski, J., ul Oskara Lange 7/97, PL-42-207 Czeszochowa, Poland

7738. Gros, P. (2008): Erste Nachweise von *Somatochlora arctica* (Zetterstedt 1840) und *Lestes barbarus* (Fabricius 1798) aus dem Ibmer Moos (Innviertel, Oberösterreich) sowie aktuelle Libellenfunde aus diesem Europaschutzgebiet (Insecta: Odonata). Beiträge zur Naturkunde Oberösterreichs 18: 115-121. (in German, with English summary) ["*S. arctica* and *L. barbarus* are reported from the Upper Austrian bog of Ibmer for the first time. In Upper Austria, these two dragonfly species are currently only known from very few sites. Details of these discoveries are given, typical features of the concerned species are described. Beyond that, all dragonfly species recently found in this area by the author are listed." (Author)] Address: Gros, P., Haus der Natur, Museumsplatz 5, A-5020 Salzburg, Austria. E-Mail: patrick.gros@hausdernatur.at

7739. Günther, A. (2008): Erste Nachweise der Kleinen Zangenlibelle (*Onychogomphus f. forcipatus*) an der Freiburger Mulde. Mitteilungen des Naturschutzinstitutes Freiberg 4: 72-76. (in German) [In June 2008, *O. forcipatus* was recorded along the river Freiburger Mulde between Gleisberg and Roßwein (Landkreis Mittelsachsen, Sachsen, Germany). This record is the first after 60 years.] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstraße 10, D-09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

7740. Hauenstein, W. (2008): Buchbesprechungen: Die Falkenlibellen Europas, Hansruedi Wildermuth, Die Neue Brehm-Bücherei Bd. 653, 1. Auflage von 2008, Westarp Wissenschaften, Hohenwarsleben. 512 S., 173 SW-Abb., 39 Farb-Abb., ISBN: 3-89432-896-7, € 59,95 / sFr 102,60. Entomo Helvetica 1: 84. (in German) [Book review] Address: not stated

7741. Heidemann, H. (2008): Nouvelles parutions: Die Falkenlibellen Europas (Corduliidae) par Hansruedi Wildermuth, 2008. La lettre des sociétaires. Société française d'Odonatologie 48: 8-9. (in French) [Book presentation.] Address: Heidemann, H., Au in den Buchen, 76646 Bruchsal, Germany

7742. Höttinger, H. (2008): Nachweise der Braunen Mosaikjungfer *Aeshna grandis* (Linnaeus, 1758) und der Balkan-Smaragdlibelle *Somatochlora meridionalis* (NIELSEN, 1935) aus dem Burgenland, östliches Österreich (Insecta: Odonata). Beiträge zur Entomofaunistik 9: 181-186. (in German) [Records of *A. grandis* (and the rare *Sympetrum meridionalis* from the same locality) (28-VII-2008) and *Som. meridionalis* (29-VII-2008) from Burgenland, E Austria are documented in detail.] Address: Höttinger, H., Institut für Zoologie, Dept für Integrative Biologie & Biodiversitätsforschung, Universität für Bodenkultur, Gregor Mendel Straße 33, A-1180 Wien, Austria. E-Mail: helmuthoettinger@boku.ac.at

7743. Janský, V.; David, S. (2008): Occurrence of the dragonfly *Cordulegaster heros* ssp. *heros* (Odonata: Cordulegastridae) in Slovakia. Acta Rer. Natur. Mus. Nat. Slov. Vol. LIV: 61-68. (in Slovakian, with English summary) [In 2003, *C. heros* was published new for Slovakia. It was known from 7 localities (4 loc. from

Malé Karpaty Mts. and 3 loc. from Borská nížina lowlands). Recent records arised the number of localities to 27 (23 loc. – Malé Karpaty Mts. and 4 loc. – Borská nížina lowland). The records are documented in detail, and mapped. The Slovakian oldest record is a larva from 1956 (Igt. Jedlička, Malé Karpaty Mts.). *C. heros* is listed in the appendix of the European Fauna-Flora-Habitat-Directive, and of special concern for the protection of European biodiversity.] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

7744. Jensen, K.; Das, I. (2008): Dietary observations on the Asian Softshell Turtle (*Amyda cartilaginea*) from Sarawak, Malaysian Borneo. Chelonian Conservation and Biology 7(1): 136-141. (in English) ["We examined the diet of *A. cartilaginea* from 2 localities in Sarawak: Loagan Bunut National Park and Balai Ringin. The most commonly found items in stomach contents, when using percentage frequency of occurrence, were plant material (77%) and unknown vertebrate parts (55%). Fecal analysis indicated similar results: plant material (100%), unknown vertebrate parts (84%), fish (69%), and unknown arthropods (62%). Results indicate that *A. cartilaginea* is an opportunistic omnivore." (Authors) The diet of one female *A. cartilaginea* included one "Odonata".] Address: Jensen, Karen, Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia. E-mail: kitti.jensen@yahoo.com; idas@ibec.unimas.my

7745. Kamisawa, Y.; Isigai, I. (2008): Optimum flapping wing motions of dragonfly. Trans. Japan Soc. Aero. S Sci. 51: 114-123. (in English) ["We studied the optimum flapping wing motions of a dragonfly (*Anax parthenope julius*) from hovering to cruising flight at various speeds, using a 3D Navier-Stokes code coupled with an optimization algorithm. The minimum necessary power curve and optimum flapping wing motions for the various flight velocities were determined using the optimization algorithm. The minimum power curve shows the typical U-shape. The optimum flapping wing motions were evaluated by comparison with experimental data. Examining the flow patterns showed that the large-scale flow separation around the wings is suppressed at these optimum conditions, except for very low flight speeds including hovering." (Authors)] Address: Isigai, I., Micro Flying Robot Laboratory, Nippon Bunri University

7746. Kazanci, N. (2008): Contribution to the knowledge of Odonata Fauna of Turkey: Central Anatolia. Review of Hydrobiology 2: 119-128. (in English, Turkish summary) ["1. This paper provides data on 41 Odonata species from Central Anatolia and Bolu province between 1977 and 1980. Adults were collected surroundings of lakes, dams, wetlands and running waters. 2. Some observations of larval habitats of species were also given. Pollution and habitat destruction are the main reasons of the elimination of the Odonata species in freshwater ecosystems." (Author)] Address: Kazanci, Nilgün., Hacettepe University Science Faculty Biology Department Hydrobiology Section, Beytepe, Ankara, Turkey. E-mail: nilgunkazanci@gmail.com

7747. Kazanci, N.; Girgin, S. (2008): Ephemeroptera, Odonata, Plecoptera (Insecta) Fauna of Ankara Stream (Turkey). Review of Hydrobiology 1: 37-44. (in English,

Turkish summary) [14 odonate taxa are reported; some identifications need confirmation (e.g. *Aeshna juncea*, *Coenagrion mercuriale*.)] Address: Kazanci, Nilgün, Hacettepe University Science Faculty Biology Department Hydrobiology Section, Beytepe, Ankara, Turkey. E-mail: nilgunkazanci@gmail.com

7748. Kim, S. B.; Jeon, H.S.; Oh, H.S.; Jung, Y.H.; Kim, W.T. (2008): Phylogenetic relationships of the Anisoptera (Insecta, Odonata) of Jeju Island, Korea, based on partial mitochondrial 16S ribosomal RNA sequences. *Korean J. Genetics* 30: 53-61. (in English) ["The phylogenetic relationship of the suborder Anisoptera distributed on Jeju Island, Korea, was analyzed by comparing partial mitochondrial 16S ribosomal RNA (rRNA) gene sequences. The length of the partial mitochondrial 16S rRNA genes for the 27 species of the Anisoptera studied ranged from 405 to 421 base pairs (bp). No intra-genus length-variations were identified in the genera *Anax* and *Orthetrum*, while the genes of *Somatochlora* and *Sympetrum* displayed lengths of 411 to 412 and 406 to 411 bp, respectively. The GC content of the partial mitochondrial 16S rRNA gene ranged from 26.76% to 30.83%. A parsimony analysis of the unambiguously aligned mitochondrial 16S rRNA gene sequences from 28 species, including outgroup species, produced eight equally most parsimonious trees. The strict consensus tree had three large independent groups: group I (family Aeshnidae), group II (family Libellulidae), and group III (family Corduliidae). Interestingly, the eight species of the genus *Sympetrum* were clearly distinguishable from the other species. The strict consensus tree, based on the mitochondrial 16S rRNA gene sequences, contained monophyletic groups. These results concurred with previous studies published by several researchers that were based on morphological characteristics." (Authors) *Anax parthenope*; *Anax nigrofasciatus*; *Anax guttatus*; *Gynacantha japonica*; *Polycanthagyna melanictera*; *Aeschnoplebia anisoptera*; *Somatochlora graeseri*; *Somatochlora clavata*; *Epophthalmia elegans*; *Macromia amphigena*; *Lyriothemis pachygastra*; *Orthetrum albistylum*; *Orthetrum melania*; *Crocothemis servilia*; *Deielia phaon*; *Sympetrum striolatum*; *Sympetrum darwinianum*; *Sympetrum eroticum*; *Sympetrum uniforme*; *Sympetrum kunkeli*; *Sympetrum infuscatum*; *Sympetrum risi*; *Sympetrum speciosum*; *Pseudothemis zonata*; *Rhyothemis fuliginosa*; *Pantala flavescens*; *Tramea virginia*] Address: Oh, Hong-Shik, Dept of Science Education, Cheju National University, Jeju 690-756, Korea. E-mail: sci-edu@cheju.ac.kr

7749. Kosco, J.; Manko, P.; Miklisova, D.; Kosuthova, L. (2008): Feeding ecology of invasive *Percottus glenii* (Perciformes, Odontobutidae) in Slovakia. *Czech J. Anim. Sci.* 53(11): 479-486. (in English) [Stomach contents of 331 specimens of *P. glenii* were dominated by chironomids, ephemeropterans and crustaceans. Odonata larvae were represented in two sampling periods (April, August), but accounted to less than 2% of food items.] Address: Kosco, J., Faculty of Human and Natural Sciences, University of Presov, Presov, Slovak Republic

7750. Kovacs, T.; Godunko, R.J.; Juhasz, P.; Kiss, B.; Müller, Z. (2008): Quantitative records of larvae of Ephemeroptera, Odonata and Plecoptera from the Zakarpats'ka Region, Ukraine (2004, 2006). *Folia historica naturalia musei matraensis* 32: 135-147. (in English)

[*Gomphus vulgatissimus*, *Onychogomphus forcipatus*, and *Platycnemis pennipes* are listed.] Address: Kovacs, T., Mátra Museum., Kossuth Lajos u. 40, HU-3200 Gyöngyös, Hungary. E-mail: koati@matavnet.hu

7751. Kulesza, A.E.; Holomuzki, J.R.; Klarer, D.M. (2008): Benthic community structure in stands of *Typha angustifolia* and herbicide-treated and untreated *Phragmites australis*. *Wetlands* 28(1): 40-56. (in English) ["We compared benthic community structure among stands of *T. angustifolia* (narrow-leaf cattail) and herbicide-treated (Glypro) and untreated *P. australis* (common reed) over two summers in a Lake Erie coastal wetland (i.e., drowned river mouth). Both macrophytes are invasives, but only *Phragmites* is currently controlled by herbicides because of its reputed "undesirable" effects on wetland community structure and function. Macroinvertebrate diversity was similar among stand types and relatively high (Shannon-Weaver indices 2.6-4.2), probably because of high system primary productivity and a mix of lentic and riverine species. Proportions of macroinvertebrate functional feeding groups were also similar, but Jaccard's similarity indices were relatively low (29%-57%), suggesting macroinvertebrate compositional differences among stand types. Coleopterans particularly affected species presence/absence patterns, but their presence was associated with low water level rather than hydrophyte type per se. Moreover, total macroinvertebrate densities were greater in both *Phragmites* treatments than in *Typha*; a pattern generated mostly by gastropods ($\geq 95\%$ *Gyraulus deflectus* and *Physella gyrina*) and chironomids. Microalgal food supply likely plays a part in explaining these density differences, given diatom-dominated epiphyton was denser on submerged shoots of *Phragmites* than on *Typha*. Common diatom assemblages were similar among stand types, but species richness was significantly greater on untreated-*Phragmites* than on herbicide-treated, early senescent *Phragmites* and untreated-*Typha*. However, advanced senescence from herbicide application (~3 months) did not apparently affect macroscale habitat suitability and structure above and below the waterline, given counts of ovipositing odonates (mostly *Ischnura* and *Enallagma*) and captures of juvenile fishes ($>90\%$ *Lepomis* spp.) were similar among stand types. Overall, our results suggest that benthic community structure is comparable between similarly-aged stands (~4 yrs old) of invading reed and cattail and is not directly or indirectly affected by Glypro application." (Authors) Of the 813 Odonata individuals observed, a total of 86 were observed to oviposit; 93% of these were zygopterans, and 7% were anisopterans. The main genera of zygopterans observed were *Ischnura* and *Enallagma*, whereas the main genus of anisopterans observed was *Anax*. Counts of ovipositing odonates did not significantly differ among stand types or among sample dates.] Address: Holomuzki, J., Dept of Evolution, Ecology, and Organismal Biology, The Ohio State University, 1680 University Drive, Mansfield, Ohio, USA 44906. E-mail: holomuzki.3@osu.edu

7752. Machida, K.; Oikawa, T.; Shimanuki, J. (2008): Structure analyses of the wings of *Anotogaster sieboldii* and *Hybris subjacens*. *Journal of the Japanese Society for Experimental Mechanics* 8(2): 142-146. (in Japanese, with English summary) ["In general, it is known that structures of living things are optimized. The wings of a dragonfly are very thin and light. Although it is having the structure of bearing the load produced in the

case of an advanced flight such as "Flapping flight", "Glide", and "Hovering". The wings of a dragonfly are made by veins and membranes. In addition, the wings of a dragonfly have some characteristic structures, such as "Nodus". Thus, the wings of a dragonfly have many complicated structures. The costal vein configuration of the wings of a dragonfly is different from them of other insects. So, we paid attention to the costal vein configuration of the wings of a dragonfly. Therefore, in this study, we researched about the effect of the costal vein. As a result, it was showed that the configuration of costal vein made the deformation of bending and torsion small. In addition, it was showed that the configuration of costal vein closely related to nodus. In this study, several 3-D models of the dragonfly's wing were created and analyzed by the 3-D finite element method (FEM)." (Authors)] Address: not transliterated.

7753. Makarieva, A.M.; Gorshkova, V.G.; Lib, B.-I.; Chown, S.L.; Reich, P.B.; Gavrillov, V.M. (2008): Mean mass-specific metabolic rates are strikingly similar across life's major domains: Evidence for life's metabolic optimum. *Proceedings of the National Academy of Sciences* 105(44): 16994-16999. (in English) ["A fundamental but unanswered biological question asks how much energy, on average, Earth's different life forms spend per unit mass per unit time to remain alive. Here, using the largest database to date, for 3,006 species that includes most of the range of biological diversity on the planet—from bacteria to elephants, and algae to sapling trees—we show that metabolism displays a striking degree of homeostasis across all of life. We demonstrate that, despite the enormous biochemical, physiological, and ecological differences between the surveyed species that vary over 1020-fold in body mass, mean metabolic rates of major taxonomic groups displayed at physiological rest converge on a narrow range from 0.3 to 9 W kg⁻¹. This 30-fold variation among life's disparate forms represents a remarkably small range compared with the 4,000- to 65,000-fold difference between the mean metabolic rates of the smallest and largest organisms that would be observed if life as a whole conformed to universal quarterpower or third-power allometric scaling laws. The observed broad convergence on a narrow range of basal metabolic rates suggests that organismal designs that fit in this physiological window have been favoured by natural selection across all of life's major kingdoms, and that this range might therefore be considered as optimal for living matter as a whole." (Authors) Odonata included into this study are: *Anax junius*, *Brachymesia gravida*, *Erythemis simplicicollis*, *Erythrodiplax berenice*, and *E. connata*.] Address: Makarieva, Anastassia, Theoretical Physics Division, Petersburg Nuclear Physics Institute, Gatchina, St. Petersburg 188300, Russia

7754. Martens, A.; Schiess, H.; Kunz, B.; Wildermuth, H. (2008): *Onychogomphus uncatus* in Deutschland: die historischen Funde am Hochrhein (Odonata: Gomphidae). *Libellula* 27(1/2): 53-61. (in German, with English summary) ["According to diary notes by Friedrich Ris, the Canadian odonatologist Edmund M. Walker collected several specimens of *O. uncatus* on 16-viii-1928 on the German side of the High Rhine near Altenburg. This should be considered the first record in Germany. Based on Ris' diary further published accounts, of which precise records have been lacking, can now be clearly interpreted. A survey of all hitherto known records between 1883 and 1991 from Switzer-

land and Germany is given." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

7755. Monnerat, C. (2008): Première observation de l'Aesche isocèle *Aeshna isocèles* (O.F. Müller, 1776) (Odonata: Aeshnidae) en Ajoie (canton du Jura: Suisse). *Entomo Helvetica* 1: 135-137. (in French, with English and German summaries) [A single adult male *A. isocèles* - quite obviously vagrant - was seen the 15 of June 2006 at Porrentruy.] Address: Monnerat, C., Centre suisse de cartographie de la faune (CSCF), Maximilien de Meuron 6, 2000 Neuchâtel, Switzerland. E-mail: christian.monnerat@unine.ch

7756. Montesinos, A.; Santoul, F.; Green A.J. (2008): The diet of the night heron and purple heron in the Guadalquivir Marshes. *Ardeola* 55(2): 161-167. (in English, with Spanish summary) [Spain; in Purple heron (*Ardea purpurea*), Odonata nymphs were present in 13.5 % of samples. The Night heron (*Nycticorax nycticorax*) did not feed on Odonata.] Address: Green, A., Department of Wetland Ecology, Estación Biológica de Doñana-CSIC, Avda. Américo Vespucio s/n, 41092 Sevilla, Spain. E-mail: ajgreen@ebd.csic.es

7757. Pelabon, C.; Hansen, T.F. (2008): On the adaptive accuracy of directional asymmetry in insect wing size. *Evolution* 62(11): 2855-2867. (in English) ["Subtle left-right biases are often observed in organisms with an overall bilateral symmetry. The evolutionary significance of these directional asymmetries remains uncertain, however, and scenarios of both developmental constraints and adaptation have been suggested. Reviewing the literature on asymmetry in insect wings (including a paper on *Calopteryx maculata*), we analyze patterns of directional asymmetry in wing size to evaluate the possible adaptive significance of this character. We found that directional asymmetry in wing size is widespread among insects, with left- and right-biased asymmetries commonly observed. The direction of the asymmetry does not appear to be evolutionarily conserved above the species level. Overall, we argue that the very small magnitude of directional asymmetry, 0.7% of the wing size on average, associated with an extremely imprecise expression, precludes directional asymmetry from playing any major adaptive role." (Authors)] Address: Pelabon, C., Dept of Biology, Centre for Conservation Biology, Norwegian University of Science and Technology, Trondheim, Norway. E-mail: christophe.pelabon@bio.ntnu.no

7758. Phillips, I.D.; Parker, D.; McMaster, G. (2008): Aquatic invertebrate fauna of a northern prairie stream: range extensions and water quality characteristics. *Western North American Naturalist* 68(2): 173-185. (in English) [28 Odonata taxa, in most cases on the species level, are listed from Pipestone Creek watershed in southeastern Saskatchewan, Canada.] Address: Phillips, I.D., Stewardship Division, Saskatchewan Watershed Authority, #330-350 3rd Av. North, Saskatoon, SK, Canada S7K 2H6. E-mail: iain.phillips@swa.ca

7759. Pisica, E.I.; Popescu-Mirceni, R. (2008): Data on some dragonflies (Insecta: Odonata) from western Turkey (Results of the "Taurus"-2005 and "Focida"-2006 expeditions). *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"* 51: 335-344. (in English, with French summary) ["The paper presents a list of

258 Odonata specimens collected during the expeditions carried out in Western Turkey between 2005-2006 by the "Grigore Antipa" National Museum of Natural History. In all, 27 Odonata species were identified, grouped in nine families. The paper also presents some distributional data for these 27 species"] Address: Pîsica, Elena, Muzeul Naþional de Istorie Naturală "Grigore Antipa", Sos. Kiseleff nr. 1, 011341 Bucuresti 2, Romania. E-mail: elenap@antipa.ro

7760. Popova, O.N.; Haritonov, A.Yu. (2008): Inter-annual changes in the fauna of dragonflies and damselflies (Insecta, Odonata) in the Southern Urals. *Russian Journal of Ecology* 39(6): 405-413. (in English) ["Data on the abundance and occurrence of 64 odonate species in the Southern Urals are considered. A comparative analysis of the odonate fauna in the early 20th century, in the 1960s and 1970s, and in the early 21st century is performed. On this basis, it is concluded that its structure has been markedly changing with time, with the magnitude of these changes being comparable to that of regional faunistic differences. The causes of these changes are discussed. The apparent enrichment of the odonate fauna is attributed primarily to the appearance of new anthropogenic habitats." (Authors) Original Russian Text © O.N. Popova, A.Yu. Kharitonov, 2008, published in *Ekologiya*, 2008, No. 6, pp. 427-435] Address: Institute of Animal Systematics and Ecology, Siberian Branch, Russian Academy of Sciences, ul. Frunze 11, Novosibirsk, 630091, Russia. E-mail: pc@eco.nsc.ru

7761. Pryke, J.S.; Samways, M.J. (2008): Conservation of invertebrate biodiversity on a mountain in a global biodiversity hotspot, Cape Floral Region. *Biodivers. Conserv.* 17: 3027-3043. (in English) ["Mountains present particular challenges for biodiversity conservation. Table Mountain is a significant mountain in a global biodiversity hotspot, the Cape Floristic Region. It has outstanding angiosperm diversity and endemism. Yet, aerial and foliage invertebrates in the area have been poorly studied, despite their importance as pollinators and predators. These plant and invertebrate assemblages are under great pressure from human disturbance. Aerial and foliage invertebrates were sampled with a range of techniques. Sites were chosen to make comparisons between vegetation structure and type, elevation and aspect. In total, 216 species from 63 families and 14 orders were recorded. Vegetation structure (fynbos or forest) and elevation were the most important environmental variables for both aerial and foliage invertebrates. Peak time for aerial invertebrate abundance was spring and summer in the fynbos and spring in the forests, while the foliage invertebrates showed very little seasonal variation. There was no correlation between the diversity of aerial and foliage invertebrates. When these results were compared with others on epigaeic invertebrates, it became clear that epigaeic and aerial invertebrates are not correlated, while epigaeic and foliage invertebrates were only partially correlated, but not sufficiently so to consider one as a reliable estimator of the other. The management pointer from this study is that sites at all elevations are vital for the conservation of biodiversity on Table Mountain. Both the aerial and epigaeic/foliage invertebrate assemblages will need to be monitored separately to maintain the mountain's conservation status." (Authors) The paper includes references to Odonata.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch,

Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7762. Qiao, H.-l.; Luo, Y.-q.; Tian, C.-m.; Sun, J.-h.; Feng, X.-f. (2008): Diversity of insect communities with different development phases in natural *Populus euphratica* forests in Xinjiang. *Forestry Studies in China* 10(1): 56-59. (in English) ["An investigation method with sample plots was used to study insect communities in four different growth phases of *P. euphratica* forests, which are juvenile, middle aged, over-mature and degraded forests, in Tarim, Xinjiang in July, 2005 and April, 2006. In our studies, 5,116 insect specimens, belonging to 12 orders, 61 families and 141 species, were collected. Lepidoptera and Coleoptera were the dominant orders. In middle-aged forests, species, individual numbers and diversity indices of insect communities were higher than those in other woodlands. The species richness and diversity indices were lowest in degraded forests because of extremely scarce vegetation." (Authors) Three libellulid species with 11 specimens are listed without taxonomic details.] Address: Qiao, H.-l., Key Laboratory for Silviculture and Conservation of Ministry of Education, Beijing Forestry Univ., Beijing 100083, P. R. China. E-mail: youqingluo@26.com

7763. Rivera-Usme, J.J.; Camacho-Pinzón, D.L.; Botero-Botero, A. (2008): Estructura numérica de la entomofauna acuática en ocho quebradas del departamento del Quindío-Colombia. *Acta biol. Colomb.* 13(2): 133-146. (in Spanish, with English summary) [A study of the aquatic insect fauna of 8 streams in the department of Quindío, Colombia in La Tebaida and Calarcá was carried out. During August to December of 2004, 1917 individuals were collected including 216 odonate specimens. These are listed at the genus level.] Address: Botero-Botero, A., Fundación Neotrópica-Colombia, Armenia - Quindío, Carrera 7 No. 12-55 La Tebaida Quindío, Colombia. E-mail: albotero33@yahoo.com

7764. Rocha, V.; Aguiar, L.M.; Silva-Pereira, J.E.; Moro-Rios, R.F.; Passos, F.C. (2008): Feeding habits of the crab-eating fox, *Cerdocyon thous* (Carnivora: Canidae), in a mosaic area with native and exotic vegetation in Southern Brazil. *Revista Brasileira de Zoologia* 25(4): 594-600. (in English, with Portuguese summary) ["*C. thous* (Linnaeus, 1766) is the most widespread neotropical canid, most commonly inhabiting forested areas. This animal is a generalist omnivore that is able to use environments disturbed by human activities. The aim of this study was to describe its diet through the stomach content analysis of 30 samples obtained from specimens that were run over in a mosaic composed by *Araucaria* Pine Forest, Semidecidual Seasonal Forest, natural grasslands, and exotic vegetation. The items were quantified by frequency of occurrence (F.O.) and percentage of occurrence (P.O.). A total of 64 food items were found among 171 occurrences. According to F.O. method, plant items corresponded to 93.3% of the occurrences, followed by animal items (86.7%) and human rejects (16.6%)....] (Authors) In one occasion wings of a *Coenagrionidae* were found as stomach content.] Address: Rocha, V., Bioecologia e Manejo Integrado de Pragas e Doenças Florestais, Pesquisa Florestal, Klabin S.A. Avenida Araucária, 84279-000 Lagoa, Paraná, Brasil. E-mail: vlamir@klabinxom.br

7765. Sadeghi, S. (2008): Aspects of infraspecific phylogeography of *Calopteryx splendens*. PhD thesis.

Dept Biology, Univ. Ghent. ISBN 978-90-8756-015-7: IV, 166 pp. (in English, with Iranian summary) [*Calopteryx splendens* Harris (1780) (Odonata: Calopterygidae) is a widespread damselfly, found in most of Europe, large parts of Siberia and much of west and central Asia. There is great variation among males in wing coloration. Traditionally subspecific taxa have been distinguished by the size and position of the pigmented wing spot, and by (mating) behavior. About a dozen of subspecies have been recognized. *Calopteryx splendens splendens*; *C. s. xanthostoma*; *C. s. caprai*; *C. s. balcanica* in Europe and various other names, such as *C. s. intermedia*, *C. s. orientalis*, *C. s. taurica*, *C. s. tschaldirica*, *C. s. waterstoni*, *C. s. amasina*, and so on, refer to putative subspecies, all of which are more or less geographically confined, but often with overlapping ranges and strong variation in wing spot size. For more than a century wing and wing spot characters have been used as criteria for *Calopteryx* species and subspecies identification. Most results suggest that wing pigmentation is a reliable signal of male quality and plays a role in mate recognition by females. Size and density of wing pigmentation is also correlated with immunological condition and animal resistance against disease. In spite of these indications, the question arises whether variation in wing spot is really a taxonomically valid discriminator. We used two morphological (traditional and geometric morphometries) and one molecular (AFLP) method to quantify and analyze morphological and molecular data. Comparing the results of these methods helped us to show some unclear and ambiguous relations between these populations and lighted some aspects of phylogeography of the (sub)species. In morphological study, the question was how well populations (subspecies) are recognizable based on wing and wing spot sizes and wing shape (irrespective of wing spot). In both morphological methods, left fore wing of the male specimens were evaluated because generally only males bear wing spot. For traditional morphometry, 10 different wing characters were measured using a semi-automatic image analysis program. Geometric morphometric study was implemented based on collected superimposed data from 19 digitized landmarks following the procrustes method. We used AFLP as molecular method because of its low start-up time and cost effective generation of data from a large number of distributed loci in the whole genome. In this part, the first aim was to investigate patterns of *C. splendens* population structure and the spatial distribution of genetic diversity, and the second aim was to determine whether there is a consistent spatial distribution pattern of *C. splendens* based on genetic and morphological diversity of wings, in other words whether the genetic differences are compatible with morphological differences of wings. Our results in traditional and geometric morphometries (regardless of wing spot) confirmed differentiation of *C. s. waterstoni* from other populations. Likewise, a relationship between two populations from north-east border of Turkey (*C. s. tschaldirica*) and Ireland, both with a small wing spot, was supported. Populations of *C. s. orientalis* from north of Iran and south of Turkmenistan (16 and Tm254 respectively) also showed close relations, which differentiate them from other groups in both morphometric techniques. The relationship between *C. s. xanthostoma* and *C. s. amasina* (from Turkey) was more remarkable than European populations in both morphometric methods. However, the results of these two morphometric methods were not consistent in many cases, while geometric morphometric analysis showed

wing shape differences between entire populations; traditional morphometry did not revealed such differences based on linear measurements of wing characters between most of populations. In general, geometric morphometric of Eurasian populations showed that two almost separate European and Asian groups of *C. splendens* are recognizable except some relations of *C. s. waterstoni* (from Turkey) to Eastern European populations, and *C. s. xanthostoma* (from Spain) to Asian populations. These conclusions were partly confirmed by AFLP results, but were not consistent with results of traditional morphometry which is mainly affected by linear size and area of wing and wing spot. Hence, use of wing spot patterns must be studied critically before those are used up as systematic characters at any taxonomic level. The AFLP results of our samples showed low levels of gene flow between populations except one case in the central Asia between Russian and Kazakhstani populations which is partly due to lack of effective obstacles and presence of Irtysh river. Many populations showed double or more geographical origin, a circumstance that can reflect rapid diversification and introgression. The reasons of this situation and likely relations between three main subspecies, *C. s. waterstoni*, *C. s. intermedia* and *C. s. xanthostoma* have been discussed. The deepest split in the phylogeography of *C. splendens* populations was found within the unglaciated areas in the east border of Turkey and Azerbaijan. We discuss the isolation of *C. s. waterstoni*. We interpret the unexpected relation between Azerbaijani and French populations as an intrusion of *intermedia*-genes in both. The conclusion drawn from comparison of the data in all three analyses is that the results of shape analysis between populations was more akin to molecular data and more reliable than linear measurements of wing characteristics, although some populations showed the same result in both methods. These observations suggest that wing spot similarity necessarily cannot capture the full genetic grouping of populations and therefore, is not an infallible character in *Calopteryx splendens* subspecies." (Author)]

7766. Schmidt, E. (2008): Libellen als Indikatoren für einen Klimawandel - Mediterrane Libellen neu im NABU-Laubfrosch-Schutzgebiet Brink bei Coesfeld. *Naturzeit im Münsterland* 9(1): 14. (in German) [Records of *Crocothemis erythraea*, *Sympetrum fonscolombii*, and *S. meridionale* near Coesfeld, Nordrhein-Westfalen, Germany are briefly reported and commented.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

7767. Slos, S.; Stoks, R. (2008): Predation risk induces stress proteins and reduces antioxidant defense. *Funct. Ecol.* 22(4): 637-642. (in English) ["1. Despite its wide ecological relevance, we know little about the physiological mechanisms underlying the growth vs. mortality by predation trade-off. Here, we test for two costly, potential physiological correlates of the fight-or-flight response that may contribute to the growth reduction under predation risk: induction of stress proteins (Hsp60 and Hsp70) and of antioxidant enzymes (superoxide dismutase, SOD and catalase, CAT), in larvae of the damselfly *Enallagma cyathigerum*. 2. Under predation risk, there was a growth reduction and an increase in oxygen consumption, indicative of the fight-or-flight response. Predation risk did not affect Hsp60 levels but induced an increase in energetically costly Hsp70 levels. 3. Under predation risk, levels of SOD remained

constant and those of CAT decreased. Together with the increase in respiration, this should inevitably result in oxidative stress. 4. Our results suggest that induction of stress proteins may contribute to the partly physiologically mediated growth reduction under predation risk and that oxidative stress is a novel cost of predation risk that may have important long-term negative fitness consequences for the prey. The latter adds to the recent insight that costs of stressors and life-history trade-offs may not always directly operate through increased energy consumption and differential allocation, but, may also work through the increased production of reactive oxygen species." (Authors)] Address: Slos, Stefanie, Laboratory Aquatic Ecology and Evolutionary Biology, Univ. of Leuven, Ch. Debériotstraat 32, B-3000 Leuven, Belgium. E-mail: stefanie.slos@bio.kuleuven.be

7768. Srivastava, D.S.; Trzcinski, M.K.; Richardson, B.A.; Gilbert, B. (2008): Why are predators more sensitive to habitat size than their prey? Insights from bromeliad insect food webs. *American Naturalist* 172(6): 761-771. (in English) ["Ecologists have hypothesized that the exponent of species-area power functions (z value) should increase with trophic level. The main explanation for this pattern has been that specialist predators require prior colonization of a patch by their prey, resulting in a compounding of the effects of area up trophic levels. We propose two novel explanations, neither of which assumes trophic coupling between species. First, sampling effects can result in different z values if the abundances of species differ (in mean or evenness) between trophic levels. Second, when body size increases between trophic levels, effects of body size on z values may appear as differences between trophic levels. We test these alternative explanations using invertebrate food webs in 280 bromeliads from three countries. The z value of predators was higher than that of prey. Much of the difference in z values could be explained by sampling effects but not by body size effects. When damselflies occurred in the species pool, predator z values were even higher than predicted, as damselflies avoid small, drought-prone bromeliads. In one habitat, dwarf forests, detrital biomass became decoupled from bromeliad size, which also caused large trophic differences in z values. We argue that there are often simpler explanations than trophic coupling to explain differences in z values between trophic levels." A(uthors)] Address: Srivastava, Diane, Dept of Zoology, University of British Columbia, 6270 University Boulevard, Vancouver, British Columbia V6T 1Z4, Canada. E-mail: srivast@zoology.ubc.ca

7769. Stamper, C.E.; Downie, J.R.; Stevens, D.J.; Monaghan, P. (2008): The effects of perceived predation risk on pre- and post-metamorphic phenotypes in the common frog. *Journal of Zoology* 277(3): 205-213. (in English) ["Where organisms undergo radical changes in habitat during ontogeny, dramatic phenotypic reshaping may be required. However, physiological and functional interrelationships may constrain the extent to which an individual's phenotype can be equally well adapted to their habitat throughout the life cycle. The phenotypic response of tadpoles to the presence of a predator has been reported for several species of anuran but the potential post-metamorphic consequences have rarely been considered. We reared common frog *Rana temporaria* tadpoles in the presence or absence of a larval odonate predator, *Aeshna juncea*, and examined the consequences of the result-

ing phenotypic adjustment in the aquatic larval stage of the life cycle for the terrestrial juvenile phenotype. In early development tadpoles developed deeper tail fins and muscles in response to the predator and, in experimental trials, swam further than those reared in the absence of a predator. While the difference in swimming ability remained significant throughout the larval period, by the onset of metamorphosis we could no longer detect any differences in the morphological parameters measured. The corresponding post-metamorphic phenotypes also did not initially differ in terms of morphology. At 12 weeks post-metamorphosis, however, frogs that developed from predator-exposed tadpoles swam more slowly and less far than those that developed from tadpoles reared in the absence of predators, the opposite trend to that observed in the larval stage of the life cycle, and had narrower femurs. These results suggest that there may be long-term costs for subsequent life-history stages of tailoring the larval phenotype to prevailing environmental conditions." (Authors)] Address: Stamper, Clare, Dept of Environmental and Evolutionary Biology, Institute of Biomedical and Life Sciences, Univ. of Glasgow, Glasgow, UK. Email: c.e.stamper@exeter.ac.uk

7770. Sudo, S.; Tsuyuki, K.; Honda, T. (2008): Swimming mechanics of dragonfly nymph and the application to robotics. *Journal International Journal of Applied Electromagnetics and Mechanics* 27(3): 163-175. (in English) ["This paper concerned with the development of swimming micro mechanism based on the study of swimming functions and mechanisms of the minute organisms. At the beginning, this paper describes the swimming analysis of a dragonfly nymph using the high speed video camera system. It was found that dragonfly nymphs can swim skillfully by reciprocating motions consisting of a power stroke and a recovery stroke. Based on the swimming analysis of the dragonfly nymph, the micro swimming robot with the wireless energy supply system was produced. Driving elements of the micro swimming robot are composed of NdFeB permanent magnet, polystyrene body, and a polyethyleneterephthalate film fin. Frequency characteristics of the micro swimming robot propelled by the alternating magnetic field and small permanent magnet were examined experimentally." (Authors)] Address: Sudo, S., Faculty of Systems Science & Technology, Akita Prefectural Univ., Ebinokuchi 84-4, Yurihonjo 015-0055, Japan

7771. Švitra, G.; Gliwa, B. (2008): New records of *Nehalennia speciosa* (Charpentier, 1840) (Odonata, Coenagrionidae) in Lithuania in 2006–2008. New and rare for Lithuania insect species 20: 10-13. (in English, with Lithuanian summary) [Between 2006 and 2008, seven new populations of *N. speciosa* were detected totalling all known localities in Lithuania of this rare species to thirteen. The new additions are briefly documented.] Address: Švitra G., Lithuanian Entomological Society, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: gjedsvis@gmail.com

7772. Sy, T. (2008): Ein neuer Fundort der Scharlachlibelle *Ceragrion tenellum* (de Villiers, 1789) in Sachsen-Anhalt (Odonata, Coenagrionidae). *Entomologische Nachrichten und Berichte* 52(1): 61-64. (in German) [A second record in the German Federal State Sachsen-Anhalt from 17-VII-2007 (Jävenitzer Moor near Gardelegen) is documented and discussed in detail. The species probably has colonised the new hab-

itat less than 20 years ago. The nearest population exists in a distance of 20 km.] Address: Sy, T., RANA - Büro für Ökologie und Naturschutz, Frank Meyer, Mühlweg 39, D-06114 Halle(Saale), Germany. E-mail: thoralf.sy@rana-halle.de

7773. Tafangenyasha, C.; Dube, L.T. (2008): An investigation of the impacts of agricultural runoff on the water quality and aquatic organisms in a Lowveld sand river system in southeast Zimbabwe. *Water Resour. Manage.* 22: 119-130. (in English) ["In this research we examined the hypothesis that agricultural pollution is a key determinant of variability in nutrients concentrations and benthic fauna in a semi-arid tropical lowveld region of southeast Zimbabwe. Water quality was monitored in the river water column and river bottom sediments at a time when dissolved oxygen concentration was thought to be very low during the winter period in the rivers passing through low input agricultural sections and intensive commercial agricultural sections. The surveys used established chemical methods and biological methods. Benthic fauna assemblages were used to complement chemical cases of nutrient loading at localities chosen for sampling. Unpolluted control sites were not significantly different (t test, $p < 0.05$) from polluted sites in levels in mean values of dissolved oxygen, conductivity, total dissolved solids and mean density (no.m²) of benthic invertebrates in May. Significant differences (t test, $p < 0.05$) were not found in mean values of calcium, magnesium, potassium, total nitrogen, nitrate nitrogen, ammonia nitrogen and total phosphorus in river bottom sediments in May and August. These data certainly do not support the notion that the Runde River is severely polluted by the upstream agricultural activities and the hypothesis that agricultural runoff is a key determinant of water quality is rejected. As the data suggests the Runde River may be receiving moderate nutrient pollution. The positive effects of moderate eutrophication on fish catch and the trade-off in pollution implied here needs to be addressed by appropriate agricultural and environmental policies that relate to water pollution and land use." (Authors) Four Odonata taxa are listed at the genus level.] Address: Tafangenyasha, C., Department of Environmental Science and Health, National University of Science and Technology, P. Bag AC 939, Bulawayo, Zimbabwe. E-mail: ctafangenyasha@nust.ac.zw

7774. Tchiboza, S.; Aberlenc, H.-P.; Ryckewaert, P.; Le Gall, P. (2008): Première évaluation de la biodiversité des Odonates, des Cétoines et des Rhopalocères de la forêt marécageuse de Lokoli (Sud Bénin). *Bulletin de la Société entomologique de France* 113(4): 497-509. (in French, with English summary) [2006; 24 Odonata species are listed, with 13 new species for Benin, including *Oxythemis phoenicosceles*, a rare species, and *Ceriagrion citrinum*, an endangered species on the IUCN red list.] Address: Tchiboza, S., Centre de Recherche pour la Gestion de la Biodiversité et du Terroir (Cerget), 04 B.P. 0385 Cotonou, Bénin. E-mail: tchisev@yahoo.fr

7775. Triapitsyn, S.V.; Querino, R.B.; Feitosa, M.C. B. (2008): A new species of *Anagrus* (Hymenoptera: Mymaridae) from Amazonas, Brazil. *Neotropical Entomology* 37(6): 681-684. (in English, with Portuguese summary) [The new fairyfly species from the Neotropics, *Anagrus* (*Anagrus*) *amazonensis* sp. n., is described and illustrated. *Anagrus* Haliday is a large genus of

Mymaridae (Hymenoptera), which now includes eight species recorded from Brazil. This new species attacks eggs of damselflies.] Address: Triapitsyn, S.V., Entomology Research Museum, Dept. of Entomology, Univ. California, Riverside, California 92521, USA. E-mail: serguei.triapitsyn@ucr.edu

7776. Vanappelghem, C.; Lambret, P.; Prioul, B. (2008): Symposium international sur le suivi des odonates d'Europe. La lettre des sociétés. *Société française d'Odonatologie* 48: 6-7. (in French) [This is an extensive report on the international symposium on monitoring European Odonata held in Wageningen, the Netherlands on 13/14 June 2008.] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

7777. Vilaseca, C.J.; Baptiste, L.G.; López-Ávila, A. (2008): Incidence of the margins on the natural biological control of *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) in rice crops. *Revista Corpoica – Ciencia y Tecnología Agropecuaria* 9(2): 45-54. (in Spanish, with English summary) ["Multiple researches have shown the environmental, economic and productive benefits that can be generated when including natural vegetation in the margins of the crops. This happens thanks to the presence of natural habitats, which are the ones that promote biotic factors such as natural enemies and abiotic ones as temperature, humidity or rain that can affect negatively the pests. The objective of this research was to evaluate and compare the effect of other natural systems present at the same landscape such as crop of oil palm and gallery forests over the natural biological control of *Spodoptera frugiperda* in growing areas of rice. For this purpose, an area of study was selected at the Colombian plain foothills (Villanueva, Casanare), a place that is characterized for having big extensions of rice, surrounded by oil palms plantations and gallery forests. The abundance of *S. frugiperda* in the stages of larva and imago was evaluated, as well as the parasitism of eggs and larvae and the diversity of natural enemies and other arthropods. It was found that plantations of oil palm, as the gallery forests promote the natural biological control of *S. frugiperda* by increasing the diversity of the natural enemies and reduction of the pest population in the borders of the crop. The importance of parasitoids as *Apanteles marginiventris* and predators of the order Odonata in the control of *S. frugiperda* was identified. It is highlighted the importance to associate perennial crops as oil palm with transitory crops as rice in the planning of agroecosystems on the region and promote the conservation of gallery forest, as long as they can become key factors in the natural biological control of pests. Nevertheless, aspects as the low quality of the habitat and frequently use of chemical pesticides affected the results." (Authors)] Address: Vilaseca, C.J., Ecólogo. Pontificia Universidad Javeriana, Bogotá. Colombia. E-mail: javiervila4@hotmail.com

7778. Wei, L.; Han, N.; Zjang, L.; Helgen, K.M.; Parsons, S.; Zhou, S.; Zhang, S. (2008): Wing morphology, echolocation calls, diet and emergence time of black-bearded tomb bats (*Taphozous melanopogon*, Emballonuridae) from southwest China. *Acta Chiropterologica* 10(1): 51-59. (in English) [*T. melanopogon* was studied from May to October 2006 in Guangxi Province, southwest China. A total of 344 fecals was collected; Odonata contributed with 1.05% to abundance. The diet of

this species consists mostly of Lepidoptera and Hemiptera.] Address: Zhang, S., School of Life Science, East China Normal University, 3663 Zhongshan Beilu, Putuo, Shanghai 200062, China. E-mail: syzhang@bio.ecnu.edu.cn

7779. Weidel, B.; Carpenter, S.; Cole, J.; Hodgson, J.; Kitchell, J.; Pace, M.; Solomon, C. (2008): Carbon sources supporting fish growth in a north temperate lake. *Aquatic Sciences* 70: 347-260. (in English) [Bluegill growth was primarily the result of feeding on Trichoptera, Odonata, Diptera, terrestrial invertebrates (predominantly Coleoptera) and Cladocera. These same diet items made up the majority of age 0 yellow perch growth, whereas age 1 perch diets consisted mainly of Odonata (> 60%). Adult Odonata was the predominant terrestrial item contributing to largemouth bass growth, but diets also included Coleoptera, small mammals, and arachnids.] Address: Weidel, B., Center for Limnology, University of Wisconsin, Madison, Wisconsin 53706, USA. E-mail: weidel@wisc.edu

7780. Wildermuth, H. (2008): Die Falkenlibellen. Libellen Europas Bd. 5 in "Die Neue Brehm-Bücherei 653". ISBN: 3-89432-896-7: 496 pp. (in German) [The late Philip Corbet writes in his foreword to this outstanding book on odonate biology exemplified using the European Corduliidae: "The prospect of a book devoted to the family Corduliidae, or Emeralds, will instantly appeal to any odonatologist. Members of this family are strikingly elegant, and they possess a romantic, almost magical, quality, being furtive in their habits and frequenting wild, beautiful and remote habitats. The elusive habit of corduliids means that relatively little information has been placed on record about their biology." The information presented in this monograph comprises a comprehensive synopsis of observations published by other workers, integrated and greatly enlarged by own researches of H. Wildermuth, in the field and laboratory. "The content of this book upholds the best tradition of the science of natural history: meticulous field observations are extended by behavioural experiments and microscopic dissections conducted in the laboratory. The book's scope embraces all aspects of the family that any reader might wish to learn about: systematics; nomenclature; evolution; the life cycle, including the morphology and natural history of all developmental stages; adult life, including maturation, foraging, and reproductive behaviour; neurophysiology, with special emphasis on the visual system of Corduliidae; and habitat selection and threat and conservation of the dragonfly family." Monographs of the eleven European species comprise information on the discovery and name of each species, taxonomic information, descriptions of imago and larva, emergence, flight period, habitat, habits, accompanying species, threats and conservation measures, needs of research, and distribution differed according to the European countries. The book also includes an extensive bibliography, and an excellent(!) register. Corbet: "A definitive monograph of a family of Odonata is always to be welcomed and admired. It represents an immense commitment of time, effort and expertise. In the hands of a first-class, all-round biologist such as Hansruedi Wildermuth it constitutes an immensely valuable contribution to a field of science: it saves the aspiring investigator from devoting time to a laborious literature search, which should be an obligation but nowadays is sadly often dispensed with; and it points up possible avenues for fruitful research. In gratitude and

admiration, I commend this fine book to all odonatologists. I am confident that odonatology as a science will benefit if investigators are encouraged to adopt Hansruedi Wildermuth's rigorous methodology, especially in the field, so that, by the exercise of appropriate rigour, observations can be standardised and made comparable between habitats. I commend this book to its fortunate readership. It sets a new, high standard for monographs in odonate biology (Philip S. Corbet in his foreword). There is only to add that the book is completely written in German language. As Dr. B. Kiauta wrote in his review of the book, the author is well known for the excellence of his research and lucidity of his writings. The latter will facilitate everyone not common with the German language to read this book overcoming difficulties with the language. I am sure: This book is worth to refresh your German. (Martin Schorr) For additional details see the publisher's home page: <http://www.westarp.de/pages/hauptsei.php?/texts/webasn.php?Kennung=540c61fc2d769292c3d7c8862d3db06a&titlnr=3-89432-324-8&wseite=1> Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

7781. Wilson, H.W. (2008): The behavior of the Seaside Dragonlet, *Erythrodiplax berenice* (Odonata: Libellulidae), in a Maine Salt Marsh. *Northeastern Naturalist* 15(3): 465-468. (in English) [E. berenice was studied over two summers at Weskeag Marsh, South Thomaston, Maine, USA. "These dragonflies are lethargic, spending over 99% of their time perched on the culm of a salt marsh plant. No evidence of territorial behaviour was found. Females oviposit while in tandem in algal mats on the surface of salt-water pannes. They perch preferentially into the wind, presumably to aid in providing lift on take-off." (Author)] Address: Dept of Biology, Colby College, 5739 Mayflower Hill, Waterville, ME, 04901, USA. E-mail: whwilson@colby.edu.

7782. Yoshimura, M. (2008): Longitudinal patterns of benthic invertebrates along a stream in the temperate forest in Japan: in relation to humans and tributaries. *Insect Conservation and Diversity* 1: 95-107. (in English) [" 1. The relationship between benthic invertebrate assemblage composition and surrounding land use has been examined in various ways, but most studies are undertaken at a coarse scale, or they compare obviously different landscapes. In Japan, these obvious differences in landscape are rare, and humans reside even in remote montane areas. 2. In order to clarify the influence of human residence on benthic invertebrate assemblages, seasonal and site differences among benthic samples collected from a 15-km stretch of Kuroson Stream and their relation with riparian land use were examined. 3. The number of individuals and genera differed significantly both spatially and temporally. Multivariate assemblage structure also differed significantly across space and time along the stream. 4. Increase of residential areas affected the in-stream benthic invertebrate assemblage. Site differences along the stream and the effect of human residence were not masked by the potentially homogenizing influence of tributary streams. 5. The composition of surrounding vegetation was the most important factor influencing benthic community structure. The presence or absence of human residential areas and seasonal change were also important variables. 6. Benthic invertebrates may be carried and migrate to main streams from tributaries; however, this phenomenon was not observed. As-

semblages of benthic invertebrates that inhabit a particular site do not change and are considered to vary seasonally across a certain range." (Author). The following taxa are listed: *Epiophlebia* spp., *Lanthus* spp., and *Calopteryx* spp.] Address: Yoshimura, M., Forest Biodiversity Group, Kansai Research Center, Forestry and Forest Products Research Institute, Nagaikyutaro 68, Momoyama, Fushimi, Kyoto 612-0855, Japan. E-mail: yoshi887@ffpri.affrc.go.jp

7783. Zawal, A.; Dyatlova, E.S. (2008): Parasitizing on damselflies (Odonata: Coenagrionidae) by water mite (Acari: Hydrachnidia) larvae from Odessa province (southwestern Ukraine). *Natura Montenegrina* 7(3): 453-462. (in English, with Serbian summary) [*Ischnura elegans*, *I. pumilio*, *Coenagrion pulchellum*, and *Erythromma najas* "from the Odessa province were found with six parasitic water mite species (*Hydryphantes octoporus*, *Arrenurus cuspidator*, *A. maculator*, *A. tricuspikator*, *A. sp.1*, *A. sp.2*). The greatest numbers of the larvae were recorded on *I. elegans* and *C. pulchellum*. Larvae of *H. octoporus* were mainly attached to the lateral side of odonata's body while larvae of *Arrenurus* genus were only attached to the ventral side of odonata's body. The preferred parts were mesosternum and metasternum. Larvae two of the parasitic species never been described therefore they are sign as *Arrenurus sp.1* and *A. sp.2*. The larvae of *Hydryphantoidae* were recorded first time on odonata's body." (Authors)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

7784. Zessin, W. (2008): Einige Aspekte zur Biologie paläozoischer Libellen (Odonoptera). *Entomologica generalis* 31(3): 261-278. ["Some aspects concerning the biology of Palaeozoic dragonflies (Odonoptera): In the more than 320 million years old evolution the monophyletic group Odonoptera (dragonflies) developed a number of unique morphological adaptations. One of them is the very complex mating behaviour ('tandem position' and 'wheel position') which is the strongest argument for a monophyletic status of the recent dragonflies. A first theory concerning the development of this strange behaviour as well as the evolution of such unique structures was published by Zessin [1995]; it was modified subsequently by Bechly, Brauckmann, Zessin & Gröning [2001] and Zessin et al [2001]. Based upon two fossil specimens of *Namurotypus sippeli* Brauckmann & Zessin 1989 and *Erasipteroides valentini* (Brauckmann 1985) of Namurian B age from Hagen-Vorhalle, Germany, with preserved wings as well as even the male and female genitalia, the evolution of the 'mating wheel' and of the mode of oviposition of recent dragonflies with its peculiar copulation apparatus is discussed; both specimens are therefore of outstanding scientific value for the reconstruction of the development of these body structures. The enlargement of the wing-span of certain Late Palaeozoic Odonoptera [as for example the specimens mentioned above from the Namurian B of Hagen-Vorhalle; *Erasipterella piesbergensis* Brauckmann 1983, and *Piesbergtypus hielscheri* Zessin 2006 of Westphalian D age of the Piesberg near Osnabrück, Germany, and other Permocarboneous species from Central Europe and North America] is discussed in connection with the supposed increasing oxygen concentration in the air during the Late Carboniferous and Early Permian; largest known insect at all is

the Early Permian *Meganeuropsis permiana* Carpenter 1939 with a wing-span of 72 cm. The flying ability of the giant Odonoptera is discussed, too, by focussing on *Stephanotypus schneideri* Zessin 1983. Gliding flight is assumed to be predominant, interrupted by phases of wing flapping. Improvements of the flight ability by nodus- and pterostigma-like structures within the wings were already developed during the Late Carboniferous. Certain characters of the head (size of mandibles and eyes) and spiniferous legs (with three terminal claws) recommend a predatory mode of life similar to the ones of recent Odonoptera. The well-preserved large orthopteroid-like ovipositor of *Erasipteroides valentini* (Brauckmann 1985) suggests an endophytic or an endosubstratic oviposition in soils at the bottom of ponds. The giant dragonflies (Meganisoptera) were not able to adapt their mode of life to the rapidly decreasing oxygen concentration in the air at the end of the Permian period and became completely extinct. Other, smaller Permocarboneous Odonoptera with petiolate wing-base - for example such Protozygoptera as *Bechlya ericrobinsoni* Jarzembowski & Nel 2002, *Oboraneura kukalovae* Zessin 2008, the species of the Kennedyidae Tillyard 1925 and *Saxonagrion minutus* Nel et al 2000 (firstly grouped by NEL et al 2000 with the Zygoptera Selys 1854, then, NEL et al 2008, with the Panodonata) - survived the Permian/ Triassic crisis and gave origin to the rich diversity of the Mesozoic and to the recent species. The so-called 'secondary copulation' must have already evolved during Permocarboneous or Lower Triassic, because each of the recent suborders of the Odonata [Anisoptera, Anisozygoptera, and Zygoptera] share it; therefore their common stem species (presumably of Permian or Triassic age) must already have had 'secondary copulation' (with the female taking off the sperm from a special structure at the 2nd and 3rd abdominal segment while forming a 'mating wheel' with the male). The larval instars of the giant Odonoptera are poorly known; a single wing of a nymph is described from the Stephanian of Wettin (Sachsen-Anhalt, Germany) as *Schlechtendaliola nympha* Handlirsch 1919." (Author)] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

7785. Zhang, B.; Ren, D.; Pang, H. (2008): New Isophlebioid Dragonflies from the Middle Jurassic of Inner Mongolia, China (Insecta: Odonata: Isophlebioptera: Campteroptelebiidae). *Acta geologica Sinica* (English Edition) 82(6): 1104-1114. (in English) ["Three new species of fossil dragonflies assigned to *Sinokaratawia* Nel, Huang & Lin in family Campteroptelebiidae, i.e. *S. daohugouica* sp. nov., *S. magica* sp. nov. and *S. gloriosa* sp. nov., and new materials of male *S. prokopi* Nel, Huang & Lin, 2007 are described from the Middle Jurassic of Daohugou, Inner Mongolia, China. An emended diagnosis of genus *Sinokaratawia* was proposed." (Authors)] Address: Ren Dong, College of Life Sciences, Capital Normal University, Beijing 100037, China. E-mail: rendong@mail.cnu.edu.cn

7786. Zhang, D.; Yang G.; Zheng, Z. (2008): Comparison of cytochrome b gene sequences and phylogenetic analysis of partial Libellulidae (Odonata: Anisoptera). *Journal of Ningxia University* (Natural Science Edition) 29(2): 161-165. (in Chinese, with English summary) ["Based on 576 bp sequences of Cytb gene by MEGA 2.0 biosoftware, the nucleotide composition and the phylogenetic relationship among 8 libellulid species (*Libellula depressa*, *Pantala flavescens*, *Trithemis fest-*

iva, *T. aurora*, *Diplacodes trivialis*, *Neurothemis fulvia*, *Palpoleura sex-maculata*, *Pseudothemis zonata*) were dealt with. The results show that the average contents of T, C, A and G are 37.0%, 18.3%, 31.3% and 13.4%. The contents of A+T (68.3 %) is obviously higher than that of G+C (31.7 %), and come up to 81.0 % at the third position of cordon. The replacement of nucleotides mostly occurs at the third position. Employing *Mnais auripennis* and *Neurobasis chinensis* as outgroups, the phylogenetic trees shows that the relationship between *Pseudothemis* and *Trithemis* are more closed than that of other genera. *Neurothemis* and *Palpoleura* are the sister group of *Diplacodes*, *Libellula* and *Pantala*." (Authors)] Address: Zhang Dazh, School of Life Science, Ningxia University, Yinchuan 750021, China

7787. Zhang, D.; Dai, J. (2008): Odonata species diversity of Yinchuan. *Journal of Ningxia University (Natural Science Edition)* 29(4) : 343-347. (in Chinese, with English summary) [The Odonata diversity (n = 24) in Yinchuan region, China was surveyed from May to September in 2006. Five plots were choosed. Species diversity was analyzed by Margalef's richness indexes (dMa), Shannon-Wiener's diversity index (H'), Simpson index (D), Pielon evenness index (I) and Jaccard similarity coefficients. 827 samples were collected. *Sympetrum frequens* is the most abundant species. *S. frequens*, *Orthetrum albistylum*, *Pantala flavescens*, *Crocothemis servilia*, *Ischnura elegans* and *Coenagrion dyeri* are dominant species. The dMa score in five plots from high to low is: Junqu Farm, Shuidonggou, Hequan Lake, West Lake and Bao Lake. The highest H' was Shuidonggou plot, and Bao Lake plot was lowest. The authors conclude that the environmental heterogeneity and the diversity of Odonata are significantly positive correlated.] Address: Zhang, D., School of Life Science, Ningxia University, Yinchuan 750021, China

7788. Anikin, V.V.; Streshnev, A.V.; Boyarkin, A.G. (2008 (>2004)): [Productivity, composition and bioindication of the macrozoobenthos of the Surskoje reservoir]. *Actual Problems of Geography and Ecology* 2(4): o.P.. (in Russian) [*Platycnemis pennipes* and *Coenagrion hastulatum* are mentioned from two and one out of 10 sampling sites, respectively. Odonata larvae occurred in densities of 10 to 26 ind/m², or 0.05 to 0.28 g/m².] Address: E-mail: vvanikin@mail.ru

2009

7789. Abbott, J.K.; Gosden, T.P. (2009): Correlated morphological and colour differences among females of the damselfly *Ischnura elegans*. *Ecological Entomology* 34(3): 378-386. (in English) ["1. The female-limited colour polymorphic damselfly *Ischnura elegans* has proven to be an interesting study organism both as an example of female sexual polymorphism, and in the context of the evolution of colour polymorphism, as a model of speciation processes. 2. Previous research suggests the existence of correlations between colour morph and other phenotypic traits, and the different female morphs in *I. elegans* may be pursuing alternative phenotypically integrated strategies. However, previous research on morphological differences in southern Swedish individuals of this species was only carried out on laboratory-raised offspring from a single population, leaving open the question of how widespread such differences are. 3. The present study therefore analysed multi-generation-

al data from 12 populations, investigating morphological differences between the female morphs in the field, differences in the pattern of phenotypic integration between morphs, and quantified selection on morphological traits. 4. It was found that consistent morphological differences indeed existed between the morphs across populations, confirming that the previously observed differences were not simply a laboratory artefact. It was also found, somewhat surprisingly, that despite the existence of sexual dimorphism in body size and shape, patterns of phenotypic integration differed most between the morphs and not between the sexes. Finally, linear selection gradients showed that female morphology affected fecundity differently between the morphs. 5. We discuss the relevance of these results to the male mimicry hypothesis and to the existence of potential ecological differences between the morphs." (Authors)] Address: Abbott, Jessica, Department of Animal Ecology, Ecology Building, Lund University, SE-223 63 Lund, Sweden. E-mail: abbottj@queensu.ca

7790. Anderson, R.C. (2009): Do dragonflies migrate across the western Indian Ocean? *Journal of Tropical Ecology* 25(4): 347-358. (in English) ["In the tropical Indian Ocean, the Maldives Islands lack surface freshwater, so are unsuitable for dragonfly reproduction. Nevertheless, millions of dragonflies (Insecta, Odonata; mostly globe skimmer, *Pantala flavescens*) appear suddenly every year starting in October. Arrival dates in the Maldives and India demonstrate that the dragonflies travel from southern India, a distance of some 500–1000 km. Dates of arrival and occurrence coincide with the southward passage of the Inter-tropical Convergence Zone (ITCZ). Circumstantial evidence suggests that the dragonflies fly with north-easterly tail winds, within and behind the ITCZ, at altitudes over 1000 m. It is proposed that this massive movement of dragonflies is part of an annual migration across the western Indian Ocean from India to East Africa. Arrival dates in the Seychelles support this hypothesis. Dragonflies also appear (in smaller numbers) in the Maldives in May, with the onset of the southwest monsoon, suggesting a possible return migration from Africa. These proposed migrations of dragonflies, regularly crossing 3500 km or more of open ocean, were previously unknown. It is known that these dragonflies exploit ephemeral rain pools for reproduction; the monsoons and ITCZ bring not only alternating, seasonal rains to India and Africa, but also appropriate winds for dragonflies to follow those rains. Several bird species migrate from India across the western Indian Ocean to wintering grounds in Africa. They do so at the same time as the dragonflies, presumably taking advantage of the same seasonal tail winds. Many of these birds also eat dragonflies; the possible significance of this was not previously appreciated." (Author)] Address: Anderson, C., Manta Marine Pvt Ltd, P.O. Box 2074, Malé, Republic of Maldives. E-mail: anderson@dhivehinet.net.mv

7791. Anonymus (2009): Abstracts of Talks to be Presented at the Sullivan, Missouri DSA Annual Meeting. *Argia* 21(2): 1-3. (in English) [Brief abstracts of the following lectures are presented: *National Review of State Wildlife Action Plans for Odonata SGCN—Jason Bried and Celeste Mazzacano. *Some Chalcidoid Parasites of *Aeshna tuberculifera* Walker (Black-tipped Darner)—Burton Cebulski. *Status and Distribution of *Orthemis schmidti* Buchholz and the Odonata of Grenada—Jerrold J. Daigle, Erik Pilgrim, and François Me-

urges. *Live Culturing of Dragonflies from Larvae to Adults—Richard Groover. *Population genetics of Hine's Emerald Dragonfly (*Somatochlora hineana*) in Missouri—Meredith J. Mahoney and E.D. Cashatt. *Lessons Learned from the First Eight Years of Conducting Hine's Emerald Dragonfly Surveys in Missouri—P.M. McKenzie, T. Vogt, J.C. Walker, J.H. Smentowski, R. Gillespie, R. Day, E.D. Cashatt and M.J. Mahoney. *West Indian Odonata—Constraints and Opportunities—Dennis Paulson. *A proposal: Incorporating Odonates into Stream Bioassessments Using DNA Barcodes—Erik Pilgrim. *Somatochlora Phylogeny—T.E. Vogt, Meredith Mahoney, Everett Cashatt, and James Purdue] Address: Editor: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

7792. Baldaccini, G.N.; Leone, L.M.; Taddei, C. (2009): The running waters macroinvertebrates community: sampling techniques. *J. Environ. Monit.* 11: 756-760. (in English) ["The community of running water macroinvertebrates has proved to be one of key subjects for fluvial ecology and bioindication studies, thanks both to the different trophic roles within the range of taxa and to the ease with which they may be collected and identified. However, the complex nature of this community creates problems concerning the complete identification of the full range of taxa, even when restricting the taxonomic classification to families and genera. Even so, the need to use the community for the implementation of indexes of Ecological Status of freshwaters and for the detection of reference conditions, necessarily means a deeper knowledge of this structure. Hence, a standard methodology of the capture effort is required to identify not only the ecological quality but also a reference community for each selected fluvial typology and for each section examined. Starting from the processing of data collected during intercalibration exercises of the IBE method, the authors analyse the results underlining the share given by the size of the sample collected (catchment effort), and by the distribution models of different taxa within the community, in order to give a contribution to the evaluation of the reliability level of standard samples. The results confirm the models already described in previous publications and lead us to accept the presence of marginal degrees of uncertainty in standard samples." (Authors) "Onychogomphus" is listed.] Address: not stated

7793. Bao, L.; Yu, Y.L. (2009): Preliminary modeling of the fluid-structure interaction on a deformable insect wing in flapping. *New Trends in Fluid Mechanics Research. Proceedings of the Fifth International Conference on Fluid Mechanics (Shanghai, 2007)*. ISBN 978-3-540-75994-2 (Print) 978-3-540-75995-9 (Online): 638-???. (in English) ["Insect wings are considered as highly functional and largely optimized mechanical constructions. They can deform passively in flapping, corresponding to external aerodynamic loading, wing's structure and material properties, which is a complicated Fluid-Structure Interaction course. In this paper, a viscoelastic constitutive relation model of the dragonfly wing was established firstly, and then the FSI problem—the periodical deformation in wing flapping was primarily explored." (Authors)] Address: Bao, L., The Laboratory for Biomechanics of Animal Locomotion, Graduate University of Chinese Academy of Sciences, Beijing, 100049, China. E-mail: lbao@gucas.ac.cn

7794. Barquyn, J.; Death, R.G. (2009): Physical and chemical differences in karst springs of Cantabria, northern Spain: do invertebrate communities correspond? *Aquatic Ecology* 43(2): 445-455. (in English) ["Benthic macroinvertebrate communities (including *Onychogomphus* sp. and *Aeshna* sp.) were studied and environmental variables were measured in six rheocrene springs in Cantabria, northern Spain. Principal component analysis revealed two different spring types according to their physical and chemical characteristics. Springs from group A (GA) had higher temperature and conductivity, while springs in group B (GB) had higher values of pH, altitude, mean water velocity, percentage of boulders and coarse particulate organic matter. Total number of invertebrate taxa and individuals were not different between GA and GB springs. However, Shannon diversity index was significantly higher for GB springs. Analysis of similarities (ANOSIM) and non-metric multidimensional scaling (NMDS) analysis indicated that invertebrate assemblages from GA and GB springs were different. [...]" (Authors)] Address: Death, R.G., Institute of Natural Resources, Ecology, Massey University, Private Bag 11222, Palmerston North, New Zealand. E-mail: R.G.Death@massey.ac.nz

7795. Behrstock, R.A. (2009): An updated list of the Odonata of Coahuila, Mexico, including forty-one new state records and the first Mexican occurrence of *Libellula composita* (Hagen). *Bulletin of American Odonatology* 11(1): 1-7. (in English, with Spanish summary) ["Records are presented for Odonata located at various sites in the state of Coahuila, Mexico during May 2006 and June 2007. Based upon collected specimens, photos and sightings, 41 species (17 Zygoptera and 24 Anisoptera) are reported as new for the state. Also included is the first Mexican record of *L. composita*." (Author)] Address: Behrstock, R.A., 10359 S. Thicket Pl., Hereford, AZ 85615, USA. E-mail: rbehrstock@cox.net

7796. Belevich, O.E. (2009): A key to Palaearctic dragonflies of the genus *Aeshna* Fabricius, 1775 (Odonata, Aeschnidae). *Entomological Review* 89(2): 185-188. (in English) ["Keys to 10 Palaearctic species of the dragonfly genus *Aeshna* are given. For adults of the two morphologically similar species *Ae. juncea* (Linnaeus, 1758) and *Ae. subarctica* Walker, 1908, new distinguishing characters are given. These are the shape of the genital plate and position of the anal appendages relative to the horizontal plane of the female body, and the shape of the processes of the anterior hooks of the male genitalia. Additionally, keys to the larvae based on characters of larvae reared in the laboratory are given. These keys allow species-level identification for early and middle larval instars." (Author) Original Russian Text © O.E. Belevich, 2009, published in *Entomologicheskoe Obozrenie*, 2009, Vol. 88, No. 1, pp. 111-115.] Address: Belevich, O.E., Institute of Animal Systematics and Ecology, Siberian Branch, Russian Academy of Sciences, Novosibirsk, Russia

7797. Bogunski, G. (2009): Ergebnisse entomofaunistischer Untersuchungen im "Hochmoorrest am Filzteich" - einem entomofaunistisch bedeutsamen Gebiet Sachsens" - mit angrenzenden Bereichen im Hartmannsdorfer Forst. *Mitt. Sächs. Entomol.* 85: 13-28. (in German) [Saxonia, Germany; 22 species are recorded from the locality including *Coenagrion hastulatum*, *Lesites virens*, and *Leucorrhinia dubia*.] Address: Bogunski, G., Gartenstr. 10, 08141 Reinsdorf, Germany

7798. Borisov, S.N. (2009): Distribution patterns of dragonflies (Odonata) in Central Asia. *Entomological Review* 89(1): 26-33. (in English) ["The dragonfly fauna of Central Asia reveals distinct vertical differentiation. Three groups of species can be distinguished: mountain (24 species), plain (18), and plain-mountain (34) ones. The ranges observed can be classified into 7 principal types: plain, mountain, continuous boreo-montane, disjunctive Central Asian boreo-montane, disjunctive Tien Shan boreo-montane, Central Asian, and Pamir-Alay plain-mountain. The leading factors determining the distribution of dragonflies are the temperature and the presence of streams suitable for preimaginal development; the former factor determines the potential ranges, and the latter, the actual ones. The present-day composition, structure, and vertical distribution of the dragonfly fauna formed during the historical time, after the development of artificial irrigation canals which provided new habitats for dragonflies. Original Russian Text © S.N. Borisov, 2009, published in *Zoologicheskii Zhurnal*, 2009, Vol. 88, No. 1, pp. 11–17." (Author)] Address: Borisov, S.N., Institute of Animal Systematics and Ecology, Russian Academy of Sciences, Novosibirsk, 610091, Russia. Email: borisov-s-n@yandex.ru

7799. Bots, J.; van Dongen, S.; Adriaens, T.; Dumont, H.J.; Stoks, R.; van Gossum, H. (2009): Female morphs of a colour polymorphic damselfly differ in developmental instability and fecundity. *Animal Biology* 59: 41-54. (in English) ["Sex-limited colour polymorphism occurs in several animal taxa and is usually explained in the context of sexual selection. Specifically, for polymorphism restricted to the female sex, multiple phenotypes may have evolved in response to male harassment. Such male harassment is generally considered to entail differential costs to female morphs, which may ultimately result in fitness differences. However, contrary to this prediction, most previous studies do not support that female morph (andromorphs and heteromorphs) differ in measures of quality and (or) fitness components. In this study, we evaluate quality and fitness differences between mated female morphs of the damselfly *Enallagma cyathigerum*. We suggest that many earlier studies may have failed to observe morph differences in quality or fitness because selection by male harassment was weak. Here, we selected a study population for which our expectation was that levels of per female capita male harassment were high. Nevertheless, also in this population mated female morphs did not differ in body size or condition (body mass/body length). However, mated female morphs did differ in levels of developmental instability: heteromorphs consistently showed a higher level of fluctuating asymmetry than andromorphs. Also, mated female morphs differed in fecundity: andromorphs had a lower clutch size than heteromorphs. In addition, larger females contained more eggs, but the slope of this relationship was steeper in heteromorphs. In conclusion, mated female morphs of the damselfly *E. cyathigerum* at our study site clearly differed in one quality estimate (developmental instability) and in our measure of fitness (fecundity)." (Authors)] Address: Bots, Jessica, Evolutionary Ecology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: jessica.bots@ua.ac.be

7800. Bots, J.; Breuker, C.J.; van Kerkhove, A.; van Dongen, S.; De Bruyn, L.; van Gossum, H. (2009): Variation in flight morphology in a female polymorphic dam-

selfly: intraspecific, intrasexual, and seasonal differences. *Can. J. Zool.* 87(1): 86-94. (in English, with French summary) ["In aerial animals, flight morphology needs to be designed to allow daily behavioural activities. Within species differences in behaviour can therefore be expected to relate to differences in flight morphology, not only between males and females but also between same-sex members when they use different behavioural strategies. In female polymorphic damselflies, one female morph is considered a male mimic that resembles the male's body colour and behaviour (andromorph), whereas the other is dissimilar (gynomorph). Here, we questioned whether males, andromorphs, and gynomorphs of the damselfly *Enallagma cyathigerum* differ in flight morphology, with andromorphs being more similar to males than gynomorphs. In addition, we evaluated whether differences in flight morphology are consistent or whether some morphs are more plastic in response to seasonal environmental fluctuations. Most morphometrics showed similar seasonal plasticity for males and both female morphs, which could only partly be explained from allometry. Consistent with high manoeuvrability in flight, males had broader wings and lower wing loading than females. Variation between female morphs was less pronounced, with no consistent differences in length, aspect ratio, total surface, and wing loading. However, we detected morph-specific differences in shape and width, with andromorphs having broader wings than gynomorphs similarly to males." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

7801. Boudot, J.P.; Kalkman, V.J.; Azpilicueta Amorin, M.; Cordero Rivera, A.; Degabriele, G.; Domanget, J.-L.; Ferreira, S.; Garrigós, B.; Jovic, M.; Kotarac, M.; Lopau, W.; Marinov, M.; Mihokovic, N.; Riserivato, E.; Samraoui, B.; Schneider, W. (2009): Atlas of the Odonata of the Mediterranean and North Africa. *Libellula Suppl.* 9: 256 pp. (in English, with German summary) ["This atlas gives the distribution of Odonata in Africa north of the 18th northern parallel, the Levant, Anatolia and the whole of Mediterranean Europe. Some nearby areas like Portugal, The Canary Islands, Madeira, Serbia, Macedonia, Bulgaria and parts of the Arabian Peninsula, Iraq and Iran are included as well. Records, shown via a 50 km x 50 km UTM MCRS grid, are categorized according to their date - prior to 1980 and from 1980 onwards. 179 species are presently recognized in this area." (Authors)] Address: Boudot, J.-P., LIMOS, UMR CNRS 7137, Universités de Nancy, Faculté des Sciences, B.P. 239, F-54506 - Vandoeuvre-lès-Nancy Cedex, France. E-mail: jean-pierre.boudot@limos.uhp-nancy.fr

7802. Bredenhand, E.; Samways, M.J. (2009): Impact of a dam on benthic macroinvertebrates in a small river in a biodiversity hotspot: Cape Floristic Region, South Africa. *Journal of Insect Conservation* 13(2): 297-307. (in English) [Suitable reservoirs and monitoring methods are needed to manage scarce water supplies in dry countries. We assessed here the impact on aquatic macroinvertebrates of the only dam on the Eerste River, which runs through the heart of a biodiversity hotspot, the Cape Floristic Region, South Africa. The dam and associated activities, were the only forms of disturbance in this otherwise pristine area. We sampled over 20,000 macroinvertebrate individuals and illus-

trated some categorical effects of the impoundment and its effects on macroinvertebrate assemblages. Macroinvertebrate species diversity below the dam was only half of that in the pristine catchment area above the dam. Furthermore, Ephemeroptera, Plecoptera and Trichoptera diversity and abundance dropped to almost zero as a result of the impoundment. In contrast, the abundance of the Diptera family Chironomidae increased substantially below the dam. These changes in macroinvertebrate diversity mirrored those recorded in biologically less diverse areas, but are of major concern in this biodiversity hotspot with its rich endemic fauna. We conclude that such an impoundment, while important for human welfare, results in a high price being paid in terms of loss of local biodiversity." (Authors) All specimens - including Odonata - were identified to family level according to South African Scoring System version 5 protocol.] Address: Samways, M.J., Dept Ent. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7803. Breuker, C.J. (2009): Book review: Alex Córdoba-Aguilar (ed): Dragonflies and damselflies. Model organisms for ecological and evolutionary research. Oxford University Press, Oxford, UK, 2008, Hardback, Sterling £65.00, ISBN 978-0-19-923069-3, 288 pages. *Journal of Insect Conservation* 13(3): 363-365. (in English) [Book review.] Address: Breuker, C.J., Evolutionary Developmental Biology Research Group, Sinclair Building, School of Life Sciences, Oxford Brookes University, Gypsy Lane, Headington, Oxford, OX3 0BP, UK. E-mail: cbreuker@brookes.ac.uk

7804. Bried, J.T. (2009): Location and seasonal differences in adult dragonfly size and mass in northern Mississippi, USA (Odonata: Libellulidae). *Int. J. Odonatology* 12(1): 123-130. (in English) ["Size and mass are often uniformly related within individuals and populations, but the relationship may vary in time or space. I asked whether isolated adult dragonfly populations within the same environmental context (climate, physiography, ecoregion) differ in both size and mature mass, and whether earlier emerging dragonflies are both larger and heavier on average. Differences were apparent among locally separated populations (ca 130-160 km apart), with the most northerly populations containing larger and heavier adults on average. Site-level environmental variation probably exerted a larger influence than broad-based ecogeographic rules (e.g., Bergmann's rule) at this fine scale. On average, earlier emerging dragonflies tended to outsize and/or outweigh later emerging dragonflies, a commonly observed pattern in adult odonates and other insect taxa. Size and mass did not produce the same results in every case, suggesting the size-mass relationship within dragonfly species can vary among spatially or seasonally isolated adult populations." (Author)] Address: Bried, J.T., The Nature Conservancy, 195 New Karner Road, Albany, New York 12205, USA. E-mail: jbried@tnc.org

7805. Cannings, R.A. (2009): Book reviews: Samways, M.J. 2008. Dragonflies and Damselflies of South Africa. Pensoft, Sofia, 297 pp. ISBN 978-954-642-330-6, hardback, 145x210 mm. Euros 39.00. From <http://www.Pensoft.net>. *Florida Entomologist* 92(2): 404-405. (in English) [Book review.] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street, Victoria, BC, Canada V8W 9W2. E-mail: RCannings@royalbcmuseum.bc.ca

7806. Cicort-Lucaciu, A.-S.; Dimancea, N.; Blaga-Lungulescu, R.M.; Hodisan, O.; Benkö, A. (2009): Diet composition of a *Triturus dobrogicus* (Amphibia) population from Arad County, western Romania. *Bihorean Biologist* 3(1): 77-82. (in English) ["Odonata larvae" play a minor role as diet in a *Triturus dobrogicus* population from Cermeiului Plain.] Address: Cicort-Lucaciu, A.-S., University of Oradea, Faculty of Sciences, Department of Biology, 1 Universitatii str., 410087 - Oradea, Romania. E-mail: cicort.alfred@yahoo.com

7807. Clausnitzer, V.; Kalkman, V.J.; Ram, M.; Colleen, B.; Baillie, J.E.M.; Bedjanic, M.; Darwall, W.R.T.; Dijkstra, K.-D.; Dow, R.; Hawking, J.; Karube, H.; Malikova, E.; Paulson, D.; Schütte, K.; Suhling, F.; Villanueva, R.J.; von Ellenrieder, N.; Keith Wilson, K. (2009): Odonata enter the biodiversity crisis debate: The first global assessment of an insect group. *Biological Conservation* 142(8): 1864-1869. (in English) ["The status and trends of global biodiversity are often measured with a bias towards datasets limited to terrestrial vertebrates. The first global assessment of an insect order (Odonata) provides new context to the ongoing discussion of current biodiversity loss. A randomly selected sample of 1500 (26.4%) of the 5680 described dragonflies and damselflies was assessed using IUCN's Red List criteria. Distribution maps for each species were created and species were assigned to habitat types. These data were analysed in respect to threat level for regions and habitat types. We have found that one in 10 species of Odonata is threatened with extinction. This threat level is among the lowest of groups that have been assessed to date, suggesting that previous estimates of extinction risk for insects might be misleading. However, Odonata only comprise a small invertebrate order, with above-average dispersal ability and relatively wide distribution ranges. For conservation science and policy to be truly representative of global biodiversity a representative cross-section of invertebrates needs to be included." (Authors)] Address: Clausnitzer, Viola, Graefestr. 17, D-06110 Halle/Saale, Germany. E-mail: violacl@t-online.de

7808. Contreras-Garduno, J.; Canales-Lazcano, J.; Jiménez-Cortés, J.G.; Juárez-Valdez, N.; Lanz-Mendoza, H.; Córdoba-Aguilar, A. (2009): Spatial and temporal population differences in male density and condition in the American rubyspot, *Hetaerina americana* (Insecta: Calopterygidae). *Ecological Research* 24(1): 21-29. (in English) ["Increased resource availability should favour higher animal density. It may also affect sex ratio, the male condition, and mating competition over access to females, although the direction of these variables is not straightforward to predict. Using a non-experimental approach, we carried out preliminary research using the territorial *H. americana* by comparing two spatially separated populations and the same population in two different seasons (each comparison with varying population densities). We first compared the sex ratio by counting males (using two categories, territorial and non-territorial) and females; relative foraging time (as an indicator of how much feeding resources each site provides); wing spot size (a sexual ornament), body size and immune melanization response (these two variables were used to assess male condition); and fighting time and contest number (to assess competition). For the seasonal comparison we used a third population in which we only compared male spot size and two indicators of condition and immune response, phen-

oloxidase (PO) and nitric oxide (NO) activity. The high-density population had higher values of non-territorial males (but similar sex ratio), relative foraging time, contest time and number, wing spot (but similar body size) and melanization response than the low-density population. According to season, at high density, males had higher values of wing spots, PO, and NO. Our results suggest that in a population where animals have more dietary resources, males reach a better condition despite the competition being more intense." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Univ. Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

7809. Córdoba-Aguilar, A.; Serrano-Meneses, M.A.; Cordero-Rivera, A. (2009): Copulation duration in non-territorial Odonate species lasts longer than in territorial species. *Annals of the Entomological Society of America* 102(4): 694-701. (in English) ["We tested whether long copulation duration is more likely to have evolved in nonterritorial odonate species than in territorial species, given that nonterritorial males do not incur the costs of territory defense. A phylogenetic comparative method that controls for the phylogenetic nonindependence of species was used to compare copulation duration among 46 species of the two main odonate suborders (Anisoptera and Zygoptera). Copulation duration of nonterritorial anisopteran species was longer than for territorial dragonflies; however, this relationship was not found for Zygoptera. Long copulations in Anisoptera may be related to a male's ability to manipulate a female's stored sperm. It is suggested that constraints that prevent a territorial male from lengthening copulation do not seem to operate in Zygoptera. Other selective processes (i.e., cryptic female choice and/or sexual conflict) may also be important determinants of copulation duration in the Zygoptera. To our knowledge, this is the first exploration of the relation copulation duration and mating systems in insects." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

7810. Costa, J.M.; Oldrini, B.B.; Anjos-Santos, D. (2009): Eight new Leptagrion larvae from Brazil (Zygoptera: Coenagrionidae). *Odonatologica* 38(2): 93-111. (in English) ["The ultimate instar larvae of *L. andromache*, *L. bocainense*, *L. capixabae*, *L. dardanoi*, *L. elongatum*, *L. macrumum*, *L. perlongum*, and *L. vriesianum* are described and illustrated from the states of Rio de Janeiro, Espírito Santo, Minas Gerais, Pernambuco, and Santa Catarina. All specimens are deposited in Museu Nacional, Rio de Janeiro, Brazil. A comparative tab. of the structural characters is included." (Authors)] Address: Costa, J.M., Depto de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20940-40 Rio de Janeiro, RJ, Brazil. jcosta@globocom

7811. Couteyen, S., (2009): Biogéographie et spéciation des Odonates de l'île de la Réunion. *Ann. soc. entomol. Fr.* (n.s.) 45(1): 83-91. (in French, with English summary) ["The odonatological fauna of la Réunion is fundamentally of Mauritian origin for the geological history of the Mascarenes and the different routes taken by cyclones in the south-west of the Indian Ocean. The study of the Odonata distribution according to various

aquatic ecosystems of the island shows that: 1. Indigenous species with wide repartition are mainly found in open ecosystems of low and moderate altitude (from 0 to 800 meters). These ecosystems include as many as 13 species and have the highest Odonata density. 2. The Odonata fauna of la Réunion can be distinguished from those of the other islands of the Madagascan Region by the presence of two species originated from the continent which are confined above an altitude of 1000 meters. 3. For most of them, endemic species live in forested ecosystems. Those ecosystems do not hold more than five species of the odonatological fauna of the island. Finally, it seems that the speciation of Odonata in la Réunion doesn't take place in the diversified ecosystems with widely distributed species, but in a set of marginal ecosystems with low Odonata diversity." (Author)] Address: Couteyen, S., Association réunionnaise d'Ecologie, 188 chemin nid joli, F-97430 le Tampon, île de la Réunion, France. E-mail: scouteyen@ecologie.re

7812. Damm, S.; Hadrys, H. (2009): *Trithemis morrisoni* sp. nov. and *T. palustris* sp. nov. from the Okavango and Upper Zambezi Floodplains previously hidden under *T. stictica* (Odonata: Libellulidae). *International Journal of Odonatology* 12(1): 131-145, pls III-IV. (in English) ["During the course of a population genetic study of *Trithemis stictica* that included sites in Namibia, Kenya, Tanzania, Ethiopia, Botswana and Zambia, two undescribed libellulid species were discovered in the Okavango and Upper Zambezi Floodplains. These were both previously identified as *T. stictica*. We describe the two species, *T. morrisoni* sp. nov. (holotype ♂: Namibia, Nature Reserve Popa Falls, Okavango River at the rapids, 18°07'S, 21°40'E; IV 2007, leg. K.-D.B. Dijkstra; dep. in the National Museum of Namibia, Windhoek) and *T. palustris* sp. nov. (holotype ♂: Botswana, Okavango Delta, Moremi Game Reserve, 19°15'S, 23°20'E; II 2007, leg J. Kipping; dep. in the Nat. Mus. of Namibia, Windhoek) and compare them with *T. stictica*." (Authors)] Address: Damm, Sandra, ITZ, Ecology & Evolution, TiHo Hannover, Bünteweg 17d, 30559 Hannover, Germany. E-mail: sandra.giere @ecolevol.de

7813. Deeds, J.; Bogar, D.; Koval, R.; McWilliams, J.; Schiffer, C. (2009): Six new Odonata state records in Pennsylvania. *Argia* 21(2): 5-6. (in English) [Records of *Enallagma anna*, *Ischnura kellicotti*, *Ophiogomphus incurvatus*, *Macromia taeniolata*, *Libellula deplanata*, and *Celithemis fasciata* are documented.]

7814. Dibble, C.J.; Kauffman, J. E.; Zuzik, E.M.; Smith, G.R.; Rettig, J.E. (2009): Effects of potential predator and competitor cues and sibship on wood frog (*Rana sylvatica*) embryos. *Amphibia-Reptilia* 30(2): 294-298. (in English) ["Chemical cues emitted from predators or competitors are often important for animals living in aquatic ecosystems as they allow potential prey to assess predation risk and make appropriate risk-sensitive responses. In our experiment, we examined if *R. sylvatica* embryos exposed to potential predator and competitor cues would alter their time to hatching, size at hatching, or survivorship. Eggs from four different sibships were subjected to a variety of cues including dragonfly larvae (potential tadpole predator), mosquito fish (*Gambusia affinis*; a non-native potential egg and tadpole predator), and overwintered tadpoles of *Rana* sp. (potential competitors). We found no significant effects of any of the cues. However, we did find sig-

nificant variation in mean time to hatching and mean hatchling size among sibships. Our results suggest that wood frog embryos may have limited ability to respond to some cues at the embryonic stage, at least for the concentrations and conditions used in this experiment. Our results do indicate genetic or parental effects can affect embryonic wood frog development rate and hatchling size." (Authors)] Address: Smith, G.R., Dept Biology, Denison University, Granville, OH 43023, USA. Email: smithg@denison.edu

7815. Donnelly, T.W. (2009): Book Review: Dragonflies and Damselflies of the West. By Dennis Paulson, Princeton University Press, 2009. 535 pages, color, soft cover \$29.95. ISBN 978-0-691-12281-6. *Argia* 21(2): 14-15. (in English) [Book review.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

7816. Dow, R.A.; Reels, G.T. (2009): Expedition to Mount Dulit, Sarawak, August-September 2008 - Odonata. IDF-Report 19: 1-16. (in English) [This is a report on a short expedition to Mount Dulit, Sarawak, conducted by Rory Dow and Graham Reels in late August, and early September, 2008. The objective of the expedition was to survey Odonata on the mountain, with particular attention to reconfirming the presence of a number of species (*Rhinoneura caerulea*, *Bornargiolestes nigra*, *Drepanosticta dulitensis*, *D. forficula*, & *D. dentifera* and *Orthetrum borneense*) originally described from Mt. Dulit by Kimmins (1936), from material collected by members of an Oxford University Expedition to Sarawak in 1932 (Harrison 1933). The mountain was not re-visited by odonatologists until 2006. A total of 49 species is listed. Some of the target species could not be traced due to insurmountable problems to reach the plateau of the Dulit mountains.] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

7817. Dumont, H.J. (2009): Aquatic insects of the Nile basin, with emphasis on the Odonata. *Monographiae Biologicae* 89: 631-646. (in English) ["Much work has been done on the Diptera of the Nile, because many species are vectors of disease of man and cattle. Some biogeographic work has been done on the Heteroptera, but the group that is known best is that of the Odonata. With c. 250 species out of an estimated 900 for Africa, the Nile is not particularly rich. Unlike the Congo basin, it lacks a high degree of endemism. Relatively most endemic species are found on the faunistically depauperate Ethiopian plateau, followed by the East African lake zone. Quite a few wide-ranging Afrotropical species have used the Nile valley as a pathway to reach the Mediterranean shores, while in Lower Egypt some Palaearctic species of Irano-Turanian extraction occur. There has been exchange, across Sinai with the Levant, and perhaps across the Bab-el-Mandeb passage with Arabia. Some of these exchanges have been recent, others are older, and (sub) speciation has occurred since. Old endemics of Arabia and The Levant (at genus level) may not have had anything to do with the Nile. Their ancestors may have used the Red Sea valley as a pathway for dispersal before the opening of Bab-el-Mandeb. Not only the Afrotropical fauna of the Levant is a pluvial relict of Pleistocene age; also in West Sudan, relicts of an African forest fauna are found in a mountainous Sahel environment (Jebel Marra). Oriental elements in the Nile fauna are extre-

mely rare." (Author)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@ugent.be

7818. Ellenrieder, N.v. (2009): Odonata of the Argentine Yungas cloud forest: distribution patterns and conservation status. *Odonatologica* 38(1): 39-53. (in English) ["Odonata of streams, small rivers and ponds were sampled in the Yungas cloud forest of NW Argentina, and presence / absence information of species from samples and from examination of collections was recorded in a spatial-relational data base. Alpha, beta, and gamma diversity and total species richness expected for the area were estimated. Similarity in composition of odonate communities from lotic and lentic environments were analyzed according to latitudinal and altitudinal gradients, using multivariate cluster analysis. Assemblages from NW Argentina were compared to those from equivalent sites in SE Peru. Odonata species diversity was found to follow both a latitudinal (decreasing from N to S) as an altitudinal gradient (decreasing from low to high elevations). Based on IUCN (2001) criteria, the conservation status of the odonate species endemic to the Yungas cloud forest was assessed at a global scale; 6 species were assessed as of Least Concern and 2 as Near Threatened." (Author)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7819. Escoto-Moreno, J.A.; González-Soriano, E.; Escoto-Rocha, J. (2009): Odonata from Aguascalientes state, Mexico. *Odonatologica* 38(2): 151-158. (in English) ["A list is presented of 58 species, including their distribution by municipalities; 50 of these are new records for the state. Information on general distribution of selected species is also provided. In accordance with the non-parametric estimation Chao2, the number of observed species represents ca 87.8% of the total number of species estimated for the state of Aguascalientes." (Authors)] Address: Escoto-Moreno, J.A., Depto de Biología, Universidad Autónoma de Aguascalientes, Avenida Universidad 940, MX-20100 Aguascalientes, Mexico. E-mail: jerjaem2002@yahoo.es

7820. Ferenti, S.; Dimancea, N.; David, A.; Tântar, A.; Daraban, D. (2009): Data on the feeding of a *Rana ridibunda* population from Sarighiol de Deal, Tulcea County, Romania. *Bihorean Biologist* 3(1): 45-50. (in English) [The diet of 86 specimens of *R. ridibunda* is mainly represented by the Coleoptera, Diptera and Homoptera (Cicada). The majority of prey have a terrestrial origin. The presence of different size preys indicates opportunistic feeding. Odonata contribute between 3.5 - 6% to the diet.] Address: Ferenti, Sara, University of Oradea, Faculty of Science, Dept of Biology, 1 Universitatii str., 410087, Oradea, Romania. E-mail: ferentisara@yahoo.com

7821. Fincke, O.M.; Santiago, D.; Hickner, S.; Biebek, R. (2009): Susceptibility of larval dragonflies to zebra mussel colonization and its effect on larval movement and survivorship. *Hydrobiologia* 624: 71-79. (in English) ["Colonization by the zebra mussel, *Dreissena polymorpha*, was quantified for five dragonfly species that differed in size and larval habits in a Michigan lake. Both larger size and a non-burrowing habit independently increased susceptibility to colonization. In 2005, over 50% of the final instars of the sprawlers *Didymops*

transversa and Hagenius brevistylus were colonized, as well as younger instars. Rarely colonized were Progomphus obscurus and Dromogomphus spinosus, whose larvae burrow under sand, and the sprawler Epithea princeps, whose final instars were lightly covered with sand. Hagenius larvae that had been preyed upon carried more mussels than those dying of other causes. More generally, mussel attachment decreased the probability that sprawlers left the water to emerge, the distance that some species traveled before emerging, and the ability of an overturned sprawler to right itself. On average, final instars of Didymops and Hagenius remaining in the water carried three times as many mussels as individuals known to emerge. Compared to uncolonized individuals, Epithea and Progomphus with mussels emerged closer to the water line. Among colonized Didymops, the distance traveled on land before emerging decreased with increasing mussel load. Of the colonized Didymops that could right themselves, righting time increased with mussel load. Because the two common species of sprawlers were disproportionately colonized, and mussel attachment decreased their chances of emerging, our results suggest that *D. polymorpha* has the potential to affect the community structure of this guild of aquatic and terrestrial predators." (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

7822. Fleck, G.; Waller, A.; Serafin, J.; Nel, A. (2009): The oldest Calopterygidae in the Eocene Baltic amber (Odonata: Zygoptera). *Zootaxa* 1985: 52-56. (in English) ["A larva of the damselfly family Calopterygidae is described from Eocene Baltic amber. It is the oldest record of this family partially filling the gap between previous records from the Oligocene and the Mesozoic inferred from molecular analyses for this family." (Authors)] Address: Serafin, J., 3Ul. Balladyny 5A, 05-502 Piaseczno, Poland. E-mail: dorotaz@orange.pl

7823. Fontanarrosa, M.; Collantes, M.B.; Bachmann, A.O. (2009): Seasonal patterns of the insect community structure in urban rain pools of temperate Argentina. *Journal of Insect Science* 9:10: 18 pp. (in English) ["Temporary aquatic environments are widespread in the world, and although there are considerable regional differences in their type and method of formation they have many physical, chemical and biological properties in common. With the aim to increase knowledge of urban temporary pool fauna, the objectives of this work were to assess the seasonal patterns of species composition, richness, and diversity of the aquatic insect community inhabiting rain pools in urban temperate Argentina, and to identify the environmental variables associated to these patterns. Four temporary pools of an urban green space in Buenos Aires City were studied throughout a 1-year period. Eleven flood cycles with very varied hydroperiods and dry periods, mainly associated with rainfall, were identified. Insect species richness in these temporary urban pools, 86 taxa were documented, was found to be within the range reported for wild temporary water bodies of other regions of the world. The present results provide evidence for the existence of a clear link between habitat and community variability. Hydroperiod and seasonality were the main environmental factors involved in structuring the insect communities of the studied water bodies. Urban pools in green spaces have the potential to act to its dwellers like corridors through the urban matrix. Taking into ac-

count these characteristics and their accessibility, urban temporary pools can be considered as promising habitats for the study of ecological processes involving the insect community." (Authors) Odonata are treated on the order resp. in app. 1 family level] Address: Soledad Fontanarrosa, M., Departamento de Ecología, Genética y Evolución, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, CONICET, Argentina. E-mail: fontanarrosa@ege.fcen.uba.ar

7824. Garrison, R.W.; von Ellenrieder, N. (2009): Re-definition of *Mesoleptobasis* Sjöstedt 1918 with the inclusion of *Metaleptobasis cyanolineata* (Wasscher 1998) comb. nov. and description of a new species, *Mesoleptobasis elongata* (Odonata: Coenagrionidae). *Zootaxa* 2145: 47-68. (in English, with Spanish summary) ["*Metaleptobasis cyanolineata* is transferred to *Mesoleptobasis* and a new species, *Mesoleptobasis elongata*, is described. The genus is diagnosed by the combination of rounded frons, highly modified pronotum with long processes at least in males, pterothoracic color pattern lacking dark mid-dorsal stripe, pretarsus with supplementary tooth vestigial or absent, vein descending from quadrangle forming an unbroken line to wing margin, and genital ligula with a small inner fold and with spine-like projections on lateral margins distal to flexure. Its species are illustrated, mapped, and keyed." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

7825. Garrison, R.W. (2009): Book Review: Common Dragonflies of California. A Beginner's Pocket Guide (2nd Edition). By Kathy Biggs, Azalea Creek Publishing, 2009, 128 pages (ISBN 978-0-9677934-6-7) 220 full-color photos. Still \$9.95. Available from <http://www.sonic.net/dragonfly/>. *Argia* 21(2): 15. (in English) [Book review.] Address: Garrison, R.W., Plant Pest Diagnostics, California Dept of Food & Agriculture, 3294 Meadowview Rd, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

7826. Gligorovic, B.; Pesic, V.; Zekovic, A. (2009): A contribution to the knowledge of the dragonflies (Odonata) of mountainous area Lukavica (Montenegro). *Natura Montenegrina* 8(1) (2008): 31-39. (in English, with Serbian summary) [12 species including *Coenagrion hastulatum*, *Aeshna juncea*, and *Cordulia aenea* are reported from the region. The record of *Aeshna cyanea* on Manito jezero Lake (1764 m a.s.l.) represents the highest altitude of finding of this species in Montenegro.] Address: Gligorovic, B., Dept of Biology, Faculty of Sciences, University of Montenegro, Cetinjski put b.b., 81000 Podgorica, Montenegro. E-mail: bogic1@cg.yu

7827. Gonzalez-Soriano, E.; von Ellenrieder, N. (2009): What is *Amphipteryx agrioides* Selys 1853 (Odonata: Amphipterygidae)? *Zootaxa* 2074: 61-64. (in English) [The paper determines the correct identity of *A. agrioides*, provides diagnostic illustrations of the same, and discusses the location of its type locality] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autonoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

7828. Gosden, T.P.; Svensson, E.I. (2009): Density-dependent male mating harassment, female resistance,

and male mimicry. *Am. Nat.* 173: 709-721. (in English) ["Genetic variation in female resistance and tolerance to male mating harassment can affect the outcome of sexually antagonistic mating interactions. We investigated female mating rates and male mating harassment in natural populations of *Ischnura elegans*. This damselfly species has a heritable sex-limited polymorphism in females, where one of the morphs is a male mimic (androchrome females). The three female morphs differ in mating rates, and these differences are stable across populations and years. However, the degree of premating resistance toward male mating attempts varied across generations and populations. Male mating harassment of the female morphs changed in a density-dependent fashion, suggesting that male mate preferences are plastic and vary with the different morph densities. We quantified morph differences in male mating harassment and female fecundity, using path analysis and structural equation modeling. We found variation between the morphs in the fitness consequences of mating, with the fecundity of one of the nonmimetic morphs declining with increasing male mating harassment. However, androchrome females had lower overall fecundity, presumably reflecting a cost of male mimicry. Density-dependent male mating harassment on the morphs and fecundity costs of male mimicry are thus likely to contribute to the maintenance of this female polymorphism." (Authors)] Address: Svensson, E.I., Department of Animal Ecology, Ecology Building, Lund University, S-223 62 Lund, Sweden. E-mail: erik.svensson@zooekol.lu.se.

7829. Gossum, H. van; Bots, J.; Snijkers, T.; Meyer, J.; Wassenbergh, S. van; De Coen, W.; De Bruyn, L. (2009): Behaviour of damselfly larvae (*Enallagma cyathigerum*) (Insecta, Odonata) after long-term exposure to PFOS. *Environmental Pollution* 157(4): 1332-1336. (in English) ["Perfluorooctane sulfonic acid (PFOS) is a persistent and ubiquitous environmental contaminant that has been detected in organisms worldwide. Here, we evaluate whether long-term (1 and 4 months) exposure to PFOS contamination affects the behavioural performance of freshwater larvae of the damselfly *E. cyathigerum*. Our results show reduced behavioural performance with increasing PFOS concentration. In 1 month exposed larvae, no observed effect concentrations (NOECs) were 100 µg/L for general activity. In 4 months exposed larvae, NOECs were 10 µg/L, for each behavioural trait, except swimming acceleration of male larvae where the NOEC was 100 µg/L. When faced with PFOS concentrations above the NOEC, *E. cyathigerum* larvae were less active, less capable to escape a simulated predator attack and less efficient in foraging. Together, our results show that damselfly larvae suffer reduced survival-related behavioural performance." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

7830. Gysels, J.; Puls, H. (2009): Beekschaatsenrijder en bosbeekjuffer in de provincie Antwerpen (1995-2008). *Antenne* 3(1): 12-15. (in Flemish) [Records (province Antwerpen, Belgium) of *Calopteryx virgo* from 1995-2008 are discussed and mapped.] Address: Gysels, J. Poelenwerkgroep Natuurpunt, Belgium. E-mail: jos.gysels@natuurpunt.be

7831. Hämäläinen, M.; Reels, G.T.; Zhang, H. (2009): Description of *Aristocypha aino* sp. nov. from Hainan, with notes on the related species (Zygoptera: Chlorocyphidae). *Tombo* 51: 16-22. (in English, with Japanese summary) ["A new chlorocyphid damselfly species, *Aristocypha aino* sp. nov. (holotype ♂ from Jianfengling National Nature Reserve, Hainan Island, China) is described and illustrated for both sexes. Its systematic relationship with other taxa in the genus is discussed. *Rhinocypha bifenestrata* Fraser, 1922 is ranked as a synonym of *Aristocypha cuneata* (Selys, 1853), not as a synonym of *A. quadrimaculata* (Selys, 1853). *Rhinocypha chaoi* Wilson, 2004 is transferred to the genus *Aristocypha*." (Authors)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

7832. Hamasaki, K.; Yamanaka, T.; Tanaka, K.; Nakatani, Y.; Iwasaki, N.; Sprague, D.S. (2009): Relative importance of within-habitat environment, land use and spatial autocorrelations for determining odonate assemblages in rural reservoir ponds in Japan. *Ecological Research* 24(3): 597-605. (in English) ["To clarify the major factors affecting odonate assemblages in rural reservoir ponds among within-habitat environments, land use around ponds and spatial autocorrelation, we surveyed odonate adults in 70 study ponds in Ibaraki Prefecture, Japan, during three sampling periods in 2005. Redundancy analyses (RDA) for these three factor groups were executed to determine their strength in explaining the odonate species composition. Their relative contributions were also evaluated by the method of variation partitioning. A total of 41 odonate species were recorded in the study ponds, and 24 of them, excluding rare species, were used for our analysis. Summed effects including all three factor groups explained approximately 39% of the variation in odonate species composition. We found that spatial autocorrelation was the most important, though the within-habitat environment and land use had comparable effects. We conclude that spatial autocorrelation should be considered in this type of analysis, though we could not clearly explain what caused such a spatial structure. Pond area and debris that had accumulated at the bottom of ponds were selected as the within-habitat environment, and the forests and paddy fields around ponds were selected for land use after the procedure of forward stepwise selection. These results suggest that the recent decrease of forests around the ponds has had a negative effect on the odonate assemblages." (Authors)] Address: Hamasaki, K., Biodiversity Division, National Institute for Agro-Environmental Sciences, 3-1-3 Kannondai, Tsukuba Ibaraki, 305-8604, Japan. E-mail: kenjih@affrc.go.jp

7833. Hammers, M.; Sánchez-Guillén, R.A.; Gossum, H. van (2009): Differences in mating propensity between immature female color morphs in the damselfly *Ischnura elegans* (Insecta: Odonata). *Journal of Insect Behaviour* 22: 324-337. (in English) ["Female-limited color polymorphisms occur in a variety of animal taxa where excessive male sexual harassment may explain the coexistence of multiple female color morphs. In the color polymorphic damselfly *Ischnura elegans*, mature and immature female color morphs coexist at the mating site where males are in search for suitable mating partners. Here, we study male preference and female mating propensity for the two immature female morphs.

As would be expected, compared to mature morphs, both immature female morphs mate much less. Within immature females, one morph consistently mates more frequently compared to the other morph, a pattern that is similar for the ontogenetically corresponding mature female morphs. Preference experiments with the two differently colored immature female morphs, however, did not indicate male mate preference for either morph. Low mating frequencies of immature females at natural sites in combination with relatively high attractiveness of immature models in terms of male preference indicate that female behavior influences female mating success." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvgossum@ruca.ua.ac.be

7834. Huang, D.-y.; Baudoin, A.; Nel, A. (2009): A new aeschniid genus from the Early Cretaceous of China (Odonata: Anisoptera). *Cretaceous Research* 30: 805-809. (in English) ["The new genus and species of aeschniid dragonfly *Linaeschnidium sinensis* is described from the Early Cretaceous of China. Its close relationships with the two Western European genera *Angloaeschmidium*, and *Lleidoaeschmidium* confirms the great affinities between the aeschniid faunas of the two areas despite of the presence of continental seas between them during this period." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

7835. Huang, D.-y.; Nel, A. (2009): The first Chinese Tarsophlebiidae from the Lower Cretaceous Yixian Formation, with morphological and phylogenetic implications (Odonoptera: Panodonata). *Cretaceous Research* 30(2): 429-433. (in English) ["The Early Cretaceous *Turanophlebia sinica* sp. nov. is the first Chinese representative of the enigmatic family Tarsophlebiidae. The exquisite preservation of the type specimen allows to precise several important morphological structures of phylogenetic importance, i.e. three-segmented tarsi, with basal tarsomere very long; and absence of subapical tooth on tarsal claw. If the first character not longer supports a basal position for Tarsophlebiidae, the second confirms it. The presence of a fore leg tibial comb of the Hemiphlebiidae is apomorphic for this last group." (Authors)] Address: Huang, D.-y., Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China. E-mail: huangdiy-ing@sina.com

7836. Huang, D.-y.; Nel, A. (2009): The first Chinese Tarsophlebiidae from the Lower Cretaceous Yixian Formation, with morphological and phylogenetic implications (Odonoptera: Panodonata). *Cretaceous Research* 30(2): 429-433. (in English) ["The Early Cretaceous *Turanophlebia sinica* sp. nov. is the first Chinese representative of the enigmatic family Tarsophlebiidae. The exquisite preservation of the type specimen allows to precise several important morphological structures of phylogenetic importance, i.e. three-segmented tarsi, with basal tarsomere very long; and absence of subapical tooth on tarsal claw. If the first character not longer supports a basal position for Tarsophlebiidae, the second confirms it. The presence of a fore leg tibial comb supports the hypothesis that the reduced tibial comb of the Hemiphlebiidae is apomorphic for this last group." (Authors)] Address: Huang, D.-y., State Key

Lab. of Palaeobiology & Stratigraphy, Nanjing Inst. of Geology & Paleontology, Chinese Acad. Sci., Nanjing 210008, PR China. E-mail: huangdiy-ing@sina.com

7837. Ishizawa, N. (2009): Akatombo, "Red Dragonflies". *Argia* 21(2): 13-14. (in English) [The note presents an English translation of the famous Japanese song, and reports on the current situation (2005) of aka tomo - *Sympetrum frequens*, now seems to be lost around the birthplace of the poet, Miki, Rofu.] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozawa City, Saitama Pref., Japan. E-mail: sieba4318@rivo.mediatte.net

7838. Johansson, F.; Soderquist, M.; Bokma, F. (2009): Insect wing shape evolution: independent effects of migratory and mate guarding flight on dragonfly wings. *Biological journal of the Linnean society* 97(2): 362-372. (in English) ["Although, in some insect taxa, wing shape is remarkably invariant, the wings of Anisopteran dragonflies show considerable variation among genera. Because wing shape largely determines the high energetic costs of flight, it may be expected that interspecific differences are partly due to selection. In the present study, we examined the roles of long-distance migration and high-maneuvrability mate guarding in shaping dragonfly wings, using a phylogeny-based comparative method, and geometric morphometrics to quantify wing shape. The results obtained show that migration affects the shape of both front and hind wings, and suggest that mate guarding behaviour may also have an effect, especially on the front wing. These effects on front wing shape are at least partly independent. Our findings are interesting when compared with the geographically widespread and ecologically diverse dipterans *Acalyptatae* (including the genus *Drosophila*). The wings in that group are similar in function and structure, but show strikingly low levels of interspecific variation." (Authors)] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

7839. Johnson, J. (2009): Presumed *Enallagma anna* Williamson × *carunculatum* Morse hybrids from Oregon and California. *Bulletin of American Odonatology* 11(1): 8-10. (in English, with Spanish summary) ["Two presumed male *E. anna* × *carunculatum* hybrids, one from Crook County, Oregon, the other from Inyo County, California, are described and their abdominal terminalia are figured. Figures of *E. anna* and *carunculatum* are provided for comparison." (Author)] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

7840. Johnson, J. (2009): *Ophiocordyceps odonatae* —An odonate-specific fungal pathogen. *Argia* 21(2): 4-5. (in English) [The paper briefly reports on the fungus *O. odonatae*. Dr. Joey Spatafora (E-mail: spatafoj@science.oregonstate.edu) from the Oregon State Arthropod Collection (OSAC) holds a specimen from Japan with this fungus noting that such a fungus is not known from the neotropis. Conscientized for fungi in Odonata specimens, a *Gynacantha nervosa* from the Dominican Republic was traced which was infected by a fungal pathogen. The latter will be processed in near future.]

7841. Jones, B.R.; Bogdanowicz, S.M.; Jordan, S. (2009): Isolation and characterization of 16 polymorphic microsatellite loci in the endemic Hawaiian damselfly

Megalagrion xanthomelas (Odonata: Coenagrionidae). Molecular Ecology Resources 9(1): 165-167. (in English) ["Microsatellite loci have been isolated from two species of endemic Hawaiian damselflies, Megalagrion xanthomelas and M. eudytum, that are of conservation concern. Sixteen polymorphic loci were characterized in 32 M. xanthomelas from one population on Molokai and one on Hawaii Island. The total number of alleles per locus ranged from two to 16 and observed population heterozygosity ranged from 0.0 to 0.963. Eleven of these loci amplified successfully in M. eudytum as well. These loci will be used to further conservation efforts and infer genetic consequences of Pleistocene glaciations." (Authors)] Address: Jones, B., Dept of Biology, Bucknell University, Lewisburg, PA 17837, USA. E-mail: BRJones04@gmail.com

7842. Jorcin, A.; Nogueira, M.G.; Belmont, R. (2009): Spatial and temporal distribution of the zoobenthos community during the filling up period of Porto Primavera Reservoir (Paraná River, Brazil). Braz. J. Biol. 69(1): 19-29. (in English, with Portuguese summary) ["This study is part of the limnological monitoring undertaken by the Energy Company of the State of São Paulo (CESP) during the filling up process of the Porto Primavera Reservoir (Hydroelectric Power Plant Engenheiro Sérgio Motta). This reservoir, located in the high Paraná River between the States of São Paulo and Mato Grosso do Sul, is the fourth largest in the country. The first filling up phase started in December 1998 and the second phase in March 2001. Samples for benthic community and sediment characteristics analysis were quarterly collected between August of 1999 and November 2001 and also in August of 2002 (11 sampling campaigns). Samplings were carried out at 13 stations distributed in the reservoir, and at one point located downstream of the dam. 128 invertebrate taxa were identified [(including "Gomphidae" and "Aphylla") ...] Noticeable variations in the fauna density were observed, considering both different periods and locations. The maximum density of organisms (mean value of 7812 ind.m²) was recorded in the center of the reservoir, and the minimum (mean value 9 ind.m²) in the more lacustrine area near the dam. The greatest species richness per sample (24 taxa) was observed in the reservoir upstream (fluvial zone). The maximum diversity (Shannon-Wiener Index) per station/period, 3.82 and 3.86 bits.ind⁻¹, were calculated in the transitional river/reservoir zone during the beginning (August 1999) and in the reservoir central zones in the end (August 2002) of the filling up period, respectively. There was no clear relation between the distribution of the different faunistic groups and the sediment granulometric characteristics. However, the decrease or even total absence of organisms was observed at stations with high organic matter concentration (>40%) in a low degradation state (coarse detritus). This fact may be related to the lack of sediment deposits, which would cause difficulties to the fixation of the benthic fauna. Additionally, in those conditions more reduced chemical conditions are expected in function of the intense decomposition process of the flooded vegetation." (Authors)] Address: Jorcin, A., Depto de Zoologia, Instituto de Biociências, Universidade Estadual Paulista – UNESP, Distrito de Rubião Júnior, CEP 18600-000, Botucatu, SP, Brazil. E-mail: ajorcin@ibb.unesp.br

7843. Jovic, M.; Malidzana, S. (2009): List of dragonflies in the collection of the national History Museum of

Montenegro (Insecta: Odonata). Acta entomologica serbica 14(1): 121-124. (in English) [The Odonata collection of the Natural History Museum of Montenegro totals to 86 specimens representing 28 species. In most cases they were collected during the 2006 and 2007 summer seasons. The list contains about half of all known dragonfly species in Montenegro, including Coenagrion scitulum, which is here recorded for the first time from Montenegro. This species has a wide Mediterranean distribution but is most common in the western part of its range; it is considered a Least Concerned species on the Red List of Mediterranean Odonata (BOUDOT et al., 2009).] Address: Jovic, M., Natural History Museum Belgrade, Njegoševa 51, P.O. Box 401, YU-11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.rs

7844. Jovic, M. (2009): Report on Macedonia 2008 project - Odonata. IDF-Report 21: 1-23. (in English) [Macedonia; in the period from 29 May till 12 June 2008, 34 Odonata species were collected and observed at 38 localities. The list of species e.g. includes Coenagrion ornatum, C. scitulum, C. pulchellum, Ophiogomphus cecilia, and Cordulegaster heros.] Address: Jovic, M., Natural History Museum, Njegoševa 51, P.O. Box 401, 11000 Belgrade, Serbia. email: milos.jovic@nhmbeo.rs

7845. Khrokalo, L.; Prokopov, G. (2009): Review of the Odonata of Crimea (Ukraine). IDF-Report 20: 1-32. (in English) ["A list of 60 Odonata species and their distribution across 109 localities on the Crimean Peninsula is provided. The study is based on a literature review and a field survey between 1999 and 2008. Erythromma lindenii and Epiteca bimaculata are here recorded for the first time from Crimea. Diagnostic morphological characters of Calopteryx splendens taurica and Orthetrum coerulescens anceps are briefly described. Descriptions of typical Crimean habitats of dragonflies are also presented. The necessity of the protection of Crimean freshwater habitats is discussed." (Authors)] Address: Khrokalo, Lyudmilla, Environmental biotechnology and bioenergy Dept, National Technical University of Ukraine "KPI", Kyiv, Ukraine, lkhrokalo@mail.ru

7846. Kim, S.-B.; Oh, H.-S.; Kim, W.-T.; Tadauchi, O. (2009): Phenetic analysis of the Anisoptera (Insecta: Odonata) in Jeju Island, Korea, based on morphological characters. J. Fac. Agr., Kyushu Univ. 54(1): 123-132. (in English) ["This study was conducted from April 2002 to September 2007 to investigate the relationships of 27 species of Anisoptera which were collected in wetlands of Jeju Island, using a phenetic analysis of external morphological characters. The generated phenogram revealed the presence of two superfamilies within Anisoptera, Aeshnoidea and Libelluloidea. Moreover, the three groups, Aeshnidae, Libellulidae and Corduliidae, were clearly branched. As a result, the phenogram was similar to that of the ordinary systematic classification. The Aeshnidae was divided into Anax and Gynacantha, and Polycanthagyna and Aeschnophlebia. Three species of Anax (e.g., guttatus, parthenope and nigrofasciatus) presented to have very similar external morphological characteristics. Particularly, A. guttatus has confused its name, e.g., someone treated it as a synonym with A. parthenope due to the presence of very similar morphological characters. However, major differences were observed in the upper edge of the frons and the anterior femur in these species. Therefore, we obtained

a conclusion that is more valid to classify *A. guttatus* as an independent species rather than as a synonym. The Libellulidae consisted of three subgroups. When the relationship of the genus *Sympetrum* were considered, the key characteristics were determined to be the patterns of the first lateral suture, the second lateral suture and the humeral suture. The Corduliidae was divided into Macromiinae and Cordulinae. Particularly, *Somatochlora graeseri* and *S. clavata* were confirmed to be unregistered species in Jeju Island." (Authors) *Anax parthenope*; *A. nigrofasciatus*; *A. guttatus*; *Gynacantha japonica*; *Polycanthagyna melanictera*; *Aeschnophlebia anisoptera*; *Somatochlora graeseri*; *Somatochlora clavata*; *Epophthalmia elegans*; *Macromia amphigena*; *Lyriothemis pachygastra*; *Orthetrum albistylum*; *O. melania*; *Crocothemis servilia*; *Deilelia phaon*; *Sympetrum striolatum*; *S. darwinianum*; *S. eroticum*; *S. uniforme*; *S. kunkeli*; *S. infuscatum*; *S. risi*; *S. speciosum*; *Pseudothemis zonata*; *Rhyothemis fuliginosa*; *Pantala flavescens*; *Tramea virginia*] Address: Oh, Hong-Shik, Dept of Science Education, Cheju National University, Jeju 690-756, Korea. E-mail: sciedu@cheju.ac.kr

7847. Koch, K.; Quast, M.; Sahlén, G. (2009): Morphological differences in the ovary of Libellulidae (Odonata). *International Journal of Odonatology* 12(1): 147-156. (in English) ["All female Odonata have been assumed to produce oocytes continuously during their mature life span. However, a recent study of ovariole orientation and development led to the suggestion that Libellulidae are divided into two groups of species, one with continuous, the other with stepwise oocyte production. To find more evidence of this division, we compared the size variation and growth within the vitellarium of the ovary, studying oocytes, and follicle cells. We found that morphological characters discriminate between the two ovary types in eight of the 10 investigated species. In both types we found an increase in all measurements from the anterior to the posterior end of the vitellarium. The increase in oocyte width and follicle cell length was significantly higher in species with a continuous oocyte production. We also noted that follicle cells may have more than one nucleus and that their number can vary during vitellogenesis. Our study confirmed the hypotheses that two different ovary types exist in Libellulidae. The two species not fitting into this grouping could be an artefact of small sample size due to intraspecific phenotypic plasticity, or else there might be more than two ovary groups, or even a continuum. We could not offer an explanation as to how the process of stepwise oocyte production differs from continuous based production on morphological characters." (Authors)] Address: Koch, Kamilla, Department of Ecology, Johannes-Gutenberg University of Mainz, Becherweg 13, 55128 Germany. E-mail: kochka@uni-mainz.de

7848. Küry, D. (2009): *Krebsschere* (Stratiotes aloides) in Naturschutzweihern der Schweiz. *Bauhinia* 21: 49-56. (in German, with English summary) ["*S. aloides* is an aquatic macrophyte which colonizes shallow water zones of meso- to eutrophic lakes, lowland rivers and ditches. It is distributed in northern and eastern parts of Central Europe as well as in southern Scandinavia. In the past it has been introduced in other regions of Europe like France and Switzerland. Since several years *S. aloides* has been planted out in newly created ponds where it had rapidly overgrown most of the water surface. By introducing this neophyte conservationists intend to foster the pond fauna. However, the

consequences for the pond ecosystem are disadvantageous. Allelopathic effects inhibit the growth of other hydrophytes and planktic algae. In consequence, faunistic diversity decreases and over-growing increases. The management of ponds should aim at creating habitats similar to the stagnant waters which existed more than 150 years ago, when the floodplains were still natural landscapes." (Author) Special emphasis is given to *Aeshna viridis*, and the disadvantageous effects of *S. aloides* in Swiss waterbodies for dragonflies and additional macrozoobenthic species.] Address: Küry, D., Life Science AG, Greifengasse 7, 4058 Basel, Switzerland. E-mail: daniel.kuery@lifescience.ch

7849. Lehmann, F.-O. (2009): Wing-wake interaction reduces power consumption in insect tandem wings. *Experiments in Fluids* 46(5): 765-775. (in English) ["Insects are capable of a remarkable diversity of flight techniques. Dragonflies, in particular, are notable for their powerful aerial manoeuvres and endurance during prey catching or territory flights. While most insects such as flies, bees and wasps either reduced their hind wings or mechanically coupled fore and hind wings, dragonflies have maintained two independent-controlled pairs of wings throughout their evolution. An extraordinary feature of dragonfly wing kinematics is wing phasing, the shift in flapping phase between the fore and hind wing periods. Wing phasing has previously been associated with an increase in thrust production, readiness for manoeuvrability and hunting performance. Recent studies have shown that wing phasing in tandem wings produces a twofold modulation in hind wing lift, but slightly reduces the maximum combined lift of fore and hind wings, compared to two wings flapping in isolation. Despite this disadvantage, however, wing phasing is effective in improving aerodynamic efficiency during flight by the removal of kinetic energy from the wake. Computational analyses demonstrate that this increase in flight efficiency may save up to 22% aerodynamic power expenditure compared to insects flapping only two wings. In terms of engineering, energetic benefits in four-wing flapping are of substantial interest in the field of biomimetic aircraft design, because the performance of man-made air vehicles is often limited by high-power expenditure rather than by lift production. This manuscript provides a summary on power expenditures and aerodynamic efficiency in flapping tandem wings by investigating wing phasing in a dynamically scaled robotic model of a hovering dragonfly." (Author)] Address: F.-O. Lehmann, F.-O., BioFuture Research Group, University of Ulm, Albert-Einstein-Allee 11, 89081 Ulm, Germany. E-mail: fritz.lehmann@uni-ulm.de

7850. Lencioni, F.A.A. (2009): The genus *Idioneura* (Selys) with description of *I. celioi* spec. nov. (Zygoptera: Protoneuridae). *Odonatologica* 38(1): 1-5. (in English) ["The new species is described from 1 ♂ and ♀♀. Holotype ♂ and allotype ♀: Brazil: São Paulo State, Fazenda Santana do Rio Abaixo (24°14'55"S – 46°00'27"W), alt. 569 m, 30-XI-2002, collected in tandem; deposited in author's collection. It is compared with the original description of *I. ancilla* Selys, 1860 (the type species of the genus) and with specimens identified as that species. Diagnostic illustrations and notes on *Idioneura* distribution and biology are provided." (Author)] Address: Lencioni, F.A.A., Rua Aníbal, 216 – Jardim Coleginho – Jacareí – São Paulo – Brazil - CEP (ZIP) 12310-780. E-mail: odonata@zygoptera.bio.br

7851. Leuthold, W. (2009): Libellen (Odonata) im Neeracherried (Kanton Zürich). Das Artenspektrum und seine Veränderungen in 20 Jahren. Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich 154(1/2): 21-29. (in German, with English summary) [The Odonata of the Neeracherried, a 100 ha marsh in the Canton of Zürich, Switzerland, a total of 42 species was recorded (25 Anisoptera; 17 Zygoptera) – nine species more than were found in a similar study some 20 years ago. "Two then fairly widespread species have apparently disappeared (*Sympetrum flaveolum* and *Lestes dryas*). The differences in species composition are probably due to several factors such as long-term habitat changes, measures of habitat management, changes in distribution of individual species and some differences in the methods of study. – A fairly sizeable population of the critically endangered *Lestes virens* (still) exists in the Neeracherried." (Author)] Address: Leuthold, W., Kinkelstr. 61, CH-8006 Zürich, Switzerland. E-mail: wleuthold@bluewin.ch

7852. Levine, T.D.; Lang, B.K.; Berg, D.J. (2009): Parasitism of mussel gills by dragonfly nymphs. The American Midland Naturalist 162(1): 1-6. (in English) ["Predators of unionoid mussels are generally identified as fishes or aquatic mammals. During a mark and recapture study of the critically endangered mussel *Popeinaias popeii*, we discovered a nymph of the dragonfly *Gomphus militaris* eating the gills of a gravid mussel; larvae and gill material were found in the nymph's gut. Many (15.2%) of the other mussels captured during a quantitative survey exhibited damage consistent with that inflicted by this dragonfly. Few non-gravid mussels were damaged and gravid mussels exhibited substantially more damage in gills used for brooding larvae than in gills not typically used for brooding. This previously unreported parasitic relationship may reflect a unique cost associated with reproduction and should be considered in the development of conservation strategies for *P. popeii*. Our observations underscore the need for basic ecological data when monitoring endangered species." (Authors)]

7853. Li, Z.-x.; Shen, W.; Tong, G.-s.; Tian, J.-m.; Yu-Quoc, L. (2009): On the vein-stiffening membrane structure of a dragonfly hind wing. Journal of Zhejiang University Science A 10(1): 72-81. (in English) ["Aiming at exploring the excellent structural performance of the vein-stiffening membrane structure of dragonfly hind wings, we analyzed two planar computational models and three 3D computational models with cambered corrugation based on the finite element method. It is shown that the vein size in different zones is proportional to the magnitude of the vein internal force when the wing structure is subjected to uniform out-of-plane transverse loading. The membrane contributes little to the flexural stiffness of the planar wing models, while exerting an immense impact upon the stiffness of the 3D wing models with cambered corrugation. If a lumped mass of 10% of the wing is fixed on the leading edge close to the wing tip, the wing fundamental frequency decreases by 10.7%~13.2%; if a lumped mass is connected to the wing via multiple springs, the wing fundamental frequency decreases by 16.0%~18.0%. Such decrease in fundamental frequency explains the special function of the wing pterostigma in alleviating the wing quivering effect. These particular features of dragonfly wings can be mimicked in the design of new-style reticulately stiffening thin-walled roof systems and flapping

wings in novel intelligent aerial vehicles." (Authors)] Address: Li, Z.-x., 1Institute of Structural Engineering, Zhejiang University, Hangzhou 310058, China. E-mail: lizx19993@zju.edu.cn

7854. Locklin, J.L.; Vodopich, D.S. (2009): Bidirectional gender biases of gregarine parasitism in two co-existing dragonflies (Anisoptera: Libellulidae). Odonatologica 38(2): 133-140. (in English) ["Parasitism affects all taxa and influences individual and population success. Parasitism of adult dragonflies is widespread and frequently includes gregarine (Apicomplexa) life stages in the gut of the host. This research investigates variation in gregarine parasite prevalence and load in male versus female adults of *Erythemis simplicicollis* and *Brachymesia gravida* associated with 2 central Texas reservoirs in close proximity. Parasite prevalence was biased toward male *E. simplicicollis* and toward female *B. gravida*. Results suggest that gender bias in parasite prevalence is influenced by gender behaviour and environment more so than by immuno-response differences between genders." (Authors)] Address: Locklin, J.L., Dept of Biology, Baylor University, One Bear Place 76798, Waco, TX 97388, USA. E-mail: jasonlocklin@baylor.edu

7855. Machado, A.B.M. (2009): Denticulobasis and Tuberculobasis, new genera close to Leptobasis, with description of ten new species (Odonata: Coenagrionidae). Zootaxa 2108: 1-36 (2009): 1-36. (in English) ["Two new genera, Denticulobasis and Tuberculobasis, are described. Denticulobasis contains three species: *D. dunklei* sp. nov. from Loreto, Peru, and *D. garrisoni* sp.nov. and *D. ariken* sp. nov. from Rondônia, Brazil. Tuberculobasis includes 12 species, all from South America, seven of which are new, viz.: *T. arara* sp. nov. from Rondônia, Brazil, *T. geijskesi* sp. nov. from Suriname, *T. guarani* sp. nov. from São Paulo, Brazil, *T. karitiana* sp. nov. from Rondônia, Brazil, *T. macuxi* sp. nov. from Roraima, Brazil, *T. tirio* sp. nov. from Pará, Brazil, and *T. williamsoni* sp. nov. from Colombia and Venezuela. Five species are herein transferred from Leptobasis Selys, 1877 to Tuberculobasis: *L. cardinalis* (Fraser, 1946), *L. costalimai* Santos, 1957, *L. inversa* Selys, 1876, *L. mammilaris* Calvert, 1909, and *L. yanomami* De Marmels, 1992. The new genera are close to Leptobasis; differences between them are analyzed and their diagnostic characters are described. In addition, diagnostic characters of females of three species of Tuberculobasis, most likely new, are illustrated but they are not named. A key for males and females of Tuberculobasis is provided, and an attempt to understand their life cycle is made." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Caixa Postal 486, BR 31270-901, Belo Horizonte, Minas Gerais, Brasil. E-mail: angelo@icb.ufmg.br

7856. Manger, R.; Dingemanse, N.J. (2009): Adult survival of *Sympecma paedisca* (Brauer) during hibernation (Zygoptera: Lestidae). Odonatologica 38(1): 55-59. (in English) ["The survival of hibernating adults was assessed in its winter habitat in the Netherlands to gain insight in the potential importance of this life-history phase for the population dynamics of this endangered species Compared to other Odonata, monthly survival rates (Dec. 2004 - March 2005) were high (mean \pm SE = 0.75 \pm 0.08), but overall winter survival was low (0.42). Potential causes of mortality during hibernation

are discussed. The results imply that effective protection of this species in the Netherlands may benefit from protection of both its breeding and wintering habitat.] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen, The Netherlands. E-mail: rmanger@planet.nl

7857. Marinov, M. (2009): Spatial modelling of dragonfly habitats in New Zealand (Odonata: Insecta). Dissertation. Master of Applied Sciences, Lincoln Univ., Christchurch, New Zealand: VI, 50 pp., 15 app. (in English) ["While New Zealand is poor in Odonata species the seventeen species thus far established have great natural importance (Moore 1989). Ten of them are endemic to the islands representing the country. Those include four genera known to occur only in this part of the world (Rowe 1987). This poses a great responsibility on New Zealand to protect this natural treasure. Damselflies and dragonflies are considered well protected within the national parks, but the loss of habitats could severely impact them in the future. This suggests that a habitat assessment should be prepared for the whole country that will serve as base-line data set for monitoring the development of the natural environment for the Odonata species in New Zealand. Fourteen species have been selected for this analysis. Their biological features and ecological requirements were considered in preparing a working habitat assessment methodology. Habitat models were developed using ArcGIS 9.2 software. Multistep spatial analysis was carried out to reclassify the layers containing the important information on the land topology representing crucial elements in the Odonata species habitats. The final outputs are individual species maps where the New Zealand territory is marked with four different colour classes corresponding to the ranks of importance that each area is considered to have for individual species. The models are named probabilistic in that they reveal the areas where the ecological demands of the species are approached at a maximum level. However, they should not be used as distribution maps. Probabilistic models are contrasted against deterministic models used in other Odonata habitat models. The strengths and weaknesses are discussed and some important conclusions and recommendations are described and suggested." (Author)] Address: Marinov, M., 5/160 Rossall Str., Merivale, Christchurch, New Zealand. E-mail: mgmarinov@mail.bg

7858. McMeeking, RM; Ma, LF; Arzt, E. (2009): Mechanism maps for frictional attachment between fibrillar surfaces. *Journal of applied mechanics - Transactions of the ASME* 76(3)(Art. No. 031007): 8 pp. (in English) ["The mechanics of frictional attachment between surfaces with pillars, inspired by the head fixation system of dragonflies, is analyzed. The system consists of two surfaces of interdigitating pillars held together through friction, as by the densely packed bristles of two brushes when pressed together. The adhesive strength of the system is promoted by high elastic modulus, high friction coefficient, large aspect ratio, and dense packing of the fibers. However, the design is limited by the compressive buckling, the compressive indentation or cracking of the contacting pillars, yielding in shear or similar mechanisms that limit the achievable friction stress, and tensile failure of the pillars upon pull-out. Maps, which summarize the strength of the adhesive system and the failure limits and illustrate the trade-off among the design parameters, are presented. Case studies for steel, nylon, and ceramic pillars show that

useful strength can be achieved in such attachments; when buckling during assembly and contact failure can be avoided, adhesive performance as high as 30% of the tensile strength of the pillar material may be possible." (Authors)] Address: Arzt, E., Leibniz Institute for New Materials (INM), Campus D2 2, 66123 Saarbrücken, Germany

7859. McPeck, M.A.; Shen, L.; Farid, H. (2009): The correlated evolution of three-dimensional reproductive structures between male and female damselflies. *Evolution* 63(1): 73-83. (in English) ["For many taxa, species are defined by the morphologies of reproductive structures. In many odonates, these structures are the cerci of males (used to hold females during mating) and the thoracic plates of females where the male cerci contact the females' bodies. A previous study showed that the shapes of cerci of *Enallagma* males (Zygoptera: Coenagrionidae) are best explained by an evolutionary model of punctuated change at the time of speciation, with a homogeneous rate of change across the entire phylogeny of the genus. In the present study, we examine the evolution of shape change in the corresponding female plates. We found that, like male cerci, the shapes of *Enallagma* female thoracic plates could best be explained by an evolutionary model of punctuated change at the time of speciation, with a homogeneous rate of change across the clade. Moreover, the evolutionary contrasts quantifying the rates of change in male cerci and female thoracic plates were positively related across the history of the clade, demonstrating that these male and female structures evolve in a correlated fashion. This pattern of evolution suggests that these structures are primary signals of species identity during mating." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

7860. Muzón, J.; Weigel Munoz, S.; Campos, R. (2009): Description of the bromeliad-dwelling final instar larva of *Leptagrion andromache* Hagen in Selys (Zygoptera: Coenagrionidae). *Zootaxa* 2089: 65-68. (in English) [Specimens examined: 3 males 2 females, reared final instar larvae; Argentina, Misiones province, Parque Nacional Iguazu, 25°39'S, 54°18'W, October to November 2005, leg., R. Campos and M. Mogi. All specimens deposited in the collection of the Departamento Entomología, Museo de La Plata.] Address: Muzón, J., Instituto de Limnología "Dr. R. A. Ringuelet" (CONICET - CCT La Plata), C.C. 712, 1900, La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

7861. Møller, A.P.; Mousseau, T.A. (2009): Reduced abundance of insects and spiders linked to radiation at Chernobyl 20 years after the accident. *Biology letters* 5(3): 356-359. (in English) ["Effects of low-level radiation on abundance of animals are poorly known. We conducted standardized point counts and line transects of bumble-bees, butterflies, grasshoppers, dragonflies and spider webs at forest sites around Chernobyl differing in background radiation by over four orders of magnitude. Abundance of invertebrates decreased with increasing radiation, even after controlling for factors such as soil type, habitat and height of vegetation. These effects were stronger when comparing plots differing in radiation within rather than among sites, implying that the ecological effects of radiation from Chernobyl on animals are greater than previously assumed. [...] The total number of dragonflies was 105 during

point counts, with abundance decreasing significantly with radiation, time of day and habitat." (Authors)] Address: Møller, A.P., Department of Biological Sciences, University of South Carolina, Columbia, SC 29208, USA. E-mail: anders.moller@u-psud.fr

7862. Nagel, L.; Robb, T.; Forbes, M.R. (2009): Parasite-mediated selection amidst marked inter-annual variation in mite parasitism and damselfly life history traits. *Ecoscience* 16(2): 265-270. (in English) ["Parasite-mediated selection in host populations is thought to vary in magnitude temporally. We monitored variation in life history traits that are known or suspected to influence fitness in a population of damselflies parasitized by larval water mites. Mite prevalence and intensity varied considerably over 5 y and was often higher in females. Prevalence and intensity were highest in the years when the damselfly emergence periods were early and of short duration, which also corresponded to damselflies emerging at larger sizes. Mites appeared to exert negative effects on apparent survival in some years only, and only for females, suggesting that parasite-mediated selection on damselflies is variable and dependent on other factors such as emergence times, weather, and sex and body size of hosts." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

7863. Nanao, J.; Kubo, H.; Bockel, A. (2009): Wohin fliegst du, kleine Libelle? Sauerländer-Verlag. ISBN 978-3-7941-9142-0: 24 pp. (in German) [This children book was first published 2002 in Japan under the title 'Niramekko' by Kaisei-sha Publishing Co. Wording is from Jun Nanao and photographs from Hidekazu Kubo. The German translation of the Japanese original was realised by Antje Bockel. This book is a brief introduction into biodiversity portraying many arthropods "seen" with the eyes of a Zygoptera.] Address: www.sauerlaender.de

7864. Nel, A. (2009): A new Odonata family from the Jurassic of Central Asia (Odonata: Epiproctophora). *Journal of Natural History* 43(1-2): 57-64. (in English) ["The new damsel-dragonfly family Paragonophlebiidae is described based on a new genus and two new species from the Middle-Late Jurassic of Central Asia." (Author)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

7865. Ninomiya, T.; Yoshizawa, K. (2009): A revised interpretation of the wing base structure in Odonata. *Systematic Entomology* 34(2): 334-345. (in English) ["Homology of the wing base structure in the Odonata is highly controversial, and many different interpretations of homology have been proposed. In extreme cases, two independent origins of insect wings have been suggested, based on comparative morphology between the odonate and other pterygote wing bases. Difficulties in establishing homology of the wing base structures between Odonata and other Pterygota result mainly from their extreme differences in morphology and function. In the present paper, we establish homology of the wing base structures between Neoptera, Ephemeroptera and Odonata using highly conservative and unambiguously identifiable characters (the basal wing hinge and subcostal veins) as principal landmarks. Homology of the

odonate wing base structure with those of Ephemeroptera and Neoptera can be identified reliably. Based on this interpretation, the ancestral condition of the insect wing base structure is discussed." (Authors)] Address: Yoshizawa, K., Systematic Entomology, Graduate School of Agriculture, Hokkaido University, Sapporo 060-8589, Japan. E-mail: psocid@res.agr.hokudai.ac.jp

7866. Novelo-Gutiérrez, R.; Gómez-Anaya, J.A. (2009): A comparative study of Odonata (Insecta) assemblages along an altitudinal gradient in the Sierra de Coalcomán Mountains, Michoacán, Mexico. *Biodivers. Conserv.* 18: 679-698. (in English) ["Odonate diversity in the Coalcomán Mountain Range (CMR), Michoacán State, Mexico, was surveyed, and samplings were made during 2 years in eight streams along an altitudinal gradient. Presence-absence data were analyzed using non-parametric and parametric methods. Beta and gamma diversities were estimated using Whittaker's and Lande's formulae, respectively. A total of 2,526 adults and 489 larvae were captured, yielding 116 species (c diversity), 44 genera and 9 families. 5 new species were discovered. The genus *Argia* was the most important contributor to Zygoptera diversity and total richness (c diversity), yielding 40.4 and 14.7%, respectively. The non-parametric estimator Chao2 provided the closest theoretical estimate of species richness, and Clench's model fit the data well (R² ranged from 99.44 to 99.99) to explain a high proportion of the variance (98.8). We conclude that beta diversity is important at the landscape scale, supporting the hypothesis that Mexico is a beta diverse country. Our results triple the number of known species of Odonata for Michoacán. Given the considerable richness of odonates at local and landscape scales, our results support the proposal of the Coalcomán Mountain Range as a priority area for conservation and related research." (Authors)] Address: Novelo-Gutiérrez, R., Depto de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: novelor@ecologia.edu.mx

7867. Oberholster, P.J.; Botha, A.-M.; Ashton, P.J. (2009): The influence of a toxic cyanobacterial bloom and water hydrology on algal populations and macroinvertebrate abundance in the upper littoral zone of Lake Krugersdrift, South Africa. *Ecotoxicology* 18(1): 34-46. (in English) ["The biological interactions and the physical and chemical properties of the littoral zone of Lake Krugersdrift were studied for a 4-month period when a dense, toxic cyanobacterial bloom dominated by *Microcystis aeruginosa* was present in the main lake basin. The presence of a toxic strain of *M. aeruginosa* was confirmed through the use of ELISA and molecular markers that detect the presence of the *mcyB* and *mcyD* genes of the *mcy* gene cluster that synthesizes microcystin. An increase in *Microcystis* toxicity at sites dominated by the cyanobacterial scum was accompanied by an increase in total abundance of the macroinvertebrate families Hirudinae, Chironomidae, and Tubificidae. Sites located away from the cyanobacterial scum had a lower abundance but a higher diversity of macroinvertebrates (including Coenagrionidae). The water quality under the *Microcystis* scum was characterized by low pH values, low concentrations of dissolved oxygen, and lower total alkalinity values. The periphytic alga *Ulothrix zonata* was absent in areas dominated by the cyanobacterial scum, possibly as a result of overshadowing by the scum or direct toxic al-

lelopathic effects on growth and photosynthesis. The diatom *Diatoma vulgare* dominated the benthic algal flora beneath the cyanobacterial scum." (Authors)] Address: Oberholster, P.J., CSIR Natural Resources and the Environment, PO Box 395, Pretoria ZA0001, South Africa. E-mail: anna.oberholster@up.ac.za

7868. Obolewski, K.; Głinska-Lewczuk, K.; Kobus, S. (2009): An attempt at evaluation the influence of water quality on the qualitative and quantitative structure of epiphytic fauna dwelling on *Stratiotes aloides* L., a case study on an oxbow lake of the Lyna river. *J. Elementol.* 14(1): 119-134. (in English, with Polish summary) ["The paper contains the results of a study on the dependence of the qualitative and quantitative structure of the phytophilous macrofauna dwelling on *S. aloides* (water soldier) on the quality of waters in a lentic oxbow lake of the Lyna River. The observations were carried out during the vegetative season (April – June) 2006 at high and moderate water levels. During the study, a total of 18 taxa of invertebrates dwelling on the above plant species were identified, with the exact number of taxa varying in time: 11 taxa were noticed in April and May, and in June their number went up to 13. The examination of hydrochemical parameters of the oxbow lake waters revealed that the density of macrofauna was lower at higher values of proper conductivity and macronutrients, ammonia nitrogen and COD, increasing at high levels of sulphates. High concentrations of ammonia nitrogen and non-organic components coincided with decreased biomass of epiphytic animals on water soldier. Additionally, it has been observed that elevated concentrations of potassium ions have a negative influence on the biomass of most epiphytic animals (except *Erbodella* sp.)." (Authors) The biomass of Odonata is considered in tables and graphs.] Address: Obolewski, K., Chair of Land Reclamation and Management, University of Warmia and Mazury, pl. Łódzki 2, Olsztyn-Kortowo 10-719, Poland. E-mail: obolewsk@apsl.edu.pl

7869. Parkes, K.A.; Amos, W.; Moore, N.W.; Hoffman, J.I.; Moore, J. (2009): Population structure and speciation in the dragonfly *Sympetrum striolatum* / *nigrescens* (Odonata: Libellulidae): An analysis using AFLP markers. *Eur. J. Entomol.* 106(2): 179-184. (in English) ["There has been a long-standing debate as to whether *Sympetrum striolatum* (Charpentier, 1840) and the darker northern form, *S. nigrescens* (Lucas, 1912) should be recognised as separate species of dragonfly. Here we address this question using genetic analysis based on AFLP markers and samples collected from sites across the species' United Kingdom range. The program STRUCTURE finds no support for specific status. Instead, it reveals strong patterns of divergence between populations sampled from Scottish islands and those on the mainland, suggesting that salt water is a major barrier to gene flow. Thus, the dark form is quite likely to reflect a beneficial polymorphism that allows individuals to take advantage of short periods of warmer weather. Our AFLP markers appear to be very rapidly evolving, showing little or no overlap between congeneric species, and hence are ideally suited to answering questions relating to the levels of gene flow among populations within species." (Authors)] Address: Parkes, K.A., Dept of Zoology, Univ. Cambridge, Downing Str., Cambridge, CB2 3EJ, UK. E-mail: jih24@cam.ac.uk

7870. Paulson, D. (2009): *Dragonflies and Damselflies of the West*. Princeton University Press: 536 pp. (in

English) [This book is the first fully illustrated field guide to all 348 species of Odonata in western North America. Every species is generously illustrated with 863 full-colour photographs and a distribution map, and structural features are illustrated where they aid in-hand identification. Detailed species accounts include information on size, distribution, flight season, similar species, habitat, and natural history. Dennis Paulson's introduction provides an essential primer on the biology, natural history, and conservation of Odonata along with helpful tips on how to observe and photograph them.] Address: <http://press.princeton.edu/titles/8871.html>

7871. Paulson, D. (2009): Larval Tiger Beetles eat dragonflies. *Argia* 21(2): 13. (in English) [On 9-V-2009 at Red Slough Wildlife Management Area, McCurtain County, Oklahoma, USA, two mature male *Erythemis simplicicollis* were found that had been captured by larval tiger beetles (*Cicindela* sp.).] Address: Paulson, D. R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

7872. Pinto, A.P.; Carvalho, A.L. (2009): On a small collection of dragonflies from Barcarena Municipality, Pará State, Brazil, with the rediscovery of *Acanthallagma luteum* Williamson & Williamson. *Bulletin of American Odonatology* 11(1): 11-16. (in English, with Spanish summary) ["A small series of 42 specimens of Odonata from the Barcarena municipality, northern Brazil, is brought on record. 18 species belonging to the families Calopterygidae, Coenagrionidae, and Libellulidae were identified. The rare species *Acanthallagma luteum* Williamson & Williamson is reported for the first time after its description and represents the first record of the genus from Pará state. In addition we provide taxonomic remarks on the Libellulidae *Erythrodiplax fusca* (Rambur), *Gynothemis pumila* (Karsch), *Orthemis ferruginea* (Fabricius) and *Zenithoptera lanei* Santos." (Authors) A distribution map of the 3 species of genus *Acanthallagma* and photographs of *A. luteum* are also presented.] Address: Carvalho, A.L., Laboratório de Biologia e Sistemática de Odonata, Depto de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão 20940-040, Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

7873. Poornima, V.; Mathai, M.T.; Inbaraj, R.M. (2009): Analysis of ecdysterone in *Bradinopyga geminata* (Rambur) larvae by reverse phase - high performance liquid chromatography, RP-HPLC (Anisoptera: Libellulidae). *Odonatologica* 38(1): 61-65. (in English) ["Ecdysterone or 20-hydroxyecdysone (20E) is a polyhydroxylated ecdysone that plays a major role in insect growth and metamorphosis. The 20E level was analyzed in 2 larval instars of the dragonfly using RP-HPLC. The presence of 20E was demonstrated for the first time in dragonflies, with the higher levels occurring in the older larval instar (larger larvae), while in the younger instar (smaller larvae) low or negligible levels were recorded. This has implications for extending the use of odonate larvae as biocontrol agents in aquatic ecosystems." (Author)] Address: Poornima, V., Dept Zoology, Madras Christian College (Autonomous), Tambaram, Chennai-600059, India. E-mail: inbarajmoses2004@yahoo.com

7874. Rae, S. (2009): *Dragonflies*. *Bandicoot times*. Newsletter of the Hobart Bushcare Groups 33 (Winter 2009): 6, 8. (in English) [Brief general account on Tas-

manian Odonata.] Address: <http://www.hobart-city.tas.gov.au/hccwr/assets/main/lib60033/bandicoot%20times%20-%20winter%202009.pdf>

7875. Reece, B.A.; McIntyre, N.E. (2009): Community assemblage patterns of odonates inhabiting a wetland complex influenced by anthropogenic disturbance. *Insect Conservation and Diversity* 2(2): 73-80. (in English) ["1. Many wetland complexes around the world are highly influenced by human activity (chiefly land conversion for agriculture). Measuring the impact of such activity hinges not only upon using appropriate wetland indicator taxa but also upon metrics that are sensitive enough to capture subtle effects. 2. Over a 5-year period, we quantified the distribution and community structure of odonates occupying a wetland complex in Texas. When using traditional community metrics, there were no significant differences in diversity or evenness in the odonate assemblages in wetlands surrounded by the two dominant regional forms of land use (tilled cropland and grassland). Similarity analyses likewise failed to detect any significant differences in odonate community composition with land use. 3. Discriminant function analysis, however, revealed that species co-occurrences could be distinguished on the basis of surrounding land use, which indicates that odonate assemblages in these wetlands are structured in a manner that typical community metrics fail to adequately describe. 4. Differences between the approaches are discussed, particularly with regard to the use of presence-absence data." (Authors)] Address: McIntyre, Nancy, Department of Biological Science, Texas Tech University, Lubbock, TX 79409-3131, USA. E-mail: nancy.mcintyre@ttu.edu

7876. Reece, B.A.; McIntyre, N.E. (2009): Odonata of Playas in the southern high plains, Texas. *The Southwestern Naturalist* 54(1): 96-99. (in English, with Spanish summary) ["Playas represent the only natural source of above-ground freshwater in the southern High Plains of North America; there are >20,000 such wetlands in the Panhandle of Texas (area of the highest concentration of playas). Many organisms use these small, ephemeral ponds during some stage of their life histories; [...] of this otherwise semi-arid region require these aquatic habitats for larval development. Relatively few distributional records have been established for Odonata in this region, so we conducted a baseline survey to assess distributional patterns of odonates in playas. 5 seasons of observation and collection yielded important presence-absence data, resulting in 110 county records for the 16 counties in the study area." (Authors)] Address: Reece, B.A., Dept of Biological Sciences, Texas Tech University, Lubbock, TX 79409-3131, USA. E-mail: b.reece@ttu.edu

7877. Reinhardt, K. (2009): Book Review: Die Falkenlibellen Europas. Corduliidae. Wildermuth, H. 2008. Neue Brehm-Bücherei, Westarp Wissenschaften Hohenwarsleben. ISBN 3 89432 896 7. *Antenna* 33(2):110. (in English) [Extensive book review.] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

7878. Remsburg, A.J.; Turner, M.G. (2009): Aquatic and terrestrial drivers of dragonfly (Odonata) assemblages within and among north-temperate lakes. *J. N. Am. Benthol. Soc.*, 2009, 28(1):44-56: 44-56. (in English) ["The physical structure of vegetation influences di-

versity, interactions, movement, and thermoregulation of animals. Vegetation structure might be a good indicator of habitat requirements of generalist predators, such as Odonata, and thereby affect species diversity. Odonates use aquatic and terrestrial habitats during larval and adult life stages, respectively, but the relative importance of vegetation in these habitats is poorly understood. We compared how aquatic and riparian habitat variables affected odonate larvae from 41 sites (each 30 m in shoreline length) on 17 lakes in northern Wisconsin. We used principal components analyses to reduce multiple habitat variables to 2 lakelevel axes (lake size and development, lake wetlands and predators), 2 site-level littoral axes (littoral macrophytes, littoral muckiness), and 2 site-level riparian axes (riparian structural complexity, riparian tall wetland plants). Most (61.6%) of the variance in larval species richness occurred at the site level. Density of the most abundant family, Gomphidae, was positively related to riparian tall wetland plants, whereas species richness was positively correlated with abundance of littoral macrophytes (on the basis of multiple linear regression with an information theoretic approach). Surveys in 18 paired littoral microsites in 9 lakes indicated that larvae from the clasper and sprawler behavioral guilds were most abundant in microsites with submerged macrophytes. However, predation risk, assessed by tethering larvae in patches of submerged macrophytes, did not differ between habitats with and without macrophytes. We tested whether shoreline plants affected recruitment from the adult stage by comparing adult odonate behaviors in response to 2 riparian vegetation treatments. Adult damselfly abundance was higher where we placed potted wetland plants than at manicured lawns without tall vegetation. Our results indicate that odonate larvae might be influenced by vegetation structure in both aquatic and riparian habitats and demonstrate how animals with complex life histories link aquatic and terrestrial communities." (Authors)] Address: Remsburg, Alys, Biodiversity Center, Unity College, Unity, Maine 04988 USA. E-mail: aremsburg@unity.edu

7879. Rojas-R., N.C.; Sánchez, M. (2009): New records of *Acanthagrion* (Odonata: Coenagrionidae) from Colombia. *Bulletin of American Odonatology* 11(1): 17-19. (in English, with Spanish summary) ["7 species of *Acanthagrion*, *A. abunae*, *A. adustum*, *A. inexpectum*, *A. minutum*, *A. vidua*, *A. peruvianum*, and *A. viridescens*, are newly reported from Colombia and characters that differ from the original descriptions are mentioned, thus expanding their known variability." (Authors)] Address: Sánchez, Melissa, Museo de Historia Natural, Universidad de los Andes, Bogotá, Colombia. A. A. 4976 Bogotá, Colombia. E-mail: mel-sanc@uniandes.edu.co

7880. Rose, J.S. (2009): Dragonfly Days 2009. *Argia* 21(2): 3-4. (in English) [60 Odonata species were recorded along the Dragonfly Days at 23-25-V-2009 held in Texas, USA and spotting several regional localities for Odonata. The activities resulted e.g. in a first sighting of *Leptobasis vacillans* for USA.] Address: E-mail: opihi@rgv.rr.com

7881. Sarzetti, L.C.; Labandeira, C.C.; Muzón, J.; Wilf, P.; Cúneo, N.R.; Johnson, K.R.; Genise, J.F. (2009): Odonatan endophytic oviposition from the Eocene of Patagonia: The ichnogenus *Paleoovoidus* and implications for behavioral stasis. *Journal of Paleonto-*

logy 83(3): 431-447. (in English) ["We document evidence of endophytic oviposition on fossil compression / impression leaves from the early Eocene Laguna del Hunco and middle Eocene Río Pichileufú floras of Patagonia, Argentina. Based on distinctive morphologies and damage patterns of elongate, ovoid, lens-, or teardrop-shaped scars in the leaves, we assign this insect damage to the ichnogenus *Paleoovoidus*, consisting of an existing ichnospecies, *P. rectus*, and two new ichnospecies, *P. arcuatum* and *P. bifurcatus*. In *P. rectus*, the scars are characteristically arranged in linear rows along the midvein; in *P. bifurcatus*, scars are distributed in double rows along the midvein and parallel to secondary veins; and in *P. arcuatum*, scars are deployed in rectilinear and arcuate rows. In some cases, the narrow, angulate end of individual scars bear a darkened region encompassing a circular hole or similar feature indicating ovipositor tissue penetration. A comparison to the structure and surface pattern of modern ovipositional damage on dicotyledonous leaves suggests considerable similarity to certain zygopteran Odonata. Specifically, members of the Lestidae probably produced *P. rectus* and *P. bifurcatus*, whereas species of Coenagrionidae were responsible for *P. arcuatum*. Both Patagonian localities represent an elevated diversity of potential fern, gymnosperm, and especially angiosperm hosts, the targets of all observed oviposition. However, we did not detect targeting of particular plant families. Our results indicate behavioral stasis for the three ovipositional patterns for at least 50 million years. Nevertheless, synonymy of these oviposition patterns with mid-Mesozoic ichnospecies indicates older origins for these distinctive modes of oviposition." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@iilpla.edu.ar

7882. Schouten, M.A.; Verweij, A.; Barendregt, A.; Kleukers, R.M.J.C.; Kalkman, V.J.; de Ruiter, P.C. (2009): Determinants of species richness patterns in the Netherlands across multiple taxonomic groups. *Biodiversity and Conservation* 18: 203-217. (in English) ["We examined the species richness patterns of five different species groups (mosses, reptiles and amphibians, grasshoppers and crickets, dragonflies, and hoverflies) in the Netherlands (41,500 km²) using sampling units of 5 × 5 km. We compared the spatial patterns of species richness of the five groups using Spearman's rank correlation and used a stepwise multiple regression generalized linear modelling (GLM) approach to assess their relation with a set of 36 environmental variables, selected because they can be related to the several hypotheses on biodiversity patterns. Species richness patterns of the five groups were to a certain extent congruent. Our data suggest that environmental heterogeneity (in particular habitat heterogeneity) is one of the major determinants of variation in species richness within these five groups. We found that for taxonomic groups comprising a low number of species, our regression model explained more of the variability in species richness than for taxonomic groups with a large number of species." (Authors)] Address: Schouten, M.A., Department of Environmental Sciences, Copernicus Institute for Sustainable Development and Innovation, Utrecht University, P.O. Box 80115, 3508 TC Utrecht, The Netherlands. E-mail: m.a.schouten@uu.nl

7883. Schultz, T.D. (2009): Diversity and habitats of a prairie assemblage of Odonata at Lostwood National

Wildlife Refuge, North Dakota. *Journal of the Kansas Entomological Society* 82: 91-102. (in English) ["An inventory of the Odonata at the Lostwood National Wildlife Refuge (LNWR) was conducted during the summer of 2003. Adult censuses and larval sampling at 32 wetland sites produced 10 dragonfly and 14 damselfly species that were resident in the refuge. In 2006, two additional species were added. The odonate fauna of LNWR consisted primarily of widespread, common species that are adapted to fishless lentic communities and tolerant of alkaline and impermanent water regimes. *Enallagma annexum*, *E. boreale*, *Lestes disjunctus*, *L. congener*, *Sympetrum costiferum*, and *S. internum* were the most abundant odonates at the refuge. The odonate communities of semipermanent, oligosaline ponds were the most diverse and included species of *Aeshna*, *Anax*, *Libellula*, *Leucorrhinia*, *Sympetrum*, *Lestes*, *Coenagrion*, *Enallagma*, *Ischnura*, and *Nehalennia*. Large polysaline lakes were inhabited only by *Ischnura damula* and four species of *Enallagma*. Seasonal ponds that remained flooded until mid-July produced large numbers of *S. internum*, *L. disjunctus*, and *L. unguiculatus*. Spring-fed bogs and fens supported several species that were rare at the refuge including *Sympetrum danae*, *S. semicinctum*, and *Amphiagrion abbreviatum*. Long-term monitoring of odonate diversity and abundance may be useful in tracking the effects of climate change in the prairie pothole region but must take into account yearly fluctuations due to variation in winter and summer precipitation." (Author)] Address: Schultz, T.D., Department of Biology, Denison University, Granville, OH, USA 43023 Schultz@denison.edu

7884. Simaika, J.P. (2009): Diversity of Nature's Valley damselfly and dragons: Groot river. *Nature's news* (Newsletter of the Nature's Valley Trust) 25: 4-6. (in English) [The paper gives a brief introduction to the 14 species recorded at the Groot River so far. Nearly half are endemic to South Africa, and of these, four are restricted to the southern Cape.] Address: www.naturesvalleytrust.co.za

7885. Simaika, J.P.; Samways, M.J. (2009): Reserve selection using Red Listed taxa in three global biodiversity hotspots: Dragonflies in South Africa. *Biological Conservation* 142(3): 638-651. (in English) ["The Red List can be used as a gauging tool by conservationists to assess which species require focused conservation attention. Mapping the relative distributions of species, and identification of centers of richness, endemism and threat are a first step towards site-oriented conservation action. We use here a specially developed biodiversity index, based on three weighted sub-components assigned to each species: geographical distribution, Red List status, and sensitivity to habitat change. We test this approach using what is called here the Dragonfly Biotic Index (DBI) to prioritize sites for conservation action, with special emphasis on species occurrence in three global hotspots in southern Africa. Using a selected set of the 23 top prioritized sites, we compare the DBI's performance to that of a rarity-complementarity algorithm. As with several other taxa, local endemism levels are highest in the Cape Floristic Region (CFR), while richness is highest in the north east, particularly in the stream systems of the Maputland-Pondoland-Albany (MPA) hotspot. Red Listed Odonata species are also concentrated in the CFR, while richness is highest in the MPA hotspot. Site prioritization using the DBI reveals that CFR sites protect Red Listed taxa rather well,

despite the fact that catchments are only partially protected. The DBI demonstrates high levels of redundancy in representing Red Listed species, in other words, the same species are represented in several catchments. The value in the DBI thus lies in maximizing redundancy (i.e. representation) of globally Red Listed species. The rarity-complementarity algorithm represents all species, but without greater emphasis on the rare and threatened (i.e. Red Listed) species. We conclude that the DBI is of great value in selecting biodiversity hotspots, while the algorithm is useful for selecting complementarity hotspots. We identify protection gaps and thus recommend continued searches in centers of endemism and existing reserves, as well as gap areas. These searches will hone Red List assessments and identify priority sites, as well as monitor already-identified sites for changes in quality of habitat." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7886. Simaika, J.P.; Samways, M.J. (2009): An easy-to-use index of ecological integrity for prioritizing freshwater sites and for assessing habitat quality. *Biodiversity and Conservation* 18(5): 1171-1185. (in English) ["Prioritizing and assessing the condition of sites for conservation action requires robust and ergonomic methodological tools. We focus here on prioritizing freshwater sites using two promising biodiversity indices, the Dragonfly Biotic Index (DBI) and Average Taxonomic Distinctness (AvTD). The AvTD had no significant association with either species richness or endemism. In contrast, the DBI was highly significantly associated with species richness and endemism, although the strengths of the associations were weak. These associations are related to how the sub-indices in the DBI are weighted, and how species are distributed geographically. Additionally, the DBI was found to be very useful for site selection based on its ability to measure ecological integrity, combined with level of threat, at multiple spatial scales. The AvTD was found to be useful principally for regional use. As the DBI is a low-cost, easy-to-use method, it has the additional use as a method for assessing habitat quality and recovery in restoration programs. The DBI operates at the species level, and is therefore highly sensitive to habitat condition and has great potential for environmental assessment and monitoring freshwater biodiversity and quality. Practical, worked examples of river restoration are given here. In view of the ease and versatility by which the DBI can be employed, we recommend its testing and possible integration into freshwater management and conservation schemes elsewhere in the world." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7887. Slos, S.; Meester, L.D.; Stoks, R. (2009): Behavioural activity levels and expression of stress proteins under predation risk in two damselfly species. *Ecological Entomology* 34(3): 297-303. (in English) ["1. It has become apparent that predators may strongly decrease prey fitness without direct contact with the prey, as they induce the development of defence systems that limit the availability of energy for growth and reproduction. Recent studies suggest that stress proteins may help prey organisms deal with this stress. The pattern is not general, however, and little is known about species differences in physiological traits in coping with

predator stress, and covariation of physiological with other antipredator traits. 2. To explore these issues, we quantified levels of constitutive and fish-induced stress proteins (Hsp60 and Hsp70) and anti-predator behaviours in larvae of two damselfly species that differ in lifestyle. Both stress proteins were fixed at higher levels in *Erythronma najas*, which has a slow lifestyle, than in *Lestes sponsa*, which has a fast lifestyle. Similarly, anti-predator behaviours were fixed at safer levels in *E. najas* than in *L. sponsa*. 3. These results suggest that stress proteins may be part of anti-predator syndromes of damselfly larvae, and there may be trait co-specialisation between stress proteins and behavioural anti-predator traits. Studies formally testing these hypotheses in more species may prove rewarding in advancing our understanding of the functional integration of physiological anti-predator traits in relation to the prey's lifestyle." (Authors)] Address: Slos, Stefanie, Lab. of Aquatic Ecology & Evolutionary Biology, Katholieke Universiteit Leuven, Ch. Debériotstraat 32, B-3000 Leuven, Belgium. E-mail: stefanie.slos@bio.kuleuven.be

7888. Slos, S.; De Block, M.; Stoks, R. (2009): Autotomy reduces immune function and antioxidant defence. *Biology letters* 5(1): 90-92. (in English) ["Costs of autotomy, an antipredator defence, are typically explained by impaired mobility; yet physiologically mediated costs may also play a role. Given the resemblance to wounding, a decreased immune function and an associated reduction in antioxidant defence is expected after autotomy. In line with this, after lamellae autotomy, larvae of *Lestes viridis* showed lower levels of innate immunity (i.e. phenoloxidase, PO) and antioxidant defence (superoxide dismutase, SOD). Levels of catalase (CAT) remained, however, unaffected. In line with its cytotoxicity, PO covaried positively with CAT, yet negatively with SOD. We identified a novel cost of autotomy in terms of a reduced innate immunity, which may provide an alternative explanation for the often observed costs of autotomy and which may generate indirect interactions between predators and parasites.] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

7889. Stetzuhn, H. (2009): Kleines Granatauge (*Erythronma viridulum*) am Rodder Maar, Ldkrs Ahrweiler. *Pflanzen und Tiere in Rheinland-Pfalz (Berichtsjahr 2008)* 19: 160. (in German) [Germany, Rheinland-Pfalz, 14-VIII-2008] Address: not stated

7890. Stevens, L.E.; Bailowitz, R.A. (2009): Odonata Biogeography in the Grand Canyon Ecoregion, Southwestern USA. *Annals of the Entomological Society of America* 102(2): 261-274. (in English) ["The Odonata fauna of the Grand Canyon ecoregion (GCE) on the southern Colorado Plateau includes 89 species (35 genera, seven families), including 49 Anisoptera species (25 genera, four families) and 40 Zygoptera species (10 genera, three families), and with 58 Odonata species in Grand Canyon (GC; 24 genera, seven families). Three biogeographic hypotheses account for this relatively high regional species richness: faunal affinity (origin), elevation effects on range, and landform impacts across spatial scale. The GCE Odonata assemblage is the result of mixing of taxa from adjacent Neotropical and Nearctic regions. Allochthonous taxa include 34.8% tropical (Mexican, Caribbean, Neotropical, or Pantropical) and 21.3% boreal (Nearctic or Holarctic)

species. Autochthonous species (43.8%) are range-centered in North American, neither clearly Nearctic nor Neotropical, with a strong Pacific Coast influence. Area-adjusted species richness is negatively linearly related to elevation. Tropical species have lower elevation ranges than do boreal species, whereas the elevation ranges of both allochthonous groups overlap those of autochthonous species. Odonata generally overcome landform-based range constraints at coarse spatial scales, but barrier/filter and corridor effects predominate over refuge and null biogeographic effects in GC. Anisoptera and Zygoptera biogeographic patterns are similar, except that 9-fold more Zygoptera species exist in refugia in GC compared with Anisoptera. Although no GCE Odonata previously have been considered rare or at risk, 15 (16.9%) species are restricted to three or fewer localities, four (4.5%) of species have been detected at only a single locality, and four high-elevation Nearctic species may be at risk of extirpation through climate change impacts on their habitats." (Authors)] Address: Stevens, L.E., Museum of Northern Arizona, 3101 N. Ft. Valley Rd, Flagstaff, AZ 86001, USA. E-mail: farvana@aol.com

7891. Stevenson, D.J.; Beaton, G.; Elliott, M.J. (2009): Distribution, status and ecology of *Cordulegaster sayi* Selys in Georgia, USA (Odonata: Cordulegasteridae). *Bulletin of American Odonatology* 11(1): 20-25. (in English) ["*C. sayi* is one of the most poorly known dragonfly species of the southeastern United States. Over a 13-year period (1996–2008), we documented *C. sayi* from 17 sites in 11 counties in southern Georgia, including nymph collections. At 11 (65%) sites, nymph habitat consisted of mucky seepages at the base of the slopes of xeric sandhills; at the remaining six sites, the habitat consisted of seepages on the slopes of steep hardwood bluffs above major streams (or within ravines associated with these bluffs). Salamanders of the genus *Pseudotriton* (*P. ruber* and *P. montanus*) are characteristic associates of *C. sayi* nymph habitats. Because nymph habitats are perennial seepages located downslope of Longleaf Pine (*Pinus palustris*)–Turkey Oak (*Quercus laevis*) sandhills, and because adults typically forage in these habitats, we consider *C. sayi* a Longleaf Pine ecosystem endemic." (Authors)] Address: Stevenson, D.J., Project Orianna, Ltd., Indigo Snake Initiative, 414 Club Drive, Hinesville, Georgia, USA 31313. E-mail: dstevenson@projectorianna.org

7892. Strobbe, F.; McPeck, M.A.; de Block, M.; De Meester, L.; Stoks, R. (2009): Survival selection on escape performance and its underlying phenotypic traits: a case of many-to-one mapping. *Journal of evolutionary biology* 22(6): 1172-1182. (in English) ["Selection often operates not directly on phenotypic traits but on performance which is important as several traits may contribute to a single performance measure (many-to-one mapping). Although largely ignored in the context of selection, this asks for studies that link all relevant phenotypes with performance and fitness. In an enclosure experiment, we studied links between phenotypic traits, swimming performance and survival in two *Enallagma* damselflies. Predatory dragonflies imposed survival selection for increased swimming propensity and speed only in *E. annexum*; probably *E. aspersum* was buffered by the former species' presence. Accordingly, more circular caudal lamellae, structures involved in generating thrust while swimming, were selected for only in *E. an-*

nexum. Other phenotypic traits that contributed to swimming speed were apparently not under selection, probably because of many-to-one mapping (functional redundancy). Our results indicate that not only the phenotypic distributions of syntopic prey organisms but also many-to-one mapping should be considered when documenting phenotype–performance–fitness relationships." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

7893. Svensson, E.I.; Abbott, J.K.; Gosden, T.P.; Coreau, A. (2009): Female polymorphisms, sexual conflict and limits to speciation processes in animals. *Evolutionary Ecology* 23(1): 93-108. (in English) ["Heritable and visually detectable polymorphisms, such as trophic polymorphisms, ecotypes, or colour morphs, have become classical model systems among ecological geneticists and evolutionary biologists. The relatively simple genetic basis of many polymorphisms (one or a few loci) makes such species well-suited to study evolutionary processes in natural settings. More recently, polymorphic systems have become popular when studying the early stages of the speciation process and mechanisms facilitating or constraining the evolution of reproductive isolation. Although colour polymorphisms have been studied extensively in the past, we argue that they have been underutilized as model systems of constraints on speciation processes. Colouration traits may function as signalling characters in sexual selection contexts, and the maintenance of colour polymorphisms is often due to frequency-dependent selection. One important issue is why there are so few described cases of female polymorphisms. Here we present a synthetic overview of female sexual polymorphisms, drawing from our previous work on female colour polymorphisms in lizards and damselflies. We argue that female sexual polymorphisms have probably been overlooked in the past, since workers have mainly focused on male-male competition over mates and have not realized the ecological sources of genetic variation in female fitness. Recent experimental evolution studies on fruit flies (*Drosophila melanogaster*) have demonstrated significant heritable variation among female genotypes in the fitness costs of resistance or tolerance to male mating harassment. In addition, female-female competition over resources could also generate genetic variation in female fitness and promote the maintenance of female sexual polymorphisms." (Authors)] Address: Svensson, E.I., Section for Animal Ecology, Ecology Building, Lund University, Lund 223 62, Sweden. E-mail: erik.svensson@zoekol.lu.se

7894. Svidersky, V.L.; Plotnikova, S.I.; Gorelkin, V.S. (2009): Structural-functional peculiarities of the wing apparatus of insects that do not have and do have the maneuvering flight. *Journal of Evolutionary Biochemistry and Physiology* 44(6): 643-656. (in English) ["The work considers character of behaviour in flight and discusses peculiarities of structural-functional organization of the wing apparatus of two representatives of insects — the migratory Asian locust *Locusta migratoria* (a low-maneuvering insect) and the dragonfly-darner *Aeshna* sp. (an insect able to perform complex maneuvers in air). The main principles underlying the insect wing apparatus activity are considered and the mechanisms allowing the dragonflies to perform complex maneuvers in the flight are analyzed in detail." (Authors) Original Russian Text published in *Zhurnal Evolyutsionnoi Biokhimii*

i Fiziologii, 2008, Vol. 44, No. 6, pp. 545–555.] Address: Svidersky, V.L., Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia. E-mail: office@iephb.ru

7895. Tajima, Y.; Watanabe, M. (2009): Changes in the number of spermatozoa in the female sperm storage organs of *Ischnura asiatica* (Brauer) during copulation (Zygoptera: Coenagrionidae). *Odonatologica* 38(2): 141-149. (in English) ["Spermatozoan dynamics in the female sperm storage organs of *I. asiatica* were examined with interrupted copulation experiments in the field. The copulation process was divided into 3 stages (I, II and III) according to the movements of the male abdomen. Females interrupted just after the termination of stage I of copulation contained a much lower number of spermatozoa, both in the bursa copulatrix and in the spermatheca, than solitary females captured before being attached by males. At the tip of the male's secondary genitalia, there was a pair of horns which might be used to remove sperm from the bursa copulatrix and the spermatheca during copulation. The latter was joined to the base of the former by a spermathecal duct. Since each horn of the male genitalia was significantly shorter than the spermathecal duct, the spermatheca might be inaccessible to males. The actual position of the horns in the female sperm storage organs during stage I of copulation was observed by freezing copulating pairs using quick-freeze aerosol sprays. The horns were in the bursa copulatrix, but no horns had entered the spermatheca. Additional mechanisms of sperm removal from the spermatheca are proposed." (Author)] Address: Graduate School of Life & Environmental Sciences, Univ. of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

7896. Tol, J. van (2009): Phylogeny and biogeography of the C (Odonata). Ph.D. thesis, University of Leiden: X + 294 pp.[Chapter: 1. J. van Tol, B.T. Reijnen & H.A. Thomassen. Phylogeny and biogeography of the Platystictidae (Odonata); *Chapters 2-8 were previously published with the same text and illustrations. *Chapter 2. – Chapter 2 in: W. Renema (editor) [2007]. Biogeography, time and place: Distributions, barriers and islands. p. 45-91. Springer, Dordrecht. *Chapter 3. – Zoologische Mededelingen 82 (21) [2008]: 217-234. *Chapter 4. – *Odonatologica* 32 [2003]: 39-45. *Chapter 5. – Zoologische Mededelingen 79-2 [2005]: 195-282. *Chapter 6. – Tijdschrift voor Entomologie 143 [2000]: 221-266. *Chapter 7. – *Odonatologica* 36 [2007]: 171-189. *Chapter 8. – Deutsche Entomologische Zeitschrift 54 [2007]: 3-26. *For the complete version see: <https://openaccess.leidenuniv.nl/handle/1887/13522>;

7897. Trapero Quintana, A.; Alonso Tabet, M.; Reyes Tur, B.; Alonso Jiménez, Y.; López, M. (2009): Notes on the Odonata of Refugio de Fauna Monte Cabaniguán, Las Tunas, Cuba. *Bulletin of American Odonatology* 11(1): 26-28. (in English) ["The Odonata fauna at Refugio de Fauna Monte Cabaniguán (Las Tunas Province) in eastern Cuba is brought on record. A total of 19 species in four families (Lestidae, Coenagrionidae, Aeshnidae, Libellulidae) were collected; 15 were libellulids." (Authors)] Address: Trapero Quintana, A., Depto de Biología, Universidad de Oriente, Patricio Lumumba s/n, C.P. 90500, Santiago de Cuba, Cuba. E-mail: atrapero@cnt.uo.edu.cu

7898. Trapero Quintana, A.D.; & Cuellar Araújo, N. (2009): Description of the last instar larva of *Cannaphila insularis funerea* (Carpenter, 1897) (Anisoptera: Libellulidae), with notes on the habitat of the species. *Zootaxa* 2034: 61-64. (in English) [The description is based on two male exuviae collected in the outlet of the Chalons basin (20°04'13"N, 75°48'47"W, 108 m), 4-VIII-2007, and the Los Gomez stream (20°02'52"N, 75°49'18"W, 90 m), 30-V-2008, col. Trapero. Both locations are in northern Santiago de Cuba.] Address: Trapero Quintana, A.D., Departamento de Biología, Universidad de Oriente. Ave. Patricio Lumumba. Santiago de Cuba 90500. Cuba. E-mail: trapero76@gmail.com

7899. Trapero-Quintana, A.; Cabrera Anaya, A.; Torres Cambas, Y.; Rodríguez Montelíer, L. (2009): Reproductive behavior of *Enallagma coecum* (Hagen) in Cuba (Zygoptera: Coenagrionidae). *Odonatologica* 38 (1): 7-13. (in English) ["The reproductive behaviour is described from 2 populations on the outskirts of Santiago de Cuba, between June 2005 and May 2006. Males started arriving at the water body in the morning nearly 2 h before females. Sperm translocation was brief (less than 30 s), and the duration of copulation averaged about 18 min. During oviposition the female was guarded in tandem by the male, except when she submerged under water, when non-contact guarding was observed. The mean duration of oviposition was about 10 min. Abiotic factors that interfered with the reproduction were wind, absence of sun, and rain; and the biotic interactions included conspecific males, spiders of the genus *Dolomedes*, *Gambusia punctata* fishes and the lizard *Anolis sagrei*.] Address: Trapero Quintana, A., Departamento de Biología de la Universidad de Oriente, Patricio s/n, Santiago, Cuba, CP 90500, Cuba. E-mail: atrapero@cnt.uo.edu.cu

7900. van der Poorten, N. (2009): *Lyriothemis defonsekai* spec. nov. from Sri Lanka, with a review of the known species of the genus (Anisoptera: Libellulidae). *Odonatologica* 38(1): 15-27. (in English) ["Both sexes of the new species and its early instar larva are described and illustrated. Holotype ♂: Ratnapura district, near Kudawe, alt. 500 m, 3-VII-2007; to be deposited at the Colombo National Museum. The habitat characteristics and species behaviour are briefly outlined. The new species is compared to all known congeners. It closely resembles *Lyriothemis acigastra* and *L. elegantissima*." (Author)] Address: van der Poorten, Nancy, 17 Monkton Avenue, Toronto, Ontario, M8Z 4M9, Canada; E-mail: nmgvdp@netscape.net

7901. van Huyssteen, P.; Samways, M.J. (2009): Overwintering dragonflies in an African savanna (Anisoptera: Gomphidae, Libellulidae). *Odonatologica* 38(2): 167-172. (in English) ["To better understand overwintering capability of dragonflies in the African savanna, observed individuals were placed into predetermined age categories at sites along the Mogalakwena river, Limpopo province, South Africa, during mid-winter. Age categories were determined by degree of wing wear each individual had sustained. The Dragonfly Biotic Index (DBI) was used to categorize species into rare, widespread generalists versus rare, narrow-range specialists. All the recorded species were common, widespread generalists, occupying microhabitats created by the winter dry season decrease in water level and flow rate, and able to survive seasonal habitat changes. Seven of the 8 species were libellulids, and 1 gomphid.

Their ability to thermoregulate by selecting appropriate perch sites, in addition to their high habitat tolerance, plays an important role allowing them to survive as adults throughout winter. It is confirmed that the libellulids observed here were highly habitat tolerant, common and widespread species whose success comes about at least partly from their ability to overwinter and be ready to take advantage of the first rains." (Authors) The species involved in this study are: *Ictinogomphus ferox*, *Orthetrum chrysostigma*, *Crocothemis erythraea*, *C. sanguinolenta*, *Trithemis annulata*, *T. arteriosa*, *T. furva*, and *T. kirbyi*.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

7902. Velasquez, N.; Bautista, K.; Guevara, M.; Ramirez, D.; Realpe, E.; Perez-Gutierrez, L.A. (2009): Larval development and growth ratio in *Ischnura cruzi* De Marmels, with description of last larval instar (Zygoptera: Coenagrionidae). *Odonatologica* 38(1): 29-38. (in English) ["Under stable laboratory conditions larval stages were measured and morphologically compared in order to establish growth ratio and total number of instars through their postembryonic development. Head width, total length, metafemur length, forewing pad length, and length and width of prementum were measured to determine variation between instars, and growth ratio was calculated. By Dyar's Law, 12 larval instars were estimated. Fundamental morphological differences were found in order to distinguish the stages and at the same time to have a record of the morphological development through the stages. Finally, the last larval instar is described and illustrated." (Authors)] Address: Perez-Gutierrez, L.A., Departamento de Biología, Universidad del Atlántico, Km. 7, Antigua Vía, Puerto Colombia, Barranquilla, Colombia; 1 la.perez60@egresados.uniandes.edu.co

7903. Villanueva, R.J.T. (2009): Dragonflies of Babuyan and Batanes group of islands, Philippines (Insecta: Odonata). *IDF-Report* 17: 1-16. (in English) ["Odonata were recorded and voucher specimens collected between April 23 and May 14 2008. In the islands of Sabtang and Itbayat >90% of the known freshwater system was explored while for Batan and Calayan approximately 60 and 40 percent respectively. In total 33 species belonging to 21 genera and 7 families were found. In addition to this three unidentified species were seen. All these species are new to the islands and one species is new to the Philippines. Furthermore, four of the recorded species (*Amphicnemis* in Calayan, *Drepanosticta* 1 & 2 in Calayan and Batan, *Teinobasis* in Calayan and Batan) are probably new to science. For a further four species the material shows differences with the specimens from the mainland. Some of these might also represent species new to science. Nearly 55 percent of the recorded species are Anisoptera. On the island of Calayan I found 29 species, most of which are forest specialists. Among these species are three probably new species, *Amphicnemis*, *Drepanosticta* and *Teinobasis*. Some of the species, *Diplacina*, *Neurobasis* and *Teinobasis* requires further comparison with known species. Only one species (*Rhyothemis regia*) noted on the island was not captured. On Sabtang, I found 12 species including a new record for the Philippines (*Tramea virginia*). On Batan, 9 species were found including two possibly new species of Zygoptera. Only one species noted in the island was not collected. The island of

Itbayat has nine species including possible one new species. Two species were noted only by sighting and could not be confirmed for proper identification." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000 Philippines. E-mail: reaganjoseph@lycos.com

7904. Vukusic, P.; Stavenga, D.G. (2009): Physical methods for investigating structural colours in biological systems. *J. R. Soc. Interface* 6, Suppl 2: S133-S148. (in English) ["Many biological systems are known to use structural colour effects to generate aspects of their appearance and visibility. The study of these phenomena has informed an eclectic group of fields ranging, for example, from evolutionary processes in behavioural biology to micro-optical devices in technologically engineered systems. However, biological photonic systems are invariably structurally and often compositionally more elaborate than most synthetically fabricated photonic systems. For this reason, an appropriate gamut of physical methods and investigative techniques must be applied correctly so that the systems' photonic behaviour may be appropriately understood. Here, we survey a broad range of the most commonly implemented, successfully used and recently innovated physical methods. We discuss the costs and benefits of various spectrometric methods and instruments, namely scatterometers, microspectrophotometers, fibre-optic-connected photodiode array spectrometers and integrating spheres. We then discuss the role of the materials' refractive index and several of the more commonly used theoretical approaches. Finally, we describe the recent developments in the research field of photonic crystals and the implications for the further study of structural coloration in animals." (Author) *Neurobasis chinensis* exhibits bright and highly saturated iridescent green hind wings as a result of the melanin-backed multilayer in its wing membrane.] Address: Vukusic, P., School of Physics, University of Exeter, Exeter EX4 4QL, UK. E-mail: p.vukusic@ex.ac.uk

7905. Wilson, S.R.; Ricciardi, A. (2009): Epiphytic macroinvertebrate communities on Eurasian watermilfoil (*Myriophyllum spicatum*) and native milfoils *Myriophyllum sibiricum* and *Myriophyllum alterniflorum* in eastern North America. *Canadian Journal of Fisheries and Aquatic Sciences* 66(1): 18-30. (in English, with French summary) ["Aquatic macrophytes play an important role in the survival and proliferation of invertebrates in freshwater ecosystems. Epiphytic invertebrate communities may be altered through the replacement of native macrophytes by exotic macrophytes, even when the macrophytes are close relatives and have similar morphology. We sampled an invasive exotic macrophyte, *M. spicatum*, and native milfoils *M. sibiricum* and *M. alterniflorum* in four bodies of water in southern Quebec and upstate New York during the summer of 2005. Within each waterbody, we compared the abundance, diversity, and community composition of epiphytic macroinvertebrates (including Odonata on different taxonomical levels) on exotic and native *Myriophyllum*. In general, both *M. sibiricum* and *M. alterniflorum* had higher invertebrate diversity and higher invertebrate biomass and supported more gastropods than the exotic *M. spicatum*. In late summer, invertebrate density tended to be higher on *M. sibiricum* than on *M. spicatum*, but lower on *M. alterniflorum* than on *M. spicatum*. Our results demonstrate that *M. spicatum* supports macroinvertebrate communities that may dif-

fer from those on structurally similar native macrophytes, although these differences vary across sites and sampling dates. Thus, the replacement of native milfoils by *M. spicatum* may have indirect effects on aquatic food webs." (Authors)] Address: Ricciardi, A., Redpath Museum. McGill University. 859 Sherbrooke Street West. Montreal. QC H3A 2K6. Canada. E-mail: tony.ricciardi@mcgill.ca

7906. Wissinger, S.A.; Greig, H.; McIntosh, A. (2009): Absence of species replacements between permanent and temporary lentic communities in New Zealand. *J. N. Am. Benthol. Soc.* 28(1): 12-23. (in English) ["The species composition of lentic communities often shifts along hydroperiod gradients, in part because temporary-habitat specialists replace closely related permanent-habitat specialists. These replacements reflect tradeoffs between traits that facilitate coexistence with permanent-habitat predators and those that prevent desiccation. The evidence for species replacements and the underlying tradeoffs is considerable in North America, but few studies have explored this pattern in other regions. We compared benthic communities in permanent and temporary habitats on the South Island of New Zealand. Ordination across 58 sites showed that community composition was distinctly different between the 2 types of habitats. Assemblages in permanent habitats had .23 the number of species as those in temporary habitats. We found little evidence for temporary-habitat specialists; i.e., species in temporary communities were a nested subset of those in permanent communities. Quantitative sampling at 12 intensively studied sites revealed that chironomids, water bugs, beetles, and crustaceans accounted for 90% of the biomass in temporary, but only 14% of the biomass in permanent habitats, which were dominated by molluscs, annelids, caddisflies, and odonates. Damselflies, dragonflies, caddisflies, and several other large-bodied taxa common in permanent habitats were absent from most temporary habitats. We propose 2 explanations for the absence of species replacements in these groups in the New Zealand habitats that we studied. First, drying is unpredictable within and between years, perhaps precluding the evolution of temporary-habitat specialization. Second, fish predation on benthic invertebrates, a driver for phylogenetic diversification in North America, appears to be comparatively weak in New Zealand. Comparative studies across a range of climates and faunas will be needed to identify the ecological and phylogenetic contexts that favour evolution of generalists vs specialists along permanence gradients." (Authors)] Address: Wissinger, S.A., Biology Department, Allegheny College, Meadville, Pennsylvania 16335 USA. E-mail addresses: swissing@allegheny.edu

7907. Zhang, H.-m.; Tong, X.-l. (2009): *Trigomphus hainanensis* spec. nov., a new dragonfly species from Hainan, China (Anisoptera: Gomphidae). *Odonatologica* 38(1): 67-71. (in English) ["Both sexes of the new species are described and illustrated. Holotype ♂, paratype ♀: China, Wushishan, Hainan, 30-III-2008; deposited in the Collection of Aquatic Insects and Soil Animals, Department of Entomology, South China Agricultural University Guangzhou. *T. hainanensis* sp. n. is closely related to *T. citimus* (Needham), from which it can be distinguished by the labrum, colour of ♂ superior appendices and by a pointed black occipital horn in female." (Authors)] Address: Tong, X.-l., Department of Entomology, College of Natural Resources and En-

vironment, South China Agricultural University, Guangzhou 510642, China. E-mail: xtong@scau.edu.cn

"I'm thinking dragonflies"

http://www.eb-sqart.com/Artist/s/cmd_6023_profile.htm



7908. Zhang, H.-m.; Tong, X.-l. (2009): First description of the larva and adult male *Paragomphus wuzhishanensis* Liu (Anisoptera: Gomphidae). *Odonatologica* 38(2): 173-178. (in English) ["The descriptions and illustrations are based on specimens reared in the laboratory from larvae collected from the type locality of Hainan, China. A comparison is also provided between adult males *P. capricornis* (from Guangdong), and *P. wuzhishanensis* and *P. pardalinus* (both from Hainan)."] Address: Zhang, H.-m., Dept of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou-510642, China. E-mail: xtong@scau.edu.cn

Thanks to all who contributed to this issue of OAS!!!



http://www.toonpool.com/user/1391/files/tongue_tied_372365.jpg

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1997

7909. De Knijf, G.; Anselin, A.; Demolder, H. (1997): The odonatofauna of the Damvallei (east-Flanders, Belgium); past glory or still worthwhile? *Biol. Jaarh. Dodonaea* 64, 1996 (1997): 75-91. (in English) ["The Damvallei, rich in aquatic habitats, hosted an impressive number (39) of interesting dragonfly (Odonata) species before the construction of a highway junction in 1967. A dragonfly survey was undertaken in the area between 1992-1995 to compare present-day with former species richness. A number of species linked to mesotrophic ponds and marshes, oligotrophic waterbodies and oxygen-rich slow running rivers and brooks have disappeared from the area. Although several species have been lost since 1970, the presence of healthy populations of several interesting species, in particular *Coenagrion pulchellum* and *Erythromma najas* and of a high species richness (26), indicates that the area is still valuable for dragonflies. However it urgently needs a proper dragonfly-friendly management." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

7910. Jacobsen, D.; Schultz, K.; Encalada, A. (1997): Structure and diversity of stream invertebrate assemblages: the influence of temperature with altitude and latitude. *Freshwater Biology* 38: 247-261. (in English) ["1. Structure and diversity of the macroinvertebrate fauna were studied in relation to altitude and latitude among three groups of streams from Ecuador (lowland: 100-600 m, Central Valley: 2600-3100 m, Paramo: 3500-4000 m), and one group from the temperate lowland region of Denmark. The streams in the four regions were comparable with regard to physical characteristics such as size, current and substratum. 2. In terms of faunal composition the Ecuadorian highland streams bore more resemblance to the Danish lowland streams than the Ecuadorian lowland streams. The greater similarity between the Ecuadorian highland and the Danish streams, however, was due to the large number of insect families in the Ecuadorian lowlands, many of which were not found in the other regions. Of ten physico-chemical parameters measured, maximum stream temperature explained by far the most variability in faunal composition. 3. The number of insect orders

and families increased linearly with maximum stream temperature and therefore decreased with altitude and latitude. A compilation of literature data on insect richness and maximum water temperature from streams around the world confirmed this pattern, yielding a common linear relation for both temperate and tropical streams. This pattern may arise due to a direct temperature effect on speciation but is probably also related to geological history and the influence of climatic changes on stream ecosystems. We estimate that small, tropical, lowland streams have, on average, a two- to fourfold higher species richness than temperate lowland streams. [...] The number of insect orders decreased with altitude. In the lowland streams nine orders were found. Odonata comprised 8%, Hemiptera 7%, Megaloptera 0.8% and Lepidoptera 0.5% of the lowland fauna, but, except for a few Odonata in the Central Valley, these four orders were absent in the Central Valley and the Paramo streams." (Authors)] Address: Jacobsen, D., Freshwater Biological Laboratory, Univ. of Copenhagen, 51 Helsingorsgade, DK 3400 Hillerod, Denmark

7911. Lebenhagen, A. (1997): Die Entomofauna und Malakofauna des LSG "Wanzeberg". *Virgo, Mitt.bl. ent. Ver. Mecklenburg* 1: 7-8. (in German) [Mecklenburg-Vorpommern, Germany; a total of 27 Odonata species is reported from the locality, but only *Anax imperator* is specified.] Address: Lebenhagen, A., Schäferstraße 4, D -19053 Schwerin

7912. Lopez, D.; Lugo, E.; Valle, S.; Espinoza, P.; Lopez, M.M.; Delgado, M.; Rivera, P.; Garcia Avila, I. (1997): Insectos acuáticos como biorreguladores de larvas de mosquitos en Nicaragua [Aquatic insects as bio-regulators of mosquito larvae in Nicaragua]. *Revista Nicaraguense de Entomología* 39: 27-30. (in Spanish, with English summary) ["This study presents some predators of mosquito larvae collected during a survey in Nicaragua. High populations of predators correspond to low populations of mosquito larvae. Predators were: *Pantala flavescens*, *Orthemis ferruginea*, *Leptemis vesiculosa*, *Erythrodiplax umbrata*, *Tremea calverti*, *Anax amazilii*, *Ischnura ramburi*, *Enallagma novaehispaniae*, *Ceratura capreola* (Odonata); *Belostoma annulipes*, *B. minor*, *Ranata fabricii*, *Buenoa platycnemis* (Heteroptera), *Tropisternus lateralis*, *T. proximus*, *Hy-*

drophilus sp., *Thermonectes circumscripta* (Coleoptera)." (Authors)] Address: not stated

7913. Nel, A.; Martinez-Declòs, F.; Papier, F.; Oudard, J. (1997): New Tertiary fossil Odonata from France (Sieblosiidae, Lestidae, Coenagrionidae, Megapodagrionidae, Libellulidae). *Deut. entomol. Zeitschrift* 44(2): 231-258. (in English, with German summary) ["*Thanetophilosina menatensis* gen. n., sp. n. (Zygoptera: Megapodagrionidae) is described from the Palaeocene of France. Two new species of *Stenolestes* (Zygoptera: Sieblosiidae) and a new specimen of *Stenolestes fischeri* Nel, 1986 are described from the Oligocene of France. Three unnamed new Coenagrionidae, a lestid, *Lesstes brisaci* sp. n., and a libellulid, *Caussanelia papaziani* gen. n., sp. n. are described from the Upper Oligocene of south-east France. An unnamed new species of Coenagrionidae is described from the Upper Miocene of central France. These new taxa increase our knowledge of the palaeodiversity of odonatan faunas in the Tertiary of western Europe." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

7914. Plaistow, S.J. (1997): Variation in non-territorial behaviour in male *Calopteryx splendens xanthostoma* (Charpentier) (Zygoptera: Calopterygidae). *Odonatologica* 26(2): 171-181. (in English) ["Male calopterygid damselflies commonly demonstrate 2 alternative mate-securing tactics, occurring as either territorial or non-territorial individuals. Previous studies have assumed that non-territorial males constitute one category. This study describes variation in non-territorial behaviour which is dependent upon whether or not the non-territorial male had been displaced from a territory. Consequently, non-territorial males are classified as pre-territorial or post-territorial. Pre-territorial males are agonistic towards conspecific territorial males and fight to obtain territories. Post-territorial males rarely fight; instead they wait for territories to become vacant." (Author)] Address: Plaistow, S.J., School Biol. Sciences, University of Liverpool, Liverpool P.O. Box 147, Liverpool, L69 3BX, UK

7915. Salamun, A.; Bedjanic, M. (1997): Dragonflies (Odonata) from Slovenia and Croatia in the Collection "Finzi" of the Natural History Museum Trieste. *Exuviae* 4(1): 4-10. (in Slovenian, with English summary) ["A list of 27 dragonfly species from the collection of odonatologist and myrmecologist Bruno Finzi is given. *Sympetrum depressiusculum* (Sel.) is new for the territory of Istria, north-western Croatia." (Authors)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjazbedjanic@yahoo.com

7916. Schutte, G.; Reich, M.; Plachter, H. (1997): Mobility of the rheobiont damselfly *Calopteryx splendens* (Harris) in fragmented habitats (Zygoptera: Calopterygidae). *Odonatologica* 26(3): 317-327. ["*C. splendens* is common along slow-flowing streams and rivers in central Europe. This species is well-suited for studies on the population structure and mobility of semi-aquatic rheobiont organisms. In this study the authors investigated a local population over a 2 km stretch of river in central Germany, by habitat analysis and mark-recapture-experiments. Emergent aquatic vegetation only influences density if the coverage is lower than 10%. Adult damselflies mainly use vegetation along the banks. Unused, moderately eutrophicated stands of herbaceous vegetation without trees and shrubs are preferred. In-

solation in the morning is the primary factor for the selection of the males' territories and thus determines the pattern of density. The investigated population turns out to be much bigger than expected. 2649 individuals have been marked individually (1543 male, 1106 female). 47% of the males and 29% of the females have been recaptured at least once. Most individuals migrated less than 300 m, which is roughly the home range size, but 23 individuals covered more than 1000 m. Three bridges spanned the investigated stretch of river. None of them caused a complete fragmentation of the habitat, but in the case of a wide but low bridge, more than 70% of the approaching damselflies turned back. However, 13% of all recaptured individuals successfully crossed at least one bridge." (Authors)] Address: Plachter, H., University of Marburg, Fac.Biologie, Nature Conservation Division, D-35037 Marburg, Germany. E-mail: h-plachter@staff.uni-marburg.de

7917. Tol, J. van (1997): The genus *Pocordulia* Martin in western Malesia (Odonata, Corduliidae). *Tijdschrift voor Entomologie* 140: 133-146. (in English) ["The species of the genus *Procordulia* occurring in Malaysia, the Philippines and Indonesia, excl. New Guinea, are discussed and a key to the species is provided. *P. papandayanensis* is described from Java, and *P. lompobatang* and *P. rantemario* from SW Sulawesi. These new species all belong to the *P. sambawana* group of species." (Author)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

1998

7918. Lockwood, M. (1998): Primer inventari dels odonats del delta del Llobregat. *Spartina. Butlletí naturalista del delta del Llobregat* 3 (Anys 1997-98): 111-118. (in Catalan, with English summary) ["First inventory of the dragonflies of the Llobregat Delta, NE Spain: Based on observations of dragonflies in the Llobregat Delta, NE Spain, during 1995-1997, a database of information on the distribution and ecology of the area's dragonflies has been assembled. Seventeen species were recorded during this period, three of which (*Hemianax ephippiger*, *Aeshna isosceles*, *A. affinis*) are very scarce in the Iberian Peninsular. The species richness of certain artificial habitats (recently created pools in El Prat Golf Club and Remolar-Filippines marsh) is remarked upon and illustrates the ease with which more quality habitat could be created for dragonflies in the Llobregat Delta." (Author)] Address: Lockwood, M., La Devesa, 3, 1", E-17850 Besalu, Spain. E-mail: mike@walkingcatalonia.net

7919. Muzón, J.; Ellenrieder, N. von (1998): Estado de conservación de los Odonata en la Argentina.. *Pro-Biota, FCNyM, UNLP, Serie Folletos T04*: 1-3. ISSN 1666-731X.: 6 pp. (in Spanish) [Leaflet with introducing information on conservation matters of the Odonata of Argentina] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

7920. Spikkeland, I. (1998): Dyreliv i dammer i Askim. *Natur i Østfold* 17(1-2): 13-22. (in Norwegian) [Norway; eleven Odonata taxa are listed, of which *Aeshna cyanea* and *Libellula depressa* are of special regional

interest.] Address: Spikkeland, I., Buer, 1870 Ørje, Norway. E-mail: isp@riff.hiof.no

7921. Springer, M. (1998): Genera of aquatic insects from Costa Rica, deposited at the Museo de Zoología, Universidad de Costa Rica. *Rev. Biol. Trop.* 46. Suppl. 6: 137-141. (in English) ["A first checklist of the genera of aquatic insects from Costa Rica is presented. The material has been collected since 1990 throughout the entire country and is deposited at the Museo de Zoología, Universidad de Costa Rica. The collection includes only the aquatic stages from each order and contains a total of 278 genera from 92 families in 11 orders." (Author) Odonata larval stages are represented by 54 genera.] Address: Springer, Monika, Escuela de Biología, Universidad de Costa Rica, 2060 San Jose, Costa Rica. E-mail: mspringe@t:ariari.ucr.ac.cr

1999

7922. Bae, Y. J.; Yum, J. W.; Cha, J.Y.; Yoon, I. B. (1999): Morphology, habitat, and distributional records of *Nannophya pygmaea* Rambur (Libellulidae, Odonata). *Korean J. Ent.* 29(4): 287-290. (in English) [Male and female adults and the larva of *N. pygmaea* are described from the southwestern part of the Korean peninsula. In addition, information on habitat, ecology, distribution, and conservation status are provided.] Address: Yum, Jin-Whoo, E-mail: lestes93@me.go.kr

7923. Hecker, K.R. (1999): Testing for sex biases and morph biases in parasitism of zygopterans (Odonata) by gregarines (Eugregarinidae). M.Sc. thesis, Carleton Univ. Ottawa, Ontario: 72 pp. (in English) ["I studied gregarine parasites of *Enallagma boreale* to elucidate causes and consequences of sex biases in parasitism of adult hosts. I found some evidence that adult females had higher prevalence and intensity of infection than males. Both sexes showed a positive correlation between number of gregarines and longevity under conditions of food stress. This may be because food ingested with the infective cysts is more beneficial than the parasites are harmful. I also studied *Nehalennia irene* damselflies and their gregarine parasites, predicting that female morphs would differ in measures of parasitism, therefore balancing the advantages accrued to one morph at high population densities. I found that female morphs did not differ in measures of parasitism. There was no significant difference in prevalence between the sexes across five separate ponds. although females had more gregarines than males. I found no correlation between the number of gregarines and longevity of hosts.] Address: <http://www.collectionscanada.gc.ca/obj/s4/f2/dsk2/ftp01/MQ48490.pdf>

7924. Ivanov, V.D.; Krivokhatsky, V.A. (1999): Insects and spiders of the Leningrad region. *Transactions of the St. Petersburg naturalists society Ser. 6, Vol. 2:* 339-396. (in Russian, with English summary) [15 odonate species are listed. The authors consider only rare or endangered taxa (= redlisted species from Lithuania, Finland, Germany or Norway, and from Karelia). The species list bases on literature data from the 1880s (!).] Address: not stated

7925. Pleguezuelos, J.M.; Poveda, J.C.; Monterrubio, R.; Ontiveros, D. (1999): Feeding habits of the common chameleon, *Chamaeleo chamaeleon* (L.,

1758) in the southeastern Iberian Peninsula. *Israel Journal of Zoology* 45(2): 267-276. (in English) ["We present the feeding habits of *C. chamaeleon* at Taramay, a small coastal valley in the southeastern Iberian Peninsula. Fecal pellets collected from sexed and measured specimens trapped in the field were used for diet analysis. 34 fecal samples provided a total of 777 identified prey items. All prey were arthropods and the numerically dominant groups were Diptera, Hymenoptera, Orthoptera, and Heteroptera. We failed to find sexual differences in diet preference, but there was a seasonal shift in the prey consumed. Orthoptera, the largest prey type, was consumed less in spring than summer or autumn. Examination of grasshopper phenology in coastal habitats of the southeastern Iberian Peninsula, and of the change in chameleon habitat utilization and mobility during the mating period, verified that the common chameleon appears to consume grasshoppers in approximate proportion to their abundance. Prey consumed were smaller than in previous studies. We believe the earlier findings may have been biased due to the diet consisting of captive specimens. Most of the prey consumed in the present study were flying insects, perhaps reflecting the arboreal habits of this climbing species; and most prey were also mobile, as has been predicted for sit-and-wait foragers such as the common chameleon." (Authors) Lestidae are very rarely represented in the diet of the chameleon.] Address: Pleguezuelos, J.M., Dept of Animal Biology and Ecology, University of Granada, 18071 Granada, Spain

2000

7926. Collier, K.J.; Smith, B.J.; Quinn, J.M.; Scarsbrook, M.R.; Halliday, N.J.; Croker, G.F.; Parkyn, S.M. (2000): Biodiversity of stream invertebrate fauna in a Waikato hill-country catchment in relation to land use. *New Zealand Entomologist* 23: 9-22. (in English) [Mangaotama nr Hamilton, New Zealand; "between 1992 and 1999, stream invertebrates were collected from 24 sites surrounded by a mixture of native forest and pasture. *Antipodochlora braueri*, *Austrolestes colenisonis*, and *Xanthocnemis* sp. were collected from pasture and mixed pasture, while no Odonata were recorded from native and mixed native forest." (Author)] Address: Collier, K.J., Natn. Inst. Water & Atmospheric Res., P.O. Box 11-115, Hamilton, New Zealand. E-mail: k.collier@niwa.cri.nz

7927. Karube, H. (2000): Additional records of the genus *Petaliaeschna* of northern Vietnam with description of a new species. *Tombo* 42: 23-25. (in English) [*Petaliaeschna tomokunii* sp. nov.; holotype, male, Mt Piaoac, Cao Hang Province, Northern Vietnam. 17-V-1998, leg. M. Tomokuni. The holotype is deposited in the collection of the National Science Museum, Tokyo. The new species looks related to *P. flavipes* Karube recorded from same locality, but is easily distinguished by the longer pterostigma and the shape of the superior appendage (pointed apex). This latter character reflects a relationship to *P. fletcheri* from India.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

7928. Last, L.L.; Whitman, R.L. (2000): Aquatic macroinvertebrates of the Grand Calumet river. *Proceedings of the Indiana Academy of Science* 108 / 109

(1999/2000): 45-81. (in English) ["The Grand Calumet River is potential habitat for a rich community of aquatic macroinvertebrates. Historical surveys of these organisms have been limited to post-industrialization of the Calumet Region; but because river habitats and conditions prior to industrialization have been described, past macroinvertebrate community composition can be inferred. In the past 20 years, several surveys have been conducted in the Grand Calumet that have focused on a limited area, but when these studies are amassed the information available covers much of the river. In this paper, the aquatic macroinvertebrate communities in the river are described, and options for restoration are discussed. Many of the macroinvertebrates present are indicators of high levels of pollution, but a few pollution-sensitive species have been found. There is evidence, however, that the sediment quality has improved since the 1960's, likely due to pollution controls that have been put into place. Restoration opportunities should consider the macroinvertebrate community and the potential to improve sediment habitat without damaging the community structure." (Authors) Odonata are treated at the genus level.] Address: Last, L.L., U.S. Geological Survey, Biological Resources Division, Lake Michigan Ecological Research Station, 1100 North Mineral Springs Road, Porter, Indiana 46304 USA

7929. Strayer, D.L.; Smith, L.C. (2000): Macroinvertebrates of a rocky shore in the freshwater tidal Hudson River. *Estuaries* 23(3): 359-366. (in English) ["We studied the macroinvertebrate fauna of a rocky shore in the freshwater tidal Hudson River during 1992-1994, the early years of the zebra mussel (*Dreissena polymorpha*) invasion. The macroinvertebrate community was numerically dominated by chironomids, nematodes, oligochaetes, gastropods, zebra mussels, and planarian flatworms. The community was a mixture of species typical of stony warm water rivers and lake shore, freshwater generalists and semiterrestrial species. Overall macroinvertebrate densities were moderate to low (2,800-14,600 m²). Density was a strong function of season and elevation with consistently low densities in the early spring and in the intertidal zone. This pattern suggests that physical harshness (alternating submergence and desiccation; ice and low temperatures) limits the distribution of invertebrates at this site. [...] A weak correlation between the densities of zebra mussels and those of other macroinvertebrates nonetheless suggests that the zebra mussel invasion may have affected community structure." (Authors) Mean density of Odonata: 2 specimens / m².] Address: Strayer, D.L., Inst. Ecosystem Studies, Box AB, Millbrook, New York 12545, USA

2001

7930. Czeżuga, B.; Godlewska, A. (2001): Aquatic insects as vectors of aquatic zoospore fungi parasitic on fishes. *Acta Ichthyologica & Piscatoria* 31(2): 87-104. (in English, with Polish summary) [32 species of aquatic insects in 6 water bodies of various trophic state in Poland were surveyed for aquatic zoospore fungi. 46 different species of aquatic zoospore fungi parasitic on fishes were recorded on *Erythromma najas* (n = 26 fungi), *Anax imperator* (n = 12) and *Aeshna grandis* (n = 32).] Address: Czeżuga, B., Dept Gen. Biol., Medical Univ., Białystok, Kilińskiego 1, 15-230 Białystok, Poland

7931. Edokpayi, C.A.; Osimen, E.C. (2001): Hydrobiological studies on Ibiekuma River at Ekpoma, southern

Nigeria, after impoundment: the faunal characteristics. *African Journal of Science and Technology (AJST) Science and Engineering Series* 2(1): 72-81. (in English) ["A study of a 3 Km stretch of a perennial rainforest stream in southern Nigeria describes the macrobenthic faunal characteristics of pools (dam site stations) and runs. A total of 84 invertebrate taxa made up of 2,535 individuals were recorded. The overall faunal abundance was not significantly different at the study stretch. The abundance of the major taxonomic groups was however significantly different (P < 0.05) at the study stations. Hemiptera and Diptera were the most abundant invertebrate groups recorded. The high number of benthic invertebrates observed is a reflection of the physical and chemical stability of the study stream." (Authors) The study includes records of "Petaluridae" at several stations.] Address: Edokpayi, C.A., Department of Zoology, Marine Biology and Fisheries, University of Lagos, Akoka, Lagos, Nigeria

7932. Harp, G.L.; Trial, L. (2001): Distribution and Status of *Ophiogomphus westfalli* (Odonata Gomphidae) in Missouri and Arkansas. *Journal of the Arkansas Academy of Science* 55: 43-50. (in English) ["*O. westfalli* is endemic to the Interior Highlands (Ozark Plateaus and Ouachita Mountains), in Missouri, Arkansas and southeastern Kansas. First described in 1985, its life history is still little known. Prior to 1997, this species was known from only six sites in Missouri and 10 in Arkansas. From late May through late July in both 1999 and 2000 we surveyed 49 sites, three of them twice each, on Missouri Ozark streams in order to further clarify the distribution and relative abundance of this dragonfly. Adults, nymphs and/or exuviae were found at 23 sites. Literature and museum searches bring to 72 locations in Missouri and 10 in Arkansas where this species has been found. Small to moderate-sized populations, restricted to the Interior Highlands, are known from at least 82 locations. Therefore, it is recommended that its global and Missouri rankings be changed from G2 and S2 to G3 and S3, respectively. Distribution and abundance of this species needs further study in Arkansas." (Authors)] Address: Harp, G.L., Department of Biological Sciences, Arkansas State University, State University, AR72467, Fish & Wildlife Res. Center, Missouri Dept. of Conservation, 1110 South College Ave., Columbia, MO 65201, USA

7933. Illinois Department of Natural Resources (2001): Vermilion River (Illinois River Basin) Area Assessment. Volume 3. Living resources. Authority of the State of Illinois: X, 166 pp. (in English) [The checklist of Odonata is compiled in table 18. The full version of the study is available at: <http://www.ideals.uiuc.edu/bitstream/handle/2142/13890/vermillionirb3.pdf?sequence=4>] Address: Illinois Department of Natural Resources, Office of Scientific Research and Analysis, Natural History Survey Division, 607 East Peabody Drive, Champaign, Illinois 61820, USA

7934. Vercauteren, T.; Martin, P.; Goddeeris, B.; (2001): *Vejdovskya comata* (Vejdovski, 1883) (Oligochaeta: Naididae) in een vijver van het Raadsheerenpark te Vosselaar: eerste melding van deze gelede worm in België. *Antwerpse Koepel voor Natuurstudie - Jarboek* 2001: 83-88. (in Dutch, with English and French summaries) [The study also includes record odonate larvae of *Lestes sponsa*, *L. viridis*, *Cordulia aenea*, *Sympetrum* spp., and *Anax imperator*.] Address: Vercauteren, T.,

2002

7935. Bambaradeniya, C.N.B.; Ekanayake, S.P.; Kekulandala, L.D.C.B.; Samarawickrama, V.A.P.; Ratnayake, N.D.; Fernando, R.H.S.S. (2002): An assessment of the status of biodiversity in the Muthurajawela Wetland Sanctuary. Occ. Pap. IUCN, Sri Lanka 3. ISBN: 955-8177-17-2: IV, 48 pp. (in English) [Odonata consist "of 22 species (in 4 families), representing approximately 19 % of the total odonate species in Sri Lanka (App. 10). Among them, only one is endemic, while 2 are nationally threatened. Among the odonate species, 36% were common. *Rhyothemis variegata* and *Agriocnemis pygmaea* were abundant. Interestingly, the former was more common in degraded/disturbed habitats. The survey clearly highlighted that odonates could be used as indicators of habitat quality in wetland ecosystems." (Authors)] Address: IUCN - Sri Lanka, No. 53, Horton Place, Colombo 7, Sri Lanka.

7936. Garcés, H.A. (2002): Fauna acuática asociada al Río San Félix, provincia de Chiriquí, República de Panamá. *Tecnociencia* 4(2): 73-86. (in Spanish) [Panama; Odonata are treated at the order level.] Address: Garcés, H., Universidad de Panamá, Facultad de Ciencias Naturales, Exactas y Tecnología. Centro de Ciencias del Mar y Limnología (CCML). Departamento de Biología Marina y Limnología, Panama. E-mail: hgarcés@ancon.up.ac.pa

7937. Jueg, U.; Grosser, C. (2002): Erste Fachtagung "Europäische Hirudinea" in Karnin (Landkreis Parchim, Mecklenburg-Vorpommern) vom 30.08. bis 02.09.2001. *Lauterbornia* 44: 37-44. (in German, with English summary) ["10 participants concerned with leeches or interested in at least attended the first workshop on European Hirudinea. They came from Poland, Germany and Slovenia. After exchange of experience by papers and statements a study trip to waters near Schwerin, Germany yielded remarkable faunistic results." (Authors) The list of taxa also includes *Cordulia aenea*.] Address: Jueg, U., Schweriner Allee 16, D-19288 Ludwigslust, Germany. E-mail: uweueg@t-online.de

7938. Kadoorie Farm and Botanic Garden (2002): Report of Rapid Biodiversity Assessments at Tongtieling Forest Area and Xinglong Tropical Botanic Garden, Southeast Hainan, China, 22-23 May 1999, ii.. South China Forest Biodiversity Survey Report Series (Online Simplified Version): No. 22. KFBG, Hong Kong SAR: II + 18 pp-["17 species were recorded at Tongtieling, and ten at Xinglong Tropical Botanic Garden. The most frequently encountered species at Tongtieling was *Drepanosticta zhoui*, which was first recorded from Shangxi on the same survey trip. *Burmargiolestes xinglongensis* is a species new to science. It has been described from a single specimen by Wilson K.D.P. & Reels (2001), and named after the locality. The record of *Pseudoagrion australasiae* is the first from China. The records of *Macromia berlandi*, *M. katae*, *M. moorei malayana* and *M. rapida* are the first from Hainan. [...] Some species at Tongtieling are of particular conservation significance: – *Burmargiolestes xinglongensis* is known only from

Tongtieling; – *Euphaea ornata*, *Pseudolestes mirabilis*, *Coeliccia scutellum hainanense*, *Drepanosticta zhoui* are known only from Hainan; – *M. katae* and *Zygonyx iris insignis* are known only from Hainan and Hong Kong; – *M. calliope* is known only from Hainan and Vietnam; – *M. rapida* is known only from Hainan, Hong Kong and Guangdong; – *Paragomphus pardalinus* is known only from Hainan, Guangxi and Guangdong; – *M. berlandi* is known only from Hainan, Guangxi, Hong Kong and Vietnam. At Xinglong Botanic Garden the species present were more associated with lentic habitats such as ponds." (Authors; K.D.P. Wilson)] Address: Kadoorie Farm and Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

7939. Kadoorie Farm and Botanic Garden (2002): Report of Rapid Biodiversity Assessments at Fusui Rare Animal Nature Reserve, Southwest Guangxi, China, 1998 and 2001. South China Forest Biodiversity Survey Report Series (Online Simplified Version): No. 12. KFBG, Hong Kong SAR: II + 12pp. (in English) ["24 dragonfly species were recorded (Table 5: Dragonfly species at Fusui, 28 May 1998). Most are typical of lentic habitats. Notable finds included *Indocypha* sp. and *Dysphaea* sp., which have yet to be identified: *Indocypha* sp. (pending identification), *Libellago lineata lineata*, *Ceragrion auranticum*, *Pseudagrion pruinosum*, *P. spencei*, *P. rubriceps*, *Dysphaea* sp. (pending identification), *Copera marginipes*, *Prodasineura autumnalis*, *Anax guttatus*, *Epophthalmia elegans*, *Ictinogomphus pertinax*, *Sinictinogomphus clavatus*, *Brachydiplax farinosa*, *Orthetrum pruinosum*, *O. sabina sabina*, *Acisoma p. panorpoides*, *Brachythemis contaminata*, *Crocothemis servilia*, *Neurothemis fulvia*, *Trithemis aurora*, *Pantala flavescens*, *Tholymis tillarga*, *Zygonyx iris insignis*." (Authors; K.D.P. Wilson)] Address: Kadoorie Farm and Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

7940. Kadoorie Farm and Botanic Garden (2002): Report of Rapid Biodiversity Assessments at Nonggang National Nature Reserve, Southwest Guangxi, China, 19 to 27 May 1998. South China Forest Biodiversity Survey Report Series (Online Simplified Version): No. 10. KFBG, Hong Kong SAR: II + 34pp. (in English) ["Sixty-two species of dragonfly were recorded over the course of the study period, of which 40 were found in the Nonggang section, 33 at Longhu and 19 at Longshan [...]. Most of these are new records for the reserve. A new species of *Coeliccia* (Zygoptera: Platycnemididae) was discovered. *Orolestes selysi* is a new record for mainland China, but is also known from Hainan, Taiwan, India, Laos and Vietnam. *Dysphea basitincta* is a new record for mainland China. It is also known from Hainan and was described from Vietnam. *Euphaea superba* is a new record for China. It too was described from Vietnam. [...] Despite the lack of surface streams in the porous limestone hills of Nonggang and Longhu sections, the dragonfly fauna was very rich, and included a number of rare species. Several species were good forest indicators, including *Dysphaea* sp., *Polycanthagyna erythromelas*, and many gomphid species. At Longshan the odonates encountered were, with the exception of *Libellago lineata*, *Pseudagrion rubriceps*, *Coeliccia* sp., *Stylurus* sp. B and *Tetrathemis platyptera*, largely typical of lentic habitats." (Authors; K.D.P. Wilson)] Address: Kadoorie Farm and Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

7941. Kadoorie Farm and Botanic Garden (2002): Report of a Rapid Biodiversity Assessment at Xidamingshan Headwater Forest Nature Reserve, Southwest Guangxi, China, 15-17 October 1998. South China Forest Biodiversity Survey Report Series (Online Simplified Version) 20. KFBG, Hong Kong SAR: II + 16 pp. (in English) ["A total of 15 dragonfly species were recorded in the Xidamingshan area over the period 15-17 October. All but one of these were recorded at Lizhi on the first day. The odonate fauna was generally typical of mixed habitats, and no restricted or forest-specialist species were recorded." (Authors; K.D.P. Wilson)] Address: Kadoorie Farm and Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

7942. MacRury, N.K.; Graeb, B.D.S.; Johnson, B.M.; Clements, W.H. (2002): Comparison of dietary mercury exposure in two sympatric top predator fishes, largemouth bass and northern pike: a bioenergetics modeling approach. *Journal of Aquatic Ecosystem Stress and Recovery* 9: 137-147. (in English) ["Physical and ecological factors, including lake temperature, fish physiology, and diet, influence methylmercury (MeHg) exposure in fish. We employed bioenergetics modeling to compare dietary MeHg exposure in sympatric top predators, largemouth bass (*Micropterus salmoides*) and northern pike (*Esox lucius*). We compared simulations using field data to hypothetical simulations with (1) \pm 25% change in mean daily lake temperature for juvenile and adult bass and pike; (2) \pm 25% change in long-term growth rate of pike; (3) adult bass diet shift from generalist predator to strict piscivore. Bass and pike MeHg exposures were similar in baseline simulations and reflected patterns in field tissue concentrations. This occurred despite the fact that bass consumed highly contaminated benthic invertebrates (including Odonata), while pike exclusively consumed less contaminated fish prey. Higher temperatures increased adult bass and pike MeHg exposures by 35% and 27%, respectively. Shifting adult bass diets to 100% fish resulted in a 54% decrease in exposure, while increasing pike growth rates resulted in a 24% decrease. Bioenergetics modeling proved useful in understanding the influence of temperature, prey-base, and predator growth on differences in Hg exposure across fish species." (Authors)] Address: MacRury, Nicole, Dept of Fishery and Wildlife Biology, Colorado State University, Fort Collins, CO 80523, USA. E-mail: nicolem@cnr.colostate.edu

7943. Ruchin, A.B.; Ryzhov, M.K. (2002): On the diet of the Marsh Frog (*Rana ridibunda*) in the Sura and Moksha watershed, Mordovia. *Advances in Amphibian Research in the Former Soviet Union* 7: 197-205. (in English, with Russian summary) [Russia; based on material collected in 2001 – 2002, the diet of *R. ridibunda* included 200 different taxa. Odonata contribute with 1,4% of prey items to the diet of *R. ridibunda* including the following taxa: Calopterygidae im., Calopteryx virgo L. im., Lestes dryas im., Aeshna sp. l., Gomphus sp. l., Libellula sp. l., and Anax sp. larvae.] Address: Ruchin, A.B., Department of Biology, Mordovian State University, Bolshevitskaya Ul., Saransk 430000 Russia

7944. Stich, M.; Stich, F.; Holzinger, W.E.; Wieser, C. (2002): Zwei bemerkenswerte Libellenfunde in den Karawanken (Insecta: Odonata). *Carinthia* II 192/112: 511-516. (in German, with English summary) [Austria; *Somatochlora arctica* was recorded for the first time from Carinthia in the area of Bodental on 22.6.2000, S.

meridionalis was photographed at the Singerberg near Ferlach on 27.6.2000, a second record for the country.] Address: Stich, Margit & Friedrich, Griesgasse 62, A-9170 Ferlach, Austria

7945. Suda, S. (2002): Dragonflies of the Institute for Nature Study, Tokyo. *Miscellaneous reports of the National Park for Nature Study* 34: 107-130. (in Japanese, with English summary) [Between July 1998 to November 2000, and in July 2001, 28 odonate species were recorded in the Institute for Nature Study, Tokyo. The species are listed and briefly discussed. *Anaciaeschna martini* is a new addition to the list of 49 species recorded at this locality between 1949-2001.] Address: Suda, S., Graduate School of Agricultural and Life Sciences, The University of Tokyo, Japan

7946. Yokoi, N. (2002): Description of new *Boyeria* species from central Laos (Anisoptera: Aeshnidae). *Tombo* 45(1/4): 12-14. (in English) ["A new *Boyeria* species (captured at last instar larvae and reared in room until emergence) is described from central Laos and compared with *B. sinensis* from China and *B. madachlani* from Japan. The new sp. *Boyeria karubei* differed from the Japanese species in colour of head and antealar carina, and differed from the Chinese species in a pair of distinct yellow stripes in front of pterothorax, and subbasal ventral tubercle and sharply pointed apex in superior appendages. The genus *Boyeria* is recorded for the first time from South-East Asia." (Author)] Address: Yokoi, N., 2-37-11 Kaisei, Koriyama. Fukushima, 963-8851 Japan

7947. Yutaka, Y.; Bunzaemon, S.; Norio, S. (2002): Adult eclosion of *Sympetrum* (red dragonfly) and paddy rice cultivation method in paddy field. *Tohoku Nogyo Kenkyu Seika Joho* 16: 57-58. (in Japanese) ["Influence of difference in cultivation methods of paddy rice on the aquatic organisms was investigated. Cultivation sectors by non chemical fertilizers, reduced pesticides, combination of these two, organic cultivation, and traditional practice (medium dry and full-time flooding) were set up, and number of adult-eclosion individuals of *Sympetrum* was counted at the respective sector. The number was found remarkably high in the full-time flooding sector compared with that in the medium dry sector. The number did not show much difference between sectors with and without chemical fertilizers. The adult eclosion number was found higher both in organic cultivation sector and reduced pesticide sector than that for the traditional practice sector." (Authors)] Address: unknown

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7948. Arimoro, F.O. (2003): Guides to the Freshwater Invertebrates of Southern Africa. Volume 7: Insecta I. Ephemeroptera, Odonata and Plecoptera. I.J. de Moor, J.A. Day and F.C. de Moor (editors). Water Research Commission, Pretoria, South Africa. WRC Report No. TT 207/03. ISBN 978-1-77005-017-4: 288 pp. (in English) [not available for abstracting.] Address: Obtainable from the Water Research Commission, Private Bag X03, Gezina, Pretoria 0031, South Africa, or orders @wrc.org.za

7949. Boano, G.; Rolando, A. (2003): Aggressive interactions and demographic parameters in *Libellula*

fulva (Odonata, Libellulidae). Italian Journal of Zoology 70(2): 159-166. (in English) ["Male aggressive interactions and demographic parameters (sex ratio, survival, abundance and life span) of *L. fulva* were studied for four years at a marsh in northwestern Italy by monitoring marked individuals. Perching males attacked every dragonfly passing near the perch. However, the mean homospecific attack distance was significantly longer than the heterospecific one and this suggests that males were able to discriminate among species, at least partially. In some instances, aggressive males succeeded in catching and copulating with females. Release-recapture analyses indicate that the sex ratio was very biased towards males, even though male and female capture probabilities were equal. Females had a slightly greater mortality rate than males, but this difference in adult survival is not sufficient to explain why adult females were rather rare at our study site. Life span estimates are in keeping with field observations, indicating that most males stayed alive for less than 10 days. All these results suggest a connection between interactions and demographic parameters. Male aggressive behaviour can in fact be viewed as an adaptation to a sexual environment here the time for reproduction is very short and the probability of meeting a partner is very low. Aggressions may in fact enhance males' probabilities to catch (and copulate with) females which are flying through the site. Weather conditions influenced males' behaviour, attack distance being significantly and positively related with light intensity. Vice-versa, weather conditions did not influence survival, maybe because of mild temperatures and scanty rain. The aggressive behaviour of *L. fulva* males might be classed as territoriality. However, the classical "defence of resource approach" seems to be scarcely appropriate here, since no resource located inside the hypothetical territory was defended, at least at the perch site." (Authors)] Address: Boano, G., Museo Civico di Storia Naturale, Via San Francesco di Sales 188, I-10022 Carmagnola, Torino, Italy. E-mail: gboano@tiscali.it

7950. Cano, F.J. (2003): Una rara libélula amenaza da peligra al excluirse de Natura 2000 una cuenca malagueña. Quercus 212: 53. (in Spanish) [Brief report on a record of a population of *Oxygastra curtisii* along the river Alaminos at the confluent with the river Fuen-girola in the southern part of the province of Málaga, Spain.] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: fjcanovi2@hotmail.com

7951. Catling, P.M. (2003): Dragonflies (Odonata) of the Northwest Territories, Status ranking and preliminary atlas. University of Ottawa: 49 pp. (in English) ["Thirty-five species of Odonata are given status ranks in the Northwest Territories based on number of occurrences and distributional area within the territory. Nine species are ranked as S2, may be at risk, including *Aeshna subarctica*, *Lestes congener*, *Nehalennia irene*, *Ophiogomphus colubrinus*, *Somatochlora albicincta*, *S. forcipata*, *S. franklini*, *S. sahlbergii* and *S. septentrionalis*. Many of these are widespread and on the edge of their range in the Northwest Territories. The most restricted species overall in North America is the Palearctic - East Beringian *S. sahlbergii*. *O. colubrinus* appears rare and local in the western part of its range. Nineteen species are ranked as S3, sensitive and 7 are ranked as S4, secure. The ranking is based on a database of 1040 records each defined as unique combination of

date, location and collector. Rejected taxa and possible additions are outlined. Regions requiring further survey are noted. Information on collecting and inventory is provided. Distribution maps for the species in the Northwest Territories are included." (Author)] Address: <http://www.enr.gov.nt.ca/live/documents/documentManagerUpload/AtlasDragonflies.pdf>

7952. Corbet, P.S. (2003): Leiden, June 2002. Agri-on 7(1): 3-4. (in English) [Report on a regional meeting of the Worldwide Dragonfly Association in June 2002 in the Netherlands]

7953. Crampton, W.G.R.; Lovejoy, N.R.; Albert, J.S. (2003): *Gymnotus ucumara*: a new species of Neotropical electric fish from the Peruvian Amazon (Ostariophysi: Gymnotidae), with notes on ecology and electric organ discharges. Zootaxa 277: 1-18. (in English) [*Gymnotus ucumara* n.sp. is described from floodplain habitats in the Rio Ucayali Basin, Peru. Stomach content analysis shows that Odonata play a significant role (app. one third of food items) of this fish.] Address: Crampton, W.G.R., Florida Museum of Natural History, University of Florida, Gainesville, FL, 32611-7800, USA. E-mail: willc@flmnh.ufl.edu

7954. Filho, D.Z.; Cunha Ribeiro, A.; Cunha Ribeiro, G.; Aguiar Fracasso, M.P.; Monetti Pavani, M.; Müller Patrao Oliveira, O.; Adriano de Oliveira, S.; Marques, A.C. (2003): Faunistic survey of sandstone caves from Altinópolis region, Sao Paulo state Brazil. Papéis Avulsos de Zoologia: 93-99. (in English, with Portuguese summary) ["The fauna of eight sandstone caves of the region of Altinópolis, (Serra Geral Arenitic Speleological province, São Paulo State, Southeastern Brazil) was surveyed. Our results improve the previous faunistic knowledge of the region, recording 15 new occurrences for Brazilian caves and 26 for Brazilian sandstone caves. The fauna is characterized by a large number of detritivores/omnivores such as crickets and cockroaches, and several predators like spiders and heteropterans in bat guano." (Authors) One specimen of a Libellulidae was found in the Duas Bocas cave.] Address: Marques, A.C., Depto de Zoologia, Instituto de Biociências, Univ. de São Paulo, Caixa Postal 11461, 05422-970, São Paulo, Brasil. E-mail: marques@ib.usp.br.

7955. Hämäläinen, M. (2003): *Platycnemis phasmovolans* sp. nov., an extraordinary damselfly from Laos with notes on its East Asian congeners (Odonata: Platycnemididae). Tombo 46: 1-7. (in English) [*Platycnemis phasmovolans* sp. n. from Lak Sao area in central Laos is described and illustrated in both sexes. The new species is characterized by possessing the most highly expanded tibiae so far known in Odonata. Its habitat is briefly described. The other species found from the same stream include *Philoganga vetusta* Ris, 1912 and *Zygonyx takasago* Asahina, 1966, both of which are recorded from Laos for the first time. The forgotten Japanese taxon *Platycnemis bilineata* Barteneff, 1910 from Matsuyama, Shikoku, is synonymized with *Copera annulata* (Selys, 1863). Preliminary taxonomic notes on other East Asian taxa described as *Platycnemis* species are provided.] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

7956. Hansen, H. (2003): Food habits of the North American River Otter (*Lontra canadensis*). Graduate Program, Department of Zoology and Physiology, Uni-

iversity of Wyoming: 7 pp. (in English) ["Aquatic invertebrates have been found to comprise a significant portion of the river otters' diet. Reid et al. (1994) found that otters ate more aquatic invertebrates in the summer as the insect populations increased and certain life stages became vulnerable. Most aquatic invertebrates consumed are dragonfly and stonefly nymphs and adult beetles) (Berg 1999, Reid et al. 1994)." (Author)] <http://www.amigosbravos.org/docs/projects/riverotter/030700-foodhabits.pdf>

7957. Karube, H. (2003): Description of a new species of the genus *Cephalaeschna* (Anisoptera: Aeshnidae) from northern Vietnam. *Tombo* 46: 9-12. (in English) [The genus *Cephalaeschna* is recorded from northern Vietnam for the first time. *Cephalaeschna aritai* n.sp. - related to *C. needhami* Asahina, 1981 from Jiangxi, SE China - is described. Distribution. Sapa, N Vietnam. Type-specimens. Holotype: male; Sapa (alt. 1500-2000 m), Lao Cai Province, northern Vietnam, 2002, native collector leg. Paratypes, 2 females, same date as holotype. The holotype is deposited in the collection of the Kanagawa Prefectural Museum of Natural History, Japan.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

7958. Mkize, N. (2003): A contribution to cabbage pest management by subsistence and small-scale farmers in the Eastern Cape, South Africa. Submitted in fulfilment of the requirements for the Degree of Master of Science in Entomology, Rhodes University: X, 108 pp. (in English) ["The interaction between farmers, agricultural scientists and extension workers is sometimes overlooked in agricultural entomology. In an attempt to respond to this reality this study examines some foundation of this interaction in relation to the pest management practices of subsistence and small-scale farmers and also highlights the problems that might arise in the implementation of IPM. Problems involving pests occurrence; language barriers; beliefs, knowledge and perception about insects, and visual literacy are examined. The thesis has a two-fold focus, firstly the study of pests on cabbages of subsistence farmers in Grahamstown and secondly a broader focus on other aspects such as cultural entomology, perception of insects and visual literacy specifically in relation to Xhosa speaking people in the Eastern Cape." (Author) Names of Odonata (general, Zygoptera, Anisoptera) in isiXhosa language are listed in tables 2 and 3.] Address: <http://eprints.ru.ac.za/752/1/Mkize-MSc.pdf>

7959. Nekaris, K.A.I. ; Rasmussen, D.T. (2003): Diet and feeding behaviour of Mysore Slender Lorises. *International Journal of Primatology* 24(1): 33-46. (in English) ["We studied the feeding ecology of the Mysore slender loris (*Loris lydekkerianus lydekkerianus*) for 10.5 month in a dry scrub forest at Ayyalur Interface Forestry Division, Tamil Nadu, South India. We recorded and analyzed 1240 feeding incidents, which indicate that the lorises were almost exclusively faunivorous, with 96% of all feeding events representing animal prey. Of prey items that could be identified (n = 605), 62.9% were ants and termites. Lorises fed on 9 orders and 17 families of insects, including Odonata, plus spiders, molluscs, and small vertebrates. Lorises infrequently fed on gums and a legume pod. They usually grabbed prey with one hand, while other appendages firmly held the substrate. Many of the identifiable prey

items belong to insect taxa likely to contain toxic chemicals. Consumption of insects inferred to be toxic was accompanied by an elaborate behavioural repertoire of sneezing, slobbering and urine-washing. A high proportion of insects eaten by slender lorises (71%) occurred in patches or aggregations. The utilization of aggregated social insects may have implications for understanding the unusually high degree of gregarious behaviour exhibited by the lorises." (Authors)] Address: Nekaris, K.A.I., Dept of Anthropology, Washington University, One Brookings Drive, St. Louis, Missouri, 63110, USA. E-mail: titania@nocturnalprimate.org

7960. Park, Y.-I.; Bradshaw, J. (2003): Insect origami: Into the fold. Using the art of paper folding to stimulate an interest in insect diversity and morphology. *American entomologist*, Winter 2003: 210-214. (in English) [The paper presents stunning works of insect origami, including the example of an Aeshnidae.] Address: not stated

7961. Prysawit, K.-P. (2003): Die Zwerglibelle (*Nehalennia speciosa*) im NSG Helstorfer Moor (Region Hannover). *Mitt. AG Zool. Heimatt. Nds.* 9: 25. (in German) [Niedersachsen, Germany; 15-VI-2003, app. 20 specimens of *N. speciosa* were recorded in the high bog of Helstorf.] Address: Prysawit, K.-P., Lessingstr. 2, 31535 Neustadt a. Rbge, Germany. E-mail: K-P.Prysawit@freenet.de

7962. Sanford, M.R.; Keiper, J.B.; Walton, W.E. (2003): The impact of wetland vegetation drying time on abundance of mosquitoes and other invertebrates. *Journal of the American Mosquito Control Association* 19(4): 361-366. (in English) ["Vegetation management for constructed treatment wetlands often involves knocking down emergent vegetation with heavy equipment and inundating the dead vegetation after a period of drying. Such practices create favourable conditions for larval mosquitoes. We studied the relationship between length of the drying period for an emergent macrophyte, *Typha* sp., and the abundance of aquatic invertebrates in replicated 0.18-m³ wading pools. The mosquito, *Culex tarsalis*, was significantly more abundant in pools containing vegetation aged for 2 wk before inundation compared to pools containing vegetation aged 5 wk, freshly cut vegetation, or without vegetation. Potential larval mosquito food resources (particles between 2 and 61 µm in equivalent spherical diameter) in the 2-wk aging treatment did not differ significantly from the other treatments during the 5-wk experiment. The abundance of other larval culicids, nonculicine Diptera, and potential mosquito predators (i.e., Dytiscidae and Aeshnidae) did not differ significantly among the vegetation aging treatments."] Address: Sanford, Michelle, Department of Entomology, University of California, Riverside, Riverside, CA 92521, USA

7963. Schlüpmann, M. (2003): Beitrag zur Flora und Fauna des Erfttales bei Grevenbroich. Teil II: Fauna. *Decheniana* 156: 261-286. (in German, with English summary) [Nordrhein-Westfalen, Germany; 6 odonate taxa are reported. *Calopteryx splendens* is accessed as regionally threatened.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, German. E-mail: martin-schluempmann@t-online.de

7964. Teixeira, D.M.; Nacinovic, J.B. (2003): Itens alimentares do colhereiro, *Ajaia ajaja* (Linnaeus, 1758) no Brasil central (Ciconiiformes, Threskiornithidae). *Arqui-*

vos do Museu Nacional, Rio de Janeiro 61(1): 49-54. (in Portuguese, with English summary) [The food of roseate spoonbill, *Ajaia ajaia* in Central Brazil was analyzed dissecting 20 stomachs of adult specimens obtained near the Fontoura Indian Post, Bananal island, State of Tocantins. 14 different food items among fishes (99% of total volume) and aquatic insects (0.4% of total volume). Four of the stomachs also contained larvae of Odonata.] Address: Nacinovic, J.B., Museu Nacional / UFRJ, Depto de Vertebrados. Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, RJ, Brasil

7965. Thipaksorn, A. (2003): Diversity, distribution and Wolbachia infection of rice field odonate insects in Thailand. M.Sc. diss., Fac. Graduate Stud., Mahidol Univ., Bangkok. ISBN974-04-3551-3: xiii+115 pp. ["Odonate insects are important predators of rice pests that play a valuable role in the rice ecosystem. Twenty-nine odonate species, 15 zygoptera and 14 anisoptera, were collected from rice fields in 36 provinces around Thailand from 1998 to 2000. Within all rice odonate species, three zygopteran species, *Agriocnemis pygmaea*, *Agriocnemis f. femina* and *Ischnura senegalensis*, had the highest numbers of individuals. Within the anisoptera, the species with the highest number of individuals was *Diplacodes trivialis*. The distributions of 15 coenagrionid and 11 libellulid odonate species were extended with many new provincial records. The distribution and phylogenetic relationships of the reproduction-modifying bacteria called Wolbachia in odonate insects were also studied. Using a PCR-based method and wsp gene primers, four odonate species, *Agriocnemis f. femina*, *Pseudagrion pruinatum* (Zygoptera), *Brachythemis contaminata* and *Neurothemis t. tullia* (Anisoptera) were found to be infected with Wolbachia and the percentage of Wolbachia infection among species of the Order Odonata was 13.79 %. All procedures used for phylogenetic reconstruction (maximum parsimony, maximum likelihood and neighbor-joining methods) place all odonate Wolbachia strains in the Con and Pip subgroups within the B group of Wolbachia strains. The wsp gene sequences of *Agriocnemis f. femina* and *Brachythemis contaminata* were in the Pip subgroup, but Wolbachia sequences from *Neurothemis t. tullia* and *Pseudagrion pruinatum* were grouped together into the Con subgroup of B group Wolbachia strains. The low Wolbachia infection frequencies and identical wsp gene sequences in odonate species that are not closely related suggest that Wolbachia might have recently invaded rice field odonate populations through some means of horizontal transmission. Identical wsp gene sequences were found from all three positive populations of *A. f. femina* collected from different regions of Thailand. This finding supports the hypothesis that Wolbachia-infected damselflies spread into uninfected populations. Further study should be done to investigate the rates at which Wolbachia-infected damselflies could spread into uninfected populations." (Author) "The subjects treated in this well-styled and beautifully produced dissertation were earlier summarized in 3 journal papers, viz. the diversity and distribution in *Malangpo* 18(2001): 171-174, and *Notulae odonatologicae* 6(2003): 20-24; and the Wolbachia infection in *Curr. Microbiol.* 47(2003): 314-318. As to the Thai ricefield Odonata, all species are here described and keyed, their distribution is listed per province (along with the quantitative data), and a map is provided. The distribution and phylogenetic relationships of the reproduction-modifying Wolbachia in *Agriocnemis f. femina*, *Pseud-*

agrion pruinatum, *Brachythemis contaminata* & *Neurothemis t. tullia* form the main and most important part of this work. All procedures used for phylogenetic reconstruction (maximum parsimony, maximum likelihood, and neighbour-joining methods) place the odonate Wolbachia strains (wsp gene sequences) in the Pip (*A. femina*, *B. contaminata*) and Con (*P. pruinatum*, *N. tullia*) subgroups within the B group of Wolbachia strains. The low infection frequencies and the identical wsp gene sequences in not closely related spp. suggest that Wolbachia might have recently invaded rice field odonate populations through some means of horizontal transmission." Address: Thipaksorn, A., Biol. Sect., Mahidol Wittayanusom Sch., Salaya, Phutthamonthon, Nakhon Pathom-73170, Thailand

7966. Whiteman, H.H.; Sheen, J.P.; Johnson, E.B.; Vandeuken, A.; Cargille, R.; Sacco, T.W. (2003): Heterospecific prey and trophic polyphenism in larval Tiger salamanders. *Copeia*, 2003(1): 56-67. (in English) ["Polyphenisms (environmentally cued polymorphisms) are ubiquitous, yet the specific proximate mechanisms producing alternative morphs are generally not well known. We tested hypotheses for the role of large heterospecific prey in the cannibalistic polyphenism within larval tiger salamanders, *Ambystoma tigrinum nebulosum*, to determine whether heterospecific prey directly or indirectly influence the production of cannibal morphs. Field surveys suggested, and laboratory experiments confirmed, that macroinvertebrate prey induce cannibals via an increase in body size variation within larval salamander populations. Dietary data and laboratory foraging experiments revealed that cannibals preferred conspecifics even when their capture success was greater on macroinvertebrates. Typical morphs, in contrast, consumed only macroinvertebrate and other prey and never successfully cannibalized conspecifics. Our results support the indirect hypothesis that cannibals are induced via increased body size variation within a population of larvae, as a result of differential consumption of large heterospecific prey, and do not rely on consumption of heterospecific prey once they are cannibals. The cannibalistic polyphenism is one example of phenotypic plasticity in which the functional significance and the proximate mechanisms producing the two morphs are becoming clearer, allowing further study of the molecular and physiological basis of the alternative phenotypes." (Authors) Odonata included into this study were larvae of *Coenagrion resolutum* and *Enallagma cyathigerum*.] Address: Whiteman, H.H., Dept Bio. Sci., Murray State University, Murray, Kentucky 42071, USA

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7967. Achmed, S.; Kashif, M.; Nisar, S. (2004): Efficacy of Monomethypo 5G and Chlorpyrifos 40EC against insect pests and their effect on natural enemies in rice eco-system. *Pak. Entomol.* 26(1): 87-94. (in English) ["An experiment for the efficacy of monomethypo 5G @ 7 kg arce-1 against rice leaf folder (*Cnaphalocrocis medinalis*, G.M), rice stem borers (*Tryporyza* spp.) and chlorpyrifos 40 EC @ 1000 ml acre-1 and effect on natural enemies (dragonflies, damselflies and green lacewings) was laid out in Randomized Complete Block Design (RCBD). Three treatments, i.e., monomethypo 5G, chlorpyrifos 40EC and a control were replicated thrice. Results showed that % leaf folder infestation level, pop-

ulation density of naiads and adults of Odonata and adults of green lace wings on Basmati super was not significantly different from that of Basmati-385 ($P=0.20$) for one tail and $P<0.41$ for two tail t-test. The effect of insecticides was more evident in chlorpyrifos 40EC than in monomehyppo 5G treated plots at 24, 46,72 hr, one week after the application compared to the check plots. It was also found that ~50% reduction in population of natural enemies of naiads and adults of Odonata flies and green lace wings was observed." (Authors)] Address: Nisar, S., College of Agriculture, University of Agriculture, DG Khan, Pakistan

7968. Bracken, B.; Lewis, C. (2004): First records and emergence of Variegated Meadowhawk (*Sympetrum corruptum*) in Prescott-Russell County. Ontario Odonata 4: 1-3. (in English) ["On 17-VIII-1997, at a sewage lagoon east of Ottawa, Canada near the town of Embrun (45.2584·N, 75.3313· W), we collected one teneral female *S. corruptum*, and observed a second teneral. This is the second record of the species for the Ottawa valley and the first record for eastern Ontario away from the Great Lakes. The new eastern Ontario record is an extension of 202 km northeast from the nearest known Ontario collection from Sandbanks Provincial Park (Prince Edward County) on Lake Ontario. The observation of these tenerals, incapable of flight, is also of interest in indicating emergence at the site." (Authors)] Address: Lewis, Christina Lewis, 22-246 Harcourt Ave. Ottawa, ON K2B 5C3, Canada. E-mail: ha-genius@primus.ca

7969. Bree, D. (2004): Additional records of Arrowhead Spiketail (*Cordulegaster obliqua*) in Ontario. Ontario Odonata 4: 6-8. (in English) ["*C. obliqua* is reported from two locations in eastcentral Ontario, Canada which are first county records for Peterborough and Frontenac. The nine previous records from Ontario are outlined. Information on the small stream habitats at the two new locations and on ovipositing behaviour is provided. Possible reasons for the rarity of this species in Ontario are discussed." (Author)] Address: Bree, D., Box 123, Bloomfield, Ontario K0K 1G0, Canada

7970. Cating, P.M. (2004): The Austral Spreadwing, *Lestes australis*, in Ontario. Ontario Odonata 4: 18-22. (in English) ["Documentation for the occurrence of *L. australis* in Ontario, Canada is discussed. No fully reliable Ontario records are known. The literature reports are problematic because they are based on females which cannot be identified with certainty. Other reports lack supporting evidence or the voucher lacks some characteristic features. More study of this species in Ontario is needed. Identification is discussed." (Author)] Address: Cating, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7971. Cating, P.M. (2004): Rapid recovery of Odonata populations at a completely dried up pond. Ontario Odonata 4: 15-17. (in English) ["In 2001, a shallow gravel pit pond completely dried up to a dusty sun-baked expanse and remained completely dry for three months. Water returned in 2002 and 14 species of adult Odonata, and over 100 individuals as well as 3 species of nymphs were observed. The uncommon *Enallagma aspersum* was present and *Lestes forcipatus* and *L. unguiculatus* were ovipositing at the pond. Periodically dry ponds are an important habitat for Odonata. To a degree their periodic drying out can be viewed as a ne-

cessary and natural process." (Author)] Address: Cating, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7972. Cating, P.M. (2004): Ontario Odonata records through the years. Ontario Odonata 4: 23-27. (in English) ["Records from the Ontario Odonata Database and those published in Ontario Odonata as part of the annual Ontario Odonata summary are mapped. For mapping purposes, the records were divided into the "Walker Period" with 6,000 records up to and including 1975, the 1976-1998 pre-annual summary period with 10,000 records, and then each year of the annual summary (1999-2001) including a total of almost 16,000 records. A map also features all the 32,000 Ontario records combined. These maps illustrate the tremendous amount of survey work (both historical and contemporary) that has occurred in Ontario, as well as identifying those areas that could most benefit from more detailed surveys in the future. They also demonstrate the effectiveness of a well-coordinated effort to compile and maintain records in a central repository." (Author)] Address: Cating, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7973. Cating, P.M. (2004): *Anax junius* overwintering in eastern Ontario. Ontario Odonata 4: 9-10. (in English) ["Populations of *A. junius* in southern Canada are both resident and migrant. The resident population is said to overwinter as half grown larvae and emerge in late June. A resident population has not been reported north of Toronto and was not expected in eastern Ontario based on a 1965 study at approximately the same latitude at Montreal which found no evidence of overwintering. In April 2002 overwintering larvae of *Anax junius* were found at three locations in the Ottawa and St. Lawrence valley regions of Ontario, far beyond the Carolinian region which was the previously known limit of resident populations." (Author)] Address: Cating, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7974. Cating, P.M. (2004): A preliminary study of dragonflies at eastern Ontario sewage lagoons in relation to water quality. Ontario Odonata 4: 28-32. (in English) ["To better understand the Odonata species composition at sewage ponds and its relationship to water quality, numbers of individuals of each species were recorded from 15 sewage ponds and the same data was collected for nymphs from 10 sewage ponds. The ponds studied were distributed throughout eastern Ontario. The numbers and presence of species was related to clarity which was shown to be related to water quality and chemical parameters. Seventeen species of adults and thirteen species of larvae were recorded. The predominant species were *Ischnura verticalis* and *Enallagma civile* and these were also characteristic of the poorest water quality. Species of *Lestes* and *E. ebrium* occurred only in the pools with relatively clean water. More species occurred in clean ponds." (Author)] Address: Cating, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7975. Cating, P.M. (2004): Another record of Zebra Mussel attached to an exuvium of *Epitheca princeps*, and inferences of effect. Ontario Odonata 4: 5. (in English) ["An exuvium of *E. princeps* with an attached Zebra Mussel was found 30 cm above the water level along the wall of a marina at Presqu'île Bay (44.0188 N,

77.7276 W, Northumberland Co.), Canada." Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

7976. Che Salmah, M.R.; Wahizatul Afzan, A. (2004): Distribution of Odonata (Insecta) in various ecosystems in northern Peninsular Malaysia. *Wetland Science* 2(3): 184-191. (in English) ["Odonata larvae and adults were collected from fourteen sites of various habitats including rivers, rice fields, mountain streams, freshwater and peat swamps, oil palm, sugarcane and rubber plantations and lake. Out of 51 species recorded, Libellulidae made up the most dominant of 10 families followed by Gomphidae and Coenagrionidae. Other families were less common. Riverine and stream ecosystems were the most diverse, both with six families and 19 and 13 species respectively. In the rice fields, Libellulidae and Coenagrionidae were represented by 17 and seven species respectively. The poorest fauna of Odonata was recorded from a lake system. A few of libellulids were found to be pollution tolerant and widespread in distribution. Many odonate species were restricted to preferred habitats or water parameter gradients that could be used as bioindicators of respective habitats or parameters." (Authors)] Address: Mrs. Wahizatul Afzan Bt. Azmi, Fac. Science & Technol., Kustem, Mengabang Telipot, 21030 Kuala Terengganu, Terengganu, Malaysia. E-mail: wahizatul@kustem.edu.my

7977. Clausnitzer, V. (2004): Ecology and biogeography of the dendrolimnetic *Coryphagrion grandis* (Odonata). In: Breckle, S.-W., Schweizer, B. & Fangmeier, A. (eds) "Results of worldwide ecological studies". Heimbach, Stuttgart: 243-256. (in English) ["A study on the ecology of *C. grandis* was undertaken in coastal forests of East Africa. The results are compared with other dragonfly species, known to breed in phytotelmata as well. These ecological and additional morphological and genetic results of this study show, that the monotypic *C. grandis*, which was placed for conveniences within the Megapodagriidae, belongs to the otherwise South and Central American Pseudostigmatidae. Although the separation from the neotropical Pseudostigmatidae occurred at least 100 million years ago, the morphology and biology *C. grandis* is still very similar to the former. These findings support biogeographical considerations about historical forest distribution in Africa, stability of East African coastal forests and the species loss due to extinctions in West and Central Africa. Since the future of *C. grandis* depends on the survival of the last coastal and lower Eastern Arc forests in East Africa, a short conservation chapter is added in the end." (Author)] Address: Clausnitzer, Viola, Friedländer Weg 53, 37085 Göttingen, Germany. E-mail: violacl@t-online.de

7978. Cook, J. (2004): Notable records of Emeralds (*Somatochlora* spp.) from Leeds-Grenville, eastern Ontario. *Odonata* 4: 4. (in English) [*S. forcipata* and *S. walshii*, both previously known from Mer Bleue bog, are reported for the second time in eastern Ontario. *S. williamsoni* also occurred at the location near a slow moving stream 2 km SW of Bishops Mills in a general region of extensive marshes and swamps. The distinction between females of *S. williamsoni* and *S. tenebrosa* is discussed.] Address: Cook, Joyce, R.R. 3 North Augusta Ont. K0G 1R0, Canada. E-mail: joyce-cook@carleton.ca

7979. Costa, S.M. (2004): Distribution and species richness of Odonate at Brookhaven National Laboratory. Prepared in partial fulfillment of the requirements of the Office of Science, DOE Science Undergraduate Laboratory Internships (SULI) Program under the direction of Dr. Timothy M. Green in the Environmental and Waste Management Services Division at Brookhaven National Laboratory: 17 pp. (in English) ["Odonate research was conducted at Brookhaven National Laboratory during the summer of 2004. The purpose for the research was to continue the Odonata research that began in the summer of 2003, which consisted of identifying and cataloging the specimens found at the Laboratory. Identification was to species level when ever possible. In addition the 2004 goal was to survey the bodies of water at the Lab primarily for adult odonates, to observe species richness, and catalog and preserve the specimens collected in support of the New York Odonate Atlas. To date a total of forty-six species have been identified at Brookhaven National Laboratory between the two summers of research. Twenty-five adults and twelve larvae were identified during the summer of 2003 and fifteen different adults species were found and identified during the summer of 2004. Future research may continue at the ponds in order to expand cataloging of Odonates; to possibly look at a link between species richness and pH of ponds; and to continue the larger on going biotic inventory of the Lab." (Author)] Address: Costa, Susan, SULI Program Community, College of Rhode Island, Brookhaven National Laboratory, Upton, New York

7980. González Soriano, E.; Delgado Hernández, O.; Harp, G.L. (2004): Libélulas de la Estación de Biología Chamela (Insecta: Odonata). In: Alfonso N. García Aldrete & Ricardo Ayala Barajas (Editores): *Artrópodos De Chamela*. Universidad Nacional Autónoma. ISBN: 9703216072: 37-61. (in Spanish) [For more details see: <http://books.google.com/books?hl=en&lr=&id=B4SGsUEYcM8C&oi=fnd&pg=PA37&dq=%22Lib%C3%A9lulas+de+la+Estaci%C3%B3n+de+Biolog%C3%ADa+Chamela%22&ots=gFqkTtN0zQ&sig=fCALX54o17ZQjWl0VRPKwLUQE>] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

7981. Kadoorie Farm and Botanic Garden (2004): Report of a Rapid Biodiversity Assessment at Luokeng Nature Reserve, North Guangdong, China, September 2002. South China Forest Biodiversity Survey Report Series (Online Simplified Version) 40. KFBG, Hong Kong SAR: II + 19 pp. (in English) ["23 species were recorded in Luokeng during the three-day survey. The most frequently encountered species was *Pantala flavescens*. The record of *Indocypha katharina* is new to Guangdong. This is a very restricted species and is previously known from only three sites, two in Guangxi and another in Sichuan (Wilson & Reels, 2003)." (Authors; K.D.P. Wilson)] Address: Kadoorie Farm & Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

7982. Kadoorie Farm and Botanic Garden (2004): Report of a Rapid Biodiversity Assessment at Heishiding Nature Reserve, West Guangdong, China, July 2002. South China Forest Biodiversity Survey Report Series (Online Simplified Version): No. 39. KFBG, Hong Kong SAR: II + 19 pp. (in English) ["37 species were re-

corded during the five-day survey. *Rhinocypha* sp. (*Aristocypha chaoi* sp.n.) is a species new to science and is being described. *Vestalis miao* and *Bayadera bidentata* are apparently new records for Guangdong province. The former has also been recorded from Guangxi and Hainan while the latter is known from Guangxi, Hubei and Zhejiang (Wilson & Reels, 2003)." (Authors; K.D.P. Wilson)] Address: Kadoorie Farm and Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

7983. Lekka, E.; Kagalou, I.; Lazaridou-Dimitriadou, M.; Albanis, T.; Dakos, V.; Lambropoulou, D.; Sakkas, V. (2004): Assessment of the Water and Habitat Quality of a Mediterranean River (Kalamas, Epirus, Hellas), in accordance with the EU Water Framework Directive. *Acta hydrochim. hydrobiol.* 32(3): 175-188. (in English, with German summary) ["In the present study, the water quality of Kalamas river (NW Greece) was evaluated using physicochemical and hydromorphological parameters and benthic macroinvertebrates. Statistical analyses (Cluster and FUZZY analyses) were performed and two biotic scores (BMWP' and HS) were used in order to classify the sites according to water quality. Kalamas river appeared to have excellent to moderate water quality at all sampling sites except one (close to the delta area) which was "fairly or significantly polluted". During the low flow season water quality appeared poorer than during the high flow season. The Greece ecological parameters (hydromorphological, chemical, and biological) used for this integrated approach are the ones proposed by the New Water Directive 2000/60 EC for an efficient surveying monitoring of running waters." (Authors) Taxa - including Odonata - are treated on the order level.] Address: Lazaridou-Dimitriadou, Maria, Department of Zoology, School of Biology, Faculty of Sciences, Aristotle University of Thessaloniki, 54006, Thessaloniki, Greece. E-mail: mlazarid@bio.auth.gr

7984. Płaska, W. (2004): The influence of predators on the forming of species diversity of zooplankton of some water ecosystems of the Łężna-Włodawa lake-land. *Teka Kom. Ochr. Kszt. Srod. Przyr.*, 2004,1: 180-183. (in Polish, with English summary) ["The studies were conducted within two lakes and two subsided ponds situated in the Leczna-Włodawa Lake District. In the studied water bodies, 73 zooplanktonic taxa were found to occur; the highest number of taxa - 44 - occurred in Lake Usciwierz, the lowest one - 24 - in the depression reservoir Szczecin. The highest values of frequency (35-40%) were found in Lake Usciwierz and the depression reservoir Nadrybie, the lowest one - from 10% to 19% - occurred in Lake Piastfczno and the depression reservoir Szczecin. The obtained results showed that within water bodies with escalating pressure of predators the species diversity of zooplankton was also high." (Authors) Odonata contributed highly to the biomass of predators.] Address: Płaska, W., Katedra Hydrobiologii i Ichtiologii Akademii Rolniczej, ul. Akademicka 13, 20-950 Lublin, Poland

7985. Pratt, P.D.; Paiero, S.M. (2004): *Archilestes grandis* (Rambur) (Odonata: Lestidae), new to Canada. *Ontario Odonata* 4: 11-12. (in English) ["One adult male *A. grandis* was collected while perched on foliage in the Ojibway Prairie Provincial Nature Reserve (42° 15' 43", 82° 04' 12") on August 26, 2002." (Authors)] Address: Pratt, P.D., 7100 Matchette Rd, La Salle, ON, Canada, N9C 2S3. E-mail: prairie@netcore.ca

7986. Armstrong, K.N.; Storey, A.W.; Davies, P.M. (2005): Effects of catchment clearing and sedimentation on macroinvertebrate communities of cobble habitat in freshwater streams of southwestern Australia. *Journal of the Royal Society of Western Australia* 88: 1-11. (in English) ["The removal of riparian vegetation from along first order streams of the northern jarrah forest reduced ecological health, as assessed by an examination of cobble communities. Macroinvertebrate diversity was significantly lower in cleared compared to uncleared reaches. There was also an associated decrease in the biomass and a change in the composition of epilithon communities, from those dominated by the angiosperm *Potamogeton ?crispus* to thin slimes dominated by diatoms. Extensive growths of filamentous algae were not observed on cobbles in cleared reaches. Species of Odonata (*Argiolestes minimus*), Ephemeroptera, Trichoptera and Chironomidae were the most notable absences from cobbles in cleared reaches. Grazer abundance also was reduced. Few species in cobble habitats appeared to benefit from catchment clearing although there was a significant increase in the abundance of the undescribed chironomid *Orthocladiinae* V61, which may be a useful indicator species. We also tested the effect of short term elevations in suspended sediment through experimental addition of sediment in an attempt to separate the effects of sediment from others related to catchment clearing. There was no significant difference in macroinvertebrate diversity between control and sediment-added cobbles, and both had higher diversity than cobbles in cleared reaches. We concluded that the changes in the epilithic cover in cleared reaches caused indirectly the changes in the macroinvertebrate community, either through a change in the composition of food sources or loss of refugia. Sedimentation in cobble environments might have greater impact in the longer term than noted in this study, and also might have impact on other stream mesohabitats." (Authors)] Address: Armstrong, K.N., School Animal Biology (M092), Univ. Western Australia, Crawley, WA 6009, Australia

7987. Boelter, R.A. (2005): Predation of native anurans by bullfrogs (*Rana catesbeiana*: Ranidae) in the South of Brazil. *Dissertação de Mestrado, Mestrado em Biodiversidade Animal, Universidade Federal de Santa Maria, RS, Brasil*: 36 pp. (in Portuguese and English) ["Bullfrogs have been introduced in many continents causing impact on native species. We have studied the influence of bullfrogs on the native anuran fauna through the diet analysis of 291 specimens, collected between May 2002 and June 2003, in an area in the South of Brazil. In order to check the feeding importance of the food items, the Pinkas index was used, classifying them by their relative importance (IRI). To analyze ontogenetic changes in the diet, we compared the variation among weight classes. The most important item found in the bullfrog diet was the anuran (IRI = 2157.71) from the Leptodactylidae, Hyliidae, Microhylidae and Ranidae families, totalizing nine preyed species. Anurans were found in all weight classes. These results show a potentially strong predation pressure on the native anuran fauna. A control program for this invasive species in natural environments in the South of Brazil is suggested to be undertaken urgently." (Authors) Odonata are represented as app. 10% of food items in bullfrog stomachs.] Address: Boelter, R.A., Curso de Mestrado em Biodiversidade Animal, Universidade Federal

de Santa Maria, Faixa de Camobi, Km 9, Bairro Camobi, Santa Maria, Rio Grande do Sul Brasil, Cep.: 97105-900. E-mail: rubinhoboelter@brturbo.com.br

7988. Brito-Junior, L. de; Pegado Abílio, F.J.; Watanabe, T. (2005): Aquatic insects of São José dos Cordeiros dam (Paraiban semiarid) with emphasis in Chironomidae. *Entomol. Vect.* 12(2): 149-157. (in Portuguese, with English summary) [Brasil; Chironomidae and additional aquatic insects of São José dos Cordeiros dam, in São José dos Cordeiros-PB (07°23'S 36°49'W) were bimonthly collected between July 1998 and July 1999. The insect fauna was sampled randomly with a hand net. Dominant taxa were Aedokritus (Chironomidae) and Gomphidae.] Address: Pegado Abílio, F.J., Depto de Metodologia da Educação, Centro de Educação e Depto de Sistemática e Ecologia, Centro de Ciências Exatas e da Natureza, Universidade Federal da Paraíba, Rua Maria Rosa Padilha 84, Edifício Aeroville, Ap. 210, Bairro Bessa, CEP: 58037-260 João Pessoa, Paraíba. E-mail: chicopegado@hotmail.com

7989. Carvalho, A.L.; Wernck-de-Carvalho, P.C. (2005): Descrição da larva de *Orthemis cultriformis* Calvert, 1899 (Insecta, Odonata, Libellulidae). *Arquivos do Museu Nacional, Rio de Janeiro* 63(2): 267-273. (in Portuguese, with English summary) ["The ultimate instar larva of *O. cultriformis* is described and figured based on reared specimens from Magé, RJ, Brazil. This larva is compared in a table with those other six known of the genus, using features of the external morphology. A preliminary key to the known larvae of the genus is appended." (Authors)] Address: Carvalho, A.L., Museu Nacional / UFRJ, Depto de Entomologia, Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, RJ, Brasil.

7990. Catling, P.M.; Cannings, R.A.; Brunelle, P.M. (2005): An annotated checklist of the Odonata of Canada. <http://www.bcarchives.bc.ca/ContentFiles/Files/Collections%20and%20Research/Natural%20History/Entomolog y/CanadaOdonatalistPDFNov05.pdf>: 33 pp. (in English) ["This list of the 208 species of Canadian Odonata is current as of December 2004. It uses the scientific nomenclature and English names of the North American list [...]. Most French names come from Pilon and Lagacé (1998), which includes only those species known in the province of Québec as of the date of that publication. We encourage the development of appropriate French names for the whole Canadian fauna. Following the List of Species is a table of species occurrence by province and territory with rankings indicating national and provincial conservation status. Also included are recent additions to the Canadian fauna, taxonomic notes and an extensive list of references that provides the basis for decisions on occurrence and status." (Authors)] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada. E-mail: as849@chebucto.ns.ca

7991. Denk, T.; Seehofer, H.; Berg, H.M.; Braun, M.; Hochebner, T.; Jäch, M.A. (2005): Biotoperhebung Garnisonsübungsplatz (GÜPI) Völtendorf bei St. Pölten, NÖ. *Vegetationskundliche und faunistische Kartierung 2000-2001. Wiss. Mitt. Niederösterreich. Landesmuseum* 17: 183-264. (in Berg, H.-M., *Naturhistorisches Museum, 1. Zoologische Abteilung, Burgring 7, A-1010 Wien, Austria.* E-mail: hans-martin.berg@nhm-wien.ac.at) [20 out of the 69 odonate species known in Nieder-

österreich (Austria) were recorded. Most species were those characteristic of ephemeral water bodies, created by military use of the landscape. *Lestes barbarus* and *Ischnura pumilio* build up large populations.]

7992. Dohogne, R. (2005): Observation originale de la Cordulie à corps fin, *Oxygastra curtisii* (Dale, 1834) (Odonata, Cordulidae) en Limousin et dans l'Indre. *Epops* 65: 53-55. (in French) [Brief report on the record of *O. curtisii* in June 2004 at lake Pontauzier, near Châtre-Langlin, France.] Address: <http://www.epol.asso.fr/@Publications/@EPOPS/Epops65.pdf>

7993. Englund, R.A. (2005): Threats to native aquatic insect biodiversity in Hawai'i and the Pacific and challenges in their conservation. Dissertation, University of Hawai'i: IX, 202 pp. (in English) [Although the decline in numbers and diversity and threat to native insects in the Hawaiian Islands is widely recognized by field scientists there has been little progress in either documenting the real decline of native species, or in demonstrating specific causes of the overall decline of these species. Additionally, few conservation actions to either restore populations or mitigate actual threats to native arthropods have been mentioned in the literature. The following chapters examine several assessments of relevant aquatic systems and the native aquatic insects dwelling within, where there has either been a perceived or real decline of these native Hawaiian aquatic arthropods because of threats from invasive or introduced species. The large adaptive radiation of the endemic native damselflies (Coenagrionidae: Megalagrion) in Hawai'i has received considerable attention and study since at least the 1880s. Endemic Megalagrion are in many ways reflective of a great loss because they are largely now found in remote upper headwater areas of streams, yet they also represent the hope of preserving highly diverse freshwater ecosystems found throughout the Hawaiian archipelago. The first two chapters of this dissertation examine the impacts of two differing taxa of introduced fish on Hawaiian Megalagrion, Pocciliidae (livebearers or mosquitofish family) and Salmonidae (trout). The effects of each fish species on native aquatic insects depended mainly on the invasive status of each group; for example. Chapter 1 (Englund 1999) examines the impacts of introduced poeciliids on native damselflies. Damselflies were completely eliminated on the island of O'ahu wherever species in the highly invasive mosquitofish family were found, and only remnant populations were found in high elevations lacking introduced fish. Chapter 2 (Englund and Polhemus 2001) examines the impacts of the non-invasive rainbow trout (*Oncorhynchus clarki*) on Megalagrion damselflies. Damselflies and all other native aquatic insects were not found to be harmed by trout in the uppermost elevations of Kaua'i streams where trout reproduce naturally, and even had more robust populations than in some nearby non-trout containing streams. The lack of impacts on native damselflies by a large, generalist predator such as rainbow trout pointed out a seeming paradox. Whereas the small but ubiquitous mosquitofish appears to have completely devastated native aquatic fauna wherever it has been introduced outside of its natural range, trout, because of their restricted range and smaller population sizes have had minimal, if any impacts on native invertebrates in Hawai'i. Because introduced fish species have caused either the extinction or severe range contractions of Megalagrion damselflies in Hawai'i, long-term monitoring of the remnant

populations has become necessary to preserve these remaining populations. Chapter 3 (Englund 2001) provides a case study in both the monitoring and preservation of a remnant O'ahu damselfly population now found in only 95 m of Ashless stream at the Tripler Army Medical Center. Chapter 3 also provides several harrowing examples of how this species was nearly eliminated in the past 10 years through accidents and mismanagement. Not only are the endemic *Megalagrion* now missing from all lowland areas of O'ahu (with the exception of the Tripler population), lowland aquatic insect diversity throughout O'ahu is at a remnant status, and biodiversity surveys for native aquatic insects in the Pearl Harbor watersheds in Chapter 4 (Englund 2002) indicated a near absence of native aquatic insects in these freshwater habitats. Lower Pearl Harbor watersheds were documented to have lost many native aquatic insect taxa such as all native Heteroptera, damselflies, Coleoptera, and many Diptera species, while introduced insect species were abundant. A variety of conservation measures have been suggested to either restore or maintain the current levels of freshwater biodiversity in Hawai'i. In Chapter 5 (Englund and Filbert 1999), the case of significantly increasing and restoring stream flow in a formerly diverted stream was examined to determine whether this factor alone would lead to a restoration of native aquatic species. It was found that merely increasing stream flow by itself was not enough to rid the stream of any alien aquatic species, in fact, several new nonindigenous aquatic species became established after stream flows were increased. The results of Chapter 5 confirm that an integrated, balanced and possibly drastic approach will be required to maintain and preserve Hawai'i's native aquatic insect fauna. A wide-variety of conservation measures in the Hawaiian archipelago will be needed to maintain current biodiversity levels, and also hopefully restore native freshwater biodiversity in selected areas. To put the Hawai'i problem into perspective, a brief review of the impacts of invasive species on native insects in other tropical areas is provided in Chapter 6. This review chapter also provides a synthesis of the problem facing Hawaiian freshwater insects and other terrestrial arthropods in Hawai'i and elsewhere due to invasive species, and how the Hawaiian case study of invasive species impacts has many parallels to other vulnerable biotas. Finally, drawing on a mixed record of past mistakes and successes in Hawai'i and elsewhere, some potential practical conservation measures intended to preserve and restore endemic island aquatic insects are provided in Chapter 6." (Author)] Address: Englund, R.A., J. Linsley Gressitt Center for Entomological Research, Bishop Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA. E-mail: englund@bishopmuseum.org

7994. García Ruiz, A. (2005): Importancia de las lagunas temporales para la conservación de la biodiversidad de artrópodos edáficos en zonas agrícolas de Castilla-La Mancha. *Limnetica* 24(1-2): 83-90. (in Spanish, with English summary) ["The aim of this work is the comparative study of the soil arthropod communities in two transient lagoons from Castilla-La Mancha, by the use of pit-fall type traps. In the study areas sites with different environmental characteristics were identified. Analysis of frequency, abundance and richness and multivariate analyses were performed to detect preferences for particular habitats among the groups found." (Authors) Arthropods including Odonata are treated on

the order level.] Address: García Ruiz, A., Depto de Didácticas Específicas. Facultad de Formación de Profesorado y de educación. Univ. Autónoma Madrid. 28049 Madrid, Spain. E-mail: andres.garcia.ruiz@uam.es

7995. Gerecke, R.; Stoch, F.; Meisch, C.; Schrankel, I. (2005): Die Fauna der Quellen und des hyporheischen Interstitials in Luxemburg Unter besonderer Berücksichtigung der Milben (Acari), Muschelkrebse (Ostracoda) und Ruderfusskrebse (Copepoda). *Ferrantia* 41: 134 pp. (in German, with English and French summaries) [*Aeshna cyanea* (n = 1) and *Cordulegaster bidentata* (n = 3) were reported from a few sampling sites.] Address: Meisch, C., Musée nat. d'histoire naturelle Luxembourg, 25, rue Munster, L-2160 Luxembourg, Luxembourg. E-mail: claude.meisch@education.lu

7996. Hurtado, S.; Garcia-Trejo, F.; Gutierrez-Yurrita, P.J. (2005): Importancia ecológica de los macroinvertebrados bentónicos de la subcuenca del Río San Juan, Querétaro, México. *Folia Entomot. Mex.*, 44(3): 271-286. (in Spanish, with English summary) [Three sections of river Río San Juan with different impacts / degradation by man were surveyed: "before the dam (1) and just after the dam (2), these areas have moderate and high impact levels, respectively; the third place was located close to the lower section of the San Juan river, Boyecito spring (3), and has no negative impact, apparently. Alpha- and beta-diversity-indices were assessed for each locality and for the entire basin, respectively." 19 orders were collected from the first site: Diptera was the dominant order (51.8%). 16 orders were collected from the second site; Amphipoda and Diptera were the dominant groups (35.2 and 25%, respectively). 19 orders were collected from the third site: Diptera was the dominant order (41.4%). "The less deteriorated site was Boyecito, being this site the only one that can keep constant its diversity levels during a hydrological cycle. Whereas, Tecozautla river showed in its great variations of diversity levels during the hydrological cycle the effects of regulating its water due to the dam. Action plans to conserve the ecological integrity of the basin are proposed." The study includes Odonata, as all taxa on the order level.] Address: Gutierrez-Yurrita, P.J., Laboratorio de Ecofisiología, Facultad de Ciencias Naturales, Universidad Autónoma de Querétaro, Campus Junquilla, Carretera estatal a Juriquilla s/n. Querétaro 76230, Qro., México. E-mail: yurrita@uaq.mx

7997. Pegado Abílio, F.J.; Fonseca-Gessner, A.A.; Watanabe, T. Leite, R.L. (2005): *Chironomus* gr. *decorus* (Diptera: Chironomidae) and others [sic] aquatic insects in a temporary dam from Paraíba semi-arid, Brazil. *Entomol. Vect.* 12(2): 233-242. (in Portuguese, with English summary) [The taxa list includes Odonata at the family level.] Address: Pegado Abílio, F.J., Depto de Metodologia da Educação, Centro de Educação e Depto de Sistemática e Ecologia, Centro de Ciências Exatas e da Natureza, Universidade Federal da Paraíba, Rua Maria Rosa Padilha 84, Edifício Aeroville, Ap. 210, Bairro Bessa, CEP: 58037-260 João Pessoa, Paraíba. E-mail: chicopegado@hotmail.com

7998. Stevens, L.E.; Bailowitz, R.A. (2005): Distribution of *Brechmorhoga* clubskimmers (Odonata: Libellulidae) in the Grand Canyon region. *Western North American Naturalist* 65(2): 170-174. (in English) ["We examined the distribution of *B. mendax* and *B. pertinax* in northern Arizona and southern Nevada. *Brechmorhoga*

mendax occurs widely throughout the Southwest and in Arizona up to the Mogollon Rim, and up the Colorado River from the west to at least River Mile 132 (downstream from Lees Ferry, Arizona) at elevations of 110–1460 m. In Grand Canyon it occurs along small to large tributaries and on the mainstream at elevations below 650 m. The only previously reported locality for *B. pertinax* in the United States is in southeastern Arizona, where it was presumed to be accidental. We report *B. pertinax* along 5 small, perennial tributaries emanating from Redwall Formation aquifer springs on the south side of central Grand Canyon. Those springs habitats may be threatened by regional groundwater depletion. *B. pertinax* appears to be somewhat more stenotolerant in its habitat requirements than *B. mendax*, a finding in keeping with these differences in range. The presence of isolated populations of *B. pertinax* in Grand Canyon is an example of a Neotropical influence on the fauna and indicates biogeographic corridor and refuge functions of this large, deep canyon." (Authors)] Address: Stevens, L.E., Museum of Northern Arizona, 3101 N. Ft. Valley Rd, Flagstaff, AZ 86001, USA. E-mail: farvana@aol.com

7999. Toth, S. (2005): Monitoring dragonflies on the section of the Dráva between Ortilos and Vízvár (Insecta: Odonata). *Natura Somogyiensis* 7: 35-48. (in English) ["The power plant planned on the Croatian section of the Drava can result in unfavourable changes in the fauna of wetlands by the river and may - among others - affect the dragonflies developing there, too. This necessitates the long-term monitoring of the local dragonfly fauna. Already the experiences of the first few years of monitoring referred to the fact that the shallower wetlands of the area are particularly vulnerable. In the course of the examination, it turned out that the dragonfly fauna of the area is rich- 14 of the 48 species detected so far are protected by law. Outstanding among these are the 5 taxa listed in the Bern Convention (*Aeshna viridis*, *Gomphus flavipes*, *Ophiogomphus cecilia*, *Leucorrhinia caudalis*, *L. pectoralis*). The composition of the local fauna - similarly to the national situation - is dominated by Pontic-Mediterranean, Siberian and West-Siberian faunal elements. However, the proportions alter to some extent from group to group. The author gives a detailed analysis of the composition of the fauna of the individual sampling sites and offers a separate depiction of the quantitative composition of the fauna according to the suborder." (Author)] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

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8000. Bentley, C. (2006): Reports from Coastal Stations - 2006: Rye Harbour Nature Reserve, East Sussex. *Atropos* 30: 63-64. (in English) [UK; *Anax parthenope*, *Erythromma viridulum*, *Lestes dryas*] Address: not stated

8001. Bowman, N. (2006): Reports from Coastal Stations - 2006: Eccles-on-Sea, Norfolk. *Atropos* 30: 77-78. (in English) [UK; *Erythromma viridulum*, *Anax parthenope*, *Calopteryx splendens*] Address: not stated

8002. Buchwald, R. (2006): Libellen – Kleinode unserer Gewässer. NVN/BSH 3/06 (Naturschutzverband Niedersachsen/Biologische Schutzgemeinschaft Hunte

Weser-Ems): 4 pp. (in German) [General on Odonata.] Address: Buchwald, R., Universität Oldenburg, Institut für Biologie und Umweltwissenschaften (IBU), 26111 Oldenburg, Germany. E-mail: rainer.buchwald@uni-oldenburg.de

8003. Cano Villegas, F.J.; Gomez, B. (2006): Confirmación de la presencia de *Aeshna affinis* Van der Linden, 1820 (Odonata, Aeshnidae) en Andalucía. *Boletín de la S.E.A.* 39: 150. (in Spanish) [29-VI-2006, a male of the rare Andalusian *A. affinis* was caught at Encantada (alt. 450 m a.s.l., UTM 30S 033827 420483), Sierra Morena cordobesa, Spain.] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: fjcanovi2@hotmail.com

8004. Clancy, S. (2006): Reports from Coastal Stations - 2006: Dungeness area, Kent. *Atropos* 30: 64-67. (in English) [UK; *Anax parthenope*, *Sympetrum fonscolombii*, *Erythromma viridulum*, *Calopteryx splendens*] Address: not stated

8005. Cordoba-Aguilar, A.; Contreras-Garduno, J. (2006): Differences in immune ability in forest habitats of varying quality: dragonflies as study models. In: Rivera, AC (ED). 2006. Forests and Dragonflies. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. *Pensoft Series Faunistica* 61: 268-278. (in English) ["In this chapter we review the potential use of dragonflies for testing current ideas of differences in immune ability related to habitat quality. It is known that immune ability in insects can be affected by a number of biotic and abiotic factors. We briefly review these factors in dragonflies. Given the fact that the same species of dragonfly may live in forests of varying quality (e.g. food abundance), this can lead to immune ability differences among dragonfly populations. We examine the literature regarding this, in particular studies of varying parasite burden and immune ability to advance the hypothesis that forest quality can be assessed using immune ability. One particular trait that may be used for this is male wing pigmentation. Current knowledge suggests that this trait is sexually selected (the more pigmentation, the more successful the male is in leaving more offspring), sensitive to environmental stress (such as food supply) and an indicator of immune ability. These conditions make pigmentation ideal to see the response of dragonflies to forest quality and environmental stress." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

8006. Darke, J. (2006): Reports from Coastal Stations - 2006: Skomer Island NNR, Pembrokeshire. *Atropos* 30: 83-84. (in English) [UK; *Sympetrum danae*, *Orthetrum cancellatum*, *Cordulegaster boltonii*, *Aeshna mixta*, *Anax imperator*] Address: not stated

8007. Davidson, P.J.A. (compiler) (2006): The biodiversity of the Tonle Sap Biosphere Reserve. 2005 status review. Technical report for the UNDP/GEF funded Tonle Sap Conservation Project. Wildlife Conservation Society, Phnom Penh: 76 pp. (in English) [The Tonle Sap Great Lake is the largest permanent freshwater lake in Southeast Asia. It is situated in the centre of the low-lying Cambodian plain, which has an average elevation of 10-30 m asl. The paper compiles available data on biodiversity of the locality. Eight dragonfly spe-

cies were identified during a visit to Prek Toal on 7 February 2003 (P.K. Batchelor in litt. to Sam Veasna Centre for Wildlife Conservation, 2003): *Pseudagrion rubriceps*, *Brachythemis contaminata*; *Crocothemis servilia*, *Orthetrum sabina*, *Rhyothemis phyllis*, *R. variegata*; *Tholymis tillarga*, and *Trithemis pallidinervis*.] Address: not stated

8008. Deans, M. (2006): Reports from Coastal Stations - 2006: Bawdsey Peninsula, Suffolk. *Atropos* 30: 73-75. (in English) [*Erythromma viridulum*, *Sympetrum striolatum* (at light)] Address: not stated

8009. Djernaes, M.; Damgaard, J. (2006): Exon-Intron structure, paralogy and sequenced regions of elongation factor-1 alpha in Hexapoda. *Arthropod Systematics & Phylogeny* 64(1): 45-52. (in English) ["Elongation factor-1 alpha (EF-1a) is already widely used and shows even more promise for phylogenetic studies of Hexapoda. However, paralogous copies and the presence of nitrons pose problems. We survey exon-intron structure, presence of paralogous copies and the number and extent of sequenced regions in all hexapod orders. We assess the phylogenetic utility of the exon-intron structure of EF-1a, which is unexpectedly dynamic with widespread losses and several independent instances of intron gain. Paralogous copies of EF-1a are present in Hemiptera, Thysanoptera, Neuropterida, Coleoptera, Hymenoptera and Diptera. With the presented information about exon-intron structure and paralogous copies, researchers will be able to realise the full phylogenetic potential of EF-1a, including exon-intron structure as this can provide additional characters and help to define clades and paralogous copies. We recommend a suitable focus region of 500 bp for future studies of EF-1a in Hexapoda." (Authors) The study includes Odonata.] Address: Damgaard, J., Biological Institute and Zoological Museum, University of Copenhagen, Denmark. E-mail: JDamgaard@bi.ku.dk

8010. Eason, P.K.; Switzer, P.V. (2006): International Journal of Comparative Psychology 19: 268-281. (in English) ["Spatial learning is evident in dragonflies on a variety of spatial scales. Mature dragonflies must be able to locate a variety of features in the habitat that are critical to survival and reproduction, including sites for breeding, foraging, roosting, and thermoregulating. In many species, these sites do not coincide in space. Because individuals may repeatedly use particular sites for different activities, they must learn both the locations of these sites and routes among them. Further evidence of spatial memory in dragonflies is provided by their site specificity on a finer scale. Breeding males, for example, often are faithful not only to a particular area, but to a specific territory site within that area. Males appear to become faithful to a territory site through localization, a process during which they explore the site and develop a spatial map of the location of the territory and its resources. Males also respond to their interactions with other individuals, adjusting both their choice of territories and their space use within their territories to reflect those interactions. In eastern amberwing dragonflies (*Perithemis tenera*), males are not faithful to territories on which they have lost a fight with another male; in contrast, males are more likely to be faithful to territories on which they successfully mated than to territories on which they obtained no matings. Similarly, while on territories, male amberwings adjust their position in response to negative and positive interactions. They

move away from the side of the territory from which neighbors most frequently intruded, and they move toward locations from which they pursued a female. Territorial amberwings thus modify their space use at both the territory and within-territory spatial scale in response to their social environment. Their responses are consistent with the hypothesis that they learn from their positive and negative experiences and adjust their future space use accordingly. Further study of spatial learning in dragonflies would greatly enhance studies of dragonflies' behaviour and ecology, and help us understand learning in general." (Authors)] Address: Eason, P.K., Dept of Biology, University of Louisville, Kentucky 40292, U.S.A. E-mail: perri.eason@louisville.edu

8011. Gapud, V.P. (2006): Damselflies (Odonata: Zygoptera) of Greater Luzon, Philippines with description of two new species. *Philippine entomologist* 19(2): 1-42. (in English) ["39 species of damselflies are recorded for Greater Luzon. Of these, 21 are endemic to Luzon and 11 are endemic to the Philippines. Two new species, *Drepanosticta makilingia* and *Amphicnemis isabelae*, are described and illustrated. Thirty of the 39 species are similarly illustrated. The Philippine Odonata are represented by 309 species (Hämäläinen & Müller 1997) with an overall endemism of 65.7%. Of these, the Zygoptera include 186 species with very high endemism (85.5%). Majority of endemic damselflies such as *Risicnemis*, *Drepanosticta*, *Argiolestes*, *Rhinagrion*, *Amphicnemis*, and *Teinobasis* are forest dwellers. Many species remain undescribed and are waiting to be discovered. In 2001, *Argiolestes baltazarrae* Gapud and Recueno-Adorada, was described from a lowland forest beside an inundative river in Digsinan, San Mariano, Isabela, within the Northern Sierra Madre Natural Park. It is not known how many new species will turn out in this biodiversity corridor." (Author)] Address: Gapud, V.P., Univ. Philippines, Coll. Agr., Pest. Biol. and Biodivers. Div., Los Banos 4031, Philippines

8012. Hadrys, H.; Clausnitzer, V.; Groeneveld, L.F. (2006): The present role and future promise of conservation genetics for forest Odonates. In: Rivera, AC (ED). 2006. Forests and Dragonflies. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. *Pensoft Series Faunistica* 61: 279-299. (in English) ["Although the history of conservation genetics as a discipline dates back more than two centuries, odonates have only recently entered the scene. This is highly unfortunate since – especially in tropical forests – odonates may serve as prime examples for the application and potential of conservation genetic research. Faced with the same conservation problems as the forests themselves, they epitomize the difficulties of maintaining biodiversity in tropical forests. To date, no data exist on population structures, dynamics, viabilities or histories of afro-tropical forest odonates. Below, a case study is introduced that demonstrates the application of population genetic research to three African damselfly species of the genus *Pseudagrion*. The three species selected represent a habitat gradient ranging from open habitats in Namibia to isolated mountain forests in Kenya and Tanzania. The results of mitochondrial (ND1) sequence analyses revealed strong inter- and intraspecific differences in the population structures of all three species, reflecting their habitat adaptations and demographic distribution. Mean genetic diversity and genetic isolation patterns increased with habitat specificities and restricted distributional range of the species. The two species

with a wider distributional range, *Pseudagrion massaicum*, and *P. kersteni* displayed similar low genetic diversities in Namibia but showed considerable differences in population sub-structures between Namibian and East African populations. The third species, *P. bicocculans*, an endemic of high-elevated mountain forests in Kenya and Tanzania, shows a multifold higher genetic diversity and complete genetic isolation between populations. The comparison with divergence values of true species suggests, that speciation in this species is well advanced. Given that the strong divergence patterns are neither correlated with geographic distance nor with the differences in morphological traits, the results provide a good example on how genetic data can provide information about conservation units and cryptic speciation processes. Future challenges in conservation genetic research for tropical forest species should focus on establishing as many genetic species profiles of current conditions as possible. Those data sets are valuable snapshots of the current conditions and may serve as calibration points for future conservation work." (Authors)] Address: Hadrys, Heike, ITZ, Ecology & Evolution, TiHo, D-30559 Hannover, Germany

8013. Harvey, R.; Higgott, J. (2006): Reports from Coastal Stations - 2006: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 30: 75-76. (in English) [UK; *Anax parthenope*, *Anaciaeschna isosceles*, *Erythromma viridulum*] Address: not stated

8014. Hunter, I. (2006): Reports from Coastal Stations - 2006: Elms Farm, Icklesham, East Sussex. *Atropos* 30: 62-63. (in English) [UK; *Erythromma viridulum*] Address: not stated

8015. Jarman, N.; Morris, T. (2006): Reports from Coastal Stations - 2006: Kingsdown Beach and St Margaret's at Cliffe, Kent. *Atropos* 30: 67-69. (in English) [UK; *Erythromma viridulum*] Address: not stated

8016. Joniak, T.; Domek, P. (2006): Influence of humification on biodiversity of lake benthic macroinvertebrates. *Acta Agrophysica* 7(2): 363-368. (in English, with Polish summary) ["The work presents the taxonomic composition and abundance of macrozoobenthos in 3 humic lakes, each undergoing different stages in the process of humification. The potential influence of habitat conditions was defined, modified under the influence of the humic substances, on biodiversity and the number of benthic invertebrates. Fish were also researched in an attempt to define the possibility of their influence on the benthic fauna." (Authors) The taxa list includes six Odonata.] Address: Joniak, T., Dept of Water Protection. Adam Mickiewicz University, ul. Drzymały 24, 60-613 Poznań, Poland. E-mail: tjoniak@wp.pl

8017. Kim, D.G.; Yum, J.W.; Yoon, T.J.; Bae, Y.J. (2006): Effect of temperature on hatching rate of *Nannophya pygmaea* eggs (Odonata: Libellulidae). *Korean J. Appl. Entomol.* 45(3): 381-383. (in English) ["The hatching rate of the eggs of *N. pygmaea*, an endangered dragonfly species in Korea, was experimented in different temperature conditions (10, 15, 20, 25, and 30 °C) in laboratory. *N. pygmaea* eggs were collected from female adults inhabited a small wetland in Mungyong-si, Gyeongsangbuk-do, Korea, in July 2006. The hatching rate was evaluated from the number of hatched nymphs for the period of 100 days. As a result, the hatching rates were 83, 89, and 76% at 20, 25, and 30 deg C, respectively; however, eggs were not hatched at

10 °C and 15 °C during the experiment period. The derived thermal threshold for egg hatching was 14.3 °C, which is relatively higher than the values of other temperate dragonflies." (Authors)] Address: Bae, Y.J., Seoul Women's University, Seoul, Republic of Korea. E-mail: yjbae@swu.ac.kr

8018. Kishimoto, N.; Natori, M.C.; Higuchi, K.; Ukegawa, K. (2006): New deployable membrane structure models inspired by morphological changes in nature. American Institute of Aeronautics and Astronautics, 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Newport, Rhode Island, 2006/05/01 - 2006/05/04 : 10 pp. (in English) ["Some characteristics of morphological changes in nature are discussed and morphological changes in space structure systems are investigated. Essentially space structure systems change their forms and functions, since they must be initially stowed due to spatial constraints of transportation systems, and deployed in their designed orbits. Recently various concepts of membrane structures are proposed for future large space systems, since they can be compactly stowed, and can easily realize space structures with large area. In their developments, it is a major important issue to ensure the reliability of their deployment processes. From the viewpoint of deployment processes, various morphological changes of some plants, insects (including *Anax parthenope* and *Davidius nanus*), and animals are investigated. The efficient characteristics in their morphological changes such as high redundancy, sequential deployment, utilization of gravity forces, and so on are introduced. A new concept of deployable membrane structure models derived especially from the observation of insects' metamorphosis including eclosion of butterflies, dragonflies, cicadas, and so on is proposed. Numerical results of its deployment behaviour are also shown." (Authors)] Address: Kishimoto, N., Institute of Space and Astronautical Science / Japan Aerospace Exploration Agency 3-1-1 Yoshinodai, Sagamihara, Kanagawa 229-8501, Japan

8019. Knill-Jones, S. (2006): Reports from Coastal Stations - 2006: Isle of Wight. *Atropos* 30: 58-60. (in English) [UK; *Sympetrum fonscolombii*, *Erythromma najas*] Address: not stated

8020. Li, C.W.; Cook, S.B.; Li, P.; Hollingsworth, J. W. (2006): Influence of water quality on macroinvertebrate population and diversity. *Journal of Environmental Hydrology* 14(Paper 11): 13 pp. (in English) ["Water samples from rural and urban watersheds around Cookeville, TN, USA were collected and analyzed. GIS was used to delineate watersheds, and land use and land cover data were computed to obtain urban areas in each watershed. Water samples were collected from three sites, all 3rd ordered streams. [...]. Habitat assessment and land use data were compared to measurements of water quality. Computation from percent dominance and percent clingers showed that watersheds exert their own characteristics. Percent urban area has negative impact on the diversity of macroinvertebrate community and dominance. Habitat assessment also supports such findings." (Authors) Gomphidae, Gomphus are listed from Blackburn Fork.] Address: Li, P., Department of Earth Sciences, Tennessee Technological University, Cookeville, TN 38505, USA. E-mail: pli@tntech.edu

- 8021.** Luque Pino, P.; Serra Sorribes, A. (2006): *Macromia splendens* i *Gomphus graslinii*, dues noves espècies d'odonats per a Catalunya. *Butll. Inst. Cat. Hist. Nat.* 74: 113-116. (in Spanish) [Spain; *M. splendens*: Locality: near Vidre, river Algars, community of Arnes, 31TBF6826, 555 m asl, 15-VI-2007, 23-VI-2007 i 07-VII-2007. *G. graslinii*: Localities: rivers Algars and Estrets, communities Vidre, Arnes, Horta de Sant Joan, end of June and early July 2007.] Address: Luque Pino, P., Museu Comarcal del Montsià, Gran Capità, 34. E-43870 Amposta, Spain. E-mail: odonats@yahoo.es
- 8022.** McMurray, P.D.; Newhouse, S.A. (2006): An annotated list of the aquatic insects collected in 2004 in the Wabash River watershed, Indiana. *Proceedings of the Indiana Academy of Science* 115(2): 110-120. (in English) [USA; In 2004, 47 streams and rivers within the Wabash River watershed were sampled. More than 5500 aquatic insect specimens, representing 229 taxa were collected. "Diptera (73 taxa) was the most diverse insect order followed by Coleoptera (43 taxa), Odonata (31 taxa), Ephemeroptera (25 taxa), Trichoptera (23 taxa), Hemiptera (20 taxa), Plecoptera (7 taxa), Megaloptera (5 taxa), and Lepidoptera (2 taxa). We collected 50–70% of the families, 21-45% of the genera, and 9–17% of the species of Ephemeroptera, Odonata, Plecoptera, and Trichoptera currently reported from Indiana. The upper Wabash sub-watershed had the greatest number of insect taxa (148) while the lower Wabash sub-watershed had the fewest taxa (119)." (Authors) *Calopteryx maculata* was found at more than 50% of the sites.] Address: McMurray, Jr, P.D., Indiana Dept Environmental Management, Biol. Studies Section, 100 North Senate Av., Indianapolis, Indiana 46204 USA
- 8023.** Mesquita, D.O.; Colli, G.R.; Costa, G.C.; Franca, F.G.R.; Garda, A.A.; Peres Jr., A.K. (2006): At the water's edge: Ecology of semiaquatic teiids in Brazilian Amazon. *Journal of Herpetology* 40(2): 221-229. (in English) [Activity patterns, diet, reproduction, sexual dimorphism, and thermal ecology of the semiaquatic teiids *Crocodylus amazonicus* and *Dracaena guianensis*, from two localities in the Brazilian Amazon are described. In one case, the stomach content of 57 *C. amazonicus* surveyed, included an Odonata.] Address: Garda, A., Sam Noble Oklahoma Museum of Natural History, 2401 Chautauqua, Norman, Oklahoma 73072-7029, USA; E-mail: garda@ou.edu
- 8024.** Moore, C. (2006): Reports from Coastal Stations - 2006: Dunwich Heath National Trust, Suffolk. *Atropos* 30: 76-77. (in English) [UK; *Erythromma viridulum*, *Anaciaeschna isosceles*, *Sympetrum flaveolum*] Address: not stated
- 8025.** Morgan da Costa, F.L.; Oliveira, A.; Callisto, M. (2006): Inventory of benthic macroinvertebrates diversity in the Peti Environmental Station Reservoir of Minas Gerais, Brazil. *Neotropical Biology and Conservation* 1(1): 17-23. (in Portuguese, with English summary) ["The aim of this study was to inventory the diversity of benthic macroinvertebrates of the reservoir of the Peti Environmental Station in Minas Gerais State through the evaluation of these communities in space and temporal scales during the rainy and dry periods from June - 2002 up to June - 2004. The Peti reservoir has almost 50 years and is used for hydropower generation. The benthic macroinvertebrates are an important tool for the evaluation of water quality and environment monitoring through inventories of diversity and data on community structure. A total of 16 taxa was found and the most abundant groups were Chaoboridae (47,51%), the Chironomidae genera *Coelotanytus* (15,1%) and *Chironomus* (2,77%), *Bivalvia* (19,11%) and *Oligochaeta* (9,54%). There were no significant variations ($R = 0,1927$; $p > 0,05$) for the biotic data among the sampling stations during the studied periods. The evaluation of the distribution and structure of the benthic community showed that the quality of the reservoir's water is preserved, because there was no predominance of bad quality indicator organisms. This situation is due to the constant oxygenation of the hypolimnion which is probably related with the reservoir operation." (Authors) "Gomphidae" are listed.] Address: Universidade Federal de Minas Gerais, Instituto de Ciências Biológicas, Depto de Biologia Geral, Laboratório de Ecologia de Bentos. CP. 486, CEP. 30.161-960, Belo Horizonte, MG, Brasil. E-mail: callisto@icb.ufmg.br
- 8026.** Odin, N. (2006): Reports from Coastal Stations - 2006: Landguard Bird Observatory, Suffolk. *Atropos* 30: 71-72. (in English) [UK; No daytime migration was observed; nocturnal immigration of *Enallagma cyathigerum*, *Aeshna mixta*, *Sympetrum sanguineum* and *S. striolatum* is documented, especially for *S. striolatum* with a total of 42 records at a 400w light trap.] Address: not stated
- 8027.** Packard, P. (2006): Dragonflies and Damselflies. Small Wonder. Beautiful and Beneficial. *Downstream* 15: 1, 5-7. (in English) [Massachusetts, USA; general on Odonata] Address: Packard, Paula; <http://archives.lib.state.ma.us/bitstream/handle/2452/41013/ocm48880163-15.pdf?sequence=1>
- 8028.** Parr, A.J. (2006): Migrant dragonflies in 2006 including recent decisions and comments by the Odonata Record Committee. *Atropos* 30: 26-35. (in English) [UK; the following species are involved: *Calopteryx splendens*, *C. virgo*, *Lestes dryas*, *L. barbarus*, *Erythromma viridulum*, *Enallagma cyathigerum* (caught at light), *Aeshna affinis*, *A. juncea*, *A. mixta*, *Anax imperator*, *A. parthenope*, *Libellula depressa*, *Orthetrum cancellatum*, *Crocothemis erythraea* (Guernsey, Jersey), *Sympetrum striolatum*, *S. fonscolombii*, *S. flaveolum*, *S. sanguineum*, *S. danae*] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 8029.** Parr, A.J. (2006): Identification workshop: Forms of Lesser Emperor *Anax parthenope* Selys. *Atropos* 28: 17-18. (in English) ["Given reasonably good views of a typical male Lesser Emperor it is easy enough to make a positive identification. The St Mary's Lesser Emperor, however, highlights some of the more subtle identification issues—for instance, not all individuals showing significant amounts of blue are necessarily males, and the 'dull abdomen with a bright blue base' is not always a distinctive feature of the species. The combination of olive-brown thorax and greenish eyes are useful points to look for in 'unusual' individuals, helping to distinguish the species from Emperor (which has a green thorax), Vagrant Emperor *Hemianax ephippiger* (which has brown eyes) and Green Darner *Anax junius* (which has both a dark green thorax and brownish eyes)." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

- 8030.** Parr, A.J. (2006): The changing trends of Britain's Odonata. *Atropos* 28: 27-31. (in English) ["Given the increasing numbers of dragonfly enthusiasts in recent years, it is not surprising that new species to Britain have been discovered, and that ranges have become better documented. Considering the small size of the British dragonfly fauna—approximately 47 resident or regular migrant species recorded prior to 1995—the seven new species recorded since then is, however, impressive, and suggestive of more than just increased observer awareness. The colonisation of Small Red-eyed Damselfly, in particular, is an event of significance—even past historic colonists such as Migrant Hawker seem to have taken some while to become widely established. Range changes now being observed for some of our more traditional residents are also substantial, and cannot simply be artefacts of improved coverage. Distribution maps for some species are out of date almost as soon as they are published, and Britain's dragonfly fauna seems to be in a state of flux. Given the nature of the trends being observed in Britain and the near Continent, and the fact that many other taxa, including birds and Lepidoptera, are behaving similarly, it would seem that change is being driven by some broad-scale controlling variable, such as climate. Indeed, in retrospect, modern changes seem to have begun somewhere in the 1980s, at roughly the same time as the British and Northern Hemisphere mean annual temperatures started to rise sharply above their 1961-1990 average (Hadley Centre 2006; University of East Anglia 2006). Many of the events of the last decade or so thus seem likely to be linked to climate change and global warming, whatever the precise underlying reasons behind this phenomenon. It will be of considerable interest to continue monitoring changes to the British dragonfly fauna in the years to come." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 8031.** Paulson, D. (2006): The importance of forests to neotropical dragonflies. In: Rivera, AC (ED). 2006. *Forests and Dragonflies*. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. Pensoft Series Faunistica 61: 79-101. (in English) ["Dragonflies are quintessential forest animals, and forests are essential to them. The majority of odonate species are associated with forests, especially in the neotropical region. Forests are important, in furnishing a variety of larval habitats and favourable conditions for adults. Adult odonates can use both sunshine and shade available in forests, but forests also offer constraints to odonate activity. Forest odonates are poorer dispersers than those of open country, this factor contributing to the very high biodiversity of the tropics." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu
- 8032.** Phillips, J. (2006): Reports from Coastal Stations - 2006: Hayling Island, Hampshire. *Atropos* 30: 60-61. (in English) [UK; *Sympetrum fonscolombii*] Address: not stated
- 8033.** Samways, M. (2006): Threat levels to odonate assemblages from invasive alien tree canopies. In: Rivera, AC (ED). 2006. *Forests and Dragonflies*. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. Pensoft Series Faunistica 61: 209-224. (in English) ["Dragonflies are well-known to be sensitive to light conditions, with the various species having a range of light conditions that they prefer. When these conditions are changed, such as by human removal of the tree canopy, the odonate assemblage changes accordingly, with forest species being replaced by species preferring sunlit habitats. Most of the South African species, including the national and local endemics, are mostly species that inhabit sunlit habitats, especially those fringed with indigenous grasses and bushes. During the 20th century, many of the South African riparian corridors became invaded and radically transformed by alien trees, especially *Acacia* spp. As these trees are a threat to hydrological processes, a massive national 'Working for Water Programme' was started to clear riparian zones of these alien trees. These trees were also posing a major threat to local biodiversity, especially endemic odonates. Some odonate species were even on the verge of extinction as a result of shading of their habitats by the alien trees as well as from various synergistic impacts such as over-abstraction of water and damage to the banks by domestic livestock. The recovery of some of these odonate species as a direct result of alien tree removal has been absolutely remarkable, and is a strong message in support of genuinely effective and positive conservation action involving removal of alien trees." (Author)] Address: Samways, M. J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za
- 8034.** Scott, D.A. (2006): Reports from Coastal Stations - 2006: Dursey Island, Co. Cork. *Atropos* 30: 85-86. (in English) [Ireland; *Sympetrum striolatum*; *Aeshna juncea*] Address: not stated
- 8035.** Scott, M.A.; Scott, W.J.; Scott, T.R. (2006): Reports from Coastal Stations - 2006: Longstone Heritage Centre, St Mary's, Isles of Scilly. *Atropos* 30: 49. (in English) [UK; *Ischnura elegans*, *Sympetrum striolatum*, *Aeshna mixta*] Address: not stated
- 8036.** Solly, F. (2006): Reports from Coastal Stations - 2006: Isle of Thanet, Kent. *Atropos* 30: 69-71. (in English) [UK; *Sympetrum flaveolum*, *S. fonscolombii*, *S. danae*, *S. sanguineum*, *A. mixta*] Address: not stated
- 8037.** Spence, B. (2006): Reports from Coastal Stations - 2006: Spurn Point, East Yorkshire. *Atropos* 30: 79-81. (in English) [UK; *Sympetrum fonscolombii*, *S. flaveolum*] Address: not stated
- 8038.** Strieder, M.N.; Ronchi, L.H.; Stenert, C.; Scherer, T.; Neiss, U.G. (2006): Biological measures and water quality indices in a micro-watershed polluted with urban and tannery sewage in south Brazil. *Acta Biologica Leopoldensia* 28(1): 17-24. (in Portuguese, with English summary) ["The article is based on a comparative study between biological measures based on the benthic macroinvertebrate communities and the Water Quality Index (WQI) determined by physical-chemical parameters. The data were collected in the downstream region of the Sinos river basin, in the State of Rio Grande do Sul, at six sites located in the longitudinal gradient of the Peão creek and in the Sinos river. The macroinvertebrate sampling followed the methodology proposed by the Environmental Protection Agency (EPA) of the United States of America and the water analyses were conducted according to standard methods established by the American Public Health Association (APHA). The macroinvertebrate communities were

evaluated by the Shannon-Wiener diversity index, the Hilsenhoffs Family-level Biotic Index and the Biological Monitoring Working Party (BMWP) Score System. These biotic indices presented a strong correlation with the WQI. Whereas the Shannon-Wiener diversity index and the BMWP biotic score system indicated a positive correlation with the WQI values ($r = 0.680$ and $r = 0.567$ respectively), the Hilsenhoff Biotic Index presented a negative correlation ($r = -0.667$). Thus, the benthic macroinvertebrates are important indicators of the water quality and can provide relevant information for the water quality management program in the Sinós river basin." (Authors) Odonata are treated on the family level.] Address: Strieder, M.N., Programa de Pós-Graduação em Biologia – Universidade do Vale do Rio dos Sinós - UNISINOS, Caixa Postal 275, 93001-970, São Leopoldo, RS, Brasil. E-mail: strieder@unisinos.br

8039. Sulem; S.Y.; Brummett, R.E. (2006): Relative importance of various predators in *Clarias gariepinus* fry mortality in Cameroon. *NAGA, WorldFish Center Quarterly* 29(3/4): 74-77. (in English) [The authors study interspecific competition between fishes and dragonflies. "To estimate the relative importance of the most common predators of *C. gariepinus* fry, increasing levels of protection were afforded to exclude amphibians, aquatic arthropods and birds. At a stocking density of 10 larvae/m² in nursing ponds, fencing off amphibians resulted in a 28 per cent decrease in mortality. Holding fry in hapas to protect them from both amphibians and aquatic arthropods decreased mortality by an insignificant 5.7 per cent. Installation of bird-netting over the hapas reduced mortality by 21.7 per cent. The remaining 4.9 per cent of total mortality, which could not be explained, was attributed to opportunistic cannibalism, disease and/or handling stress. Increasing stocking density to 40/m² and, thus, reducing the food available per fry increased mortality by 28.3 per cent." (Authors) Aquatic arthropods were most notably dragonfly larvae that entered the pond after filling through direct oviposition from the airborne female. But: "The selection of such hapas as a defense against aquatic insects was based on the observation that these predators are common in open ponds at the PARC, but have never been found in hapas. Presumably, any insect eggs laid directly into a hapa are vulnerable to predation by the larval catfish." The breeding hapa is a box-like enclosure (2 m x 1.5 m x 1.0 m) stitched out of square-meshed mosquito netting cloth and tied on to bamboo poles fixed in ponds or tanks so that about 0.3 m is above the water level while its bottom is 0.3 m above the pond bottom. For more details see e.g.: <http://aquacomm.fcla.edu/1728/1/Better-Practice5opt.pdf>] Address: Sulem, S.Y., IITA-Cameroon (Attn: R.E. Brummett), c/o L.W. Lambourn & Co. Ltd., Carolyn House, 26 Dingwall Road, Croydon, Surrey CR9 3EE, United Kingdom

8040. Tam, T.-w.; Lee, V.L.F. (2006): 17th International Symposium of Odonatology at Hong Kong Wetland Park. *Hong Kong Biodiversity* 12: 16. (in English) ["The symposium provided a valuable platform for odonate experts to share their experience and research findings. Keynote speakers talked about the uses and values of dragonflies for monitoring freshwater ecosystem health, dragonfly biodiversity in South East Asia and dragonfly conservation in Africa. Other participants presented papers on dragonfly biology, morphology, ecology, conservation, taxonomy, reproduction and habitat enhancement. The symposium included a field trip to Sha Lo

Tung for participants to appreciate the 'winged jewels' and the Hong Kong countryside. There was also a five-day tour to Nankanshan mountain ranges, in mainland China, after the symposium. Nearly half of the participants joined the tour. They found it to be a great opportunity to examine this unexplored insect group, making a few new records (e.g. *Aciagrion tillyardi* and *Philosina* sp.) for the area. [...]" (Authors)] Address: not stated

8041. Taylor, P. (2006): Movement behaviours of a forest odonate in two heterogeneous landscapes. In: Rivera, AC (ED). 2006. *Forests and Dragonflies*. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. *Pensoft Series Faunistica* 61: 225-238. (in English) ["The results from an empirical survey of *C. maculata* along streams in both a largely forested landscape and a more open, agricultural landscape are compared so simple measures of landscape structure, and the output from a behavioural simulation model based on a set of simple rules that govern how *C. maculata* accesses resources in the two landscapes. In the more open landscape, only proximity of the forest to the stream explains the empirical pattern of distribution, but in the more forested landscape, only simulated use of streams does. Further, populations are aggregated at broader spatial scales in the more open landscape. Collectively, the results suggest that *C. maculata* move more extensively when compared to the more closed, forested landscape, which has implications for landscape scale population structure." (Author)] Address: Taylor, P.D., Atlantic Cooperative Wildlife Ecology Research Network, Department of Biology, Acadia University, Wolfville, NS. B4P 2N5

8042. Troake, P. (2006): Reports from Coastal Stations - 2006: Gibraltar Point, Lincolnshire. *Atropos* 30: 78-79. (in English) [UK; *Erythromma viridulum*, *Sympetrum fonscolombii*, *S. flaveolum*] Address: not stated

8043. Tunmore, M. (2006): Reports from Coastal Stations - 2006: Lizard Peninsula, Cornwall. *Atropos* 30: 51-53. (in English) [UK; *Sympetrum fonscolombii* (attracted at light), *Ceragrion tenellum*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.-freeseve.co.uk

8044. Wagstaff, W. (2006): An unusual Migrant Hawker *Aeshna mixta*. *Atropos* 28: 84. (in English) [UK; "... around St Agnes, Isles of Scilly, on 16 VIII 2005 I noticed a hawker dragonfly zipping about over Bracken *Pteridium aquilinum* near the sandbar across to the Isle of Gugh. It was not easy to get views until it perched about 60ft from us, at which point I was able to set my telescope up. I soon realised that although it was probably a *A. mixta*, a species I had seen many times on Scilly, it showed far more orange on the abdomen compared to any I had seen before. [...] Having subsequently looked up *A. mixta* in the available literature I could find no reference to any hawker showing the orange that was so obvious in the field." Adrian Parr comments on the "abnormal" colour as follows: "As can be seen from the shape of the markings on abdominal segments S2/S3, this individual is actually a female *A. mixta*, despite the blue abdominal spots (the yellow markings in *A. mixta* are known to become bluish in some individuals, an effect in part probably related to ageing but likely to involve other factors). Females of many species of hawker show a more brownish ground colour to that of the

males with which most people are more familiar, and in *A. mixta* this is quite orangey. This individual nicely illustrates some of the subtle variation that it is difficult to convey in field guides, where there is space for only one or two illustrations."] Address: Wagstaff, W., 42 Sally Port, St Mary's, Isles of Scilly, TR210JE, UK

8045. Walia, G.K.; Sandhu, R.; Goyal, S. (2006): Cytogenetical analysis of *Nepogomphus modestus* from Palampur area of Himachal Pradesh, India (Gomphidae : Anisoptera). *Chromosome Science* 9: 99-100. (in English) [Primary spermatocyte chromosome analysis of *N. modestus* "showed haploid number $n(\text{male}) = 12$ consisting of 11 bivalents and a univalent. In the complement, m chromosomes were lacking. The univalent, the largest element in the complement, is X chromosome. The result indicates that diploid chromosome number of *Nepogomphus modestus* is $2n(\text{male}) = 23 = 22A+X$. *N. modestus* is the first species described cytologically among three species known to genus *Nepogomphus*." (Authors)] Address: Walia, G.K., Dept of Zoology, Punjab University, Patiala-147 002 (Punjab), India

8046. Wallace, K.M. (2006): The feeding ecology of yearling, juvenile and sub-adult Nile crocodiles, *Crocodylus niloticus*, in the Okavango Delta, Botswana. Thesis presented in partial fulfilment of the requirements for the degree of Master of Science, Department of Conservation Ecology and Entomology, Faculty of Agricultural Sciences, University of Stellenbosch: 123 pp. (in English) [Young crocodilians primarily predate on insects (Coleoptera, Orthoptera and Odonata) and arachnids. These decrease in importance as the crocodilian increases in size. Larvae of *Orthetrum* sp., *Trithemis* sp., and *Phyllomacromia* sp. were identified as stomach items in young crocodiles.] Address: <http://etd.sun.ac.za/bitstream/10019/1300/1/Wallace,%20KM.pdf>

8047. Watanabe, M. (2006): Mate location and competition for mates in relation to sunflecks of forest floors. In: Rivera, AC (ED). 2006. Forests and Dragonflies. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. *Pensoft Series Faunistica* 61: 259-268. (in English) ["Although most forest odonate species have a maiden flight away from water and sexually immature adults stay in the forests foraging for food, mature males of some species (e.g. *Platycnemis echigoana*, *Letes sponsa* and hyaline-winged males of *Mnais pruinosa costalis*) tend to remain in forests. To locate females in the forests, males mainly perch in sunflecks (a sunlit site in the forest floor) and adopt a sit-and-wait tactic. Some of them try to occupy perching sites. Territorial behaviour of males of *P. echigoana* is described at sunflecks in climax deciduous forests, Males showed patrolling flight along the periphery of the sunfleck. and hovering flight above it. suggesting that such flight was a display associated with the occupation of the sunfleck. Flight behaviour of the damselfly, *L. sponsa*, in The forest floor also showed male-male interference and the existence of a lek-like mating system is discussed. Some solitary males interfered in copulation in the forest floor, while others were also observed on the shoreline of the pond throughout the day. but they did not harass pairs ovipositing in tandem. Although hyaline-winged males of *M. pruinosa costalis* adopt, sneak tactics, a male that failed in occupying a perching site to intercept females entering the territory is called an 'opportunist', which moves around forest floor with sunflecks to search females. The longest copula dura-

tion was observed in the opportunists, suggesting that the entire sperm displacement must be occurred. These observations point to functional relationships with habitat selection and thermoregulation. Perching behaviour under direct, sunlight at sunflecks was shown to result in considerable variation in thermoregulatory properties. The relationships of thermoregulation to mate location strategy are different among species. A male that has been able to perch in direct sunlight will gain an advantage over an individual that lies not. and this advantage may manifest, itself in fights with other males. Forest structures with sunflecks are discussed from the viewpoint of habitat selection acting on female choice. These relationships are also relevant to other behaviours, particularly oviposition behaviour by water. Adults that showed mating behaviour in the forests oviposit in tandem by water. The importance of sunflecks in the forest floor is discussed in relation to the life history strategies of the damselfly species inhabiting forests." (Author)] Address: Watanabe, M., Dept of Biology, Faculty of Education, Mie University, Tsu, Mie 514-8507, Japan. E-mail: watanabe@edu.mie-u.ac.jp

8048. Wightman, S. (2006): Dragonfly Conservation from the BDS: Cornmill Meadows Dragonfly Sanctuary. *Atropos* 30: 42-43. (in English) [UK, Essex; a new established Dragonfly Discovery Trail is introduced.] Address: not stated

8049. Wilson, K.D.P. (2006): New *Planaeschna* record from Hong Kong (Odonata: Aeshnidae). *Porcupine* 34: 5-6. (in English) [Verbatim: During late October 2005 I undertook a crepuscular survey of dragonflies at Wu Kau Tang. In the 10-20 minute feeding frenzy which takes place just before dusk, I captured a total of seven aeshnid specimens using a net. Six of the seven specimens were identified as *Gynacantha japonica* Barteneff and the remaining specimen belongs to the genus *Planaeschna* McLachlan. It may represent an undescribed species. No previous species of *Planaeschna* has been recorded from Hong Kong. The genus *Planaeschna* is mainly confined to Indo-China with outliers occurring in South China, Thailand, Burma, India (Assam) and Japan. Seven species of *Planaeschna* have been described from China, which are *P. celia* Wilson & Reels, 2001 (Hainan), *P. gressitti* Karube, 2002 (Guangdong), *P. maolanensis* Zhou & Bao, 2002 (Guizhou), *P. risi* Asahina, 1964 (Japan & Taiwan), *P. shanxiensis* Zhu & Zhang (Shanxi), *P. suichangensis* Zhou & Wei, 1980 (Guangdong, Guangxi & Zhejiang), *P. taiwana* Asahina, 1951 (Taiwan). In addition, a further five species of *Planaeschna* have been described from Vietnam. A total of 17 species have been described to date with nine of these named in the last 10 years. The Hong Kong female *Planaeschna* does not belong to *suichangensis*, which is the most widespread and abundant *Planaeschna* species recorded from Guangdong. Currently the female *gressitti* is unknown but the abdomen does not have yellow spots, adjacent to the transverse carina, which are linked to basal, ventral yellow spots to form a yellow median from S3-8. This ringed pattern is possessed by male *gressitti* (Karube, 2002) and in all other *Planaeschna* species the feature is exhibited by both males and females. The Hong Kong female does not have this feature so is most unlikely to belong to *gressitti*. Two new species of *Planaeschna* from central and north Guangdong await description but the Hong Kong female does not belong to either of these new species. It is closest to *risi* but further specimens are

nevertheless required, especially a male, before a clear placement of the Hong Kong *Planaeschna* can be made. *Planaeschna risi* was recorded from Guangxi by Wilson (2005) but evaluation of further material from Guangxi and Guangdong indicates this material does not in fact belong to *risi*, which is endemic to Taiwan and the Ryukyu islands. The Hong Kong female *Planaeschna* was collected over abandoned marshy agricultural land at San Uk Ha, Wu Kau Tang on the evening of 30 October 2005. *Planaeschna* larvae dwell in flowing streams usually in montane, forested areas. Most species are known from altitudes exceeding 500 m. Only one species, described from North Vietnam, *Planaeschna cucphuongensis* Karube, is known from lowland forest (Karube, 1999). The new *Planaeschna* species is likely to breed in montane forested tributary streams in the country park surrounding Wu Kau Tang but its larvae may utilize the tributaries or main stream flowing through the Wu Kau Tang basin i.e. the area covered by the Wu Kau Tang Outline Zoning Plan.] Address: Wilson, K.D.P., Dragonfly Ecological Services, 18, Chatsworth Road, Brighton, BN1 5DB, UK. E-mail: kdpwilson@gmail.com

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- 8050.** Abbott, J.C. (2007): Update on OdonataCentral. *Argia* 18(4): 7-8. (in English) [Problems with the data map server, activities to solve the problems, and improve the services of OdonataCentral are outlined.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu
- 8051.** Abilhoa, V. (2007): Aspectos da história natural de *Astyanax scabripinnis* Jenyns (Teleostei, Characidae) em um riacho de floresta com araucária no sul do Brasil. *Revista Brasileira de Zoologia* 24(4): 997-1005. (in Spanish, with English summary) [Population structure, feeding habits and reproduction of *A. scabripinnis* are described, basing on the analysis of fish collected monthly from October 1998 to September 1999 in a Araucaria-forest stream of the upper Iguaçu River basin. Odonata larvae (without further specification) belong to the diet of this fish species.] Address: Abilhoa, V., Grupo de Pesquisas em Ictiofauna, Museu de História Natural Capão da Imbuia, Prefeitura de Curitiba. Rua Professor Benedito Conceição 407, 82810-080 Curitiba, Paraná. E-mail: vabilhoa@uol.com.br
- 8052.** Anselin, A. (2007): From goldfish to *Aeshna cyanea*. *Libellenvereniging Vlaanderen - nieuwsbrief* 1 (3): 2-3. (in Dutch, with English summary) ["Garden ponds may not be prime habitat for dragonflies, but if having the opportunity to develop in a rather "natural way" they may offer the observer some surprises. In a formerly concrete basin in the observers garden after about 15 years in total 32 *A. cyanea* emerged this year. Two of the freshly emerged dragonflies stayed on their support for more than 30 hours, probably due to bad weather. An adult one landed on a sunlit wall and stayed there for about 36 hours, sitting on the same spot." (Author)] Address: Anselin, Anny, Emiel Poetoustr. 13, 9030 Mariakerke, Belgium. E-mail: anny.anselin@inbo.be
- 8053.** Arbour, D. (2007): *Tholymis citrina* (Evening Skimmer) found in Oklahoma. *Argia* 18(4): 29. (in English) [Red Slough Wildlife Management Area, McCurtain County, Oklahoma, USA, 20-VIII-2006; first state record for Oklahoma, and seventh for USA] Address: Arbour, D., De Queen, Arkansas, USA. E-mail: arbour@windstream.net
- 8054.** Beaton, G.; Dobbs, M. (2007): 2006 summary of Odonate research in Georgia. *Argia* 18(4): 26-28. (in English) [Records of the 25 species/taxa with fewer than ten county records in Georgia, USA are documented.] Address: Beaton, G., 320 Willow Glen Drive, Marietta, GA 30068, USA. E-mail: giffbeaton@mindspring.com
- 8055.** Behrstock, R.A.; Rose, J.S.; Abbott, J.C. (2007): First Texas record and second U.S. occurrence of the Pale-green Darner, *Triacanthagyna septima* (Selys in Sagra, 1857) (Odonata: Aeshnidae). *Argia* 18(4): 28-29. (in English) [Anzalduas County Park, Hidalgo County, Texas, USA, 22-X-2006] Address: Behrstock, R.A., 9707 S.Gessner #3506, Houston, TX, 77071-1032, USA. E-mail: rbehrstock@cox.net
- 8056.** Behrstock, R.A.; Danforth, D.; Upson, S. (2007): List of the Odonata of Chihuahua State, Mexico, including new State records and the first Mexican record of *Argia alberta*, Kennedy, 1918. *Bulletin of American Odonatology* 10(2-3): 52-63. (in English, with Spanish summary) ["Twenty-one sites were visited in northwestern Chihuahua from 17 June to 30 September 2005. Based upon these visits, we present 35 records of Odonata (15 Zygoptera and 20 Anisoptera) that have not been reported or confirmed for Chihuahua. The total number of species known from the state is increased to 80. Just over one-half of the new records exhibit broad distributions, living from sea level to moderate altitudes. The remainder inhabit higher elevations. *Argia alberta* Kennedy, 1918, is reported for the first time from Mexico." (Authors)] Address: Behrstock, R.A., 10359 S. Thicket Pl., Hereford, AZ 85615, USA. E-mail: rbehrstock@cox.net
- 8057.** Beinlich, B.; Lohr, M. (2007): Zur Tierwelt des NSG „Grundlose-Taubenborn“ bei Höxter. *Beiträge zur Naturkunde zwischen Egge und Weser* 19: 41-59. (in German) [Nordrhein-Westfalen, Germany; 36 odonate species (31 autochthonous) are listed and briefly discussed with focus on the colonisation of new water bodies. Two years after creation, 23 odonate species could be recorded. Such a high diversity is discussed as result of dispersal of specimens from the nearby source populations established in the gravel pits of the alluvium of River Weser.] Address: Lohr, M., FH Lippe und Höxter, Fachgebiet Tierökologie und Landschaftsökologie, An der Wilhelmshöhe 44, D-37671 Höxter, Germany. E-mail: mlrohr@fh-luh.de
- 8058.** Bernardo, C. (2007): Seleção intra-sexual na libélula *Homeoura nepos* (Zygoptera: Coenagrionidae): conflito sexual e sistema de acasalamento. *Dissertação apresentada ao Departamento de Ecologia da Universidade de Brasília, como requisito parcial à obtenção do grau de Mestre em Ecologia, Instituto de Ciências Biológicas Departamento de Ecologia*: 60 pp. (in Portuguese, with English summary) ["Sexual dimorphism, agonistic interactions and the type of association between males and their sexual partners are characteristics subjected to selective pressures that determine the type of mating system of a species. In Odonata. Two types of mating systems occur: resource defense

polygyny and polygyny through scramble competition. In the latter type, there is no consensus concerning the role of sexual dimorphism, the influence of individual size in agonistic interactions and the type of selective pressures that influence the occurrence of tandem (post copulation guarding). In this study I used *Homeoura nepos* as the model species to analyze: 1) type of sexual dimorphism; 2) effect of environmental temperature, body size and local density of males, male distance to the shore, and residency upon agonistic interactions; 3) influence of male and female density at the oviposition site, and the effects of environmental temperature and wind upon tandem duration and upon oviposition events that occur during tandem; and 4) the effect of male body size on tandem duration. In the species analyzed, females had longer wings than males, male density at the sites where interactions occurred influenced agonistic encounters and resident males won more fights, supporting the hypothesis of asymmetric contest. Tandem duration was longer when other females were abundant in the immediate area and there was also a positive tendency between tandem duration and temperature, which suggests that environmental temperature can contribute to male permanence in tandem. Oviposition events were more abundant in sites with higher male density. The wind had no effect on the behaviours evaluated. It is assumed that *H. nepos* presents scramble competition polygyny. Nevertheless, some predictions of this hypothesis concerning post copulatory association were not met, indicating the necessity of more studies on the behaviour of tropical damselflies." (Author)] Address: Carolina Tavares da Silva Bernardo, no further details available

8059. Blue, D.V. (2007): First record of *Erythrodiplax basifusca* (Plateau Dragonlet) for California. *Argia* 18 (4): 30. (in English) [Imperial County, California, USA, 21-X-2006] Address: Blue, D.V., 3783 Ruelle San Raphael, San Diego, CA 92130, USA. E-mail: dblue@san.rr.com

8060. Cano Villegas, F.J. (2007): Odonatos del río Borosa (Jaén, sur de España) (Odonata). *Boln. S.E.A.* 41: 468-470. (in Spanish, with English summary) [13 Odonata species of the Borosa river (Jaen, southern Spain, Sierra de Cazorla. Segura y Las Villas Natural Park) are reported. Most of them are said to be rare or threatened in Spain.] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: fcanovi2@hotmail.com

8061. Claret, C.; Lienhardt, G.; Cartier, V.; Franquet, E.; Miralles, G. (2007): Composition et distribution des assemblages d'invertébrés dans la zone hyporhéique d'une plaine alluviale de la Moyenne-Durance. *Ecologia mediterranea* 33: 5-13. (in French, with English summary) ["Alluvial flood plains are among the most heterogeneous and dynamic ecosystems in the world. This heterogeneity is linked to the mosaic of terrestrial and aquatic habitats in surface waters, as well as to the functional relationships between surface and subsurface waters via the hyporheic zone (i.e. the ecotone between benthic and groundwater compartments). In natural systems, discharge and flow variability influence the connectivity among habitats and ecological conditions within habitats that contribute to the richness of flood plains. However, the natural dynamics of many rivers and streams have been impacted by regulation and low residual discharge that change the composition

and structure of invertebrate assemblages. In the Durance River, a regulated river in the south-east of France, the benthic fauna of the main channel has been widely studied, but the hyporheic zone has never been considered. In this study, we present some first data on the composition and the distribution of invertebrate assemblages from the hyporheic zone of an alluvial flood plain located in the middle stretch of the Durance. This study provides some biological information on a poorly known compartment of this sub-Mediterranean system." (Authors) Odonata are treated at the family level.] Address: Claret, Cécile, Institut méditerranéen d'écologie et de paléocéologie (IMEP, UMR-CNRS 6116), Univ. Paul-Cézanne Aix-Marseille 3 (case 441), 13397 Marseille cedex 20, France. E-mail: cecile.claret@univ-cezanne.fr

8062. Cortel, N., Gailledrat, M., Jourde, P., Précigout, L., Prud'Homme, E., (2007): Liste Rouge des Libellules menacées du Poitou-Charentes. Statut de conservation des Odonates et priorités d'actions. Juin 2007. Poitou-Charentes Nature, Fontaine-le-Comte. ISBN 2-9515017-8-1: 48 pp. (in French) [Poitou-Charentes, France; Between 2000 and 2005, more than 50000 data points of Odonata were recorded. Based on that, 27 species of the 70 regionally known species had to be included into the regional Red list of Odonata. According to the IUCN criteria, the situation details as follows: Regionally Extinct: 2; Critically Endangered: 6; Endangered: 6; Vulnerable: 7; Near Threatened 6. For details see: <http://www.poitou-charentes-nature.asso.fr/IMG/pdf/listerougedeslibellulesenpc.pdf>] Address: Poitou-Charentes Nature, 14 rue Jean Moulin – 86240 Fontaine-le-Comte, France. E-mail: pc.nature@laposte.net

8063. Daigle, J.J.; McPeck, M.A. (2007): DNA Status of *Enallagma coecum* Hagen (Purple Bluet) and *E. cardenium* Hagen. *Argia* 18(4): 13. (in English) ["I sequenced 702 base pairs of the cytochrome oxidase mitochondrial gene. Three individuals of *E. cardenium* differed from three *E. caecum* individuals at 32 sites - a genetic difference of 4.6%. Based on the accepted molecular clock estimate for this gene, this genetic difference suggests that these two species are derived from a common ancestor that lived approximately 2 million years ago. When placed in the overall molecular phylogeny for the *Enallagma*, these species group with *E. novaehispaniae*, but they appear to have been separated from *E. novaehispaniae* for 6-0 million years." (Authors)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

8064. De Block, M.; Stoks, R. (2007): Flight-related body morphology shapes mating success in a damselfly. *Animal behaviour* 74: 1093-1098. (in English) ["A small-male mating advantage has been only rarely encountered in territorial species and may be an artefact of selection on covarying traits linked to flight-related body morphology. Here, we explicitly tested its occurrence in the territorial damselfly, *Lestes viridis*, while taking into account two key traits shaping flight performance: relative thorax mass and wing asymmetry. Morphological correlates of mating success were determined by comparing sets of mated and unmated males in a natural population at two different collection dates. We showed consistent morphometric differences between mated and unmated males across both sampling dates, suggesting consistent sexual selection on these traits. Mated males were smaller, had a higher relative

thorax mass (proxy for flight-muscle ratio), and showed lower levels of fluctuating asymmetry in the hindwings compared with unmated males. Moreover, these patterns remained when taking their potential covariation into account, suggesting they were directly selected for. As such, we provided the first multivariate proof for a small-male mating advantage in a territorial species taking into account two other key traits related to flight-related body morphology. Given the assumed mechanistic base (low energy consumption and high flight manoeuvrability), we hypothesize that a small-male mating advantage may not be that rare in flying territorial species." (Authors)] Address: De Block, Marjan, Laboratory of Aquatic Ecology, Department of Biology, University of Leuven, Debe'riotstraat 32, B-3000 Leuven, Belgium. E-mail: marjan.deblock@bio.kuleuven.be)

8065. De Knief, G. (2007): Report of the European Odonata camp in Romania. Libellenvereniging Vlaanderen - nieuwsbrief 1(3): 12-13. ["The dragonfly fauna of Romania is one of the least known in Europe. To better understand its fauna, a European fieldwork meeting was organised in July 2007 with almost 30 odonatologists from 9 different European countries. In total 42 species were observed and an area of approximately 120 by 150 km was investigated. Along the streams in the mountains we found *Cordulegaster heros* and *C. bidentata* widely distributed. The fieldwork shows that it is likely that *C. boltonii* is absent in this region and is replaced by *C. heros*. Research on mountain lakes and peatbogs (1500-2000m asl) resulted in the discovery of *Somatochlora arctica* and several populations of *S. alpestris*. Both species were hitherto unknown or very doubtfully cited for Romania. Other remarkable faunistic findings were one of the first records of *Erythromma lindenii* and the first evidenced record of *Lestes viridis* for Romania." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

8066. De Knijf, G. (2007): Excursion of the 12th of August to the nature reserve Hageven in Neerpelt. Libellenvereniging Vlaanderen —nieuwsbrief 1(3): 8-9. (in Dutch, with English summary) ["A total of 23 species were observed during the fieldtrip. The most interesting were the high numbers of *Lestes virens* (>120) and the rediscovery of *Somatochlora flavomaculata* at several fens. The main reason for this fieldtrip was to assess the status of the once rather common *Sympetrum depressiusculum* in the reserve. We only could find 3 and 4 individuals at two different localities in the reserve. This low number is very alarming since the species disappeared at most sites the last 5 years in Flanders." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

8067. De Marmels, J. (2007): *Tepuibasis* gen. nov. from the Pantepui region of Venezuela, with descriptions of four new species and with biogeographic, phylogenetic and taxonomic considerations on the *Teinobasinae* (Zygoptera: Coenagrionidae). *Odonatologica* 36(2): 117-146. (in English) [The new genus *Tepuibasis* includes 7 species, all endemic to Pantepui; - 4 are new to science, viz.: *T. garciana* sp. n. from the Serranía de Maigualida, *T. nigra* sp. n. from Cerro Yutajé and Cerro Yaví, *T. rubicunda* sp. n. from Cerro Guanay, and *T. thea* sp. n., also from Cerro Guanay. *T. chimantai* (De Marmels, 1988), comb. n., *T. fulvum* (Needham, 1933),

comb. n. and *T. neblinae* (De Marmels, 1989) comb. n. are transferred to *Tepuibasis* from *Aeolagrion* Williamson, 1917. The new genus falls within *Teinobasinae* Tillyard, 1917 (= *Amphicneminae* Fraser, 1957 syn. n. = *Nehalenniinae* De Marmels, 1984 syn. n), and herein within *Teinobasini*, because of the presence of an articulated ventrobasal spur on the male cercus. Other noticeable features of *Tepuibasis* are a bifid apical penis segment, and a spiny, auricle-like process directed proximad, at the base of each of the lobes forming bifid tip. *Tepuibasis* evolved out of ancestral *teinobasine* stock with considerable morphogenetic potential reflected by the large number of recent genera present in cratonic S. America, which is equaled only by insular SE Asia. Taxogeny of *Tepuibasis* was triggered by the uplift of the Guyana shield, and the vicariant species are the result of secondary isolation through fracturing and partial erosion of these highlands." (Author)] Address: De Marmels, J., Inst. Zool. Agrícola, Fac. Agronomía, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

8068. Duffey, A. (2007): Genetic structuring among naturally isolated dune lake populations; a microcosm of evolutionary processes on oceanic islands. Thesis submitted for the degree of Doctor of Philosophy, Queensland University of Technology, Faculty of Science, School of Natural Resource Sciences: XIII, 121 pp. (in English) ["Oceanic islands have been used as model systems for studies of evolution and speciation as the range of island sizes coupled with their known geological chronosequence make them ideal systems for the study of spatial and temporal variations in species diversity and distributions. These processes also occur on continental islands and mainland habitats but features of oceanic islands, notably their clearly delimited boundaries, natural isolation and simple geological composition make them more amenable to study. The perched dune lakes of Fraser Island, Australia share many of the properties of oceanic islands. The naturally isolated formation of the perched lakes, clearly delimited boundaries of the freshwater habitat and phase difference compared to the surrounding, terrestrial environment have significant implications for the biota these lakes support. Inhabitants of the perched dune lakes consist of the aquatic and semi-aquatic descendants of colonisers that were able to traverse a land barrier and survive in the oligotrophic acidic waters over subsequent generations. Barriers to ongoing gene flow among lake populations, are however likely to be different for species with different life history characteristics. I therefore sought to assess the effects of three different life history characteristics on post-colonisation inter-population gene flow. A representative species was selected to represent one of each of the following life history characteristics: • Aquatic species confined to lake for entire life cycle - freshwater shrimp *Caridina* indistincta, • Semi-aquatic species capable of terrestrial dispersal - freshwater turtle *Emydura krefftii*, • Semi-aquatic species capable of aerial dispersal - odonate *Orthetrum boumiera*. 137-250 individuals were sampled per species across six lakes separated by 1-6km. Regions of the mitochondrial genome were targeted and molecular screening methods developed and employed to assess the relative levels of post-colonisation gene flow among lake populations. Parsimony analysis of the 25 unique haplotypes identified in the species with no apparent inter-lake dispersal mechanism, the freshwater

shrimp *Caridina indistincta*, demonstrated that there was no sharing of derived haplotypes among lake populations. Star shaped genealogies were identified in four lake populations indicative of a population expansion and mismatch distribution analysis confirmed a recent population expansion estimated to have occurred no more than 200,000 years ago. This demonstrates that each of the perched dune lakes was colonised by *C. indistincta* soon after their inception but that no ongoing gene flow among lake populations has occurred. The population genetic structure of the species assessed which is capable of terrestrial dispersal suggests that although this species of freshwater turtle, *Emydura krefftii*, is capable of overland dispersal, gene flow among lake populations is limited. Even at the small spatial scale examined in this study, *E. krefftii* populations displayed a pattern of isolation by distance ($r=0.854$, $p<0.03$). Nested clade analysis also suggested a pattern of restricted gene flow with some long distance dispersal in recent times with long distance dispersal and a possible range expansion occurring historically. The species examined in this study that displayed the most extensive gene flow among lake populations was the dragonfly *Orthetrum boumiera* (population pairwise $i>st$ all <0.1). No relationship was found between genetic and geographic distance ($r=-0.0852$, $p>0.05$) and nested clade analysis could not identify a geographical association among haplotypes indicative of panmixia. While larval life stages of this species are fully aquatic, the winged adult stages of this species appear to be connecting seemingly isolated lake populations, at least at the spatial scale examined here. The results of this study have demonstrated that these perched dune lakes provide 'island like' models for recent biogeographic processes. The pattern of colonisation and subsequent diversification identified in these populations takes the form of in-situ 'genetic radiations' with those populations that are isolated forming monophyletic clades endemic to a single lake. The genetic diversity and endemism identified in this study has occurred over much smaller temporal ($<500,000$ years) and spatial (<6.5 km) scales than in studies of oceanic island fauna. However, the mode of formation of the perched dune lakes and the implications that their natural isolation and abiotic genesis have for the evolution of colonisers of these unique habitats has resulted in them being analogous to true oceanic islands." (Author) Address: Duffy, Angela, further details not stated

8069. Duran, M.; Kara, Y.; Akyildiz, G.K.; Özdemir, A. (2007): Antimony and heavy metals accumulation in some macroinvertebrates in the Yesilirmak River (N Turkey) near the Sb-mining area. *Bull. Environ. Contam. Toxicol.* 78: 395-399. (in English) [Mobility and the biological role of Antimony (Sb), its behaviour and transfer into food chain, are not well known. Total Sb concentrations in natural waters have been reported to be in the range of 0.01–1.1 mg/L (US EPA 1996). Acutely toxic concentrations of Sb are in the range of 22–36 mg/L fish (Lin and Hwang 1998), and 9–20 mg/L for daphnids (Anderson 2000), although the toxicity database is small. All these concentrations are above the typical range of concentrations in mine effluents. Therefore, Sb is unlikely to contribute appreciably to effluent acute toxicity. A decline in biodiversity of macroinvertebrate communities has generally related to metal pollution but Sb is not often studied in contrast to Zn, Cu and Cd. "This work presents total Sb, Cd, Pb, Zn and Cu accumulation in water, sediments, some macro-

invertebrate from active antimony mining area. We were interested in comparing heavy metal levels between mine impacted and non impacted sites. Also, this study addresses the impact of Sb-mining on biological components of macroinvertebrate of this part of Yesilirmak River." (Authors) *Leucorrhinia dubia* was identified in the effluent of the mine - certainly wrongly so as *L. dubia* does not inhabit running waters but mires and bogs. Accumulation of heavy metals is presented. The density of the odonate taxa is higher in the effluent of the mine compared with the unimpacted stretch of the water. Antimony and lead concentrations are higher in specimens from the effluent.] Address: Duran, M., Fac. of Science and Arts, Dept of Biology, University of Pamukkale, Denizli 20070, Turkey. E-mail: mduran@pau.edu.tr

8070. Dyatlova, E.S. (2007): First record of *Cordulia aenea* (Odonata, Corduliidae) in Dnieper Delta. *Vestnik zoologii* 41(1): 326. (in English) [One male of the regionally rare *C. aenea* was collected in Dnieper Delta: 46°29'04.27"N 32°25'37.98"E, Golaya Pristan' vicinity, left bank of Konka river, 17.05.2007 (M.O. Son).] Address: Dyatlova, Elena Sergeevna, Inst. Zoology, Faculty of Biology, I.I. Mechnikov University of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

8071. Ferris, G.; Rudolph, V.H.W. (2007): Responses of larval dragonflies to conspecific and heterospecific predator cues. *Ecological Entomology* 32: 283-288. (in English) ["1. In cannibalistic populations, smaller individuals are subject to predation by larger conspecifics, and small individuals commonly alter their behaviour in response to cannibals. Little is known, however, about the underlying cues that trigger such responses and how the behavioural responses to conspecific cannibals differ from heterospecific predators. 2. This study tests which cues are used for the detection of conspecific predators in the larva of the dragonfly *Plathemis lydia* and how the behavioural response to cannibals differed from the response to heterospecific predators. 3. Individuals were exposed to chemical cues, visual cues, and a combination of both cues from conspecifics as well as no predator and heterospecific predator controls during which their activity and feeding rates were observed. 4. Individuals increased their activity, spatial movement and feeding behaviour in response to either visual or chemical cues from conspecific predators, which was opposite to responses displayed with cues from heterospecific predators. Interestingly, the responses to visual and chemical cues from conspecifics combined were weaker than to either cue in isolation and similar to the no cue control. 5. The results clearly indicate that individuals are able to use chemical and visual cues to detect even very subtle differences in phenotype of conspecific predators. 6. The opposite response in behaviour when exposed to conspecific cannibals vs. heterospecific predators suggests that the presence of cannibals will increase the mortality risk of small individuals due to heterospecific predation. This risk-enhancement is likely to have important consequences for the dynamics of predator – prey interactions.] Address: Volker H. W. Rudolf, Dept of Biology, University of Virginia, 243, Gilmer Hall, Charlottesville, VA 22904, USA. E-mail: vrudolf@virginia.edu

8072. Gorb, S. (2007): An impressive time piece. *Argia* 18(4): 35. (in English) [Report of a visit to an exhibition of the miniatures made by Nikolay Syadrysty <<http://www.microart.kiev.ua>> in Kiev, Ukraine. "I was mostly

impressed by the clock, which almost perfectly casts a *Sympetrum* dragonfly with the complete working mechanism built into the eye." (Author)] Address: Gorb, S.E-mail: s.gorb@mf.mpg.de

8073. Grosser, N. (2007): Insekten der Wildflusslandschaft des Tagliamento (Friaul/Italien) - Ergebnisse eines studentischen internationalen Workshops 2006. *Entomologica Romanica* 12: 195-201. (in German, with English summary) [Italy; in August 2006, a student ecological survey of the Tagliamento river landscape was made. A total of 10 odonate species is listed. *Gomphus simillimus* would be a new record for Italy, and therefore urgently needs confirmation.] Address: Grosser, N., FH Erfurt, Landschaftsarchitektur, Leipziger Straße 77, 99085 Erfurt, Germany. E-Mail:grosser@fh-erfurt.de

8074. Hatfield, I. (2007): The dragonflies and damselflies of the Llano Estacado: In search of new species records on the Panhandle South Plains. *Argia* 18(4): 30-32. (in English) [Texas, USA, 2006; records of 14 species are documented.] Address: E-mail: jhatfield@teamumc.com

8075. Jeziorski, P. (2007): Collection of dragonflies (Odonata) in the Museum of National History in Olomouc and in the Regional Muzeum Valašsko in Valašské Meziříčí. *Cas. Slez. Muz. Opava (A)* 56: 145-148. (in English, with Czech summary) ["A list of dragonflies deposited in collections of the Museum of National History in Olomouc and in the Regional Muzeum Valašsko in Valašské Meziříčí is given. In total, the material from both museums contains 143 specimens of 28 species which were collected predominantly in Moravia; only a few specimens come from Slovakia." (Author)] Address: Jeziorski, P., Na Belidle 1, CZ - 735 64 Havírov-Suchá, Czech Republic

8076. Kadoya, T.; Washitani, I. (2007): An adaptive management scheme for wetland restoration incorporating participatory monitoring into scientific predictions using dragonflies as an indicator taxon. *Global Environmental Research* 11(2): 179-185. (in English) ["Here we propose an adaptive management scheme for wetland restoration using data collected by citizens to make scientific predictions. We assessed the potential advantages of such a scheme using a wetland restoration project conducted in a small floodplain area along the Matsu-ura River in Kyushu, Japan. For the case study, we compiled data provided by amateur naturalists on distribution patterns of dragonflies on the eco-regional scale, as well as ecological characteristics such as behaviour and habitat preferences. Based on this information, we predicted a species recovery trajectory at the wetland restoration site. By monitoring species recovery to test our prediction, we demonstrated that colonization by dragonfly species at the restored site could be predicted using species prevalence on the regional scale based on the nestedness rule. The data collected by the amateur naturalists were critical in making this prediction, which highlights the importance of citizen participation in the proposed scheme."] Address: Kadoya, T., Dept Ecosyst. Studies, Inst. Agr. and Life Sci., Bunkyo Ku, Univ. Tokyo, 1-1-1 Yayoi, Tokyo, 1138657, Japan. E-mail: aa47143@mail.ecc.u-tokyo.ac.jp

8077. Kim, K.g.; Jamg, S.K.; Park, D.W.; Hong, M.Y.; Oh, H.-H.; Kim, K.Y.; Hwang, J.S.; Han, Y.S.; Kim, I.K. (2007): Mitochondrial DNA sequence variation of the Tiny Dragonfly *Nannophya pygmaea* (Odonata; Libellul-

idae). *Int. J. Indust. Entomol.* 15(1): 47-58. (in English) ["*N. pygmaea* is one the smallest dragonflies in the world and listed as a second-degree endangered wild animal and plant in Korea. For the long-term conservation of such endangered species, an investigation on nation-wide genetic magnitude and nature of genetic diversity is required as a part of conservation strategy. We, thus, sequenced a portion of mitochondrial COI gene, corresponding to "DNA Barcode" region (658 bp) from 68 *N. pygmaea* individuals collected over six habitats in Korea. The sequence data were used to investigate genetic diversity within populations and species, geographic variation within species, phylogeographic relationship among populations, and phylogenetic relationship among haplotypes. Phylogenetic analysis and uncorrected pairwise distance estimate showed overall low genetic diversity within species. Regionally, populations in southern localities such as Gangjin and Gokseong in Jeollanamdo Province showed somewhat higher genetic diversity estimates than those of remaining regions in Korean peninsula. Although geographic populations of *N. pygmaea* were subdivided into 2 groups, distance- or region-based geographic partition was not observed." (Authors)] Address: Kim, K.-G.; E-mail: kimkg@me.go.kr

8078. Kouassi, N.; Peng, J.-x.; Li, Y.; Cavallaro, C.; Veyrunes, J.-C. (2007): Pathogenicity of *Diatraea saccharalis* densovirus to host insects and characterization of its viral genome. *Virologica Sinica* 22(1): 53-60. (in English) [This study on the sugar cane moth borer *Diatraea saccharalis* (Lepidoptera: Crambidae) includes a passing reference to Odonata, also known to be infected by densoviruses.] Address: Li, Y., College of Life Sciences, Huazhong Normal University, 430079 Wuhan, P.R. China. E-mail: liyi@mail.ccnu.edu.cn

8079. Martin, K. (2007): Chipmunks as predators of emerging Odonata. *Argia* 18(4): 12. (in English) ["During the summer of 2006, I observed four cases of *Gomphus vastus* predation by Eastern Chipmunk (*Tamias striatus*). All of the predation occurred on a sandy exposed beach located within the Turner's Pool area of the Connecticut River. The beach in this area is a wide (100 ft) sandy section, that lacks emergent vegetation and has only a few protruding logs. The beach area abuts a steeply forested slope, which provides ample cover for chipmunks. Predation was observed on 24 June 2006 between 8:00 and 8:40 AM, 3.7-3.9 m from the water's edge. As I sat at the edge of the study area, I observed several *G. vastus* nymphs emerging from the water, as they proceeded to crawl across the beach toward the bank, two chipmunks emerged from a small hole on the bank. The chipmunks ran down the hill and across to a large fallen log that partially extended over one side of the beach. As the first *G. vastus* neared the tip of the log, one of the chipmunks jumped down, pounced on the nymph, and carrying it in its teeth, ran up the bank and sat on a large rock. Another nymph neared the log, which the second chipmunk also grabbed and ate. While I was noting this behaviour, two more chipmunks emerged from opposite sides of the study area, and ran out onto the same log. Within a maximum period of five minutes, each of these chipmunks had also grabbed an emerging nymph. I did not observe any aggressive interactions between the four chipmunks. The chipmunks did not venture out onto the exposed section of the beach, but instead stayed near the fallen log, and the exposed roots that lined the

bank. Chipmunk predation of dragonfly nymphs may be a rare event, as during the 24 days (192 hours) of field-work conducted this season, these were the only such events that were observed." (Author)] Address: Martin, Kirsten, Environmental Studies, Antioch University New England, Keene, NH, USA. E-mail: Kirsten.Martin@antiochne.edu

8080. Mills, C. (2007): *Aphylla williamsoni* (Two-striped Forceptail) new for Arkansas. *Argia* 18(4): 34. (in English) [Okay Landing area of Millwood Lake in Howard County, Arkansas, USA 2-IX-2006] Address: Mills, C., Ogden AR 71853, USA. E-mail: cmills@arkansas.net

8081. Neiss, U.G. (2007): Estrutura da comunidade de microinvertebrados aquáticos associados a *Mauritia flexuosa* Linnaeus (Arecaceae). fitotelmata. na Amazônia Central, Brasil. Dissertação (mestrado)- INPA / UFAM. Manaus: X, 79 pp. (in Portuguese, with English summary) ["Adult *M. flexuosa* palms, known locally as buriti, have large individual axillae that can store substantial volumes of water (phytotelmata). The objectives of the present study were to compare the aquatic macroinvertebrate fauna associated with the axillae of palms occurring in groups and as isolated trees in order to verify the relationship between abiotic factors (volume of water, pH, electrical conductivity, dissolved oxygen and height above the ground) and the macroinvertebrates, in addition to inferring a trophic web for these organisms. A total of 60 axillae were sampled in May and June 2006. distributed over 17 rural and semi-urban locations in Manaus and President Figueiredo counties, Amazonas state, Brazil. A total of 31,135 individuals distributed over 19 macroinvertebrate taxa were collected. The families Chironomidae and Ceratopogonidae were the most abundant (32.2% and 29.6% respectively), followed by Oligochaeta (17.5%), Acarina (9.6%) and Culicidae [*Culex* (*Microculex*) *stonei* Lane & Whitman, 1943 (3.4%), *Culex* (*Mcx.*) *pleuristriatus* Lutz, 1903 (2%), *Culex* (*Mcx.*) *sp.1* (1.8%), *Culex* (*Culex*) *mollis* Dyar & Knab. 1906 (0.6%), *Wyeomyia* *sp.* (16 individuals) and *Toxorhynchites* (*Haemorrhoidalis*) *haemorrhoidalis* (Fabricius, 1794) (1 individual)]. For each axilla. the following averages (\pm SD) were calculated: individuals per axilla: 519 (\pm 348); volume of water: 1075 mL (\pm 972); temperature: 27.3 °C (\pm 1.4); pH: 5.6 (\pm 0.7); electrical conductivity: 25.2 μ S/cm (\pm 18.4) and dissolved oxygen: 7.3 mg/L (\pm 1.3). The most frequent taxa were *Culicoides* spp. and *Endotribelos* sp., both with 100% occurrence, followed by *Oligochaeta* (93.3%), *Acarina* (85%) and *Culex* (*Mcx.*) *stonei* (75%). The final multiple regression model relating macroinvertebrate abundance to the abiotic variables explained 25.3% of the variance ($F_{4,55}=4.66$; $p=0.0026$), volume being the only variable that was related to abundance ($p=0.007$). Multiple regression for species richness was not significant ($F_{4,55}=2.31$; $p=0.069$). The numbers of Culicidae and Odonata individuals showed significant positive relationships with water volume ($p=0.0009$ and $p=0.045$, respectively). The distribution of macroinvertebrates not differed between grouped and isolated palm trees (ANOSIM. $R=0.037$; $p=0.029$), the abundance of Odonata being influenced by the grouping of the trees (t-test, $p=0.048$). The presence of Odonata larvae (top predators in the ecosystem) appears not to influence the abundance of Culicidae larvae in the axillae of *M. flexuosa* (t-test, $p=0.382$). Analysis of the stomach content of Odonata representatives found in the buriti (Coe-

nagrionidae sp. and *Erythrodiplax* sp.) revealed Chironomidae, Ceratopogonidae and Culicidae as the most frequent prey. Diptera was the most frequent and abundant group, confirming the importance of this insect in communities associated with phytotelmatas. In comparison with other phytotelmata studies, the trophic web found in the *M. flexuosa* axillae is relatively complex, involving 20 taxa: the top predator of this web is represented by *Coenagrionidae* sp. and *Erythrodiplax* sp." (Author)] Address: not stated

8082. Novelo-Gutiérrez, R. (2007): El estudio de los odonatos (Insecta: Odonata) en México. Enfoques y perspectivas. In: Novelo-G., R. & R. Alonso-Eguialis (Eds.), 2007. Simposio Internacional Entomología Acuática Mexicana: Estado Actual de Conocimiento y Aplicación, Instituto Mexicano de Tecnología del Agua, Sociedad Mexicana de Entomología, Jiutepec, Mor., 105 pp: 9-23. (in Spanish, with English summary) ["The main approaches in which the odonates have been used as a subject of study in a worldwide scale are analysed, making emphasis on the Mexican panorama. While at worldwide scale odonates are studied under several approaches, in Mexico only three main lines of study have traditionally been developed: taxonomical, faunistical and ethological. In this country, taxonomical studies appear as the most consistent and diverse, while the ethological ones show other scale of analysis in the last years. Most of the odonate fauna studies come from students' thesis that are rarely published." (Author)] Address: Novelo-Gutiérrez, R., Depto Entom., Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

8083. Ortega, H.; Rengifo, B.; Samanez, I.; Palma, C. (2007): Diversidad y el estado de conservación de cuerpos de agua Amazónicos en el nororiente del Perú. *Rev. peru. biol.* número especial 13(3): 189-193. (in Spanish, with English summary) ["The present paper describes the diversity and state of conservation, determined by a rapid biological inventory, carried out since October 24 to 30 of 2005, at the Amazonian waterbodies from Northeast of Peru, between 680 and 133 m of altitude, among Tarapoto (San Martin) and Yurimaguas (Loreto). Data and samples were collected in 26 stations. Plankton samples were collected with standard net (40 microns), benthos with Surber net and fishes with small mesh seines. Descriptions of each habitat included coordinates (UTM), and limnological characteristics (pH, temperature, conductivity, oxygen). The richness of species of fishes was of 95, dominated by Characiformes and Siluriformes. Richness of species in phytoplankton was of 74, in zooplankton, 22 species and in benthos of 20 species. The conservation state was determined using the Index of Biological Integrity (IBI) for fishes, and EPT index (Ephemeroptera, Plecoptera, and Trichoptera) for the aquatic environments. The results indicate that in the better zones conserved were found in the around of Yurimaguas." (Authors) Odonata are treated on the genus level.] Address: Ortega, H., Museo de Historia Natural, Facultad de Ciencias Biológicas, Universidad Nacional Mayor de San Marcos, Apartado 14-0434, Lima 14, Perú. E-mail: hortega@terra.com.pe

8084. Paulson, D. (2007): A suggested species code for odonates. *Argia* 18(4): 26. (in English) [The author reports on a species name system comprising of three

letters of the genus name and three or four of the species name. Such a system can be helpful taking quick field notes.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8085. Paulson, D. (2007): New Checklist Committee for DSA, Argia 18(4): 6-7. (in English) [The Common Names Committee of the Dragonfly Society of the Americas began its existence in 1996, and was charged with the responsibility for overseeing the common (English) names of the Odonata of Canada and the US after the publication in 1996 of an approved list of common names. The paper lists the names affected by the committee since the publication of the original list. The old committee has now been disbanded, to be replaced by a DSA Checklist Committee that will not only continue deliberations on common names but will also attempt to maintain an official checklist of North American Odonata, incorporating published taxonomic proposals.] Address: Paulson, D.R., Slater Mus., Univ. Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8086. Peeters, L.; Anselin, A.; Taily, M. (2007): Den Diel at Mol threatened? Libellenvereniging Vlaanderen - nieuwsbrief 1(3): 10-11. (in Dutch, with English summary) ["The richest site for dragonflies in the whole of Belgium and even the Benelux is the nature reserve Den Diel in Mol (Flanders). There are plans for building economically important shiplocks precisely in the reserve itself, but it remains uncertain if this could ever be the case as the site is protected by several nature protection measures. Nevertheless our Flemish Dragonfly Association will be vigilant for any further initiatives." (Authors)] Address: Taily, M., Hoonakkerdreef 35, 8791 Waregem, Belgium. E-mail: marc.taily@pandora.be

8087. Pessacq, P. (2007): Peristicta aeneoviridis Calvert, 1909 and P. forceps Hagen in Selys, 1860: re-descriptions and a new synonymy (Zygoptera: Protoneuridae). Odonatologica 36(2): 207-218. (in English) ["Peristicta misionera Jurzitza, 1981 is considered a junior synonym of P. aeneoviridis Calvert, 1909. The holotype of P. aeneoviridis and male P. forceps are re-described, and P. forceps female and larva are described for the first time." (Author)] Address: Pessacq, P., Laboratorio de Investigacion en Sistemática y Ecología animal (LIESA), Sarmiento 849, AR-9200 Esquel, Chubut, Argentina. E-mail: pablopessacq@yahoo.com.ar

8088. Prokopov, G.; Khrokalo, L. (2007): Sravnitelnyy analiz vidovykh kompleksov strekoz fisiko-geograficheskikh oblastey Kryma (Comparative analysis of Odonata species complexes from Crimean physical-geographical regions). Zapovedniki Kryma (Reservation of Crimea). Proceedings of IV international conference, 2th November 2007, Simferopol': 152-164. (in Russian) [A brief history of odonatological investigation in Crimea, Ukraine, and an analyse of the distribution of the 57 species - so far known to the region - among steppe and mountain geographical provinces (7 districts) are presented. Comparing of species abundance was provided due to Chekanovsky-Sørensen Index and cluster analysis. Need of conservation measures for rare species and their habitats are also discussed. (Lyudmila Khrokalo)] Address: Khrokalo, Lyudmila, P.O. Box 16, Kyiv-118, Ukraine 03118. E-mail: lkhrokalo@mail.ru

8089. Prys Witt, K.-P.; Riedel, J. (2007): Grüne Mosaikjungfer (Aeshna viridis) im Netz der Wespenspinne

(Argiope bruennichi). Naturkundliche Beiträge Soltau-Falingbostel 13/14: 52-54. (in German) [Grindau, Niedersachsen, Germany; 29-VII-2006, A. viridis was caught in the net of A. bruennichi. A record of A. affinis also is documented.] Address: Prys Witt, K.-P., Lessingstr. 2, 31535 Neustadt a. Rbge, Germany. E-mail: K.P.Prys Witt@freenet.de

8090. Randel, C.J.; Aguirre, R.; Peterson, M.J.; Sly, N.J. (2007): Invertebrate abundance at Rio Grande Wild Turkey brood locations. Journal of Wildlife Management 71(7): 2417-2420. (in English) ["Abundance of Rio Grande wild turkeys (Meleagris gallopavo intermedia) has declined in the southeastern Edwards Plateau (EP) of Texas, USA, whereas abundance has remained stable in the northwestern EP. Invertebrates are a critical protein source for poult <6 weeks posthatch. We collected invertebrates at brood and paired locations in both the stable and declining regions. Our objective was to determine if differences in invertebrate abundance existed in regions typified by declining versus stable Rio Grande wild turkey abundance. We found no difference in invertebrate abundance between brood or paired locations within regions, but invertebrate abundance, whether measured as dry mass or frequency, was greater in the stable region. Decreased invertebrate abundance may have contributed to the decline in wild turkey abundance in the southeastern EP." (Authors) The study includes Odonata (at the order level) data of biomass and frequency of occurrence.] Address: Randel, C.J., Sapphos Environmental, Inc., Pasadena, CA 91105, USA. E-mail: crandel@sapphosenvironmental.com

8091. Rensburg, A.J. (2007): Aquatic and terrestrial vegetation influence lacustrine dragonfly (order Odonata) assemblages at multiple life stages. Ph.D., The University of Wisconsin - Madison, 127 pp. (in English) ["Understanding how animals respond to habitat structure is a fundamental objective in ecology, but is particularly challenging when the animals require distinct habitats for different life stages. Although the majority of animals have spatially segregated life stages, research on habitat associations has generally been restricted to only one of the life stages. The relative importance of aquatic and terrestrial habitat structure is not well known for the order Odonata. In northern Wisconsin (USA) lakes, housing development contributes to heterogeneity in riparian and littoral vegetation structure. I surveyed odonate larval assemblages at 41 sites across 17 lakes. Based on mixed-effects multiple regressions, model selection identified site-level littoral macrophyte abundance as a key driver of larval odonate species richness, and riparian wetland plant abundance as the best predictor for odonate density. Subsequent field experiments on larval predation and adult site selection helped explain these patterns. Additional surveys of the most abundant family (Gomphidae) at 22 lake sites indicated that local larval densities depend most on recruitment, which I estimated from adult densities during the previous year. Densities of emergent Gomphidae skins (exuviae) were most related to densities of the later-instar (second-year) larvae, further suggesting that larval survivorship and movement are less variable spatially than recruitment from the previous life stage. Field experiments conducted at two South African lakes demonstrated how riparian tree structures alter adult odonate abundances. Riparian shade reduced the abundance of odonates at these potential breeding sites. Perch structures, added to separate experimental plots,

supported locally higher adult abundances, but dragonflies were not sensitive to perch structure density or diversity. Thus shade is the critical habitat component that should be addressed for odonate conservation in South Africa. Collectively, this research describes the role of habitat structure during multiple life stages. Field experiments demonstrate that generalist predators are sensitive to vegetation structure. The results suggest that riparian habitat selection by animals with complex life cycles can influence aquatic communities." (Author)] Address: Remsburg, Alysa, Dept Zoology, Univ. Wisconsin, 430 Lincoln Dr., Madison, WI 53706, USA. E-mail: aremsburg@unity.edu

8092. Rouag, R.; Djilalib, H.; Gueraiiche, H.; Luiselli, L. (2007): Resource partitioning patterns between two sympatric lizard species from Algeria. *Journal of Arid Environments* 69: 158-168. (in English) [Parc National d'El Kala, north-eastern Algeria; in the stomach of *Acanthodactylus erythrurus* one specimen of Odonata was found.] Address: Luiselli, L., F.I.Z.V. (Ecology) & Centre of Environmental Studies Demetra s.r.l., via Olona 7, I-00198 Roma, Italia. E-mail: lucamlu@tin.it

8093. Ruchin, A.B.; Loginova, N.G.; Kurmaeva, D.K. (2007): [Insects fauna of two forestries of "Smolny" National park (Mordovia Republic)]. *Fauna and ecology of insects. - Vol. 1. - Rostov-on-Don. - CBBP publishing: 24-33.* (in Russian) [Insects of two forestries in "Smolny" National Park (Republic of Mordovia) were studied. "Smolny" National Park (36.5 thousand ha) is situated in the NE part of Mordovia, Russia in landscapes of mixed forests of water-ice and the ancient alluvial plains on the left bank of Alatyr river. The river is remarkable for its young ravines. The bank is sloped and terraced. The floodplain has lakes, dry ducts and vast marshland. In 2004-2006, insects were studied on the territory of Mordovia. Among dragonflies, *Lestes dryas*, *Enallagma cyathigerum*, *Platycnemis pennipes*, *Coenagrion puella*, *C. pulchellum*, *Cordulia aenea*, *Sympetrum flaveolum*, *Aeshna viridis*, and *A. isosceles* were recorded. (Elena Dyatlova)] Address: Ruchin, A.B., Department of Biology, Mordovian State University, Bolshevitskaya Ul., Saransk 430000 Russia

8094. Rüppell, G.; Hilfert, D. (2007): NABU Winter-vortrag in Bad Gandersheim: Die Liebe der Libellen. „Kurzzeitfotos und Zeitlupen zeigen nie Gesehenes“. *Kurzeitung Bad Gandersheim* 1/07: 20. (in German) [A few generals on dragonflies are attended by information on the most recent film and book productions on Odonata done by the authors.] Address: Hilfert-Rüppell D., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

8095. Sánchez-Fernández, D.; Abellán, P.; Camarero, F.; Esteban, I.; Gutiérrez-Cánovas, C.; Ribera, I.; Velasco, J.; Millán, A. (2007): Los macroinvertebrados acuáticos de las salinas de Anana (Álava, España): Biodiversidad, vulnerabilidad y especies indicadoras. *Boletín Sociedad Entomológica Aragonesa* 40(1): 233-245. (in Spanish, with English summary) ["The purpose of this study was to complete and update the available information on the diversity of aquatic macroinvertebrates in the Añana salt-pans. We also wanted to identify both the most threatened species and those with the highest value as indicators. Finally, we have tried to determine the conservation status and the main sources of environmental impact affecting the area. We found a

total of 84 taxa, 61 identified to the species level. The species with the highest value as natural indicators in Añana's saline environment are *Nebrioporus baeticus*, for lotic environments, and *Ochthebius notabilis*, for wells and salt-pans. Also, these two species were the most threatened in the study area. The area's main environmental problem is the progressive deterioration of the salt-pans caused by neglect and by organic contamination processes, eutrophication and loss of salinity in the lower part of the stream." (Author) Odonata are treated at the family level.] Address: Millán, A., Depto de Ecología e Hidrología. Facultad de Biología. Universidad de Murcia. 30100. Espinardo. Murcia. Spain. E-mail: acmillan@um.es

8096. Santos, S.A.P.; Cabanas, J.E.; Pereira, J.A. (2007): Abundance and diversity of soil arthropods in olive grove ecosystem (Portugal): Effect of pitfall trap type. *European Journal of Soil Biology* 43: 77-83. (in English) [Curiously enough, Odonata were represented in pitfall-traps; reasons for that are not outlined. Eventually they have been prey of wasps or ants, which in case of ants where caught regularly in pitfall-traps.] Address: Santos, Sónia, CIMO/Escola Superior Agrária, Instituto Politécnico de Bragança, Apt. 1172, 5301-855 Bragança, Portugal. E-mail: saps@ipb.pt

8097. Sathe, T.V.; Shinde, K.P. (2007): On a new species of the genus *Crocothemis* Brauer from western Ghats, Maharashtra. *Flora and Fauna (Jhansi)* 13(2): 367-370. (in English) [India; Odonata "are potential bio-control agents. Taxonomical studies were made on a new species, *Crocothemis rageshri* sp. n. The male is 32.3 mm long excluding anal appendages; head 3.2 mm long, thorax 9.5 mm long, fore wing 27.00 mm long, hind wing 26.5 mm long, abdomen 19.5 mm long, red; superior anal appendages 1.46 mm long, reddish.] No additional information are available, and this seems to be one more of the obscure "new species" "described" by the authors. (Martin Schorr)

8098. Schütte, K.; Razafindraibe, P. (2007): Chapter 4.3: Checklist of Dragonflies of the Littoral Forests near Tolagnaro (Fort-Dauphin). In: Ganzhorn, J.U., S.M. Goodman & M. Vincelette (Eds.): *Biodiversity, Ecology and Conservation of Littoral Ecosystems in Southeastern Madagascar, Tolagnaro. SIMAB Series 11.* ISBN 978-1-893912-00-7: 163-165. (in English, with French summary) [A total of 52 Odonata species is checklisted from the littoral forests of Petriky, Mandena, and Sainte Luce in southeastern Madagascar.] Address: Smithsonian Institution, Nat. Zool. Park, Center for Conservation Education & Sustainability. Monitoring & Assessment of Biodiversity Program, 1100 Jefferson Drive, SW, Suite 3123, Washington, DC 20560-0705, USA

8099. Sibley, F.C. (2007): Second record of *Anax ephippiger* (Vagrant Emperor) from the West Indies. *Argia* 18(4): 17. (in English) [Guan Island, British Virgin Islands, 20-X-2006] Address: Sibley, F.C., The Conservation Agency, 6 Swinburne St. Jamestown, RI 02835, USA. E-mail: fcsibley@empacc.net

8100. Statzner, B.; Bonada, N.; Dolédec, S. (2007): Conservation of taxonomic and biological trait diversity of European stream macroinvertebrate communities: a case for a collective public database. *Biodivers. Conserv.* 16: 3609-3632. (in English) ["The use of databases for the conservation of biodiversity is increasing. During the last decade, such a database has been cre-

ated for European stream macroinvertebrates. Today, it includes 527 sites that are the least human-impacted representatives of many stream types across many European regions. It includes data on the abundance of 312 invertebrate genera, several environmental site characteristics, collection methods, bibliographic data sources, and 11 biological traits of the genera (e.g. size, life cycle, food and feeding habits, described in 61 categories). The database will be useful in addressing many topics that are potentially relevant to biodiversity conservation. To illustrate this potential, we provide examples of how the data could be exploited. First, we describe the frequency of some taxonomic and biological characteristics (e.g. richness and diversity of genera and traits) of the macroinvertebrate communities and assess how these characteristics are related (e.g. how trait richness increases with genus richness). Second, we describe the frequency of some characteristics of the genera and traits (e.g. occurrence frequency, abundance, dispersion index) and again assess how these characteristics are related (e.g. how occurrence increases with abundance). Finally, we suggest how the database could be developed into a collective, publicly accessible database that covers stream types and regions of Europe more comprehensively." (Authors) Table 3 includes Brachytron, Diplacodes, and Enallagma.] Address: Statzner, B., CNRS-Ecologie des Hydrosystèmes Fluviaux, Université Claude Bernard Lyon 1, 69622 Villeurbanne Cedex, France. E-mail: statzner@biomserv.univ-lyon1.fr

8101. Subramanian, K.A.; Sivaramkrishnan, K.G. (2007): Aquatic Insects of India - A Field Guide. Ashoka Trust for Ecology and Environment (ATREE), Bangalore, India: 62 pp. (in English) [Larval Odonata are keyed at the family level on pages 26-29.] Address: Subramanian, K.A., Zoological Survey of India, Western Regional Station, Pune-411 044 Maharashtra, India. E-mail:subbuka.zsi@gmail.com

8102. Tailly, M.; Van der Schoot, P.; Wallays, H. (2007): Excursion of 1st of July 2007 to the Mol area. Libellenvereniging Vlaanderen - nieuwsbrief 1(3): 5-6. (in Dutch, with English summary) ["Although the weather was not optimal during the whole week and the day itself proved to be suboptimal from the meteorological point of view, 29 species were observed in this area which is the area with the most species in the whole of Belgium. The top of the day was a male of Anax parthenope at Den Diel." (Authors)] Address: Tailly, M., Hoonakkerdreef 35, 8791 Waregem marc.tailly@pandora.be

8103. Tennessen, K.J.; Hopper, A.E. (2007): New distribution records of Gomphus consanguis (Odonata: Gomphidae) in Tennessee. Journal of the Tennessee Academy of Science 82(1-2): 40-41. (in English) ["Gomphus consanguis was found in two counties in eastern Tennessee (McMinn and Meigs) in 2004-2005. The streams in which the species was found are impacted by farm operations, and population numbers appear to be low. The species is still considered rare." (Authors)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktensessen@centurytel.net

8104. Torralba Burrial, A.; Ocharan, F.J. (2007): Dragonflies caught by plants (Odonata: Libellulidae). Entomologia generalis 30(4): 301-305. (in English, with German summary) ["Observations of a male of Crocothemis erythraea (Brullé 1832) which was caught by the

plant *Silene inaperia* (Caryophyllales: Caryophyllaceae) are reported. This plant presents sticky secretions on the stem, with seemingly defensive functions against herbivory. The dragonfly was caught when sticking the four wings to the stems of several plants. Other cases of capture of dragonflies by non insectivorous plants are reviewed." (Authors)] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

8105. Upson, S.; Danforth, D.; Gonzalez-Soriano, E.; Behrstock, R.A.; Bailowitz, R.A. (2007): A preliminary checklist of the Odonata of Sonora, Mexico. Bulletin of American Odonatology 10(2-3): 23-51. (in English, with Spanish summary) ["Little detailed information is available on the Odonata of Sonora, which is located in northwestern Mexico. A recent paper (Paulson & Gonzalez-Soriano, 2006) listed 46 species for the state. We have documented 122 species based on seven years of field work, including two undescribed species (an *Argia* and an *Erpetogomphus*). Species accounts include locality data, flight period and distribution map by municipio (= county). An overview of Sonora's regional biocommunities is provided, including maps of major watersheds and municipio boundaries." (Authors)] Address: Behrstock, R.A., 10359 S. Thicket Pl., Hereford, AZ 85615, USA. E-mail: rbehrstock@cox.net

8106. Van der Schoot, P. (2007): Excursion of 28th of July 2007 to "Het Vinne" in Zoutleeuw. Libellenvereniging Vlaanderen - nieuwsbrief 1(3): 7-8. (in Dutch, with English summary) ["Again the weather was not good for an odonatological excursion in this recently restored lake. During recent years quite a number of interesting species has been found. But on this day the main observations were Little bittern and Black woodpecker." (Author)] Address: not stated

8107. Vinogradova, E.B. (2007): 5. Diapause in aquatic insects, with emphasis on mosquitoes. Monographiae Biologicae 84: 83-113. (in English) ["In Odonata both egg and larval diapauses occur in different instars (Corbet, 1980). Embryonic diapause occurs in certain temperate species, notably *Aeshna*, *Sympetrum*, and *Lestes*. For instance, *Lestes* congener oviposits in dry stems, the eggs undergo a bit of embryogenesis in autumn and then enter diapause in winter, at which time they are resistant to both low temperature and desiccation. Hatching of larvae is observed only after wetting and exposure to temperatures of 5°C and higher (Sawchin & Gillott, 1974). Such a response may be augmented in some other species of *Lestes* by sensitivity to photoperiod. Larval diapause is the most common diapausing stage for dragonflies in the temperate zone. Larval growth rate is controlled by the interaction of responses to temperature and photoperiod such that morphological development within and between certain instars is arrested or accelerated at different times of year (Corbet, 1980). A relatively simple example of the mechanism of environmental regulation is provided by *L. eurinus* from North Carolina, USA, where the populations overwinter in three larval instars preceding the final one (Lutz, 1968). Over a wide temperature range larvae of these instars develop more rapidly under summer than under winter photoperiods. Such a response magnifies the seasonal change in growth rate due to temperature. More complex responses to temperature and photoperiod exist among certain other species from

North Carolina, South Ontario, Sweden, and England. Their common feature is that one or more late instars became unresponsive to a long photoperiod stimulus in late summer or early autumn and thus enter diapause. The larvae of some dragonflies may also diapause in a dried (anhydrobiotic) state (Van Damme & Dumont, 1999). In Brazil, one larva of *Pantala flavescens* survived drought at least a few months and after flooding successfully completed metamorphosis. It is argued that early larval tolerance to drought may be common in *Pantala* contributing its success in semiarid environments; possible other species in which a similar phenomenon occurs are also listed by Van Damme and Dumont (1999). In *Enallagma hageni* it has been shown experimentally (Ingram 1975) that termination of diapause can be caused by exposure to a low temperature, regardless of photoperiod, or to short photoperiod at a permissive temperature. A critical element in the seasonal regulation of many dragonflies at higher latitudes is the annual reversal of response to photoperiod among one or more late instars at, or sometimes before, the autumnal equinox. This reversal can induce the population to molt synchronously at that time and can also establish a latent sensitivity to spring photoperiod (Lutz 1974). In European *Leucorrhinia dubia*, which spends its last winter mainly in the final instar, analogous differential responses to photoperiod operate within the final instar and thus enhance the responses to photoperiod and the degree to which each of several developmental phases is synchronized within the larval population (Norling 1976). Such responses prevent autumnal emergence and reduce temporal variation among overwintering larvae that are due to emerge the next summer." (Author)] Address: Vinogradova, Elena, University of Experimental Entomology and Biocontrol, Zoological Institute of the Russian Academy of Science, University emb., 1, 199034, St. Petersburg, Russian Federation. E-mail: vino@md12306.spb.edu

8108. Winterbourn, M.J.; Harding, J.S.; McIntosh, A.R. (2007): Response of the benthic fauna of an urban stream during six years of restoration. *New Zealand Natural Sciences* 32: 1-12. (in English) ["Okeover Stream flows through the University of Canterbury campus and has been subject to restoration since 1998. While initially spring-fed, its main source of flow is now aquifer water, which has been used for cooling university buildings. Water quality is generally good, but the low-gradient streambed includes substantial amounts of fine inorganic sediment and organic matter including deciduous tree leaves. Restoration activities include riparian plantings, channel shaping, substratum manipulations and additions, the construction of sediment traps and macrophyte management. Thirty aquatic invertebrate taxa (13-19 per year) have been recorded in annual surveys since 2000. *Paracalliope fluviatilis* (Amphipoda), Copepoda and Oligochaeta were most abundant in all years, whereas Mollusca and Trichoptera always made up <4% and <2% of individuals, respectively. Furthermore, cased caddisflies were found only in the two (of four) downstream reaches, whereas Copepoda were predominantly in the upper two reaches where flow was generally slower. Low annual MCI (69-84) and SQMCI (3.5-4.8) values indicated the fauna comprised mainly species that are tolerant of poor water quality or degraded habitat conditions. Our data indicate that the invertebrate fauna has yet to respond positively to the changes in physical habitat and riparian conditions made along Okeover Stream. The introduction of pulses of

poor quality water during heavy rainfalls, high levels of siltation, heavy metals in bed sediments, large accumulations of slowly decomposing leaves and an inadequate source of potential colonists may all contribute to the weak response of the invertebrate fauna to restoration activities." (Authors) *Xanthocnemis zealandica* is rare.] Address: Winterbourn, M.J., School of Biological Sciences, University of Canterbury, Private Bag 4800, Christchurch, New Zealand. E-mail: michael.winterbourn@canterbury.ac.nz

8109. Worthen, W.B.; Jones, C.M. (2007): Odonata survey of Union County, South Carolina. *Argia* 18(4): 32-33. (in English) [USA; from IV, 2004 through IX, 2006. Most of the sites were within the Enoree Ranger District of Sumter National Forest. We found 41 species of odonates, 34 representing new county records. We focused our attention on the watersheds of the Tyger River and Fairforest Creek, just north of Whitmire and south of Union." (Authors)] Address: Worthen, W.B., Dept of Biology, Furman Univ., Greenville, SC29613 USA. E-mail: worthen@furman.edu

8110. Yum, J. W.; Bae, Y. J. (2007): Description of the larva of *Copera tokyoensis* Asahina (Insecta: Odonata: Platynemididae) from Korea. *Korean J. Syst. Zool.* 23(1): 87-89. (in English) ["The larval stage of *C. tokyoensis* is described for the first time from Korea. The larva can be distinguished from other known larvae of *Copera* by the absence of lateral setae on the abdominal segments and by the labial palpal lobe, which bears three setae. Line-drawings of key characters and discussion on Korean *Copera* are provided." (Author)] Address: Yum, Jin-Whoa, E-mail: lestes93@me.go.kr

8111. Zhang, W. (2007): Computer inference of network of ecological interactions from sampling data. *Environ. Monit. Assess.* 124: 253-261. (in English) ["Both direct and indirect ecological interactions may occur in an ecosystem with large numbers of taxa. Traditional food web technique is a popular tool to measure the quality and health of the environment. Much of works must be done before constructing a food web for an ecosystem especially with many taxa. This food web is generally specific for some ecological interactions and fixed for a set of given species. It is therefore not an effective method for dynamic and prompt assessment of environment. Ecological interactions and their interactive intensity may be detected by sampling biological taxa in the field and by detecting various between-taxa distances or similarities. Network may clearly exhibit the complex interactions among biological taxa. Statistic tests on various distance or similarity measures and computer designs are required to infer the network. We develop an algorithm and software to infer the network of direct or indirect ecological interactions in ecosystem. It is a prompt and effective tool in monitoring and assessment of the environment. A redundant network may be inferred and drawn by computer based on the statistic tests on sampling data or the pathway information given in HTML file. Dominant taxa may be found in the network. In total of 16 distance and similarity measures, including Euclidean distance, Manhattan distance, Pearson correlation, partial correlation, point correlation, linkage coefficients, Jaccard coefficient etc., are provided to detect taxa pairs with significant parametric or nonparametric similarities, based on randomization tests and ordinary statistic tests. Criteria to use distance and similarity measures are discussed." (Author) The

interaction network also includes Odonata.] Address: Zhang, W., Research Institute of Entomology and State Key Laboratory of Biocontrol, School of Life Sciences, Zhongshan Univ., Guangzhou 510275, P.R. China. E-mail: LS71@zsu.edu.cn; zhangwenjun@scientist.com

2008

8112. Anonymus (2008): In Memoriam Dr. John Haarstad. University of Minnesota, Department of Entomology, Newsletter 2008: 24. (in English) [John Haarstad was the long time resident naturalist at the University of Minnesota Cedar Creek Ecosystem Science Reserve (CCESR) in East Bethel, MN, USA. November 17, 2008 he passed away at the age of 62. After graduating from Carleton College in Northfield, MN, he served in the Peace Corps in northern Nigeria teaching science. He later earned his M.S. degree in 1980 (Thesis Title: Temporal organization in dragonfly communities). An obituary was published in the Minneapolis Star Tribune on 11/20/2008.] Address: not stated

8113. Bambaradeniya, C.N.B.; Edirisinghe, J.P. (2008): Composition, structure and dynamics of arthropod communities in a rice agro-ecosystem. *Cey. J. Sci. (Bio. Sci.)* 37(1): 23-48. (in English) ["The study on terrestrial arthropod communities in rice agro-ecosystems was conducted in Bathalagoda, Sri Lanka. A total of 342 arthropod species was documented comprising 282 species of insects in 90 families and 17 orders and 60 species of arachnids in 14 families. Eight taxa new to Sri Lanka are reported. Majority of the insects documented were hymenopterans, dominated by bees and ants. Based on feeding habits, majority of the arthropods recorded were predators (149 species), dominated by spiders. However, in the rice field proper, abundance of phytophagous rice pests was higher than that of predators. Density fluctuations of predators and parasitoids were positively correlated. Species richness and diversity of terrestrial arthropods increased gradually with crop age, but declined following application of pesticides. Species diversity (H') of terrestrial arthropods during vegetative, reproductive and grain ripening stages and the fallow period were significantly different. Diversity of terrestrial arthropods in the field proper positively correlated with crop age and height of the rice plant, and in field bunds with the weed cover. Findings indicate that a stable relationship could be maintained between rice insect pests and their arthropod natural enemies through minimal biocide applications and manipulation of weed cover in the rice agroecosystem." (Authors) 19 odonate taxa, in most cases at the species level, are listed.] Address: Bambaradeniya, C.N.B., IUCN – The World Conservation Union, Asia Regional Office, Sri Lanka. E-mail: cnb@iucnsl.org

8114. Bedjanic, M.; Micevski, N.; Micevski, B. (2008): On the dragonfly collection in the natural history museum in Struga, Macedonia (Insecta: Odonata). *Biol. Macedonica* 61: 97-105. (in English) ["The collection of the Natural History Museum "Dr. Nikola Nežlobinski" in Struga contains 23 dragonfly species, collected in the first half and in the middle of 20th century in the vicinity of city Struga on the shores of Ohrid Lake. *Somatochlora flavomaculata* is new for the fauna of Macedonia. Its occurrence in the Balkans and south-eastern Europe is outlined and a short zoogeographical discussion is provided. A list of 37 dragonfly species hereto recorded

at Ohrid Lake and its surroundings is compiled." (Authors)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjazbedjanic@yahoo.com

8115. Bobeldyk, A.M.; Lamberti, G.A. (2008): A decade after invasion: Evaluating the continuing effects of Rusty Crayfish on a Michigan river. *J. Great Lakes Res.* 34: 265-275. (in English) ["In 2004, we revisited a Michigan stream invaded by rusty crayfish (*Orconectes rusticus*) to determine if this species continued to expand its downstream range and negatively impact the stream food web. Compared to a 1992 study, we predicted that rusty crayfish would increase in density and downstream distribution from a small lake, resulting in further reduction of in-stream resources such as organic matter, benthic invertebrates, and periphyton. To determine current crayfish distributions and impacts, we conducted a longitudinal survey of crayfish abundance, ran a 28-d leaf breakdown experiment, and sampled benthic substrates. Leaf packs of sugar maple (*Acer saccharum*) leaves were placed at three sites with differing crayfish densities (high, intermediate, and none). Breakdown rates were compared across the three sites and for two treatments (closed leaf bags excluding crayfish and open bags allowing crayfish access). Benthic invertebrates were sampled from leaf bags and invertebrates and periphyton were sampled from cobbles. In contrast to 1992, we found that the maximum downstream distance of rusty crayfish declined from 4 km to less than 3 km downstream from the lake. Leaves in open bags decayed significantly faster ($k = 0.143$) than did leaves in closed bags at all sites ($k = 0.079$) ($p = 0.0005$). The site lacking crayfish had significantly higher densities of invertebrates compared to both high and intermediate crayfish density sites ($p = 0.005$). Although we found that rusty crayfish reduced standing stocks of leaves and invertebrates, we did not detect measurable changes in periphyton biomass. Therefore, rusty crayfish have not dispersed further downstream since 1992, but where present, these omnivores significantly reduce resource availability via the consumption of leaf material and benthic invertebrates." (Authors)] Address: Bobeldyk, Angela, Department of Biological Sciences, University of Notre Dame, Notre Dame, Indiana 46556-0369, USA. E-mail: bobeldyk.1@nd.edu

8116. Boulton, A.J.; Boyero, L. Covich, A.P.; Dobson, M.; Lake, S.; Pearson, R. (2008): Are tropical streams ecologically different from temperate streams? In: Dudgeon, D. (Ed): *Tropical Stream Ecology*. San Diego: Academic Press. ISBN: 978-0-12-088449-0: 257-284. (in English) ["If tropical streams differ ecologically from temperate ones, we must be cautious in our extrapolation of ecosystem models developed in temperate-zone streams. Similarly, approaches and techniques used routinely in management of temperate streams may not be applicable in the tropics. Despite considerable variability in geological history, flow regime and geomorphology, streams in the tropics typically receive higher insolation and more intense rainfall, with warmer water and often relatively predictable floods. For many groups of aquatic taxa, tropical streams also harbour higher biodiversity than their temperate equivalents. Nonetheless, there is little published evidence for consistent differences in food-web structure, productivity, organic-matter processing and nutrient dynamics, or responses to disturbance which would indicate that the term 'tropical' has special significance

when applied to stream ecology. Instead, ecological processes in tropical streams appear to be driven by the same variables that are important in temperate ones. For example, biotic responses to drought and flooding are similar to those in temperate streams while in-stream productivity is limited by the same factors: nutrients, shading, disturbance, and trophic structure. Shredders are reputed to be rare in many tropical streams but this also is the case in many southern temperate streams, implying that models of leaf breakdown developed in the north-temperate zone may not have the universal applicability often assumed. Biome comparisons among temperate and tropical streams are confounded by the immense inherent variability of streams within both these zones, and the wide range of climatic and hydrological conditions – even in the tropics. Valid extrapolation of models and management strategies may be less a matter of tropical versus temperate streams but, instead, of ensuring comparability at appropriate scales and fuller understanding of ecological mechanisms, plus recognition of the magnitude and complexity of spatial and temporal variation in stream ecosystems at all latitudes." (Author) Many references to Odonata are made.] Address: not stated

8117. Bowman, N. (2008): Reports from coastal stations - 2007: Eccles-on-sea, Norfolk. *Atropos* 33: 69-70. (in English) [UK; *Calopteryx splendens*, *Brachytron pratense*, *Erythromma viridulum*, *Sympetrum fonscolombii*] Address: not stated

8118. Brame, W. (2008): Willow Emerald damselfly *Lestes viridis* Vander Linden in Suffolk. *Atropos* 33: 3. (in English) [17-VIII-2007; third or fourth UK record of *L. viridis* from Trimley, Suffolk.] Address: Brame, W., 27 Maidstone Rd, Felixstowe, IO11 9EE, UK

8119. Brooks, D.R.; Hoberg, E.P. (2008): Darwin's necessary misfit and the sloshing bucket: The evolutionary biology of emerging infectious diseases. *Evo. Edu. Outreach* 1: 2-9. (in English) ["Evolutionary studies suggest that the potential for rapid emergence of novel host-parasite associations is a "built-in feature" of the complex phenomenon that is Darwinian evolution. The current Emerging Infectious Disease (EID) crisis is thus a new manifestation of an old and repeating phenomenon. There is evidence that previous episodes of global climate change and ecological perturbation, broadly defined, throughout earth history have been associated with environmental disruptions that produce episodic bursts of new host-parasite associations, each of which would have been called an EID at the time of its first appearance. This perspective implies that there are many evolutionary accidents waiting to happen, requiring only the catalyst of climate change, species introductions, and the intrusion of humans into areas they have never inhabited before. [...] The trematode *Haematoloechus floedae* transmission dynamics, although specialized, are conservative across the genus, in each case involving a freshwater pulmonate snail, a dragonfly nymph, and a relatively large aquatic frog. Although most lung flukes are known from only a single snail species in natural infections, a number are capable of infecting a broader range of snails from the superfamily Lymnaeidae in the laboratory. The larvae, called cercariae, that emerge from the snail infect the second intermediate host, which, for all species studied to date is an anisopteran odonate (dragonflies). Members of the Lymnaeidae and the Anisoptera are widespread through-

out North American and Mesoamerica. Evolutionary conservatism in the physiology and ecology would allow the parasite to expand into novel territory; all that would be required is a species of lymnaeoid pond snail and a species of anisopteran dragonfly. Leopard frogs appear to be the ancestral frog hosts for *Haematoloechus* species. Within that historical context, however, *H. floedae* itself appears to have originated through a switch to bullfrogs, so the original host for *H. floedae* is bullfrogs. *Rana taylori* and *R. cf. forreri*, the hosts for *H. floedae* in Costa Rica, are leopard frogs. Parasite species can thus retain ancestral host utilization capabilities, even when they are not being used, which allows "new" associations to be formed through 'retrocolonization'." (Authors)] Address: Brooks, D.R., Dept of Ecology & Evolutionary Biology, University of Toronto, Toronto, ON M5S 3G5, Canada. E-mail: dbrooks@zoo.utoronto.ca

8120. Buden, D.W. (2008): First records of Odonata from the Republic of Nauru. *Micronesica* 40(1/2): 227-232. (in English) [Five odonate species are recorded from Nauru for the first time, and constitute the first records of Odonata from this island republic identified to species. None is endemic; all are widespread in the Indo-Australian region and the islands of the west central Pacific Ocean. *Diplacodes bipunctata* is the most common species throughout the island, but *Ischnura aurora* appears locally abundant, possibly seasonally. Breeding is confirmed for all species.] Address: Buden, D.W., Division of Natural Sciences and Mathematics, College of Micronesia-FSM, P.O. Box 159, Kolonia, Pohnpei, Federated States of Micronesia 96941. E-mail: donbuden@comfsm.fm

8121. Campero, M.; De Block, M.; Ollevier, F.; Stoks, R. (2008): Metamorphosis offsets the link between larval stress, adult asymmetry and individual quality. *Functional Ecology* 22: 271-277. (in English) ["1. It is poorly understood which traits translate larval stressors into adult fitness in animals where larval and adult stages are separated by metamorphosis. Although fluctuating asymmetry (FA) is often assumed to do so, especially in insects the relationship between larval stress, adult FA and individual quality is often absent. One suggested hypothesis for this is the higher mortality of low quality (hence more asymmetric) animals during metamorphosis (i.e. developmental selection hypothesis). 2. Here we test this hypothesis and also propose and test an alternative hypothesis where metamorphosis is stressful but not lethal and increases FA of all animals up to a certain level (i.e. stressful metamorphosis hypothesis). 3. We manipulated larval stress (food stress and pesticide stress) and measured FA before and after metamorphosis in *Coenagrion puella*. Additionally, we assessed the relationship between FA and individual quality variables measured at metamorphosis (age, mass and two immune variables: phenoloxidase (PO) and haemocyte number). 4. Before metamorphosis, FA reflected the combination of food and pesticide stress and was negatively related with mass and both immune variables after metamorphosis. These patterns were, however, offset after metamorphosis. Low mortality, not linked to FA during metamorphosis, indicates that developmental selection cannot explain this. Instead, the strong increase in FA up to equal levels across treatments during metamorphosis supports the stressful metamorphosis hypothesis. 5. Taken together, the developmental stage in which FA is measured may critically determine the reliability of FA as an indicator of

stress and of individual quality in insects." (Authors)] Address: Campero, Melina, Unidad de Limnología y Recursos Acuáticos, Univ. Mayor de San Simón, Cochabamba, Bolivia. E-mail: melina.campero@gmail.com

8122. Cano Villegas, F.J. (2008): Interesantes observaciones de artrópodos en Sierra Nevada (Granada, Andalucía). Boletín de la SAE 15 (ISSN: 1573-1666): 99-102. (in Spanish) [Pyrrhosoma nymphula and Ischnura graellsii were observed in the Sierra Nevada, Spain at 2220 a.s.l. (Parque del Mirlo resp. Estranque (Pradollano, Granada), 10-08-2004 resp. 09-08-2007 (UTM: 30S VG 647 055).] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: fcanovi2@hotmail.com

8123. Chaput-Bardy, A.; Lemaire, C.; Picard, D.; Secondi, J. (2008): In-stream and overland dispersal across a river network influences gene flow in a freshwater insect, Calopteryx splendens. Molecular Ecology 17(5): 3496-3505. (in English) ["Gene flow in riverine species is constrained by the dendritic (branching) structure of the river network. Spatial genetic structure (SGS) of freshwater insects is particularly influenced by catchment characteristics and land use in the surroundings of the river. Gene flow also depends on the life cycle of organisms. Aquatic larvae mainly drift downstream whereas flying adults can disperse actively overland and along watercourses. In-stream movements can generate isolation by distance (IBD) at a local scale and differentiation between subcatchments. However, these patterns can be disrupted by overland dispersal. We studied SGS across the Loire River in C. splendens which is able to disperse along and between watercourses. Our sampling design allowed us to test for overland dispersal effects on genetic differentiation between watercourses. Amplified fragment length polymorphism markers revealed high genetic differentiation at the catchment scale but the genetic structure did not reflect the geographical structure of sampling sites. We observed IBD patterns when considering the distance following the watercourse but also the Euclidean distance, i.e. the shortest distance, between pairs of sites. Altogether, our results support the hypothesis of overland dispersal between watercourses. From a conservation perspective, attention should be paid to the actual pathways of gene flow across complex landscapes such as river networks." (Authors)] Address: Chaput-Bardy, Audrey, Laboratoire Paysages et Biodiversité, UFR Sciences, 2 Bd Lavoisier, 49045 Angers cedex 01, France. E-mail: audrey.chaput-bardy@univ-angers.fr or chaputbardyaudrey@hotmail.com

8124. Chen, S. (2008): Erstfund von Ceriagrion tenellum (de Villers, 1789) (Späte Adonislíbel) und Erythromma lindenii (Selys, 1840) (Pokal-Azurjungfer) im NSG "Heiliges Meer". Natur und Heimat 68(1): 26-28. (in German) [Nordrhein-Westfalen, Germany; C. tenellum: 20./25-VIII-2007; E. lindenii: 15./26-VIII-2007] Address: Chen, S., Hustr. 76, 44263 Dortmund, Germany. E-mail: simon.chen@lycos.de

8125. Choong, C.; Orr, B.; Dow, R. (2008): Checklist of dragonflies of UKM Campus, including Bangi Forest Reserve, Bangi, Selangor, Malaysia. Echo 2008: 4-5. (in English) ["In total, 74 species from 13 families were recorded. This compares with 235 species from 15 families recorded from Peninsular Malaysia and Singapore (Orr, 2005, Dow, Choong and Orr, 2007, Choong 2006,

Choong and Orr, unpublished records). To find more than 30 percent of a major region's rich fauna concentrated on a single university campus is we believe, some kind of record, and surely provides a magnificent opportunity for using these lovely insects for teaching and research." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

8126. Clancy, S.P. (2008): Reports from coastal stations - 2007: Dungeness area, Kent. Atropos 33: 57-59. (in English) [UK; records of Anax parthenope, Sympetrum fonscolombii, and Erythromma viridulum are documented.] Address: not stated

8127. De Gennaro, D.; Rebagliati, P.J.; Mola, L.M. (2008): Fluorescent banding and meiotic behaviour in Erythrodiplax nigricans (Libellulidae) and Coryphaeschna perrensi (Aeschnidae) (Anisoptera, Odonata). Caryologia 61(1): 60-67. (in English) ["The species of Odonata are cytogenetically characterised by possessing holokinetic chromosomes, a post-reductional meiosis, an XX/XO (female/male) sex chromosome mechanism, m-chromosomes, and only one chiasma per bivalent. Chromosome studies were performed on males of E. nigricans and C. perrensi from Argentina. E. nigricans has n=12+XO and lacks m-chromosomes, while C. perrensi has 2n=27, n=13+XO, m-chromosomes and a large autosomal pair associated with the nucleolus. The meiotic behaviour of both species follows the general pattern of the order: the X chromosome is positively heteropycnotic during early prophase I; bivalents regularly show only one chiasma; all chromosomes migrate synchronously and almost parallel to the equatorial plane at anaphase I; at metaphase II the X chromosome is present in all the cells as a consequence of the post-reductional division, lies outside the metaphasic plate, and migrates asynchronously with the autosomes at anaphase II. In C. perrensi, the largest bivalent exhibits two chiasmata in a large proportion of cells, which is a very rare feature among dragonflies. Heterochromatin characterisation with DAPI-CMA banding reveals that C. perrensi does not show fluorescent banding, except for a CMA bright band at one telomeric region of the largest bivalent, associated with the NOR region; in E. nigricans, autosomes have small AT-rich telomeric blocks, except for the smallest pair, which exhibits conspicuous bands in both telomeric regions, one being GC-rich and the other AT-rich. Taking into account that the m-chromosomes have been found in other E. nigricans populations, their absence in the studied population may be due to the presence of such heterochromatic blocks." (Authors)] Address: Mola, Liliana Maria, Laboratorio de Citogenética y Evolución, Departamento de Ecología Genética y Evolución, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires. Intendente Güiraldes y Costanera Norte, 1428 Ciudad Universitaria. Ciudad Autónoma de Buenos Aires, Argentina. E-mail: limola@ege.fcen.uba.ar

8128. De Knijf, G. (2008): The season 2006 for dragonflies (Odonata) in Flanders: a review. Libellenvereniging Vlaanderen - nieuwsbrief 2(1): 9-13. (in Dutch, with English summary) ["Here we present the first results of the observations of dragonflies we received for the year 2006 for Flanders. A total of more than 6000 observations, the highest number ever, from 58 species were received. These were collected by 73 collaborators. All geographical regions and 40% of the total num-

ber of atlas squares (5x5 km UTM) were investigated. Three species, *Ischnura elegans*, *Anax imperator* and *Orthetrum cancellatum* were seen in more than 50% of the investigated squares. Remarkable was the still going on increase of *Calopteryx splendens* which was observed in 30% of the squares. Southern species as *Erythromma viridulum* and *Crocothemis erythraea* are getting quite common and are among the 20 most reported species in Flanders. Other southern species as *Lestes barbarus*, *Sympetrum fonscolombii*, both mentioned in more than 10% of the squares, and *Aeshna affinis*, *Anax parthenope* and *Orthetrum brunneum* were observed at several localities. The decline of some Red List species seems still to be going on. The number of localities for some of them, e.g. *Coenagrion lunulatum*, *Gomphus vulgatissimus*, *Sympetrum depressiusculum* and *Leucorrhinia rubicunda* has fallen to less than three. They can be considered as becoming extinct in Flanders in the near future if their decline continues." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

8129. Deans, M. (2008): Reports from coastal stations - 2007: Bawdsey Peninsula, Suffolk. *Atropos* 33: 65-66. (in English) [UK, *erythromma viridulum*; *Sympetrum striolatum* was caught at light on 8 and 13 August, 2007] Address: not stated

8130. Dow, R.; Reels, G. (2008): List of species recorded at Gunung Mulu National Park, Sarawak, Malaysian Borneo in 2005-2006. *Echo* 2008: 2-3. (in English) ["Gunung Mulu National Park, with an area of 544 km², is the largest national park in Sarawak. It is located in northeast Sarawak close to the border with Brunei. Gunung Mulu, a sandstone massif, dominates the park. The park covers an altitudinal range from close to sea level up to 2376m at the summit of Gunung Mulu. A number of smaller limestone mountains run along the western face of Gunung Mulu. With the exception of mangrove forest, all of the main vegetation types found in Sarawak are represented within the park: mixed dipterocarp forest (MDF), montane forest, limestone forest, alluvial forest (including freshwater swamp forest), kerangas (tropical heath) forest and peat swamp forest. Collecting was carried out from 16th April to 24th April 2005 and from 4th February to 20th February 2006. At present, some 106 species are known from the park, of which at least four represent probable new species." (Authors)] Address: Dow, R.A., 6 Bramley Av., Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

8131. Durst, S.L.; Theimer, T.D.; Paxton, E.H.; Sogge, M.K. (2008): Age, habitat, and yearly variation in the diet of a generalist insectivore, the Southwestern Willow Flycatcher. *The Condor* 110(3): 514-525. (in English, with Spanish summary) ["Characterizing avian diet is complex, especially for generalist insectivores, as food resources can vary over space and time, and individuals of different sexes and ages may consume different food. We examined diet of a generalist insectivore, the Southwestern Willow Flycatcher (*Empidonax traillii* extimus), at Roosevelt Lake in central Arizona from 2000 to 2004, determined from 344 fecal samples. We found that five prey categories accounted for 70% of the proportional abundance in flycatcher diet: Hymenoptera, Diptera, Cicadellidac, Coleoptera and Formicidae, although the relative amounts of these and other taxa differed significantly among years. We detected no

differences in diet between sexes of adults, but adults and nestlings differed, with higher proportions of Hymenoptera in adult samples and more Diptera in nestling samples. Using a subset of samples, we compared flycatcher diet in habitat patches dominated by native cottonwood (*Populus fremontii*) and willow (*Salix gooddingii*), exotic salt cedar (*Tamarix ramosissima*), or a mix of these tree species. We found that prey groups varied significantly among habitats in only one year, 2002, with Araneae, Lepidoptera and Odonata significant indicators of native habitat, Cicadellidae and Hymenoptera significant indicators of exotic habitats, and Homoptera a significant indicator of mixed habitat. In 2002, a severe drought resulted in reduced prey base and near total reproductive failure, but we detected no major shift in the composition of adult diet during that year, suggesting that for generalists like the Southwestern Willow Flycatcher, overall insect abundance may be a more important driver of productivity than abundance of specific prey taxa." (Authors)] Address: Durst, S.L., Department of Biological Sciences, P.O. Box 5614, Northern Arizona University, Flagstaff, AZ 86011, USA. E-mail: scottdurst@fws.gov

8132. Dyatlova, E. (2008): [Study of amphibiotic insects at Zoological field station of Odessa National I.I. Mechnikov University in Low Dniestr // Significance and prospects of stationary research on conservation of biodiversity]. Proceedings of International Scientific Conference devoted to the 50th anniversary of high-mountain "Pozhizhevskia" Biological Station. - Lviv-Pozhizhevskia, 23-27 September 2008.- Lviv 2008: 129. (in Russian) [Dragonflies are currently well-studied in the Low Dniestr River (SW Ukraine) - 33 species have been recorded since the beginning of this century but have almost never been studied here before. Among the species protected at the European level *Gomphus flavipes* occurs. *Anax imperator* and *Erythromma lindenii* are nationally protected in Ukraine. In field and laboratory conditions the fecundity of two *Ischnura elegans* morphs have been studied here. Also mite infestation, morphometric analysis and density of each morph in population were studied. Dragonflies in Low Dniester were divided in 6 groups according their flight periods. Trichoptera and Ephemeroptera also have been studied at the Low Dniestr. These insects were attracted to light. (Elena Dyatlova)] Address: Dyatlova, Elena, Institute of Zoology, Faculty of Biology, I.I. Mechnikov University of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

8133. Ebejer, M.J.; Degabriele, G.; Sciberras, A. (2008): An annotated checklist of Odonata of the Maltese Islands, with evidence for a recent influx of species. *Libellula* 27(1/2): 133-145. (in English, with German summary) ["Mainly within the last ten years, the number of species of Odonata known from the Maltese Islands has increased from nine resident and two migrant species to 13 residents and two migrants. The former migrant species now regularly breed in the islands. The literature on the Odonata of Malta is reviewed, and an overview of the flight season data is given. Records of all species are given for the first time and some reasons for the recent increase in the number of species are discussed." (Authors)] Address: Ebejer, M.J., Entomology Section, Department of Biodiversity and Systematic Biology, Amgueddfa Cymru National Museum Wales, Cathays Park, Cardiff CF10 3NP, UK. E-mail: martin.ebejer@btinternet.com

8134. Ewuim, C.S. (2008): Odonata fauna of contrasting semi-aquatic and terrestrial ecosystems in Awka, Nigeria. *Animal Research International* 5(1): 783-786. (in English) ["The sweep net was used to study the Odonata fauna of the Permanent Site of Nnamdi Azikiwe University, Awka for a twelve-month period. The Odonata species collected from the marshy plot included *Orthetrum chrysostigma*, *Ceriatrigon glabrum*, *Platycnemis subaequistyla* Fraser and *Nesciothemis nigeriensis* while *Hemistigma coronata* and *Palpopleura lucia* were obtained from the fallow plot. Only two species - *Palpopleura lucia* and *Hemistigma albipuncta* were collected from the cultivated plot. A statistical analysis of the collections of these insect species using Analysis of variance (ANOVA) failed to show any significant differences at F-ratio of 0.458 and p-value of 0.6339, even though higher numbers of species were obtained at the wetland. Similarly the sweep net catches failed to show any significant difference using the Fisher's Least Significance Difference(F-LSD) test at 5% probability level. The higher catches of the odonates at the marshy plot was traced to the nature of the habitat. The role of these sub aquatic species as indicators of ecosystem quality was highlighted." (Author)] Address: Ewuim, C.S., Department of Zoology, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria. E-mail: cewuim@yahoo.com

8135. Fernandez, L.; Springer, M. (2008): El efecto del beneficiado del café sobre los insectos acuáticos en tres ríos del Valle Central (Alajuela) de Costa Rica. *Rev. Biol. Trop.* 56 (Suppl. 4): 237-256. (in Spanish, with English summary) ["The effect of coffee processing on aquatic insects in three rivers from the Central Valley (Alajuela) of Costa Rica: In Costa Rica one of the greatest sources of organic pollution in the rivers has been the residual material generated from the processing of coffee beans. In this study, the usefulness of aquatic insects as bioindicators is examined in order to measure the effect of spills of coffee processing plants into two rivers of the Central Valley. The study was conducted at three different coffee processing plants at the three most important moments of the harvest, at the beginning, the peak and at the end. On each of the three dates, biological samples were taken 50m up- and 50m down-stream from the point where the coffee processing plants discharge their liquid wastes. The following physical and chemical factors were also measured: DBO, DQO, pH, temperature, fats and oils, sedimentable solids, dissolved oxygen and the discharge of the river. Systematic samples of aquatic insects were taken in order to obtain relative abundance, taxa richness, diversity (Shannon-Wiener), similarity (Bray-Curtis) and biological index B.M.W.P.' (Biological Monitoring Working Party) adapted for Costa Rica. Physical-chemical results showed a decrease in the amount of dissolved oxygen and in the discharge of the rivers. In addition, in some cases very high values of DBO and DQO were reached as the season advanced; nevertheless, the majority of the measurements taken were within the limits established by the laws of Costa Rica. Populations of insects increased down stream as the season advanced, due mainly to an increase in the density of *Chironomus* larvae (Diptera) which became the dominant group. At the same time other pollution sensitive taxa diminished or disappeared. This was reflected by decreasing taxonomic richness and a low diversity index. Similarity between samples taken up and down stream was less than half (0,41), and comparing the

three main harvest moments, the highest point was very similar to the end of the harvest (0,81) and both were very different from the beginning of the harvest (0,26). According to the modified biological index BMWP, water quality diminished to category "strongly contaminated" at the highest point of the harvest. The results indicate that there is an important effect on the populations of aquatic insects caused by the period of harvest, which is not necessarily detected by the standard analysis required by law. Therefore we recommend that the fauna of aquatic macroinvertebrates should be included as a mandatory procedure in water quality testing, the capacity of the treatment plants should be evaluated, and the standard limits established by present laws in Costa Rica, should be critically analyzed." (Authors) Odonata (*Hetaerina*, *Argia*, *Brechmorhoga*, *Perithemis*, *Palaemnema*) are treated on the genus level.] Address: Fernández, L., Escuela de Biología, Universidad de Costa Rica, 2060 San Pedro, San José, Costa Rica. E-mail: leofq@hotmail.com; springer@biologia.ucr.ac.cr

8136. Glitz, D. (2008): Erstnachweis von *Coenagrion scitulum* in Rheinland-Pfalz (Odonata: Coenagrionidae). *Libellula* 27(1/2): 33-37. (in German, with English summary) ["*C. scitulum* was recorded during July 2006 for the first time in Rhineland-Palatinate, Germany including breeding records. Successful reproduction was also evidenced at the same site, which is situated in the southern 'Rhenish Bay', during the summer of 2007. The breeding records pertained to newly emerged males, together with copulation wheels and oviposition. The closest known record of *C. scitulum* was taken near Zülpich in North Rhine-Westphalia at a distance of 40 km from the new site." (Author)] Address: Glitz, D., Vischeler Str. 50, 53505 Kaienborn, Germany. E-mail: Glitz-Kalenborn@t-online.de

8137. Günther, A. (2008): Erste Nachweise der Feuerlibelle (*Crocothemis erythraea*) im Regierungsbezirk Chemnitz. *Mitteilungen des Naturschutzes Freieberg* 4: 68-71. (in German) [Documentation and discussion of records of *C. erythraea* from VII-2008 in the counties (Landkreise) Freieberg and Zwickau, Sachsen, Germany.] Address: Günther, A., Naturschutzinstitut Freieberg, Waisenhausstraße 10, D-09599 Freieberg, Germany. E-mail: a.guenther@abo.freieipresse.de

8138. Harvey, R.; Higgott, J. (2008): Reports from coastal stations - 2007: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 33: 67. (in English) [UK; *Symptetrum fonscolombii*, *Anaciaeschna isosceles*, *Erythromma viridulum*] Address: not stated

8139. Heckman, C.W. (2008): *Encyclopedia of South American Aquatic Insects: Odonata -Zygoptera*. Springer-Verlag. ISBN: 9781402081750: VIII, 692 pp. (in English) ["Zygoptera completes the two volume work on the order Odonata in the *Encyclopedia of South American Aquatic Insects*. A brief review of the biology of the group includes illustrations of the main morphological features as well as explanations of alternative systems for naming the wing veins and other characteristics commonly used to distinguish the species. This will show the user of the identification keys in the volume the alternative names for the anatomical structures most frequently encountered in the literature. The sections on the morphology of the adults and larvae are followed by brief discussions of ecological and zoogeographical factors influencing the distribution of the

dragonflies and instructions on the various methods used to observe, collect, preserve, and examine specimens. Most of the book is devoted to keys that facilitate identification of both adults and those larvae which have already been described. For the first time, all of the available information needed to identify the adults of all recognized species inhabiting South America has been compiled from a large number of individual taxonomic works written in six languages during the past two centuries. Separate keys are provided to identify all larvae that have been positively identified and described prior to early 2007. In addition to the descriptions of the morphological features used to distinguish the species, the keys provide the known ranges listed by country and by states within Brazil, as well as the synonyms most likely to be encountered in the literature. The publications cited with the species names and in the keys can be found compiled in an extensive bibliography, informing the user where more extensive species descriptions and additional information about each species can be located. Although taxonomic revisions are deliberately avoided, suggestions for additional research and the opinions of experts concerning imminent taxonomic changes are provided where appropriate. To provide the user of the keys with maximum assistance in making reliable identifications, the book is richly illustrated with pen and ink drawings of thousands of individual morphological structures arranged in 767 figures. It is certain that many significant changes will occur in the systematics of South American damselflies in the future, and this book is meant to provide the impetus needed to accelerate the work of nomenclature and revision. Meanwhile, it will provide a comprehensive overview of the South American Zygoptera that has hitherto remained almost unobtainable to most South American scientists because of the great difficulties in obtaining the numerous publications from numerous countries in which the original descriptions of species and taxonomic revisions have appeared. It also provides student entomologists with a basic text for learning what they need to know to work effectively with the Zygoptera of South America and adjacent regions." (Publisher)]

8140. Heidecke, F.; Lindemann, K. (2008): Erster Nachweis der Schabrackenlibelle für Sachsen-Anhalt in der Goitzsche. *Naturschutz im Land Sachsen-Anhalt* 45(2): 60. (in German) [Anax ephippiger, 14-VI-2007, Goitzsche near Bitterfeld (Sachsen-Anhalt, Germany)] Address: Heidecke, F., Sieverstorstr. 57, 39016 Magdeburg, Germany. E-mail: Libellenforscher@web.de

8141. Herrera, L.G.; Reynoso, V.H.; Curiel, D.; Ramírez, N.; Rodríguez, M.; Mirón, L.; Sánchez, R.; Aguilar, S.; Carmona, F.; Urbina, J.; González, A. (2008): La riqueza faunística en un ambiente perturbado: el caso del Parque Ecológico Jaguarundi. In: Yolanda Nava & Irma Rosas (coord.): *El Parque Ecológico Jaguarundi Conservación de la selva tropical veracruzana en una zona industrializada*. ISBN: 978-968-7623-28-4: 79-100. (in Spanish) [Mexico; the following Odonata taxa are listed: *Argia pulla*, *Argia* sp., *Ischnura ramburii*, *Ischnura* sp., *Leptobasis vacillans*, *Dythemis sterilis*, *Erhythomis plebeja*, *Erythrodiplax fusca*, *Erythrodiplax* sp., *Micrathyria* sp., and *Perithemis moonia*.] Address: www.puma.unam.mx

8142. Herzon, I.; Helenius, J. (2008): Agricultural drainage ditches, their biological importance and func-

tioning. *Biological conservation* 141: 1171-1183. (in English) ["We reviewed studies on the biological state of agricultural drainage ditches in the temperate and boreal zones of the Northern Hemisphere. We looked at the relative importance of ditches for farmland biota as compared to that of other habitats, and assessed the degree to which biological communities of ditches contribute to the provisioning of ecosystem services. We evaluated impacts pertaining to replacement of open drains by subsurface drainage, removal of main ditches, rehabilitation of old drainage systems, and maintenance of ditches. Most ditches support species also common elsewhere. Whenever comprehensive surveys were conducted, ditches were shown to provide valuable wet vegetated noncropped habitats to both aquatic and terrestrial taxa, supply food resources lacking in otherwise dry and intensively managed cropland, and perform connectivity functions within a wider landscape. Regionally ditches were shown to harbour rare species or species not found presently in other farmland habitats. Some functions of drainage ditches, such as regulating water flow and nutrient retention, are likely to depend on the composition and structure of biological communities of ditches, though the issue remains poorly explored. The biggest threat to the quality of ditch networks as ecosystems is presented by a severe runoff from the fields, management in disregard of a habitat value of ditches, and removal of ditches." (Authors) The paper includes a passing note on the importance and ecological function of ditches in USA, but ignores completely e.g. the German publications on the highly significant ecological importance of ditches as habitat for the European protected by law species *Coenagrion mercuriale* and *C. ornatum*.] Address: Herzon, Irina, Dept of Applied Biology, University of Helsinki, Latokartanonkaari 5-7, 00014, Finland

8143. Hill, P. (2008): Review: Watching British Dragonflies by Steve Dudley, Caroline Dudley & Andrew Mackay. *Subbuteo Natural History Books*, 2007. 341 pp.. *Atropos* 33: 29-30. (in English) [critical review] Address: not stated

8144. Holmes, P. (2008): East Keswick's dragonflies and damselflies. *East Keswick Wildlife Trust Newsletter* 31: 1-2. (in English) [UK; a general on Odonata with a few local resp. locality information, and advice for regional places good to see Odonata.] Address: E-mail: paul@ox-close.co.uk

8145. Holusa, O. (2008): *Trithemis kirbyi* auf Sardinien: Erstnachweis für Europa (Odonata: Libellulidae). *Libellula* 27(1/2): 111-115. (in German, with English and Italian summaries) ["In June 2003 *T. kirbyi* was recorded for the first time in the territory of Europe, on the Italian island of Sardinia. One male was collected at the Oridda rivulet, in the surroundings of the Villacidro village, in the southwestern part of the island." (Author)] Address: Holusa, O., Muzeum Beskyd, prirodovedné oddeleni, Zámecké náměstí 1264, CZ-738 01 Frydek-Mistek. E-mail: holusao@post.cz

8146. Hunter, I. (2008): Reports from coastal stations - 2007: Elms Farm. Ickesham, East Sussex. *Atropos* 33: 57. (in English) [UK; *Erythromma viridulum*: 17-VI - 3-IX-2008, max. of 150 specimens at 3-VIII-2007. *Symptetrum fonscolombii*: 3-VI-2007] Address: not stated

8147. Jones, C.D.; Kingsley, A.; Burke, P.; Holder, M. (2008): *Field Guide to The Dragonflies and Damselflies*

flies of Algonquin Provincial Park and the Surrounding Area. The Friends of Algonquin Park. Algonquin Park Field Guide Series 1: 263 pp. (in English) ["A comprehensive field guide to all 135 species of dragonflies and damselflies found in Algonquin Provincial Park and surrounding area, extending across southcentral Ontario and into southwestern Quebec. Detailed, full-colour illustrations of all species, including males, females and variants. Additional close-up illustrations of features important in species identification. Key field marks are highlighted through the use of arrows and accompanying text. Information on identification, similar species, habitat, behaviour, flight period, status and range for each species. Includes an introduction, complete with illustrations and photographs, to anatomy and life cycle, as well as the fundamentals of observation, identification and capture. A site guide to some of the key areas within Algonquin Park to find and observe these fascinating insects." (Publisher)] Address: <http://store.algonquinpark.on.ca/cgi/algonquinpark/00517.html?id=BL9A-JDPX&mvp=211>

8148. Kasangaki, A.; Chapman, L.J.; Balirwa, J. (2008): Land use and the ecology of benthic macroinvertebrate assemblages of high-altitude rainforest streams in Uganda. *Freshwater Biology* 53(4): 681-697. (in English) ["1. In sub-Saharan Africa, tropical forests are increasingly threatened by accelerating rates of forest conversion and degradation. In East Africa, the larger tracts of intact rainforest lie largely in protected areas surrounded by converted landscape. Thus, there is critical need to understand the functional links between large-scale land use and changes in river conditions, and the implications of park boundaries on catchment integrity. 2. The objective of this study was to use the mosaic of heavily converted land and pristine forest created by the protection of the high-altitude rainforest in Bwindi Impenetrable National Park, Uganda to explore effects of deforestation on aquatic systems and the value of forest in buffering effects of adjacent land conversion. A set of 16 sites was selected over four drainages to include four categories of deforestation: agricultural land, deforested upstream (of the park boundary), forest edge (park boundary) and forest. We predicted that forest buffer (downstream or on the edge) would moderate effects of deforestation. To address this prediction, we quantified relationships between disturbance level and both physicochemical characters and traits of the macroinvertebrate assemblages during six sampling periods (February 2003 and June 2004). 3. Results of both principal components analysis and cluster analyses indicated differences in limnological variables among deforestation categories. PC1 described a gradient from deforested sites with poor water quality to pristine forested sites with relatively good water quality. Agricultural sites and deforested upstream sites generally had the highest turbidity, total dissolved solids (TDS), and conductivity values and low transparency values. Forest sites and boundary site groups generally exhibited low turbidity, TDS, and conductivity values and high water transparency values. Sites also clustered according to deforestation categories; forest and forested edge sites formed a cluster independent of both agricultural land and deforested-upstream. 4. Water transparency, water temperature, and pH were the most important factors predicting benthic macroinvertebrate assemblages. Sensitive invertebrate families of Trichoptera, Ephemeroptera, Plecoptera, and Odonata dominated forested sites with high water transparency,

low water temperature, and low pH while the tolerant families of Ephemeroptera, Diptera, Hemiptera, and Coleoptera were abundant in agriculturally impacted sites with low water transparency, high water temperature, and high pH. 5. This study provides support for the importance of riparian buffers in moderating effects of deforestation. Forest and forested edge sites were more similar in both limnological and macroinvertebrate assemblage structure than sites within or downstream from agricultural lands. If the protected area cannot encompass the catchment, the use of rivers as park boundaries may help to maintain the biological integrity of the rivers by buffering one side of the watercourse." (Authors)] Address: Kasangaki, A., Institute of Tropical Forest Conservation, Mbarara University of Science & Technology, PO Box 44, Kabale, Uganda. E-mail: kasangaki@itfc.org

8149. Knott, C. (2008): Further observation of facing oviposition in Emperor Anax imperator. *Atropos* 33: 37-38. (in English) [Oviposition behaviour of two female *A. imperator* is described.] Address: Knott, C., Old Hall Farm House, Penhill rd, Great Ellingham, Attleborough, Norfolk, NR17 1 LR, UK

8150. Kotenko, A.G.; Plushtch, I.G.; Ermolenko, V. M.; Pavlusenko, I.N. (2008): Protected insects in Kiev. *Sci. Bull. Uzhgorod Univ. (Ser. Biol.)*, 24: 175-177. (in Russian, with Ukrainian and English summaries) [57 species of protected insects (those enlisted in Red Book of Ukraine, Bern Convention List, European Red List and IUCN List) are indicated for Kiev basing on the investigations of the author as well as on bibliographical sources. The list includes Lepidoptera, Hymenoptera, Orthoptera, Odonata, Coleoptera, Diptera. Ten species belong to the Odonata.] Address: Pavlusenko, I.N., Schmalhausen Institut of Zoology, Vul.B. Khmelnyts'kogo, 15, Kiev, 01601, Ukraine. E-mail: pavlusenko@inbox.ru

8151. Kucuk, S. (2008): The effect of organic pollution on benthic macroinvertebrate fauna in the Kirmer creek in the Sakarya basin. *ADÜ Ziraat Fakültesi Dergisi* 5(1): 5-12. (in English) [Turkey; Libellulidae contributed - in seasonal dependence - significantly to the biomass of the macroinvertebrate fauna.] Address: Kucuk, S., Adnan Menderes Üniversitesi Ziraat Fakültesi Su Ürünleri Bölümü, 09100, Aydın, Turkey. E-mail: skucuk@adu.edu.tr

8152. Lambeets, K.; Pellegrons, B. (2008): Estimating damselfly populations at the Hannecartbos (Koksijde). *Libellenvereniging Vlaanderen - nieuwsbrief* 2(1): 2-8. (in Dutch, with English summary) ["During a five day field survey in June 2007, population size and dispersal distance of *Coenagrion puella* and *Ischnura elegans* were estimated based on capture-mark-recapture (CMR) data. Beside it, all odonata species observed were listed. The study was performed in the Hannecartbos (Koksijde, Belgium), which is part of the Flemish nature reserve Ter Yde. In order to restore calcareous dune grasslands on a peaty, seepage-fed underground, the woodland was partly cleared in 2004. In general, 671 individuals spread over 13 species were observed. During the CMR study, a total of 631 individuals of *C. puella* (352) and *I. elegans* (279) were caught from which respectively 66 and 4 individuals were recaptured (total: 70). Population size was calculated by the Petersen estimate for closed populations and the Jolly-Seber

estimate for open populations. Both estimates were comparable for *C. puella*, but for *I. elegans* they differed remarkably due to low recapture numbers for this species. Dispersal distances were found to be quite similar for both species, with a maximum of 149.5m for *C. puella* and 104.5m for *I. elegans*. Furthermore, the Hannecartbos seems to provide suitable habitat conditions for rare species as *C. pulchellum* and *Libellula quadrimaculata*. This study indicates the high potential of both damselfly species for recolonizing suitable patches and their ability to build up persistent populations quite fast. Plausible factors confounding population size estimates as weather conditions and the lateral demarcation of the sample plots, however, may obfuscate the results. Also, maximum dispersal distances of both species may be larger since the survey was carried out along the banks of a small rivulet and did not account for other water bodies nearby. A standardized and more comprehensive experimental set-up would certainly increase the value of CMR-studies." (Authors)] Address: Lambrechts, K.; Onderzoeksgroep Terrestrische Ecologie (TEREC), Dep. Biologie, Universiteit Gent, KL Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Kevin.lambrechts@UGent.be

8153. Lambrechts, J. (2008): Quick colonisation by dragonflies of a pond on the ecoduct Kikbeek (Maasmechelen, Limburg). *Libellenvereniging Vlaanderen - nieuwsbrief* 2(2): 2-6. (in Dutch, with English summary) ["This ecoduct was built in 2006 to facilitate movements between some large areas north and south of the highway. During monitoring activities for other organisms also dragonflies were recorded. The minimum width of the ecoduct is 40 m and length 70 m. Substrate is "grind", hard pressed. A pond was dugged and rain water stagnates easily, creating temporary water. No less than 21 species of Odonata were recorded in the first year, 12 of which reproducing (pioneer species as *Lesites barbarus*, *Ischnura pumilio* and *Sympetrum fonscolombii* in important numbers)."] (Author)] Address: Lambrechts, J., Zuurbemde 9, 3380 Glabbeek, Belgium. E-mail: jr.lambrechts@arcadisbelgium.be

8154. Lin, Y.c. (2008): A survey of aquatic insects and biotic index in constructed wetlands. M.S. thesis, Department Graduate of Environmental Engineering and Science: 167pp. (in Chinese, with English summary) ["This study analysis the parameters of water quality and collected the aquatic insects in the Chna constructed wetland system, Gang-Wei constructed wetland system, Ke-Liao constructed wetland system, Er-Hang constructed wetland system, An-Shun constructed wetland system and Niao-Song wetland park since March 2006 to May 2008. We related aquatic insects sampling to water quality parameters in various constructed wetland system and investigated to establish the biotic index to assess constructed wetland water quality. The aquatic insects were collected regularly, and the monitoring parameters of water quality were recorded at the same time. In this research, we analyse the monitoring parameters of water quality including temperature, pH, conductivity, DO, BOD5, NH4-N and SS, and to calculate the river pollution index of a constructed wetland system. We counted the number and identified the species of the collected aquatic insects. We utilize the numbers and the species of the collected aquatic insects to calculate the biotic index, including the number of individual, Family-level biotic index, Richness index, Shannon-Weaver diversity index, Simpson's-

s diversity index and Evenness index. We wish to establish an ideal formula for the biotic index to assess the constructed wetland water quality. The results showed that the water quality and aquatic insects of the six constructed wetlands systems were significant difference. We compared the four water quality parameters that to calculate the river pollution index of the four regular sampling system, we found that the Gang-Wei system had high DO and low NH4-N value, Chna system had better BOD5 and SS value. The Gang-Wei system had the best environment quality overall. Chna system's aquatic insects recorded six orders, 15 family and 15 species, the number of individual per sampling area was 5044 / m². Gang-Wei system's aquatic insects recorded seven orders, 18 family and 19 species, the number of individual per sampling area was 14,998 / m². Ke-Liao system's aquatic insects recorded six orders, 8 family and 8 species, the number of individual per sampling area was 477 / m². An-Shun system's aquatic insects recorded five orders, 9 family and 9 species, the number of individual per sampling area was 544 / m². Niao-Song system's aquatic insects recorded five orders, 5 family and 5 species, the number of individual per sampling area was 111 / m². The correlation testing of the water quality parameters and the biotic index are significant difference, depending on the various characteristics of the constructed wetland system. The river pollution index (RPI) was used to evaluate the river water pollution levels. The river pollution index (RPI) of Gang-Wei system, Chna system, Ke-Liao system and Er-Hang system were progressive increase. The Family-level biotic index was to evaluate the water quality, the Gang-Wei system is better than the Chna system, and the Ke-Liao system is the worse. The higher Shannon-Weaver diversity index value represented the more species diversity and abundance. The Shannon-Weaver diversity index value of Gang-Wei system, Chna system, and Ke-Liao system were reduce progressively. Applied these methods to evaluate water quality had the same results. We were able to refer the current use of the biotic index to assess stream water quality methods, and to establish the biotic index to assess constructed wetland water quality. The potential biotic indexes were Family-level biotic index and Shannon-Weaver diversity index. These methods could assist chemical analysis to assess the whole water quality. The multiple gradually regression analysis was to establish an ideal formula for water quality parameters to estimate the Gleason index, Evenness index and Simpson's diversity index. The results were the same as the utility of river pollution index. It could reduce water quality parameters analysis project, and assess the overall water environment. Analyze the river pollution index (RPI) and the individuals of various orders correlation to establish the biological indicators. The result was that the Odonata, Hemiptera, Coleoptera and Ephemera were the candidate of the biological indicators in the constructed wetland system. It needed more large sample size and more detail aquatic insect classification to establish the more representative biological indicators. The constructed wetland was the breeding site of *Culex* and *Anopheles*. It has the potential to increase the local adult mosquito populations. These mosquitoes could be the vectors of pathogen or to disturb the neighbour of constructed wetland. It should improve the management of constructed wetland to reduce the public health problem." (Author)] Address: Lin, Yi-cheh, Email Address tracy0614@xuite.net

- 8155.** Malkmus, R.; Ruf, T. (2008): Herbstaktive Libellen in Südportugal (Odonata). *Libellula* 27(1/2): 123-132. (in German, with English summary) ["During an excursion in November 2007 through the southern Portuguese provinces Algarve and Baixo Alentejo, Odonata were recorded at 43 investigated sites. Six species - *Lestes viridis*, *Aeshna mixta*, *Crocothemis erythraea*, *Orthetrum chrysostigma*, *Sympetrum fonscolombii*, and *S. striolatum* - were observed in reproductive activity. Autumn activity of Odonata is discussed in the context of the few hitherto published records. Remarkable observations of *Trithemis annulata* and *O. chrysostigma* within the first ten days of November, and a large number of migrating specimens of *S. tons-colombii* along the southwestern coast, are noted. *A. mixta* and *S. striolatum* so far had been recorded only from few places in southern Portugal. As a result of our observations both species must be considered as the most common ones in this region. The occurrence of *A. cyanea* in the hilly hinterland of the Algarve coast is noteworthy." (Authors)] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany
- 8156.** Martens, A. (2008): Die Rolle Baden-Württembergs bei der Vervollständigung der deutschen Libellenartenliste Records on the territory of the federal state of Baden-Württemberg for the refinement of the German Odonata checklist. *mercuriale* 8: 1-3. (in German, with English summary) ["After 1871, about 20 species were added to the German checklist of Odonata. In this process, records from southwestern Germany play an important role. In the Baden part of Baden-Württemberg, in chronological order, *Somatochlora arctica*, *Sympetma paedisca*, *Coenagrion scitulum*, *Anax ephippiger*, *Onychogomphus uncatatus*, and *Gomphus simillimus* were recorded at first for the territory of Germany." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Bismarckstraße 10, 76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de
- 8157.** Martynov, A.V.; Martynov, V.V. (2008): Dragonflies of the National Natural Park "Guculshina". *Liriodnichy Almanac*: 100-106. (in Russian) [On the basis of published and own records, 33 species are listed and discussed for the Guculshina-National Park in Ukraine.] Address: E-mail: martynovav@ukr.net
- 8158.** Martinov, A.V.; Martinov, V.V. (2008): Biology of *Lestes macrostigma* (Odonata: Lestidae) in south-eastern Ukraine. *Kharkov Entomological Society Gazette* 2007 (2008) XV(1-2): 185-192. (in Russian, with English summary) ["*L. macrostigma* is well adapted to development in ephemeral water basins of variable salinity. The stages of species life cycle, in particular, follow the seasonal changes in its immediate environment. We studied the life cycle of *L. macrostigma* in southeastern Ukraine in relation to changes of environment salinity, noting the distinction between the first and last instar larvae, and describe the oviposition and development of larvae in natural and laboratory conditions." (Authors)] Address: Martynov A. V., Martynov V. V. Department of Zoology, Biological Faculty, Donetsk National University, ul. Shchorsa 46, Donetsk, 83050, Ukraine. E-mail: martynov@dongu.donetsk.ua
- 8159.** Mathuriau, C.; Thomas, A.G.B.; Chauvet, E. (2008): Seasonal dynamics of benthic detritus and associated macroinvertebrate communities in a neotropical stream. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 171(4): 323-333. (in English) ["The dynamics of benthic detritus and the structure, composition and functional feeding groups of associated macroinvertebrate communities were followed at biweekly intervals over one year in a 4th-order Andean stream located in a forested hill in SW Colombia. The density of macroinvertebrates and the number of taxa showed a similar bimodal annual pattern with highest values occurring from January to mid-March and from July to mid-October. The accumulated benthic detritus and the invertebrate abundance and community structure were apparently controlled by stream discharge. This was confirmed by a cluster analysis of invertebrate assemblages over the year where three groups of sampling dates emerged. The first group occurred during high discharges, the second one under intermediate hydrological conditions and the third coincided with low rainfall and low discharges. Numerically, collectors dominated, whereas shredders represented less than 5.3 % of the invertebrates. Unexpectedly, benthic detritus and collector densities were negatively correlated; however, no relation between benthic detritus and the abundance of shredders was found, which may suggest that benthic detritus consisting mainly of plant remains was not a limiting resource in this neotropical stream. Macroinvertebrates appear to have a minor role in the decomposition of plant matter which is consistent with previous observations from the same and other tropical streams. As a consequence, macroinvertebrate dynamics in this stream were more influenced by hydrological variations than by input of plant detritus." (Authors) 'Hetaerina' and 'Brechmorhoga' are listed.] Address: Mathuriau, Catherine, Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México (UNAM), antigua carr. a Pátzcuaro # 8701, 58190 Morelia, Michoacán, México. E-mail: mathuriau@oikos.unam.mx
- 8160.** Maue, T.; Springer, M. (2008): Effect of methodology and sampling time on the taxa richness of aquatic macroinvertebrates and subsequent changes in the water quality index from three tropical rivers, Costa Rica. *Rev. Biol. Trop.* 56 (Suppl. 4): 257-271. (in English) ["Three rivers, one in Alajuela province and two in Puntarenas province in Costa Rica, were tested with two methods and different collecting times, in the rainy and dry season. The first method involved collecting of organic and inorganic material for a fixed time period (3, 5, 8, 10 min) with a strainer. This material was transferred to a plastic bowl containing 70% alcohol and aquatic macroinvertebrates were sorted out in the laboratory. With the second method the specimens were collected in the field directly out of the strainer for a total collecting time of 120 minutes and preserved immediately with 70% alcohol. In order to obtain species accumulation curves for this method, subsamples were taken every 15 minutes. The data analysis showed that the abundance and taxa richness was higher with the second method, and a higher number of genera could be found with increasing collecting time, but not necessarily a higher number of individuals. A difference in the number of individuals between rainy and dry season was observed. Species accumulation curves for samples taken with both methods showed that new genera and families were still being found after the maximum time of collection, no matter which season or river. Categories of water quality obtained from the BMWP-CR index varied greatly among sampling times and methods used. The second method always achieved a higher water quality than the longest sampling time (10 min)

in the first method. However, it still didn't reach the level obtained for all families found in both methods combined. Although the first method is the one officially used in most sampling protocols for biomonitoring in temperate zones, these results suggest that more extensive testing of adequate sampling time and methodology is still necessary for tropical rivers." (Authors) Taxa including Odonata are treated at the genus level.] Address: Maue, T., Hydrobiologie, Universität Essen-Duisburg, Essen, Germany. E-mail: tmaue@web.de

8161. Monnerat, C. (2008): Neufund einer Population von *Nehalennia speciosa* in der Westschweiz (Odonata: Coenagrionidae). *Libellula* 27(1/2): 39-51. (in German, with French and English summaries) ["A population of *N. speciosa* was discovered on 19-VI-2007, in a permanently flooded fen zone of the southern shore of Lake Neuchâtel. This is the westernmost locality of its distribution area currently known. The species has not been found in Switzerland since it was last recorded in 1990 in the Canton of Zurich, therefore having been considered extinct in this country. The discovery demonstrates that surprising findings are still possible in Central Europe, even for rather well known taxa like the Odonata. On a national scale the new record stimulates fresh efforts for the conservation of one of the most endangered species in Switzerland. With respect to the preservation of *N. speciosa* it is considered important to establish a monitoring scheme and to stipulate an optimal manner and frequency of habitat maintenance." (Author)] Address: Monnerat, C., Centre Suisse de cartographie de la faune (CSCF), Maximilien-de-Meuron 6, CH-2000 Neuchâtel, Switzerland. E-mail: christian.monnerat@unine.ch

8162. Montoya Moreno, Y. (2008): Caracterización de la biodiversidad acuática y de la calidad de las aguas de La Quebrada Los Andes, el Carmen de Viboral, Antioquia. *Revista Institucional Universidad Tecnológica del Chocó: Investigación, Biodiversidad y Desarrollo* 27(1): 85-123. (in Spanish, with English summary) ["The watershed of Los Andes stream it's very important for El Carmen de Viboral municipality because is one on the main water sources for the aqueduct municipal, for these reason was realized twelve bimonthly surveys between Jan. 2004 and Dec. 2005 in one station upstream of the intake of the aqueduct. Physics, chemistry and biologists variables don't show statistic variability although were observed fluctuation in community indexes, in special in number of taxa evenness. We found 95 taxa belonging to 52 families and five phyla. Values of BMWPCol index oscillated between 77 and 294, with a 159 average value indicate that the waters of the stream are very clean." (Author) Taxa including Odonata are treated at the genus level.] Address: Montoya Moreno, Y., Grupo de investigación GAIA, Facultad de Ingeniería, Universidad de Antioquia, Medellín, Colombia. E-mail: yimmymontoya3@hotmail.com

8163. Moore, C. (2008): Reports from coastal stations - 2007: Dunwich Health National Trust, Suffolk. *Atropos* 33: 68-69. (in English) [UK; *Anaciaeschna isoceles*] Address: not stated

8164. Muscatello, J.R.; Belknap, A.M.; Janz, D.M. (2008): Accumulation of selenium in aquatic systems downstream of a uranium mining operation in northern Saskatchewan, Canada. *Environmental Pollution* 156:

387-393. (in English) ["The objective of this study was to investigate the accumulation of selenium in lakes downstream of a uranium mine operation in northern Saskatchewan, Canada. Selenium concentrations in sediment and biota were elevated in exposure areas even though water concentrations were low (<5 µg/L). [...] Detritivore and predator invertebrates (including 'Odonata') showed significant increases in selenium concentrations ($p < 0.05$) compared to filterer invertebrates, plankton and periphyton at both medium and high exposure sites. The overall pattern of selenium accumulation (from smallest to largest) was as follows: periphyton < plankton and filterer invertebrates < detritivore and predator invertebrates < small bodied fish (shiners) and predatory fish (juvenile pike). Selenium concentrations in the evaluated exposure areas were higher in fish, detritivore and predator invertebrates than filterer invertebrates, indicating the importance of sediments and detrital processes in selenium bioaccumulation. Filterer invertebrates feed on the particles suspended in the water column (e.g., plankton), but in contrast, other invertebrates rely on food sources closely related to detrital processes, suggesting a stronger association with sediments. [...] Biomagnification of selenium resulted in an approximately 1.5-6 fold increase in the selenium content between plankton, invertebrates and forage fish. However, no biomagnification was observed between forage fish and predatory fish. Selenium content in organisms from exposure areas exceeded the proposed 3-11 µg/g (dry weight) dietary toxicity threshold for fish, suggesting that the selenium released into these aquatic systems has the potential to bioaccumulate and reach levels that could impair fish reproduction." (Authors)] Address: Janz, D.M., Toxicology Centre, Univ. Saskatchewan, 44 Campus Drive, Saskatoon, SK Canada S7N 5B3. E-mail: david.janz@usask.ca

8165. Muschiol, D.; Traunspurger, W. (2008): Life at the extreme: meiofauna from three unexplored lakes in the caldera of the Cerro Azul volcano, Galápagos Islands, Ecuador. *Aquatic Ecology* 43(2): 235-248. (in English) ["On Isla Isabela, Galápagos Archipelago, 3 so far unexplored lakes were investigated in the caldera of Cerro Azul, one of the most active volcanoes in the world. The lakes face recurrent desiccation and eruption events and showed distinct differences in their water chemistry. Thirty cores from the upper 15 cm of sediment indicate distinct differences in the composition of meiobenthic communities between the lakes. In total, 27 different aquatic metazoan species could be distinguished. Numerically, rotifers dominated in two of the lakes, with mean densities up to 4.56 9 106 individuals m⁻² while the third lake was dominated by a gastrotrich of the genus *Chaetonotus* (0.67 9 106 individuals m⁻²). The largest lake harboured up to 14.4 9 106 nematodes m⁻², which is the highest nematode density thus far reported for a freshwater habitat. The lakes yielded few nematode species ($S = 7$, $N = 887$) and calculation of the Shannon-Wiener index (H_0) indicated an exceptionally low nematode diversity. The nematode community of one lake was clearly dominated by an undescribed suction-feeding *Mesodorylaimus* (59.6%), the community of the other lake by the epistrate feeder *Achromadora pseudomicoletzkyi* (89.3%), whereas the third lake surprisingly contained no nematodes. The benthic nematode biomasses for the two nematode-containing lakes differed by a factor 50. The food webs of the three lakes are presumed to have an exceptional simple structure." (Authors) The tax list includes "Aeshnidae" and

"Libellulidae".] Address: Muschiol, D., Animal Ecology, Univ. Bielefeld, Morgenbreede 45, 33615 Bielefeld, Germany. E-mail: daniel.muschiol@uni-bielefeld.de

8166. New, T.R. (2008): Günther Theischinger and John Hawking, The Complete Field. Guide to Dragonflies of Australia. CSIRO Publishing, Collingwood, 2006, Paperback, Au\$49.95, ISBN 0-643-09073-8, 376 pp. J. Insect Conserv. 12(2): 189-190. (in English) [Review.] Address: New, T.R., Dept Zool., La Trobe Univ., Victoria, 3086, Australia. E-mail: T.New@latrobe.edu.au

8167. Ngai, J.T.; Kirby, K.R.; Gilbert, B.; Starzomski, B.M.; Pelletier, A.J.D.; Conner, J.C.R. (2008): The impact of land-use change on larval insect communities: Testing the role of habitat elements in conservation. Ecoscience 15(2): 160-168. (in English, with French summary) [Costa Rica; "Conservationists have proposed that maintaining key elements of the original land-cover type in modified landscapes may mitigate the detrimental effects of land-cover change on residual species. We tested this hypothesis for aquatic insect communities in tank-forming bromeliads in forested and non-forested habitats in Costa Rica. Bromeliad tanks hold much of the standing water in this region and therefore provide an important resource for insects with aquatic larval stages. We quantified the relative importance of land-use type and the bromeliad-specific "local" environment on the insect community, and also the effect of land-use type on this local environment. Insect species responded to both land-use type and the local environment, with these variables explaining a total of 36% of species densities. The local environment independently explained 19% of insect densities, while land-use type explained 17%, mainly through its modification of the local environment. Local environmental conditions were strongly correlated to land-use type ($r^2 = 0.64$), with non-forest habitat having a higher average temperature, a greater variation in temperature, and a lower density of bromeliads. Our results indicate that the land-use type in which bromeliads occur influences the relative densities of insects by altering the local environment of bromeliads. Therefore, maintaining bromeliads under land-use conversion will not necessarily maintain the bromeliad insect community of the original forested habitat." (Authors) *Mecistogaster ornata* was found more frequently in larger bromeliads in warmer, roadside areas.] Address: Ngai, Jacqueline, Biodiversity Research Centre, Dept Zool., Univ. of British Columbia, 6270 University Boulevard, Vancouver, British Columbia V6T 1Z4, Canada E-mail: ngai@zoology.ubc.ca

8168. Noikong, W.; Palarak, C. (2008): Diversity and nutritional values of edible aquatic insects in Ban Thi and Mueang Lamphun District, Lamphun Province. 32nd Congress on Science and Technology of Thailand (STT.32), 10 - 12 October 2006 at Queen Sirikit National Convention Center, Bangkok, Thailand "Science and Technology for Sufficiency Economy": 2 pp. (in English) ["During November 2004 to November 2005, samples of edible aquatic insects were collected from 6 sampling sites and 6 local markets. In addition, physical and chemical parameters of water quality were also determined. The result showed that total edible aquatic insects were 3 orders 10 families and 20 genera. Family Notonectidae represented as highest number of individual. According to the diversity index, Ban Jam, was found as the highest diversity (2.98) while Ban San Rim Ping, showed highest species richness (3.14). For nutritional

values analysis, family Hydrophilidae in order Coleoptera showed highest protein content, family Belostomatidae in order Hemiptera showed highest crude fat level whereas, highest level of carbohydrate, fiber and ash were belonged to family Gomphidae in order Odonata. The physical and chemical parameters analysis revealed that there were no significant different among sampling sites and water quality assessment resulting as mesotrophic – eutrophic status." (Authors)] Address: Noikong, W., Dept Applied Biology, Fac. of Science, Rajabhat Piboonsongkram University, Pitsanulok, Thailand

8169. Noordijk, J.; de With, N. (2008): Les Odonates de la vallée du Liort avec quelques notes sur la gestion conservatoire (département de l'Aveyron). Martinia 24(4): 143-150. (in French, with English summary) ["The results of a survey of the Odonata of the catchment basin of the the Liort river (Aveyron, France) are presented. The basin provides three habitat types: the Liort river, its tributaries and artificial ponds. All together, twenty-nine species could be recorded. The presence of many characteristic species in small sunny brooks tributaries on the plateaus is important, and includes *Coenagrion mercuriale* which appears on the Habitat Directive of the European Union. In the fast flowing stream, the Liort, all specialized species that would be expected were really present, indicating healthy ecological conditions. Some recommendations for the conservation of the observed dragonflies are given for the three kinds of habitat." (Authors)] Address: Noordijk, J., Ass. les Amis du Moulin de Liort, F-12440, La Salvétat-Peyralès, France. E-mail: jinzenoordijk@hotmail.com

8170. Ober, S.V. (2008): First record of *Pantala flavescens* for the western Balkans (Odonata: Libellulidae). Libellula 27(1/2): 117-121. (in German, with English summary) ["In the course of the reorganisation of the Odonata collection of the 'Staatliches Museum für Naturkunde Stuttgart', a male of *Pantala flavescens*, collected in Herceg-Novi in June 1972, was discovered. It marks the first record for Montenegro as well as for the western Balkans. The record on the Adriatic coast is analysed in comparison with the remaining odonate data from Montenegro and possible flight paths to the country are discussed." (Author)] Address: Ober, S.V., Staatliches Museum für Naturkunde Stuttgart, Rosenstein 1, 70191 Stuttgart, Germany. E-mail: ober.smns@naturkundemuseum-bw.de

8171. Odin, N. (2008): Reports from coastal stations - 2007: Landguard Bird Observatory, Suffolk. *Atropos* 33: 64. (in English) [UK; records of *Brachytron pratense*, *Sympetrum fonscolombii*, and *Erythromma viridulum* are documented.] Address: not stated

8172. Öz, B.; Kazanci, N. (2008): A research on determination of habitat quality of running waters of western Black Sea region using by benthic macroinvertebrates. BALWOIS 2008 – Ohrid, Republic of Macedonia – 27: 16 pp. (in English) [The benthic macroinvertebrate fauna was studied in running waters near Düzce, Bolu, Karabük, Kastamonu and Sinop, Turkey. Odonata were recorded at 6 of the 15 sampling sites, and refer to *Epallage fatime*, *Calopteryx splendens*, *Aeshna affinis*, and *Onychogomphus forcipatus*.] Address: Öz, B., Hacettepe University, Department of Biology, 06532, Beytepe, Ankara, Turkey. E-mail: basakozz@gmail.com

8173. Osadowski, Z.; Obolewski, K.; Strzelczak, A. (2008): Influence of anthropogenic factors on microhab-

itats inhabited by riverine hydrobionts – assessment with MRT method. *Ecological Questions* 10: 41-50. (in English) ["This study concerns the influence of urban area on vegetation and invertebrates inhabiting the Ślupia River (northern Poland). Altogether, 10 plant communities and 37 macrozoobenthos taxa were determined during four seasonal samplings (October 2005, January, April and August 2006). In order to reveal how the city of Ślupsk affects the vegetation and fauna, MRT (multivariate regression tree) models were created. On their basis the most important factors were determined from the following set of variables: season, water temperature, salinity, distance, water depth, bottom type, location in the river bed and degree of river bed transformations. Performed analyses showed that vegetation in the urban area was primarily influenced by distance (correlated with anthropogenic pressure), while for invertebrates season and temperature were the most important factors." (Authors)] Address: Osadowski, Z., Dept of Botany and Genetics, Institute of Biology & Environmental Protection, Pomeranian University in Ślupsk, Arciszewskiego 22B, 76 – 200 Ślupsk, Poland. E-mail: osadowsk@sl.onet.pl

8174. Parr, A.J. (2008): Migrant dragonflies in 2007. Including recent decisions and comments by the Odonata Records Committee. *Atropos* 33: 17-21. (in English) [Records of the following species are discussed: *Calopteryx splendens*, *Lestes dryas*, *L. viridis*, *Erythromma viridulum*, *Aeshna juncea*, *A. mixta*, *Anaciaeschna isoceles*, *Anax imperator*, *A. parthenope*, *Libellula depressa*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. vulgatum*, *S. fonscolombii*, *S. flaveolum*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

8175. Paz, A.; Moreno, P.; Rocha, L.; Callisto, M. (2008): Effectiveness of protected areas for the conservation of water quality and freshwater biodiversity in reference sub-basins in Das Velhas River. *Neotropical Biology and Conservation* 3(3): 149-158. (in Portuguese, with English summary) ["The creation of protected areas is one of the most important methods for the preservation of the biodiversity. It does not necessarily mean that the creation of these areas will guarantee the proper conservation of all biodiversity. It is necessary to evaluate the site, the protection capacity and the ecological status of this environment and if the management is effective. The proper conservation and management of rivers and the maintenance of their ecological integrity are essential to preserve the biodiversity and the health of freshwater ecosystems in Brazil. In this study, we assessed the effectiveness of six protected areas in maintaining the quality of freshwater habitats and in preserving the benthic assemblages in Das Velhas river watershed. Both abiotic and biotic analysis showed that the protected areas are effective in preserving the sampling stretches of Das Velhas watershed, due to the use control and the land occupation in the surrounding areas. The results suggest that, although the protected areas do not have the conservation of freshwater biodiversity as their priority, its effective management guaranteed the preservation of benthic communities in those rivers." (Authors) Odonata are treated at the family level.] Address: Paz, Aline, ICB, Depto. Biologia Geral, Lab. Ecologia de Bentos, UFMG, Caixa Postal 486, 31270-901, Belo Horizonte, MG, Brazil. E-mail: alinezap@yahoo.com.br

8176. Pelli, A.; Rejane de Paula, D.; Martins Arruda, A.A.; de Magalhães Lopes, J.; Ramos, S.M.; Sampaio Rezende, A.P. (2008): Acute and chronic toxicity of diflubenzuron to jaú Zungaro zungaro (Humboldt, 1821) (Pisces, Pimelodidae). *Revista Brasileira de zootecnias* 10(1): 51-54. (in Portuguese, with English summary) [Acute and chronic toxicity of diflubenzuron for *Z. zungaru*, aiming to use this product in the control of the predation of juveniles by Odonata, is studied. The studies indicate that this insecticide is an efficient regulator of growth of insects impacting ecdesis.] Address: Pelli, A, Universidade Federal do Triângulo Mineiro. Depf de Ciências Biológicas, Rua Frei Paulino 30, CEP 38025180, Uberaba, MC, Brasil. E-mail: apelli.oikos@dcb.uftm.edu.br

8177. Percsy, C.; Percsy, N. (2008): La réserve naturelle de Gentissart (Villers-la-Ville, Brabant Wallon): Colonisation d'une ancienne sablière par les odonates et autres insectes. *Les Naturalistes belges* 89(2-3): 34-56. (in French, with English summary) ["A continued survey of the Odonata has been made at the old sand quarry of Gentissart from 1997 until 2007. In total, 27 species have been observed, from which four are included in the Wallonian Red List (*Lestes virens*, *Sympetma fusca*, *Ischnura pumilio*, *Sympetrum flaveolum*) and two are « nearly threatened » (*Erythromma najas*, *Sympetrum vulgatum*) ; four others are rare recent colonisers in Wallonia (*Lestes barbarus*, *Anax parthenope*, *Crocothemis erythraea*, *Sympetrum fonscolombii*). Concerning *Lestes virens*, a single female has been observed in 2003: it constitutes the first mention of this species in Wallonia since the middle of the 20th Century. The odonatological interest of this site (26ha) is explained by the abundance and diversity of pools. Their varied characteristics give the opportunity to reveal the habitat preferences of the Odonata species." (Authors)] Address: Percsy, C., Chemin du Bon Air, 12, 1380 Ohain, Belgium

8178. Pessacq, P. (2008): Book Review: Dragonfly Genera of the New World: an illustrated and annotated key to the Anisoptera. Rosser WG, N Von Ellenrieder & JA Louton. The Johns Hopkins University Press, Baltimore, Maryland, USA, 2006. 384 pp., ISBN-10: 0801884462, USD 99.00 (hardcover). *Revista Chilena de Historia Natural* 81: 151-152. (in English) [Extensive book review: "In conclusion, this book becomes the fundamental study for every biologist and advanced naturalist who deals with or is interested in Neotropical dragonflies." (Author)] Address: Pessacq, P., CONICET - Facultad de Ciencias Naturales, (LIESA), Universidad Nacional de la Patagonia San Juan Bosco, Sarmiento 849, 9200, Esquel, Chubut, Argentina. E-mail: pablo-pessacq@yahoo.com.ar

8179. Reinhardt, K. (2008): Der Beitrag von Eduard May (1905-1956) zur Libellenkunde (Odonata). *Libellula* 27(1/2): 89-110. (in German, with English summary) ["E. May worked on Fritz Ris's Odonata collection at the Senckenberg Museum in Frankfurt/Main between 1929 and 1931. This work led to most of his odonatological papers. Most of his original papers appear to be largely based on Friedrich Ris's unpublished manuscripts and notes and vary considerably in quality and novelty. E. May also published several reviews, most notably the Odonata part in the 'Fauna arctica' and the 'Tierwelt Deutschlands'. In the latter he covered the literature in depth, in particular ecological and behavioural observa-

tions for individual species, rather than the Odonata as a whole. As such he is among the founders of the 'Integrating Strand' sensu Corbet (1991) of German speaking odonatology although much of this work is based on earlier observations mainly by Wesenberg-Lund (1913) and Tillyard (1917). It remains unknown how E. May, who had published little on the Odonata, happened to become the contributor to such a prestigious reference series. Other odonatological works of E. May include a faunistic paper on Odonata collected in China, a paper on the classification of the Coenagrionidae and some field observations. None of these contributions are particularly original. His last paper on the Odonata was published in 1935. However, Odonata may have remained part of May's interest. As first evidenced here, in 1948 he stated that two publications on the Calopterygidae were in press and in preparation, both of which, however, never appeared in print." (Author)] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

8180. Robison, H.; McAllister, C.; Carlton, C.; Tucker, G. (2008): The Arkansas endemic biota: An update with additions and deletions. *Journal of the Arkansas Academy of Science* 62: 84-96. (in English) ["It has been over a decade since the publication of Robison & Allen (1995) that provided the definitive list of endemic flora and fauna of Arkansas. The present study brings up-to-date the endemic biota of the state. Since 1995, several new species have been described and new discoveries have been made, adding species to the state biota. Other species are deleted and new distributional information on other state endemics is presented. Specifically, 3 new plant species are added to the state list while 4 plant species are deleted. Sixteen new animal species/subspecies are added to the state list while numerous species are deleted. These changes bring to 110 (10 species of plants and 100 species/subspecies of animals) the total number of Arkansas state endemic plants and animals presently known, which represents a decrease by 7 species from the 117 species reported in 1995." *Cordulegaster talaria* Tennessee 2004 is an addition to the state list of endemics. "This new dragonfly was described from a first-order tributary of the Caddo River at Caddo Gap in Montgomery County. It was also reported from a site in Garland County and is considered endemic to the Ouachita Mountains of western Arkansas. Habitat of this new odonate is densely-shaded small seeps." (Authors)] Address: Robison, H., Department of Biological Sciences, Southern Arkansas University, Magnolia, AR 71754-9354, USA. E-mail: hwrobison@suddenlink.net

8181. Samways, M. (2008): *The Dragonflies and Damselflies of South Africa*. Pensoft Publishers (Sofia-Moscow). ISBN 9789546423306. 297 pp (in English) [This book enables their identification, using several approaches, from simple flick-through to the use of comprehensive identification keys. Each species is also given a Dragonfly Biotic Index, covering a spectrum from the most common, widespread and tolerant species through to the most threatened, rare and sensitive ones.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

8182. Schuran, E. (2008): The impact of Deltamethrin on larval development of dragonflies (Odonata) of

the Okavango delta, Botswana. Diploma Thesis, Anhalt University (FH), Bernburg, Department 1, „Nature Conservation & Landscape Planning“ in cooperation with the Harry Oppenheimer Okavango Research Centre (HOORC), University of Botswana, Maun, Botswana: 39 pp. (in English, with German summary) ["Tsetse flies have long been a threat to the health of humans and their livestock in tropical and subtropical Africa. In the early 1940s, the first attempts to control or eradicate *Glossina morsitans centralis* were implemented in order to fight concealed pupae in the ground. Methods used were bush clearance, game destruction and ground spraying. The mid 1970s saw the dominance of aerial spraying with dieldrin and DDT above all other techniques. After a ten year break of aerial applications in the 1990s and a new outbreak of trypanosomiasis in 1999, deltamethrin, which is considered far less dangerous to the environment, was used in 2001/02 to fight the new outbreak. Tsetse fly control monitoring conducted between 2002 and 2005 did not detect any tsetse in the sprayed areas. However, it does appear that deltamethrin applications were responsible for a significant decrease in terrestrial and aquatic invertebrate abundance and shifted species composition within different habitats in the Okavango Delta. For a closer investigation of the affects caused by deltamethrin, fourteen artificial ponds were constructed at the ground of the Harry Oppenheimer Okavango Research Centre (HOORC) in May 2007. Half of these were treated with spraying campaigns of equivalent dose of deltamethrin after natural colonisation by freshwater invertebrates. The observation of subsequent effects focused primarily on Dragonflies (Odonata). During the research period was observed, that the abundance of invertebrate fauna decreased drastically in treated ponds. The emergence of Odonata stopped within these ponds almost entirely whereas Odonates in control ponds constantly flourished successful reproduction. This experiment was simultaneously conducted for Odonata larvae and *Bufo poweri* tadpoles under laboratory conditions. Applied was a concentration (30 µl) equivalent to the dose used in former spraying operations. Additionally the experiment was repeated with just half of the concentration. In both cases the results resembled and supported those obtained under field conditions. Odonata larvae died within 3 hours at a concentration of 15 µl and 30 µl; hence measurements of probably occurring delays in larval growth could not be measured. In accordance to results from the laboratory experiment the lethal dose is estimated below 15 µl. In accordance to the obtained results the significant increase in mortality of Odonata larvae and other fresh water invertebrates can not be denied. Hence, all further campaigns of aerial spraying should be handled carefully and with utmost concern. The impact of deltamethrin needs to be analyzed in a more controlled setting in order to achieve more concrete and generalizable results to avoid further endangerments of already threatened species and a loss in biodiversity." (Author)] Address: not stated

8183. Schweighofer, W. (2008): Syntopes Vorkommen von *Cordulegaster boltonii* und *C. heros* an einem Bach im westlichen Niederösterreich (Odonata: Cordulegastridae). *Libellula* 27(1/2): 1-32. (in German, with English summary) ["For the first time, co-occurrence of larval *C. boltonii* and *C. heros* was detected at three small streams in western Lower Austria. At one of these streams some aspects of this co-occurrence were investigated during 2006 and 2007. As no conspicuous

differences in larval microhabitat use could be found between the two species, an intensive mark-release-recapture study was conducted on male adults. This study revealed slight differences in patrolling activity patterns between the two species, both seasonally and daily. This was interpreted as a tendency to mutually avoid peaks in patrolling activity. At the stream studied, patrolling males of *C. boltonii* were much more frequent than those of *C. heros*. Furthermore, data on minimal lifespan and site fidelity of patrolling males was recorded. A few long-lived males visited the stream 35 days after having been marked. Some males displayed a tendency to frequent a certain stream section, but no males remained solely in one location. Only single individuals of a third Cordulegaster species, *C. bidentata*, were found at the study site." (Author)] Address: Schweighofer, W., Ötscherblick 10, A-3661 Artstetten, Austria. E-mail: wolfgang.schweighofer@schule.at

8184. Sciberras, A. (2008): A contribution to the knowledge of Odonata in the Maltese Islands. The Central Mediterranean Naturalist 4: 275-288. (in English) [*Calopteryx virgo meridionalis*, *Ischnura genei*, *Anax ephippiger*, *A. imperator*, *A. parthenope*, *Aeshna mixta*, *Crocothemis erythraea*, *Orthetrum brunneum*, *O. cancellatum*, *O. coerulescens anceps*, and *Trithemis arteriosa* are discussed in detail with special emphasis on the diet of the odonate species and predation of Odonata by birds, reptils, fishs, and amphibians.] Address: Sciberras, A., 131, "Arnest", Arcade Str., Paola, Malta. E-mail: bioislets@gmail.com

8185. Sciberras, A.; Sammut, M. (2008): On the occurrence of *Calopteryx virgo meridionalis* (Selys, 1873) (Odonata: Calopterygidae) in the Maltese Islands. The Central Mediterranean Naturalist 4: 334-337. (in English) [The first Maltese record of a calopterygid (*Calopteryx virgo meridionalis*) at a rock pool near Marsacala is documented in detail.] Address: Sciberras, A., 131, "Arnest", Arcade Str., Paola, Malta. E-mail: bioislets@gmail.com

8186. Seggewiße, E. (2008): Paarungsrüttümer bei Libellen. *mercuriale* 8: 51-52. (in German) [Baden-Württemberg, Germany; heterospecific copulations are documented: male *Calopteryx virgo* - female *Pyrrhosoma nymphula*, male *Ischnura elegans* - female *Calopteryx splendens*, male *Ischnura elegans* - female *Sympecma fusca*, male *Libellula fulva* - female *L. quadrimaculata*.] Address: Seggewiße, Edelgard, Rottenburger St. 18, 72411 Bodelshausen, Germany. E-mail: Seggewisse@t-online.de

8187. Serrano-Meneses, M.A.; Córdoba-Aguilar, A.; Azpilicueta-Amorín, M.; González-Soriano, E.; Székely, T. (2008): Sexual selection, sexual size dimorphism and Rensch's rule in Odonata. *Journal of Evolutionary Biology* 21: 1259-1273. (in English) ["Odonata exhibit a range of sexual size dimorphism (SSD) that includes species with male-biased (males > females) or female-biased SSD (males < females) and species exhibiting nonterritorial or territorial mating strategies. Here, we use phylogenetic comparative analyses to investigate the influence of sexual selection on SSD in both suborders: Anisoptera and Zygoptera. First, we show that damselflies have male-biased SSD, and exhibit an allometric relationship between body size and SSD, that is consistent with Rensch's rule. Second, SSD of dragonflies is not different from unit, and this suborder does

not exhibit Rensch's rule. Third, we test the influence of sexual selection on SSD using proxy variables of territorial mating strategy and male agility. Using generalized least squares to account for phylogenetic relationships between species, we show that male-biased SSD increases with territoriality in damselflies, but not in dragonflies. Finally, we show that nonagile territorial odonates exhibit male-biased SSD, whereas male agility is not related to SSD in nonterritorial odonates. These results suggest that sexual selection acting on male sizes influences SSD in Odonata. Taken together, our results, along with avian studies (bustards and shorebirds), suggest that male agility influences SSD, although this influence is modulated by territorial mating strategy and thus the likely advantage of being large. Other evolutionary processes, such as fecundity selection and viability selection, however, need further investigation." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

8188. Shebl, M.A.; Kamel, S.M.; Abu Hashesh, T.A.; Osman, M.A. (2008): The most common insect species in alfalfa field in Egypt. *Academic Journal of Entomology* 1(2): 27-31. (in English) ["Alfalfa (*Medicago sativa* L.) is a superb forage, but it can be shelter by a complex of insect pests, natural enemies and pollinators. Alfalfa insect populations can vary greatly from field to field. Therefore, it is essential to check each alfalfa field frequently for the presence of insects. The survey of the insect fauna of alfalfa was carried out in different areas of Egypt like Ismailia, Suez, Swia Oasis and The New Valley. A high number of insects were collected from alfalfa fields. Different samples were collected during the season 2003, the insect faunal composition could be categorized to the following groups; pests, natural enemies and pollinators." (Authors) *Ischnura senegalensis* and *Crocothemis erythraea* are listed as common predators of pest insects.] Address: Mohamed A. Shebl, Department of Plant Protection, Faculty of Agriculture, Suez Canal University, Ismailia, Egypt

8189. Simaika, J.P. (2008): Conservation biogeography of South African dragonflies (Odonata). M.s. Thesis, Stellenbosch University, Department of Conservation Ecology and Entomology, Faculty of AgriSciences: XI + 71 pp. (in English) ["The great pressures on freshwaters require their conservationists and managers to develop methods to rapidly and accurately assess their condition. Dragonflies are excellent indicators of habitat integrity and are effective organisms for this purpose. However, assessment must be done at the correct spatial scale. My aim here is to optimize the spatial resolution at which species are mapped, using three different concepts and methods in freshwater invertebrate distribution mapping, with special emphasis on IUCN Red Listing. The first is the extent of occurrence (EOO) concept, using the minimum convex polygon, and the second, the area of occupancy (AOO) concept, using IUCN and quaternary catchments. The third approach uses a river layer to compare the suitability of grids as opposed to catchments in mapping. In this study I found that area estimation based on minimum convex polygons should not be encouraged for aquatic organisms. This study also suggests that the IUCN concept of area of occupancy (AOO) should be redefined simply as occurrence, referring to known point-locality presences

only and, if future data allow to known absences. The IUCN extent of occurrence (EOO), for aquatic species, should be defined as 'the sum of the smallest hydrological units identified of presently known, inferred or projected occurrences of a taxon, excluding cases of vagrancy, that are used to estimate the threat to a taxon'. A single hydrological unit is also the conservation or management unit. Currently, that unit is the quaternary catchment. Dragonflies have excellent potential as indicators of habitat integrity. For this purpose, my aim was to develop the Dragonfly Biotic Index (DBI) for South Africa and compare the DBI to another index, the Average Taxonomic Distinctness Index (AvTD), which was believed to have potential in assessments. The DBI and AvTD are correlated, which suggests that they could be used on a complementary basis to prioritize sites. The DBI is a low-cost, easy-to-use method and is already used for measuring habitat recovery. It has great potential for environmental assessment and monitoring freshwater biodiversity, especially as a complement to freshwater quality assessments that use macroinvertebrate scores. I thus recommend its integration into freshwater management and conservation schemes." (Author)] Address: Simaika, J.P., Centre for Invasion Biology, Dept of Conservation Ecology and Entomology, Stellenbosch University, P Bag X1, Matieland 7602, South Africa. E-mail: simaika@sun.ac.za

8190. Smilkov, S.; Slavevska-Stamenkovic, V.; Prelic, D.; Paunovic, M. (2008): Distribution of benthic macroinvertebrates in Mantovo Reservoir (South-East part of the R. Macedonia). BALWOIS 2008 – Ohrid, Republic of Macedonia – 27: 1-12. (in English) [Composition and community structure of the macroinvertebrates from Mantovo Reservoir (South-East part of the R. Macedonia) in relation to lake depth was analysed. Bottom samples, carried out between May 2003 and April 2004, were collected at four different depths across the reservoir. *Calopteryx splendens* and *Ischnura elegans* are found in very small abundances.] Address: Slavevska-Stamenkovic, V., Sv Cyril & Methodius University, Faculty of Natural Science and Mathematics, Institute of Biology, P.O. Box 162, 1000 Skopje, Republic of Macedonia. E-mail: vstamen@yahoo.com

8191. Solly, F.; Milton, P.; Sawyer, D.; Hodge, T.; Hunt, B. (2008): Reports from coastal stations - 2007: Isle of Thanet. *Atropos* 33: 62-63. (in English) [UK; *Sympetrum fonscolombii*] Address: not stated

8192. Spence, B. (2008): Reports from coastal stations - 2007: Spurn Point, East Yorkshire. *Atropos* 33: 70-71. (in English) [UK; *Calopteryx splendens*, *Erythromma viridulum*, *Sympetrum fonscolombii*] Address: not stated

8193. Springer, M. (2008): Aquatic insect diversity of Costa Rica: state of knowledge. *Rev. Biol. Trop.* 56 (Suppl. 4): 273-295. (in English) ["Costa Rica hosts an extraordinarily high biodiversity and is among the best studied neotropical countries. Insects represent the most diverse group of organisms, not only in terrestrial but also in aquatic, especially freshwater, habitats. Among the most diverse aquatic insect orders are the Trichoptera, Diptera and Coleoptera; although Ephemeroptera can locally also be very abundant and diverse. In Costa Rica, the taxonomically best known orders of aquatic insects are Trichoptera, Odonata, and Plecoptera and within the Dipterans, groups of medical im-

portance have received special attention. The interest in aquatic insects has been constantly growing in Costa Rica over the past 10 years, but scientific publications are widely dispersed and often difficult to locate. Due to the importance of aquatic organisms in environmental impact studies and biomonitoring of freshwater habitats, there is an urgent need for comprehensive studies and publications that are locally available. In this sense, the present paper tries to give an overview on the state of knowledge and the literature published to date on the aquatic insects of Costa Rica, taking in account taxonomic, biological and ecological studies. [...] The country's Odonata fauna is very well known, especially the adults, but also, to some extent, the immatures. For the 268 species of Odonata existing in Costa Rica, a great amount of taxonomic works have been published (...), and the Costa Rican dragonfly fauna is considered to be the best known of all Latin-American countries (Ramírez et al. 2000). Despite this, only half of the species have their nymphal stages described and next to nothing is known about their behaviour, natural history, ecology and distribution (Ramírez 1996-1997, Ramírez et al. 2000.)] Address: Springer, Monika, Escuela de Biología, Universidad de Costa Rica, 2060 San Pedro de Montes de Oca, San José, Costa Rica. E-mail: springer@biologia.ucr.ac.cr

8194. Stöhr, M. (2008): Erste Treuhandstiftung dank des Testaments von Hartmut Spaeter. Individualist, Globetrotter, Naturfreund. Umweltstiftung Greenpeace. Jahresrundbrief 2008. (in German) [Polythore spaeteri Burmeister & Börsöny, 2003 was named after Hartmut Spaeter, Munich, Germany (1922 - 2007). The published note refers to this species and provides two figures with portraits of H. Spaeter.] Address: <http://www.umweltstiftung-greenpeace.de/fileadmin/umweltstiftung/userupload/Jahresrundbrief2008.pdf>

8195. Stoks, R. (2008): Philip Corbet – een leven vol libellen. Libellenvereniging Vlaanderen - nieuwsbrief 2(1): 19. (in Dutch) [Obituary] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robbystoks@bio.kuleuven.ac.be

8196. Strobl, P.; Heinze, B. (2008): Insekten der Altmark und des Elbhavellandes. 3. Teil: Odonata - Libellen, Heteroptera - Wanzen, Trichoptera - Köcherfliegen. *Entomologische Mitteilungen Sachsen-Anhalt Sonderh.* 2008: 3-46. (in German) [Sachsen-Anhalt, Germany, 55 odonate species are listed, and 23 species are briefly discussed.] Address: Strobl, P., Schulstr. 34, 39576 Stendal, Germany. E-mail: strobl-angepe@web.de

8197. Surugiu, V.; Cristea, A.E. (2008): Spatial and temporal analysis of aquatic invertebrate fauna from the Ozana river. *Analele Stiintifice ale Universitatii „Al. I. Cuza” Iasi, s. Biologie animala LIV:* 169-176. (in English, with Romanian summary) [Spatial and temporal distribution of benthic macroinvertebrates from the Ozana River was studied seasonally at 4 stations between autumn 2003 and summer 2004. As a result of the examination of 877 individuals collected 34 taxa were identified. The most diverse group were Ephemeroptera (8 taxa), Diptera (7 taxa), Gastropoda (5 taxa), and Plecoptera (4 taxa), whereas in terms of number of individuals dominant were Ephemeroptera (534 individuals), Trichoptera (121 individuals), and Diptera (93 individuals). The most abundant species was *Ecdyonurus* dis-

par (211 individuals), followed by *Paraleptophlebia submarginata* (125 individuals), and *Hydropsyche pellucidula* (120 individuals). Species assemblages of the macrobenthos and variations in ecological indices at stations with respect to seasons were determined and discussed." (Authors) Gomphus flavipes] Address: "Al. I. Cuza" University Iasi, Faculty of Biology, Bd. Carol I 20A, 700505 Iasi, Romania. E-mail: vsurugiu@uaic.ro

8198. Tailly, M.; De Knijf, G. (2008): Dutch names for European dragonflies (including Northern Africa and Western Turkey). *Libellenvereniging Vlaanderen - nieuwsbrief* 2(1): 22-25. (in Dutch, with English summary) ["Vernacular names gain in importance for popular insect groups. Since some time there was a readily accepted list for Western European species in Dutch, but with the future publication of a Dutch translation of the Dijkstra & Lewington Field Guide an extended list with Dutch names for all European species was made by a group of Dutch and Flemish people and is presented here." (Authors)] Address: Tailly, M., Hoonakkerdreef 35, 8791 Waregem, Belgium. E-mail: marc.tailly@pandora.be

8199. Takahashi, Y.; Watanabe, M. (2008): Male mate preference depending on mating experience in the damselfly, *Ischnura senegalensis* (Rambur) (Odonata: Coenagrionidae). *Japanese Journal of Entomology* N.S. 11(1): 13-17. (in Japanese, with English summary) ["Females of coenagrionid damselflies exhibit colour dimorphism, andromorph and gynomorph. Males seem to switch reversibly their mate choice to the morphs by prior experience of encounters with females. To clarify the effect of mating experience on male mate preference, binary choice experiments between the two female morphs in *Ischnura senegalensis* were conducted in the laboratory. Unexperienced males that had been reared separately from females after emergence showed fair selectivity, indicating that the innate male mate preference was not biased. Binary choice experiments for males that had been put into a small cage with a single female in the morning were also conducted both in the afternoon and in the following morning. In the former, males that mated with the female during the morning significantly preferred the same female morph, while males that did not mate due to the female rejection showed fair selectivity. In the latter, males that mated with female during the morning of previous day showed fair selectivity. These results indicate that the male mate preference changes depending on the prior mating experience, and the biased male preference disappears by the following morning." (Authors)] Address: Watanabe, M., Department of Biology, Faculty of Education, Mie University, Tsu, Mie 514-8507, Japan. E-mail: watanabe@edu.mie-u.ac.jp

8200. Tam, T.-w.; Kwan, B.S.P.; Wu, K.K.Y.; Wong, B.S.F.; Tang, S.S.H.; Fung, C.H.L.; Wong, W.S.Y.; Wong, J.K.; Fongt, S.W.L.; Lei, A.H.C. (2008): Current status of dragonflies (Odonata) and their representation in protected areas of Hong Kong. *Hong Kong Biodiversity* 16: 1-7. (in English, with Chinese summary) ["All the extant 112 species (after excluding the three historical records that were made over 40 – 110 years ago) were well represented in the protected areas and are considered to be well protected. In addition, the dragonfly species of conservation interest and the dragonfly representative sites were also well protected by the protected areas system or appropriate conservation meas-

ures in Hong Kong. Nevertheless, monitoring of the dragonfly representative sites and up-keeping of the existing management measures of the protected area system will be continued so as to safeguard the habitats and local populations of the dragonflies of conservation interest in Hong Kong.] Address: not stated

8201. Ternois, V. (2008): L'Aeschna paisible *Boyeria irene* (Donscolombe, 1838): Première mention pour de Département de la Haute-Marne (Odonata, Anisoptera, Aeshnidae). *Bull. Société de sciences naturelles et d'archéologie de la Haute-Marne* 7: 11-13. (in French) [*Boyeria irene* was observed for the first time in the Département Haute-Marne, France at 4-VIII-2007. This is a considerable range extension to the north (east).] Address: Ternois, V., RCPiE du Pays de Soulaïnes, Domaine de Saint-Victor, 10200 Soulaïnes-Dhuys, France

8202. Torralba Burrial, A. (2008): Comportamiento de cerrar las alas al estar posado en *Lestes dryas* Kirby, 1890 (Odonata: Lestidae). *Boletín de la S.E.A.* 42(1): 455-456. (in Spanish, with English summary) [*L. dryas* perching with closed wings, instead of keeping them open, as is the usual practice in *Lestes* spp., are reported. Other congeneric cases are commented.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonio@hotm.com

8203. Viallanueva, R. (2008): Some notes on the dragonflies of Dinagat, northeast Mindanao, Philippines. *Echo* 2008: 2. (in English) [Verbatim: When arriving on Dinagat Island I travelled through the interior from Dinagat town to Albor-Libjo. The entire area from Dinagat to Albor was completely deforested and I saw only some areas with secondary growth, particularly in the mountain areas of Basilisa. Dragonfly habitats seen along the road included small ponds, wet rice field areas and creeks. Some small rivulets and trickles were present along some roadside cliffs. *Pantala flavescens* was often seen at roadsides and in open areas, *Macrodiplax cora* was also seen hovering at some ponds and pools along the road. While staying in the Albor District Hospital for 3 days I managed to explore few places in its vicinity. The area seems to be bare of forest specialist and only *Prodasineura integra* was noted near a small stream. Several opportunistic species like *Diplacodes trivialis*, *Neurothemis terminata* and *Orthetrum sabina* were the only Anisoptera encountered. I arrived in Loreto and stayed in Loreto District Hospital where I work as medical officer. I explored the surrounding waterways and managed to collect some specimens of *Teinobasis* sp. (nov?) in the nearby Nipa swamp were *Raphismia bispina* was also present. Aside from several widespread oriental species I managed to collect a *Gynacantha* sp female entering the hospital. During a short trip to a river near the entrance road to Chromico mining firm I saw *Euphaea amphicyana* and *Drepanosticta mylitta* and *Risicnemis appendiculata* were found at a shaded rivulet near the river. A trip to Paragua Forest reserve yielded two new records for the island: *Rhinagrion philippina* and *Teinobasis cf filamentum*. *Risicnemis prauesta* is the commonest species found in the area and was even found at some distance from the waterways. In total I visited seven sites thus far mostly within Loreto and a total of 29 species were recorded.] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000 Philippines. E-mail: reaganjoseph@lycos.com

- 8204.** Wang, X.-s.; Li, Y.; Shi, Y.-f. (2008): Effects of sandwich microstructures on mechanical behaviours of dragonfly wing vein. *Composites Science and Technology* 68: 186-192. (in English) ["Dragonfly wings, which consist mainly of the veins and membranes, are highly specialized flight organs adapted to cope with the individual flight behaviour of each dragonfly. Therefore, it is important and necessary from a bionic view to investigate how the microstructures affect their mechanical behaviours of elements. In this study, it is focused on effects of microstructure on mechanical characteristics of dragonfly wing vein. These results indicate that the microstructure of vein is a complex sandwich structure, which consists of chitin shell and protein/muscle with some fibrils. This sandwich structure can be subjected to the rather greater bending loading and torsional deformation based on the von Mises stress and flexural deformation analysis of finite element analysis (FEA). It assists us to understand and design the new high strength-to-weight ratio of composite materials or structure." (Authors)] Address: Wang, X.-s., Dept Engineering Mech., Tsinghua Univ., 100084 Beijing, PR China
- 8205.** Westermann, K. (2008): Auswirkungen von Hochwassern auf die Emergenzraten von Libellen an Fließgewässern des Oberrheinischen Tieflandes (Odonata). *Libellula* 27(1/2): 63-88. (in German, with English summary) ["Exuviae were collected systematically during several years at four running water sites in the southern Upper Rhine lowland plains. Different impacts of floods on the emergence of Odonata were documented: At two channels, over which the main flood discharge occurred, the emergence rates of all frequent species decreased to insignificant levels. In contrast, emergence rates drastically increased at a side channel, which featured little current during floods. At one stream, the emergence rates of some species recovered at the earliest after two years. In a mesotrophic channel considerable amounts of nutrients were accumulated during a flood, causing the macrophyte populations to almost entirely die off, so that Odonata larvae evidently migrated away in large numbers. Emergence was at most an exception during floods. A long-lasting flood delayed the emergence in the same year for several weeks. The specific flood characteristics of a running water site are crucial factors for both species composition and the abundance of Odonata. As reported from other organisms, the results confirmed that a 'catastrophic drift' may occur during floods, possibly leading to a substantial reduction of population sizes. The larvae of Odonata can survive in refugia like side channels, and recolonize watercourses with flood-depleted subpopulations from there. The canalization of most watercourses in Central Europe has destroyed many of these refugia or has reduced their effectiveness. Hence, securing and reconstructing refugia has become a key challenge for water management authorities when running waters are revitalized and measures for flood protection are taken. The conservation or recreation of a species-rich and abundant fauna in riverscapes cannot succeed otherwise." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de
- 8206.** Wilson, K.D.P.; Reels, G.T.; Xu, Z. (2008): Revised Checklist of Hainan Odonata, China. *Echo* 2008: 6-14. (in English) ["A revised checklist of the odonates of Hainan is provided. In total 146 species are listed, which includes 16 unpublished species records. Six of these species are recorded from Chinese territory for the first time. The Hainan fauna is briefly compared with the odonate fauna from Taiwan." (Authors) B&W figures of the following species are provided: *Stylurus erectornis*, *Rhinocypha* (*Heliocypha*) *huai*, *Rhinocypha drusilla*.] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com
- 8207.** Yu, W.-y.; coauthors not transliterated (2008): Analysis on the flora [sic] of Libellulidae insects of Odonata in Lushan Area, Jiangxi province and its diversity study. (in Chinese, with English summary) *Journal of Anhui Agri. Sci.* 36(7): 2854-2856, 2866 [24 species of Libellulidae are reported from the Lushan area, including 12 species new for the Jiangxi province.] Address: Yu, W.-y., Dept of Life Science, Nanjing Xiaozhuang University, Nanjing, Jiangsu 210017, China
- 8208.** Yu, W.-y.; Li, Z.-h.; Song, D.-j.; Huang, C.; Yang, X.; Yuan, X.-j.; Zhou, J. (2008): Study on the fauna and diversity of Odonata insects in Zijin Mountain of Nanjing. *Journal of Nanjing Forestry University* (Natural Sciences Edition) 32(4): 139-142. (in Chinese, with English summary) [Between 2005 and 2007, 30 species of Odonata were collected in the Zijin Mountain of Nanjing, China, including 8 species new for the Jiangsu province.] Address: Yu Wei-yan, Dept of Life Science, Nanjing Xiaozhuang University, Nanjing 211171, China
- 8209.** Yu, W.-y.; Li, Z.-h.; Song, D.-j.; Huang, C.; Wang, H.-q.; Lu, J.; Wang, H.; Qian, Y.-p. (2008): Research on fauna and diversity of Odonata in different seasons in Laoshan Area, Nanjing. *Sichuan Journal of Zoology* 127(13): 322-326. (in Chinese, with English summary) [Between 2005 to 2007, 30 odonate species were found in the Laoshan area of Nanjing City, China, 7 of them for the first time in the Jiangsu Province. The species belonged to different zoogeographical groups.] Address: Yu Wei-yan, Dept of Life Science, Nanjing Xiaozhuang University, Nanjing 211171, China
- 8210.** Yu, X. (2008): Ovipositing of *Ischnura aurora*. *Echo* 2008: 2. (in English) [Verbatim: In the summer of 2006, I went to Yunnan, China for fieldwork. In a valley in Tengchong County I noticed a female *Ischnura aurora* ovipositing in the centre of a little pool on a stem of a kind of horsetail (*Equisetum* sp.). She moved slowly down along the stem into the water and stayed below the water for about two minutes. Suddenly, just like a missile launched from a submarine, she was ejected out of the water without leaving a ripple on the face of the pool and without any interruption she flew around and ceased at another stem nearby. All this happened in a split second and I am sure she came out off the water directly, so without crawling upward along the stem, as the position where she came out of the water was at a little distance from the stem of the plant. About one minute later, she tested the new stem with her ovipositor and went down into the water again. Four minutes later she used the same trick and came out of the water and flew away. I have observed the submerged oviposition behaviour of *Ischnura asiatica*, *Paracercion v-nigrum*, *Euphaea ochracea*, and some other species, but they never showed such an impressive style like this female *Ischnura aurora*.] Address: Xin Yu [yuxin@mail.nankai.edu.cn]

Thanks to all who contributed to this issue!!

Odonatological Abstract Service

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8211. Abilhoa, V.; Bornatowski, H.; Otto, G. (2009): Temporal and ontogenetic variations in feeding habits of *Hollandichthys multifasciatus* (Teleostei: Characidae) in coastal Atlantic rainforest streams, southern Brazil. *Neotropical Ichthyology* 7(3): 415-420. (in English, with Portuguese summary) [Stomach content of *H. multifasciatus* includes odonate larvae but is not further specified.] Address: Otto, G., Universidade Federal do Paraná (UFPR), Depto de Zoologia, CP 2936, 69083-000 Curitiba, PR, Brazil. E-mail: ottogis@gmail.com

8212. Adeyemi, S.O.; Adikwu, I.A.; Akombu, P.M.; Iyela, J.T. (2009): Survey of zooplanktons and macroinvertebrates of Gbedikere Lake, Bassa, Kogi State, Nigeria. *International Journal of Lakes and Rivers* 2(1): 37-44. (in English) [Between July and Sept., 2008, macroinvertebrates were represented by Coleoptera (2.44%), Diptera (48.85%), Ephemeroptera (2.59%), Hemiptera (9.59%), Odonata (29.07%), Trichoptera (0.91%), Plecoptera (0.30%), Arachnida (2.13%), Annelida (2.89%) and Nematoda (1.22%).] Address: Adeyemi, S.O., Dept of Biological Sciences, Benue State University, Makurdi, Nigeria. E-mail: sadeyemi2003@yahoo.com

8213. Akira, M. (2009): Growth of several fish and dragonfly species in the drainage system of a consolidated paddy field. *Japanese Journal of Conservation Ecology* 14(1): 3-11. (in Japanese, with English summary) ["This study examined the growth of aquatic animals in the canal system constituting the main, lateral, and farm drains in a consolidated paddy field, with emphasis on canal structure and year-round water flow in the canals. A field survey at six sites, which involved three different canal levels, was carried out in Chikusei, Ibaraki Prefecture, Japan (36°21'N, 139°59'E). Sampling was conducted at monthly intervals from April 2001 to March 2002. Of the freshwater fish, young-of-the-year (YOY) *Zacco platypus* appeared in September, while YOY *Misgurnus anguillicaudatus* appeared in May. Last instars of *Calopteryx atrata* were collected only in June, suggesting emergence about this time, while those of *Orthetrum albistylum speciosum* were collected in May and July, suggesting a longer duration of emergence. Since populations of the four species decreased during the non-irrigation season when the wa-

ter level was low, I propose that a marsh be developed as a wintering site in the lower reaches of the canal system in consolidated paddy fields." (Author)] Address: not available

8214. Al-Houty, W. (2009): Insect biodiversity in Kuwait. *International Journal of Biodiversity and Conservation* 1(8): 251-257. (in English) ["Natural causes, together with the deliberate destruction of the environment with the objective of forcing political, military and means of civilization have resulted in great deterioration of the environment. The insect fauna of Kuwait has suffered from such destructions, resulting in some becoming extinct, while others are threatened with extinction from Kuwait desert, however, others still flourishing. This contribution records the status of the entomofauna in Kuwait prior to the Gulf War (from 1980 - 1990), and after the Gulf War (from 1992 - 2008), including the effects of new modern dwellings and severe draught. During the first period 474 species of insects were recorded from Kuwait (356 genera, 109 families, 19 orders) but the numbers of species increased to 492 (273 genera, 116 families, 19 orders) during the second period. The differences are caused by disappearance and re-appearance. This study will discuss the reasons for increase, disappearance and reappearance of insects in the desert ecosystem of Kuwait." (Author) 11 odonate taxa - without specification - and each prior and after the war are listed.] Address: Al-Houty, W., Department of Biological Sciences, Faculty of Science, University of Kuwait. E-mail: wamia@kuc01.kuniv.edu

8215. Aliberti Lubertazzi, M.A.; Ginsberg, H.S. (2009): Persistence of dragonfly exuviae on vegetation and rock substrates. *Northeastern Naturalist* 16(1): 141-147. (in English) ["Surveys of dragonfly exuviae have been used to assess rare species' habitats, lake water quality status, and wetland restoration programs. Knowledge of the persistence of exuviae on various substrates is necessary to accurately interpret exuvial surveys. In 2006, we recorded exuvial persistence at defined areas in a variety of small freshwater wetlands in Rhode Island. Exuviae were field-identified, labeled with small daubs of nail polish, and observed every three weeks from June through September. Overall, exuvial persistence displayed exponential decline, disappearing rapidly during the first few weeks, and more slowly

thereafter. The initial rate of decline was similar for most species, but differed in some taxa. There was no significant difference in exuvial retention on emergent vegetation vs. rock substrate." (Authors)] Address: Lubertazzi, Maria, Dept of Plant Sciences/ Entomology, University of Rhode Island, Woodward Hall, Kingston, RI 02881, USA. E-mail: mariaaa@mail.uri.edu

8216. Altamiranda Saavedra, M. (2009): Actualización de registros del orden Odonata del Museo Entomológico Francisco Luis Gallego. Boletín del Museo Entomológico Francisco Luis Gallego 1(3): 6-18. (in Spanish) [Since 1945, 1,180 Odonata specimens were deposited in the collection of the Museo Entomológico Francisco Luis Gallego. In a table, taxonomic information, identifier, and locality data of this collection are compiled. All specimens are from Colombian localities.] Address: Altamiranda Saavedra, M., Biólogo, Estudiante de Maestría Ciencias – Entomología, Universidad Nacional de Colombia sede Medellín, Grupo de Investigación en Ecología y Sistemática de Insectos (GIESI). Museo Entomológico Francisco Luis Gallego MEFLG Apartado Aéreo 3840. Medellín, Colombia

8217. Alvarez, G.; Nicieza, A.G. (2009): Differential success of prey escaping predators: Tadpole vulnerability or predator selection? *Copeia* 2009(3): 453-457. (in English) ["Species inhabiting habitats with different predators are expected to show divergent phenotypes for antipredator traits. Here, we used a predator-prey system of dragonfly larvae and tadpoles to determine if vulnerability to a common predator differs in species with contrasting antipredator strategies. We examined the vulnerability of tadpoles of *Rana temporaria* and *Bufo bufo* to predation by *Aeshna* larvae when the two species co-occur in the same arena. Our results demonstrated that tadpoles of *Bufo* were more vulnerable than tadpoles of *Rana* despite the observation that dragonfly larvae did not show initial preferences for either prey species. Differences in susceptibility to predation seem to be associated with their low performance in evasive responses. Most important, our data suggest that despite chemical protection that effectively prevented the consumption of *B. bufo* by *Aeshna* larvae, injured tadpoles that otherwise had survived are at a high risk of being cannibalized. This loss of survival advantage of a chemical defense is an indirect result of two antipredator responses: the effectiveness of the chemical defense itself and the immobility of refused tadpoles." (Authors)] Address: Álvarez, G, Depto de Biología de Organismos y Sistemas, Unidad de Ecología, Univ. de Oviedo, E-33006 Oviedo, Spain. E-mail: dalvarez@innova.uniovi.es.

8218. Andrew, R.J. (2009): Fine structure of the egg chorion in two anisopteran dragonflies from central India (Libellulidae). *Odonatologica* 38(4): 359-363. (in English) ["The fine structure of the egg chorion in *Brachydiplax sibirica* and *Orthetrum s. sabina*, is described using the scanning electron microscope. The unwetted eggs of *B. sibirica* are bluish-green and spindle-shaped while those of *O. s. sabina* are oval and light brown in colour. The egg chorion is distinctly divided into an outer exochorion and an inner tough endochorion. The exochorion expands into a thick, sticky, jelly-like structure in water during oviposition, whereas the endochorion remains unchanged. The endochorion is thin and smooth in *O. s. sabina*, but in *B. sibirica* the undersurface of the endochorion is pitted and rough. The apical

micropylar apparatus is composed of a sperm storage chamber (atrium) and a median projecting stalk, which possesses a pair of sub-terminal orifices. The atrium in *B. sibirica* is dome shaped with a tiny stalk whereas in *O. s. sabina* the micropylar apparatus is triangular with a longer stalk and a pair of almost apically placed orifices. Significant variations occur in the shape and size of the micropylar apparatus. The functional interrelationship of the micro morphological modifications in the chorionic structures is discussed." (Author)] Address: Andrew, R.J., Post-Graduate Department of Zoology, Hislop College, Nagpur 440 001, India. E-mail: rajuan-drew@yahoo.com

8219. Anonymous (2009): Of damsels and dragons. *The Nature of Scotland* 4 (Summer 2009): 17-19. (in English) [General account on Scottish Odonata.] Address: <http://www.snh.org.uk/pdfs/SNHMagazine/Contents-Summer-2009/Damselsdragons.pdf>

8220. Ardila-Garcia, A.M.; Gregory, T.R. (2009): An exploration of genome size diversity in dragonflies and damselflies (Insecta: Odonata). *Journal of Zoology* 278: 163-173. (in English) ["Like most insect orders, the Odonata remain poorly studied from the perspective of genome size. They exhibit several characteristics that make them desirable targets for analysis in this area, for example a large range in body size, differences in developmental rate, and distinct modes of flight – all of which are related to genome size in at least some animal taxa. The present study provides new genome size estimates and morphometric data for 100 species of odonates, covering about 1/5 of described North American diversity. Significant relationships are reported between genome size and body size (positive in dragonflies, negative in damselflies), and there is also indication that developmental rate and flight are related to genome size in these insects. Genome size is also positively correlated with chromosome number across the order. These findings contribute to an improved understanding of genome size evolution in insects, and raise several interesting questions for future research." (Authors)] Address: Gregory, T.R., Department of Integrative Biology, University of Guelph, Guelph, Ontario N1G 2W1 Canada. Email: rgregory@uoguelph.ca

8221. Argyroudi, A.; Chatzinikolaou, Y.; Poirazidis, K.; Lazaridou, M. (2009): Do intermittent and ephemeral Mediterranean rivers belong to the same river type?. *Aquatic ecology* 43(2): 465-476. (in English) ["The benthic macroinvertebrate communities and ecological quality of eleven temporary rivers (seven intermittent and four ephemeral) in Dadia National Park, north-eastern Greece, were examined with respect to the degree of flow temporality. Sampling took place during the high flow season at both ephemeral and intermittent sites and during the low flow season only at the intermittent ones, which receded to pools. Despite the remarkable seasonal variation in both the hydrology and ecology of the intermittent rivers, the various metrics and indices as well as the multivariate analyses confirmed the clear distinction between the two river types (ephemeral and intermittent). Existing European quality indices do not sufficiently differentiate between ephemeral and intermittent river types, and thus cannot reliably discriminate the degree of natural variability from human induced stressors in temporary rivers." (Authors) Cluster A was composed of the low flow intermittent sites and characterized mostly by the Diptera family of Chironomidae

and the Odonata Platycnemydidae (40.62% and 21.99% contribution, respectively.)] Address: Argyroudi, A., School of Biology, Department of Zoology, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece. E-mail: anna.argyrou@gmail.com

8222. Asokan, S.; Samsoor Ali, A.M.; Manikannan, R. (2009): Diet of three insectivorous birds in Nagapattinam District, Tamil Nadu, India – a preliminary study. *Journal of Threatened Taxa* 1(6): 327-330. (in English) ["The dietary composition of the White-breasted Kingfisher *Halcyon smyrnensis*, the Small Bee-eater *Merops orientalis* and the Black Drongo *Dicrurus macrocercus* was studied between 2005 and 2006 in Nagapattinam District, Tamil Nadu, India by analyzing regurgitated pellets. The analysis revealed that the White-breasted Kingfisher preys mainly on arthropods (83.40%) and less on vertebrates; seven orders of insects were identified, with Coleoptera, Hemiptera, Hymenoptera and Orthoptera predominant. The small bee-eater diet is composed of Coleoptera (22.3%), Hymenoptera (20.8%), Hemiptera (14.1%), Orthoptera (12.6%), Odonata (10.7%), Lepidoptera (10.4%) and Diptera (8.6%). Beetles were also found to be the most frequent prey (23.7%) in the diet of black drongos, followed by Hemiptera (21.6%), Orthoptera (19.3%), Hymenoptera (14.4%), Lepidoptera (7.5%), Diptera (6.8%) and Odonata (6.0%)."] (Authors)] Address: Asokan, S., Ph.D. Research Scholar, Department of Zoology & Division of Wildlife Biology, A.V.C. College (Autonomous), Manampandal, Mayiladuthurai, Tamil Nadu 609305, India. E-mail: beeeasokan@yahoo.co.in

8223. Ayten, Y.; Özgökçe, M.S. (2009): Odonata species, their distribution and habitats in Van province. *Yyü. Tar. Býl. Derg. (Yyü J. Agr. Sci.):* 1-9. (in Turkish, with English summary) [The Odonata of Van Province, Turkey were investigated in 2003 and 2004. A total of 11 species including new provincial records (*Calopteryx splendens intermedia*, *Lestes barbarus*, *Aeshna affinis*, *Anax imperator* *Orthetrum anceps*, *Sympetrum meridionale*) were recorded.] Address: Özgökçe, M.S., Yüzüncü Yýl Üniversitesi, Ziraat Fakóltesi, Bitki Koruma Bölümü, VAN, Turkey. e-mail: msozgekce@yyu.edu.tr

8224. Ballengée, B.; Sessions, S.K. (2009): Explanation for missing limbs in deformed amphibians. *Journal of Experimental Zoology Part B: Molecular and Developmental Evolution* 312(7): 770-779. (in English) ["We present evidence that the most commonly found deformities in wild-caught amphibians, those featuring missing limbs and missing limb segments, may be the result of selective predation. Here we report that predatory dragonfly nymphs can severely injure and even fully amputate developing hind limbs of anuran tadpoles. Developmental responses of the injured/amputated tadpole limbs range from complete regeneration to no regeneration, with intermediate conditions represented by various idiosyncratic limb deformities, depending mainly on the developmental stage of the tadpole at the time of injury/amputation. These findings were reinforced by experimental amputations of anuran tadpole hind limbs that resulted in similar deformities. Our studies suggest that selective predation by dragonfly nymphs and other aquatic predators may play a significant role in the most common kinds of limb deformities found in natural populations of amphibians." (Authors)] Address: Sessions, S.K., Department of Biology, Hartwick College, Oneonta, New York, USA. E-mail: sessions@hartwick.edu

8225. Beckemeyer, R.J. (2009): First record of the dragonfly *Miathyria marcella* (Selys) for Kansas (Odonata: Anisoptera: Libellulidae). *Transactions of the Kansas Academy of Science* 112: 130-132. (in English) [USA, Sedgwick County, Kansas, Wichita State University Ninescah Field Station, 26-IX-2008, single specimen of a mature male *M. marcella*. "This occurrence is approximately 200 miles beyond the previously recorded range, a distance that does not seem likely to be due to an individual wandering about while feeding. Dragonflies are often displaced long distances by weather systems. Such a system was in place from 8 to 15 September, 2008, in the form of Hurricane Ike." (Author)] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

8226. Beckemeyer, R.J. (2009): Kinematics of a territorial defense maneuver by the dragonfly *Pachydiplax longipennis* (Odonata: Anisoptera: Libellulidae). *Transactions of the Kansas Academy of Science* 112(3/4): 169-180. (in English) ["A high speed (1000 frame/s) video segment, 0.367 seconds long, showing a territorial male *P. longipennis* dragonfly responding in the field to a challenge from a conspecific male, reveals that the defender used a high rate yaw-turn to position itself to drive off the challenger. In-phase flapping of the fore and hind wings was used during the yaw turn and in the following pursuit of the challenger. During the right yawing turn, the dragonfly flapped its right wings to a more negative stroke amplitude than its left wings on the first two downstrokes (1st downstroke: -65° right wing, -45° left wing; 2nd downstroke: -90° right wing, -50° left wing). Upstroke amplitudes were the same for both wings throughout the yaw turn. The 135° yaw turn was executed, in three wing beats (0.085 s) and in about 6/10ths of a body length of horizontal travel, at an average yaw rate of 1590%, and a peak turn rate of 3000%. This rapid yawing rotation was accompanied by a significant deceleration in flight path speed, which dropped from 30 to 7 body lengths per second (1.1 m/s to 0.3 m/s) as the dragonfly yawed through 90° in the first half of the yaw turn. The wingbeat frequency dropped from 41.7 Hz at the beginning of the yaw turn to 33.3 Hz at the end. The horizontal and vertical flight velocity components both reached zero near the completion of the yaw turn, during the upstroke portion of the third wing beat. Within 1/10th of a second after completing the yaw turn, the defender had reached speeds of 8 body lengths per second (0.3 m/s) upward and 14 body lengths per second (0.55 m/s) horizontally, and was accelerating along its flight path at approximately 150 body lengths per second² (5.5 m/s²) in its pursuit of the challenger." (Author)] Address: Beckemeyer, R.J., Research Associate, Division of Entomology, Natural History Museum, 1501 Crestline Drive — Suite 140, University of Kansas, Lawrence, Kansas 66049-2811, USA. E-mail: roybeckemeyer@ku.edu

8227. Bedjanic, M. (2009): *Drepanosticta starmuehlneri* St. Quentin, 1972 from Sri Lanka, a synonym of *D. lankanensis* (Fraser, 1931) (Zygoptera: Platystictidae). *Notulae odonatologicae* 7(4): 38-39. (in English) ["The badly damaged holotype of *D. starmuehlneri* in the Vienna Natural History Museum is compared with Fraser's original description and illustrations and with the type-checked specimens of *D. lankanensis*, and it is concluded the former is a junior synonym of the latter." (Author)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310

Slovenska Bistrica, Slovenia. E-mail: matjazbedjanic@yahoo.com

8228. Berezina, N.A.; Zhakova, L.V.; Zaporozhets, N.V.; Panov, V.E. (2009): Key role of the amphipod *Gmelinoides fasciatus* in reed beds of Lake Ladoga. *Boreal Env. Res.* 14: 404-414. (in English) [Russia, "The Baikalian *G. fasciatus*, a successful invader in Eurasia, colonized the coastal zone of Lake Ladoga (northeastern Europe) in late 1990s. In the summers of 2000 and 2005 the density and biomass of benthic communities (including Odonata) associated with macrophyte beds (*Phragmites australis*) and role of the invader in fish diet were studied." (Authors)] Address: Berezina, N.A., Zoological Institute of Russian Academy of Sciences, St-Petersburg 199034, Russia. E-mail: nber@zin.ru

8229. Bergmann, T.; Hadrys, H.; Breves, G.; Schierwater, B. (2009): Character-based DNA barcoding: a superior tool for species classification. *Berliner und Münchener Tierärztliche Wochenschrift* 122(11/12): 446-450. (in English, with German summary) ["In zoonosis research only correct assigned host-agent-vector associations can lead to success. If most biological species on Earth, from agent to host and from prokaryotes to vertebrates, are still undetected, the development of a reliable and universal diversity detection tool becomes a *conditio sine qua non*. In this context, in breathtaking speed, modern molecular-genetic techniques have become acknowledged tools for the classification of life forms at all taxonomic levels. While previous DNA-barcoding techniques were criticised for several reasons (Moritz and Cicero, 2004; Rubinoff et al. (2006a, b; Rubinoff, 2006; Rubinoff and Haines, 2006) a new approach, the so called CAOS-barcoding (Character Attribute Organisation System), avoids most of the weak points. Traditional DNA-barcoding approaches are based on distances, i.e. they use genetic distances and tree construction algorithms for the classification of species or lineages. The definition of limit values is enforced and prohibits a discrete or clear assignment. In comparison, the new character-based barcoding (CAOS-barcoding; DeSalle et al. 2005; DeSalle, 2006; Rach et al. 2008) works with discrete single characters and character combinations which permits a clear, unambiguous classification. In Hannover (Germany) we are optimising this system and developing a semiautomatic high-throughput procedure for hosts, agents and vectors being studied within the Zoonosis Centre of The „Stiftung Tierärztliche Hochschule Hannover“. Our primary research is concentrated on insects, the most successful and species-rich animal group on Earth (every fourth animal is a bug). One subgroup, the winged insects (Pterygota), represents the outstanding majority of all zoonosis relevant animal vectors." (Authors) The method is exemplified using *Crocothemis erythraea*, *Orthetrum chrysostigma* and *Anax imperator*.] Address: Bergmann, T., Institut für Tierökologie und Zellbiologie, Stiftung Tierärztliche Hochschule Hannover, Bünteweg 17d, 30559 Hannover, Germany. E-mail: tjard.bergmann@ecolevol.de

8230. Bhattarai, G.P.; Horner, J.D. (2009): The importance of pitcher size in prey capture in the carnivorous plant, *Sarracenia alata* Wood (Sarraceniaceae). *The American Midland Naturalist* 161(2): 264-272. (in English) ["Prey capture in pitcher plants has been found to be significantly dependent on pitcher size, but the ac-

tual importance of size is not clearly understood. We studied insect capture by the carnivorous plant *Sarracenia alata* and compared the rate of insect capture per unit capture area of plants with that of nonbiological models and traps. The total mass of insects captured was significantly positively related to capture area for both biological and nonbiological systems. However, the rate of insect capture was significantly greater for plants than for models and traps, which suggests a role of attractants in insect capture in pitcher plants. Odor from decaying insects was found to have a significant effect on insect capture on experimental attraction cups. Further study should focus on the nature of other attractants including nectar, UV reflectance and volatiles to determine their role in insect capture by pitcher plants. [...] Even though dragonflies are commonly observed perching on pitcher hoods, we have never observed one captured in hundreds of pitchers examined." (Authors)] Address: Horner, J.D., Department of Biology, Box 298930, Texas Christian University, Fort Worth, Texas 76129, USA. E-mail: J.Horner@tcu.edu

8231. Bjurström, L. (2009): Impacts of the non-native crayfish (*Pacifastacus leniusculus*) on littoral benthic invertebrate communities in Lake Päijänne. Master of Science Thesis, Department of Biological and Environmental Science, International Aquatic Masters Programme, University of Jyväskylä: 28 pp. + attachments. (in English, with Finnish summary) ["The introduced crayfish *P. leniusculus* is now a permanent resident in many of the large lakes in Finland, but the effects of this large omnivore on lake ecosystems are largely unknown. In general, it is thought that when crayfish abundance increases, species composition of benthic invertebrates may change towards species less vulnerable to predation by crayfish and the snail abundance is expected to decrease. However, indirect impacts of crayfish on benthic communities can also be expected. The impacts of *P. leniusculus* on littoral benthic invertebrate communities in large Lake Päijänne were therefore studied by comparing the benthic invertebrate assemblages of stony shores in lake areas with well established crayfish populations to those in areas without crayfish. The invertebrate community composition differed between the areas, and there was a clear reduction in species richness and abundance and of snail abundance in particular in the presence of signal crayfish. The crayfish sites were dominated by Chironomidae and Oligochaeta and small number of other invertebrate groups (including Odonata, Coenagrionidae, Corduliidae). The non-crayfish sites were dominated evenly by Chironomidae and Oligochaeta, Elmidae, Amphipods, Gastropoda and Trichoptera. [...] The invertebrate density was on average 44 % lower at areas with crayfish than without crayfish. [...] Significant negative relationships at the family level included [...] Coenagrionidae." (Author)] Address: Bjurström, Lotta; not stated

8232. Bonino, M.F.; Lescano, J.N.; Haro, J.G.; Leynaud, G.C. (2009): Diet of *Hydromedusa tectifera* (Tentaculata-Chelidae) in a mountain stream of Córdoba province, Argentina. *Amphibia-Reptilia* 30(4): 545-554. (in English) ["The diet of *H. tectifera* occurring in two mountain streams in the province of Córdoba is described through a comparative analysis of 154 individuals. Turtles were manually captured between August 2005 and August 2006 from streams at the localities of Tanti and Flor Serrana. Before being released, turtles were stomach-flushed, and sex and carapace length

were recorded. The stomach contents were observed under stereomicroscope; prey items were identified and classified according to size and volume. The importance of the different items was quantified using the Index of Relative Importance (IRI). Similarity in the diet between sexes and among size classes and seasons of an annual cycle was evaluated using the simplified Morisita index. Trophic breadth was estimated with the Shannon diversity index. Detrended Correspondence Analysis (DCA) was used to evaluate differences in the diet between categories (sex, size classes). Forty-seven food items belonging to the following taxa were identified: leeches, annelids, gastropods, arachnids, insects, and fishes. According to the IRI value, the most important items in the diet of *H. tectifera* were larvae of Trichoptera (IRI = 33.5), fishes (IRI = 30), and naiads of Odonata (IRI = 25.2). The relative importance of the items varied with size of turtles but not with sex. Size of prey consumed increased with increasing turtle size. A greater trophic breadth was observed in smaller individuals." (Authors)] Address: Leynaud, G.C., Centro de Zoología Aplicada. Facultad de Ciencias Exactas, Físicas y Naturales (Universidad Nacional de Córdoba), Rondeau 798, Casilla de Correo 122, Córdoba (5000), Argentina. Email: gleynaud@efn.uncor.edu

8233. Bowers, J. (2009): The Dragonflies of Lesbos. Promoline SA for the Friends of Green Lesbos, Mytilene, Lesbos. ISBN 978-960-930703-1: 92 pp. (in English) [The book starts with a brief discussion of dragonfly biology and ecology. Dragonfly habitats are listed with typical species. 42 species found on the island are briefly described and illustrated with a photograph. Neuroptera that may be confused with dragonflies are also illustrated. There is a gazeteer of the main dragonfly sites. The book finishes with a discussion of problems of dragonfly conservation. For more details on the Odonata of Lesbos, Greece, see: Lopau, W. (1995): Die Libellenfauna der Insel Lesbos. Libellen, Lurche, Kriechtiere. Naturkundliche Reiseberichte, Gnarnenburg 3. 81 pp] Address: Bowers, J., 6 Ashwood Terrace, Leeds, West Yorkshire, L56 2EH, UK

8234. Brauner, O. (2009): Erstnachweis von *Ceragrion tenellum* in Brandenburg (Odonata: Coenagrionidae). *Libellula* 28(1/2): 25-29. (in German, with English summary) ["In 2008 *C. tenellum* was recorded for the first time in Brandenburg, northeastern Germany. The circumstances of the record - a single male only - and the water body are briefly described. The species, which has chiefly an Atlantic and western Mediterranean distribution, benefited from the milder winters during recent years and was observed increasingly at the eastern fringe of its area. The distances to the closest known localities in Saxony-Anhalt and Mecklenburg-West Pomerania were 50 to 85 km. Hence, other hitherto undiscovered occurrences can be expected." (Author)] Address: Brauner, O., R.-Breitscheidstr. 62, D-16225 Eberswalde, Germany. E-mail: oliver.brauner@gmail.com

8235. Brauner, O.; Reichling, A.; Möller, J. (2009): Die Libellenfauna im östlichen Teil des Naturparks Barnim sowie in der nördlich angrenzenden Umgebung von Eberswalde. *Märkische entomologische Nachrichten* 11 (1): 69-90, 4 pl.. (in German, with English summary) [In the period from 1999 to 2008, 175 sites were examined. In total, 59 of the 68 dragonfly species known for Brandenburg, Germany were discovered. Of these, 54

species were proved on the territory of the Nature Reserve Barnim, 46 in the city of Eberswalde and 54 in the southern part of the Biosphere Reserve Schorfheide-Chorin. 25 odonate species are discussed in detail.] Address: Brauner, O., R.-Breitscheidstr. 62, 16225 Eberswalde, Germany. E-mail: oliver.brauner@gmail.com

8236. Brockhaus, T. (2009): Erste kommentierte Checkliste der Libellen des Himalayagebirges (Insecta: Odonata). In: Hartmann, M. & J. Weipert: Biodiversität und Naturlandschaft im Himalaya III. - Verein der Freunde und Förderer des Naturkundemuseums Erfurt e.V., Erfurt: 87-106, Tafel III. (in German, with English summary) [239 species are included into the checklist of the Himalaya's Odonata. A brief discussion is given about typical mountain species, possible endemic species and the zoogeographical composition of the Himalayan odonate fauna.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

8237. Brockhaus, T.; Rychla, A. (2009): Vorläufige kommentierte Checkliste der Libellen des Muskauer Faltenbogens (Insecta: Odonata). *Berichte der Naturforschenden Gesellschaft der Oberlausitz* 17: 77-82. (in German, with English summary) ["The "Muskauer Faltenbogen" is a potential UNESCO area named "Geopark". In this region many water bodies with natural and anthropogenic origin are found. A preliminary checklist of 49 dragonfly species with comments to remarkable discoveries is given. Further research is needed to demonstrate the biodiversity of this area exemplified by the dragonflies." (Authors)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

8238. Brockhaus, T.; Hartmann, A. (2009): New records of *Epiophlebia laidlawi* Tillyard, 1921 in Bhutan with notes on its biology, ecology, distribution, zoogeography and threat status (Anisozygoptera: Epiophlebiidae). *Odonatologica* 38(3): 203-215. (in English) ["*E. laidlawi* larvae were found for the first time in Bhutan, collected in 5 streams in W and central parts of the country, at altitudes 2350-2885 m a.s.l. The habitats and larval development stages are described, and a brief overview is presented on the biology, ecology and known distribution in Bhutan, India and Nepal. The species inhabits fast running mountain streams in Himalayan broadleaf and subtropical pine forests at an altitude of 1300-2885 m a.s.l. The palaeobiogeographical history of the fossil Epiophlebiidae and Stenophlebiidae and of the 2 extant Epiophlebia species is discussed. *E. laidlawi* is a relict species, living in headwaters of pristine mountain forests. It is endangered because human influences, such as deforestation, provision of water power, erosion and other factors. The best protection would be ensured by the conservation of specific habitats in vast protected areas. This has at least partly been put into action in Nepal." (Authors)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

8239. Brooks, A.C.; Gaskell, P.N.; Maltby, L.L. (2009): Sublethal effects and predator-prey interactions: Implications for ecological risk assessment. *Environmental toxicology and chemistry* 28(11): 2449-2457. (in English) ["Ecological risk assessments tend to focus on contaminant effects on single species in isolation. However, additional effects from interactions between spe-

cies (e.g. predator-prey interactions) may also occur in natural systems. This study investigated the consequences of sublethal contaminant effects in prey on predator-prey interactions, particularly the interaction between prey behavioural changes and predation by predators with different hunting strategies. Ambush (*Ischnura elegans*) and active (*Notonecta glauca* (Heteroptera)) predator species were used in conjunction with three prey species (*Asellus aquaticus* (Crustacea, Isopoda), *Cloëon dipterum* (Ephemeroptera), and *Chironomus riparius* (Diptera)). Immobilised prey demonstrated the importance of prey behaviour for determining predation rates for both single and multiple prey species. *C. riparius* was less responsive following exposure to cadmium, becoming more vulnerable to attack by the active but not the ambush predator. There was also some evidence for reduced general activity in *C. dipterum* following cadmium exposure. Sublethal exposure of prey did not affect the prey choice of active predators, possibly due to prey behavioural changes being insufficient to influence their relative availabilities. However, cadmium exposure of prey did alter their susceptibility to ambush predators. There was a reduction in the proportion of *C. dipterum* and an increased proportion of *A. aquaticus* in the diet of ambush predators, possibly due to reduced activity in *C. dipterum* affecting their relative encounter rates with predators. Sublethal exposures can therefore result in reduced prey survival that would not be predicted by single species toxicity tests." (Authors)] Address: Maltby, L.L., Dept Animal & Plant Sciences, Univ. of Sheffield, Western Bank, Sheffield S10 2TN, UK. E-mail: l.maltby@sheffield.ac.uk

8240. Brotóns Padilla, M.; Ocharan, F.J.; Outomuro, D.; Torralba Burrial, A. (2009): "Anaciaeschna isoceles" (Müller, 1767) en el ámbito iberobaleár (Odonata: Aeshni). Boletín de la Sociedad Entomológica Aragonesa 44: 365-374. (in Spanish, with English summary) ["Six Iberian-baleáric localities and biological data on *A. isoceles* are presented, including the first records for Álava, Albacete and Toledo provinces, and the second one for Ciudad Real. A bibliographic review of the scarce Iberian-Baleáric data has been done. The distribution pattern is fairly concordant with bioclimatic factors, being *A. isoceles* a thermal, low-altitude species at the study area. Phenology data indicate a continuous flight season from late March to early August, peaking in early summer, with late records in mid-October. European and North African data on species' phenology and biology are compared with the Iberian ones. The conservation status for the study area is revised using IUCN regional criteria, assigning a Data Deficient (DD) category. Finally, several priority actions to clarify its biology and conservation status are suggested." (Authors)] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

8241. Buczyński, P. (2009): Babki, palatiki i dzieweczki, czyli o wazkach – ozdobie przyrody Warmii i Mazur. Natura 3(14): 6-11. (in Polish) [General account on Odonata in a Polish journal dedicated to nature observation and conservation.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8242. Buczyński, P.; Jędryczak, P. (2009): On the occurrence of *Orthetrum brunneum* (FONSCOLOMBE,

1837) (Odonata: Libellulidae) in the Polish part of the South Baltic Sea Coast Region. Wiad. entomol. 28(3): 141-147. (in Polish, with English summary) [*O. brunneum* was recorded in northern Poland (54°29'.54°48' N, 18°15'.18°33' E). This is a range extension over 1.5 degree of latitude towards the north compared with localities of species known so far. The distribution of *O. brunneum* in northern parts of Central Europe is also analyzed.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8243. Byun, D.-y.; Hong, J.; Saputra; Koa, J.H.; Young, J.L.; Park, H.C.; Byun, B.-K.; Lukes, J.R. (2009): Wetting characteristics of insect wing surfaces. Journal of Bionic Engineering 6(1): 63-70. (in English) ["Biological tiny structures have been observed on many kinds of surfaces such as lotus leaves, which have an effect on the colouration of *Morpho* butterflies and enhance the hydrophobicity of natural surfaces. We investigated the micro-scale and nano-scale structures on the wing surfaces of insects and found that the hierarchical multiple roughness structures help in enhancing the hydrophobicity. After examining 10 orders and 24 species of flying Pterygotan insects, we found that micro-scale and nano-scale structures typically exist on both the upper and lower wing surfaces of flying insects. The tiny structures such as denticle or setae on the insect wings enhance the hydrophobicity, thereby enabling the wings to be cleaned more easily. And the hydrophobic insect wings undergo a transition from Cassie to Wenzel states at pitch/size ratio of about 20. In order to examine the wetting characteristics on a rough surface, a biomimetic surface with micro-scale pillars is fabricated on a silicon wafer, which exhibits the same behaviours as the insect wing, with the Cassie-Wenzel transition occurring consistently around a pitch/width value of 20.2." (Authors) *Pantala flavescens* and *Orthetrum albistylum speciosum* have been studied.] Address: Byun, D., Department of Aerospace Information Engineering, Artificial Muscle Research Center, Konkuk University, Seoul 143-701, Republic of Korea. E-mail: dybyun@konkuk.ac.kr

8244. Cano Villegas, F.J. (2009): Desarrollo larvario de "*Onychogomphus costae*" Sélys, 1885 en el sur de la Península Ibérica y aclaración sobre su confusión con "*Ophiogomphus cecilia*" (Fourcroy, 1785) (Odonata: Gomphidae). Boletín de la Sociedad Entomológica Aragonesa 44: 327-332. (in Spanish, with English summary) ["A preliminary study of the larval development and phenology of *O. costae* in Andalusia is presented. In the studied area, this species exhibits a semivoltine life cycle. Previous records of *O. cecilia* from the studied area are considered to be misidentifications of *O. costae* larvae. These mistakes may be due to faults in the taxonomic keys. Finally, a new taxonomic key is proposed which makes it possible to separate *O. cecilia* larvae from those of *O. costae* as well as from the rest of the Iberian species of the same genus. This key is valid even for larval instars lower than the last one." (Author)] Address: Cano Villegas, F.J., C/Montemayor, 4 1°-2; 14003-Córdoba, Spain. E-mail: fcanovi2@hotmail.com

8245. Cano Villegas, F.J.; Conesa García, M.A. (2009): Expansión de *Trithemis kirbyi* Sélys, 1891 (Odonata: Libellulidae) en la provincia de Málaga (sur de la Península Ibérica). Boletín de la Sociedad Ento-

mológica Aragonesa 44: 569-572. (in Spanish, with English summary) ["Eight new Iberian localities are recorded for the Afro-tropical anisopteran *T. kirbyi*, with an update of its current distribution in Málaga province (Spain). Its reproduction in Europe is confirmed for the first time, and biometric information is given on the collected specimens." (Authors)] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: fjcanovi2@hotmail.com

8246. Cano-Villegas, F.J.; Conesa-Garcia, M.A. (2009): Confirmation of the presence of *Lestes macrostigma* (Eversmann, 1836) (Odonata: Lestidae) in the "Laguna de Fuente de Piedra" Natural Reserve (Málaga, South Spain). *Boln. Asoc. esp. Ent.* 33(1-2): 91-99. (in English, with Spanish summary) ["We introduce new data about 14 species of dragonflies in the Nature Reserve "Laguna de Fuente de Piedra". We especially highlight the persistence of *L. macrostigma* in that area, after fourteen years with no trace of them in Andalusia. Populations of this species are clearly regressive along its European distribution." (Authors)] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: fjcanovi2@hotmail.com

8247. Carroll, T.M. (2009): Resource pulses and spatial subsidies in Ozark Karst Springs: Effects on community structure and food webs. Ph.D. Dissertation. University of Kansas: 162 pp. (in English) [Steury and Danforth Springs (37°21' N, 93°21' W; 37°24' N, 93°15' W) east of Springfield in the James River basin, Missouri, USA. "Spatial and temporal patterns of invertebrate community composition, biomass, functional diversity, foodweb dynamics, and foodweb complexity were examined in three Ozarks springs. Also examined was the effect of an experimental manipulation of algal production (function of light limitation) on foodweb pathways and complexity. Food source-consumer interactions were determined using carbon and nitrogen stable isotope and stoichiometric analyses. Biocomplexity and functional diversity increased temporally and spatially along the spring source-springbrook gradient likely due to variability in the composition and availability of food sources. Foodweb analyses indicated that the trophic base of the foodweb was autochthonous, shifting temporally towards a greater reliance on allochthonous resources. Spatial and temporal shifts in food availability and utilization were associated with corresponding increases in foodweb complexity. Isotope ratios, based on manipulation of algal production, indicated a shift toward more allochthonous-based pathways and increases in omnivory and foodweb complexity in manipulated (shaded) sections of the spring." (Author) The publication includes many notes on *Argia sedula*, represented in Danforth and Steury (coniferous and deciduous canopies, respectively). Young larvae of *A. sedula* feed on protozoans that colonize fine allochthonous detrital matter, and were prominent in springbrooks with heavy riparian growth of coniferous and deciduous trees.] Address: Carroll, Teresa Mae, <http://kuscholarworks.ku.edu/dspace/handle/1808/5571>

8248. Carron, G. (2009): *Coenagrion mercuriale* (Charpentier, 1840) et *Leucorrhinia albifrons* (Burmeister, 1839) (Odonata) dans la région genevoise. *Entomo Helvetica* 2: 71-81. (in French, with English and German summaries) ["A restricted but quite large population of *C. mercuriale* was rediscovered in 2006, after 46 years of absence, in a small river located in the can-

tons of Geneva and Vaud, Switzerland. No other population of this species is known in the Geneva basin. A confirmed reproduction site of a small population of *L. albifrons* was found in 2006 in Cartigny. This is also the single population of this species in the Geneva region, and the third one in Switzerland." (Author)] Address: Bureau Gilles Carron, Bioindication Gestion Monitoring, case postale 90, 2002 Neuchâtel, Switzerland. E-mail: carron.bureau@vtx.ch

8249. Carron, G. (2009): Les coléoptères aquatiques des marais du lac de Pfäffikon (canton de Zürich), avec première mention pour la Suisse de *Hydroporus scalexianus* Stephens, 1828 et recommandations pour la conservation. *Entomo Helvetica* 2: 239-253. (in French, with English and German summaries) [61 species of water beetles have been recorded in two transitional mires adjacent to Lake Pfäffikon. The paper includes a passing reference on Odonata] Address: Bureau Gilles Carron, Bioindication Gestion Monitoring, case postale 90, 2002 Neuchâtel, Switzerland. E-mail: carron.bureau@vtx.ch

8250. Carron, G. (2009): Une illustration de la ponte de *Cordulegaster boltonii* (Donovan, 1807) (Odonata, Cordulegasteridae. *Entomo Helvetica* 2: 200. (in French) [Photograph of an oviposition of *C. boltonii*, 13-VII-2005, Veyron, near Montricher VD, Switzerland.] Address: Bureau Gilles Carron, Bioindication Gestion Monitoring, case postale 90, 2002 Neuchâtel, Switzerland. E-mail: carron.bureau@vtx.ch

8251. Chakona, A.; Phiri, C.; Chinamaringa, T.; Muller, N. (2009): Changes in biota along a dry-land river in northwestern Zimbabwe: declines and improvements in river health related to land use. *Aquatic Ecology* 43(4): 1095-1106. (in English) ["Macroinvertebrates (including Odonata) were sampled from 15 sites along a dry-land river in northwestern Zimbabwe to assess biotic responses to land use changes along the course of the river. The headwater sites were protected by a riparian corridor of native forest, but this was replaced by intensive subsistence agriculture in the mid-reaches while the lower reaches were located within a protected wildlife area with diverse and wide riparian forests. Canonical correspondence analysis indicated that intensive agricultural activities within the mid-reaches caused severe degradation of the stream physical habitat through increased fine sediment deposition. This coincided with a significant decline in macroinvertebrate richness, diversity, and abundance at the agriculturally impacted mid-reach sites. The presence of wide riparian zones at the lower river sites resulted in significant improvements in stream physical habitat quality, and this was paralleled by significant recovery or reappearance of taxa that had disappeared from the mid-reaches. We suggest that restoration of the riparian vegetation within the mid-reaches of the Nyadza River would lead to improved physical habitat and biotic health of this dry-land river." (Authors)] Address: Chakona, A., University of Zimbabwe Lake Kariba Research Station, PO Box 48, Kariba, Zimbabwe. E-mail: achakona@yahoo.com

8252. Chaplin, G.I.; Valentine, J.F. (2009): Macroinvertebrate production in the submerged aquatic vegetation of the Mobile-Tensaw Delta: Effects of an exotic species at the base of an estuarine food web. *Estuaries and Coasts* 32(2): 319-332. (in English) ["This study, conducted in 1997, reports the first estimates of the im-

pacts of the proliferation of an exotic submerged aquatic vegetation (SAV) species (*Myriophyllum spicatum*) on macroinvertebrate production via comparisons with two co-occurring native SAV species (*Heteranthera dubia* and *Vallisneria spiralis*) in the tide-influenced Mobile-Tensaw Delta (located in the north-central Gulf of Mexico, 30°40' N, 87°55' W). Production of macroinvertebrates was greatest on *M. spicatum* and *H. dubia* and least on *V. americana*. The key determinant of these differences was a greater abundance of amphipods (*Gammarus mucronatus*) found on the leaves of *M. spicatum* and *H. dubia*. Macroinvertebrate production on *M. spicatum* was three times greater (>1 kg m⁻² year⁻¹) than on either of the native SAV species. No-choice palatability tests showed that these differences could not be attributed to differences in invertebrate grazing on these plants. Instead, it is probable that the high production within the structurally complex *M. spicatum* and *H. dubia* was the result of reduced predator foraging efficiency. If true, then the presence of this exotic species probably renders this elevated production inaccessible to most high-order predators." (Authors) Odonata are treated at the suborder level.] Address: Valentine, J.F., Department of Marine Science, University of South Alabama, Mobile, AL 36688, USA. Email: jvalentine@disl.org

8253. Chase, J.M.; Suhlman, R.S. (2009): Wetland isolation facilitates larval mosquito density through the reduction of predators. *Ecological Entomology* 34: 741-747. (in English) ["1. Wetlands harbour high biodiversity and offer important ecosystem services, but they are also a habitat for mosquito larvae (Diptera: Culicidae), which are important disease vectors. 2. Isolation among remnant, or newly created wetlands and ponds, and their consequent density in the landscape, is a key factor that can influence a variety of food web processes, including effects on mosquitoes which are important prey to many predators. 3. We assess the impact of habitat isolation on the density of pond-breeding mosquitoes (several *Anopheles* and *Culex* species) both directly and indirectly through the food web. 4. Results from structural equation modelling of survey data shows that larval mosquitoes are denser in ponds that are more isolated from one another, and that this result was primarily driven indirectly by a reduction of larval mosquito predators (e.g. predaceous insects and amphibians). Furthermore, results from a long-term mesocosm experiment factorially manipulating isolation and predator reduction show that the effect of isolation on mosquito density was eliminated when predators were experimentally reduced. 5. It is concluded that metacommunity processes, both directly and indirectly mediated through predators, can play an important role in the local abundance of wetland breeding mosquitoes and possibly the diseases they spread." (Authors) Mosquito predators are primarily insects in the orders Hemiptera, Odonata, and Coleoptera, as well as salamanders and newts. Their biomass was converted to dry-weight biomass using species-specific conversions.] Address: Chase, J.M., Dept of Biology and Tyson Research Center, Washington University in St. Louis, Saint Louis, MO 63130, USA. E-mail: jchase@wustl.edu

8254. Chase, J.M.; Biro, E.G.; Ryberg, W.A.; Smith, K.G. (2009): Predators temper the relative importance of stochastic processes in the assembly of prey metacommunities. *Ecology Letters* 12(11): 1210-1218. (in English) [St Louis, Missouri, USA. "Communities as-

semble through a combination of stochastic processes, which can make environmentally similar communities divergent (high β -diversity), and deterministic processes, which can make environmentally similar communities convergent (low β -diversity). Top predators can influence both stochasticity (e.g. colonization and extinction events) and determinism (e.g. size of the realized species pool), in community assembly, and thus their net effect is unknown. We investigated how predatory fish influenced the scaling of prey diversity in ponds at local and regional spatial scales. While fish reduced both local and regional richness, their effects were markedly more intense at the regional scale. Underlying this result was that the presence of fish made localities within metacommunities more similar in their community composition (lower β -diversity), suggesting that fish enhance the deterministic, relative to the stochastic, components of community assembly. Thus, the presence of predators can alter fundamental mechanisms of community assembly and the scaling of diversity within metacommunities." (Authors) The following taxa are listed in the supporting material to the paper: *Aeshna canadensis*, *Epiaeschna heros*, *Tetragoneuria synosura*, *Erythemis simplicicollis*, *Libellula cyanea*, *L. incesta*, *L. pulchella*, *Pachydiplax longipennis*, *Pantala hymenaea*, *Perithemis tenera*, *Plathemis lydia*, *Sympetrum rubicundum*, *S. corruptum*, *Tramea lacerata*, *Archilestes grandis*, *Lestes disjunctus*, *Ischnura* sp., *Enallagma* sp. 1, *Enallagma* sp. 2, and *Argia* sp.] Address: Chase, J.M., Department of Biology and Tyson Research Center, Washington University in St. Louis, 1 Brookings Drive, St Louis, MO 63130, USA. E-mail: jchase@wustl.edu

8255. Chelmick, D. (2009): Species Review 2: The Orange-spotted Emerald Dragonfly *Oxygastra curtisii* (Dale 1834). *J. Br. Dragonfly Society* 25(2): 76-93. (in English) ["This review deals with *O. curtisii*, [...] which is locally common in the Iberian peninsula and France south of the 48° parallel. It is endemic to the western Palearctic. In northern Europe it is very local and was last recorded in the UK in 1963. It is the only southern endemic riparian dragonfly to have occurred in the UK and probably became extinct here by a combination of habitat degradation and the extreme winter of 1962/63." (Author) The paper discusses the chances to rediscover the species in UK] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

8256. Chelmick, D.G.; Moore, N.W. (2009): The Scarce Emerald Damselfly *Lestes dryas* Kirby in East Sussex 1940 to 2007: an account of species extinction through changing agricultural practice. *J. Br. Dragonfly Society* 25(1): 27-40. (in English) ["*L. dryas* is a very local damselfly which, in England, is found only in a few localities in the extreme east, mainly in coastal areas. In the 1940's NWM discovered this species in East Sussex and carried out a detailed survey. DGC has visited the historical NWM sites and recorded the fauna now present. This paper covers a period of 67 years and compares the historical and modern habitat and faunal information. The paper first outlines the life history and distribution of *L. dryas* and, from these perspectives, considers how changes in agricultural practice have led to the extinction of *L. dryas* in East Sussex." (Authors)] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

- 8257.** Chen, T.-H.; Lue, K.-Y. (2009): Changes in the population structure and diet of the Chinese Stripe-Necked Turtle (*Mauremys sinensis*) inhabiting a disturbed river in northern Taiwan. *Zoological Studies* 48(1): 95-105. (in English) ["*Mauremys (Ocadia) sinensis* was investigated in the Keelung River, northern Taiwan, following severe habitat disturbances. "During a 2-yr levee construction and channel dredging project, the physical characteristics and riparian vegetation of the river were dramatically altered. Compared with results obtained prior to the disturbance, sex ratios were significantly skewed toward males, and the proportion of larger females significantly decreased both during and after project construction. Moreover, fewer small-sized juveniles were found following the construction disturbance. The diet of *M. sinensis* also changed, with plant materials assuming greater importance than they had prior to the disturbance. Furthermore, the mean volume of food ingested decreased both during and after the project. This tendency was more pronounced in females than males. Dietary overlap indices between the sexes during (0.591) and after (0.922) the project suggest that intraspecific food competition increased throughout the duration of the study." (Authors) Odonata contribute less than 0.1% to diet of the turtle.] Address: Chen, Tien-Hsi, Department of Life Science, National Taiwan Normal University, Taipei 116, Taiwan. E-mail: cuora.flavo@msa.hinet.net
- 8258.** Chin, K.S.; Taylor, P.D. (2009): Interactive effects of distance and matrix on the movements of a peatland dragonfly. *Ecography* 32(5): 715-722. (in English) ["We conducted a mark-release-recapture survey of *Leucorrhinia hudsonica* in each of two years (2002; 2003) in a harvested forest landscape in western Newfoundland, Canada. The odds of an individual male moving between peatlands was influenced by both the distance between peatlands and the type of intervening habitat (the matrix). Specifically, at meso scales (>700 m) there was a positive effect of the amount of cut matrix between peatlands on the odds of moving, but at fine scales (<700 m) there was the opposite effect; proportionally fewer individuals moved between peatlands. The odds of moving out of a peatland decreased as the surface area of water in the peatland increased. Multi-state mark-recapture models showed that the daily probability of a male moving between any two peatlands was 1.9% in 2002 and 6.9% in 2003 (n=1527 and 1280 marked individuals). The results suggest that additional empirical studies that directly measure patterns of movement with respect to landscape structure at multiple spatial scales in other taxa and situations are needed in order to uncover other possible non-linear changes in behaviour." (Authors)] Address: Chin, Krista, Dept of Biology, Acadia Univ., 24 Univ. Ave., Wolfville, NS B4P 2R6, Canada. E-mail: 057448c@acadiau.ca
- 8259.** Clancy, S.P. (2009): Reports from Costal Stations - 2008: Dungeness area, Kent. *Atropos* 36: 47. (in English) [UK; *Anax parthenope*, *Sympetrum fonscolombii*, *Erythromma viridulum*] Address: not stated
- 8260.** Colding, J.; Lundberg, J.; Lundberg, S.; Andersson, E. (2009): Golf courses and wetland fauna. *Ecological Applications* 19(6): 1481-1491. (in English) ["Golf courses are often considered to be chemical-intensive ecosystems with negative impacts on fauna. Here we provide evidence that golf courses can contribute to the support and conservation of wetland fauna, i.e., amphibians and macroinvertebrates. Comparisons of amphibian occurrence, diversity of macroinvertebrates, and occurrence of species of conservation concern were made between permanent freshwater ponds surveyed on golf courses around Sweden's capital city, Stockholm, and off-course ponds in natureprotected areas and residential parklands. A total of 71 macroinvertebrate species were recorded in the field study, with no significant difference between golf course ponds and offcourse ponds at the species, genus, or family levels. A within-group similarities test showed that golf course ponds have a more homogenous species composition than ponds in natureprotected areas and ponds in residential parkland. Within the macroinvertebrate group, a total of 11 species of odonates were identified, with no difference detected between the categories of ponds, nor any spatial autocorrelation. [...] Among macroinvertebrates of conservation status, *Leucorrhinia pectoralis* was only detected in golf course ponds, and *Tricholeiochiton fagesi* (Trichoptera) was only found in one off-course pond. GIS results revealed that golf courses provide over a quarter of all available permanent, freshwater ponds in central greater Stockholm. We assert that golf courses have the potential to contribute to wetland fauna support, particularly in urban settings where they may significantly contribute to wetland creation. We propose a greater involvement of ecologists in the design of golf courses to further bolster this potential." (Authors)] Address: Colding, J., The Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, Box 50005, 104 05 Stockholm, Sweden. E-mail: Johanc@beijer.kva.se
- 8261.** Collier, K.J.; Hamer, M.; Chadderton, W.L. (2009): A new substrate for sampling deep river macroinvertebrates. *New Zealand Natural Sciences* 34: 49-61. (in English) ["We compared macroinvertebrate communities colonising multiplate samplers constructed from perspex or tempered hardboard (wood) with an alternative artificial substrate constructed from folded coconut fibre matting (coir) enclosed in nylon netting. Substrates were incubated for 62 days over January to March 2007 at six sites over 240 km along the Waikato River. The three substrates supported similar numbers of invertebrate taxa (27 - 29 taxa), but coir samples contained 71% of total invertebrate numbers from all substrates combined, compared with <17% for each type of multiplate sampler. Coir faunas were heavily dominated by the hydrobiid snail *Potamopyrgus* (84 % of numbers), and this taxon along with the amphipod *Paracalliope* comprised 58 - 66 % of invertebrates on both types of multiplate samplers. Analysis of a Bray-Curtis matrix suggested statistically significant differences in percent community composition between coir samplers and each type of multiplate sampler over the late summer study period. Densities per cm³ of Oligochaeta, Mollusca, and "other worms" (Platyhelminthes, Rhabdocoela, Nemertea and Hirudinea combined) were significantly higher in coir samples than one or both of the multiplate samplers. Results suggest coir samplers may provide a useful supplement to multiplate samplers for deep river invertebrate studies by collecting a different range of taxa, including those favouring cover and characteristic of depositional environments." (Authors) One specimen of *Hemicordulia* sp. was found in coir; *Xanthocnemis* sp. was represented in all substrates without significant differences.] Address: Collier, K.J., Environment Waikato, PO Box 4010, Hamilton, New Zealand. E-mail: kevin.collier@ew.govt.nz

8262. Coram, R.A.; Nel, A. (2009): A new petalurid dragonfly from the Lower Cretaceous of southern England (Odonata: Petalurida: ?Cretapetaluridae). *Palaeodiversity* 2: 205-208. (in English, with German summary) ["The new petalurid genus and species *Anglopetalura magnifica* n. gen., n. sp. is described from the Lower Cretaceous of southern England, and tentatively attributed to the Mesozoic family Cretapetaluridae, already known by two genera from the Lower Cretaceous Crato Formation of Brazil." (Authors).] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

8263. Cordoba-Aguilar, A. (2009): A female evolutionary response when survival is at risk: male harassment mediates early reallocation of resources to increase egg number and size. *Behavioral Ecology and Sociobiology* 63(5): 751-763. (in English) ["One unexplored area in sexual conflict studies is the female physiological costs and possible resource reallocation that accompany evolutionary costs due to male harassment. Using females of the damselfly *Hetaerina americana*, I first investigated whether male harassment affected female mating rate and survival and explored whether such effects induced a resource allocation from immunity (in the form of phenoloxidase activity) and muscular fat reserves to egg number and size. Using two seasons that differed in male harassment, it was found that the higher the male harassment, the fewer are the female matings and the lower is the female survival. These results were corroborated using an experimental approach in which a situation of high male harassment was induced. It was also found that when the first mating takes place and at high male harassment, females had more reduced phenoloxidase activity and fat reserves and tended to lay most of the eggs they produce in their lifetime and these were considerably large. However, at low male harassment, egg number and size were more equally produced across matings. Females under high male harassment seemed to suffer the survival costs but may show a plastic evolutionary response of reallocating resources to egg traits to maximize fitness." (Author)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

8264. Córdoba-Aguilar, A.; Raihani, G.; Serrano-Meneses, M.A.; Contreras-Garduño, J. (2009): The lek mating system of *Hetaerina* damselflies (Insecta: Calopterygidae). *Behaviour* 146(2): 189-207. (in English) ["We investigated whether territorial males of *Hetaerina* damselflies show lekking behaviour using experimental techniques and observations: (i) we altered potential vegetation substrates to determine whether this affected the number of female visitations and matings; (ii) by removing territorial males and allowing other males to occupy the territory, we determined whether females changed their visitation and mating number; (iii) we observed whether vegetation substrates were present and used, and whether lighting conditions affected male territorial behaviour; (iv) we documented female pre- and post-copulatory behaviour to examine whether female choice occurred; and (v) we investigated whether male traits were linked to mating success. Our results revealed that (1) vegetation substrates were rarely found in territories and even when vegetation was present, it did not affect female visitation and mating number; (2)

males constantly moved to more illuminated places and females had little opportunity to exert choice due to harassment from males; (3) females oviposited outside territories; and (4) males with larger wing pigmentation and body size obtained a larger mating number because they were more likely to acquire a territory and/or displace other males while in tandem. This is the first documented evidence that odonate males display a lek mating system." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

8265. Cordoba-Aguilar, A.; Serrano-Meneses, A.; Cordero-Rivera, A. (2009): Copulation duration in nonterritorial Odonate species lasts longer than in territorial species. *Ann. Entomol. Soc. Am.* 102(4): 694-701. (in English) ["We tested whether long copulation duration is more likely to have evolved in nonterritorial odonate species than in territorial species, given that nonterritorial males do not incur the costs of territory defense. A phylogenetic comparative method that controls for the phylogenetic nonindependence of species was used to compare copulation duration among 46 species of the two main odonate suborders (Anisoptera and Zygoptera). Copulation duration of nonterritorial anisopteran species was longer than for territorial dragonflies; however, this relationship was not found for Zygoptera. Long copulations in Anisoptera may be related to a male's ability to manipulate a female's stored sperm. It is suggested that constraints that prevent a territorial male from lengthening copulation do not seem to operate in Zygoptera. Other selective processes (i.e., cryptic female choice and/or sexual conflict) may also be important determinants of copulation duration in the Zygoptera. To our knowledge, this is the first exploration of the relation copulation duration and mating systems in insects.] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biologicas, Universidad Autonoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

8266. Cordoba-Aguilar, A. (2009): Seasonal variation in genital and body size, sperm displacement ability, female mating rate, and male harassment in two calopterygid damselflies (Odonata: Calopterygidae). *Biological Journal of the Linnean Society* 96(4): 815-829. (in English) ["Sperm competition is a pervasive force. One adaptation is the male ability to displace the rivals' sperm that females have stored from previous copulations. In the damselfly, *Calopteryx haemorrhoidalis asturica*, males with wider aedeagi displace more spermathecal sperm. The present study documents that the same mechanism operates in another damselfly, *Hetaerina americana*. However, this genital width in both species decreases along the season, but late-emerging females have more sperm displaced than early-emerging females. Because territorial males mated more and were larger in body and genital size than nonterritorial males, late-season females mated with considerably larger males with respect to female size and this produced higher sperm displacement. Assuming female benefits from storing sperm but that such benefit does not prevail if males displace sperm, it is predicted that, along the season, females will mate less and male harassment (in terms of male mating attempts and oviposition duration) will increase. These predictions were cor-

roborated. In *H. americana*, it was also tested whether spermathecal sperm became less viable along the season. The results obtained did not corroborate this. This is the first evidence indicating that season affects sperm displacement ability and female mating frequency due to changes in male body and genital size." (Author)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

8267. Córdova, S.; Gaete, H.; Aránguiz, F.; Figueroa, R. (2009): Evaluación de la calidad de las aguas del estero Limache (Chile central), mediante bioindicadores y bioensayos. *Lat. Am. J. Aquat. Res.* 37(2): 199-209. (in Spanish, with English summary) ["The water quality in the Limache stream was evaluated at five sampling stations during the period of low water flow. At each station, aquatic macroinvertebrates were collected and the following parameters were measured in situ: pH, conductivity, dissolved oxygen, and total dissolved solids. The biological oxygen demand, total phosphorus, and total nitrogen were determined in the laboratory. Water toxicity was determined through toxicity bioassays with the microalga *Pseudokirchneriella subcapitata*. Thirty-three macroinvertebrate families were found and the dominant taxa were Dugessidae, Oligochaeta and Chironomidae. A significant correlation was found among the Family Biotic Index ChFBI, conductivity, and total dissolved solids ($r = 0.92$; $p < 0.05$). Species diversity was lowest, as was the growth rate of *P. subcapitata*, at the stations with the greatest anthropogenic activity and in the discharge zone of a domestic wastewater treatment plant." (Authors) The taxa list includes indetermined specimens of Gomphidae and Coenagrionidae.] Address: Gaete, H., Departamento de Biología y Ciencias Ambientales, Facultad de Ciencias, Universidad de Valparaíso, Av. Gran Bretaña 1111, Playa Ancha, Valparaíso, Chile. E-mail: hernan.gaete@uv.cl

8268. Cortezzi, S.S.; Bispo, P.; Paciencia, G.; Leite, R.C. (2009): Influência da ação antrópica sobre a fauna de macroinvertebrados aquáticos em riachos de uma região de cerrado do sudoeste do Estado de São Paulo. *Iheringia, Sér. Zool.* 99(1): 36-43. (in Portuguese, with English summary) [Macroinvertebrate colonisation of standardized pebble packages at nine stations in the headwaters of the Ribeirão Água do Cervo (the main water supplier of the city of Assis, Brazil). After twenty-five days of exposure, the packages were removed from the stream. The macroinvertebrates associated to each of the pebble packages were identified. Biodiversity was lowest at the most impacted station. No significant trade-off between the physicochemical factors and the fauna were detected. It is concluded that anthropogenic impacts can be identified by the fauna. Taxa including Odonata are treated using the morphospecies concept.] Address: Cortezzi, Sara, Laboratório de Biologia Aquática, Departamento de Ciências Biológicas, Faculdade de Ciências e Letras de Assis, Universidade Estadual, Paulista. Av. Dom Antônio, 2100, Parque Universitário, 19806-900 Assis, SP, Brasil. E-mail: saracortezzi@yahoo.com.br

8269. Costa, J.M.; Santos, T.C. (2009): Description of the larva of *Orthemis schmidti* (Odonata, Libellulidae). *Iheringia, Sér. Zool.* 99(2): 129-131. (in English, with Portuguese summary) ["The larva of *O. schmidti* is described and illustrated for the first time based on one

specimen from the northeastern region Brazil. Diagnostic characters which separate this larva from known larvae of other congeners are mentioned, and some notes on the habitat of the species are presented." (Authors)] Address: Costa, J.M., Depto de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@globocom

8270. Crick, K. (2009): Variations in key features of the final instar larvae and exuviae of the Azure Damsel-fly *Coenagrion puella* (Linnaeus). *J. Br. Dragonfly Society* 25(1): 16-26. (in English) ["A number of key features used for species identification of zygopteran final instar larvae and exuviae, published in the United Kingdom can be shown to have levels of variability exceeding the published limits. This paper seeks to record those variations as they apply to *Coenagrion puella*, based on the population contained within the Blackwater Valley catchment area located on the Hampshire/Berkshire border; outlining in detail specific variations found through close examination of 387 individuals. The features addressed include the species-specific characteristics of the caudal lamellae, the prementum and the post ocular region of the head; also some that are not found in current published keys, such as the setae on the labial palps and the lateral carinae on the second abdominal segment. The need to address a combination of key factors and to be aware of the areas of morphology where significant variations occur within species cannot be over emphasised." (Author) In fig. 5, the prementum of *C. puella* and *Ceriagrion tenellum* are transposed.] Address: Crick, K., 29 Village Way, Yateley, Hants, GU46 7SE, UK

8271. Czachorowski, S.; Czachorowski, P. (2009): New localities of *Nehalennia speciosa* (Charpentier, 1840) in the vicinity of Dobre Miasto (north-eastern Poland). *Odonatrix* 5(2): 45-47. (in Polish, with English summary) ["*N. speciosa* is one of the most endangered dragonfly species in Europe. In July 2008, two new localities were recorded. Adults were observed in shore vegetation of two water bodies near Dobre Miasto (north of Olsztyn, Masurian Lakeland), in the area planned to be included in the Natura 2000 network. Together with *N. speciosa* occurred: *Leucorrhinia albifrons*, *Aeshna grandis*, *Cordulia aenea*, *Erythromma najas*, *Coenagrion puella*, *Ischnura elegans*, *Lestes virens*, *Enallagma cyathigerum*." (Authors)] Address: Czachorowski, S., Katedra Ekologii i Ochrony Środowiska, Uniwersytet Warmińsko-Mazurski w Olsztynie, Pl. Łódzki 3, 10-727 Olsztyn, Poland. E-mail: stanislaw.czachorowski@uwm.edu.pl

8272. Daraż, B. (2009): Dragonflies (Odonata) of the Przemysl Foothills and adjacent areas along the San River. *Wiad. entomol.* 28(1): 5-32. (in Polish, with English summary) ["Studies were carried out at 36 localities in Pogórze Przemyskie (the Przemysl Foothills) and adjacent areas along the San River (SE Poland) in the years 2004-2007. 54 species of dragonflies (74% of the Polish dragonfly fauna) were recorded, among them: a) *Nehalennia speciosa* in a highly isolated population, currently situated at the southern border of the species distribution, b) *Crocothemis erythraea* at 5 localities, autochthonous at least at two of them, abundant at one site, and with a probable second generation, c) *Cordulegaster bidentata*, widespread at many localities, d) *Leucorrhinia albifrons* and *L. caudalis* at the southern

border of their distribution, the latter species being extremely rare at these latitudes, e) *L. pectoralis*, rare in southern Poland, f) several thermophilous species as e.g. *Aeshna affinis*, *Orthetrum brunneum*, *O. albistylum*, *Sympetrum meridionale*. The species composition of the odonate fauna and the occurrence of some species are commented on and discussed with reference to the geographical position of the area and the habitat spectrum. Conservation aspects are presented and assessed and some conservation measures are proposed." (Author)] Address: Daraz, B., ul. Kościelna 41, 35-505 Rzeszów; Poland. E-mail: bdaraz@poczta.onet.pl

8273. Dargent, T.; Bao, X.-q.; Grondel, S.; Le Brun, G.; Paquet, J.B.; Soyer, C.; Cattan, E. (2009): Micromachining of an SU-8 flapping-wing flying micro-electro-mechanical system. *J. Micromech. Microeng.* 19, 085028 (doi:10.1088/0960-1317/19/8/085028): 10 pp. (in English) ["This paper presents a feasibility step in the development of an ultra-small biomimetic flying machine. Advanced engineering technologies available for applications such as the micro-electro-mechanical system (MEMS) technologies are used. To achieve this goal, a flapping-wing flying MEMS concept and design inspired from insects is first described. Actuators and an actuation way for the control over the wing kinematics are proposed. The initial concepts are subsequently analyzed and presented using multi-body and finite element models. An overview of SU-8 photoresist structures and their functions in the future micro-robot insect is then presented. Consequently, micromachining enables the implementation of a flying MEMS. It is also demonstrated that the structure can be made at insect sizes and actuated at low power inputs. Moreover, the flapping frequency obtained is within the flapping frequency range of wings of many common insects of millimetric dimensions. Such prototypes are of interest as tools to artificially recreate and study insect flight with characteristics, similar to those of insects, that are able to produce lift and hover. Finally, if a micro-battery, wireless receivers, microcontrollers, sensors and actuators can all be fitted onto chips only a few millimeters square, with a mass in the order of milligrams, then we believe that an insect-size flying MEMS can be realized. All these requirements can now be achieved due to advanced engineering methods." (Authors) The publication includes references to Odonata.] Address: Cattan, E., Université Lille Nord de France, F-59000 Lille, France. E-mail: eric.cattan@univ-valenciennes.fr

8274. Darvizeh, M.; Darvizeh, A.; Rajabi, H.; Rezaei, A. (2009): Free vibration analysis of dragonfly wings using finite element method. *The International Journal of Multiphysics* 3(1): 101-110. (in English) ["In the present work, investigations on the microstructure and mechanical properties of the dragonfly wing are carried out and numerical modeling based on Finite Element Method (FEM) is developed to predict flight characteristics of dragonfly wings. Vibrational behaviour of wings type structures is immensely important in analysis, design and manufacturing of similar engineering structures. For this purpose natural frequencies and mode shapes are calculated. In addition, the kind of deformation in each mode shape evaluated and the ratio between numerical natural frequency and experimental natural frequency presented as damping ratio. The results obtained from present method are in good agreement with same experimental methods."] Address: Guilan University, Iran

8275. de Oliveira, D.E.; de Marco Júnior, P. (2009): Is there a trade-off between the melanin allocated to the immune system and to camouflage on larvae of the dragonfly *Micrathyrja catenata* Calvert, 1909 (Odonata: Libellulidae)? *Neotropical Biology and Conservation* 4 (3): 133-136. (in English, with Portuguese summary) ["In insects, the immune system responds to the presence of antigens involving them in melanin. However, the melanin is also allocated into the exoskeleton's pigmentation, used to camouflage. We aimed to test the existence of a trade-off between the allocation of melanin to the immune system and to camouflage on the larvae of *M. catenata*. We conducted the study in the "Reserva do km 41" (41 km' Reserve), 80 km distant from Manaus, Amazonas, Brazil. We implanted a nylon line into the abdomen of 30 larvae and observed if had or not deposition of melanin in the line. We counted the number of individuals who responded to implant depositing melanin and, later, we took photos of the larvae's heads and calculate gray intensity. We used a t-test for independent samples. 76% of larvae responded to treatment depositing melanin on the implants. There were no significant differences in the intensity of gray between the larvae that responded to the implants and those who did not responded. There is no trade-off to allocation of melanin for camouflage and for the immune system. This should happen because the immune system is not limited by the acquisition of resources or the camouflage's demand for melanin is not enough to influence the immune system." (Authors)] Address: de Oliveira, D.E., Programa de Pós-Graduação em Biologia Animal, Instituto de Ciências Biológicas, Sala AT 159, Campus Universitário Darcy Ribeiro, Universidade de Brasília, 70910-900, Asa Norte, Brasília, DF, Brazil. E-mail: daniloelo@gmail.com

8276. Deans, M. (2009): Reports from Costal Stations - 2008: Bawdsey Peninsula, Suffolk. *Atropos* 36: 53-54. (in English) [UK; *Erythromma viridulum*, *Sympetrum striolatum* (at a light trap)] Address: not stated

8277. Delevati Colpo, K.; Brasil, M.T.; Vielmo Camargo, B. (2009): Macroinvertebrados bentônicos como indicadores do impacto ambiental promovido pelos efluentes de áreas orizícolas e pelos de origem urbana/industrial. *Ciência Rural* 39(7): 2087-2092. (in Portuguese, with English summary) [Cachoeirinha, Rio Grande do Sul, Brazil; Benthic macroinvertebrates as indicators of environmental impact promoted by rice crop flood and by urban/industrial effluents. Table 1 includes data on the abundance of "Anisoptera".] Address: Delevati Colpo, Karine, Depto de Ciências Biol., Univ. Regional Integrada do Alto Uruguai e das Missões (URI), Campus de Santiago. Av. Batista Bonoto Sobrinho, 97700-000, Santiago, RS, Brasil. E-mail: kacolpo@gmail.com

8278. Demarez, L. (2009): Eerste waarneming van eiafzetting bij Zuidelijke keizerlibel (*Anax parthenope*) in Vlaanderen, Het Vinne 30 juli 2008 [First observation of ovipositing *Anax parthenope* in Flanders]. *Nieuwsbrief Libellenvereniging Vlaanderen* 3(2): 2-3. (in Dutch, with English summary) ["Although in Flanders, Belgium *A. parthenope* has been observed quite a few times during the last years, and populations being suspected, real reproduction had not yet been proven. The author describes an observation of a pair ovipositing in tandem at the nature reserve Het Vinne in Zoutleeuw." (Author)] Address: Demarez, L., Ooststraat 2, 8890 Moorslede, Belgium. E-mail: leendemarez@telenet.be

8279. Dibble, E.D.; Thomaz, S.M. (2009): Use of fractal dimension to assess habitat complexity and its influence on dominant invertebrates inhabiting tropical and temperate macrophytes. *Journal of Freshwater Ecology* 24(1): 93-102. (in English) ["We evaluated the feasibility of using fractal geometry to measure the structural complexity innate to 11 species of temperate and tropical macrophytes. The efficacy of fractal dimension (D) as a surrogate of plant complexity was tested by using D values to predict the density of two dominant invertebrate taxa (Annelida and Odonata). Plants and invertebrates were collected from lagoons in the upper Parana River, Brazil, and from a lake in central Minnesota, USA. Fractal dimensions varied from 1.16 (SD=0.03) in *Potamogeton illinoensis* to 1.68 in *Najas conferta* (SD=0.07) and *Myriophyllum spicatum* (SD=0.02). Spatial scale did not affect D values, since the results obtained for pictures taken at 25 cm², 100 cm² and 600 cm² did not differ for five tropical species. Using the results of D recorded at 100 cm², a positive and significant relationship between plant complexity and Annelida and Odonata densities was observed. The biological significance of the positive correlations between D and invertebrate densities and the feasibility in calculating D make this method a potential candidate for measuring plant complexities at small scales."] (Authors)] Address: Dibble, E.D., Rm# 217, Thompson Hall, Department of Wildlife and Fisheries, Box 9690, Mississippi State, MS 39762-9690, USA. E-mail: edibble@cfr.msstate.edu

8280. Diomande, D.; Bony, K.Y.; Oi Edia, E.; Konan, K.F.; Gourène, G. (2009): Diversité des Macroinvertébrés Benthiques de la Rivière Agnébi (Côte d'Ivoire; Afrique de l'Ouest). *European Journal of Scientific Research* 35(3): 368-377. (in French, with English summary) [The middle stream range of the Agnébi, Ivory Coast (Pont Autoroute) was sampled monthly over 10 months, and covering the 4 local rainy seasons. Ten samples with an Ekman grab resulted in the record of 50 taxa (Oligochetes: 2, molluscs: 14, and insects: 34 taxa). The following odonate taxa are listed: *Pseudagrion salisburyensis*, *Ictinogomphus*, *Lestiniogomphus angustus*, *Paragomphus*, *Phyllogomphus aethiops*, and *Phyllomacromia*.] Address: Diomandé, D. Laboratoire d'Environnement et Biologie Aquatique UFR Sciences et Gestion de l'Environnement, Université d'Abobo-Adjamé 02 BP 801 Abidjan 02, Ivory Coast. E-mail: diomdram@yahoo.fr

8281. Dominak, P.; Michalczuk, W. (2009): Two species of biting midges (Diptera: Ceratopogonidae) new to the Polish fauna. *Dipteron* 25: 8-13. (in Polish, with English summary) ["*Forcipomyia paludis* (Macfie, 1936) and *Monohelea estonica* Remm, 1965 are recorded from Poland for the first time. As a result the number of biting midges species in the Polish fauna increased to 215. Females are briefly diagnosed and illustrated, geographical distribution analysed and Odonata hosts of parasitic *F. paludis* reviewed."] (Author)] Address: Dominak, Patrycja, Katedra Zoologii Bezkręgowców Uniwersytetu Gdańskiego, Al. Marszałka Piłsudskiego 46, 81-378 Gdynia, Poland. E-mail: heliocopris@gmail.com

8282. Donoso, D.A.; Salazar, F.; Maza, F.; Cárdenas, R.E.; Dangles, O. (2009): Diversity and distribution of type specimens deposited in the Invertebrate section of the Museum of Zoology QCAZ, Quito, Ecuador. *Ann. soc. entomol. Fr. (n.s.)* 45(4): 437-454. (in English, with French summary) ["The Invertebrate section of the Mu-

seum of Zoology QCAZ at the Pontifical Catholic University of Ecuador in Quito maintains nearly two million curated specimens, and comprises Ecuador's largest collection of native taxa. We review 1902 type specimens from 6 subspecies and 320 species in 121 genera and 42 families, currently kept in the Museum. The list includes 116 holotypes, 10 allotypes, 1774 paratypes and 2 neoparatypes. The collection of type specimens is particularly strong in the Coleoptera (family Carabidae and Staphylinidae) and Hymenoptera. [...]. An analysis of the geographic distribution of type localities showed that collection sites are clustered geographically with most of them found towards the northern region of Ecuador, in Pichincha, Cotopaxi and Napo provinces. Sites are mainly located in highly accessible areas near highways and towns. Localities with a high number of type species include the cloud forest reserve Bosque Integral Otonga and Parque Nacional Yasuní in the Amazon rainforest near PUCE's Yasuní Scientific Station. Type localities are not well represented in the Ecuadorian National System of Protected Areas. Future fieldwork should include localities in the southern region of Ecuador but also target less accessible areas not located near highways or towns. We discuss the value of the collection as a source of information for conservation and biodiversity policies in Ecuador."] (Authors) Odonata are represented in the collection by the following type material: *Lestes jerrelli* Tennessen 1997. Paratype; *Oxyagrion tennesseni* Mauffray 1999. Paratype.; *Aeshna* (*Marmaraeschna*) *brevicercia* Muzón & Von Ellenrieder 2001. Holotype, paratype (= *Rhionaeschna brevicercia* (Muzón & von Ellenrieder, 2001)).] Address: Salazar, Fernanda, Museo de Zoología, Escuela de Ciencias Biológicas, Pontificia Universidad Católica del Ecuador, Av. 12 de Octubre 1076 y Roca, Apdo. 17-01-2184, Quito, Ecuador. E-mail: mafersalazar@yahoo.es

8283. Ebrahimi, A.; Madjdzadeh, S.M.; Mohammadian, H. (2009): Dragonflies (Odonata) from South-Eastern Iran. *Caspian Journal of Environmental Sciences* 7 (2): 107-112. (in English) [27 species of Odonata (528 specimens from more than 30 sites, 2006-2008) were collected in south-eastern Iran, Kerman province, in contrast to 11 species that were recorded previously from this region. 528 specimens were collected from more than 30 sites in Kerman province during 2006-2008. *Anax imperator* was first recorded for the central plateau of Iran. This species had been recorded only from northern part of Iran (Caspian Sea fringe).] Address: Ebrahimi, A., Dept. of Biology, Faculty of Sciences, Shahid Bahonar University, Kerman, Iran. E-mail: aebrahimi60@yahoo.com

8284. Edokpayi, C.A.; Uwadiae, R.E.; Oluwarotimi, O.T. (2009): The physicochemistry and phytomacrobenthic communities associated with *Pistia stratiotes* (L.) (Water Lettuce) in a non tidal creek within the University of Lagos, South-West, Nigeria. *Journal Sci. Res. Dev.* 11(2008 / 2009): 62-76. (in English) [Samples were collected monthly for six months (March-August, 2003). A total of 5,593 individuals (32 taxa) was dominated by Dipterans (53.21%) and Plecopterans (23.85%). Odonata (*Libellulidae*, "*Coenagrionidae*", "*Agriidae*") are represented by 5 specimens only.] Address: Edokpayi, C.A., Dept of Marine Sciences, University of Lagos, Nigeria

8285. El-Kazafy, A.T.; Yousry, A.B. (2009): The value of honey bees (*Apis mellifera*, L.) as pollinators of summer seed watermelon (*Citrullus lanatus* colothyn-

thoides L.) in Egypt. *Acta Biologica Szegediensis* 53(1): 33-37. (in English) [*Hemianax ephippiger* and *Ischnura senegalensis* are listed in Tab. 2 as pollinators on summer seed watermelon plants at Dessouk region, Kafr El-Sheikh Governorate during 2006 season.] Address: Economic Entomology Department, Faculty of Agriculture, Kafrelsheikh University, Kafr El-Sheikh, Egypt

8286. Ellenrieder, N. von; Molineri, C.; Emmerich, D. (2009): Odonata de Uruguay: lista de especies y nuevos registros. *Rev. Soc. Entomol. Argent.* 68(1-2): 227-230. (in Spanish, with English summary) ["A list of 70 species known to occur in Uruguay is given. 14 species are new country records: *Mnesarete pruinosa*, *Acanthagrion lancea*, *A. peruvianum*, *Argia serva*, and *Oxyagrion chapadense*, *Neoneura ethela*, *Progomphus costalis*, *Elasmothemis constricta*, *Erythrodiplax basalis*, *Erythrodiplax media*, *Micrathyria hypodidyma*, *Micrathyria ringueleti*, *Orthemis ambiginosa*, and *Perithemis icteropectera*." (Authors)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

8287. Ellenrieder, N. von; Garrison, R.W. (2009): Odonata. In: Domínguez, E. & H. R. Fernández (eds.). *Macroinvertebrados bentónicos sudamericanos. Publicación Especial N° X, Fundación Miguel Lillo, Tucumán, Argentina.* [ISBN 978-950-668-015-2]: 95-143. (in Spanish) [The larvae of South American taxa are keyed to the family level, the imagines to the genus level. Many illustrations demonstrate morphological characters on the species level. The chapter also includes morphological essentials and notes on observing and collecting Odonata.] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

8288. Endersby, I. (2009): Nomenclatural amendments to the current catalogue of Australian Odonata. *Australian Entomologist* 36(3): 99-101. (in English) ["Notes on the type depositories for seven species of libellulid dragonflies described by J.J. Kaup or F. Brauer from southeast Asia and recorded from Australia are provided, together with a note on the validity of the generic name *Tamea* Hagen." (Author) The paper bases on Schneider (2004), and considers *Gynacantha rosenbergi*, *Brachydiplax denticauda*, *B. duivenbodei*, *Raphisomia bispina*, *Neurothemis stigmatizans*, *Tamea loewii*, and *Macrodiplox cora*.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@mira.net

8289. Eroukhmanoff, F.; Outomuro, D.; Ocharan, F.J.; Svensson, E.I. (2009): Patterns of phenotypic divergence in wing covariance structure of calopterygid damselflies. *Evolutionary Biology* 36(2): 214-224. (in English) ["Comparing species differences in covariance patterns of traits subject to divergent selection pressures can increase our understanding to the mechanisms of phenotypic divergence. Different species of calopterygid damselflies have diverged in the melanized wing patch of males. This trait serves multiple ecological functions and has behavioural consequences in terms of sexual selection, interspecific interactions, reproductive isolation. We compared the phenotypic variance-covariance matrices (P) of wing traits among nine populations of four European species of calopterygid

damselflies. We found modest divergence in covariance structure among populations of the same species, but strong divergence between species. Interestingly, the orientation of the first eigenvector of P (P max) differed more between closely related species than between distantly related species, although this pattern was absent when overall covariance structures were compared. We also found that distantly related species but geographically closer had converged towards a similar covariance structure. Finally, divergence in covariance structure was correlated with divergence in wing patch length, but not with other wing traits. This last finding suggests that divergent selection on wing patch length might have affected the stability of P. These results indicate that P might not only reflect ancestral developmental pathways but might also be influenced by current ecology." (Authors) *Calopteryx splendens*, *C. xanthostoma*, *C. virgo meridionalis*, and *C. v. virgo*] Address: Eroukhmanoff, Fabrice, Section for Animal Ecology, Ecology Building, Lund University, 223 62 Lund, Sweden. E-mail: fabrice.eroukhmanoff@zoekol.lu.se

8290. Ferro, M.L.; Sites, R.W.; Vitheepadit, A. (2009): Contributions to the faunistics of Odonata in Thailand. *Insecta Mundi* 0104: 1-24. (in English) ["Distribution and habitat information are provided for 1578 adult specimens of Odonata representing 127 species in 70 genera and 16 families that were collected from 143 locations throughout Thailand. Of the species collected, 25 (20%) were represented by a single specimen, and 40 (31%) were collected from a single location. Collections were made at 49 lentic and 85 lotic sites, and an average of 6.9 and 6.6 species were collected at each site in each habitat, respectively." (Authors)] Address: Ferro, M.L., Louisiana State Arthropod Museum, Department of Entomology, LSU Agricultural Center, Baton Rouge, Louisiana, 70803, USA. E-mail: spongymesophyll@gmail.com

8291. Fillinger, U.; Sombroek, H.; Majambere, S.; van Loon, E.; Takken, W.; Lindsay, S.W. (2009): Identifying the most productive breeding sites for malaria mosquitoes in The Gambia. *Malaria Journal* 2009, 8:62: 14 pp. (in English) ["Background: Ideally larval control activities should be targeted at sites that generate the most adult vectors, thereby reducing operational costs. Despite the plethora of potential mosquito breeding sites found in the floodplains of the Gambia River, about 150 km from its mouth, during the rainy season, only a small proportion are colonized by anophelines on any day. This study aimed to determine the characteristics of larval habitats most frequently and most densely populated by anopheline larvae and to estimate the numbers of adults produced in different habitats. Methods: A case-control design was used to identify characteristics of sites with or without mosquitoes. Sites were surveyed for their physical water properties and invertebrate fauna. The characteristics of 83 sites with anopheline larvae (cases) and 75 sites without (controls) were collected between June and November 2005. Weekly adult productivity was estimated with emergence traps in water-bodies commonly containing larvae. Results: The presence of anopheline larvae was associated with high invertebrate diversity (Odds Ratio, OR 11.69, 95% CI 5.61-24.34, $p < 0.001$), the presence of emergent vegetation (OR 2.83, 95% CI 1.35-5.95, $p = 0.006$), and algae (at borderline significance; OR 1.87, 95% CI 0.96-3.618, $p = 0.065$). The density of larvae was reduced in sites that were larger than 100 m in

perimeter (OR 0.151; 95% CI 0.060–0.381, $p < 0.001$), where water was tidal (OR 0.232; 95% CI 0.101–0.533, $p = 0.001$), vegetation shaded over 25% of the habitat (OR 0.352; 95% CI 0.136–0.911, $p = 0.031$) and water conductivity was above 2,000 $\mu\text{S}/\text{cm}$ (OR 0.458; 95% CI 0.220–0.990, $p = 0.048$). Pools produced the highest numbers of *Anopheles gambiae* adults compared with rice fields, floodwater areas close to the edge of the floodplain or close to the river, and stream fringes. Pools were characterized by high water temperature and turbidity, low conductivity, increased presence of algae, and absence of tidal water. Conclusion: There are few breeding sites that produce a high number of adult vectors in the middle reaches of the river in The Gambia, whereas those with low productivity are larger in area and can be found throughout the rainy season. Even though risk factors could be identified for the presence and density of larvae and productivity of habitats, the results indicate that anti-larval interventions in this area of The Gambia cannot be targeted in space or time during the rainy season." (Authors) Odonata are treated at the order level.] Address: Fillinger, Ulrike, Disease Control & Vector Biology Unit, London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT, UK. E-mail: Ulrike.fillinger@lshtm.ac.uk;

8292. Fischer, C. (2009): *Enallagma cyathigerum* und *Ischnura elegans* als Kleptoparasiten in Spinnennetzen (Odonata: Coenagrionidae). *Libellula* 28(3/4): 183-186. (in German, with English summary) [Two observations near Starnberg, Bavaria, Germany, are portrayed, when one female *E. cyathigerum* and one male *I. elegans* successfully purloined prey items from spiders' webs.] Address: Fischer, Christine, Ammerseestr. 32, D-82061 Neuried, Germany

8293. Fleck, G.; Hamada, N.; Carvalho, A.L. (2009): A remarkable new genus and species of dragonfly (Odonata: Anisoptera: Libellulidae) from Brazil and notes on its bionomics and phylogenetic affinities. *Ann. soc. entomol. Fr. (n.s.)* 45(3): 275-284. (in English, with French summary) ["*Orionothemis felixorioni* n. gen., n. sp. from Bahia state, Brazil, is described and illustrated from larvae, reared adults and an immature adult male taken in association with its possible larval shuck. This taxon exhibits remarkable features among the Odonata, such as enormous dorsal and lateral spines perpendicular to the body axis, totally fused last abdominal segments in the larva, strongly differentiated and sexually dimorphic posterior legs, and the incompletely chitinized eighth abdominal tergite of the adult. *Orionothemis* is closely related to *Elasmothemis* (Neotropical) and *Onychothemis* (South-East Asia). The larvae were collected in the abundant immersed vegetation in a clear and cool stream in the Brazilian 'planalto' (central plateau) in an area that is endangered by deforestation and irrigation." (Authors)] Address: Hamada, N., Instituto Nacional de Pesquisas da Amazônia (INPA), Coordenação de Pesquisas em Entomologia (CPEN), Avenida André Araújo, n. 2936, CP 47, BR 69011-970, Manaus, AM, Brazil. E-mail: nhamada@inpa.gov.br

8294. Flenner, I.; Olne, K.; Suhling, F.; Sahlén, G. (2009): Predator-induced spine length and exocuticle thickness in *Leucorrhinia dubia* (Insecta: Odonata): a simple physiological trade-off? *Ecological Entomology* 34: 735-740. (in English) ["1. Morphological defence structures evolve against predators but are costly to the individual, and are induced only when required. A well-

studied example is the development of longer abdominal spines in dragonfly larvae in the presence of fish. Numerous attempts to discover trade-offs between spine size and behaviour, development time or body size have, however, produced little evidence. 2. We considered a physiological trade-off. Spines consist of cuticle and using material to build longer structures may result in less material remaining elsewhere. We therefore measured exocuticle thickness at nine locations on *Leucorrhinia dubia* larvae from habitats with and without fish. 3. Our results show a significant effect of the interaction between fish presence and spine length on head and fore leg exocuticle thickness. Relative thickness increased with relative length of lateral spine 9 in the absence of fish, whereas no such relationship existed with fish. Hence, synthesis and secretion of cuticle material occur as a trade-off when larvae react to fish presence. 4. We assume the mechanism to be a selective synthesis of material with different responses in different parts of the larval body. These findings offer a new angle to the fish/spine trade off debate.] Address: Sahlén, G., Halmstad University, P.O. Box 823, 30118 Halmstad, Sweden. E-mail: goran.sahlen@hh.se

8295. Fliedner, H. (2009): Two remarkable observations from Puerto Rico. *Argia* 21(1): 8-9. (in English) [Lucia Beach east of Yabucoa, eastern coast of Puerto Rico, 4-XII-2008]: *Crocothemis servilia*, which is a new addition to the regional fauna, and *Erythrodiplax umbrata*. This male is "noteworthy because of the irregularity of its wing pattern. On the left forewing the dark band is missing totally, on the right one there is only an irregular dark mark near the anterior margin, and the dark bands on the hindwings are much lighter at the rear. This asymmetrical lack of pigment may be due to an anomaly in development." (Author)] Address: Fliedner, H., Louis-Seegelken Str., D-28717 Bremen, Germany. E-mail: H.Fliedner@t-online.de

8296. Florencio, M.; Serrano, L.; Gomez-Rodriguez, C.; Millan, A.; Dyaz-Paniagua, C. (2009): Inter- and intra-annual variations of macroinvertebrate assemblages are related to the hydroperiod in Mediterranean temporary ponds. *Hydrobiologia* 634: 167-183. (in English) ["Macroinvertebrate assemblages of 22 temporary ponds with different hydroperiod were sampled monthly during a dry year (2005–2006) and a wet year (2006–2007). Coleopteran and Heteropteran adults were most abundant at the end of the hydroperiod, while Coleopteran larvae, mainly Dytiscidae, were mostly recorded in spring. Macroinvertebrate assemblages differed between study years. The shorter hydroperiod of ponds in the dry year constrained the length of the aquatic period for macroinvertebrates, and three distinct wet phases of community composition could be distinguished: filling phase, aquatic phase and drying phase. In the wet year, with a longer pond hydroperiod, five phases could be identified, with the aquatic phase differentiated into winter, early spring and late spring phases. Dispersers such as *Anisops sardeus*, *Berosus guttalis* or *Anacaena lutescens* were typical during the filling phase and *Corixa affinis* or *Enochrus fuscipennis* during the drying phase. The ponds with intermediate hydroperiod showed a similar composition (mainly dispersers) at the beginning and end of their wet period; this is not being seen in early drying or long hydroperiod ponds. A general pattern was detected, with similar variation between both years, which may be associated with the life histories of the macroinvertebrate taxa re-

corded." (Authors) 16 odonate species are listed. Odonata and Heteroptera included the highest number of species and individuals during both years." (Authors)] Address: Florencio, Margarita, Donana Biological Station-CSIC, P.O. Box 1056, 41080 Seville, Spain. E-mail: margarita@ebd.csic.es

8297. Fraker, M.E. (2009): Predation risk assessment by green frog (*Rana clamitans*) tadpoles through chemical cues produced by multiple prey. *Behav. Ecol. Sociobiol.* 63: 1397-1402. (in English) ["Many prey assess predation risk through predator chemical cues. Numerous studies have shown that (1) prey sometimes respond to chemical cues produced by heterospecifics and (2) that many species are capable of associative learning. This study extends this research by focusing on predation risk assessment and antipredator behaviour in environments containing chemical cues produced by multiple prey species. The results show that *R. clamitans* tadpoles (1) assess risk from the chemical cue produced during predation by a heterospecific (gray tree frog, *Hyla versicolor*, tadpoles) and (2) can exhibit similarly strong behavioral responses to a mix of conspecific and heterospecific cues compared to conspecific cue alone, depending on their conditioning environment. I then discuss how the prey choice of the predators and the relative abundances of the prey species should influence the informational value of heterospecific cues." (Authors) The tadpole-odonate larvae interaction was tested using *Anax junius*.] Address: Fraker, M.E., Department of Ecology and Evolutionary Biology, University of Michigan, 830 North University, Ann Arbor, MI 48109-1048, USA. E-mail: mfraker@umich.edu

8298. Funk, A.; Reckendorfer, W.; Kucera-Hirzinger, V.; Raab, R.; Schiemer, F. (2009): Aquatic diversity in a former floodplain: Remediation in an urban context. *Ecological Engineering* 35(10): 1476-1484. (in English) ["The Lobau, a former floodplain area of the Danube River situated within the city limits of Vienna (Austria), was strongly affected by the river regulation in 1875. The reduced hydrological connectivity led to an increasing loss of aquatic habitats. A water enhancement scheme with a maximum water input of 0.5 m³ s⁻¹ was initiated in 2001. The present study assesses the effect of this scheme on biodiversity using three target species groups – aquatic molluscs, dragonflies and fish – following a common Before-After Control-Impact design (BACI). Dragonflies and molluscs were positively affected, reflecting the habitat alterations in the system. For fish, no significant impact was observed. The aim of the scheme has been achieved: increased habitat diversity and improved habitat conditions for the system's initial community and further rheophilic / rheotolerant species. Water enhancement schemes can be effective remediation measures and deserve further attention in the management of urban wetlands." (Authors)] Address: Raab, R., Tech. Büro für Biol., Quadenstr. 13, A-2232 Deutsch-Wagram, Austria. E-mail: rainer.raab@gmx.at

8299. Gaenzle Schilling, E.; Loftin, C.S.; Hury, A.D. (2009): Macroinvertebrates as indicators of fish absence in naturally fishless lakes. *Freshwater Biology* 54 (1): 181-202. (in English) ["1. Little is known about native communities in naturally fishless lakes in eastern North America, a region where fish stocking has led to a decline in these habitats. 2. Our study objectives were to: (i) characterise and compare macroinvertebrate

communities in fishless lakes found in two biophysical regions of Maine (U.S.A.): kettle lakes in the eastern lowlands and foothills and headwater lakes in the central and western mountains; (ii) identify unique attributes of fishless lake macroinvertebrate communities compared to lakes with fish and (iii) develop a method to efficiently identify fishless lakes when thorough fish surveys are not possible. 3. We quantified macroinvertebrate community structure in the two physiographic fishless lake types (n = 8 kettle lakes; n = 8 headwater lakes) with submerged light traps and sweep nets. We also compared fishless lake macroinvertebrate communities to those in fish-containing lakes (n = 18) of similar size, location and maximum depth. We used nonmetric multidimensional scaling to assess differences in community structure and t-tests for taxon-specific comparisons between lakes. 4. Few differences in macroinvertebrate communities between the two physiographic fishless lake types were apparent. Fishless and fish-containing lakes had numerous differences in macroinvertebrate community structure, abundance, taxonomic composition and species richness. Fish presence or absence was a stronger determinant of community structure in our study than differences in physical conditions relating to lake origin and physiography. 5. Communities in fishless lakes were more speciose and abundant than in fish-containing lakes, especially taxa that are large, active and free-swimming. Families differing in abundance and taxonomic composition included Notonectidae, Corixidae, Gyrinidae, Dytiscidae, Aeshnidae, Libellulidae and Chaoboridae. 6. We identified six taxa unique to fishless lakes that are robust indicators of fish absence: *Graphoderus liberus*, *Hesperocorixa* spp., *Dineutus* spp., *Chaoborus americanus*, *Notonecta insulata* and *Callicorixa* spp. These taxa are collected most effectively with submerged light traps. 7. Naturally fishless lakes warrant conservation, because they provide habitat for a unique suite of organisms that thrive in the absence of fish predation." (Authors)] Address: Gaenzle Schilling, Emily, Department of Wildlife Ecology, University of Maine, 5755 Nutting Hall, Orono, ME 04469-5755, USA. E-mail: emily.schilling@umit.maine.edu

8300. Garrison, R.W. (2009): A synopsis of the genus *Telebasis* (Odonata: Coenagrionidae). *International Journal of Odonatology* 12(1): 1-121, 2 pls. (in English) ["In this synopsis all 50 species of the primarily neotropical genus *Telebasis* are keyed, diagnosed, and illustrated. *Helveciagrion* is considered a junior subjective synonym of *Telebasis*, *T. coccinata* a junior subjective synonym of *T. coccinea*, and *T. limoncocha* a junior subjective synonym of *T. griffinii*. Six new species from South America are described: *T. carvalhoi* (holotype male: Brazil, Pará State, Floresta Nacional de Carajás, Parauapebas, S11D-C, 6°02'59"S, 49°53'24"W, ix 2005, leg. N. Ferreira Jr., in UFRJ); *T. corbeti* (holotype male: Peru: Madre De Dios Department, Tambopata-Candamo Reserved Zone, Camp 3, Collpa, Río Tambopata west bank, 13°08'31"S, 69°36'46"W, 17 ix 1992, leg. M. Butt, in BNHM); *T. farcimentum* (holotype male: Colombia: Valle del Cauca Department, Cali, 3°26'14"N, 76°31'21"W, 01 viii 1972, leg. N.B. Stiles, in FSCA); *T. leptocyclus* (holotype male: Brazil: Rondônia State, Abuna, 9°42'S, 65°23'W, 112 m, 09 iii 1922, leg. J.H. Williamson, J.W. Strohm, in UMMZ); *T. levis* (holotype male: Guatemala, El Petén Department, Uaxactun, 03 v 1931, leg. A. Murie, in UMMZ); and *T. williamsoni* (holotype male: Colombia: Magdalena Department, El Banco, 9°02'50"N, 73°58'41"W, 46 m, 25 i 1917, leg. J.H.

Williamson, E.B. Williamson, in UMMZ)." (Author)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

8301. Gonzalez-Soriano, E.; Noguera, F.A.; Zaragoza-Caballero, S.; Ramirez-Garcia, E. (2009): Odonata de un bosque tropical caducifolio: sierra de San Javier, Sonora, Mexico. *Revista Mexicana de Biodiversidad* 80: 341-348. (in Spanish, with English summary) ["A faunistic survey of the Odonata from San Javier. Sonora, was undertaken during 7 months between November 2003 and October 2004. A total of 1012 specimens were collected belonging to 7 families. 27 genera, and 52 species. The family Libellulidae was the most diverse with 23 species, followed by Coenagrionidae (16), Gomphidae (5) and Aeshnidae (4). The least diverse families were Lestidae (2). Calopterygidae (1) and Coenagrionidae (1). The genus *Argia* was the dominant one with 10 species followed by *Enallagma* with 4. This diversity of this small area is outstanding, with 42.6% of all the species recorded for the state of Sonora." (Authors)] Address: Gonzalez-Soriano, E., Depto de Zool., Inst. de Biología, Univ. Nacional Autónoma de México. Avenida Universidad 3000, Ciudad Universitaria, 04510 México, D. F., México. E-mail: esoriano@ibiologia.unam.mx

8302. Gorb, S.N.; Tynkkyne, K.; Kotiaho, J.S. (2009): Crystalline wax coverage of the imaginal cuticle in *Calopteryx splendens* (Odonata: Calopterygidae). *International Journal of Odonatology* 12(2): 205-221. (in English) ["In this study we use high resolution SEM to describe the diversity of wax crystals and their distribution on different morphological structures in male individuals of *C. splendens*. The entire cuticle surface of this damselfly, with the exception of ommatidia and ocelli, is covered with crystalline wax in dimensions from submicron to micron range. It is shown that shape – rod-like, plate like, filamentous, etc. –, size, and density of crystals vary on different surfaces and in individuals of different ages. Additionally, we demonstrate different types of damage to the crystalline wax layer: scratches, compressions, wear, and contamination. The primary function of the wax crystalline coverage in odonates is, presumably, reduction of surface wettability by water (superhydrophobicity). However, other functions are also discussed, especially in such specialized body areas as postero-ventral parts of male abdomen, the so called 'lantern'." (Authors)] Address: Gorb, S.N., Department of Functional Morphology and Biomechanics, Zoological Institute, Christian Albrecht University of Kiel, Am Botanischen Garten 1-9, 24118 Kiel, Germany. E-mail: sgorb@zoologie.uni-kiel.de

8303. Hacet, N.; Aktaç, N. (2009): Contribution to the knowledge of Odonata fauna of Southern Marmara Region of Turkey. *Türk. entomol. derg.* 33(3): 171-178. (in English, with Turkish summary) [Records of 17 species and subspecies, collected in 1996, 2002 and 2003 from the Çanakkale and Yalova provinces situated in the Southern Marmara Region of Turkey are listed. *Libellula fulva* is a first record for the region. Species new for the Çanakkale and Yalova provinces are discussed.] Address: Hacet, Nurten, Trakya University, Faculty of Arts and Sciences, Department of Biology, 22030, Edirne, Turkey. E-mail: nhacet@hotmail.com

8304. Hacet, N. (2009): Odonata of the western Black Sea region of Turkey, with taxonomic notes and species list of the region. *Odonatologica* 38(4): 293-306. (in English) ["40 species and subspecies from 58 localities were recorded during 2003 and 2005-2007. *Sympetma fusca*, *Erythromma lindenii*, *Somatochlora meridionalis*, *Orthetrum albistylum* and *Sympetrum pedemontanum* are new for the region. *S. meridionalis* records are the easternmost within its range. Geographical distribution of some other species is discussed, and notes on the morphology and taxonomic status of the regional *Calopteryx splendens*, *C. virgo*, *Ischnura elegans* and *Cordulegaster insignis* are provided. The distributions of *Coenagrion pulchellum*, *C. scitulum*, *Pyrhosoma n. nymphula*, *Aeshna cyanea*, *Cordulia aenea* and *Sympetrum depressiusculum* in Turkey are still largely unknown. Based on all available records, a list of the 51 species and subspecies currently known from the Western Black Sea Region is presented." (Author)] Address: Hacet, Nurten, Department of Biology, Faculty of Arts and Sciences, Trakya University, TR-22030 Edirne, Turkey. E-mail: nhacet@hotmail.com

8305. Hannelly, E.C. (2009): The effects of introduced trout on native macroinvertebrates from lakes in the Trinity Alps Wilderness in northern California. Thesis, Faculty of Humboldt State University, Masters of Arts In Biology: IX, 61 pp. (in English) ["I examined differences in native macroinvertebrates among four lake management categories (fish stocked, temporary stocking suspension, fish removal lakes, and historically fishless lakes) and among three habitats (rock, organic/silt substrate, and emergent vegetation) from 16 different lake basins in a four-year study (2003-2006) in the Trinity Alps Wilderness in northeastern California. This study showed that introduced insectivorous fish reduce the diversity of native aquatic insects. Chironomid midges were more abundant and in greater proportion in fish lakes than in fishless lakes. Additionally, more taxa were sampled each subsequent year following fish removals and more taxa were sampled from Hidden Lake, a stocking suspension lake that did not maintain a fish population, than in the other three stocking suspension lakes that did sustain viable fish populations. The reduction in insect diversity due to fish was further exemplified in Hidden Lake alone, where more taxa were recorded each subsequent year of the study. *Libellula* was most common in fish stocked lakes. The life history and morphology of *Libellula* seems to give them an advantage over other invertebrate predators in fish lakes. Fish create top down effects that are illustrated by the apparent ability of *Libellula* to regulate other insect abundances and proportions. This study also demonstrated how large-bodied insects are more commonly found in complex habitats, which may be attributable to increased habitat availability and resources, to the invertebrates seeking refugia from insectivorous fish, or to a combination of both." (Author)] Address: not stated

8306. Harvey, R.; Higgott, J. (2009): Reports from Coastal Stations - 2008: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 36: 54-55. (in English) [UK; *Sympetrum flaveolum*; *Anaciaeschna isosceles*, *Erythromma najas*, *E. viridulum*] Address: not stated

8307. Hassall, C.; Thompson, D.J. (2009): Variation in wing spot size and asymmetry of the Banded Demoiselle *Calopteryx splendens* (Harris, 1780). *J. Br. Dragonfly Society* 25(1): 7-15. (in English) ["Wing pigment-

ation of calopterygid damselflies has received considerable attention due to its role as an honest signal of male quality. We describe a quantitative analysis of this trait in two populations of *C. splendens* in England. One population, sampled close to the northern limit of its range in Northumberland, exhibited substantially smaller wing spots than a population sampled in Hampshire. Wing asymmetry (in terms of length and area) did not vary between the two populations, nor did it co-vary with the size of the wing spots. We propose that the decline in wing spot size is the result of variation in climate between the two sites. Such variation in immunocompetence could contribute to the determination of range margins in this species." (Authors)] Address: Thompson, D. J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

8308. Hassall, C.; Thompson, D.J.; Harvey, I.F. (2009): Variation in morphology between core and marginal populations of three British damselflies. *Aquatic Insects* 31(3): 187-197. (in English) ["As selective pressures are altered by the changing climate, species have been shown to shift their distributions. Here we investigate morphological variation in dispersal-related traits between core and marginal populations in three species of Odonata, a taxon that is known to be expanding polewards. We sampled individuals of (i) *Calopteryx splendens*, a species with a rapidly expanding range, (ii) *Erythromma najas*, a species with a slowly expanding range, and (iii) *Pyrrhosoma nymphula*, a species that does not exhibit a range margin in the UK (as a control). Only *C. splendens* exhibited consistent trends within two dispersal-related traits (wing:abdomen length ratio and aspect ratio). This result suggests that proximity to range margin alone does not account for variations in damselfly morphology, but that the rate of range expansion may also be important in determining variation." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biol. Sciences (Nicholson Building), Univ. of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

8309. Heidemann, H. (2009): Die Entdeckung von *Coenagrion hylas* in Österreich. *IDF-Report* 18: 5-8. (in German) [Harald Heidemann reports the story of the discovery of the rare and disjunct distributed *C. hylas* in central Europe. The sketch includes brief anecdotes with Gerhard Jurzitza and M.A. Lieftinck.] Address: Heidemann, H., Au in den Buchen 66, 76646 Bruchsal, Germany, German

8310. Hentz, J.-L.; Bernier, C. (2009): *Macromia splendens*, une libellule remarquable dans le département du Gard. *Synthèse des connaissances. Gard Nature*: 16 pp. (in French) [The paper critically reviews the representation of *M. splendens* in the French network of Natura2000 sites. On the basis of 242 records of *M. splendens* along several rivers in the Gard region the current distribution of the species in southern France is documented.] Address: Gard Nature, Mas du Boschet Neuf, 30300 Beaucaire, France. E-mail: gard.nature@laposte.net

8311. Herath, H.M.M.; Edirisinghe, J.P. (2009): Spatial interactions of odonates frequenting "Lanka Pokuna" at the Royal Botanic Gardens, Peradeniya. *Proceedings of the Peradeniya University Research Ses-*

sions, Sri Lanka 14: 275-277. (in English) [A total of 27 Odonata species was recorded at the pond. "Monthly variation in species composition and species presence of Odonata during the study period is shown in Figure 1. The highest species composition was recorded during January-March 2009 and the lowest in December. Only 2 species were present throughout the study period while majority (25 species) was confined to certain months of the year. Presence of different species at the pond varied depending on the time of the day (Figure 1). Majority were active between 10.00-12.00 noon. Two species were present throughout the daytime and others for 2-3 hrs of the day." (Authors)] Address: Herath, H., Dept of Zoology, Faculty of Science, University of Peradeniya, Peradeniya 20400, Sri Lanka

8312. Hoffmann, J. (2009): Summary catalogue of the Odonata of Peru - Kommentiertes Faksimile des Manuskripts von J. COWLEY, Cambridge, 20.05.1933 und aktuelle Liste der Odonaten Perus mit Fundortangaben sowie Historie zu Sammlern und Odonatologen in Peru. *International Dragonfly Fund Report* 16: 1-115. (in German, with English and Spanish summaries) ["In the entomological library of the Natural History Museum of Lima, Peru, a badly damaged manuscript, entitled 'Summary Catalogue of the Odonata of Peru' was discovered at the beginning of the 1990s. This manuscript had been kept there since 1933. Its author was stated as 'J. Cowley'. Whether indeed Cowley is the sole author of the whole text, cannot be asserted with certainty. However there are numerous indications that the manuscript was written in Cambridge, England. It seems certain that the list itself was written by Cowley, since many examples were given from his collection and the way the locations were cited. Presumably the manuscript was written together with the German veterinarian Paul Martin and his wife Margarita who lived in Lima. Martin was a very enthusiastic amateur lepidopterologist who had set up a network of butterfly collectors in Peru. Insects other than Lepidoptera were passed on by Martin to specialists, dragonflies apparently mainly to Cowley, who named a species in honour of Martin. The manuscript is of great value, since it is the first known and most complete list of Odonata with localities based on the state of knowledge of those days. Up to this time these records were scattered across few and also incomplete lists as part of taxonomic works or collection catalogues. On the basis of the state of knowledge and rules of nomenclature of his days (1933) Cowley named a total of 174 dragonfly species (synonymised 168 species) from 71 localities. Eleven years later Schmidt (1942) published a list of 173 Peruvian odonates, while 21 years later a catalogue with 165 species (synonymised 158 species) was published by Soukop in 1954. A comprehensive list of 252 species (synonymised to 243) was published by Racenis (1959) 26 years after Cowleys unpublished list. Since then there have been only a few complete lists. Currently and here presented, there are 481 species known from 238 localities, of which 87 were new species first described on the basis of type material from Peru. Up to the end of the 1960s material from commercial collectors and the trade with insects was the basis for most catalogues, with dragonflies being only a by-catch of butterfly collecting expeditions. Publications of lists from scientific expeditions on the other hand, were a rare event. The history of Odonatology in Peru is, therefore, largely connected to the history of research and collecting expeditions into the Amazon region for the greater

part of the 20th century. Up to the era of Cowley, expeditions into the collection regions of Peru took place mainly out of the east of the continent by way of the Amazon and its tributaries. The first of such odonatological evidences are by the famous Amazon researcher Henry Walter Bates, who also collected a large number of dragonflies between the years 1848 and 1859. With an increasing interest in the flora and fauna in their own country and with the founding of natural history institutions at the beginning of the 20th century in Lima, more and more expeditions were organised from Lima. Until the middle of the last century the majority of researchers and collectors active in Peru were still mainly Europeans. With the beginnings of the 70s of the last century, pure collecting expeditions became progressively less common. Odonata, collected during the last 20 years in Peru, mainly stem from research projects with a defined goal. A map of the locations until 2007 shows that more than 70% of the country is still unexplored as far as odonates are concerned. Thus the list of the 481 species more than likely does not reflect the actual inventory of dragonfly species and distribution of Peru. The register lists all the species which have definitely been recorded for the country and takes into account their present validity and comprehensible taxonomic relationships." (Author)] Address: Hoffmann, J., alauda, Wendenstr. 435, D-20537 Hamburg, Germany. E-Mail: hoffmann@alauda.de

8313. Holusa, O. (2009): New records of *Cordulegaster bidentata* and *Somatochlora alpestris* in the Ukrainian Carpathians (Odonata: Cordulegasteridae, Corduliidae). *Libellula* 28(3/4): 191-201. (in English, with German summary) ["During 2005 and 2006, a detailed research of freshwater habitats in the catchment of the Chrepeliv River and in a part of the catchment of the Bistricja Nadvirnjanska River in the Nadvirna district in the Ivano-Frankivsk Oblast, Ukraine, was carried out. *C. bidentata* was found at four localities. Its occurrence in the Ukrainian Carpathians is discussed, and all hitherto published records of *S. alpestris* and *C. bidentata* from the territory of the Ukraine are summarised. In August 2004 and 2006, male adults of *S. alpestris* were recorded at two sites on the massif of Mt. Pip Ivan Maramorosky in the Zakarpattia Oblast, Ukraine. One recording site was in the vicinity of Mt. Berlebashka, and the other on the foot of Mt. Obniz. The occurrence of permanent populations is discussed." (Author)] Address: Holusa, O., Dept Forest Protection & Game Management, Faculty Forestry & Wood Technology, Mendel University of Agriculture & Forestry Brno, Zemedelská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

8314. Honkavaara, J.; Rantala, M.J.; Suhonen, J. (2009): Mating status, immune defence, and multi-parasite burden in the damselfly *Coenagrion armatum*. *Entomologia Experimentalis et Applicata* 132(2): 165-171. (in English) ["Immunity and reproductive effort are both physiologically costly and often a trade-off between these functions has been shown. In studies with damselflies, parasite load has been associated with fitness costs, such as reductions in mating success, male condition, and survival. Although each individual may be simultaneously infected by various parasite species, most studies have concentrated on the effects of a single parasite taxon. We examined natural ecto- and endoparasite infection levels in male *C. armatum* in relation to their mating status, fat reserves, and ability to further mount an immune response, measured as en-

capsulation of an experimentally introduced foreign object. Encapsulation response was lower for mated (paired) males than for single males and declined with increasing water mite abundance. Mated males had fewer water mites than single males. Male weight or fat reserves did not explain variation in encapsulation response. The number of gregarine gut parasites was not related to the level of encapsulation response and did not differ between mated and single males. However, there was a negative correlation between mite abundance and gregarine load. Our data suggest that current mite infection may compromise a male's resistance against further infections by pathogens and parasites, and there may be a trade-off between reproductive effort and encapsulation response in male *C. armatum*." (Authors)] Address: Honkavaara, J., Department of Biology, Section of Ecology, University of Turku, 20014 Turku, Finland. E-mail: johhon@utu.fi

8315. Hope, P. (2009): Species Review 1: The Small Red Damselfly *Ceriagrion tenellum* (de Villers) and its close relative, the Turkish Red Damselfly *Ceriagrion georgifreyi* (Schmidt). *J. Br. Dragonfly Soc.* 25(1): 41-56. (in English) ["This review deals *C. tenellum*, a widespread species in Europe, with Britain and Ireland at the northern end of its range. It also looks at its close relative, *C. georgifreyi*, only discovered in 1953 and confined to a narrow fringe along the Mediterranean from Israel to southwest Turkey and three Greek islands." (Authors)] Address: Hope, P., English Bridge Court, Wyle Cop, Shrewsbury, Shropshire, SY1 1XH, UK

8316. Horváth, G.; Kriska, G.; Malik, P.; Robertson, B. (2009): Polarized light pollution: a new kind of ecological photopollution. *Front. Ecol. Environ.* 7(6): 317-325. (in English) ["The alteration of natural cycles of light and dark by artificial light sources has deleterious impacts on animals and ecosystems. Many animals can also exploit a unique characteristic of light – its direction of polarization – as a source of information. We introduce the term "polarized light pollution" (PLP) to focus attention on the ecological consequences of light that has been polarized through interaction with human-made objects. Unnatural polarized light sources can trigger maladaptive behaviors in polarization-sensitive taxa and alter ecological interactions. PLP is an increasingly common byproduct of human technology, and mitigating its effects through selective use of building materials is a realistic solution. Our understanding of how most species use polarization vision is limited, but the capacity of PLP to drastically increase mortality and reproductive failure in animal populations suggests that PLP should become a focus for conservation biologists and resource managers alike." (Authors) References to Odonata are made at several occasions.] Address: Horvath, G., Biooptics Laboratory, Department of Biological Physics, Loránd Eötvös University, 1117 Budapest, Pázmány Péter sétány 1, Hungary. E-mail: gh@arago.elte.hu

8317. Hunter, I. (2009): Reports from Costal Stations - 2008: Elms Farm, Icklesham, East Sussex. *Atropos* 36: 46. (in English) [UK; *Erythromma viridulum*] Address: not stated

8318. Hunter, M. (2009): My best day. *Atropos* 37: 44-45. (in English) [The author describes his most memorable day involving Odonata. 5-VIII-2000, Hamsterley Forest, Durham, UK, records of *Aeshna juncea*, *A. grandis*, *A. mixta*, *A. cyanea*, *Anax partenope*, *A. imper-*

ator, and *Cordulegaster boltonii* are reported.] Address: Hunter, M., 9 Colpitts Lane, West Park, Darlington, DL2 2FG, UK

8319. Idris, A.B.; Ismail, S.; Haron, Y.; Suhana, Y. (2009): Insects of Tasik Chini with special emphasis on ichneumonid wasps. *Sains Malaysiana* 38(6): 813-816. (in English) [Tasik Chini, trails to Sg. Gumum and Kampung Melai, Malaysia: a total of 502 insect individuals comprising of seven orders (Hymenoptera, Diptera, Coleoptera, Orthoptera, Blattaria, Odonata and Microcoryphia) and 47 families were collected. Aeshnidae contribute with 12, and Libellulidae with 73 specimens (*Rhythemis phyllis phyllis*, *Nuerothemis fluctuans*, *Orthetrum testateum testateum*, *Orthetrum* sp. 1, *Brachydiplax* sp. 1, *Diplacodes trivialis*, *Cratilla* sp. 1, *Orthetrum sabina* and *Acisoma panorpoides*). In May-Juni 2004, *N. fluctuans* was the dominant species. All taxa are new records for the area as there has been no study conducted previously.] Address: Idris, A.B., Center for Insect Systematics Faculty of Science and Technology Universiti Kebangsaan Malaysia 43600 UKM Bangi, Selangor D.E. Malaysia. E-mail: idrisgh@ukm.my

8320. Ingram, S. (2009): Dragonflies: Marvels of the meadows. *SierraScapes*. The Newsletter of the Eastern Sierra Land Trust. Spring 2009: 2. (in English) [General on Odonata.] Address: www.easternsierralandtrust.org

8321. Iserbyt, A.; Bots, J.; Ting, J.J.; Jvostov, F.P.; Forbes, M.R.; Sherratt, T.N.; Van Gossum, H (2009): Multi-annual variation in female morph frequencies of the polymorphic damselfly, *Nehalennia irene*, at continental and regional scales. *Animal Biology* 59(3): 313-326. (in English) ["Female-limited polymorphism occurs in different animal taxa but is particularly abundant among species of damselflies, most likely as a consequence of selection to avoid excessive male harassment. Recent work *N. irene* indicated that within year spatial variation in female morph frequencies was limited in nearby populations (i.e. intra-regional scale), but large at a continental scale. As anticipated, some of the observed variation in morph frequency was correlated with variation in the estimated degree of male harassment towards female morphs, measured by male density and operational sex ratio. Here, we extended earlier work by quantifying variation in morph frequency over two to three years, allowing us to elucidate how morph frequencies vary temporally at both intra-regional and continental scales (data for 8 populations over three years and for 33 populations over two years, respectively). Annual variation in morph frequencies was relatively high at the intra-regional scale, but was never large enough to obscure the underlying spatial pattern at the continental scale. At both geographic scales, male density and operational sex ratio were highly variable between years. The estimated degree of male harassment correlated with variation in morph frequency within some regions, but not all. Together, the observed natural variation in female morph frequencies may be partly explained by variation in male harassment, but it appears that a complete understanding will require considering the role of other environmental factors." (Authors)] Address: Iserbyt, A., Evolutionary Ecology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium

8322. IUCN (2009): Odonata Facts. The IUCN Red List of Threatened Species™ 2009 update: 2 pp. (in

English) [*Chlorocypha centripunctata*] – VU known from very few areas in southeast Nigeria and southwest Cameroon, Africa, and *Arabicnemis caerulea* – VU known from Yemen, northeast Oman and the north of the United Arab Emirates are added to the list of threatened Odonata.] Address: Clausnitzer, Viola, Friedländer Weg 53, 37085 Göttingen, Germany. E-mail: violacl@t-online.de

8323. Iwata, S.; Watanabe, M. (2009): Spatial distribution and species composition of larval Odonata in the artificial reed community established as a habitat for *Mortonagrion hirosei* Asahina (Zygoptera: Coenagrionidae). *Odonatologica* 38(4): 307-319. (in English) ["Yearly changes in the odonate larval community were surveyed for 4 year after setting up an artificial reed community adjacent to the original habitat of *M. hirosei*, an endangered brackish water species. Only *M. hirosei* larvae were found in the original habitat during the survey period. In the first year of the established habitat, *Ischnura senegalensis* was the dominant species in the larval community. Although the abundance of *M. hirosei* larvae increased year by year, becoming the most abundant species after the second year, the species composition of the larval community of the established habitat was different between the West and East because of environmental factors, such as saline concentration and reed shoot density. *M. hirosei* larvae had expanded their distribution to the entire area of the established habitat in 2005, while the distribution of *I. senegalensis* had been restricted to several patchy areas in accordance with a decrease in their population. There was a negative relationship between the number of *M. hirosei* and *I. senegalensis* larvae. The prey-predator relationship and competitive relationship between the 2 species should have affected the population dynamics and distribution of *M. hirosei*. The odonate larval community and habitat environment that is optimal for *M. hirosei* conservation are discussed from the viewpoint of both biotic and abiotic factors.] Address: Iwata, S., Graduate School of Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: shukoikiwa@hotmail.com

8324. Jana, S.; Pahari, P.R.; Dutta, T.K.; Bhattacharya, T. (2009): Diversity and community structure of aquatic insects in a pond in Midnapore town, West Bengal, India. *Journal of Environmental Biology* 30(2): 283-287. (in English) [In total, 20 species of aquatic insects have been recorded from a weed infested pond. Odonata were the most abundant group constituting of 54% of the total aquatic insects. *Urothemis signata* was a eudominant species. *U. signata*, *Agriocnemis pygmaea* and *Enallagma parvum* have been recorded from Paschim Medinipore district for the first time.] Address: Bhattacharya, T., Department of Zoology, Vidyasagar University, Midnapore - 721 102, India. E-mail: prof.t.bhattacharya@gmail.com

8325. Johnson, A. (2009): Dragonflies and Damselflies in Your Pocket: A Guide to the Odonates of the Upper Midwest. *Bur Oak Guides*. University of Iowa Press. ISBN-10: 1587297868: laminated fold-out guide. (in English) [This laminated fold-out guide introduces us to some 50 odonates of the Upper Midwest, USA. Ann Johnson includes common and scientific names, sizes, general flight seasons, and the best habitats in which to find each species. Any more in Odonata experienced user will ask, what such a field guide is good for? May

be that a first insight into the different families of Odonata will be possible. This "guide" is sold for 10 US \$. You can waste your money, or you can buy one of the good US-field guides that work. (Martin Schorr) Address: <http://www.uipress.uiowa.edu/books/2009-spring/johnson-dragons.htm>

8326. Jovic, M.; Mihajlova, B. (2009): Catalogue of the Odonata collection in the Macedonian museum for natural history. *Acta entomologica serbica* 14(2): 133-146. (in English, with Serbian summary) ["The Odonata collection in the Macedonian Museum of Natural History is the most comprehensive collection of this insect order in Macedonia. It is comprised of 1344 specimens, belonging to 46 species. The oldest specimens were collected in 1938, while the freshest material was collected in 2009. This period of time, about 70 years long, presents respectable continuity in collecting Odonata. Unfortunately, explorations didn't equally cover the given period of time and the area from which the entomological material originated. This catalogue includes data on *Lestes parvidens*, which is a new species for Macedonian fauna. New data on the distribution of *Aeshna juncea* and *Gomphus schneiderii* in Macedonia are briefly commented on." (Authors) The collections also includes a few records from Bosnia and Herzegovina, Serbia, Greece and Turkey.] Address: Jovic, M., Natural History Museum Belgrade, Njegoševa 51, P.O. Box 401, YU-11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.rs

8327. Jovic, M.; Andjus, L.; Santovac, S. (2009): New data on some rare and poorly known Odonata species in Serbia. *Bulletin of the Natural History Museum* 2: 95-108. (in English, with Serbian summary) ["In spite of the relatively long tradition of studies on Odonata fauna in Serbia, its territory remains a "blank space" on distribution maps of many European Odonata species. The real distribution of almost all species is poorly known, so this paper presents new data on the least known species (*Lestes viridis*, *Erythromma lindenii*, *Brachytron pratense*, *Anax parthenope*, *A. ephippiger*, *Cordulegaster heros*, *Somatochlora flavomaculata*, *S. metallica*, *Epitheca bimaculata* and *Sympetrum vulgatum*), including overview based on modern tendencies in taxonomy. Also included is a comment on the needs and present state of conservation of certain species as natural rarities and assets of Serbia." (Authors)] Address: Jovic, M., Natural History Museum Belgrade, Njegoševa 51, P.O. Box 401, YU-11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.rs

8328. Junichi, T.; Motoharu, F.; Yoshitaka, T. (2009): Genetic diversity of the dragonfly *Libellula angelina* in the Okegayanuma area of Japan. *Japanese Journal of Conservation Ecology* 14(1): 73-79. (in Japanese, with English summary) ["The genetic diversity and differentiation among 60 individuals of the threatened dragonfly species *Libellula angelina* from three populations in the Okegayanuma area of Japan was determined using random amplified polymorphic DNA (RAPD) analysis. Twenty polymorphic loci were detected by 19 of the 80 RAPD primers examined, and 12 DNA types were determined (only four types were population specific). The diversity among and within the populations was lower; the mean gene diversity and gene differentiation values were 0.317 and 0.007, respectively. No significant between-population genetic differences were detected in the analysis of molecular variance (AMOVA). Of the ge-

netic divergence, 98.7% was attributable to population divergence and 1.3% to individual differences within a population. Cluster analysis indicated that most individuals from the three populations belonged to the same cluster. Our results provide data that could be used to elucidate genetic diversity in *L. angelina* populations, using RAPD analysis." (Authors)] Address: not available

8329. Kadoya, T.; Suda, S.; Washitani, I. (2009): Dragonfly crisis in Japan: A likely consequence of recent agricultural habitat degradation. *Biological Conservation* 142(9): 1899-1905. (in English) ["Many Japanese dragonfly species depend on habitat complexes maintained in rice paddy systems. We postulated that recent alterations to habitat complexes in paddy systems have had adverse effects on dragonfly populations, especially those 'once common species' that have come to depend primarily on paddy systems following losses of natural floodplain habitats. A high proportion of Japanese lentic dragonfly species depends on paddy fields or agricultural ponds that have been extensively degraded, while lotic species can often use both paddies and natural river systems. Thus we also postulated that lentic species are more susceptible to changes in agricultural habitats and are subject to higher extinction risks than lotic species. We aimed to extend previous work on estimating dragonfly extinction risk by developing mechanistic insights into the processes involved. Postulates were tested by analyzing relationships between (1) previous quantitative extinction risk assessments for dragonfly species and (2) species' ecological characteristics (i.e., distribution range and habitat type [lentic or lotic]). Lentic species were disproportionately represented among those with elevated extinction risk. Species with large distribution ranges were also subject to higher extinction risks than those with narrower ranges, reflecting a driving force acting at a national scale (i.e., intensive degradation of paddy systems)." (Authors)] Address: Kadoya, T., Dept Ecosystem Studies, Institute of Agriculture & Life Sci., Univ. Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan. E-mail: kadoya@e-mail.jp

8330. Kaize, J.; Kalkman, V.J. (2009): Records of dragonflies from kabupaten Merauke, Papua, Indonesia collected in 2007 and 2008 (Odonata). *Suara Serangga Papua* 4(2): 40-45. (in English, with Indonesian summary) ["Odonata were collected in the period 9 July to 4 August 2007 and 4 to 16 June 2008 in the surroundings of Merauke, Papua province, Indonesia. In total 37 species were recorded during the fieldwork bringing the number of species known for the area to 42. It is estimated, that this is about half of the species present in the area. Of the 42 species recorded from the Merauke area 38 belong to the families of Coenagrionidae and Libellulidae. None of the genera endemic to New Guinea were recorded during the fieldwork and only one (*Hemicordulia silvarum* Ris, 1913) of the recorded species is endemic to New Guinea. The results seem to suggest that —compared to the central mountain range or the area in the north of New Guinea— the southern parts of New Guinea have an impoverished fauna. Further fieldwork in the area should be held in different seasons and should try to sample along running waters." (Authors)] Address: Kaize, J., 1d/a Kelompok Entomologi Papua, Kotakpos 1078, Jayapura 99010, Indonesia. Email: jexluz@yahoo.com

8331. Kalkman, V.J.; van Mastrigt, H.; Richards, S.J. (2009): First records of dragonflies (Odonata) from the

Foja Mountains, Papua Province, Indonesia. *Suara Serangga Papua* 4(1): 14-19. (in English, with Indonesian summary) ["A small collection of dragonflies obtained during two RAP biodiversity surveys to the Foja Mountains, organised by Conservation International with help of LIPI, Bogor, in 2005 and 2008 are brought on record. Twelve species were found at two sites below 100 m near Kwerba, a small village adjacent to the Mamberamo River. Thirteen species were recorded at 'Moss Camp' at 1650 m in the Foja Mountains. Of these *Hemicordulia ericetorum* was previously only known from the central mountain range while *Oreoeschna dictatrix* was only known from Lake Paniai and the Cyclops Mountains. It is likely that more genera and species now known only from the central mountain range occur in the Foja Mountains and probably also the Van Rees Mountains. However one species, *Argiolestes* spec. nov. is probably endemic to the Foja Mountains. Although this collection includes only a small fraction of the diversity likely to be present in the mountains it is nonetheless of interest as it represents the first records of dragonflies from the area." (Author)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

8332. Kalnins, M. (2009): Lesser Emperor *Anax parthenope* (SELYS, 1839) (Odonata: Aeshnidae) – a new dragonfly species in Latvia. *Latvijas Entomologs* 47: 16-20. (in English) ["In 2008 and 2009, *A. parthenope* has been found at five localities in Latvia. The dragonfly is a new species for Latvian fauna. 59 dragonfly species of nine families have been recorded in Latvia so far, inter alia two or three temporary immigrants and one species with unclear status." (Author)] Address: Kalnins, M., Nature Protection Agency, Bazn cas iela 7, LV-2150, Sigulda, Latvia. E-mail: martins.kalnins@daba.gov.lv

8333. Karjalainen, S (2009): Sudenkorentojen aikaisimmat ja myöhäisimmät aikuishavainnot Suomessa [The earliest and latest observations of dragonflies in Finland]. *Crenata* 2: 39-43. (in Finnish) [Tabulated abstract of the phenological basic data of all Finnish species available from literature or data bank resource is presented. (Asmus Schröter)] Address: not stated

8334. Kishida, O.; Trusseli, G.C.; Nishimura, K. (2009): Top-down effects on antagonistic inducible defense and offense. *Ecology* 90(5): 1217-1226. (in English) ["Antagonistic phenotypic plasticity may strongly influence trait evolution in tightly interacting predator-prey pairs as well as the role that trait plasticity plays in community dynamics. Most work on trait plasticity has focused on single predator-prey pairs, but prey must often contend with multiple predators in natural environments. Hence, a better understanding of the evolutionary and ecological significance of phenotypic plasticity requires experiments that examine how multiple predators shape prey trait plasticity. Here, using a simple food chain consisting of a top predator (dragonfly larvae, *Aeshna nigroflava*), an intermediate predator (salamander larvae, *Hynobius retardatus*), and frog (*Rana pirica*) tadpoles as prey, we show that the presence of dragonfly risk cues substantially modifies the intensity of antagonistic morphological plasticity in both amphibians. In the absence of dragonflies, tadpoles produced bulgier bodies in response to salamanders, and salamanders responded to this defense by enlarging their gape size. However, in the presence of dragonfly risk cues, the ex-

pression of both antagonistic traits was significantly reduced because tadpoles and salamanders produced phenotypes that are more effective against dragonfly predators. Thus, the reduced antagonism likely emerged, in part, because the benefits of antagonistic trait expression were outweighed by the potential cost of increased vulnerability to dragonfly predation. In addition, our results suggest that when all three species were present, salamander activity levels, which influence the amount of signals required to induce antagonistic traits, were more strongly affected by dragonfly risk cues than were tadpole activity levels. This species-specific difference in activity levels was likely responsible for the reduced tadpole mortality caused by salamanders in the presence vs. absence of dragonfly risk cues. Hence, dragonflies had a positive trait-mediated indirect effect on tadpoles by modifying both the morphological and behavioral traits of salamanders." (Authors)] Address: Kishida, O., Center for Ecological Research, Kyoto University, Otsu, Shiga 520-2113 Japan. E-mail: bulgytadpoles@hotmail.com

8335. Knijf, G. de (2009): Waarneming van de Zadelibel (*Anax ephippiger*) in centrum Brussel (België) [Recent observation of *Anax ephippiger* in the city centre of Brussels (Belgium)]. *Nieuwsbrief Libellenvereniging Vlaanderen* 3(2): 4-6. (in Dutch, with English summary) ["At lunchtime of the 9th of May an adult male of *A. ephippiger* was seen flying 1 meter above the buildings of INBO (15 meter above ground level) in Brussels. It came straight from the south and continued flying northwards at the same altitude. This illustrates the inconspicuous movements and migration of *A. ephippiger* and the difficulties to detect the species outside its reproduction sites. A short overview of all observations from Belgium (4 published and 1 unpublished) are given. We further discuss the probability when to detect this species in Belgium and its possible origins." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

8336. Knill-Jones, S. (2009): Reports from Costal Stations - 2008: Isle of Wight. *Atropos* 36: 43-44. (in English) [UK; *Anax parthenope*, *Libellula fulva*, *Cordulia aenea*, *Erythromma najas*, *Brachytron pratense*, *Sympetrum danae*] Address: not stated

8337. Kobingi, N.; Raburu, P.O.; Masese, F.O.; Gichuki, J. (2009): Assessment of pollution impacts on the ecological integrity of the Kisian and Kisat rivers in Lake Victoria drainage basin, Kenya. *African Journal of Environmental Science and Technology* 3(4): 097-107. (in English) ["Macro-invertebrate assemblages were used as bioindicators to assess the ecological integrity of Rivers Kisat (influenced by urban development) and Kisian (influenced by agriculture) using community attributes and the Index of Biotic Integrity. Six stations, three per river, were selected to correspond to different impact types and intensities along the rivers. Physico-chemical parameters and nutrients were determined for each station on a monthly basis from November 2007 to April 2008. Two-way analysis of variance was used to compare water quality and nutrient parameters, and macro invertebrate community attributes between the two rivers, with the river and station as the main factors. Significant differences were accepted at 95% confidence level. There were inconsistencies in the variation of physico-chemical parameters along the two rivers.

However, River Kisat recorded higher values for all physico-chemical parameters considered, except pH and DO. Different indices and metrics representing the structural and functional organization of macro invertebrates were computed and evaluated for responsiveness to physico-chemical parameters and nutrient levels. Macro invertebrate diversity, richness and evenness values failed to delineate stations according to the different levels of degradation they were experiencing. However, the differences were captured by the index of biotic integrity, which separated stations into different classes of quality. River Kisat stations in urban areas scored lowest index values, less than 15 out of 25, while two river Kisat stations scored the highest value, more than 19. The index provided evidence of response to changes in ecosystem integrity exhibited by resident macro invertebrate assemblages to pollution arising from both point and nonpoint sources." (Authors) Aeshna sp. and Gomphus sp. are well represented in Kisian River, and only Aeshna sp. is very rare in Kisat River. As regrettably of often, taxonomic work was processed by using identification keys of non-African handbooks.] Address: Kobingi, Nyakeya, Kenya Marine & Fisheries Research Institute (KMFRI), P. O. Box 1881 Kisumu, Kenya. E-mail: kobnyakeya@yahoo.com.

8338. Koch, B.; Wildermuth, H.; Walter, T. (2009): Einfluss der Habitategenschaften auf das Verbreitungsmuster von *Coenagrion mercuriale* an einem renaturierten Fließgewässer im Schweizer Mittelland (Odonata: Coenagrionidae). *Libellula* 28(3/4): 139-158. (in German, with English summary) ["Only few and isolated populations of the Southern Damselfly exist in Switzerland and the species is considered as critically endangered. The recent discovery of a hitherto unknown population of *C. mercuriale* on a revitalized stream in the Canton of Zurich caused a study to be made on the size and the distribution pattern of the population along a heterogeneously structured 2.15 km-stretch. In summer 2007, the abundance of *C. mercuriale* was recorded at 215 sections and data on physical parameters were collected. The results of statistical analyses showed that the distribution pattern of *C. mercuriale* was significantly affected by the width of the watercourse, depth of the water, cover of the water vegetation, cover and width of the riparian vegetation and cover by trees higher than three metres. The composition of the riparian vegetation that could be classified into six different groups using a cluster analysis also exhibited an effect on the distribution. *Coenagrion mercuriale* preferred sites with relatively wide and deep water, luxuriant aquatic vegetation, wide intermittent but jaggy riparian vegetation and little cover by trees shading the water surface. Riparian vegetation that was mainly composed of *Carex* spp., *Lythrum salicaria* or *Phalaris arundinacea* was most densely colonized by *C. mercuriale*. In contrast, sections overgrown predominantly by *Filipendula ulmaria* and *Epilobium hirsutum* were generally avoided. Additionally, data on the local dragonfly fauna were collected and 14 streams in the neighbourhood of the study site were examined for their suitability for colonization by *C. mercuriale*. In total 21 Odonata species were recorded. Maintenance of the habitat by patchy clearance of dense riparian vegetation, aiming at the promotion of the local population, was conducted in the frame of a conservation programme in late 2007 and early 2008. Censuses carried out during the flying season 2008 showed that the measures adopted had a positive effect on *C. mercuriale*.] Address: Koch, Bärbel,

Via Grütli 21, CH-6855 Stabio, Switzerland. E-mail: baerbel.koch@hotmail.com

8339. Kolozsvári, I.; Illar, L. (2009): A Tisza tiszaujlaki szakaszán élő szitakötőfajok faunisztikai felmérése. *Acta Beregsasiensis* 8(1): 231-240. (in Hungarian, with Russian summary) [Study along a stretch of the Tisza-river in Hungaria with focus on *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Stylurus flavipes*, *Platycnemis pennipes*, and *Calopteryx splendens*.] Address: Kolozsvári, I., II. Rákóczi Ferenc Kárpátaljai Magyar Főiskola, 4. éves biológia-földrajz szakos hallgató, Hungaria

8340. Koskimäki, J.; Rantala, M.J.; Suhonen, J. (2009): Wandering males are smaller than territorial males in the damselfly *Calopteryx virgo* (L.) (Zygoptera: Calopterygidae). *Odonatologica* 38(2): 159-165. (in English) ["In territorial Odonata, adult males may use 2 mating tactics that may be genetically or environmentally determined: territoriality and non-territoriality. The non-territorial tactic has been sometimes found to include 2 additional males: sneaking and wandering. The non-territorial males, however, often have lower reproductive success than territorial males. Studies on various *Calopteryx* species have repeatedly shown that territorial and non-territorial behaviours are conditional mating tactics and that body size does not predict male resource-holding potential and territorial behaviour. Instead, the resource holding potential seems to depend on the amount of male fat resources. Here, both territorial and wandering *C. virgo* males were collected from a creek in central Finland. It was found that territorial males were larger and heavier than wandering males. The data show that the size of the individual may predict the reproductive tactic of some odonate males to a greater degree than previously thought." (Authors)] Address: Suhonen, J., Sect. Ecology, Dept Biol., Univ. Turku, FIN-20014 Turku, Finland. E-mail: juksuh@utu.fi

8341. Koskinen, J. (2009): Kuutyönkorento ja aapaikiitokorento Suomessa 2008 [*Coenagrion lunulatum* and *Somatochlora alpestris* in Finland 2008]. *Crenata* 2: 2-4. (in Finnish) [In 2008 the national monitoring project laid special emphasis on two target species due to the fact that their distribution pattern and ecology in Finland is not well understood. (Asmus Schröter)] Address: not stated

8342. Koskinen, J.; Mäkinen, J. (2009): Korentokatsaus 2008 [Dragonfly review for 2008]. *Crenata* 2: 8-31. (in Finnish) [The article gives a detailed overview and analysis of the observation data of the national monitoring project and points out the number of records and the phenology of every species in 2008. The commonest dragonfly and damselfly were *Aeshna grandis* and *Coenagrion hastulatum*, whereas *Somatochlora sahlbergi*, *Aeshna viridis* and *Nehalennia speciosa* were seen only once each. Moreover *Aeshna affinis* was observed in Finland for the first time. (Asmus Schröter)] Address: not stated

8343. Kosterin, O.E.; Sivtseva, L.V. (2009): Odonata of Yakutia (Russia) with description of *Calopteryx splendens njuja* ssp. nov. (Zygoptera: Calopterygidae). *Odonatologica* 38(2): 113-132. (in English) ["A short overview of the history of odonatological exploration of Yakutia and an annotated checklist of 35 species currently known from its territory are provided with reference to all earlier records and lists of hitherto unpublished spe-

cimens. *Calopteryx splendens*, *Aeshna grandis* and *Ophiogomphus obscurus* were not previously known from Yakutia. *C. splendens njuja* ssp. n. is described and illustrated. Holotype male: Russia, Sakha Republic, Yakutia: Lena Ulus, the Nyuya river at the mouth of the Chayanda; 14-VII-2006; deposited in Institute of Animal Systematics and Ecology, Novosibirsk. It is characterised by a drastic reduction of wing pigmentation in males." (authors)] Address: Kosterin, O.E., Institute Cytology & Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

8344. Kosterin, O.E.; Lyubchanskii, I.I. (2009): Odonata collection from the Bureinskii State Nature Reserve, Khabarovskii Krai, Russia. *Notulae odonatologicae* 7(3): 25-27. (in English) ["11 species, all boreal, were collected in 2004-2005 in the Reserve, which is situated within the larch taiga zone of the Russian Far East, ca 52°N and 500-2175 m a.s.l. Interesting is the presence of *Somatochlora sahlbergi*, but the southernmost locality of this species is on the Sokhondo Mt in Transbaikalia." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

8345. Krilowicz, C. (2009): Congregating Odes. *Argia* 21(1): 8. (in English) [oas 25: Cape May, New Jersey, USA. "I then stopped and decided to look more closely for *S. ambiguum*. To my surprise I was surrounded by them. Earlier, I had unsuccessfully been searching in all the local ponds and surrounding fields for this species. My count for this area was 60 males and 8 females with four of those in a wheel. I am not 100% sure why all these bugs were here. The dominant activity was basking and mating. I did not make any observation of feeding behavior. I could only conclude that there was something unique about this site that attracted so many individuals. The date was 14 October 2008 and it happened to be a new late date for New Jersey. On 22 October 2008 I decided to look for *Aeshna umbrosa* in Atlantic County where it had not been recorded. I picked Makepeace Wildlife Management Area in Mayes Landing. While slowly driving down a deserted blacktop drive surrounded by overgrown pines a small bug hit my windshield. I stopped the car and jumped out. It was a *Lestes* congener and I was able to photograph and collect it. I decided to walk this section of road. By the time I finished my tally, I counted 50 male and 10 female *L.* congener and one *S. ambiguum* (late dates are fleeting). I never expected to see this spreadwing here, for it is an Atlantic County record and I had no idea where there was any standing water nearby. Only 100 yards away is a very large vernal pool which was completely dry. Again I did not observe any feeding behaviour and none were in a wheel. I wonder why they all decided to congregate here? May be just another location to pick a mate." (Author)] Address: Krilowicz, C., Haddonfield, NJ, USA. E-mail: chippop@verizon.net

8346. Kriska, G.; Bernath, B.; Farkas, R.; Horvath, G. (2009): Degrees of polarization of reflected light eliciting polarotaxis in dragonflies (Odonata), mayflies (Ephemeroptera) and tabanid flies (Tabanidae). *Journal of Insect Physiology* 55: 1167-1173. (in English) ["With few exceptions insects whose larvae develop in freshwater possess positive polarotaxis, i.e., are attracted to sources of horizontally polarized light, because they detect

water by means of the horizontal polarization of light reflected from the water surface. These insects can be deceived by artificial surfaces (e.g. oil lakes, asphalt roads, black plastic sheets, dark-coloured cars, black gravestones, dark glass surfaces, solar panels) reflecting highly and horizontally polarized light. Apart from the surface characteristics, the extent of such a 'polarized light pollution' depends on the illumination conditions, direction of view, and the threshold p^* of polarization sensitivity of a given aquatic insect species. p^* means the minimum degree of linear polarization p of reflected light that can elicit positive polarotaxis from a given insect species. Earlier there were no quantitative data on p^* in aquatic insects. The aim of this work is to provide such data. Using imaging polarimetry in the red, green and blue parts of the spectrum, in multiple-choice field experiments we measured the threshold p^* of ventral polarization sensitivity in mayflies, dragonflies and tabanid flies, the positive polarotaxis of which has been shown earlier. In the blue (450 nm) spectral range, for example, we obtained the following thresholds: dragonflies: *Enallagma cyathigerum* ($0\% < p^* 17\%$), *Ischnura elegans* ($17\% p^* 24\%$). Mayflies: *Baetis rhodani* ($32\% p^* 55\%$), *Ephemera danica*, *Epeorus silvicola*, *Rhithrogena semicolourata* ($55\% p^* 92\%$). Tabanids: *Tabanus bovinus*, *T. tergestinus* ($32\% p^* 55\%$), *T. maculicornis* ($55\% p^* 92\%$)." (Authors)] Address: Horvath, G., Bio-optics Laboratory, Dept of Biological Physics, Loránd Eötvös University, 1117 Budapest, Pázmány Péter sétány 1, Hungary. E-mail: gh@arago.elte.hu

8347. Kukulova-Peck, J. (2009): Carboniferous protodonatoid dragonfly nymphs and the synapomorphies of Odonoptera and Ephemeroptera (Insecta: Palaeoptera). *Palaeodiversity* 2: 169-198. (in English, with German summary) ["Three extremely rare fossil protodonatoid dragonfly nymphs are described from the middle Pennsylvanian (Moscowian) of Mazon Creek, Illinois: *Dragonympha srokai* n. gen., n. sp. (Meganisoptera), a large, nearly complete young nymph with an extended labial mask and uplifted wing pads; *Alanympa richardsoni* n. gen., n. sp. (Meganisoptera), a nymphal forewing with two articular plates attached to it; and *Carbonympha herdinai* n. gen., n. sp. (Eomeganisoptera), a detached nymphal forewing. Plesiomorphic states in *Dragonympha* n. gen. indicate homologies unresolved in modern Odonata. The segmented head bears 3rd tergum ventrally invaginated. The extended labial mask still shows limb segments. The prothorax bears a pair of winglets. The short wing pads are fully articulated, twisted, uplifted and streamlined with body. The mesothoracic anepisternum is placed between acrotergite and prescutum. The abdominal leglets form long, segmented, serial gill filaments. In the ontogenesis of modern dragonflies, the wing and articulation disc occurs just above subcoxal pleuron and far from tergum. Wing sclerites are arranged in eight rows protecting eight blood pathways running towards eight wing veins. The sistergroup of Odonoptera has not yet been convincingly resolved with computer cladistic approaches. Reasons are examined and discussed. More accurate, evolution-based character evaluations are shown with examples. The role of a correct model of the pan-arthropod limb and the origin of insect wings is discussed. Groundplan characters in dragonflies and mayflies are compared in their Paleozoic and modern states, their obscurity is clarified and complex synapomorphies are proposed. Palaeoptera is confirmed as a monophyletic group and the following sistergroup relationships are

suggested: Pterygota = Palaeoptera + Neoptera; Palaeoptera = Palaeodictyopteroidea + Hydropalaeoptera; Hydropalaeoptera = Odonoptera + Ephemeroptera." (Author)] Address: Kukulova-Peck, Jarmila, Department of Earth Science, Carleton University, Ottawa K1S 5B6, Ontario, Canada. E-mail: jarmilapeck@carleton.ca

8348. Kunz, B. (2009): Fehlbildungen der Flügel bei *Libellula depressa* (Odonata: Libellulidae). *Libellula* 28 (3/4): 175-182. (in German, with English summary) ["A teneral female *L. depressa* with one heavily malformed wing, and another individual with completely missing wings were found in June 2008 at two ponds that had been constructed in September 2006. During 2008 *L. depressa* emerged from these ponds in great numbers. The malformations may have been caused by injuries of the wing structures in the larval stage, inflicted by crowded fellow larvae in the newly established ponds with low prey density." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunz.de

8349. Lak, M.; Fleck, G.; Azar, D.; Engel, M.S.; Kad-dumi, H.F.; Neraudeau, D.; Tafforeau, P.; Nel, A. (2009): Phase contrast X-ray synchrotron microtomography and the oldest damselflies in amber (Odonata: Zygoptera: Hemiphlebiidae). *Biol. Jour. Linnean Soc.* 156(4): 913-923. (in English) ["*Electrohemiphlebia barucheli* gen. et sp. nov. and *Jordanhemiphlebia electronica* gen. et sp. nov., two new genera and species are described, based on exceptional inclusions of hemiphlebiid damselflies in Cretaceous amber from France and Jordan. The type specimen of *E. barucheli* was studied using phase contrast X-ray synchrotron microtomography, giving exceptional images and detailed information. Its comparison with the recent *Hemiphlebia mirabilis* confirms the attribution of several Cretaceous damselflies to the Hemiphlebiidae, showing that this particular group was widespread in the Early Cretaceous and probably originated in the Late Jurassic or earlier. The ecological niches today occupied by the small coenagrionoid damselflies were occupied during the Triassic and Jurassic by Protozygoptera, hemiphlebiids during the Early Cretaceous, and modern taxa in the Cenozoic." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

8350. Larison, B. (2009): Impacts of environmental heterogeneity on alternative mating tactics in the threadtail damselfly. *Behavioral Ecology and Sociobiology* 63(4): 531-536. (in English) ["Environmental heterogeneity, including variation in the physical environment, may be key to understanding the evolution and maintenance of alternative mating tactics, but its influence is rarely examined. Males of the threadtail damselfly *Protoneura amatoria* reversibly use two alternative mating tactics (perching vs. hovering) and have previously been found to modulate their use of these tactics in response to variation in both light conditions and the density of ovipositing females. Here, I show that mating success payoffs of the two tactics are differentially influenced by these factors. The payoff of the perching tactic was greater than that of the hovering tactic under low light conditions and at low densities of ovipositing females. The payoff of the hovering tactic was greater under high light conditions and higher densities of ovipositing females. The differential success of the two mating tactics in response to light conditions is dis-

cussed in light of flight dynamics, vision, and predation." (Author)] Address: Larison, Brenda Dept Ecology & Evolutionary Biology, Univ. of California, Los Angeles, 621 Charles E. Young Drive So., Los Angeles, CA 90095, USA. E-mail: blarison@ucla.edu

8351. Larkin, P.V. (2009): Photospot: Emperor Anax imperator. *Atropos* 37: 64. (in English) [16-VI-2009, Brockholes Quarry, Lancashire, UK] Address: not stated

8352. Lasley, G.W.; Abbott, J.C. (2009): Two New Damselflies for Texas. *Argia* 21(3): 17-18 (in English) [Mature male *Leptobasis vacillans*, Santa Ana National Wildlife Refuge in Hidalgo Co., Texas, 9-VI-2009. Male *Nehalennia gracilis*, Beaver Ponds in Angelina National Forest, Jasper Co., Texas, 15-VI-2009] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabott@mail.utexas.edu

8353. Lau, D.C.P.; Leung, K.M.Y.; Dudgeon, D. (2009): What does stable isotope analysis reveal about trophic relationships and the relative importance of allochthonous and autochthonous resources in tropical streams? A synthetic study from Hong Kong. *Freshwater Biology* 54: 127-141. (in English) ["1. Analysis of the stable isotope signatures of carbon (C) and nitrogen (N) of foods and consumers has led to some preliminary understanding of the relative importance of allochthonous and autochthonous resources in tropical streams. However, robust generalizations about the dynamics of food webs in these habitats, and their response to shading gradients or season, are still lacking. In addition, the feasibility of employing a baseline $\delta^{15}\text{N}$ value for estimating trophic positions (TPs) of consumers in small tropical streams has yet to be explored. 2. We analysed data on stable isotope signatures of food sources and aquatic consumers obtained from 14 studies carried out in small streams in monsoonal Hong Kong (22°30'N, 114°10'E) between 1996 and 2006. Emphasis was placed on determining the relative importance of leaf litter and autochthonous foods in supporting consumer biomass, and the extent to which trophic base and TP vary among streams and seasons. 3. Although allochthonous leaf litter was generally ^{13}C - and ^{15}N -depleted relative to autochthonous foods, there were marked isotopic shifts of food sources and consumers in response to season (dry versus wet) and stream shading. Consumer taxa were generally more ^{13}C - and ^{15}N -enriched in the unshaded streams, but seasonal effects were more variable. Despite these changes, there was consistent evidence that stream food webs were based on periphytic algae and/or cyanobacteria with leaf litter serving as a minor food. 4. Heptageniidae (Ephemeroptera), Tipulidae (Diptera), Elmidae (Coleoptera) and shrimps (Atyidae) were used as a baseline for calculating the TPs of other consumer taxa. The maximum TPs in shaded streams remained fairly constant between seasons (dry = 3.93; wet = 3.97), while those in unshaded streams were higher and showed seasonal fluctuations (dry = 5.13; wet = 4.39). 5. Although variations in consumer isotope signatures in response to season and shading gradients did not confound our interpretation of the stream food base, changes in consumer $\delta^{15}\text{N}$ did affect the calculation of consumer TPs. Misleading estimates of consumer TPs are likely if samples are collected from a narrow range of streams and/or during one season. Overestimation of

the TPs of specialist herbivores (e.g. fish grazers) is also possible when autochthonous resources are substantially more ¹⁵N-enriched than allochthonous foods." (Authors) The study includes *Euphaea decorata*.] Address: Dudgeon, D., Division of Ecology & Biodiversity, School of Biological Sciences, The University of Hong Kong, Pokfulam Road, Hong Kong, China. E-mail: ddudgeon@hkucc.hku.hk

8354. Le Viol, I.; Mocq, J.; Julliard, R.; Kerbiriou, C. (2009): The contribution of motorway stormwater retention ponds to the biodiversity of aquatic macroinvertebrates. *Biological Conservation* 142(12): 3163-3171. (in English) ["Biodiversity conservation does predominantly focus on protected natural areas, but has to consider also the usually Human-dominated matrix in which these natural areas are embedded. Here we study highway stormwater retention ponds, which may act as refuges for native flora and fauna and contribute to the maintenance of biodiversity in Human-dominated landscapes. However, the biodiversity supported by such artificial ponds has received little attention so far. Using standardised methods, we addressed the potential role of highway stormwater ponds as refuges by comparing aquatic macroinvertebrate communities (Coleoptera, Heteroptera, Odonata and Gastropoda) in highway stormwater ponds with ponds in the wider landscape. As expected from their pollutant retention function, highway ponds differed in abiotic conditions from surrounding ponds. However, they supported aquatic macroinvertebrate communities at least as rich and diverse at the family level as surrounding ponds and exhibited similar variability in family community composition and structure. The main difference we observed was a higher abundance of small and/or short-lived invertebrates in the highway ponds. These similar community compositions and structures suggest that highway ponds contribute to the biodiversity of the pond network at a regional scale. Thus, road practitioners should consider highway ponds not only for their hydrological and pollutant retaining purposes but also as a possibility to increase the role of highway verges as a refuge and, consequently, landscape connectivity. The management of these water bodies should recognise their potential for biodiversity especially in Human-dominated landscapes."(Authors)] Address: Le Viol, Isabelle, Muséum national d'Histoire naturelle, Conservation des espèces, restauration et suivi des populations, CERSP – UMR 7204 MNHN-CNRS-UPMC, 55 rue Buffon, 75005 Paris, France

8355. Lee, E.M.; Hong, M.Y.; Kim, M.I.; Kim, M.J.; Park, H.C.; Kim, K.Y.; Lee, I.H.; Bae, C.H.; Jin, B.R.; Kim, I. (2009): The complete mitogenome sequences of the palaeopteran insects *Ephemera orientalis* (Ephemeroptera: Ephemeridae) and *Davidius lunatus* (Odonata: Gomphidae). *Genome* 52(9): 810-817. (in English) ["Currently, the palaeopteran lineages (insect orders Ephemeroptera and Odonata) that have a problematic relationship with neopteran lineages are poorly represented by mitogenome sequences. In this study, we have determined the complete mitogenome of the oriental mayfly, *Ephemera orientalis*, and the dragonfly *Davidius lunatus*. The 16 463 bp mitogenome of *E. orientalis* and the 15 912 bp mitogenome of *D. lunatus* have many of the features typically detected in insect mitogenomes. Although the initiation codon for the *D. lunatus* COI gene is the typical ATA, *E. orientalis* is unusual in that no typical start codon was detected in the start region of

the COI gene. The A+T-rich regions of both mitogenomes have some unusual features. The *E. orientalis* A+T-rich region harbors two identical 55 bp sequences separated by 158 bp, and the *D. lunatus* A+T-rich region harbors a tandem repeat comprising two identical 261 bp copies and one partial copy of the repeat. Additionally, the A+T-rich regions of both mitogenomes harbour the stem-and-loop structures flanked by the conserved sequences "TA(A)TA" at the 5' end and "G(A)nT" at the 3' end, which have been suggested to be the signals involved in minor strand replication initiation. Furthermore, the *D. lunatus* A+T-rich region contains two tRNA-like structures with proper anticodon and cloverleaf structures." (Authors)] Address: Hong, M.Y., Dept of Life Science, Hoseo University, Asan-city, Chungchungnam-do 336-795, Republic of Korea

8356. Lehmann, F.-O. (2009): 17. The limits of turning control in flying insects. In: Dario Floreano, Jean-Christophe Zufferey, Mandyam V. Srinivasan & Charlie Ellington (Eds.): *Flying Insects and Robots*. Springer Berlin Heidelberg. ISBN 978-3-540-89392-9 (Print): 231-246. (in English) ["This chapter provides insights into the turning flight of insects, considering this specific behaviour from experimental and numerical perspectives. The presented analyses emphasize the need for a comparative approach to flight control that links an insect's maneuverability with the physical properties of its body, the properties and response delays of the sensory organs, and the precision with which the muscular system controls the movements of the wings. In particular, the chapter focuses on the trade-off between lift production and the requirement to produce lateral forces during turning flight. Such information will be useful not only for a better understanding of the evolution and mechanics of insect flight but also for engineers who aim to improve the performance of the future generation of biomimetic micro-air vehicles." (Authors) References to Odonata are made.] Address: Lehmann, F.-O., Institute of Neurobiology, University of Ulm, Albert-Einstein-Allee 11, 89081 Ulm, Germany. E-mail: fritz.lehmann@uni-ulm.de

8357. Lemelin, R.H. (2009): Goodwill Hunting? Dragon hunters, dragonflies & leisure. *Current Issues in Tourism* 12(5&6): 553-571. (in English) ["In Asia, insects have a long history of being a part of recreation and tourism activities, with some species such as rhinoceros beetles and dragonflies being raised as pets. While the role of insects in recreation and tourism (i.e. dragonfly gatherings, educational outings) is somewhat more modest in North America, Europe, and Australia, some of these activities are increasing in popularity. The availability of field guides, associations, and websites is helping to facilitate the growth of these leisure activities, and more specifically the viewing of Odonata. Participant observations and interviews were used to provide an empirical understanding of how one particular insect order - Odonata attracts participants to recreation and tourism activities, fosters interests, and creates controversies (e.g. collecting). A theoretical framework provided by naturework, an interpretivistic approach developed by Fine [(2003). *Morel tales: The culture of mushrooming*. University of Illinois Press.] is used to understand the philosophies involved in dragonflying. The conclusion highlights how new forms of recreation and tourism activities can promote greater awareness of insects." (Author)] Address: Lemelin, H., Lakehead University, School of Outdoor Recreation, Parks and Tour-

ism, 955 Oliver Rd., Thunder Bay, Ontario, P7B 5E1, Canada. E-mail: harvey.lemelin@lakeheadu.ca

8358. Li, J.; Luo, Y.-q.; Huang, T.-y.; Shi, J.; Chen, Y.-j.; Heliövaara, K. (2009): Diversity and dominant species of arthropods in different forests of Aershan, Inner Mongolia. *Forestry Studies in China* 11(1): 1-8. (in English) [Four Odonata species without any taxonomic details are listed in a table.] Address: Luo, Y.-q., Key Laboratory for Silviculture and Conservation of Ministry of Education, Beijing Forestry University, Beijing 100083, P.R. China. E-mail: youqingluo@126.com

8359. Liao, L.M. (2009): Recent collecting efforts of Philippine flora and fauna based on a critical assessment of the published literature (2002-2005): Some accommodations for policy re-evaluation and reforms. *Philippine Journal of Systematic Biology* 3: 68-96. (in English) [The bibliography includes papers from Dirk Gassmann, Matti Hämäläinen and Jan van Tol on Odonata.] Address: Liao, L.M., Graduate School of Biosphere Science, Hiroshima University, 1-4-4 Kagamiyama, Higashi-Hiroshima, 739-8528 Japan

8360. Linke, T.J. (2009): Flussjungfern am Niederrhein. Verbreitung und Habitatbindung. Diplomarbeit. Institut für Landschaftsökologie, Westfälische Wilhelms-Universität Münster: III, 44 pp, Anhänge. (in German, with English summary) ["Distribution and population density of clubtails at the lower Rhine over, are poorly investigated: only a few exuviae and adults of *Gomphus flavipes*, *G. vulgatissimus*, *Onychogomphus forcipatus* and *Ophiogomphus cecilia* were observed during the last decade. This study aims at investigating the local distribution and at identifying those environmental factors that determine habitat selection. Research was carried out at 30 study sites of 200 x 10 m size, between May 1st and August 31st 2008. Each site was sampled 10 times for exuviae. Additionally, structural parameters were ascertained. Exuviae of all four gomphids were found; however, numbers differed widely. Compared to other streams total abundances of all species were low. Most common species in the area were *G. flavipes* and *G. vulgatissimus* (4-5 exuviae/200 m waterside). At most sites, *G. flavipes* and *G. vulgatissimus* co-occurred. At five sites, exuviae of *O. forcipatus* occurred together with these two species. Exuviae abundances of *G. flavipes* showed positive correlation with the amount of fine sand fractions. A positive effect of sand and total riparian vegetation cover on the abundances of *G. vulgatissimus* was indicated. In sandy substrates *O. forcipatus* and *O. cecilia* are possibly replaced by *G. flavipes* and *G. vulgatissimus* due to hunting strategy and activity patterns. It is assumed, that low abundances of exuviae are caused by inappropriate and fragmented habitat structures, noticeable by the lack of fine substrate fractions. Additionally, hydromorphology, adjacent land use and shipping traffic may have a negative influence on the species." (Author)] Address: Linke, J., Schillerstr. 71, 48155 Münster, Germany

8361. Linke, T.J. (2009): Exuvienfunde zweier Gomphiden im Brackwasserbereich des Nestos (Odonata: Gomphidae). *Libellula* 28(3/4): 203-208. (in German, with English summary) ["On 30-V-2009 several exuviae of *Gomphus vulgatissimus* and *Onychogomphus f. forcipatus* were found on the beach of the estuary mouth of River Nestos. The possible origin of the exuviae is

briefly discussed.] Address: Linke, T.J., Gertrudenstr. 29A, D-38120 Braunschweig, Germany. E-mail: jonas.linke@web.de

8362. Linke, T.J.; Fartmann, T. (2009): Flussjungfern am Niederrhein: Verbreitung und Habitatbindung (Odonata: Gomphidae). *Libellula* 28(3/4): 159-173. (in German, with English summary) ["This study aims to investigate the local distribution and to identify environmental factors that determine habitat selection of all species of Gomphidae on the Lower Rhine. Altogether exuviae of 4 gomphid species were recorded, however, their numbers differed widely. Compared to other large rivers, the total abundances of all species were low. Most abundant were *Gomphus flavipes* and *G. vulgatissimus*, with 4-5 exuviae on 200 m bank sections. Exuviae abundances of *G. flavipes* were positively correlated with the amount of fine sand, those of *G. vulgatissimus* with sand and total riparian vegetation cover. Both *G. flavipes* and *G. vulgatissimus* can be described as specialists for certain digging substrates and as opportunists in their emergence behaviour. We assume that low abundances of exuviae are caused by inappropriate and fragmented habitat structures, noticeably by the lack of fine substrate fractions. Additionally, hydro-morphology, drift, adjacent land use and shipping traffic may have a negative influence on gomphids." (Authors)] Address: Linke, T.J., Gertrudenstr. 29A, D-38120 Braunschweig, Germany. E-mail: jonas.linke@web.de

8363. Lorenzo-Carballa, M.O.; Cordero-Rivera, A. (2009): Thelytokous parthenogenesis in the damselfly *Ischnura hastata* (Odonata, Coenagrionidae): genetic mechanisms and lack of bacterial infection. *Heredity* 103: 377-384. (in English) ["Thelytokous parthenogenesis, the production of female-only offspring from unfertilized eggs, has been described in all the insect orders, but is a rare phenomenon in the Odonata. The only-known case of parthenogenesis in this group is the North American damselfly species *Ischnura hastata*, which has parthenogenetic populations in the Azores Islands. Here, we present for the first time the results of laboratory rearing, which showed parthenogenetic reproduction in the Azorean I. *hastata* populations. In an attempt to understand how parthenogenesis could have evolved in this species, we first determined the genetic mode of parthenogenesis by analysing the genotype of parthenogenetic females and their offspring at three polymorphic microsatellite loci. In addition, we used polymerase chain reaction amplification to test whether parthenogenesis in I. *hastata* could be bacterially induced. Our data indicate that thelytoky is achieved through an (at least functionally) apomictic mechanism and that parthenogenesis is not caused by endosymbionts. Finally, we discuss possible routes to parthenogenetic reproduction, as well as the evolutionary implications of this type of parthenogenesis." (Authors)] Address: Lorenzo-Carballa, M.O., Departamento de Ecología e Biología Animal, Grupo de Ecología Evolutiva e da Conservación, Universidade de Vigo, EUET Forestal, Campus Universitario, Pontevedra, España 36005, Spain. E-mail: olalla.lorenzo@uvigo.es

8364. Lorenzo-Carballa, M.O.; Beatty, C.D.; Utzeri, C.; Vieira, V.; Cordero-Rivera, A. (2009): Parthenogenetic *Ischnura hastata* revisited: present status and notes on population ecology and behaviour (Odonata: Coenagrionidae). *International Journal of Odonatology* 12(2): 395-411, pl. VIII. (in English) ["Populations of *Ischnura*

hastata found in the Azores archipelago represent the only known example of parthenogenesis in the order Odonata. In this paper, we present results from field-work done on the islands of São Miguel, Pico, Santa Maria, and Graciosa, aimed at characterizing population ecology and habitat preferences of this species. Sampling of several ponds in the islands of São Miguel and Pico showed that *I. hastata* occurred in oligotrophic ponds, but was absent from all eutrophic ponds sampled, many of which have been impacted by cattle grazing and water extraction by humans. This suggests that parthenogenetic populations are highly sensitive to eutrophication, which may be different from suggested habitat preferences of sexual populations for this species. Mark-recapture studies showed *I. hastata* to occur in high densities in the studied populations. Although life expectancy of mature females was estimated at less than one week, their high fecundity and fertility could potentially explain the large number of individuals observed in some of the studied sites. Submerged oviposition seems to be a common behaviour, probably evolved as an adaptation to unfavourable climatic conditions and to avoid egg desiccation caused by water depletion. In summary, this work represents a first attempt to study the ecology and population biology of parthenogenetic populations of *I. hastata*, and may help us to understand the unique conditions under which these populations could have evolved and how to best insure their conservation." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

8365. Lowe, C.D.; Harvey, I.F.; Watts, P.C.; Thompson, D.J. (2009): Reproductive timing and patterns of development the damselfly *Coenagrion puella* in the field. *Ecology* 90: 2202-2212. (in English) ["By a combination of detailed behavioural observations and molecular genetic approaches we have assessed development time, timing of first maturity, and the extent of genetic structure through the flying season in a wild population of *C. puella* in England. This work provides the first estimate of development time (egg to mature adult) in the field based on individual damselflies. Development time was significantly longer for females than males. In contrast to reported laboratory studies, there was no difference in development times between different female colour morphs. Development time ranged between 347 and 396 days and was negatively correlated with egg-laying date. As a result eggs laid early in one season reach adult maturity relatively late in the next; concurrently individuals developing from eggs laid late mature relatively early. We speculate that this pattern of development is a direct physiological response to seasonal environmental variation and results in reproductive synchrony within a population. Size, specifically hind wing length, declined with development time in males, but not in females. In one of the two years of the study there was evidence for weak clustering of related individuals during the reproductive season. This appeared to be the result of developmental synchronization within families: variance in timing of maturation was smaller in full-sib families than in half-sib families or randomly assigned unrelated groups." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

8366. Lozano, F.; Muzon, J.; Torres, S. (2009): Description of the final instar larva of *Homeoura lindneri* (Ris, 1928) and redescription of the larva of *H. chelifera* (Selys, 1876) (Odonata: Coenagrionidae). *Zootaxa* 2231: 47-54. (in English, with Spanish summary) ["The final instar larvae of *H. lindneri* and *H. chelifera* are described and illustrated based on reared specimens from Argentina. A generic diagnosis is provided, as well as a key to the larvae of the most common genera of Coenagrionidae present in Argentina." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

8367. Luostarinen, T. (2009): Sorjahukankorento (*Libellula fulva*) Itä-Suomessa [*Libellula fulva* in eastern Finland]. *Crenata* 2: 5-7. (in Finnish) [*L. fulva* is very rare and localised in Finland, most populations live near-by Kitee (Northern Karelia). A typical biotope of *L. fulva* is shown and described and the role of calcareous water as a possible limiting factor for this species is shortly discussed. (Asmus Schröter)] Address: not stated

8368. Machado, A.B.M. (2009): Studies on Neotropical Protoneuridae. 21. The status of *Amazona Machado, 2004* (Odonata: Protoneuridae). *Lundiana* 9(1) (2008): 53-56. (in English) ["The genus *Amazona* Machado, 2004, regarded by Lencioni (2005) as a junior synonym of *Forcepsioneura* Lencioni, 1999, is revalidated based on morphological and zoogeographic evidence." (Author)] Address: Machado, A. B.M., Depto de Zool., Instituto de Ciên. Biol., Universidade Federal de Minas Gerais, C.P. 486, 31270-901, Belo Horizonte, Minas Gerais, Brasil. E-mail: angelo@icb.ufmg.br.

8369. Mäkinen, J. (2009): Havainnot hyötykäyttöön [The use and report of dragonfly observation data]. *Crenata* 2: 34-35. (in Finnish) [The scheme of the Finnish national data bank for dragonfly records is presented. (Asmus Schröter)] Address: no stated

8370. Mäkinen, J. (2009): Pääkirjoitus [Preface]. *Crenata* 2: 1. (in Finnish) [Introducing words to volume 2 of 'Crenata', the journal of the Finnish Odonatological Society.] Address: Finnish Dragonfly Society/ Suomen sudenkorentoseura ry. www.sudenkorento.fi. makisenjussi@gmail.com

8371. Magnusson, A.K.; Williams, D.D. (2009): Top-down control by insect predators in an intermittent pond – a field experiment. *Ann. Limnol. - Int. J. Lim.* 45: 131-143. (in English, with French summary) ["The role of predation in the regulation of freshwater communities is predicted to decrease along a habitat-duration gradient, from permanent to episodic waters. We tested the role of invertebrate predation in shaping the community structure in a fishless temperate intermittent pond with a three month long hydroperiod by comparing the community structure in two large field enclosures (4.2 m²) with added predators to two enclosures without added predators. The added predators reflected the density and composition of top predators in the pond and comprised weekly additions of dytiscid larvae (for three weeks) followed by weekly additions of odonate nymphs (for five weeks). Compared with the enclosure controls, the predator addition enclosures had fewer dipterans and crustaceans, higher concentrations of benthic ciliates and other protozoans, higher chlorophyll a and bacterial counts, and lower abundance of rotifers. Many treatment effects were temporally variable and this ap-

peared to be linked to predator identity, predator size, and prey availability. Compared with the surrounding pondwater, the enclosed areas had lower abundance of molluscs, ostracods and cladocerans but higher abundance of cyclopoids and higher concentrations of phytoplankton and ciliates. Despite high productivity and seasonally variable predator and prey assemblages, which likely buffered against strong top-down control, we conclude that the top-predators regulate the dipterans and zooplankton in this intermittent pond and that the effects propagated down through the food web to lower trophic levels." (Authors)] Address: Magnusson, Katarina, Dept Biol. Sc., Univ. Toronto at Scarborough, 1265 Military Trail, Scarborough, Ontario M1C 1A4, Canada. E-mail: a.katarina.magnusson@gmail.com

8372. Maguregi Arenaza, J. (2009): Presencia de *Brachytron pratense* (Müller, 1764) en la Comunidad Autónoma Vasca, norte de la Península Ibérica (Odonata: Aeshnidae). *Heteropterus Revista de Entomología* 9(1): 53-55. (in Spanish, with Euskarian and English summaries) [Field observations of *B. pratense* in Forua, Bizkaia, are reported. It is the first record of this species (rare and localised in the Iberian Peninsula) from the Basque Autonomous Community.] Address: Maguregi Arenaza, J., B° Altamira 64. 3o izda.: 48350 Busturia (Bizkaia), Spain. E-mail: fotosmagu@gmail.com

8373. Markovic, G.; Karan-Znidarsic, T.; Simonovic, P. (2009): Bryozoan species *Hyalinella punctata* Hancock in the gut content of chub *Leuciscus cephalus* L.. *Pol. J. Ecol.* 57(1): 201-205. (in English) [In spring, Odonata make up to 10%, in summer 9%, and in autumn 6% of food items in the gut content of *L. cephalus* in the Zapadna Morava river (West Serbia, Danube River basin).] Address: Markovic, G., Faculty of Agronomy, Cacak, University of Kragujevac, Cara Dušana 34, 32000 Cacak, Serbia. E-mail: goranmsv@tfc.kg.ac.yu

8374. Marrocco, J. (2009): Biomimetic design of a flexible wing. *ACCEESS Proceedings 0908*: 5 pp. (in English) ["The practical application of relatively small, and light weight micro air vehicles (MAV), is of great interest to the engineering community. Innovative and interesting approaches are being utilized to address the many constraints that arise from attempting to design a flapping MAV. The goal of this research is to investigate the structural and mechanical properties of the dragonfly, that give it its unique flight capabilities, and mimic the design in a finite element model to simulate the wings structural dynamics for analyses." (Author)] Address: Computational Science Research Center, 5500 Campanile Drive, San Diego, CA 92182-1245, USA

8375. Martens, A. (2009): Die Libellenfauna von Samos (Odonata). *Libellula* 28(3/4): 209-220. (in German, with English summary) ["From 28-VII to 09-VIII-1999, 24 species were recorded from a total of 24 localities. *Selysiotthemis nigra* is new for the fauna of Samos, which now includes 32 species of Odonata. An overview of the Odonata fauna is given. Emphasis is placed on the fauna of permanent lotic waters, which are threatened by intensive use of water for irrigation purposes and touristic development." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Bismarckstr. 10, D-76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de

8376. Martens, A.; Griese, J. (2009): Verschleppung von *Agrionemys pygmaea* mit exotischen Wasserpflan-

zen nach Deutschland (Odonata: Coenagrionidae). *Libellula* 28(3/4): 187-189. (in German, with English summary) ["Two very small zygopteran larvae were taken from an aquarium with exotic plants in a pet shop in Karlsruhe, Germany. After emergence, one individual was clearly identified as a male *A. pygmaea* (Rambur). The species is distributed from India to Japan and Australia, where it is common at waters with rich vegetation. Currently, tropical plants for aquaristics in Europe are mainly imported from Singapore, Indonesia and Thailand, and it is suggested that the damselflies originated in one of those countries." (Authors)] Address: Griese, J., Bahnhofstr. 34, D-76461 Muggensturm, Germany. E-mail: lilly.Griese@t-online.de

8377. Martinez, N.; Küttel, M.; Weber, D. (2009): Deutliche Zunahme wildlebender Tierarten in der Schweiz seit 1900. Aussterbe- und Einwanderungsereignisse über 107 Jahre. *Naturschutz und Landschaftsplanung* 41(12): 375-381. (in German, with English summary) ["The number of species recorded on Red Lists in Central European countries is high and includes several species that already have disappeared. This suggests that the total species number is declining in these countries. However, besides disappearing species there are species immigrating into new areas, either due to human help or due to natural area expansion, as well as formerly extinct species that are remigrating. Regional extinction of some species therefore does not necessarily lead to a decrease in total species number. The study analysed the influence of extinction and of immigration on total species number in Switzerland for the last 107 years and for several taxonomic groups (mammals without bats, breeding birds, reptiles, amphibians, fish, cyclostomes, butterflies, grasshoppers and dragonflies). During this period total species number clearly increased (+19 species). This increase is mainly due to species that immigrated autonomously from other European countries. Most of them are wetland inhabitants." (Authors) As new to the Odonata fauna are listed *Erythromma lindenii* (1910), *Crocothemis erythraea* (1990), and *Orthetrum albistylum* (1990). Lost Odonata are *Coenagrion lunulatum* (2000), *C. ornatum* (1960), and *Onychogomphus uncutus* (1990).] Address: Martinez, N., Hintermann & Weber AG, Austr. 2a, CH-4153 Reinach, Switzerland. E-Mail martinez@hintermannweber.ch

8378. Matsumoto, K. (2009): Odonate fauna of Tama Forest Science Garden. *Bulletin of Forest Entomology, Forestry and Forest Research Institute (FFPRI)* 8(1): 109-114. (in Japanese, with English summary) [33 odonate species were collected in the Tama Forest Science Garden of Forestry and Forest Products Research Institute, Hachioji City, Tokyo Metropolis, Japan. Species occurring in Hachioji City but unrecorded from the study locality were mostly those preferring un-shaded ponds or marshy habitats, and those preferring middle reaches or limited to upper reaches of running waters. Twelve red data listed species for South Tama Region of Tokyo Metropolis are represented in this study: three B-ranked species (*Onychogomphus viridicostus*, *Boyeria maclachlani* and *Aeschna juncea juncea*), and eight C-ranked species (*Asiagomphus melaenops*, *Lanthus fujiacus*, *Sieboldius albardae*, *Gynacantha japonica*, *Polycanthygyna melanictera*, *Somatochlora uchidai*, *Sympetrum parvulum*, and *Sympetrum infuscatum*.)] Address: Matsumoto, K., Division of Forest Entomology, Forestry & Forest products Research Institute, Matsun-

osato 1, Tsukuba, Ibaraki 305-8687 Japan. E-mail: kazuma@ffpri.affrc.go.jp

8379. McMullen, L.E.; Campbell, E.Y.; Lytle, D.A. (2009): Burrowing behaviour of *Progomphus borealis* (McLachlan) larvae (Anisoptera: Gomphidae). *Notulae odonatologicae* 7(4): 39-41. (in English) ["Burrowing behaviour was studied in the Big Sandy River (Mojave co., Arizona, USA). Observations of (1) burrowing speed and (2) trail length of different instars are discussed. *P. borealis* is shown to have the fastest burrowing speed of all larval Odonata. on record." (Authors)] Address: McMullen, L.E., Department of Zoology, Oregon State University, Corvallis, OR 97331, USA

8380. Metsälä, P.; Parkko, P. (2009): Summit sahlbergi [Sahlbergi summit]. *Crenata* 2: 32-33. (in Finnish) [The authors report about a typical trip to northern Finnish-Lapland with *Somatochlora sahlbergi* as the target species. Plenty of dragonflies were observed during the four days trip but not the elusive *S. sahlbergi*. (Asmus Schröter)] Address: not stated

8381. Meurgey, F. (2009): Description of the larva of *Macrothemis meurgeyi* Daigle from the Lesser Antilles (Anisoptera: Libellulidae). *Odonatologica* 38(4): 365-368. (in English) ["The last instar larva is described and illustrated for the first time, and compared with the known congeneric larvae from the Caribbean. Its peculiarities are: size reduction of dorsal hooks, the presence of a dorsal hook on segment 2, and the absence of dorsal hooks on segments 6-9. *M. meurgeyi* has a triangular ligula with 10 premental setae and 6 palpal setae. Notes on the ecology of this lotic species are provided." (Author)] Address: Meurgey, F., Muséum d'Histoire Naturelle, 12 rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

8382. Meurgey, F. (2009): Redescription of *Argia concinna* (Rambur), with a description of *Argia telesfordi* spec. nov. from Grenada, West Indies (Zygoptera: Coenagrionidae). *Zootaxa* 2272: 54-62. (in English) ["*Argia telesfordi* sp. nov. a new species close to *Argia concinna*, is described from Grenada. Both species are illustrated and diagnosed. They can be distinguished by morphology of male tori, cerci and paraproct and female mesostigmal laminae. Their distribution is allopatric, with *Argia telesfordi* distributed on Grenada and *Argia concinna* known only from Guadeloupe and Dominica." (Author)] Address: Meurgey, F., Muséum d'Histoire Naturelle, 12, rue Voltaire, 44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

8383. Meurgey, F. (2009): The Odonata of Grenada (Lesser Antilles). Survey report May 1 – 14 2009. L'Herminier Natural History Society. Odonata report # 1: 33 pp, app.. (in English) ["This report is based on the examination of 200 specimens, collected by two individuals. Although 23 specimen localities are included in this report, and although these localities occur in the totality of the six parishes of Grenada, the areal coverage of the island is uneven. The principal collecting localities have been in the north part of the island, and especially on St Andrews and St Marks parishes, along the east coast, in the central uplands of the island and in the most of waterfalls. There are very few collections from the south part of the island, and almost none from the south-west coast of the island. The most important locality, on the northeast coast of Grenada is the large swamp at Meadow Beach, at Conference Bay, where a

variety of habitats have been collected rather thoroughly. The most of the species are far more common here than elsewhere, and *Lestes tenuatus* and *Erythrodiplax fervida* has been recorded on Grenada only from this locality. Several waterfalls in the central upland region were collected repeatedly. These streams and small rivers are characteristically rocky, more or less swift, and have very limited emergent vegetation. They have limited odonata fauna, consisting mainly of *Argia concinna*, *Dythemis sterilis* and *Brechmorhoga praecox grenadensis*. From a biogeographical point of view, the dragonfly fauna of Grenada is clearly a mix between the Caribbean and the South American fauna, with three species originated from South America not shared with other islands, and one (*Argia concinna*) which is a Caribbean endemic. This first survey needs to be completed by further researches on the ecology and on the biology of species. The dragonfly fauna of Grenada could increase to 20-22 species." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

8384. Michalczyk, M.; Buczyński, P.; Daraż, B. (2009): First data from the monitoring of population condition of Ornate Bluet *Coenagrion ornatum* (Selys, 1850) in the valley of Sieniocha river (Sniatycze, south-eastern Poland) *Wiaczeslaw. Odonatrix* 5(2): 33-44. (in Polish, with English summary) ["*Coenagrion ornatum* is a critically endangered dragonfly species in Poland known nowadays from only one site (three others given after 1990 extinguished). The authors discuss first data (2007–2008) coming from regular observations of the last known population discovered in 2007 r. in Sniatycze near Zamosc (50°38'–50°39'N, 23°32'E, UTM square: FB71). *C. ornatum* inhabits one of drainage ditches in the area of a spring fen of calcareous character (Fig. 1). *Molinietum caeruleae* and *Caricetum appropinquatae* are dominating in vegetation, in some places *Cladietum marisci* and *Schoenetum ferruginei*, associated with shallowly situated calcareous substratum, are also preserved. The described fen is systematically burnt-out together with surrounding meadows. The ditch with *C. ornatum* has no direct connection with springs. Its water is warmer, slightly impoverished in oxygen and more fertile than spring waters (Tab. 1). During the warmer winter in 2007 ice layer did not cover the whole water surface –it was present only in sides. In the cooler winter in 2008 layer reached the thickness of 5 cm and covered the whole water surface, however, the ditch were not frozen to the bottom. The ditch is shallow (a few cm), narrow (the width of water surface up to 1m, however, in many places only to 20–30 cm), the bottom is covered with muddy substrata. Current is slow, water transparent. The bottom is grown by *Berula erecta*: in varied density –from a single plant to compact clusters. In large part of the watercourse the expansion of *Phragmites communis* and *Carex appropinquata* is visible, banks are grown by single scrubby willows in some places. In the front part of the ditch water is covered by moss mats. Regular observations were conducted in the year 2007, from the moment of discovery of the site and through the whole year 2008. *C. ornatum* was noted during 11 controls (Tab. 2). Maximum number of individuals was 195, they inhabited the stretch of ditch with length of ca. 170 m –with *Berula erecta* the least choked by *Phragmites communis* and *Carex appropinquata*. The period of imaginal flight lasted from the last decade of May till the last decade of July (individuals

observed on 3 June were very numerous and partially mature therefore their emergence must have taken place several days earlier). It is a relevant supplement to the previous data from Poland. This corresponds with the data from Czech Republic and is similar to data from other countries of Central and Eastern Europe. The features of habitat correspond with these in literature. The fact that the species is resistant to ice layer seems to be important (however, water must be flowing just above the bottom). Two colour forms were distinguished within females: blue and green, within males – only blue one. Juvenile individuals of blue form were violet, green one – beige-brown. The base of eyes corresponded with colour forms. Three forms of abdominal pattern of males and two of females were described (Fig. 2). One of the forms of males (spot in form of goblet without a stem on the second segment) has been described for the first time. The following species coexisted with *C. ornatum* in the ditch (* autochthonic ones or probably autochthonic): *Lestes barbarus*, **L. sponsa*, *Ischnura elegans*, *I. pumilio*, **Enallagma cyathigerum*, **Coenagrion puella*, **C. pulchellum*, **Somatochlora flavomaculata*, *Libellula quadrimaculata*, *L. fulva*, **Orthetrum coerulescens*, *O. cancellatum*, *Sympetrum danae*, **S. sanguineum*, *S. vulgatum*. In neighbouring habitats (other ditches, peat excavations) there were also: *Calopteryx virgo*, **Sympecma paedisca*, *Pyrrhosoma nymphula*, **Aeshna juncea*, *Leucorrhinia albifrons*. The threat to the ornate bluet in Sniatycze is mainly the expansion of vegetation (reed and sedges). Moreover, water surface is covered with litter. In 2008, by the efforts of Nature Association of Zamosc, first protection activities were taken like mowing reeds in some places and removing reed and sedge litter from current to the banks of the watercourse. The aim of these activities is to redouble the length of the ditch with optimal conditions for the species. These actions will be continued and their results monitored. *C. ornatum* is the species proposed by Poland to the appendix II of Habitats Directive. On this account, as well as due to its legal protection and Red List status, this species should be encompassed by national program of inventarisation, monitoring and protection. In the meantime there are no funds for this purpose – at the same time money is available for researches of species important but not endangered in Poland to Nature 2000, like *Ophiogomphus cecilia* and *Leucorrhinia pectoralis*. The authors criticise this situation." (Authors)] Address: Michalczuk, M., Zamojskie Towarzystwo Przyrodnicze, ul. Szymonowica 19/6, 22-400 Zamość, Poland. E-mail: wiack@wp.pl

8385. Miszta, A.; Cuber, P. (2009): New localities of dragonflies (Odonata) endangered in Poland recorded in the years 2006–2008 in Silesian Province outside of protected areas. *Odonatrix* 5(2): 48-54. (in Polish, with English summary) ["In the area of districts: Chelm Śląski, Tarnowskie Góry, Ogrodzieniec and the city of Czechochowa, five new sites were found in 2006–2008, which occurred to be the breeding and development sites of endangered dragonfly species in Poland, such as: *Nehalennia speciosa*, *Somatochlora arctica*, *Cordulegaster boltonii*, *Aeshna subarctica elisabethae* and *A. juncea*. One of those sites, a sinkhole pond in Bledów near Chelm Śląski, is quite interesting for *N. speciosa*, *A. subarctica* and *A. juncea* were recorded all together. Another interesting site is in Pniowiec, where *S. arctica* and *C. boltonii* were found, which completed previous observations of the other dragonfly species in this site: *Brachytron pratense*. Because of their natural aspects

both sites are going to be included in the conservation system of Nature 2000 areas." (Authors)] Address: Miszta, Alicja, Centrum Dziedzictwa Przyrody Górnego Śląska, ul. Św. Huberta 35, 40-543 Katowice, Poland. E-mail: a.miszta@cdpigs.katowice.pl

8386. Mitra, T.R.; Babu, R. (2009): Previously unrecorded Odonata from salt ranges and Sind in Pakistan. *Notul. odonatol.* 7(4): 37-44. (in English) [238 specimens in the National Zoological Collection at Zoological Survey of India: 28 species are new records for Salt Ranges and 11 species for Sind. (Authors)] Address: Babu, R., Zoological Survey of India, M-Block, New Alipore, Kolkata/Calcutta - 700 053, India. E-mail: rb-abu2000@rediffmail.com

8387. Montana, C.G.; Winemiller, K.O. (2009): Comparative feeding ecology and habitats use of *Crenicichla* species (Perciformes: Cichlidae) in a Venezuelan floodplain river. *Neotropical Ichthyology* 7(2): 267-274. (in English, with Spanish summary) ["Feeding behaviour and habitat use of two species of pike cichlids *Crenicichla lugubris* and *C. aff. wallacii* were studied in the río Cinaruco, a floodplain river in the Venezuelan llanos. We examined 309 individuals of *C. lugubris* and 270 individuals of *C. aff. wallacii* from both the main channel and lagoons throughout the falling-water phase of the annual hydrological cycle. [...] Analysis of stomach contents showed that larger specimens (> 100 mm SL) *C. lugubris* fed mostly on small fishes (e.g. characids, cichlids), but juveniles (< 100 mm SL) consumed mostly aquatic insects, fish scales, and shrimps. *Crenicichla aff. wallacii* fed on aquatic insects and other invertebrates associated with leaf litter substrates." (Authors) "Odonata" contributed up to app. 10% of the diet depending on the age class of the fish.] Address: Montaña, Carmen, Section of Ecology, Evolution and Systematic Biology, Dept Wildlife & Fisheries Sciences. Texas A&M University, College Station, TX 77843-2258, USA. E-mail: car1607@tamu.edu

8388. Moreira-Hara, S.S.; Zuanon, J.A.S.; Amadio, S.A. (2009): Feeding of *Pellona flavipinnis* (Clupeiformes, Pristigasteridae) in a Central Amazonian floodplain. *Iheringia, Sér. Zool.* 99(2): 153-157. (in English, with Portuguese summary) ["The feeding habits of *P. flavipinnis* at Catalão, a floodplain area on the Brazilian Central Amazon was studied. Data was obtained during three hydrological cycles, between September 1999 and September 2003. Diet composition, daily and seasonal variation in the feeding activity and the relationship between predator's size and its prey were analyzed. Almost 80% of the food consumed has autochthonous origin and diet was composed basically by insects and fish. Juvenile fish predominated in the stomach contents of all size classes but there was no significant relationship between predator's size and its prey. *P. flavipinnis* may be considered a carnivorous species which feeds mainly on juvenile (young-of-the-year) specimens of other fish. More intense feeding activity occurred at night and in the high water period." (Authors) "Odonata" accounted significantly to the diet of the fish species.] Address: Moreira-Hara, Sandra, Escola Superior Batista do Amazonas, Rua Leonor Telles, 278, Conj. Abílio Nery, Adrianópolis, Manaus, AM, Brazil. E-mail: sandrasocorromoreira@yahoo.com.br

8389. Moreno, P.; Franca, J.S.; Ferreira, W.R.; Paz, A.D.; Monteiro, I.M.; Callisto, M. (2009): Use of the

BEAST model for biomonitoring water quality in a neotropical basin. *Hydrobiologia* 630: 231-242. (in English) ["The use of predictive models in Neotropical basins is relatively new, and applying these models in large basins is hindered by the lack of ecological, geographical, and social-environmental knowledge. Despite these difficulties, we used data from the das Velhas River basin to apply the BEAST (Benthic Assessment of SedimenT) methodology to evaluate and classify the level of environmental degradation. Our two main objectives were to modify and implement the BEAST methodology for use in biomonitoring programs of Brazilian basins, and to test the hypothesis that a gradient of environmental degradation determines a gradient in the structure and composition of benthic macroinvertebrate assemblages. We evaluated 37 sites: 8 in the main river, 15 in the main tributaries with different impact levels, and 14 in tributaries with minimally disturbed conditions (MDC). The BEAST model allowed us to classify 16 test sites: two as natural, four as altered, three as highly altered, and seven as degraded. Our results indicated degradation of the das Velhas River basin near its urban areas. The BEAST model indicated that the pollution gradient found among the sites generated a gradient of the macroinvertebrate assemblages, corroborating the hypothesis." (Authors) Odonata are treated at the family level.] Address: Callisto, M., Laboratório de Ecologia de Bentos, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Av. Antônio Carlos 6627, Belo Horizonte, Minas Gerais, Brazil. E-mail: callistom@ufmg.br

8390. Msyani, E.K.; Lazaro, J.; Castor, O.N.; Chambegega, O.A. (2009): Seasonal inventory and status of flying insects, in Kihansi Gorge, Tanzania. *African Journal of Ecology* 47(3): 267-275. (in English) ["Sampling of flying insects in Kihansi Gorge was conducted in six micro-habitats namely Lower, Upper, Main, Mid-Gorge and Mhalala Spray Wetlands and adjacent forest. The four traps used were, malaise, pitfall, light and artificial substrate sampler, besides sweep netting and beating. In the wet season, 65,549 flying insects (65.13%) were recorded when compared to 35,633 flying insects (34.87%) in dry season. At its peak, 29,783 flying insects (29.15%) were recorded at the start of wet season (December 2004). The abundance value was significant ($\chi^2= 1794.98$, d.f.= 5, $P \leq 0.001$). The favourable weather condition at the beginning of the wet season might have triggered emergence of high numbers of winged insects like ants, to facilitate migration through dispersal and reproduction, and some aquatic insects (Plecoptera, Odonata and Trichoptera) moulted and entered into terrestrial life to raise terrestrial abundance. No association was recorded between abundance of flying insects and amphibians (Kihansi Spray Toad; *Nectophrynoides asperginis*), for Mid-Gorge and Main Spray Wetlands ($r = -0.71$, $n = 4$, $P = 0.147$ and $r = -0.69$, $n = 5$, $P = 0.201$) respectively." (Authors)] Address: Msyani, E.K., Coll. of African Wildlife Management, Mweka, PO Box 3031, Moshi, Tanzania; E-mail: emsyani@yahoo.com

8391. Müller, J. (2009): Bibliographie zur Libellen-Fauna (Odonata) Sachsens-Anhalts. Erstes Verzeichnis der Schriften zur Libellen-Fauna Sachsens-Anhalts. Abhandlungen und Berichte des Museums Heineanum 8: 55-83. (in German, with English summary) [An annotated bibliography of odonatological literature from Saxony-Anhalt, Germany is presented, comprising 275 literature-references and 178 unpublished expert research

reports.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

8392. Müller, J.; Steglich, R. (2009): Zum Vorkommen der Scharlachlibelle *Ceragrion tenellum* in Sachsen-Anhalt. *halophila*, Mitt.-Bl. FG Faun. u. Ökol. Staßfurt 53: 14. (in German) [Sachsen-Anhalt, Germany; compilation of records of this regionally very rare species.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

8393. Müller, J. (2009): Beitrag zur Geschichte der Libellenkunde (Odonatologie) in Sachsen-Anhalt. Abhandlungen und Berichte des Museums Heineanum 8: 35-53. (in German, with English summary) [The paper presents a concise history of odonatological research in Sachsen-Anhalt, Germany, documents regional museum collections of Odonata, and compiles biographic data of 65 odonatologists / persons involved in odonatological research in Sachsen-Anhalt.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

8394. Muzon, J. (2009): Estado actual del conocimiento del orden Odonata en la Patagonia. *Rev. Soc. Entomol. Argent.* 68(1-2): 163-167. (in Spanish, with English summary) [Patagonian (Argentina) Odonata are represented by 36 species belonging to nine families and 18 genera. "The endemism level is high being approximately 60% of the species and 40% of genera endemic. The specific richness in Patagonia decreases from West to East and from North to South, being Nahuel Buta (Chile) and Andes mountains between 38° and 41° S on the forest area, and the Somuncurá plateau (Argentina) on the steppe the richest areas. An update of its records and an analysis of the main distribution patterns are provided in this paper." (Author)] Address: Muzón, J., Instituto de Limnología "Dr. Raúl A. Ringuelet", C.C. 712, 1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

8395. Nel, A.; Huang, D.-y. (2009): First Chinese *Cymatophlebiidae* from the Middle Jurassic of Inner Mongolia (Odonata: Anisoptera: Aeshnoptera). *Palaeodiversity* 2: 199-204. (in English, with German summary) ["*Sinacymatophlebia mongolica* n. gen., n. sp., the oldest and first Chinese record of the Mesozoic aeshnopteran dragonfly family *Cymatophlebiidae*, is described from the Middle Jurassic Jiulongshan Formation of Inner Mongolia." (Authors).] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

8396. Nel, A.; Bechly, G. (2009): The third petalurid dragonfly from the lower cretaceous of Brazil (Odonata: Cretapetaluridae). *Annales zoologici (Warszawa)* 59(3): 281-285. (in English) ["*Cratopetalura petruleviciusi* gen. et sp. nov. is the third genus and species of the Mesozoic petalurid family Cretapetaluridae from the Lower Cretaceous of Brazil. With the recent discovery of another representative of this family in the Lower Cretaceous of England, it demonstrates the great diversity of this group during this period." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

8397. Nel, A.; Bechly, G.; Declos, X.; Huanag, D.-y. (2009): New and poorly known Mesozoic damsel-dragonflies (Odonata: Isophlebioidea: Campterothlebiidae,

Isophlebiidae). *Palaeodiversity* 2: 209-232. (in English, with German summary) ["The diagnoses of the families Camptero-phlebiidae and Isophlebiidae are emended. *Camptero-phlebia elegans* BODE, 1905, type of the Camptero-phlebiidae, and *Sinitia sophiae* PRITYKINA, 2006 are redescribed. The latter is transferred from the Isophlebiidae into the Camptero-phlebiidae sit. nov. Two new camptero-phlebiids are described: *Pritykinia rasnitsyni* n. gen., n. sp. (Lowermost Cretaceous of Russia) and *Qibinlina sinica* n. gen., n. sp. (Middle Jurassic of China). Three new isophlebiids are described: *Walleria magnifica* n. gen., n. sp. (Upper Jurassic of Kazakhstan), *Parawalleria mongolica* n. gen., n. sp. and *Parawalleria incompleta* n. sp. (Upper Jurassic of Mongolia)."] (Authors.) Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

8398. Niederbichler, C. (2009): Hartmut Spaeter: Weltreisender, Naturschützer, Förderer des LBV. Großherzige Unterstützung der LBV-Stiftung „Bayerisches Naturerbe“: LBV Vogelschutz 1/2009: 11. (in German) [Hartmut Spaeter, Munich, Germany (1922 - 2007). The published note refers to *Polythore spaeteri* Burmeister & Börsöny, 2003, and provides a figure with a portrait of H. Spaeter.] Address: <http://www.lbv.de/fileadmin/lbvde/service/HeftVogelschutz/Heft109www.pdf>

8399. Niehuis, M. (2009): Nur scheinbar die Altbekannte. Boten des Klimawandels: Die Südliche Mosaikjungfer findet man in Flachgewässern im Oberrheingraben. Rheinpfalz - Marktplatz aktuell vom 29.07.09 Ausgabe Kandel und Ausgabe Edenkoben; eine Woche vorher in Bad Bergzabern und Germersheim: (in German) [Rheinland-Pfalz, Germany; popular account in a regional significant newspaper on Odonata with special emphasis on *Aeshna affinis* resp. species favoured by climate change.] Address: Niehuis, M., Im Vorderen Großthal, D-76857 Albersweiler, Germany. E-mail: Niehuis@t-online.de

8400. Novelo-Gutiérrez, R. (2009): Description of the larva of *Acanthagrion quadratum* Selys, with a key to the known larvae of the genus (Zygoptera: Coenagrionidae). *Odonatologica* 38(4): 321-328. (in English) ["The larva is described, illustrated, and compared with other described congeneric larvae. *A. quadratum* is distinguished from all others by possessing 3 premental setae, 4 setae on labial palp, and caudal lamellae 8-10 times longer than their widest part. A key to the 9 known congeneric larvae is provided."] (Author)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

8401. Ober, S.V.; Staniczek, A.H. (2009): A new genus and species of coenagrionid damselflies (Insecta, Odonata, Zygoptera, Coenagrionidae) from Vanuatu. *Zoosystema* 31(3): 485-497. (in English, with French summary) ["A new genus, *Vanuatubasis* n. gen., is described and illustrated based on specimens from the islands of Aneityum, Espiritu Santo, and Malekula, Vanuatu. Males of the new genus differ from males of the similar *Nesobasis* Selys, 1891 in having short and broad superior anal appendages and long, forcipate inferior anal appendages. The already described species, *Nesobasis malekulana* Kimmins, 1936 and *N. bidens* Kimmins, 1958, are transferred to the new genus. Both

species, only known from males, are redescribed. Additionally, a new species, *Vanuatubasis santoensis* n. gen., n. sp., is described from Espiritu Santo. Males of *V. santoensis* n. gen., n. sp. differ from males of the closely related *V. malekulana* n. comb. by their larger size, a more raised hind ridge of the pronotum, the less prominent medio-posterior protuberance of the mesostigmal laminae, and the paisley-shaped superior anal appendages. A key to the males of *Vanuatubasis* n. gen. is provided." (Authors)] Address: Ober, S.V., Staatliches Museum für Naturkunde Stuttgart, Abteilung Entomologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: ober.smns@naturkundemuseum-bw.de

8402. Odin, N. (2009): Reports from Coastal Stations - 2008: Landguard Bird Observatory, Suffolk. *Atropos* 36: 52-53. (in English) [UK; *Lestes sponsa*, *Erythromma viridulum*; *Libellula depressa*, *L. quadrimaculata*] Address: not stated

8403. Palacino-Rodríguez, F. (2009): Dragonflies (Odonata: Anisoptera) of the collection of the Instituto de Ciencias Naturales, Universidad Nacional de Colombia. *Boletín del Museo de Entomología de la Universidad del Valle* 10(1): 37-41. (in English, with Spanish summary) [This collection of Anisoptera holds 2900 specimens which have been collected since 1940 across 27 departments of the country. "More than a half of the specimens are Anisoptera (53%) and these are represented by three families Aeshnidae, Gomphidae, and Libellulidae, 38 genera and 91 species. These numbers constitute 80% of the genera and species of the suborder reported from Colombia. The more abundant genera are *Erythrodiplax* (37%), *Uracis* (15%), and *Erythemis* (8%). The presence of *Uracis siemensi* Kirby, 1897, *U. infumata* (Rambur, 1842), and *Zenithoptera viola* Ris, 1910, in Colombia, is confirmed." (Authors)] Address: Palacino-Rodríguez, F., Instituto de Ciencias Naturales, Universidad Nacional de Colombia, A. A. 7495, Bogotá - Colombia. E-mail: fpalacino@unal.edu.co

8404. Parr, A.J. (2009): Winter damselfly *Sympecma fusca* Vander Linden in West Glamorgan. *Atropos* 37: 28-31. (in English) [14-XII-2008, Tonna, UK.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

8405. Parr, A.J. (2009): Migrant Dragonflies in 2008 including recent decisions and comments by the Odonata Records Committee. *Atropos* 36: 28-32. (in English) [UK; the following species are considered in the report: *Sympecma fusca*, *Aeshna grandis*, *A. mixta*, *Anax* sp. (*Anax junius* cf.), *A. imperator*, *A. parthenope*, *Libellula fulva*, *Sympetrum danae*, *S. striolatum*, *S. flaveolum*] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

8406. Parr, A.J. (2009): Migrant and dispersive dragonflies in Britain during 2008. *J. Br. Dragonfly Society* 25(2): 94-99. (in English) ["The year 2008 was rather a quiet one for dragonfly migration in Britain, probably no surprise given the frequently unfavourable summer and autumn weather. A low level of immigration did however take place, especially during warmer spells in late July and early August. One or two species also appeared to show enhanced dispersal within Britain, whilst other interesting sightings probably related to the consequences of previous migration/dispersion events. The highlight of 2008 must be the discovery to-

wards the end of the year of a female Winter Damsselfly *Sympecma fusca*, apparently attempting to hibernate inside a house in south Wales. This represents the first record of the species for Britain, though its appearance had been anticipated." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

8407. Parr, M.J. (2009): Professor Philip S. Corbet, 21 May 1929 - 13 February 2008. *J. Br. Dragonfly Society* 25(1): 1-6. (in English) [Obituary.] Address: Parr, M. J., Hele Barton, 9c St James's St., South Pethcrton, Somerset, TA13 5BS, UK. E-mail: mima37@tiscali.co.uk

8408. Paulson, D.R. (2009): A new species of *Leptobasis* from Costa Rica (Odonata: Coenagrionidae). *Zootaxa* 2239: 62-68. (in English) ["*Leptobasis guanacaste* is described from seasonal wetlands in dry forest in Guanacaste, Costa Rica. It is unique among the five species of the genus in thoracic colour pattern and the structure of the male terminal appendages and female mesostigmal laminae and appears to be closest to *L. candelaria* through similarities in genital ligula, male metafemur, and female ovipositor." (Author)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8409. Paulson, D.R. (2009): Scarlet Skimmer (*Crocothemis servilia*) in Jamaica. *Argia* 21(1): 9. (in English) [Iverclaud Hotel in Black River, St. Elizabeth Parish, July 2008.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8410. Peixoto, P.E.C.; De Marco Jr., P. (2009): No size or density effect on alternative mate-locating tactics in the tropical damselfly *Hetaerina rosea* males (Odonata: Calopterygidae). *Rev. Biol. Trop.* 57(1-2): 361-370. (in English, with Spanish summary) ["Males of *H. rosea* may defend mating sites along river margins (resident males) or, alternatively, wander among different areas presumably searching for mates (nonterritorial males). Although the occurrence of territorial and non-territorial males of *H. rosea* is very common in Brazil, studies examining which factors may be responsible for the adoption of alternative mate-locating tactics in this species are inexistent. We investigated the relationship between the adoption of these alternative mate-locating tactics by males of *H. rosea* and two possible causes: body weight and male abundance. We carried the study in three areas: sites 1, 2 and 3. Samples were monthly undertaken in sites 1 and 2 between September/2001 and August/2002 and in site 3 between May/1999 and January/2001. Using the scan method with fixed areas and mark-resighting techniques, we did not find any relationship between the proportion of nonterritorial males and male abundance per month on sites 2 ($n=6$) and 3 ($n=7$), indicating that the adoption of alternative mate-locating tactics is not affected by competition for territories. In the same way, nonterritorial and resident males showed similar body and thoracic weight measures ($n=30$ and $n=27$ for sites 2 and 3 respectively). Maybe the nonterritorial tactic is adopted by individuals searching for better territories or males that were evicted from their defended sites. The absence of relationship between weight and male territorial status is in accordance with other *Hetaerina* species. However, other traits not investigated here such as parasitic load, fat content and age may influence the adoption of different mate-ac-

quisition tactics in *H. rosea* males.] Address: Peixoto, P.E.C., Departamento de Zoologia, IB, UNICAMP, C.P.6109, CEP 13083-970, Campinas, São Paulo, Brasil. E-mail: popscardoso@yahoo.com.br

8411. Penney, D. (2009): Field guide to wildlife of The Gambia: an introduction to common flowers & animals. Siri Scientific Press, Manchester, U.K.. ISBN 978 0 9558636 1 5: 120 pp. (in English) [14 of the 554 colour photographs show Odonata: Ceriagrion, Azuragrion, Palpopleura, Pantala, Diplacodes, Crocothemis, Orthetrum, Brachythemis, and Bradinopyga.]

8412. Petrulevicius, J.F.; Nel, A. (2009): First Cordulephyidae dragonfly in America: A new genus and species from the Paleogene of Argentina (Insecta: Odonata). *Comptes Rendus Palevol.* 8(4): 385-388. (in English, with French summary) ["*Palaeophya argentina* gen. et sp. n. is the first American representative of the Cordulephyidae. The fossil belongs to Neophyinae and is closely related to the unique genus *Neophya* present in the Early Oligocene of England and extant in Africa. This fossil record supports the evidence of a Cretaceous age and a wide ancient distribution in Palaeogene warm regions for the Neophyinae, which acquire the status of relict in recent intertropical Africa." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimr-s1.mnhn.fr

8413. Porst, G.; Irvine, K. (2009): Implications of the spatial variability of macroinvertebrate communities for monitoring of ephemeral lakes. An example from turloughs. *Hydrobiologia* 636(1): 421-438. (in English) ["Turloughs, ephemeral water bodies associated with karstified limestone, are an important habitat found in the West of Ireland. They are a priority habitat under the European Habitats Directive (92/43/EEC) and are groundwater-dependent habitats under the European Water Framework Directive (2000/60/EC; WFD). Sampling to meet the objectives of either Directive requires discrimination of inherent natural variation from anthropogenically induced disturbances and accounting for both spatial and seasonal patterns of biotic distribution. This study reports within. (submerged grassland) and between-habitat (submerged and emergent grassland) variability of macroinvertebrate (including *Lestes dryas*) communities in six turloughs. Two different habitat types were sampled from two turloughs in April 2007, and further assessment of spatial pattern in commonly found submerged grassland habitat was determined from four additional turloughs in spring 2008. While cluster analysis and non-metric multidimensional scaling identified differences in macroinvertebrate community structures between habitats in one out of two turloughs, congruence of invertebrate communities was, nevertheless, greater within than among turloughs. Within-habitat variability of macroinvertebrate communities across sampling locations of submerged grassland habitat was sufficiently low so that samples collected at any location of a turlough can provide a reliable metric of the macroinvertebrate community of a turlough as a whole. A standardized submerged grassland sampling approach for routine turlough sampling is recommended as a pressure response method to fulfil the requirements of the WFD. For a comprehensive conservation assessment, however, as demanded under the EC Habitats Directive, we suggest a multi-habitat sampling approach to obtain a thorough assessment of turlough

macroinvertebrate biodiversity." (Author)] Address: Porst, Gwendolin, Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB), Müggelseedamm 301, 12587 Berlin, Germany. E-mail: porst@igb-berlin.de

8414. Precigout, L.; Prud'Homme, E.; Jourde, P. (Coord.) (2009): *Libellules du Poitou-Charentes*. Poitou-Charentes Nature. ISBN: 978-2-918831-00-6: 256 pp. (in French) ["The fruit of 18 years of sampling and of the accumulated experience of more than 200 naturalists, this work treats the 73 species of dragonflies currently known in the Poitou-Charentes. Precise descriptions of the distribution, abundance, life cycle and conservation status of each species are presented. This detailed information is accompanied by graphs, distribution maps and by numerous photographs. More than a simple field guide, this is a book to read at home. It will please naturalists, fishermen and those who enjoy simply observing the natural world around them. It is a collective and associative work where each chapter reflects the different personalities of the contributors. To know, to respect, and to protect dragonflies - such are the principles which have led us to publish this work today. May it contribute to a better understanding and long term protection of these marvellous creatures which form an important part of our natural heritage." (Editors)] Address: <http://www.poitou-charentes-nature.asso.fr/Livre-Libellules-extraits.html>

8415. Proess, R. (2009): Plan national pour la protection de la nature (PNPN). Plans d'actions espèces: Plan d'action Agrion de mercure *Coenagrion mercuriale*. <http://www.environnement.public.lu/conservation/dossiers/Plansdactions/PAECoenagrionmercuriale.pdf>: 4 pp. (in French) [Fundamentals for conservation of the single locality of *C. mercuriale* (Wollefsbach, sw of Useldange) in Luxembourg are outlined.] Address: Proess, R., ECOTOP, 6, rue Gustave Kahnt, L-1851 Luxembourg, Luxembourg. E-mail: ecotop@pt.lu

8416. Pryke, J.S.; Samways, M.J. (2009): Conservation of the insect assemblages of the Cape Peninsula biodiversity hotspot. *Journal of Insect Conservation* 13(6): 627-641. (in English) ["The Cape Peninsula is an area of outstanding biological importance, not only for its high levels of floristic diversity and endemism, but also for its number of localised endemic invertebrates. Little is known of the spatial distribution of invertebrates across the Peninsula, or how best to conserve them. Sampling by visual searches assisted by aerial and aquatic hand-nets was undertaken throughout the Peninsula. The most important areas for insect diversity on the Peninsula, and associated environmental variables, were determined. The 'Peninsula effect' was also investigated. Nine Red Listed species and five new species for the Peninsula were recorded. This high number of Red Listed species (for those few groups that have been assessed) emphasises the biological importance of the Cape Peninsula. Table Mountain had the most Red Listed species, while Cape Point had many species not found in the other areas. Noordhoek Wetland is very important for aquatic Coleoptera. Small hills on the Peninsula are important for overall insect diversity. Elevation, slope, aspect, distance to water and vegetation structure were the most important environmental variables in determining the insect assemblages. The Peninsula effect appears to have no influence on these particular insect assemblages of the Cape Peninsula. The high number of new Peninsula records for well-known

taxonomic groups indicates that still little is known of the insect assemblages across the Peninsula. Nevertheless, areas of conservation priority identified in this study are Table Mountain (for Red Listed species), Noordhoek (for aquatic Coleoptera) and Cape Point and the small hills across the Peninsula (for their unique invertebrate assemblages). Conservation of a variety of elevations, including steep and flat areas, all aspects of mountains, as well as both the wet and dry areas, overall will contribute to the conservation of the insects." (Authors) The paper includes references to Odonata. For more details also see: <http://etd.sun.ac.za/bitstream/10019/1452/2/Pryke,JS.pdf>] Address: Pryke, J. S., Dept Conservation Ecology and Entomology, Centre for Agricultural Biodiversity, Faculty of AgriSciences, University of Stellenbosch, Private Bag X1, Matieland, 7602, South Africa. E-mail: Jpryke@sun.ac.za

8417. Purse, B.V.; Thompson, D.J. (2009): Emergence site selection in the endangered Southern Damselfly *Coenagrion mercuriale* in its UK stronghold, with observations on the Small Red Damselfly *Ceragrion tenellum*. *J. Br. Dragonfly Society* 25(2): 68-75. (in English) ["Emergence site selection was compared between *C. mercuriale* and *C. tenellum* in one of the UK strongholds for the former species. The mean height of exuviae above water level was 3.64 ± 0.36 cm ($n = 74$) for *C. mercuriale* and 2.35 ± 0.18 cm ($n = 68$) for *C. tenellum*. For both species there was a significant difference between observed and expected (based solely on relative abundance) plant species used as emergence perches. *Eleocharis palustris* and *Juncus articulatus* were used more, and *Hypericum elodes* less, often than expected. The national vegetation community in 13 cages was M29 i.e. *Hypericum elodes*-*Potamogeton polygonifolius* (Bog Pondweed) mire. Two other cages contained Si9a and Si9b which is *Eleocharis palustris* swamp. Broadly, suitable emergence habitat consisted of semi-submerged communities of *H. elodes* (mean % cover $50 \pm 4.4\%$), *P. polygonifolius* (mean % cover $5.8 \pm 1.9\%$), *E. palustris* (mean % cover $19.2 \pm 2.6\%$) and *J. articulatus* (mean % cover $3.2 \pm 1.1\%$)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

8418. Querino, R.B.; Hamada, N. (2009): An aquatic microhymenopterous egg-parasitoid of *Argia insipida* Hagen in Selys (Odonata: Coenagrionidae) and biological observations in the Central Amazon, Brazil. *Neotropical Entomology* 38(3): 346-351. (in English, with Portuguese summary) ["The tritrophic interaction *A. insipida*, the Trichogrammatidae egg parasitoid *Pseudoligosita longifrangata* (Viggiani) and the host plant *Tonina fluviatilis* (Eriocaulacea), which is a substrate for egg deposition of *A. insipida*, was investigated. The study locality was a stream with rapids where macrophytes such as *T. fluviatilis* grow. Information on aquatic egg parasitoids is scarce. This is the first record of egg parasitism of *A. insipida* by *P. longifrangata* in Brazil, and the first record of occurrence of *P. longifrangata* in the country. Parasitized and unparasitized eggs of *A. insipida* were observed only on leaves 0-5 cm below the water surface. The maximum number of pairsof *A. insipida* laying eggs in the study area was observed between 13:00h and 14:00h. Leaves of *T. fluviatilis* become yellowish and dry out when large numbers of eggs of *A. insipida* are laid on them." (Authors)] Ad-

dress: Querino, R.B., Embrapa Roraima, BR 174, km 8, Distrito Industrial, 69301-970, Boa Vista, RR; ranys@cpafrr.embrapa.br

8419. Rainier Audubon Society (2009): Monday, November 16, at 7:00 PM. Rainier Audubon Presents Dr. Dennis Paulson Dragonflies and Damselflies of Washington. The Heron Herald November 2009: 1. (in English) [Introduction to a lecture of Dennis Paulson on the Odonata of Washington, USA.] Address: Rainier Audubon Society, PO Box 778. Auburn WA 98071. (253) 796-2203, USA

8420. Ramos-Elorduy, J.; Pino Moreno, J.M.; Martínez Camacho, V.H. (2009): Edible aquatic Coleoptera of the world with an emphasis on Mexico. Journal of Ethnobiology and Ethnomedicine 2009, 5:11 doi:10.1186/1746-4269-5-11: 13 pp. (in English) [Passing references on Odonata. Anthropoentomophagy is an ancient culinary practice wherein terrestrial and aquatic insects are eaten by humans. Of these species of insects, terrestrial insects are far more commonly used in anthropoentomophagy than aquatic insects. In this study we found that there are 22 genera and 78 species of edible aquatic beetles in the world. [...] Address: Ramos-Elorduy, Julieta, Instituto de Biología, UNAM, Apdo. Postal 70-153, 04510, México. E-mail: relorduy@ibunam2.ibiologia.unam.mx

8421. Reborá, M.; Piersanti, S.; Gaino, E. (2009): A comparative investigation of the antennal sensilla in adult Anisoptera. Odonatologica 38(4): 329-340. (in English) ["A fine structural overview of the flagellar sensilla of *Onychogomphus forcipatus*, *Aeshna cyanea*, *Somatochlora metallica*, and *Cordulegaster boltonii* revealed the presence of pits containing sensilla typically located on the latero-ventral side of the first flagellar segments in all four species. These sensilla are represented by coeloconic single-walled olfactory sensilla and deeply sunken sensilla styloconica (type-1 and type-2) sharing common features typical of thermo-hygroreceptors. Sensilla styloconica are located inside deep convoluted cavities. It is suggested that olfactory and thermo-hygroreceptive sensilla are the main sensilla on the antennae of all anisopteran families. The attribution of the coeloconic sensilla of dragonflies to single-walled olfactory sensilla (confirmed by the finding of pore tubules in *O. forcipatus*), together with their common occurrence in the suborder Anisoptera, are relevant for phylogenetic studies." (Authors)] Address: Reborá, Manuela, Dipto di Biologia Cellulare e Ambientale, Università di Perugia, Via Elce di Sotto, I-06123 Perugia, Italy

8422. Reinboud, W. (2009): View and reviews: Field Guide to the Larvae and Exuviae of British Dragonflies, Volume 1. Atropos 36: 63. (in English) [Review of: Cham, S. (2007): Field Guide to the Larvae and Exuviae of British Dragonflies. Volume 1: Dragonflies (Anisoptera). British Dragonfly Society. ISBN-13: 9780955647109. 80 pp] Address: Reinboud, Weia

8423. Reinhardt, K. (2009): Ein Nachweis des Plattbauches von 1797 – der erste Libellennachweis in Bayern? IDF-Report 18: 3-4. (in German) [In a publication by Johann Heinrich Jördens (1764–1813) [Jördens, J. H. 1798. Geschichte der kleinen Fichtenraupe, oder der Larve von der Phalaena Monacha Linn. Nebst einem Beytrag zur Berichtigung der Ausrottungsmittel dieser Waldverheererin und einer mit Farben erleuchteten Kupfertafel. 46 S. Hof, Verlag von Grau.] Libellula de-

pressa is documented. The author discusses the probability that this is the first published record of this species in Bavaria, Germany.] Address: Reinhardt, K., Dept Animal & Plant Sciences, Univ. Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

8424. Reinhardt, R. (2009): Bericht über die 17. Tagung der Sächsischen Entomologen der EFG e.V.. Entomologische Nachrichten und Berichte 53(3-4): 187-188. (in German) [Sachsen, Germany, Jens Kipping made a lecture reporting on his activities on African Odonata.] Address: Reinhardt, R., Burgstädter Str. 80a, 09648 Mittweida, Germany

8425. Renker, C.; Henrich, B. (2009): Die Entomologischen Sammlungen des Naturhistorischen Museums Mainz / Landessammlung für Naturkunde Rheinland-Pfalz. Mainzer naturwiss. Archiv 47: 395-447. (in German, with English summary) [The paper summarizes the development of the entomological collections at the Mainz Museum of Natural History / State Collection of Natural History of Rhineland-Palatinate, Germany. After the nearly complete destruction of the museum and its collections during the air raid on Mainz on February 27th, 1945, the rebuilding of the entomological collections started in the 1960's. The different phases of the rebuilding are described, introducing the volunteers, and important persons who worked for a long time in the entomological collections of the museum. In a second section the nowadays available collections and their collectors are presented. The most comprehensive inventory exists for the butterflies (Lepidoptera), true bugs (Heteroptera), wasps and bees (Hymenoptera), and beetles (Coleoptera). Concerning flies (Diptera) the museum has the largest individual collection based on the hoverflies (Syrphidae) from Franz Malec. Other insect orders are represented by small or very small collections or are lacking completely. Odonata are represented in five boxes, in most cases in poor labelling condition. Taxa are represented by records from Germany, Austria, Denmark, Norway, 10 specimens from Peru, and 44 specimens from Ruanda.] Address: Renker, C., Naturhistorisches Museum Mainz / Landessammlung für Naturkunde Rheinland-Pfalz, Reichklarastr. 10, 55116 Mainz, Germany. E-mail: dr.carsten.renker@stadt.mainz.de

8426. Repenning, M.; de P. Basso, H.C.; Rossoni, J.R.; Krügel, M.M.; Fontana, C.S. (2009): Análise comparativa da dieta de quatro espécies de cucos (Aves: Cuculidae), no sul do Brasil. Zoologia 26(3): 443-453. (in Portuguese, with English summary) [The diet from 4 species of cuckoos (Aves: Cuculidae) in South Brazil was studied by analyzing stomachs contents of 50 specimens: *Guira guira* (Gmelin, 1788) (n = 21), *Coccyzus melacoryphus* (Vieillot, 1817) (n = 8), *Crotophaga ani* (Linnaeus, 1758) (n = 11), and *Piaya cayana* (Linnaeus, 1766) (n = 10). One item of Odonata was found in a *Guira guira* stomach.] Address: Fontana, Carla, Setor de Ornitologia, Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul. Avenida Ipiranga 6681, 90619-900 Porto Alegre, Rio Grande do Sul, Brasil. E-mail: carla@pucrs.br

8427. Riservato, E.; Boudot, J.-P.; Ferreira, S.; Jovice, M.; Kalkman, V.J.; Schneider, W.; Samraoui, B.; Cuttelod, A. (compilers) (2009): The status and distribution of dragonflies of the Mediterranean basin. Gland, Switzerland and Malaga, Spain: IUCN. ISBN: 978-2-

8317-1161-4: vii + 33 pp. (in English) [Executive Summary: Aim: This report contains a review of the conservation status of 165 Mediterranean species of dragonflies occurring in the Mediterranean basin, according to the IUCN regional Red Listing criteria. It identifies species that are threatened with extinction at regional level so that appropriate conservation action can be taken to improve their status. Scope: The geographical scope of this report is the Mediterranean region in terms of freshwater hydrosystems, defined by identifying all catchments of rivers flowing into the Mediterranean Sea as well as in the adjacent Atlantic waters of Spain, Portugal and Morocco. Status assessment: The status of all species was assessed using the IUCN Red List Criteria (IUCN 2001), which are the world's most widely accepted system for measuring extinction risk. All assessments followed the Guidelines for Application of IUCN Red List Criteria at Regional Levels (IUCN 2003). The assessments were peer-reviewed by other experts during a workshop and through correspondence with relevant experts. Results: Almost a fifth (19%) of the dragonfly species occurring in the Mediterranean region are threatened and a further 16% are Near Threatened. Four species (2%), *Agriocnemis exilis*, *Ceriatrigon glabrum*, *Rhyothemis semihyalina* and *Phyllomacromia africana* are listed as Regionally Extinct. Threatened dragonflies are found all over the Mediterranean region. However, some areas have a particular high concentration of threatened species: the most notable are the southern Balkans, northeastern Algeria and the Levant with the adjacent southern parts of Turkey. Fourteen percent of the species in the Mediterranean Basin are endemic, (9 of these are threatened and 5 Near threatened). This highlights the responsibility that the Mediterranean countries have to protect the global populations of these species. The highest number of endemics are found in the Maghreb and in the Levant whereas the smaller numbers are found in the southern Balkans, Crete and the Western Mediterranean. Dragonfly diversity is greatest in the northern parts of the region as both Mediterranean and more boreal species can be found in the same area. Italy has the highest number of species due to its particular shape allowing the presence of North African species in the south and alpine species in the north. Other species rich areas are found in France, the Balkans region, Greece, Tunisia and Turkey. Habitat destruction, degradation, pollution and mismanagement of water bodies are significant threats to dragonflies in the Mediterranean Basin. In recent years it has become clear that Climate Change will turn out to be one of the most important threats to dragonflies in the Mediterranean. Increased water demand together with a lower level of precipitation will result in the desiccation of brooks, a habitat on which many of the endemics are dependent. Conclusions: Threatened dragonflies in the Mediterranean Basin require urgent action to improve their status: While some species are already receiving some conservation attention thanks to international laws (e.g. the European Habitat Directive), others are not. The priorities identified in this study include addressing the threats, such as the destruction and degradation of freshwater habitats, and the need to improve monitoring, surveys and studies in some important areas of the Mediterranean Basin. Regional action is urgently needed: This report shows where the highest diversity, the highest level of endemism, and the highest portion of threatened dragonflies are found within the Mediterranean region. Based on this, five areas of high conser-

vation concern were selected (Maghreb, The Levant, Crete, Southern Balkans and Western Mediterranean). These areas are discussed separately, and for each one, conservation actions are prioritized. A sustained investment in the conservation and monitoring of species sites and landscapes is needed for all Mediterranean countries: To ensure that Mediterranean species are secure in the long term, this needs to be combined with the political will to integrate biodiversity conservation into all policy sectors.] Address: IUCN Centre for Mediterranean Cooperation, C/ Marie Curie 22, 29590 Campanillas, Malaga, Spain

8428. Riservato, E. (2009): Atlante delle libellule della Provincia di Novara. Provincia di Novara: 180 pp. (in Italian) [51 odonate species occurring in the Italian province Novara are monographically introduced giving information on morphology, ecology, phenology, status of conservation, and regional distribution.] Address: agricoltura@provincia.novara.it

8429. Robinette, P.R. (2009): A macroinvertebrate study of the Shenango River Westinghouse Superfund Site, Sharon, PA. M.s. thesis, Environmental Studies Program, Youngstown State University: VII, 41 pp. (in English) [Odonata are treated on the genus, a few at the family level.] Address: not stated

8430. Romo-Beltrán, A.; Macías-Ordóñez, R.; Córdoba-Aguilar, A. (2009): Male dimorphism, territoriality and mating success in the tropical damselfly, *Paraphlebia zoe* Selys (Odonata: Megapodagrionidae). *Evolutionary Ecology* 23(5): 699-709. (in English) ["The tropical damselfly *Paraphlebia zoe* has two male morphs: a black-winged (BW) male which is associated with territorial defense of oviposition sites; and a hyaline-winged (HW) male similar in appearance to females, and, compared to the black morph, less frequently found defending territories. In a wild population of this species, we first assessed the relationship between phenotypic traits [male morph, size and territorial status (being territorial or non-territorial)], their role on mating success, and the degree to which a particular territory may contribute to male mating success. Second, to relate a physiological basis of being territorial we compared both morphs in terms of muscular fat reserves and thoracic muscle, two key traits related to territory defense ability. Males of both morphs defended territories although the BW males were more commonly found doing this. BW males were larger than HW males and size predicted being territorial but only within HW males (territorial males were larger) but not in BW males. Male mating success was related to territorial status (territorial males achieved a higher mating success), but not to morph or size. Furthermore, territory identity also explained mating success with some territories producing more matings than others. The BW morph stored more fat reserves which may explain why this morph was more likely to secure and defend a place than the HW morph. However, the HW morph showed higher relative muscle mass which we have interpreted as a flexible strategy to enable males to defend a territory. These results are distant to what has been found in another male dimorphic damselfly, *Mnais pruinosa*, where the advantage of the non-territorial morph relies on its longevity to compensate in mating benefits compared to the territorial morph." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza

Juarez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

8431. Sadeghi, S.; Adriaens, D.; Dumont, H.J. (2009): Geometric morphometric analysis of wing shape variation in ten European populations of *Calopteryx splendens* (Harris, 1782) (Zygoptera: Calopterygidae). *Odonatologica* 38(4): 341-357. (in English) ["The wings of 10 *C. splendens* populations were examined by landmark-based geometric morphometric analysis. Subspecific taxa in this group are currently based on wing spot size in males. Here, the variation in wing shape and size is evaluated, to test whether shape is different at a population level, and whether this has implications at a taxonomic level. It was found that Geometric Morphometrics successfully discriminates populations; overall wing shape significantly differed between populations but the results were only partly compatible with taxonomic studies based on wing spot size. Irrespective of wing spot, all populations showed differentiation in wing shape even though not in wing size; 4 groups were recognized based on wing shape: (1) Turkish1 population; (2) Spanish, Finnish, Russian and Turkish populations; (3) Italian, German and French populations; (4) Greek and Albanian populations. Ordination of the populations based on consensus data and cluster analysis phenogram confirmed such a pattern. The Spanish population (*C. xanthostoma*), did not show a strong identity, while the Turkish1 (*C. s. waterstoni*) was quite isolated. The Italian population (*C. s. caprai*) showed more relation to the French (*C. s. fairvei*) and German populations than to Albanian and Greek populations." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@ugent.be

8432. Samways, M. (2009): Book Review: Rosser W. Garrison, Natalia von Ellenrieder and Jerry A. Louton, *Dragonfly Genera of the New World: An Illustrated and Annotated Key to the Anisoptera*. The John Hopkins University Press, Baltimore MS, USA, 2006, Hardback, US\$99.00, ISBN: 0-8018-8446-2, 368 pp. *Journal of Insect Conservation* 13: 137-138 (in English) [Review]. Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

8433. Sánchez-Montoya, M.M.; Suárez, M.L.; Vidal-Abarca, M.R. (2009): Seasonal and interannual variability of macroinvertebrate reference communities and its influence on bioassessment in different Mediterranean stream types. *Fundamental and Applied Limnology / Archiv für Hydrobiologie*, Volume 174(4): 353-367. (in English) ["We investigated the seasonal changes in macroinvertebrate reference communities in four Mediterranean stream types (temporary, evaporite calcareous at medium altitude, siliceous headwaters at high altitude, and calcareous headwaters at medium and high altitudes) and the interannual changes in the two headwaters stream types in Spain. Eighty-eight seasonal reference sites distributed into 23 basins were sampled on three occasions (spring, summer and autumn of 2003), and 18 interannual reference sites distributed in 6 basins were sampled in the autumn of 2003, 2004 and 2005 to examine this temporal variability. Interannual reference sites were a subset of seasonal reference sites. The analysis of similarity (ANOSIM) performed on Bray-Curtis similarity distances, using presence-absence data, showed no seasonal or inter-

annual changes in the macroinvertebrate communities. The influence of seasonal and interannual variability was also tested in all the stream types using 18 macroinvertebrate metrics classified as richness, index, multi-metric index, tolerance/intolerance and diversity. ANOVAs showed no seasonal differences in any of the studied metrics for temporary and evaporite calcareous at medium altitude and most of the metrics in the two headwaters stream types. This suggests the suitability of using a single season approach for the biomonitoring purposes of these metrics. Conversely, the seasonal differences detected in the metrics related with EPT (Ephemeroptera, Plecoptera and Trichoptera) and OCH (Odonata, Coleoptera and Heteroptera) taxa in calcareous headwaters indicate possible differences in the relative presence of macrohabitats (riffles and pools) as a result of flow variation. No interannual changes were detected in any of the metrics except EPT/OCH in siliceous headwaters. However, the large variability in the annual rainfall in this study area suggests that this three-year study period may be too short to assess the effect of climatic variations on the ecological status assessment. In general, the lower temporal variability (measured as seasonal and interannual coefficients of variation) of the taxon richness metric (S) and the two studied indices (IBMWP and IASPT), compared with the other metrics, make them a priori robust indicators to assess ecological status in Mediterranean streams." (Authors)] Address: María del Mar Sánchez Montoya, Dept of Ecology and Hydrology, University of Murcia, E-30100, Murcia, Spain. E-mail: marsanch@um.es

8434. Sasamoto, A.; Kawashima, I. (2009): Description of the last instar larva of *Hylaeothemis clementia* Ris from Laos (Anisoptera: Libellulidae). *Odonatologica* 38(4): 369-374. (in English) ["The larva is described and illustrated for the first time, based on the last instar exuviae. It is compared with the known *Tetrathemistinae* larvae and appears similar to the African *Neodythemis* rather than to the Asian members of the subfamily." (Author)] Address: Sasamoto, A., 190-4 Yakuoji, Tawaramoto-chô, Shiki-gun, Nara, 636-0341, Japan. E-mail: aksmt@sea.plala.or.jp

8435. Schmutterer, H. (2009): *Tropische Insekten - Meisterwerke der Evolution. Einblick in die Formenvielfalt und faszinierende Biologie tropischer Kerbtiere*. Neue Brehm Bücherei 671: 269 pp. (in German) [Chapter 2.1 Ordnung Libellen (Odonata) (Abb. 1-4), pages 12-17 are directed to the dragonflies]

8436. Schneider, B.; Wildermuth, H. (2009): Libellen als Individuen – zum Beispiel *Aeshna cyanea* (Odonata: Aeshnidae). *Entomo Helvetica* 2: 185-199. (in German, with English and French summaries) ["All ascertainable males and females of *A. cyanea* that were present in the course of about two months in autumn 2008 at four small adjacent ponds near Winterthur (Switzerland) were documented by digital photography. The insects were examined for morphological features by which the individuals could be recognized. Distinct differences were found in the marking-pattern of head, thorax and abdomen as well in the fine wing veins. Altogether 66 males and nine females could be identified with certainty. They were present at the study site on one to eleven different days over a maximum period of 43 days. The advantages and disadvantages of photodocumentation of the individuality with respect to morphology and behaviour are discussed." (Authors)] Address: Schneider,

B., Wolfbühlstrasse 34a, CH-8408 Winterthur, Switzerland. E-mail: beatsch@bluemail.ch

8437. Schröter, A.; Karjalainen, S. (2009): Hohtoukkorento (*Aeshna affinis*) tavattiin Suomessa ensi kerran [First record of the Blue-eyed Hawker/Migrant Hawker *Aeshna affinis* in Finland]. *Crenata* 2: 36-38. (in Finnish) [The article describes the circumstances of the discovery of the first record of *A. affinis* in Finland (2nd August 2008; Vuosaari, Helsinki) and gives a short synopsis of the species status and recent records in adjacent countries and the northern half of Europe. The origin and possible migration route of the Finnish specimen is shortly discussed. (Asmus Schröter)] Address: not stated

8438. Schultz, T.D.; Fincke, O.M. (2009): Structural colours create a flashing cue for sexual recognition and male quality in a neotropical damselfly. *Functional Ecology* 173: 724-732. (in English) ["Structural colouration is common among animals that produce sexual displays involving motion or ultraviolet reflection. Different sources of colour may provide multicomponent signals that indicate the location, sex, and fitness of a potential mate or rival. We investigated the proximate basis and ultimate function of the wing colouration of the territorial damselfly *Megaloprepus caerulatus*, which produces a dynamic, high contrast display during flight. The wings of both sexes have blue and white bands, but the location of the white patches are sex specific. Wax filaments produce diffuse, white areas through broadband scattering of wavelengths between 300 and 700 nm. Blue bands reflect wavelengths between 300 and 500 nm (max = 398 nm) and shift in hue with viewing angle, the result of thin layer interference produced by layers of cuticle and pigment within the wing membrane. Both wing bands strongly reflect UV wavelengths. Both the iridescent UV-blue and white wing patches provide high contrast against the vegetation in forest light gaps where mating occurs. Moreover, the iridescent signal oscillates during flight. Angle-dependent UV-blue iridescence is periodically extinguished during each wing beat cycle, in contrast to the white areas, which remain bright. Males distinguish potential mates from rivals by the presence of a female's white wing tip. Blackening the white wing bands of males and adding white wing tips to resemble a female elicits a sexual rather than aggressive response from males. Conversely, blackening the white wing tips of females reduces sexual responses. The proportional area of the white wing bands of males is indicative of wing symmetry, correlated with body size, and in turn, territory residency suggesting that it may serve as a signal of male condition during intra- and intersexual interactions. We propose that the flashing iridescent UV-blue wing bands provide a beacon to potential mates across forest light gaps, whereas the white patches serve in mate recognition and may indicate male quality or territorial status. Our study identifies a unique combination of interference and broadband reflectors that provide a dynamic multicomponent signal." A(authors)] Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

8439. Scott, M.A.; Scott, W.J.; Scott, T.R. (2009): Reports from Costal Stations - 2008: Longstone Heritage Centre, St Mary's, Isles of Scilly. *Atropos* 36: 35-36. (in English) [UK; *Ischnura elegans*, *Aeshna mixta*] Address: not stated

8440. Segura, N.A.; Usaquén, W.; Sánchez, M.C.; Chuaire, L.; Bello, F. (2009): Succession pattern of cadaverous entomofauna in a semi-rural area of Bogotá, Colombia. *Forensic Science International* 187: 66-72. (in English) ["The main objective of this work was to examine the succession of insects colonizing three pig (*Sus scrofa*) cadavers in a semi-rural area of Bogotá. The 12 kg pigs were shot and put into metallic mesh cages to allow access by insects. Arthropods were then sampled at different intervals depending on the corresponding stage of decomposition. In total 5981 arthropods were collected during decomposition, 3382 adults and 2599 immature stages, belonging to 10 orders and 27 families. *Sarconesia magellanica* and *Comptosomyia verena* (Diptera: Calliphoridae) were the first species to colonize the corpses. Egg masses and 1st stage Calliphoridae larvae were associated with the fresh stage of decomposition, 1st and 2nd stage larvae of Calliphoridae and Sarcophagidae during chromatic and emphysematous stages, immature *Chrysomya albiceps* (Diptera: Calliphoridae), *Ophyra* sp. (Diptera: Muscidae) and *Oxellytrum discicolle* (Coleoptera: Silphidae) during the colliquative stage and mainly Coleoptera during the skeletization phase (plus some adult Diptera). The data obtained in the present investigation could be used for the estimation of postmortem interval (PMI) in real cases when the conditions to which a cadaver has been exposed are similar to those recorded during this work." (Authors) During the chromatic and emphysematous stages (days 4–10) of decomposition, Odonata were represented by 0.08% of the total fauna.] Address: Bello, F., Laboratorio de Entomología Médica y Forense, Facultad de Ciencias Naturales y Matemáticas, Universidad del Rosario, Calle 63D No. 24-31, Bogotá D.C., Colombia. E-mail: fbello@urosario.edu.co

8441. Shang, J.K.; Combes, S.A.; Finio, B.M.; Wood, R.J. (2009): Artificial insect wings of diverse morphology for flapping-wing micro air vehicles. *Bioinspiration & Biomimetics* 4: 6 pp. (in English) ["The development of flapping-wing micro air vehicles (MAVs) demands a systematic exploration of the available design space to identify ways in which the unsteady mechanisms governing flapping-wing flight can best be utilized for producing optimal thrust or maneuverability. Mimicking the wing kinematics of biological flight requires examining the potential effects of wing morphology on flight performance, as wings may be specially adapted for flapping flight. For example, insect wings passively deform during flight, leading to instantaneous and potentially unpredictable changes in aerodynamic behaviour. Previous studies have postulated various explanations for insect wing complexity, but there lacks a systematic approach for experimentally examining the functional significance of components of wing morphology, and for determining whether or not natural design principles can or should be used for MAVs. In this work, a novel fabrication process to create centimeter-scale wings of great complexity is introduced; via this process, a wing can be fabricated with a large range of desired mechanical and geometric characteristics. We demonstrate the versatility of the process through the creation of planar, insect-like wings with biomimetic venation patterns that approximate the mechanical properties of their natural counterparts under static loads. This process will provide a platform for studies investigating the effects of wing morphology on flight dynamics, which may lead to the design of highly maneuverable and efficient MAVs and insight into the functional morphology of natural

wings." (Authors) The paper includes references to dragonfly wings.] Address: Wood, R.J., School of Engineering & Applied Sciences, Harvard Univ., Cambridge, MA 02138, USA. E-mail: rjwood@seas.harvard.edu

8442. Sharma, R.C.; Arambam, R.; Sharma, R. (2009): Surveying macroinvertebrate diversity in the Tons river, Doon Valley, India. *Environmentalist* 29: 241-254. (in English) ["A survey of macro-invertebrates and their monthly variations occupying the Tons river in Doon Valley was conducted from August 2003 – July 2004. Macroinvertebrate collections and water samples were taken from three sampling stations every month during the period of study. All the hydrological attributes were measured monthly for 1 year. The present study showed that the water velocity, hydromedian depth, turbidity and dissolved oxygen and nature and size of the bottom substrates do play a major role in determining the macroinvertebrate diversity of Tons river. The ecological relevance of the measured hydrological attributes was investigated by comparing their degree of correlation with invertebrate density and diversity. The Shannon–Wiener index (H0) of macroinvertebrates was found to be highest (3.60) during spring season (February and March) and lowest (2.59) during monsoon season (July and August). The high values of diversity index of macro-invertebrates at all the three sampling sites indicate diverse macroinvertebrate communities in the Tons river in Doon Valley, India." (Authors) The following taxa are listed in table 2: Agrion, Ceriagrion cerinorubellum, Ischnura, and Ophiogomphus.] Address: Sharma, R.C., Department of Environmental Sciences, H.N.B. Garhwal University, Post Box 67, Srinagar-Garhwal, Uttarakhand 246174, India. E-mail: drrameshchsharma@yahoo.com

8443. Sherwin, G. (2009): Submergence of both sexes during oviposition in the Large Red Damselfly *Pyrhosoma nymphula* (Sulzer) in Norfolk. *J. Br. Dragonfly Society* 25(2): 62-67. (in English) ["A pair of *P. nymphula* was observed and filmed whilst ovipositing in Norfolk in the summer of 2008. During previous observations, pairs were usually seen on floating *Ceratophyllum demersum* with attached males in the sentinel position contact guarding their respective mates. Females oviposited into the Hornwort with only a part of their abdomens submerged. Similar behaviour was also observed by pairs perched on other plants, including *Menyanthes trifoliata*. On 11 May a pair was observed when the female submerged completely for just over a minute. On 23 May a pair was seen with the female already completely submerged and the male followed. At the same time a second pair was also observed nearby with both sexes submerged. To the best of my knowledge this is the first report of complete male submergence in this species." (Authors)] Address: Sherwin, G., The Beeches, Sporle Road, Little Dunham, King's Lynn, Norfolk, PE32 2DG, UK

8444. Slos, S.; De Meester, L.; Stoks, R. (2009): Food level and sex shape predator-induced physiological stress: immune defence and antioxidant defence. *Oecologia* 161: 461-467. (in English) ["Despite the potential impact on prey fitness and predator–prey interactions, most studies of predation risk ignore physiological responses and their dependence upon food level and sex. Therefore, we reared male and female larvae of the damselfly *Lestes viridis* under predator stress (dragonfly larvae) at high and low food levels, and sub-

sequently scored for important variables of insect immune defence (i.e. phenoloxidase) and antioxidant defence [i.e. superoxide dismutase, and catalase (CAT)]. Under predation risk, larvae did not decrease growth rate or immune defence, and only slightly reduced food intake in the high food treatment, probably because of time stress, i.e. little time available to complete the larval development. However, larvae facing predator stress did show an upregulation of antioxidant enzymes. This upregulation was dependent upon food level for CAT and both food level and sex for SOD, consistent with energetic constraints and sex differences in the link between longevity and adult fitness. Our results illustrate that predator stress can influence life history, behavioural and physiological responses differentially and in a context-dependent way. This implies that non-consumptive physiological effects of predators on their prey show independent yet similar complexities in behavioural and life history response variables. In general, our results advocate that mechanistic studies on predator–prey interactions may benefit from including physiological variables." (Authors)] Address: Slos, Stefanie, Lab. of Aquatic Ecology and Evolutionary Biology, Univ. of Leuven, Ch. Debériotstraat 32, B-3000 Leuven, Belgium. E-mail: stefanie.slos@bio.kuleuven.be

8445. Solly, F.; Milton, P.; Sawyer, D.; Woods, C.; Hodge, T. (2009): Reports from Costal Stations - 2008: Isle of Thanet, Kent. *Atropos* 36: 50-51. (in English) [UK; *Sympetrum fonscolombii*] Address: not stated

8446. Song, H.; Bucheli, S.R. (2009): Comparison of phylogenetic signal between male genitalia and non-genital characters in insect systematics. *Cladistics* 25: 1-13. (in English) ["It is generally accepted that male genitalia evolve more rapidly and divergently relative to non-genital traits due to sexual selection, but there is little quantitative comparison of the pattern of evolution between these character sets. Moreover, despite the fact that genitalia are still among the most widely used characters in insect systematics, there is an idea that the rate of evolution is too rapid for genital characters to be useful in forming clades. Based on standard measures of fit used in cladistic analyses, we compare levels of homoplasy and synapomorphy between genital and non-genital characters of published data sets and demonstrate that phylogenetic signal between these two character sets is statistically similar. This pattern is found consistently across different insect orders (- the genus *Enallagma* represents the Odonata -) at different taxonomic hierarchical levels. We argue that the fact that male genitalia are under sexual selection and thus diverge rapidly does not necessarily equate with the lack of phylogenetic signal, because characters that evolve by descent with modification make appropriate characters for a phylogenetic analysis, regardless of the rate of evolution. We conclude that male genitalia are a composite character consisting of different components diverging separately, which make them ideal characters for phylogenetic analyses, providing information for resolving varying levels of hierarchy." (Authors)] Address: Song, H., Dept Biology, Brigham Young University, Provo, UT 84602, USA. E-mail address: hojunsong@byu.edu

8447. Spaccesi, F.; Rodrigues Capitulo, A. (2009): Benthic invertebrate assemblage in Samborombón River (Argentina, S. America), a brackish plain river. *Aquatic Ecology* 43(4): 1011-1022. (in English) ["The

spatial and temporal differences in the structure and composition of benthic invertebrates were studied at three sites of the Samborombón River, which is an important tributary of the Río de la Plata Estuary (Argentina), having a low slope and brackish drainage. Biological samples were taken during each season. Physico-chemical variables were measured to determine their association in the benthic fauna distribution. Site 1, in the headstream, was characterized by freshwater Pampean organisms; site 2 showed the highest density, taxa diversity, and richness; brackish species, e.g., *Laonereis culveri*, were found here. Site 3, close to the Samborombón Bay, was characterized by an unstable taxonomic composition that is strongly influenced by the estuary. The lowest density and taxonomic diversity of organisms were registered and distinguished by estuarine species. The multivariate method (redundancy analysis) showed the benthic groups having an important spatial variability, superimposed on the temporal variability, associated with the salinity gradient of the river." (Authors) *Erythrodiplax nigricans* and *Oxyagrion hemipeli* were sampled at site 1 resp. site 2.] Address: Spaccesi, F., Laboratorio de Bentos, Instituto de Limnología Dr. Raúl A Ringuet (ILPLA) UNLP-CONICET, Av. Calchaquí, km 23,5 CC 712, CP 1900 La Plata, Buenos Aires, Argentina. E-mail: spaccesi@ilpla.edu.ar

8448. Spence, B. (2009): Reports from Coastal Stations - 2008: Spurn Point, East Yorkshire. *Atropos* 36: 57-58. (in English) [UK; *Calopteryx splendens*, *Erythromma viridulum*] Address: not stated

8449. Stavenga, D.G. (2009): 15. Surface colours of insects: Wings and eyes. In: Gorb, S.N. (Ed): *Functional surfaces in biology. Little structures with big effects. Volume 1.* Verlag Springer Netherlands. ISBN 978-1-4020-6696-2 (Print): 285-306. (in English) [On pages 288-289 Odonata are treated: "14.3 Damselfly Wing colours: The wings of damselflies are thin chitinous structures with mechanically strong veins, bordering membranous cells. Damselfly wings are usually rather colourless, although often adorned with some black spots. A few species have colourful wings, however A notable example is the damselfly *Neurobasis chinensis*, where the membranous structure in the cells of the hindwings feature beautiful multilayers, causing blue-green iridescent wings (Vukusic et al.. 2004). Remarkably, the mature males of another Asian damselfly, *Calopteryx japonica*, also display iridescent wings, but here the multilayers are exclusively in the wing veins. They provide the wings with a blue-green sheen (Fig. 14.3). Measurements of the reflectance of immature and mature males and females show that the reflectance is generally rather low (Fig. 14.4a-d), but the mature male wings have a noticeable reflectance peak in the blue (Fig. 14.4d). The wing transmittance varies strongly with age and sex. The transmittance spectra of the wings of immature and mature females indicate that the wings contain some melanin pigment (Fig. 14.4e, 0, so that the wings have a rather inconspicuous, brownish colouration. The wing transmittance of the immature males is much lower than that of the females (Fig. 14.4g), due to a higher concentration of melanin, and this concentration increases sharply with age (Fig. 14.4h). The deposition of melanin in the wing cells and the vein multilayers causes a dark background upon which the iridescence of the mature males, although not very intense, still clearly stands out. Behavioral observations show that the resulting striking blue colour of the mature

males plays an important role in the sexual recognition and discrimination of immature and mature animals (Hariyuma et al.. 2005)." (Author)] Address: Stavenga, Doekele, Department of Neurobiophysics, University of Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands. Email: d.g.stavenga@rug.n

8450. Strand, L.; Billqvist, M.; Karlsson, T. (2009): Projekt trollslandor i Skane 2009 - 2014. Inventeringsmanual. Entomologiska sällskapet i Lund, Naturskyddsföreningen i Skåne och Studieförbundet: 37 pp. (in Swedish) [Well organized manual to survey the Odonata in the Skane-region, Sweden. For details see: <http://www.trollslandor.se/trollslandemmanual.pdf>] Address: Strand, Linda

8451. Subramanian, K.A. (2009): *Dragonflies of India: A Field Guide.* Published by Vigyan Prasar, Noida. ISBN: 978-81-7480-192-0: XII + 168 pp. (in English) [Photographic field guide with more than 200 photographs to 111 Indian Odonata species, with English common names introduced to Indian dragonflies and damselflies for the first time. Implemented are field keys for the identification of larvae and adults, and information on key characteristics and ecology of each species.] Address: <http://www.vigyanprasar.gov.in>; Subramanian, K.A., Zoological Survey of India, Western Regional Station, Pune-411 044 Maharashtra, India. E-mail:subbuka.zsi@gmail.com

8452. Subramanian, K.A. (2009): A checklist of Odonata (Insecta) of India (version December 2009). Zoological Survey of India. <http://zsi.gov.in/zoological-survey-of-india/zsi-data/checklist/OdonataIndica151209.pdf>: 36 pp. (in English) [463 species are included into the checklist of the Indian Odonata. Thirteen of these are critically commented. Information on species described after 1995 (n=5), new species reports to India after 1995 (n=4), species synonymised after 1995 (n=16), species removed (n=7) and 18 taxa declared as nomen nudem according the provisions of ICZN Articles-13 & 16, as well as acknowledgements and references are added.] Address: Subramanian, K.A., Zoological Survey of India, Western Regional Station, Pune-411 044 Maharashtra, India. E-mail:subbuka.zsi@gmail.com

8453. Subramanian, K.A. (2009): A checklist of Odonata (Insecta) of India (version July 2009). Zoological Survey of India, Western Regional Station. <http://zsi.gov.in/zoological-survey-of-india/zsi-data/checklist/OdonataIndica110709.pdf>: III, 34 pp. (in English) [Globally app. 5,740 species of Odonata are known. Of these 470 species in 139 genera and 19 families exist in India. The taxa are listed and discussed. The type materials of following species (18 species) published by Sathe & Shinde (2006a,b, 2008a,b) are not deposited in any recognized national or international repositories. Moreover, the species descriptions do not provide illustrations or photographs of genitalia, anal appendages, wing venation etc. for a critical comparative study. Since the species descriptions does not adhere to the provisions of ICZN Articles-13 & 16 (Edition-4, 2000), the species may be considered nomen nudum until the types and illustrations are made available for scientific scrutiny: 1. *Agriocnemis kolhapurensis*; 2. *Anax mahaxmi*; 3. *Bradinopyga satarens*; 4. *Crocothemis rage-shri*; 5. *Gynacantha sathei*; 6. *Indothemis indica*; 7. *Indothemis koyinei*; 8. *Mesogomphus humani*; 9. *Mesogomphus indica*; 10. *Onychothemis patani*; 11. *Pantala*

shalakhi; 12. *Pantala shivajiensis*; 13. *Potamarcha humani*; 14. *Potamarcha koynii*; 15. *Rhyothemis rangiri*; 16. *Rhyothemis yashawanti*; 17. *Trithemis hivei*; 18. *Trithemis maharashtri*.] Address: Subramanian, K.A., Zool. Survey India, Western Regional Station, Pune-411 044 Maharashtra, India. E-mail:subbuka.zsi@gmail.com

8454. Suhling, F.; Martens, A.; Leipelt, K.-G.; Schütte, K.; Hoppe-Dominik B. (2009): Libellen Braunschweigs – Verbreitungsmuster und Bestandstrends der Libellenfauna einer Großstadt (Odonata). *Braunschweiger Naturkundliche Schriften* 8(2): 449-476. (in German, with English summary) ["In the period from 1980 to 2009, 51 odonate species were recorded in the area of Braunschweig, Lower Saxony, Germany. With a data base of 4405 records from 180 localities and a relatively continuous field work in that period, distribution patterns as well as long-term trends in the occurrence of species were analysed. For several species distinct trends of decline or increase could be detected and related to local habitat variation and general population trends. 30 of the recorded species were categorised as more or less frequent, 13 as rare and eight species were only recorded as single specimens. *Sympetrum pedemontanum*, *Coenagrion pulchellum*, *Ischnura pumilio* and especially *Sympetrum danae* showed a decline, whereas *Sympecma fusca*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Orthetrum brunneum* and *O. coerulescens* became more frequent during that period. The diversity of the dragonfly fauna of Braunschweig can be explained by the presence of pond systems in the urban periphery and by the presence of two rivers and their floodplain remnants: both habitat types were improved by restauration and conservation measures, i.e. construction of small ponds and sympathetic river management, respectively." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, 38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

8455. Suutari, E.; Salmela, J.; Paasivirta, L.; Rantala, M.J.; Tynkkynen, K.; Luojumäki, M.; Suhonen, J. (2009): Macroarthropod species richness and conservation priorities in *Stratiotes aloides* (L.) lakes. *Journal of Insect Conservation* 13(4): 413-419. (in English) ["Species with narrow ranges and specialised traits are most at risk, and the extinction wave is further enhanced by coextinctions. We studied the conservation value and indicator potential of *Stratiotes aloides*, an aquatic macrophyte that has declined considerably in Europe. Our purpose was to determine whether *S. aloides* could be used as an indicator of a valuable habitat in terms of macroarthropod diversity and species richness. The potential occurrence of an internationally endangered *Stratiotes*-habitat specialist, the dragonfly *Aeshna viridis*, can increase the conservation value of plant colonies. *S. aloides* beds harboured diverse macroarthropod fauna often containing species of conservation concern, including *A. viridis*. *Stratiotes* is a potential indicator of a valuable habitat, and its indicator value is enhanced by the easy identification of the species. However, its use as an indicator of a defined macroarthropod community is limited because no particular community type is connected to it. We suggest that protecting *Stratiotes* simultaneously conserves valuable arthropod fauna, including *A. viridis*." (Authors)] Address: Suutari, Erna, Department of Biological and Environmental Science, University of Jyväskylä, P.O. Box 35, FI-40014 Jyväskylä, Finland. Email: ermasuut@jyu.fi

8456. Swillen, I.; De Block, M.; Stokks, R. (2009): Morphological and physiological sexual selection targets in a territorial damselfly. *Ecological Entomology* 34(6): 677-683. (in English) ["1. Several morphological and physiological traits may shape fitness through the same performance measure. In such cases, differentiating between a scenario of many-to-one mapping, where phenotypic traits independently shape fitness leading to functional redundancy, and a scenario where traits strongly covary among each other and fitness, is needed. 2. A multivariate approach was used, including morphological and physiological traits related to flight ability, a crucial performance measure in flying insects, to identify independent correlates of short-term mating success (mated versus unmated males) in the territorial damselfly *Lestes viridis*. 3. Males with higher flight muscle mass, higher relative thorax mass, and more symmetrical hindwings, all traits presumably linked to manoeuvrability, were more likely to be mated. Unexpectedly, although relative thorax mass is often used as a proxy for flight muscle mass, both traits were selected for independently. Mated males had a higher thorax fat content than unmated males, possibly because of enhanced flight endurance. 4. The finding of several independent targets of sexual selection linked to flight ability is consistent with a scenario of many-to-one mapping between phenotype and performance. Identifying such a scenario is important, because it may clarify situations where animals may show suboptimal values for some phenotypic traits shaping a performance measure, while still having high performance and fitness. We argue in the discussion that the functional approach of sexual selection provides a potent tool for examining unresolved issues in both sexual selection theory, as well as life-history theory." (Authors)] Address: Swillen, Ine, Laboratory of Aquatic Ecology and Evolutionary Biology, University of Leuven, Deberiotstraat 32, B-3000 Leuven, Belgium. E-mail: Ine.swillen@bio.kuleuven.be

8457. Takahashi, Y.; Watanabe, M. (2009): Diurnal changes and frequency dependence in male mating preference for female morphs in the damselfly *Ischnura senegalensis* (Rambur) (Odonata: Coenagrionidae). *Entomological Science* 12(3): 219-226. (in English) ["*I. senegalensis* females exhibit colour dimorphism, consisting of an andromorph and a gynomorph, which might be maintained under a frequency-dependent process of mating harassment by mate-searching males. Males change their mating preference for female morph depending on prior copulation experience. Binary choice experiments between two female morphs were carried out in four local populations in the early morning (07.00–09.00 hours) and the afternoon (12.00–14.00 hours), times which mark the onset and the end of diurnal mating activity, respectively. According to the line census along the water's edge, the proportion of andromorphs in the female population varied from 21 to 67% throughout the survey period for four local populations. Males showed non-biased preference for female morphs in the early morning in each local population, while they chose the common morph in the afternoon. Male mating preference for female morphs was positively correlated to the proportion of female morphs in the population. If the selective mating attacks on the common female morphs inhibit their foraging and/or oviposition behaviour, frequency-dependent male mating attacks might provide a selective force for maintaining the female colour dimorphism in *I. senegalensis*." (Authors)] Address: Watanabe, M., Graduate School of Life

& Environmental Sciences, Univ. of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. Email: watanabe@kankyo.envr.tsukuba.ac.jp

8458. Takehara, S.; Uchida, S.; Kimura, K. (2009): Impact assessment of deposit removal on the physical habitat for aquatic insects in the middle reach of the Yahagi River, central Honshu, Japan. *Aichi Kogyo Daigaku Kenkyu Houkoku B* [Annual Report of Aichi Institute of Technology B.] 44(21): 155-162. (Japanese, with English summary) ["We assessed the impact of deposit removal from the middle reach of the Yahagi River, central Honshu, Japan, on the physical habitat availability for five species of aquatic insects (*Macromia daimoji*, *Gomphus postocularis*, *Onychogomphus viridicostus*; *Oyamia seminigra*, *Neoperla* sp. (Plecoptera: Perlidae), by employing the IFIM / PHABSIM. The weighted usable area (WUA) of the species that live in the cobble substrates with interstitial spaces, *O. viridicostus*, *O. seminigra*, and *Neoperla*, were expected to become wider in the estimated riverbed after the deposit removal than in the present riverbed. On the other hand, the WUA of the species that live on the mud and sand substrates in a backwater pool along the channel margin, *M. daimoji* and *G. postocularis*, were expected to become smaller in the estimated riverbed after the deposit removal than in the present riverbed, if the gravel bar around the backwater pool would be removed. But, it was difficult to accurately assess the physical habitat in the places like the backwater pool after the deposit removal. Therefore, the practice of deposit removal work should follow the process of adaptive management in order to determine the best management strategy." (Authors)] Address: not transliterated into English

8459. Taylor, P.; Smallshire, D.; Parr, A. (2009): Revised list of Odonata recorded in the United Kingdom. *J. Br. Dragonfly Soc.* 25(1): 57-61. (in English) ["The Trustees of the BDS recently decided that the species list used in all BDS publications should follow the same systematic order. Additionally it was felt that a system of categories for UK species is needed. The Odonata lists presented follow the taxonomic sequence of Davies & Tobin (1984, 1985) and employ similar groupings to the example set by the British Ornithologists' Union Records Committee for its bird list, although it has not been sensible to use exactly the same categories." (Authors)] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk NR29 5LX, UK

8460. Tennesen, K.J. (2009): Description of the final instar nymph of *Homeoura nepos* (Selys, 1876) (Odonata: Coenagrionidae). *Zootaxa* 2286: 65-68. (in English) ["The description of the nymph of *H. nepos* by Calvert (1948) was based on a single, immature specimen from São Paulo, Brazil which lacked gills. The nymphs of *H. chelifera* and *H. lindneri* were described by Lozano et al. (2009), who considered Calvert's description of the nymph of *H. nepos* doubtful. The following description and illustrations of the nymph of *H. nepos* are based on reared specimens from Bolivia. The nymphs of the three species now definitely known are compared; the nymphs of *H. sobrina* and *H. obrieni* remain unknown." (Author)] Address: Tennesen, K.J., 125 N Oxford St., Wautoma, WI 54982, USA. E-mail: ktennesen@centurytel.net

8461. Teuscher, M.; Brändle, M.; Traxel, V.; Brandl, R. (2009): Allometry between leg and body length of in-

sects: lack of support for the size-grain hypothesis. *Ecological Entomology* 34(6): 718-724. (in English) ["The size-grain hypothesis (Kaspari & Weiser, 1999) states that (1) as organisms decrease in size, they perceive their environment as being more rugose; (2) long legs allow organisms to step over obstacles but hinder them from entering small gaps; and (3) as the size of an organism decreases, the benefits of long legs begin to be outweighed by the costs of construction. Natural selection should therefore favour proportionally longer legs in larger organisms, thereby leading to a positive allometry between leg and body length (scaling exponent $b > 1$). Here we compare the scaling exponent of leg-to-body length relationships among insects that walk, walk and fly, and predominantly fly. We measured the lengths of the hind tibia, hind femur, and body length of each species. The taxa varied considerably in the scaling exponent b . In seven out of ten groups (Formicidae, Isoptera, Carabidae, Pentatomidae, Apidae, Lepidoptera, Odonata adult), b was significantly greater than one. However, there was no gradual decrease in b from walking to walking/flying to flying insects. The results of the present study provide no support for the size-grain hypothesis. We propose that leg length is not only affected by the rugosity of the environment, but also by (1) functional adaptations, (2) phylogeny, (3) lifestyle, (4) the type of insect development (hemimetabolism or holometabolism), and (5) constraints of gas exchange." (Authors)] Address: Teuscher, Miriam, Animal Ecology, Department of Ecology, Faculty of Biology, Philipps-Universität Marburg, Karl-von-Frisch Str. 8, 35032 Marburg, Germany. E-mail: miriam.teuscher@gmx.de

8462. Thiery, G.; Milenkovski, S.; Lindgren, P.E.; Sahlén, G.; Berglund, O.; Weisner, S.E.B. (2009): Wetland creation in agricultural landscapes: Biodiversity benefits on local and regional scales. *Biological Conservation* 142: 964-973. (in English) ["Wetland creation aiming at a simultaneous increase in nutrient retention and species diversity in agricultural landscapes has recently become applied as a catchment-scale compensation measure for past wetland losses. Here, we evaluate if, and to what extent, dual-purpose wetlands benefit local and regional diversity of agricultural landscapes. We analysed composition and a , b , and c diversity of aquatic macroinvertebrate assemblages among dual-purpose wetlands in an agricultural region in southwest Sweden in relation to local (water quality, wetland morphology, succession stage, proximity to other aquatic habitats) and landscape parameters (regional connectivity, wetland density). Diversity of mature agricultural ponds was used as a standard to evaluate the value of dual-purpose wetlands. Dual-purpose wetlands sustained a , b , and c diversity similar to that of natural lentic water bodies in agricultural landscapes in the region and elsewhere. Over 80% of the overall species richness was attributed to b diversity, and each created wetland contributed to overall species accumulation. Ecosystem parameters explained 19% of the compositional variation among assemblages, but were only marginally related to diversity. Wetland density promoted a and c diversity, while spatial heterogeneity (b) remained equally high, independent of wetland density. Our results indicate that catchment-scale wetland creation for simultaneous retention and diversity purposes benefits the biodiversity of agricultural landscapes, particularly if the density of aquatic habitats is increased by at least 30%." (Authors) Odonata belong to the most diverse insect orders in man-made water bodies.] Address: Sah-

lén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@set.hh.se

8463. Ting, J.T.; Bots, J.; Pérez Jvostov, F.; van Gossum, H.; Sherratt, T.N. (2009): Effects of extreme variation in female morph frequencies on the mating behaviour of male damselflies. *Behavioral Ecology and Sociobiology* 64(2): 225-236. (in English) ["Female-limited polymorphism is often attributed to selection to avoid excessive male mating attempts. It is encountered in various taxonomic groups, but is particularly common in damselflies, where one female morph (andromorph) typically resembles the conspecific male in colour pattern, while the other(s) (gynomorph(s)) do not. Two sets of theories have been proposed to explain the phenomenon in damselflies, which can be classified as the learned mate recognition (LMR) and male mimicry (MM) hypotheses. To test predictions of these hypotheses, we evaluated the rate of male sexual response towards female morphs and conspecific males in *Nehalennia irene*. The LMR hypothesis predicts that males should respond sexually to andromorphs at greater rates in populations containing a higher relative frequency of andromorphs. The MM hypothesis predicts that males respond more often sexually to both andromorphs and males as the ratio of andromorphs to males increases. While LMR predicts that the rate of mating attempts towards gynomorphs should vary, the MM predicts that it should be relatively fixed. On experimentally presenting live specimens to focal males in five different populations with extreme variation in female morph frequencies, we observed that as the andromorph frequency and ratio of andromorphs to males increased, the proportion of male mating attempts increased on both andromorphs and males, whereas it decreased on gynomorphs. While the simplest form of the MM hypothesis is rejected, the results support specific predictions of both hypotheses and suggest that future studies should not treat these hypotheses as mutually exclusive." (Authors)] Address: Sherratt, T.N., Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa ON, K1S 5B6, Canada. E-mail: sherratt@ccs.carleton.ca

8464. Toivanen, T.; Rantala, M.J.; Suhonen, J. (2009): Influence of alternative mating tactics on predation risk in the damselfly *Calopteryx virgo*. *Can. Jour. Zool.* 87: 684-688. (in English, with French summary) ["Alternative mating tactics are a widespread feature in insects. A typical form of alternative mating behaviour is being a sneaker in the vicinity of a territorial male. Such nonterritorial males have lower mating success, but they may benefit from lower energetic costs and decreased predation risk. In this study, we examined whether nonterritorial male damselflies *C. virgo* are subject to lower predation risk than territorial males. To distinguish predation from other sources of mortality, we used models. The experiment consisted of dried male damselflies settled into the typical perching positions of territorial and nonterritorial males. Also the spatiotemporal patterns of predation risk were studied. The survival of nonterritorial male models was consistently higher than that of territorial male models, which can be attributed to different predation risk. Survival of the models was lower in the presence of avian predators and in large populations. Survival rates were affected by habitat type but did not change during the season. We conclude that nonterritorial male damselflies are less vulnerable to predation and that there may be a

trade-off which could potentially make the fitness of sneakers equal to that of territorial males." (Author)] Address: Suhonen, J., Secti. Ecology, Dept Biology, Univ. Turku, 20014 Turku, Finland. E-mail: juksuh@utu.fi

8465. Torralba Burrial, A.; Mezquita, I. (2009): De Monstruos y Prodigios (23): un caso de teratología abdominal en *Ischnura pumilio* (Charpentier, 1825) (Odonata: Coenagrionidae). *Boletín de la Sociedad Entomológica Aragonesa* 44: 349-350. (in Spanish, with English summary) [A teratology in last abdominal segments of a male specimen of *I. pumilio* is reported] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

8466. Torralba Burrial, A.; Mezquita, I. (2009): Fallos en reconocimiento de pareja en libélulas: cinco tandems intrasexuales inter e intraespecíficos (Odonata: Lestidae. Coenagrionidae y Gomphidae). *Boletín de la Sociedad Entomológica Aragonesa* 44: 522-524. (in Spanish, with English summary) ["Partner recognition failure in dragonflies: five intrasexual inter and intraspecific tandems (Odonata: Lestidae, Coenagrionidae and Gomphidae) 5 intrasexual tandems in dragonflies are reported. Two are intraspecific tandems (*Ischnura pumilio* and *Lestes sponsa*) and three are interspecific tandems (*L. sponsa* with *Lestes barbarus*, *L. sponsa* with *Chalcolestes viridis* and *Onychogomphus uncutus* with *Onychogomphus forcipatus*)." (Authors)] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

8467. Torralba-Burrial, A. (2009): Libélulas de montaña: cuatro especies amenazadas en la Península Ibérica. *El Ecologista* 62: 40-41. (in Spanish, with English summary) [*Aeshna juncea*, *Cordulegaster bidentata*, *Sympetrum flaveolum*, and *Leucorrhinia pectoralis* are threatened in the Iberian Peninsula, due to distribution fragmentation, loss of its habitats and climatic change.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

8468. Torralba-Burrial, A.; Ocharan, F.J. (2009): Two gynandromorphs of *Sympetrum striolatum* (Charpentier, 1840) (Odonata: Libellulidae). *Entomological Science* 12(2): 182-187. (in English) [Spain; 2 gynandromorphs of *S. striolatum*, with different features, are described here, with special emphasis on the genitalic structures.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

8469. Trautner, J. (2009): Artenschutz und Umweltaftung bei Pflege- und Unterhaltungsmaßnahmen an Fließgewässern. Ein Streiflicht zur Berücksichtigung der relevanten Rechtsnormen in der Praxis. *Naturschutz und Landschaftsplanung* 41(3): 78-82. (in German, with English summary) ["Species Protection and Environmental Liability in Watercourse Maintenance – Consideration of relevant legal norms'. Measures in the context of watercourse maintenance may seriously impair protected species. Some examples are given, including strictly protected species of the European Habitats Directive (92/43/EEC). It is necessary to pay attention to the regulations of the German Federal Nature Conservation Act (BNatSchG) on species protection as well as

to those of the Environmental Damage Act (USchadG) on environmental liability. Currently this seems to be insufficiently known or is not taken seriously enough. Concerning measures planned in the framework of watercourse maintenance firstly at least a rough estimation of their effects is necessary. If highly endangered species could be affected a more detailed assessment should be done. Both the estimation and the assessment aim to clarify (a) which particularly sensitive and protected species are affected, (b) which possibilities for prevention or reduction of negative impacts respectively a careful management are given, (c) if nevertheless legal prohibitions are touched, (d) if a legal exemption is necessary and even possible under the specific circumstances (reasons for the planned measures, lack of satisfactory alternative solutions, conservation status of the populations), (e) if and which additional measures could be necessary in this context." (Author) Coenagrion mercuriale serves as an example to outline legal considerations to maintain watercourses.] Address: Trautner, J., Arbeitsgruppe für Tierökologie und Planung, Johann-Strauß-Straße 22, D-70794 Filderstadt, Germany. E-Mail info@tieroekologie.de

8470. Tun-Lin, W.; Lenhart, A.; Nam, V.S.; Rebolgar-Tellez, E.; Morrison, A.C.; Barbazan, P.; Cote, M.; Midega, J.; Sanchez, F.; Manrique-Saide, P.; Kroeger, A.; Nathan, M.B.; Meheus, F.; Petzold, M. (2009): Reducing costs and operational constraints of dengue vector control by targeting productive breeding places: a multi-country non-inferiority cluster randomized trial. *Tropical Medicine and International Health* 14(9): 1143-1153. (in English) ["Objectives: To test the non-inferiority hypothesis that a vector control approach targeting only the most productive water container types gives the same or greater reduction of the vector population as a non-targeted approach in different ecological settings and to analyse whether the targeted intervention is less costly. Methods: Cluster randomized trial in eight study sites (Venezuela, Mexico, Peru, Kenya, Thailand, Myanmar, Vietnam, Philippines), with each study area divided into 18-20 clusters (sectors or neighbourhoods) of approximately 50-100 households each. Using a baseline pupal-demographic survey, the most productive container types were identified which produced $\geq 55\%$ of all *Ae. aegypti* pupae. Clusters were then paired based on similar pupae per person indices. One cluster from each pair was randomly allocated to receive the targeted vector control intervention; the other received the 'blanket' (nontargeted) intervention attempting to reach all water holding containers. Results: The pupal-demographic baseline survey showed a large variation of productive container types across all study sites. In four sites the vector control interventions in both study arms were insecticidal and in the other four sites, non-insecticidal (environmental management and/or biological control methods). Both approaches were associated with a reduction of outcome indicators in the targeted and non-targeted intervention arm of the six study sites where the follow up study was conducted (PPI, Pupae per Person Index and BI, Breteau Index). Targeted interventions were as effective as non-targeted ones in terms of PPI. The direct costs per house reached were lower in targeted intervention clusters than in non-targeted intervention clusters with only one exception, where the targeted intervention was delivered through staff-intensive social mobilization. Conclusions: Targeting only the most productive water container types (roughly half of all water holding container types) was

as effective in lowering entomological indices as targeting all water holding containers at lower implementation costs. Further research is required to establish the most efficacious method or combination of methods for targeted dengue vector interventions." (Authors) In Myanmar, the study included dragonflies to reduce *Ae. aegypti*, and is in combination with sweeps and fishes as predators of *Aedes* the most effective method to reduce *Ae. aegypti* as well as community participation in controlling and maintaining water containers.] Address: Tun-Lin, W., Dept Medical Research, Yangon, Myanmar

8471. Tunmore, M. (2009): Reports from Costal Stations - 2008: Lizard Peninsula. *Atropos* 36: 36-38. (in English) [*Sympetrum fonscolombii*, *Ceragrion tenellum*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freeseerve.co.uk

8472. Tynkkynen, K.; Raatikainen, K.J.; Häkklä, M.; Haukilehto, E.; Kotiaho, J.S. (2009): Alternative reproductive tactics and the propensity of hybridization. *J. evol. biol.* 22: 2512-2518. (in English) ["One explanation for hybridization between species is the fitness benefits it occasionally confers to the hybridizing individuals. This explanation is possible in species that have evolved alternative male reproductive tactics: individuals with inferior tactics might be more prone to hybridization provided it increases their reproductive success and fitness. Here we experimentally tested whether the propensity of hybridization in the wild depends on male reproductive tactic in *Calopteryx splendens* damselflies. Counter to our expectation, it was males adopting the superior reproductive tactic (territoriality) that had greatest propensity to hybridize than males adopting the inferior tactics (sneakers and floaters). Moreover, among the territorial males, the most ornamented males had greatest propensity to hybridize whereas the pattern was reversed in the sneaker males. Our results suggest that there is fluctuating selection on male mate discrimination against heterospecific females depending on both ornament size and the male's reproductive tactic." (Authors)] Address: Tynkkynen, Katja, Centre of Excellence in Evolutionary Research, Department of Biological and Environmental Sciences, PO Box 35, University of Jyväskylä, FI-40014 Jyväskylä, Finland. E-mail: katja.m.m.tynkkynen@jyu.fi

8473. Tyrrell, M.; Emary, C.; Piper, M. (2009): The Beautiful Demoiselle *Calopteryx virgo* (Linnaeus) in Northamptonshire: eastwards expansion & habitats. *J. Br. Dragonfly Soc.* 25(2): 100-106. (in English) ["Northamptonshire is at the eastern limit of the range of *C. virgo* in the Midlands of England, making this population of regional importance. *C. virgo* is included as a Key County species according to key sites criteria (French & Smallshire, 2008). Historically, *C. virgo* in Northamptonshire has been limited to two river systems, the Rivers Tove and Cherwell, with its range showing few signs of expanding. However, since 2003, it has undergone a significant range expansion and is now recorded on six river systems, adding the Great Ouse near Brackley, the Leam, the Avon and the Nene to the list. While increased recording in the County over this time period will have undoubtedly contributed new records, this is mainly infilling, and a genuine expansion has been noted into new previously well recorded areas. This paper discusses this expansion using a series of dated distribution maps, and reviews the river habitats of all

river systems with possible expansion corridors discussed." (Authors) Address: Tyrrell, M., 8 Warwick Close, Raunds, Northamptonshire, NN9 6JH, UK

8474. Uzenbaev, S.D.; Lyabzina, S.N. (2009): An experimental study of the effects of spider venom on animals. *Entomological Review* 89(4): 479-486. (in English) ["The effects of venom of spiders from the families Pisauridae, Argyronetidae, and Araneidae on different animals (worms, molluscs, arthropods, fishes, and mammals) were studied. The animals of different classes varied in their sensitivity to spider venom. The animals that can be a potential prey were the most sensitive. The venom of spider females was more efficient than that of males. The spiders were found to be able to kill five victims in sequence; the most effective action of venom was on the first two ones. The venom regenerates in 1.5–2 hours." (Authors) In case of the two odonata taxa studied, the results are as follows: Sensitivity of *Lestes sponsa* larvae to venom of terrestrial *Araneus bituberculatus* (7.4 h before death); *A. diadematus* (1.5 h before death); Sensitivity of *Lestes sponsa* larvae to venom of aquatic *Argyroneta aquatica* (12.4 h \pm 2.3 before death); *Dolomedes fimbriatus* (14.3 h \pm 4.2 before death); Sensitivity of *Aeshna juncea* larvae to venom of aquatic *Argyroneta aquatica* (17.7 h \pm 5.6 before death); *Dolomedes fimbriatus* (44.8 h \pm 4.2 before death)] Address: Uzenbaev, S.D., Petrozavodsk State University, Petrozavodsk, 185910 Russia. E-mail: uzenbaev@petrsu.ru

8475. Van Passel, B. (2009): Dragonflies in the northern part of the Waasland (province of East-Flanders) in 2008. *Libellenvereniging Vlaanderen —nieuwsbrief* 3(1): 8-10. (in Dutch, with English summary) [Belgium; *Ceragrion tenellum*, *Coenagrion pulchellum*, *Leucorhinia dubia*, and *Aeshna isocoles* were found by surveying a region with relatively few historical data.] Address: Van Passel, Brigitte, (Libellenwerkgroep Natuurpunt Waasland-Noord), Bormte 24, 9190 Stekene, Belgium. E-mail: brigitte.van.passel1@telenet.be

8476. Veber, T.; Kotta, J.; Lauringson, V.; Kotta, I. (2009): Influence of the local abiotic environment, weather and regional nutrient loading on macrobenthic invertebrate feeding groups in a shallow brackish water ecosystem. *Oceanology* 51(4): 541-559. (in English) ["This study evaluated the extent to which depth, sediment type, exposure to waves and coastal slope inclination modulate the relationships between regional nutrient loading, weather patterns and the species composition and dominance structure of macrobenthic invertebrate feeding groups in a brackish water ecosystem of the Baltic Sea. Irrespective of feeding function, the species composition and dominance structure of benthic invertebrate communities were determined by local abiotic variables such as exposure, depth and sediment type. Regional weather variables (average southerly winds, salinity, water temperature, ice conditions) either separately or interactively contributed to the variability of benthic invertebrates. Nutrient loading had significant effects on benthic invertebrates only in interactions with local abiotic or regional weather variables. Herbivores, deposit feeders and suspension feeders exhibited a stronger response to the studied environmental variables than carnivores. All this suggests that (1) the dynamic coastal habitats studied in this work are not very sensitive to shifts in nutrient loading and (2) local abiotic conditions and weather patterns largely define the ob-

served biotic patterns. We believe that the benthic invertebrate time series will only be a better reflection of the nutrient loading signal if more years covering extreme events are included." (Authors) Odonata are referred on the order level.] Address: Kotta, J., Estonian Marine Institute, University of Tartu, Mäealuse 10a, EE-12618 Tallinn, Estonia. E-mail: jonne.kotta@sea.ee

8477. Vercruyssen, W.; Feys, S.; Provoost, S. (2009): Two years of dragonflies in the PINK-project, an inventory of ponds at the Belgian coast. *Libellenvereniging Vlaanderen —nieuwsbrief* 3(1): 2-7. (in Dutch, with English summary) ["Very few historic dragonfly data exist from the coastal region. Till 2006, 27 species had been reported. In this three-year project some 150 waterbodies, some created recently as drinking reservoirs for nature-helping grazers, will be monitored. Till now 32 species have been found during these visits (two from the past haven't been found back yet), meaning 7 new species for the coast, some relatively rare for the western provinces of Belgium. One of the most extraordinary facts is the now almost omnipresence of *Coenagrion scitulum*, where the less good weather of 2008 seems to have had no impact on its populations." (Authors)] Address: Vercruyssen, W., INBO, Kliniekstraat 25, 1070 Brussel, Belgium. E-mail: edward.vercruyssen@inbo.be

8478. Versigghel, J. (2009): Ontdekking van een populatie Tangpantserjuffer (*Lestes dryas*) op de grens tussen West- en Oost-Vlaanderen [Discovery of a population of *Lestes dryas* on the border of West- and East-Flanders]. *Nieuwsbrief Libellenvereniging Vlaanderen* 3(2): 7-10. (in Dutch, with English summary) ["In the summer of 2009 a population of this rare damselfly was discovered in Wingene (on the border the provinces of East- and West-Flanders. The spot is situated in woodland, but parts have been cleared and ponds digged as part of a Life project. The area - as the nearby "Gulke Putten" nature reserve - holds quite a number of typical species from the Campine region. As the species is very rare, except in parts of the eastern half of Flanders (Antwerp and Limburg Campine), it seems that she is capable of colonising rather far away regions given a suitable habitat." (Author)] Address: Versigghel, J., Gouvernementstraat 34, 9880 Aaler, Belgium. E-mail: jan.versigghel@skynet.be

8479. Victorian Department of Sustainability and Environment (2009): Advisory list of threatened invertebrate fauna in Victoria - 2009. Department of Sustainability and Environment, East Melbourne, Victoria. ISBN 978-1-74242-058-5: 12 pp. (in English) [Australia; the red list of includes the following odonate species: *Caligrion billinghami*, *Hemiphlebia mirabilis* (endangered), *Austroaeschna flavomaculata* (vulnerable), *Austrolestes aridus*, *Austropetalia tonyana*, *Coenagrion lyelli* (near threatened), and *Dendroaeschna conspersa* (data deficient).] Address: Dept of Sustainability & Environment, 8 Nicholson Street, East Melbourne 3002, Australia

8480. Villanueva, R.J.T. (2009): Odonata of Dinagat Island, the Philippines: updated species list and notes on conservation of species and habitats. *Notulae odonatologicae* 7(3): 27-35. (in English) ["69 species were recorded from the island in 2007-2008, raising the number of the known species up to 83, but 12 species from the 1997 list of M. Hämäläinen & R.A. Müller (*Odonatologica* 26: 249-315) were not recorded during the present survey. 7 species and 3 sites are considered im-

portant from conservation viewpoint." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000 Philippines. E-mail: reaganjoseph@lycos.com

8481. Vintchevski, D.; Yasievitch, A. (2009): Comparison of a diet of the Montagu's Harrier *Circus pygargus* L. during breeding season in two distinct plots in the western Belarus. *Studia i Materialy Centrum Edukacji Przyrodniczo-Lesnej R. 11. Zeszyt 3 (22):* 110-117. (in English, with Polish summary) [Hrodna and Smarhon' districts, Belarus; the diet of *Circus pygargus* included *Sympetrum* sp.] Address: Vintchevski, D., Hrodna regional branch of APB-BirdLife Belarus. E-mail: Harrier@tut.by

8482. von Ellenrieder, N. (2009): Five new species of *Orthemis* from South America (Odonata: Libellulidae). *International Journal of Odonatology* 12(2): 347-381, pl. VII. (in English, with Spanish summary) ["Five new species of the levis-group of *Orthemis*, *O. cinnamomea* (holotype male in USNM: Peru, Madre de Dios Department, Explorer's Inn on Rio Tambopata, 12°50'S, 69°17'W, 300 m, 23 vii 2002, leg. D. Paulson & N. Smith), *O. coracina* (holotype male in USNM: Ecuador, Sucumbios Province, Limoncocha, 00°24'S, 76°36'W, 300 m, 23 vii 1977, leg. D. Paulson), *O. harpago* (holotype male in USNM: Peru, Madre de Dios Department, Explorer's Inn on Rio Tambopata, 12°30'S, 69°12'W, 300 m, 17 vi 1977, leg. D. Paulson), *O. philipi* (holotype male in MLP: Argentina, Salta Province, pond at route 15 between route 5 and Las Varas, 23°21'S, 64°08'W, 392 m, 23 v 2008, leg. N. von Ellenrieder), and *O. tambopatae* (holotype male in USNM: Peru, Madre de Dios Department, Explorer's Inn on Rio Tambopata, 12°30'S, 69°12'W, 300 m, 16 vi 1977, leg. D. Paulson), are described, illustrated, and diagnosed. A key for all species of the levis-group of *Orthemis* is provided." (Author)] Address: Ellenrieder, Natalia von, Museo de Ciencias Naturales, Universidad Nacional de Salta, Mendoza 2, Salta 4400, Argentina. E-mail: natalia.ellenrieder@gmail.com

8483. von Reumont, B.M.; Meusemann, K.; Szucsich, N.U.; Dell'Ampio, E.; Gowri-Shankar, V.; Bartel, D.; Simon, S.; Letsch, H.O.; Stocsits, R.R.; Luan, Y.-x.; Wägele, J.W.; Pass, G.; Hadrys, H.; Misof, B. (2009): Can comprehensive background knowledge be incorporated into substitution models to improve phylogenetic analyses? A case study on major arthropod relationships. *BMC Evolutionary Biology* 2009, 9:119: 19 pp. (in English) ["Background: Whenever different data sets arrive at conflicting phylogenetic hypotheses, only testable causal explanations of sources of errors in at least one of the data sets allow us to critically choose among the conflicting hypotheses of relationships. The large (28S) and small (18S) subunit rRNAs are among the most popular markers for studies of deep phylogenies. However, some nodes supported by this data are suspected of being artifacts caused by peculiarities of the evolution of these molecules. Arthropod phylogeny is an especially controversial subject dotted with conflicting hypotheses which are dependent on data set and method of reconstruction. We assume that phylogenetic analyses based on these genes can be improved further i) by enlarging the taxon sample and ii) employing more realistic models of sequence evolution incorporating nonstationary substitution processes and iii) considering covariation and pairing of sites in rRNA-genes.

Results: We analyzed a large set of arthropod sequences, applied new tools for quality control of data prior to tree reconstruction, and increased the biological realism of substitution models. Although the split-decomposition network indicated a high noise content in the data set, our measures were able to both improve the analyses and give causal explanations for some incongruities mentioned from analyses of rRNA sequences. However, misleading effects did not completely disappear." (Authors)] Address: Björn M von Reumont, Molecular Lab, Zoologisches Forschungsmuseum A. Koenig, Bonn, Germany. E-mail: bmv@arcor.de

8484. Waldhauser, M. (2009): First record of *Erythromma lindenii* (Sélys, 1840) (Odonata, Coenagrionidae) in the Czech Republic. *Bulletin Lampetra* VI: 26-29. (in Czech, with English summary) [In July 2009, *E. lindenii* was recorded for the first time in Czech Republic (northern Bohemia, Liberec region, at a pond called Horní Kunratický rybník near the village of Kunratice u Cvikova). It is a mesotrophic pond of 0,07 km² at 350 m a.s.l. with submerged vegetation dominated by *Myriophyllum spicatum* and a narrow zone of littoral vegetation. It is located approx. 65 km SE from the nearest known locality - Knappensee - in Saxony, Germany.] Address: Waldhauser, M., Petrovice 136, 47125 Jablonné v Podještědí, Czech Republic. E-mail: martin.waldhauser@nature.cz

8485. Walker, I. (2009): Emergence of aquatic insects and spider abundance in the Balbina Reservoir (Presidente Figueiredo, Amazonas, Brazil) during the phase of declining eutrophication. *Acta Limnol. Bras.* 21(2): 199-207. (in English, with Portuguese summary) ["Aim: Between April 1991 and December 1994 the patterns of insect emergence were assessed by a total of 422 emergence traps that were set for 24 hours periods on the water surface of the riparian zones of two islands in the Balbina Lake; Methods: These collections were accompanied by observations of spider densities along the shrubby forest margins of the islands. Furthermore, to characterize the lake ecosystem, casual observations on Odonata and spider abundance within the inundated forest with dead, emergent trees were recorded, and some of the species were identified; Results: Insect emergence did not decline during the 4 years of collection, and the Chironomidae and Chaoboridae were dominant throughout, adding up to 70-90% of the catches. There is some indication of seasonal cycles, and the specific pattern of Ephemeroptera emergence is demonstrated in more detail; Conclusions: It appears that production of aquatic insects in the Balbina Reservoir, while still in its eutrophic phase, is lower than along the Tarumã- Mirim, an undisturbed Central Amazonian forest stream of nutrient-poor, acid water. [...] A total of 37 counts made during these excursions resulted in a mean estimate of 40-55 adult Odonata/ha of inundated dead forest, and there was no consistent trend of change of abundance during the seven- year period of observation. On a single occasion no Odonata were seen (20 July/94, 8:30 hours, Ilha das Aranhãs), and it may be that this is due to the relatively early hour of the day, because the highest number recorded from this area was 306/ha, between 14:00-16:00 hours (28 November/95). This interpretation is favored by the observation that on May 2nd 1993, 37% of emergent tree tops were occupied by Odonata at 9:00 in the morning, as against 68% at midday on the same day in the same place (near the Ilha das Aranhãs). Excessive densities

were recorded in July/97 when approaching the Serra do Chocador: 5-15 individuals per 100 m², which amounts to 500-1500/ha. Extension of the 100 m² values to hectares, however, may not be realistic, because naiads may accumulate locally for emergence; for example, on March/94, 41 Odonata-exuviae were counted within 1 m² of aquatic macrophytes that floated between the dead trees near the Serra do Chocador. Although adult Odonata were not specified when motoring to the research sites, the abundance of *Brachymesia herbida* in the emergent dead forest of the reservoir between the dam and the research islands was noted during the whole period of the project." (Author) In tab. 4 the following taxa are listed: *B. herbida*, *Erythemis hematogaster*, *Erythemis vesiculosa*, *Orthemis ferruginea* (?), *Perithemis lais*, *Ischnura fluviatilis*, and *Protoneura* sp.] Address: Walker, I., Coordenação de Pesquisa em Ecologia – CPEC, Instituto Nacional de Pesquisa da Amazônia – INPA, Av. André Araújo, 2936, Aleixo, CP 478, CEP 69011-970, Manaus, AM, Brazil. E-mail: iwalker@inpa.gov.br

8486. Walker, I. (2009): Omnivory and resource - sharing in nutrient - deficient Rio Negro waters: Stabilization of biodiversity? *Acta Amazonica* 39(3): 617-626. (in English, with Portuguese summary) [*Ischnura* spec. and *Aeschnosoma* spec. "are essentially insectivores, [...] any other prey type is sporadic. The only exception is oligochaete capture by *Aeschnosoma*. The Anisoptera occupy niches within the litter layers, and thus, have access to the small oligochaetes that colonize the surface of litter leaves, while the Zygoptera usually occupy surfaces near the open water, where oligochaetes are less frequent. The prevalent prey of both Odonata species are Ephemeroptera and Chironomidae, presumably because these are the most frequent and ubiquitous insect larvae in these benthic habitats (Walker 1994, 1998). Algae ingestion is questionable, because small algae may accidentally enter the ventricle in the course of prey capture. Rather surprising are fish vertebrae within an Odonata ventricle, yet, the smallest fish species of the litter habitat is a tiny gobby *Microphylipnus*, with a standard length of 1,2cm. This fish, therefore, is within the range of the normal prey of larger anisopteran larvae, furthermore, there are the larvae and juveniles of other small litter-colonizing fish species, which may serve as prey. On the whole it appears that both Odonata species, [...] accept any animal prey within the range of their perception and size that allows for successful capture and ingestion. Thus, even if algae- feeding is excluded, they are omnivores in the sense that they feed on various trophic levels, considering that larger insect larvae (Ephemeroptera, Trichoptera) feed on algae, microcrustacea and chironomids (Walker 1987)." (Author)] Address: Walker, Ilse, Instituto Nacional de Pesquisas da Amazônia (INPA), Coordenação de Pesquisas em Ecologia (CPEC), Caixa Postal 478, 69011-970, Manaus (AM), Brazil. E-mail: iwalker@inpa.gov.br

8487. Ware, J.L.; Simaika, J.P.; Samways, M.J. (2009): Biogeography and divergence time estimation of the relict Cape dragonfly genus *Syncordulia*: global significance and implications for conservation. *Zootaxa* 2216: 22-36. (in English) ["*Syncordulia* (Libelluloidea) inhabits mostly cool mountainous streams in the Cape Floristic Region of South Africa. It is found at low densities in geographically restricted areas. *Syncordulia* is endemic to South Africa and, until recently, only two spe-

cies were known, *S. venator* and *S. gracilis*, both considered Vulnerable by the World Conservation Union (IUCN). Two new species, *S. serendipator* and *S. legator*, were described from previously unrecognized museum specimens and new field collections. Here we corroborate the validity of these two new species using multiple genes and propose intergeneric relationships within *Syncordulia*. Molecular data from two independent gene fragments (nuclear 28S and ribosomal and cytochrome oxidase subunit I mitochondrial data) were sequenced and/or downloaded from GenBank for 7 libelluloid families, including 12 *Syncordulia* specimens (2 *Syncordulia gracilis*, 4 *S. serendipator*, 2 *S. legator* and 4 *S. venator*). The lower libelluloid group GSI (sensu Ware et al. 2007), a diverse group of non-corduliine taxa, is strongly supported as monophyletic. *Syncordulia* is well supported by both methods of phylogenetic analyses as a monophyletic group deeply nested within the GSI clade. A DIVA biogeographical analysis suggests that the ancestor to the genus *Syncordulia* may have arisen consequent to the break-up of Gondwana (>120 Mya). Divergence time estimates suggest that *Syncordulia* diverged well after the breakup of Gondwana, approximately 60 million years ago (Mya), which coincides with the divergence of several Cape fynbos taxa, between 86 – 60 Mya. DIVA analyses suggest that the present distributions of *Syncordulia* may be the result of dispersal events. We relate these phylogenetic data to the historical biogeography of the genus and to the importance of conservation action." (Authors)] Address: Ware, Jessica Dept Ent., Rutgers Univ., New Brunswick, NJ, USA. E-mail: jware@amnh.org

8488. Watts, P.C. (2009): Characteristics of microsatellite loci in Odonata. *International Journal of Odonatology* 12(2): 275-286. (in English) ["Microsatellite loci have become the genetic markers of choice for population-level molecular ecological studies. However, microsatellite loci had been isolated for comparatively few species of odonate until the past five years. This review summarises the main characteristics – expected heterozygosity and microsatellite length – of 116 microsatellite loci that have been isolated from the genomes of 11 odonate species and discusses potential problems associated with using microsatellite loci to study odonate biology. It is clear that odonates are characterised by relatively short microsatellites, typically less than 10 core motifs, that demonstrate a high level of heterozygote deficits. Some reasons why some odonate species have particularly low levels of gene diversity are discussed also." (Author)] Address: Watts, P.C., School of Biol. Sc., Biosciences Building, Univ. Liverpool, Crown Str., L69 7ZB, Liverpool, UK. E-mail: phill@liv.ac.uk

8489. Weiss, K. (2009): Libellen-Beobachtungen im Queich-Gebiet/TK 6715-Lingenfeld und Basaltsteinbruch/TK 6312-Rockenhausen. *Pflanzen und Tiere in Rheinland-Pfalz (Berichtsjahr 2008)* 19: 159. (in German) [Germany, Rheinland-Pfalz; a list of 17 species includes *Coenagrion mercuriale* and *Ophiogomphus cecilia*, species protected by law.] Address: not stated

8490. Wichard, W.; Gröhn, C.; Sereuszus, F. (2009): Aquatic Insects in Baltic Amber - Wasserinsekten im Baltischen Bernstein. Verlag Kessel. ISBN: 978-3-941300-10-1: 336 pp. (in Bilingual text (English/German)) ["At first sight the embedment of aquatic insects in Baltic amber seems to be contradictory, as the insects live in water and amber originated from resin of

extinct trees that grew in a Fennoscandian montane forest approximately 40–50 million years ago. About 25% of all animals found in amber are aquatic insects. The larvae of these amphibious forms lived in water whereas adults were frequently terrestrial and capable of flying. The Tertiary “amber forest” apparently contained a great amount of lentic waters, flood plains and flowing waters. The resin was washed out of dead wood and streams and rivers transported it to the sea where it became fossilized into amber. Without water, the genesis of amber would be impossible. The high number of aquatic insects in amber is connected with the process of its fossilization. As if in a complex “paleontological jigsaw puzzle” amber inclusions are combined together so that the whole mosaic of the nature of 40–50 million years ago can be reconstructed.” (Authors) Odonata are treated on pages 19-29.] Address: www.verlagkessel.de.

8491. Wildermuth, H.; Küry, D. (2009): Libellen schützen, Libellen fördern. Leitfaden für die Naturschutzpraxis. Beiträge zum Naturschutz in der Schweiz 31: 88 pp. (in German; French) [This is a manual on protection and conservation of Odonata including the management of their habitats in Switzerland.] Address: Schweizerische Arbeitsgemeinschaft Libellenschutz, SAGLS, Life Sciences AG, Greifengasse 7, CH-4058 Basel, Switzerland

8492. Willigalla, C.; Fartmann, T. (2009): Die Libellenfauna der Regenrückhaltebecken der Stadt Mainz (Odonata). Libellula 28(3/4): 117-137. (in German, with English summary) [“Between 2006 and 2008, 32 species of Odonata were recorded at twelve rain-storage ponds (RSP) in Mainz. This is 84 % of the total Odonata fauna of the city area of Mainz, which comprises 38 species in total. Twenty-two of the observed species were classified as indigenous. On average, we found between six and nine species per RSP. Therefore, beside park ponds, RSP serve as a second important habitat for dragonflies and damselflies in urban areas. The diversity of Odonata depended on pond size and the position of the ponds in different city zones. In the suburbs more species were found than in the city centre. In damselflies the abundance was negatively correlated with the density of buildings in the surroundings (up to 200 m around the ponds). Where building cover exceeded 40 %, damselfly abundances were very low. The spatial distance between the RSP was the main driver of similarity among Odonata assemblages of the RSP. Due to the warm urban climate in cities RSP generally favour Mediterranean species. However, the macroclimate had a stronger impact on community composition in cities. The Odonata fauna of the RSP of Mainz was very similar to those of the cities of Münster and Osnabrück. The main reason for this seems to be that the majority of species occurring in RSP are widespread and common species that are typical of eutrophic ponds. We assume that in Germany about 35 Odonata species are able to colonize RSP in cities. Enallagma cyathigerum, Erythromma viridulum, Aeshna affinis, A. mixta, Libellula depressa and Orthetrum cancellatum act as regional character species.] Address: Willigalla, C., Am Großen Sand 22, D-55124 Mainz, Germany. E-mail: christoph@willigalla.de

8493. Wingate, D.B.; Madeiros, J.L.; Kushlan, J.A. (2009): Green Heron colonizes Bermuda. Waterbirds 32(1): 162-168. (in English) [“The only non-fish prey

item observed to be taken by Green Herons (*Butorides virescens*) during the study period was a *Tremea abdominalis*, captured by a recently-fledged bird.” (Author)] Address: Kushlan, J.A., P.O. Box 2008, Key Biscayne, FL 33149, USA. E-mail: jkushlan@earthlink.net

8494. Winkler, C.; Neumann, H.; Drews, A. (2009): Verbreitung und Ökologie von *Coenagrion armatum* am südwestlichen Arealrand in Schleswig-Holstein (Odonata: Coenagrionidae). Libellula 28(1/2): 1-24. (in German, with English summary) [“Distribution and ecology of *C. armatum* on the southwestern fringe of its area in Schleswig-Holstein, Germany — The last systematical surveys of *C. armatum* in Schleswig-Holstein (SH) had been conducted during the 1960s and 1970s. The last population was detected in 1982. In order to record the present distribution of *C. armatum* in SH a countrywide survey was carried out between 24-IV and 5-VI-2008. Based on former records, 137 standing waters in 37 sites were investigated. Imagines of *C. armatum* were found at 18 waters, which were situated in 12 sites. All these sites were located in the northern part of SH. More than ten imagines were detected at eight waters, whereas more than 100 imagines were recorded from a shallow lake and a peat digging hole. Tandems were found at 13 waters and ovipositions at four of these localities. Only one pair was seen in wheel position. *C. armatum* populated mesotrophic waterbodies from 0.01 to 4.7 ha with shallow water zones. Most waters were regarded as perennial. All known occurrences were restricted to moor- and heathland. The soft rush *Juncus effusus* occurred, at least partially, as riparian vegetation on all colonised waters. Stocks of soft rush offered perches and were used by *C. armatum* for hiding and mating. Broken stems of soft rush on the water surface were even used for oviposition. The flying period of *C. armatum* extended at least from 6-V to 30-V-2008.” (Authors)] Address: Winkler, C., Bahnhofstr. 25, 24582 Bordesholm, Germany. E-mail: chr.winkler@email.de

8495. Winkler, C.; Neumann, H. (2009): Neu für Schleswig-Holstein: Die Feuerlibelle (*Crocothemis erythraea* (Brullé, 1832)). Bombus 3(76-78): 312. (in German) [Germany; 19.VI.2007, Stadthagen (Kreis Rendsburg-Eckemförde; 10°04'46.77"E, 54°25'13.50"N). 15.VII.2007, N Muggenburg, NSG Salemer Moor (Kreis Hzt. Lauenburg; 10°49'03"E, 53°40'54"N).] Address: not stated

8496. Wolff, L.L.; Abilhoa, V.; Sant'Anna Rios, F.; Donatti, L. (2009): Spatial, seasonal and ontogenetic variation in the diet of *Astyanax aff. fasciatus* (Ostariophysi: Characidae) in an Atlantic Forest river, Southern Brazil. Neotropical Ichthyology 7(2): 257-266. (in English, with Spanish summary) [Odonata are of minor importance as food for *A. aff. fasciatus*.] Address: Wolff, L.L., Departamento de Biologia Celular, Universidade Federal do Paraná. Caixa Postal 19031, 81531-990 Curitiba, PR, Brazil. E-mail: lucianobiol@yahoo.com.br;

8497. Wu, Z.-r.; Han, L.-x.; Kuang, Z.-f. (2009): Breeding behaviors of Blue Tailed Bee-eater of Nujiang valley. Zoological Research 30(4): 429-432. (Chinese, with English summary) [China; observations from 26th March to 17th July, 2007 showed that the most common food items male *Merops philippinus* fed to females are Odonata and Hymenoptera, accounting for 83.56% (Odonata: 63%) of all food items.] Address: Han, L.-x., Faculty of Conservation Biology, Southwest Forestry

University, Kunming, 650224, China. E-mail: lianxian.han@gmail.com

8498. Wu, Y.-t.; Wang, C.-h.; Zhang, X.-d.; Zhao, B.; Jiang, L.-F.; Chen, J.-k.; Li, B. (2009): Effects of salt-marsh invasion by *Spartina alterniflora* on arthropod community structure and diets. *Biol. Invasions* 11: 635-649. (in English) ["Invasive plants strongly affect physical and biotic environments of native ecosystems. Insects and other arthropods as one of the major components of many ecosystems are very sensitive to subtle changes in abiotic and biotic environments. We examined the effects of exotic *Spartina alterniflora* invasion on community structure and diets of arthropods in a saltmarsh previously dominated by native *Phragmites australis* in Yangtze River estuary through net sweeping and plant harvesting methods and stable isotope analysis. [...]."] (Authors) According to the authors, the plants *Phragmites* and *Spartina* contribute 100% to diets of the *Caeneagriidae* (Odonata).!!!] Address: Li, B., Coastal Ecosystems Research Station of Yangtze River Estuary, Ministry of Education Key Lab. Biodiv. Science & Ecological Engineering, Institute of Biodiversity Science, Fudan Univ., Shanghai 200433, China. E-mail: bool@fudan.edu.cn

8499. Yu, X.; Bu, W. (2009): A revision of *Mesopodagrion* McLachlan, 1896 (Odonata: Zygoptera: Megapodagrionidae). *Zootaxa* 2202: 59-68 (in English) ["A synopsis of *Mesopodagrion* including diagnostic illustrations, distribution maps, and keys to all taxa incorporates the following taxonomic changes: *Mesopodagrion yachowensis* Chao, 1953 is resurrected from synonymy, *Mesopodagrion tibetanum* McLachlan, 1896 comprises two subspecies, one new *M. tibetanum australe* and a unique character for the genus, the bifurcate process on distal dorsum of S10 of the male."] (Authors)] Address: Bu, W., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, 300071 China. E-mail: wenjunbu@nankai.edu.cn

8500. Xu, Q.-h.; Chen, Z.; Qiu, Z.-p. (2009): A new species of the genus *Planaeschna* McLachlan from Fujian, China (Odonata, Aeshnidae). *Acta zootaxonomica Sinica* 34(3): 439-442. (in English, with Chinese summary) [*Planaeschna liui* sp. nov. is described and illustrated from a single male. The holotype is deposited at Institute of Biological Control Research, Fujian Agriculture and Forestry University, Wuyi Mountain (27°33'-54'N, 117°27'-51'E), 16 July 2008.] Address: Xu, Q.h., Zhangzhou City University, Zhangzhou, Fujian 363000, China

8501. Yu, X.; Bu, W. (2009): Description of two new damselflies, *Protosticta zhengi* and *Sinosticta sylvatica*, from China (Odonata: Zygoptera: Platystictidae). *Zootaxa* 2245: 54-58. (in English) ["2 new species of Platystictidae (*Sinosticta sylvatica*, holotype male: China, Hainan, Diaoluoshan Nature Reserve, 620m, 29-V-2007; and *Protosticta zhengi*, holotype male; China, Yunnan, Xishuangbanna, Menghun, 750m, 30-V-1958; both deposited in Inst. Ent., Nankai Univ., Tianjin, China) are described, and a key is provided for the identification of all described species of *Sinosticta* Wilson."] (Authors)] Address: Yu, X., Coll. Environmental Science & Engineering, Nankai Univ., Tianjin, 300071, China. E-mail: nkyuxin@yahoo.cn

8502. Zampaulo, R.; Ferreira, R.L. (2009): Diversidade de invertebrados terrestres cavernícolas em nove

cavidades naturais no município de Aurora do Tocantins (TO). *ANAIS do XXX Congresso Brasileiro de Espeleologia, Montes Claros MG, 09-12 de julho de 2009 - Sociedade Brasileira de Espeleologia: 267-274.* (in Portuguese, with English summary) ["Odonata" are listed without any further details as recorded in the caves of Aurora, Brazil.] Address: Zampaulo, R., Univ. Federal de Lavras, Depto de Biologia, Setor de Ecologia, Campus Universitário, Caixa Postal 3037, 37200-000, Minas Gerais, Brasil. E-mail: rzampaulo@yahoo.com.br

8503. Zessin, W.; Günther, A. (2009): Bericht über das 18. Internationale Symposium der Odonatologie, 5. bis 13. November 2008 in Nagpur, Indien. *Virgo - MittBl. ent. Ver. Mecklenburg* 12(1): 57-71. (in German) [Report on the 18th International Symposium of Odonatology in India, with the list of presentations, a checklist of Odonata of the Nagpur area (Tamil Nadu), documents of reports in local newspapers, and the list of records made during the Symposium at 8 localities. Many photographs are included in the paper.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

8504. Zessin, W. (2009): Erstnachweis der Zierlichen Moosjungfer (*Leucorrhinia caudalis*) in West-Mecklenburg 2008 am Kraaker Waldsee, Landkreis Ludwigslust. *Virgo - MittBl. ent. Ver. Mecklenburg* 12(1): 76-78. (in German) [*L. caudalis* was recorded on 24-V-2008 in the western part of the federal state Mecklenburg-Vorpommern, Germany. There, a total of 22 Odonata species is co-occurring.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

8505. Zhao, Y.; Tong J.; Sun J.; Chen D.; Zhang, J. (2009): Property tests of nanoindentation on membranous wings of dragonflies. *Journal of Agricultural Mechanization Research* 11: 26-29. (in Chinese, with English summary) ["The nano-mechanical behaviour of dragonfly membranous wings was investigated with a nano-indenter. The holding time and the loading rate were selected 20s and 53µN/s by the method of test optimization. In nano-indentation experiment, 6 indentation measurements were done in an area of 0.075mm × 0.01mm and then took the mean value as the nano-mechanical parameter of this position. It was shown that the maximums of the reduced modulus and the hardness of the living dragonfly *Anax parthenope julius* Brauer and *Pantala flavescens* Fabricius are about at position of 0.7L of their wings, where L is the total length of their wings. The maximums of the reduced modulus and the hardness of the dragonfly *Sympetrum striolatum* are at position of 0.5L of its wing, where L is the total length of the wing. The reduced modulus and the hardness of *A. parthenope julius* are maximum on the corresponding parts among the three dragonflies, related to the large somatotype."] (Authors)] Address: Zhao, Y., The College of Mechanical and Power Engineering, Henan Polytechnic University, Jiaozuo 454000, China

8506. Zherikhin, V.V.; Sukacheva, I.D.; Rasnitsyn, A.P. (2009): Arthropods in contemporary and some fossil resins. *Paleontological Journal* 43(9): 987-1005. (in English) ["More than 4800 arthropod inclusions were isolated and identified from resin of various contemporary conifer trees in various parts of northern Eurasia. Their composition is compared with that in representat-

ive collections of Baltic and Rovno ambers (Upper Eocene) and with that in Dominican amber (Lower Miocene). The original composition of inclusions of Dominican amber is reconstructed for the first time using a procedure intended to reduce the effect of human bias. Taphonomical characteristics of resins and their effects on the composition of inclusions are studied. The actual paleontological approach reveals a trend towards a decrease in the relative abundance of arboreal springtails and nematoceran dipterans and an increase in that of the true bugs, beetles, lepidopterans, and hymenopterans (especially ants) between the Eocene and the present. Relative abundances of spiders and mites show no clear trend. The available data on other arthropods are still insufficient for elucidating evolutionary trends. Surprisingly, a small contemporary sample from Taimyr (N. Siberia) was inexplicably more similar to the Eocene amber than to other contemporary resins. No other significant differences in composition of inclusions, compared across different conifer genera or geographic areas, have been revealed. A more detailed comparison between contemporary and fossil hymenopteran and beetle inclusions reveals correlations with both age (= evolutionary change) and geography. The absolute dominance of ants, particularly Formicinae and Myrmicinae, and, among solitary hymenopterans, Ichneumonidae, Braconidae, and Pteromalidae, and a corresponding decline in the abundance of Scelionidae and Dolichoderinae in contemporary resins compared to amber reflect evolutionary changes. In contrast, the overwhelming abundance of Formicinae and consistent occurrence of sawflies in contemporary resins of northern Eurasia appear to be explained by geography. The Eocene assemblages of beetle inclusions are characterized by a wider and more variable set of dominant families, in sharp contrast to contemporary resins, which are uniformly dominated by Curculionidae, Chrysomelidae, and Staphylinidae. Additional analyses are needed to explain this difference." (Authors)] Address: V. V. Zherikhin, V.V., Borissiak Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117997, Russia. E-mail: lab@palaeontolog.ru

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8507. Allen, K.A.; Thompson, D.J. (2010): Movement characteristics of the Scarce Blue-tailed Damselfly, *Ischnura pumilio*. *Insect Conservation and Diversity* 3(1): 5-14. (in English) ["1. *I. pumilio*, is threatened in the UK and exists in small, transient colonies. Consequently, little is known about its dispersal characteristics. This study investigates movement in two contrasting habitats with the aim of informing conservation management on a landscape scale. 2. Mark-release-recapture studies were performed at an established colony in the New Forest and a smaller population in the Red River valley in southern England. A total of 2304 individuals was marked. 3. *I. pumilio* was found to be exceptionally sedentary. Mean gross lifetime movement was 56 m and 43% of individuals moved <50 m in their lifetime. Movements over 150 m were very rare. Maximum lifetime movement was 1165 m. As such, *I. pumilio* is the most sedentary odonate studied in the UK to date. 4. Movement was inversely density dependent, which has important conservation implications if individuals attempt to emigrate from small populations be-

cause of low density. The presence of parasitic mites (*Hydryphantes* sp.) significantly increased movement distance. 5. *I. pumilio* had a low dispersal probability compared to other damselflies. As the smallest British odonate, this is in keeping with the relationship between size and dispersal found across taxa. 6. *I. pumilio* has been regarded as a 'wandering opportunist' due to its tendency to appear in locations far from known sites. However, this study suggests that long range movement rarely occurs from prime habitat that is maintained in an early successional stage. This has implications for the conservation of the species in the UK." (Author)] Address: Allen, Katherine, School Biol. Sc., University of Liverpool, Liverpool, UK. E-mail: kaallen@liv.ac.uk

8508. Anderson, C.N.; Grether, G.F. (2010): Inter-specific aggression and character displacement of competitor recognition in *Hetaerina* damselflies. *Proc. R. Soc. B* 277: 549-555. (in English) ["In zones of sympatry between closely related species, species recognition errors in a competitive context can cause character displacement in agonistic signals and competitor recognition functions, just as species recognition errors in a mating context can cause character displacement in mating signals and mate recognition. These two processes are difficult to distinguish because the same traits can serve as both agonistic and mating signals. One solution is to test for sympatric shifts in recognition functions. We studied competitor recognition in *Hetaerina* damselflies by challenging territory holders with live tethered conspecific and heterospecific intruders. Heterospecific intruders elicited less aggression than conspecific intruders in species pairs with dissimilar wing colouration (*H. occisa*/*H. titia*, *H. americana*/*H. titia*) but not in species pairs with similar wing colouration (*H. occisa*/*H. cruentata*, *H. americana*/*H. cruentata*). Natural variation in the area of black wing pigmentation on *H. titia* intruders correlated negatively with heterospecific aggression. To directly examine the role of wing colouration, we blackened the wings of *H. occisa* or *H. americana* intruders and measured responses of conspecific territory holders. This treatment reduced territorial aggression at multiple sites where *H. titia* is present, but not at allopatric sites. These results provide strong evidence for agonistic character displacement." (Authors) The experiments reported here were carried out in June–August 2006, May–July 2007 and April–May 2008 at 10 sites in Texas, USA and Mexico.] Address: Grether, G.F., Dept Ecology & Evolutionary Biol., Univ. California, 621 Charles E Young Drive South, Los Angeles, CA, 90095. USA. E-mail: ggrether@oeb.ucla.edu

8509. Azpilicueta Amorin, M.; Vila, M.; Cordero Rivera, A. (2010): Population genetic structure of two threatened dragonfly species (Odonata: Anisoptera) as revealed by RAPD analysis. In: Jan Christian Habel and Thorsten Assmann (Eds.): *Relict species. Phylogeography and conservation biology*. Springer Berlin Heidelberg. ISBN 978-3-540-92161-5 (Print): 295-308. (in English) ["*Macromia splendens* and *Oxygastra curtisii* were included in the European Habitats directive as taxa of special concern. Nevertheless, there is almost no genetic information about them. We assessed the genetic diversity and population structuring among several Northwest Iberian locations where these species occur. For this, we examined the genetic pattern revealed by RAPD markers in 4 locations of *M. splendens* and five locations of *O. curtisii*. The former showed strong population structuring, whereas gene flow bet-

ween different river systems may be the reason for the lower structuring inferred for *O. curtisii*. Based on these results, we support the need of special management for *M. splendens* in Northwest Iberia." (Authors)] Address: Azpilicueta Amorin, Mónica, Department of Ecology and Animal Biology, University of Vigo, EUET Forestal, Campus Universitario, E-36006 Pontevedra, Spain. E-mail: mazpilicueta@sek.es

8510. Bogut, I.; Cerba, D.; Vidakovic, J.; Gvozdic, V. (2010): Interactions of weed-bed invertebrates and *Ceratophyllum demersum* stands in a floodplain lake. *Biologia* 65(1): 113-121. (in English) ["This investigation reports on weed-bed invertebrate abundance associated with the submersed macrophyte *Ceratophyllum demersum* L. in Lake Sakadaš within Kopacki rit Nature Park (Croatia). Twenty five taxonomic groups, with the dominance of chironomids (79%), were recorded at three stations during the investigation from July 14 to September 8, 2004. Nematodes and large predatory larvae of Zygoptera with 6% were second in dominance, followed by oligochaetes with 5%. Weed-bed invertebrates on *C. demersum* were more abundant than on *Myriophyllum spicatum* L. due to different morphology of the host plants. Environmental parameters within *C. demersum* stands were found in the same range at all stations, but they changed during the season. They indicated eutrophy with the tendency to hypertrophy which is reflected by the composition of the weed-bed invertebrate community." (Authors)] Address: Bogut, Irella, Fac.Education, J. J. Strossmayer Univ., Lorenza Jägera 9, Osijek, Croatia. E-mail: dcerba@gmail.com

8511. Bots, J.; de Bruyn, L.; Snijkers, T.; van den Branden, B.; van Gossum, H. (2010): Exposure to perfluorooctane sulfonic acid (PFOS) adversely affects the life-cycle of the damselfly *Enallagma cyathigerum*. *Environmental Pollution* 158(3): 901-905. (in English) ["We evaluated whether life-time exposure to PFOS affects egg development, hatching, larval development, survival, metamorphosis and body mass of *Enallagma cyathigerum* (Insecta: Odonata). Eggs and larvae were exposed to five concentrations ranging from 0 to 10 000 µg/L. Our results show reduced egg hatching success, slower larval development, greater larval mortality, and decreased metamorphosis success with increasing PFOS concentration. PFOS had no effect on egg developmental time and hatching or on mass of adults. Eggs were the least sensitive stage (NOEC = 10 000 µg/L). Larval NOEC values were 1000 times smaller (10 µg/L). Successful metamorphosis was the most sensitive response trait studied (NOEC < 10 µg/L). The NOEC value suggests that *E. cyathigerum* is amongst the most sensitive freshwater organisms tested. NOEC for metamorphosis is less than 10-times greater than the ordinary reported environmental concentrations in freshwater, but is more than 200-times smaller than the greatest concentrations measured after accidental releases. Long-term laboratory exposure to perfluorooctane sulfonic acid reduces survival and interferes with metamorphosis of *Enallagma cyathigerum* (Insecta: Odonata)." (Authors)] Address: Bots, Jessica, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: Jessica.bots@ua.ac.be

8512. Buden, D.W. (2010): *Pantala flavescens* (Insecta: Odonata) rides west winds into Ngulu Atoll, Micronesia: Evidence of seasonality and wind-assisted

dispersal. *Pacific Science* 64(1): 141-143. (in English) ["Observations of *P. flavescens* on Ngulu Island during early August 2008 constitute the first report of Odonata on Ngulu Atoll, Yap State, Federated States of Micronesia; no other odonate is documented on the atoll, but descriptions by local residents of a larger, rarely encountered, blue dragonfly may pertain to *Anax guttatus*. The sudden appearance of *P. flavescens* on Ngulu after its apparent absence during the previous two and a half weeks of this study, together with the absence of exuviae at potential breeding sites and remarks by local residents alluding to its appearance each year around August and September, suggests that it occurs regularly in migration and that there is no permanent resident population. Its appearance often coincides with winds from a westerly direction." (Author)] Address: Buden, D.W., Division of Natural Sciences and Mathematics, College of Micronesia-FSM, P.O. Box 159, Kolonia, Pohnpei, Federated States of Micronesia 96941. E-mail: donbuden@comfsm.fm

8513. Buffagni, A.; Erba, S.; Armanini, D.G. (2010): The lentic-lotic character of Mediterranean rivers and its importance to aquatic invertebrate communities. *Aquatic Sciences* 72(1): 45-60. (in English) ["Hydromorphological features are crucial in structuring habitats for freshwater organisms. The quantification of these variables is often performed through accurate measuring or detailed estimation, but their assessment is not always feasible for river management purposes. Economic and time constraints often lead to difficulty in creating simple summaries of collected data for practical use. The Lentic-lotic River Descriptor (LRD) was developed to identify the character of a river site in terms of local hydraulic conditions. Information about the presence of flow types, channel substrates, in-stream vegetation, organic debris and artificial features is included in its calculation. The main aim of this paper is to investigate whether the lentic-lotic character of a river site, as summarized with the LRD descriptor, is relevant to aquatic invertebrate communities in nearly natural river sites. Invertebrate data were collected with multi-habitat, proportional sampling and hydromorphological information was gained by applying the CARAVAGGIO method (river habitat survey technique) in the field. The dataset was generated from High or Good ecological status river sites located in Mediterranean areas of Italy. Correspondence Analysis was performed to relate the invertebrate community structure to a set of catchment-scale, reach-scale and chemical environmental variables. The results of the multivariate analysis indicate that LRD provides a persuasive explanation of the most important axis of variation in benthic data. This paper also presents the optimal LRD range for a set of invertebrate taxa, accompanied by a short discussion of their potential use in conservation issues." (Authors) Odonata are treated at the genus level (*Calopteryx*, *Orthetrum*.)] Address: Buffagni, A., CNR, IRSA, Water Research Institute, Via del Mulino, 19, 20047 Brugherio (MB), Italy. E-mail: buffagni@irsa.cnr.it

8514. Davis, J.M.; Rosemond, A.D.; Eggert, S.L.; Cross, W.F.; Wallace, J.B. (2010): Long-term nutrient enrichment decouples predator and prey production. *PNAS* 107(1): 121-126. (in English) ["Increased nutrient mobilization by human activities represents one of the greatest threats to global ecosystems, but its effects on ecosystem productivity can differ depending on food web structure. When this structure facilitates efficient

energy transfers to higher trophic levels, evidence from previous large-scale enrichments suggests that nutrients can stimulate the production of multiple trophic levels. Here we report results from a 5-year continuous nutrient enrichment of a forested stream that increased primary consumer production, but not predator production. Because of strong positive correlations between predator and prey production (evidence of highly efficient trophic transfers) under reference conditions, we originally predicted that nutrient enrichment would stimulate energy flow to higher trophic levels. However, enrichment decoupled this strong positive correlation and produced a nonlinear relationship between predator and prey production. By increasing the dominance of large-bodied predator-resistant prey, nutrient enrichment truncated energy flow to predators and reduced food web efficiency. This unexpected decline in food web efficiency indicates that nutrient enrichment, a ubiquitous threat to aquatic ecosystems, may have unforeseen and unpredictable effects on ecosystem structure and productivity." (Author) The paper includes data on *Cordulegaster* and *Lanthus*.] Address: Davis, J.M., Odum School of Ecology, University of Georgia, Athens, GA 30602, USA. E-mail: jmdavis@isu.edu.

8515. Dumont, H.J.; Vierstraete, A.; Vanfleteren, J.R. (2010): A molecular phylogeny of the Odonata (Insecta). *Systematic Entomology* 35: 6-18. (in English) ["We estimated the phylogeny of the order Odonata, based on sequences of the nuclear ribosomal genes 5.8 S, 18S, and ITS1 and 2. An 18S-only analysis resolved deep relationships well: the order Odonata, as well as suborders Zygoptera and Epiprocta (Anisoptera + Epiophlebia), emerged as monophyletic. Some other deep clades resolved well, but support for more recently diverged clades was generally weak. A second, simultaneous, analysis of the 5.8S and 18S genes with the intergenic spacers ITS1 and 2 resolved some recent branches better, but appeared less reliable for deep clades with, for example, suborder Anisoptera emerging as paraphyletic and Epiophlebia superstes recovered as an Anisopteran, embedded within aeshnoid-like anisopterans and sister to the cordulegastrids. Most existing family levels in the Anisoptera were confirmed as monophyletic clades in both analyses. However, within the corduliids that form a major monophyletic clade with the Libellulidae, several subclades were recovered, of which at least Macromiidae and Oxygastridae are accepted at the family level. In the Zygoptera, the situation is complex. The lestid-like family groups (here called Lestomorpha) emerged as sister taxon to all other zygopterans, with Hemiphlebia sister to all other lestomorphs. Platystictidae formed a second monophylum, subordinated to lestomorphs. At the next level, some traditional clades were confirmed, but the tropical families Megapodagrionidae and Amphipterygidae were recovered as strongly polyphyletic, and tended to nest within the clade Caloptera, rendering it polyphyletic. Platycnemididae were also non-monophyletic, with several representatives of uncertain placement. Coenagrionids were diphyetic. True Platycnemididae and non-American Protoneurids are closely related, but their relationship to the other zygopterans remains obscure and needs more study. New World protoneurids appeared relatively unrelated to old world + Australian protoneurids. Several recent taxonomic changes at the genus level, based on morphology, were confirmed, but other morphology-based taxonomies have misclassified taxa considered currently as Megapodagrionidae, Pla-

tycnemididae and Amphipterygidae and have underestimated the number of family-level clades." (Authors)] Address: Dumont, H.J., Department of Biology, Ghent University, Ledeganckstraat, 35, B-9000 Ghent, Belgium. E-mail: Henri.Dumont@ugent.be

8516. Eberhard, W.G. (2010): Evolution of genitalia: theories, evidence, and new directions. *Genetica* 138: 5-18. (in English) ["Many hypotheses have been proposed to explain why male intromittent genitalia consistently tend to diverge more rapidly than other body traits of the same individuals in a wide range of animal taxa. Currently the two most popular involve sexual selection: sexually antagonistic coevolution (SAC) and cryptic female choice (CFC). A review of the most extensive attempts to discriminate between these two hypotheses indicates that SAC is not likely to have played a major role in explaining this pattern of genital evolution. Promising lines for future, more direct tests of CFC include experimental modification of male genital form and female sensory abilities, analysis of possible male-female dialogues during copulation, and direct observations of genital behaviour." (Author) References on Odonata are made.] Address: Eberhard, W.G., Smithsonian Tropical Research Institute, and Escuela de Biología, Universidad de Costa Rica, Ciudad Universitaria, San Pedro, Costa Rica. E-mail: william.eberhard@gmail.com

8517. Flenner, I.; Richter, O.; Suhling, F. (2010): Rising temperature and latitudinal development in dragonfly populations. *Freshwater biology* 55: 397-410. (in English) ["1. For modelling the future ecological responses to climate change, data on individual species and on variation within and between populations from different latitudes are required. 2. We examined life cycle regulation and growth responses to temperature in Mediterranean and temperate populations of a widespread European odonate, *Orthetrum cancellatum*. In an experiment, offspring from individual females from different parts of the range were kept separately to elucidate differences between families. 3. The experiment was run outdoors at 52°N at a natural photoperiod for almost a year. We used four temperature regimes, ambient (i.e. following local air temperature) and ambient temperature increased by 2, 4 and 6°C, to mimic future temperature rise. A mathematical model was used to categorise the type of seasonal regulation and estimate parameters of the temperature response curve. 4. Growth rate varied significantly with temperature sum, survival and geographic origin, as well as with family. Offspring of all females from the temperate part of the range had a life cycle with a 12 h day-length threshold necessary to induce diapause (i.e. diapause was induced once day length fell below 12 h). By contrast, Mediterranean families had a 10 h threshold or had an unregulated life cycle allowing winter growth. The temperature response did not significantly differ between populations, but varied between families with a greater variation in the optimum temperature for growth in the Mediterranean population. 5. The variation in seasonal regulation leads to a diversity in voltinism patterns within species, ranging from bivoltine to semivoltine along a latitudinal gradient. Given that the type of seasonal regulation is genetically fixed, rising temperatures will not allow faster than univoltine development in temperate populations. We discuss the consequences of our results in the light of rising temperature in central Europe." (Authors)] Address: Flenner, Ida, Ecology & Environmental

8518. González-Tokman, D.-M.; Córdoba-Aguilar, A. (2010): Survival after experimental manipulation in the territorial damselfly *Hetaerina titia* (Odonata: Calopterygidae): more ornamented males are not more pathogen resistant. *Journal of Ethology* 28(1): 29-33. (in English) ["It has been hypothesized that sexual ornaments communicate pathogen resistance ability. We experimentally explored the relationship between the expression of a male ornamental trait (wing pigmentation) of *H. titia* and survival after a bacterial challenge. We infected males with *Serratia marcescens* (a Gram-negative bacteria typical of insects) and compared survival against a group infected with dead bacteria and a noninfected group. Wing pigmentation was entered as a predictor of survival in this comparison. Our study indicated that wing pigmentation was not a good predictor of immune ability against bacteria. This result contradicts previous findings in the same and other calopterygid species in which wing pigmentation intensity inversely correlated with gregarine infection levels. It also contradicts the general idea that ornaments are honest indicators of pathogen defense." (Authors)] Address: González-Tokman, D.-M., Depto de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510 Mexico D.F., Mexico. E-mail: danielgt@miranda.ecologia.unam.mx

8519. Heiser, M.; Schmitt, T. (2010): Do different dispersal capacities influence the biogeography of the western Palearctic dragonflies (Odonata)? *Biological Journal of the Linnean Society* 99(1): 177-195. (in English) ["The biogeography of the western Palearctic has been intensively studied for more than a century. Recent advances in genetics have allowed the testing of old theories based on distribution patterns, although these analyses are obviously restricted to a reduced number of specific genetic data sets. On the other hand, an increased knowledge on the distributions of species and advances in computer capacities have allowed more detailed biogeographical analyses based on species presence/absence. In the present study, we selected the Odonata as the study group. For all 162 species native to the western Palearctic, we compiled their respective presence or absence in 97 predefined biogeographical regions. Using cluster analyses and principal component analyses, both based on Jaccard similarity coefficients, we analysed the differentiation among these regions and species. In subsequent analyses, the data set was reduced to the Zygoptera, Anisoptera, and the western Palearctic endemics. All analyses consistently showed different faunal regions and faunal elements. In particular, the (1) western and (2) eastern Mediterranean; (3) Central and (4) Northern Europe; and (5) the British Isles were invariably found in all cases. Although the two major Mediterranean regions were characterized by several endemic faunal elements, Northern Europe and the British Isles lacked such elements, but were characterized by faunal compositions strongly deviating from the rest of the western Palearctic region. Moderate differences between Zygoptera and Anisoptera existed, with the latter more clearly redrawing the Mediterranean refuge areas, whereas the former reflected to a greater extent the postglacial expansion patterns from these regions. In general, our findings underline the old biogeographical

theories, but refine especially our understanding of the Atlanto- and Ponto-Mediterranean region. Central Europe, comprising the area with the highest species numbers of our whole study region, unravels as a crossroad of postglacial immigrations, but might also represent a region of in situ glacial survival." (Authors)] Address: Schmitt, T., Biogeographie, Fachbereich VI, Am Wissenschaftspark 25-27, Universität Trier, 54296 Trier, Germany. E-mail: thsh@uni-trier.de

8520. Kefford, B.J.; Zalizniak, L.; Dunlop, J.E.; Nugegoda, D.; Choy, S.C. (2010): How are macroinvertebrates of slow flowing lotic systems directly affected by suspended and deposited sediments? *Environmental Pollution* 158(2): 543-550. (in English) ["The effects of suspended and deposited sediments on the macroinvertebrates are well documented in upland streams but not in slower flowing lowland rivers. Using species found in lowland lotic environments, we experimentally evaluate mechanisms for sediments to affect macroinvertebrates, and in one experiment whether salinity alters the effect of suspended sediments. Suspended kaolin clay reduced feeding of *Ischnura heterosticta* at high turbidity (1000–1500 NTU) but had no effects on feeding of *Hemianax papuensis* and *Micronecta australiensis* (Hemiptera: Corixidae). In freshwater (0.1 $\mu\text{S}/\text{cm}$), survival of *Ischnura aurora* was poor in clear water, but improved with suspended kaolin. Growth and feeding of *I. aurora* were unaffected by suspended sediments and salinity. Burial (1–5 mm) of eggs with kaolin or sand reduced hatching in *Physa acuta* (Gastropoda: Physidae), *Gyraulus tasmanica* (Gastropoda: Planorbidae) and *Chironomus cloacalis* (Diptera: Chironomidae). Settling sediments may pose greater risk to lowland lotic invertebrates than suspended sediments." (Authors)] Address: Kefford, B.J., Dept of Biotechnology & Environmental Biology, RMIT University, PO Box 71, Bundoora, 3083, Victoria, Australia. E-mail: ben.kefford@rmit.edu.au

8521. Koperski, P. (2010): Diversity of macrobenthos in lowland streams: ecological determinants and taxonomic specificity. *J. Limnol.* 69(1): 1-14. (in English) ["The present study contains the results of an investigation of the relationships between the environmental variables and the taxonomic diversity of common and important groups of benthic macrofauna: Chironomidae, Ephemeroptera, Odonata, Hirudinea and Gastropoda, collected from various types of bottom substrate in seven lowland streams of north-eastern Poland. Four metrics were used to express the diversity of the studied taxa in each sample as the examples of its four different aspects: species richness, rarity, Shannon-Weaver's diversity index and Pielou evenness index. The values of total species richness and Shannon-Weaver index were rarified by functional extrapolation with Michaelis-Menten asymptotic function chosen as a richness estimator. There are high differences in taxonomic diversity of benthic animals between the studied streams. The results of estimation of total species richness and total species diversity are mainly affected by the diversity of the taxon richest in species – larval Chironomidae and, to a lesser extent, Hirudinea. The total taxonomic diversity significantly correlates with the status of riparian vegetation and with the isolation of the sampling site, while the relationship with other environmental parameters, i.e. pollution and seasonality, is not significant. The diversity of Gastropoda and Hirudinea is significantly affected by pollution (positively), water depth and season-

ality; whereas the diversity of Ephemeroptera and Chironomidae by the state of riparian vegetation, and that of Odonata by stream width and isolation of the site. The study presents and discusses reduced diversity of certain higher taxa as a result of a reduction in pollution loading to a stream with simultaneous unchanged values of the total diversity." (Authors)] Address: Koperski, P., Dept Hydrobiol., Univ. Warsaw, Banacha 2, 02-097 Warszawa, Poland. E-mail: p.t.koperski@uw.edu.pl

8522. Marques Couceiro, S.R.; Hamada, N.; Forsberg, B.R.; Padovesi-Fonseca, C. (2010): Effects of anthropogenic silt on aquatic macroinvertebrates and abiotic variables in streams in the Brazilian Amazon. *Journal of Soils and Sediments* 10(1): 89-103. (in English) ["Purpose: While environmental risks associated with petroleum extraction such as oil spills or leaks are relatively well known, little attention has been given to the impacts of silt. The increase in petroleum exploitation in Amazonia has resulted in sediment input to aquatic systems, with impacts on their biodiversity. Here we use a combination of field measurements and statistical analyses to evaluate the impacts of anthropogenic silt derived from the construction of roads, borrow pits, and wells during the terrestrial development of gas and oil, on macroinvertebrate communities in streams of the Urucu Petroleum Province in the Central Brazilian Amazon. Material and methods: Ten impacted and nine non-impacted streams were sampled in January, April, and November of 2007. Macroinvertebrates were sampled along a 100-m continuous reach in each stream at 10-m intervals using a dip net. Abiotic variables including, a siltation index (SI), suspended inorganic sediment (SIS), sediment colour index (SCI), suspended organic sediment (SOS), pH, electrical conductivity, dissolved oxygen, temperature, water velocity, channel width, and depth, were measured at three equidistant points in each stream (~30-m intervals). Results and discussion: SI did not differ between impacted and undisturbed streams. SIS was higher and SCI lower (more reddish) in impacted than in non-impacted streams. SCI had a positive and SIS a negative effect on both macroinvertebrate richness and density. SIS and SCI also influenced macrophyte taxonomic composition. In impacted streams, taxonomic richness and density were 1.5 times lower than in non-impacted streams. No taxon was significantly associated with impacted streams. SIS was positively correlated with SOS and electrical conductivity while SCI was negatively correlated with SOS, electrical conductivity, and pH. The lack of difference in SI between impacted and non-impacted streams suggests that anthropogenic sediment does not accumulate on stream beds. The reddish colour of SIS in impacted streams reflects terrestrial erosion and indicates the rapid flow of suspended sediments through these reaches, impacting macroinvertebrate richness, density, and species composition. Conclusions: Anthropogenic suspended silt has had a significant negative impact on aquatic macroinvertebrate diversity and density in streams in the Urucu Petroleum Province. Soil conservation measures are needed to reduce silt inputs and restore these streams to their natural condition. Additional studies are also needed to investigate the dynamics of sediments in the impacted streams." (Authors) Odonata are treated at the genus level.] Address: Marques Couceiro, Sheyla Regina, Instituto Nacional de Pesquisas da Amazônia/Coordenação de Pesquisas em Entomologia, Av. André Araújo, 2936, Aleixo, CP 478 CEP 69060-001 Manaus,

Amazonas, Brazil. E-mail: sheylacouceiro@yahoo.com.br

8523. Muscatello, J.R.; Janz, D.M. (2010): Selenium accumulation in aquatic biota downstream of a uranium mining and milling operation. *Science of the total environment* 407(4): 1318-1325. (in English) ["Uranium mining and milling operations have the potential to release trace elements such as arsenic, molybdenum, nickel, selenium and uranium and ions (e.g., sulfate, ammonium) into the receiving aquatic ecosystem. The major implication of elevated environmental selenium is its propensity to accumulate in the aquatic food chain, potentially impairing fish reproduction. The objective of this study was to investigate the accumulation of selenium in the major compartments of aquatic ecosystems (lakes) upstream and downstream of a uranium mine in northern Saskatchewan, Canada. Selenium concentrations in aquatic biota were elevated in the exposure lake although water and sediment concentrations were low (0.43 µg/L and 0.54 µg/g dry weight, respectively). Biomagnification of selenium resulted in approximately 1.5 to 6 fold increase in the selenium concentration between plankton, invertebrates and fish. However, no biomagnification was observed between forage and predatory fish. Although some aquatic biota (e.g., forage fish) exceeded the lower limit of the proposed 3 to 11 µg/g (dry weight) dietary toxicity threshold for fish, no adverse effects of selenium could be identified in this aquatic system. Continued environmental monitoring is recommended to avoid potential selenium impacts. [...] Selenium concentrations in Diptera, Trichoptera and Odonata were significantly ($p < 0.05$) greater in the exposure site than the reference site. In addition, there were significant ($p < 0.05$) increases in the concentrations of Co and Mn in Gastropoda, Odonata and Hirudinea between sites. The concentration of As was greater for Odonata collected from exposure site compared to the reference site ($p < 0.05$). In contrast, other concentrations of trace elements in Diptera (Ba, copper [Cu], Mn, Ni and zinc [Zn]), Trichoptera (Ba and V), Gastropoda (Cr, Fe and V) and Odonata (Cd, Cu and Sr) collected from the exposure site were significantly less ($p < 0.05$) than the reference site." (Authors)] Address: Janz, D.M., Toxicology Centre, University of Saskatchewan, 44 Campus Drive, Saskatoon, SK Canada S7N 5B3. E-mail: david.janz@usask.ca

8524. Omoigberale, M.O.; Ogbeibu, A.E. (2010): Environmental impacts of oil exploration and production on the macrobenthic invertebrate fauna of Osse River, southern Nigeria. *Research Journal of Environmental Sciences* 4(2): 101-114. (in English) [The impact of Dubri Oil Company operations on the macrobenthic invertebrate fauna of Osse River, Edo State (Nigeria) was investigated between July 2000 and June 2002 at five sites. A total of fifty-seven taxa was identified; Odonata accounted to 6.56% of the taxa. The Odonata listed are a mixture of North-American and European taxa.] Address: Omoigberale, M.O., Department of Animal and Environmental Biology, University of Benin, P.M.B. 1154, Benin City, Nigeria

8525. Paralikidis, N.; Papageorgiou, N.; Tsiompanoudis, A.; Konstantinou, L.; Christakis, T. (2010): Foods of hunter-killed Black Francolins (*Francolinus francolinus*) in Cyprus. *European Journal of Wildlife Research* 56(1): 89-93 (in English) [Odonata contributed accidentally as diet of the Black Francolin on the island of

Cyprus during November and December of 2004 and 2005.] Address: Paralikiadis, N., Dept Forestry & Natural Environment, Laboratory of Wildlife and Fisheries, Aristotle University of Thessaloniki, 541 24 Thessaloniki, Greece. E-mail: atsiompa@for.auth.gr

8526. Reinhardt, K. (2010): Natural selection and genital variation: a role for the environment, parasites and sperm ageing? *Genetica* 138: 119-127. (in English) ["Male genitalia are more variable between species (and populations) than other organs, and are more morphologically complex in polygamous compared to monogamous species. Therefore, sexual selection has been put forward as the major explanation of genital variation and complexity, in particular cryptic female choice for male copulatory courtship. As cryptic female choice is based on differences between males it is somewhat paradoxical that there is such low within-species variation in male genitalia that they are a prime morphological identification character for animal species. Processes other than sexual selection may also lead to genitalia variation but they have recently become neglected. Here I focus on pleiotropy and natural selection and provide examples how they link genitalia morphology with genital environments. Pleiotropy appears to be important because most studies that specifically tested for pleiotropic effects on genital morphology found them. Natural selection likely favours certain genital morphology over others in various environments, as well as by reducing re-infection with sexually transmitted diseases or reducing the likelihood of fertilisation with aged sperm. Both pleiotropy and natural selection differ locally and between species so may contribute to local variation in genitalia and sometimes variation between monogamous and polygamous species. Furthermore, the multitude of genital environments will lead to a multitude of genital functions via natural selection and pleiotropy, and may also contribute to explaining the complexity of genitalia." (Authors) References to Odonata are made.] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

8527. Starzomski, B.M.; Suen, D.; Srivastava, D.S. (2010): Predation and facilitation determine chironomid emergence in a bromeliad-insect food web. *Ecological Entomology* 35: 53-60. (in English) ["1. Ecological theory has focused on negative interactions, such as competition and predation, to explain species' effects on one another. This study demonstrates the importance of considering both positive and negative interactions in explaining how species influence abundances at the local scale. 2. Two experiments were conducted using the aquatic insect food web in Costa Rican bromeliad phytotelmata. Manipulations contrasted the strength of predation between trophic levels versus facilitation within a trophic level on the emergence of detritivore chironomids. 3. Predation had a strong negative effect on chironomids, reducing emergences by 81% overall. Most predation was as a result of the top predator, *Mecistogaster modesta*; the intermediate predator, a tany-podine chironomid, had little effect. In the absence of predators, shredder and scraper detritivores (tipulid and scirtid larvae) increased the emergence rate of chironomid larvae by 86%. The mechanism of facilitation was likely the processing, by tipulids and scirtids, of intact detritus into fine particles that the detritivore chironomids consume or use to build protective cases. 4. This study is among the first demonstrations of a pro-

cessing chain in a multispecies context, and in bromeliad-insect food webs. Our finding that top-down effects are of similar magnitude to facilitative effects suggests that the relative importance of processing chains in nature will depend on food web context." (Authors)] Address: Starzomski, B.M., School of Environmental Studies, Univ. Victoria, Victoria, British Columbia V8P 5C2, Canada. E-mail: starzom@uvic.ca

8528. Takahashi, Y.; Watanabe, M. (2010): Female reproductive success is affected by selective male harassment in the damselfly *Ischnura senegalensis*. *Animal Behaviour* 79: 211-216. (in English) ["In animals without any courtship behaviour, persistent mating attempts by males are frequently observed. Male harassment affects female reproductive success in the laboratory, but few studies have evaluated the costs of male harassment in the wild. In *I. senegalensis*, females exhibit colour dimorphism (andromorph and gynomorph), and the morph frequency varies between local populations. In two populations where gynomorphs were common, we found that males harassed more gynomorphs than andromorphs throughout their daily foraging and oviposition activity period. Gynomorphs excreted less faeces than andromorphs, indicating that preferential harassment of gynomorphs decreased their food intake. Gynomorphs also produced fewer eggs than andromorphs. As a result, gynomorphs laid 35% fewer eggs per day than andromorphs, suggesting that male harassment decreased their reproductive success." (Authors) Address: Watanabe, M., Conservation Biology Laboratory, Graduate School of Life & Environmental Sciences, Univ. Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki, Japan. E-mail address: watanabe@kankyo.envr.tsukuba.ac.jp

8529. Vernoux, J.; Huang, D.-y.; Jarzembowski, E. A.; Nel, A. (2010): The Proterogomphidae: a worldwide Mesozoic family of gomphid dragonflies (Odonata: Anisoptera: Gomphidae). *Cretaceous Research* 31(1): 94-100. (in English) ["The first Chinese and English representatives of the Mesozoic gomphid family Proterogomphidae are described, respectively *Lingomphus magnificus* gen. et sp. nov., and *Cordulagomphus europaeus* sp. nov. A phylogenetic analysis of the most 'basal' gomphid lineages is proposed, showing the monophyly of the Proterogomphidae and the position of *Lingomphus* as sister group of all other representatives of this family. *C. europaeus* is the first Eurasian representative of the subfamily Cordulagomphinae that was previously restricted to the Lower Cretaceous of Crato Formation (South America). The Proterogomphidae has a known distribution very similar to those of several other Lower Cretaceous insect groups, viz. Asia, Europe, and South America, showing that the distribution of the climates and land masses at that time was not a 'serious' impediment for the displacements of these organisms." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

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8530. Both, C. (1997): Career-decisions of Calopteryx-species. *Brachytron* 1(1): 11-15. (in Dutch, with English summary) ["Males of *Calopteryx splendens* and *C. virgo* sometimes engage in long, escalated fights. This paper addresses the question why these damselflies spend so much time and energy in those fights. By individually marking males from both species we showed that about three quarters of the marked individuals was restricted to a particular site. These males were frequently involved in short disputes with bordering males, suggesting that the males defended territories. Males not restricted to a particular site hardly got engaged in these border disputes, suggesting that these males were non-territorial. Only one escalated fight was observed in which a marked territorial male was displaced by a non-territorial individual after more than 30 minutes continuous fighting. Territorial males attracted females by a flight display, sometimes including a part in which males entered the stream and floated some distance downstream. Non-territorial males chased females in a pursuit flight. The territorial strategy is far more rewarding in *Calopteryx* damselflies, resulting in 1000 times more eggs fertilized per day than males without territories (Plaistow & Siva-Jothy, 1996). The escalated fights seem to be a way of getting the preferred mating option." (Author)] Address: Both, C., Droevendaalsesteeg 57, 6708 PB Wageningen. The Netherlands. E-mail: Both@cto.nioo.knaw.nl

8531. Habraken, J.M.; Crombaghs, B.H. (1997): Discovery of a larva of *Gomphus flavipes* along the Waal. *Brachytron* 1(1): 3-5. (in Dutch, with English summary) ["On the 5th of June 1996 a living larva of *G. flavipes* was found in the residue of the cooling-water filters of the EPON power station at Nijmegen. This was the first record of the species in The Netherlands since 1902. Pollution and canalization of rivers have caused its extinction in most of western Europe. It was recently re-discovered along some German rivers. The cooling-water is extracted from a canal connecting the rivers Waal (Rhine) and Maas (Meuse) which originate in Germany and France respectively. It seems probable that larval drift, due to high-water in recent winters, explains this remarkable discovery. The Rhine is the most

likely source, there being a number of barriers in the canal from the other side. The importance of the regeneration of riverine habitats for the possible return of populations of *G. flavipes* to The Netherlands is stressed." (Authors)] Address: Habraken, J.M. p/a Limes Divergens, Postbus 31070, 6503 CB Nijmegen, The Netherlands

8532. Hermans, J.T.; Gubbels, R.E. (1997): The Scarlet Dragonfly (*Crocothemis erythraea*) Brullé in Limburg. *Brachytron* 1(1): 22-26. (in Dutch, with English summary) ["In Europe the *C. erythraea* has a predominantly mediterranean distribution. During the last decade it has expanded in a northerly direction. In 1993 it reappeared in The Netherlands, after an absence of 17 years, in the south-western province of Zeeland. From 1995 onwards it has also been recorded regularly in the south-eastern province of Limburg. Until now it is known from five localities in the latter province. Two sites in Limburg (De Doort and Weustenrade) are discussed in more detail. Both areas possess enough potential for a possibly viable population of *C. erythraea* in the future." (Authors)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands

8533. Pritchard, G.; Kortello, A. (1997): Roosting, perching, and habitat selection in *Argia vivida* Hagen and *Amphiagrion abbreviatum* (Selys) (Odonata: Coenagrionidae), two damselflies inhabiting geothermal springs. *Canadian Entomologist* 129(4): 733-743. (in English, with French summary) ["Although *A. abbreviatum* and *A. vivida* often occur at the same geothermally heated springs in western Canada and the United States, they differ markedly in their abundance at any particular site. There is no relationship between crude data on water temperature, conductivity, or aquatic vegetation and the relative abundance of the two species, but there is a striking correlation with presence or absence of trees. The absence of *A. abbreviatum* from heavily treed areas is associated with the paucity of suitable daytime perching sites, and there may be competitive pressure exerted by *A. vivida* for the perching sites that are available. *A. vivida* does not live at open sites because it requires trees for night-time roosts. *A. vivida* roosted higher than *A. abbreviatum* in cages and held the body at a greater angle from the cage wall. The roosting posture of *A. vivida* is probably related to interception of solar radiation in the morning, and the body positions of

both species possibly provide defence against predation." (Authors)] Address: Pritchard, G., Div. Ecol. Dept Biol. Sci., Univ. Calgary, Calgary, AB, T2N 1N4, Canada. E-mail: gpritcha@ucalgary.ca

8534. Strausfeld, N.J.; Hansen, L.; Li, Y.; Gomez, R.S.; Ito, K. (1998): Evolution, discovery, and interpretations of arthropod mushroom bodies. *Learning & Memory* 5: 11-37. (in English) ["Mushroom bodies are prominent neuropils found in annelids and in all arthropod groups except crustaceans. First explicitly identified in 1850, the mushroom bodies differ in size and complexity between taxa, as well as between different castes of a single species of social insect. These differences led some early biologists to suggest that the mushroom bodies endow an arthropod with intelligence or the ability to execute voluntary actions, as opposed to innate behaviors. Recent physiological studies and mutant analyses have led to divergent interpretations. One interpretation is that the mushroom bodies conditionally relay to higher protocerebral centers information about sensory stimuli and the context in which they occur. Another interpretation is that they play a central role in learning and memory. Anatomical studies suggest that arthropod mushroom bodies are predominately associated with olfactory pathways except in phylogenetically basal insects. The prominent olfactory input to the mushroom body calyces in more recent insect orders is an acquired character. An overview of the history of research on the mushroom bodies, as well as comparative and evolutionary considerations, provides a conceptual framework for discussing the roles of these neuropils. [...] Thysanura, Ephemeroptera, and Odonata are probably all primarily anosmic (lacking a sense of smell) with respect to airborne odors. [...] A crucial feature is that these apterygotes, as well as palaeopteran insects, all lack the glomerular antennal lobes typical of Neoptera whose ancestors first appeared in the Late Carboniferous. Another important feature of the mushroom bodies of primitive anosmic insects is that they lack calyces. However, their neuropils derive from thousands (in odonates, hundreds of thousands) of globuli cells that provide cell body fibers forming a thin pedunculus, which, anteriorly, gives rise to elaborately subdivided and swollen lobes. [...] Judging from their modern representatives, the mushroom body lobes of these earliest insects thus seem to serve mainly mechano- and optosensory integration rather than olfaction." As example of anosmic insects (Odonata), *Argia* sp. is used. "In some species, the calyx is divided into inner, middle, and outer components vertical, medial, frontal, and recurrent lobes (in some species, lobe subdivisions represent inner, middle, and outer calyces)." (Authors)] Address: Strausfeld, N.J., Arizona Research Laboratories Division of Neurobiology, University of Arizona, Tucson, Arizona 85721 USA

8535. Hermans, J.T. (1999): The dragonfly fauna of the Meinweg area 1992 - 1999. *Natuurhistorisch maandblad* 88: 308-310. (in Dutch, with English summary) ["The Meinweg nature reserve includes various types of water body. Stagnant waters include heathland pools, raised bog pools, cattle ponds and artificial ponds; running water is present in the form of brooks. The odonatological value of the Meinweg is determined by these various aquatic biotopes. Between 1980 and 1992, the author found forty species of dragonfly; ten of these species are very common, such as *Coenagrion puella*, *Libellula quadrimaculata*, *Anax imperator*, *Sym-*

ptetrum danae, *Lestes sponsa*, *L. virens*, *Aeshna cyanea*, *Ischnura elegans*, *Pyrrhosoma nymphula* and *Enallagma cyathigerum*. Between 1992 and 1999, 36 dragonfly species were observed. The status of the common species did not change over this period. Some species showed a decline, such as *Coenagrion lunulatum*, *Ceriagrion tenellum*, *Leucorrhinia dubia* and *L. rubicunda*. Preservation of the unique dragonfly fauna of the Meinweg area can only be achieved by means of special management measures against dehydration, in combination with rigorous biotope protection." (Author)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands

8536. Kiauta, B.; Kiauta, M. (1999): A note on dragonfly response during the 98,3% solar eclipse of 11 August 1999 in the Netherlands (Odonata). *Opusc. zool. flumin.* 172: 1-6. (in English) ["An analysis of odonate behaviour at a locality near Utrecht, combined with the available evidence from India and France, seems to indicate it is the rapid reduction of light intensity during a solar eclipse rather than a relatively minor drop in the ambient temperature that triggers the behavioural response. The latter is similar to the behaviour preceding oncoming heavy weather." (Authors)] Address: Kiauta, B., P.O. Box 256, NL-3720 AG Bilthoven, The Netherlands. E-mail: mb.kiauta@12move.nl

8537. Wirth, T.; Le Guellec, R.; Veuille, M. (1999): Directional substitution and evolution of nucleotide content in the Cytochrome Oxidase II gene in earwigs (Dermapteran Insects). *Mol. Biol. Evol.* 16(12): 1645-1653. (in English) ["The cytochrome oxidase subunit II (COII) gene was sequenced for six dermapteran species. The nucleotide composition of this gene is biased in most animals. While the CG content of other insect orders is low (mean, 27.6%; range, 19.5%–33.1%), species from the *Forficula* genus showed unusually high values (mean, 42.4%; range, 37.3%–44.1%), mostly due to high CG frequencies at third codon positions: the mean CG content at these positions was around 45% (range, 43.9%–46.9%) for *Forficula*, compared with only 13.3% for other insects. This effect was so strong that in one species, *Forficula lesnei*, there was no significant difference between the frequencies of the four bases. During evolution, this loss of bias has involved a significant increase in the synonymous substitution rate and an increase of transitions over transversions compared with other insects. A strong directionality of substitutions has favored T->C and A->G changes. This phenomenon was also observed between two conspecific populations of *Forficula auricularia*. A species from a closely related genus, *Anechura bipunctata*, was intermediate between *Forficula* and other insects for these parameters, while two remotely related dermapteran species, *Labidura riparia* and *Euborellia moesta*, were similar to other insects. These results suggest that the evolution of *Forficula* DNA content has been both rapid and recent." (Authors) *Symptetrum striolatum* was used as outgroup representative in phylogenetic analysis.] Address: Wirth, T., Laboratoire d'Ecologie and Ecole Pratique des Hautes Etudes, Paris 6 University, Paris, France

2000

8538. Batzer, D.P.; Pusateri, C.R.; Vetter, R. (2000): Impacts of fish predation on marsh invertebrates: direct and indirect effects. *Wetlands* 20(2): 307-312. (in Eng-

lish) ["We excluded predatory fish from a marsh weedbed to evaluate experimentally their impact on invertebrate prey. Gut analyses of wetland fish, including pumpkinseed sunfish (*Lepomis gibbosus*), brown bullhead (*Ictalurus nebulosus*), black crappie (*Pomoxis nigromaculatus*), and common carp (*Cyprinus carpio*), revealed that large numbers of midge larvae (Diptera: Chironomidae) were consumed. However, our exclusion of these predatory fish from study habitats did not result in midge population increases. On the contrary, fewer epiphytic midges occurred where predatory fish had been excluded ($P = 0.0043$). Populations of midge competitors (especially Planorbidae and Physidae) and invertebrate midge predators (especially Corixidae and Glossiphoniidae) were suppressed directly by fish, and midges that co-existed with fish apparently benefitted indirectly from those interactions. For epiphytic midge larvae, the negative direct influence of fish predation was strong, but positive indirect effects apparently were even more powerful. [...] When all of the potential invertebrate predators of non-tanypod midges were pooled (odonates, hemipterans, leeches, tanypod midges), more occurred in habitats where fish were excluded, but in this case, no interaction existed between predator taxa and fish treatment" (Authors)] Address: Batzer, D.P., Department of Entomology, University of Georgia, Athens, Georgia, USA 30602.

8539. Birge, W.J.; Price, D.J.; Shaw, J.R.; Spromberg, J.A.; Wigginton, A.J.; Hogstrand, C. (2000): Metal body burden and biological sensors as ecological indicators. *Environmental Toxicology and Chemistry* 19(4): 1199-1212. (in English) [Big Bayou Creek, Kentucky, USA; "Metal body burden (BB) was analyzed in three groups of organisms evaluated as sentinel monitors of metal exposure. The study site was a lotic system of moderate gradient that received effluent outfalls from an uranium enrichment plant. Metal BBs (e.g., Ag, Cd, Cr, Cu) increased in the order Cheumatopsyche spp. (caddisfly), *Campostoma anomalum* (central stoneroller minnow), and *Stenonema* spp. (mayfly). This was consistent with their classifications as metal-tolerant, moderately tolerant, and sensitive taxa, respectively. The Ag, Cd, and Cu BBs in stoneroller minnows from upstream, effluent-receiving, and downstream stations correlated strongly with macroinvertebrate bioassessment (BA) scores, numbers of taxa, and the Ephemeroptera, Plecoptera, Trichoptera indices. Proportional differences in metal BBs in the minnow were used to derive metal multipliers that were applied to total recoverable metal concentrations to calculate bioavailable metal. The bioavailable metal fractions correlated with BA scores and numbers of taxa. When five metals (i.e., Ag, Cd, Cu, Cr, Pb) were included in an additive model, results also correlated with BA scores ($r = -0.93$) and numbers of taxa ($r = -0.86$). Metal BB in minnows was a strong indicator of ecological impact and provided a means of determining bioavailable metals. Also, we describe the development of the metal biosensor, which incorporates a reconstructed fish gill epithelium, the primary target of metal exposure. This *in vitro* biosensor should directly quantify bioreactive metals that cross the epithelium and react with a genetically engineered intracellular detector. This biosensor complements biotic ligand models based on surface binding of metals to gill epithelia." (Authors) Density of Odonata in appendix 1 is documented at the family level.] Address: Birge, W.J., School of Biological Sciences, University of Kentucky,

101 TH Morgan Building, Lexington, Kentucky 40506-0225, USA. E-mail: bio110@pop.uky.edu

8540. De Moor, F.C.; Barber-James, H.M.; Harrison, A.D.; Lugo-Ortiz, C.R. (2000): The macroinvertebrates of the Cunene River from the Ruacana Falls to the river mouth and assessment of the conservation status of the river. *Afr. J. aquat. Sci.* 25: 105-122. (in English) [The paper includes a checklist of 13 odonate taxa (mostly at genus level) from selected sites along the Cunene river, Namibia.] Address: De Moor, F.C., Dept Freshwater Invertebrates, Albany Museum, Grahamstown - 6139, South Africa

8541. Termaat, T. (2000): Survey of new riverine habitat of *Gomphus flavipes* in The Netherlands in 1999. *Brachytron* 4(1): 13-17. (in Dutch, with English summary) ["After the rediscovery of *G. flavipes* in The Netherlands in 1996, the species was recorded in 1998 in eight 1x1 km-squares along the river Waal near Nijmegen in the eastern part of The Netherlands. Extensive research in 1999 displayed the species presence at many new locations of *G. flavipes* along the rivers Waal, Nedernjn, Nieuwe Merwede and Beneden Merwede. One wandering male was found near Goirte outside the species normal riverine habitat, at short distance of the Belgian border. An overview is presented of all new locations, many reaching well westwards. In addition, all locations where the species appeared to be absent despite searching are presented also. Possible reasons for absence of *G. flavipes* along the river Lek are discussed, just as the possibilities for the species presence along other river systems." (Author)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

2001

8542. Euliss, N.H.; Mushet, D.M.; Johnson, D.H. (2001): Use of macroinvertebrates to identify cultivated wetlands in the prairie pothole region. *Wetlands* 21(2): 223-231. (in English) ["We evaluated the use of macroinvertebrates (in most cases at order or family level, and including Odonata larvae) as a potential tool to identify dry and intensively farmed temporary and seasonal wetlands in the Prairie Pothole Region. The techniques we designed and evaluated used the dried remains of invertebrates or their egg banks in soils as indicators of wetlands. For both the dried remains of invertebrates and their egg banks, we weighted each taxon according to its affinity for wetlands or uplands. Our study clearly demonstrated that shells, exoskeletons, head capsules, eggs, and other remains of macroinvertebrates can be used to identify wetlands, even when they are dry, intensively farmed, and difficult to identify as wetlands using standard criteria (i.e., hydrology, hydrophytic vegetation, and hydric soils). Although both dried remains and egg banks identified wetlands, the combination was more useful, especially for identifying drained or filled wetlands. We also evaluated the use of coarse taxonomic groupings to stimulate use of the technique by nonspecialists and obtained satisfactory results in most situations." (Authors)] Address: Euliss, N.H., U.S. Geological Survey, Northern Prairie Wildlife Research Center. 8711 37 Street SE Jamestown, North Dakota, USA 58401

8543. Han, F.-y.; Xi, Y.-y. (2001): *Ischnura elegans* as an indicator of pollution of cadmium on water system.

Agro-environmental protection 20(4): 229-230. (in Chinese, with English summary) [*I. elegans* was found to accumulate cadmium. Content of cadmium in *I. elegans* males corresponded well with cadmium content in the water body of the locality the damselfly was sampled.] Address: Xi, Y.-y., Department of Environment Protection Science, Shanxi University, Taiyuan 030006 China

8544. Vliegenthart, A.; Termaat, T. (2001): De Mercurwaterjuffer (*Coenagrion mercuriale*) in Nederland? *Brachytron* 5(1/2): 3-7. (in Dutch, with English summary) ["Recently, several species of damselfly that were considered to be extinct in The Netherlands were re-discovered. We describe the habitat and ecological requirements of *C. mercuriale* in order to provide an accurate search image for this species. The habitat is usually situated in agricultural landscape, in places mostly ignored by many observers. Our description of the ecological requirements may enable observers to search more specific for *C. mercuriale* in The Netherlands. The influx of other southern species and the recent discovery of a new population in Belgium give hope for success." (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

8545. Yagi, T.; Kitagawa, K. (2001): A survey of the dragonflies in the Klias and Binsulok Forest Reserves, Sabah, Malaysia. *Nature and Human Activities* 6: 31-39. (in English) ["In the Klias-Binsulok Scientific Expedition and Inventory 1999 jointly organized by Universiti Malaysia Sabah and the Sabah Wildlife Department, a total of 28 Odonata species [...] were recorded. Twenty-two species were recorded from the Klias Forest Reserve and its surroundings, while 21 species were from the Binsulok Forest Reserve. Two types of dragonfly fauna were recognized in the Klias region as a result of the classification of collecting sites by the distribution pattern of the dragonflies. One is a type that developed in the forest area, the other is a type that developed on open land. In the Binsulok Forest Reserve, these two types of fauna were found coexisting." (Authors)] Address: Yagi, T., Division of Natural History, Museum of Nature and Human Activities, Hyogo, Yayoigaoka 6, Sanda, Hyogo, 669-1546 Japan

8546. Zwick, P. (2001): Book review: CORBET, P.S. (1999): *Dragonflies: Behaviour and Ecology of Odonata*. *Aquatic Insects* 23(1): 83. (in English) [review] Address: Zwick, P., Limnologische Fluß-Station des Max-Planck-Instituts für Limnologie, PF 260, D-36105 Schlitz. e-mail: pzwick@mpil-schlitz.mpg.de

2002

8547. Aswari, P. (2002): Keragaman serangga air ditaman Nasional Gunung Halimun. Edisi Khusus "Biodiversitas Taman Nasional Gunung Halimun" *Berita Biologi* 5(6) (2001): 755-764. (in Indonesian, with English summary) [Java, Indonesia; between 1995 and 2002, 26 Odonata taxa were recorded along the Cikaniki, Cibeurang and Citarik streams and some of their branches, in the villages of Malasari, Cisarua and Cihameurang.] Address: Aswari, P., Bidang Zoologi, Pusat Penelitian Biologi-LIPI

8548. De Haro, J.J. (2002): Guida de campo de la entomologia en Internet, 3: Odonata. *Boln Soc. ent. aragon.* 30: 205-207. (in Spanish) [36 websites with

odonatological content are listed..] Address: De Haro, J.J., jjdeharo@terra.es

8549. Dudley, R. (2002): Mechanisms and implications of animal flight maneuverability. *Integr. Comp. Biol.* 42: 135-140. (in English) ["Accelerations and directional changes of flying animals derive from interactions between aerodynamic force production and the inertial resistance of the body to translation and rotation. Anatomical and allometric features of body design thus mediate the rapidity of aerial maneuvers. Both translational and rotational responsiveness of the body to applied force decrease with increased total mass. For flying vertebrates, contributions of the relatively heavy wings to whole-body rotational inertia are substantial, whereas the relatively light wings of many insect taxa suggest that rotational inertia is dominated by the contributions of body segments. In some circumstances, inertial features of wing design may be as significant as are their aerodynamic properties in influencing the rapidity of body rotations. Stability in flight requires force and moment balances that are usually attained via bilateral symmetry in wingbeat kinematics, whereas body roll and yaw derive from bilaterally asymmetric movements of both axial and appendicular structures. In many flying vertebrates, use of the tail facilitates the generation of aerodynamic torques and substantially enhances quickness of body rotation. Geometrical constraints on wingbeat kinematics may limit total force production and thus accelerational capacity in certain behavioural circumstances. Unitary limits to animal flight performance and maneuverability are unlikely, however, given varied and context-specific interactions among anatomical, biomechanical, and energetic features of design." (Author) The paper includes references to Odonata.] Address: Dudley, R., Section of Integrative Biology, University of Texas, Austin, Texas 78712, USA. E-mail: rpdudley@utxvms.cc.utexas.edu

8550. Eda, S. (2002): A hybrid male supposed between *Sympetrum e. eroticum* and *S. baccha mutatum*. *Tombo* 45(1/4): 20. (in Japanese, with English summary) [On September 26, 2002, an interspecific hybrid was captured at Ebinoko-ike pond in Shiojiri City, Nagano Prefecture, Japan.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

8551. Eda, S. (2002): A correction and some considerations of the records concerning numerous occurrence of *Anax guttatus* (Burmeister) in Japan, 1999. *Tombo* 45(1/4): 1-6. (in Japanese, with English summary) [In autumn of 1998, unusually great numbers of *A. guttatus* migrated to the Japanese mainland: Kyushu, Shikoku and south-east Honshu. Records of 38 Japanese prefectures totalling to 743 males and 64 females, 4 males and 4 female larvae, and each one male and female exuvia.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

8552. Gallardo Mayenco, A. (2002): Macroinvertebrados acuáticos de la red hidrográfica del campo de Gibraltar: una revisión. *Almoraima* 27: 351-364. (in Spanish) [Seven Odonata species are listed from four localities in the Gibraltar region in southern Spain. *Ischnura elegans* and *Crocothemis erythraea* from Algeciras, *Ischnura graellsii* from Junto al Camping Río Jara, Tarifa, *Ceriagrion tenellum* from Canuto Juan de Sevilla, and *Onychogomphus uncatius*, *Cordulegaster*

boltonii, and *Oxygastra curtisii* from Canuto Garganta del Prior.] Address: not stated

8553. Sherwood, G.D.; Kovacs, J.; Hontela, A.; Rasmussen, J.B. (2002): Simplified food webs lead to energetic bottlenecks in polluted lakes. *Can. J. Fish. Aquat. Sci.* 59: 1-5. (in English, with French summary) [Quebec, Canada; "Very little is known about the consequence of human activities on the flow of energy through natural ecosystems. Here, we present a trophic-based approach to describing energy relationships in pollutant-disturbed lakes, emphasizing the importance of prey diversity in maintaining energy transfer to growing fish. Both diet and community analysis indicated that the food web leading to yellow perch (*Perca flavescens*) in metal-polluted lakes was extremely simplified compared with reference lakes. Through the application of an in situ marker for fish activity costs (muscle lactate dehydrogenase activity) and through bioenergetic modelling, we show how this has severe consequences on the efficiency of energy transfer to perch from their prey; premature energetic bottlenecks (zero conversion efficiency) occur when successively larger prey types are not available to growing perch. These observations provide a much needed ecological and physiological framework for assessing how energy transfer can be affected in polluted systems. Our approach need not be limited therein but should be applicable to any aquatic system where food web structure is variable and (or) disrupted." (Authors) The analysis includes Odonata, but without further details.] Address: Sherwood, G.D., Department of Biology, McGill University, 1205 Dr. Penfield, Montreal, QC H3A 1B1, Canada. E-mail: grahamsherwood@hotmail.com).

8554. Taketo, A. (2002): Transition of odonate fauna in the artificial ponds in Yuhidera, Kanazawa: situation in the 9th year. *Tombo* 45(1/4): 33-35. (in Japanese, with English summary) ["The Odonate fauna in artificial ponds at Yuhidera sanctuary on the 9th year is reported. Two rare species, *Polycanthagyna melanictera* and *Aeschnophlebia anisoptera* emerged and are new records in 2001. A teneral male of *Sympetrum pedemontanum elatum* was caught, for the first time in this area. Except for such species as *Libellula quadrimaculata asahinai*, *Anax parthenope julius* and *Pseudothemis zonata*, yield of dragonflies as revealed by exuviae collection decreased markedly. Nine zygopteran species appeared in this area and, larval density of Zygoptera was considerably higher than that of Anisoptera. Unexpectedly, *Micropterus salmoides*, a kind of voracious foreign sunfish, had been illicitly released into one of the pond. In November, the pond was drained to remove the sunfish thoroughly. Examination of digestive tract of the fish demonstrated remains of *P. zonata* larvae." (Author)] Address: Taketo, A., 1-19, Ishibiki 1-chome, Kanazawa City, 920, Japan

8555. Van der Weide, M. (2002): 'De Nederlandse Libellen', about the results and the future. *Brachytron* 6(2): 56-59. (in Dutch, with English summary) ["This article provides an anthology of the recently published book 'De Nederlandse Libellen'. It ends with targets for further field research. The main aim of the book is the presentation of the distribution of the seventy species recorded in The Netherlands. The distribution is given in three periods (before 1950, 1950-1989 and 1990-1997). Striking changes in distribution are for example visible in *Erythromma viridulum*, *Sympecma fusca*, *Gomphus flavipes* and *G. vulgatissimus*. The balance in the drag-

onfly fauna in the last 100 year is as follows: five species have disappeared. 20 have decreased. 23 are more or less stable and 17 have increased. Species of fens, brooks and rivers show the highest decreases. Morphology, life history and behaviour of dragonflies in relation to their environment is also described in the book. However, with the publication of this atlas, knowledge of dragonflies in The Netherlands is not complete. For the future the challenges are monitoring of the dragonfly populations, further distribution surveys and research on behaviour, ecology and the effects of nature management." (Author)] Address: van der Weide, M., van Oldenbarneveltstraat 46, 6 512 AZ Nijmegen, The Netherlands. E-mail: mvdweide@knoware.nl

8556. Arefina, T.I.; Ivanov, P.Yu.; Kocharina, S.L.; Lafer, S.S.; Makarchenko, M.A.; Teslenko, V.A.; Tinova, T.M.; Khamenkova, E.V. (2003): Aquatic insects from Taui basin (Magadan territory). *Vladimir Ya. Levandov's Biennial Memorial Meetings 2003(2)*: 45-60. (in Russian, with English summary) [Five Odonata taxa are listed..] Address: Khamenkova, E.V., Magadan Research Institute of Fisheries and Oceanography, 36/10 Portovaya Street, Magadan, 685000, Russia

8557. Brothers, D.J.; Rasnitsyn, A.P. (2003): Diversity of Hymenoptera and other insects in the Late Cretaceous (Turonian) deposits at Orapa, Botswana: a preliminary review. *African Entomology* 11(2): 221-226. (in English) ["The kimberlitic eruption that formed the crater at Orapa occurred about 91 Mya, and its fossiliferous sediments were deposited shortly thereafter. The pieces of rock from Orapa which contain insect fossils, approximately 2000 currently housed in the Bernard Price Institute of Palaeontology at the University of the Witwatersrand and about 220 in the National Museum of Botswana in Gaborone, were screened for Hymenoptera, and all arthropods on the 68 pieces so selected were identified to the lowest level possible. After adjusting for the prior selection of Hymenoptera, the ordinal composition of the arthropods was calculated. The major components, based on number of specimens, are: Coleoptera (29 %), Homoptera (18 %), Blattodea (17 %), Diptera (13 %), Thysanoptera (7 %), and Hymenoptera and Orthoptera (6 % each)." (Authors) 1 specimen of the 641 studied insects belonged to the Odonata.] Address: Brothers, D.J., School of Botany and Zoology, University of Natal Pietermaritzburg, Private Bag X01, Scottsville, 3209 South Africa

8558. Harp, G.L.; Harp, P.A. (2003): Dragonflies (Odonata) of the Ouachita National Forest. *Journal of the Arkansas Academy of Science* 57: 68-75. (in English) [USA; "The Ouachita National Forest (ONF) was established in 1907 and encompasses 1.8 million acres (728,450 ha) in Arkansas and Oklahoma, almost entirely within the Ouachita Mountains Natural Division. The adult dragonfly species richness, seasonal and spatial distribution, and relative abundance were surveyed during 2002. Fifty four collections were made at 43 sites during 10-19 May (20 collections), 10-22 July (19 collections) and 9-17 September (15 collections). Literature records were searched, as well as records from pertinent museums and individuals. Eighty-three species are reported here for the ONF, 77 of which were collected during 2002. *Nehalennia integricollis* is newly reported for Arkansas, as are several species for the six Arkansas and two Oklahoma counties that encompass the ONF. The species richness results from a diversity of aquatic habitats, particularly within the

Caddo Ranger District. Plastic species (e.g. *Plathemis lydia*) typically are widely distributed and have long flight seasons. More specialized species (e.g. *Ophiogomphus westfalli*) often are quite restricted in both distribution and flight season. Maintenance of good water quality in all aquatic habitat types will ensure species richness for dragonflies and the invertebrates upon which they feed." (Authors)] Address: Harp, G., Dept of Biological Sciences, Arkansas State Univ., State University, AR 72467, USA. E-mail: glharp@astate.edu

8559. Kawashima, I. (2003): Redescription of the larva of the aeshnid dragonfly, *Sarasaeschna kunigamiensis* (Ishida, 1972) (Aeshnidae) from Okinawa-jima Is., Ryukyu Isls. Tombo 46: 13-16. (in English, with Japanese summary) [The external morphology of the last instar larva of *S. kunigamiensis* from Okinawa-jima Is., Ryukyu Isls., is redescribed and illustrated in detail. Many external characters of this species are closely allied to those of *S. pryeri* from the mainland of Japan, not to *S. niisato* from northern Vietnam.] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

8560. Prokonov, G.A. (2003): Presnovodnaya fauna basseyna r. Chernov. [Freshwater fauna of the Chernaya river basin]. Vopr. Razvitiya Kryma 15: 151-174. (in Russian) [*Calopteryx taurica*, *Gomphus vulgatisimus* and *Onychogomphus forcipatus* are recorded from the Chernaya River, Crimea, the Ukraine.] Address: not stated

8561. Sasamoto, A. (2003): Description of a new *Rhinagrion* species from Laos (Megapodagrionidae: Zygoptera). Tombo 46: 17-19. (in English) [*Rhinagrion yokoi* sp. n., is described from Sekong, SE Laos. It is related to *R. mima* (Karsch, 1891), but easily distinguished from the latter by body maculations and the structures of anal appendages and penile organ.] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto-cho, Shiki-gun, Nara, 636-0341 Japan

8562. Taketo, A. (2003): Transition of Odonate fauna in the artificial ponds in Yuhidera. Kanazawa: Situation in the 10 th year. Tombo 46: 20-21. (in Japanese, with English title) ["The Odonate fauna in artificial ponds at Yuhidera sanctuary, Kanazawa City on the 10 th year is reported. The occurrence of 13 anisopteran species was confirmed by quantitative exuviae collection. Although *Anax n. nigrofasciatus* and *Anaciaeschna martini* showed a considerable increase as compared with last year, seven dragonfly species disappeared, including common species, such as *Sympetrum eroticum*, *S. frequens* and *S. infuscatum*. Besides drought and accumulated mud, increasing crayfish numbers may be responsible for deterioration of the Odonate fauna." (Author)] Address: Taketo, A., 1-19, Ishibiki 1-chome, Kanazawa City, 920, Japan

8563. Taketo, A. (2003): Recent information on the Odonate fauna of Tshikawa Prefecture. Tombo 46: 21-22. (in Japanese, with English title) ["Recent habitat situation of several rare odonate species (incl. *Asiagomphus pryeri* and *Gynacantha japonica*) in Ishikawa Prefecture, Hokuriku District, in 2002, were reported. Adults of *Mnais pruinosa nawai* Yamamoto were taken from Noto-jima Is., a solitary island in Nanao Bay. Exuviae of two stream dwellers, *Anisogomphus maacki* and *Sieboldius albardae* were found in a typically lentic habitat. Lake Shibayama-gata in Kaga City." (Author)]

Address: Taketo, A., 1-19, Ishibiki 1-chome, Kanazawa City, 920, Japan

8564. Taylor, M.J. (2003): The Naturalist on Chios. The Prefecture of Chios: 26 pp. (in English) [Odonata are treated on pages 15-17. The author gives a general account on dragonflies and lists a few prospective localities for dragonfly observation.] Address: E-mail: mike.taylor@tiscali.co.uk

8565. Verstrael, T.J.; Bouwman, J.; Kleukers, R.; Turin, H.; Verhagen, R.; de Vries, H. (2003): Prioritaire insecten en andere ongewervelden in Noord-Brabant. Rapport VS2003.022, De Vlinderstichting, Wageningen: 36 pp. (in Dutch) [Noord-Brabant, The Netherlands; the following Odonata are assessed as species action plans should be prepared: *Calopteryx virgo*, *Lestes virens*, *Sympecma fusca*, *Coenagrion hastulatum*, *Aeshna isoceles*, *Brachytron pratense*, *Gomphus vulgatisimus*, *G. flavipes*, *Cordulegaster boltonii*, *Somatochlora flavomaculata*, *S. arctica*, *Leucorrhinia dubia*, *L. pectoralis*, *Libellula fulva*, *Orthetrum coerulescens*, *Sympetrum depressiusculum*, *S. pedemontanum*] Address: Bouwman, J.H., Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

8566. Zhou, Z.-h.; Barrett, P.M.; Hilton, J. (2003): An exceptionally preserved Lower Cretaceous ecosystem. Nature 421: 807-814. (in English) ["Fieldwork in the Early Cretaceous Jehol Group, northeastern China has revealed a plethora of extraordinarily well-preserved fossils that are shaping some of the most contentious debates in palaeontology and evolutionary biology. These discoveries include feathered theropod dinosaurs and early birds, which provide additional, indisputable support for the dinosaurian ancestry of birds, and much new evidence on the evolution of feathers and flight. Specimens of putative basal angiosperms and primitive mammals are clarifying details of the early radiations of these major clades. Detailed soft-tissue preservation of the organisms from the Jehol Biota is providing palaeobiological insights that would not normally be accessible from the fossil record." (Authors) Records include Odonata.] Address: Zhou, Z., Institute of Vertebrate Paleontology & Paleoanthropology, Chinese Academy of Sciences, PO Box 643, Beijing 100044, China

2004

8567. Ferreras-Romero, M.; Cano-Villegas, F.J. (2004): Odonatos de cursos fluviales del parque natural Los Alcornocales (sur de España). Boln. Asoc. esp. Ent. 28(3-4): 49-64. (in Spanish, with English summary) ["Odonata of running waters of Los Alcornocales Natural Park (southern Spain). Faunistic data on 29 species of Odonata collected in brooks and streams of Los Alcornocales Natural Park are given. The more frequent species found were *Boyeria irene*, *Onychogomphus uncatatus* and *Cordulegaster boltonii*. Three species listed as vulnerable by the IUCN and included in the Spanish National Catalogue of Threatened Species (*Gomphus graslinii*, *Oxygastra curtisii* and *Macromia splendens*) maintain populations within this protected area. A biogeographical analysis of the breeding species in flowing waters within this park indicates the low percentage (20%) of Ethiopian elements, and the high presence (69.2%) of endemic sensu lato species geo-

graphically restricted to western Europe and the occidental part of the Mediterranean basin." (Authors)] Address: Ferreras-Romero, M., Depto de Ciencias Ambientales (Zoología). Univ. Pablo de Olavide. Ctra de Utrera km 1. 41013 Sevilla, Spain. E-mail: ferreras@teleline.es

8568. Huang, K.-y.; Lin, Y.-s.; Severinghaus, L.L. (2004): The diet of Besra Sparrowhawk (*Accipiter virgatus*) in Yangmingshan area, northern Taiwan. *Taiwania* 49(3): 149-158. (in English) ["We monitored 25 *A. virgatus* nests from 1993 to 2002, to document the prey composition of this species during the breeding season. Results showed that birds were the major prey both in frequency and in biomass. *A. virgatus* preyed more on species active in canopy, mid-layer, and shrubs than on the ground. There were seasonal shifts in prey composition and diet diversity indices. We suggest that *A. virgatus* captured prey opportunistically, capitalizing on seasonally emerging prey species that are abundant and energetically rewarding to catch." (Authors) Six specimens of *Anotogaster sieboldius* are among the prey items, accounting to 0.7% of prey frequency and 0.1% of biomass.] Address: Severinghaus, Lucia Liu., Research Center of Biodiversity and Institute of Zoology, Academia Sinica, Taipei 115, Taiwan. Email: zobowl@gate.sinica.edu.tw

8569. Kotarac, M.; Salmun, A.; Govedic, M. (2004): NATURA 2000 vrste v naravnih in antropogenih vodnih habitatih – Primer kaejih pastirjev. Mišičev vodarski dan 2004, Maribor, 10. december. Zbornik referatov, (Mišičev vodarski dan). Maribor: Vodnogospodarski biro, 2004: 91-97. (in Slovenian) [Slovenia, distribution maps of the appendix II/IV - species of the European Fauna-Flora-Habitat-Directive; *Coenagrion ornatum*, *Ophiogomphus cecilia*, *Cordulegaster heros*] Address: Kotarac, M., Centre for Cartography of Fauna & Flora, Antoliceva 1, SI-2204 Miklavz na Dravskem polju, Slovenia. E-mail: mladen.kotarac@ckff.si

2005

8570. Bedell, P.; Bryan, A. (2005): *Orthemis ferruginea* observed in Virginia. *Argia* 17(3): 27. (in English) [19-VI-005 in Henrico County, Virginia, USA] Address: not stated

8571. Bernard, R. (2005): Swiss precision: WILDERMUTH, H., Y. GONSETH & A. MAIBACH (Hrsg.), 2005. *Odonata – Die Libellen der Schweiz*. *Fauna Helvetica* 12, CSCF/SEG, Neuchâtel, 440 pp. *Odonatrix* 1(2): 36-37. (in Polish, with English summary) ["Dragonflies of Switzerland" appears as an excellent monograph presenting the occurrence of dragonflies in various aspects of the Swiss space and time. The author comments on the contents and form of the book stressing its 'smooth' dignified appearance, richness of data, plasticity and informativeness of figures and maps, great precision and some economy of species texts." (Author)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

8572. Bernard, R. (2005): Buffer protection zones for *Nehalennia speciosa* – a vision, law and problems. *Odonatrix* 1(2): 21-24. (in Polish, with English summary) ["Buffer protection zones in the range up to 100 m around localities with *N. speciosa*, proposed by the

author, were legally implemented in Poland in 2004 by the Ministry of Environment, with the aim to prevent deforestation, changes in hydrological conditions and any other impact on the species habitat. So far, conservation measures of this type have been used in Poland mainly for birds. The vital role of forests as buffer zones for *N. speciosa* is evident. To a large extent they influence hydrochemical conditions and through them the composition and texture of vegetation, extremely important for the species. They also contribute to the stabilization of the hydrological conditions and serve as windshields. In the article, the necessity of implementation of the protection zones is substantiated considering a deep regress of this very endangered species. The legal status quo is described, some of its imperfections are explained, and a list of bans is enclosed. The expected problems related to designation of individual localities and outlining the range of their protection zones are considered in the context of continuous disputes with forest administration bodies." (Author)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

8573. Brown, G. (2005): *Celithemis verna* in New York. *Argia* 17(3): 21-22. (in English) [Several specimens were recorded at Long Island in summer 2005. "It is, to my knowledge, the first record of this southern species for New York, and the first record north of New Jersey."] Address: not stated

8574. Buczyński, P.; Tończyk, G. (2005): New regulation pertaining to the list of the animal species being under protection. *Odonatrix* 1(1): 3-5. (in Polish, with English summary) ["The new regulation about species protection of animals encompasses 15 dragonfly species: *Sympecma paedisca*, *Coenagrion armatum*, *C. ornatum*, *Nehalennia speciosa*, *Gomphus flavipes*, *Ophiogomphus cecilia*, *Aeshna caerulea*, *A. subarctica*, *A. viridis*, *Cordulegaster boltonii*, *Somatochlora alpestris*, *S. arctica*, *Leucorrhinia albifrons*, *L. caudalis* and *L. pectoralis*. Additionally, for *N. speciosa* 100 m yearlong protection zone was introduced, covering its breeding and regularly inhabiting areas. In the paper the history of constructing the list of dragonflies under protection was also presented. They were provided for the first time in the regulation from 1995 in which only 7 species were involved. The next regulation (2001) encompassed 11 species, and the newest (2004) – 15 ones. It seems that after almost 10 years of efforts and mistakes, the composition of protected dragonflies has been competently fixed. It covers: non-threatened species or little threatened ones (their protection is associated with the ratification of the Bern Convention by Poland in 1995 as well as the acceptance of the EU-Habitat Directive in 2004) and really endangered (of the highest threat categories on the Red List of Threatened Animals in Poland). The authors analyse the practical dimension of species protection. Its up-to-date very restrictive legal construction derives from vertebrate and vascular plant protection. It can hinder the conducting of scientific research and cause conflicts with forest services." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska Univ., Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8575. Buczyński, P. (2005): Why *Odonatrix*? *Odonatrix* 1(1): 1. (in Polish, with English summary) [*Odonatrix* is the bulletin of the Odonatological Section of the Pol-

ish Entomological Society (PTE). It is launched twice a year, in January and July, and presents information on recent events of the section as well as Polish and world-wide odonatology, announcements and discussions of scientific conferences, comments on odonological literature, short reviews and popular scientific texts as well as faunistic notes. The bulletin is also available as a PDF-file in the Internet. It is written in Polish, with English abstracts.] Address: Buczyński, P., Dept Zool., Maria Curie-Skłodowska Univ., Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8576. Buczyński, P. (2005): Polish and dedicated to Poland odonological papers published in the 1st half of the year 2005 and additions to the year 2004. *Odonatrix* 1(2): 38-40. (in Polish, with English summary) [Update of the Polish odonological bibliography.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8577. Buczyński, P. (2005): List of Polish odonatologists and dragonfly fans. *Odonatrix* 1(1): 7-8. (in Polish, with English summary) [27 people are listed. Their postal and e-mail addresses are given.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8578. Buczyński, P. (2005): The 2nd National Symposium of Odonatology, Urszulin, May 21-23, 2004. *Odonatrix* 1(1): 8-10. (in Polish, with English summary) [15 odonatologists from Poland, the Ukraine and Czech Republic participated the symposium, that was held in the Poleski National Park, Poland within the framework of the conference "Studies on dragonflies, beetles and caddisflies within protected areas". 12 reports and 14 posters were presented. These covered methods of odonological studies, situation of dragonflies in Poland and neighbouring countries as well as dragonfly protection, composition and status of the faunas of particular areas (mainly protected ones) and some problems connected with taxonomy and biology of dragonflies.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8579. Buczyński, P. (2005): Polish and dedicated to Poland odonological papers published in the year 2004. *Odonatrix* 1(1): 14-17. (in Polish) [46 papers are considered.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8580. Buczyński, P.; Tończyk, G. (2005): Keys useful in identifying Polish dragonflies. Part 1. Imagines. *Odonatrix* 1(2): 33-36. (in Polish, with English summary) [Poland; "It was 2005 when the first national key to imagines was published, and the only key to larvae and exuviae still remains in the manuscript form. Thus the authors present the main, recently published and available keys, useful in studying national adult dragonflies. These are in most cases the keys included in monographs of European dragonflies as well as in the compilations of the faunas of neighbouring countries (Germany, the Ukraine, Czech Republic). Newly published atlas of the dragonflies of Switzerland was highly evaluated." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska Univ., Akademicka 19,

PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8581. Buczyński, P. (2005): Minutes of the meeting of the Odonatological Section of the PES in Urszulin. *Odonatrix* 1(1): 10-12. (in Polish, with English summary) ["The meeting was held on May 22, 2004, with 16 people participating in. New governing authorities were chosen and the forms of the activities of the Section were discussed, e.g. „The atlas of distribution of dragonflies (Odonata) in Poland” project as well as other desirable trends in dragonfly research in Poland." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8582. Butler, R.G.; deMaynadier, P.G.; Tomlinson, M.; Robbins, H.; Long, P.; Marenberg, A. (2005): Northeast range extension and observations of atypical "sash" of *Enallagma laterale* (New England Bluet) in Maine. *Argia* 17(3): 23-25. (in English) [*Enallagma laterale* (New England Bluet) is a globally rare damselfly species (G3 or vulnerable) that has been documented in eastern Pennsylvania, northern New Jersey, southeastern New York, Connecticut, Rhode Island, Massachusetts, southeastern New Hampshire, and in southwestern and coastal Maine, the northern extreme of its range. Previously the northern-most known location for this species was Tilton Pond in Fayette, Maine (Kennebec City: N 44.4563°, W 70.0722°), and the eastern-most site was Pitcher Pond in Lincolnville, Maine (Waldo City: N44.3361°, W 69.0498°). In Downeast, Maine on 16 June 2004, a new breeding location for *E. laterale* was discovered at Otter Pond in T24 MD BPP, ME (Washington City: N44.8244°, W 67.9324°). Approximately 105 km from the nearest known site to the southwest, this population currently represents the extreme northeastern known limit to the distribution of *E. laterale* in North America. The habitat is described, and the morphology of the terminal abdominal segments is discussed.] Address: deMaynadier, P.G., Endangered Species Group, Maine, Maine Department of Inland Fisheries and Wildlife, 650 State Street, Bangor, Maine 04401, USA. E-mail: phillip.demaynadier@maine.gov

8583. Catling, P.M.; Kostiuk, B. (2005): Post-conference field trip — DSA 2005. *Argia* 17(3): 11-12. (in English) [Ontario, Canada; 12-14-VII-2005; 58 species from several localities (manly rivers and bogs) could be added to the Ontario Odonata Database maintained by the Natural Heritage Information Centre.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

8584. Catling, P.M.; Kostiuk, B.; Lewis, C.; Bracken, B. (2005): Observations on local field trips collecting in the Arnprior area; Annual meeting of the Dragonfly Society of the Americas. *Argia* 17(3): 9-11. (in English) [10-11-VII-2005; 68 species at five localities in the Arnprior, Ontario, Canada area.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

8585. Cios, S. (2005): Trout preying on adult dragonflies. *Odonatrix* 1(1): 5-7. (in Polish, with English summary) ["In the stomach of a brown trout caught on 22.06.2001 in Lake Valkeisjarvi near Oulu (Finland) the author found 14 males of *Cordulia aenea* and 2 males of *Enallagma cyathigerum*. The fish fed close to the water surface, without jumping out of the water. The large number of adults in the diet and the fact that they

were solely males, results from falling on the water surface of victims of combats between territorial males. The author discusses also literature data on the proportion of sexes in adult Odonata and on the role of imagines as food of fish." (Author)] Address: Cios, S., ul. Stryjeńskich 6/4, 02-791 Warszawa, Poland. E-mail: tanislaw.cios@msz.gov.pl

8586. Cios, S. (2005): Further accounts of fish preying on adult Odonata. *Odonatrix* 1(2): 24-25. (in Polish, with English summary) ["... In the first case the angler observed big chub (*Leuciscus cephalus*) jumping out of the water (River Gwda in Poland) trying to catch male adults of *Calopteryx* perching on vegetation overhanging the water. He didn't see any successful attacks, but in the stomachs of caught fish he found some of these damselflies. The second account also concerns male adults of *Calopteryx*. In River Dosse near Berlin another angler has seen brown trout jump out of the water, in an effort to catch the males. This angler has also once found an adult of *Anax imperator* in the stomach of a brown trout caught in the River Nuthe near Berlin. The last account is taken from an angler's article published in Internet. The angler has seen brown trout in the River Lozoya (Castilia in Spain) jump out of the water, trying to catch damselflies (probably females of *Calopteryx haemorrhoidalis*) perching on vegetation overhanging the water." (Author)] Address: Cios, S., ul. Stryjeńskich 6/4, 02-791 Warszawa, Poland. E-mail: stanislaw.cios@msz.gov.pl

8587. De Brito, L.; Abillo, F.J.P.; Watanabe, T. (2005): Insetos aquáticos do acude São José dos Cordeiros (semi-árido Paraibano) com ênfase em Chironomidae. *Entomologia y Vectores* 12(2): 149-157. (in Portuguese, with English summary) [Brazil; the decrease in the Gomphidae abundance was correlated with the increase of organic matter in the sediment.] Address: De Brito, L., Depto Metodol. Educação. Univ. Fed. Paraíba, Rua Maria Rosa Padilha 84, Edif. Aeroville, Ap. 210, Bairro Bessa, 58037-260 João Pessoa, PB, Brazil

8588. Donnelly, N. (2005): Oceanic islands in the news - or - parthenogenesis means never having to remember Valentine's Day. *Argia* 17(3): 31-32. (in English) [The author refers to the work of Adolf Cordero from Vigo University in Spain on the partenogenetic population of *Ischnura hastata* on the Azores, and discusses impacts of natural catastrophes like hurricanes or volcanic eruptions on island faunas and the possibilities resp. biological strategies to recover from such tragedies. The author also discusses the qualities of a good coloniser such as *I. hastata* (laying eggs in wide range of tiny fresh water habitats, low pressure from predators).] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

8589. Dragonfly Society of the Americas (2005): *Argia* Vol. 17, No. 3, 1 October 2005. *Argia* 17(3): (in English) [In This Issue: 1-2; Nancy Adams (1958 – 2005), by Oliver Flint: 2-3; In Grateful Appreciation, by Carl Cook: 3; Welcome to Kentucky in June 2006, by Carl Cook & Ellis Lauder milk: 3-4; 2006 Southeastern DSA Meeting, by George L. Harp: 4; Northeast DSA Meeting, 2006: 4; Springtime in Tallahassee, Florida, 2006, by Jerrell J. Daigle: 4; Yahoo Yazo!, by Steve & Mary Jane Krotzer: 5; Bigger is better at Northeast DSA Meeting, by Bryan Pfeiffer: 5-7; North to Arnprior — The DSA 2005 Annual Meeting, by Roy Beckemeyer: 7-9; 2004 – 2005 DSA

Financial Report, by Jerrell Daigle:13; DSA Business Meeting Minutes, 2005, by Sid Dunkle: 13-14; Report of first field foray of the newly formed Dragonfly Society of Missouri, 10 – 12 June 2005, by Paul M. McKenzie: 14; The fourth Hine's Emerald dragonfly workshop, St. Ignace, Michigan, or show me your hiney!, by Mark O'Brien:15-17; Aeshna Sierra Ware Huff (26 March 2005), by Mike May: 38.] Address: DSA c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., Univ. Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

8590. Geiger, W.; Alcorlo, P.; Baltanas, A.; Montes, C. (2005): Impact of an introduced Crustacean on the trophic webs of Mediterranean wetlands. *Biological Invasions* 7: 49-73. (in English) ["Based on a review and our own data, we present an overview of the ecological impacts on the trophic web of Mediterranean wetlands by an introduced Decapod Crustacean, the red swamp crayfish (*Procambarus clarkii*). *P. clarkii* lacks efficient dispersal mechanisms but is very well adapted to the ecological conditions of Mediterranean wetlands (fluctuating hydroperiods with regular intervals of drought). As an opportunistic, omnivorous species, which adapts its ecology and life history characteristics, such as timing and size at reproduction to changing environmental conditions, it became readily established in most of the Mediterranean wetland environments. High reproductive output, short development time and a flexible feeding strategy are responsible for its success as an invader. Like most crayfish, it occupies a keystone position in the trophic web of the invaded system and interacts strongly with various trophic levels. It efficiently grazes on macrophytes and is one of the main factors, besides the impact of flamingos, cattle and introduced fish, of the change of many water bodies from a macrophyte dominated, clear water equilibrium to a phytoplankton driven turbid water balance. Juveniles feed on protein rich animal food with the corresponding impact on the macroinvertebrate community in competition with other crayfish or fish species. At the same time, it serves as a prey for mammals, birds and fish. Due to its predatory and grazing activity, it efficiently canalises energy pathways reducing food web complexity and structure. Feeding also on detritus it opens, especially in marshlands, the detritic food chain to higher trophic levels which results in an increase of crayfish predators. As a vector of diseases, it has a severe impact on the preservation and reintroduction of native crayfish. *P. clarkii* accumulates heavy metals and other pollutants in its organs and body tissues and transmits them to higher trophic levels. Due to the long history of its presence, the complex interactions it established within the invaded ecosystems and the socio-economic benefits it provides to humans, prevention and control seem the most promising management measures to reduce the negative impact of this crayfish species." (Authors) Odonata rarely were represented in crayfish traps.] Address: Geiger, W., Departamento de Ecología, Universidad Autónoma de Madrid, 28049 Madrid, Spain. E-mail: walter.geiger@uam.es

8591. Hutchings, G.E.; Halstead, D.A. (2005): Southern boreal forest observations for *Somatochlora williamsoni*: is its range extending northward? *Argia* 17(3): 41. (in English) [12-VII-2005, *S. williamsoni* adults were encountered in large numbers west of Stanley Mission in the Churchill River region of north central Saskatchewan, Canada.] Address: Hutchings, G.E., 971 Arun-

del Dr., Victoria, B.C., Canada, V9A-2C4. E-mail: seatrek@islandnet.com

8592. Kawartha Highlands Signature Site (2005): Kawartha Highlands Signature Site. Management Plan. Background Information. ISBN 0-7794-9039-8 (Print): 104 pp. (in English) [74 species of Odonata are known to have been recorded from Kawartha Highlands or from within 3 km of the boundary, representing 45 per cent and 77 per cent of the species known to occur in Ontario and Peterborough County respectively (Catling & Brownell, 2000; Jones, 1999b). The Kawartha Highlands Odonata checklist has been compiled from 746 dragonfly and damselfly records. Of the records, 486 were field observations made during 2000 fieldwork. The remaining 260 records were obtained from the Atlas of Ontario Odonata database (OOD, 2001). No species details are given.] Address: Kawartha Highlands Signature Site Park, P.O. Box 500, 106 Monck Street, Bancroft, ON K0L 1C0, Canada

8593. Larsen, R. (2005): Navajo word for dragonfly. *Argia* 17(3): 41. (in English) ["Robert Larsen recently circulated a list of Odonata from the Navajo Nation homeland. In this he reveals that on the Navajo homeland ("Dine'Tah"), odonates are called "Tani-l'ai".] Address: not stated

8594. Lee, Y.-F.; Mccracken, G.F. (2005): Dietary variation of Brazilian Free-tailed bats links to migratory populations of pest insects. *Journal of Mammalogy* 86(1): 67-76. (in English) ["We examined food habits of Brazilian free-tailed bats (*Tadarida brasiliensis*) at 3 colonies in central Texas over 3 summers. Fecal samples collected from 1,550 bats contained remains of 12 orders and 35 families of insects, documenting the most diverse diet ever reported in insect-eating bats. Daily and seasonal patterns of insect consumption were similar at the 3 sites and closely correlated to patterns of emergence, migration, and availability of adult populations of corn earworms *Helicoverpa zea* and fall armyworms *Spodoptera frugiperda*, both species of noctuid moths and major crop pests. The percentage of feces volume comprised by moth remains increased from 14.8% \pm 2.1 SE (range: 6.3–43.7%) to 43.0% \pm 7.1 (range: 1.7–73.5%) in samples collected at midnight versus dawn on days when large influxes of migratory moths arrived in Texas in early morning, following their massive emergence from northern Mexico. Daily patterns diminished later in the season, after moth populations became established in local crops and were available in large numbers throughout night. Moth consumption decreased in both evening and dawn feeding periods when crops senesced and moth populations declined. These and other data suggest that crop pests comprise a substantial portion of the bats' diet and that bats provide valuable natural pest control services." (Authors) Odonata represented 0.2% to the diet items of *T. brasiliensis*.] Address: Lee, Y.-F., Dept Life Sciences & Inst. Biodiversity, National Cheng Kung Univ., Tainan 701, Taiwan

8595. Matthews, J.H. (2005): Long-distance migration and emergence patterns in *Anax junius*: review of work to date. *Argia* 17(3): 29-30. (in English) [The author refers current knowledge on the bimodal emergence pattern in *A. junius* (residents/overwintering population in late spring/summer, while migrants emergence in later summer/autumn), records of (rare) overwintering larvae at the northern range limit of the species distribu-

tion (in Canada), and migration events of the species. He outlines his own attempts to get additional information on the migration system of *A. junius* (running dissertation).] Address: Matthews, J.H., USGS/Oregon State University, 541/738-0386, USA. E-mail: johoma@gmail.com

8596. McKenzie, P.M.; Vogt, T.E. (2005): Observations of Hine's Emerald Dragonfly (*Somatochlora hineana*) in Missouri between 1999 and 2004. *Argia* 17(3): 17-21. (in English) [The paper gives detailed information on ecology, biology and distribution of the species in Missouri, USA, and introduces into the methodology to prove the different stages of the species. Between 2001 and 2004 approximately 93 sites were examined in 23 counties throughout the state, and resulting in 19 new records of the species in Missouri. The vast majority of sites searched were within the Ozark Highlands Ecoregion, which has the largest concentration of fens in the state.] Address: Vogt, T.E., 207 West Summer Street, Hillsboro, IL 62049, USA

8597. Mielewczyk, S. (2005): Origins of the words *ważka*, *Libellula*, *Odonata*. *Odonatrix* 1(2): 25. (in Polish, with English summary) ["The first vernacular name of Odonata in Poland was *panna* (demoiselle, miss), which has been quickly replaced by the word *ważka* (a very small libra)."] (Author)]

8598. Nakamura, S.; Matsuda, S. (2005): The Insects in the riversides of Takatsu River, Shimane Prefecture, a result of survey in 2000. *Bull. Hoshizaki Green Found.* 8: 99-172. (in Japanese, with English summary) [Japan; 51 Odonata species are listed with location and day of capture dates.] Address: Nakamura, S., Nishihon-machi, 1-7-7, Shobara, Hiroshima Pref. 727-0013, Japan

8599. O'Brien, M. (2005): *Hagenius brevistylus* larva with attached Zebra mussels, Photo by P. Myer. *Argia* 17(3): 32-33. (in English) [Author and editor of *Argia* contribute some cases of mussel epizoon on *Hagenius brevistylus*, *Dromogomphus spinosus* and *Epithea princeps*. Detrimental effects of mussel load on mobility, hunting success and emergence of larvae are discussed.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

8600. Paulson, D. (2005): Northern Bluet separated from its Eurasian relative and assigned a new species name. *Argia* 17(3): 28-29. (in English) [Turgeon et al (2005): Simultaneous quaternary radiations of three damselfly clades across the Holarctic. *American Naturalist* 165: E78 – E107 show, that new world populations previously considered as *Enallagma cyathigerum* must be recognized as a separate species, which receives the name *Enallagma annexum* (Hagen 1861). The common name remains Northern Bluet.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8601. Paulson, D. (2005): *Anax concolor*, a new species for the United States. *Argia* 17(3): 26-27. (in English) [5-VI-2005, Santa Ana National Wildlife Refuge, Hidalgo County, Texas, USA.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8602. Paulson, D. (2005): Common names for two species new to the United States. *Argia* 17(3): 38. (in English) [*Leptobasis melinogaster* González 2002 -

Cream-tipped Swampdamself; *Anax concolor* Brauer 1865 - Blue-spotted Comet Darner] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8603. Rehn, A.; Furth, D. (2005): Rediscovery of a lost dragonfly collection and the holotype of *Tanypteryx hageni* (Selys) - or - *Tanypteryx* meets sasquatch: The Perry Turner story. *Argia* 17(3): 34-37. (in English) ["The fate of Perry Edward Turner, Jr. remains a mystery." Turner was a somewhat obscure American odonatologist with special interest in Petaluridae. Many institutions and private persons borrowed specimens (or additional information) to Turner, material which never was returned. By chance, Turner's rebate was discovered. The fascinating story of inspecting the rebate and to get access to it, is told in some extend. In the end, much of the material that Turner had borrowed was recovered and returned to the appropriate institutions.] Address: Rehn, A., 2817 G Street, #1, Sacramento, CA 95816, USA

8604. SaintOurs, F. (2005): Monponsett disaster. *Argia* 17(3): 33-34. (in English) [The use of the herbicide Sonar in a suburban water body with unnaturally high nutrient loads (Monponsett Pond in southeastern Massachusetts, USA, a popular recreational pond for fishermen, motor boaters, and jet skiers), caused the complete domination of one of the most common lentic species (*Pachydiplax longipennis*) in USA in the lotic system of the outlet stream of the west pond. Calopteryx, Didymops, and Cordulegaster had disappeared.] Address: SaintOurs, F., Dept of Biology, Univ. of Massachusetts Boston, USA. E-mail: fred.saintours@umb.edu

8605. Steele, M.; Daigle, J.J. (2005): New Stewart County, Tennessee records. *Argia* 17(3): 28. (in English) [2003 and 2005, 34 species were recorded at the pond and creek on the "Triple J Ranch", Stewart County, Tennessee, USA. "The presence of *Dythemis velox*, a species common in dry Texas country, is interesting in that it may be expanding its range towards the Northeast."] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

8606. Tończyk, G. (2005): Database of Polish odonatalogical literature. *Odonatrix* 1(2): 29-30. (in Polish, with English summary) ["The announcement for odonatologists writing about the dragonflies of Poland. Works on the base of Polish and referring to Poland literature have begun. The base will be available in electronic form. Every paper will be provided with short note on the subject and a study area. The list of papers will be constructed in two versions: chronological and alphabetical one. Detailed information on the taken initiative can be received from Grzegorz Tończyk (tonczyk@biol.uni.lodz.pl)."] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk@biol.uni.lodz.pl

8607. Tończyk, G. (2005): Odonatological Section of the Polish Entomological Society. *Odonatrix* 1(1): 1-3. (in Polish, with English summary) ["Short history of the origin of the Odonatological Section of Polish Entomological Society. The Section started its activity on April 18, 1998. The make-up of previous governing body (chairman: S. Mielewicz, secretary: P. Buczyński) and current one (chairman: P. Buczyński, secretary: G. Tończyk). Information about taken up projects by the

Section: „The atlas of distribution of dragonflies (Odonata) in Poland”, WWW-page, electronic data base of Polish odonatalogical literature, editing of the bulletin *Odonatrix*." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk@biol.uni.lodz.pl

8608. Tończyk, G. (2005): The atlas of distribution of dragonflies (Odonata) in Poland – we have just started to collect data! *Odonatrix* 1(1): 12-13. (in Polish, with English summary) [The action of data collecting for "The atlas of distribution of dragonflies (Odonata) in Poland" has started. This project of collective authorship (R. Bernard, P. Buczyński, G. Tończyk, A. Łabędzki, S. Mielewicz and J. Wendzonka) is going to be a summary of the knowledge on the distribution of the dragonflies recorded in Poland. The presentation of collected data is planned till the end of 2008. The initiative has been directed to people involved in entomology as well as to amateurs.] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i hydrobiologii, Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk@biol.uni.lodz.pl

8609. Tończyk, G. (2005): The observations of the foraging of Hawkers (*Aeshna* spp.) in the urban conditions. *Odonatrix* 1(2): 26-27. (in Polish, with English summary) ["During the research on odonofauna of Łódź city conducted in the years 2002-2004 the foraging of Hawkers (*A. cyanea*, *A. mixta* and *A. grandis*) in the area of urban compact development was observed very often. In late summer and early autumn periods Hawkers forage regularly along walls with southern exposition, strongly heating up during the day. Numerous insects, taking advantage on specific microclimatic conditions, gather willingly by such walls." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk@biol.uni.lodz.pl

8610. Vogt, T.E.; McKenzie, P.M. (2005): New Zygotera state records for Missouri: *Telebasis byersi* and *Telebasis salva*. *Argia* 17(3): 22-23. (in English) [Telebasis byersi, 1-IX-2004, in a baldcypress (*Taxodium distichum*) swamp at Big Oak Tree State Park, Mississippi County, Missouri, USA. *Telebasis salva*, 11-VIII-1963, Jasper County, Missouri, USA, no further data were available.] Address: Vogt, T.E., 207 West Summer Street, Hillsboro, IL 62049, USA

8611. Worthen, W.B. (2005): Odonata survey of Paris Mountain State Park and Jones Gap State Park, Greenville County, South Carolina. *Argia* 17(3): 27-28. (in English) [USA; Paris Mountain State Park: 22 species; Jones Gap State Park: 17 species.] Address: Worthen, W.B., Dept Biology, Furman Univ., Greenville, SC 29613, USA. E-mail: worthen@furman.edu

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8612. Albertoni, E.F.; Palma-Silva, C. (2006): Macroinvertebrates associated with floating macrophytes in urban channels (Balneário Cassino, Rio Grande, RS, Brazil). *Neotropical Biology and Conservation* 11(2): 90-100. (in Portuguese, with English summary) ["The Bal-

neario Cassino is located at south coastal plain of Rio Grande do Sul State. It has channels to pluvial running in all of its extension, with dense stands of floating macrophytes. The aim of this study was to characterize macroinvertebrates associated with these macrophytes, which were sampled in five sampling points (P1 *Pistia stratiotes*; P2 *Spirodela intermedia*; P3 *Eichhornia crassipes*; P4 *Salvinia minima* and P5 *Eichhornia crassipes*), monthly, with a net (500 μ m mesh size) in triplicates, between March 2000 and February 2001. The macrophytes were washed on 500 μ m mesh size sieve, the retained material preserved in 80 % alcohol and then separated at stereomicroscope. The plants were dried (60°C) to obtain the dry weight. At each point dissolved oxygen, temperature, pH and electric conductivity, and nutrient (P and N) concentrations were measured. The associated community was assessed with taxa abundance and occurrence, and calculated the Shannon-Wiener diversity index and homogeneity (Jf, Pielou). The Dice-Sorensen similarity among plants was estimated. *Eichhornia crassipes* (P5) had the highest relative density (116,723.61 org. 100g DW⁻¹) and the higher taxa number (46). In all plant species Chironomidae (Diptera), Oligochaeta and Copepoda predominated in abundance and density. The associated community showed high similarity among macrophyte species, with significant difference in Hf ($p < 0.05$), varying between 2.51 (*E. crassipes* P3 in spring) and 0.98 (*S. minima* P4 in summer). Low concentration of dissolved oxygen (between 1.4 and 7.6 mg.L⁻¹) and high nutrient concentration (total-P between 0.01 and 4.81 mg.L⁻¹, and total-N between 0.35 and 14.94 mg.L⁻¹) suggesting an eutrophication process in these channels, mainly during summer months, when increased population and domestic sewage contribution to this systems. This process is reflected by macroinvertebrate community, by the predominant groups, and indicates the deterioration of water quality of these channels." (Authors) Odonata are treated at the family level.] Address: Albertoni, E.F.; Laboratório de Ecologia e Limnologia, Depto de Ciências Morfobiológicas, Fundação Universidade Federal do Rio Grande (FURG), Avenida Itália, km 8, Caixa Postal 474, Rio Grande, RS, 96.201-900, Brasil. E-mail: dmbefa@furg.br

8613. Bailowitz, R.; Stevens, L. (2006): *Argia hinei* in Utah. *Argia* 17(4): 21. (in English) ["*A. hinei* is one of these tropically-rooted species, extending into the United States only in Arizona, southern California, southern Nevada, southern New Mexico, and western Texas." Now, the species was recorded at Bowns Canyon, a tributary to Lake Powell in Utah, USA, on 21-VII-2004.] Address: Stevens, L.E., Museum of Northern Arizona, 3101 N. Ft. Valley Rd, Flagstaff, AZ 86001, USA. E-mail: farvana@aol.com

8614. Bailowitz, R. (2006): Marl Pennant (*Macrodiplosis balteata*) in Nevada. *Argia* 17(4): 22. (in English) [8-VII-2005, group of ponds in extreme northwestern Arizona, Mohave County, USA.]

8615. Beckemeyer, R. (2006): Talking about dragonflies — Spreading the word. *Argia* 17(4): 24-25. (in English) [The author gives some didactical advise on how to do talks about Odonata.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

8616. Bernard, R.; Buczyński, P.; Tończyk, G. (2006): Dr Stefan Mielewicz (4 II 1933 – 12 VIII 2005). *Odo-*

natrix 2(1): 2-8. (in Polish, with English summary) [Obituary: "A biography and a profile of Dr S. Mielewicz, an excellent Polish hydroentomologist, are presented with special attention paid to his odonatological achievements. A complete list of his 76 publications (57 original) to a various extent related to Odonata or odonatology is enclosed." (Authors)] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

8617. Bernard, R. (2006): 4th WDA International Symposium of Odonatology, Pontevedra (Spain), 26-30 July 2005 – a report. *Odonatrix* 2(1): 21-22. (in Polish, with English summary) [The author's report focuses on most interesting events, papers and posters from a personal view.] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

8618. Blust, M. (2006): What a day! *Argia* 17(4): 4-5. (in English) [21-VI-2005, Vermont, USA; *Enallagma laterale*, *Nasiaeschna pentacantha*, *Epiaeschna heros* and *Rhionaeschna mutata*, new state records. Later this summer *Gomphus abbreviatus* and *Stylurus amnicola* also could be added to the Vermont list of Odonata.] Address: Blust, M., The University of the State of New York, The State Education Department, Albany, NY 12230, USA

8619. Braccia, A.; Voshell, J.R. (2006): Benthic macroinvertebrate fauna in small streams used by cattle in the Blue Ridge Mountains, Virginia. *Northeastern Naturalist* 13(2): 269-286. (in English) ["Cattle production is a common land use, and the adverse effects of cattle grazing on stream habitat and macroinvertebrates has been well documented. The purpose of our study was to provide a list of taxa that can be expected to occur in small streams impacted by cattle in the southern Blue Ridge Mountains and to demonstrate how taxon-specific natural history information can be used to gain insight about benthic habitat condition. We identified 97 benthic macroinvertebrate taxa (including *Cordulegaster*, *Gomphus*, *Lanthus*, and *Stylogomphus albistylus*) from five cattle-impacted streams that differed in cattle grazing intensity. Our findings suggest that some macroinvertebrate taxa can sustain low levels of cattle grazing and that sedimentation is a major stressor to the macroinvertebrate fauna." (Authors)] Address: Braccia, Amy, Department of Entomology. Blacksburg, Virginia, USA; E-Mail rvoshell@vt.edu

8620. Bridgehouse, D.W. (2006): Significant range extension for *Somatochlora brevicincta* (Quebec Emerald) in Nova Scotia. *Argia* 17(4): 19-20. (in English) [2-IX- 2005, at a small roadside pond at West Porters Lake, Halifax County, Nova Scotia, Canada. This record represents a further range increase to ca. 1,550 km from the type locale, and is the most southern locale for the species at ca. 44.73°N.] Address: Bridgehouse, Derek. E-mail: d.bridgehouse@ns.sympatico.ca

8621. Buczyński, P. (2006): 25. annual meeting of the Society of German-Speaking Odonatologists (GdO), Essen (Germany), March 17-19, 2006. *Odonatrix* 2(2): 44-46. (in Polish, with English summary) [Report on the GdO-meeting with particular attention paid to some speeches concerning ecology and protection of dragonflies.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

- 8622.** Buczyński, P. (2006): Corbet's monograph: a "bible" for odonatologists. *Odonatrix* 2(1): 25-26. (in Polish, with English summary) [Book review: "The monograph by Corbet (1999, 2004) is estimated as the most important and very useful world-wide elaboration of the biology and ecology of dragonflies." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8623.** Buczyński, P. (2006): Polish and dedicated to Poland odonatological papers published in the 2nd half of the year 2005 and additions to the 1st half of this year and for the year 2004. *Odonatrix* 2(1): 27-29. (in Polish, with English summary) [Update of the Polish odonatological bibliography.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8624.** Buczyński, P.; Tonczyk, G. (2006): Keys useful in identifying Polish dragonflies. Part 2. Larvae and exuviae. *Odonatrix* 2(1): 22-25. (in Polish, with English summary) ["The most important literature useful in determining of larvae and exuviae of Polish dragonflies are reviewed and evaluated. The authors describe the newest publications first of all, but some older keys are mentioned that are important due to historical or didactical reasons." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8625.** Buczyński, P. (2006): Worth to know, worth to have: the monograph of European Calopterygidae. *Odonatrix* 2(1): 26-27. (in Polish, with English summary) [Book review: "The book analysed is appreciated as a highly valuable synthesis of data about European demoiselles. Especially worth of attention is a very extensive and competent part concerning the behavioural and evolutionary biology. Some remarks on the whole series "Die Libellen Europas" "(The dragonflies of Europe") are given." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8626.** Buczyński, P. (2006): Polish and dedicated to Poland odonatological papers published in the 1st half of the year 2006 and additions to the year 2005. *Odonatrix* 2(2): 47. (in Polish, with English summary) [Update of the Polish odonatological bibliography.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8627.** Cannings, R.A.; Catling, P.M.; Brunelle, P.M. (2006): An annotated checklist of the Odonata of Canada update — November 2005. *Argia* 17(4): 26-28. (in English) [New records and status changes for *Somatochlora williamsoni* in Saskatchewan, and six new records of *Arigomphus villosipes* in Ontario are referred. „North American populations of the Northern Bluet, previously *Enallagma cyathigerum* (Charpentier), are now to be called *Enallagma annexum* (Hagen) as outlined by Turgeon et al., and by Paulson (see below). The name *cyathigerum* is correctly applied to old world populations. *Leucorrhinia proxima* has the pale areas red and is truly the Red-waisted Whiteface in much of the west, but is pale yellow on the waist and elsewhere in much of the east (e.g. Donnelly 2004b). This interesting pattern of variation deserves more study." A list of new and important publications is also added to the paper.] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca
- 8628.** Cannings, R.A.; Catling, P.M.; Brunelle, P.M. (2006): New subspecific status for *Macromia rickeri* Walker. *Argia* 17(4): 23. (in English) ["Recently, *M. rickeri* Walker (1937, see also Walker & Corbet 1975) has been treated as a synonym of *M. magnifica* (e.g. Needham et al. 2000, Cannings 2002); Dunkle (2000) called it the "northern form" of the species. We believe it is best treated as a subspecies. Although identical structurally to *M. m. magnifica*, subspecies *M. m. rickeri* is a dark-coloured form endemic to southern British Columbia, Canada." (Authors)] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca
- 8629.** Cano Villegas, J.J.; Muñoz Vallés, S. (2006): Nueva cita de "*Coenagrion mercuriale*" (Charpentier, 1840) en el Parque Natural Sierra Norte (Sevilla, España) (INSECTA: ODONATA). *Boletín de la Sociedad Andaluza de Entomología* 14: 13-19. (in Spanish, with English summary) [11-VI-2006, *Coenagrion mercuriale* was found in the Sierra Norte Natural Park (Seville, Spain). At the same date, *Calopteryx xanthostoma* was firstly recorded in the province of Seville.] Address: Cano Villegas, F.J., Departamento de Sistemas Físicos, Químicos y Naturales, Área de Zoología, Universidad Pablo de Olavide, 41013 Sevilla, Spain. E-mail: ficanovil@wanadoo.es
- 8630.** Casey, R.E.; Simon, J.A.; Atueyi, S.; Snodgrass, J.W.; Karouna-Renier N.; Sparling, D.W. (2006): Temporal trends of trace metals in sediment and invertebrates from stormwater management ponds. *Water Air Soil Pollution* 178: 69-77. (in English) ["Stormwater ponds are an increasingly common feature in urban landscapes. Because these ponds retain runoff and particulate-bound contaminants from impervious surfaces, organisms inhabiting stormwater ponds may be exposed to elevated metal levels in sediments. This study evaluated temporal changes in sediment and macroinvertebrate Cu, Pb and Zn over an eleven-year period with specific attention to land use in pond watersheds. Sediment and invertebrate metal levels were quantified using atomic absorption spectrophotometry (1993 samples) or inductively coupled plasma mass spectrometry (2003–2004 samples). Sediment trace element levels did not significantly change from 1993 to 2003-2004 with the exception of Zn in ponds receiving runoff from highways, which increased from a mean of 32 mg kg⁻¹ in 1993 to 344 mg kg⁻¹ in 2003–2004. Sediment Pb and Cu generally remained below published threshold effects concentrations (TEC) except for two instances of elevated Cu in 2003–2004. Zn remained below the TEC in 1993 but exceeded the TEC in six ponds in 2003–2004. Trace metal body burdens varied among invertebrate groups, and to a lesser extent among land uses, but in both cases this variation was a function of year. In general, trace element body burdens were more similar among invertebrate groups or land use or both during 2003–2004 when compared to levels in 1993. Our results suggest sediment and invertebrate trace metal levels are at steady state in these stormwater management ponds and that risk to organisms in-

habiting these ponds does not vary as a function of pond age. [...] In general, Cu, Pb and Zn levels were lowest among odonates, composite samples and molluscs, respectively." (Authors) Address: Casey, R.E., Department of Chemistry, Towson University, 8000 York Rd., Towson, MD 21252-0001, USA. E-mail: racasey@towson.edu

8631. Craves, J. (2006): Odonata in central Panama. *Argia* 17(4): 15-16. (in English) [Report from a ten-day field trip in August 2005 to Panama.] Address: not stated

8632. Dragonfly Society of the Americas (2006): *Argia* Vol. 17, No. 4. *Argia* 17(4): (in English) [In This Issue: 1-2; A Message from the President, by Steve Krotzer: 2-3; Calendar of Events: 3; DSA Kentucky Bound in 2006! by Carl Cook and Ellis Lauder milk, 3-4; Northeast Regional Meeting of the DSA, Twin Mountain, New Hampshire, 22 – 25 June 2006, by Pam Hunt: 4; Catling, P.M. 2006 Zebra mussels on dragonfly larvae — from Ontario *Argia* 17(4) 25 (reprinted from Ontario Odonata vol. 6. 2005); DSA National Meeting Sites Committee, by Daigle, J.J.: 26; Meeting of Ohio Odonata Society: 28; Errata for an annotated checklist of the Odonata of Canada: 28; Tidbits from the IORI, by Bill Mauffray: 29; Proposed Revisions to the Bylaws of the Dragonfly Society of the Americas: 29-31.] Address: DSA c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

8633. Ehmman, H. (2006): Libellenfunde im Bundesland Salzburg 2000-2005 (Insecta: Odonata). Mitteilungen aus dem Haus der Natur XVII: 91-117. (in German, with English summary) [During 2000-2005, a total of 54 odonate species was recorded in the province of Salzburg, Austria. Collection data are presented in detail.] Address: Ehmman, H., Hirschenhöhrstr. 25, A-5450 Werfen, Austria

8634. Gordon, S.; Kerst, C. (2006): 2005 Aeshna Blitz — the best ever. *Argia* 17(4): 10-12. (in English) [Oregon, USA; brief report on collecting Odonata in ? 2005. A total of 42 species (some are outlined) were recorded. A female *Aeshna constricta* (new Klamath Co. record) is the second record for this species in Oregon since 1929.] Address: Kerst, C. E-mail: caryk@comcast.net

8635. Grimes, B. (2006): Robber fly predation on dragonfly. *Argia* 17(4): 26. (in English) [Henry County, Virginia, USA, City of Martinsville Reservoir on 15-VII-2005; *Perithemis tenera* was preyed by a robber fly (species unknown).] Address: not stated

8636. Gros, P. (2006): Ausbreitung der westlichen Keiljungfer *Gomphus pulchellus* Selys, 1840 in Zentral-europa: erster Nachweis dieser Art im Bundesland Salzburg, Österreich (Odonata: Gomphidae). Mitteilungen aus dem Haus der Natur 17: 118-121. (in German, with English summary) [*G. pulchellus* is newly reported for the fauna of the county of Salzburg, Austria. Details of this discovery are given, typical features of this dragonfly are described.] Address: Gros, P., Haus der Natur, Museumsplatz 5, 5020 Salzburg, Austria. E-mail: patrick.gros@hausdernatur.at

8637. Harp, G.; Robinson, (2006): Aquatic macroinvertebrates of the Strawberry River system in north-central Arkansas. *Journal of the Arkansas Academy of*

Science 60: 46-61. (in English) [USA; "The Strawberry River has been designated an Extraordinary Resource Water, an Ecologically Sensitive Water Body, and a Natural and Scenic Waterway. As such, it is particularly important that the biodiversity of this river system be documented thoroughly. The purpose of this research was to develop a comprehensive list of the aquatic macroinvertebrates of the Strawberry River and its major tributaries. The information was developed from a thorough literature review and by examining specimens housed in various collections of the Arkansas State University Museum of Zoology and collections of the authors. The latter included 9 collections at 4 sites along the mainstream and 17 collections from 8 tributaries. To date, 313 species of aquatic macroinvertebrates are known to occur in the Strawberry River system." (Authors) Odonata contribute with 50 taxa, in most cases identified to the species level, in some cases at the genus level. The taxa are listed locality wise.] Address: Harp, G., Department of Biological Sciences, Arkansas State University, State University, AR 72467, USA. E-mail: glharp@astate.edu

8638. Harp, G.L. (2006): The Shirey Bay Rainey Brake WMA BioBlitz. *Argia* 17(4): 12. (in English) [Shirey Bay Rainey Brake (SB/RB) Wildlife Management Area. Arkansas, USA, 9 – 10-V-2005. A total of 24 Odonata species was recorded. Less common species of the survey, at least in Arkansas, were *Lestes vigilax*, *Ischnura kellicotti*, and *Celithemis verna*.] Address: Harp, G.L. E-mail: glharp@astate.edu

8639. Harp, G.L. (2006): Dragonfly records from the Hiawatha National Forest, Michigan. *Argia* 17(4): 24. (in English) [USA; between 18–19-VII-2005, seven sites within this Forest were visited and 26 species recorded.] Address: Harp, G.L. E-mail: glharp@astate.edu

8640. Hummel, S. (2006): Mistaken identity. *Argia* 17(4): 19. (in English) [20-IX-2005, Ida Grove, Iowa, USA; attempt of mating between a male *Aeshna constricta* and a female *Anax junius*.] Address: Hummel, S., P.O. Box 121, Lake View, IA, 51450, USA. E-mail: mshummel@netins.net

8641. Hung, K.-y.; Lin, Y.-s.; Severinghaus, L.L. (2006): Comparison of three common methods for studying the diet of nestlings in two *Accipiter* species. *Zoological Studies* 45(2): 234-243. (in English) ["Food provisioning to 4 *Accipiter virgatus* nests and 2 *A. trivirgatus* nests was monitored during 1998 and 2000 in Yangmingshan National Park, Taipei, Taiwan. We made direct observations of prey deliveries and collected prey remains and pellets throughout the breeding seasons in order to compare the effectiveness and efficiency of the different diet analysis methods for these 2 raptor species. The method of using prey remains worked best for *A. virgatus* for all measurements, producing 45.23% of all prey items found, 45.23% of all prey items identified to prey taxa, and 38.87% of all prey items identified to species. The observation method worked best for *A. trivirgatus*, providing 41.05% of all prey items and 18.95% of prey items identified to species, but the proportion of prey items identified to prey taxa was highest using the pellet method (37.37%). Time efficiency was consistently the highest for the prey remains method in *A. virgatus*. In contrast, for *A. trivirgatus*, the pellet method was most efficient for assessing the number of prey items delivered and the number identified to prey taxa, but the prey remains method worked best for

identifying prey to species. Combining the prey remains and pellet methods increased the prey taxa identified to 81.63% for *A. virgatus* and 58.95% for *A. trivirgatus*. Although the value of direct observation has been stressed by many researchers, its effectiveness varied between these 2 species studied in Taiwan." (Authors) *A. virgatus* preyed upon *Anotogaster sieboldii*.] Address: Severinghaus, Lucia Lin, Research Center for Biodiversity, Academia Sinica, Taipei, Taiwan 11528, R.O.C. E-mail: zobbowl@gate.sinica.edu.tw

8642. Hutchings, G.E.; Halstead, D.A. (2006): Southern boreal forest observations of *Somatochlora williamsoni*: is their range extending northward? *Argia* 17(4): 20-21. (in English) [In July 2005, *S. williamsoni* adults were encountered in large numbers west of Stanley Mission at several locations in the Churchill River region of north central Saskatchewan, Canada.] Address: Halstead, D.A., University of Victoria, Victoria, B.C., Canada. E-mail: odonatas@uvic.ca

8643. Kunz, B.; Hunger, H. (2006): Phänologiedaten 2006 einiger Libellen aus Mitteleuropa. *mercuriale* 6: 42-46. (in German) [Phenology data and / or observations referring to voltinism are presented from localities in Germany and Switzerland.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunz.de

8644. Lagunov, A.V. (2006): Insect species from the Red Book of Russian Federation in the fauna of the Chelyabinsk district. An annotated list. Proceedings of the Chelyabinsk Scientific Center 4 (34): 96-100. (in Russian) [The list includes *Aeshna viridis*, *Leucorrhinia albifrons*, *L. caudalis*, and *Ophiogomphus cecilia*.] Address: Lagunov, A.V., Ilmensky state reserve, Ural branch of Russian Academy of Science, Miass, Russia. E-mail: lagunov@ilmeny.ac.ru

8645. Mielewczyk, S. (2006): Życiorys: Stefan Mielewczyk. *Odonatrix* 2(1): 1-2. (in Polish, with English summary) [Curriculum vitae; short autobiography of Dr. Stefan Mielewczyk (1933-2005)]

8646. Novak, P. (2006): New York dragonfly and damselfly survey: An update. *Argia* 17(4): 17-19. (in English) [Brief report on activities to prepare an Odonata survey and keep it running in New York, USA. A list of interesting records from 2005 field trips is added.] Address: Novak, P., New York Natural Heritage Program, NYSDEC, 625 Broadway, 5th Floor, Albany, NY 12233-4757, USA. E-mail: pgnovak@gw.dec.state.ny.us

8647. Odonatological Section of the Polish Entomological Society (2006): Statute of the Odonatological Section of the Polish Entomological Society. *Odonatrix* 2(1): 29-30. (in Polish, with English summary) [Published print version of the official document.] Address: c/o Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8648. Odonatological Section of the Polish Entomological Society (2006): Report on activities of the Odonatological Section of the Polish Entomological Society in 2005. *Odonatrix* 2(2): 50-52. (in Polish, with English summary) ["Annual report is presented that has been submitted to the Governing Board of the Polish Entomological Society. A discussion and constructive criticism of activities of the section are welcome." (Author)] Ad-

dress: c/o Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8649. O'Brien, M. (2006): *Archilestes grandis* in Michigan. *Argia* 17(4): 22. (in English) [Wayne County, Michigan, USA; without further data.] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfbrien@umich.edu

8650. Paulson, D. (2006): Dragonfly graveyards. *Argia* 17(4): 17. (in English) [The author describes a few observations on dead or dying *Enallagma* and *Somatochlora*-specimens. „Are these old individuals that don't have the strength to fly up ... Do dragonflies go to the water to die, or do they merely attempt to get a drink and get stuck?"] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8651. Paulson, D. (2006): *Gynacantha mexicana* at communal roost in south Texas. *Argia* 17(4): 5-6. (in English) [Santa Ana, Texas, USA; 9 – 12-XI-2005; „I was quite surprised, when I followed one flushed individual deeper into the low branches of a shrub thicket, to find it at a communal roost with a total of eight individuals, four males and four females, in a space of about a cubic meter and about a meter above the ground. Six were hanging under branches, and two were perched vertically on a good-sized tree trunk. Several individuals were almost touching other individuals. I saw one additional individual, so at least nine were present near one side of the pond.“] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8652. Pfeiffer, B.M. (2006): The dragonflies and damselflies of teal Farm, Huntington, Vermont, 2005. Prepared for Foundation for a Sustainable Future: 15 pp. (in English) [Survey work was concentrated at the two ponds sites, where Teal Farm's odonate diversity is greatest. No natural ponds occur on the land. This investigation revealed a total of 11 Zygoptera species and 26 Anisoptera species. These represent 26 % of the Vermont's known Zygoptera fauna and 27% of its Anisoptera fauna. Notable species are associated with watercourses: *Lanthus parvulus* and *Ophiogomphus carolus*.] Address: Pfeiffer, B., 113 Bartlett Rd, Plainfield VT, 05667, USA. E-mail: Bryan@VermontBirdTours.com

8653. Schlüpmann, M. (2006): Die Fauna einer bedrohten Kulturlandschaft in Hagen. *Dortmunder Beiträge zur Landeskunde. Naturwissenschaftliche Mitteilungen* 40: 59-96. (in German, with English summary) [Nordrhein-Westfalen, Germany; 13 odonate taxa are reported from two running waters and two artificial ponds. *Erythromma viridulum* is an addition to the regional fauna.] Address: Schlüpmann, M., Hierseier Weg 18, D-58119 Hagen, German. E-mail: martin-schlupe-mann@t-online.de

8654. Schneider, B. (2006): Herbstmosaikjungfer *Aeshna mixta* in den Klauen einer Wasserkäfer-Larve. *mercuriale* 6: 40. (in German) [Switzerland; on 15-VIII-2006, an ovipositioning female of *A. mixta* was attacked by a water beetle, probably *Cybister* sp.] Address: Schneider, B., Wolfbühlstr. 34a, CH-8408 Winterthur, Switzerland

- 8655.** Schneider, T. (2006): Die Libellenfauna an der Schmalen Sinn vor und nach Einbürgerung des Bibers (*Castor fiber albicus*). Beiträge zur Naturkunde in Ost-hessen 43: 61-74. (in German, with English summary) ["The odonata fauna of the trout region brook „Schmale Sinn" in the secondary chain of mountains in the south-east of Hessen (Central Germany) is poorly investigated. The introduction of the beaver at the end of the 80th in the last century resulted in changes in the environment with the creation of beaver ponds in this region. The analysis of the Odonata fauna in this region over a long period prior and after the introduction of the beaver revealed an increase of species from 19 before to 26 after the establishing of a stable beaver population. Not all of the changes of the Odonata fauna in this period were due to the creation of ponds by the beavers. The disappearance of one specie (*Orthetrum coerulescens*) was already established several years before the beaver was introduced. From 8 species new in the region, 2 (*Gomphus pulchellus*, *Aeshna mixta*) appeared at the same time at the beaver pond and at several other biotopes of the region. The introduction of the beaver in the trout region brook „Schmale Sinn" had no negative effects on the autochthonous Odonata fauna, in contrary the spectrum and abundance of species increased." (Author)] Address: Schneider, T., Arnold-Knoblach-Ring 76, 14109 Berlin/Wannsee, Germany. E-mail: karin.thomas.schneider@gmx.de
- 8656.** Sibley, F. (2006): Nebraska summer. *Argia* 17(4): 8-10. (in English) [Nebraska is one of most less studied Federal states in USA with respect to Odonata (850 county records for all of Nebraska.). In July 2005, "we hit 44 counties in the month adding over 600 county records to the Nebraska database. *Argia nahuana* (5 counties), *Nasiaeschna pentacantha* (2 counties), and *Stylurus plagiatus* were new for the state list."] Address: Sibley, F.C., The Conservation Agency, 6 Swinburne St., Jamestown, RI 02835, USA
- 8657.** Sibley, F.; Daigle, J.J. (2006): Return to Red October or Wilma chases Fred and Barney from paradise! *Argia* 17(4): 6-8. (in English) [Middle Torch Key, Florida, USA; records of *Nehalennia minuta*, *Lestes spumarius* and *Brachymesia herbida* are reported and discussed. *Remartinia secreta* is a new addition to the Odonata fauna of USA. A total of 23 species was recorded in October 2005. The problem of *Orthemis ferruginea* vs. *O. schmidti* is discussed.] Address: Sibley, F.C., The Conservation Agency, 6 Swinburne St., Jamestown, RI 02835, USA
- 8658.** Stephan, U. (2006): Nachweis von *Gomphus flavipes* (Asiatische Keiljungfer) am Rheinkanal bei Vogelgrun/Breisach. *mercuriale* 6: 9-11. (in German, with French summary) [A total of 62 *Stylurus flavipes exuviae* were collected in 2005 and 2006 along a flat sandy riverside of the Grand Canal d'Alsace near Vogelsheim, France, Departement Haut-Rhin.] Address: Stephan, Ulrike, Im Westengarten 12, 79241 Ihringen, Germany
- 8659.** Strickland, G.; Strickland, J. (2006): First record of *Gomphus australis* for Louisiana. *Argia* 17(4): 22. (in English) [Lake in St. Tammany Parish, Louisiana, USA, 15-IV-2005.] Address: Strickland, J., 1354 Brookhollow Drive, Baton Rouge, LA 70810, USA
- 8660.** Tennesen, K. (2006): Ecuador expedition V. *Argia* 17(4): 13-15. (in English) [Report on a field trip to Ecuador held between 11-22-IX-2005. The elusive *Archaepodagrion bicorne* was traced on 21 Sept. along Rio Anzu north of Mera. Drough resistance potential of *Uracis fastigiata* larvae is discussed.] Address: Tennesen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennesen@centurytel.net
- 8661.** Tończyk, G. (2006): Dragonflies (Odonata) of the City of Łódź - data from Ernst Koeppen's collection. *Odonatrix* 2(2): 39. (in Polish, with English summary) [Data from a small collection of dragonflies caught in Łódź by Ernst Koeppen in 1941 and 1942 are documented. Four Odonata species (*Lestes sponsa*, *Sympetrum danae*, *S. vulgatum*, *Ophiogomphus cecilia*) were found. These species are also present within the administrative borders of Łódź nowadays.] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk@biol.uni.lodz.pl
- 8662.** Tończyk, G. (2006): Odonatological notes from the vicinities of the Wigry Lake. *Odonatrix* 2(2): 40-42. (in Polish, with English summary) [Two week field trip in August 2005 to 10 localities situated in the Wigry National Park, Poland led to the record 26 species of Odonata. Most interesting species from a regional view are: *Anax parthenope*, *Erythromma viridulum* and *Sympetrum pedemontanum*.] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk@biol.uni.lodz.pl
- 8663.** Tończyk, G. (2006): Dragonflies (Odonata) recorded at the Puck Bay. *Odonatrix* 2(2): 42-44. (in Polish, with English summary) [Poland; 26-27-V-1998; 11 species were recorded of which *Coenagrion puella*, *Ischnura elegans*, *Erythromma najas*, *Enallagma cyathigerum* and *Orthetrum cancellatum* breed in salty waters of the Puck Bay.] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk@biol.uni.lodz.pl
- 8664.** Wasscher, M.T. (2006): Van NLO tot NVL, 35 jaar georganiseerde libellenstudie in Nederland. *Brachytron* 9(1/2): 21-32. ["Before 1970 some people in The Netherlands were studying dragonflies, but there was no higher organisation with newsletters and/or meetings. Since the start of the NLO on 7 March 1970, three periods of 'official' dragonfly activity can be recognised. These periods were separated by intervals of lesser activity, where no meetings were organised and few, if any, official newsletters were published. In those intervening periods, there were always youth federation members studying dragonflies, and those dragonfly lovers would then start the next period of official dragonfly study in The Netherlands. The first period commenced with the formation of the NLO during 1970, under the leadership of Bastiaan Kiauta. This period ended with the foundation of the international SIO in 1974. The second period lasted from 1979 to 1992 and was started by Marian Verdonk, with Marcel Wasscher gradually taking over her tasks. The final period, which is still on-going, started in 1994, though already in 1992 youth federation members of the NJN had started a 'Dragonfly Project' which would result in increased interest in dragonflies in The Netherlands. In 1997 both the NLO and the Dragonfly Project merged into a new

dragonfly organisation, the NVL. In 2002 the Dutch Atlas was published, a milestone in dragonfly study in The Netherlands. Over the last decade, dragonflies have become an important group for nature study and nature management. This is illustrated by an official Red List, two field guides in Dutch, 22 regional and provincial study groups and over 400 members of the NVL, some of whom are also professional dragonfly workers." (Author)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: marcel.hilair@12move.nl

8665. Wybraniec, K. (2006): Preliminary results of studies on the dragonflies of the Skierbieszów community. *Odonatrix* 2(1): 18-19. (in Polish, with English summary) ["24 dragonfly species were recorded in the Skierbieszów community (the Lublin Upland, CE Poland) in the years 2004 and 2005. The most interesting are: *Sympecma paedisca*, *Aeshna affinis*, *A. juncea*, *Libellula fulva*, *Sympetrum pedemontanum*." (Author)] Address: Wybraniec, Katarzyna, Lipina Nowa, 41, 22-420 Skierbieszów, Poland

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8666. Agudelo-Zamora, H.D.; Lopez-Macias, J.N.; Sanchez-Paz, C.L. (2007): Hábitos alimentarios de la arawana (*Osteoglossum bicirrhosum* Vandelli, 1829) (Pisces: Osteoglossidae) en el alto río Putumayo, área del Parque Nacional Natural La Paya, Putumayo, Colombia. *Acta Biol. Par., Curitiba* 36(1-2): 91-101. (in Spanish, with English summary) ["To analyze food habits of *O. bicirrhosum* in lagoons of the Paya National Park, we made 12 collections from August, 2002 to July, 2003 which included all river phases of the Caucaya River. 247 individuals were captured, from 220 - 820 mm SL and 98 to 5150 gr of weight 91% of the stomachs analysed for contents contained food. We used IRI to determine the arawana's preference for fish, insects and snails, but birds and reptiles are also eaten. This species is an opportunistic omnivore that mainly consumes fish. No difference in diet was noted between sexes ($p > .05$). The active consumption of snails from November - December was related with the need protein storage for the reproductive period, which requires a period of starvation because this species incubates the young orally." (Authors) Odonata were among the prey, but are not specified further.] Address: Agudelo-Zamora, H.D., Facultad de Administración de Recursos Costeros y Marinos, Universidad Santiago de Cali, Santiago de Cali, Colombia. E-mail: obicirrhosum@yahoo.es

8667. Belevich, O.E.; Yurchenko, Yu. A. (2007): Dynamics of daily activity and feeding of *Aeshna mixta* Latreille, 1805 (Odonata, Aeshnidae) in the south of west Siberia. *Evraziatskii Entomologicheskii Zhurnal [Eurasian entomological journal]* 6(1): 25-28. (in Russian, with English summary) ["Maximum of flight and trophic activity of *Aeshna mixta* Latreille, 1805 in August in the southern part of West Siberia occur at dusk. Food remains undigested in the gut of dragonflies until the following day. Low night temperatures dictate slow food assimilation, which is probably significant for the accumulation of energy for morning activity and for surviving of poor weather conditions." (Authors)] Address: Belevich, O.E., Institute for Animal Systematics and Ecology, Russian Academy of Sciences, Siberian Branch, Frunze Str. 11, Novosibirsk 630091, Russia

8668. Besprozvannykh, V.V. (2007): Life cycle of the trematode *Halipegus japonicus* (Halipegidae) in Primorskiy Krai (Russia). *Vestnik Zoologii* 41(1): 23-28, 95. (in Russian with English and Ukrainian summaries) [*H. japonicus* Yamaguti, 1936 involves the fresh water snails *Helicorbis suffunensis* and *Polypylis semiglobosa* as first intermediate hosts, ostracode crustaceans as second and larvae of the dragonflies *Cordulia* and *Aeshna* as third intermediate host. A possibility of involvement of the fish species *Percottus glehni* and *Pseudobagrus fulvidraco* into the life cycle of the trematode is shown; the parasite is localized in the fish esophagus on its early stages.] Address: Besprozvannykh, V.V., Biologo-pochvennyi institut DVO RAN, prosp. 100-let Vladivostoky, 159, Vladivostok, 690022, Russia

8669. Boyce, W.M.; Lawler, S.P.; Schultz, J.M.; McCauley, S.J.; Kimsey, L.S.; Niemela, M.K.; Nielsen, C.F.; Reisen, W.K. (2007): Nontarget effects of the mosquito adulticide pyrethrin applied aerially during a West Nile virus outbreak in an urban California environment. *J. Am. Mosq. Control. Assoc.* 23: 335-339. (in English) ["In August 2006, a pyrethrin insecticide synergized with piperonyl butoxide (EverGreen Crop Protection EC 60-6, McLaughlin Gormley King Company, Golden Valley, MN) was sprayed in ultralow volumes over the city of Davis, CA, by the Sacramento-Yolo Mosquito and Vector Control District to control mosquitoes transmitting West Nile virus. Concurrently, we evaluated the impact of the insecticide on nontarget arthropods by 1) comparing mortality of treatment and control groups of sentinel arthropods, and 2) measuring the diversity and abundance of dead arthropods found on treatment and control tarps placed on the ground. We found no effect of spraying on nontarget sentinel species including dragonflies (*Sympetrum corruptum*), spiders (*Argiope aurantia*), butterflies (*Colias eurytheme*), and honeybees (*Apis mellifera*). In contrast, significantly higher diversity and numbers of nontarget arthropods were found on ground tarps placed in sprayed versus unsprayed areas. All of the dead nontarget species were small-bodied arthropods as opposed to the large-bodied sentinels that were not affected. The mortality of sentinel mosquitoes placed at the same sites as the nontarget sentinels and ground tarps ranged from 0% to 100%. Dead mosquitoes were not found on the ground tarps. We conclude that aerial spraying with pyrethrins had no impact on the large-bodied arthropods placed in the spray zone, but did have a measurable impact on a wide range of small-bodied organisms." (Authors)] Address: Boyce, W.M., Wildlife Health Center, University of California, One Shields Avenue, Davis, CA 95616, USA

8670. Buczyński, P. (2007): Dragonflies (Odonata) of the valley of the River Bug between Gołębie and Włodawa. *Nowy Pam. Fizjogr., Warszawa* 5(1-2): 3-26. (in Polish, with English summary) [The article presents faunistic and ecological data on the Odonata of the middle part of the River Bug valley (Poland) gathered during long-term studies in the years 1993-2005 (mainly 2000-2003), in the vicinity of 24 localities, and resulting in records of 52 dragonfly species (71% of the Polish dragonfly fauna).] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8671. Kefford, B.J.; Salter, J.; Clay, C.; Dunlop, J.E.; Nugegoda, D. (2007): Freshwater invertebrates' response to gradients of salinity and turbidity: using pref-

erence as a rapid sub-lethal test. *Australasian journal of ecotoxicology* 13: 131-142. (in English) ["This study investigates the use of a sub-lethal rapid toxicity testing method that allows animals to move within a concentration gradient in an attempt to measure a sub-lethal response of preference to inhabit a particular contaminant concentration. We describe a testing apparatus and trial its use in assessing the preferences of selected riverine invertebrates (collected from Victoria, Australia) for two common river contaminants, salinity and turbidity [simulated by suspended fine sediment (standardised clay, kaolin)]. For salinity preference experiments, the testing apparatus was found to be unsuitable for use with small macroinvertebrates due to the need to use vigorous aeration to mix the test solution in order to prevent horizontal stratification. However, aerated salinity preference tests were successful using the freshwater shrimp *Paratya australiensis* (Decapoda: Atyidae), and indicated their preference for salinity <17.6-18.8 μ S/cm. This observed preference for low salinity was unchanged by acclimation to salinity of 0.1, 10 or 20 μ S/cm prior to testing. A dispersion of suspended particulates was used for turbidity preference experiments, and so vigorous aeration was unnecessary. When used in this way the test apparatus was found to be suitable for testing all stream macroinvertebrates tested (nine species including *Ischnura aurora* and *I. heterosticta*) and one microinvertebrate. One test species, *Micronecta annae* (Hemiptera: Corixidae), was observed to prefer relatively high turbidity (>200 NTU) but only when collected from one of two locations. Another species, *Austrochiltonia subtenuis* (Amphipoda: Hyalellidae), showed weak evidence for a preference for lower turbidity (<200 NTU). It is unknown whether the lack of turbidity preference shown for the other seven species is because turbidity is not directly harmful or whether they are not able to detect and/or avoid certain turbidity levels. When preference experiments find that most species show no preference to a specific contaminant, then another approach will be needed to establish their sensitivity." (Authors) *Ischnura aurora* appeared unsuitable for preference testing in the device. Their movement was restricted by air bubbles and the lack of suitable substrate for them to attach. *Ischnura heterosticta* was observed across the spectrum of turbidity levels examined.] Address: Kefford, B., Biotechnology & Environmental Biology, School of Applied Sciences, RMIT University, PO Box 71, Bundoora, Victoria 3083, Australia. E-mail: ben.kefford@rmit.edu.au

8672. Silva F.J.; Callisto, M. (2007): Benthic macroinvertebrates collection: a tool for the knowledge of freshwater biodiversity. *Neotropical Biology and Conservation* 2(1): 3-10. (in Portuguese, with English summary) ["Zoological collections can be considered important registries of freshwater biodiversity for academical and research activities. The objective of this study was to organize a database of the diversity of benthic indicators of water quality collected in many freshwater ecosystems. The Benthic Macroinvertebrates Reference Collection of the Laboratory Ecology of Benthos, Institute of Biological Sciences, Federal University of Minas Gerais was created in 1997. This collection comprises 16,500 registers from different lotic and lentic ecosystems in Brazil and other countries. The taxa (with one or more organisms) are preserved in tubes, glasses, and wardrobes. In the tomb notebooks are registered: the taxonomical identification, origin, collection method, number of individuals, sample number and field obser-

ations. Besides the maintenance of the Reference Collection, a database is being constructed with the benthic biodiversity information. Up to this moment, the database has almost 71,000 registers preserved in 6,000 tubes and in 174 glasses. The incorporation of new organisms to the Collection is of c. 7,100.00 (+ 7,471.67) organisms per year. The aquatic insects are the main abundant and taxonomic diverse in the Collection. Diptera, Ephemeroptera, and Trichoptera were the most numerical important groups, with respectively 37.9%, 16.7%, and 14.5%. Among the Dipterans, Chironomidae comprises 59 genera. This Reference Collection represents an important tool for knowledge of benthic biodiversity in lotic and lentic ecosystems, allowing later taxonomical identification, and the development of population dynamics and community structure studies, due to the increase deposit of knew material. Moreover, it is of paramount importance to guarantee future taxonomical, biogeographical, phylogenetical and ecological studies, using this material." (Authors) Odonata are treated at the family level.] Address: Callisto, M., Univ. Federal de Minas Gerais, Instituto de Ciências Biológicas, Departamento de Biologia Geral, Laboratório de Ecologia de Bentos. CP. 486, CEP. 30.970-201, Belo Horizonte, MG, Brasil. E-mail: callisto@icb.ufmg.br

8673. Verdonschot, R.C.M.; Groenendijk, D.; Bouwman, J.H. (2007): Dragonflies on shallow soft-water lakes in Noord-Brabant; a first attempt for a synecological analysis of the Dutch national dragonfly database. *Brachytron* 10(2): 185-193. (in Dutch, with English summary) ["Shallow soft-water lakes are one of the most Odonata rich habitats in the Netherlands. Different types of shallow soft-water lake ecosystems are distinguished to test whether the Odonata species composition of those waters reflect this classification. A comparison was made of observations of adults at 13 shallow soft-water lakes. In the province of Noord-Brabant, which is situated on sandy soils in the southern part of the Netherlands, information about the species composition was gathered using the database of Odonata observations of the Netherlands, considering the period 1990-2003, the months may-august. TWINSPAN was used to analyse the species composition data. Because observations from the database are used, there is a lot of uncertainty regarding investigated area, search time, number of individuals. Therefore, only present/absent data were used. Despite this drastic transformation, the analysis shows that the species composition of shallow soft-water lakes fed by rain water differs from lakes which are fed by both rain water and buffered ground water. The lakes fed by buffered ground water were characterised by *Aeshna grandis*, *A. mixta*, *A. cyanea*, *Erythromma najas*, *Brachytron pratensis* and *Cordulia aenea*. The lakes fed by rainwater were characterised by *Lestes dryas* and *Libellula depressa*." (Authors)] Address: Bouwman, J., De Vlinderstichting, Postbus 506, 6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

8674. Waldhauser, M.; Waldhauserova, I. (2007): Interesting findings of dragonflies (Odonata) in the Liberec Region. *Sborník Severočeského Muzea, Přírodní Vědy*, 25: 39-48. (in Czech, with English summary) [Records of the following species from the Liberec Region, Czech Republic are presented: *Aeshna affinis*, *A. caerulea*, *Brachytron pratense*, *Sympetrum depressiculum*, *S. fonscolombii*, *S. meridionale*, *S. pedemontanum*, *Somatochlora alpestris*, *S. arctica*, *Cordulegaster*

bidentata, *Ophiogomphus cecilia*, *Gomphus vulgatis-simus*, *Leucorrhinia albifrons*, and *L. pectoralis*.] Address: Waldhauser, M., Petrovice 136, 471 25 Jablonné v Podještědí, Czech Republic.

8675. Wang, Y.-n.; Leong, R.; Tian, P.-t.; Chan, M.-h.; Liu, S.W.; Chang, C.-s. (2007): Using biological investigation to evaluate the landslide rebuilt at experimental forest of NTU. *Journal of Experimental Forest of the National Taiwan University* 21(4): 307-319. (in Chinese, with English summary) [We collected 143 landslide rebuilt cases that were restored between 2001 and 2002 at Experimental Forest of National Taiwan University to evaluate the restoring effectiveness by using biological investigation. Important vegetation index (IVI), birds diversity index (BDI), and aquatic insect community parameters index (AICPI) were applied for biological investigation. Our data showed that major vegetation in landslide rebuilt are *Miscanthus floridulus*, *Arundo formosana*, *Trema orientalis*. The performance of silviculture of *Acacia confusa* and *Alnus formosana* silvicultures were better than *Zelkova serrata*. BDI at BeSer creek watershed was better than Chenyolan creek. However, BDI was not different with different technics and construction situation, while BDI could be differed with the size of landslide area. We collected 26 families and 32 taxa aquatic insects, mainly in Ephemeroptera and Trichoptera. Aquatic insect diversity was 1.94 – 2.03, and evenness was 0.63 – 0.69. Water quality assessed by aquatic insects biotic index was at good scale for most landslide rebuilt cases, except site 1 at fine scale." (Authors) *Euphaea formosa* was recorded at two sites.] Address: E-mail: cannon@exfo.ntu.edu.tw

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8676. Bachmann, R. (2008): Ökopreis des WWF Schwyz für die Libellen. *Schwyz Panda. Mitteilungen des WWF Schwyz* 20(2): 4-5. (in German) [The well known German odonatologists, Heinrich and Traude Flieder were awarded with the Swiss Ökopreis for their engagement in dragonfly conservation.] Address: not stated

8677. Englund, R.A. (2008): Invasive species threats to native aquatic insect biodiversity and conservation measures in Hawai'i and French Polynesia. *Journal of Insect Conservation* 12(3-4): 415-428. (in English) ["Impacts of invasive species, and of attempts to control them, on the aquatic invertebrate fauna of Hawaii and French Polynesia are reviewed and discussed, as a foundation for determining conservation need. Aquatic insects are poorly documented in the region, with many species undescribed, so that practical conservation must be pursued with highly incomplete basic taxonomic knowledge. The establishment of at least one dedicated reserve for aquatic invertebrates is recommended for each high island in an archipelago, as an aid to safeguarding local endemic species, and other recommendations include increased monitoring for new alien species (particularly of fish), planning for removal of alien species from selected water bodies where alien species are less likely to recolonize, effective protection of key sites with high biodiversity value, and securing sites for future restoration and translocation or rare and endangered species." (Author) Many references to Odonata are made.] Address: Englund, R.A., J. Linsley Gressitt Center for Entomological Research, Bishop

Museum, 1525 Bernice Street, Honolulu, HI, 96817, USA. E-mail: englund@bishopmuseum.org

8678. Graf, R. (2008): Jahresbericht Wauwiler Ebene 2007/2008: Abschlussbericht der ersten Umsetzungsperiode des Vernetzungprojekts. *Schweiz. Vogelwarte, Sempach*: 41 pp. (in German) [The man-made ponds, constructed since 1995 in the Wauwiler Plain (canton Luzern, Switzerland), were soon colonised by *Ischnura pumilio*. 42 odonate species were recorded between 1999 and 2007 at the Mauensee.] Address: Graf, R., Schweizerische Vogelwarte, 6204 Sempach, Switzerland

8679. Harp, G.; Harp, P.; McCord, S. (2008): Aquatic macroinvertebrates collected from thirty-two Missouri Ozark streams. *Journal of the Arkansas Academy of Science* 62: 61-74. (in English) ["A previously reported study of the distribution and status of an endemic dragonfly in Missouri, USA emphasized data collected by aerial netting and examination of specimens housed in the Wilbur Enns Museum of Entomology. Dip net samples were also taken, however, to find naiads of the target species at sites where adults might not have been found and to determine whether there were associated species. Forty-one collections were made in 32 Ozark streams between mid-May and early June 1999-2000." (Authors) Odonata represent 64 of the 372 taxa identified, in most cases identified at the species level, in some cases at the genus level. The taxa are listed locality wise.] Address: Harp, G., Department of Biological Sciences, Arkansas State University, State University, AR 72467, USA. E-mail: glharp@astate.edu

8680. Kaynas, B.Y.; Gürkan, B. (2008): Species richness and abundance of insects during post-fire succession of a *Pinus brutia* forest in Mediterranean region. *Polish Journal of Ecology* 56(1): 165-172. (in English) ["In the Marmaris National Park (located on the Mediterranean coast of SW Turkey) mostly covered with *Pinus brutia* forests, four sites were selected to study the post-fire successional trends in vegetation and insect communities. The sites represented: 1, 5, and 21 years after fire as well as control site (more than 45 years after fire). On the study plots (0.5 ha) the insects were collected with the sweep net swung along three transects each of 100 m length, in monthly intervals between August 2000 and September 2001. The number of plant species decreased from 41 to 32 along succession, as well as the number of stage-specific species but the mean height of vegetation increased with successional stage. The abundance and species richness of herbivorous insects decreased along succession as well as two main herbivore groups – xylophagous and sap-feeders. However, no major changes were found between the sites in terms of abundance or species richness of predators. This decrease in herbivorous forms may be a result of changes in the plant architecture and vegetation structure between post-fire successional stages." (Authors) Odonata are treated at the order level.] Address: Kaynas, B.Y., Hacettepe University, Faculty of Science, Biology Department 06800 Beytepe-Ankara, Turkey. E-mail: bkaynas@hacettepe.edu.tr

8681. Ketelaar, R.; Bouwman, J. (2008): A reconstruction of the dragonfly and butterfly fauna of the Koningsven (Odonata, Lepidoptera). *Nederlandse faunistische mededelingen* 29: 5-20. (in Dutch, with English summary) ["The Koningsven ('Kings peat') is a former peat moor in the eastern part of the Netherlands. It

was almost completely reclaimed in the first half of the twentieth century, leaving only a tiny bit of 7 hectare of wetland. The area has a reputation as former habitat of rare and threatened plant species. Old publications show its enormous natural value. Recently, plans have been developed to renaturalise the area and restore the Koningsven. For a better understanding of the natural history of the area, a reconstruction of the former fauna of dragonflies and butterflies was based on records in literature and faunistic databases. It is shown that the Koningsven was a very important biodiversity hot spot for dragonflies and, to a lesser degree, butterflies. Dragonflies like *Nehalennia speciosa*, *Coenagrion hastulatum*, *Leucorrhinia caudalis* and *L. pectoralis* are nowadays rare, threatened or even extinct in the Netherlands and northwestern Europe. [...] At present it is likely that nowhere in northwestern Europe a similar habitat and species composition can be found. The planned renaturalisation will hopefully contribute to at least a partial recovery of this extraordinary fauna." (Authors)] Address: R. Ketelaar, R., Vereniging Natuurmonumenten, Postbus 9911, 1243 zr 's-Graveland, The Netherlands. E-mail: r.ketelaar@natuurmonumenten.nl

8682. Lim, Y.-S.; Lee, S.-L.; Kwon, K.-W.; Bin, J.-H.; Park, H.-K. (2008): Study on benthic macroinvertebrates community at Daecheon stream. The Annual Report of Busan Metropolitan City Institute of Health & Environment 18(1): 126-136. (in Korean, with English summary) [Daecheon stream, Busan, South-Korea; from Jan. – Nov. 2008, physicochemical parameters and benthic macroinvertebrate communities were correlated at three sites - upperstream (Gonghae village), mid-stream (Aegi-So), downstream (Gycongnam apartment). Benthic macroinvertebrates were composed by 71 species including one odonate species, *Davidus lunatus*.] Address: E-mail:im3632528@korea.kr

8683. Martynov, A.V.; Martynov, V.V. (2008): Dragonflies (Insecta, Odonata) of the "Kamennye Mogily" reserve. Prirodovedniy Al'manah (Biologichni nauki) 10: 67-82. (in Russian., with English & Ukrainian summaries) [28 odonate species of the Reserve, situated on the Karatysh river (Donetsk region, the Ukraine) are outlined with emphasize to phenology.] Address: Martynov, A.V., Dept Ecol., Fac. Biol., Donetsk Natn. Univ., Shchorsa 46, 83050 Donetsk, Ukraine

8684. McCauley, S.J.; Davis, C.J.; Werner, E.E. (2008): Predator induction of spine length in larval *Leucorrhinia intacta* (Odonata). Evolutionary Ecology Research 10: 435-447. (in English) ["Questions: Do larvae of a dragonfly with a broad habitat distribution have longer abdominal spines when they co-exist with fish, and are these differences the result of phenotypic plasticity? Hypothesis: Phenotypic plasticity will result in larvae having longer spines when they are exposed to cues from predatory fish. Organism: Larvae of *L. intacta* (Research site: Natural ponds and cattle tanks on the E.S. George Reserve in southeast Michigan. Methods: We compared the morphology of larvae collected from two natural ponds before and after a drought resulted in the extirpation of fish from one pond. We also compared spine morphology of larvae reared in an experiment where they were either exposed to caged fish or empty cages. Finally, we use a phylogeny for this genus to begin reconstructing the evolutionary history of plasticity and spine morphology within *Leucorrhinia*. Results: Larvae collected from ponds with fish present had longer spines than larvae collected from ponds without

fish. In the experiment, exposure to fish resulted in longer spines for some but not all of the spines measured. These results indicate that at least some of the variation in spine length is the result of plasticity. *L. intacta* is not a sister species to a European *Leucorrhinia* in which similar plasticity has been found. Mapping plasticity on to the phylogeny of this genus indicates that either plasticity is ancestral to the two major clades of this genus or that it has arisen independently twice." (Authors)] Address: McCauley, S.J., Center for Population Biology, University of California Davis, 2320 Storer Hall, One Shields Avenue, Davis, CA 95616, USA. E-mail: sjmccauley@ucdavis.edu

8685. Miyaguchi, H.; Katsuura, M.; Yamamoto, R.; Hirabayashi, T.; Ban, S.; Toda, T.; Yamamoto, H. (2008): Aquatic invertebrate fauna in Tohorogawa mire, eastern Hokkaido. Japanese Journal of Limnology 69: 143-153. (in Japanese, with English summary) [Japan; "To clarify the characteristics of the aquatic invertebrate fauna in Tohorogawa mire, we collected aquatic invertebrates from peat soils, peat-excitation pools and the Tohorogawa River, in May 2005 and June 2006. As a result, 83 taxa of aquatic invertebrates were found in the study site. Northern species included [...] *Libellula quadrimaculata asahinai*, [...], while southern species were [...] *Orthetrum albistylum speciosum* [...]. The proportion [sic: only three taxa are documented!] of northern species of Odonata and Coleoptera in Tohorogawa mire was similar to that found in other mires in eastern Hokkaido. This indicates that Tohorogawa mire allows the inhabitation of northern species at the same level as the other mires in eastern Hokkaido. The northern species were distributed in peat-excitation pools where the water temperature is comparatively low, while the southern species were found in peat soil where the water temperature is relatively high. Therefore, it is concluded that the significant spatial difference in water temperature is a major factor allowing the coexistence of northern and southern aquatic invertebrates in Tohorogawa mire." (Authors)] Address: Miyaguchi, H., 1-236 Department of Environmental Engineering for Symbiosis. Faculty of Engineering. Soka University. 1-236 Tangi-cho. Hachioji. Tokyo 192-S577. Japan

8686. Mrosovsky, N.; Godfrey, M.H. (2008): The path from grey literature to Red Lists. Endang. Species Res. 6: 185-191. (in English) ["This paper concerns the process by which Red List designations are decided and supported; it does not concern whether the past or present Red List categorizations are correct. We argue that, contrary to statements extolling the scientific and authoritative nature of the Red List, the reality for some species falls far short of these ideals. The prominent role played by the grey literature is an important factor in these problems. We use the case of the hawksbill turtle *Eretmochelys imbricata* as an example of the problems with relying on unavailable grey literature, but similar problems apply to various taxa classified in the Red List." (Author) The case of *Pseudagrion newtoni* is briefly outlined: Occurrence of grey literature (including personal communications) in selected Red List (RL) assessments (retrieved from the IUCN Red List website (www.redlist.org)) show, that 8 of the 9 citations are based on published information.] Address: Mrosovsky, N., Department of Ecology and Evolutionary Biology, University of Toronto, 25 Harbord Street, M5S 3G5 Toronto, Ontario, Canada. E-mail: mgodfrey@seaturtle.org

- 8687.** Nuckowska, K.; Agapow, L.; Nadobnik, J. (2008): Preliminary evaluation of the quality of water in the Mierzęcka Struga River by a biological method. In: R. Goldyn, P. Klimaszuk, N. Kuczyńska-Kippen & R. Piotrowicz (eds): *The Functioning and Protection of Water Ecosystems*. Department of Water Protection, Faculty of Biology, Adam Mickiewicz University, Poznań: 11-16. (in English) [The Mierzęcka Struga River, Poland is the longest right tributary of the lower Drawa River. On the basis of the research conducted between 2000 and 2004, it has been found that the river is characterised by taxa typical for unimpacted or slightly polluted water. The taxa-list includes *Calopteryx splendens*.] Address: Nuckowska, Kinga, 66-400 Gorzów Wlkp., ul. Owocowa 28a
- 8688.** Obeten Offem, B.; Akegbejo-Samsons; Y.; Tunde Omoniyi, I. (2008): Diet, size and reproductive biology of the silver catfish, *Chrysichthys nigrodigitatus* (Siluriformes: Bagridae) in the Cross River, Nigeria. *Rev. Biol. Trop.* 56 (4): 1785-1799. (in English) [*C. nigrodigitatus* is a highly valued food-fish included among the dominant commercial catches exploited in major rivers of Africa. To provide useful biological data for management, samples were collected monthly between January (2005) and December (2007) in three zones: I: Upper Cross River (grassland), II: Middle Cross River (mixed forest and grassland), and III: Lower Cross River (rainforest)] along 200 km length of the Cross River, Nigeria. Data from 1 248 specimens were processed. Frequency of occurrence of Odonata in the stomach of *C. nigrodigitatus* was between 1.4 and 8.7%.] Address: Obeten Offem, B., Department of Fisheries, Faculty of Agriculture and Forestry, Obubra Campus, Cross River State, Nigeria. E-mail: benbeff06@yahoo.com
- 8689.** Ott, J. (2008): Der "Libellenatlas Rheinland-Pfalz" - es geht weiter ... GNOR-Info 107: 36. (in German) [Brief report on the current status on work to prepare a manual of the Odonata in Rheinland-Pfalz, Germany] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de
- 8690.** Srygley, R.B.; Dudley, R. (2008): Optimal strategies for insects migrating in the flight boundary layer: mechanisms and consequences. *Integrative and Comparative Biology* 48(1): 119-133. (in English) ["Directed aerial displacement requires that a volant organism's airspeed exceeds ambient wind speed. For biologically relevant altitudes, wind speed increases exponentially with increased height above the ground. Thus, dispersal of most insects is influenced by atmospheric conditions. However, insects that fly close to the Earth's surface displace within the flight boundary layer where insect airspeeds are relatively high. Over the past 17 years, we have studied boundary-layer insects by following individuals as they migrate across the Caribbean Sea and the Panama Canal. Although most migrants evade either drought or cold, nymphalid and pierid butterflies migrate across Panama near the onset of the rainy season. Dragonflies of the genus *Pantala* migrate in October concurrently with frontal weather systems. Migrating the furthest and thereby being the most difficult to study, the diurnal moth *Urania fulgens* migrates between Central and South America. Migratory butterflies and dragonflies are capable of directed movement towards a preferred compass direction in variable winds, whereas the moths drift with winds over water. Butterflies orient using both global and local cues. Consistent with optimal migration theory, butterflies and dragonflies adjust their flight speeds in ways that maximize migratory distance travelled per unit fuel, whereas the moths do not. Moreover, only butterflies adjust their flight speed in relation to endogenous fat reserves. It is likely that these insects use optic flow to gauge their speed and drift, and thus must migrate where sufficient detail in the Earth's surface is visible to them. The abilities of butterflies and dragonflies to adjust their airspeed over water indicate sophisticated control and guidance systems pertaining to migration."] (Authors)] Address: Srygley, R.B., USDA-Agricultural Research Service, 1500 N. Central Avenue, Sidney, MT 59270, USA. E-mail: robert.srygley@ars.usda.gov
- 8691.** Stewart, T.W.; Downing, J.A. (2008): Macroinvertebrate communities and environmental conditions in recently constructed wetlands. *Wetlands* 28(1): 141-150. (in English) [Iowa, USA; "We quantified macroinvertebrate community characteristics in nine temporary or permanent wetlands, and related these to environmental conditions. Macroinvertebrates inhabiting the water column and shallow sediment (42-cm depth) were sampled 20 months after wetland construction in June 2005. A total of 29 taxa were collected, and macroinvertebrate communities varied among wetlands. Total macroinvertebrate biomass (mean 6 SE 5 16.44 6 4.72 g AFDW/m³) and densities (mean 6 SE 5 372,096 6 124,972 individuals/m³) were positively related to coarse particulate organic matter abundance (living and nonliving plant matter; CPOM) and negatively related to turbidity. Density of ecologically sensitive EOT (Ephemeroptera, Odonata, Trichoptera) taxa was also positively related to CPOM and negatively related to turbidity. Total taxa richness was negatively related to turbidity, and percent of total macroinvertebrate density consisting of EOT (% EOT) was positively related to CPOM. These relationships were greatly influenced by 10 dominant taxa (nematodes, physid snails, mites, small squaregill mayflies, narrowwinged damselflies, biting midges, non-biting midges, ostracods, cladocerans, and cyclopoid copepods) that were positively associated with CPOM and negatively related to turbidity. Two wetlands inhabited by common carp (*Cyprinus carpio*) appeared to be in the poorest condition. These wetlands had the lowest macroinvertebrate biomass and densities and highest turbidity. Additionally, although net uptake of total nitrogen (TN) occurred in these high-turbidity wetlands, NH₃ concentrations were two-fold higher in outflow than inflow. Net uptake of total phosphorus (TP) occurred only in wetlands with low turbidity, high CPOM abundance, and high macroinvertebrate abundance and diversity. To enhance macroinvertebrate abundance and diversity and ecological functions (e.g., nutrient removal) in newly constructed wetlands, management efforts should be directed toward increasing plant abundance and reducing turbidity.] Address: Stewart, T.W., Dept of Natural Resource Ecology & Management, Iowa State Univ. Ames, Iowa, USA 50011. E-mail: twstewar@iastate.edu
- 8692.** Szálassy, N. (2008): Date preliminare privind fauna de odonate (Insecta: Odonata) de pe Bratele Moarte ale Râului Tur. In: Sike, T., Márk-Nagy, J. (eds.) *Flora i Fauna Rezervaiei Naturale „Râul Tur” / The Flora and Fauna of the Tur River Natural Reserve*. *Bihorean Biologist* 2 (Suppl. 1): 51-54. (in Romanian, with English summary) ["Preliminary data on the Odonata fauna of the backwaters of River Tur. The paper presents faunistic results based on collection and obser-

vations of adults in odonatological studies carried out in the backwaters of River Tur. By this study 18 species (8 Zygoptera, 10 Anisoptera) were found to occur in the area, out of which 11 are very frequent, 4 from the less frequent and 3 from the rare class of country-wide occurrence frequency. The main threats to survival of these species are pollution, dredging, drying-out of the habitats." (Author)] Address: Szállassy, Noémi, Babeş-Bolyai University, Fac. of Psych. & Sci. of Educ., Dept. of Math. & Sci. Teaching Education, Sindicatelor Str. 7, 400029 Cluj-Napoca, Romania. E-mail: szallassy@gmail.com

8693. Tafangenyasha, C.; Dube, L.T. (2008): Evaluation of the usefulness of the South African scoring systems in savanna rivers. *Tropical and Subtropical Agroecosystems* 8: 135-144. (in English, with Spanish summary) ["The usefulness of the South African Scoring Systems (SASS) in a savanna river was studied for an array of lowveld streams. The streams were also characterised using standard chemical methods from August 2004 to May 2005 to complement biological monitoring methods. Nutrients such as total nitrogen, nitrate nitrogen and total phosphates did not show differences ($p>0.05$) between the wet and dry seasons. The SASS and ASPT scores were different ($p<0.05$) between dry and wet season at test sites but not between the dry and wet season at control sites. Site, media and site x media interaction had a significant effect on SASS scores and only site showed significant difference in ASPT scores. Multiple comparison tests using paired t-tests with Bonferoni adjustment showed site effect ($p<0.05$) on total nitrogen, ammoniacal nitrogen, ASPT scores and SASS scores. Media effect showed difference ($p<0.05$) on total nitrogen, nitrate nitrogen and SASS scores. The effect of season was significant ($p<0.05$) on total nitrogen and total phosphate. In this study, nutrient data show that water quality is dynamic and the nutrients change with season because of real changes in nutrient concentrations. The results indicate that SASS indices provide a better measure of water quality since they integrate seasonal influences on changes in water bodies than chemical data that reflect conditions at the time the water samples were taken. The study of seasonal effects on nutrients and water quality has the potential to develop our conceptual understanding of the impact of discharges on the fluvial ecology for an environment that is naturally challenging for organisms, given the temporal variation in river flow, temperature and suspended solids." (Authors) Odonata are treated at the genus level.] Address: Tafangenyasha, C., Dept of Environmental Science and Health, National University of Science and Technology, P. Bag AC 939, Bulawayo, Zimbabwe. E-mail: ctafangenyasha@nust.ac.zw

8694. Zhang, J.; Zhou, C.; Gai, Y.; Song, D.; Zhou, K. (2008): The complete mitochondrial genome of *Parafro-nurus youi* (Insecta: Ephemeroptera) and phylogenetic position of the Ephemeroptera. *Gene* 424: 18-24. (in English) ["The first complete mitochondrial genome of a mayfly, *P. youi*, was sequenced using a long PCR-based approach. The genome is a circular molecule of 15,481 bp in length, and encodes the set of 38 genes. Among them, 37 genes are found in other conservative insect mitochondrial genomes, and the 38th unique gene is *trnM*-like (*trnM2*). The duplication-random loss model can be used to explain one of the translocations at least. The A+T content of the control region is 57%,

the lowest proportion detected so far in Hexapoda. Based on the nucleotide dataset and the corresponding amino acid dataset of 12 protein-coding genes, Bayesian inference and maximum likelihood analyses yielded stable support for the relationship of the three basal clades of winged insects as Ephemeroptera+(Odonata+Neoptera)." (Authors)] Address: Zhou, K., Jiangsu Key Laboratory for Biodiversity and Biotechnology, College of Life Sciences, Nanjing Normal University, Nanjing 210046, China. E-mail: kyzhou@126.com

8695. Zhang, J.; Wu, W.; Huang, R.-i. (2008): Investigation on beneficial insects in Xinjiang(III) - Predatory insects and insects for joy. *Xinjiang Agricultural Science* 45(1): 98-101. (in Chinese, with English summary) ["Insects for joy are those of beautiful-colourful or of fancy shape such as butterflies, dragonflies, crickets, katydids, grasshoppers, 'tumblebugs', leaf beetles, mantis, stick insects etc." (Authors) The following Odonata - all originating from north western China - are listed: *Calopteryx splendens*, *Onychogomphus forcipatus*, *Aeshna juncea*, *A. mixta*, *Somatochlora arctica*, *Libellula depressa*, *L. quadrimaculata*, *Orthetrum albistylum*, *Symptetrum pedemontanum*, and *Leucorrhinia rubicunda*. The occurrence of some of these taxa in China is questionable, and the really spectacular taxa from subtropical China are lacking in total.] Address: Zhang, J.-i., College of Science and Technology, Xinjiang University, Urumqi, C830046 China

2009

8696. Anderson, A.L.; Brown, W.D. (2009): Plasticity of hatching in Green Frogs (*Rana clamitans*) to both egg and tadpole predators. *Herpetologica* 65(2): 207-213. (in English) ["We examined whether embryos of *R. clamitans* would adaptively alter hatching times in the presence of both egg predators (the crayfish *Procambarus nigrocinctus*) and tadpole predators (the dragon nymph *Anax junius*). Under laboratory conditions, we exposed eggs with developing embryos to four experimental treatments that varied in the type of caged predator: egg predator only, tadpole predator only, both predators together, or no predator. As predicted, the presence of an egg predator caused a significant reduction in time to hatching. However, contrary to our prediction, eggs also hatched sooner in the presence of a tadpole predator. Moreover, there was no significant interaction between the effects of the two predators and thus no evidence that *R. clamitans* embryos can distinguish between predator types. We also found significantly lower hatching success in the presence of an egg predator, despite the fact that the predator did not have direct contact with the eggs. These results suggest adaptive early and delayed hatching do not co-occur in this species with this particular predator regime." (Authors)] Address: William D. Brown, W.D., Department of Biology, State University of New York at Fredonia, Fredonia, New York 14063, USA. E-mail, William.Brown@fredonia.edu

8697. Bailowitz, R.; Danforth, D. (2009): Another interesting saddlebags from Arizona. *Argia* 21(4): 13. (in English) [A young male *Tramea binotata* photographed on 25-IX-2009, in Roper Lake State Park, is a new species addition to the state Odonata list of Arizona, USA.] Address: Danforth, D., P.O. Box 232, Bisbee, Az., 85603, USA. E-mail: Dougofbis@yahoo.com

- 8698.** Bailowitz, R.; Danforth, D.; Deviche, P. (2009): West Mexico updated. *Argia* 21(4): 15-18. (in English) [On a five day trip (1-5-X-2009), 62 species of Odonata for the coastal region between Mazatlán in southern Sinaloa and San Blas in central Nayarit, Mexico could be recorded. *Leptobasis guanacaste*, a recently described species (Paulson, 2009) was heretofore known only from two locations in Costa Rica and represents a new record for Sinaloa and for Mexico as well as a significant northward range extension for the species. *Leptobasis melinogaster*, *Erythemis haematogastra*, and *Micrathyrina dissociana* are further rare Mexican and regionally interesting species.] Address: Danforth, D., P.O. Box 232, Bisbee, Az., 85603, USA. E-mail: Dougofbis@yahoo.com
- 8699.** Behr, H. (2009): Notizen zur Libellenfauna des Siebendorfer Moores bei Schwerin (Mecklenburg-Vorpommern). *Virgo*, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 12(1): 44-46. (in German) [Germany; A total of 32 Odonata species were recorded between 2005 and 2008 near Schwerin. These data are compared with a survey from the early 1990th. The increase of species number is explained by a higher frequency of survey dates in 2005-2008. Special emphasize is given to *Crocothemis erythraea*.] Address: Behr, H., Herrengartenweg 57, 19061 Schwerin, Germany. E-mail: hauke-behr@web.de
- 8700.** Bogunski, G. (2009): Aktuelle Checkliste der Tagfalter, Widderchen, Libellen und Heuschrecken aus den Kalksteinbrüchen im Wildenfeser Zwischengebirge (EBG Nr. 35 sowie FFH Nr. 276). *Mitteilungen Sächsischer Entomologen* 88: 4-6. (in German) [Sachsen, Germany; between 2005 and 2008, eight limestone gravel pits were surveyed for their fauna of Lepidoptera, Orthoptera and Odonata. A total of 19 Odonata species is listed including - in most cases - more widespread species. Dominant species are *Aeshna grandis*, *A. mixta*, *Anax imperator*, *Sympetrum sanguineum* and *S. vulgatum*. *S. pedemontanum* is rare and only locally represented.] Address: Bogunski, G., Gartenstr. 10, 08141 Reinsdorf, Germany
- 8701.** Braby, M. (2009): Dragonflies: reporting back on the talk by Brian Thistleton at the April meeting. *Nature Territory* 2009 (May): 9-10. (in English) [General, with emphasis on Australia and with a list of some Northern Territory odonate species.] Address: Braby, M., c/o P.O. Box 39565, Winnellie, NT 0821, Australia
- 8702.** Buczyński, P. (2009): Demoiselles, emerald damselflies and azure bluets, or on dragonflies, ornaments of nature of Warmia and Mazury. *Natura*, Olaztyn 2(14): 6-11. (in Polish, with English summary) [Poland; the objective of this general is to trigger the interest in odonatological research with amateur entomologists. Following a brief introduction into Odonata morphology, biology, ecology and biotopes, and with reference to Polish fauna, the odonate fauna of Warmia and Mazury is outlined. The emphasis is given to the various types of habitats, consequences of the climate change and to the anthropogenic impacts.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8703.** Buczyński, P. (2009): Polish and dedicated to Poland odonatological papers. 7. The year 2008 and the supplement for the year 2007. *Odonatrix* 5(1): 22-24. (in Polish, with English summary) [Update of the Polish odonatological bibliography.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8704.** Caesar, R.M.; Wenzel, J.W. (2009): A phylogenetic test of classical species groups in *Argia* (Odonata: Coenagrionidae). *Entomologica Americana* 115(2): 97-108. (in English) ["We present the first cladistic analysis of *Argia* species, focusing on those occurring in North America north of Mexico. Our analysis is based on mitochondrial 16S rDNA and morphological characters of both sexes of adults and immatures. We reexamine classical work on *Argia* taxonomy and phylogeny. Our results agree considerably with previous hypotheses based morphology in an absence of phylogenetic analysis, and thus our work represents and independent test of these previous hypotheses. *Argia* is recovered as monophyletic. The clade composed of *A. funcki* plus *A. lugens* is basal among the species studied here. The species *A. fumipennis*, including the three subspecies, appears to be a paraphyletic assemblage, and thus may warrant being considered separate species as originally described. The feasibility of producing a thorough phylogenetic analysis of the entire genus using multiple sources of data is discussed." (Authors)] Address: Caesar, R.M., Dept of Entomology, Ohio State Univ., Columbus, OH, USA. E-mail: caesar.6@osu.edu
- 8705.** Catling, P.M.; Lucas, Z.; Freedman, B.; Brunelle, P. (2009): New records of Odonata from Sable Island, Nova Scotia. *Argia* 21(4): 11-12. (in English) [*Schnura hastata*, *Tramea carolina* and *T. lacerata* were new to the Maritime Provinces of Canada and/or to Sable Island. These records are documented and discussed in detail.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca
- 8706.** Cebulski, B.C. (2009): *Hetaerina titia* (Smoky Rubyspot) no longer rare in southern Michigan. *Argia* 21(4): 21-22. (in English) [Several new records of *H. titia* in southeast Michigan, USA are communicated.] Address: Cebulski, B.C. E-mail: bcebul@tc3net.com
- 8707.** Cebulski, B.C. (2009): Collecting odonates under the ice. *Argia* 21(3): 8-9. (in English) [Odonata larvae were collected with a dredge that could be pulled over the ground.] Address: Cebulski, B.C. E-mail: bcebul@tc3net.com
- 8708.** Chadwick, W. (2009): A visit to central Florida. *Argia* 21(3): 7. (in English) [11 Odonata species at six localities in Florida, USA are dealt with.] Address: Chadwick, W., Bronxville, New York, USA. E-mail: mrcnaturally@optonline.net
- 8709.** Daigle, J.J. (2009): 2009 Florida Panhandle Soirée. *Argia* 21(3): 9-10. (in English) [In the framework of the 2010 Southeast Regional meeting of odonatologists, several localities in northern Florida, USA were visited in 2009 to scout out areas and logistics for the meeting. Records (range extensions) of *Brachymesia furcata*, *Lestes forficula*, and *Nehalennia pallidula* are discussed as result of global warming.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com
- 8710.** Daigle, J.J. (2009): *Tramea* treasure island. *Argia* 21(4): 20-21. (in English) [Report on a short field trip to Key West, Florida, USA in October 2009.] Ad-

dress: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

8711. Dijkstra, K.D.B.; Matushkina, N. (2009): Kindred spirits: "Brachythemis leucosticta", Africa's most familiar dragonfly, consists of two species (Odonata: Libellulidae). *International Journal of Odonatology* 12(2): 237-256. (in English) ["Brachythemis leucosticta was found to include two morphotypes, which we consider to represent separate species. Males are separable by the ventral structure of S8 and often differ in the colour of the venation and genital lobe. Females are as yet not reliably distinguishable. Examination of 1,154 males demonstrated that both species are widespread: the true *B. leucosticta* occupies most of tropical Africa and Madagascar, while *B. impartita* (comb. nov.; corrected spelling - neotype P: Ngaoundaba Ranch, Cameroon; in RMNH) ranges north and south of the Sahara, and extends into Eurasia. The two overlap from The Gambia to Ethiopia and south at least to Lake Victoria. The presence of wing bands was scored for all examined males and 970 females. Banded females are frequent in sub-Saharan populations of *B. impartita*, but virtually absent in *B. leucosticta* and northern *B. impartita*. *B. impartita* males become banded shortly after emergence, but *B. leucosticta* becomes so more gradually. Larval morphology and ecology require further study, but some ecological and seasonal segregation may occur in areas of overlap. Of two larval forms described from Uganda, the 'mud form' may pertain to *B. leucosticta*, and the 'sand form' to *B. impartita*." (Authors)] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

8712. DiLeo, C.; Deng, X. (2009): Design of and experiments on a dragonfly-inspired robot. *Advanced Robotics* 23(7-8): 1003-1021. (in English) ["This paper describes the design of dragonfly-inspired robots. Dragonflies demonstrate unique and superior flight performance compared with most other insect species. They are equipped with two pairs of independently controlled wings. The high level of dexterity in wing motion of the dragonfly allows it to hover, fly fast forward, make turns rapidly, fly sideways and even glide. A dragonfly-inspired robot that could effectively mimic those kinematics would potentially exhibit superior flight performance compared with existing designs of insect robots. In this paper, we introduce two generations of robotic dragonfly prototypes developed to implement simplified dragonfly kinematics. Preliminary experiments on kinematics and aerodynamic force measurements of the prototypes are also presented." (Authors)] Address: Deng, X., Dept of Mechanical Engineering, Univ. Delaware, Newark, DE, USA. E-mail: deng@udel.edu

8713. Donnelly, N.; Donnelly, A. (2009): Malawi in february — sure beats New York. *Argia* 21(2): 7-9. (in English) [Extensive report on a field trip to Malawi in Februar 2009.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

8714. Donnelly, N.; Donnelly, A. (2009): Peru in November — Not to every odonatist's taste. *Argia* 21(2): 9-10. (in English) [Report from a high Andean field trip in Peru (November 2008) with poor odonatological results. 40 specimens in 13 taxa (one *Gomphomacromia* new to science) were recorded.] Address: Donnelly, T., 2091

Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

8715. Dragonfly Society of the Americas (2009): *Argia* Vol. 21, No. 2. *Argia* 21(2): (in English) [In This Issue: 1; Calendar of Events: 1; Results of the Dragonfly Society of the Americas 2009 Election, from Steve Valley: 6; Free Odonata Boxes Available: 10; From Princeton—Special 20% Discount: 14; Is a 2,000 foot dragonfly coming to a town near you?: 15. Papers from *Argia* 21(2) omitted in this section are abstracted in this issue of OAS.] Address: DSA c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

8716. Dragonfly Society of the Americas (2009): *Argia* Vol. 21, No. 3. (in English) [In This Issue: 1; Calendar of Events: 1; 2010 DSA Annual Meeting in Maine: A Preview, by Bryan Pfeiffer: 1-2; 2009 Annual DSA Meeting in Sullivan, Missouri: An overwhelming success, by Paul M. McKenzie: 2-3; 2009 Northeast DSA Regional Meeting Report, by Bryan Pfeiffer: 4-5; Galax Gallopers!, by Jerrell Daigle: 10-11; Duncan Cuyler 2009 Update, by Jerrell Daigle: 11.] Address: DSA c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

8717. Dragonfly Society of the Americas (2009): *Argia* Vol. 21, No. 4. (in English) [In This Issue: 1; Calendar of Events: 1; Fourth Annual Minnesota Dragonfly Gathering at Shalom Hill Farm near Jeffers, Minnesota, by Scott King: 2; The Tenth Annual Oregon Aeshna Blitz: October in August, by Steve Gordon: 3; GLOM 2009 Visits Indiana Dunes National Lakeshore, by Bob DuBois and Burton C. Cebulski: 4; Snow Dragonfly!: 5; Minutes of the 2009 Annual Meeting of the Dragonfly Society of the Americas, by Jerrell J. Daigle: 5; 2009 Treasurer's Report, by Jerrell J. Daigle: 6.] Address: DSA c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

8718. Dyatlova, E.S. (2009): Dragonflies (Insecta, Odonata) of the southwestern Ukraine: biodiversity, ecology and conservation. Thesis for a degree of Candidate of Biological Sciences (Ph. D. (Biology)) by speciality 03.00.16 – ecology. Odessa National - Mechnikov University, MES of Ukraine. – Odesa. Autoreferat: 22 pp. (in Ukrainian, with English summary) ["The recent odonate fauna is described. In the study area (Odesa, Mykolaiv and Kherson provinces) 48 species of dragonflies were recorded, belonging to 21 genera and 8 families. Two species and one subspecies (*Sympetrum pedemontanum*, *Coenagrion scitulum* and *Orthetrum coerulescens anceps*) were recorded for the first time in southwestern Ukraine. The fauna of Zmeiny Island in the Black Sea and National Park "Nizhnednestrovsky" in the lower Dniestr river were almost unstudied before our investigations. Two Zygoptera species (*Ischnura elegans* and *Coenagrion pulchellum*) were chosen as model objects for population studies. Age and sex structures of populations and the ratio of female morphs were investigated. Morphometry analysis, fecundity and parasite infestation were studied in two *I. elegans* "infuscans" and "andromorph" female morphs. Based on criteria we have developed, six important dragonfly areas (IDA) were identified. Three IDA are of particular importance: the Danube delta, Dniestr and Dniepr rivers." (Author)] Address: Dyatlova, Elena

Sergeyevna, Institute of Zoology, Faculty of Biology, I.I. Mechnikov University of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

8719. Ellenrieder, N. von (2009): Type specimens of Insecta housed at the Museo de Ciencias Naturales de Salta, Argentina. *Rev. Soc. Entomol. Argent.* 68(3-4): 253-262. (in English, with Spanish summary) [A short description of the entomological collection of the Natural History Museum of Salta, Argentina, is provided, with a listing of the type specimens held here (34 holotypes, 6 syntypes, 9 allotypes, and 55 paratypes). The collection includes two paratypes of *Oligoclada rubribasalis* von Ellenrieder & Garrison 2008.] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

8720. Ferreras-Romero, M.; Márquez-Rodríguez, J.; Ruiz-García, A. (2009): Implications of anthropogenic disturbance factors on the Odonata assemblage in a Mediterranean fluvial system: River Guadiamar, southern Iberian Peninsula. *International Journal of Odonatology* 12(2): 413-428. (in English) ["During a period of nine years, from 2000 to 2008, two consecutive studies - one focusing on observations of adult Odonata, the other on collection of larvae - were carried out in the basin of the Guadiamar River in the southwestern Iberian Peninsula. In addition to monitoring Odonata, several environmental variables were assessed, including an index based on macroinvertebrate communities (IBMWP). In April 1998, this river system suffered from an accidental release of a large mass of toxic mining waste, which exterminated macroinvertebrates in the middle and lower parts and floodplain. Several years later, dragonfly communities in these areas were similar to those of unaffected upper reaches. Communities of sites less affected by general human impact were dominated by semivoltine anisopterans. In contrast, headwaters and river reaches where riparian forest had been destroyed many years ago and seasonality of river discharge was boosted by landscape management harboured chiefly uni- or bivoltine species, regardless whether a site had been affected by mining waste or not. Species assemblage was especially poor in lower river reaches that experienced permanent, diffuse urban and agricultural pollution. A few parti-voltine species were recorded, but only in habitats with a high IBMWP index. It seems that over the long term, Odonata respond more to land use and catchment management than other groups included in the IBMWP index." (Authors)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain. E-mail: ferreras@teleline.es

8721. Fraker, M.E. (2009): Perceptual limits to predation risk assessment in green frog (*Rana clamitans*) tadpoles. *Behaviour* 146(8): 1025-1036. (in English) ["Many prey assess predation risk through information sources that decline in reliability over time (i.e., the information sources indicate a wider range of potential predation risk levels over time until they provide no information about the current predation risk). However, prey may lack the perceptual ability to accurately assess the reliability of ageing information sources. Here, evidence is provided that suggests that *R. clamitans* tadpoles are unable to assess the age of the chemical cue of predatory larval *Anax junius* upon exposure to

cue up to 48 h old (but can at 72 h). As a result, tadpoles may overestimate the level of risk when they encounter aged *Anax* chemical cue, resulting in a disproportionately strong behavioural response. In general, the results suggest that the predation risk assessment of prey depends not only on the objective characteristics of the information source, but also on the perceptual limitations of the prey. Prey may lack the context to accurately assess information sources and may consequently misestimate the actual level of predation risk." (Author)] Address: Fraker, M.E., Dept of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, MI 48109-1048, USA. Email: mfraker@umich.edu

8722. Frankovic, M.; Bogdanovic, T. (2009): *Vretenca. Prirucnik za inventarizaciju i pracenje stanja.* Zagreb. ISBN 978-953-7169-71-8: 48 pp. (in Croatian) [Manual for the inventarisation of the Croatian Odonata.] Address: not stated

8723. Gonzalvez Neves dos Santos, A.F.; Racca-Filho, F.; Neves dos Santos, L. (2009): El pez Tracheleopterus striatulus (Siluriformes: Auchenipteridae) como herramienta de muestreo de la entomofauna en un embalse tropical. *Revista de Biología Tropical* 57(4): 1081-1091. (in Spanish, with English summary) [The diet of the insectivorous fish *T. striatulus* was examined through dietary analyses of 383 individuals caught between April 1999 and March 2000 in Lajes Reservoir, a 30 km² oligotrophic impoundment in Southeast Brazil. The diet consisted to 92.1% of insects (10 orders and 9 families). Hymenoptera (57.90%), Odonata (39.76%), Trichoptera (27.41%), Ephemeroptera (26.25%) and Coleoptera (28.96%) were the most frequent taxa.] Address: Racca-Filho, F., Depto de Biologia, Univ. Federal Rural do Rio de Janeiro, Antiga BR 465, Km 47, Seropédica, RJ - Brasil. E-mail: fraccafo@ufrj.br

8724. Gregoire, S.; Gregoire, J. (2009): Shift in *Celithemis elisa* (Calico Pennant) emergence strategy. *Argia* 21(4): 10. (in English) [Daily counts of emergence of *C. elisa* are documented for 2005-2009.] Address: Gregoire, J., Kestrel Haven Avian Migration Observatory, Burdett, NY 14818, USA. E-mail: khmo@empacc.net

8725. Guezennec, P.; Guezennec, C. (2009): First record of *Tauriphila australis* Hagen (Garnet Glider) for Guadeloupe (FWI). *Argia* 21(4): 14. (in English) [28-IX-2009, a single male specimen of *Tauriphila australis* was observed at "Mare Castex", near Petit-Canal on Grande-Terre of Guadeloupe.] Address: Guezennec, P., Société d'Histoire Naturelle L'Herminier, Muséum d'Histoire Naturelle, 12 rue Voltaire, 44000 Nantes, France. E-mail: pierre.guezennec@shnlh.org

8726. Hatfield, J.K. (2009): *Sympetrum pallipes* (Striped Meadowhawk): A new Texas state record. *Argia* 21(4): 11. (in English) [Llano Estacado Audubon Society Trail of Buffalo Springs Lake, Texas, 2-IX-2009] Address: Hatfield, J.K. E-mail: dragonflywatcher1029@yahoo.com

8727. Hatfield, J.K. (2009): The Dot-winged Baskettail (*Epitheca petechialis*) of the Texas Llano Estacado. *Argia* 21(3): 6-7. (in English) [Llano Estacado Audubon Trail of Buffalo Springs Lake in southeast Lubbock County, Texas, USA, spring 2005] Address: Hatfield, J.K. E-mail: dragonflywatcher1029@yahoo.com

8728. Hilfert-Rüppell, D.; Rüppell, G. (2009): Males do not catch up with females in pursuing flight in Calo-

pteryx splendens (Odonata: Calopterygidae). International Journal of Odonatology 12(2): 195-203. (in English) ["In high densities males of Calopteryx splendens showed alternative reproductive behaviour at the river Oker in northern Germany. One of several tactics was to pursue females. Pursuing flight was filmed in summer 2006 in slow motion. Frame by frame analysis showed that males fly in irregular flight patterns: they showed different lengths of wing beat phases in comparison to females which fly more steadily. Females had significantly lower wing beat frequencies than males. The flight patterns of males depended on their position to other pursuing males and to the pursued female. The possible causes of these flight differences are discussed." (Authors)] Address: Hilfert-Rüppell, Dagmar, Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

8729. Höpstein, G.; Bellstedt, R. (2009): Die Besiedlung eines neu angelegten Kleingewässers durch Amphibien (Amphibia) und aquatische Insekten (Insecta: Odonata, Coleoptera) bei Bad Blankenburg (Landkreis Saalfeld-Rudolstadt / Thüringen). Thüringer faunistische Abhandlungen 14: 31-42. (in German, with English summary) [Thüringen, Germany; 16 Odonata species are recorded between 2004 and 2008. With the exception of the strongly dispersive but rare species *Ischnura pumilio* and *Lestes barbarus*, the Odonata recorded are more widespread species.] Address: Höpstein, G., Flecken 17, 07422 Bad Blankenburg, Germany

8730. Holdt, E. von (2009): Entomologische Besonderheiten des Jahres 2009. HVV-info 1/2021 (Hannoverscher VogelschutzVerein): 3-6. (in German) [*Leucorrhinia caudalis*, 30-VI-2009, Hannover, Niedersachsen, Germany] Address: von Holdt, E., Offensteinstr. 13, 30451 Hannover, Germany. E-mail: ecvocho@t-online.de

8731. Holdt, E. von (2009): Bemerkenswerte Libellen im Raum Hannover 2007 und 2008. HVV-info 1/2009 (Hannoverscher VogelschutzVerein): 29-30. (in German) [Germany, Niedersachsen; records of the following Odonata species are dealt with: *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, *Anax parthenope*, *Orthetrum brunneum*, *O. coerulescens*, *Sympetrum pedemontanum*, *S. fonscolombii*, *Erythromma lindenii*, *Anaciaeschna isoceles*.] Address: von Holdt, E., Offensteinstr. 13, 30451 Hannover, Germany. E-mail: ecvocho@t-online.de

8732. Hong, S.J. (2009): Surface ultrastructure of *Plagiorchis muris* growth and developmental stages in rats, the final host. Parasitol. Res. 105(4): 1077-1083. (in English) ["In the excysted metacercaria, the whole fluke surface was covered with peg-shaped tegumental spines. Ciliated sensory papillae (type I) were concentrated around the oral sucker, and non-ciliated sensory papillae (type II) were aligned on the lip of oral and ventral suckers. Several type II papillae were aligned laterally with linear symmetry between the oral and ventral suckers. In juvenile flukes, cytoplasmic processes were band-shaped on the anterior half of the body surface and velvety on the posterior half. In adult flukes, cytoplasmic processes were differentiated into velvety processes, and densities of tegumental spines were reduced on the posterior half of the body. Flukes grew to be elongated and leaf-like as adults and retained a surface ultrastructure that was similar to that of juveniles in terms of the distribution of tegumental spines and sen-

sory papillae. From the above results, the authors suppose that the marked differentiation of cytoplasmic processes and the reduced density of tegumental spines observed on the posterior half of the body surface are closely related to the development of reproductive organs therein. [...] *Sympetrum eroticum* were caught in the rice paddies of Yongho-myon, Koseong-gun, Gyeongsangnam-do, Korea during June and July 1994. They were crushed with a mortar and pestle and digested within artificial gastric juice at 37°C for 1 h. After washing with phosphate-buffered physiological saline (PBS), *P. muris* metacercariae were collected from particulates under a dissecting microscope." (Author)] Address: Hong, S.J., Department of Medical Environmental Biology, Chung-Ang University College of Medicine, Tongjak-gu, Seoul 156-756, South Korea. E-mail: hongsj@cau.ac.kr

8733. Iserbyt, A.; van Gossum, H. (2009): Unexpected absence of behavioural differences between female damselfly colour morphs. Animal Behaviour 78(6): 1463-1469. (in English) ["Males are often selected for higher mating rates than females. As a consequence of this sexual conflict, unreceptive females may suffer fitness costs from excessive male sexual harassment. In a variety of vertebrate and invertebrate species, multiple female morphs coexist in natural populations which have been observed to differ in body colour, in behaviour and also in the amount of male harassment received. However, the degree of harassment on a female morph may depend on the frequency and density of males and female morphs in the population. We quantified harassment rate and subsequent refusal behaviour of males and female morphs of the polymorphic damselfly *Nehalennia irene*. Unexpectedly and contrary to previous work, female morphs received similar amounts of male harassment and showed mostly the same behaviour. We discuss why differences in morph behaviours may be lacking and how this compares to contemporary explanations for the maintenance and evolution of female-limited polymorphisms." (Authors)] Address: Iserbyt, A., Evolutionary Ecology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: arne.iserbyt@ua.ac.be

8734. Iwasaki, H.; Suda, D.; Watanabe, M. (2009): Foraging activity of *Sympetrum infuscatum* (Selys) adults living in Satoyama Forest gaps (Odonata: Libellulidae). Jpn. J. Appl. Entomol. Zool. 53: 165-171. (in Japanese, with English summary) ["Adult *S. infuscatum* live in the forest gaps throughout their life except when visiting rice paddy fields for oviposition. They prey on small flying insects in the forest gaps, using sit-and-wait tactics. They perch on the tips of branches or grass all day and take off when a small flying insect comes into sight. In the present study, the foraging behaviour of *S. infuscatum* in the forest gaps was observed. The perching height was high in the morning and evening and low around noon. The diurnal change in the perching height corresponded to the abundance of flying small insects. The mean daily frequency of foraging flights was 251 for females and 182 for males, and the mean actual number of insects captured was 109 and 89, respectively. A total of 2,935,300 small flying insects were preyed on by *S. infuscatum* adults during one day in the Satoyama forest gaps." (Authors)] Address: Iwasaki, H., Graduate School of Life and Environmental Sciences, University of Tsukuba; Tennodai, Tsukuba, Ibaraki 305-8572, Japan

- 8735.** Johanson, J. (2009): Two new odonates for Oregon in two days. *Argia* 21(3): 22-23. (in English) [USA; male *Lestes forcipatus* at a pond about 14 miles north of Enterprise, Wallowa County, Oregon, 3-VIII-2009. Female *Aeshna tuberculifera* at a borrow pit near Fry Meadow, Union County, Oregon, 3-VIII-2009.] Address: Johnson, J., Vancouver, Washington, USA. E-mail: jjjohnson@comcast.net
- 8736.** Johnson, J. (2009): Mysterious behavior: Tail-dipping female *Octogomphus specularis* (Grappletail). *Argia* 21(4): 7-8. (in English) [Females perched on the sides of rocks and lodged with just the tip of the abdomen in the water.]
- 8737.** Karlsson, T. (2009): Arsprapport 2008 för project Trollsländor i Östergötland. Ent. For. Östergötland: 7 pp. (in Swedish) [A report on the 2008 survey of the Odonata of Östergötland, Sweden, with information on records of the observed species as *Aeshna serrata*, *Lestes virens*, *Nehalennia speciosa*, *Coenagrion armatum* and *C. lunulatum*.] Address: Karlsson, T., Länsstyrelsen Östergötland, Miljövärdsheten, 58186 Linköping, Sweden
- 8738.** Keppner, E. (2009): Occurrence of *Libellula pulchella* (Twelve-spotted Skimmer) in Bay County, Florida. *Argia* 21(3): 12. (in English) [*L. pulchella* appeared to be a rare migrant in Florida, USA; imagines of *L. pulchella* were recorded on 30-XI-2007, and larvae of the species were collected in winter 2007 and 2008.] Address: Keppner, E. E-mail: ekeppner@bellsouth.net
- 8739.** Kerst, C. (2009): A deformity in a female *Aeshna sitchensis* (Zigzag Darner) from Washington. *Argia* 21(4): 9. (in English) [Bunchgrass Meadows in north-eastern Washington, USA; „The abdomen of the female was upside down with the ovipositor on top. The female appeared to be mature so apparently was able to feed and function with this deformity. The abdomen may have twisted during emergence, but it appeared more likely that segments three and four of the abdomen were malformed.“ (Author)] Address: Kerst, C. E-mail: caryk@comcast.net
- 8740.** Kerst, C. (2009): Color change in male *Argia nahuana* (Aztec Dancer) in tandem pairs. *Argia* 21(4): 8-9. (in English) [Twentymile Creek, Oregon, USA; In most tandems of *A. nahuana*, the blue colours of the male head and thorax were a dull purple colour rather than the normal bright blue. The author collected a couple of tandem pairs of *A. nahuana* with dark males and placed them in envelopes where the males changed back to the normal bright blue colour. Additional examples of darkening of males in tandem pairs in *Argia* sp. are outlined, and advice to the physiological colour change at low temperatures is given.] Address: Kerst, C. E-mail: caryk@comcast.net
- 8741.** Khrokalo, L.A.; Verves, Yu.H. (2009): Dragonflies (Odonata) and certain two-winged insects (Diptera: Calliphoridae; Sarcophagidae) of the Shatsk Lake district. *Nauk. Visn. Bolls'kogonac. Univ. L Ukrainki* 2009(2) [Research news of the Volyn National University of Lesya Ukrainka 2 (Fauna) (2): 114-118. (in Ukrainian, with Russian and English summaries) [31 out of 49 regionally known Odonata species were recorded between 2005–2008 in the Shatsk Lake District and in the Volyn Oblast, Ukraine. *Sympecma fusca*, *Anaciaeschna isosceles*, *Ophiogomphus cecilia*, and *Calopteryx splendens ancilla* are new for the fauna of Volyn, while *S. fusca* and *Sympetrum striolatum* are new for the Shatsk lakes area.] Address: Khrokalo, Lyudmila, P.O. Box 16, Kyiv-118, Ukraine 03118. E-mail: khrokalo@mail.ru
- 8742.** Kitt, M.; Röller, O.; Seitz, U. (2009): Viele neue Erkenntnisse über Tiere und Pflanzen des Bienwaldes. *POLLICHA-Kurier* 25(4): 5-6. (in German) [In the framework of the the "Day of biodiversity", held on 12./13-VI-2009 in the Bienwald-region, southern Rheinland-Pfalz, Germany, several regionally rare Odonata were recorded including *Coenagrion mercuriale*, *C. scitulum*, *Gomphus vulgatissimus*, and *Cordulegaster boltonii*.] Address: Kitt, M., Raiffeisenstr. 39, D-76872 Minfeld, Germany, E-mail: MKitt@tonline.de
- 8743.** Krilowicz, C.; Lubchansky, J. (2009): New county records for New Jersey. *Argia* 21(4): 22. (in English) ["After spending several years in the field chasing Odonata, we have accumulated a number of county records.“ 48 species are listed along with data on first record in each of the counties visited by the authors.] Address: Krilowicz, C., Haddonfield, NJ, USA. E-mail: chippop@verizon.net
- 8744.** Khrokalo, L.A.; Savcuk, V.V. (2009): New records of rare dragonflies (Insecta, Odonata) in Ukraine. *Vestnic zoologii* 43(4): 378. (in Russian) [Records of *Erythromma lindenii*, *Coenagrion scitulum*, and *Selysiothemis nigra* are documented.] Address: Khrokalo, Lyudmila, P.O. Box 16, Kyiv-118, Ukraine 03118. E-mail: khrokalo@mail.ru
- 8745.** Krotzer, S. (2009): A new species record for Alabama. *Argia* 21(4): 13-14. (in English) [*Lestes forcipula*, a species expanding its range to the east of USA was observed on 24-IX-2009 in the Conecuh National Forest, Covington County, Alabama, USA (31°05.40' N, 086°33.38' W).] Address: Krotzer, S., 2238 Haysop Church Road, Centreville, AL 35042, USA. E-mail: rskrotze@southernco.com
- 8746.** Martynov, A.V.; Martinov, V.V. (2009): New interesting finds of dragonflies (Odonata) in Ukraine. *Vest. Zool.* 43(2): 150. (in Russian, with English title) [New records are presented for *Chalcolestes parvidens*, *Coenagrion scitulum*, *Anax ephippiger*, *Somatochlora arctica*, *S. metallica*, *Sympetrum fonscolombii*, and *S. striolatum*.] Address: Martynov, A.V., Dept Zool., Fac. Biol., Donetsk Natn. Univ. Shchorsa 46, UKR-83050 Donetsk, Ukraine
- 8747.** Matushkina, N.A.; Guga, E.K.; Buy, D.D.; Limarenko, D.A. (2009): Dragonflies (Insecta, Odonata) of the Udai River part of the Sula River ecological corridor (Central Ukraine: A preliminary checklist). *Nature Reserves in Ukraine* 15(1): 70-71. (in English) [14 species including *Sympecma paedisca* are listed.] Address: Matushkina, Natalia A., Department of Zoology, Biological Faculty, National Taras Shevchenko University of Kyiv, vul. Volodymyrs'ka, 64, Kyiv UA-01033, Ukraine. E-mail: odonatally@gmail.com
- 8748.** McCaul, A.; McCaul, E. (2009): Dragonhunter (*Hagenius brevistylus*) mating trio. *Argia* 21(4): 10. (in English) [Triple connection of *H. brevistylus* with two males leading a female, as seen near Huntsville, Alabama, USA, 15-VIII-2009.] Address: McCaul, A. E-mail: asm@stormshooter.com
- 8749.** Meurgey, F.; Daigle, J.J. (2009): Collecting trip to Grenada (Lesser Antilles): an updated checklist of

species. *Argia* 21(3): 13-17. (in English) [To further increase knowledge on the biogeography of the Lesser Antillean dragonflies, a survey of Grenada was carried out from 1-14-V-2009. Localities are briefly described and interesting species are dealt with. *Brechmorhoga grenadensis* is considered a synonym of *B. praecox*.] Address: Daigle, J.J., Little River Lane, Tallahassee, FL 32311 USA. E-mail: jdaigle@nettally.com

8750. Millan Jimenez, C., (2009): Insectos acuáticos del humedal Timbique en el corregimiento del Bolo-Palmira (Valle del Cauca, Colombia). *Boletín del Museo de Entomología de la Universidad del Valle* 10(1): 30-36. (in Spanish, with English summary) ["Sampling of aquatic insects associated with the Timbique wetland (Palmira, Valle del Cauca) was performed between May of 2008 and January 2009. Insects were collected using Surber and kick nets D in five strategic points chosen in the wetland. In general, the absence of the Diptera *Culicidae* and *Chironomidae* in the latter year was evident. This result appears to be caused by the partial removal of water lettuce (*Pistia* sp.) in the wetland, which served as substrate for the larvae of mosquitoes *Coquillettidia* sp. and *Mansonia* sp. found in 2008. Additionally, the presence of larvae and adults in courtship flights of Odonata suggests reproductive activity in the area." (Authors) Odonata are treated at the family level.] Address: Millán Jiménez, Carolina, Departamento de Biología, Universidad del Valle, Calle 13 # 100 - 00 Sede Meléndez. Cali - Colombia. A.A 25360, Cali, Colombia. E-mail: lepidoptera.azul@gmail.com

8751. Ohba, S. (2009): Feeding habits of the diving beetle larvae, *Cybister brevis* Aubé (Coleoptera: Dytiscidae) in Japanese wetlands. *Appl. Entomol. Zool.* 44 (3): 447-453. (in English) ["A number of descriptive reports suggest that *Cybister* larvae feed on tadpoles, fish, and aquatic insects; however, no quantitative study on their feeding habits has been reported. In order to elucidate the feeding ecology of *C. brevis* larvae, field observations and laboratory experiments were carried out. In the field, all *C. brevis* larvae fed on invertebrates, such as insects and isopoda, but did not eat vertebrates, such as fish and anuran larvae. A rearing experiment demonstrated that all *C. brevis* larvae provided with tadpoles died. Larvae provided with Odonata nymphs - [Small damselfly nymphs (Platycnemididae: *Copera* spp. and *Lestes* spp., <15 mm), medium damselfly nymphs (same species, 15-20 mm), and large dragonfly nymphs (Libellulidae: *Orthetrum albistylum speciosum*, *Sympetrum frequens*, *S. infuscatum*; Aeshnidae: *Planaeschna milnei*, and *Anax parthenope parthenope*, 20-30 mm) were provided as food to 1st, 2nd, and 3rd instars, respectively.] - had a longer total body length than larvae reared with a mixture of tadpoles and Odonata nymphs. In addition, larvae of *C. brevis* could search for and eat motionless Odonata nymphs, but all larvae died from starvation when they were supplied with motionless tadpoles. These results suggested that *C. brevis* larvae mainly preyed upon invertebrate animals and did not eat vertebrate animals, such as tadpoles and fish." (Author)] Address: Ohba, Shin-ya, Dept of Vector Ecology & Environment, Inst. of Tropical Medicine, Nagasaki Univ., Sakamoto, Nagasaki 852-8523, Japan. E-mail: oobug@hotmail.com

8752. Orr, A.G. (2009): Reproductive behaviour of *Libellago semiopaca* on a Bornean rainforest stream (Odonata: Chlorocyphidae). *International Journal of Odonatology* 12(2): 157-180. (in English) ["The repro-

ductive behaviour of *L. semiopaca* was studied on a swift-flowing shallow forest stream in Brunei. Females oviposited just below the water-line, commonly in groups, only on large, firm-textured, semi-submerged logs, usually guarded by males. Both sexes were very sedentary. Suitable sites, with good illumination and deep deposits of fine gravel and leaf mulch in dead water immediately behind the log were scarce. When stream levels were high, no oviposition sites were available. When possible, females generally oviposited every day, arriving between 10:00 and 15:00 h, and usually remaining on site for at least two hours. Males arrived earlier, between 09:00 and 13:00 h, and established small territories along the log. Females apparently began reproductive activity only when all oocytes were mature, and the egg load diminished daily as eggs were laid. Most matings occurred before 12:00 h with early-arriving females. Females mated every 2-3 days, probably to replenish sperm supplies. Male density was at its highest after 11:00 h and males shared territories, spending much of their time flying in low intensity confronting contests. Removal of males from a site, just as it was becoming available by falling water levels, resulted in little use of the site by females. Pinning decoy dead females at a good oviposition site failed to attract females if males had been removed. It is suggested that the prolonged male agonistic display attracts females to the site, and possibly commits them to future matings with the territory holders." (Authors)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

8753. Paulson, D. (2009): *Lestes forcifera* (Rainpool Spreadwing) in Florida. *Argia* 21(3): 18-19. (in English) [11 July 2009, at a series of flatwoods ponds on Eglin Air Force Base, Okaloosa County, Florida, USA (30° 29.05' N, 086° 43.09' W).] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8754. Paulson, D. (2009): Additional comments about Odonata of Baja California Sur. *Argia* 21(2): 12-13. (in English) [The regional status of *Archilestes grandis*, *Ischnura hastata*, *Aeshna walkeri*, *Tramea lacerata* (all: first records for BCS) and *Libellula croceipennis* (correction of the first record in BCS) is updated. *Enallagma annexum* and *Ischnura denticollis* should be deleted as regional records.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8755. Phillips, I.D.; Vinebrooke, R.D.; Turner, M.A. (2009): Experimental reintroduction of the crayfish species *Orconectes virilis* into formerly acidified Lake 302S (Experimental Lakes Area, Canada). *Canadian Journal of Fisheries and Aquatic Sciences* 66(11): 1892-1902. (in English, with French summary) ["Reintroduction of functionally important species is considered a key strategy for restoring damaged ecosystems. However, the sudden reappearance of an extirpated species may have adverse ecological impacts, degrading ecosystem services. Therefore, we experimentally reintroduced *O. virilis* [...] to determine its effect on the littoral food web following a 17-year absence. In June 2004, a single-factor experimental design consisting of two treatment levels (crayfish-less control versus 1.8 introduced crayfish-m⁻²) was replicated five times for a total of 10 littoral cages (4m²). *O. virilis* significantly ($P < 0.05$) suppres-

sed the total biomass of other benthic invertebrates by 70% primarily because of declines in larval damselflies and midges. In addition, crayfish reduced periphytic biomass by 90% ($P < 0.001$). Stable isotopic analyses of the mesocosm food webs further indicated that *O. virilis* likely functioned as an omnivore, exerting direct and possibly indirect effects on other invertebrates and periphyton. Our findings highlight how the reintroduction of *O. virilis* must be balanced with adequate fish predation to prevent this species from becoming an invader and negatively affecting the productive capacity of boreal lakes. [...] Crayfish treatments had contrasting species-specific effects on odonates. *O. virilis* enclosures contained significantly less biomass of the most abundant odonate, *Aeshna* sp. However, crayfish significantly increased the population density of this anisopteran (RM-ANOVA, $F = 4.37$, $P = 0.04$). In contrast, crayfish significantly increased total zygopteran biomass, consisting primarily of *Enallagma* sp.. [...] *O. virilis* strongly suppressed the total abundance of the *Aeshna* sp. by negatively affecting larger individuals belonging to this genus. However, densities of *Aeshna* sp. were significantly elevated in the enclosures relative to the crayfishless controls because of the increase in small individuals. Similarly, the smaller zygopteran genus *Enallagma* sp. was also more abundant in the presence of crayfish. Therefore, we suggest that size-selective predation by crayfish on larger odonates, or possibly their active avoidance of this large predator, released smaller odonates from competition and cannibalism." (Authors)] Address: Vinebrooke, R., Dept of Biological Sciences, University of Alberta, Edmonton, Alberta T6G 2E9, Canada. E-mail: rolf@ualberta.ca

8756. Purse, B.V.; Thompson, D.J. (2009): Oviposition site selection by *Coenagrion mercuriale* (Odonata: Coenagrionidae). *International Journal of Odonatology* 12(2): 257-273. (in English) ["The aim of the study was to determine oviposition site selection in the endangered damselfly *Coenagrion mercuriale* in its UK stronghold and to determine hatching success of eggs. This was achieved by watching the behaviour of marked pairs from the onset of copulation to the end of oviposition and recording the number and duration of oviposition attempts and the plants oviposited in during the pairing. Pairs were either freely observed along a stream or placed in pre-placed cages within the stream. Stems into which oviposition had been observed were collected after four weeks and the fate of deposited eggs was determined. Pairs typically oviposited in several stems during multiple oviposition bouts, but usually in just one plant species. Mean total duration of oviposition behaviour was 671 s but ranged from 244 to 1,471 s. Mean number of eggs laid was 91 and ranged from 23 to 337. The female submerged completely in 15% of ovipositions. Mean egg deposition rate was 14 eggs per min but there was considerable variation. There was a significant positive relationship between total duration of oviposition in a stem and number of eggs laid in that stem. None of the habitat variables measured was a good predictor of duration of oviposition or number of eggs laid. Mean mortality of eggs was 14% at the time of collection and there was asynchronous development. *Hypericum elodes* was used significantly more than expected from its frequency in the environment and *Eleocharis palustris*, *Molinia caerulea* and *Myrica gale* significantly less." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liver-

pool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

8757. Rasteiro Ordiale, P.; Costa Cavalcante, A. (2009): Influência da urbanização na comunidade de insetos aquáticos no Ribeirão das Antas. *Anuário da Produção de Iniciação Científica Discente* XII(14): 97-113. (in Portuguese) [Brazil; taxa including "Gomphidae" are treated at the family level.] Address: Rasteiro Ordiale, Patrícia, Alameda Maria Tereza, 2000 Valinhos, SP - CEP 13278-181, Brazil. E-mail: rc.ipade@unianhanguera.edu.br

8758. Reid, L. (2009): Dragonflies and butterflies: reporting back on the April field trip. *Nature Territory* 2009 (May): 11. (in English) [14 odonate species are recorded from McMinns Lagoon, Northern Territory, Australia.] Address: Reid, L., c/o P.O. Box 39565, Winnellie, NT 0821, Australia

8759. Reid, M. (2009): *Cannaphila insularis* (Gray-waisted Skimmer), a new genus/species for New Mexico. *Argia* 21(4): 14-15. (in English) [5-VIII-2009, Rattlesnake Springs, part of Carlsbad Caverns National Park, New Mexico.] Address: Reid, M., 11500 Huebner Road #1605, San Antonio, TX 78230, USA. E-mail: upupa@airmail.net

8760. Reid, M. (2009): *Libellula gaigei* (Red-mantled Skimmer), a new species for the United States. *Argia* 21(3): 20-21. (in English) [11-VIII-2009, Santa Ana National Wildlife Refuge, Hidalgo county, southernmost Texas.] Address: Reid, M., 11500 Huebner Road #1605, San Antonio, TX 78230, USA. E-mail: upupajynx@yahoo.com

8761. Saavedra, M.A. (2009): Dragonfly (Insecta: Odonata) diversity in two use of soils in a tropical dry forest. *Rev. Fac. Nal. Agr. Medellín* 62(2): 5071-5079. (in Spanish, with English summary) ["Dragonfly diversity was estimated in the Agricultural Center Cotove (Santafe de Antioquia-Colombia). Active capture using an entomological net was used. Each transect was located perpendicular to the water body, for a length of approximately 200 m and a lateral extension of 8 m. Twenty Odonata species were registered. Libellulidae showed the biggest abundance and richness, with 65 specimens that represent 53.7% of the total abundance, and 12 species that represent 60% of the registered community. The alpha-diversity was high in the forest in reference at crop; however, the low abundances register highlight the need for greater sampling effort in cultivating, for a better estimate of gamma-diversity; the beta-diversity was of 12 species and the complementary index was of 0.6, it indicates that the Odonata's fauna is characteristic and distinctive for each use of soil." (Author)] Address: Estudiante de Maestría en Ciencias-Entomología. Universidad Nacional de Colombia, Sede Medellín. Facultad de Ciencias. A.A. 3840, Medellín, Colombia. E-mail: marianoaltamirandas@hotmail.com

8762. Saha, N.; Aditya, G.; Saha, G.K. (2009): Habitat complexity reduces prey vulnerability: An experimental analysis using aquatic insect predators and immature dipteran prey. *Journal of Asia-Pacific Entomology* 12(4): 233-239. (in English) ["The effects of alternative prey and structural complexity of habitat on the selection of mosquito larvae by aquatic insect predators were evaluated in the laboratory. The water bugs *Anisops bouvieri*, *Diplonychus* (= *Sphaerodema*) *rusticus*, and *D.*

annulatus, and the odonate nymphs, *Ceriagrion coromandelianum* and *Brachydiplax chalybea chalybea*, selected mosquito larvae based on their abundance relative to chironomid larvae and on the levels of habitat complexity. The effect of one prey species on the other was asymmetrical, as indicated through prey selectivity values. Compared to open habitat, the presence of macrophytes reduced the vulnerability of mosquito larvae while the effect was reverse in the presence of sediments. When both sediment and macrophytes were present in habitats, all the predators except *D. annulatus* consumed more mosquito larvae than chironomid larvae. The clearance rate, an indicator of predatory efficiency, varied among the predator species and habitat types. The results suggest that the outcome of the interactions between insect predators and mosquito immatures was context-dependent and that it was mediated by the presence of alternative trophic species and the habitat complexity." (Authors)] Address: Saha, N., Department of Zoology, University of Calcutta, 35, Ballygunge Circular Road, Kolkata 700019, India. E-mail: nabaneetasaha@gmail.com

8763. Sartor, V.; Holdefer Woldan, D.R.; Mello Garcia, F.R. (2009): Survey and ecological aspects of entomological fauna in municipality of União da Vitória state of Paraná. *Biodiversidade Pampeana Uruguiana* 7(1): 35-43. (in Portuguese, with English summary) [Brasil; a total of 19 Odonata specimens was caught in malaise traps.] Address: Sartor, V., Depto. de Engenharia Florestal da Univ. do Contestado – UNC, Campus Canoinhas. Campus Universitário Mar cílio Dias, Canoinhas SC. Brasil. E-mail: vitorsartor@yahoo.com.br

8764. Schiel, F.-J. (2009): Exuvie der Zierlichen Moosjungfer (*Leucorrhinia caudalis*) mit Dreikantmuschel (*Dreissena polymorpha*) (*Bivalvia*: *Dreissenidae*) als Aufsitzer. *mercuriale* 9: 21-22. (in German, with English summary) ["On 09-VI-2008, an exuvia of *Leucorrhinia caudalis* with a zebra mussel (*Dreissena polymorpha*) attached to the ventral side of its metathorax was found in a gravel pit near Karlsruhe, SW-Germany. The mussel had a length of 6 mm." (Author)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

8765. Schmidt, E. (2009): Langzeit-Beobachtungen zur Libellenfauna am Garten-Kleinteich im Münsterland /Westfalen. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 12(1): 37-43. (in German) [Germany, Nordrhein-Westfalen; starting in 1995/96, a total of 17 odonate species was observed as dispersers or - in rare cases - as breeders in a small garden-pond, resp. a 80 l water bucket. Habitat conditions are assessed as sub-optimal to Odonata. Species- and ecological composition of the fauna and the periods of emergence and flight are analyzed and discussed. Devouring of a freshly emerged *Pyrrhosoma nymphula* by *Ischnura elegans* lasted app. 45 min.] Address: Schmidt, E.G., Coesfelder Str. 230, 48249 Dülmen, Germany

8766. Schoeppner, N.M.; Relyea, R.A. (2009): Phenotypic plasticity in response to fine-grained environmental variation in predation. *Functional Ecology* 23: 587-594. (in English) [1. In nature, organisms experience environmental variability at coarse-grained (inter-generational) and fine-grained (intra-generational) scales and a common response to environmental variation is phenotypic plasticity. The emphasis of most empirical

work on plasticity has been on examining coarse-grained variation with the goal of understanding the costs and benefits of plastic responses in response to a particular environment. 2. In this study, we investigated the effects of fine-grained variation in predation on the inducible defences of larval wood frogs (*Rana sylvatica*) by widely altering the density and feeding schedule of caged predators (*Dytiscus* spp.) while holding average predation constant. 3. We found that predator cues induced change in tadpole behaviour, morphology, and mass. Surprisingly, however, temporal variation in predation did not cause the tadpoles to alter their activity (compared to a constant predation treatment) or mass. Temporal variation in predation did alter tadpole tail depth, but only when experiencing our most extreme variation treatment in which the predators were fed once every 8 days. Under these conditions, the predator-induced tadpole tail was less extreme compared to environments containing constant predation. 4. While a number of previous studies have examined behavioural responses of prey to temporal variation in predation risk without holding average predation constant, this appears to be the first test of temporal variation per se. As in previous studies of organism responses to temporal variation in resources, our results suggest that fine-grained environmental variability can affect the expression of phenotypically plastic traits, but our tadpoles appear to be generally unresponsive to this finegrained variation for many of their traits." (Authors)] Address: Schoeppner, Nancy, School of Biology, Georgia Institute of Technology, 310 Ferst Drive, Atlanta, Georgia 30332; E-mail: nschoeppne3@mail.gatech.edu.

8767. Schoeppner, N.M.; Relyea, R.A. (2009): When should prey respond to consumed heterospecifics? Testing hypotheses of perceived risk. *Copeia* 2009(1): 190-194. (in English) ["In aquatic systems, a long-standing question is why chemical cues from some diets consumed by a predator induce strong anti-predator responses in prey while other diets induce weak or no responses. We performed an experiment to determine if strong prey responses to particular predator diets are due to prey being closely related to the predator's diet (i.e., phylogenetic relatedness) or due to prey coexisting with the predator's diet and thereby sharing a risk of predation. We compared the behaviour of Gray Treefrog tadpoles (*Hyla versicolor*) to cues from a dragonfly nymph (*Anax junius*) that consumed either conspecific Gray Treefrogs, one of six diets that commonly coexist with Gray Treefrogs (spanning a wide range of phylogenetic relatedness), or one diet that is closely related to Gray Treefrogs but has an allopatric range that has not overlapped for at least 20,000 yrs. We found that tadpoles could discriminate among the diets and that the magnitude of behavioural response supported the hypothesis of diet phylogenetic relatedness and refuted the hypothesis of diet coexistence." (Authors)] Address: Schoeppner, Nancy, School of Biology, Georgia Institute of Technology, 310 Ferst Drive, Atlanta, Georgia 30332; E-mail: nschoeppne3@mail.gatech.edu.

8768. Shibuya, A.; Araujo, M.L.G.; Zuanon, J.A.S. (2009): Analysis of stomach contents of freshwater stingrays (*Elasmobranchii*, *Potamotrygonidae*) from the middle Negro River, Amazonas, Brazil. *Pan-American Journal of Aquatic Sciences* 4(4): 466-475. (in English, with Portuguese summary) ["Potamotrygonid stingrays are restricted to Neotropical rivers and information on their diet remains scarce. Thus, the prey composition of

four freshwater stingray species from the middle Negro River was studied using stomach contents analysis: *Potamotrygon motoro* (n=40), *Potamotrygon orbignyi* (n=27), *Potamotrygon* sp. "cururu" (n=26), and *Paratrygon aiereba* (n=34)." (Authors) Odonata - identified up to the family level - were used as diet by all fish taxa. Stomach contents of *P. orbignyi* were composed principally by insects (96.4%), with predominance of gomphid dragonfly larvae.] Address: Shibuya, Akemi, Programa de Pós-Graduação em Biologia de Água Doce e Pesca Interior, BADPI, Instituto Nacional de Pesquisas da Amazônia, INPA, Avenida André Araújo, 2936, Aleixo, 69083-000, Manaus, AM, Brazil. E-mail: akemishibuya@yahoo.com.br

8769. Smith, G.R.; Boyd, A.; Dayer, C.B.; Ogle, M.E.; Terlecky, A.J. (2009): Responses of grey treefrog and American toad tadpoles to the presence of cues from multiple predators. *The Herpetological Journal* 19(2): 79-83. (in English) ["Prey may often need to confront and integrate cues from multiple predators simultaneously. We examined the effects of the cues of two potential predators, mosquitofish and odonates, individually and in combination, on the behaviour of two species of anuran tadpoles, grey treefrog (*Hyla versicolor*) and American toad (*Bufo americanus*). Mosquitofish cues alone reduced the activity of tadpoles of *H. versicolor*, but had no effect on activity of the tadpoles of *B. americanus*. Odonate cues had no independent effects on the behaviour of *B. americanus* or *H. versicolor*. The behaviour of neither species was affected differently by the simultaneous exposure to mosquitofish and odonate cues compared to the independent effects of each predator cue. Habitat use was not affected by any cues or combination of cues in either species. Our results suggest that grey treefrog tadpoles and American toad tadpoles do not respond to the combination of cues from multiple predators any differently than would be expected from their exposure to each cue independently. Our results also demonstrate that the behavioural response of tadpoles to predator cues can be variable among species of prey, as well as among species of predator." (Authors)] Address: not available

8770. Sodhi, N.S.; Wilcove, D.S.; Subaraj, R.; Yong, D.-I.; Lee, T.-m.; Bernard, H.; Lim, S.L.H. (2009): Insect extinctions on a small denuded Bornean island. *Biodiversity and Conservation* 19(2): 485-490. (in English) ["We report odonate and butterfly extinctions on Pulau Mengalum (Sabah) between 1928 and 2007. Pulau Mengalum has lost all of its closed-canopy forest; 55.5% of the odonates and 40% of the butterflies present in 1928 have likely been extirpated. Fourteen and five species of odonates and butterflies found by us were new records for the island, respectively. It is unclear if newly recorded species were missed by previous surveyors in 1928 or if they have colonized the island after that time. While our study indicates that deforestation is a serious threat to tropical insects, it remains unclear if deforested areas provide opportunities for new colonists. [...] Mengalum has likely lost five (55.5%) of nine odonates since 1928 (*Archibasis melanocyana*, *Camacinia gigantea*, *Gynacantha dohrni*, *Lestes praemorsa*, and *Raphismia bispina*). Our last survey in October did not add any species to the previously recorded odonates suggesting that our sampling was adequate. [...] We recorded 14 new odonates in 2007 (*Archibasis viola*, *Agriocnemis femina*, *A. pygmaea*, *Brachydiplax chalybea*, *Diplacodes trivialis*, *Isch-*

nura senegalensis, *Lathrecista asiatica*, *Macrodiplax cora*, *Mortagrion falcatum*, *Orthetrum sabina*, *Pantala flavescens*, *Pseudagrion microcephalum*, *Rhyothemis phyllis*, and *Tramea transmarina*). One of these new records (*A. viola*) is a forest species." (Authors)] Address: Sodhi, N.S., Dept of Biological Sciences, National Univ. of Singapore, 14 Science Drive 4, Singapore, 117543, Republic of Singapore. Email: nsodhi@oeb.harvard.edu

8771. Stefanović, K.S.; Nikolić, V.P.; Tubić, B.P.; Tomović, J.M.; Atanacković, A.D.; Simić, V.M.; Paunović, M.M. (2009): Aquatic macroinvertebrates of the Jablanica river, Serbia. *Arch. Biol. Sci., Belgrade* 61(4): 787-794. (in English, with Serbian summary) [*Gomphus vulgatissimus* was the only dragonfly sampled during 2005 and 2006 at four sampling sites along the Jablanica River, a right-hand tributary of the Kolubara River.] Address: Stefanovic, Katarina, Siniša Stankovic Institute for Biological Research, 11060 Belgrade, Serbia

8772. Steiner, U.K.; Van Buskirk, J. (2009): Predator-induced changes in metabolism cannot explain the growth/predation risk tradeoff. *PLoS ONE* 4(7): e6160., doi:10.1371/journal.pone.0006160: 4 pp. (in English) ["Defence against predators is usually accompanied by declining rates of growth or development. The classical growth/predation risk tradeoff assumes reduced activity as the cause of these declines. However, in many cases these costs cannot be explained by reduced foraging effort or enhanced allocation to defensive structures under predation risk. Here, we tested for a physiological origin of defence costs by measuring oxygen consumption in tadpoles (*Rana temporaria*) exposed to predation risk (final instar dragonfly larva (*Aeshna cyanea*) over short and long periods of time. The short term reaction was an increase in oxygen consumption, consistent with the "fight-or-flight" response observed in many organisms. The long term reaction showed the opposite pattern: tadpoles reduced oxygen consumption after three weeks exposure to predators, which would act to reduce the growth cost of predator defence. The results point to an instantaneous and reversible stress response to predation risk. This suggests that the tradeoff between avoiding predators and growing rapidly is not caused by changes in metabolic rate, and must be sought in other behavioural or physiological processes." (Authors)] Address: Steiner, U.K., Department of Biology, Stanford University, Stanford, California, USA. E-mail: usteiner@stanford.edu

8773. Suhling, F.; Martens, A.; Marais, E. (2009): How to enter a desert - patterns of Odonata colonisation of arid Namibia (Odonata). *International Journal of Odonatology* 12(2): 287-308.. (in English) ["With a total of 75 species the odonate diversity in the Namibian desert is surprisingly high. Based on their distribution characteristics, invasion patterns, and breeding success, there are six well-defined categories of Odonata: widespread species - (1) permanently living in the desert, and desert biased, (2) permanently living in the desert, but not desert-biased; (3) entering the desert seasonally; (4) entering from neighbouring tropical or temperate regions, whose populations may breed in the desert sometimes or locally. Category (5) consists of species with highly localised breeding populations in the desert, which are widely isolated from potential source populations. The last category (6) consists of species restricted to allochthonous perennial rivers. We discuss these patterns from a geographical and a temporal perspective. On the one hand, there have been

different spatial directions from where species have entered deserts. On the other hand, Odonate distribution patterns in the deserts have a palaeoclimatic as well as a present time perspective, the latter with seasonal and annual fluctuations and a strong influx from neighbouring biomes. The discovery of a desert-bias in several species suggests that odonates could be well adapted to desert conditions or, in other words, some species of odonates may be promoted by arid conditions." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

8774. Svitra, G. (2009): Data on eight protected species of dragonflies (Odonata) recorded in Lithuania in 2003–2009. New and rare for Lithuania insect species 21: 5-11. (in English, with Lithuanian summary) [Records of *Sympecma paedisca*, *Aeshna viridis*, *Anax parthenope*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. pectoralis* are compiled.] Address: Švitra G., Lithuanian Entomological Society, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: giedsvis@gmail.com

8775. Szállassy, N.; Szabó, Z.D.; Nagy, B.H. (2009): Survival of dragonfly *Libellula fulva* males according to their mating status: a four year study. *Entomologica romanica* 14: 13-18. (in English, with Romanian summary) ["During four seasons (2000-2003), a closed *L. fulva* population was studied along a creek in Eastern Hungary. The movement of marked and solitary males was observed with binoculars and it was recorded along a 350 meter natural section of the Kutas-channel. Our aim was to analyse the recapture and survival rate of two male groups of *L. fulva* by using mark-recapture models. The model-selection showed that the recapture rate of mated males was higher than of solitary ones. Survival rate of mating males was also higher in every year than the survival of the solitary individuals. This result suggest, that even if it is costly for males to occupy and defend a territory, finding, guarding and mating a female, the successful males have still a higher survival rate." (Authors)] Address: Szállassy, Noémi, Babes Bolyai University, Fac. of Psych. & Sci. of Educ., Dept. of Math. & Sci. Teaching Education, Sindicatelor Str. 7, 400029 Cluj-Napoca, Romania. E-mail: szallassy@gmail.com

8776. Takahara, T.; Yamaoka, R. (2009): Temporal and spatial effects of predator chemical and visual cues on the behavioral responses of *Rana japonica* tadpoles. *Current Herpetology* 28(1): 19-25. (in English) ["A laboratory experiment was conducted to evaluate temporal and spatial effects of predator chemicals and visual stimuli on the behavioural responses of the *Rana japonica* tadpoles. Nymphs of *Anax parthenope julius* were used as the predator model. Tadpoles exhibited defensive responses by reducing tail movement time associated with their activity when exposed to chemicals from the nymphs. These responses tended to be quicker and stronger as distance from the nymphs decreased. Tadpoles exposed to visual stimuli from the nymphs also exhibited similar but weaker behavioural responses. Our results suggest that in a short distance encounter defensive responses of the *R. japonica* tadpole are induced more quickly by chemical cues of the predator than by its visual cues. For the tadpole, detecting the dragonfly nymph by chemical cues may function as a trigger for effective predator-avoidance strategy in tadpole-dragonfly nymph interactions." (Authors)] Address:

Yamaoka, R., Chemical Ecology Laboratory, Graduate School of Science and Technology, Kyoto Institute of Technology, Japan

8777. Tennessen, K. (2009): *Aeolagrion philipi* sp. nov. from Bolivia and a review of the genus *Aeolagrion* (Odonata: Coenagrionidae). *International Journal of Odonatology* 12(2): 309-322. (in English, with Spanish summary) ["*Aeolagrion philipi* sp. nov. is described and illustrated (holotype cf: Bolivia, Santa Cruz department, Nuflo de Chavez province, pooled tributary of Rio San Julian, 5 km SE of San Ramon, 14 xi 1998, leg. KJT, in FSCA). The new species is closely related to *A. inca* but is distinct in shape of hind margin of prothorax, genital ligula morphology, shape of male cerci, and colour pattern of female S8 (dark brown). The female of *A. axine* is described and a key to the species of the genus is provided." (Author)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennesen@centurytel.net

8778. Theischinger, G.; Endersby, I. (2009): Identification Guide to the Australian Odonata. ISBN 978 1 74232 475 3: IV, 283 pp. (in English) [The identification guide includes 325 species in 110 recognised genera, and "provides keys to the identification of the adults of all Australian species and to the larvae as far as known and diagnosable. In order to facilitate identifications, and to increase confidence, particularly in the identification of some larvae, detailed distribution maps of all species are included. Finally, profiles are given for species of serious conservation concern." (Publisher)] Address: Published by: Department of Environment, Climate Change and Water NSW, 59–61 Goulburn Street Sydney, PO Box A290 Sydney South 1232, Australia. E-mail: info@environment.nsw.gov.au; website: www.environment.nsw.gov.au

8779. Walker, J.C.; McKenzie, P.M.; Smentowski, J.H. (2009): *Nehalennia gracilis* (Sphagnum Sprite) found in Missouri: No longer a historical record. *Argia* 21(4): 19-20. (in English) [The rediscovery of *N. gracilis* in Missouri, USA (several records in summer 2009) represents another, more southern, disjunct population of this species.] Address: Walker, Jane, Washington University Tyson Research Center, P.O. Box 258, Eureka, MO 63025, USA. E-mail: walker@biology.wustl.edu

8780. Wang, F.; Huang, Y.; Wang, X.-I. (2009): The first record of the genus *Hylaeothemis* with a species from China (Odonata, Libellulidae). *Acta zootaxonomica sinica* 34(2): 391-394. (in Chinese, with English summary) [*Hylaeothemis clementia* Ris, 1909 is reported for the first time from Xishuangbanna, Wangtianshu, Yunnan, China (21°39'N, 101°30'E); the specimens were caught on 3-V-2007, and are deposited in the Insect Collections of China Agricultural University, Beijing, China.] Address: Wang, Fang, Department of Entomology, College of Agronomy and Biotechnology, China Agricultural University, Beijing 100193, China. E-mail: wangxl @cau.edu.cn

8781. Ware, J.; Louton, J. (2009): A larva worth a thousand words: Imaging preserved dragonfly nymphs using a digital camera. *Argia* 21(2): 10-12. (in English) [As digital photographing substitute line drawings more and more in morphological studies, the authors provide extensive advises how to prepare (cleaning) exuviae for digital processing and how to process the photographing. This is a very thorough paper which enables the user to get very good results in using digital cameras to

photograph exuviae.] Address: Ware, Jessica, Division of Invertebrate Zoology, American Museum of Natural History, 79th and Central Park West, New York, NY, 10024, USA. E-mail: jware@amnh.org

8782. Wildermuth, H. (2009): Season and temperature dependent location of mating territories in *Somatochlora flavomaculata* in a heterogeneous environment (Odonata: Corduliidae). *International Journal of Odonatology* 12(2): 181-193. (in English) ["In a heterogeneous environment, males of *S. flavomaculata* regularly occupy site-fixed locations away from water, adjacent to vertical landscape elements, and to a lesser extent, also at water, i.e. at oviposition sites. Territories both over land and over water are typically patrolled by continuous site-fixed flights. These places serve as rendezvous sites where copulation is initiated. The results of a sevenyear study in a heterogeneous mire habitat of Central Europe with scattered oviposition sites demonstrated that the rendezvous sites changed over the flight season in both location and quality. At the beginning of the reproduction period territories were established almost exclusively over land. Subsequently, there was a significant shift from sites over land to sites over water, and towards the end of the flight season virtually all territories were situated over water. Areas with overgrown puddles were also attractive for establishing territories, even at the beginning of the flight season. When the puddles desiccated during hot and dry spells in the first half of the reproduction period, these sites were no longer used as rendezvous sites. However, no shift towards territories over water was observed in this situation. Small-scale transfer of territories was also related to ambient temperatures. Below 28°C all males patrolled in full sunshine, but when temperatures rose they shifted their patrol sites gradually to the shade, presumably for thermoregulatory reasons. It appears that the mate search strategy of *S. flavomaculata* is characterised by extensive phenotypic plasticity with respect to time and space." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

8783. Willkommen, J. (2009): The tergal and pleural wing base sclerites – homologous within the basal branches of Pterygota? *Aquatic Insects* 31(Supplement 1): 443-457. (in English) ["The Ephemeroptera are usually regarded as the sister group of the remaining Pterygota. Their wing base sclerites and pterothoracic musculature are compared with that of other basal pterygote lineages. It is shown that most elements of the neopteran wing base are also present in Ephemeroptera and Odonata. The wing base in the ground plan of Pterygota is presumably composed of three axillaries and a proximal median plate. The first axillary is provided with two muscles. The third axillary is equipped with one short muscle in the ground plan of Pterygota. A second muscle, which inserts at the third axillary and originates from the episternum, is most likely an autapomorphic character of Neoptera. The results imply that the wing base of Plecoptera is close to the pterygote ground plan. It is assumed that the wing bases of Ephemeroptera and Odonata are secondarily stiffened. The so-called basalare and its associated muscles in Ephemeroptera and Odonata are probably not homologous to the basalare and respective muscles in Neoptera. Though the wing bases of both Ephemeroptera and Odonata show similar modifications their specialisations may have evolved independently from each

other." (Author)] Address: Willkommen, Jana, Staatliches Museum für Naturkunde, Abt. Entomologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: willkommen.smns@naturkundemuseum-bw.de

8784. Worthen, W.B. (2009): A second Odonata survey at Congaree National Park, Richland Co., South Carolina. *Argia* 21(3): 19. (in English) [13 sampling days 2002 and 39 sampling days in 2008–09 totalled at 70 species for the Congaree National Park, approximately 25 km southeast of Columbia, South Carolina, USA. The new state record is *Gomphus* (*Hylogomphus*) *apomyius*.]. A single teneral female was captured on 30-III-2009 at Wise Lake (33.8150°N, 080.828°W).] Address: Worthen, W.B., Dept of Biology, Furman Univ., Greenville, SC29613 USA. E-mail: worthen@furman.edu

8785. Zhang, J.; Lu, X.-y. (2009): Aerodynamic performance due to forewing and hindwing interaction in gliding dragonfly flight. *Physical Review E* 80, 017302: 017302-1-017302-4. (in English) ["Aerodynamic performance due to forewing and hindwing interaction in gliding dragonfly flight has been studied using a multiblock lattice Boltzmann method. We find that the interactions between forewing and hindwing effectively enhance the total lift force and reduce the drag force on the wings compared to two independent wings. The interaction mechanism may be associated with the triangular camber effect by modulating the relative arrangement of the forewing and hindwing. The results obtained in this Brief Report provide physical insight into the understanding of aerodynamic behaviors for gliding dragonfly flight." (Authors)] Address: Lu, X.-y., Department of Modern Mechanics, University of Science and Technology of China, Anhui, Hefei 230026, China. E-mail: xlu@ustc.edu.cn

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8786. Abbott, J.K.; Svensson, E.I. (2010): Morph-specific variation in intersexual genetic correlations in an intra-specific mimicry system. *Evolutionary Ecology Research* 12: 105-118. (in English) ["Background: Positive intersexual genetic correlations are typically viewed as constraining the evolution of sexual dimorphism, when traits are subject to sexually antagonistic selection. Our study species, *Ischnura elegans*, has a female-limited colour polymorphism with three female colour morphs (males are monomorphic), one of which is considered to be a male mimic. Questions: Are there morph-specific differences in the magnitude of intersexual genetic correlations in *I. elegans*? Specifically, do male-mimic (Androchrome) females have higher intersexual genetic correlations for morphological traits than non-mimic (Infuscans) females? Methods: We collected copulating pairs in the field and raised offspring from these pairs in the laboratory. We measured five morphological traits in both parent and offspring generations and investigated their heritabilities and genetic correlations. Results: We found a negative overall relationship between the degree of sexual dimorphism for a trait and its intersexual genetic correlation. But the magnitude and direction of intersexual genetic correlations depended on the female morph. As expected, male mimic (Androchrome) females had higher intersexual genetic correlations. In addition, the genetic correlations between the morphs were in all cases significantly lower than unity. Male mimic (Androchrome) females had higher mother–son covariances

than the non-mimic (*Infuscans*) morph, and this difference is the proximate explanation for the difference in intersexual genetic correlations between the morphs." (Authors)] Address: Abbott, Jessica, Department of Animal Ecology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, SE-752 36 Uppsala, Sweden. E-mail: jessica.abbott@ebc.uu.se

8787. Aletsee, M. (2010): Classification of dystrophic ponds by means of the TWINSPAN algorithm for an ecological characterisation of the Odonata habitats in the Hohe Venn / Hautes Fagnes (Germany/Belgium). *Brachytron* 12(1/2): 50-59. (in English, with Dutch and German summaries) ["the Hohe Venn contains a large number of mired *palsa*. Regarding the Odonata, there are two types of reproduction habitats, the ones with a central, open water body (shallow pool, *Kolk*) and the ones with at most times a shallow, temporary water body (shallow, *Schlenke*). Huge parts of the fens in this area were destroyed by afforestation and intensive draining (Kamp, 1962). At the beginning of the 1990s, some *palsa* were restored by filling up the drains with clay (Paulissen, 1997). This paper compares a descriptive morphologic-genetic classification of the habitats of Odonata with a classification using the TWINSPAN algorithm. We discuss in particular the potential of recolonisation of the restored *palsa*. Some characteristic and very rare species like *Aeshna subarctica* and *Somatochlora arctica* could not be found in the recently developed habitats, while others such as *Coenagrion hastulatum* and more euryoecious species, i.e. those that tolerate very different environmental conditions, have successfully established themselves." (Author)] Address: Aletsee, M., Obersteinstr. 38, 52223 Stolberg, Germany. E-mail: aletsee@rwth-aachen.de

8788. Arscott, D.B.; Larned, S.; Scarsbrook, M.R.; Lambert, P. (2010): Aquatic invertebrate community structure along an intermittence gradient: Selwyn River, New Zealand. *Journal of the North American Benthological Society* 29(2): 530-545. (in English) ["Changes in community structure and life-history traits of benthic invertebrates were examined along a longitudinal intermittence gradient in an alluvial river. The gradient was characterized with modeled and measured hydrologic, chemical, and physical environmental variables. The invertebrates were collected in the Selwyn River, southeastern New Zealand, at multiple sites in each of 4 river sections with distinct hydrological conditions (perennial-losing, ephemeral, intermittent, perennial-gaining). Values of hydrological metrics for each site were generated with an empirical model developed for the Selwyn River. The metrics included 4 that characterized intermittent flow (flow permanence, flow duration, drying frequency, distance to nearest perennial site). Most invertebrate richness and density metrics were significantly higher in the perennial-losing and perennial-gaining sections than in the ephemeral and intermittent sections. A principle components analysis (PCA) separated invertebrate samples from the 4 sections along 2 primary factors. Nine of 13 hydrological metrics, including the 4 intermittence metrics, were correlated with the PCA site scores. Linear regressions indicated that most taxon-richness metrics and some density metrics were related to flow permanence, flow duration, or both. Based on the regression analysis, we predicted that 1.9 taxa/m² are added with each 10% increase in flow permanence, and 0.5 taxa/m² are added with each 10-d increase in flow duration. Results from a nested-

ness analysis indicated that communities at ephemeral and intermittent sites were nested subsets of the communities at perennial sites, and the nesting order of sites was related to both flow permanence and flow duration. Assemblages of taxa with particular life-history traits (life span, fecundity, maximum size, and voltinism) varied linearly with flow permanence and flow duration. The variation in invertebrate communities along the Selwyn River was primarily the result of progressive removal of desiccationsensitive taxa with increasing intermittence, not to selection for desiccation-resistant specialists. Quantitative intermittence–ecology relationships are needed to predict the consequences of future changes in flow intermittence, but such relationships are rare. The univariate relationships reported in our study contribute to a small but growing array of intermittence–ecology relationships." (Author) In data analysis, Odonata are treated as "other insects".] Address: David B. Arscott, D.B., Stroud Water Research Center, 970 Spencer Rd, Avondale, Pennsylvania 19311 USA. E-mail: darscott@stroudcenter.org

8789. Beaton, G.; Dobbs, M. (2010): 2008–2009 summary of odonate research in Georgia. *Argia* 22(1): 15-17. (in English) [This article summarizes the additional work done in Georgia, USA during 2008 and 2009. Georgia has 159 counties and since the end of 2007 there have been 176 new records for a total of 4439. The best finds were a huge new population of *Ophiogomphus edmundo*, new state records for *Gomphus viridifrons* and *Brachymesia furcata*. These additions raise the state list to 180 taxa comprising 177 species. Of these, 53 species (55 taxa) are Zygoptera and 124 species (125 taxa) are Anisoptera. 20 interesting taxa are discussed in detail.] Address: Dobbs, Marion, 9 Bridlewood Lane, Rome, GA, 30165, USA. E-mail: spreadwing@mac.com

8790. Bernhardt, G.E.; Kutschenbach-Brohl, L.; Washburn, B.E.; Chipman, R.B.; Francoeur, L.A. (2010): Temporal variation in terrestrial invertebrate consumption by Laughing Gulls in New York. *American Midland Naturalist* 163: 442-454. (in English) [Terrestrial insects consumed by laughing gulls and collected at the John F. Kennedy International Airport, USA, New York during 2003 and 2004 included one specimen of Libellulidae.] Address: Washburn, B.E., USDA Wildlife Services, National Wildlife Research Center, 6100 Columbus Avenue, Sandusky, Ohio 44870. E-mail: brian.e.washburn@aphis.usda.gov

8791. Borisov, S.N. (2010): Study of dragonfly (Odonata) migrations in the western Tien Shan mountains using ornithological traps. *Entomological review* 89(9): 1025-1029. (in English) ["Migrations of dragonflies in Chokpak Pass of the Western Tien Shan (42.530°N, 70.605°E) were studied using large bird traps of the Rybachy type, which proved to be very efficient for recording these insects. The obligatory southward autumn migrations were proved for *Sympetrum fonscolombii* and *Anax parthenope*, and supposed for *Hemianax ephippiger*, which is a rare species in this region. The autumn movement from the mountains to plains was recorded for the species characterized by seasonal vertical migrations: *Sympetrum arenicolor*, *S. striolatum pallidum*, and *Aeshna mixta*. The cold air fronts increase the intensity of flights." (Author) Original Russian Text © S.N. Borisov, 2009, published in *Zoologicheskii Zhurnal*, 2009, Vol. 88, No. 10, pp. 1184–1188] Address: Borisov, S.N., Institute of Animal Systematics &

Ecology, Siberian Branch, Russ. Acad. of Sci., Novosibirsk, 630091 Russia. E-mail: borisov-s-n@yandex.ru

8792. Bouwman, J.; Conze, K.-J.; Göcking, C.; Ketelaar, R. (2010): The first cross-border dragonfly symposium. *Brachytron* 10(1/2): 4-5. (in English) [Introduction into the Dutch-German cross-border symposium on regional the Odonata fauna.] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

8793. Bouwman, J.H.; Conze, K.-J.; Ketelaar, R. (2010): The organisation of dragonfly research in The Netherlands and North Rhine-Westphalia. *Brachytron* 12(1/2): 6-9. (in English) [The authors give introductions into the origins of dragonfly study in The Netherlands and - with less extent - in Nordrhein-Westfalen, Germany, the development and increase of odonatological activities in the past decades and current activities ("dragonfly projects").] Address: Bouwman, J.H., Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

8794. Bowerman, J.; Johnson, P.T.J.; Bowerman, T. (2010): Sublethal predators and their injured prey: linking aquatic predators and severe limb abnormalities in amphibians. *Ecology* 91(1): 242-251. (in English) ["While many predators completely consume their prey, others feed only on blood or tissue without killing the prey, sometimes causing ecologically significant levels of injury. We investigated the importance of sublethal predator attacks in driving an emerging issue of conservation importance: missing-limb deformities in amphibians. We combined long-term field data and manipulative experiments to evaluate the role of sublethal predation in causing abnormalities in two regions of central Oregon, USA. Since 1988, western toads (*Bufo boreas*) in Lake Aspen have exhibited abnormalities dominated by partially missing limbs and digits at annual frequencies from <1% to 35%. On Broken Top volcano, we found comparable types and frequencies of abnormalities in Cascades frogs (*Rana cascadae*). Field sampling and observational data implicated two aquatic predators in these abnormality phenomena: introduced sticklebacks (*Gasterosteus aculeatus*) at Lake Aspen and cordulid dragonfly larvae (*Somatochlora albicincta*) at Broken Top. In experiments, these predators produced limb abnormalities identical to those observed in the respective regions. At Lake Aspen, in situ predator exclosures effectively eliminated abnormalities in toads, while comparisons among years with low and high stickleback abundance and between wetlands with and without sticklebacks reinforced the link between fish and amphibian abnormalities. Neither trematode parasite infection nor pesticide contamination could explain observed abnormalities. Our results suggest that predators are an important explanation for missing-limb abnormalities and highlight the ecological significance of sublethal predation in nature." (Authors)] Address: Johnson, P., Ecology and Evolutionary Biology, University of Colorado, Ramaley N122, Campus Box 334, Boulder, Colorado 80309 USA. E-mail: pieter.johnson@colorado.edu

8795. Bried, J. (2010): Dragonfly survey effort project: C'mon on join the fun! *Argia* 22(1): 5. (in English) [The author introduces a project to acquire data on how frequently to survey and how long each survey should last to get a representative spectrum of Odonata species at

a chosen site.] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jbried@TNC.ORG

8796. Bried, J.T.; Mazzacano, C.A. (2010): National review of state wildlife action plans for Odonata species of greatest conservation need. *Insect Conservation and Diversity* 3(2): 61-71. (in English) ["1. The overarching goal of United States wildlife action plans is to prevent wildlife from becoming endangered or declining to levels where recovery becomes unlikely. Effective plan implementation depends on establishing Species of Greatest Conservation Need (SGCN), defined as wildlife species with small or declining populations or other characteristics that make them vulnerable. 2. Although nearly two-thirds of distinct Odonata species known from the U.S. (441 species as of 2005) were appointed as SGCN, over half the states neglected to assign dragonfly SGCN, damselfly SGCN, or both. Western and southern states listed proportionately fewer Odonate SGCN than states of the Great Lakes, Mid-Atlantic, and New England regions, apparently reflecting geographic patterns of legal authority, available information, and involvement by Odonata specialists. 3. Greater consultation of Odonata specialists is encouraged in any revision of state wildlife action plans, along with increased: (i) use of existing conservation lists, (ii) inferences from field guides and major faunal synopses, (iii) recognition of patterns of endemism, and (iv) application of empirical species distribution modelling. 4. Legal and management restrictions aside, insects and other invertebrates are often neglected in mainstream conservation efforts because they are perceived as understudied. It is erroneous to assume 'not enough information' exists for well-studied microfauna such as Odonata and doing so further undermines the conservation of less conspicuous and charismatic taxa." (Authors)] Address: Bried, J.T., Albany Pine Bush Preserve Commission, Albany, NY 12205-4605, USA. E-mail: jbried@albanypinebush.org

8797. Cannings, R. (2010): Rex Kenner (1950–2010). *Argia* 22(1): 7-10. (in English) [Obituary: Rex Kenner born on 14 November 1950, deceased on 23 January 2009] Address: Cannings, R., Curator of Entomology, Royal British Columbia Museum, 675 Belleville Street, Victoria, BC V8W 9W2, Canada. E-mail: rcannings@royalbcmuseum.bc.ca

8798. Chadwick, W. (2010): Yonkers odonates. *Argia* 22(1): 18. (in English) [Yonkers is the fourth most populous city in New York State, USA. In 2009 the Yonkers sites where the author searched for odonates were Lenoir Nature Preserve, Tibbetts Brook Park, and the Bronx River. 28 species could be recorded.] Address: Chadwick, W. E-mail: mrcnaturally@optonline.net

8799. Chaput-Bardy, A.; Gregoire, A.; Baguette, M.; Pagano, A.; Secondi, J. (2010): Condition and phenotype-dependent dispersal in a damselfly, *Calopteryx splendens*. *PLoS ONE* 5(5): e10694. doi: 10.1371/journal.pone.0010694: 7 pp. (in English) ["Individual dispersal decisions may be affected by the internal state of the individual and the external information of its current environment. Here we estimated the influence of dispersal on survival and investigated if individual phenotype (sex and wing length) and environmental condition (conspecific density and sex-ratio) affected dispersal decisions in *C. splendens*. As suspected from the litera-

ture, we showed that the proportion of dispersing individuals was higher in females than in males. We also found negative-density dependent dispersal in both sexes and influence of sex-ratio on dispersal. Individuals moved less when sex-ratio was male biased. These results are consistent with a lek mating system where males aggregate in a place and hold mating territories. Contrary to our expectations, neither dispersal nor survival was affected by wing length. Nevertheless, mean adult survival was about 8% lower in dispersing individuals than in residents. This might reflect a mortality cost due to dispersal." (Authors)] Address: Chaput-Bardy, Audrey, 1 Laboratoire d'Etudes Environnementales des Systèmes Anthropisés, Univ. d'Angers, Angers, France. E-mail: chaputbardyaudrey@hotmail.com

8800. Chase, J.M.; Burgett, A.A.; Biro, E.G. (2010): Habitat isolation moderates the strength of top-down control in experimental pond food webs. *Ecology* 91(3): 637-643. (in English) ["Habitat isolation is well known to alter patterns of species' abundance, richness, and the ratios of predators : prey. Less clear, however, is how isolation alters interactions within food webs. Here, we present the results from an experiment performed in artificial ponds (mesocosms) manipulating habitat isolation crossed with a predator reduction treatment to disentangle how isolation mediates the top-down effect of predators. The strength of the trophic cascade, from predators, through herbivores, to producers, was considerably stronger in connected than in isolated habitats. We further found that the overall richness of both predator and herbivore species declined strongly with isolation. Experimental predator reductions suggest that the mechanism underlying the herbivore response was likely mediated by a keystone predator effect; when predators were reduced, herbivore richness was lower, and there was no discernible effect of isolation on herbivore richness. Finally, we found that the composition of predators in more isolated habitats consisted of species that were smaller and likely less effective predators than species that persisted in less isolated habitats. In all, our experiment showed that habitat isolation can alter the structure of communities by a combination of direct effects of the species in question, as well as effects mediated through their interactions in the food web." (Authors) The study includes Odonata.] Address: Chase, J.M., Department of Biology and Tyson Research Center, Washington University in Saint Louis, Saint Louis, Missouri 63130 USA

8801. Chaudhry, M.T.; Aslam, M. (2010): New record of genus *Macromia* Rambur 1842 (Odonata: Anisoptera) from Azad Jammu and Kashmir, Pakistan. *Asia Life Sciences* 19(2): 229-233. (in English) [So far, *M. cingulata*, has been the only member of the genus reported from Pakistan. Now, specimens of *M. moorei* were collected from Dhirkot, Azad Jammu and Kashmir.] Address: Aslam, M., Department of Entomology, Pir Mehr Ali Shah (PMAS) Arid Agriculture University, Rawalpindi, Pakistan.

8802. Cobbaert, D.; Bayley, S.E.; Greter, J.-L. (2010): Effects of a top invertebrate predator (*Dytiscus alaskanus*; Coleoptera: Dytiscidae) on fishless pond ecosystems. *Hydrobiologia* 644(1): 103-114. (in English) ["We investigated the predatory effects of *D. alaskanus*, a large predaceous diving beetle, on the biomass, species composition and diversity of fishless pond communities. The effects were tested using presence and absence treatments of *D. alaskanus* in 24 mesocosms

distributed among six ponds. We sampled phytoplankton, zooplankton and macroinvertebrates every two weeks for a six week period. Periphyton was sampled from the mesocosm walls on the final day. Total macroinvertebrate biomass decreased in the presence of dytiscids while species richness was not affected. Macroinvertebrate predators, snails and *Gammarus lacustris* decreased in the dytiscid treatments. Laboratory feeding experiments confirmed feeding preferences consistent with the mesocosm results. Periphyton biomass was six times greater in the dytiscid enclosures, concomitant with the decreased grazing by gastropods and other invertebrate primary consumers indicating a benthic trophic cascade. Top-down effects of dytiscids on other predatory invertebrates led to increased total zooplankton biomass, largely due to increased abundances of large and small cladocerans. Zooplankton species richness increased in the dytiscid enclosures. Inconsistent with trophic cascade theory, phytoplankton did not respond to top-down effects of *D. alaskanus* within the study period. Overall, the results show *D. alaskanus* predation caused trophic effects via two distinct food chains, a dytiscid–snail–periphyton trophic cascade, and a dytiscid–predatory macroinvertebrates–zooplankton partial trophic cascade." (Authors) *D. alaskanus* preferred prey was large mobile predaceous macroinvertebrates including Corixidae, Zygoptera and Chaoborus.] Address: Cobbaert, Danielle, Department of Biological Sciences, University of Alberta, Edmonton, AB, T6G 2E9, Canada. E-mail: cobbaert@ualberta.ca

8803. Collins, A.R. (2010): The Globe Skimmer *Pantala flavescens* (Fabr.): the greatest migrant? *Atropos* 39: 14-17. (in English) [The paper reviews the recent publication of Anderson (2009) (see OAS 7790) and records of the species in Great Britain, and reports feeding aggregations of *P. flavescens* north of Davao City, Mindanao, Philippines.] Address: Collins, A.R., 228 Kathleen Road, Sholing, Southampton, Hampshire, SO19 8GY, UK; E-mail: arc@soton.ac.uk

8804. Combes, S.A.; Crall, J.D.; Mukherjee, S. (2010): Dynamics of animal movement in an ecological context: dragonfly wing damage reduces flight performance and predation success. *Biology letters* 6(3): 426-429. (in English) ["Much of our understanding of the control and dynamics of animal movement derives from controlled laboratory experiments. While many aspects of animal movement can be probed only in these settings, a more complete understanding of animal locomotion may be gained by linking experiments on relatively simple motions in the laboratory to studies of more complex behaviours in natural settings. To demonstrate the utility of this approach, we examined the effects of wing damage on dragonfly flight performance in both a laboratory drop–escape response and the more natural context of aerial predation. The laboratory experiment shows that hindwing area loss reduces vertical acceleration and average flight velocity, and the predation experiment demonstrates that this type of wing damage results in a significant decline in capture success. Taken together, these results suggest that wing damage may take a serious toll on wild dragonflies, potentially reducing both reproductive success and survival." (Authors)] Address: Combes, S.A., Dept of Organismic & Evolutionary Biology, Concord Field Station, Harvard University, 100 Old Causeway Road, Bedford, MA 01730, USA. E-mail: scombes@oeb.harvard.edu

8805. Conze, K.-J.; Bouwman, J.H. (2010): Working with the Habitats Directive: two countries, two approaches. *Brachytron* 12(1/2): 60-67. (in English, with Dutch and German summaries) ["The Habitats Directive is getting more and more important in Europe. The Netherlands and North Rhine-Westphalia implement the Habitat-directive in their own way in local laws. One of the most important parts of the Habitats Directive is the designation of Special Protected Areas. They have to be designated for all species mentioned in Annex II of the Habitats Directive. Both in distribution and in designating Special Protection Areas (SPA) there's quite a difference between both countries." (Authors) The policy is exemplified using the cases of *Coenagrion mercuriale*, *Leucorrhinia pectoralis*, and *Ophiogomphus cecilia*.] Address: Conze, K.J., Listerstr. 13, D-45147 Essen, Germany. E-Mail: kjc@loekplan.de

8806. Corbi, J.J.; Froehlich, C.G.; Trivinho Strixino, S.; dos Santos, A. (2010): Bioaccumulation of metals in aquatic insects of streams located in areas with sugar cane cultivation. *Química Nova* 33(3): 644-648. (in English) ["Streams located in areas of sugar cane cultivation receive elevated concentrations of metal ions from soils of adjacent areas. The accumulation of metals in the sediments results in environmental problems and leads to bioaccumulation of metal ions by the aquatic organisms. In the present study, bioaccumulation of the metals ions Al, Cd, Cr, Cu, Fe, Mg, Mn and Zn in aquatic insects in streams impacted by the sugar cane was evaluated. The results pointed out that the insects were contaminated by the sediment and that the collector organisms as Chironomus species accumulated higher concentration of metals than the predator organisms." (Authors). The following odonate taxa are involved in the study: *Dasythemis* sp., *Erythemis* sp., *Erythrodiplax* sp., *Miathyria* sp., *Dythemis* sp., *Micrathyria* sp. and *Tamea* sp. Odonata accumulate taxa- and locality-specific: (1) Água Sumida stream: *Dasythemis* sp. accumulate more Al, Cr, Cu, Fe, Mg, Mn, Zn than *Erythemis* sp. (2) São João stream: larvae of *Erythrodiplax* sp. accumulate high amounts of Al, Cr, Cu, Fe and Zn, while *Dasythemis* sp. accumulate high amounts of Mg and Mn. (3) Água Preta stream: Larvae of *Tamea* sp. accumulate more Al, Cu, Mg and Zn than the other species. Chromium and manganese were mostly accumulate by *Micrathyria* sp.] Address: Corbi, J.J., Departamento de Biologia, Faculdade de Filosofia Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Av. Bandeirantes, 3900, 14040-901 Ribeirão Preto – SP, Brasi. E-mail: julianocorbi@yahoo.com.br

8807. Crosby, T.K. (2010): Honoured by taxon name — Robin John Tillyard. *Zootaxa* 2414: 67-68. (in English) [Correspondance with a very concise biography of R.J. Tillyard.] Address: Crosby, T.K., Landcare Research, Private Bag 92170, Auckland 1142, New Zealand. E-mail: crosbyt@landcareresearch.co.nz

8808. Crumrine, P.W. (2010): Size-structured cannibalism between top predators promotes the survival of intermediate predators in an intraguild predation system. *J. N. Am. Benthol. Soc.* 29(2): 636-646. (in English) ["Individuals in most natural populations of predators vary in size, and size differences among individuals often result in cannibalism. Cannibalism is an extremely common phenomenon in the animal kingdom, particularly among generalist predators that engage in intraguild predation (IGP). However, few studies have specifically addressed the effects of cannibalism on IGP.

The aim of my study was to investigate how trophic and behavioural interactions between 2 size classes of an intraguild (IG) predator influenced the survival and behaviour of IG prey and a shared prey resource. I tested for these effects with larval odonates by exposing a shared prey resource (*Ischnura verticalis*) to the presence or absence of IG prey (*Pachydiplax longipennis*) and 2 size classes of IG predators (small or large *Anax junius*) in a 2 3 2 3 2 factorial design. Mortality rates of the shared resource in all single-predator treatments were significantly greater than in nonpredator controls, and risk reduction was observed when the shared resource was exposed to combinations of predators. The significant negative effect of large *A. junius* on *P. longipennis* survival and activity level was greater than that of small *A. junius*. Cannibalism occurred between large and small *A. junius* in size-structured IG predator treatments, and the effects of the size classes were not additive for the survival of IG prey. Cannibalism was not solely responsible for risk reduction in IG prey, and reduced activity level of small *A. junius* in the presence of larger conspecifics probably had a positive influence on *P. longipennis* survival. My results demonstrate that cannibalism among IG predators can influence the survival of IG prey and might contribute to coexistence among predators in systems with strong IGP." (Author)] Address: Crumrine, P.W., Department of Biological Sciences and Program in Environmental Studies, Rowan University, Glassboro, New Jersey 08028 USA. E-mail: crumrine@rowan.edu

8809. Curry, C.M.; Kennedy, J.H. (2010): Factors affecting interaction rates in *Plathemis lydia* (Drury) (Anisoptera: Libellulidae). *Odonatologica* 39(1): 29-38. (in English) ["Interspecific interaction rates and space use were observed for *P. lydia* at 3 ponds in north-central Texas from June to August 2007. Aggressive interactions of marked individuals were tallied for each interacting species by which individual was the aggressor or target and which species won or lost. The space used was also mapped. These data were also collected for one individual each of the libellulids *Pachydiplax longipennis* and *Tamea lacerata* and compared to *P. lydia*. Interaction rates were different depending on the category of interacting Odonata (perching or flying), supporting the hypothesis that the thermoregulatory categories of perching and flying aid in habitat partitioning among species" (Authors)] Address: Curry, Claire, Dept of Zoology, University of Oklahoma, 730 Van Vleet Oval, Room 314, Norman, Oklahoma 73019, USA. E-mail: Claire.M.Curry-1@ou.edu

8810. Damm, S.; Dijkstra, K.D.; Hadrys, H. (2010): Red drifters and dark residents: The phylogeny and ecology of a Plio-Pleistocene dragonfly radiation reflects Africa's changing environment (Odonata, Libellulidae, Trithemis). *Molecular Phylogenetics and Evolution* 54: 870-882. (in English) ["In the last few million years, tropical Africa has experienced pronounced climatic shifts with progressive aridification. Such changes must have had a great impact on freshwater biota, such as Odonata. With about forty species, *Trithemis* dominates dragonfly communities across Africa, from rainpools to streams, deserts to rainforests, and lowlands to highlands. Red-bodied species tend to favour exposed, standing and often temporary waters, have strong dispersal capacities, and some of the largest geographic ranges in the genus. Those in cooler habitats, like forest streams, are generally dark-bodied and more seden-

tary. We combined molecular analyses of ND1, 16S, and ITS (ITS1, 5.8S, and ITS2) with morphological, ecological, and geographical data for 81% of known *Trithemis* species, including three Asian and two Madagascan endemics. Using molecular clock analyses, the genus's origin was estimated 6–9 Mya, with multiple lineages arising suddenly around 4 Mya. Open stagnant habitats were inferred to be ancestral and the rise of *Trithemis* may have coincided with savannah-expansion in the late Miocene. The adaptation of red species to more ephemeral conditions leads to large ranges and limited radiation within those lineages. By contrast, 3 clades of dark species radiated in the Plio-Pleistocene, each within distinct ecological confines: (1) lowland streams, (2) highland streams, and (3) swampy habitats on alternating sides of the Congo-Zambezi watershed divide; together giving rise to the majority of species diversity in the genus. During *Trithemis* evolution, multiple shifts from open to more forested habitats and from standing to running waters occurred. Allopatry by habitat fragmentation may be the dominant force in speciation, but possibly genetic divergence across habitat gradients was also involved. The study demonstrates the importance of combining ecological and phylogenetic data to understand the origin of biological diversity under great environmental change." (Authors)] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

8811. De Paiva Silva, D.; De Marco, P.; Resende, C.D. (2010): Adult odonate abundance and community assemblage measures as indicators of stream ecological integrity: A case study. *Ecological Indicators* 10(3): 744-752. (in English) ["Water resources demand constant conservation actions due to several problems (e.g. riparian vegetation cut-off, construction of dams, acidification, sewage and pesticide spills) that degrade the aquatic systems worldwide and affect its physico-chemical parameters and habitat characteristics. Odonata is a potential group of organisms that could indicate these habitat alterations once they have aquatic and terrestrial life forms. In this study, we tested the use of adult odonate individual species and community assemblage measures to evaluate the effect of riparian vegetation cut-off and sewage discharges. The study was performed at Turvo Sujo River, in Viçosa, Southern Brazil. We selected twelve sites, six of them were upstream and six were downstream the city. Species abundance and species richness estimates of adult odonates were performed on sunny days during summer and winter. We analyzed the goodness-of-fit of the species abundances to geometric and lognormal series. We also measured the Habitat Physical Integrity Score (HPIS), pasture and forest proportions and physico-chemical water parameters at each site. Only few species were abundant in up- and downstream regions. Abundance of *Argia modesta* was higher at the upstream ($t = 3.188$; $df = 17$; $p = 0.005$) than at the downstream region and this species is a potential habitat bioindicator organisms. Species richness was statistically different only in the wet season and species-abundance relations at the two regions fitted well to both geometric and lognormal series. The lack of riparian vegetation indicates a loss of habitat integrity and heterogeneity at Turvo Sujo River basin, which was mainly dominated by lake-dwelling odonate species. Low species richness differences are caused by spe-

cies pool biases toward those ones capable to survive at degraded ecosystems, suggesting that the effects of water parameters are much less important than a landscape dominated by pastures and practically without forests. We suggest the use of species-abundance models (like geometric and lognormal series) to determine the degree of impacts over a given community once they are simple models and can show intrinsic processes structuring communities." (Authors)] Address: De Marco, P., Lab. Ecologia Teórica e Sintese, Depto de Biologia Geral, Univ. Federal de Goiás, BR-74001-970, Goiania, GO, Brazil. E-mail: pdemarco@icb.ufg.br

8812. Dillon, M. (2010): Odonates of Wright Patman Lake in northeast Texas. *Argia* 22(1): 13-14. (in English) [USA; 57 species from the locality are checklisted.] Address: Dillon, M., 4414 Jeff Davis St., Marshall, Texas 75672, USA. E-mail: mdillon444@charter.net

8813. Dow, R.A. (2010): Two new Platystictidae (Odonata: Zygoptera) from Sarawak, Malaysian Borneo. *Zootaxa* 2412: 63-68. (in English) ["Two new members of the Platystictidae are described from Sarawak: *Drepanosticta sbong*, holotype male: Malaysia, Sarawak, Kapit division, Sungai Spong, 11-II-2008; and *Protosticta tubau*, holotype male: Malaysia, Sarawak, Bintulu division, Planted Forest Zone, Tubau area, block E2K, 16-VIII-2009; both to be deposited in the RMNH Leiden, The Netherlands." (Author)] Address: Dow, R.A., National Museum of Natural History Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

8814. Dow, R.A.; Choong, C.Y.; Ng, Y.F. (2010): *Elatoneura mauros* sp. nov. (Odonata: Zygoptera: Protoneuridae) from Sarawak, Malaysian Borneo. *Zootaxa* 2502: 65-68. (in English) [Holotype: male, Malaysia, Sarawak, Lanjak Entimau Wildlife Sanctuary, Sungai Begua, 18.VI.2008. A key to the six *Elatoneura* species known from Borneo and Sundaland is provided.] Address: Choong, C.Y., Centre for Insect Systematics, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. E-mail: cychoong@ukm.my

8815. Dragonfly Society of the Americas (2010): *Argia* 22(1). *Argia* 22(1): 1-19. (in English) [These are the papers from issue 22(1) with technical background: In This Issue: 1; Thank You!: 1; Calendar of Events: 1; 2010 DSA Annual Meeting in Orono, Maine, by Bryan Pfeiffer: 2; 2010 Southeast Regional Meeting, by Jerrell J. Daigle: 3; Great Lakes Odonata Meeting, by Bob Glotzhober: 3; Rob Cannings Receives National Award from Canadian Museum Network: 4; New Listserve—Colorado Odes: 7; Duncan Cuyler Collection now in IORI/FSCA, by Bill Mauffray: 10-11; Nick and Ailsa Donnelly Fellowship for 2010: 17; A Call for Papers for BAO: 19.] Address: DSA c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

8816. Dube, T.; Makaka, C.; Sibanda, Z. (2010): An assessment of the effect of industrial and sewage effluent on aquatic invertebrates: A case study of a southern urban stream, Zimbabwe. *Journal of Sustainable Development* 3(2): 210-214. (in English) ["The impact of industrial effluent discharged in Mazai stream was assessed through physical-chemical parameters and also by bio-monitoring of benthic macro-invertebrates. Samples were collected at three sites, one before the effluent discharge point into the stream (site 3) and two sites which were located downstream after the dis-

charge points (sites 1 and 2). High levels of chemical pollutants were recorded at sites 1 and 2 (ZINWA red category) whereas site 3 (reference site) consisted of relatively clean water (ZINWA blue category). This was confirmed by the biological evaluation process. The SASS4 scores at sites 1 and 2 indicated a deterioration of water quality while site 3 there was good water quality with high species diversity. Detrended correspondence analysis (DCA) showed that pollution sensitive taxa such as Hemiptera, Trichoptera, Coleoptera and Odonata were dominant at site 3 whilst the other sites were dominated by pollution tolerant species such as Chironomids. Continuous discharge of effluent could lead to extreme degradation of Mazai stream hence loss of biodiversity of macro-invertebrates." (Authors)] Address: Dube, T., Dept Biological Sciences, Midlands State Univ., P. Bag 9055, Gweru, Zimbabwe. E-mail: tdube@msu.ac.zw

8817. DuBois, B. (2010): *Cordulegaster maculata* (Twin-spotted Spiketail) nymphs in a natural drainage lake in Wisconsin. *Argia* 22(1): 6-7. (in English) [5 June 2009, Upper St. Croix Lake, Douglas County, Wisconsin, USA; „To my knowledge, *C. maculata* appears to be an obligate forested-stream species. Although some lotic odonates are also found along windswept shorelines of large lakes, I have not found any published reference to *C. maculata* inhabiting lakes. I suspect that the nymphs I collected originated from Park Creek and that oviposition did not occur in the lake proper, but obviously this is just a guess." (Author)] Address: Bob DuBois, Department of Natural Resources, Superior, WI, USA. E-mail: robert.dubois@wisconsin.gov

8818. Duxbury, C.; Holland, J.; Pluchino, M. (2010): Experimental evaluation of the impacts of the invasive catfish *Hoplosternum littorale* (Hancock, 1828) on aquatic macroinvertebrates. *Aquatic Invasions* 5(1): 97-102. (in English) [*H. littorale* is a callichthyid catfish native to South America. It was first recorded in Florida in 1995. It has now dispersed throughout much of Florida. It is thought that this fish has had little or no impacts to native fish. However, it is unknown if the introduction of this fish can cause other ecological impacts, such as alteration of aquatic invertebrates assemblages. We conducted a cage experiment to evaluate the effects of the hoplo catfish on macroinvertebrates. Results showed that macroinvertebrate abundance and taxa on artificial substrates (MAS) were reduced by 31 and 50% in the fish treatments, respectively. The entire macroinvertebrate assemblage structure was significantly different between fish and no-fish treatments. This difference was driven primarily by reductions in amphipods, and chironomids. Macroinvertebrates were also identified from fish stomachs and these were compared to assemblages on the MAS. We found a smaller subset of taxa in the stomachs, as compared to the MAS. These results suggest that this fish could alter the macroinvertebrate assemblage structure. This could have implications for environmental monitoring programs that use macroinvertebrates to assess water quality." (Authors) Relative abundance of Odonata found on the artificial substrates in fish and no-fish treatments (n=10, each) did not differ significantly. No Odonata were found in the stomach contents of caged fish.] Address: Duxbury, C., Walt Disney Imagineering, Research & Development, 1365 Ave. of The Stars, Lake Buena Vista, Florida, USA. E-mail: craig.v.duxbury@disney.com

8819. Dyatlova, E.S. (2010): Dragonflies of Moldova: state of knowledge and personal observations. *International Dragonfly Fund - Report 25*: 1-43. (in English) ["During summer field work in 2005 and 2009 data on the distribution of dragonflies were obtained on the territory of Moldova. In August 2005, 9 species were recorded for the middle part of the Dniester River (surroundings of Sakharna). Between 28 June and 4 July 2009 dragonflies were studied in almost all parts of the country - 25 species were observed. Four species (*Lesites macrostigma*, *Coenagrion ornatum*, *Coenagrion scitulum*, *Orthetrum brunneum*) were recorded for the first time in Moldova. For many species the knowledge of their Moldovan distribution was improved. The habitats of every species were described, illustrated and preliminary maps of species distribution were prepared. Literature data were also analysed and a check list of Moldovan dragonflies was created containing 37 species. The presence of several species (including *Nehalennia speciosa*) in Moldova needs confirmation." (Author)] Address: Dyatlova, Elena, Low Dniester National Nature Park, Frantzuzskij boulevard 89, Ukraine, Odessa 65009. E-mail address: lena.dyatlova@gmail.com

8820. Ellenrieder, N. von (2010): Odonata biodiversity of the Argentine Chaco biome. *International Journal of Odonatology* 13(1): 1-25. (in English, with Spanish summary) ["Odonates of small temporary pools, marshes, large permanent ponds, oxbow lakes, dams, and perennial rivers were sampled in the semiarid Chaco biome of NW Argentina between September 2007 and December 2008. Information from 35 localities yielded 60 species; presence/absence information of species was recorded in a spatial-relational database. Alpha, beta, and gamma diversity and total species richness expected for the area were estimated, and structure of Chaco odonate assemblages was preliminarily analyzed using nonmetric multidimensional scaling (NMS) ordination. Species composition was found to be related to both habitat type and longitudinal sector. Some species that might be indicative of habitat type were identified. — In order to analyze the distribution and biogeography of the odonates of the Chaco biome in Argentina, collections and literature were also examined, adding 58 localities (93 total) and 28 species (88 total). Odonate diversity of the Chaco was compared with that of neighboring Yungas and Paranense biomes by means of percent complementarity and cluster analysis, which showed Chaco odonate composition to be slightly more similar to that of the Yungas than to the Paranense biome, and W and E Chaco sectors to be more similar between them than with either of the two neighboring biomes. Most odonate species found in the Chaco are vagile and more widely distributed in the Neotropical region, with only four potential endemics." (Authors)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, Cdfa, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

8821. Fenoglio, S.; Bo, T.; Cammarata, M.; Malacarne, G.; Del Frate, G. (2010): Contribution of macro- and micro-consumers to the decomposition of fish carcasses in low-order streams: an experimental study. *Hydrobiologia* 637: 219-228. (in English) ["Vertebrate carrions, in particular fish, can provide a significant source of organic matter to lotic systems. Most studies related to animal matter degradation have been

undertaken in Western North America, where entire lotic networks depend on large masses of anadromous salmonids, but less is known of other aquatic environments. In this study, the decomposition process of trout was analyzed in a Northern Italian stream, investigating the different importance of macro (invertebrates)—and micro (fungi)—consumers. Trout carcasses exhibited an exponential mass loss over time and attracted a rich community of microbic and invertebrate colonists. Final values for fish decay were significantly affected by the presence of macroconsumers; nevertheless, the role of macroinvertebrates seems to be not as predominant as in other ecological systems. Our study indicates that in lotic environments, which lack specialized necrophagous or sarcophagous invertebrate taxa equivalent to those found in terrestrial environments (such as maggots or carrion beetles), micro-consumers play a main role in fish carcasses decomposition." (Authors) *Calopteryx splendens* was absent in the river bed; its relative abundance from macroinvertebrates on fish carcasses counts 0,5%.] Address: Fenoglio, S., Dept of Environmental & Life Sciences, University of Piemonte Orientale, Via Teresa Michel, 11, 15121 Alessandria, Italy. E-mail: fenoglio@unipmn.it

8822. Fulan, J.A.; Almeida, S.C. (2010): Effect of the spatial heterogeneity on the predation of *Scinax fuscovarius* and *Physalaemus cuvieri* tadpoles by Odonata larvae. *Acta Scientiarum. Biological Sciences*, Maringá 32(2): 121-124. (in English, with Portuguese summary) ["The objective of this work was to analyze the effect of predation by Odonata naiads (*Micrathyrina* sp.) on two amphibian species with distinct habits – benthic and mid-water – and to verify whether the presence and architecture of macrophytes can mediate this interaction. All tadpoles and Odonata larvae were captured in a temporary pond. Sixteen tanks were used for three different treatments: *Pistia*, *Salvinia* and no macrophytes. Ten tadpoles of each species and two Odonata larvae were placed in each tank. The survival of tadpoles according to treatments was assessed through analysis of repeated measures. We concluded that the survival of *P. cuvieri* and *S. fuscovarius* tadpoles was not affected by the presence and architecture of the macrophytes (*Pistia* and *Salvinia*) or by their behaviour." (Authors)] Address: Fulan, J.A., Univ. Federal do Amazonas, Instituto de Educação, Agricultura e Ambiente, Rua 29 de Agosto, 786, 69800-000, Humaitá, Amazonas, Brazil. E-mail: joaofulan@ig.com.br

8823. Göcking, C.; Hübner, T.; Röhr, K. (2010): Status and conservation of *Coenagrion mercuriale* in North Rhine-Westphalia. *Brachytron* 12(1/2): 11-17. (in German, with Dutch and English summaries) ["*C. mercuriale* occurs in North Rhine-Westphalia (NRW) in small, sunny, alkaline meadow brooks and ditches poor in detritus, with submerged and emergent vegetation. A herb-rich vegetation is present on the banks. To our present knowledge, there are about twelve populations in NRW; two are discussed here in detail. In order to protect the species, conservation measures concerning the management of the water bodies are suggested." (Authors)] Address: Göcking, C., NABU-Naturschutzstation Münsterland, Haus Heidborn, Westfalenstr. 490, 48165 Münster, Germany. E-mail: C.Goecking@NABU-Station.de

8824. Gregoire, S.; Gregoire, J. (2010): *Lestes* survival at high temperature and low water. *Argia* 22(1): 5-6. (in English) [New York, USA; report on emergence of

Lestes species (*L. rectangularis*, *L. unguiculatus*, *L. congener*) in dependence of water table and water temperature. Water temperature arised to app. 33°C; no larval mortality could be observed.] Address: Gregoire, J., 5373 Fitzgerald Rd., Burdett, NY 14818, USA. E-mail: khmo@empacc.net

8825. Groenendijk, D.; Bouwman, J.H. (2010): Occurrence and conservation of *Somatochlora arctica* in the Netherlands. *Brachytron* 12(1/2): 18-24. (in English, with Dutch and German summaries) ["*S. arctica* is one of the least known and rarest dragonflies of northwest Europe. As one of the most characteristic species of raised bog, its decline is paralleled by the diminishing quantity and quality of this habitat type. Since the publication of the Species Protection Plan in 2005, seven populations are known to be present in the Netherlands. Locating the breeding grounds and understanding the adult's behaviour were given priority. Small pools, about a metre deep and largely covered with *Sphagnum* moss, were frequented by both males and females. Females were seen ovipositing, and larvae in various stages and empty skins were found. These pools have been targeted for measures on the short term; depending on the local situation, managers are given advice either on how to protect them or how to dig new ones. On the long term, the existence of such pools needs to be included into plans for the restoration of the bog, ensuring suitable breeding grounds for this rare and beautiful species. Moreover, as most populations are located in border areas, cross-border protection is urgently needed." (Authors)] Address: Groenendijk, D., De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

8826. Hacet, N. (2010): Notes on flight periods and distributions of some dragonflies in Turkey. *Munis Entomology & Zoology* 5(1): 158-162. (in English) [Phenological data of 11 species collected in 1996, 1997, 2001, 2002 and 2005-2009 are presented. *Anax ephippiger* is the earliest dragonfly recorded (in February) in Turkey so far. In addition, new localities are reported for *Coenagrion scitulum*, *Aeshna mixta*, *A. ephippiger*, *Stylurus flavipes*, *Gomphus vulgatissimus*, and *Somatochlora meridionalis*.] Address: Hacet, Nurten, Trakya University, Faculty of Arts and Sciences, Department of Biology, TR-22030 Edirne, Turkey. E-mail: nhacet@hotmail.com

8827. Hepp, L.U.; Milesi, S.V.; Biasi, C.; Restello, R.M. (2010): Effects of agricultural and urban impacts on macroinvertebrates assemblages in streams (Rio Grande do Sul, Brazil). *Zoologia* 27(1): 106-113. (in English) ["This study evaluates the effects of agricultural and urban activities on the structure and composition of benthic communities of streams in the state of Rio Grande do Sul, Brazil. Benthic macroinvertebrates were collected in streams influenced by urbanization and agriculture and in streams with no anthropogenic disturbances (reference streams). Organism density was superior in urban streams when compared with streams in the other two areas. The taxonomic richness and Shannon diversity index were higher in reference streams. The benthic fauna composition was significantly different among land uses. The classification and ordination analyses corroborated the results of variance analyses demonstrating the formation of clusters corresponding to streams with similar land use. Seasonality was also found to influence the benthic community,

though in a lesser degree than land use." (Authors) Odonata are treated at the family level; abundance of Odonata was low.] Address: Laboratório de Biomonitoramento, Departamento de Ciências Biológicas, Universidade Regional Integrada do Alto Uruguai e das Missões. Avenida Sete de Setembro 1621, Caixa Postal 743, 99700-000 Erechim, Rio Grande do Sul, Brasil. E-mail: lhepp@uri.com.br

8828. Huang, D.-y.; Nel, A. (2010): *Protoliupanshanian wangi*, a new genus and species from the Chinese Early Cretaceous (Odonata: Aeshnoptera: Liupanshanidae). *Zootaxa* 2387: 57-62. (in English) ["*Protoliupanshanian wangi*, new genus and species, is described from the Lower Cretaceous Yixian Formation of western Liaoning, China. It is probably the sister genus of the clade that comprises all other liupanshaniid genera, based on current knowledge of the wing venation of *Paramesuropetala*." (Authors)] Address: Nel, A., Lab. Ent. Mus. Nat. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

8829. Huang, D.-y.; Nel, A. (2010): *Sinahemeroscopus magnificus*, new genus and species of 'libelluloid' dragonfly from the Chinese Mesozoic (Odonata, Anisoptera: Nannogomphidae?). *Zootaxa* 2388: 44-48. (in English) ["*Sinahemeroscopus magnificus* gen. and sp. nov. is described from the Early Cretaceous of China. We tentatively attribute it to the Nannogomphidae. This family was currently known from the Late Jurassic of Germany." (Authors)] Address: Huang, D.-y., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, P.R. China. E-mail: huangdiyong@sina.com

8830. Jara, F.G.; Perotti, M.G. (2010): Risk of predation and behavioural response in three anuran species: influence of tadpole size and predator type. *Hydrobiologia* 644: 313-324. (in English) ["Many species alter their activity, microhabitat use, morphology and life history in response to predators. Predation risk is related to predator size and palatability of prey among others factors. We analyzed the predation risk of three species of tadpoles that occur in norwestern Patagonia, Argentina: *Pleurodema thaul*, *Pleurodema bufoninum* and *Rhinella spinulosa*. We sampled aquatic insect predators in 18 ponds to determine predator-tadpole assemblage in the study area. In laboratory conditions, we analysed the predation rate imposed by each predator on each tadpole species at different tadpole sizes. Finally, we tested whether tadpoles alter their activity in the presence of chemical and visual cues from predators. Small *P. thaul* and *P. bufoninum* tadpoles were the most vulnerable prey species, while small *R. spinulosa* tadpoles were only consumed by water bugs. Dragonflies and water bugs were the most dangerous tadpole predators. Small *P. thaul* tadpoles reduced their activity when they were exposed to all predators, while large tadpoles only reduced the activity in the presence of large predators (dragonfly larvae and water bugs). Small *P. bufoninum* tadpoles reduced the activity when they were exposed to beetle larvae and dragonfly larvae, while large tadpoles only reduced activity when they were exposed to larger predators (water bugs and dragonfly larvae). *R. spinulosa* tadpoles were the less sensitive to presence of predators, only larger tadpoles responded significantly to dragonfly larvae by reducing their activity. We conclude that behavioural responses of these anuran species were predator-specific and related to the risk

imposed by each predator." (Authors)] Address: Jara, F.G., Laboratorio de Fotobiología-INIBIOMA (CONICET), Centro Regional Universitario Bariloche, Universidad Nacional del Comahue, Quintral 1250, 8400 San Carlos de Bariloche, Rio Negro, Argentina. E-mail: fjara@crub.uncoma.edu.ar

8831. Karube, H.; Moriya, H.; Hayashi, F. (2010): Distribution of calopterygid damselflies of the genus *Mnais* in Kanagawa prefecture and its adjacent areas, central Japan. *Bull. Kanagawa prefect. Mus. (Nat. Sci.)* 39: 25-34. (in Japanese, with English summary) ["Two closely related species of *Mnais* damselflies. *M. pruinosa* and *M. costalis* are known in Kanagawa Prefecture. The previous studies of DNA sequences of the ITS1 region suggested that another group of *Mnais* is also distributed there. In this study, we sequenced 223-bp of ITS1 of 543 *Mnais* damselflies collected across Kanagawa Prefecture and its adjacent Shizuoka, Yamanashi, Tokyo, and Saitama Prefectures. Morphological measurements were also made for 404 male adult specimens. Obtained sequences consisted of three types, each corresponding to *M. pruinosa*, *M. costalis*, and another one. The last group was distributed in the central part of the studied region, being surrounded by either species, and had intermediate morphologies between the two species. Thus, this group seems to be a hybrid swarm derived from isolation of the past hybrid individuals of the two species. We discuss the possible geographic events in the past that affected the distribution patterns of them." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

8832. Kawashima, I.; Tsuji, I. (2010): Records of *Aeschnophlebia anisoptera* Selys and *Gynacantha japonica* Barteneff (Odonata: Anisoptera: Aeshnidae) from the Southern Part of the Miura Peninsula, Kanagawa Prefecture. *Natural History Report of Kanagawa* 31: 37-40. (in Japanese, with English title) [Japan; *Aeschnophlebia anisoptera*: 10-VII-2009; *Gynacantha japonica*: 19-VII-2009] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

8833. Ketelaar, R. (2010): Recovery and further protection of rheophilic Odonata in the Netherlands and North Rhine-Westphalia. *Brachytron* 12(1/2): 38-49. (in English, with Dutch and German summaries) ["This article describes and discusses the current distribution of lotic dragonflies in The Netherlands and North Rhine-Westphalia, Germany. Combined distribution maps of seven species are published: *Calopteryx splendens*, *C. virgo*, *Cordulegaster bidentata*, *C. boltonii*, *Ophiogomphus cecilia*, *Gomphus flavipes* and *G. vulgatissimus*. It is concluded that most dragonflies of running waters are recovering since 1990. Although the trend is undoubtedly positive, some species are still very rare and threatened, especially *Coenagrion mercuriale*, *C. ornatum* and *Cordulegaster bidentata*. The European Habitat Directive will provide new activities for the protection of these species. However, more promising seems to be the Water Framework Directive. To make further recovery of these species possible cooperation of odonatologists is necessary, the exchange of distribution data is a first step." (Author)] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

- 8834.** Kim, D.G.; Yum, J.W.; Yoon, T.J.; Bae, Y.J. (2010): Life history of an endangered dragonfly, *Nannophya pygmaea* Rambur, in Korea (Anisoptera: Libellulidae). *Odonatologica* 39(1): 39-46. (in English) ["Aspects of the *N. pygmaea* life history, an endangered species in Korea, were studied at an abandoned paddy field in Mungyeong, Gyeongsangbuk-do, Korea. The larvae were sampled quantitatively at monthly intervals (every 2 weeks during the emergence period) from June 2006 to July 2007 and the adults were counted via a line-transect method. Based on the analyses of larval body length distribution, degree days (DD), and emergence time, the species is considered univoltine with an emergence period from mid-May to early August. The estimated sum of the thermal amount, effective to larval development during the study period, was 2468 DD. The relationship between the larval head width and wingsheath width, which is coincident with the temperature fluctuation pattern, shows that the population harbors at least 4 size groups (cohorts) in a generation." (Authors)] Address: Bae, Y.J., College of Life Sciences and Biotechnology, Korea University, Seoul 136-701, Korea. E-mail: yjbae@korea.ac.kr
- 8835.** King, S. (2010): The dragonflies and damselflies of the Cannon River watershed. *Watershed Watcher* 19(2-4): 5. (in English) [Announcement for starting odonatological activities in the Cannon River Watershed, Minnesota, USA.] Address: Cannon River Watershed Partnership, 8997 Eaves Ave, Northfield, MN 55057, USA
- 8836.** Kohler, N.S. (2010): First records of *Sympetrum vicinum* (Autumn Meadowhawk) in Montana. *Argia* 22(1): 12-13. (in English) [Montana, USA. The first sightings of *S. vicinum* came on 15-IX-2009 while surveying a man-made pond complex west of Drummond in Granite County, Montana. Additional records result from three western Montana counties.] Address: Kohler, N.S. E-mail: nskohler@bresnan.net
- 8837.** Kortello, A.D.; Ham, S.J. (2010): Movement and habitat selection by *Argia vivida* (Hagen) (Odonata, Coenagrionidae) in fuel-modified forest. *Journal of Insect Conservation* 14(2): 133-140. (in English) ["Fuel management for wildfire protection is becoming increasingly common in the wildland-urban interface and may have conservation implications for species with restricted distributions and limited dispersal abilities. To evaluate the impact of forest fuel management on the damselfly *A. vivida* at the northern margin of its range, we examined terrestrial movements and habitat associations using Capture-Mark-Recapture and point count techniques. We found that habitats away from the springs were particularly important for *A. vivida* females. Most damselflies travelled at least 50 m between capture and recapture and patches of cleared forest up to this size did not pose a barrier to movement. Although *A. vivida* typically roosts in trees at night, cleared fuel treatment areas were preferred over unmodified or thinned forest as daytime basking and foraging sites. Preferred sites were also characterized by heterogeneous canopy closure, i.e., a clearing adjacent to unmodified forest with a closed canopy. We speculate that this behaviour derives from the species' thermoregulation requirements; the use of sunspots for thermal basking during the day and the use of forest cover at night to slow the radiant loss of heat. Our findings demonstrate the scale of movements that define available habitat and the importance of both daytime and night time habitat requirements in considering terrestrial foraging and movement corridors. Consequently, conservation efforts for this species in fuel management areas should focus on maintaining unmodified stands of dense trees in association with cleared patches of appropriate dimension, rather than a uniformly thinned forest." (Authors)] Address: Kortello, Andrea, Banff National Park, Fire and Vegetation Management Program, Box 900, Banff, AB, T1L 1K2, Canada. E-mail: kortello@yahoo.com
- 8838.** Kraus, J.M. (2010): Diet shift of lentic dragonfly larvae in response to reduced terrestrial prey subsidies. *Journal of the North American Benthological Society* 29(2): 602-613. (in English) ["Inputs of terrestrial plant detritus and nutrients play an important role in aquatic food webs, but the importance of terrestrial prey inputs in determining aquatic predator distribution and abundance has been appreciated only recently. I examined the numerical, biomass, and diet responses of a common predator, dragonfly larvae, to experimental reduction of terrestrial arthropod input into ponds. I distributed paired enclosures ($n = 7$), one with a screen between the land and water (reduced subsidy) and one without a screen (ambient subsidy), near the shoreline of 2 small fishless ponds and sampled each month during the growing season in the southern Appalachian Mountains, Virginia (USA). Screens between water and land reduced the number of terrestrial arthropods that fell into screened enclosures relative to the number that fell into unscreened enclosures and open reference plots by 36%. The $\delta^{13}C$ isotopic signatures of dragonfly larvae shifted towards those of aquatic prey in reduced-subsidy enclosures, a result suggesting that dragonflies consumed fewer terrestrial prey when fewer were available (ambient subsidy: 30%, reduced subsidy: 19% of diet). Overall abundance and biomass of dragonfly larvae did not change in response to reduced terrestrial arthropod inputs, despite the fact that enclosures permitted immigration/emigration. These results suggest that terrestrial arthropods can provide resources to aquatic predators in lentic systems, but that their effects on abundance and distribution might be subtle and confounded by in situ factors." (Author) The most common dragonflies emerging from the ponds during the experiment were *Libellula lydia*, *L. pulchella*, *Somatochlora elongata*, *Cordulia shurtleffi*, *Aeshna umbrosa*, and *Sympetrum rubicundulum*.] Address: Kraus, Johanna, Trani Center for Life Sciences, Dept of Biology, Virginia Commonwealth Univ., 1000 West Cary Street, Richmond, Virginia 23284-2012 USA. E-mail: jmkraus@vcu.edu
- 8839.** Kutera, M.; Woźniak, A. (2010): New locality of common goldenring *Cordulegaster boltonii* (Donovan, 1807) near Starachowice on the Kielce Upland. *Chrońmy Przyr. Ojcz.* 66(2): 121-124. (in Polish, with English summary) [On 11-VII-2007, a male *C. boltonii* was recorded near Lubienia (UTM EB15), Poland. "The nearest known locality is situated in the Suchedniowsko-Oblęgorski Landscape Park, where the species was recorded in 1981. After the year 2005 found in the vicinity of Suchedniowsko-Oblęgorski Landscape Park and in the Świętokrzyskie (Holy Cross) Mountains. The extent of *C. boltonii* in Poland includes northwestern, midwestern and southern part of the country, and only one locality known from the North-East. The species seemed to be nearly extinct in the Upper Silesia region, however, it has recently been rediscovered in this area. The species is protected by law in Poland and in the

national Red List 2002 it was qualified for the category VU – (vulnerable). However, new data have shown the more favourable conservation status of the species than it had previously been assessed. Therefore, *C. boltonii* has been deleted from the Polish Red List." (Authors)] Address: Kutera, M., Rudka 30, 27–415 Kunów. Poland. E-mail: marcin.kutera@poczta.onet.pl

8840. Lavilla, I.; Rodrigueza-Linares, G.; Garrido, J.; Bendicho, C. (2010): A biogeochemical approach to understanding the accumulation patterns of trace elements in three species of dragonfly larvae: evaluation as biomonitors. *J. Environ. Monit.* 12: 724-730. (in English) ["The accumulation patterns of different trace elements (As, Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn) were studied in three species of dragonfly larvae (*Cordulegaster boltoni*, *Boyeria irene* and *Onychogomphus uncatas*). Additionally these species were assessed as potential biomonitors in a lotic ecosystem (Louro River, Spain). Element concentrations were determined by inductively coupled plasma optical emission spectrometry (ICP-OES) in both dragonfly larvae and river sediments. The surface of the larvae was observed and analyzed with scanning electron microscopy (SEM). A desorption test was used to establish the percentage of element adsorbed into the exoskeleton. Field biomonitoring studies were made considering the first part of the river as a control area in relation to the second part, which was severely polluted by industrial and domestic activities. Upon application of principal component analysis (PCA), two different element groups were found in relation to element bioaccumulation. Cu, Cd and Zn were mainly associated with the inner part of the larvae. As, Cr, Fe, Mn, Ni and Zn were found on the outer body parts, related with deposition of oxyhydroxides in the hydrocycle. SEM revealed a layer of inorganic particles, similar in composition to fine bed sediments. Significant relations between the element content of this group and that of sediments at the sampling site were found. Differences in bioaccumulation for each of the three species, except for As, were observed. Dragonfly larvae revealed their ability to reflect environmental concentrations of As in freshwater media." (Authors)] Address: Lavilla, Isela, Departamento de Química Analítica y Alimentaria, Facultad de Química, Universidad de Vigo, As Lagoas—Marcosende s/n, 36310 Vigo, Spain. E-mail: isela@uvigo.es

8841. Lehmann, F.-O. (2010): Wing-wake interaction reduces power consumption in insect tandem wings. In: G.K. Taylor, M.S. Triantafyllou & C. Tropea (eds.): *Animal Locomotion*. Springer Verlag. Berlin Heidelberg. ISBN 978-3-642-11632-2: 203-213. (in English) ["Insects are capable of a remarkable diversity of flight techniques. Dragonflies, in particular, are notable for their powerful aerial manoeuvres and endurance during prey catching or territory flights. While most insects such as flies, bees and wasps either reduced their hind wings or mechanically coupled fore and hind wings, dragonflies have maintained two independent-controlled pairs of wings throughout their evolution. An extraordinary feature of dragonfly wing kinematics is wing phasing, the shift in flapping phase between the fore and hind wing periods. Wing phasing has previously been associated with an increase in thrust production, readiness for manoeuvrability and hunting performance. Recent studies have shown that wing phasing in tandem wings produces a twofold modulation in hind wing lift, but slightly reduces the maximum combined lift of

fore and hind wings, compared to two wings flapping in isolation. Despite this disadvantage, however, wing phasing is effective in improving aerodynamic efficiency during flight by the removal of kinetic energy from the wake. Computational analyses demonstrate that this increase in flight efficiency may save up to 22% aerodynamic power expenditure compared to insects flapping only two wings. In terms of engineering, energetic benefits in four-wing flapping are of substantial interest in the field of biomimetic aircraft design, because the performance of man-made air vehicles is often limited by high-power expenditure rather than by lift production. This manuscript provides a summary on power expenditures and aerodynamic efficiency in flapping tandem wings by investigating wing phasing in a dynamically scaled robotic model of a hovering dragonfly." (Author)] Address: Lehmann, O.-F., BioFuture Research Group, University of Ulm, Albert-Einstein-Allee 11, 89081 Ulm, Germany. E-mail: fritz.lehmann@uni-ulm.de

8842. Lencioni, F.A.A. (2010): *Telebasis luizae* spec. nov. from Brazil (Zygoptera: Coenagrionidae). *Odonatologica* 39(1): 71-74. (in English) ["The new species is described and illustrated based on a single specimen from the state of Bahia. Holotype male: Brazil, Bahia, São Desidério, 17-I-2004; deposited in author's collection. It can be separated from all other known congeners by the long and strongly sclerotized carina on the dorso-posterior margin of abdominal segment 10, which is much larger than the almost vestigial carina in *T. dominicana*, *T. filiola* and *T. willinki*." (Author)] Address: Lencioni, F.A.A., Rua Aníbal, 216 - Jardim Coleginho, BR-12310-780, Jacareí, SP, Brazil. E-mail: odonata@zygoptera.bio.br

8843. Lin, Q.-b.; Petrulevicius, J.F.; Huang, D.-y.; Nel, A.; Engel, M.S. (2010): First fossil Calopterygoidea from southeastern Asia (Odonata: Zygoptera): A new genus and species from the Paleogene of China. *Geobis* 43(3): 349-353. (in English, with French summary) ["*Sinocalopteryx shangyongensis* nov. gen., nov. sp., the first fossil calopterygoid from eastern Asia, is described from the earliest Eocene of Southwest China. Although the new genus has the principle synapomorphies of Calopterygoidea, it possesses a unique structure (possible reversal) in the pattern of vein RP1/2." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

8844. Lin, Q.-b.; Nel, A.; Huang, D.-y. (2010): *Sinak-tassia tangi*, a new Chinese Mesozoic genus and species of Aktassiidae (Odonata: Petaluroidea). *Zootaxa* 2359: 61-64. (in English) ["Here we describe a new well-preserved fossil of Petaluroidea attributable to a new genus and species of the family Aktassiidae from the Early Cretaceous Yixian Formation, Western Liaoning, China. This fossil is the most recent representative of the Aktassiinae. The genus *Aktassia* is known from the Jurassic of Mongolia, Chinese Inner Mongolia (Nel et al., 1998; Huang et al., 2006), and Kazakhstan (Pritykina, 1968)." (Authors)] Address: Huang, D.-y., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, P.R. China. E-mail: huangdiyong@sina.com

8845. Locklin, J.L.; Vodopich, D.S. (2010): Patterns of gregarine parasitism in dragonflies: host, habitat, and seasonality. *Parasitology Research* 107(1): 75-87. (in

English) ["Gregarines are ubiquitous protozoan parasites that infect arthropods worldwide. More than 1,600 gregarine species have been described, but only a small percentage of invertebrates have been surveyed for these apicomplexan parasites. Adult dragonfly populations were surveyed for gregarines at two reservoirs in Texas, USA for 2 years. Gregarine prevalence and intensity were compared intraspecifically between host genders and reservoirs, among wing loads, and through time. Of the 29 dragonfly species collected, 41% hosted gregarines. Nine of these dragonfly species were previously undocumented as hosts. Among the commonly collected hosts, prevalence ranged from 18 to 52%. Parasites were aggregated among hosts and had a median intensity of five parasites per host. Gregarines were found only in hosts exceeding a minimum wing load, indicating that gregarines are likely not transferred from the naiad to adult during emergence. Prevalence and intensity increased during both years, suggesting that gregarine oocyst viability parallels increasing host population densities and may be short-lived. Prevalence and intensity also differed between dragonfly populations at two reservoirs. Regression analyses revealed that host species, host gender, month, and year were significant explanatory variables related to gregarine prevalence and intensity. Abundant information on odonate distributions, diversity, and mating activities makes dragonfly-gregarine systems excellent avenues for ecological, evolutionary, and parasitological research. Our results emphasize the importance of considering season, hosts, and habitat when studying gregarine-dragonfly ecology." (Authors)] Address: Locklin, J.L., Department of Biology, Baylor University, One Bear Place 97388, Waco, TX 76798, USA. Email: jasonlocklin@baylor.edu

8846. Lumbra, L. (2010): Wildlife, Plants and Natural Communities News. Natural Heritage Harmonies Winter 2010: 4-6. (in English) [Vermont, USA; Statewide surveys have been completed to identify Odonata that live in peatland habitats and large rivers. Information from this project has greatly increased our knowledge of both common and rare members of the odonate family. Twenty-seven species of greatest conservation need (SGCN) were targeted in these habitats, of which 20 were observed. Three additional SGCN were encountered during the course of field work. One new species for the state, *Enallagma durum* was also observed. Efforts included at least 54 sites on 23 rivers and 28 peatland sites. Overall, the project has resulted in the discovery of new sites for many of Vermont's Odonata SGCN. This project has allowed us, for the first time, to assign status ranks to all of Vermont's Odonata, which number over 140 species.] Address: Vermont Fish & Wildlife Department, 103 South Main Street, 10 South Waterbury, VT 05671-0501, USA

8847. Mantel, S.K.; Muller, N.W.J.; Hughes, D.A. (2010): Ecological impacts of small dams on South African rivers Part 2: Biotic response – abundance and composition of macroinvertebrate communities. *Water SA* 36(3): 361-370. (in English) ["This paper investigates the cumulative impacts of small dams on invertebrate communities in 2 regions of South Africa – the Western Cape and Mpumalanga. Previous research found reduced discharge, increased total dissolved salts, and a decrease in average score per taxon (ASPT; collected using SASS4 methods) at sites with high density of small dams in their catchment. These

changes in ASPT are investigated using the invertebrate abundance data available in the River Health Programme. Multivariate analyses found differences in invertebrate communities in rivers with high densities of small dams in their catchment in foothill-gravel streams (in both Western Cape and Mpumalanga) and in foothill-cobble streams (in Western Cape only). Opportunistic taxa that are tolerant of pollution, and capable of exploiting various habitats, and those that prefer slower currents increased in numbers, while other taxa that are sensitive to pollution and disturbance declined in numbers. Some regional differences were noted possibly reflecting climatic differences between the regions. Since the results of this study are correlative, it highlights the need for a systematic (by sites and seasons) and detailed (at species level) collection of data to verify the results of cumulative effects of small dams. This can further the development of a framework for small-dam construction and management that will limit their impact on river catchments. ... the average abundance for the taxa contributing to 90% of the dissimilarity in the invertebrate communities between sites with low and high small-dam density for the 3 group comparisons where ANOSIM found significant differences. In general, the abundance of taxa with low SASS4 scores (signifying species that are less sensitive to pollution and disturbance, and primarily belonging to Turbellaria, Mollusca and Heteroptera) increased, and those with high SASS4 score (i.e. more sensitive species, mostly Odonata, Trichoptera and some Ephemeroptera) declined." (Authors) Odonata are treated at the family level.] Address: Mantel, S.K., Unilever Centre for Environmental Water Quality – Institute for Water Research (UCEWQ-IWR), Rhodes University, PO Box 94, Grahamstown, South Africa. E-mail: s.mantel@ru.ac.za

Martin, K.H. (2010): The transition zone: Impact of riverbanks on emergent dragonfly nymphs. Implications for riverbank restoration and management. Ph.D. thesis, Antioch University, Antioch New England: Environmental Studies: IV, 104 pp. (in English) ["The use of riprap in the restoration and stabilization of riverine landscapes is an issue of concern for many ecologists. While current methods of bank stabilization, especially those involving the placement of rocks (riprap) along the waterline, are effective in controlling erosion their presence changes habitat components (slope, substrate composition, near-shore river velocity) at the river-land interface. The additional impacts of river current, water temperature, soil composition, slope, and water level fluctuation, may further imperil emerging nymphs. The purpose of this research is to document the effects of riprap, location (upriver or downriver of hydroelectric intake/outtake facilities), water level fluctuation, river velocity, air temperature, water temperature, substrate temperature, and soil composition on the distance traveled to eclosure site by *G. vastus* and *S. spiniceps*, and the density of *S. spiniceps*, *G. vastus*, *N. yamaskanensis*, *D. spinosus*, *O. rupinsulensis*, *M. illinoensis*, and *E. priniceps*. Knowledge of the conservation status of these species is fairly limited, although *S. spiniceps* (threatened), *G. vastus* (species of special concern), and *N. yamaskanensis* (species of special concern) are all currently listed on the Massachusetts Endangered Species list. Species density was determined through exuviae collection, and emergence distance was recorded from the edge of the waterline to the site of attached exuviae. Results of the study indicate that nymphal response to the observed abiotic

features varies both with location and species. The presence of riprap had no significant effect on densities of *S. spiniceps*, *G. vastus*, *N. yamaskanensis*, *D. spinosus*, *O. rupinsulensis*, *M. illinoiensis*, and *E. princeps*, but did significantly reduce the distance traveled from the waterline by both *G. vastus* and *S. spiniceps*." (Author)] Address: Martin, Kirsten, 132 Root Road, Somers, CT 06071

8848. McCauley, S. (2010): Body size and social dominance influence breeding dispersal in male *Pachydiplax longipennis* (Odonata). *Ecological Entomology* 35 (3): 377-385. (in English) ["1. Dispersal behaviour can be affected by an individual's phenotype, by the environmental or social context they experience, and by interactions between these factors. Differential dispersal propensities between individuals may also be an important modifier of functional connectivity between populations. To assess how a key trait, body size, affected both social interactions and dispersal behaviour, this study examined the relationship between body size, antagonistic interactions, and breeding dispersal in male *P. longipennis* across a seasonal decline in adult body size. 2. During a seasonal peak in male body size in this study, dispersers were smaller than non-dispersers. Later in the season, the body size of dispersers and non-dispersers did not differ. 3. Focal observations found that body size was related to competitive dominance, large males engaged in aggressive chases more often and smaller males were more frequently pursued. 4. These results indicate that when large males were present, small males were more likely to disperse suggesting that dispersal is a tactic adopted by social subordinates in this context. If breeding dispersal is typically undertaken by subordinate males, functional connectivity between populations may be less than estimated from absolute dispersal rates." (Author)] Address: McCauley, S., Department of Ecology and Evolutionary Biology, University of Toronto, 25 Willcocks St., Toronto, ON M5S 3B2, Canada. E-mail: shannon.mccauley@utoronto.ca

8849. McCauley, S.J.; Brodin, T.; Hammond, J. (2010): Foraging rates of larval dragonfly colonists are positively related to habitat isolation: Results from a landscape-level experiment. *American Naturalist* 175 (3): E66-E73. (in English) ["There is increasing evidence of intraspecific variation in dispersal behaviour. Individual differences in dispersal behaviour may be correlated with other traits that determine the impact individuals have on patches they colonize. We established habitat patches—artificial pools—across a landscape, and these pools were naturally colonized by dragonfly larvae. Larvae were collected from pools at different levels of isolation and held under common lab conditions for 5 months. We then compared larval foraging rates. Foraging rate was positively related to habitat isolation, and colonists from the most isolated artificial pools had significantly higher foraging rates than individuals from the least isolated pools. Our results indicate that spatial patterns in colonist behaviour can develop across a landscape independent of species-level dispersal limitation. This finding suggests that studies of community structure across space should include an assessment of the distribution of phenotypes as well as species-level dispersal limitation patterns." (Authors)] Address: McCauley, S.J., Center for Population Biology, Department of Entomology, University of California, Davis, California 95616, USA.

8850. Milesi, S.V.; Biasi, C.; Restello, R.M.; Hepp, L.U. (2010): Distribution of benthic macroinvertebrates in Subtropical streams (Rio Grande do Sul, Brazil). *Acta Limnol. Bras.* 21(4) (2009): 419-429. (in English, with Portuguese summary) [The aim of the study was to evaluate the spatial and seasonal distribution of the benthic macroinvertebrates community in nine streams in the north region of Rio Grande do Sul State. "Streams with riparian vegetation and lower contents of dissolved nutrients showed higher richness of intolerant organisms to pollution. The results suggest that the distribution of benthic macroinvertebrates in the studied region was mainly related to anthropic activities developed in the catchment." (Authors) Odonata are treated at the family level.] Address: Milesi, S.V., Laboratorio de Biomonitoramento, Departamento de Ciencias Biológicas, Universidade Regional Integrada do Alto Uruguai e das Missoes, Campus de Erechim, Av. Sete de Setembro, 1621, CEP 99700-000, Erechim, RS, Brazil. E-mail: silviamilesi@yahoo.com.br

8851. Molecular Ecology Resources Primer Development Consortium; Cordero-Rivera, A.; & 40 co-authors (2010): Permanent Genetic Resources Note: Permanent Genetic Resources added to Molecular Ecology Resources Database 1 December 2009–31 January 2010. *Molecular Ecology Resources* 10(3): 576-579. (in English) [The article documents the addition of 220 microsatellite marker loci to the Molecular Ecology Resources Database, including *Ischnura elegans*. The loci were cross-tested on *I. graellsii*, *I. ramburii*, and *I. pumilio*.] Address: Center for the Conservation of Biological Resources, Black Hills State University, 1200 University St Unit 9053, Spearfish, SD 57799, USA. E-mail: editorial.office@molecol.com.

8852. Moreno, J.L.; Angeler, D.G.; De las Heras, J. (2010): Seasonal dynamics of macroinvertebrate communities in a semiarid saline spring stream with contrasting environmental conditions. *Aquatic Ecology* 44: 177-193. (in English) ["Semiarid saline streams are rare aquatic ecosystem types. Their constituent biota is expected to have adapted evolutionarily to strong hydrological variability and salinity stress; however, their ecology is not well known. In this study, we quantify the seasonal changes in the structure of the macroinvertebrate community in the Reventón Rambla (southeastern Spain), a permanent saline spring stream which is included in a drainage system consisting of ephemeral dry channels (so-called "ramblas"). Seasonal patterns of community structure were studied in two reaches with contrasting environmental regimes using univariate and multivariate statistics. The upstream site showed more stable environmental conditions than the downstream site, and both sites also differed with regard to species richness, and structural and functional group attributes. On a seasonal basis, community dissimilarity was high during periods when both sites were isolated during summer droughts but dissimilarity decreased when both sites were connected through surface flow. Furthermore, the communities tended to show cyclical trajectories in multivariate ordination space. Rather than being related to salinity stress, these patterns seemed to track the hydrological disturbance regime of this rambla system. Spates tended to disrupt communities, while signs of recovery were evident during low-flow periods. Results suggest that salinity fluctuation does not pose a severe abiotic constraint to these adapted macroinvertebrate communities. Their

suits of functional properties provide them with the necessary traits to recover quickly from natural disturbance. While human-caused salinization of streams severely impacts communities eventually reducing their recovery potential, our results suggest that communities in natural saline streams may show similar responses to hydrological disturbance as communities from non-saline streams. [...] The biomass of Diptera and Odonata was significantly higher in the upstream reach, and Ephemeroptera and Heteroptera in the downstream reach. The biomass of Mollusca, Hydrachnidia, Diptera, Odonata, Ephemeroptera, Coleoptera and Heteroptera showed a marked increase in the spring-summer period. The highest value of average dissimilarity between upstream and downstream sites was recorded in summer (78.17%), when communities were more independent as a result of isolation of both reaches. When both sites were connected by high flows (e.g. autumn), the structure of upstream and downstream communities was more similar, showing a lower dissimilarity value. The main dissimilarities between upstream and downstream sites in community structure, measured as biomass differences, were shown by Mollusca [...] and Odonata (*Orthetrum brunneum* at upstream)." (Authors)] Address: J. L. Moreno, J.L., Regional Centre of Water Research (CREA), University of Castilla-La Mancha, Crtra. de Las Penas, km 3, Albacete 02071, Spain. E-mail: joseluis.moreno@uclm.es

8853. Muzon, J.; Weigel Munoz, S.; Campos, R.E. (2010): The larva of *Mecistogaster amalia* (Odonata: Pseudostigmatidae). *International Journal of Odonatology* 13(1): 137-144. (in English) ["The final larval stadium of *M. amalia* is described and illustrated for the first time based on one female collected in a tree hole in Misiones province, Argentina, and compared with all known larvae of related genera. Larval morphology of Pseudostigmatidae is briefly discussed." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

8854. Nagel, L.; Robb, T.; Forbes, M.R. (2010): Inter-annual variation in prevalence and intensity of mite parasitism relates to appearance and expression of damselfly resistance. *BMC Ecology* 2010, 10:5: (in English) ["Background: Insects can resist parasites using the costly process of melanotic encapsulation. This form of physiological resistance has been studied under laboratory conditions, but the abiotic and biotic factors affecting resistance in natural insect populations are not well understood. Mite parasitism of damselflies was studied in a temperate damselfly population over seven seasons to determine if melanotic encapsulation of mite feeding tubes was related to degree of parasitism, host sex, host size, emergence timing, duration of the emergence period, and average daily air temperature. Results: Although parasite prevalence in newly emerged damselflies was >77% each year, hosts did not resist mites in the early years of study. Resistance began the year that there was a dramatic increase in the number of mites on newly emerged damselflies. Resistance continued to be correlated with mite prevalence and intensity throughout the seven-year study. However, the percentage of hosts resisting only ranged from 0-13% among years and resistance was not sex-biased and was not correlated with host size. Resistance also was not correlated with air temperature or with timing or duration of damselfly emergence. Conclusions: Resis-

tance in host damselflies was weakly and variably expressed over the study period. Factors such as temperature, which have been identified in laboratory studies as contributing to resistance by similar hosts, can be irrelevant in natural populations. This lack of temperature effect may be due to the narrow range in temperatures observed at host emergence among years. Degree of mite parasitism predicted both the appearance and continued expression of resistance among parasitized damselflies." (Authors)] Address: Nagel, Laura, Department of Biology, Carleton University, Ottawa, Canada. E-mail: lnagel@connect.carleton.ca

8855. Neseemann, H.; Shah, R.D.T.; Shah, D.N.; Sharma, S. (2010): First records of *Rhincoda natatrix* and *Rhincoda rugosa* (Blattodea: Blaberidae) from Nepal and India (Maharashtra) with notes on habitat quality. *Journal of threatened taxa* 2(1): 648-652. (in English) [Two species of cockroaches (*R. natatrix* and *R. rugosa*) were collected from aquatic habitats of undisturbed natural forest streams in Nepal and India (Maharashtra). Nymphs and adults are depicted and field observations of microhabitat and behaviour described. Taxa lists of accompanying macroinvertebrate fauna are given (in most cases at the family level; *Epiophlebia laidlawi* was recorded at two sites), and water quality class is calculated using three biotic scoring systems. *R. natatrix* is a true aquatic species with amphibious lifestyle in the eulittoral of springs (Crenon) and streams (Rhithron) of excellent and good water quality classes I and II. *R. rugosa* is a predominantly terrestrial species that also colonizes the banks of water bodies and appears in between aquatic fauna. These species cannot be classified using the traditional habitat system." (Authors)] Address: Neseemann, H., Aquatic Ecology Center, Kathmandu University, Dhulikhel, Nepal. E-mail: hneseemann2000@yahoo.co.in

8856. Novelo-Gutierrez, R.; Tennesen, K.J. (2010): Description of the larva of *Aeshna persephone* Donnelly, 1961 (Odonata: Aeshnidae). *Zootaxa* 2484: 61-67. (in English, with Spanish summary) ["The last instar larva of *A. persephone* is described and compared to the other *Aeshna* species inhabiting Mexico and the southwestern U.S. A key is provided to separate *A. persephone* from the six other sympatric species of *Aeshna*. Larvae inhabit roots of riparian herbaceous vegetation in open streams with boulders." (Authors)] Address: Instituto de Ecología, A.C. Red de Biodiversidad y Sistemática. Apartado Postal 63, 91070 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

8857. Ohiokhioya, T.; Imoobe, T.; Ohiozebau, E. (2010): Pollution status of a tropical forest river using aquatic insects as indicators. *African Journal of Ecology* 48(1): 232-238. (in English, with French summary) ["Aquatic insects inhabiting Okhuo River, in a tropical forest near Benin City, Southern Nigerian, were studied between January and December 2006 to determine the taxa composition, diversity, EPT index, relative proportions of the various groups and hence the pollution level of the waterbody. Three stations were selected and sampled monthly using the kick sampling technique. A total of 3235 individual aquatic insects belonging to 24 taxa distributed among 23 genera in six orders were collected. The insect orders occurred in the following order of dominance: Ephemeroptera > Odonata > Coleoptera > Diptera > Plecoptera > Tricoptera. Based on the diverse composition of the community dominated by organisms intolerant of organic enrichment, and the

high diversity and EPT index, water quality in Okhuo River is not significantly degraded. Community composition varies seasonally, with a trend toward a declining proportion during the rainy season and increasing proportions during the dry season. Aquatic insect composition in Okhuo River compares favourably with those in similar, relatively undisturbed forest streams and rivers in Nigeria, but the diversity and proportional distribution of taxa vary considerably between streams." (Authors)] Address: Imoobe, T., Department of Animal and Environmental Biology, University of Benin, Benin City, P.M.B. 1154, Nigeria. E-mail: timoobe@yahoo.co.uk

8858. Olthoff, M. (2010): The dragonflies of the peat bogs and heathlands in Western Münsterland (Westphalia, Germany). *Brachytron* 12(1/2): 32-37. (in English, with Dutch and German summaries) ["The dragonflies of the peat bogs and heathlands in Western Münsterland, most of them situated nearby the Dutch-German borderline, were investigated between 1999 and 2005. Altogether 42 species of dragonflies were recognized, among them stenotopic moorland dragonflies (e.g. *Aeshna subarctica*, *Somatochlora arctica*). The peat bogs and heathlands are of a great importance for the protection of dragonflies in an otherwise well-fertilized landscape of the Western Münsterland." (Author)] Address: Olthoff, M., Biologische Station Zwillbrock e.V., Zwillbrock 10, 48691 Vreden, Germany

8859. Paiero, S.M.; Marshall, S.A. (2010): Chapter 9. Insects of Ojibway Prairie, a southern Ontario tallgrass prairie. In: Paiero, S. M., S. A. Marshall, P. D. Pratt, and M. Buck. 2010. Insects of Ojibway Prairie, a Southern Ontario Tallgrass Prairie. In *Arthropods of Canadian Grasslands (Volume 1): Ecology and Interactions in Grassland Habitats*. Edited by J. D. Shorthouse and K. D. Floate. Biological Survey of Canada. © 2010 Biological Survey of Canada. ISBN 978-0-9689321-4-8. doi:10.3752/9780968932148xh9: 199-225. (in English, with French summary) [The Ojibway prairie is the single locality in Canada, *Archilestes grandis* is occurring.] Address: Paiero, S.M., Department of Environmental Biology, University of Guelph Guelph, Ontario, Canada

8860. Parag, R.; Manoj, B.; Omkar, D. (2010): Additions to the Odonata (Insecta) of Goa. *Journal of Threatened Taxa* 2(4): 805-814. (in English) ["The study reports the results from surveys for Odonates in the State of Goa over 19 months during 2007-2008. A total of 66 species of Odonates were documented with 34 new species records from the State. The present study has resulted in an increase of 47.30% in the number of species reported from Goa to 74 from the existing 39. Family Libellulidae dominated the odonate community with 32 species followed by Coenagrionidae with 14 species. *Orthetrum sabina* was the most abundant species while seven species were documented only once during the survey period. More survey effort are needed to completely document the odonate species diversity of the state." (Authors)] Address: Rangnekar, P, Bldg 4, S-3, Technopark, Chogm Road, Alto-Porvorim, Goa 403001, Tamil Nadu, India. E-mail: paragrangnekar@yahoo.com

8861. Paula-Lima, J.E. de; Rödder, D.; Sole, M. (2010): Diet of two sympatric Phyllomedusa (Anura: Hylidae) species from a cacao plantation in southern Bahia, Brazil. *North-Western Journal of Zoology* 6(1): 13-24. (in English) [Contrary to Teixeira, R. L. & D. Vrcibradic (2007): *Phyllomedusa rohdei*. Diet. *Herpeto-*

logical Review 38: 69-70' no Odonata were detected as prey items in the diet of the *Phyllomedusa rohdei* and *P. burmeisteri*.] Address: Sole, M., Departamento de Ciências Biológicas, Universidade Estadual de Santa Cruz, Rodovia Ilhéus Itabuna, km 16, CEP 45650-000, Ilhéus, Bahia, Brazil. E-mail: mksole@uesc.br

8862. Paulson, D. (2010): Damsels in distress — or Maui phooey. *Argia* 22(1): 11-12. (in English) [Maui, Hawaii, this winter (9–15 December 2009); visiting known as prospective localities for *Megalagrion* species, no *Megalagrion* specimens could be traced. „We saw crayfish and *Gambusia* (both introduced) at a number of the stream crossings, and my understanding was that both of them, as well as other fish species introduced in the lower reaches of many of the streams, could have adverse effects on *Megalagrion* populations. I wonder if they have increased and/or spread farther since Jerrell was there in 1993.“] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8863. Pinto, A.P.; Carvalho, A.L. (2010): A new species of *Lauromacromia* (Odonata: Corduliidae) from Southeastern Brazil, with a cladistic analysis of the genus and comments on Neotropical dragonfly biogeography. *Zootaxa* 2425: 45-68. (in English) ["*Lauromacromia melanica* sp. nov. from Conceição da Barra municipality, Espírito Santo State, Brazil, is described and illustrated based on two males (both in MNRJ nº 135). The new species is similar to *L. pinguaba* differing from it mainly by the absence of pale spots on S3–6 and by the ellipsoid shape of metepisternal pale stripe. A key for males of all species of the genus is provided. A cladistic analysis encompassing 43 external morphological male characters carried out in two distinct procedures, the first with all characters unordered and the second with two or three state characters ordered. The unordered analysis generated only one most-parsimonious tree (66 steps of length, CI = 0.69, RI = 0.62). The hypothesis of monophyly of *Lauromacromia* is supported and includes three groups, one formed by the Atlantic Forest species (*L. melanica* sp. nov. + *L. pinguaba*), and another by the Cerrado species (*L. flaviae* + (*L. bedei* + *L. luismoojeni*)), and *L. dubitalis*, positioned in polytomy with these two groups. The ordered analysis also generated only one most-parsimonious tree (68 steps of length, CI = 0.70, RI = 0.67), which maintained the monophyly of *Lauromacromia* but *L. dubitalis* positioned basally as sister-group to the Atlantic Forest + Cerrado species groups. The geographic distribution of *Lauromacromia* is updated with a new record of *L. luismoojeni* based on one adult male (Brazil: Mato Grosso do Sul State) and probable first Brazilian records for *L. dubitalis* (Amazonas and Pará States) based on two larvae. A vicariance hypothesis is proposed to explain spatial evolution of *Lauromacromia*, and based on current biogeographical classifications we consider *Gomphomacromia* and *Rialla* apart from Neotropical biota. Some aspects of biology and ecology of *Lauromacromia* are also discussed." (Authors)] Address: Pinto, A.P., Programa de Pós-graduação em Ciências Biológicas (Zoologia) IB - USP, Museu de Zoologia, Universidade de São Paulo, Av. Nazaré 481, Ipiranga 04263-000, São Paulo, SP, Brazil. E-mail: odonata_angelo@hotmail.com

8864. Popova, O.N.; Smirnova, Yu.A. (2010): Community of aquatic insects in forest-steppe lakes of Baraba (South of West Siberia). *Contemporary Prob-*

lems of Ecology 3(1): 50-54. (in English) ["The studies were performed from 2004 to 2006 (mid-May-late October) on drainage Lake Fadikha, a typical water body with reed beds in the Barabinsk region of the Baraba forest-steppe zone in the south of West Siberia." At the lake and adjacent areas, 41 species of dragonflies (imagos) were identified. Samples taken from the lake contained larvae of 18 Odonata species. A checklist of the species is omitted in the paper. Some results are discussed as follows: In the sublittoral, 14 species (8 Anisoptera and 6 Zygoptera), and in the reed border, also 14 species (9 Anisoptera and 5 Zygoptera) were found. In the sublittoral, *Lestes sponsa*, *Aeshna serrata*, *Leucorrhinia dubia*, and *Sympetrum danae* were absent. "The absence of *Lestes sponsa* in the sublittoral zone is not surprising since this species prefers shallow, saline, and heavily silted or overgrown water bodies. The absence of the other three species may be occasional [...]. In reeds (*Phragmites australis* reed beds), *Enallagma cyathigerum*, *Erythromma najas*, *Anax parthenope*, and *Somatochlora flavomaculata* are absent. [...] Ten species, characterized by wide environmental valence, appeared to be common for the sublittoral and reeds: *Sympecma paedisca*, *Coenagrion armatum*, *C. lunulatum*, and *C. pulchellum*, and *Leucorrhinia pectoralis*, *L. rubicunda*, *Libellula quadrimaculata*, *Sympetrum flaveolum*, *S. sanguineum*, and *S. vulgatum*. A comparison of the number of dragonfly larvae in the studied biotopes showed that Odonata are 3.3 times more abundant in reeds than in the sublittoral, and of them Anisoptera were 1.7 times and Zygoptera 3.6 times more abundant in reeds than in the sublittoral. The ratio of the numbers of Anisoptera and Zygoptera is 1 : 6.4 in the sublittoral and 1 : 13.5 in reeds. Most likely, these ratios are not quite realistic. This large difference between Anisoptera and Zygoptera in the number of larvae is likely due to the specific distribution of representatives of each of the suborders in the water environment. Anisoptera larvae, unlike Zygoptera larvae, appear to show aggregated distribution more often than random; therefore they are rare and less abundant in samples. Generally, the number of Anisoptera larvae in a water body should not be much smaller than that of Zygoptera larvae because counts of imagos provide evidence for approximately equal proportions of these suborders in nature." (Authors) Original Russian Text © O.N. Popova, Yu.A. Smirnova, 2010, published in *Sibirskii Ekologicheskii Zhurnal*, 2010, Vol. 17, No. 1, pp. 69-74] Address: Popova, Olga, Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, ul. Frunze 11, Novosibirsk, 630091, Russia. Email: pc@eco.nsc.ru

8865. Poschmann, M.; Schindler, T.; Uhl, D. (2010): Fossil-Lagerstätte Enspel – a short review of current knowledge, the fossil association, and a bibliography. *Palaeobiodiversity and Palaeoenvironments* 90: 3-20. (in English) ["Almost two decades ago, the Generaldirektion Kulturelles Erbe Rheinland-Pfalz initiated annual field campaigns in order to investigate geological and palaeobiological aspects of the Fossil-Lagerstätte Enspel, an upper Oligocene crater lake. Since then, the fossil-bearing 'oilshale' became more and more exposed due to the removal of the overlying basalt, which is still being commercially exploited. This contribution briefly summarizes the current knowledge that accumulated mainly within the last 20 years, gives a taxonomic listing of the fossil association, and includes a bibliography." (Authors) The following odonate taxa were iden-

tified from the Enspel Lagerstätte: *Lestomorpha?*, oviposition of "coenagrionid-type", *Oligaeschna jungi* Piton and Theobald, 1939, and *Aeshninae* indet.] Address: Poschmann, M., Generaldirektion Kulturelles Erbe RLP, Direktion Landesarchäologie, Referat Erdgeschichte, Große Langgasse 29, 55116 Mainz, Germany. E-mail: markus.poschmann@gdke.rlp.de

8866. Pryke, J.S.; Samways, M.J. (2010): Significant variables for the conservation of mountain invertebrates. *J. Insect Conserv.* 14: 247-256. (in English) [Conserving biodiversity on mountains holds particular challenges, with topographic species beta diversity being high. In turn, conserving mountain biodiversity in the heart of a biodiversity hotspot, with intense urbanization on its lower slopes, poses further challenges. We investigate here an iconic mountain at the southern tip of Africa, which is under multiple human pressures, while receiving much conservation attention. We sought here some general principles to guide conservation management of this and other similar mountains. Our focal organisms were surface-active invertebrates, as they are abundant, diverse, and environmentally sensitive at point localities. We show that vegetation structure and elevation were the most important environmental variables determining this diversity. Type of fynbos vegetation, proximity of forest to a river, aspect, and abundance of the alien Argentine ant *Linepithema humile*, had no significant influence. Suburban woodland species richness and abundance had a non-significant difference to that of natural forest. Fynbos had high species beta diversity of invertebrates, suggesting that large areas of this dominant vegetation type should be conserved. However, many specialist and highly local endemic species were in forest, highlighting the irreplaceability of forest habitats. Such a mountain, with its complex topography, requires total protection, as there is no room for loss of any part of the mountain. We emphasize that, while the upper slope and summit are well protected, the lower slopes are in need of urgent attention, a situation which mirrors that in Europe." (Authors) Reference is made to *Orthetrum rubens* which has not been recorded on the Cape Peninsula since the holotype was collected in 1927.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

8867. Ramamurthy, V.V.; Akhtar, M.S.; Patankar, N.V.; Menon, P.; Kumar, R.; Singh, S.K.; Ayri, S.; Parveen, S.; Mittal, V. (2010): Efficiency of different light sources in light traps in monitoring insect diversity. *Munis Entomology & Zoology* 5(1): 109-114. (in English) [Field observations were undertaken at weekly interval (standard week), in 2007-08 at the Indian Agricultural Research Institute, New Delhi, India for studying the effect of three light sources in light traps (viz., mercury, black and ultra violet) on insect catch and relationship with weather parameters. More than 70% of Odonata were caught at mercury, and app. 30% at black light sources. None was attracted by ultra violet light sources. The absolute numbers of Odonata are not stated.] Address: Ramamurthy, V.V., Division of Entomology, Indian Agricultural Research Institute, New Delhi-110012, India

8868. Reels, G. (2010): Report on field surveys of dragonflies in Hainan, China, and preparation of a field guide to the Odonata of the island. *International Dragonfly Fund - Report* 24: 1-60. (in English) [Four Kadoorie Farm & Botanic Garden (KFBG, Hong Kong)

field surveys were joined in order to gather information for a field guide on Hainan Odonata focused primarily on nature reserves, with some sampling of unprotected upland and lowland habitats. The locations visited were dictated by KFBG, in close collaboration with local officials, and comprised sites in southern, central and eastern parts of the island. The results of the study are detailed and species list are presented locality-wise. A checklist of 160 Odonata of Hainan is presented, but additional material from other region of the Island and current studies not yet finished are known. The total number of Hainan Odonata taxa should be 170, and it is to expect that this number will be exceeded by intensifying research activities. The paper contains personally written reports and little stories, and is furnished with wonderful pictures of Odonata species and landscape impressions.] Address: Reels, G., H-3-30 Fairview Park, Yuen Long, Hong Kong. E-mail address: greels@gmail.com

8869. Resende, D.C. (2010): Residence advantage in heterospecific territorial disputes of Erythrodiplax braueri species (Odonata, Libellulidae). *Revista Brasileira de Entomologia* 54(1): 110-114. (in English, with Portuguese summary) [Área de Proteção Ambiental (APA) São José, Minas Gerais, Brazil; "Territories are the outcome of interactions determining where and how long individuals settle. To odonate species, aggressive disputes are not so common since the outcome can be predetermined by advantages such as residency, age, and body size. However, it is possible to predict that at heterospecific disputes, larger body-sized or more aggressive species have some profits overcoming these individual advantages, generating patterns of species hierarchy. Here, I studied the aggressiveness of five Erythrodiplax species (*E. famula*, *E. fusca*, *E. latimaculata*, *E. media*, *E. pallida*) during territorial disputes and verified if larger body-sized species are more aggressive than smaller ones or if the residence advantage prevails on the heterospecific disputes. Larger species were not more aggressive than smaller ones and winners of intra- and interspecific territorial disputes were defined mainly by the residence. So, the residence advantage between heterospecific opponents appears to prevail over any other asymmetry among these species. This pattern may occur because, despite the territorial behaviour in dragonfly males, heterospecific disputes may not increment male reproductive success because it may not increase their access to females." (Author)] Address: Resende, D.C., Laboratório de Bioinformática e Evolução, Departamento de Biologia Geral, Universidade Federal de Viçosa, 36570-000, Viçosa-MG, Brasil. E-mail: dcresende@ig.com.br

8870. Sadeghi, S.; Kyndt, T.; Dumont, H.J. (2010): Genetic diversity, population structure and taxonomy of *Calopteryx splendens* (Odonata: Calopterygidae): An AFLP analysis. *Eur. J. Entomol.* 107(2): 137-146. ["*Calopteryx splendens* is a widely distributed palaeartic damselfly with a remarkably uniform morphology. Variation in the size and shape of the pigmented spot on the wing is the main diagnostic character used to discriminate subspecies across its huge geographic range. Here, AFLP analysis was used to assess the genetic structure and diversity of nine populations representing 3 putative subspecies and evaluate the pigment spot as a taxonomic marker. Genetic diversity was high, with the number of polymorphic loci per population ranging from 141 to 280 out of a total of 333 variable sites

(42.3–84.1%) and Nei's gene diversity from 0.160 to 0.283 (overall 0.299). Overall population genetic differentiation ($F_{ST} = 0.2766$) suggests limited gene flow and adaptation to local environments. Restricted gene flow and genetic differentiation among populations are supported by significant F_{ST} estimates. High levels of gene flow ($N_m > 1$) were only recorded among three Asian populations (Russia – Kazakhstan – Turkey). The patterns of genotypic diversity suggest that a given wing spot size and shape may arise from the hybridization of a limited number, possibly not more than four, ancestral gene pools in different ways and at different times. Clearly, the sample analyzed was not sufficient to capture all of the complex history of *C. splendens*, but sufficient to indicate the taxa *ancilla*, *waterstoni*, and *orientalis* possibly represent three of the four ancestral gene pools, and originated in western Asia. The origin of the fourth, *xanthostoma*, is the western Mediterranean." (Authors)] Address: Dumont, H.J., Department of Biology, Gent University, Ledeganckstraat 35, B-9000 Gent, Belgium; e-mail: henri.dumont@ugent.be

8871. Samejima, Y.; Tsubaki, Y. (2010): Body temperature and body size affect flight performance in a damselfly. *Behav. Ecol. Sociobiol.* 64: 685-692. (in English) ["Flight performance is undoubtedly an important factor for behavioural success in flying insects. Though it is well-known that the flight performance is influenced by body temperature and body size, the relative importance of these factors is not well-understood. We performed laboratory experiments using the male-polymorphic damselfly *Mnais costalis* with larger territorial males and smaller nonterritorial males in a population. We analyzed the effects of body temperature and body size, measured as the thoracic temperature and left hind-wing length, respectively, on two indices of flight performance: maximum lifting force and size-corrected lifting force. The latter is an index of acceleration that is related to aerial agility. The results showed that higher body temperature produced both larger maximum lifting force and larger size-corrected lifting force. In contrast, while larger size produced a larger maximum lifting force, it produced a lower size-corrected lifting force. The results of field measurements showed that territorial males had variable thoracic temperatures depending on the insolation in their territories. In contrast, nonterritorial males had less variable and generally higher thoracic temperatures than territorial males as they are mostly found in sunny spots. Until now, the influence of body temperature on behavioural performance has remained unclear although considerable studies have suggested such influence. We showed, here, for the first time, combined effects of body size and body temperature on flight performance. We also showed that body temperature was influenced by the mating strategies of a damselfly. These findings provide new insights into the cost and benefits of territorial behaviour in ectothermic animals." (Authors)] Address: Samejima, Y., Center for Ecological Research, Kyoto University, 2-509-3 Hirano, Otsu, Shiga, Japan. E-mail: samejima@ecology.kyoto-u.ac.jp

8872. Sanchez-Herrera, M.; Realpe, E. (2010): Population structure of *Polythore procera* at a Colombian stream (Odonata: Polythoridae). *International Journal of Odonatology* 13(1): 27-37. (in English, with Spanish summary) ["We studied a population of *Polythore procera* along a stream in the Colombian eastern Andean foothills. Mark and recapture samples were made dur-

ing January to April 2006, covering both dry and wet seasons. We determined population size, daily survival probability, and longevity during the entire period and compared them with precipitation data. Age and sex proportions along two different sectors of the stream were also analyzed, and notes about their ecology and habitat were taken. Our data suggest this species has a high daily survival probability in comparison with those of other odonates. Males are highly territorial, and exhibit low dispersal capacity. We also conclude that population dynamics of *P. procerus* can be affected by an extrinsic factor such as seasonality." (Authors) Address: Sánchez-Herrera, Melissa, Laboratorio de Zoología y Ecología Acuática, Departamento de Ciencias Biológicas, Universidad de Los Andes, Carrera 1 N° 18A 10, Bogotá, Colombia. E-mail: mel-sanc@uniandes.edu.co

8873. Śniegula, S.; Johansson, F. (2010): Photoperiod affects compensating developmental rate across latitudes in the damselfly *Lestes sponsa*. *Ecological Entomology* 35(2): 149-157. (in English) ["1. Although there is a great deal of theoretical and empirical data about the life history responses of time constraints in organisms, little is known about the latitude-compensating mechanism that enables northern populations' developmental rates to compensate for latitude. To investigate the importance of photoperiod on development, offspring of the obligatory univoltine damselfly *Lestes sponsa* from two populations at different latitudes (53°N and 63°N) were raised in a common laboratory environment at both northern and southern photoperiods that corresponded to the sites of collection. 2. Egg development time was shorter under northern photoperiod regimes for both populations. However, the northern latitude population showed a higher phenotypic plasticity response to photoperiod compared with the southern latitude population, suggesting a genetic difference in egg development time in response to photoperiod. 3. Larvae from both latitudes expressed shorter larval development time and faster growth rates under northern photoperiod regimes. There was no difference in phenotypic plastic response between northern and southern latitude populations with regard to development time. 4. Data on field collected adults showed that adult sizes decreased with an increase in latitude. This adult size difference was a genetically fixed trait, as the same size difference between populations was also found when larvae were reared in the laboratory. 5. The results suggest phenotypic plasticity responses in life history traits to photoperiod, but also genetic differences between north and south latitude populations in response to photoperiod, which indicates the presence of a latitudinal compensating mechanism that is triggered by a photoperiod." (Authors)] Address: Śniegula, S., Dept of Ecosystem Conservation, Institute of Nature Conservation, Polish Academy of Sciences, Kraków, Poland. E-mail: szymon.sniegula@gmail.com

8874. Sujay, Y.H.; Sattagi, H.N.; Patil, R.K. (2010): Invasive alien insects and their impact on agroecosystem. *Karnataka J. Agric. Sci.* 23(1): 26-34. (in English) [*Heteropsylla cubana* (Psyllidae: Homoptera), native of Central America was introduced into India during the 19th century. It sucks the sap from young shoots, leaves and inflorescences which results in complete deformation of young shoots, plants susceptible *Leucaena* species and varieties. In severe cases, the plants could not recover. In Karnataka, *Leucaena* is

being cultivated in an area of 10,000 ha its planned extension by the Karnataka Plantation Corporation by 4000 ha was abandoned for the fear of loosing the plantation due to the psyllid attack. *Pantala flavescens* fed on the outbreak populations of the psyllid but is sated not to exercise the required control.] Address: Sujay, Y.H., Department of Agricultural Entomology, University of Agricultural Sciences, Dharwad- 580 005, Karnataka, India. E-mail: sujayhurali@yahoo.co.in

8875. Sun, J.Y.; Pan, C.X.; Tong, J.; Zhang, J. (2010): Coupled model analysis of the structure and nano-mechanical properties of dragonfly wings. *IET Nanobiotechnol.* 4(1): 10-18. (in English) ["To establish the quantitative model of the dragonfly wing the reconfiguration and nanoindentation technique were used. The mechanical properties of wings were measured by nanoindentation. Generally, the cost to undertake is mainly pressure, and its mechanical properties should be the largest. However, in the nanoindentation test, the largest value of the reduced modulus (E_r) and hardness (H) mainly appear in the radius, except the value at $0.7L$ (L is the wing length). The E_r and H of the forewing were larger than that of the hindwing, except the value at $0.7L$. The reversing engineering (3-D scanner) and AutoCAD were cooperated to reconfigure the dragonfly wing. Then the material parameters and skeleton transforms to a finite element analysis. The quantitative models were discussed in static range." (Authors)] Address: Sun, J.Y., Key Laboratory of Bionic Engineering, Ministry of Education and Jilin University, College of Biological and Agricultural Engineering, Changchun, People's Republic of China

8876. Theischinger, G. (2010): Der GSI-Clade (Odonata, Libelluloidea) in Australien – Systematik im Fluss. *Entomologica Austriaca* 17: 49-66. (in German, with English summary) ["GSI (=Gomphomacromia-Synthemis-Idionyx"), a taxon recently (WARE et al. 2007) established for a monophyletic group (clade) of higher Libelluloidea, is discussed. Details are presented on the history of discovery and systematic integration of the Australian members of the group. Information is also given on morphological characters of adults and larvae, distribution, biology, behaviour, conservation, collecting and preparation, and pressing research priorities are pointed out." (Author) Address: Theischinger G., NSW Department of Environment and Climate Change, 480 Weeroona Rd, Lidcombe, NSW, Australia 2141. E-mail: Gunther.Theischinger@environment.nsw.gov.au

8877. Tom, K.R.; Newman, M.C.; Schmerfeld, J. (2010): Modeling mercury biomagnification (South River, Virginia, USA) to inform river management decision making. *Environmental Toxicology and Chemistry* 29(4): 1013-1020. (in English) ["Mercury trophic transfer in the South River (VA, USA) was modeled to guide river remediation decision making. Sixteen different biota types were collected at six sites within 23 river miles. Mercury biomagnification was modeled using a general biomagnification model based on 15N and distance from the historic mercury release. Methylmercury trophic transfer was clearer than that for total Hg and, therefore, was used to build the predictive model (r^2 prediction = 0.76). The methylmercury biomagnification factors were similar among sites, but model intercept did increase with distance down river. Minimum Akaike's Information Criterion Estimation (MAICE) justified the incorporation of distance in the model. A model with a very similar biomagnification factor to the South

River (95% confidence intervals [CI] = 0.38-0.52) was produced for a second contaminated Virginia river, the North Fork Holston River (95% CI = 0.41-0.55). Percent of total Hg that was methylmercury increased monotonically with trophic position. Trophic models based on ^{15}N were adequate for predicting changes in mercury concentrations in edible fish under different remediation scenarios." (Authors) Test organisms include "Gomphidae" and "Zygoptera".] Address: Newman, M., College of William and Mary - VIMS, Gloucester Point, Virginia 23062, USA. E-mail: newman@vims.edu

8878. Verma, A.K.; Saksena, D.N. (2010): Impact of pollution on sewage collecting River Kalpi (Morar) Gwalior (M.P.) with special reference to water quality and macrozoobenthic fauna. *Asian j. exp. biol. sci.* 1(1): 155-161. (in English) [India; Five odonate taxa are listed. The highly polluted stretches of the river are uninhabited by Odonata with the exception of *Brachythemis contaminata*. That species doesn't occur at stretches without or with less pollution.] Address: Verma, A.K., Limnology Research Unit, Aquatic Biology Laboratory, SOS in Zoology, Jiwaji University, Gwalior-474011 (M.P.), India. E-mail: akwater79@yahoo.com

8879. Villanueva, R.J.T. (2010): Dragonflies of Polillo Island, Philippines. *International Dragonfly Fund - Report* 23: 1-24. (in English) [Polillo is a small group of islands east of central Luzon made up of four main islands and several islets. Odonata were recorded and voucher specimens collected between April 16 and April 27 2009. Sixty-two species of 14 families and 41 genera were found. An additional two unidentified Aeshnidae were seen. Two of the 17 previously recorded species were not found. An observed *Anax* could not be determined and it was uncertain whether it was the previously recorded *A. guttatus* or represented an additional island record. The *Gynacantha* material could not be compared at the moment with the previously recorded species. Forty-seven of the recorded species are new to the island and one species is new to the Philippines. Furthermore, five of the recorded species (*Sulcosticta*, *Amphicnemis*, *Teinobasis*, *Heliogomphus*) are new or possible new to science. An additional four of the recorded species (*Drepanosticta*, *Amphicnemis*, *Teinobasis*, *Rhinocypha*) shows variation from known species or need more material for better comparison and some of them may even represent an additional species new to science. The first male of *Idionyx salva* was found. *Drepanosticta* sp. n. without naming is described. *Teinobasis martinschorri* nov. sp. is described after three males (holotype male: Tamulaya, Polillo, Polillo Island. April 25, 2009. RJTV leg., to be deposited in RMNH; paratype: 2 males in the authors collection). A female of *Gomphidia kirschii* is described in detail.] Address: Villanueva, R.J.T., 1 D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000 Philippines. E-mail: rjtvillanueva@gmail.com

8880. Vries, H.H. de (2010): Species Protection Plan for *Aeshna viridis*. *Brachytron* 12(1/2): 25-31. (in English, with Dutch and German summaries) ["*A. viridis* was the first dragonfly in the Netherlands to have its own national species protection plan. This was published in 2001 by the Ministry of Agriculture, Nature and Fisheries, aiming to initiate several conservation activities. As *A. viridis* is strongly associated with *Stratiotes aloides*, this plant plays an important role in the strategies adopted for protection and communication. The protection plan led to a number of projects in several

provinces, including the compilation of distribution maps, communication about good management and starting nature restoration. Backed up with European legislation, the need for protection of this species has come to the attention of a much wider audience. Therefore, it can be expected that this plan will continue to have an effect long after the projects it gave rise to have ended." (Author)] Address: de Vries, H., De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands. E-mail: henk.devries@vlinderstichting.nl

8881. Walid Fathy, M.; El Sayed, H. S. (2010): A checklist of some recorded insects in Misurata, Libya. *Journal of King Saud University (Science)* 22(2): 61-65. (in English) [Three Odonata species: *Anax ephippiger*, *Ischnura sengalensis*, *Brachythemis leucosticta* are listed.] Address: Walid Fathy, M., Faculty of Education, Ain Shams University, Roxy, Cairo, Egypt. E-mail: walidfathy72@yahoo.com (M. Walid Fathy)

8882. Wedmann, S.; Poschmann, M.; Hörschemeyer, T. (2010): Fossil insects from the Late Oligocene Enspel Lagerstätte and their palaeobiogeographic and palaeoclimatic significance. *Palaeobio. Palaeoenv.* 90: 49-58. (in English) ["Fossil insects can provide unique insights into evolutionary history, and their study has become increasingly important in recent decades. In this paper, we give an overview of the insect taphocoenosis from the upper Oligocene Enspel Lagerstätte (Rheinland-Pfalz, Germany) and discuss taphonomic similarities with other localities. Among the fossil insects identified, terrestrial groups are highly dominant, with march flies (*Bibionidae*) and weevils (*Curculionidae*) being the most common groups; aquatic insects are rare. We provide a detailed survey of the represented taxa, including new records of a predaceous diving beetle (*Dytiscidae*), a soldier beetle (*Cantharidae*) and mayfly larvae (*Ephemeroptera*). Updated information on the ants (*Formicidae*) and reticulated beetles (*Cupediidae*) is reported. The palaeoclimatic and palaeobiogeographic inferences that can be drawn from the represented groups are discussed. Studies on the insects from Enspel indicate a warm temperate climate. Several records document that the distribution of many insect groups in the Oligocene was distinctly wider than it is today. [...] While only one adult damselfly (*Odonata*: *Zygoptera*) has been found in Enspel, several dragonflies (*Odonata*: *Anisoptera*) have been recorded, comprising both larvae and remains of the adults (Wedmann 2000) (Fig. 6). Most fossils belong to the darners (*Aeshnidae*), but the morphological diversity seen among the larvae (Fig. 6a-c) suggests the presence of further, hitherto undetermined dragonfly families. Several fossils of adult specimens belong to the species *Oligaeschna jungi* Piton and Theobald, 1939 (Fig. 6d), previously recorded from the upper Oligocene locality Puy-de-Mur (Auvergne, France) (Piton and Theobald 1939). A leaf with characteristic marks of damselfly eggsets has also been found (Poschmann and Wedmann 2005)." (Authors)] Address: Wedmann, Sonja, Forschungsstation Grube Messel, Forschungsinstitut Senckenberg, Markstraße 35, 64409 Messel, Germany. E-mail: Sonja.Wedmann@senckenberg.de

8883. Wesner, J.S. (2010): Aquatic predation alters a terrestrial prey subsidy. *Ecology* 91(5): 1435-1444. (in English) ["Organisms with complex life histories (CLH) often cross habitat or ecosystem boundaries as they develop from larvae to adults, coupling energy flow bet-

ween ecosystems as both prey (bottom-up) and consumers (top-down). Predation effects on one stage of this life cycle can therefore cascade across ecosystems, magnifying the impact of local predation. The majority of predation studies have assessed effects only on a local level, within the habitat of the predator. I used large outdoor stream mesocosms to test the hypothesis that predation in an aquatic habitat alters the magnitude and trophic structure of a prey assemblage in a terrestrial habitat. I also tested how a consumer in the terrestrial habitat (web-weaving spiders) responded to these changes in prey export. Two fish species were the predators (red shiner, *Cyprinella lutrensis* and orangethroat darter, *Etheostoma spectabile*) in an experiment with three treatments: both fish species monocultures plus a fishless control. Fish predation reduced aquatic insect emergence biomass by 50% compared to the fishless control and altered the trophic structure of the emergent community, reducing emerging insect predator biomass by 50%, but had no effect on other insect trophic groups. Spiders captured only insects that were unaffected by fish predation (mostly chironomids) and therefore did not respond numerically to overall changes in insect abundance or biomass. Patterns of insect emergence were largely driven by a strong negative relationship between fish and a predatory dragonfly (*Pantala flavescens*). The results of this experiment show that predation in one habitat can have strong effects on the biomass and trophic structure of subsidies entering adjacent habitats, resulting in contrasting predictions for the role of these subsidies in recipient food webs. In the absence of fish, aquatic habitats produced terrestrial insect communities with higher biomass (bottom-up potential) and a higher proportion of predators (top-down potential) than when fish were present." (Author)] Address: Wesner, J.S., Biological Station and Department of Zoology, University of Oklahoma, Norman, Oklahoma 73019 USA

8884. Wildermuth, H. (2010): Die Wasserschlauch-Arten im oberen Glatttal, Kanton Zürich, mit besonderer Berücksichtigung von *Utricularia stygia* Thor. *Bauhinia* 22: 61-82. (in German, with English summary) ["Occurrence and distribution of Central European bladderworts (*Utricularia* spp.) have been studied in the upper Glatt Valley (Canton of Zürich, Switzerland), with special reference to *U. stygia*. [...] Recent decline of *Utricularia* spp. in the Swiss Plateau and its causes are outlined and recommendations for suitable habitat management are given to secure long-term survival of the rare *Utricularia* species in Switzerland. Special attention is paid to cooccurrence of *Utricularia stygia*, *U. intermedia*, *U. minor* and the damselfly *Nehalennia speciosa*, all exhibiting similar habitat requirements." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

8885. Wilkens, H. (2010): Vielfalt auf der Kanareninsel Lanzarote: Vögel auf Lava. *Der Falke* 57(1): 16-22. (in German) [Canary Islands, Spain; the paper includes brief note on predation of *Ischnura saharensis* by *Falco eleonorae*.] Address: not stated

8886. Wittwer, T.; Sahlen, G.; Suhling, F. (2010): Does one community shape the other? Dragonflies and fish in Swedish lakes. *Insect Conservation and Diversity* 3(2): 124-133. (in English) ["1. Freshwater communities are often structured by predation. In permanent lentic freshwater habitats dragonfly larvae are major predators which, in return, suffer predation by fish. Antipreda-

tor traits vary between the dragonfly species, and the dragonfly communities are therefore shaped by the presence of fish. But fish communities vary, and as different fish species affect dragonflies in different ways, the species composition of the fish community may affect the composition of the dragonfly community. 2. We sampled dragonfly larvae in 24 lakes with a known fish stock in south-western Sweden, and explored the impact of fish as well as vegetation structure on dragonfly communities by means of multivariate analyses. 3. We found that the presence of four fish species affected the community structure of dragonflies. The impact strength depended mainly on the abundance of *Perca fluviatilis*, with which most dragonfly species were negatively correlated. Many dragonfly species were also positively correlated with the occurrence of at least one fish species, which may reflect similar habitat requirements or imply indirect positive effects of these fish species. 4. Of the 24 recorded dragonfly species, four did not occur in lakes dominated by *P. fluviatilis*, whereas only one species was lacking in lakes dominated by *Rutilus rutilus*. The dragonfly species diversity was higher in *R. rutilus* lakes than in *P. fluviatilis* lakes. 5. Our results suggest that the fish species composition is a major determinant of the dragonfly community, which in turn will influence the lower trophic levels." (Authors)] Address: Wittwer, T., Department of Earth and Ecosystem Sciences, Lund University, Sölvegatan 12, SE-223 62 Lund, Sweden. E-mail: torben.wittwer@nateko.lu.se

8887. Zhang, H. (2010): The Superfamily Calopterygoidea in South China: taxonomy and distribution. Progress Report for 2009 surveys. *International Dragonfly Fund - Report 26*: 1-36. (in English) [Three families in the superfamily Calopterygoidea occur in China, viz. the Calopterygidae, Chlorocyphidae and Euphaeidae. They include numerous species that are distributed widely across South China, mainly in streams and upland running waters at moderate altitudes. To date, our knowledge of Chinese species has remained inadequate: the taxonomy of some genera is unresolved and no attempt has been made to map the distribution of the various species and genera. This project is therefore aimed at providing taxonomic (including on larval morphology), biological, and distributional information on the superfamily in South China. In 2009, two series of surveys were conducted to Southwest China-Guizhou and Yunnan Provinces. 1. Odonata recorded from Xiangzhigou, Guizhou Province: A total of 51 species were found in Xiangzhigou area, belonging to 11 families. Many of the species recorded here are rather rare in South China, such as *Anaciaeschna martini*, *Cephalaeschna needhami*, *Cephalaeschna obversa*, *Planaeschna maolanensis*, *Polycanthagyna melanictera*, *Chlorogomphus papilio*, *Watanabeopetalia usignata*. 2. Odonata from Yunnan: A total of 82 species in 12 families were recorded from Xiangshuangbanna, Yunnan Province. Four species are new to the fauna of China, and 9 species have not been identified." (Author)] Address: Zhang, H., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com

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1997

8888. Ihssen, G. (1997): Florida vom 15.03. bis 05.04.1994. Ein naturkundliches Reisetagebuch mit ausführlicher Behandlung der Libellenfunde (Odonata). Naturkundliche Reiseberichte 6: 1-53. (in German) [Detailed report on a trip to Florida, USA between 15-III. and 5-IV-1994] Address: Ihssen, G., Timm-Kröger-Weg 6, 22335 Hamburg, Germany

2000

8889. Miyashita, M. (2000): Studies on the method for assessment of the habitat of the damselfly *Mortonagrion Hirosei*. Proceedings of the Japan Society of Civil Engineers 657: 65-73. (in Japanese, with English summary) [M. Hirosei was studied at the Tone Kamorae Chashi bridge on the Tonegawa river, Japan. Water level fluctuation and salinity were measured as ecological variables. The larvae were recorded only from a pond on a "sunken place" on the riverside (landward pothole?), covered with dead reed leaves.] Address: not stated

8890. Miyashita, M. (2000): Studies on the conditions of location and restoration of the habitat of the damselfly *Mortonagrion Hirosei*. Proceedings of Annual Meeting of Environmental Systems Research 28: 475-483. (in Japanese, with English summary) [M. Hirosei, was designated as an endangered species by the Japanese Environment Agency in 1991, due to the vulnerability to the habitats against effects of land reclamation and river improvement. It prefers as habitat reed vegetation, and is distributed from the Kitakamigawa River in Miyagi Prefecture to the Tsushima Islands in Nagasaki Prefecture, Japan. Habitats of the species are located from the estuary up to a distance of 40 km from the mouth of a river. Four types are occupied; riverside, movable dam, brackish lake and tidewater control pond. The author considers fluctuation of salinity and water level as most important environmental variables in population ecology of the species.] Address: not stated.

2001

8891. Rose, J. (2001): Dragonflies for birders. The bulletin of the Chapel Hill Bird Club 30(3): 4-6. (in Eng-

lish) [General on Anisoptera in North Carolina, USA.] Address: not stated

8892. Vinebrooke, R.D.; Turner, M.A.; Kidd, K.A.; Hann, B.J.; Schindler, D.W. (2001): Truncated foodweb effects of omnivorous minnows in a recovering acidified lake. J. N. Am. Benthol. Soc. 20(4): 629-642. (in English) ["Cyprinids (*Margariscus margarita*, *Phoxinus* spp., *Pimephales promelas*) have resumed reproduction in a boreal headwater lake (Lake 302S, Experimental Lakes Area, northwestern Ontario) that is recovering from experimental acidification. Concomitant changes to the littoral food web suggested that these omnivorous minnows suppressed the development of green algal mats, termed metaphyton. We tested this hypothesis by conducting an experiment using minnow enclosures, minnow exclosures, and open control plots in the shallow littoral zone of Lake 302S. Minnows significantly suppressed zooplankton biomass, and altered community composition by disproportionately reducing large daphnids and chydorids. Epiphytic chironomids were also significantly less abundant in the presence of minnows. Minnows had a significant time-dependent, negative effect on benthic invertebrate biomass and community composition because chironomids and anisopterans were suppressed during the second half of the 6-wk experiment. However, minnows did not reduce the abundance of the dominant primary producer, namely metaphyton. Stable isotope analyses revealed that minnows did not suppress metaphyton because these algae were not the primary C source for the food web. Instead, our findings suggest that the littoral food web depended mainly on sedimentary C, which resulted in the foodweb effect of minnows being truncated at the level of invertebrates. Therefore, metaphyton appears to be regulated primarily by abiotic factors (e.g., availability of dissolved inorganic C) and not herbivory in recovering acidified lake." (Authors)] Address: Vinebrooke, R., Department of Biological Sciences, University of Alberta, Edmonton, Alberta T6G 2E9, Canada. E-mail: rolf@ualberta.ca

8893. Voisin, J.-F. (2001): The entomology collections of the Museum national d'Histoire naturelle, Paris (France). Norw. J. Ent. 48(1): 31-34. (in English) ["The Museum was founded in 1793. The staff of the Ent. Lab. includes 42 persons (25 research scientists, 17 technicians & administrative employees). It is organised according to the major taxonomic units, but in 1996, another division was superimposed onto taxonomically

based organisation, viz. "Origin and structure of insect biodiversity" and "Systematics, biodiversity and insect evolution". The section, "Odonata & small orders" harbours a collection of 160,000 specimens. The total insect collection of the Laboratory consists of ca. 45,5 million specimens, covering ca 400,000 insect species. The best represented regions are W Europe, the Mediterranean, Madagascar, W Africa, New Caledonia and French Guyana." (Author)] Address: Voisin, J.-F., Lab. Zool., Mus. natn. Hist. nat., 45 rue Buffon, F-75005 Paris, France

2002

8894. Futahashi, R.; Futuhashi, H. (2002): The first record of the migrant *Sympetrum vulgatum* imitans from Japan. *Tombo* 45(1/4): 29-30. (in Japanese, with English summary) [Four males, one caught at 4-X-2002 and three at 6-X-2002, Takaoka City, Toyama Prefecture, Japan] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

8895. Futahashi, R.; Futuhashi, H., Arab, Y. (2002): Recent findings concerning Odonata in the Hokuriku district, part 2. *Tombo* 45(1/4): 31-32. (in Japanese, with English summary) ["*Paracercion melanotum* is here recorded for the first time from Ishikawa Prefecture. Some zoogeographical comments are given for the noteworthy species, *Lestes japonicus*. Eight males and one female of the migrant species, *Sympetrum fonscolombii* were collected from Toyama and Ishikawa Prefectures. One male, an interspecific hybrid between *Anax n. nigrofasciatus* and *A. parthenope julius* is newly recorded from Ishikawa Prefecture, Japan." (Author)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

8896. Labandeira, C.C. (2002): Paleobiology of predators, parasitoids, and parasites: Death and accommodation in the fossil record of continental invertebrates. In: Kowalewski, M., and P.H. Kelley, (eds.), 2002. *The Fossil Record of Predation*. Paleontological Society Papers 8: 211-249. (in English) ["Carnivory is the consumption of one animal by another animal; among invertebrates in terrestrial and freshwater ecosystems this type of feeding can take three forms: predation, parasitoidism, and parasitism. Differences among these three functional modes involve (i) whether the duration of feeding on the prey item is quick or there is an accommodation, coevolutionary or otherwise, between the carnivore and the host prey; (ii) whether the prey or host is killed; (Hi) whether single or multiple prey or host items are consumed during the carnivore's lifespan, and (iv) the relative sizes of the carnivore and its prey or host. Uniformitarian and nonuniformitarian evidence directly relating to the history of carnivory can be found in exceptionally preserved deposits from the mid-Paleozoic to the Recent, but such evidence is relatively rare because carnivores are the least represented trophic group in ecosystems. Six types of paleobiological data provide evidence for carnivory: taxonomic affiliation, fossil structural and functional attributes, organismic damage, gut contents, coprolites, and indications of mechanisms for predator avoidance. Only 12 invertebrate phyla have become carnivorous in the continental realm. Six are lophotrochozoans (*Acanthocephala*, *Rotifera*, *Platyhelminthes*, *Nemertinea*, *Mollusca*, and *Annelida*) and six are ecdysozoans (Ne-

matoda, *Nematomorpha*, *Tardigrada*, *Onychophora*, *Pentastoma*, and *Arthropoda*). Most of these groups have poor continental fossil records, but the two most diverse - nematodes and arthropods - have comparatively good representation. The record of arthropods documents (i) the presence of predators among primary producers, herbivores, and decomposers in early terrestrial ecosystems; (ii) the addition later in the fossil record of the more accommodationist strategies of parasitoids and parasites interacting with animal hosts; (Hi) the occurrence of simpler food-web structures in terrestrial ecosystems prior to parasitoid and parasite diversification; and (iv) a role for mass extinction in the degradation of food-web structure that ultimately affected carnivory. Future research should explore how different modes of carnivory have brought about changes in ecosystem structure through time. Despite numerous caveats and uncertainties, trace fossils left by predators on skeletons of their prey remain one of the most promising research directions in paleoecology and evolutionary paleobiology." (Author) The paper includes many references to Odonata.] Address: Labandeira, C., Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0121 and Department of Entomology, University of Maryland, College Park, Maryland 20742 USA. E-mail: labandec@si.edu

2003

8897. Appleton, C.C.; Curtis, B.A.; Kipping, J. (2003): Appendix 2. Macro-invertebrate collections by geo-reference point. In: Alonso, L.E. & Nordin L.-A. (2003): A rapid biological assessment of the aquatic ecosystems of the Okavango Delta, Botswana: High water survey. *RAP Bulletin of Biological Assessment* 27, Conservation International, Washington DC: 123-129. (in English) [52 points have been researched; some of them with records of Odonata.] Address: Kipping, J., BioCart - Ökologische Gutachten & Studien, Albrecht-Dürer-Weg 8, D-04425 Taucha, Germany. E-mail: BioCartKipping@web.de

8898. De Vries, H. (2003): Libel met een eigen website: de groene glazenmaker. - *Aeshna viridis*, a dragonfly with its own website. *Vlinders* 18(3): 12-13. (in Dutch, with English summary) [General remarks on the current situation of *A. viridis* in the Netherlands, with emphasis on the management of its habitats and on the related *Stratiotes aloides* research. For detail see www.groeneglazenmaker.nl] Address: henk.devries@vlinderstichting.nl

8899. Stoffels, R.J.; Karbe, S.; Paterson, R.A. (2003): Length-mass models for some common New Zealand littoral-benthic macroinvertebrates, with a note on within-taxon variability in parameter values among published models. *New Zealand Journal of Marine and Freshwater Research* 37: 449-460. (in English) [Regression models are developed and presented to predict dry mass (mg) from two linear dimensions (mm) for 17 benthic macroinvertebrate taxa (including *Xanthocnemis zealandica*; *Procordulia grayi*) common to littoral zones of New Zealand lakes. We also provide regression models to predict body length from head capsule width for the major insect taxa. Dry mass was best explained as a power function of all linear dimensions: $M = aL^b$. Parameters are presented in the log₁₀-transformed linear form of this power function. Body

length was a simple linear function of head capsule width for all insect taxa, hence parameters for these models are presented as untransformed values." (Authors)] Address: Stoffels, R.J., Department of Zoology, University of Otago, P.O. Box 56, Dunedin, New Zealand. E-mail: rick.stoffels@toroa.otago.ac.nz

2004

- 8900.** Abbott, J.C. (2004): A summer for the record books in Texas. *Argia* 16(3): 16-17. (in English) [New state records: *Argia oenea*, *Enallagma antennatum*, *Aeshna persephone*, and *Erythemis attala*. *Leptobasis melinogaster*, *Phyllocycla breviphylla* and *Erythemis mithroides* are also new records for Texas and USA.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu
- 8901.** Biggs, K. (2004): Simply superb! A new California state record — 2004. and a bit of California Odonata history. *Argia* 16(3): 21-22. (in English) [*Pseudoleon superbus*, 9-V-2004, San Diego County, California, USA.] Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol CA, 95472, USA. E-mail: bigsnest@sonic.net
- 8902.** Bocanegra, O.R.; Czaplak, D. (2004): *Phyllocycla breviphylla* collected in the United States. *Argia* 16(3): 18. (in English) [29-V-2004, Anacua Wildlife Management Area, Cameron County, Texas, USA.] Address: Bocanegra, O.R., U.S. Fish and Wildlife Service, 711 Stadium Drive, Arlington, Texas 76011, USA
- 8903.** Catling, P.M.; Oldham, M.J.; Jones, C.D.; Oldham, R.; Dombroskie, J.J.; Kostiuik, B. (2004): Broad-tailed Shadowdragon, *Neurocordulia michaeli* Brunelle, new to Ontario. *Argia* 16(3): 13-16. (in English) [First record: Petawawa River, near Petawawa, Renfrew County, Ontario (45.8908° N, 77.3072° W), Canada, in June 2003 (exuviae), 3-VI-2004 (imagos). Additional localities resp. records are also dealt with.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca
- 8904.** Catling, P.M.; Kostiuik, B. (2004): Another addition to the Odonata of the Northwest Territories. *Argia* 16(3): 21. (in English) [Canada, *Enallagma hageni*, Great Slave Lake northwest of Enterprise (61.08596° N, 118.29758° W), 25-VII-2004.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca
- 8905.** Catling, P.M.; Kostiuik, B. (2004): Dragonflies recorded in 2004 from the Saskatchewan portion of the Cypress Hills Interprovincial Park. *Argia* 16(3): 20-21. (in English) [Cypress Hills, southern Saskatchewan-Alberta, Canada, 16 Odonata species are listed.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca
- 8906.** Catling, P.M.; Kostiuik, B. (2004): Three additions to the Odonata of Saskatchewan, and some notable records. *Argia* 16(3): 18-20. (in English) [Surveys made in July 2004 resulted in new additions to the Saskatchewan, Canada Odonata list. *Argia fumipennis* violacea, *Enallagma antennatum*, and *Ischnura perparva* are additions to the Odonate fauna of Saskatchewan. *Stylurus notatus* and *Enallagma anna* are additions to/corrections of the status ranking in Canada, but reported previously in 2004. *I. verticalis* has not been reported from Saskatchewan in the scientific literature, but is on the ranking list.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca
- 8907.** Coelho, J.R. (2004): Insects in Rock and Roll cover art. *American Entomologist* 50(3): 142-151 (in English) ["Sixteen taxonomic orders of insects graced album covers or liner notes. Of these, the order appearing most frequently was Lepidoptera (36%), followed by Hymenoptera (17%), Coleoptera (11%), Diptera (9%), and Odonata (8%)." App. 30 covers with dragonfly illustrations are known to the author; this is far away from a realistic count, because many covers more are known to the abstracter ... "Dragonflies provided for some striking covers, such as Deyss' The Dragonfly from the Sun, Dragonfly's self-titled release, and Galadriel's Chasing the Dragonfly." (Author)] Address: Coelho, J., Biology Program, Quincy University, 1800 College Ave., Quincy, IL 62301, USA
- 8908.** Dragonfly Society of the Americas (2004): *Argia* 16(3). *Argia* 16(3): (in English) [In This Issue: 1; DSA 2005 at Arnprior, Ontario, 8 – 12 July 2005, by Paul Catling, Colin Jones, & Brenda Kostiuik: 2-5; 2005 Southeastern DSA Meeting, by Steve Krotzer: 5; DSA 2005 Northeast Meeting June 9 – June 12 State College, PA, by Hal White: 5; Eglin AFB Odonata Survey in March, 2005, by Jerrell J. Daigle & Theresa Thom: 6; 2005 GLOM Meeting In Southwestern Ontario, by Bill Morgenstern: 6; Final call for Georgia data, by Bill Mauffray: 26; Dragonfly study — The Baltimore Sun's Version, by Sandy Alexander: 27; Agency to designate habitat for dragonfly, by John Fleisher: 28; Florida State Collection of Arthropods (FSCA) Collection Expansion, by Bill Mauffray: 31; Book notice: Damselflies of Alberta, by John Acorn, by Dennis Paulson: 31; Paper notice: Cues for territory choice in two tropical dragonflies [*Perithemis mooma* Kirby and *Orthemis discolor*; Neotropical Entomology 33(4):397 – 401(2004)], by Paulo de Marco jr. & Daniela C. Resende: 32; First announcement of the International Symposium on the Odonata fauna of the Balkans and current problems of its conservation: 32; TRAMEA: Using dragonfly discussion groups to help determine distribution and flight data, by Kathy Biggs: 33; Odonata list available for the birder's diary program, by Kreg D. Ellzey: 34. Papers from *Argia* 16(3) omitted in this section are abstracted in this issue of OAS.] Address: Dragonfly Society of the Americas c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu
- 8909.** Ellzey, K.D. (2004): *Enallagma doubledayi* population in Kisatchie National Forest, Natchitoches Parish, Louisiana. *Argia* 16(3): 24-25. (in English) [5-VI-2004, Kisatchie Ranger District, Kisatchie National Forest, Natchitoches Parish, Louisiana, USA (31° 27.59'N, 93°11.96'W).] Address: Ellzey, K.D., 3416 Gum Springs Loop, Hornbeck, LA 71439, USA.
- 8910.** Fernández-Martínez, M.A. (2004): First record of *Triacanthagyna septima* for the Dominican Republic. *Argia* 16(3): 27. (in English) [25-II-2004, Punta Cana, Dominican Republic (18°35'N 68°19'W).] Address: Fernández-Martínez, M.A., Tercio de Afora n 9, 36201 VIGO, Spain. E-mail: miguelvacaloura@hotmail.com
- 8911.** Johnson, J. (2004): *Aeshna* Blitz '04 not a bust. *Argia* 16(3): 6-7. (in English) [20 – 22-VIII-2004, Gold Lake Bog, Lane County, Oregon, USA. Findings in-

cluding three new county records are briefly documented.]

8912. Johnson, J. (2004): A new damselfly for Utah. *Argia* 16(3): 25-26. (in English) [*Argia hinei*., 5-X-2004, Virgin River at La Verkin, Washington County, Utah, USA]

8913. Mauffray, B. (2004): *Epithea semiaquea* (Selys) added to the Louisiana list. *Argia* 16(3): 25. (in English) [Two records from the early 1990s are added to the Louisiana, USA list.] Address: Mauffray, B., 4525 N.W. 53rd Lane., Gainesville, FL 32653, USA. E-mail: iori@afn.org

8914. Michalski, J. (2004): Return to New Guinea. *Argia* 16(3): 8-10. (in English) [The author introduces into PNG country, people, and – at the genus level – *Odonata* with its app. 600 species.]

8915. Mikat, M.; Cip, D. (2004): New records of dragonfly *Coenagrion ornatum* (Selys, 1850) (Odonata, Coenagrionidae) in the Czech Republic. *Acta Mus. Reginaehradecensis* (A) 30: 43-44. (in Czech, with English summary) [*C. ornatum* was not seen in Czech Republic since many decades. Here, two males are reported from Hradec Kralove, 23-VII-2001 and 27-VII-2003, respectively. The habitats are described, and the history of *C. ornatum* in the Czech Republic is outlined.] Address: Mikat, M., Muz. vychodnich Cech, Eliscino nabr. 465, CZ-500 01 Hradec Kralove, Czech Republic

8916. Oldham, M.J.; Brodribb, K.E. (2004): Notes on the Smoky Rubyspot (*Hetaerina titia*) in southern Ontario. *Ontario Odonata* 4: 38-40. (in English) [Canada; "Thames River between Tate's Bridge, 9.2 km south-east of Glencoe (Post Office), and Big Bend Conservation Area, 4.3 km southeast of Wardsville (main intersection) ... In total on 15 September we recorded 108 *H. titia* at 32 different locations along a 23 km stretch of the Thames River. We estimate that this represents less than 50% of the number actually observed. Second in abundance were *H. americana* with 19 individuals being recorded at 9 sites. The only other odonate species encountered were *Boyeria vinosa* (6 individuals at 5 sites) and *Calopteryx maculata* (1 individual at 1 site). ... On 16-IX-2002 we surveyed several sites on the Sydenham River between Alvinston and Dawn Mills. Sites were accessed by land from bridges and other access points. *H. titia* was observed at only a single location, near Shetland." (Authors)] Address: Oldham, M.J., Natural Heritage Information Centre, Ontario Ministry of Natural Resources, P.O. Box 7000, 300 Water St., Peterborough, Ontario, K9J 8M5. E-mail: michael.oldham@rnr.gov.on.ca

8917. Orr, R.L. (2004): Notes on the 2004 impact of the 17-Year Periodical Cicada on Potomac River dragonflies. *Argia* 16(3): 11-12. (in English) ["Every 17 years during May and June, three species of Magicicada emerge together in phenomenal numbers. These large heavy 25 – 50 mm red-eyed Homoptera dominate the landscape for about a month. Their numbers are truly impressive with up to 1.5 million per acre; but densities of a few tens, to hundreds, of thousands per acre are more the norm. Predators (mainly birds, mammals, reptiles etc.) become so focused on the cicadas that they tend to ignore other types of prey items. During mass emergences of *Gomphus vastus*, mortality rates in 2002 and 2003 at some sites along the Potomac climbed in excess of 50% (the wings of the emerging

specimens were scatted along the shore line). During May and June of 2004 (with mass emergence of cicadas), two very obvious differences were noted when compared to the same period in 2002 and 2003 (without mass emergence of cicadas). First, dragonfly wings were noticeably absent in 2004. It was obvious that few predators wanted to eat dragonflies when they had a belly full of cicadas! „The emerging dragonflies were having a banner year, with negligible predation thanks to the cicadas. Second, the number of dead adult dragonflies found in June 2004 was far in excess of the numbers found in previous years. The reason for this is not that more dragonflies were dying but that they were not being eaten by scavengers. Again, why eat a dying or dead dragonfly when there are lots of dead and dying cicadas to eat?“ „Did the dragonflies feed on the adult cicadas? It may be surprising, but I would say, generally not. It was likely a size thing. I observed *Hagenius brevistylus*, *Epiaeschna heros*, and *Anax junius* successfully take them out of the air and onto the ground but it always ended in the buzzing cicada getting away.“] Address: Orr, R.L., 5215 Durham Road East, Columbia, MD 21044-4444, USA. E-mail: richard.l.orr@usad.gov

8918. Paulson, D. (2004): New common names for some North American Odonata. *Argia* 16(3): 29. (in English) [North American Odonata species for which common names are to be changed: *Lestes disjunctus*, Northern Spreadwing; *Lestes australis*, Southern Spreadwing; *Argia fumipennis violacea*, Violet Dancer; *Argia fumipennis fumipennis*, Smoky-winged Dancer; *Argia fumipennis atra*, Black Dancer; *Chrysobasis lucifer*, Lucifer Damsel; *Macromia illinoensis*, Swift River Cruiser; *Macromia illinoensis illinoensis*, Illinois River Cruiser; *Macromia illinoensis georgina*, Georgia River Cruiser. New north American Odonata species for which common names are designated: *Ophiogomphus* sp. nov., Sioux Snaketail; *Stylogomphus albistylus*, Eastern Least Clubtail (modified); *Stylogomphus sigma-stylus*, Interior Least Clubtail; *Cordulegaster* sp nov, Ouachita Spiketail; *Erythemis simplicicollis* + *Erythemis collocata*, Common Pondhawk; *Leucorrhinia proxima*, Belted Whiteface; *Orthemis discolor*, Carmine Skimmer; *Orthemis* "Antillean", Antillean Skimmer; *Sympetrum vicinum*, Autumn Meadowhawk.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

8919. Pfeiffer, B. (2004): The view from Vermont. *Argia* 16(3): 22-24. (in English) [Second record of *Aeshna subarctica* in Vermont (27-IX-2004). The author uses this record to outline additional Odonata records recently reported from Vermont, USA.] Address: Pfeiffer, B., 113 Bartlett Rd, Plainfield VT, 05667, USA. E-mail: Bryan@VermontBirdTours.com

8920. Prather, I.; Prather, B. (2004): First Colorado record of *Erpetogomphus compositus* Hagen in Selys, 2004. *Argia* 16(3): 26. (in English) [8-VII-2004, Delores River, Mesa County, Colorado, USA.] Address: Prather, I.; Prather, B., 13810 Weld County Road 1, Longmont CO 80504, USA

2005

8921. Beckemeyer, R. (2005): Afrikaan Anisoptera and Zulu Zygoptera: A trip to South Africa. *Argia* 17(1): 17-18. (in English) [Report on a trip to South Africa ma-

de in February 2005 and highlighting Odonata.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

8922. Behrstock, R.A. (2005): New state records of Odonata for eastern Mexico. *Argia* 17(1): 13-15. (in English) [Records of the following species are documented: *Lestes forficula*, *Mecistogaster ornata*, *Protoneura aurantiaca*, *Argia oculata*, *A. pulla*, *A. ulmea*, *A. westfalli*, *Neocythromma cultellatum*, *Anax amazili*, *Erpetogomphus elaps*, *Phyllogomphoides suasus*, *Brechmorhoga vivax*, *Dythemis maya*, *Erythemis peruviana*, *Libellula herculea*, *Macrothemis inequinguis*, *Orthemis discolor*, *Perithemis mooma*, *Tramea lacerata*.] Address: Behrstock, R.A., 10359 S. Thicket Pl., Hereford, AZ 85615, USA. E-mail: rbehrstock@cox.net

8923. Bernard, R. (2005): Dragonflies in a guidebook for the conservation of habitats and species of Natura 2000 in Poland – a story of a fight. *Odonatrix* 1(2): 30-33. (in Polish, with English summary) ["The course of the author's struggle for the shape and consistence of papers on three dragonfly species, *Coenagrion ornatum*, *Ophiogomphus cecilia* and *Leucorrhinia pectoralis*, is described. Insufficient finances, the necessity to follow top-down orders, not considering authors' suggestions, unwise decisions of editors, carelessness of editorial staff making corrections in the texts have made these papers less communicative and poorer in information. However, despite these disadvantages, the papers have remained the valuable synthetic source of data on these species in Poland with reference to their ecology, situation, threats and conservation." (Author)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

8924. Bree, D. (2005): Predation of *Ladona julia* by Crab-Spider (Thomisidae). *Argia* 17(1): 8. (in English) [At Petroglyphs Provincial Park, near Peterborough, Ontario, Canada on 26 May 2004 a young adult *L. julia* was caught by a species of Crab Spider, possibly *Xysticus elegans*. The dragonfly was about 5× longer than the spider, and probably massed over 7× greater.] Address: not stated.

8925. Bried, J.; Krotzer, S. (2005): New species records for Mississippi: An expected dragonfly and an unexpected damselfly. *Argia* 17(1): 6-7. (in English) [*Arigomphus lentulus*: 17-V-2004, northern Oktibbeha Co., east-central Mississippi (N 33° 31.008', W 88° 52.167');; *Lestes forficula* 17-IX-2004 (N 33.5328°, W 88.8649°), the second record was taken 24-IX-2004 from a beaver wetland complex (N 33° 13.814', W 89° 03.726') in the Tombigbee National Forest, Winston Co., east-central Mississippi, USA.] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jbried@TNC.ORG

8926. Bried, J.T. (2005): Species of adult Odonata from three natural areas in Mississippi. *Argia* 17(1): 10. (in English) [Altogether, 75 species were caught or seen among the natural areas in 2003 – 04: Noxubee National Wildlife Refuge in Noxubee, Winston, and Oktibbeha Counties; Strawberry Plains Audubon Center in Marshall Co.; and Tombigbee National Forest in Winston and Choctaw Counties.] Address: Bried, J., Mississippi State University, Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jbried@TNC.ORG

8927. Buczynski, P. (2005): Dragonflies in the Net. Part 1. Poland. *Odonatrix* 1(2): 40-42. (in Polish, with English summary) [28 Polish websites with odonatological content are introduced.] Address: Buczynski, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8928. Buczyński, P. (2005): The 24th Annual Meeting of the Society of German Speaking Odonatologists, Freising (Germany), March 18-20, 2005. – Conference report. *Odonatrix* 1(2): 28-29. (in Polish, with English summary) [This is an extensive report on the meeting of GdO in 2005, with reference to some lectures held in the framework of the meeting.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8929. Daigle, J.J. (2005): A super Bowl Weekend or The Hunt for Red October: Part II. *Argia* 17(1): 10. (in English) [Feb. 2005, Big Pine Key, Florida, USA. Report on a few catches of *Orthemis* sp., *Tramea* sp. and potential species to trace later in the season.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

8930. de Maynadier, P.; Hudson, J. (2005): First national records for Canada Whiteface (*Leucorrhinia patricia*) in the USA. *Argia* 17(1): 5-6. (in English) [18-VI-2003, *L. patricia* was collected for the first time in the USA in Maine (Somerset Co.), and the second record was realised on 23-VI-2003 in Alaska (Southeast Fairbanks Borough). Habitats and co-occurring Odonata species are documented.]

8931. Donnelly, N. (2005): Is there life after acetone? A "cool" method for preserving odonates. *Argia* 17(1): 18. (in English) [In cases acetone to proceed specimens is not available in field trips, the author proposes the following treatment: „I have found what seems to be an easier, and more satisfactory method. First, I thoroughly dry the specimen. My method is truly "cool": instead of heat I use a desiccant. My desiccant of choice is 4-angstrom synthetic zeolite, which generally goes under the commercial name "molecular sieve". It is non-toxic, and is also handy for drying your wallet when it falls in the river. It lowers the partial pressure of water to a lower value even than silica gel, which is itself far superior to cobalt-doped calcium sulfate ("Drierite"). The desiccant can be reused essentially infinitely by cooking it in the oven at about 300 degrees F. When you return from the trip with your crispy specimens, then a good soak in acetone will degrease them."] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

8932. Dragonfly Society of the Americas (2005): *Argia* 17(1). *Argia* 17(1): (in English) [In This Issue: 1; Rainy River Valley Field Naturalists to Host Dragonfly Symposium, by Bill Morgenstern: 2-3; DSA Annual Meeting in Ontario: Information on Post-conference trip, Paul M. Catling: 3; Calendar of Events for 2005: 3; Dragonfly Days, 20 – 22 May 2005, by Joshua Stuart Rose: 15; What every boy and girl needs to know about GPS, and how to locate your position, by Nick Donnelly: 19-22; Dragonfly pond selected for the Garden Conservancy's Open Days program, by Kathy Biggs: 22-23; Damselfly Creeps into National Geographic, by Kathy Biggs: 23; Hine's Emerald Dragonfly Workshop, by Tim Cashatt: 23-24; WDA Symposium in Vigo, Spain, July 2005, by

Adolfo Cordero: 24; Proposed Photo Archive for DSA, by Steve Valley: 25; Minutes of the Annual Meeting of the Dragonfly Society of the Americas, by Ailsa Donnelly: 25-26; BAO Notice: An Annotated Checklist of the Odonata of Canada, by P. Catling, R. Cannings, and P. M. Brunelle: 26; A Reminder from the Publisher: 26; TRAMEA: OdonataCentral: A New North American Web Site, by John C. Abbott: 26-27; Williamsonia On-Line, by Mark O'Brien: 28; Label Data Standards, by Mark O'Brien: 28; ESA Debuts New Web Site: 28. Papers from *Argia* 17(1) omitted in this section are abstracted in this issue of OAS.] Address: Dragonfly Society of the Americas c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

8933. Hogsden, K.L.; Vinebrooke, R.D. (2005): Environmental predictors of benthic consumers and autotrophic communities along a recovery gradient. *Can. J. Fish. Aquat. Sci.* 62: 2226-2239. (in English, with French summary) ["Ecological theory predicts that biological factors replace abiotic regulation of community structure during recovery from ecosystem stress. We examined relationships between benthic autotroph (epilithic periphyton) and consumer communities, and environmental variables, along a gradient of six recovering acidified lakes to identify the best explanatory variables of community structure. Dissolved organic carbon, pH, and total dissolved phosphorus were important predictors of autotrophic biomass, while total dissolved phosphorus was the only significant factor explaining variation in consumer biomass. Abiotic factors (e.g., dissolved organic carbon, pH) were also significant predictors of autotrophic and consumer community composition. Autotrophic biomass was significantly greater in recovering lakes owing to an increased abundance of attached filamentous green algae. However, consumer biomass did not differ significantly between severely stressed and recovering lakes because of a compensatory shift from numerous small tolerant omnivores to fewer large-bodied sensitive grazers. Lack of a significant relationship between autotrophic and consumer biomass along with stable isotopic evidence of few primary consumers suggested that grazing pressure was weak, especially in the stressed lakes. The persistent importance of abiotic factors to autotrophic and consumer communities suggested that ecosystem recovery remained incomplete in these lakes." (Authors) Odonata are treated at the family level.] Address: Hogsden, Kristy, Freshwater Biodiversity, Laboratory, Dept of Biological Sciences, University of Alberta, Edmonton, AB T6G 2E9, Canada. E-mail: khogsden@gmail.com).

8934. Hunt, P. (2005): Additional notes on the Odonata of the Cayman Islands. *Argia* 17(1): 16. (in English) [Twelve species of Odonata were recorded between 8 – 12 April 2004, two of these were not previously recorded from the Cayman Islands: *Coryphaeschna adnexa* and *Micrathyria aequalis*.] Address: Hunt, Pamela, Audubon Society of New Hampshire, 3 Silk Farm Road, Concord, NH 03301, USA. E-mail: phunt@nhaudubon.org

8935. Johnson, P.G. (2005): Odonata survey of Pinnacles National Monument, California. *Argia* 17(1): 4. (in English) [38 Odonata species were recorded between 2001 and 2003. No details are dealt with. Records of *Lestes stultus* and *Erpetogomphus compositus* represent considerable range extensions, and *Anax walsinghami* is distributed very disjunctly in California.

Predation of *Cordulegaster dorsalis* by red-legged frogs is outlined. Noteworthy is the observation of reptile predation on Odonata: „I watched a Western fence lizard flinging itself into the air repeatedly at coenagrionids, like a dog leaping after a Frisbee.“] Address: not stated

8936. Landmann, A. (2005): Rote Listen und Föderalismus im deutschsprachigen Raum: Entwicklung, Bestand, fachliche und praktische Probleme. *Naturschutz und Biologische Vielfalt* 18: 167-185. (in German, with English summary) ["More than 2000 Red Lists (RL) have been published in German-speaking countries during the last thirty years. Many of these RL only refer to political subunits (federal countries, provinces, districts, cities) and often to only small areas. After giving a general review of numbers and history of such regional-level RL (RRL) in Switzerland, Austria, Germany, Liechtenstein and the South Tyrol (Alto Adige, Italy), the paper mainly deals with specific scientific problems of RRL which tend to increase with decreasing reference areas (eg. problems connected with metapopulation biology, biogeography) and with tendencies reducing the practicability of RRL for nature conservation activities (e. g. inflation with insufficiently known invertebrate taxa or with biological units below species level). For several scientific and practical reasons, I think that in many cases the IUCN-guidelines for RL at regional-levels are not adequately applicable for RRL at small scales. As such RRL are mostly dedicated to serve as instruments for regional nature conservation, different and more region-specific criteria and threat descriptors might be more useful than for national and international RL. Moreover, I doubt, that the comparability between RRL is improved by just simply adopting standardised criteria and categories." (Authors) The analysis includes Red Lists referring to Odonata.] Address: Landmann, A., Institut für Zoologie der Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria. E-mail: Armin.Landmann@uibk.ac.at

8937. Laswell, J. (2005): Curtis "Curt" Williams. *Argia* 17(1): 2. (in English) [Obituary: 5-IX-1917 – 19-II-2005] Address: not stated

8938. Łabędzki, A. (2005): The symposium of the Odonatological Section in the year 2005. *Odonatrix* 1(1): 13-14. (in Polish, with English summary) [Announcement; the symposium/workshop will be held on June 26-30 2005 in Laski near Kępno (SW Poland). In the framework of the meeting it is planned to collect insects in the area of Wzgórza Trzebnicko-Ostrzeszowskie, one of the poorest known faunistic regions of Poland.] Address: Łabędzki, A., Akademia Rolnicza, Katedra Entomologii Leśnej, ul. Wojska Polskiego 71c, PL-60-625 Poznań, Poland. E-mail: andrzejlab@poczta.onet.pl

8939. Markowich, J.; Mayer, S. (2005): Birth of a dragon. *Argia* 17(1): 12-13. (in English) [General remarks on identifying an emerging *Argomphus furcifer*.]

8940. Roble, S.M. (2005): Observations on an aggregation of *Gomphaeschna furcillata* in southeastern Virginia. *Argia* 17(1): 8-9. (in English) [16-IV-2003; First Landing State Park, City of Virginia Beach, Virginia, USA. During the period from 1100 – 1130 hrs, we observed hundreds of adults of *G. furcillata*, yet not a single mating pair or aggressive interaction was detected.] Address: not stated.

8941. Tennessen, K. (2005): Elegy for the Azure Bluet. *Argia* 17(3): 38. (in English) [poem] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

8942. Wild Bird Society of Taipei (2005): Dragonflies of Taiwan: 120 species. ISBN 9579875162: 128 pp. (in Chinese with Latin and English names) [Photographic guide of adult dragonflies occurring in Taiwan with more than 360 colour photos.] Address: www.Booksfrom-Taiwan.com

8943. Xu, Q.-h. (2005): A new species of the genus *Aciagrion* Selys from Fujian, China (Odonata: Coenagrionidae). *Entomological Journal of East China* 14(4): 301-302. (in Chinese, with English summary) [*Aciagrion huaanensis* sp. nov. is described. The new species is similar to *A. olympicum*, but different from the latter by "(1) the blue markings on head limited only to frons, postocular spots and the stripe linking the latter, (2) two small brown spots at the median area of postclypeus, (3) the scape, pedicel and flagellum of antenna with different colour respectively, (4) dorsal base of segment 3—7 narrowly ringed with pale blue, and (5) dorsal markings of segments 8—9 on basal 4/5 and basal half respectively, not as *A. olympicum* which has bifurcate markings on segments 8 and elongate triangle-shaped markings on segment 9." Measurements (mm): female: Abd. + app. 28 mm, hindwing 20 mm. Holotype: female: Huaan County, Fujian Province, China (24°49'N 117°45'E), 2005-09-22, coll. XU Qi-han; the type specimen is deposited in Zhangzhou Education College, Fujian, China.] Address: XU Qi-han, Zhangzhou Education College, Zhangzhou, Fujian 363000, China

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8944. Abellan, P.; Sanchez-Fernandez, D.; Millan, A.; Botella, F.; Sanchez-Zapata, J.A.; Gimenez, A. (2006): Irrigation pools as macroinvertebrate habitat in a semi-arid agricultural landscape (SE Spain). *Journal of Arid Environments* 67: 255-269. (in English) ["The intensification of agriculture has resulted in the loss of many aquatic ecosystems in southern Europe. Despite this, the construction of irrigation pools and reservoirs to retain the water necessary for intensive cultivation may also provide new habitats for macroinvertebrates. The biotic and abiotic attributes of 40 such reservoirs in south-eastern Spain were studied to determine the presence of macroinvertebrates, and to discover if there is such a thing as an optimal design of an artificial pond for maximizing macroinvertebrate richness. A total of 72 macroinvertebrate taxa belonging to 38 families were recorded from the pools examined. Pools constructed with low-density polyethylene covered with sand and stones contained a significantly greater species richness, abundance and diversity of macroinvertebrates than those constructed with high-density plastic materials. The treatment with algicide, and the presence of emergent and submerged vegetation, accounted for most of the deviance when modelling species richness by means of logistic regression." (Authors) The following Odonata taxa are listed: *Coenagrion*, *Ischnura*, *Libellula*, *Orthetrum*, *Crocothemis erythraea*, *Diplacodes lefebvrei*, *Sympetrum*, and *Anax*.] Address: (P. Abellán, P., Departamento de Ecología e Hidrología,

Universidad de Murcia, Campus de Espinardo, 30100 Murcia, Spain. E-mail: pabellan@um.es

8945. Balik, S.; Ustaoglu, M.R.; Sari, H.M.; Mis, D.Ö.; Aygen, C.; Tasdemir, A.; Yildiz, S.; Topkara, E.T.; Sömek, H.; Özbek, M.; İlhan, A. (2006): A preliminary study on the biological diversity of Bozalan Lake (Memen-Izmir). *Journal of Fisheries & Aquatic Sciences* 23(3-4): 291-294. (in Turkish, with English summary) [*Libellula* sp., *Leucorrhinia* sp., *Anax* sp., *Coenagrion* sp. are listed.] Address: Ustaoglu, M.R., Ege Üniversitesi, Su Ürünleri Fakültesi Su Ürünleri Temel Bilimler Bölümü, 35100, Bornova, Izmir, Turkey. E mail: m.rusen.ustaoglu@ege.edu.tr

8946. Buczyński, P. (2006): Distribution atlas of the dragonflies in the Thuringia. ZIMMERMANN, W., PETZOLD, F., FRITZLAR, F. 2005. Verbreitungsatlas der Libellen (Odonata) im Freistaat Thüringen. *Naturschutzreport* 22, Jena. *Odonatrix* 2(2): 47-48. (in Polish, with English summary) [Review of a German regional fauna on Odonata.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8947. Buczyński, P.; Daraż, B. (2006): Interesting records of *Leucorrhinia caudalis* in secondary habitats. *Odonatrix* 2(1): 9-12. (in Polish, with English summary) ["Breeding populations of *L. caudalis* were found in the years 2000-2005 in a sand pit in Zarzeka (CE Poland) and in fish ponds in Pawłokoma (SE Poland). The localities are interesting complements to the knowledge about the distribution of the species at the southern border of its compact range. The importance of fish ponds and surface rock excavations as secondary habitats is stressed. The water bodies are especially essential in areas that are poor of optimal habitats (well preserved glacial lakes and oxbow lakes) or where the habitats are destroyed. Some clues on the conservation activities (interference in succession of water body, limitation of an intensive fish culture, restrictions on fishing) are given." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

8948. Buczyński, P.; Tończyk, G.; Daraż, B.; Dyatlova, E.; Michalczyk, W.; Miszta, A.; Szymański, J.; Szpala, B.; Tondys, J. (2006): Dragonflies collected during the 3rd National Symposium of Odonatology of the Polish Entomological Society (Zwierzyniec, September 15-17, 2006). *Odonatrix* 2(suppl. 1): 1-12. (in Polish, with English summary) ["15 localities in SE Poland were visited within the frame-work of a field workshop that was conducted during the 3rd National Symposium of Odonatology of the Polish Entomological Society. These localities represented the following habitats: streams, rivers, fish ponds, sand pits, fens, and transitional peat bogs. 40 dragonfly species were recorded, of which the following ones were the most interesting for faunistic, zoogeographical and sociological reasons: *Sympecma paedisca*, *Ophiogomphus cecilia*, *Aeshna juncea*, *A. subarctica elisabethae*, *A. viridis*, *Somatochlora arctica*, *Sympetrum depressiusculum*, *S. meridionale*, *S. striolatum*, *Leucorrhinia pectoralis*. Peat bogs were regarded as the most important habitats that hold strong populations of many endangered species. The numerous occurrence of Mediterranean species was also discussed." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

- 8949.** Buczyński, P. (2006): Notes on the occurrence of *Aeshna affinis* Vander L. in the Lublin region. *Odonatrix* 2(2): 33-36. (in Polish, with English summary) ["Fifteen new localities of *Aeshna affinis* are given from the Lublin district (SE Poland). Data about the occurrence of the species in this region is compiled and discussed. *A. affinis* has been recorded more frequently, especially in the last years. Clear abatement towards the north and strong preferences for river valleys (81% of localities) as well as warm and shallow waters (95%) were observed. The occurrence of this species mainly in river valleys can be associated with the using them as migration tracks. The main track is probably the River Bug valley (>50% of localities)."] (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8950.** Cios, S. (2006): References to Odonata in Polish literature from the 18th and 19th centuries. *Odonatrix* 2(1): 12-17. (in Polish, with English summary) ["Presented are the oldest currently known references to Odonata in Polish literature (well known entomological papers from the second part of the 19th century are omitted). The first one is in KLUK (1780), who mentioned the species after Linnaeus. KLUK (1780), CZEMPIŃSKI (1789), JAROCKI (1807) and MORAWSKI (1880) reported massive flights of these insects in May. Of particular interest is the terminology. It seems that there was no single common name of these insects. Three old local ones are known – babka, lalka and strzałka. KLUK (1780) and many later authors used the name panna, a translation of demoiselle and Wasserjungfern. CZEMPIŃSKI (1789) was the first author to record the name wazka, currently referring to Odonata. He could have introduced it as an equivalent of libella. However, in Polish there was a verb ważyć, which referred to flying birds and insects. The relatively small number of references to Odonata may be due to poor knowledge of these insects in the past. The common people often confused them with locusts and probably even with butterflies."] (Author)] Address: Cios, S., ul. Stryjeńskich 6/4, 02-791 Warszawa, Poland. E-mail: stanislaw.cios@msz.gov.pl
- 8951.** Dolný, A. (2006): Ecological characteristics of dragonflies (Odonata) signficated within the European territory - Czech Republic. *Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších: seminár usporádaly ve dnech 23.-26.6.2005* Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Líze / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 97-122. (in Czech, with English summary) [Czech Republic; Odonata protected by European law (FFH-Directive, app. II & IV) and occurring in the member state of the European Community are introduced in great detail (areal and regional distribution, habitat, phenology): *Sympetma paedisca*, *Coenagrion ornatum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Leucorrhinia caudalis*, *L. albifrons*, and *L. pectoralis*.] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic
- 8952.** Dolný, A.; Petrikova, M. (2006): New findings of dragonflies (Odonata: *Epithea bimaculata* and *Libellula fulva*) in Moravia and Silesia (Czech Republic). *Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších: seminár usporádaly ve dnech 23.-26.6.2005* Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Líze / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vyd. 1. -- Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 179-181. (in Czech, with English summary) [Regional records from May/June 2005 for *E. bimaculata* (n=1) and *L. fulva* (n=5) are added to the known distribution of these species in the Czech Republic.] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic
- 8953.** Dolný, A. (2006): Long-termed monitoring of dragonflies (Odonata) within the protected territory system of European interest NATURA 2000: methodical proposals for the Czech Republic. *Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších: seminár usporádaly ve dnech 23.-26.6.2005* Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Líze / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vyd. 1. -- Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 123-153. (in Czech, with English summary) [The author introduces a monitoring scheme for the Odonata protected by European law (FFH-Directive, app. II & IV) and occurring in Czech Republic, to fulfil the demands of article 17 of the directive: *Sympetma paedisca*, *Coenagrion ornatum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Leucorrhinia caudalis*, *L. albifrons*, and *L. pectoralis*.] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic
- 8954.** Eda, S. (2006): *Lestes temporalis* Selys laid an egg unusually into a leaf of cattail grass. *Tombo* 48: 34. (in Japanese) [Documentation of oviposition by a photograph.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com
- 8955.** Eda, S. (2006): Old records of *Libellula angelina* in Nagano Prefecture. *Tombo* 48: 29. (in Japanese) [Japan] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com
- 8956.** Eda, S. (2006): The first collector of *Epiophlebia superstes* larva may be Takeo Ito. *Tombo* 48: 24. (in Japanese) [Japan] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com
- 8957.** Eda, S. (2006): Two caces of triple-connection in the Odonata. *Tombo* 48: 32. (in Japanese) [Japan; "The female of *Lestes temporalis* is laying eggs into a branch of a willow tree. Type A." "While two males of *Sympetrum frequens* are trying to fly, the female is grasping the grass. Type A."] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com
- 8958.** Ellwanger, G.; Burbach, K.; Mauersberger, R.; Ott, J.; Schiel, F.-J.; Suhling, F. (2006): 11 Libellen (Odonata). *Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt Halle, Sonderheft* 2(2006): 121-139. (in German) [Schemes to access the local populations of Odonata species protected by the European law.] Address: Ellwanger, G., c/o Bundesamt für Naturschutz, Konstantinstr. 110, 53179 Bonn, Germany. E-mail: EllwangerG@bfn.de

- 8959.** Fukunaga, K.; Tomita, M.; Murata, M.; Matsu-mura, K.; Shirai, M. (2006): Analysis of mitochondrial DNA in the exuviae of *Libellula angelina* Selys (Libellulidae). Tombo 48: 21-22. (in Japanese, with English summary) ["DNA analyses were made from the exuviae of *L. angelina* and *L. quadrimaculata asahinai*. The partial fragments of the mitochondrial 16S rRNA gene were amplified by using a polymerase chain reactions PCR method. Amplified genetic sequences extracted from two *L. angelina* individuals were 100% identical, but differed from that of *L. quadrimaculata asahinai*. These results indicate that the use of exuviae is efficient for analyzing DNA sequences in odonate species." (Authors)] Address: not stated in English
- 8960.** Futahashi, R.; Futahashi, H. (2006): The Odonate fauna of the Noto Peninsula, Hokuriku District, Honshu (2). Tombo 48: 18-20. (in Japanese, with English summary) [Noto Peninsula (Ishikawa Pref., Hokuriku District, Central Honshu, Japan); recent collections of *Paracercion melanotum*, *Sympetrum paedisca*, and *Sympetrum maculatum* are documented. Two migratory species, *Sympetrum fonscolombii* and *Tramea virginia*, and a supposed hybrid between *Anax nigrofasciatus nigrofasciatus* and *Anax parthenope julius* are newly recorded from this peninsula.] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan
- 8961.** Hesoun, P.; Tichy, V. (2006): A contribution to the knowledge about dragonflies (Odonata) of South - East Asia. Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších: seminár usporádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lípe / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vlašim : ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 90-96. (in Czech, with English summary) [Records of 63 taxa from several trips to Thailand, Birma, Nepal, and Malaysia between 1996 and 2005. 13 taxa remain currently unidentified.] Address: Hesoun, P., Bednáreček 58, CZ-37842 Nová Včelnice, Czech Republic. E-mail: hesoun@jh.cz
- 8962.** Hesoun, P.; Holuša O. (2006): The results of faunistic research of the dragonflies (Odonata) in central and east parts of district of Jindřichuv Hradec town (Southern Bohemia). Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších : seminár usporádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lípe / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 64-78. (in Czech, with English summary) [Czech Republic; records of 51 Odonata species are documented.] Address: Hesoun, P., Bednáreček 58, CZ-37842 Nová Včelnice, Czech Republic. E-mail: hesoun@jh.cz
- 8963.** Hogsden, K.L.; Vinebrooke, R.D. (2006): Benthic grazing and functional compensation in stressed and recovered lakes. Can. J. Fish. Aquat. Sci. 63: 1999-2010. (in English, with French summary) ["During ecosystem recovery, grazing pressure is expected to increase as larger herbivores become reestablished. Alternatively, grazing pressure may remain unchanged during recovery as large consumers replace and functionally compensate for more abundant populations of smaller, tolerant herbivores. We tested these hypotheses by conducting a 90-day experiment in which three size categories of benthic consumers were excluded from producers in three chemically stressed and three recovered lakes. Our findings showed that consumers did not significantly affect producer biomass in either type of lake. However, exposure to larger and more abundant grazers did induce a physiognomic shift towards less edible producers in the recovered lakes. In comparison, recovered lakes contained significantly greater producer biomass and diversity. Comparison of the observed subtle effects of consumers and pronounced negative impact of ecosystem stress on benthic producers suggest that they can compensate for natural disturbances (e.g., grazing), but not for the other multiple stressors associated with anthropogenic acidification of the Killarney lakes." (Authors) Odonata are treated at the family level.] Address: Hogsden, Kristy, Freshwater Biodiversity, Laboratory, Department of Biological Sciences, University of Alberta, Edmonton, AB T6G 2E9, Canada. E-mail: khogsden@gmail.com)
- 8964.** Ishikawa, H.; Yano, M. (2006): A record of *Neurothemis fluctuans* (Fabricius, 1793) from Tokyo. Tombo 48: 36. (in Japanese) [Japan] Address: not stated
- 8965.** Kawashima, I.; Karube, H. (2006): External morphology of the last instar larva of probable *Petaliaeschna flavipes* Karube (Anisoptera, Aeshnidae, Brachytroninae) from Laos, Indochina. Tombo 48: 7-11. (in English, with Japanese summary) ["The external morphology of the last instar larva of what is presumed to be *Petaliaeschna flavipes* Karube, 1999, from Laos is reported and illustrated based on an exuvia. The characters are compared with those of the genera *Cephalaeschna* Selys, 1883 (Fraser, 1943; Asahina, 1961) and *Periaeschna* Martin, 1909 (Matsuki & Lien, 1984)." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp
- 8966.** Kawashima, I.; Sasamoto, A. (2006): Description of the last instar larva of *Periaeschna laidlawi* (Forster) (Anisoptera, Aeshnidae) from Malaysia, southwestern Asia. Tombo 48: 12-17. (in English, with Japanese summary) ["The external morphology of the last instar larva of *P. laidlawi* is described and illustrated for the first time, and is compared with the larvae of *P. magdalena* Martin from Taiwan (Matsuki & Lien, 1984) and *Cephalaeschna* spp. from Assam (Fraser, 1943; Asahina, 1961)." (Author)] Address: Sasamoto, A., 190-4 Yakuoji, Tawaramoto-chô, Shiki-gun, Nara, 636-0341, Japan. E-mail: aksmt@sea.plala.or.jp
- 8967.** Kita, H. (2006): A female of *Sympetrum speciosum* that copulated after refusing in tandem position. Tombo 48: 27-28. (in Japanese, with English summary) ["A female *Sympetrum* s. *speciosum* repeatedly showed a refusal behaviour (i.e., not complying with taking a copula position by bending abdomen forward) while in tandem with a male, although she did finally copulated with the male. The female is not fully mature and this may be the cause of this unusual behaviour. (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan
- 8968.** Kita, H. (2006): A heterospecific "Type AB" triple-connection between a male of *Sympetrum infuscatum* (Selys, 1883) and a copulating pair of *S. maculatum* Oguma, 1915. Tombo 48: 25-26. (in Japanese, with English summary) ["A case of heterospecific triple-connection (Type AB) by a male of *Sympetrum infuscatum*

and a pair of *S. maculatum* in copula was observed in Ojiya City, Niigata Prefecture. The male *S. infuscatum* showed, while in the triple connection, swing movements that resembled typical tandem oviposition behaviour in the air above grassland suitable for oviposition for this species. From this behaviour, and similar examples cited, it was guessed that a male *Sympetrum* might show oviposition movements in tandem without experiencing copulation with the connected partner(s) if it was in tandem with a heterospecific individual or in triple connection." (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan

8969. Kita, H. (2006): A male of *Indolestes boninensis* (Odonata, Lestidae) connected with a dead female. Tombo 48: 28-29. (in Japanese, with English summary) ["A male *I. boninensis*, in tandem with a dead female which had lost her abdomen posterior to the 5th segment, was observed in Ototo-jima Island of the Ogasawara Islands, Japan. This male showed some movement that seemed to prompt the female to oviposition. (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan

8970. Kunz, B. (2006): Beitrag zur unterschiedlichen Färbung der Exuvien von *Aeshna cyanea. mercuriale* 6: 38-40. (in German) [Colour variation of exuviae of *A. cyanea* is documented and discussed.] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunz.de

8971. Lockwood, M.T. (2006): Una primera aproximació a la riquesa específica dels odonats al Parc Natural de la Zona Volcànica de la Garrotxa. Butlletí de la Institució Catalana d'Història Natural 73 (2005): 71-83. (in Spanish, with English summary) ["A total of 35 species of odonata (dragonflies and damselflies) were recorded from the Natural Park of the Volcanic Zone of La Garrotxa (NE Iberian Peninsula; PNZVG) in 2002 and 2003, of which 27 were observed at Els Estanys de Can Jordà. Three factors were considered in explaining this species-richness. First, the PNZVG is located at a confluence of biogeographical regions, a fact which ensures that there is great variety in the habitat type in the natural park and therefore in the Odonata that fly there. Secondly, the habitat surrounding the wetlands in the natural park is very varied and satisfies the ecological needs of a great variety of species. Lastly, the wetlands themselves in the PNZVG are very varied, and have good water quality. At the end we comment that only by understanding the reasons for such great species-richness can habitat be managed for Odonata in the PNZVG and elsewhere." (Author)] Address: Lockwood, M., La Devesa, 2, 1r. 17850 Besalú, Spain

8972. Mikát, M. (2006): The atypical tandems of dragonflies (Odonata: Lestidae) observed in the protected locality Na Plachte (Hradec Králové, Eastern Bohemia). Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších: seminář uspořádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lípě / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 182-189. (in Czech, with English summary) [The following interspecific tandems were noticed during 2004-2005: male *Lestes barbarus* + female *Lestes dryas*; male *Lestes sponsa* + female *Lestes virens*; male *Lestes viridis* + female *Lestes dryas*; male *L.*

sponsa + female *Erythromma najas*. Male-male tandems: *Lestes viridis*; *Sympetma fusca*; male *Lestes sponsa* + male *Lestes dryas*; male *Lestes dryas* male *Lestes sponsa*; male *Lestes sponsa* + male *Lestes barbarus*. A tandem was formed by a male of *Lestes sponsa* and a dead immature male of *Lestes viridis*. Triple connection: male *Lestes sponsa* with a tandem *Lestes viridis*.] Address: Mikát, M., Pekařova 670, CZ-500 09 Hradec Králové, Czech Republic. E-mail: marmulak.hk@tiscali.cz

8973. Miszta, A. (2006): We search him; we search her – reflections on the beginning of the fifth year of dragonfly monitoring the Upper Silesia. *Odonatrix* 2(2): 52-53. (in Polish, with English summary) ["The author presents a brief history of her interest in Odonata paying special attention to studies on Silesian nature reserves and to searching of the most threatened species out of nature reserves. The necessity of a coherent dragonfly monitoring system in Poland is stressed too." (Author)] Address: Miszta, Alicja, Centrum Dziedzictwa Przyrody Górnego Śląska, ul. Świętego Huberta 35, 40-543 Katowice, Poland. E-mail: amiszta@cdpgs.katowice.pl

8974. Nakada, A. (2006): An observation of heterogeneric copulation between *Deielia phaon* (Selys, 1883) male and *Orthetrum albistylum speciosum* (Uhler, 1853) female. Tombo 48: 23-24. (in Japanese) [Japan] Address: not stated in English

8975. Naraoka, H. (2006): Four continental *Sympetrum* dragonflies (Libellulidae) collected in Aomori Prefecture, northern Honshu, Japan, in 2005. Tombo 48: 33-34. (in Japanese, with English summary) ["*Sympetrum depressiusculum*, *S. cordulegaster*, *S. vulgatum imitans* and *S. f.flaveolum* were collected from Aomori Prefecture in autumn of 2005. The former three species are well-known migrants from Continental Eurasia. *S. f. flaveolum* is new to Honshu, and is considered to have migrated from Eurasia continent or Hokkaido. A female, instead of males, of *S. vulgatum imitans* was recorded for the first from Japan." (Authors)] Address: Naraoka, H., 36-71 Fukunoda, Kitatsugaru, Aomori 0383661, Japan

8976. Rowe, R.J. (2006): Patterns and processes in freshwater systems: the social dimension. *New Zealand Natural Sciences* 31: 59-71. (in English) ["Social interactions within species present an under-appreciated complicating factor in freshwater ecology. Such processes can markedly alter distribution patterns. Odonata are an important group of animals in freshwater systems and have the capacity, under some circumstances, to exclude other organisms (invertebrate and vertebrate) from otherwise suitable habitats. Within the Odonata stylised agonistic behaviours are widespread in larvae of Zygoptera and have important consequences for both the ecology of the species concerned and for the impact of zygopteran larvae within ecosystems. In this paper the diversity of agonistic displays within the Zygoptera is reviewed. On phylogenetic grounds, supported by fossil dates, zygopteran display systems are very ancient (~ 150-200 My). Given the obvious costs in energy, increased exposure to predators, and the real risk of damage during interactions, agonistic behaviours must have considerable adaptive significance. Investigations of the processes involved in social interactions, and how they generate the patterns that are more generally recorded, will probably require

a return to large aquarium studies, or to in situ examination of microhabitats using underwater observatories." (Author)] Address: Rowe, R.J., School of Marine and Tropical Biology, James Cook University, Townsville 4811, Australia. E-mail: richard.rowe@jcu.edu.au

8977. Sahlén, G. (2006): Specialists vs. generalists among dragonflies - the importance of forest environments in the formation of diverse species pools. In: Rivera, A.C. (Ed). 2006. Forests and Dragonflies. 4th WDA Symposium of Odonatology, Pontevedra, Spain, July 2005. Pensoft Series Faunistica 61: 153-179. (in English) ["In Scandinavia more Odonate species occur in forested environments than in agricultural areas. Some authors attribute the high number of forest species to extensive river and wetland networks. But because there are also fewer species in some agricultural areas with numerous wetlands, there must be another explanation-It is known that forestry practices affect species composition. Remove the trees, the environment changes and some species disappear. The time elapsed after logging affects species survival. While undisturbed forest habitats support the greatest number of species, partivoltine species decrease during the first 5-10 years after disturbance, partivoltine species are not affected - in fact the univoltine species present here are also part of the species pool of agricultural areas; they are true generalists. A discriminant analysis comparing the species composition of lakes in different seral stages during forest regrowth gave more than 90% separation between the stages. Moreover, an even better separation was achieved when the investigation was combined with an analysis of (semi)aquatic plant communities along the shoreline, or when dragonfly density was taken into account. Plants and odonates are interconnected; the insects respond to the habitat's form and structure rather than to water chemistry (e.g. acidity or nutrient levels) or other ecological parameters. Forestry thus affects the very structures needed for survival. What kind of structures are we dealing with? A classification of species according to habitat preferences in a comparison between agricultural and forested areas showed that, in treeless habitats there were fewer specialists as well as generalists in constructed wetlands compared to older ponds and lakes. The latter habitats however, had fewer species than were present in the adjacent forested lakes. An investigation of constructed wetlands under 10 years of ago showed that, those close to forest habitats (over small clumps of trees) had, on average, more than twice as many breeding species than those in more open areas. Trees are obviously important to Odonata species, at least during some stage of their life. All species would probably survive in the waters of open areas, yet certain species do not survive unless a forest habitat occurs at a moderate distance from their breeding waters. Larval as well as adult habitat is relevant: egg-laying substrates must be included. Forests thus seem to possess what agricultural areas do not the maintenance of a high diversity of Odonata within a landscape depends on several seral stages and many different wetlands, surrounded by a diverse matrix of plants, including trees. All this adds up to one general rule: forests harbour specialists, while open landscapes are the playgrounds of generalists." (Authors)] Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@set.hh.se

8978. Salcher, M. (2006): Erstnachweis mit Reproduktionsnachweis der Südlichen Binsenjungfer (*Lestes barbarus*) für den Nordschwarzwald. *mercuriale* 6: 21-22. (in German) [In August 2005 a 25m² shallow pond was dug out within a meadow near Obermusbach, Landkreis Freudenstadt (MTB 7416-SO, R 3461404, H 5373940, 695 m asl, Germany). It was dry until mid September 2005. On 29-VI-2006, 50 freshly emerged *L. barbarus* were recorded immediately near the pond.] Address: Salcher, M., Ferdinand-Weiß-Str. 92, 79106 Freiburg, Germany

8979. Schiel, F.J. (2006): Tagesaktivität der Gemeinen Becherjungfer (*Enallagma cyathigerum*) am Fortpflanzungsgewässer. *mercuriale* 6: 22-25. (in German) [Diel activity patterns of *Enallagma cyathigerum* and air temperature were studied on 01-VIII-1995 on a gravel pit near Neuried-Altenheim (MTB 7512, 48° 30' N, 7° 45' E, 144 m asl.), Baden-Württemberg, Germany.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

8980. Schneider, B. (2006): Kommensalen bei *Anax imperator*. *mercuriale* 6: 37. (in German) [29-VI-2005 near Winterthur, Switzerland, a male *Anax imperator* was observed catching a bee (*Apis mellifera*). Starting to devour its prey, a few seconds later some small Diptera occupied the caput of the *Anax* and tried to get something from the dragonfly's prey. The Diptera stayed as long on the head of the *Anax* as long as it fed on its prey (5 min.), and then disappeared as secretly as they had arrived. The Diptera could not be identified, but looks similar to *Desmometopa*.] Address: Schneider, B., Wolfbühlstrasse 34a, CH-8408 Winterthur, Switzerland. E-mail: b.schneider@libellen.li

8981. Śniegula, S. (2006): The adventure with *Soma-tochlora sahlbergi* Trybom, 1889. *Odonatrix* 2(2): 36-39. (in Polish, with English summary) ["At the beginning of July 2004, I reached a decision to challenge myself and bike 4,5 thousand km one way in order to search for the population of *S. sahlbergi*. This happened in gorgeous regions of north-western Canada. The adventure started in Calgary (51°N) and ended in Inuvik (68° N). The search for treeline emerald started from the 28th day of my trip, from a place where a paved road transfers to a gravel road called Dempster Highway. The gravel highway stretches from 64°N to Inuvik. It runs through subarctic tundra and is underlain by permafrost. The investigation took place on meso- and oligotrophic ponds, peat bogs and along creeks. The weather conditions and the date were adequate to see flying *S. sahlbergi*, but investigations usually ended by observations of another Odonata, mostly from families *Aeshna* and *Enallagma*. On August 2nd, while checking a small (8 x 4m) and approximately 1,3m deep peat bog located on the North slope of the Ogilvie Mountains range, a single male of *S. sahlbergi* was noticed. In addition to *Sphagnum* moss and lichens, the pond was surrounded also by single sedges and in a farther distance by low spruce trees and shrubby birch. The male was patrolling open water, sometimes crisscrossing the pond over the water surface. The observations lasted 15 minutes, until tree-line emerald left the pond and flew to the evergreen forest. *S. sahlbergi* is a far north dragonfly. It requires deep, cold water that is surrounded by moss but not necessary *Sphagnum*. Because of the severe climate, the right habitats are hard to check by scientists. Currently, it is hard to say

how big is the whole population and in what degree this species is endangered. It should be noticed that treeline emerald would be probably a good indicator for environmental changes caused by global warming and in North Norway additionally, by acid rains." (Author)] Address: Śniegula, S., Rakowo 32, 78-445 Lubowo, Poland. E-mail: ssniegula81@interia.pl

8982. Śniegula, S.; Johansson, F. (2006): Trollsländor i Grössjöns naturreservat, Umeå. *Natur i Norr*, Umeå 25 (2): 105-106. (in Swedish) [Sweden, in 2006 the following species have been recorded in that nature reserve: *Lestes sponsa*, *Enallagma cyathigerum*, *Coenagrion hastulatum*, *C. johanssoni*, *Erythromma najas*, *Aeshna caerulea*, *A. juncea*, *A. subarctica*, *A. grandis*, *Cordulia aenea*, *Somatoclora metallica*, *S. arctica*, *S. flavomaculata*, *Libellula quadrimaculata*, *Sympetrum danae*, *Leucorrhinia dubia*, and *L. rubicunda*.] Address: Śniegula, S., Instytut Ochrony Przyrody PAN, al. Mickiewicza 33, 31-120 Kraków, Poland. E-mail: ssniegula@iop.krakow.pl

8983. Steverding, M. (2006): Die Moore im Kreis Borken. *Naturerbe von landesweiter Bedeutung. Naturzeit im Münsterland* 3(6): 9-10. (in German) [General on bogs and bog fauna in Landkreis Borken, Nordrhein-Westfalen, Germany. *Aeshna subarctica*, *A. juncea*, *Somatoclora arctica*, *Leucorrhinia rubicunda*, *L. dubia*, *Ceriagrion tenellum*, *Coenagrion lunulatum* and *C. hastulatum* are stressed as noteworthy members of the Odonata fauna of bogs.] Address: not stated

8984. Sugano, T.; Umeda, T. (2006): The first record of *Neurothemis fluctuans* (Fabricius, 1793) from Kanagawa Prefecture. *Tombo* 48: 35. (in Japanese) [Japan; 26-VIII-2005] Address: not stated in English

8985. Tończyk, G. (2006): "Switezianka" – a forbidden newsletter. *Odonatrix* 2(2): 46-47. (in Polish, with English summary) [Brief "story of the trial of origins of bulletin called „Switezianka”. The bulletin was about to be published in the middle of the 1980s. It was the initiative of Dr. Stefan Mielewczyk. However, the bulletin „Switezianka” was never published due to the objection of communistic authorities of the then Poland." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

8986. Tończyk, G. (2006): 3rd National Symposium of Odonatology of the Polish Entomological Society (Zwierzyniec, September 15-17, 2006). *Odonatrix* 2 (suppl. 1): 13-16. (in Polish, with English summary) [Announcement: "Third national meeting of odonatologists took place in Zwierzyniec in Roztocze. Three-day long conference was of a field workshop type thus the training in larval identification, exuviae and imaginal dragonflies as well as presentation of the methods of field works were possible to conduct. Nine persons were involved in the symposium. The studies conducted during the meeting resulted in finding 40 dragon-fly species at 15 study sites – detailed data was published in the current supplement of the 2nd annual edition of „Odonatrix”." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

8987. Tończyk, G.; Buczyński, P. (2006): Dragonflies recorded in Białowieża during the Meeting of Polish Platform for Biodiversity (23-25.04. 2004) and 45th meeting of the Polish Entomological Society (17-19.08. 2004). *Odonatrix* 2(1): 20-21. (in Polish, with English summary) ["The authors present a list of 17 Odonata species that were recorded in the Białowieża Primeval Forest during two scientific meetings in the year 2004. The most interesting species are *Sympetma fusca* and *Erythromma viridulum*, Mediterranean species that are relatively rare in the NE Poland." (Authors)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

8988. Watanabe, K. (2006): *Sympetrum fonscolombi* emerged out in winter at Ishigaki Is. *Tombo* 48: 17. (in Japanese, with English summary) ["Last instar larvae of *S. fonscolombii* were collected from a swimming pool at Ishigaki, Japan on Jan. 14, 2006. From them a male and a pair emerged on Jan. 18 and on Feb. 11 respectively." (Author)] Address: not stated in English

8989. Yamamoto, T.; Nobuaki, N. (2006): A few atypical oviposition behavior in *Epitheca marginata* (Selys) (Anisoptera: Corduliidae). *Tombo* 48: 30-32. (in Japanese, with English summary) ["Three cases of atypical oviposition behaviour of *E. marginata* were observed in Kyoto Prefecture. 1) A female did oviposition without perching after copulation. During oviposition she repeatedly released egg masses by striking the water surface with the tip of abdomen, while the partner male flew around her. 2) A female repeated perching and flying oviposition about eight times. The oviposition was carried out by striking the water surface with the tip of abdomen. While perching, the female made an egg mass. The egg masses after oviposition did not take an usual form of "eggs-string" or "eggs-strand", but took a form of several small fragments of egg-masses. 3) When a female arriving at a pond immediately began flying oviposition without perching, like that of *Sympetrum* species." (Authors)] Address: not stated in English

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8990. Aguillard, D. (2007): CalOdes/DSA Blitz II—The desert experience (A new state record). *Argia* 18(4): 4-6. (in English) [Riverside & Imperial Counties, California, USA; 8-X-2006, *Tramea calverti*] Address: not stated

8991. Belenkova, N.I.; Djurtubaev, M.M.; Djurtubaev, Yu.M. (2007): The Danube lakes dragonfly larvae (Odonata). *Odessa National University Herald* 12(5): 159-166. (in Russian, with Ukrainian and English summary) [In the paper matters of taxonomy, distribution, diversity and biomass of the Danube lakes Odonata larvae are treated. 16 species have been found; most frequent are *Ischnura elegans*, *Sympetma fusca*, *Anax imperator*, and *Libellula quadrimaculata*. Maximum larvae numbers and biomass in most of the lakes is found in summer. Remarkable species are *Sympetma paedisca*, *Coenagrion scitulum*, and *Leucorrhinia caudalis*.] Address: Belenkova, N.I., Odessa National I. I. Mechnikov University, Department of Hydrobiology and General Ecology Dvoryanskaya 2, Odessa, 65058, Ukraine

- 8992.** Bernard, R.; Kosterin, O. (2007): Odonatological impressions from the Vasyugan Plain, Western Siberia. *Odonatrix* 3(2): 50-58. (in Polish, with English summary) ["Between 12 and 23 July 2006, dragonflies of selected localities in the Vasyugan Plain, West Siberia, were studied during an expedition by Rafal Bernard and Oleg Kosterin. The article presents personal impressions of the first author from this expedition, partly based on the odonatological results. Our investigations were focused on the largest in the world complex of Sphagnum bogs and fens and on rivers flowing between them. Additionally, small anthropogenic water bodies were also visited. In total, 34 odonate species were recorded. An important result of our expedition is the picture of the summer aspect of the odonate fauna in these mostly primeval and remote boggy areas, with the flourishing complex of peat-moss bog species and an interesting species composition of the fauna of rivers. *Nehalennia speciosa* (the main aim of our expedition) and *Aeshna subarctica*, both species poorly known and considered to be rare in Siberia, appeared to be omnipresent in pools of Sphagnum peat bogs. The latter species and two other aeshnids occurring there, *A. crenata* and *A. juncea* were well-segregated in aspects of space, weather and behaviour. It is also noteworthy that one member of the mentioned complex of species, *Coenagrion johanssoni*, abundant in primary habitats - small bog water bodies, is completely missing in large oxbows and man-made larger ponds. This absence seems to be related to their higher trophic and inappropriate or too poor vegetation. One mystery of peat-moss complexes remained undisclosed: the breeding places of generally very abundant foraging *Somatochlora arctica*. In rivers, the records of western *Gomphus vulgatissimus* and eastern *Shaogomphus postocularis* broadened significantly their known ranges to the north. What is more, the former species, earlier almost unknown in Siberia, turned out to be widely distributed and fairly abundant in the studied area, and the latter one was for the first time found west of the Ob' River. From zoogeographical point of view records of *Lestes virens*, *Coenagrion puella*, *Coenagrion pulchellum*, *Leucorrhinia albifrons*, *Leucorrhinia pectoralis* and *Sympetrum sanguineum* were also interesting as they were situated at the hitherto known northern range limits of these species or to the north of them. The expedition did not bring taxonomic surprises but an interesting high percentage of androchrome females of *Calopteryx splendens* and dark-winged *Somatochlora* individuals, especially noteworthy in *Somatochlora flavomaculata*, were recorded." (Authors)] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl
- 8993.** Bried, J.T.; Hunt, P.; Worthen, W.B. (2007): How often and how long? Studying temporal survey design for adult odonates. *Argia* 18(4): 8-11. (in English) ["This study is not about trying to find an optimum survey design, as decisions regarding sampling frequency and survey length will depend on the project objectives, the level of accuracy required, and the human resources available. Instead, our mission is to offer a set of guidelines and options built upon rigorous data that will facilitate prudent decisions about temporal survey design in any projects using adult odonates." (Authors)] Address: Worthen, W.B., Dept Biol., Furman University, Greenville, SC29613 USA. E-mail: worthen@furman.edu
- 8994.** Buczyński, P. (2007): Polish and dedicated to Poland odonatological papers. 5. The second half of the year 2006. *Odonatrix* 3(2): 62-64. (in Polish, with English summary) [The author presents a list of Polish and dedicated to Poland odonatological papers that were published in the second half of the year 2006. In the reported time period, 24 papers appeared, and 2 Ph.D. theses and 1 expertise were written. Some additions to the year 2005 were given too. The list does not contain the papers published in *Odonatrix* - they are listed in a separate index at the end of an ever volume.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8995.** Buczyński, P. (2007): Odonatological conferences in the year 2007. *Odonatrix* 3(1): 29. (in Polish, with English summary) [Announcements and brief information on the coming conferences of GdO in Dresden, Germany, and WDA in Namibia.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8996.** Buczyński, P. (2007): New records of *Erythromma viridulum* (Charpentier, 1840) on the edge of its distribution area in the northern Poland. *Odonatrix* 3(1): 15-18. (in Polish, with English summary) ["The author gives four localities of *E. viridulum* situated in the northern Poland at Polish-Russian borderline, outside the up-to-date-known area of its occurrence. *E. viridulum* has been in the stage of expansion towards the north in last two decades, likewise in other countries of western and central Europe. The changes of climate and eutrophication of surface waters are crucial factors of this state. It is clear that next records of this species outside its range are expected. The neighbourhood of the localities given in the paper to Kaliningrad District (NW part of Lake Głębockie - only 2.2 km) points out that this species might occur in its area." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8997.** Buczyński, P. (2007): Dragonflies in the Net. Part 2. Germany. *Odonatrix* 3(1): 30-32. (in Polish, with English summary) [17 web based links are presented.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 8998.** Cios, S (2007): Odonata as food of fish. *Odonatrix* 3(1): 1-8. (in Polish, with English summary) ["Presented is data on the occurrence of Odonata in fish stomachs in certain waters in Poland, Finland, Italy and France. In general Odonata are a rare item in fish stomachs (they constitute less than 1% of the organisms eaten). In Poland the main Odonata eaten by salmonids are *Calopteryx*, *P. pennipes* and gomphids, almost exclusively in highland and lowland running waters. In the material from Finland there is a striking lack of Zygoptera. The material from Italy, though small, indicates a similar role of lotic and lentic species. In general high water favours consumption of Odonata larvae by salmonids in running waters, by increasing their availability to fish (higher catastrophic drift). In the case of perch it seems that the consumption increases during low water level. In the material adults played a negligible role." (Author)] Address: Cios, S., ul. Stry-

jeńskich 6/4, 02-791 Warszawa, Poland. E-mail: tani-slav.cios@msz.gov.pl

8999. Cotrel, N.; Rouillier, P.; Boissinot, A. (2007): Atlas commenté des Odonates des Deux-Sèvres. Nature entre Deux-Sèvres 1: 56-76. (in French) [Deux-Sèvres is a Department in the region Poitou-Charentes situated in the west of France. A total of 59 species is briefly introduced and records of the species are mapped.] Address: Deux-Sèvres Nature Environnement, 7 rue Crémeau, 79000 NIORT, France. E-mail: contact@dsne.org

9000. Curtean-Babduc, A. (2007): Contributions to the study of Cibin river Odonata larvae communities. Brukenthal. Acta Musei 3: 117-124. (in English, with Romanian summary) [Romania; between 1997 - 2001, and in 2005 nine sampling stations (S1 - S9) - localized along Cibin River, starting at 16 km downstream the springs to the confluence with the Olt River - were sampled for their Odonata fauna. Eight species: *Calopteryx virgo* (S3, S4, S5, S6), *C. splendens* (S1), *Lestes dryas* (S1), *Gomphus vulgatissimus* (S2, S3, S9), *Ophiogomphus cecilia* (S2, S3), *Cordulegaster boltonii* (S1, S2), *Cordulegaster bidentata* (S2, S3), and *Leucorrhinia pectoralis* (S6, S7, S9) were recorded.] Address: Curtean-Babduc, Angela, „Lucian Blaga” University, Faculty of Sciences, Ecology and Environmental Protection Department, Oituz Street, no. 31, Sibiu, Sibiu County, Ro - 550337, Romania. E-mail: angela.banaduc@ulbsibiu.ro

9001. Dapkus, D. (2007): Protected species of insects in conservation areas of central Lithuania recorded in 2007. New and rare for Lithuania insect species 19: 5-9. (in English, with Lithuanian summary) [Lithuania; records of *Leucorrhinia pectoralis* and *Ophiogomphus cecilia* are documented.] Address: Dapkus, D., Dept of Zoology, Vilnius Pedagogical University, Studentu 39, LT-08106 Vilnius, Lithuania. E-mail: daldap@vpu.lt

9002. Donnelly, N. (2007): More on the Caribbean Islands: Odonates taken during Mike Ivie's beetle survey of Montserrat. Argia 18(4): 13-14. (in English) [Lesser Antilles: *Triacanthagyna trifida*, *Orthemis macrostigma*, *Protoneura romanae*, *Macrothemis meurgeyi*, *Dythemis* sp.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

9003. Dyatlova, E.S. (2007): Phenology of dragonflies (Insecta: Odonata) in south-western Ukraine. Odessa National University Herald 12(5): 167-176. (in English) [Dragonflies, South-Western Ukraine, phenology, Odonata] ["38 species of dragonflies from the south-western Ukrainian fauna have been distributed into six groups according to their flying periods: 53% belong to the summer group, 18% - to the summer-autumnal group, 5% - to spring-summer-autumnal group, 8% - to spring-summer group; 3% - to overwintering species on the adult stage. Data on phenology for two subspecies (*Calopteryx splendens ancilla* and *Orthetrum coerulescens anceps*) and one species (*Erythromma lindenii*) are published for the first time in Ukraine. In comparison to the literature data obtained from other parts of Ukraine, the phenological range has increased for ten species. The largest number of species flying simultaneously was observed in the second half of June." (Author)] Address: Dyatlova, Elena Sergejevna, Institute of Zoology, Faculty of Biology, I.I. Mechnikov University of

Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

9004. Feldwieser, G. (2007): Aus meinem Kuriositäten Kabinett. mercuriale 7: 42-43. (in German) [Among some curious pictures are an interspecific copulation between male *Chalcolestes viridis* and male *Enallagma cyathigerum*, and pictures of predation of damselflies by hornet and an Orthoptera.] Address: Feldwieser, G., Gönninger Straße 27, 72793 Pfullingen, Germany

9005. Göcking, C.; Menke, N.; Kiel, E.-F.; Hübner, T. (2007): Die Helm-Azurjungfer (*Coenagrion mercuriale*, CHARPENTIER 1840). Vorkommen, Schutz und Management einer FFH-Art in NRW. Natur in NRW 2/07: 18-23. (in German) [The distribution of *C. mercuriale* in Nordrhein-Westfalen, Germany was mapped, and habitats are described and assessed according to the assessing scheme of Ellwanger et al (2007). At present only 12 localities are known with in most cases medium sized population (100-500 ind.).] Address: Göcking, C., NABU-Naturschutzstation Münsterland e.V., Zumsandstr. 15, 48145 Münster, Germany. E-Mail: C.Goeking@NABU-Station.de

9006. Hunger, H. (2007): Nachruf auf Adolf und Stefan Heitz. mercuriale 7: 44-47. (in German) [Obituary for two well known German odonatologists.] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INULA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

9007. Kelly, J.M. (2007): Ecotoxicological assessment of juvenile northern pike inhabiting lakes downstream of a uranium mill. M.Sc. thesis, Toxicology Graduate Program, University of Saskatchewan, Saskatoon: XIV, 129 pp. (in English) [Key Lake uranium mill in northern Saskatchewan, Canada; "dragonfly larvae" were present in the stomachs of pike from all three lakes.] Address: Kelly, Jocelyn Marie, Toxicology Centre, University of Saskatchewan, 44 Campus Drive, Saskatoon, Saskatchewan S7N 5B3, Canada

9008. Kronenbitter, J. (2007): Ungewöhnliches Eiablageverhalten beim Kleinen Granatauge (*Erythromma viridulum*). mercuriale 7: 39-41. (in German) [Würzburg, Bavaria, Germany (9°55'54"O, 49°45'55"N); submerged oviposition of a tandem] Address: Kronenbitter, Jenja, Schwabenstr. 21, D-76646 Bruchsal, Germany

9009. May, M. (2007): Phylogeny of Odonata: Part 1, Phylogenetic inference. Argia 18(4): 19-25. (in English) [Brilliant introduction into general and Odonata phylogeny.] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

9010. Meurgey, F.; Weber, G. (2007): The Odonata of Dominica, British West Indies — 2006 collecting trip. Argia 18(4): 14-16. (in English) [A survey of 23 localities, resulted in 21 Odonata species, and bringing the checklist of Dominica to 25 species.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

9011. Michalczuk, W. (2007): Ornate damselfly *Coenagrion ornatum* (Sélys, 1850) found in the Wołyńska Upland (south-eastern Poland). Odonatrix 3(2): 40-42. (in Polish, with English summary) ["The paper is a preliminary report about the population of *C. ornatum* re-

corded 20 km east-south-east of Zamość (50°39'N, 23°32' E, the Wołyńska Upland, south-eastern Poland). Numerous imagines of *C. ornatum* were observed on 15 May, 2007 in the valley of the River Sieniocha at the outlet canal of the spring peat bog of carbonate character. *Enallagma cyathigerum*, *Somatochlora flavomaculata* and *Libellula fulva* were co-occurring species. *C. ornatum* has been observed for the first time since 1992 and it has been the first record in south-eastern Poland since over 60 years. In the near future more detailed analyses of the recorded population as well as the habitat and its monitoring are planned." (Author)] Address: Michalczuk, M., Zamojskie Towarzystwo Przyrodnicze, ul. Szymonowica 19/6, 22-400 Zamość, Poland. E-mail: wiack@wp.pl

9012. Miszta, A.; Dolný, A. (2007): Localities of protected and rare dragonfly species in the Silesian woiwodship found out of water and peat bog nature reserves in the years 2003-2005. *Odonatrix* 3(1): 9-14. (in Polish, with English summary) [A survey of dragonflies at 13 localities in the Silesian woiwodship but situated outside the area of nature reserves was made. 15 dragonfly species belonging to protected or rare animal species occurred. Only one of the sites seems to be safe from human activities or natural succession. The remaining ones need continuous monitoring, some of them should be actively protected." (Authors)] Address: Miszta, Alicja, Centrum Dziedzictwa Przyrody Górnego Śląska, ul. Św. Huberta 35, 40-543 Katowice, Poland. E-mail: a.miszta@cdpgs.katowice.pl

9013. Miszta, A.; Boroń, M.; Cuber, P.; Dolný, A. (2007): The occurrence of *Aeshna affinis* Vander Linden, 1820 and *Crocothemis erythraea* (BRULLÉ, 1832) in sinkhole ponds in the Silesian voivodeship in 2006 (Odonata: Aeshnidae, Libellulidae). *Odonatrix* 3(2): 42-46. (in Polish, with English summary) [A study "of dragonflies on man-made reservoirs of the Silesian Region took place, in 2006 there were recorded numerous males and less numerous females of *A. affinis*. Single individuals have been reported in 1939 in Gwozdziany and in 1966 in Ustron. Since its last record *A. affinis* has been noted again in 2005 in an old river bed of the River Odra River in Lasaki. It has been recorded on seven new sites in the next year. Most of those new sites were small sinkhole ponds created by coal-mining. What is more *A. affinis* was recorded on a few natural sites too. While on natural sites there were 2 - 4 specimens recorded, on anthropogenic water bodies there were usually about 20 individuals. Creating tandems indicated making attempts to inhabit anthropogenic water bodies by this species. There was another quite rare and stenothermic species - *C. erythraea* recorded on two sites together with *A. affinis*. This species has been observed since 2002 in Oder River Valley, near the southern border of Silesian Region with Czech Republic. Nevertheless it was recorded for the first time in sinkhole ponds in 2006." (Authors)] Address: Miszta, Alicja, Centrum Dziedzictwa Przyrody Górnego Śląska, ul. Św. Huberta 35, 40-543 Katowice, Poland. E-mail: a.miszta@cdpgs.katowice.pl

9014. Paulson, D. (2007): Hawaii — another view. *Argia* 18(4): 11-12. (in English) [Kauai, Hawai'i, USA, 15-15. Oct. 2006: *Anax strenuus*, *Megalagrion vagabundum*, *M. oresitrophum*, *M. eudytum*, *Pantala flavescens*, and some introduced Odonata: *Ischnura ramburii*, *I. posita*, *Orthemis ferruginea*, *Crocothemis servilla*, *Anax junius*] Address: Paulson, D.R., Slater Museum,

Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

9015. Prioul, B. (2007): Analyse d'ouvrage: Juwelenschwingen, Geheimnisvolle Libellen (Gossamer Wings, Mysterious Dragonflies) par Dagmar Hilfert-Rüppell & Georg Rüppell, 2007. Splendens-Verlag, Allemagne. Relié, couverture rigide en couleurs. 22 x 28 cm, 168 pages, 264 photographies en couleurs. ISBN : 978-3-00-020389-3. Prix: 34,95. Site Internet: <http://www.splendens-verlag.de/>. *Martinia* 23(3): 111-112. (in French) [review] Address: not stated

9016. Robin, J.; Albinet, S.; Fusari, M. (2007): Atlas préliminaire des Odonates de Tarn-et-Garonne. *Bulletin de la Société des sciences naturelles de Tarn-et-Garonne* 31(2006-2007): 1-21. (in French) [Département Tarn-et-Garonne, France; 48 Odonata species are mapped and briefly discussed.] Address: Robin, J., 6 rue du Stade 24, 82370 Corbarieu, France, E-mail: robin-jerome@voila.fr

9017. Sächsische Landesstiftung Natur und Umwelt; Staatliches Museum für Tierkunde Dresden (Hrsg.); Brockhaus, T.; Nuß, M.; Voigt, N. (Red.) (2007): Abstracts, 26. Jahrestagung Gesellschaft deutschsprachiger Odonatologen (GdO e.V.), 09.-11. März 2007 · Dresden. 49 pp: (in German) [Laptop-Präsentation: ROLAND TÜRK: Tierdatenbanken. Poster: EVA BULANKOVA, ALES DOLNÝ & DAN BÁRTA: River Habitat Survey – eine Methode zur Charakterisierung der Biotopansprüche der rheophilen Libellen; W. ZESSIN: Überblick über die paläozoischen Libellen; H. SCHNABEL: Die Libellen des Biosphärenreservates Oberlausitzer Heide- und Teichgebiet; D. BÁRTA & A. DOLNÝ: *Aeshna juncea* in pictures – some methods of displaying the dragonflies; A. DOLNÝ & L. HANEL: Současné znalosti o vážkách České republiky a možnosti jejich ochrany (Present knowledge about dragonflies of the Czech Republic and ways and means of their protection). Vorträge: H. VOIGT: Die Libellenfauna der Stadt Dresden; J. PHOENIX & P. BENDA: Die Libellenfauna der Sächsisch-Böhmischen Schweiz; H.-J. CLAUSNITZER: Die Veränderung der Libellenfauna im Landkreis Celle 1984–2006; E. G. SCHMIDT: Die Veränderungen der Odonatenfauna der nordfriesischen Insel Amrum in den letzten Jahrzehnten und ihre Ursachen; R. BERNARD & T. SCHMITT: Ecological and genetical potential of *Nehalennia speciosa* and its implication for conservation; K. BURBACH: Voruntersuchungen zu einem Artenhilfsprogramm Libellen in Bayern; K.-J. CONZE: Quelljungfern (*Cordulegaster* sp.) in Nordrhein-Westfalen; H. DONATH: Libellen als Indikatoren zur Evaluierung von Gässerschutzprojekten im Naturpark Niederlausitzer Landrücken; J. OTT, M. SCHORR, B. TROCKUR & U. LINGENFELDER: Artenschutzprojekt Gekielte Smaragdlibelle (*Oxygastra curtisii*); B. HACHMÖLLER & C. SCHMIDT: Pflegekonzept für Gräben im LSG Nassau bei Meißen unter besonderer Berücksichtigung der Vogel-Azurjungfer (*Coenagrion ornatum*); S. HEITZ: Regionale Mindeststandards zur Gewässerunterhaltung von Wiesenbächen am Oberrhein; G. DE KNIJF & A. ANSELIN: Some interesting results of the Belgian dragonfly atlas; P. BUCZYŃSKI, R. BERNARD & G. TONCZYK: Atlas der Verbreitung der Libellen in Polen; M. MARINOV: Current gaps in our knowledge and the need of research on Bulgarian Odonata; MARTENS: Libellen als Neozoen; T. BROCKHAUS: Das Projekt der Libellenfauna Deutschlands; T. KOHBACH & D. AUGUSTIN:

MultiBase Version CS, kartengestützte Arterfassung deutschlandweit am Beispiel der Libellen; V. KALKMAN: Mapping European dragonflies; K. KOCH, M. KARLSSON & G. SAHLÉN: Wie können Ovarienstrukturen die zwei Eigelege-Typen von Libelluliden erklären?; A. GÜNTHER & D. BARTÁ: *Archineura incarnata* – erste Impressionen aus dem Verhalten der unbekanntesten Riesen; F. WEIHRAUCH: Fakt oder Phantasma – ist *Ophiogomphus cecilia* auf der Iberischen Halbinsel indigen?; D. GOERTZEN: Die Industriebrachen des Ruhrgebiets – wertvolle Lebensräume für Libellen?; W. ZESSIN: Zur Biologie paläozoischer Libellen; H. WILDERMUTH: Ökologische Fallen in der Zivilisationslandschaft – Neues zum Polarisationssehen der Libellen; K. WESTERMANN: Anhaltende Eiablage vieler *Lestes viridis* in Stängel der Großen Brennnessel (*Urtica dioica*) – falsche Substratwahl infolge der Geburtsortstreue; KUNZ: Eiablage von *Sympetma fusca* in vertikales grünes Substrat; O. MÜLLER: Beitrag zur Ökologie der Larven von *Boyeria cretensis*; F. SUHLING, E. BRAUNE & O. RICHTER: Wie wirken sich Klimaveränderungen auf Lebenszyklen von Libellen aus? Erste Ergebnisse am Beispiel von *Gomphus vulgatissimus*; J. OTT: Die Veränderung der Libellengemeinschaften der Wöoge im Biosphärenreservat Pfälzerwald infolge der Klimaveränderung und Konsequenzen für das Netz NATURA 2000; J. HOFFMANN: Klimawandel und Libellen – Eindrücke zu Untersuchungen in den Anden] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

9018. San Roman, L.S.; Bastero Monserrat, J.J.; De La Campa Martinez, H. (2007): El Homenaje a Linneo de 1907 en Zaragoza: un siglo más tarde. *Naturaleza Aragonesa* 18: 4-13. (in Spanish) [The paper includes references to Longinos Navás (1858-1937), famous Spanish neuropterologist and experienced worker in Odonata.] Address: San Román, L.S., già de Granada. Campus Universitario de La Cartuja, s/n. Apto. de Correos 2002. E-18080 Granada. España. E-mail: Lsequeiros@probesi.org

9019. Schielke, E.; Costantini, C.; Carchini, G.; Sagnon, F.; Powell, J.; Caccone, A. (2007): Short report: Development of a molecular assay to detect predation on *Anopheles gambiae* complex larval stages. *Am. J. Trop. Med. Hyg.* 77(3): 464-466. (in English) ["We developed a molecular assay to detect predation on *Anopheles gambiae* sensu lato (s.l.) mosquitoes. This intergenic spacer ribosomal DNA polymerase chain reaction assay and restriction enzyme analysis uses *An. gambiae*-specific primers to detect mosquito DNA in the DNA extracts from whole invertebrate predators, which enables identification of species (*An. gambiae* s.s. versus *An. arabiensis*) and molecular forms (M versus S in *An. gambiae* s.s.). We show that *An. gambiae* s.l. DNA can be detected after ingestion by members of the families Lestidae after four hours, Libellulidae after six hours, and Notonectidae (order Hemiptera) after 24 hours. This method is an improvement over previously published methods because of ease of execution and increased time of detection after ingestion." (Authors)] Address: Powell, P., Dept Ecol. Evol. Biol., Yale Univ., PO Box 208106, New Haven, CT 06520-8106, USA. E-mail: jeffrey.powell@yale.edu

9020. Sibley, F.C.; Daigle, J.J. (2007): Florida Keys—September/October 2006 or where's Wilma? *Argia* 18(4): 17-19. (in English) [Hurricane affected ponds and species composition of habitats. The results of a pre-

hurricane (Oct. 2005) and the post-hurricane (Oct. 2006) samples are documented and discussed.] Address: Sibley, F.C., The Conservation Agency, 6 Swinburne St. Jamestown, RI 02835, USA. E-mail: fcsibley@empacc.net

9021. Śniegula, S. (2007): The Odonata of the Täfteån (Västerbotten, Province, Sweden). *Odonatrix* 3(2): 47-49. (in Polish, with English summary) ["This article contains data on Odonata species recorded on July 16th, 2006 in two localities at the Täfteån River. *Calopteryx virgo* and *Cordulegaster boltonii* represent typical lotic species and were recorded in locality 1. *Pyrrhosoma nymphula* was previously recorded in 5 localities in the Västerbotten Province. It seems that these are the most northern localities of the species, whose larvae prefer slow flowing and productive rivers. The author recorded *P. nymphula* in locality 2. Two widespread in Sweden *Aeshna* species are usually found in meso- and dystrophic lakes. Both were recorded exclusively in locality 2. *Somatochlora metallica* was a dominant dragonfly in two studied localities. In the Västerbotten Province larvae of this species are found in variety of aquatic habitats." (Author)] Address: Śniegula, S., Rakowo 32, 78-445 Lubowo, Poland. E-mail: ssniegula81@interia.pl

9022. Tończyk, G. (2007): Moreover than dragonfly impressions from field studies at northern Mazowsze. *Odonatrix* 3(1): 19-21. (in Polish, with English summary) ["Report on nature impressions from the expedition to the northern Mazowsze in the frames of "Atlas of the distribution of the dragonflies (Odonata) of Poland" project. The studies covered 124 study sites and resulted in recording 55 dragonfly species. However, the studied area was strongly transformed - especially this referred to small water courses. Melioration and pollution were probably the main reasons why *Calopteryx virgo* was found as a very rare species. *Erythromma viridulum*, *Lestes barbarus*, *Aeshna juncea*, *A. subarctica elisabethae*, *A. viridis*, *Orthetrum albistylum* and *O. brunneum* were the most interesting species recorded during studies." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

9023. Tończyk, G. (2007): 4th National Symposium of Odonatology of the Polish Entomological Society, Brda, May 18-20, 2007. *Odonatrix* 3(2): 59-61. (in Polish, with English summary) ["4th All-Polish Odonatological Symposium took place in Brda by the River Brda in Tucholskie Forests. There were 18 participants involved. During three days of the conference the problems connected with standardisation of the methods used in odonatological studies as well as larval and exuvial identification were discussed. The main task of the meeting was the practical introduction to the analysis of dragonfly faunistic composition of some study sites which were visited during a daylong field excursion." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

9024. Tończyk, G. (2007): Horizontal and vertical parameters of *Ophiogomphus cecilia* (Fourcroy, 1785) (Odonata: Gomphidae) emergence in small lowland river.

Odonatrix 3(1): 23-25. (in Polish, with English summary) ["Short note on horizontal and vertical parameters of the position of *Ophiogomphus cecilia* exuviae in the bank zone of small lowland river. The measurements of 111 exuviae positions were made. The average height on which exuviae were found was 77 cm (min. 11 cm, max. 172 cm, most often from 60 to 120 cm), the average distance from the bank line was 43 cm (min. 0 cm, max. 210 cm, most often from 0 to 50 cm).] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

9025. Tończyk, G. (2007): Interesting development sites of *Aeshna cyanea* (O.F. Müller, 1764). *Odonatrix* 3(1): 22-23. (in Polish, with English summary) ["*A. cyanea* is one of the most eurytopic dragonfly species using all types of waters for its development. The observations of this species inhabiting pools made during the mud bath of boars (*Sus scrofa*) are given. This phenomenon was observed in 2006 in Mazowsze and the east Sudety Mts." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

9026. Wendzonka, J. (2007): Second record of *Crocothemis erythraea* (Brullé, 1832) in Western Poland with remarks on its distribution and ecology (Odonata: Libellulidae). *Odonatrix* 3(2): 33-39. (in Polish, with English summary) [*C. erythraea* was observed in a pond near the village Gostyń Stary, 51° 54' N, 16° 57' E, by Gostyn, 65 km S of Poznań, Poland.] Address: Wendzonka, J., ul. Graniczna 17, 63-800 Gostyń, Poland. E-mail: wendzonka@wp.pl

9027. Zięba, P.; Buczyński, P. (2007): Green Hawker *Aeshna viridis* caught in light traps. *Odonatrix* 3(1): 26-28. (in Polish, with English summary) ["Adults of *A. viridis* were collected in light traps in the valley of the river Narewka in Białowieża village, NE Poland (2006-07-22, 1 female at mercurial lamp and 2006-07-23, 3 females and 1 male at arc-lamp). All specimens were caught on ca 21.40. The collected individuals were sitting frontally to the lamp so that their body axes were forwardly directed to the source of light. The authors discuss the known cases of light-trapped dragonflies, especially in the zone of temperate climate and in Europe. This phenomenon can be the result of spontaneous activity of dragonflies or their arousal to activity by strong light. Up-to-date observations have shown that there are two possible explanations: in particular cases the first or the second mechanism was involved. For the observations from Białowieża more possible is the second one: *A. viridis* was multiply found in the valley of the Narewka River, also at the sites where light traps were provided. It seems that many cases of dragonflies attracted to the light source are overlooked for odonatologists do not use the method and other entomologists who set light traps are not interested in dragonflies or underestimate such observations. So for gathering more data on the subject the cooperation of odonatologists and specialists of other insect groups is needed." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

9028. Bernard, R.; Daraż, B. (2008): State and habitat of a peripheral and isolated population of *Nehalennia speciosa* (Charpentier, 1840) in southeastern Poland (Odonata: Coenagrionidae). *Odonatrix* 4(1): 12-19. (in Polish, with English summary) ["The peripheral population of *N. speciosa*, discovered in 2004 in the nature reserve "Broduszurki", SE Poland (49°49' N, 22°21' E; UTM EA91), is the southernmost remaining population of the species in E Europe and E part of Central Europe. The Broduszurki population represents the same Evolutionary Significant Unit (ESU) as other Polish populations of the species and could be included into the same Management Unit (MU). However, a slightly greater genetic distance and genetic differentiation against all other studied populations, combined with the current state of strong isolation (the nearest species locality 90 km distant), might justify treating this population as a separate MU. This population, occupying ca 0.06 ha, is medium-sized (max > 400 imagines per control and min 1500 in the flight period) and dynamic, recently increasing and colonizing new patches of the habitat, but also tightly attached to selected small areas. The local high density was mirrored in a high mortality in spiders' webs (e.g. 36 individuals/14 webs or 35/15). The habitat of *N. speciosa* is secondary: several-dozen-year old peat excavation pools in different stages of succession, surrounded by low peaty pine forest. *N. speciosa* occurred in two subpopulations (pools) and four habitat patches. It was related mostly to the rich in water habitat with *Carex rostrata*, *Sphagnum* sp., *Warnstorfia fluitans*, and admixtures of *Juncus effusus* and *Molinia caerulea*, resembling the "rostrata" habitats known from several other localities in E Poland and Europe. However, the species occurrence in one patch based mostly on *Molinia caerulea* is exceptional, known only from Lower Saxony, where one locality even highly resembles the Broduszurki one. The habitat in this patch is spatially separated between the larval one (*Warnstorfia fluitans* "soup" in water) and that one for imagines - land tussocks of *M. caerulea* explored by the species up to 5 m from the water. Dry leaves of *Molinia*, hanging into water and used for the emergence were a passage between these two microhabitats. However, the use of such an untypical habitat is possible only due to a specific combination of conditions, such as the occurrence of *M. caerulea* under the canopy of trees protecting from excessive insolation and stronger winds. As *N. speciosa* was not observed in other seemingly similar places nearby for no apparent reason, it seems that some of these conditions have remained unrecognised." (Authors)] Address: Bernard, R., Dept General Zool., Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

9029. Buczyński, P. (2008): Impressions from the 26th Annual Congress of the German Speaking Odonatologists in Dresden (March 9-11, 2007). *Odonatrix* 4(1): 28-29. (in Polish, with English summary) ["Brief relation on the international odonatological congress that took place in Dresden. The main streams of debates are presented. The most valuable speeches are pointed, especially from the field of dragonfly conservation, biology and zoogeography." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

- 9030.** Buczyński, P. (2008): First record of *Coenagrion armatum* (Charpentier, 1840) in the Lithuanian Lake District (Odonata: Coenagrionidae). *Odonatrix* 4(1): 25-27. (in Polish, with English summary) ["*C. armatum* is a critically endangered species in Poland which has been vanishing in the western part of the country. Its refuge is eastern borderland, however, no contemporary existing populations have been found from the northern part of this area so far. The author gives the description of the first site of *C. armatum* known from Polish part of the Lithuanian Lake District: Lake Gulberek NE from Wizajny (54°23'44" N, 22°55'26" E, 220 m. a.s.l., UTM: FF22)."] (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 9031.** Buczyński, P. (2008): 47th Congress of the Polish Entomological Society, Bieszczady Mts., June 26-29, 2008. *Odonatrix* 4(1): 27. (in Polish, with English summary) [Announcement: "In June 2008 the 47th Congress of the Polish Entomological Society will be held in the Bieszczady Mts. (SE Poland). Meetings of thematic sections are planned during this congress. Therefore we are forced to cancel the 5th All-Polish Symposium of Odonatology that was planned in the year 2008. All persons interested in dragonflies are invited to participate in the congress of the Polish Entomological Society. Information about the congress are available on the webpage of the PES: www.pte.au.poznan.pl (section "Aktualności")."] (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 9032.** Buczyński, P. (2008): Preliminary studies on dragonflies (Odonata) of carbonate fens near Chelm. *Odonatrix* 4(1): 21-35. (in Polish, with English summary) ["In 2007 in the vicinity of Chelm (Central-Eastern Poland), researches on dragonflies of carbonate fens and habitats associated with them or formed in the area (canals, small water bodies, ponds) were conducted. 34 dragonfly species were found, of which 32 with confirmed or probable development. The most frequent species are: *Lestes virens*, *Coenagrion puella*, *C. pulchellum*, *Somatochlora flavomaculata*, *Libellula quadrimaculata* and *Sympetrum danae*. Carbonate fens as well as dystrophic waters connected with them were characterized by a specific dragonfly fauna - with no or very scarce some tyrphophilous (e.g. *Aeshna juncea*, *Leucorrhinia pectoralis*) and strong dominance of others (e.g. *Lestes virens*, *Somatochlora flavomaculata*). Peat bog drying out caused the disorder of this arrangement: the extinction of tyrphophilous, the increase in number of eurytopes and incidence of thermophilous species like *Lestes barbarus*."] (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com
- 9033.** Dillon, M. (2008): Dragonflies and damselflies of Wright Patman Lake. *Dragonflies and Damselflies (Odonata) of Texas* 3: 5. (in English) [31 Odonata species are listed from Wright Patman Lake, extreme northeast Texas, USA.] Address: Dillon, M., Marshall, Texas, USA. E-mail: mdillon@charter.net
- 9034.** El Haisoufi, M.; Lmohdi, O.; Bennas, N.; Mellado, A.; Millan, A. (2008): Les Odonates du bassin versant Laou (Rif occidental, Maroc). *Bayed A. & Ater M. (éditeurs). Du bassin versant vers la mer: Analyse multidisciplinaire pour une gestion durable. Travaux de l'Institut Scientifique, Rabat, série générale* 5: 47-59. (in French, with English summary) ["Prospecting of 17 localities of the catchment area of Oued Laou allowed us to identify 22 species of Odonata, among which, *Coenagrion scitulum*, *Pyrrhosoma nymphula nymphula*, and *Onychogomphus costae* are new quotations for this catchment area. Data collected during this study and the literature analysis made it possible to draw up the inventory of 32 species of Odonata known until now for this area. Detailed data on the regional distribution, a description of the habitat of each species captured and a chorological analysis of the odonatological settlement of the area are presented."] (Authors)] Address: El Haisoufi, M., Université Abdelmalek Essaâdi, Faculté des Sciences, Laboratoire de Diversité et Conservation des Systèmes Biologiques, B.P. 1221, 93000 Tétouan, Maroc. E-mail: sympetrum111@hotmail.com
- 9035.** Gallucci, T. (2008): The Odonata of Kerr county and the Guadalupe river system of Texas. *Dragonflies and Damselflies (Odonata) of Texas* 3: 6-11. (in English) [USA.; brief history in regional Odonata study, brief description of ecological situation, and checklist of the county Odonata.] Address: Gallucci, T., Gulf Coast Laboratory for Wildlife Research and Milk River Milm; P.O. Box 6, Camp Verde, Texas 78010-5006, USA. E-mail: milkrivermusic@hotmail.com
- 9036.** Gallucci, T. (2008): The Odonata of Real County and the Frio-Nueces River System of Texas. *Dragonflies and Damselflies (Odonata) of Texas* 3: 12-19. (in English) [USA.; brief history in regional Odonata study, brief description of ecological situation, and checklist of the county Odonata.] Address: Gallucci, T., Gulf Coast Laboratory for Wildlife Research and Milk River Milm; P.O. Box 6, Camp Verde, Texas 78010-5006, USA. E-mail: milkrivermusic@hotmail.com
- 9037.** Gamboa, M.; Reyes, R.; Arrivillaga, J. (2008): Macroinvertebrados bentónicos como bioindicadores de salud ambiental. *Boletín de malariología y salud ambiental XLVIII(2)*: 109-120. (in Spanish, with English summary) [Benthic macroinvertebrates as bioindicators of environmental health: The fluvial system has been under strong human pressure, due to a lack of urban planning, which has triggered a potentially dangerous potable water problem for human consumption and irrigation. These changes in the quality of the fluvial systems have promoted important microclimatic changes, within the niche of special aquatic fauna, macroinvertebrates, that have a susceptible population dynamics to habitat disturbances. For sustainable development it is necessary to consider aquatic atmosphere conservation and to propose an adequate management plan, which includes bioindicators as a potential tool, to evaluate the perturbation grade and monitor the fluvial system within the water conservation plan. A bioindicador is defined as a set of species, with specific requirements in relation to physical or chemical variables, so that the significant changes of these variables indicates for the species that the system is perturbed and the species are close to tolerance limits. The assemblages of macroinvertebrates are the best bioindicators of contaminated water, because they are very abundant, are present in all the fresh water ecosystems, easy to collect and monitoring is low cost. The taxa to consider for environmental quality are: Ephemeroptera, Trichoptera, Plecoptera, Diptera, Odonata and Coleoptera. In this work we suggest the use of these aquatic macroin-

vertebrates as biological bioindicators, and their utility as biotic indices to estimate the tolerance of benthos to the polluting agents (BMWP, IBMW, BMWQ, IBF, EPT, the percentage of scrapers and the abundance of Chironomidae) as well as the functional response of these organisms to the polluting agents. Increasing studies of biomarkers leads to a better understanding of how fresh water is affected by a pollutant.] Address: Gamboa, Maribet, Depto de Estudios Ambientales, Laboratorio de Genética de Poblaciones, Ecología Molecular de Insectos, Departamento de Biología de Organismos, Universidad Simón Bolívar, Caracas 89000, Venezuela. E-mail: maribetg@gmail.com

9038. Gierach, K.-D. (2008): Die Wiesenweihe in der nordwestlichen Niederlausitz: 2003 bis 2007. Biologische Studien, Luckau 37: 70-84. (in German) [Brandenburg, Germany; four dragonfly specimens were found as prey items of Montagu's Harrier (*Circus pygargus*).] Address: Gierach, K.-D., Straße der Einheit 48, 15926 Luckau, OT Beesdau

9039. Goertzen, D. (2008): Die Libellenfauna von Industriebrachen des Ruhrgebiets (NRW). Entomologie heute 20: 77-91. (in German, with English summary) [Germany; "In the highly industrialized Ruhr region the Odonata fauna at 11 industrial wasteland sites in 2006 resulted in 36 species; 29 of them reproduced in the water bodies present there. Temporary pools and small ponds as well as artificial basins were colonized from many species. From the 20 Red List species, 12 are indigenous at one or more sites, *Ischnura elegans*, *Sympetrum striolatum*, *Anax imperator*, *Aeshna mixta* and *Coenagrion puella* with a steadiness of at least 80 % are the most frequent species. Compared to the Ruhr region and NRW the rare *Lestes barbarus* and *Ischnura pumilio* are more frequent on industrial wasteland." (Author)] Address: Goertzen, Diana, Dornröschenweg 27, D-44339 Dortmund, Germany. E-mail: diana.goertzen@rub.de

9040. Heidemann, H. (2008): Analyse d'ouvrage: Die Falkenlibellen Europas par Hansruedi Wildermuth, Série Die Neue Brehm-Bücherei, vol. 653. 2008. Westarp-Wissenschaften, Hohenwarsleben. Couverture rigide en couleurs. Format: 14,5 x 21 cm. 496 pages. 16 planches avec 39 photographies en couleurs, 140 figures (4 photos au microscope électronique à balayage, 11 cartes de distribution, 4 autres cartes géographiques, 27 schémas géométriques, 97 dessins), 33 tableaux. ISBN 978 3 89432 896 2. Prix: 60 €. Commande à adresser à: Westarp-Wissenschaften, Kirchstr. 5, D-39326 Hohenwarsleben. *Martinia* 24(4): 153-156. (in French) [book review] Address: Heidemann, H., Au in den Buchen 66, 76646 Bruchsal, Germany

9041. Hilfert-Rüppell, D.; Rüppell, G. (2008): Alternative Taktiken im Fortpflanzungsverhalten von *Calopteryx splendens* in einem geographischen Vergleich (Odonata: Calopterygidae). *Entomologie heute* 20: 93-103. (in German, with English summary) ["Males of the widespread European *C. splendens* exhibited in high densities different alternative reproductive tactics between which they were able to change. Precedent copulations influenced the choice of the tactic and the outcome of fights. The causes are discussed. In a northern population of *C. splendens* frequency, intensity and success of the alternative reproductive tactics were higher than in a southern population. *C. haemorrhoidalis* that is restricted to the western Mediterranean

region, never showed alternative tactics during the investigation period, neither at the roosting site nor in enclosure experiments. These geographical variations of the behaviour within a species and in comparison to a southern species are discussed in a climatic context." (Authors)] Address: Hilfert-Rüppell, Dagmar, Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

9042. Kasthala, G.; Hepelwa, A.; Hamiss, H.; Kwayu, E.; Emerton, L.; Springate-Baginski, O.; Allen, D.; Darwall, W. (2008): An integrated assessment of the biodiversity, livelihood and economic value of wetlands in Mtanza-Msona Village, Tanzania. Tanzania Country Office, International Union for Conservation of Nature, Dar es Salaam: VI, 143 pp. (in English) ["Odonata specimens were collected from 10 locations (9 lakes, 2 locations on the Mbaligani River following rain, and 1 site adjacent to the northern terrace of the Rufiji River). 100 specimens were collected, photographed and preserved. No field keys currently exist for East African odonates, and an export permit, required to send the specimens to an expert for identification, was not obtained. However, photographs of the specimens were submitted to an expert (V. Clausnitzer) for identification, and 14 specimens were identified (3 to Genus level, 11 to Species). All identified specimens are of Least Concern according to the IUCN Red List, and, except for *A. tristis* (a new record for the Rufiji), are common species associated with wetlands in the region." (Author) The following taxa are listed in table 25: *Anax tristis*, *Azuragrion nigradorsum*, *Ceriagrion* spp., *Ceriagrion glabrum*, *Ischnura senegalensis*, *Lestes uncifer*, *Acisoma panorpoides*, *Brachythemis leucosticta*, *Crocothemis* spp., *Orthetrum* spp., *Palpopleura lucia*, *Rhyothemis semihyalina*, *Trithemis annulata*, *T. arteriosa*.] Address: Tanzania Country Office IUCN, 63/1 Galu Street, Ada Estate, Kinondoni, PO Box 13513, Dar es Salaam, Tanzania

9043. Lambert, J.-L. (2008): Redécouverte de la leucorrhine à large queue (*Leucorrhinia caudalis*) dans le bassin du Drugeon. *l'Azuré* 7: 6. (in French) [9 juin 2006, commune de Frasne, Franche-Comté, France] Address: Lambert, J.-L., Office national de l'eau et des milieux aquatiques (Onema), Service Départemental de la Marne, France. E-mail: jean-luc.lambert18@wanadoo.fr

9044. Leipelt, K.G.; Schiel, F.J. (2008): Neufunde des Zweiflecks (*Epithea bimaculata*) am nördlichen Oberrhein und im angrenzenden Kraichgau (Baden). *mercuriale* 8: 27-35. (in German) [Records of *E. bimaculata* at 14 water bodies situated in Baden-Württemberg, Germany are documented in detail.] Address: Leipelt, K.G., Kriegsstraße 184, 76133 Karlsruhe, Germany. E-mail: klausguidoleipelt@gmx.de

9045. Martin, P. (2008): Wassermilben (Hydrachnidia, Acari) und Insekten. Ein Überblick über eine selten betrachtete Beziehung. *Entomologie heute* 20: 45-75. (in German, with English summary) [Parasite-host associations between insects and water mites are introduced with many details. Odonata are referred to at several occasions.] Address: Martin, P., Christian-Albrechts-Universität zu Kiel, Zoologisches Institut, Abt. Ökologie der Tiere, Olshausenstr. 40, 24098 Kiel, Germany. E-mail: pmartin@zoologie.uni-kiel.de

9046. Roland, H.-J. (2008): Zum Vorkommen der Helm-Azurjungfer *Coenagrion mercuriale* im Wetterau-

kreis 2007. Libellen in Hessen 1: 56-58. (in German) [Six habitats of *C. mercuriale* studied in 2007 in Landkreis Wetterau, Hessen, Germany are briefly documented.] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

9047. Rychła, A. (2008): New records of Keeled Skimmer *Orthetrum coerulescens* (Fabricius, 1798) from western Poland (Odonata: Libellulidae). *Odonatrix* 4(1): 19-20. ["*O. coerulescens* is a rare dragonfly in Poland and the data of its distribution is still insufficient (DD category in the Red List of Poland). In 2007, adults of this species were observed at two sites in the Lubuskie district (western Poland). In a meadow at a small ditch near Wicina (UTM: WT03) two females were recorded. At Lake Głębokie near Proszów (VT83) a single male was observed." (Author)] Address: Rychła, Anna, ul. Osiedlowa 12, Ploty, PO-66-016 Czerwiensk, Poland. E-Mail: rychlan@op.pl

9048. Shcherbakov, D.E. (2008): Madygen, Triassic Lagerstätte number one, before and after Sharov. *Alavesia* 2: 113-124. (in English) ["The insect fauna of the world's richest Triassic fossil locality, Madygen (Ladinian–Carnian of Kyrgyzstan) is reviewed; other groups of animals and plants recorded from the locality are also listed. The research history, fossil preservation and paleoenvironment of the Madygen Formation are briefly discussed. The site was discovered in 1933, and the better part of fossils was collected from the outcrop richest in insects, Dzhayloucho, during five expeditions headed by Alexander Sharov, who discovered there and described two peculiar gliding reptiles that made Madygen worldwide known. The entomofauna includes 20 orders (including the earliest Hymenoptera and early Diptera) and nearly 100 families. The insect assemblage is numerically dominated by Coleoptera, Blattodea, and Auchenorrhyncha. In Dzhayloucho, subdominants are Mecoptera, Orthoptera, and Protorthoptera. The largest insects belong to Titanoptera, the order established by Sharov and the most diverse in Madygen. Amphibiotic insects are rare and represented almost exclusively by adults. In some outcrops phyllopod *Kazacharthra* are common. The paleoenvironment may be reconstructed as an intermontane river valley in seasonally arid climate, with mineralized oxbow lakes and ephemeral ponds on the floodplain. ... Turning to the entirely amphibiotic orders, we find the Odonata the most abundant (about 100 specimens, all adults), and nearly as diverse in Madygen (10 families with 30 species) as in the Jurassic of Karatau or Solnhofen. This rich fauna is dominated by stalk-winged forms analogous to modern damselflies, and appears more archaic than those of Ipswich or Molteno (Pritykina 1981). Most groups are Triassic endemics: *Triadophlebiidae* (1/3), *Paurophlebiidae* (5/11), *Zygophlebiidae* (4/4), *Mitophlebiidae* (1/1), *Xamenophlebiidae* (1/1), *Batkeniidae* (1/1). Other families either are Permian relicts as the *Triadotypidae* s.l. (1/1) and *Kennedyidae* (1/2), or survived into the Jurassic as the *Protomyrmeleontidae* (2/4) and *Triassolestidae* (2/2)."] (Author)] Address: Shcherbakov, D.E., Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya 123, Moscow 117647, Russia. E-mail: dshh@narod.ru

9049. Steinmann, P. (2008): Makrozoobenthos und aquatische Neozoen im Greifensee und Pfäffikersee 2008. Untersuchung im Auftrag der Baudirektion des Kantons Zürich, AWEL Amt für Abfall, Wasser, Energie

und Luft: 28 pp. (in German) [Two lakes in the Kanton Zürich, Switzerland were surveyed in 2006 and 2007 for their macrozoobenthos with special reference to neozoon. 6 Odonata species including *Erythromma najas*, *Onychogomphus uncatatus* and *Gomphus pulchellus* were recorded. Thanks to the author of the study, the voucher species could be restudied by H. Wildermuth. *O. uncatatus* has to be replaced by *O. forcipatus* and *E. najas* by *Enallagma cyathigerum*. To download the study see: <http://www.gewaesserqualitaet.zh.ch/inter-net/bd/awel/gg/gg/de/doku/dokuseen.SubContainerList.SubContainer1.ContentContainerList.0047.Download-File.pdf?CFCcK=1273943659299>

9050. Tończyk, G.; Stankiewicz, M. (2008): Dragonflies (Odonata) of the Łódź Hills Landscape Park. *Odonatrix* 4(1): 1-11. (in Polish, with English summary) ["In the studies encompassing the years 1994-2006 (mainly 2004 and 2005) in the area of the Łódź Hills Landscape Park, 40 dragonfly species were recorded. Fauna of this area consists of eurytopic forms, rare and endangered species on the national and regional scale are not numerous. The most valuable species of the park area are: *Lestes barbarus*, *Ischnura pumilio*, *Coenagrion lunulatum*, *Erythromma viridulum*, *Aeshna affinis*, *Anax parthenope* and *Libellula fulva*. The studies covered 4 types of habitats: running waters, fish ponds, small temporary water bodies, water bodies on peat bogs. The most valuable habitats were small pools inhabited by the strong populations of *Lestes barbarus* and *Leucorrhinia pectoralis* as well as fish ponds in which some rare typical of middle Poland species were found." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

9051. Tończyk, G. (2008): Klaas-Douwe B. Dijkstra (ed.). Illustrated by Richard Lewington. 2006. Field Guide to the Dragonflies of Britain and Europe. British Wildlife Publishing, Gillingham, 320 pp., ISBN 0-953-1399-4-8 (paperback), ISBN 0-953-1399-5-6 (hardback), price: Engl. Pound 21,9. *Odonatrix* 4(1): 30-32. (in Polish, with English summary) [Extensive book review.] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

9052. Torralba Burrial, A.; Ocharan, F.J. (2008): Odonata de la red fluvial de la provincia de Teruel (España). *Boletín de la S.E.A.* 42(1): 325-335. (in Spanish, with English summary) ["Data of 33 Odonata species present in Teruel's fluvial network are given. *Chalcolestes viridis*, *Lestes sponsa* and *Sympetrum sinaiticum* are recorded for the first time from the province, and a further five species are recorded of which there were no records since the beginning of the 20th century (*Aeshna mixta*, *A. cyanea*, *Gomphus simillimus*, *Onychogomphus uncatatus* and *S. striolatum*). *Calopteryx haemorrhoidalis*, *Platycnemis latipes*, *C. xanthostoma*, *Boyeria irene*, *Coenagrion mercuriale*, *Cordulegaster boltonii* and *C. caerulescens* are the most common dragonflies in this fluvial network. Records of the last one and *C. mercuriale* are particularly interesting." (Authors)] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

9053. Torralba Burrial, A.; Ocharan, F.J. (2008): Odonata del Somontano de Barbastro (Huesca, España). Boletín de la S.E.A. 42(1): 267-270. (in Spanish, with English summary) ["Faunistic data of 27 Odonata species from Somontano de Barbastro are reported. These data include records of scarcely recorded dragonflies like *Onychogomphus costae* and *Sympetrum meridionale*, which complete their development in the area." (Author)] Address: Torralba Burrial, A., Depto de Biol. de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

9054. Vieira, V. (2008): First record of *Sympetrum fonscolombii* (Selys, 1840) (Odonata: Libellulidae) for the Sal Island, Cape Verde. Boletín de la S.E.A. 42(1): 376. (in English) [*S. fonscolombii* is recorded for first time from Sal island of the Cape Verde archipelago. *Crocothemis erythraea* is recorded too.] Address: Vieira, V., Universidade dos Açores, Depto de Biol., CIRN, Rua da Mãe de Deus, PT - 9501-801 Ponta Delgada, Açores, Portugal. E-mail: vvieira@notes.uac.pt

9055. Zimmermann, P. (2008): Prädation zwischen Heupferd (*Tettigonia viridissima*) und Feuerlibelle (*Crocothemis erythraea*). *mercuriale* 8: 49-50. (in German) [29-06-2008, near Karlsruhe, Baden-Württemberg, Germany; documentation of the predation of *C. erythraea* by the orthopteroid *T. viridissima*.] Address: Zimmermann, P., Regierungspräsidium Karlsruhe, Referat Naturschutz und Landschaftspflege, 76247 Karlsruhe, Germany. E-mail: peter.zimmermann@rpk.bwl.de

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9056. Abbott, J.C. (2009): Odonata (Dragonflies and Damselflies). In: Gene E. Likens (Ed.): *Encyclopedia of Inland Waters*. Elsevier Ltd. ISBN: 978-0-12-370626-3: 394-404. (in English) ["Odonata [...] inspire a wide range of emotions ranging from fear to admiration. They are a beneficial group of insects whose primary prey items, as both larvae and adults, include biting flies such as mosquitoes (Culicidae), black flies (Simuliidae), and horse and deer flies (Tabanidae). They also represent important components in the food webs of freshwater systems. Odonata are paleopterous, exopterygote insects whose closest relatives are the Ephemeroptera. The larvae are longer-lived than the adults and have evolved numerous adaptations to the freshwater aquatic environment resulting in pronounced differences in form across taxonomic groups. The adults occupy a conspicuous presence in the air, especially around ponds. The group is largely found in warmer areas, with over 75% of its species occurring in tropical regions. Some species, such as *Anax junius*, are known to migrate and are capable of travelling from Canada to Veracruz, Mexico, though our understanding of exactly what triggers these events, when they occur, and which members in the population are migrating, still remains a mystery." (Author) The article gives information on: Paleontology, Systematics, Characterization and Morphology, Biology, Life Cycle and Metamorphosis, Egg stage, Larval stage, Larval Habitats, Emergence, Dispersal and Maturation, Recognition and Courtship, Mating, Mate Guarding Behaviour, Thermoregulation, Conservation, Further Reading, Glossary.] Address: Abbott, J.C., University of Texas at Austin, Austin, TX, USA

9057. Abbott, J.C. (Ed.) (2009): *Dragonflies and Damselflies (Odonata) of Texas*. Vol. 3. ISBN 978-0-6151-9494-3: 315 pp. (in English) [The book is a reference to the 224 species of odonates distributed in Texas, USA. Included in Volume 3 are updated and detailed species distribution and seasonality accounts arranged so that users can search by scientific name, county name, or flight season. A variety of articles are also included on the natural history, collection and preservation, and diversity of Texas odonates. Articles. Odonata of the Lower Rio Grande Valley: 2007 Summary, J.S. Rose; Dragonflies and Damselflies of Wright Patman Lake, M. Dillon; The Odonata of Kerr County and the Guadalupe River System of Texas, T. Gallucci; The Odonata of Real County and the Frio-Nueces River System of Texas, T. Gallucci; Statistical Summary of Odonata in Texas; Abundance & Distribution of Texas Odonata, J.C. Abbott; Diversity of Texas Odonata by County; Checklist of Dragonflies & Damselflies of Texas, J.C. Abbott; Seasonality of Odonata in Texas, J.C. Abbott; Dragonflies & Damselflies of Texas Listed by County; Distribution Maps of Texas Odonata; Appendix: Collection Guidelines for the Odonata Survey of Texas, J.C. Abbott; The Dragonfly Society of the Americas Guidelines for Collecting; Specific Collecting & Preservation Instructions, J.C. Abbott; Guidelines for Field Notes & Data Recording, J.C. Abbott; Odonata Field Guides, Resources, Societies, & Suppliers; Glossary of Terms Relating to Odonata, J.C. Abbott; Index to Maps] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

9058. Anonymus; Bernard, R. (2009): 6th Polish Symposium of Odonatology of the Polish Entomological Society "Polish odonatology in the past, present time and future", Poznan and environs, October 23-25, 2009. First announcement. *Odonatrix* 5(1): 16-17. (in Polish, with English summary) [Announcement: "6th Polish Odonatological Symposium will be focused on the first book on the dragonflies of Poland, "Atlas of the distribution of dragonflies in Poland". The Atlas is scheduled to be published in September 2009. This is an opportunity to sum up past and present achievements of Polish odonatology and the conservation status of the Polish odonate fauna. Workshops, informal discussions and presentations, and a field trip are also planned. If you are interested in the participation, please, contact Dr. Rafal Bernard (Adam Mickiewicz University in Poznań, Department of General Zoology, Umultowska 89, PO-61-614 Poznań, e-mail: rbernard@amu.edu.pl) (Author)] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz Univ., Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

9059. Ballesteros, T.M.; Torres-Mejia, M.; Ramírez-Pinilla, M.P. (2009): How does diet influence the reproductive seasonality of tropical freshwater fish? A case study of a characin in a tropical mountain river. *Neotropical Ichthyology* 7(4): 693-700. (in English, with Portuguese summary) ["Seasonal breeding of tropical freshwater fish may be synchronized with periods of high food consumption. We explored this hypothesis by studying the relationship between diet and reproductive activity of *Creagrutus guanes* (Teleostei, Characidae). Our results showed that *C. guanes* had a generalist and omnivorous diet dominated by aquatic insects (mainly Diptera larvae) and seeds. *Creagrutus guanes* did not show intersexual or ontogenetic variation in diet. Peaks

of feeding activity during rainy months were not synchronized with breeding in dry months. Our results do not support the hypothesis that the reproductive season has to be synchronized with high food consumption. We discussed the hypothesis fat reserves may be an important factor for the desynchronization of peaks of feeding and reproduction as explanation of seasonal breeding of this species." (Authors) The 'Index of Relative Importance' for Odonata as diet is very low.] Address: Ballesteros, Tania M., Laboratorio de Biología Reproductiva de Vertebrados, Universidad Industrial de Santander, A.A. 678, Bucaramanga, Colombia. E-mail: marceballesteros10@gmail.com

9060. Benazzouz, B.; Mouna, M.; Amezian, M.; Bensusan, K.; Perez, C.; Cortes, J. (2009): Assessment and conservation of the dragonflies and damselflies (Insecta: Odonata) at the marshes of Smir. Bulletin de l'Institut Scientifique, Rabat, section Sciences de la Vie 31(2): 79-84. (in English, with French summary) ["Wetlands are characterized by their high biodiversity. However, these habitats are very vulnerable and are often altered by human activity, which often includes drainage. Many wetlands have disappeared and this trend will continue until ecological awareness increases. The Smir marshes are presently targeted by the tourism industry. Knowledge of the Odonata of the marshes is important because these insects are useful indicators of habitat quality. Therefore, an inventory of Odonata living in the Smir marshes was carried out over thirteen months, demonstrating the importance of this area in terms of biodiversity. The status of the species collected is examined in order to promote the protection of the marshes and their living organisms. The biogeography of these insects is also considered so as to assess their origin." (Authors) With the exception of *Sympecma fusca*, *Anaciaeschna isosceles*, and *Aeshna mixta*, the odonate species recorded are widely distributed in northern Africa. The following species are listed: *Ischnura graellsii*, *Sympecma fusca*, *A. mixta*, *A. isosceles*, *Anax ephippiger*, *A. imperator*, *A. parthenope*, *Crocothemis erythraea*, *Diplacodes lefebvrei*, *Orthetrum chrysostigma*, *O. cancellatum*, *O. trinacria*, *Sympetrum striolatum*, *S. fonscolombii*, *S. meridionale*] Address: Benazzouz, B., Université Ibn Tofail, Faculté des Sciences, Laboratoire Génétique & Physiologie Neuroendocrinienne, B.P.133, 14000-Kénitra, Maroc. E-mail: bbenazzouz@yahoo.fr

9061. Bhattarai, S.; Chaudhary, R.P.; Taylor, R.S.L. (2009): Ethno-medicinal plants used by the people of Nawalparasi District, Central Nepal. Our Nature 7: 82-99. (in English) ["Despite new advances in modern medicine, the cultural use of plant in traditional medicine continues from ancient time to this day all over the world. The present research seeks to explore ethnomedicinal plants used by the local people of Nawalparasi district for primary healthcare. Local healers were interviewed regarding the detail uses of plants. When convenient a jungle or forest walk was also conducted, accompanying local healers for plant collection and detailed information gathering. A rich and unique diversity of 94 ethnomedicinal plant species belonging to 49 families under 86 genera were documented. In Nawalparasi, the expense of modern medical treatment combined with the poor economic status of indigenous people and a strong belief in the traditional medicine and traditional medical practitioners are the main reasons for the persistence of the traditional healing sys-

tem. In addition, we have also documented a lack of continuation and flow of indigenous knowledge from the elders to the younger generation. Youth tend to be attracted by the wave of modernization and do not appreciate the importance of conservation of traditional knowledge. The use of plants in Nawalparasi is an old tradition and the exploration of such unique cultures should be completed thoroughly so that the oral traditions are not lost forever. Immediate conservation and management approaches of valuable medicinal plants with the involvement of local indigenous people of Nawalparasi district will encourage the sustainable conservation of both biological and cultural diversity. ... 69. *Plumeria rubra* L. (Apocynaceae), V 2586. 'Galaini' (N). (b) About 100 g stem bark is mixed with 100 g of jag-gery and approximately 100 g of dead dragonflies and cooked. This is then taken twice a day to try to prevent rabies infection after someone is bitten by a mad dog. It is taken until the patient recovers, which the healers stated does happen." (Authors)] Address: Bhattarai, S., Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu, Nepal

9062. Boroń, M.; Mirosławski, J. (2009): Using insects (damselflies: *Azur damselfly* - *Coenagrion puella*) as biomarkers of environmental pollution. Fresenius environmental bulletin 18(7a): 1219-1225 [Czech Republik, Poland; "The phenomenon of bioaccumulation in damselflies was used to assess the metal pollution in the natural environment and indirectly but consequently, to estimate the risks for humans. *C. puella* was collected in polluted regions of Silesia and the control site – Wigry National Park. Flame atomic absorption spectrophotometer was used to estimate the concentration of chosen heavy metals: Cd, Cr, Cu, Fe, Mn, Ni, Pb, and Zn. The analysis indicated a general correlation between metal concentration in damselflies and in chosen elements of environment. It has been stated that azure damselflies can be used as biomarkers of environmental pollution for iron, lead and zinc, also manganese and nickel to an average degree. However, there is an insignificant correlation in case of cadmium and copper. Chromium was not present in the samples." (Authors)] Address: Boroń, Marta, School of Labour Safety Management in Katowice, Department of Environmental Engineering and Hygiene of Work, Bankowa Street 8, 40-007 Katowice, Poland. E-mail: marta.boron@wp.pl

9063. Bowman, N. (2009): Reports from Costal Stations - 2008: Eccles-on-Sea, Norfolk. *Atropos* 36: 56. (in English) [UK; *Erythromma viridulum*, *Sympetrum sanguineum*] Address: not stated

9064. Brockhaus, T.; Meng, S.; Müller, O. (2009): Fossile Libellenlarven aus den interglazialen Seesedimenten von Neumark-Nord (Odonata: Coenagrionidae, Libellulidae). *Libellula* 28(1/2): 49-58. (in German, with English summary) ["Two fossil Odonata larvae from the Upper Pleistocene fossil deposit 'Neumark-Nord', Saxony-Anhalt, Germany, are described. They comprise one larva of *Erythromma najas* and a libellulid larva. Owing to a lack of diagnostic characteristics, it is not possible to assign the latter clearly to a species. As a result of the most recent investigations, this fossil deposit has been classified as Eemian Interglacial." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

9065. Buczyński, P.; Karasek, T.; Kowalak, E.; Kowalak, J.; Oder, T. (2009): Contribution to the knowledge of dragonflies (Odonata) of the Roztocze Upland. *Odonatrix* 5(1): 1-6. (in Polish, with English summary) ["The paper presents the results of studies conducted in Roztocze Upland (SE Poland) during the camp of Student Scientific Circle of Biologists of Maria Curie-Skłodowska University in July 2008. At 27 study sites, of which 13 were situated in the Roztoczanski National Park, 37 dragonfly species were found (51% of the national fauna). The most interesting were: *Sympecma paedisca*, *Nehalennia speciosa*, *Gomphus vulgatissimus* and *Ophiogomphus cecilia*. 9 species have been recorded for the first time from the Roztoczanski National Park, which elongated the list of well-known species to the number of 47. The study site of *Nehalennia speciosa* (Borowina near Józefów, *Caricetum lasiocarpae* on the edges of the water body between dunes) has been known for over 10 years. New data confirms the subsistence of the population and even the decrease in numbers: at least >1.000 specimens, juvenile imagines and development behaviour were observed. At the same time, the disappearance of the other population of *N. speciosa* was found - on a transitional peat-bog near the village Hamernia (last data from 2002). Perhaps the same refers to the population of *Somatochlora arctica* on a transitional peat-bog near the village Tarnowola (last data from 2003). Other examples of vanishing of peat-bog species on Roztocze due to drying out of habitats are also given. Perhaps we are witnessing the start of regress of this ecologic group which has not been endangered up till now. Data about Gomphidae has been analyzed by their rarity in the discussed region which is surprising for Roztocze is rich in rivers with suitable habitat structure and satisfactory water quality. The authors give two possible explanations responsible for these conditions: forest basin of the rivers (which results in shading and low pH among others) as well as strong fish stocking of Roztocze rivers by trout by Polish Angling Association." (authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

9066. Buczyński, P.; Bernard, R.; Pietrzak, L. (2009): Dragonflies (Odonata) of selected dystrophic water bodies in the vicinity of Złocieniec (north-western Poland). *Chrońmy Przyrodę Ojczystą* 65(5): 353-364. (in Polish, with English summary) ["Studies of the odonate fauna (mostly larvae and exuviae, additionally imagines) were carried out between 1999 and 2001 at 3 localities in the environs of Złocieniec ("Czarnówek" No. 1, "Gronowo" No. 2, "Krosino" No. 3). All the water bodies represent acidic habitats typical of the Pomeranian Lake Districts (NW Poland): an oligohumic, very poor in nutrients, and extremely clearwater pool surrounded by a broad Sphagnum bog (No. 3); a mesohumic lake and small pools situated in a Sphagnum bog channel (No. 1a – pools, 1b – lake); a polyhumic, kettle lake with brownish water, bounded only with a few-metre-wide Sphagnum zone (No. 2). 27 species were recorded, i.e. 37% of the odonate fauna of Poland. Most of them were autochthonous, several – probably autochthonous, and one certainly allochthonous species. Number of species was the poorest in small, less diversified pools "hanging" in Sphagnum mats, and (among greater water bodies) in oligohumic, crystal lake No. 3. Species composition was mostly typical of the habitats, predominated by tyrphobiontic (*Leucorrhinia dubia*, *Aeshna sub-*

arctica elisabethae) and tyrphophilic (e.g. *L. rubicunda*, *L. albifrons*, *Lestes virens*, *Coenagrion hastulatum*, *Nehalennia speciosa*) species. This was confirmed by high values of the Biocenosis Natality Index (especially in its quantitative aspect). In this context, the occurrence of *Erythromma viridulum* (with reproductive behaviour) was rather surprising. It suggests its misidentification of the microhabitat – an occupied specific patch of floating Sphagnum at locality No. 1 was physiologically very similar to favourable *Ceratophyllum demersum*. The autochthonous large population of *Lestes viridis* at locality No. 1 and a regular occurrence of *Coenagrion lunulatum* were also noteworthy. However, the large population of *N. speciosa* (critical species in Europe, EN in the Polish Red list, NT in the Global Red list) in *Carex limosa* belt at locality No. 2 was certainly the most valuable element, qualifying this site for legal protection with the use of a buffer protection zone." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

9067. Buczyński, P. (2009): Red list of dragonflies (Odonata) of the Lublin Region (Eastern Poland). Second edition: 2009. *Odonatrix* 5(1): 25-29. (in Polish, with English summary) ["The author presents the new red list of dragonflies of the Lublin Region, 10 years after publishing the previous edition (Buczyński 1999). The list includes 10 species: 4 species of high risk categories (VU-CR) and 6 of low risk categories (LC, NT). The most endangered are: *Coenagrion ornatum* (CR), *Cordulegaster boltonii* (CR), *Coenagrion armatum* (EN) and *Nehalennia speciosa* (EN). The scale of threats of dragonflies of the Lublin Region is smaller than in the whole Poland (Bernard et al. 2002) or in the Łódź Region (central Poland) (Tończyk, Szymański 2006). Seriously endangered are the faunas of small running waters and Sphagnum peat bogs. For the protection of dragonflies in Poland, particularly important are populations of *Coenagrion armatum* (9 in total) as well as one of 3-4 populations of *C. ornatum* known nowadays in the country which is large and stable." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

9068. Canobbio, S.; Mezzanotte, V.; Sanfilippo, U.; Benvenuto, F. (2009): Effect of multiple stressors on water quality and macroinvertebrate assemblages in an effluent-dominated stream. *Water Air Soil Pollution* 198: 359-371. (in English) ["Lura stream flows in the populated and industrialized conurbation North of Milan, Italy. The area suffers a sprawling urbanization which is leading to major alterations in water quality, hydrology and morphology of streams. These water bodies are known as effluent-dominated streams, because most of the baseflow is given by Wastewater Treatment Plant (WWTP) discharges. In this paper, a 5 year long assessment of Lura stream is presented and the collected data is discussed to understand overall ecological quality. Multivariate analysis carried out on macroinvertebrate assemblages and environmental variables suggests that invertebrate communities suffer severe alteration both upstream and downstream WWTP discharges. Results indicate that the high polluting loads coming from WWTP discharges affect seriously the stream water quality, but the most important cause of impairment are pulse perturbations related to the modified hydrology, causing droughts and flash floods, and to the spills

of untreated sewage from overflows during rain events." (Authors) *Onychogomphus* sp., *Crocothemis* sp. and *Orthetrum* sp. are listed from the Lura stream.] Address: Canobbio, S., Dipartimento di Scienze dell'Ambiente e del Territorio, Università degli Studi di Milano-Bicocca, Piazza della Scienza 1, 20126 Milan, Italy. E-mail: sergio.canobbio@unimib.it

9069. Carvalho, A.L.; Pinto, A.P.; Ferreira-Jr., N. (2009): *Castoraeschna corbeti* sp. nov. from Floresta Nacional de Carajás, Pará state, Brazil (Odonata: Aeshnidae). *International Journal of Odonatology* 12(2): 337-346. (in English) ["*Castoraeschna corbeti* sp. nov. is described and diagnosed based on four males (holotype: Brazil, Para State, Floresta Nacional de Carajas [6°06'13.9"S, 50°08'13.1"W, ca 600 m a.s.l.], 28 ix 2007 to be deposited in Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro). This species is similar to *C. longfieldae* and *C. coronata* but can be distinguished mainly by the absence of medio-dorsal spots on S8; postero-dorsal spots on S8-9 very narrow; cerci external margin almost straight in lateral view, without a distinct angulation between stem and base of lamina; cerci apex blunt. The probable ultimate stadium larva is described based on two individuals, male and female, collected at the type locality. Adults were observed flying along margins of a small shaded second-order stream where the larvae were taken. The surrounding forest is under impact of iron ore extraction and will probably disappear in the next years." (Author)] Address: Carvalho, A.L., Depto de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

9070. Casatti, L.; Veronezi Júnior, J.L.; de Paula Ferreira, C. (2009): Diet of the armored catfish *Aspidoras fuscoguttatus* (Ostariophysi, Callichthyidae) in streams with different limnological and structural features. *Biota Neotropica* 9(1): 113-121. (in Portuguese, with English summary) [Odonata: Percent composition by number (CP: 1,6), frequency of occurrence (FO: 4,9), and dominance (D: 0) of the feeding items registered in the stomach contents of *Aspidoras fuscoguttatus* (246 specimens) from 18 streams in the São Paulo State northwestern region, upper Rio Paraná system, São Paulo State, Brazil.] Address: Casatti, Lilian, Laboratório de Ictiologia, Depto de Zoologia e Botânica, IBILCE, Universidade Estadual Paulista – UNESP, Rua Cristóvão Colombo, 2265, Jardim Nazareth, CEP 15054-000, São José do Rio Preto, SP, Brasil. E-mail: Lilian Casatti, e-mail: lcasatti@ibilce.unesp.br

9071. Chasle, J.-P. (2009): Inventaire des Odonates du Baugeois de 2002 à 2005 (département du Maine-et-Loire). *Martinia* 25(1): 29-39. (in French, with English summary) [An inventory of Odonata carried out from May to September between 2002 and 2005, resulted in 38 species. These are checklisted, classified to habitat types, and briefly discussed.] Address: Chasle, J.-P., Association pour la promotion, l'étude et la protection des écosystèmes aquatiques (APEPEA) de la Bretagne et des Pays de la Loire, 9 rue du Gué de l'Arche, F-49150 Fougère, France

9072. Chovet, M.; Pratz, J.-L.; Lett, J.-M. (2009): Un Odonate nouveau pour le département du Cher et la région Centre: *Cordulegaster bidentata* Selys, 1843 (Anisoptera: Cordulegastriidae). *Martinia* 25(4): 165-171. (in French, with English summary) [30-V-2007,

north of Cher department, in Fort land which is a hill territory separated from Massif Central mountains.] Address: Chovet, M., 97 B, rue Vieille Levée F-45100 Orléans, France

9073. Costa, J.M.; Santos, T.C.; de Souza, L.O.I. (2009): *Cyanallagma corbeti* sp. nov. from Brazil (Odonata: Coenagrionidae). *International Journal of Odonatology* 12(2): 232-329. (in English) ["The new species *Cyanallagma corbeti* (holotype male: Brazil, Rio Grande do Sul State, Rio do Pinto river, km 93 of road RS-453 between Sao Francisco de Paula and Rio Tainha, 29°30'70"S, 50°51'70"W, 900 m, 09 xi 1967, leg. N.D. Santos); deposited in the Museu Nacional (UFRJ), Rio de Janeiro, Brazil is described, illustrated, and compared with the other species of the genus. A justification for the placement of this new species in *Cyanallagma* is presented, and males of known species of the genus are keyed." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

9074. Couroy, Y.; Duquet, M. (2009): Quatre nouvelles espèces d'Odonates pour la faune de Guyane française. *Martinia* 25(4): 140-144. (in French, with English summary) [*Aphylla producta*, *Aeschnosoma elegans*, and *Orthemis anthracina* - collected from French Guyana during a field study in December 2007, near Sinnamary and Roura - are new to the fauna of this French overseas department. *Perilestes* sp. indet., with well characterized anal appendages, is probably new to science. This species is closely related to *P. attenuatus* Bates in Selys, 1886.] Address: Couroy, Y., 271 rue de l'Armée de l'Est, 70110 Villersexel, France

9075. Daraž, B. (2009): New data on dragonflies (Odonata) of northeasternmost Bulgaria. *Odonatrix* 5(2): 55-64. (in Polish, with English summary) ["During the summer trip to north-eastern coasts of Bulgaria, the fauna of dragonflies was studied at 12 study sites between the 2nd and 12th of July 2008. The studies covered the area between the Romanian border and the River Kamchia, mostly within the villages of Shabla, Kavarna, Balchik and Dobrich. In the northern part, temporary running waters prevail. Thus, studies were concentrated in a narrow zone along the coasts of the Black Sea where permanent waters occur, both running and standing. In the southern part of the studied area the network of permanent flowing waters is more dense and present in the depth of the land. 24 dragonfly species, have been recorded in the studied area, which comprises 35% of 68 species known in Bulgaria. The most interesting were the records of: *Cordulegaster insignis*, *Cordulegaster picta* and *Lestes macrostigma*, moreover, *Caliaeschna microstigma* is also worth mentioning. *C. insignis* has been known from 13 published localities and a few unpublished records found recently. Its occurrence is practically restricted to the eastern part of the country and a few sites situated along the Danube River. Two new study sites partly covered a gap in the north-eastern part of the country. This suggests a wider and more continuous occurrence of the species range in eastern Bulgaria. The range of *C. picta* in Bulgaria encompasses a narrow belt along the coast of the Black Sea. Four new study sites found by the author have a bit extended this belt in its northern part, in the basin of the River Batova. These study sites are presently the northernmost known localities in the

whole range of the species. *C. picta* has been found in general in small fast-flowing streams with a stony bottom, totally or to a large degree shaded by trees. Numerous patrolling males have been observed (often in a high density), as well as females ovipositing in shallow sandy areas along the stream banks. Larvae were found among stones while exuviae - among roots and dry vegetation near banks. Four study sites of *L. macrostigma* have been recorded so far from Bulgaria. The 5th site, given in this paper, was known previously from 2006, however, it was not published. This study site has a similar coastal situation to three study sites adjacent to the Burgas Gulf. However, it is located much more to the north. Very numerous local population, estimated to over 10000 of specimens, results from optimal habitat conditions: the low depth and high temperature of brackish water, and the abundant occurrence of *Bolboschoenus maritimus* and *Scirpus* sp. swamps. *C. microstigma* was recorded in Bulgaria in the southern, central and eastern part of the country. In the east, it was known from the coasts of the Black Sea to Kavarna. The author's studies provided 6 sites of this species, one of them was situated 25 km to the north-east of Kavarna. The last record is presently northernmost locality of *C. microstigma* in the eastern Balkans. Two recorded species - *L. macrostigma* and *C. ornatum* belong to critical species in Europe. Four species were proposed to the Bulgarian Red List of dragonflies: *C. insignis* (CR), *L. macrostigma* (CR), *C. microstigma* (VU), *C. picta* (VU). New records combined with the literature data seem to show that the species mentioned above are not threatened in Bulgaria to such degree." (Author)] Address: Daraż, B., ul. Kościelna 41, 35-505 Rzeszów; Poland. E-mail: bdaraz@poczta.onet.pl

9076. Delasalle, J.-F. (2009): Contribution à la connaissance d'un Zygoptère récemment décrit de Guyane française: *Neoneura angelensis* Juillerat, 2007 (Odonata: Zygoptera: Protoneuridae). *Martinia* 25(4): 149-152. (in French, with English summary) [The paper presents new observations of *N. angelensis* in French Guyana with a description of the biotope and the observation of the reproduction of that Protoneuridae.] Address: Delasalle, J.-F., Domaine de Chantraigne 30 rue Jules Lardière BP 70225 F-80800 Corbie, France. E-mail: jf.delasalle@aliceadsl.fr

9077. Dolata, P.T.; Stawicki, A.; Żuk, T. (2009): New records of the Scarlet Dragonfly *Crocothemis erythraea* (Brullé, 1832) in the South Wielkopolska region (SW Poland) and some remarks about its detecting and the participation of amateurs in odonatology. *Odonatrix* 5 (1): 13-16. (in Polish, with English summary) ["Two new localities (within 35 km) of the Scarlet Dragonfly were recorded on the clay pits in the South Wielkopolska region: 1) Odolanów (Ostrów Wielkopolski district, 51°35' N, 17°39' E, UTM: XT81): one male on 28th May 2007; 2) Kotlin (Jarocin district, 51°54' N, 17°40' E, UTM: XT85): one male on 23rd June 2007. Those records were made 4-48 km from localities detected by Zurawlew (2009) in Pleszew district (Fig. 1) and support his opinion about high importance of clay pits for this species. Both records came from Kartoteka Przyrodnicza Południowej Wielkopolski (Nature Database of the South Wielkopolska), the "citizen science" scheme, led by local group of the Polish Society for the Protection of Birds. The wider co-operation of the odonatologists with such groups and schemes is proposed in the article." (Authors)] Address: Żuk, T., Południowewiel-

kopolska Grupa OTOPI, ul. Wrocławska 60 A/7, 63-400 Ostrów Wielkopolski, Poland. E-mail: tomasz.zuk@post.pl

9078. Dommange, J.L.; Guilmet, M. (2009): Odonates nouveaux pour le département de l'Aveyron. *Martinia* 25(3): 102. (in French) [France; *Sympetrum meridionale*, VII-2009, le Rougier de Camarès (commune de Montlaur) & lac du causse de Villeneuve (commune de Martiel); *Somatochlora arctica*, V-2009, commune de Laguiole, Aubrac. La découverte d'exuvies et d'individus émergents (24 et 30 mai 2009); *Calopteryx haemorrhoidalis*, 2005 and 2006, Dourdou de Camarès (commune de Montlaur) & 2008, Lot (communes de Balaguier-d'Olt).] Address: Guilmet, Martine, 51, cité Cardaillac, F-12000 Rodez, France

9079. Doucet, G. (2009): Suivi de l'émergence d'*Oxygastra curtisii* (Dale, 1834) et de *Gomphus graslinii* Rambur, 1842 sur un étang du centre de la Dordogne (Odonata: Anisoptera: Corduliidae, Gomphidae). *Martinia* 25(4): 157-164. (in French, with English summary) ["Following the discovery of *O. curtisii* and *G. graslinii* exuviae in a pond located in the center of Dordogne department, France during early June 2008, the author decided to study the emergence of both species in order to increase the knowledge of their phenology and abundance in this particular breeding biotope. Exuviae collection highlighted not only that both species had great population size but also that several other species which are encountered in this pond are rather relevant of running waters."] Address: Doucet, G., 74 me de la Colonie, F-75 013 Paris, France. E-mail: guillaume.doucet@yahoo.fr

9080. Dufour, C. (2009): Nouvelle preuve de reproduction d'*Onychogomphus* f. *forcipatus* (Linnaeus, 1758) dans le Lac de Neuchâtel, Suisse (Odonata, Gomphidae). *Ento Helvetica* 2: 23-31. (in French, with English and German summaries) [*O. forcipatus* reproduces again in the Lake of Neuchâtel, Switzerland "along a highly artificial bank, after many decades without any observations of either larvae or exuvia. This return is probably linked to the great improvement of the quality of the water which is the result of efforts developed over more than 40 years. A particularly rapid imaginal moult is described and illustrated." (Author)] Address: Dufour, C., Muséum d'histoire naturelle, rue des Terreaux 14, CTI-2000 Neuchâtel, Switzerland. E-mail: Christophe.Dufour@unine.ch

9081. Duprez, B. (2009): Étude des exuvies d'*Aeshna cyanea* (Millier, 1764) dans une mare de ferme en Limousin (Corrèze) (Odonata, Anisoptera, Aeshnidae). *Martinia* 25(3): 129-130. (in French, with English summary) ["Based on three sampling sessions of *A. cyanea* exuviae, the author presents the corresponding chronology, sex-ratio and measurements." (Author)] Address: Duprez, B., 43 avenue Alexandre de Serbie, F-51100 Reims, France

9082. Eid, E.; Katbeh-Bader, A.; Al-Otoom, M.; Othmaii, Y. (2009): Contribution to the Entomofauna of Dibeen Forest Reserve in Jordan. *Centre for Entomological Studies Ankara - Cesa News* 49: 19-41. (in English) ["A baseline insect survey of the Dibeen Forest Reserve was conducted from 26th of March till the 5th of May, 2006. Pitfall traps, light traps and butterfly nets were used for collecting. The collected specimens were preserved in the University of Jordan Insect Museum and Dibeen Forest Reserve. A total of 122 insect spe-

cies in 11 orders and 42 families were identified. Nine of these species were recorded for the first time from Jordan. Available biological and or ecological data, distribution and relevant remarks about each species are given. Rare, common, pest species, and species that can be used in ecological studies are discussed." (Authors) Only two Odonata species - *Orthetrum chrysostigma*, *Trithemis arteriosa* - were recorded.] Address: Katbeh-Bader, A. Department of Plant Protection, Faculty of Agriculture, University of Jordan, Amman 11942, Jordan. Email: Ahmadvk@ju.edu.jo

9083. Faucheux, M.J. (2009): Sensilles antennaires de l'imago de *Brachythemis leucosticta* (Burmeister, 1839) (Odonata, Anisoptera, Libellulidae). *Martinia* 25 (1): 40-48. (in French, with English summary) ["The sensory complement of the adult antenna of *B. leucosticta* is studied using scanning electron microscopy. The scape and the pedicel bear aporous sensilla chaetica: those located at the following joints (head-scape, scape-pedicel, pedicel-flagellum) are proprioceptors which monitor the movements of these segments in relation to each other; the other sensilla chaetica are tactile mechanoreceptors. The sensillum campaniformium of the pedicel controls the movements of flagellum. The two first flagellomères possess two types of multiporous sensilla coeloconica whose hygroreceptive function is assumed, and a third type of sensillum coeloconicum with unknown function." (Author)] Address: Faucheux, M.J., Lab. d'Endocrinologie des Insectes Sociaux, Fac. Sciences et Techniques, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex

9084. Faucheux, M.J.; Meurgey, F. (2009): Les sensilles antennaires d'une larve fousseuse, *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785) (Odonata, Anisoptera, Gomphidae). *Martinia* 25(2): 85-92. (in French, with English summary) ["The flattened antenna of the burrower larva of *Ophiogomphus cecilia* bears five types or subtypes of mechanoreceptive sensilla: club-shaped sensilla, thorny sensilla chaetica, sensilla filiformia of subtypes short, long, thorny. The variety of the sensilla filiformia suggests that the reception of the vibrations is carried out subtly. The dorsal surface of antenna is covered with club-shaped sensilla whose presence is related to the burrowing behaviour of the larva; they are probably current receptors that also detect the presence and position of prey. They are described for the first time on the larval antennae of Odonata. Thorny sensilla chaetica are tactile. The proprioceptors which monitor the relative position of antennal segments in other species are not here observed." (Authors)] Address: Faucheux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Faculté des Sciences et Techniques, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex 3, France

9085. Feldwieser, G. (2009): Blutsauger auf den Flügeln der Braunen Mosaikjungfer (*Aeshna grandis*) - erster Fund der Gnitz Forcipomyia paludis (Diptera: Ceratopogonidae) auf Libellen in Baden-Württemberg, mercuriale 9: 31-32. (in German) [Bad Wurzach, Baden-Württemberg, Germany; photographic evidence of a ceratopogonid *Forcipomyia paludis* sucking on the wings of *A. grandis*.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

9086. Feldwieser, G. (2009): Neun Exuvien der Großen Königslibelle (*Anax imperator*) auf einem Halm. *mercuriale* 9: 40. (in German) [Aggregation of nine exu-

viae at the tip of *Typha latifolia*.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

9087. Feldwieser, G. (2009): Blaugrüne Mosaikjungfer (*Aeshna cyanea*) fällt ins Wasser und einem Gelbrandkäfer (Coleoptera: Dytiscidae) zum Opfer. *mercuriale* 9: 39. (in German) [Reutlingen, Baden-Württemberg, Germany; photographic documentation of an *A. cyanea* male accidentally fallen into water and caught by water tension. *Dysticus marginatus* preyed upon the dragonfly immediately, starting to devour it at the caput.] Address: Feldwieser, G., Gönningerstr. 27, D-72793 Pfullingen, Germany

9088. Franz, N.M.; Vanegas, S.Z.Y. (2009): The university of Puerto Rico at Mayagüez insect collection – then and now. *Entomological news* 120(4): 457-464. (in English) ["The origin, historical trajectory, and present status of the insect collection of the University of Puerto Rico at Mayagüez (collection coden: UPRM) are reviewed. The collection initiated in the mid 1920s and has grown relatively continuously thanks to efforts by several outstanding entomologists working at UPRM. As of 2007, the collection includes more than 130,000 objects (individual specimens, slides, or vials) pertaining to 25 hexapod orders (Odonata: 840 specimens). The numbers of collection objects per order are listed. The geographic emphasis is on Puerto Rico and surrounding islands. The auchenorrhynchos Hemiptera, Collembola, and Coleoptera are particularly well represented. The collection is in a process of reorganization and is available for specimen loans and related collaborative activities." (Authors)] Address: Franz, N.M., Dept Biol., P. O. Box 9012, Univ. of Puerto Rico, Mayagüez, Puerto Rico 00681 USA. E-mail: franz@uprm.edu

9089. Gaenzle Schilling, E.; Loftin, C.S.; Huryn, A.D. (2009): Effects of introduced fish on macroinvertebrate communities in historically fishless headwater and kettle lakes. *Biological Conservation* 142(12): 3030-3038. (in English) ["Widespread fish introductions have led to a worldwide decline in the number of fishless lakes and their associated communities. Studies assessing effects of fish stocking on native communities in historically fishless lakes have been limited to high-elevation headwater lakes stocked with non-native trout. Little is known about the effect of fish stocking in historically fishless and hydrologically isolated lowland kettle lakes. We compared the effects of introduced fish on macroinvertebrate communities in kettle lakes stocked with centrarchids, salmonids, and cyprinids, and headwater lakes stocked with brook trout (*Salvelinus fontinalis*) in Maine, USA. Fish had significant effects on macroinvertebrate community structure in both lake types, with reduced species richness and abundances of taxa characteristic of fishless lakes. The effects of introduced fish were more pronounced in headwater lakes despite a less diverse fish assemblage than in kettle lakes. We attribute this to abundant submerged vegetation providing refuge from fish predation and reduced stocking frequency in kettle lakes. We assessed effects of stocking duration on macroinvertebrates in a subset of headwater lakes with known dates of trout introduction. Species richness and abundance of most taxa declined within 3 years following trout introduction; however, richness and abundance were least in lakes with long stocking histories (40 years). Macroinvertebrates previously identified as fishless bioindicators were absent from all stocked lakes, indicating that trout rapidly eliminate these sensitive taxa. Conservation of this his-

torically undervalued ecosystem requires protecting remaining fishless lakes and recovering those that have been stocked. [...] The odonates *Aeshna eremita* and *Leucorrhinia* spp. were more abundant in fishless than stocked headwater lakes. No odonates differed in abundance or percent occurrence between stocked and fishless kettle lakes." (Authors)] Address: Gaenzle Schilling, Emily, Department of Wildlife Ecology, University of Maine, 5755 Nutting Hall, Orono, ME 04469-5755, USA. E-mail: emily.schilling@umit.maine.edu

9090. Gilard, B.; Vrignaud, S. (2009): Redécouverte de *Coenagrion ornatum* (Selys in Selys et Hagen, 1850) dans le département de l'Allier (Région Auvergne), 20 ans après une première donnée (Odonata, Zygoptera, Coenagrionidae). *Martinia* 25(3): 95-101. (in French, with English summary) ["*C. ornatum* has been rediscovered in Allier department (Auvergne Region, France) during 2005 and 2006 investigations, twenty years after its first observation in the area. Among important populations of *C. mercuriale*, those of *C. ornatum* were found in pastures. They were very localized and sensitive to overgrazing." (Authors)] Address: Gilard, B., 3, lotissement de la Croix des Frères, rue du Mont Mouchet, F-43100 Brioude, France

9091. Grand, D.; Billaud, F. (2009): Les Odonates du marais temporaire de Morlin (Communes de Montagny et de Taluyers) (Département du Rhône). *Martinia* 25(1): 15-24. (in French, with English summary) ["*Lestes dryas* has been recently discovered in Morlin temporary pond and is thus the 62nd species of Rhône department, France. A low deep ditch borders the 3 ha pond which is mainly composed by a submerged meadow with shrubs and trees. This meadow dries out from early summer to autumn, sometimes winter, except for a pool measuring only a few squared meters; such a milieu is rare in the department. Thirty three Odonata species can be encountered. Among them a significant part is represented by typical temporary pools species such as *Lestes barbarus*, *L. virens*, *Aeshna affinis*, *Sympetrum meridionale* and *S. sanguineum* but also by *Chalcolestes viridis* and *Sympetma fusca* that can stand the drying of the pool during summer but are rather permanent pool species. Considering those seven species, lots of adults emerge from the water and *L. barbarus* and *S. sanguineum* do so especially early (respectively on the 8th and 15th of May). Other conspicuous dragonflies fly around the pool: *Ischnura pumilio*, *Coenagrion scitulum*, *Anax parthenope*, *Sympetrum fonscolombii*; *Leucorrhinia pectoralis* do so occasionally. Finally, the author underlines that Morlin temporary pool is threatened by a highway project." (Author)] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

9092. Grosser, N.; Hahn, K. (2009): *Brachytron pratense* (Müller, 1764) - Kleine Mosaikjungfer im Werratal bei Sallmannshausen (Thüringen) im Jahre 2008 (Odonata: Aeshnidae). *Mitteilungen des Thüringer Entomologenverbandes* 16(1): 16-17. (in German) [Thuringia, Germany; documentation of a record in early summer 2008 without further data details of the regionally rare *B. pratense*.] Address: Grosser, N., Fakultät LGF, Fachrichtung Landschaftsarchitektur Fachhochschule Erfurt University of Applied Sciences Leipziger Strasse 77 99085 Erfurt, Germany

9093. Guerbaa, K. (2009): Restauration de milieux favorables à *Coenagrion mercuriale* (Charpentier, 1840) sur la Réserve Naturelle Nationale de la Tourbière des Dauges (Saint-Léger-la-Montagne, Haute-Vienne). *Martinia* 25(3): 131-32. (in French, with English summary) ["The author presents a management approach of *C. mercuriale* based on a traditional agricultural technique. It consists in creating or restoring drains using a tractor equipped with a channel digger. The advantages of this technique are highlighted." (Author)] Address: Guerbaa, K., CREN Limousin, Sauvagnac, F-87340 Saint-Léger-la-Montagne, France

9094. Hennequin, E.; Lolive, N. (2009): Synthèse des connaissances des Odonates du Pays de Tulle (Département de la Corrèze). *Martinia* 25(1): 25-27. (in French, with English summary) [France; data were gathered by field investigations and literature, resulting in 50 Odonata species of which 17 are in the Limousin Red List. Only a few are briefly discussed, but the complete checklist is omitted.] Address: Hennequin, E., Société Limousine d'Odonatologie, 11 rue Jauvion, F-87000 Limoges assoslo@wanadoo.fr

9095. Hennequin, E. (2009): Découverte d'une nouvelle population de *Leucorrhinia dubia* (Vander Linden, 1825) dans le département de la Corrèze (Limousin) (Odonata, Anisoptera, Libellulidae). *Martinia* 25(3): 116. (in French) [France; 28-V-2008] Address: Hennequin, E., Conservatoire Régional des Espaces Naturels du Limousin, 6 ruelle du Theil, F-87510 Saint-Gence, France

9096. Hennige, K. (2009): Odonate Sightings April 1 to August 31 2009. *The Blue Bill* 56(3): 105-107. (in English) [76 species are listed according their first sighting in 2009. The report includes records in the Kingston Checklist area and Charleston Lake & Menzel Provincial Parks, Ontario, Canada. Cool weather delayed the appearance of many species by one to two weeks, and numbers for some common species were lower than in past years. A new species was added to the Checklist when 3 *Somatochlora walshi* were seen along Roblin Road, 3km east of the Menzel Gate. This species was also seen in at least three more locations just outside the Kingston Checklist area and at least 15 were seen at Menzel. *Somatochlora kennedyi* and *S. willamsoni* also were found at Menzel Centennial Provincial Park. Even more surprising was the discovery of 1 male and several female of the very rare and scattered distributed *Williamsonia fletcheri*, also at Menzel Centennial. Other highlights include the second record of *Sympetrum costiferum*, third and fourth records of *Epiaeschna heros*, also on Charleston Lake, 3km from the 2007 location, a new population of *Enallagma antennatum* along Millhaven Creek, and 3 records of the rare *Gomphaeschna furcillata*.] Address: Hennige, K. E-mail: khennige@sympatico.ca

9097. Hope, P. (2009): New records of *Leucorrhinia pectoralis* in Turkey (Odonata: Libellulidae). *Libellula* 28(1/2): 93-96. (in English, with German summary) ["In June 2008, a male *L. pectoralis* was observed perched on a waterside plant beside a canal, in an area known as Koca Calis, situated on the Mediterranean coast near Fethiye, Mugla province, Turkey. In the same month, another male *L. pectoralis* was photographed at Koycegiz, 80 km to the west of Fethiye. These two sightings extend the previously known range of *L. pectoralis* 200 km further south to the Mediterranean

coast." (Author)] Address: Hope, P., 2 English Bridge Court, Wyle Cop, Shrewsbury, Shropshire, SY1 1XH, United Kingdom. E-mail: paulhope99@googlemail.com

9098. Ingley, S.J. (2009): Life on the fly: Ecology and evolution of the helicopter damselflies (Odonata: Pseudostigmatidae). University of Florida, Dept of Wildlife Ecology & Conservation, CALS Honors Program: 32 pp. (in English) [Helicopter damselflies form a relatively small, yet dynamic group of endangered odonates (including the largest extant odonate, *Megaloprepus caeruleus*, with a wingspan of ~190 mm). This highly specialized group is found in primary-growth rainforest (Central and South America; one East African species) where they oviposit exclusively in phytotelmata and are specialist foragers on orb weaver spiders which are plucked from their web. Pseudostigmatids exhibit unique wing structure within Zygoptera, and within Pseudostigmatidae both broad and narrow wing forms exist. Oviposition, spider feeding, and wing form evolution are examined for the first time within an evolutionary context using modern phylogenetic methods of tree reconstruction and character optimization. Phylogenetic analyses (Bayesian and Parsimony) were performed on a data set composed of 60 morphological characters and ~3.4kb of sequence data (Mitochondrial loci: 12S, 16S, COII; Nuclear loci: 28S, H3). Findings include monophyletic Pseudostigmatidae, *Coryphagrion grandis* (East African species) as the sister group to all Neotropical genera, and *Pericnemis* as sister to Pseudostigmatidae. The genera *Mecistogaster* and *Pseudostigma* are monophyletic while *Microstigma* forms a monophyletic group with *Megaloprepus*. Oviposition in phytotelmata likely evolved multiple times within Zygoptera, and spider feeding evolved from a single origin. There are two separate origins of narrow wings within Pseudostigmatidae. These findings provide new insight into Pseudostigmatid evolution that can be used to generate awareness of the threatened status of Helicopter damselflies.] Address: Ingley, S.J. E-mail: sjingley@gmail.com

9099. Juillerat, L., Monnerat, C. (2009): Odonata in southern Morocco, with first records of *Orthetrum ransonnetii* and *Sympetrum sinaiticum* (Odonata: Libellulidae). *Libellula* 28(1/2): 97-115. (in English, with French and German summaries) ["On several field trips between 2001 and 2008 to southern Morocco, 26 odonate species were recorded in 24 localities. *O. ransonnetii* and *S. sinaiticum* were recorded for the first time in April 2003 and April 2007 respectively. Both are new for the Moroccan fauna, increasing the number of odonate species for this country to 61." (Authors)]

9100. Kovacs, T.; Ambrus, A.; Olajos, P.; Szilagyi, G. (2009): Records of Ephemeroptera and Odonata from the Biebrza National Park, Poland. *Folia historico naturalia musei Matraensis* 33: 87-96. (in English) [This paper provides data on 20 Ephemeroptera and 42 Odonata species from the Biebrza National Park, Poland, including many species protected by European law.] Address: Kovács, T., Mátra Museum, H-3200 Gyöngyös, Kossuth Lajos u. 40, Hungary. E-mail: koati@t-online.hu

9101. Krieger, M. (2009): Frühe Heidelibelle *Sympetrum fonscolombii* (Selys 1843) in Rotenburg/Fulda um das Jahr 1880. *Libellen in Hessen* 2: 62. (in German) [A male of *S. fonscolombii* was traced in the collection of the Natural History Museum Kassel, caught by Heinrich

Eisenach prior 1886 in Rotenburg/Fulda, Hessen, Germany. This seems to be one of the oldest records known from Germany.] Address: Krieger, M., Fuldablick 20, 36199 Rotenburg a.d. Fulda, Germany

9102. Krieg-Jacquier, R.; Deliry, C. (2009): Observations récentes de *Leucorrhinia albifrons* (Burmeister, 1839) dans le département de l'Ain (Odonata, Anisoptera, Libellulidae). *Martinia* 25(3): 119-127. (in French, with English summary) ["At the beginning of summer 2006, a new site of *L. albifrons* has been discovered in Bugey (Jura mountain, Ain department, France). Because of the big size of the population, its nearness to other populations and the discovery of another big population in the northern part of Isère department in 2007, the species seems likely to disperse in montane regions." (Authors)] Address: Deliry, C., Villa D, 2 rue de la Forge, F-38200 Villette de Vienne, France

9103. Lambert, J.-L. (2009): A propos du statut de *Leucorrhinia caudalis* (Charpentier, 1840) et *Leucorrhinia albifrons* (Burmeister, 1839) dans le bassin du Drugeon (département du Doubs) (Odonata, Anisoptera, Libellulidae). *Martinia* 25(1): 3-13. (in French, with English summary) ["*L. caudalis* and *L. albifrons* have been recently rediscovered in the hydrographical basin of Drugeon river (Doubs department, France) by roughly 840 meters asl. The author demonstrates their autochthony and reminds that *L. pectoralis* and *L. dubia* are also native from this area. He wonders about historical data regarding the status of *L. caudalis* at this altitude. Several species mainly encountered in the plain have been recently observed in this middle high mountain area, especially in Remoray's lake natural reserve. Hence their strongly suspected nativity could be established." (Author)] Address: Lambert, J.-L., Office National de l'Eau et des Milieux Aquatiques, Service Départemental de la Marne, F-51520 La Veuve, France. E-mail: sd51@onema.fr

9104. Lambret, P.; Cohez, D.; Janczak, A. (2009): *Lestes macrostigma* (Eversmann, 1836) en Camargue et en Crau (Département des Bouches-du-Rhône) (Odonata, Zygoptera, Lestidae). *Martinia* 25(2): 51-65. (in French, with English summary) [France; "*L. macrostigma* is a patchily spread species. It is not legally protected, either in Europe or in France, despite its conservation status. This paper reviews the previous and recent investigations (i.e. before and from 1998 onwards) in Camargue and in Crau. Its abundance can experience great variations from to year and the species can even eclipse from a site during some time. Nonetheless those eclipses are not irreversible. Our data show that its biology and ecology are still poorly known. Numerous human activities threaten the preferred habitats of the species and therefore increase its weakness. Hence, it seems necessary (i) to lead further investigations in the area and (ii) to monitor and to study already known populations and (iii) to protect this endangered species at the European scale." (Authors)] Address: Lambret, P., Marais du Vigueirat, 13104 Mas Thibert, France. E-mail: philambret@hotmail.com

9105. Lambret, P.; Boudot, J.-P. (2009): *Nesciothemis farinosa* (Förster, 1898) et *Orthetrum ransonnetii* (Brauer, 1865) nouveaux pour l'Arabie Saoudite et autres observations d'Odonates sur les reliefs côtiers de la Mer Rouge. *Martinia* 25(4): 153-155. (in French, with English summary) [*Nesciothemis farinosa* and *Orthetrum ransonnetii* have been recently identified from pho-

tographs taken in Saudi Arabia in 2002; both are new to the country. Additional records include *Ceragrion glabrum*, *Pseudagrion hamoni*, *Anax ephippiger*, *Paragomphus sinaiticus*, *Orthetrum chrysostigma*, *Pantala flavescens*, *Trithemis arteriosa*, and *T. kirbyi*.] Address: Lambret, P., Marais du Vigueirat, F-13104 Mas Thibert, France. E-mail: philambret@hotmail.com

9106. Lolive, N. (2009): *Cordulegaster bidentata* Selys, 1843 dans le département du Cantal: état des connaissances (Odonata, Anisoptera, Cordulegastriidae). *Martinia* 25(2): 73-78. (in French, with English summary) [*C. bidentata* seemed to be a quite rare species in the Cantal department, France prior 2005. To improve knowledge on the distribution of that species the Odonatological Society of Limousin region developed a method to detect larvae of *C. bidentata*. Conducting this method lead to a significant increase of new localities for the species. Thus, the new data gathered thereby show that this species is well represented in the department.] Address: Lolive, N., 35 avenue de la République, F-1 5000 Aurillac, France

9107. Machado, A.B.M. (2009): *Tukanobasis* gen. nov. with the descriptions of *T. corbeti* sp. nov. from the Amazonian region of Brazil (Odonata: Coenagrionidae). *International Journal of Odonatology* 12(2): 331-336. (in English) ["A new coenagrionid genus, *Tukanobasis*, is described for *T. corbeti* sp. nov. found in a flooded forest in the Amazonian region of Brazil (holotype: Brazil, Amazonas State, Taraqua [3°27'15"S, 62°51'05"W, 35 m], viii 1964, in ABMM). The new genus is characterized by the presence of an apical brown spot on Hw of mature males, a ventral thoracic tubercle, long paraprocts, two large pleural yellow stripes, and a short CuA. Its affinities are uncertain." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

9108. Martens, A.; Schiel, F.J. (2009): *Pseudagrion microcephalum* mit exotischen Wasserpflanzen nach Deutschland verschleppt (Odonata: Coenagrionidae). *mercuriale* 9: 27-29. (in German, with English summary) [[*Pseudagrion microcephalum* introduced accidentally to Germany with exotic water plants (Odonata: Coenagrionidae)]: Zygopteran larvae were taken from an aquarium containing Java Moss, *Taxiphyllum barbieri*, bought in a pet shop in Ulm, Germany. After emergence, several imagoes were clearly identified as *P. microcephalum*. The species is distributed from India and Sri Lanka to Japan and Australia, where it is common at waters with abundant vegetation. This is the second record of the species for Europe. In Europe, tropical plants for aquariums are presently mainly imported from Singapore, Indonesia and Thailand, and it is suggested that the damselflies originated from one of these countries." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

9109. Martens, A. (2009): Die Quagga-Muschel *Dreissena rostriformis bugensis* (Bivalvia: Dreissenidae) erobert den Main, Rhein und Neckar: Hinweise zu einem potenziellen Aufsitzer von Libellenlarven. *mercuriale* 9: 23-26. (in German, with English summary) ["[The quagga mussel *Dreissena rostriformis bugensis* (Bivalvia: Dreissenidae) invading the Main, Rhine and Neckar

Rivers: Clues for a potential epizoon on odonate larvae.] *D. rostriformis bugensis* is rapidly spreading in navigable inland waters of Central Europe. Whether this invasive species is epizoic on odonate larvae as the zebra mussel *Dreissena polymorpha* is unknown. Information on identification, ecology and biogeography is given." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

9110. Mauersberger, R. (2009): Nimmt *Leucorrhinia caudalis* im Nordosten Deutschlands rezent zu? (Odonata: Libellulidae). *Libellula* 28(1/2): 69-84. (in German, with English summary) ["Evidence is given that *L. caudalis* became more numerous and widespread in the lake region of northern Brandenburg and Mecklenburg-Vorpommern, Germany, during the last ten years. In the years 1992 to 1996 0.4 % of all dragonfly records referred to *L. caudalis*, whereas 1.4 % of records referred to this species in the period from 2004 to 2008. Between 2001 and 2008, the constancy of *L. caudalis* at the monitoring sites of 16 lakes increased from 19 to 53 %. During the same period, the average annual abundance at all monitoring sites rose from 0.3 to 4.7 exuviae per 10 m shoreline. Altogether 48 sites in Brandenburg and 14 in Mecklenburg-Vorpommern were recorded where *L. caudalis* was newly detected from 2004 to 2008. Global warming is assumed as a probable cause for this increase." (Author)] Address: Mauersberger, R., Prenzlauer Allee 66, 17268 Templin, Germany. E-mail: rue.mau@web.de

9111. McLachlan-Troup, T.A.; Dickman, C.R.; Grant, T.R. (2009): Diet and dietary selectivity of the platypus in relation to season, sex and macroinvertebrate assemblages. *Journal of Zoology* 280(3): 237-246. (in English) ["The diet of the platypus *Ornithorhynchus anatinus* was studied by examination of material collected from the cheek pouches of animals captured while foraging in streams in Kangaroo Valley, NSW, Australia. Platypuses consumed benthic invertebrates from 55 families in 16 orders, with virtually no prey being derived from the terrestrial environment. We also sampled invertebrates in pool, riffle and stream edge habitats to identify where prey were obtained. Invertebrates in the diet were most similar to those collected along stream edges and in pools compared with the faster-flowing riffles, suggesting that platypuses focused their foraging activities largely in these deeper water habitats. Although there was no seasonality in the assemblage structure of macroinvertebrates, the diet of platypuses varied between seasons, notably between winter and summer, suggesting that some dietary selectivity is seasonal. Dietary differences between the sexes were not detected. Overall, our results suggest that some dietary selection occurs in the platypus with respect to both foraging habitat and season. Seasonal selectivity may reflect different metabolic demands on platypuses at different times of the year. In contrast, habitat selectivity may reflect difficulty of prey access and risk of prey escape in fast-flowing riffles, higher energy costs and risk of predation associated with exploiting this habitat, and prey avoidance responses that are more rapid in the shallow riffles than in the deeper water pools and stream edges. These alternatives await evaluation by future research." (Authors)] Macroinvertebrate taxa found most frequently in cheek pouch samples from platypuses (n=50 samples)

included Gomphidae with 34 %.] Address: McLachlan-Troup, Tanya, Inst. Wildlife Res., School of Biological Sciences, A08, University of Sydney, Sydney, NSW 2006, Australia. E-mail: mclachlan.troup@gmail.com

9112. Menke, N.; Olthoff, M. (2009): Individuenreiche Vorkommen der Großen Moosjungfer (*Leucorrhinia pectoralis*) in Westfalen im Jahr 2008 - Masseneinflug oder übersehene Vorkommen. *Natur und Heimat* 69(3): 69-72. (in German) [06-06-2008; more than 20 specimens were found in NSG Heiliges Meer; 20-06-2008, 18 specimens in NSG Gagelbruch Borkenberge, both situated in the Federal State Nordrhein-Westfalen, Germany.] Address: Menke, N., Stephanweg 15, 48155 Münster, Germany. E-mail: Menkems@aol.com

9113. Michel, M.J.; Adams, M.M. (2009): Differential effects of structural complexity on predator foraging behavior. *Behavioral Ecology* 20(2): 313-317. (in English) ["The choice of predator foraging mode has important consequences for ecological communities. Foraging mode designations are often made on the basis of predator activity, yet activity can be affected by various environmental stimuli independent of changes in foraging mode. Structural complexity can reduce predator activity by either interfering with predator vision and mobility or as part of a foraging mode shift. We examined the effects of simulated aquatic vegetation on multiple behaviours of 2 aquatic insect predators to distinguish between these 2 possible outcomes. Larvae of the diving water beetle (*Dytiscus* spp.) shifted from an active predator in treatments without structure to a sit-and-pursue (SAP) predator in treatments containing structure, as indicated by a decrease in activity and prey encounter rates and an increase in probability of capture. This trade-off between encounter rates and probability of capture resulted in an equal number of prey captures among the treatments. Dragonfly nymphs (*Anax junius*) remained SAP predators in both treatments, although interference from the simulated vegetation significantly reduced activity. Structure also slightly decreased the number of aeshnid prey captures. Physiological attributes of the predators, such as mode of respiration and method of prey detection, seemed to influence foraging behaviour. This study emphasizes the benefits of measuring multiple predator behaviours when classifying predators to particular foraging modes." (Authors)] Address: Michel, M.J., Department of Biological Sciences, University of Notre Dame, Notre Dame, IN 46556, USA. E-mail: mmichel1@nd.edu.

9114. Moore, C. (2009): Reports from Coastal Stations - 2008: Dunwich Heath National Trust, Suffolk. *Atropos* 36: 55. (in English) [UK, *Anaciaeschna isosceles*, *Sympetrum striolatum* was caught at a light trap] Address: not stated

9115. Mühle, L.; Rohe, L.; Flenner, I.; Suhling, F. (2009): Atmungsverhalten von *Orthetrum cancellatum*-Larven: Einfluss der aktuellen Temperatur und der Aufzuchtbedingungen (Odonata: Libellulidae). *Libellula* 28 (1/2): 59-68. (in German, with English summary) ["The intensity of respiration of larval Anisoptera can be determined by observing the frequency of abdominal movements. We used this to study the influence of the current temperature on the larval respiration of *O. cancellatum*. We assumed that (1) the breathing rate of the larvae increases with rising temperature and that (2) the response to the current temperature depends on the rearing conditions. The larvae were kept for nine

months under four different rearing conditions. The egg clutches originated from two countries in different climate zones, from southern France in the Mediterranean area and from northern Germany in the temperate zone. Our experiment revealed that the ventilation rate increased with increasing temperature. This was more pronounced with higher rearing temperatures than the larvae experienced. We interpreted this as a habituation effect. The size of the larvae influenced the ventilation rate as well. On the other hand, the genetic and geographic origin of the larvae had no significant effect." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

9116. Ohba, S. (2009): Ontogenetic dietary shift in the larvae of *Cybister japonicus* (Coleoptera: Dytiscidae) in Japanese rice fields. *Environmental Entomology* 38(3): 856-860. (in English) ["No quantitative study on the feeding habits of *C. japonicus* larvae has been reported. In this study, field observations and rearing experiments were carried out to show the feeding ecology of *C. japonicus* larvae. Unlike previous commentaries, the first- and second-instar larvae of *C. japonicus* preyed on insects, mainly Odonata nymphs (*Orthetrum* spp. and *Sympetrum* spp.) and *Notonecta triguttata*, irrespective of prey availability, but did not eat vertebrates such as tadpoles and fish in the field. On the contrary, the third-instar larvae fed on both insects and vertebrates. Rearing experiments showed that the number of Odonata nymphs consumed was significantly more than the number of tadpoles consumed by the first and second instars but third-instar larvae ate both the Odonata nymphs and tadpoles in the tadpole-Odonata nymph mixture experiment. The total body lengths of *C. japonicus* new adults in the Odonata nymph and tadpole-Odonata nymph mixture treatments were statistically equal. These results suggested that the first- and second-instar larvae of *C. japonicus* prey mainly on insects and do not eat vertebrate animals (insectivore), whereas the third-instar larvae fed on both insects and vertebrates (generalist)." (Author)] Address: Ohba, S., Dept of Vector Ecology & Environment, Institute of Tropical Medicine, Nagasaki University, Sakamoto, Nagasaki 852-8523, Japan. E-mail: oobug@hotmail.com

9117. Olthoff, M.; Schmidt, E. (2009): Die Libellen (Insecta, Odonata) des Truppenübungsplatzes Haltern-Borkenberge (Kreis Coesfeld und Recklinghausen). *Abhandlungen aus dem Westfälischen Museum für Naturkunde* 71(3): 223-262. (in German, with English summary) ["Between 2004 and 2008, the dragonfly fauna of the Haltern-Borkenberge Training Area, a hilly sand area with little bogs (approx. 1.800 ha) southwest of the city of Münster in the Westphalian Bight, was recorded. Water-filled ruts and two oligotrophic ponds were investigated in the intensively used opened parts of the training area, while two small bogs (Habichtsmoor, Heimingshofmoor) were examined in the woody south of Borkenberge. Two bogs in the north of the training area (Gagelbruch, Suskenbrocksmoor) were examined very intensively, while the little stream Sandbach was only investigated at random. Altogether, 44 species of dragonflies were recorded. Three more species were documented between 1990 and 2002, which sums up to 47 in total, i.e. almost two thirds of the North Rhine-Westphalian species (64% of 73 species). The water-filled ruts that developed from the military training represent important biotopes for pioneer species (*Ischnura pu-*

milio, *Platetrum depressum*). The oligotrophic ponds in the open area accommodate remarkable populations of *Lestes virens* and *Leucorrhinia rubicunda*. The woody bogs in the south of the training area (Habichtsmoor, Heimingshofmoor) are relatively poor in species (21 species), though very important for specific acid water dragonflies (e.g. *Ceriagrion tenellum*, *Somatochlora arctica*, *Leucorrhinia dubia*, *L. rubicunda*). The two bogs in the northern part of the training area are species-rich (30 species in Suskenbrocksmoor, 41 species in Gagelbruch). The low density of acid water dragonflies and the breakdown of species since 2002 (*S. arctica* in both bogs, in addition *Brachytron pratense*, *Coenagrion lunulatum*, *C. hastulatum* in Gagelbruch) can be regarded as an indication of unfavourable water conditions. The stream Sandbach at the northern borderline of the training area is habitat for running-water dragonflies (*Calopteryx splendens*, *C. virgo*, *Gomphus vulgatissimus*). After 1990, a large population of *Orthetrum coerulescens* was discovered in a nutrient-poor ditch in Gagelbruch. Its core population is supposedly located in an outflow of a flooded quarry which was set up in the 1980s. The flooded quarry and the outflow have got mediterranean thermic conditions caused by ground water. All species found in Borkenberge are categorized in ecological groups and discussed in detail." (Authors)] Address: Olthoff, M., Naturförderstation im Kreis Coesfeld, Borkener Str. 13, 48653 Coesfeld, Germany. E-Mail: matthias.olthoff@naturfoerderstation.de

9118. Oosterhout, M.P. van; van der Velde, G.; Gaigher, I.G. (2009): High altitude mountain streams as a possible refuge habitat for the catfish *Amphilius uranoscopus*. *Environ. Biol. Fish.* 84: 109-120. (in English) ["*Amphilius uranoscopus* is [...] restricted to rivers and streams in east, southern and central Africa. It is likely to be displaced due to both competition and predation by exotic trout and other introduced fish. In high altitude mountain streams it can be the only species occurring, which means that this habitat may act as a refuge for this species. [...] The abiotic environment, population structure, behaviour and feeding biology of *Amphilius uranoscopus* were studied in a small, high-altitude perennial tributary of the Limpopo River in the Soutpansberg mountain range, Limpopo Province, South Africa, during 2005–2006. Here *A. uranoscopus* showed nocturnal behaviour. It used dark hollow crevices in rapids as shelters during the daytime. The rapids are characterized by a high flow rate, high dissolved oxygen content and coarse riverbed substrate consisting mainly of boulders without fallen leaves. In contrast to the adults, juveniles found shelter among the fallen leaves in pools. At night, *A. uranoscopus* moved out of the rapids into the open water of the pools. The main food of *A. uranoscopus* consisted of macroinvertebrates, mainly Trichoptera larvae." (Authors) The diet also includes a few Odonata ('Zygoptera', 'Anisoptera', 'Gomphidae')] Address: Gaigher, I.G., Lajuma Environmental Research Centre, P.O. Box 522, Makhado 0920, South Africa. E-mail: leopard@lajuma.com

9119. Ott, J. (2009): Veränderungen der Libellenfauna in Deutschland und Europa Klimawandels und Konsequenzen für den Naturschutz. *BfN-Skripten* 246: 41-42. (in German) [Brief introduction into current developments and processes in climatic induced changes of the European Odonata fauna.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

9120. Petzold, F. (2009): Fund eines von Wassermilben parasitierten Männchens von *Anax parthenope* (Hydrachnidia; Odonata: Aeshnidae). *Libellula* 28(1/2): 85-88. (in German, with English summary) [A male *A. parthenope* parasitized by water mites "was found on 17-vi-2008 at a water-filled peat pit in northeastern Brandenburg, Germany. Approximately 830 water mite larvae were counted. The indeterminable mite larvae clung predominantly to the ventral side of the abdominal segments 5 to 7 and to the underpart of the thorax. This finding is the first documented evidence of parasitization of *A. parthenope* by water mites." (Author)] Address: Petzold, F., Pappelallee 73, 10437 Berlin, Germany. E-mail: petzold.falk@googlemail.com

9121. Petzold, F. (2009): Bericht über die Aktivitäten des Arbeitskreises Libellen Thüringens. *Mitteilungen des Thüringer Entomologenverbandes* 16(1): 29-34. (in German) [Thüringen; detailed report with species list of two excursions, and a seminar on species identification held at the university of Erfurt, Germany.] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

9122. Phoenix, J. (2009): Herbstschlupf von *Ophiogomphus cecilia* (Odonata: Gomphidae) an der unteren Elbe in der tschechischen Republik. *Lampetra* 6: 30-32. (in German, with English and Czech summaries) [12-IX-2008, river Elbe at Velké Brezno, Czech Republic; unusual autumnal emergence of *O. cecilia*] Address: Phoenix, J., Goethestr. 22, 01824 Königstein, Germany. E-mail: juergen.phoenix@t-online.de

9123. Raczyńska, M.; Chojnacki, J.C. (2009): The structure of macrozoobenthic communities in the Tywa River, a right-bank tributary of the Oder River (north-west Poland). *Oceanological and hydrobiological studies* 38(3): 32-42. (in English) [Odonata are treated at the order level.] Address: Raczyńska, Małgorzata, West Pomeranian University of Technology, Faculty of Food Sciences and Fishery, Department of Marine Ecology and Environmental Protection, ul. K. Królewicza 4/H, 71-550 Szczecin, Poland. E-mail: malgorzata.raczynska@zut.edu.pl

9124. Radwell, A.J.; Camp, N.B. (2009): Comparing chemiluminescent and LED light for trapping water mites and aquatic insects. *Southeastern Naturalist* 8(4): 733-738. (in English) ["This research compared the effectiveness of red, yellow, green, and blue chemiluminescent candles and white light from an LED source in capturing water mites and aquatic insects in a macrophyte bed of a small reservoir. We sought to compare the abundance of organisms captured and to determine whether specific taxa showed a preference for certain colours. A total of 2974 organisms in 19 taxa were collected including 7 water mite genera and 12 other invertebrate taxa. The abundance of Hydrachnida (water mites) in the traps was greater than all other taxa combined. The dominant insect taxa collected were Ephemeroptera and Odonata. No statistically significant inter-taxon preferences for colour were found, but overall there was a greater attraction to yellow, green, or white light than to red and blue light. Since white light from the reusable LED source performed as well as yellow or green disposable chemiluminescent candles that are typically used in aquatic traps, submersible LED flashlights could be considered a suitable alternative" (Authors)] Address: Radwell, Andrea, 34 Sunrise Place, Cabot, AR 72023, USA. E-mail: aradwell@uark.edu.

- 9125.** Renker, C.; Beck, H.; Feuck, W.; Fritsch, R.; Grimm, F.; Haybach, A.; Henss, E.; Idelberger, S.; Keller, P.; Ludewig, H.-H.; Malec, F.; Marx, M.; Oesau, A.; Rodeland, J.; Simon, H.; Simon, L.; Trautmann, S.; Weitmann, G.; Weitzel, M.; Willigalla, C. (2009): Eine Momentaufnahme aus der Flora und Fauna des Eich-Gimbsheimer Altrheins - Ergebnisse des 11. GEO-Tags der Artenvielfalt am 13. Juni 2009. Fauna und Flora in Rheinland-Pfalz 11(3): 879-940. (in German, with English summary) [Rheinland-Pfalz, Germany; 18 Odonata species were recorded, including the regionally rare *Coenagrion pulchellum*] Address: Willigalla, C., Am Großen Sand 22, D-55124 Mainz, Germany. E-mail: christoph@willigalla.de
- 9126.** Robertson, A. (2009): The Great Canadian BioBlitz 2009. The Blue Bill - Quarterly Journal of the Kingston Field Naturalists 56(3): 82-101. (in English) [Camden East, Ontario, Canada, 12-13-VI-2009; 21 Odonata are reported.] Address: Robertson, Anne. E-mail: n8ture.anne@sympatico.ca
- 9127.** Rochelet, B.; Maillard, W. (2009): Redécouverte à Anax parthenope (Selys, 1839) en Sarthe et état des connaissances sur la présence de l'espèce en Pays de la Loire (Odonata, Anisoptera, Aeshnidae). Martinia 25(2): 79-84. (in French, with English summary) [France; "A. parthenope has been rediscovered in 2008 in Sarthe department after a gap of observation longer than 60 years. The species was observed in three different sites that were separated by several kilometres and clues of reproduction were detected in one of them. A focus is made on its regional status." (Authors)] Address: Rochelet, B., 19, rue des Allards F-79210 Usseau, France
- 9128.** Roland, H.-J. (2009): Erstnachweis von *Coenagrion scitulum* (Rambur, 1842) (Gabel-Azurjungfer) in Hessen. Libellen in Hessen 2: 59-61. (in German) [Echzell-Gettenau, Hessen, Germany, 29-VI-2008] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com
- 9129.** Rychła, A. (2009): New localities of some protected and rare dragonfly species from western Poland with remarks to the hydrological state of the habitats. Odonatrix 5(1): 7-12. (in Polish, with English summary) ["New records of six protected or/and rare dragonfly species (*Leucorrhinia caudalis*, *L. albifrons*, *Cordulegaster boltonii*, *Erythromma lindenii*, *Aeshna juncea* and *A. affinis*) from western Poland have been described. The characterisation of habitats includes short remarks to the hydrological situation with regard to changing climate followed by fluctuations of water levels. The possible consequences for the habitat quality and for the dragonfly species are discussed." (Author)] Address: Rychła, Anna, ul. Osiedlowa 12, Ploty, PO-66-016 Czerwieńsk, Poland. E-Mail: rychlan@op.pl
- 9130.** Samraoui, B. (2009): Seasonal ecology of Algerian Lestidae (Odonata). International Journal of Odonatology 12(2): 383-394. (in English) ["When comparing the phenology of species within the family Lestidae in Numidia, northeastern Algeria, we found that: (1) four of five species - *Lestes barbarus*, *L. numidicus*, *L. viridis*, and *Sympetma fusca* - feature a prolonged pre-reproductive period approaching five (*Lestes* spp.) or eight months (*S. fusca*); (2) adults of *L. numidicus*, and probably of *S. fusca*, move to upland refuge sites in summer, whereas those of *L. barbarus* and *L. viridis aestivate* in alder carrs in lowlands close to reproductive sites; and (3) adults of all five species exhibit distinct spatial and/or temporal segregation." (Authors)] Address: Samraoui, B., Lab. de Recherche des Zones Humides, Université d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@hotmail.com
- 9131.** Schlotmann, F. (2009): Populationsdynamik der Gemeinen Keiljungfer (*Gomphus vulgatissimus*) und der Kleinen Zangenlibelle (*Onychogomphus forcipatus*) im Gewässersystem der Nahe (Rheinland-Pfalz) (Anisoptera: Gomphidae). Fauna und Flora in Rheinland-Pfalz 11(3): 981-998. (in German, with English summary) ["In the second half of the 20th century the gomphids represented the most severely endangered group of dragonfly species in central Europe. Their populations have generally recovered since the decade of the 1980ies. The paper documents this development for the Nahe river system in Rheinland-Palatinate (Western Germany) focusing on *G. vulgatissimus* and *O. forcipatus* which are regionally the most important species of this group. *G. vulgatissimus* had only been recorded three times before 1985; since then it has spread widely through the river system in a time period of less than two decades. The same development is reported for *O. forcipatus* starting in 1979 with the first record since 1915. The rapid increase of both populations goes hand in hand with the installation of many efficient sewage plants which improved the water quality of the rivers and streams. Measures to improve the morphological situation of the water bodies started later when the recovery of the gomphid populations had already become evident." (Author)] Address: Schlotmann, F., Weserstr. 11, 55296 Harxheim, Germany. E-mail: frank.schlotmann@gmx.de
- 9132.** SGL (2009): Vereinsnachrichten. 40: 50. (in German) [Schutzgemeinschaft Libellen in Baden-Württemberg, Germany; minutes, announcements, membership list] Address: SGL c/o Schiel, F.-J., Inst. Naturschutz & Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de
- 9133.** Shaalan, E.-A.-S.; Canyon, D.V. (2009): Aquatic insect predators and mosquito control. Tropical Biomedicine 26(3): 223-261. (in English) ["The use of insect predators in mosquito control has been exploited in a limited fashion and there is much room for further investigation and implementation. Insects that are recognized as having predatorial capacity with regard to mosquito prey have been identified in the Orders Odonata, Coleoptera, Diptera (primarily aquatic predators), and Hemiptera (primarily surface predators). Although their capacity is affected by certain biological and physical factors, they could play a major role in mosquito control. Furthermore, better understanding for the mosquitoes-predators relationship(s) could probably lead to satisfactory reduction of mosquito-borne diseases by utilizing either these predators in control programs, for instance biological and/or integrated control, or their kairomones as mosquitoes' ovipositing repellents. This review covers the predation of different insect species on mosquito larvae, predator-prey-habitat relationships, cohabitation developmental issues, survival and abundance, oviposition avoidance, predatorial capacity and integrated vector control." (Authors)] Address: Canyon, D.V., School of Public Health and Tropical Medicine, James Cook University, Townsville Qld 4811, Australia. E-mail: deon.canyon@jcu.edu.au

9134. Śniegula, S. (2009): Dragonflies (Odonata) of eutrophic waterbodies of Borne Sulinowo commune (West and South Pomeranian Lakeland District). *Wiad. entomol.* 28(2): 73-82. (in Polish, with English summary) ["The investigated habitats included two eutrophic lakes with some features of mesotrophy (high water transparency; significant part of sandy and rocky bottoms) located in the northwestern part of Borne Sulinowo commune and numerous small shallow eutrophic water bodies (ZMZE) situated in the southern part of the commune (former Soviet Union military area). A total of 37 dragonfly species were recorded, most of them were eurytopic organisms which were widely distributed in Europe and not endangered in Poland. However, there were several species collected during this study that were sensitive to anthropogenic changes in aquatic ecosystems. Those dragonflies indicated a high natural value of the investigated habitats. Furthermore, some of these species (*Sympecma paedisca*, *Aeshna viridis*, *Leucorrhinia albifrons*, *L. caudalis* and *L. pectoralis*) are protected in Poland and three species (*A. viridis*, *L. albifrons* and *L. caudalis*) are placed on the Polish Red list." (Author)] Address: Śniegula, S., Instytut Ochrony Przyrody PAN, al. Mickiewicza 33, 31-120 Kraków, Poland. E-mail: sniegula@iop.krakow.pl

9135. Śniegula, S.; Gołąb, M.J. (2009): The dragonflies (Odonata) of peat bog water bodies in the vicinity of Borne Sulinowo (West and South Pomeranian Lakeland District). *Wiad. entomol.* 28(1): 33-41. (in Polish, with English summary) [Poland; "Five localities in the vicinity of the town of Borne Sulinowo, northwestern Poland, were studied in two seasons: 2005 and 2006. The investigated habitats included small dystrophic (sublocality 1a, localities 2 and 3) and eutrophic (sublocality 1b, 4 and 5) forest lakes surrounded by Sphagnum mats. Thirty-six species of dragonflies were recorded at all the localities. Among them there were two species (*Aeshna subarctica* and *Leucorrhinia dubia*) that represented dragonflies restricted to bogs (tyrphobionts), and three species (*A. juncea*, *Somatochlora flavomaculata* and *Sympetrum danae*) that were characteristic of bogs but not confined to them (tyrphophiles). The composition of dragonfly species at locality 1 (fish-free sublocality 1a and fishstocked sublocality 1b) showed that introducing fish into peat-bogs may have drastic effects on dragonflies sensitive to habitat changes. Locality 5 had a very interesting species composition that included the Mediterranean dragonflies *Anax imperator*, *A. parthenope*, and a coexisting numerous population of northern species *L. albifrons*. It must be stressed that four reported dragonflies: *Sympecma paedisca*, *A. subarctica*, *L. albifrons* and *L. pectoralis* are protected by law in Poland and three species are placed on the Polish Red list: *A. juncea*, *A. subarctica* and *L. albifrons*. The data enclosed in this paper confirm that the environs of Borne Sulinowo comprise a large number of valuable aquatic habitats that are important in sustaining the populations of stenotopic dragonflies." (Author)] Address: Śniegula, S., Instytut Ochrony Przyrody PAN, al. Mickiewicza 33, 31-120 Kraków, Poland. E-mail: sniegula@iop.krakow.pl

9136. Sonnenburg, F.; Böhm, K.; Haßel, C. (2009): Libellenfauna der Ohligser Heide. *Jber. Naturwiss. Ver. Wuppertal* 61: 101-124. (in German, with English summary) ["The dragonfly fauna of Ohligser Heide (Germany, North Rhine-Westphalia, Solingen) is well known because of field studies conducted by the Biolo-

gische Station Mittlere Wupper and further odonatologists, and based on data analysis of published papers. This enables us to record changes in the dragonfly fauna since 1984 and before. Over the whole period 40 species were recorded in total, 27 of them with established populations and four of them colonizing at least periodically in the study area. The number of established species has been increasing continuously, which is a result of successful re-creation of wetland habitats. Many of the dragonfly species found are regionally rare. Nine species show a more or less high affinity for bog or heath habitats. The study area is of major importance for dragonfly protection not only locally but also on wider scale." (Authors)] Address: Sonnenburg, F., Biologische Station Mittlere Wupper, Vogelsang 2, 42653 Solingen, Germany. E-mail: FSonnenburg@t-online.de

9137. St John, M.A. (2009): The benthic invertebrate community of lakes previously impaired by mining-related acidification near Wawa, Ontario. M.S. Thesis, Graduate Department of Zoology, University of Toronto: VII, 75pp. (in English) ["Iron mining began in Wawa, Ontario in the late 1800s and ceased in 1998. The sintering process of iron pyrite produced sulfur dioxide which led to the acidification of nearby lakes. Benthic macroinvertebrate samples were collected from lakes along a gradient of historical impairment in Wawa to examine the extent to which the benthos of the lakes would separate along the historical impairment gradient. The results show that the lakes are not separated along a gradient of impairment, and acid-intolerant taxa were collected in previously acidified lakes. There was no ameliorative intervention to combat the historical acidification and the observed recovery of water chemistry and benthos is entirely due to natural ecosystem processes. The two sampling methods (littoral kick sampling using a D-net and Hester-Dendy substrates) used to sample the benthos in these lakes can lead to substantial differences in the taxa collected." (Author) Odonata are treated at the genus level.] Address: St John, Margaretha Ann, Graduate Department of Zoology, University of Toronto, Canada

9138. Stephan, U.; Schiel, F.-J. (2009): Nachruf auf Karl Müller. *mercuriale* 9: 41. (in German) [Obituary Karl Müller (1927-2009); with bibliography.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

9139. Szkokan-Emilson, E.J.; Wesolek, B.E.; Gunn, J.M.; Sarrazin-Delay, C.; Bedore, J.; Chan, F.; Garreau, D.; O'Grady, A.; Robinson, C. (2009): Recovery of benthic invertebrate communities from acidification in Killarney Park lakes. *Environmental Monitoring and Assessment* 166(1-4): 293-302. (in English) ["Using a reference-condition comparison, recovery of benthic invertebrate communities from acidification was assessed in three lakes in Killarney Wilderness Park approximately 40–60 km from the massive metal smelters in Sudbury, Canada. Test site analyses (TSAs) were used to compare the park lakes to 20 reference lakes near Dorset Ontario, 200 km to the east. An extension of a previous survey (1997–2001) of two sensitive mayfly species (*Stenonema femoratum* and *S. interpunctatum*) was conducted in one of the lakes. TSA results indicate that the three Killarney lakes remain significantly different from reference condition due primarily to higher abundances of a few acid-tolerant families and the presence of some less abundant sensitive families. Colo-

nization rates differ greatly between the two mayfly species presumably because of competition for available habitat. Overall, this study suggests that early colonizers will gain an advantage to out-compete subsequent arrivals, and these competitive interactions will delay the return of communities to reference condition. ... George Lake was found to be the most different from reference, and this is largely because of the presence of Gammaridae, Cordulegastridae, and Glossosomatidae." (Authors)] Address: Szkokan-Emilson, E.J., Co-operative Freshwater Ecology Unit, Biology Dept, Laurentian University, Sudbury, ON, P3E 2C6, Canada. E-mail: exszkokanemilson@laurentian.ca

9140. Tellez, D.; Dommanget, J.-L. (2009): *Lindenia tetraphylla* (Vander Linden, 1825) en Corse du sud (Odonata, Anisoptera, Gomphidae). *Martinia* 25(3): 117-118. (in French, with English summary) [14-VI-2009, Corsica, France, in a littoral lagoon in the southern part of the island.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

9141. Tillmanns, O. (2009): *Aeshna mixta* als Beute der Larve von *Cicindela campestris* (Odonata: Aeshnidae; Coleoptera: Cicindelidae). *Libellula* 28(1/2): 89-91. (in German, with English summary) [19-VIII-2001, Burgwald near Marburg, Hessen, Germany, NSG „Franzosenwiesen/Rotes Wasser“; a larva of *C. campestris* was observed while feeding on a female *A. mixta*. Obviously such a large dragonfly species hitherto had not been recorded as prey of *Cicindela* larvae in Middle Europe.] Address: Tillmanns, O., Orkener Str. 17, D-41515 Grevenbroich, Germany. E-mail: mail@natur-gutachten.de

9142. Tończyk, G. (2009): Review. Cham S. 2007. Field Guide to the larvae and exuviae of British Dragonflies. Volume 1: Dragonflies (Anisoptera). The British Dragonfly Society. Gem Publishing Company, Brightwell, Wallingford, 76 ss. ISBN-978-0-9556471-0-9. *Odonatrix* 5(1): 30-32. (in Polish, with English summary) ["Field Guide to the larvae and exuviae of British Dragonflies. Volume 1: Dragonflies (Anisoptera)"] is an interestingly prepared key to the identification of final stage larvae and exuviae of dragonflies. The review contains the de-briefing of contents with emphasizing the value of good photographs presenting exuviae of 25 dragonfly species. The study was evaluated as a moderately successful work of local importance." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

9143. van Buskirk, J. (2009): Natural variation in morphology of larval amphibians: Phenotypic plasticity in nature? *Ecological Monographs* 79(4): 681-705. (in English) ["Phenotypic plasticity has been studied intensively in experimental settings but infrequently in nature, and therefore the relevance of experimental findings is poorly known. This is especially true for morphological plasticity in amphibian larvae induced by predators and competitors. This paper describes a seven-year survey of head and tail shape in eight species of anuran and newt larvae in northern Switzerland, involving 6824 individual larvae and 59 ponds. I tested relationships between geometric measures of size and shape and five habitat gradients: pond permanence, cover by forest canopy and aquatic vegetation, and the densities of predators and competitors. Responses to competitors and predators were often similar to those reported in

experiments. High competitor density was associated with small size and a large head in newt larvae, a long or deep head/body in anuran larvae, and a short or shallow tail in newts and some tadpoles. High predator density was correlated with a deep tail fin and tail muscle in many species. In anurans, the change in shape between low- and high-predator ponds in nature closely paralleled the plastic response to nonlethal predators in mesocosm experiments. The survey revealed many previously undescribed relationships between morphology and the other habitat features. Several species had relatively large tails in ponds that were shaded or thickly vegetated. Associations between year-to-year changes in shape and habitat within ponds implicated phenotypic plasticity rather than genetic population divergence, at least in anurans. These results inspire confidence in the relevance of experiments and highlight many new patterns that will merit further study. [...] Common predators were aeshnid dragonfly larvae (*Aeshna cyanea* and *Anax imperator*), larval dytiscid beetles (especially *Dytiscus marginalis* and *Hydaticus* spp.), four species of adult *Triturus* newts, adult backswimmers (Hemiptera: *Notonecta glauca*), and larval libellid and corduliid dragonflies." (Author)] Address: van Buskirk, J., Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.uzh.ch

9144. van der Poorten, N. (2009): *Libellago corbeti* sp. nov. from Sri Lanka (Odonata: Chlorocyphidae). *International Journal of Odonatology* 12(2): 223-230. (in English) ["*Libellago corbeti* sp. nov. (holotype male; Sri Lanka, Ratnapura District, near Kudawe, 6.26°N, 80.25°E, 03 vii 2007, to be deposited in the Sri Lanka National Museum, Colombo) is described and figured. Its phenotype does not resemble that of any other *Libellago* species. Habitat characteristics and species behaviour are briefly outlined. Keys to males and females of *Libellago* species in Sri Lanka are provided." (Author)] Address: van der Poorten, Nancy, 17 Monkton Avenue, Toronto, Ontario, M8Z 4M9, Canada; E-mail: nmgvdp@netscape.net

9145. Vanappelghem, C. (2009): Les odonates de la région Nord - Pas de Calais - Historique de la connaissance et diversité. *L'heron* 40(4)(2007): 149-154. (in French, with English summary) [Basing his study on the published reports recording the distribution of Odonata, the author analyzes the evolution of the species diversity in the "region Nord - Pas-de-Calais", France up to 2005. The situation of some species of this region (*Sympetrum depressiusculum*, *Onychogomphus forcipatus*, *Crocothemis erythraea*, *S. meridionale*, *Lestes barbarus*) is discussed particularly through new information from the collections of the "musee d'Histoire naturelle de Lille".] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

9146. Villanueva, R.J.; van der Ploeg, J.; van Weerd, M. (2009): Some Odonata from the Northern Sierra Madre Natural Park, Isabela, Luzon, Philippines. *Agrion* 13(2): 72-74. (in English) ["From 12 to 24 September 2008, we organized a biodiversity survey to sitio Dipagsangan, barangay Didian in the municipality of Palanan. We camped in lowland dipterocarp forest at Dipinantahikan (campsite 1), and in mid-elevation forest at Pinakdatatin ti Bulayo (campsite 2). The short field survey revealed 35 species, and represents the first Odonata survey in the eastern side of NSMNP. New records are predominantly zygopteran, which, with one

exception, are all endemic. This shows the remarkable Odonata assemblage in this largest remaining Philippine forest block. The present list is the result of a short fieldwork period (with field days further shortened by a tropical depression hitting the area during the survey). Additional species are to be expected when more fieldwork is conducted during good weather conditions. More field work is also necessary to provide distributional data for the undescribed species." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

9147. Villanueva, R.J.T. (2009): Two new species of Risiocnemis from northern Sierra Madre Luzon, Philippines (Odonata: Platynemididae). *International Journal of Odonatology* 12(2): 231-236. (in English) ["Risiocnemis corbeti sp. nov. and R. hamalaineni sp. nov. (for both species: holotype male, Dipmantang area [16°53'39"N, 122°20'47"E], Dipagsangaan, Palanan, Isabela, Luzon, Philippines, 12-20 ix 2008, in RMNH) are described, illustrated, and diagnosed." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000 Philippines. E-mail: reaganjoseph@lycos.com

9148. Wildermuth, H. (2009): Förderung der Libellenfauna kleiner Moorgräben durch einfache Naturschutzmaßnahmen (Odonata). *Libellula* 28(1/2): 31-48. (in German, with English summary) ["In a nature reserve near Zürich, Switzerland, the overgrown drains with an overall length of 370 m were revitalized in 1.5 ha of recently cleared fenland. In order to promote the odonate fauna and other aquatic organisms, several controllable weirs had been installed successively, thus preventing or protracting desiccation of the drains during hot periods with low or no precipitation. Habitat maintenance by a rotational strategy of clearing the ditches should allow the dragonflies to colonize the water bodies permanently. Extensive monitoring during three years revealed positive results throughout. In total 22 species were recorded, nine of them with regular reproduction. *Orthetrum coerulescens*, *Pyrrhosoma nymphula* and *Coenagrion puella* turned out to be the most abundant species and were found at all sections. *Cordulegaster boltonii* preferred the rare, short stretches with visible running water, and *Somatochlora flavomaculata* colonised sites with stagnant water, submerged vegetation and peat mud. Due to the retention of the water by weirs, the drains never dried up completely, which allowed the larvae to survive during longer lasting hot and dry periods. After clearing of largely overgrown sections in autumn, no emergence of dragonflies was noted in the subsequent season at these sites as the larvae had obviously been eliminated with the excavated material. However, the cleared sections were immediately colonised by reproductively active adults, e.g. by *O. coerulescens*; by the following spring larvae in different stadia were found there, together with other species. The results substantiate the hypothesis that the dragonfly fauna of the small fen ditches was considerably promoted by simple measures of habitat restoration and maintenance." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

9149. Wright, I.A.; Burgin, S. (2009): Comparison of sewage and coal-mine wastes on stream macroinvertebrates within an otherwise clean upland catchment, southeastern Australia. *Water Air Soil Pollution* 204:

227-241. (in English) ["Macroinvertebrates have been widely used in freshwater ecosystems as surrogates to assess the impacts of waste discharges and water pollution. However, often interpretations have been made on the impact of one pollutant in the presence of others that may provide an unidentified additive effective or otherwise confound the results. There have been few opportunities to study the impact of pollutants without such potentially confounding effects. We studied macroinvertebrates using a replicated kick sampling technique and identified to the family level to assess and compare the effects of zinc-rich coal-mine waste and organic pollution from treated sewage on an otherwise clean upland stream network within a world heritage area. We used multivariate analysis of macroinvertebrate assemblages from polluted and clean sites to measure and compare the effect of each waste impact to community structure. We also calculated three widely used biotic indices (Ephemeroptera, Plecoptera and Trichoptera (EPT) family richness, family richness, and abundance) and found that the EPT index was the only one to respond to both pollution types. Macroinvertebrate abundance was an important attribute of the study, with each source of pollution having a contrasting effect on total abundance. It also helped us to measure the relative response of families to each pollutant. There was an initial significant modification of macroinvertebrate assemblages below the outflow of each of the pollutants, followed by different degrees of recovery downstream." (Authors) Taxa including Odonata: Aeshnidae and Gomphidae are treated at the family level.] Address: Wright, I.A., College of Health and Science, Univ. of Western Sydney, Locked Bag 1797, South Penrith Distribution Centre, 1797 Sydney, NSW, Australia. E-mail: i.wright@uws.edu.au

9150. Xiao, T.; Ang, H. (2009): Numerical study of unusual phase relationships and aerodynamic interaction between forewing and hindwing of dragonfly Model. *Acta Aeronautica et Astronautica Sinica* 30(7): 1165-1175. (in Chinese, with English summary) ["Dragonflies have the ability to control the aerodynamic forces for flight by modulating the phase relationship between their forewings and hindwings. In this article, unsteady flows of a dragonfly model in hovering (advance ratio $J = 0$) and in forward flight with medium-speed ($J = 0.3$) are simulated by solving unsteady Navier-Stokes (N2S) equations on dynamic overset unstructured grids. At each advance ratio, 13 phases from 0° to 360° with intervals of 30° each are considered. The variation of aerodynamic force and power with phase as well as the aerodynamic perturbation between the forewing and hindwing are studied. It is found that the period average vertical force and power varies in a "U" shape as a function of the phase. The vertical force generated by the model is enough to balance the weight, and the data for aerodynamic power also agree with the statistical data of real dragonflies. In the wide phase region of 90° to 270° , aerodynamic interaction between the wings is relatively strong and stable. The vertical force and power is relatively small and stay roughly constant. All these results may be useful for explaining the unusual phase relationships between the wings of dragonflies." (Authors)] Address: Xiao, T., College of Aerospace Engineering, Nanjing Univ. of Aeronautics & Astronautics, Nanjing 210016, China. E-mail: xt.hang@nuaa.edu.cn

9151. Xu, Y.; Wu, B. (2009): A primary study on dragonflies from Huangshan region. *Journal of Huangshan*

University 11(3): 59-61. (in Chinese, with English summary) [Between 2000 and 2006, 61 Odonata species were collected in the Huangshan region of Anhui Province, China, 54 for the first time in Anhui Province.] Address: Xu Yajun, Wu Bian (Institute of Biodiversity, Huangshan University, Huangshan 245041, China

9152. Xu, Y.j.; Zeng, L.; Lu, Y.-y.; Liang, G.-w. (2009): Food content of refuse piles of the red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera: Formicidae). *Acta Ecologica Sinica* 29(11): 5791-5798. (in Chinese, with English summary) ["Refuse piles of *S. invicta*, were collected from four typical habitats in South China: litchi orchard, nursery, wasteland and roadside, and analyzed to learn seasonal food content fluctuation of this ant. The result showed that the refuse piles had a wide variety of solid particles including 41 species of insect fragments and seeds from 8 orders in total. Coleopterans were the dominant components in all of the habitats accounting 69.05%, 41.17%, 51.8% and 66.67% in litchi orchard, nursery, wasteland and roadside respectively. Homoptera was the least common prey which was only found in the wasteland composing 1.20%. The Hymenoptera, Hemiptera, seeds, Orthoptera, Lepidoptera, Isoptera and Odonata preys comprised 14.92, 11.96, 11.66, 2.08, 0.60, 0.60 and 0.60%, respectively. Adult fragments were the main parts in refuse piles with few insect larval or pupal fragments found. The numbers of prey species discovered in refuse piles were similar among habitats, but the composition of the species and their quantity were different. It showed obvious seasonal fluctuations of the forage items with two foraging active periods occurring from April to May and from September to October." (Authors) Odonata result from the roadside habitat; it will be possible that the ants collected odonate road kills.] Address: Laboratory of Insect Ecology and Red Imported Fire Ant Research Centre, South China Agricultural University, Guangzhou 510642, China. E-mail: zengling@scau.edu.cn

9153. Yu, W.-y.; Li, Z.-h.; Song, D.-j.; Lu, J.; Qian, Y.-p.; Lou, T.-t.; Gao, L. (2009): A study on fauna and diversity of Odonata in Huaiyu Mountain, Jiangxi Province. *Acta agriculturae universitatis Jiangxiensis* (Natural Sciences edition) 31(3): 562-584. (in Chinese, with English summary) [Between 2005 and 2008, 57 Odonata species were recorded including 16 new records for Jiangxi Province, China.] Address: Dept of Life Science, Nanjing Xiaozhuang University, Nanjing 211171, China. E-mail: ywy138519@126.com

9154. Zhang, H.-j. (2009): Odonata resources in Shaanxi province. *Journal of Anhui Agri. Sci.* 37(24): 11565-11567. (in Chinese, with English summary) [China; 117 Odonata species are listed.] Address: Zhang, H.-j., Bioresources Key Laboratory of Shaanxi Province, Shaanxi University of Technology, Hanzhong, Shaanxi 723000, China

9155. Zhao, H.-x.; Zhong, Z. (2009): Research advance in mechanics of dragonfly wings. *Chinese quarterly of mechanics* 30(3): 389-404. (in Chinese, with English summary) ["The study shows that Odonata are supremely versatile, maneuverable fliers in nature because of the special constructions of their wings. The pterostigma and nodus can balance the fore- and hind-wings and eliminate the wings tremor. Four types of wing model are generally used: the conceptual model, physical model, simple analytical model and numerical analysis

model. The first three models are simplified ones, though the numerical model can modify as three dimensional numerical simulation, but ignore the materials composition of the wings. The flight mechanism of dragonfly and the mechanical characteristics of its wings were described, and pointed out that the influence of the unsteady flow must be taken into account when analyzing the flight mechanism of dragonfly. The measuring method of elastic modulus, hardness and bending stiffness of the wings were introduced. It shows that the spanwise EI scales with the cube of span length, whereas the chordwise EI scales with the square of chord length. A prospect of mechanism of dragonfly and its wings was proposed." (Authors)] Address: Zhao, H.-x., School of Aerospace Engineering and Applied Mechanics, Tongji Univ. Shanghai 200092, China

9156. Żurawlew, P. (2009): Occurrence and records of breeding behaviour of Scarlet Dragonfly *Crocothemis erythraea* (Brullé, 1832) (Odonata: Libellulidae) in the Pleszew Poviát (south-eastern Great Poland). *Odonatrix* 5(1): 18-21. (in Polish, with English summary) [In 2007 and 2008, "over 60 study sites were controlled against the occurrence of Odonata. 45 species were recorded within (61,6% of the dragonfly fauna in Poland). *C. erythraea* was recorded at four study sites (all of them were clay excavations): 1) Kwileń (51°59'N, 17°51'E, UTM: XT96), in 2007 - 4 observations 1 male, and in 2008 it was noted during 9 controls: the highest numbers 10 VI - ca. 15 males, 3 VII and 31 VII - each ca. 10 males, additionally, 10 VI a pair in copula was observed, and next, 1 female laying eggs in *Batrachium* sp.; 2) Kowalew (51°53'N, 17°43'E, UTM: XT85), 1 male observed 11 VI 2008; 3) Nowa Wies (51°52'N, 17°46'E, UTM: XT95), 1 male recorded on 18 VI 2008; 4) Lenartowice (51°55'N, 17°48'E, UTM: XT95), 2 males patrolling and territorial noted on 25 VI 2008. In Poland the stable populations of the Scarlet Dragonfly have been found so far in the valley of the Upper Vistula River and in Przemysl Upland. Clay excavations are the environments that play very important role in the existence of many dragonfly species. This refers not only to the Pleszew Poviát but also to the whole south-eastern Great Poland (Wielkopolska)." (Author)] Address: Żurawlew, P., Kwileń 67A, 63-313 Chocz, Poland. E-mail: grusleo@wp.pl

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9157. Andrew, R.J. (2010): Mortality during emergence of *Pantala flavescens* Fabricius in central India (Anisoptera: Libellulidae). *Odonatologica* 39(1): 57-62. (in English) ["Mortality during emergence was studied at an open drain in the city of Nagpur (central India). The total mortality rate (MR) was 10.92% (n = 686). Failure to moult (incomplete emergence state, MR = 4.8%) and failure to expand abdomen and harden wings for flight (complete emergence state, MR = 6.12%) were the two major reasons of mortality. The emerging dragonflies failed to moult and were found dead in the following conditions: cuticle of the thorax split and head and thorax of the pharate partly out of the exuviae (MR = 2.04%), head, thorax and wings out but the entire abdomen trapped in the exuviae (MR = 2.76%). After complete moulting some pharates were found floating, dead or completely exhausted in the water body. Some of the dead pharates had a curved telescopic abdomen

and crumpled (MR = 0.44%), or stretched wings (MR = 2.33%), while others exhibited a straight, expanded abdomen and stretched overlapping (MR = 1.75%) or stretched spread wings (MR = 1.60%). Death due to overcrowding and predation was negligible. Statistical analysis revealed that mortality is independent of stage of emergence ($P = 0.25$). (Author)] Address: Andrew, R.J., Dept of Zoology, Hislop College, Civil lines, Nagpur-440 001, India. E-mail: rajuanrew@yahoo.com

9158. Andrew, R.J.; Patankar, N. (2010): The process of moulting during female emergence of the dragonfly *Pantala flavescens* (Fabricius) (Anisoptera: Libellulidae). *Odonatologica* 39(2): 141-148. (in English) ["The chain of events occurring during emergence in *P. flavescens* is described in detail. The moulting process is divided into 3 stages. The larva climbs out of the water a few hours after sunset. If disturbed while climbing, it exhibits thanatosis i.e. death feigning and crab-like side-ways crawling. It stops at a suitable vertical emergent support. Manipulation from vertical to horizontal of this support stops commencement of ecdysis. 1 Stage I starts from the moment the larva finds a suitable site for moulting. Soon, it starts shuddering, quivering and shaking its body in a synchronized pattern. The imago inside the exuviae exerts pressure on the thoracic tergites until the cuticle splits. This stage varies from 8 to 20 min and occupies 16% of the moulting period. 1 During stage II, the head and thorax of the imago emerge out of the split thoracic cuticle. The imago exhibits an antero-posterior humping movement and the body hangs out downwards with folded legs. The half suspended, upturned imago starts 'breathing' heavily. Unfolding of the legs and movements of the packed wings takes place in a characteristic manner. The imago turns upwards, grips the head of the exuviae and jerks out the remaining terminal portion of the abdomen from the exuviae. This stage takes 18 to 35 min and occupies 31% of the moulting time. Pigmentation of the head region is completed during this stage. 1 In stage III, the imago is released from the exuviae, it starts hardening its cuticle and extending the wings. The imago moves a few inches above the exuviae. The abdomen is pale green and curved upwards. The wings expand but are opaque. Simultaneously, pigmentation of the body starts around the thoracic region and the terminal tip of the abdomen. Within 10-14 min the whole body of the imago develops a species-specific teneral pattern of colouration. Meanwhile, the expanding wings unfold and separate out and the teneral adult is ready for flight. This stage takes 40-55 min and occupies 53% of the total moulting period. Observations on incomplete metamorphosis indicate that gravitational force is responsible for uniform wing expansion." (Authors)] Address: Andrew, R.J., Dept of Zoology, Hislop College, Civil lines, Nagpur-440 001, India. E-mail: rajuanrew@yahoo.com

9159. Baker, R.A. (2010): Robert John Tillyard (1881-1937) F.R.S. - an account of his life and legacy with special reference to odonatology. *J. Br. Dragonfly Society* 26(1): 1-9. (in English) ["R. J. Tillyard had a short but remarkable life into which he packed so much scientific work. Trained as a mathematician at Cambridge, he soon left England for Australia to teach at the grammar school in Sydney before embarking on a career in scientific research and then scientific administration in Australia and New Zealand. However his first love was in natural history and in particular dragon-

flies. He published about 180 scientific papers; also five books, his best known being "The Biology of Dragonflies". He was elected a Fellow of the Royal Society in 1925." (Author)] Address: Baker, R.A., Faculty of Biological Sciences, University of Leeds, Leeds LS2 9JT, UK

9160. Bernard, R.; Schmitt, T. (2010): Genetic poverty of an extremely specialized wetland species, *Nehalennia speciosa*: implications for conservation (Odonata: Coenagrionidae). *Bulletin of Entomological Research* 100(4): 405-413. (in English) ["Oligo- and mesotrophic wetlands, such as bogs, fens and swamps, have become more and more restricted in Europe, and wetland species related to them have increasingly been threatened. Due to increasing habitat fragmentation, the exchange of individuals of these species among sites and, as a consequence, gene flow has been reduced or even eliminated. Therefore, we analysed the genetic structure of 11 populations of an endangered stenotopic damselfly, *Nehalennia speciosa* (Odonata: Coenagrionidae), in Poland and Lithuania by means of allozyme electrophoresis of 14 gene loci. The overall genetic diversity of all populations was low (A: 1.32; H: 2.6%; Ptot: 29.2%), and no significant differences were observed among the different groupings of populations (degree of fragmentation, habitat type and size, population size). The genetic differentiation among populations was also low (FST: 2.0%) and no regional groups were detected. A low degree of isolation by distance was observed for genetic distances. Taking into account these results, the conservation effort for this species should be focused on large local populations and not necessarily on metapopulation structures. Furthermore, *N. speciosa* could be (re-)introduced in extinct patches and seemingly suitable localities. Genetically, such relocations should be feasible due to the generally high genetic homogeneity of populations." (Authors)] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: rbernard@main.amu.edu.pl

9161. Bernard, R.; Daraž, B. (2010): Relict occurrence of East Palaearctic dragonflies in northern European Russia, with first records of *Coenagrion glaciale* in Europe (Odonata: Coenagrionidae). *International Journal of Odonatology* 13(1): 39-62, pl. 1. (in English) ["The East Palaearctic *C. glaciale* and *C. hylas* are characterized by a current disjunct distribution. New data from northern European Russia significantly modify the earlier known pattern of their distribution. The first European records of *C. glaciale* and a new record of *C. hylas* west of the Urals are reported from the environs of Pinega village (Arkhangelsk oblast, Pinega region). Distribution ranges of these two species are analysed in light of their palaeogeography. These postglacial relicts in Europe are representatives of a cold-stenothermal fauna that probably colonized the continent during the late Pleistocene and early Holocene in the period of the maximum spread of birch and pine. During the Atlantic period they withdrew far to the East remaining probably only as isolates in the Urals and in Europe. However, the new records suggest that the European remains of the early Holocene distribution may be more numerous and extensive than previously believed and are concentrated especially in the almost unexplored northeast. The survival of *C. glaciale* and *C. hylas* in the presumptive isolate of their distribution range in the Pinega region is probably a consequence of a specific combination of severe climate and habitat and microclimatic

conditions, largely influenced by karst. The habitat conditions at 'Pinega' localities are analysed in the context of the species' requirements. Additionally, biogeographically important findings of the North and Central Asian *Aeshna serrata* are recorded. This species was previously assumed to occur in Europe only as an isolate around the Baltic Sea, but the new records suggest that it has a much more extensive but fragmented distribution in the European north and northeast." (Authors)] Address: Bernard, R., Dept General Zool., Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: rbernard@main.amu.edu.pl

9162. Bernard, R.; Kosterin, O.E. (2010): Biogeographical and ecological description of the odonata of eastern Vasyugan Plain, west Siberia, Russia. *Odonatologica* 39(1): 1-28. (in English) ["Results of the studies of odonate fauna, carried out in July 2006 in the odonatologically almost unexplored Vasyugan Plain, are presented. The studies concentrated in the northern and northeastern parts of the largest bog in the world, the Vasyugan Bog, and its surroundings. Large primeval complexes of Sphagnum bogs and fens and other accompanying habitats, man-made as well, were studied. 25 localities are briefly described and the occurrence of 35 recorded spp. is commented. Due to almost total absence of typically East Palaearctic species (only *Shaogomphus postocularis* found), the aspect of the Odonata fauna in the studied area is similar to a certain degree to that known from central and eastern Europe, but with some differences in the species composition, abundance of many species and their habitat preferences. In *Coenagrion puella*, *C. pulchellum*, *Enallagma risi*, *Nehalennia speciosa*, *Gomphus vulgatissimus*, *Shaogomphus postocularis*, *Somatochlora flavomaculata*, *Leucorrhinia albifrons*, and *L. pectoralis*, the northern limit of their distribution appears further N than it was previously known. This suggests that the actual northern range limit of some of these species in W Siberia does not descend as sharply to the S as it was expected. The first known site of *S. postocularis* W of the Ob' river and on a perfect plain is also worth noticing. Among the most remarkable discoveries was the regular, area-wide occurrence of several previously poorly known in Siberia species, such as *N. speciosa*, *Aeshna subarctica*, *G. vulgatissimus* and *S. flavomaculata*. Taxonomically interesting is the coexistence, in the studied area but not at the same localities, of two taxa considered as subspecies or separate species, *E. c. cyathigerum* and *E. (c.?) risi*. The fact of clear spatial separation and at most a minimum degree of intergrading (if any) of these 2 taxa suggests their full species status which would agree with morphological and recent molecular data. The regular and not rare presence of 2 androchrome *Calopteryx splendens* / forms and females with the wings coloured to the tips, as well as the occurrence of brownish wing 'smoking' of many / *S. flavomaculata* and *S. arctica* are peculiar features of the Vasyugan Odonata aspect. The male segregation in the 'triangle' of peat bog aeshnids, *Aeshna crenata*, *A. juncea* and *A. subarctica*, is described and discussed. Between *A. juncea* and *A. subarctica* it was very advanced, partially spatial and partially weather/temporal, between *A. crenata* and *A. subarctica* almost complete, spatial, and between *A. crenata* and *A. juncea* advanced, weather/temporal. These observations confirm the dominant position of *A. crenata* over the water table, and also suggest the lack of *crenata*-dominance off the water table. The reliability of adult diagnostic features, more

and less commonly used to distinguish between *A. subarctica* and *A. juncea*, is discussed." (Authors)] Address: Kosterin, O.E., Institute of Cytology & Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

9163. Brodman, R.; Newman, W.D.; Laurie, K.; Osterfeld, S.; Lenzo, N. (2010): Interaction of an aquatic herbicide and predatory salamander density on wetland communities. *Journal of Herpetology* 44(1): 69-82 (in English) ["Pesticides can be important conservation tool, but they could have unintended impacts on amphibians. The commercial glyphosate-based herbicide Accord is approved for use in wetlands and ponds because it is designed to be safer to aquatic wildlife than other herbicide formulations (e.g., Roundup or Atrazine); however, field experiments are needed to determine whether there are direct, indirect, or sublethal effects on amphibians or effects on wetland community structure. We conducted a replicated field experiment in constructed ponds to test for both the effects of Accord and predator (Tiger Salamanders, *Ambystoma tigrinum*) density on amphibians and aquatic invertebrates. Herbicide treatment had significant density-dependent effects on Tiger Salamander growth, development, and survival. The survival of anurans and aquatic invertebrates was also affected by herbicide treatment and predator density. At certain Tiger Salamander densities, the community structure was altered such that some species became more common with herbicide treatment, whereas others became less common. Behaviour assays of salamander larvae suggest that herbicide treatment alters predator-prey relationships in the experimental pond communities. These results suggest that competition and predation may mediate indirect effects of this herbicide on the aquatic fauna. We conclude that exposure to Accord poses less of a risk to the ecology of amphibians than do other formulations of glyphosate-based herbicides. ... The abundance of benthic worms (*Turbellaria* and *Oligochaeta*) and pelagic insects (*Anisoptera*, *Zygoptera*, *Corixidae*, *Notonectidae*, *Belostomatidae*, *Gyrinidae*, *Dytiscidae*, *Chaoboridae*) were not significantly affected by herbicide treatment. ... Tiger Salamander larvae from herbicide treated ponds ate significantly fewer chironomid midges and *Bufo* tadpoles but significantly more damselflies than larvae from control ponds." (Authors)] Address: Brodman, R., Biology Department, Saint Joseph's College, Rensselaer, Indiana 47978 USA. E-mail: bobb@saintjoe.edu

9164. Bwong, B.A.; Measey, G.J. (2010): Diet composition of *Xenopus borealis* in Taita Hills: effects of habitat and predator size. *African Journal of Ecology* 48(2): 299-303. (in English, with French summary) [Kenya; "Frogs in the genus *Xenopus* are ubiquitous in sub-Saharan Africa, yet very little is recorded on their ecology. They are commonly found in anthropogenically disturbed habitats, but how do these compare to conspecifics from natural habitats? The diet of *Xenopus borealis* from three different sites in Taita Hills, Kenya was established based on a sample of 77 (54 females and 23 males) specimens from two disturbed and one pristine sites. *Xenopus borealis* from all the sites was found to be a dietary generalist, feeding predominantly on invertebrates. A total of twelve invertebrate orders both terrestrial and aquatic were recorded in addition to amphibian eggs, tadpoles and fish. Frogs from the

pristine forest were smaller and had ingested more terrestrial prey items than frogs in the disturbed open habitat ponds. The stomach content (both by mass and quantity) was independent of body size. The results suggest that *X. borealis* is an opportunistic generalist predator which may be constrained by food availability in its natural habitat. However, disturbed habitats provide abundant food items which are enough to significantly increase the mean size of the population." (Authors) Odonata were recorded from all three habitats sampled.] Address: Bwong, B.A., Herpetology Section, National Museums of Kenya, PO Box 40658-00100, Nairobi, Kenya: E-mail: bebwong@yahoo.com

9165. Catarino, M.F.; Zuanon, J. (2010): Feeding ecology of the leaf fish *Monocirrhus polyacanthus* (Perciformes: Polycentridae) in a terra firme stream in the Brazilian Amazon. *Neotropical Ichthyology* 8(1): 183-186. (in English, with Portuguese summary) ["*M. polyacanthus* is a remarkable leaf-mimicking fish that inhabits streams, lake and river margins along the Amazon basin. Despite its obvious predatory habits and being frequently present in the international aquarium trade, little is known about its diet under natural conditions. We examined 35 specimens of leaf fish (28.5-82.0 mm SL), of which 19 had food the stomach. Thirty-three preys were found in the stomach contents, 19 of which were measured (2.0-33.0 mm total length). Up to five preys were found in the stomach contents of a single leaf fish specimen. The diet of the leaf fish was constituted by fish (63.15% FO, n = 12) and invertebrates (36.3% FO, n = 4); fish and invertebrate preys occurred together in three stomachs (15.8% FO). Of the 33 prey found in the stomachs, 21 were fish and 12 invertebrates. Among the consumed preyfishes, Characiformes and Perciformes represented 76.1% and 14.2% respectively. Characidae was the most commonly recorded prey family, followed by Lebiasinidae. Invertebrates were represented by shrimps (Decapoda) and insects (Coleoptera, Hymenoptera, Ephemeroptera and Odonata). There was a positive relation between the size of the leaf fish specimens and of its consumed preys. The combination of leaf fish's visually effective body camouflage and the reduced activity of the characids at crepuscular hours probably allow the capture of such fast moving preys. The coiled position of the fishes found in the stomach of *M. polyacanthus* possibly allowed the accommodation of more than one prey simultaneously, which seems to be important for predators that consume proportionally large preys that are captured only occasionally." (Authors)] Address: Catarino, M.F., Universidade Federal do Amazonas, Laboratório de Ecologia Pesqueira, Mini Campus, Setor Sul, Bloco Z, Manaus, AM, Brazil. E-mail: michel-catarino@yahoo.com.br

9166. Chadwick, W. (2010): Costa Rica in April. *Argia* 22(2): 7-8. (in English) [14-20-IV-2010, Villa Lapas and Carara National Park, Puntarenas Province, Costa Rica. 16 taxa are listed including one *Argia* to be described as new to science.] Address: Chadwick, W., Yonkers, New York, USA. E-mail: mrcnaturally@optonline.net

9167. Cham, S. (2010): Variations in the key features of exuviae of the Variable Damselfly *Coenagrion pulchellum* (Vander Linden) and the use of a score matrix to determine identification. *J. Br. Dragonfly Society* 26(1): 10-28. (in English) ["The identification of exuviae of the *C. pulchellum* can be determined in the majority

of cases by examination of the caudal lamellae and the setae on the prementum. These can however, be highly variable and some specimens are similar to *C. puella* and pose difficulties for separation. A combination of characters when used in a score matrix will aid identification of borderline specimens." (Author)] Address: Cham, S., 24 Bedford Avenue. Silsoe, Bedfordshire, MK45 4ER, UK

9168. Choong, C.Y.; Orr, A.G. (2010): The larva of *Podolestes orientalis* from West Malaysia, with notes on its habitat and biology (Odonata: Megapodagrionidae). *International Journal of Odonatology* 13(1): 109-117, pl. IV. (in English) ["The larva of the south-east Asian *P. orientalis*, is described and figured. Specimens were collected from shallow forest pools lined with large dead leaves in secondary lowland forest. Final and earlier stadium larvae were found concentrated around the edges of pools in very shallow water. Larvae sometimes perched in exposed situations, just below the water surface, with abdomen upturned and caudal lamellae splayed outward to expose the broad respiratory surfaces. This represents the first account of the immature stages for this south-east Asian genus. The caudal lamellae are very broad and flattened, inserted horizontally, suggesting a close relationship between the genus *Podolestes* and Australian region megapodagrionids." (Authors)] Address: Choong, Chee Yen, Centre for Insect Systematics, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia. E-mail: cychoong@ukm.my

9169. Collins, S.; Reece, B; McIntyre, N. (2010): Lestes on the playas of the southern high plains of Texas. *Argia* 22(2): 4-7. (in English) [Specimens were collected from 37 wet playas in 10 counties in Texas, USA from July 2003 to September 2009. A map shows the distribution of playas in the Texas panhandle and the localities of *Lestes alacer* and *L. australis*.] Address: McIntyre, Nancy, Department of Biological Sciences, Texas Tech University, Mailstop 3131, Lubbock, TX 79409-3131, USA. E-mail: nancy.mcintyre@ttu.edu

9170. Costa, J.M.; Carriça, C.; Santos, T.C.; Mascarenhas, B.J.A. (2010): Description of the final instar of *Macrothemis heteronycha* (Calvert) (Anisoptera: Libellulidae). *Zootaxa* 2506: 65-68. (in English) ["Material Deposited in the Museu Nacional da Universidade Federal do Rio de Janeiro; Brazil, Rio de Janeiro, 22°14'31" S and 43°42'5" W, 6.III.2004 (alt: 249 m) B. Mascarenhas leg. Ultimate larval instar male emerged 23.III.2004." A key to the known *Macrothemis* larvae (n = 10) is provided.] Address: Costa, Janira, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, RJ, Brazil. E-mail: jmcosta@globocom

9171. Covaciu-Marcov, S.D.; Cicirt-Lucaciu, A.; Mitrea, I.; Sas, I.; Caus, A.V.; Cupsa, D. (2010): Feeding of three syntopic newt species (*Triturus cristatus*, *Mesotriton alpestris* and *Lissotriton vulgaris*) from Western Romania. *North-Western Journal of Zoology* 6(1): 95-108. (in English) ["The feeding of three newt species from western Romania is different in the aquatic period regarding both the composition and the time needed. Thus, *Mesotriton alpestris* spends shorter time in the water compared to *Triturus cristatus* and *Lissotriton vulgaris*, having the weakest feeding habit in this environment. This is probably a consequence of its relationship with mountainous and harsher climate areas that

shortens its aquatic environment period, which also affects the species in a lower altitude habitat. The difference in the food of the three species results from their different sizes and hunting territories. *L. vulgaris* mainly hunts near puddle banks, in areas with lower and warmer water and the other two species hunt near the bottom, in the deeper areas. The crested newts have the longest aquatic period and the highest affiliation for hunting in this habitat. This species consumes larger sized preys while the common newts consume numerous reduced sized preys, having an intensive feeding and high food diversity. Meanwhile, differences between the food ingested by male and female individuals are not significant in any newt species." (Authors) Odonata don't play an important role as food of nets.] Address: Covaciu-Marcov, S.D., University of Oradea, Faculty of Sciences, Department of Biology, 1 Universitatii str., Oradea - 410387, Romania. E-mail: scovaciu@uoradea.ro

9172. Daigle, J.J.; Abad, R. (2010): *Ophiogomphus australis* sightings in Florida. *Argia* 22(2): 11. (in English) [Notes on some recent records of *O. australis* in Florida, USA detailed at the county level.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

9173. De Knijf, G.; Termaat, T. (2010): *Sympetum meridionale* in Belgium and The Netherlands. Identification, distribution and status in North-western Europe. *Brachytron* 13(1/2): 4-18. (in Dutch, with English summary) ["Since 2000 sightings of *S. meridionale* have become frequent in Belgium and The Netherlands. First records came from Belgium, soon followed by observations in The Netherlands. *S. meridionale* is difficult to identify among other *Sympetum* species. notable *S. striolatum* and *S. vulgatum* with which it often co-occurs. *S. meridionale* shows a lot of variation in coloration depending on age and sex. In general it can be distinguished by the paucity of black markings. Fully coloured imagines can be recognised by their rather pale coloration. It is advisable that several characters are checked for correct identification. In the 19th century, the species was only observed once in The Netherlands (Friesland). More records are available from Belgium, mostly from Selys, but its former status remains unclear. It is plausible that the species could reproduce then, but only sporadically and not over a longer time period. Records from the 20th century are very scarce. There is one observation in 1906 in a large peat bog area at 700 m altitude in Belgium and one in The Netherlands in 1994. Since 2000, 26 records are available from 15 localities in Belgium, nearly all from the northern part. *S. meridionale* could reproduce successfully at least on three localities: in 2000 in Harchies (Henegouwen), in 2003 in Kallo (port of Antwerp) and in 2006 and 2007 in Ekeren (north of Antwerp). Only two records are available from the Netherlands for the period 2000-2005. Since 2006 the species has been observed at no less than 35 localities. At one locality (Vooroes Duin, Zuid-Holland) it was able to reproduce from 2006 to 2008. This recent increase in records has also been noted in several other regions or countries in North-western Europe. For the French regions Picardie and Nord-Pas-de-Calais, no records from before 2000 are available. Since then, several records are known. *S. meridionale* could reproduce en masse at water reservoirs in the region Champagne-Ardenne. No populations are present in the Lorraine region, but the species

has been noted at several localities, especially in the valley of the Moselle. The only record for Luxembourg is from 1993 and also originated from this river valley. The last records in the UK already date back from 1948, when the species was noted on the Channel Islands. This might reflect a lack of experience of English odonatologists with the species. In Germany, the species has always been limited to Baden-Württemberg and Bavaria. In more northern regions like North Rhine-Westphalia, the species was first observed in 2000. It has been observed since 2006 in most of the German federal states and reproduction has been recorded at several localities. We suppose that the recent increase of records of *S. meridionale* in Belgium and The Netherlands is primarily due to climate change. As so, it follows the recent increase of several other southern species, like *Crocothemis erythraea*, in Northern Europe. Specimens of *S. meridionale* have been observed in Belgium and The Netherlands at a broad spectrum of habitats, ranging from heathlands to forest edges, peat bogs, dune waters and garden ponds. All localities where reproduction could be observed can be characterised by the presence of relatively small, shallow and very thermophilic water bodies, which partly dry out in summer. Well developed emergent vegetation is present at the shore. Imagines of *S. meridionale* can be observed in Belgium and The Netherlands from mid June to early September. The species has only one generation per year in Belgium and the Netherlands." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

9174. Donnelly, N. (2010): R. Duncan Cuyler, 1929-2010. *Argia* 22(2): 2-4. (in English) [Obituary († 3-V-2010), with personal reminiscences of Carl Cook, Sid Dunkle and Nick Donnelly.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

9175. Dragonfly Society of the Americas (2010): *Argia* 22(2). *Argia* 22(2): (in English) [In This Issue: 1; Tell Your Friends!: 1; Calendar of Events: 1; 2010 SE DSA Meeting in Panama City, by Jerrell J. Daigle: 1; Coming Soon: Damselfly Genera of the New World: An Illustrated and Annotated Key to the Zygoptera: 14; From the Huffington Post: 15; A call for papers for BAO: 15. Papers from *Argia* 22(2) omitted in this section are abstracted in this issue of OAS.] Address: Dragonfly Society of the Americas c/o Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

9176. Dudgeon, D.; Cheung, F.K.W.; Mantel, S.K. (2010): Foodweb structure in small streams: do we need different models for the tropics?. *J. N. Am. Benthol. Soc.* 29(2): 395-412. (in English) ["Prevailing notions of foodweb structure and trophic relations in fresh waters are based on research undertaken in a limited range of latitudes or habitat types. This limitation had led to the general view that stream food webs are detritus-based with short food chains and simple interactions that often are dominated by a few key species. We used gut-content analyses and stable-isotope signatures to characterize feeding relationships and foodweb attributes of benthic communities in riffles in 2 forest streams in Hong Kong. We compared them with existing data on foodweb structure from pools in 1 of the streams and data from the literature. The 2 approaches to dietary analyses yielded complementary results,

providing confidence that trophic relations and foodweb structure were adequately characterized. Food webs in both streams were remarkably similar regardless of habitat (riffle vs pool). Consumers in both streams depended primarily on autochthonous resources, as has been reported from some other tropical streams, and food chains were short although connectance was higher than has been recorded previously for stream food webs. Very few omnivores were found, and omnivory was even rarer than is typical of temperate streams, although it is common in other tropical streams and rivers. No evidence was found for dominance by a few common macroconsumer species, as observed elsewhere in the tropics. The apparently high levels of autochthony in tropical running waters imply that models of ecosystem functioning for northern temperate streams are inadequate for describing tropical systems. However, marked differences in the degree of omnivory and dominance of tropical stream food webs by macroconsumers is evidence that characterization of trophic interactions and stream ecosystem functioning cannot be captured by a simple tropical vs temperate dichotomy. Successful management of these systems will depend upon development of conceptual models that reflect the diversity of food webs within and between regions." (Authors) A single odonate, *Euphaea decorata* (Euphaeidae), was well represented in significant numbers in samples from both streams (Appendix 1).] Address: Dudgeon, D., School Biological Sciences, Division of Ecology & Biodiversity, University of Hong Kong, Hong Kong. E-mail: ddudgeon@hkucc.hku.hk

9177. Felix, Z.I.; Wang, Y.; Schweitzer, C.J. (2010): Effects of experimental canopy manipulation on amphibian egg deposition. *Journal of Wildlife Management* 74(3): 496-503. (in English) ["Although effects of forest management on amphibians are relatively well studied, few studies have examined how these practices affect egg deposition by adults, which can impact population recruitment. We quantified the effects of 4 canopy tree-retention treatments on amphibian oviposition patterns in clusters of 60-L aquatic mesocosms located in each treatment. We also related aquatic and terrestrial biophysical parameters in treatment plots to oviposition patterns. Cope's gray treefrogs (*Hyla chrysoscelis*) deposited more egg masses in clear-cut and 25–50% tree-retention treatments than in controls. In contrast, mountain chorus frogs (*Pseudacris brachyphona*) deposited more egg masses in unharvested control and 75% retention treatments than in clear-cut or 25–50% retention treatments. Spotted salamanders (*Ambystoma maculatum*) only deposited eggs in 75% retention treatments and controls. The number of egg masses deposited by mountain chorus frogs was positively related to canopy cover and negatively related to water temperature, pH, and dissolved oxygen, whereas we noted the opposite relationships for Cope's gray treefrogs. We did not detect a relationship between the number of egg masses deposited by any species and the distance of mesocosms to either the nearest mature closed-canopy forest or to the nearest natural amphibian breeding pool. The impacts of the silvicultural treatments we studied were species-specific and depended on the amount of trees removed. In areas where protection of spotted salamander and mountain chorus frog breeding habitat is a priority, we recommend harvests retain at least 75% of the canopy. Our results also suggest that retention of 25–50% of canopy trees surrounding amphibian breeding pools has little conservation benefit.

[...] We observed larval dragonflies at least once in 17% of 25–50% and 75% retention treatment arrays, and in 33% of clear-cut arrays. Other studies have reported increased prevalence of dragonflies in open- versus closed-canopy pools (McCauley 2005, Hocking and Semlitsch 2008). Increased abundance of larval dragonflies in clear-cuts compared to mature forest habitats had little effect on survival of gray treefrog tadpoles in Missouri (Hocking and Semlitsch 2008). It is unlikely that higher prevalence of dragonfly larvae in open-canopy treatments affected mountain chorus frog and spotted salamander oviposition because these amphibian species breed prior to dragonflies and we dewatered all pools between years." (Authors)] Address: Felix, Z.I., Center for Forestry, Ecology, and Wildlife, Alabama A&M University, Normal, AL 35762, USA. E-mail: zif@reinhardt.edu

9178. Ferland-Raymond, B.; March, R.E.; Metcalfe, C.D.; Murray, D.L. (2010): Prey detection of aquatic predators: Assessing the identity of chemical cues eliciting prey behavioral plasticity. *Biochemical Systematics and Ecology* 38(2): 169-177. (in English) ["Chemical cues transmitted through the environment are thought to underlie many prey responses to predation risk, but despite the known ecological and evolutionary significance of such cues, their basic composition are poorly understood. Using anuran tadpoles (prey) and dragonfly larvae (predators), we identified chemical cues associated with predation risk via solid phase extraction and mass spectrometry of the extracts. We found that dragonfly larvae predators consistently produced a negative ion, m/z 501.3, when they fed on bullfrog (*Rana catesbeiana*) and mink frog (*Rana septentrionalis*) tadpoles, but this ion was absent when dragonflies were fasted or fed invertebrate prey. When tadpole behavioral responses to dragonfly chemical cues were examined, tadpoles reduced their activity, particularly in response to dragonflies feeding on tadpoles. Furthermore, a negative correlation was noted between the level of tadpole activity and the concentration of the m/z 501.3 compound in dragonfly feeding trials, indicating that this ion was possibly responsible for tadpole anti-predator behaviour." (Authors)] Address: Ferland-Raymond, B., Department of Biology, Trent University, Peterborough, Ontario, Canada. E-mail: bastien.ferland-raymond@usherbrooke.ca

9179. Ferreira, S. (2010): 1st European Congress on Odonatology. Programme and abstracts, 2-5 July 2010, Vairão-Vila do Conde, Portugal: 77 pp. (in English) [Dijkstra, K.-D.: The biogeography of European dragonflies, with an emphasis on Afrotropical species in the Palaearctic; Froufe, E.; Ferreira, S.; Boudot, J.-P.: Phylogeny of Cordulegaster in West Palearctic; Kosterin, O.: Siberian taxonomical problems concerning European odonate species; Kalkman, V.: An atlas of the European dragonflies: will it ever happen?; Sillero, N.; Tarroso, P.: How to record and store species locations? The use of Geographical Information Systems, GPS and Free/Open Source software; Kulijer, D.: Odonata in Bosnia and Herzegovina; Martens, A.: An overview of exotic dragonflies found in Europe; Nielsen, E.R.: Danish Odonata Atlas and newly arrived species; Mihokovic, N.; Matejci, M.: Towards the atlas of Croatian dragonflies; Dyatlova, E.S.; Kormyzenko, V.L.: Dragonflies of Moldova: state of knowledge and personal observations (2005, 2009); Jovic, M.; Marinov, M.; Gligorovic, B.; Hacet, N.; Kitanova, D.; Kulijer, D.: A

Project Named BOB . Balkan OdoBase; Conze, K.-J.: Dragonflies in Germany - the atlas-project of the GdO (society of german-speaking odonatologists); Weihrauch, F.; Malkmus, R.: Distribution and ecology of *Sympetrum nigrifemur* in the Macaronesian Islands (Odonata: Libellulidae); Vilenica M.; Micetic, V.; Frankovic, M., Kucinic, M.: Dragonfly composition (Insecta, Odonata) in wetland area of Turopolje region, Croatia; Kitanova, D.; Jovic, M.: Review of Macedonian Odonata; Mancini, C.-O.: An overview on dragonfly (Insecta: Odonata) fauna from Romania; Muranyi, D.: The Odonata fauna of Albania; Riservato, E.; Hardersen, S.: Odonatology in Italy: state of the art; Luque, P.; Soler, E.; Lockwood, M.: The Atlas of Dragonflies and Damselflies of Catalonia; Karjalainen, S.: New records of *Somatochlora sahlbergi* from Finland; Sacha, D.: Notes to conservation of dragonflies in Northern Slovakia; Termaat, T.; Groenendijk, D.; van Strien, A.: A European Dragonfly Monitoring Scheme: how to get started?; Kalmar, A.F.; Devai, G.; Jakab, T.: Preliminary study to monitoring the dragonfly fauna (Odonata) in the ET 56 UTM grid square (South-Nyirseg, Hungary); Soler, E.; Mendez, M.: The dragonflies of temporary pools in Menorca; Lambret, P.H.: Identifying keys to the conservation of *Lestes macrostigma* (Eversmann, 1836): to a European monitoring?; Torralba-Burrial, A.; Ocharan, F.J.; Outomuro, D.; Azpilicueta Amorin, M.; Cordero Rivera, A.: VOPHI: an index to assess threatened dragonfly populations and habitats; Salamun, A.: Research of Balkan goldenring (*Cordulegaster heros*) in Slovenia; Ott, J.: Climatic changes and alien invasive species - a deadly cocktail for dragonflies; Sahlen, G.; Suhling, I.: Communities in forest lakes show ecological shifts: indirect effects of climate change; Suhling, F.; Suhling, I.; Richter, O.: Rising temperatures, altered life cycles and their consequences for dragonflies in Europe; Conze, K.-J.; Menke, N.; Olthoff, M.: Nature conservation response to climate change - some ideas from Northrhine-Westphalia, Germany; De Knijf, G.; Flenker, U.; Vanappelghem, C.; Mancini, C.O.; Kalkman, V.J.: The impact of climate change on two boreo-alpine dragonfly species, *Somatochlora alpestris* and *S. arctica*, at the edge of their range; Ott, J.; Sanchez-Guillen, R.A.; Cordero-Rivera, A.: Microevolution through climatic changes? The example of the expansion of *Crocothemis erythraea* in Europe; Parr, A.: Migrant Dragonflies in the UK: Distributions are flexible, especially in times of climate change; Kalkman, V.: European Red List; Nelson, B.: Dragonflies on the western fringe: red list and important dragonfly areas of Ireland; Günther, A.: Construction of a new stream (even) for dragonflies; Groenendijk, D.; Termaat, T.: Protection of Red List species in the Netherlands: ecological research, monitoring and conservation; Watts, P.C.; Thompson, D.J.: Developmental plasticity as a cohesive evolutionary force between alternate-year odonate cohorts; Gordon, L.K.; Watts, P.C.; Thompson, D.J.: Range-wide genetic diversity of the rare odonate *Coenagrion mercuriale*: influence of latitude and isolation; Cordero Rivera, A.; Luque Pino, P.; Azpilicueta Amorin, M.; Blanco Garrido, F.; Cano Villegas, F.J.; da Silva, G.; Gavira Romero, O.; Herrera Grao, A.F.; Nieto, A.; Perez Gordillo, J.; Torralba Burrial, A.; Ocharan Larrondo, F.J.: *Macromia splendens* in the Iberian peninsula: status and priorities for future research; Boudot, J.-P.: Outside European borders: the Odonata from Palearctic Africa; Schneider, W.: The Odonata of the Levant (Eastern Mediterranean): Taxonomy, biogeography, and conservation; Martens, A.: Ecology of the Odonata at the western-

most spot of Africa, the island of Santo Antao, Cape Verde; Riservato, E.; Bouwman, J.; Ketelaar, R.: About dragonflies and dragons blood! Odonata on the island of Socotra (Yemen); Reimer, R.W.: Recent advances in UAE and Oman; Lorenzo-Carballea, M.O.; Hadrys, H.; Cordero-Rivera, A.; Andres, J.A.: Geographic parthenogenesis in the damselfly *Ischnura hastata*: A role for metapopulation structure?; Stoks, R.: Latitude patterns in life history, physiology and behaviour; Cordero Rivera, A.; Lorenzo Carballea, O.: Reproductive behaviour of *Calopteryx haemorrhoidalis*: a species with a surprising phenotypic variation; Ewoud van der Ploeg, E.; Brochard, C.: Photographic Guide to the Exuviae of European Dragonflies; Holuša, O.: Notes to the ecological demands of *Cordulegaster heros* (Cordulegasteridae) in its northern part of area in Slovakia; Leipelt, K.G.: *Cordulegaster insignis* and *C. picta* on Aegean Islands: longitudinal distribution patterns and the mechanism behind them; Dumont, H.: Towards an understanding of *Calopteryx splendens*; Outomuro, D.; Rodriguez-Martinez, S.; Ocharan, F.J.: Fluctuating asymmetry in wings of *Calopteryx damselflies* at species, population and latitudinal levels; Hardersen, S.: The influence of season on wing morphology of *Calopteryx splendens* (Harris, 1782); Sanchez-Guillen, R.A.; Wellenreuther, M.; Cordero-Rivera A.; Svensson, E.; Hansson, B.: Genetic diversity and introgression between *Ischnura elegans* and *I. graellsii* (Odonata: Coenagrionidae); Gyulavari, H.A.; Felföldi, T.; Benken, T.; Szabo, L.J.; Miskolczi, M.; Cserhati, C.S.; Horvai, V.; Marialigeti, K.; Devai, G.Y.: Preliminary morphometric and molecular investigations on adult specimens of two *Lestes* (Chalcolestes) taxa; Sacha, D.: Project "Popularizacia odonatologie na Slovenskuh", its outputs and inspiration for the participants of the Congress.] Address: Ferreira, Sónia, Centro de Investigação em Biodiversidade e Recursos Genéticos (CIBIO), Campus Agrário de Vairão, Rua Padre Armando Quintas, 4485-661 Vairão, Portugal. E-mail: europeandragonflies@googlemail.com

9180. Fraker, M.E.; Hu, F.; Cuddapah, V.; McCollum, A.; Relyea, R.A. (2010): Characterization of an alarm pheromone secreted by amphibian tadpoles that induces behavioral inhibition and suppression of the neuroendocrine stress axis. *Hormones and Behavior* 55(4): 520-529. (in English) ["Many species assess predation risk through chemical cues, but the tissue source, chemical nature, and mechanisms of production or action of these cues are often unknown. Amphibian tadpoles show rapid and sustained behavioral inhibition when exposed to chemical cues of predation. Here we show that an alarm pheromone is produced by rapid tadpole skin cells, is released into the medium via an active secretory process upon predator attack (*Anax junius*), and signals predator presence to conspecifics. The pheromone is composed of two components with distinct biophysical properties that must be combined to elicit the behavioural response. In addition to the behavioural response, exposure to the alarm pheromone caused rapid and strong suppression of the hypothalamo-pituitary-adrenal (HPA) axis, as evidenced by a time and dose-dependent decrease in whole body corticosterone content. Reversing the decline in endogenous corticosterone caused by exposure to the alarm pheromone through addition of corticosterone to the aquarium water (50 nM) partially blocked the anti-predator behaviour, suggesting that the suppression of the HPA axis promotes the expression and maintenance

ce of a behaviorally quiescent state. To our knowledge this is the first evidence for aquatic vertebrate prey actively secreting an alarm pheromone in response to predator attack. We also provide a neuroendocrine mechanism by which the behavioural inhibition caused by exposure to the alarm pheromone is maintained until the threat subsides." (Authors)] Address: Denver, R.J., Department of Ecology and Evolutionary Biology, The University of Michigan, Ann Arbor, MI 48109-1048, USA. E-mail address: rdenver@umich.edu

9181. Giannatos, G.; Karypidou, A.; Legakis, A.; Polymeni, R. (2010): Golden jackal (*Canis aureus* L.) diet in Southern Greece. *Mammalian Biology - Zeitschrift für Säugetierkunde* 75(3): 227-232. (in English) ["The diet of jackals was studied in the Mediterranean lowlands of Fokida and Samos island, Greece, by analyzing 127 scats collected between January 2002 and May 2003. Across all seasons frequencies of food items show that the most common items were mammals (frequency 42.7%, biomass 69.8%) and birds (12.0%, biomass 27.7%). Although the frequencies of plant material (27.3%) and insects (18.0%) were quite high, their biomass contribution was low (1.7%, 0.8% respectively). Most of the biomass consumed composed of mammals of domestic livestock origin (55.9%) which were presumably scavenged. This reveals the importance of this food item to the opportunistic jackals in wildlife-poor ecosystems like the anthropogenic Mediterranean lowlands. The occurrence of small mammals in the scats was very low while very few traces of grass and human refuse (such as leftovers of meals, plastic, pieces of paper etc.) were found in the diet of jackals. Furthermore, the findings support the opportunistic nature of a species capable to exploit any easily available food source." (Authors) 3 items from a total of 45 insects represent Odonata.] Address: Giannatos, G., Section of Zoology – Marine Biology, Department of Biology, University of Athens, Panepistimioupolis GR-15784, Athens, Greece. E-mail: giannatos@biol.uoa.gr

9182. Gonzalez-Soriano, E. (2010): A synopsis of the genus *Amphipteryx* Selys 1853 (Odonata: Amphipterygidae). *Zootaxa* 2531: 15-28. (in English, with Spanish summary) ["The Mesoamerican damselfly genus *Amphipteryx* includes one already described and three more undescribed species: *Amphipteryx agrioides*, Selys 1853, *A. chiapensis* (Mexico, Chiapas, 5 mi E Rayón), *A. meridionalis* (Honduras, 10 mi SW Siguatepeque) and *A. nataliae* (Verapaz, Guatemala). Here I include keys and diagnostic illustrations of all species." (Author)] Address: González-Soriano, E., Instituto de Biología, UNAM, Departamento de Zoología Apartado Postal 70-153, C.P. 04510, Mexico D.F. E-mail: esoriano@ibiologia.unam.mx

9183. Grunwell, M.J. (2010): Dragonflies and Damselflies in the State of Qatar. *Journal of the Qatar Natural History March 2010 Issue No. 3: 2-13.* (in English) ["A brief generalist overview of Odonata is given below followed by a summary of eleven known species (*Ischnura evansi*, *I. fountaineae*, *Anax parthenope*, *A. ephippiger*, *Orthetrum sabina*, *Sympetrum fonscolombii*, *Crocothemis erythraea*, *C. sevilla*, *Trithemis annulata*, *Diplacodes lefebvrei*, *Selysiothemis nigra*) in the State of Qatar. The main body is an illustrated and annotated checklist of the Odonata of Qatar followed by speculation about further additions to the list, ending with a proposal for future recording procedures of Odonata in Qatar." (Author)] Address: Grunwell, M.J., Al Khor Inter-

national School – British stream, Secondary Staffroom, PO Box 22166, Doha, Qatar. E-mail: mjgrunwell@gmail.com

9184. Hacet, N. (2010): An anomalous connection in the genus *Aeshna* Fabricius, 1775 (Odonata: Aeshnidae) with an additional record of *Aeshna cyanea* (Müller, 1764) from Turkish Thrace. *Acta entomologica serbica* 15(1): 1-6. (in English, with Serbian summary) ["A heterospecific tandem between a male *Aeshna affinis* and a female *A. cyanea* is reported from Igneada (Longo Forest) in Kirklareli province in the Turkish Thrace Region. The locality, where the tandem was observed, is the second recording locality for *A. cyanea* from the region." (Author)] Address: Hacet, Nurten, Trakya University, Faculty of Arts and Sciences, Department of Biology, TR-22030 Edirne, Turkey. E-mail: nhacet@hotmail.com

9185. Hassall, C.; Lowe, C.D.; Harvey, I.F.; Watts, P.C.; Thompson, D.J. (2010): Phenology determines seasonal variation in ectoparasite loads in a natural insect population. *Ecological Entomology* 35(4): 514-522. (in English) ["1. The extent to which individuals are parasitised is a function of exposure to parasites and the immune response, which in ectotherms may be associated with temperature. 2. We test the hypothesis that seasonal variation in ectoparasite burden is driven by temperature using an extensive mark-release-recapture study of adult *Coenagrion puella* as a model system. Mite counts were taken both at capture and on a subset of subsequent recaptures over two entire, consecutive breeding seasons. 3. Emergence date was the most significant factor in determining individual differences in mite burden, and mean counts for individuals emerging on the same days showed strong unimodal relationships with time of season. Subsequent recounting of mites on a subset of individuals showed that patterns of loss of mites were similar between seasons. 4. While temperature did not significantly affect mite burdens within seasons and ectoparasite prevalence was very similar across the two seasons, intensity of infection and rate of mite gain in unparasitised individuals were significantly higher in the cooler season. 5. We demonstrate that, while temperature may modulate the invertebrate immune response, this modulation does not manifest in variations in mite burdens in natural populations." (Authors)] Address: Hassall, C., Dept of Biology, Carleton University, Ottawa, ON, Canada K1S 5B6. E-mail: chassall@connect.carleton.ca

9186. Holuša, O.; Holuša, J. (2010): "Accompanying" behaviour of *Brachythemis leucosticta* (Burmeister in Europe (Anisoptera: Libellulidae). *Odonatologica* 39(1): 63-70. (in English) ["At a location in southern Spain (nr Vejer de la Frontera, Rio Barbate valley, Andalusia), observations were made on a local population of ca 40 *B. leucosticta* individuals, a species known for its inclination to accompany large mammals (the test subject was a human). The goal of the tests was to ascertain how far they are willing to accompany a large mammal, whether the size of the group has an influence on the distance for accompanying the subject and whether the accompaniment differs between sexes. Accompanying a person was recorded in 53 cases, involving 41 male and 83 female dragonflies. They generally flew at a height of 10-50 cm above the ground in front of the moving person, distributed in a semicircle with a radius of 1-2 m (the maximum observed group size was 11 dragonflies). Group size did not influence

the flight range of the last individual or the detachment of the first individual from the group, as the dragonflies broke away at random. The average distance of accompaniment by females (38.4 m) was further than that by males (23.9 m). The maximum path of accompaniment was 89 m for males and 111 m for females. After detaching from the person, the dragonflies returned to the shade. Only rarely did females settle on open pasture, and then just for a brief period. In 3 cases (i.e. 1.6%), hunting of prey stirred up from the pasture by the person was observed." (Authors) According Dijkstra & Matushkina (2009): Kindred spirits: "Brachythemis leucosticta", Africa's most familiar dragonfly, consists of two species (Odonata: Libellulidae). International Journal of Odonatology 12(2): 237-256 the behaviour described should correspond to *B. impartita*.] Address: Holuša, J., Department of Forest Protection and Game Management, Faculty of Forestry and Wood Sciences, Czech University of Life Sciences, Kamyčká 1176, CZ-16521 Prague 6-Suchbát, Czech Republic. E-mail: HolušaJ@seznam.cz

9187. Hossie, T.J.; Murray, D.L. (2010): You can't run but you can hide: refuge use in frog tadpoles elicits density-dependent predation by dragonfly larvae. *Oecologia* 163(2): 395-404. (in English) ["The potential role of prey refuges in stabilizing predator-prey interactions is of longstanding interest to ecologists, but mechanisms underlying a sigmoidal predator functional response remain to be fully elucidated. Authors have disagreed on whether the stabilizing effect of prey refuges is driven by prey- versus predator-centric mechanisms, but to date few studies have married predator and prey behavioural observations to distinguish between these possibilities. We used a dragonfly [*Anax junius*] nymph-tadpole system to study the effect of a structural refuge (leaf litter) on the predator's functional response, and paired this with behavioural observations of both predator and prey. Our study confirmed that hyperbolic (type II) functional responses were characteristic of foraging predators when structural cover was low or absent, whereas the functional response was sigmoidal (type III) when prey were provided with sufficient refuge. Prey activity and refuge use were density independent across cover treatments, thereby eliminating a prey-centric mechanism as being the genesis for density-dependent predation. In contrast, the predator's pursuit length, capture success, and handling time were altered by the amount of structure implying that observed shifts in density-dependent predation likely were related to predator hunting efficiency. Our study advances current theory by revealing that despite fixed-proportion refuge use by prey, presence of a prey refuge can induce density-dependent predation through its effect on predator hunting strategy. Ultimately, responses of predator foraging decisions in response to changes in prey availability and search efficiency may be more important in producing density-dependent predation than the form of prey refuge use." (Authors)] Address: Hossie, T.J., Environmental & Life Sciences Graduate Program and Department of Biology, Trent University, 1600 West Bank Dr., Peterborough, ON, K9J 7B8, Canada. E-mail: thomashossie@trentu.ca

9188. Hudson, J. (2010): Dragonfly investigations in central Alaska, 2009. *Argia* 22(2): 8-9. (in English) [Records from Bettles, Fairbanks and Galena, Alaska, USA taken in 2008 and 2009, are documented. The state list of Odonata now encompasses 32 species. *Somatochlora*

ra minor is a new state record for Alaska. For some species significant range extensions over several 100 km resp. knowledge on distribution could be recorded.] Address: Hudson, J., Juneau, Alaska, USA. E-mail: jhudson@gci.net

9189. Jenkins, D.K. (2010): Folding wing behaviour in the Golden-ringed Dragonfly *Cordulegaster boltonii*. *J. Br. Dragonfly Society* 26(1): 32-33. (in English) ["An unusual observation is reported of a specimen of *C. boltonii* raising its wings over its back while at rest during a period of light rain." (Author)] Address: Jenkins, Derek, 7 Lakewood Road, Ashurst, Southampton, Hants SO40 7DH, UK

9190. Johansson, F.; Sniegula, S.; Brodin, T. (2010): Emergence patterns and latitudinal adaptations in development time of Odonata in north Sweden and Poland. *Odonatologica* 39(2): 97-106. (in English) ["Using exuviae, data are presented on emergence dates of dragonflies from northern Sweden and northwestern Poland. The 17 species sampled in Sweden showed considerable overlap in emergence periods. In Sweden, *Leucorrhinia rubicunda* was the first species to emerge (May 31) and *Sympetrum danae* the last (July 19). A comparison of first dates of emergence of species in Sweden and Poland showed a difference between 9 and 30 days, with all Polish species emerging first. Compared to spring species, summer species and obligate univoltine summer species showed less difference in first date of emergence between Swedish and Polish populations. In a laboratory experiment *Leucorrhinia dubia* was reared from both regions from the egg to final instar larva under northern Swedish and northwestern Polish photoperiods. Swedish larvae developed faster under a northern Swedish photoperiod compared to a northwestern Polish photoperiod. However, no such difference in development was found for northwestern Polish larvae. This suggests that there are genetic differences between both populations in response to photoperiod. The results are discussed in the context of compensation of larval development of northern populations in relation to photoperiod." (Authors)] Address: Johansson, F., Dept of Ecology & Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

9191. Jovic, M.; Gligorovic, B.; Stankovic, M. (2010): Review of faunistical data on Odonata in Bosnia & Herzegovina. *Acta entomologica serbica* 15(1): 7-27. (in English, with Serbian summary) ["This paper deals with faunistical data and taxonomic notes on Odonata in Bosnia and Herzegovina. A database containing all available published, previously unpublished, and new data was made in order to create a review of the current knowledge of the country's Odonata fauna and point out the priorities in future investigations. 57 Odonata species are listed as resident species in Bosnia and Herzegovina. Of that number, exact data on the occurrence of 6 species (*Lestes parvidens*, *L. macrostigma*, *Erythromma viridulum*, *Aeshna grandis*, *Lindenia tetraphylla* and *Somatochlora flavomaculata*) are presented and discussed here for the first time." (Authors)] Address: Jovic, M., Natural History Museum Belgrade, Njegoševa 51, P.O. Box 401, YU-11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.rs

9192. Kalkman, V.J.; Wilson, K.D.P. (2010): *Calilestes* and *Lestomima*, junior synonyms of *Rhipidolestes* (Odonata: Megapodagrionidae). *International Journal of*

Odonatology 13(1): 97-102. (in English) ["*Calilestes pallidistigma* and *Lestomima flavostigma*, both sole representatives of their respective genera, are shown to belong to the genus *Rhipidolestes*. *Rhipidolestes flavostigma* comb. nov. is determined to be a junior synonym of *R. truncatidens*. *R. pallidistigma* comb. nov. is deemed to be a valid species." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey – Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

9193. Kalkman, V.J.; Richards, S.J.; Polhemus, D.A. (2010): Three new species of *Argiolestes*, with a key to the males of *Argiolestes* s. str. (Odonata: Megapodagrionidae). *International Journal of Odonatology* 13(1): 75-88, pls II, IIIa. (in English) ["In this article the genus *Argiolestes* s.str. is defined and three new species belonging to this group are described: *A. foja* sp. nov. (holotype: Foja Mountains, Indonesia, dep. in MBBJ); *A. muller* sp. nov. (holotype: Baia River, Papua New Guinea, dep. in SAMA); *A. roon* sp. nov. (holotype: Roon Island, Indonesia, dep. in BPBM). New records for *A. alfurus* are given, a key to males is presented and a map of the distribution of the species is shown. Both sexes of *A. muller* and the male of *A. roon* are depicted in life. The group is distributed from New Guinea over the Moluccas to Sulawesi. As far as is known all species are confined to forest brooks." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey – Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

9194. Kalkman, V.J.; Boudot, J.-P.; Bernard, R.; Conze, K.J.; De Knijf, G.; Dyatlova, E.; Ferreira, S.; Jovic, M.; Ott, J.; Riservato, E.; Sahlén, G. (2010): European Red List of Dragonflies. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-14153-9: vii + 28pp. (in English) ["Aim: The European Red List is a review of the conservation status of ca. 6,000 European species (dragonflies, butterflies, freshwater fishes, reptiles, amphibians, mammals and selected groups of beetles, molluscs, and vascular plants) according to the IUCN regional Red Listing guidelines. It identifies species that are threatened by extinction at the regional level – so that appropriate conservation action can be taken to improve their status. This Red List publication summarises the results concerning the European dragonflies. Scope: All dragonfly species native to Europe are included, except those confined to northern Caucasus. The geographic scope is continent-wide, extending from Iceland in the west to the Urals in the east, and from Franz Josef Land in the north to the Mediterranean and the Canary Islands in the south. The Caucasian region is not included. Red List assessments were made at two regional levels: for geographical Europe, and for the 27 current Member States of the European Union. Status assessment: The status of all species was assessed using the IUCN Red List Criteria (IUCN 2001). This is the world's most widely accepted system for measuring extinction risk. All assessments followed the Guidelines for Application of IUCN Red List Criteria at Regional Levels (IUCN 2003). Preliminary regional assessments were made by Jean-Pierre Boudot and Vincent Kalkman. These assessments were then evaluated by Rafal Bernard, Klaus-Jürgen Conze, Geert De Knijf, Elena Dyatlova, Sónia Ferreira, Miloš Jovic, Jürgen Ott, Elisa Riservato and Göran Sahlén during a

workshop held in Faro, Portugal and through correspondence with relevant experts. The assessments are available on the European Red List website and internet platform: <http://ec.europa.eu/environment/nature/conservation/species/redlist> and <http://www.iucnredlist.org/europe>. Dragonflies in Europe: Dragonflies are colourful, relatively large, and well-known insects. Their larvae live in freshwater habitats such as lakes, bogs, seepages, rivers and springs. Dragonflies occur almost everywhere in Europe, but the highest species diversity is found in the southern half, with the highest numbers in parts of southern France, the footland of the Alps and parts of the Balkan Peninsula. Europe holds 138 species, only three of which are not found in the 27 member states of the EU. Five species were regarded as Not Applicable, as they have no stable populations in Europe. Two species (*Cordulegaster helladica* and *Onychogomphus forcipatus*) have three subspecies each, the taxonomy and distribution of which are sufficiently well-known to make them eligible for an assessment. Thus, a total of 137 species and subspecies were assessed. Eighteen of the European species are endemic to Europe (i.e. they are not found anywhere else in the world). Fourteen are endemic to the EU27. Sixteen of the 18 endemics are either confined to islands, to the Balkan Peninsula or (at least mainly) to the Iberian Peninsula and France. Results: Approximately one out of seven (15%) European dragonflies are threatened in Europe, with a similar proportion being threatened at the EU level. An additional 11% are considered Near Threatened. By comparison, 23% of the amphibians, 19% of the reptiles, 15% of the mammals, 13% of the birds, 11% of the saproxylic beetles and 9% of the butterflies in Europe are threatened (Temple & Cox 2009, Cox & Temple 2009, Temple & Terry 2007, BirdLife International 2004, Nieto & Alexander 2010, Van Swaay et al. 2010). No other groups have so far been comprehensively assessed at the European level. About a quarter (24%) of the European dragonflies have declining populations, ten percent are increasing and roughly half of the species are stable. For the remaining 12%, the available information is too limited to define any population trends. Most of the threatened species are confined to parts of southern Europe. Currently, the main threat to European dragonflies is desiccation of their habitats due to the increasingly hot and dry summers combined with intensified water extraction for drinking and irrigation. Other important threats to species living in running waters are water pollution and the construction of dams and reservoirs. Conclusion and recommendations: This report shows where the highest levels of diversity and endemism, and the greatest proportion of threatened dragonflies are found within the European region. Using these parameters, three key areas for dragonfly conservation in Europe have become evident: the southern Balkan Peninsula, Crete and the Iberian Peninsula. Certain measures are urgent: *A freshwater action plan is needed for Crete. *Species action plans should be made for the most threatened species on the southern Balkan Peninsula, especially for *Pyrrhosoma elisabethae*, *Cordulegaster helladica* ssp. and *Somatochlora borisi*, as these taxa are endemic to Europe. *Large scale and multi-taxa conservation plans for river systems are needed in order to establish a balance between agriculture, development and nature conservation, especially on the Iberian Peninsula, in southern France, Greece and parts of Italy. *Better management practices for fish ponds and rice fields would also have

valuable conservation effects without increasing the long term costs. *Development of a sustainable network of local experts and volunteers is needed to facilitate the conservation and monitoring of dragonfly species and habitats.] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

9195. Kalkman, V.J.; Choong, C.Y.; Orr, A.G.; Schütte, K. (2010): Remarks on the taxonomy of Megapodagrionidae with emphasis on the larval gills (Odonata). *International Journal of Odonatology* 13(1): 119-135. (in English) ["A list of genera presently included in Megapodagrionidae and Pseudolestidae is provided, together with information on species for which the larva has been described. Based on the shape of the gills, the genera for which the larva is known can be arranged into four groups: (1) species with inflated sack-like gills with a terminal filament; (2) species with flat vertical gills; (3) species in which the outer gills in life form a tube folded around the median gill; (4) species with flat horizontal gills. The possible monophyly of these groups is discussed. It is noted that horizontal gills are not found in any other family of Zygoptera. Within the Megapodagrionidae the genera with horizontal gills are, with the exception of Dimeragrion, the only ones lacking setae on the shaft of the genital ligula. On the basis of these two characters it is suggested that this group is monophyletic." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

9196. Karlsson, M.; Sahlén, G.; Koch, K. (2010): Continuous and stepwise oocyte production in Libellulidae (Anisoptera). *Odonatologica* 39(2): 107-119. (in English) ["Compared to other insect groups, libellulids have a rather high mean number of ovarioles. In addition, the mean ovariole diameter differs greatly between and within species. In general, 2 different types of ovariole arrangement exist: (1) all developing oocytes mature and equal in size; in some species without, and in others with, surrounding connective tissue and (2) oocytes displaying gradual maturation, with only the outermost ovarioles mature. These differences have ecological consequences: the first arrangement occurs in species that have stepwise egg production. These species will lay one or more clutches, after which an interclutch interval of ovariole regrowth follows. Species with the second arrangement have continuous egg production and are able to lay at least some eggs all the time, reducing the length of interclutch intervals. However, no direct connection between mate-guarding strategies and ovariole arrangements can be seen. Nevertheless, it is believed that the process of ovariole maturation differs between these groups. It is concluded that ovary morphology in libellulids may exhibit evolutionary fixed traits, although the whole picture still remains complex. The ovariole arrangement may have a crucial impact on the reproductive ecology of the species." (Authors)] Address: Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@set.hh.se

9197. Kishida, O.; Trussell, G.C.; Mougi, A.; Nishimura, K. (2010): Evolutionary ecology of inducible morphological plasticity in predator-prey interaction: toward the practical links with population ecology. *Population*

Ecology 52(1): 37-46. (in English) ["The outcome of species interactions is often strongly influenced by variation in the functional traits of the individuals participating. A rather large body of work demonstrates that inducible morphological plasticity in predators and prey can both influence and be influenced by species interaction strength, with important consequences for individual fitness. Much of the past research in this area has focused on the ecological and evolutionary significance of trait plasticity by studying single predator-prey pairs and testing the performance of individuals having induced and noninduced phenotypes. This research has thus been critical in improving our understanding of the adaptive value of trait plasticity and its widespread occurrence across species and community types. More recently, researchers have expanded this foundation by examining how the complexity of organismal design and community-level properties can shape plasticity in functional traits. In addition, researchers have begun to merge evolutionary and ecological perspectives by linking trait plasticity to community dynamics, with particular attention on trait-mediated indirect interactions. Here, we review recent studies on inducible morphological plasticity in predators and their prey with an emphasis on internal and external constraints and how the nature of predator-prey interactions influences the expression of inducible phenotypes. In particular, we focus on multiple-trait plasticity, flexibility and modification of inducible plasticity, and reciprocal plasticity between predator and prey. Based on our arguments on these issues, we propose future research directions that should better integrate evolutionary and population studies and thus improve our understanding of the role of phenotypic plasticity in predator-prey population and community dynamics." (Authors) Reference to a study using *Aeshna nigroflava* as predator is made.] Address: Kishida, O., Center for Ecological Research, Kyoto Univ., Otsu Shiga, 520-2113, Japan. E-mail: bulgytadpoles@hotmail.com

9198. Kouam, M.K.; Ditoa, M.Y.; Da Costa, S.K.; Edia, E.O.; Ouattara, A.; Gourne, G. (2010): Aquatic macroinvertebrate assemblages associated with root masses of water hyacinths, *Eichhornia crassipes* (Mart.) Solms-Laubach, 1883 (Commelinales: Pontederiaceae) in Taabo Lake, Ivory Coast. *Journal of Natural History* 44 (5&6): 257-278. (in English) ["We examined aquatic macroinvertebrates associated with *Eichhornia crassipes* roots at five sampling sites in Taabo Lake. An average density of 1644 individuals (ind.)/m² was recorded. In total, 68 macroinvertebrate taxa belonging to 34 families and 14 orders were identified. Among these, Insecta was predominant (77.94%). The highest densities were recorded at Taabo cit during both rainy and dry seasons. Taxon diversity differences were not observed among all stations according to a Kruskal-Wallis test. High densities of predators were recorded. Next most prevalent in the trophic structure were detritivores. Indicator taxa analysis, using the Indval method, showed that stations upstream of the lake were characterized by eight taxa, while 11 appeared as indicators of the station near the dyke. Predators and herbivores dominated within those indicators. Sites near bays were distinguished by 18 indicator taxa with a predominance of predators and detritivores. Conductivity, NH₄⁺, temperature, PO₄³⁻, turbidity and dissolved oxygen were parameters that strongly influenced the macroinvertebrate community. ... Five orders (Coleoptera, Diptera, Heteroptera, Odonata and Ephemer-

optera) dominated within Insecta, which represented qualitatively 77.94% of macroinvertebrate assemblages. Table 4 shows the diversity of these macroinvertebrates at the five stations." (Authors)] Address: Kouam, M.K., Lab. d'Environnement et de Biologie Aquatique, UFR-SGE, Univ. d'AboboAdjam, Ivory Coast

9199. Kownacki, A. (2010): Benthic macroinvertebrates from waters of the Tatra National Park – present state, threats, protection. Benthic fauna of Polish national parks. ISBN 978-83-62298-09-9: 54-60. (in Polish, with English summary) ["738 species of benthic macroinvertebrates were found so far in the Tatra National Park waters. Many of them living above the timber line are not found in Poland except the Tatra Mts. Among them only 2 species and probably additional 2 taxa are recognized as endemic. Tatra waters are generally not altered by the human activity. The effect on benthic macroinvertebrate are observed only below the inflow of sewage from shelter house. Other factors such as introduction of fish into high mountain lakes, acid rains and climatic changes little effect on fauna. Nevertheless *Branchinecta paludosa polonica* disappeared in the Polish part of Tatra." (Author) The paper includes remarks on *Cordulegaster boltonii*, *Somatochlora alpestris*, and *S. arctica*.] Address: Kownacki, A., Institute of Nature Conservation PAS, al. Mickiewicza 33, 31-120 Kraków, Poland. E-mail: kownacki@iop.krakow.pl

9200. Lacerda, C.H.F.; Hayashi, C.; Soares, C.M.; GFernandes, C.E.B. (2010): Influence of aquatic plants on the predation of *Piaractus mesopotamicus* larvae by *Pantala flavescens*. *Acta Scientiarum. Biological Sciences*, Maringá, 32(2): 147-151. (in English, with Portuguese summary) ["The experiment aimed to study the influence of the aquatic plants *E. najas*, *P. stratiotes* and *S. auriculata* on the predation of *P. mesopotamicus* larvae by *P. flavescens*. One hundred and twenty larvae of *P. mesopotamicus* and 24 larvae of *P. flavescens* were placed in 24 aquariums with capacity of 12 L, with one Odonate per aquarium. Treatments were different regarding the species of aquatic plants *E. najas*, *S. auriculata* and *P. stratiotes*, with one control treatment without aquatic plants. One aquarium (12 L) containing one Odonate and 30 *P. mesopotamicus* larvae was considered one experimental unit. After 18 hours, the Odonates were removed from the aquariums and fish larvae left (alive) were counted in each experimental unit. The survival rate of *P. mesopotamicus* larvae in the treatment without aquatic plants (control) was significantly lower than in the treatment with *E. najas*. However, the survival rates in the aquariums with floating aquatic plants did not differ from the control. The morphological characteristics of *E. najas* promoted higher structural complexity in the environment, offering more protection to the fish larvae, and increasing their survival. We concluded that the presence of the submerged aquatic plant *E. najas* promoted the reduction of predation of *P. mesopotamicus* larvae by *Pantala flavescens*." (Authors)] Address: Lacerda, C., Laboratory of Ecology & Management of Estuarine & Coastal Ecosystems, Depto de Oceanografia, Univ. Federal de Pernambuco, Cidade Universitária, Av. Arquitetura, s/n, 50740-550, Recife, Pernambuco, Brazil. E-mail: lacerdachf@hotmail.com

9201. Machado, A.B.M. (2010): *Philogenia marina-silva* spec. nov. from the state of Aacre Brazil (Zygoptera: Megapodagrionidae). *Odonatologica* 39(2): 149-152. (in English) ["The new species is described and il-

lustrated from a single specimen, representing the second unquestionable *Philogenia* record from Brazil. Holotype male; Brazil, state of Acre, Mancio Lima, 11/15-VII-1996; deposited in author's collection. It is close to *P. schmidti*." (Author)] Address: Machado, A.B.M., Depto Zoologia, Instituto de Ciências Biológicas, Univ. Federal de Minas Gerais, Avenida Antonio Carlos, 6627, Caixa Postal 486, BR 31270-901, Belo Horizonte, Minas Gerais, Brasil; 1 angelo@icb.ufmg.br

9202. Machado, A.B.M. (2010): Seven new species of *Telebasis* from Brazil (Odonata: Coenagrionidae). *Zootaxa* 2384: 53-64. (in English) ["Seven new species of *Telebasis* from Brazil are described, illustrated, and diagnosed: *T. celiovallei*, *T. divaricata* (Pará State); *T. lenkoi* (Mato Grosso State); *T. myrianae* (Bahia State); *T. pallida* (Mato Grosso State); *T. pareci* (Mato Grosso State); and *T. pataxo* (Bahia State)." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

9203. Machado, A.B.M. (2010): Four new species of *Phoenicagrion* von Ellenrieder, 2008 from Brazil (Odonata, Coenagrionidae). *Zootaxa* 2517: 44-52. ["Four new species of *Phoenicagrion* von Ellenrieder, 2008, *P. flavescens*, *P. ibseni*, *P. karaja*, and *P. megalobos* are described and illustrated. A key is provided for the six species of the genus." (Author)] Address: Machado, A.B.M., Depto de Zoologia, Univ. Federal de Minas Gerais, Caixa Postal 486, 31270-901, Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

9204. Marinov, M. (2010): Further knowledge of the colonisation of the South Island, New Zealand by *Hemicordulia australiae* (Odonata: Corduliidae). *The Weta* 39: 17-28. (in English) ["Information on *Hemicordulia australiae* from New Zealand is summarised with emphasis on its colonisation over South Island. The first records on possibly breeding individuals from Canterbury plains are also presented." (Author)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: mgmarinov@yahoo.com

9205. Mendoza, G. de; Catalan, J. (2010): Lake macroinvertebrates and the altitudinal environmental gradient in the Pyrenees. *Hydrobiologia* 648: 51-72. (in English) ["The distribution of different macroinvertebrate (including 'Aeshna' and 'Enallagma') groups inhabiting the littoral zone of 82 mountain lakes in the Pyrenees was investigated in relation to the altitudinal environmental gradient. For each lake, altitude, longitude and latitude, together with 28 environmental variables, relating to chemical and physical characteristics and to lake general productivity, were considered. Using Principal Component Analysis (PCA) we showed that the altitudinal environmental gradient (i.e. altitude and altituderelated variables) represented the largest gradient of environmental variability. We found that incidence was related to altitude in about 50% of macroinvertebrate groups, most relationships being inverse, and also that the number of macroinvertebrate groups found per lake was better described by a second-order polynomial function than by simple linear regression. However, this relationship was linear for a subset of high-altitude lakes above 2,500 m a.s.l., suggesting an ecological threshold around this altitude. Redundancy Analyses (RDAs) showed the importance of environmental factors varying with altitude for the distribution of macroin-

vertebrate groups. Organic matter, salmonid presence, fine substrate dominance, macrophyte coverage, temperature and altitude by itself were, in this order, the most relevant factors. Partial RDAs showed that different combinations of these variables contributed to the explanation of the distribution of each group. However, the variable that uniquely explained most variability differed from group to group. We conclude that the altitudinal gradient is a multi-faceted ecological factor, which impinges on each group by means of some specific environmental variable(s) that are particularly relevant for the life history of that group." (Authors)] Address: de Mendoza, G., Limnology Group (CSIC-UB), Centre d'Estudis Avançats de Blanes (CEAB-CSIC), c/Acc. Cala St. Francesc, 14, 17300 Blanes (Girona), Spain. E-mail: mendoza@ceab.csic.es

9206. Meurgey, F. (2010): Description of the larva of *Protoneura romanae* Meurgey from the West Indies (Zygoptera: Protoneuridae). *Odonatologica* 39(2): 153-157. (in English) ["The larva from Guadeloupe is described, illustrated for the first time, and compared to the other described larvae. Additional notes on ecology are also given." (Author)] Address: Meurgey, F., Muséum d'Histoire Naturelle, 12 rue Voltaire, F-44000 Nantes, France. E-mail: francois.meurgey@mairie-nantes.fr

9207. Michalski, J.; Opperl, S. (2010): Two new species of *Argiolestes* from Papua New Guinea (Odonata: Megapodagrionidae). *International Journal of Odonatology* 13(1): 63-74. (in English) ["Two new species of the New Guinean megapodagrionid genus *Argiolestes* are described: *A. tuberculiferus* (holotype male: Papua New Guinea, Simbu Province, 6°43'S, 145°05'E; 900 m, 14 xii 2003) and *A. verrucatus* (holotype male: Papua New Guinea, Sandaun Province, 4°48'S, 141°39'E; 1,700-2,100 m, 08 ix 2004). We further provide additional descriptions and ecological data of new specimens of *A. fornicatus*. We briefly discuss the status of several other nominal taxa in *Argiolestes* based on observations of some recent collections." (Authors)] Address: Michalski, J., 223 Mount Kemble Avenue, Morristown New Jersey 07960, USA. E-mail: jmichalski@east-hanoverschools.org

9208. Mill, P.J. (2010): The Large Red Damselfly *Pyrrhosoma nymphula* (Sulzer) with notes on its close relative the Greek Red Damselfly *Pyrrhosoma elisabethae* Schmidt. *J. Br. Dragonfly Society* 26(1): 34-56. (in English) ["Only four species belonging to the coenagrionid genus *Pyrrhosoma* are known to date, two in Europe and two in China. Our knowledge of *P. nymphula* is described in detail along with brief notes on the little known *P. elisabethae*. Some areas where further study would be useful are given in the conclusions." (Author)] The paper stresses *P. nymphula* due to lack of knowledge in *P. elisabethae*. Descriptions of eggs, larvae, adults, habitat, and detailed information on life cycle, emergence, reproduction, dispersal, and parasites are provided.] Address: Mill, P.J., School of Biological Sciences, University of Leeds, Leeds, LS2 9JT, UK. E-mail: gpmill@supanet.com

9209. Moore N.W. (2010): Remembering encounters with dragonflies from the 1930s to the launching of the BDS in 1983. *J. Br. Dragonfly Society* 26(1): 29-31. (in English) ["The history of research on dragonflies has been extensively reviewed by Corbet & Brooks (2008). The aim of this paper is to describe the problems experienced by an odonatologist during the 45-year pe-

riod before the formation of the BDS in 1983." (Author)] The author presents a brief personal history of development of odonatology in UK, Europe, and worldwide.] Address: Moore N.W., The Farmhouse, 117 Boxworth End, Swavesey, Cambridge CB4 5RA, UK

9210. Nel, A.; Petrulevicius, J.F. (2010): Afrotropical and Nearctic genera of Odonata in the French Oligocene: biogeographic and paleoclimatic implications (Insecta: Calopterygidae, Aeshnidae). *Ann. Soc. Entomol. (N.S.)* 46(1-2): 228-236. (in English, with French summary) ["New species of the genera *Sapho* and *Epiaeschna* are recorded in the Oligocene of Aix-en-Provence, Bouches-du-Rhône, France. *Sapho legrandi* n. sp. is the third fossil representative of this recent African genus and *Epiaeschna pseudoheros* n. sp. is the fifth fossil species of this recent North American genus. The fossil species *Triaeschna gossi* from the Eocene of England, *Epacantha magnifica* from the Late Oligocene of Kazakhstan, and *Mediaeschna matutina* from the Oligocene of China, are considered species of *Epiaeschna* and the three fossil genera *Triaeschna* Campion 1916, *Mediaeschna* Zhang 1989, and *Epacantha* Martynov 1929 are synonymized with *Epiaeschna*. The closely related genera *Umma* and *Sapho* inhabit warm humid forests of Western Africa. Their presence in two Oligocene deposits of France supports the hypothesis of a warm humid palaeoenvironment for Armissan (Aude, France), and Aix-en-Provence." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

9211. Peters, G. (2010): Abnahme der Großlibelle *Aeshna subarctica* auf den Rheinsberger Hochmooren und mögliche Ursachen. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin (N.F.)* 47: 119-125. (in German, with English summary) ["The populations of *A. subarctica* at 4 Sphagnum circled bog lakes in the north of Brandenburg (east of Rheinsberg; Germany) have been monitored since 1966 (a 5th lake north of Rheinsberg was added in 1988). This survey yielded data on population sizes and their fluctuations. For comparison, similar data were collected on the accompanying species *A. cyanea*, *A. grandis*, *A. juncea* and *A. mixta*. During the 1990s, the populations of *A. subarctica* declined drastically such that over the last years only single specimens could be observed. The proposed reasons for this decline are repeated long-lasting periods of summer heat („climate warming“), which severely affect the younger larvae of *A. subarctica*. No decline was observed in populations of the accompanying species, whose larvae are not specialized on living in peat bog pools." (Author)] Address: Peters, G., Dürerstr. 17, 16341 Panketale, Germany. E-mail: guenther.peters@freenet.de

9212. Petrulevicius, J.F.; Nel, A.; Voisin, J.-F. (2010): A new genus and species of damer dragonfly (Aeshnidae: Odonata) from the lower Eocene of Laguna del Hunco, Patagonia, Argentina. *Ann. Soc. Entomol. (N.S.)* 46 (1-2): 271-275. (in English, with French summary) ["A new genus of Aeshnidae, *Huncoeschna* n. gen., based on *Huncoeschna corrugata* n. gen., n. sp., is erected from Laguna del Hunco (Ypresian) in Patagonia Argentina. The specimen presents a special kind of preservation with the middle part of the wing wrinkled. The presence of only two fossil specimens of Aeshnidae in South America is surely due to the lack of paleontologists and collections of fossil insects in the subcontinent." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist.

Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

9213. Pinto, A.P. (2010): A Sertanejo's trip: Occurrence of *Orthemis sulphurata* Hagen in northeastern Brazil? *Argia* 22(2): 12-14. (in English) [Ceará state, the northeast region, Brazil, debate of specimens recorded end 2009, beginning 2010. It is concluded that „*O. sulphurata* is a coastal species in Brazil, while *O. schmidti* is more abundant in the inland.“] Address: Pinto, A.P., Museu de Zoologia, Universidade de São Paulo, SP, Brazil. E-mail: odonataangelo@hotmail.com

9214. Prokop, J.; Nel, A. (2010): New griffenfly, *Bohemiatupus elegans* from the Late Carboniferous of western Bohemia in the Czech Republic (Odonoptera: Meganisoptera: Meganeuridae). *Ann. Soc. Entomol. (N.S.)* 46(1-2): 183-188. (in English, with French summary) ["A new griffenfly, *Bohemiatupus elegans* n. gen., n. sp. (Meganeuridae) is described from the Upper Carboniferous (Bolsvian) deposits of the Ovcín near Radnice in western Bohemia (Czech Republic). The new taxon based on fore- and hindwing venation is compared with the other meganeurid genera. It is the first record of a large griffenfly from the continental basins of the Bohemian Massif supplementing the other giant insects such as *Bojophlebia prokopi* Kukalová-Peck 1985 or *Carbotriplura kukalovae* Kluge 1996 from the same strata." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

9215. Rada, B.; Puljas, S. (2010): Do Karst rivers "deserve" their own biotic index? A ten years study on macrozoobenthos in Croatia. *International Journal of Speleology* 39(2): 137-147. (in English) ["In this study we present the results of a ten year survey of the aquatic macroinvertebrate fauna along four karst rivers: Jadro, Žrnovnica, Grab and Ruda, all of them situated in the Middle Dalmatia region of Croatia, in an attempt to construct the Iliric Biotic Index, which will be more applicable for the water quality analysis than the most frequently applied biotic index in Croatia, the Italian Modification of Extended Biotic Index. The rivers geologically belong to the Dinaric karst, unique geological phenomena in Europe. Benthic macroinvertebrates were collected along each river at 15 sites by standard methods of sampling along with several physicochemical parameters, including: temperature, dissolved oxygen, carbon dioxide, alkalinity, hardness and pH. Univariate and multivariate techniques revealed differences in the macroinvertebrate community structure as well as in physicochemical parameters between the Karst rivers and continental rivers. Based on those differences, the Iliric Biotic Index was proposed as the standard of karst river water quality in Croatia in accordance with the EU Water Framework Directive. Differences between the Iliric Biotic Index and the most commonly used biotic indices in the European Community and the USA (The Biological Monitoring Working Party (B.M.W.P.) scores, i.e. Extended Biotic Index, Indice Biotique, Family Biotic Index) suggest that karst rivers need a new biotic index." (Authors) In a table records of the benthic fauna of the karst rivers made during the period of investigation (1994-2004) are compiled. The list includes - without further details - *Anax imperator*, *Cordulegaster boltonii*, and *Calopteryx virgo*.] Address: Rada, B., University of Split, Faculty of Science, Department of Biology, Teslina 12/III, 21000 Split, Croatia. E-mail: radja@pmfst.hr

9216. Realpe, E. (2010): Two new Andean species of the genus *Ischnura* Charpentier from Colombia, with a key to the regional species (Zygoptera: Coenagrionidae). *Odonatologica* 39(2): 121-131. (in English) ["*Ischnura chingaza* sp. n. (holotype male: Cundinamarca Dept, Parque Nacional Natural Chingaza, Quebrada La Playa, alt. 3164 m a.s.l., 10-V-2005) and *Ischnura cyane* sp. n. (holotype male: Cundinamarca Dept, Francisco de Sales, Vereda San Miguel, alt. 1984 m a.s.l., 1-XII-2004) are described and illustrated. The types are deposited at Mus. Hist. Nat., Univ. Andes, Bogotá. A key to the regional species is appended." (Author)] Address: Realpe, E., Lab. de Zoología y Ecología Acuática, Depto de Ciencias Biológicas, Universidad de Los Andes, Carrera 1 N° 18A 10 Bloque J, Bogotá, Colombia. E-mail: erealpe@uniandes.edu.co

9217. Reels, R. (2010): The curious case of the cannibal coenagrionid. *Agrion* 14(2): 27. (in English) [25 July 2008, small stream at Luk Keng, N.T., Hong Kong; a male *Ceriagrion auranticum* consumed a female.] Address: Reels, G., H-3-30 Fairview Park, Yuen Long, Hong Kong. E-mail address: gtreels@gmail.com

9218. Regier, J.C.; Shultz, J.W.; Zwick, A.; Hussey, A.; Ball, B.; Wetzer, R.; Martin, J.W.; Cunningham, C.W. (2010): Arthropod relationships revealed by phylogenomic analysis of nuclear protein-coding sequences. *Nature* 463 (7284): 1079-1083. (in English) ["The remarkable antiquity, diversity and ecological significance of arthropods have inspired numerous attempts to resolve their deep phylogenetic history, but the results of two decades of intensive molecular phylogenetics have been mixed. The discovery that terrestrial insects (Hexapoda) are more closely related to aquatic Crustacea than to the terrestrial centipedes and millipedes (Myriapoda) was an early, if exceptional, success. More typically, analyses based on limited samples of taxa and genes have generated results that are inconsistent, weakly supported and highly sensitive to analytical conditions. Here we present strongly supported results from likelihood, Bayesian and parsimony analyses of over 41 kilobases of aligned DNA sequence from 62 single-copy nuclear protein-coding genes from 75 arthropod species. These species represent every major arthropod lineage, plus five species of tardigrades and onychophorans as outgroups. Our results strongly support Pancrustacea (Hexapoda plus Crustacea) but also strongly favour the traditional morphology-based Mandibulata (Myriapoda plus Pancrustacea) over the molecule-based Paradoxopoda (Myriapoda plus Chelicerata). In addition to Hexapoda, Pancrustacea includes three major extant lineages of 'crustaceans', each spanning a significant range of morphological disparity. These are Oligostraca (ostracods, mystacocarids, branchiurans and pentastomids), Vericrustacea (malacostracans, thecostracans, copepods and branchiopods) and Xenocarida (cephalocarids and remipedes). Finally, within Pancrustacea we identify Xenocarida as the long-sought sister group to the Hexapoda, a result confirming that 'crustaceans' are not monophyletic. These results provide a statistically well-supported phylogenetic framework for the largest animal phylum and represent a step towards ending the often-heated, century-long debate on arthropod relationships." (Authors) The analysis includes "*Ischnura*" and "*Libellula*".] Address: Wetzer, Regina, Natural History Museum of Los Angeles County, Los Angeles, California 90007, USA.

- 9219.** Roland, H.-J.; Roland, U. (2010): New records of Odonata on a birding trip to Cambodia 12th-26th February 2010. *Agrion* 14(2): 30-33. (in English) ["On a guided birding trip to various places in Cambodia, over 500 pictures of Odonata were taken. 24 Anisoptera and 8 Zygoptera species could be identified. Among these only one was without photo evidence, *Pseudothemis jorina*. One *Neurothemis* species had to be left unidentified. The following species have not been recorded for Cambodia before: *Aethriamanta aethra*, *A. brevipennis*, *A. gracilis*, *Brachydiplax farinosa* and *Rhyothemis triangularis*. This fact can be partially explained by the low number of observers of Odonata in Cambodia. Most of the species are rather common in neighbouring countries." (Authors)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com
- 9220.** Samways, M.J.; Sharratt, N.J. (2010): Recovery of endemic dragonflies after removal of invasive alien trees. *Conservation Biology* 24(1): 267-277. (in English) ["Because dragonflies are very sensitive to alien trees, we assessed their response to large-scale restoration of riparian corridors. We compared three types of disturbance regime—alien invaded, cleared of alien vegetation, and natural vegetation (control)—and recorded data on 22 environmental variables. The most significant variables in determining dragonfly assemblages were percentage of bank cover and tree canopy cover, which indicates the importance of vegetation architecture for these dragonflies. This finding suggests that it is important to restore appropriate marginal vegetation and sunlight conditions. Recovery of dragonfly assemblages after the clearing of alien trees was substantial. Species richness and abundance at restored sites matched those at control sites. Dragonfly assemblage patterns reflected vegetation succession. Thus, initially eurytopic, widespread species were the main beneficiaries of the removal of alien trees, and stenotopic, endemic species appeared after indigenous vegetation recovered over time. Important indicator species were the two national endemics (*Allocnemis leucosticta* and *Pseudagrion furcigerum*), which, along with vegetation type, can be used to monitor return of overall integrity of riparian ecology and to make management decisions. Endemic species as a whole responded positively to restoration, which suggests that indigenous vegetation recovery has major benefits for irreplaceable and widespread generalist species." (Authors)] Address: Samways, M.J., Dept of Conservation Ecology and Entomology and Centre for Invasion Biology, University of Stellenbosch, Private Bag X1, Matieland, 7602, South Africa. E-mail samways@sun.ac.za
- 9221.** Saperstein, L. (2010): People swarm to 2nd Annual Dragonfly Day in Fairbanks, Alaska. *Argia* 22(2): 10-11. (in English) ["About 450 people flocked to the Creamer's Field refuge in Fairbanks, Alaska on 20 June 2009 to celebrate the second annual Dragonfly Day, a 50% increase over the previous year's attendance." (Author)] Address: Saperstein, Lisa, Yakima, WA, USA. E-mail: lsaperst@gmail.com
- 9222.** Schütte, K. (2010): The larva of *Nesolestes* sp. from Madagascar (Odonata: Megapodagrionidae). *International Journal of Odonatology* 13(1): 103-108. (in English) ["The larva of the genus *Nesolestes* is described and figured for the first time. Specimens were found in small brooklets in littoral swamp forest in south-eastern Madagascar. The larva is compared with the two other Madagascan genera of Megapodagrionidae, *Protolestes* and *Tatocnemis*, and diagnostic characters are given. The caudal lamellae are held in a horizontal plane. Similar types of caudal lamellae are found in some megapodagrionids of the south-east Asian and Australian region. It can be easily distinguished from the genera *Protolestes* and *Tatocnemis* by the shape of the caudal lamellae." (Author)] Address: Schütte, K., Entomologie, Biozentrum Grindel und Zoologisches Museum Hamburg, 20146 Hamburg, Germany. E-mail: Kai.Schuette@uni-hamburg.de
- 9223.** Skvortsov, V.E.; Kuvaev, A.V. (2010): *Ischnura fountaineae* Morton, *Lindenia tetrphylla* (Vander Linden) and *Selysiothemis nigra* (Vander Linden) new for European Russia (Zygoptera: Coenagrionidae; Anisoptera: Gomphidae, Libellulidae). *Notul. odonatol.* 7(5): 49-51. (in English) ["25 Odonata species recorded during 2005-2007 from Kalmykia Republic (lower reaches of the Volga river), are listed. *I. fountaineae*, *L. tetrphylla* and *S. nigra* were not previously recorded from European Russia; the former 2 species are also new for Eastern Europe, and the *I. fountaineae* specimen is the first reliable specimen collected in the Russian territory." (Authors)] Address: Skvortsov, V.E., Dept Biol. Evolution, Fac. of Biology, Moscow State Univ., Moscow-119992. GSP-1, Russia. E-mail: west-urnus@yandex.ru
- 9224.** Sutherland, T.; Young, J.H.; Weisman, S.; Hayashi, C.Y.; Merritt, D.J. (2010): Insect silk: One name, many materials. *Annual Review of Entomology* 55: 171-188. (in English) ["Silks play a crucial role in the survival and reproduction of many insects. Labial glands, Malpighian tubules, and a variety of dermal glands have evolved to produce these silks. The glands synthesize silk proteins, which become semicrystalline when formed into fibers. Although each silk contains one dominant crystalline structure, the range of molecular structures that can form silk fibers is greater than any other structural protein group. On the basis of silk gland type, silk protein molecular structure, and the phylogenetic relationship of silk-producing species, we grouped insect silks into 23 distinct categories, each likely to represent an independent evolutionary event. Despite having diverse functions and fundamentally different protein structures, these silks typically have high levels of protein crystallinity and similar amino acid compositions. The substantial crystalline content confers extraordinary mechanical properties and stability to silk and appears to be required for production of fine protein fibers." (Authors) The authors refer to Gomphidae (papers of Trueman 1990, Gambles 1956, Gambles & Gardner 1960): "Anchoring eggs? Bundles of fibers attached to eggs that uncoil upon exposure to water."] Address: Sutherland, Tara, CSIRO Entomology, Canberra, ACT 2601, Australia. E-mail: Tara.Sutherland@CSIRO.au
- 9225.** Takahashi, Y.; Watanabe, M. (2010): Diurnal changes in male mate preference to female dimorphism in *Ischnura senegalensis* (Rambur) (Zygoptera: Coenagrionidae). *Odonatologica* 39(2): 159-162. (in English) ["*I. senegalensis* females exhibit colour dimorphism as andromorphs and gynomorphs, to which males seem to switch their mate preference according to prior copulation experience. In the field where andromorphs were dominant, the binary choice experiments were conducted both in the early morning, which marks the onset of daily copulation activity, and in the afternoon, which marks the end of the copulation activity. During

the former period, males showed fair selectivity, while they preferred the andromorphs in the afternoon, suggesting that male mate preference to each female morph switched in relation to copulation experience; i.e. the mating attempts of males were biased to the dominant female morph. Mating attempts in the afternoon were considered to inhibit female oviposition behaviour, resulting in a decrease of her reproductive success. Therefore, biased male mate choice toward the dominant morph in the afternoon might be a selective force to maintain the female colour dimorphism." (Authors)] Address: Takahashi, Y., Graduate School of Life & Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki, 305-8572 Japan. E-mail: yuyuyuyu@ies.life.tsukuba.ac.jp

9226. Takahashi, Y.; Watanabe, M. (2010): Mating experience affecting male discrimination between sexes and female morphs in *Ischnura senegalensis* (Rambur) (Zygoptera: Coenagrionidae). *Odonatologica* 39(1): 47-56. (in English) ["*Ischnura senegalensis* females exhibit colour dimorphism, appearing as andromorphs and gynomorphs. Binary choice experiments between sexes and morphs were conducted in the laboratory. Virgin males reared separately from females showed no preference between sexes or between morphs, suggesting that virgin males were unable to recognize potential mates and had no innate mating preference for a particular female morph. After enclosure with a single female in a small cage, males that had experienced copulation significantly preferred the same female morph with which they had copulated, while males that failed to copulate with the female showed no preference. The males that had experienced copulation significantly preferred females over males. Therefore, ability of males to discriminate between sexes and morphs was confirmed by their copulation experience." (Authors)] Address: Watanabe, M., Grad. School of Life & Environmental Sc., Univ. of Tsukuba, Tsukuba, Ibaraki, 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

9227. Takahashi, Y.; Watanabe, M. (2010): Morph-specific fecundity and egg size in the female-dimorphic damselfly *Ischnura senegalensis*. *Zoological Science* 27: 325-329. (in English) ["Females of coenagrionid damselflies exhibit colour dimorphism, consisting of an andromorph and a gynomorph. This study compared reproductive traits between the female morphs in both fieldcaptured and laboratory-reared females of the female-dimorphic *I. senegalensis*. No difference was found in the onset of egg development between the morphs. The andromorphs developed significantly smaller mature eggs and had significantly more immature eggs than the gynomorphs. These results suggest that the andromorphs are r-strategists (high fecundity with small eggs), whereas the gynomorphs are K-strategists (low fecundity with large eggs). Fecundity and egg size might determine the quantity and quality of the offspring, respectively, indicating that morph-specific reproductive traits would contribute to the overall fitness of each female morph, and consequently be key factors affecting morph frequency in a population." (Authors)] Address: Watanabe, M., Conservation Biology Lab., Graduate School of Life & Environmental Sciences, University of Tsukuba, 1-1-1, Tennodai, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

9228. Taylor, A.N. (2010): Impacts of cadmium contamination and fish presence on wetland invertebrate communities: An application of population measures and multi-metric tests. *Ecological Indicators* 10(6): 1206-1212. (in English) ["Wetlands are extensively used in heavy metal bioremediation, and it is important to know how biota are impacted by such toxins. I examined invertebrate communities in six experimental wetland ponds in Ithaca, NY, USA to assess the effects of residual cadmium. Three ponds had been treated with cadmium in 1983, and still had average levels of 3.6 mg/kg in the sediment in 2001. Also, two of the cadmium ponds and one non-cadmium pond had predatory fish populations. I quantified the variable effects on invertebrate communities using non-parametric statistics, CCA (canonical correspondence analysis), and three published multi-metric tests ([Burton et al., 1999], [Apfelbeck, 2001] and [Helgen and Gernes, 2001]). Cadmium effects could not be seen in ponds with fish because invertebrate abundance in these ponds was low. In ponds without fish, cadmium appeared to have significant influence on invertebrate abundance, but not on diversity. None of the multi-metric tests detected a cadmium impact. This study suggests that trophic interactions between fish and invertebrates should be considered in wetland index development and implementation." (Author) Odonata are treated at the genus level. No effects of cadmium on Odonata seem to exist.] Address: Office of Surface Mining, 1645 S. 101 East Avenue, Suite 145, Tulsa, OK 74128, USA. E-mail: ataylor@osmre.gov

9229. Tennessen, K.J.; Johnson, J.T. (2010): *Archaeopodagrion armatum* sp. nov. from Ecuador (Odonata: Megapodagrionidae). *International Journal of Odonatology* 13(1): 89-95, pl. IIIb. (in English) ["*Archaeopodagrion armatum* sp. nov. is described and illustrated (holotype male: Ecuador, Zamora Chinchipe Prov., forest S of Zamora (4°07'18"S, 78°58'22"W), 02 iv 2008, leg. KJT; in FSCA). The new species is distinct from *A. bicorne* and *A. bilobatum* by the pair of highly recurved processes on the hind margin of the prothorax of both sexes, and a hair pencil and preapical spike-shaped process on the dorsal surface of the male paraprocts." (Authors)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

9230. Tennessen, K.J. (2010): The madicolous nymph of *Heteropodagrion sanguinipes* Selys (Odonata: Megapodagrionidae). *Zootaxa* 2531: 29-38. (in English, with Spanish summary) ["Nymphs of the genus *Heteropodagrion* are described and illustrated for the first time based on supposed specimens of *H. sanguinipes* taken in vertical sheet flow adjacent to small montane streams in western Ecuador. The nymph of *Heteropodagrion* resembles *Paraphlebia* and *Sciotropis*, but is unique among Megapodagrionidae in possessing a slightly curved row of very small transverse ridges on each side of the prementum." (Author)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

9231. Tsubaki, Y. (2010): 2011 International Congress. *Agrion* 14(2): 26. (in English) [Announcement of the International Odonatological Congress to be held in Kanagawa Prefectural Museum of Natural History in Odawara City, Kanazawa, Japan in July 2011.] Address: Tsubaki, Y., Center for Ecological Research, Kyoto Uni-

versity, Hirano 2-509-3, Otsu, 520-2113, Japan. E-mail: ytsubaki@ecology.kyoto-u.ac.jp

9232. Villanueva, R.J.T. (2010): Adult Odonata community in Dinagat Island, The Philippines: impact of chromium ore mining on density and species composition. *Odonatologica* 39(2): 133-140. (in English) ["Mining modifies the surrounding environment and causes habitat deterioration along river systems receiving mine tailings. Here it is assessed whether chromium ore mining affects the Odonata abundance and diversity. Line transect surveys were conducted during 4 months at the Henry river (along a pristine section and a previously mined section), and at the Lecing river, which is currently receiving tailings from chromium ore mines. The density of adult Odonata was 10 times higher in the pristine than in the mined river. Species richness was reduced in both the currently and in the previously mined sections (5 species) as compared to that of the pristine river (12 species), showing a detrimental effect of chromium mining on dragonfly diversity and abundance." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

9233. Xu, Q.-h. (2010): The larvae of *Macromia flavocolorata* and *M. septima* from Fujian, China (Odonata: Macromiidae). *International Journal of Odonatology* 13(1): 145-152. (in English) ["The final stadium larvae of *M. flavocolorata* and *M. septima* are described and illustrated for the first time. They are diagnosed against the congeners on the basis of published descriptions." (Author)] Address: Xu, Q.-h., Zhangzhou City University, Zhangzhou, Fujian 363000, P.R. China. E-mail: qihanx@yahoo.com.cn

9234. Yates, A.G.; Bailey, R.C. (2010): Covarying patterns of macroinvertebrate and fish assemblages along natural and human activity gradients: implications for bioassessment. *Hydrobiologia* 637(1): 87-100. (in English) ["Bioassessment is based upon the premise that biological assemblages have predictable relationships with the surrounding natural and human environments. As the nature of these relationships can vary from region to region, it is important that environment-biota relationships be established prior to the initiation of any bioassessment program. In this study, multivariate analysis was used to establish how fish and benthic macroinvertebrate (BMI) assemblages in southwestern Ontario streams vary across natural and human activity gradients. The use of canonical correspondence analysis allowed us to determine that changes in community composition of both fish and BMI are strongly correlated with variation in the extent of human activity. The primary source of variation in community composition across activity gradients appeared to reflect a shift from intolerant to tolerant taxa as the extent of human activity increased. Habitat and feeding traits, for BMI and fish respectively, accounted for a secondary source of variation primarily attributable to differences in the extent of human activity at the reach scale. However, variation in human activity, especially at the basin scale, covaried with the dominant natural gradient of surface geology, making interpretation of the results difficult. Implications for bioassessment studies are discussed." (Authors) Odonata are treated at the family level.] Address: Yates, A.G., Department of Biology, The University of Western Ontario, 1151 Richmond St. N., London, ON, N6A 5B7, Canada. E-mail: adam.yates@ec.gc.ca

9235. Zhang, Z.-s.; Lü, X.-g.; Wang, Q.-c.; Zheng, D.-m.; Zhang, Xi-y.; Zheng, N. (2010): Mercury contents and distribution characteristics in Cicadae. *Environmental Science* 31(2): 509. (in Chinese, with English summary) ["Total mercury contents of cicadae bodies, wings and exuviae were studied in Huludao City to discuss mercury distribution characteristics in cicadae and to reveal the environmental mercury accumulation effects in the long life-cycle insects through comparing cicadae with other insect species. The average mercury contents of cicadae bodies were 2.64 mg·kg⁻¹ and much higher than those in the contrast sites (1.00 mg·kg⁻¹ on average) in Huludao City. Mercury contents were found in the order of cicadae bodies > wings (0.98 mg·kg⁻¹ on average) > exuviae (0.50 mg·kg⁻¹ on average). Sex differences of mercury contents and body weights of cicadae were significantly great. The females had larger body weights (1.11 g on average) and lower mercury contents (1.34 mg·kg⁻¹ on average) than the males (body weight: 0.54 g on average; mercury contents: 3.38 mg·kg⁻¹ on average), respectively. Mercury contents of cicadae's bodies varied greatly with sample sites, mercury contents of wings changed little. No significant correlation was found between mercury contents of soil and cicadae bodies. Mercury contents of cicadae were lower than those of dragonflies, higher than those of other insects with shorter life-cycle periods and it reflected the accumulation effects of environmental mercury in the long life-cycle insects such as cicadae." (Author)] Address: Wang, Q.-c., Key Lab. of Wetland Ecology & Environment, Inst. Northeast Geography & Agroecology, Chinese Acad. of Sci., Changchun 130012, China. E-mail: wangqichao@neigae.ac.cn

9236. Zimmermann, M.; Vischer-Leopold, M.; Ellwanger, G.; Ssymank, A.; Schröder, E. (2010): The EU Habitats Directive and the German Natura 2000 network of protected areas as tool for implementing the conservation of relict species. In: Habel, J.C. & T. Assmann (Hrsg.): *Relict Species: Phylogeography and Conservation Biology*. Verlag Springer Berlin Heidelberg. ISBN 978-3-540-92161-5: 323-340. (in English) ["This study analyses whether the Natura 2000 network of Sites of Community Importance (SCIs) is able to protect relict species in the taxonomic groups of higher plants, molluscs, dragonflies and damselflies as well as butterflies (only Rhopalocera) in Germany. Altogether, a total of 157 species from all groups are identified as relict species in Germany. 14 of these are included in Annexes II, IV or V of the Habitats Directive. Most glacial relicts are well covered by an indirect protection regime of the European Union (EU) Habitats Directive as they occur in 46 of Annex I habitat types, and their occurrences are to a large extent covered by Natura 2000 sites (SCIs). For a few relict species and certain relict plant communities a gap remains in the EU protection regime, which can be filled by a national protection regime, for example, in nature reserves. The best way to protect local relict species is to include them in special management plans for their conservation." (Authors)] Address: Zimmermann, M., Inst. Forest Botany & Forest Zoology, TU Dresden, Tharandt, Germany. E-mail: marcozimmermann53129@googlemail.com

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1997

9237. Bernard, R.; Samoląg, J. (1997): Analysis of the emergence of *Aeshna affinis* Vander Linden, 1823 in the vicinity of Poznan, western Poland (Odonata: Aeshnidae). *Opusc. zool. flum.* 153: 1-12. (in English) ["The studies were conducted during June-July 1996. The habitat is described and the data are presented on population strength, sex ratio, changes in daily emergence rate, differences between the sexes, time of emergence, height of climbing and on mortality. The emergence in this species is highly synchronized (ECM = 7); this is probably related to the mechanism of a lower temperature threshold in larval development. The status of the species in this part of Europe in relation to climatic conditions, and temporal segregation with the coexisting *A. mixta* are discussed."] (Authors)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

9238. Gerlach, J.; Matyot, P.; Saaristo, M. (1997): Silhouette species list. *Phelsuma* 5, Suppl. A: 42 pp. (in English) [11 taxa are listed together with their published sources resp. first description data.]

1998

9239. Bernier, C. (1998): ODONATA 44-85: L'atlas contemporain (suite). *Lettre de l'Atlas entomologique régional (Nantes)* 10: 144-146. (in French) [The paper gives a brief interim report - covering the period between 1990 and 1997 - on 55 odonate species found in the frame work of a grid mapping (10x10km) project on the regional distribution of Odonata in France.] Address: Bernier, C., 8, allée des Tilleuls, 44230 Saint-Sébastien-sur-Lorie, France

2000

9240. Besprozvannykh, V.V. (2000): A life cycle of the trematode *Pneumonocercis nanchangensis* major (Plagiorchiidae) parasitizing in lungs of frogs in the Primorye region. *Parazitologiya* 34(1): 63-65. (in Russian, with English summary) ["The life cycle of the trematode *P. nanchangensis* major includes three hosts: primary intermedial host (molluscs *Helicorbis sijfunensis*, *Polypylis semiglobosa*), secondary intermedial host (larvae of dragonfly genus *Lestes*), and final host (frogs *Rana ni-*

gromaculata, *R. semiplicata*). Descriptions and measurements of cercariae and metacercariae are proposed."] (Author)] Address: Besprozvannykh, V.V., Institute of Biology & Soil Sciences, Far East Branch of the Russian Academy of Sciences, prospect 100-letija, 159, Vladivostok, 690022, Russia. E-mail: besproz@ibss.dvo.ru

9241. Besprozvannykh, V.V. (2000): Biology of trematodes *Nenimandijea kashmirensis* and *Pleurogenoides medians* (Pleurogenidae) - The parasites of frogs in the Primorye territory. *Parazitologiya* 34(4): 349-354. (in Russian, with English summary) ["The experimental study of life cycles of the trematodes *Nenimandijea kashmirensis* Kaw, 1950 and *Pleurogenoides medians* Olsson, 1876 was carried out. It was found out, that their life cycles include: the first intermedial host - the mollusc *Boreoelona contortrix ussuriensis*, the second intermedial host - dragonfly larvae of the genus *Cordulia*, and the final host - the frogs *Rana nigromaculata* and *R. semiplicata*. Based on obtained data it is suggested, that *Pleurogenoides japonicus* (Yamaguti) should not be considered as a separate species."] (Author)] Address: Besprozvannykh, V.V., Institute of Biology & Soil Sciences, Far East Branch of the Russian Academy of Sciences, prospect 100-letija, 159, Vladivostok, 690022, Russia. E-mail: besproz@ibss.dvo.ru

9242. Besprozvannykh, V.V. (2000): Life cycle of the trematode *Glyphthelmiss rugocaudata* (Plagiorchiidae) in the Primorye region. *Parazitologiya* 34(2): 153-155. (in Russian, with English summary) ["It is found out, that the life cycle of the trematode *G. rugocaudata* (Yoshida, 1916) in the Primorye region includes two intermedial hosts (molluscs *Lymnaea pacifampla* and larvae of the genera *Cordulia* and *Lestes*) and a final host, frog species *Rana nigromaculata* and *R. semiplicata*."] (Author)] Address: Besprozvannykh, V.V., Institute of Biology & Soil Sciences, Far East Branch of the Russian Academy of Sciences, prospect 100-letija, 159, Vladivostok, 690022, Russia. E-mail: besproz@ibss.dvo.ru

9243. Nagano, M.; Ooki, H.; Mizutani, Y.; Shimano, S.; Aoki, J. (2000): List of insects collected in the campus of Yokohama National University. *Bulletin, Institute of Environmental Science and Technology, Yokohama National University* 26: 123-134. (in Japanese, with English title and nomenclature) [Japan; six odonate species are listed.] Address: Nagano, M., Dept of Soil Zoology, Institute of Environmental Science & Technology, Yokohama National University, Yokohama, 240-8501 Japan

9244. Alonso, L.E.; Slonso, A.; Schulenberg T.S.; Dallmeier, F. (Eds.) (2001): Biological and social assessments of the Cordillera de Vilcabamba, Peru. Rapid Assessment Program. Smithsonian Institution / Monitoring and Assessment of Biodiversity Program 12: 296 pp. (in English) [The report includes a few information on Odonata: Acosta, R., M. Hidalgo, E. Castro. N. Salcedo & D. Reyes: Biodiversity assessment of the aquatic systems at the southern Vilcabamba region, Peru (pp. 140-146); same authors: Number of aquatic invertebrate species per family found in quantitative and qualitative sampling at Lactahuaman and Wayrapata, southern Cordillera de Vilcabamba, Peru (pp. 271-275).] Address: Alonso, L.E., Conserv. International Cent. Appl. Biodiv. Sci., Dept Conserv. Biol., 1919 M Street NW, Suite 600, Washington. DC 20036, USA

9245. Chambers, D.B.; Messinger, T. (2001): Benthic invertebrate communities and their responses to selected environmental factors in the Kanawha River Basin, West Virginia, Virginia, and North Carolina. U.S. Department of the Interior, U.S. Geological Survey, Water-Resources Investigations Report 01-4021, National Water-Quality Assessment Program, Charleston, West Virginia 2001: VII, 52 pp. (in English) ["The effects of selected environmental factors on the composition and structure of benthic invertebrate communities in the Kanawha River Basin of West Virginia, Virginia and North Carolina were investigated in 1997 and 1998. Environmental factors investigated include physiography, land-use pattern, streamwater chemistry, streambed-sediment chemistry, and habitat characteristics. Land-use patterns investigated include coal mining, agriculture, and low intensity rural-residential patterns, at four main stem and seven tributary sites throughout the basin. Of the 37 sites sampled, basin size and physiography most strongly affected benthic invertebrate-community structure. Land-use practices also affected invertebrate community structure in these basins. The basins that differed most from the minimally affected reference condition were those basins in which coal mining was the dominant nonforest land use, as determined by comparing invertebrate-community metric values among sites. Basins in which agriculture was important were more similar to the reference condition. The effect of coal mining upon benthic invertebrate communities was further studied at 29 sites and the relations among invertebrate communities and the selected environmental factors of land use, streamwater chemistry, streambed-sediment chemistry, and habitat characteristics analyzed. Division of coal-mining synoptic-survey sites based on invertebrate-community composition resulted in two groups—one with more than an average production of 9,000 tons of coal per square mile per year since 1980, and one with lesser or no recent coal production. The group with significant recent coal production showed higher levels of community impairment than the group with little or no recent coal production. Median particle size of streambed sediment, and specific conductance and sulfate concentration of streamwater were most strongly correlated with effects on invertebrate communities. These characteristics were related to mining intensity, as measured by thousands of tons of coal produced per square mile of drainage area." (Authors) The study includes data on *Ophiogomphus* sp., *Boyeria grafiana*, *Macromia taeniolata* (low tolerance against pollution), and *Argia* sp.

(high tolerance against pollution).] Address: Chambers, D.B., U.S. Geological Survey, Branch of Information Services, Box 25286, Denver, CO 80225-0286, USA

9246. Restani, M.; Rau, L.R.; Flath, D.L. (2001): Nesting ecology of Burrowing Owls occupying Black-tailed Prairie dog towns in southeastern Montana. *J. Raptor Res.* 35(4): 296-303. (in English) [Nest-site selection, productivity, and food habits of 13 breeding pairs of Burrowing Owls (*Athene cunicularia*) breeding on prairie dog (*Cynomys ludovicianus*) towns in southeastern Montana, USA were studied. Owls fed on invertebrates (mainly grasshoppers and beetles), mammals (mice and voles), birds (blackbirds and buntings), and amphibians (frogs). In one case an unidentified Odonata was found as prey.] Address: Department of Biology, Rocky Mountain College, Billings, MT 59102 USA. E-mail: restanim@rocky.edu

9247. Samways, M.J. (2001): Seychelles fineliner damselfly not extinct after all. *Phelsuma* 9: 55. (in English) [*Teinobasis alluaudi* (Martin, 1896) was recorded from Mahe in 1894 and 1909 and on Silhouette in 1908. It was feared extinct, not having been observed since 1909. On 27-VI-1997 it was rediscovered on southwestern Mahe, by a small stream in Terminalia forest, at sea level. New records (1998-2001) from Silhouette are also communicated.] Address: Samways M.J., Invertebrate Conservation Research Centre, Dept Zool. & Entomol., University of Natal, P/Bag X01, Scottsville 3209, Pietermaritzburg, South Africa. E-mail: samways@un.ac.za

2002

9248. Eigenheer, K. (2002): Die Libellen an der Aare zwischen Büren a.A. und Rothrist (Schweiz). Eigenverlag: 47 pp. (in German) [www.konrad.eigenheer.ch; 27 Odonata species along the river Aare, Switzerland are mapped according their reproduction status (exuviae / imagines), and phenology of species is documented.] Address: Eigenheer, K., Hofmatt 11, CH-4582 Brügglen, Switzerland. E-mail: konrad@eigenheer.ch

9249. Guilloton, J.-A. (2002): ODONATA 44-85: L'atlas contemporain (suite). *Lettre de l'Atlas entomologique régional (Nantes)* 15: 12-14. (in French) [The paper gives a brief progress report - covering the period between 1997 and 2001 - on 59 odonate species found in the frame work of a grid mapping (10x10km) project on the regional distribution of Odonata in France.] Address: Guilloton, J.-A., La Close des Saules, 44810 Héric, France

9250. Perron, J.M.; Ruel, Y. (2002): Saison de vol des Odonates du Territoire du marais Léon-Provancher, Neuville, division de recensement de Portneuf (Québec). *Le Naturaliste Canadien* 126(2): 13-17. (in French) [Canada; Phenological data of the regional fauna are presented and compared with data compiled in Pilon, J.-G. & D. Lagacé (1998): *Les Odonates du Québec. Entomofaune du Québec (EQ) inc, Chicoutimi (Québec)*, 367 pp.] Address: Perron, J.-M., 963, rue Grandjean, app. 506, Sainte-Foy, Quebec G1X 4P9, Canada. E-mail: collections@coll.ulaval.ca

9251. Schlüter, M.; Welt, M. (2002): The dragonfly: a more effective genetic biomarker of pollution. Poster 78-04. presented at the 12th Annual Meeting of the Society of Environmental Toxicology and Chemistry Europe,

Vienna (Austria), 12-16 May 2002: (in English) ["Currently, there are limited insect biomarkers with field applications, even though insects play key roles in most terrestrial and freshwater ecosystems. Most pollutants and toxicants occur at the highest concentrations in the soil or aquatic sediment due to solubility and settling; however most current biomarker species spend little or no time in these areas. The development of a biomarker species that resides a significant portion of its life span in the sediment may be a more sensitive indicator of environmental health and stability. Dragonflies are an excellent example of an insect species whose larvae spends one or more years in the aquatic sediment. The main goal of the following study is to investigate the potential of the dragonfly as a new biomarker species of pollution. Dragonflies show a high level of genetic diversity as measured by allozymes (protein phenotypes) and by DNA fingerprinting. Allozyme allele frequencies were examined to determine if these characteristics were related to environmental quality. Population genetic structure (allele frequencies) of several populations of a common dragonfly species, *Erythemis simplicicollis*, were compared and contrasted. Populations were sampled from "polluted" sites (e.g. heavy metals, petroleum) and "clean" sites. Differences in allele frequencies were detected in the populations. These differences may be related to the toxicants present in the environment. DNA fingerprinting (RAPD markers) was able to identify individuals as well as separate populations. Allozyme data show that selection for specific phenotypes are related to environmental pollution. This was illustrated by comparisons of allozyme phenograms to genomic population phenograms. These differences suggest that the phenotypic (allozyme) data from dragonflies may serve as an effective biomarker of environmental health." (Authors)] Address: Schlüter, M., Dept Biol., Xavier Univ., 1 Drexel Dr., New Orleans, LA 70125-1098. USA

9252. Watanabe, M.; Mimura, Y.; Higashi, T. (2002): Ecological studies on habitat establishment for threatened brackish water damselfly, *Mortonagrion hirosei*: microclimate of the habitat. Annual Report of the interdiscipl. Res. Inst. environ. Sci. 21: 47-58. (in Japanese, with English summary) ["The spatial distribution for perching sites of the endangered brackish water damselfly, *Mortonagrion hirosei*, was restricted about 20cm above the water surface in a small reed community of an estuary in the warm-temperate zone of Japan. The flight season was from late May to early August. The peak estimated daily number of the damselfly adults was about 1000, that is 2 adults per square meter in the habitat. There was a dense reed community, 440 shoot per square meter, that is, the distance between shoots is 5cm. Relative light intensity at the 20cm above the water surface in the reed community was about 10%. Although there was no difference between ambient and inside temperature of reed community, the wind velocity inside the reed community was apparently lower than that outside the community. Therefore, the micro-environment of the damselfly habitat was comparable to that of forest floor. The closed habitat made by a lot of shoot of the reed may inhibit the other odonate species to enter inside of the reed community. Consequently, the floor of the reed community was considered to be a suitable micro-habitat of the brackish water damselfly." (Author)] Address: Watanabe, M., Conservation Biology Laboratory, Graduate School of Life and Environmental Sciences, University of Tsukuba, 1-1-1, Tennodai, Tsu-

kuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

9253. Zuellig, R.E.; Kondratieff, B.C.; Rhodes, H.A. (2002): Benthos recovery after an episodic sediment release into a Colorado rocky mountain river. Western North American Naturalist 62(1): 69-72. (in English) [During late September 1996, approximately 7000 m³ of clay- to gravel-sized sediment was flushed from Halligan Reservoir, Larimer County, Colorado, into the North Fork Cache la Poudre River during dam inspections. Approximately 9.6 km of this river was partially or completely affected by this episodic sediment release. Pools up to 3.2 km downstream from the dam lost 50% of their volume. Hess samples taken from October 1996 to September 1997, 100 m downstream from the dam (site 1) and 3.2 km downstream (site 2), revealed effects of sediment on recovery patterns of benthic communities. A 2-way ANOVA was used to determine significant interactions using site and date as main factors. Pairwise differences were then compared using least squares means to determine significant dates within and between sites. Ten days after the sediment release, both density and taxa richness at site 1 (55 organisms per m², 5 taxa) were significantly lower ($P < 0.05$) than site 2 (1156 organisms per m², 25 taxa). These differences remained until June when species richness and densities increased. Plecoptera and Trichoptera colonized from June to September after being eliminated at site 1 and reduced at site 2. No permanently flowing tributaries exist within the study area; therefore, passive downstream drift from such inputs apparently did not influence recovery. Increased densities of taxa such as Baetidae, Hydroptilidae, Hydropsychidae, Chironomidae, Simuliidae, and Oligochaeta occurred plausibly by rapid reproduction. Based on pre-event data, community function completely changed at site 2 from a scraper community to one dominated by collector-gatherers." (Authors) Odonata are represented in very small numbers by "Zygoptera" and *Ophiogomphus severus*.] Address: Zuellig, R.E., Colorado State University, Dept of Bioagricultural Sciences and Pest Management, Fort Collins, CO 80523

2003

9254. Blanco-Garrido, F.; Sánchez-Polaina, F.J.; Prenda, J. (2003): Summer diet of the Iberian chub (*Squalius pyrenaicus*) in a Mediterranean stream in Sierra Morena (Yeguas stream, Córdoba, Spain). Limnetica 22 (3-4): 99-106. (in English, with Spanish summary) [The diet of *S. pyrenaicus* was studied in the upper Yeguas river. The chub showed a wide trophic range, and a pronounced generalist character. The main trophic categories were chironomid larvae and filamentous algae. Taxa - including Odonata - are treated at the order level.] Address: Prenda, J., Depto de Biología Ambiental y Salud Pública, Univ. de Huelva. Campus universitario de El Carmen, Avda. de la Fuerzas Armadas s/n, 21007 Huelva, Spain. E-mail: jprenda@uhu.es

9255. Brammer, C.A.; MacDonald, J.F. (2003): Benthic insect fauna of a clean water stream on Utah's Colorado Plateau, USA. Western North American Naturalist 63(1): 21-34. (in English) ["Extensive collecting using a variety of methods was conducted in 1994 and 1995 in association with Pleasant Creek in south central Utah, USA, in an effort to inventory the aquatic insects. Collecting efforts yielded 133 insect taxa from

12 sample sites in 8 study areas from near the headwaters of Pleasant Creek and downstream to where it flows out of Capitol Reef National Park. Applying Protocol III methodology of Plafkin et al. (1989), we determined species assemblages of benthic insects and calculated selected ecological indices based on monthly collections from March through August 1994. Richness, equitability index, and mean diversity index values at all sample sites approached, or were greater than, the generally accepted values for clean-water streams in the mountains of the western United States." (Authors) The taxa list includes *Hetaerina americana*, *Argia vivida*, and *Ophiogomphus severus*.] Address: Brammer, C.A., Department of Biology, Utah State University, Logan, UT 84322.

9256. Chochel, M. (2003): Příspěvek k rozšíření klínatky obecné *Gomphus vulgatissimus* (Linnaeus, 1785) v CHKO Labské pískovce a její bionomii (Odonata, Gomphidae) - Beitrag zur Verbreitung Gemeine Keiljungfer - *Gomphus vulgatissimus* (Linnaeus, 1785) im Landschaftsschutzgebiet Labské pískovce und seine Bionomie (Odonata, Gomphidae). Sborník Oblastního muzea v Mostě, řada přírodovědná 25: 37-38. (in Czech, with German summary) [07-V-2003, three larvae and one exuvia of *Gomphus vulgatissimus* were found along River Elbe near Diéin/Tetschen, Czech Republic. This record raises the regionally known Odonata to 44 species.] Address: Chochel, M., Malá Veleč 23, 407 22 Benešov nad Ploučnicí, Czech Republic. E-mail: chochel@schkocr.cz

9257. Henriksson, B. (2003): Citrongul kärtrrollslända *Leucorrhinia pectoralis* i Blekinge. LUCANUS 2003 8:2. SydOstEntomologerna. www.fsoe.se: 4 pp. (in Swedish) [In June and beginning of July 2001, 26 sample sites near Blekinge, southern Sweden were studied for the Odonata fauna with special emphasis to *Leucorrhinia pectoralis*. This species was recorded at 10 localities. A total of twelve odonate species is documented locality-wise in a table.] Address: Henriksson, B., Sandåsvägen 12, 370 30 Rödeby, Sweden

9258. Zeppelini Filho, D.; Cunha Ribeiro, A.; Cunha Ribeiro, G.; Aguiar Fracasso, M.P.; Monetti Pavani, M.; Müller Patrao Oliveira, O.; De Oliveira, S.A.; Marques, A. (2003): Faunistic survey of sandstone caves from Altinópolis region, Sao Paulo state, Brazil. Papéis Avulsos de Zoologia 43(5): 93-99. (in English, with Portuguese summary) ["*Libellulidae*" are listed from Duas Bocas cave, High Parana River Basin Domain, northern Sao Paulo state.] Address: Marques, A., Depto Zool., Inst. Bio-cien., Univ. Sao Paulo, C.P. 11401, BR-05422-97' Sao Paulo, Brazil. E-mail: marques@ib.usp.br

2004

9259. Andreew, A.; Derschanskij, B. (2004): Fauna strekkoz (Insecta, Odonata) Moldov'i: Perwye itogi. Analele Stiintifice ale USM, Seria "Stiinte chimico-biologice" 2004: 170-173. (in Russian, with Romanian and English summaries) ["Not less than 54 Odonata species may inhabit Moldova; 42 species were noted in Moldova's boundaries during (in the last 100 years, currently the presence of 37 species was confirmed. The most numerous species is *Ischnura elegans* the number of which seemingly exceeds the joint number of three nearest species; evidently the species becomes the dominant and superdominant in the most eutrophic

waters. *Sympetrum sanguineum* takes the second place on number, then *Platycnemis pennipes*, *Erythronma viridulum*, *Calopteryx splendens*, *Sympetrum meridionale* and *Orthetrum albistylum* succeed. There were 33 species in the Ramsar site - the planned Nistrul de Jos (Lower Dniester) National Park and in comparison with the published data shows an important concentration of a specific diversity." (Authors)] Address: not stated in English

9260. Borisov, S.N. (2004): Night hatching of dragonflies in southern part of West Siberia. Eurasian entomological journal 3(3): 216. (in Russian, with English summary) [In a locality in the south of West Siberia, night emergence of *Lestes macrostigma*, *Sympetrum flaveolum*, *S. vulgatum* L., *Aeshna mixta*, *A. affinis* is recorded.] Address: Borisov, S.N., Inst. of Systematic & Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia

9261. Borisov, S.N.; Haritonov, A.Yu. (2004): Dragonflies (Odonata) in high mountains of the East Pamirs. Eurasian entomological journal 3(2): 97-100. (in Russian, with English summary) [Tajikistan; "Presence of six dragonfly species in high mountains of the East Pamirs (3360 5000 m a.s.l.) was established. *Sympetrum fonscolombii* and *Pantala flavescens* fly here only during seasonal migrations. The first of these species is rare. For the second species the directed passages in a Southern direction are marked in August. *Orthetrum brunneum*, *S. haritonovi* and *Ischnura pumilio* inhabit only the bogs formed by hot springs. Their life cycle is outlined." (Author) Most of the records result from studies in the early 1980th, and include also a record of *Enallagma cyathigerum*.] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

9262. Bree, D. (2004): Significant Odonate observations from Petroglyphs Provincial Park and Area in 2002. Ontario Odonata 4: 33-37. (in English) ["Updates to the checklist of the Odonata found at Petroglyphs Provincial Park during field studies in 2002 are presented. Documented are eleven new species for the park's list bringing the total to 71. Included are two uncommonly encountered species, *Cordulegaster obliqua* and *Enallagma aspersum*, which are also new for Peterborough County, and two provincially rare species, *Lestes eurinus* and *Williamsonia fletcheri*. Two of the other new species for the park, *Erythemis simplicicollis* and *Celithemis eponina* suggest the possibility of a northern range expansion of southern species. Additional documentation of breeding evidence for species in and near the park is presented, including the provincially rare *Progomphus obscurus* and the uncommon *Neurocordulia yamaskanensis*. New late and early flight dates for Peterborough County are also included." (Author)] Address: Bree, D., Box 123, Bloomfield, Ontario K0K 1G0, Canada. E-mail: dbree@post.kosone.com

9263. Catling, P.M.; Jones, C.D.; Pratt, P. (2004): Ontario Odonata projects; News and comments; Recent literature; Index to species in the year 2002 summary table. Ontario Odonata 4: 194-216. (in English) [10 even running studies are compiled; NEWS AND COMMENTS: 1. *Williamsonia lintneri* has been found in a number of localities in Michigan and likely occurs in Ontario. Articles about its occurrence in Michigan may be found in *Williamsonia*, an excellent publication of the

Michigan Odonate Survey (<http://insects.umrnz.lsa.urnich.edu/michodo/mos.htm> 1, michodo@urnich.edu. 2. Could Citrine Forktails (*Ischnura hastata*) be expanding north, or have they just been overlooked? There are a number of recent records in the Great Lakes region. See Craves, J. and D. O'Brien. 2003. Update on two 2002 State Records. *Williamsonia* 7(3,4): 6-7. 3. Mike May and Phil Corbet have outlined a question about the northern occurrences of *Anax junius* and their note is worth reading: May, M. and P. Corbet. 2003. Gathering useful information about the seasonal ecology of *Anax junius*. *Argia* (the news journal of the dragonfly society of America) 15(2): 15-16. See also an article about overwintering *Anax junius* in this volume. 4. Although the resource guide may not be reprinted, it is anticipated that the first volume of a three volume guide to the Dragonflies of Ontario by P. M. Catling will be available late in 2004. The first advertisements will likely appear in "Ontario Insects." 5. Mystery species: The following species (historically known from Ontario) have not been recorded during the detailed survey of Odonata in Ontario over the past four years: *Aeshna mutata*, *A. subarctica*, *Anax longipes*, *Celithemis fasciata*, *Coenagrion angulatum*, *Gomphus ventricosus*, *Leucorrhinia borealis*, *Somatochlora ensigera*, *S. hudsonica*, *Stylurus plagiatu*s, *Sympetrum ambiguu*m. 6. Status of Canadian Dragonflies. The National General Status Working Group, which is composed of biologists from each of the Canadian provinces and territories and three federal agencies whose mandate includes wildlife, met in Ottawa on November 22, 2003 to finalize assessments of the general status of 209 dragonfly species in Canada. Ensuring human actions don't drive species extinct in Canada means knowing the status of species across the length and breadth of the nation - which species are secure for now, which to keep an eye on, and which need to be formally assessed and perhaps protected. The most recent effort on dragonflies provides an overview of their status in Canada. It brings the results of Provincial, Territorial, and Federal monitoring efforts onto a single platform for the first time. This effort was conducted under the auspices of the National Accord for the Protection of Species at Risk. The results and interpretation of these assessments will be available on the Wild Species Web site <http://www.wildspecies.ca> as part of Wild Species 2005, the second of the General Status of Species in Canada reports. For more information, contact wild.species@ec.gc.ca (From Lisa Twolan and Jim Duncan, January 23, 2004)." (Authors)] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

9264. Catling, P.M. (2004): Monitoring dragonflies using exuviae from under bridges. *Ontario Odonata* 4: 13-14. (in English) ["On the walls beneath bridges exuviae are often more or less protected from wind and rain, and they are often secured by spider webs. For these reasons they remain longer than elsewhere. The walls of bridges, being rather extensive upright structures, provide an opportunity to monitor dragonflies on a continuing basis." (Authors)] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

9265. Catling, P.M.; Jones, C.D.; Pratt, P. (2004): Introduction to the year 2002 Ontario Odonata summary. List of contributors; Observations of Odonata in Ontario during 2001; Corrections to previous volumes. *Ontario Odonata* 4: 41-194. (in English) [The 2002

summary of Ontario Odonata involved 43 contributors and includes 6698 records.] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

9266. Costa, J.M.; Souza, L.O.I.; Oldrini, B.B. (2004): Chave para as famílias e gêneros das larvas de Odonata citadas para o Brasil: Comentários e Registros Bibliográficos. Publicações avulsas do Museu Nacional, Rio de Janeiro 99: 1-43. (in Portuguese, with English summary) [An illustrated key to identify the Brazilian Odonata larvae at family and genus levels is provided. Brief information on habitat, and a bibliography with additional information on most of the taxa are also presented.] Address: Costa, J.M., Depto de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

9267. Dolný, A.; Veselý, M.; Bárta, D. (2004): On Dragonflies of Central America. *Živa journal* 1/2004: 30-32. (in Czech, with English summary) [General remarks on south American Odonata: "Some 500 known species of Odonata occur in continental Central America. The authors present the odonate richness and the diversity of the insects as well as some remarkable and unusual members of the order. For example, the largest representatives of the suborder Zygoptera living on the Earth hunt for Comb-Footed Spiders, sometimes also called Cobweb Weavers from the family Theridiidae. There are also some dragonflies displaying activities at dusk." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic

9268. Feher, Z.; Eröss, Z.; Kontschan, J.; Muranyi, D. (2004): Collecting sites of the zoological expeditions of the Hungarian Natural History Museum to Albania (1992-2003). *Folia historico naturalia musei Matraensis* 28: 67-82. (in English) ["Researchers and collaborators of the Hungarian Natural History Museum participated in nine zoological expeditions to Albania between 1992 and 2003. Mollusca, Oligochaeta, Tardigrada, Araneae, Opiliones, Acari, Decapoda, Amphipoda, Isopoda, Chilopoda, Diplopoda, Ephemeroptera, Odonata, Plecoptera, Blattodea, Dermaptera, Orthoptera, Heteroptera, Homoptera, Psocoptera, Neuroptera, Coleoptera, Diptera, Trichoptera, Lepidoptera, Hymenoptera, Pisces, Amphibia, Reptilia, Aves and Mammalia specimens were collected or observed at 277 localities. Apart of this material is not worked up yet, and some of the results are still unpublished. The aim of publishing the list of the collecting sites was (i) to ease the uniform usage of the locality names, (ii) to make it easy to identify the localities on common maps and (iii) to help other researchers to find and visit the same sites." (Authors) For details see: Muranyi, D. (2007): Contribution to the Odonata fauna of Albania. *Folia entomologica hungarica* 68: 41-53.] Address: Feher, Z., Dept Zoology of the Hungarian, Natural History Museum, H-1088 Budapest, Baross u. 13, Hungaria. E-mail: feher@nhmus.hu

9269. Forrest, P.J (2004): Southern Emerald Damselfly *Lestes barbarus* in Kent. *Atropos* 21: 81. (in English) [21-VIII- 2004, Sandwich Bay, Kent, UK.] Address: Forrest, P.J., Flat 3, No. 8 Chandos Square, Broadstairs, Kent, CT10 1QN, UK

9270. Jobin, L.-J.; Perron, J.-M. (2004): Odonatofaune du parc écologique du mont Shefford, division de recensement de Shefford, Québec. *Le Naturaliste Cana-*

dien 128(1): 27-30. (in French) [6 sites within the boundaries of the ecological park of Shefford mountain, Québec, Canada were surveyed in 2000 and 2001. 42 Odonata species could be recorded; these are listed in a table together with phenological data.] Address: Perron, J.-M., 963, rue Grandjean, app. 506, Sainte-Foy, Quebec G1X 4P9, Canada. E-mail: collections@coll.ulaval.ca

9271. Starzyk, J.R. (2004): Contribution of entomologists of Lviv to the development of nature conservation in eastern Galicia. Scientific Bulletin of the Ukrainian State Forestry University 14(8) ISSN: 1994-7836: 38-46. (in English, with Ukrainian summary) ["Entomological research before World War I, and during the period between First and Second World Wars was conducted in Lviv in three scientific centres: Dzieduszycki Natural Museum, Department of Forest Protection & Entomology of Forest Technological University of Lviv, and Department of Zoology of Jan Kazimierz University. In 1920 the Entomological Section was erected within Nicholas Copernicus Natural Society, transformed into the Polish Entomological Association in 1923. A high activity of entomologists conducting investigations in eastern Galicia resulted in over 360 publications, mainly of faunistic character. They formed the basis for evaluation of natural areas which should be put includes such names as Marian Lomnicki, Jaroslaw Lomnicki, Aleksander Kozikowski, Jan Romaniszyn, Jan Kinel, Adam Krasucki, Jan Noskiewicz, and Roman Kuntze. [...] Józef Dziędzielewicz (1844-1918) was a long term co-worker of the Physiographic Committee of the Polish Academy of Sciences in Krakow. He conducted faunistic investigations in surroundings of Lviv, Podolia, the Gorgany Mts, Czarnohora, the Tatra Mts, and Silesia, collecting insects of the orders: Ephemeroptera, Odonata, Plecoptera, Copeognatha, Megaloptera, Raphidioptera, Plannipennia, Trichoptera, and Mecoptera. A part of his collection he handed down to the Museum of the Physiographic Committee in Krakow, and a part to the Dzieduszycki Museum. The results of his studies were published in the "Reports of the Physiographic Committee of the Polish Academy of Sciences". A specially valuable is his monograph of dragonflies of Galicia (1902), and the work entitled "Neuropterous insects of the Polish territory" (1919-1920) published by the Dzieduszycki Museum." (Author)] Address: Starzyk, J.R., Department of Forest Entomology, Agricultural University of Kraków, 31-425 Kraków, Al. 29 Listopada 46, Poland

2005

9272. Ameilia, Z.S.; Che Salmah, M.R.; Abu Hassan, A. (2005): The diversity of Odonata in relation to ecosystem and land use in northern peninsular Malaysia. Jurnal Ilmiah Pertanian KULTURA 40(2): 106-112. (in English) ["Odonata larvae were sampled from 16 tributaries of Kerian River in Kerian River Basin (KRB) using a long handle D-pond net from September 1998 until May, 1999 covering wet and dry seasons. Platycnemididae (Suborder Zygoptera) and Libellulidae (Suborder Anisoptera) were the most dominant families. The distribution of odonate genera was significantly different in wet season ($F=4.70$) and dry season ($F=3.99$) at $p=0.05$ in all streams but no difference in distribution was detected between both seasons. Scores of biological indices (H' , D , E , $R1$, $R2$) and indicator species based on selected chemical properties were listed, which showed the dragonfly fauna was slightly poor.

There were strong correlation between generic diversity to dissolved oxygen and nitrate in wet season, likewise temperature and conductivity in dry season." (Authors)] Address: Ameilia, Z.S., Lecturer Dept. Pest and Disease, Faculty of Agriculture USU, Medan 20155, Malaysia

9273. Beckemeyer, R. (2005): Afrikan Anisoptera and Zulu Zygoptera: A Trip to South Africa. Idalia Society of Mid-American Lepidopterists 16(2): 3-5. (in English) [oas 29 Report from a field trip made in February 2005.] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

9274. Behle, L.; Lisges, E.; Irle, A. (2005): Erstnachweise der Südlichen Binsenjungfer *Lestes barbarus* (Fabricius, 1798) und des Kleinen Granatauges *Erythromma viridulum* (Charpentier, 1840) sowie weitere bemerkenswerte Libellenbeobachtungen im Kreis Siegen-Wittgenstein. Beiträge zur Tier- und Pflanzenwelt des Kreises Siegen-Wittgenstein 8: 29-34. (in German) [Nordrhein-Westfalen, Germany. Records of the following Odonata species are communicated: *Sympetrum pedemontanum*, *Lestes barbarus*, *Erythromma viridulum*, *E. najas*, *Orthetrum brunneum*.] Address: Behle, L., Albaumer Str. 5, 57399 Kirchhundem, Germany

9275. Borisov, S.N. (2005): Ecology of *Selysiothemis nigra* (Vander Linden, 1825) (Odonata, Libellulidae) under desert conditions. Eurasian entomological journal 4(2): 95-100. (in Russian, with English summary) ["The ecology of *S. nigra* is investigated in one of the hottest region of Central Asia, Tigrovaya Balka State Reserve in Tajikistan where it reaches its greatest abundance on semi-flowing artificial reservoirs. Development of the species is bivoltine, individuals of the second generation being smaller in size. Emergence of the first generation imagines starts when the daily average aerial temperature reaches 22-23° C. Emergence takes place at night. During the pre-reproductive period, dispersal from reservoirs is well expressed. In the desert zone, *S nigra* is the most heliophylic, thermophilic and xerophylic species among all dragonflies. Peaks of daily activity coincide with the highest values of temperature and lowest values of air humidity under direct sun irradiation.] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Bran, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

9276. Borisov, S.N. (2005): Distribution and habitat characteristics of *Ophiogomphus reductus* Calvert, 1898 (Odonata, Gomphidae). Eurasian entomological journal 4(4): 273-278. (in Russian, with English summary) [Records of *O. reductus*, a species endemic to Central and Middle Asian mountains, from Turkmenistan and Tajikistan are detailed, and all available data are mapped. "In mountainous areas, the larvae develop in rivers strongly influenced by silt and snow waters. The main factor influencing the spread of this species in the plains is anthropogenic, since the larvae inhabit channels of irrigation systems; hence their establishment there over time is related to the development of irrigation work." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Bran, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

9277. Kryukova, N.A.; Yurlova, N.I.; Glupov, V.V. (2005): The effect of trematodes on the cellular immunity of the dragonfly *Aeschna grandis* (Odonata) larvae.

Parazitologiya 39(4): 306-317. (in Russian, with English summary) [The last larval stage of *A. grandis* is highly infested trematodes of the families Plagiorchiidae and Prosthogonimidae. "About 30 % of the trematode cysts were melanized. It is established, that the parasitising of the trematodes do not affect the process of incapsulation of extrinsic bodies, but it suppresses partly the formation of oxygen free radicals and phenoloxidase activity in the haemocytes of dragonfly larvae." (Authors)] Address: Kriukova, N.A., Siberian Division, Russian Academy of Sciences, Inst. of Animal Systematics and Ecology, ul. Frunze 11, Novosibirsk, 630091, Russia

9278. Mancu, C.O. (2005): Preliminary study on the dragonfly (Insecta: Odonata) fauna from the Vanatori Neamt Natural Park. In: Deju R. & S. Catanoiu (Eds): Studies and research in Vanatori Neamt Natural Park. 1: 28-35. (in English, with Romanian summary) [At present, 11 Odonata species have been recorded until now. The relative small number of species found results from an inappropriate period of the year in which the samples have been collected.] Address: Mancu, C.O., Acad. Remus Radulet 13, bl. 119, ap. 7, Timisoara 300281, Timis County, Romania. E-mail: cosminovidiu@yahoo.com

9279. Moiseenko, T.I. (2005): Effects of acidification on aquatic ecosystems. Russian Journal of Ecology 36(2): 110-119. (in English) ["Effects of acidification on aquatic ecosystems are analyzed on the basis of an analytical synopsis of relevant data. Major active agents influencing aquatic organisms and main trends in the reorganization of microbial, phyto- and zooplanktonic, benthic, and fish communities in an acidified environment are described. A generalized concept of changes in ecosystems caused by acid precipitation and accompanying factors is formulated. These changes include the reduction of biodiversity of all structural elements due to the disappearance of species sensitive to acidification, modification of trophic structure, and decrease of fish stock." (Author) The study includes references to a few studies with information on acidification impacts on Odonata, but provides no original data. Translated from *Ekologiya*, No. 2, 2005, pp. 110-119] Address: Moiseenko, T.I., Institute of Water Problems, Russian Academy of Sciences, ul. Gubkina 3, Moscow, 119991 Russia

9280. Olthoff, M. (2005): Die Gemeine Keiljungfer (*Gomphus vulgatissimus*) an der Berkel, Westmünsterland. Jahrbuch des Kreises Borken 2006: 53-56. (in German) [Nordrhein-Westfalen, Germany; In 2001, a survey of *G. vulgatissimus* was made along the Berkel, a sandy river in den German/Dutch border region. The river bears a strong population of the species.] Address: Olthoff, M., Naturförderstation im Kreis Coesfeld, Borkener Straße 13, 48653 Coesfeld, Germany. E-Mail: matthias.olthoff@naturfoerderstation.de

9281. Paoletti M.G.; Dufour, D.L. (2005): Edible invertebrates among Amazonian indians: A critical review of disappearing knowledge. Paoletti M.G. (ed.) 2005. Ecological Implications of Minilivestock. Potential of Insects, Rodents, Frogs and Snails Science Publishers, Enfield N.H., USA 648 pp: 293-342. (in English) ["For the indigenous populations of Amazonia, invertebrates constitute an important component of the diet. Information on entomophagy for 39 ethnic groups (and three other post-Columbian settlers) or about 21.4% of the 182 groups known in the Amazon Basin is presented here,

but utilization of this non-conventional food resource is surely much more widespread. A database is given of all the information available for each ethnic group regarding the species included in the diet, scientific and the ethno name if known, stage of life cycle consumed, manner of preparation and, when known, host plant. This database lists 209 scientifically identified species (including seven Odonata taxa identified at the species resp. genus level). Information on an additional 426 species and ethno names, with an insecure link to Linnean taxonomy suggest that local knowledge is very extensive. The database represents not only an easy-to-consult resource, but also a support for further research. Caterpillars, termites, leafcutter ants, bees, wasps, and Coleoptera seem to be the more collected items, together with a few aquatic ones. The most intensively collected are those dependent on forest leaves and litter, representing in general the higher biomass, so much work needs to be done for other groups, including caterpillars, aquatic insects, grasshoppers, snails, and spiders. Knowledge of the relations between indigenous populations and ecosystems is indeed the base for the preservation of natural and cultural biodiversity. We are at the beginning of a survey that has to be expanded." (Authors)] Address: Paoletti M.G., Dept of Biology, Padova University, Via U. Bassi 58/b, Padova, Italy. E-mail: paoletti@civ.bio.unipd.it

9282. Perron, J.-M.; Jobin, L.-J.; Mochon, A. (2005): Odonatofaune du parc national de la Yamaska, division de recensement de Shefford, Québec. *Le Naturaliste Canadien* 129(2): 17-25. (in French) [This National Park is situated app. 90 km southeast of Quebec, Canada. A total of 67 Odonata species was recorded in 2002. The species are differed for six sampling sites in a table, and species diversity is compared with addition studies made in regions south of Quebec.] Address: Perron, J.-M., 963, rue Grandjean, app. 506, Sainte-Foy, Quebec G1X 4P9, Canada. E-mail: collections@coll.ulaval.ca

9283. Saleh, M.A.; Basuony, M.I. (2005): The Zoril, *Ictonyx striatus erythrae* De Winton, 1898 in Egypt. *Egyptian Journal of Biology* 7: 103-107. (in English) ["The Zoril *Ictonyx striatus* is one of the rarest mammals of Egypt, known from only two specimens collected more than 50 years ago. The collection of two new specimens and the observation of others in the Gabal Elba area provide new data on this little-known animal in Egypt. [...] The analysis of the stomach contents of our Egyptian specimens revealed that insects form the main item in the food of this mammal. Insects belonging to three different orders were detected. Coleoptera were represented by several species of ground-dwelling beetles, which occurred with the highest frequency in the stomach contents (84%). Odonata and Hymenoptera (ants) occurred at frequencies of 8 % and 6% respectively. Contrary to these findings, Dorst (1970) and Osborn & Helmy (1980) suggest that the food of *Ictonyx striatus* consists of rodents, reptiles and bird eggs." (Authors)] Address: Basuony, M.I., Dept Zoology, Faculty of Science, Al-Azhar Univ., Nasr City, Cairo, Egypt

9284. Ternois, V.; Fradin, E.; Gautier, C. (2005): Atlas préliminaire des Odonates du Parc naturel régional de la Forêt d'Orient. *Courrier scientifique du Parc naturel régional de la Forêt d'Orient* 28: 90 pp. (in French) [Champagne-Ardenne, France; between 1998 and 2005, 51 Odonata species were recorded. These are monographically introduced, and the records of each species are mapped in detail.] Address: Parc naturel

2006

9285. Borisov, S.N. (2006): Distribution and ecology of *Sympetrum arenicolor* Jödicke, 1994 (Odonata, Libellulidae) in Middle Asia. *Eurasian entomological journal* 5 (4): 278-284. (in Russian, with English summary) ["Distribution data on *S. arenicolor* in Middle Asia are given. It is shown that this species mainly inhabits artificial ponds in lowlands. Its development is monovoltine. Seasonal migrations into mountains and back to lowlands are characteristic during the pre-reproductive period. Emergence in spring and in the beginning of summer, and reproductive period in autumn and the beginning of winter are described. This species is the most kreophilous amongst all dragon flies in desert zone of the Middle Asia. It probably evolved in mountainous conditions, but its increase in numbers in lowlands during historic time is dependent on the development of irrigation systems." (Author)] Address: Borisov, S.N., Russian Acad. Sci., Inst. Animal. Systemat. & Ecol., Novosibirsk 610091, Russia. E-mail: mu4@eco.nsc.ru

9286. Borisov, S.N. (2006): A new record of *Lindenia tetraphylla* (Van der Linden, 1825) (Odonata, Gomphidae) in Balkhash Region, South East Kazakhstan. *Eurasian entomological journal* 5(2): 122. (in Russian, with English summary) [*L. tetraphylla* is documented from two northern-easternmost localities of South-East Kazakhstan, 45° 03' N, 74° 37' E and 45° 22' N, 74° 08' E.] Address: Borisov, S.N., Institute of Systematic & Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia

9287. Boukhemza, M.; Boukhemza-Zemmouri, N.; Voisin, J.-F.; Baziz, B. (2006): Écologie trophique de la Cigogne blanche (*Ciconia ciconia*) et du Héron garde-boeufs (*Bubulcus ibis*) en Kabylie (Algérie). *ecologia mediterranea* 32: 15-28. (in French, with English summary) [Odonata are a potential regionally available prey, but it is not clear from the publication if they are preyed upon by the two bird species.] Address: Boukhemza, M., Laboratoire d'ornithologie et d'écologie des vertébrés, Département des sciences agronomiques, Université Mouloud Mammeri de Tizi Ouzou, BP 17 RP, Tizi Ouzou, DZ-15000, Algeria. E-mail: boukhemza@hotmail.com

9288. Couteyen, S. (2006): Étude de l'exploitation des sites de reproduction par les Anisoptères à l'île de la Réunion (Odonata). *Bulletin de la Société entomologique de France* 111(1): 65-71. (in French, with English summary) [France, Réunion; habitat selection of reproduction sites and interspecific competition avoiding mechanisms are discussed. The paper considers all Odonata taxa known to occur along the island: *Anax imperator mauritanus*, *Diplacodes lefebvrei*, *Gynacantha bispina*, *Hemicordulia asiatica*, *Orthetrum* spp. (*O. brachiale* et *O. stemmale*), *Pantala flavescens*, *Sympetrum fonscolombii*, *Tholymis tillarga*, *Tramea limbata*, *Trithemis annulata haemetina*, and *Zygonyx torrida torrida*.] Address: Couteyen, S., Assoc. Reunionnaise Ecol., 188 Chemin Nid Joli, F-97430 Le Tampon, Reunion. E-mail: couteyensf@wanadoo.fr

9289. Feulner, G. (2006): Kuwait Natural History. *Gazelle, Dubai* 21(6): 4-5. (in English) ["Last but not least,

my Kuwait visit ("May 2006") gave me, quite unexpectedly, my first encounter with the Arabian lobetail (*Lindenia tetraphylla*), Arabia's largest perching dragonfly. Also present were many of the smaller, hovering desert darter (*Selysiotthemis nigra*). Both of these species were probably migrating into the area in response to the recent rains, as they have long been recognised to do." (Author)] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, United Arab Emirates

9290. Feulner, G. (2006): Diverse Dragonflies. *Gazelle, Dubai* 21(5): 6-7. (in English) [Oman; "In March I visited a minor wadi in the Mahdhah area where, at the mountain front, a small settlement exists and a series of bedrock pools have been "improved" for human and agricultural use. Just above this area, at a 10m long natural pond that had not existed when I visited the site two years before, I found 12 species of dragonflies – an impressive number given that only about 24 species have been identified from the UAE and neighbouring northern Oman. My mid-morning visit gave me an opportunity to watch how all of these "similar but different" organisms divided up the available pond habitat among them." (Author) The following species are briefly discussed: *Ischnura evansi*, *Arabicnemia caerulea*, *Arabineura khalidi*, *Trithemis arteriosa*, *T. kirbyi*, *T. annulata*, *Paragomphus sinaiticus*, *Crocothemis erythraea*, *Diplacodes lefebvrei*, *Orthetrum sabina*, *O. chrysostigma*, *Anax imperator*] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, UAE

9291. Feulner, G. (2006): Dragonfly migration. *Gazelle, Dubai* 21(3): 4. (in English) ["*Hemianax ephippiger* was once again on its characteristic January migration in January 2006. Or rather, since this phenomenon is not known with certainty to be a directional one, perhaps it should be called a peregrination. In any case, large numbers were observed at mid-month among low hills in the Wadi Shawkah area. In previous years, in January swarms could be found intermittently over much of the mountain areas, including even the very tip of the Musandam Peninsula. Gary Feulner would be interested to know if others have noticed this year's 'migration.' The Vagrant Emperor is a relatively large dragonfly and generally patrols at a height of more than a meter above the ground, seldom perching. Both males and females appear basically olive green in flight, although the male may show accents of blue. [If high-swarmling dragonflies seem slightly reddish, you are probably seeing the Globe Skimmer (*Pantala flavescens*), a strong migrant which often appears after localized showers.] Address: Feulner, G., Dubai Nat. Hist. Gr., P.O. Box 9234, Dubai, UAE

9292. Jensen, P.D. (2006): Ecological impact of selenium and mercury on two insect food chains. PhD Dissertation, University of California, Riverside, CA, USA. 139 pp. (in English) [The author evaluated the effects of Se and/or methyl-mercury (MeHg) on consumption rates of *Sympetrum corruptum* when fed *Culex quinquefasciatus* (Diptera: Culicidae). He found that *S. corruptum* in Se treatment solutions consumed significantly more mosquito larvae per day than controls; however, predators eating prey contaminated with Se + MeHg consumed significantly fewer prey per day. Predators' consuming more in Se-treated water with non-treated prey was attributed to the mosquito larvae experiencing a reduction in avoidance behaviour. Predators' consuming less in the Se + MeHg treatments was attributed to treatments making the prey unpalatable or suppressing

the predator's appetite.] Address: Jensen, P.D., Department of Entomology, University of California, Riverside, 92521 California, USA

9293. Kirchen, T. (2006): Mittagssmahl der etwas unüblichen Art. *mercuriale* 6: 41. (in German) [A female *Ischnura elegans* devoured a freshly emerged female *Coenagrion puella*.] Address: Kirchen, T., Wolsfelder Str. 35, 54886 Holsthum, Germany

9294. Kriukov, N.A.; Sokolova, I.; Glupov, V.V. (2006): Microsporidiosis of the dragonfly *Aeshna viridis* larvae (Odonata: Aeshnidae) caused by *Systemostrema alba* Larsson, 1988 (Microsporidia: Thelohaniidae). *Parazitologiya* 40(1): 66-73. (in Russian, with English summary) ["A microsporidian species producing octospores in sporophorous vesicles is found in *Aeshna viridis* larvae from intermittent streams situated in the vicinity of Novosibirsk City. Size of the spores measured on fresh smears was 6.9 +/- 0.09 microm x 4.1 +/- 0.08 microm (6.0-7.6 x 3.5-4.9). Each spore have single elongated nucleus and an anisofilar polar filament composed of 10-11 anterior and 10-11 posterior coils. The infection was restricted to adipose tissue. According to spore morphology the Siberian isolate can be attributed to the species *Systemostrema alba* described from *Aeshna grandis* in Sweden (Larsson, 1988). This is the first description of *Microsporidia* infecting Odonata from Siberia." (Authors) The microsporidia constitute a phylum of spore-forming unicellular parasites. They were once thought to be protists but are now known to be fungi.] Address: Glupov, V.V., Laboratory of insect pathology, Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Frunze street 11, Novosibirsk 630091 Russia

9295. Li, X.; Zhou, W.; Yang, Y.; P, X.-f. (2006): Sexual dimorphism and feeding habits of *Rana pleuraden*. *Journal of southwest forestry college* 26(1): 47-51. (in Chinese, with English summary) [China (no additional locality information provided in English language), 563 specimens of *Rana pleuraden* (female: 235, male: 223) were analysed for feeding habits. Odonata were only represented by one prey item from 1 118 items devoured by females.] Address: Li, X., Faculty of Conservation Biology, Southwest Forestry College, Kunming Yunnan 650224, China

9296. Lu, J.-f.; Che, J.-z. (2006): Review on the utilization history, current status and development trend of edible insect resources. *Shipin Kexue* 27(12): 830-837. (in Chinese, with English summary) ["Edible insects as alternate source of food provide significant nutritional, economic and ecological benefits for rural communities. In this review, we summarize research progresses of edible insect resources, including that the utilization history, species and distributions of edible insects in the whole globe, and the attitude of the eastern and western world on this issue. Based on the current status, some reasonable advices on exploitation and utilization of edible insects as human food were suggested." (Authors) Table 1 includes "Odonata".] Address: Lu, J.-f., School of Biotechnology and Food Engineering, Hefei University of Technology, Hefei 230009, China

9297. Schiel, F.J.; Hunger, H. (2006): Zufallsfunde von *Sympyga fusca* in mutmaßlichen Überwinterungshabitaten fernab geeigneter Entwicklungsgewässer. *Mercuriale* 6: 26-27. (in German) [Baden-Württemberg, Germany; forest clearings as hibernation habitats of *S. fusca* are documented. Post emergence mobility of the

specimens from the nearest known breeding habitat may reach up to 16 km as the crow flies.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

9298. Schmidt, E. (2006): Das NSG Fürstenkuhle im Gescher-Hochmoor. Ein gefährdeter Hochmoorrest aus Sicht der Libellenfauna. *Naturzeit* 3(6): 12-13. (in German) [The author introduce into the development / degradation over the past app. 70 years of the high bog Fürstenkuhle between Coesfeld and Velen, Nordrhein-westfalen-Germany, with special emphasis on the Odonata fauna.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

9299. Semwal, N.; Akolkar, P. (2006): Water quality assessment of sacred Himalayan rivers of Uttaranchal. *Current Science* 91(4): 486-496. (in English) ["Mass bathing in sacred water bodies is an age-old ritual in India. Organized outdoor bathing is an important in situ utilization of water bodies, which demands water quality requirements for drinking as well as bathing purposes. Apart from this, the Himalayan rivers have a great potential for hydroelectric power generation due to altitudinal variations. The present study deals with water quality assessment of rivers in Uttaranchal, in view of their religious importance and ecological sustainability. Based on bio-monitoring assessment, biological water quality criteria have been evolved for rivers of Uttaranchal, indicating various beneficial uses of water quality and their respective levels of characteristics. Out of 60 stretches of 19 rivers, 41 stretches indicated clean water quality of Class 'A', five stretches were slightly polluted (class 'B'), six were moderately polluted (class 'C'), one stretch was highly polluted (class 'D') and there were altogether seven severely polluted (class 'E') stretches. The physico-chemical water quality in most of the rivers of Uttaranchal remained unchanged except of total dissolved solids, which ranged from 90.23 to 121.33 mg/l, total suspended solids varying from 126.5 to 236.5 mg/l and total alkalinity of 37.0 to 96.0 mg/l. Religious places have contributed significant levels of sulphates to water quality (1.66 to 20.0 mg/l). Traces of iron, zinc and copper metals in water and sediments have been observed in clean water quality stretches. Agricultural practices on the river bank may have considerable impact on contribution of pesticide residues such as total Endosulfan, Dieldrin and DDT. Open defecation is the most common activity on river banks, which has significant contribution towards the aesthetic water quality of rivers." (Authors) Odonata are treated at the family level.] Address: Semwal, N., Central Pollution Control Board (Ministry of Environment & Forests, Govt of India), Parivesh Bhawan, East Arjun Nagar, Delhi 110 032, India. E-mail: nripsemwal@yahoo.co.in

9300. Société Limousine d'Odonatologie (2006): Elaboration d'une Liste Rouge des odonates menacés du Limousin. *Epops - La revue des naturalistes du Limousin* 70(4): 8-10. (in French) [33 odonate species are redlisted in the Limousin region, France (Départements Corrèze, Creuse, Haute-Vienne).] Address: Société Limousine d'Odonatologie, 11, rue Jauvion, F-87000 Limoges, France

- 9301.** Archaux, F. (2007): *Sympetrum fonscolombii* (Selys, 1840), nouvelle espèce pour le département du Loiret et découverte d'une nouvelle population de *Coenagrion mercuriale* (Charpentier, 1840). *Martinia* 23(3): 109-111. (in French, with English summary) [Département Loiret, France; "the observation of at least one male of *Sympetrum fonscolombii* on the Grand rue pond on 4th June 2006 constitutes the first record of this species for the Loiret department (Centre region). Furthermore, a new population of *C. mercuriale* was discovered in May 2005 on a small, temporary stream over chalky substrate. This population is the fourth known in the department and the only one in the East." (Author)] Address: Archaux, F., Cemagref, Domaine des Barres, 45290 Nogent-sur-Vernisson, France
- 9302.** Bernard, D. (2007): Découverte d'une nouvelle population d'*Epithea bimaculata* (Charpentier, 1825) dans l'Ain (Odonata, Anisoptera, Corduliidae). *Martinia* 23(1): 30. (in French) [26-V-2006, Thézillieu (01), France.] Address: Bernard, D., 15 rue Puits Gaillot, F-69001 Lyon, France. E-mail: damlbernard@yahoo.fr
- 9303.** Borisov, S.N.; Haritonov, Yu.A. (2007): The dragonflies (Odonata) of Middle Asia. Part 1. Caloptera, Zygoptera. *Eurasian entomological journal* 6(4): 343-360. (in Russian, with English summary) ["A review of the Odonata fauna of Middle Asia (Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan, southern part of Kazakhstan) is presented from which 85 species of dragonflies have been recorded, including 51 for Turkmenistan, 56 for Uzbekistan, 56 for Tajikistan, 58 for Kyrgyzstan and 66 for the southern part of Kazakhstan. Taxonomic problems, distribution characteristics and ecology of Caloptera and Zygoptera are given in this first part of the review. Distribution maps for all (n = 36) zygopteran species in Middle Asia are provided." (Authors) Table 1. List of dragonfly species and their distribution in Middle Asia: Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan, southern part of Kazakhstan] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru
- 9304.** Cordoba-Aguilar, A.; Leshner-Trevino, A.C.; Anderson, C.N. (2007): Sexual selection in *Hetaerina titia* males: a possible key species to understand the evolution of pigmentation in calopterygid damselflies (Odonata: Zygoptera). *Behaviour* 144(8): 931-952. (in English) ["*H. titia* males bear wing pigmentation patterns similar to *Hetaerina* and *Calopteryx* (a derived sister genus of *Hetaerina*) species: black (typical of *Calopteryx*) and red (typical of *Hetaerina*). Sexual selection has operated on red (via male-male competition) and black (via male-male competition and female choice) in *Hetaerina* and *Calopteryx*, respectively. We investigated sexual behaviour and pigmentation in *H. titia* to understand their evolution in both genera using *H. titia* as a possible evolutionary transitional stage. Similar to *Calopteryx*, the black pigmentation correlated with five male quality aspects: defending a territory, survival, immune ability, parasite resistance and fat reserves. We hypothesize that black pigmentation, but not red, may be used to signal energetic condition when males compete for a territory. The red pigmentation, despite indicating male quality in *Hetaerina* species, did not correlate with quality but showed a positive relation with parasite burden. These results suggest that the red lost its function which was gained by the black pigmentation, possibly via intrasexual competition, in the absence of female choice (as *H. titia* does not show male pre-copulatory courtship as in *Calopteryx*, during which females choose males based on black pigmentation). It is unknown why the red pigmentation was retained." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Univ. Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx
- 9305.** Dommangeat, J.-L. (2007): La faune odonatologique du département des Yvelines: état des connaissances (Région Ile-de-France). *Martinia* 23(3): 95-108. (in French, with English summary) [France; "This first assessment of Yvelines department Odonata counts 51 species, i.e. 56% of mainland France fauna. Half of these species are critically endangered (1 species), endangered (3 species) or vulnerable (22 species). Two tables summarize the status, habitats and populations of the species present in the area." (Author)] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 9306.** Dommangeat, J.-L. (2007): La rue René Martin au Blanc (Département de l'Indre). *Martinia* 23(1): 34. (in French) [A street in Blanc (Département Indre), France was named after René Martin (1846-1925).] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 9307.** Dommangeat, J.-L. (2007): Analyse d'ouvrage: Les libellules de Belgique. Répartition, tendances et habitats par P. Goffart, G. De Knijf, A. Anselin et M. Taily, 2006, Publication du Groupe de Travail Libellules Gomphus et du Centre de Recherche de la Nature, des Forêts et du Bois. Ministère de la Région wallonne. Série Faune-Flore-Habitats, n°1. Gembloux. Relié couverture souple en couleurs. 24 x 17 cm, 398 pages. Très nombreuses cartes, graphiques, tableaux, photographies et autres illustrations en couleurs. ISBN: 2-87401-204-1 - Distributeur: Librairie Aves-Natagora, Maison liégeoise de l'Environnement, Rue Fusch 3, B-4000 Liège. librairie@aves.be. Prix : 24,90 €. *Martinia* 23(2): 71-72. (in French) [book review] Address: Dommangeat, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France
- 9308.** Dyatlova, E.; Kalkman, V. (2007): Important Dragonfly Areas in Southwest Ukraine. Dutch Ministry of Agriculture, Nature and Food Quality (BBI-MATRA / 2006/002): 32 pp. (in English) ["In this report information gathered during the project 'Guardians of the watershed: Identifying Important Dragonfly Areas in Southwest Ukraine' is presented. The project was conducted from July 2006 to December 2007. [...]. The project resulted in an overview of the dragonfly fauna and a list of Important Dragonfly Areas of SW Ukraine. This information is important when establishing new nature reserves and for the management of existing reserves. In order to do so a database was created containing Ukrainian records and additional fieldwork have been conducted. Based on four criteria six areas were selected as Important Dragonfly Areas: 1) Reservoirs in a lower part of Khadzhibejski Liman; 2) Basin of South Bug and Ingul rivers; 3) Lower Dniestr with tributaries and lakes and Dniestrovski Liman; 4) Kinburn Peninsular; 5) Dniepr Delta; 6) Lower Danube and Predanube Region. The project resulted in the start of

an informal organised Odonata-community in Ukraine, which will maintain and further expand the database with distributional records." (Authors) The regional distribution of the following species is mapped: *Aeshna cyanea*, *Anax imperator*, *Calopteryx splendens ancilla*, *Coenagrion scitulum*, *C. ornatum*, *Cordulia aenea*, *Erythromma lindenii*, *Gomphus vulgatissimus*, *Stylurus flavipes*, *Lestes macrostigma*, *Selysiothemis nigra*, *Sympetrum danae*, *S. depressiusculum*, and *S. pedemontanum*.] Address: Dyatlova, Elena, Inst. of Zool., Faculty of Biology, I.I. Mechnikov Univ. of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

9309. Dyatlova, E.S. (2007): Polymorphism of coenagrionid damselflies in the southwestern Ukraine. Questions of aquatic entomology of Russia and adjacent lands: Materials of the Third All-Russia Symposium on Amphibiotic and Aquatic Insects. Voronezh State University. ISBN 978-5-9273-1169-9: 107-113. (in Russian, with English summary) ["Population characteristics of *Coenagrion pulchellum* and *Ischnura elegans* were studied in southwestern Ukraine for the first time. During all the flight period juvenile specimens were continually recorded in two populations of *I. elegans*. The following population characteristics have been studied: age structure of populations and ratio of gynomorphic and andromorphic females. It was shown that in southwestern Ukraine andromorphic females of *C. pulchellum* constituted 25% of the females. In two populations of *I. elegans* andromorphic females constituted 52% and 66%." (Author)] Address: Dyatlova, Elena, Inst. of Zool., Faculty of Biology, I.I. Mechnikov Univ. of Odessa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

9310. Feulner, G. (2007): Dragonflies at the Beach. *Gazelle, Dubai* 22(2): 5. (in English) ["When I first came to the UAE, I was surprised to find the occasional dragonfly deep within sand desert regions such as Liwa. Later I learned that two kinds, both relatively large, can often be found in the deserts of the UAE, although sadly from the point of view of study they are "hawkers" that tend to remain in flight continuously and seldom settle. One is the globe skimmer, *Pantala flavescens*, a pan-tropical dragonfly that is a strong migrant and often one of the first to show up in a "dry" area (desert, wadi or mountain) after rain. In January a lone female specimen patrolled very close to us as we sat in the shade of the car near midday among large dunes in the Umm Az-Zamool area. This is a medium size dragonfly that is often identifiable by the slightly "dipped" posture of its abdomen in flight. Females are a yellowish green; males may be more orange or reddish, with a bright yellow face. The other is the larger Vagrant Emperor, *Hemianax ephippiger*, also yellowish green, but with hints of blue in the male, which seems often to migrate in January and February. Most of the Emperor dragonflies in the collection at EAD (formerly ERWDA) in Abu Dhabi are of this species. In confirmation of prior experience, I have recently seen this species in the Huqf area of Oman (patrolling outside a roadside restaurant) and in Umm Az-Zamool (patrolling the landscaped surroundings of a guardhouse). I was able to confirm the identification of the Umm Az-Zamool species because one flew into the lantern in the archeologists' field camp there. It was swatted and dispatched by one of the workmen, but preserved for science and brought back to civilisation by former DNHG member John Martin, a member of the archeological team. Like the Globe Skimmer, the Vagrant Emperor is a strong migrant and

can be found throughout the UAE, not just in deserts. In mid-February, travelling home by taxi from a delightful tour of Bur Dubai's Temple Alley, I saw two individuals patrolling different patches of roadside landscaping within urban Dubai." (Author)] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, UAE

9311. Feulner, G. (2007): Dragonflies at the Beach. *Gazelle, Dubai* 22(10): 6-7. (in English) [United Arab Emirates; "In early September of this year, on a visit to Hulaylah Island north of Rams, RAK, ... I encountered *P. flavescens* almost everywhere on the barrier island, despite the decidedly overgrazed and partly 'developed' landscape. We saw them swarming high in the air near large mesquite trees; around goat and camel pens; patrolling a partially fenced area that excluded camels (but not goats) and therefore had retained a low ground cover of the bristly *Heliotropium kotschy*; over more or less barren, overgrazed sand near a shallow lagoon with flamingoes (where the dragonflies seemed to seek out our vehicles as an intruder into their familiar surroundings; and even along the length of the 1 km jetty at the mouth of the inlet.) We found them active from 7 am until we ourselves departed at nearly noon." (Author)] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, UAE

9312. Grand, D. (2007): *Coenagrion ornatum* (Selys in Selys et Hagen, 1850) dans le département du Rhône (Odonata, Zygoptera, Coenagrionidae). *Martinia* 23(2): 66. (in French) [The author documents three records of *C. ornatum* in the Rhône Department, France from May/June 2007.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

9313. Grand, D. (2007): Apparition précoce des libellules au printemps 2007 en région lyonnaise. *Martinia* 23(3): 88. (in French) [Phenological data on spring flight season in the Lyon region, France are presented.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

9314. Greenway, M.; Polson, C. (2007): Protecting aquatic ecosystem health: are water quality objectives realistic? Case studies from Queensland, Australia. *NOVATECH 2007*: 1747-1754. (in English, with French summary) ["Many regulatory authorities set water quality objectives or thresholds based on nutrient concentrations to safeguard aquatic ecosystem health. But do these criteria adequately assess the biological and ecological status? Our research has been focussing on the performance of constructed wetlands for water quality improvement and ecosystem health. In this paper we present data on macroinvertebrate species richness from two wastewater treatment wetlands and two stormwater treatment wetlands. Despite nutrient concentrations exceeding water quality objectives all four wetlands supported a diverse assemblage of macroinvertebrates, including sensitive taxa. From our study we concluded that water quality objectives may be too stringent and that aquatic plants are more important for macroinvertebrate richness. Thus, constructed wetlands are effective for both water quality improvement and aquatic biodiversity." (Authors) Taxa, including Odonata, are treated at the order level.] Address: Greenway, Margaret, School of Engineering, Griffith

Univ., Brisbane, Queensland 4111, Australia. E-mail: m.greenway@griffith.edu.au

9315. Guerbaa, K. (2007): Les Odonates de la Collection Charles Alluaud (Musée de la Sénatorie, Guéret, Creuse). *Martinia* 23(1): 31-33. (in French, with English summary) [The «Musée de la Sénatorie» in Guéret has an important insects collection, built up by Charles Alluaud (1861-1949). Two boxes with Odonata harbour 23 species in most cases from the Département Creuse, France, and including few records from the Vienne and Loire Atlantique (Île Dumet) Departments.] Address: Guerbaa, K., Société Limousine d'Odonatologie, 11, rue Jauvion, F-87000 Limoges, France

9316. Hennequin, E. (2007): État des connaissances sur *Coenagrion mercuriale* (Charpentier, 1840) en Limousin (Odonata, Zygoptera, Coenagrionidae). *Martinia* 23(3): 89-93. (in French, with English summary) [The development of the knowledge about the distribution of *C. mercuriale* in Limousin, France is presented, "together with ecological information from data gathered between 1994 and 2005. The species distribution appears to be growing. This can be explained by more extensive searches for this species. Breeding sites are nevertheless not numerous and the unfavourable regional status of this species is justified." (Author)] Address: Hennequin, E., Société Limousine d'Odonatologie, 11 rue Jauvion F-87000 Limoges, France

9317. Levasseur, M. (2007): Une remise de pluie pour *Pantala flavescens* (Fabricius, 1798) (Odonata, Anisoptera, Libellulidae). *Martinia* 23(1): 8. (in French) [Mutsamudu (capital Anjouan), Comores, 30-XI-2006. 150-200 specimens of *P. flavescens* were found in the vegetation near a shed during long lasting and heavy rain. The temperature reached 27°C, and during periods of less rain, small groups of the species started to flight erratically.] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France. E-mail: levasseur@magic.fr

9318. Levasseur, M. (2007): Observation et collection d'Odonates au Malawi (Afrique australe). *Martinia* 23(1): 13-22. (in French, with English summary) ["During a 22 months period in Malawi from november 1988 to august 1990, [...] a total of 53 species has been collected or identified, representing 35 % of the country's known fauna (152 species). Four colour plates of pictures taken by the author and representing imagines of 24 taxa are given." (Author)] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France. E-mail: levasseur@magic.fr

9319. Li, G.; Liang, B.; Wang, Y.; Zhao, Y.; Helgen, K.M.; Lin, L.; Jones, G.; Zhang, S. (2007): Echolocation calls, diet, and phylogenetic relationships of *Stoliczka's trident* bat, *Aselliscus stoliczkanus* (Hipposideridae). *Jour. Mammalogy* 88(3): 736-744. (in English) [China; "The diet of *A. stoliczkanus* is mainly composed of lepidopterans, beetles, and hemipterans. Lepidopterans were the most abundant food items in the samples (79% of the diet in volume), followed by coleopterans (15%), hemipterans (7%), and odonates (<1%)." (Authors)] Address: Zhang, S., School of Life Science, East China Normal University, Shanghai, 200062, China. E-mail: syzhang@bio.ecnu.edu.cn

9320. Lolive, N.; Hennequin, E. (2007): Découverte d'un site de première importance pour le genre *Somatochlora* en Limousin (Odonata, Anisoptera, Cordulii-

dae). *Martinia* 23(1): 12. (in French) [Swamps of Vénachat (Compreignac, 87), France; 24-VI-2006; exuviae of *Somatochlora flavomaculata* and *S. arctica* were found.] Address: Lolive, N., Société Limousine d'Odonatologie, 11, rue Jauvion, F-87000 Limoges, France

9321. Louve, N.; Guerbaa, K. (2007): La connaissance de *Cordulegaster bidentata* Selys, 1843 en Limousin affinée par une méthode de recherche des larves très efficace (Odonata, Anisoptera, Cordulegasteridae). *Martinia* 23(1): 3-8. (in French, with English summary) [Prior 2002, only 18 records of *C. bidentata* were available in Limousin (Corrèze and Haute-Vienne departments), France. In order to improve the knowledge about this species, an efficient method for searching larvae operating with a landing net was proposed. Within three years, this method led to the discovery of the species at ten additional sites.] Address: Guerbaa, K., Société Limousine d'Odonatologie, 11, rue Jauvion, F-87000 Limoges, France

9322. Manger, R. (2007): An unusual hibernator - *Sympecma paedisca*. *Vlinders* 1/2007: 4-6. (in Dutch, with English summary) ["In the Netherlands, there are two damselflies that hibernate as adult, *S. fusca* and *S. paedisca*. Both species are on the Red List; *S. paedisca* is critically endangered. Recent research on heathland in Drenthe into the hibernation and survival of *S. paedisca* has brought new facts to light. Being nondescript brown in colour, it is well camouflaged in its winter biotope. The adults can be found deep in grass tussocks in cold weather, but may fly when it is sunny. During hibernation, they stay put. Only half of the winter population survives. They do not reproduce here, despite water in the vicinity. In spring, they suddenly disappear. Wing marking at the reproduction sites showed that adults are able to fly large distances of up to 20 km. Eggs are laid in mid-April on dead vegetation, especially *Typha latifolia* and *Phragmites australis*, in lowland marshes. Perhaps these damselflies show migratory behaviour, spending eight or nine months on land and then flying in search of suitable waters to reproduce." (Authors)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

9323. Matushkina, N.A. (2007): The morpho-functional adaptations in Lestidae (Odonata, Zygoptera) to the oviposition into plant substrates of different stiffness. Questions of aquatic entomology of Russia and adjacent lands: Materials of the Third All-Russia Symposium on Amphibiotic and Aquatic Insects. Voronezh State University. ISBN 978-5-9273-1169-9: 177-183. (in Russian, with English summary) ["Several morpho-functional peculiarities of ovipositors in five lestids species, *Sympecma paedisca*, *Lestes virens*, *L. sponsa*, *L. barbarus*, and *Chalcolestes parvidens*, are listed, in part on the basis of this author's earlier studies. Some of the found modalities of the ovipositor's skeletal musculature and the insect's oviposition behaviour were considered as possible adaptations to oviposition into plants of different stiffness. The problems and methodology of such complex research, as well as the phylogenetic significance of some obtained results, are briefly discussed." (Author)] Address: Matushkina, Natalia A., Department of Zoology, Biological Faculty, National Taras Shevchenko University of Kyiv, vul. Volodymirs'ka, 64, Kyiv UA-01033, Ukraine. E-mail: odonataly@gmail.com

- 9324.** Meurgey, F. (2007): Observations récentes de *Sympetrum danae* (Sulzer, 1776) dans les Pyrénées-Orientales (Odonata, Anisoptera, Libellulidae). *Martinia* 23(1): 23-29. (in French, with English summary) ["*S. danae* is a rather common species in France, notably in mountainous areas. However, data are missing for the Pyrénées-Orientales department, where the most recent observation was made in 1997. The author presents observations made in this department in 1997, 1999 and 2003." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 9325.** Meurgey, F.; Weber, G. (2007): Observation récente d'*Ischnura capreolus* (Hagen, 1861) en Guadeloupe (Antilles françaises) (Odonata, Zygoptera, Coenagrionidae). *Martinia* 23(1): 35-37. (in French, with English summary) ["*I. capreolus* is a rare species in Guadeloupe, ever not seen since 1983. Many still invalidated data throwed the doubt about the real presence of this species in the archipelago. During our 2006 mission, a small population was observed on Grande-Terre (Les Abymes)." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 9326.** Meurgey, F. (2007): Liste actualisée des Odonates des Antilles françaises (Guadeloupe et dépendances, Martinique). *Martinia* 23(3): 75-88. (in French, with English summary) ["Studies of the Odonata fauna of the French West Indies began in 2000. They allowed to update the check-list of extant species in this area, and to accumulate biogeographical, ecological and biological data. Comments are given about the distribution and relative abundance of the 37 species composing this fauna." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr
- 9327.** Prioul, B. (2007): Analyse d'ouvrage: Les libellules de France, Belgique et Luxembourg par Daniel Grand et Jean-Pierre Boudot, 2006, Biotope, Mèze, (Collection Parthénope). Relié couverture rigide en couleurs. 24,5 x 17 cm, 480 pages en couleur. ISBN-10: 2914817053 ISBN-13: 978-2914817059 - Adresse de l'éditeur: Biotope 22, Boulevard Maréchal Foch, BP 58, F-34140 Mèze. Prix : 43 €. *Martinia* 23(1): 39-40. (in French) [book review] Address: not stated
- 9328.** Riexinger, W.-D. (2007): Die Libellenfauna im Stadtkreis Heilbronn. *mercuriale* 7: 1-3. (in German) [Baden-Württemberg, Germany; 31 Odonata species are listed. Some water bodies of importance as habitat of rare or specialized Odonata are briefly introduced.] Address: Riexinger, W.-D., Stadt Heilbronn, Planungs- & Baurechtsamt (Untere Naturschutzbehörde), Cäcilienstr. 56, D-74072 Heilbronn, Germany
- 9329.** Rückriem, C. (2007): Die Eiablage der Mond-Azurjungfer. Beobachtung eines Luftjägers auf Tauchgang. *Jahrbuch des Kreises Borken* 2007: 89-92. (in German) [Nordrhein-Westfalen, Germany, nature reserve Amtsfenn und Hündfelder Moor, between Ahaus und Gronau, 22-V-2006; a submerged oviposition of *Coenagrion lunulatum* is documented.] Address: not stated
- 9330.** Ryazanova, G.I. (2007): Reproduction tactics in the males of *Lestes sponsa* (Hansemann) (Odonata, Zygoptera): individual reproduction success or success of the population. Questions of aquatic entomology of Russia and adjacent lands: Materials of the Third All-Russian Symposium on Amphibiotic and Aquatic Insects. Voronezh State University. ISBN 978-5-9273-1169-9: 287-292. (in Russian, with English summary) ["Reproductive behaviour of individually marked males of *L. sponsa* at the water was observed. The males displayed territoriality. We suggested that one of the main functions of male *L. sponsa* territoriality in this case was even distribution of the males on all mating places at the water. The conservatism of individual reproductive tactics of the males was demonstrated. It may be supposed that this male tactics does not promote individual reproductive success, but promotes the reproductive success of all the population." (Author)] Address: Ryazanova, G.I., Biological Faculty, Moscow Lomonosov State University, Moscow, 119992, Russia
- 9331.** Salm, P. (2007): Heuschrecken und Libellen am Wulfesknapf. *ABU info* 30/31 (2006/07): 18-23. (in German) [Nordrhein-Westfalen, Germany; between 2003 and 2006, a total of 22 odonate species was recorded in that legally protected area. Most of the water bodies are of temporary character. Hence, the Odonata fauna is represented by many species known to be quite dispersive and good colonisers.] Address: Salm, Petra, c/o Landschaftsökologisches Planungsbüro Stelzig, Aldegrevewall 1, D-59594 Soest, Germany
- 9332.** Schäfer, R.B.; Caquet, T.; Siimes, K.; Mueller, R.; Lagadic, L.; Liess, M. (2007): Effects of pesticides on community structure and ecosystem functions in agricultural streams of three biogeographical regions in Europe. *Science of the Total Environment* 382: 272-285. (in English) ["There is a paucity of large-scale field investigations on the effects of organic toxicants on stream macroinvertebrate community structure and ecosystem functions. We investigated a total of 29 streams in two study areas of France and Finland for pesticide exposure, invertebrates and leaf-litter breakdown. To link pesticide exposure and community composition we applied the trait-based Species At Risk (SPEAR) indicator system. In the French region, pesticide stress was associated with a decrease in the relative abundance and number of sensitive species in the communities. The presence of undisturbed upstream reaches partly compensated the effects of pesticide contamination. Functional effects of pesticides were identified by a 2.5-fold reduction of the leaf-litter breakdown rate that was closely correlated with the structural changes in the contaminated streams. No effects of pesticides were observed in Finnish streams since contamination with pesticides was very low. In a follow-up analysis, the SPEAR approach successfully discriminated between reference and contaminated sites across different biogeographical regions, also including results of a previous field study in North Germany. Furthermore, change of the community structure was detectable at a concentration range as low as 1/100 to 1/1000 the acute 48 h-LC50 of *Daphnia magna*. Our findings demonstrate that pesticides may influence the structure and function of lotic ecosystems and that the SPEAR approach can be used as a powerful tool in biomonitoring over large spatial scales." (Authors) Supplementary data include Odonata on different taxonomic levels.] Address: Schäfer, R.B., UFZ - Helmholtz Centre for Environmental Research, Dept. System

Ecotoxicology, Permoser Straße 15, 04318 Leipzig, Germany. E-mail: Ralf.Schaefer@ufz.de

9333. Semenova, V.A.; Golub, V.B. (2007): Results of evaluating the condition of the benthic layer of the Voronezhskoye Reservoir on the basis of the stability of development index of the test-object, the damselfly *Ischnura elegans* (Odonata, Coenagrionidae). Questions of aquatic entomology of Russia and adjacent lands: Materials of the Third All-Russia Symposium on Amphibiotic and Aquatic Insects. Voronezh State University. ISBN 978-5-9273-1169-9: 296-302. (in Russian, with English summary) [Fluctuating asymmetry of wing venation of *Ischnura elegans* from three sample points at the Voronezhskoye Reservoir and one sample point at the Usman River, Russia with different anthropogenous impacts was studied. "The highest index of the fluctuating asymmetry level was observed at the lower reaches of the reservoir and at the Usman River near railway station Borovoye; the lowest level of this index was observed at the higher reaches of the reservoir." (Author)] Address: Semenova, V.A., Voronezh State University, Voronezh, Russia

9334. Sharma, G.; Sundararaj, R.; Karibasvaraja, L.R. (2007): Species diversity of Odonata in the selected provenances of sandal in southern India. *Zoos' Print J.* 22(7): 2765-2767. (in English) [21 Odonata species are reported from sandal ecosystems of 6 localities in Karnataka, Tamil Nadu and Kerala, India (Bengaluru, Thangli and Mandagadde in Karnataka, Javadis and Chitteri in Tamil Nadu and Marayoor in Kerala).] Address: Sharma, G., Wood Biodegradation Div., Inst. Wood Sci. & Technol., 18th Cross Malleswaram, Bangalore, Karnataka-560003, India

9335. Shestani, L.; Morisi, A.; Battagazzore, M. (2007): Comunità macrobentoniche di riferimento nei fontanili del cuneese. *Studi Trent. Sci. Nat., Acta Biol.* 83: 123-128. (in English) ["Macrobenthic reference communities in the flood-plane springs of the Cuneo province - On the basis of the macrobenthic fauna the flood-plane springs of the Cuneo plain may be ascribed to different reference types. The chemical-physical features, the relative composition of invertebrate community and the presence/absence of indicator taxa, grouped the flood-plane springs reflecting a division in geographic areas. The belonging to different types appeared well stated considering the taxa present in the 50% of the surveys, even more when the limit was fixed at 90%. In some cases, flood-plane springs with similar physico-chemical features belonged to different groups on the basis of the composition of the macrobenthic community (e.g. springs of Morozzo). This work points out the meaning of these biotopes as "stock" of biodiversity, also emphasizes their importance as matter of studies devoted to provide a more detailed ecological classification, exclusively based, in case of chemical/physical uniformity, on their faunal features." (Authors) "Calopteryx" and "Cordulegaster" were present in "Reference communities" (taxa present in 50% of samplings.)] Address: Morisi, A., Dipartimento di Scienze Ambientali, Università degli Studi del Piemonte Orientale "Amedeo Avogadro", Via Bellini 25, 15100 Alessandria, Italia. E-mail: a.morisi@arpa.piemonte.it

9336. Silina, A.Ye. (2007): Substance and energy outflow from marsh ecosystem by insect emerging: the succession aspect. Questions of aquatic entomology of Russia and adjacent lands: Materials of the Third All-

Russia Symposium on Amphibiotic and Aquatic Insects. Voronezh State University. ISBN 978-5-9273-1169-9: 303-320. (in Russian, with English summary) ["Insects emerging as adults from the hydrocenothesis of a mesotrophic marsh in the Usman pine-forest (Voronezh province, Russia) were studied from early May to late September, 1990. Insects were collected using floating emergence traps (S=1m²). For the determination of the concentrations of Cd and Pb in adult insects we used a Graphite Furnance Atomic Absorption Spectrometer with deuterium background correction, Cu and Zn with Flame Atomic Absorption Spectrometer, C and N with CHN-analyser. Total number, biomass, the role of different taxa, dominants composition and zoogeographical character of communities are discussed in correlation with the succession stage of the biocenosis. Levels of bio-, energy-mass and chemical elements outflowing out from water to terrestrial biotopes and the loss of secondary production with insects emerging are estimated." (Authors) The study includes data referring to *Lestes virens*, *L. sponsa*, *Coenagrion hastulatum*, and *Sympetrum flaveolum*.] Address: Silina, A.Ye., Voronezh State University, Voronezh, Russia

9337. Skvortsov, V.E.; Kuvaev, A.V. (2007): *Lindenia tetraphylla* (Vander Linden, 1825) and *Selysiothemis nigra* (Vander Linden, 1825) (Insecta, Odonata), new records for European Russia. *Eurasian entomological journal* 6(4): 448-449. (in Russian, with English summary) ["*L. tetraphylla* and *S. nigra* are recorded for the first time from European Russia. Material was collected in June 2007 from the Kalmyk Republic (Yashkul'sky and Chernozemelsky districts), mostly in the territory of the Chernye Zemli Nature Reserve. Both species proved to be common and occurred together in many localities, sometimes in great number. The problem of their autochthony in Kalmyk Republic is discussed." (Authors)] Address: Skvortsov, V.E., M.V. Lomonosov Moscow State University, Faculty of Biology, GSP-1, Leninskiye Gory, Moscow 119992 Russia. E-mail: westurnus@yandex.ru; Kuvaev, A.V., A.N. Severtzov Institute of Ecology and Evolution, Russian Academy of Sciences, Leninskiy prospect 33, Moscow 119071 Russia. E-mail: kuvaevav@mail.ru

9338. Ternois, V.; Epe, M. (2007): Première mention de *Boyeria irene* (Fonscolombe, 1838) dans le Parc naturel régional de la Forêt d'Orient et en région Champagne-Ardenne (Odonata, Anisoptera, Aeshnidae). *Martinia* 23(2): 53-57. (in French, with English summary) [*B. irene* was observed 1-IX- 2006 in Orient forest Natural Park (Aube department, France). This is the first record of this species for Champagne-Ardenne region.] Address: Epe, M., De Vlier 18, NL-6581 WE Maiden, The Netherlands. E-mail: martineniris@hotmail.com

9339. Vanappelghem, C. (2007): Les collections d'Odonates des Muséums et Universités du Nord-Pas-de-Calais. Inventaire et révision I. Faculté Libre des Sciences et Technologies et Station Marine de Wimereux. *Martinia* 23(2): 59-66. (in French, with English summary) [France; the author presents an inventory and a revision of the Odonata collections of the Faculté Libre des Sciences et technologies (92 specimens for 18 species) and Station Marine de Wimereux (7 specimens for 7 species). Recording details are documented, and a few species are briefly discussed.] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

- 9340.** Andrade, H.T.A.; Santiago, A.S.; Medeiros, J.F. (2008): Estrutura da comunidade de invertebrados bentônicos com enfoque nos insetos aquática do Rio Piranhas-Assu, Rio Grande do Norte, nordeste do Brasil. *EntomoBrasilis* 1(3): 51-56. (in Portuguese, with English summary) [The benthic invertebrate community with focus on the insects of the Piranhas-Assu River, State of Rio Grande do Norte, Northeast, Brazil was studied in May (rain season), July and September (dry season) 2002. Odonata are treated at the family level.] Address: de Almeida Andrade, Herbet Tadeu, Departamento de Microbiologia e Parasitologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte, Brazil. E-mail: herbet@ufrnet.br.
- 9341.** Bogdanović, T.; Merdić, E.; Mikuska, J. (2008): Data to the dragonfly fauna of lower Neretva river. *Entomologia Croatica* 12(2): 51-65. (in English, with Croatian summary) [Between 2003 to 2005, a total of 48 odonate species was recorded at six localities along the lower stretches of Neretva River, Croatia. 12 species are additions to the regional list of Odonata: *Calopteryx virgo*, *Ceragrion tenellum*, *Aeshna cyanea*, *Brachytron pratense*, *Onychogomphus forcipatus*, *Cordulia aenea*, *Somatochlora flavomaculata*, *Somatochlora meridionalis*, *Orthetrum albistylum*, *Orthetrum coerulescens*, *Sympetrum flaveolum* and *Sympetrum fonscolombii*.] Address: Bogdanović, T., Department of Biology, University of J. J. Strossmayer, Osijek, Trg Ljudevita Gaja 5, HR-31000 Osijek, Croatia. E-mail: tbogdano@ffos.hr
- 9342.** Borisov, S. (2008): The larve of *Anormogomphus kiritshenkoi* Bartenef, 1913 (Odonata, Gomphida). *Eurasian entomological journal* 7(4): 307-310. (in Russian, with English summary) [Turkmenistan, the last instar larva of the rare *A. kiritshenkoi* is described. The larva differs from the other larvae of the Gomphidae by the shape of mask, with a strongly convex and emarginate distally medial paddle. The larval stage of *A. kiritshenkoi* lasts probably four years.] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru
- 9343.** Borisov, S.N. (2008): Dragonflies (Odonata) in ornithological traps from Western Tien-Shan. *Eurasian entomological journal* 7(1): 1-10. (in Russian, with English summary) [Kazakhstan; "seven migratory dragonfly species are found in ornithological traps settled in Western Tien-Shan (N 42.530°, E 70.605°): *Sympecma gobica*, *S. fusca*, *S. paedisca*, *Aeshna mixta*, *Anax parthenope*, *Sympetrum arenicolor*, and *S. fonscolombii*." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru
- 9344.** Borisov, S.N.; Haritonov, A.Yu. (2008): The Dragonflies (Odonata) of Middle Asia. Part 2 (Anisoptera). *Eurasian entomological journal* 7(3): 97-123. (in Russian, with English summary) ["A review of the Odonata fauna of Middle Asia (Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan, southern part of Kazakhstan) is presented. In the second part of the paper the problems of taxonomy, distribution and ecology of Anisoptera are discussed. Distribution maps for all dragonfly species in Middle Asia are provided." (Authors)] Address: Haritonov, A.Yu., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia.
- 9345.** Boudot, J.-P. (2008): Un *Crocothemis* en bien mauvaise posture. *Martinia* 24(4): 151. (in French) [WWF Kerkini Wetland, Greece, 29-VII-2008; a juvenile Squacco Heron (*Ardeola ralloides*) is preying on *Crocothemis erythraea*] Address: Boudot, J.-P., LIMOS, UMR CNRS 7137, Universités de Nancy, Faculté des Sciences, B.P. 239, F-54506 - Vandoeuvre-lès-Nancy Cedex, France. E-mail: jean-pierre.boudot@limos.uhp-nancy.fr
- 9346.** Breton, F. (2008): Phénomènes migratoires chez *Sympetrum fonscolombii* (Selys, 1840) dans les Alpes du Sud (Odonata, Anisoptera, Libellulidae). *Martinia* 24(4): 113-128. (in French, with Italian and English summary) [The paper compiles older observations on migration of *S. fonscolombii* across the European Alps (and the Pyrenees). More systematic observations were made between 2003 and 2007 along the southwestern Alps situated along the border between Italy and France, analysing 38 records of - in most cases - southwards directed late summer-autumn migrations. "These irregular migrations, which could concern several millions of individuals, seem to be initiated by massive emergences in the Italian region of Piémont, starting at the end of July. The most observed direction is toward north-west and south, sometimes toward west and south-west. The environmental conditions which release these migrations are debated." (Authors)] Address: Breton, F., Parc national du Mercantour, Franc. E-mail: francois.breton@espaces-naturels.fr
- 9347.** Collen, B., Ram, M., Dewhurst, N., Clausnitzer, V., Kalkman, V., Cumberlidge, N. and Baillie, J.E.M. (2008): Broadening the coverage of biodiversity assessments. In: J.-C. Vié, C. Hilton-Taylor and S.N. Stuart (eds). *The 2008 Review of The IUCN Red List of Threatened Species*. IUCN Gland, Switzerland. 9 pp. (in English) [Verbatim: "Box 4: Threats to dragonflies and damselflies: a. Restricted range - damselflies: The Pemba Featherleg *Platycnemis pembipes*, a fragile black and white damselfly was first discovered in 2001 on the island of Pemba off the Tanzanian coast. Remarkably its nearest relatives occur on Madagascar, separated by 1,000 km of ocean. Although the species might have reached Pemba aided by strong monsoon winds, recent studies suggest it may be the survivor of an ancient African fauna that is now largely confined to Madagascar. The species only inhabits the single stream flowing through Pemba's last remnant of forest and is listed as Critically Endangered. The Pemba Featherleg shares this fate with two other East African damselflies of unknown origin. *Amanipodagrion gilliesi* (Critically Endangered) survives on a single stream in Tanzania's Usambara Mountains. It shares no similarities with any other known species. Equally unique is *Oreocnemis phoenix* (Critically Endangered), named for its bright red males. Streams on the high plateau of Mount Mulanje in Malawi, known aptly as 'the island in the sky' and a mere 24 km across, are its only known habitat. The plateau is made up of bauxite deposits: mining these would significantly impact the habitat. b. Climate change impact on the Ancient Greenling *Hemiphlebia mirabilis*: The Australian endemic damselfly *Hemiphlebia mirabilis* (Endangered), the Ancient Greenling, is notable for its apparent archaic characters, its male mating displays and its biogeography. Originally thought to have been a Victorian endemic, the species was subsequently found in northeastern Tasmania and then on Flinders Island.

This suggests that the species would have occupied the Bassian Ridge when it was exposed during glacial times and this may have been a dispersal route at some time. The species is cryptic within its reed habitat except when the males in particular display by waving their expanded, white anal appendages. The species breeds in open, sedge marshes with a low water level and seems to be capable of recolonizing habitats when they have become dry, probably surviving in the egg stage. In recent times, however, dry spells are longer and more frequent due to climate change and they pose a severe threat to this already rare species. The Ancient Greenling is not the only Australian dragonfly to be affected by climate change and it seems likely that dry spells will become a major driver for decline in the near future." (Authors)] Address: Clausnitzer, Viola, Heinzelstr. 3, 02826 Görlitz, Germany. E-mail: violacl@t-online.de

9348. COSEWIC/COSEPAC; Harris, A.; Foster, R. (2008): COSEWIC. 2008. COSEWIC assessment and status report on the Rapids Clubtail *Gomphus quadricolor* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa (www.sararegistry.gc.ca/status/statuse.cfm). ISBN 978-0-662-48813-2: vi + 35 pp. (in English) ["Species information: *Gomphus* (*Gomphus*) *quadricolor* Walsh 1863, Rapids Clubtail, is a member of the family Gomphidae, the clubtail dragonflies. It is a small dragonfly, with a wingspan of 25-27 mm and a contrasting pattern of brownish-black and yellowish-green stripes on the thorax. The abdomen is slender, but in males is expanded slightly at the tip. Distribution: The range of *Gomphus quadricolor* includes Ontario and 25 states in the northeastern and northcentral U.S. The global maximum extent of occurrence encompasses about 1.7 million km². In Canada, it was historically known from four sites in southern and eastern Ontario, but is extant at only two sites. Its extent of occurrence in Canada is about 1570 km² and its area of occupancy is approximately 26 km². Habitat: Larvae live in muddy pools in clear, cool streams. Adult males perch on rocks in rapids. Adult females inhabit forests on the riverbanks, moving to the rapids when ready to mate. Biology: Adult *Gomphus quadricolor* fly between early June and early July in Ontario and live about three to four weeks. Mating takes place over the river and females deposit eggs on the water surface over rapids. Eggs or recently hatched larvae are carried downstream to pools. Larvae spend most of their time buried just below the surface of the sediment in the bottom of the pool, breathing through the tip of the abdomen raised above the sediments. The duration of the larval stage of *Gomphus quadricolor* is unknown, but is probably two or more years. Before the final moult, larvae crawl onto vegetation on the edge of the stream. Newly emerged adults disperse inland to avoid predation until the exoskeleton hardens and they are able to fly swiftly." (Authors)] Address: COSEWIC Secretariat, c/o Canadian Wildlife Service, Environment Canada, Ottawa, ON, K1A 0H3. E-mail: COSEWIC/COSEPAC@ec.gc.ca; <http://www.cosewic.gc.ca>

9349. Couteyan, S.; Papapzin, M. (2008): Contribution à la connaissance des Odonates de l'île de La Réunion 9. Description de la larve d'*Hemicordulia atrovirens* Dijkstra, 2007 (Odonata, Corduliidae). *L'entomologiste* 64(4): 225-227. (in French) [On the basis of numerous exuviae, the last larval instar of the Reunion Island endemic *H. atrovirens* is described.] Address: Cou-

teyan, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France. E-mail: couteyensf@vanadoo.fr

9350. Cremona, F.; Planas, D.; Lucotte, M. (2008): Biomass and composition of macroinvertebrate communities associated with different types of macrophyte architectures and habitats in a large fluvial lake. *Fundamental and Applied Limnology - Archiv für Hydrobiologie* 171/2: 119-130. (in English) ["The influence of macrophyte habitat and architecture on macroinvertebrate biomass, abundance, and richness was investigated in Lake St. Pierre, a large fluvial lake of the St. Lawrence River (Quebec, Canada). A lake-wide estimate of macroinvertebrate biomass associated with different macrophyte habitats was also calculated in order to assess the quantitative effects of vegetation changes on macroinvertebrate communities. For two years during the ice-free period, phytophilous macroinvertebrates were sampled in macrophyte beds comprising more than ten species of plants and three habitats (emergent, floating-leaved, submerged), and in three submerged macrophyte architectures based on plant morphology (simple, intermediate, and complex). Invertebrate sub-samples were classified into four functional groups (detritivore, grazer, crawling predator - including not further specified Odonata -, diving predator). Biomass and density of invertebrates were expressed per unit of plant dry weight. The main findings are that macroinvertebrate biomass, abundance and richness were significantly greater in submerged than in emergent and floating-leaved habitats. However, macrophytes with a complex architecture did not host significantly greater macroinvertebrate biomass than plants with a simpler architecture. This could be related to substrate preferences of herbivores (mostly Gastropoda) toward the tape grass *Vallisneria americana*. Differences in macroinvertebrate abundance and biomass were found between the two years associated with variations in the river water level. During the year with average water level, total macroinvertebrate biomass was 16 % greater than in the year with a lower water level. We conclude that a reduction in the water level of Lake St. Pierre, predicted to occur with climate change, could lead to a decrease in benthos biomass which constitutes a crucial food source for fish." (Authors)] Address: Cremona, F., Centre GÉOTOP-UQAM-McGill, Université du Québec à Montréal, P.O. Box 8888 Succ. Centreville, Montreal, Quebec, Canada H3C 3P8. E-mail: cremona.fabien@courrier.uqam.ca

9351. Cuttelod, A.; García, N.; Abdul Malak, D.; Temple, H.; Katariya, V. (2008): The Mediterranean: a biodiversity hotspot under threat. In: J.-C. Vié, C. Hilton-Taylor and S.N. Stuart (eds). *The 2008 review of The IUCN Red List of Threatened Species*. IUCN Gland, Switzerland. 13 pp. (in English) [In figure 8 Odonata species richness in the Mediterranean basin and species richness of regionally threatened dragonflies in the Mediterranean basin are mapped.] Address: IUCN, Rue Mauverney 28, CH-1196 Gland, Switzerland. www.iucn.org

9352. Diehl, D.A. (2008): Libellenarten in der Sammlung Wilhelm Michel. *Libellen in Hessen* 1: 59. (in German) [A small, undated collection of Odonata made between 1930 and 1960 near Babenhausen, Hessen, Germany includes four species. *Orthetrum coerulescens* and *Sympetrum fonscolombii* are of regional interest.] Address: Diehl, D.A., Naturkunde-Institut Langstadt, Breuberger Weg 4, 64832 Langstadt, Germany. E-mail: biologodd@aol.com

- 9353.** Doucet, G.; Mora, F.; Bettinelli, L. (2008): Contribution à la biologie et à l'écologie de *Leucorrhinia pectoralis* (Charpentier, 1825) en Haute-Saône (Odonata, Anisoptera, Libellulidae). *Martinia* 24(4): 137-142. (in French, with English summary) [France; Habitat parameters are given based on the authors', and in most cases, literature data.] Address: Doucet, G., 7 rue Esquirol, F-87000 Limoges, France. E-mail: guillaume.doucet@yahoo.fr
- 9354.** Duprez, B. (2008): Ponte répétitive à *Orthetrum cancellatum* (L., 1758) sur une racine de *Typha* sp. Interrogation sur une stratégie de reproduction (Odonata, Anisoptera, Libellulidae). *Martinia* 24(4): 136. (in French) [The author reports on a repetitive oviposition of a female at the same microhabitat. Benayes, Corrèze Département, France, summer 2006.] Address: Duprez, B., 43 avenue Alexandre de Serbie, F-51100 Reims, France
- 9355.** Duquef, M. (2008): Préparation des Odonates récoltés dans les pays tropicaux. *Martinia* 24(3): 106-108. (in French, with English summary) ["Basing on its French Guiana experience to preserve collected local specimens of Odonata, the author details a methodology taking the tropical climate constraints into account.] Address: Duquef, M., 25 rue Paul Baroux, Blangy-Tronville, F-80440 Boves, France
- 9356.** Eagles-Smith, C.A.; Suchanek, T.H.; Colwell, A.E.; Anderson, N.L.; Moyle, P.B. (2008): Changes in fish diets and food web mercury bioaccumulation induced by an invasive planktivorous fish. *Ecological Applications*, 18(8) Suppl., 2008: A213-A226. (in English) ["The invasion, boom, collapse, and reestablishment of a population of the planktivorous threadfin shad in Clear Lake, California, USA, were documented over a 20-yr period, as were the effects of changing shad populations on diet and mercury (Hg) bioaccumulation in nearshore fishes. Threadfin shad competitively displaced other planktivorous fish in the lake, such as inland silversides, young-of-year (YOY) largemouth bass, and YOY bluegill, by reducing zooplankton abundance. As a result, all three species shifted from a diet that was dominated by zooplankton to one that was almost entirely zoobenthos. Stable carbon isotopes corroborated this pattern with each species becoming enriched in $\delta^{13}C$, which is elevated in benthic vs. pelagic organisms. Concomitant with these changes, Hg concentrations increased by ~50% in all three species. In contrast, obligate benthivores such as prickly sculpin showed no relationship between diet or $\delta^{13}C$ and the presence of threadfin shad, suggesting that effects of the shad were not strongly linked to the benthic fish community. There were also no changes in Hg concentrations of prickly sculpin. The temporary extirpation of threadfin shad from the lake resulted in zooplankton densities, foraging patterns, isotope ratios, and Hg concentrations in pelagic fishes returning to pre-shad values. These results indicate that even transient perturbations of the structure of freshwater food webs can result in significant alterations in the bioaccumulation of Hg and that food webs in lakes can be highly resilient." (Author) Odonata are treated at the order level.] Address: Eagles-Smith, C.A., U.S. Geol. Survey, Western Ecol. Res. Center, Davis Field Station, One Shields Av., Davis, California 95616 USA. E-mail: ceagles-smith@usgs.gov
- 9357.** Feulner, G. (2008): Emperor Dragonflies Swarming. *Gazelle*, Dubai 23(2): 6. (in English) [UAE; The typical January migration (or at least swarming) of *Anax ephippiger* "was in evidence throughout the area once again this year. They could be seen from the relatively idyllic setting of Wadi Khadra (over pools adjacent to the plantations) in the Mahdhah area of Oman, to the urban setting of downtown Dubai (the entrance road between Emirates Towers and the DIFC). They were also observed on a DNHG field trip deep within the mountains near Masafi in earliest February. *Anax imperator* The so-called "emperor" dragonflies are the largest local dragonflies. The UAE has three species but the vagrant emperor is the only one which flies in groups and the only one which is routinely seen far from water. The other two are territorial. The distinctive electric-blue males of the blue emperor (*Anax imperator*) patrol territories at fresh water bodies and will not tolerate intrusion by other males."] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, United Arab Emirates
- 9358.** Feulner, G. (2008): Dragonfly Detectives. *Gazelle*, Dubai 23(11): 4-5. (in English) [UAE; the story, to properly identification of *Orthetrum ransonneti* in UAE and northern Oman is told in some extend.] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, United Arab Emirates
- 9359.** Fraker, M.E. (2008): The dynamics of predation risk assessment: responses of anuran larvae to chemical cues of predators. *Journal of Animal Ecology* 77: 638-645. (in English) ["1. While the antipredator behaviour of prey has been well studied, little is known about the rules governing the predation risk assessment of prey. In this study, I measured the activity levels of predator-naïve green frog (*Rana clamitans*) tadpoles during and after exposures to the chemical cue of predatory larval dragonflies (*Anax longipes* and *A. junius*). I then used the lengths of the time lags from the end of the cue exposures until the tadpoles returned to a control level of activity as an index of the perceived risk of the tadpoles. 2. While tadpoles always responded upon exposure to the *Anax* chemical cue by strongly reducing their activity level, their perceived risk increased asymptotically over time during the initial period of the cue exposure. Tadpoles of all size classes perceived increasing risk in proportion to chemical cue concentration, but the length of time that tadpoles responded during cue exposure and the length of their post-exposure time lags decreased with increasing body mass. 3. The results suggest that the perceived risk of green frog tadpoles varies over time and does not correspond directly to their behavioural response (i.e. activity level). However, their perceived risk does appear to vary in accordance with the predation risk associated with the *Anax* chemical cue and the reliability of the information from the cue, and therefore may be predictable." (Author)] Address: Fraker, M.E., Dept of Ecology & Evolutionary Biology, University of Michigan, 830 North University, Ann Arbor, MI 48169-1048, USA
- 9360.** Grand, D. (2008): Quelques données commentées sur la période de vol de *Sympecma fusca* (Vander Linden, 1820) dans les environs de Lyon (Odonata, Zygoptera, Lestidae). *Martinia* 24(4): 129-135. (in French, with English summary) [Records of *S. fusca* in the Lyon-region, France are compiled in detail.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

- 9361.** Groll, E.K. (2008): Besprechungen: Hilfert-Rüppell, D. & Rüppell, G.: Juwelenschwinger - Geheimnisvolle Libellen ; Gossamer Wings - Mysterious Dragonflies. - Cremlingen: Splendens-Verlag, 2007. - 168 S., zahlr. Farbabb. - ISBN 978-3-00-020389-3. Beiträge zur Entomologie 58(1): 96. (in German) [book review] Address: Groll, E.K., c/o DEI, Eberswalder Str. 90, 15374 Müncheberg, Germany. E-mail: egroll@senckenberg.de
- 9362.** Holzenthal, R. (2008): Nature's Design Identified. University of Minnesota, Department of Entomology, Newsletter 2008: 1-2-7. ["From October 9 through November 7, the Paul Whitney Larson Gallery in the St. Paul Student center was infested by insects. Well, actually it was infested by insect illustrations and pinned specimens from the Insect Museum. The Department of Entomology sponsored an exhibition entitled Nature's Design Identified: An Exhibition of Insect Illustrations With an estimated one million different species, insects are the most diverse group of organisms on Earth. In order to identify such a vast array of species, taxonomists rely on the exquisitely accurate illustrations of the insect's complex anatomy. It is this meticulous design that determines each individual species' identity. Based on the Entomology course "Scientific Illustration of Insects (ENT 5051)," the exhibition displayed examples of scientific illustration ranging from delicately hand-drawn pen and ink drawings from of the early twentieth century to digital artwork design by today's University of Minnesota students. Both 'traditional' and digital illustrations were displayed. Traditional techniques used include pen and ink, coquille board, watercolour, and mixed use of acrylic paint and coloured pencils; digital illustrations were created in Adobe Illustrator using the pen tool to create weighted line illustrations as well as the gradient mesh tool to create more complex illustrations in black and white and colour. Adobe Photoshop was used to render highly realistic colour digital paintings using primarily the digital brush and varying its hardness, opacity and colour were displayed. The illustrations were displayed alongside pinned specimens of the actual insects portrayed. Contributions to the University of Minnesota Insect Collection began in 1879 with specimens of insects and spiders from the North Shore of Lake Superior. During the last 130 years, the Collection's holdings have grown from a regional collection of 3,000 specimens to a major national and international resource of almost 3,700,000 specimens. In the most recent survey, the Collection ranked as the 8th largest university-affiliated insect collection in North America. Enhancing the Collection's status as an outstanding research facility are 7 resident taxonomists, computerized inventory management and specimen databases, a large departmental library, and a molecular taxonomy laboratory. Research projects associated with the Collection have broad taxonomic and geographic scope. Faculty and graduate student research focuses on both aquatic and terrestrial insect groups and includes taxonomic, phylogenetic, and applied questions. The Collection is the mainstay of graduate training in systematic entomology at the University of Minnesota. Artists included in the exhibition were: Courtney Amundson, Roger Blahnik, Louise Bush, Lourdes Chamorro, Kevin Denny, Lydia M. Hart, Ralph Holzenthal, Sharolyn Kawakami, Kris Kuda, Haude Levesque, Stephanie Lyon, Julie Martinez, Rufus H. Pettit, Manuel Ramirez Desiree Robertson." (Authors) The cover of the newsletter includes colour drawings of R. Holzenthal from *Ophiogomphus rupinsulensis* and *Lestes* sp.] Address: Ralph W. Holzenthal, E-mail: holze001@umn.edu
- 9363.** Hunt, P. (2008): The New Hampshire Dragonfly Survey manual for volunteers: 2008. New Hampshire Audubon, Concord: 23pp. (in English) [Instruction manual for the recorders (with the related forms) and a checklist of species currently known to occur in NH, USA.] Address: Hunt, Pamela, Audubon Soc. New Hampshire, 3 Silk Farm Rd, Concord, NH 03301, USA
- 9364.** Johansson, F.; Crowley, P. (2008): Cannibalism and population regulation in dragonfly larvae systems. In: Lancaster, J.; Briers, R.A. (Eds.): Aquatic Insects: Challenges to Populations: Proceedings of the Royal Entomological Society's 24th Symposium. Cabi Publishing. 332 pp: 36-54. (in English) ["Cannibalism has strong impacts on population structure and population dynamics. Dragonfly larvae are important predators in aquatic systems and cannibalism is common in these larvae. Dragonflies are therefore an important model system that can be used for a thorough understanding of the dynamic interactions that shape community structure in aquatic systems. In this review we bring up the costs and benefits of cannibalism in general terms. We then briefly discuss important mechanism that affects the intensity and degree of cannibalism in dragonfly larvae: intraspecific density, alternative prey, habitat structure, size structure and time constraints. Thereafter we review general theoretical models that consider the population dynamics of cannibalism. We also provide some empirical evidence for the model predictions by using dragonfly larvae as examples. Finally, we suggest some avenues for further research on cannibalism." (Authors)] Address: Johansson, F., Dept Ecol. & Environmental Sc., Animal Ecol. Group, Umea Univ., 90187 Umeå, Sweden. E-mail: frank.johansson@eg.umu.se
- 9365.** Jorcin, A.; Nogueira, M.G. (2008): Benthic macroinvertebrates in the Paranapanema reservoir cascade (southeast Brazil). Braz. J. Biol. 68(4, Supl.): 1013-1024. (in English, with Portuguese summary) [Composition, diversity and abundance of benthic macroinvertebrates from sediments of eight reservoirs of the Paranapanema River (southeast Brazil), as well as from the main tributaries (Taquari, Pardo and Tibagi) and the mouth zone into the Parana River were analyzed. Nineteen points distributed along 700 km were sampled quarterly (8 campaigns) during a two-year period (2000 and 2001). The zoobenthos was characterized by a high species richness, (app. 100 taxa; including Odonata: Gomphidae: Aphylla and Progomphus), with the predominance of Diptera (Chironomidae; app. 50 taxa).] Address: Jorcin, A., Depto de Zoologia, Instituto de Biociências, Universidade Estadual Paulista – UNESP, Distrito de Rubião Júnior, CEP 18600-000, Botucatu, SP, Brazil. E-mail: ajorcin@ibb.unesp.br
- 9366.** Khan M.S. (2008): Biology and distribution of geckos of the genus *Indogekko* Khan, 2003 (Sauria: Gekkonidae). Russian Journal of Herpetology 15(2): 87-92. (in English) [Notes on morphology, ecology and distribution of geckos of genus *Indogekko* Khan, 2003 are provided, with comments on their distribution in upper Indus Valley and circum Hindukush Region (northwestern Pakistan, southwestern Afghanistan, northeastern Iran and southern Turkmenistan. Stomach content of the three studies *Indogekko* species (*I. fortunroi*, *I. indusoani*, *I. rohtasfortai*) contained Odonata (Zygoptera)] Address: Khan, M.S., D-206 west. Lands-

downe Towers Apartments, 776 Providence Road, Aldan, PA 19018, USA. E-mail: Typhlops99@hotmail.com

9367. Krassilov, V.; Shuklina, S. (2008): Arthropod trace diversity on fossil leaves from the mid-Cretaceous of Negev, Israel. *Alavesia* 2: 239-245. (in English) [A set of egg insertions on an *Acaciaephyllum*-type leaf (*Phyllostigmas*) is illustrated from the Albion of Makhtesh Ramon. The set shows a zigzag pattern characteristic of Odonata and assigned to the "coenagrionid type" (Hellmund & Hellmund 1996).] Address: Krassilov, V., Inst. Evol., Univ. Haifa. Mount Carmel, Haifa-31905, Israel

9368. Lambert, J.-L.; Lumet, J.-C. (2008): Une journée consacrée aux Odonates pour les agents de la Délégation interrégionale de Metz de l'Office National de l'Eau et des Milieux Aquatiques. *Martinia* 24(3): 101-105. (in French, with English summary) [The excursion of the National agency of water and aquatic environments (ONEMA) lead to three habitats in the Lorraine/Alsace-region in northeastern France. The study of two bog waters and the Schwarzbach near Windsheim resulted in 23 Odonata species. Highlight of the excursion was the record of *Ophiogomphus cecilia* along the Schwarzbach.] Address: Lambert, J.-L., ONE-MA, Service départemental de la Marne, F-51520 Veuve, France. E-mail: jean-luc.lambertl8@wanadoo.fr

9369. Maes, D.; Anselin, A.; Decler, K.; De Knijf, G.; Fichet, V. (2008): Insect diversity and climate change in Belgium. The worst is yet to come. *Natuur.focus* 7(3): 107-111. (in Dutch, with English summary) ["Being ectothermal, insects are predicted to suffer more severely from climate change than warm-blooded animals. We forecast possible changes in diversity and composition of butterflies, grasshoppers and dragonflies in Belgium under increasingly severe climate change scenarios for the year 2100. Butterfly and grasshopper diversity were predicted to decrease significantly in all scenarios and species-rich locations were predicted to move towards higher altitudes. Dragonfly diversity was predicted to decrease significantly in all scenarios, but dragonfly-rich locations were predicted to move upwards only in the less severe scenarios. The largest turnover rates were predicted to occur at higher altitudes for butterflies and grasshoppers, but at intermediate altitudes for dragonflies. We discuss possible conservation and policy measures to mitigate the putative strong impact of climate change on insect diversity in Belgium." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.de-knijf@inbo.be

9370. Martynov, A.V. (2008): [Dragonflies (Insecta: Odonata) of the left-bank side steppe of the Ukraine]. In: A.V. Prisny, [Ed.]. *Shivye objekty v usloviyah antropogennogo pressa*, Belgorod. Gos. Univ., Belgorod, ISBN 978-5-98242-107-4: 124-125. (in Russian) [59 odonate species are reported without detailed checklist.] Address: Martynov, A.V., Dept Ecol., Fac. Biol., Donetsk Natn. Univ., Shchorsa 46, 83050 Donetsk, Ukraine. E-Mail: martynov_av@ukr.net

9371. Mendiondo, E.M. (2008): Challenging issues of urban biodiversity related to ecohydrology. *Braz. J. Biol.* 68(4, Suppl.): 983-1002. (in English) [Tijuco Preto Creek, Sao Carlos, Brazil; "This paper aims to outline challenging issues of urban biodiversity in order to address yardsticks related to ecohydrology, and with a complementary approach to eutrophication impacts.

The vision of environmental services, urbanization's consequences and management aspects of water governance are also depicted. Factors of river restoration, environmental tradeoffs and socio-cultural constraints are envisaged through concept questions towards emerging aspects that figure out methodological guides, strategic challenges for stakeholders and inter-disciplinary opportunities. Examples from case studies on restoration and management, from experiences and lessons learned, are enclosed, with brief discussions and literature citation." (Author) The toxicity evidences tolerance value of 'Zygoptera', 'Libellulidae', and 'Aeshnidae' is listed in table 7.] Address: Mendiondo, E.M., Escola de Engenharia de São Carlos – EESC, Universidade de São Paulo – USP, Av. Trabalhador Sancar-lense, 400, CEP 13566-590, São Carlos, SP, Brazil. E-mail: emm@sc.usp.br

9372. Meyer, C.K.; Whiles, M.R. (2008): Macroinvertebrate communities in restored and natural Platte River slough wetlands. *J. N. Am. Benthol. Soc.* 27(3): 626-639. (in English) ["Wetlands in the central Platte River basin provide numerous ecosystem services but have been diminished and degraded by agricultural practices and development. Wetland restoration is increasingly common in this region, but the success of restorations is virtually unknown. We sampled macroinvertebrates during spring 2003 and 2004 in restored (5–16 y old) and natural slough wetlands to assess restoration success. Simple measures (e.g., total abundance, biomass, diversity) were all similar in restored and natural wetlands. Communities were similar in natural and restored wetlands, but we observed some taxonomic differences. For example, abundances of *Helisoma* and *Pisidium* and abundance and biomass of amphipods were higher in natural than in restored wetlands, and leeches were collected only in natural wetlands. These results suggest that dispersal ability is a biotic filter limiting recovery and that these noninsects are good candidates for assessing recovery. Functional structure on the basis of abundance was similar between natural and restored wetlands, but some differences in biomass-based estimates were evident. For example, relative biomass of collector-filterers was higher in natural than in restored wetlands in 2003. Multivariate analyses indicated that factors such as hydroperiod might be more important than restoration status in shaping wetland macroinvertebrate communities. Furthermore, drought conditions constrained our sampling efforts and influenced temporal patterns, thereby underscoring the need for multiyear studies, especially under extreme environmental conditions. Our results indicate that wetland macroinvertebrate communities in this region are resilient and recover rapidly after restoration, but that ongoing restoration and management efforts should focus on hydrology, which might limit recovery in restorations and is a critical factor shaping wetland macroinvertebrate communities." (Authors) Taxa, including Odonata, are treated at the order level.] Address: Meyer, C.K., Dept of Zoology & Center for Ecology, Southern Illinois Univ. Carbondale, Carbondale, Illinois 62901-6501 USA

9373. Millen, A. (2008): Summer Science. *Gazelle, Dubai* 23(10): 3-4. (in English) [United Arab Emirates; "Dragonflies apparently treat the smaller pond on the Sheikh Zayed Road side as a typical man-made pond. I found the four species I would most have expected: the purple-blushed darter (*Trithemis annulata*), the carmine

darther (*Crocothemis erythraea*), the oasis skimmer (*Orthetrum sabina*) and the blue-banded damselfly (*Ischnura* sp. - we have to be more cautious in identifying them, now that a second species has been recognised locally)." This note is illustrated with a photograph entitled "Oasis skimmer (*Orthetrum sabina*), From The Emirates: A Natural History, eds. Peter Hellyer & Simon Aspinall." In fact, the picture shows *Ceriagrion glabrum* (see Millen & Feuler, 2008)] Address: Millen, Anne, E-mail: pvana@emirates.net.ae

9374. Millen, A.; Feulner, G. (2008): Erratum: Oasis Skimmer Dragonfly. *Gazelle*, Dubai 23(11): 6-7. (in English) ["The "dragonfly" depicted on page 4 of the previous *Gazelle* (October 2008) is NOT the Oasis Skimmer *Orthetrum sabina*. It is not even a dragonfly but a damselfly, *Ceriagrion glabrum*, which has been called, in the vernacular, the "Olive Eyes Damselfly"." (Authors)] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, United Arab Emirates

9375. Mugnai, R.; Oliveira, R.B.; do Lago Carvalho, A.; Baptista, D.F. (2008): Adaptation of the Índice Biotico Esteso (IBE) for water quality assessment in rivers of Serra do Mar, Rio de Janeiro State, Brazil. *Tropical Zoology* 21: 57-74. (in English) ["This paper presents the index Índice Biotico Estendido-Instituto Oswaldo Cruz (IBE-IOC) adapted from the Índice Biotico Esteso (IBE) for the Serra do Mar region, Rio de Janeiro State, Brazil. This index was adjusted to 1st to 4th order streams using data from previous studies from 1999 through 2002. The surveys were carried out at 36 sampling sites, most with records from three different times of the year, for a total of 98 sampling events. The adaptation of the index was carried out in three stages: (1) adequacy of the taxonomic list of the SU definition table; (2) vertical modification of the calculation table, considering the taxa richness data; (3) horizontal modification of the calculation table, considering the tolerance of taxa to stress-related factors. In this article, there is also a table with the relative tolerances of the taxa present in the study area. Preliminary tests indicate good sensitivity of the IBE-IOC for the detection of different types of environmental impact, associated with the organic pollution, deforestation and industrial activities." (Authors) Odonata are treated at the genus level.] Address: Mugnai, R., Laboratório de Avaliação e Promoção da Saúde Ambiental, Fundação Oswaldo Cruz, Av. Brasil 4365, Manguinhos, 21045-900 Rio de Janeiro, RJ, Brazil. E-mail: mugnai@ioc.fiocruz.br

9376. Nishu, S. (2008): A late record of *Pseudothemis zonata*. *Sympetrum Hyogo* 11: 32-33. (in Japanese, with English summary) [Japan; "P. zonata has been recorded during early May to mid October in literatures. In Sakurabori Pond in Akashi Park, two males of this species were recorded on October 21, 2008. The record continued to subsequent days until November 2 when a single male was recorded. This marks the latest record of the imago life of this "summer species". It will be interesting to determine whether this male belongs to the second generation from the egg laid by an early ovipositing female." (Author)] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

9377. Polhemus, D.A.; Englund, R.A.; Polhemus, J.T. (2008): Aquatic Insects of the Solomon Islands. In: Polhemus, D.A.; Englund, R.A.; Allen, G.R.; Boseto, D.;

Polhemus, J.T. (2008): Freshwater biotas of the Solomon Islands. Analysis of richness, endemism and threats. Contribution 2008-13 to the Pacific Biological Survey (ISSN 1085-455X). 133 pp: 41-89. (in English) [Between 11-XI-2004 and 4-VIII-2005, 70 localities were visited and collected for Odonata. The localities are briefly characterized, and the species recorded are listed, and in some cases discussed. Fig. 37-52 are devoted to Odonata. "Based on these surveys, plus examination of museum collections and scientific literature, the aquatic insect biota of the Solomon Islands displays the following levels of richness and endemism for the groups surveyed: [...] 2.) In the Odonata, 63 described species are now known, representing 37 genera in 9 families. Of these, 4 genera and 28 species are endemic, representing a 11% rate of endemism at the generic level and a 44% rate of endemism at the species level. At least one undescribed species of endemic Zygoptera was collected during the present survey." (Authors) Address: Polhemus, D., Dept. of Entomology, MRC 105, Smithsonian Institution, Washington, D.C. 20560, USA. Email: bugman@bpbm.org

9378. Rochelet, B. (2008): Première preuve de reproduction de *Gomphus graslinii* Rambur, 1842 en Deux-Sèvres et observations odonatologiques en bord de Sèvre niortaise (Odonata, Anisoptera, Gomphidae). *Martinia* 24(3): 93-100. (in French, with English summary) [Reproduction of *G. graslinii* was proved at 18-VI-2007, Sèvre River, Surimeau, Deux-Sèvres department (W France). The status of the species in W central France is discussed, and the Odonata fauna of the stretch of the river investigated is listed.] Address: Rochelet, B., 19, rue des Allards F-79210 Usseau, France

9379. Sahuquillo, M.; Miracle, M.R.; Rieradevall, M.; Kornijów, R. (2008): Macroinvertebrate assemblages on reed beds, with special attention to Chironomidae (Diptera), in Mediterranean shallow lakes. *Limnetica* 27(2): 239-250. (in English, with Spanish summary) ["Macroinvertebrate assemblages on reed beds, with special attention to Chironomidae (Diptera), in Mediterranean shallow lakes Macroinvertebrates associated to reed-beds (*Phragmites australis*) in six shallow natural water bodies along the 220 km of coast of the Comunidad Valenciana (Spain) were studied. These sites were selected to reflect different trophic states, but also, and due to the natural variability of mediterranean wetlands, they greatly differ in salinity and hydroperiod. To unify the sampling, reed bed was chosen to provide data from a habitat common to all wetlands, including the most eutrophic ones where submerged macrophytes have disappeared due to water turbidity. Individual submerged stems of *Phragmites australis* were sampled along with the surrounding water. The animal density found refers to the available stem surface area for colonization. Forty-one taxa were recorded in total, finding Chironomidae to be the most important group, quantitatively and qualitatively. In freshwater sites it was observed an increase in macroinvertebrate's density at higher trophic states. Nevertheless each studied region had a different fauna. The PCA analysis with macroinvertebrate groups distinguished three types of environment: freshwaters (characterized by swimming insect larvae, collectors and predators, oligochaetes and Orthocladiinae), saline waters (characterized by crustaceans and Chironominae) and the spring pool, which shares both taxa. Chironomids were paid special attention for being the most abundant. A DCA analysis based

on the relative abundance of Chironomids reveals salinity as the main characteristic responsible for its distribution, but trophic state and hydrological regime were also shown to be important factors." (Authors) The study includes *Ischnura elegans* and *Sympetrum fonscolombii*.] Address: Sahuquillo, Maria, Dept. de Microbiologia i Ecologia. Universitat de València. 46100 Burjassot (Valencia) Spain. E-mail: maria.sahuquillo@uv.es

9380. Sciberras, A. (2008): Nota fuq in Nomenklatura tal- Mazzarelli Li ghawn idokumentati fil Gzejjer Maltin. *L-Imnara* 9(1): 42-44. (in Maltese) [For the hitherto known Odonata species of Malta, vernacular names are given.] Address: Sciberras, A., 131, "Arnest", Arcade Str., Paola, Malta. E-mail: bioislets@gmail.com

9381. Stanley, S.; Pehek, E. (2008): Biodiversity of a unique habitat in an urban setting. Abstracts Northeast Natural History Conference X., N.Y. State Mus. Circ. 71. ISBN: 1-55557-246-4: 79. (in English) ["Despite New York City's mountains of concrete and dense population, its natural areas provide an important refuge for many species of wildlife. Most of the city's undeveloped land is in the borough of Staten Island, much of it in private ownership. As these green spaces quickly disappear, parkland becomes essential to the continued survival of local wildlife species. The 110-acre Ocean Breeze Park is a unique natural area in northern Staten Island supporting an incredible diversity of flora and fauna. Originally an estuarine salt marsh, the site was filled in, over time developing into a complex of seasonal freshwater wetlands within open, sandy uplands. An unusual habitat type in the metropolitan area, Ocean Breeze Park has the highest odonata species count in the city for any one year in recent times, including three New York State rare species, *Ischnura ramburii*, *I. hastata*, and *Libellula needhami*. [...] As recent survey work took place only in 2007, further exploration of the park will likely yield more interesting finds of both invertebrate and vertebrate species." (Authors)] Address: Stanley, Susan, New York City Dept of Parks & Recreation, Natural Resources Group, New York, NY, USA

9382. Stübing, S.; Gelpke, C. (2008): Mehrjähriges Vorkommen der Torf-Mosaikjungfer *Aeshna juncea* in einem Gartenteich. *Libellen in Hessen* 1: 60-61. (in German) [Exuviae of *A. juncea* were found in a garden pond (10 x 5 m) located at Niedenstein-Metze, Hessen, Germany from 2002 to 2007.] Address: Stübing, S., Im Feldchen 1a, D-61209 Echzell, Germany. E-mail: stefan.stuebing@gmx.de

9383. Stübing, S.; Roland, H.-J.; Cloos, T.; Korn, M.; Patzich, R. (2008): Einleitung - Libellen in Hessen. *Libellen in Hessen* 1: 4-5. (in German) [Introduction into tasks and schedule of the working group to study the Odonata of Hessen, Germany] Address: Stübing, S., Im Feldchen 1a, D-61209 Echzell, Germany. E-mail: stefan.stuebing@gmx.de

9384. Termaat, T.; Groenendijk, D.; Bouwman, J. (2008): Monitoring dragonflies Europe: report on a successful symposium. *Vlinders* 4/2008: 6-7. (in Dutch) ["The International Symposium on Monitoring Dragonflies in Europe took place in Wageningen on 13th and 14th June 2008. The symposium was one of many activities organised this year by Dutch Butterfly Conservation to mark their 25th anniversary. We wanted to bring people together, to exchange experiences and discuss the possibilities of a European monitoring project. We had invited people from as many countries

as possible whom we knew were already involved in monitoring, or those hoping to be so in the future; 35 people came from eleven countries! On the first day, we heard lectures about how dragonfly work was organized in the various countries, whether monitoring was carried out, and if so, how? At the end of the day, there was a discussion on the easiest and most practical way of combining current initiatives to create a European monitoring network. The excursion to the wetland De Weerribben the next day gave the participants the chance to see typical lowland bog species. It was suggested that a congress be held every two years, with a wider choice of subjects. Portugal in 2010?" (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

9385. Ternois, V.; Lambert, J.-L.; Fradin, E. (2008): *Oxygastra curtisii* (Dale, 1834) en Champagne-Ardenne: premiers résultats du programme d'études 2007-2009 (Odonata, Anisoptera, Corduliidae). *Martinia* 24 (3): 75-87. (in French, with English summary) [A survey devoted to *O. curtisii* was initiated in 2007 in the Champagne-Ardenne region (NE France) to examine the status of this species. First results of the study are used to update the regional distribution map of the species. The importance of gravel pits as habitat of the species is stressed.] Address: Ternois, V., CP1E du Pays de Soullaines, Domaine de Saint-Victor, F-10200 Soullaines-Dhuys, France. E-mail: cpie.vincent.ternois@wanadoo.fr

9386. Tessier, M.; Sfreddo, G. (2008): Premier bilan d'inventaires d'Odonates dans le nord du département de l'Ariège. *Martinia* 24(3): 89-92. (in French, with English summary) ["This paper presents the first results of Odonata surveys in the northern part of the Ariège department, France between the Ariège and Hers Vif rivers. During these surveys, a large population of *Coenagrion mercuriale* was recorded in the "Ariège plain" and few individuals of *Oxygastra curtisii* were seen on the Hers Vif river." (Authors)] Address: Tessier, M., 62 chemin del prat, 31320, Auzeville-Tolosane, France. E-mail: marc.tessier3@free.fr

9387. Todd, J.H.; Ramankutty, P.; Barraclough, E.I.; Malone, L.A. (2008): A screening method for prioritizing non-target invertebrates for improved biosafety testing of transgenic crops. *Environ. Biosafety Res.* 7: 35-56. (in English) ["We have developed a screening method that can be used during the problem formulation phase of risk assessment to identify and prioritize non-target invertebrates for risk analysis with any transgenic plant. In previously published protocols for this task, five criteria predominated. These criteria have been combined by our method in a simple model which assesses: (1) the possible level of risk presented by the plant to each invertebrate species (through measurements of potential hazard and exposure, the two principal criteria); (2) the hypothetical environmental impact of this risk (determined by the currently known status of the species' population in the ecosystem and its potential resilience to environmental perturbations); (3) the estimated economic, social and cultural value of each species; and (4) the assessed ability to conduct tests with the species. The screening method uses information on each of these criteria entered into a specially designed database that was developed using Microsoft Access 2003. The database holds biological and ecological information for each non-target species, as well as information about the transgenic plant that is the subject of the risk

assessment procedure. Each piece of information is then ranked on the basis of the value of the information to each criterion being measured. This ranking system is flexible, allowing the method to be easily adapted for use in any agro-ecosystem and with any plant modification. A model is then used to produce a Priority Ranking of Non-Target Invertebrates (PRONTI) score for each species, which in turn allows the species to be prioritized for risk assessment. As an example, the method was used to prioritize non-target invertebrates for risk assessment of a hypothetical introduction of *Bacillus thuringiensis* (Bt) Cry1Ac-expressing *Pinus radiata* trees into New Zealand." (Author) *Antipodochlora braueri* was selected as one of 80 test species.] Address: Todd, Jacqui, The Horticulture and Food Research Institute of New Zealand Limited, Mt Albert, Private Bag 92169, Auckland Mail Centre, Auckland 1142, New Zealand. E-mail: jtodd@hortresearch.co.nz

9388. Torralba Burrial, A.; Alonso Naveiro, M. (2008): Primera cita de la libélula amenazada *Coenagrion scitulum* (Odonata: Coenagrionidae) en la provincia de Teruel (España). *Boletín de la Asociación Española de Entomología* 32(3-4): 375-377. (in Spanish) [30-VI-2008, first record of the threatened *C.scitulum* in Teruel province (Spain, Costanilla en Fonfría; 30TXL611392).] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniob@hotmail.com

9389. Vanappelghem, C. (2008): In memoriam Philip S. Corbet. *Martinia* 24(4): 111-112. (in French) [Obituary, including a brief account on the major stations of scientific and publication activities.] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

9390. Verdu, J.R.; Galante, E. (2008): Atlas de los Invertebrados Amenazados de España (Especies En Peligro Crítico y En Peligro). Dirección General para la Biodiversidad, Ministerio de Medio Ambiente, Madrid. ISBN: 978-84-8014-753-8: 340 pp. (in Spanish) [Odonata are treated on pages 198-234, and refer to *Brachytron pratense*, *Macromia splendens*, *Oxygastra curtisii*, *Gomphus graslinii*, *Lindenia tetraphylla*, *Leucorrhinia pectoralis*. All species are treated in a monographic way including information on habitat and distribution, protection status and a bibliography. The maps are the most informative ever published on these species in Spain. Authors of the Odonata chapters are: Mónica Azplicueta Amorín, Francisco J. Ocharan, Antonio Torralba Burrial, Rocío Ocharan Ibarra, David Outomuro Priede & Adolfo Cordero Rivera.] Address: http://www.mma.es/portal/secciones/biodiversidad/inventarios/inb/atlasinvertebrados/pdf/Atlasinvertebrado_samenazadosEspania.pdf

9391. Zia, A.; Naeem, M.; Ather Rafi, M.; Ali Hassan, S. (2008): A List of damselflies (Zygoptera: Odonata) recorded from Azad Jammu and Kashmir, Pakistan. *Pakistan Journal of Scientific and Industrial Research* 51(6): 329-332. (in English) [An intensive odonatological survey of the valley of Kashmir during the summer season of three consecutive years (2005-2007) yielded 31 Zygoptera.] Address: Zia, A., National Insect Museum, NARC-Islamabad, Pakistan

9392. Altamiranda Saavedra, M. (2009): Diversidad de libélulas (Insecta-Odonata) para dos usos de Suelo, en un bosque seco tropical. *Rev. Fac. Nal. Agr. Medellín* 62(2): 5071-5079. (in Spanish, with English summary) ["Dragonfly diversity was estimated in the Agricultural Center Cotove (Santafé de Antioquia-Colombia). Active capture using an entomological net was used. Each transect was located perpendicular to the water body, for a length of approximately 200 m and a lateral extension of 8 m. Twenty Odonata species were registered, from 5 families and 15 genus. Libellulidae showed the biggest abundance and richness, with 65 specimens that represent 53.7% of the total abundance, and 12 species that represent 60% of the registered community. The alpha diversity was high in the forest in reference at crop; however, the low abundances register highlight the need for greater sampling effort in cultivating, for a better estimate of gamma diversity; the beta diversity was of 12 species and the complementary index was of 0.6, it indicates that the Odonata's fauna is characteristic and distinctive for each use of soil." (Author)] Address: Altamiranda Saavedra, M., Universidad Nacional de Colombia, Sede Medellín. Facultad de Ciencias. A.A. 3840, Medellín, Colombia. E-mail: marianoaltamirandas@hotmail.com

9393. Asokan, S.; Samsoor Ali, A.M.; Manikannan, R. (2009): Preliminary investigations on diet and breeding biology of the Indian Roller *Coracias benghalensis* in a portion of Cauvery Delta, Tamil Nadu, India. *World Journal of Zoology* 4(4): 263-269. (in English) [The diet composition of the Indian Roller - studied between 2005 and 2006 and based on the regurgitated pellets (n=712) - mainly includes Coleoptera (26.6%), followed by Orthoptera (19.5%), Hemiptera (16.7%), Hymenoptera (14.2%), Diptera (9.1%), Odonata (6.7%) and Lepidoptera (6.5%).] Address: Samsoor Ali, A.M., Department of Zoology, Saraswathi Narayanan College, Perungudi, Madurai - 625 022, Tamil Nadu, India

9394. Azuma, T. (2009): Difference in the mating strategy between *Aeshna nigroflava* and *A. juncea*. *Sympetrum Hyogo* 11: 18-19. (in Japanese, with English summary) ["The difference in the mating strategy between *A. nigroflava* and *A. juncea* is discussed through some cases of observation. A male *A. nigroflava* will not catch the ovipositing female in his territory but keep on flying in pursuit of the ovipositing female, and will catch the female when forced to come out of the pond. A male *A. juncea* caught the female soon after finding the ovipositing female. During a series of observation the author found a case that a female *A. juncea* tried to escape and got into a hole in a leaf accidentally, by which means succeeded in escaping from the male." (Author)] Address: not stated

9395. Bamann, T.; Betz, O. (2009): Die Libellen des NSG Schaichtal (Schönbuch) - Ergebnisse einer ökologisch orientierten Diplomarbeit. *mercuriale* 9: 1-10. (in German) [NSG Schaichtal, Baden-Württemberg, Germany; in 2008, a total of 28 Odonata species was recorded. Habitat parameter or faunistically interesting records of the following species are briefly discussed: *Calopteryx virgo*, *Lestes virens*, *Sympetma fusca*, *Cordulegaster bidentata*, *Gomphus pulchellus*, *Onychogomphus forcipatus*, *Crocothemis erythraea*, *Leucorrhinia dubia*, and *Sympetrum flaveolum*.] Address: Bamann,

T., Amselweg 9, 71144 Steinenbronn, Germany. E-mail: t.bamann@web.de

9396. Baumgärtner, D. (2009): Großer Blaupfeil (*Orthemtrum cancellatum*) Larve läuft Langstrecke auf Landgang. *mercuriale* 9: 37-38. (in German) [Baden-Württemberg, Germany; The distance between the emergence site and nearest shore line of a gravel pit was 34 m.] Address: Baumgärtner, D., Regierungspräsidium Karlsruhe, Karl-Friedrich-Str. 17, 76133 Karlsruhe, Germany

9397. Brydegaard, M.; Guan, Z.; Wellenreuther, M.; Svanberg, S. (2009): Insect monitoring with fluorescence lidar techniques: feasibility study. *Applied Optics* 48(30): 5668-5677. (in English) ["We investigate the possibilities of light detection and ranging (lidar) techniques to study migration of *Calopteryx splendens* and *C. virgo*. Laboratory and testing-range measurements at a distance of 60 m were performed using dried, mounted damselfly specimens. Laboratory measurements, including color photography in polarized light and spectroscopy of reflectance and induced fluorescence, reveal that damselflies exhibit reflectance and fluorescence properties that are closely tied to the generation of structural color. Lidar studies on *C. splendens* of both genders show that gender can be remotely determined, especially for specimens that were marked with Coumarin 102 and Rhodamine 6G dyes. The results obtained in this study will be useful for future field experiments, and provide guidelines for studying damselflies in their natural habitat using lidar to survey the air above the river surface. The findings will be applicable for many other insect species and should, therefore, bring new insights into migration and movement patterns of insects in general." (Authors)] Address: Brydegaard, M, Atomic Physics Division, Lund University, P.O. Box 118, SE-221 00 Lund, Sweden. E-mail: mikkel.brydegaard@fysik.lth.se

9398. Byers, C.J.; Eason, P.K. (2009): Conspecifics and their posture influence site choice and oviposition in the damselfly *Argia moesta*. *Ethology* 115(8): 721-730. (in English) ["Finding a suitable oviposition site can be costly because of energy and time requirements, and ovipositioning can be dangerous because of the risk of predation and harassment by males. *A. moesta* oviposits, contact-guarded by her mate, on vegetation in streams. Oviposition aggregations are commonly observed in this species, despite their territorial nature during other behaviours. We conducted experiments in the field to test the hypothesis that aggregations are the result of conspecific attraction. In the first experiment, two oviposition sites (sycamore leaves) were provided, one with models of ovipositing pairs, and one without. In the second experiment, one leaf again had ovipositing models, while the other had models of uncoupled males and females in a resting posture. In both experiments, damselfly pairs preferred the site with ovipositing models. In general, they visited the ovipositing models first more often than expected by chance, stayed longer there, were more likely to oviposit there, and laid a greater total number of eggs there. These results support the hypothesis that conspecific attraction is responsible for ovipositing aggregations in *A. moesta* and that posture is an important cue for attraction. Using conspecific cues could be a beneficial strategy to save in search costs while taking advantage of the presence of ovipositing conspecifics to dilute the effects of harassment and predation." (Authors)] Address:

Eason, Perri, Dept of Biology, University of Louisville, LF 139, Louisville, KY 40292, USA. E-mail: perri.eason@louisville.edu

9399. Čadková, Z. (2009): Aquatic ecosystems of the Radovesice dumping site. In: Harabiš Filip & Suvorov Petr (Eds.): *Environmental Sciences 2009. Proceedings of the 2nd conference, 12-13 March 2009.* Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences in Prague, Kamýcká 129, 165 21 Prague 6 – Suchbát. ISBN 978-80-213-1919-6: 5-8. (in English) [The study presents results of a biological monitoring of the aquatic ecosystems of the Radovesice dumping site (northwest Bohemia, near the city of Bílina, Czech Republic). A total of 39 zoobenthic taxa includes includes Odonata (without any additional detail).] Address: Čadková, Zuzana, Czech University of Life Sciences Prague, Faculty of Agrobiological Sciences, Department of Zoology and Fisheries, Kamýcká 957, 165 21 Prague 6 – Suchbát, Czech Republic. E-mail: cadkova@af.czu.cz

9400. Chovanec, A.; Schindler, M.; Pall, P.; Hostettler, K. (2009): Bewertung des österreichischen Bodenseeuferes auf der Grundlage libellenkundlicher Untersuchungen. *Schriftenreihe Lebensraum Vorarlberg* 59: III, 43 pp. (in German, with English summary) ["The ecological status of the littoral areas of Lake Constance in Austria was assessed by a dragonfly survey. A key element of the approach, which is oriented towards the Water Framework Directive (WFD), is the Odonata Habitat Index. The assessment is based on the comparison between the status quo and a reference condition derived from current and historical data on dragonflies and macrophytes. A total of 28 species were recorded at 15 investigation sites, 25 species were classified as autochthonous. The ecological status of the lake shore section was ranked as class II ("good ecological status") in the 5-tiered WFD classification scheme." (Authors)] Address: Chovanec, A., Krottenbachgasse 68, A-2345 Brunn am Gebirge, Austria.

9401. Ciemiński, J.; Zdanowski, B. (2009): Changes in the zoobenthos structure in a system of heated lakes in central Poland. *Arch. Pol. Fish.* 17: 221-238. ["The aim of the study was to identify changes in the quality and quantity structure of the zoobenthos assemblages inhabiting the lakes, channels, and basins that comprise the cooling system of a power plant in central Poland. By comparing the invertebrate fauna occurring on the freshwater clam *Sinanodonta woodiana* (Lea) and the macrophyte *Vallisneria spiralis* (L.), the significance of exotic species in the development of invertebrate macrofauna species was demonstrated. The zoobenthos inhabiting the channels was poorer quantitatively and qualitatively than was the lake zoobenthos. Factors that determined this included thermal and oxygen conditions and water flow. Elements that enriched the development of the zoobenthos and the zooperiphyton included populations of alien zebra mussel *Dreissena polymorpha* Pallas and *S. woodiana*, and assemblages of *Myriophyllum spicatum* L. and *Ceratophyllum demersum* L. In comparison to thirty years ago, the quality of the bottom fauna in the system has decreased." (Authors)] The study includes records of *Platycnemis pennipes*, *Coenagrion pulchellum*, *Calopteryx virgo*, and *Calopteryx* sp.] Address: Zdanowski, B., Department of Hydrobiology, The Stanislaw Sakowicz Inland Fisheries Institute in Olsztyn, ul. Oczapowskiego 10, 10-718 Olsztyn, Poland. E-mail: bzdanowski@infish.com.pl

- 9402.** Clopton, R.E. (2009): Phylogenetic relationships, evolution, and systematic revision of the septate gregarines (Apicomplexa: Eugregarinorida: Septatorina). *Comparative parasitology* 76(2): 167-190. (in English) ["A phylogenetic hypothesis was constructed with the use of ssu rDNA sequence data from 27 eugregarine species parasitizing a variety of arthropod hosts and habitats. The data were used to address higher-level character transitions, identify clades, recognize supraspecific taxonomic groups, assess the existing gregarine classification, and assess the effects of host metabolic pattern and habitat transitions on the radiation of the septatorinid gregarines. [...] Trophozoites, gamonts, and gametocysts of *Geneiorhynchus manifestus* were collected as part of the original type series collection from naiads of *Anax junius* collected from Beaver Slide Pond, Big Sandy Creek Unit, Big Thicket National Preserve, Polk County, Texas, USA (30°38'49"N; 96°17'64"W) in February 2006. [...] Trophozoites, gamonts, and gametocysts of *Prismatospora evansi* were collected from naiads of *Anax junius* collected from Collins Pond, Big Sandy Creek Unit, Big Thicket National Preserve, Polk County, Texas, USA. (30°47'78"N; 94°12'81"W) in February 2006. [...] Trophozoites, gamonts, and gametocysts of *Hoplorhynchus acanthatholius* were collected from adults of *Enallagma civile* collected from Optimist Lake, Auburn, Nemaha County, Nebraska, USA (40°23'94"N; 95°50'24"W) during July–August 2007. [...] Hemimetabolic insect life cycles are found only in truly aquatic insect orders. In the analysis presented herein, hemimetabolic hosts are exploited only by the Actinocephalidae. Patterns of host-stadium specificity are more complex in this group. Host-stadium specificity is observed in species of *Prismatospora* and *Geneiorhynchus*, which infect dragonfly naiads (Anisoptera) but not in species of *Hoplorhynchus*, which infect damselfly naiads and adults (Zygoptera). As a general trend, anisopterans are strong fliers with comparatively large home ranges, and zygopterans are weak fliers with small home ranges. Adult anisopterans are rarely infected, probably because they are exploiting a different, perhaps nonaquatic, resource base than are their naiads. Although physiologically hemimetabolic, from a gregarine's point of view anisopteran hosts are holometabolic ecological actors, whereas zygopteran hosts are hemimetabolic ecological actors." (Author)] Address: Clopton, R.E., Dept Natural Science, Peru State College, Peru, Nebraska 68421, USA. E-mail: rclipton@oakmail.peru.edu
- 9403.** Covey, S. (2009): Wiltshire dragonfly report 2008. Wiltshire County Recorder's Annual Report 2008-2009: 9-11. (in English) [14 odonate species - recorded in 2008 from Wiltshire (UK) - are briefly commented on.] Address: not stated
- 9404.** Csordás, L.; Ferincz, Á.; Lókkös, A.; Rozner, G. (2009): New data on the distribution of Large Golden Ringed Dragonfly (*Cordulegaster heros* Theischinger, 1979) (Odonata) in Zselic hills. *Natura Somogyiensis* 15: 53-56. (in English) [The first regional record of *C. heros* dates back to 2005. Intensive investigations of *C. heros* were conducted in 2008 and 2009. These records are documented and mapped.] Address: Csordás, Lilla, Western Hungary University, Institution of Forest Protection and Forest Cultivation, H-9400 Sopron, Bajcsy-Zsilinszky Endre u. 4., Hungary. E-mail: lillaszitakotok@gmail.com
- 9405.** Darvizeh, M.; Darvizeh, A.; Rajabi, H.; Rezaei, A. (2009): Free vibration analysis of dragonfly wings using finite element method. *Int. J. Multiphysics* 3(1): 101-110. (in English) ["In the present work, investigations on the microstructure and mechanical properties of the dragonfly wing are carried out and numerical modelling based on Finite Element Method (FEM) is developed to predict Flight characteristics of dragonfly wings. Vibrational behaviour of wings type structures is immensely important in analysis, design and manufacturing of similar engineering structures. For this purpose natural frequencies and mode shapes are calculated. In addition, the kind of deformation in each mode shape evaluated and the ratio between numerical natural frequency and experimental natural frequency presented as damping ratio. The results obtain from present method are in good agreement with same experimental methods." (Authors)] Address: Rajabi, H., Department of Mechanical Engineering, Guilan University, P.O. Box 3756, Rasht, Iran. E-mail: harajabi@hotmail.com
- 9406.** David, A.; Ferenți S.; Hodișan; O., Horia, B.-V.; Gale, O. (2009): The food analysis of a *Triturus cristatus* population near Ignești locality, Arad County, Romania. *Herpetologica Romanica* 3: 47-52. (in English) [The stomach content of 113 individuals of *T. cristatus* was studied during the reproductive period in March and April. Crustacean-Cladocera and Trichoptera larvae represent the most important prey taxa categories. Odonata are of minor importance in the diet of *T. cristatus*.] Address: David, Anamaria, University of Oradea, Faculty of Sciences, Department of Biology, Universității str., No. 1, 410087- Oradea, Romania. E-mail: anadavid07@yahoo.com
- 9407.** Delasalle, J.-F. (2009): Contribution à la connaissance d'*Acanthallagma luteum* Williamson & Williamson, 1924 en Amérique du Sud (Odonata: Zygoptera: Coenagrionidae). *Martinia* 25(4): 145-148. (in French, with English summary) [French Guyana, 21-II-2004 (2 males, 2 females) and 19-VIII-2005 (1 male) near Saül. Known South American records of the species are mapped.] Address: Delasalle, J.-F., Domaine de Chantraigne 30 rue Jules Lardièrre BP 70225 F-80800 Corbie, France. E-mail: jf.delasalle@aliceadsl.fr
- 9408.** Dierickx, H. (2009): Negen jaar libellen in het Kollintenbos te Zemst (2000-2008). *Brakona jaarboek* 2008: 88-99. (in Dutch) [Kollintenbos near Zemst, Belgium; a nine year monitoring of the Odonata fauna resulted in 25 species. These are listed in a table according their first occurrence in the habitat. *Sympetrum vulgatum* was lost, while in most cases species favoured by climate change are new additions to the local fauna.] Address: Dierickx, H., L. Luybaertstraat 244/1, 1850 Grimbergen, Belgium. E-mail: herman.dierickx@telenet.be
- 9409.** Dolson, R.; McCann, K.; Rooney, N.; Ridgway, M. (2009): Lake morphometry predicts the degree of habitat coupling by a mobile predator. *Oikos* 118: 1230-1238. (in English) ["Habitat coupling is an ecosystem process whereby semi-discontinuous habitats are connected through the movement of energy and nutrients by chemical, physical or biological processes. One oft-cited example is that of littoral pelagic coupling in lakes. Theory has argued that such habitat coupling may be critical to food web dynamics, yet there have been few empirical studies that have quantified ecological factors that affect the degree of habitat coupling in ecosystems.

Specifically, the degree to which habitat coupling occurs across important physical gradients has largely been ignored. To address this, we investigate the degree of littoral habitat coupling (i.e. the degree to which a top predator lake trout, *Salvelinus namaycush*, derives energy from the littoral zone) along a gradient of lake shape, where lake shape modifies the relative quantity of coupled epilimnetic benthic and pelagic habitats within each lake. Herein we demonstrate that littoral habitat coupling is intensified in simple circular lakes compared to their reticulate counterparts in seven Canadian Shield lakes. Although the more reticulate lakes had larger areas of epilimnetic benthic habitat, littoral food sources comprised 11% compared to 24% of lake trout diet in reticulate and circular lakes, respectively. This heightened interaction in circular lakes also appears to translate into increased omnivory in more circular lakes compared to reticulate lakes such that lake trout of circular lakes have a significantly lower trophic position than lake trout of reticulate lakes ($F_{1,5} = 6.71$, $p = 0.05$). These results suggest that it is the accessibility of littoral production via thermal refugia, and not the amount of littoral production, that determines the degree to which lake trout couple littoral and pelagic habitats in lakes. [...] Due to low snail abundance in some lakes, littoral grazing [sic] benthic invertebrate specimens (Odonata and Ephemeroptera, $n = 6-8$ per lake) were incorporated into the littoral carbon baseline signature." ((Authors)] Address: Dolson, Rebecca, Dept of Integrative Biology, Univ. of Guelph, Guelph, ON, N1G 2W1, Canada. E-mail: rebecca.dolson@gmail.com

9410. Dominiak, P.; Michalczuk, W. (2009): Two species of biting midges (Diptera: Ceratopogonidae) new to the Polish fauna. *Dipteron* 25: 8-13. (in Polish, with English summary) (http://pte.au.poznan.pl/dipteron/biuletyn/vol25/Dipteron_vol_25.pdf) ["*Forcipomyia paludis* (Macfie, 1936) and *Monohalea estonica* Remm, 1965 are recorded from Poland for the first time. As a result the number of biting midges species in the Polish fauna increased to 215. Females are briefly diagnosed and illustrated, geographical distribution analysed and Odonata hosts of parasitic *Forcipomyia paludis* reviewed." (Authors)] Address: Dominiak, Patrycja, Katedra Zoologii Bezkręgowców Uniwersytetu Gdańskiego, Al. Marszałka Piłsudskiego 46, 81-378 Gdynia, e-mail: heliocopris@gmail.com

9411. Dommanget, J.-L. (2009): In Memoriam René Préchac - 1919-2009. Un artiste au service de l'entomologie. *Martinia* 25(1): 14, 24. (in French) [R. Préchac realised the plates in d'Aquilar, J.; Dommanget, J.-L.; Prechac, R. (1985): *Guide des Libelles d'Europe de d'Afrique du Nord*. Delachaux & Niestlé. Neuchâtel. Paris. 341 pp.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

9412. Donath, H. (2009): Zur Entwicklung des Schlupfbeginns von Libellen in der nordwestlichen Niederlausitz (1977 - 2009). *Biologische Studien, Luckau* 38: 59-64. (in German) [Phenological data of 20 Odonata species obtained between 1977 and 2009 are presented. The data referring to start of emergence in the respective year are detailed for *Libellula quadrimaculata*, *Cordulia aenea*, *Pyrrhosoma nymphula*, *Ischnura pumilio*, *Erythromma najas*, and *Coenagrion puella*. In recent years emergence has started one week earlier than in the 1980ies.] Address: Donath, H., Caule Nr. 1, 15926 Luckau, OT Zieckau, Germany

9413. Evangelista, M. (2009): Italian faunistic records 483 - *Coenagrion scitulum* (Rambur, 1842) (Odonata Coenagrionidae). *Boll. Soc. entomol. ital.* 141(2): 113. (in Italian) [Piemonte: Poirino (Torino), Favari, Sito Natura "Cascina Bellezza", 248 m a.s.l., Italy; 15-VI-2008. M. Evangelista leg., 3 males, 1 female.] Address: Evangelista, M., c/o Museo civico di Storia naturale, Parco Cascina Vigna, c. p. 89, 1-10022 Carmagnola TO, Italy

9414. Feulner, G. (2009): Date Palm Evolution. *Gazelle, Dubai* 22(10): 5-6. (in English) [UAE; a photograph of *Crocothemis sanguinolenta* without data is published.] Address: Feulner, G., c/o Dubai Natural History Group, PO Box 9234, Dubai, United Arab Emirates

9415. Feulner, G. (2009): 'Female *Trithemis annula* on an aloe in a very dry garden on Al Wasl Road, at least half a kilometre from Safa Park'. *Gazelle, Dubai* 22(9): 1. (in English) [In June 2009, a female *Trithemis annula* was photographed on an aloe in a very dry garden on Al Wasl Road, at least half a kilometre from Safa Park, United Arab Emirates.] Address: Feulner, G., Dubai Natural History Group, PO Box 9234, Dubai, UAE

9416. Frank, J.H.; Lounibos, L.P. (2009): Insects and allies associated with bromeliads: a review. *Terrestrial arthropod reviews* 1(2): 125-153. (in English) ["Larvae of Odonata are aquatic and predatory. They have well-developed legs and thereby can climb out of the water from one leaf axil and into the water in another. At least 12 species have been reported from bromeliad phytotelmata in Neotropical countries, and some of them appear to be specialists to this habitat. These specialists are all species of damselflies, especially of the genera *Leptagrion* and *Bromeliagrion* (Coenagrionidae), but also of *Mecistogaster* (Pseudostigmatidae) (Corbet, 1983; Melnychuk & Srivastava, 2002; Srivastava et al., 2005; Marmels & Garrison, 2005). Their prey includes mosquito larvae (Lounibos et al., 1987a) and immature crabs where these exist (Diesel, 1992). Predation by *M. modesta* on detritivores increases nitrogen cycling by preventing its export from the bromeliad axils by emerging adults of the detritivores, allowing uptake by the plant (Ngai & Srivastava, 2006)." (Authors)] Address: Frank, J.H., Florida Medical Entomology Laboratory, 2009th St. SE, Vero Beach, Florida 32962, USA. E-mail: jhfrank@ufl.edu

9417. Gallardo, B.; Gascon, S.; Garcia, M.; Comin, F.A. (2009): Testing the response of macroinvertebrate functional structure and biodiversity to flooding and confinement. *J. Limnol.* 68(2): 315-326. (in English) ["The aim of the present study was to investigate the relative importance of flooding- and confinement-related environmental features in explaining macroinvertebrate trait structure and diversity in a pool of wetlands located in a Mediterranean river floodplain. To test hypothesized trait-environment relationships, we employed a recently implemented statistical procedure, the fourth-corner method. We found that flooding-related variables, mainly pH and turbidity, were related to traits that confer an ability of the organism to resist flooding (e.g., small body-shape, protection of eggs) or recuperate faster after flooding (e.g., short life-span, asexual reproduction). In contrast, confinement-related variables, mainly temperature and organic matter, enhanced traits that allow organisms to interact and compete with other organisms (e.g., large size, sexual reproduction) and to efficiently use habitat and resources (e.g., diverse locomotion and feeding strategies). These results are in

agreement with predictions made under the River Habitat Templet for lotic ecosystems, and demonstrate the ability of the fourth-corner method to test hypothesis that posit trait-environment relationships. Trait diversity was slightly higher in flooded than in confined sites, whereas trait richness was not significantly different. This suggests that although trait structure may change in response to the main environmental factors, as evidenced by the fourth-corner method, the number of life-history strategies needed to persist in the face of such constraints remains more or less constant; only their relative dominance differs." (Authors) Odonata (Coenagrion) were more abundant in confined habitats.] Address: Gallardo, Belinda, Pyrenean Institute of Ecology (CSIC), Avda. Montañana 1005, 50192 Zaragoza, Spain. E-mail: belinda@ipe.csic.es

9418. Groenendijk, D.; Plate, C. (2009): Positive population trends for odonates. *Vlinders* 3/2009: 22-24. (in Dutch, with English summary) ["The Dutch Monitoring Scheme shows that, in general, the year 2008 can be regarded as a good year for odonates. Monitoring routes have been set out in various habitats, along streams, ponds and pools, and across peat bogs. The population trends in the coastal dunes seem to differ from those calculated for inland water bodies, being quite negative for common species. Inland, the improved water quality results in higher numbers of odonates. In addition, some rare species benefit from the improved water quality of their habitats. The monitoring results confirm that dragonflies are useful indicators of the habitat quality of Dutch wetlands." (Authors)] Address: Groenendijk, D., De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

9419. Hennequin, E. (2009): Les Odonates d'un site remarquable du Limousin: la tourbière-étang de Chabannes (Tarnac-Saint-Merd-les-Oussines, Corrèze). *Martinia* 25(2): 67-72. (in French, with English summary) [Between 1994 and 2007, 34 Odonata species were recorded at the peat bog-pond of Chabannes, located in the western part of Limousin Mountain, France. The list includes 8 regionally red-listed species (*Aeshna juncea*, *Coenagrion hastulatum*, *Leucorrhinia dubia*, *Somatochlora arctica*, *S. flavomaculata*, *Symptetrum danae*, *S. flaveolum*, *S. vulgatum*).] Address: Hennequin, E., Conservatoire Régional des Espaces Naturels du Limousin, 6 ruelle du Theil, F-87510 Saint-Gence, France

9420. Holz, B. (2009): Fotografische Dokumentation der Prädation von Großlibellenlarven durch den Eisvogel (*Alcedo atthis*) (Coraciiformes: Alcedinidae). *Mercuriale* 9: 35-36. (in German) [A kingfisher with a Libellulidae-larva was photographed north of Freiburg, Baden-Württemberg, Germany. Along with a few published data, references from photographs published in the www are briefly discussed.] Address: Holz, B., Franzosenstr. 1, 79341 Kenzingen, Germany. E-mail: holz.bernd@web.de

9421. Inoue, K. (2009): On the names of dragonflies: Part 1. Scientific names of Japanese odonate taxa. *Sympetrum Hyogo* 11: 2-17. (in Japanese, with English summary) ["The meaning and the origin of the scientific names of all Japanese odonate species, subspecies and forms is explained in detail." (Author)] Address: Inoue, K., 5-9 Fuminosato 4-chome, Abeno-ku, Osaka 545, Japan. E-mail: ks-inoue@mx2.nisiq.net

9422. Jeon, D-Y.; Cha, Y.-U.; Kim, M.-H.; Lee, S.-L.; Kim, C.-I.; Kwon, K.-W.; Yoo, P.-J. (2009): Assessments of ecosystem health in middle reaches of Suyoung River. The Annual Report of Busan Metropolitan City Institute of Health & Environment 19(1): 94-113. (in Korean, with English summary) [Busan, South-Korea; the assessment of stream condition based on the index of Korea Saprobic Index (KSI) indicated a "good ~ fair" status. Odonata are treated at the order level.] Address: Jeon, D-Y., Busan Metropolitan City Institute of Health & Environment, Busan, South-Korea. E-mail: jeon1st@korea.kr

9423. Kalyoncu, H.; Gülboy, H. (2009): Benthic macroinvertebrates from Darýören and Isparta streams (Isparta/Turkey) – Biotic indices and multivariate analysis. *Journal of Applied Biological Sciences* 3(1): 79-86. (in English) ["During 2003 -2004, seventy-two samples were collected from 6 sampling points on Isparta stream basin (Isparta/Turkey). Macrozoobenthic organisms and physico-chemical parameters were investigated to assess the impact of the pollution on macrozoobenthos assemblages. Ecological methodologies (species richness, diversity and family biotic indices and multivariate analysis) were employed to assess the impact of the pollution on macrozoobenthic assemblages. During the study, totally 27293 specimens were collected from six sampling points. These belonged to 83 taxa distributed into 6 taxonomic groups as follows: Plathelminthes, Mollusca, Annelida, Crustacea, Insecta, and Arachnida. Biological oxygen demand, NH4-N, NO3-N, NO2-N SO4, conductivity, total hardness and turbidity parameters were measured higher in the 3rd and 6th sampling points, while dissolved oxygen amount was the lowest in these. pH was variable. In this study, the number of species is the highest at station 1, which is also reflected by Margalef and Shannon-Weaver indices. As the amount of pollution is higher at stations 3 and 6, the number of species is fewer in these stations compared to the others. Sampling points 1, 2, 4 and 5 were of good water quality levels. Changes in water quality levels were better reflected by species richness, diversity indices and principal component analysis than pollution indices in Isparta stream." (Authors) Odonata taxa are treated at the genus level with the exception of *Epallage fatime*.] Address: Kalyoncu, H., S. Demirel University Faculty of Arts and Sciences Department of Biology 32260 Isparta, Turkey. E-mail: kalyoncu@fef.sdu.edu.tr

9424. Kato, Y.; Takemon, Y.; Hori, M. (2009): Invertebrate assemblages in relation to habitat types on a floating mat in Mizorogaike Pond, Kyoto, Japan. *Limnology* 10(3): 167-176. (in English) ["Abiotic environmental variables and invertebrate assemblages were compared among four habitat types (bare hollow, sphagnum-rich hollow, pool, and mat edge) on a floating mat in Mizorogaike Pond, Kyoto. We found differences in abiotic environments between two hollows and two inundated habitats (pool and mat edge); pH was significantly lower in hollow habitats than in inundated habitats, and water depths were significantly shallower in sphagnum-rich hollows than in inundated sites. The composition of invertebrate assemblages in the hollow was distinct from that in the inundated habitats. The abundances of some dominant invertebrate taxa or functional feeding groups on the floating mat differed between the hollows and inundated habitats, and were correlated with water temperature, pH and depth. These results indicate that

habitat heterogeneity created by the coexistence of hollows and inundated habitats contributes to species diversity on the floating mat in Mizorogaike Pond. A comparison of the pH values in different wetlands revealed that both bog- and fen-specific components coexist within this system. In order to adequately manage and conserve peatland ecosystems, it is necessary to consider the importance and vulnerability of both hollows and inundated habitats in peatlands." (Authors) *Ceriagrion melanurum* was significantly more abundant at mat edges than in pools and the two types of hollows. The following taxa have been recorded in the nymphal stage: *Ceriagrion nipponicum*, *Aciagrion migratum*, *Lestes sponsa*, *Sympetrum speciosum speciosum*, *S. eroticum eroticum*, *S. pedemontanum elatum*, *Nannophya pygmaea*, *Crocothemis servilia*, *Libellulidae*] Address: Kato, Y., Laboratory of Animal Ecology, Dept. of Zoology, Graduate School of Science, Kyoto Univ., Kitashirakawa-oiwake, Sakyo, Kyoto 606-8502, Japan. E-mail: yoshikazukato@terra.zool.kyoto-u.ac.jp

9425. Keller, D.; Brodbeck, S.; Holderegger, R. (2009): Characterization of microsatellite loci in *Leucorhinia caudalis*, a rare dragonfly endangered throughout Europe. *Conservation Genetics Resources* 1(1): 179-181. (in English) ["*L. caudalis* is a rare dragonfly, threatened throughout Europe. It only survived in a single population in Switzerland in the 1980s. However, it recently spread and colonized new ponds. In order to be able to study contemporary migration in this species, eight new microsatellite markers were developed and tested on 24 individuals from six Swiss ponds. We detected three to eleven alleles per polymorphic locus and found observed and expected heterozygosities of 0.250 to 0.875 and 0.215 to 0.840, respectively." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr. 111, 8903 Birmensdorf, Switzerland

9426. Khrokalo, L.A.; Savchuk, V.V.; Dyatlova, E.S. (2009): New records of rare dragonflies (Insecta, Odonata) in Ukraine. *Vestnik Zoologii* 43(4): 378. (in Russian, with English title) [Records of *Erythromma lindenii*, *Coenagrion scitulum* and *Selysiotthemis nigra* are documented..] Address: Khrokalo, Lyudmila, P.O. Box 16, Kyiv-118, Ukraine 03118. E-mail: lkrokalo@mail.ru

9427. Kim, W.-K.; Kob, J.H.; Park, H.C.; Byun, D. (2009): Effects of corrugation of the dragonfly wing on gliding performance. *Journal of Theoretical Biology* 260 (4): 523-530. (in English) ["We investigate the aerodynamic performance of the dragonfly wing, which has cross-sectional corrugation, via a static 2-dimensional unsteady simulation. Computational conditions are $Re = 150, 1400, \text{ and } 10,000$ with angles of attack ranging from 0° to 40° . From the computational results, lift coefficients are increased by the wing corrugation at all Reynolds number. However, the corrugation has little influence on the drag coefficients. The flows such as vortex in the valley of corrugation and near the edge of the corrugation are locally different from those of an elliptic wing. However, such local flows have little influence on the time averaged wing performance. From the numerical experiment presented in this study, it is determined that suction side corrugations of the wing have very little influence on increase of the lift coefficient at a positive angle of attack." (Authors)] Address: Byun, D., Department of Intelligent Advanced Technology Fusion, Konkuk University, Gwangjin-gu, Seoul 143-701, Republic of Korea. E-mail: dybyun@konkuk.ac.kr

9428. Lambrechts, J.; Guelinckx, R.; Collaerts, P.; Van der Wijden, B.; Jacobs, M. (2009): De kracht van natuurherstel in Het Vinne Resultaten van 4 jaar intensieve faunamonitoring. *Brakona jaarboek* 2008: 6-35. (in Dutch) ["Het Vinne" near Zoutleeuw, Belgium; 38 Odonata species were recorded between 2005 and 2008. The abundance of the species is documented in a table. Colonisation, succession and fluctuation of the odonate fauna are briefly described.] Address: Lambrechts, J., Zuurbemde 9, 3380 Glabbeek, Belgium. E-mail: j.lambrechts@arcadisbelgium.be

9429. Lambret, P.; Boudot, J.-P. (2009): Sortie d'hibernation précoce de *Sympetma fusca* (Vander Linden, 1820) en région lyonnaise (Odonata: Zygoptera: Lestidae). *Martinia* 25(4): 156. (in French) [Despite a very hard winter in the Lyon-region, France, the first specimens of *S. fusca* were recorded at the end of February 2009.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

9430. Levy, D.-E.; Seifert, A. (2009): Simplified dragonfly airfoil aerodynamics at Reynolds numbers below 8000. *Phys. Fluids* 21: 17 pp. (in English) ["Effective aerodynamics at Reynolds numbers lower than 10000 is of great technological interest and a fundamental scientific challenge. The current study covers a Reynolds number range of 2000–8000. At these Reynolds numbers, natural insect flight could provide inspiration for technology development. Insect wings are commonly characterized by corrugated airfoils. In particular, the airfoil of the dragonfly, which is able to glide, can be used for two-dimensional aerodynamic study of fixed rigid wings. In this study, a simplified dragonfly airfoil is numerically analyzed in a steady free-stream flow. The aerodynamic performance (such as mean and fluctuating lift and drag), are first compared to a "traditional" low Reynolds number airfoil: the Eppler-E61. The numerical results demonstrate superior performances of the corrugated airfoil. A series of low-speed wind and water tunnel experiments were performed on the corrugated airfoil, to validate the numerical results. The findings indicate quantitative agreement with the mean wake velocity profiles and shedding frequencies while validating the two dimensionality of the flow. A flow physics numerical study was performed in order to understand the underlying mechanism of corrugated airfoils at these Reynolds numbers. Airfoil shapes based on the flow field characteristics of the corrugated airfoil were built and analyzed. Their performances were compared to those of the corrugated airfoil, stressing the advantages of the latter. It was found that the flow which separates from the corrugations and forms spanwise vortices intermittently reattaches to the aft-upper arc region of the airfoil. This mechanism is responsible for the relatively low intensity of the vortices in the airfoil wake, reducing the drag and increasing the flight performances of this kind of corrugated airfoil as compared to traditional low Reynolds number airfoils such as the Eppler E-61." (Authors)] Address: Seifert, A., School of Mechanical Engineering, Faculty of Engineering, Tel-Aviv University, Tel Aviv 69978, Israel

9431. Lok, A.F.S.L.; Orr, A.G. (2009): The biology of *Euphaea impar* Selys (Odonata: Euphaeidae) in Singapore. *Nature in Singapore* 2: 135-140. (in English) [According to specimens deposited in the Zoological Reference Collection (ZRC), Raffles Museum of Biodiversity Research, National University of Singapore, *Euphaea*

impar was first recorded in Singapore in 1992 at Nee Soon Swamp Forest. The typical habitat of *E. impar* in Singapore is usually near relatively pristine, clear, shallow-flowing streams in primary or secondary forest, with a sandy or slightly muddy substrate with accumulations of detritus and leaf litter, and sometimes with large rocks. The stream banks are usually well-vegetated, providing suitable perches from which the males guard their territory. The vividly-coloured males are somewhat more frequently encountered because they are usually seen along streams, whereas the duller females are usually encountered in the shady undergrowth. Typically, there are three main types of habitats of *E. impar* in Singapore: firstly sandy, clear-water streams with dense marginal vegetation, secondly, a muddy braided stream system at the lower reaches of the Sime Road Forest where the canopy consists predominantly of pulai paya (*Alstoma spathula*) and has a relatively open undergrowth, thirdly, small forest streams with muddy bottoms (especially in the Nee Soon Swamp Forest). *E. impar* is very sensitive to movement, making approaching it for photographing difficult, with the subject flying higher and higher when disturbed. Flash photography also can be very difficult with this species and requires careful and prolonged stalking until the subject becomes accustomed to the flash and ceases to fly away with each discharge.] Address: Lok, A., Dept Biol. Sciences, National University Singapore, 14 Science Drive 4, Singapore 117543, Republic of Singapore. E-mail: dbsloks@nus.edu.sg

9432. Lopez, J.A.; Scarabotti, P.A.; Medrano, M.C.; Ghirardi, R. (2009): Is the red spotted green frog *Hypsiboas punctatus* (Anura: Hylidae) selecting its prey? The importance of prey availability. *Revista de Biología Tropical* 57(3): 847-857. (in English) ["Notwithstanding, the lack of food resources data in many studies of amphibians feeding has led to partial understanding of frog feeding strategies. In this study we evaluate the trophic selectivity of a *Hypsiboas punctatus* population from a Middle Paraná River floodplain pond in Argentina, and discuss the importance of prey availability data when interpreting results from diet analysis. We analyzed the gut contents of 47 *H. punctatus* adults and compared frog's diet with the environmental food resources. Prey availability was estimated by systematically seep-netting the microhabitat where anurans were localized foraging. We identified 33 taxonomic categories from gastrointestinal contents. Numerically, the most important prey categories were dipterans, followed by hemipterans, homopterans and coleopterans. The diet similarity between males and females was high and no statistical differences in diet composition were found. The most abundant food resources in the environment were dipterans, coleopterans, homopterans and collembolans. In order to assess whether frogs were selecting their preys, we calculated Pianka's niche overlap index and Jacobs' electivity index comparing gut contents to prey availability data. Trophic niche overlap was medium but significantly higher than expected by chance. The electivity index indicated that *H. punctatus* foraged dipterans slightly above their environmental abundance. Among the secondary preys, hemipterans were foraged selectively, homopterans were consumed in the same proportion to their occurrence in the environment, coleopterans were foraged quite under their availability and collembolans were practically ignored by frogs. Without food resources data, *H. punctatus* could be classified as a specialist feeder, but dipterans

also were quite abundant in the environment. Our results show that *H. punctatus* fit better as a generalist feeder, foraging on their main food item and some secondary preys in similar proportion to their environmental availability; even though other secondary preys are being selectively preferred or ignored by frogs. Our data illustrate the importance of including the resource availability data on diet studies to improve the understanding of amphibian feeding ecology." (Authors) Compared with the food availability, Odonata (Coenagrionidae) are used quite rarely.] Address: Scarabotti, P.A., Instituto Nacional de Limnología (CONICET - UNL), Ciudad Universitaria "Paraje El Pozo", (3000) Santa Fe, provincia de Santa Fe, Argentina. E-mail: pascarabotti@yahoo.com.ar

9433. Lotzing, K. (2009): Kurzübersicht der seit 1980 nachgewiesenen Libellen (Insecta: Odonata) im Bereich der Bode und ihrer Nebenarme innerhalb des ehemaligen Landkreises Aschersleben-Staßfurt (Sachsen-Anhalt). *halophila*, Mitteilungsblatt der Fachgruppe Faunistik und Ökologie Staßfurt 53: 15-18. (in German) [5 wetland localities in the former district of Aschersleben-Stassfurt (Sachsen-Anhalt, Germany) are described in detail and their recorded odonate fauna (29 species) is listed.] Address: Lotzing, K., Am Hollschen Bruch 4c, D.39435 Unseburg, Germany

9434. Machet, P. (2009): Les espèces du genre *Perilestes* Hagen in Selys, 1862 en Guyane française (Odonata: Zygoptera: Perilestidae). *Martinia* 25(4): 135-140. (in French, with English summary) ["In French Guyana, the genus *Perilestes* Hagen in Selys, 1862 is represented by three species belonging to the attenuates / gracillimus group. This one was set off on the character of Cu2 in the hind wing by Kennedy (1941). The three species are commented on and briefly characterized. Two taxa are probably confused under the species *P. attenuatus* Bates in Selys, 1886. The female type of this latter should be studied and redefined. The third species is very close to *P. gracillimus* Kennedy, 1941." (Author)] Address: Machet, P., L'Étre Delangle, F-61140 La Chapelle-d'Andaine, France

9435. Mayer, J. (2009): Ein bodenständiges Vorkommen der Helm-Azurjungfer (*Coenagrion mercuriale*) im baden-württembergischen Donauraum. *mercuriale* 9: 11-14. (in German) [Westernach brook system, MTB 7626, Baden-Württemberg, Germany; occurrence of *C. mercuriale* was mapped in 2009 along the Westernach. Habitat was analyzed and assessed according habitat suitability for *C. mercuriale*. The brook is settled by a small, isolated population of this rare damselfly species.] Address: Mayer, J., Arbeitsgruppe für Tierökologie und Planung, Johann-Strauß-Str. 22, 70794 Filderstadt, Germany. E-mail: info@tieroekologie.de

9436. McMurray Jr, P.D.; Schuster, G.A. (2009): The dragonflies and damselflies (Insecta: Odonata) of the upper Rockcastle River system, Kentucky, U.S.A. *Journal of the Kentucky Academy of Science* 70(2): 122-126. (in English) ["A survey of the adult Odonata fauna of streams in the upper Rockcastle River system, Kentucky, was conducted during 2002–2003. Twenty-seven species were collected, resulting in 31 new county records for Jackson, Laurel, and Rockcastle counties and the extension of the Kentucky flight season for six species. The 27 species collected during this study represent 18% of the odonate species currently known from Kentucky." (Authors)] Address: McMurray Jr, P.D.,

Biology Dept, Indiana State Univ., 600 Chestnut Street, Science Building Room 281, Terre Haute, Indiana 47809, USA. E-mail: paul.mcmurray79@gmail.com

9437. Morioka, Y. (2009): A male *Macromia daimoji*. *Sympetrum Hyogo* 11: 1. (in Japanese, with English summary) [A male *M. daimoji* is the cover photo of this issue of *Sympetrum Hyogo*, and was taken by Yasuyuki, Morioka on July 12, 2008.] Address: not stated

9438. Müller, J.; Steglich, R. (2009): Beringungsarbeit erbringt entomologisch wertvolle FFH-Libellen-Nachweise in Nahrungsresten. *Berichte der Vogelwarte Hiddensee* 19: 69-70. (in German) [A subadult female *Stylurus flavipes* found on 30-VII-2009 as prey of *Meros apiaster* is the first record for the near situated Natura 2000-Site "Bode und Selke im Harzvorland", Sachsen-Anhalt, Germany.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

9439. Müller, J. (2009): Großes Granatauge *Erythromma najas* (Odonata, Coenagrionidae) wehrt Angriff des Wasserläufers *Gerris najas* (Heteroptera, Gerromorpha, Gerridae) erfolgreich ab. *Ent. Nachr. Ber.* 53(3-4): 167-168. (in German, with English summary) [The attack of a water strider, *G. najas*, on the male of a submerged ovipositing *E. najas*-tandem is documented and briefly discussed. The male slung the water strider away the moment the predator jumped and landed on the head of the damselfly. This observation is photographically documented in a sequence of three pictures.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

9440. Nishu, S. (2009): Report of the survey trips of The Hyogo Society of Odonatology in 2009. Part 1 focused to *Mortonagrion Hirosei* and *Macromia daimoji*. *Sympetrum Hyogo* 11: 34-37. (in Japanese, with English summary) [Japan; "results of the survey trips of the Hyogo Society of Odonatology carried out on June 20 and 21, 2009 are reported. *Mortonagrion Hirosei* was recorded in good numbers, though the date of the survey was somewhat too early and the imagoes were rather immature and no copulation was observed. This species was recorded only in Momoike Pond. One male *Macromia daimoji* was recorded along Izushi River where the Typhoon No.23 brought a severe flood in 2004. *Onychogomphus viridicostus* was seen in good numbers, thus it is considered that odonate species of running waters are regaining their good habitats." (Author)] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

9441. Nishu, S. (2009): Exuviae of *Pseudothemis zonata* placed on the trees distant from the pond shore. *Sympetrum Hyogo* 11: 28-31. (in Japanese, with English summary) [Japan; "Fifteen exuviae of *P. zonata* were found on the tree trunks some distance far from the shore of Gonoike Pond in Akashi Park on June 20, 2008. Measurements of the distance between the shore and the exuviae were made. The results revealed that the larvae travelled the distance of 2.89m to 5.88m with the average of 4.99m through the wall of the pond, horizontal part and the tree trunk of 2.36m high above the water surface. The angles of posture were mostly over 90°, and it seems that this species likes to emerge in overhang posture. The shore of this pond is not high enough for the emergence, and the adjacent land is almost flat, thus they walked in search of overhang wall

until at last climbed to such high." (Author)] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

9442. Nishu, S.; Yoshihiko, Y (2009): The survey results of *Macromia daimoji* along Izushi River in 1997. *Sympetrum Hyogo* 11: 22-26. (in Japanese, with English summary) [Japan; "*M. daimoji* had been recorded along Izushi River during 1993-2004, but the flood caused by Typhoon No.23 swept the population of this species away in October 2004. It was revealed through the survey carried out in 2009 that a small population of this species is established. The survey results carried out by Yamazaki in 1997 on all odonate species are added, which will give a suitable measure for evaluating the recovery after the typhoon."] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

9443. Nishu, S. (2009): Report of the survey trips of The Hyogo Society of Odonatology in 2009. Part 2 Odonate fauna of Aonogahara. *Sympetrum Hyogo* 11: 38-44. (in Japanese, with English summary) [Japan; "This is the report of the survey trips for the odonate fauna of Aonogahara carried out on September 27, October 11 and 25, 2009 by the members of the Hyogo Society of Odonatology. 36 species were recorded including 2 male *Sympetrum maculatum* and many *Sympetrum uniforme*, though *Lestes japonicus* was not found." (Author)] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

9444. Oda, Y. (2009): An additional photograph of *Sympetrum fonscolombii* in Shishigaik pond. *Sympetrum Hyogo* 11: 27. (in Japanese, with English summary) ["The author succeeded in taking photograph of a male *S. fonscolombii* at Shishigaik Pond on September 17, 2009. This is the second record of this migrant species in Kobe City, Japan after that of November 10, 2004 by the same author." (Author)] Address: not stated

9445. Papazian, M. (2009): Compte-rendu d'étude faunistique réalisée sur la Cèze (Gard): les Odonates. *L'Entomologiste* 65(4): 171-173. (in French) [The presence of the legally protected Odonata species *Macromia splendens*, *Oxygastra curtisii* and *Gomphus grasilinii*, in the French Gard Department along the Cèze River is confirmed. Results of the mapping mandatory made it necessary to enlarge the respective Natura 2000 site.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France. E-mail: mpapazian@ecologie.re

9446. Prunier, F. (2009): Nueva cita de "*Oxygastra curtisii*" (Dale, 1834) (Odonata: Corduliidae) en la Provincia de Sevilla. *Boletín de la Sociedad Andaluza de Entomología* 16: 45-47. (in Spanish) [A larva of *O. curtisii* was recorded at 16-III-2008 in the Rivera River near Ciudad de Jaén (TH80), Sierra Morena, Spain.] Address: E-mail: florent.prunier@netcourrier.com

9447. Quadros, G.; Gurav, G.; Bhagat, K.; Chorghé, A.; Dhamorikar, A.; Khot, K.; Nagarkar, M. (2009): Report of the study of the biodiversity of Indian Institute of Technology Bombay Campus. WWF-India MSO for IIT Bombay: 158 pp. (in English) [In the campus, 36 odonate taxa were recorded, of which 30 species are iden-

tified and presented on pages 93-97.] Address: World Wide Fund for Nature -India, Maharashtra State Office, 204 National Insurance Building, Dr. D.N. Road. Fort Mumbai 400 001, India

9448. Robin, J.; Fusari, M (2009): Deux nouvelles espèces pour l'atlas préliminaire des Odonates de Tarn-et-Garonne. Bulletin de la Société des sciences naturelles de Tarn-et-Garonne 33: 23-26. (in French) [*Soma-tochlora metallica*: 5-VIII-2009, le vallon du Lemboulas; *Macromia splendens*: 2006, Aveyron River near Bruniquel. These records increase the regional list of Odonata to 50 species. The possible/to expect presence of *Anax parthenope* and *Trithemis annulata* is outlined.] Address: Robin, J., 6 rue du Stade, 82370 Corbarieu, France. E-mail: robin-jerome@voila.fr

9449. Rosa, B.F.J.V.; Martins, R.T.; de Oliveira, V.C.; Alves, R. (2009): Phoretic association between larvae of *Rheotanytarsus* (Diptera: Chironomidae) and genera of Odonata in a first-order stream in an area of Atlantic Forest in southeastern Brazil. *Zoologia* 26(4): 787-791. (in English) ["In this note, the occurrence of phoresy between larvae of *Rheotanytarsus* sp. (Diptera: Chironomidae) and larvae of *Heteragrion* sp. (Odonata: Megapodagrionidae) and of unidentified genera of Calopterygidae (Odonata) collected in a first-order stream in an area of Atlantic Forest in southeastern Brazil is reported. During the dry season of 2007 and the rainy season of 2008, with the aid of a Surber sampler, 15 samples of each of the following mesohabitats were collected: litter from riffle areas, litter from pool areas and sediment in pool areas. Eighty-five Odonata larvae were obtained, 10 (11.76%) with cases of phoresy by *Rheotanytarsus* sp.. These chironomids were associated with only one specimen of Megapodagrionidae, whereas the other larvae were recorded in association with Calopterygidae. Most of the Odonata with cases of phoresy by *Rheotanytarsus* sp. were recorded in the dry season. In the present study, the absence of the phoretic association with other potential hosts for *Rheotanytarsus* sp. found in the samples indicates a possible preference of these larvae for Odonata, which accounted for only 2.42% of the collected macroinvertebrates in litter and sediment." (Authors)] Address: Rosa, Beatriz, Laboratório de Invertebrados Bentônicos, Programa de Pós-graduação em Ciências Biológicas em Comportamento Animal e Biologia, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Juiz de Fora. 36036-330 Juiz de Fora, Minas Gerais, Brasil. E-mail: beatrizjabour@yahoo.com.br

9450. Sängner, H. (2009): Das Naturschutzlehrojekt Rückersdorf (Landkreis Greiz). Teil 1: Bilanz der Entwicklung seit der EXPO 2000. Landschaftspflege und Naturschutz in Thüringen 46(1): 27-41. (in German) [Germany, Thüringen; of a total of 27 species observed between 1998 and 2007, only the four regionally red listed Odonata species are listed: *Calopteryx splendens*, *C. virgo*, *Coenagrion hastulatum*, *Aeshna grandis*.] Address: Sängner, H., Berggasse 6, 08451 Crimmitschau, Germany. E-mail: bios-bfu@arcor.de

9451. Schmid, F. (2009): Erstnachweis der Grünen Flussjungfer (*Ophiogomphus cecilia*) an der baden-württembergischen Donau. *mercuriale* 9: 33-34. (in German) [Danube, NSG Braunsel near Rechenstein, Alb-Donau-Kreis, Baden-Württemberg, Germany, 20-VII-2009] Address: Schmid, F, Graben 23, 7225 Münsingen, Germany. E-mail: fcschmid@t-online.de

9452. Schmidt Dalzochio, M. (2009): Descrição da larva de último estágio de *Nephepeltia berlai* Santos, 1950 (Odonata, Libellulidae). *EntomoBrasilis* 2(3): 70-72. (in Portuguese, with English summary) ["The larvae of the last instar of *N. berlai* is described and illustrated based on material collected in Cascavel Municipality, Paraná State, Brazil. The generic concept based in the immatures is redefined." (Author)] Address: Schmidt Dalzochio, Marina, Pesquisadora autônoma. Rua Terezina, 2305 - Bairro Tropical, CEP 85807-140 - Cascavel-PR-Brasil. E-mail: mahsdalzochio@gmail.com

9453. Schmidt Dalzochio, M.; Rodrigues, M.E. (2009): Descrição da larva de último estágio de *Oxyagrion sulmatogrossense* Costa, Souza & Santos (Odonata, Coenagrionidae). *EntomoBrasilis* 2(3): 73-75. (in Portuguese, with English summary) [Larvae and imago of *O. sulmatogrossense* are described and illustrated based on material collected in Cascavel Municipality, Paraná State, Brazil.] Address: Schmidt Dalzochio, Marina, Pesquisadora autônoma. Rua Terezina, 2305 - Bairro Tropical, CEP 85807-140 - Cascavel-PR-Brasil. E-mail: mahsdalzochio@gmail.com

9454. Schmidt Dalzochio, M. (2009): Descrição da larva de último estágio de *Micrathyria pseudeximia* Westfall (Odonata, Libellulidae). *EntomoBrasilis* 2(2): 54-57. (in Portuguese, with English summary) ["The larva of ultimate stadium of *M. pseudeximia* is described and illustrated based on material collected in Cascavel Municipality, Paraná State, Brazil. The generic concept based in the larvae is amplified." (Author)] Address: Schmidt Dalzochio, Marina, Pesquisadora autônoma. Rua Terezina, 2305 - Bairro Tropical, CEP 85807-140 - Cascavel-PR-Brasil. E-mail: mahsdalzochio@gmail.com

9455. Silva Dias, A.S.; Molozzi, J.; Pinheiro, A. (2009): Distribuição e ocorrência de macroinvertebrados bentônicos em rios nas áreas com cultura orizícola no vale do Itajaí-SC. *Holos Environment* 9(1): 45-64. (in Portuguese, with English summary) ["Rice is one of the main cereals grown in Brazil. The handling of the rice culture may impact in the river downstream of the farming. The main goal of this research was to evaluate the distribution and occurrence of benthic macroinvertebrates in rivers with rice plantations. This research was developed in the cities of Gaspar and Agrolândia, in Itajaí River Basin, Santa Catarina, Brazil. [...] 21.831 organisms were collected at the six sites. 73% were Diptera with predominance of Chironomidae family with 14.956 individuals. Site 4 had the lowest diversity and the highest dominance. In rivers under influence of the rice culture it is observed predominance of taxons resistant to pollution. Taxons more sensitive to pollution were hardly found at the six sites, demonstrating the inappropriate conditions for their development." (Authors) Odonata are treated at the family level.] Address: Silva Dias, Aline, .Bióloga, Universidade Regional de Blumenau - FURB. Rua Antônio da Veiga, 140. Bairro Victor Konder. CEP 89012-900 - Blumenau - SC. E-mail: aline.sil@terra.com.br

9456. Smiroldo, G.; Balestrieri, A.; Remonti, L.; Prigioni, C. (2009): Seasonal and habitat-related variation of otter *Lutra lutra* diet in a Mediterranean river catchment (Italy). *Folia Zool.* 58(1): 87-97. (in English) ["To investigate time- and spatial related variations in the composition of otter *Lutra lutra* diet, a total of 838 faecal samples was collected in the upper catchment of the Agri

River (Basilicata region, southern Italy), and analysed. Data were split up according to the four seasons and between the main river and three of its tributaries. Fish and amphibians formed the bulk of otter diet, their consumption being inversely correlated. Trophic niche breadth was positively correlated with the frequency of occurrence of fish, whilst it was negatively correlated to that of amphibians and the altitude of the sampling stations. The frequency of consumption of fish did not vary through the year, whilst amphibians were mainly eaten during their hibernation and breeding period. Otter diet along the four main rivers differed significantly, the species being mainly piscivorous on the main river, whilst relying on alternative food resources on its tributaries, where habitat features or human interference reduced fish abundance. Fish availability seems to represent the main factor determining the composition and diversity of otter diet." (Authors) Odonata have a minor importance as food of the otter.] Address: Prigioni, C., Dipartimento di Biologia Animale, Università di Pavia, Piazza Botta 9, 27100 Pavia, Italy. E-mail: prigioni@unipv.it

9457. Storck, F. (2009): Les Odonates de la réserve naturelle du Plan de Tuéda: bilan des connaissances (Les Allues, Savoie). *Martinia* 25(3): 103-115. (in French, with English summary) [14 Odonata species are known in the nature Reserve Plan de Tuéda (Les Allues, Savoie department, France).] Address: Storck, F., Parc national de la Vanoise, route de Mussillon, F-73550 Meribel-les-Allues, France

9458. Toth, S. (2009): Dragonfly fauna (Odonata) based on the Biodiversity Days at Gyűrűfü. *Natura Somogyensis* 13: 77-80. (in Hungarian, with English summary) [In 2006-2007, a total of 24 Odonata species "were recorded from the sampling area that was about 1 km² with two brooks and drying up marsh. The most important species is *Cordulegaster heros*, a strictly protected and Natura 2000 species. *Coenagrion ornatum* and *Orthetrum brunneum*, protected species were also found. *Pyrrhosoma nymphula interposita* Varga, 1968 is important from faunistic and zoogeographical point of view." (Author)] Address: Tóth, S., H-8420 Zirc, Széchenyi, u. 2., Hungary. E-mail: flycatcher@vnet.hu

9459. Ueda, Y.; Nishu, S.; Futahashi, R. (2009): A male hybrid between *Sympetrum e. eroticum* male and *S. baccha matutinum* female caught at Aonogahara. *Sympetrum Hyogo* 11: 20-21. (in Japanese, with English summary) ["A male hybrid between *Sympetrum eroticum* and *Sympetrum baccha matutinum* was recorded at Aonogahara in Ono City, Hyogo Prefecture, Honshu, Japan, which has intermediate characteristics between both species. The results of nuclear and mitochondrial DNA analyses suggest that this specimen was derived from interspecific mating between male *S. eroticum* and female *S. baccha matutinum*." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

9460. van Wijngaarden, R.P.A.; Barber, I.; Brock, T.C.M. (2009): Effects of the pyrethroid insecticide gamma-cyhalothrin on aquatic invertebrates in laboratory and outdoor microcosm tests. *Ecotoxicology* 18(2): 211-224. (in English) ["The sensitivity of a range of freshwater lentic invertebrates to gamma-cyhalothrin (GCH), a single enantiomer of the synthetic pyrethroid lambda-cyhalothrin, was assessed in single species

laboratory tests and an outdoor multi-species ecosystem test. The most sensitive species in the laboratory single species tests with GCH was *Chaoborus obscuripes* (96 h EC50: 3.8 ng/l). The species sensitivity distribution curve, based on the laboratory 96 h EC50 acute toxicity data for eight species, gave a median HC5 value for GCH of 2.12 ng/l. The NOECcommunity derived from the multi-species ecosystem test was 5 ng/l, and the insects *Chaoborus* sp. and *Caenis* sp. were identified as the most sensitive species. The results indicate that the median HC5, based on eight species selected to include those known to be sensitive to pyrethroids, provided a good estimation of the NOECcommunity for GCH. Furthermore, the results for GCH indicated that the endpoints typically used in higher-tier risk assessments for pesticides in Europe (HC5 and NOECcommunity) were consistent with expectations when compared to the equivalent endpoints for the racemate LCH." (Author) Zygotera tested were a mixture of at least four species (*Coenagrion puella/pulchellum*, *Enallagma cyathigerum*, *Ischnura* sp., *Coenagrion* sp.)] Address: van Wijngaarden, R.P.A., Dept for Water and Climate, Alterra, PO Box 47, 6700 AA Wageningen, The Netherlands. E-mail: rene.vanwijngaarden@wur.nl

9461. Walguarnery, J.W.; Schröder, R.; Butler, M.A. (2009): Visual target detection in damselflies. U.S. Army Research Office, P.O. Box 12211, Research Triangle Park, NC 27709-2211: IV, 19 pp. (in English) ["Insect predators accomplish difficult visual tasks with tiny visual systems, and may provide important information for machine vision and remote sensing applications in variable light environments. We studied the visual system of *Megalagrion xanthomelas*, which possesses 1.5mm diameter eyes with 360 field of view, lives in dark habitats, and detects small objects against complex backgrounds. We accomplished four objectives: 1) Mapped regional variation in light sensitivity and spatial resolving power across the thousands of individual sensory units. Compound eyes (multiple, non-focusing lenses) may inspire microsensor array design. 2) Developed methods to quantify light heterogeneity viewed by the sensor array in nature along four principle viewing directions. These spectroradiometric measurements provide critical data on limits to target detection imposed by ambient brightness and colour contrast. 3) Established colour as an essential sensory channel for target discrimination in insect vision, especially when light levels are too dim to detect achromatic contrast. 4) Discovered that damselflies extend the performance range of their eyes through behavioural means, pointing their high-resolution frontal regions toward backgrounds against which visual targets will appear most conspicuous. This behaviour may provide insight for the design and deployment of artificial sensory systems for target detection in low light." (Authors)] Address: Butler, Marguerite A., University of Hawaii, Department of Zoology, 2538 McCarthy Mall, Honolulu, HI, 96822 USA. E-mail: mbutler@hawaii.edu

9462. White, H.B.; Calhoun, J.V. (2009): Miss Mattie Wadsworth (1862–1943): Early woman author in Entomological News. *Transactions of the American Entomological Society* 135(3 & 4): 413-429. (in English) ["Miss Mattie Wadsworth, an amateur entomologist from rural Maine, stands out as one of the early women authors in Entomological News. Wadsworth's correspondence with Philip P. Calvert, prominent and longtime member of the American Entomological Society, shows Calvert's

important role in cultivating her entomological interests. *Celithemis martha* was named in honor of Wadsworth by E.B. Williamson." (Authors)] Address: White, III, H.B., Department of Chemistry and Biochemistry, University of Delaware, Newark, Delaware 19716

9463. Wyn, B.; Kidd, K.A.; Burgess, N.M.; Curry, R.A. (2009): Mercury biomagnification in the food webs of acidic lakes in Kejimikujik National Park and National Historic Site, Nova Scotia. *Canadian Journal of Fisheries and Aquatic Sciences* 66(9): 1532-1545. (in English, with French summary) ["Mercury (Hg) concentrations in fish from acidic lakes (pH < 6.0) are typically elevated above those from near-neutral systems. It is unknown whether high biomagnification rates through the supporting food web can explain elevated Hg concentrations in top predators from low pH lakes. To investigate this, we collected yellow perch (*Perca flavescens*), brown bullhead (*Ameiurus nebulosus*), banded killifish (*Fundulus diaphanous*), golden shiner (*Notemigonus crysoleucas*), and littoral and pelagic invertebrates from four acidic lakes in Kejimikujik National Park and Historic Site (KNPNHS), Nova Scotia, Canada, and analyzed them for total Hg and methyl Hg (MeHg), and $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ to determine sources of energy and trophic position, respectively. Mercury biomagnification rates (slopes of $\log\text{Hg}$ versus $\delta^{15}\text{N}$) varied significantly among the four lakes but did not explain the among-lake differences in perch Hg; these slopes were also within the range published for near-neutral systems. Rather, Hg concentrations in yellow perch (i.e., predatory fish) in KNPNS were higher in lakes with higher MeHg in lower-trophic-level organisms and suggest that processes influencing Hg uptake at the base of the food web are more important than rates of food web biomagnification for understanding the variation in concentrations of this contaminant among top predators." "The $\delta^{15}\text{N}$ data indicated distinct trophic levels in these four lakes of KNPNS. Limnephilids and heptagenids typically had the lowest mean $\delta^{15}\text{N}$ (e.g. 1.45 \pm 0.43 and 2.26 \pm 0.78, respectively, in North Cranberry), illustrating that that these invertebrates were primary consumers (Table 3-2, Figures 3-2 \pm 3-5). The dragonfly nymph, *Aeshna umbrosa*, had the highest $\delta^{15}\text{N}$ of the invertebrates (e.g. 4.32 \pm 0.12 in North Cranberry; Figures 3-2 \pm 3-5), which was between 2 and 3. higher than that of the limnephilids and heptagenids, suggesting that this invertebrate preys upon other invertebrates. All fish in these lakes had $\delta^{15}\text{N}$ values that were 3 - 6. higher than the littoral invertebrates, suggesting that most fishes were insectivorous or omnivorous, relying either partially or completely on near-shore invertebrates. In particular, this degree of enrichment suggests that fish were likely feeding on the most $\delta^{15}\text{N}$ enriched littoral macroinvertebrates (e.g. *Aeshna umbrosa*). Fish in each lake had similar $\delta^{15}\text{N}$ (Table 3-4; Figures 3-2 \pm 3-5). The large yellow perch were typically more enriched than the smaller individuals, but the mean $\delta^{15}\text{N}$ of yellow perch was not related to the diversity or type of fishes present. The invertebrates and fishes in North Cranberry Lake had the highest $\delta^{15}\text{N}$, while those in Pebblelogitch had the lowest $\delta^{15}\text{N}$; the differences among lakes were reduced when the data were adjusted for baseline $\delta^{15}\text{N}$."] Address: Wyn, Brianna, Biology & Canadian Rivers Inst., Univ. New Brunswick

9464. Yu, W.y.; Li, Z.-h.; Song, D.j.; Li, Z.-x.; Lu, J.; Qian, Y.-p. (2009): Study on community diversity at spring and autumn of Odonata in DaZhang mountain, Jiangxi Province. *Journal of Nanchang University (Natural Science)* 33(5): 505-510. (in Chinese, with English summary) [Between 2005 and 2008, 57 Odonata species were collected in the DaZhang mountain of Jiangxi, China. 16 species have not observed previously in the Jiangxi Province. An analysis of zoogeographical range of the species shows that Oriental species outnumber Palearctic species.] Address: Yu, W.-y., Department of Life Science, Nanjing Xiaozhuang University, Nanjing 211171, China

9465. Zimmermann, W.; Arenhövel, C. (2009): Die Südliche Heidelibelle, *Sympetrum meridionale* (Selys, 1841), aktuell neu in Thüringen. *Landschaftspflege und Naturschutz in Thüringen* 46(1): 42-45. (in German) [Germany, Thüringen, Weimar, Legefelder Seeteich, 10-VII-2008] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, 99423 Weimar, Germany. E-mail: wolfgang.zimmermann.we@kabelmail.de

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9466. Armatys, P.; Loch, J.; Ruciński, M. (2010): Nature of forest clearings in Gorce Mts. Goczański Park Narodowy, Poręba Wielka. ISBN – 978-83-924596-7-5: 64 pp. (in Polish) (www.gorzanski-park.pl/UserFiles/Przyroda%20gorcza%20C5%84skich%20polan_internet.pdf) [The booklet introduces into fauna and flora of forest clearings in the Goczański Park in southern Poland. *Cordulegaster spec.* is figured, and a brief reference on hobbies (*Falco subbuteo*) preying on dragonflies is made.] Address: Goczański Park Narodowy, Poręba Wielka 590, 34-735 Niedźwiedz, Poland. E-mail: gpn@gorcepn.pl

9467. Aroviita, J.; Mykrä, H.; Hämäläinen, H. (2010): River bioassessment and the preservation of threatened species: Towards acceptable biological quality criteria. *Ecological Indicators* 10: 789-795. (in English) ["A central objective of environmental management is to maintain biodiversity, including populations of threatened species. Freshwater ecosystems are increasingly assessed by their biotic properties, but whether the resulting classifications of biotic condition are sufficient to protect species with conservation status has received very little consideration. We used data from 225 reference and impacted river sites from Finland to examine whether the occurrence and abundance of threatened macroinvertebrate species (TS) are associated with a commonly used estimate of biological condition (Observed-to-Expected number of predicted taxa of macroinvertebrates or O/E-ratio of taxonomic completeness, based on a predictive model). We suggest that a minimal acceptable condition below which restoration is needed, equivalent to, e.g. 'good' ecological status described by the European Union Water Framework Directive, should also ensure the occurrence of TS populations. We therefore followed conventional procedures for condition assessment, and examined two classifications by using the 10th or 25th percentiles of a reference O/E-distribution as alternative upper boundaries for the acceptable condition. The number and abundance of TS, and occurrence of individual TS showed positive relationships with the O/E. However, particularly if the 10th percentile threshold was used, there were only few occurrences and low abundance of TS in the

suggested 'good' condition. The results imply that conventional criteria for satisfactory condition may not be sufficient for preservation of threatened river macroinvertebrates. However, our approach could bring an objective, meaningful, and societally acceptable means for setting site quality criteria in freshwater assessment." (Authors) *Ophiogomphus cecilia* occurred at 5% of the 96 sites with minimum alteration by human activities and therefore adjudged to be in reference or best-available condition, and at 3% of impacted sites (n = 134).] Address: Aroviita, J., University of Jyväskylä, Department of Biological and Environmental Science, P.O. Box 35, FIN-40014 University of Jyväskylä, Finland. E-mail: jukka.aroviita@ymparisto.fi

9468. Arulprakash, R.; Gunathilagaraj, K. (2010): Abundance and diversity of Odonata in temporary water bodies of Coimbatore and Salem districts in Tamil Nadu. *Journal of Threatened Taxa* 2(8): 1099-1102. (in English) [India; "Conclusion: The survey of 13 temporary water bodies revealed the occurrence of 21 species of Odonata. Libellulidae dominated in all the temporary water bodies except Nagarajapuram Tank (Coimbatore) which was dominated by Zygoptera. The presence of shade cover and aquatic vegetation favoured zygopteran population more than Anisoptera. *P. flavescens* was the most dominant Odonata and *Diplacodes trivialis*, *Orthetrum sabina* and *P. flavescens* were present in all temporary water bodies sampled. Maximum Odonata diversity was observed in Kamalapuram tanks one and two." (Authors)] Address: Arulprakash, R., Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu 641003, India. E-mail: avrarulprakash@gmail.com

9469. Belevich, O.E.; Yurchenko, Yu.A. (2010): Variability of *Aeshna juncea* Linnaeus, 1758 and taxonomic status of *Ae. undulata* Bartenev, 1930 (Odonata, Aeshnidae). *Eurasian entomological journal* 9(1): 13-18. (in Russian, with English summary) ["Analysis of diagnostic characters (colouration of labrum and thorax, structure of anal appendages and penis) used in the description of *Aeshna undulata* showed that each is more or less inherent to *A. juncea*. It was shown that the size and location of penis structure elements of *A. juncea* strongly depended upon digestion time in alkali. The posterior plate (pp) and hamular folds shape, which according to A. N. Bertnev distinguish *A. undulata* and *A. juncea*, are variable. It was established that the structure of the medial plate (ip) remains unchanged, but the shape of the male *A. juncea* varies considerably and cannot serve as a reliable diagnostic feature. The shape of the appendages of the hamular process (hp) of the genitalia of *Ae. undulata* is identical to that of *A. juncea*. We are of the opinion that A. N. Bertnev erroneously described a young male *A. juncea* as a new species, and therefore propose the synonymy *A. juncea* = *A. undulata*, syn. n." (Authors)] Address: Belevich, Olga, Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: belong@ngs.ru

9470. Berti, J.; Gonzalez, J.; Navarro-Bueno, E.; Zoppi, E.; Gordon, E.; Delgado, L. (2010): Larval seasonality of the mosquito *Anopheles aquasalis* (Diptera: Culicidae) and other insects associated to its habitat in Sucre, Venezuela. *Revista de biología tropical* 58(2): 777-787. (in Spanish, with English summary) ["*Anopheles aquasalis* Curry is considered the main vector of human malaria in Northern Venezuela. A longitudinal study was

carried out in the coastal areas of the Paria Peninsula, Sucre state. The larval habitats of *A. aquasalis* were classified as: 1--Brackish mangrove, and 2--Freshwater herbaceous swamp. Field surveys of mosquito larvae and aquatic insects (including Coenagrionidae, Aeshnidae and Libellulidae) were carried out in the same breeding sites over a one-year period, between January and December 1999. At each site, 30 samples of *Anopheles* larvae and aquatic insects were taken monthly. Simultaneously with mosquito larvae sampling, five selected variables of water were measured: conductivity, salinity, dissolved oxygen, temperature and pH. Seasonal and temporal variations of *A. aquasalis* larvae and aquatic insects were determined in the two larval habitats. For the entire study period, the abundance of larvae was higher in the mangrove. Correspondence analysis showed a strong relation between some chemical factors of water and larval abundance. The abundance of *A. aquasalis* larvae in both seasons, was positively correlated with water salinity, pH and conductivity, and negatively and with dissolved oxygen in the dry season. The presence of larvae was positively correlated with the presence of *Avicenia germinans*. In the mangrove there was a positive association between larvae abundance and Scirtidae family abundance and a negative correlation between larvae abundance and monthly precipitation (Spearman), as well as a significant negative correlation between Gerridae abundance and monthly precipitation. In the herbaceous swamp, there were not significant associations between *A. aquasalis* larvae abundance and abundance of others aquatic insects associated to habitat." (Authors)] Address: Berti, J., Inst. Altos Estudios 'dr A. Gabaldon', Lab. Ent. Malaria, Calle Dr A. Gabaldon, Las Delicias, Maracay, Venezuela

9471. Biggs, K.; Oriti, B. (2010): Second Striped Saddlebags (*Tramea calverti*) site found in California! *Argia* 22(3): 19-20. (in English) [22-VIII-2010; Owens River in the Owens Valley, east of the Sierra Nevada in California, Upper and Lower Twin Lakes (36.8804° N, 118.1672° W), USA. This record of *T. calverti* is believed to be the most northern record for the species in the western USA.] Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol CA, 95472, USA. E-mail: biggsnest@sonic.net

9472. Bolek, M.G.; Tracy, H.R.; Janovy, J. (2010): The role of damselflies (Odonata: Zygoptera) as paratenic hosts in the transmission of *Halipegus eccentricus* (Digenea: Hemiuridae) to anurans. *J. Parasitol.* 96(4): 724-735. (in English) [During July–August 2007 and 2008, 19 larvae and 122 adult *Lestes unguiculatus*, 140 adult *Ischnura verticalis*, and 55 teneral and adult *Enallagma civile*, were collected from Nevens Pond and examined for *Halipegus* sp. metacercariae. "*Halipegus eccentricus* is a common hemiurid trematode in the eustachian tubes of North America frogs. However, the life cycle of this species has never been completely elucidated. Studies on *H. eccentricus* suggest that it has a 3-host life cycle. Here, we show through fieldwork and host specificity experimental infections that the life cycle of *Halipegus eccentricus* utilizes 4 hosts. Metamorphosed anurans become infected with *H. eccentricus* by feeding on infected damselflies; worms reside in the stomach of anurans, migrate to the eustachian tubes within 32–39 days post-exposure (DPE), and release eggs 50–60 DPE. Cystophorous cercariae develop in *Physa gyrina* snails within 32–35 DPE, infect

ostracod (*Cypridopsis* sp.) second intermediate hosts, and develop to metacercariae. Fifteen- to 19-day-old metacercariae from ostracods are infective to both damselfly larvae and metamorphosed anurans. Field surveys of damselflies and tadpoles, along with laboratory exposure of damselfly larvae, metamorphosed anurans, and tadpoles with infected ostracods, indicated that only metamorphosed anurans and damselflies become infected with *H. eccentricus*, whereas field-collected tadpoles and laboratory-exposed tadpoles were never infected with *H. eccentricus*. Because little morphological change occurred in the metacercaria stage of *H. eccentricus* between the ostracod second intermediate host and damselfly host, and metamorphosed anurans became infected with *H. eccentricus* metacercariae recovered from both host groups, we suggest that odonates serve as paratenic hosts in this life cycle. Additionally, our field work and experimental infections provide data on the use of odonates as the route of infection by another North American *Halipegus* sp. that matures in the stomach of frogs. Our data indicate that when the life cycles are known, the use of odonates as the route of infection to anurans is common in the life cycles of *Halipegus* spp., and all species exhibit remarkable infection site fidelity in their amphibian hosts." (Authors)] Address: Bolek, M.G., Department of Zoology, Oklahoma State University, Stillwater, Oklahoma 74078, USA. E-mail: bolekm@okstate.edu

9473. Borisov, S.N. (2010): Autumnal migrations of dragonflies in the Chokpak Pass of West Tien-Shan, observed and actual flight measurements. *Eurasian entomological journal* 9(1): 7-18. (in Russian, with English summary) [Kazakhstan; obligate migrations of *Anax ephippiger*, *A. parthenope*, and *Sympetrum fonscolombii*, were studied using ornithological traps established in Chokpak pass (N 42.530, E 70.605) in Western Tien-Shan. The correlation between flight and cold air fronts is described, and the inequality of dragonfly migration intensity in different years was defined by ornithological trap data. These findings can explain the actual change in number of migrating dragonflies in different years, and the characteristics of dragonflies falling into traps according to winds from different directions. Noticeable above-ground flights were registered only with south-west headwinds. However, numbers observed or trapped may provide only an approximate measure of dragonfly autumnal movements since a large proportion occur at higher altitudes.] Address: Borisov, S.N., Institute of Systematics & Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

9474. Bots, J.; van Dongen, S.; de Bruyn, L.; van Houtte, N.; van Gossum, H. (2010): Clutch size and reproductive success in a female polymorphic insect. *Evolutionary Ecology* 24(5): 1239-1253. (in English) ["Differences in reproductive success (RS) between different groups of individuals are of interest to researchers studying natural and sexual selection. Since it is often not feasible to quantify RS in the wild, researchers make use of proxies instead. One such proxy is clutch size. However, research on species providing parental care (mainly birds and mammals) has learned that a large clutch size does not guarantee a large number of offspring. In contrast, much less is known on the link between clutch size and RS for species lacking parental care, such as many reptiles and insects. Here, we ask whether clutch size provides a satisfactory estimate of

RS for a polymorphic insect. Our study species is *Enallagma cyathigerum* showing two distinct female morphs for which RS (estimated by clutch size) has been studied to evaluate the evolutionary role of sexual conflict. However, in this system not only among family variation in offspring viability, but also differences between female morphs, may affect how clutch size relates to offspring number and quality. To evaluate the use of clutch size as estimate of RS, we examined how clutch size correlated with subsequent success measures of developing offspring by rearing damselfly from eggs to adults under two laboratory food treatments. In both treatments, we detected that clutch size correlated well with offspring number early in larval life, but that this relation is reduced by among family variation in survival in later developmental stages. Clutch size was moderately correlated with the number of offspring that successfully metamorphosed to winged adults. Patterns did not differ between female morphs and the nature of the correlation could not be explained from offspring quantity-quality trade-offs." (Authors)] Address: Gossum, H. van, Evolutionary Biology Group, University of Antwerp (RUCA), Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: hvvgossum@ruca.ua.ac.be

9475. Brake, I.; von Tschirnhaus, M. (2010): *Stomosis arachnophila* sp. n., a new kleptoparasitic species of freeloader flies (Diptera, Milichiidae). *ZooKeys* 50: 91-96. (in English) ["Adults of some species in several milichiid genera feed by sucking on prey of spiders or predatory insects such as Reduviidae, Asilidae, Mantidae, or Odonata. Mostly they are attracted to predators feeding on stink bugs (Pentatomidae), squash bugs (Coreidae) or in the case of *Desmometopa* flies, on honey bees (Apidae)."] Address: Brake, Irina, Department of Entomology, Natural History Museum, Cromwell Road, London SW7 5BD, United Kingdom. E-mail: Irina.Brake@nhm.ac.uk

9476. Braune, E.; Martens, A.; Richter, O.; Söndgerath, D.; Suhling, F. (2010): A spatially explicit model for interacting populations of dragonflies in arid Namibia. In: Schmiedel, U. & Jürgens, N. [Eds.]: *Biodiversity in southern Africa. Volume 2: Patterns and processes at regional scale.* Klaus Hess Publishers, Göttingen & Windhoek: 289-294. (in English) ["In order to understand the spatial and seasonal distribution of dragonflies in western Namibia we developed a model framework based on habitat suitability models, a local population dynamic model of interacting species and a dynamic landscape model combined with a spatially explicit model. Local population dynamics as well as the spatial patterns of the aggregated model showed good accordance with field data. Therefore, the model approach may be useful for the identification and understanding of dragonfly spatial patterns as well as for predicting future spatial patterns, which are influenced by changes in the water balance due to climate change.] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

9477. Buss, D.F.; Vitorino, A.S. (2010): Rapid Bioassessment Protocols using benthic macroinvertebrates in Brazil: evaluation of taxonomic sufficiency. *J. N. Am. Benthol. Soc.* 29(2): 562-571. (in English) ["Rapid Bioassessment Protocols (RBPs) have been widely used to assess the ecological health of aquatic ecosystems. Specific aims of RBPs for wadeable streams are to indicate the ecological condition of a stream using low-

cost protocols to allow long-term and widespread routine monitoring. Our study was part of an ongoing effort to test and standardize a protocol using benthic macroinvertebrates as indicators of the water quality of Wadeable streams in southeast Brazil. One of the most controversial issues during RBP development is deciding the taxonomic resolution that should be used. We evaluated how well genus-, family-, and order-level taxonomic resolution detected a gradient of impairment. All 3 taxonomic resolutions statistically discriminated reference, intermediately impaired, and impaired sites based on assemblage structure, water-quality classification, and biotic index responses. Analysis at the genus level was more effective than analysis at other levels of taxonomic resolution for discriminating sites that varied in degradation conditions, especially when considering biotic index responses, but the lack of comprehensive taxonomic keys and information about the ecology of those genera hinder their widespread use in bioassessments. On the other hand, analyses at the order level had lower discriminating power to separate reference sites from intermediately impaired sites when considering biotic index responses. Analyses at the family level gave results similar to results at the genus level, and we support its use in a RBP program for this region, at least until better keys and autoecological knowledge are available." (Author) Odonata - without further specification - are said to be considered at the genus level.] Address: Vitorino, A.S., Laboratório de Avaliação e Promoção da Saúde Ambiental, Instituto Oswaldo Cruz, Fundação Oswaldo Cruz – FIOCRUZ, Av. Brasil, 4.365, Manguinhos, Rio de Janeiro, RJ, Brazil, CEP 21045-900. E-mail: as.vitorino@bol.com.br

9478. Capellan, E.; Nicieza, A.G. (2010): Constrained plasticity in switching across life stages: pre- and post-switch predators elicit early hatching. *Evolutionary Ecology* 24(1): 49-57. (in English) ["The timing of many life history events shows phenotypic plasticity in response to the risk of predation. Theory predicts that increased risk of mortality in an early stage should select for switching earlier, while a higher risk after the transition should select for switching later. Here we examined the effects of stage-specific predation risk on the timing of hatching of *Rana temporaria*. Embryos were exposed to chemical cues from either an egg predator (*Haemaphysalis sanguisuga*) or a tadpole predator (*Aeshna cyanea*) to evaluate three specific hypotheses: (1) a fixed intermediate response, (2) a 'fixed predator' response (i.e., either anticipation or delay), and (3) a specific predator response (both anticipation and delay). *Rana temporaria* embryos did not discern between pre- and post-hatching specific predators, and they hatched prematurely regardless predator type. These results suggest that *R. temporaria* embryos respond to predation risk in a fixed way by hatching early, and that they use cues stemming from injured conspecifics, which provides a simple, conservative mechanism of risk assessment. In conclusion, our data are not anticipated by the theoretical consideration that organisms should spend less time in more dangerous environments, but they confirm an invariable adjustment of hatching time in response to an inscrutable predation risk (response to a fixed-predator) in connection with a consistent mechanism mediating the perception of predation risk." (Authors)] Address: Nicieza, A., Ecology Unit, Dept of Biology of Organisms and Systems, University of Oviedo, 33071 Oviedo, Spain. E-mail: nicieza@innova.uniovi.es

9479. Chalmers, V. (2010): Light trap session and reptile moonwalk. *Gazelle*, Dubai 25(5): 4-5. (in English) [Prior may 2010 (not data are available to the abstracter), a mercury vapour light trap was installed at the Al Ain Zoo roundabout, UAE. "Dragonflies were also seen at the light trap and Bob Reimer identified them as a female *Anax ephippiger* and two female *Anax parthenope* dragonflies."] Address: Chalmers, Valerie; not stated

9480. Chara-Serna, A.M.; Chara, J.D.; Zuniga, M.; Pedraza, G.X.; Giraldo, L.P. (2010): Clasificación trófica de insectos acuáticos en ocho quebradas protegidas de la ecorregión cafetera colombiana. *Universitas Scientiarum* 15(1): 27-36. (in Spanish, with English summary) ["Trophic classification of aquatic insects in eight sheltered streams of the Colombian coffee ecoregion. Objective. To determine the trophic structure of the aquatic insect assembly associated to eight streams in the Colombian coffee-growing ecoregion. Materials and methods. Aquatic insects were collected in eight forested streams located in La Vieja river basin. The taxa collected were assigned to dietary groups according to a regional classification based on the gut content analysis of aquatic insects associated to forested streams of the Otún river basin. Results. 2019 individuals belonging to 73 taxa were collected and 60 were classified into dietary groups. The most abundant group was collectors (55%), followed by shredders (31%) and predators (10%). Scrapers represented only 0.05% of the sample and the remaining 3,95% could not be classified due to lack of information. Conclusions. The dominance of collectors and shredders reveals the importance of coarse particulate organic matter (leaf litter) as a food resource for the insect fauna. Similarities between the trophic structure of this community and other communities studied in similar streams, suggest the possibility of a common pattern for Andean streams. This study evidenced the lack of knowledge on trophic ecology of tropical aquatic insects; 50% of the taxa collected did not have this kind of information for the tropics and 20% had no information neither for the tropics nor temperate zones." (Authors) Odonata are treated at the genus level.] Address: Chará-Serna, Ana M., Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria - CIPAV, Carrera 25 No. 6-62 Cali, Colombia. E-mail: ana@cipav.org.co

9481. Chemes, S.B.; Giraudo, A.R.; Gil, G. (2010): Dieta de *Lontra longicaudis* (Carnivora, Mustelidae) en El Rey National Park (Salta, Argentina) y su comparación con otras poblaciones de la cuenca del Paraná. *Mastozoología Neotropical* 17(1): 19-29. (in Spanish, with English summary) [The diet of *Lontra longicaudis* (Carnivora, Mustelidae) in El Rey National Park (Salta, Argentina) was studied and compared with others populations from the Paraná basin. 130 feces from 37 latrines were collected. 623 prey items analyzed included two Anisoptera (= 0.32%) and three Zygoptera (= 0.48%).] Address: Chemes, Silvina, Facultad de Humanidades y Ciencias, Universidad Nacional del Litoral, Ciudad Universitaria, Paraje El Pozo, S3000ZAA Santa Fe, Argentina. E-mail: schemes@fhuc.unl.edu.ar

9482. Chertoprud, M.V. (2010): Biogeographic zonation of the Eurasian fresh waters based on the macrobenthic faunas. *Zhurnal Obshchei Biologii* 71(2): 144-162. (in Russian, with English summary) ["Spatial differentiation of the Eurasian freshwater faunas is analyzed based on the original and published data on the aquatic

insects, crustaceans, and mollusks (about 8800 species in total). The Hacker-Dice similarity index is employed as a principal criterion of differentiation. The schemes of biogeographic zonation are constructed for [...] Odonata, Ephemeroptera, Plecoptera, Hemiptera, Coleoptera, Trichoptera, Malacostraca, Gastropoda, and Bivalvia. Discussed are principal discordances in distribution of three different ecological-systematic groups of the macrobenthos, namely, limnophylic insects, rheophylic insects, and crustaceans with mollusks. A generalized zonation system of the Eurasian fresh waters is elaborated, which is fundamentally divided into Palaearctic and Oriental Regions. The former is further divided into five subregions: Euro-Ob, Near East, Central Asia, Eastern Siberia, and Japan. The latter is divided into three subregions: Indo-Himalaya, China, and Malay. Preliminary classification of the provinces is also provided. Disagreements between the biogeographic systems of different authors are discussed." (Author)] Address: Chertoprud, M.V., Moscow Lomonosov State University, Faculty of Biology, 119992 Moscow, Leninskie Gory, Russia. E-mail: lymnaea@yandex.ru

9483. Clopton, R.E.; Cook, T.J.; Cielocha, J.J. (2010): *Nubenocephalus nickoli* n. sp. and *Nubenocephalus xunantunichensis* n. sp. (Apicomplexa: Eugregarinida: Actinocephalidae) parasitizing damselflies (Odonata: Zygoptera) in Belize, Central America. *Comparative Parasitology* 77(2): 125-136. (in English) ["Two new species of *Nubenocephalus* are described from adult damselflies sampled in Cayo District, Belize, Central America. *N. nickoli* n. sp. is described from *Hetaerina americana*, and *H. titia*, and *N. xunantunichensis* n. sp. is described from *Argia chelata*. New, complete morphological data sets are reported for populations of *N. nebraskensis* and *N. secundus*, and a complete, synoptic reevaluation of diagnostic morphological characters used to discriminate species within *Nubenocephalus* is presented for all known species of the genus in the New World. *N. nebraskensis* is reported from *Argia apicalis* for the first time." (Authors)] Address: Cielocha, J.J., Department of Ecology and Evolutionary Biology and the Biodiversity Institute, University of Kansas, Lawrence, Kansas 66045, USA. E-mail: jjhays@ku.edu

9484. Corser, J.D. (2010): Status and ecology of a rare gomphid dragonfly at the northern extent of its range. *Northeastern Naturalist* 17/2: 341-345. (in English) ["New records of the rare *Stylurus plagiatus*, are described from the Hudson River estuary in eastern New York State, USA. Breeding occurred primarily in tidal mudflats; however, in other parts of its range, this species is known to use a broader array of habitat types. As a southerly species at its northern range margin, populations of *S. plagiatus* in eastern New York are likely to be temperature-limited, although other factors, such as shoreline habitat integrity and dispersal behaviour, may also play a role in defining its range limits." (Author)] Address: New York Natural Heritage Program, 625 Broadway, 5th Floor, Albany, NY 12233, USA. E-mail: jdcorser@gw.dec.state.ny.us.

9485. Couceiro, M.S.; Fonseca Ferreira, N.M.; Tenreiro Machado, J.A. (2010): Modeling and Control of a Dragonfly-Like Robot. *Journal of Control Science and Engineering* Volume 2010, Article ID 643045: 10 pp. (in English) ["Dragonflies demonstrate unique and superior flight performances than most of the other insect species and birds. They are equipped with two pairs of independently controlled wings granting an unmatched

ble flying performance and robustness. In this paper, the dynamics of a dragonfly-inspired robot is studied. The system performance is analyzed in terms of time response and robustness. The development of computational simulation based on the dynamics of the robotic dragonfly allows the test of different control algorithms. We study different movements, the dynamics, and the level of dexterity in wing motion of the dragonfly. The results are positive for the construction of flying platforms that effectively mimic the kinematics and dynamics of dragonflies and potentially exhibit superior flight performance than existing flying platforms." (Authors)] Address: Fonseca Ferreira, N.M., Department of Electrotechnical Engineering, Institute of Engineering of Coimbra, Rua Pedro Nunes, Quinta da Nora, 3030-199 Coimbra, Portugal. E-mail: nunomig@isec.pt

9486. De Knijf, G.; Demolder, H. (2010): Odonata records from Alentejo and Algarve, southern Portugal. *Libellula* 29(1/2): 61-90. (in English, with German summary) ["During two field trips in summer 2008 and spring 2009 to the Alentejo and Algarve in southern Portugal, we altogether recorded 42 species of Odonata at 112 localities. All localities were classified in one of the following five categories: streams, rivers, ponds and pools, reservoir lakes, and brackish waters. Seventeen species are categorised as rheophilous and twelve as having a clear preference for standing waters. Remarkable records of *Lestes dryas*, *Onychogomphus forcipatus*, *O. uncatatus*, *Paragomphus genei*, *Orthetrum chrysostigma*, *O. coerulescens*, *O. nitidinerve*, *O. trinacria*, *Diplacodes lefebvrii*, *Brachythemis impartita* and *Zygonyx torridus* are presented in detail and discussed, and a regional distribution map is provided for most of them. With 35 species, the Odonata fauna of southern Portuguese streams and rivers is rich and diverse. This diversity can be explained by the high naturalness of many fluvial systems, resulting in a high degree of variation in velocity and substrate, and by the regionally warm climate. Nearly all endemic and threatened species are restricted in the region to running waters. This demonstrates very well the great importance of streams and rivers for dragonflies and the international responsibility of Portugal to protect and conserve these habitats. Despite their rarity in southern Portugal, ponds and pools harbour relict populations of several northern species like *Lestes dryas* and *Libellula quadrimaculata* at the limits of their distribution. However, today these ponds are endangered by intensification of agriculture and the loss of traditional land use practices and should also be protected." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

9487. Deubelius, K.; Jödicke, R. (2010): *Leucorrhinia caudalis* in Nordwestdeutschland (Odonata: Libellulidae). *Libellula* 29(1/2): 1-12. (in German, with English summary) ["In 2009, *L. caudalis* was recorded from four lakes in Lower Saxony north and east of Bremen, Germany, for the first time. Reproduction in one of the lakes was proved by several exuviae. An analysis of all records from Lower Saxony showed that only the flood plain of the river Elbe in the Wendland area may be part of the permanent range of the species. All other records from the 20th century indicate short-term populations, some of which having been only inadequately documented. Since the turn of the millennium, the species was recorded from six localities in Lower Saxony, which may be interpreted in terms of a turnaround in the hi-

therto observed decline of the species. Hence, similar news from other parts of Germany and adjacent countries is supported." (Authors)] Address: Deubelius, K., Am Kapellenberg 7, D-28759 Bremen, Germany. E-mail: KadeeHB@t-online.de

9488. Dijkstra, K.D.; Boudot, J.-P. (2010): First update of the Atlas of the Odonata of the Mediterranean and North Africa: *Orthetrum machadoi* new to the Palaearctic and *Agriocnemis sania* new to the Egyptian Nile Valley. *Libellula* 29(1/2): 107-125. (in English, with German summary) ["Twenty-four species of Odonata were found in the Egyptian Nile Valley and Western Desert in May 2009, which represents 71 % of the fauna confirmed for African Egypt. *Agriocnemis sania* Nielsen, 1959 was recorded in the lower valley and delta of the Nile. This suggests that a doubtful old record of a damaged *Agriocnemis exilis* Selys, 1872 from Port Said referred to *A. sania*, and that *A. exilis* should be removed from the checklist of Egyptian, North African and Mediterranean Odonata. *Agriocnemis sania* is new to African Egypt and should be downgraded from «Regionally Extinct» to «Endangered» on the IUCN North African Red List. *Orthetrum machadoi* Longfield, 1955 was discovered in the Siwa Oasis and is new for Egypt and the Palaearctic at large. The site is over 2600 km from the nearest known locality in Ethiopia, and, like the sympatric and sometimes syntopic *Acisoma panoroides* Rambur, 1842, can be considered as a tropical relict from (a) pluvial period(s), more than 6,000 years ago, when the Sahara was considerably wetter. The overall proportion of observed Afrotropical species was 71 %, whereas the Palaearctic element was only 25 %." (Authors)] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

9489. Dong, H.; Koehler, C.; Liang, Z.-x.; Wan, H.; Gaston, Z. (2010): An integrated analysis of a dragonfly in free flight. 28th AIAA Applied Aerodynamics Conference, 28 June - 1 July 2010, Chicago, Illinois. American Institute of Aeronautics and Astronautics Paper 2010-4390: (in English) ["There were few literatures on the discussion of the wing flexion and associated aerodynamic performance of dragonfly wings in dragonfly free flights, which are potential candidates for developing bio-inspired micro aerial vehicles (MAVs) that can match the hovering and maneuvering performance of winged insects. To this end, we experimentally measure the wing flexion of a free flying dragonfly during take-off using high-speed photogrammetry and three-dimensional surface reconstructions. From the collected data, analysis of body motion Euler angles, SVD analysis of wing kinematics, wing surface deformation and topologies, and direct numerical simulations will provide insights into the selection of flapping wing and kinematics for quad-winged MAV designs and applications." (Authors)] Address: Dong, H., Department of Mechanical & Materials Engineering, Wright State University, Dayton, OH 45435, USA. E-mail: haibo.dong@wright.edu.

9490. Dubai Natural History Group (2010): Our next speaker. *Gazelle*, Dubai 25(5): 2. (in English) [This is an introduction in a scheduled lecture on 6-VI-2010, to be given by: "Keith Wilson is Director Marine Programme, Emirates Marine Environmental Group. He has 32 years experience in the water and aquaculture industries, management of fisheries and marine protected areas, environmental impact assessment, development

project management, and management of marine and coastal resources in the UK, Asia and the Middle East. Keith has written many scientific papers and several books on conservation, marine fishes and dragonflies. He is an accomplished photographer both above and below water with numerous wildlife photographs used commercially in books, journals and newspapers. Keith has a BSc (Hons) in Physiology and Biochemistry and an MSc in Applied Hydrobiology, together with a host of postgraduate qualifications and memberships. He includes amongst his achievements being a founder member of the Hong Kong Institute of Environmental Impact Assessment, a member of the Royal Entomological Society, UK, and is a recognized international expert on the Odonata (dragonflies) of China."] Address: Dubai Natural History Group, PO Box 9234, Dubai, UAE

9491. Eigenheer, K. (2010): Massenschlupf von *Gomphus vulgatissimus* an einem neu gestalteten Flachufer der Aare (Odonata: Gomphidae). *Libellula* 29(1/2): 13-20. (in German, with English summary) ["Between 12 June and 12 July 2009, on a shallow 350 m-stretch of the river Aare near Selzach, Canton of Solothurn, Switzerland, 6644 exuviae of *G. vulgatissimus* were collected. The river bank had been raised during the years 2006 and 2007. Averaging 19 exuviae per meter of river bank, this is the highest density ever recorded in this species." (Author)] Address: Eigenheer, K., Hofmatt 11, CH-4582 Brügglen/SO, Switzerland. E-mail: konrad@eigenheer.ch

9492. Eltjon, H.; Anila, P.; Dritan, T.; Kastriot, M. (2010): The impact of environmental conditions on the biodiversity of aquatic insects, Odonata, from aquatic ecosystems of Karavasta and Spillea, in Albania. *Water Observation and Information System for Balkan Countries - BALWOIS 2010 - Ohrid, Republic of Macedonia - 25, 29 May 2010: 6 pp.* (in English) [Between 2007-2008, Odonata of the Karavasta lagoon (Divjaka), the Spillea Area and the delta of Shkumbini River (Kavaja) were studied. A total of 26 Odonata species could be recorded. The Albanian vernacular names of all the taxa are also provided.] Address: Halimi Eltjon, University of Tirana; Faculty of Natural Science; Department of Biology, Tirana, Albania

9493. Englund, R.A.; Polhemus, D.A. (2010): A review of the damselfly fauna of the Austral Islands, French Polynesia, with descriptions of two new species (Odonata: Zygoptera: Coenagrionidae). *Tijdschrift voor Entomologie* 153(1): 25-40. (in English) ["The Zygoptera biota of the Austral Islands in French Polynesia is reviewed, and two new endemic species are described: *Ischnura rurutana* endemic to the island of Rurutu, and *Ischnura jeanyvesmeyer* endemic to the island of Rai-vavae. Additional notes on coloration and ecological preferences are also given for *Ischnura thelmae* Lief-tinck, 1966, endemic to Rapa, and the occurrence of the widespread species *Ischnura aurora* Brauer, 1865 on all the high islands in the Australs is briefly noted. Colour photographs of adult males are provided for all three endemic Austral Island species, as well as figures of the male wing venation, pterothoracic colour patterns, and male secondary genitalia, and the female dorsal pterothorax and lateral terminal abdomen. Scanning electron micrographs of the male abdominal appendages in various views are provided for all three endemic Austral Island Zygoptera species. Photographs are also provided for the breeding habitat and immature stage of *I. rurutana*." (Authors)] Address: Englund, R.A.,

J. Linsley Gressitt Center for Entomological Research, Bishop Museum, 1525 Bernice Street, Honolulu, Hawaii 96817, USA. E-mail: englund@bishopmuseum.org

9494. Eremia, E.E. (2010): New records of dragonfly species (Insecta, Odonata) for Southern Urals. Eurasian entomological journal 9(1): 19-21. (in Russian, with English summary) [Russia; "48 dragonfly species were collected in the southern Urals and Trans-Ural regions, Republic of Bashkortostan, Chelyabinskaya, Kurganskaya and Orenburgskaya Oblast, during the field season of 2009. Four species were found there for the first time. *Coenagrion glaciale*, considered earlier as endemic of East Siberia, was caught on Slyudorudnik water pond in the vicinity of Kyshtym City in Chelyabinskaya Oblast (eastern slope of Ural mountain, Asia), and *Aeshna caerulea*, *A. subarctica* and *Somatochlora arctica*, previously known as representatives of the northern faunal complex, were captured on Tygyn swamp of Beloretsky District (western slope of ural mountain) (alt. 980 m asl) in the Republic of Bashkortostan." (Author)] Address: Eremina, E.E., Post Box 2775, Chelyabinsk 454014 Russia. E-mail: karmiska@mail.ru

9495. Fischer, E.; Munin, R.L.; Longo, J.M.; Fischer, W.; de Souza, P.R. (2010): Predation on bats by Great Kiskadees. Journal of Field Ornithology 81(1): 17-20. (in English, with Spanish summary) [Great Kiskadees (*Pitangus sulphuratus*) "are known to occasionally prey on small vertebrates, but, to our knowledge, bats have never been reported as a prey item. We observed a breeding pair of Great Kiskadees preying on bats (*Myotis* spp.) at the field station Base de Estudos do Pantanal in the southern Pantanal, Brazil. [...] We found that bats, insects, and fruits were the most common food items fed to nestlings by adult kiskadees." (Authors) Odonata represented 2 items from a total of 123 food items fed to nestlings by adult Great Kiskadees at two nests in the Pantanal, 1997–1998.] Address: Fischer, E., Depto de Biologia, Universidade Federal de Mato Grosso do Sul, 79070-900 Campo Grande, Mato Grosso do Sul, Brasil. E-mail: eafischer@uol.com.br

9496. Gabriels, W.; Lock, K.; De Pauw, N.; Goethals, P.L.M. (2010): Multimetric Macroinvertebrate Index Flanders (MMIF) for biological assessment of rivers and lakes in Flanders (Belgium). Limnologica 40: 199-207. (in English) ["The European Water Framework Directive requires that member states assess all their surface waters based on a number of biological elements, including macroinvertebrates. Since 1989, the Flemish Environment Agency has been using the Belgian Biotic Index for assessing river water quality based on macroinvertebrates. Throughout the years, the Belgian Biotic Index has proven to be a reliable and robust method providing a good indication of general degradation of river water and habitat quality. Since the Belgian Biotic Index does not meet all the requirements of the Water Framework Directive, a new index, the Multimetric Macroinvertebrate Index Flanders (MMIF) for evaluating rivers and lakes was developed and tested. This index was developed in order to provide a general assessment of ecological deterioration caused by any kind of stressor, such as water pollution and habitat quality degradation. The MMIF is based on macroinvertebrate samples that are taken using the same sampling and identification procedure as the Belgian Biotic Index. The index calculation is a type-specific multimetric system based on five equally weighted metrics, which are taxa richness, number of Ephemeroptera,

Plecoptera and Trichoptera taxa, number of other sensitive taxa, the Shannon–Wiener diversity index and the mean tolerance score. The final index value is expressed as an Ecological Quality Ratio ranging from zero for very bad ecological quality to one for very good ecological quality. The MMIF correlates positively with dissolved oxygen and negatively with Kjeldahl nitrogen, total nitrogen, ammonium, nitrite, total phosphorous, orthophosphate and biochemical and chemical oxygen demand. This new index is now being used by the Flemish Environment Agency as a standard method to report about the status of macroinvertebrates in rivers and lakes in Flanders within the context of the European Water Framework Directive." (Authors) Taxa taken into account for calculating the Multimetric Macroinvertebrate Index Flanders, with their respective tolerance scores (TS), ranging from 10 for very pollution sensitive to 1 for very pollution tolerant taxa. With reference to Odonata the sensitive index is as follows: *Aeshna* 6, *Brachytron* 7, *Calopteryx* 8, *Cercion* 7, *Ceriagrion* 7, *Coenagrion* 6, *Cordulegaster* 9, *Cordulia* 7, *Crocothemis* 7, *Enallagma* 7, *Epithea* 7, *Erythromma* s.s. 7, *Gomphus* 7, *Ischnura* 6, *Lestes* 7, *Leucorrhinia* 7, *Libellula* 7, *Nehalennia* 7, *Onychogomphus* 7, *Ophiogomphus* 7, *Orthetrum* 7, *Oxygastra* 7, *Platycnemis* 7, *Pyrrosoma* 7, *Somatochlora* 7, *Sympetma* 7, *Sympetrum* 7.] Address: Gabriels, W., Flemish Environment Agency (VMM), A. Van de Maelestraat 96, B-9320 Erembodegem, Belgium. E-mail address: w.gabriels@vmm.be

9497. Garrison, R.; Ellenrieder, N. von (2010): Redefinition of *Leptobasis* Selys with the synonymy of *Chrysobasis* Rácenis and description of *L. mauffrayi* sp. nov. from Peru (Odonata: Coenagrionidae). Zootaxa 2438: 1-36. (in English, with Spanish summary) ["*Chrysobasis* is synonymized with *Leptobasis*. The latter is diagnosed by the combination of rounded frons, CuP reaching hind margin of wing, CuA relatively short, and supplementary pretarsal claw reduced to vestigial, and by the presence on the distal segment of the genital ligula of a pair of chitinized, flap-like, movable processes directed posteriorly. A new species from Peru, *L. mauffrayi*, is described, and illustrations, maps, and keys for all *Leptobasis* species are provided." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

9498. Giudicelli, J.; Olivari, G. (2010): Les cours d'eau méditerranéens à régime de soutien karstique Spécificités écologiques et hydrobiologiques. *ecologia mediterranea* 36(1): 25-44. (in French, with English summary) [*Platycnemis* spec. and *Onychogomphus uncatus* are reported from one station along the riversystem Les Sorgues, Vaucluse, France.] Address: Giudicelli, J., 945, avenue du 21 Août 1945. F-13400 Aubagne, France. E-mail: jb.giudicelli@wanadoo.fr

9499. Godlevska, L.; Fesenko, H. (eds) (2010): Fauna of Ukraine: conservation categories. Reference book. 2nd edition. Kyiv. ISBN 978-966-7830-13-5: 80 pp. (in Ukrainian, with English summary) (<http://www.lucanus.org.ua/articles/redlist-ukr-animals-2010.pdf>) ["The book includes lists of all species of Ukrainian fauna which have conservation status according to national and international red lists as well as to conventions and agreements ratified by Ukraine. A short review of documents determining conservation status for species and definition for all the conservation categories are given.

Ways for practical implementations of the conservation documents are considered. For officers of protected territories, nature protection organizations, students and lecturers of biological speciality, all biologists." (Authors). 30 Odonata species including their vernacular Ukrainian names are listed.] Address: Godlevska, Lena, Schmalhausen Institute of Zoology of NAS of Ukraine, 15 Khmelnytskogo Str., Kyiv, Ukraine, 01601. E-mail: lgodlevska@gmail.com

9500. Groenendijk, D. (2010): Mysterious and beautiful, the Northern Emerald. *Vlinders* 3/2010: 18-21. (in Dutch, with English summary) ["*Somatochlora arctica* is one of the least known and rarest dragonflies of north-west Europe; in the Netherlands it is listed as a threatened species. One of the most characteristic species of living raised bog, its decline has been paralleled by the loss and degradation of such wetland habitat. We set up a Species Protection Plan which came into action in 2005. Seven Dutch populations are now known. Priority was given to locating the breeding grounds and understanding the adult's behaviour. Both males and females were seen frequenting small pools of about a metre deep. The surface was almost completely covered with rather dried out looking *Sphagnum* moss, often with other bog plants growing in it. We saw females ovipositing, and found larvae in various stages and their empty skins (exuviae). These pools have been targeted for conservation measures. On the short term, managers are given on-site advice either on how to protect them or how to dig new ones, depending on the local situation. On the long term, it is important that hydrological plans for the restoration of the bog include such pools, thus ensuring suitable breeding grounds for this rare and beautiful species." (Author)] Address: Groenendijk, D., De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

9501. Grome, N.M. (2010): Neural basis of visually evoked head and wing movements in dragonflies. *FASEB Journal* 24: 988.16. (in English) ["Dragonflies make their living by foraging on flying insects. We are using two approaches to study their prey capture behavior. (1) Using close-up, high speed video, we are recording the head movements of dragonflies (*Sympetrum vicinum*) to the movement of small moving images that simulate prey items. Our study shows that dragonflies use two distinct types of head/eye movements, tracking and saccades. The former are smooth movements that stabilize the moving prey image. The latter are jerky movements that may be involved in distance estimation. (2) Using intracellular penetration and recording, we are studying a group of neurons that are thought to guide prey capture. By controlling their activity with current pulses we are studying the wing steering movements that they elicit. Injection of a fluorescent dye, Lucifer Yellow, into these neurons allows us to study their dendritic structure within the dragonfly's brain." (Author)] Address: Grome, Natalie Marie, Biology, Union College, Schenectady, NY, USA

9502. Hamamoto, M.; Ohta, Y.; Hara, K.; Hisada, T. (2010): Basic design strategy for stiffness distribution on a dragonfly-mimicking wing for a flapping micro aerial vehicle. *Advanced Robotics* 24(5-6): 861-877. (in English) ["A basic configuration of a flexible wing is derived from that of a real dragonfly. To realize the development of a flapping micro aerial vehicle, it is essential to study real insects' flight. In particular, the

sophisticated structure of the wing contains many helpful hints for the solution of the efficiency. However, to solve the fluid-structure interaction problem between wing deformation and the surrounding airflow has been quite difficult, and the study of the ultimately light wing has been inhibited. We analyzed this problem using a novel numerical simulation — finite element analysis based on the arbitrary Lagrangian-Eulerian method, which can treat the interactive behaviour accurately. A comparison of wing deformations and surrounding airflows for 13 wing models, actuated in the same way as is hovering by a real dragonfly and having one-third to 23 times the Young's modulus of a real dragonfly wing, indicated that the real wing positioned on the lower border of the zone where the flight efficiency was sustained. It was also observed that the wingtip area, the attitude of which plays a dominant role in determining the efficiency, was mainly supported by the structural stiffness of a shallow groove that crosses the wing diagonally." (Authors)] Address: Hamamoto, M., Advanced Technology Research Lab., Corporate Research & Develop. Group, Sharp Corp., 2613-1 Ichinomoto-cho, Tenri-city, Nara 632-8567, Japan. E-mail: hamamoto.masaki@sharp.co.jp

9503. Hill, B.T.; Roland, H.-J. (2010): Die Mond-Azurjungfer *Coenagrion lunulatum* (Charpentier 1840) in Hessen. *Libellen in Hessen* 3: 55-57. (in German) [Old records of *C. lunulatum* in Hessen, Germany, from 1963/64 (Rau 1966), thought to be questionable, could be verified. Voucher specimens were found in the entomological collection of the Künanzhaus.] Address: Hill, B.T., Egenolfstr. 22, 60316 Frankfurt, Germany. E-mail: hillbt@yahoo.de

9504. Hughes, M. (2010): Effects of Zebra Mussel colonization on dragonfly larvae burying behavior. Thesis submitted to the faculty of Wesleyan University in partial fulfillment of the requirements for the Degree of Bachelor of Arts with Departmental Honors in Biology Middletown, Connecticut April: 55 pp. (in English) ["Invasive species have caused massive ecological and economic damage throughout the world. In North America, zebra mussels (*Dreissena polymorpha*) native to Eastern Europe invaded aquatic ecosystems in the 1980s, altering ecological communities and harming human infrastructure. Zebra mussels have been found attached to dragonfly larvae, decreasing the likelihood of successful emergence as adults. This study assesses the negative impacts zebra mussel colonization has on dragonfly larvae by testing the effects of colonization on dragonfly burying behavior. *Macromia illinoensis* larvae and zebra mussels were collected and tested at Douglas Lake, Michigan in July and August 2009. Weather and water temperature affected uncolonized burial time, but not uncolonized burial depth. Uncolonized burial time, head width, and body area were predictors of which individual dragonflies got colonized. Once individuals were colonized, their burial depth was impaired, which could lead to early mortality. Because dragonflies link aquatic and terrestrial ecosystems, increased early mortality of dragonflies could cause cascading effects across ecosystems." (Author)] Address: not stated

9505. Hunt, P.A.; Blust, M.; Morrison, F. (2010): Lotic Odonata of the Connecticut River in New Hampshire and Vermont. *Northeastern Naturalist* 17(2): 175-188. (in English) ["Several riverine species in the insect order Odonata are recognized as being of conservation con-

cern in the Northeast. Along the Connecticut River, most data on these species have come from the southern portion of the river that passes through Connecticut and Massachusetts, while the northern portion has been poorly sampled until recently. In this paper, we summarize recent surveys along the Vermont—New Hampshire stretch of the river and place these in the context of known distributional data for the river as a whole. Our focus is on species typical of large rivers, with a particular focus on members of the family Gomphidae. Also included is information on the first Vermont or New Hampshire records of three species — *Enallagma antennatum*, *E. durum*, and *Stylurus amnicola* — and the first upper river records for several other species." (Authors)] Address: Hunt, Pamela, Audubon Society of New Hampshire, 3 Silk Farm Road, Concord, NH 03301, USA. E-mail: phunt@nhaudubon.org

9506. Ippolito, A.; Sala, S.; Faber, J.H.; Vighi, M. (2010): Ecological vulnerability analysis: A river basin case study. *Science of the Total Environment* 408: 3880-3890. (in English) [Italy, "Assessing and quantifying ecosystem vulnerability is a key issue in site-specific ecotoxicological risk assessment. In this paper, the concept of vulnerability, particularly referred to aquatic ecosystems is defined. Sensitivity to stressors, susceptibility for exposure and recovery capability are described as component of vulnerability of biological communities. The potential for habitat changes must also be considered in ecosystem vulnerability assessment. A procedure based on the application of an ecosystem vulnerability index is proposed. The method allows the assessment of vulnerability of riverine ecosystems to multiple stressors. The procedure is applied to two river systems in northern Italy: River Serio, subject to strong human pressure, and River Trebbia, in semi-natural conditions, as reference system. Macrozoobenthos is chosen as the indicator community. The actual quality of River Serio was evaluated as the result of the multiple stressor pressure on the reference system. Values and limitations of the approach are discussed." (Authors) Taxa, including Odonata, are treated at the order level.] Address: Vighi, M., Department of Environmental Sciences, University of Milano Bicocca, Piazza della Scienza, 1, 20126 Milano, Italy. E-mail address: marco.vighi@unimib.it (M. Vighi).

9507. Juhant, M.A. (2010): Austral spring migration counts of raptors in Punta Rasa, Argentina. *Ornitologia Neotropical* 21: 263-270. (in English, with Spanish summary) ["Punta Rasa, eastern Buenos Aires province, Argentina; "That day, there were 5000 to 10,000 hawks moving westward through the Tanques Watchsite area, together with swarms of thousands of dragonflies. Another episode was recorded at the same moment 5 km south from Tanques Watchsite, where a flock of approximately 5000 hawks was feeding on dragonflies in a 300 x 300 m area." (Author)] Address: Juhant, M.A., Universidad Nacional de La Plata. Republica de Chile 3006, San Justo 1754, Buenos Aires, Argentina. E-mail: matiasjuhant@yahoo.com.ar

9508. Kalniņš, M. (2010): Dragonfly (Odonata) conservation in Latvia. XXVIII Nordic - Baltic Congress of Entomology. Abstract book: 49. (in English) [Verbatim: "Until now, there are altogether 59 species of nine dragonfly families known in Latvia including one irregularly immigrated species – *Sympetrum fonscolombii* and one species with unclear status – *Aeshna caerulea*. Although dragonflies represent a faunistically well investi-

gated group of insects in Latvia, the data of threatened and protected species regional distribution is still insufficient as compared with other dragonflies species. There is also few ecological data available on dragonflies of Latvia. Published data, the collections of different institutions, the data collected during the project „Analysis of the Specially Protected Nature Territories in Latvia and Establishing of EMERALD/Natura 2000 Network” in 2001-2002 and material collected by Latvian entomologists up to 2009 have been used in the analysis of the distribution and habitat preference. Data on dragonflies were collected by using a hydrobiological net or entomological net, or by direct observations. The material was collected from 1998 to 2009. Both historical and recent data, totally 10885 records of all dragonfly species, were included in a Microsoft Office Access database hold by the author. There are altogether 16 species are protected by national and European legislation or included in Red Data book of Latvia. They are: *Lestes virens*, *Ischnura pumilio*, *Pyrrhosoma nymphula*, *Nehalennia speciosa*, *Aeshna mixta*, *A. isosceles*, *A. viridis*, *Anax imperator*, *Gomphus flavipes*, *Ophiogomphus cecilia*, *Cordulegaster boltonii*, *Epitheca bimaculata*, *Libellula fulva*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*. Specially protected natural areas of Latvia are geographical territories, that are under special state-level protection, in order to safeguard and maintain biodiversity of nature – rare and typical ecosystems, habitats for rare species, landscapes, that are peculiar, beautiful and characteristic for Latvia, geological and geomorphological formations, as well as territories, significant for recreational and educational purposes. The protected areas are classified according following categories: strict nature reserves, nature parks, nature reserves, national parks, biosphere reserves, natural monuments, areas of protected landscapes. Altogether in Latvia there are 684 (excluding nature monuments – veteran trees) specially protected natural areas certified by law or regulations of the Cabinet of Ministers. The half of these protected areas has been established as Natura 2000 – protection areas of European level also." (Author)] Address: Kalniņš, M., Nature Conservation Agency, Baznīcas iela 7, Sigulda, Siguldas novads, LV-2150, Latvia. E-mail: martins.kalnins@daba.gov.lv

9509. Kalogianni, E.; Giakoumi, S.; Andriopoulou, A.; Chatzinikolaou, Y. (2010): Feeding ecology of the critically endangered *Valencia letourneuxi* (Valenciidae). *Aquatic Ecology* 44: 289-299. (in English) [Greece; Food resource utilization by *V. letourneuxi*, a critically endangered freshwater fish, was studied in its most abundant known Greek population of Chiliadou stream. "The diet of this population appears to be dominated by microcrustaceans, dipteran larvae, Acari, and Mollusca. Its feeding is highly dependent on seasonal prey availability and diversity, with niche overlap being low only between winter and the rest of the seasons, indicating that only during winter its diet differs significantly in relation to the other seasons. There are no significant sex- and sizerelated dietary shifts. This *V. letourneuxi* population is characterized by a generalist feeding strategy and appears to consist mostly of individuals with broad niches. Its generalist feeding pattern and dietary flexibility permits it to fully exploit this very diverse and rich habitat and may account for the high local abundance of this population." (Authors) 0,5% of prey items contributed to Odonata.] Address: Kalogianni, E., Institute of Inland Waters, Hellenic Centre for

Marine Research, 46.7 km Athinon—Souniou Av., P.O. Box 712, 190 13 Anavissos, Greece. E-mail: ekalog@ath.hcmr.gr

9510. Karube, H. (2010): 20. Endemic insects in the Ogasawara Islands: Negative impacts of alien species and a potential mitigation strategy. In: Kazuto Kawakami and Isamu Okochi (2010) (eds.): *Restoring the Oceanic Island Ecosystem. Impact and Management of Invasive Alien Species in the Bonin Islands*. ISBN 978-4-431-53858-5 (Print). Springer Japan: 133-137. (in English) ["The impact of invasive alien species on endemic insects in the Ogasawara Islands and current efforts to mitigate this impact are described. Endemic insects have probably been impacted most by the green anole (*Anolis carolinensis carolinensis*) as a result of its direct predation pressure, although alien trees such as bishopwood (*Bischofia javanica*) and ironwood (*Casuarina equisetifolia*) have also had substantial indirect impacts. Factors causing the decline of species that typify individual habitats — endemic odonates, the Ogasawara tiger beetle (*Cicindela bonina* Nakane et Kurosawa, 1959), and the Ogasawara lycaenid butterfly (*Celastrina ogasawaraensis* Pryer, 1883) — have been revealed, and possible conservation efforts have been developed based on these results. Habitat restoration is now underway. Specific examples of these efforts are presented here." (Author)] Address: Karube, H., Kanagawa Prefectural Museum of Natural History, 499 Iryuda, Odawara Kanagawa, 250-0031, Japan. E-mail: paruki@nh.kanagawa-museum.jp

9511. Kazanci, N.; Dögel, M. (2010): Determination of influence of heavy metals on structure of benthic macroinvertebrate assemblages in low order Mediterranean streams by using canonical correspondence analysis. *Review of Hydrobiology* 3(1): 13-26. (in English, with Turkish summary) [Köyceğiz-Dalyan Nature Reserve, Turkey; Seventy-five species of benthic macroinvertebrates were identified. Relationships between benthic macroinvertebrate assemblages and the metal Zn, Cd, Ni, Cu, Fe, Mn and electrical conductivity, pH, Ca, dissolved oxygen and nitrate were explored by using canonical correspondence analysis. The study includes records of the following Odonata taxa: *Calopteryx splendens*, *Platycnemis pennipes*, *Coenagrion* sp., *Aeshna* sp., *Gomphus flavipes*, *Onychogomphus forcipatus*, and *Ophiogomphus cecilia*. *O. forcipatus*, *O. cecilia* were related to Cd, Ni, dissolved oxygen and pH but negatively with nitrate nitrogen and Ca (Figure 1). These taxa tended to tolerate high concentrations of Cd and Ni and preferred alkaline, organically unpolluted habitat with low Ca concentration. *C. splendens* and *G. flavipes* were positively related to nitrate and Ca and were negatively correlated with Cd, pH, Ni and dissolved oxygen.] Address: Kazanci, Nilgün, Hacettepe Univ. Science Faculty Biology Dept Hydrobiology Section, Beytepe, Ankara, Turkey. E-mail: nilgunkazanci@gmail.com

9512. Kazanci, N. (2010): Contribution to the knowledge of Odonata (Insecta) fauna of Turkey: Eastern and Southeastern Anatolia. *Review of Hydrobiology* 3(1): 1-11. (in English, with Turkish summary) [Turkey, Hakkari and Siirt Provinces. Between 1981 and 1984, 18 Odonata species were recorded. *Ischnura senegalensis* is a new record for Turkey. The list also includes the rare *Sympetrum haritonovi*.] Address: Kazanci, Nilgün, Hacettepe University Science Faculty Biology Dept

Hydrobiology Section, Beytepe, Ankara, Turkey. E-mail: nilgunkazanci@gmail.com

9513. Keller, D.; Brodbeck, S.; Flöss, I.; Vonwil, G.; Holderegger, R. (2010): Ecological and genetic measurements of dispersal in a threatened dragonfly. *Biological Conservation* 143: 2658-2663. (in English) ["*Leucorrhinia caudalis* is a rare dragonfly, threatened throughout its European distribution. The species was formerly widespread in the Swiss lowlands, but only a single population remained in the 1980s. However, a spread has recently been observed, with additional ponds being colonised, sometimes at considerable distance. Despite this evidence of recent long-distance dispersal, it is unknown whether *L. caudalis* regularly moves among ponds or whether this is a rather rare event. A combination of an ecological mark-resight and a population genetic study was applied to investigate contemporary dispersal and the genetic footprint of the recent population history of *L. caudalis* in Switzerland. DNA for genetic microsatellite analysis was extracted from exuviae. The mark-resight study and the genetic analysis gave congruent results. They showed that *L. caudalis* is mostly a sedentary species, with only a few contemporary dispersal events over distances up to 5 km being observed. The genetic analysis was in agreement with the recent population history of the Swiss populations. The oldest and largest population showed large genetic diversity and acted as source population for the recent spread of *L. caudalis* in Switzerland. Recurrent gene flow among this source population and close populations caused substantial local genetic variation in the latter, as well as low population differentiation. The two recently founded distant populations (30 km distance) were genetically less diverse and highly differentiated. These distant populations and another recently colonised population also expressed signatures of genetic bottlenecks." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr. 111, CH-8903 Birmensdorf, Switzerland. E-mail: mailto:daniela.keller@wsl.ch

9514. Korte, T. (2010): Current and substrate preferences of benthic invertebrates in the rivers of the Hindu Kush-Himalayan region as indicators of hydromorphological degradation. *Hydrobiologia* 651(1): 77-91. (in English) ["The study introduces an approach to obtaining information about the preferences of benthic invertebrates for substrate and current velocity in a region with little prior knowledge of benthic invertebrates. These preferences are then used for river assessment. Substrate-specific sampling of 271 reference sites was conducted in lower mountainous and lowland areas of the Hindu Kush-Himalaya region. Statistical analysis revealed significant preferences for substrate type and current velocity for 50 taxa of Ephemeroptera, Plecoptera, Trichoptera, Coleoptera, Diptera, Odonata, Mollusca, and Oligochaeta. A 20-point system was developed to assign scores for substrate and current preferences. Scores from seven taxa of Ephemeroptera and Trichoptera revealed low ecological potential in response to habitat alteration. These data were used to develop four preference metrics. The Lithal metric is composed of 34 taxa with significant preferences for stony substrates (fine gravel to bedrock size). The Lithophile metric contains 21 taxa with strong statistical links to stony substrates, which were also found on other substrates. The Lithobiont metric consists of 13 taxa exclusively found on stones. The Lotic metric consists of 11

taxa with significant preferences for moderate-to-fast current velocities. Multi-habitat sampling was conducted at 181 sites reflecting a hydromorphological gradient. The Mann-Whitney U test and box-and-whisker plots were applied to test the relationship of the new metrics to hydromorphological stress. Of the four new metrics, the Lithal, Lithophile, and Lotic were able to detect impacts of hydromorphological degradation." (Authors)] Address: Korte, T., Dept Applied Zoology/Hydrobiology, Institute of Biology, University of Duisburg-Essen, Universitätsstr. 5, 45141 Essen, Germany. E-mail: thomas.korte@uni-due.de

9515. Kosterin, O.E.; Gorbunov, P.G. (2010): Notes on the Odonata of Kazakhstan, including the first record of *Ischnura evansi* Morton (Zygoptera: Coenagrionidae). *Notulae odonatologicae* 7(5): 45-48. (in English) ["*Ischnura evansi* and *I. fountaineae* are reported from brackish springs in the Ustyurt Nature Reserve, W. Kazakhstan. This is the northernmost record and the first Kazakhstan record of the former species. The Kazakhstan record of *Aeshna cyanea*, by K. REINHARDT & J. SAMIETZ (2003, *Entomologische Nachrichten und Berichte* 47: 71-76), is most probably erroneous. Some corrective notes on the recent review of the Odonata of Kazakhstan by I.A. CHAPLINA et al. (2007, *Odonatologica* 36: 339-364) are provided." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

9516. Landwer, B.H.P.; Sites, R.W. (2010): The larval Odonata of ponds in the Prairie region of Missouri. *Transactions of the American entomological society* 136(1-2): 1-105. (in English) ["Despite a proliferation of regional faunistic treatments throughout North America in recent years, knowledge of the Odonata fauna of Missouri has lagged behind that of other midwestern states. Samples of larval Odonata were collected from 105 ponds in the Prairie Region of Missouri over three sampling periods: Fall 1998, Spring 1999, and Summer 1999. Some ponds were sampled during more than one sampling period, resulting in a total of 117 unique pond and sampling period combinations. Sites were selected from Missouri Department of Conservation owned lands and the University of Missouri owned Baskett Wildlife Area. Within each pond, sampling was conducted separately in each distinct vegetational mesohabitat. Supplemental rearing of difficult or uncommon taxa was carried out in the laboratory. More than 30,000 specimens, representing 51 species, 22 genera, and 6 families of larval Odonata were collected from ponds in the Prairie Region of Missouri. Overall, the ponds of the Prairie Region supported a generalized Odonata community, with a relatively small number of species being found in a large number of ponds. Presented here is a faunistic inventory of the larval Odonata of ponds in the Prairie Region of Missouri, with mesohabitat associations and a taxonomic key to suborders, families, genera, and species known or expected to occur there." (Authors) Archilestes, Lestes, Amphigrion, Argia, Enallagma, Ischnura, Nehalennia, Aeshna, Anax, Boyeria, Basiaeschna, Epiaeschna, Nasiaeschna, Rhionaeschna, Arigomphus, Dromogomphus, Gomphus, Epithecica, Epicordulia, Tetragoneuria, Celithemis, Dythemis, Erythemis, Ladona, Leucorrhinia, Libellula, Pachydiplax, Pantala, Perithemis, Plathemis, Sympetrum, Tramea] Address: Enns Entomology Museum, Division of Plant

Sciences, University of Missouri, Columbia, Missouri 65211, USA.

9517. Lima, D.O.; Behr, E.R. (2010): Feeding ecology of *Pachyurus bonariensis* Steindachner, 1879 (Sciaenidae: Perciformes) in the Ibicuí River, Southern Brazil: ontogenetic, seasonal and spatial variations. *Braz. J. Biol.* 70(3): 503-509. (in English, with Portuguese summary) [The diet of *P. bonariensis*, a freshwater sciaenid, was analyzed (stomachs of 324 fish specimens). Fish were collected bimonthly from December 1999 to January 2002 at three locations along the Ibicuí River in the Rio Grande do Sul State, Brazil. The main items were Ephemeroptera, Diptera (larvae), Trichoptera and Odonata.] Address: Lima, Daniela, Universidade Federal da Fronteira Sul – UFFS, Campus de Cerro Largo, Rua João Sebastião, 16, CP 63, CEP 97900-000, Cerro Largo, RS, Brazil. E-mail: daniela.ol.lima@gmail.com

9518. Lopau, W. (2010): Verbreitungsatlas der Libellen in Griechenland (Odonata). *Libellula Supplement* 10: 5-153. (in German, with English summary) ["Based on a set of approximately 14,750 records, distribution maps are presented for all and flight period histograms for most of the 78 species that have been reported from Greece. Remarks on distribution and phenology of each species are given and, in special cases, information on taxonomy and ecology is added. Particular emphasis is given on distribution data from islands." (Author)]

9519. Lopau, W. (2010): Bisher unveröffentlichte Libellenbeobachtungen aus Griechenland IV (Odonata). *Libellula Suppl.* 10: 155-260. (in German, with English summary) ["Hitherto unpublished Odonata records from Greece IV - Almost 3,380 Odonata records provided by 27 workers are listed. The data, comprising 64 of the 78 species known from Greece today, was recorded between 02-ix-1990 and 25-ix-2008." (Author)]

9520. Lopez, L.D.; Peterson, M.S.; Lang, E.T.; Charbonnet, A.M. (2010): Linking habitat and life history for conservation of the rare saltmarsh topminnow *Fundulus jenkinsi*: morphometrics, reproduction, and trophic ecology. *Endangered Species Research* 12: 141-155. (in English) [The diet (including Odonata) of the fish species *F. jenkinsi* is analyzed at the order level.] Address: Peterson, M.S., Dept of Coastal Sciences, The University of Southern Mississippi, Ocean Springs, Mississippi 39564, USA. E-mail: mark.peterson@usm.edu

9521. Loskutova, O.A.; Zelentsov, N.I.; Scherbina, G. Kh. (2010): Amphibiotic insects of mountain lakes and small watercourses in the Urals. *Inland Water Biology* 3(1): 11-20. (in English) [Russia; Several specimens of *Leucorrhinia dubia* were found on the snow near the lakes in the Bal ban yu River basin (65°16 N, 59°56 E). This is a range extension of that species which had not previously been found north of the Ukhta Rive according Sedykh, K.F., *Zhivotnyi mir Komi ASSR. Bespozvochno nye* (Animal World of Komi ASSR: Invertebrates), Syk-tyvkar: Komi Knizh. Izd., 1974.] Address: Loskutova, O.A., Institute of Biology, Komi Scientific Center, Urals Branch, Russian Academy of Sciences, ul. Kommunisticheskaya 28, Syktyvkar, 167982 Russia. E-mail: loskutova@ib.komisc.ru

9522. Macip-Ríos, R.; Sustaita-Rodríguez, V.H.; Barrios-Quiroz, G.; Casas-Andreu, G. (2010): Alimentary habits of the Mexican Mud Turtle (*Kinosternon integrum*) in Tonatico, Estado de México. *Chelonian Conservation and Biology* 9(1): 90-97. (in English) ["We

analyzed the diet of the previously unstudied Mexican mud turtle during 2003 and 2004. Analysis was conducted separately by sex and age (immature vs. adults) and seasons (rainy vs. dry). Gastric contents and fecal samples were used in combination for more complete results. Based on 57 samples (32 stomach flushes and 25 from feces), *K. integrum* is a generalist–opportunist in alimentary habits, feeding on 27 categories of food. Plant material, Coleoptera, Odonata, Diptera, and mixed animal matter were the most important components. Overall dietary diversity was similar between adults and juveniles and between the two sexes, but juveniles differed between seasons. In similarity analysis we found a shift in diet between seasons. Females shifted from being primarily carnivorous during the rainy season to being primarily herbivorous during the dry season, while males were carnivorous during both seasons. The data suggest that this turtle feeds opportunistically on available prey items rather than on a few preferred food items." (Authors)] Address: Macip-Ríos, R., Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México, Circuito exterior S/N, Ciudad Universitaria, Coyoacán, Distrito Federal, CP 04510 México rmr@ibiologia.unam.mx

9523. Maes, D.; Titeux, N.; Hortal, J.; Anselin, A.; Declerck, K.; De Knijf, G.; Fichet, V.; Luoto, M. (2010): Predicted insect diversity declines under climate change in an already impoverished region. *J. Insect Conservation* 14: 485-498. (in English) ["Being ectotherms, insects are predicted to suffer more severely from climate change than warm-blooded animals. We forecast possible changes in diversity and composition of butterflies, grasshoppers and dragonflies in Belgium under increasingly severe climate change scenarios for the year 2100. Two species distribution modelling techniques (Generalised Linear Models and Generalised Additive Models), were combined via a conservative version of the ensemble forecasting strategy to predict present-day and future species distributions, considering the species as potentially present only if both modelling techniques made such a prediction. All models applied were fair to good, according to the AUC (area under the curve of the receiver operating characteristic plot), sensitivity and specificity model performance measures based on model evaluation data. Butterfly and grasshopper diversity were predicted to decrease significantly in all scenarios and species-rich locations were predicted to move towards higher altitudes. Dragonfly diversity was predicted to decrease significantly in all scenarios, but dragonfly-rich locations were predicted to move upwards only in the less severe scenarios. The largest turnover rates were predicted to occur at higher altitudes for butterflies and grasshoppers, but at intermediate altitudes for dragonflies. Our results highlight the challenge of building conservation strategies under climate change, because the changes in the sites important for different groups will not overlap, increasing the area needed for protection. We advocate that possible conservation and policy measures to mitigate the potentially strong impacts of climate change on insect diversity in Belgium should be much more pro-active and flexible than is the case presently." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

9524. Malkmus, R.; Weihrauch, F. (2010): Verbreitung und Phänologie von *Sympetrum nigrifemur* auf den Ma-

karonesischen Inseln (Odonata: Libellulidae). *Libellula* 29(1/2): 91-106. (in English, with German summary) ["12 new records of *S. nigrifemur*, taken during October 2008 in Madeira, are presented. These are included in a compilation of all available record of this species, published and unpublished, from the Macaronesian Islands. Altogether 220 dated records have been investigated that originate from three Macaronesian archipelagoes - Madeira, Ilhas Selvagens and Canary Islands - and are distributed on nine islands: Madeira (86 records), La Gomera (73), Tenerife (37), Gran Canaria (10), La Palma (7), Selvagem Grande (3), Ilhas Desertas (3; Deserta Grande, 2, & Ilheu Chao, 1) and Lanzarote (1). Autochthony of *S. nigrifemur* can be assumed in Madeira, La Palma, Tenerife, La Gomera and Gran Canaria. Seen vertically, records were taken from sea level to 1,600 m, and breeding sites were recorded from sea level up to 1,300 m. Adult *S. nigrifemur* are on the wing throughout the year. Larval records were taken in February, April, August and October. Emergence was recorded in April and May as well as in August, September and October. Oviposition was seen in the winter months from November until March and in July, and old individuals were explicitly noted only from early March to late April. In our eyes the most likely phenological scenario is a bivoltine development with a rapid larval summer generation." (Authors)] Address: Malkmus, R., Schulstr. 4, D-97859 Wiesthal, Germany

9525. Marr, B. (2010): Odonata of the Robert Thorson Brown Nature Sanctuary. *Argia* 22(3): 19. (in English) [Houghton County, Michigan, USA; 18 Odonata species were recorded in 2009-2010 in this fen.] Address: Marr, B. E-mail: rmarr@mtu.edu

9526. Martens, A.; Richter, O.; Suhling, F. (2010): The relevance of perennial springs for regional biodiversity and conservation. In: Schmiedel, U. & Jürgens, N. [Eds.]: *Biodiversity in southern Africa. Volume 2: Patterns and processes at regional scale.* Klaus Hess Publishers, Göttingen & Windhoek: 70-74. (in English) ["Natural perennial surface water in the interior parts of Namibia only occurs at widely separated springs around mountains. These waters host a very diverse and unique Odonata assemblage, which is threatened due to the habitat restriction of several species, as well as by recent habitat loss and degradation. Species occurring permanently at these waters, including *Crocothemis sanguinolenta*, *Orthetrum julia*, and *Trithemis stictica* differ significantly in seasonality, dispersal and life cycle characteristics from species colonising temporary waters. Their larvae grow slowly and they are present in these habitats as larvae throughout the year. This presence is the key factor why invaders with rapid development, which are dominant elsewhere, do not outcompete these species in these unique habitats. There is significant potential for stream dragonfly species to act as indicators for threatened freshwater wetlands in arid Namibia and they may also serve as an indication of the sustainable use of water resources, including the evaluation of measures to rehabilitate environments." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

9527. Matsushita, M. (2010): Torahiko Terada (1878–1935): Father of the science of complex systems. *Evolutionary and Institutional Economics Review* 6(2): 337-340. (in English) ["I do not remember when I first heard the name of Torahiko Terada. But I still have a strong

impression of being a middle school student and reading his essay entitled "Tombo" ("Dragonflies") in my Japanese language textbook. Starting from the behaviour of a dragonfly resting on a hat, he observed many dragonflies staying on electric power lines and performed a statistical analysis about their orientation." (Author)] Address: Matsushita, M., Dept of Physics, Chuo University, Kasuga, Bunkyo-ku, Tokyo 112-8551, Japan. E-mail: matusita@phys.chuo-u.ac.jp

9528. Mayumi, Y.; Isamu, O. (2010): A decrease in endemic odonates in the Ogasawara Islands, Japan. In: Kawakami, K. and I. Okochi (eds): Restoring the Oceanic Island Ecosystem. Impact and Management of Invasive Alien Species in the Bonin Islands: 139-144. (in English) ["There are many endemic species in the Japanese Ogasawara Islands. However, many of these endemic species are likely to disappear as a result of reduction of habitat and the introduction of exotic species. Odonates are included within this category of species at risk. If the decrease in endemic odonates is due to a decrease in aquatic habitat, we have only to provide artificial ponds to conserve these species. In this study, we provided artificial ponds as a habitat for odonates in Chichi-jima and Ani-jima, Ogasawara Islands. We then examined the possibility of protection and enhancement of odonate populations. Endemic odonates were found in the natural ponds of Ani-jima and Ototo-jima. In Ani-jima, they could be collected both in the artificial and natural ponds. The artificial pond could provide habitat for endemic odonates. However, in Chichi-jima, few odonates could be collected both in the artificial and natural ponds. Here, invasive species, such as *Gambusia affinis* and *Anolis carolinensis*, are found, which considered to prey upon odonate larvae and adults. Extermination of invasive species may be necessary to conserve the endemic odonates in Chichi-jima. Reprinted from Yoshimura M, Okochi I (2005) Bulletin of FFPRI 4:45-51, with permission of FFPRI." (Authors)] Address: Mayumi, Y., Kansai Research Center, Forestry and Forest Products Research Institute (FFPRI), 68 Nagaikyutaro, Momoyama, Fushimi Kyoto, 612-0855, Japan. E-mail: yoshi887@ffpri.affrc.go.jp

9529. Meurgey, F. (2010): 2010 collecting trip to St. Vincent (Lesser Antilles). *Argia* 22(3): 10-12. (in English) [35 locations were sampled and 7 Odonata species were recorded as follows: *Argia telesfordi*, *Ischnura ramburii*, *Anax amazili*, *Dythemis multipunctata*, *Erythrodiplax fusca*, *Erythrodiplax umbrata*, *Orthemis sulphurata*, and *Pantala favescens*.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

9530. Meusemann, K.; von Reumont, B.M.; Simon, S.; Roeding, F.; Strauss, S.; Kück, P.; Ebersberger, I.; Walz, M.; Pass, G.; Breuers, S.; Achter, V.; von Haeseler, A.; Burmester, T.; Hadrys, H.; Wägele, W.; Misof, B. (2010): A phylogenomic approach to resolve the arthropod tree of life. *Molecular Biology and Evolution* 27 (11): 2451-2464 (in English) ["Arthropods were the first animals to conquer land and air. They encompass more than three quarters of all described living species. This extraordinary evolutionary success is based on an astoundingly wide array of highly adaptive body organizations. A lack of robustly resolved phylogenetic relationships, however, currently impedes the reliable reconstruction of the underlying evolutionary processes. Here, we show that phylogenomic data can substantial-

ly advance our understanding of arthropod evolution and resolve several conflicts among existing hypotheses. We assembled a data set of 233 taxa (including Odonata) and 775 genes from which an optimally informative data set of 117 taxa and 129 genes was finally selected using new heuristics and compared to the unreduced data set. We included novel EST data for eleven species and all published phylogenomic data augmented by recently published EST data on taxonomically important arthropod taxa. This thorough sampling reduces the chance of obtaining spurious results due to stochastic effects of undersampling taxa and genes. Orthology prediction of genes, alignment masking tools, and selection of most informative genes due to a balanced taxa-gene ratio using new heuristics were established. Our optimized data set robustly resolves major arthropod relationships. We received strong support for a sister group relationship of onychophorans and euarthropods, and strong support for a close association of tardigrades and cycloneuralia. Within pancrustaceans, our analyses yielded paraphyletic crustaceans and monophyletic hexapods, and robustly resolved monophyletic endopterygote insects. However, our analyses also showed for few deep splits that were recently thought to be resolved, for example the position of myriapods, a remarkable sensitivity to methods of analyses." (Authors)] Address: Misof, B., Biozentrum Grindel & Zoologisches Museum, Martin-Luther-King Platz 3, 20146 Hamburg, Germany. E-mail: bernhard.misof@uni-hamburg.de

9531. Munguia-Steyer, R.; Cordoba-Aguilar, A.; Romo-Beltran, A. (2010): Do individuals in better condition survive for longer? Field survival estimates according to male alternative reproductive tactics and sex. *Journal of Evolutionary Biology* 23(1): 175-184. (in English) ["There is a gap in terms of the supposed survival differences recorded in the field according to individual condition. This is partly due to our inability to assess survival in the wild. Here we applied modern statistical techniques to field-gathered data in two damselfly species whose males practice alternative reproductive tactics (ARTs) and whose indicators of condition in both sexes are known. In *Paraphlebia zoe*, there are two ART: a larger black-winged (BW) male which defends mating territories and a smaller hyaline-winged (HW) male that usually acts as a satellite. In this species, condition in both morphs is correlated with body size. In *Calopteryx haemorrhoidalis*, males follow tactics according to their condition with males in better condition practicing a territorial ART. In addition, in this species, condition correlates positively with wing pigmentation in both sexes. Our prediction for both species was that males practicing the territorial tactic will survive less longer than males using a nonterritorial tactic, and larger or more pigmented animals will survive for longer. In *P. zoe*, BW males survived less than females but did not differ from HW males, and not necessarily larger individuals survived for longer. In fact, size affected survival but only when group identity was analysed, showing a positive relationship in females and a slightly negative relationship in both male morphs. For *C. haemorrhoidalis*, survival was larger for more pigmented males and females, but size was not a good survival predictor. Our results partially confirm assumptions based on the maintenance of ARTs. Our results also indicate that female pigmentation, correlates with a fitness component – survival – as proposed by recent sexual selection ideas applied to females." (Authors)] Address: Córdoba-

Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Coyoacán, Mexico. E-mail: acordoba@ecologia.unam.mx

9532. Murphy, J.T.; Hu, H. (2010): An experimental study of a bio-inspired corrugated airfoil for micro air vehicle applications. *Experiments in Fluids* 49(2): 531-546 (in English) ["An experimental study was conducted to investigate the aerodynamic characteristics of a bioinspired corrugated airfoil compared with a smooth-surfaced airfoil and a flat plate at the chord Reynolds number of $Re_C = 58,000-125,000$ to explore the potential applications of such bio-inspired corrugated airfoils for micro air vehicle designs. In addition to measuring the aerodynamic lift and drag forces acting on the tested airfoils, a digital particle image velocimetry system was used to conduct detailed flowfield measurements to quantify the transient behavior of vortex and turbulent flow structures around the airfoils. The measurement result revealed clearly that the corrugated airfoil has better performance over the smooth-surfaced airfoil and the flat plate in providing higher lift and preventing large-scale flow separation and airfoil stall at low Reynolds numbers ($Re_C < 100,000$). While aerodynamic performance of the smooth-surfaced airfoil and the flat plate would vary considerably with the changing of the chord Reynolds numbers, the aerodynamic performance of the corrugated airfoil was found to be almost insensitive to the Reynolds numbers. The detailed flow field measurements were correlated with the aerodynamic force measurement data to elucidate underlying physics to improve our understanding about how and why the corrugation feature found in dragonfly wings holds aerodynamic advantages for low Reynolds number flight applications." (Authors) The paper includes references to Odonata] Address: Hu, H., Dept of Aerospace Engineering, Iowa State University, Ames, IA 50011, USA. E-mail: huhui@iastate.edu

9533. Neiss, U.G.; Hamada, N. (2010): The larva of *Perilestes attenuatus* Selys, 1886 (Odonata: Perilestidae) from Amazonas, Brazil. *Zootaxa* 2614: 53-58. (in English, with Portuguese summary) ["The larva of *P. attenuatus* is described and illustrated based on exuviae of reared larvae and last-instar larvae collected in Manaus, Amazonas state, Brazil. The larva of *P. attenuatus* can be distinguished from that of *P. fragilis*, the only other species of which the larva has been described, by the presence of a pair of tubercles on the ligula and by the arrangement of the spines and hooks on the abdominal segments." (Authors)] Address: Neiss, U.G., Inst. Nacional de Pesquisas da Amazônia/INPA, Coordenação de Pesquisas em Entomologia/CPEN, Caixa Postal 478, CEP 69011-970, Manaus, AM, Brazil. E-mail: ulisses.neiss@gmail.com

9534. Nel, A.; Huang, D.-y. (2010): A new Mesozoic Chinese genus of aeshnopteran dragonflies (Odonata: Anisoptera: Progobiaeshnidae). *Comptes Rendus Palevol.* 9(4): 141-145. (in English, with French summary) ["*Mongoliaeschna sinica* gen. et sp. n., third record of the Mesozoic aeshnopteran family Progobiaeshnidae is described from the Lower Cretaceous of Yixian Formation in Liutiagou (Ningcheng County, Inner Mongolia, China)." (Authors)] Address: Huang, D.-y., State Key Laboratory of Palaeobiology & Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, P.R. China. E-mail: mail: huangdiyong@sina.com

9535. Norma-Rashid, Y. (2010): Dragonflies (Odonata) of Bachok Coast, Kelantan and promoting common names. *Malaysian Journal of Science* 29 (Special Issue): 73-79. (in English, with Malaysian summary) ["A brief study of odonates in the coastal area of Bachok, Kelantan found 16 species, belonging to two families Coenagrionidae (made up 25 % of the population) and Libellulidae (75 %). The common names used here are accepted internationally for cosmopolitan species, while others are coined to reflect local descriptions. *Crocothemis servilia* was most predominant followed by *Agrionemis femina* while the rest of the species occurred in moderate numbers. Population numbers were biased towards males rather than females which was reflective of male tendency to exploit water as a reproductive strategy in acquiring mates." (Author)] Address: Norma-Rashid, Y., Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur. E-mail: ynorma@um.edu.my

9536. Novelo-Gutiérrez, R. (2010): The larva of *Apanisagrion lais* (Brauer in Selys) (Zygoptera: Coenagrionidae). *Odonatologica* 39(3): 259-264. (in English) ["The larva is described and illustrated, based on material from Mexico. It is characterized by having 5+2 or 5+3 premental setae, 7 palpal setae, abdomen granular, caudal lamellae apically widened, female gonapophyses exceeding sternite 10, and male cerci sharply pointed." (Author)] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A.C., Apartado Postal 63, MX-91070 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

9537. O'Brien, M. (2010): *Arigomphus submedianus* (Odonata: Gomphidae) to be removed from the Michigan list of Odonata. *Argia* 22(3): 16-17. (in English) ["It was based solely on Hagen's 1885 paper on nymphal forms of Odonata. That record (under "*Gomphus pallidus*") is from a nymph in alcohol supposedly collected in Detroit, Michigan, 6 June 1879, by H.G. Hubbard. Hagen states that the various nymphal specimens he listed represent "four different moults." Given the status of knowledge of Gomphid nymphs at the time, and subsequent work on the group, I would say that common sense dictates that the Hagen "record" which has been propagated throughout the literature (and in the Byers [1927] and Kormondy [1958] Michigan lists), and has been a questionable record by the Michigan Odonata Survey (1997), be stricken from the Michigan list. With all the collecting that has taken place over the last 100 years, and not a single *Arigomphus submedianus* caught in Michigan, it's plain to me that the record is an error. To believe that a casual collector caught this in the Detroit area, far from any typical habitat and based on a larval specimen when the taxonomy of the larvae was imprecise at best, flies in the face of scientific scrutiny. Hagen may have been the father of North American Odonatology, but like any scientist, he was not perfect. It's time to be rid of this mistake that keeps getting propagated in the literature."] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

9538. Ott, J.; Samways, M.J. (2010): Effects of climatic changes on Odonata: Are the impacts likely to be the same in the northern and southern hemispheres? In: Josef Settele, Lyubomir Penev, Teodor Georgiev, Ralf Grabaum, Vesna Grobelnik, Volker Hammen, Stefan Klotz, Mladen Kotarac & Ingolf Kuehn (Eds): Atlas of

Biodiversity Risk. Pensoft Publishers, Sofia + Moscow. ISBN 978-954-642-446-4: 84-85. (in English) ["In both the northern and southern hemispheres, the species most at risk are those of sensitive habitats – such as moorland and montane species, as well as species requiring stable environmental conditions (e.g., water level). Species with small populations and a patchy distribution or isolated populations within these groups are even more threatened." (Authors)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

9539. Outomuro, D.; Torralba-Burrial, A.; Ocharan, F.J. (2010): Distribution of the Iberian Calopteryx damselflies and its relation with bioclimatic belts: Evolutionary and biogeographic implications. *Journal of Insect Science* 10(61): 16 pp. (in English) ["Using bioclimatic belts as habitat and distribution predictors, the present study examines the implications of the potential distributions of the three Iberian Calopteryx-taxa, with the aim of investigating the possible consequences in specific interactions among the species from a sexual selection perspective and of discussing biogeographical patterns. To obtain the known distributions, the literature on this genus was reviewed, relating the resulting distributions to bioclimatic belts. Specific patterns related to bioclimatic belts were clearly observed in the Mediterranean region. The potential distribution maps and relative frequencies might involve latitudinal differences in relative abundances, *C. virgo meridionalis* being the most abundant species in the Eurosiberian region, *C. xanthostoma* in the northern half of the Mediterranean region and *C. haemorrhoidalis* in the rest of this region. These differences might explain some previously described latitudinal differences in secondary sexual traits in the three species. Changes in relative abundances may modulate interactions among these species in terms of sexual selection and may produce sexual character displacement in this genus. *C. v. meridionalis* distribution and ecological requirements explain its paleobiogeography as a species which took refuge in Iberia during the Würm glaciation. Finally, possible consequences in species distributions and interactions are discussed within a global climate change context." (Authors)] Address: Outomuro, D., Depto de Biología de Organismos y Sistemas, Univ. de Oviedo, Oviedo, E-33071, Spain. E-mail: aoutomuro.david@gmail.com

9540. Padgett, D.J.; Carboni, J.J.; Schepis, D.J. (2010): The dietary composition of *Chrysemys picta picta* (Eastern Painted Turtles) with special reference to the seeds of aquatic macrophytes. *Northeastern Naturalist* 17(2): 305-312. (in English) ["Animals facilitate macrophyte seed dispersal in various ways despite specializations of macrophytes for water dispersal. Previous diet analyses of freshwater aquatic turtles revealed that several North American turtle species consume a variety and abundance of seeds among other plant material and animal prey. We quantified the dietary habits of *C. picta picta* in a Massachusetts lake to examine if these animals included hydrophyte seeds in their diet and evaluate their capacity as passive seed-dispersal agents. Fifty-four turtles were trapped and housed to collect feces. Examination of feces revealed a diverse diet with comparatively high frequencies of animal, plant, and algal matter. 857 seeds of at least nine plant species were egested (among 87% of turtles), with all but five (99%) seeds visibly intact. Seeds of *Nuphar* (473) and *Decodon* (305) were most abun-

dant in the feces. Life-history characteristics of both *C. p. picta* and *Nuphar* suggest an effective endozoochorous seed dispersal association. [...] The most frequent animal prey were dipteran larvae (mostly ceratopogonid midges) and odonate larvae (mostly libellulid dragonflies), egested by 83% and 60% of the turtles, respectively." (Authors)] Address: Padgett, D.J., Dept of Biological Sciences, Bridgewater State College, Bridgewater, MA 02325, USA. E-Mail: dpadgett@bridgew.edu.

9541. Paillat, R. (2010): Les libellules (Odonata) de l'étang de la Benette, à Senonches. *La Garzette d'Eure-et-Loir Nature* 94: 9-12. (in French) [Département Eure-et-Loir, France; in 2009, 21 odonate species were recorded. Four of these species are listed due to regional faunistic importance: *Lestes sponsa*, *Aeshna grandis*, *Cordulegaster boltonii*, and *Boyeria irene*.] Address: not stated.

9542. Palacino, F.R.; Millan, C.A. (2010): First records of possible migratory dragonflies in Colombia. *Argia* 22 (3): 9-10. (in English) ["We recently observed more than 3 km of the center of Yopal (Casanare) covered by "clouds" of dragonflies travelling in a west-east direction, between 6:30 and 9:00 in the morning. The event occurred on a cloudy day with a temperature of 24°C. Within the swarm, tandem pairs of *Erythrodiplax umbrata* were collected, a species with great dispersion capacity, but for which migratory behaviour has not yet been recorded here. Aggregations of thousands of individuals of *E. umbrata* have been seen travelling in Texas (USA) and Veracruz (Mexico) but its flight path has not been determined (Paulson, pers. comm.). Several visual records include the movements of swarms of *Miathyria marcella* and *Pantala flavescens* in bogs and other habitats along the Atlantic coast (pers. obs.)."] Address: Palacino F.R., Universidad Nacional de Colombia, A.A. 7495, Bogotá-Colombia. E-mail: fpalacino@unal.edu.co

9543. Paulson, D. (2010): Book Review: *Dragonflies & Damselflies: Model Organisms for Ecological and Evolutionary Research*. Edited by A. Córdoba-Aguilar. Oxford: Oxford University Press (2010). Pp. xii, 290. Price \$59.95. paperback. *Animal Behaviour* 80: 345-346. (in English) [book review] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

9544. Petrin, Z.; Schilling, E.G.; Loftin, C.S.; Johanson, F. (2010): Predators shape distribution and promote diversification of morphological defenses in *Leucorrhinia*, Odonata. *Evolutionary Ecology* 24(5): 1003-1016. (in English) ["Predators strongly influence species assemblages and shape morphological defenses of prey. Interestingly, adaptations that constitute effective defenses against one type of predator may render the prey susceptible to other types of predators. Hence, prey may evolve different strategies to escape predation, which may facilitate adaptive radiation of prey organisms. Larvae of different species in the dragonfly genus *Leucorrhinia* have various morphological defenses. We studied the distribution of these larvae in relation to the presence of predatory fish. In addition, we examined the variation in morphological defenses within species with respect to the occurrence of fish. We found that well-defended species, those with more and longer spines, were more closely associated with habitats inhabited by predatory fish and that species with weakly developed morphological defenses were

more abundant in habitats without fish. The species predominantly connected to lakes with or without fish, respectively, were not restricted to a single clade in the phylogeny of the genus. Our data is suggestive of phenotypic plasticity in morphological defense in three of the studied species since these species showed longer spines in lakes with fish. We suggest that adaptive phenotypic plasticity may have broadened the range of habitats accessible to *Leucorrhinia*. It may have facilitated colonization of new habitats with different types of predators, and ultimately, speciation through adaptive radiation." (Authors)] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

9545. Piersanti, S.; Rebor, M.; Gaino, E. (2010): A scanning electron microscope study of the antennal sensilla in adult Zygoptera. *Odonatologica* 39(3): 235-241 (in English) ["Scanning electron microscope studies of the antennal flagella of *Coenagrion puella* and *Ischnura elegans* (Coenagrionidae), *Platycnemis pennipes* (Platycnemididae), *Lestes barbarus*, *L. viridis* (Lestidae), *Calopteryx virgo* and *C. haemorrhoidalis* (Calopterygidae) reveal the presence of pits containing sensilla on the latero-ventral side of the antenna. All these pits are the opening of deep cavities bearing the same sensilla previously described on Anisoptera antennae. These sensilla are represented by: (i) coeloconic porous sensilla, visible on the antennal surface, whose structure is in agreement with that reported for single walled olfactory receptors, and by (ii) two types of sensilla styloconica (type-1 and type-2), located at the bottom of the cavities and sharing common features typical of thermo-hygroreceptors. The present data allow us to extend previous considerations on the sensory role of the dragonfly antennae to the whole order Odonata, suggesting that olfaction, together with the ability to perceive temperature and humidity, are the main sensory functions of the antennae of these insects." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

9546. Polacik, M.; Reichard, M. (2010): Diet overlap among three sympatric African annual killifish species *Nothobranchius* spp. from Mozambique. *J. Fish Biol.* 77 (3): 754-768. (in English) ["The diet patterns of three *Nothobranchius* species (*N. furzeri*, *N. orthonotus* and *N. rachovii*), small, short-lived annual killifish from temporary pools in African savannah were investigated. Four sites with contrasting fish density and water surface area were sampled in 2008 and 2009 in southern Mozambique. Stomach content analysis showed that all the species examined were generalists, with diets largely based on aquatic invertebrates. The same invertebrate prey categories were consumed by all three species, but their relative proportions varied across species. The largest species, *N. orthonotus*, showed the most distinct diet and consumed vertebrates (juvenile lungfish *Protopterus annectens* and larval Amphibia) and a relatively high proportion of Odonata, Coleoptera and Ephemeroptera larvae. The diet of the other two species (*N. furzeri* and *N. rachovii*) showed a stronger overlap, did not include vertebrates, but was rich in small crustaceans (Cladocera, Copepoda, Ostracoda and Conchostraca). Mosquito (Diptera) larvae formed only a negligible part of the diet of all the three species." (Authors)] Address: Polacik, M., Institute of Vertebrate

Biology, Academy of Sciences of the Czech Republic, Kvetná 8, 603 65 Brno, Czech Republic. E-mail: polacik@ivb.cz

9547. Raebel, E.M.; Merckx, T.; Riordan, P.; Macdonald, D.W.; Thompson, D.J. (2010): The dragonfly delusion: why it is essential to sample exuviae to avoid biased surveys. *Journal of Insect Conservation* 14(5): 523-533. ["Odonate populations and species numbers are declining globally. Successful conservation requires sound assessments of both odonate distributions and habitat requirements. Odonates have aquatic (larval) and terrestrial (adult) stages, but most surveys that are used to inform conservation managers are undertaken of the adult stage. This study investigates whether this bias towards adult records in odonate recording is misinterpreting the environmental quality of sites. The habitat focus is farmland ponds, a key feature of agricultural landscapes. We tested whether or not, adult, larval and exuvial surveys lead to similar conclusions on species richness and hence on pond quality. Results showed that pond surveys based upon larvae and exuviae are equally suitable for the reliable assessment of presence/absence of odonates, but that adult surveys are not interchangeable with surveys of larvae/exuviae. Larvae were also found at ponds with no emerging individuals due to changes in habitat quality, therefore presence of exuviae remains the only proof of life-cycle completion at a site. Ovipositing females were recorded at all ponds where exuviae were totally absent hence adult surveys over-estimate pond quality and low-quality ponds are functioning as ecological traps. Highly mobile and generalist species were recorded at more locations than other species. Adult surveys also bias recording towards genera, species and populations with non-territorial mate-location strategies. Odonate biodiversity monitoring would benefit from applying the best survey method (exuviae) to avoid wasting valuable financial resources while providing unbiased data, necessary to achieve conservation objectives." (Authors)] Address: Raebel, Eva M., Wildlife Conservation Research Unit, The Recanati-Kaplan Centre, Department of Zoology, University of Oxford, Tubney House, Abingdon Road, Tubney, Abingdon, OX13 5QL, UK. E-mail: eva.raebel@zoo.ox.ac.uk

9548. Rantala, M.J.; Honkavaara, J.; Suhonen, J. (2010): Immune system activation interacts with territory-holding potential and increases predation of the damselfly *Calopteryx splendens* by birds. *Oecologia* 163: 825-832. (in English) ["Activation of the immune system in insects has been shown to be costly in the laboratory setting, but experimental studies in the field are lacking. The costs of immunity in the wild may be different to those in the laboratory because animals in the wild are simultaneously subjected to a suite of selective agents. We have measured the costs of immune system activation in a wild population of the territorial damselfly *Calopteryx splendens*. Immune-challenged males were found to be less likely to be territorial and had lower overall survival rates than control or sham-manipulated males. Because territorial males have a higher mating success than nonterritorial males, this result suggests that immune-challenged males are also likely to suffer reduced mating success. However, the activation of the immune system as such did not increase predation risk; this occurred due to a combination of the former with a reduced territory-holding potential. As such, immune-challenged males not holding a

territory were most susceptible to predation by birds. The size of the wing spots, a known sexually selected male trait, predicted territorial behaviour in control and sham-manipulated males, but not in immune-challenged males. Our data show that immune system activation can have several costs acting in unison and that ubiquitous ecological interactions, such as predation, may affect trade-offs between immunity and other life history traits."(Authors)] Address: Rantala, M.J., Dept of Biology, University of Turku, FIN-20024 Turku, Finland. E-mail: markus.rantala@utu.fi

9549. Reithäusler, M.; Martens, A. (2010): Der Anteil gebänderter Larven von *Anax imperator* in einem Gartenteich im November (Odonata: Aeshnidae). *Libellula* 29(1/2): 21-28. (in German, with English summary) ["In November 2009, from a garden pond in Karlsruhe, Germany, 203 larvae of *A. imperator* were sampled. Their size varied from very small stadia (head width 2.1 mm) to those in the ultimate larval stadium before emergence (maximum head width 9.7 mm). Apart from larvae with sharp transversely white bands and those with a greenish ochreous mottled body, we defined two intermediate forms: (1) banded larvae with less contrast in their colouration, the dark areas not uniformly dark, and (2) larvae with only one broad transversal stripe on the basis of the abdomen. Up to 3.3 mm head width all larvae were banded, from 5.3 mm head width onwards all larvae were not banded. Within the transition zone the proportion of banded larvae was decreasing." (Authors)] Address: Reithäusler, M., Leipziger Str. 3, D-76646 Bruchsal, Germany. E-mail: michael.reithaeusler@gmx.net

9550. Richardson, J.S.; Zhang, Y.; Marczak, L.B. (2010): Resource subsidies across the land-freshwater interface and responses in recipient communities. *River Research and Applications* 26: 55-66. (in English) ["Fluxes of resource subsidies, such as terrestrial leaf litter to streams and adult aquatic insects to riparian predators, are examples of important links between adjacent ecosystems. The importance of these cross-ecosystem resource flows from donor systems to recipient consumers is increasingly recognized. Streams, especially small streams with their high edge ratio with the terrestrial system, provide excellent models for the study of subsidies and a large portion of this literature has been produced by aquatic scientists. Field experiments manipulating flows between small streams and their riparian areas (e.g. leaf litter, terrestrial invertebrates, and adult aquatic insects to riparian areas) have indicated that consumers in streams and riparian areas are highly dependent upon such subsidies and the value of the subsidies are further modified by patterns of retention and pathways of use. Experiments typically indicate rapid growth or demographic responses by consumers, indicating these populations are resource limited or at levels of incipient population limitation, and can capitalize on short-term resource pulses. More press manipulations are still necessary to determine the dynamical consequences of subsidies for recipient communities. The nature of the subsidy (e.g. species of litter or invertebrates) and its timing are also important details that need further study. Finally, there are opportunities to consider the evolution of life cycle timing (modelling), interception strategies by recipient populations and short-term and long-term responses of communities. [...] Linkages at the community level: Knight et al. (2005) demonstrated that the presence of predacious

fish in aquatic systems could lead to a trophic cascade in adjacent riparian ecosystems by suppressing the numbers of adult dragonflies. The numbers of dragonfly larvae can be suppressed directly through fish predation or indirectly through behavioural modifications resulting in fewer dragonfly adults. Such fish predation on dragonfly larvae indirectly facilitates terrestrial vegetation reproduction, because insect pollinators were released from the predation pressure of dragonfly adults. Hence, the numbers of pollinators were higher in riparian zones of fish-bearing ponds, where plants received more pollinator visits than plants near fish-free ponds (Knight et al., 2005). Similarly, Ngai and Srivastava (2006) demonstrated that aquatic communities in epiphytic bromeliads containing damselflies had lower rates of emergence of adults of detritivorous insects (chironomids, tipulids, scirtids). As a consequence of a difference in communities the type and rates of subsidies to the terrestrial environment constrained by the presence or absence of predators in the aquatic system. These examples indicate that strong biotic interactions between species can reverberate across ecosystem boundaries through consumer flows." (Authors)] Address: Richardson, J.S., Dept of Forest Sciences, University of British Columbia, Vancouver, V6T 1Z4 Canada. E-mail: john.richardson@ubc.ca

9551. Riservato, E.; Grieco, C.; Pella, F.; Sindaco, R.; Pupin, F.; Saeed Suleiman, A.; Fasola, M. (2010): A contribution to the knowledge of the odonatofauna of the Socotra Archipelago (Yemen) (Insecta: Odonata). *Zoology in the Middle East* 50: 101-106. (in English) ["The odonatofauna of the Socotra Archipelago is reviewed on the basis of recently collected material and a literature survey. The occurrence of 17 out of the 18 known species from the main island was confirmed between 2007 and 2010, and information on their distribution patterns was obtained. New information on the species occurring on Abd El-Kuri and Samha islands is presented." (Author)] Address: Riservato, Elisa, Dipartimento di Biologia Animale, Università di Pavia, Piazza Botta 9, 27100 Pavia, Italy. E-mail: elisa.riservato@unipv.it

9552. Rodriguez-S., L.C. (2010): Dieta de *Anolis homolechis* (COPE, 1864) en el Jardín Botánico Nacional de Cuba. *Revista Colombiana de Ciencia Animal* 2(1): 147-152. (in Spanish) [The diet of 21 male and 19 female *Anolis homolechis* (Cope, 1864) (Reptilia) caught at 27-VI-1991 in the Jardín Botánico Nacional, La Habana, Cuba (23°00'01" N, 82°02'36" E) was studied. One each of 138 male and 267 female prey items belonged to "Odonata".] Address: Rodriguez-S., Lourdes, Instituto de Ecología y Sistemática. C. de Varona Km 3.5, Boyeros CP 10800, AP 8029, La Habana, Cuba. E-mail: zoologia.ies@ama.cu

9553. Santos, T.C.; Costa, J.M.; Carrico, C. (2010): A new species of *Neocordulia* Selys, 1882 (Odonata: Corduliidae) from Minas Gerais State, Brazil. *Biota Neotropica* 10(2): 89-91. (in English, with Portuguese summary) [*Neocordulia machadoi* sp. n. is described and illustrated based on a reared male, collected at Cachoeira da Eubiose stream, São Tomé das Letras, Minas Gerais State, Brazil. The holotype is deposited in the Museu Nacional, UFRJ, Rio de Janeiro, Brazil.] Address: Costa, Janira, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, RJ, Brazil. E-mail: jmcosta@globo.com

- 9554.** Schmidt, E.G. (2010): Adolf Portmann (1897-1982), ein Basler Zoologe von Weltrang: «Mit Libellen fing es an» (Odonata). *Libellula* 29(1/2): 127-141. ["A biographic outline and remarks on the work of the famous Swiss zoologist Adolf Portmann is given, with special reference to his dissertation (1921) on the Odonata of the surroundings of Basel, Switzerland. It comprised the starting point of "biological systematics" in the Odonata, which were later established generally, based on behaviour, by Konrad Lorenz. A popular book on social behaviour (1953) was introduced by a chapter on dragonflies, proving his lifelong love for these insects. He initiated the thesis of the Dutch Dirk C. Geijskes on the limnology of a mountain rivulet near Basel (1935), including a key stone factor analysis on the habitat preference of *Cordulegaster bidentata* and *C. boltonii*. Hence, Portmann is important for the history of odonatology in Central Europe during the first half of the 20th century." (Author)] Address: Schmidt, E.G., Coesfelder Straße 230, D-48249 Dülmen, Germany
- 9555.** Schneider, T.; Müller, O. (2010): Neue Funde von *Boyeria irene*, *Cordulegaster bidentata sicilica* und *C. trinacriae* in Kalabrien (Odonata: Aeshnidae, Cordulegastriidae). *Libellula* 29(1/2): 47-54. (in German, with English and Italian summaries) ["New sites for these species are presented from Calabria, Italy. Apart from one older single record, the findings of *B. irene* are the first from the Calabrian catchment area of the Ionian Sea. In addition, this is the closest known population to its sibling species *Boyeria cretensis*, a Cretan endemic. Furthermore, we report a new locality of *C. bidentata sicilica* in southern Calabria in the Aspromonte mountains." (Authors)] Address: Schneider, T., Arnold-Knoblauch-Ring 76, D-14109 Berlin/Wannsee, Germany. E-mail: karin.thomas.schneider@gmx.de
- 9556.** Schouten, M.A.; Barendregt, A.; Verweij, P.A.; Kalkman, V.J.; Kleukers, V.; Lenders, H.J.R.; Siebel, H.N. (2010): Defining hotspots of characteristic species for multiple taxonomic groups in the Netherlands. *Biodivers. Conserv.* 19: 2517-2536. (in English) ["Biogeographical zonation based on single taxa poses major limitations on planning for nature conservation. This paper identifies biogeographical patterns of multiple taxa in the Netherlands, where no endemics are present at species level, on the basis of characteristic species. We used occurrence data on five species groups in order to identify spatially coherent, ecologically important regions. TWINSPAN was used to cluster grid squares according to similarity in species composition for each taxonomic group. Species that are characteristic of each of the clusters were identified using a preference index, and corresponding clusters among the taxonomic groups were identified with Kappa statistics. Regions containing characteristic species for several taxonomic groups were defined as 'hotspots'. Stepwise discriminant analysis was then used to characterize these hotspots according to differences in environmental conditions. The analysis yielded five regions that are clearly distinct in terms of species composition for individual taxonomic groups. Each region is characterized by a set of unique species that occur in the zonation of at least two of the taxonomic groups. Stepwise discriminant analysis revealed significant environmental differences among these regions. The concept of hotspots as operationalized in this study can make nature conservation planning more efficient. In combination, the hotspots defined here comprise the majority of the species occurring in the Netherlands for the studied groups. Therefore, this regionalization should be taken into account when prioritizing nature conservation efforts." (Authors) The study includes of hoverflies, herpetofauna, grasshoppers and crickets, dragonflies, and mosses.] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl
- 9557.** Schröter, A. (2010): The Odonata of Kyrgyzstan I. Critical national check list, annotated list of records and collected data of the summer half-years 2008 and 2009. *International Dragonfly Fund - Report 28*: 1-72. (in English) ["Based on the results of fieldwork and collecting in 2008 and 2009 and the evaluation of literature an updated national checklist of the Odonata of Kyrgyzstan is presented. The list comprises a total of 63 species, whereas 55 species were encountered in the field by the author, including five new for the country: *Aeshna serrata*, *Onychogomphus lefebvrei*, *Orthetrum sabina*, *Crocothemis servilia*, *Selysiothemis nigra*. 826 specimens of 49 species have been collected (dep. in coll. A. Schröter). All 55 species recorded in 2008 and 2009 are listed and annotated. Moreover, the unclear or controversial taxonomical status of several species is briefly debated. Interesting ecological observations include the emergence of *Libellula quadrimaculata* from running water and cleptoparasitism by *Ischnura forcipata* in spider webs." (Author)] Address: Schröter, A., Harustie 7F 79, 00980 Helsinki, Finland. Email: asmustim@gmx.de
- 9558.** Sciberras, A.; Sciberras, J.; Kunz, B. (2010): *Orthetrum nitidinerve* new to the Maltese Islands (Odonata: Libellulidae). *Libellula* 29(1/2): 55-60. (in English, with German summary) ["In July 2008 *O. nitidinerve* was observed and collected on the Maltese Islands. Records were taken in several localities. *O. nitidinerve* is new to the fauna of the Maltese Islands, which now includes 16 species of Odonata." (Authors)] Address: Sciberras, A., 1131 Arnest', Arcade Street, Paola, Malta. E-mail: bioislets@gmail.com
- 9559.** Shafroth, P.B.; Wilcox, A.C.; Hickey, L.J.T.; Andersen, D.C.; Beauchamp, V.B.; Hautzinger, A.; McMullen, L.E.; Warner, A. (2010): Ecosystem effects of environmental flows: modelling and experimental floods in a dryland river. *Freshwater Biology* 55: 68-85. (in English) ["1. Successful environmental flow prescriptions require an accurate understanding of the linkages among flow events, geomorphic processes and biotic responses. We describe models and results from experimental flow releases associated with an environmental flow program on the Bill Williams River (BWR), Arizona, in arid to semiarid western USA. 2. Two general approaches for improving knowledge and predictions of ecological responses to environmental flows are: (1) coupling physical system models to ecological responses and (2) clarifying empirical relationships between flow and ecological responses through implementation and monitoring of experimental flow releases. 3. We modelled the BWR physical system using: (1) a reservoir operations model to simulate reservoir releases and reservoir water levels and estimate flow through the river system under a range of scenarios, (2) one- and two-dimensional river hydraulics models to estimate stage-discharge relationships at the whole-river and local scales, respectively, and (3) a groundwater model to estimate surface- and groundwater interac-

tions in a large, alluvial valley on the BWR where surface flow is frequently absent. 4. An example of a coupled, hydrology-ecology model is the Ecosystems Function Model, which we used to link a one-dimensional hydraulic model with riparian tree seedling establishment requirements to produce spatially explicit predictions of seedling recruitment locations in a Geographic Information System. We also quantified the effects of small experimental floods on the differential mortality of native and exotic riparian trees, on beaver dam integrity and distribution, and on the dynamics of differentially flow-adapted benthic macroinvertebrate groups. 5. Results of model applications and experimental flow releases are contributing to adaptive flow management on the BWR and to the development of regional environmental flow standards. General themes that emerged from our work include the importance of response thresholds, which are commonly driven by geomorphic thresholds or mediated by geomorphic processes, and the importance of spatial and temporal variation in the effects of flows on ecosystems, which can result from factors such as longitudinal complexity and ecohydrological feedbacks. [...] While both Gomphidae and Ephemeroptera experienced flood-induced mortality, both groups rebounded in numbers after 2 weeks. We attribute the rapid return of gomphids to their ability to move back to the active stream channel, even when they were displaced into high flow channels that dried out postflood." (Authors)] Address: Shafroth, P.B., U.S. Geological Survey, Fort Collins Science Center, 2150 Centre Avenue, Building C, Fort Collins, CO 80526, USA. E-mail: shafrothp@usgs.gov

9560. Sherratt, T.N.; Laird, R.A.; Hassall, C.; Lowe, C.D.; Harvey, I.F.; Watts, P.C.; Cordero-Rivera, A.; Thompson, D.J. (2010): Empirical evidence of senescence in adult damselflies (Odonata: Zygoptera). *Journal of Animal Ecology* 79(5): 1034-1044. (in English) ["1. Age-dependent increases in mortality have been documented in a variety of species of insect under laboratory conditions. However, while strong statistical evidence has been presented for senescence in vertebrate populations in the wild, we know little about the rate and shape of senescence in wild populations of insects. 2. Odonates provide excellent candidate species for evaluating demographic senescence as they are large enough to be marked individually and they are easily re-sighted without recapture. The prevailing opinion – based entirely on qualitative examination of the declines in log numbers alive with time since marking – is that odonates exhibit age-independent daily survivorship. 3. Here, we examine mark-recapture data on *Coenagrion puella* over two consecutive seasons. For the first time, we evaluate and compare the fit of quantitative models that not only account for weather-dependent daily variation in daily re-sighting rates, but also age-dependent variation in daily survivorship. 4. Models with age-dependent declines in daily survivorship provide a more parsimonious explanation for the data than similar models without these age-dependent effects. In general, models in which mortality increases in an exponential (Gompertz) fashion explain the mark-recapture sequences more efficiently than a range of alternative models, including those in which mortality increases as a power function (Weibull) or reaches a plateau (logistic). These results are indicative of a general senescent decline in physiological functioning, which is particularly marked after 15 days as a mature adult. 5. Weather (temperature, sun and precipitation)

and initial mite load influenced the probability of daily re-sighting. Weather and mite load also influenced daily survivorship, but their effects differed between seasons. 6. Overall, fitting models with age as an explicit covariate demonstrates that odonates do indeed senesce. This contradicts previously held assumptions that Odonata do not exhibit age-dependent survivorship in the wild." (Authors)] Address: Sherratt, T.N., Dept of Biology, Carleton Univ., 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: sherratt@ccs.carleton.ca

9561. Siepielski, A.M.; Hung, L.L.; Bein, E.E.B.; McPeck, M.A. (2010): Experimental evidence for neutral community dynamics governing an insect assemblage. *Ecology* 91(3): 847-857. (in English) ["The high levels of species diversity observed within many biological communities are captivating, yet the mechanisms that may maintain such diversity remain elusive. Many of the phenotypic differences observed among species cause interspecific trade-offs that ultimately act to maintain diversity through niche-based coexistence. In contrast, neutral community theory argues that phenotypic differences among species do not contribute to maintaining species diversity because species are ecologically equivalent. Here we provide experimental and observational field evidence that two phylogenetically very distant *Enallagma* species appear to be ecologically equivalent to one another. Experimental abundance manipulations showed that each species gains no demographic advantage at low relative abundance, whereas manipulations of total *Enallagma* abundance resulted in large increases in per capita mortality and large decreases in growth for both species. Moreover, demographic rates and relative abundances of multiple *Enallagma* species were uncorrelated with major environmental gradients in an observational study of 20 natural lakes. These are the expected patterns if species are ecologically equivalent. However, these results do not imply that all damselflies in these lakes are ecologically identical. Previous experimental results have demonstrated the operation of strong coexistence mechanisms maintaining *Enallagma* and its sister-genus *Ischnura* in these littoral food webs. Combined with a simple theoretical model we present, these results taken together show how both neutral and niche dynamics can jointly structure communities." (Author)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

9562. Simaika, J.P.; Samways, M.J. (2010): Large-scale estimators of threatened freshwater catchment species relative to practical conservation management. *Biological Conservation* 143(2): 311-320 (in English) ["Freshwater ecosystems are among the most threatened in the world. In light of the threats to freshwater biodiversity, it is essential to map the distribution and status of species to ascertain their threat status for prioritizing conservation action. However, while there is agreement that the conservation of freshwater ecosystems depends on whole-catchment management, there are still a wide variety of large-scale mapping methods in use, the advantages and disadvantages of which have not been fully explored. This study shows that area estimation based on minimum convex polygons should not be encouraged for aquatic species. The IUCN definition of area of occupancy (AOO) is a useful term, albeit highly scale-dependent, for assessment of the total approximate area over which a species occurs.

However, for aquatic fauna, and perhaps many other organisms, assessment of occurrence should be based on the more accurate point-locality presences only. The IUCN extent of occurrence (EOO), for freshwater catchment species, should be redefined as 'the sum of the smallest hydrological units identified, of presently known, inferred or projected occurrences of a taxon, excluding cases of vagrancy, that are used to estimate the threat to a taxon'. A single hydrological unit is also the conservation or management unit. Here we suggest that this unit is the quaternary catchment. This new mapping approach is more appropriate and practical for use in both management planning and conservation action. We suggest that conservation managers and decision makers facilitate co-operation in freshwater mapping efforts by working at the same spatial scale, i.e. the same hydrological unit." (Authors) The paper includes many references to Odonata.] Address: Samways, M.J., Dept Entomol. & Nematol, Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

9563. Small, G.E.; Pringle, C.M. (2010): Deviation from strict homeostasis across multiple trophic levels in an invertebrate consumer assemblage exposed to high chronic phosphorus enrichment in a Neotropical stream. *Oecologia* 162(3): 581-590. (in English) ["A central tenet of ecological stoichiometry is that consumer elemental composition is relatively independent of food resource nutrient content. Although the P content of some invertebrate consumer taxa can increase as a consequence of P-enriched food resources, little is known about how ecosystem nutrient loading can affect the elemental composition of entire consumer assemblages. Here we examine the potential for P enrichment across invertebrate consumer assemblages in response to chronic high P loading. We measured elemental ratios in invertebrate consumers and basal food resources in a series of streams in lowland Costa Rica that range widely in P levels (2-135 µg l⁻¹ soluble reactive P). Streams with high P levels receive natural long-term (over millennia) inputs of solute-rich groundwater while low-P streams do not receive these solute-rich groundwater inputs. P content of leaf litter and epilithon increased fourfold across the natural P gradient, exceeding basal resource P content values reported in the literature from other nutrient-rich streams. Invertebrate consumers from the high-P study stream were elevated twofold in P content across multiple taxonomic and functional feeding groups, including predators. Our results strongly support the hypothesis that elevated P content in consumers feeding on P-enriched food resources is a consequence of deviation from strict homeostasis. In contrast to prior studies, we found that between-stream variation in P content of a given taxon greatly exceeded within-stream variation among different taxa, suggesting that environment may be as important as phylogeny in controlling consumer stoichiometry. Relaxing the assumption of strict homeostasis presents challenges and opportunities for advancing our understanding of how nutrient limitation affects consumer growth. Moreover, our findings may provide a window into the future of how chronic anthropogenic nutrient loading can alter stoichiometric relationships in food webs." (Authors) Taxa including Odonata are treated at the order or family-level.] Address: Small, G.E., Odum School of Ecology, University of Georgia, Athens, GA 30602, USA. E-mail: csmall@uga.edu

9564. Souza, L.O.; Costa, J.M.; Santos, T.C. (2010): Revalidation of *Acanthagrion cuyabae* (Odonata, Coenagrionidae) and description of the female, with a key to the Brazilian species of the *viridescens* group. *Iheringia, Sér. Zool.* 100(1): 79-83. (in English, with Portuguese summary) ["*Acanthagrion cuyabae* Calvert, 1909 was described based on a male from State of Mato Grosso, Brazil. The female of this species was described based on morphological characters of four individuals collected in copula from State of Mato Grosso do Sul, and three other specimens of same locality. *A. cuyabae* is here revalidated based on morphological characters of the female. Illustrated keys to the groups of *Acanthagrion* Selys, 1876 and species of the *viridescens* group occurring in Brazil are provided." (Authors)] Address: de Souza, L.O., Depto de Biologia/CCBS, Universidade Federal de Mato Grosso do Sul, Cidade Universitária s/n, 79070-900 Campo Grande, MS, Brazil. E-mail: irineudesouza@gmail.com

9565. Stannard, H.J.; Caton, W., Old, J.M. (2010): The diet of red-tailed phascogales in a trial translocation at Alice Springs Desert Park, Northern Territory, Australia. *Journal of Zoology* 280(4): 326-331. (in English) ["In this study, a dietary analysis was conducted to determine the preferred diet of the translocated phascogales in the park environment. Scats were collected during July–October, 2006 and January–March, 2007 from nesting sites within the park. [...] Scat analysis methods identified that red-tailed phascogales were primarily insectivorous with 92.6% of all scats containing arthropods. They are also opportunistic predators within the park, consuming birds (51.6%), small mammals (33.3%) and on occasion reptiles, and plant material (27.4%). Seasonal comparison of data through SIMPER analyses showed there was significant variation (P=0.009) between spring and summer, due to a large portion of birds present in the diet in spring." (Authors) The diet of the Red-tailed phascogales *Phascogales calura* (Mammalia) also includedes a *Zygoptera*.] Address: Old, Julie, Native & Pest Animal Unit, School of Natural Sciences, Univ. of Western Sydney, Hawkesbury Building M15, Locked Bag 1797, Penrith South DC 1797, NSW, Australia. E-mail: j.old@uws.edu.au

9566. Števo, B.; Bulánková, E. (2010): Macrozoobenthos of the middle part of the Vydrice stream – comparison after 50 and 25 years. *Folia faunistica Slovaca* 15(3): 19-24. (in Slovakian, with English summary) [Records of *Cordulegaster heros* from two localities along the the middle part of stream Vydrice in the Malé Karpaty Mts. (48°12'59,6"N 17°05'20,0" E; 48°12'57,5"N 17°05'27,6"E) are reported.] Address: Bulánková, Eva, Inst. of Ecology, Faculty of Natural Sciences, Comenius Univ., Mlynská dolina B-II, SK-84215 Bratislava., Slovakia. E-mail: Bulankova@fns.uniba.sk

9567. Stübing, S.; Roland, H.-J. (2010): Hinweise zum Auftreten der Südlichen Heidelibelle *Sympetrum meridionale* (Selys 1841) in Hessen und zu ihrer Bestimmung. *Libellen in Hessen* 3: 58-60. (in German) [Current records of *S. meridionale* in Hessen, Germany are compiled. Some critical remarks on identification of the species are made.] Address: Stübing, S., Im Feldchen 1a, D-61209 Echzell, Germany. E-mail: stefan.stuebing@gmx.de

9568. Suhling, F.; Samways, M.J.; Simaika, J.P.; Richter, O.; Marais, E.; Martens, A.; Kipping, J. (2010): Dragonfly diversity from the Cape to the Kavango. In:

Schmiedel, U. & Jürgens, N. [Eds.]: Biodiversity in southern Africa. Volume 2: Patterns and processes at regional scale. Klaus Hess Publishers, Göttingen & Windhoek: 64-69. (in English) ["Dragonflies are amongst the most well-studied and most recognised insects and there is an ongoing worldwide initiative in which the diversity and conservation status of all species are being assessed. In Africa, where about 900 species of Odonata occur, the southern part of the continent is currently the best surveyed for Odonata. In this chapter we analyse and depict biodiversity distribution patterns in the BIOTA transect area, from the Cape in the south to the Okavango River in the north, using Odonata databases for Botswana, Namibia and South Africa. We counted species numbers in each WWF Terrestrial Ecoregion and freshwater basin. Species numbers were highest in the Zambebian ecoregions followed by the Cape ecoregions, whereas the drier ecoregions had fewer species, except for a few outstanding localities. The proportions of range-restricted species were highest in the Cape and Zambebian ecoregions accounting for at least one third of the species, whereas all other ecoregions were almost exclusively populated by widespread species." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

9569. Suhonen, J.; Hilli-Lukkarinen, M.; Korkeamäki, E.; Kuitunen, M.; Kullas, J.; Penttinen, J.; Salmela, J. (2010): Local extinction of dragonfly and damselfly populations in low- and high-quality habitat patches. *Conservation Biology* 24(4): 1148-1153. (in English, with Spanish summary) ["Understanding the risk of extinction of a single population is an important problem in both theoretical and applied ecology. Local extinction risk depends on several factors, including population size, demographic or environmental stochasticity, natural catastrophe, or the loss of genetic diversity. The probability of local extinction may also be higher in low-quality sink habitats than in high-quality source habitats. We tested this hypothesis by comparing local extinction rates of 15 species of Odonata between 1930-1975 and 1995-2003 in central Finland. Local extinction rates were higher in low-quality than in high-quality habitats. Nevertheless, for the three most common species there were no differences in extinction rates between low- and high-quality habitats. Our results suggest that a good understanding of habitat quality is crucial for the conservation of species in heterogeneous landscapes." (Authors)] Address: Suhonen, J., Department of Biological and Environmental Science, P.O. Box 35, FI-40014, University of Jyväskylä, Finland

9570. Suhonen, J.; Honkavaara, J.; Rantala, M.J. (2010): Activation of the immune system promotes insect dispersal in the wild. *Oecologia* 162(3): 541-547. (in English) ["Dispersal has important ecological and evolutionary consequences but is a poorly understood behaviour. We experimentally tested whether activation of the immune system affects dispersal in male damselflies, *Calopteryx virgo*, from three natural populations. We show that males that contained an experimentally inserted artificial pathogen, a nylon monofilament implant, had higher dispersal rates and flew further than control males, but not further than sham manipulated males. Our data suggest that dispersal may reduce the risk of further infections if immune system activation indicates high parasite infection risk in the present habitat. We, thus, suggest that parasites may play an impor-

tant role in the evolution of host dispersal." (Authors)] Address: Suhonen, J., Section of Ecology, Department of Biology, University of Turku, 20014 Turku, Finland. E-mail: juksuh@utu.fi

9571. Togashi, H.; Suzuki, T.; Urabe, J. (2010): Spatial variations in chironomid larvae and dragonfly predation in pools on a Japanese high mountain moor. *Verh. Int. Ver. Limnologie* 30(9): 1357-1362. (in English) ["Our study clearly showed a negative impact of dragon-flies, *Aeshna juncea* and *A. nigroflava*, on the abundance of chironomid larvae, due largely to the impact on *Alotanypus*, which dominated the chironomid communities in the Shibakusa-Daira pools. The abundance of this genus when dragonfly nymphs were added was significantly lower than that in their absence. The effect index of post-manipulation was negatively correlated with dragonfly biomass. Thus, regardless of the pool, an increase in *Aeshna* abundance consistently reduced *Alotanypus* abundance. However, in the 3 other genera - *Tanytarsus*, *Procladius*, and *Chironomus* - no significant difference was detected between the effect indices of pre- and post-manipulation. This implies either that *Aeshna* do not prey heavily on these genera or that net effects of this predatory dragonfly on these genera differ among the pools. These possibilities imply that the abundance of *Aeshna* can be a factor differentiating the community structure of chironomid larvae among pools at the Shibakusa-Daira." (Authors)] Address: Togashi, H., Division of Ecology and Evolutionary Biology, School of Life Sciences, Tohoku University, Aoba, Aramaki, Aoba-ku, Sendai 980-8578, Japan. E-mail: hiroyuki-togashi@mail.tains.tohoku.ac.jp

9572. Touchon, J.C.; Warkentin, K.M. (2010): Short- and long-term effects of the abiotic egg environment on viability, development and vulnerability to predators of a Neotropical anuran. *Functional Ecology* 24(3): 566-575. (in English) ["1. Environmental variation during development is common and often has long-lasting effects on phenotypes and survival. In organisms with complex life cycles, such effects may carry over from one life stage into the subsequent stages, affecting reproductive success and survival in both direct and indirect manners. Much research has focused on the transition from the larval to adult stages, but fewer studies have addressed how egg-stage variation may affect the larval stage, development to metamorphosis, and adult fitness. 2. We assessed the short- and long-term consequences of abiotic environmental variation during egg development of the Neotropical treefrog *Dendropsophus ebraccatus*. Typically, *D. ebraccatus* eggs are oviposited terrestrially on leaves above water and hydrated by rainfall. However, at our field site in Panama ~25% of terrestrial eggs become desiccated during development and ~19% become submerged underwater. In addition, in unshaded ponds *D. ebraccatus* lays eggs directly in water. We assessed immediate and carryover effects of egg development under hydrated, desiccated and submerged conditions. We measured morphology and vulnerability to predators at hatching and at three time points during the larval period. We also measured morphology at metamorphosis. 3. Submerged eggs hatched less developed and later and had higher baseline mortality after hatching than either hydrated or desiccated terrestrial eggs. By 10 days after hatching, the morphology of tadpoles from the three egg environments was indistinguishable. Nonetheless, the egg environment affected predation, with tadpoles from

submerged eggs being least vulnerable; later in development egg environment ceased to affect vulnerability. Tadpoles from all egg environments grew to a size refuge from dragonfly nymphs, whereas vulnerability to water bugs remained constant throughout development. At metamorphosis, froglets from submerged eggs were the largest and those from hydrated eggs were the smallest. 4. With anticipated climate change in the Neotropics, rainstorms are predicted to become more sporadic but larger when they do occur, potentially increasing the chances of both egg desiccation and flooding. The incidence of different egg environments may therefore change, potentially affecting amphibian phenotypes, interactions with predators, and survival across multiple life stages." (Author)] Address: Touchon, J.C., Department of Biology, Boston University, Boston, Massachusetts, USA. E-mail: jtouchon@bu.edu

9573. Tsubaki, Y.; Samejima, Y.; Siva-Jothy, M.T. (2010): Damselfly females prefer hot males: higher courtship success in males in sunspots. *Behavioral Ecology and Sociobiology* 64(10): 1547-1554. (in English) ["Males of some territorial calopterygid damselflies show an elaborate courtship display that involves high-frequency wing-beats directed toward an incoming female. Although it has been suggested that female mate preference is based on some characteristics of male's courtship display, it is unclear whether the courtship display varies between males or is influenced by environmental conditions. We combined two recent technologies, thermographic imaging and high-speed digital videography, to show that the wing-beat frequency during courtship (i.e., courtship intensity) in a damselfly, *Mnais costalis*, is correlated with thorax temperature. Our data indicated that (1) male thorax temperature was associated with solar exposure in his territory, (2) environmentally derived thermal gain enhanced courtship intensity, (3) hotter males were more likely to copulate than others, and (4) female thorax temperature during oviposition within a territory was associated with solar exposure. Males with territories that have longer exposure to sun spots are expected to attain higher thorax temperatures for longer and so are able to successfully court more females. We suggest that females benefit from mating with hot males because they will be on a warmer territory while ovipositing. Hot males might also have greater mate guarding ability, and/or eggs may develop faster in warmer territories." (Authors)] Address: Tsubaki, Y., Center for Ecological Research, Kyoto University, Hirano 2-509-3, Otsu 520-2113, Japan. E-mail: ytsubaki@jecology.kyoto-u.ac.jp

9574. Tsuchiya, K.; Hayashi, F. (2010): Factors affecting sperm quality before and after mating of calopterygid damselflies. *PLoS ONE* 5(3): e9904. doi: 10.1371/7 pp. (in English) ["Damselflies have a more complex sperm transfer system than other internally ejaculating insects. Males translocate sperm from the internal reproductive organs to the specific sperm vesicles, a small cavity on the body surface, and then transfer them into the female. To examine how the additional steps of sperm transfer contribute to decreases in sperm quality, we assessed sperm viability (the proportion of live sperm) at each stage of mating and after different storage times in male and female reproductive organs in two damselfly species, *Mnais pruinosa* and *Calopteryx cornelia*. Viability of stored sperm in females was lower than that of male stores even just after copulation. Male sperm vesicles were not equipped to main-

tain sperm quality for longer periods than the internal reproductive organs. However, the sperm vesicles were only used for short-term storage; therefore, this process appeared unlikely to reduce sperm viability when transferred to the female. Males remove rival sperm prior to transfer of their own ejaculate using a peculiar-shaped aedeagus, but sperm removal by males is not always complete. Thus, dilution occurs between newly received sperm and aged sperm already stored in the female, causing lower viability of sperm inside the female than that of sperm transferred by males. If females do not mate, sperm viability gradually decreases with the duration of storage. Frequent mating of females may therefore contribute to the maintenance of high sperm quality." (Authors)] Address: Hayashi, F., Department of Biology, Tokyo Metropolitan University, Tokyo, Japan. E-mail: fhayashi@tmu.ac.jp

9575. van Strien, A.J.; Termaat, T.; Groenendijk, D.; Mensing, V.; Kery, M. (2010): Site-occupancy models may offer new opportunities for dragonfly monitoring based on daily species lists. *Basic and Applied Ecology* 11(6): 495-503 (in English) ["Monitoring biodiversity is necessary but difficult to achieve in practice, in part because standardized field work is often demanding for volunteer field workers. Collecting opportunistic data on presence and absence of species is much less demanding, but such data may suffer from a number of biases, such as variation in observation effort over time. Here we explore whether site-occupancy models may be helpful to reduce such biases in opportunistic data, especially those caused by temporal variation of observation effort and by incomplete reporting of sightings. Site-occupancy models represent a generalisation of classical metapopulation models to account for imperfect detection; they estimate the probability of sites to be occupied (and of the rates of change, colonisation and extinction rates) while taking into account imperfect detection of a species. The models require so-called presence-absence data from replicated visits for a number of sites (e.g., 20-50). We tested whether these models provide reliable trend estimates if collectors of opportunistic data do not report all species detected. We applied the models to three opportunistic datasets of dragonfly species (1999-2007) in the Netherlands: (1) one-species records, (2) short daily species lists and (3) comprehensive daily species lists. Trend estimates based on a fourth dataset from a standardized monitoring scheme were used as a yardstick to judge the results. The analyses showed that occupancy trends based on comprehensive daily species lists in combination with site-occupancy models were generally similar to those based on the monitoring scheme. But trends based on one-species records and short daily lists were too imprecise to be very useful. In addition, site-occupancy models lead to more realistic occupancy estimates than those obtained from conventional logistic regression analysis. We conclude that comprehensive daily species lists can be useful surrogates for monitoring schemes to assess distributional trends." (Authors) Address: van Strien, A.J., Statistics Netherlands, P.O. Box 24500, 2490 HA The Hague, The Netherlands. E-mail: asin@cbs.nl

9576. Varnosfaderany, M.N.; Ebrahimi, E.; Mirghafary, N.; Safyanian, A. (2010): Biological assessment of the Zayandeh Rud River, Iran, using benthic macroinvertebrates. *Limnologica* 40: 226-232. (in English) ["Benthic macroinvertebrate communities from the

middle of Zayandeh Rud River were analyzed monthly during 1 year at 8 stations, in order to assess changes in their diversity and richness in relation to water quality. Two major groups of sites based on similarity between macroinvertebrate communities were identified by cluster analysis. The performances of the original and revised BMWP score systems were assessed by comparing the community structure indices of benthic macroinvertebrates along with physico-chemical parameters of the water. The biotic indices (BMWP, ASPT, revised BMWP and ASPT) showed better correlation with water quality parameters than that of the richness and diversity indices. The revised ASPT had the highest correlation with water quality parameters. It seems that the application of the revised BMWP score system could be useful for assessment of the water quality in Zayandeh Rud River." (Authors) Odonata are treated at the family level.] Varnosfaderany, M.N., Dept of Natural Resources, Isfahan Univ. of Technology, Isfahan 84156-83111, Iran. E-mail address: mnemati@na.iut.ac.ir (M.N. Varnosfaderany).

9577. Velte, F. (2010): Teichfrosch erbeutet Blaugrüne Mosaikjungfer *Aeshna cyanea* (Müller 1764). Libellen in Hessen 3: 61. (in German) [19-IX-1995, Oberursel, Hessen, Germany; Two males of *A. cyanea* involved in territorial contest, dropped at the surface of a pond. One of two *Rana esculenta* (No. 1) successfully preyed on one of the specimens, while the second male *A. cyanea* could escape *R. esculenta* (No. 2).] Address: Velte, F., In den Lindengärten 3, 61352 Bad Homburg, Germany. Marlin1904@aol.com

9578. Villanueva, R.J.T. (2010): Odonata fauna of Polillo Island - revisited. International Dragonfly Fund - Report 27: 1-16. (in English) [Philippines; "Odonata were recorded and voucher specimens collected between March 25 and April 4 2010. The present survey revealed 73 species from 15 families and 44 genera. An additional nine species were added from the previous list. This includes two species new to science and one that is possible also new to science. Additional specimens were obtained from species of particular importance (2 individual of the new *Drepanosticta* and 2 individual of *Hemicordulia*, both noted during 2009 survey). Several species collected in 2009 were not found during the recent survey." (Author)] Address: Villanueva, R., D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000 Philippines. Email: rjtvillanueva@gmail.com

9579. von Blanckenhagen, B. (2010): Zwei Stillgewässer als Fortpflanzungshabitat der Gemeinen Keiljungfer *Gomphus vulgatissimus* (Linnaeus 1758) in Hessen. Libellen in Hessen 3: 62. (in German) [Germany; Exuviae of the rheophilous *G. vulgatissimus* were found in gravel pits.] Address: von Blanckenhagen, B., Kaffweg 8, 35039 Marburg, Germany. E-mail: benno.v.blanckenhagen@web.de

9580. Waldhauser, M.; Mikát, M. (2010): New records of *Coenagrion ornatum* in the Czech Republic (Odonata: Coenagrionidae). Libellula 29(1/2): 29-46. (in English, with German and Czech summaries) ["The distribution of *C. ornatum* in the Czech Republic is far more extensive than considered up to 2009. Before 2009 only one recent population from the Piletický brook watershed and five historical records from Bohemia and Moravia were known. In 2009 twenty-five new localities with *C. ornatum* were discovered. These localities are distributed in northern, central and eastern Bohemia.

The new *C. ornatum* localities are situated mostly in open farmland or mining areas at altitudes below 280 m a.s.l. *C. ornatum* prefers sunny parts of brooks and amelioration ditches with lush littoral vegetation (e.g. *Sparganium erectum*, *Veronica beccabunga*, *Potamogeton* spp., *Berula erecta*). However, it also occurs along degraded and regulated sections of the streams where the vegetation is dominated by *Phalaris arundinacea* and *Urtica dioica*." (Authors)] Address: Waldhauser, M., Administration of Lužické hory Protected Landscape Area, Školní 12, 471 25 Jablonné v Podještědí, CZ-471 25, Czech Republic. E-mail: martin.waldhauser@nature.cz

9581. Waldhauser, M.; Mikát, M. (2010): The Ornate Blue – A surprise from a coal mine dump. *Ochrana přírody* 2010(2): 15-17. (in Czech, with English summary) ["The distribution of *Coenagrion ornatum* in the Czech Republic is far more extensive than it was considered before 2009. At that time the only single recent population from the Piletický potok Brook Basin and five historical records from Bohemia and Moravia had been known. In 2009 25 new sites inhabited by the Ornate Blue were discovered. They are located in northern, central and eastern Bohemia and are situated mostly in open farmlands or mining areas at altitudes below 280 m a.s.l. *Coenagrion ornatum* prefers sunny parts of brooks and channels with rich littoral vegetation (e.g., *Sparganium erectum*, *Veronica beccabunga*, *Potamogeton* spp.). However, it also occurs at degraded and regulated stream stretches where the vegetation is dominated by *Phalaris arundinacea* and *Urtica dioica*." (Authors)] Address: Mikát, M., Charles University in Prague, Faculty of Science, Department of Zoology, Viničná 7, Praha 2, CZ-128 43, Czech Republic. E-mail: michael.mikat@gmail.com

9582. Watts, P.C.; Keat, S.; Thompson, D.J. (2010): Patterns of spatial genetic structure and diversity at the onset of a rapid range expansion: colonisation of the UK by the small red-eyed damselfly *Erythromma viridulum*. *Biological Invasions* 12(11): 3887-3903. (in English) ["Species' geographic ranges may vary in size in response to a change in environmental conditions. The specific genetic consequences of range expansions are context dependent, largely depending upon the rate of colonisation as well as the origins and numbers of founders, and the time since colonisation. Like other "charismatic" taxa, such as birds and lepidopterans, the distributions of odonates are well-known through substantial monitoring programmes co-ordinated by various societies. The small red-eyed damselfly *E. viridulum* has undergone a substantial, northward range expansion in Europe in the last 30 years and has recently colonised two distinct areas in the UK. We quantify the immediate genetic consequences of this rapid colonisation by genotyping more than 1,400 *E. viridulum* from 39 sites across the northwest margin of this species' geographic range. Levels of genetic diversity and spatial structure are impacted by this species recent range expansion and non-equilibrium conditions that drive weak genetic divergence, even at regional spatial scales. Populations of *E. viridulum* become less diverse towards the edge of this species' distribution, presumably as a consequence of colonisation through a series of founder events. Specifically, there is a significant reduction in genetic diversity in the smallest, most recent focus of colonisation in the UK; however, there are generally low levels of genetic diversity across this *E.*

viridulum's northern range margin. While most populations are generally poorly differentiated, *E. viridulum* nonetheless consists of two distinct lineages that broadly differentiate between eastern and western Europe. Genetic divergence between the two UK colonisation foci are indicative of distinct immigration events from separate sources; however a general lack of spatial structure prevents us from pinpointing the specific origins of these migrant damselflies." (Authors) Address: Watts, P.C., School of Biological Sciences, The Biosciences Building, Crown Street, University of Liverpool, Liverpool, L69 7ZB, UK. E-mail: p.c.watts@liv.ac.uk

9583. Wellenreuther, M.; Vercken, E.; Svensson, E.I. (2010): A role for ecology in male mate discrimination of immigrant females in *Calopteryx damselflies*?. *Biological Journal of the Linnean Society* 100(3): 506-518. (in English) ["Sexual selection against immigrants is a mechanism that can regulate premating isolation between populations but, so far, few field studies have examined whether males can discriminate between immigrant and resident females. Males of the damselfly *C. splendens* show mate preferences and are able to force pre-copulatory tandems. We related male mate responses to the ecological characteristics of female origin, geographic distances between populations, and morphological traits of females to identify factors influencing male mate discrimination. Significant heterogeneity between populations in male mate responses towards females was found. In some populations, males discriminated strongly against immigrant females, whereas the pattern was reversed or nonsignificant in other populations. Immigrant females were particularly attractive to males when they came from populations with similar predation pressures and densities of conspecifics. By contrast, immigrant females from populations with strongly dissimilar predation pressures and conspecific densities were not attractive to males. Differences in the abiotic environment appeared to affect mating success to a lesser degree. This suggests that male mate discrimination is context-dependent and influenced by ecological differences between populations, a key prediction of ecological speciation theory. The results obtained in the present study suggest that gene-flow is facilitated between ecologically similar populations." (Authors)] Address: Wellenreuther, Maren, Section for Animal Ecology, Ecology Building, Lund University, Sölvegatan 37, SE-223 62 Lund, Sweden. E-mail: maren.wellenreuther@zoekol.lu.se

9584. Wildermuth, H. (2010): Waldlichtungen als terrestrische Habitate von Libellen (Odonata). *Entomo Helvetica* 3: 7-24. (in German, with English and French summaries) ["Forest clearings as terrestrial habitats of dragonflies (Odonata). – Odonates are generally considered aquatic insects living in or near water. However, during the imaginal period they spend much time in terrestrial habitats often far aside from the breeding sites. In a systematic study at eight forest clearings with extensively utilized moist meadows in the Swiss Plateau it has been shown that 80 % of the local odonate fauna used these terrestrial habitats for maturation, foraging, thermoregulation and exceptionally also as rendezvous. *Platycnemis pennipes* and *Libellula fulva* evidently had to cover distances of 0.7–2.2 km and to fly over forests and cross wide roads in order to reach the clearings and to return to the breeding site. The importance of the clearings for various species was different and thus discussed in detail." (Author)] Address: Wildermuth, H.,

Haltbergstrasse 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

9585. Worthen, W.B. (2010): Flying Dragons: A colorful field experiment in resource partitioning. *The American Biology Teacher* September 72(7): 432-436. (in English) ["Several common dragonfly species perch at different heights. Using dowels as perches and simple chi-square tests, this pattern of resource partitioning can be described quickly and easily. Additional experiments can examine the effect of interspecific competition on perch selection, and the relationships between perching height, body size, and wing aerodynamics." (Author)] Address: Worthen, W.B., Dept of Biology, Furman Univ., Greenville, SC29613 USA. E-mail: worthen@furman.edu

9586. Yamada, Y.; Sasaki, H.; Harauchi, Y. (2010): Composition of road-killed insects on coastal roads around Lake Shikotsu in Hokkaido, Japan. *J. Rakuno Gakuen Univ.* 34(2): 177-184. (in English, with Japanese summary) ["Road-killed insects were collected 12 times along two environmentally different coastal roads of Lake Shikotsu, Hokkaido, Japan, from mid-June to mid-September in 2007. Route 276 is located 50-100 m distant from the lakeshore and separated from the water by woodland, whereas Route 453 is situated alongside the lakeshore; thus, flora along the two roadsides differ. In total, 2590.1 insects per kilometre were found along Route 276, whereas 2414.2 insects per kilometre were found on Route 453. When classified by order, the composition of the collected insects differed between the two roads: Lepidoptera (32.79%) was the dominant order on Route 276 followed by Coleoptera (25.29%) and Diptera (18.52%), whereas on Route 453, Coleoptera (25.47%) was the dominant order, followed by Diptera (21.33%) and Odonata (17.02%). The species composition of dragonflies and butterflies also differed between the roads. Our results suggest that differences in the composition of insects killed along roads are due to differences in roadside environments.] Address: Yamada, Y., Lab. of Entomol., Graduate school of Rakuno Gakuen Univ., Ebetsu, Hokkaido 069-8501, Japan

9587. Yoon, J.; Jong, M.N.; Heungtae, K.; Yeon, J.B.; Jae, G.K. (2010): *Nannophya pygmaea* (Odonata: Libellulidae), an endangered dragonfly in Korea, prefers abandoned paddy fields in the early seral [sic] stage. *Environ. Entomol.* 39(2): 278-285. (in English) ["To characterize habitats of *N. pygmaea*, which is endangered in Korea, we analyzed characteristics of surface water and soil, landscape properties, and vegetation types in 22 habitats in eight areas of Korea where nymphs of *N. pygmaea* have been found since 2005. We divided the habitats into two groups: DS (dwelling site) habitats, where *N. pygmaea* was observed at the time of the study, and PDS (past dwelling site) habitats, where *N. pygmaea* recently lived but is no longer found. The habitats were mostly located in former paddy fields on mountain slopes that have been abandoned for 3-7 yr. The main water sources for these habitats were ground water and surface runoff, and the water level was stable at 3-7 cm in depth. The habitats ranged from 300 to 1000 m² and were dominated by *Juncus effusus*, which formed tussock mounds. According to the hydrosere model of succession, *N. pygmaea* appeared mostly in the early stages of plant succession (the period 3-7 yr after the initiation of succession in former paddy fields) and *N. pygmaea* preferred habitats displaying the water and soil characteristics that are typical of the

early stages of succession in abandoned paddy fields. These results indicate that the primary habitats of *N. pygmaea* in Korea are recently abandoned paddy fields that are in an oligotrophic state. As succession proceeds in these habitats, *N. pygmaea* disappears. A habitat management program should be launched to conserve the habitats and populations of *N. pygmaea*." (Authors)] Address: Jae, G.K., Department of Biology Education, Seoul National University, Seoul 151-748, Korea. E-mail: jaegkim@snu.ac.kr.

9588. Zambrano, L.; Valiente, E.; Vander Zanden, M.J. (2010): Stable isotope variation of a highly heterogeneous shallow freshwater system. *Hydrobiologia* 646: 327-336. (in English) ["Food web structure is well known to vary widely among ecosystems. Recent research indicates that there can be a high degree of spatial heterogeneity within ecosystems as well. Xochimilco is a small heterogeneous freshwater system that has been transformed into a network of canals, small lakes, and wetlands. Located within Mexico City, this ecosystem has been intensively managed and highly impacted for more than 50 years. This system receives urban and agricultural runoff, with resulting impacts on water quality. The aquatic community is dominated by exotics such as carp (*Cyprinus carpio*) and tilapia (*Oreochromis niloticus*), though the system still supports endemic species such as the aquatic salamander, axolotl (*Ambystoma mexicanum*), and crayfish (*Cambarellus montezumae*), which are both endangered. In this study, we used carbon and nitrogen stable isotopes for the whole food web and gut content analysis from the exotic fishes to describe food web structure in different canals within Xochimilco. There were significant isotopic differences among canals. These differences may result from isotopic baseline differences as well as differences in actual food web structure: both are related to local spatial variation in water quality driven by nutrient inputs and exotic fishes. Within ecosystem variability is likely to be seen in other perturbed shallow systems as well, and should be explicitly considered in future food web studies." (Authors) There were no significant differences among years in carbon or nitrogen for Odonata. Most taxa did not show seasonal differences in $\delta^{15}N$, except for axolotl, which were higher in the rainy season, and Odonata, which were higher in the dry season.] Address: Zambrano, L., Depto de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México, Ciudad Universitaria, México DF 04200, México. E-mail: zambrano@ibiologia.unam.mx

9589. Zessin, W. (2010): Der renaturierte Kraaker Mühlenbach – ein Refugium für seltene Pflanzen und Tiere. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 13(1): 17-19. (in English) [27 Odonata species were found in 2008 to have colonized the revitalised Kraaker Mühlenbach, Mecklenburg-Vorpommern, Germany. Without the exception of *Sympetrum pedemontanum* no Odonata species are specified. For details see: Zessin, W.; Ludwig, R. (2010): Die Libellen auf dem Gebiet der Gemeinde Rastow-Kraak, Landkreis Ludwigslust, Mecklenburg. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 13(1): 32-37.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

9590. Zessin, W.; Ludwig, R. (2010): Die Libellen auf dem Gebiet der Gemeinde Rastow-Kraak, Landkreis Ludwigslust, Mecklenburg. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 13(1): 32-37. (in

German) [A total of 28 species reported including the rare resp. redlisted *Leucorrhinia caudalis*, *Erythromma viridulum*, *Aeshna isocetes*, *Anax imperator Calopteryx virgo* (RL 3), *Calopteryx splendens*, *Lestes viridis*, *Sympetma fusca*, and *Sympetrum pedemontanum*.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

9591. Zhang, Y.-y.; Xuan, W.-j.; Zhao, J.-l.; Zhu, C.-d.; Jiang, G.-f. (2010): The complete mitochondrial genome of the cockroach *Eupolyphaga sinensis* (Blattaria: Polyphagidae) and the phylogenetic relationships within the Dictyoptera. *Molecular Biology Reports* 37(7): 3509-3516. (in English) ["We present the complete mitochondrial DNA sequence of *Eupolyphaga sinensis*. This closed circular molecule is 15553 bp long and consists of 37 genes that encode for 13 inner membrane proteins, 2 ribosomal RNAs and 22 transfer RNAs. The genome shares the gene order and orientation with previously known Blattaria mitochondrial genomes. All tRNAs could be folded into the typical cloverleaf secondary structure, but the tRNA^{Ser} (AGN) appears to be missing the DHU arm. The A + T-rich region is 857 bp long and longer than other cockroaches. Based on the concatenated amino acid sequences of all protein coding genes of *E. sinensis* in conjunction with those 23 other arthropod sequences, we reconstruct the phylogenetic tree. Phylogenetic analyses shows that Blataria (including Isoptera) and the Mantodea are sister groups. Furthermore the relationship of the three basal clades of winged insects are different from the three previous hypotheses ((Ephemeroptera + Odonata) + Neoptera, Ephemeroptera + (Odonata + Neoptera), Odonata + (Ephemeroptera + Neoptera)). The Ephemeroptera (*Parafronurus youi*) clusters with the Plecoptera (*Pteronarcys princes*)."] (Authors)] Address: Jiang, G.-f., Jiangsu Key Laboratory for Biodiversity & Biotechnology, College of Life Sciences, Nanjing Normal University, Nanjing, 210046, China. Email: cnjg1208@163.com

9592. Zhao, H.-x.; Yin, Y.-j.; Zhong, Z. (2010): Micro- and nanostructures and morphologies on the wing veins of dragonflies. *Chinese Science Bulletin* 55(19): 1993-1995. (in English) ["The surfaces of the veins of dragonflies (*Pantala flavescens* and *Crocothemis servilia*) wings are observed through SEM, and interesting micro- and nanostructures and morphologies are discovered. On the surfaces of the veins, not only ripple wave morphologies are distributed, but also spikes are grown. Besides, on the surfaces of the spikes, straight stripe wave morphologies are grown along the generatrix. These marvellous micro- and nanostructures and morphologies may enable us to better understand the remarkable flying abilities of dragonflies." (Authors)] Address: Zhong, Z., School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai 200092, China. E-mail: zhongk@tongji.edu.cn

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1997

9593. Bernard, R. (1997): An extremely late record of *Sympetrum fonscolombi* (Sel.) in Poland (Anisoptera: Libellulidae). *Notulae odonatologicae* 4(10): 159-160. (in English) [Record of a male caught on 29-X-1996, near Poznań, Poland] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: Bernard@amu.edu.pl

9594. Burkart, W. (1997): Neue Reproduktionsnachweise der Frühen Heidelibelle (*Sympetrum fonscolombi* SELYS 1840) (Odonata: Libellulidae) in Niedersachsen. *Beiträge zur Naturkunde Niedersachsens* 50: 48. (in German) [Teneral of *S. fonscolombi* were recorded in Rotenburg, Niedersachsen, Germany on 8-IX-1996] Address: Burkart, W., Am Emel 7, 27412 Wilstedt, Germany. E-mail: weguburkart@gmx.de

9595. Dijkstra, K.-D. (1997): New records of *Libellula fulva* (Müll.) for Portugal (Anisoptera: Libellulidae). *Notulae odonatologicae* 4(10): 160. (in English) [Two records of the regional very rare *L. fulva* are documented and briefly discussed.] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nrm.nl

9596. Gatter, W. (1997): *Birds of Liberia*. Aula-Verlag, Wiesbaden. ISBN 3-89104-615-4: 320 pp. (in English) [The book includes a colour picture of the Little Bee-eater *Merops pusillus* with an anisopteran prey.] Address: AULA-Verlag, Industriepark 3, 56291 Wiebelsheim, Germany

9597. Habdijia, I.; Radanovic, I.; Primc-Habdijia, B. (1997): Longitudinal distribution of predatory benthic macroinvertebrates in a karstic river. *Archiv für Hydrobiologie* 139(4): 527-546. (in English) ["The longitudinal distribution of predatory macroinvertebrates and their diversity were investigated on boulder, cobble and gravel substrates along the River Kupa, a karstic river in the NW Dinarid area (Croatia). Depending on substrate type and river section, the predator biomass constituted 6.9 % to 20.2 % of the total macro-invertebrate biomass. In the headwater streams more than 80 % of predator biomass was represented by rhyacophilid, perlid and perlodid larvae. In the upper river section *Hirudinea* species, rhyacophilids and the dipteran larva,

Atherix ibis, constituted approximately equal percentages of total predators. In the lower river section *Hirudinea* species, Odonata larvae, tanipod and ceratopogonid larvae were the most dominant predators. Along the river gradient the increase of predator biomass corresponded with the increase of scraper, collector-gatherer and filterer biomass. The Shannon index of diversity showed that the diversity of predators increased from the source area to the downstream reaches. A significant and positive association was found between diversity of predators and diversity of collector-gatherers. This positive relationship between predators and collector-gatherers may be interpreted as the diversity response of predators to the diversity of prey." (Authors) The species list includes *Platycnemis* sp., *Corduliidae*, 'non det.', *Gomphus vulgatissimus*, and *Onychogomphus* sp.] Address: Habdijia, I., Department of Zoology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, 10000 Zagreb, Croatia

9598. Holuša, O. (1997): The occurrence of dragonfly *Aeshna subarctica* Walker, 1908 (Odonata: Aeshnidae) in the Hrubý Jeseník Mts. (Czech Republic). *Čas. Slez. Muz. Opava (A)*. 46: 287-288. (in Czech, with English summary) [5 males, 1 female and 2 exuviae of *A. subarctica* were collected by the author on 8-IX-1997 at the peaty lake Malé mechové jezírko on the moorland of Rejvíz (745 in a.s.l., Hrubý Jeseník Mts., north-western Silesia in Czech Republic). Oviposition took place in the growth of *Eriophorum* sp. in the margin of the lake. *A. subarctica* frequently was observed to hunt for tandems of *Sympetrum* species.] Address: Holuša, O., Muzeum Beskyd, Přírodovědné oddělení, Zámecké náměstí 1264, CZ-738 01 Frýdek-Místek

9599. Holuša, O. (1997): Scarce chaser (*Libellula fulva*), a rare species in the Czech Republic and Slovak Republic. *Ochrana Přírody* 52(8): 240-241. (in Czech, with English summary) [*L. fulva* was found on a pond near the village Brzotin, Slovakia. The regional records of this species are documented. The list of Odonata from the same locality includes further 9 Odonata species e.g. *Erythromma viridulum*, *Anax parthenope*, and *Crocothemis erythraea*.] Address: Holuša, O., Muzeum Beskyd, Přírodovědné oddělení, Zámecké náměstí 1264, CZ-738 01 Frýdek-Místek

9600. Parr, A. (1997): The 1996 Red-veined Darter *Sympetrum fonscolombi* (Selys) influx into Britain. *Atropos* 2: 44-46. (in English) [The influx is given in de-

tails presenting phenological diagram of observation dates and a map with localities of observation.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK

9601. Raab, R.; Chwala, E. (1997): Rote Liste ausgewählter Tiergruppen Niederösterreichs - Libellen (Insecta: Odonata), 1. Fass. 1995. Hrsg.: Amt der Niederösterreichischen Landesregierung, Abteilung Naturschutz, Wien. ISBN 3-901542-07-8: 91 pp. (in German) [Red list of the endangered Odonata of the federal state 'Niederösterreich' (NÖ), Austria. The publication also includes notes on dragonflies as bioindicators, the history of dragonfly research in NÖ, altitudinal distribution of Odonata in NÖ, a checklist of the species, data on the regional distribution, habitats, risk assessment, action plan, regional papers on Odonata, and in most cases colour pictures and distribution maps of the species.] Address: Amt der NÖ Landesregierung, Abteilung Naturschutz, Landhausplatz 1; Haus 16, A-3109 St. Pölten, Austria

9602. Zimmermann, P. (1997): Die Naturschutzgebiete im Landkreis Calw (Nordschwarzwald) - Beitrag zur Herpeto-, Heuschrecken- und Libellenfauna. Veröffentlichungen für Naturschutz und Landschaftspflege in Baden-Württemberg 71/72: 327-377. (in German) [27 Odonata species are represented in the 25 studied nature conservation areas within the boundaries of Landkreis Calw, Baden-Württemberg, Germany.] Address: Zimmermann, P., Regierungspräsidium Karlsruhe, Referat Naturschutz und Landschaftspflege, 76247 Karlsruhe, Germany. E-mail: peter.zimmermann@rpk.bwl.de

9603. Zimmermann, W. (1997): Die Arktische Smaragdlibelle (*Somatochlora arctica*) erstmalig in Thüringen nachgewiesen. Landschaftspflege und Naturschutz in Thüringen 34(1): 24-25. (in German) [First record of *S. arctica* in Thüringen, Germany, 11-VI-1997, NSG Saukopfmoor.] Address: Zimmermann, W., Thomas-Müntzer-Str. 5, D-99423 Weimar, Germany

1998

9604. Brinkmann, R. (1998): Berücksichtigung faunistisch-tierökologischer Belange in der Landschaftsplanung. Informationsdienst Naturschutz Niedersachsen 4/98: 58-127. (in German) [The potential of Odonata for landscape planning purposes is commented on pages 102-103.] Address: Niedersächsisches Landesamt für Ökologie, Abt. Naturschutz, Postfach 101062, D-31110 Hildesheim, Germany. E-mail: poststelle@hi.nloe.land.ni.dbp.de

9605. Dahmen, D.; Dahmen, E.-G.; Gellert, G. (1998): Einfluß extremer Schwermetallbelastungen auf die Zusammensetzung der Makrobenthoszönose eines Mittelgebirgsbaches in einem ehemaligen Erzabbaugebiet des Raumes Overath (Bergisches Land). Decheniana 151: 173-182. (in German, with English summary) ["The effects on benthic invertebrates of the extremely with heavy metals contaminated creek Grünewaldbach (Nordrhein-Westfalen, Germany), impacted by wastes from past mining activities, were studied in 1995. As reference served a low impacted creek (Hellenthalbach), situated at a distance of 1.3 km. Both creeks are tributaries of the river Sülz. The organisms were exposed to high levels of Cd (up to 0.13 mg/L), Zn (up to

133 mg/L) and Ni (up to 2.18 mg/l) and lower concentrations of Pb and Cu. This led to a high elevated whole-body heavy metals bioaccumulation. The grazing species showed the highest and the carnivorous species the lowest concentrations. Severely influenced by heavy metals was the composition of the benthic community in the Grünewaldbach. Triclad, gammarids, mayflies, dragonflies and water beetles were absent. The most widespread organism was the caddisfly *Plectrocnemia conspersa*." (Authors) Larvae of *Cordulegaster boltonii* occurred in the low impacted creek Hellenthalbach; the mean (n=20) of heavy metals in dried bodymass in mg/kg is as follows: Cd: 5.6 (s=3.7), Pb: 28.1 (s=11), Cr: 1.9 (s=0.2), Cu: 43.3 (s=9.9), Ni: 4.9 (s=1.9), Zn: 193 (s=16).] Address: Dahmen, D., Burbacherstr. 263, 53129 Bonn, Germany

9606. Dudley, R. (1998): Atmospheric oxygen, giant Paleozoic insects and the evolution of aerial locomotor performance. *The Journal of Experimental Biology* 201: 1043-1050. (in English) ["Uniformitarian approaches to the evolution of terrestrial locomotor physiology and animal flight performance have generally presupposed the constancy of atmospheric composition. Recent geophysical data as well as theoretical models suggest that, to the contrary, both oxygen and carbon dioxide concentrations have changed dramatically during defining periods of metazoan evolution. Hyperoxia in the late Paleozoic atmosphere may have physiologically enhanced the initial evolution of tetrapod locomotor energetics; a concurrently hyperdense atmosphere would have augmented aerodynamic force production in early flying insects (including Protodonata). Multiple historical origins of vertebrate flight also correlate temporally with geological periods of increased oxygen concentration and atmospheric density. Arthropod as well as amphibian gigantism appear to have been facilitated by a hyperoxic Carboniferous atmosphere and were subsequently eliminated by a late Permian transition to hypoxia. For extant organisms, the transient, chronic and ontogenetic effects of exposure to hyperoxic gas mixtures are poorly understood relative to contemporary understanding of the physiology of oxygen deprivation. Experimentally, the biomechanical and physiological effects of hyperoxia on animal flight performance can be decoupled through the use of gas mixtures that vary in density and oxygen concentration. Such manipulations permit both paleophysiological simulation of ancestral locomotor performance and an analysis of maximal flight capacity in extant forms." (Author)] Address: Dudley, R., Dept of Zoology, University of Texas, Austin, TX 78712, USA. E-mail: rdudley@utxvms.cc.utexas.edu

9607. Finck, P. (1998): Der Einfluß von Probenahmezeitpunkt und -häufigkeit auf die Erfassung der Makroinvertebraten in Mittelgebirgsbächen. *Lauterbornia* 34: 245-254. (in German, with English summary) [The influence of sample timing and frequency on the recording of the macroinvertebrates in mountain brooks was studied by recording macroinvertebrates at two sites in the Eifel mountains in Northrhine-Westfalen, Germany. Additionally the dominance structures of the biocoenosis indicating different habitat requirements were analysed. Recommendations are given for a minimum standard to guarantee the relevance and validity of the results for physical planning: not less than 4 samples obligatory in March, May, June, and September. *Calopteryx virgo* and *C. splendens* are recorded for the studied brooks Ahbach and Klausenbach.] Address: Finck,

P., Bundesamt für Naturschutz, Abt. Biotopschutz und Landschaftsökologie, Konstantinstr. 110, 53179 Bonn, Germany

9608. Jödicke, R. (1998): Extraordinary flight dates of *Ceriatrigona tenellum* (De Vill.) in NW Germany (Zygoptera: Coenagrionidae). *Notulae odonatologicae* 5(2): 20-21. (in English) [The paper compiles data on phenology of the species, in most cases from the Federal State Niedersachsen, Germany.] Address: Jödicke, R., Am Liebfrauenbusch 3, D-26655 Westerstede, Germany. E-mail: reinhard.joedicke@ewetel.net

9609. Kossenko, S.M.; Fry, C.H. (1998): Competition and coexistence of the European bee-eater *Merops apiaster* and the Blue-cheeked bee-eater *Merops persicus* in Asia. *Ibis* 140(1): 3-13. (in English) ["Studies were conducted over a 10-year period on the supposedly similar European Bee-eater *Merops apiaster* and Blue-cheeked Bee-eater *M. persicus* breeding in mixed and separate colonies in four Asiatic countries (Turkmenistan, Uzbekistan, Tajikistan). In spring, *M. persicus* arrived a few days later and laid up to 2 weeks later than *M. apiaster*. Spatial distributions of the two species were positively associated. They were sympatric and syntopic: more than half of the local breeding ranges overlapped, and many birds bred within sight and sound of the congener. Intraspecific conflict was frequent, but in mixed colonies interspecific conflict was rare. Most *M. apiaster* nest burrows were dug into cliffs and most *M. persicus* ones into level ground, but dense mixed colonies occurred only in cliffs. Burrow architecture differed specifically. Diets were qualitatively similar at insect family level but different at the species level, partly because of local variation in availability and partly because of distinct preferences of *M. apiaster* for small beetles, ants and termites and of *M. persicus* for large dragonflies and cicadas. *Merops persicus* was less specialized than *M. apiaster* and had an airborne insect prey spectrum nearly twice as broad. Diets were more alike where the two birds foraged together than where they foraged separately. There was a high incidence of egg and nestling loss by predation and starvation. We speculate that each species may prove to breed more successfully in mixed than in monospecific colonies. We propose that the two bee-eaters do not compete for nest sites but may compete for food and coexist unaggressively by trading off food competition against improved breeding success in mixed colonies." (Authors)] Address: Fry, C.H., University of Aberdeen, Department of Zoology, Tillydrone Avenue, Aberdeen AB9 2TN, UK

9610. Niedringhaus, R.; Zander, B. (1998): Die Kleingewässer der Ostfriesischen Inseln. Zustandsanalyse und ökologische Bewertung anhand der Flora/Vegetation und der Wirbellosenfauna. Schriftenreihe Nationalpark Niedersächsisches Wattenmeer 3: 270 pp. (in German) [This is a detailed and extensively documented study of the Mollusca, Odonata, Coleoptera and Heteroptera of the pools in the Lower-saxony watten sea Islands. Odonata (37 species) are dealt with in chapter 6.12 and on several other places in the book.] Address: Bezirksregierung Weser-Ems, Nationalparkverwaltung, Virchowstr. 1, 26382 Wilhelmshaven, Germany

1999

9611. Kuhn, J. (1999): Zwischen Hochwasser und Austrocknung – die Gefleckte Heidelibelle. *Magazin*

Lebensräume 3: 29. (in German) [Baden-Württemberg, Germany; brief note on factors determining population dynamic of *Sympetrum flaveolum*. The species is a habitat specialist of fluctuating water levels in the littoral of lakes and ponds.] Address: Kuhn, J., Marktstr. 26, 89143 Blaubeuren, Germany

2000

9612. Dudley, R. (2000): The biomechanics of insect flight: form, function, evolution. Princeton Univ. Press, Princeton, N.J. ISBN-13: 978-0691044309: 476 pp. (in English) ["Here, Robert Dudley presents the first comprehensive explanation of how insects fly. The author relates the biomechanics of flight to insect ecology and evolution in a major new work of synthesis. The book begins with an overview of insect flight biomechanics. Dudley explains insect morphology, wing motions, aerodynamics, flight energetics, and flight metabolism within a modern phylogenetic setting. Drawing on biomechanical principles, he describes and evaluates flight behaviour and the limits to flight performance. The author then takes the next step by developing evolutionary explanations of insect flight. He analyzes the origins of flight in insects, the roles of natural and sexual selection in determining how insects fly, and the relationship between flight and insect size, pollination, predation, dispersal, and migration. Dudley ranges widely--from basic aerodynamics to muscle physiology and swarming behaviour--but his focus is the explanation of functional design from evolutionary and ecological perspectives." (Publisher) This is a comprehensive and definitive summary of the state of the art in the biomechanics of insect flight - including Odonata - through the late 1990's.] Address: Dudley, R., Dept of Zoology, Univ. of Texas, Austin, TX 78712, USA. E-mail: rdudley@utxvms.cc.utexas.edu

9613. Kotenko, T.I. (2000): The European pond turtle (*Emys orbicularis*) in the Steppe Zone of the Ukraine. *Stapfia* 69: 87-106. (in English) ["*E. orbicularis* is widely distributed in the Steppe Zone of the Ukraine and most abundant in the deltas of big rivers. Data are presented on distribution, habitats, abundance, seasonal and daily activity, migrations, reproduction, diet, enemies and parasites, collected between 1974 and 1999. ... The diet included many species of invertebrates and a few vertebrates. Gastropoda, Dytiscidae (Coleoptera), Hemiptera and larvae of Diptera and Odonata were the dominant components." (Author)] Address: Kotenko, Tatiana, Schmalhausen Institute of Zoology, National Academy of Science, Khmel'nitsky Str. 15, 252030 Kiev, Ukraine. E-mail: Kotenko@iz.freenet.kiev.ua

9614. Kourie, J.I.; Shorthouse, A.A. (2000): Properties of cytotoxic peptide-formed ion channels. *Am. J. Physiol. Cell. Physiol.* 278: C1063-C1087. (in English) ["Cytotoxic peptides are relatively small cationic molecules such as those found 1) in venoms, e.g., melittin in bee, scorpion toxins in scorpion, pilosulin 1 in jumper ant, and lycotoxin I and II in wolf spider; 2) in skin secretions (e.g., magainin I and II from *Xenopus laevis*, dermaseptin from frog, antimicrobials from carp) and cells of the immune system (e.g., insect, scorpion, and mammalian defensins and cryptidins); 3) as autocytoxicity peptides, e.g., amylin cytotoxic to pancreatic b-cells, prion peptide fragment 106–126 [PrP-(106–126)], and amyloid b-protein (AbP) cytotoxic to neurons; and 4) as designed synthetic peptides based on the sequences and

properties of naturally occurring cytotoxic peptides. The small cytotoxic peptides are composed of β -sheets, e.g., mammalian defensins, AbP, amylin, and PrP-(106–126), whereas the larger cytotoxic peptides have several domains composed of both α -helices and β -sheets stabilized by cysteine bonds, e.g., scorpion toxins, scorpion, and insect defensins. Electrophysiological and molecular biology techniques indicate that these structures modify cell membranes via 1) interaction with intrinsic ion transport proteins and/or 2) formation of ion channels. These two nonexclusive mechanisms of action lead to changes in second messenger systems that further augment the abnormal electrical activity and distortion of the signal transduction causing cell death. Alignment of the sequence of the scorpion defensin with the sequences of insect defensins (20). The defensins were characterized from species belonging to three insect orders: Diptera (a), Coleoptera (b), and Odonata (c). The scorpion defensin is closely related to the *Aeschna* defensin (c). Dashes indicate gaps to optimize the alignment. Identical amino acids are boxed. Boxes in bold represent the identical residues between *Aeschna* and scorpion residues." (Authors)] Address: Kourie, J.I., Membrane Transport Group, Department of Chemistry, The Faculties, The Australian National University, Canberra City, Australian Capital Territory, 0200 Australia

9615. Nachtigall, W.; Kesel, A.B. (2000): Biologisch komponentierte Materialien und Systeme Schwerpunkt Biomimetische Materialien. *magazin forschung* 1/2000, Saarbrücken: 49-56. (in German) [The membrane of the wing of *Orthetrum cancellatum* is used to demonstrate the mechanical characterisation of biological materials, serving as a basis for the biomimetical development of new (industrial) materials.] Address: Kesel, Antonia, Department of Zoology, Technical Biology and Bionics, University of Saarland, 66041 Saarbrücken, Germany. E-mail: a.kesel@rz.uni-sb.de

9616. Palot, M.J.; Soniya, V.P. (2000): Odonata of Keoladeo National Park, Bharathpur, Rajasthan, India. *Zoos' Print Journal* 15(8): 317-320. (in English) [Sixteen odonate species are briefly documented from the Keoladeo National Park which is situated in the Indo-Gangetic flood plains in the Bharathpur District of Rajasthan, India.] Address: Soniya, Y.P., Zool. Survey of India, Freshwater Biological Station, 1-1-300/B Ashok Nagar, Hyderabad, Andhra Pradesh 500020, India

9617. Sankey, J. (2000): Key to adult damselflies of the Ottawa District. *Trail & Landscape* 34(1): 17-27. (in English) ["This article includes diagrams of damselfly body and wing anatomy and many detailed drawings of the features that allow one to distinguish among local species. Adapted from larger keys, especially The Odonata of Canada, and with illustrations prepared for Manuel d'identification des libellules du Québec." (Author)] Address: not stated

2001

9618. Bechly, G. (ed.) (2001): Die faszinierende Evolution der Insekten. *Stuttgarter Beiträge zur Naturkunde - Serie C (Wissen für alle)* 49: 94 pp. (in German) [The Book includes several well written brief introductions to different aspects of insect evolution and contains many references to Odonata.] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosen-

stein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

9619. Berezina, N.A. (2001): Influence of ambient pH on freshwater invertebrates under experimental conditions. *Russian Journal of Ecology* 32(5): 343-351. (in English) ["In experimental mesocosms differing in water pH, the communities of macroinvertebrates demonstrated marked differences in their species composition and the quantitative ratios between the main groups of members (oligochaetes, chironomids, mollusks, etc.). The highest species diversity was recorded at pH 4.09–8.65. It proved to decrease at pH below 4 and above 9. In experiments on determining tolerance to water pH, seven groups of invertebrates differing in their adaptive potential were distinguished among 40 species found en masse in the freshwater zoobenthos and zooperiphyton of the Upper Volga basin." (Author) *Epitheca bimaculata* and *Libellula depressa* were used in laboratory experiments. In these species, pH-tolerance ranges from 4.5–9.0. Translated from *Ekologiya*, No. 5, 2001, pp. 372–381.] Address: Berezina, N.A., Papanin Institute of the Biology of Inland Waters, Russian Academy of Sciences, Borok, Nekouzskii raion, Yaroslavl oblast, 152742 Russia

9620. Keiler, J.-A.; Kovac, D. (2001): Travertininsekten. *Natur und Museum, Frankfurt* 131(6): 195-197. (in German) ["Includes a brief description of a Thuringian travertine rock, with an odonate larva incrustation (age 130.000-110.000 B.C.)."] Address: Keiler, J.-A., c/o Senckenberg. Naturf. Gesellschaft, Senckenberganlage 25, D-60325 Frankfurt/Main, Germany

9621. Kordges, T. (2001): Kalksteinbrüche in Wuppertal-Dornap: Eingriffsflächen mit Refugialfunktionen für gefährdete Tier- und Pflanzenarten. *Umweltschutz in Wuppertal*: 33-52. (in German) [The paper includes some general information on the dragonfly fauna of quarries and their habitat requirements.] Address: Kordges, T., Oekoplan, Hushmannshoferstr. 10, 45143 Essen, Germany. E-mail: thomas.kordges@oekopla-essen.de

2002

9622. Kadoorie Farm and Botanic Garden (2002): Report of Rapid Biodiversity Assessment at Heweishan Forest Farm, Southwest Guangdong, 4 to 5 May 1998. *South China Forest Biodiversity Survey Report Series (Online Simplified Version)* 6. KFBG, Hong Kong SAR: II + 15 pp. (in English) ["Sixteen species of dragonfly were encountered over the two-day period. The most frequently encountered was the ubiquitous *Pantala flavescens*. Unfortunately, apart from a species of Gomphinae awaiting identification, the most interesting dragonflies observed were two species of *Macromia* which could not be collected or identified in the field. The remaining thirteen species are all also known from Hong Kong, where (with the exception of the rare *Paragomphus capricornis*) they are all abundant to fairly common (K.D.P. Wilson, 1997). *P. capricornis* has not previously been recorded from Chinese territory outside of Hong Kong (K.D.P. Wilson, 1997), and is therefore a new provincial record." (K. D.P. Wilson)] Address: Kadoorie Farm and Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

9623. Kunkel, A.; Werner, W. (2002): Vergessen Sie Archaeopteryx! *aviso* 1/2002: 16-22. (in German) [The

papers reports on fraudulent falsification of fossils including an example of a dragonfly mounted on plates from the Lower Cretaceous of the Brazilian Santana-formation.] Address: not stated

9624. Malkmus, R. (2002): Die Libellen des Spessarts. Nachrichten des Naturwissenschaftlichen Museums der Stadt Aschaffenburg 106: 3-55. (in German, with English summary) ["Between 1990 and 1996 the dragonflies of the mountain range Spessart in Central Germany - an area of 3922 qkm, within the borderlines of the river Main, Sinn and Kinzig - were mapped. 47 species could be pointed out, 38 of them in established reproductive populations. Significant is the appearance of *Gomphus vulgatissimus*, *Cordulegaster bidentata*, *Somatochlora arctica*, and *Crocothemis erythraea*; rare guests - some of them presumably reproducing - are the species *Aeshna affinis*, *Anaciaeschna isocoles*, *Brachytron pratense*, *Libellula fulva*, *Orthetrum brunneum*, *Sympetrum pedemontanum*, and *Leucorrhinia pectoralis*."] (Author)] Address: Malkmus, R., Schulstr. 4, 98759 Wiesthal, Germany

9625. Rizali, A.; Buczori, D.; Triwidodo, H. (2002): Insect diversity at the forest margin-rice field interface: Indicator for a healthy ecosystem. Hayati 9(2): 41-48. (in English) ["This research was conducted in Gunung Halimun National Park, West Java. The influence of forest habitat toward insect diversity in rice field was shown. Samplings of insect species were done using pitfall trap, farmcop, malaise trap, and light trap. Altogether, there were 14 352 individual insects collected, which consist of 16 orders, 110 families, and 435 species. Based on analysis of their functional role, the insect complexes consist of 37.2% herbivores, 21.4% predators, 12.2% parasitoids, 6.2% detritivores, and 23.0% transient species. Our data further suggested that Chironomidae are dominating species on the rice field. Some of the transient species could potentially be used as indicator for healthy ecosystem. These are the Ephemeroptera, Trichoptera, Carabidae and Formicidae in rice field. Ephemeroptera and Trichoptera are bioindicators for water habitat whereas Carabidae and Formicidae for soil habitat."] (Authors) Odonata are only represented by "Coenagrionidae".] Address: Rizali, A., Yayasan Peduli Konservasi Alam, Jalan Sirnasari II No. 12A, Sindangbarang, Bogor 16117, Indonesia. E-mail: kpkai@indo.net.id

2003

9626. Kadoorie Farm and Botanic Garden (2003): Report of a Rapid Biodiversity Assessment at Guan-yinshan Nature Reserve, Central Guangdong, China, August 2000. South China Forest Biodiversity Survey Report Series (Online Simplified Version) 30. KFBG, Hong Kong SAR: II + 19 pp. (in English) [29 species were recorded during the three-day survey. One of these (*Vestalis* sp.) remains unidentified. The presence of four calopterygids and two *Macromia* species indicates that streams in the study area were of high water quality. (G.T. Reels, K.D.P. Wilson)] Address: Kadoorie Farm and Botanic Garden Corporation, Lam Kam Road, Tai Po, N.T., Hong Kong SAR

9627. Mühle, R.-U. (2003): Tierleben: ein zoologischer Überblick zur Unteren Havelniederung. Brandenburgische Umwelt Berichte 13: 82-97. (in German) [Brandenburg, Germany. 17 Odonata species are briefly characterized with reference to ecology and habitats.]

Address: Mühle, R.-U., Ökologische Station Gülpe, Universität Potsdam, 15715 Gülpe, Germany. E-mail: muehle@rz.uni-potsdam.de

9628. Strnadova, M.; Borstelmann, G. (2003): "Fliegende Edelsteine". Die Libellenwelt der Schlatts im Landkreis Diepholz. Stiftung Naturschutz Diepholz: 22 pp. (in German) [The paper focuses on the app. 40 Odonata species in the Landkreis Diepholz. Niedersachsen, Germany-region, and gives a brief introduction in biology, ecology and aesthetics of Odonata.] Address: <http://www.stiftung-naturschutz-diepholz.de/img/download/libelle.pdf>

2004

9629. Biologische Station Westliches Ruhrgebiet (2004): Grundlagenarbeiten (Kartierungen, Bestandsaufnahmen) und Konzeptentwicklung. Jahresberichte der Biologischen Station Westliches Ruhrgebiet 2003: 17-48. (in German) [Nordrhein-Westfalen, Germany; Legally protected sites were studied for their fauna and flora. Twenty eight Odonata species are included in the study. Regionally interesting species are briefly presented.] Address: Biologische Station Westliches Ruhrgebiet, Ripshorster Str. 306, 46117 Oberhausen, Germany. E-mail: info@bswr.de

9630. Fenoglio, S.; Bo, T.; Gallina, G.; Cucco, M. (2004): Vertical distribution in the water column of drifting stream macroinvertebrates. Journal of freshwater ecology 19(3): 485-492. (in English) ["We examined the macroinvertebrate composition and drift density in a Mediterranean lotic system, the Erro River (northwestern Italy). Drift density and composition were sampled for one year at three levels of the water column; temperature and flow velocity were also measured. We found that drift density was generally highest near the bottom. We also noticed that various taxa tended to drift at preferential levels of the water column, with 41.4 % of taxa mainly at the bottom level and 31.0% mainly at the top. Drift density decreased with increasing water temperature. Both taxa richness and macroinvertebrate abundance in the drift were positively associated with natural riverbed richness and abundance."] (Authors) The list of taxa includes *Onychogomphus* sp.] Address: Fenoglio, S., University of Eastern Piedmont, Di.S.A.V., Via Cavour 84, 15100 Alessandria, Italy. E-mail: tenoglio@unipmn.it

9631. Windte, J.; Pfingsten, K.C. (2004): On 2D motion parameters for flapping wing propulsion. First European micro air vehicle conference and flight competition. Braunschweig, Germany, July 13 & 14, 2004: (in English) ["The paper discusses how to obtain favourable 2D motion parameters for a flapping wing propulsion system. To find parameter sets with a high propulsion efficiency, two different approaches are considered: A biomimic approach is undertaken, where the motion parameters of a dragonfly are derived from slow motion Im material of a dragonfly in search flight condition with a flight speed of $U_1 = 1m/s$ and a Reynoldsnumber based on chord length of $Re = 800$. These are used to perform a Navier-Stokes-simulation of two moving airfoils representing the flow conditions at a position of $2=3$ of the wingspan. Then, a generic approach is undertaken, in which simple motion forms are analysed systematically to achieve a basic understanding of the

generation of thrust. For this investigation the flight conditions of a dragonfly in fast forward flight at $U_1 = 10\text{m/s}$ are studied. Both approaches result in a set of motion parameters which yield a good efficiency. They demonstrate two different ways to obtain essential knowledge for a potential propulsion system for micro air vehicles." (Authors)] Address: Windte, J., Institute of Fluid Mechanics, Technical University Braunschweig, Germany. E-mail: J.Windte@tu-bs.de

2005

9632. Albrecht, C.; Dworschak, U.; Esser, T.; Klein, H.; Weglau, J. (2005): Tiere und Pflanzen in der Rekultivierung. 40 Jahre Freilandforschung im Rheinischen Braunkohlerevier. Kapitel 4.1.10 Libellen (Odonata). Acta Biologica Benrodis Supplementband 10: 176-183. (in German) [A total of 42 odonate species was recorded in the brown coal mining region west of Köln, Nordrhein-Westfalen, Germany. Most of the data result from expertises from the late 1990th and early 2000th.] Address: Albrecht, C., Forschungsstelle Rekultivierung, Hackhausen 86, 41363 Jüchen. dr.albrecht@kbbf.de

9633. Aletsee, M. (2005): Schutz und Renaturierung der "Palsen" als Grundlage für den Erhalt der Moorvegetation und gefährdeter Libellenarten im deutsch-belgischen Hohen Venn. Telma 35: 93-109. (in German, with English summary) ["The Hohe Venn contains a large number of so called palsen (mired relicts of palsa). Different types of oligotrophic and acidic mires have developed in the palsen. These mires often show a characteristic, radial ecological gradient. Simplified this gradient starts with a Sphagnum fallax-fazies, continues with an ombrotrophic stage of vegetation and ends in a central fen. Not influenced by humans these palsen are unique relict of a natural landscape with a large number of endangered species. They are very important especially as reproduction habitat for Odonata. On account of intensive drainage up to the middle of the 20th century a lot of palsen were influenced and some were destroyed. This paper points out the potential of renaturation of drained palsen by investigating the vegetation and by classifying the Odonata habitats by means of TWINSPAN-algorithm. In conclusion you can still find a reduced flora in restored palsen, but also an expansion of the typical, remained vegetation (Sphagnum fallax, Eriophorum angustifolium, Vaccinium oxycoccus). The marginal zone shows in both, flora and Odonata fauna, in one part more euryoecious species (Juncus effusus, Glyceria fluitans, Aeshna cyanea) and in the other part typical species of acid-dystrophic water (Carex echinata, C. canescens, Sphagnum fallax, Aeshna juncea, Leucorrhinia dubia, Coenagrion hastulatum, Sympetrum danae). On the other hand you can find highly specialized Odonata species like Aeshna subarctica and Somatochlora arctica as well as elements of the vegetation like Andromeda polifolia and Rhychospora alba only in not by human influenced palsen." (Author)] Address: Aletsee, M., Obersteinstr. 38, 52223 Stolberg, Germany. E-mail: aletsee@rwth-aachen.de

9634. Biologische Station Westliches Ruhrgebiet (2005): Grundlagenarbeiten (Kartierungen, Bestandsaufnahmen) und Konzeptentwicklung. Jahresberichte der Biologischen Station Westliches Ruhrgebiet 2004: 17-82. (in German) [Nordrhein-Westfalen, Germany; Legally protected sites were studied for their fauna and flora. Thirty three Odonata species are included in the

study. Regionally interesting species are briefly presented.] Address: Biologische Station Westliches Ruhrgebiet, Ripshorster Str. 306, 46117 Oberhausen, Germany. E-mail: info@bswr.de

9635. Darwall, W.; Smith, K.; Lowe, T.; Vié, J.-C. (2005): The status and distribution of freshwater biodiversity in eastern Africa. IUCN SSC Freshwater Biodiversity Assessment Programme. IUCN, Gland, Switzerland and Cambridge, UK. Occasional Paper of the IUCN Species Survival Commission No. 31: viii + 36 pp. (in English) ["Biodiversity within inland water ecosystems in Eastern Africa is both highly diverse and of great regional importance to livelihoods and economies. However, development activities are not always compatible with the conservation of this diversity and it is poorly represented in the development planning process. One of the main reasons for inadequate representation of biodiversity is cited as a lack of readily available information on the status and distribution of inland water taxa. In a response to this need for information, the IUCN/SSC Freshwater Biodiversity Assessment Programme conducted a regional assessment of over 1,600 taxa of freshwater fishes, molluscs, odonates and crabs from Burundi, Kenya, Malawi, Rwanda, Tanzania and Uganda. In the process of the study, which is based on the collation and analysis of existing information, regional experts from five of these countries were trained in biodiversity assessment methods and, where appropriate, in field assessment and taxonomy. Distribution ranges have been mapped for the majority of species so providing an important tool for application to the conservation and development planning process. The full dataset is to be made freely available through the internet and through distribution on CD-ROM. Levels of regional endemism are notably high with 82% of fish and 74% of molluscs restricted to the region. Species diversity is also high and the major centres of diversity are the African Great Lakes of Malawi/Nyassa/Niassa, Tanganyika and Victoria, and in the Eastern Arc Mountain Range (for Odonata). Major threats are identified as loss and degradation of habitat, in particular from sedimentation due to deforestation and eutrophication, and the introduction of alien species. The centres of threatened species are the African Great Lakes and a number of East Coast river drainages. A major concern for the future is the potential impact of water resource developments such as for improved water supply, irrigation and provision of hydroelectric power. A gaps analysis found that inland waters are poorly protected within the existing Protected Areas network which is largely focused on terrestrial ecosystems. Forest Reserves were, however, observed to provide effective protection of watersheds at the headwaters of some river systems; it is recommended that their legal status be raised to provide a greater incentive for their effective management and for increasing the potential for attracting funds. Finally, it is most important that the data from this study are made available to the relevant decision makers and stakeholders in a format that can be easily understood and readily integrated within the decision making process. With this in mind a second major project has been initiated to extend the work to the rest of Africa and to develop a series of "Best Practice Guidelines" for the integration of biodiversity information within the development process." (Authors)] Address: IUCN Publications Services Unit, 219c Huntingdon Road, Cambridge CB3 0DL, UK. E-mail: books@iucn.org

- 9636.** Durdin, C. (2005): Recent wildlife highlights on Fenland nature reserves. Fenland Newsletter 3: 3. (in English) ["Small red-eyed damselfly *Erythromma viridulum* was recorded for the first time at the Ouse Washes in 2004. Seven males and a breeding pair were using the important ditch habitats on the reserve. This species is a recent colonist in Britain (first records 1999) and its spread from the continent is being linked to climate change." (Author)] Address: E-mail: chris.durdin@rspb.org.uk
- 9637.** Gillett, M.; Gillet, C. (2005): Insects & other arthropodes. In: Peter Hellyer and Simon Aspinall (Eds): The Emirates. A natural history. Trident Press Limited. The Environment Agency, Abu Dhabi, Dolphin Energy Limited. ISBN: 1-900724-74-X: 169-196. (in English) [Verbatim: "Although the early stages of dragonflies are totally dependent on fresh water, adult specimens can be found in a variety of habitats, including offshore islands and inland sand dunes. Indeed, for a desert country, the UAE has a remarkable and beautiful dragonfly fauna, reviewed most recently by Giles (1998), with some additions by Feulner (1999). Five species of damselflies (suborder Zygoptera) and 17 of dragonflies (suborder Anisoptera) are known from the Emirates with a further small number of species recognised from neighbouring areas of Oman and, therefore, also likely to be found in the UAE. After the Lepidoptera, the Odonata, including both damselflies and dragonflies proper, is probably the next most colourful insect group in the Emirates. Damselflies migrate at night, but during daytime they are usually not found far from water, as in the wadis of the Hajar Mountains. Particularly colourful damselflies include the endemic powder-blue damselfly *Arabicnemis caerulea* and the bright orange-red *Ceragrion glabrum*. Blues and red also predominate in the colours of the dragonflies. A striking example is the large and iridescent blue male of the emperor dragonfly *Anax imperator*, common wherever there is water for it to patrol. Equally large, the female is more dully coloured. The males of several species have reddish-marked wings and bodies, such as the purple-blushed, gully and orange darter dragonflies (*Trithemis annulata*, *T. arteriosa* and *T. kirbyi*, respectively). The young stages of all species of Odonata are spent in fresh water. Eggs may be simply dispersed at random over water or the female may insert single eggs into slits cut into the stems of aquatic plants. After hatching, the nymphs may spend several years growing and developing in the water, before climbing out and giving rise to the mature winged insect in a final spectacular moult. Both young and adults are carnivorous. The adults of dragonflies are very fast and manoeuvrable predators that attack even large insects on the wing. After the adults hatch out, they often migrate vast distances to find feeding areas and new bodies of water for reproduction to begin anew."] Address: Gillett, M., Dept Biochemistry, FMHS, UAE University, P.O. Box 17666, AL Ain, U.A.E. E-mail: M.gillet@uaeu.ac.ae
- 9638.** Gröning, E.; Brauckmann, C. (2005): Neue Rekonstruktions-Zeichnungen von ausgewählten paläozoischen Gliederfüßern (Fluginsekten, Spinnentiere und Arthropodea). *Virgo - Mitteilungsblatt des entomologischen Vereins Mecklenburg-Vorpommern* 8: 21-25. (in German) [Five species are presented including *Namurotypus sippeli* Brauckmann & Zessin, 1989.] Address: Gröning, Elke, Institut für Geologie und Paläontologie, Technische Universität Clausthal, Leibnizstr. 10, D-38678 Clausthal-Zellerfeld, Germany. E-mail: groening@geologie.tu-clausthal.de
- 9639.** Lange, L. (2005): Ausgewählte Libellenfunde im Kreis Parchim aus den Jahren 2001-2003. *Virgo - Mitteilungsblatt des entomologischen Vereins Mecklenburg-Vorpommern* 8: 2-3. (in German) [30 Odonata species from various localities in the district Parchim (Mecklenburg-Vorpommern, Germany) are briefly documented.] Address: Lange, L., Deichreihe 21, 25599 Wewelsfleth, Germany
- 9640.** Liess, M.; von der Ohe, P.C. (2005): Analyzing effects of pesticides on invertebrate communities in streams. *Environmental Toxicology & Chemistry* 24(4): 954-965. (in English) ["The aim of this investigation was to find patterns in aquatic invertebrate community composition that are related to the effects of pesticides. Investigations were carried out in 20 central European streams. To reduce the site-specific variation of community descriptors due to environmental factors other than pesticides, species were classified and grouped according to their vulnerability to pesticides. They were classified as species at risk (SPEAR) and species not at risk (SPenotAR). Ecological traits used to define these groups were sensitivity to toxicants, generation time, migration ability, and presence of aquatic stages during time of maximum pesticide application. Results showed that measured pesticide concentrations of 1 : 10 of the acute 48-h median lethal concentration (LC50) of *Daphnia magna* led to a short- and long-term reduction of abundance and number of SPEAR and a corresponding increase in SPenotAR. Concentrations of 1 : 100 of the acute 48-h LC50 of *D. magna* correlated with a long-term change of community composition. However, number and abundance of SPEAR in disturbed stream sections are increased greatly when undisturbed stream sections are present in upstream reaches. This positive influence compensated for the negative effect of high concentrations of pesticides through recolonization. The results emphasize the importance of considering ecological traits and recolonization processes on the landscape level for ecotoxicological risk assessment." (Authors) Nine Odonata families and *Platycnemis pennipes*, *Aeshna cyanea* and *Cordulegaster boltonii* are classified as invertebrate at risk of being affected by pesticides.] Address: Liess, M., UFZ—Centre for Environmental Research, Permoserstr. 15, D-04318 Leipzig, Germany. E-mail: matthias.liess@ufz.de
- 9641.** Minniti, M. (2005): Biotopi di Odonata Anisoptera nel Lazio e nella Toscana. *Atti Mus. Stor. nat. Maremma* 21: 3-13. (in Italian, with English summary) [Records of Anisoptera from seven localities in Lazio (n = 10) and four in Toscana (n = 13 taxa) are outlined. Most interesting is a record of *Lindenia tetraphylla* from Lago dell'Accesa, Toscana.] Address: Minniti, M., Via del Giordano 19, 00144 Roma, Italy
- 9642.** Packauskas, R.J. (2005): Hudsonian Emerald Dragonfly (*Somatochlora hudsonica*): A technical conservation assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project: 38 pp. (in English) ["*S. hudsonica* appears to be an uncommon species, both from the standpoint of its encounters with human beings as well as the number of specimens found in collections. Very little historical information or primary literature exists for this dragonfly, and it has never been studied in depth. Although the species is reported to be widely distributed across

Canada (Dunkle 2000), the only records of its occurrence in the continental United States place it at seven locales in Colorado, possibly three in Wyoming, and one in Montana. Most records are over 30 years old, and little or no documented collecting has been done at these sites since the originals. The paucity of records for this species, which may be due to a lack of collecting in areas where the species may occur, makes it suspect as a species of special concern. At this time, however, there is limited scientific evidence that either alleviates or warrants concern for its viability. The Hudsonian emerald dragonfly is considered a sensitive species in the Rocky Mountain Region of the USDA Forest Service. Primary Threats: As with other dragonflies, the main threat to the viability of this species would be the degradation of its aquatic habitat. Trees are an important component of areas surrounding the aquatic habitats of the Hudsonian emerald dragonfly since they provide areas for prey foraging by adults as well as shade that maintains lower water temperatures. Trees may also serve as mating areas. The loss of trees can occur through timber harvest, fuel reduction, or wildfires. Grazing by livestock may decrease perching or emergence vegetation for this species as well as degrade the aquatic habitat by increasing sedimentation. Sedimentation may also occur as a result of road construction or clear cutting. Tree harvest, grazing, and road construction can also help to produce nutrient runoff, increasing nutrient loads to the aquatic habitat, thus producing eutrophication. Use of pesticides, like piscicides and herbicides, can also serve to decrease population densities of the Hudsonian emerald dragonfly as well as populations of prey species when these chemicals enter the aquatic environment. Primary Conservation Elements, Management Implications and Considerations: Since this species is known from only a few limited areas, those areas and nearby aquatic habitats should be protected from management practices that would adversely affect them until more information on this species is forthcoming. Since the largest proportion (possibly 80 percent or more) of this species' life cycle is spent as larvae in the water, these aquatic stages are the most important to preserve in order to produce reproducing populations. Land management practices done in or around the areas currently inhabited by this species must be done thoughtfully to have as little impact on the aquatic habitats as possible. Adaptive land management methodologies, such as adjusting livestock grazing regimes in riparian or wetland areas, creating alternative livestock watering sources, and leaving timber harvest and fuel reduction buffers around known aquatic habitats for this species may be warranted. The main conservation focus should be to keep the known aquatic habitats (given in this paper) in mind when proposing management of any kind in these areas." (Author) The full paper is available at: <http://www.fs.fed.us/r2/projects/scp/assessments/hudsonianemeralddragonfly.pdf> Address: Packauskas, R.J., Dept. Biol. Sc., Fort Hays State Univ., 600 Park Str., Hays, Kansas 67601, USA

9643. Schachtner, J.; Schmidt, M.; Homberg, U. (2005): Organization and evolutionary trends of primary olfactory brain centers in Tetraconata (Crustacea + Hexapoda). *Arthropod Structure & Development* 34: 257-299. (in English) ["The olfactory lobes of crustaceans and the antennal lobes of insects are the primary olfactory brain centers in Tetraconata. Recent publications considered the apparent lack of olfactory centers in se-

veral crustacean and insect taxa and structural differences in the organization of olfactory and antennal lobes as evidence for an independent origin of both brain areas. In depth comparison of species within and across tetraconate taxa, however, rather demonstrates that many characters of the organization of tetraconate olfactory centers are shared even among distantly related clades, but have been modified in various taxon-specific ways. From the available data and from comparison with the situation in chilopods, a closely related mandibulate outgroup, we conclude that an olfactory lobe organized into spheroidal glomeruli is a plesiomorphic character of the tetraconate brain. Shared features between decapod crustaceans and neopteran insects are cholinergic uniglomerular afferent neurons, a single large serotonin-immunoreactive neuron, multiglomerular GABAergic local interneurons, and projection neurons of similar morphology. Taxonspecific apomorphies include loss of olfactory sensilla and olfactory lobes in palaeopteran insects, certain branchiopod, maxillopod, and isopod crustaceans, profound changes in glomerular architecture in decapod crustaceans, and decomposition of glomerular boundaries in orthopteroid insects. In holometabolous insects, olfactory afferent projections from mouthpart sensilla are integrated into the antennal lobe and an increased tendency of contralateral connections is observed in lepidopterans and dipterans. Sexual dimorphism of antennal lobes, prominent in several neopteran insects, has most likely occurred convergently, and is not observed in malacostracan crustaceans." (Authors) In Fig. 5, the agglomerular area in the brain receiving sensory input from the antennae of *Hemicordulia tau* is shown; this area is innervated by AST-A-ir fibers originating partly from cell bodies in a medial cell group.] Address: Homberg, U., FB Biologie, Tierphysiologie, Universität Marburg, D-35032 Marburg, Germany. E-mail: homberg@staff.uni-marburg.de

9644. Schiess, H. (2005): Schmetterlinge und Libellen in der Schwantenuau. Franz Kälin AG. Einsiedeln. ISBN 3-9523062-0-7: 135 pp. (in German) [Einsiedeln, Kanton Schwyz, Switzerland; 20 Odonata species are illustrated and briefly introduced.] Address: Druckerei Franz Kälin AG, Kornhausstr. 22, CH-8840 Einsiedeln, Switzerland

9645. Terzani, F.; Marconi, A.; Carletti, B. (2005): Odonati raccolti dal 1971 al 1986 e depositati nel Museo Zoologico dell'Università di Firenze (Odonata). *Atti Mus. Stor. Nat. Maremma* 21: 39-48. (in Italian, with English summary) [A collection of 109 odonate specimens from Somaliland has been studied. It resulted in a list of 29 species. New additions for Somaliland are *Hemistigma albipuncta*, *Orthetrum guineense*, and *Trithemis pluvialis*. An updated list of the dragonflies of Somaliland is provided.] Address: Terzani, F., Museo Zoologico "La Specola" dell'Università di Firenze, Via Romana, 17, I-50125 Firenze, Italy. E-mail: tterza@tin.it

9646. Zessin, W. (2005): Bilder aus der Geschichte des Schweriner Zoos (15). *Ursus, Schwerin* 11(1): 81-84. (in German) [The paper includes photographs of participants of the 16th International Symposium of Odonatology, held on 28-VII-2004 in Schwerin, Germany.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

9647. Aletsee, M. (2006): Libellen - rasante Flieger über den Gewässern. In: Heiko Schumacher, Frauke Severit (Red.): Tiere und Pflanzen im Nationalpark Eifel. Ein Begleiter durch Wald, Wasser und Wildnis. Verlagsgruppe Bachem. ISBN: 3761620055: 319 pp. (in German) [General view on the Odonata fauna (n=20 species) of the Nationalpark Eifel, situated in Nordrhein-Westfalen, Germany.] Address: Aletsee, M., Obersteinstr. 38, 52223 Stolberg, Germany. E-mail: aletsee@rwth-aachen.de

9648. Benstead, P. (2006): Casual observations of Odonata recorded in Cambodia in 2005 and 2006. *Malangpo* 21: 218-220. (in English) ["The Odonate fauna of Cambodia is poorly known, the list for the country presented in Tsuda (2000) is incomplete and many widespread Indochinese species are missing. This short note hopes to fill some of these gaps. The author recently made two three-day visits to Cambodia and spent some time identifying Odonata. The trips took place in March 2005 and March 2006 and cumulatively 27 species of Odonata were recorded. Visual observations were in most cases backed up by photographic records. No specimens were taken." (Author)] Address: Benstead, P., The Old Stables, Church Street, Reepham, Norwich. NR10 4JW, UK. E-mail: phil.benst01@tesco.net

9649. Biologische Station Westliches Ruhrgebiet (2006): Grundlagenarbeiten (Kartierungen, Bestandsaufnahmen) und Konzeptentwicklung. Jahresberichte der Biologischen Station Westliches Ruhrgebiet 2005: 19-85. (in German) [Nordrhein-Westfalen, Germany; Legally protected sites were studied for their fauna and flora. Twenty four Odonata species are included in the study. Regionally interesting species are briefly presented.] Address: Biologische Station Westliches Ruhrgebiet, Ripshorster Str. 306, 46117 Oberhausen, Germany. E-mail: info@bswr.de

9650. Buchwald, R.; Manzi, A.; Hunger, H. (2006): Habitatwahl von *Lestes dryas* und *Sympetrum flaveolum* in mittelitalienischen Karst-Hochebenen. In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 15-26. (in English, with German and Italian summaries) ["In numerous, both permanent and ephemeral (summer-dry) standing waters of karst plateaus of Central Italy, we studied the effect of various factors regarding their structure, hydrology, and vegetation on abundance, frequency, and reproduction of the odonate species *L. dryas* and *S. flaveolum*. Both species occur in a wide variety of waters and habitat types - however, with significant differences in frequency and abundance. The imagoes prefer waters with shallow shores which are covered by (brownish- or yellowish-) green vegetation dominated by the growth forms "rushes" (or similar) and "sedges". The vegetation height exceeds (30-) 35 cm (*L. dryas*) respectively 20 cm (*S. flaveolum*) along the edges and (30-) 35 cm (*L. dryas*) respectively (25-) 30 cm (*S. flaveolum*) in the central depressions. Compared to vegetation aspect and -colour and vegetation height in the central depressions, other parameters (e.g., area size, water level at the time of oviposition, density and cover of the vegetation, soil colour) play a subdominant

or no role at all for the colonisation by the studied species. These results are congruent with those from other regions of Europe to the greatest possible extent. From our findings, we derive a habitat selection hypothesis for the two species. This hypothesis should be tested by carrying out experiments designed to study the importance of each parameter individually." (Authors)] Address: Buchwald, R., Universität Oldenburg, Institut für Biologie und Umweltwissenschaften (IBU), 26111 Oldenburg, Germany. E-mail: rainer.buchwald@uni-oldenburg.de

9651. Ewers, M.; Buchwald, R. (2006): *Orthetrum coerulescens* zwischen Weser und Ems - Bestandssituation, Ökologie und Schutzmöglichkeiten. In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 84-91. (in German, with English summary) ["Actually only two populations of *O. coerulescens* are known in the Region Weser-Ems (western Lower Saxony, Germany). In the Börstel Forest (Lkr. Osnabrück) the species reproduces in a ditch, a spring brook and some ponds in a heath bog with *Erica tetralix*] the breeding habitats are characterized by flowing, summer-warm, acid water with low content of bases. In the Meerkanal (Lkr. Oldenburg), an outflow of a natural lake, a big population was detected in 1997 and intensively studied in 1999 and 2002. In a section of 900 meters up to 118 territorial males were counted showing a maximum abundance between 13.00 and 14.30 o'clock. The maximum density of males was observed in sections with little or no shade, medium velocity of flow, rich floating vegetation (e.g. *Potamogeton alpinus*), and adjacent extensive meadows/pastures or heaths. Despite the different structure of their water bodies and their vegetation, the two habitats have some characteristics in common, above all high water temperatures in winter and summer, open and flowing water courses, a small or medium cover of helophytes and hydrophytes and an extensive use of the surrounding landscape. In order to improve the situation of *O. coerulescens* in the study region it is proposed to keep open the breeding waters and to (re)create appropriate flowing waters near the two actual populations." (Authors)] Address: Buchwald, R., Universität Oldenburg, Institut für Biologie und Umweltwissenschaften (IBU), 26111 Oldenburg, Germany. E-mail: rainer.buchwald@uni-oldenburg.de

9652. Gärtner, E.; Karsch, U.; Prys Witt, K.-P.; Scherzer, H. (2006): Libellenfauna im NSG Helstorfer Moor (Hannoversche Moorgeest) -Lebensraum der Zwerglibelle (*Nehalennia speciosa*). In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 106-113. (in German, with English summary) ["The Helstorfer Moor, a small bog north of Hannover (Lower Saxony, Germany), has been exploited by peat cutting over some centuries. In a two-year-inventarisation 35 dragonfly species (Odonata) were found, among these many rare typical species of peat bogs (sensu Eb. SCHMIDT). After one single male had been discovered by Prys Witt, in 2003 a large population of the Graceful Dragonfly (*Nehalennia speciosa*) was found in the Helstorfer Moor,

situated in a distance of about 20 km from another population near Hannover. The imagoes of this species predominantly occur in the northern part of the bog, where the peat waters are hydrologically influenced by flowing water and/or adjacent springs. In the small larval ponds the Small Water-Hose (*Utricularia minor*) is the characteristic plant species. The peat water is strongly or weakly acid, the conductivity is below 100 μ S. The imagoes of *Nehalennia* were found in sections dominated by the Whistle Grass (*Molinia caerulea*), in part mixed with sparse stands of trees (*Pinus silvestris*, *Betula pubescens*). The habitat is part of a Nature Reserve of 410 hectares, well protected against external detrimental influences." (Authors)] Address: Gärtner, E., Drosselgasse 14, 31139 Hildesheim, Germany

9653. Geißler-Strobel, S.; Trautner, J.; Jooß, R.; Hermann, G.; Kaule, G. (2006): Informationssystem Zielartenkonzept Baden-Württemberg. Ein Planungswerkzeug zur Berücksichtigung tierökologischer Belange kommunalen Praxis. *Naturschutz und Landschaftsplanung* 38(12): 361-369. (in German, with English summary) ["Information System Target Species Concept in Baden-Württemberg- Tool to consider faunistic concerns in local planning practice This System is a web-based planning tool for designing zoological conservation and development concepts for target species. Intended to start in December 2006, it will be available within the web-space of the governmental 'Authority of Environment. Measurements and Nature Conservation' (www.lubw.baden-wuerttemberg.de). Target groups for the tool are local and regional authorities and their departments for planning, environmental protection and forestry as well as zoologists commissioned to produce expert reports. The planning tool has been developed to improve consideration of the essential aims of the Target Species Concept in municipal landscape planning. The tool assesses expert knowledge on the distribution and ecology of about 330 selected animal target species, applying the approach of assigning special conservation responsibilities for target species to local communities. The planning methodology derived from this knowledge supports the first steps of a planning process towards species and habitat oriented measures but it does not replace zoological investigations. In combination with the planning tool a two step approach to design community-based conservation concepts for target species has been developed and already tested to some extent. The first step allows to evaluate planning priorities and the relevance of many types of measures for the local area without extensive field work. This preliminary evaluation is based on the tool output, an overview inspection by qualified zoologists, and the analysis of existing faunistic data. The results of the first step can be used as a rough framework for action, particularly for the development of local landscape plans and of qualified "eco-accounts". The second step aims to specify the preliminary results more precisely e.g. concerning selected parts of a local community. This step generally requires additional field data. Partial results can be integrated as separate modules." (Authors) The paper refers to *Coenagrion mercuriale* and *Orthetrum coerulescens*.] Address: Geißler-Strobl, Sabine, Jahnstr. 15, 72070 Tübingen, Germany. E-Mail geissler-strobel@t-online.de

9654. Hall, L.W.; Killen, W.D.; Anderson, R.D. (2006): Characterization of benthic communities and physical habitat in the Stanislaus, Tuolumne, and Merced Rivers,

California. *Environmental Monitoring and Assessment* 115: 223-264. (in English) ["The primary goal of this study was to characterize physical habitat and benthic communities (macroinvertebrates, including Odonata) in the Stanislaus, Tuolumne and Merced Rivers in California's San Joaquin Valley in 2003. These rivers have been listed as impaired water bodies (303 (d) list) by the State of California due to the presence of organophosphate (OP) insecticides chlorpyrifos and diazinon, Group A pesticides (i.e., organochlorine pesticides), mercury, or unknown toxicity. Based on 10 instream and riparian physical habitat metrics, total physical habitat scores in the Stanislaus River ranged from 124 to 188 (maximum possible total score is 200). The highest total habitat score was reported at the upstream site. Tuolumne River physical habitat scores ranged from 86 to 167. Various Tuolumne River physical habitat metrics, including total habitat score, increased from downstream to upstream in this river. Merced River physical habitat scores ranged from 121 to 170 with a significant increase in various physical habitat metrics, including total habitat score, reported from downstream to upstream. Channel flow (an instream metric) and bank stability (a riparian metric) were the most important physical habitat metrics influencing the various benthic metrics for all three rivers. Abundance measures of benthic macroinvertebrates (5,100 to 5,400 individuals) were similar among the three rivers in the San Joaquin watershed. Benthic communities in all three rivers were generally dominated by: (1) Baetidae species (mayflies) which are a component of EPT taxa generally considered sensitive to environmental degradation; (2) Chironomidae (midges) which can be either tolerant or sensitive to environmental stressors depending on the species; (3) Ephemerellidae (mayflies) which are considered sensitive to pollution stress; and (4) Naididae (aquatic worms) which are generally considered tolerant to environmental stressors. The presence of 117 taxa in the Stanislaus River, 114 taxa in the Tuolumne River and 96 taxa in the Merced River implies that the benthic communities in these streams are fairly diverse but without a clear definition of benthic community expectations it is unknown if these water bodies are actually impaired." (Authors)] Address: Hall, L.W., Agricultural Experiment Station, Wye Research and Education Center, University of Maryland, Queenstown, MD, USA

9655. Joger, U. (2006): In Memoriam Peter Lenk (26 March 1964 – 23 November 2005). *Salamandra* 42(4): 193-196. (in English) [Obituary for a regionally known German resp. Bavarian odonatologist.] Address: Joger, U., Staatliches Naturhistorisches Museum, Pockelsstr. 10, 38106 Braunschweig, Germany, E-Mail: ulrich.joger@snhm.niedersachsen.de

9656. Khaleghizadeh, A.; Sehhatibet, M.E. (2006): Contribution of the knowledge of the diet of Iranian birds. *Ekologia* 15: 145-150. (in English, with Russian summary) [The diet of the Black Frankolin (*Francolinus francolinus*) also includes Odonata.] Address: Khaleghizadeh, A., Ornithology Laboratory, Agricultural Zoology Research Department, Iranian Research Institute for Plant Protection, PO Box 1454, Tehran 19395, Iran. E-mail: akhaleghi@adeh@yahoo.com

9657. LeRoy Poff, N.; Olden, J.D.; Vieira, N.K.M.; Finn, D.S.; Simmons, M.P.; Kondratieff, B.C. (2006): Functional trait niches of North American lotic insects: traits-based ecological applications in light of phylogenetic relationships. *J. N. Am. Benthol. Soc.* 25(4): 730-

755. (in English) ["The use of species traits to characterize the functional composition of benthic invertebrate communities has become well established in the ecological literature. This approach holds much potential for predicting changes of both species and species assemblages along environmental gradients in terms of traits that are sensitive to local environmental conditions. Further, in the burgeoning field of biomonitoring, a functional approach provides a predictive basis for understanding community-level responses along gradients of environmental alteration caused by humans. Despite much progress in recent years, the full potential of the functional traits-based approach is currently limited by several factors, both conceptual and methodological. Most notably, we lack adequate understanding of how individual traits are intercorrelated and how this lack of independence among traits reflects phylogenetic (evolutionary) constraint. A better understanding is needed if we are to make the transition from a largely univariate approach that considers single-trait responses along single environmental gradients to a multivariate one that more realistically accounts for the responses of many traits across multiple environmental gradients characteristic of most human-dominated landscapes. Our primary objective in this paper is to explore the issue of inter-trait correlations for lotic insects and to identify opportunities and challenges for advancing the theory and application of traits-based approaches in stream community ecology. We created a new database on species-trait composition of North American lotic insects. Using published accounts and expert opinion, we collected information on 20 species traits (in 59 trait states) that fell into 4 broad categories: life-history, morphological, mobility, and ecological. First, we demonstrate the importance of considering how the linkage of specific trait states within a taxon is critical to developing a more-robust traits-based community ecology. Second, we examine the statistical correlations among traits and trait states for the 311 taxa to identify trait syndromes and specify which traits provide unique (uncorrelated) information that can be used to guide trait selection in ecological studies. Third, we examine the evolutionary associations among traits by mapping trait states onto a phylogenetic tree derived from morphological and molecular analyses and classifications from the literature. We examine the evolutionary lability of individual traits by assessing the extent to which they are unconstrained by phylogenetic relationships across the taxa. By focusing on the lability of traits within lotic genera of Ephemeroptera, Plecoptera, and Trichoptera, taxa often used as water quality indicators, we show how a traits-based approach can allow a priori expectations of the differential response of these taxa to specific environmental gradients. We conclude with some ideas about how specific trait linkages, statistical correlations among traits, and evolutionary lability of traits can be used in combination with a mechanistic understanding of trait response along environmental gradients to select robust traits useful for a more predictive community ecology. We indicate how these new insights can direct the research in statistical modeling that is necessary to achieve the full potential of models that can predict how multiple traits will respond along multiple environmental gradients." (Authors) Odonata taxa are treated at the genus level.] Address: LeRoy Poff, N., Department of Biology and Graduate Degree Program in Ecology, Colorado State University, Fort Collins, Colorado 80523 USA. E-mail: poff@lamar.colostate.edu

9658. Luck, J. (2006): Dragonflies and damselflies – Sussex 2006. *Adastra* 2006: 19-20. (in English) [Records of the locals *Erythromma viridulum*, *Lestes dryas* and the immigrants *Anax parthenope*, *Aeshna affinis*, and *Sympetrum fonscolombii* are briefly reported. In regard to the Sussex Rare Species Inventory, *Platycnemis pennipes*, *Brachytron pratense*, and *Sympetrum sanguineum* were removed for the encouraging reason that they had become more common. The report includes a brief report on current research on the distribution of *Libellula fulva*, and the announcement of a lecture held by Dave Chelmick.] Address: Luck, J., 4 Mill View, Ringmer, East Sussex BN8 5EP, UK. Email: johnluck@gotadsl.co.uk

9659. Malkmus, R. (2006): Zur Verbreitung von Amphibien, Reptilien und Libellen in den Ostalpen (4. Nachtrag). *Nachrichten des naturwissenschaftlichen Museum der Stadt Aschaffenburg* 108: 55-67. (in German, with English summary) [Odonate records (including *Aeshna caerulea*, *Somatochlora alpestris*, *S. arctica*) from Überschalljoch, Karwendel, Hirzkarsee, Dachstein, and Schladminger Tauern, Austria are briefly documented.] Address: Malkmus, R., Schulstr. 4, 98759 Wiesthal, Germany

9660. Malkmus, R. (2006): Herbstbeobachtungen an Libellen in Ost-Portugal. *Nachrichten des naturwissenschaftlichen Museum der Stadt Aschaffenburg* 108: 25-31. (in German, with English summary) ["During a journey to the eastern parts of Portugal in November 2004 six species of Odonata were recorded. In the mid of this month 3 species (*Lestes viridis*, *Aeshna mixta*, *Sympetrum striolatum*) were observed at oviposition. Several new distribution data could be located for *Aeshna cyanea* and *Aeshna mixta*." (Author)] Address: Malkmus, R., Schulstr. 4, 98759 Wiesthal, Germany

9661. Martens, A. (2006): Paarungssysteme bei Libellen - aktueller Kenntnisstand und offene Fragen. In: Buchwald, R. (Hrsg.) (2006): *Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata)*. Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 30-32. (in German, with English summary) ["A brief review is given on new findings on sperm competition and related aspects in dragonflies since 1999." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

9662. Michalsky, J. (2006): Dragons & Damsels. *Paradise Magazine - in flight with Air Niugini* 203(6): 46-50. (in English) [The author reports on his fascination of Papua New Guinean dragonflies, gives some general information on biology and ecology of Odonata, and outlines some facts on rare or specialised species inhabiting the country.] Address: not stated

9663. Monteiro, B.R. (2006): Distribuicao dos lepidopteros o odonatas da Reserve Natural da Serra da Malcata. *Depto Biol., Univ. Avciro*: 121 pp.. (in Portuguese) [Portugal; the paper includes distribution maps of 22 odonate species (including e.g. *Macromia splendens*, *Oxygastra curtisii*, *Pyrrhosoma nymphula*, *Coenagrion caerulescens*) in the Reserve.] Address: not stated

9664. Ngai, J.T.; Srivastava, D.S. (2006): Predators accelerate nutrient cycling in a bromeliad ecosystem. *Science* 314: 963. (in English) ["The availability of nutri-

ents in ecosystems is determined by resource supply and recycling rates and affects important ecosystem properties (1–3). The relative roles of abiotic supply and food web configuration in determining resource-processing rates remain contentious and poorly understood. Under anthropogenic pressure, ecosystems are predicted to lose predators disproportionately, affecting ecosystem processes (4). Current ecological theory predicts that predator loss will affect nutrient cycling by changing prey abundance (density-mediated effects, as in a trophic cascade) (5) or prey foraging efficiency (trait-mediated effects) (6). These changes can further affect nutrient cycling by altering the species composition or size structure of the prey community. In this study, we examined the effects of predators on nutrient cycling by using the detritus-based insect community in bromeliads. We demonstrate that predation can have counterintuitive effects on nutrient cycling. Leaves of tank-forming bromeliads (e.g., *Vriesea* and *Guzmania* genera) are tightly interlocking, forming wells that collect water and leaf litter and provide habitat for aquatic insect larvae. The detritus not only supports the insect community but also provides a source of nutrients for the bromeliad. A natural gradient also exists in predation where the major predator, a damselfly larva (*Mecistogaster modesta*), becomes more abundant as the plant grows. Although it has been hypothesized that aquatic insects increase nutrient flux to the bromeliad, this relationship has never been documented. First, we ran fertilization experiments to determine whether nitrogen (N) or phosphorus (P) limit the productivity of the plant and insect components of this ecosystem. (7). Both tissue nutrient ratios and fertilization experiments showed that N, rather than P, primarily limits productivity of bromeliads and can limit insect productivity [Supporting Online Material (SOM) text and tables S1 and S2], so we focused on the effects of trophic structure on N cycling. Leaf detritus enriched in ^{15}N was used to trace the movement of N through the food web in bromeliads containing either no insects, detritivores only, or detritivores and predators. The presence of detritivores alone did not affect the amount of N entering bromeliads from the enriched detritus (Fig. 1A). However, in the presence of both detritivores and predators, there was a significant enrichment in ^{15}N in bromeliad leaves compared with plants containing detritivores alone, indicating that the presence of predators increased the flow of N from litter to bromeliads. This is surprising given that previous studies, consistent with the predictions of density or trait-mediated effects, have shown that predators decrease litter decomposition by reducing detritivore abundance (8) or by decreasing the foraging rate (9) of detritivorous arthropods. We hypothesize that the detritivorous insects, which pupate relatively rapidly, constitute a loss of litter-derived N for bromeliads when they emerge. A survey indicated that detritivorous insects generally have higher N:P ratios than those found in typical litter (Fig. 1B), suggesting that, as leaf litter is consumed, the insects will preferentially retain N in their body tissues and release P. Predation by longer-lived damselfly larvae converts the mobile pool of N contained in detritivores into fecal pellets that can be decomposed by microbes or leached to release N in a form available to the bromeliad. Thus, insects facilitate nutrient uptake by the plant, but only if both predators and detritivores are present. These results emphasize the importance of the temporal and spatial scales of dispersal for nutrient flux. The emergence of adult insects means that, although detritivores increase re-

source flux over larval time scales by releasing nutrients from litter, these insects act as a nutrient sink for bromeliads over their entire life span. The faster emergence rate of detritivores compared with that of predators allows predation to reduce the loss of N from the bromeliad. Although we use insects in bromeliads to examine biotic effects on nutrient cycling, our results can give insights into other systems where mobility differs between trophic levels. Some trophic interactions, for instance, involve migratory and nonmigratory species or species that undergo ontogenetic niche shifts. This mechanism may also apply if the prey species has a very different range size than its predator. Given the increased extinction risk of higher trophic levels, understanding the mechanisms whereby predators drive important ecosystem processes is critical in predicting anthropogenic impacts on natural systems." (Authors)] Address: Ngai, Jacqueline, Department of Zoology, University of British Columbia, 6270 University Boulevard, Vancouver, British Columbia V6T 1Z4, Canada. E-mail: ngai@zoology.ubc.ca

9665. Röske, W. (2006): Artenschutz mit Tradition: Coenagrion mercuriale in Baden-Württemberg. In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 54-58. (in German, with English summary) ["Since the early 1990s, a continuous species protection project for *C. mercuriale* has been carried out in the administrative region of Freiburg (federal state of Baden-Württemberg, south-western Germany). The main topics of this project are public relations work, the organisation of concrete measures, and the monitoring of the populations. The primary objectives of the programme are described, and information on funding, on the type of management actions taken, and on the population development of *C. mercuriale* is given." (Author)] Address: Röske, W., Hofmatte 22, 79232 March, Germany. E-mail: Wolfgang.Roeske@ifo-freiburg.de

9666. Sauer, H. (2006): Rudolf Malkmus zum 65. Geburtstag. Zeitschrift für Feldherpetologie 13: 1-12. (in German) [R. Malkmus, Aschaffenburg, Bayern, Germany is a profiled herpetologist who also has published several odonatological papers.] Address: Sauer, H., Berliner Straße 65, D-63619 Bad Orb, Germany

9667. Schiel, F.-J. (2006): Bilanz des Artenschutzprojekts *Leucorrhinia pectoralis* in Baden-Württemberg. In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 46-51. (in German, with English summary) ["*L. pectoralis* is a very rare species in the German federal state Baden-Württemberg. Stable, autonomous populations which do not depend on steady immigration of individuals from other populations exist exclusively in the southeastern region „Oberschwäbisches Hügel- und Moorland". As the species is listed in the Annexes II and IV of the European habitats directive, the populations of *L. pectoralis* in SW-Germany have been the subject of increased attention since 1997: Between 1997 and 2000, intensive investigations and management measures were financed by a LIFE-Nature-Project called "Endangered Dragonfly Species in SW-Germany". Dur-

ing the years 2001 through 2003, these actions were continued as projects financed by the "Bezirksstelle für Naturschutz und Landschaftspflege" Tübingen. The purpose of this paper is to evaluate the protection actions that have been taken during the last seven years. Since 1997, 67 management measures were undertaken in 14 different mire areas. The most urgent type of management action was the removal of dense vegetation from inhabited peat bogs (In 11 mires), followed by cutting trees and shrubs along the shorelines (in 8 mires), electrofishing (in 2 mires), and mowing of dense reed vegetation (*Phragmites australis*), removal of eutrophicated soil and extensification of grassland utilization in the surrounding of 1 reproduction site, respectively. Only in three mires the management measures showed no success so far, two of which are situated in a distance of many kilometres from the margin of the populated area and therefore more or less isolated. At all sites in which small populations were still present when the implementation of management measures started, the number of individuals of *L. pectoralis* increased on account of the actions taken. Whereas, in 1997, the species was recorded in only 20 peat waters located in 9 mires, it reproduced in 40 peat waters of 12 mires in 2003. These findings show that the balance of the species protection project *L. pectoralis* is positive. Nevertheless, further management actions will remain absolutely necessary in order to guarantee the long-term survival of the species in Baden-Württemberg. It is recommended to employ Wildermuth's rotation model, which has been successfully tested over many years in Switzerland." (Author) Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

9668. Schmidt, E. (2006): Zur Odonatenfauna von Freizeit-Angelteichen im Westmünsterland. In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 92-102. (in German, with English summary) ["The dragonfly fauna of some fishing ponds is recorded. These ponds have a regulated water feeding by a nearby rivulet, they remain filled with water throughout the year, there is no feeding of the fishes (like carps), which all are large enough for being taken by angle (no spawn), and a replacement for the output by fishing. The number of dragonfly species is rather high, but nearly no species are endangered, and most species have only small abundances. Only *Platycnemis pennipes* and *Gomphus pulchellus* in the region are favoured at these fishing ponds. Nevertheless these ponds enrich the dragonfly fauna in Westfalian lowlands, which are poor in natural stagnant water bodies." (Author)] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

9669. Sohni, V.; Finch, O.-D. (2006): Bedeutung eines renaturierten Hochmoor-Restes bei Oldenburg (Oldb.) für die Libellenfauna. In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 104. (in German) ["We examined the odonate assemblages of 11 water systems situated

within a protected remnant peat bog in the north-eastern part of Cloppenburg district, Lower Saxony, Germany in summer 2001. A total of 30 species was recorded, representing half of the species known to occur between the rivers Ems and Weser. 13 species (45%) are listed in the Red Data Books of either Germany and/or Lower Saxony. Two species, *Ceriatrigon tenellum* and *Aeshna subarctica*, are listed as endangered, with the former being confirmed to reproduce within the study site. Species richness at the water systems ranged from 5 to 18 species per system. Besides high densities of eurytopic species like *Lestes sponsa* and *Pyrrosoma nymphula*, we found some stenotopic species confined to acidic bogs occurring in lower numbers. The number of bog specialists found in our study area is in concordance with the situation of other bogs in early stages of regeneration. Regeneration of the investigated bog was initiated by measures in 1988. Subsequent measures like the sealing of drainages increased the ratio of bog specialists vs. generalist species in the study area. The occurrence of *Ceriatrigon tenellum* and *Aeshna subarctica* justifies taking measures in the future." (Authors) The results have been published in detail in Dosera 2004: 119-135.] Address: Finch, O.-D., Universität Oldenburg, Terrestrische Ökologie, 26111 Oldenburg, Germany. E-mail: Oliver.d.finch@uni-oldenburg.de

9670. Velasco, J.; Millán, A.; Hernández, J.; Gutiérrez, C.; Abellán, P.; Sánchez, D.; Ruiz, M. (2006): Response of biotic communities to salinity changes in a Mediterranean hypersaline stream. *Saline Systems* 2(1): 15 pp. (in English) ["This study investigates the relationship between salinity and biotic communities (primary producers and macroinvertebrates) in Rambla Salada, a Mediterranean hypersaline stream in SE Spain. Since the 1980's, the mean salinity of the stream has fallen from about 100 g L⁻¹ to 35.5 g L⁻¹, due to intensive irrigated agriculture in the watershed. Furthermore, large dilutions occur occasionally when the water irrigation channel suffers cracks. [...] Salinity was the first factor determining community composition and structure in Rambla Salada stream followed by the type of habitat." (Authors) *Anax* sp. is the single odonate taxon mentioned in table 4.] Address: Velasco, Josefa, Department of Ecology and Hydrology, University of Murcia, 30100 Murcia, Spain E-mail: jvelasco@um.es

9671. Vershinin V.L.; Ivanova N.L. (2006): Peculiar features of the trophic relations of an introduced species *Rana ridibunda* (Pallas, 1771) depending on habitat conditions. *Volga Ecological Journal* 2006(2/3): 119-123. (in Russian, with English summary) [Russia; Odonata are preyed by the frog *R. ridibunda*.] Address: Vershinin, V.L., Institute of Plant and Animal Ecology, UB RAS Russia, 620144 Ekaterinburg, 8 Marta, 202, Russia

9672. Wildermuth, H (2006): Sequenzielle Mehrfachpaarung beim gleichen Vierfleckpaar (Libellula quadrimaculata) - Zufall oder Gesetzmäßigkeit?. In: Buchwald, R. (Hrsg.) (2006): Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata). Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 33-34. (in German, with English summary) ["Repetitive mating sequences of up to six times between the same male and female of the Four-spotted Chaser were recorded, interrupted by oviposition, rest, or attempted de-

parture of the female. These repeated matings were recorded several times and are, therefore, believed to occur regularly if the pair is not disturbed by rival males, which often happened. The phenomenon is discussed with respect to individual fitness and sperm competition." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wilder-muth.ch

9673. Wildermuth, H. (2006): *Nehalennia speciosa* in der Schweiz ausgestorben - und in Europa? In: Buchwald, R. (Hrsg.) (2006): *Habitatwahl, Fortpflanzungsverhalten und Schutz mitteleuropäischer Libellen (Odonata)*. Ergebnisse der 23. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen (GdO), 19.-21.3. 2004, Oldenburg. ISBN: 3-89995-278-2. 128 pp: 63-64. ["*N. speciosa* was recorded in Switzerland from 1867 until 1990. Intensified search for the species during the subsequent years remained unsuccessful. The 17 localities where it was recorded partially in rather high numbers until the early seventies of the last century concentrated on a small area in the eastern Swiss Plateau. It is believed that *N. speciosa* became extinct because of desiccation of its formerly already damaged habitats during a long lasting dry period in 1976, combined with changes in the vegetation due to slow eutrophication. In view of strong regressive tendencies of the species in whole Europe the future of the species in the western Palearctic region depends largely on the conservation of the last large populations in southern Bavaria, Poland, Belorussia and perhaps also Russia." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wilder-muth.ch

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9674. Caspari, S.; Bettinger, A. (2007): Konzept: Die Saarländische Naturschutzstrategie. Modul: Regionale Biodiversitätsstrategie (Arten, für deren Erhalt unsere Region / das Saarland besondere Verantwortung trägt). Landesamt für Umwelt- und Arbeitsschutz (LUA), Zentrum für Biodokumentation des Saarlandes (ZfB), Am Bergwerk 10, D-66578 Landsweiler-Reden. <http://www.saarland.de/dokumente/themanaturschutz/Biodiv110707.pdf>: 42 pp. (in German) [*Cordulegaster bidentata* is the only odonate species that the Federal State Saarland should be responsible for its protection within the borders of Germany. This is due to the fact that significant parts of the German populations are restricted to this region.] Address: Caspari, S.; Bettinger, A., Landesamt für Umwelt- und Arbeitsschutz (LUA), Zentrum für Biodokumentation des Saarlandes (ZfB), Am Bergwerk 10, D-66578 Landsweiler-Reden, Germany. E-mail: SCaspari@biodokumentation.saarland.de

9675. Chang, C.H.; Ting, K.; Chen, K.T. (2007): Microstructure and nanomechanical properties of the wing membrane of dragonfly. *Advanced Materials Research* 79-82: 1325-1328. (in English) ["The flight mechanics of dragonflies including hovering and taking off backwards, flight sideways and vertical directions has been attentions in Bionics. The dragonfly wing consists of the networks of various veins and membranes to make the structural properties complicated. In the past investigations, surface characteristics of dragonfly wing were measured by nanoindentation test. Thus the aim of this study will comprehensively concern the nanomechanical properties of veins, membrane and pterostigma of the wing of the dragonfly with nanoindentation. In the

mean time, the modulus and hardness of the wing of the dragonfly's composites including lengthwise vein, transverse vein, membrane and pterostigma are measured. The value of modulus of lengthwise vein is greater than the other structures. The value of modulus of transverse vein is the smallest due to its soft behavior. Its hardness is also smaller than others." (Authors)] Address: Chang Ching-Hsin, National Chung Hsing University, 250, Kuo Kuang Rd., Taichung 402. Taiwan. E-mail: chang.chhs@gmail.com

9676. Chuzakova, T.A.; Poljakova, N.V. (2007): Macrozoobenthos of some Samarskaya Luka waters. *Samarskaya Luka* 16(3) (21): 538-546. (in Russian, with English summary) [The macrozoobenthic fauna of 6 streams and 2 ponds of the National Park Samarskaya Luka was investigated. The list of 72 taxa includes *Cordulegaster boltonii* and *Erythromma najas*.] Address: Chuzakova, T.A., St. Petersburg State University, Biological Faculty, Department of Ichthyology and Hydrobiology, St. Petersburg

9677. De Marmels, J. (2007): Reportes de Odonata nuevos para Venezuela. *Entomotropica* 22(1) (issued in 2010): 45-47. (in Spanish, with English summary) ["Four species are added to the Venezuelan checklist: *Neoneura rufithorax* Selys, 1886 (Zygoptera: Protoneuridae); *Phyllocycla pegasus* (Selys, 1869) (Anisoptera: Gomphidae); *Aeschnosoma elegans* Selys, 1871 (Anisoptera: Corduliidae) and *Brechmorhoga flavopunctata* (Martin, 1897) (Anisoptera: Libellulidae). Five are deleted from that list: *Euthore hyalina* (Selys, 1853) (Zygoptera: Polythoridae); *Heteragrion macilentum* Hagen in Selys (Zygoptera: Megapodagrionidae), 1862; *Anomalophlebia nitida* Belle, 1995 (Anisoptera: Gomphidae); *Phyllocycla diphylla* (Selys, 1854) (Anisoptera: Gomphidae) and *Macrothemis declivata* Calvert, 1909 (Anisoptera: Libellulidae)." (Author)] Address: De Marmels, J., Museo del Instituto de Zoología Agrícola "Francisco Fernández Yépez" (MIZA), Facultad de Agronomía, Univ. Central de Venezuela, Apartado 4579, Maracay 2101-A, Venezuela. E-mail: demarmjc@gmail.com

9678. Gassmann, D. (2007): Die Ligula der Kleinlibellen im Rasterelektronenmikroskop - Morphologische Strukturen und evolutionsbiologische Bedeutung. *Mikrokosmos* 96(3): 183-187. (in German) [Detailed description of morphology and function of the ligula in Zygoptera with special emphasis on *Coeliccia membranipes*, *Torrenticnemis filicornis*, *Idiocnemis obliterata*, *I. strumidens*, and *Thaumatagrion funereum*. The phylogenetic importance of differences in the structure of the ligula is outlined.] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

9679. Gondat, L.; Arluziaga, I. (2007): Zarauzko (Euskal Herria) erreketako makroornogabe bentikoen faunaren ezagutzari zenbait ekarpen. *Heteropterus - Revista de Entomología* 7(1): 111-121. (in Euskarian, with Spanish and English summaries) ["Contribution to the knowledge of benthic macroinvertebrate fauna from Zarautz streams (The Basque Country)." The checklist includes *Calopteryx virgo*, *Chalcolestes viridis*, *Boyeria irene*, and *Cordulegaster boltonii*.] Address: Gondat, L., EHU/UPV Donostiako Irakasleen Eskola; Matematika-ren eta Zicntzia Esperimentalen Didaktika Saila, Oñati plaza 3; 20009 Donostia, Spain

- 9680.** Kalniņš, M.; Medne, M. (2007): The spatial allocation of dragonflies (Odonata) communities in raised bogs of Latvia. Book of abstracts: Daugavpils University Institute of Systematic Biology. 4th International Conference "Research and Conservation of Biological Diversity in Baltic region". Daugavpils, 25 - 27 April, 2007. Daugavpils University Academic Press "Saule": 50. (in English) [Verbatim: "The communities of different dragonfly species and their spatial allocation have been poorly studied in Latvia. Research in dragonflies 'communities' spatial allocations in bogs were undertaken in Sudas bog, (Cesis district), Taures bog (Valka district) and Lielais Kemeru tirelis bog (Tukums and Riga districts) in 2005 - 2006. Individual researches were taken also in other bogs of Latvia. Research surveys included quantitative adult registration along 100 m long patches inspection. Sloughs registration in several habitats or groups of species has been done additionally. Different characteristic bog habitats were selected as patches for examination: large water pools complexes in open bog areas, lakes in the bogs inclusive lakes with woody coasts, lake with woody coasts located at the edge of bog, the watercourse at edge of bog, beavers over flooded watercourse in the dif of bog, complexes of water pools with woody edges and water pools in the middle of the wood. 26 dragonfly species were examined during current research: 20 species in Sudas bog, 6 species in Taures and 13 species in Lielais Kemeru tirelis bog. Major diversity of species has been registered near the watercourses with rich vegetation (14 species) and in large complexes of water pools (10 species). Lower diversity has been confirmed in bog lakes situated on open areas (7 species) and in open patches of the bog without water pools (3-4 species). *Sympetrum danae* has been registered in all examined patches of Sudas bog, *Libellula quadrimaculata*, *Lestes sponsa* and *Enallagma cyathigerum* – in 80 % of examined patches of Sudas bog. Meanwhile, *Anax imperator* was found only in water pools, but *Pyrrhosoma nymphula* – along watercourses with grassy coasts. Due to sloughs research also *Aeshna subarctica* was registered but during adult registration this species was found only in Taures bog."] Address: Kalniņš, M., Nature Protection Board, Eksporta iela 5, Riga, LV-1010, Latvia. E-mail: martins.kalnins@dap.gov.lv
- 9681.** Kiel, E.-F. (2007): Erhaltungszustand der FFH-Arten in Nordrhein-Westfalen. Ergebnisse des FFH-Berichtes 2001 bis 2006. Natur in NRW 2/2007: 12-17. (in German) [Documentation of the present conservation status of *Coenagrion mercuriale*, *C. ornatum*, *Stylurus flavipes*, and *Leucorrhinia pectoralis* in Nordrhein-Westfalen, Germany.] Address: Kiel, E.-F., LANUV, Fachbereich 24, Leibnitzstr. 10, 45659 Recklinghausen, Germany. E-mail: ernst-friedrich.kiel@lanuv.nrw.de
- 9682.** Krüner, U. (2007): Der Südliche Blaupfeil, *Orthetrum brunneum* (Fonscolombe, 1837), am Entwässerungsgraben der Halde Emil Mayerisch, Kreis Düren (NRW). Entomologie heute 19: 51-57. (in German, with English summary) ["The drainage ditch at the hard coal dump Emil Mayerisch is colonized by *O. brunneum* since 15 years. The larval growth was studied in 1993. Due to the optimal environmental conditions a part of the population emerged one year after oviposition while another part needed two years. Phenological data of exuviae and imagoes from 1992 to 2006 show a flying time from June to August. Until now the population of *O. brunneum* could be preserved by regular removing of mud and aquatic plants." (Author)] Address: Krüner, Ulrike, Gelderner Str. 39, 41189 Mönchengladbach, Germany. E-mail: kruener@t-online.de
- 9683.** Machida, K.; Oikawa, T. (2007): Structure analyses of the wings of *Anotogaster sieboldii* and *Hybris subjacens*. Key Engineering Materials 345-346: 1237-1240. (in English) ["The wings of a dragonfly have many complicated structures. The configuration of the costal vein of the wings of a dragonfly is different from them of other insects. So, we paid attention to the configuration of the costal vein of the wings in this study. In order to know the functions and structures of the wings of a dragonfly, several 3-D models of the wing of *Anotogaster sieboldii* were created, and calculated with the 3-D finite element method. In addition, we created a 3-D model of the wing of *Hybris subjacens* which has the configuration of original wing, and compared the models of *Anotogaster sieboldii* and *Hybris subjacens*. As a result, it was clarified that the arch configuration of the costal vein controls the bending and the torsion of the wings." (Authors)] Address: Kenji Machida, K., Tokyo University of Science, 2641 Yamazaki, Noda-shi, Chiba, 278-8510, Japan. E-mail: mac@rs.noda.tus.ac.jp
- 9684.** Maibach, A.; Flöss, I. (2007): 19. Symposium der Schweizerischen LibellenkundlerInnen. Nouvelles. Centre Suisse de la Cartographie de la Faune 32: 33-36. (in German or French) [Abstracts of the following lectures are presented: René Hoess: Neuere und ältere Funde von *Coenagrion scitulum* in der Schweiz; Gilles Carrón & Olivier Schær: *Leucorrhinia albifrons*, *Gomphus vulgatissimus* et *Coenagrion mercuriale* à Genève; Moritz Frei & Daniel Kury: Erfassung von Libellen - ein Methodenvergleich; Frank Hampel: Beobachtungen eines Anfängers am Gattikerweiher und anderswo; Sandrine Angélibert, N. Indermuehle, D. Luchier, B. Oertli, J. Perfetta: Les Odonates adultes: quelle place dans la biodiversité aquatique du Canton de Genève?; David Leclerc: Mise en place d'une liste d'espèces de libellules prioritaires pour le bassin genevois («Liste rouge» régionale); Hansruedi Wildermuth: Erfolgreiche Förderung einer Population von *Orthetrum coerulescens* durch technische Naturschutzmassnahmen; Nicola Indermuehle, B. Oertli, A. Maibach, O. Schær & S. Lezat: L'échantillonnage des Odonates adultes: inventaire exhaustif et/ou «rapid assessment method»? Résultats préliminaires; Sandrine Angélibert, N. Indermuehle, D. Luchier, B. Oertli, J. Perfetta: Les Odonates adultes: quelle place dans la biodiversité aquatique du Canton de Genève?; Traute Fliedner: Biotopzerstörung durch Viehtritt nicht nur auf Alpweiden, sondern auch in Naturschutzgebieten; Gerhard Vonwil: Flutmulden – wenig bekannte Libellenrefugien] Address: Centre Suisse de Cartographie de la Faune (CSCF), Passage Maximilien de Meuron 6, 2000 Neuchâtel, Switzerland
- 9685.** Ott, J. (2007): Hat die Klimaänderung eine Auswirkung auf das Netz Natura 2000? - erste Ergebnisse aus Untersuchungen an Libellenzönosen dystropher Gewässer im Biosphärenreservat Pfälzerwald. Naturschutz und Biologische Vielfalt 46: 65-90. (in German) ["Dragonflies are suitable indicators for the quality of aquatic environments and for environmental changes. Dragonflies recently have been used as monitoring organisms to demonstrate the effects of climatic change, e.g. via the range expansion of southern species to the north or via the shifts within community composition. First results from a study in the transboundary biosphere reserve "Pfälzerwald-Vosges du Nord" are pre-

sented. The dragonfly fauna and the environmental conditions of the so called "Wooge", mainly dystrophic lakes (Natura 2000-code 3160), were monitored and compared with previous investigations. Most of these waters are part of the national Natura 2000 network. As a consequence of the effects of climatic changes and also synergistic effects (e.g. ground water extraction, drying/freezing out, lacking maintenance, increasing fragmentation) the aquatic systems have changed dramatically in the last couple of years. Water levels have dropped between one and two meters, reaching extreme situation in July 2006, where some waters even dried out completely. As a consequence, the dragonfly fauna also has changed: many of the stenoeccious and endangered moorland species, which are characteristic for the dystrophic waters, have disappeared from most of the waters (e.g. *S. arctica*, *A. juncea*, *L. dubia*, *C. hastulatum*). These species now are nearly extinct in the German part of the biosphere reserve. At the same time, these lakes have been colonised by generalists and widely distributed species, which are now dominating the waters and dragonfly communities (e.g. *O. cancellatum*, *L. depressa*, *G. pulchellus* - also *A. Imperator*) indicating the strong disturbance. Some of the waters even have dried out completely and, thus, totally lost their value for the aquatic fauna. In addition, species typical for astatic waters and thermophilic species like *Lestes virens*, *L. barbarus* and *Ischnura pumilio* are rapidly invading the area, indicating a change in the biological communities as well. If summer droughts and synergistic effects continue at current rates — and the scenarios show an ongoing impact in the region - and if no immediate management and mitigation measurements are undertaken, the remaining waters will lose their importance for the Natura 2000 network shortly and devalue this concept completely." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

9686. Santos, J.A. (2007): Libelulas e libelinhas. *Madressilva* 7: 6-7-9, 11. (in Portuguese) [This is an illustrated, brief general description of odonate biology, with a key to the families occurring in Algarve, Portugal. References to some regional species are made family wise.] Address: Santos, J.A., Associacao Almargem, Alto di S. Domingos 14, PT-8100-756 Louie, Portugal

9687. Smith, A.J.; Bode, R.W.; Kleppel, G.S. (2007): A nutrient biotic index (NBI) for use with benthic macroinvertebrate communities. *Ecological Indicators* 7(2): 371-386. (in English) ["Aquatic macroinvertebrates have been among the principal biological communities used for freshwater monitoring and assessment for several decades, but macroinvertebrate biomonitoring has not incorporated nutrient measures into assessment strategies. Two nutrient biotic indices were developed for benthic macroinvertebrate communities, one for total phosphorus (NBI-P), and one for nitrate (NBI-N). Weighted averaging was used to assess the distributions of 164 macroinvertebrate taxa across TP and NO₃- gradients and to establish nutrient optima and subsequent nutrient tolerance values. Both the NBI-P and NBI-N were correlated with increasing mean TP and NO₃- values ($r = 0.68$ and $r = 0.57$, respectively, $p < 0.0001$). A three-tiered scale of eutrophication for TP and NO₃- (oligotrophic: ≤ 0.0175 mg/l TP, ≤ 0.24 mg/l NO₃-, mesotrophic: > 0.0175 to ≤ 0.065 mg/l TP, > 0.24 to ≤ 0.98 mg/l NO₃-, eutrophic: > 0.065 mg/l TP, > 0.98 mg/l NO₃-) was also established through cluster analysis of

invertebrate communities using Bray-Curtis (quantitative) similarity. Significant differences ($p < 0.0001$) were detected between median NBI-P and NBI-N scores among the three trophic states. Therefore, the nutrient biotic indices (NBIs) appear to accurately reflect changes in stream trophic state. Multimetric water quality assessments were also used to identify thresholds of impairment among the three trophic states. Hodges-Lehman estimation indicated that the greatest change in assessment results occurred between the mesotrophic and eutrophic states. The eutrophic state also represented the highest percentage of overall impairment. Therefore, the suggested threshold for nutrient impairment is the boundary between mesotrophic and eutrophic (0.065 mg/l TP and 0.98 mg/l NO₃-). The corresponding NBI-P score (6.1) and NBI-N score (6.0) for this threshold incorporate predictive capabilities into the NBIs. The NBI and index score thresholds of impairment will provide monitoring programs with a robust measure of stream nutrient status and serve as a useful tool in enforcing regional nutrient criteria." (Authors) The index includes "Ophiogomphus sp. and undetermined Gomphidae".] Address: Smith, A.J., New York State Department of Environmental Conservation, Stream Biomonitoring Unit, Albany, NY 12233-3502, USA. E-mail: ajsmith@gw.dec.state.ny.us

9688. Staudacher, K.; Füreder, L. (2007): Habitat complexity and invertebrates in selected Alpine springs (Schütt, Carinthia, Austria). *Internat. Rev. Hydrobiol.* 92(4-5): 465-479. (in English) ["The invertebrate fauna from eight selected springs of the landslide area of Schütt (Carinthia, Austria) with contrasting environmental factors was investigated. The role of habitat structure on the community composition was studied with a particular focus on the spring-dwelling animals colonizing the aquatic and the adjacent aquatic-terrestrial transition zones. The crenocoenosis was predominantly composed of Chironomidae, Plecoptera, Trichoptera, Mollusca and Ostracoda and the number of spring-specialists was high. Habitat complexity, variable microhabitat composition and the concomitance of lotic and lentic areas in the eucrenal zone furthered a high species diversity and abundance. Even the aquatic-terrestrial transition zone was inhabited by high numbers of crenobionts and crenophiles. Moreover, the connectivity of aquatic and terrestrial habitats positively affected the structural and functional organisation of invertebrate assemblages in the spring biotopes." (Authors) The list of taxa includes *Cordulegaster bidentata* and *Aeshna cf. caerulea*.] Address: Staudacher, Karin, River Ecology and Invertebrate Biology, Institute of Ecology, University of Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria. E-mail: karin.staudacher@student.uibk.ac.at

9689. Xiao, K.; Bai, K.; Wang, W.s.; Song, F. (2007): Experimental study on the microstructure and nanomechanical properties of the wing membrane of dragonfly. *Acta Mechanica Sinica* 23(3): 281-285. (in English) ["Detailed investigations on the microstructure and the mechanical properties of the wing membrane of the dragonfly are carried out. It is found that in the direction of the thickness the membrane was divided into three layers rather than a single entity as traditionally considered, and on the surfaces the membrane displays a random distribution rough microstructure that is composed of numerous nanometer scale columns coated by the cuticle wax secreted. The characteristics of the surface structure are measured and described. The

mechanical properties of the membranes taken separately from the wings of live and dead dragonflies are investigated by the nanoindentation technique. The Young's moduli obtained here are approximately two times greater than the previous result, and the reasons that yield the difference are discussed." (Authors)] Address: Song, F., Slate Key Laboratory of Nonlinear Mechanics (LNM), Institute of Mechanics, Chinese Academy of Sciences, Beijing 100080, China. E-mail: songf@lnm.imech.ac.cn

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9690. Bechly, G. (2008): Additions to the fossil dragonfly fauna from the Lower Cretaceous Crato Formation of Brazil (Insecta: Odonata). *Palaeodiversity* 3, Supplement: 11-77. (in English, with German summary) ["Several interesting new discoveries of fossil odonates from the Lower Cretaceous Crato Formation of NE Brazil are presented. Two new taxa of damselflies (*Euarchistigma peterknobli* n. sp. and *Santanagrion longipes* n. gen., n. sp.) are described, and a new specimen of *Euarchistigma marialuiseae* with preserved colour pattern, distinct from the type species, is featured. Among the dragonflies totally three new families (*Megaphlebiidae* n. fam., *Magnathemidae* n. fam., and *Cratopetaliidae* n. fam.), nine new genera, and ten new species (*Paracordulagomphus aberrans* n. gen., n. sp.; *Paracordulagomphus divergens* n. gen., n. sp.; *Pauciphlebia novaolindense* n. gen., n. sp.; *Cratogomphus erraticus* n. gen., n. sp.; *Cratohagenius erichweberi* n. gen., n. sp.; *Megaphlebia rayandressi* n. gen., n. sp.; *Magnathemis marcusthorhalli* n. gen., n. sp.; and *Cratopetalia whiteheadi* n. gen., n. sp.) are described. A further putative new dragonfly genus and species is discussed and featured, but not formally described because of the poor preservation of the single available specimen. The original descriptions of *Euarchistigma marialuiseae*, *Cratostenophlebia schwickerti*, *Eotanypteryx paradoxa*, *Paramesuropetala gigantea*, *Cordulagomphus hanneloreae* and *Cordulagomphus winkelhoferi* are emended with new data and supplemented with drawings and photos. The newly discovered counter plate of the holotype of *Cratopetala petruleviciusi* is featured. Some errors concerning collection numbers and depositions of fossil odonates in Martill et al. (2007) are corrected and new collection numbers are updated for the Senckenberg museum collection." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: bechly@gmx.de

9691. Beckmann, H.; Berlin, A.; Blumrich, B.; Eitner, M.; Gottschalk, H.-J.; Grawe, D.; Thiele, V.; Wolf, F.; Zilch, M.; (2008): Entomofaunistische Untersuchungen im Bereich des Baggersees bei Alt Gaarz (NSG „Seen- und Bruchlandschaft südlich Alt Gaarz, Landkreis Müritz, Mecklenburg-Vorpommern). *Archiv der Freunde der Naturgeschichte in Mecklenburg XLVII*: 5-26. (in German) [Germany; the list of Odonata totals to 21 species, and includes the regional rare *Onychogomphus forcipatus*.] Address: Thiele, V., Ahornring 10, 19292 Möllen, Germany. E-mail: mv.thiele@t-online.de

9692. De Vlinderstichting (2008): Monitoring Dragonflies in Europe. Programme & Abstracts of International Symposium, Wageningen, 13-14 June 2008. De Vlinderstichting, Wageningen: 26 pp. (in English) [Oral presentations: Groenendijk, D., V. Mensing & C. Plate: Ten

years dragonfly monitoring in the Netherlands: results and lessons for the future: - Ott, J.: What can monitoring studies of dragonflies tell us? From single waters to landscapes, from short term to long term projects; - Grönhagen, N & K.-J. Conze: How to detect trends in heterogeneous data accurately? The example of the preparation of the new red list of dragonflies in Northrhine-Westphalia; — Oertli, B.: The local species richness: a metric for a long term monitoring; - Torralba-Burrial, A. & F.J. Ocharan: Monitoring dragonfly species as river ecological status bioindicators; - Van Strien, A.: Detecting trends in dragonfly data: difficulties & opportunities; - Bell, S.: People count too: volunteers and biodiversity monitoring in Europe; - De Knijf, G.: The dragonfly inventory project in Flanders (Belgium): thirty years of collecting data. Are there any trends detectible?; - Dyatlova, E.S.: Dragonflies of the proposed National Park "Nizhnednestrevsky": monitoring and conservation; — Thompson, D.J.: Monitoring *Coenagrion mercuriale*: the UK experience; - Termaat, T, J. Bouwman & C. Plate: Monitoring threatened species in the Netherlands; - Luque, P. & M. Lockwood: The Catalan Dragonfly Monitoring Scheme; - Kalkmam, V.: Progress report on the atlas and red list of European dragonflies; - Van Swaay, C: Lessons from the Butterfly Monitoring Network in Europe; - Poster presentations: Azpilueeta Amerin, M. & A. Cordero Rivera: Monitoring *Oxygastra curtisii* and *Macromia splendens*: their habitat and life cycle; - Oertli, B. & P. Nicolet: The European Pond Conservation Network (EPCN); - Sanchez Guillen, R.A. & A. Cordero Rivera: Relative frequency of *Ischnura elegans* and *I. graellsii* (Odonata: Coenagrionidae) in the Galician coast; — Termaat, T, VI Kalknum & J.H. Bouwman: Trends in ranges of dragonflies in the Netherlands: does climate change play a role?; - Termaat, T, V Mensing, D. Groenendijk & J. Bouwman: Dragonfly protection in the Netherlands: a stepwise approach.] Address: Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands

9693. Geraeds, R.P.G. (2008): Larven van de Gewone bronlibel in de Rode Beek (Nationaal Park De Meinweg). *natuurhistorisch maandblad* 97(6): 129-132. (in Dutch, with English summary) ["The Meinweg nature reserve hosts the largest population of *Cordulegaster boltonii* in the Netherlands. The species is known to breed in three brooks in the reserve, the Bosbeek, Nartheciumbeekje and Venbeek brooks. The Rode Beek brook, also situated in this nature reserve, was never considered as a breeding water for this species. In October 2007, the Rode Beek brook was surveyed (with a net) to establish the presence of larvae of *C. boltonii*. The survey yielded 23 larvae in the stretch from the Dutch-German border, where the brook enters the Netherlands, to the Gitstapper water mill. The species was not found downstream of this mill, where the brook has been canalised and runs through open farmland, making it an unsuitable habitat for this species. The survey showed, however, that the brook does function as a breeding water for *C. boltonii* at the Meinweg reserve. The larvae we caught ranged in age from 1 to 4 or 5 years, proving that the Rode Beek brook actually hosts a population of *C. boltonii*." (Author)] Address: Geraeds, R.P.G., Bergstraat 70, 6131 AW Sittard, The Netherlands

9694. Golovatyuk, L.V.; Zinchenko, T.D.; Shitikov, V.K. (2008): An indicative assessment of macrozoobenthos organisms in flowing waters. *Inland Water Biology* 1(3):

260-273. (in English) [*Calopteryx splendens*, *Coenagrion puella*, *Erythromma najas*, *Gomphus vulgatissimus*, *Ischnura elegans*, *Libellula quadrimaculata*, *Platycnemis pennipes*, *Stylurus flavipes*, *Sympetrum flaveolum*, and *Sympetma fusca* were used as indicators for saprobic conditions in rivers of the middle and lower Volga River, Russia. Original Russian Text © L.V. Golovatyuk, T.D. Zinchenko, V.K. Shitikov, 2008, published in *Biologiya Vnutrennikh Vod*, No. 3, 2008, pp. 66–79.] Address: Zinchenko, T.D., Institute of the Ecology of the Volga River Basin, Russian Academy of Sciences, ul. Komzina 10, Tolyatti, 445003, Russia. E-mail: tdz@mail333.com

9695. Haller, R.; Nössing, T.; Werth, F.; Festi, A. (2008): *Libellen* (Odonata) am Schlern (Südtirol, Italien). *Gredleriana* 8: 287-300. (in German, with English summary) [In 2006 and 2007, 19 odonate species were recorded in the Schlern massif, South Tyrol, Italy. *Cordulegaster bidentata* (regionally threatened with extinction), *Sympetrum fonscolombii*, and *Crocothemis erythraea* are noteworthy. The rest of species are regionally common.] Address: Haller, R., St. Peterweg 83, 39018 Terlan, Italy. E-mail: reinhold.haller@brennercom.net

9696. Hocking, D.J.; Semlitsch, R.D. (2008): Effects of experimental clearcut logging on gray treefrog (*Hyla versicolor*) tadpole performance. *Journal of Herpetology* 42: 689-698. (in English) ["Clearcutting detrimentally affects the populations of many amphibian species. However, Gray Treefrogs (*Hyla versicolor*) have shown a preference for breeding sites located in clearcuts near forested habitat. To test the implications of this preference, we examined Gray Treefrog tadpole performance in cattle tanks along a gradient from clearcut to forest habitat. We replicated this design at three experimental clearcut sites. Tadpole performance was measured as length of the larval period, size at metamorphosis, and survival. We also examined the influence of temperature, periphyton productivity, and invertebrate predator abundances (anisopteran and dyticide beetle larvae) on tadpole performance. Time to metamorphosis was shorter in the clearcuts, but metamorphs tended to be smaller than metamorphs in the forest tanks. Survival was also greater in the clearcuts than in the forest treatments. Higher temperatures in the clearcuts primarily contributed to tadpole performance whereas invertebrate predators did not appear to influence performance. Although clearcuts benefited tadpoles through higher survival and shorter larval periods, there are potential fitness consequences for small metamorphs emerging in clearcuts." (Authors)] Address: Hocking, D.J., University of New Hampshire, 215 James Hall, Durham, New Hampshire 03824 USA. E-mail: dhocking@unh.edu

9697. Karpelson, M.; Wei, G.-Y.; Wood, R.J. (2008): A review of actuation and power electronics options for flapping-wing robotic insects. 2008 IEEE International Conference on Robotics and Automation Pasadena, CA, USA, May 19-23, 2008: 779-786. (in English) ["Flapping-wing robotic insects require actuators with high power densities at centimeter to micrometer scales. Due to the low weight budget, the selection and design of the actuation mechanism needs to be considered in parallel with the design of the power electronics required to drive it. This paper explores the design space of flapping-wing microrobots weighing 1g and under by determining mechanical requirements for the actuation mechanism, analyzing potential actuation

technologies, and discussing the design and realization of the required power electronics. Promising combinations of actuators and power circuits are identified and used to estimate microrobot performance." (Authors) A reference to Odonata is made.] Address: Karpelson, M., School of Engineering and Applied Sciences, Harvard University, Cambridge, MA 02138, USA. E-mail: michaelk@seas.harvard.edu

9698. Khan, M.R.; Irshad, M.; Rafi, M.A. (2008): *Insect Fauna of Azad Jammu and Kashmir*. MK Printers, Islamabad. ISBN 978-969-8909-01-07: 143 pp. (in English) ["Due to importance of insects in agriculture, forestry, household and human/animal health of AJ & K, it is essential to document the insect fauna of the area. In the present compilation 941 insect species have been reported. These belong to order Coleoptera, Diptera, Heteroptera, Hymenoptera, Isoptera, Lepidoptera, Neuroptera, Odonata and Orthoptera. The present list has been compiled through the available literature and personal efforts of authors. Forty-nine species have been collected by the authors and reported first time from AJ & K. Efforts have been made to collect all the published material." (Publisher)] Address: Rafi, M.A., National Agricultural Research Centre, Islamabad, National Insect Museum, Pakistan. E-mail: arafiam@yahoo.com

9699. Khrokalo, L.; Nazarov, N. (2008): Odonata of the Poliskyi Nature Reserve, Ukraine. IDF-Report 13: 17-28. (in English) ["Twenty-eight Odonata species were recorded in the Poliskyi Nature Reserve (Zhytomyr oblast', North Ukraine) in 2006 and 2007, 18 of which were reported for the first time from this location. This included such rare species as *Somatochlora arctica* (second record in the Ukraine, first record for 100 years), *Leucorrhinia dubia*, *L. rubicunda* and *L. albifrons*. A breeding site and a dense population of *Nehalennia speciosa* were found in a bog near the river. *Zholobnytsya*. The record of *Orthetrum coerulescens* is the northernmost in Ukraine." (Authors)] Address: Khrokalo, Lyudmyla, Institute of Environment & Biotechnologies, National Agricultural University of Ukraine, Geroiv Oborony str.15, Kyiv, Ukraine 03041. E-mail: Khrokalo@mail.ru

9700. Khrokalo, L.; Krylovskaya, S. (2008): Distribution and current status of *Coenagrion armatum* (Charpentier, 1840) in Ukraine. IDF-Report 13: 1-16. (in English) ["The 14 known localities of *C. armatum* in Ukraine are listed and the 27 dragonfly species recorded are presented. An expedition devoted to revisit 10 of them in spring 2007 did not result in a confirmation at any of them. Here, all localities are described in detail and possible reasons for the absence of the species are discussed. These include habitat alterations because of anthropogenic impact, such as agricultural activity, as well as decreasing competitiveness against Mediterranean species that spread in response to altered climatic conditions. Proposed measures of conservation of *C. armatum* in Ukraine include a) the inclusion into the Red Data Book of Ukraine under category I (Endangered) and b) additional studies, monitoring and habitat conservation." (Authors)] Address: Khrokalo, Lyudmyla, Institute of Environment & Biotechnologies, National Agricultural University of Ukraine, Geroiv Oborony str.15, Kyiv, Ukraine 03041. E-mail: khrokalo@mail.ru

9701. Kochurova, T.I. (2008): The bottom invertebrates of small rivers in an area where pesticides were buried. *Inland Water Biology* 1(3): 287-295. (in English)

["The effect of Kilmezskii pesticide disposal site on the zoobenthos of Osinovka and Loban' rivers (the Vyatka River basin, Kirovskaya oblast) is reviewed. A faunistic list of water invertebrates in these rivers is published for the first time, qualitative and quantitative indices of zoobenthos development are given, and the condition of watercourses is assessed using bioindicative methods. The peculiarities of benthic communities of the Osinovka River and its tribute, i.e., a significant impoverishment of species composition, the simplification of structural organization, and low bioindicative indices, allow us to assume that the burial has a negative effect on zoobenthos condition." (Author) The following Odonata taxa are considered: *Calopteryx virgo*, *C. splendens*, *Platycnemis pennipes*, *Gomphus* sp., and *Somatochlora metallica*. Original Russian Text © T.I. Kochurova, 2008, published in *Biologiya Vnutrennikh Vod*, No. 3, 2008, pp. 93–101.] Address: Kochurova, T.I., Vyatka State University of Humanities, ul. Krasnoarmeiskaya 26, Kirov, 610002, Russia. E-mail: ecolab@vshu.kirov.ru

9702. Krach, J.E. (2008): *Libellenvorkommen im Landkreis Eichstätt*. facetta, Suppl. 3 - Berichte der entomologischen Gesellschaft Ingolstadt e.V.; 338 pp. (in German) [The author presents a detailed study based on 1227 water body situated in the Landkreis Eichstätt, Bayern, Germany. A total of 52 odonate species was recorded; the species are treated in a monographic style providing information on distribution (detailed map), frequency, habitat, phenology, co-occurring species, and some cases also conservation measures and vernacular naming of species. The big population of *Coenagrion ornatum* is of more than regional importance] Address: Krach, J.E., Oberstimmerstr. 62, 85051 Zuchering, Germany. E-mail: JEKrach@gmx.de

9703. Lemelin, R.H. (2008): Dragonfly tourism. In: M. Lück (Ed.). *Encyclopedia of Tourism and Recreation in Marine Environments*. Wallingford, Oxfordshire: CABI: 145. (in English) [Verbatim: "Dragonfly Tourism: While the activity of enjoying (viewing, photographing, collecting) Odonata (dragonflies and damselflies) is a relatively new leisure phenomenon in Western society, in some Asian countries such as China and in Japan dragonflies have a long history of being involved in popular culture and are even raised as pets (Mitchell and Lasswell, 2005). Dragonfly gatherings (i.e. counts and educational outings) in North America and Europe are, however, increasing in popularity. For example, popular Odonata activities include the Valley Nature Centre's Annual Dragonfly Days in Weslaco, Texas, annual Odonata meetings (e.g. the Great Lakes Odonata Meeting) and counts (e.g. the Algonquin Park Odonata Count). Elsewhere, dragonflies are viewed in various sanctuaries found in Japan and the UK (Moore, 1997, 2001). The most notable dragonfly attraction may perhaps be the dragonfly awareness trails located in the National Botanical Gardens in Pietermaritzburg, South Africa (Suh and Samways, 2001). Individuals are also building 'dragonfly ponds' to attract Odonata to their homes (Moore, 2002). Conservative estimates place the number of Odonata enthusiasts belonging to a formal association at over 3000 worldwide. This number increases dramatically if one was to include participants in the growing number of dragonfly events. Facilitating the growth of these leisure activities, but more specifically the viewing of dragonflies, is the availability of field guides (Dunkle, 2000, Mead, 2003, Jones et al, 2006),

associations (e.g. Dragonfly Society of the Americas, Worldwide Dragonfly Association) and online verification of specimens (e.g. Digital Dragonflies). While concerns over the emerging role of Odonata in marine leisure activities (e.g. boat activity) have been noted (Samways, 2005), the greatest concerns over anthropogenic disturbances of Odonata in coastal areas are the loss of suitable habitat (i.e. drained wetlands) and declining water quality (Medland, 2004). Some coastal species may be particularly vulnerable. For example, the Seaside Dragonlet (*Erythrodiplax berenice*), found primarily along the Atlantic Coast from Venezuela's north to southern Canada, breeds mostly in brackish water (salt marshes and estuaries) in coastal areas (Mitchell and Lasswell, 2005; Fig. D6). Odonata are important bio-indicators for both aquatic and semi-aquatic habitats and they can be used as flagship species for tourism and leisure strategies (Moore, 1997)." (Author)] Address: Lemelin, H., Lakehead University, School of Outdoor Recreation, Parks and Tourism, 955 Oliver Rd., Thunder Bay, Ontario, P7B 5E1, Canada. E-mail: harvey.lemelin@lakeheadu.ca

9704. Li, Y.; Wang, X.S. (2008): Investigation on characteristics of structure and simulation analysis for dragonfly wing vein. *Advanced Materials Research* 33-37: 785-788. (in English) ["In this work, the microstructure of the dragonfly wing vein was investigated by the finite element method (FEM). It is a bionic view to simulate the microstructure of the wing vein, which could be used to construct the micro air vehicles (MAVs). From the FEM results, the sandwich structure of the dragonfly wing vein was proved, which could supply more torsional deformation and reduce the weight of dragonfly. And the protein layer in the sandwich structure almost not bear the bending loadings, which could protect the protein not to be destroyed. It could assist us to utilize such design for the new micro air vehicle (MAV), especially ornithopter." (Authors)] Address: Li, Y., Dept of Engineering Mechanics, Tsinghua University, 100084, Beijing, P.R. China. E-mail: Lee2002hu@yahoo.com.cn

9705. Marquez Rodríguez, J.; Ferreras-Romero, M. (2008): Contribution to the knowledge of the Iberian distribution of *Macromia splendens* (Pictet, 1843) (Odonata: Cordulidae). *Boln. Asoc. esp. Ent.* 32(3-4): 371-374. (in Spanish) [A larva of *M. splendens* was caught 2-III-2007, in a tributary of the River Guadiamar, near Cañaveroso, Spain (coordinates: 10x10 km: 29S QB36; altitude 160 m a.s.l.).] Address: Rodríguez, J.M., Departamento de Sistemas Físicos, Químicos y Naturales (Zoología), Universidad Pablo de Olavide, A-376 km 1, 41013 Sevilla, Spain.

9706. Naranjo López, C.; Trapero Quintana, A. (2008): Clave dicotómica para la identificación de las especies cubanas del orden Odonata, en estado larval. *Cocuyo* 17: 28-36. (in Spanish, with English summary) ["A dichotomous key for the identification of the 81 Cuban species of the order Odonata, in the larval stage, is presented for the first time. It keys to the level of the six families that comprise the group and in each family keys the 42 genera and all known larvae occurring in the Cuban archipelago. Eleven taxa whose larvae are unknown to science are not keyed. All key characters are based on literature, no new distinguishing morphological data are presented and known larvae are described. The key constitutes an important systematic tool for the study of biodiversity of the dragonflies in the Cuban archipelago." (Authors)] Address: Naranjo Ló-

pez, C., Departamento de Biología. Universidad de Oriente. Patricio, Lumumba s/n. C.P. 90500. Santiago de Cuba, Cuba. E-mail: naranjo@jcnl.uo.edu.cu

9707. Schorr, M. (2008): Die Libellen des Mt Dulit, Borneo, Sarawak, Malaysia – revisited. Spendenaufwurf des International Dragonfly Fund e.V.. IDF-Report 13: 29-32. (in German) [Plea for donations to support an odonatological expedition organised by Rory Dow, UK to the Dulit region.] Address: Schorr, M., Schulstr. 7B, 54314 Zerf, Germany. E-mail: bierschorr@online.de

9708. Silina, A.E.; Prokin, A.A. (2008): The trophic structure of macrozoobenthos in marsh water bodies of the forest-steppe zone. *Inland Water Biology* 1(3): 231-240. (in English) [The trophic structure of macrozoobenthos was studied in a lake and three marshes of different succession stages in a secondary steppe of the Zorinsky part of the Central Chernozem Reserve. Odonata are treated at the genus level. Original Russian Text © A.E. Silina, A.A. Prokin, 2008, published in *Biologiya Vnutrennikh Vod*, No. 3, 2008, pp. 35–44] Address: Silina, A.E., Voronezh State University, pl. Universitetskaya 1, Voronezh, 394600 Russia. E-mail: allasilina@list.ru

9709. Tavares, J.P. (2008): Die Falken der einsamen Inseln. *Der Falke* 55(11): 413-418. (in German) [General note on *Falco eleonorae*'s diet, which also includes Odonata.] Address: not stated

9710. Termaat, T. (2008): Hulp bij het determineren van libellen Glazenmakers. *Vlinders* 4 2008: 21-23. (in Dutch) [Detailed notes on field characteristics of the members of the genera *Aeshna* and *Brachytron* occurring in the Netherlands.] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

9711. Termaat, T. (2008): Hulp bij het determineren van libellen Heidelibellen. *Vlinders* 3 2008: 20-21. (in Dutch) [Detailed notes on field characteristics of the members of the genus *Sympetrum* occurring in the Netherlands.] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

9712. Termaat, T. (2008): Libellenet online! *Vlinders* 4 2008: 24-25. (in Dutch) [The web page of the Dutch dragonfly watchers was launched: <http://www.libellenet.nl/>] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

9713. Trapero Quintana, A.D.; Torres Cambas, Y. (2008): Actualización sistemática de la odonofauna cubana (Insecta: Odonata). *Cocuyo* 17: 25-28. (in Spanish, with English summary) ["This paper updates the Cuban list of the Odonata to 85 species grouped in seven families and 42 genera. *Protoneura viridis* Westfall, 1964, *Erythrodiplax bromeliicola* Westfall 2000, *Macrothemis inequiunguis* Calvert 1895, *Orthemis discolor* (Burmeister 1839) and *Telebasis vulnerata* (Hagen 1861) are considered new records. *E. bromeliicola* and *M. inequiunguis* were reported by foreign authors on surveys from the last century. Endemism remains with five species from suborder Zygoptera while 11 species were changed to different genera." (Authors)] Address: Trapero Quintana, A.D., Depto de Biología. Universidad de Oriente. Patricio, Lumumba s/n. C.P. 90500. Santiago de Cuba, Cuba. E-mail: atrapero@cnuo.edu.cu; traperoquintana76@yahoo.es

9714. Wang, J.Z. (2008): Dragonfly flight. *Physics Today* (October 2008): 74-75. (in English) [Introduction into biophysics of flight in planes and dragonflies.] Ad-

dress: Wang, Z. Jane, Theoretical and Applied Mechanics, Cornell University, Ithaca, New York 14853, USA. E-mail: z.jane.wang@cornell.edu

2009

9715. Allen, K. (2009): The ecology and conservation of threatened damselflies. Integrated catchment science programme. Science report: SC040027/SR1: VII, 142 pp. (in English) ["Background: This report presents the results of an autecological study of *Ischnura pumilio* in south-west England. *I. pumilio* has a sparse, localised distribution in the UK and is classed as "scarce" in the British Red Data Book of Insects. The aim of this study was to raise the ecological understanding of this species to a similar level to that of other threatened odonates such as *Coenagrion mercuriale* with a view to better informing its conservation management. Fieldwork was conducted in the New Forest, Hampshire and at a variety of sites throughout Cornwall and Devon. Main objectives: The primary aim of this study was to examine the dispersal potential, survival rates, population sizes and habitat requirements of *I. pumilio* in the south of England. Similar work on other species, such as *C. mercuriale*, has been useful in guiding conservation efforts, but there are very few studies of *I. pumilio*. It is hoped that this study will inform conservation management and allow more effective monitoring and surveillance of this species. Results: Intensive mark-recapture (MRR) studies were conducted at two sites during 2005 and 2006. These revealed that, despite a reputation as long range dispersers, *I. pumilio* were generally very sedentary with movement characteristics similar to those of other similar sized odonates. No movement between sites was recorded and 88 per cent of individuals moved less than 50m (net) in their lifetime. Movement distance was inversely dependent on population density, indicating a tendency to move towards conspecifics or areas of more suitable habitat. The presence of parasitic mites (*Hydryphantes* spp.) significantly increased movement distance. Males consistently moved further than females. Longer intervals between captures resulted in greater movement distances. Surveys of vegetation and environmental factors were conducted at 31 sites with *I. pumilio* records from the previous 10 years. The species occurred at sites with a range of water depths, management regimes and levels of pH, grazing, pollution and disturbance. Occupied habitats generally had slow-flowing water, some bare ground at the water's edge and low levels of shade. A low overall count for odonate species was also associated with the presence of *I. pumilio*. Areas away from water were found to be important for the species and over 30 per cent of matings were recorded at least 10m from water. Existing sites should be actively managed up to 25m from water, and new habitat created, where possible, with dispersal potential in mind. Survival and recapture rates for Scarce Blue-tailed Damselflies and *C. mercuriale* were estimated using single and multistate MRR modelling techniques. The resulting rates were used to estimate population sizes for *I. pumilio* populations surveyed in 2005 and 2006, and two *C. mercuriale* populations in south England surveyed during 2001 and 2002. Survival generally decreased with age and time in the season and a negative effect of parasites was also indicated. Removing a leg for genetic analysis was not found to affect survival. The sex of mature individuals had no, or negligible ef-

fect on their survival rates. *Ischnura pumilio* was found to exist in much smaller populations than *C. mercuriale* and so may suffer greater levels of inbreeding. A comparison of monitoring methods showed that transect walk estimates were a reliable method of estimating abundance and provided a good basis for further work to develop a predictive relationship. Conclusions and recommendations: Despite the strength of some UK populations, such as Latchmoor, *I. pumilio* still requires conservation management at sites that have poorer quality habitat and smaller populations. Many populations are isolated, based on the range of movements observed in this study, and without dispersal to augment genetic diversity even strong populations are at risk of developing high levels of inbreeding. This study has examined several aspects of the species' ecology and is the first large scale study of *I. pumilio* that has been conducted. This report presents estimates of dispersal potential, survival rates and habitat requirements and discusses these with respect to the species' conservation management. Key findings and recommendations include: • The species was found at sites with a range of water depths, management regimes and levels of pH, pollution, grazing and disturbance. However, sites generally had slow-flowing water, with some bare ground in and around the water's edge and were relatively open in terms of shade from tall vegetation. • Management of areas away from water should be incorporated into any habitat management plan, as different individuals may be present and may exhibit different behaviours. A buffer of 25m may be sufficient for the necessary roosting, mating and feeding requirements of *I. pumilio*. • A monitoring program to establish the current status of these and other key odonate sites across the UK would be beneficial. Monitoring of adult *I. pumilio* at existing sites may be achieved using transect walks, which are a useful method for large-scale monitoring. • The ability of *I. pumilio* to colonise newly formed habitat is still open to question. No long-range dispersal movements were recorded in this study and no upward flight behaviour was observed. • In this report, the estimated maximum population sizes for the two studies of *C. mercuriale* are among the highest recorded for any damselfly. However, *I. pumilio* populations were much smaller and as such may be more at risk of genetic effects such as inbreeding." (Author) Available at: <http://publications.environment-agency.gov.uk/pdf/SCHO0809BQVW-e-e.pdf> Address: Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, BS32 4UD, UK. www.environment-agency.gov.uk; Allen, Kathrine, University of Liverpool Liverpool, L69 3BX, UK

9716. Becker, I.; Sigalas, V. (2009): Von Pfauen, Libellen und Fledermäusen - Geheimnisvolle Tierwelt im Jugendstil. Veröffentlichungen des Bröhan-Museums 14: 63 pp. (in German) [This is a catalogue directed to animals in art nouveau including two pages (14-15) on dragonflies.] Address: Bröhan-Museum, Landesmuseum für Jugendstil, Art Deco und Funktionalismus (1889-1939), Schloßstr. 1a, 14059 Berlin, Germany

9717. Bethoux, O.; De la Horra, R.; Benito, M.I.; Barrenechea, J.F.; Galán, A.B.; López-Gómez, J. (2009): A new triadotypomorphan insect from the Anisian (Middle Triassic), Buntsandstein facies, Spain. *Journal of Iberian Geology* 35(2): 179-184. (in English, with Spanish summary) ["The species *Rabru rubra* sp. nov., a new triadotypomorphan insect from the Iberian Ranges, is

described on the basis of a newly discovered specimen, found in fine grained sandstones of alluvial origin, in the lowermost part of the Eslida Formation (Buntsandstein facies), in the central part of the Iberian Ranges. The occurrence of a triadotypomorphan suggests an Anisian age of the Eslida Formation. The species represents the oldest Mesozoic insect described from Spain, and provides interesting information to better appreciate the process of ecosystems recovery after the Permian-Triassic boundary crisis." (Authors) Odonatoptera] Address: Béthoux, O., Freiberg University of Mining and Technology, Institute of Geology, Department of Palaeontology, Bernhard-von-Cotta Str. 2, D-09596 Freiberg, Germany. E-mail: obethoux@yahoo.fr

9718. Borisov, S.N. (2009): Dragonflies (Odonata) of a thermal spring in «Altyn Emel» Nature Park (South East Kazakhstan). *Euroasien entomological journal* 8(3): 362. (in Russian, with English summary) [*Ischnura elegans*, *I. pumilio*, *Orthetrum brunneum*, and *O. anceps* are newly recorded from a thermal spring (t=32 °C) of Altyn Emel National Park in South-East Kazakhstan (43.921° N, 78.793° E).] Address: Borisov, S.N., Siberian Zoological Museum, Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

9719. Bouwman, J.; Groenendijk, D.; Termaat, T.; Platte, C. (2009): Dutch Dragonfly Monitoring Scheme. A Manual. Report number VS2009.015, Dutch Butterfly Conservation, Wageningen & Statistics Netherlands, Den Haag, Netherlands: 21 pp. (in English) [Handout with detailed instructions to choose a transect, count and document specimens, and supply data to the Dutch organisers.] Address: Bouwman, J.H., Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

9720. Burkart, W.; Kappes, E.; Kappes, W.; Martens, A.; Weihrauch, F. (2009): In memoriam Wolfgang Lopau (29. März 1938-29. Juli 2009). *Libellula* 28(3/4): 221-232. (in German, with English summary) ["Wolfgang Lopau, better known to most of his friends as 'Lopi', was without doubt the worldwide acknowledged authority on the Odonata of Greece and surrounding regions. In this obituary his life is portrayed, and his professional impact on international odonatology as well as the spirit of co-operation and friendship in his work is emphasized. A list of Lopi's odonatological publications is appended." (Authors)] Address: Burkart, W., Am Emel 7, D-27412 Wilstedt, Germany. E-mail: weguburkart@gmx.de

9721. Catling, P.M. (2009): Dragonflies (Odonata) emerging from brackish pools in saltmarshes of Gaspé, Quebec. *Canadian Field-Naturalist* 123(2): 176-177. (in English) ["*Enallagma hageni*, *Lestes disjunctus*, *Sympetrum costiferum*, *S. danae*, *S. internum*, and *S. obtrusum* were observed emerging from brackish pools with an overall salinity range of 6.0-17.3 ppt in three saltmarshes in Gaspé, Quebec. *Lestes* congener, *Libellula quadrimaculata*, and species of *Sympetrum* were prominent among the larvae in these pools." (Author)] Address: Catling, P.M., 170 Sanford Avenue, Ottawa, Ontario K2C 0E9 Canada; E-mail: catlingp@agr.gc.ca

9722. David, S.; Smiga, M. (2009): Dragonflies (Insecta: Odonata) of Považské podolie region in the vicinity of the town of Trenčín. *Folia faunistica Slovaca* 14(16): 107-112. (in Slovakian, with English summary) [Slovakia; between 2002 until 2004, 21 Odonata species were

found at 11 localities studied. Dominant species were *Ischnura elegans*, *Platycnemis pennipes*, *Orthetrum albistylum*, and *O. cancellatum*. The community of Odonata was classified as *Orthetrum – Libellula depressa* odonatocenosis.] Address: David, S., Katedra ekológie a environmentalistiky, Fakulta prírodných vied, Univerzita, Konštatná Filozofa v Nitre, Tr. A. Hlinku 1, SK – 949 74 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

9723. Eggers, T.O.; Martens, A. (2009): Limnische Neozoa in Deutschland: Verbreitungsmuster und Ausbreitungstrends. Deutsche Gesellschaft für Limnologie (DGL). Erweiterte Zusammenfassungen der Jahrestagung 2008 (Konstanz), Hardegsen 2009 : 378-381. (in German) [*Gomphus pulchellus* is considered to have spread along canals ("Hauptmigrationsachse") and nearby situated gravel pits from west to east. Annotation (Martin Schorr): Range extension of *G. pulchellus* is without any doubt, however it is questionable if this expansion was triggered by canals. The later did not exist (with one exception only - Mittellandkanal) and were realised decades after the first records of the species east of the River Rhine.] Address: Martens, A., Abteilung Biologie, Pädagogische Hochschule Karlsruhe, Bismarckstr. 10, 76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de

9724. Festi, A.; Nössing, T.; Winkler, F.; Werth, A. (2009): Erhebungen der Libellenfauna (Odonata) im Naturpark Trudner Horn (Südtirol, Italien). *Gredleriana* 9: 231-248. (in German, with English summary) ["The Odonata fauna of the area of the „Trudner Horn“ Natural Park (Parco Naturale Monte Corno), which is characterized from several still-water and moorland biotopes, was investigated during the summer of 2008. A total of 22 species of Odonata was identified. Most of those are considered typical generalists of the low mountains. The rarest species of the studied area are the specialized moorland dragonflies like *Aeshna caerulea*, *Leucorrhinia dubia*, *Somatochlora alpestris* and *S. arctica*. Those where found only in a few spots and are to be considered endangered in reason of a progressive loss of habitat due to a deterioration of the moorland biotopes." (Authors)] Address: Festi, A., Dreiheiligenstr. 24, I-39100 Bozen, Italy. E-mail: alex.festi@rol-mail.net

9725. Gilroy, J.J.; Anderson, G.Q.A.; Grice, P.V.; Vickery, J.A.; Watts, P.N.; Sutherland, W.J. (2009): Foraging habitat selection, diet and nestling condition in Yellow Wagtails *Motacilla flava* breeding on arable farmland. *Bird Study* 56(2): 221-232. (in English) ["Yellow Wagtails (Aves) showed seasonally variable foraging preferences, favouring field margin and crop habitats, although habitat availability did not influence brood productivity ... Samples taken in June tended to be dominated by flies and beetles (both adults and larvae) While flies continued to dominate the diet in July, beetles were much less prevalent, and adult damselflies became increasingly frequent in samples. It is not known whether this shift is associated with changes in foraging habitat preference, or the relative scarcity of damselflies across the whole study area prior to strong emergences of the commonest species *Enallagma cyathigerum*, and *Ischnura elegans* in late June. The ability to switch between prey items and/or foraging habitats can be important in multi-brooded species that face sharp seasonal peaks in the abundance of invertebrate taxa." (Authors)] Address: Gilroy, J.J., School of Biological

Sciences, University of East Anglia, Norwich, NR4 7TJ, UK. Email: james.gilroy@googlemail.com

9726. Goffart, P.; Devillers, C.; Bertrand, S. (2009): Observations récurrentes du Leste verdoyant (*Lestes virens*) dans la région de Spa-Malchamps: une population reproductrice s'y maintient-elle? *Les naturalistes Belges* 90(3-4): 47-54. (in French, with English summary) ["A male adult *Lestes virens* was captured near Spa, Liège province, in September 2006. A female probably belonging to this species was also observed. A second male individual was captured at the same place late August 2007. The possibility that a small relict breeding population is maintaining itself in the area seems most likely. But where does it hides and in what state is it (numbers)?" (Authors)] Address: Goffart, P., Observatoire de la Faune, de la Flore et des Habitats (OFFH), Département cle l'Etude du Milieu naturel et agricole (DEMna) Service Public Wallon (SPW) - DGARNE - Direction de la Nature et de l'Eau. Avenue Maréchal Juin, 23 B-5030 Gembloux, Belgium. E-mail: Philippe.GOFFART@spw.wallonie.be

9727. Goffart, P. (2009): Nouvelle émergence du *Sympetrum méridional* (*Sympetrum meridionale*) en Wallonie. *Les naturalistes Belges* 90(3-4): 55-61. (in French, with English summary) ["The capture of a male Southern Darter (*Sympetrum meridionale*) currently emerging in the vegetation of a marl pool in the Belgian Lhotaringy (south of the Luxembourg province), Vance, August 6, 2007 is reported and commented. It is the third recent record (after 2000) of this species in Wallonia. This probably comes up in a wave of colonization, which reached the Netherlands in 2006. The species could be under-detected in our region because of its superficial resemblance with other darters widespread in our region. The diagnostic characters are recalled." (Author)] Address: Goffart, P., Observatoire de la Faune, de la Flore et des Habitats (OFFH), Département cle l'Etude du Milieu naturel et agricole (DEMna) Service Public Wallon (SPW) - DGARNE - Direction de la Nature et de l'Eau. Avenue Maréchal Juin, 23 B-5030 Gembloux, Belgium. E-mail: Philippe.GOFFART@spw.wallonie.be

9728. Ichinose, T.; Ishi, J.; Morita, T. (2009): Relationship between distribution of Odonata species and environmental factors on the irrigation ponds in Awaji Island, central Japan, analyzing spatial autocorrelation. *Journal of rural planning association* 27(special issue): 191-196. (in Japanese, with English summary) ["Odonata were surveyed from May to October 2002 at 38 small irrigation ponds in the northern part of Awaji Island, Japan. The investigation was conducted nine times on each pond. A total of 1568 individuals from 28 species was recorded. We selected nine species with at least 40 individuals recorded, and correlated them with environmental factors, as conductivity, NO_2 , NO_3 , NH_4 , PO_4^{3-} , COD, surrounding land uses within 50 meters from the edge of pond, the number of aquatic water plant species, and autocovariates explaining spatial autocorrelation, using Generalized Linear Models (GLM). The result showed that NO_3 , COD, surrounding grassland, woodland and the number of water plant species were critical factors for the distribution of some Odonata species." (Authors)] Address: Ichinose, T., Fac. of Environment and Information Studies, Keio University, Japan

9729. Ivinskis, P.; Rimšaitė, J. (2009): Odonata of Purvinas wetland in eastern Lithuania. *Acta Biol. Univ. Daugavp.* 9(1): 39-42. (in English) [Between 2005-2007

36 odonate species were recorded in the in northeastern part of Lithuania in Purvinas wetland. The list of records includes rare species as *Nehalennia speciosa*, *Coenagrion armatum*, *Sympetma paedisca*, *Somatochlora flavomaculata*, *Leucorrhinia pectoralis* and *L. albifrons*.] Address: Ivinskis, P., Jolanta Rimšaitė. Institute of Ecology of Vilnius university, Akademijos 2, LT – 08412, Vilnius, Lithuania. E-mail: entlab@centras.lt

9730. Jarju, L.B.S.; Fillinger, U.; Green, C.; Louca, V.; Majambere, S.; Lindsay, S.W. (2009): Agriculture and the promotion of insect pests: rice cultivation in river floodplains and malaria vectors in The Gambia. *Malaria Journal* 8(1): 12 pp. (in English) ["Background: Anthropogenic modification of natural habitats can create conditions in which pest species associated with humans can thrive. In order to mitigate for these changes, it is necessary to determine which aspects of human management are associated with the promotion of those pests. *Anopheles gambiae*, the main Africa malaria vector, often breeds in rice fields. Here the impact of the ancient practice of 'swamp rice' cultivation, on the floodplains of the Gambia River, on the production of anopheline mosquitoes was investigated. Methods: Routine surveys were carried out along 500 m transects crossing rice fields from the landward edge of the floodplains to the river during the 2006 rainy season. Aquatic invertebrates (including 'Zygoptera' and 'Anisoptera') were sampled using area samplers and emergence traps and fish sampled using nets. Semi-field experiments were used to investigate whether nutrients used for swamp rice cultivation affected mosquito larval abundance. Results: At the beginning of the rainy season rice is grown on the landward edge of the floodplain; the first area to flood with fresh water and one rich in cattle dung. Later, rice plants are transplanted close to the river, the last area to dry out on the floodplain. Nearly all larval and adult stages of malaria vectors were collected 0–100 m from the landward edge of the floodplains, where immature rice plants were grown. These paddies contained stagnant freshwater with high quantities of cattle faeces. Semi-field studies demonstrated that cattle faeces nearly doubled the number of anopheline larvae compared with untreated water. Conclusion: Swamp rice cultivation creates ideal breeding sites for malaria vectors. However, only those close to the landward edge harboured vectors. These sites were productive since they were large areas of standing freshwater, rich in nutrients, protected from fish, and situated close to human habitation, where egg-laying mosquitoes from the villages had short distances to fly. The traditional practice of 'swamp rice' cultivation uses different bodies of water on the floodplains to cultivate rice during the rainy season. A consequence of this cultivation is the provision of ideal conditions for malaria vectors to thrive. As the demand for locally-produced rice grows, increased rice farming will generate great numbers of vectors; emphasizing the need to protect local communities against malaria." (Authors)] Address: Lindsay, S.W., School of Biological and Biomedical Sciences, Durham University, Durham, UK, E-mail: Steve.Lindsay@lshmt.ac.uk

9731. Jongerius, S.R.; Lentink, D. (2009): Structural analysis of a dragonfly wing. *Experimental Mechanics* 50(9): 1323-1334. (in English) ["Dragonfly wings are highly corrugated, which increases the stiffness and strength of the wing significantly, and results in a lightweight structure with good aerodynamic performance.

How insect wings carry aerodynamic and inertial loads, and how the resonant frequency of the flapping wings is tuned for carrying these loads, is however not fully understood. To study this we made a three-dimensional scan of a dragonfly (*Sympetrum vulgatum*) fore- and hindwing with a micro-CT scanner. The scans contain the complete venation pattern including thickness variations throughout both wings. We subsequently approximated the forewing architecture with an efficient three-dimensional beam and shell model. We then determined the wing's natural vibration modes and the wing deformation resulting from analytical estimates of 8 load cases containing aerodynamic and inertial loads (using the finite element solver Abaqus). Based on our computations we find that the inertial loads are 1.5 to 3 times higher than aerodynamic pressure loads. We further find that wing deformation is smaller during the downstroke than during the upstroke, due to structural asymmetry. The natural vibration mode analysis revealed that the structural natural frequency of a dragonfly wing in vacuum is 154 Hz, which is approximately 4.8 times higher than the natural flapping frequency of dragonflies in hovering flight (32.3 Hz). This insight in the structural properties of dragonfly wings could inspire the design of more effective wings for insect-sized flapping micro air vehicles: The passive shape of aeroelastically tailored wings inspired by dragonflies can in principle be designed more precisely compared to sail like wings—which can make the dragonfly-like wings more aerodynamically effective." (Authors)] Address: Lentink, D., Faculty of Aerospace Engineering, Delft University of Technology, 2600 GB Delft, The Netherlands. E-mail: david.lentink@wur.nl

9732. Lafontaine, R.-M.; de Schaetzen, R. (2009): Que s'est-il passé depuis l'an 2000 pour les libellules méridionales en Wallonie et à Bruxelles? *Les naturalistes Belges* 90(3-4): 33-46. (in French, with English summary) ["A previous study showed that at the end of last century southern species of dragonflies were seen more regularly in Wallonia and Brussels. Data collected since then show, first, installation confirmed for all species during the 2000s and, secondly, a good correlation between changes in the number of observations and mean annual temperatures. This development, which can be regarded as favourable, is discussed and put into perspective." (Authors)] Address: Lafontaine, René-Marie, 'Unité Biologie de ja Conservation, Institut royal des Sciences naturelles de Belgique, Rue Vautier 29, B-1000 Bruxelles, Belgium. E-mail: rene-marie.lafontaine@sciencesnaturelles.be

9733. Leong, T.M.; Tay, S.L. (2009): Encounters with *Tetracanthagyna plagiata* (Waterhouse) in Singapore, with an observation of oviposition (Odonata: Anisoptera: Aeshnidae). *Nature in Singapore* 2: 115-119. (in English) ["One of the females was spotted flying low (waist level) over a sandy forest stream, perched on a moss-covered, decomposing log beside the stream and began to arch its abdomen in order to insert its ovipositor into the soft, moist wood. The female deliberately scraped an dug into the branch for over a minute, after which it flew off downstream." (Authors)] Address: Leong, T.M., Central Nature Reserve, National Parks Board. 601 Island Club Road, Singapore 57S775. E-mail: leongtzing@nparks.gov.sg

9734. Liang, Z.; Dong, H. (2009): Computational study of wing-wake interactions between ipsilateral wings of dragonfly in flight. *American Institute of Aeronautics and*

Astronautics Paper 2009-4192: 7 pp. (in English) ["Bilateral and ipsilateral wing-wing interactions can be commonly observed in insect flights. As a representative example of ipsilateral wing-wing interaction, dragonflies in flight have been widely studied. It has been discovered that they utilize changes of phase between ipsilateral forewings and hindwings at different kinds of flying mode. In the current study, we present a direct numerical simulation of a modeled dragonfly in slow flight as reported in Azuma et al (1985). Realistic morphologies of wing, body, and kinematics are used for maximum including wing and body features of a dragonfly. This work aims to study the relations between waketopology and aerodynamic performance due to wing-wing and wing-wake interactions of dragonfly ipsilateral wings. Current high fidelity numerical results are also compared with lowerfidelity aerodynamic modeling method discussed in Azuma et al (1985).] Address: Dong, H., Department of Mechanical & Materials Engineering, Wright State University, Dayton, OH 45435, USA. E-mail: haibo.dong@wright.edu.

9735. Liu, T.J.-C.; Wang, L.-J.; Liu, W.-C.; Wu, H.-C. (2009): Biomechanical analyses of hind wing of dragonfly. *Journal of Advanced Engineering* 4(1): 19-24. (in Chinese, with English summary) ["The purpose of this paper is to investigate the deformation and bending stiffness of the hind wing of the dragonfly *Anax panybeus*. Using the finite element analysis, the results show that the membrane almost provides no contributions for the bending stiffness. But the smallest veins have contributions to support the wing. From the results due to the wind pressure, the maximum stress occurs at the corrugation region in the middle of the wing." (Authors)] Address: Liu, T.J.-C., Dept of Mechanical Engineering, Ming Chi Univ. of Technology, Taishan, Taipei, Taiwan, R.O.C. E-mail: jinchee@mail.mcut.edu.tw

9736. Maiolini, B.; Carolli, M. (2009): Odonata in Trentino (NE-Italy): historical and recent data. *Studi Trentini di Scienze Naturali, Acta Biologica* 84: 11-18. (in English, with Italian summary) ["The historical presence of Odonata in Trentino was reconstructed using data from the collections of the Natural Science Museum of Trento and from existing literature. Recent (2006-2007) observations by the authors in selected biotopes were conducted to start an updated list of species for the Trento Province. Odonata are one of the most interesting invertebrate taxa due to their ecological and trophic features, which allow their use as good and useful indicators of the ecological quality of freshwater biotopes and their neighbouring areas, and of the impact of human activities. The updated database (1699 records) comprises 64 species (77% of the Italian species). Large part of the records regarded lowland areas, but altitudinal preferences in some Odonata species were evident. The database comprises common and widespread species, as *Aeshna juncea*, *A. cyanea*, *Platycnemis pennipes*, *Ischnura elegans*, *Sympetrum striolatum* and *Coenagrion puella*. Rare species were represented by *Epitheca bimaculata*, *C. ornatum*, *Sympetma paedisca*, *Leucorrhinia pectoralis*, *Ophiogomphus cecilia*, *Somatochlora flavomaculata*, *Sympetrum depressiusculum*. Some of these were recorded before the 50's only in floodplain wetlands of the Adige Valley, which were claimed in the second half of last century, thus causing a local extinction. Recent and spatially limited observations allowed recording the presence of 24 species." (Authors)] Address: Maiolini, B., Sezione di

Zoologia degli Invertebrati e Idrobiologia, Museo Tridentino Scienze Naturali, Via Calepina 14, 38122 Trento, Italia. E-mail: maiolini@mtsn.tn.it

9737. Miller, F.P.; Vandome, A.F.; Mcbrewster, J. (2009): *Insect Wing*. Alphascript Publishing. ISBN: 6130242862: 168 pp. (in English) [Articles taken from Wikipedia (and including a few references to Odonata), poorly arranged (e.g. very small letter types), and sold for maximum profit purposes. Before buying this book, you should order a display copy.]

9738. Nakamura, M.; Okamiya, T.; Hasegawa, M.; Hasegawa, M. (2009): Cooperative breeding in the endemic Madagascan Chabert's Vanga *Leptopterus chabert*. *Ornithological Science* 8: 23-27. (in English) ["To examine the breeding system of the endemic Madagascan Chabert's Vanga *Leptopterus chabert* (Aves), we studied the contributions made by adults to nest building, incubating, brooding, and feeding the young at six nests. The study was conducted during November and December in 1999, 2000, and 2005 at Ankara-fantsika Strict Nature Reserve. During the nest-building stage, two adults (perhaps a heterosexual pair) delivered nest materials. Two adults participated in incubating and brooding. During the nestling period, several (3-4) adults delivered food (mainly bees, dragonflies, and moths) to the nestlings at two nests. They also mobbed animals that approached the nest. During the post-fledging period, several (3-4) adults fed the fledglings in two family groups. These observations suggest that Chabert's Vangas are cooperative breeders in which several adults feed the young of one brood." (Authors)] Address: Nakamura, M., Laboratory of Animal Ecology, Department of Biology, Joetsu University of Education, 1 Yamayashiki-machi, Joetsu, Niigata 943-8512, Japan

9739. Oliveira, D.E.; De Marco Jr., P. (2009): Is there a trade-off between the melanin allocated to the immune system and to camouflage on larvae of the dragonfly *Micrathyrina catenata* Calvert, 1909 (Odonata: Libellulidae)? *Neotropical Biology and Conservation* 4(3): 133-136. (in English, with Portuguese summary) ["In insects, the immune system responds to the presence of antigens involving them in melanin. However, the melanin is also allocated into the exoskeleton's pigmentation, used to camouflage. We aimed to test the existence of a trade-off between the allocation of melanin to the immune system and to camouflage on the larvae of *Micrathyrina catenata*. We conducted the study in the Reserva do km 41, 80 kilometer distant from Manaus, Amazonas, Brazil. We implanted a nylon line into the abdomen of 30 larvae and observed if had or not deposition of melanin in the line. We counted the number of individuals who responded to implant depositing melanin and, later, we took photos of the larvae's heads and calculate gray intensity. We used a t test for independent samples. 76% of larvae responded to treatment depositing melanin on the implants. There were no significant differences in the intensity of gray between the larvae that responded to the implants and those who did not responded. There is no trade-off to allocation of melanin for camouflage and for the immune system. This should happen because the immune system is not limited by the acquisition of resources or the camouflage's demand for melanin is not enough to influence the immune system." (Authors)] Address: De Marco, P., Laboratório Ecologia Teórica e Síntese, Departamento de Biologia Geral, Universidade Federal de Goiás, BR-

74001-970, Goiania, GO, Brazil. E-mail: pdemarco@icb.ufg.br

9740. Perchard, R.; Long, R. (2009): The rediscovery of Dainty Damselfly *Coenagrion scitulum* (RAMB.) in Jersey. *Atropos* 38: 3-5. (in English) [UK; La Rocque, south-eastern corner of Jersey, 16-VI-2009; Grands Vaux, 6km north-west of La Rocque, 7-VII-2009] Address: Perchard, R., 4 New Road, Gorey Village, St Martin, Jersey, JE3 6UN, UK

9741. Phoenix, J.; Hentschel, W. (2009): Die Hochmoore um Prebuz/Frühbuss, Rolava/Sauersack und Jelení/Hirschenstand (Erzgebirge) – bedeutsame Lebensräume für moorgebundene Libellenarten. *Sborník Oblastního muzea v Moste, rada přírodovědná* 31: 31-42. (in German and Czech, with English summary) ["The raised bogs on top of the western part of the Iron Mountains, situated in the communities of Prebuz, Rolava and Jelení are important habitats for dragonflies. In the years 2005 – 2009 the occurrence of species confined to bogs as *Aeshna subarctica elisabethae*, *Somatochlora alpestris* and *S. arctica* have been recorded in this bogland for the first time. The suggestion to preserve this bogland in an expanded scale is also of use to dragonfly protection. In the context with climate change a long-term monitoring of dragonflies is recommended." (Authors)] Address: Phoenix, J., Goethestr. 22, 01824 Königstein, Germany. E-mail: juergen.phoenix@t-online.de

9742. Pick, C.; Schneuer, M.; Burmester, T. (2009): The occurrence of hemocyanin in Hexapoda. *FEBS J.* 276(7): 1930-1941. (in English) ["Hemocyanins are copper-containing, respiratory proteins that have been thoroughly studied in various arthropod subphyla. Specific O(2)-transport proteins have long been considered unnecessary in Hexapoda (including Insecta), which acquire O(2) via an elaborate tracheal system. However, we recently identified a functional hemocyanin in the stonefly *Perla marginata* (Plecoptera) and in the firebrat *Thermobia domestica* (Zygentoma). We used RT-PCR and RACE experiments to study the presence of hemocyanin in a broad range of ametabolous and hemimetabolous hexapod taxa. We obtained a total of 12 full-length and 5 partial cDNA sequences of hemocyanins from representatives of Collembola, Archeognatha, Dermaptera, Orthoptera, Phasmatodea, Mantodea, Isoptera and Blattaria. No hemocyanin could be identified in Protura, Diplura, Ephemeroptera, Odonata, or in the Eumetabola (Holometabola + Hemiptera). It is not currently known why hemocyanin has been lost in some taxa. Hexapod hemocyanins usually consist of two distinct subunit types. Whereas type 1 subunits may represent the central building block, type 2 subunits may be absent in some species. Phylogenetic analyses support the Pancrustacea hypothesis and show that type 1 and type 2 subunits diverged before the emergence of the Hexapoda. The copperless insect storage hexamerins evolved from hemocyanin type 1 subunits, with *Machilis germanica* (Archeognatha) hemocyanin being a possible 'intermediate'. The evolution of hemocyanin subunits follows the widely accepted phylogeny of the Hexapoda and provides strong evidence for the monophyly of the Polyneoptera (Plecoptera, Dermaptera, Orthoptera, Phasmatodea, Mantodea, Isoptera, Blattaria) and the Dictyoptera (Mantodea, Isoptera, Blattaria). The Blattaria are paraphyletic with respect to the termites." (Authors)] Address: Burmester, T., Biozentrum Grindel und Zoologisches Museum, Universi-

tät Hamburg, Hamburg, Germany. E-mail: thorsten.burmester@uni-hamburg.de.

9743. Pivko Knežević, A. (2009): The evaluation of the effect of sewage treatment plant Celje on the river Savinja regarding longitudinal changes of macroinvertebrate community. Graduation thesis (University studies), University of Ljubljana, Biotechnical faculty, Dept. of Biology: 82 pp, 3 app. (in Slovenian, with English summary) ["The aim of our research was to evaluate effect of Central sewage treatment plant Celje (CSPC) on the river Savinja, Slovenia. We assumed that because of its nutrient content, discharge of CSPC causes changes in the number, diversity and structure of macroinvertebrate community in the river. We measured physical, chemical and biological parameters and sampled macroinvertebrates three times at three different locations (location Polule upstream of the CSPC and locations Tremerje and Laško downstream of the CSPC). We determined 80 taxa of macroinvertebrates. The values of Shannon – Wiener index of diversity showed high diversity at all tree researched locations. Values were the highest at location Tremerje, where also the most taxa were present. High diversity at location Tremerje was probably consequence of diverse substrat in the river bed. Saprobic index (SI) was low due to high aeration of water. Referring to values of SI, we can classify the studied part of river Savinja ti the 1. – 2. quality class. Value of SI was slightly increasing down the stream (from Polule to Laško). Analysis of macroinvertebrate functional feeding groups showed dominancy of detritivores, followed by grazers, miners, filtrators and predators. Cluster analysis of data showed that temporal differences were bigger than spatial differences. Seasonal impacts affected macroinvertebrate community more than environmental variables at different locations." (Author) The study includes the following odonate species: *Calopteryx splendens*, *Platycnemis pennipes*, *Gomphus vulgatissimus*, and *Onychogomphus f. forcipatus*.] Address: Pivko Knežević, Alijana, University of Ljubljana, Biotechnical faculty, Dept. of Biology, SI – 1000 Ljubljana, Večna pot 111, Slovenia

9744. Reels, G.T. (2009): Dragonfly emergence at a small newly-created pond in Hong Kong. *Hong Kong Entomological Bulletin* 1(2): 32-37. (in English) ["Dragonfly emergence was monitored at a small (0.02ha) pond in Hong Kong from March 2004 to July 2005. The pond was created in late 2003, with emergent vegetation established along the margin. Dragonfly exuviae were much more abundant in 2004 (597 exuviae in 12 species) than in 2005 (49 exuviae in three species). Exuviae abundance was highest in March in 2004; April in 2005. In 2004, exuviae were recorded until September; in 2005, they were not recorded after May. Exuviae were estimated to have an average persistence of 3.4 days in the field. Emergence patterns varied between species. Most aeshnids and libellulids emerged in March and April 2004, although *Anax guttatus* had a second pulse of emergence in June 2004; *Sinictinogomphus clavatus* and *Ictinogomphus pertinax* (Gomphidae), and *Epopthalmia elegans* (Corduliidae) were late emergers in 2004. Their exuviae first appearing in June or July. The two gomphid species emerged in greater numbers in April and May 2005. The dramatic decline of emergence in 2005 was probably due to the growth and proliferation of predatory fish in the pond. More dragonfly species were recorded as adults than as exuviae, suggesting adult immigration. Surveys of

adult dragonflies alone may not give a completely accurate impression of the value of particular ponds for breeding dragonflies." (Author)] Address: Reels, G.T., H-3-30 Fairview Park, Yuen Long, N.T. Hong Kong. E-mail: gtreels@cyberdude.com

9745. Rehfeld, G.; Bachmann, V. (2009): Renaturierung der Schunteraue im Flurbereinigungsgebiet Hon-delage/Dibbesdorf: Monitoring von Libellen und Amphibien. LaReG, Braunschweig: 29 pp. (in German) [Twenty three Odonata species have been recorded for the period 2007-2008 at the Schunter and its oxbow, Braunschweig, Niedersachsen, Germany.] Address: Rehfeldt, G., Zool. Inst. TU Braunschweig, Fasanenstr. 3, 38092 Braunschweig, Germany. E-mail: G.Rehfeldt@tu-bs.de

9746. Strausfeld, N.J.; Sinakevitch, I.; Brown, S.M.; Farris, S.M. (2009): Ground plan of the insect mushroom body: functional and evolutionary implications. *J. Comp. Neurol.* 513(3): 265-291. (in English) ["In most insects with olfactory glomeruli, each side of the brain possesses a mushroom body equipped with calyces supplied by olfactory projection neurons. Kenyon cells providing dendrites to the calyces supply a pedunculus and lobes divided into subdivisions supplying outputs to other brain areas. It is with reference to these components that most functional studies are interpreted. However, mushroom body structures are diverse, adapted to different ecologies, and likely to serve various functions. In insects whose derived life styles preclude the detection of airborne odorants, there is a loss of the antennal lobes and attenuation or loss of the calyces. Such taxa retain mushroom body lobes that are as elaborate as those of mushroom bodies equipped with calyces. Antennal lobe loss and calycal regression also typify taxa with short nonfeeding adults, in which olfaction is redundant. Examples are cicadas and mayflies, the latter representing the most basal lineage of winged insects. Mushroom bodies of another basal taxon, the Odonata, possess a remnant calyx that may reflect the visual ecology of this group. That mushroom bodies persist in brains of secondarily anosmic insects suggests that they play roles in higher functions other than olfaction. Mushroom bodies are not ubiquitous: the most basal living insects, the wingless Archaeognatha, possess glomerular antennal lobes but lack mushroom bodies, suggesting that the ability to process airborne odorants preceded the acquisition of mushroom bodies. Archaeognathan brains are like those of higher malacostracans, which lack mushroom bodies but have elaborate olfactory centers laterally in the brain." (Authors) Two dragonfly species: *Calopteryx splendens*, *Libellula depressa* and one mayfly species: *Potamanthus luteus* were collected near streams and rivers in the vicinity of Würzburg, Bayern, Germany. *Perithemis tenera* (Odonata) and Japanese beetles (*Popillia japonica*, Scarabaeidae, Coleoptera) were collected in the Morgantown, West Virginia, region, USA.] Address: Strausfeld, N.J., Arizona Research Laboratories, Division of Neurobiology, University of Arizona, Tucson, Arizona 85721, USA. E-mail: flybrain@neurobio.arizona.edu

9747. Strickland, G.; Strickland, J. (2009): Damsellies of Louisiana. The Entomology Club at Louisiana State University: 65 pp. (in English) ["The Odonata have been treated in many wonderful technical and popular guides at both the national and regional levels. Many of these guides provide detailed accounts of each species, including range maps, habitat information, and keys for

species identification. Style of illustration varies from guide to guide, but often photographs of specimens in situ are used. Although these photos are aesthetically pleasing, important characters for species level identification are frequently sacrificed in the process. In addition, the specimen's true life size can be hard to determine. Because of constraints placed on the size of the field guides, photos of specimens showing individual variation due to sex, age, etc. are typically only included when this variation is extreme. This book is not meant to replace other books, but to be used as a local and regional supplement to a field guide of your choice. [...] Gayle and Jeanell Strickland have worked tirelessly to compile each of these species plates. The checklist was compiled by Bill Mauffray. The main purpose of this book is to make Gayle and Jeanell's photographic plates available to a wider audience and especially to aspiring students of the Odonata. We are grateful for their peerless contributions to highlighting the fauna of Louisiana and allowing us to produce this book from their work." (Editors) The authors use a scanner to produce their brilliant figures. The method is introduced in detail. Supplemental material can be accessed at: <http://members.fotki.com/gstrick3/>] Address: Gayle & Jeanell Strickland, Baton Rouge LA, USA. E-mail: gstrick3@cox.net

9748. Termaat, T. (2009): Hulp bij het determineren van libellen. *Pantserjuffers*. *Vlinders* 3/2009: 16-18. (in Dutch) [Detailed notes on field characteristics of the Lestidae (*Lestes dryas*, *L. sponsa*, *L. virens*, *L. barbarus*, *Chalcolestes viridis*) occurring in the Netherlands.] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

9749. Termaat, T. (2009): Hulp bij het determineren van libellen Blauwe waterjuffers. *Vlinders* 2/2009: 12-14. (in Dutch) [Detailed notes on field characteristics of *Enallagma cyathigerum* and the species of the genus *Coenagrion* occurring in the Netherlands] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

9750. Utz, R.M.; Hilderbrand, R.H.; Boward, D.M. (2009): Identifying regional differences in threshold responses of aquatic invertebrates to land cover gradients. *Ecological Indicators* 9(3): 556-567. (in English) ["Conversion of land from natural to urban or agricultural cover degrades stream ecosystems and results in loss of biodiversity. We compared cumulative frequency distributions to measure responses to land use gradients for aquatic invertebrate taxa to agricultural, urban, and impervious surface cover gradients across the state of Maryland, USA. The technique identifies the upper limit threshold above which taxa cease to occur as well as a lower limit of detection of effect for negatively affected taxa. Urban development and impervious surface cover negatively affected the distributions of 44–56% of the 180 taxa tested, depending on region. Across similar taxa, negative responses occurred at lower levels of urban land covers in the Piedmont compared to the Coastal Plain physiographic province, which suggests that Piedmont aquatic biodiversity may be more vulnerable to urbanization. Most taxa were capable of tolerating high levels of agricultural development, although a number of common taxa in the Coastal Plain and Highlands regions were found to be agriculture-sensitive. Some taxa traditionally used as indicators were tolerant of very high levels of human-altered land uses, suggesting that such taxa require

examination prior to use as indicators of landscape stressors. Our analysis method appears to be sufficiently flexible and sensitive to be used for a variety of taxa and systems for stressor detection, ecosystem monitoring, and spatially explicit forecasts of taxa loss as watershed land cover changes." (Authors) Odonata were found to be positively associated with urbanized land cover.] Address: Utz, R.M., University of Maryland Center for Environmental Science Appalachian Laboratory, 301 Braddock Road, Frostburg, MD 21532, USA. E-mail: rutz@al.umces.edu

9751. Wildermuth, H. (2009): Buchbesprechung: Libellen schützen, Libellen fördern. Leitfaden für die Naturschutzpraxis. Entomo Helvetica 2: 32. (in German) [Book review: "Schweizerische Arbeitsgemeinschaft Libellenschutz (SAGLS). 1. Auflage. Beiträge zum Naturschutz in der Schweiz Nr. 31/2009. A4, broschiert. 88 Seiten, 164 Farbfotos, 7 Zeichnungen und Grafiken, 1 Tabelle. ISSN 1421-5527. Zu beziehen bei: Pro Natura, Postfach, CH-4018 Basel. E-Mail: mailbox@pronatura.ch. Art. Nr. 4631. Preis: Fr. 34.-, für Mitglieder Pro Natura Fr. 29.-; Französische Ausgabe: Groupe de travail pour la conservation des libellules de Suisse (GTCLS): Protéger et favoriser les libellules. Guide pratique de protection de la nature. Contribution à la protection de la nature en Suisse No 32/2009. Pro Natura, case postale, 4018 Bâle. E-Mail: mailbo x@pronatura.ch. Art. no 5632."] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

9752. Wohlfahrt, B.; Vamosi, S.M. (2009): Antagonistic selection or trait compensation? Diverse patterns of predation-induced prey mortality due to the interacting effects of prey phenotype and the environment. *Evol. Biol.* 36: 386-396. (in English) ["Differentiation among closely related prey species may result from differing adaptations to heterogeneous environments. Many studies have focused on competition for shared resources as a major factor promoting differentiation, with considerably less attention focused on interacting effects of abiotic factors and predator-prey relationships. To further investigate the effects of interacting selective factors on the outcomes of mortality and survival in aquatic prey, we conducted interrelated laboratory studies examining the effects of water colour and plant density on predator-induced mortality in four dytiscid species (Coleoptera: Dytiscidae) that varied in body size (total body length), and body colouration pattern. Body size was more strongly phylogenetically conserved than colouration pattern, and larger body size generally resulted in decreased predator-induced mortality rates. In contrast, the effectiveness of body colouration patterns in decreasing prey mortality risk depended on water colour and prey body size. In clear water, small and patterned dytiscids had mortality rates equal to medium-sized plain beetles, thereby compensating for differences in mortality risk due to body size differences. Under dark water conditions, small dytiscids experienced higher mortality rates compared to medium-sized dytiscids; however, the effectiveness of colouration patterns in medium-sized beetles decreased to the point that it became detrimental to survival, revealing antagonistic selection. We suggest that colouration patterns are not ubiquitous in prey species and cospecialization in larger size and presence of colouration patterns does not generally result in higher prey survival, because the effectiveness of the two antipredator defences may be

restricted to certain phenotype environment combinations. Our results illustrate how interactions between prey phenotype and variable environmental conditions among habitats dominated by the same predator can lead to adaptive trade-offs, which can increase the number of possible outcomes of predator mediated selection." (Authors) Aeshna juncea larvae were used in laboratory experiments on predation-induced mortality in 4 dytiscid species (Coleoptera). Some notes on the larvae are provided based on brief and clear definitions of various types of their behaviour.] Address: Wohlfahrt, Bianca, Dept Biol. Sci., Univ. Calgary, 2500 Univ. Dr. NW, Calgary. T2N 1N4. Canada

9753. Zhang, Z.-S.; Lu, X.-G.; Wang, Q.-C.; Zheng, D.-M. (2009): Mercury, cadmium and lead biogeochemistry in the soil-plant-insect system in Huludao City. *Bull. Environ. Contam. Toxicol.* 83: 255-259. (in English) ["Mercury, cadmium, and lead concentrations of ashed plants and insects samples were investigated and compared with those of soil to reveal their biogeochemical processes along food chains in Huludao City, Liaoning Province, China. Concentration factors of each fragments of the soil-plant-herbivorous insect-the carnivorous insect (= "Dragonfly") food chain were 0.18, 6.57, and 7.88 for mercury; 6.82, 2.01, and 0.48 for cadmium; 1.47, 2.24, and 0.57 for lead, respectively. On the whole, mercury was the most largely biomagnified, but cadmium and lead were not greatly accumulated in the carnivorous insects as expected when the food chain extended to the secondary consumers. Results indicated that concentration factors depended on metals and insects species of food chains." (Authors)] Address: Zhang, Z.-S., Key Laboratory of Wetland Ecology and Environment, Northeast Institute of Geography and Agro ecology, CAS, Changchun, China. E-mail: zzslycn@163.com

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9754. Abbott, J.C. (2010): OdonataCentral: The past, present and future. *Argia* 22(4): 10-14. (in English) [Extensive report on activities to launch, run, and improve the functionality of the website of the Dragonfly Society of the Americans with special reference to the management of species records.] Address: Abbott, J.C., Patterson Labs 219, School Bio. Sci., Univ. Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

9755. Abbott, J.C. (2010): Book Review: Dragonflies of Alaska, Second edition. *Argia* 22(4): 22. (in English) [Compared with the first edition of the book, additional three species had to be considered.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

9756. Abilhoa, V.; Vitule, J.R.S.; Bornatowski, H. (2010): Feeding ecology of Rivulus luelingi (Aplouscheiloidei: Rivulidae) in a Coastal Atlantic Rainforest stream, southern Brazil. *Neotropical Ichthyology* 8(4): 813-818. (in English, with Portuguese summary) ["Odonata - Libellulidae (nymphs)" occurred in 10.1% of the 129 studied stomach of Rivulus luelingi from a Coastal Atlantic Rainforest stream in southern Brazil.] Address: Vitule, J.R.S., Departamento de Engenharia Ambiental, Setor de Tecnologia, Universidade Federal do Paraná. 81531-970 Curitiba, Paraná, Brazil. E-mail: biovitule@gmail.com

- 9757.** Alcocer, J.; Bernal-Brooks, F.W. (2010): Limnology in Mexico. *Hydrobiologia* 644: 15-68. (in English) [The paper "deals with the geography, geology, and climate of the Mexican territory as the basis to further explain the development of Limnology as a science in this country. An early knowledge started with the Aztecs, with evidence of practical solutions for a life within a lake. After the conquest of the American territories by the Spaniards, the exploration of the new territories provided the main source of information relative to natural resources. In 1938, the Mexican government established the Estación Limnológica de Pátzcuaro and the pioneer studies appeared under the name of Spanish scientists not only here but also at the Universidad Nacional Autónoma de México and the Instituto Politécnico Nacional. During the 1970s, the participation of Mexican limnologists began and the attempt to build-up a conceptual framework in its own for lakes, reservoirs, and rivers. This article outlines the main limnological characteristics of Mexican water bodies, highlights the peculiarities of a transitional zone between the tropics and subtropics, and describes the government structure for management and administration. A fast development in this area of knowledge got underway with the creation of the Asociación Mexicana de Limnología in 1997 and the collaboration with international counterparts." (Authors) Table 10 with a list of benthic macroinvertebrates characteristic of some Mexican lakes includes some Odonata.] Address: Alcocer, J., Proyecto de Investigación en Limnología Tropical, FES Iztacala, Universidad Nacional Autónoma de México, Av. de los Barrios No. 1, Los Reyes Iztacala, Tlalnepantla, Estado de México 54090, Mexico. E-mail: jalcocer@servidor.unam.mx
- 9758.** Allen, K.A.; Le Duc, M.G.; Thompson, D.J. (2010): Habitat and conservation of the enigmatic damselfly *Ischnura pumilio*. *Journal of Insect Conservation* 14(6): 689-700. (in English) ["*Ischnura pumilio* is threatened in the UK and its habitat requirements are not well understood. This study tests previously held notions of the habitat requirements of *I. pumilio*, investigates the features of a habitat influencing odonate species composition and provides recommendations for habitat creation and management for *I. pumilio* persistence. Thirty-one sites across south west England with past *I. pumilio* records were surveyed in 2006. Environmental variables and odonate abundance were recorded. Odonate species composition and *I. pumilio* abundance were related to environmental variables using multivariate techniques and GLM. *Ischnura pumilio* was found at a wide variety of habitat types; key habitat features were a muddy substrate with some open ground, turbid water, and low levels of shade. It was associated with increased structural diversity of vegetation away from water but low maximum height; characteristic of early-successional sites. The variables predicting odonate composition were location, shade, level of disturbance, water depth, and cover of terrestrial dwarf shrubs and Sphagnum species. Vegetation height and structure were also highly influential to at least 20 m from water. This study indicates that odonate habitat management should include adjacent hinterland. Management for *I. pumilio* may be complicated by the species' use of two habitat types, each with associated problems. Furthermore, odonate species diversity was negatively associated with *I. pumilio* abundance, which may cause conflict of interest when managing habitats." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk
- 9759.** Altmüller, R.; Clausnitzer, H.-J. (2010): Rote Liste der Libellen Niedersachsens und Bremens. 2. Fassung, Stand 2007. Informationsdienst Naturschutz Niedersachsen 4/10: 209-260. (in German, with English summary) [Germany; "This Red List of dragonflies in Lower Saxony and Bremen was derived from a stock of 136.441 datasets, the majority of which were contributed by volunteer faunists participating in Lower Saxony's Fauna Survey Programme. By the end of 2006, 68 species of Odonata had been recorded, equalling 84 % of 81 species occurring in Germany. Of the former, 21 species have been accorded a status of 0 - 3 denoting the extent to which these species are threatened. For one species, threat status is not discernible for the time being. Nine species are naturally extremely rare, necessitating careful monitoring. All in all, 31 species (= 46 %) feature in this Red List, with additional 4 species featuring as 'near threatened'. Besides listing the threat categories on state level, the threat categories have been further regionalized into "western lowlands", "eastern lowlands" and "uplands". Causes of threat are various forms of habitat destruction, e.g. drainage of bogs, mires and wet grasslands as well as amelioration and maintenance of water courses. More recently, eutrophication of wet lowlands adds to the risks." (Authors)] Address: Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) - Naturschutzinformation, PF 91 07 13, 30427 Hannover, Germany.
- 9760.** Andersson, J.; Karjalainen, S. (2010): Pellingin sudenkorennot [The dragonflies of Pellinki archipelago]. *Crenata* 3(1): 34-37. (in Finnish) ["The article gives a detailed overview of the dragonfly fauna of Pellinki archipelago at the Finnish south coast 50 km W Helsinki. Earliest Finnish records of *Aeshna mixta* and *Sympetma paedisca* are both from Pellinki (both made in 2002). In total 33 species have been observed in the area, including *Ischnura pumilio*, *Aeshna viridis*, *A. serrata* and *Orthetrum coerulescens*. Due to its favourable geographical position several other interesting migrating insect species, like *Locusta migratoria* (Orthoptera) has been encountered on the archipelago." (Asmus Schröter)] Address: Karjalainen, S., Neidonpuistontie 6 D 8, FI-02400 Kirkkonummi, Finland. Email: sk@korento.net
- 9761.** Andres, C. (2010): Zur Verbreitung der Kleinen Zangenlibelle (*Onychogomphus f. forcipatus*) an der Tauber. *mercuriale* 10: 35-42. (in German, with English summary) ["In July 2010, the river Tauber between Archshofen and the embouchure into the Main river at Wertheim was surveyed for *O. f. forcipatus*. It was a „cursory scan" restricted to a search for imagoes at sites which appeared suitable for the species. One to three males of *O. f. forcipatus* could be found at 26 places. Most sightings were made at bypass water courses" that had been created" not earlier than 11 years ago. The places where the dragonflies were found and the possible dispersal along the river Tauber are discussed." (Author)] Address: Andres, C., Planungsbüro Andrena, Burgweg 22, 97956 Werbach, Germany. E-mail: andrena@gmx.de
- 9762.** Arnaldo, P.; Moreira, J.; Oliveira, I. (2010): Habitat associations of Odonata in mountainous water sites

in northeastern Portugal. *Odonatologica* 39(3): 185-193. (in English) ["A total of 19 species was recorded in a survey carried out at 28 water sites located in the Alvão Natural Park, NE Portugal. Multivariate statistical procedures were used to analyse the relationship between the species and the characteristics of their habitat, in order to determine different species biotope preferences. Aside from species with unspecific habitat requirements, 2 main species assemblages could be detected. *Enallagma cyathigerum*, *Sympetrum fonscolombii*, *S. sanguineum*, *Ischnura pumilio*, *Lestes virens* and *Anax imperator* preferred permanent water bodies characterized by high temperatures, while *Calopteryx virgo*, *Pyrrhosoma nymphula*, *Cordulegaster boltonii* and *Onychogomphus uncatatus* preferred sites with fast-flowing water characterized by low and moderate temperatures. Conservation strategies should take these patterns and habitat requirements into consideration." (Authors)] Address: Arnoldo, P., Forest and Landscape Department, University of Trás-os-Montes and Alto Douro, PT-5000-911 Vila Real, Portugal

9763. Arribère, M.A.; Campbell, L.M.; Rizzo, A.P.; Arcagni, M.; Revenga, J.; Ribeiro Guevara, S. (2010): Trace elements in plankton, benthic organisms, and forage fish of Lake Moreno, northern Patagonia, Argentina. *Water, Air, & Soil Pollution* 212(1-4): 167-182. (in English) ["The Northern Patagonian Andean range shared by Chile and Argentina has numerous glacial oligotrophic lakes protected in a series of National Parks. Recent baseline surveys indicated that concentrations in muscle and liver tissues from various fish species from across Nahuel Huapi and Los Alerces National Parks in Argentina were comparable or higher than similar fish species from other parts of the world. As a result, Lake Moreno, in Nahuel Huapi National Park, was chosen to investigate multiple element sinks, trends, and transfer in a representative Patagonia aquatic food web. The metals and metalloids Ag, As, Ba, Br, Cs, Co, Cr, Fe, Hg, K, Na, Rb, Se, and Zn were analyzed in three size plankton fractions, submerged macrophytes, biofilm, insect larvae, amphipods, decapods, gastropods (snails), annelids (earthworms), and forage fish. Except for nanoplankton (10–53 µm; small-celled algae, rotifers) and microplankton (53–200 µm; larger algae, ciliates, zooplankton nauplii), which share elemental compositional similarities, each taxon category had its own distinctive compositional pattern, revealed by principal component analysis. Nano- and microplankton tend to be relatively elevated in some metals, including As, Co, Cr, Fe, Hg, Zn, and Rb, followed by biofilm. Shredder-scrapper Trichoptera (caddisflies) have higher concentration of most of the studied elements than other insect larvae taxa, especially carnivorous Odonata (Anisoptera, dragonflies), which were associated with lower elemental contents. Those trends point to an overall tendency for biodiminishing element concentrations with trophic level in the benthos of Lake Moreno." (Authors)] Address: Arribère, Maria, Laboratorio de Análisis por Activación Neutrónica, UAIN, Centro Atómico Bariloche, Comisión Nacional de Energía Atómica (CNEA), Bustillo 9500, 8400 Bariloche, Argentina. E-mail: arribere@cab.cnea.gov.ar

9764. Bailowitz, R. (2010): *Lestes australis* (Southern Spreadwing), new for Arizona. *Argia* 22(4): 4. (in English) [Apache, Cochise, and Graham Counties, USA, July and August 2010] Address: Bailowitz, R., USA. E-mail: raberg2@q.com

9765. Bailowitz, R. (2010): *Enallagma novaehispaniae* Calvert (Neotropical Bluet), another new species for Arizona. *Argia* 22(4): 3. (in English) [16-XI-2010, Maricopa county, range extension of app. 225 km to the northwest of its known Mexican range.] Address: Bailowitz, R., USA. raberg2@q.com

9766. Barbosa dos Santos, S.; Rodrigues, S.L.; Menezes Nunes, G.K.; Brum Barbosa, A.; Macedo de Lacerda, L.E.; Miyahira, I.C.; Viana, T.A.; Lopes de Oliveira, J.; Cardoso Fonseca, F.; Campos da Silva, P. (2010): Estado do conhecimento da fauna de invertebrados nao-marinheiros da Ilha Grande (Angra dos Reis, RJ). *Oecologia Australis* 14(2): 504-549. (in Portuguese, with English summary) ["Ilha Grande, a continental island located at Southern of Rio de Janeiro state, Brazil, has important remnants of Atlantic Rainforest. However, the knowledge of the non-marine invertebrate fauna is not sufficiently well known, concerning not only taxonomic groups but also geographic areas. Considering the relevance of biodiversity inventories to conservation, allied to the absence of organized information about the existing data, we prepared a taxonomic list of the non-marine invertebrates reported to Ilha Grande, including distributional data, based on primary data of ongoing research projects and literature. The list is composed of 465 taxa of non-marine invertebrates, mainly Arthropoda (72.9%), followed by Mollusca (22.15%). [...] (Authors) 41 Odonata taxa (39 at the species level) are listed from the Ilha Grande.] Address: Barbosa dos Santos, Sonia, Universidade do Estado do Rio de Janeiro (UERJ), Inst. de Biologia Roberto Alcântara Gomes, Depto de Zoologia, Laboratório de Malacologia Limnica e Terrestre, Rua São Francisco Xavier, 524, PHLC, sala 525/2, Maracanã, Rio de Janeiro, Brasil. CEP: 20550-900, Brazil. E-mail: sbsantos@uerj.br

9767. Barndt, D. (2010): Beitrag zur Arthropodenfauna des Naturparks Dahme-Heideseen (Land Brandenburg) - Faunenanalyse und Bewertung - (Coleoptera, Auchenorrhyncha, Heteroptera, Hymenoptera part., Saltatoria, Díptera part., Araneae, Opiliones, Chilopoda, Diplopoda u.a.). *Märkische entomologische Nachrichten* 12(2): 195-298. (in German, with English summary) [Between 2004 and 2008, a total of 1600 species was identified. 11 species were recorded for the first time in Brandenburg, Germany and 8 species were rediscovered. The list of taxa includes Odonata; but most of the odonatalogical data are taken from published sources.] Address: Barndt, D., Bahnhofstr. 40d, 12207 Berlin-Lichterfelde Ost, Germany. E-mail: dr.barndt@kabelmail.de

9768. Beatty, C.; Fraser, S.; Pérez-Jvostov, F.; Sherratt, T. (2010): Dragonfly and damselfly (Insecta, Odonata) distributions in Ontario, Canada: Investigating the influence of climate change. *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 225-241. (in English) ["We analysed temperature data and odonate distribution data collected in the province of Ontario, Canada, over approximately sixty years. Analysis of temperature data from 31 weather stations collected in the years 1945–2000 showed an overall significant increase in the minimum, maximum and mean monthly temperatures; these trends were not adjusted for changes in urbanisation. Comparison of county level presence/absence data for odonates from the 1950's and 2002 found a slight decrease in the northernmost distributions of some species, although no significant patterns were evident. Lower sampling coverage in the larger, more northerly counties in Ontario, as well as the

assessment of distributions based on county records may limit the sensitivity of our approach in detecting changes in odonate species distributions over time. Future work should focus on increasing the coverage, uniformity and geographic detail of available datasets, as well as evaluating range change through testing predictions based on the ecology and biogeography of odonate species." (Authors)] Address: Beatty, C., Dept Biology, Santa Clara University, 500 El Camino Real, Santa Clara, California 95053-0268, USA. E-mail: cbeatty@scu.edu

9769. Bellstedt, R. (2010): Gratulation zum 75. Geburtstag an Dr. Wolfgang Zimmermann. *Mitteilungen des Thüringer Entomologenverbandes* 17(1/2): 52-53. (in German) [W. Zimmermann is one of the most profiled German odonatologists, and was and is still active in Thüringen.] Address: Bellstedt, R., Brühl 2, D-99867 Gotha, Germany

9770. Betoux, O.; Beattie, R. (2010): *Iverya averyi* gen. nov. and sp. nov., a New Triadotypomorphan Species from the Middle Triassic at Picton, New South Wales, Australia. *Acta Geologica Sinica - English Edition* 84(4): 688-692. (in English) ["A new specimen assigned to the species *Iverya averyi* gen. nov. and sp. nov. is described. This species is considered as a triadotypomorphan insect, a poorly known group of Triassic stem-odonatans. Like other triadotypomorphans, this species exhibits an area between MA and MP that is comparatively broad, and a cubitoanal area involving an AA stem distinct from CuA + CuP + AA emitting several posterior branches. Diagnostic character states of the new species are listed. Although incomplete, the specimen provides new information on the wing morphology of triadotypomorphans. This discovery might contribute to better assessment of the phylogenetic position of triadotypomorphan species with respect to other stem-odonatans." (Authors)] Address: Beattie, R., Department of Earth and Marine Sciences, The Australian National University, Canberra, ACT 0200 Australia and P.O. Box 320, Berry, NSW 2535 Australia. E-mail: Robert.beattie@anu.edu.au

9771. Bieger, L.; Carvalho, A.B.P.; Strieder, M.N.; Maltchik, L.; Stenert, C. (2010): Are the streams of the Sinos River basin of good water quality? Aquatic macroinvertebrates may answer the question. *Braz. J. Biol.* 70(4, suppl.): 1207-1215. (in English, with Portuguese summary) ["The main objective of this study was the assessment of the water quality of the Sinos River basin (Rio Grande do Sul state, Brazil) through biotic indices based on the macroinvertebrate community ("Family Biotic Index – FBI", and "Biological Monitoring Working Party Score System – BMWP"). Three lower order streams (2nd order) were selected in each one of three main regions of the basin. In each stream, the samplings were performed in three reaches (upper, middle, and lower), totalling 27 reaches. Two samplings were carried in each reach over one year (winter and summer). A total of 6,847 macroinvertebrates distributed among 54 families were sampled. The streams from the upper region were of better water quality than the lower region. The water quality did not change between the upper, middle and lower reaches of the streams. However, the upper reaches of the streams were of better water quality in all the regions of the basin. The water quality of the streams did not vary between the summer and the winter. This result demonstrated that water quality may be analysed in both studied seasons (summer

and winter) using biotic indices. The analysis of the results allows us to conclude that the biotic indices used reflected the changes related to the water quality along the longitudinal gradient of the basin. Thus, aquatic macroinvertebrates were important bioindicators of the water and environmental quality of the streams of the Sinos River basin." (Authors) Odonata are treated at the family level.] Address: Maltchik, L., Ecology and Conservation of Aquatic Ecosystems, Universidade do Vale do Rio dos Sinos – UNISINOS, CEP 93022-000, São Leopoldo, Rio Grande do Sul, Brazil. E-mail: maltchik@unisinobrazil.br

9772. Billqvist, M. (2010): Två nya trollsländor i Sverige – *Aeshna affinis* och *Anax parthenope* påträffade 2010. *fauna och flora* 105(3): 20-23. (in Swedish) [*Aeshna affinis*: 5-VIII-2010, Svarta håll, Revingefältet, Öland?, Sweden; *Anax parthenope*: 15-VII-2010, Hornsjön, Öland, Sweden (57°11'38"N, 16°57' 7"E)] Address: E-mail: magnus.billqvist@naturskyddsforeningen.se

9773. Bogacka-Kapusta, E.; Kapusta, A. (2010): Feeding strategies and resource utilization of 0+ perch, *Perca fluviatilis* L., in littoral zones of shallow lakes. *Archives of Polish Fisheries* 18: 163-172. (in English) [The diet of *P. fluviatilis* L., in two lakes (Goslawskie and Dolgie Wielkie, Poland) includes Anisoptera and Zygoptera without further differentiation to species level.] Address: Bogacka-Kapusta, Elżbieta, Dept of Ichthyology, The Stanislaw Sakowicz Inland Fisheries Institute in Olsztyn, Oczapowskiego 10, 10-719 Olsztyn-Kortowo, Poland. E-mail: ela@infish.com.pl

9774. Bried, J.; Mazzacano, C. (2010): Review of Wildlife Action Plans for Odonata conservation. *Argia* 22(4): 15-16. (in English) ["We found that the wildlife action plans have disturbing gaps. The first state wildlife action plans were developed in 2001-2005, when 441 distinct species were known from the US. Although nearly two-thirds (277) of these species were appointed as Species of Greatest Conservation Need (SGCN) overall (191 dragonfly and 86 damselfly species), over half the states neglected to assign dragonfly SGCN, damselfly SGCN, or both. Most (89%) of the 277 SGCN odonates were recognized as such in five or fewer states; 95 species (34%) were assigned in one state only, with Alaska and Hawaii contributing 30 of these. States in the west and south listed proportionately fewer odonate SGCN than those in the Great Lakes, Mid-Atlantic, and New England regions. We believe this reflects patterns of legal authority, information availability, and involvement by odonatists rather than geographic patterns of true conservation need. Nationally, it appears that few odonatists were involved in wildlife action plans relative to available expertise (potentially only -5% of DSA members), and that Odonata were underrepresented or omitted as SGCN in many states." (Authors)] Address: Bried, J., Albany Pine Bush Preserve Commission, Albany, NY, USA. E-mail: jbried@albanypinebush.org

9775. Bried, J.T.; Ervin, G.N. (2010): Randomized intervention analysis for detecting non-random change and management impact: Dragonfly examples. *Ecological Indicators* 11(2): 535-539. (in English) ["The quasi-experimental approach of before–after control–impact (BACI) sampling can help decide when changes are due to human activities rather than natural variability. Detailed arguments for and against BACI designs and analytic methods are widespread in the literature, but far less attention has been paid to the mechanics of

analyzing a BACI experiment. This paper demonstrates randomized intervention analysis with user-friendly software, where observations are paired in time before and after intervention. We provide examples using dragonfly count data in vegetation removal experiments." (Authors)] Address: Bried, J., Mississippi State Univ., Dept Biol. Sciences, Rm 130 Harned, PO Box GY, Mississippi State, MS 39762, USA. E-mail: jbried@TNC.org

9776. Brook, J.; Brook, G. (2010): Return of the Dainty Damselfly *Coenagrion scitulum* to the UK. *Dragonfly News* 58: 18-19. (in English) [*Coenagrion scitulum* was discovered in Kent, UK on 21-VI-2010; after the record from 16-VI-2009 on the Channel Island Jersey, this is the second record of this species after 1953, the year the colony along the British coast near Hadleigh was wiped out by a sea water flood.] Address: not stated

9777. Chambers, C.P.; Whiles, M.R.; Rosi-Marshall, E.J.; Tank, J.L.; Royer, T.V.; Griffiths, N.A.; Evans-White, M.A.; Stojak, A.R. (2010): Responses of stream macroinvertebrates to Bt maize leaf detritus. *Ecological Applications* 20(7): 1949-1960. (in English) ["In the mid-western United States, maize detritus enters streams draining agricultural land. Genetically modified Bt maize is commonly planted along streams and can possibly affect benthic macroinvertebrates, specifically members of the order Trichoptera, which are closely related to target species of some Bt toxins and are important detritivores in streams. The significance of inputs of Bt maize to aquatic systems has only recently been recognized, and assessments of potential nontarget impacts on aquatic organisms are lacking. We conducted laboratory feeding trials and found that the leaf-shredding trichopteran, *Lepidostoma liba*, grew significantly slower when fed Bt maize compared to non-Bt maize, while other invertebrate taxa that we examined showed no negative effects. We also used field studies to assess the influence of Bt maize detritus on benthic macroinvertebrate abundance, diversity, biomass, and functional structure in situ in 12 streams adjacent to Bt maize or non-Bt maize fields. We found no significant differences in total abundance or biomass between Bt and non-Bt streams, and trichopterans comprised only a small percentage of invertebrate biomass at all sites (0–15%). Shannon diversity did not differ among Bt and non-Bt streams and was always low (H' range = 0.9–1.9). Highly tolerant taxa, such as oligochaetes and chironomids, were dominant in both Bt and non-Bt streams, and macroinvertebrate community composition (including "Odonata") was relatively constant across seasons. We used litterbags to examine macroinvertebrate colonization of Bt and non-Bt maize detritus and found no significant differences among litter or stream types. Our in situ findings did not support our laboratory results; this is likely because the streams we studied in this region are highly degraded and subject to multiple, persistent anthropogenic stressors (e.g., channelization, altered flow, nutrient and pesticide inputs). Invertebrate communities in these streams are a product of these degraded conditions, and thus the impact of a single stressor, such as Bt toxins, may not be readily discernable. Our results add to growing evidence that Bt toxins can have sublethal effects on nontarget aquatic taxa, but this evidence should be considered in the context of other anthropogenic impacts and alternative methods of pest control influencing streams draining agricultural regions." (Authors)] Address: Whiles, M.R., Department of Zoology and Center for Ecology, Southern Illinois

University, Carbondale, Illinois 62901 USA. E-mail: mwhiles@zoology.siu.edu

9778. Chelmick, D. (2010): Studying British dragonflies in the 1970s: the wilderness years. *J. Br. Dragonfly Society* 26(2): 57-63. (in English) [David Chelmick tells a lot of nice stories with some emphasis on Cyril Hammond who published probably the most influencing book on British amateur odonatology. That book gives some insight into the development of amateur odonatology in UK, especially into the early steps with mapping the distribution of Odonata on the British Isles.] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

9779. Chelmick, D. (2010): The Scarce Emerald Damselfly *Lestes dryas* Kirby with notes on the family Lestidae in the Western Palearctic. *J. Br. Dragonfly Society* 26(2): 66-83. (in English) ["*L. dryas* is a species of marginal habitats and has a life history adapted to temporary waters that dry out in summer. It has one of the largest overall areas of distribution of any UK dragonfly species and is one of only seven circumboreal species that occur in the Western Palearctic. In lowland areas it is much threatened by agricultural practice but in uplands, which today provide its key habitats in our region, it is probably overlooked." (Author)] Address: Chelmick, D., Macromia Scientific, 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@davidchelmick.com

9780. Chertoprud, M.V. (2010): Biogeographic zonation of the Eurasian fresh waters based on the macrobenthic faunas. *Journal of General Biology* 71(2): 144-162. (in Russian, with English summary) ["Spatial differentiation of the Eurasian freshwater faunas is analyzed based on the original and published data on the aquatic insects, crustaceans, and molluscs (about 8800 species in total). The Hacker-Dice similarity index is employed as a principal criterion of differentiation. The schemes of biogeographic zonation are constructed for the nine large macrobenthic taxa, namely, Odonata, Ephemeroptera, Plecoptera, Hemiptera, Coleoptera, Trichoptera, Malacostraca, Gastropoda, and Bivalvia. Discussed are principal discordances in distribution of three different ecological-systematic groups of the macrobenthos, namely, limnophylic insects, rheophylic insects, and crustaceans with molluscs. A generalized zonation system of the Eurasian fresh waters is elaborated, which is fundamentally divided into Palaearctic and Oriental Regions. The former is further divided into five subregions: Euro-Ob, Near East, Central Asia, Eastern Siberia, and Japan. The latter is divided into three subregions: Indo-Himalaya, China, and Malay. Preliminary classification of the provinces is also provided. Disagreements between the biogeographic systems of different authors are discussed." (Author)] Address: Chertoprud, M.V., Moscow Lomonosov State University, Faculty of Biology, 119992 Moscow, Leninskie Gory, Russia. E-mail: lymnaea@yandex.ru

9781. Conze, K.-J.; Grönhagen, N.; Lohr, M.; Menke, N. (2010): Trends in occurrence of thermophilous dragonfly species in North Rhine-Westphalia (NRW). *Bio-Risk* 5: Special issue: Monitoring climatic change with dragonflies: 31-45. (in English) ["Since 1996 the "Workgroup Odonata in North Rhine-Westphalia" ("AK Libellen NRW") has built up a data base including about 150.000 data sets concerning the occurrence of drag-

onflies in North Rhine-Westphalia (NRW). This data confirms an increase and spread of some thermophilous dragonfly species in NRW, and the effects of climate change evidenced by an increasing average temperature, are considered to be important reasons for this process." (Authors)] Address: Conze, K.-J., Arbeitskreis Libellen Nordrhein-Westfalen, Listerstr. 13, 45147 Essen, Germany. E-mail: kjc@loekplan.de

9782. Cooper, I.A. (2010): Ecology of sexual dimorphism and clinal variation of coloration in a damselfly. *American Naturalist* 176(5): 566-572. ["Sexual selection, more so than natural selection, is posited as the major cause of sex differences. Here I show ecological correlations between solar radiation levels and sexual dimorphism in body color of a Hawaiian damselfly. *Megalagrion calliphya* exhibits sexual monomorphism at high elevations, where both sexes are red in color; sexual dimorphism at low elevations, where females are green; and female-limited dimorphism at midelevations, where both red and green females exist. Within a midelevation population, red females are also more prevalent during high daily levels of solar radiation. I found that red pigmentation is correlated with superior antioxidant ability that may protect from UV damage and confer a benefit to damselflies in exposed habitats, including males, which defend exposed mating habitats at all elevations, and females, which are in shaded habitats except at high elevation. This study characterizes the ecology of sexual dimorphism and provides a new, ecological hypothesis for the evolution of female-limited dimorphism." (Author)] Address: Cooper, Idelle, Dept of Zoology, Michigan State University, Kellogg Biological Station, Hickory Corners, Michigan 49060, USA. E-mail: cooperi@msu.edu

9783. Cordero-Rivera, A.; Lorenzo Carballa, M.O. (2010): Three sisters in the same dress: cryptic speciation in African odonates. *Molecular Ecology* 19: 3840-3841. (in English) ["The discovery of cryptic species (i.e. two or more distinct but morphologically undistinguishable species) has grown exponentially in the last two decades, due mainly to the increasing availability of DNA sequences. This suggests that hidden in the known species, many of which have been described based solely on morphological information, there might be a high number of species waiting to be discovered. In this issue Damm et al. (2010) use a combination of genetic, morphological and ecological evidence to identify the first cryptic species complex found within dragonflies (insect order Odonata). Their findings add more evidence for the importance of combining information from different disciplines to new species' discovery (DeSalle et al. 2005)." (Authors)] Address: Cordero-Rivera, A., Grupo ECOEVO, Universidade de Vigo, EUET Forestal, Campus Universitario, 36005, Pontevedra, Galiza, Spain

9784. Costa, J.M.; Carriço, C.; Santos, T.C. (2010): *Neocordulia pedroi* sp. nov. (Odonata: Corduliidae) from southeastern Brazil. *Zootaxa* 2685: 51-56. (in English) ["*Neocordulia* (*Mesocordulia*) *pedroi* sp. n. is described and illustrated based on a reared adult male from Tapiuã stream, Estação Biológica de Santa Lúcia, Santa Teresa municipality, Espírito Santo State, Brazil. The holotype is deposited in the Museu Nacional, UFRJ, Rio de Janeiro, Brazil. This new species can be separated of the other species of the genus by the following characters: cerci strongly convergent and vesica spermalis with shorter flagellum." (Authors)] Address: Costa, Jani-

ra, Departamento de Entomologia Museu Nacional – Universidade Federal do Rio de Janeiro – Quinta da Boa Vista – São Cristóvão – Rio de Janeiro – RJ – Brasil – 20940-040. E-mail: jmcosta@globocom

9785. Crumrine, P.W. (2010): Body size, temperature, and seasonal differences in size structure influence the occurrence of cannibalism in larvae of the migratory dragonfly, *Anax junius*. *Aquatic Ecology* 44: 761-770. (in English) ["The aim of this study was to test the hypotheses that body size and seasonal differences in temperature and size structure influence cannibalism in larval dragonflies. In the first two experiments, larvae that were either similar or different in size were paired to examine the potential for intra- and intercohort cannibalism. In the third experiment, size structure of an assemblage of larvae and water temperature were manipulated to explore the seasonal dynamics of cannibalism. Cannibalism was common between individuals that differed in body size by one or more instars. Cannibalism also occurred between individuals similar in size but the rate varied across developmental stages. Results suggest that cannibalism may be most common when water temperatures are warm and late-instar larvae are present at high densities. These results highlight the importance of intra- and intercohort cannibalism as factors that can influence the population dynamics of generalist predators." (Author)] Address: Crumrine, P.W., Dept of Biological Sciences & Program in Environmental Studies, Rowan University, Glassboro, NJ 08028, USA. E-mail: crumrine@rowan.edu

9786. da Silva, M.J.; Figueiredo, B.R.S.; Ramos, R.T.C.; Medeiros, E.S.F. (2010): Food resources used by three species of fish in the semi-arid region of Brazil. *Neotropical Ichthyology* 8(4): 825-833. (in English, with Portuguese summary) [The analysis showed no Odonata species in the diet of *Prochilodus brevis*. Anisoptera were found to be 1.25% of the *Astyanax aff. bimaculatus*'s food while in *Hoplias malabaricus* both Anisoptera (3.75%) and Zygoptera (11.36%) were present as food items.] Address: Medeiros, E.S.F., Grupo de Ecologia de Rios do Semiárido, Universidade Estadual da Paraíba, Centro de Ciências Biológicas e Sociais Aplicadas. Campus V, 58020-540 João Pessoa, Paraíba, Brazil. E-mail: elviomedeiros@uepb.edu.br

9787. Damm, S.; Schierwater, B.; Hadrys, H. (2010): An integrative approach to species discovery in odonates: from character-based DNA barcoding to ecology. *Molecular Ecology* 19(18): 3881-3893. (in English) ["Modern taxonomy requires an analytical approach incorporating all lines of evidence into decision-making. Such an approach can enhance both species identification and species discovery. The character-based DNA barcode method provides a molecular data set that can be incorporated into classical taxonomic data such that the discovery of new species can be made in an analytical framework that includes multiple sources of data. We here illustrate such a corroborative framework in a dragonfly model system that permits the discovery of two new, but visually cryptic species. In the African dragonfly genus *Trithemis* three distinct genetic clusters can be detected which could not be identified by using classical taxonomic characters. In order to test the hypothesis of two new species, DNA-barcodes from different sequence markers (ND1 and COI) were combined with morphological, ecological and biogeographic data sets. Phylogenetic analyses and incorporation of all data sets into a scheme called taxonomic circle high-

ly supports the hypothesis of two new species. Our case study suggests an analytical approach to modern taxonomy that integrates data sets from different disciplines, thereby increasing the ease and reliability of both species discovery and species assignment." (Authors)] Address: Damm, Sandra, ITZ, Ecology & Evolution, TiHo Hannover, Bünteweg 17d, 30559 Hannover, Germany. E-mail: sandra.giere@ecolevol.de

9788. Das, S.; Roy, S.; Mukhopadhyay, A. (2010): Diversity of arthropod natural enemies in the tea plantations of North Bengal with emphasis on their association with tea pests. *Current Science* 99(10): 1457-1463. (in English) ["A study was undertaken to explore the diversity of arthropod natural enemies in sub-Himalayan tea plantations of North Bengal, India. The study revealed the presence of 94 species of predators (including *Ceragriion* sp., *Pseudagriion* sp., *Ictinogomphus* sp., *Anax* sp.) and 33 of parasitoids in the region. New records on tea pest–natural enemy associations were made on the basis of field observations as well as laboratory rearing. Among the predators, spider and ladybird fauna, and among the parasitoid groups, *Bracnidae* and *Ichneumonidae* were dominant during the survey period." (Authors)] Address: Das, Soma, Entomology Research Unit, Department of Zoology, University of North Bengal, Darjeeling 734 013, India

9789. David, S. (2010): Recenzia knihy: Dolný A et al., 2007: *Vážky ěskej republiky. Folia faunistica Slovaca* 15(11): 99-100. (in Slovakian) [book review: Dolný Aleš, Bárta Dan, Waldhauser Martin, Holuša Otakar, Hanel Lubomír, Lízler Robert, 2007: *Vážky ěské republiky: Ekologie, ochrana a rozšíření (The Dragonflies of the Czech Republic: Ecology, Conservation and Distribution)*. Vlašim: ěský svaz ochránců přírody Vlašim, 672 s.] Address: David, S., Katedra ekologie a environmentalistiky Fakulty přírodních věd, Univerzity Konštatína Filozofa v Nitre, Tr. A. Hlinku 1, 949 74 Nitra, Slovakia. E-mail: sdavid@ukf.sk

9790. Davies, P.J.; Wright, I.A.; Findlay, S.J.; Jonasson, O.J.; Burgin, S. (2010): Impact of urban development on aquatic macroinvertebrates in south eastern Australia: degradation of in-stream habitats and comparison with non-urban streams. *Aquatic Ecology* 44: 685-700. (in English) ["Internationally, waterways within urban areas are subject to broad-scale environmental impairment from urban land uses. In this study, we used in-stream macroinvertebrates as surrogates to measure the aquatic health of urban streams in the established suburbs of northern Sydney, in temperate south eastern Australia. We compared these with samples collected from streams flowing in adjacent naturally vegetated catchments. Macroinvertebrates were collected over a 30-month period from riffle, edge and pool rock habitats and were identified to the family level. Macroinvertebrate assemblages were assessed against the influence of imperviousness and other catchment and water quality variables. The study revealed that urban streams were significantly impaired compared with those that flowed through naturally vegetated non-urban catchments. Urban streams had consistently lower family richness, and sensitive guilds were rare or missing. We found that variation in community assemblages among the instream habitats (pool edges, riffles and pool rocks) were more pronounced within streams in naturally vegetated catchments than in urban waterways." (Authors) Odonata are treated at the family level.] Address: Davies, P.J., Ku-ring-gai Council, Locked

Bag 1056, Pymble 2073, Australia. E-mail: pdavies@mkc.nsw.gov.au

9791. de Almeida, M.C.; Cortes, L.G.; de Marco, P. (2010): New records and a niche model for the distribution of two Neotropical damselflies: *Schistoboloboliviensis* and *Tuberculoboloboliviensis* (Odonata: Coenagrionidae). *Insect Conservation and Diversity* 3(4): 252-256. (in English) ["1. Two new records for the Neotropical damselflies, *S. (Telagriion) boliviensis* and *T. (Leptoboloboliviensis)* *inversa*, previously known only from the Amazonia, are presented from the Brazilian Cerrado. 2. Potential distribution models for the two species were built first using only previous occurrence points from the literature, and later adding the new records. The first niche models had low capacity to predict the new records for both species. The models with all biogeographical information increased overall distributional area for both species and indicated priority areas for inventory outside its original distribution. The results reinforce the use of modelling as a tool to increase faunal knowledge in poorly studied areas, allowing an initial evaluation of conservation status and the indication of priority areas for inventories." (Authors)] Address: De Marco Júnior, P., Laboratório de Ecologia Teórica e Síntese, Depto de Ecologia, ICB, Universidade Federal de Goiás, Rodovia Goiânia-Nerópolis, km 5, Campus II, Setor Itatiaia, CP 131, CEP 74001-970, Goiânia (GO), Brasil. E-mail: pdemarco@icb.ufg.br

9792. De Knijf, G.; Anselin, A. (2010): When south goes north: Mediterranean dragonflies (Odonata) conquer Flanders (North-Belgium). *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 141-153. (in English) ["Since 1980, eight southern dragonfly species have been regularly recorded in Flanders. They show a significant increase in relative abundance, relative area as well as indications of reproduction since the beginning of the nineties, with peak occurrence mainly in the 1995–1999 period. Since 2000, numbers are lower but more species were simultaneously present. Three species, *Lestes barbarus*, *Crocothemis erythraea* and *Sympetrum fonscolombii*, show a combination of earlier arrival, earlier reproduction with a higher frequency and higher maximum ranges and can be considered as stable populations in Flanders. All other southern species show in general a later arrival, only one confirmed or probable reproduction and have much lower maximum ranges. Two other species, reaching their northern limit of distribution in Flanders, *Erythromma viridulum* and *E. lindenii* have clearly expanded their relative area since the eighties. Their relative abundance also increased although this shows more fluctuations." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

9793. DePalma, R.; Cichocki, F.; Dierick, M.; Feeney, R. (2010): Preliminary notes on the first recorded amber insects from the Hell Creek Formation. *The Journal of Paleontological Sciences JPS*. C.10.0001: 1-7. (in English) ["Insects, the most diverse of living organisms today, inhabit virtually every terrestrial and freshwater ecosystem on earth. Yet the strata of the Upper Cretaceous Hell Creek Formation, although deposited in a luxuriant subtropical biome during the initial diversification of flowering plants, until now have revealed practically no insect fossils. Here, we provide a preliminary report on the discovery of the first amber insects from the Hell Creek Formation. This well-preserved assem-

blage of amber insects includes members of the Diptera (Suborders Nematocera and Brachycera) and Odonata (Suborder Zygoptera). The discovery will enable future studies to develop a better paleoecological understanding of the Hell Creek that includes the essential role of insects." (Authors)] Address: DePalma, R., Dept. of Paleontology, Palm Beach Museum of Natural History, 2805 E. Oakland Park Blvd., Suite 402, Ft. Lauderdale, FL 33306, Rdepalma@PBMNH.org

9794. Deviche, P. (2010): Copulating pair of *Ischnura barberi* (Desert Forktail) and *I. ramburii* (Rambur's Forktail). *Argia* 22(4): 17-18. (in English) [A heterospecific pair of a male *Ischnura barberi* and a female *I. ramburii* was observed at 14-IX-2010 at aricopa, Arizona, USA.] Address: Deviche, P.J. E-mail: deviche@asu.edu

9795. Dixon, J.R.; Gennard, D.E. (2010): The influence of meteorological conditions on the flight activity of the Blue-tailed Damselfly *Ischnura elegans* (Vander Linden), the Azure Damselfly *Coenagrion puella* (Linnaeus) and the Emerald Damselfly *Lestes sponsa* (Hanse-mann). *J. Br. Dragonfly Society* 26(2): 84-97. (in English) ["The flight activity was compared for *I. elegans*, *C. puella* and *L. sponsa* at an exposed pond and a sheltered pond at Rimac, Saltfleetby National Nature Reserve, Lincolnshire in July and August 1998. Meteorological conditions (air temperature, light intensity, cloud cover, wind speed and direction were investigated in relation to flight activity of the species. Flight activity of all three species increased with rising air temperature, light intensity and declining cloud cover. These factors appear to be the main ones that exert control on day to day variation in flight activity of these three species. Their relative importance varies from species to species, which is most likely to be due to the nature of the exoskeletons (which influences the rate of solar radiation absorption), size (which influences rate of warming and power requirements) and behaviour. Only *C. puella* showed any relationship between mating activity (tandem wheel flight) and meteorological conditions." (Authors)] Address: Dixon, J.R., Department of Environmental Science, University of Lincolnshire and Humberside 61 Bargate, Grimsby DN34 5AA, UK

9796. Dogramaci, M.; DeBano, S.J.; Wooster, D.E.; Kimoto, C. (2010): A method for subsampling terrestrial invertebrate samples in the laboratory: Estimating abundance and taxa richness. *Journal of Insect Science* 10:25 (available online: insectscience.org/10.25): 17pp. (in English) ["Significant progress has been made in developing subsampling techniques to process large samples of aquatic invertebrates. However, limited information is available regarding subsampling techniques for terrestrial invertebrate samples. Therefore a novel subsampling procedure was evaluated for processing samples of terrestrial invertebrates collected using two common field techniques: pitfall and pan traps. A three-phase sorting protocol was developed for estimating abundance and taxa richness of invertebrates. First, large invertebrates and plant material were removed from the sample using a sieve with a 4 mm mesh size. Second, the sample was poured into a specially designed, gridded sampling tray, and 16 cells, comprising 25% of the sampling tray, were randomly subsampled and processed. Third, the remainder of the sample was scanned for 4-7 min to record rare taxa missed in the second phase. To compare estimated abundance and taxa richness with the true values of

these variables for the samples, the remainder of each sample was processed completely. The results were analyzed relative to three sample size categories: samples with less than 250 invertebrates (low abundance samples), samples with 250-500 invertebrates (moderate abundance samples), and samples with more than 500 invertebrates (high abundance samples). The number of invertebrates estimated after subsampling eight or more cells was highly precise for all sizes and types of samples. High accuracy for moderate and high abundance samples was achieved after even as few as six subsamples. However, estimates of the number of invertebrates for low abundance samples were less reliable. The subsampling technique also adequately estimated taxa richness; on average, subsampling detected 89% of taxa found in samples. Thus, the subsampling technique provided accurate data on both the abundance and taxa richness of terrestrial invertebrate samples. Importantly, subsampling greatly decreased the time required to process samples, cutting the time per sample by up to 80%. Based on these data, this subsampling technique is recommended to minimize the time and cost of processing moderate to large samples without compromising the integrity of the data and to maximize the information extracted from large terrestrial invertebrate samples. For samples with a relatively low number of invertebrates, complete counting is preferred." (Authors) Zygoptera only were caught in pan but not in pitfall traps.] Address: Dogramaci, M., Dept of Fisheries and Wildlife, Hermiston Agricultural Research and Extension Center, Oregon State University, Hermiston, OR 97838

9797. Dolný, A.; Drozd, P.; Petříková, M.; Harabiš, F. (2010): Sex ratios at emergence in populations of some Central European Gomphidae species (Anisoptera). *Odonatologica* 39(3): 217-224. (in English) ["At emergence (F-0) a significant bias for females was observed within the Moravian (Czech Republic) populations of *Gomphus flavipes*, *G. vulgatissimus* and *Ophiogomphus cecilia*. Males represented 45.6% of all specimens (43.5% in the first and 46.4% in the second research year). The results of the χ^2 test supported the female-biased sex ratio in populations of all 3 species. The sex ratio in populations varied significantly in time during the emergence season, caused by the fact that all 3 species demonstrated a significant protandric trend. The greatest changes in sex ratio during the emergence season were demonstrated by *G. flavipes* (coefficient value -0.007542); the smallest were recorded in *G. vulgatissimus* (CV -0.008617). Environmental impact did not prove to act be a factor which has an effect on the sex ratio of species with phenotypical determination of sex." (Authors)] Address: Dolný, A., Department of Biology and Ecology, Faculty of Natural Sciences, University of Ostrava, Chittussiho 10, CZ-71000 Slezská Ostrava, Czech Republic. E-mail: ales.dolny@osu.cz

9798. Donnelly, N. (2010): Book Review: *Dragonflies & Damselflies of the Rocky Mountains*. *Argia* 22(4): 22-23. (in English) [Dubois, B. (2010): *Dragonflies & Damselflies of the Rocky Mountains*. Kollath Stensaas. ISBN 10: 0979200687. 200 pp. The review includes some personal and general annotations on the lack of information on high altitude Odonata in USA.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

9799. Dow, R.A.; Unggang, J. (2010): The Odonata of Binyo Penyilam, a unique tropical wetland area in Bintu-

lu Division, Sarawak, Malaysia. *Journal of Threatened Taxa* 2(13): 1349-1358. (in English) ["Binyo Penyilam is a unique wetland conservation area within the Sarawak Planted Forest Project zone in Sarawak's Bintulu Division. A variety of forest and open habitats are present in the area; these are characterised. An annotated list of 61 species of Odonata from 11 families collected in the area to-date is presented. At least seven of these species had not been found in Sarawak prior to their discovery at Binyo Penyilam, of these four – *Pseudagrion coomansi*, *Merogomphus femoralis*, *Brachygonia puella* and *Chalybeothemis fluviatilis* – have still not been found elsewhere in the state; no other location is known for the genus *Merogomphus* in Borneo. Although under-sampling makes assessments of the conservation status of south-east Asian Odonata difficult, at least 16 of the species found at Binyo Penyilam can be considered to be of potential conservation concern, at least within Sarawak." (Authors)] Address: Dow, R.A., National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

9800. Dragonfly Society of the Americas (2010): *Argia* 22(4). *Argia* 22(4): 23 pp. (in English) [Calendar of Events, 1; In This Issue 1; Minutes of the 2010 Annual Meeting of the Dragonfly Society of the Americas, S. Valley; 2010 Treasurer's Report J. Daigle 2; Request for *Orthemis* specimens J. Daigle, 8; Minutes of the 2010 Annual Meeting of the Dragonfly Society of the Americas, S. Valley; High Oxygen Levels Spawn Monster Dragonflies, 16] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

9801. Dubois, B. (2010): *Dragonflies & Damselflies of the Rocky Mountains*. Kollath Stensaas. ISBN-10: 0979200687: 200 pp. (in English) [This guide covers the mountainous western interior and adjacent lowlands of USA. The author begins with a complete and easily digested description of odonate morphology, followed by an account of odonate biology, both on larval and adult stages. The author gives a brief characteristic of the Rockies themselves, emphasizing the elevation-defined life zones which govern the distribution of nearly all living creatures, and which have much less relevance in the remainder of North America. The species accounts of the approximately 100 species are thorough, and include not only good colour photos of the adults but also numerous black and white drawings of details. The book contains a description for each species, plus valuable clues for their quick identification. Range maps include the entire western United States, making this a useful guide for a much larger area than the title implies.]

9802. Dupont, P. (2010): Plan national d'actions en faveur des Odonates. Office pour les insectes et leur environnement / Société Française d'Odonatologie – Ministère de Ecologie, de l'Energie, du Développement durable et de la Mer: 170 pp. (in French) [This French species action plan considers the following 18 odonate species: *Aeshna caerulea*, *Coenagrion caerulescens*, *C. lunulatum*, *C. mercuriale*, *C. ornatum*, *G. flavipes*, *G. graslinii*, *L. albifrons*, *L. caudalis*, *L. pectoralis*, *Lestes macrostigma*, *Lindenia tetraphylla*, *Macromia splendens*, *Nehalennia speciosa*, *Ophiogomphus cecilia*, *Oxygastra curtisii*, *Sympetma paedisca*, and *Sympetrum depressiusculum*.] Address: <http://www.developpement-durable.gouv.fr/1-Qu-est-ce-qu-un-plan-national-d.html>

9803. Ferrari, M.C.O.; Wisenden, B.D.; Chivers, D.P. (2010): Chemical ecology of predator-prey interactions in aquatic ecosystems: a review and prospectus. *Can. J. Zool.* 88: 698-724. (in English, with French summary) ["The interaction between predator and prey is an evolutionary arms race, for which early detection by either party is often the key to success. In aquatic ecosystems, olfaction is an essential source of information for many prey and predators and a number of cues have been shown to play a key role in trait-mediated indirect interactions in aquatic communities. Here, we review the nature and role of predator kairomones, chemical alarm cues, disturbance cues, and diet cues on the behaviour, morphology, life history, and survival of aquatic prey, focusing primarily on the discoveries from the last decade. Many advances in the field have been accomplished: testing the survival value of those chemicals, providing field validation of laboratory results, understanding the extent to which chemically mediated learning may benefit the prey, understanding the role of these chemicals in mediating morphological and life-history adaptations, and most importantly, the selection pressures leading to the evolution of chemical alarm cues. Although considerable advances have been made, several key questions remain, the most urgent of which is to understand the chemistry behind these interactions." (Authors) This review includes several references to Odonata.] Address: Ferrari, Maud, Department of Environmental Science and Policy, University of California, Davis, One Shields Avenue, Davis, CA 95616, USA. E-mail: mcferrari@ucdavis.edu

9804. Folz, H.-G. (2010): Gabel-Azurjungfer (*Coenagrion scitulum* RAMBUR, 1842) in Rheinhessen angekommen (Insecta: Odonata: Coenagrionidae). *Fauna und Flora in Rheinland-Pfalz* 11(4): 1411-1412. (in German) [3-06-2010, Gau-Bickelsheim, Landkreis Alzey-Worms, Rheinland-Pfalz, Germany] Address: Folz, H.-G., Hausener Str. 8, 55270 Engelstadt, Germany. E-mail: folz-engelstadt@gmx.de

9805. Folz, H.-G. (2010): Ergänzende Libellenfunde in den Landkreisen Mainz-Bingen und Alzey-Worms, Rheinhessen (Insecta: Odonata). *Fauna und Flora in Rheinland-Pfalz* 11(4): 1163-1174. (in German, with English summary) [Rheinland-Pfalz, Germany; records of 43 species are documented.] Address: Folz, H.-G., Hausener Str. 8, 55270 Engelstadt, Germany. E-mail: folz-engelstadt@gmx.de

9806. Folz, H.-G. (2010): Spitzenfleck - *Libellula fulva* MÜLLER, 1764 - zahlreich bei Bingen (Insecta: Odonata: Coenagrionidae). *Fauna und Flora in Rheinland-Pfalz* 11(4): 1415-1417. (in German) [09-VI-2010, Landkreis Mainz-Bingen, Rheinland-Pfalz, Germany] Address: Folz, H.-G., Hausener Str. 8, 55270 Engelstadt, Germany. E-mail: folz-engelstadt@gmx.de

9807. Fortin, B.L. (2010): Selenium dynamics in Canadian Rocky Mountain lakes. M.Sc. thesis, Department of Biological Sciences, University of Alberta, Edmonton: 142 pp. (in English) ["I investigated, water, invertebrates and fishes from lakes in Banff National Park and Kananaskis Country, Alberta for selenium (Se), an element known to be toxic to vertebrates. At some depths, Se concentrations in sediment exceeded recognized thresholds for bird and fish reproductive impairment. Se concentrations in water were over USEPA guidelines after spring melt runoff. In aquatic invertebrates, Se concentrations exceeded values known to

cause reproductive impairment in fish and bird predators. Se concentrations in all fish species exceeded known thresholds for reproductive impairment in avian consumers and the majority surpassed concentrations that would negatively affect wildlife and human consumers. Se concentrations in some fish species have significantly increased over the past 6-16 years. The strongest predictors of fish Se concentrations were growth rate, condition factor, age, weight, trophic position (within lakes) and vegetation type (among lakes). These results suggest that consumption advisories are desirable for several lakes in the Banff and Kananaskis area, and that Se concentrations in fish from other area lakes should be investigated." (Author) Odonata (= Aeshnidae, Coenagrionidae, Libellulidae) mean Se concentrations exceeded the established toxicity thresholds for fish and bird diets in all lakes. Mud Lake would be the only exception, where the mean Se concentration of Odonates was very close to, but did not exceed the threshold for fish reproductive impairment.] Address: Fortin, Barbra Linda, Dept Biol. Sciences, University of Alberta, Canada. E-mail: bfortin@ualberta.ca

9808. Franzen, J. (2010): Nachweis der Gabel-Azurjungfer - *Coenagrion scitulum* RAMBUR, 1842 - in der Kiesgrube Platten bei Wittlich (Insecta: Odonata: Coenagrionidae). *Fauna und Flora in Rheinland-Pfalz* 11(4): 1413-1414. (in German) [11/18-VII-2010, Platten, Landkreis Bernkastel-Kues, Rheinland-Pfalz, Germany] Address: Franzen, J., Auf Cales 54, 56814 Bremm, Germany. E-mail: juergen@jfranzen.de

9809. Friebe, R. (2010): They call me the wanderer. *Frankfurter Allgemeine Sonntagszeitung* 10. Januar 2010: 52. (in German) [Extensive report on the studies of Charles Anderson published as Anderson, R.C. (2009): Do dragonflies migrate across the western Indian Ocean? *Journal of Tropical Ecology* 25(4): 347-358.] Address: not stated

9810. Fujiwara, Y.; Kobayashi, S. (2010): A study on the distribution of *Mnais costaris* Selys the dragonfly in Ehime Prefecture. *Bulletin of the Ehime Prefectural Science Museum* 15: 1-8. (in Japanese, with English summary) [*M. costaris* was recorded in Imabari and Saijo city, eastern part of Ehime prefecture, Japan. This species has a limited distribution in Shikoku Island. In Ehime prefecture, it is thought living only in the middle part, thus it was categorized as threatened species. In general, any investigation on the distribution of this taxon is insufficient in eastern and northern part of prefecture, and the discovery of new habitats is likely. The taxonomic status of *Mnais costaris* Selys and *M. pruinosa* Selys still awaits clarification, and intensified field work can help to improve the data basis.] Address: Kobayashi, S., Professional Graduate Division of Arts and curator of Natural Ehime Prefectural Science Museum, Niihama, Ehime Prefecture, 792-0060, Japan

9811. Gahl, M.K.; Calhoun, A.J.K. (2010): The role of multiple stressors in ranavirus-caused amphibian mortalities in Acadia National Park wetlands. *Canadian Journal of Zoology* 88(1): 108-121. (in English, with French summary) ["Recent studies suggest that multiple sublethal stressors compromise amphibian immune systems and increase susceptibility to disease. We examined two aspects of multiple stressors and incidence of ranavirus-caused amphibian mortalities in free-living amphibian populations: (1) among-pond differences in physical, chemical, and biological stressors (eg. family

Belostomidae, order Hemiptera; family Dytiscidae, order Coleoptera; some suborder Anisoptera, order Odonata) that may exacerbate mortality events, and (2) temporal changes in within-pond stressors that coincide with mortality events. At the among-pond scale, we used principal components analysis and logistic regression followed by Akaike's information criterion (QAICc) to identify stressors associated with disease incidence. Of the stressors we investigated, aluminum, temperature, and conductivity were most correlated with outbreaks, but it was unclear whether they increased ranavirus-caused mortality events. Sublethal stressors were difficult to isolate in the field and few were significantly associated with ranavirus across all breeding ponds. Our results suggest that each wetland, because of varied physical, biological, and chemical settings, will have its own suite of stressors that sublethally affect amphibians." (Authors)] Address: Gahl, M.K., Dept of Plant, Soil, and Environmental Sciences, University of Maine, 5722 Deering Hall, Orono, ME 04469, USA

9812. Gashtarov, V.; Beshkov, S. (2010): *Lindenia tetraphylla* (Vander Linden, 1825) (Odonata: Gomphidae) a new genus and species for the Bulgarian fauna. *Entomologist's Rec. J. Var.* 122: 272-274. (in English) [16.vi.2009; Marena Hill, near Novo Konopladi, Bulgaria N 41°26'48"; E 23°18'44", 114 metres a.s.l., *L. tetraphylla*, female. "During the next few days, many other individuals of the same species were observed flying around the same long pathway, with approximately 8-10 individuals on 17 June 2009 and the last observation on the afternoon of 20 June." This species record the total number of known Odonata in Bulgarian to 67.] In fact *L. tetraphylla* is the 69th species reported for Bulgaria. (M. Marinov)] Address: Gashtarov, V., P.O. Box 1733, 1000 Sofia, Bulgaria. E-mail: vgashtarov@yahoo.com; Beshkov, S., National Museum of Natural History, Tzar Osvooboditel Blvd 1, 1000 Sofia, Bulgaria. E-mail: beshkov@nmnhs.com

9813. Goforth, C.L. (2010): Behavioural responses of *Enallagma* to changes in weather (Zygoptera: Coenagrionidae). *Odonatologica* 39(3): 225-234. (in English) ["Odonates exhibit a variety of weather associated behaviours, including abandoning ponds just before storms begin. They may be able to detect changes in weather that alert them to approaching storms and allow them to escape the water's edge before it begins to rain. *E. annexum* and *E. boreale* were observed at a Colorado marsh (USA) to determine which weather factors contributed to the weather-induced behaviours they exhibit. They were observed for 191 five-minute periods and their flight activity quantified. Weather parameters were measured during each interval to account for rapid changes in conditions. Based on results from multiple regression analysis, it is clear that light intensity is the strongest weather parameter affecting zygopteran flight activity, but temperature, wind speed, and the presence of rain are also significant. The 2 species exhibited pond abandonment behaviour during storms. It is likely that storms are dangerous to zygopterans and their apparent ability to detect impending storms is a survival mechanism. Alternatively, pond abandonment behaviour may be triggered by the same factors necessary to trigger roosting and the zygopterans simply return to their roosting sites during storms." (Author)] Address: Goforth, C.L., Department of Biology, Olin Hall, Colorado College, Colorado Springs, Colorado 80903, USA

- 9814.** Gomez-Anaya, J.A.; Novelo-Gutierrez, R. (2010): Richness and structure of an Odonata larval assemblage from Río Pinolapa, Tepalcatepec, Michoacán, Mexico in relation to their habitat characteristics. *Odonatologica* 39(4): 287-303. (in English) ["The odonate larval assemblage from Río Pinolapa (RP) in the municipality of Tepalcatepec, Michoacán, is described. Sampling was conducted twice in each season (8 trips in total), and additionally some physicochemical variables of the river channel were recorded. Strata (shores, riffles and eddies) and seasonal variation of assemblages are described and ecompared using classical diversity measures such as Shannon's diversity index, Simpson's diversity index as a dominance measure, Margalef's richness index and Pielou's evenness index. For comparing strata and seasonal diversity the Renyi's diversity profiles were used. A Cluster Analysis was performed on a Bray-Curtis similarity matrix to explore the faunal relationships among year seasons and strata. CCA was also performed to investigate the relationships between the physicochemical and species abundance matrixes. As results, 28 species (12 Zygoptera and 16 Anisoptera) were recorded as larvae. Most abundant species were *Erpetogomphus elaps*, *Brechmorhoga praecox* and *Phyllogomphoides luisi*. The highest number of species was registered in winter and the lowest in summer. Among strata the highest abundance was recorded in riffles, although the shoreline had the largest number of species. The most similar assemblages were those of autumn and winter. Shore habitats were more heterogeneous than eddies and riffles and this could explain the larger number of species. The Clench's model explains better the data. Additionally, we used the slope of cumulative number of species curve for assessing completeness of the RP list. CCA was significant, with pH, autumn, shoreline and riffles the most important variables. This means that species variation is related to physicochemical, temporal and strata conditions in RP." (Authors)] Address: Gomez-Anaya, J.A., Instituto de Ecología, A.C., Apartado Postal 63, MX-91070, Xalapa, Veracruz, Mexico. E-mail: antonio.gomez@inecol.edu.mx
- 9815.** Gonzalez-Tokman, D.M.; Gonzalez-Santoyo, I.; Lanz-Mendoza, H.; Cordoba Aguilar, A. (2010): Territorial damselflies do not show immunological priming in the wild. *Physiological Entomology* 35(4): 364-372. (in English) ["Adaptive immunity allows vertebrates to gain protection against repeated pathogenic infections. Analogous responses (priming) have been recently uncovered in invertebrates. However, whether such responses are widespread is not known. The present study investigated the presence of immunological priming in males of a species whose phylogenetic position places it in one of the less derived insect orders. It is hypothesized that the efficiency of such a response could be related to animal condition, as assessed by the expression of a sexually selected ornament. *Hetaerina americana* Fabricius (Odonata: Calopterygidae) males bear a conspicuous ornament (a red wing spot), which is evolutionarily maintained via male territorial competition. Using field-collected animals, a group of males is challenged with bacteria before exposure to a higher dose of the same or a different bacteria, and survival is compared with that of infected males not previously challenged, as well as control groups. Gram-positive and Gram-negative bacteria are used. To explore how long priming may take to work, the second exposure is carried out either after 1 or 5 days. Red spot and body size are entered in the analysis as predictors of survival within and between groups. There is no difference in survival among groups, which suggests no priming effect. Overall, red spot and body size are not consistent in explaining survival." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx
- 9816.** Hacker, H.H.; Segerer, A.H. (2010): Herbert K. Pröse (1933-2009). *Beiträge zur bayerischen Entomofaunistik* 10: 1-11. (in German) [H.K. Röse, a well-known specialist in Microlepidoptera and Neuroptera, started his scientific career with some publications on Odonata in Bavaria, Germany.] Address: Hacker, H.H., Kilianstr. 10, 96231 Bad Staffelstein, Germany. E-Mail: hermann-heinrich.hacker@t-online.de
- 9817.** Hämäläinen, M. (2010): Sudenkorentolajien ensilöydöt Suomessa [The discovery of Finnish dragonflies: a chronological list.]. *Crenata* 3(1): 2-7. (in Finnish with English summary) ["The history of the discovery of the Finnish dragonfly fauna is briefly outlined. The first dragonfly record from Finland was published by Pehr Adrian Gadd in 1751. Gadd's brief Latin and Swedish descriptions fits the male of *Leucorrhinia rubicunda* well. The next author Johan Julin (1792, 1803) listed 10 species from northern Finland. Edvard Hisinger (1861) published the first synopsis of Finnish dragonflies, totalling 35 species. In the 20th century, knowledge of the local fauna started to increase due to the activity of K.J. Valle, who, beside research papers and notes, also authored two national guide books (1922, 1952). The publication of Sami Karjalainen's acclaimed book on Finnish dragonflies in 2002 increased the number of dragonfly enthusiasts greatly. This led to increasingly better knowledge of the distribution of species and discovery of novelties moving to Finland from south. Table 1 summarizes the number of known species by decade from the beginning of 19th century. Table 2 lists the known 55 Finnish dragonfly species in chronological order based on the publication of the first record and gives relevant references." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 Univ. of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi
- 9818.** Haesloop, U. (2010): Nachweis der Westlichen Geisterlibelle *Boyeria irene* in Norddeutschland. *Lauterbornia* 70: 33-35. (in German, with English summary) ["A larva of the Western Spectre *Boyeria irene* (Fonscolombe, 1838) was caught in 2009-05-26 in the lower part of the Oertze, a tributary of the Aller, which is located in the catchment area of the Weser River. This is the first mentioned record of this Mediterranean species in Northern Germany. Discussion of the circumstances of the finding." (Author)] Address: Haesloop, U., Spezialbüro für gewässerfaunistische Untersuchungen im Norddeutschen Tiefland, Jenaer Str. 10; D-28215 Bremen, Germany. E-Mail: haesloop@freenet.de
- 9819.** Harabiš, F.; Dolný, A. (2010): Ecological factors determining the density-distribution of Central European dragonflies (Odonata). *Eur. J. Entomol.* 107(4): 571-577. (in English) ["Habitat specificity is the most important factor affecting the regional distribution of dragonflies. Nevertheless, species with the highest specificity are not always the scarcest. Several important determinants of dragonfly density-distribution relationships were identified. Altitude preference and altitude range

are significantly associated with dragonfly distribution. Some of the species that are habitat specialists but occur over a wide range of altitudes should be classified as rare but not endangered. This very simple principle is based on the assumption that habitat specialists have a very limited number of suitable biotopes. Obviously, dragonflies with a marginal distribution prefer a narrow range of altitudes (especially in terms of temperature limitation) and biotopes (effect of biogeography, marginality). Surprisingly, there is no "critical" life stage that is significantly associated with the regional distribution of dragonflies, although most species spend most time in the larval stage. Knowledge of the dispersal ability of particular species is limited, although it could significantly affect species survival and distribution." (Authors)] Address: Harabiš, F., Department of Ecology, Czech University of Life Sciences Prague, Kamycka 129, 165 21 Praha 6 – Suchbátka, Czech Republic. E-mail: harabis.f@gmail.com

9820. Haritonov, A.Yu.; Kiauta, B. (2010): At the centenary of Dr B.F. Belyshev's birth: The impact of his work on Siberian odonatology. *Odonatologica* 39(4): 305-318. (in English) ["A brief appreciation of B.F. Belyshev's (1910-1993) work is presented and its impact on the current development of odonatology in Siberia is outlined. The bibliography (1993-2010, partim) of the members of his "school" is appended." (Authors)] Address: Kiauta, B., *Odonatologica* Editorial Office, P.O. Box 124, NL5854 ZJ Bergen / LB, The Netherlands. E-mail: mbkiauta@gmail.com

9821. Hassall, C.; Thompson, D.J. (2010): Accounting for recorder effort in the detection of range shifts from historical data. *Methods in Ecology & Evolution* 1(4): 343-350. (in English) ["1. Climate-induced range shifts have been detected in a large number of plant and animal taxa and a significant portion of these shifts have been found using records collected over a long period of time. However, the absence of standardized collecting procedures in some historical data sets introduces bias and skew into the data which can result in misleading conclusions. A range of different methods has been employed to account for this heterogeneity, but these methods have yet to be compared using a single data set. 2. We tested the accuracy of published methods for accounting for this heterogeneity. An extensive, heterogeneous data base of sightings of Odonata from the United Kingdom was analysed using four published methods to control for uneven recorder effort. For each method, five different range statistics were calculated. The results were compared and tested against changes in temperature over time to select the most accurate method. 3. Significant variation existed between results derived using different methods to account for uneven recorder effort. Range statistics were also shown to exhibit different biases to varying recorder effort, particularly those most commonly used in published studies. 4. A combination of existing methods is recommended to control for temporal variation in recorder effort. This focuses on random resampling of the more heavily recorded time period. A novel range statistic based on a gamma frequency distribution, which avoids the inherent bias of existing statistics, is suggested as a descriptor for range margins. 5. When the most robust methods to control for uneven recorder effort were combined with the most robust range statistics describing the range shift, British Odonata as a group were shown to be tracking isotherms between 1960 and 2005. 6.

Accurate description of past range shifts is essential for correct predictions of future trends and for making decisions concerning conservation priorities. We strongly recommend the use of the best performing methods outlined here to ensure consistency and accuracy in future studies." (Authors)] Address: Hassall, C., Department of Biology, Carleton University, Ottawa, ON, Canada K1S 5B6. E-mail: chassall@connect.carleton.ca

9822. Hertzog, M. (2010): Beobachtung eines frisch geschlüpften Weibchens von *Boyeria irene* am Seerhein (Odonata: Aeshnidae). *AGBU e.V. (Arbeitsgruppe Bodensee-ufer)* – Thema des Monats November 2010 – www.bodensee-ufer.de: 3 pp. (in German) [17-VIII-2007, Gottlieben, Kanton Thurgau, Switzerland] Address: Manfred Hertzog, M., Rebhaldenstr. 19, CH-596 Scherzingen, Switzerland. E-mail: mhertzog@bluewin.ch

9823. Hilling, B. (2010): Beautiful Demoiselle *Calopteryx virgo* resting with wings spread. *Atropos* 41: 57- [Verbatim: "On 17 May 2009 at Swallowfield, along the River Loddon south of Reading, I found a *C. virgo* resting with its wings open. It sat for some 30 minutes in this position, allowing photographs to be taken. Normally, of course, both species of demoiselle occurring in Britain rest with their wings characteristically folded above the body. It was a rather cold, mainly cloudy and occasionally wet day. In the first photographs the tip of one of the wings was obscured by a leaf; hoping to get better pictures I gently blew on the damselfly whereupon it closed its wings. To my great surprise a minute or so later it spread its wings as illustrated here, maintaining this position some further 25 minutes. Only when a very short interlude of sunshine came along did the insect fly."] Address: Hilling, B., 28 Hampton Road, Worcester Park, Surrey, KT4 8ET, UK

9824. Hoffmann, J. (2010): Do climate changes influence dispersal and population dynamics of dragonflies in the western Peruvian Andes? *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 47-72. (in English) ["For nine dragonfly species (five aeshnids and four libellulids) all previous and verifiable data are related to the vertical climate zones and nature regions of the western Peruvian Andes and the Peruvian Pacific coast. Climate changes due to the El Niño and La Niña phenomena, as well as the global climate change have an influence on the different natural regions and also restrict aquatic biotopes. These changes influence the dispersal and behavior of some dragonflies and concern also loss of habitats as well as alterations of biotic and abiotic factors at and in water. However new waters and habitats also are formed in most nature regions. Specialists like *Rhionaeschna peralta*, a species of high mountain regions and the Puna, are not able to react to habitat losses by adaptation, while other species such as *R. maita* and *R. marchali* do colonize new habitats also in higher altitudes. While the here represented aeshnids change their distribution ranges within the vertical nature regions of the west Andes, this is suspected for three of the four libellulids (*Orthemis ferruginea*, *O. discolor* and *Pantala flavescens*) as latitudinally respectively longitudinally immigrations and expansions of their areals. For all species discussed, a seasonally earlier flight beginning is detectable, but for no species an extension of their flight time. Altogether, the above named three libellulid do react more flexibly and faster to the alterations by climate changes than the majority of the five aeshnid species. The influence of increased

UV-B and UV-A radiation possibly affects also the site occurrence of some species in high altitudes of the Andes." (Author)] Address: Hoffmann, J., Alauda, Wendenstr. 435, D-20537 Hamburg, Germany. E-mail: hoffmann.joa@t-online.de

9825. Holmes, P. (2010): Seasons' Summary. East Keswick Wildlife Trust Newsletter 35: 2. (in English) [East Keswick, Leeds, West Yorkshire, England. "A notable addition to the species of the Parish is that of *Orthetrum cancellatum*. One was seen on the bridle path down to the river and a group of about 25 were found at a pond on land owned by David Cook (permission had been given). This dragonfly is unusual in that it prefers bare ground on which to perch rather than prominent branches and twigs. Their usual range is south of The Wash with scattered populations up to the Humber so our sightings have confirmed its expansion northwards. Other species seen were Southern Hawker, a few of which were emerging from the Hirsts' garden pond, Emperor Dragonfly, Brown Hawker, 4-spot Chaser, Blue-tailed Damselfly, Common Blue and Azure Damselfly. During the day of the survey we did not visit Ox Close so did not see the Banded Demoiselles which had made their usual spectacular appearance." (Author)] Address: E-mail: paul@ox-close.co.uk

9826. Holomuzki, J.R.; Klarer, D.M. (2010): Invasive reed effects on benthic community structure in Lake Erie coastal marshes. *Wetlands Ecol. Manage.* 18: 219-231. (in English) ["We examined how dominance (% canopy cover) and invasion history of common reed, *Phragmites australis*, affected benthic macroinvertebrate diversity and density in 8 marshes along Lake Erie's southern shoreline. We also compared macroinvertebrate densities among patches (0.25 m²) of reed, cattail (*Typha* spp.), and native flora (e.g., *Sagittaria*, *Sparganium*) and epiphytic algal communities on submerged stems of reed and cattail. Narrow-leaf cattail (*T. angustifolia*) is also a common invasive plant to these wetlands, but does not greatly change plant community composition or ecosystem conditions like reed. Macroinvertebrate diversity (Shannon-Weaver H₀) was positively related to reed cover and was highest (4.6) in two marshes with *35- and 5-year invasion histories. Shading from high reed cover increased H₀-diversity, in part, by reducing the abundance of floating duckweed, which harboured many *Hyalella azteca* amphipods. Percent Ephemeroptera, Odonata, and Trichoptera was low to moderate across marshes, regardless of reed cover and invasion history. Macroinvertebrate density was not affected by reed cover or average plant stem density, and did not differ among plant types. However, epiphyton densities and % diatoms were greater on reed than on cattail, suggesting reed provides a better feeding habitat for microalgal grazers than *Typha*. Abundance rankings of common species in these diatom-dominated communities were also typically dissimilar between these plant types. Although % grazers was unrelated to epiphyton densities and % diatoms, grazer identity (snails) differed between natural and diked marshes, which had different microalgal food supplies. Our findings suggest that *Phragmites* does not necessarily adversely affect macroinvertebrate community structure and diversity and that invasion history alone has little effect on the H₀-diversity–reed dominance relationship." (Authors) Dominant odonates were *Anax junius*, *Drury*, *Ischnura verticalis*, and *I. posita*.] Address: Holomuzki, J.R., Department of Evolution, Ecol-

ogy, and Organismal Biology, Ohio State University, 1760 University Drive, Mansfield, OH 44906, USA. E-mail: holomuzki.3@osu.edu

9827. Huang, D.-Y.; Petrulevicius, J.F.; Nel, A. (2010): New morphological data from the Jurassic of Inner Mongolia confirms the damselfly aspect of *Protomyrmeleontidae* (Insecta: Odonatoptera). *Eur. J. Entomol.* 107(4): 615-620. (in English) ["*Protomyrmeleon daohugouensis* sp. n. and *Protomyrmeleon lini* sp. n., two new species of *Protomyrmeleontidae* from the Middle Jurassic of Jiulongshan Formation are the first Chinese representatives of this Mesozoic odonatopteran family. The type specimen of *P. lini* is exceptionally well preserved, showing several particular wing and body structures that were unknown, viz. unique shape of tarsal claws, extreme thoracic skewness, presence of three pairs of long spurs on all femora and tibiae. The type "A" (sensu Nel et al., 2005) of wing venation (i.e. with a very long bridge between IR₂ and RP_{3/4}) corresponds to that of the *protomyrmeleontid* fore wing. The nearly complete absence of the meso-metathoracic interpleural suture, newly discovered in the *Protomyrmeleontidae*, can be considered as a synapomorphy of the clade *Protozygoptera* + *Odonata*." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

9828. Hunt, R.J.; Swift, M.C. (2010): Predation by larval damselflies on cladocerans. *Journal of Freshwater Ecology* 25(3): 345-351. (in English) ["We quantified the strike and capture efficiency, handling time, and functional response of *Enallagma hageni* and *Ischnura verticalis* larvae feeding on several sizes of the cladocerans *Polyphemus pediculus*, *Daphnia pulex*, and *Holopedium gibberum*. Both species were most efficient at capturing and ingesting *P. pediculus*, the smallest and most vulnerable prey, followed by *D. pulex*, a larger, faster prey. *H. gibberum* was rarely eaten due to a protective gelatinous sheath. The handling time was shortest for *P. pediculus* and longest for *D. pulex* due to a combination of size and carapace protection. Both damselfly species exhibited a Type II functional response with a maximum of 20-30 prey eaten per hour. Both *E. hageni* and *I. verticalis* larvae are efficient predators that selectively capture *P. pediculus* and small *D. pulex*; they avoid *H. gibberum*. Due to this differential predation, these larvae may substantially alter zooplankton community composition." (Authors)] Address: Swift, M.C., Dept of Biology, St. Olaf College, Northfield, Minnesota 55057 USA. E-mail: swift@stolaf.edu

9829. Johnson, J. (2010): *Ischnura barberi* (Desert Forktail) found in Oregon. *Argia* 22(4): 4-5. (in English) [18-IX-2010, Borax Lake, Harney County, Oregon, USA] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

9830. Johnson, J. (2010): Using wing vein coloration to identify *Argia agrioides* (California Dancer) and *A. nahuana* (Aztec Dancer). *Argia* 22(4): 19-20. (in English) ["Recently, I discovered what appears to be another helpful character for identifying both males and females of these species in the field or in good quality, well-exposed photos. On *nahuana*, the subcosta, radius anterior, radius posterior first branch, and cubitus are noticeably paler (light brown or golden) than other major veins. In particular, the pale subcosta and radius anterior contrast with the darker costa, and especially compared with the costa proximal to the nodus (some-

times more obvious, sometimes more subtle — possibly depending on the angle and lighting). On agrioides the wing veins are relatively uniform in tone without any contrastingly pale veins, or if there is any difference in tone, the costa is paler than the other veins." (Author)] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

9831. Johnson, J. (2010): A nymph found out of water. *Argia* 22(4): 18-19. (in English) [Libellula cf quadrimaculata was found crawling out of water at Great Meadow near Lake of the Woods, Klamath County, Oregon, USA, 20-VIII-2010.] Address: Johnson, J., 3003 Unander Av., Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

9832. Johnson, P.T.; Bowerman, J. (2010): Do predators cause frog deformities? The need for an eco-epidemiological approach. *Journal of Experimental Zoology Part B: Molecular and Developmental Evolution* 314B(7): 515-518. (in English) ["Renewed controversy has emerged over the likely causes and consequences of deformed amphibians, particularly those with missing limbs. The results of a series of experiments by Balengée and Sessions (2009) implicate aquatic predators (i.e. dragonfly larvae) in causing such abnormalities. Skelly and Benard (2010), however, argued that the small scale of these experiments and the absence of a correlation between predator abundance and deformity frequencies in natural amphibian populations undermine such a conclusion. Drawing upon our experiences with frog malformations, we suggest that the study of amphibian deformities has been hindered by two, inter-related problems. First, empirical studies often fail to critically define the expected baseline level of abnormalities and differentiate between "epidemic" and "endemic" frequencies of malformations. Second, recognizing the likelihood of multiple causes in driving amphibian malformations, continued research needs to embrace a "multiple lines of evidence" approach that allows for complex ethologies by integrating field surveys, diagnostic pathology, comparative modelling, and experiments across a range of ecological scales. We conclude by highlighting the results of a recent study that uses this approach to identify the role of aquatic predators (i.e., fishes and dragonflies) in causing high frequencies of deformed frogs in Oregon. By combining long-term data, comparative data and mechanistic experiments, this study provides compelling evidence that certain predators do cause deformities under ecologically relevant conditions. In light of continuing concerns about amphibian deformities and population declines, we emphasize the need to integrate ecological, epidemiological, and developmental tools in addressing such environmental enigmas." (Authors)] Address: Pieter T.J. Johnson, Ecology and Evolutionary Biology, University of Colorado, Ramaley N122, Campus Box 334, Boulder, CO 80309. E-mail: pieter.johnson@colorado.edu

9833. Juutinen, R. (ed.) (2010): Restoration decision-making in boreal spring complexes – an assessment of insect fauna and summary of the whole project. *Metsähallituksen luonnonsuojelujulkaisu*. Sarja A 193: 133 pp. (in Finnish, with Swedish and English summaries) ["Restoration of springs has been evoked as a tool for enhancing the natural state of disturbed springs. However, preliminary vegetation mapping as well as research and monitoring concerning restoration of springs has thus far been scarce. At 2008 Metsähallitus Natural Heritage Services launched a pilot project aiming to as-

sess the flora and fauna, natural state and restoration needs of 30 spring complexes. This publication presents the results for insect fauna and recommendations for restoration. In the first part of this publication it is assessed whether the natural state of a spring complex affects the overall abundance of individuals, species diversity, community structure and conservation value based on adult aquatic insects and/or semiaquatic flies. In addition, the chosen response variables are compared between aquatic insects and semiaquatic flies. Naturalness was not found to be among the most important factors affecting the overall abundance of individuals, species diversity, community structure and conservation value based on adult aquatic insects and/or semiaquatic flies. The spring complexes with highest conservation value were partially different, when based on aquatic insects or semiaquatic flies. The most important conclusion concerning restoration decision-making is that even seriously disturbed spring complexes can harbour valuable, endangered species. And, on the other hand, pristine spring complexes can be species-poor and harbour no taxa with high conservation value. In the second part, restoration needs and possibilities of the studied spring complexes based on flora and fauna, and other field data and subsequent analyses are assessed for each study site. Sites are presented in detail with maps and factors affecting restoration are discussed. Also, the required conservation measures concerning endangered or otherwise valuable species are stated. One aim of this project was to make possible a thorough and scientific monitoring of restoration success. Methods used are documented in detail and planned so that they can be accurately repeated. Species surveys conducted in 2008 thus serve as a baseline survey before restoration." (Author) *Coenagrion hastulatum*, *C. johanssoni*, *C. lunulatum*, and *Leucorrhinia dubia* were sampled at very few localities and in very small abundances.] Address: Juutinen, R., Metsähallitus, luontopalvelut, Finland. E-mail: riikka.juutinen@metsa.fi

9834. Karjalainen, S. (2010): *Suomen Sudenkorennot (The Dragonflies of Finland)* (2nd edition, 2010). ISBN-13: 9789513154257: 239 pp. (in Finnish) ["The new edition of the book covers all the 55 species of dragonfly recorded in Finland, of which 54 were observed in the field and photographed by the author over a period of more than 15 years. All the insects were photographed free in the wild. The first part of the book provides a broad general introduction to dragonfly life. In the main part of the book, a double page spread is reserved for each of the 55 local species. On the left page is one full page photo and on the right 1-2 smaller photos, distribution map, diagrams showing flight season and size and a brief text giving identification characters, habitats and habits. Brief instructions are given in English to help interpret data given in specific accounts. This revised edition includes updated maps and photos along with new information gathered since the publication of the original book." (Publisher)] Address: Karjalainen, S., Neidonpuistontie 6 D 8, FI-02400 Kirkkonummi, Finland. Email: sk@korento.net

9835. Kharitonov, A.; Eremina, E.E. (2010): Dragonflies (Odonata) of the Southern Urals - the experience of regional faunistic studies. *Eurasian Entomological Journal* 9(2): 263-271. (in Russian, with English summary) ["The results of long-term faunistic research on South Ural dragonflies are summarized. Data on the

abundance, occurrence, flight period and biotopical distribution of 69 species are provided. It is concluded that the structure of this regional odonate fauna has been markedly changed over time, especially in recent years." (Authors)] Address: Eremina, Ekatherina, Post Box 2775, Chelyabinsk 454014 Russia. E-mail: karmiska@mail.ru

9836. Khrokalo, L. (2010): Expansion of *Crocothemis erythraea* in Ukraine. *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 211-223. (in English) ["A noticeable expansion of some Mediterranean species takes place in Europe during last several decades and this data are related to climatic effects clearly. The present work is a review of literature and original data on distribution of *C. erythraea* in Ukraine. In the beginning and middle of XX century in Ukraine *C. erythraea* was observed in southern area at Dnieper valley, in outmost southwest at Danube delta at the west of Ukraine in Transcarpathian and Forecarpathian. Next, this species was registered at the foothills of Carpathian Mountains. During last three decades *C. erythraea* was also recorded at the north and east (central regions, eastern, northern and northeastern areas). Since 2000 new points have been registered in Odessa, Kherson, Vinnytsya, Cherkasy, Chernihiv, Kyiv administrative regions and in Crimea." (Author)] Address: Khrokalo, Lyudmila, P.O. Box 16, Kyiv-118, Ukraine 03118. E-mail: lkhrokalo@mail.ru

9837. Kipping, J. (2010): *Lestinogomphus silkeae* sp. nov. from the Okavango and Zambezi Rivers (Odonata: Gomphidae). *International Journal of Odonatology* 13(2): 255-265. (in English) ["*Lestinogomphus silkeae* sp. nov. from the northern Okavango Delta in Botswana, the Kavango River in northern Namibia and the middle Zambezi River in Zimbabwe is described and illustrated (holotype male: Botswana, Xaro Lodge, 09 vi 2000, dep. at ZMBH). The shape of the male appendages distinguishes this species from all others in the genus. The new species is compared with the widespread type species of the genus, *L. angustus*." (Author)] Address: Kipping, J., Naturkundliches Museum 'Mauritianum' Altenburg, Parkstrasse 1, 04600 Altenburg, Germany. E-mail: kipping@mauritianum.de

9838. Kita, H. (2010): Charm of dragonflies. *Japic News* 313: 8-9. (in Japanese) [Verbatim: "Now the season of fresh green is coming. I like it so much. The season is also the one for rice sprouts and for rice planting. And in the season we see various insects in neighbouring nature, ponds and streams. Among them dragonflies are popular insects and here I will tell you about them. I have been engaged in public information in a pharmaceutical company. My job is to publicize charmingly correct and useful information to people. And I am very pleased if I can tell you a charm of dragonflies. I am a member of The Japanese Society for Odonatology, and have been studying the ecology of dragonflies, traveling from the north, Hokkaido, to the south of Iriomote Island or the Ogasawara Islands, almost all over Japan for taking photographs of them in nature. Japan is a long and narrow mountainous island, however, it is rich in water, and about 200 odonatas inhabit it. At Shiretoko I chased species of cool region being frightened of bears, and landed on a desert island of Ogasawara in a small boat and photographed an indigenous species there. As mentioned above, I am continuing travel for dragonflies besides working in a pharmaceutical company. It may be my life work. What makes me so much be interested in dragonflies? I think it is the

flight of them. The dragonfly is an insect with excellent flight ability. In Japan tomo is derived from "tobu bou", "tobu": to fly, and "bou": a stick that is a flying stick. Most of the life of dragonflies, though it varies by the species, is occupied by flight behaviour. Some dragonflies fly at a flight speed of more than 100 km/h, and they can catch preys in the air as well as they can fly so far a distance, and can copulate and lay eggs in the air and can hover or can turn a somersault so skillfully. The present day aerodynamics is not a match for their flight technique. The secret is due to the mechanism of the flight muscles and the wings. They have four thoracic muscles with each wings directly attached to it, and they can move them separately, different from other insects, therefore, they can fly straight without up and down movement like butterflies. Also the beautiful water habitat of them is attractive. In this season I am relieved with a sound of streams in neighbouring nature, and when a dragonfly will appear at such a scene, it will be much more the best. Thus, I cannot tell you all of the charms of dragonflies. Photographing dragonflies is my pleasure and expression of the charm of them. In my boyhood, I used reflex cameras with micro-lenses. But now, digital cameras became widespread. If you want to take ecological photos of dragonflies, you are required to use a digital reflex camera with a few conversion lenses of a micro 100 mm a wide lens, a fish-eye lens and a stroboscope. These apparatuses made us everybody enjoy readily insect photographing now. Since ancient times of Emperor "Jinmu" our land was called "Akitsu-shima". Akitsu is an old name of dragonfly, and its origin is when Emperor Jinmu looked out over the land from the hill of Asuka, it resembled the shape of copulation by dragonflies, or a lot of swarms of dragonflies were seen. Also, according to Kojiki, when Emperor Yuryaku visited Yoshino for hunting, a horsefly stung his arm, a dragonfly caught it and preyed. Then, he praised the dragonfly so much, and thereafter, dragonflies were called "kachi-mushi"; insect of victory, and became a representative of lucky insects. Dragonflies have been used for one of old wife's remedy, effects of whooping cough, tonsillitis and asthma. Kuro-yaki, char, and decoction are said to be useful for the effects. The species for it is said to be aka-tombo, *Sympetrum* species. Dr. Ogata, Akira, former president of The Pharmaceutical Society of Japan had investigated whether kuro-yaki of aka-tombo included the effect of sedation or not. He roasted aka-tombo at temperatures 200-300 degrees C for 34 hours, and then, after extraction by alcohol, he refined it, which had an effect of sedating the cramp of the muscle of the bronchi. He noticed that old wife's remedy was effective. Also, dried *Orthetrum* species seems to have been used for a tonic in Taiwan and China. Moreover, we might have used dragonflies for food according to a survey in the Taisho era (1910's). We ate insects such as locusts and larvae of wasps from long time ago, so dragonflies might have been an important source of protein. When people of ancient times saw aka-tombo flying in tandem over the rice paddies in the harvest time of autumn, they might have felt as if the aka-tombo delivered the harvest to them. Dragonflies were very familiar insects for us from ancient times. I hear the most popular children's song is "Aka-tombo" and the important and typical scenery of Japan for us seems to be aka-tombo perching on the harvested ears of rice. However, recently it is often said that dragonflies decreased. Now water environment was contaminated and beautiful water edges are being lost by exploitation here and there in Japan. Larvae of

dragonflies are underwater dwellers, and when the suitable water environment is lost, they cannot live. I experienced often that nice habitats were lost in a few years. The extremely decreasing of dragonflies may be largely due to the change of water environment. It is doubtful whether we can live in such an environment or not, where dragonflies cannot live as well as such scenery as that relieve us is lost. Dragonflies and nature seem to warn us." (Translation: Naoya Ishizawa)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan.

9839. Klausnitzer, B. (2010): Entomologische Schulen in der Oberlausitz - Ergebnisse vorbildlicher, bis heute wirkender Freizeitforschung. Berichte der Naturforschenden Gesellschaft der Oberlausitz 18: 21-42. (in German) [Michael Rostock is the most prominent regional odonatologist at the end of the 19th and beginning of the 20th century in Sachsen, Germany.] Address: Klausnitzer, B., Lannerstr. 5, 01219 Dresden, Germany

9840. Klausnitzer, H. (2010): Bericht über die 18. Tagung Sächsischer Entomologen. Entomologische Nachrichten und Berichte 54(3/4): 174. (in German) [The report includes a note on the lecture of Thomas Brockhaus on *Somatochlora alpestris* and reasons of its occurrence in the Erzgebirge-mountains, Sachsen, Germany.] Address: Klausnitzer, Hertha, PF 202731, 01193 Dresden, Germany

9841. Kleinsteuber, W. (2010): Zur aktuellen Verbreitung der Grundwanze *Aphelocheirus aestivalis* (Fabricius, 1794) in Thüringen (Heteroptera: Aphelocheiridae). Mitteilungen des Thüringer Entomologenverbandes 17 (1/2): 2-10. (in German) [Along four rivers (24 sampling sites) in Thüringen, Germany, the distribution of the heteropteran *Aphelocheirus aestivalis* was studied. Sampling also resulted in locating many macroinvertebrate species, including *Calopteryx splendens*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Platycnemis pennipes*.] Address: Kleinsteuber, W., Hirtenweg 15, 04425 taucha, Germany. E-mail: aquahet@gmx.net

9842. Koehler, G.; Frey, W.; Hauptlorenz, H.; Schindler, H. (2010): Konzept zur ökologischen Bewertung und Entwicklung der Wooge im Biosphärenreservat Pfälzerwald. Berichte des Fachgebietes Wasserbau und Wasserwirtschaft der TU Kaiserslautern 20: 312 pp. (in German) [Rheinland-Pfalz, Germany; Odonata are treated on pages 122 - 139.] Address: Koehler, G., FG Wasserbau und Wasserwirtschaft, Technische Universität Kaiserslautern, Paul-Ehrlich-Straße 14, 67663 Kaiserslautern, Germany

9843. Kohl, S. (2010): Binsenjungfer-Weibchen (*Lestes sponsa*) überfällt Paarungsrad der Zwerglibelle (*Nehalennia speciosa*). *mercuriale* 10: 49-50. (in German) [Switzerland, 3-VII-2010: Predation by a female *Lestes sponsa* on a copulating pair of *Nehalennia speciosa*.] Address: Kohl, S., Fuchsgasse 5, CH-8610 Uster, Switzerland. E-mail: stefan.kohl@bluewin.ch

9844. Kohler, N. (2010): Recent discoveries in Montana. *Argia* 22(4): 5-8. (in English) [Montana, USA; Records of the following species are documented and discussed: *Ischnura damula*, *Argia apicalis*, *A. moesta*, *A. immundum*, *Macromia pacifica*, *Calopteryx aequabilis*, *Lestes forcipata*, *Aeshna subarctica*, *Somatochlora ensigera*.] Address: Kohler, N.S. E-mail: nskohler@bresnan.net

9845. Kondratieff, B.C.; Durfee, R.S. (2010): Aquatic Insects (Ephemeroptera, Odonata, Hemiptera, Coleoptera, Trichoptera, Diptera) of Sand Creek Massacre National Historic Site on the Great Plains of Colorado. *Journal of the Kansas Entomological Society* 83(4): 322-331. (in English) ["The Great Plains of Colorado occupies over two-fifths of the state, yet very little is known about the aquatic insects of this area. This paper reports on the aquatic insects found in temporary and permanent pools of Big Sandy Creek within the Sand Creek Massacre National Historic Site, on the Great Plains of Colorado. A total of 107 distinguishable taxa were collected representing six orders and 27 families of insects. The orders Coleoptera (39% or 42 taxa), Diptera (23% or 25 taxa), and Odonata (21% or 23 species) dominated this site. Most of these taxa are geographically widespread and considered common." (Authors)] Address: Kondratieff, B.C., Colorado State University, Department of Bioagricultural Sciences and Pest Management, Fort Collins, CO 80523-1177, USA

9846. Langheinrich, U.; Braumann, F.; Lüderitz, V. (2010): Niedermoor- und Gewässerrenaturierung im Naturpark Drömling (Sachsen-Anhalt). *Waldökologie, Landschaftsforschung und Naturschutz* 10: 23-29. (in German, with English summary) [oas 30, "The Drömling Natural Park is the largest fen area in Central Germany. The management and development plan defines the re-wetting of fens, the preservation and development of extensively used wetlands and the improvement of the ecological status of water bodies as the main aims. In 11 areas, re-wetting already started or will start in the near future. Habitat quality of canals and ditches was enhanced by building shallow water zones and careful management. Function of canals and ditches changes stepwise from drainage to irrigation. Furthermore, new shallow ponds were created. This contribution presents examples for implementation of measures and first results of scientific evaluation. All the measures help to maintain and enhance aquatic and amphibic biodiversity and conservation value. A high total number of species correlates well with the occurrence of endangered species. 50 of such Red Lists species (including 14 Odonata species) were found among aquatic macroinvertebrates and 20 among aquatic macrophytes. These values are above average compared to other fens in Germany. However, the maintenance of diverse landscape and water body structure demands high management efforts. A rising problem for native diversity is the appearance of invasive neozoons." (Authors)] Address: Langheinrich, Uta, Hochschule Magdeburg-Stendal, FB Wasser- und Kreislaufwirtschaft, Breitscheidstr. 2, 39114 Magdeburg, Germany. E-mail: uta.langheinrich@hs-magdeburg.de

9847. Leipelt, K.G.; Suhling, F.; Gorb, S.N. (2010): Ontogenetic shifts in functional morphology of dragonfly legs (Odonata: Anisoptera). *Zoology* 113: 317-325. (in English) ["Anisopteran leg functions change dramatically from the final larval stadium to the adult. Larvae use legs mainly for locomotion, walking, climbing, clinging, or burrowing. Adults use them for foraging and grasping mates, for perching, clinging to the vegetation, and for repelling rivals. In order to estimate the ontogenetic shift in the leg construction from the larva to the adult, this study quantitatively compared lengths of fore, mid, and hind legs and the relationships between three leg segments, femur, tibia, and tarsus, in larval and adult Anisoptera of the families Gomphidae, Aeshnidae, Cor-

dulegastridae, Corduliidae, and Libellulidae, represented by two species each (*Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Cordulegaster insignis*, *C. picta*, *Orthetrum cancellatum*, *Sympetrum sanguineum*, *Cordulia aenea*, *Somatochlora metallica*, *Aeshna cyanea*, and *Anax imperator*). We found that leg segment length ratio as well as ontogenetic shift in length ratios was different between families, but rather similar within the families. While little ontogenetic shift occurred in Aeshnidae, there were some modifications in Corduliidae and Libellulidae. The severest shift occurred in Gomphidae and Cordulegastridae, both having burrowing larvae. These two families form a cluster, which is in contrast to their taxonomic relationship within the Anisoptera. Cluster analysis implies that the function of larval legs is primarily responsible for grouping, whereas adult behavior or the taxonomic relationships do not explain the grouping. This result supports the previous hypothesis about the convergent functional shift of leg characters in the dragonfly ontogenesis." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

9848. Lentink, D.; Jongerius, S.R.; Bradshaw, N.L. (2010): Chapter 14: The scalable design of Flapping Micro-Air Vehicles inspired by insect flight. In: D. Floreano, Zufferey, J.-C.; Srinivasan, M.V.; Ellington, C. (Eds.): *Flying Insects and Robots*. Springer-Verlag Berlin Heidelberg. 1st Edition. 2010, XII, 316 pp. ISBN: 978-3-540-89392-9: 185-205. (in English) ["Here we explain how flapping micro air vehicles (MAVs) can be designed at different scales, from bird to insect size. The common believe is that micro fixed wing airplanes and helicopters outperform MAVs at bird scale, but become inferior to flapping MAVs at the scale of insects as small as fruit flies. Here we present our experience with designing and building micro flapping air vehicles that can fly both fast and slow, hover, and take-off and land vertically, and we present the scaling laws and structural wing designs to miniaturize these designs to insect size. Next we compare flapping, spinning and translating wing performance to determine which wing motion results in the highest aerodynamic performance at the scale of hummingbirds, house flies and fruit flies. Based on this comparison of hovering performance, and our experience with our flapping MAV, we find that flapping MAVs are fundamentally much less energy efficient than helicopters, even at the scale of a fruit fly with a wing span of 5 mm. We find that insect-sized MAVs are most energy effective when propelled by spinning wings. [...] We used dragonfly wings (*Sympetrum vulgatum*) as an inspiration to develop design principles for such stiffer micro-wings with venation-like tear-stoppers." (Authors)] Address: Lentink, D., Experimental Zoology Group, Wageningen University, 6709 PG Wageningen, The Netherlands; Faculty of Aerospace Engineering, Delft University of Technology, 2629 HS Delft, The Netherlands. E-mail: david.lentink@wur.nl

9849. Lin, C.-P.; Chen, M.-Y.; Huang, J.-P. (2010): The complete mitochondrial genome and phylogenomics of a damselfly, *Euphaea formosa* support a basal Odonata within the Pterygota. *Gene* 468(1-2): 20-29. (in English) ["This study determined the first complete mitochondrial genome of a damselfly, *Euphaea formosa* (Insecta: Odonata: Zygoptera), and reconstructed a phylogeny based on thirteen protein-coding genes of mitochondrial genomes in twenty-five representative hexapods to ex-

amine the relationships among the basal Pterygota. The damselfly's mitochondrial genome is a circular molecule of 15,700 bp long, and contains the entire set of thirty-seven genes typically found in insects. The gene arrangement, nucleotide composition, and codon usage pattern of the mitochondrial genome are similar across the three odonate species, suggesting a conserved genome evolution within the Odonata. The presence of the intergenic spacer s5 likely represents a synapomorphy for the dragonflies (Anisoptera). Maximum parsimony, maximum likelihood, and Bayesian analyses of both nucleotide and amino acid sequences cannot support the three existing phylogenetic hypotheses of the basal Pterygota (Palaeoptera, Metapterygota, and Chistomyaria). In contrast, the phylogenetic results indicate an alternative hypothesis of a strongly supported basal Odonata and a sister relationship of the Ephemeroptera and Plecoptera. The unexpected sister Ephemeroptera + Plecoptera clade, which contradicts with the widely accepted hypothesis of a monophyletic Neoptera, requires further analyses with additional mitochondrial genome sampling at the base of the Neoptera." (Authors)] Address: Lin, C.-P., Department of Life Science, Tunghai University, Taichung, Taiwan. E-mail: treehops@thu.edu.tw

9850. Locklin, J.L. (2010): Gregarine parasitism in dragonfly populations of Central Texas with an assessment of fitness costs in *Erythemis simplicicollis*. Ph.D. thesis, Dept. of Biology, Baylor University: XI, 88 pp. (in English) ["Dragonfly parasites are widespread and frequently include gregarines (Phylum Apicomplexa) in the gut of the host. Gregarines are ubiquitous protozoan parasites that infect arthropods worldwide. More than 1,600 gregarine species have been described, but only a small percentage of invertebrates have been surveyed for these apicomplexan parasites. Some consider gregarines rather harmless, but recent studies suggest otherwise. Odonate-gregarine studies have more commonly involved damselflies, and some have considered gregarines to rarely infect dragonflies. In this study, dragonfly populations were surveyed for gregarines and an assessment of fitness costs was made in a common and widespread host species, *Erythemis simplicicollis*. Adult dragonfly populations were surveyed weekly at two reservoirs in close proximity to one another and at a flow-through wetland system. Gregarine prevalences and intensities were compared within host populations between genders, among locations, among wing loads, and through time. Host fitness parameters measured included wing load, egg size, clutch size, and total egg count. Of the 37 dragonfly species surveyed, 14 species (38%) hosted gregarines. Thirteen of those species were previously unreported as hosts. Gregarine prevalences ranged from 2% – 52%. Intensities ranged from 1 – 201. Parasites were aggregated among their hosts. Gregarines were found only in individuals exceeding a minimum wing load, indicating that gregarines are likely not transferred from the naiaid to adult during emergence. Prevalence and intensity exhibited strong seasonality during both years at one of the reservoirs, but no seasonal trend was detected at the wetland. The seasonal trend at the reservoir suggests that gregarine oocyst viability parallels increasing host population densities and may be short-lived. Prevalence and intensity also differed between dragonfly populations at the locations. Regression analyses revealed that host species, host gender, month, and year were significant explanatory variables related to grega-

rine prevalence and intensity. The fitness parameters measured were not correlated with presence or intensity of gregarines, suggesting that either gregarines do not affect wing loading and egg production in *E. simplicicollis*, or that virulence depends on parasite intensity and/or the specific gregarine species infecting the hosts. Our results emphasize the importance of considering season, hosts, and habitat when studying gregarine-dragonfly ecology." (Author)] Address: Locklin, J.L., Department of Biology, Baylor University, One Bear Place 76798, Waco, TX 97388, USA. E-mail: jasonlocklin@baylor.edu

9851. Locklin, J.L.; Vodopich, D.S. (2010): Eugregarine parasitism of *Erythemis simplicicollis* (Say) at a constructed wetland: A fitness cost to females? (Anisoptera: Libellulidae). *Odonatologica* 39(4): 319-331. (in English) ["Eugregarine parasites infect a wide variety of invertebrates. Some authors suggest that eugregarines are rather harmless, but recent studies suggest otherwise. Among odonate-eugregarine investigations, Zygoptera have been more frequently studied than Anisoptera. Adult dragonfly populations were surveyed for eugregarines at a constructed, flow-through wetland system and the fitness cost of infection was assessed in a common and widespread dragonfly host species, *E. simplicicollis*. Populations were sampled weekly throughout the flight season. Host fitness parameters measured included wing load, egg size, clutch size, and total egg count. Of the 22 host species surveyed, 8 hosted eugregarines and 2 of these odonate species were previously undocumented as hosts. While eugregarine parasitism has been shown to exhibit seasonality, parasite prevalence and intensity in *E. simplicicollis* in this study showed no seasonal trend. The fitness parameters measured were not correlated with the presence or intensity of eugregarines. These findings suggest that either eugregarines do not affect wing loading and egg production in *E. simplicicollis*, or that virulence depends on parasite intensity and/or the specific eugregarine species infecting the hosts." (Authors)] Address: Locklin, J.L., Department of Biology, Baylor University, One Bear Place 97388, Waco, TX 76798, USA

9852. Mabry, C.; Dettman, C. (2010): Odonata richness and abundance in relation to vegetation structure in restored and native wetlands of the prairie pothole region, USA. *Ecological Restoration* 28(4): 475-484. (in English) ["Over the past couple of decades, 2,200,000 ha of wetlands and grasslands have been restored in the prairie pothole region, USA. However, many restored and remnant wetlands in the region are dominated by two invasive plant species, reed canary grass (*Phalaris arundinacea*) and cattail (*Typha* spp.), which form dense monotypic stands. These restorations are usually evaluated as habitat for waterfowl and other birds; however, there is a need to evaluate their success for invertebrates. Odonata are ideal organisms to include in our evaluations of restored wetland habitat quality for both ecological and practical reasons. To examine the association between vegetation structure and odonate assemblages in shoreline vegetation of prairie pothole wetlands, we compared odonate richness and abundance in dense, monotypic stands to that of vegetation with diverse vertical structure. We also observed the use of these two different habitats by odonate species classified as "of conservation concern" in Iowa. Odonate species richness was substantially greater in the mixed-structure vegetation than in monotypic

stands. A similar trend was found in odonate species with a "vulnerable" or "uncommon" conservation status. The number of occurrences of species of conservation concern was four times greater in mixed than in monotypic vegetation. A comparison of our data to those collected in the 1990s for one monotypic vegetation site further supported this conclusion. Many odonate species are targets for conservation and can readily benefit from wetland restoration and reconstruction if the sites are managed for proper vegetation structure." (Authors)] Address: Mabry McMullen, Cathy, Iowa State Univ., Dep.t of Natural Resource Ecology & Management, 339 Science Hall II, Ames, Iowa 50011, USA. E-mail: mabry@iastate.edu

9853. Machado, A.B.M. (2010): *Oxyagrion mirmae* spec. nov. from Brazil (Zygoptera: Coenagrionidae). *Odonatologica* 39(4): 353-356. (in English) ["The new species is described, illustrated and compared with the other 25 congeners. Holotype male: Virginia, Minas Gerais, Brasil, 3-II-2010; deposited in author's collection." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

9854. Mäkinen, J. (2010): Kirja-arvostelu: Sami Karjalainen - Suomen sudenkorennot [Review of new edition of Suomen sudenkorennot (The Dragonflies of Finland) by Sami Karjalainen]. *Crenata* 3(1): 40. (in Finnish) [The publication of the first edition of Suomen sudenkorennot in 2002 raised the interest in dragonflies in Finland enormously. Finnish Dragonfly Society was founded few years later. There are a number of reasons why the publication of new edition is important. The book has been sold out for many years and no other Finnish guides are available. After the publication of the first edition significant changes in Finnish fauna and distribution areas of many species have happened. Also maps and flight charts are updated with new information. The new edition includes 92 new photos and 17 pages more than the first edition. Thirteen species from neighbouring areas are also presented in the book, including all Scandinavian species. All of them are presented with Finnish (vernacular) names for the first time. (Asmus Schröter)] Address: Mäkinen, J. E-mail: makisenjussi@gmail.com

9855. Mäkinen, J. (2010): Sudenkorennoille oma suojelualue [A nature reservation area for dragonflies]. *Crenata* 3(1): 38-39. (in Finnish) ["Finnish Dragonfly Society has started a project, which aims for a nature reservation area for dragonflies. Fundraising has already begun. When enough money has been collected, a bog with a good dragonfly fauna will be bought and then protected." (Asmus Schröter)] Address: Mäkinen, J. E-mail: makisenjussi@gmail.com

9856. Mäkinen, J.; Koskinen, J.; Tuohimaa, J. (2010): Sudenkorentokatsaus 2009 [Dragonfly review 2009]. *Crenata* 3(1): 8-33. (in Finnish with English summary) ["This article presents the most interesting dragonfly records from Finland in 2009. For each observed species the following information is presented: first and last records of the summer, greatest sums and northernmost records. Seven new provincial records were made: *Coenagrion lunulatum* was found for the first time in Keski-Pohjanmaa, *Aeshna crenata* in Pohjois-Savo, *Aeshna viridis* and *Orthetrum coerulescens* in

Uusimaa, *Orthetrum cancellatum* in Pohjois-Karjala and *Leucorrhinia albifrons* in Pohjois-Pohjanmaa. A map of Finnish biogeographical provinces is shown in the end of the article. Table 1 presents the total number of records of each species, as well as their rankings between 2007 and 2009. Most of the records for this article were gathered from Hatikka database (www.hatikka.fi). The records were made by 104 observers. Their names (abbreviations are used for the members of the Finnish Dragonfly Society) are presented in the end of the article." (Authors)] Address: Mäkinen, J. E-mail: makisenjussi@gmail.com

9857. Magoba, R.N.; Samways, M.J. (2010): Recovery of benthic macroinvertebrate and adult dragonfly assemblages in response to large scale removal of riparian invasive alien trees. *Journal of Insect Conservation* 14(6): 627-636. (in English) ["Invasive alien organisms can impact adversely on indigenous biodiversity, while riparian invasive alien trees (IATs), through shading of the habitat, can be a key threat to stream invertebrates. We ask here whether stream fauna can recover when the key threat of riparian IATs is removed. Specifically, we address whether IAT invasion, and subsequent IAT removal, changes benthic macroinvertebrate and adult dragonfly assemblages, for the worse or for the better respectively. Natural riparian zones were controls. There were statistically significant differences between stream reaches with natural, IAT-infested and IAT-cleared riparian vegetation types, based on several metrics: immature macroinvertebrate taxon richness, average score per macroinvertebrate taxon (ASPT), a macroinvertebrate subset (Ephemeroptera, Plecoptera, Trichoptera and Odonata larvae; EPTO), and adult dragonfly species richness. Reaches with natural vegetation, or cleared of IATs, supported greater relative diversity of macroinvertebrates than reaches shaded by dense IATs. Greatest macroinvertebrate ASPT and EPTO were in reaches bordered by natural vegetation and those bordered by vegetation cleared of IATs, and the lowest where the riparian corridor was IATs. Highest number of adult dragonflies species was along streams cleared of dense IATs. Overall, results showed that removal of a highly invasive, dense canopy of alien trees enables recovery of aquatic biodiversity. As benthic macroinvertebrate scores and adult dragonfly species richness are correlated and additive, their combined use is recommended for river condition assessments." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

9858. Maltchik, L.; Stenert, C.; Bender Kotzian, C.; Marques Pires, M. (2010): Responses of odonate communities to environmental factors in southern Brazil wetlands. *Journal of the Kansas Entomological Society* 83(3): 208-220. (in English, with Portuguese summary) ["Odonate larvae play an important role in wetland systems, providing food for many fish species and birds. Besides, they are important predators in these ecosystems. However, studies of factors that determine odonate species richness and distribution in wetlands are scarce in the Neotropical region. The objectives of this study were to: 1) conduct a survey of the diversity of odonate larvae in southern Brazil wetlands, and 2) determine how much variation in odonate richness, abundance and composition is explained by wetland area, altitude, water conductivity and nitrate, hydroperiod, and dominant aquatic vegetation in 140 wetlands in

an extensive area of the Neotropical region (280,000 km², southern Brazil). A total of 4,039 individuals distributed among five families and 28 genera were collected. Libellulidae, Coenagrionidae and Aeshnidae were the families that showed the greatest richness. *Erythrodiplax* was observed in more than 70% of the sampled wetlands, and comprised 61% of individuals collected. Richness was negatively associated with wetland area and nitrate concentration. Odonate abundance was negatively associated with water conductivity and nitrate, and it was higher in aquatic beds than in emergent wetlands. Richness and abundance were higher in permanent than in intermittent wetlands. Variation in odonate composition was correlated with wetland altitude, area and water conductivity. Hydroperiod and dominant aquatic vegetation also influenced composition. Our results showed that southern Brazil wetlands are important habitats for 28 odonate genera, and that richness, abundance and composition are influenced mainly by hydroperiod, nitrate, and aquatic vegetation type. These results should be seen as important to determine the environmental factors that shape and maintain odonate diversity in southern Brazil wetlands." (Authors)] Address: Maltchik, L., Laboratório de Ecologia e Conservação de Ecossistemas Aquáticos, Universidade do Vale do Rio dos Sinos, UNISINOS, Av. Unisinos, 950, CEP 93022-000, Sao Leopoldo, Rio Grande do Sul, Brasil. E-mail: maltchik@unisinos.br

9859. Marrocco, J.; Demasi, L.; Venkataraman, S. (2010): Investigating the structural dynamics implication of flexible resilin joints on dragonfly wings. San Diego State University Access proceedings 10-09: 6 pp. (in English) ["The practical application of relatively small, light weight micro air vehicles by biomimicry is of great interest to the engineering community. The goal of this research project is to improve the understanding of the structural construction of insect wings. A dragonfly insect has been chosen, as it has a very revealing structure and is an insect that has unique flight capabilities. Dragonfly wings are able to withstand the forces imposed upon them by the surrounding air, inertial forces caused by acceleration and decelerating their own weight. The basic design of a dragonfly wing is a pleated membrane stiffened by tubes at the apexes of the pleats, forming a particularly rigid and strong structure. This tubular pleated membrane provides a stiff structure along the length (span wise) direction of the wing and a flexible structure along the width (chord wise direction) of the wing. The tailoring flexibility in the wing is essential as it can play significant role in the aerodynamics wing airfoil shape it can achieve, in addition to the benefits of gust alleviations, and damage tolerance. The investigation into the material composition and architecture on the dragon fly wings revealed that while a large part of the wing structure is made of chitin protein, there is a regular pattern of joints on the wing made of less stiffer resilin protein. The focus of this effort is to understand the effect and implications of the resilin joints on the structural dynamics of the wing. To achieve this goal a finite element structural analysis tool has been used and a detailed model of the dragonfly wing was created. Main focus of the present analysis is to understand how the presence of flexible resin joints affects the natural vibration and mode shapes of the dragonfly wing." (Authors)]; <http://www.csrc.sdsu.edu/csrc/access/reports/AP10-09.pdf>] Address: Marrocco, J., Department of Biology, Department of Aerospace Engineering and Engi-

neering Mechanics, San Diego State University, USA.
E-mail: JosephMarrocco@yahoo.com

9860. Martens, A.; Hazevoet, C.J. (2010): Dragonflies (Insecta, Odonata) of São Vicente, Cape Verde Islands: 10 species on a desert island. *Zoologia Caboverdiana* 1 (2): 112-115. (in English) [Records of the following species are documented and briefly discussed: *Lestes pallidus*, *Ischnura senegalensis*, *Anax ephippiger*, *A. imperator*, *Crocothemis erythraea*, *Orthetrum trinacria*, *Pantala flavescens*, *Sympetrum fonscolombii*, *Tramea limbata*, *Trithemis annulata*, and *Zygonyx torridus*.] Address: Hazevoet, C.J., Instituto de Investigação Científica Tropical - Jardim Botânico Tropical, Unidade de Zoologia, Rua da Junqueira 14, 1300-343 Lisboa, Portugal

9861. Martens, A. (2010): Ecology of the dragonflies at the westernmost spot of Africa, the island of Santo Antão, Cape Verde (Odonata). *International Journal of Odonatology* 13(2): 241-254, pl. IVa. (in English) ["From 12 to 25 August 2009, the odonate fauna of Santo Antão, Cape Verde was surveyed by recording adults and collecting larvae and exuviae at 26 localities, mostly situated in the northwest of the island. Based on the results of this survey and literature data on the Cape Verde it appears that the resident odonate fauna consists of only five species, namely *Anax imperator*, *Crocothemis erythraea*, *Orthetrum trinacria*, *Trithemis annulata* and *Zygonyx torridus*. Three additional species, *Anax ephippiger* and *Pantala flavescens*, which were recorded as single adults in this study, and *Sympetrum fonscolombii*, which was previously recorded in another study, represent seasonal invaders that do not establish permanent populations on the island. Surprisingly, there is no zygopteran species recorded from the island, although a few occur on the neighbouring islands. The breeding habitats of the resident odonates on the island comprise short perennial stream sections in large wadi beds ('ribeiras') that are intensely used for agriculture, as well as artificial irrigation tanks. The odonate assemblage is very uniform, although *Z. torridus* prefers micro-habitats with flowing water and *O. trinacria* is found only in micro-habitats with fine sediments. In the absence of fish, crabs and large water beetles, the larva of *A. imperator* appears to be the top predator in freshwater habitats." (Author)] Address: Martens, A., University of Education Karlsruhe, Bis-marckstraße 10, 76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de

9862. Matthews, J. (2010): Anthropogenic climate change impacts on ponds: a thermal mass perspective. *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 193-209. (in English) ["Small freshwater aquatic lentic systems (lakes and ponds) are sensitive to anthropogenic climate change through shifts in ambient air temperatures and patterns of precipitation. Shifts in air temperatures will influence lentic water temperatures through convection and by changing evaporation rates. Shifts in the timing, amount, and intensity of precipitation will alter the thermal mass of lentic systems even in the absence of detectable ambient air temperature changes. These effects are likely to be strongest in ponds (standing water bodies primarily mixed by temperature changes than by wind), for whom precipitation makes up a large component of inflows. Although historical water temperature datasets are patchy for lentic systems, thermal mass effects are likely to outweigh impacts from ambient air temperatures in

most locations and may show considerable independence from those trends. Thermal mass-induced changes in water temperature will thereby alter a variety of population- and community-level processes in aquatic macroinvertebrates." (Authors) This review includes data on Odonata.] Address: Matthews, J.H., University of Texas, Section of Integrative Biology, Austin, USA. E-mail: johoma@gmail.com

9863. Mauersberger, R. (2010): *Leucorrhinia pectoralis* can coexist with fish (Odonata: Libellulidae). *International Journal of Odonatology* 13(2): 193-204. (in English) ["The Palearctic libellulid *Leucorrhinia pectoralis* is generally considered to be a species inhabiting fish-free water bodies. Yet, a long-term monitoring study of 38 water bodies in NE Germany resulted in 16 species of fish being recorded in reproductive habitats of *L. pectoralis*, with *Rutilus rutilus* and *Carassius carassius* as the most numerous and widespread fish species. Only 14 water bodies were certainly or probably without fish. The seasonal numbers of exuviae of *L. pectoralis* at the water bodies ranged between 0.1 and 136 per 10 m of bank section. The abundance of *L. pectoralis* was higher in fish-free water bodies (an average of 28.0 exuviae/10 m) than in fish-inhabited waters (1.7 exuviae/10 m). The emergence success of *L. pectoralis* depended on the density and species composition of the fish. If only one non-piscivorous fish species (*Carassius carassius*, *Tinca tinca*) was present at low density, the abundance of exuviae averaged 6.5/10 m. In water bodies containing a multispecies fish fauna that included piscivorous species, combined with high fish density only 0.7 exuviae/10 m were found on average. At localities where the fish fauna was dominated by *Perca fluviatilis* virtually no emergence of *L. pectoralis* occurred." (Author)] Address: Mauersberger, R., Prenzlauer Allee 66, 17268 Templin, Germany. E-mail: rue.mau@web.de

9864. Mauersberger, R.; Bukowsky, N. (2010): Moor-Wiedervernässung als Maßnahme zur Grundwasseranreicherung und Hochwasserableitung - Praxisbeispiel aus dem Naturpark Uckermärkische Seen. *Naturschutz und Landschaftspflege in Brandenburg* 19(3/4): 167-169. (in German) [The revitalisation of two bogs in Brandenburg, Germany resulted in a significant increase in population density of *Aeshna viridis* and *Leucorrhinia pectoralis*. No details are given.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerderevereinUeckermark.Seen@t-online.de

9865. Mauersberger, R.; Gunnemann, H.; Rowinsky, V.; Bukowsky, N. (2010): Das Mellenmoor bei Lychen - ein erfolgreich revitalisiertes Braunmoosmoor im Naturpark Uckermärkische Seen. *Naturschutz und Landschaftspflege in Brandenburg* 19(3/4): 182-186. (in German) [Brandenburg, Germany; the revitalisation of the intermediate bog resulted in local range extensions and population increase of several Odonata, including the rare *Leucorrhinia pectoralis*.] Address: Mauersberger, R., Bahnhofstr. 24, D-17268 Templin, Germany. E-mail: FoerderevereinUeckermark.Seen@t-online.de

9866. Mbabazi, D.; Makanga, B.; Orach-Meza, F.; Hecky, R.E.; Baliwa, J.S.; Ogutu-Ohwayo, R.; Verburg, P.; Chapman, L.; Muhumuza, E. (2010): Intra-lake stable isotope ratio variation in selected fish species and their possible carbon sources in Lake Kyoga (Uganda): implications for aquatic food web studies. *African Journal of Ecology* 48(3): 667-675. (in English, with French summary) ["The stable isotopes of nitrogen ($\delta^{15}\text{N}$) and

carbon ($\delta^{13}\text{C}$) provide powerful tools for quantifying trophic relationships and carbon flow to consumers in food webs; however, the isotopic signatures of organisms vary within a lake. Assessment of carbon and nitrogen isotopic signatures in a suite of plants, invertebrates, and fishes in Lake Kyoga, indicated significant variation between two sites for $\delta^{13}\text{C}$ (paired $t = 6.305$; $df = 14$, $P < 0.001$ and $\delta^{15}\text{N}$ paired $t = 1.292$; $df = 14$; $P < 0.05$). The fish fauna in Bukungu was generally more $\delta^{13}\text{C}$ enriched (mean $\delta^{13}\text{C} = -16.37 \pm 1.64\text{‰}$) than in Iyingo (mean $\delta^{13}\text{C} = -20.80 \pm 2.41\text{‰}$) but more $\delta^{15}\text{N}$ depleted (mean $\delta^{15}\text{N} = 5.57 \pm 0.71\text{‰}$) than in Iyingo (mean $\delta^{15}\text{N} = 6.92 \pm 0.83\text{‰}$). The simultaneous shifts in phytoplankton and consumer signatures confirmed phytoplankton as the major source of carbon for the food chain leading to fish. Limited sampling coverage within lakes may affect lake wide stable isotope signatures, and the same error is transferred into trophic position estimation. Consideration of potential intra-lake spatial variability in isotope ratios and size is essential in evaluating the spatial and trophic structure of fish assemblages." (Authors) Odonata are treated at the order level.] Address: Mbabazi, D., National Fisheries Resources Research Institute, PO Box 343, Jinja, Uganda. E-mail: mbabazidismas@yahoo.com

9867. McHugh, E.S. (2010): The northward extension and new county records of five Kansas dragonflies. *Argia* 22(4): 8-9. (in English) [During the 2010 field season *Libellula deplanata*, *Tramea carolina*, *Celithemis fasciata*, *Dythemis fugax*, and *D. velox* were found further north in Kansas than had been previously reported.] Address: Earl S. (Mick) McHugh DDS, Kansas City, USA. E-mail: Emchugh2@kc.rr.com

9868. Miller, F.P.; Vandome, A.F.; Mcbrewster, J. (2010): Dragonfly: Odonata, Epiprocta, Eye, Damselfly, Insect, Insect Wing, Predation, Mosquito, Fly, Bee, Ant, Butterfly, Wetland, Larva, Nymph (Biology). Alphascript Publishing. ISBN: 6130601638: 168 pp. (in English) [Articles taken from Wikipedia (focusing on Odonata), poorly arranged (e.g. very small letter types), and sold for maximum profit purposes. Before buying this book, you should order a display copy.]

9869. Mollov, I.; Boyadzhiev, P.; Donev, A. (2010): Trophic role of the Marsh frog *Pelophylax ridibundus* (Pallas, 1771) (Amphibia, Anura) in the aquatic ecosystems.. *Bulgarian Journal of Agricultural Science* 16(3): 298-306. (in marsh frog, diet, trophic spectrum, niche breadth, South Bulgaria) ["During our study we identified 1356 prey items, divided in 64 prey categories in the trophic spectrum of *Pelophylax ridibundus* from the surrounding of Skutare Village (Plovdiv District, South Bulgaria). The average number of prey items per stomach for all studied seasons is as follows: spring 1994 - 11.93 (SD=18.31); autumn 1994 - 9.65 (SD=13.44); spring 1995 - 11.84 (SD=16.34) and totally - 11.49 (SD =38.67). The most important prey category for the whole period of study is Coleoptera (31.93%), followed by Diptera (27.65%) and Hymenoptera (13.42%)." (Authors) Odonata, mainly Zygoptera contributed with 3% to the prey items.] Address: Mollov, I., Univ. of Plovdiv "Paisii Hilendarski", Faculty of Biology, Department of Ecology and Environmental Conservation, 4000 Plovdiv, Bulgaria. E-mail: E-mail: mollovi@yahoo.com

9870. Monroe, E.M.; Lynch, C.; Soluk, D.A.; Britten, H.B. (2010): Nonlethal tissue sampling techniques and microsatellite markers used for first report of genetic di-

versity in two populations of the endangered *Somatochlora hineana* (Odonata: Corduliidae). *Annals of the Entomological Society of America* 103(6): 1012-1017. (in English) ["Techniques for obtaining DNA noninvasively or nonlethally are highly desirable in molecular genetic studies of protected species, and several advances have been made in these types of sampling and extraction techniques. Insects present a unique set of difficulties in this regard that are not present when working with most vertebrates. This study evaluated the effectiveness of several nonlethal sampling techniques for larval and adults of the federally listed endangered dragonfly *Somatochlora hineana*. Fecal pellets and shed exuviae from captive *S. hineana* larvae did not provide high enough quality DNA for microsatellite analyses. Invasive, but nonlethal, wing clips from adults and tarsi from larvae provided high-quality DNA that amplified 10 microsatellite markers for this species. Ten loci were polymorphic in 94 specimens with four to 14 alleles per locus. Two populations in WI had average observed heterozygosity of 0.47, which is within the range reported for other odonates. Our sampling techniques and these new microsatellite markers provide an essential tool for determining the genetic structure of *S. hineana* populations throughout its range." (Authors)] Address: Monroe, Emy, Department of Biology, University of South Dakota, 414 E. Clark Avenue, Vermillion, SD 57069, USA. E-mail: emy.monroe@usd.edu.

9871. Morimoto, M.; Yamamura, Y.; Watanabe, M. (2010): Conservation ecology of the brackish water damselfly, *Mortonagrion Hirosei* Asahina: Dynamics of a newly established reed community (Zygoptera: Coenagrionidae). *Odonatologica* 39(4): 333-340. (in English) ["The endangered *M. Hirosei* perches in the understory of dense reed communities in brackish water. To aid the conservation of a population, a new reed community (2110 m²) was established in abandoned rice paddy fields adjacent to the original, threatened community (500 m²) by transplanting reed rhizomes in January 2003; brackish water was supplied to the new community. It was assessed whether the new community developed into a suitable habitat for *M. Hirosei* by comparing it to the original community in 2005. Shoot height, density, and aboveground biomass of the reeds and relative light intensity in the community were measured periodically during the growing season. Reed height and biomass were significantly lower in the new community than in the original one. This suggests that 3 yr after transplantation the new community was still underdeveloped. However, shoot density and relative light intensity in the understory were not significantly different between the two communities. Thus, the new reed community was offered in 2005 to *M. Hirosei* adults as a suitable habitat." (Authors)] Address: Yamamura, Y., College of Science, Ibaraki University, Mito, Ibaraki 310-8512, Japan. E-mail: yama@mx.ibaraki.ac.jp

9872. Mousat, F.; Dumont, H.J.; Karrom, M.; Ali, N.M. (2010): Dragonflies from northern Syria (Insecta: Odonata). *Zoology in the Middle East* 51: 105-112. (in English) ["Nineteen stations distributed across the northern part of Syria were inventoried for dragonflies between 2006 and 2010. About 37 species were recorded, and four species are added to the list of known Syrian species. Because of a generalized decrease in the water quality of Syrian rivers, and an increasing number of rivers falling dry, lotic species such as the calopterygids have suffered and the remaining populations have be-

come reduced to disjunct islands. *Calopteryx splendens hyalina*, once extending from Lake Hula to the Wadi Af-rin, now appears to have become extinct in the Orontes valley, and only survives in few short Syrian coastal rivers." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@ugent.be

9873. Müller, G.A.; Name, F.T.; Pacheco, F.C.L.; Marcondes, C.B. (2010): Analysis of an alternative method for the study of bromeliad-associated fauna in plants with different foliar organization. *Anais da Academia Brasileira de Ciências* 82(4): 903-906. (in English, with Portuguese summary) ["The efficiency of an alternative method of collection (by suction of water) for the study of Culicidae and Chironomidae (Diptera), Scirtidae (Coleoptera) and Coenagrionidae (Odonata; Leptagrion sp1 and sp2) in bromeliads with different foliar architecture in a restinga at Florianópolis, SC, Brazil, was studied. The alternative method was less efficient to collect Culicidae and Chironomidae (Wilcoxon test $p < 0.05$) and was more efficient to Scirtidae and Coenagrionidae (Wilcoxon test $p > 0.05$) from *Aechmea lindenii*. This method was less efficient to collect insects of all groups from *Vriesea friburgensis* (Wilcoxon test $p < 0.05$). The alternative method was efficient to estimate the diversity of these insects in both species of bromeliads. The higher mobility of immature forms of beetles and dragonflies, and the availability of only one tank in *Aechmea lindenii*, contrasting to several tanks in *Vriesea friburgensis* that help the suction of these immature, probably influenced the results, which indicated that the suction method should not replace the dismantling in the study of Culicidae and Chironomidae. This method can be useful to get immature forms of Scirtidae and Coenagrionidae in one-tank bromeliads." (Authors)] Address: Müller, G.A., Departamento de Zoologia, Setor de Ciências Biológicas, Universidade Federal do Paraná Caixa Postal 19020, Centro Politécnico, 81531-980 Curitiba, PR, Brasil

9874. Müller, J. (2010): Dr. rer. nat. Wolfgang Zimmermann zum 75. Geburtstag. *Entomologische Nachrichten und Berichte* 54(3/4): 271-274. (in German) [Wolfgang Zimmermann is one of the leading limnologists - with focus on Ephemeroptera and Odonata - in Thüringen, Germany. For several decades he was and is involved in many odonatological activities. The paper compiles milestones in his professional and voluntary life, and adds an updated bibliography.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

9875. Muzon, J.; Spinelli, G.R.; Rossi, G.C.; Marino, P.I.; Diaz, F.; Melo, C. (2010): Nuevas citas de insectos acuáticos para la Meseta de Somuncurá, Patagonia, Argentina. *Rev. Soc. Entomol. Argent.* 69(1-2): 111-116. (in Spanish, with English summary) [Total of 12 Odonata species have been recorded on the Somuncurá plateau (Argentinean Patagonia). Six of them (*Andinagrion peterseni*, *Rhionaeschna absoluta*, *R. variegata*, *Progomphus joergenseni*, *Dasythemis mincki clara*, and *Erythrodiplax atroterminata*) are listed.] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

9876. Nagy, H.B. (2010): Population dynamics of *Libellula fulva* Müller, 1764 in the lowland creeks of landscape Bihari-sík. PhD-thesis, University of Debrecen: VIII, 113 pp. (in Hungarian, with English summary)

[Hungary; "In quantitative ecology few invertebrates are better study targets than dragonflies and damselflies. Dragonflies were used as model organisms in the development of mark-recapture methods, because their study yielded in a relatively short period large amount of data. I carried out my studies on two sites located near two lowland creeks, in the Bihar Plain, Hajdú-Bihar County, Hungary between 2002 and 2007. [...] In the first part of my dissertation I estimated the population sizes for each study day and year, for the comparison of the two populations studied at the two sites. In the second part I analysed the effect of males' density on their mating behaviour. For this analysis I determined the number of assessed matings (mating frequency) and fights (fight frequency) per individual from the daily number of matings which was divided by the daily estimated population sizes. Then I compared the mating and fight frequency in the function of the yearly population sizes between the two sites. In the third part I studied how the temperature and rainfall affected daily male density, their fight and mating habits and site fidelity. In the last part of the dissertation I analysed whether there could be a discrepancy between the body size of males in the smaller and larger populations; and whether there could be any correlation between the body size and behaviour of males. My results showed that the populations near Ártánd were significantly smaller than the populations near Bojt. The density of males did not affect their intraspecific aggression, but at higher population densities males mate less than at lower ones. In the case of the larger population the site fidelity of males decreased as compared to the smaller population. The frequencies of matings and fights showed a weak significantly positive correlation with the daily mean temperatures. The number of larger and medium sized males was higher in the site near Bojt than near Ártánd, where the frequency of larger males corresponded with the frequency of smaller ones." (Author)] Address: Nagy Beáta, Dept of Taxonomy & Ecology, Babeş-Bolyai Univ., 400006 Cluj Napoca, Clinicilor str. 5-7, Romania. E-mail: nagy.beata@gmail.com

9877. Narita, S.; Pereira, R.A.S.; Kjellberg, F.; Kageyama, D. (2010): Gynandromorphs and intersexes: potential to understand the mechanism of sex determination in arthropods. *Terrestrial Arthropod Reviews* 3(1): 63-96. (in English) ["Arthropods are sexually dimorphic. An arthropod individual usually differentiates into a male or a female. With very low frequencies, however, individuals with both male and female morphological characters have repeatedly been found in natural and laboratory populations of arthropods. Gynandromorphs (i.e., sexual mosaics) are genetically chimeric individuals consisting of male and female tissues. On the other hand, intersexes are genetically uniform (i.e., complete male, complete female or intermediate in every tissue) but all or some parts of their tissues have either a sexual phenotype opposite to their genetic sex or an intermediate sexual phenotype. Possible developmental processes (e.g., double fertilization of a binucleate egg, loss of a sex chromosome or upregulation/downregulation of sex-determining genes) and causal factors (e.g., mutations, genetic incompatibilities, temperatures or endosymbionts) for the generation of gynandromorphs and intersexes are reviewed and discussed." (Authors) The paper includes a list of publications with reference to gynandromorphs in Odonata.] Address: Kageyama, D., National Institute of Agrobio-

logical Sciences, Owashi 1-2, Tsukuba, Ibaraki 305-8634, Japan. E-mail: e-mail: kagymad@aff rc.go.jp

9878. Nattress, B. (2010): Wing-folding behaviour in the Golden-ringed Dragonfly *Cordulegaster boltonii* (Donovan). *J. Br. Dragonfly Society* 26(2): 64-65. (in English) [26-VI-2006, Kinlochewe, Wester Ross, Scotland, UK; an observation of *C. boltonii* folding its wings over its back is reported. This behaviour is not related to bad (e.g. rainy) weather.] Address: Nattress, B., 25 West Lea Drive, Tingley, Wakefield, West Yorks. WF3 1DH, UK

9879. Nedjah, R.; Bouchecker, A.; Samraoui, F.; Menai, R.; Alfarhan, A.; Al-Rasheid, K.A.S.; Samraoui, B. (2010): Breeding ecology of the Purple Heron *Ardea purpurea* in Numidia, north-eastern Algeria. *Ostrich* 81(3): 189-196. (in English) ["During 2002-2007, we assessed the status of the Purple Heron *Ardea purpurea* in Numidia, Algeria by surveying all the major wetlands in the region. We located six distinct breeding sites; four of these were not previously known. We also investigated nest site selection and determined the species' reproductive success at Dakhla, a dunary pond during two successive years (2006 and 2007). The egg laying period was comparable to that reported for southern Europe (March-May) and a seasonal change of breeding success was recorded. A growth curve was derived for developing nestlings and the impact of an ectoparasite (mite) infestation upon nestling's growth was considered. We also examined 73 food boluses regurgitated by nestlings and identified 329 prey items. Fish, mainly *Gambusia holbrooki* and *Cyprinus carpio*, dominated by mass, whereas insects, mainly aquatic Coleopteran larvae and aeshnids (Odonata), were the most frequent prey (67.1%). Loss of habitat is identified as a major threat to the future of colonial herons in Algeria." (Authors)] Address: Nedjah, R., Laboratoire de Recherche et de Conservation des Zones humides, Dept de Biologie, University of Guelma, Guelma, Algeria

9880. Nel, A.; DePalma, R.A.; Engel, M.S. (2010): A possible hemiphlebiid damselfly in late cretaceous amber from South Dakota (Odonata: Zygoptera). *Transactions of the Kansas Academy of Science* 113(3&4): 231-234. (in English) ["The first damselfly in Late Cretaceous amber from South Dakota is described and figured. The specimen preserves the forewing apex of a possible hemiphlebiid, a group of relict damselflies today that were apparently widespread and diverse during the Cretaceous." (Authors)] Address: DePalma, R.A., Division of Vertebrate Paleontology, Natural History Museum, and Department of Geology, 1475 Jayhawk Boulevard, University of Kansas, Lawrence, Kansas 66045-7613, USA. E-mail: paleogen@aol.com

9881. North East Scotland Biological Records Centre (2010): Dragonflies and Damselflies: a distributional atlas for Aberdeenshire, Aberdeen City, Moray and the Cairngorms 1900-2008. North East Scotland Biological Records Centre: II, 44 pp. (in English) ["This colourful A5 booklet is an interesting new addition to the growing range of county dragonfly atlases. It differs from many in not being the result of a specific survey or driven by key individuals; rather it is essentially a 'summary statement' of all the dragonfly records from the region that are currently held on the National Biodiversity Network (NBN) database, and is dedicated to the International Year of Biodiversity. There is a brief introduction to dragonflies and to recording, then for each species

there follows a short summary of identification features and habitat preference, a detailed flight period diagram based on local data, a summary map of past/present national distribution, and a detailed (1km grid square resolution) map of local distribution that also shows key geographical features. Records are assigned either to 'confirmed breeding' or to 'presence', but are not subdivided by time period due to the scarcity of information from many areas — a familiar problem for much of Scotland, though this is gradually being overcome. There are several strengths to this book and relatively few errors or omissions, most of which arise out of the need for succinctness. Unfortunately the photograph illustrating a female *Sympetrum striolatum* is a *S. danae*. In the section on *Aeshna caerulea* the authors could have been more strongly dismissive of erroneous English records that have somehow recently appeared in the NBN database, though this fortunately doesn't affect their own regional treatment. This publication serves both as a statement of the known biodiversity of Odonata in northeast Scotland, and more importantly as an incentive for further study. It is a well-produced and professional example of what can be done with modern data handling and publishing packages, and I would strongly recommend it to all dragonfly-watchers who are ever likely to visit the Aberdeenshire area, or who have an interest in Scotland in general." (taken from: Adrian Parr, *Atropos* 41: 48-49, 2010)] Address: Available free from NESBReC whilst stocks last. Send a self-addressed A5 envelope with 81 p stamp to NESBREC, Room G29, University of Aberdeen, 23 St Machar Drive, Aberdeen, AB24 3RY, UK

9882. Oertli, B. (2010): The local species richness of dragonflies in mountain waterbodies: an indicator of climate warming? *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 243-251. (in English) ["With climate warming, many Odonata species are extending their geographical area. In Switzerland, as in many parts of the world, this phenomenon may lead to a regional increase in species richness. The local richness (the richness of individual waterbodies) is also expected to increase, particularly in the alpine or subalpine areas where the waterbodies are particularly species-poor. Based on the species richness recorded in 109 waterbodies scattered all across Switzerland, a model is presented here relating the local species richness (adult dragonflies) to environmental variables, including the mean annual air temperature. This model predicts a sharp increase in species richness for alpine or subalpine waterbodies, which is expected to double or even treble before the end of this century. This increase would mainly be the consequence of the immigration of eurythermal species extending their geographical range, together with potential local extinctions of the cold stenothermal species." (Author)] Address: Oertli, B., University of Applied Sciences Western Switzerland, École d'Ingénieurs HES de Lullier, 150 route de Presinge, CH-1254 Jussy / Geneva, Switzerland. E-mail: beat.oertli@hesge.ch

9883. Offenberger, M. (2010): Libellen auf Fernreise. Fliegen die Insekten jedes Jahr 18 000 Kilometer von Indien nach Afrika und zurück? *Süddeutsche Zeitung* 25/7/2010: 22. (in German) [This report in a nationwide German newspaper is based on Anderson, R.C. (2009): Do dragonflies migrate across the western Indian Ocean? *Journal of Tropical Ecology* 25(4): 347-358.] Address: Offenberger, Monika

9884. Olberg, R.M. (2010): Insect Optic Glomeruli: exploration of a universal circuit for sensorimotor processing. Air Force Office of Scientific Research, 875 N. Randolph Street, Room 31 I 2, Arlington., VA 22203-1768. Contract No.: AFRL-SR-AR-TR-10-0109: 33 pp. (in English) ["Electrophysiological investigations of dragonfly target-selective descending neurons yielded the following findings: (1) Outdoor experiments with 2 families of dragonflies with different prey capture strategies (*Aeshna canadensis* and *Pachydiplax longipennis*) revealed family-specific differences in the receptive fields. (2) Real objects moving in 3 dimensions elicited greater responses to nearby small objects than predicted from responses to images on a flat visual display. (3) Outdoor experiments and experiments with expanding images on a flat display revealed looming-object preference of 2 TSDNs, which appear to predict time-to-contact. (4) TSDNs showed extremely high spike rates with the raised body temperatures (30°-35°C) seen in naturally behaving dragonflies. (5) Two TSDNs were tuned to looming objects, coding for time-to-contact. (6) Two TSDNs were identified whose spikes carry predictive information about future object position. Investigation of flight behavior revealed that take-off direction is a linear function of the prey's angular velocity 28 ms before takeoff. Collaboration with Dr. Anthony Leonardo (HHMI-JFRC) led to development of a flight arena, a chronic electrode implantation technique, and a miniature telemetry chip, paving the way for wireless recording of TSDN activity during prey interception." (Author)] Address: Olberg, R.M., Department of Biological Sciences, Union College, Schenectady, NY 12308, USA. E-mail: olbergr@union.edu

9885. Orr, A.G.; Ngiam, R.W.J.; Leong, T.M. (2010): The larva of *Tetracanthagyna plagiata*, with notes on its biology and comparisons with congeneric species (Odonata: Aeshnidae). *International Journal of Odonatology* 13(2): 153-166, pl. la. (in English) ["The F stadium larva of both sexes of *Tetracanthagyna plagiata* is described and figured based on exuviae from which confirmed adult specimens had been reared. Larvae were originally collected in small, slow forest streams in Singapore, and in captivity were fed on local shrimp and small fish species. The known larvae of *Tetracanthagyna* species, *T. degorsi*, *T. plagiata* and *T. waterhousei* are compared and characters for separating the three species are tabled and figured. *T. plagiata* larvae reared in captivity exhibited obligate ambush predation and ballistic defaecation." (Authors)] Address: Orr, A.G., Griffith, School of the Environment, Griffith University, Nathan, Q4111, Australia. E-mail: agorr@bigpond.com

9886. Orrock, J.L.; Dill, L.M.; Sih, A.; Grabowski, J.H.; Peacor, S.D.; Peckarsky, B.L.; Preisser, E.L.; Vonesh, J.R.; Werner, E.E. (2010): Predator effects in predator-free space: the remote effects of predators on prey. *The Open Ecology Journal* 3: 22-30. (in English) ["Predators can have remote effects on prey populations that are connected by migration (i.e. prey metapopulations) because predator-mediated changes in prey behavior and abundance effectively transmit the impact of predators into predator-free prey populations. Behavioral changes in prey that might give rise to remote effects are altered rates of migration or activity in the presence of predation risk (called non-consumptive effects, fear- or μ -driven effects, and risk effects). Changes in prey abundance that may result in remote effects arise from changes in prey density due to direct predation (i.e.

consumptive effects, also called N-driven effects and predation effects). Remote effects provide a different perspective on both predator-prey interactions and spatial subsidies, illustrating how the interplay among space, time, behavior, and consumption generates emergent spatial dynamics in places where we might not expect them. We describe how strong remote effects of predators may essentially generate "remote control" over the dynamics of local populations, alter the persistence of metapopulations, shift the importance of particular paradigms of metacommunity structure, alter spatial subsidies, and affect evolutionary dynamics. We suggest how experiments might document remote effects and predict that remote effects will be an important component of prey dynamics under several common scenarios: when predators induce large changes in prey dispersal behavior, when predators dramatically reduce the number of prey available to disperse, when prey movement dynamics occur over greater distances or shorter timescales than predator movement, and when prey abundance is not already limited by competitors or conspecifics." (Author) The paper also includes references to Odonata.] Address: Orrock, J.L., Department of Zoology, University of Wisconsin, Madison, WI, 53706, USA. E-mail: jorrock@wisc.edu

9887. Ott, J. (2010): Zur aktuellen Situation der Moorlibellen im «Pfälzerwald» – wie lange können sie sich in Zeiten des Klimawandels noch halten?. *Annales scientifiques de la réserve de Biosphère transfrontalière Vosges du Nord-Pfälzerwald* 15 (2009-2010): 123-139. (in German, with French and English summary) ["In this contribution, the situation is analyzed with regard to mire dragonflies in the German part of the Pfälzerwald-Vosges du Nord Biosphere Reserve, in which a comparison is made between their distribution up to 2007 and their development in the past few decades. While most types of mires were still fairly widespread up until the nineteen-eighties, they have since shrunk significantly, something which is attributable to a number of causes (among other, biotope degradation). In most recent years, this regression process has been accelerated still further due to the extreme dryness in 2003 and the general climate change. Most types are now only found in isolated waters and/or have very small populations. Possible regeneration and resettlement processes are hindered by other communities, which have been established in the meantime in the water bodies, and these water bodies also have changed their structure (succession processes involving water and riverbank vegetation). The dystrophic ponds areas (FFH habitat type, Natura 2000-Code 3160) are in this context not only losing their unique features, but also their significance for the Natura 2000 network, which is very well indicated by the dragonfly coenoses." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

9888. Ott, J. (2010): Bemerkungen zum Vorkommen von *Aeshna affinis* VANDER LINDEN, 1820, *Somatochlora arctica* (ZETTERSTEDT, 1840) und *Crocothemis erythraea* (BRULLÉ, 1832) (Insecta: Odonata: Aeshnidae, Corduliidae, Libellulidae) in Woogen des Biosphärenreservates Pfälzerwald-Vosges du Nord. *Fauna und Flora in Rheinland-Pfalz* 11(4): 1291-1310. (in German, with English summary) [The author presents the situation of *A. affinis*, *S. arctica*, and *C. erythraea* in the German part of the biosphere reserve "Palatinate forest – Northern Vosges". Whereas *S. arctica* has only

a single but stable population, *A. affinis* and *C. erythraea* show a remarkable expansion in higher altitudes and also in waters of the centre of the dense forest. Meanwhile *C. erythraea* is found indigenous even in an acidic moorland water (pH 5). Possible consequences for nature protection and the protection of the generally rare moorland dragonfly species are discussed.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

9889. Ott, J. (2010): Dragonflies and climatic change - recent trends in Germany and Europe. *BioRisk 5: Special issue: Monitoring climatic change with dragonflies: 253-286.* (in English) ["In this paper the trends of dragonfly expansions during the last decades in Germany and Europe are summarized. It is shown, that there is a general expansion of many species to the north: Mediterranean species expanded to Central and Northern Europe, whereas some African species expanded to Southern Europe, some are even new to the continent. In general this means an increase of biodiversity, but looking at the ecological effects, in the medium term a decrease can be expected for moorland and alpine species. Dragonflies can be regarded as a good indicator group for climatic change. Already now in some areas or regions negative effects on waters bodies and their dragonfly communities can be observed and more will occur if e.g. temperature rises or precipitation decreases. The consequences for nature conservation strategies - such as the NATURA 2000 network - are outlined and the general need for monitoring programmes is emphasised." (Author)] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

9890. Ott, J. (2010): Die Zweigestreifte Quelljungfer - Ein typischer Pfälzer Bachdrache. *Heimatjahrbuch des Landkreises Kaiserslautern 2011: 59-60.* (in German) [Rheinland-Pfalz, Germany; this is a brief general introduction into dragonfly biology exemplified with *Cordulegaster boltonii*.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

9891. Owens, D.C. (2010): Seasonal variation in terrestrial insect subsidies to tropical streams and implications for the diet of *Rivulus hartii*. *Natural Resources, School of Dissertations & Theses in Natural Resources, University of Nebraska, USA: VIII, 73 pp.* (in English) [Trinidad; "Terrestrial invertebrates subsidize fish diets in lotic ecosystems. Seasonality strongly influences terrestrial invertebrate abundance in temperate regions and alters their delivery to streams. Seasonal changes in the tropics are characterized by distinct wet and dry periods, with marked variation in invertebrate abundance. However, little is known about how these seasonal changes affect invertebrate subsidies and their ecological consequences for tropical streams. We measured the effect of rainfall and canopy density on terrestrial invertebrate falling input, as well as seasonal variation in falling input, benthic and drifting invertebrate, and *Rivulus hartii* (Hart's *Rivulus*) diet composition during both the wet and dry seasons at three stream sites in Trinidad. Rates of input of terrestrial invertebrates showed seasonal trends in biomass and abundance. Rainfall magnitude and canopy density were directly correlated with falling input. The delivery of terrestrial invertebrates increased from an average of 52 mg m⁻² day⁻¹ to 72 mg m⁻² day⁻¹ from wet to dry season. Conversely, average benthic invertebrate

abundance and biomass decreased from 382 mg m⁻² in the dry season to 130 mg m⁻² in the wet season, presumably due to displacement and mortality resulting from severe flow conditions. A 75% increase in drifting invertebrate biomass was driven by a terrestrial invertebrate biomass that more than doubled during the wet season. Prey selectivity in *Rivulus* diets mirrored this seasonal variation in prey invertebrate availability, as percent composition of terrestrial invertebrate volume in *Rivulus* guts also doubled during the wet season. We conclude that terrestrial invertebrates are a substantial energetic subsidy for tropical river ecosystems, and the spatial and temporal variation in delivering these resources from wet to dry season have profound effects on consumer-resource dynamics." (Author) Macrozoobenthic taxa including Odonata are treated at the order level. This paper is posted at DigitalCommons@University of Nebraska - Lincoln. <http://digitalcommons.unl.edu/natresdiss/8>] Address: Owens, D.C., University of Nebraska at Lincoln, USA. E-mail: davidchristopherowens@yahoo.com

9892. Papazian, M.; Mary-Sasal, N. (2010): Description of male *Rhyothemis phyllis apicalis* Kirby, 1889 (Anisoptera: Libellulidae). *Odonatologica 39(4): 357-361.* (in English) ["The male allotype is described and illustrated from the Northern Province of New Caledonia, and compared with the *R. p. phyllis* from Thailand. The habitats of *R. p. apicalis* are described and a list of odonate species recorded during the 1999 and 2000 surveys is added." (Authors)] Address: Papazian, M., Le Constellation Bât.A, 72 Avenue des Caillols, F-13012 Marseille, France. E-mail: papazianmcm@wanadoo.fr

9893. Parr, A. (2010): Monitoring of Odonata in Britain and possible insights into climate change. *BioRisk 5: Special issue: Monitoring climatic change with dragonflies: 127-139.* (in English) ["The history of recording and monitoring of Odonata in Britain is briefly described. Results are then presented which suggest that the country's Odonata fauna is currently in a period of flux, in a manner consistent with the actions of a high-level regulatory factor such as climate change. The ranges of many resident species are shifting. *Leucorhinia dubia* has recently been lost from southern England, but many species are presently expanding their ranges to the north and west, some (such as *Aeshna mixta* and *Anax imperator*) with considerable speed. In addition to these changes, a number of 'southern' species have started to appear in Britain for the very first time. These include *Lestes barbarus*, *Erythromma viridulum* (which has now become a locally-common resident in southeast England), *Anax parthenope* and *Crocothemis erythraea*. In addition to these distributional changes, some recent trends in flight times are also discussed. Evidence indicates that many species are now emerging significantly earlier than in the past, though trends relating to the end of the flight period are less clear cut." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

9894. Parr, A. (2010): Records of exotic Odonata in Britain during 2010. *Atropos 41: 39-42.* (in English) [Recent UK records of *Ischnura senegalensis* and *Crocothemis servilia* resulting from indoor fish tanks resp. aquatic plant nurseries are documented.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

- 9895.** Parr, A.J. (2010): Migrant and dispersive dragonflies in Britain during 2009. *J. Br. Dragonfly Society* 26(2): 98-107. (in English) ["The 2009 season saw major arrivals of *Sympetrum fonscolombii* during the late spring and summer, and a significant hot weather movement of many migratory/dispersive species during a short period around the end of June/early July. Other significant finds included the discovery of singleton *Lestes barbarus* at three sites on the East Anglian coast during August. The highlight of the year was, however, the discovery of large numbers of *Lestes viridis* in southeast Suffolk, under circumstances strongly suggestive of the presence of a recently-established breeding population." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk
- 9896.** Paula, M.C.; Fonseca-Gessner, A.A. (2010): Macroinvertebrates in low-order streams in two fragments of Atlantic Forest in different states of conservation, in the State of São Paulo (Brazil). *Braz. J. Biol.* 70(3, suppl.): 899-909. (in English, with Portuguese summary) ["The presence of a riparian forest is one of the main factors that act directly on the ecology of a fluvial system, and the relation of the forest and the lotic environments might have an important influence on the distribution of the macroinvertebrates. In this context, the benthic macroinvertebrate communities in four low-order streams in São Paulo (Brazil) were analysed, with the aim of assessing the state of recovery of the surrounding forest fragments. The benthic organisms were sampled in the winter, a period of low rainfall. Of the 6,331 specimens of macroinvertebrates collected, 124 taxa belonging to 48 families were identified. The results showed greater diversity in the Canchim Farm streams and greater abundance in the Lake Park streams. Cluster analysis showed that the stream Canchim distanced itself from the others, being considered reference." (Authors) Taxa including Odonata are treated at the genus level.] Address: Paula, M.C., Programa de Pós-graduação em Ecologia e Recursos Naturais, Universidade Federal de São Carlos – UFSCar, Rod. Washington Luiz, Km 235, CP 676, CEP 13565-905, São Carlos, SP, Brazil. E-mail: marciacdp@ig.com.br
- 9897.** Perez-Bilbao, A.; Alonso, A.I.; Garrido, J. (2010): Phenology of aquatic insects in a protected wetland (Natura 2000 network) in northwestern Spain. *Limnetica* 29(2): 379-386. (in English, with Spanish summary) ["The aim of this study was to gather new data about the life cycle phenologies of several species of aquatic insects in the "Gándaras de Budino" (Galicia, NW Spain) protected wetland, included in the Natura 2000 network. During an annual cycle (2004-2005), three shallow lakes and four streams were sampled monthly using a semi-quantitative sampling method. The body lengths of the larvae and nymphs of thirteen species were measured, and their life cycles were analysed. All species had univoltine or semivoltine cycles. Additionally, a possible correlation between larval and nymphal lengths and water temperature was examined. We found a significant correlation for two species: the water beetle (*Noterus laevis*) and the dragonfly (*Boyeria irene*)." (Authors) The following Odonata species have been studied: *Coenagrion mercuriale*, *C. puella*, *Pyrrhosoma nymphula*, *Calopteryx virgo*, *Boyeria irene*, *Onychogomphus uncatatus*, and (*Cordulegaster boltonii*.) Address: Pérez-Bilbao, Amaia, Department of Ecology and Animal Biology, Faculty of Biology, University of Vigo. 36310, Vigo, Spain. Email: amaiapb@uvigo.es
- 9898.** Pessacy, P.; Costa, J.M. (2010): *Epipleoneura angeloi* (Odonata: Protoneuridae), a new species from the central region of Brazil. *Zootaxa* 2721: 55-61. (in English, with Portuguese summary) [*Epipleoneura angeloi* sp. nov., is described and illustrated based on males from Mato Grosso and Goiás states, central region of Brazil.] Address: Pessacy, P., Universidad Nacional de La Patagonia "San Juan Bosco", LIESA, Sarmiento 849, 9200, Esquel, Chubut, Argentina. E-mail: pablopessacq@yahoo.com.ar
- 9899.** Plotnikova, S.I. (2010): About the olfactory system of the dragonfly *Aeschna* genus. *Journal of Evolutionary Biochemistry and Physiology* 46(4): 420-421. (in English) [Original Russian Text © S. I. Plotnikova, 2010, published in *Zhurnal Evolyutsionnoi Biokhimi i Fiziologii*, 2010, Vol. 46, No. 4, p. 352. Verbatim: Strausfeldt [1] thinks that of the most essential significance in life of insect are two systems of the subesophageal ganglion — the visual and the olfactory ones. The olfactory system in dragonflies is poorly developed. However, in 17 dragonfly species [2] organs of chemical perception were observed, and later, on antennae of *Libellula depressa*, chemoreceptor celoconical sensillae were revealed [3] after which they were found to perceive some odors in imago [4]. In the *Aeshna* sp. larva, we have managed to trace the nerve from antenna to the subesophageal ganglion and to reveal on it a nodule, in which sensory fibers of antenna receptors are terminated. It has its own interneurons and the interneuron connecting this nodule with lateral protocerebrum [5]. When visiting laboratory of Invertebrate Neurophysiology of Sechenov Institute of Evolutionary Physiology and Biochemistry. Strausfeldt examined the total methylene blue-stained preparations of A.A. Zavarrin and found in neuropil of this nodule the olfactory glomerulus, which confirmed our point of view of the nodule olfactory significance. It is also to be noted that, besides, this nodule contains motor neurons of antenna muscles and that it is connected with the β -lobe of the mushroom body. The most interesting is connection of the nodule with aid of the interneuron with lateral protocerebrum. The cerebral branching of this interneuron is going forwards along the lateral protocerebrum and is spreading onto its significant part; the same area of lateral protocerebrum contains lateral processes of Canyon cells. Thus, there is present here the characteristic chain of the neurons that have been described by Strausfeldt [1] in other insects in the olfactory nervous system: the olfactory bulb (it corresponds to the nodule on the olfactory nerve), protocerebrum and Canyon cells in the area, in which in other insects and in the *Aeshna* imago (the Strausfeldt's preparation) there is located the mushroom body calyx. Thus, the general plan of structure of the *Aeshna* olfactory system is the same as in other insects, but its nuclei are expressed poorly. The weak development of the *Aeshna* olfactory system is compensated by development of its visual system that has not only the huge visual blades, but also unites all structures of the subsophagal ganglion. It seems that the strong development of the visual system resulted in development of the unique locomotion providing the high rate and maneuver flight allowing this ancient insect genus to survive until our time."] Address: Plotnikova, S.I., Sechenov Institute of Evolutionary Physiology and

Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia. E-mail: gorelkin@iephb.ru

9900. Poinar, G.; Bechly, G.; Buckley, R. (2010): First record of Odonata and a new subfamily of damselflies from Early Cretaceous Burmese amber. *Palaeodiversity* 3: 15-22. (in English, with German summary) ["A new subfamily, genus and species of damselfly, *Palaeodisparoneura burmanica* n. gen., n. sp. (Platycnemididae; Palaeodisparoneurinae n. subfam.) is described as the first fossil odonate from Early Cretaceous Burmese amber. This fossil taxon is tentatively considered as sistergroup of Recent Disparoneurinae. The remains of a lizard in the same piece of amber suggest that the damselfly may have been targeted as prey." (Authors)] Address: Poinar, G. Jr., Department of Zoology, Oregon State University, Corvallis, OR 97331, USA: E-mail: poinarg@science.oregonstate.edu

9901. Popova, O.N.; Haritonov, A.Yu. (2010): Population dynamics and migration in the dragonfly *Libellula quadrimaculata* L., 1758 (Odonata, Libellulidae). *Eurasian entomological journal* 9(2): 231-238. (in Russian, with English summary) [ISEA SO RAN Biological Station near Chany Lake, Russia; Long-term data of population dynamics and spatial distribution of *L. quadrimaculata* are provided. "Counts of dragonflies, conducted from 1972 to 2009, demonstrate that *L. quadrimaculata* population size varied significantly during this period, the minimum density being 250 times lower than the maximum one (i.e. 0.04 vs 10 larval specimens per 1 m²). The population density correlates with the water supply of the region, the dragonfly numbers reaching their highest values in one or two years after a maximum water level. A mass migration in *L. quadrimaculata* which occurred in the southwestern part of the West-Siberian Plain in the Ishym River Valley, is described in detail. The reason for the mass migrations is an excessive growth in population density. As a result, a mass exodus from native habitats takes place which not only optimizes their population size but also increases the input of chemical elements and organic matter into the soil ecosystem from eutrophic water bodies." (Authors)] Address: Popova, Olga, Institut Sistemati i Zkologii Zhivotnykh, 630091 Novosibirsk, Ul. Frunse 11, Russia. E-mail: pc@eco.nsc.ru

9902. Radhakrishnan, V.; Zawal, A.; Ramaraju, K. (2010): First record of parasitized *Trithemis pallidinervis* (Kirby) from Tamil Nadu, India by *Arrenurus* larvae with a description of larval morphology (Anisoptera: Libellulidae; Acari: Hydrachnidia). *Odonatologica* 39(3): 243-252. (in English) ["Out of a total of 20 adult *T. pallidinervis* specimens, collected in Tamil Nadu, India, 164 larvae of *Arrenurus* sp. were found; prevalence: 57.5%, intensity: 5-12. They were attached to the mesosternum and metasternum. Their morphology is very similar to that of *A. cuspidator* and *A. maculator*, but differs by the absence of Mp1 tripartite seta, V2 seta and secondary seta in PIII 1 and the presence of secondary setae on both sides of V3 setae. They also differ from *A. maculator* by the absence of hairbrush on the base of C1 seta." (Author)] Address: Radhakrishnan, V., Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore - 641 003, Tamil Nadu, India

9903. Rasmussen, R.D.; Dixon, J.W. (2010): An unusual occurrence of Golden-winged Skimmer (*Libellula auripennis* Burmeister, 1839) (Anisoptera: Libellulidae) in Iowa. *Argia* 22(3): 12-13. (in English) ["On 10 July

2010 two male *L. auripennis* were observed near the Horseshoe Bend Division of the Port Louisa National Wildlife Refuge (41.1096° N, 091.0777° W) in Louisa County, Iowa." (Authors)] Address: Ryan D. Rasmussen, R.D., Muscatine Soil and Water Conservation District, 3500 Oakview Dr, Ste A, Muscatine, Iowa 52761, E-mail: ryan.rasmussen@ia.nacdn.net

9904. Ratti, J.; Vachtsevanos, G. (2010): A biologically-inspired micro aerial vehicle. Sensing, modeling and control strategies. *Journal of Intelligent and Robotic Systems* 60(1): 153-178. (in English) ["This paper introduces a novel framework for the design, modeling and control of a Micro Aerial Vehicle (MAV). The vehicle's conceptual design is based on biologically-inspired principles and emulates a dragonfly (Odonata-Anisoptera). We have taken inspiration from the flight mechanism features of the dragonfly and have developed indigenous designs in creating a novel version of a Flapping Wing MAV (FWMAV). The MAV design incorporates a complex mechanical construction and a sophisticated multi-layered, hybrid, linear/non-linear controller to achieve extended flight times and improved agility compared to other rotary wing and FWMAV Vertical Take Off and Landing (VTOL) designs. The first MAV prototype will have a ballpark weight including sensor payload of around 30 g. The targeted lifting capability is about twice the weight. The MAV features state of the art sensing and instrumentation payload, which includes integrated high-power on-board processors, 6DoF inertial sensors, 3DoF compasses, GPS, embedded camera and long-range telemetry capability. A 3-layer control mechanism has been developed to harness the dynamics and attain complete navigational control of the MAV. The inner-layer is composed of a 'quad hybrid-energy controller' and two higher layers are at present, implementing a linear controller; the latter will be replaced eventually with a dynamic adaptive non-linear controller. The advantages of the proposed design compared to other similar ones include higher energy efficiency and extended flight endurance. The design features elastic storage and re-use of propulsion energy favouring energy conservation during flight. The design/modeling of the MAV and its kinematics & dynamics have been tested under simulation to achieve desired performance. The potential applications for such a high endurance vehicle are numerous, including air-deployable mass surveillance and reconnaissance in cluster and swarm formations. The efficacy of the design is demonstrated through a simulation environment. The dynamics are verified through simulations and a general linear controller coupled with an energy based non-linear controller is shown to operate the vehicle in a stable regime. In accordance with specified objectives a prototype is being developed for flight-testing and demonstration purposes." (Authors)] Address: Vachtsevanos, G., Intelligent Control Systems Laboratory, School of Electrical & Computer Engineering, Georgia Institute of Technology, 777 Atlantic Dr. NW, Atlanta, GA 30332-0250, USA. E-mail: gjv@ece.gatech.edu

9905. Rawson, A.; Lim, R.P.; Tremblay, L.A.; Warne, M.S.J.; Ying, G.-g.; Laginestra, E.; Chapman, J.C. (2010): Benthic macroinvertebrate assemblages in remediated wetlands around Sydney, Australia. *Ecotoxicology* 19(8): 1589-1600. (in English) ["To investigate potential high organisational level impacts of persistent organic pollution in the wetlands in the Sydney Olympic Park (SOP) remediated site, the benthic macroinverte-

brate assemblages of seven wetlands within SOP and two off-site reference wetlands were examined. Sediment cores were collected, stained and preserved from each study site and the macroinvertebrates identified to the appropriate taxonomic level (class, order, family, subfamily) (in Odonata: Coenagrionidae & Corduliidae). Data were analysed for taxon richness and macroinvertebrate abundance and multivariate techniques were used to identify chemical/physical characteristics of the sediment, which were important influences on the differences in the assemblage between study sites. Macroinvertebrate abundance was highly variable between study sites and taxon richness was low across all sites. Oligochaetes, nematodes, ostracods and chironomids were the most common taxa found and were the most important in influencing differences between the macroinvertebrate assemblages among the study sites. Sediment grain size and chemical characteristics of the sediments (RPAH, RPCB, TCDDeq and heavy metal concentrations) were important in separating the study sites based on taxon richness and abundance. Canonical correspondence analysis separated the macroinvertebrate assemblages at newly two created wetlands from those at other study sites including the urban reference sites. Increased sediment POP contamination (particularly as measured TCDDeq and RDDT concentrations) is a likely contributor in excluding pollution sensitive taxa and, therefore, alterations to benthic macroinvertebrate assemblages. Further, the influence of TOC suggests the significance of catchment inputs in contributing to changes in macroinvertebrate assemblage. The SOP remediation led to the establishment of wetlands with benthic communities representative of those expected in urban wetlands." (Authors)] Address: Rawson, C.A., Department of Environmental Sciences, Institute of Water and Environmental Resource Management (IWERM), University of Technology, Sydney (UTS), PO Box 123, Broadway, Sydney, NSW 2001, Australia. E-mail: C.Rawson@curtin.edu.au

9906. Reels, G.T. (2010): Seasonal emergence of dragonflies (Odonata: Anisoptera) at ten ponds in Hong Kong. *Hong Kong Entomological Bulletin* 2(1): 24-31. (in English) ["Dragonfly emergence was monitored at ten ponds in Hong Kong, using emergence traps, for periods of varying duration between February 2004 and September 2007. Three newly created ponds, five re-profiled ponds and two long-established former commercial fish ponds were included in the study. Exuviae abundance varied considerably between ponds and years, as did the number of species recorded. There was an overall declining trend over the four year period. The causes of these variations were not determined. Dragonfly emergence was strongly seasonal in all four years, with > 80% of total annual emergence occurring in March to May in most ponds. A winter emergence peak, dominated by *Pantala flavescens*, was recorded in ponds which had only been filled in the preceding summer." (Author)] Address: Reels, G.T., H-3-30 Fairview Park, Yuen Long, N.T. Hong Kong. E-mail: gtreels@cyberdude.com

9907. Resende, D.C.; De Marco, P. (2010): First description of reproductive behavior of the Amazonian damselfly *Chalcopteryx rutilans* (Rambur) (Odonata, Polythoridae). *Revista Brasileira de Entomologia* 54(3): 436-440. (in English, with Portuguese summary) ["Polythoridae comprise a widespread group of species in the New World tropics, but little is known about their behav-

ior or life history. Here, we described the reproductive behavior of Amazonian *Chalcopteryx rutilans*, using mark-recapture techniques. Males were resident and territorial, though we found disputes (complex flight manoeuvres) to be rare. Trunks (rotting wood) were important to male persistence in sites, as these are the locations preferred by females for oviposition. The mating system of *C. rutilans* may be comparable to the resource limitation category, described by Conrad & Pritchard (1992), where males cannot control female access to oviposition sites. So, female choice becomes important and apparently, the observed displays (in which males flash the coppery coloration of their hind wings) may be related to attraction of females to territories, as in a lek system." (Authors)] Address: Resende, D.C., Laboratório de Bioinformática e Evolução, Depto. de Biologia Geral, Universidade Federal de Viçosa, 36570-000 Viçosa-MG, Brazil. E-mail: dcresende@ig.com.br

9908. Risely, K. (2010): A mixed bag for Britain's birds. *BTOnews* 290: 21-22. (in English) [Recent increase in population and northward range extension in UK of the Hobby (*Falco subbuteo*; Aves) is explained as follows: "Numbers are increasing and the species' range expanding, perhaps in response to climate change affecting dragonfly numbers and range, a key food source for this dashing falcon."] Address: not stated

9909. Ross, A.J. (2010): A review of the Carboniferous fossil insects from Scotland. *Scottish Journal of Geology* 46: 157-168. (in English) ["The known fossil insects of Carboniferous age from Scotland are reviewed. Of the seven recorded, one record is highly dubious and rejected, and another is herein identified as a crustacean. The remaining five insects belong to three orders: The extinct order Protodonata (giant dragonflies) is represented by the holotype of *Truemanina multiplicata* (Bolton 1922). The extinct order Palaeodictyoptera is represented by the holotypes of *Lithomantis carbonarius* Woodward 1876 and the nymph *Idoptilus peachii* (Woodward 1887b) comb. nov. The order Blattodea (cockroaches) is represented by the lost holotype of '*Lithomylacris*' *kirkbyi* Woodward 1887a and a nearly complete cockroach, herein identified as *Archimylacris*? sp. The localities and ages are reviewed and the five insect specimens came from the Coal Measures (Westphalian) of Ayrshire and Fife." (Author)] Address: Ross, A.J., Department of Natural Sciences, National Museums Collection Centre, National Museums Scotland, 242 West Granton Road, Edinburgh, EH5 1JA, UK. E-mail: a.ross@nms.ac.uk

9910. Rosset, V.; Lehmann, A.; Oertli, B. (2010): Warmer and richer? Predicting the impact of climate warming on species richness in small temperate waterbodies. *Global Change Biology* 16: 2376-2387. (in English) ["Climate change is expected to affect communities worldwide. Many studies focus on responses at the regional level and show an increase in species richness. However, less is known about the consequences of climate change at the local scale (in ecosystems). Small waterbodies, such as ponds, could play an important role for the assessment of the impact of future changes in climate at the local level. We evaluated here the potential changes due to climate warming in the species richness for various groups (plants, snails, beetles, dragonflies, amphibians) across 113 lowland and high altitude ponds in Switzerland. We modelled the relationships between species richness and environmental variables (including temperature) and predicted species

richness changes for the end of the century (2090–2100; using the A2 IPCC scenario). Temperature rise could significantly increase pond species richness. For the five taxonomic groups pooled, species richness would potentially increase from 41 to 75 (183%) in lowland ponds. In presently species-poor high altitude ponds, the potential increase would be particularly marked, with a proportional increase (1150%; from 14 to 35 species) almost double that in lowland areas. A strong increase in species richness also resulted from models including changes in additional variables, such as land-use or water quality. Future reductions in water quality (e.g. increase in nutrients) may limit the predicted increase in lowland species richness or, conversely, result in a greater increase in species richness in high altitude areas. Nutrient enrichment is shown to affect the taxonomic groups differentially, with plant species richness the most negatively influenced. Climate warming could therefore affect species richness of temperate ponds not only regionally, but also at the local, within ecosystems-scale; species richness could increase markedly in temperate regions, and especially so at higher altitude." (Author)] Address: Rosset, Veronique, Dept of Nature Management, Hepia University of Applied Sciences Western Switzerland, hepia Geneva technology, architecture and landscape, CH 1254 Jussy-Geneva, Switzerland. E-mails: veronique.rosset@hesge.ch

9911. Rüppell, G.; Hilfert-Rüppell, D. (2010): Kinematic analysis of maiden flight of Odonata. *International Journal of Odonatology* 13(2): 181-192. (in English) [The maiden flight of *Calopteryx splendens*, *Coenagrion puella*, *Aeshna cyanea*, *Cordulia aenea*, *Libellula quadrimaculata* "was filmed by slow motion up to 500 f/s and analysed frame by frame. The aim of this study was to find out if the maiden flight differs among various species as well as between teneral and adults within the same species with respect to wing beat frequency, phase-relationship between fore- and hind wings, flight speed and acceleration. All the values of the flight parameters were much lower in maiden flight than in the flight of adults. The possible reasons for the weakness of the maiden flight are discussed." (Authors)] Address: Hilfert-Rüppell, Dagmar, An der Wasserfurche 32, 38162 Cremlingen, Germany. E-mail: d.hilfert-rueppell@tu-bs.de

9912. Šacha, D. (2010): Dragonflies (Odonata) observed during monitoring of species of the European importance in southern Slovakia. *Folia faunistica Slovaca* 15(6): 43-46. (in Slovakian, with English summary) [In 2007, at 6 sites in southern Slovakia 16 odonate species were observed. Three of them are protected by the European law: *Cordulegaster heros*, *Gomphus flavipes*, and *Ophiogomphus cecilia*. In addition, records of *Onychogomphus forcipatus* and *Coenagrion pulchellum* are of regional interest.] Address: Šacha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@vazky.sk

9913. Samways, M. (2010): Impacts of extreme weather and climate change on South African dragonflies. *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 73-84. (in English) ["The absence of ice sheets for many millions of years, yet variable topography and changing climate, has generated considerable biodiversity in South Africa. There is no evidence to date that anthropogenic climate change has affected odonate populations in the region. One reason is that the highly varying weather and climate constitutes considerable background noise against which any effects of

modern climate change must be measured. Evidence is accumulating that the Holocene interglacial and gradual warming has left some species with isolated populations in montane areas among a matrix of arid land. Many South African odonate species are remarkably vagile and elevationally tolerant, readily immigrating into and emigrating from pools during wet and dry phases respectively. Some species take this movement to greater extremes by moving the southern margins of their geographical range back and forth with varying climate. After floods, populations of riverine odonates can recover within a year, although where the riparian corridor has been stripped of its trees, the recovery is very slow. Various synergistic impacts, particularly from invasive alien woody plants, area severe impact on many riverine species, and reducing their ability to respond positively to changing environmental conditions. Large-scale removal of these woody aliens is greatly benefiting the odonates' ability to survive in the short-term and to restore natural corridors for movement in the face of possible future climatic changes." (Author)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

9914. Samways, M.; Niba, A. (2010): Climate and elevational range of a South African dragonfly assemblage. *BioRisk* 5: Special issue: Monitoring climatic change with dragonflies: 85-107. (in English) ["Elevation and climate are interrelated variables which have a profound affect on biota. Flying insects such as dragonflies can rapidly disperse and optimal habitat conditions at appropriate elevations. Such behaviour is likely to be especially important in geographical areas which are subject to major climatic events such as El Niño. Accordingly, we studied dragonflies and environmental variables in a series of reservoirs over an elevational range of 100–1350 m a.s.l. at the same latitude on the eastern seaboard of South Africa. The aim was to determine how elevation and climate (as regional processes), as well as local factors, influence species assemblage variability, habitat preference and phenology. Certain environmental variables strongly explained the main variation in species assemblage. These included local factors such as pH, marginal grasses, percentage shade, exposed rock, marginal forest and to a lesser extent, marshes and flow. Different species showed various tolerance levels to these variables. Elevation and climate as regional processes had very little influence on dragonfly assemblages in comparison with these environmental factors. These odonate species are essentially sub-tropical, and are similar to their tropical counterparts in that they have long flight periods with overlapping generations. Yet they also have temperate characteristics such as over-wintering mostly as larvae. These results indicate evolutionary adaptations from both temperate and tropical regions. Furthermore, most were also widespread and opportunistic habitat generalists. The national endemics *Pseudagrion citricola* and *Africallagma sapphirinum* only occurred at high elevations. However, the endemic *Agriocnemis falcifera* was throughout all elevations, suggesting regional endemism does not necessarily equate to elevational intolerance. Overall, the results suggest that many millennia of great climatic variation have led to a highly vagile and elevation-tolerant dragonfly assemblage which readily occupies new water bodies. Such an assemblage is likely to be highly tolerant of global climate change, so long as there is sufficient water to keep the

reservoirs at a constant level." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

9915. Samways, M.J. (2010): The rare Ghost Duskdarter dragonfly *Zyxomma petiolatum* on Desroches Island, Seychelles. *Phelsuma* 18: 98. (in English) [Verbatim: "On each evening at dusk, between 11th and 21st April 2010, the rare *Zyxomma petiolatum* was hawking the northern shoreline of coralline Desroches Island, Amirantes, Seychelles. It also attempted to lay eggs in swimming pools. What is surprising is that this sandy island is virtually waterless, with only a small pool for tortoises. These dragonfly individuals may have come from the granitic Seychelles, where it has been recorded (Bowler 2006). However, its rarity there, and in Asia (Bedjaniè et al. 2007), does not make it a normal candidate for migratory behaviour, suggesting that there is also a chance that it might be breeding in very small semi-permanent pools on Desroches Island. The only other odonate recorded on Desroches at the same time, was *Tramea limbata*, a well-known long-distance migrant."] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

9916. Sarfaty, A.; Pruett-Jones, S. (2010): Coloration indicates body size in *Calopteryx maculata* (Odonata: Calopterygidae). *International Journal of Odonatology* 13(2): 167-180. (in English) ["*Calopteryx maculata* has become a model system for studying behaviour and reproduction in odonates. Its iridescent coloration is thought to be important in intraspecific interactions but no study has yet measured coloration in a quantitative manner. In a recent study, Fitzstephens & Getty (2000. *Animal Behaviour* 60: 851-855) showed that lipid levels predict coloration as determined by Munsell chips, such that fat males were blue and lean males were green. In this study we quantified color in *C. maculata* with a spectrometer to test the prediction of Fitzstephens & Getty (2000) using quantitative measures. We found that body size, but not lipid levels, correlates with color. In our study, larger males were green and smaller males blue. Territorial males did not differ from non-territorial males in color, size, or lipid levels. Coloration thus predicts size in male *C. maculata*, but the significance of this in intraspecific interactions remains unclear." (Authors)] Address: Sarfaty, Anna, Department of Ecology and Evolution, University of Chicago, 1101 East 57th St., Chicago IL 60637, USA. E-mail: asarf@uchicago.edu

9917. Sauber, F. (2010): Hommage à Jos Hoffmann (1911–2000). *Bull. Soc. Nat. luxemb.* 111: 145-149. (in French) [In the 1960ies, J. Hoffmann contributed significantly to the knowledge of the odonate fauna in Luxembourg.] Address: not stated

9918. Schlotmann, F. (2010): Arealerweiterung der Gemeinen Winterlibelle (*Sympecma fusca*) (Odonata: Libellidae) in Rheinhessen – eine Folge der Klimaänderung und von anthropogener Gewässerunterhaltung. *Fauna und Flora in Rheinland-Pfalz* 11(4): 1385-1396. (in German, with English summary) ["Due to findings in the early 1980 decade in Rheinhessen (Rhineland-Palatinate, Germany) *S. fusca* had a distribution gap that has been explained by climatic parameters and a lack of woodland. New investigations have shown that since 1984 the species has silently expanded its range across

the whole region of about 1400 square kilometers. *S. fusca* prefers shallow ponds of anthropogenic origin that are in an early stage of natural succession and typically have developed reed or cattail stands along the littoral zone. This kind of habitat can be frequently found in flood retention basins and nature conservation ponds and the species seems to be profiting much of these types of stagnant waters. Additionally, the effects of the man-made climate change are thought to be a reason for the expansion. In contrast to most literature statements the winter habitats in Rheinhessen cannot be wooded areas, because these are missing in the region. Wintering seems to take place in habitats of the open landscape like hedges and elements of fallow land. The pioneer character of the species is pointed out." (Author)] Address: Schlotmann, F., Weserstr. 11, 55296 Harxheim, Germany. E-mail: frank.schlotmann@gmx.net

9919. Schlumprecht, H.; Bittner, T.; Jaeschke, A.; Jentsch, A.; Reineking, B.; Beierkuhnlein, C. (2010): Gefährdungsdiskussion von FFH-Tierarten Deutschlands angesichts des Klimawandels. Eine vergleichende Sensitivitätsanalyse. *Naturschutz und Landschaftsplanung* 42(10): 293-303. (in German, with English summary) ["Risk Assessment of Animal Species of the EU Habitats Directive in View of Climate Change: Climate change presumably means greater vulnerability for many animal species of the Habitats Directive. This susceptibility was comparatively estimated for all German animal species of the Habitats Directive based on a uniform database of ecological traits using a uniform methodology. The estimated additional vulnerability was analysed with reference to the Red List status for Germany, the Annexes of the Habitats Directive, to species group and habitat constellation. The results show that endangerment increases in line with the Red List status. Species of Annex II are more endangered than species of Annex IV or V. Beetles are probably more vulnerable than other species groups. Species essentially requiring small structures (mainly butterflies, beetles) are additionally endangered, followed by species requiring aquatic habitats and surroundings or species found exclusively in aquatic habitats. Species which do not necessarily require unfragmented habitats but at least specific or limited habitat patches, or species with a large home range appear to be less vulnerable. The consequences for the conservation of species within Natura 2000 are discussed." (Authors) The analysis includes five odonate species: *Coenagrion hylas*, *C. ornatum*, *Ophiogomphus cecilia*, *Oxygastra curtisii*, *Sympecma paedisca*.] Address: Schlumprecht, H., Büro für ökologische Studien, Oberkonnorsreuther Str. 6a, 95448 Bayreuth, Germany. E-Mail kontakt@bfoes.de

9920. Schneider, T.; Schneider, J. (2010): Occurrence, behaviour, and habitat preference of the Levant Pincertail, *Onychogomphus macrodon* Selys, 1887 in Turkey (Insecta: Odonata). *Zoology in the Middle East* 49: 79-88. ["The current status and distribution of the rare and threatened *O. macrodon* was studied in Turkey 2006-2009. Despite an intensive search for the species, it was found only at one locality in the middle course of the Ceyhan river. Other localities in Turkey, from where the species has been reported in the literature which could not be confirmed. The habitat preference of the species is described and observations on the behaviour of both sexes were made. Some morphological details are described and notes on the colour are given. Litera-

ture records are summarised and reasons for the decline of this species are discussed." (Authors)] Address: Schneider, T., Arnold-Knoblach-Ring 76, 14109 Berlin-Wannsee, Germany. E-mail: karin.thomas.schneider@gmx.de.

9921. Schorr, M. (2010): Umzug der Libellensammlung Jurzitza von Karlsruhe nach Frankfurt, Senckenbergmuseum. *Libellennachrichten* 23: 12-14. (in German) [The important collection of Gerhard Jurzitza, Karlsruhe, Germany with many thousand Southamerican specimens and including holo- and paratypes was translocated from his private property to the Senckenberg Museum in Frankfurt, Germany.] Address: Schorr, M., Schulstr. 7B, 54314 Zerf, Germany. E-mail: bierschorr@online.de

9922. Schröter, A. (2010): On a collection of dragonflies from eastern Georgia, with the first record of *Sympetrum arenicolor* (Odonata: Libellulidae). *Libellula* 29(3/4): 209-222. (in English, with Georgian and German summary) ["On a short field trip in 2006 to eastern Georgia, 14 Odonata species were recorded at six localities. A male of *Sympetrum arenicolor* was collected in the outskirts of Tbilisi. This species is new for the Georgian fauna. All species are annotated and a list of the sampled localities is given." (Author)] Address: Schröter, A., Rasenweg 10, D-37130 Gleichen, Germany. E-mail: asmustim@gmx.de

9923. Shieh, S.-H.; Chi, Y.-S. (2010): Factors influencing macroinvertebrate assemblages in artificial subtropical ponds of Taiwan. *Hydrobiologia* 649: 317-330. (in English) ["Macroinvertebrate assemblages and its association with environmental factors at the 11 artificial subtropical ponds of Taiwan were examined using the multivariate analysis software STATICO. The aims of the study were to determine whether spatial and seasonal variation of macroinvertebrate assemblages changed seasonally, to examine which environmental factors determined the spatial and temporal structure of macroinvertebrate assemblages, and to compare between-pond variations in the taxon composition of macroinvertebrates. Macroinvertebrates were collected seasonally by a corer and a sweep net in 2007, and 13 physical and chemical factors were measured at the same time. A total of 31 macroinvertebrate taxa were collected during the sampling period, and the most dominant taxa were Chironomidae (31.7% of total animal abundance) and Tubificidae (22.4%). STATICO identified pond size, pond depth, sediment depth, and altitude as the major abiotic factors and *Bufo melanostictus* (Amphibia) as the major biotic factor to influence macroinvertebrate assemblages at these ponds. These factors changed with seasonality. For example, the abundance of *B. melanostictus* was the most important factor during the spring but became much less important in other seasons. According to the spatial distribution patterns of macroinvertebrate assemblages, macroinvertebrates could be split into two groups based on their dispersal. The active dispersers, such as insect taxa, were strongly associated with pond size and the passive dispersers, such as non-insect taxa, were strongly associated with the pond depth and/or sediment depth. The results of this study suggested that pond size might influence macroinvertebrate assemblages through their dispersal mechanisms and that the environmental factors which influenced the macroinvertebrate assemblages most changed with seasons in this study area." (Authors) Odonata were represented by nine taxa.] Address:

Shieh, S.-H., Department of Ecology, Providence University, 200 Chung-Chi Rd, Shalu, Taichung, 43301, Taiwan, ROC, E-mail: shshieh@pu.edu.tw

9924. Siraj, S.; Yousuf, A.R.; Bhat, F.A.; Parveen, M. (2010): The ecology of macrozoobenthos in Shallabugh wetland of Kashmir Himalaya, India. *Journal of Ecology and the Natural Environment* 2(5): 84-91. (in English) ["Macrozoobenthos comprise of an important group of aquafauna by way of their contribution to ecosystem stability, besides acting as potential bioindicators of trophic status. Being efficient energy converters, they constitute an important link in the aquatic food web. In view of importance of such an aquatic bioresource, on one hand, and scarcity of information about them, on the other, the present study aimed at working out the species composition, distribution pattern and abundance of macrozoobenthos in relation to several physico-chemical parameters of the Shallabugh wetland of Kashmir Himalaya. The data collected on various physico-chemical parameters showed wide seasonal and site-specific fluctuations. Dissolved oxygen concentration fluctuated between 3 - 12 mg/l, while as free CO₂ ranged from 1 - 19 mg/l showing also high values of bicarbonates of Ca and Mg, nitrogen and total phosphorus. The pH of the wetland remained mostly alkaline but at the emergent macrophytic site it showed a slight acidic trend (6.6) in during late summer. Benthos of the Shallabugh wetland was represented by Arthropoda, Annelida and Mollusca, and was studied in relation to abiotic and biotic factors for one year. Perusal of the results revealed that Arthropoda, Annelida and Mollusca were represented by 10, 7 and 6 species respectively. The abundance of some specific pollution indicator species, especially Annelids such as *Limnodrilus* sp, *Tubifex tubifex* and *Branchiura sowerbyii*, is depictive of transition in trophic status of the wetland from meso- to eutrophy. In view of the eutrophication-induced changing biotic community structure, the present study calls for urgent management and restoration of the Shallabugh wetland ecosystem." (Authors) "*Lestes spec.*" larvae were recorded only once at site W2.] Address: Siraj, S., Centre of Research for Development (CORD), University of Kashmir, Srinagar, J & K, India, 190006. E-mail: mashah75@yahoo.com.

9925. Skvortsov, V.E. (2010): The dragonflies of Eastern Europe and Caucasus: An illustrated guide. KMK Scientific Press Ltd. Moscow. ISBN: 9785873176571: 623 pp. (in bilingual Russian and English) [Reviewed by Asmus Schröter:

Mainly due to the language barrier 20 years after the fall of the Iron Curtain both exchange and cooperation between Odonatologists from Europe and Russia and the successor states of the former Soviet Union still remains on an unsatisfying low level. The result is a considerable mutual lack of knowledge of the respective Odonata fauna of the other side's part of the world. Whilst on the one hand European Russia and the Caucasus region faunistically are still largely terra incognita for most of the European odonatologists, their Russian speaking colleagues on the other hand are frequently unaware of the situation in the West. According to the book author's introduction one of the aims of his work is to function as a link between Russian and English-speaking Odonatologists and in this perspective this consequently bilingual guide of the Odonata fauna of European Russia and the Caucasus region conceptually fills this gap.

The book to be discussed covers the European part of Russia, stretching to the Yamal Peninsula and Tyumen Province in the east. Moreover, the territories of Moldova, Estonia, Lithuania, Latvia, Belarus, Ukraine and Georgia, Armenia and Azerbaijan are considered.

Almost all of the 120 species which are subject of the book are depicted, including numerous detail drawings of appendages, secondary genitalia, wings, larvae and other features substantial for determination. Beside the author's introduction and a concise and well illustrated introduction on morphology of imago and larvae, the main part of the book consists of a dichotomous identification key. The key is organized from suborder down to species level, whereas each species additionally is shortly described in an extra chapter, supplying information on flight period, measurements, distribution and ecology whenever available.

As a special feature of the key and probably a novelty in dragonfly guides, diagnostic traits of the larvae and wing venation (whenever available) are incorporated in the key.

The chapters following the key offer distribution maps based on more than 350 localities, a list of localities, toponyms and administrative items. With extra schemes in a larger scale in some species special attention is paid to the complicated situation of the species rich Caucasus region. The book ends with species annotations and comments on distribution and a list of references.

When first paging through, the most conspicuous feature of the voluminous book is without doubt the more than 2000 (!) aesthetically appealing drawings and illustrations, which alone makes the book a remarkable piece of odonatological artwork. These drawings were made exclusively for this book. Some images, however, show unrealistic proportions, f. ex. the much too big terminalia of the males in *Coenagrion australocaspicum* (page 200) and *ponticum* (208), the inadequately big head in the depicted male of *Cordulegaster insignis charpentieri* (374) etc.

However, the majority of the drawings in view of accuracy and clarity satisfy high scientific demands.

Generally the book's importance as a profound and comprehensive fully illustrated diagnostic key for Russian speaking people interested in the dragonflies of the region cannot be assessed highly enough, as to date no up-to-date dragonfly guide for the region was available.

As the level of odonatological exploitation in the considered region, compared to the Asian part within the area of the former Soviet Union, curiously still remains on a lower level, the book hopefully will have a positive effect on the faunistic survey of the region encouraging more people interested in nature to deal with dragonflies.

As far as the authors second aim is concerned - to provide a complete revision of the faunistic data of European Russia and the Caucasus especially for non-Russian speaker - unfortunately the book does not meet the requirements.

Beside many unnecessary spelling errors, even very eye catching ones in bold headlines, f. ex. "*Cordulegasler*" (359), in author names, f. ex. "*Kolentai*" (359) or species names, f. ex. constantly "*stirolatum*" (459 onwards), several inconsistencies concerning the contents hamper the reader, f. ex. an incomplete list of abbreviations (23), not allowing the interpretation of several ab-

brevisions in the section "general distribution" in species descriptions, f. ex. MDT, ME, TEA, AM etc.

The same goes for missing entries concerning the navigation of the headers and footers of the key, f. ex. in *Onychogomphus lefebvrei* (346) no indication to the annotation on page 593 is given, the latter being written inconsistently on one and the same page (346) "*lefebvrei*" (species description) and "*lefebvrei*" (footer below) etc.

Several contents are incorrect displayed, f. ex. *Onychogomphus assimilis* is stated for Lagodekhi NE Georgia in the species annotation (593; i. e. Bartenev 1932), but this is not plotted on the species distribution map (583).

Data given for several species concerning the status in the region are blurred and lost in vagueness, f.ex. in *Onychogomphus lefebvrei*:

Whilst the genus introduction (340) ["The only species widespread over the region is *O. forcipatus*; however, three other species occur in its Caucasus part where field separation of all the congeners is complicated."] implicitly mentions this species as part of the regional fauna and thus leads to the assumption, that *O. lefebvrei* definitively occurs in Caucasus, it is relativised in the following annotation "only reported from NW Caucasus; no exact data cited" (593). Thus, the reader is left in the lurch about the status of *O. lefebvrei* in the region and it remains unclear for which reason this species is dealt with at all etc.

Other data are out of date and incorrect, f. ex. in *Ophiogomphus*:

Four North Asian members of the genus *Ophiogomphus* are known from the area of the former Sowjet Union, not only three! (338/339): *O. cecilia* (Geoffroy in Fourcroy, 1785) (= *O. serpentinus* (Charpentier, 1825), *O. obscurus* Bartenev, 1909, *O. reductus* Calvert, 1898 and *O. spinicornis* Selys, 1878. For *O. spinicornis* in Russia see Kosterin (2003). Even though the latter three are not very likely to be found in the covered area, they are now widely accepted as full species (inter alia Asahina (1979), Haritonov & Borisov (1990).

Moreover, several species included in the key do decidedly not occur in the considered region, but have been recorded in adjacent areas and countries and might be considered as hopeful candidates to be discovered once. Those species are marked with an asterisk, and thus being clearly designated as such. However, at least some of the included species marked with an asterisk, like *Oxygastra curtisii* and *Somatochlora borisi*, are in hardly any respect connected to the region and according to the author included just on account of interest to show the fascinating taxonomical variety of dragonflies (16/17). However, I would have cautioned the author from doing so, as the pure mention of such species bearing no relation to the region or the content of the book at all, is just another unnecessary source of misunderstanding.

The same applies for the dubious Lithuanian record of *Sympetrum eroticum* (Stanionyte 1989) which, although clearly marked with an asterisk, should have better been neglected at all.

Some further species are presented in a very general way and a more precise and differentiated contemporary presentation or at least the attempt to do so would have been desirable:

Gomphus flavipes: Unfortunately no indication on the occurrence of *Gomphus ubadschii* Schmidt, 1953 (sub

(*Gomphus flavipes lineatus* Bartenev, 1929) is given and only the nominate taxon is considered (337). *Lineatus* was described from Poti/Georgia by Bartenev (1929) and it appears likely that all records of *flavipes* from Transcaucasia in fact pertain to *ubadschii*.

Aeshna juncea: The bewildering phenotypical variability of *A. juncea* in the Caucasus region and the doubtful status of two regional taxa *atshischgho* Bartenev, 1929 and *crenatooides* Bartenev, 1929 are mentioned shortly (285), but unfortunately no new information or interpretation is given. Especially against the background of recent records of specimens of *A. juncea* of the "mongolica-type" with distinctly enlarged yellow thorax pattern in adjacent NE Turkey

(<http://www.libellen.org/epallage/pubs/juncea.html>)

further information on distribution and colouration of Caucasian populations would have been highly appreciated. From this perspective "the comma-like spot below spiracle" presented as diagnostic feature in the key (274) to separate *subarctica* from *juncea* may apply elsewhere, but should be treated with some caution in the Caucasus region.

However, such weak points are of minor importance and do not affect the general quality of the book. Much more serious in this context is, however, the frequent uncritical reviewing and subsequent repeating of obviously or probably erroneous records. Undoubtedly, the book boasts an impressive amount of data and contains the essence of virtually the complete literature relevant for the region and one can easily imagine the huge amount of work behind it. However, one main problem - beside the language barrier - most of the European Odonatologists are constantly facing while dealing with (mainly old) faunistic data from Russia and the Caucasus, are the numerous doubtful records and unclear status of several taxa described from the region. In this respect the book unfortunately does hardly provide any progress as it does largely not represent the current state of knowledge and unfortunately contains such doubtful data throughout. Considering the stated aim of the author on the one hand, to improve the insufficient communication between East and West (9), and the nature of many of the erroneous data presented on the other hand, one could easily get the impression, that the author itself became a victim of insufficient exchange with colleagues from elsewhere as obvious errors like *Cordulegaster princeps* etc. might easily have been avoidable just by a few words from an expert of the region. Those mistakes cast a shadow on the pleasure to read and work with this otherwise useful book.

The following seven species and taxa dealt with in identification key and species description, which are presented as part of the fauna of the area covered by the book are either doubtful or with the outermost probability erroneous and should be therefore deleted from the species list at all:

1. *Platycnemis latipes*: Stated for Kabardino-Balkaria (Russian Caucasus).

P. latipes is a western Mediterranean Endemic confined to Iberia and France and definitively not part of Russia and adjacent countries. According to the cited reference (594) ([Byuleten' gosudarstvennogo muzeya Gruzii] 6:85-96) another specimen from that area was considered (...) "a form of *P. pennipes* closely resembling *P. latipes*." However, obviously the same goes for that particular specimen stated as *P. latipes*. Another explanation

might be confusion with the similar regional congener *P. dealbata*.

2. *Coenagrion mercuriale*: Stated for Armenia, Azerbaijan and Belarus (588/589). This species has been rejected by Tally et al. (2004) from the checklist of Armenia, and Dijkstra (2006: 110) consider even all records of *C. mercuriale* from Eastern Europe to be erroneous. Hence, the occurrence of this western Mediterranean species in the Caucasus region generally seems to be most unlikely.

3. *Onychogomphus forcipatus unguiculatus*: Both taxa *albotibialis* and *unguiculatus* are stated for Caucasus (593). However, Boudot et al. (1990) outlined the nature and distribution of the subspecies of *Onychogomphus forcipatus*, whereupon the taxon *O. f. unguiculatus* is confined to the western Mediterranean and is replaced by *O. f. albotibialis* in Asia Minor. Therefore, *O. f. unguiculatus* is certainly not part of the regional fauna. As far as the Caucasus is concerned Reinhardt (1992) and Schröter (2010b) decidedly assigned specimens from Georgia to *O. f. albotibialis*.

4. *Gomphus davidi*: *G. davidi* is stated for Caucasus without further information (336). However, *Gomphus davidi* is a Levantine Endemic restricted to a small range within Turkey, Israel, Jordan, Lebanon and Syria (Suhling & Müller 1996, Kalkman 2006, Boudot et al. 2009) and most probably does neither occur nor will ever be expected in the Caucasus or elsewhere within the region covered by this book.

5. *Cordulegaster princeps*: *C. princeps* is an endemic confined to the Middle and High Atlas of Morocco (Boudot 2001, Van Pelt (2006), Boudot et al. 2009) and thus the stated record from Tbilisi/Georgia is with the outermost certainty erroneous and one could hardly imagine another Palaearctic dragonfly species, whose occurrence in Georgia is as unlikely as this.

6. *Cordulegaster coronata*: Included in the diagnostic key (364) and in the species description (367), but no further information or data are given - "no regional data" (367), "no local record" (590). However, this Central Asian species is very unlikely to occur within the considered region. In addition to all this, images which should depict *Cordulegaster coronata* are erroneous and both images of the male in top and lateral view (375) do for sure not show this species! *C. coronata* has a much yellower overall appearance and the yellow abdominal markings do laterally not descend onto the underside of the segments, every segment additionally shows yellow apical patches and on segments 8 and 9 very distinctive shaped yellow "double-7 spots" are present. For accurate drawings of males of *C. coronata* see Fraser (1929), Schmidt (1961) and for photos of both sexes Schröter (2010a).

7. *Brachythemis impartita* (Karsch, 1890) (see: Dijkstra & Matushkina, 2009: sub *B. leucosticta*): *Brachythemis impartita* has an Afrotropical distribution and comes closest to the considered region in the Near East, where it is locally very common. Notably only a few records from adjacent southern Turkey are known to date (Kalkman 2006, Dijkstra 2006). Although a wandering individual could not be excluded a priori, the cited very old single record (586; referring to Bartenev 1912d) appears to be erroneous beyond doubt.

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- 9928.** Smith-Patten, B.D.; Patten, M.A. (2010): Broken antehumeral stripes in a male *Enallagma civile* (Familial Bluet). *Argia* 22(3): 20. (in English) [Two avoid identification confusion it is important to consider that life and dried specimens may differ in appearance: Broken antehumeral stripes on a male *E. civile* collected near Fonda, Dewey County, Oklahoma, USA, 23-V-2010 are shown by the authors. These stripes were symmetric in life, but postmortem desiccation of the specimen has distorted this symmetry.] Address: Smith-Patten, Brenda, Dept of Recent Invertebrates, Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma 73072, E-mail: argia@ou.edu

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- 9930.** Suhling, F.; Marais, E. (2010): *Crenigomphus kavangoensis* sp. nov. from the Okavango River, Namibia (Odonata: Gomphidae). *International Journal of Odonatology* 13(2): 267-276, pl. Ib, c. (in English) ["A new species of *Crenigomphus* is described and illustrated from a type series of eight males and eight females, all collected along the Okavango River in Namibia during December 2004, three non-type adult specimens and several exuviae (holotype male: Namibia, N'Kwazi Lodge, 19 xii 2004, deposited at NMNW). Both sexes lack foliations at S8-9 as occur in some *Crenigomphus*, but the male is peculiar in having exceptionally long cerci. The latter character is normally present in the genus *Paragomphus*. Other characters typical of *Crenigomphus* include all wings having a bright yellow costal border, S10 longer than S9 in males, colouration mostly ochreous with few darker markings, and the strong blackish serration at the posterior end of the cerci. The larval characters based on exuviae, one associated with an emerged male, do not allow clear separation from *Paragomphus*." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de
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- 9932.** Szivák, I.; Deák, C.; Kálmán, Z.; Soós, N.; Mauchart, P.; Lökkös, A.; Rozner, G.; Móra, A.; Csabai, Z. (2010): Contribution to the aquatic macroinvertebrate fauna of the mountains Mecsek with the first record of *Limnius opacus* P.J.W. MÜLLER, 1806 in Hungary. *Acta Biol. Debr. Oecol. Hung.* 21: 197-222. (in English, with Hungarian summary) [In 2005, 2008 and 2009 faunistic and quantitative samplings were carried out at 54 sampling sites in the mountains Mecsek. The species list includes many records of *Cordulegaster heros*, and a single record of *Calopteryx virgo*.] Address: Szivák, I., University of Pécs, Department of General and Applied Ecology, Ifjúság útja 6, H-7624 Pécs, Hungary. E-mail: szivaki@gamma.ttk.pte.hu
- 9933.** Tajima, V.; Watanabe, M. (2010): Sperm transfer process in the non-territorial *Ischnura asiatica* (Brauer) during copulation (Zygoptera: Coenagrionidae). *Odonatologica* 39(3): 253-258. (in English) ["According to the movements of the male abdomen, the copulation process in *I. asiatica* is divided into 3 stages (I, II and III). The mean duration of each stage was 75.8 ± 8.8 min, 6.4 ± 0.3 min and 15.8 ± 0.9 min for stage I, II and III, respectively (S.E.). No sperm transfer was found during stage I. The prolonged duration in stage I was related to the time of onset of copulation. Sperm was transferred into the bursa copulatrix during stage II. Although stage III was a phase without apparent abdominal movement, the sperm transfer was continued, following the sperm migration from the bursa copulatrix to the spermatheca. Immediately after copulation termination, the estimated number of sperm was $64,500 \pm 4,425$ in the bursa copulatrix and $43,143 \pm 6,397$ in the spermatheca (S.E.). The role of each stage in copulation will be discussed from the viewpoint of sperm competition." (Authors)] Address: Tajima, V., Graduate School of Life and Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: tj@ies.life.tsukuba.ac.jp
- 9934.** Takahashi, Y.; Yoshimura, J.; Morita, S.; Watanabe, M. (2010): Negative frequency-dependent selection in female color polymorphism of a damselfly. *Evolution* 64(12): 3620-3628. (in English) ["Negative frequency-dependent selection (NFDS) is one of the most powerful selective forces maintaining genetic polymorphisms in nature. Recently many prospective cases of polymorphisms by NFDS have been reported. Some of them are very complicated, although strongly supportive of the NFDS. Here we investigate NFDS in wild populations of the dimorphic damselfly *Ischnura senegalensis*, in which females occur as andromorphs and gynomorphs. Specifically, we (1) test fitness responses to morph frequencies, (2) built a simple population genetic model, and (3) compare the observed and predicted morph-frequency dynamics. Fitnesses of the two morphs are an inverse function of its own frequency in a population, and are about equal when their frequencies are similar. Thus the conditions necessary for NFDS are satisfied. The long-term field surveys show that the morph frequencies oscillate with a period of two generations. Morph frequencies in a small population undergo large oscillations whereas those in a large population do small oscillations. The demographic properties of the observed dynamics agree well with those of our model. This example is one of the simplest confirmed cases of NFDS maintaining genetic polymorphisms in nature." (Authors)] Address: Watanabe, M., Grad. School of Life & Environmental Sc., Univ. Tsukuba, Tennodai, Tsukuba, Ibaraki 305-8572, Japan
- 9935.** Tang, H.B.; Wang, L.K.; Hämäläinen, M. (2010): *A Photographic Guide to the Dragonflies of Singapore*. ISBN-13: 9789810861551: 222 pp. (in English) [This fieldguide includes details of all 124 species currently found in Singapore "and almost all are illustrated in brilliant colour photographs. There are additional chapters covering Odonata taxonomy, morphology, ecology and conservation and tips on where to find and how to study them." (Publisher)] Address: Nature's Niche Pte Ltd, 10 Lorong Lada Hitam, Singapore 778793, Singapore
- 9936.** Taylor, P.; Smallshire, D. (2010): A change in status of the Dainty Damselfly *Coenagrion scitulum* (Rambur) in the United Kingdom. *J. Br. Dragonfly Society* 26(2): 108-109. (in English) ["The revised list of Odonata in the United Kingdom produced by Taylor et al. (2009) contained 42 species in Category A, a further

12 species in Category B and 3 species in Category C (former breeding species not recorded since 1970). The discovery of at least four *Coenagrion scitulum* adults in Kent during June and July 2010 and the identification of two exuviae from the same species, require *C. scitulum* to be moved from Category C to Cat. B (vagrant species)." (Authors)] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK

9937. Termaat, T.; Kalkman, V.; Bouwman, J. (2010): Changes in the range of dragonflies in the Netherlands and the possible role of temperature change. *BioRisk 5: Special issue: Monitoring climatic change with dragonflies: 155-173.* (in English) ["The trends of 60 Dutch dragonfly species were calculated for three different periods (1980–1993, 1994–1998 and 1999–2003). Comparing period 1 and period 3 shows that 39 of these species have increased, 16 have remained stable and 5 have decreased. These results show a revival of the Dutch dragonfly fauna, after decades of ongoing decline. The species were categorized in different species groups: species with a southern distribution range, species with a northern distribution range, species of running waters, species of fenlands and species of mesotrophic lakes and bogs. The trends of these different species groups were compared with the all-species control group. As expected, a significantly higher proportion of the southern species show a positive trend than the all-species group. In the northern species group on the contrary, a significantly higher proportion of the species show a negative trend than the all-species group. Different explanations for these results are discussed, such as climate change, improved quality of certain habitats and degradation of other habitats. It is likely that the observed increase of southern species is at least partly caused by the increasing temperatures. The less positive picture of the northern species group is probably more influenced by other environmental factor than directly by climate change. Three out of six southern species which have become established since 1990 have done so during the aftermath of large invasions. It is concluded that dragonflies are well capable of using changing climate circumstances to colonise new habitats." (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

9938. Thienel, F.; Holtmann, B. (2010): Libellen (Odonata) im EU-Vogelschutzgebiet Südradde sowie in den NSG Molberger Dose und Hahnenmoor. *Feuchtwiesen-Info 10: 25-28.* (in German) [Niedersachsen, Germany. Between 2009 and 2010 a total of 30 odonate species was recorded. The list of species includes regionally rare or threatened species as *Ceragrion tenellum* and *Sympetrum depressiusculum*.] Address: Thienel, F., St. Antoniort 1, 49610 Quakenbrück, Germany

9939. Tom, K.R.; Newman, M.C.; Schmerfeld, J. (2010): Modeling mercury biomagnification (South River, Virginia, USA) to inform river management decision making. *Environmental Toxicology and Chemistry 29: 1013-1020.* (in English) ["Mercury trophic transfer in the South River (VA, USA) was modelled to guide river remediation decision making. Sixteen different biota types were collected at six sites within 23 river miles. Mercury biomagnification was modelled using a general biomagnification model based on $\delta^{15}N$ and distance from the historic mercury release. Methylmercury trophic transfer was clearer than that for total Hg and, therefore, was used to build the predictive model ($r^2_{prediction} = 0.76$).

The methylmercury biomagnification factors were similar among sites, but model intercept did increase with distance down river. Minimum Akaike's Information Criterion Estimation (MAICE) justified the incorporation of distance in the model. A model with a very similar biomagnification factor to the South River (95% confidence intervals [CI] = 0.38–0.52) was produced for a second contaminated Virginia river, the North Fork Holston River (95% CI = 0.41–0.55). Percent of total Hg that was methylmercury increased monotonically with trophic position. Trophic models based on $\delta^{15}N$ were adequate for predicting changes in mercury concentrations in edible fish under different remediation scenarios." (Authors) Organisms analyzed from the South and Holston Rivers (VA, USA) include "Gomphidae" and "Zygoptera".] Address: Newman, M.C., College of William and Mary—VIMS, Gloucester Point, Virginia 23062, USA. E-mail: newman@vims.edu

9940. Trockur, B.; Boudot, J.-P.; Fichet, V.; Goffart, P.; Ott, J.; Proess, R. (2010): Atlas der Libellen / Atlas des libellules (Insecta, Odonata). *Fauna und Flora in der Großregion / Faune et Flore dans la Grande Région, Band 1; Hrsg./Éd.: Zentrum für Biodokumentation (Landsweiler-Reden): 201 pp.* (Bilingual in German and French, with English summary) ["All data on dragonflies collected in the databases of the five partner regions of the „Sar-Lor-Lux+-region" have been put together and on this basis, actual maps have been compiled. Existing databases of four regions were completed with the data up to the year 2006. Furthermore, for the first time ever, a database on dragonflies was established for the German federal state Rhineland-Palatinate. Concerning the depiction of the total number of 117 053 records, two time spans are compared: before 1990, and from 1990 onwards whereupon 70 % of all records originate from the second period. In the „Großregion", a total of 75 species are known, whereas in each of the three big regions (regarding their extension) Wallonia, Lorraine and Rhineland-Palatinate, 67 species have been detected. On the basis of the total number grid cells (10x6 minutes, about 134 km² each grid cell) where a species was recorded, a simple analysis of the most common and the rarest species is conducted, as well as of the species with the biggest increase and the biggest decline during the two time spans which have been compared. In addition, maps showing the "dragonfly hotspots" (areas with a high number of different species) in the "Großregion" were created by summarizing all species per grid cell. All species listed in the different Red Lists and in the Annexes II and IV of the EC Habitats Directive are presented in a table. Range expansions or changes within the faunas - observed or expected - are described and discussed; some remarkable species of the "Großregion" are presented and described. All species are described in a single chapter by one of the five authors — representing the five regions — who were also responsible for the photos of the species and typical biotopes thus emphasizing the cross-border cooperation. Finally, the experiences made in compiling the atlas are discussed and suggestions for further cross-border cooperation are presented." (Authors)] Address: Zentrum für Biodokumentation, Am Bergwerk Reden 11, 66578 Schiffweiler, Germany. E-mail: info.biodoku@lua.saarland.de

9941. White, E.L.; Corser, J.D.; Schlesinger, M.D. (2010): Distribution and Status of the Odonates of New York. A Partnership between The Nature Conservancy

and the NYS Department of Environmental Conservation, 625 Broadway, 5th Floor Albany, NY 12233-4757: 424 pp. (in English) ["The New York Dragonfly and Damselfly Survey (NYDDS) began in 2005, spanned five field seasons through 2009, and relied heavily on citizen scientists to help collect data over a large geographic area. Its primary goal was to document the current distribution of all odonate species in New York State. This cooperative project between the New York State Department of Environmental Conservation (NYSDEC), Division of Fish, Wildlife and Marine Resources, and the New York Natural Heritage Program was funded through New York State Wildlife Grant T-2-1 in cooperation with the U.S. Fish and Wildlife Service Division of Wildlife and Sport Fish Restoration. Survey efforts were directed toward under-surveyed regions, areas with potential high diversity, and locations with potential for harboring Species of Greatest Conservation Need (SGCN). NYDDS volunteers were trained at workshops held throughout the state during the summers of 2005-2007. The training was designed for beginners from all walks of life and focused on basic odonate biology, taxonomy, and identification, as well as field capture and specimen preservation techniques. Nearly 300 people were trained at these workshops, some of whom were NYSDEC or NY Natural Heritage staff. We focused most of our survey efforts on adults rather than larvae due to their relative ease of identification. Surveys were completed from April through October in or near aquatic breeding habitats such as lakes, ponds, bogs and fens, rivers and streams, marshes, swamps, and forest seeps. Wooded areas and fields near aquatic habitats were also fruitful survey sites, as adults use these areas to mature, roost, and forage. We took many steps to ensure that data received from volunteers were accurate. Participants were provided with a list that noted, for each species (and in some cases, for each sex) the level of verification necessary for record confirmation (observation, photograph or specimen). These photo and specimen vouchers were verified by odonate experts. Our five-year sampling effort yielded many important finds. Most notable were five species added to the list of known odonates for the state, bringing the cumulative total to 194 species, one of the highest diversities of any U.S. state. Owing to the efforts of entomologists, odonatologists, and odonate enthusiasts prior to the NYDDS, New York has records extending back to the late 1800s. This existing county distribution information was compiled by odonatologist Thomas Nick Donnelly of the Dragonfly Society of the Americas in 1999 and again in 2004. We were unable to confirm the presence of 15 of the 189 Odonata species ever documented in New York by Donnelly, and every one of these species was rare in the state to begin with. Participants visited over 2,170 survey sites statewide and a total of 4,383 surveys were conducted, including repeat visits. We confirmed over 18,000 individual species records based on our verification protocol. NYDDS yielded 1,111 new county records beyond these preexisting data. Each county's documented richness increased by 18 species on average, and we documented at least 75 species in two-thirds of New York's 62 counties. A list was compiled for each county as well as a distributional map and phenology chart for all 194 species and full species accounts are included for all 48 SGCN. We calculated draft S-ranks for rare species using NatureServ's Element Rank Calculator and we found that of N's 194 odonate species, 26% are likely to be ranked as critically imperiled (S1) or imperiled

(S2). Surveys for the state historical *Williamsonia lintneri* were unsuccessful, but produced leads in the Grafton and Rome areas. We completed at least five group surveys in western NY for the Federally Endangered *Somatochlora hineana* in appropriate habitat; we did not confirm the species, and it seems unlikely to be present, with the nearest known population occurring in Michigan. Multiple surveys have often been required before the presence of *S. hineana* was confirmed at new sites discovered in Wisconsin and other states, so future survey work may yet prove fruitful. Surveys for New York's state-threatened damselflies in Suffolk county revealed two new sites for *Enallagma recurvatum* (previously known from nine ponds), seven new sites for *Enallagma pictum* (previously known from three ponds), and *Enallagma minusculum* is known from three locations (two in Suffolk county and one in Queens). These surveys will inform the development of a Recovery Plan for these species. Analyses of survey effort showed that the state was sampled sufficiently to document its odonate fauna. Similarly, each of the state's seven ecoregions was well sampled, while some counties could have used additional survey effort. Such counties where additional survey effort would be most productive were identified and survey effort, ecological and biogeographical explanations were forwarded as possible reasons for the apparent lower species richness in western vs. eastern New York. Since odonates are noted indicators of water quality, biodiversity, and ecological change, our findings should help inform future conservation efforts in freshwater habitats. Along with previous distribution information, this report provides baseline information on the distribution and status of odonates in New York against which to measure future change. Much like the 2000-2005 Breeding Bird Atlas followed up on the 1980-1985 Atlas, leading to some highly informative analyses of distributional shifts, we hope that in the future this survey effort will be similarly revisited to assess shifts in odonate distributions. Monitoring of this sort may be the only way to know whether we are maintaining New York's dragonfly and damselfly biodiversity in the face of continuing global change." (Authors)] Address: White, E., NYSDEC-DFWMR, NY Natural Heritage Program, 625 Broadway, 5th Floor, Albany, NY 12233-4757, USA: E-mail: nydds@gw.dec.state.ny.us

9942. Wildermuth, H. (2010): *Somatochlora flavomaculata* als Beute von Radnetzspinnen (Araneae: Araneidae). *mercuriale* 10: 43-46. (in German, with English summary) [Switzerland; *S. flavomaculata* "has been recorded three times deadily entangled in orb webs. In all cases ovipositing females were concerned, in two of them also males were caught, probably after they had grasped an ovipositing female. The findings are discussed with respect to gender-specific predation-proneness of *S. flavomaculata* by orb-web spiders." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

9943. Wildermuth, H. (2010): Ein Dreigespann der Großen Moosjungfer (*Leucorrhinia pectoralis*). *mercuriale* 10: 47-48. (in German) [Intraspecific triple connection in *Leucorrhinia pectoralis* (Odonata: Libellulidae).] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

9944. Wildermuth, H. (2010): Monitoring the effects of conservation actions in agricultural and urbanized landscapes – also useful for assessing climate change?.

BioRisk 5: Special issue: Monitoring climatic change with dragonflies: 175-192. (in English) ["Various methods for measuring the success of conservation actions and for evaluating aquatic habitats are outlined, based on quantified dragonfly monitoring. They are discussed with respect to their practicability and information value, counts of adult males and especially of exuviae yielding the most valuable results. These are presented by actual examples of mire ponds, streams, ditches and rivers from central Europe, making allowance for the dynamics of the habitats and their dragonfly community. Records of detailed data, if repeated subsequently at the same localities with the same methods, are considered a useful basis for preparation of distribution maps and for comparison of the fauna over the time. Fauna shifts in horizontal and vertical distribution over the time should be judged critically with respect to climate change as they could also be caused by anthropogenic habitat changes." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hans-ruedi@wildermuth.ch

9945. Willigalla, C.; Fartmann, T. (2010): Libellen-Diversität und -zöosen in mitteleuropäischen Städten. Ein Überblick. *Naturschutz und Landschaftsplanung* 42(11): 341-350. (in German, with English summary) ["Since 1986 nearly 30 Odonata surveys in cities have been published in Central Europe. 77% (62 species) of the total Odonata fauna of Germany have been found in cities. This high Odonata species richness can be explained by the structural richness due to the high natural diversity of habitats within the biogeographical regions of the cities. However, increased urbanization leads to homogenization of the Odonata fauna. The Odonata assemblages of the cities are more similar than those of not built-up areas, which was indicated by a significantly higher Sørensen coefficient. Within the city borders an urban gradient can be observed. To the city centre the total number of species and the proportion of specialists markedly decreases. In the cities' centers, the Odonata communities only occur rudimentarily, and not even the 21 most frequent species have been found in all cities. The highest species diversity in cities was reported before 1975 with a decreasing trend thereafter. Since the 1990ies the number of species recorded in cities has increased again, probably because of the improvement of the total quality of lotic waters. Approximately 37% of the total Odonata fauna of Germany can be classified as "urbano-neutral" to moderately "urbano-philous". Correspondingly, 63% of all species are restricted to non-sealed areas and can be classified as (moderately) urbanophobe." (Authors)] Address: Willigalla, C., Willigalla - Ökologische Gutachten, Am großen Sand 22, D-55124 Mainz, Germany. E-mail: christoph@willigalla.de

9946. Worthen, W.B. (2010): Emergence-site selection by the dragonfly *Epitheca spinosa* (Hagen). *South-eastern Naturalist* 9(2): 251-258. (in English) ["Odonates are vulnerable during emergence, when they shed their exuvia to take flight as adults. Emergence-site selection should adapt to the local mortality risks. Here, I characterized emergence-site selection of *E. spinosa* by noting the substrate, height, and distance from water of exuviae in a 300 m × 5 m plot at Weston Lake, Congaree National Park, Hopkins, SC, USA. Of the 82 *E. spinosa* exuviae sampled, 52 (63.4%) were found on trees with corky bark (*Nyssa aquatica* [Water Tupelo], *Nyssa biflora* [Swamp Tupelo], *Fraxinus penn-*

sylvanica [Green Ash]), while no exuviae were found on the peeling, flaky trunks of *Taxodium distichum* (Bald Cypress) or the smooth, platy trunks of *Acer rubrum* (Red Maple). However, 26 (31.7%) exuviae were on *T. distichum* pneumatophores. This pattern was significantly different from the relative abundances of these substrate types ($\chi^2 = 19.8$, $df = 3$, $P < 0.001$). Most exuviae (93.9%) were on substrates touching the water, suggesting that larvae climb directly from the water to their emergence site. The mean height of exuviae on trees was 3.3 ± 1.37 m, with a range from 1.8–7.7 m. High-climbing by *E. spinosa* larvae may be an adaptation to flooding at Weston Lake; major flood events (>3 m) are common (5 of the last 10 years) during their March–April emergence period." (Author)] Address: Worthen, W.B., Biology Dept, Furman Univ., Greenville, SC 29613, USA. E-mail: wade.worthen@furman.edu

9947. Zawal, A.; Czachorowski, S. (2010): Dragonflies (Odonata) and caddisflies (Trichoptera) of water reservoirs in the suburban landscape of Swinoujscie (north-west Poland). *Natura Montenegrina, Podgorica* 9(3): 481-488. (in English) ["In 2007, ten dragonfly species and eight caddisflies species were recorded in periodical water reservoirs situated at the site where a liquefied natural gas terminal was going to be constructed. The encountered dragonfly and caddisfly fauna was typical of periodical reservoirs. Three communities of these insects were differentiated. Faunistic similarities among the reservoirs only partly corresponded to habitat diversity and reservoir types, which might indicate that species composition depends also on colonization processes, which are well described by the model of ecological islands." (Authors)] Address: Zawal, A., Department of Invertebrate Zoology S Limnology, University of Szczecin. 71-415 Szczecin. Wąska 13. Poland. E-mail: zawal@univ.szczecin.pl

9948. Zha, L.-S.; Jiang, Y.-H. (2010): *Epophthalmia bannaensis* spec. nov., a new dragonfly from Yunnan, China (Anisoptera: Corduliidae). *Odonatologica* 39(4): 363-366. (in English) ["The new species is described and illustrated. Holotype male: China, Yunnan: Xishuangbanna Tropical Botanical Garden (21.55°N, 101.13°E), 500m, 4-VIII-2004; deposited at the Institute of Zoology, Shaanxi Normal University, Xi'an, China. It is related to *Epophthalmia frontalis* Selys, but is easily separated based on structural differences of the secondary and caudal genitalia and slight differences in colouration." (Authors)] Address: Jiang, Y.-H., Yuntai-xiang Culture Station, Xinpu district, Lianyungang, Jiangsu-222064, China. E-mail: Jiangyh26@yahoo.com.cn

9949. Zhang, H.; Tong, X. (2010): Descriptions of the final instar larvae of three Chinese *Idionyx* species (Odonata: Anisoptera: Corduliidae). *Zootaxa* 2716: 53-63. (in English) ["The larvae of *Idionyx carinata* Fraser, 1926, *I. selysi* Fraser, 1926 and *I. victor* Hämäläinen, 1991 are described and illustrated for the first time based on final stage larvae reared in laboratory. *Idionyx selysi* is newly recorded from China. A generic diagnosis and biological information are provided." (Authors)] The paper also includes impressive figures of the imaginal stages of the species studied.] Address: Tong, X., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou, 510642, Guangdong Province, P. R. of China. E-mail xtong@scau.edu.cn

9950. Zhang, H.-m.; Tong, X.-l. (2010): Chlorogomphinae dragonflies of Guihou province (China) with first descriptions of Chlorogomphus tunti Needham and Watanabeopetalia usignata (Chao) larvae (Anisoptera: Cordulegastriidae). *Odonatologica* 39(4): 327-338. (in English) [Chlorogomphus papilio, C. nasutus, C. suzukii, C. tunti, and Watanabeopetalia usignata are recorded from Guihou province. Four of them are new for the region. C. tunti and W. usignata larvae are described based on the specimens reared in the laboratory. The adults are illustrated and some biological information is provided.] Address: Tong, X.-L., Dept of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou-510642, China. E-mail: xtong@scau.edu.cn

9951. Zhang, H.-m.; Yeh, W.-c.; Tong, X.-i. (2010): Descriptions of two new species of the genus *Planaeschna* from China (Odonata: Anisoptera: Aeshnidae). *Zootaxa* 2674: 51-60. (in English) ["Two new species of *Planaeschna* McLachlan, *P. laoshanensis* sp. nov. from Shandong, China and *P. nankunshanensis* sp. nov. from Guangdong, China are described and illustrated and diagnosed from their congeners. Description of the final stadium larva of *Planaeschna nankunshanensis* is also provided." (Authors)] Address: Tong, X.-i., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou, 510642, Guangdong Province, P. R. of China. E-mail: xtong@scau.edu.cn

9952. Zoder, S. (2010): *Libellula fulva* MÜLLER, 1764 (Spitzenfleck) am Unteren Inn (Odonata, Anisoptera, Libellulidae). *Mitteilungen der zoologischen Gesellschaft Braunau* 10(1): 91-94. (in German) [Studies of ditches in the lower River Inn region (Landkreise Passau and Rottal-Inn, Bayern, Germany) prior 2008 didn't prove any records of *L. fulva*. First unpublished records from this region of this species dates from 2008. In 2009 and 2010 two additional small populations were found. This is assessed as range extension of *L. fulva*, which also is observed in others west- and central European regions. The paper also includes a record of the rare *Coenagrion ornatum*.] Address: Zoder, S., Am Ziegelstadelberg 17, D-94094 Rothalmünster, Germany. E-mail: Sebastian.Zoder@gmail.com

2011

9953. Cannings, R.A.; Cannings, S.G. (2011): Chapter 10: Odonata (dragonflies and damselflies) of the montane Cordillera ecozone. In: *Assessment of Species Diversity in the Montane Cordillera Ecozone*. Edited by G.G.E. Scudder and I.M. Smith. Royal British Columbia Museum: 1-31 (in English). ["The Odonata are energetic aerial predators of other insects; the aquatic larvae are voracious predators of invertebrates and small vertebrates. Over 5500 species of the order are described worldwide; the Montane Cordillera Ecozone supports about 40% of the Canadian fauna. A checklist and systematic overview of the Suborders Zygoptera and Anisoptera, their 10 families and 81 species (19 of which are listed as potentially endangered, threatened, or vulnerable), and an analysis of their biogeographic elements are presented. Twenty-eight species of Boreal origin (35%) are recorded. Of these, 13 (16%) are Widespread Boreal, 9 (11%) are Southern Boreal, 4 (5%) are Northern Boreal, and 2 (3%) are Western Boreal. Transition species total 18 species (22%) and there are 12

(15%) Cordilleran species. Nine species (11%) are Western, 8 (9%) are Austral, and 6 (8%) are widespread species according to our definitions. Ecozone aquatic habitats and their typical species are divided into 12 categories: large lakes (wave-washed shores with little vegetation), small lakes and ponds (floating, but little emergent vegetation), alkaline ponds, ephemeral ponds, cattail/bulrush marshes (including margins of lakes and ponds), sedge marshes, small peatland ponds with aquatic moss, three types of fens, streams and springs. Stress on dragonfly populations is discussed under the headings of draining of wetlands, flooding of wetlands, fish introductions, lakeshore modifications, livestock disturbance, hot springs development, logging, and climate change. Recommendations for inventory and taxonomic research are noted." (Authors) Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street, Victoria, BC, V8W 9W2, Canada

9954. Chakravorty, J.; Ghosh, S.; Meyer-Rochow, V.B. (2011): Practices of entomophagy and entomotherapy by members of the Nyishi and Galo tribes, two ethnic groups of the state of Arunachal Pradesh (North-East India). *Journal of Ethnobiology and Ethnomedicine* 2011, 7:5 doi:10.1186/1746-4269-7-5: 35 pp. (in English) [We prepared a consolidated list of edible and therapeutic insects used in Arunachal Pradesh (N.E. India) by two tribal societies (i.e., the Nyishi of East Kameng and the Galo of West Siang). The list is based on thorough, semi-structured field-interviews with 20 informants of each tribal group. At least 81 species of local insects, belonging to 26 families and five orders of insects, namely Coleoptera (24 species), Orthoptera (17 species), Hemiptera (16 species), Hymenoptera (15 species) and Odonata (9 species), are being used as food among members of these two indigenous societies. However, Nyishi use overall more species of insects as food than Galo people do and consume mostly Coleoptera and Hemiptera; amongst the Galo, on the other hand, Odonata and Orthoptera dominate. The selection of the food insects amongst the Nyishi and Galo is dictated by traditional tribal beliefs as well as the taste and availability of the insects. Depending on the species, only particular or all developmental stages are consumed. Some food insects may be included in the local diet throughout the year, others only when seasonally available. Commonly specimens are being prepared for consumption by roasting, frying or boiling. Twelve species of insects are deemed therapeutically valuable by the locals and are being used by the tribes investigated to treat a variety of disorders in humans and domestic animals. Members of the Galo use a greater number of insect species for remedial purposes than the Nyishi. With the degradation of natural resources, rapid population growth, and increasing influence of 'westernization', the traditional wisdom of entomophagy and entomotherapy is at risk of being lost. There is thus an urgent need to record the role insects play as components of local diets and folk remedies and to assess insect biodiversity in the light of these uses." (Authors)] Address: Meyer-Rochow, V.B., School of Engineering and Science, Jacobs University, Research II (rm. 37) D-28759 Bremen, Germany. E-mails: b.meyer-rochow@jacobs-university.de

9955. Do Manh, C.; Bui Minh, H.; Nguyen Thi, H.; and Phan Quoc, T. (2011): Anisoptera of Cuc Phuong National Park, North Vietnam. *International Dragonfly Report* 33: 1-18 (in English) [During three field trips in

2006 and 2010 to Cuc Phuong National Park in northern Vietnam, a total of 19 anisopteran taxa was recorded. The most interesting records are documented here with field photographs of living specimens or collection material. Observations on their biology and behaviour are also noted." (Authors)] *Asiagomphus xanthenatus* *acco* Asahina, 1996 is given species rank. Address: Do Manh Cuong, Hom thu so 16, Buu Dien 10210, 35 Thai Thinh, Hanoi, Vietnam. E-mail: docuong@gmail.com

9956. Feld, C.K.; Tangelder, M.; Klomp, M.J.; Sharma, S. (2011): Comparison of river quality indices to detect the impact of organic pollution and water abstraction in Hindu Kush-Himalayan rivers of Nepal. *Journal of Wetlands Ecology* 4: 112-127. (in English) ["Several assessment methods exist for river quality classification in the Hindu Kush-Himalayan region. While rapid field bioassessment (RFB)1 applies on-site screening protocols, more sophisticated multi-habitat sampling (MHS) is employed to generate biotic scores using benthic macroinvertebrates as bioindicators. This study presents the comparison of River Quality Classifications (RQC) according to i) 40 RFB records based on two slightly different RFB protocols and ii) 20 qualitative benthic macroinvertebrate samples used to calculate two different scores (average scores per taxon; ASPT). Sensory attributes, such as odour, colour, foam and epilithic algal cover, were used in addition to biological samples for RFB. All samples were taken at two river basins in Nepal, the Punyamata river (12 stations, stressor: organic pollution) and the Khimti river (8 stations, stressor: damming and water abstraction). RQCs revealed organic pollution to impact benthic invertebrate communities in the Punyamata river, while the impact of water abstraction and damming was not detectable in the Khimti basin based on the methods compared. Furthermore, a pollution gradient was clearly detectable based on 66 macroinvertebrate families and genera found in our samples. Our results confirm the applicability of RFB protocols and scoring systems to assess the impact of organic pollution in Nepalese rivers. Further research, however, will be required to adjust the protocols and taxon scores to assess also the impact of other stressors present in the region." (Authors) Gomphidae is the only Odonata family included in the study. No species names are represented.] Address: Feld, C.K., University of Duisburg-Essen, Faculty of Biology and Geography, Applied Zoology/Hydrobiology, D-45117 Essen, Germany. E-mail: christian.feld@uni-due.de

9957. Fredricks, T.B.; Giesy, J.P.; Coefield, S.J.; Setton, R.M.; Haswell, M.M.; Tazelaar, D.L.; Bradley, P.W.; Moore, J.N.; Roark, S.A.; Zwiernik, M.J. (2011): Dietary exposure of three passerine species to PCDD/DFs from the Chippewa, Tittabawassee, and Saginaw River floodplains, Midland, Michigan, USA. *Environmental Monitoring and Assessment* 172(1-4): 91-112. (in English) ["Dietary exposure of house wrens (*Troglodytes aedon*), tree swallows (*Tachycineta bicolor*), and eastern bluebirds (*Sialia sialis*) to polychlorinated dibenzofurans (PCDFs) and polychlorinated dibenzo-p-dioxins (PCDDs) near Midland, Michigan (USA) was evaluated based on site-specific data, including concentrations of residues in bolus samples and individual invertebrate orders and dietary compositions by study species. Site-specific dietary compositions for the three species were similar to those reported in the literature, but differed in their relative proportions of some dietary items. Oligochaeta (non-depurated) and Brachycera (Diptera) con-

tained the greatest average concentrations of SPCDD/DFs of the major site-specific dietary items collected via food web-based sampling. Average ingestion values of SPCDD/DFs from site-specific bolus-based and food web-based dietary concentrations for nestlings at study areas (SAs) were 6- to 20-fold and 2- to 9-fold greater than at proximally located reference areas (RAs), respectively. Average ingestion values of total 2,3,7,8-tetrachlorodibenzo-p-dioxin equivalents (TEQWHO?-?Avian) from site-specific bolus-based and food web-based dietary concentrations for nestlings at SAs were 31- to 121-fold and 9- to 64-fold greater than at proximally located RAs, respectively. Estimates of SPCDD/DFs and TEQWHO?-?Avian tissue concentrations based on nestling dietary exposures were greater than those measured. Plausible explanations include nestling metabolism of 2,3,7,8-tetrachlorodibenzofuran and assimilation rates of less than the 70% assumed to occur over the nestling growth period. Profiles of the relative concentrations of individual PCDD/DF congeners in samples of invertebrates and bolus at SAs on the Tittabawassee River downstream of the source of contamination were dominated by 1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin (22% to 44%) and 2,3,7,8-tetrachlorodibenzofuran (18% to 50%)." (Authors)] Address: T. B. Fredricks, T.B., Dept of Zoology, Michigan State Univ., East Lansing, MI 48824, USA. E-mail: fredri29@msu.edu

9958. Gäde, G.; Simek, P.; Fescemyer, H.W. (2011): Adipokinetic hormones provide inference for the phylogeny of Odonata. *Journal of Insect Physiology* 57(1): 174-178. (in English) ["Adipokinetic neuropeptides from the corpora cardiaca of 17 species of Odonata encompassing mainly the families Corduliidae and Libellulidae were isolated and structurally elucidated using liquid chromatography coupled with ion trap electrospray ionization mass spectrometry. It became evident that all species of the family Corduliidae studied express the peptide code-named Libau-AKH (pGlu-Val-Asn-Phe-Thr-Pro-Ser-Trp amide), which is also present in all but one libellulid species, *Erythemis simplicicollis* which expresses Erysi-AKH (pGlu-Leu-Asn-Phe-Thr-Pro-Ser-Trp amide). This divergence from all other Libellulids is due to a nonsynonymous missense single nucleotide polymorphism (SNP) in the nucleotide coding sequence (CDS) of prepro-AKH CDS and supports the polyphyletic nature of Sympettrinae and other subfamilies of libellulids. Despite this exception, these findings then support the hypothesis that Corduliidae and Libellulidae are closely related as stated in most phylogenies. The presence of Anaim-AKH (pGlu-Val-Asn-Phe-Ser-Pro-Ser-Trp amide) in Macromiidae likely distinguishes species in this family from Corduliidae. Current molecular genetic phylogenies and our AKH findings suggest that *Syncordulia gracilis*, which expresses Anaim-AKH, does not belong in Corduliidae. Evolution of AKHs in anisopteran Odonata are likely due to nucleotide substitution involving nonsynonymous missense SNPs in the CDS of prepro-AKH." (Authors)] Address: Gäde, G., Zoology Dept, Univ. of Cape Town, Rondebosch 7701, South Africa. E-mail: gerd.gade@uct.ac.za

9959. Gorb, S.N. (2011): Insect-Inspired Technologies: Insects as a Source for Biomimetics. Vileinskas, A. (Ed.): *Insect Biotechnology. Biologically-Inspired Systems*, 2011, Volume 2, Part 3: 241-264. (in English) ["The understanding of functional principles of insect materials, structures, sensors, actuators, locomotion,

control systems, and behaviour is of major scientific interest. On the other hand, this basic knowledge is also highly relevant for technical applications. One of the greatest challenges for today's engineering science is miniaturization. Insects have solved many problems correlated with extremely small size, during their evolution. Zoologists, entomologists, morphologists, and neurobiologists have collected a huge amount of information about the structure and function of such living micro-mechanical systems. This information can be utilized to mimic them for industrial applications. Insect solutions may be applied in the following main technology areas: (1) materials science and technology, (2) surface science, (3) science of adhesives, (4) optics, (5) photonics, (6) sensorics, and (7) robotics. A few selected examples are discussed in this chapter, but with over one million described species as a source for inspiration, one can expect many more ideas from entomological science for biomimetics." (Author) The paper includes references to Odonata.] Address: Gorb, S.N., Functional Morphology and Biomechanics, Zoological Institute, Christian-Albrecht University of Kiel, 24098 Kiel, Germany. E-mail: sgorb@zoologie.uni-kiel.de

9960. Honkavaara, J.; Dunn, D.W.; Ilvonen, S.; Suhonen, J. (2011): Sympatric shift in a male sexual ornament in the damselfly *Calopteryx splendens*. *Journal of Evolutionary Biology* 24(1): 139-145. (in English) ["Character displacement is a process by which interactions between two species that exhibit similar traits, results in geographical patterns of trait divergence in one or both species. These traits evolve to reduce costs of interspecific interactions in sympatry and thus differ from their condition in allopatry. In male damselflies *Calopteryx splendens*, large wing spots are sexually selected. However, in sympatric populations with *Calopteryx virgo*, wing spot size decreases as *C. virgo* abundance increases. The stability of this pattern is unclear, because previous studies have focused on sympatric populations with potentially fluctuating relative abundances. We studied the wing spot sizes of *C. splendens* in both sympatric and allopatric populations. Our data show that male *C. splendens*' wing spots are larger in allopatry than in sympatry with *C. virgo*. We suggest that both interspecific aggression and avoidance of interspecific reproductive interactions may result in this pattern, although their relative importance remains unclear." (Authors)] Address: Honkavaara, J., Department of Biology, Section of Ecology, University of Turku, 20014 Turku, Finland. E-mail: johhon@utu.fi

9961. Kuitunen, K.; Kotiaho, J.S.; Luojumäki, M.; Suhonen, J. (2011): Selection on size and secondary sexual characters of the damselfly *Calopteryx splendens* when sympatric with the congener *Calopteryx virgo*. *Canadian Journal of Zoology* 89(1): 1-9. (in English) ["Male mating success is often determined by body size or secondary sexual characters because of female mate choice or competition for females. In addition to intraspecific interactions, interspecific interactions may interfere with intraspecific selection. In this study, we investigated sexual selection on size and sexual characters of male banded demoiselle (*Calopteryx splendens* (Harris, 1780)) in wild populations sympatric with the beautiful demoiselle (*Calopteryx virgo* (L., 1758)). As secondary sexual characters, male *C. splendens* have pigmented wing spots whose size appears to be under positive selection. Male *C. virgo* resemble male *C. splendens* that have the largest wing spots, leading to

interspecific male-male aggression and possibly also to heterospecific matings via mistaken species recognition. If interspecific interactions interfere with intraspecific sexual selection on wing-spot size of *C. splendens*, their effects should increase with the increasing relative abundance of *C. virgo*. Our results did not show the expected positive selection on wing-spot size in *C. splendens*, suggesting that interspecific interactions might interfere with sexual selection. Also, we observed no relationship between the strength of interspecific sexual selection and the relative abundance of *C. virgo*. However, there was a positive intraspecific density-dependent sexual selection for larger size. Although the present results are tentative, we suggest that interspecific interactions should be considered along with intraspecific selection when studies of sexual selection are performed in the wild." (Authors)] Address: Suhonen, J., Department of Biological and Environmental Science, P.O. Box 35, FI-40014, University of Jyväskylä, Finland

9962. Mishra, A.S.; Nautiyal, P. (2011): Factors governing longitudinal variation in benthic macroinvertebrate fauna of a small Vindhyan river in Central Highlands ecoregion (central India). *Tropical Ecology* 52(1): 103-112, 2011: 103-112. (in English, with Portuguese and Spanish summary) ["Variation in the taxonomic composition of benthic macroinvertebrate fauna was examined in the Paisuni river at four stations (P1 to P4) located longitudinally along the river, with P1 being nearest the source of origin. The fauna was dominated by insects at all the stations. Total density increased from P1 to P3, decreased at P4 and differed significantly among the stations. Increase in the relative abundance from P1 to P4 was observed for Baetidae, Chironomidae and Gomphidae, and a decrease for Leptophlebiidae, Heptageniidae, Neophemeridae, Rhyacophilidae and Thiaridae. Ordination analysis indicated that Rhyacophilidae was the characteristic taxon at P1, Thiaridae at P2 and Chironomidae at stations P3 and P4. Ordination also revealed that current velocity, substratum and landuse were the major environmental factors influencing the relative composition of macroinvertebrates. The longitudinal variation in taxonomic composition and assemblages showed a change of trophic status due to direct human interference at P2. Collectors were abundant at all stations but predominated the assemblages from P3 to P4. The balance between collectors, scrapers and predators shifted to predominance by collectors indicating heterotrophic conditions at P3 and P4 in contrast to autotrophic conditions at P1 and P2. Hence, two ecological zones are evident in the Paisuni river." (Authors)] Address: Mishra, A.S., Aquatic Biodiversity Unit, Department of Zoology, H.N.B. Garhwal University, Srinagar Garhwal 246174, Uttarakhand, India. E-mail: shivama2000@yahoo.co.in

9963. Ott, J. (2011): Wie helfe ich einer Libelle? Lebensweise und Schutz der Libellen. www.bund.net: 16 pp. (in German) [This is a basic introduction to dragonflies and their habitat requirements within the framework of the activities of the BUND (Friends of the Earth) directed to dragonfly conservation in 2011.] Address: Bund für Umwelt und Naturschutz Deutschland e.V., Friends of the Earth Germany, Am Köllnischen Park 1, 10179 Berlin. Germany. E-Mail: info@bund.net. www.bund.net

9964. Outomuro, D.; Johansson, F. (2011): The effects of latitude, body size, and sexual selection on wing shape in a damselfly. *Biological Journal of the Linnean*

Society 102(2): 263-274. (in English) ["Under natural selection, wing shape is expected to evolve to optimize flight performance. However, other selective factors besides flight performance may influence wing shape. One such factor could be sexual selection in wing sexual ornaments, which may lead to alternative variations in wing shape that are not necessarily related to flight performance. In the present study, we investigated wing shape variations in a calopterygid damselfly along a latitudinal gradient using geometric morphometrics. Both sexes show wing pigmentation, which is a known signal trait at intra- and interspecific levels. Wing shape differed between sexes and, within the same sex, the shape of the hind wing differed from the front wing. Latitude and body size explained a high percentage of the variation in wing shape for female front and hind wings, and male front wings. In male hind wings, wing pigmentation explained a high amount of the variation in wing shape. On the other hand, the variation in shape explained by pigmentation was very low in females. We suggest that the conservative morphology of front wings is maintained by natural selection operating on flight performance, whereas the sex-specific differences in hind wings most likely could be explained by sexual selection. The observed sexual dimorphism in wing shape is likely a result of different sex-specific behaviours." (Authors)] Address: Outomuro, D., Depto de Biología de Organismos y Sistemas, E-33071 University of Oviedo, Spain. E-mail: outomuro.david@gmail.com

9965. Phan Quoc, T.; Do Manh, C.; Hämäläinen, M. (2011): Xuan Son National Park, a paradise for Caloptera damselflies in northern Vietnam. *International Dragonfly Fund Report 32*: 1-34 (in English) ["During three field trips in 2009-2010 to Xuan Son National Park in Phu Tho province in northern Vietnam, a total of 13 species of damselflies of the superfamily Calopterygoidea were recorded. These records are documented here with field photographs of living damselflies. Observations on their biology and behaviour are also noted. Three of the species are reported from Vietnam for the first time: *Rhinocypha arguta*, an undescribed *Matrona* species and *Vestalaria miao*. The last species was first found in Huu Lien Nature Reserve in Lang Son province in June 2008." (Authors)] Address: Phan Quoc, T.; Vietnam National Museum of Nature, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam. E-mail: phanquoctoan-84@gmail.com

9966. Scheibler, E.E.; Ciocco, N.F. (2011): Distribution of macroinvertebrate assemblages along a saline wetland in harsh environmental conditions from Central-West Argentina. *Limnologica - Ecology and Management of Inland Waters* 41(1): 37-47. (in English) ["The goal was to examine how macroinvertebrate taxonomic richness and density respond to spatial-temporal changes and to the influence of water physicochemical characteristics along the Bañado Carilauquen (BC). Benthic samplings were conducted seasonally and environmental parameters were recorded in five reaches of the BC. Cluster analysis was applied to compare taxonomic richness among sites. Community structure and spatial-temporal variation were explored using logarithmic regression. CCA was applied to explore the relationship between species and environmental variables. A total of 36 taxa were identified, predominantly insects. A growing gradient of conductivity and hardness was registered between headwaters (HD; relatively soft waters) and outlet (OL; very hard and saline waters). Total

density of taxa showed significant differences among sampling sites and climate seasons. A decline in richness and density was observed from HD to OL. The spatial conductivity gradient is the major factor modulating macroinvertebrate distribution along this saline arid wetland. With the exception of the headwaters, hard, eutrophic, polysaprobic and contaminated waters such as those of the BC represent critical conditions for the development of macroinvertebrate assemblages." (Authors) Odonata taxa in the Bañado Carilauquen are: *Rhionaeshna absoluta* and *Ischnura fluviatilis*.] Address: Scheibler, Erica, IADIZA, CCT CONICET Mendoza, sede Cricyt. Avda. Ruiz Leal s/n. Parque General San Martín, CC 507, 5500 Mendoza, Argentina. E-mail: escheib@mendoza-conicet.gov.ar

9967. Simaika, J.P.; Samways, M.J. (2011): Comparative assessment of indices of freshwater habitat conditions using different invertebrate taxon sets. *Ecological Indicators* 11(2): 370-378. (in English) ["Monitoring changes in population levels of a wide range of species in biodiversity research and conservation requires practical, easy-to-use and efficient assessment and monitoring methods. Dragonflies (Insecta: Odonata) are a valuable tool for assessing aquatic systems and have been used as indicators of ecological health, ecological integrity, and environmental change, including climatic change, as well as indicators of habitat recovery. We field-tested a freshwater ecological integrity index, the Dragonfly Biotic Index (DBI), based on dragonfly assemblages at the local scale, and compared the DBI to a biodiversity index (average taxonomic distinctness, AvTD) as well as to a standard freshwater benthic macroinvertebrate-based freshwater health index (South African Scoring System, using Average Score Per Taxon, ASPT). We sampled 20 river sites, selected a priori. Adult dragonflies and benthic macroinvertebrates were collected using standardized methods. Environmental variables were collected in situ, and water samples taken. Temperature and pH were the most important physical environmental variables in explaining the assemblage structure, and we found significant abiotic-biotic relationships, as well as biotic-biotic relationships. Overall, dragonflies were more sensitive to changes in river condition than were macroinvertebrates, in part because they were responding at the species rather than higher taxonomic level. AvTD scores did not show any significant relationship with changes in river condition. Furthermore, sites with low biotic scores (indicating disturbance) had high AvTD values. In contrast, DBI site value and ASPT scores were highly significantly correlated. We conclude that dragonfly assemblages in the form of a DBI are an excellent tool for environmental assessment and monitoring freshwater biodiversity, with the potential to replace labour-intensive benthic macroinvertebrate-based freshwater quality assessments, such as SASS." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

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1997

9968. Anders, U.; Ruppell, G. (1997): Zeitanalyse der Balzflüge europäischer Prachtlibellen-Arten zur Betrachtung ihrer Verwandtschaftsbeziehungen (Odonata, Calopterygidae). *Entomologica Generalis* 21(4): 253-264. (in German, with English summary) ["The courtship flights of males of *Calopteryx virgo*, *C. splendens*, *C. xanthostoma* and *C. haemorrhoidalis* where filmed with a slow motion camera in N' Germany and S' France. The shots where taken under unmanipulated conditions as well as in a provoked situation, with a fixed female. The parameters wingbeat frequency and phase relationship from hind- and forewings where studied. The most important differences are: In *C. splendens* and *C. xanthostoma* the fore- and hindwings move nearly absolutly counterwise. That means, while the forewings are at the start of the upstroke, the hind-wings are at the start of the downstroke. So here the phase relationship is 180°. Phase relationship in *C. virgo* is 100°. Here the forewings reach the changing points before the hindwings. *C. haemorrhoidalis* move the hindwings nearly synchronously to the forewings but with a very small amplitude. In reference to the wingbeat frequency and the continuity of the phase relationship, the *Calopteryx*-males court more intensively in the unmanipulated situation, than in the provoked one. With respect to the studied parameter, there is no difference between *C. splendens* and *C. xanthostoma*, in contrast to *C. haemorrhoidalis* and *C. virgo*, which are different to each other and to the first two." (Authors) Address: Ruppell, G., An der Wasserfurche 32, 38162 Cremlingen, Germany

9969. Groot, T. de (1997): Gevlekte witsnuitlibel (*Leucorrhinia pectoralis*) in De Wieden. *Brachytron* 1(1): 27-28. (in Dutch) [5-VI-1996, De Wieden, Nationaal Park Weerribben-Wieden, The Netherlands] Address: not stated.

1998

9970. Ou, Y.-j.; Chen, Q.-j.; Chen, F.-h. (1998): A preliminary research report of Odonata insects in Heilongjiang Province. *Natural Science Journal of Harbin Normal University* 14(6): 89-93. (in Chinese, with English summary) [China; 46 regional Odonata species are documented. The list of species includes *Aeshna nigroflava* and *Macromia daimoji* (new records in China), and

Gomphidia confluens and *Sympetrum imitans* (new records in Northeastern China).] Address: Ou, Y.j., Heilongjiang Nongken Normal College, China

1999

9971. Arnaud, L. (1999): La compétition spermatique chez les insectes: les stratégies d'assurance de la paternité et la préséance du sperme. *Biotechnol. Agron. Soc. Environ.* 3(2): 86-103. (in French, with English summary) ["Sperm competition in insects: paternity assurance and sperm precedence. The prediction that insects, as a result of polyandry, extreme sperm longevity within the female and high efficiency of sperm utilisation at fertilisation, are preadapted to sustain a very high level of sperm competition is demonstrated across numerous studies. In many insects, males have evolved strategies to decrease sperm competition risk. Paternity assurance mechanisms such as mating plugs or mate guarding do not necessarily influence the number of eggs laid by the female but are taken by male to reduce the probability of his sperm to be preceded by the sperm of another male. Each of these mechanisms influencing mating has an adaptative significance in promoting male reproductive success. However, female insects are polyandrous and they play an active role in mate choice and in discrimination between the ejaculates of different males. Also, they have co-evolved strategy to increase their own reproductive success and to counteract the costs resulting from paternity assurance mechanisms. They can control paternity before copulation (pre-copulation, pre-insemination), during copulation, and because fertilisation takes place within their bodies after insemination, and after fertilisation through selective abortion. A male's reproductive success can be determined as the product of his mating success (mate per lifetime) and his fertilisation success (average number of progeny sired per mate). Male fertilisation success is generally studied in terms of sperm precedence where the proportion of the female progeny fathered by a given male is examined. Sperm precedence can be studied using different methods, each having advantages and disadvantages. Although female insects behave polyandrously, most sperm competition studies investigate sperm precedence when only two males are mated with a female. To determine if the results obtained in double-mating experiments fit well with reality, it is thus important to examine last-male mating

success in experiments where females are mated with more than two males. Moreover, within a species, high fertilisation success variations are observed between males of different populations or even of the same population. These variations result from interaction between factors such as sperm number, sperm length, pre- and/or post-copulatory female choice, paternity assurance mechanism efficiency, female sperm storage organ morphology, etc." (Author) The paper includes many references to Odonata.] Address: Arnaud, L., Unité de Zoologie générale et appliquée. Faculté universitaire des Sciences agronomiques de Gembloux. Passage des Déportés 2, 5030 Gembloux Belgium. E-mail: arnaud.l@fsagx.ac.be

9972. Huber, A. (1999): Odonatological survey on the River Somes/Szamos Romania. In: Sárkány-Kiss, A. & Hamar, J. (eds.): The Somes/Szamos River Valley: a study of the geography, hydrobiology and ecology of the river system and its environment. Tiscia monograph series: 207-213. (in English) [26 odonate species were recorded at 25 sampling points along the or nearby the river Somes. The list includes the legally protected species *Stylurus flavipes* and *Ophiogomphus cecilia*.] Address: Huber, A., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

9973. Cannings, R. (2000): Dragons and Damsels in the Columbia/Kootenay Region. *Boreus* 20(2): 9-10. (in English) [Verbatim: "Fire-breathing dragons and damsels in distress at Cranbrook? Knights in shining armour riding to the rescue from Fort Steele? Not likely. Just a handful of keen biologists and volunteers searching for dragonflies and damselflies (the insect Order Odonata) for the Royal British Columbia Museum's Living Landscapes project in the Columbia Basin. As part of the project, the Museum, the B.C. Conservation Data Centre (CDC) (Ministry of Environment, Lands and Parks) and Parks Canada joined forces to study the dragonflies of southeastern British Columbia. Parks Canada enthusiastically provided logistic and financial support for the inventory in the four national parks in the region. The area we explored is the Columbia River Basin exclusive of the Okanagan River drainage. In British Columbia this area is commonly called "The Kootenays" after the Kootenay River -- the largest of the Canadian tributaries of the Columbia River. Through 1998 and 1999 we criss-crossed the region to document occurrence and habitat requirements of the dragonflies of the Kootenays (in the rest of the article I use the term "dragonflies" to include the closely related damselflies). Although the Museum had dragonfly specimens and a species list for the region that represented our knowledge up to 1997, no comprehensive survey for dragonflies had ever been made; some of the recorded populations were known only from collections made almost a century ago. Dragonflies are invertebrates that seldom receive the attention they deserve from biologists and resource managers. But they are of great ecological importance. They are major predators in aquatic habitats, often dominating the large invertebrates, especially in fish-free systems. Both the underwater larvae and the flying adults live mainly along the edges of water bodies, thriving in the rich and sensitive interface between land and water. Many species are habitat-specific and their presence can be used to characterize healthy wetlands of all sorts. Furthermore, unlike most invertebrates, dragonflies are identifiable in the field by experts, and surveys can proceed with speed and effi-

ciency. Finally, because they are large, colourful, diurnal creatures with fascinating behaviour, dragonflies are excellent subjects for nature interpretation programs and public education about aquatic ecosystems in general. The Living Landscapes Project is designed to take the museum's resources to the diverse regions of the province, stimulating local residents and organizations to conceive their own research projects and participate in the Museum's research, collections and public programming activities. In the Columbia Basin we wanted to improve our scientific knowledge about British Columbia dragonflies, and we were keen to gather information for use in wetland management and conservation planning -- issues of great concern in the region. But we also wanted to create simple educational materials that would promote the understanding of dragonflies and their relationship to diverse and healthy wetland habitats. In addition to the main report on the internet, complete with photographs and distribution maps of every species, we decided to produce slide shows and videos for distribution to parks, naturalist groups and schools. Finally, we had a long-term goal -- to involve a few residents of the regional community in the detailed study of dragonflies and the long-term monitoring of selected species and localities. The region, with its maze of deep valleys and high mountains, is rich in dragonfly habitats. Mountain fens and bogs, trickling springs, warm lake beaches, grassland alkali ponds and rich cattail marshes all beckoned. We added nine dragonflies to the fifty-seven species that were listed from the Columbia Basin before the start of the project. The additions were: *Calopteryx aequabilis*, *Lestes forcipatus*, *Coenagrion interrogatum*, *Stylurus olivaceus*, *Somatochlora cingulata*, *S. forcipata*, *S. minor*, *S. walshii* and *Leucorrhinia glacialis*. The inventory also improved our understanding of the status of other species rarely recorded in the Columbia Basin. Thirteen are considered rare and of management concern, based on collections in museums. However, with increased study, species such as *Aeshna tuberculifera* and *S. cingulata* proved to be more widespread than initial records suggested. Dean Nicholson, a Cranbrook volunteer, found *Gomphus graslinellus* at Wasa Lake in the Rocky Mountain Trench, far to the east of the only other regional record at Christina Lake. *Argia vivida* is a Kootenay specialty, because its Canadian range is centred in the region and because it is restricted there to the outlets of hot springs that are such a feature of the area's mountain ridges. Although we found a few new populations of *Argia*, it's still considered vulnerable -- it has been eliminated from some springs and most of the others are threatened by development. *C. aequabilis*, *L. forcipatus* and *S. forcipatus* are species new to British Columbia. *Calopteryx* represents a new family of Odonata for British Columbia: the *Calopterygidae*. This spectacular damselfly, with its metallic green body and brown-banded wings, had been recorded as close to British Columbia as Stevens County, Washington; for several decades we had suspected that it lived in the streams of the Boundary district. However, we had not managed to find it there until July 1999, when Leah Ramsay (wide-eyed with amazement!) discovered it dancing along Christina Creek, the outlet of Christina Lake. In 1998, in a wetland near Donald in the Rocky Mountain Trench, Leah also found *Lestes forcipatus*, not confirmed elsewhere in Canada west of Manitoba. Here is a good example of an uncommon species that had been overlooked simply because it was not expected and because it closely resembles the wide-

spread and abundant *L. disjunctus*. Since the discovery, more localities were found, and some of our old specimens of *L. disjunctus* have been re-identified as *L. forcipatus*. Inventories do not simply gather new records; they force curators to re-evaluate old collections! Finding *S. forcipata* was a goal that had eluded us for years. In the 1920s Edmund Walker of the Royal Ontario Museum had collected this elusive dragonfly about three kilometres from the British Columbia/Alberta boundary in Banff National Park. This ancient collection had remained the only record west of Manitoba. Surely it also had to live in "small spring runs following devious courses" (as Walker had described the habitat) west of the Continental Divide. After much searching, we finally came across it in Kicking Horse Pass, Yoho National Park). Gord Hutchings, a long-time RBCM volunteer, netted a dragonfly hovering over a small trickling seep near Ross Lake. "This looks different!" he yelled, slogging back to the rest of us examining a boggy pond. Sure enough -- *S. forcipata*! Two years and much searching later, we now have mapped the species at three peatland sites in Yoho and Kootenay National parks. This emerald is clearly a sparsely distributed member of the Rocky Mountain dragonfly community, and an inhabitant of an apparently rare habitat as well. The 66 species now known from the Columbia Basin represent 76% of the 87 species recorded from British Columbia, and 33% of the 201 recorded in Canada. At least six more species are thought to occur in the region, and several more than that will probably be added to the list. With more study of Columbia Basin dragonflies, especially by the enthusiastic residents who continue to monitor some special habitats, our understanding of these important and lovely insects will surely grow. The full report of this project, complete with photographs and distribution maps of the species, is found at <http://www.livinglandscapes.bc.ca/cbasin/wwwdragon/pdf/dragonflies4.pdf>. (Author)] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca

9974. Cannings, R. (2000): Dragonfly Society of the Americas Annual Field Meeting. 27 July-1 August 2000, Nanaimo and points East. *Boreus* 20(2) (<http://www.sfu.ca/biology/esbc/boreus/Bor202.html>): ?-?. (in English) [Verbatim: "The 2000 annual field meeting of the Dragonfly Society of the Americas was held in Nanaimo. Every year, the Society organizes a field meeting somewhere in North America; this one was a first for Western Canada. Thirty-two participants came from as far away as Florida, Texas, Vermont, North Carolina and even England to observe, collect and talk about the dragonfly fauna of British Columbia and the world. On 28 July, unfortunately, the sky was overcast and a light rain was falling – not a good omen for entomologists who pray for sun. Once the rain stopped and the temperature rose, dragonflying would be good, but in the meantime, one group who were keen see something moving went to Nanoose Bay to look for birds. Between watching Merlins and Peregrine Falcons they managed to record *Aeshna multicolor*, *Anax junius* and *Sympetrum pallipes*, species that the second group, which headed right to dragonfly habitat, failed to record. The larger group went off to the Nanaimo Lakes watershed. They were rewarded with improving weather and managed to find 15 species including *Cordulegaster dorsalis*, *Ophiogomphus occidentis*, *Somatochlora semicircularis* and *S. walshii*. For the locals, the highlight was

confirming that *Lestes forcipatus* indeed occurred on the BC coast – it had been overlooked all these years in the hordes of the widespread *L. disjunctus*. The next day at this site others found two more species, one of them *A. tuberculifera*. Saturday 29 July dawned with much better weather. The group headed north to Hamilton Marsh near Coombs. Collectors and photographers spread out over this large, rich fen and managed to see 25 species – *A. canadensis*, *A. interrupta*, *A. palmata*, *A. multicolor*, *Pachydiplax longipennis*, *S. obtrusum* and *S. occidentale* were abundant. The specialty of the site, *A. tuberculifera*, was finally caught. Later, at Bowser Bog, a peatland species, *Aeshna sitchensis*, excited the southerners. Evening meetings took care of business. In addition, various members showed photographs of foreign faunas. Explaining the local fauna, Rob Cannings gave an overview of the dragonflies of British Columbia. He showed slides of species from representative families found in the province and his biogeographical maps indicated how diverse this part of North America truly is. The field trip to the Okanagan Valley the next day showed us some of this diversity. On Sunday (30 July) morning the crowd dispersed, some heading home via Vancouver or Victoria, others continuing on the field trip to the Okanagan Valley. The weather was sunny and hot for the rest of the meeting. Half the group drove up to Cypress Provincial Park to see a *Tanypteryx hageni* colony, the only one known in Canada. A few burrows, complete with larvae, were found in the mud and moss of a road cut; adults were yet to emerge. Part of the group, led by Syd Cannings, drove east via Rolley Creek in the Fraser River Valley to look for *Octogomphus specularis*. A second bunch under the watchful eye of Rob Cannings, headed up the Coquihalla Highway from Hope, eager to find high altitude species near the summit of Highway 97C on the plateau east of Okanagan Lake. The highlight here among the fens and ponds (some of the latter man-made dug-outs for watering cattle) was *Somatochlora hudsonica*; this is the most so otherly record of the species in British Columbia. *S. albicincta* and *S. minor* were also collected, along with *Coenagrion resolutum*, *A. sitchensis*, and other species. *S. semicircularis*, a common Cordilleran species, literally swarmed in the Beaked Sedge fens. The night was spent to the south at Oliver. On Monday (31 July), a small group keen to see *S. hudsonica* returned to the area at the summit of Highway 97C; they were not disappointed – *Somatochlora* and *Aeshna* abounded. The main crew visited the bottomlands of the Okanagan River north of Osoyoos. Along the oxbows and main river channel cruised *Macromia magnifica* and *O. occidentis*. *Erythemis collocata*, a rarity here at the extreme northern limit of its range, swarmed over its favourite pond and a lone *Pachydiplax longipennis*, a common species to the south but a new species to the Interior of British Columbia, appeared here, too. *Libellula forensis* and *L. pulchella* were abundant. In the afternoon, collectors split up and went off in various directions into the pine and fir-clad hills surrounding the valley. Many species, including *A. eremita*, *A. interrupta*, *A. multicolor*, and *S. costiferum*, were recorded. At a dry sedge marsh a lucky group recorded *S. madidum*, *L. dryas* and a population of *A. constricta*, the latter another common species to the south that is scarce here at its northern outposts. The last day (1 August) again dawned clear and warm; at 05:00 it was already about 80 degrees F and by 06:30 *A. multicolor*, was flying around the motel parking lot (the afternoon temperature in the valley reached about

100 degrees). But we were heading high in the hills to the northeast to escape the heat and find more northern species. Dick Cannings and his 13 year-old son Russell, Okanagan residents, led the day's jaunt to several lakes and fens over dusty gravel logging roads. John Abbott of Texas provided a memorable quote as he anticipated the dragonflies to come -- "There'd better be plenty of 'em and they'd better be easy to catch!" At Solco Lake, a sunny and quiet oasis in the Engelmann Spruce/ Lodgepole Pine woods at 5500 feet, the high-lights were *Somatochlora cingulata* (common, and for once, flying along the shore and easy to catch) and *C. interrogatum*. We stopped at two fens dominated by Beaked Sedge, *A. juncea* and *S. semicircularis*. One of them had a sluggish stream and lots of *S. minor*. Both had adjacent mossy, rather dry areas thick with *A. sitchensis*. At each place a single *S. whitehousei* showed up, the most southerly records in British Columbia – even more surprising because appropriate habitat couldn't be found anywhere." (Author) (<http://www.sfu.ca/biology/esbc/boreus/Bor202.html>) Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca

9975. Cannings, S.G. (2000): The Quebec Emerald out West. *Boreus* 20(2): 11. (in English) [Verbatim. "In the summer of 2000, staff from the B.C. Conservation Data Centre (Ministry of Environment, Lands & Parks) and the Royal B.C. Museum organized a dragonfly survey of east-central British Columbia. This was the first year of a larger northern B.C. inventory, part of the Royal B.C. Museum's Living Landscapes project, and partly funded by a grant from the Habitat Conservation Trust Fund. See the article by Rob Cannings in this issue that discusses a similar dragonfly inventory in the Columbia/Kootenay region in 1998-99. Dragonflies are one of our best-known insect groups, but this vast study area of snowy mountains, boggy and marshy valleys, and plateaus awash with warm lakes was literally a big blank spot on our dragonfly distribution maps for the province. We knew that we might find that some of the 'rare' dragonflies on our provincial list are more common than we previously thought (and we did, but that's another story), but we weren't prepared for the discovery of the year! It all began with the capture of an odd-looking female emerald (a medium-sized, dark-metallic dragonfly with brilliant green eyes) in the huge fens near the headwaters of the Parsnip River north of Arctic Lake. That one was put back in the collection box with the plan of checking on it further when time allowed, but then forgotten for the moment. Two days later, I teamed up with Sid Dunkle, a dragonfly expert from Texas, and we drove to a fabulous set of terraced fens near timberline at McBride. The common dragonflies there were, *Somatochlora whitehousei*, a rarely-collected beast of shallow fen pools. Sid was ecstatic with these northern specialties, and we even added the very rare *Leucorhinia patricia*, to our list as well! But then Sid caught a female emerald that was unfamiliar to him and I realized that it was the same as the one I had caught a couple of days earlier. We scratched our heads for a while, then resumed searching for more. Soon I caught a male, which was certainly different than any other emerald I had ever seen! We eliminated candidate species one after another and were soon faced with the amazing conclusion that this was a Quebec Emerald! *Somatochlora brevicincta*, is one of the Holy Grails of northern dragonflies—known for many years from only

two localities in a remote area of central Quebec, it has been recently located in a handful of peatlands in Newfoundland, Nova Scotia, New Brunswick, and Maine. Despite these recent discoveries, to find it in British Columbia was unexpected, to say the least—and we've now challenged our colleagues from Alberta to Ontario to fill in the huge gap in central Canada! We continued searching, but after another day of trembling fen-treading we still had found only a handful of specimens. The day after that we returned to the Parsnip River, but arrived there shortly after a tremendous cloudburst had just cleared, and very few dragonflies were flying. We did, however, find a couple more Quebec Emeralds patrolling the rich fens there! And to top things off, during the following week my brother Rob Cannings and Andrew Harcombe found them at two more sites in the Rocky Mountains north and east of McBride. Nowhere are these dragonflies common, and we certainly did not find them in most of the 'appropriate'-looking fens we sampled. Their full distribution and habitat requirements remain a mystery, both within British Columbia and across the boreal and sub-boreal regions of North America. We'll be out again this summer, searching and hoping!" (Author)] Address: Cannings, S.G., Canadian Wildlife Service, 91780 Alaska Highway, Whitehorse, YT, Y1A 5B7, Canada

9976. Geraeds, R.P.C. (2000): Observations of *Ophiogomphus cecilia*, Fourcroy, 1785) along the river Roer. *Brachytron* 4(2): 3-7. (in Dutch, with English summary) ["*O. cecilia* has always been a rare dragonfly in the Netherlands. It has been extinct since 1936. In 1995 and 1996 several animals were found along the Geleenbeek. Between August 24 and September 9, 2000, the species was seen in low numbers along the river Roer near Melick. Besides, the species was found near the German border south of Vlodrop once. Two females were observed ovipositing. The river Roer appears to be a suitable habitat for this species. Further investigation must make clear if *O. cecilia* can establish itself in the Roer." (Author)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

2001

9977. Meads, M.J.; Fitzgerald, B.M. (2001): List of invertebrates on Mokoia Island, Lake Rotorua. Conservation Advisory Science Notes No. 343: 9 pp. (in English) [A survey of invertebrates was undertaken on Mokoia Island, Lake Rotorua, for three days in February 2000, with the emphasis on larger ground-dwelling taxa. The species list (124 taxa) includes *Hemicordulia australiae*.] Address: Meads, M.J., Ecological Research Associates of New Zealand Inc., PO Box 48-147, Silverstream, Upper Hutt, New Zealand

2002

9978. Bossart, J.L.; Carlton, C.E. (2002): Insect conservation in America: status and perspectives. *American Entomologist* • Summer 2002: 82-92. (in English) ["The conservation attention allotted to odonates is especially noteworthy considering that only a tiny fraction (<1%) of insect species occurring in America are dragonflies or damselflies. Indeed, nearly 75% of all named Odonata species are state-listed species-of-concern." (Authors)] Address: Bossart, Janice L., Dept of Biology,

The College of New Jersey, P.O. Box 7718, Ewing, NJ 08628, USA. E-mail: bossart@tcnj.edu

9979. Curry, J. (2002): Rare Odonata of Indiana. Newsletter of the Michigan Entomological Society V47(3-4): 10. (in English) ["Rare species of dragonflies in Indiana fall into one of three categories: (1) southern species at the northern fringe of their ranges in southern Indiana; (2) northern species at the southern fringe of their ranges in northern Indiana; (3) and species once more common to the state which have apparently become rare due to habitat changes. Most of the species in categories 1 and 2 are common within their ranges and need not be of concern to Indiana conservationists. Those in category 3 apparently need protection if they are to survive. The only way to protect them is through habitat preservation. Representative southern species (category 1) include *Macromia pacifica*, *Ariogomphus submedianus*, *Gomphus hybridus*, and *Neurocordulia molesta*. Representative northern species include *Aeshna canadensis*, *A. tuberculifera*, *Gomphus ventricosus*, *Epitheca canis*, *Libellula julia*, and *Nannothemis bella*. Species that were once more widespread in Indiana but now have become rare due to habitat change include *Tachopteryx thoryi*, *Anax longipes*, *Cordulegaster obliqua*, and perhaps, *Somatochlora hineana*."] (Author)] Address: Curry, J., Dept of Biology, Franklin College, 501 E. Monroe Street, Franklin, IN 46131, USA. Email: jcurry@franklincollege.edu

9980. Horecký, J.; Stuchlík, E.; Chvojka, P.; Bitušík, P.; Liška, M.; Pšenaková, P.; Špaček, J. (2002): Effects of acid atmospheric deposition on chemistry and benthic macroinvertebrates of forest streams in the Brdy Mts (Czech Republic). *Acta Soc. Zool. Bohem.* 66: 189-203. (in English) ["Water chemistry and macroinvertebrates of 8 streams in the Brdy Mts (Central Bohemia) differing in pH value were studied during a synoptic survey in December 1997. Together 73 macroinvertebrate taxa (including *Cordulegaster boltonii*) were identified, varying in number from 9-25 at sites of critical pH (3.8-4.3), contrary to 25.28 taxa at non-acidified sites (pH around 6.7). The fauna of streams was dominated by Chironomidae (Diptera) and Plecoptera, Trichoptera were less abundant. In three strongly acidified streams the predominance of Plecoptera exceeded 50% of all macroinvertebrates. The absence of some aquatic insects (like e.g. Ephemeroptera, some Trichoptera, most Diptera, and some Plecoptera) at sites with pH < 4.8 is discussed."] (Authors)] Address: Horecký, J., Dept of Hydrobiology, Charles Univ., Vinická 7, CZ.128 44 Praha 2, Czech Republic. E-mail: horecky@natur.cuni.cz

9981. Kitowski, I. (2002): Behaviour of Montagu's Harrier juveniles during the post-fledging dependency period in southeast Poland. *Ethologia* 11(2): 202-207. [The dependency period of 51 fledglings Montagu's Harrier (*Circus pygargus*) was studied on calcareous peat-bogs near Chelm (SE Poland). The juveniles fledged on average 33.6 days after hatching, and continued to depend on their parents for 17-31 days. A progression was observed in the flight behaviour ability of the fledglings. With progressing dependency period the rate of successfully aerial prey transfers increased. Juveniles tried to catch dragonflies in the air. However, no attempt was successful.] Address: Kitowski, I., Dept of Nature Conservation, Maria Curie-Skłodowska Univ., Akademicka 19, 20-033 Lublin, Poland. E-mail: kitowign@biotop.umcs.lublin.pl

9982. Lemoine, G. (2002): Sur les traces des insectes dans les dunes flamandes. Week-end à Zuydcoote. *Insecta* 126: 25-27. (in French) [*Lestes barbarus*, *Crocothemis erythraea*, and *Sympetrum flaveolum* were recorded from the North Sea coast near Zuydcoote, France.] Address: not stated

9983. Wykle, J. (2002): The Year of the Dragonfly. *WV Wildlife Diversity News* 19(3): 1, 8. (in English) [Report on the meeting of the Dragonfly Society of the Americas in Lewisburg, West Virginia, USA on June 20-22, 2002. "Throughout the week, a total of 99 species were observed or collected. Eight of these had never been documented in West Virginia! Also, 171 county records were gathered."] (Author)] Address: jwykle@dnr.state.wv.us

2003

9984. Heidenreich, U.; Hering, J. (2003): Mönchgrasmücke *Sylvia atricapilla* erbeutet Großlibelle. *Ornithologische Mitteilungen* 55(2): 49. (in German) [garden in Limbach-Oberfrohna, Saxony, Germany; a blackcap is reported to have taken as food a freshly emerged *Aeshna cyanea*; 22-VI-2002.] Address: Heidenreich, U., Am Hohen Hain 23 d, 09212 Limbach-Oberfrohna, Germany

9985. Hellmund, W. (2003): Endlich aufgespürt - die Späte Adonislibelle. *Unsere Libellen - Versuch einer Bestandsaufnahme Teil VII. Troisdorfer Jahreshefte*: 11-13. (in German) [Wahner Heide near Köln resp. Troisdorf, Nordrhein-Westfalen, Germany, 28-VIII-2001.] Address: Hellmund, W., Von-Loe-Str. e 11, 53840 Troisdorf, Germany

9986. Kalkman, V.J.; Wasscher, M.T. (2003): Rare dragonfly species in the Netherlands in 1998. *Brachytron* 7(1): 15-23. (in Dutch, with English summary) ["The submitted Dutch records of a selected number of rare dragonfly species are reviewed annually. Acceptability is judged independently by each of the committee members, based on the documentation available (e.g. descriptions, drawings and pictures). In this report the records of 1998 are presented. Of each accepted record the province, nearby city, date(s), number, sex and observers are given. In addition, not (yet) accepted records and records received without documentation are listed. Highlights of the odonatological year 1998 were undoubtedly the records of the first adult specimens of *Gomphus flavipes* since 1902. These records made clear that the larva found in 1996, which constituted the first record since 1902, was the forerunner of the return of this species in The Netherlands. Remarkable was the discovery of two populations of *Somatochlora arctica* on one single day bringing the known number of populations to three. In the dune-area a population of *Leucorhinia pectoralis* was found after absence as breeding species for several decades. Also the first records ever for *Sympecma fusca* for the dune-area were made. In 1998 the third and fourth Dutch records of *Anax parthenope* were made. One of which constituted the highlight of the day for an excursion of 25 members of the Dutch Society for the Study of Dragonflies (NVL)."] (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

9987. Schlüter, T. (2003): Fossil insects in Gondwana – localities and palaeodiversity trends. *Acta zoologica cracoviensia*, 46(suppl. – Fossil Insects): 345-371. (in English) ["The faunal history of insects in the various fragments of Gondwana is presented. The first part of the paper summarizes the current knowledge of its insect-bearing localities, particularly their stratigraphy and fossil content, emphasizing the record of the higher systematic groups. The second part discusses some trends of their palaeobiodiversity as evidenced from the above mentioned sites. Generally, the knowledge of the fossil Gondwanan insect faunae is still much lower than that of the Laurasian ones, but has considerably increased over the last decade. Altogether about 85 localities are known from Gondwana, with a maximum of sites in Permian and a minimum in Jurassic times. Best represented is South America. Fossil insects of Gondwana are probably less known than those of Laurasia due to inadequate exploration rather than unfavourable conditions for the formation of deposits." (Author) Many references to Odonata are made.] Address: Schlüter, T., UNESCO Nairobi Office; P. O. Box 30592 Nairobi, Kenya. E-mail: Thomas.Schlueter@unesco.unon.org

9988. Sinakevitch, I.; Douglass, J.K.; Scholtz, G.; Loesel, R.; Strausfeld, N.J. (2003): Conserved and convergent organization in the optic lobes of insects and isopods, with reference to other Crustacean taxa. *J. Comp. Neurol.* 467: 150-172. (in English) ["The shared organization of three optic lobe neuropils—the lamina, medulla, and lobula—linked by chiasmata has been used to support arguments that insects and malacostracans are sister groups. However, in certain insects, the lobula is accompanied by a tectum-like fourth neuropil, the lobula plate, characterized by wide-field tangential neurons and linked to the medulla by uncrossed axons. The identification of a lobula plate in an isopod crustacean raises the question of whether the lobula plate of insects and isopods evolved convergently or are derived from a common ancestor. This question is here investigated by comparisons of insect and crustacean optic lobes. The basal branchiopod crustacean *Triops* has only two visual neuropils and no optic chiasma. This finding contrasts with the phyllocarid *Nebalia pugettensis*, a basal malacostracan whose lamina is linked by a chiasma to a medulla that is linked by a second chiasma to a retinotopic outswelling of the lateral protocerebrum, called the protolobula. In *Nebalia*, uncrossed axons from the medulla supply a minute fourth optic neuropil. Eumalacostracan crustaceans also possess two deep neuropils, one receiving crossed axons, the other uncrossed axons. However, in primitive insects, there is no separate fourth optic neuropil. Malacostracans and insects also differ in that the insect medulla comprises two nested neuropils separated by a layer of axons, called the Cuccati bundle. Comparisons suggest that neuroarchitectures of the lamina and medulla distal to the Cuccati bundle are equivalent to the eumalacostracan lamina and entire medulla. The occurrence of a second optic chiasma and protolobula are suggested to be synapomorphic for a malacostracan / insect clade. [...] Columnar and stratified arrangements of centrifugal terminals are seen in dragonflies, such as *Aeshna Canadensis*, the lamina of which comprises discrete rows of optic cartridges each supplying a sheet of axons into the first optic chiasma (see, Meinertzhagen, 1976). In *Aeshna* (Fig. 4E), each centrifugal GABAergic ending bifurcates to provide a system of tangential processes and systems of climbing fibers to

three or four optic cartridges. These fibers end as beaded tufts at the level of the incoming receptor axons (Fig. 4E)." (Authors)] Address: Strausfeld, N.J., ARL, Division of Neurobiology, Univ. of Arizona, Tucson, AZ, 85721, USA. E-mail: flybrain@neurobio.arizona.edu

9989. Smith, S.G.F. (2003): Ionocytes in the dragonfly nymph *Erythemis simplicicollis* (Say). Proceeding of the ninth symposium on the natural history of the Bahamas: 135-138. (in English) ["Nymphs of *E. simplicicollis* are known to inhabit brackish water environments as well. Presence and location of ionocytes, or ion transport cells, were compared in nymphs of two different species, *Anax junius* (a freshwater species) and *E. simplicicollis*. The nymphs were held in tanks of three different salinities for a total of thirteen days, and then subjected to a silver nitrate staining technique to allow us to identify ionocytes on the gill tissues. Patches of ionocytes were found at the base of the rectal gill leaflets in *E. simplicicollis*. No similar patches were observed in *A. junius* nymphs, regardless of salinity. Patch density of ionocytes in *E. simplicicollis* increased as the salinity increased, which suggests that this species is able to respond to changes in salinity." (Author)] Address: Smith, Sherilyn, Dept of Biology, Le Moyne College, Syracuse, NY 13214, USA

2004

9990. Benard, M.F. (2004): Predator-induced phenotypic plasticity in organisms with complex life histories. *Annu. Rev. Ecol. Evol. Syst.* 35: 651-673. (in English) ["Predator-induced phenotypic plasticity is widespread in nature and includes variation in life history, morphology, and behaviour. In organisms with complex life histories, predator-induced phenotypic plasticity in the larval period has been widely documented. Several models predict how organisms should alter their size at and time to metamorphosis in response to an increased risk of predation. A survey of empirical studies finds that these theoretical predictions are frequently met. However, no one model performs the best. Additionally, there are several results not predicted by any model. Predator-induced plasticity in metamorphic traits may be related to predator-induced changes in larval morphology and behaviour. Predictions of predator effects on larval traits are generally met, except for direct costs of predator-induced morphological phenotypes. Future work should incorporate more detailed studies of growth rate, morphology, and behaviour during the larval period, as well as studies of size-specific mortality rates in the presence and absence of predators." (Author) This review includes references to Odonata.] Address: Benard, M.F., Section of Evolution and Ecology, Center for Population Biology, Univ. of California, Davis, California 95616, USA. E-mail: mfbenard@ucdavis.edu

9991. Godunko, R.; Klymyshyn, O. (2004): Scientific heritage of Józef Dzierżewicz. *Proc. State Nat. hist. Mus., Lviv* 19: 187-190. (in Ukrainian, with English summary) [The entomological work of J. Dzierżewicz (1844-1918) is honoured. Dzierżewicz published in 1902 a classic work on the Odonata of Galicia, a region with shifting administrative responsibility between Poland and Ukraine: "Ważki Galicyi i przyległych Krajów Polskich (Odonata Halicae) (reliquarumque provinciarum Poloniae). Muzeum Imienia Dzierżewiczkich we Lwowie V. 176 pp.] Address: not stated

9992. Prokofiev, I.V. (2004): Role of dragonflies (Odonata) in bird diet. Russian ornithological journal 13 (257): 299-303. (in Russian) [In a total of 5855 food samples in bird species of the Leningrad region (Russia) between 1955 and 2000, 181 Odonata species could be detected. 116 items were caught by *Muscicapa striata* (n=44), *Ficedula hypoleuca* (n=10), *Lanius collurio* (n=27), *Motacilla flava* (n=24) and *M. alba* (n=11). The rest was preyed by 24 additional bird species. Odonata species recorded include *Libellula quadrimaculata*, *Sympetrum* sp., *Libellulidae* indet., *Lestes* sp., *Sympecma* sp. *Lestidae* indet., *Cordulia aenea*, *Somatochlora flavomaculata*, *Coenagrion* sp., *C. pulchellum*, *C. hastulatum*, *Coenagrionidae* indet., *Cordulegaster boltonii*, *Aeshna* sp., *Aeshnidae* indet. *Lestidae* or *Coenagrionidae*, *Libellulidae* or *Aeschnidae* and *Odonata* indet.] Address: not stated.

2005

9993. Ajay, J.C.; Balakrishnan, M. (2005): Abundance and richness of insects in Kazhakuttom. Bulletin of the National Institute of Ecology 16: 19-27. (in English) ["Abundance, density and richness of insects in Kazhakuttom Grama Panchayat of Kerala was studied using transect and quadrat methods. During the present investigation, 94 species of insects belonging to 42 families of 9 orders were located." Odonata were treated at the family level and represented by five taxa (5.31%).] Address: Balakrishnan, M., Department of Biology, Addis Ababa University, Post Box No. 1176, Addis Ababa, Ethiopia; E-mail: balak212@yahoo.com

9994. Alonso, A.; Camargo, J.A. (2005): Estado actual y perspectivas en el empleo de la comunidad de macroinvertebrados bentónicos como indicadora del estado ecológico de los ecosistemas fluviales españoles. Ecosistemas 14(3): 87-99. (in Spanish, with English summary) ["Fluvial ecosystems are nowadays affected by several anthropogenic activities. Impounded and channelized rivers, organic matter pollution, eutrophication, and mining activities, among others, cause changes in the structure and function of biological communities inhabiting rivers and streams. Benthic macroinvertebrate communities are sensitive to those environmental impacts. These communities enclose invertebrates that dwell the bottom substrate and that can be detected with the naked eye. The study of those communities permits to assess the health of fluvial ecosystem. In this article we review the main traits of macroinvertebrate communities that are used as environmental indicators, and we show several cases of Spanish fluvial bioassessments. Besides the future necessities in fluvial macroinvertebrate bioassessment are discussed." (Authors) *Cordulegaster boltonii*] Address: Alonso, A., Dpto. Interuniversitario de Ecología. Sección de Alcalá. Edificio de Ciencias. Universidad de Alcalá. E-28871, Alcalá de Henares, Spain

9995. Borisov, S.N. (2005): Aperiodic changes in number of *Lestes macrostigma* (Eversmann, 1836) (Odonata, Lestidae) in forest-steppe of West Siberia. Euroasian entomological journal 4(1): 30-32. (in Russian, with English summary) ["An increase in the number of *L. macrostigma* in the lower reaches of the Karasuk river (forest-steppe of Novosibirsk Ob-last') during 2000-2001 is recorded. Formerly, only a single record in 1973 had been recorded. Possible reasons for number fluctuations are discussed. Extreme variation in

wing venation is shown." (Author)] Address: Borisov, S.N., Siberian Zoological Museum, Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

9996. Elliott, N.B.; Smith, D.L.; Smith, S.G.F.; Carey, E. (2005): Establishment of the National Bahamian Entomological collection. Proceedings of the 10th Symposium on Natural History of the Bahamas: 34-36. (in English) [437 specimens are included into the collection and based on material in 2003; no details other than geographic are dealt with. The specimens are listed according the 13 islands of the Bahamas: New Providence, Cat Island, Acklins, Great Inagua, Mayaguana, North Andros, South Andros, Grand Bahama, Eleuthera, Long Island, Great Exuma, Great Abaco, San Salvador] Address: Smith, D.L., Department of Biology Le Moyne College Syracuse, NY 13214, USA

9997. Geraeds, R.P.G.; Schaik, V.A. van (2005): Ecological aspects of the dragonfly *Ophiogomphus cecilia* along the river Roer: monitoring exuviae in 2002 and 2003 and a comparison of survey methods. Natuurhistorisch Maandblad 94(1): 1-6. (in Dutch, with English summary) ["In the year 2000, a population of *O. cecilia* was discovered along the river Roer. Since monitoring exuviae of this species along the banks of the Roer is hampered by the limited accessibility of the terrain, we used a boat (provided by the local water board) to hold surveys in 2002 and 2003. Four of such boat surveys in each of these years, during June, July and August, yielded 86 exuviae of *Ophiogomphus cecilia*. By contrast, 47 land surveys during the same period only yielded another 19 exuviae. This indicates that boat surveys are the most suitable method, allowing more locations to be accessed and monitored. Most larvae emerge vertically (59%) and close to the banks (0-0.25 m). They preferably seem to emerge amid the vegetation. The average length of the exuviae was 29.5 mm.] Address: Schaik, V.A. van, Hoosveld 56, 6075 DB Herkenbosch

9998. Jacobi, B. (2005): Neue und selten nachgewiesene Insekten in Oberhausen. Elektronische Aufsätze der Biologischen Station Westliches Ruhrgebiet 1.8: 1-6. (in German) [*Sympecma fusca*; Germany, Oberhausen, Zentrum, roofgarden of the Elsa-Brändström-Gymnasium, 18-VII-2003.] Address: Jacobi, B., Dieckerstr. 26, 46047 Oberhausen, Germany. E-mail: h.b.jacobi@gmx.de

9999. Jourde, P. (2005): Une nouvelle espèce de libellule pour la Charente-Maritime: la Cordulie splendide *Macromia splendens* (Pictet, 1843) (Odonata, Anisoptera, Macromiidae). Annales de la société des sciences naturelles de la Charente-Maritime 9(5): 529-534. (in French, with English summary) [In 2004, *M. splendens* was recorded for the first time in Charente-Maritime, along the rivers La Dronne, Lary, Né and Charente. It is the 61st Odonata species found in Charente-Maritime, France.] Address: Jourde, P., LPO, La Corderie Royale, BP 90263, F-17305 Rochefort, France. E-mail: philippe.jourde@lpo.fr

10000. Kawakami, Y.; Ichisawa, K.; Watanabe, K. (2005): A list of the insect collection of Mt Daisen Museum of Nature and History, Tottori, Japan. Bulletin of the Tottori Prefectural Museum 42: 21-27. (in Japanese, with English title) [19 odonate species: *Calopteryx cornelia*, *Mnais pruinosa nawai*, *M. pruinosa pruinosa*, *Tanypteryx pryeri*, *Anisogomphus maacki*, *Davidius*

nanus, *Stylogomphus suzukii*, *Sinogomphus flavolimbat*, *Anotogaster sieboldii*, *Anax nigrofasciatus nigrofasciatus*, *A. parthenope julius*, *Epophthalmia elegans*, *Nannophya pygmaea*, *Crocothemis servilia mariannae*, *Sympetrum pedemontanum elatum*, *S. risi risi*, *S. speciosum speciosum*, *S. croceolum*, and *Rhyothemis fuliginosa* are listed.] Address: Kawakami, Y., Tottori Prefectural Mus., Higashi-machi 2-124, Tottori, 680-0011, Japan

10001. Keppner, E.J.; Keppner, L.A. (2005): Some dragonflies and damselflies (Insecta: Odonata) from Bay County, Florida. For: The St. Andrew Bay Environmental Study Team, Inc.: 33 pp. (in English) [USA; records of 43 Odonata species are recorded. Most are new records for the County.] Address: Keppner, E.J., c/o The St. Andrew Bay Environmental Study Team, PO Box 2465, Panama City, Florida 32402, USA

10002. Lagunov, A.V. (2005): Insects from the Red Book of Russian Federation in the fauna of the Chelyabinsk region. Annotated list. Proceedings of the Chelyabinsk Scientific Center of UB RAS 2: 110-114. (in Russian) [According to an oral communication of AY Kharitonov to the author, *Ischnura aralensis* is known from the Chelyabinsk region (Bashkortostan).] Address: Lagunov, A.V., Ilmensky state reserve, Ural branch of Russian Academy of Science, Miass, Russia. E-mail: lagunov@ilmeny.ac.ru

10003. Ma, S. (2005): Buzz of life in our bay. The Hamilton Spectator, Thursday, August 25, 2005: Go 5. (in English) [General account on insects including Odonata.] Address: not stated

10004. Sharapova, T.A.; Abdullina, G.H. (2005): On studying the water invertebrates of the west Siberian southern tundras. Bulletin of Environment, Forestry and Landscape 5: 97-115. (in Russian) [The paper reports on fauna of Jamal Peninsula and compiles data from the Gydan Peninsula including old records of *Somatochlora sahlbergia* published by Belyshev & Kharitonov (1981).] Address: Sharapova, T.A., Institute of Northern Development, Siberian Branch of the RAS, Tyumen, Russia

10005. Xu, Q.-h. (2005): Note on the female sex of *Amphigomphus hansonii* Chao (Odonata: Gomphidae). Entomological Journal of East China 14(2): 191-192. (in Chinese, with English summary) ["The female of *Amphigomphus hansonii* Chao, 1954 is described for the first time and illustrated. It was collected at Hua'an County, Fujian Province of China, 2004-06-26. The specimen is deposited in Zhangzhou Education College, Fujian, China." (Author)] Address: Xu, Qi-han, (Zhangzhou Education College, Zhangzhou, Fujian 363000, China

10006. Bernard, R. (2006): New locality of *Somatochlora arctica* (Zetterstedt, 1840) (Odonata: Corduliidae) in western Poland. Wiad. Entomologiczne 25: 55-56. (in Polish) [Kobyła Łąka, 50°50'N 15°22'E, UTM: WS23, 18 VIII 2005] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz Univ., Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

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10007. Cheung, F. (2006): Will Luk Keng become another Sham Chung? Porcupine 34: 28. (in English) ["In

a biweekly adult dragonfly survey started in February 2005, more than one third of the total Odonate species in Hong Kong were recorded, including the globally-endangered *Mortonagrion hirosei*, and six locally-uncommon species (Wilson, 2004): *Cercion calamorum*, *C. melanotum*, *Pseudagrion microcephalum*, *Gomphidia kelloggi*, *Macrodiplax cora* and *Nannophyopsis clara*." (Author)] Address: not stated

10008. Craves, J.A. (2006): *Archilestes grandis* (Rambur) (Odonata: Lestidae): new for Michigan. Great Lakes Entomologist 39(1/2): 88-90. (in English) [27-IX-2005, retention pool in Livonia, Wayne County, Michigan, T1S R9E, sec 7, USA.] Address: Craves, J.A., 15911 Andover Dr., Dearborn, MI 48120, USA. E-mail: jcraves@umd.umich.edu

10009. Eda, S. (2006): Two cases of triple-connection in the Odonata. Tombo 48: 32. (in Japanese) [*Lestes temporalis*, *Sympetrum frequens*] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10010. Fukunaga, K.; Iomita, M.; Murata, M.; Matsumura, K.; Shirai, M. (2006): Analysis of mitochondrial DNA in the exuviae of *Libellula angelina* Selys (Libellulidae). Tombo 48: 21-22. (in English, with Japanese summary) ["DNA analyses were made from the exuviae of *Libellula angelina* Selys and *L. quadrimaculata asahinai* Schmidt. The partial fragments of the mitochondrial 16 S rRNA gene were amplified by using a polymerase chain reactions PCR method. Amplified genetic sequences extracted from two *L. angelina* individuals were 100% identical, but differed from that of *L. quadrimaculata asahinai*. These results indicate that the use of exuviae is efficient for analyzing DNA sequences in Odonate species." (Authors)] Address: not stated

10011. Futahashi, R.; Futahashi, H. (2006): The Odonate fauna of the Noto Peninsula, Hokuriku District, Honshu (2). Tombo 48: 18-20. (in English, with Japanese summary) [*Paracercion sexlineatum*, *Sympetma paedisca*, and *Sympetrum maculatum* are regionally noteworthy. "Two migratory species, *Sympetrum fonscolombii* and *Trapezostigma virginia*, and a supposed hybrid between *Anax nigrofasciatus nigrofasciatus* Oguma, 1915 and *Anax parthenope julius* Brauer, 1865 are newly recorded from this peninsula." (Author)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

10012. Gärtner, E.; Olthoff, M.; Scherzer, H. (2006): Die Libellenfauna des Helstorfer Moores (Niedersachsen) unter besonderer Berücksichtigung eines Reliktvorkommens der Zwerglibelle (*Nehalennia speciosa*) und deren Habitatstruktur. Telma 36: 133-154. (in German, with English summary) ["The Helstorfer Moor, a small bog north of Hannover (Lower Saxony, Germany), has been exploited by peat cutting over some centuries. In a two-year-inventarisation 35 Odonata species were found, among these many rare typical species of peat bogs. After one single male had been discovered by Pryswhitt, in 2003 a large population of *Nehalennia speciosa* was found in the Helstorfer Moor, situated in a distance of about 20 km from another population near Hannover. The imagoes of this species predominantly occur in the northern part of the bog, where the peat waters are hydrologically influenced by flowing water and/or adjacent springs. In the small larval ponds *Utricularia minor* is the characteristic plant species. The peat water is strongly or weakly acid, the conductivity is be-

low 100 μ S. The imagoes of *Nehalennia* were found in sections dominated by *Molinia caerulea*, in part mixed with sparse stands of trees (*Pinus silvestris*, *Betula pubescens*). The habitat is part of a Nature Reserve of 410 hectares, well protected against external detrimental influences." (Authors)] Address: Olthoff, M., Naturförderstation im Kreis Coesfeld, Borkener Str. 13, 48653 Coesfeld, Germany. E-Mail: matthias.olthoff@gmx.de

10013. Handke, K.; Adena, J.; Handke, P. (2006): Landschaftsökologische Untersuchungen auf dem Golfplatz Achim (Niedersachsen). Ein Vergleich mit dem Ausgangsbestand und einem Referenzgebiet. *Naturschutz und Landschaftsplanung* 38(7): 214-224. (in German, with English summary) ["On the golf course in Achim (ca. 113 ha) (near Bremen, Lower Saxony, Germany) and on an adjacent reference site (ca. 294 ha) an ecological survey was conducted in 2004. The investigation comprised habitat types, endangered plant species, breeding birds, amphibians, dragonflies, butterflies and grasshoppers. About 35 ha of the golf-course are intensively used whilst the remaining area consists of poor grassland, afforestation sites, and more than 70 water areas. On the golf-course five endangered plant and 43 animal species were identified. Compared to 1996 13 species of the Red Data Book have disappeared and 34 species were registered for the first time. As expected mainly breeding birds of the open agricultural landscape have disappeared whilst particularly amphibians and dragonflies have newly colonised the golf course area, and bird species of hedges and woodlands have expanded. Ornithological importance has slightly increased. Compared to the former conditions the amount of habitat types of very high and high value has markedly increased (1995: 4.6%, 2004: 25%). Furthermore, the poor grassland sites and most of the water areas and their shores developed positively. The large amphibian populations of species like newt (*Triturus cristatus*) and natter jack (*Bufo calamita*) as well as a dragonfly fauna of national importance have also to be pointed out. All in all, the investigations reveal a positive development of fauna and flora on the golf-course area. Compared to the reference site the golf course has a significantly higher importance for habitat types and fauna. The study shows that the potential for nature conservation measures is high on oligotrophic grounds and that various animal species colonise such areas in a short time period." (Authors)] Address: Handke, K., Riedenberg 19, 27777 Ganderkesse, Germany. E-mail: k.handke@oekologische-gutachten.de

10014. Ishikawa, H.; Yano, M. (2006): A record of *Neurothemis fluctuans* (Fabricius, 1793) from Tokyo. *Tombo* 48: 36. (in Japanese) [28-IX-2005]. Address: not stated in English.

10015. Kawashima, I.; Karube, H. (2006): External morphology of the last instar larva of probable *Petaliaeschna flavipes* Karube (Anisoptera, Aeshnidae, Brachytroninae) from Laos, Indochina. *Tombo* 48: 7-11. (in English, with Japanese summary) ["The external morphology of the last instar larva of what is presumed to be *Petaliaeschna flavipes* Karube, 1999 from Laos is reported and illustrated based on an exuvia. The characters are compared with those of the genera *Cephalaeschna* Selys, 1883 (Fraser, 1943; Asahina, 1961) and *Periaeschna* Martin, 1909 (Matsuki & Lien, 1984)." (Authors)] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

10016. Kawashima, I.; Sasamoto, A. (2006): Description of the last instar larva of *Periaeschna laidlawi* (Förster) (Anisoptera, Aeshnidae) from Malaysia, south-western Asia. *Tombo* 48: 12-17. (in English, with Japanese summary) ["The external morphology of the last instar larva of *P. laidlawi* from Malaysia is described and illustrated for the first time, and is compared with the larvae of *P. magdalena* Martin from Taiwan (Matsuki & Lien, 1984) and *Cephalaeschna* spp. from Assam (Fraser, 1943; Asahina, 1961)." (Authors)] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

10017. Kita, H. (2006): A female of *Sympetrum speciosum speciosum* that copulated after refusing in tandem position. *Tombo* 48: 27-28. (in Japanese, with English summary) ["A female *Sympetrum s. speciosum* repeatedly showed a refusal behaviour [i.e., not complying with taking a copula position by bending abdomen forward) while in tandem with a male, although she did finally copulated with the male. The female is not fully mature and this may be the cause of this unusual behaviour." (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan

10018. Kita, H. (2006): A male of *Indolestes boninensis* (Odonata, Lestidae) connected with a dead female. *Tombo* 48: 28-29. (in Japanese, with English summary) ["A male *I. boninensis* in tandem with a dead female which had lost her abdomen posterior to the 5th segment, was observed in Otôto-jima Island of the Ogasawara Islands. This male showed some movement that seemed to prompt the female to oviposition." (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan

10019. Kita, H. (2006): A heterospecific "Type AB" triple-connection between a male *Sympetrum infuscatum* (Selys, 1883) and a copulating pair of *S. maculatum* Oguma, 1915. *Tombo* 48: 25-26. (in Japanese, with English summary) ["... Ojiya City, Niigata Prefecture. The male *S. infuscatum* showed, while in the triple connection, swing movements that resembled typical tandem oviposition behaviour in the air above grassland suitable for oviposition for this species. From this behaviour, and similar examples cited, it was guessed that a male *Sympetrum* might show oviposition movements in tandem without experiencing copulation with the connected partner (s) if it was in tandem with a heterospecific individual or in triple connection." (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan

10020. Lagunov, A.V. (2006): Red book listed arthropods in fauna of the Chelyabinsk region. *Proceedings of the Chelyabinsk Scientific Center of UB RAS* 4: 33-37. (in Russian) [Russia; *Aeshna viridis*, *Leucorrhinia albifrons*, *Leucorrhinia caudalis* and *Ophiogomphus cecilia* are listed. (55°09'17"N 61°22'33"E)] Address: Lagunov, A.V., Ilmensky state reserve, Ural branch of Russian Academy of Science, Miass, Russia. E-mail: lagunov@ilmenny.ac.ru

10021. Lagunov, A.V. (2006): Insects from the Red Book of Russian Federation in fauna Ilmensky Reserve and prospects of their conservation. *Proceedings of the Chelyabinsk Scientific Center of UB RAS* 1: 88-91. (in Russian) [In July 2004 several specimens of *Anax imperator* were observed in the Uchalinsky district (Bashkortostan). According an oral communication of AY Haritonov to the author, also *Ischnura aralensis* is known

from the same region.] Address: Lagunov, A.V., Ilmeny state reserve, Ural branch of Russian Academy of Science, Miass, Russia. E-mail: lagunov@ilmeny.ac.ru

10022. Nakada, A. (2006): An observation of heterogeneric copulation between *Deielia phaon* (Selys, 1883) male and *Orthetrum albistylum speciosum* (Uhler, 1853) female. Tombo 48: 23-24. (in English, with Japanese summary) [4-VI-2005] Address: not stated in English

10023. Naraoka, H. (2006): Four continental Symptetrum dragonflies (Libellulidae) collected in Aomori Prefecture, northern Honshu, Japan, in 2005. Tombo 48: 33-34. (in Japanese, with English summary) ["Symptetrum depressiusculum, *S. cordulegaster*, *S. vulgatum imitans* and *S. f. flaveolum* were collected from Aomori Prefecture in autumn of 2005. The former three species are well known migrants from Continental Eurasia. *S. f. flaveolum* is new to Honshu, and is considered to have migrated from Eurasia continent or Hokkaido. A female, instead of males, of *S. vulgatum imitans* was recorded for the first from Japan." (Author)] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagi-cho, Kita-gun, Aomori Prefecture, 038-3661, Japan

10024. Romstöck-Völkl, M.; Völkl, W.; Rebhan, H.; Franke T.; Krug, R. (2006): Auswirkungen einer naturschutzorientierten Teichwirtschaft im NSG Craimoosweiher. Ergebnisse einer zehnjährigen Untersuchung auf Libellenfauna und Unterwasservegetation. Naturschutz und Landschaftsplanung 38(8): 251-258. (in German, with English summary) ["Between 1995 and 2005 the effects of near-natural fish farming (main fish species: carp) on odonate fauna and submersed vegetation were studied in the nature reserve "Craimoosweiher" in Northern Bavaria, Germany. The natural potential of carp increase has been estimated to approx. 150 kg/ha related to a water area of 14 ha. This potential was reached with a stocking rate of only 1500 - 2000 specimens K2 (=* two year old carps) (approx. 600 and 1000 kg input, according to fish size). Increased stocking rate led to reduced carp growth. Further, the biomass reduction could not be raised by a higher stocking rate. A total of 28 odonate species was recorded in the pond, with 15 species occurring in all years of investigation. The average annual species number was relatively constant and varied between 16 and 23 species. However, winter draining in 1996 and 2003 led to a subsequent reduction in the density of all damselfly species. The population density of *Erythromma najas* was influenced most conspicuously; *Erythromma viridulum* and *Coenagrion pulchellum* completely disappeared after winter drainage. The species-rich submersed vegetation (13 species of Angiospermae, 2 species of Bryophyta-Hepaticae, 3 species of Characeae) was dominated by *Ceratophyllum submersum* and *Najas minor*. Like the odonate fauna, the submersed vegetation was negatively influenced by winter drainage. However, the plant species recovered faster than the odonates. Additionally, high fish density (especially roach) led to a decrease in submersed vegetation density and species number. At the same time this decrease of vegetation had a negative influence on the odonate fauna. A reduction of fish density enhanced both submersed vegetation and odonate fauna. The case study "Craimoosweiher" allows the conclusion that freshwater fishery and nature conservation measures not necessarily contradict each other."] Address: Völkl, W., Ökologische Planung, Hohe Eiche 6, 95517 Seybothenreuth, Germany. E-mail: wolfgang.voelk@t-online.de

10025. Savard, M. (2006): Un bel exemple d'atlas pratique pour la conservation de la biodiversité des insectes à l'échelle humaine! Bulletin de l'entomofaune 33: 12-14. (in French) [Book review of: Jourde, Philippe. 2005. Les libellules de Charente-Maritime. Annales de la Société des Sciences Naturelles de la Charente-Maritime, Supplément décembre 2005. Société des Sciences naturelles de La Rochelle. ISSN 0373.9929. 144 pages] Address: not stated

10026. Schmidt, Eb. (2006): Stichwort: Hochmoor. Naturzeit 3(5): 5. (in German) [Concise characterisation of bog ecology including a few passing references to Odonata.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

10027. Sugano, T.; Umeda, T. (2006): The first record of *Neurothemis fluctuans* (Fabricius, 1793) from Kanagawa Prefecture. Tombo 48: 35. (in Japanese) [26-VIII-2005] Address: not stated in English

10028. Vonička, P. (2006): The occurrence of dragonfly *Leucorrhinia pectoralis* (Odonata: Libellulidae) in the Jizerske hory Mountains (Northern Bohemia). Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších: seminár usporádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lipe / editor sborníku Lubomír Hanel. -- Vyd. 1. - - Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 162-164. (in Czech, with English summary) [Czech Republic, Na Kotli bog, 14-VI-2005, 930m a.s.l., 1 male.] Address: Vonička, P., Severočeské muzeum, Masarykova 11, 46001 Liberec, Czech Republic. E-mail: pavel.vonicka@muzeumlb.cz

10029. Watanabe, K. (2006): *Sympetrum fonscolombi* emerged out in winter at Ishigaki Is.. Tombo 48: 17. (in English, with Japanese summary) ["The last instar larvae of *S. fonscolombii* were collected from a swimming pool at Ishigaki on Jan. 14, 2006. From them a male and a pair emerged out on Jan. 18 and on Feb. 11 respectively." (Author)] Address: not stated in English

10030. Yamamoto, T.; Nishiura, N. (2006): A few atypical oviposition behavior in *Epitheca marginata* (Selys) (Anisoptera: Corduliidae). Tombo 48: 30-32. (in Japanese, with English summary) ["Three cases of atypical oviposition behaviour of *E. marginata* were observed in Kyoto Prefecture, Japan: 1) A female did oviposition without perching after copulation. During oviposition she repeatedly released egg masses by striking the water surface with the tip of abdomen, while the partner male flew around her. 2) A female repeated perching and flying oviposition about eight times. The oviposition was carried out by striking the water surface with the tip of abdomen. While perching, the female made an egg mass. The egg masses after oviposition did not take an usual form of "eggs-string" or "eggs-strand", but took a form of several small fragments of egg-masses. 3) When a female arriving at a pond immediately began flying oviposition without perching, like that of *Sympetrum* species." (Authors)] Address: not stated in English.

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10031. Abro, A. (2007): Microanatomy of the terminal male genital tract in the dragonfly *Aeshna juncea* (L.) (Odonata: Anisoptera: Aeshnidae). Entomologist's

monthly magazine 143(1718/1720): 175-179. (in English) ["Males of Odonata eject sperm into the copulatory apparatus of secondary genitalia situated below the base of their abdomen; during copulation the penis of this apparatus becomes inserted into the female vaginal canal. The micro-anatomy of the vesicula seminalis and the terminal ejaculatory canal in adult males of *A. juncea* reveals in these tubular segments the presence of a powerful muscular coat that is presumed to play a decisive role during the intramale sperm translocation which is usually of brief duration. Sperm bundles dispersed in a gelatinous carrier-substance are thought to be ejected by violent contraction of that musculature." (Author)] Address: Abro, A., Division of Anatomy, Dept of Biomedicine, University of Bergen, Jonas Lies vei 91, N-5009 Bergen, Norway

10032. Bechly, G. (2007): Chapter 11.5 Odonata: damselflies and dragonflies. In: Martill, D.M., Bechly, G. & Loveridge, R.F. (eds) (2007): The Crato fossil beds of Brazil: Window into an ancient world. xvi + 625 pp. - Cambridge University Press, Cambridge, UK: 184-222. (in English) ["Even though they constitute only about 2% of the fossil insects found (Bechly 1998c), dragonflies are not rare in the Crato Formation, so that more than 1,000 specimens of about 46 different species have been discovered so far. No other fossil locality yields more fossil odonates, either in the number of individuals or in the number of species, than the limestones of the Crato Formation. Furthermore, Crato Formation examples are outstanding because of their completeness and very beautiful preservation." (Author) Information on these taxa is compiled, including detailed descriptions of the following new taxa: *Euarchistigma marialuiseae* sp. nov., *Cratostenophlebia schwickerti* sp. nov., *Eotanypteryx paradoxa* sp. nov., *Cordulagomphus winkelhoferi* sp. nov., *Cordulagomphus haneloreae* sp. nov. and (*Procordulagomphus michaeli* sp. nov.) Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

10033. Benton, T.; Dobson, J. (2007): The Dragonflies of Essex. Lopinga Books: XII + 228 pp. (in English) ["Nineteen years have passed since Ted Benton produced the first Dragonflies of Essex, as good as it was this volume far surpasses it in scope and production. A hard backed washable and illustrated cover conceals 228 pages with numerous colour photographs and distribution maps. A chapter on biology and conservation is followed by a very useful illustrated guide to many of the best Essex sites for Dragonflies. The main body of the book, the species accounts includes sections on identification, flight period, habits, distribution and conservation. Excellent photographs of each species are included within the accounts as well as an Essex distribution map of each species. Early records are also discussed at the conclusion of each account. Chapter four is devoted to a history of dragonfly recording in Essex, dealing with many notable entomologists from Victorian times until the present day. There are appendices on former Essex species, possible future arrivals and a couple of rare species as well as a plant list. An extensive bibliography is included and the whole is fully indexed. All in all a first class book essential for all Essex field naturalists as well as dragonfly specialists. It is well bound and produced on quality paper, place your order today." From: Del Smith, <http://www.essexfieldclub.org.uk/portal/p/Dragonflies%20of%20Essex>] Address:

Dobson, J., 158 Main Rd, Danbury, Essex CM3 4DT, UK. E-mail: johndobson@mammals.fsnet.co.uk

10034. Besse-Lototskaya, A.; Verdonschot, R.C.M.; Verdonschot, P.F.M.; Klostermann, J. (2007): Effect of climate change on the Netherlands government policies: the case of brooks and brook valleys (a study of literature Alterra-Rapport 1536: 134 pp. (in Dutch) [In appendix 2, the the ecological preferences and tolerances of the following species are tabled: *Calopteryx splendens*, *C. virgo*, *Cordulegaster boltonii*, *Gomphus flavipes*, *G. vulgatissimus*, *Ophiogomphus cecilia*, *Orthetrum brunneum*, *O. coerulescens*.] Address: Alterra, P.O. Box 47, NL-6700 AA Wageningen

10035. Brockhaus, T. (2007): Die Libellenfauna der Döbrichauer Wiesen, östlich von Torgau (Odonata). Sächsische Entomologische Zeitschrift 2: 2-8. (in German) [Döbrichauer Meadows, east of Torgau, Sachsen, Germany, 31 Odonata species - including the regionally rare species *Brachytron pratense*, *Leucorrhinia pectoralis*, *Sympetrum meridionale*, *Somatochlora flavomaculata*, *Coenagrion pulchellum*, *Lestes virens*, *Orthetrum coerulescens*, *Anaciaeschna isoceles*, *Cordulia aenea* - were observed between 2003 and 2006.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

10036. Corbet, P.S. (2007): Dr Syoziro Asahina: fond recollections of fifty years of friendship. Tombo 50: 7-9. (in English) [P.S. Corbet met S. Asahina for the first time at 29 November 1953 in London. In this paper, he gives a brief insight in a long lasting odonatological friendship between himself and Dr. S. Asahina.]

10037. Eda, S.; Kawashima, I.; Sasamoto, A.; Suito, Y.; Inoue, K. (2007): A checklist of publications by Dr Syoziro Asahina (1928-). Tombo 50: 27-48. (in Japanese and English) [Between 1928 and 1988, Dr. Asahina wrote 985 publications, on most cases referring to Odonata.] Address: Sasamoto, A., Yakuoji Tawaramotocho, Shiki-gun, Nara, 636-0341 Japan

10038. Eda, S. (2007): On the puncta of nodi on the wings of *Libellula quadrimaculata asahinai* Schmidt. Tombo 49: 48. (in Japanese, with English summary) ["The puncta of nodi on the wings of *L. quadrimaculata asahinai* vary in size. The photograph shows an example of the "extremely reduced type". The note also advises on two specimens of the "disappeared type".] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10039. Eda, S. (2007): On a mature male of *Planaeschna milnei* (Selys) with the reflecting wings. Tombo 49: 30. (in Japanese) [Japan; an old male of *P. milnei* with heavily damaged wings is documented.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10040. Eda, S. (2007): Advance of the Japanese Society for Odonatology in these 50 years. Tombo 50: 1-6. (in Japanese, with English summary) ["On October 7, 1957, the Japanese Club of Odonatology was founded by only 14 members, and managed by Asahina, S., Ando, H. C and Eda, S.C. This Club to study only Odonata is through to be the first in the World. Annual meetings were held once a year. The bulletin "TOMBO" was published in every year. After 10 years, 1967, the Club changed into the Society, chiefly because of members' activity and partly of increasing in number. Dr. Asahina

became the first president. On November 2, 1997, 40th anniversary of the Society, Dr. Eda became the second president and Dr. Asahina got the Honorary President. At present members are about 380 persons including foreigners, and are gradually increasing." (Author)] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10041. Eda, S. (2007): An abnormal connection between two males of *Leucorrhinia dubia orientalis* Selys. Tombo 50: 76. (in Japanese) [Photo of a "tandem" between two males of *L. orientalis*.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10042. Eda, S. (2007): A recollection of *Lestes temporalis* Selys as a noxious insect to mulberry and fruit trees. Tombo 49: 35-40. (in Japanese, with English summary) ["In 1915, Fukaya reported that *L. temporalis* used to lay eggs into the branches of mulberry and fruits trees near the pond, after that the branches become death, therefore the insect is not beneficial but noxious. Thereafter some papers and books described *L. temporalis* belongs to noxious insects. Moreover "Explanatory Diagram of Noxious Insects to Mulberry Tree" by SUZUKI (1930) showed *Lestes temporalis* Selys at the top. In 1987, however, that name of the insect disappeared from "Major Insect and other Pests of Economic Plants in Japan".] (Author)] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10043. Eda, S. (2007): An introduction to "Fundamental Study of Animals for Teaching Material" - rare books as a phantom. Tombo 49: 40-43. (in Japanese, with English summary) [The book introduced by S. Eda was published 1926 by Bunyosha, Tokyo. This book presently is hard to get from any antiquarian. It was directed to teachers to introduce animals to pupils of elementary school and contains excellent explanations of dragonflies in volume 1 on pages 141-165 for 4th year pupils.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10044. Eda, S. (2007): Color patterns of the larvae of *Epiophlebia superstes* Selys. Tombo 49: 22. (in Japanese, with English summary) ["The 13 instar larvae of *Epiophlebia superstes* may be divided into 3 types such as black, brown and Panda, in colour. Most of them are black type and the last 2 types are very few. All of the last (14) instar larvae belong to black type. Regarding the Panda type the 6 instar larva is youngest at the present time." (Author)] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10045. Futahashi, R.; Futahashi, H. (2007): A record of black mutant of *Nannophya pygmaea* Rambur, 1842. Tombo 50: 71-72. (in Japanese, with English summary) ["An extremely melanized male of *N. pygmaea* was captured in Toyama Prefecture on July 15, 2007. This specimen had black coloration instead of normal reddish coloration around the whole body, and was caught by a normal male perhaps because it looked like a female." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

10046. Gallardo, B.; Garcia, M.; Cabezas, A.I.; Gonzalez, E.; Ciancarelli, C.; Gonzalez, M.; Francisco A. Comin, F.A. (2007): First approach to understanding ri-

parian wetlands in the Middle Ebro River floodplain (NE, Spain): Structural characteristics and functional dynamics. *Limnetica* 26(2): 373-386. (in English) ["In Spring of 2005, the relationships between the physical and chemical characteristics of the aquatic and benthic environments and macroinvertebrate assemblages in seven wetlands representative of the floodplain of the Middle Ebro River (NE Spain), were analyzed. The selected wetlands differed in their hydrological connectivity, local environmental conditions and anthropic influence. Through multivariate analyses, two environmental gradients and three main wetland groups were detected. The hydrological connectivity differences generate a heterogenous landscape of structurally and functionally different wetlands in the Ebro Middle floodplain. Confined wetlands, such as older ox bow lakes, showed higher salt and organic matter contents and lower macroinvertebrates' density and biodiversity than did the other wetlands. This suggests that confinement and lack of disturbance events have led to water salinization and eutrophication, habitat homogenization and natural succession of the communities towards more adapted structures with lower biodiversity. Wetlands that still maintain some functional relationship with the river, such as newer ox bow lakes, constructed wetlands, and backwaters, show a higher inorganic nutrient concentration and suspended solids. They also show higher taxa richness and evenness, which suggests that higher disturbance frequencies enhance habitat's heterogeneity and resource availability, and therefore primary and secondary production that allow adapted and opportunistic species to coexist. The progressive flow regulation tends to homogenise this complex system, endangering its conservation. Therefore, the key processes identified here should be taken under consideration for the planning and execution of ecological monitoring, management and restoration." (Authors) Odonata are treated at the order level.] Address: Gallardo, Belinda, Pyrenean Institute of Ecology (CSIC). Avda. de Montañana 1005, Zaragoza. 50192. Spain: E-mail: belinda@ipe.csic.es

10047. Geraeds, R.P.G.; Schaik, V.A. van (2007): De Gevlekte glanslibel langs de Venbeek, De situatie in 2005 en 2006 en een overzicht van de begeleidende Libellenfauna. *Natuurhistorisch Maandblad* 96(7): 198-201. (in Dutch, with English summary) [*Somatochlora flavomaculata* along the Venbeek brook. Situation in 2005 and 2006 and an overview of the accompanying dragonfly fauna. "The Venbeek brook is a shallow, spring-fed and slowly flowing ditch in an agricultural area in the western part of the 'De Meinweg' National Park. It has a rich vegetation and features a thick (10 to 40 cm) layer of organic sediment covering a sandy bottom. The site was surveyed regularly in both years from May till October, mostly in June. *S. flavomaculata* was found along the Venbeek brook in June and July, which is the main flight period in the Netherlands. On 10 June 2005, 19 males were counted, the largest number of males seen on a single day in these two years. Most mating wheels were seen in June, especially in 2005. Males were seen most frequently, often patrolling patrolling above richly vegetated parts of the ditch or above land near bushes and trees. Only once, on 30 June 2006, was an ovipositing female observed; its behaviour is described in this article. *S. flavomaculata* is accompanied by 28 other dragonfly species along the Venbeek brook, some of which are rare or even very rare in the province of Limburg. Examples include *Calopteryx virgo*, *Brachytron pratense* and *Cordulegaster bol-*

tonii. Hence, this particular brook can be regarded as a very important dragonfly habitat. This is somewhat remarkable because it is basically a straight ditch flowing through farmland, which is normally not the best habitat for rare dragonflies. Nevertheless, its special characteristics have resulted in the occurrence of many dragonfly species." (Authors)] Address: Schaik, V.A. van, Hoosveld 56, 6075 DB Herkenbosch

10048. Geurten, R.H.; Nordström, K.; Sprayberry, J.D. H.; Bolzon, D.M.; O'Carroll, D.C. (2007): Neural mechanisms underlying target detection in a dragonfly centrifugal neuron. *Journal of Experimental Biology* 210: 3277-3284. (in English) ["Visual identification of targets is an important task for many animals searching for prey or conspecifics. Dragonflies utilize specialized optics in the dorsal acute zone, accompanied by higher-order visual neurons in the lobula complex, and descending neural pathways tuned to the motion of small targets. While recent studies describe the physiology of insect small target motion detector (STMD) neurons, little is known about the mechanisms that underlie their exquisite sensitivity to target motion. Lobula plate tangential cells (LPTCs), a group of neurons in dipteran flies selective for wide-field motion, have been shown to take input from local motion detectors consistent with the classic correlation model developed by Hassenstein and Reichardt in the 1950s. We have tested the hypothesis that similar mechanisms underlie the response of dragonfly STMDs. We show that an anatomically characterized centrifugal STMD neuron (CSTMD1) gives responses that depend strongly on target contrast, a clear prediction of the correlation model. Target stimuli are more complex in spatiotemporal terms than the sinusoidal grating patterns used to study LPTCs, so we used a correlation-based computer model to predict response tuning to velocity and width of moving targets. We show that increasing target width in the direction of travel causes a shift in response tuning to higher velocities, consistent with our model. Finally, we show how the morphology of CSTMD1 allows for impressive spatial interactions when more than one target is present in the visual field." (Authors)] Address: Nordström, Karin, Department of Neuroscience, Uppsala University, PO Box 593, 751 24 Uppsala, Sweden. E-mail: karin.nordstrom@neuro.uu.se

10049. Haritonov, Yu.A.; Borisov, S.N.; Popova, O.N. (2007): Odonatological researches in Russia. *Eurasian Entomological Journal* 6(2): 143-156. (in Russian, with English summary) ["A brief historical survey of dragonfly studies in the former USSR is presented. The Institute of Systematics and Ecology of Animals (Russian Academy of Sciences, Siberian Branch, Novosibirsk) has provided an important centre for odonatological research in Russia. The basic results of faunal, zoogeographic and ecological investigations are adduced. A list of odonate species of Russia and adjacent territories and distribution in regions (European lowlands, Caucasus, Ural, Middle Asia, Siberia, Russian Far East) are provided." (Authors) The odonate species are regionally checked.] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia. E-mail: pc@eco.nsc.ru

10050. Hisamatsu, S.; Takechi, L. (2007): *Tamea virginia* (Rambur. 1842) overwinters as larval stages in Ehime prefecture. *Tombo* 50: 69-70. (in Japanese, with English summary) ["We collected later instar larvae, ex-

uviae, and teneral adults of *T. virginia* in Matsuyama City, Ehime Prefecture in springs of 2005 and 2007. These observations indicated, for the first time, that this species over-wintered as larval stages in Ehime Prefecture." (Authors)] Address: not stated in English

10051. Irusta, J.B. (2007): *Ecologia comportamental reprodutiva de Diastatops obscura Fabricius (Insecta, Odonata)*. Tese apresentada, Universidade Federal do Rio Grande do Norte: 99 pp. (in partly bilingual Portuguese and English) ["In this thesis I discuss the reproductive behaviour and ecology of the libellulid *Diastatops Obscura Fabriciás*, 1775, (Insecta: Odonata) in natural conditions. Populations of this species were studied on the middle stretch of the Pitimbu River, Pamaririm municipality, Rio Grande do Norte, Brazil, during four discontinuous periods between 2002 and 2004. The objectives include the description of strategies and behaviours of both sexes, with especial interest in the intra-male competition for territories and females, the mate selection by females and the importance of male body size and other secondary characters on their reproductive success; from an adaptationist point of view. It was observed that the behaviour of males and females in the reproductive areas are interrelated: the males came earlier to compete for the best territories and the females waited the result of that competition to be fertilized by dominants males, which preferably occupied areas near the river margin. The reproductive success of males with territories on the margin, estimated by number of copulations, ovipositions and days acting as territorial, was better than obtained by more separated territorial males and by satellite males. The body size of males is an important factor for the copulation and opposition taxes and for the number of territorial days, favouring the biggest individuals. I also discuss the apparently importance of wing brilliance and wing integrity on male reproductive success. On intersexual relationships, I proved that females of *D. obscura* participate in mate selection, rejecting non-territorial males or substituting their sperm for other of higher status." (Author)] Address: Irusta, J.B., Univ Fed Rio Grande Norte, Sect Psychobiol, Dept Physiol, Caixa Postal 1511, Campus Univ, BR-59072970 Natal, RN, Brazil. E-mail: banuelos@ufrnet.br

10052. Itoh, S. (2007): A case of horizontal perching in *Pantala flavescens* (Fabricius). *Tombo* 49: 43. (in Japanese, with English summary) ["Adults of *P. flavescens* usually take more or less vertical position while resting. A male adult was observed perching on a tree branch in horizontal position in the early afternoon on September 14, 2006 at Hachimantai, Iwate Prefecture." (Author)] Address: Itoh, S., Kinoshita 4-9-7-102, Wakabayashiku, Sendai-shi, Miyagi, 984-0047 Japan

10053. Kakichi, K.; Kakichi, K.; Futahashi, R. (2007): The first collecting records of *Tholymis tillarga* (Fabricius, 1798) (Libellulidae) from Toyama prefecture, Honshu, Japan. *Tombo* 50: 60. (in Japanese, with English summary) [24-VII-2007 and 17-VIII-2007; "Two males of *T. tillarga* were captured at Miyaaa in Himi-shi, Toyama Prefecture, Honshu, Japan. This is the first record from Toyama Pref., and the northernmost record of this species from Japan." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

10054. Karube, H. (2007): The southernmost record of dragonfly in Japanese territory. *Tombo* 50: 76. (in Japa-

nese) [Bruno Bird Island (20°25'31"N, 136°4'11"E), *Pantala flavescens*, 12-17.X.2007] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

10055. Karube, H. (2007): Occurrence of a new species of the genus *Procordulia* (Anisoptera, Corduliidae) from northern Vietnam. Tombo 50: 47-50. (in English, with Japanese summary) [*Procordulia asahinai* sp. nov. is described from northern Vietnam. "It is related to *P. artemis* Lieftinck, 1930, which has been recorded from high altitude mountain zones of West Malaysia, Sumatra, and Java. But it is distinguished from the latter by the following characters: 1) larger and stouter body, 2) rather robust superior appendages with developed triangular lateral projections in male, 3) longer cerci in female, 4) female valvula valvae with rounded apices. Discovery of this new species demonstrates the expansion of the known distribution limit of *Procordulia* to about 1,800 km north in Asian Continent." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

10056. Karube, H. (2007): On the scientific name of the Japanese name "Kiioharabiro-tombo". Tombo 50: 71-72. (in Japanese) [*Lyriothemis tricolor* Ris, 1916] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

10057. Kawashima, I.; Sasamoto, A. (2007): Descriptions of the last two instar larvae of *Heliaeschna filostyla* Martin, 1906 (Anisoptera, Aeshnidae, Aeshninae) from Sulawesi Island, Indonesia. Tombo 49: 9-14. (in English, with Japanese summary) ["The external morphology of the last two instar larvae of *Heliaeschna filostyla* from Sulawesi Island, Indonesia are described and illustrated for the first time. The external characters of these last instar larvae are compared with those of two species belonging to the same tribe, *Gynacantha japonica* from the mainland of Japan and *G. ryukyuensis* from the Ryukyu Islands, SW Japan." (Authors)] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

10058. Keppner, E.J.; Keppner, L.A. (2007): Dragonflies and Damselflies (Odonata) of the St. Andrew Bay Ecosystem and Bay County, Florida. For: St. Andrew Bay Environmental Study Team, Inc. and Friends of St. Andrew Bay: 14 pp. (in English) ["The St. Andrew Bay ecosystem supports a significant number of species of odonates considering that the collection currently has 49% of the total number of species reported from Florida. The presence of the number of species of odonates is indicative of the variety of aquatic habitats that the area supports. The inventory establishes the presence of a number of species not previously reported from Bay County or the ecosystem (24 Anisoptera and 23 Zygoptera) including Phantom Darner, Swamp Darner, Laura's Clubtail, Gray Petaltail, etc. Keppner and Keppner (in press) provide a list of the new records for Bay County, Florida. The survey extended the range of two species, Everglades Sprite and Phantom Darner in Florida. Collecting will continue in an attempt to document the species listed as possibly occurring in the county and ecosystem. Anyone who collects a specimen of odonate can aid in this endeavour to document the species in Bay County and the St. Andrew Bay ecosys-

tem by depositing the specimen(s) in our collect or another collection that will be available for examination by interested individuals." (Authors)] Address: Keppner, E. J., c/o The St. Andrew Bay Environmental Study Team, PO Box 2465, Panama City, Florida 32402, USA

10059. Kita, H.; Ozono, A. (2007): Notes on the oviposition of a libellulid species, *Brachythemis contaminata* (Fabricius, 1793) in Ishigaki-jima Is., Yaeyama Isis., SW Ryukyus. Tombo 49: 33-34. (in Japanese, with English summary) ["'Contact flying oviposition into water' of *B. contaminata* has been recorded on Ishigaki-jima Is. Oviposition "occurred just after copulation, with females settling on twigs projecting from the water surface or on floating reed leaves. Eggs were attached via the distal abdominal segments onto the surface of these plant materials, as reported by Muraki (1990)." (Authors)] Address: not stated in English

10060. Krassilov, V.; Silantjeva, N.; Hellmund, M.; Hellmund, W. (2007): Insect egg sets on angiosperm leaves from the Lower Cretaceous of Negev, Israel. *Cretaceous Res.* 28: 803-811. (in English) ["Egg set impressions on fossil leaves, a new field of palaeontological research, links insect palaeoecology with that of the host plant. Zygopteran egg sets from the Albian of Makhtesh Ramon, central Negev, Israel, were deposited on narrow leaves of an angiospermous *Acaciaephyllum*-like morphotype. Their pattern resembles the extant and Tertiary "Coenagrionid Type", attesting to evolutionary conservatism of this oviposition mode since the time of early angiosperms. A comparison with the Palaeozoic-Jurassic proto-Odonata egg sets suggests a change in oviposition modes in several steps that can be related to the evolution of wetlands. The Albian remains are among the earliest of a modern aspect supposedly related to the advent of angiosperms. A wetland source community has been previously suggested for *Acaciaephyllum*-like leaves on taphonomic grounds, and the finding of damselfly egg sets provides additional evidence in favour of such a habitat, thus having a bearing on the palaeoecology of Early Cretaceous angiosperms." (Authors)] Address: Krassilov, V., Inst. Evol., Univ. Haifa, Mount Carmel, Haifa-31905, Israel

10061. Lagunov, A.V. (2007): "Red Book" species of invertebrates Ilmen Reserve (south Ural). *Bulletin of the Orenburg State University* 12: 76-82. (in Russian) [Russia; *Calopteryx virgo*, *C. splendens*, *Ischnura aralensis*, *Aeshna viridis*, *Leucorrhinia albifrons* and *Ophiogomphus cecilia* are listed as rare in the reserve.] Address: Lagunov, A.V., Ilmensky state reserve, Ural branch of Russian Academy of Science, Miass, Russia. E-mail: lagunov@ilmeny.ac.ru

10062. Macaulay, D. (2007): Survey of the Odonate Fauna in Kakwa Wildland Park - June - July, 2006. Prepared for the Alberta Natural Heritage Information Centre, Parks Resource Management Coordination Branch, Alberta Tourism, 2nd Floor, Oxbridge Place, 9820 - 106 Street, Edmonton, Alberta T5K 2J6, Canada: 27 pp. (in English) ["A total of 21 odonate species were found during the 2006 survey of the Kakwa WP. ... There may be as many as 52 odonate species that occur in the area. Most of the species recorded for Kakwa WP were common and have wide distributions across Canada. Of the 21 species recorded, 10 are either rare or uncommon. The rare species were *Aeshna septentrionalis* (S1-rank), *Somatochlora forcipata* (S1-rank), and *S. kennedyi* (S1-rank). The uncommon species

were *Aeshna subarctica* (S2-rank), *A. sitchensis* (S3-rank), *S. albicincta* (S2-rank), *S. franklini* (S2-rank), *S. whitehousei* (S2-rank), *S. hudsonica* (S3-rank) and *Enallagma hageni* (S3-rank). The Kakwa WP odonate survey was successful and a wide variety of species were found. The diversity of suitable habitats in the park supports a diversity of odonate species. Future surveys in the park, if conducted over the course of the spring and summer months, would likely add several more species to what is currently known." (Author)] Address: not stated

10063. Matsuhira, K. (2007): A new record of *Sympetrum fonscolombii* from Amami-Ōshima Is., Amami Islands. Tombo 49: 28. (in Japanese) [21-IV-2006, Japan] Address: not stated in English

10064. Matsuhira, K. (2007): The first record of *Rhipidolestes okinawanus* (Asahina, 1951) from Yoro-jima Is., Amami Islands. Tombo 49: 44. (in Japanese) [Japan, 17-VI-2006.]

10065. Móra, A.; Barnucz, B.; Boda, P.; Csabai, Z.; Cser, B.; Deák, C.; Papp, L. (2007): On the macroinvertebrate fauna of inflows of Lake Balaton. Acta biol. Debrecina Oecol. Hung. 16: 105-167. (in Hungarian, with English summary) [Documentation on literature data and unpublished material of 35 Odonata species recorded from the streams in the catchment of the Balaton Lake, Hungary.] Address: Móra, A., Balaton Limnol. Res. Inst., Hung. Acad. Sei. Klebeisberg Kuno 3, 8237 Tihany, Hungaria

10066. Naraoka, H. (2007): Reproductive behaviour of the damselfly *Lestes japonicus* Selys (Odonata: Lestidae), with the comparison of other two Japanese *Lestes*. Tombo 50: 61-66. (in Japanese, with English summary) ["The reproductive behaviour of *L. japonicus* was observed at two small marshes in Fukaura-machi and Rokkasho-mura, Aomori Prefecture and in a insectarium built in the garden, from 2004 to 2006. The males formed tandem with the female without courtship and display by quick pursuing at when the female flight away. The male did intra-male sperm translocation of 77.5+-22.7s (n=24) in mean, after the tandem pair perched. Copulation duration was 17m42s+-5m54s (n=29) in mean, and it was divided into two stages (I:16m28s+-5m57s, n=25; II: 82s+-20s, n=27). Stage III was not recognized. The reproductive behaviour, which was bimodal type of 8:00-11:00h and 13:00-17:00h, is considered with the difference of the utilization of the host plant, space and hour of the oviposition, in the relation of other Japanese two *Lestes*."] Address: not stated in English

10067. Ozono, A.; Karube, H.; Muramatsu, M. (2007): A new record for the Japanese fauna *Neurothemis ramburii* ramburii (Kaup in Brauer, 1866) from Yonaguni-jima Is. SW, Ryukyus. Tombo 49: 23-26. (in Japanese, with English summary) [*Neurothemis ramburii* was newly recorded on 17-V-2006 and in November 2006. The specimens probably originate from Taiwan. The November-record was an ovipositing female, which gives the opportunity that a population will be founded.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

10068. Paraschiv, G.-M.; Schroeder V.; Samargium M.D.; Sava, D. (2007): Ecological study of zoobenthos communities from the Matita and Merhei lakes (Danube

delta). Research Journal of Agricultural Science 39(2): 489-498. (in English, with Romanian summary) [Romania; Odonata are only listed at the order level; several ecological indices are outlined in an annex on the basis of Odonata larvae sampling.] Address: Paraschiv, Gabriela-Mihaela, University Ovidius, Constanta, Romania. E-mail: gmparaschiv@gmail.com

10069. Richardson, G.M. (Ed.) (2007): One of North America's rarest dragonflies discovered in Canada. Ontario Insects 13(1): 9-10. (in English) [*Somatochlora hineana*, Minesing Wetlands, Ontario, 20/27-VI-2007.] Address: Richardson, G.M., 18 McDonald St. West. Listowel, ON, N4W 1 K4, CA

10070. Sadyrin, V.M. (2007): The growth, somatic and exuvial production of *Leucorrhinia dubia* V.D.L. (Odonata, Libellulidae). In: T.M. Mikheyeva, [Ed.]. Lake ecosystems: biological processes, anthropogenic transformation, water quality: materials of the III Intern. Sci. Conf., September 17-22, 2007, Minsk – Narodn / Belarusian state university. ISBN 978-985-476-521-1: 250. (in Russian, with English title) [The influence of different temperatures on larval length and mass increase of *L. dubia* was studied in the laboratory.] Address: Sadyrin, V.M., Inst. Biol. Russ. Acad. Sei., Syktyvkar, Russia. E-mail: v.sadyrin@ib.komisc.ru

10071. Sasamoto, A.; Karube, H. (2007): Descriptions of two new species of *Drepanosticta* (Zygoptera, Platystictidae) from Sumatra, Indonesia, with a note of unknown female of *D. pytho*. Tombo 50: 51-57. (in English, with Japanese summary) ["Two new species of *Drepanosticta*, *D. asahinai* sp. nov. (holotype male, Mt. Sorik, Marapi, W. Sumatra) and *D. sumatrana* sp. nov. (holotype male, Bandar Baru, N. Sumatra), are described and illustrated, these two species are easily distinguished from the other allied species in the structures of prothorax and anal appendages etc. In addition, we make a brief description on a hitherto unknown female of *D. pytho*, which has a peculiar structure in prothorax, and has not been recorded for 70 years since original description." (Authors)] Address: Sasamoto, A., Yakuoji Tawaramoto-cho, Shiki-gun, Nara, 636-0341 Japan

10072. Sasamoto, A.; Kawashima, I. (2007): Description of the last instar larva of *Amphigomphus nakamurai* Karube, 2001 (Anisoptera, Gomphidae, Onychogomphinae) from Northern Vietnam, Indo-China. Tombo 49: 5-9. (in English, with Japanese summary) ["The external morphology of the last instar larva of *A. nakamurai* from N. Vietnam, Indo-China is described and illustrated for the first time. The external characters are compared with those of two species belonging to the same tribe, *Onychogomphus viridicostus* and *Nihonogomphus viridis* from Japan." (Authors)] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

10073. Schaik, V.A. van; Geraeds, R.P.G. (2007): Herontdekking van de Gaffellibel langs de Swalm. Natuurhistorisch Maandblad 96(11): 299-302. (in Dutch, with English summary) [At 24-VII-2006, *Ophiogomphus cecilia* was recorded for the first time after a gap of 70 years along the river Swalm, The Netherlands. Following this record, an intensified study proved several additional records of this species in the Swalm.] Address: Schaik, V.A. van, Hoosveld 56, 6075 DB Herkenbosch, The Netherlands

10074. Sharapova, T.A. (2007): The Odonata larvae in the periphyton of West Siberia. Questions of aquatic

entomology of Russia and adjacent lands: Materials of the Third All-Russia Symposium on Amphibiotic and Aquatic Insects. Voronezh State University. ISBN 978-5-9273-1169-9: 374-376. (in Russian, with English summary) ["Data on the species composition of Odonata larvae and their role in freshwater zooperiphyton communities of various water bodies of West Siberia are given." (Author). The following taxa are listed: *Coenagrion lunulatum*, *C. pulchellum*, *Enallagma cyathigerum*, *Libellula depressa*, *Sympecma paedisca*, *Leucorrhinia albifrons*, *Aeshna grandis*, *A. juncea*, *A. caerulea*, *A. viridis*, *Anax* sp., *Calopteryx splendens*, *Somatochlora metallica*, *Ischnura elegans*, *Erythromma humerale*. Locality data are lacking.] Address: Sharapova, T.A., Inst. of Northern Develop., Siberian Branch of the RAS, Tyumen, Russia.

10075. Shimizu, N. (2007): A record of nocturnal oviposition in *Boyeria maclachlani* (Selys) (Aeshnidae: Brachytroninae). Tombo 50: 74-75. (in Japanese, with English summary) ["Nocturnal oviposition behaviour was observed for the first time in *Boyeria maclachlani*. I observed a female of this species to lay eggs from 18:45 to 20:35 in August 21, 1995 (Sunset Time: 18:36 PM). Next year and later, I observed 16 females to lay eggs at nighttime: a latest example among them lasted until 21:05 on August 13, 2000 (Sunset Time: 18:44 PM)."] (Author)] Address: not stated in English

10076. Shivakumar, K.N.; Lingaiah, S. (2007): Ultra lightweight materials for bio inspired microsystems. 16th International Conference on Composite Materials kyoto, Japan: 7 pp. (in English) ["Ultra lightweight nanofiber fabrics play a vital role in the development of Microsystems. Polyacrylonitrile, polybenzimidazole and Nylon-66 polymer based ultra lightweight nanofiber fabrics were produced using electrospinning technique. SEM characterization showed that the diameter of Nylon-66 nanofibers varied from 50-300 nm. The average modulus and strength of Nylon-66 nanofiber fabric was 2.4 GPa and 154 MPa respectively. An attempt to build dragonfly's wing using carbon fiber as grid and electrospun fabric as skin was made. Three types of phenomenological dragonfly wings such as carbon fiber grid, electrospun Nylon-66 nanofiber fabric bonded carbon fiber grid and commercial Nylon-6 film bonded carbon fiber grid were made. The flexural stiffness to weight ratio of electrospun Nylon-66 fabric bonded wing was 160% higher than that of commercial Nylon-6 film bonded wing. This shows the potential application of ultra lightweight electrospun nanofiber fabric for building Microsystems." (Authors)] Address: Shivakumar, K.N., Center for Composite Materials Research, Dept of Mechanical & Chemical Engineering, North Carolina A & T State University, Greensboro, NC 27411, USA. E-mail: kunigal@ncat.edu

10077. Ueda, A.; Karube, H.; Noerdjito, W.A.; Fukuyama, K. (2007): A new record of *Brachythemis contaminata* (Fabricius, 1793) from Borneo. Tombo 49: 29-30. (in Japanese, with English summary) ["*B. contaminata* was newly recorded from Borneo at the reservoir in lowland *Acacia mangium* plantation of East Kalimantan (12 km point on the road from Balikpapan to Samarinda, E. Kalimantan, Indonesia) (lat. 1°16'8" S, long. 116°90'8" E). Specimens are stored at Zoological Museum, Research Center for Biology, Indonesian Institute of Sciences (LIPI), JL Ir. Juanda no.18 Bogor, Indonesia." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

10078. Usada, M. (2007): An observation of the oviposition site of *Chlorogomphus okinawensis* Ishida. Tombo 49: 31-32. (in Japanese, with English summary) [Okmawa-jima Island, Ryukyu Islands, Japan. A female laid eggs on damp sand at a riverside. The oviposition site was very similar to that of *C. b. brunneus*.] Address: not stated in English

10079. Verberk, W.C.E.P.; Kuper, J.T.; Lamers, L.P.M.; Christianen, M.J.A.; Esselink, H. (2007): Restoring fen water bodies by removing accumulated organic sludge: what are the effects for aquatic macroinvertebrates?. Proc. Neth. Entomol. Soc. Meet. 18: 115-124. (in English) [Only *Pyrrhosoma nymphula* and *Erythromma najas* are mentioned. They are associated with dredged water bodies. "Pristine freshwater fens harbour many species of aquatic macroinvertebrates. Effects of eutrophication and desiccation have strong negative impacts on macroinvertebrate assemblages. To restore degraded fens, the removal of accumulated organic sludge by dredging seems a necessary step. However, degraded fens may harbour relic populations of rare and characteristic species as was found for raised bogs and shallow soft water lakes. This study investigates the effectivity of dredging by comparing dredged and undredged water bodies in two areas (SW & MP). To help interpret the observed differences, a third least impacted area is sampled in addition (WD). Abiotic conditions clearly differed between areas, but when comparing dredged and undredged water bodies, only turbidity was lower in dredged water bodies. Coverage of submerged vegetation was higher in dredged water bodies, especially in MP. For aquatic macroinvertebrates, strong differences between dredged and undredged water bodies were found for both SW and MP. Dredged water bodies in MP resembled WD most strongly, in abiotic conditions, vegetation, and invertebrates. Nevertheless, a number of species commonly occurring in WD were mainly associated with undredged water bodies, indicating incomplete restoration of certain key factors. Results indicate that dredging contributes to ecological restoration of fens. To maximise effectiveness of dredging, internal and external supply of nutrients should be minimized, removal of organic sludge should be near-complete, while retaining small patches of vegetation and recesses as sources of individuals to facilitate recolonisation. Furthermore, this study shows that taking fauna into account can yield new information which is not uncovered by researching solely abiotic conditions and vegetation. In contrast to raised bogs and shallow soft water lakes, no relic populations of rare and characteristic species were found in degraded, undredged fen water bodies. These differences may be related to differences in ecosystem functioning, with characteristic fen species having a lower persistence and a higher recolonisation rate." (Authors)] Address: Verberk, W. Dept Animal Ecol., Radboud Univ. Nijmegen, PO Box 9010, 6500 GL Nijmegen, The Netherlands, E-mail: W.Verberk@science.ru.nl

10080. Weida, S. (2007): Record of a gynandromorphic individual of *Sympetrum maculatum* Oguma, 1915 (Anisoptera: Libellulidae). Tombo 50: 67-68. (in Japanese, with English summary) ["On August 31, 2006, a gynandromorphic individual of *S. maculatum* was captured for the first time at Noto-jima Island, off the Noto Peninsula, Ishikawa Pref., Japan. This individual roughly bears male characteristics on the left-hand side and female characteristics on the right-hand side." (Author)] Address: not stated in English

10081. Westermann, K.; Weihrach, F. (2007): Eindeutige Indizien für eine bivoltine Entwicklung von *Anax imperator* in einigen Gewässern Süddeutschlands. *mercuriale* 7: 12-17. (in German) [The bivoltine development of *A. imperator* at two localities in Baden-Württemberg, Germany is document and discussed in detail.] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

10082. Zhou, Z.-h. (2007): Taxonomic and faunistic studies on the superfamily Calopterygoidea from China (Odonata: Zygoptera). *Special Zoology*, Institute of Entomology, Guizhou University, Guiyang, China: VII + 80 pp. (in Chinese, with English summary) ["The present dissertation is a systematic study on the superfamily Calopterygoidea from China. It mainly deals with the morphology, taxonomy and faunal analysis of the Chinese Calopterygoidea. Totally 4 families, 20 genera and 84 species are treated in the taxonomic part, of which 2 new species and 1 first female record are described: 1 new combination is proposed as well. The new taxa are listed as follows: New species: *Mnais leigongshanus* sp. nov., *Bayadera unimaculata* sp. nov.; new combination: *Rhinocypha maolanensis* (Zhou and Bao, 2002) comb. nov.; first female record: *Rhinocypha maolanensis* (Zhou and Rao, 2002) comb. nov. The faunal structures of the Chinese Calopterygoidea at generic and specific levels were examined. 20 known genera only constitute 3 types of distribution in zoogeographic regions in the world. Among them, 12 genera are distributed in Oriental region, which make up 60%. while 7 genera in Oriental + Palaearctic region, accounting for 35%. 20 genera in total distribute in Oriental region, accounting for 100%. It is clear that Oriental genera make up the majority of the Chinese Calopterygoidea at genera level. 84 known species of Chinese Calopterygoidea are mainly distributed in Oriental region, in which the number of species makes up 83.33% of Chinese species in total. All the known species constitute 16 types of distribution in seven Chinese zoogeographic sub-regions. Among them, 16 species are present only in Central China sub-regions, 15 in South China sub-regions, 10 in Central China + South China sub-regions, 9 in Southwest China sub-regions, 9 in Southwest China + South China sub-regions, 8 in Central China + South China + Southwest China sub-regions, accounting for 19.05%, 17.86%, 11.90%, 10.71%, 10.71% and 9.52%, respectively. It is obvious that Oriental species make up the majority of Chinese Calopterygoidea at species level and they distribute mainly in Central China and South China sub-regions." (Author) "Please note that this thesis may not constitute a published work in terms of Article 8 of the CODE. So, the two new species group names are not yet available names and should not be included in catalogues. Moreover, Haomiao Zhang and I have some doubts of their status as valid species." (Matti Hämäläinen, e-mail-note from 220052011)] Address: not available

2008

10083. Barbier, G.; Bécan, R.; Claude, J.-F.; Dussaix, C.; Kerihuel, C. (2008): Entomofaune sarthoise: nouvelles espèces apparues depuis ving ans. *Troglodyte* 21 / 22: 9-21. (in French) [France, La Sarthe Department; *Ophiogomphus cecilia*: 6.VII-1996, SO Mans, Saint-Mars-d'Outille; *Leucorrhinia caudalis*, 18-VI-2005, SO of La Flèche.] Address: Kerihuel, C., 2 imp. Ravault, F-

72190 Coulaines, France. E-mail: christian.kerihuel@wanadoo.fr

10084. Borisov, S.N. (2008): Anthropogenic influence on the dragonfly fauna (Odonata) in an oasis of Pamir-Alai. *Siberian Journal of Ecology* 15(1): 43-52. (in Russian, with English summary) ["Development of irrigation in the plains around the Pamir-Alai caused the formation of new habitats for Odonata: numerous water bodies of artificial irrigation systems which are unique in the hydrological regime. They serve as the main and often sole biotopes for the larvae. Thus, a number of initially mountainous rheophil and eurytopic oxyphilic species became able to adjust to the desert zone when warm water flows - channels and aryks - appeared there. The mountainous and boreomontan limnophilic species survive the least anthropogenic action. The negative anthropogenic action is connected with the disappearance or change of natural biotopes of dragonflies. It is essential in the submountain zone for stenoecic obligate rheophilic and hemerophobic species that do not populate artificial water flows." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

10085. Buidin, C.; Rochepault, Y. (2008): Habitat des larves de la libellule *Somatochlora brevicincta* Robert en Minganie, Québec, Canada. *Naturaliste Canadien* 132(2): 30-37. (in French) [Imaginal and larval habitats of *S. brevicincta* are described in detail.] Address: Buidin, C. E-mail: balbu1@globetrotter.net

10086. Cannings, R.A. (2008): Grassland dragonflies. *BC Grasslands (Summer 2008)*: 15-17. (in English) ["Wherever grasslands are punctuated by ponds, marshes or lakeshores, dragonflies can be abundant. While they usually fly or perch around the edge of water bodies, many also move far into the dry, grassy landscape, especially when they are hunting for prey or when young adults are awaiting sexual maturity. [...] Of the 87 species known in British Columbia, Canada at least 50 can be found around grassland waters, although not all of these are common or widespread. [...] There is no specialized dragonfly fauna in BC grasslands. The species that occur in the grasslands are the same as those found in marshes and on pond edges in other ecosystems around the province. However, some dragonflies are more often found in grassland waters than are their close relatives, and a few are able to withstand the high salinities of alkaline ponds, typical of many of our dry grassland habitats." (Author) Following this introduction, the paper introduces typical Odonata family wise.] Address: Cannings, R.A., Royal British Columbia Mus., 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca

10087. Cooper, I.A. (2008): Ecological causation of sex differences and a female-limited dimorphism in Hawaiian damselflies. PhD thesis, Faculty of the University Graduate School, Dept of Biology, Indiana University: VI + 98 pp + app. (in English) ["Evolution theory posits that sexual selection, more so than natural selection, drives sex differences, such as bright males and intersexual mimicry. However, female-limited dimorphism has not been fully explained by sexual selection even though this phenomenon includes what appears to be intersexual mimicry of bright males. This dissertation presents evidence that natural selection over an eco-

logical gradient may explain sexual dimorphism and female-limited dimorphism in a damselfly species, as well as macroevolutionary patterns of sexual dimorphism throughout a damselfly genus. I documented new cases of female-limited colour dimorphism in the endemic Hawaiian *Megalagrion* damselflies. Two species, *M. calliphya* and *M. hawaiiense*, contain a typical, green female morph (gynomorph) as well a red female morph (andromorph) that is similar in colour to the males. In *M. calliphya*, I describe habitat differences between the sexes and patterns of colour variation in males and females over an elevational gradient on Hawaii Island that varies in temperature and solar radiation. Using transplant experiments, I determined that body temperature does not differ between the female morphs according to hue, although it is affected by body brightness. Therefore, environmental temperature is not a selective agent on the female-limited dimorphism. However, solar radiation may select for red individuals, including andromorphs, under exposed conditions. A comparison of antioxidant ability between the female morphs as well between males over an elevational gradient indicated that red pigmentation is an effective antioxidant that may enable red individuals to exist where free radicals are produced from high radiation levels. Finally, I extend the ecological explanation for the female-limited dimorphism to patterns of sex differences throughout the *Megalagrion* genus as well a case of female-limited dimorphism in a distantly related species (*Nehalennia irene*). (Author) Address: Cooper, Idelle A., 1001E, 3Rdst. Jordanhall, Bloomington, IN 47405, USA

10088. Delarze, R.; Gonseth, Y. (2008): Lebensräume der Schweiz. Ökologie - Gefährdung - Kennarten. 2. Auflage. ott-Verlag. Bern: 424 pp. (in German) [Odonata are used as bioindicative important taxa to characterise springs, running and standing waters in Switzerland.] Address: Gonseth, Y., Centre Suisse de Cartographie de la Faune, Terreaux 14, CH-2000 Neuchâtel, Switzerland. E-mail: yves.gonseth@cscf.unine.ch

10089. Klenke, F. (2008): Änderungen im Bestand der Naturschutzgebiete in Sachsen im Jahre 2006. Naturschutzarbeit in Sachsen 49: 83-88. (in German) [The paper compiles amendments in the Saxonian nature conservation areas (extensions, new dedications by law). A few Odonata are listed as follows: NSG D 105 Grenzwiesen Fürstenau und Fürstenauer Heide (ca. 507 ha, Landkreis Sächsische Schweiz-Osterzgebirge): *Somatochlora alpestris*. NSG D 106 Rutschung P (ca. 112 ha, Landkreis Görlitz): *Leucorrhinia pectoralis*, *Coenagrion lunulatum*, *C. pulchellum*.] Address: not stated

10090. Macaulay, D. (2008): Survey of the Odonate Fauna in Willmore Wilderness Park. Prepared for: Parks Resource Management Coordination Branch, Alberta Tourism, 2nd Floor, Oxbridge Place, 9820 - 106 Street, Edmonton, Alberta T5K 2J6, Canada: 15 pp. (in English) [Alberta, Canada; "Willmore Wilderness Park (about 4596.7 km² in size) is located in the northern portion of Alberta's Rocky Mountains just west of Grand Cache and north of Jasper National Park." (Author) In 2007, 17 Odonata species were collected at 18 localities. *Aeshna eremita*, *A. septentrionalis*, *A. juncea*, *A. palmata*, *Libellula quadrimaculata*, *Leucorrhinia hudsonica*, *Sympetrum internum*, *Cordulia shurtleffii*, *Somatochlora albicincta*, *S. cingulata*, *S. hudsonica*, *S. semicircularis*, *Lestes unguiculatus*, *Coenagrion resolutum*, *C. interrogatum*, *Enallagma boreale* E. hageni] Address: not stated

10091. Nikolaeva, N.E. (2008): Analysis of freshwater invertebrate fauna, caught in underwater light-trap. TSU Herald. A series of Biology and Ecology 7: 95-105. (in Russian, with English summary) [White-light diodes were used as the source of light in traps. More than 80 taxa were caught. Larval *Lestes sponsa*, *L. virens*, *Sympetrum flaveolum*, *S. vulgatum* and *S. danae* were attracted by light. *Coenagrion* responded weakly, whereas *Aeshna*, *Cordulia* and *Libellula* larvae were not phototactic.] Address: Nikolaeva, N.E., Tver State University, 33, Zhelyabova st., 170100, Tver, Russia

10092. Salcher, M. (2008): Libellen der Mooswälder. In: Helge Körner (Hrsg.): Die Mooswälder. Natur- und Kulturgeschichte der Breisgauer Bucht. Lavori-Verlag. Freiburg im Breisgau: 261-276. (in German) [The paper includes both a general introduction into dragonfly biology and a discussion of regional Odonata fauna. In the region of the western Freiburger Bucht, Baden-Württemberg, Germany a total of 48 odonate species was recorded (literature and author's data). Special emphasis is given to *Calopteryx splendens*, *C. virgo*, *Coenagrion mercuriale*, *Orthetrum coerulescens*, *Libellula fulva*, *Cordulegaster boltonii*, and *Sympetrum pedemontanum*.] Address: Salcher, M., Ferdinand-Weiß-Str. 92, 79106 Freiburg, Germany

10093. Shivakumar, K.N.; Lingaiah, S.; Sadler, R.L. (2008): Ultra lightweight material for building microsystems. American Institute of Aeronautics and Astronautics: 8 pp. (in English) ["Electrospinning technology was used to produce ultra lightweight nanofiber fabrics from Nylon-66. The fiber diameter ranged from 50-300 nm depending on the collector speed, polymer concentration, distance, and the voltage. Tensile properties were conducted using a specially designed test specimen and fixture, and micro tension test machine. The average tensile modulus and strength were 960 MPa and 60.7 MPa, respectively, which are 6 to 10 times higher than those reported in the literature. This nanofiber fabric was used as a membrane to construct a dragonfly wing from a carbon grid. The specific flexural stiffness to nanofiber fabric wing was 260% of commercial Nylon-6 film wing. This study demonstrates a potential application of using electrospun nanofiber fabrics for microsystems." (Authors)] Address: Shivakumar, K.N., Center for Composite Materials Research, Dept of Mechanical & Chemical Engineering, North Carolina A & T State University, Greensboro, NC 27411, USA. E-mail: kunigal@ncat.edu

10094. Wang, Y.; Kalyanasundaram, S.; Young, J. (2008): Design and fabrication of dragonfly test bed for aerodynamic characterization. In: Jonghyuk, K. & R. Mahony (eds): Proceedings of the 2008 Australasian Conference on Robotics & Automation, December 3 - 5, 2008, Canberra, Australia. ISBN 978-0-646-50643-2: 6 pp. (in English) ["This paper focuses on the design of an electro-mechanical device for studying the aerodynamic behaviour of flapping wings. The experimental device is designed to mimic the flight behaviour of dragon fly. Wing flapping speed is precisely controlled by controlling the motor speed. Wing flapping amplitude could be varied by changing the rotating arm length. Wing rotation amplitudes during down- and up- stroke could be different and are controlled separately by two different springs. A six degree of freedom sensor is placed at the wing root to collect the force and torque data. The test of a wing with a dragonfly hind-wing contour but enlarged 11 times, showed the device met the

design expectation, and further more, the phase-averaged data for lift force in one flapping cycle had the similar pattern as the ones obtained via CFD simulations as well as the one calculated based on a real dragonfly's flight behaviour." (Authors)] Address: Wang, Y., Dept of Engineering, Australian National University, Canberra, Australia. E-mail: Yutong.Wang@anu.edu.au

10095. Whitfield, J.B.; Kjer, K.M. (2008): Ancient rapid radiations of insects: Challenges for phylogenetic analysis. *Annual Review of Entomology* 53: 449-472. (in English) ["Phylogenies of major groups of insects based on both morphological and molecular data have sometimes been contentious, often lacking the data to distinguish between alternative views of relationships. This paucity of data is often due to real biological and historical causes, such as shortness of time spans between divergences for evolution to occur and long time spans after divergences for subsequent evolutionary changes to obscure the earlier ones. Another reason for difficulty in resolving some of the relationships using molecular data is the limited spectrum of genes so far developed for phylogeny estimation. For this latter issue, there is cause for current optimism owing to rapid increases in our knowledge of comparative genomics. At least some historical patterns of divergence may, however, continue to defy our attempts to completely reconstruct them with confidence, at least using current strategies." (Authors) The Palaeoptera problem (Odonata, Ephemeroptera, and their extinct stem lineages, along with the extinct Palaeodictyoptera) is discussed in detail.] Address: Whitfield, J.B., Department of Entomology, University of Illinois, Urbana, Illinois 61821, USA. E-mail: jwhitfie@life.uiuc.edu

10096. Zasyapkina, I.A. (2008): Examination of the amphibiotic insect fauna of the Tauskaya Bay coasts. *Bulletin of the North-East Scientific Center FEB RAS* 4: 35-44. (in Russian, with English summary) [Russia; Odonata are treated at the family level.] Address: E-mail: irina492008@yandex.ru

10097. Zivic, N.; Vukanic, V.; Babovic-Jaksic, T.; Miljanovic, B. (2008): Distribution of macrozoobenthos in the tributaries of the river Ibar in the northern part of Kosovo and Metohija. *Natura montenegrina* 7(2): 401-411. (in English, with Serbian summary) [Cordulegaster boltonii, Ophiogomphus cecilia, Gomphus vulgatissimus, Onychogomphus forcipatus, and Libellula quadrimaculata are recorded from the Socanska, Josanicka and Ibar rivers.] Address: Zivic, N., Fac. Sei. & Math., Univ. Pristina, Kosovska Mitrovica, Kosovo. E-mail: nebzivic@gmail.com

2009

10098. Amoroso, N.A.; Chalcraft, D.R. (2009): PS 78-28: Effects of dragonfly colonization history on the biodiversity of aquatic communities. The 94th ESA Annual Meeting (August 2 - 7, 2009) (in English) [Verbatim: "Background/Question/Methods: It is clear that current interactions among species in a system can have an important role in controlling the biodiversity of that system. Some studies, however, have shown that the timing of species arrival to a community could influence the strength of species interactions within ecological communities. Such priority effects should be important in frequently disrupted environments, such as temporary ponds, which provide opportunities for new collec-

tions of species to colonize the refilled pond. In temporary ponds, the top predators are often larval dragonflies but their presence is dependent, in part, on the timing in which adult dragonflies find and oviposit in the pond. We tested the hypothesis that the biodiversity of aquatic invertebrates present in temporary ponds is influenced by the arrival time of larval dragonflies. Specifically, we hypothesize that ponds with early-arriving dragonflies will have a lower biodiversity of aquatic insects compared to ponds where dragonfly colonization is continuously inhibited or where dragonflies arrive late in the summer. To test this hypothesis, we experimentally altered the timing in which dragonflies could oviposit eggs into artificial ponds (modified stock tanks). After a four month period, the insect biodiversity of each pond was sub-sampled and quantified. Results / Conclusions: We found that ponds allowing early dragonfly colonization produced more metamorphosed dragonflies than ponds preventing early dragonfly colonization. Preliminary results suggest that ponds with only late-arriving dragonflies had more late-instar dragonflies than ponds always allowing dragonfly colonization. The fewest late-instar dragonflies were found in ponds with only early-arriving dragonflies. Hence, early-arriving dragonflies appear to inhibit late-arriving individuals. In addition, dragonfly oviposition caused differences in insect communities among ponds, yet dragonfly arrival time does not influence total insect species richness in ponds. We found that ponds which prevented dragonfly colonization had greater beetle species richness than ponds allowing dragonfly colonization but dragonfly arrival time did not influence beetle richness. Total abundance of beetles did not vary among treatments. Trends indicate that chironomid abundance is greatest in ponds with only late-arriving dragonflies and least in ponds where dragonflies can continuously oviposit. These results suggest predatory dragonflies have important effects on insect assemblages in ponds. The timing of dragonfly arrival, however, seems to play an important role in influencing the abundance of some taxa (e.g., dragonflies or flies) but did not affect the abundance or biodiversity within other taxa (e.g., beetles) or in the number of insect species found." (Authors)] Address: not stated

10099. Babu, R.; Mondal, S.B. (2009): First record of *Rhinocypha trifasciata* Selys from Maharashtra, India (Odonata: Zygoptera: Chlorocyphidae). *Rec. zool. Surv. India* 109(3): 115-116. (in English) [2 males, 1 female, Burgaon, Nagpur, India, 26-III-2004.] Address: Babu, R., Zool. Surv. India, M-Block, New Alipore, Kolkata-700053, India

10100. Baker, R.L.; McGuffin, M.E. (2009): Technique and observer presence affect reporting of behaviour of damselfly larvae. *Jl N. Am. benthol. Soc.* 26(1): 145-151. (in English) ["We experimentally tested for systematic biases in techniques commonly used to study behaviour of larval aquatic insects. We determined whether larval Zygoptera responded to the presence of an observer and whether live observation missed some behaviours. We found significant differences between behaviours recorded during live observations and behaviours videotaped in the absence of an observer. All behaviours, except Rotate, were exhibited less frequently in the presence of an observer. These results suggest that larvae respond to the presence of observers as if they were predators. Live observation also missed some behaviours. The duration of Crawl For-

ward, which can be very subtle, and the frequency of Rotate, which can be very rapid and is easily missed, were greater when recorded from the videotape than by a live observer. Wherever possible, use of video recording systems is preferable over reliance on live observations." (Authors)] Address: Baker, R.L., Dept Ecol. & Evol. Biol, Univ. Toronto, Mississauga, ON, M5S 3B2. Canada. E-mail: rbaker@credit.erin.utoronto.ca

10101. Berezovikov, N.N. (2009): Notes on the feeding flights of the White-winged tern *Chlidonias leucopterus* during the breeding period. Russian ornithological journal 18(494): 1118-1121. (in Russian) [Long-distance feeding flights of *C. leucopterus* are correlated with feeding aggregations of (crepuscular) dragonflies.] Address: Berezovikov, N.N., Lab. of Ornithology & Herpetology, Inst. Zoology, Center for Biological Research of the Ministry of Education & Science, Prospect Al Farabi, 93, Akademgorodok, Almaty 050060, Kazakhstan. E-mail: berezovikovn@mail.ru

10102. Bylak, A.; Kukuła, K.; Kukuła, E. (2009): Influence of regulation on ichthyofauna and benthos of the Różanka stream. *Ecology & Hydrobiology* 9(2-4): 211-223. [Poland; the density of *Calopteryx virgo* (the only Odonata species listed in this paper) reached up to 192 indiv./m² at one station where the river was modified into a channel (table. 3). Contrary to the fish fauna, channel regulation seems not to have negative effects on *C. virgo*. Curiously enough, the species was not to detect in unimpaired sections of the river (station 4, 5).] Address: Bylak, Aneta, Dep of the Environmental Biology, University of Rzeszów, ul. Prof. S. Pigoń 6, 35-310 Rzeszów, Poland. E-mail: abyлак@univ.rzeszow.pl

10103. Chaput-Bardy, A.; Fleurant, C.; Lemaire, C.; Secondi, J. (2009): Modelling the effect of in-stream and overland dispersal on gene flow in river networks. *Ecological Modelling* 220(24): 3589-3598. (in English) ["Modelling gene flow across natural landscapes is a current challenge of population genetics. Models are essential to make clear predictions about conditions that cause genetic differentiation or maintain connectivity between populations. River networks are a special case of landscape matrix. They represent stretches of habitat connected according to a branching pattern where dispersal is usually limited to upstream or downstream movements. Because of their peculiar topology, and the increasing concern about conservation issues in hydrosystems, there has been a recent revival of interest in modelling dispersal in river networks. Network complexity has been shown to influence global population differentiation. However, geometric characteristics are likely to interact with the way individuals move across space. Studies have focused on in-stream movements. None of the work published so far took into consideration the ability of many species to disperse overland between branches of the same network though. We predicted that the relative contribution of these two dispersal modalities (in-stream and overland) would affect the overall genetic structure. We simulated dispersal in synthetic river networks using an individual-based model [using *Calopteryx splendens*]. We tested the effect of dispersal modalities, i.e. the ratio of overland/in-stream dispersal, and two geometric parameters, bifurcation angle between branches and network complexity. Data revealed that if geometrical parameters affected population differentiation, dispersal parameters had the strongest effect. Interestingly, we observed a quadratic relationship between p the proportion of overland dispersers and population differentiation.

We interpret this U-shape pattern as a balance between isolation by distance caused by in-stream movements at low values of p and intense migrant exchanges within the same branching unit at high values of p . Our study is the first attempt to model out-of-network movements. It clearly shows that both geometric and dispersal parameters interact. Both should be taken into consideration in order to refine predictions about dispersal and gene flow in river network.] Address: Chaput-Bardy, Audrey, Laboratoire Paysages et Biodiversité, UFR Sciences, 2 Bd Lavoisier, 49045 Angers cedex 01, France. E-mail: audrey.chaput-bardy@univ-angers.fr

10104. Charest, P. (2009): Première mention au Québec de la demoiselle *Ischnura hastata* (Say, 1839) (Odonata: Coenagrionidae). *Naturaliste Canadien* 133 (1): 29-30. (in French) [*I. hastata*, was recorded in a gravel pit near Maurice, Québec, Canada (46° 24' 51" N, 72° 35' 55" E) at 13-IX-2008.] Address: Charest, Pierrette. E-mail: chapie1@videotron.ca

10105. de Araujo, N. A. de; Pinheiro, C.U.B. (2009): Ecological relations between the ichthyologic fauna and the ciliary vegetation of the lacustrine area of Low Pindaré River in the Baixada Maranhense Region and their implications on the sustainability of regional fishing. *Boletim do laboratório de hidrobiologia* 22: 55-68. (in Portuguese, with English summary) ["The lacustrine area of Penalva, in the Baixada Maranhense region, is formed by the lakes Cajari, Capivari, Lontra and Formoso, which encompass a diversified ciliary vegetation. Those environments, subject to the influence of seasonal floods, provide a variety of habitats for shelter, reproduction and feeding of fish species. Some of the fish species, as they feed from fruits and seeds from ciliary plant species they help in the process of seed dispersion, contributing to the reproductive success of the plants. This research aimed at studying the relationship between the ichthyologic fauna of the lacustrine area of Penalva and the ciliary vegetation and its implications in the sustainability of the regional fishing. More specifically, to analyze the relationship among the different plant species and the reproductive period, feeding habits and shelter of the fish species, investigating which species are dependent on the ciliary vegetation and which species function as seed dispersers. The methodology included, in a first phase, interviews with fishermen (key informants), by using semi-structured questionnaires, to record the traditional knowledge on fish and vegetation. In a second phase, monthly collections of fish specimens from the lakes Cajari and Capivari were carried out in the period April, 2007 to June, 2008; following the collections, the specimens were taken to laboratory analyses. The results showed that fishermen possess a vast knowledge on the relationship between the ichthyofauna and the regional ciliary vegetation, making clear the dependence between fish and plants. In this study eleven fish species were identified as seed dispersers of eleven ciliary plant species. In the rainy season, when extensive vegetation areas are flooded, the biggest number of fish specimens was recorded with full stomachs, as well as the biggest number of males and females in the maturation phase, confirming the importance of the ciliary forests for the ichthyofauna." (Author) Odonata are treated at the order level.] Address: Pinheiro, C.U.B., to de Oceanografia e Limnologia, Av. dos Portugueses s/n, Campus do Bacanga, CEP 65080-040, São Luís-MA, Brazil. E-mail: cpinheiro@elo.com.br

10106. Dijkstra, K.D.B. (2009): Dragonflies and damselflies (Odonata) of the Lower Malagarasi Basin, western Tanzania. In: Malagarasi Aquatic Rapid Biodiversity Assessment. Mott MacDonald. 53-60 (report): 98-104 (appendix). (in English) ["Eighty eight species were recorded, although two genera (*Lestinogomphus* and *Neurogomphus*) were found as larvae only and cannot be identified to species. *Agriocnemis victoria*, *Ceragrion corallinum*, *Pseudagrion sudanicum*, *Ictinogomphus regisalberti*, *Trithemis dichroa* and *T. grouti* were recorded from Tanzania for the first time, while a single *Pseudagrion* species appears to be new to science. None of the recorded species are included in the Malagarasi Aquatic Rapid Biodiversity Assessment IUCN Red List as globally or regionally threatened, nor are any rangerestricted or confined to the Malagarasi Basin, although the new species may be unique to Lake Tanganyika (see discussion). Table B.2 summarizes observed habitat preferences, further discussion of the ecology of the species will be provided within the final report." (Author)] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nmm.nl

10107. Geraeds, R.P.G. (2009): De Gaffellibel langs de Vlootbeek. *Natuurhistorisch Maandblad* 98(6): 121-125. (in Dutch, with English summary) ["The green Snaketail along de Vlootbeek brook: discovery of the third dutch population in a canalised brook. On 3 May 2008, twelve larvae of *Ophiogomphus cecilia* were caught along the upper stretches of the Vlootbeek brook in Posterholt (NL), near the German border. Two more larvae were caught in the German Kitschbach brook, which is connected to the Vlootbeek. In the course of July, 18 exuviae were found along the Vlootbeek. This brook is the third location in the Netherlands where this species has been found, the other two being the Roer and Swalm rivers. Both are large, naturally meandering streams, whereas the Vlootbeek is a canalised brook. At the sites where the finds were made, the brook is 1 to 1.5 m wide and 10 to 30 cm deep. The water quality is not too good, as it contains high levels of sulphate, nitrate, phosphate, copper and nickel. The oxygen level is favourable, however. Almost all of the larvae and exuviae were found along a 300 m stretch of the brook, where the substrate is dominated by sand that locally contains grit. Upstream and downstream of this location, the substrate was covered with algae in May, while the substrate further downstream is dominated by silt, making these stretches of the Vlootbeek unsuitable for the larvae of the Green Snaketail. The algae had disappeared in July. Although the occurrence of the Green Snaketail is normally associated with larger natural rivers and brooks, we now find that the species also occurs in small, canalised streams with a mediocre water quality. The oxygen level appears to be an important factor for the larvae of this species. The other two locations where this species has been found, the Roer and Swalm rivers, are also characterised by relatively poor water quality (with high levels of nutrients) but favourable oxygen levels." (Author) Larvae also were found in the near situated Kitschbach (Nordrhein-Westfalen, Germany).] Address: Geraeds, R.P.G., Bergstraat 70, 6131 AW Sittard, The Netherlands

10108. Groppali, R. (2009): Odonati europei e riscaldamento globale. *Studi Trent. Sci. Nat.*, 86: 115-118. (in Italian, with English summary) ["European Odonata and

global warming - Odonata used as biological indicators can give data about global warming: some species can fly over long distances and quickly respond to environmental changes. In Europe the consequences of this phenomenon could be: dominance of southern origin species in areas with continental climate (e.g. actually in north-western Germany the dominant species are mediterranean), northward expansion of occupied areas (e.g. in Lombardy are increasing 7 southern species, and 16 in Europe) or displacement to higher altitudes in the mountains, local extinction of relict mountain populations, living in south-European territories with isolated populations, or of microthermic species in plain territories, with 7 threatened species, phenological modifications (larval life length and adult emergence moment, flight times, perhaps passage from mono- to bivoltinism). If also some elements can disturb the analysis, e.g. the increase of suitable habitat for some expanding species, the available data examination, including recent studies in southern Sardinia, confirms the variations originated from climatic warming in Europe, also with the recent colonisation of 4 African species." (Author)] Address: Groppali, R., Laboratorio di Ecologia degli Invertebrati e Conservazione della Natura del Dipartimento di Ecologia del Territorio, Università di Pavia, Via S.Epifanio 14, 27100 Pavia, Italy. E-mail: groppali@et.unipv.it

10109. Karube, H. (2009): Present status of Odonata species at Ogasawara Islands and conservation effort to preserved endangered endemic species. *Japanese journal of limnology* 70(3): 239-245. (in Japanese) ["The five endemic species of Odonata inhabiting the oceanic islands of Ogasawara have been rapidly declining from the mid-1980s. The reason for that decline is likely due to predation by an invasive alien species, 'green anoles'. Currently, almost all the endemic Odonates have gone extinct from the main islands of Chichi-jima and Haha-jima. Although these endemic Odonates have still managed to survive in a few satellite islands, there are only small aquatic habitats which readily dry up when severe droughts hit Ogasawara. Our recent efforts to construct artificial conservation ponds in these satellite islands appear to be effective. Three endemic species are currently breeding in those ponds, and the total population has increased. Based on these encouraging results, we continue to stress the importance of an integrated action plan, including the development of areas protected from green anoles predation and the construction of more permanent ponds." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

10110. Kim, D.G.; Jeong, M.-H.; Tae, J.-Y.; Yeon, J.-B. (2009): Relationship between temperature and egg development of *Nannophya pygmaea* Rambur (Odonata: Libellulidae), an endangered dragonfly in Korea. *Korean J. Environ. Biol.* 27(3): 292-296. (in Korean, with English summary) ["This study was conducted to estimate relationship between temperature and egg development of *N. pygmaea*, using eight different temperature conditions (17, 20, 22, 25, 28, 30, 33, and 36°C). Eggs of *N. pygmaea* were collected from female adults inhabited a small wetland in Mungyeong-si, Gyeongsangbuk-do, Korea, in June 2007. As a result, hatching rates were 2.86, 17.09, 24.32, 39.67, 34.43, 40.57, 44.79, and 1.75% at 17, 20, 22, 25, 28, 30, 33, and 36°C, respectively. The nonlinear model of the tempera-

ture related to egg development was well fit to the modified Sharpe and DeMichele model. The derived lower developmental threshold temperature for egg hatching was 14.02°C ($y = 0.005988x - 0.084$, $r^2 = 0.99$), and the derived optimal development temperature was 30~35°C.] Address: Yeon J.B, Korean Ent. Inst., Korea Univ., Seoul 136-701, Korea. E-mail: yjbae@korea.ac.kr

10111. Lee, T. E.; Patel, A.J.; Johnson, B.W.; Vogtsberger, R.C. (2009): Noteworthy records of Dragonflies (Odonata: Anisoptera) from Jones and Taylor Counties of Central Texas. *Texas Journal of Science* 61: 157-160. (in English) [USA; records of the following species are presented: *Rhionaeschna multicolor*, *Didymops transversa*, *Epitheca costalis*, *Neurocordulia xanthosoma*, *Libellula luctuosa*, *Pachydiplax longipennis*, *Plathemis lydia*, and *Tramea lacerata*.] Address: Lee, T.E., Dept of Biology, Abilene Christian University Abilene, Texas 79601, USA. E-mail: lee@biology.acu.edu

10112. Müller, J.; Steglich, R. (2009): Fundort- und Artenliste eigener Libellen-Nachweise im Jahre 2008 in Sachsen-Anhalt - Odonatologischer Jahresbericht 2008. *halophila*, *Mitteilungsblatt der Fachgruppe Faunistik und Ökologie Staßfurt* 53: 7-13. (in German) [Locality records from 2008 including species of regional importance: *Crocothemis erythraea*, *Libellula fulva*, *Leucorrhinia caudalis*, *L. pectoralis*, *Orthetrum coerulescens*, *Soma-tochlora flavomaculata*, *Sympetrum meridionale*, *Coenagrion mercuriale*, *Erythromma lindenii*, *Ceriagrion tenellum*, *Aeshna affinis*.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

10113. Muranyi, D.; Tarjanyi, N.; Schöll, K. (2009): First record of the genus *Atrichops* Verrall, 1909 in Hungary (Diptera: Athericidae). *Opusc. Zool. Budapest* 40(2): 103-105. (in English) [Hungary, Pest county, Börzsöny Mts, Kismaros, Morgó Stream above the bridge of the forest railway terminal, N 47°49.751' E 19°00.777', 200 m a.s.l., 28-X-2008: *Calopteryx virgo* and *Onychogomphus forcipatus*.] Address: Muranyi, D., Magyar Természettudományi Múzeum Állattára (Department of Zoology, Hungarian Natural History Museum), H-1088 Budapest, Baross utca 13, Hungary. E-mail: muranyi@zool.nhmus.hu

10114. Nationalpark Hainich (Hrsg.) (2009): Artenbericht 2008: Tiere, Pflanzen und Pilze im Nationalpark Hainich. Kenntnisstand zum 31.12.2008. Hrsg.: Nationalpark Hainich Verwaltung, Bei der Marktkirche 9. D-99947 Bad Langensalza: 134 pp. (in German) [Thüringen, Germany; on pages 23-24, 43 Odonata species are listed. Of special regional interest are records of *Coenagrion mercuriale*, *Lestes barbarus*, *Crocothemis erythraea*, *Leucorrhinia pectoralis*, *L. rubicunda*, *Orthetrum coerulescens*, and *Sympetrum pedemontanum*.] Address: Nationalpark Hainich Verwaltung, Bei der Marktkirche 9, 99947 Bad Langensalza, Germany

10115. Ngiam, R.W.J. (2009): The record of *Archibasis rebeecae* Kemp, 1989 in Singapore (Odonata: Zygoptera: Coenagrionidae). *Nature in Singapore* 2: 449-452. (in English) [1 male, small sandy stream in Central Catchment Nature Reserve, 22-V-2009] Address: Robin Wen Jiang Ngiam, R.W.J., National Biodiversity Centre, National Parks Board, 1 Cluny Rd, Singapore 259569. E-mail: ngiamwenjiang@nparks.gov.sg

10116. Nishu, S. (2009): Report of the survey trips of The Hyogo Society of Odonatology in 2002-2008. The

Odonate Fauna of Aonogahara. *Sympetrum Hyogo* 11: 45-59. (in Japanese, with English summary) [Except 2003 and 2004, several trips during 2002 and 2008 were made to study the odonate fauna of Aonogahara, Japan. Prior this study, *Symetrum maculatum* was seen in numbers here, but only one male was seen during the study period. *Sympetrum uniforme* is likewise an endangered species, but was recorded in good numbers throughout these years here. *Lestes japonicus* and *Sympetrum gracile* are abundant but population number is strongly diminishing.] Address: Nishu, S., 247 Gunge Shonomoto, Mikage-cho, Higashinda-ku, Kobe, Hyogo, 658-0057, Japan. E-mail: Snishu@mx2.nisiq.net

10117. Obolewski, K.; Strzelczak, A. (2009): Epiphytic fauna inhabiting *Stratiotes aloides* in a new lake of the Slowiński National Park (Smoldzińskie lake, Poland). *Ecology & Hydrobiology* 9(2-4): 257-267. (in English) ["Qualitative and quantitative structure of phytophilous macrofauna inhabiting *Stratiotes aloides* L. have been studied in a newly formed Smoldzińskie Lake in the area of the Slowiński National Park during vegetation period (V-IX) in year 2008. Jointly 27 taxa (including *Aeshna grandis* and *Calopteryx* sp.) inhabiting the studied plant species were identified and their number varied in time. The highest amount of epiphytic fauna taxa was observed in June (22) and September (20) while the lowest in August (13). The quality of lake waters significantly influenced both density and biomass of fauna inhabiting and mining the leaves of water soldiers. On the basis of qualitative and quantitative structure of epiphytic fauna, the quality of lake waters was assessed, which - according to BMWP-PL index - corresponded to class III. The analyses of benthofauna inhabiting pleustonic vegetation, as a part of biomonitoring, seem to complete the ecological assessment of aquatic ecosystems." (Author)] Address: Obolewski, K., Dept of Water Ecology, Pomeranian Univ., Arciszewskiego St. No 22 b, 76-200 Słupsk, Poland. E-mail: obolewsk@apsl.edu.pl

10118. Post, M. (2009): Libellen im Raum Neustadt an der Weinstraße (TK 6614 und 6615). *POLLICHIA-Kurier* 25(2): 47-49. (in German) [Rheinland-Pfalz, Germany; records of 40 species are briefly commented.] Address: E-Mail: libellen-nw@web.de

10119. Post, M. (2009): Weitere Libellenbeobachtungen im Raum Neustadt. *POLLICHIA-Kurier* 25(4): 40. (in German) [Rheinland-Pfalz, Germany; records from 2009 of the following species are briefly noted: *Sympetrum fonscolombii*, *Brachytron pratense*, *Aeshna affinis*, *Coenagrion mercuriale*, *Libellula fulva*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*] Address: E-Mail: libellen-nw@web.de

10120. Prunier, F. (2009): Presencia de *Macromia splendens* (Pictet, 1843) (Odonata: Corduliidae) en el embalse del Tranco de Beas (Jaén). *Zool. baetica* 20: 97-99. (in Spanish) [A larva of *M. splendens* was captured in the Tranco de Beas reservoir (Jaén, Spain) (UTM 30S 0520/4226), 620 a.s.l., 30-VIII-2007.] Address: Prunier, F., Centro Internacional de Estudios y Convenciones Ecológicas y Medio Ambientales (CIECEM), Matalascañas, Huelva, Spain. E-mail: florent.prunier@yahoo.fr

10121. Sadeghi, S.; Mohammadalizadeh, J. (2009): Additions to the Odonata fauna of Iran. *Iranian Journal of Science & Technology, Transaction A*, Vol. 33, No. A4: 355-359. (in English) [Forty eight species of Odonata from 46 sampling sites in Iran were recorded bet-

ween early May 2001 to mid June 2002. *Libellula fulva*, *Sympetrum sinaiticum*, and *Paragomphus sinaiticus* are recorded from Iran for the first time.] Address: Sadeghi, S., Department of Biology, College of Sciences, Shiraz University, Shiraz, Iran

10122. Schaik, V.A. van; Geraeds, R.P.G. (2009): The emergence period of the *Gomphus vulgatissimus* - A three year study along the river Roer, The Netherlands. *Natuurhistorisch Maandblad* 98(8): 153-158. (in Dutch, with English summary) ["From 2001 to 2003, a 150 m stretch of the river Roer was examined to analyse some aspects of the emergence period of *G. vulgatissimus*. Exuviae were collected every other day, from the start till the end of the emergence period. During these three years, 1585 exuviae were collected: 385 in 2001, 510 in 2002 and 690 in 2003. The emergence period seems to be very constant over the years, lasting 31 to 35 days. It took 8(9) to 11(12) days (average 9) for 50% of the population to emerge (EM50). The overall sex ratios in 2001, 2002 and 2003 were 1.0 (49.9% females), 0.7 (57.3% females) and 0.8 (55.2% females), respectively. The sex ratios changed during the emergence period. From the start of emergence until the moment when EM50 was reached, the sex ratios were 1.5 (40.6% females), 1.1 (48.4% females) and 0.9 (52.5% females) in 2001, 2002 and 2003, respectively. During the period from EM50 until the end of emergence, the sex ratios were 0.6 (63.5% females), 0.4 (71.6% females) and 0.7 (59.2% females), respectively. The predominance of females in this period was significant in all three years." (Authors)] Address: Schaik, V.A. van, Hoosveld 56, 6075 DB Herkenbosch, The Netherlands

10123. Seemann, R. (2009): Otto le Roi (1878 - 1916) – Zoologe aus Leidenschaft. *Archiv der Freunde der Naturgeschichte in Mecklenburg XLVIII*: 5-70. (in German, with English summary) [Otto le Roi was one of the most profiled German odonatologists in the early 20th century with an extraordinary broad knowledge in many zoological groups. "Correspondence can give information about people's lives and about contemporary history. Both aspects can also be taken from the correspondence between the Mecklenburger Otto Hermann Held (1875 - 1945) and the Rhinelander by choice, Otto August le Roi (1878 -1916). 214 letters and cards from Otto le Roi dating from between 1899 and 1916 have survived in the scientific inheritance of the apothecary and ornithologist Otto Held, kept in the archives of the federal state natural history collections at the MÜRITZEUM in Waren. The paper concerned here centres on the versatile zoologist Dr. Otto le Roi, whose promising scientific career as assistant to the Bonn zoologist Professor Alexander Koenig ended at the eastern front in the First World War in October 1916. With the aid of further records and publications, an attempt has been made to trace the short life of le Roi, who initially in 1896 started training to become an apothecary. Scientific curiosity that became evident at an early stage and a special passion for ornithology influenced his further development. He made contact with numerous notable scientists in order to learn and to gain ideas for his scientific work. Two personalities had a formative influence on the life of le Roi: Johannes Thienemann and Alexander Koenig. Le Roi made the acquaintance of Thienemann, who was in charge of the ornithological station at former Rossitten, during a fairly long stay on the Kurische Nehrung (Courland Spit) in 1902. Professor Alexander Koenig became le Roi's teacher, mentor and fatherly

friend in Bonn. As assistant at the Koenig Museum and a member of the Deutsche Ornithologische Gesellschaft (German Ornithological Society), the zoologist le Roi, who had meanwhile received a doctorate, was given the possibility of working with the most notable zoologists of that time. The war, however, put an end to this promising research scientist existence." (Author) Le Roi has written 12 papers and notes referring to Odonata. Some of these papers belong to the most cited German odonatological papers.] Address: Seemann, Renate, Naturhistorische Landessammlung im MÜRITZEUM Waren, Zur Steinmole 1, 17192 Waren, Germany

10124. Sharma, G.; Ramamurthy, V.V.; Kumar, R. (2009): Collection of damselflies and dragonflies (Odonata: Insecta) in National Pusa collection, Division of Entomology, Indian Agricultural Research Institute, New Delhi, India. *Biological Forum* 1(2): 47-50. (in English) [273 Odonata species are represented in the collection; these are listed without further details.] Address: Sharma, G., Desert Regional Centre, Zoological Survey of India (Ministry of Environment & Forests), Post-Jhalamand, Pali Road, Jodhpur-Rajasthan, India

10125. Wang, Y.; Kalyanasundaram, S.; Young, J. (2009): Effects of angle-of-attack on lift and thrust. Experimental study via test apparatus with passive wing rotation. *Proceedings of the 6th WSEAS International Conference on FLUID MECHANICS (FLUIDS'09)* ISSN: 1790-5095: 126-139. (in English) ["This paper focuses on the effect of mean angle-of-attack (AOA) on aerodynamic forces of flapping wings. The study was conducted with the aid of a test bench, which provided an active flapping motion in a vertical stroke plane and meanwhile a passive rotating motion about the longitudinal axis of the tested wing having the planform of a dragonfly's hindwing. AOA effect was studied together with the wing stiffness effect using Taguchi's DOE method in order to extract the major effects with minimum expenditure both in labor and time. The experimental results indicated that during downstroke, the lift decreased with the decreasing of the overall AOA monotonically, but thrust increased. However, during upstroke, the relationship between the effects of mean AOA and aerodynamic forces were not monotonic: larger and smaller AOAs were beneficial to the lift; smaller AOA was detrimental to the thrust; and the effect of larger AOA on thrust was close to the one caused by medium AOA." (Authors)] Address: Wang, Y., Department of Engineering, Australian National University, Canberra, 0200, Australia. E-mail: yutong.wang@anu.edu.au

2010

Aliberti Lubertazzi, M.A.; Ginsberg, H.S. (2010): Emerging dragonfly diversity at small Rhode Island (U.S.A.) wetlands along an urbanization gradient. *Urban Ecosystems* 13(4): 517-533. (in English) ["Natal habitat use by dragonflies was assessed on an urban to rural land-use gradient at a set of 21 wetlands, during two emergence seasons (2004, 2005). The wetlands were characterized for urbanization level by using the first factor from a principal components analysis combining chloride concentration in the wetland and percent forest in the surrounding buffer zone. Measurements of species diversity and its components (species richness and evenness) were analyzed and compared along the urbanization gradient, as were distributions of individual

species. Dragonfly diversity, species richness, and evenness did not change along the urbanization gradient, so urban wetlands served as natal habitat for numerous dragonfly species. However, several individual species displayed strong relationships to the degree of urbanization, and most were more commonly found at urban sites and at sites with fish. In contrast, relatively rare species were generally found at the rural end of the gradient. These results suggest that urban wetlands can play important roles as dragonfly habitat and in dragonfly conservation efforts, but that conservation of rural wetlands is also important for some dragonfly species." (Authors)] Address: Aliberti Lubertazzi, Maria, Dept of Plant Sciences and Entomology, Woodward Hall, Univ. of Rhode Island, Kingston, RI 02881, USA. E-mail: alibertilubertazzi@gmail.com

10126. Amaya Vallejo, V.A.; Ledezma; J. (2010): Libélulas (Odonata: Anisoptera) de la colección entomológica del museo de historia natural Noel Kempff Mercado, Santa Cruz de la Sierra, Bolivia. *Kempffiana* 6(2): 40-47. (in Spanish, with English summary) ["A list of genera and species of Anisoptera deposited in the entomological collection of Noel Kempff Mercado Natural History Museum is presented. The 1401 Anisoptera specimens registered since 1986 were examined, and 261 unidentified specimens were identified and incorporated to the collection, adding to a total of 1662 collected specimens from five of the nine Bolivian departments (Santa Cruz, Cochabamba, La Paz, Tarija, and Beni). There were 1650 individuals identified to species and 12 to genera level. The infraorder is represented by three families: Aeshnidae, Gomphidae, and Libellulidae, with 41 genera and 149 species. The best represented genera are *Erythrodiplax* (24%), *Micrathyria* (14%) and *Erythemis* (11%). *Orthemis* sp. probably *O. tambopatae* von Ellenrieder 2009, *Macrothemis hahneli* Ris 1913, *Macrothemis flavescens* Kirby 1897, *Rhionaeschna confusa* Rambur 1842 and *Zenithoptera Selys* 1869 are reported as new records for the country." (Authors)] Address: Ledezma, Julieta, Directora Sección de Entomología, Museo de Historia Natural Noel Kempff Mercado, Santa Cruz de la Sierra, Bolivia. E-mail: jledezma@museonoelkempff.org

10127. Arulprakash, R.; Gunathilagaraj, K. (2010): Odonata fauna of Tamil Nadu Agricultural University campus, Coimbatore India. *Notulae Odonatologicae* 7(6): 53-55. (in English) [26 species are listed; *Anax guttatus*, *Gynacantha hyaline*, *Epophthalmia frontalis*, and *Tholymis tillarga* were attracted by a light source.] Address: Arulprakash, R., Dept Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore-641003, Tamil Nadu, India. E-mail: arulprakash@gmail.com

10128. Arulprakash, R.; Gunathilagaraj, K. (2010): Odonate fauna of Tamil Nadu Agricultural University campus, Coimbatore, India. *Notulae Odonatologicae* 7(6): 53-55. (in English) ["An annotated list of 26 species is presented. *Anax guttatus*, *Gynacantha hyalina*, *Epophthalmia frontalis* and *Tholymis tillarga* were attracted by a light source." (Authors)] Address: Arulprakash, R., Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore-641 003, Tamil Nadu, India. E-mail: avrarulprakash@gmail.com

10129. Babu, R.; Nandy, S. (2010): New Odonata records from Himachal Pradesh, India. *Notulae Odonatologicae* 7(6): 55-57. (in English) ["The records are presented of 19 species, all new to the fauna of the state.

The occurrence of Platystictidae (*Drepanosticta*, Proto-sticta) and that of the genera *Aeshna*, *Gynacanthaeschna*, *Megalogomphus* and *Zygonyx* in Himachal Pradesh is documented for the first time."] Address: Babu R., Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053, India. E-mail: rbabu2000@rediffmail.com

10130. Blakely, T.J.; Harding, J.S.; Clews, E.; Winterbourn, M.J. (2010): An illustrated guide to the freshwater macroinvertebrates of Singapore. Canterbury Educational Printing Services, University of Canterbury, New Zealand. ISBN 978-0-473-16730-1: 74pp. (in English) [On pages 46-50, a key to the Odonata at the family level is provided.] Address: School of Biological Sciences, University of Canterbury, Private Bag 4800, Christchurch 8140, New Zealand

10131. Bößneck, U.; Sparmberg, H. (2010): Die Schutzgebiete der Landeshauptstadt Erfurt (Thüringen). Teil XVII: Flora und Fauna des GLB "Am Entenpfuhl" bei Stotternheim. *Thüringer Faunistische Abhandlungen* XV: 33-54. (in German, with English summary) [Thüringen, Germany. The total of 422 species recorded in 2008 and 2009 includes only *Sympeca fusca*, *Ischnura elegans*, *Enallagma cyathigerum*, and *Aeshna grandis*.] Address: Bößneck, U., Stadtverwaltung Erfurt, Umwelt- und Naturschutzamt, Stauffenbergallee 18, 99085 Erfurt, Germany. E-mail: ulrich.boessneck@erfurt.de

10132. Bonifait, S.; Villard, M.-A. (2010): Efficiency of buffer zones around ponds to conserve odonates and songbirds in mined peat bogs. *Ecography* 33(5): 913-920. (in English) ["Patch isolation resulting from habitat loss and fragmentation generally has detrimental effects on associated species. Peatlands may be especially sensitive to such effects because peat mining results in drastic changes in the hydrology of natural remnants. This study aimed to assess the efficiency of conservation zones surrounding ponds in mined bogs for two taxa: songbirds and odonates. We compared songbird distribution and odonate assemblages between ponds isolated by peat mining (n=6-12) and control ponds (n=11-13) located in natural bogs. Birds did not show major responses to pond isolation, whether in terms of their relative abundance or reproductive activity. However, longer-term data would be required to confirm this trend. In contrast, odonate abundance, as estimated from exuviae, was higher in natural ponds than in isolated ones. Some taxa, especially bog specialists, were more sensitive than others. Hence, pond isolation by peat mining significantly altered the structure of odonate assemblages. Pond size also influenced odonate abundances and distribution. Effective conservation of bog ponds should account not only for variations in the response of different taxa, but also for pond structural diversity, which influence species response to isolation." (Authors)] Address: Villard, M.-A., Chaire de recherche du Canada en conservation des paysages, Dépt de biologie, Univ. de Moncton, Moncton, NB E1A 3E9 Canada. E-mail: marc-andre.villard@umoncton.ca

10133. Borisov, S.N. (2010): Geographic variations in the life cycle of *Sympecma paedisca* (Brauer, 1877) (Odonata, Lestidae) in the plains of Central Asia. *Euroasian entomological journal* 9(2): 249-254. (in Russian, with English summary) ["Latitudinal changes in life cycle of *Sympecma paedisca* from forest-steppe zone of South Siberia (53° N) to deserts of Tadjikistan depression (37° N) are shown. The species is univoltine with long-term imaginal period, including aestivation and hi-

bernation. To the south, the reproductive period of the species is moderately extended and moved to spring-time. Latitudinally there is a more significant change in the ratio of aestivation and hibernation period duration. In the northern part, the areal time from exclusion to imago wintering covers less than 3 months and the imago winters for 7 months, while in southern part these periods last 6 and 4 months respectively. During the pre-reproductive period dragonflies make bidirectional migrations. Aestivation appeared far from where the imago emerged from its pupa, but the wintering imago returns to these habitats. In the plains (forest-steppe) of Siberia, dragonfly migrations are shorter than in central Asia. Dragonflies from the former, after emergence, move to the mountains for the whole summer period, and return to the plains in late autumn. This strategy avoids the high summer temperatures experienced in the central Asian plains. However, some dragonflies remain in the plains throughout the summer in habitats from where they emerged from their pupae." (Author)] Address: Borisov, S.N., Siberian Zoological Museum, Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia.

10134. Boudot, J.-P. (2010): Abondance, synchronisme et sex-ratio à l'émergence chez *Epitheca bimaculata* (Charpentier, 1825) en Lorraine (NE France) (Odonata, Anisoptera: Corduliidae). *Martinia* 26(1-2): 9-17. (in French, with English summary) ["Population size in *Epitheca bimaculata* varies considerably with space and time in Lorraine (northeast France). However, emergences are always synchronized with an EM50 index ranging from 4 to 6 days, irrespective of the population size. The daily sex ratio (male to female ratio) shows a constant imbalance in favour of females throughout the emergence time, with values ranging from 0.59 to 0.97 and an overall value of 0.74 at the end of emergence (i.e. 42% of males, 58% of females). These results are compared to published data from other countries and the reasons for such a constant imbalance in sex ratio are discussed. The hypotheses of i) a segregation of male and female according to banks orientation, ii) a differential phenology between males and females, do not account for such an imbalance, which is a frequent trend in Anisoptera, particularly Corduliidae." (Author)] Address: Boudot, J.-P., LIMOS, UMR CNRS 7137, Universités de Nancy, Faculté des Sciences, B.P. 239, F-54506 - Vandœuvre-lès-Nancy Cedex, France. E-mail: jean-pierre.boudot@limos.uhp-nancy.fr

10135. Cannings, R. (2010): *Calopteryx aequabilis* (River Jewelwing) in Northeastern British Columbia. *Boreus* 30(2): 29-30. (in English) [25-VII-2009, Hay River east of Fort Nelson, BC (10V 649049E 6504599N). "Given the occurrence of *C. aequabilis* in the boreal forests of northern Alberta (Acorn 2004), its presence in northeastern BC has long been suspected. The species is now known from two populations and two localities in the province, almost 1200 km apart. Although the southern population still must be considered endangered, the addition of the northern population to the provincial fauna requires a modest reduction in the species' conservation rank, but probably maintaining its presence on the provincial red list." (Author)] Address: Cannings, R., Curator of Entomology, Royal British Columbia Museum, 675 Belleville Street, Victoria, BC V8W 9W2, Canada. E-mail: rcannings@royalbcmuseum.bc.ca

10136. Chaudhry, M.T.; Aslam, M.; Naeem, M. (2010): New record of genus *Gynacanthaeshna* Fraser, 1922 (Odonata: Anisoptera: Aeshnidae) from Pakistan. *Pakistan Journal of Zoology* 42(4): 501-503. (in English) [*Gynacanthaeshna sikkima* was collected from Rawalpindi. This species is a new record for Pakistan.] Address: Chaudhry, M.T., PMAS-Arid Agriculture Univ., Rawalpindi (Pakistan). Dept. of Entomology, Pakistan. E-mail: chtariq273@hotmail.com

10137. Clausnitzer, H.-J.; Hengst, R.; Krieger, C.; Thomas, A. (2010): *Boyeria irene* in Niedersachsen (Odonata: Aeshnidae). *Libellula* 29(3/4): 155-168. (in German, with English summary) ["A population of *B. irene* was recorded in Lower Saxony, northern Germany, on the river Örtze, a tributary of the river Aller. Adults were recorded from 2008 to 2010 at ten different localities along the lower reaches of the river over 20 km, and reproduction was proved by the finding of 37 exuviae. On a small brook situated close to river Örtze, three exuviae and imagines were additionally found." (Authors)] Address: Clausnitzer, H.-J., Eichenstr. 11, 29348 Eschede, Germany. E-mail: H.-J.Clausnitzer@t-online.de

10138. Collier, A.; Nair, V.; Taylor, S.; Zettler, J. (2010): Apparent risk of predation by dragonfly naiads (Odonata: Libellulidae) inhibits tadpole growth (*Rana sphenoccephala*). *BIOS* 81(2): 45-54. (in English) ["We reared 120 *Rana sphenoccephala* tadpoles in 1.5 m long chambers (10 tadpoles per chamber) made from vinyl rain gutters. The chambers contained predatory late-instar dragonfly naiads (Odonata: Libellulidae) confined at one end in clear tubes drilled with aeration holes. The number of confined predators varied between control ($n = 0$), low ($n = 1$), and high density conditions ($n = 5$). Tadpoles were free to swim throughout each chamber, although food was isolated at one end adjacent to the predator tubes. In an additional high density predator condition, food was isolated at the opposite end of the chamber away from the predator tubes. There were a total of three replicates for each of the four conditions. Tadpoles from each condition were individually weighed (g) and their total length (mm) was recorded at regular intervals throughout the trial. Tadpoles raised in the high density condition with multiple predators surrounding their only food source were significantly shorter in length and weighed significantly less than those reared in all other conditions. When multiple predators and larval food were isolated at opposite ends of the chamber, tadpole growth did not statistically differ from that of control animals. Tadpoles raised with multiple predators surrounding their food also possessed slightly deeper tails, although these results were not statistically significant. Our results suggest that the inhibition of tadpole growth observed in this study may be linked to behavioral changes when perceived predation risks are high." (Authors)] Address: Collier, A., Dept Biology, Armstrong Atlantic State Univ., 11935, Abercorn Street, Savannah, GA, 31419, USA. E-mail: alex.collier@armstrong.edu

10139. Curtis, A.E.; Paton, P.W.C. (2010): Assessing detection probabilities of larval amphibians and macroinvertebrates in isolated ponds. *Wetlands* 30(5): 901-914. (in English) ["Isolated ponds provide vital habitat for an array of vertebrates and invertebrates (including Libellulidae, excluding Damselflies). Given the potential decline in protection of isolated ponds and the increase in urbanization in northeastern North America, knowledge of the condition of this aquatic resource is essential for developing revisions to existing regula-

tions, conservation efforts, and restoration initiatives. We were interested in the ability of rapid assessment methods, which require only one site visit, to estimate the condition of isolated ponds. During 2008, we conducted dip-net surveys at 10-day intervals from mid-May to late July 2008 at each of 36 isolated ponds in Rhode Island. We calculated detection probabilities for larval amphibian species and predatory macroinvertebrate families and assessed factors influencing detection probabilities. Most taxa displayed distinct seasonal phenologies in detection probabilities. Pond depth and vegetative characteristics also influenced detection probabilities of many taxa. Based on seasonal variation in detection probabilities, rapid assessment methods would not be effective to monitor overall biodiversity of isolated ponds in southern New England. Rather, multiple visits would be required to estimate occupancy rates of pond-breeding amphibians or aquatic macroinvertebrates if they were used as ecological indicators of pond condition." (Authors)] Address: Curtis, Annie, Natural Resources Office, Massachusetts Army National Guard, Bldg. 2808 Richardson Road, Camp Edwards, MA 02542, USA. E-mail: annie.curtis@us.army.mil

10140. Dehondt, F.; Mora, F.; Ferrez, Y. (2010): Redécouverte en France de *Nehalennia speciosa* (Charpentier, 1840) (Odonata, Zygoptera: Coenagrionidae). *Martinia* 26(1-2): 3-8. (in French, with English summary) [In July 2009, *N. speciosa* has been rediscovered by chance by a botanist in a peat bog located in the south of the Jura department, France. The habitat is characterised as a predominately *Eriophoro-Caricetum lasiocarpae*. The current knowledge about its biology and distribution in France are discussed.] Address: Dehondt, F., 22A rue de la Rotonde, F-25000 Besançon, France. E-mail: fdehondt4@yahoo.fr

10141. Deutschmann, U.; Dettmann, K.; Eifler, M.; Halletz, S.; Hengmith, K.; Ludwig, R.; Plotz, A.; Schuster, A.; Woog, D.; Zessin, W.; Ziegler, W. (2010): Erfassung und Bewertung der Insektenfauna im FFH-Gebiet „Wald- und Moorlandschaft um den Röggeleiner See“ bei Dechow, Mecklenburg (Lepidoptera, Coleoptera, Heteroptera, Orthoptera, Odonata). *Virgo*, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 13(2): 4-35. (in German) [Mecklenburg-Vorpommern, Germany; in 2008, 19 common distributed Odonata species were recorded. These are briefly discussed.] Address: Zessin, W., Lange Str. 9, 19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

10142. Dlugolecki, L. (2010): A characterization of seasonal pools in Central Oregon's high desert. MSc Thesis, Oregon State University: XIV + 76 pp. (in English) ["Seasonal wetlands in arid and semi-arid lands provide an important source of surface water in otherwise dry lands. Central Oregon's high desert, located in the Northern Great Basin (NGB) is dotted with hundreds of seasonal pools, locally called playas. The playas hold water or snow during parts of winter and spring but typically dry up during summer months. The mechanisms of seasonal pool hydrology, especially in the NGB, are poorly understood and have not been thoroughly examined. There is high seasonal variability and inter-annual variability in surface water amounts in the playas. [...]"] (Author) The thesis includes a list of aquatic macroinvertebrates observed during the 2007 inventory period and the frequency of observation at a playa. Odonata are treated at the genus/species level (*Anax junius*, *Rhionaeschna californica*, *Libellula pulchella*, *L. satura-*

ta.)] Address: Laura Dlugolecki, Laura, U.S. Environmental Protection Agency, Office of Water (4100T), Healthy Watersheds Project, 1200 Pennsylvania Avenue, N.W., Washington, D.C. 20460, USA

10143. Donnelly, N. (2010): Book review: *Damselfly genera of the New World: An illustrated and annotated key to the Zygoptera*. *Argia* 22(3): 21-23. (in English) [Rosser W. Garrison, Natalia von Ellenrieder, and Jerry A. Louton. 2010, The Johns Hopkins University Press, Baltimore. ISBN 978-8018-9670-5. 490 pp, 2586 fgs., 24 colour pls., \$125.00. (Incl. additions and corrections for previous book, *The Dragonfly Genera (Odonata: Anisoptera) of the New World*, 2006, by the same authors)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

10144. Dow, R.A.; Choon, C.Y.; Ng, Y.F. (2010): A review of the genus *Amphicnemis* in Peninsular Malaysia and Singapore, with descriptions of two new species (Odonata: Zygoptera: Coenagrionidae). *Zootaxa* 2605: 45-55. (in English) ["The *Amphicnemis* species occurring in Peninsular Malaysia and Singapore are reviewed, and two new species are described: *A. bebar* and *A. hoisen* (holotype for both: Malaysia, Pahang, Sungai Bebar). Keys to both sexes of all species are provided. *A. ecornuta* is recorded from Borneo for the first time. A summary of the distributions of the named species of *Amphicnemis* occurring in Sundaland is given. Four species of *Amphicnemis* are now known from Peninsular Malaysia and Singapore, and twelve from Borneo." (Authors)] Address: Dow, R.A., National Museum of Natural History Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow2300@yahoo.co.uk; Ng, Y.F., Centre for Insect Systematics, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. E-mail: cychoong@ukm.my

10145. Dragonfly Society of the Americas; Alcock, J. (2010): *Argia* 22(3). *Argia* 22(3): 1-23. (in English) [oas 31, In This Issue; DSA is on Facebook; Calendar of Events; 2010 DSA Annual Meeting in Orono, Maine Donnelly, N.; Congratulations Dennis Paulson!; Photos Needed; 2011 Dragonfly Society of the Americas Annual Meeting at Colorado State University, Fort Collins, Colorado by Kondratieff, B.C.; International Odonata Research Institute 'Garage Sale' for DSA Members; A Call for Papers for BAO; Request for Annual DSA Meeting Proposals; Drink Beer?URL] Address: Alcock, J., Department of Biology, Arizona State University, Tempe, Arizona 85287-1501, USA. E-mail: j.alcock@asu.edu

10146. Duquef, M.; Salack, P. (2010): Nouvelle capture en Guyane d'*Aphylla producta* Selys, 1854 (Odonata, Anisoptera: Gomphidae). *Martinia* 26(1-2): 48. (in French) [Corossony, 24-XI-2008] Address: Duquef, M., 25 rue Paul Baroux, Blangy-Tronville, F-80440 Boves, France

10147. Eutropio, F.J.; Gomes, L.C. (2010): Dieta alimentar de *Trichomycterus longibarbus* Costa, 1992 e *Pimelodella transitoria* Miranda Ribeiro, 1905 (Siluriformes): um caso de competição interespecífica. *Natureza on line* 8(2): 67-70. (in Portuguese, with English summary) [The catfish *Trichomycterus longibarbus* and *Pimelodella transitoria* are associated with submerged litter streams of Yellow Wood, REBIO de Duas Bocas, Brazil. Their stomach contents were analyzed and identified up to the lower taxonomic level. The food items were dominated by Chironomidae and Odonata, while *T. longibarbus* preyed exclusively on Odonata.]

Address: Eutrópio, F.F., Programa de Mestrado em Ecologia de Ecossistemas. Centro Universitário Vila Velha - UVV. Rua Comissário José Dantas de Melo, 21, Boa Vista, Vila Velha, Espírito Santo, Brasil. CEP 29101-770. E-mail: eutropioff@gmail.com

10148. Finkenzeller, M. (2010): First record of *Pantala flavescens* for Croatia (Odonata: Libellulidae). *Libellula* 29(3/4): 205-208. (in German, with English summary) ["On a short holiday trip to the island of Krk, Croatia, at least three individuals of *P. flavescens* were observed, patrolling along a beach near Stara Baska. This is the first record for Croatia." (Author)] Address: Finkenzeller, M., Staufferstraße 24, D-88239 Wangen, Germany. E-mail: michael.finkenzeller@web.de

10149. Fiuczynski, K.D.; Hallau, A.; Hastädt, V.; Herold, S.; Kehl, G.; Lohmann, G.; Meyburg, B.-U.; Meyburg, C.; Sömmer, P. (2010): Der Baumfalke in der modernen Kulturlandschaft. *Greifvögel und Falkneri* 2009/2010: 230-244. (in German) [The paper includes detailed descriptions on hunting methods of hobbies (Aves: *Falco subbuteo*) on dragonflies, and documents a successful hunt and final catch of an *Aeshna* sp.] Address: not stated

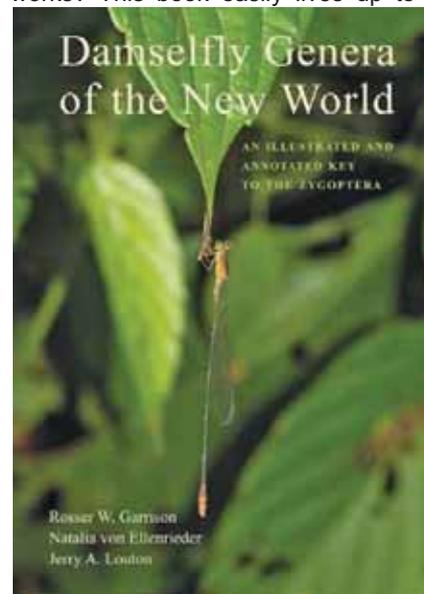
10150. Frank, M. (2010): Nachweis der Zierlichen Moosjungfer (*Leucorrhinia caudalis* Charpentier, 1840) im Landkreis Nordwest-Mecklenburg. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 13(2): 71-72. (in German) [Kleekamp, Germany; records from 05.06.2010 and 10.07.2010 are documented.] Address: Frank, M., Zur Traubenmühle 5A, 55268 Nieder-Olm, Germany. E-mail: mikel.frank@gmx.de

10151. Gander, A. (2010): *Nehalennia speciosa* (Charpentier, 1840) dans la Grande Cariçaie: une population singulière d'importance internationale (Odonata: Coenagrionidae). *Entomo Helvetica* 3: 189-203. (in French, with English and German summaries) ["A population of *N. speciosa*, one of the most endangered odonate species of Europe, was detected in 2007 in the nature reserves named 'Grande Cariçaie' on the southern shore of Lake Neuchâtel, Switzerland. In order to secure adequate maintenance measures of the habitat aimed at the conservation of this species, corresponding investigations were conducted in 2008. The purpose of these studies was on one hand to specify the local distribution and the ecological requirements of *N. speciosa* and on the other hand to evaluate the impact of mowing the marsh meadows on the attractiveness of the different sites within the colonized area. 29 transect runs comprising 6466 m in length allowed to sample 30 ha of the marsh. In total 391 individuals of *N. speciosa* were recorded on an area of 9 ha, 94 % of them being situated within flooded stands of large sedges (Magnocaricion). Marsh meadows without maintenance are not colonized. The number of years after cutting the vegetation in maintained allotments is not decisive for the habitat choice. The singularities of the species' local ecology, the importance of the population on the European scale and the modalities of conservation of *N. speciosa* in the nature reserves of the Grande Cariçaie are discussed." (Author)] Address: Gander, Antoine, Grande Cariçaie, ch. de la Cariçaie 3, CH-1400 Cheseaux-Noréaz, Switzerland. E-mail: a.gander@grande-caricaie.ch

10152. Garrison, M. (2010): Damselflies of Chicago-land. A Photo Field Guide, version 1. Published by The Field Museum, Chicago. 140 pp. (in English) [Introduction: 5; Basic anatomy: 10; Life cycle: 17; Mating: 19;

Ovipositioning: 21; Feeding: 23; Predation: 25; Field guide key: 27; Damselfly taxonomy: 33; Families Broadwings: 35; Spreadwings: 43; Pond damsels: 67; Checklist: 121; Potential species: 124; References: 136; Index of species: 138. This guide is available as a free download in PDF format: <http://fm2.fieldmuseum.org/plantguides/damselflies>] Address: Garrison, Marla, Biology Faculty McHenry County College Crystal Lake, IL, USA. E-mail: mgarriso@mcchenry.edu

10153. Garrison, R.W.; Ellenrieder, N. von; Louton, J.A. (2010): Damselfly genera of the New World: An illustrated and annotated key to the Zygoptera. Johns Hopkins University Press; 1 edition. ISBN-10: 0801896703. 528 pp. (in English) ["This book follows by four years its companion volume on the Anisoptera of the New World by the same authors (Garrison et al. 2006, reviewed in *Florida Entomologist* 90: 290-291). Although about the same number of genera (124 Anisoptera, 118 Zygoptera) are treated in the two books, the dragonflies are treated in 368 pages with 1626 figures, the damselflies in 490 pages with 2586 figures. This points out the considerably greater degree of work and detail the authors put into the second volume. In addition, while preparing to write and writing this volume, the first two authors have become the pre-eminent odonate taxonomists of the New World tropics, publishing no fewer than 17 papers (since 2000) to clarify the taxonomy of numerous groups, some of them large. Before this, the largest family, Coenagrionidae, was a taxonomic quagmire, and now a fair modicum of order has emerged from the chaos. How else to build a key to genera that actually works? This book easily lives up to the expectations



promised by the dragonfly volume, including comprehensive, extremely well illustrated keys; detailed morphological descriptions of each genus; and brief descriptions of natural history wherever known. The writing is clear, but its conciseness fails to convey how much work at the microscope must have gone into the keys and descriptions. And most of us will be unable to imagine the amount of time that went into producing the figures. They are meticulous and superb, by the standards of any scientific illustrator. They are lavishly provided, often more than one species in a genus. I am constantly engaged by the morphological diversity of damselflies that one can see under magnification, and this book shows it all. Many of them were used before, in their recently published papers, but the majority appear uniquely in this book. Having worked with the authors on several genera, I can add that they are impeccably accurate. The three-dimensional rendering of medio-dorsal views of terminal appendages is so much

more helpful than the old standard of dorsal and lateral views that one wonders why the excellent illustrators of a century ago didn't come up with it. There are a lot more photos in this book than in the dragonfly book, 81 vs. 24, and the beauty and variety of New World damselflies are shown off to the fullest. All the families are represented, and there was a real effort made to get all the genera. Many have not been photographed. Everything about this volume invites the term "comprehensive." The maps of generic ranges are of great value to the biogeographer and might be used to point out poorly surveyed regions. The long list of references provides access to the taxonomic and biological literature of all New World damselflies, and to that all-important opportunity to identify specimens to species. The list that attributes a locality to every figure is a nice touch. If there are mistakes in the volume, I did not find them with my level of scrutiny. The very timely Appendix lists additions and corrections to the Anisoptera volume, and such a list will doubtless be generated for this volume in a few years. Like Philip Corbet's grand book on Odonata (Corbet 1999), the two superb volumes from these authors are perfectly placed to show us what still needs to be done: 1) databasing and georeferencing existing collections to give an even clearer picture of regional biodiversity; 2) many more surveys and much more collecting over neotropical regions that are still poorly known; 3) modern taxonomic revisions of genera that have not yet received that treatment; and 4) sets of keys to species, especially regional keys such as those by Lencioni (2005, 2006). Finally, regional photo-illustrated field guides to all species!" (Dennis Paulson). Orders: The Johns Hopkins University Press, 2715 North Charles Street, Baltimore, Maryland 21218-4363, USA

10154. Gauquie B. (2010): Habitats de l'Orthetrum brun (Orthetrum brunneum) et de l'Orthetrum bleuissement (Orthetrum coerulescens) sur le territoire du Parc naturel des Plaines de l'Escaut et dans le bassin carrier tournois. Les naturalistes Belges 91(3-4): 37-53. (in French, with English summary) ["During this last five years, I undertook a specific search on two rare Orthetrum species in Belgium, *O. coerulescens* and *O. brunneum*, both recently discovered in Western Hainaut province. The exploration area is Tournai and the territory of the Natural Park of the Plains of the Scheide, which extends east to west from Bernissart to Antoing. *O. brunneum* was found on five sites and *O. coerulescens* on three sites. Following data analysis, it seems that in the region *O. coerulescens* is more a stenotopic species, selecting only limestone quarries and *O. brunneum* is an eurytopic species, occupying more varied environments, nevertheless at least four abiotic parameters characterize in common the breeding sites of the two species: a sunny environment, a shallow water, with good physico-chemical conditions and constantly renewing seepage, or flow resurgence. If these ecological requirements are met, it appears that, among other factors (biotic or abiotic), the vegetation structure is of crucial importance for the reproduction of either species. At sites with still water, *O. brunneum* proves to be a pioneer species essentially, eventually disappearing when the vegetation becomes too high. For *O. coerulescens*, eutrophication is really a non-favorable factor, but the vegetal cover did not appear to be influential." (Author)] Address: Gauquie B., Chargé de mission Recherches et milieux naturels, Parc naturel des Plaines de l'Escaut, rue des Sapins 31, 7603 Bon-Secours, Belgium. E-mail: bgauquie@plainesdelescaut.be

10155. Goffart, P. (2010): Southern dragonflies expanding in Wallonia (south Belgium): a consequence of global warming? BioRisk 5: Special issue: Monitoring climatic change with dragonflies: 109-126. (in English) ["The occurrence of seven southern Odonata species (*Crocothemis erythraea*, *Lestes barbarus*, *Sympetrum fonscolombii*, *Anax parthenope*, *Coenagrion scitulum*, *Aeshna affinis*, *S. meridionale*) has been watched in Wallonia over the last two decades (from 1981 to 2000). They have clearly expanded in the meantime and this pattern is still highly significant when the data are corrected for the increase of sampling efforts. Moreover, reproduction evidences have been collected recently (from 1993 onwards) for all these species and several settled and have now resident populations in Wallonia. In a second step, all present regular and irregular resident species of Wallonia were looked for change in range size and observation rate per visit between two six years periods of a survey and monitoring scheme, from 1989 to 2000. Analysis was achieved on grid cells visited at the right time at both periods, a procedure designed to neutralize the spatio-temporal heterogeneity of sampling. The comparison of results in relation to the distribution types of species and their habitat preferences show a significant global trend toward an increase for southern species during the investigated time interval, contrasting with other groups of species. If there is a tendency to rise for species preferring eutrophic still waters, this proves to be clearly due to the southern species sub-group, the other dragonflies of this habitat type showing a stable or even decreasing trend. Three distinct hypotheses are examined and discussed as possible explanations of the expansion pattern of southern species: (1) global warming, (2) change in aquatic habitats, especially eutrophication, and (3) intrinsic population dynamics. The rise of temperatures appears to be the main factor explaining the observed expansions." (Author)] Address: Philippe Goffart, P., Observatoire de la Faune, de la Flore et des Habitats (OFFH), Département de l'Étude du Milieu naturel et agricole (DEMna), Service Public Wallon (SPW) - DGARNE - Direction de la Nature et de l'Eau, Avenue Maréchal Juin, 23, B-5030 Gembloux, Belgium. E-mail: philippe.goffart@spw.wallonie.be

10156. Grand, D. (2010): *Tramea basilaris* (Palisot de Beauvois, 1805): un nouveau Libellulidae pour l'île de la Réunion (Odonata, Anisoptera: Libellulidae). *Martinia* 26(1-2): 18. (in French) [pond near Gol à Saint-Louis, 23-I-2003] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

10157. Gros, P. (2010): Die Libellenfauna des Mandlinger Moores (Gemeindegebiet Radstadt, SIlbg): Erster inernalpiner Nachweis der Großen Moosjungfer *Leucorhinia pectoralis* (Charpentier, 1825) aus dem Bundesland Salzburg und erste Meldung der Glänzende Binsenjungfer *Lestes dryas* Kirby, 1890 aus dem Ennstal Österr. (Odonata). *Mitteilungen aus dem Haus der Natur Salzburg* 18: 29-34. (in German, with English summary) [A total of 29 odonate species are listed for the locality Mandlinger Moor, Austria. "*L. pectoralis* and *L. dryas*" are reported from Salzburg's part of the Enns river valley for the first time. For *L. pectoralis*, it is the first report inside the alpine region in Salzburg. In this Austrian county, these two dragonfly species are currently only known from very few sites. Details of these discoveries are given. Beyond that, all dragonfly spe-

cies recently found in this area are listed." (Author)] Address: Gros, P., Haus der Natur, Museumsplatz 5, 5020 Salzburg, Austria. E-mail: patrick.gros@hausdernatur.at

10158. Helitas, N.; Lambret, P. (2010): Observation d'un tandem de *Lestes sponsa* (Hansemann, 1836) se laissant dériver à la surface d'un plan d'eau (Odonata, Zygoptera: Lestidae). *Martinia* 26(1-2): 29-34. (in French, with English summary) [A tandem of *L. sponsa* was observed landing and drifting on the surface of a lake in the Vosges mountains (northeastern France). Thermoregulatory behaviour is discussed as a possible cause of this behaviour.] Address: Helitas, N., 4 rue de Longeville - F-55000 Savonnières devant Bar, France. E-mail: nicolas.helitas@wanadoo.fr

10159. Hertzog, M. (2010): Beobachtung eines frisch geschlüpften Weibchens von *Boyeria irene* am Seerhein (Odonata: Aeshnidae). *Libellula* 29(3/4): 169-174. (in German, with English summary) ["On 17-VIII-2007 a general female *B. irene* was found and documented photographically near Gottlieben, Canton of Thurgau, Switzerland, west of Constance, where a 4 km-section of the River Rhine connects the upper with the lower part of Lake Constance. This is the first record of reproduction of this species in the Lake Constance basin." (Author)] Address: Hertzog, M., Rebhaldenstrasse 19, CH-596 Scherzingen, Switzerland. E-mail: mhertzog@bluewin.ch

10160. Horváth, G.; Blaho, M.; Egri, A.; Kriska, G.; Seres, I.; Robertson, B. (2010): Reducing the maladaptive attractiveness of solar panels to polarotactic insects. *Conservation Biology* 24(6): 1644-1653. (in English, with Spanish summary) ["Human-made objects (e.g., buildings with glass surfaces) can reflect horizontally polarized light so strongly that they appear to aquatic insects to be bodies of water. Insects that lay eggs in water are especially attracted to such structures because these insects use horizontal polarization of light off bodies of water to find egg-laying sites. Thus, these sources of polarized light can become ecological traps associated with reproductive failure and mortality in organisms that are attracted to them and by extension with rapid population declines or collapse. Solar panels are a new source of polarized light pollution. Using imaging polarimetry, we measured the reflection-polarization characteristics of different solar panels and in multiple-choice experiments in the field we tested their attractiveness to mayflies, caddis flies, dolichopodids, and tabanids. At the Brewster angle, solar panels polarized reflected light almost completely (degree of polarization $d = 100\%$) and substantially exceeded typical polarization values for water ($d = 30-70\%$). Mayflies (Ephemeroptera), stoneflies (Trichoptera), dolichopodid dipterans, and tabanid flies (Tabanidae) were the most attracted to solar panels and exhibited oviposition behaviour above solar panels more often than above surfaces with lower degrees of polarization (including water), but in general they avoided solar cells with nonpolarizing white borders and white grates. The highly and horizontally polarizing surfaces that had nonpolarizing, white cell borders were 10- to 26-fold less attractive to insects than the same panels without white partitions. Although solar panels can act as ecological traps, fragmenting their solar-active area does lessen their attractiveness to polarotactic insects. The design of solar panels and collectors and their placement relative to aquatic habitats will likely affect populations of aquatic insects that use polarized light as a behavioural cue." (Authors)] Address: Horváth, G., Biooptics Laboratory, Department of Biological Physics, Loránd Eötvös University, 1117 Budapest, Pázmány Péter sétány 1, Hungary. E-mail: gh@arago.elte.hu

(Authors) The paper includes references to Odonata.] Address: Horváth, G., Biooptics Laboratory, Department of Biological Physics, Loránd Eötvös University, 1117 Budapest, Pázmány Péter sétány 1, Hungary. E-mail: gh@arago.elte.hu

10161. Houard, X.; Lorthiois, M. (2010): Premiers indices formels d'autochtonie d'*Anax parthenope* (Selys, 1839) en Haute-Normandie (Odonata, Anisoptera: Aeshnidae). *Martinia* 26(1-2): 39-40. (in French) [28-VII-2009, oviposition, Val-de-Reuill, France] Address: Houard, X., Conservatoire des Sites Naturels de Haute-Normandie, Rue Pierre de Coubertin, BP 424, F-76850 St-Étienne-du-Rouvray Cedex, France. E-mail: x.houard@gmail.com

10162. Imler, E.; Olberg, R.; Leonardo, A. (2010): 3D reconstructions and flight statistics of dragonfly prey-capture trajectories. Abstracts of the 9th International Congress of Neuroethology, Salamanca (Spain) 2-7 August 2010. P 395: 649. (in English) ["Dragonflies are among evolution's finest aerial hunters; intercepting prey in mid-air, they rarely miss their targets. Most previous studies of dragonfly prey capture have taken place outdoors and have been limited by environmental variability and availability of adult dragonflies in these situations. These single camera studies have been restricted to 2D analyses, and have missed long complex flights due to the narrow field-of-view (FOV) required by outdoor conditions. To enable more sophisticated studies of prey capture, we have constructed a fully indoor flight arena that can be used to study dragonfly behaviour in a controlled environment. The flight arena is 5.5m x 4m x 4.5m in size, and is illuminated to 10mW/cm². The end result is a bright, windless, temperature and humidity controlled environment in which adult dragonflies can forage year round. Individual animals gained up to 100mg of weight per day, and lived as long as 3 weeks. We have focused our studies on libellulid dragonflies (*L. lydia*, *L. luctuosa*), because they will forage readily from a single perch positioned in the focal zone of a high speed camera array (2 cameras; 1000fps). We have analyzed over 150 prey capture trajectories of both the dragonfly and its prey (*Drosophila*) in a 3D recording volume of ~1m³, with sub-millimeter tracking accuracy. Foraging success rates were ~80%, with a mean flight time of 361 ± 124ms – on the order of 15 wing strokes. Dragonfly flight accelerations were very high, over double those of its prey (dragonfly: mean acceleration 18 m/s², max 75 m/s²; *Drosophila*: mean acceleration 8 m/s², max 42 m/s²). When the dragonfly failed to catch its prey, mean flight times increased by 20%, and mean accelerations increased by 10% (dragonfly) and 30% (*Drosophila*). The data suggest the presence of a narrow "trigger zone" above and slightly forward of the dragonfly's head, which most prey pass through in the moments before a foraging flight begins." (Authors)] Address: Olberg, R.M., Department of Biological Sciences, Union College, Schenectady, NY 12308, USA. E-mail: olberg@union.edu

10163. Jeon, D.-Y.; Lee, S.-L.; Son, J.-W.; Cha, Y.-W.; Yoo, P.-J. (2010): Assessments of ecosystem health in middle reaches of Suyoung River. *The Annual Report of Busan Metropolitan City Institute of Health & Environment* 20(1): 98-121. [A total of 44 species including five, not further specified Odonata species was recorded between September 2008 to October 2010 in the middle reach of the Suyoung river in Busan, South Korea.] Address: E-mail: Jeon1st@korea.kr

- 10164.** Karolinska, E.O.; Gram, B.M. (2010): New finds of dragonflies (Odonata) in Kharkiv region. *Vestnik zoologii* 44(6): 524. (in Ukrainian, with English title) [Ukraine; records of the following taxa are documented: *Sympecma paedisca*, *Anax parthenope*, *Orthetrum brunneum*, *Orthetrum coerulescens anceps*, *Crocothemis erythraea*, *Sympetrum fonscolombii*, *S. striolatum*, *S. depressiusculum*, and *Leucorrhinia rubicunda*.] Address: not stated
- 10165.** Kipping, J. (2010): The dragonflies and damselflies of Botswana – an annotated checklist with notes on distribution, phenology, habitats and Red List status of the species (Insecta: Odonata). *Mauritiana (Altenburg)* 21: 126-204. (in English, with German summary) ["Between 2000 and 2010, 111 species of Odonata have been recorded mainly from northern Botswana. Together with other published and unpublished records, this increases the checklist of the Odonata of Botswana to 127 species, of which 21 species have not been recorded before in Botswana. This updated checklist provides information for each recorded species on distribution, phenology, preferred habitats and specific notes, where appropriate. A detailed list of records is given, the localities sampled by the author are described in the appendix. The Red List status according to the IUCN assessment is given. Distribution patterns of the Odonata species in different freshwater ecoregions are discussed." (Authors)] Address: Kipping, J., Naturkundliches Museum Mauritium Altenburg, Parkstr. 1, 04600 Altenburg, Germany. E-mail: kipping@mauritium.de
- 10166.** Klimaszuk, P.; Heymann, D. (2010): Vertical distribution of benthic macroinvertebrates in a meromictic lake (Lake Czarne, Drawieński National Park). *Oceanological and Hydrobiological Studies* XXXIX(4): 99-106. (in English) ["Investigations of the distribution of benthic macroinvertebrates in Lake Czarne were conducted in fall 2005 and spring 2006. Samples were taken in three transects (at a depth of 0.5 m and at 5 m intervals). It was noted that macrobenthos only inhabit depths to 10 m. Laminar sediments from 15 m to 29 m indicate that macrobenthos never inhabit the deepest part of the lake in spite of temporary oxygen abundance (between 15 and 20 m during the winter and spring mixing periods). The largest diversity and biomass of macrozoobenthos was observed in the littoral zone at a depth of 0.5 m. At a depth of 5 m in the characean stands and at a depth of 10 m the number and biomass of benthic macroinvertebrates were significantly smaller. The reason for the decrease of benthos density seems to be gradual oxygen depletion." (Authors) Odonata larvae could be found up to a depth of app. 5 m. Odonata occurred at densities of 15 ind./m².] Address: Klimaszuk, P., Department of Water Protection, University of Adam Mickiewicz ul. Umultowska 89, 61–614 Poznań, Poland. E-mail: pklim@amu.edu.pl
- 10167.** Knijf, G. de; Termaat, T. (2010): Statut et distribution de *Sympetrum meridionale* (Selys, 1841) dans le nord ouest de l'Europe, en particulier en Belgique et aux Pays-Bas (Odonata, Anisoptera: Libellulidae). *Martinia* 26(3/4): 81-82. ["The more and more frequent presence of *S. meridionale* in Northwestern Europe is detailed. The habitats where breeding occurs are briefly described."] Address: De Knijf, G., Matrouwstraat 10, 9661 Parike-Brakel, Belgium. E-mail: geert.deknijf@inbo.be
- 10168.** Kosterin, O.E.; Borisov, S.N. (2010): Dragonflies (Odonata) of the Dzhungarskiy Alatau mountains, South-East Kazakhstan. *Euroasian entomological journal* 9(2): 299-302. (in Russian, with English summary) ["An annotated list of 24 species of Odonata collected on expeditions to the Dzhungarian Alatau Mountains in 1993–1994 and 2006–2007 is given. Water bodies fit for odonate breeding are sparse and located mostly in foothills; however, *Sympecma* spp., *Sympetrum* spp. and *Aeshna mixta* migrate to the mountains in the pre-reproductive period." (Authors)] Address: Kosterin, O. E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru
- 10169.** Krieg-Jacquier, R.; Lathuilière, M. (2010): *Cordulegaster bidentata* Selys, 1843 dans le département de l'Ain. État des connaissances en 2009 (Odonata, Anisoptera: Cordulegasteridae). *Martinia* 26(1-2): 35-39. (in French, with English summary) [2008 and 2009, in the Ain department (Eastern France, Rhône-Alpes region) records of *C. bidentata* were added to the regional list of Odonata. The distribution of the species in the Ain and the adjacent Departments is mapped.] Address: Krieg-Jacquier, R., 18 rue de la Maçonne F-73000 Barberaz, France. E-mail: regis.krieg.jacquier@gmail.com
- 10170.** Krieg-Jacquier, R.; Grand, D.; Mora, F. (2010): Fragments odonatologiques sur le Doubs, 2009 (Régions Franche-Comté et Bourgogne). *Martinia* 26(1-2): 41-47. (in French, with English summary) [In summer 2009, eight Odonata species could be added to the regional list of (autochthonous) species: *Chalcolestes viridis*, *Erythromma viridulum*, *Boyeria irene*, *Gomphus pulchellus*, *G. vulgatissimus*, *Onychogomphus forcipatus*, *Somatochlora metallica*, and *Crocothemis erythraea*. Distribution maps of these species are updated.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr
- 10171.** Kunz, B. (2010): Heterospecific copulation with subsequent oviposition in Libellulidae (Odonata). *Libellula* 29(3/4): 223-230. (in English, with German summary) [Sardinia, Italy; Baden-Württemberg, Germany; "Two cases of heterospecific mating in two different genera of Libellulidae were documented photographically from pair formation to subsequent oviposition. The pairs consisted of male *Orthetrum trinacria* x female *O. cancellatum* and of male *Sympetrum danae* x female *S. striolatum*. Copulation and oviposition took place in the genus specific manner. Due to the rare observation of these events the full course of the behaviour is described and the possible reproductive success of heterospecific pairing is discussed." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellen@berndkunz.de
- 10172.** Kyek, M.; Wittmann, H. (2010): Die Geländeabsenkung Oberau – ein Naturschutzprojekt der besonderen Art - Kurzbericht über den Zustand des Naturhaushaltes kurz nach Fertigstellung. *Mitteilungen aus dem Haus der Natur, Salzburg* 18: 91-102. (in German, with English summary) ["During the late winter months of 2008 the Mayr-Melnhof forest management newly created the "Oberau" wetland, covering an area of 11 hectares. The biotope is located between the Antheringer Au lowland forest and the Haunsberg hill. From the area the humus layer was removed, gravel extracted and 13 new near-natural ponds built. Most of the area immediately adjacent to the ponds was assigned to be left

to natural succession, in some parts grey alder, ash trees, willows and, for the Red-backed Shrike, thorny shrubs were planted. Rough pasture surrounds the forest. Preliminary botanical, ornithological, entomological and herpetological analyses of the area's species inventory prove it to be a species-rich and exciting biotope. The Oberau project was implemented within a short period of time, but has already a sustained positive influence on the "Salzachauen" Natura 2000 Area. It remains to hope that in the interest of supporting biodiversity a large number of similar projects may be initiated in the future." (Authors) 17 odonate species were recorded including *Sympetrum pedemontanum*.]

10173. Lambert, P. (2010): Un mâle de *Lestes macrostigma* (Eversmann, 1836) prisonnier de *Juncus maritimus*. *Martinia* 26(1-2): 49-51. (in French, with English summary) [The right forewing of a male *L. macrostigma* that was accidentally pierced by a stem of *Juncus maritimus*.] Address: Lambert, P., Amis des Marais du Vigueirat, F-13104 Mas Thibert, France. E-mail: philambret@hotmail.com

10174. Leonardo, A.; Imler, E.; Olberg, R. (2010): Guidance laws underlying prey capture in the dragonfly. Abstracts of the 9th International Congress of Neuroethology, Salamanca (Spain) 2-7 August 2010. P 363: 235. (in English) [Verbatim: "Dragonflies are nature's consummate aerial predators; flying at extremely high speeds, they catch small moving insect prey; escapes are rare. We have constructed the first indoor dragonfly flight arena in order to unravel the computations and circuit dynamics underlying this remarkable behaviour. We will present data from an array of high speed cameras that allows us to reconstruct the trajectory of the dragonfly and its prey (*Drosophila*). From these data, we can test quantitatively the hypothesis (Olberg et al., 2000) that dragonflies use a strategy of proportional navigation to intercept their prey. Starting with the three-dimensional coordinates of the dragonfly and its prey, we calculate the azimuthal and elevational line-of-sight position of the prey as a function of time. The numerical derivatives of these line-of-sight vectors are then estimated, and their drift rates are compared to the dragonfly's acceleration vector normal to its bearing. The extent to which these numbers are consistent with different models of proportional navigation and other guidance laws will be discussed." (Authors)] Address: Olberg, R.M., Dept Biol. Sciences, Union College, Schenectady, NY 12308, USA. E-mail: olbergr@union.edu

10175. Lopez Salmeron, A.; Mendoza-Cuenca, L. (2010): Efecto del parasitismo por ácaros acuáticos en la adecuación de *Argia* sp. (Odonata: Coenagrionidae). *Biológicas* 12(2): 122-128. (in Spanish, with English summary) ["In the late three decades a deep interest in theoretical and empirical knowledge of sexual selection, have showed that it is common in nature. In dragonfly species such as *Argia* sp. (Odonata: Coenagrionidae), where males did not perform any precopulatory display and the sexual harassment to females occurs very frequently, we would expect that females use traits to discriminate between males. We evaluated, using capture-recapture marking and through behavioral observations, if mites attack affects individual survival of *Argia* sp. from one population with high levels of parasitism by aquatic mites, and also if parasitism levels could be used by females to discriminate among males. Our results showed that mites attack males with higher intensity, despite females are bigger and could potentially

house a higher number of mites. Parasitism by aquatic mites reduces both individual survival of males and females and male's mating success, and bigger males are less attacked, have a higher survival and obtain higher numbers of matings. These results suggest that females could use male size as an indicator to their capacity to resist the attack from mites." (Authors)] Address: Mendoza-Cuenca, L. E-mail: lmendoza@lca.unam.mx

10176. Martens, A. (2010): New Odonata records from Atiu and Rarotonga, with an overview of the species known from the Cook islands. *Notulae odonatologicae* 7(6): 57-59. (in English) ["In September and October 1995, 6 species were collected at Atiu and 4 at Rarotonga. Of these 5 species are recorded for the first time from Atiu. The odonate fauna of the Cook Islands is poorly known; an island-annotated list of the hitherto recorded 9 species is presented." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, 76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

10177. Martinov, A.V.; Martinov, V.V. (2010): Distribution of *Cordulegaster bidentata* (Selys, 1843) (Odonata, Cordulegasteridae) in Ukraine. *Euroasian Entomological Journal* 9(2): 303-307. (in Russian, with English summary) [*C. bidentata* is widespread in mountainous and sub-mountainous regions of the Ukrainian Carpathian settling at altitudes between 400 - 1000 m a.s.l. It prefers habitats with low water temperature and a moderate water velocity, providing sedimentation of sand and small gravel, a prerequisite for larval development. It is also tolerant of anthropogenic loads and is therefore present in artificial water bodies. In general, the status of *C. bidentata* populations on the territory of Ukrainian Carpathian Mountains is considered by the authors as satisfactory. Since the majority of known populations occur within the boundaries of nature conservation sites, no additional protective measures are taken for necessary. All known localities are listed.] Address: Martinov, A.V., Dept. Gen. & Appl. Ent., Schmalhausen Inst. Zool. Natn. Acad. Sci., Khmelnytskygo 15, 01601 Kyiv, Ukraine

10178. Martinov, A.V. (2010): The Odonata fauna of the basin of the river Severskyi Donets in its middle current (Eastern Ukraine). *International Dragonfly Fund - Report* 31: 1-41. (in English) ["A list of 57 Odonata species from 108 localities recorded in the basin of the river Severskyi Donets in its middle range (Eastern Ukraine) is provided. This compilation includes literature and museum data as well as results from field surveys realized between 2001 and 2009. Annotations to the history of regional odonate research are made. Brief descriptions of typical dragonfly habitats in the floodplain of Severskyi Donets are presented. Locality wise notes on the reproductive status for most of the species are made." (Author)] Address: Martynov, A.V., Entomology Department, Schmalhausen Institute of Zoology NAS of Ukraine, Kyiv, Ukraine. Email: martynovav@ukr.net

10179. Matos, R. (2010): Analysis of biogeography of stream Botafogo, Presidente Prudente – Sao Paulo – Brazil. *Geotas, Departamento de Geografia da FCT/UNESP, Presidente Prudente* 10(1): 70-85. (in Portuguese, with English summary) [Limnological data of the main channel within the basin of the Botafogo stream system and water source are taken and discussed with emphasize on the implications resulting from urbaniza-

tion in this area. Odonata are treated at the family level.] Address: Matos, R., Grupo de Pesquisa Gestão Ambiental e Dinâmica Socioespacial (GADIS), Rua Roberto Simonsen, 305; rmatos789@gmail.com.

10180. Mauscherling, I.; Jödicke, K.; Neumann, C.; Winkler, C. (2010): Artenhilfsprojekt Grüne Mosaikjungfer und Kriebsschere in Dithmarschen. Bündnis Naturschutz in Dithmarschen e.V. (Hrsg.): Faltblatt, 6 pp. (in German) [Leaflet with a brief introduction into conservation tasks to protect habitats of *Aeshna viridis* and *Stratiotes aloides* in Schleswig-Holstein, Germany.] Address: Bündnis Naturschutz in Dithmarschen e.V., Meldorfer Str. 17, 25770 Hemmingstedt, Germany. E-mail: info@buendnis-dithmarschen.de

10181. Mikolajewski, D.J.; De Block, M.; Rolff, J.; Johansson, F.; Beckerman, A.P.; Stoks, R. (2010): Predator-driven trait diversification in a dragonfly genus: covariation in behavioral and morphological antipredator defense. *Evolution* 64(11): 3327-3335. (in English) ["Proof for predation as an agent shaping evolutionary trait diversification is accumulating, however, our understanding how multiple antipredator traits covary due to phenotypic differentiation is still scarce. Species of the dragonfly genus *Leucorrhinia* underwent shifts from lakes with fish as top predators to fishless lakes with large dragonfly predators. This move to fishless lakes was accompanied by a partial loss and reduction of larval spines. Here, we show that *Leucorrhinia* also reduced burst swimming speed and its associated energy fuelling machinery, arginine kinase activity, when invading fishless lakes. This results in patterns of positive phylogenetic trait covariation between behavioral and morphological antipredator defense (trait cospecialization) and between behavioral antipredator defense and physiological machinery (trait codependence). Across species patterns of trait covariation between spine status, burst swimming speed and arginine kinase activity also matched findings within the phenotypically plastic *L. dubia*. Our results highlight the importance of predation as a factor affecting patterns of multiple trait covariation during phenotypic diversification." (Authors)] Address: Mikolajewski, D.J., Laboratory of Aquatic Ecology and Evolutionary Biology, Katholieke Universiteit Leuven, Charles Debériotstraat 32, 3000 Leuven, Belgium. E-mail: d.j.mikolajewski@sheffield.ac.uk

10182. Mill, P.; Brooks, S.; Parr, A. (2010): 26. Dragonflies (Odonata) in Britain and Ireland. In: Maclean, N. (Ed.): *Silent Summer; The State of Wildlife in Britain and Ireland*. Cambridge University Press: 471-494. (in English) ["Although three species of dragonfly became extinct in Britain and Ireland in the 1950s, the outlook for most of the present resident species is favourable, providing that appropriate freshwater habitat is increased and pollution reduced. A number of species are extending their range northwards, mostly as a result of overall temperature increase, but at least one also as a result of reduction in river pollution. Three northern species are showing some sign of a retraction northwards of their southern range margins and this could lead to a serious problem if temperatures continue to rise. A further species currently restricted to the East Anglian coast is threatened by projected sea-level rise. According to IUCN criteria, of our 39 breeding species (17 zygopteran and 22 anisopteran) two are classed as 'endangered', four as 'vulnerable' and six as 'near threatened' in Britain. One of these 'near threatened' species is classed as 'vulnerable' in Ireland and Ireland

has a further species classed as 'vulnerable'. One resident species in Britain has become established only this century and a further two species have begun breeding on a regular basis and may become established as permanent residents in the near future.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

10183. Nationalpark Hainich (Hrsg.) (2010): Artenbericht 2009: Tiere, Pflanzen und Pilze im Nationalpark Hainich. Kenntnisstand zum 31.12.2009. Hrsg.: Nationalpark Hainich Verwaltung, Bei der Marktkirche 9. D-99947 Bad Langensalza. 135 pp: 24-25. (in German) [Thüringen, Germany; on pages 24-25, 44 Odonata species are listed.] Address: Nationalpark Hainich Verwaltung, Bei der Marktkirche 9. D-99947 Bad Langensalza

10184. Ngiam, R.W.J. (2010): *Heliogomphus* cf. *retroflexus* Ris, 1912, (Odonata: Anisoptera: Gomphidae), a possible new record for Singapore. *Nature in Singapore* 3: 221-225. (in English) [As pointed out in Ngiam et al 2011, the description of the larvae of this taxon and presented in this paper is not valid for *H. retroflexus* and refers to *Microgomphus chelifera*.] Address: Ngiam, R.W.J., National Biodiversity Centre, National Parks Board, 1 Cluny Road, Singapore 259569. E-mail: ngiamwenjiang@nparks.gov.sg

10185. Nordström, K.; Bolzon, D.; O'Carroll, D. (2010): Slow facilitation of small target motion responses. Abstracts of the 9th International Congress of Neuroethology, Salamanca (Spain) 2-7 August 2010. P 393: 617. (in English) [Verbatim: "Many insect species pursue small moving targets, e.g. the predatory dragonflies chase and capture small prey. To overcome the inherently limited resolution of the compound eye, many insects that pursue targets have developed acute zones. The optical specializations are accompanied by neural hardware giving selective responses to small targets. In the dragonfly lobula (3rd optic ganglion) small target motion detectors (STMD) respond to small moving targets (1-3°), with no response to larger bars or to wide-field stimuli (1,2). STMDs are exquisitely sensitive neurons, detecting targets with an effective neural contrast as low as 2% (3). This performance is especially impressive considering the ability to respond to small targets against moving backgrounds, and the lack of sustained responses to clutter within moving natural scenes. What mechanisms provide STMDs with a high-enough gain to allow responses to low-contrast targets, while still avoiding breakthrough responses to target-like features in natural backgrounds? It is possible that a summation mechanism plays a role, enabling responses to build up as targets move continuously across the receptive field. To investigate the presence of facilitation mechanisms, we record intracellularly from the recently characterized Centrifugal STMD1 (CSTMD1) (2,4). Its large centrifugal axon allows for more stable recordings than usual for STMDs. We show that CSTMD1 has a slow facilitation mechanism where responses continue to grow for several hundred milliseconds as targets move across the receptive field. This gives a partial explanation for the ability of STMDs to respond to low contrast targets: only continuous motion of a target with the correct spatiotemporal profile allows responses to continue to build up to maximum firing frequencies. References: 1. O'Carroll. 1993. *Nature* 362, 541. 2. Geurten, et al. 2007. *J Exp Biol* 210, 3277. 3. Nordström, et al. 2006. *PLoS Biol* 4, 378. 4. Bolzon,

et al. 2009. *J Neurosci* 29, 14143." (Authors)] Address: Nordström, Karin, Department of Neurosciences, Uppsala University, PO Box 593, 751 24 Uppsala, Sweden. E-mail: karin.nordstrom@neuro.uu.se

10186. Noskov, Yu.A.; Boyarisheva, E.A.; Belevich, O. E.; Yurchenko, Yu.A. (2010): Species sensitivity distribution of a freshwater Arthropoda community to the insecticide Esfenvalerate in the south of Western Siberia. *Eurasian Entomological Journal* 9(4): 583-589. (in Russian, with English summary) [The sensitivity of 18 insect larva species including *Sympetrum flaveolum* and *Lestes sponsa* to the pyrethroid insecticide Esfenvalerate is studied. The results of this study showed that the widely used laboratory test object *Daphnia magna* is ineffective to predict impacts of Esfenvalerate. The odonate species react less sensitive as *D. magna*.] Address: Noskov, Yu.A., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: yuranoskov@mail.ru

10187. Olberg, R.; Leonardo, A. (2010): Towards wireless monitoring of neural activity during dragonfly prey interception flights. Abstracts of the 9th International Congress of Neuroethology, Salamanca (Spain) 2-7 August 2010: 25. (in English) [Verbatim: "In response to an insect passing overhead, the foraging dragonfly takes off on an interception trajectory, aiming a point ahead of the flying prey. If the potential prey deviates in its flight path, the dragonfly corrects its own course so that the bearing to the prey is held constant, a strategy that ensures interception. During the foraging flight the dragonfly adjusts its head angle to maintain the prey's image centered on the dorsal fovea of its compound eye. Eight pairs of identified neurons are implicated in controlling the dragonfly's flight path as it intercepts its flying prey. These target-selective descending neurons (TSDNs) descend from the brain of the dragonfly to the thoracic ganglia. They show directionally selective responses to small objects moving relative to the dragonfly. Their receptive fields are located in the dorso-frontal quadrant of the visual field, the region that views prey during the foraging flight. Intracellular stimulation of any of these neurons evokes small adjustments in wing position and attitude. Details of the neural control of prey interception are not obvious. For example, because the dragonfly rotates its head to fixate the prey's image, the signal that indicates the prey's drift is probably very brief. In addition, the dragonfly must factor in its own head angle in determining the bearing of the prey. To more fully understand the neural underpinnings of this complex flight behavior, we are developing the means to monitor TSDN activity from a dragonfly in free flight. Extracellular TSDN activity will be recorded from the mesothoracic ganglion, amplified and transmitted from a lightweight telemetry chip mounted on the dragonfly. Neuronal activity will be correlated with the 3-dimensional trajectories of the dragonfly and its flying prey, reconstructed from high-speed video recordings. Our goal in this approach is to understand how visual information is translated into steering commands for interception in a freely flying insect." (Authors)] Address: Olberg, R.M., Department of Biological Sciences, Union College, Schenectady, NY 12308, USA. E-mail: olberg@union.edu

10188. Olberg, R.; Imler, E.; Seeman, S.; Shulman, D.; Worthington, A. (2010): The responses of target-selective descending neurons in the dragonfly to 3-dimensional object movements outdoors under blue sky.

Abstracts of the 9th International Congress of Neuroethology, Salamanca (Spain) 2-7 August 2010: 76. (in English) [Verbatim: "Dragonflies make their living by foraging on flying insects. Eight pairs of identified neurons are implicated in controlling the dragonfly's flight path as it intercepts its flying prey. These target-selective descending neurons (TSDNs) descend from the brain of the dragonfly to the thoracic ganglia. They show directionally selective responses to small objects moving relative to the dragonfly. Their receptive fields are located in the dorso-frontal quadrant of the visual field, the region that views prey during the foraging flight. When stimulated intracellularly with high-frequency, depolarizing current pulses, each of these neurons evokes small adjustments in wing position and attitude. To understand the behavior of the TSDNs under more natural environmental conditions, we studied their responses outdoors, under blue sky, to the movement of opaque white beads of three sizes (2, 4, and 8 mm) around the immobilized dragonfly. The bead movements were videotaped (100 frames/s) for 3-dimensional reconstruction of their paths. The extracellularly recorded TSDN spikes were sorted and correlated with bead positions and velocities. We recorded from dragonflies of two genera: *Aeshna* (which forages from continuous flight) and *Pachydiplax* (which takes off to forage from a perch). The outdoor recordings revealed several new properties of the neurons and their receptive fields, three of which are presented here. (1) Receptive fields are not identical between genera, a result that may be related to their markedly different foraging strategies. (2) Three-dimensional receptive field reconstruction showed that size selectivity varies with object distance. (3) The higher light levels and ambient temperatures outdoors resulted in TSDN spike rates of 900 Hz or greater, much higher than have ever been observed in laboratory experiments." (Authors)] Address: Olberg, R. M., Dept Biological Sciences, Union College, Schenectady, NY 12308, USA. E-mail: olberg@union.edu

10189. Outomuro, D.; Ocharan, F.J.; Herrero, F.; Pérez-Andueza, G. (2010): Primera cita de *Oxygastra curtisii* (Dale, 1834) para la provincia de Ávila (Odonata: Corduliidae). *Boletín de la Sociedad Entomológica Aragonesa* 46: 615-616. (in Spanish, with English summary) ["A new Spanish locality for the endangered *O. curtisii* is described. It constitutes the first record of the species from Ávila province and its highest recorded altitude in the Iberian Peninsula (1205 m a.s.l.). The Iberian distribution of the species is briefly discussed, with special reference to other, nearby populations." (Authors)] Address: Ocharan, F.J., Depto de Biología de Organismos y Sistemas, Univ. de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

10190. Outomuro, D. (2010): Patrones morfológicos latitudinales en poblaciones ibéricas de *Calopteryx* Leach, 1815 (Odonata, Calopterygidae): posibles causas ambientales y evolutivas. *Boln. Asoc. Esp. Ent.* 33(3-4) (2009): 299-319. (in Spanish, with English summary) ["Latitudinal morphological patterns in Iberian *Calopteryx* Leach, 1815 (Odonata, Calopterygidae) populations: possible environmental and evolutionary factors. - The morphological clines related with latitudinal or altitudinal gradients, generally caused by natural selection, can be modified by sexual selection, especially when it plays a major role in interpopulation divergence. Two species of *Calopteryx* damselflies [*C. virgo* merid-

ionalis, *C. xanthostoma*] were studied at three different latitudes in the Iberian Peninsula. Latitudinal patterns in size and secondary sexual traits were recorded. A modified converse Bergmann rule explains size patterns. Patterns in secondary sexual traits are better explained by a balance between sexual selection processes within and between the two species. These processes are influenced by latitudinal differences in relative abundances, in the sense that the most abundant species displaces the traits of the other species because of sexual interference, in order to reduce reproductive effort costs between species. Differences in relative abundances are supported by the distribution frequencies of both species in the Iberian Peninsula. The third Iberian species might cause a reinforcement polymorphism in one of the species studied." (Author)] Address: Outomuro, D., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo. 33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

10191. Outomuro, D.; Ocharan, F.J. (2010): *Gomphus simillimus* Sélys, 1840 (Odonata, Gomphidae) en la cuenca del Segura y el sur de la cuenca del Duero (SE y Centro de España). *Boln. Asoc. Esp. Ent.* 34(1-2): 245-248. (in Spanish) [All known records of *G. simillimus* in Spain are mapped. Current additions result from the river Segura basin and the south of the river Duero basin (SE and Central Spain).] Address: Outomuro, D., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo. 33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

10192. Parkinson, D. (2010): Plateau des Tailles: réponse positive des libellules suite aux travaux de restauration du projet LIFE. *Les naturalistes Belges* 91(3-4): 55-67. (in French, with English summary) [Belgium; "In peatlands of the southern slope of the plateau des Tailles, numerous water bodies were created during "plateau des Tailles" LIFE Nature project. Dragonflies found on restored sites were surveyed annually from 2006 to 2010. Following restoration's work, the number of dragonfly species recorded increased from 15 to 28. Several endangered species have expanded their range and their numbers. Through their response to the restoration works, the species studied show very different dispersal abilities and ecological requirements. Odonata are an excellent indicator taxonomic group to assess the quality of peatlands restoration." (Author)] Address: Parkinson, D., Les Floxhes, 4, 4160 Anthisnes, Belgium. E-mail: denis.parkinson@gmail.com

10193. Pinto, A.P.; Lamas, C.J.E. (2010): *Navicordulia aemulatrix* sp. nov. (Odonata, Corduliidae) from northeastern Santa Catarina State, Brazil. *Revista Brasileira de Entomologia* 54(4): 608-617. (in English, with Portuguese summary) ["*Navicordulia aemulatrix* sp. nov. from northeastern Santa Catarina State, Brazil. *Navicordulia aemulatrix* sp. nov. (holotype male deposited in MZSP: Brazil, Santa Catarina State, [São Bento do Sul municipality, 26°14'58"S, 49°22'59"W], [railroad station] Rio Vermelho, II.1952) is described and illustrated based on three males. The long cercus (2.9-3.2 mm) places this species in the longistyla-group together with *N. kiautai*, *N. longistyla* and *N. nitens* but it differs from them mainly by the shape of cercus, with carinated part occupying 0.33 of cercus total length, and also by dorsal, ventromedial and ventrolateral tubercles developed. An unusual process on tergal portion of prothorax is reported for the first time in *Navicordulia*. The rate of description of new species of South American 'Corduliidae' is dis-

cussed. A map with records of Atlantic Forest *Navicordulia* species and a list of Brazilian corduliids by state are also presented." (Authors)] Address: Pinto, A.P., Museu de Zoologia, Universidade de São Paulo, Av. Nazaré 481, Ipiranga 04263-000 São Paulo-SP, Brazil. E-mail: odonataangelo@hotmail.com

10194. Poulin, B.; Lefebvre, G.; Paz, L. (2010): Red flag for green spray: adverse trophic effects of Bti on breeding birds. *Journal of Applied Ecology* 47(4): 884-889. (in English) ["The expanding use of selective pest-control agents provides a unique opportunity to study food web interactions in the field while addressing major environmental issues. *Bacillus thuringiensis israelensis* (Bti) is the most commonly used microbial agent to control mosquitoes worldwide. Using breeding house martins *Delichon urbicum* as a model species, we assessed the effect of Bti spraying on foraging rates and chick diet prior to and during 3 years of Bti spraying in the Camargue, France. Some 9051 feeding flights and 14 857 prey items were recorded in the early, mid and late nesting season at up to three control and three treated sites. Breeding parameters were assessed during 1 year at two control and two treated sites. [...] Nematocera, Araneae and Odonata were taken significantly more often at control sites, whereas Hymenoptera (flying ants) accounted for a larger portion of the diet at treated sites (Table 2). ... Because Odonata and Araneae are favourite prey of swallows' nestlings (Foelix 1996; McCarty & Winkler 1999), and major predators of Nematocera (Foelix 1996; Corbet 1999), their lower intake at treated sites suggests an indirect effect of Bti treatments through the food web." (Authors)] Address: Poulin, Brigitte, Tour du Valat Research Center, Le Sambuc, 13200 Arles, France. E-mail: poulin@tourduvalat.org

10195. Principe, R.E.; Gualdoni, C.M.; Oberto, A.M.; Raffaini, G.B.; Corigliano, M.C. (2010): Spatial-temporal patterns of functional feeding groups in mountain streams of Córdoba, Argentina. *Ecología Austral* 20: 257-268. (in English) ["Trophic structure of benthic communities is influenced by the availability of food resources which indeed may be conditioned by stream size, shading and substrate. This study aims to analyze the distribution of macroinvertebrate Functional Feeding Groups in different habitats of mountain streams (Córdoba, Argentina) and to assess the environmental variables conditioning this distribution at the habitat level. Four streams were sampled in two hydrological periods (high and low discharge) and three benthic samples were taken in riffles and runs of coarse and fine substrate. Gathering collectors were dominant in most of the habitats, streams and periods except in riffles during the low water period in which filtering collectors dominated. At the habitat level, current velocity, substrate, abundance of macroalgae and twigs and leaves were the most important variables explaining functional feeding group distribution. Functional feeding group abundances varied in relation to the stream, the hydrological period and the habitat. The dominance of collectors demonstrates the importance of the role of this functional group and that fine detritus is the main food resource in these lotic ecosystems. The phenology and life history of the species, and the amount and type of organic matter retained in each habitat may explain the observed spatial-temporal patterns." (Authors) Odonata - including "*Progomphus* sp." are treated at the family level.] Address: Principe, Romina, Univ. Nacional de Río Cuarto, Depto de Ciencias Naturales, Río Cuarto, Pcia. de Córdoba, Argentina

10196. Reels, G. (2010): Dragonfly surveys in Hainan, China, 2007-2008. *Agrion* 14(2): 34-38. (in English) ["The first field trip (18-26 May 2007) centred on sites in and around Yinggeling Nature Reserve in central Hainan, with two days at Ganzaling Nature Reserve in southern Hainan. The next trip (17-23 June 2007) was to the Wanning region of southeast Hainan. This was followed by two trips to Wuzhishan Nature Reserve (16-23 April and 8-14 August 2008); the latter trip also involving sites between Wuzhishan and Wanning, and in the Wanning region. In total, 28 days of field work were conducted, and 98 species recorded (vouchered, photographed, or, in the case of common and easily-recognised species, unambiguously sighted). Four species had not previously been found in Hainan (the first three of these were reported by Wilson et al., 2008): *Lestes praemorsus*, *Rhyothemis obsolescens*, *R. pluto* and *Zyxomma petiolatum*. New locality records were made for five interesting species previously known from only a single location in Hainan: *Rhinagrion hainanense* and *Nannophyopsis clara* (first reported by Wilson & Reels, 2001) *Dysphaea gloriosa* and *Rhipidolestes cyanoflavus* (first reported by Wilson et al., 2008), and *Hylaeothemis clementia* (unpublished; Dragonfly surveys in Hainan, China, 2007-2008 Graham Reels one male collected by Bosco Chan at Yinggeling, 2005; det. by G.T. Reels – the first specimen of this genus for China). By an extraordinary coincidence, a female specimen of a new *Sinosticta* species that was subsequently named *S. sylvatica* Yu & Bu, 2009, was collected by team member Hilario Padilla on the same date (25 May 2007) that Yu Xin, working completely independently, collected the first of his two males, and both records were made in Yinggeling, by groups unaware of each other's existence! The following year, I found this species to be quite common around Wuzhishan." (Author)] Address: Reels, G., H-3-30 Fairview Park, Yuen Long, Hong Kong. E-mail: gtreels@gmail.com

10197. Relyea, R.A. (2010): COS 53-2: New effects of Roundup® on amphibians: Predation, stratification, and induction of tadpole morphology. The 95th ESA Annual Meeting (August 1-6, 2010): (in English) [Verbatim: "Background/Question/Methods: To understand the impacts of anthropogenic chemicals on natural communities, we often must base our predictions on short-term, single-species tests that are conducted as part of the regulation process. While a valuable first-step, these tests tell us little about the impacts of contaminants under more natural conditions. Thus, many ecotoxicologists have moved to testing contaminants under more natural conditions where natural stressors are abundant. Among the many natural stressors, predator stress is a common one whose interactions with pesticides have only been examined under laboratory conditions. Using two mesocosm experiments, I examined how predation stress interacted with the effects of Roundup®, the most widely applied herbicide in the world. The first experiment, conducted with three spring-breeding species of anurans, crossed four concentrations of Roundup with the presence of no predators, caged adult newts, or caged dragonfly larvae. The second experiment, conducted with three species of summer-breeding anurans, crossed four concentrations of Roundup with the presence of no predators, caged dragonfly larvae, or lethal dragonfly larvae. Results/Conclusions: In the first experiment, Roundup and the caged-predator treatments had interactive effects on

tadpole survival, mass, and relative morphology. Increased herbicide concentrations caused increased tadpole mortality, but the amount of mortality decreased in the presence of caged dragonflies. Tadpole mass exhibited little effect of the herbicide when no predators or caged newts were present, but mass declined with higher herbicide concentrations when caged dragonflies were present. Not surprisingly, the cues from caged dragonflies induced adaptive morphological changes in the tadpoles. What was surprising is that the herbicide induced the same morphological changes in the tadpoles as the larval dragonflies. In the second experiment, Roundup and the predator treatments also had interactive effects. Increased herbicide concentrations again caused increased mortality and the amount of mortality again declined with caged dragonflies. With lethal dragonflies, however, there mortality was reduced similarly across all herbicide concentrations. Tadpole mass increased with higher herbicide concentrations when predators were absent, was unaffected by the herbicide when caged dragonflies were present, and decreased with higher herbicide concentrations when lethal dragonflies were present. Once again, the morphology of the tadpoles was induced similarly by caged dragonflies and the herbicide. Collectively, these results suggest that the effects of Roundup on larval amphibians can differ tremendously depending on community context. Moreover, the herbicide is somehow able to induce anti-predator responses." (Author)] Address: Relyea, R.A., Dept Biol. Sci., Univ. of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

10198. Righi-Cavallaro, K.O.; Roche, K.F.; Froehlich, O.; Cavallaro, M.R. (2010): Structure of macroinvertebrate communities in riffles of a Neotropical karst stream in the wet and dry seasons. *Acta Limnologica Brasiliensia* 22(3): 306-316. (in English, with Portuguese summary) ["Aim: Our study evaluated the effects of physical and chemical variables and seasonality on diversity and structure of the macroinvertebrate fauna in riffles of a Neotropical chalk stream; Methods: Sampling was performed during the dry (September 2003) and rainy (March 2004) seasons, in five sites. Five samples were taken at each point with a Surber sampler. Physical and chemical variables were also evaluated; Results: Temperature, pH, orthophosphate and total nitrogen were very similar for both seasons, while riffle length, conductivity, alkalinity, ammonia, phosphorus and leaf litter had different values. The total number of organisms collected was 25114 belonging to at least 50 families. Insects dominated in the samples. The highest abundance was found for the dry period. Temporary stretches were sampled in rainy season in order to complement the faunal inventory; Conclusions: The environmental seasonality was an important factor for structuring the macroinvertebrate fauna, with a significant difference between the invertebrate compositions in the sampling periods. The results of this study demonstrate the influences of seasonality on the temporal variation of communities." (Authors) Odonata are treated at the family level.] Address: Righi-Cavallaro, Karina, Departamento de Biologia, Faculdade de Filosofia, Ciências e Letras, Universidade de São Paulo – USP, Av. Bandeirantes, 3900, CEP 14040-901, Ribeirão Preto, SP, Brazil. E-mail: karina.righi@gmail.com

10199. Roland, H.-J. (2010): Schlupfphänologie von *Anax imperator* und *A. parthenope* an einem Braunkohlerestloch in der Wetterau (Odonata: Aeshnidae). *Libel-*

lula 29(3/4): 143-154. (in German, with English summary) ["Between 06-vi-2010 and 11-x-2010, at an open-cast brown coal mining lake 35 km north of Frankfurt on the Main, 937 exuviae of *A. imperator* and 1026 of *A. parthenope* were collected. By the use of these systematically taken data, emergence charts were produced that allow the comparison of both species. While the emergence chart for *A. imperator* had one peak, the one for *A. parthenope* was double-peaked during the emergence period. The size of *A. imperator* exuviae fluctuated during the emergence period, while *A. parthenope* showed a clear trend of increasing in size until the first emergence peak and stayed at a high level from then on." (Author)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

10200. Roland, H.-J. (2010): Haltbarkeit von Anax-Exuvien am Ort der Emergenz (Odonata: Aeshnidae). *Libellula* 29(3/4): 231-240. (in German, with English summary) ["In the context of a systematic collection of exuviae at an open-cast mining lake in the Wetterau, Hesse, Germany, it was noted that exuviae of *Anax imperator* and *A. parthenope* were able to remain for many months, until the emergence period of the following year, at their emergence sites. The prerequisite is that the imagines have emerged fixed to a substrate that does not alter during that time. In many cases it will be impossible to tell whether an exuvia has been hanging at a site for three days or three weeks. Hence, phenological statements based on records of exuviae are only possible when the monitoring is conducted at short intervals." (Author)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

10201. Rümpler, F.; Peter, H.-U. (2010): Der ehemalige Truppenübungsplatz "Jenaer Forst" - Erfolgskontrolle landschaftspflegerischer Maßnahmen. *Landschaftspflege und Naturschutz in Thüringen* 47(3): 118-133. (in German) [Seven Odonata species are listed and briefly discussed. Special emphasis is given to the regionally rare *Orthetrum brunneum*.] Address: Rümpler, F., Friedrich-Schiller-Univ. Jena, Inst. für Ökologie, Dornburger Str. 159, 07743 Jena, Germany. E-mail: Florian.Ruemppler@gmx.de

10202. Sánchez, M.; Realpe, E.; Salazar, C. (2010): A Neotropical polymorphic damselfly shows poor congruence between genetic and traditional morphological characters in Odonata. *Molecular Phylogenetics and Evolution* 57(2): 912-917. (in English) ["The Neotropical damselfly genus *Polythore* consists of nineteen described morphospecies. We used the COI barcode locus (799bp), male genitalia, wing venation, and geometrical pattern variation to clarify specific status in four *Polythore procera* populations in the Andean foothills of Colombia. Morphological data corroborates that all populations are *Polythore procera*, but molecular data suggests two well-supported reciprocal monophyletic clades. A high genetic divergence (3%) was observed between them, and different degrees of gene flow were estimated by MDIV among populations. Our results support a recent (1.4 mya) possible speciation with morphological stasis where unknown reproductive mechanisms may be involved." (Authors)] Address: Sánchez Melissa, Laboratorio de Zoología y Ecología Acuática, Universidad de los Andes, Cr 1 No 18A - 10 J307. Tel: (571)-3394949 ext. 2765. Bogotá, Colombia. E-mail: melsanc@gmail.com

10203. Schweighofen, W.; Hochebner, T.; Rotheneder, G. (2010): *Lestes macrostigma* im westlichen Niederösterreich (Odonata: Lestidae). *Libellula* 29(3/4): 175-182. (in German, with English summary) ["During the summer of 2010, *L. macrostigma* was recorded in the Alpine foothills of Lower Austria for the first time. A maximum of three pairs, exhibiting reproductive behaviour, was observed. The conditions of the habitat are characterised, potential migration paths are discussed, and the reproductive behaviour of one pair is depicted in detail." (Authors)] Address: Schweighofen, W., Ötscherblick 10, 3661 Artstetten, Austria. E-mail: wolfgang.schweighofer@schule.at

10204. Sharma, G. (2010): Studies on the reproductive behaviour of *Ischnura aurora* (Brauer) (Odonata: Insecta) around Dholbaha Dam (Punjab Shivalik), India. *Biological Forum* 2(1): 6-8. (in English) ["Courtship is well marked and male demonstrate a circular territory with a radius of about 30-50cm. The courtship wheel lasts for about 15-18 minutes performed by perching on vegetation. Oviposition is endophytic among the aquatic vegetation and lasts for 15-20 minutes. The duration of reproductive behaviour lasts for 50-85 minutes." (Author)] Address: Sharma, G., Zoological Survey of India (Ministry of Environment and Forests), Post-Jhalamand, Pali Road, Jodhpur, (RJ) India

10205. Sites, R.W.; Vitheepradit, A. (2010): Recovery of the freshwater lentic insect fauna in Thailand following the tsunami of 2004. *The Raffles Bulletin of Zoology* 58(2): 329-348. (in English) ["The tsunami of 26 December 2004 inundated the coastlines of many Southeast Asian countries, including Thailand. The force of the surge was devastating to the extent that hundreds of thousands of humans were killed, whereas the effect on non-human biota, including insects, remains largely unreported. Along the Andaman Sea coastline of Thailand, we sampled lentic (pond) habitats within the area directly affected by the tsunami and other reference ponds slightly inland to determine the rate and trajectory of community recovery following extirpation. Our first samples were taken five months after the tsunami, which marked the end of a dry season. By that time, many impacted ponds already had substantial freshwater recharge through rainfall, and conductivity had fallen to approximately 10% that of seawater. An insect community with a mean richness of 20 taxa was present already, whereas the unaffected inland ponds had a mean richness of 27 taxa. Insect tolerance to salinity in general appears to be greater and taxonomically more widespread than previously considered. Three additional sampling periods were spaced over the next 12 months. Two-way ANOVA tests for species richness among higher taxa revealed significant differences among sampling periods for total Insecta and four orders separately (Odonata, Hemiptera, Coleoptera, and Diptera), and six subordinate taxa (Anisoptera, Zygoptera, Gerridae, Notonectidae, Dytiscidae, and Chironomidae). Patterns of species richness in impacted ponds across sampling periods were evaluated with Discriminant Function Analysis separately using ordinal and family richness values. Using ordinal richness values, 55.0% of the ponds were classified to the correct sampling period, whereas when using family richness values, 92.5% of the ponds were classified correctly. A parsimony analysis was performed to evaluate community succession and recovery trajectory. Numerous tangential trajectories are evident, suggesting that the

communities of the impacted ponds are not assembling toward the taxonomic composition of the unaffected ponds, but to one or more alternative stable states. Taxonomic composition was evaluated also by clustering Jaccard's Similarity scores. On each of the four sampling dates and overall, fidelity of pond type based on the taxonomic composition is distinct, suggesting that the community in the impacted ponds has not demonstrated any signs of shifting toward that of the unaffected ponds. In addition to the evaluation of inundated and unaffected pond communities, a series of peat swamps that had been collected in 1994 and 1995 were resampled to obtain comparable post-tsunami data. We found only 16 of the 33 taxa previously recorded and substantially fewer individuals." (Authors) Only odonate morphospecies are listed.] Address: Sites, R.W., Enns Entomology Museum, Division of Plant Sciences, University of Missouri, Columbia, Missouri 65211, USA. E-mail: sitesr@missouri.edu

10206. Sivtseva, L.V. (2010): New data on the dragonfly fauna (Odonata) of central Yakutia. Euroasian entomological Journal 9(2): 295-298. (in Russian, with English summary) [Russia; 28 species are recorded including new regional records: *Coenagrion glaciale*, *Nihonogomphus ruptus*, *Somatochlora exuberata*, *S. graeseri*.] Address: Sivtseva, L.V., Institute of Biological Problems of Cryolithozone, Lenina ave. 41, Yakutsk 677980 Russia. E-mail: sivtseval@mail.ru

10207. Stauer, M. (2010): Beobachtungen zur Mortalität wandernder *Sympetrum striolatum* und *S. vulgatum* an einem Autobahnzubringer im Nordburgenland (Odonata: Libellulidae). *Libellula* 29(3/4): 183-196. (in German, with English summary) ["Studies of the traffic mortality of insects have been restricted so far to the investigation of road kills. In this study a different research approach has been used to quantify the relative traffic risk for dragonflies. During the morning hours of four days a total of 906 Darters (*S. vulgatum* and *S. striolatum*) were counted whilst they were crossing a state dual carriageway which was heavily used by vehicles. Most dragonflies moved when temperatures reached 25°C. All days showed a traffic risk of 5.9 to 7.6 % due to collisions with vehicles or their airstreams. The collision rate was highest within 50-60 Minutes from the beginning of the first flight activities of the respective day and decreased to zero after 100 minutes." (Author)] Address: Stauer, Martina, Dept für Biodiversität der Tiere, Fak. für Lebenswissenschaften, Univ. Wien, Rennweg 14, 1030 Wien, Austria. E-mail: mstauer@web.de

10208. Stauer, M.; Holusa, O. (2010): First record of *Cordulegaster heros* in the Czech Republic, with notes on *Cordulegaster* spp. in southern Moravia (Odonata: Cordulegasteridae). *Libellula* 29(3/4): 197-204. (in German, with English summary) ["On 19-VIII-2009 a dead female of *C. heros* was found in Buchlovický stream in Buchovice village in the Chřiby hills of the Czech Republic. The potential occurrence of permanent populations of *C. heros* and records of other *Cordulegaster* species in southern Moravia are discussed." (Authors)] Address: Stauer, Martina, Dept für Biodiversität der Tiere, Fak. für Lebenswissenschaften, Univ. Wien, Rennweg 14, 1030 Wien, Austria. E-mail: mstauer@web.de

10209. Stephan, U. (2010): Mitgliederversammlung am 17. April 2010 in Kißlegg. *mercuriale* 10: 57-60. (in German) [Report on the meeting of the regional dragonfly society for the Federal State Baden-Württemberg,

Germany.] Address: Stephan, Ulrike, Im Westengarten 12, 79241 Ihringen, Germany

10210. Stollard, J.; Stollard, J. (2010): Damsels and Dragons. *The Wood Duck* 63(8): 175-176. (in English) [Ontario, Canada; brief introduction into Odonata systematics and who to observe dragonflies.] Address: Stollard, J. E-mail: jjstollard@sympatico.ca

10211. Strobbe, F.; McPeck, M.A.; De Block, M.; Stoks, R. (2010): Fish predation selects for reduced foraging activity. *Behav. Ecol. Sociobiol.* 65(2): 241-247. (in English) ["Despite the importance of foraging activity for the growth/predation risk trade-off, studies that demonstrated predator-induced survival selection on foraging activity under semi-natural conditions are relatively rare. Here, we tested for fish-induced selection for reduced foraging activity in two larval *Enallagma* damselflies using a field enclosure experiment. Fish imposed considerable mortality in both damselfly species and survival selection on foraging activity could be detected in *Enallagma geminatum*. We did not detect selection in *Enallagma hageni*, probably because this species already was not eating very much in the absence of fish compared to *E. geminatum*. Both species responded strongly to the presence of predators by reducing their foraging activity. The documented survival selection on foraging activity was detected despite the already low activity levels in fish lake prey species and despite strong predator-induced plasticity in this trait." (Authors)] Address: Stoks, R., Department of Biology, Laboratory of Aquatic Ecology and Evolutionary Biology, University of Leuven, Ch. Debériotstraat 32, 3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.be

10212. Tamm, J. (2010): Keineswegs nur braun: Vom blauen Fleck an der Flügelbasis von *Sympetma fusca* (Odonata: Libellulidae). *Libellula* 29(3/4): 241-246. (in German, with English summary) ["Males of *S. fusca* have been observed spreading and whirring their wings immediately before copulation. During this behaviour the light blue patches on the wing bases, which are present in both sexes in spring time, conspicuously became visible. The colour patches are virtually invisible in the normal perching position, in which the wings are folded above the abdomen. These colour patches might be used as a precopula signal inviting the female to accept the partner." (Author)] Address: Tamm, J., Elgershäuser Str. 12, 34131 Kassel, Germany. E-mail: jochen.tamm@t-onl.jne.de

10213. Tang, H.B.; Wang, L.K.; Mmalainen, M. (2010): A photographic guide to the dragonflies of Singapore. Raffles Museum of Biodiversity Research. ISBN 981 0861551: 222 pp. (in English) [All 124 species currently found in the country are covered and almost all are illustrated in brilliant colour photographs. There are additional chapters covering Odonata taxonomy, morphology, ecology and conservation and tips on where to find and how to study them.] Address: <http://rmbur.nus.edu.sg>

10214. Torralba-Burrial, T.; Outomuro, D.; Alonso-Naveiro, M. (2010): Teratología alar en *Sympetrum flaveolum* (Linnaeus, 1758) (Odonata: Libellulidae). *Boletín de la Sociedad Entomológica Aragonesa* 46(1): 583-584. (in Spanish, with English summary) [A teratology involving the apical area of the left forewing of a *Sympetrum flaveolum* male is described.] Address: Outomuro, D., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo. 33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

10215. Trapero-Quintana, A.; Reyes-Tur, B.; Mateu-Arebalo, J. (2010): Distancia sobre el agua durante la emergencia en larvas de Odonata para tres cuerpos dulceacuicolas de Cuba Oriental. *Dugesiana* 17(2): 103-111. (in Spanish, with English summary) ["The distance reached over the water surface at the time of emergence by species of Odonata in three ecosystems from the Santiago de Cuba province, was estimated. A positive correlation between height and species size was found in the three localities. The greater heights were registered in Guásima and Arroyo, the best conserved areas and with a few stressing elements. In general, anisopterans reached the superior heights, whereas zygopterans tend to be close to the water surface. Females reached major heights than the males." (Authors)] Address: Trapero-Quintana, A., Universidad de Oriente. Depto de Biología. Patricio Lumumba s/n 90500. Santiago de Cuba, Cuba. E-mail: atrapero@cint.uo.edu.cu

10216. Villanueva, J.R.; Mohagan, A.B. (2010): Diversity and Status of Odonata across Vegetation Types in Mt. Hamiguitan Wildlife Sanctuary, Davao Oriental. *Asian Journal of Biodiversity* 1(1): 35-45. (in English) ["Diversity and status of Odonata in Mt. Hamiguitan Wildlife Sanctuary was determined after a year of sampling in five vegetation types: agroecosystem (400 masl), dipterocarp (900 masl), montane (1200 masl), mossy (1400 masl) and pygmy (1600 masl) using 2-Km transect walk sampling to provide information on species richness trend and ecological status of Odonata. Study showed 31 species with 94% endemism for damselflies and 33.3% for dragonflies. Species richness and endemism were low in agroecosystem $H' = 0.631$ and 1 endemic; high and increasing in the dipterocarp $H' = 2.298$ and 4 endemic to dense montane forest with $H' = 3.056$ and 18 endemic; decreasing in mossy $H' = 2.036$ and pygmy $H' = 1.846$. The effects of disturbance on diversity showed highest in agroecosystem ($d = 83\%$), mossy and pygmy had intermediate value $d = 27\%$ and $d = 24\%$. Low disturbance was observed in Montane $d = 10\%$, dipterocarp $d = 18.5\%$. Bray-curtis similarity index for species composition showed four discernible clusters of habitats. Results suggest that Odonata has preference for dense forest, undisturbed vegetation, optimum temperature and presence of aquatic habitat." (Authors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

10217. Waldhauser, M. (2010): Faunistic records of dragonflies (Odonata) from the Czech Republic. *Sborník referátů XIII. celostátního semináře odonatologů v Podyjí*: 59-71. (in Czech, with English summary) [The paper documents species that are protected by law, rare or regionally significant: *Sympetma paeidisca*, *Coenagrion lunulatum*, *C. scitulum*, *Brachytron pratense*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Somatochlora flavomaculata*, *S. arctica*, *S. alpestris*, *Orthetrum albistylum*, *Sympetrum depressiusculum*, *S. meridionale*, *S. pedemontanum*, *Leucorrhinia albifrons*, *L. pectoralis*, *L. rubicunda*.] Address: Waldhauser, M., Správa CHKO Lužické hory, Školní 12, Jablonné v Podještědí, CZ 47 125. Czech Republic. E-mail: martin.waldhauser@nature.cz

10218. Waldhauser, M.; Mikat, M.; Dolny, A. (2010): *Coenagrion ornatum* (Sélys, 1850) (Odonata, Coenagrionidae) distribution and ecology in the Czech Republic – new information based on records in 2010.

Sborník referátů XIII. celostátního semináře odonatologů v Podyjí: 91-107. (in Czech, with English summary) ["The distribution of *C. ornatum* in the Czech Republic is far more extensive than considered up to 2009. Before 2008 only one recent population from the Piletický brook watershed and five historical records from Bohemia and Moravia were known. In 2009 twenty-five new localities with *C. ornatum* were discovered. Thirty-five new localities with *C. ornatum* were discovered in 2010. These localities are distributed in Bohemia as well as in southern Moravia which means further confirmation of this species distribution within the whole area of Moravia and Silesia. Furthermore, three localities with larvae occurrence were discovered in Bohemia. The new *C. ornatum* localities are situated mostly in open farmland or mining areas at altitudes below 250 m a.s.l. *C. ornatum* prefers sunny parts of brooks and amelioration ditches with lush littoral vegetation (e.g. *Sparganium erectum*, *Veronica beccabunga*, *Potamogeton* spp., *Berula erecta*). However, it also occurs along degraded and regulated sections of the streams where the vegetation is dominated by *Phalaris arundinacea* and *Urtica dioica*." (Authors)] Address: Waldhauser, M., Správa CHKO Lužické hory, Školní 12, Jablonné v Podještědí, CZ 47 125, Czech Republic. E-mail: martin.waldhauser@nature.cz

10219. Wesolek, B.E.; Genrich, E.K.; Gunn, J.M.; Somers, K.M. (2010): Use of littoral benthic invertebrates to assess factors affecting biological recovery of acid- and metal-damaged lakes. *Journal of the North American Benthological Society* 29(2): 572-585. (in English) ["Biological recovery of aquatic ecosystems from acidification damage is a slow process. In lakes near the massive Cu and Ni smelters in Sudbury, Canada, the delays might be caused by residual metals, habitat damage, altered predator-prey interactions, or other persistent ecological stressors. Assessments of benthic invertebrate communities in 24 Sudbury lakes were conducted to evaluate the relative importance of these delaying factors" (The analysis includes Odonata which are treated at the order level). "At the time of sampling, all lakes had chemically recovered to a pH >6.0, but they varied widely in the duration of time above this threshold and in current metal concentrations, watershed contributions of organic matter, littoral habitat composition, and fish community composition. A model developed with redundancy analyses (RDA) of 4 groups of environmental variables (i.e., water chemistry, fish communities, physical lake descriptors, and littoral habitat) accounted for 74.9% of the variance in benthic invertebrate community metrics across these environmental gradients. Fish species richness, duration of pH recovery, and % boulder habitat were the most significant variables and explained 22%, 9%, and 8% of the variance in benthic invertebrate community metrics, respectively. Damaged systems clearly need sufficient time to recover from severe disturbances. However, our study suggests that remediation techniques, such as manipulation of predator-prey interactions through fish introductions, might speed the recovery of benthic invertebrate communities." (Authors)] Address: Wesolek, B.E., Cooperative Freshwater Ecology Unit, Biology Dept, Laurentian Univ., 935 Ramsey Lake Road, Sudbury, Ontario, Canada, P3E 2C6. E-mail: bxwesolek@laurentian.ca

10220. Yakubovich, V.S. (2010): First record of the dragonfly *Orthetrum albistylum speciosum* (Uhler, 1858)

(Odonata: Libellulidae) from Khabarovskii Krai. Far Eastern Entomologist 219: 11-12. (in English) [Russia: Khabarovskii krai, vicinity of Khabarovsk: Bolshchekhtsirsky State Nature Reserve, mouth of Chirki River; 48°X11'4" N, 134°X40'5" E, 6-8.VII 2009, 6 males, 2 females (V. Yakubovich); vicinity of Korfovskii, 48°X12'5"N, 135°X2'7" E, 21.VI 2008, 1 female (V. Yakubovich); vicinity of Chernaya Rechka, 48°X27'1" N, 135°X18'2" E, 30.VI 2010, 2 males (V. Yakubovich).] Address: Yakubovich, V.S., Dept of Biology, Far Eastern Medical University, Murav'ev-Amursky Street 35, Khabarovsk 680000, Russia. E-mail: Presid11@mail.ru

10221. Yu, W.-y.; Li, Z.-h.; Huan, G.c.; Lu, J. (2010): On fauna and diversity of Odonata in Nanjing, Jiangsu province. Resources and Environment in the Yangtze Basin 19(5): 514-521. (in Chinese, with English summary) [43 (+ 2 taxa) Odonata species were caught between 2005 to 2008 at seven localities near Nanjing, China. The characteristic of the fauna is that Oriental species take the most part. There are 13 species belonging to Oriental, which accounted for 28.89% in total. Palearctic species, which accounted for 11.11% in total. Calculating species richness (S), species composition similarity (Cs) and species diversity index (H' / H) for the seven habitats showed that the species richness decreased in the following sequence: Zijin Mountain (30) = Lao Mountain (30) > Jianguan Mountain (24) > Jiangxinzhou Alluvion (19) > Fang Mountain (18) > Donglu Mountain (13) > Jinniu Lake (9); the species diversity decreased in a different sequence: Jianguan Mountain (2.9298) > Zijin Mountain (2.9150) > Lao Mountain (2.7258) > Fang Mountain (2.6574) > Jiangxinzhou Alluvion (2.5478) > Donglu Mountain (1.9025) > Jinniu Lake (1.6700). The dragonfly species composition between Fang Mountain and Donglu Mountain had the highest similarity (0.7742), while Jinniu Lake and Lao Mountain had the lowest similarity (0.4103).] Address: Yu, W.-y., Dept of Life Science, Nanjing Xiaozhuang College, Nanjing 211171, China

10222. Zessin, W.; Brauckmann, C. (2010): *Aulertupus tembrocki* n. gen. et sp. (Odonatoptera: Meganisoptera: Aulertupidae n. fam.) aus dem Ober-Karbon von Mazon Creek, Illinois (USA). Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 13(2): 36-43. (in German, with English summary) [Along "Oligotypus makowskii" Carpenter & Richardson, 1971 and *Paralogopsis longipes* Handlirsch, 1911, *Aulertupus tembrocki* gen. n., sp. n. is the third giant dragonfly sp. (Meganisoptera) from the famous nodules of Westphalian C/D (Moscovian) age of the Mazon Creek collection sites in Illinois, USA, which is described and illustrated on adults. It is assigned here to Aulertupidae fam. n. The 3 recently described additional species from the same locality (Kukalová-Peck 2009) are based on larvae and cannot be grouped on family level." (Authors)] Address: Zessin, W., Lange Str. 9, 19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

10223. Zessin, W. (2010): Kurzfassungen der Vorträge auf der Tagung des Entomologischen Vereins Mecklenburg am 13. März 2010 im Natureum am Schloss Ludwigslust. Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 13(2): 64-68. (in German) [A cooperation of the Ent. Ver. Meckl.-Vorp. with three odonatological societies is mentioned.] Address: Zessin, W., Lange Str. 9, 19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

10224. Zessin, W. (2010): Die Kleine Königslibelle (Odonata: Aeshnidae: *Anax parthenope*) neu am Waldsee in Kraak, Landkreis Ludwigslust, Mecklenburg. Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 13(2): 69-70. (in German) [Germany; a record of *A. parthenope* at 2-VIII-2010 is documented and discussed.] Address: Zessin, W., Lange Str. 9, 19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

2011

10225. Abbott, J.C. (2011): Dragonflies and Damselflies (Odonata) of Texas. Odonata Survey of Texas. Vol. 5: 323 pp. (in English) ["This is the fifth volume of the Dragonflies and Damselflies (Odonata) of Texas to be published and serves as an update of records including all those reported in 2010. As with earlier volumes, this book is meant to serve as a guide to the distributions and seasonality of all 238 species occurring in the state. The interest in dragonflies and damselflies in North America, and Texas specifically, continues to grow as does our knowledge of the fauna. Judging by the increasing number of records submitted since 2005, The Odonata Survey of Texas (OST) appears to be a success. I hope this volume continues to increase interest and excitement for the Odonata fauna in Texas." (Author) These compilation of data is organised in the following chapters: Statistical Summary of Odonata in Texas (page 1), Abundance & Distribution of Texas Odonata (page 3), Diversity of Texas Odonata by County (page 4), Checklist of Dragonflies & Damselflies of Texas (page 5), Dragonflies and Damselflies of Texas Conservation Ranks (page 8), Seasonality of Odonata in Texas (page 12), Dragonflies & Damselflies of Texas Listed by County (page 29), Distribution Maps of Texas Odonata (page 69), Appendix: Collection Guidelines for the Odonata Survey of Texas (page 308), The Dragonfly Society of the Americas Guidelines for Collecting (page 309), Specific Collecting & Preservation Instructions (page 311), Guidelines for Field Notes & Data Recording (page 313), Odonata Field Guides, Resources, Societies, & Suppliers (page 316), Glossary of Terms Relating to Odonata (page 318), and Index to Maps (page 320)] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

10226. Abbott, J.C.; Hibbits, T.D. (2011): *Cordulegaster sarracenia*, n. sp. (Odonata: Cordulegasteridae) from east Texas and western Louisiana, with a key to adult Cordulegasteridae of the New World. Zootaxa 2899: 60-68. ["*C. sarracenia* is described from spring seepages in pitcher plant bogs of southeast Texas and western Louisiana. It is most closely related to *C. sayi* of the *C. diastatops* group. It is unique among all North American species of its genus in having the mesepimeral and metepimeral stripes distinctly paler than the mesepisternal stripes in combination with yellow bands on S3-8 that are interrupted middorsally by the carina." (Authors)] Address: Abbott, J.C., Curator of Entomology, Texas Natural Science Center, Brackenridge Field Laboratory, Univ. of Texas at Austin, 2907 Lake Austin Blvd., Austin, Texas 78703, USA. E-mail: jcabbott@mail.utexas.edu

10227. Anjos-Santos, D.; Carricio, C.; Costa, J.M.; Santos, T.C. (2011): Description of the final instar larvae of *Acanthagrion gracile* (Rambur) and *Acanthagrion lancea* Selys (Odonata: Coenagrionidae). Zootaxa

2832: 44-50. (in English) ["The final instar larvae of *A. gracile* and *A. lancea* are described and illustrated based on reared specimens from Rio de Janeiro and Espírito Santo States, Brazil, being compared with the other known larvae of this genus." (Authors)] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

10228. Aura, C.M.; Raburu, P.O.; Herrmann, J. (2011): Macroinvertebrates' community structure in Rivers Kipkaren and Sosiani, River Nzoia basin, Kenya. *Journal of Ecology and the Natural Environment* 3(2): 39-46. (in English) [From December 2006 to May 2007 seven sites were sampled for macrozoobenthos. A total of 1499 macroinvertebrates belonging to 13 orders, 28 families and 31 genera were collected. The taxa list includes "*Aeschenia* sp., *Gomphus* sp., *Agrion* sp.".] Address: Aura, C.M., Kenya Marine and Fisheries Research Institute, P.O. Box 81651-80100, Mombasa, Kenya. E-mail: auramulanda@yahoo.com

10229. Barry, M.J. (2011): Effects of copper, zinc and dragonfly kairomone on growth rate and induced morphology of *Bufo arabicus* tadpoles. *Ecotoxicology and Environmental Safety* 74(4): 918-923. (in English) ["It is well documented that many amphibian species can detect chemical signals from predatory invertebrates and subsequently develop alternate phenotypes that are protective against predation. The effects of metallic pollutants on the development of predator-induced morphology have not previously been reported. Tadpoles of the Arabian toad *Bufo arabicus* were exposed for 20 days to copper (0, 10 or 100 µg/L), zinc (0, 10 or 100 µg/L) and kairomones of larval dragonflies (*Crocothemis erythraea* 1 dragonfly/12 L) in a fully crossed design. The effects of these treatments of growth and body shape were measured. Measured copper concentrations after 24 h were 4.25 µg/L±1.30 (10 µg/L nominal) and 34.9 µg/L±2.15 (100 µg/L nominal). Measured zinc concentrations were 3.04 µg/L±0.1 (10 µg/L nominal) and 26.3 µg/L±12.3 (100 µg/L nominal). Tadpoles exposed to 34.9 µg/L copper were significantly lighter and had a shorter body length than other groups. There was no direct effect of zinc on growth or tadpole shape. Tadpoles exposed to dragonfly kairomones were heavier, wider and had deeper bodies when viewed laterally and had longer tails but overall length was not affected. At 4.25 µg/L copper differences between the control and predator-exposed phenotypes increased but at 34.9 µg/L the phenotypes converged, indicating that copper may inhibit the induced response." (Author)] Address: Barry, M.J., Biology Department, Sultan Qaboos University, P.O. Box 36 Al Khod, Muscat 123, Oman. E-mail: mjbarry@squ.edu.om

10230. Bauer, S.; Nolet, B.A.; Giske, J.; Chapman, J.W.; Åkesson, S.; Hedenström, A.; Fryxell, J.M. (2011): Cues and decision rules in animal migration. In: Milner-Gulland, E.J., Fryxell, J.M.; Sinclair, A.R.E. (eds.): *Animal Migration. A Synthesis*. Oxford University Press: 68-87. (in English) [The paper provides a concise compilation on current knowledge in insect migration. Odonatological text passages are: "Some insect migrations are highly noticeable; among the most impressive of natural phenomena are the mass migrations in enormous cohesive swarms of a few species (e.g. the desert locusts *Schistocerca gregaria*, the dragonfly *Aeshna bonariensis*, and the monarch butterfly *Danaus*

plexippus), which rival the largest flocks and herds of migratory birds and mammals in terms of biomass, and far exceed them in total numbers. [...] Green darner dragonflies have a number of simple decision rules that guide their autumn migrations along the eastern seaboard of North America in a favourable, southerly direction (Wikelski et al. 2006). They initiate migratory flights on days following two preceding nights of dropping temperatures, which are highly likely to be associated with persistent northerly air flows, and then simply fly in the downwind direction while avoiding being carried over large water bodies (and thus out to sea). [...] Odonata have regular, bidirectional seasonal long-distance migrations that involve movements that are directed in predictable ways but not targeted at a specific site or region." (Authors)] Address: Bauer, Silke, Netherlands Institute of Ecology (NIOO-KNAW), PO Box 1299, 3600 BG Maarssen, The Netherlands

10231. Bolliger, J.; Keller, D.; Holderegger, R. (2011): When landscape variables do not explain migration rates: An example from an endangered dragonfly, *Leucorhinia caudalis* (Odonata: Libellulidae). *Eur. J. Entomol.* 108(2): 327-330. (in English) ["*L. caudalis* is a dragonfly species threatened throughout Europe. Despite evidence of the recent extension of its distribution range, it is unknown whether *L. caudalis* regularly or hardly ever migrates among ponds. The contemporary migration patterns of the species were investigated using Bayesian assignment tests and the migration rates related to landscape structural and thematic variables (distance between ponds, forest area, area of water body, area of hedgerow). Migration rates of *L. caudalis* are independent of any landscape element. Thus, landscape structure is not a barrier or corridor for migration in this species. The tendency of *L. caudalis* to disperse is largely independent of the nature of the landscape, at least at the scale of the present study." (Authors)] Address: Bolliger, Janine, Swiss Federal Research Institute WSL, Zürcherstr. 111, 8903 Birmensdorf, Switzerland. E-mail: janine.bolliger@wsl.ch

10232. Bonnaud, E.; Medina, F.M.; Vidal, E.; Nogales, M.; Tershy, B.; Zavaleta, E.; Donlan, C.J.; Keitt, B.; Le Corre, M.; Horwath, S.V. (2011): The diet of feral cats on islands: a review and a call for more studies. *Biological Invasions* 13(3): 581-603. (in English) ["Cats are among the most successful and damaging invaders on islands and a significant driver of extinction and endangerment. Better understanding of their ecology can improve effective management actions such as eradication. We reviewed 72 studies of insular feral cat diet from 40 islands worldwide. Cats fed on a wide range of species from large birds and medium sized mammals to small insects with at least 248 species consumed (27 mammals, 113 birds, 34 reptiles, 3 amphibians, 2 fish and 69 invertebrates). Three mammals, 29 birds and 3 reptiles recorded in the diet of cats are listed as threatened by the IUCN. However, a few species of introduced mammals were the most frequent prey, and on almost all islands mammals and birds contributed most of the daily food intake. Latitude was positively correlated with the predation of rabbits and negatively with the predation of reptiles and invertebrates. Distance from landmass was positively correlated with predation on birds and negatively correlated with the predation of reptiles. The broad range of taxa consumed by feral cats on islands suggests that they have the potential to impact almost any native species, even the smallest

ones under several grams, that lack behavioral, morphological or life history adaptations to mammalian predators. Insular feral cat's reliance on introduced mammals, which evolved with cat predation, suggests that on many islands, populations of native species have already been reduced." (Authors) The list of prey items also considers (unidentified) Odonata.] Address: Bonnaud, E., Mediterranean Institute for Ecology and Palaeoecology (UMR CNRS/IRD), Aix-Marseille University (Université P. Cezanne), Bâtiment Villemin, Domaine du Petit Arbois, Avenue Philibert, BP 80 13545 Aix-en-Provence cedex 04, France. E-mail: elsa.bonnaud@univ-cezanne.fr

10233. Brodin, T.; Drotz, M.K. (2011): Larval behavioral syndrome does not affect emergence behavior in a damselfly (*Lestes* congener). *Journal of Ethology* 29(1): 107-113. (in English) ["Activity is a key behavioural trait that often mediates a trade-off between finding food for growth and evading predation. We investigated how activity of the damselfly *Lestes* congener is affected by larval state and predator presence and if larval behavioural type (BT) can be used to predict larval emergence behaviour. Activity level of individual larvae was studied without predators at two different physiological states (hungry, fed) and in two predator treatments (familiar or unfamiliar predator cues). Larvae did not adjust their activity depending on state or when subjected to unfamiliar predator cues but a general reduction in activity was seen in the familiar predator treatment. Hence, active individuals remained active compared to their conspecifics, independent of state or predator treatment illustrating the presence of a behavioural syndrome. However, we found no correlation between larval BT and emergence behaviour. Active individuals did not differ from less active individuals in any emergence characteristics. The results illustrate that the larval BT occurs in many situations keeping active larvae active even in maladaptive situations. Furthermore, we show that damselfly emergence behaviour can be completely decoupled from larval BT, indicating a loss of stability in individual BT during critical stages in ontogeny." (Authors)] Address: Brodin, T., Dept of Ecology and Environmental Science, Umeå University, S-90187 Umeå, Sweden. E-mail: tomas.brodin@emg.umu.se

10234. Burrone, N.E.; Marione, M.C.; Freire, M.G.; Schweigmann, N.; Loetti, M.V. (2011): Invertebrate communities from different wetland types of Tierra del Fuego. *Insect Conservation and Diversity* 4(1): 39-45. (in English) ["1. Loss or deterioration of wetlands, which represent highly valuable environments, is a worldwide phenomenon. Sustainable management of wetlands, however, requires detailed understanding of the factors controlling their communities. The present study report the taxonomic composition and richness of invertebrate assemblages in different wetland types in Tierra del Fuego. 2. Aquatic invertebrates from 79 freshwater wetlands in Tierra del Fuego were inventoried in January 2001 and 2002 (austral summer). All wetlands were classified into six categories: roadside pools, floodplain pools, flooded quarries, peatland ponds, beaver ponds and large ponds. The wetland type effect on the taxonomic richness was analysed by one-way ANOVA. To identify wetland types with similar invertebrate communities, cluster analysis has been performed using occurrence frequency of each taxa in each wetland type and the Jaccard similarity index. 3. A total of 35 taxa were identified, including 21 microcrustaceans, 12 insects

(including "Anisoptera"), 1 gastropod and 1 cnidarian. Copepods and cladocerans were among the most frequent taxa (occurrence frequency >40%) in most wetland types. No significant differences in taxonomic richness were found among wetlands types ($P = 0.076$). The cladogram based on invertebrate taxonomic composition resulting from similarity in taxonomic composition among wetland types showed three distinct clusters; one included flooded quarries, peatland ponds, beaver ponds and floodplain pools, the second one the large ponds and the third one roadside pools. 4. Our results suggest that the wetland types studied have different conservation values, like the clusters obtained in the cladogram show. Artificial wetlands, such as the roadside pools, could play an important role in maintaining connectivity between isolated fragments of pristine, natural wetlands." (Authors)] Address: Loetti, Maria Veronica, Grupo de Estudio de Mosquitos, Departamento de Ecología, Genética y Evolución, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Pabellón II, Ciudad Universitaria, C1428EHA Buenos Aires, Argentina. E-mail: vloetti@ege.fcen.uba.ar

10235. Catling, P.; Kostjuk, B.; Tate, D. (2011): River Jewelwing, *Calopteryx aequabilis* Say, new to Northwest Territories. *Argia* 23(1): 13. (in English) [10-VII-2010, Mackenzie Highway bridge over Kakisa River, 60°98'87" N 117°24'41"W, Canada] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

10236. Chale, F.M.M. (2011): Preliminary studies on the ecology of *Mbasa* (*Opsaridium microlepis* (Günther)) in Lake Nyasa around the Ruhuhu River. *Journal of Ecology and the Natural Environment* 3(2): 58-62. (in English) [Tanzania; Odonata contributed with 12% to the diet of *Opsaridium microlepis*; diet was dependent from age stage of fishes, and thus only 30% of the juvenile consumed Odonata.] Address: Chale, F.M.M., Department of Life Science, Faculty of Science, Technology and Environmental Studies, The Open University of Tanzania, P.O. Box 23409, Dar es Salaam, Tanzania. E-mail: francischale@gmail.com

10237. Cielocha, J.; Cook, T.J.; Clopton, J. (2011): Host utilization and distribution of Nubenocephalid gregarines (Eugregarinorida: Actinocephalidae) parasitizing *Argia* spp. (Odonata: Zygoptera) in the Central United States. *Comparative Parasitology* 78(1): 152-160. (in English) ["Gregarine host specificity has been the cornerstone of gregarine taxonomy for nearly a century. Several laboratory experiments have accepted strict host specificity by failure to cross-infect distantly related hosts with unrelated gregarine species. These empirical studies are not feasible for all gregarine hosts, especially nondomesticated groups. Additionally, studies of gregarine distributions have always focused on insect hosts of disparate groups, rather than targeting potential hosts species within a single genus and their congeneric gregarines. This study addresses host utilization of nubenocephalid gregarines parasitizing the odonate genus *Argia*. Populations of 9 species of adult *Argia* were collected, dissected, and observed for gregarine infection during the April–September flight seasons in 2007 from 17 localities in the central United States. On average, 2.5 species of *Argia* were collected at each locality. A species of *Nubenocephalus*—*Nubenocephalus nebraskensis*, *Nubenocephalus secundus*, or *Nubenocephalus* spp.—was collected from every infected population of *Argia* except for the *Argia vivida* popula-

tion at Prairie Dog Town Fork-Red River, Randall County (Co.), Texas, U.S.A. *Nubenocephalus secundus* utilizes at least 7 of the 9 argid hosts sampled whereas *N. nebraskensis* was collected from only 2 argid species. Only *Argia translata* was observed to host both *N. secundus* and *N. nebraskensis*. These patterns of host utilization by nubenocephalid gregarines represent an ecotypic gregarine assemblage rather than a vicariant assemblage, demonstrating that nubenocephalid gregarines do not differentiate between species of *Argia* as hosts." (Authors)] Address: Cielocha, Joanna, Dept of Biological Sciences, Sam Houston State Univ., Huntsville, Texas 77341-2166, USA. E-mail: biotjc@shsu.edu

10238. Dia, A.; Dumont, H.J. (2011): The Odonata of Lebanon (Insecta: Odonata). *Zoology in the Middle East* 52: 63-70. (in English) ["In a year-long survey of the Odonata of Lebanon, 29 species of the approximately 49 known or expected to live in the country were recorded. Some endangered species should be considered for urgent protection. Others are doing well. A brief biogeographic analysis of the fauna is given. The almost complete absence of species typical of semi-arid to arid environments is to be noted." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@ugent.be

10239. Dijkstra, K.-D.B.; Clausnitzer, V.; Mézière, N.; Kipping, J.; Schütte, K. (2011): Chapter 5. The status and distribution of dragonflies and damselflies (Odonata) in central Africa. In: *The Status and Distribution of Freshwater Biodiversity in Central Africa* Brooks, E.G. E., Allen, D.J. and Darwall, W.R.T. (Compilers): 62-76. (in English) ["Equatorial Africa is naturally dominated by almost continuous Guineo-Congolian lowland rainforest, which has a gradual transition of riverine forests and woodland into peripheral savannahs. The highest odonate diversity in tropical Africa is found here : all African countries with well over 200 species have a considerable portion of this forest within their borders (Dijkstra and Clausnitzer 2006). Although many species range throughout Africa's forested heart, it can be subdivided into four main areas of endemism (Dijkstra 2007a), of which only the more westerly Upper Guinea lies outside the central Africa assessment region (see Dijkstra et al. 2010). The three others are (1) the Lower Guinea, with the Cameroon highlands as its focus, (2) the Congo Basin, and (3) the slope east of the Congo River towards the Albertine Rift. Each area, which agree reasonably with the freshwater ecoregions of Thieme et al. (2005), is discussed separately below, as is the large area of more open habitats to the south of the rainforest belt that dominates Katanga and adjacent Angola and Zambia. Central Africa has the richest, but also the least known and probably (currently) least imperilled, odonate fauna in Africa. Therefore this report focuses primarily on what we do and, especially, do not know. Much emphasis is given on recent discoveries, including collection work conducted as part of the central African freshwater biodiversity assessment and fieldwork by the authors in Cameroon and Gabon (all results otherwise still unpublished). We attempt to provide information on all threatened (or Near Threatened) and Data Deficient species in the region, their status being Least Concern unless indicated." (Authors)] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nbn.nl

10240. Do, M.C.; Karube, H. (2011): *Nihonogomphus schorri* sp. nov. from Huu Lien Nature Reserve, Lang Son Province, Vietnam (Odonata: Gomphidae). *Zootaxa* 2831: 63-68. (in English) ["A new species *Nihonogomphus schorri* Do & Karube, sp. nov. is described on the basis of male specimens collected from Huu Lien Nature Reserve, Lang Son Province, northern Vietnam. It is close to the Chinese species *N. bequaerti* Chao, 1954 due to the similarity of hamules, anal appendages and vesicle, but is easy to separate from that species by the vesica spermalis structure and body markings." (Authors)] Address: Do Manh, C., 409 – 57A, 22/20 Nguyen Cong Hoan, Hanoi, Vietnam. E-mail: docuong@gmail.com

10241. Do, M.C. (2011): Notes on three species of gomphid dragonflies from Vietnam (Odonata: Gomphidae). *International Dragonfly Fund - Report 36*: 1-9. (in English) ["First records for Vietnam of *Fukienogomphus prominens* Chao, 1954 and *Gomphidia abbotti* Williamson, 1908 are documented with emphasis on morphological details. The previously published record of *Sieboldius gigas* (Martin, 1904) in Do et al. (2011) has to be corrected into *Megalogomphus sommeri* (Selys, 1854)." (Author)] Address: Do, M.C., 409 – 57A, 22/20 Nguyen Cong Hoan, Hanoi, Vietnam Email: docuong@gmail.com

10242. Dolny, A.; Barta, D.; Lhota, S.; Rusdianto; Drozd, P. (2011): Dragonflies (Odonata) in the Bornean rain forest as indicators of changes in biodiversity resulting from forest modification and destruction. *Tropical Zoology* 24(1): 63-86. (in English) ["Dragonfly assemblages represent sensitive indicators of environmental conditions including the water environment and forest structure. However, an understanding the ecology of tropical forest odonates remains one of the most significant gaps in our knowledge of the order. We sampled odonates at Sungai Wain Protection Forest, East Kalimantan, Indonesia. Relatively high dragonfly species richness (88 species) was found during 35 survey days divided between two seasons. Seasonal differences in the species diversity were fairly small, in accordance with the fact that the climate in Kalimantan is generally stable. The highest species diversity was observed in intact primary forest: 60% of all recorded species were found there and 32% of all species were exclusive to this habitat. The proportion of biotope specialists decreased along the gradient - intact primary forest, slightly degraded primary forest, secondary forest, heavily degraded forest and non-forest. The ordination obtained from detrended correspondence analysis showed, along the main axis, a gradient in community similarity corresponding to the degree of forest degradation. The evidence indicates that, within the applied spatial scale, any forest degradation results in fewer species, with a pronounced change in the species composition, and an overall reduction in taxonomic diversity." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

10243. Dow, R.A.; Reels, G.T. (2011): *Coeliccia southwelli* sp. nov. (Odonata: Zygoptera: Platycnemididae) from Mount Dulit, Sarawak. *Zootaxa* 2832: 63-68. (in English) ["*Coeliccia southwelli* sp. nov. is described from Mount Dulit, Miri and Kapit Divisions, Sarawak, Malaysian Borneo. It belongs to the borneensis-group of species, and is the sixth species from this group to

be described from Borneo. New material of other borneensis-group species is put on record." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

10244. Doxon, E.D.; Davis, C.A.; Fuhlendorf, S.D. (2011): Comparison of two methods for sampling invertebrates: vacuum and sweep-net sampling. *Journal of Field Ornithology* 82(1): 60-67. (in English, with Spanish summary) ["With numerous invertebrate sampling techniques available, deciding which technique to use under certain circumstances may be difficult. Many researchers interested in invertebrate abundance and availability relative to the foraging ecology of birds may use a technique (e.g., vacuum sampling or sweep-netting) without understanding the impacts their choice may have on the samples collected and the ability of the method to meet research objectives. We compared the characteristics, including overall biomass, morphospecies richness, average size, diversity, and body length categories, of invertebrates collected using a sweep-net and a Dietrick vacuum sampler along paired transects in Woodward County, Oklahoma, from May to July 2007 and 2008. These sampling techniques differed in the taxa collected, with the orders Diptera, Homoptera, and Hymenoptera dominating vacuum samples and the orders Homoptera, Orthoptera, and Araneae dominating sweep-net samples. Although morphospecies richness was similar for the two techniques, the mean size of invertebrates collected and overall invertebrate biomass were greater for sweep-netting than vacuum sampling. Vacuum sampling was more effective at collecting small (e.g., <5 cm) invertebrates, whereas sweep-netting captured large (>5 cm) orthopteran and lepidopteran larvae at higher rates. Thus, our results indicate that neither sampling method effectively sampled all invertebrate families and investigators should be aware of the potential biases of different sampling techniques and be certain that the technique selected will allow study objectives to be met." (Authors) Comparing the mean relative biomass collected for Odonata by vacuum sampling and sweep-netting, no significant differences resulted.] Address: Doxon, Elizabeth, Department of Natural Resource Ecology and Management, Oklahoma State University, 008C Agricultural Hall, Stillwater, Oklahoma 74078, USA. E-mail: edoxon@utk.edu

10245. Eckberg, J.R. (2011): Las Vegas Wash Invertebrate Inventory, 2000-2010. Prepared for: Research and Environmental Monitoring Study Team, Las Vegas Wash Coordination Committee: VI + 22 pp, appendix. (in English) ["This report summarizes previously documented, as well as undocumented, invertebrate specimens identified along the Las Vegas Wash (Wash), where this wildlife group has a significant impact on ecological components. Four of the six major environmental resource categories laid out in the Las Vegas Wash Comprehensive Adaptive Management Plan are impacted by invertebrates: water quality, soils, vegetation, and fish and wildlife. Living in both aquatic and terrestrial environments, many invertebrates serve as indicators of environmental quality in both areas. Insects are the primary pollinator for many plants along the Wash and provide many other benefits such as controlling herbivores and seed dispersal. Many insects can be primary consumers of plant material and secondary consumers of other insects. They are also the food source for a wide variety of birds, small mammals, fish, reptiles and amphibians. Cataloging these species will

help researchers by providing baseline information and will provide managers' information on the species impacted by work being done. Further study of this animal group is needed to better understand their true impact on the ecological system at the Wash." (Author) The following Odonata are listed in an appendix: *Anax junius*, *Rhionaeschna multicolor*, *Hetaerina americana*, *Argia* sp. *A. alberta*, *A. moesta*, *A. sedula*, *A. vivida*, *Enallagma civile*, *Ischnura cervula*, *I. denticollis*, *Erpetogomphus compositus*, *Erythemis collocata*, *Libellula comanche*, *L. luctuosa*, *L. saturata*, *Orthemis ferruginea*, *Pantala hymenaea*, *Sympetrum corruptum*, *Tramea lacerata*, *T. onusta*.] Address: Eckberg, J.R., Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada 89106, USA

10246. Everard, M.; Fletcher, M.S.; Powell, A.; Dobson, M.K. (2011): The feasibility of developing multi-taxa indicators for landscape scale assessment of freshwater systems. *Freshwater Reviews* 4: 1-19. (in English) ["The use of bird assemblages as wetland indicators is now well established in the UK. An indicator based on a single taxonomic group can, however, have limitations. Conversely, a multi-taxa approach can potentially provide a more robust reflection of the health of fresh waters. In this paper, we consider the inherent suitability of different taxonomic groups for inclusion in a multi-taxa indicator, based upon taxon characteristics, species richness and prevalence across a range of freshwater habitats, and their practical suitability, based upon quality and quantity of available data. We conclude that, in addition to birds, there are six candidate groups of taxa throughout the world that are currently suitable for inclusion in a multi-taxa indicator. These are: mammals, amphibians and reptiles, fish, dragonflies and damselflies (based on adult recording), benthic macroinvertebrates and macrophytes. Of these taxa, all but amphibians and reptiles and fish are suitable for inclusion in a UK indicator. The types and limitations of currently available datasets are reviewed. We provide recommendations for advancing this approach in the assessment of freshwater systems. [...] Odonata are part of the aquatic macroinvertebrate fauna as larvae, but as adults they are also very suitable as candidates for inclusion in a multi-taxa indicator, as they are easy to see and distinguishable in the field, and provide information about the status of the terrestrial shoreline of habitats as well as the underwater component. Most are also highly mobile, and they will rapidly colonise new or restored sites and abandon impacted sites. Worldwide, the dragonfly and damselfly fauna is relatively well known (Kalkman et al., 2008), and their conspicuous nature and often high alpha diversity makes them an attractive option for biomonitoring. Adult Odonata are the most thoroughly recorded emergent aquatic invertebrates in the UK. The Dragonfly Recording Network is co-ordinated by the British Dragonfly Society and operates within guidelines based upon recommendations given by the National Biodiversity Network. However, the quantity and spread of data is not currently adequate to be considered a robust national monitoring programme." (Authors)] Address: Fletcher, M.S., Freshwater Biological Association, The Ferry Landing, Far Sawrey, Ambleside, Cumbria, LA22 0LP, UK. E-mail: mfletcher@fba.org.uk

10247. Feindt, W.; Damm, S.; Hadrys, H. (2011): Speciation in the neotropical giant damselfly *Megaloprepus caerulatus* reflects forest fragmentation (Pseudostigmatidae: Odonata). In: Niekisch, M. & B. Streit (Eds.): Status and future of tropical biodiversity. Conference of

the Society for Tropical Ecology, Gesellschaft für Tropenökologie e.V. - gto, Goethe University, 21 - 24 February 2011, Frankfurt a. M., Programme & Abstracts: 190. (in English) [Verbatim: "Increasing fragmentation rates of tropical forests disturb ecological dynamics and result in loss of biological and genetic diversity. Odonates, which are sensitive indicator organisms, face the destruction of tropical forests as probably the most important threat (Kalkman et al. 2008). Due to their complex life cycle and specific habitat preferences odonates come to know an increasing importance for measuring environmental health and identifying driving factors controlling biodiversity. *Megaloprepus caerulatus* the world's largest damselfly is widespread in the Neotropics from the South of Mexico to Bolivia (Davies & Tobin 1984, Finke & Hedström 2008). It is highly restricted to primary forests and old grown secondary forests, which provide water filled tree holes needed for reproduction. Females exclusively oviposit in water filled tree holes, which are defended by males. The size and the density of these microhabitats ultimately affect larval abundance and survivorship (Fincke 2006) resulting in changes in population size and structure. We used two mitochondrial sequence marker (ND1 and 16S rDNA) and microsatellites to analyze the population structure and diversities between populations covering the northern range of *M. caerulatus* between Mexico and Panama. High sequence divergences and an absence of gene flow indicate complete separation of all populations studied. Our results suggest ongoing speciation processes within the genus *Megaloprepus* probably driven by ongoing fragmentation of their forest habitats. Genetic distances at the species level suggest that the *Megaloprepus caerulatus* is not a single species rather than a group of at least three species. Our data illustrate the impact of tropical rainforest fragmentation on genetic isolation of a habitat specialized species and demonstrate how important it is to evaluate genetic diversities of indicator species. Together with general monitoring data the knowledge about conservation genetic parameters allow to propose refined conservation decisions in tropical forests." (Authors)] Address: Feindt, Wiebke, ITZ, Ecology and Evolution, TiHo Hannover, Bünteweg 17d, 30559, Hannover, Germany. E-mail: feindt.wiebke@gmail.com

10248. Fincke, O.M. (2011): Excess offspring as a maternal strategy: constraints in the shared nursery of a giant damselfly. *Behavioral Ecology* 22(3): 543-551. (in English) ["Maternal reproductive strategies should optimize the quality and quantity of surviving offspring. In *Megaloprepus caerulatus*, a damselfly that exhibits male-biased size dimorphism, larval siblicide, and a disproportionate fitness advantage from large sons, mothers lay many more eggs in water-filled tree holes than can survive to emergence. Using field experiments, I tested the siblicide advantage of excess offspring (i.e., faster development and/or larger survivors) in small and large holes and 2 alternative functions of excess offspring (predator satiation and insurance against nonpredator mortality). In small pots, the sole siblicidal survivors emerged larger than noncannibals but no sooner. However, doubling or even quadrupling a modest clutch of 25 failed to produce larger offspring. In large tubs, the size advantage that survivors gained from siblicide was constrained by a trade-off between offspring size and number. A clutch of 20 produced half as many but larger offspring than one of 100. When multiple females contributed eggs to a large nursery,

size of survivors was independent of the mother's clutch size. Finally, large clutches failed to satiate dragonfly predators, and although 25 neonates were better than 2 as insurance against nonpredator mortality, a clutch of 50 provided no additional benefit. In natural and experimental holes, survivorship was female biased, suggesting that sons suffered greater mortality than daughters. Because mothers seemed unable to adaptively bias offspring sex ratio, excess offspring may compensate for the lower survivorship of sons, particularly in large nurseries where males garner a disproportionate size advantage relative to females." (Author)] Address: Fincke, Ola, Ecology and Evolutionary Biology Program, Department of Zoology, University of Oklahoma, Norman, OK 73019, USA. E-mail: fincke@ou.edu

10249. Florencio, M.; Diaz-Paniagua, C.; Serrano, S.; Bilton, D.T. (2011): Spatio-temporal nested patterns in macroinvertebrate assemblages across a pond network with a wide hydroperiod range. *Oecologia* 166(2): 469-483. (in English) ["Nestedness has been widely used to measure the structure of biological communities and occurs when species-poor sites contain subsets of species-rich ones. Here, we examine nested patterns across the macroinvertebrate assemblages of 91 ponds in Doñana National Park, Spain, and explore temporal variation of nestedness and species richness in 19 temporary ponds over 2 years with differing rainfall. Macroinvertebrate assemblages were significantly nested; both pond spatial arrangement and environmental variation being important in driving nested patterns. Despite the nested structure observed, a number of taxa and ponds deviate from this pattern (termed idiosyncratic), by occurring more frequently than expected in species-poor sites, or having assemblages dominated by species largely absent from species-rich sites. Aquatic adults of winged insects, capable of dispersal, were more highly nested than non-dispersing taxa and life-history stages. Idiosyncratic taxa were found in ponds spanning a wide range of hydroperiods, although nestedness was higher in more permanent waterbodies. Monthly sampling demonstrated a gradual increase of species richness and nestedness from pond filling to April-May, when the most temporary ponds started to dry. Although the degree of nestedness of individual pond assemblages varied from month to month, the overall degree of nestedness in the two study years was practically identical despite marked differences in hydroperiod. Our results suggest that differential colonization and environmental variation are key processes driving the nested structure of Doñana ponds, that macroinvertebrate assemblages change in a predictable manner each year in response to cycles of pond wetting and drying, and that connectivity and environmental variability maintain biodiversity in pond networks." (Authors) Larvae of *Lestes virens* are largely restricted to long hydroperiod sites, and some *Sympetrum* dragonfly larvae occurred preferentially in ponds with short and intermediate hydroperiods.] Address: Florencio, Margarita, Doñana Biological Station-CSIC, P.O. Box 1056, 41080 Seville, Spain. E-mail: margarita@ebd.csic.es

10250. Gall, B.G.; Stokes, A.N.; French, S.S.; Schlepforst, E.A.; Brodie, E.D.; Brodie, E.D. (2011): Tetrodotoxin levels in larval and metamorphosed newts (*Taricha granulosa*) and palatability to predatory dragonflies. *Toxicon* 57(7-8): 978-983. (in English) ["Some populations of the newt *Taricha granulosa* possess extremely high concentrations of the neurotoxin tetro-

dotoxin (TTX). Tetrodotoxin is present in adult newts and their eggs, but has been assumed to be absent from the larval stage. We tested larval and metamorphosed juveniles for the presence of TTX and evaluated the palatability of these developmental stages to predatory dragonfly nymphs. All developmental stages retained substantial quantities of TTX and almost all individuals were unpalatable to dragonfly nymphs. Tetrodotoxin quantity varied greatly among individuals. When adjusted for mass, TTX concentrations declined steadily through metamorphosis. Several juveniles were palatable to dragonflies and these individuals had significantly lower TTX levels than unpalatable juveniles. These results suggest that despite previous assumptions, substantial quantities of TTX, originally deposited in the embryo, are retained by the developing larvae and metamorphosed juveniles and this quantity is enough to make them unpalatable to some potential predators." (Authors)] Address: Gall, B.G., 5305 Old Main HL, Logan UT, 84321, USA. E-mail: brian.gall@usu.edu

10251. Gassmann, D.; Richards (2011): Odonata (damselflies and dragonflies) of the Nakanai Mountains, East New Britain proving, Papua New Guinea RAP. Rapid Biological Assessments of the Nakanai Mountains and the upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments 60: 61-69. (in English) ["Odonatological results of a biodiversity assessment ... in April 2009 are presented. Thirty-two species of Odonata were collected at three different elevations (200-1,700 m) in the Nakanai Mountains and, to a minor extent, on the coastal fringe of Jacquinot Bay. Ten species are recorded from New Britain island for the first time. An undescribed species of *Pseudagrion* Selys and a species or subspecies of *Tetrathemis* Brauer new to science were found. Eleven odonate taxa appear to be endemic to the island and some species were only found at particular elevations suggesting that more odonate species await discovery on the island. Due to the karst topography of the Nakanai Mountains, surface water that is essential for the development of odonate larvae is very scarce in the region. Natural forest cover is crucial for the survival of forest-dwelling habitat specialists, particularly those occupying the limited above-ground aquatic habitats that do exist. The designation of a World Heritage Area in the Nakanai Mountains will be an important first step to protect New Britain's unique aquatic invertebrate fauna from extinction." (Authors)] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

10252. Geseke, C.; Hill, B.; Möller, L.; Roland, H.-J.; Stübing, S. (Red.) (2011): Atlas der Libellen Hessens. FENA Wissen 1: 184 pp. (in German) [Hessen, Germany; 65 Odonata species are mapped and introduced with information on habitat, phenology, morphology, and population trends.] Address: Hessen-Forst, Forsteinrichtung und Naturschutz, Europastr. 10-12, 35394 Gießen, Germany. E-mail: naturschutzdaten@forst.hessen.de

10253. Gossum, H. van; Bots, J.; Heusden, J. van; Hammers, M.; Huyghe, K.; Morehouse, N.I. (2011): Reflectance spectra and mating patterns support intraspecific mimicry in the colour polymorphic damselfly *Ischnura elegans*. *Evol. Ecol.* 25: 139-154. (in English) ["Coexistence of female colour morphs in animal popula-

tions is often considered the result of sexual conflict, where polymorphic females benefit from reduced male sexual harassment. Mate-searching males easily detect suitable partners when only one type of female is present, but become challenged when multiple female morphs coexist, which may result in frequency-dependent mate preferences. Intriguingly, in damselflies, one female morph often closely resembles the conspecific male in body coloration, which has led to hypotheses regarding intra-specific male-mimicry. However, few studies have quantitatively evaluated the correspondence between colour reflectance spectra from males and male-like females, relying instead on qualitative visual assessments of coloration. Using colour analyses of reflectance spectra, we compared characteristics of the body coloration of ontogenetic male and female colour morphs of the damselfly *Ischnura elegans*. In addition, we evaluated whether males appear to (1) discriminate between immature and mature female colour morphs, and (2) whether male-like females experience reduced male mating attention and low mating frequencies as predicted from male-mimicry. Spectral reflectance data show that immature female morphs differ substantially in coloration from mature individuals. Mating frequencies were much lower for immature than mature female morphs. For the male-like female morph, measures of colour were statistically indistinguishable from that of both immature and mature conspecific males. Mating frequencies of male-like females were lower than those of other mature female morphs under field and experimental conditions. Together, our results indicate that males may use the observed spectral differences in mate choice decisions. Furthermore, male-like females may be regarded as functional mimics that have reduced attractiveness and lowered rates of sexual harassment by mate-searching males." (Authors)] Address: Van Gossum, H., Evolutionary Ecology Group, University of Antwerp, Groenenborgerlaan 171, 2020 Antwerp, Belgium. E-mail: hans.vangossum@ua.ac.be

10254. Grant, P.B.C.; Samway, M.J.; Simaika, J.P. (2011): Threats to dragonflies on land islands can be as great as those on oceanic islands. *Biological Conservation* 144(3): 1145-1151. (in English) ["We ask whether oceanic islands and equivalent-sized continental blocks, which we call here 'land islands', are similar or not in their species richness, number of range-restricted species, and in number of threatened species. We used sites in southern Africa and islands in the Western Indian Ocean. We chose dragonflies as they are taxonomically tractable, well surveyed, and provide a range of characteristics from narrow-range endemics to widely-spread and vagile opportunists. We then selected as many oceanic islands as possible where there were sufficient data to make comparisons with land islands of a similar area in African savanna, grassland and mountains rich in endemic species. Generalized Linear Mixed Models were used to analyse the overall, range-restricted and threatened species richness for all islands (both oceanic and land) and then for the two types of island separately. Species richness increased with island size, with oceanic and land island size relationships being similar. Land islands overall had significantly more range-restricted species. Species on land islands were as threatened as those on oceanic islands. However, the land islands of the Western Cape were under a higher level of threat than oceanic islands of comparative size. The large islands of Madagascar and Sri Lanka were outliers with very high levels of threat. Trans-

lated into conservation, the results illustrate that over-generalizations about island faunas being more threatened than continental ones are not necessarily valid. While not wishing to draw attention away from the urgent conservation action needed on many tropical islands, we argue that comparisons of oceanic versus land islands detract from the more urgent task of local conservation action based on the special needs of any particular area, whether land or oceanic. It is more meaningful to establish how threats operate and how to mitigate them on small populations rather than focusing purely on any particular island type per se." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

10255. Grant, P.B.C.; Samway, M.J. (2011): Micro-hotspot determination and buffer zone value for Odonata in a globally significant biosphere reserve. *Biological Conservation* 144(2): 772-781. (in English) ["Reserves are frequently constrained in design and size by various financial, social or political factors. Maintenance of existing reserves must therefore rely on strategic management practices, and prioritization of conservation activities within them. Identification of global and regional hotspots have been effective for prioritizing conservation activities. Yet, identification of micro-hotspots, or overlapping areas of endemic and rare species that are under threat at the landscape scale, have largely been ignored. From a reserve management point of view, knowledge of critical micro-hotspots within a reserve, are focal points for directing cost effective, conservation initiatives, especially removal of invasive alien plants which are a major threat to biodiversity. Using diversity patterns of dragonfly assemblages, many endemic and threatened, within a biosphere reserve located in the core of a global biodiversity hotspot, we investigated the concept of micro-hotspots. As biosphere reserves contain zones with varying degrees of anthropogenic impact, we also investigated the value of buffer and transition zones for complementing the dragonfly fauna of the reserve core. We found a distinct micro-hotspot within the protected core zone which shows concordance for both endemism and species richness. We conclude that focused conservation actions to remove invasive alien plants within this micro-hotspot would help insure its continued integrity. Furthermore, while there is greater habitat degradation within the buffer and transition zones, they support many additional species, but not those necessarily endemic or threatened. The complementary value of buffer and transition zones therefore lies in increasing habitat heterogeneity and species richness of the whole reserve." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

10256. Guo, C.; Liu, F.; Yuan, S.-x.; Ren, B.-z. (2011): Dynamic study of insect community in Heilihe National Nature Reserve. *Journal of Jilin Agricultural University* 2/2011: 1-6. (in Chinese, with English summary) [Insect fauna of five habitats (*Quercus mongolica* -, *Betula platyphylla* - *Corylus heterophylla* -, man-made coniferous forest edge communities and riverside meadow community) from Heilihe National Natural Reserve in Chifeng of Inner Mongolia, China were studied from June to October in 2007. The total of more than 4000 specimens obtained belong to 11 orders, 65 families, 176 genera and 223 species." (Authors) Taxa including

Odonata are listed at the order level.] Address: Guo, Cheng, Department of Life Sciences, Chifeng University, Chifeng 024000, China

10257. Hämäläinen, M.; Yu, X.; Zhang, H. (2011): Descriptions of *Matrona oreades* spec. nov. and *Matrona corephaea* spec. nov. from China (Odonata: Calopterygidae). *Zootaxa* 2830: 20-28. (in English) ["*Matrona oreades* Hämäläinen, Yu & Zhang, spec. nov. (holotype male, China, Gansu, Wenxian, Bikou, alt. 950m, 9/13 vii 2005) and *Matrona corephaea* Hämäläinen, Yu & Zhang, spec. nov. (holotype male, China, Zhejiang, West Tianmushan, alt. 700m, 8 viii 2007) are described and illustrated for both sexes. These two species differ markedly from the members of the *Matrona basilaris* species group by their sparser venation and absence of bluish-white reticulation at the wing base." (Authors)] Address: Hämäläinen, M., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: matti.hamalainen@helsinki.fi

10258. Harabiš, F.; Dolný, A. (2011): The effect of ecological determinants on the dispersal abilities of central European dragonflies (Odonata). *Odonatologica* 40(1): 17-26. (in English) ["Individual species dispersal ability deserves special attention mainly because of negative impact of human induced changes on freshwater ecosystems. This study is focused on Central European dragonflies, because there is a high concentration of very experienced odonatologists in this region. It is more difficult to estimate dispersal ability of distant taxa than closely related species. This study supports the widespread awareness of limited dispersal abilities of habitat generalists. Although there are a variety of life-history groups between both suborders, the majority of species with limited dispersal abilities are from the suborder Zygoptera. Mediterranean elements, often referred to as those expanding due to global warming, embody higher dispersal abilities than Siberian elements. Lentic species may benefit from the stable conditions of standing waters in comparison to lotic ones, although this preference is not so strong according to authors' analysis." (Authors)] Address: Harabiš, F., Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com

10259. Holly, M. (2011): New and rare dragonflies (Odonata) in the Bieszczady National Park recorded in the years in 2009 and 2010. *Odonatrix* 7(1): 19-23. (in Polish, with English summary) ["The author studied small water bodies created for amphibians in the Bieszczady National Park in the years 2009 and 2010. *Leslea dryas* and *Cordulia aenea* have been recorded for the first time in the park. Records of additional species are given too, of which *Aeshna juncea* is of special interest. Two sites of *Cordulegaster bidentata* were also found in the Bieszczady National Park." (Author)] Address: Holly, M., Ośrodek Naukowo-Dydaktyczny Bieszczadzkiego Parku Narodowego, ul. Bełska 7, 38-700 Ustrzyki Dolne, Poland. E-mail: marekholly@wp.pl

10260. Huang, C.-C.; Lin, S.-C. (2011): Lineage-specific late Pleistocene expansion of an endemic subtropical gossamer-wing damselfly, *Euphaea formosa*, in Taiwan. *BMC Evolutionary Biology* 2011, 11:94: (in English) ["Background: Pleistocene glacial oscillations have significantly affected the historical population dynamics of temperate taxa. However, the general effects of recent climatic changes on the evolutionary history and

genetic structure of extant subtropical species remain poorly understood. In the present study, phylogeographic and historical demographic analyses based on mitochondrial and nuclear DNA sequences were used. The aim was to investigate whether Pleistocene climatic cycles, paleo-drainages or mountain vicariance of Taiwan shaped the evolutionary diversification of a subtropical gossamer-wing damselfly, *Euphaea formosa*. Results: *E. formosa* populations originated in the middle Pleistocene period (0.3 Mya) and consisted of two evolutionarily independent lineages. It is likely that they derived from the Pleistocene paleo-drainages of northern and southern Minjiang, or alternatively by divergence within Taiwan. The ancestral North-central lineage colonized northwestern Taiwan first and maintained a slowly growing population throughout much of the early to middle Pleistocene period. The ancestral widespread lineage reached central-southern Taiwan and experienced a spatial and demographic expansion into eastern Taiwan. This expansion began approximately 30,000 years ago in the Holocene interglacial period. The ancestral southern expansion into eastern Taiwan indicates that the central mountain range (CMR) formed a barrier to east-west expansion. However, *E. formosa* populations in the three major biogeographic regions (East, South, and North-Central) exhibit no significant genetic partitions, suggesting that river drainages and mountains did not form strong geographical barriers against gene flow among extant populations. Conclusions: The present study implies that the antiquity of *E. formosa*'s colonization is associated with its high dispersal ability and larval tolerance to the late Pleistocene dry grasslands. The effect of 3 late Pleistocene climatic changes on the subtropical damselfly's historical demography is lineage-specific, depending predominantly on its colonization history and geography. It is proposed that the Riss and Würm glaciations in the late Pleistocene period had a greater impact on the evolutionary diversification of subtropical insular species than the last glacial maximum (LGM)." (Authors)] Address: Lin, C.P., Department of Life Science & Center for Tropical Ecology and Biodiversity, Tunghai University, Taichung, Taiwan 40704. E-mail: treehops@thu.edu.tw

10261. Kadoya, T.; Akasaka, M.; Aoki, T.; Takamura, N. (2011): A proposal of framework to obtain an integrated biodiversity indicator for agricultural ponds incorporating the simultaneous effects of multiple pressures. *Ecological Indicators* 11(5): 1396-1402. (in English) ["One of the promising approaches to monitoring biodiversity is assessing the status of pressures driving the biodiversity state. To achieve this, we need to identify the principal pressures that cause simultaneous biodiversity loss across taxonomic groups and clarify how multiple pressures act synergistically or at least simultaneously to decrease biodiversity in the focal ecosystem. Here, we used a series of 64 ponds as a case study and we developed a framework for an integrated biodiversity indicator that took into consideration the estimated relative importance of multiple pressures. The indicator is defined as a function of the pressure(s) and is parameterized to explain a number of individual indicators of biodiversity, such as richness, abundance, and functional diversity of focal taxa. We selected aquatic macrophytes, Odonata, and benthic macroinvertebrates as the focal taxa. In addition, we focused on three types of pressure: eutrophication (represented by total phosphorus, total nitrogen, suspended solids, chlorophyll a, and density of cyanobacteria of pond water), habitat de-

struction (land-use type around the pond and pond bank protection), and invasive alien species (abundance of bluegill, largemouth bass, red swamp crayfish, and American bullfrog). We then evaluated the relationships among direct pressures and the individual biodiversity indicators and used a hierarchical Bayesian approach to calculate the integrated biodiversity indicator. Using this framework, we demonstrated that eutrophication had greater effects on the state of biodiversity of the agricultural ponds than did habitat destruction or the presence of invasive alien species. We also showed that the integrated indicator could well explain the behaviours of several individual biodiversity indicators, including total richness, endangered species richness, and functional diversity of focal taxa. These results demonstrate the advantages of the framework in providing a more practical method for assessing biodiversity, and quantifying the relative importance of the major threats to biodiversity to prioritize strategies in conservation planning and policy making." (Authors)] Address: Kadoya, T., Environmental Biology Division, National Institute for Environmental Studies, 16-2, Onogawa, Tsukuba, Ibaraki 305-8506, Japan

10262. Kerbiriou, C.; Bargain, B.; Le Viol, I.; Pavoine, S. (2011): Diet and fuelling of the globally threatened aquatic warbler at autumn migration stopover as compared with two congeners. *Animal Conservation* 14(3): 261-270. (in English) ["The effective conservation of aquatic warbler *Acrocephalus paludicola*, one of the most threatened western Palaearctic migratory passerines, requires good knowledge of its ecological needs at stopover sites. In particular, identifying its diet, which controls the accumulation of fat reserves during migration, facilitates the selection and management of adequately protected areas. Further key information includes the relationship between prey species abundance and habitats of aquatic warbler on stopover. We performed standardized mist netting in the Audierne marshes (western France) during 12 years, which resulted in the capture of 1200 aquatic warblers, and provided measurements for mass gain and the collection of faeces to infer the birds' diet. Invertebrate sampling was carried out in the three main Audierne marsh habitats (reed bed, fen mire and meadow). In order to go beyond prey digestibility bias, we also studied two closely related *Acrocephalus* species, present at migration stopover sites during the same period. We found that the diet composition of aquatic warbler observed at migration stopover sites is based on large-sized prey (Odonata, Orthoptera, Lepidoptera). Like sedge warblers, aquatic warblers put on weight during migration stopovers (daily mass gain=0.38 g). This increase in weight suggests that the aquatic warblers might have adopted a strategy for long-distance migration with few stopovers only. Owing to great differences in diet, conservation management for the threatened aquatic warbler at stopover sites should not rely on existing knowledge about sedge and reed warblers. Similarities in the diet of aquatic warbler between nesting areas and migration stopover areas and the relationship between habitat and prey abundance suggest that fen mires play an important role in the quality of the foraging habitat at stopover sites." (Authors)] Address: Kerbiriou, C., UMR 7204 MNHN-CNRS-UPMC Conservation des Espèces, Restauration et Suivi des Populations (CERSP), Muséum National d'Histoire Naturelle, Paris, France

10263. Kloskowski, J. (2011): Impact of common carp *Cyprinus carpio* on aquatic communities: direct trophic

effects versus habitat deterioration. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 178(3): 245-255. (in English) ["*C. carpio*, a worldwide introduced benthivorous fish, has been implicated in the degradation of native environments through initiation of a shift to a phytoplankton-dominated turbid state, which is associated with dramatic biodiversity loss. This study combined surveys of ponds containing either low total biomass of small-sized carp or high densities of large-sized carp with an enclosure/exclosure experiment, in order to quantify the direct (trophic) and indirect (via habitat deterioration) impacts of carp on pond communities. High-density ponds supported substantially lower biodiversity and were more turbid than low-density ponds. The subsequent field experiment examined the effects of carp presence/absence and of clear-water versus moderately turbid conditions mediated by carp on the survival to metamorphosis of larval anurans *Pelobates fuscus* and *Hyla arborea*, on Zygotera and Anisoptera densities, and on the biomass of submerged macrophytes. The presence of enclosed one-year old carp resulted in the complete elimination of larval anurans and the absence of Odonata. The effects of the habitat conditions were not significant, apart from better survival of *P. fuscus* in the moderately turbid carp enclosures than in clear water. Submerged plants were more abundant in clear-water than in turbid treatments, with a negligible effect of enclosures/exclosures. These results suggest that carp predation and related effects may be primarily responsible for animal diversity loss in invaded communities, as they may act prior to, or independent of, the ecosystem switch to a turbid phase." (Authors)] Address: Kloskowski, J., Dept of Nature Conservation, Institute of Biology, M. Curie-Skłodowska University, Akademicka 19, 20-033 Lublin, Poland. E-mail: januszkl@poczta.umcs.lublin.pl

10264. Klymko, J. (2011): *Ophiogomphus anomalus*, Extra-striped Snaketail, a new species for Nova Scotia. *Argia* 23(1): 21-22. (in English) [Medway River between Bangs Falls and Riversdale, Canada, 18-VI. and 20-VII-2010] Address: Klymko, J., Canada. E-mail: jklymko@mta.ca

10265. Konopko, D. (2011): New locality of the Pygmy Damselfly *Nehalennia speciosa* (Charpentier, 1840) (Odonata: Coenagrionidae) in the Tricity Landscape Park. *Odonatrix* 7(1): 24-27. (in Polish, with English summary) ["*N. speciosa* inhabits mainly small natural water bodies with the area less than 1 ha, great amount of mud sedge *Carex limosa* and slender sedge *C. lasiocarpa* as well as submerged vegetation. In Poland, 75 sites of this species have been discovered so far of which 44 are regarded as contemporary. In the Tricity Landscape Park, the Pygmy Damselfly was discovered for the first time in July 2006 at the site about 1,1 km NE away from Kamień in the commune of Szemud (Konopko 2007). The next site was discovered in July 2009, in a peat bog bordered from NE with Zawiat Lake situated in the vicinity of Bieszkowice, in the commune of Wejherowo. The central point of the peat bog is a dystrophic water body with the Sphagnum moss mat separated from the lake by 90 meter-width belt of *Vaccinio uliginosi*-*Pinetum sylvestris* Kleist 1929 bog woodland. *N. speciosa* are present in *Carex limosa* swamp. The population is small; the highest number of individuals was 70. During earlier studies this species was not found in the peat bog. The colonization of this site was probably made before our eyes. Except for *N. speciosa*,

32 dragonfly species were observed in the peat bog in which four of them are under protection: *Aeshna subarctica*, *Leucorrhinia albifrons*, *L. caudalis* and *L. pectoralis*. In the future, in the area of the peat bog, the forming of the nature reserve called „Bieszkowickie Moczary” is planned, however, nowadays the steps for establishing the second refuge for the *N. speciosa* in the area of the Tricity Landscape Park are taken." (Author)] Address: Konopko, D., ul. Dedala 8/2/9, 81-197 Gdynia, Poland. E-mail: darkon27@wp.pl

10266. Kovalenko, K.E.; Dibble, E.D. (2011): Effects of invasive macrophyte on trophic diversity and position of secondary consumers. *Hydrobiologia* 663(1): 167-173. (in English) ["Invasive species are one of the widespread stressors of aquatic ecosystems. Several studies document food web effects of invasive fish, but little information is available on the effects of invasive macrophytes. We studied differences in food chain length as well as trophic position and trophic diversity of fish and odonates in lakes dominated by native plants or invasive Eurasian watermilfoil. Trophic position and food chain length were determined using baseline-adjusted $\delta^{15}\text{N}$ isotope signatures. Trophic diversity, or isotope niche width, was estimated from convex hull area analysis. Results show that trophic position of secondary consumers was not affected by the invasive macrophyte, whereas trophic diversity was greater in watermilfoil-dominated lakes. The direction of isotopic niche expansion was different in fish and odonates, suggesting potential decoupling in predator-prey interactions. This study shows that dominant non-native macrophytes may cause significant changes in food web structure of invaded ecosystems. Trophic diversity may be a more sensitive indicator of environmental stress than trophic position and has the potential to be used for assessment of invasive species impacts and restoration success." (Authors)] Address: Kovalenko, Katya, Biological Sciences, University of Windsor, Windsor, ON N9B 3P4, Canada. E-mail: katya@uwindsor.ca

10267. Koyama, T.; Takano, H.; Yokoyama, T. (2011): Micropores in the Vitelline Layer of the Eggs of the Dragonfly *Oligoaeshna pryeri*: A Preliminary Observation from the Viewpoint of Oxygen Uptake. *Advances in experimental medicine and biology* 915: 307-310. (in English) ["In dragonfly eggs, oxygen diffusing in, and carbon dioxide diffusing out, encounter barriers in the shell. According to Tullett and Board, in avian eggs the most important of these barriers results from the geometry of the pores through the shells. As in birds, dragonfly egg shells consist of three layers: the exochorion, endochorion and the innermost vitelline membrane. Trueman has described pores and fine anchorlike structures in the endochorion but the vitelline membrane does not seem to have been studied. In the present work we have used scanning electron microscopy to examine the vitelline membrane in hatching eggs of *Oligoaeshna pryeri*. We have assumed that the numerous openings seen on the micrographs are pores through the membrane. Results are expressed as means \pm SD. The pore diameter, pore area and number per μm^2 of the vitelline membrane were 74.7 ± 61.3 nm, 4380 ± 3555 nm² and 4.16 ± 1.3 pores/ μm^2 (4.16×10^8 pores/cm²), respectively. The total pore area was calculated to be 18,222 nm²/ μm^2 . In avian egg shells pore density depends on the weight of the egg. Results given by Tullett and Board suggest that an egg weighing 1 g may have a pore density of 300 pores/cm², which is

much lower than the present result for dragonflies. It seems likely that the difference reflects the fact that in *Oligoaeshna pryeri* the eggs are immersed in water." (Authors)] Address: Koyama, T., Hokkaido University, Sapporo, Japan. E-mail: tomkoyamajp@yahoo.co.jp.

10268. Lampo, C.; Riservato, E.; Lencioni, V. (2011): Contributo alla conoscenza dell'odonatofauna della Val di Ledro (Trentino). *Studi Trent. Sci. Nat.* 88: 53-59. (in Italian, with English summary) ["In 2009-2010 the odonatofauna from two lakes, Ampola and Ledro (southern Trentino, NE-Italy) was studied. Larvae, exuviae and adults were collected. In all, 21 species were identified, all of them already known for the Trentino Province but only three already found in the study area. The occurrence in Trentino of two species, *Somatochlora flavomaculata* and *Aeshna isosceles*, is confirmed after 30 years. As expected, a higher species richness was recorded in Lake Ampola, being a protected site since 1990thies: 16 species of which 9 with evidence of reproduction. Only 9 species (of which 5 reproductive, with modified phenology) were observed at Lake Ledro, impacted by water abstraction with consequent high level fluctuations." (Authors)] Address: Lencioni, Valeria, Museo Civico di Storia Naturale di Verona, Lungadige Porta Vittoria 9, 37122, Verona, Italia. E-mail: lencioni@mtsn.tn.it

10269. Li, Y.; Nel, A.; Ren, D.; Zhang, B.; Pang, H. (2011): A new Chinese Mesozoic dragonfly clarifies the relationships between *Rudialeschnidae* and *Cymatophlebiidae* (Odonata: Aeshnoptera). *Zootaxa* 2802: 51-57. (in English) ["A very well preserved fossil specimen of *Rudialeschna limnobia* Ren & Guo, 1996, is described and diagnosis for *Rudialeschna* is emended. Its clear morphological structures, including body characters, clarify and confirm the affinities of *Rudialeschna* and the *Rudialeschnidae* with *Cymatophlebia* Deichmüller, 1886, and the *Cymatophlebiidae*, previously inferred only through venational characters." (Authors)] Address: Ren, D., College of Life Sciences, Capital Normal University Beijing 100048, China. E-mails: rending@mail.cnu.edu.cn

10270. Lima Silveira, T.C.; Rodrigues, G.G.; Coelho de Souza, G.P.; Würdig, N.L. (2011): Effects of cutting disturbance in *Schoenoplectus californicus* (C.A. Mey.) Soják on the benthic macroinvertebrates. *Acta Scientiarum. Biological Sciences*, Maringá 33(1): 31-39. (in English, with Portuguese summary) ["Lagoons are considered protected areas because these systems play a key ecological role. However, the extraction of macrophyte *Schoenoplectus californicus* is held for manufacture of handicrafts, being an alternative income for riverbank communities. This study evaluated the impact of *S. californicus* experimental cutting on benthic macroinvertebrates through a field experiment. Macroinvertebrates were sampled at 1, 12, 26 and 60 days after the macrophyte cutting in demarked plots (1 m²), as well at control plots. The families number was not statistically different (ANOVA, $p > 0.05$), but the total density of invertebrates, and the density of *Ceratopogonidae* were significant (ANOVA, $p < 0.05$) for interaction between sampling date and treatment. A Principal Components Analysis identified that the level of the water column was the variable that most influenced the variation between the samples gathered in the experiment. We concluded that the cutting of *S. californicus*, in this area, as the intensity of the cut held, did not affect considerably the aquatic macroinvertebrates. The results

suggest that the small-scale extractivism in these regions carries little effect because the fauna of adjacent areas probably can quickly colonize the disturbed areas. ... Because only the fauna associated with sediment have been assessed in this study, some taxa more active or rare, were not sampled in larger quantities, among them Odonata, Ephemeroptera and Hyallellidae (Table 1). The sampler used (corer) is more effective in collecting taxa with little mobility, i.e. most of detritivores." (Authors)] Address: Rodrigues, G.G., Depto de Zoologia, Centro de Ciências Biológicas, Programa de Pós-graduação em Desenvolvimento e Meio Ambiente, Universidade Federal de Pernambuco, Av. Prof. Moraes Rego, 1235, 50670-420, Cidade Universitária, Recife, Pernambuco, Brazil. E-mail: gilberto.rodrigues@ufpe.br

10271. Mac Nally, R.; Wallis, E.; Lake, P.S. (2011): Geometry of biodiversity patterning: assemblages of benthic macroinvertebrates at tributary confluences. *Aquatic ecology* 45(1): 43-54. (in English) ["We assessed whether tributaries in upland catchments (=watersheds) affected assemblages of benthic macroinvertebrates in mainstems, as has been reported in northern hemisphere systems. Eight confluences of small to medium streams (stream orders 1–4, 2.2–10.8 m wide) were studied in the Acheron River basin in Victoria, Australia. For each confluence, two transects were sampled at each of five zones relative to the confluence: two zones upstream in the mainstem, one zone upstream in the tributary, one zone at the confluence and one zone downstream in the mainstem. Surveys were conducted in both high-flow and lowflow conditions. In mainstems, there was no change in macroinvertebrate density, taxonomic richness or functional feeding group composition downstream relative to upstream of the confluences. While tributaries statistically had distinctive benthic macroinvertebrate assemblages compared to mainstems, these distinctions were small. In low flows, densities in tributaries were substantially lower than in mainstems, but densities during high flows were more similar (albeit only about one-third as high as in low flow) in tributaries and mainstems. An inverse pattern was evident for taxonomic richness, where richness in tributaries and mainstems was similar in low flows but was greater in mainstems than in tributaries in high flows. We found little evidence of tributary effects in macroinvertebrate assemblages in this basin, which is at odds with some previous results from other continents. To explain this divergence, we suggest a conceptual model outlining factors that control variation in effects of tributaries on assemblages of benthic macroinvertebrates in mainstems." (Authors) The "Supporting information" to this paper includes a list of taxa recorded in the Acheron River catchment and including "Synthemistidae" and "Telephlebiidae".] Address: Mac Nally, R., Australian Centre for Biodiversity, School of Biological Sciences, Monash University, Melbourne 3800, Australia. E-mail: Ralph.MacNally@sci.monash.edu.au

10272. Marin, A.A.; Dumbrava-Dodoaca, M., Petrovici, M.; Herlo, G. (2011): The human impact on benthic community structure and dynamics of different ecosystems from Lunca Muresului Nature Park (West of Romania). *Aquaculture, Aquarium, Conservation & Legislation. International Journal of the Bioflux Society* 4(1): 72-78. (in English, with Romanian and Hungarian summaries) [Macrozoobenthos of Mures River and Caramidariei Lake, within the area of Lunca Muresului Nature Park, Romania, was investigated to get information

on impacts of pollution to these water bodies. Taxonomic work considered only order level insects, including Odonata.] Address: Dumbrava-Dodoaca, Malina, West University of Timisoara, Faculty of Chemistry Biology and Geography, Department of Biology, Timisoara, Romania. E-mail: malinadumbrava@yahoo.com

10273. Martens, A.; Grabow, K. (2011): Early stadium damselfly larvae (Odonata: Coenagrionidae) as prey of an aquatic plant, *Utricularia australis*. *International Journal of Odonatology* 14(1): 101-104. (in English) ["Two third stadium larvae of Coenagrionidae (probably *Coenagrion puella* or *Ischnura elegans*) were recorded in the bladders of *U. australis* sampled from a garden pond in Karlsruhe, Germany, in June 2010. These are the first records of odonate larvae as prey of carnivorous aquatic macrophytes." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, PF 111062, 76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

10274. Medlock, J.M.; Vaux, A.G.C. (2011): Assessing the possible implications of wetland expansion and management on mosquitoes in Britain. *European Mosquito Bulletin* 29: 38-65. (in English) ["The expansion of existing wetlands, their creation from arable land, and the creation of new saltmarsh to alleviate coastal erosion and flooding are important UK issues as the environment sector adapts to the possible impacts of climate change and continues to meet its goals in providing increased wetland habitat for wildlife, and an outdoor space for human 'well-being'. Concerns have been raised over the potential impacts that such initiatives might have on mosquitoes and the possible future transmission of infectious diseases. This paper aims to firstly review wetland management and design strategies used in North America and Australia in relation to managing mosquitoes in wetlands, and secondly specifically discuss possible mitigating strategies for the key British mosquito species of freshwater wetland habitats in order to guide future research in this field. Developing this evidence-base is a crucial element in preparing for the emergence of mosquito-borne disease in the UK and in aiding policy makers in their assessments of the risks and impacts associated with wetland expansion on mosquito nuisance and disease risk. It is important to ensure that biodiversity gain and habitat restoration can advance without inadvertently elevating the risks from disease vectors." (Authors) Passing references to Odonata as predators of mosquitoes are made.] Address: Medlock, J.M., Medical Entomology & Zoonoses Ecology Group, Microbial Risk Assessment, Emergency Response Department, Health Protection Agency, Porton Down, Salisbury, Wiltshire SP4 0JG, UK. E-mail: jolyon.medlock@hpa.org.uk

10275. Minova, S.; Balla, M.; David, S. (2011): First record of *Hemianax ephippiger* (Odonata: Aeschnidae [sic]) from Slovakia. *Folia faunistica Slovaca* 16(1): 25-26. [E Slovakia, Vychodoslovenska rovina Plain; Inacovce (N 48°41'31.6", E 22°3'53.7"), 2 pairs of adults flying in tandem, 23.5.2007; loc. Ibid. 1 mating pair, 6.6.2007.] Address: Minov, Slávká, State Nature Conservancy of the Slovak Republic, Administration of the Protected Landscape Area Latorica, M. R. Štefánika 1755, SK-075 01 Trebišov, Slovakia. E-mail: slavka.minova@sopsr.sk

10276. Miyazaki, R.; Lehmkuhl, D.M. (2011): Chapter 6: Insects of the Saskatchewan River System in Sas-

katchewan. In: *Arthropods of Canadian Grasslands (Volume 2): Inhabitants of a Changing Landscape*. Edited by K. D. Floate. Biological Survey of Canada. ISBN 978-0-9689321-5-5: 119-157. (in English, with French summary) ["The diversity of aquatic insects in the Saskatchewan River system in Saskatchewan is high. This reflects the postglacial recruitment of species from as far away as the Colorado River system and Eurasia, but also the diverse nature of the waterway itself. Clear, cool waters flow over a variety of rubble, gravel, and sand substrates and harbour habitats of submerged branches, logs, and growing vegetation. Of the more than 1,000 species of aquatic and semi-aquatic insects that inhabit waters on the grasslands of the Canadian prairie, at least half occur in streams and rivers. This chapter provides an overview of the latter species, with an emphasis on mayflies (Ephemeroptera), stoneflies (Plecoptera), caddisflies (Trichoptera), and non-biting midges (Chironomidae) and only brief mention of other insect species. Aquatic insects often represent a large biomass with great biodiversity in pristine prairie rivers. This is still the case for some areas of the Saskatchewan River, which shows minimal damage and appears to be in its near original state. Elsewhere, however, dams, sewage, and agricultural runoff have degraded aquatic habitats over large expanses. Laws protecting flowing waters in Canada are weak, and large areas of these waters require detailed study to increase our understanding of the biodiversity and ecological roles of aquatic insects." (Authors) Odonata are treated at pages 150-152.] Address: Miyazaki, R., Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 5E2

10277. Muzon, J.; Lozano, F. (2011): Description of the final instar larva of *Progomphus joergenseni* Ris (Ephemeroptera: Gomphidae). *Zootaxa* 2762: 56-60. (in English) ["The final instar larva of *P. joergenseni* is described and illustrated for the first time based on specimens collected in Río Negro Province, northern Patagonia, Argentina. Right mandibular molar crest shows an extreme reduction in the number of teeth with no intermediates between teeth a and b. Antennal, leg and paraprocts morphology suggest a close relationship with the species included in the *Pygmaeus* group, but *P. joergenseni* differs from them because of its larger size and longer anal pyramid." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

10278. Nagel, L.; Zanuttig, M.; Forbes, M.R. (2011): Escape of parasitic water mites from dragonfly predators attacking their damselfly hosts. *Canadian Journal of Zoology* 89(1): 213-218. (in English, with French summary) ["Many parasites are transmitted trophically, whereas others can either succumb to, or escape from, the predators of their hosts. We examined the extent to which larval arrenurid water mites (*Arrenurus planus* Marshall, 1908 and *Arrenurus pollictus* Marshall, 1910) parasitizing *Lestes forcipatus* and *L. disjunctus* escape from predatory libellulid dragonflies that are consuming their hosts. We hypothesized that the brightly coloured mites would be avoided by feeding dragonflies. However, all partially engorged *A. pollictus* mites were eaten while their host was being consumed in staged predation trials. In contrast, half of the fully engorged mites detached and therefore escaped consumption. Trials with *A. planus* mites showed that they detached more readily than their congeners, which may be due to se-

lection on those temporary pond mites to survive desiccation stress following detachment. The effect of dragonfly predation on transitioning of mites from parasitic larvae to their free-living aquatic stages therefore depends on the degree of engorgement and the mite species." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

10279. Neiss, U.G.; Fiorentin, G.L.; De Marmels, J. (2011): The larva of *Allopodagrion brachyurum* De Marmels, 2001 (Odonata: Zygoptera: Megapodagrionidae) from Southern Brazil. *Zootaxa* 2836: 44-50. (in English) ["The larva of *A. brachyurum* is the first known for the genus. The larva is described and illustrated based on exuviae of reared larvae collected in the upper course of the Rio dos Sinos, in Caraá município, Rio Grande do Sul, Brazil. The larva of *A. brachyurum* can be distinguished from all other neotropical megapodagrionid larvae primarily by the presence of a well developed obtuse tubercle in sub-vertical orientation on each side of occiput; two blunt tubercles on top of the head; and caudal gills thin, stiff, triquetral and extremely long, as long as body." (Authors)] Address: Neiss, U.G., Coordenação de Pesquisas em Entomologia, Instituto Nacional de Pesquisas da Amazônia/INPA, Caixa Postal 478, CEP 69011-970, Manaus, AM, Brazil. Bolsista Doutorado/CNPq. E-mail: ulisses.neiss@gmail.com

10280. Nelson, S.M. (2011): Response of stream macroinvertebrate assemblages to erosion control structures in a wastewater dominated urban stream in the southwestern U.S. *Hydrobiologia* 663: 51-69. (in English) ["Effects of stream erosion control structures on aquatic macroinvertebrates were studied (2000–2009) in a wastewater dominated drainage (Wash) in Las Vegas, Nevada. Mainstem sites with and without structures, wastewater treatment plant outfalls, a reference site above treatment plant inputs, and tributary sites were sampled. Ordination suggested hydrology and channel characteristics (current velocity, stream depth, and width), and water quality (conductivity) were primary factors in organizing macroinvertebrate communities, with some variables altered at structures. Treatment plant inputs changed hydrology (increased flows), water chemistry (conductivity decreased below treatment plants), and temperature. Assemblages differed between site types, with midges and damselflies important at tributary sites and Fallceon mayflies and Smicridea caddisflies common at erosion control structures. Locally unique communities developed at structures which also may have facilitated exotic species invasions. Analyses showed that taxa richness increased over time at these sites and differed significantly from richness at sites without structures. Structures appeared important in retaining organic matter and, among mainstem sites, coarse particulate organic matter was highest, but variable, at structures and at wetlands above the structures. Erosion control structures, coupled with warm effluent, high baseflows, and altered water quality resulted in development of a macroinvertebrate community that did not trend towards reference or tributary sites. In this case, ecological communities at structures used for river restoration were not on a continuum between disturbed and reference sites. Goal setting of community responses at these structures would have required insight beyond the simple use of reference site attributes." (Author) Odonata are treated at the family

level.] Address: Nelson, S.M., Technical Service Center, Bureau of Reclamation, Denver Federal Center, Bldg. 56, Rm. 2010, P.O. Box 25007 (86-68220), Denver, CO 80225, USA. E-mail: snelson@usbr.gov

10281. Ngiam, R.W.J.; Sun, S.W.; Sek, J.Y. (2011): An update on *Heliogomphus cf. retroflexus* Ris, 1912 with notes on *Microgomphus chelifera* Selys, 1858 in Singapore (Odonata: Anisoptera: Gomphidae). *Nature in Singapore* 4: 95-99. (in English) ["Ngiam (2010) published a paper describing two gomphid larvae collected from the Central Catchment Nature Reserve which had been reared unsuccessfully. The two larvae were believed to be from the genus *Heliogomphus*, and based on their antennal morphology, Ngiam discussed the possibility that the larvae could be *Heliogomphus cf. retroflexus*. However the two larvae were not reared to adulthood and *Heliogomphus retroflexus* adults have never been recorded locally. Singapore is also well outside the known distribution range of *Heliogomphus retroflexus* and no other *Heliogomphus* species other than *Heliogomphus kelantanensis* Laidlaw, 1902 has been recorded in Singapore (Tang et al., 2010). Thus the exact identity of the two mysterious gomphid larvae remains unsolved. Recently more larvae similar to those collected by Ngiam (2010) were collected and two individuals were reared to adulthood. The identity of the larva is finally revealed to be *Microgomphus chelifera* Selys, 1858. In this paper, larvae from the genus *Heliogomphus* and *Microgomphus* are discussed. In addition, the successful rearing of *Microgomphus chelifera* larvae provides an update on its local status." (Authors)] Address: Robin Wen Jiang Ngiam, R.W.J., National Biodiversity Centre, National Parks Board, 1 Cluny Road, Singapore 259569. E-mail: ngiamwenjiang@nparks.gov.sg

10282. Nóbrega, C.C.; De Marco Jr. P. (2011): Unprotecting the rare species: a niche-based gap analysis for odonates in a core Cerrado area. *Diversity and Distributions* 17(3): 491-505. ["Aim: We evaluated Odonata distribution data and predicted the compositional resemblance based on niche-based species distribution models to analyse the following questions: (1) How is estimated species richness distributed, and how can it be preserved under the actual network of conservation units (a gap analysis approach)? (2) How is the estimated odonate beta diversity distributed, and is there a better distribution of conservation units (a priority setting approach)? (3) Is the probability of being under protection a function of the potential species range size? and (4) Will the current conservation network proposals protect odonate taxa? Location: Central Brazil in a core Cerrado area. Methods: We generated odonate species distribution predictions based on MaxEnt and maps derived from estimated species richness, beta diversity and gap analysis for all species predicted to occur in the study area. Then, we compared these maps with current conservation units, land-use patterns and proposals for the establishment of conservation units. Results: Raw odonate species records provided limited utility for setting conservation priorities without the use of niche-based models. However, area under the receiver operating curve (AUC) values were characterized by substantial variation that was related to the number of records. No current conservation units overlapped the areas with higher predicted richness and beta diversity, and in general, conservation units were not preserving restricted/rare species. There was a direct linear correlation between species range size and the

proportion of its range protected in the current network of conservation units. Finally, we identified three areas with high odonate beta diversity where conservationist actions should be implemented. Main conclusions: Current conservation units and future suggested areas do not overlap regions with high conservation values for odonates. Conservation units protect species at random, and the level of protection has a direct relationship with species range size; thus, wide-range species are expected to be more protected than restricted or threatened species." (Authors)] Address: De Marco Júnior, P., Laboratório de Ecologia Teórica e Síntese, ICB 1, Universidade Federal de Goiás, CP 131, 74.001-970, Goiânia, GO, Brazil. E-mail: pdemarco@icb.ufg.br

10283. Novelo Gutierrez, R.; Gomez Anaya, J.A. (2011): The larva of *Progomphus lambertoi* Novelo-Gutiérrez, 2007 (Odonata: Gomphidae). *Zootaxa* 2872: 58-62. (in English) ["The larva of *Progomphus lambertoi* is described and illustrated; it belongs to the obscurus-group of *Progomphus*. It appears closely related to *P. belyshevi* Belle and *P. borealis* McLachlan based on stature and size of abdominal dorsal protuberances but is easily separated from these species by abdominal colour pattern." (Authors)] Address: Gomez Anaya, J.A., Instituto de Ecología, A.C. Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: antonio.gomez@in-econol.edu.mx

10284. Ojha, N.; Clausnitzer, V.; Suhling, F.; Schaab, G. (2011): Adding a distribution modelling tool for conservationists of the African Odonata database. In: Niekisch, M. & B. Streit (Eds.): Status and future of tropical biodiversity. Conference of the Society for Tropical Ecology, Gesellschaft für Tropenökologie e.V. - gtö, Goethe University, 21 - 24 February 2011, Frankfurt a. M., Programme & Abstracts: 163. (in English) [Verbatim: "Species distribution models have often been employed to find the potential habitat range. Making use of the unique African Odonata database which covers over 800 species, we present a logistic-regression based modelling tool for predicting their potential distribution. Thus, the scientifically collected database has the potential to be useful for conservation related applications; as determining the species potential distribution range is one of them. E.g. the potential distribution range can aid in the assessment of IUCN's threat status. Odonata serve as good indicator species for conservation and environmental monitoring and planning for various reasons: they are easy to monitor, the taxonomy is straight forward, they inhabit aquatic (larvae) and terrestrial (adults) habitats, and they are top predators. Here we present the example of modelling, currently based on presence-only data, of two Odonata species in tropical Africa categorised as vulnerable in the IUCN red list of threatened species. The tool applies the maximum likelihood method based on the expectation-maximisation approach. In order to develop a tool in particular useful to conservationists, emphasis is given mainly to a) functions to ensure proper harmonisation of raster and vector datasets, b) a user-friendly graphical user interface, and c) a comprehensive help system. *Coryphagrion grandis*, mainly residing in the coastal areas of Kenya and Tanzania and *Pseudagrion bicoerulans*, mainly found in the montane areas of Kenya, Uganda and Tanzania have been threatened by wood extraction (deforestation), agriculture and water pollution. Therefore, the variables used for modelling are surrogates of a) climate (like 6 bioclimatic variables), b) habitat (land-co-

ver, elevation), c) resources (vegetation index, distance to water) and d) potential anthropogenic impact (population density). These example species show the model's usefulness in e.g. identifying areas in need of conservation for these species in East-Africa. An assessment of the sensitivity of the variables in regard to the predicted habitat ranges can help to project relative impacts caused by the various variables." (Authors)] Address: Ojha, Nirmal, Hochschule Karlsruhe, Karlsruhe, Germany. E-mail: nirmal.ojha@hs-karlsruhe.de

10285. Olthoff, M.; Ikemeyer, D. (2011): Erstnachweis von Hochmoor-Mosaikjungfer (*Aeshna subarctica*) und Arktischer Smaragdlibelle (*Somatochlora arctica*) im Amtsvenn-Hündfelder Moor (Kreis Borken) (Anisoptera: Aeshnidae, Corduliidae). *Natur und Heimat* 71(1): 1-8. (in German, with English summary) ["*A. subarctica* and *S. arctica* were recorded for the first time in the nature reserve Amtsvenn-Hündfelder Moor in the district of Borken (Westphalia, Germany) in 2010. Both species are bog specialists confined to Sphagnum-dominated bog pools. While the reproduction of *S. arctica* could not be proved, *A. subarctica* breeds in Sphagnum-dominated peat cuttings. It is assumed that the observed individuals of the latter species are part of a cross-border metapopulation, comprising further peat bogs in the district of Borken, the adjacent Netherlands and Lower Saxony."] Address: Olthoff, M., Biologische Station Zwillbrock e.V., Zwillbrock 10, 48691 Vreden, Germany. E-mail: matthias.olthoff@gmx.de

10286. Ordóñez, C.; Loughheed, V.L.; Gardea-Torresdey, J.L.; Bain, L.J. (2011): Impact of Metals on Macroinvertebrate Assemblages in the Forgotten Stretch of the Rio Grande. *Arch. Environ. Contam. Toxicol.* 60: 426-436. (in English) ["The objective of this study was to examine how changes in the benthic macroinvertebrate community structure and a variety of abiotic variables, such as conductivity and sediment metal concentrations, are modified along the Forgotten River stretch of the Rio Grande. This stretch receives industrial effluent, raw sewage, and agricultural return flow from the El Paso (TX, USA)—Ciudad Juárez (CHI, Mexico) metroplex and then flows relatively undisturbed for 320 km before its next significant input. The high degree of use, followed by the 320-km undisturbed stretch, makes the Forgotten River a unique study site to examine downstream attenuation of contaminants and other abiotic variables to determine their potential effects on macroinvertebrates. Five different sites along the Forgotten Stretch were sampled over a 2-year period. Metal concentrations were low throughout the stretch and were predominantly correlated to percent sediment organic matter rather than explained spatially. Several sensitive invertebrate species, such as Leptophlebiidae, increased in relative abundance downstream, whereas the percentage of tolerant invertebrates decreased. Nonmetric multidimensional scaling separated the macroinvertebrate communities upstream from those downstream, with the more sensitive species being found predominantly downstream and more tolerant taxa associated upstream. Additionally, there was a distinct seasonal gradient to the community. The most important drivers of the community assemblage appear to be distance downstream and seasonality, as well as water conductivity and concentrations of sediment cadmium, which was the only metal that exceeded protective criteria. This study did not provide evidence of the downstream attenuation of heavy metals in the sedi-

ments in the Forgotten Stretch; however, downstream changes in macroinvertebrates toward more sensitive taxa suggests that other, unmeasured contaminants might be affecting biological communities in this isolated stretch of an international waterway." (Authors) Odonata are treated at the family level.] Address: Bain, L.J., Dept of Biological Sciences, Clemson University, Clemson, SC, USA. E-mail: lbain@clemson.edu

10287. Ott, J. (2011): GNOR Arbeitskreise. AK Libellen. Neue Informationen für Libellenfreunde. GNOR info 112: 30-31. (in German) [The following books are introduced: Libellenatlas für die SAAR-LOR-LUX-Plus-Großregion and "Monitoring Climate Change with Dragonflies" (Bio-risk online) as well as information are given on the current campaign on dragonflies in Germany of BUND.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

10288. Ott, J. (2011): Moorlibellen. Verlierer und Gewinner. BUNDmagazin 2/: 21. (in German) [General account on the dragonflies of bogs in the framework of the present campaign of the German section of "Friends of the Earth and directed to the protection of dragonflies.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

10289. Outomuro, D.; Ocharana, F.J. (2011): Wing pigmentation in Calopteryx damselflies: a role in thermoregulation? Biological Journal of the Linnean Society 103(1): 36-44. (in English) ["Body melanization may show adaptive variation related to thermoregulation ability, and it is to be expected that the degree of melanization will change among populations or closely related species across environmental gradients of solar radiation and/or environmental temperature. Some melanized secondary sexual traits may also play a role in sexual selection, leading to interpopulation variation, which would not be predicted by thermoregulation pressures alone. We studied the relationships between the interpopulation variation in wing pigmentation level (i.e. melanized secondary sexual trait) of two closely related species of Calopteryx damselfly, and both solar radiation and maximum environmental temperature estimates. Wing pigmentation differs between these species, is gender specific and is used in species' discrimination. Only *C. virgo meridionalis* males showed a significant negative partial correlation between wing pigmentation degree and temperature. However, *C. virgo meridionalis* females showed a positive significant partial correlation between wing pigmentation degree and solar radiation. Wing pigmentation in *C. xanthostoma* males was not related to solar radiation or temperature. Thus, thermoregulation pressures poorly explained the observed variations in wing pigmentation between populations, although they might have an adaptive significance at the species' level. As wing pigmentation showed important latitudinal variation, several other selection pressures which might act on melanized traits are briefly discussed." (Authors)] Address: Outomuro, D., Departamento de Biología de Organismos y Sistemas, University of Oviedo, E-33071, Spain. E-mail: outomuro.david@gmail.com

10290. Patterson, R.J.; Smokorowski, K.E. (2011): Assessing the benefit of flow constraints on the drifting invertebrate community of a regulated river. River research and applications 27: 99-112. (in English) [Ontario, Canada; "The downstream effects of hydroelectric dam operations on the abundance and diversity of the

macroinvertebrate drift community of a regulated river were compared to that of an unregulated river, longitudinally and across three seasons. The regulated river operated under minimum flow and ramping rate (rate of change of flow) restrictions resulting in a 'modified peaking' regime, which means the facility could still peak, but at a slower rate and may not reach maximum turbine flows in the short time typically required to respond to market energy demand. The unregulated river had no dams or other water control structures. There was a trend of increasing abundance and diversity with distance from the dam on the regulated river, with no discernable trend along the unregulated river. While feeding guild proportions did not vary along the unregulated river, within the regulated river feeding guild proportions changed longitudinally as scrapers and collector gatherers increased, and filterers and predators decreased with distance downstream. The regulated river had similar or higher abundance across all seasons, with lower diversity in the spring. Seasonal average discharge was found to be lowest in summer on both rivers, with the regulated river benefiting from a minimum flow to help maintain higher abundance and diversity. Overall, our examination of the drifting invertebrate community on a regulated river support that operational constraints associated with modified peaking regimes helped mitigate the typical negative effects associated with river regulation." (Authors) Taxa - including Odonata - are treated at the order level.] Address: Smokorowski, Karen, Great Lakes Laboratory for Fisheries & Aquatic Sciences, Fisheries & Oceans Canada, 1219 Queen Street East, Sault Ste. Marie, ON, P6A 2E5, Canada. E-mail: Karen.Smokorowski@dfo-mpo.gc.ca

10291. Perez-Gutierrez, L.; Montes-Fontalvo, J.M. (2011): Heteropodagrion croizati sp. nov. (Odonata: Megapodagrionidae) with a key to the known species of the genus. Zootaxa 2810: 63-68. (in English) ["Heteropodagrion croizati sp. nov. is described and illustrated on the basis of two males and one female (holotype male: Colombia, Putumayo Dept., Mocoa, PNN Churumbelos (1°09'40.93'N 76°39'49.13'W) alt. 1000m, 28-I-2010. The new species is characterized by male paraproct surpassing length of cercus, genital ligula distally bilobulate, trumpet-shaped, and with laterally expanding distal lobes, and female with basal pale rings on all abdominal segments. A key for the known species of Heteropodagrion and the closely related Mesagrion leucorrhinum is provided." (Authors)] Address: Pérez-Gutiérrez, L., Grupo de investigación en Biodiversidad del Caribe colombiano. Depto de Biología, Universidad del Atlántico, km 7 antigua vía Puerto Colombia, Barranquilla, Colombia. E-mail: talysker@gmail.com

10292. Pérez-Santigosa, N.; Florencio, M.; Hidalgo-Vila, J.; Díaz-Paniagua, C. (2011): Does the exotic invader turtle, *Trachemys scripta elegans*, compete for food with coexisting native turtles? Amphibia-Reptilia 32(2): 167-175. (in English) ["Nowadays, established populations of exotic turtles, *Trachemys scripta elegans*, coexist with native turtles in the wild in southern Spain. We analysed the diet of this exotic species and compared it with the diet of the two native species (*Mauremys leprosa* and *Emys orbicularis*) in two ponds. The exotic turtle is an opportunistic omnivore. In one of our study ponds where exotic invasive crayfish were very abundant, adult and juvenile exotic turtles fed mainly on this prey. In the other study pond, juveniles fed mainly on animal matter and adults ate similar proportions of plants and animals. Na-

tive turtles also ingested mainly crayfish in the first study pond, but *M. leprosa* were mainly herbivorous in the second pond. We did not detect strong differences among the diets of the three species. While native species significantly differ in their diets, the exotic turtles did not differ from some groups of native ones. Exotic turtles had the widest range of food, overlapping the food spectra of different age groups of the two native species in both localities. Comparing with previous reports on native turtles diet of the same area, our results did not reveal changes in the diet which could be associated to interactions with exotic turtles, but the observed shift to a higher proportion of animals in the diet in one of the ponds were mainly due to the high abundance of exotic crayfish." (Authors) Odonata contributed significantly to the diet of all turtle species.] Address: Díaz-Paniagua, Carmen, Estación Biológica de Doñana (CSIC), P.O. Box 1056, 41080 Sevilla, Spain, Email: poli@ebd.csic.es

10293. Popa, M.; Zaharia, A. (2011): Early jurassic ovipositories on Bennettitalean leaves from Romania. *Acta Paleontologica Romaniae* 7: 285-290. (in English) ["Early Jurassic (Hettangian–Sinemurian) rare insect ovipositories occurring on *Pterophyllum* sp. bennettitalean (cycadeoidalean) leaves are described from Pregheda, a former open cast mine for bituminous coals belonging to the Sirinia Basin, Danubian Units of the South Carpathians, Romania. These ovipositories are represented by groups of 2-3 elliptical bodies, distributed with their longer axis parallel to the leaf venation, and associated in four distinct rows, parallel to the rachis, two rows on each side of it, a peculiar pattern for the ichnospecies *Paleoovoides rectus* (Vasilenko) Sarzetti et al. 2009 to which the material is assigned. The Hettangian–Sinemurian ovipositories recorded in Pregheda belong to fossil representatives of the Odonata. They were generated after the leaf's abscission, in a wetland area associated with a coal-generating marsh." (Authors)] Address: Popa, M., Univ. of Bucharest, Fac. of Geology & Geophysics, Laboratory of Palaeontology, 1, N. Bălcescu Ave., 010041, Bucharest, Romania. E-mail: mihai@mepopa.com

10294. Rantala, M.J.; Honkavaara, J.; Dunn, D.W.; Suhonen, J. (2011): Predation selects for increased immune function in male damselflies, *Calopteryx splendens*. *Proc. R. Soc. B.* 278(1709): 1231-1238. (in English) ["Predation selects for numerous traits in many animal species, with sick or parasitized prey often being at high risk. When challenged by parasites and pathogens, prey with poor immune functions are thus likely to be at a selective disadvantage. We tested the hypothesis that predation by birds selects for increased immune function in a wild population of male damselflies *Calopteryx splendens*, while controlling for a trait known to be under selection by bird predation, dark wing-spots. We found that selection on both immune function and wing-spot size was significantly positive, and that selection on either trait was independent of selection on the other. We found no evidence of nonlinear quadratic or correlational selection. In contrast to previous studies, we found no phenotypic correlation between immune function and wing-spot size. There was also no difference in immune response between territorial and non-territorial males. Our study suggests that predation may be an important agent of selection on the immune systems of prey, and because the selection we detected was directional, has the potential to cause phenotypic change in populations." (Authors)] Address: Rantala, M.J., Dept of

Biology, University of Turku, FIN-20024 Turku, Finland. E-mail: markus.rantala@utu.fi

10295. Remsburg, A.J. (2011): Relative influence of prior life stages and habitat variables on dragonfly (Odonata: Gomphidae) densities among lake sites. *Diversity* 3(2): 200-216. (in English) ["Many aquatic species have discrete life stages, making it important to understand relative influences of the different habitats occupied within those populations. Although population demographics in one stage can carry over to spatially separated life stages, most studies of habitat associations have been restricted to a single life stage. Among Gomphidae, recruitment via adult oviposition establishes initial population sizes of the aquatic larvae. However, spatial variability in larval survivorship could obscure the relationship between adult and larval densities. This study uses surveys conducted during 2005 and 2006 of Gomphidae larval, emergence, and adult stages from 22 lake sites in northern Wisconsin, USA, to investigate (1) whether the Gomphidae density of each life stage correlated spatially with that of the preceding life stage and (2) what habitat factors help explain variation in densities at each life stage. Results indicated that adult densities from the previous season helped predict densities of early-instar larvae. This finding suggests that oviposition site selection controlled the local larval distribution more than larval survivorship or movement. Late-instar larval densities helped predict densities of emerging Gomphidae later the same season, suggesting that variation in survivorship of final-instar larvae among sites is small relative to the variation in larval recruitment. This study demonstrates that locations with higher densities of odonates in the water also have higher densities of odonates on land. In addition to the densities of Gomphidae in previous life stages, water clarity helped predict larval densities, and riparian wetland vegetation helped predict emergent dragonfly densities." (Author)] Address: Remsburg, Alysa, Unity College, 90 Quaker Hill Rd, Unity, ME 04988, USA. E-mail: aremsburg@unity.edu

10296. Rival, D.; Schönweitz, D.; Tropea, C. (2011): Vortex interaction of tandem pitching and plunging plates: a two-dimensional model of hovering dragonfly-like flight. *Bioinspiration & Biomimetics* 6(1) 016008: (in English) ["The force evolution and associated vortex dynamics on a nominal two-dimensional tandem pitching and plunging configuration inspired by hovering dragonfly-like flight have been investigated experimentally using time-resolved particle image velocimetry. The aerodynamic forces acting on the flat plates have been determined using a classic control-volume approach, i.e. a momentum balance. It was found that only the tandem phasing of $\alpha = 90^\circ$ was capable of generating similar levels of thrust when compared to the single-plate reference case. For this tandem configuration, however, a much more constant thrust generation was developed over the cycle. Further examination showed that the force and vortex development on the fore-plate was unaffected by the tandem configuration and that nearly all variations in performance could be attributed to the vortex interaction on the hind-plate. By calculating the trajectory and strength of the hind-plate's trailing-edge vortex, the chain-like vortex interaction mechanism responsible for improved performance at $\alpha = 90^\circ$ could be identified. The underlying result from this study suggests that the dominant vortex interaction in dragonfly flight is two dimensional and that the spanwise flow

generated by root-flapping kinematics is not entirely necessary for efficient propulsion but potentially due to evolutionary restrictions in nature." (Authors)] Address: Rival, D., Institute of Fluid Mechanics and Aerodynamics, Technische Universität Darmstadt, Germany. E-mail: derival@ucalgary.ca

10297. Roberts, N.W.; Porter, M.L.; Cronin, T.W. (2011): The molecular basis of mechanisms underlying polarization vision. *Phil. Trans. R. Soc. B* 366(1565): 627-637. (in English) ["The underlying mechanisms of polarization sensitivity (PS) have long remained elusive. For rhabdomic photoreceptors, questions remain over the high levels of PS measured experimentally. In ciliary photoreceptors, and specifically cones, little direct evidence supports any type of mechanism. In order to promote a greater interest in these fundamental aspects of polarization vision, we examined a varied collection of studies linking membrane biochemistry, protein-protein interactions, molecular ordering and membrane phase behaviour. While initially these studies may seem unrelated to polarization vision, a common narrative emerges. A surprising amount of evidence exists demonstrating the importance of protein-protein interactions in both rhabdomic and ciliary photoreceptors, indicating the possible long-range ordering of the opsin protein for increased PS. Moreover, we extend this direction by considering how such protein paracrystalline organization arises in all cell types from controlled membrane phase behaviour and propose a universal pathway for PS to occur in both rhabdomic and cone photoreceptors." (Authors) *Hemiodulia tau* is presented as ultraviolet-sensitive, blue-sensitive and green-sensitive. According a personal information given by the author, at present the development of polarization vision in odonates from larval stages through to adult is studied.] Address: Roberts, N.W., School of Biological Sciences, Univ. of Bristol, Woodland Road, Bristol BS8 1UG, UK. E-mail: nicholas.roberts@bristol.ac.uk

10298. Rosario, K.; Marinov, M.; Stainton, D.; Kraberger, S.; Wiltshire, E.J.; Collings, D.A.; Walters, M.; Martin, D.P.; Breitbart, M.; Varsani, A. (2011): Dragonfly cyclovirus, a novel single-stranded DNA virus discovered in dragonflies (Odonata: Anisoptera). *Journal of General Virology* 92: 1302-1308. (in English) ["We describe Dragonfly cyclovirus (DfCyV), a new species of ssDNA virus discovered using viral metagenomics in dragonflies (Libellulidae family) from the Kingdom of Tonga (Tongatapu and Vava'u islands). Metagenomic sequences of DfCyV were similar to viruses of the recently proposed Cyclovirus genus within the Circoviridae family. Specific PCR resulted in the recovery of twenty-one DfCyV genomes from three dragonfly species (*Pantala flavescens*, *Tholymis tillarga*, and *Diplacodes bipunctata*). The 1741 nucleotide DfCyV genomes share >95% nucleotide identity and are classified into eleven subtypes representing a single strain. The DfCyV genomes share 48-63% genome-wide nucleotide identity to cycloviruses identified in human faecal samples. Recombination analysis revealed three recombinant DfCyV genomes suggesting that recombination plays an important role in cyclovirus evolution. To our knowledge this is the first report of a circular ssDNA virus identified in insects, and the data may help elucidate evolutionary links among novel Circoviridae recently identified in animals and environmental samples." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: mgmarinov@yahoo.com

10299. Rowe, R.J.; Davies, C.; Davies, D.; Pohe, S.R.; Simpson, E.H. (2011): *Tramea loewii* (Odonata: Libellulidae), a dragonfly newly arrived in New Zealand. *New Zealand Journal of Zoology* 38(2): 189-193. (in English) ["Two adult females of the large, migratory dragonfly *Tramea loewii* were observed at Lake Rotokawau, Northland in 2005 and 2007. Larvae found at nearby Lake Waipara in 2007 indicate the species had bred in New Zealand. Given appropriate climatic conditions, this species may be expected to expand its range within the northern reaches of the country. Queensland and New Caledonia are likely sources for the New Zealand population. Morphological characters are provided to enable identification of adults and larvae in the field." (Authors)] Address: Rowe, R.J., School of Tropical Biology, James Cook University, Townsville 4811, Australia. E-mail: Richard.Rowe@jcu.edu.au

10300. Samways, M.J.; Pryke, J.S.; Simaika, J.P. (2011): Threats to dragonflies on land islands can be as great as those on oceanic islands. *Biological Conservation* 144(3): 1145-1151. (in English) ["We ask whether oceanic islands and equivalent-sized continental blocks, which we call here 'land islands', are similar or not in their species richness, number of range-restricted species, and in number of threatened species. We used sites in southern Africa and islands in the Western Indian Ocean. We chose dragonflies as they are taxonomically tractable, well surveyed, and provide a range of characteristics from narrow-range endemics to widely-spread and vagile opportunists. We then selected as many oceanic islands as possible where there were sufficient data to make comparisons with land islands of a similar area in African savanna, grassland and mountains rich in endemic species. Generalized Linear Mixed Models were used to analyse the overall, range-restricted and threatened species richness for all islands (both oceanic and land) and then for the two types of island separately. Species richness increased with island size, with oceanic and land island size relationships being similar. Land islands overall had significantly more range-restricted species. Species on land islands were as threatened as those on oceanic islands. However, the land islands of the Western Cape were under a higher level of threat than oceanic islands of comparative size. The large islands of Madagascar and Sri Lanka were outliers with very high levels of threat. Translated into conservation, the results illustrate that over-generalizations about island faunas being more threatened than continental ones are not necessarily valid. While not wishing to draw attention away from the urgent conservation action needed on many tropical islands, we argue that comparisons of oceanic versus land islands detract from the more urgent task of local conservation action based on the special needs of any particular area, whether land or oceanic. It is more meaningful to establish how threats operate and how to mitigate them on small populations rather than focusing purely on any particular island type per se." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

10301. Schmidt Dalzochio, M.; Rodrigues, M.E. (2011): Description of the larva of *Archilestes exoletus* (Hagen in Selys) (Odonata: Lestidae). *Zootaxa* 2756: 65-68. (in English) ["The larva of *A. exoletus* is described and illustrated based on exuviae of reared larvae collected in Cascavel, State of Paraná, Brazil. The larva of *A. exole-*

tus can be distinguished from other species of Archilestes of which the larva has been described by the absence of a lateral spine at the margin of the 4th abdominal segment and having the cleft of the ligula closed." (Authors)] Address: Schmidt Dalzochio, Marina, Laboratory of Ecologia e Conservação de Ecossistemas Aquáticos, University of Vale do Rio dos Sinos, 93022-000, São Leopoldo, RS, Brazil. E-mail: mahsdalzochio@gmail.com

10302. Scudder, G.G.E.; Lucas, L.; Warman, L. (2011): Rarity and richness biodiversity hotspots of the montane Cordillera ecozone. In Assessment of Species Diversity in the Montane Cordillera Ecozone. Edited by G.G.E. Scudder and I.M. Smith. Royal British Columbia Museum: 1-7. (in English) ["Based upon available geo-reference distributional data on more than 15 taxa of native animals (including Odonata) and vascular plants in British Columbia, biodiversity hotspots were determined and mapped on the 1:50 000 NTS grid. Rarity hotspots are shown for provincially Red-listed animals and plants, and for the potentially rare and endangered freshwater and terrestrial invertebrates. Richness hotspots were determined for the freshwater animals, the terrestrial animals, and the vascular plants. It is shown that the Montane Cordillera Ecozone in British Columbia is a major hotspot region in the province for all the categories mapped. Some of the conservation implications are discussed." (Author)] Address: Scudder, G.G.E., Dept of Zoology, Univ. of British Columbia, Vancouver, BC, V6T 1Z4, Canada.

10303. Sesterhenn, T.M. (2011): Effects of predators and injury over different time scales in the damselfly *Ischnura posita* (Odonata: Coenagrionidae). *Annals of the Entomological Society of America* 104(2): 358-363. (in English) ["Sublethal appendage injury or loss has been shown to alter many behaviors of animals, including foraging and predation avoidance. But most studies of this phenomenon to date have been short-term in scope, and longer term studies may produce different results as seen in some studies on predator effects. Larval damselflies routinely autotomize their caudal lamellae and encounter predators, making them ideal for comparisons of short-term and longer term effects of appendage loss and predator exposure. In this study, I examined activity and foraging of larval *I. posita*, testing for effects of lamella loss and predator cues both in the short term (1 h) and the longer term (8 d). I predicted that both predators and injury would decrease activity and foraging for a short time and that these effects would diminish over time. Results indicated that only the most severe injuries affected foraging, delaying first prey capture when no predator was present; but injury did not affect total prey caught. In the 1-h experiment, damselflies had lower activity in the presence of predator cues, with no effect of injury, whereas the 8-day experiment showed no effect of predator cues on activity. I did not find a major effect of injury or predator cues on activity or foraging of larval damselflies; no effects were detectable over the entire 8-d study. I conclude that the ecological implications of such injuries in nature may often be negligible." (Author)] Address: Sesterhenn, T.M., Department of Biology, University of Kentucky, Lexington, KY 40506-0225, USA. E-mail: tsest@uky.edu

10304. Sibley, F.C. (2011): New species for Nebraska. *Argia* 23(1): 20-21. (in English) [New records for the Nebraska, USA State list are: *Argia nahuana*, *Enallagma vesperum*, *Nasiaeschna pentacantha*, *Dromogomphus*

sp., *Erpetogomphus designatus*, *Stylurus plagiatus*, *Epitheca spinigera*, and *Tramea calverti*.] Address: Sibley, F.C., The Conservation Agency, 6 Swinburne St. Jamestown, RI 02835, USA. E-mail: fcsibley@empacc.net

10305. Staniczek, A.H. (2011): Rivers and other freshwater habitats. Focus on aquatic insects. *Patrimoines naturels* 70: 251-257. (in English) [The paper includes a key to Odonata and an annotated species list of Odonata (n = 17) from Espiritu Santo, Vanuatu. *Agriocnemis exsudans*, *Ischnura aurora*, *Vanuatubasis santoensis*, *Vanuatubasis sp.*, *Pseudagrion microcephalum*, *Pseudagrion sp.*, *Anax guttatus*, *Hemicordulia fidelis*, *Diplacodes bipunctata*, *D. haematodes*, *D. trivialis*, *Neurothemis stigmatizans*, *Rhyothemis phyllis*, *Orthetrum serapia*, *O. villosovitatum*, *Tramea propinqua*, *Pantala flavescens*.] Address: Staniczek, A.H., Dept of Entomology, State Museum of Natural History, Rosenstein 1, 70191 Stuttgart, Germany. E-mail: arnold.staniczek@smns-bw.de

10306. Stoks, R.; De Block, M. (2011): Rapid growth reduces cold resistance: Evidence from latitudinal variation in growth rate, cold resistance and stress proteins. *PLoS ONE* 6(2): e16935. doi:10.1371/journal.pone.0016935: 6 pp. (in English) ["Background: Physiological costs of rapid growth may contribute to the observation that organisms typically grow at submaximal rates. Although, it has been hypothesized that faster growing individuals would do worse in dealing with suboptimal temperatures, this type of cost has never been explored empirically. Furthermore, the mechanistic basis of the physiological costs of rapid growth is largely unexplored. Methodology/Principal Finding: Larvae of the damselfly *Ischnura elegans* from two univoltine northern and two multivoltine southern populations were reared at three temperatures and after emergence given a cold shock. Cold resistance, measured by chill coma recovery times in the adult stage, was lower in the southern populations. The faster larval growth rates in the southern populations contributed to this latitudinal pattern in cold resistance. In accordance with their assumed role in cold resistance, Hsp70 levels were lower in the southern populations, and faster growing larvae had lower Hsp70 levels. Yet, individual variation in Hsp70 levels did not explain variation in cold resistance. Conclusions/Significance: We provide evidence for a novel cost of rapid growth: reduced cold resistance. Our results indicate that the reduced cold resistance in southern populations of animals that change voltinism along the latitudinal gradient may not entirely be explained by thermal selection per se but also by the costs of time constraint-induced higher growth rates. This also illustrates that stressors imposed in the larval stage may carry over and shape fitness in the adult stage and highlights the importance of physiological costs in the evolution of life-histories at macro-scales." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U. Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

10307. Sychra, J.; Adamek, Z. (2011): The impact of sediment removal on the aquatic macroinvertebrate assemblage in a fishpond littoral zone. *J. Limnol.* 70(1): 129-138. (in English) [Bottom sediment removal, a widely used technique in restoration management of standing water bodies, has a strong influence on communities of aquatic organisms. As most information on the impact of sediment removal on the aquatic environment comes from studies on lakes, the aim of this study was to describe macroinvertebrate assemblage

succession in a fishpond (Štěpánek fishpond, Bohemian-Moravian highlands, Czech Republic) littoral zone following restoration by sediment removal during the winter of 2003/2004. Semi-quantitative hand net sampling was undertaken one year before (2003) and in each of the following five years (2004–2008) after sediment removal. A significant decrease in both abundance (approx. 90% of individuals) and diversity (approx. 30% of taxa) of macroinvertebrates was detected immediately after pond restoration. The values gradually increased over subsequent years, reaching comparable abundance and diversity three years after sediment removal. A significant shift was recorded in the taxonomic and functional composition of the macroinvertebrate assemblage after sediment removal. Mayfly larvae were the dominant invertebrates before restoration, while chironomid larvae and oligochaetes dominated after sediment removal. Phytophilous taxa, grazers and scrapers, and swimming or diving invertebrates were common in 2003, whilst open-water taxa preferring mud and other mostly inorganic microhabitats, gatherers/collectors, and burrowing/boring invertebrates were relatively common after sediment removal. In 2008, the assemblage reverted towards the situation before sediment removal, probably connected with a lower water level and accelerated macrophyte bed succession. Principal Component Analysis on the species data confirmed the differences in invertebrate taxonomic structure among sampling years. Succession of the fishpond invertebrate assemblage in the years following sediment removal was mainly influenced by fish farming practice and local conditions, i.e. the presence of macrophyte beds, mesohabitat changes following restoration, and the presence of other water bodies in the surroundings." (Authors) Odonata taxa reported are: *Platycnemis pennipes*, *Coenagrion* sp., *Ischnura elegans*, *Ischnura* sp., and *Libellula depressa*.] Address: Sychra, J., Dept of Botany and Zoology, Faculty of Science, Masaryk Univ., Kotlářská 2, 611 37 Brno, Czech Republic. E-mail: dubovec@seznam.cz

10308. Takahashi, Y.; Watanabe, M. (2011): Male mate choice based on ontogenetic colour changes of females in the damselfly *Ischnura senegalensis*. *Journal of Ethology* 29(2): 293-299. (in English) ["While male mate choice behaviour has been reported in many taxa, little is known about its plasticity and evolutionary consequences. In *I. senegalensis*, females exhibit colour dimorphism (gynomorph and andromorph). The body colour of gynomorphs changed ontogenetically in accordance with sexual maturation, while little change occurred in andromorphs. To test the male mate choice between sexually immature and mature females of both morphs, binary choice experiments were conducted. Virgin males that were reared separately from females after emergence did not show significant preference between sexually immature and mature females for both morphs, indicating that virgin males were unable to discriminate female reproductive status. On the other hand, males that had experienced copulation with gynomorphs preferred sexually mature gynomorphs to sexually immature ones. However, males that had experienced copulation with andromorphs could not discriminate between sexually immature and mature andromorphs, probably due to the absence of significant ontogenetic change in their thoracic colour. Therefore, female body colour is an important cue for males in discriminating between sexual maturation stages. Learned mate discrimination depending on copulation experien-

ce might help males to detect potential mates effectively and avoid sexually unreceptive immature female. We finally discuss the adaptive significance of the ontogenetic colour change in females." (Authors)] Address: Takahashi, Y., Graduate School of Life & Environmental Sciences, Univ. of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki Japan. E-mail: yuyuyuyu@ies.life.tsukuba.ac.jp

10309. Todd, B.D.; Bergeron, C.M.; Hepner, M.J.; Burke, J.N.; Hopkins, W.A. (2011): Does maternal exposure to an environmental stressor affect offspring response to predators? *Oecologia* 166(1): 283-290. ["There is growing recognition of the ways in which maternal effects can influence offspring size, physiological performance, and survival. Additionally, environmental contaminants increasingly act as stressors in maternal environments, possibly leading to maternal effects on subsequent offspring. Thus, it is important to determine whether contaminants and other stressors can contribute to maternal effects, particularly under varied ecological conditions that encompass the range under which offspring develop. We used aquatic mesocosms to determine whether maternal effects of mercury (Hg) exposure shape offspring phenotype in the American toad (*Bufo americanus*) in the presence or absence of larval predators (dragonfly naiads). We found significant maternal effects of Hg exposure and significant effects of predators on several offspring traits, but there was little evidence that maternal effects altered offspring interactions with predators. Offspring from Hg-exposed mothers were 18% smaller than those of reference mothers. Offspring reared with predators were 23% smaller at metamorphosis than those reared without predators. There was also evidence of reduced larval survival when larvae were reared with predators, but this was independent of maternal effects. Additionally, 5 times more larvae had spinal malformations when reared without predators, suggesting selective predation of malformed larvae by predators. Lastly, we found a significant negative correlation between offspring survival and algal density in mesocosms, indicating a role for top-down effects of predators on periphyton communities. Our results demonstrate that maternal exposure to an environmental stressor can induce phenotypic responses in offspring in a direction similar to that produced by direct exposure of offspring to predators." (Authors)] Address: Todd, B.D., Department of Fish and Wildlife Conservation, Virginia Tech, 100 Cheatham Hall, Blacksburg, VA, 24061, USA

10310. Topkara, E.T.; Ozbek, M.; Tasdemir, A.; Yildiz, S.; Balik, S.; Ustaoglu, M.R. (2011): Determination of pollution level of Yuvarlak stream (Koycegiz-Mugla) by using benthic macro invertebrates. *Journal of Animal and Veterinary Advances* 10(9): 1194-1201. (in English) [Turkey; Odonata are treated at the genus level.] Address: Topkara, E.T., Dept of Hydrobiology, Faculty of Fisheries, Ege University, 35100 Bornova-Izmir, Turkey

10311. Vanderhaeghe, F. (2011): *Lestes dryas* in the west of Vlaams-Brabant. "In Flanders. Libellenvereniging Vlaanderen —nieuwsbrief 5(1): 2-3. (in Dutch, with English summary) [*L. dryas* is mainly confined to the Antwerp en Limburg Campine region, with more scattered stations elsewhere. In July 2010 the author discovered two males at a pond in Merchtem, about 5 km from where this species had also been found also in 1997. Although this species shows important dispersion capacities, we suggest it is that a local population could be present and in general it would be wise to have a

good search for this species elsewhere also." (Author)] Address: Floris Vanderhaeghe. E-mail: floris.vanderhaeghe@inbo.be

10312. Wendzonka, J.; Buczyński, P. (2011): Literatura i recenzje [Literature and reviews]: – Recenzja. Bellmann H. 2010. Przewodnik entomologa. Ważki. MULTICO Oficyna Wydawnicza. 280 ss. ISBN 978-83-7073-706-1. [Review. Bellmann, H. 2010. [Entomologist's guide. Dragonflies]. MULTICO Oficyna Wydawnicza. 280 pp. ISBN 978-83-7073-706-1.]. Odonatrix 7(1): 27-30. (in Polish, with English summary) ["The reviewed work is the first general book about dragonflies from over 100 years in Poland. It has been translated from the German edition. It contains general information about dragonflies of Central Europe with keys to adults (relatively good) and larvae (very poor) and individual descriptions of all species with good photographs and drawings. Unfortunately, the publisher has not consulted this edition with any Polish odonatologists and the book contains a lot of mistakes and omissions." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska Univ., Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

10313. Wiesenborn, W.D. (2011): Nitrogen Contents in Riparian Arthropods is most dependent on allometry and order. Florida Entomologist 94(1): 71-80. (in English, with Spanish summary) ["I investigated the contributions of body mass, order, family, and trophic level to nitrogen (N) content in riparian spiders and insects collected near the Colorado River in western Arizona. Most variation (97.2%) in N mass among arthropods was associated with the allometric effects of body mass. Nitrogen mass increased exponentially as body dry-mass increased. Significant variation (20.7%) in N mass adjusted for body mass was explained by arthropod order. Adjusted N mass was highest in Orthoptera, Hymenoptera, Araneae, and Odonata and lowest in Coleoptera. Classifying arthropods by family compared with order did not explain significantly more variation (22.1%) in N content. Herbivore, predator, and detritivore trophic-levels across orders explained little variation (4.3%) in N mass adjusted for body mass. Within orders, N content differed only among trophic levels of Diptera. Adjusted N mass was highest in predaceous flies, intermediate in detritivorous flies, and lowest in phytophagous flies. Nitrogen content in riparian spiders and insects is most dependent on allometry and order and least dependent on trophic level. I suggest the effects of allometry and order are due to exoskeleton thickness and composition. Foraging by vertebrate predators, such as insectivorous birds, may be affected by variation in N content among riparian arthropods." (Author)] Address: Wiesenborn, W.D., U.S. Bureau of Reclamation, Lower Colorado Regional Office, P.O. Box 61470, Boulder City, NV 89006

10314. Wong-Munoz, J.; Cordoba-Aguilar, A.; Cueva del Castillo, R.; Serrano-Meneses, M.A.; Payne, J. (2011): Seasonal changes in body size, sexual size dimorphism and sex ratio in relation to mating system in an adult odonate community. Evolutionary Ecology 25(1): 59-75. (in English) [Study area: 27 lakes of the Columbia National Wildlife Refuge (USA) in 1997, which occur in the centre of the Columbia Basin in eastern Washington State (46°55' N, 119°15' W; USA. "Seasonal environments impose developmental time constraints on insects which can be reflected in body size and sex ratio. By tracking these two aspects in recently emerged adults of 10 species of an odonate community in a number of lakes, we investigated whether (a) body size in both sexes

decreased as the flight season progressed and whether this led to seasonal changes in sexual size dimorphism (SSD); (b) SSD patterns were related to mating systems; (c) biases in sex ratio could be explained by mortality rates associated with the largest sex (e.g. in species with male-biased SSD, a female-biased sex ratio; in species with female-biased SSD, a male-biased sex ratio). Our results indicated that adults in most species, but not all, tend to reach a smaller body size as the season progressed. However, the opposite pattern was found in a few species. Predictions about the relation between SSD and mating systems were confirmed: a female-biased SSD in nonterritorial species and monomorphism for territorial species. However, predictions of biases in sex ratio according to SSD were not met in all species. Interestingly, changes in body size and SSD along the season were lake-specific in two species in which these patterns could be examined. These results, although partially supportive of environmental and sexual selection patterns acting on size and sex ratio as documented in other odonate species, indicate that we are still far from understanding seasonal constraints in these animals." (Authors) 14 species (*Aeshna californica*, *A. multicolor*, *Anax junius*, *Erythemis collocata*, *Libellula forensis*, *Pachydiplax longipennis*, *Sympetrum costiferum*, *S. occidentale*, *Enallagma boreale*, *E. carunculatum*, *Ischnura cervula*, *I. perparva*, *Lestes congener*, *Tramea lacerata*) were caught, but only 10 species used for the analysis, as the small sample size of the remaining four prevented statistical analysis.] Address: Córdoba-Aguilar, A., Depto de Ecol. Evol., Inst. Ecología, Univ. Nacional Autónoma de México, Ciudad Universitaria, Apdo. Postal 70-275, 04510 México DF, Mexico. E-mail: acordoba@ecologia.unam.mx

10315. Zhang, H.-m.; Tong, X.-l. (2011): Descriptions of *Boyeria karubei* Yokoi and *Periaeschna f. flinti* Asahina larvae from China (Anisoptera: Aeshnidae). Odonatologica 40(1): 57-65. (in English) ["The final stage larvae of the 2 species are for the first time described and illustrated based on laboratory reared specimens. The reared adults are also illustrated and discussed. Some biological notes are provided." (Authors)] Address: Zhang, H.-m., Dept of Entomology, College of Natural Resources & Environment, South China Agricultural Univ., Guangzhou-510642, China. zhanghaomiao6988@gmail.com

10316. Zhang, Z.-Q. (2011): Describing unexplored biodiversity: Zootaxa in the International Year of Biodiversity. Zootaxa 2768: 1-4. (in English) ["In the International Year of Biodiversity (2010), Zootaxa published 1,582 papers (including 92 monographs) in 405 issues, with a total of 32,330 pages. These papers included descriptions of 3,951 new taxa, of which 3,664 are of the species-group, 268 of the genus-group and 19 of the family-group. It is estimated that the total new animal species described in 2010 is most likely to be between 15,000 and 20,000, and Zootaxa has thus contributed 18 to 24% of the total." (Author) Odonata species: 30 and Odonata genus: 3.] Address: Zhang, Z.-Q., Landcare Research, Private Bag 92170, Auckland 1142, New Zealand. E-mail: ZhangZ@landcareresearch.co.nz

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1997

10317. Croyle, B.T. (1997): Population and community ecology of stream macroinvertebrates: the role of disturbance. M.Sc. thesis, Zoology, Texas Tech University, Lubbock: VII + 98 pp. (in English) [Texas, USA. "Quantifying factors that influence the abundance, distribution, or diversity of species within communities is a major focus of ecology and conservation biology. As concerns for the preservation and maintenance of worldwide biodiversity increase, identifying and understanding these factors becomes a critical endeavour. This goal should not be limited to large preserves of endangered habitat such as Yellowstone National Park or the plains of Africa. Indeed, knowledge gained from addressing such topics in small, accessible localities is of interest in its own right, and may prove useful when dealing with endangered habitats. Streams play vital roles in terrestrial ecosystems, as a source of water, in cycling nutrients, and as habitat for many organisms during part or all of their life cycles. This study assesses factors that affect the community structure of streams (i.e. the distribution, abundance, and diversity of aquatic macroinvertebrates)." (Author) The list of taxa sampled includes *Hetaerina americana*, *Agria* sp., *Basiaeschna*, *Dromogomphus*, *Hagenius brevistylus*, *Eretogomphus* sp., *Libellula* sp., *Brechmorhoga mendax*, and *Macromia* sp.] Address: not stated

1999

10318. Erickson, B.R. (1999): Fossil lake Wannagan (Paleocene: Tiffanian) Billings county, North Dakota. Miscellaneous series No. 87 North Dakota Geological Survey: IV + 9 pp. (in English) ["Fossil Lake Wannagan is a new name for a local freshwater lake of undetermined size that existed as part of a floodplain system during the Late Paleocene. It is located in the upper breaks of the badlands of the Little Missouri River in western North Dakota. Fossil Lake Wannagan is recognized from: sediments of fluvial, paludal and lacustrine character; a section of shoreline with well-defined beach cusps; and an exceptionally well-preserved freshwater assemblage of fossils. A sequence of stratified sediments records the brief history of its development and termination by crevasse splay deposition. Limnogeological and paleoenvironmental aspects of this ancient lake are presented along with its age and correlations. The name "Fossil Lake Wannagan" is, herein, introduced for the first time."

(Author) *Gomphaeschna schrankii* is listed as member of the Wannagan creek fauna.] Address: Erickson, B.R., Department of Paleontology, The Science Museum of Minnesota, St. Paul, Minnesota 55101, USA

2000

10319. Ketelaar, R.; Clausen, W.; Busse, R.; Eilk, J.L. van (2000): *Coenagrion ornatum* in Europe and its chances in The Netherlands. *Brachytron* 4(2): 8-15. (in Dutch) ["*C. ornatum* is a rare damselfly in Europe with an intriguing outpost north of Osnabrück, 90 kilometers from the Dutch border (Germany). *C. ornatum* is present here in very small streams with extensive *Berula erecta* vegetation. The species is in serious decline and is currently reproducing in moderate numbers (tens of individuals) at only one location. The main reasons for the decline of *C. ornatum* in central Europe are the cold winter of 1995 / 1996 when many localities became deep frozen, the lack of management practice, or too intensive management, habitat destruction, dessication and eutrofication. This article discusses the possible occurrence of this species in The Netherlands. Although suitable habitat is locally present and the dispersal capacities of *C. ornatum* seems to be rather well developed, climatic conditions and the lack of a large source population appear to be limiting factors. For the moment, it is not likely that *C. ornatum* can be recorded in The Netherlands." (Authors)] Address: Ketelaar, P., p/a De Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: ketelaar@vlinderstichting.nl

10320. Luzon-Ortega, J.M.; Tierno de Figueroa, J.M. (2000): First records of Odonata (Insecta, Odonata) from the Sierra de Hueter Natural Park (Granada, Spain). *Boletín de la Asociación Española de Entomología* 24(1-2): 257-259. (in Spanish) [16 Odonata species from 12 localities are documented.] Address: Luzon-Ortega, J. M., Departamento de Biología Animal y Ecología, Facultad de Ciencias, Universidad, 18707, Granada, Spain

10321. Petr, J. (2000): Aquatic insects (Odonata, Heteroptera, Trichoptera, Coleoptera) of small lakes in selected peatbogs of the Bohemian Forest and their relation to some environmental factors. *Silva Gabreta* 5: 121-134. (in Czech, with English summary) [*Aeshna juncea*, *A. subarctica*, *Anax imperator*, *Sympetrum danae*, *Leucorhinia dubia*, *Cordulia aenea*, *Coenagrion hastulatum*, and *Ischnura elegans* are reported from four localities in the

Modravské peatbog area studied during 1993-1995.] Address: Petr, J., Jihočeská univerzita, Pedagogická fakulta, Jeronýmova 10, CZ-37115 České Budejovice, Czech Republic

2002

10322. Kadoorie Farm & Botanic Garden; Reels, G.T. (2002): Report of Rapid Biodiversity Assessments at Maershan Nature Reserve, Northeast Guangxi, China, 1998 and 2001. South China Forest Biodiversity Survey Report Series: No. 16 (Online Simplified Version): ii + 20 pp. (in English) ["Thirty-one dragonfly species were recorded during the survey, including some undescribed species. Most frequently encountered were *Copera ciliata*, *Idionyx carinata*, and *Orthetrum triangulare*. Some of these records represent extensions of the known range: The *Oligoaeschna* is an important record; very few *Oligoaeschna* specimens have been obtained from China and none from continental China. The female of *O. petalura* from Hainan is undescribed; *O. pyanan* is known from Hainan. *Boyeria sinensis* has not previously been recorded from Guangxi. Several species recorded, including *Bayadera melanopteryx*, *Indocnemis orang*, *Planaeschna suichangensis*, *Idionyx carinata* and *Somatochlora dido*, are indicators of high stream integrity." (Author)] Address: Reels, G., H-3-30 Fairview Park, Yuen Long, Hong Kong. E-mail address: gtreels@gmail.com

10323. Kadoorie Farm and Botanic Garden; Wilson, K. (2002): Report of a Rapid Biodiversity Assessment at Qingshitan Headwater Forest Nature Reserve, Northeast Guangxi, China, 25 to 26 August 1998. South China Forest Biodiversity Survey Report Series (Online Simplified Version) No. 17: ii + 12 pp. (in English) ["Sixteen species of odonates were recorded, including two which have not yet been identified. The record of *Calopteryx melli* is important, as the genus had not been recently recorded from China and was previously known only from Guangdong. The Qingshitan record follows the first provincial record for the species, made at Huaping on 16 August 1998." (Authors)] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

10324. Kano, K.; Miyahata, T. (2002): So many victims in *Sympetrum frequens* floating on the water surface. Tombo 45: 27-28. ["On August 25, 2002, we found many dead specimens of *Sympetrum frequens* floating on the water surface of Shobu-ike pond (alt. 700 m asl) at the hillside of Mt. Akagi, Japan, where the ambient temperature seemed low and several individuals of *S. frequens* perched on grasses at the water edge looked white because they were drenched with dew drops. A few of them flied up weakly, and soon *Aeshna nigroflava* grasped one of them, but he did not eat but released it. The *S. frequens* fell on the water surface, became the victim of water striders. According to the weather data of Akagi station rainfall continued for 15 days from the beginning of August, and rainfall at night might have lowered the body temperature of *S. frequens*, and caused such accidents." (Author)] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

10325. Karube, H. (2002): Two new species of the genus *Planaeschna* (Odonata: Aeshnidae) from central Vietnam. Tombo 45: 7-11. (in English) [*Planaeschna owadai* sp. nov. (holotype male, Bach Ma National Park, Thua Thien Fue, central Vietnam, 4-X-2001, M. Owada

leg.) and *P. bachmaensis* sp. nov. (holotype male, Bach Ma National park, Thua Thien Fue, central Vietnam, 7-VI-2001, H. Karube leg.) are described. The former is closely related to *P. intersedens* from northern India, and the latter is related to *P. suichangensis* from South China. The holotypes are deposited in the collection of the National Science Museum, Tokyo, Japan.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan

10326. Kawashima, I (2002): Description of the larva of aeshnid dragonfly *Sarasaeschna niisatoi* (Karube, 1998) (Aeshnidae: Gomphaeschninae) from northern Vietnam. Tombo 45: 15-19. (in English) ["The larval morphology in last two instars of *S. niisatoi* is described and illustrated. The external larval characters of this species are compared with the larvae of *S. pryeri* and *S. kunigamiensis*.] Address: Kawashima, I., Nagasawa 1-50-9, Yokosuka-shi, Kanagawa, 239-0842 Japan

10327. Rahaman, A.A. (2002): Mangrove insect fauna of Muthupet, Tamil nadu. National Seminar on Conservation of Eastern Ghats, March 24-26, 2002, held at Tirupati, Andhra Pradesh: 327-338. (in English) [India; this is an additional frustrating example on ongoing rack and ruin of proper taxonomy and taxa identification in African and Asian countries: "Among the delicate Odonates Aeshnid sp and *Rhyotherus varigata* were of common occurrence.": "*Rhyotherus varigata*, *Acisoma panorpoides*, *Aris vivida*, *Crocothemis erythraea*, *Orthetrum brunneum*, *Libellula luctuosa*, 3 unidentified species."] Address: Rahaman, A.A., 21, Vidhya Nagar, Erode-638009, India

10328. Rocha, C.F.D.; Dutra, G.F.; Vrcibradic, D.; Menezes, V.A. (2002): The terrestrial reptile fauna of the Abrolhos Archipelago: species list and ecological aspects. Braz. J. Biol 62(2): 285-291. (in English, with Portuguese summary) [Bahia, Brazil; the diet of the lizard, *Tropidurus torquatus* is dominated by ants, but also included one unidentified Odonata specimen.] Address: Rocha, C.F.D., Departamento de Ecologia, Instituto de Biologia, Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier, 524, Maracanã, CEP 20550-019, Rio de Janeiro, Brazil. E-mail: cfdrocha@uerj.br

10329. Yokoi, N.; Kano, L. (2002): Odonata collected in Lak Sao and its neighbouring regions, central Laos, in spring. Tombo 45: 23-26. (in Japanese, with English summary) [A total of 40 Odonate species recorded in Lak Sao and its neighbouring regions, central Laos, during April 29 to May 3, 2001 is listed. Among them are 14 species recorded from Laos for the first time. Some taxonomically and zoogeographically interesting species are illustrated.] Address: Yokoi, N., 2-37-11, Kaisei, Koriyama, Fukushima, 963-8851 Japan

2003

10330. Aberlenc, H.-P.; Lentenois, P. (2003): Les insectes du bois de Païolive. In: Holthof, J.F. & Schnetzler, J. (Eds), *De Saint-Eugène en Païolive, Montmélian et les Vans, La Fontaine de Siloé et Saint-Eugène en Païolive*. 320 pp: 55-72. (in French) [Departement Ardeche, France. The Bois de Païolive is a forest situated at the eastern fringe of the Cevennen. It grows on a karstic plateau south of the river Chassezac within the administrative area of the villages Les Vans, Banne and Berriasset-Casteljau. A total of 38 Odonata species is listed, in-

cluding *Coenagrion mercuriale*, *Oxygastra curtisi*, and *Macromia splendens*. This species protected by the European law are briefly commented. Supplemental data to the regional fauna are updated in Aberlenc (2008) and Aberlenc (2011: www.aberlentomo.fr/1listeinsectespaoliolive29jan2011.doc) Address: Aberlenc, H.P., CIRAD, UMR CBGP, TA A-55/L, 34398 Montpellier cedex 5, France

10331. Bass, D. (2003): A survey of freshwater macroinvertebrates in Tobago. *Living World - Journal of the Trinidad and Tobago Field Naturalists' Club*, 2003: 64-69. (in English) ["A survey of macroinvertebrates inhabiting the freshwater environments of Tobago was made during April, May, and June of 1996. This collection yielded 61 species, bringing the total number of freshwater macroinvertebrate taxa known from Tobago to 112. Dominant taxa included a few species of gastropods, decapod crustaceans, ephemeropterans, odonates, hemipterans, and coleopterans. Species richness was usually greatest in streams having cobble substrates and flowing through undisturbed forested land. Generally this macroinvertebrate fauna is sparse when compared to that of continents, most likely due to the relatively small size of Tobago and to a much lesser extent, human disturbance of freshwater environments in some areas of the island. Further studies are likely to find additional species that were previously unknown to occur on Tobago, some of which may be endemic to the island." (Author) The following taxa are listed: *Argia* sp., *Dythemis* sp., *Erythemis vesicula*? *Ischnura ramburii*, *Micrathyrta* sp.] Address: Bass, D., Biology Dept, Univ. of Central Oklahoma, Edmond, Oklahoma, USA 73034. E-mail: Dbass@ucok.edu

10332. Birkin, E.; Quin, B.; Jelinek, A. (2003): *Hemiphysalia damselfly* / *Hemiphysalia mirabilis*. *Flora & Fauna Action Statement* 46: 1-5. (in English) [State of Victoria, Australia; distribution and conservation status of *H. mirabilis* are outlined, and the major conservation objectives and intended regional management actions are listed.] Address: Publishers: Dept Sustainability & Environment, 8 Nicholson St. East Melbourne, Victoria 3002 Australia

10333. Eda, S. (2003): Annual meeting of the Japanese Society for Odonatology in 2003. *Tombo* 46: 33-34. (in Japanese, with English summary) ["The Annual meeting of the Japanese Society for Odonatology was held at saga city in Kyushu, on May 31 and June 1, 2003, and 53 members attended." (Author)] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10334. Eda, S. (2003): Annual meeting of the Japanese Society for Odonatology in 2002. *Tombo* 45: 35. (in Japanese, with English summary) [The Annual meeting of the Japanese Society for Odonatology was held at Shibaura Institute of Technology in Tokyo, Japan, on November 23 and 24, 2002. 78 members attended.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10335. Eda, S. (2003): On the black stripes on the lateral sides of thorax appeared in *Sympetrum e. eroticum* (Selys). *Tombo* 46: 33. (in Japanese, with English summary) ["On September 28, 2003, a male of *S. e. eroticum* having black stripes instead of black spots on the first lateral sutures was captured at the lake Kutsuzawa-ko in Shiojin City, Nagano Prefecture. Though the black stripes are somewhat slender, they resemble to that of *S. darwinianum*." (Author)] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10336. Fukunaga, K.; Tomita, M.; Sumida, W.; Toshiro, K. (2003): Discovery of *Libellula angelina* Selys at Mishima Island of Hagi City in Yamaguchi pref. *Tombo* 46: 29-30. (in Japanese, with English summary) [13-V-2003; Mishima, a small island of the Japanese Sea about 45 km remote from the main island of Honshu, Japan.] Address: not stated in English

10337. Ishikawa, H. (2003): A new record of *Ictinogomphus pertinax* (Selys) from Kanagawa pref. *Tombo* 45: 40. (in Japanese, with English summary) [On August 13, 2002, a male of *I. pertinax* was captured at Futatsu-ike pond in Yokohama, Kanagawa Prefecture, Japan. This species has rapidly spread its distribution to the north and east during the past ten years. This is the first record for the Kanagawa Prefecture and the Kanto district, and thought to be the northern most and eastern most record of distribution at present." (Author)]

10338. Kano, K. (2003): *Copera tokyoensis* Asahina bitten by an ant on the mesotibia. *Tombo* 46: 8. (in Japanese, with English summary) ["On July 6, 2003, I observed that a deceased ant *Lasius japonicus* was attached to the mesotibia of *Copera tokyoensis* in Itakura, Gunma Prefecture, Japan] Address: Kano, K., 5-19-17-01, Koishikawa, Bunkyo-ku, Tokyo, 112-0002, Japan

10339. Kawashima, I. (2003): Redescription of the larva of the aeshnid dragonfly, *Sarasaeschna kunigamiensis* (Ishida, 1972) (Aeshnidae) from Okinawa-jima Is., Ryukyu Isls. *Tombo* 46: 13-16. (in English) ["Many external characters of this species are closely allied to those of *S. pryleri* (Martin, 1909) from the mainland of Japan, not to *S. niisatoi* (Karube, 1998) from northern Vietnam." (Author)] Address: Kawashima, I., Nagasawa 1-50-9, Yokosuka-shi, Kanagawa, 239-0842 Japan

10340. Kojo, T. (2003): On the nocturnal roosting in *Orthetrum albistylum speciosum*. *Tombo* 45(1/4): 36-38. (in Japanese, with English summary) ["The author observed three cases of nocturnal roosting by males of *O. albistylum speciosum* during middle and late August, 2001, in a condominium garden in a suburban area of Saitama Prefecture, Kanto District, Japan. The observations on all cases were made from the moment they touched the branches of low trees in the late afternoon to the moment of flight in the early morning. Roosting time was about 12 hours on average. They hung vertically on the branch with their wings spread and their dorsum to the west. After the dark, they became insensitive and never moved at any time during their roost. Just before flying off, they appeared sometimes to warm up by clipping wings and bobbing abdomen." (Author)] Address: not transliterated into English

10341. Kojo, T. (2003): *Sympetrum infuscatum* changes posture in the nocturnal roosting. *Tombo* 46: 23-28. (in Japanese, with English summary) ["The author observed the nocturnal roosting posture, *S. infuscatum* during the period from Aug. to Sept. 2001 and again in Aug. to Sept. 2002 in a condominium garden in a suburban area of Saitama Prefecture, Kanto District, Japan. In this report, I describe the changes in the roosting posture using photographs. One of the typical characteristics of *S. infuscatum* is that adults change posture during a period of nocturnal roosting. More precisely, although they hang horizontally during the beginning of the nocturnal roosting period, they gradually change posture to a vertical direction during the middle of the night and then change posture again to a horizontal position before flying off in the early morning. This is a remarkable difference from *Or-*

thetrum albistylum speciosum which does not change posture during nocturnal roosting." (Author)] Address: not stated in English transliteration

10342. Marine, N. (2003): Triple connection of *Orthetrum albistylum speciosum* (Uhler). Tombo 46: 34. (in bilingual in Japanese and English) [20-VII-1997; Nakamura City, Kochi Prefecture, Japan.] Address: not stated in English transliteration

10343. Miyagawa, T. (2003): A new record of *Trithemis aurora* from Kumamoto pref., Kyushu. Tombo 45: 39. (in Japanese, with English summary) [male and female specimens of *T. aurora* were found on September 12, 2002. This is the first record from the Kumamoto Prefecture, Kyushu, Japan.] Address: not transliterated into English

10344. Müller, O. (2003): Interaktion zwischen invasiven Amphipoden und Gomphidenlarven. Libellennachrichten 8/9: 10. (in German) [The paper introduces to the potential treat of Odonata larvae caused by the invasive neozon species *Dikerogammarus villosus*.] Address: Müller, O., Fischerstr. 45, 15230 Frankfurt/Oder, Germany. E-mail: o.mueller@gauss-gymnasium.de

10345. Ozono, A. (2003): A case of oviposition of *Lestes sponsa* (Hansemann) into mud and dead plants. Tombo 46: 31-32. (in Japanese, with English summary) ["*L. sponsa* has been known to lay eggs into the living tissues of aquatic plants and grass on the water's edge. During observation at an artificial irrigation pond in Hojo City, Ehime Prefecture, Japan on October 12 and 13 in 2001, some pairs of *L. sponsa* laid their eggs into the stalks of the dead plants in the water's edge, and some others laid eggs into the fragments of plants or into the mud of the bottom of the pond of which the water level had fallen and exposed at those times, though most pairs laid eggs into the living tissues of *Potamogeton* and/or into grass of the shore." (Authors)] Address: not transliterated into Japanese

10346. Taketo, A. (2003): Recent information on the odonate fauna of Ishikawa pref. Tombo 46: 21-22. (in Japanese, with English summary) ["Recent habitat situation of several rare odonate species (incl. *Asiagomphus pryeri* and *Gynacantha japonica*) in Ishikawa Prefecture, Hokuriku District, Japan, in 2002 were reported. Adults of *Mnais pruinosa* nawai Yamamoto were taken from Notojima Is., a solitary island in Nanao Bay. Exuviae of two stream dwellers, *Anisogomphus maacki* and *Sieboldius albardae* were found in a typically lentic habitat, Lake Shibayama-gata in Kaga City." (Author)] Address: Taketo, A., 1-19, Ishibiki 1-chome, Kanazawa City, 920, Japan

10347. Teixeira, M.D.; Nacinovic, I.B. (2003): Food of Roseate Spoonbill, *Ajaia ajaja* (Linnaeus, 1758) in central Brazil (Ciconiiformes, Threskiornithidae). Arqs Mus. nac. Rio de J. 61(1): 49-54. (in Portuguese, with English summary) [Odonata larvae were found in the stomachs of 5 out of the 20 spoonbills examined from Bananal island, state of Tocantins.] Address: Teixeira, M.D., Museu Nacional/UFRJ, Departamento de Vertebrados. Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, RJ, Brasil

10348. Teixeira, R.; Vrcibradic, D. (2003): Diet of *Leptodactylus ocellatus* (Anura; Leptodactylidae) from coastal lagoons of southeastern Brazil. Cuad. herpetol. 17(1-2): 111-118. [Only one Odonata specimen has been established in the diet of fifty-seven specimens of *L. ocellatus*. No species name provided.] Address: Vrcibradic, D., Se-

tor de Ecologia, Instituto de Biologia, Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier 524, 20550-011, Rio de Janeiro, RJ, Brasil. E-mail: da-vor@centroin.com.br

10349. Van Swaay, C.A.M.; Groenendijk, D.; Ketelaar, R. (2003): Monitoring butterflies and dragonflies in The Netherlands in 2002. Rapport VS2003.005, De Vlinderstichting, Wageningen: 31 pp. (in Dutch, with English summary) ["In 2002 dragonflies were counted every fortnight between May and September at 306 sites. The average number of dragonflies per transect were higher than previous years (table 2; figure 9). Like other years *Enallagma cyathigerum* was the most common species with almost 80000 individuals. For the first time indices are presented for a number of species (chapter 8). An alarming decreasing trend was detected for *Leucorrhinia pectoralis*. Another Red List species, *Lestes virens*, shows a positive trend. A translation for the Dutch vernacular names is given in chapter 10." (Authors)] Address: Groenendijk, D., De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

10350. Watanabe, K. (2003): A brief observation on the oviposition of *Tetracanthagyna plagiata* in West Malaysia. Tombo 46: 30. (in English) [Verbatim: "Species of *Tetracanthagyna* are known to oviposit in moss-covered branches 5 m or more above streams in thick forest (Corbet 1999). During my odonatological survey in west Malaysia in May, 2002, I had an opportunity to observe egg-laying behaviour by a female *T. plagiata*. The female, sitting in oviposition posture, was found on a decayed wood in a lowland jungle, at an altitude of 30 m, 20 km north of Kota Tinggi, Johor at 9:10 a.m. on May 5. Up until the time the insect was captured by me for a voucher, she continued to lay eggs into the decayed wood, about 150 cm above the water surface of a river. The surface of the wood was not covered with moss, a different situation from that observed by Corbet (1999). As the place of oviposition was above the water, it is likely that the hatched larvae drop down into the river water." (Author)] Address: Watanabe, K., 145-1, Maesato, Ishigaki, 907-0002 Japan

10351. Watcharee, L. (2003): The diet and feeding factors of the Wrinkle-lipped Free-tailed Bat (*Tadarida plicata*) at Khao-Chong-Pran, Ratchaburi Province. Master of Science (Forestry) thesis, Major Field: Forest Biology, Department of Forest Biology, The Pattaya School. University College of Agriculture Pattaya: 90 pp. (in Thai, with English summary) [Thailand; Odonata contributed with 6% to the diet of *T. plicata*] Address: not stated

2004

10352. Cowell, B.C.; Remley, A.H.; Lynch, D.M. (2004): Seasonal changes in the distribution and abundance of benthic invertebrates in six headwater streams in central Florida. *Hydrobiologia* 522(1-3): 99-115. (in English) ["Seasonal variations in invertebrate assemblages at two sites (upstream and downstream) on six central Florida headwater streams were compared by sampling at quarterly intervals with core and dip net samplers. Two of the streams were reclaimed following phosphate mining (app. 6 yr prior to this study), two received runoff from mined lands, and two were disturbed by agriculture and/or residential developments. Physical and chemical characteristics of the reclaimed streams differed markedly from those of the non-reclaimed streams; principal differences

between the streams were in current velocity, percent organic matter (POM), Mn, conductivity and alkalinity. Annual mean densities of meiofauna and smaller macrofauna for the 12 stream sites ranged from 20 896 to 175 212 m² and the mean for all sites was 56 492 m². The reclaimed streams and one of the streams influenced by agriculture had annual means of less than 40 000 m², 3- to 5-fold lower than the other streams. Fall and winter core densities were 2.4-fold greater than those for spring or summer when drought and low dissolved oxygen prevailed. Meiofauna comprised 68.91% of the core sample invertebrates in reclaimed streams but only 43.62% in the non-reclaimed streams; principal functional groups were: gathering collectors - 61.5%, predators - 19.3% and filtering collectors - 15%. The taxonomic composition of the reclaimed streams was predominated by crustaceans (60.71%) while chironomids and annelids were more abundant (71.92%) in the non-reclaimed streams. Dip net sampling added 21 larger macrofauna species (Odonata, Hemiptera and Coleoptera) to our list of taxa, producing a total of 209 species. Species richness and diversity (H and N₂) indices were lower in the reclaimed streams, but evenness was more variable. The Czekanowski-Dice-Sørensen similarity index showed that the reclaimed stream sites were quite similar to each other, but differed markedly from the other stream types; there was large variation both within and between seasons. For central Florida headwater streams, drought appears to have a larger influence on invertebrates than the type of land use, however this relationship should be confirmed using streams of similar hydrology." (Authors) The following Odonata taxa have been collected: *Anax junius*, *Boyeria vinosa*, *Gynacantha nervosa*, *Brachymesia gravida*, *Pachydiplax longipennis*, *Hagenius brevistylus*, *Argia* sp., *Calopteryx maculata*, and *Enallagma* sp.] Address: Cowell, B., Dept Biol., Univ. S. Florida, Tampa, FL, 33620, USA. E-mail: cowell@chuma1.cas.usf.edu

10353. Eda, S. (2004): Two cases of interspecific tandem formation between different genera. Tombo 47: 52. (in English, with Japanese summary) [(1) Tandem between male of *Stylurus oculatus* and female of *Anisogomphus maacki*, September 18, 2003, at Miya-gawa river in Suwa city and (2) tandem between male of *Anax parthenope julius* and female of *Aeshna nigroflava*, September 16, 2004 at Ebinoko-ike pond in Shiojiri city, Japan.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

10354. Grosser, N.; Schmidt, P. (2004): Die Tier- und Pflanzenarten nach Anhang IV der Fauna-Flora-Habitatrichtlinien im Land Sachsen-Anhalt. Naturschutz im Land Sachsen-Anhalt 41 (Sonderheft): 1-142. (in German) [The legally protected species in Sachsen-Anhalt (Germany) are treated in a monographic style. Information for each species including *Aeshna viridis*, *Stylurus flavipes*, and *Leucorrhinia albifrons* is presented and is dealing with its threat category and conservation status in Germany and Sachsen-Anhalt, biology and ecology, biogeographic distribution, regional distribution. Brief description of the taxon and regional threats and protection measures are presented as well. The profiles are prepared by Rosemarie Steglich and Joachim Müller.] Address: Steglich, Rosmarie, Zollstr. 1/128, 39114 Magdeburg, Germany. E-mail: roeseli@mdcc-fun.de

10355. Hampe, A. (2004): Comunidades de libélulas (Odonata) en el río Barbate (Cádiz): relictos glaciales y colonizadores orientales. Revista de la Sociedad Gaditana de Historia Natural 4: 205-215. [Odonate communities of

the Barbate river: glacial relicts and oriental colonizers.) The odonates of the upper and middle reach of the Río Barbate (Alcalá de los Gazules, Cádiz, Spain) were surveyed, and their flight phenology, larval development and biogeographic origin were compared. Faunistic similarity was very low. No species reproduced at both upper and middle reach. More species were recorded at the middle reach (19 vs 12). The flight phenologies showed similar patterns, although species abundances grew remarkably through the summer at the middle reach but not at the upper reach. Semivoltine species occurred only at the upper reach whereas species with two or more generations per year formed an important fraction of 77 % at the middle reach. These were mostly Libellulidae that have probably colonized southern Spain from the eastern Mediterranean Basin after the Pleistocene glaciations. In contrast, the species of the high tracks have most probably been present in the area during longer times and are (at least) glacial relicts." (Author)] Address: Hampe, A., UMR 'Biodiversité, Gènes & Communautés' (INRA), 69, Route d'Arcachon, F-33612 Cestas Cedex - France. E-mail: arndt.hampe@pierroton.inra.fr

10356. Kawashima, I.; Yoshida, M. (2004): External morphology of the last instar larvae (exuviae) of hybrids between *Sympetrum maculatum* Oguma and *S. darwinianum* (Selys) (Libellulidae). Tombo 47: 37-40. (in Japanese, with English summary) ["The external morphology of the last instar larvae (exuviae) of hybrid individuals between male *Sympetrum maculatum* Oguma, 1915 and female *S. darwinianum* (Selys, 1883) are described and illustrated. Hybrid exuviae showed the intermediate state of parent species in the external characters and almost could not be distinguished from each other. However, the lateral abdominal spines are long and slender, and more resemble those of *S. maculatum*, but are only slightly different distinguished from *S. darwinianum*. Moreover, the hybrids were clearly larger than each of the parent individuals." (Authors)] Address: not transliterated into English

10357. Lawton, J.H. (2004): Japan prize commemorative lecture: Biodiversity, conservation and sustainability. Notes Rec. R. Soc. Lond. 58(3): 321-333. (in English) [John H. Lawton, who stated his scientific career 1969 with a Ph.D. thesis at the University of Durham, UK, on "Studies on the ecological energetics of damselfly larvae (Odonata; Zygoptera)", was awarded the 2004 Japan Prize for 'Observational, experimental and theoretical achievements for the scientific understanding and conservation of biodiversity'. In this framework he gave a lecture on 21 April 2004, in Tokyo, Japan, on the occasion of the 20th Anniversary of the Japan Prize. This lecture focuses on bracken ecology, and includes no references to Odonata.] Address: Lawton, J.H., Natural Environment Research Council, Polaris House, Swindon SN2 1EU, UK and Centre for Population Biology, Imperial College, Silwood Park, Ascot SL5 7PY, UK

10358. Naraoka, H. (2004): Fluctuations of the daily activity and the reproductive behaviour of *Mortonagrion selenion* (Ris). Tombo 47: 53-57. (in Japanese, with English summary) ["The adult behaviour of *M. selenion* was examined in a period between 2000 and 2004, at a rice field in Kuroishi-City, Aomori Pref. Japan. Adults appeared from the middle of June to early August with a peak from late June to middle July. The mate-searching flights of males and copulations commenced at nearly 4:00 am or around sunrise and ended about 8:00 am. After that, males spent their time perched during almost every hour of the day. Copulation is divided into 3 stages.

Stage I was very longer when the male's abdomen was pumping ($x=2\text{ h }23\text{ m }20\text{ s} \pm 37\text{ m }34\text{ s}$, $n=13$). Stage II with intermittent pumping and Stage III with no pumping were short, $1\text{ m }57\text{ s} (\pm 31.8\text{ s})$ and $19.8\text{ s} (.5.5\text{ s})$ in mean, respectively. The total duration of copulation was negatively correlated ($P<0.01$) with the time of day (Fig. 2). The male may guard female during pre-oviposition from rival males." (Author)] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagi-cho, Kita-gun, Aomori Prefecture, 038-3661, Japan

10359. Notario, A.; Castresana, L. (2004): Contribución al estudio de la entomofauna del Monte del Estado Seladores-Contadero (Jaén). *Investigación agraria. Sistemas y recursos forestales* 13(1): 191-200. (in Spanish, with English summary) [Spain; records of the following species are listed: *Erythromma lindenii*, *Ceragrion tenellum*, *Ischnura graellsii*, *Calopteryx haemorrhoidalis*, *Orthetrum coerulescens*, and *Trithemis annulata*.] Address: Notario, A., Depto de Ingeniería Forestal. ETS de Ingenieros de Montes. Universidad Politécnica de Madrid. Spain. Address: E-mail: anotario@montes.upm.es

10360. Seymour, A. (Ed.) (2004): Monitoring forest degradation and animal populations in the forests of Central Buton: preliminary results from the pilot study. <http://www.opwall.com/Library/Opwall%20library%20pdfs/Reports/Indonesia/Indonesia%20Terrestrial/Management/2004%20Forest%20science%20programme%20summary.pdf>: 96 pp. (in English) [A total of 808 odonate specimens were collected; details are not given.]

10361. Yeh, W.-C.; Chen, Y.-M. (2004): Taxonomic notes on two odonate species from Taiwan. *Tombo* 47: 25-26. (in English) ["The taxonomic status of the enigmatic *Anisogomphus* sp. described by Matsuki (1978) is verified to be *A. maacki* (Selys). *Neurobasis chinensis chinensis* (Linnaeus) is reported from Taiwan for the first time based on an old specimen collected from Lanyu Island in eastern Taiwan and deposited in the collection of the National Museum of Natural Science in Taichung." (Author)] Address: Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute (TFRI), 53 Nanhai Rd.' Taipei' Taiwan

2005

10362. Brunken, G. (2005): Zur Odonatenfauna eines Tongrubengewässers bei Zwinge (Eichsfeldkreis). *Naturkundliche Berichte zur Fauna und Flora in Süd-Niedersachsen* 10: 113-121. (in German) [Thüringen, Germany; between May and October 2005, in a clay pit near Zwinge (Eichsfeldkreis) 26 Odonata species were found. The habitat is characterised by a high diversity and high abundances of species.] Address: Brunken, G., Kalklage 1, 37077 Göttingen, Germany

10363. Murphy, G.W.; Newcomb, T.J.; Orth, D.J.; Reeser, S.J. (2005): Food habits of selected fish species in the Shenandoah River Basin, Virginia. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 59: 325-335. (in English) ["Food habits of redbreast sunfish (*Lepomis auritus*), smallmouth bass (*Micropterus dolomieu*), and white sucker (*Catostomus commersoni*) populations in the Shenandoah River Basin, Virginia, were assessed during 2002 to identify dietary pathways and patterns potentially affecting mercury uptake. Aquatic insects (71% to 83%) were the principal food item of redbreast sunfish, while small-

mouth bass mainly consumed aquatic insects (32% to 48%), crayfish (19% to 31%), and fish (22% to 29%). Principal food items of white sucker included aquatic insects (20% to 26%) and detritus (66% to 70%). Dipterans, ephemeropterans, and trichopterans were the main taxa of aquatic insects consumed by all species." (Authors) The contribution of Odonata to the diet of the fish species is quite limited.] Address: Murphy, G.W., Delaware Division of Fish and Wildlife, 4876 Hay Point Landing Road, Smyrna, DE 19977, USA

10364. Resende, D.C. (2005): *Libellulidae* (Anisoptera: Odonata) phylogeny and body size and thermoregulation effects on behavioural evolution. Tese. Universidade Federal de Viçosa: VII + 93 pp. (in Portuguese, with English summary) ["Adult males of *Libellulidae* (Anisoptera: Odonata) are classified as perchers or fliers as a function of the time spent in flight. Insect thermoregulation depends on body length and may restrict behaviour. The family *Libellulidae* (Anisoptera: Odonata) had its monophyly corroborated by several phylogenetic hypothesis. I proposed here a phylogenetic hypothesis for *Libellulidae* using morphologic characters, including 33 Brazilian genera and four genera from other regions. Using this phylogeny, I tested if flight ability depends on body length, expecting that larger species control better the body temperature. I also tested if species that spent more time in flight have an increase in their hind wing anal area or an increase in their abdomen surface as adaptations to thermoregulation. Three *Corduliidae* species were used to polarize the characters in the phylogeny and branch support was estimated by Bootstrap. Species behaviour was obtained from an Odonata data bank and I was used a phylogenetic autocorrelation to exclude phylogenetic dependence of species. *Macrothemis*, *Miathyria*, *Tremea*, *Oligoclada*, *Rhodopygia*, *Erythemis*, *Brachymesia*, *Uracis*, *Perithemis*, *Diastatops*, *Zenithoptera*, *Nephepeltia* and *Elasmothemis* genera had their monophyly corroborated. *Palpopleurinae* is a paraphyletic group and *Brachydiplacinae*, *Leucorrhininae*, *Trithemistinae*, *Libellulinae*, *Sympettrinae* and *Tremeinae* were polyphyletic groups. Morphometry and behavioural measures showed high phylogenetic dependence. Flying time was dependent on species body weight. There was no relationship between hind wing anal area or abdomen surface and species flying time. However, total wing area increased with species body length, suggesting a possible natural selection leading to passive fly in larger species. There was a reduction in body length during *Libellulidae* evolution. It is possible that basal species, with large bodies and solar radiation dependence, are more restricted to open areas and that occupation of shadow environments caused a directional body length reduction. Decreasing of body length may have affected geographic distribution and diversification rates, affecting the conservation strategies to this group." (Author)] Address: Resende, D.C., Laboratório de Bioinformática e Evolução, Departamento de Biologia Geral, Universidade Federal de Viçosa, 36570-000, Viçosa-MG, Brasil. E-mail: dcrese-nde@ig.com.br

10365. Yanoviak, S.P.; Fincke, O.M. (2005): Sampling methods for water-filled tree holes and their artificial analogues. In: Leather, S.R. (Ed.): *Insect Sampling in Forest Ecosystems*: 168-185. (in English) [Conclusions: "Although there is a growing number of studies documenting the insect fauna of water filled tree holes around the world (Kitching 2000, Yanoviak 2001a), current knowledge remains overwhelmingly biased towards potential

disease vectors. Despite considerable interest in the ecology of this system, few studies have addressed the importance of microbial diversity and ecology in tree holes (e.g. Walker & Merritt 1988; Walker et al. 1991). Decomposer microbes (bacteria and fungi) form a critical link between the nutrient base (e.g. leaf litter) and secondary consumers (e.g. mosquito larvae) in tree holes (Fish E.; Carpenter 1982). Various other microorganisms, such as microcrustaceans, rotifers, and protozoans, also occur in tree holes (Kitcing 2000, Yanoviak 2001a), and may function as prey or competitors with the macrofauna. Microbial ecology has been largely overlooked in tropical tree holes, and several basic questions remain to be answered for this system in general. For example, what regulates microbial diversity and productivity in tree holes? How does the composition of detritus affect decomposer assemblages? Does microbial diversity influence macroorganism diversity or productivity? Are microbial assemblages more species-rich in tropical tree holes? The ecology of microorganisms has been examined in other phytotelmata (e.g. Addicott 1974, Cochran-Stafira & von Ende 1998, Carrias et al. 2001), and these studies exemplify the kinds of investigations that are needed in tree holes. Likewise, few studies have addressed the ecological importance of inorganic nutrients (e.g. nitrogen and phosphorus) in tree holes (e.g. Carpenter 1982; Walker et al. 1991). Microbial and nutrient dynamics have been described for many large freshwater systems, and some of the techniques commonly used by stream and lake ecologists to quantify these parameters could be transferred to tree holes. In summary, water-filled tree holes are tractable habitats for ecological and behavioural studies; sampling their insect fauna is a relatively simple process, and the use of artificial holes is an inexpensive way to increase sample size and control multiple factors for experiments. The extent to which inferences from tree hole data have a more general application for freshwater systems remains to be seen. Nevertheless, given their important ecological role, these aquatic microhabitats merit much more attention than they have received, especially in tropical forests." (Authors) The paper includes references to Odonata.] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: finke@ou.edu

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10366. Airaud, J.-Y.; Rochelet, B.; Cotre, N. (2006): *Anax napolitain* (*Anax parthenope*). La Virgule. Bulletin de liaison du groupe «Entomo» de Deux-Sèvres Nature Environnement 1: 9. (in French) [Departement Deux-Sèvres, France; the following records of *A. parthenope* are documented: 1 male, Plibou, 27/06/06; 2 mâles, Étang du Bois de Bressuire (Chiché), 24/07/06; 1 male, Forgeaux (Petite Boissière), 06/08/06; 1 male, Étang des Mothes, 7/09/06.] Address: not stated

10367. Baranovskiy, B.A.; Ivan'ko, I.A.; Zagubizhenko, N.I. (2006): Vliianiye rezhima osveschennosti pribrezhnoi zony ozera Kniaginya na sostav macrophytnikh biogidrocenozov. – [Influence of the illuminance conditions on macrophytes communities at the coastal zone of Knyaginya lake]. Ecology 14(2): 12-16. (in Russian, with English summary) [Lake Knyaginya, valley of the Samara river, situated in the southeastern part of European Russia; results from a study to investigate the influence of light regime on the occurrence of macrozoobenthos and

higher vegetation are presented. The taxa-list includes *Aeshna grandis*, *A. cyanea*, *Anax imperator*, and *Coenagrion sp.*] Address: Baranovskiy, B.A., Visnyk of Dnipropetrovsk University. Biology, Dnipropetrovsk, 49050 Ukraine

10368. Brady, V.J.; Bradley J.C.; Gathman, J.P.; Burton, T.M. (2006): Does facilitation of faunal recruitment benefit ecosystem restoration? An experimental study of invertebrate assemblages in wetland mesocosms. Restoration Ecology 10(4): 617-626. (in English) ["We used wetland mesocosms (1) to experimentally assess whether inoculating a restored wetland site with vegetation/sediment plugs from a natural wetland would alter the development of invertebrate communities relative to unaided controls and (2) to determine if stocking of a poor invertebrate colonizer could further modify community development beyond that due to simple inoculation. After filling mesocosms with soil from a drained and cultivated former wetland and restoring comparable hydrology, mesocosms were randomly assigned to one of three treatments: control (a reference for unaided community development), inoculated (received three vegetation/sediment cores from a natural wetland), and stocked + inoculated (received three cores and were stocked with a poorly dispersing invertebrate group—gastropods). All mesocosms were placed 100 m from a natural wetland and allowed to colonize for 82 days. Facilitation of invertebrate colonization led to communities in inoculated and stocked + inoculated treatments that contrasted strongly with those in the unaided control treatment. Control mesocosms had the highest taxa richness but the lowest diversity due to high densities and dominance of Tanytarsini (Diptera: Chironomidae). Community structure in inoculated and stocked + inoculated mesocosms was more similar to that of a nearby natural wetland, with abundance more evenly distributed among taxa, leading to diversity that was higher than in the control treatment. Inoculated and stocked + inoculated communities were dominated by non-aerial invertebrates, whereas control mesocosms were dominated by aerial invertebrates. These results suggest that facilitation of invertebrate recruitment does indeed alter invertebrate community development and that facilitation may lead to a more natural community structure in less time under conditions simulating wetland restoration." (Authors) Taxa collected from wetland mesocosms and a nearby natural wetland included *Aeshniidae*, *Orthemis sp.*, and *Coenagrionidae*.] Address: Brady, Valerie, Natural Resources Research Institute, University of Minnesota Duluth, 5013 Miller Trunk Highway, Duluth, MN 55804, USA.

10369. Chandra, G.; Chatterjee, S.N.; Ghosh, A. (2006): Role of dragonfly (*Brachytron pratense*) nymph as bio-control agent of larval mosquitoes. Bul. Penel. Kesehatan 34(4): 147-151. (in English) ["The failure of traditional vector control operations through chemical insecticides renewed interest in biological control method. In the present study Dragonfly (*Brachytron pratense*) nymph has been proved to be a strong biocontrol agent of *Anopheles subpictus* larvae in the laboratory condition. Average daily larval feeding rate of *B. pratense* nymph decreased when the search area was increased. Feeding rate increased when prey density was increased. In the field conditions also, *B. pratense* played very effective role as predator of different species of larval mosquitoes." Please note: *B. pratense* is not a member of Indian dragonfly fauna.]

10370. Hobart, H. (2006): And they don't even bite or sting! Newsletter of the Indian Ponds Association 6(4): 7. (in English) [General account on dragonflies.] Address: Hobart, H., Indian Ponds Ass., P.O. Box 383, Merstons Mills, MA 02648, USA

10371. Odin, N. (2006): Reports from Coastal Stations - 2006: Landguard Bird Observatory, Suffolk. Atropos 30: 72-73. (in English) [UK; *Erythromma viridulum* on 6-VIII-2006; *Libellula quadrimaculata* on 2-VII-2006] Address: not stated

10372. Stav, G.; Kotler, B.P.; Blaustein, L. (2006): Direct and indirect effects of dragonfly (*Anax imperator*) nymphs on green toad (*Bufo viridis*) tadpoles. *Hydrobiologia* 579 (1): 85-93. (in English) ["We conducted an artificial pond experiment to assess the direct and indirect effects of predation on *Bufo viridis* tadpoles. We ran three treatments: free *Anax* (unrestrained predatory dragonfly nymph *Anax imperator*), caged *Anax* (non-consumptive effects), and control (no *Anax*). *Anax* showed both strong consumptive and non-consumptive effects on *Bufo* tadpoles. Free *Anax* eliminated all of the tadpoles within six days. Tadpoles preferred the shady side of the ponds. Caged *Anax* caused tadpoles to increase their spatial preferences. Tadpoles avoided the center of the pond, and in the presence of the caged predator, they were found in the center even less. Tadpoles also showed a strong preference for crowding together, and in the presence of a caged *Anax*, they tended to crowd more. Moreover, *Bufo* metamorphosed earlier and at a larger size in the caged *Anax* ponds, possibly by providing extra food resources due to the extra organic matter excreted by the predators." (Authors)] Address: Stav, G., Jacob Blaustein Institute for Desert Research, Mitrani Dept of Desert Ecology, Ben-Gurion Univ. of the Negev, Sede-Boqer Campus, 84990 Negev, Israel. E-mail: gstav@tulane.edu

10373. Tavares, A.S.; Odinetz, O.; Enricone, A. (2006): The Podostemaceae family in Amazonian rivers and insect community associated. *Insula* 35: 19-50. (in Portuguese, with English summary) [In most cases Odonata larvae (*Libellulidae*, *Agrionidae*) contributed very few to the insect biomass living between the leaves of several species of the Podostemaceae family.] Address: Tavares, A.S., Universidade Federal de Santa Catarina, Departamento de Botânica, Campus Universitário, Trindade, Florianópolis, se, 88040-900. Brasil. E-mail: asprada@ccb.ufsc.br.

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10374. Environment & Heritage Service (2007): Northern Ireland Species Action Plan: Irish Damselfly *Coenagrion lunulatum*. March 2007. <http://www.Belfast-hills.org/minisite/adultversion/draftirishdamselflysapmar07-2.pdf>: 11 pp. (in English) [This is a detailed schedule for protecting *C. lunulatum* in Northern Ireland.] Address: Environment & Heritage Service, Klondyke Building, Cromac Av., Gasworks Business Park, Lower Ormeau Road, Belfast, BT7 2JA, UK. www.ehsni.gov.uk

10375. Geraeds, R.P.G. (2007): Golden-ringed dragonfly along the Venbeek brook. *Natuurhistorisch Maandblad* 96(1): 17-18. (in Dutch, with English summary) ["In Limburg, *Cordulegaster boltonii* is known to occur in the Haeselaarsbroek and Meinweg nature reserves. At Meinweg, which houses the largest population in the Netherlands, the species occurs along the Boschbeek, Roode

beek and Nartheciumbeek brooks. Recently, specimens have also been observed along the Venbeek brook, probably representing the fourth subpopulation of *C. boltonii* at the Meinweg reserve." (Author)] Address: Geraeds, R.P.G., Bergstraat 70, 6131 AW Sittard, The Netherlands

10376. Hermans, J.T. (2007): De Gewone bronlibel in de Meinweg [The Golden-ringed dragonfly at the Meinweg National Park]. *Natuurhistorisch Maandblad* 96(6): 165-169. (in Dutch, with English summary) ["*Cordulegaster boltonii* has always been a rare species in the Netherlands, whose main area of distribution in the country is restricted to the province of Limburg. The population of *C. boltonii* at the 'De Meinweg' National Park is the largest in the Netherlands. At the Meinweg area, the species has three sub-populations along the Bosbeek, Nartheciumbeek and Venbeek brooks. The sub-population along the Venbeek brook is the result of recent colonisation. The habitats in which the species occurs at the Meinweg National Park are shallow streams, which are characterised by their small size, the presence of organic litter as a biotope for the larvae and the fact that they are fed from local springs producing oxygenous groundwater with a low mineral content and a constant low temperature. In 2006, several individuals were marked with different colours to investigate possible exchanges between the sub-populations, but no such exchanges could be confirmed. *Calopteryx virgo* and *Orthetrum coerulescens* are the most characteristic accompanying dragonfly species at the Meinweg. One of the main threats to the presence of *C. boltonii* at this nature reserve is that the streams where they breed run dry during periods of drought." (Author)] Address: Hermans, J.T., Hertestraat 21, 6067 ER Linne, The Netherlands.

10377. New, T.R. (2007): The *Hemiphlebia* damselfly, *Hemiphlebia mirabilis* Selys (Odonata, Zygoptera) as a flagship species for aquatic insect conservation in south-eastern Australia. *The Victorian Naturalist* 124(4): 269-272. (in English) ["The endemic *H. mirabilis* has been a focus of conservation attention since its rediscovery in Victoria was publicised in the mid 1980s. It was listed under the state's Flora and Fauna Guarantee Act (FFG) in 1991. Discovery of additional colonies has indicated that *Hemiphlebia* is far more widespread than earlier supposed, and continued study indicates that it is variously secure or vulnerable in different places – rather than 'endangered', as previously thought. The history of study of the species is summarised briefly, and its values in promoting awareness of insect conservation as a 'flagship species' in southern Australia are discussed." (Author)] Address: New, T.R., Dept of Zoology, La Trobe University, Victoria, 3086, Australia. E-mail: T.New@latrobe.edu.au

10378. Olias, M.; Günther, A. (2007): Libellen. In: Grüne Liga Osterzgebirge e.V.: Naturführer Ost-Erzgebirge, Band 1: Pflanzen und Tiere. Sandstein-Verlag. Dresden: 350-363. (in German) [Sachsen, Germany; Czech Republic; 17 regional Odonata species are introduced giving information of morphology, habitat, phenology and sibling species. A Czech version of the paper is also available: Olias, M. & Günther, A. (2007): Vážky. In: Grüne Liga Osterzgebirge e.V.: Přírodou východního Krušnohří. - 1. Svazek: Přehled rostlin a živočichu, Sandstein Verlag Dresden: 298-309.] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstr. 10, 09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

10379. Parkes, K. (2007): Broda-bodied Chaser Survey 2007. *Atropos* 32: 58. (in English) [Verbatim: "Following

the success of the Banded Demoiselle survey, the BDS repeated the format for the 2007 season, requesting records of Broad-bodied Chaser *Libellula depressa*. Collaboration with Flytech encouraged younger participants, with a free remote controlled dragonfly being given to the first 15 confirmed records from under 16-year olds. The response was again very good with over 700 records received, despite the inclement weather for much of the flight period. The survey repeated last year's achievements, with confirmed records of Broad-bodied Chaser in several new areas. The full results of the survey and a selection of the stunning photos sent by contributors can be found via the BDS website at <http://www.dragonflysoc.org.uk>. Look there next year for a new survey to get involved in." Address: Parkers, Katharine, BDS Conservation Officer, c/o Natural England (West Mids), Attingham Park, Shrewsbury SY4 4TW, UK. E-mail: katharine.parkes@naturalengland.org.uk

10380. Perović, G.; Perović, F. (2007): Preliminary results of research into dragonflies (Odonata) in Medimurje, Croatia. *Entomol. croat.* 10(1/2): 87-103. (in Croatian, with English summary) [During 1998-2005, 31 Odonata species were documented. *Sympetrum pedemontanum* is recorded for the first time from Croatia. Records of *Coenagrion ornatum* and *Lestes dryas* are also considered of regional interest.] Address: Perović, F., Hrvatski prirodoslovni muzej, Demetrova 1, Zagreb, Croatia

10381. Pollheimer, M. (2007): Streifzüge durch die Tierwelt des Kremstals. *LANIUS – Information* 16(3-4): 3-5. (in German) [*Onychogomphus forcipatus*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Calopteryx splendens*, *C. virgo*, and *Cordulegaster boltonii* are listed for the river Krems, Austria.] Address: <http://www.lanius.at/cms/fileadmin/Files/Lanius-Info/Laniusinfo3-42007.pdf>

10382. Sahuquillo, M.; Poquet, J.M.; Rueda, J.; Miracle, M.R. (2007): Macroinvertebrate communities in sediment and plants in coastal Mediterranean water bodies (Central Iberian Peninsula). *Ann. Limnol. - Int. J. Lim.* 43(2): 117-130. ["Sediment and plant-associated macroinvertebrates were sampled in six shallow water bodies along the central part of the coast of Mediterranean Spain. The size of ponds, salinity and hydroperiod were highly variable. Seventy-one taxa were recorded, some of them were endemic or uncommon species, evidencing the important contribution of these ponds to biodiversity. Crustaceans and gastropods of biogeographical interest were found in the most primeval site. Correspondence analysis showed that macroinvertebrate assemblages responded to environmental variables such as salinity, temporality and eutrophication. The brackish water fauna was dominated by crustaceans, while *Oligochaeta* and insect larvae were abundant in freshwater conditions. *Oligochaeta* were abundant at localities with high trophic level, whereas localities with semi-permanent waters were dominated by chironomids. The density of macroinvertebrates was clearly related with trophic state but we did not find significant relationships between density and salinity or water permanence. For plant associated samples our results showed negative relationships between species richness and temporality or salinity, contrary to sediment samples, where the *Oligochaeta/Chironomidae* ratio in sediments and the percentage of sensitive taxa (Ephemeroptera, Odonata, Trichoptera) were useful indices, and were dependent on pond typology. This study emphasizes the broad ecological variety of ponds found in these wetlands and their importance for biodiversity. Some ponds act as permanent biodiversity reservoirs in

fluctuant marshes with seasonal dryness, calling for more attention on their ecological relevance for management strategies." (Authors) Odonata taxa are mentioned as follows: *Sympetrum fonscolombii*, *Ischnura elegans*, *Pyrhosoma nymphula*, *Coenagrionidae*, *Libellulidae*, *Corduliidae*, *Lestidae*.] Address: Sahuquillo, M., Departament de Microbiologia i Ecologia, Facultat de Biologia, Universitat de València, E-46100 Burjassot, València, Spain

10383. Salcher, M. (2007): Beobachtungen zur Ausbreitungsfähigkeit der Zarten Rubinjungfer (*Ceriatagrion tenellum*) auf dem Bodanrück (Odonata: Coenagrionidae). *Mercuriale* 7: 8-11. (in German) [Baden-Württemberg, Germany; the successful colonisation of new habitat resp. establishment of a new population, 750 m apart from the next known population, is documented by comparison of old bank data with new records. In addition, specimens were found up to 6,5 km remote from source populations in habitats not suited for this species.] Address: Salcher, M., Ferdinand-Weiß-Str. 92, 79106 Freiburg, Germany

10384. Sierra, R.; Burke, R. (2007): Dietary habits of Diamondback Terrapin *Malaclemys terrapin* in the Jamaica Bay Wildlife Refuge, New York, Section VII. In: W.C. Nieder & J.R. Waldman (eds.): Final report of the Tibor T. Polgar Fellowship Program 2006, Hudson river Foundation, NY: 20 pp. (in English) [The diet of this turtle species includes Odonata larvae identified to order level.] Address: not stated

10385. Stange, G.; Schmeling, F.; Berry, R.; Lenz, G.; (2007): The temporal resolution of flight attitude control in dragonflies and locusts: Lessons for the design of flapping-wing MAVs. Australian National University Canberra. Research School of Biological Sciences. Contract Number: FA48690610059; Report Number: A038474: 16 pp. (in English) ["In order to identify stability constraints in flapping-winged MAVs, within the context of longitudinal stabilization of flight attitude, the question is examined whether insects are capable of controlling flight attitude at the temporal resolution of a single wing beat. It is found that the phenomenon of phase locking between a periodic light flash and the wingbeat of insects is suitable for the examination of the time resolution with which vision contributes to stabilization. In tethered locusts, flying in a wind tunnel with a wingbeat frequency of 22 Hz, phase locking can be readily obtained by a periodic stimulus of UV light. It is suggested that the effect is a by-product of the animal continuously trying to apply corrections. Therefore, in the closed-loop situation of free flight, frequency components of the visual input at or above wing beat rate are also present and must contribute to stability control. The response is mediated by the median ocellus. In dragonflies, with a wingbeat frequency of 50 Hz, the effect is not observed. This suggests that organisms or MAV of the size and wingbeat rate of locusts require active damping by visual inputs, whereas the same is not necessary in smaller systems." (Authors)] Address: Stange, G., Centre for Visual Sciences, Research School of Biological Sciences and ANU Electron Microscopy Unit, Australian National University, P.O. Box 475, Canberra, ACT, 0200, Australia. E-Mail: gert.stange@anu.edu.au

2008

10386. Aberlenc, H.-P. (2008): Les Insectes du Bois de Païolive: premier supplément à l'inventaire. *Les Cahiers de Païolive* 1: 155-167, pl. 17-18. (in French) [Departement

ment Ardeche, France. This paper contents additions to the list published in 2003 viz. *Sympecma fusca*, *Aeshna mixta*, *Anax parthenope*, *Gomphus graslinii*, *G. simillimus*, *G. vulgatissimus*, *Sympetrum fonscolombii*, and *S. pedemontanum*. *Calopteryx splendens* was deleted from the regional list.] Address: Aberlenc, H.P., CIRAD, UMR CBGP, TA A-55/L, 34398 Montpellier cedex 5, France

10387. George, B.M.; Batzer, D. (2008): Spatial and temporal variations of mercury levels in Okefenokee invertebrates: Southeast Georgia. *Environmental Pollution* 152: 484-490. (in English) [USA; "Accumulation of mercury in wetland ecosystems has raised concerns about impacts on wetland food webs. This study measured concentrations of mercury in invertebrates of the Okefenokee Swamp in Georgia, focusing on levels in amphipods, odonates, and crayfish. We collected and analyzed total mercury levels in these invertebrates from 32 sampling stations across commonly occurring sub-habitats. Sampling was conducted in December, May, and August over a two-year period. The highest levels of mercury were detected in amphipods, with total mercury levels often in excess of 20 ppm. Bioaccumulation pathways of mercury in invertebrates of the Okefenokee are probably complex; despite being larger and higher in the food chain, levels in odonates and crayfish were much lower than in amphipods. Mercury levels in invertebrates varied temporally with the highest levels detected in May. There was a lack of spatial variation in mercury levels which is consistent with aerial deposition of mercury." (Authors)] Address: George, B.M., School of Science and Technology, Georgia Gwinnett College, 1000 University Center Lane, Lawrenceville, GA 30043, USA. E-mail address: bgeorge@ggc.usg.edu

10388. Holuša, O.; Vaněk, J. (2008): The fauna of dragonflies (Odonata) in the Krkonoše Mts. *Opera Corcontica* 45: 81-98. (in Czech, with English summary) [Between 1982-2004, 25 odonate species were found at 19 localities in the Krkonoše National Park (i.e. in the Giant Mts.) and adjacent localities of the Podkrkonosi Region. E-dominant species are: *Aeshna caerulea*, *Enallagma cyathigerum*, *Sympetrum danae*, *A. juncea*, dominant species: *Leucorrhinia dubia*, *S. vulgatum*, *Lestes sponsa*, *S. sanguineum* and *Somatochlora alpestris*. The population of *A. caerulea* in the Krkonose Mts. is the most stable and the largest population in the Czech Republic. Only two reophilous species in lower abundance - *Calopteryx splendens* and *Cordulegaster bidentata* - were found.] Address: Holuša, O., Bruzovská 420, CZ-738 01 Frýdek-Místek. E-mail: holusao@email.cz

10389. Huber, A. (2008): Data to the Odonata fauna of North-East Hungary III. *Folia historico-naturalia Musei Matraensis* 32: 93-102. (in Hungarian, with English summary) ["The author present the results of his dragonfly collecting carried out in the lowland following the river Bodrog and Takta (Bodrogekőz and Taktaköz) and in the territory enclosed by the river Hernád, river Sajó and the state border between Hungary and Slovakia. The collecting took place between 11.05.2005 and 03.07.2008. The data come mainly from the Bodrogekőz, Taktaköz, Aggtelek-mountains, the Putnok-hills and the valley of the Sajó river. The author found 46 dragonfly species in this area, 37 as larva, 35 as exuvium and 40 as imago. 7 species (*Aeshna affinis*, *Ischnura elegans*, *Lestes dryas*, *L. sponsa*, *Leucorrhinia pectoralis*, *Sympecma fusca*, *Sympetrum flaveolum*) are new in larval or exuvial form to the Bodrogekőz, and 5 species (*Anax imperator*, *Crocothemis erythraea*, *Epitheca bimaculata*, *Erythromma viridulum*,

Leucorrhinia pectoralis) to the Taktaköz." (Author)] Address: Huber, A., Aggteleki Nemzeti Park Igazgatóság, H-3758 Jósavafő, Hungaria. E-mail: epitheca@freemail.hu

10390. Kawiisar-ul-Yaqoob; Paiidit, A.K.; Wani, S.A. (2008): Some aspects of habitat ecology of aquatic entomofauna in two freshwater lakes of Kashmir Himalaya. Sengupta. M. & Dalwani, R. (Eds): *Proceedings of Taal 2007: The 12th World Lake Conference: 1916-1921.* (in English) ["The present investigation deals with the habitat ecology of lacustrine insects of Dal and Nilnag lakes of Kashmir valley 111 relation to the depth of water column and the quality and quantity of aquatic macrophytes. Three main categories of aquatic insects belonging to four different orders viz, Coleoptera, Hemiptera, Diptera and Odonata (*Macromia* sp., *Aeshna* sp., *Coenagrion* sp., *Lestes* sp., *Helocordulia* sp.) have been recognized. It has been seen that the quality of water, the diversity and density of aquatic vegetation and suitable substratum are among the favourable factors increasing the potential of aquatic insects to inhabit their suitable ecological niches." (Authors)] Address: Kawiisar-ul-Yaqoob, Aquatic Ecology Laboratory, P.G. Dept of Environmental Science, The University of Kashmir, Srinagar 190006, J&K, India

10391. Lucker, T. (2008): Wirkungen von Revitalisierungsmaßnahmen am Beispiel des Ise-Projektes. *Schriftenreihe des Deutschen Rates für Landespflege* 81: 76-80. (in German) [Niedersachsen, Germany; the Ise is a small brook formerly strongly influenced by agricultural land use. In the early 1990th, adjacent land was bought and extensified. The brook itself was revitalised. A monitoring proved the success of the conservation measurements. *Ophiogomphus cecilia*, *Cordulegaster boltonii* and *Calopteryx virgo* extended their ranges along the brook.] Address: Lucker, T., Aktion Fischotterschutz e. V., Sudendorfallée 1, 29386 Hankensbüttel, Germany. E-mail: t.lucker@otterzentrum.de

10392. Müller, J.; Steglich, R. (2008): Zur Reproduktion der Frühen Heidelibelle *Sympetrum fonscolombii* (Odonata: Libellulidae) in der Bodeniederung bei Unseburg. *Entomologische Mitteilungen Sachsen-Anhalt* 16(1): 41-47. (in German) [The paper outlines some current discussion on the taxonomic status of the species and document recent records from the Bode-region, Sachsen-Anhalt, Germany. The authors also include a compilation of the records from Sachsen-Anhalt and present field characters of the species.] Address: Müller, J., Frankfelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.J-Mueller@t-online.de

10393. Perova, S.N. (2008): The taxonomic composition of macrozoobenthos in central Russian small Karst lakes. *Inland Water Biology* 1(4): 371-379. (in English) ["The macrozoobenthos taxonomic composition in small karst lakes of Vladimir oblast is studied for the first time. In the structure of bottom communities, 149 taxa one rank below the genus have been found. Chironomid larvae and other amphibiotic animals, as well as oligochaetes, prevail. Most of them are species widely distributed in the surface waters of European Russia. The highest macrozoobenthos species diversity was recorded in neutral lakes, and the lowest diversity was in lakes with weakly acidic waters." (Author) *Epitheca bimaculata*, *Coenagrion* sp., *Cordulia aenea*, *Platycnemis pennipes*, *Somatochlora arctica*, *S. flavomaculata*, *S. sahlbergi* are listed; these taxa are partly taken for misidentified by R. Bernard, a specialist in this regional fauna. Original Rus-

sian Text © S.N. Perova, 2008, published in *Biologiya Vnutrennikh Vod*, No. 4, 2008, pp. 63–71] Address: Perova, S.N., Papanin Institute for the Biology of Inland Waters, Russian Academy of Sciences, Borok, Yaroslavl oblast, 152742 Russia. E-mail: perova@ibiw.yaroslavl.ru

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10394. Carriço, C.; Santos, T.C.; Costa, J.M.; Trapero Quinta, A.D. (2009): Occurrence of *Neoneura maria* (Scudder, 1866) (Odonata: Protoneuridae) for the Province of Santiago de Cuba. *Biota Neotropica* 9(4): 261-263. (in Portuguese, with English summary) ["During the period 2005-2006 the macroinvertebrates associated with the root system of *Eichhornia crassipes* (Mart.) Solms, 1883 were studied in the overflow Chalons dam in Santiago de Cuba. The larva of *N. maria*, endemic for Cuba, reported to the three Sectors of the island, was collected and constitute the first report for the Provincia de Santiago de Cuba." (Authors)] Address: Carriço, C., Programa de Pós-graduação em Biologia Animal - PPGBA, Instituto de Biologia, Univde Federal Rural do Rio de Janeiro - UFRJ BR 465, Km 7, CEP 23890-000, Seropédica, RJ, Brasil. E-mail: carrico82@hotmail.com

10395. Corbet, P.S. (2009): List of publications including observations on Odonata. *Agrion* 13(2): 90-96. (in English) [List of publications including observations on Odonata compiled by Philip S. Corbet up to 2000, thereafter by Sarah A. Corbet, and further additions abstracted from IDF Report 14: 1-39 compiled by Hoffmann & Schorr, 2008]

10396. Crewe, M.D.; Coheir, C. (2009): *Viridithemis viridula* Fraser, 1960: discovery of the first known male. *Agrion* 13(2): 54-55. (in English) [8-XI-2007, Madagascar, Zombitse Forest, part of the Zombitse-Vohibasia National Park. GPS: S 22.88339 E 44.69447, 800 metres asl.; start of the main rain season.] Address: Crewe, M.D.: E-mail: mike.sturmus@btinternet.com

10397. Hacet, N. (2009): The easternmost record of *Somatochlora borisi* Marinov, 2001 from Turkish Thrace, with a zoogeographic assessment on the distribution of the species (Odonata: Corduliidae). *J. Ent. Res. Soc.* 11 (2): 51-56. (in English) ["A synopsis of the known distribution of this endemic species is given. The present records add an additional locality (Istanbul-Çatalca, Incegiz village, 41°11'N 28°24'E, 70 m asl, 24-VI-1998), which is the easternmost one for this species not only for Turkey, but also for its whole range. The morphological features of the species are discussed, and its distribution is mapped. A zoogeographic evaluation on the distribution of *S. borisi* in the Balkans is included. The localization of this species underlines the biologic and zoogeographic importance of the Balkans in terms of biodiversity for the whole Eurasia." (Author)] Address: Hacet, Nurten, Trakya University, Faculty of Arts and Sciences, Dept of Biology, TR-22030 Edirne, Turkey. E-mail: nhacet@hotmail.com

10398. Hankinson, C. (2009): Naturally curious. *Findlay Spring* 2009: 16-17. (in English) [Ohio, USA; "Dwight Moody, Ed.D., an outdoorsman, educator and researcher, has conveyed his enthusiasm for the natural world to thousands of students during his 34-year tenure as professor of natural science at The University of Findlay. He retired from full-time teaching in 2008, but maintains his ties with the institution by serving as an adjunct faculty member and continuing his research... In addition, he

has done Odonata surveys at Kitty Todd Nature Preserve for the Nature Conservancy in Toledo, Ohio, in 2001-02 and the Sheldon Marsh Nature Preserve in Sandusky, Ohio, in 2002-03. Much of his work is also funded by research grants, including one from the Ohio Department of Natural Resources to establish the status of the Ohio Emerald Bog Skimmer in 1994. In 2007-08 the Ohio Historical Society funded "A State-wide Survey for the Federally Endangered Hine's Emerald Dragonfly." (Author)] Address: not stated

10399. Hu, P.; Zha, L.-s. (2009): Records of Edible Insects from China. *Agricultural Science & Technology* 10(6): 114-118. (in Chinese, with English summary) [Larvae of *Anax parthenope julius*, *Gomphus cuneatus*, *Crocothemis servilia*, *Orthetrum albistylum*, *O. triangulare melania*, *Pantala flavescens*, and *Sympetrum uniforme* are listed as edible among a list of 283 species out of 13 insect orders and 73 families classified as edible.] Address: Hu, P., Tianyi Middle School, Huaibei City, Huaibei 235000, China

10400. Humala, A.E.; Polevoi A.V. (2009): On the insects fauna of south-east Karelia. *Proceedings of the Karelian Scientific Center, Russian Academy of Sciences* 4: 53-75. (in Russian, with English summary) ["At the verge of the 21st century, the insect fauna of SE Karelia remained rather poorly known compared with other parts of the republic. Systematic entomological research that began in the areas of Karelia east of Lake Onego in the 1990s yielded substantial amounts of material on the insect fauna. This paper is the first publication of all data on the insect fauna in south-east Karelia (biogeographic provinces Karelia transonegensis, Karelia pudogensis) known to the authors. In addition, data on the species distribution, their biology and «red-list» status are provided for some most interesting findings." (Authors) 40 sampling sites were studied for their fauna. 30 Odonata species are listed. The list includes species as *Coenagrion armatum*, *C. hastulatum*, *C. johanssoni*, *C. pulchellum*, *Aeshna caerulea*, *A. crenata*, *A. subarctica elisabethae*, *Somatochlora arctica*, *S. flavomaculata*, *S. metallica*, *Epitheca bimaculata*, and *Leucorrhinia caudalis*.] Address: Humala, A., Forest Research Institute, Karelian Research Centre, Russian Academy of Science, 11 Pushkinskaya St., 185910 Petrozavodsk, Karelia, Russia. E-mail: humala@krc.karelia.ru

10401. Kiany, M.; Minaei, K. (2009): The dragonfly family Libellulidae (Insecta: Odonata: Anisoptera) of Shiraz and its vicinity (Fars Province, Iran). *Iran Agricultural Research* 27/28: 65-78. (in English, with summary in Farsi) [Thirteen libellulid species were collected near Shiraz and its vicinity (Fars province, Iran) by studying 19 localities. *Orthetrum anceps*, *O. taeniolatum*, *O. chrysostigma*, *Sympetrum fonscolombii*, *S. meridionale*, *Crocothemis servilia*, *Trithemis kirbyi*, and *Pantala flavescens* are new provincial additions. All species are listed locality wise in a table and briefly discussed. The paper includes a welcome identification key of the regional Libellulidae detailed on the genus and species level and furnished with informative figures.] Address: Kiany, M., Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, I. R. Iran. E-mail: mohsen.kiany1@gmail.com

10402. Kronenbitter, J. (2009): Laichhabitatwahl des Kleinen Granatauges (*Erythromma viridulum*) (Zygoptera: Coenagrionidae). *Der Einfluss verschiedener Habitatparameter*. Diplomarbeit. Bayerische Julius-Maximilians-Universität Würzburg: 201 pp. (in German, with English

summary) ["Human-induced climate change has caused distributional shifts of many species of Odonata in Europe within the last few decades. Among them, *E. viridulum*, a naturally holo-mediterranean distributed species is today found in many parts of Germany. Within just a decade the number of locations it has been identified in Bavaria has increased nearly tenfold. According to a number of authors, besides the influence of climate change, this increase in its distribution can also be explained by its having been previously overlooked. This is due to the fact that individuals of this species are commonly found far from the vicinity of water bodies. Until now, a systematic survey of *E. viridulum* has been hindered by the fact that no studies which allow quantitative statements about the habitat requirements of the species exist. The method of statistical habitat modelling I used in this study provides the opportunity of identifying and quantifying the relevant habitat factors which determine the presence of a species at a habitat. The data acquisition was undertaken in the area around Würzburg and Haßfurt in the North of Bavaria, Germany. I surveyed 92 standing water bodies for the presence of *E. viridulum* and recorded various potentially relevant parameters. The forecast values of the habitat models I created on the basis of this data proved to be a good representation of the likelihood of the presence of this species. The occurrence probability increased with the low isolation of a water body, a large expanse of open water surface without any swamp plants, a low degree of shading and the presence of immersed leaf vegetation, especially large stands and plants with an extremely fine-branched leaf structure. Relationships between preferred parameter values and the biology of the species are discussed. To identify suitable breeding sites, damselflies need to discriminate between different values of the relevant habitat parameters and polarotaxis plays a major role in this. At artificial ponds I undertook experimental measurements over different light regimes of the reflection-polarisation patterns of the water surface, of different ground colours and of immersion leaf vegetation at several depths. I showed the possibility of distinguishing between different parameter values on the basis of very few characteristics of the reflection-polarisation patterns. For damselflies this suggests the advantage of being able to select a preferred breeding site from a distance simply on the basis of visual information." (Author)] Address: Kronenbitter, Jenja, Schwabenstr. 21., D-76646 Bruchsal, Germany

10403. Lingane, P.J. (2009): The design and fabrication of a micro mechanical dragonfly. Senior Thesis. Project Report. Submitted March 19, 2009: 51 pp, app. (in English) ["The goal this project was to create a scaled model of a flapping wing aerial vehicle. The design was initially based on a remote controlled model available at many toy stores. This model was in the form of a dragonfly but about four times the size in each dimension. My project was to scale this down, ideally to the size of a real dragonfly. This however was difficult, and a half scaled prototype (twice life size) was constructed instead. Scaling was done using dimensionless fluid parameters such as the Reynolds and Strouhal numbers which effectively related the various properties of each model. Testing and modification of the prototype were carried out, and in the process an analytical model was made to model the dynamics. Although still not flying, the prototype will hopefully soon be ready for testing against the theory. In the future, more testing will be completed, and minor modifications made to get the scaled prototype flying. All of this is part of a larger goal to miniaturize a flapping flying ro-

bot of which this project is only a part." (Author)] Address: Lingane, P.J., Department of Mechanical Engineering, Union College, Schenectady, NY, USA

10404. Mey, E. (2009): Beobachtungen an Libellen (Insecta, Odonata) in Thüringen, insbesondere in der Umgebung von Rudolstadt. Rudolstädter naturhistorische Schriften 15: 39-98. (in German, with English summary) [Germany; "The scientific study of dragonflies and damselflies in Thüringen goes back to the first half of the 18th century, is connected with the rise of natural history cabinets, and had its hesitant beginnings in the pre-Linné era in (e.g.) the work of the Nordhausen natural theologian F. C. Lesser. For the first concrete data between 1773 and 1818 we have to thank A. C. Kühn and A. J. G. K. Batsch, but above all J. M. Bechstein and G. L. Scharfenberg. All available historical records up to the middle of the 20th century are here collected together according to their faunistic aspects and annotated. At least nine Odonata eruptions from various regions of Thüringen are known from the last 250 years or more: 1746, 1806, 1816, 1822, 1839, 1853, 1857, 1881, and 1917. They concern population explosions of a single species each time: *Libellula depressa* (twice) and *L. quadrimaculata* (five times). The original accounts are documented here. No Odonata eruptions have been recorded in Thüringen for more than 90 years. Between the end of the 18th century and about 1950, 47 species of Odonata were recorded in Thüringen. However, during this period of more than 150 years faunistic interest in dragonflies and damselflies was only sporadic. Between 1952 and the present day, reports of 17 further species have been published, bringing the total number of Odonata species recorded in Thüringen to 64. From 1984 to 2008 an attempt was made to record the entire Odonata species spectrum occurring in and around Rudolstadt (eastern Thüringen). The material consists of around 2000 data points. It deals with parts of the following natural landscapes: the central Thüringer Wald (Forest), the high Thüringen shale hills, the Schwarzsaale-Sornitz region, the Ilm-Saale-Ohrdruf shell limestone plateau, the Paulinzella bunter sandstone woodland area, the Saale sandstone plateau, and the central Saale Valley. Within this region, 48 Odonata species have been recorded, including some older valuable specimens in the Natural History Museum in Rudolstadt (*Cordulegaster bidentata*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, and *Leucorrhinia rubicunda*). In addition, some observations on the life style of *Cordulegaster boltonii* made by the author are given. Contrarily to other reports, there are no confirmed records of *Somatochlora arctica* from Thüringen." (Author)] Address: Mey, E., Naturhistorisches Museum im Thüringer Landesmuseum Heidecksburg zu Rudolstadt, Schloßbezirk 1, 07407 Rudolstadt, Germany. E-mail: mey-rudolstadt@t-online.de

10405. Müller, Z.; Kiss, B.; Juhász, P. (2009): Faunistical data to complete the nationwide occurrence of Ornate Damselfly [*Coenagrion ornatum* (Selys-Longchamps, 1850)]. *Folia historico naturalia musei Matraensis* 33: 97-101. (in English) [The authors add 42 watercourses inhabited by *C. ornatum* to the known 63 localities for the species in Hungary; data were obtained from studies from 2003 to 2009.] Address: Müller, Z., BioAqua Pro Kft. H-4032 Debrecen, Soó R. 21, Hungary. E-mail: mullerz@bioaquapro.hu

10406. Ou, J.-f.; Huang, H.; Liu, G.-q.; Yu, H.; Zheng, J.-h.; Zhang, T.-p. (2009): Research on diversity of Odonata in Zhuhai area, Guangdong Province. *Journal of Environmental Entomology* 31(4): 356-360. (in Chinese, with

English summary) [Between 2006 and 2008, 24 Odonata species were recorded in the Zhuhai region, Guangdong Province, China. *Paracercion hieroglyphicum* and *P. calamorum* are new records for the province.] Address: Guangdong Entomological Institute, Guangzhou 510260, China

10407. Schilling, E.G.; Loftin, C.S.; Hury, A.D. (2009): Macroinvertebrates as indicators of fish absence in naturally fishless lakes. *Freshwater biology* 54: 181-202. ["1. Little is known about native communities in naturally fishless lakes in eastern North America, a region where fish stocking has led to a decline in these habitats. (2.) Our study objectives were to: (i) characterise and compare macroinvertebrate communities in fishless lakes found in two biophysical regions of Maine (USA): kettle lakes in the eastern lowlands and foothills and headwater lakes in the central and western mountains; (ii) identify unique attributes of fishless lake macroinvertebrate communities compared to lakes with fish and (iii) develop a method to efficiently identify fishless lakes when thorough fish surveys are not possible. (3.) We quantified macroinvertebrate community structure in the two physiographic fishless lake types (n = 8 kettle lakes; n = 8 headwater lakes) with submerged light traps and sweep nets. We also compared fishless lake macroinvertebrate communities to those in fish-containing lakes (n = 18) of similar size, location and maximum depth. We used nonmetric multi-dimensional scaling to assess differences in community structure and t-tests for taxon-specific comparisons between lakes. (4.) Few differences in macroinvertebrate communities between the two physiographic fishless lake types were apparent. Fishless and fish-containing lakes had numerous differences in macroinvertebrate community structure, abundance, taxonomic composition and species richness. Fish presence or absence was a stronger determinant of community structure in our study than differences in physical conditions relating to lake origin and physiography. (5.) Communities in fishless lakes were more speciose and abundant than in fish-containing lakes, especially taxa that are large, active and free-swimming. Families differing in abundance and taxonomic composition included Notonectidae, Corixidae, Gyridae, Dytiscidae, Aeshnidae, Libellulidae and Chaoboridae. (6.) We identified six taxa unique to fishless lakes that are robust indicators of fish absence: *Graphoderus liberus*, *Hesperocorixa* spp., *Dineutus* spp., *Chaoborus americanus*, *Notonecta insulata* and *Callicorixa* spp. These taxa are collected most effectively with submerged light traps. (7.) Naturally fishless lakes warrant conservation, because they provide habitat for a unique suite of organisms that thrive in the absence of fish predation. ... A total of 46 Hemiptera, Coleoptera, Odonata and Chaoborus taxa were identified from submerged light trap and littoral sweeps, with eight taxa abundant in most fishless lakes. The total number of captured macroinvertebrates and total species richness, as well as richness at the family level, did not differ between fishless kettle lakes and fishless headwater lakes. No taxa collected in littoral sweeps showed significant differences in abundance or per cent occurrence between fishless kettle lakes and fishless headwater lakes. The total number of macroinvertebrates captured in submerged light traps was greater in fishless lakes than fish-containing lakes, with greater abundances of Hemiptera, Coleoptera and Odonata in fishless lakes. Odonates associated with fishless lakes were Aeshnidae, Libellulidae and Coenagrionidae, with *Aeshna eremita* and *Leucorrhinia glacialis* more abundant, as well as present in more lakes lacking

fish. Seven species were unique but not widespread among fishless lakes, including *Leucorrhinia patricia* in two lakes. Four species were unique to fish-containing lakes, *Enallagma geminatum* and *E. carunculatum*, *Lesites vigilax* and the haliplid *Haliplus connexus*. None of these was widespread, each occurring in two fish-containing lakes." (Authors)] Address: Gaenzle Schilling, E., Department of Wildlife Ecology, University of Maine, 5755 Nutting Hall, Orono, ME 04469-5755, USA. E-mail: emily.schilling@umit.maine.edu

10408. Schweighofer, W. (2009): Seltener Besuch aus der Sahelzone – die Schabracken-Königslibelle. *LANI-US-Information* 18(3-4): 7-8. (in German) [Niederösterreich, Austria; the author reports three records of *Anax ephippiger* emergence in 2009 from a gravel pond near Pöchlarn and two shallow storm water retention ponds near Rohr/Loosdorf and Nenndorf/Markersdorf.] Address: Schweighofer, W., Ötscherblick 10, A-3661 Artstetten, Austria. E-mail: wolfgang.schweighofer@schule.at

10409. Sharapova, T.A. (2009): [Study of the zooperiphyton of the River Demyankov]. *Bulletin of Environment, Forest and Landscape* 9: 146-154. (in Russian) [The river Demyankov is situated at app. 59 N 71 E in Russia. *Somatochlora graeseri* is the single odonate species mentioned.] Address: Sharapova, T.A., Institute of Northern Development, Siberian Branch of the RAS, Tyumen, Russia

10410. Srivastava, S.K.; Babu, N.; Pandey, H. (2009): Traditional insect bioprospecting – as human food and medicine. *Indian Journal of Traditional Knowledge* 8(4): 485-494. (in English) ["The wisdom that indigenous people have regarding bioprospecting is embedded in their belief system and their culture. Food insects play an important role in the new insect focus. Ants, bees, termites, caterpillars, water bugs, beetle larvae, flies, crickets, katydids, cicadas, and dragonfly nymphs are among a long list of edible insects that provide nutrition for the people of Asia, Australia, Africa, South America, the Middle East, and the Far East. Insects represent an important food source for a wide variety of other animal species. By weight, termites, grasshoppers, caterpillars, weevils, houseflies and spiders are better sources of protein than beef, chicken, pork or lamb. The traditional healers use insects as medicine. Chemicals produced by insects against self defense can be used for antibacterial and anticancer drugs. The nutritional and economic value of edible insects is often neglected and we should further encourage their collection and commercialization, given the benefits to the environment and human health. It is an interesting concept, managing pest insects by developing them into a sought after delicacy." (Authors)] Address: SK Srivastava, S.K., National Research Centre for Women in Agriculture, (NRCWA), (Indian Council of Agricultural Research), P.O. Baramunda, Bhubaneswar 751 003, Orissa, India. E-mail: srivastavasknrcwa@yahoo.com

10411. Stenman, K.; Johansson, F. (2009): Röd flicklända och finnmyrten – två nya arter för Piteå kommun. *Skörvöpparn*, Umeå 1: 25-26. (in Swedish) [Sweden; *Pyrrhosoma nymphula* was observed ca 30 km V Piteå; N 7257639, O 1735730; RT90.] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

10412. Theischinger, G.; Miller, J.; Miller, R.; Krogh, M. (2009): Rediscovery of *Austrocordulia leonardi* in the suburbia of Sydney. *Agrion* 13(2): 50-53. (in English) [A.

leonardi is considered as one of Australia's rarest dragonflies. "Ecological information accumulated during the recent search for the species is presented and discussed." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

10413. Torralba Burrial, A.; Ocharan, F.J. (2009): Temporalidad y perturbaciones antrópicas en las comunidades de macroinvertebrados de la subcuenca del río Arba (Zaragoza, NE España). Boletín de la Real Sociedad Española de Historia Natural. Sección biológica 103: 131-144. (in Spanish, with English summary) ["Benthic macroinvertebrate communities of the Arba river basin (Aragon, NE Spain) have been studied with the aim of evaluating its ecological status. In the summer of 2001 two samplings campaigns were carried out with a Surber net, coincident with the season of lower flow. Community structure was studied by means of taxa richness and diversity, equitability and dominance indices. Water quality was evaluated by taxa number of Ephemeroptera, Plecoptera and Trichoptera (EPT groups), IASPT and IBMWP indices, using this last one to classify the ecological status of the sampled reaches. In the upper reaches the superficial water is reduced to isolated pools; nevertheless they maintain diverse communities with high values in the IBMWP. There were differences among tributaries due to the diverse degree of anthropic disturbance that they support, being more serious in the downstream part of the basin. Temporality and anthropic disturbance explain the composition of the benthic macroinvertebrate communities in these Mediterranean rivers." (Authors) The taxa list includes 'Aeshnidae' and 'Gomphidae'.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

10414. Xu, C.; Zhang, G. (2009): Biodiversities of Daqing wetland and counter measures for protection. Chinese Agricultural Science Bulletin 25(11): 215-219. (in Chinese, with English summary) [From March 2007 to December 2008, the biodiversity of Daqing Longfeng and Zhalong wetland nature reserve, Dangnai section was studied. 469 plant and 316 vertebrate species were found. Sympetrum croceolum and Coenagrionidae are also mentioned in the text.] Address: Xu, C., Department of Life Science, Daqing Normal College, Daqing Heilongjiang 163712, China. E-mail: changjunxu@126.com

10415. Zhao, Y.; Tong, J.; Sun, J.; Chen, D.; Zhang, J. (2009): Property tests of nano indentation on membranous wings of dragonflies. Journal of Agricultural Mechanization Research 2009(11): 26-29. (in Chinese, with English summary) ["The nano - mechanical behaviour of dragonfly membranous wings was investigated with a nano - indenter. The holding time and the loading rate were selected 20 s and 53 μ N/s by the method of test optimization. In nano - indentation experiment, 6 indentation measurements were done in an area of 0.075mm - 0.01mm and then took the mean value as the nano - mechanical parameter of this position. It was shown that the maximums of the reduced modulus and the hardness of the living dragonfly *Anax parthenope julius* and *Pantala flavescens* are about at position of 0.7 L of their wings, where L is the total length of their wings. The maximums of the reduced modulus and the hardness of the *Sympetrum striolatum* are at position of 0.5 L of its wing, where L is the total length of the wing. The reduced modulus and the hardness of *A. parthenope julius* are maximum on the corresponding parts among the three drag-

onflies, related to the large somatotype." (Authors)] Address: The College of Mechanical and Power Engineering, Henan Polytechnic Univ., Jiaozuo 454000, China

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10416. Anderson, C.N.; Grether, G.F. (2010): Character displacement in the fighting colours of *Hetaerina* damselflies. Proc. R. Soc. B 277(1700): 3669-3675. (in English) ["Aggression between species is a seldom-considered but potentially widespread mechanism of character displacement in secondary sexual characters. Based on previous research showing that similarity in wing coloration directly influences interspecific territorial aggression in *Hetaerina* damselflies, we predicted that wing coloration would show a pattern of character displacement (divergence in sympatry). A geographical survey of four *Hetaerina* damselfly species in Mexico and Texas showed evidence for character displacement in both species pairs that regularly occurs sympatrically. *Hetaerina titia*, a species that typically has large black wing spots and small red wing spots, shifted to having even larger black spots and smaller red wing spots at sites where a congener with large red wing spots is numerically dominant (*H. americana* or *H. occisa*). *H. americana* showed the reverse pattern, shifting towards larger red wing spots where *H. titia* is numerically dominant. This pattern is consistent with the process of agonistic character displacement, but the ontogenetic basis of the shift remains to be demonstrated." (Authors)] Address: Anderson, C.N., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Circuito Exterior s/n, Apdo. Postal 70-275, México D.F. 04510, Mexico. E-mail: cndanderson1980@gmail.com

10417. Anonymus (2010): Listing Actions: Two Hawaiian Damselflies. Endangered Species Bulletin 35(2): 39. (in English) [Verbatim: "On June 24, the Service listed two species of Hawaiian damselflies as endangered. The flying earwig Hawaiian damselfly (*Megalagrion nesiotis*) historically occurred on the islands of Hawai'i and Maui but is now found only on the latter. The Pacific Hawaiian damselfly (*M. pacificum*) once lived on all of the main Hawaiian Islands (except Kaho'olawe and Ni'ihau) but now occurs only on the islands of Hawai'i, Maui, and Molo'ka'i. Damselflies are close relatives of dragonflies, which they resemble in appearance. With the extensive modification of stream and wetland habitats and the degradation of native forests, Hawaii's native damselflies, including the two species most recently listed, experienced a tremendous reduction in habitat. In addition, predation by a number of nonnative species that have been both intentionally and, in some cases, inadvertently introduced into the Hawaiian Islands is a continuing threat to all of the state's native damselflies."] Address: not stated

10418. Barros, P.; Moreira, P.; Ferreira, S. (2010): Contribution to the knowledge of the Odonata fauna of northern Portugal. Boletín de la S.E.A. 46(1): 533-539. (in English, with Spanish summary) ["The known distribution of 36 species of dragonfly in Portugal is extended with 220 records from 50 localities in the north of the country, collected between 2008 and 2009. The new data include information from three Sites of Community Importance of the Natura 2000 network: PTCON0003-Alvão-Marão, PTCON0025-Montemuro and PTCON0021-Rio Sabor e Maças; and five protected areas: Serra da Estrela Natural Park, Azibo's Lagoon Protected Landscape, Alvão Natural Park, Douro International Natural Park and Mon-

tesinho Natural Park." (Authors) The records include the legally protected Odonata species *Coenagrion mercuriale*, *Gomphus graslinii*, *Macromia splendens*, and *Oxygastra curtisii*.] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate) em Biodiversidade e Recursos Geneticos, Universidade do Porto, Campus Agrário de Vairao, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

10419. Bedjanic, M. (2010): Three new Drepanosticta species from Sri Lanka (Zygoptera: Platystictidae). *Odonatologica* 39(3): 195-215. (in English) ["*D. mojca* sp. n. (holotype male: 10km NE of Deniyaya; Matara distr.; Southern prov.; N 6.360, E 80.460; 02-V-2003; to be deposited at Sri Lanka National Museum, Colombo), *D. bine* sp. n. (holotype male: Opanayake, Ratnapura distr.; Sabaragamuwa prov.; N 6.620, E 80.660; 13-X-1970; deposited at National Museum of Natural History, Smithsonian Institution, Washington, USA) and *D. anamia* sp. n. (holotype male: Katugas Falls near Ratnapura; Ratnapura distr.; Sabaragamuwa prov.; N 6.680, E 80.410; 04-V-2003; to be deposited at Sri Lanka National Museum, Colombo), are described. Their currently known distribution, phenology, ecology and threat status are presented and discussed. The remarkable Drepanosticta diversity in Sri Lanka makes the island a globally important Platystictidae hotspot." (Author)] Address: Bedjanic, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjaz.bedjanic@yahoo.com

10420. Behrends, T. (2010): NABU-Landesstelle Wasser meldet ersten Monitoring-Erfolg: Kleine Königslibelle wiederentdeckt. *Betrifft Natur - Magazin des NABU Schleswig-Holstein* 2/10: 11. (in German) [The current situation of *Anax parthenope* in Schleswig-Holstein, Germany is briefly discussed on the basis of most recent records.] Address: Behrends, T., NABU-Landesstelle Wasser, Langes Str. 43, 24306 Plön. Germany. E-mail: Thomas.Behrends@NABU-SH.de

10421. Belevich, O.E.; Yurchenko, Yu.A. (2010): Twilight activity of dragonflies of the genus *Aeshna* Fabricius, 1775 (Odonata, Aeshnidae) in the southern part of West Siberia. *Euroasian entomological journal* 9(2): 275-279. (in Russian, with English summary) [The paper provides information on crepuscular feeding aggregation of eight Aeshnidae (*Aeshna affinis*; *A. crenata*; *A. grandis*; *A. juncea*; *A. mixta*; *A. serrata*; *A. subarctica*; *A. viridis*) in the forest zone of southern W Siberia (Novosibirsk region, Russia). *A. viridis* was the dominant crepuscular species with abundances of 80-100% of all Aeshnidae caught at one place. This behaviour can be recorded over the summer season, starting in early June, with a peak occurring in the second half of July, and ending in the early September. The average duration of the crepuscular flight was ca 1 h. The extreme values of temperatures with feeding activity varied between 9.5 and 25.5°C. Swarming dragonflies concentrated mainly near the forest edges or solitarily standing trees.] Address: Belevich, O.E., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Bran, Frunse str. 11, Novosibirsk 630091 Russia

10422. Bönsel, A. (2010): Zum Vorkommen der Libellenarten aus den Anhängen der FFH-Richtlinie in Mecklenburg-Vorpommern (Odonata). *Naturschutzarbeit in Mecklenburg-Vorpommern* 53(1/2): 24-33. (in German) [Maps of the distribution of the legally protected Odonata species *Aeshna viridis*, *Stylurus flavipes*, *Leucorrhinia albifrons*, *L. caudalis*, and *L. pectoralis* in Mecklenburg-Vor-

pommern, Germany are presented.] Address: Bönsel, A., Vasenbusch 15, D-18337 Gresenhorst, Germany. E-mail: andre.boensel@gmx.de

10423. Buczyński, P. (2010): Polish and dedicated to Poland odonatological papers. 8. The year 2009 and supplement to the year 2008. *Odonatrix* 6(2): 61-64. (in Polish, with English summary) [The author presents a list of Polish and dedicated to Poland odonatological papers that were published in the year 2009 (33 papers in 2009, 8 papers in 2008).] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

10424. Buczyński, P.; Buczyńska, E. (2010): Another record of dragonflies (Odonata) in a light trap. *Odonatrix* 6(1): 1-2. (in Polish, with English summary) ["On June 15, 2007 in the valley of the River Raba near the village Marszowice (southern Poland) *Platycnemis pennipes* (2 males) and *Ischnura elegans* (1 male) were caught to a light trap. Both species occurred numerously on the river or in an adjacent gravelpit and they were probably activated by the strong light." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

10425. Cross, D.; Jefferys, E. (2010): Catalogue of insects collected by William Sharp Macleay in Cuba 1825-1836. *Proceedings of the Linnean Society of New South Wales* 131: 27-35. (in English) ["All of William Sharp Macleay's labelled Cuban insects are now in a separately labelled Cuban insect cabinet in the Macleay Museum. There are over 7,349 labelled, pinned and partially identified. Other unlabelled specimens are still to be found throughout the collection. The geographical area where Cuba lies is also within the bio-geographical area for the southern United States, the Bahamas, the Caribbean and the northern most areas of South America. The biological scientists of these surrounding countries will find the information and knowledge of the distributions of insects of Cuba found in 1825 to 1836 of tremendous interest in relation to the possible distributions of insect faunas found or no longer found in these areas today." (Authors) The 24 Odonata specimens are still unidentified.] Address: Cross, D., Univ. of Sydney, Faculty of Agriculture, Food and Natural Resource, NSW 2006, Australia. E-mail: dcro3102@uni.sydney.edu.au

10426. Davis, J.M.; Rosemond, A.M.; Eggert, S.L.; Cross, W.F.; Wallace, J.B. (2010): Nutrient enrichment differentially affects body sizes of primary consumers and predators in a detritus-based stream. *Limnol. Oceanogr.* 55(6): 2305-2316. (in English) ["We assessed how a 5-yr nutrient enrichment affected the responses of different size classes of primary consumers and predators in a detritus-based headwater stream. We hypothesized that alterations in detritus availability because of enrichment would decrease the abundance and biomass of large-bodied consumers. In contrast, we found that 2 yr of enrichment increased the biomass and abundance of all consumers regardless of body size. Furthermore, during the fourth and fifth year of enrichment, the abundance and biomass of large-bodied primary consumers continued to increase, while small-bodied primary consumers returned to pretreatment levels. The size structure of a dominant primary consumer (*Pycnopsyche* spp.) also shifted during the 5-yr enrichment: its average and maximum individual body size increased in the treatment stream compared with the reference stream. Positive en-

richment effects also occurred on small-bodied predators, but not on large-bodied predators. Thus, enrichment increased prey body size, but these positive effects on large prey did not propagate up to higher trophic levels to affect large predators. Because consumer body size can be an important species-specific trait determining population dynamics and ecosystem processes, these observed shifts in consumer size distributions suggest a potentially important pathway for global increases in nutrient enrichment to alter stream structure and function...The predator community was dominated by app. 20 taxa of invertebrate (e.g., Beloneuria [Plecoptera], Ceratopogonidae [Diptera], Cordulegaster, Hexatoma [Diptera], and Lanthus)." (Authors)] Address: Davis, J.M., Stream Ecology Center, Dept of Biological Sciences, Idaho State Univ., Pocatello, Idaho, USA. E-mail: jmdavis@isu.edu

10427. Dow, R.A. (2010): A review of the *Teinobasis* of Sundaland, with the description of *Teinobasis cryptica* sp. nov. from Malaysia (Odonata: Coenagrionidae). *International Journal of Odonatology* 13(2): 205-230, pl. II. (in English) ["*Teinobasis cryptica* sp. nov. (holotype male: Borneo, Sarawak, Bahagian Samarahan, Kota Samarahan, old UNIMAS campus, disturbed peat swamp forest, 25 ii 2008, RMNH) from Malaysia is described from both sexes and compared with other *Teinobasis* species known to occur in Malaysia. The members of the genus known from Sundaland are reviewed. Records of *T. ruficollis* from Borneo are clarified. New records of other Bornean species are listed. The females of *T. laidlawi*, *T. rajah* and *T. ruficollis* are described for the first time. Keys are given to both sexes of all named species from the genus known from peninsular Malaysia, Singapore and the Greater Sunda Islands and the species are placed provisionally into two groups: the *laidlawi*-group and *ruficollis*-group. The former group also includes *T. rubricauda* from the Palawan region of the Philippines, which may be a junior synonym of *T. laidlawi*." (Author)] Address: Rory A. Dow, Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

10428. Dozark, K.G. (2010): Sediment effects on aquatic macroinvertebrates in a prairie pothole, Oak Lake, in eastern South Dakota. Dissertation, South Dakota State University: 90 pp. (in English) ["The Clean Water Act aims to maintain the physical, chemical, and biological integrity of the nation's waters. Sedimentation is a major pollutant to world, national, and state waterbodies. The developments of Total Maximum Daily Loads (TMDLs) are required to improve water quality problems through the use of Best Management Practices (BMPs). Sedimentation can be detrimental to aquatic ecosystems by reducing feeding ability, smothering habitat, clogging respiratory apparatuses, and increasing scouring and abrasion to exoskeletons of aquatic organisms. This study examined the influence of regional sediment loads on aquatic macroinvertebrate communities in the littoral zone of a prairie pothole lake, Oak Lake. Ten emergent macrophyte bed and ten rocky shoreline locations were treated with varying levels of soil to simulate regional sediment loads of 25 tons/km², 250 tons/km², 2,500 tons/km² and 25,000 tons/km². Five plots were treated and sampled at each of ten locations during the summers of 2005 and 2006. Invertebrates were subsampled, identified to the lowest practical taxonomic level, and classified into habitat and feeding guilds. A total of 129 invertebrate taxa were identified throughout the experiment. Macrophyte beds contained an average of 23 genera and rocky

shores contained an average of 18 genera. Sedimentation significantly decreased the percentages of collector-gatherers and sprawlers in both habitats. Percentages of gliders, swimmers, and scrapers increased with the addition of sediment in both habitats. Macrophyte beds exhibited an increase in Ephemeroptera, Trichoptera, and Odonata richness following sedimentation. The percentage of sprawlers in rocky shorelines was significantly decreased due to sedimentation. These relationships were log linear. Oligochaeta, *Caenis latipennis*, Endochironomus and Coenagrionidae abundances were reduced following treatment in macrophyte beds. In rocky habitats abundances of Oligochaeta, water mites, and *Hyalella azteca* increased following treatment. However, *C. latipennis* and *Hydra* abundances decreased. Overall, macroinvertebrate communities changed little following sedimentation. Other studies suggest that macroinvertebrate communities in the Prairie Pothole region are tolerant to environmental disturbances and changes. Non-anthropogenic factors, such as lake morphology, may be more influential to macroinvertebrate communities than anthropogenic factors, such as human development along lake shorelines. Future studies should examine possible macroinvertebrate threshold levels with higher sediment loads than were used in this study." (Author)] Address: not stated

10429. Dudarev, A.N. (2010): Strekozy (Insecta, Odonata) verkhovo bolota „El'nya" [Dragonflies (Insecta, Odonata) of the high peat bog „El'nya"]. *Vesnik Vitebskaya dzerzhavnaga universiteta* 2010(2): 80-84. (in Russian) [Belarus; 20 Odonata species have been found in the bog of El'nya, Belarus. Dominant species are *Lestes sponsa*, *Sympetrum flaveolum* and *Enallagma cyathigerum*. Noteworthy species are also *Coenagrion hastulatum*, *C. pulchellum*, *Somatochlora flavomaculata*, *Leucorrhinia albifrons*, *L. rubicunda*, and *L. dubia*.] Address: Dudarev, A.N., UO Vitebsk State Univ., PM Masherau, Belarus

10430. Geraeds, R.P.G. (2010): Habitat and development of larvae of the Club-tailed dragonfly in the river Roer. *Natuurhistorisch Maandblad* 99(11): 249-255. (in Dutch, with English summary) ["The locations and timing of emergence of in the river Roer (in the Dutch province of Limburg) have been thoroughly investigated in recent years. It is assumed that the dragonflies generally emerge close to their larval habitat. Since surveys of actual larval habitats in the Netherlands have been very rare, four transects of the Roer were checked for the presence of larvae of the Clubtailed dragonfly (*Gomphus vulgatissimus*) during 2006-2009. The goal was to discover what type of substrate the larvae prefer, and if the places where the dragonflies emerge are situated close to the actual larval habitats, as well as to find out how long larval development along the river Roer takes. The survey of larvae was carried out in four transects (Muytert, Melicker Ohé, Zwarte Berg and Roermond). The larvae were caught with a hand brailer which is normally used for fish and amphibian surveys. For each of the larvae caught, I noted the type of substrate in which it was caught and its distance to the riverbank, measured the width of its head and determined its sex. Larvae of the Clubtailed dragonfly develop in 14 stages (F13 to F0), and the stage of development can be identified by measuring the width of the head. The last hibernation before emergence always takes place in the final stage of development (F0). The larvae do not grow during hibernation, i.e. from October to May. Each transect was investigated eight times during the 2006-2009 period, and 615 larvae of *G. vulgatissimus*

simus were caught. Most were caught at the Melicker Ohé transect (245), while only four larvae were caught at the Roermond transect. Most larvae were found within a 1 m distance of the riverbank, and almost 50% even within 0.50 m from the bank. The largest distance from the bank at which larvae were caught was 5 m. Most larvae were found in mixed substrates, dominated by a combination of silt and detritus. Only a few larvae were found in substrates dominated only by silt, detritus, sand or gravel. The widths of the larval heads ranged from 1.3 to 6.5 mm. According to Müller (1995) and Kern (1999), this means that the larvae were in the last seven developmental stages (F6 to F0). Most of the larvae were in the final stage (F0). Surveys during hibernation yielded only larvae in the last six stages (F5 till F0). The distribution of developmental stages of larvae caught during hibernation shows that most of the larvae of the population in the River Roer develop over a period of three years, which means that most of the larvae hibernate successively in stages F4, F2 and F0." (Author)] Address: Geraeds, R.P.G., Bergstraat 70, 6131 AW Sittard, The Netherlands

10431. Grand, D. (2010): Observations tardives d'*Aeshna mixta* Latreille, 1805 dans la Dombes (Ain) à l'automne 2009 (Odonata, Anisoptera: Aeshnidae). *Martinia* 26(1-2): 52. (in French) [France; data on fall phenology of *A. mixta* (and *Sympetrum meridionale*, *S. striolatum*) are presented.] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

10432. Hacet, N.; Çamur-Elipek, B.; Kirgiz, T. (2010): A study on the Odonate larvae of Turkish Thrace: with larval identification keys to the considered taxa. *J. Entomol. Res. Soc.* 12(2): 57-74. (in Odonata, larvae, identification key, Turkish Thrace, Turkey) ["A total of 26 species were recorded based on larval specimens collected from the region during sampling period between years 1982 and 2009. New localities for the odonate species, except *Caliaeschna microstigma*, *Gomphus flavipes*, *Cordulegaster insignis*, and *Sympetrum fonscolombii*, were added to their distributional ranges inside the region. Furthermore, *Anax imperator*, *Brachytron pratense*, and *Libellula fulva* were recorded from the provinces where they had not previously been found. Keys including illustrations of the larvae recorded in the region were provided." (Authors)] Address: Hacet, Nurten, Trakya University, Faculty of Science, Department of Biology, TR-22030 Edirne, Turkey. E-mails: nhacet@hotmail.com

10433. Han, J.-s.; Chang, J.W.; Kang, I.-m.; Kim, S.-t. (2010): Flow visualization and force measurement of an insect wing based on dragonfly hovering. 28th AIAA Applied Aerodynamics Conference, 28 June - 1 July 2010, Chicago, Illinois: (in English) ["Flow visualization and aerodynamic force measurements were conducted in order to investigate the flow phenomena around the wing of a hovering dragonfly. Two pairs of 4-bar linkage mechanisms were installed in a flapping model and driven by a stepping motor. The fore- and hindwing have a phase difference angle of 180°. The stroke amplitude, pitch angle and incidence angle of the model were 75°, 0-90° and 60°, respectively. A wing beat frequency of 0.087 was chosen, and the corresponding Reynolds number was 2.0×10³ based on the forewing. Each wing generated LEV at the start of downstroke and the LEV was developed and maintained on the upper surface of the wing. Aerodynamic forces were also generated in the downstroke motion in all cases. When the wings stroke together, the LEV on the hindwing was deformed by the

forewing, and the forces on the hindwing are lower than in the hindwing only cases. These results indicate that the wing-wing interaction have a negative effect on the generation of aerodynamic forces." (Authors)] Address: Chang, J.W., Korea Aerospace University, Hanggongdae-gil 100, Deogyang-gu, Goyang-city, Gyeonggi-do, Republic of Korea. E-mail: jwchang@kau.ac.kr

10434. Hanson, M.A.; Palik, B.J.; Church, J.O.; Miller, A.T. (2010): Influences of upland timber harvest on aquatic invertebrate communities in seasonal ponds: efficacy of forested buffers. *Wetlands Ecology and Management* 18(3): 255-267. (in English) ["We assessed community responses of aquatic invertebrates in 16 small, seasonal ponds in a forested region of north central Minnesota, USA, to evaluate potential influences of timber harvest and efficacy of uncut forested buffers in adjacent uplands. Invertebrate data gathered before (2000) and during the first 4 years following clearcut timber harvest (2001–2004) indicated that tree removal was followed by shifts in aquatic invertebrate communities in adjacent seasonal ponds. Retention of forested buffers appeared to partially mitigate influences of tree removal, but benefits of buffers may be limited by wind throw or other factors. Additional research is needed to clarify relationships between ecological characteristics of seasonal ponds and upland silviculture activities, and to better document efficacy and longevity of forested buffers." (Authors) Odonata are treated at the order level.] Address: Hanson, M.A.; Minnesota Dept of Natural Resources, Wetland Wildlife Populations & Research Group, 102 23rd St. NE, Bemidji, MN 56601, USA. E-mail: mark.hanson@dnr.state.mn.us

10435. Hippke, M. (2010): Bemerkenswerte entomologische Beobachtungen in Mecklenburg-Vorpommern (2010): Odonata (Libellen). *Virgo - Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 13(2): 70. (in German) [Germany. Records of *Anax parthenope*, *Leucorrhinia caudalis*, *Aeshna affinis*, *A. subarctica*, and *Erythromma viridulum* are documented.] Address: Hippke, M., Wiesenring 29, 19370 Parchim, Germany. E-Mail: Mathias-Hippke@web.de

10436. Höttinger, H. (2010): Die Libellen- und Tagfalterfauna des „Tiergartens“ in Schützen am Gebirge (Burgenland, Österreich). *Beiträge zur Entomofaunistik* 11: 13-26. (in German, with English summary) [Austria; "The Esterházy-"Tiergarten" at Schützen am Gebirge in the Leitha mountains exists since 1756, has 1.200 hectare in size and is surrounded by a wall. The area is characterized by partly semi-open and park like structure, some parts of ancient woodland and high diversity of habitats. Data on the fauna of the area were sparse until yet. Therefore in the year 2009 outline mapping on birds, bats, amphibians and insects (butterflies, dragonflies, saproxylic beetles) was ordered from the owner, the Esterházy company. [...] 36 of the 58 species of dragonflies reported from Burgenland were found and about five further species can be expected. Notably four "critically endangered" species from the Austrian red list were recorded (*Coenagrion ornatum*, *C. scitulum*, *Lestes dryas* and *L. virens*). Two species are classified as "endangered" (*Libellula fulva*, *Lestes barbarus*) and further six species "vulnerable". At least 22 of the 36 species possibly or sure can reproduce in the area." (Author)] Address: Höttinger, H., Institut für Zoologie, Department für Integrative Biologie und Biodiversitätsforschung, Universität für Bodenkultur, Gregor Mendel Str. 33, 1180 Wien, Austria. E-Mail: helmut.hoettinger@boku.ac.at

10437. Joniak, T. (2010): Benthic fauna of humic lakes of Drawieński National Park – history of research and state of knowledge. In: Joniak, T. (Ed.), *Functioning and protection of marsh ecosystems. Vol 3. Benthic fauna of Polish national parks.* Department of Water Protection Faculty of Biology A. Mickiewicz University, Poznań: 40-46. (in Polish, with English summary) ["The work present the history of research and state of knowledge of macrozoobenthos of humic lakes in Drawieński National Park, Poland. The specific feature of humic lakes is the presence of dissolved, mainly humic organic matter. The process of lake humification is connected with the inflow of organic substances cause significant changes in the water environment as well as the formation of a specific association of hydrobionts. The increase in the concentration of humic acids in lake waters leads to changes in the abiotic features of the environment, such as high water colour, decline in the thickness of the trophogenic zone, pH decrease (<6.5), limitation of the bioavailability of biogenic compounds. In these conditions some groups of benthic fauna are not found (for example Crustacea, Mollusca), and species diversity and number are reduced." (Author) The following Odonata species are mentioned: *Cordulia aenea*, *Enallagma cyathigerum* and *Ischnura elegans*.] Address: Joniak, T., Adam Mickiewicz University of Poznań, Faculty of Biology, Department of Water Protection, Umultowska str. 89, 61-614 Poznań, Poland. E-mail: e-mail: tjoniak@amu.edu.pl

10438. Jović, M.; Stanković, M.; Andus, L. (2010): *Aeshna grandis* (Linnaeus 1758) - A new species in Serbian fauna (Odonata: Aeshnidae). *Bulletin of the Natural History Museum* 3: 137-140. (in English, with Serbian summary) [10-VIII-2009, Badovinci (NW Serbia)] Address: Jović, M., Natural History Museum, Njegoševa 51, 10000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.rs

10439. Kery, M.; Gardner, B.; Monnerat, C. (2010): Predicting species distributions from checklist data using site-occupancy models. *Journal of Biogeography* 37(10): 1851-1862. (in English) ["Aim (1) To increase awareness of the challenges induced by imperfect detection, which is a fundamental issue in species distribution modelling; (2) to emphasize the value of replicate observations for species distribution modelling; and (3) to show how 'cheap' checklist data in faunal/floral databases may be used for the rigorous modelling of distributions by site-occupancy models. Location: Switzerland. Methods: We used checklist data collected by volunteers during 1999 and 2000 to analyse the distribution of *Aeshna cyanea*, a common dragonfly in Switzerland. We used data from repeated visits to 1-ha pixels to derive 'detection histories' and apply site-occupancy models to estimate the 'true' species distribution, i.e. corrected for imperfect detection. We modelled blue hawker distribution as a function of elevation and year and its detection probability of elevation, year and season. Results: The best model contained cubic polynomial elevation effects for distribution and quadratic effects of elevation and season for detectability. We compared the site-occupancy model with a conventional distribution model based on a generalized linear model, which assumes perfect detectability ($p = 1$). The conventional distribution map looked very different from the distribution map obtained using site-occupancy models that accounted for the imperfect detection. The conventional model underestimated the species distribution by 60%, and the slope parameters of the occurrence–elevation relationship were also underestimated when assuming $p = 1$. Elevation was not only an im-

portant predictor of blue hawker occurrence, but also of the detection probability, with a bell-shaped relationship. Furthermore, detectability increased over the season. The average detection probability was estimated at only 0.19 per survey. Main conclusions: Conventional species distribution models do not model species distributions per se but rather the apparent distribution, i.e. an unknown proportion of species distributions. That unknown proportion is equivalent to detectability. Imperfect detection in conventional species distribution models yields underestimates of the extent of distributions and covariate effects that are biased towards zero. In addition, patterns in detectability will erroneously be ascribed to species distributions. In contrast, site-occupancy models applied to replicated detection/non-detection data offer a powerful framework for making inferences about species distributions corrected for imperfect detection. The use of 'cheap' checklist data greatly enhances the scope of applications of this useful class of models." (Authors)] Address: Kéry, M., Swiss Ornithological Institute, 6204 Sempach, Switzerland. E-mail: marc.kery@vogelwarte.ch

10440. Kołeczek, D.; Tończyk, G. (2010): *Ischnura elegans* (Zygoptera: Coenagrionidae) as a prey of *Machimus* sp. (Diptera: Asilidae). *Odonatrix* 6(1): 3. (in Polish, with English summary) [Skórzyn (western Poland, 52°07' 17,18"N, 15°02'21,18"E)] Address: Kołeczek Dagmara, Instytut Ekologii Stosowanej, Skórzyn 44a, 66-614 Maszewo, Poland. E-mail: instytut@ies.zgora.pl

10441. Koltzoff, D. (2010): *Libellen im Landkreis Leer.* Verlag H. Risius. Weener: 82 pp. (in German) [Niedersachsen, Germany. 34 Odonata species are characterised in a monographic style.]

10442. Krieg-Jacquier, R. (2010): *Epithea bimaculata* (Charpentier, 1825) dans le département de l'Ain (Odonata, Anisoptera, Corduliidae). *Martinia* 26(3/4): 83-97. (in French, with English summary) [*E. bimaculata* was found in the Ain department, France at 19 localities. At two of them a univoltin development of specimens is possible.] Address: Krieg-Jacquier, R., 18 rue de la Maconne F-73000 Barberaz, France. E-mail: regis.krieg.jacquier@gmail.com

10443. Kück, P.; Meusemann, K.; Dambach, J.; Thormann, B.; Reumont, B.M. von; Wägele, J.W.; Misof, B. (2010): Parametric and non-parametric masking of randomness in sequence alignments can be improved and leads to better resolved trees. *Frontiers in Zoology* 2010, 7: 12 pp. (in English) ["Methods of alignment masking, which refers to the technique of excluding alignment blocks prior to tree reconstructions, have been successful in improving the signal-to-noise ratio in sequence alignments. However, the lack of formally well-defined methods to identify randomness in sequence alignments has prevented a routine application of alignment masking. Here, the effects on tree reconstructions of the most commonly used profiling method (GBLOCKS), which uses a predefined set of rules in combination with alignment masking, are compared with a new profiling approach (ALISCORE) based on Monte Carlo resampling within a sliding window, using different data sets and alignment methods. While the GBLOCKS approach excludes variable sections above a certain threshold which choice is left arbitrary, the ALISCORE algorithm is free of a priori rating of parameter space and therefore more objective. ALISCORE was successfully extended to amino acids using a proportional model and empirical substitution matrices to score randomness in multiple sequence

alignments. A complex bootstrap resampling leads to an even distribution of scores of randomly similar sequences to assess randomness of the observed sequence similarity. Testing performance on real data, both masking methods, GBLOCKS and ALISCOPE, helped to improve tree resolution. The sliding window approach was less sensitive to different alignments of identical data sets and performed equally well on all data sets. Concurrently, ALISCOPE is capable of dealing with different substitution patterns and heterogeneous base composition. ALISCOPE and the most relaxed GBLOCKS gap parameter setting performed best on all data sets. Correspondingly, Neighbour-Net analyses showed the most decrease in conflict. Alignment masking improves signal-to-noise ratio in multiple sequence alignments prior to phylogenetic reconstruction. Given the robust performance of alignment profiling, alignment masking should routinely be used to improve tree reconstructions. Parametric methods of alignment profiling can be easily extended to more complex likelihood based models of sequence evolution which opens the possibility of further improvements." (Authors) The data set includes *Libellula quadrimaculata* and *Cordulia aenea*.] Address: Kück, P., Zool. Forschungsmus. A. Koenig, Adenauerallee 160, D-53113 Bonn, Germany. E-mail: patrickkueck@web.de

10444. Kulijer, D.; Marinov, M. (2010): Odonata from Bulgaria in the collection of National Museum of Bosnia and Herzegovina. *Acta entomologica serbica* 15(2): 161-169. (in English, with Serbian summary) ["The entomological collection of the National Museum of Bosnia and Herzegovina is one of the oldest Balkan insect collections. 87 dragonfly specimens from 19 species that originate from Bulgaria were found in this collection. In this paper we present the oldest and till now unknown records of dragonflies from Bulgaria from this collection. Some interesting and new distribution data on several species are also presented and discussed." (Authors) The collection includes the following taxa: *Calopteryx splendens*, *C. splendens balcanica*, *Calopteryx virgo*, *Lestes sponsa*, *L. dryas*, *L. barbarus*, *L. macrostigma*, *S. fusca*, *Ischnura elegans*, *I. pumilio*, *Coenagrion puella*, *Platycnemis pennipes*, *Gomphus flavipes*, *Sympetrum sanguineum*, *S. flaveolum*, *S. meridionale*, and *Crocotthemis erythraea*. The occurrence of *C. s. balcanica* in Bulgaria needs further confirmation.] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: dejan.kulijer@gmail.com

10445. Lamond, B. (2010): Drugstore Dragonfly. *The Wood Duck* 64(4): 85. (in English) [Brantford, Ontario, Canada, 8-VIII-2010, a female *Stylurus scudderi* flew through an open door into a pharmacy perching at the ceiling. The paper includes additional regional records of this Odonata species.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

10446. Levy, D.E.; Seifert, A. (2010): Parameter study of simplified dragonfly airfoil geometry at Reynolds number of 6000. *J. Theor. Biol.* 266(4): 691-702. (in English) ["Aerodynamic study of a simplified Dragonfly airfoil in gliding flight at Reynolds numbers below 10,000 is motivated by both pure scientific interest and technological applications. At these Reynolds numbers, the natural insect flight could provide inspiration for technology development of Micro UAV's and more. Insect wings are typically characterized by corrugated airfoils. The present study follows a fundamental flow physics study (Levy and Seifert, 2009), that revealed the importance of flow separation

from the first corrugation, the roll-up of the separated shear layer to discrete vortices and their role in promoting flow reattachment to the aft arc, as the leading mechanism enabling high-lift, low drag performance of the Dragonfly gliding flight. This paper describes the effect of systematic airfoil geometry variations on the aerodynamic properties of a simplified Dragonfly airfoil at Reynolds number of 6000. The parameter study includes a detailed analysis of small variations of the nominal geometry, such as corrugation placement or height, rear arc and trailing edge shape. Numerical simulations using the 2D laminar Navier-Stokes equations revealed that the flow accelerating over the first corrugation slope is followed by an unsteady pressure recovery, combined with vortex shedding. The latter allows the reattachment of the flow over the rear arc. Also, the drag values are directly linked to the vortices' magnitude. This parametric study shows that geometric variations which reduce the vortices' amplitude, as reduction of the rear cavity depth or the reduction of the rear arc and trailing edge curvature, will reduce the drag values. Other changes will extend the flow reattachment over the rear arc for a larger mean lift coefficients range; such as the negative deflection of the forward flat plate. These changes consequently reduce the drag values at higher mean lift coefficients. The detailed geometry study enabled the definition of a corrugated airfoil geometry with enhanced aerodynamic properties, such as range and endurance factors, as compared to the nominal airfoil studied in the literature." (Authors)] Address: Levy, D.E., School of Mechanical Engineering, Faculty of Engineering, Tel-Aviv Univ., Tel Aviv, Israel

10447. Malikova, E.I. (2010): Zoogeographically interesting dragonfly (Odonata) records from the Upper Amur region. *Eurasian Entomological Journal* 9(2): 291-294. (in Russian, with English summary) ["New records of 10 species are reported. *Lestes temporalis*, *Paracercion calamorum*, *Anax parthenope julius* and *Sinictinogomphus clavatus* are recorded for the first time from the region. The W Palaearctic *Orthetrum cancellatum*, reported from Upper Amur (Blagoveshchensk, Amurskaya Oblast, Russia), probably migrated from Chinese Inner Mongolia, following a mass migration of the beet webworm (*Loxostege sticticalis*) in 2008." (Author) Address: Malikova, E.I., Blagoveshchensk St. Pedagog. Univ., Lenina 104, RUS-675000 Blagoveshchensk, Russia

10448. Michalczyk, W.; Buczyński, P. (2010): The second recent locality of *Coenagrion ornatum* (Odonata: Coenagrionidae) in the southeastern Poland. *Odonatrix* 6(1): 15-21. (in Polish, with English summary) ["*Coenagrion ornatum* is a critically endangered species in Poland. It has been known from 24 localities so far, of which only one is preserved till now - in Śniatycze situated east of Zamosc (south-eastern Poland). The authors give and discuss a new species locality situated west-north-west of Zamość, ca. 40 km from Śniatycze, in the village of Średnie Duże (50°50'32"N, 23°01'15"E, UTM: FB43). The species inhabits the River Rakówka. The discovery was made on 13 July, thus the estimating of population number is uncertain, however, it can be at least equally numerous as the population in Śniatycze which is regarded as large and stable. New data moves the boundary of the current range of *C. ornatum* in Poland a bit to the north. The presence of the species in south-eastern Poland is probably associated with its occurrence in western Ukraine, where it was recorded at ca. 20 localities. Although many of them are historical ones, there is also fresh data from the Shatsk Lake District (Chokalo,

Werwes 2009). *Rakówka* seems to be untypical as a habitat of *C. ornatum* due to high values of river section and flow velocity. However, the calculated parameters of flow turned out to be similar to these from the other localities of this species. The discussed locality is seriously endangered due to its localization in the centre of a village - the small river is fragmented into many stretches with different type of using. *C. ornatum* has been observed on the stretch of the total length of ca 200 m, however, the numbers were different. In places with the least favourable conditions (with the bottom of concrete and removed vegetation) the species was absent. Passive and active protection of this locality is a must." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

10449. Michalkiewicz, M. (2010): Long-term changes of macrozoobenthos Rosnowskie Duże Lake. In: Joniak, T. (Ed.), Functioning and protection of marsh ecosystems. Vol 3. Benthic fauna of Polish national parks. Department of Water Protection Faculty of Biology A. Mickiewicz University, Poznań: 61-68. (in Polish, with English summary) ["The paper presents the results of bottom macrofauna found in Rosnowskie Duże Lake in the years 1986-2006. The study included 2 profundal stations and 3 of the littoral. The dominant forms in the profundal where Chaoborus and Chironomidae, while in the littoral Gastropods, *Asellus aquaticus* and Chironomidae. Most frequently occurred in the littoral was *Potamopyrgus antipodarum*, which reached an average size of over 23000 individuals per 1 m² of the bottom. The variability in individual basins of benthofauna's lake affected different physical-chemical parameters of water." (Author) Odonata are not specified in detail.] Address: Michalkiewicz, M., Poznań University of Technology, Institute of Environmental Engineering, Division of Water Supply and Environment Protection, Piotrowo str. 5, 60-965 Poznań, Poland. E-mail: drmichal@poczta.onet.pl

10450. Muehlbauer, J.D.; Doyle, M.W.; Bernhardt, E.S. (2010): Macroinvertebrate community responses to a dewatering disturbance gradient in a restored stream. *Hydrol. Earth Syst. Sci. Discuss.* 7: 9599-9630. (in English) [Timberlake mitigation site, Carolina, USA. "Dewatering disturbances are common in aquatic systems and represent a relatively untapped field of disturbance ecology, yet studying dewatering events along gradients in non-dichotomous (i.e., wet/dry) terms is often difficult. Because many stream restorations can essentially be perceived as planned hydrologic manipulations, such systems can make ideal test-cases for understanding processes of hydrological disturbance. In this study we used an experimental drawdown in a 440 ha stream / wetland restoration site to assess aquatic macroinvertebrate community responses to dewatering and subsequent rewetting. The geomorphic nature of the site and the design of the restoration allowed dewatering to occur predictably along a gradient and decoupled the hydrologic response from any geomorphic (i.e., habitat heterogeneity) effects. In the absence of such heterogeneous habitat refugia, reach-scale wetted perimeter and depth conditions exerted a strong control on community structure. The community exhibited an incremental response to dewatering severity over the course of this disturbance, which was made manifest not as a change in community means but as an increase in community variability, or dispersion, at each site. The dewatering also affected inter-species abundance and distributional pat-

terns, as dewatering and rewetting promoted alternate species groups with divergent habitat tolerances. Finally, our results indicate that rapid rewetting – analogous to a hurricane breaking a summer drought – may represent a recovery process rather than an additional disturbance and that such processes, even in newly restored systems, may be rapid." (Authors) The supplementary material contains the taxa lists identified to the genus level (*Anax*, *Enallagma*, *Ischnura*, *Erythemis*, *Miathyria*, *Pachydiplax*.)] Address: Muehlbauer, J.D., Curriculum for the Environment and Ecology, Univ. of North Carolina, Chapel Hill, NC, USA. E-mail: jeffreym@unc.edu

10451. Müller, J.; Westermann, A.; Steglich, R. (2010): Erstnachweis der Zierlichen Moosjungfer (*Leucorrhinia caudalis*) in Sachsen-Anhalt. *Naturschutz in Sachsen-Anhalt* 47(1-2): 52-53. (in German) [08-VI. and 11-VI-2008, limestone quarry west of Schwanebeck, Sachsen-Anhalt, Germany; 17.VI.2008, gravel pit east of Hohenwarthe, Sachsen-Anhalt, Germany.] Address: Müller, J., Frankelfelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

10452. Palacios, M.J.; Pérez, J.; Sánchez, A.; Muñoz, P. (coords.). (2010): Catálogo Regional de Espedes Amenazadas de Extremadura. Fauna I. Consejería de Industria, Energía y Medio Ambiente. Junta de Extremadura: 342 pp. (in Spanish) [The following species are introduced in details: *Macromia splendens*, *Aeshna juncea*, *Gomphus simillimus*, *G. graslinii*, *Onychogomphus uncutus*, *Orthetrum nitidinerve*, *Coenagrion mercuriale*, *C. caeruleum*, *C. scitulum*, *Oxygastra curtisii*. Special emphasis is given on regional distribution, habitat and conservation measures.] Address: Junta de Extremadura, Plaza del Rastro, S/N, 06800 Merida, Spain

10453. Papp, J. (2010): In memoriam Dr Henrik Steinmann (1932–2009). *Annales historico-naturales Musei nationalis hungarici* 102: 5-19. (in English) [27-III-1932 - 26-XI-2009. To odonatologists Steinmann was known as author of the two volumes of "World Catalogue of Odonata, Vol. I. Zygoptera. – Das Tierreich. The Animal Kingdom, Part 110. – 500 pp." and "World Catalogue of Odonata, Vol. II. Anisoptera. – Das Tierreich. The Animal Kingdom, Part 111. – 636 pp." both published in 1997.] Address: Papp, J., Dept of Zoology, Hungarian Natural History Museum, 1088 Budapest, Baross utca 13, Hungary

10454. Relyea, R.A.; Edwards, K. (2010): What doesn't kill you makes you sluggish: How sublethal pesticides alter predator-prey interactions. *Copeia* 2010(4): 558-567. (in English) ["Pesticides commonly occur in ecological communities at relatively low concentrations, leading to growing interest in determining the sublethal effects of pesticides. Such effects should affect individuals and, in turn, alter interspecific interactions. We sought to determine how sublethal concentrations (0.1 and 1.0 mg/L) of two common pesticides (carbaryl and malathion) affected predator and prey behaviour as well as subsequent predation rates. We conducted a series of experiments using three species of larval amphibians (Gray Treefrogs, *Hyla versicolor*; Green Frogs, *Rana clamitans*; and American Bullfrogs, *R. catesbeiana*) and three species of their predators (larval dragonflies, *Anax junius*; adult water bugs, *Belostoma flumineum*; and adult Red-spotted Newts, *Notophthalmus viridescens*). We found that the pesticides frequently reduced the activity of all three tadpole species. For the two invertebrate predators (*Anax* and *Belostoma*), the pesticides were lethal, precluding us from examining sublethal effects on predator-prey inter-

actions. However, newt survival was high and the addition of the pesticides reduced the predation rates of newts in one of the three tadpole species. There were no effects of the pesticides on the striking frequency of the newts or on their prey capture efficiency. Thus, the mechanism underlying the pesticide-induced reduction in predation rates remains unclear. What is clear is that sublethal concentrations of pesticides have the potential to alter prey behavior and species interactions and thereby alter the composition of ecological communities." (Authors)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

10455. Roland, H.-J.; Roland, U.; Pollard, E. (2010): Incidental records of dragonflies and damselflies (Order Odonata) in Cambodia. *Cambodian Journal of Natural History* 2010(2): 97-102. (in English) [The authors publish an updated version of Roland & Roland (2010) New records of Odonata on a birding trip to Cambodia 12th-26th February 2010. *Agrion* 14(2): 30-33.] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

10456. Sage, W. (2010): Fahrt der ZGB zum Neusiedler See vom 12. bis 16.052010. *Mitteilungen der Zoologischen Gesellschaft Braunau* 10(1): 119-132. (in German) [Austria, Neusiedler See, 12-16.052010; *Anaciaeschna isoceles* and *Libellula quadrimaculata* are listed.] Address: Sage, W., Seibersdorfer Str. 88a, 84375 Kirchdorf am Inn, Germany

10457. Sathe, T.V.; Bhusnar, A.R. (2010): Biodiversity of mosquitovorous dragonflies (Order: Odonata) from Kolhapur district including Western Ghats. *Biological Forum* 2(2): 38-41. (in English) ["Biodiversity protection and conservation is on national and international agenda and responsible for sustainable development of a region or a country and secondly dragonflies are potential bio control agents of mosquitoes. Therefore, biodiversity of mosquitovorous dragonflies of Kolhapur district including Western Ghats of Maharashtra has been studied. In all, 43 species of dragonflies were found feeding on mosquitoes. The important genera includes *Gomphus*, *Burmagomphus*, *Cyclogomphus*, *Microgomphus*, *Anax*, *Macromia*, *Orthetrum*, *Potomarcha*, *Pantala*, *Chlorogomphus*, *Epophthalmia*, *Indionyxa*, *Amphithemis*, *Hylaeothemis*, *Heliogomphus*, *Davidiodes*, *Bradinopyga*, *Crocothemis* and *Lameligomphus*." (Authors)] Address: Sathe, T.V., Dept of Zoology, Shivaji University Kolhapur (MS), India

10458. Schweighofer, W. (2010): Naturkundliche Beobachtungen am ÖBB-Becken Nenndorf bei Markersdorf. *LANIUS—Information* 19(3-4): 7-8. (in German) [Niederösterreich, Austria; ca 48°11'N, 15°30'E; in 2009 and 2010, in a shallow storm-water retention pond 33 Odonata species have been recorded including *Lestes barbarus*, *L. virens*, *Coenagrion scitulum*, *Orthetrum albistylum*, *Anax parthenope*, *Sympetrum flaveolum*, *S. fonscolombii*, *S. pedemontanum*, and *S. meridionale*. The author emphasizes on records of *Anax ephippiger* and *Lestes macrostigma*.] Address: Schweighofer, W., Ötscherblick 10, A-3661 Artstetten, Austria. E-mail: wolfgang.schweighofer@schule.at

10459. Simard, G. (2010): *Flying Dragons*. Editions Alatus. ISBN: 978-2-9526011-5-3: 144 pp. (in English) ["Flying Dragons rule supreme over the world of insects. High-speed manoeuvres, instant changes of direction, hovering, reverse flight, dragonflies can do almost anything on the wing. The photographs of Ghislain SIMARD

open a fresh window into a world where aerial motions are too fast to be observed by human eyes. The photographer's lens offers a journey through miniature landscapes around ponds, canals, streams, rivers and peat bogs. The chapters are arranged to show the diversity of behaviour that these spectacular insects enjoy. Frail Damselflies are unpredictable, Broad-bodied Chasers always return to the same roost, Keeled Skimmers mate in flight, Common Darters play with their reflections in the water while the Emperor flaunts its aerial prowess. The briskness of dragonflies' actions turns the photography of their flight into an almost impossible task. To shoot such actions, high-speed equipment dedicated to flying insects is required. Some tools have even been designed specifically to arrest dragonflies in flight. The final section of the book details this working method for wildlife photographers." (Publisher) Coffee table book] Address: not stated

10460. Singh, H.; Gusain, O.P.; Gusain, M.P. (2010): Benthic insect-substratum relationship along an altitudinal gradient in a Himalayan stream, India. *International Journal of Ecology and Environmental Sciences* 36(4): 215-231. (in English) ["Takoli Gad is a small spring-fed tributary of the River Alaknanda (a tributary of River Ganga) in Tehri district of Uttarakhand (India). Insect-substratum relationship was studied at five sampling sites representing an altitudinal gradient in Takoli Gad during January 2000 to February 2002. The swift flowing stream is largely dominated by pebbles and boulders (>32 nun). In general, the substrate composition ranged from coarse sand ($\phi = 0$) to small pebbles ($\phi = -4$). The benthic fauna comprised of 34 genera belonging to 09 orders and 25 families of insects. It included mostly the nymphs and larvae of Ephemeroptera, Plecoptera, Trichoptera, Coleoptera, Lepidoptera, Odonata, Neuroptera, Diptera and Hemiptera. The total benthic density was maximum during winter III (3408.0 ind. m^{-2}) at downstream site, and minimum during monsoon I (283.0 ind. m^{-2}) in the middle stretch. The Simpson Index of Diversity (D) for substrate heterogeneity was low for headwater region of the stream. The Index of Representation (IR) revealed that the heterogeneous substratum was the preferred habitat of most of the taxa during the winter. The distribution of the benthic insects varied slightly along the longitudinal gradient. Many genera were seasonally absent in different sections of the stream. Seasonal variation in the density of benthic insects was correlated with the change in the substrate composition, notably during the rainy season when the mean grain size changes to cobbles ($Md = 8$). A relatively stable substrate composition during winter together with low to moderate current velocity (0.4-0.6 $m\ s^{-1}$) and shallow water depth (0.14-0.20 m) along with abundant detritus favours a rich and diverse insect community. Further, clustering method also shows the substratum during winter to be preferred by majority of the taxa." (Authors) Odonata taxa are *Hagenius!* and *Ophiogomphus*.] Address: Singh, T., Freshwater Biology Unit, Department of Zoology, HNB Garhwal University, Srinagar-Garhwal 246174, Uttarakhand, India

10461. Skevington, J.H.; Beatty, C.D.; Van Gossom, H.; Donnelly, T.W.; Sherratt, T.N.; Rashed, A.; Kelso, S. (2010): Molecular phylogenetics of *Nesobasis* and *Melanesobasis* (Odonata: Coenagrionidae): exploring the evolution of a large insular insect radiation. *Cladistics* 26: 224-225. (in English) [Verbatim: "In 1990 Nick Donnelly revised a large part of the Fijian damselfly fauna. An unusual anomaly was discovered—some species appeared to be heavily female biased. In an effort to better under-

stand this phenomenon, we decided to create a phylogenetic hypothesis for the two large, near-endemic, Fijian genera, *Nesobasis* and *Melanesobasis*. These putative sister taxa had never been studied phylogenetically; however, Donnelly postulated the existence of several species groups and some sister species relationships based on a few characters. We refute the concept that *Nesobasis* and *Melanesobasis* are sister taxa and provide quantitative evidence supporting most of Donnelly's perceptions about relationships within *Nesobasis*. Two mitochondrial genes (COI and 12S) and one nuclear gene complex (ITS1 and ITS2, and ribosomal 5.8S rDNA) were sequenced for 45 taxa in our analysis. This represents most of the extant species of *Nesobasis* and *Melanesobasis* and all of the numerous undescribed species. Female-biased species were found in more than one lineage. Results and analytical methods will be discussed and ecological traits will be explored in light of our phylogenetic hypothesis." (Authors)] Address: Skevington, J.H., Agriculture and Agri-Food Canada, Canadian National Collection of Insects, Arachnids and Nematodes, 960 Carling Avenue, Ottawa, ON, K1A 0C6, Canada

10462. Straka M. (2010): Preliminary studies on the durability of damselfly (Odonata: Zygoptera) exuviae. *Odonatrix* 6(2): 46-49. (in English, with Polish summary) ["Twenty exuviae of *Coenagrion puella* were marked and observed for three weeks in 2005. The number of marked exuviae rapidly declined and after 23 days there were only 30% of exuviae left; these were so weather-worn that it was impossible to identify them. To collect 50% of the exuviae it would be necessary to visit a locality 10 days after emergence." (Author)] Address: Straka, M., Institute of Botany and Zoology, Faculty of Science, Masaryk University, Kotlářská 2, Brno, Czech Republic. E-mail: michal.straka@centrum.cz

10463. Tończyk, G.; Zemko, K. (2010): Preliminary estimation of population total abundance of *Leucorrhinia caudalis* and *L. pectoralis* in "Zdręczno Lake" nature reserve (Tuchola Forest, Poland). *Odonatrix* 6(1): 9-14. (in Polish, with English summary) ["A study upon the total abundance of *Leucorrhinia caudalis* and *L. pectoralis* was performed at the beginning of June 2008 in the nature reserve „Zdręczno Lake”, Tuchola Forest, Poland. The abundance estimation was based upon the number of exuviae collected within the reserve, among the reed and shore vegetation, also in some distance from the shore. Altogether 76 samples were gathered, each composed of exuviae collected from the area of 1m². In total 101 exuviae of *L. caudalis* (mean density: 1.33 ind/m², density range: 0-7 ind/m², SD=1.32) and 176 exuviae of *L. pectoralis* (mean density: 2.32 ind/m², density range: 0-7 ind/m², SD=1.68) were found. Based on aerial photographs the total area of habitat available for *Leucorrhinia* larvae in Zdręczno Lake was estimated to be from 12,179 m² (1.2 ha) to 65,969 m² (6.6 ha). Concluding, the total population abundance in the reserve was calculated as 16,198 - 97,739 individuals for *L. caudalis* and 28,255 - 153,048 individuals for *L. pectoralis*." (Authors)] Address: Tończyk, G., Katedra Zoologii Bezkręgowców i Hydrobiologii, Uniwersytet Łódzki, ul. Banacha 12/16, 90-237 Łódź, Poland. E-mail: karolzemko@vp.pl

10464. Tończyk, G.; Osobka, M. (2010): Macrofauna colonising yellow water-lily (*Nuphar lutea* (L.) Sibth. & Sm.) – distribution and structure analysis. In: Joniak, T. (Ed.), *Functioning and protection of marsh ecosystems. Vol 3. Benthic fauna of Polish national parks.* Department of Water Protection Faculty of Biology A. Mickiewicz Uni-

versity, Poznań: 74-79. (in Polish, with English summary) [Poland; "Macroinvertebrates associated with aquatic vegetation (epiphytic fauna) are among the ecofunctional groups having key importance in inland aquatic ecosystems. Our study in the Pilica River oxbow-lake revealed taxonomic composition (on genus/species level), dynamics and colonisation rate of community inhabiting yellow water-lily. In total we found 112 taxa differing in spatial distribution. The community is not highly specific as it consists mainly of predators and animals feeding on periphyton. Only caterpillars of aquatic moth were characteristic for the plant green parts. The colonisation rate is directly dependent on food availability (thickness of periphyton) and indirectly on the oxbow-lake trophy." (Authors) The following Odonata species are listed: *Enallagma cyathigerum*, *Coenagrion puella*, *C. pulchellum*, *Erythromma najas*, *Aeshna cyanea*, and *Somatochlora flavomaculata*.] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii, Uniwersytetu Łódzkiego, ul. Banacha 12/16, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

10465. Torralba-Burrial, A.; Alonso-Naveiro, M. (2010): Biodiversidad de odonatos de la sierra de Fonfría y cuenca del Jiloca (Teruel): faunística. *Xiloca* 38: 111-147. (in Spanish, with English summary) ["Odonata communities from 21 localities in Fonfría Mountains and Jiloca River Basin (province of Teruel, Spain) were surveyed. Thirty five species were found during this study, including first records of *Coenagrion scitulum* and *Libellula quadrimaculata* to Teruel province, and confirming the reproduction of *Lestes sponsa*, *L. virens* and *Aeshna cyanea*. Populations of the threatened *C. mercuriale*, *C. caerulescens*, *C. scitulum*, *Onychogomphus uncatus* and *Sympetrum flaveolum* are interesting from a conservation point of view." (Authors)] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniob@hot-mail.com

10466. Vanappelghem, C.; Hubert, B. (2010): Suivi de la population de *Coenagrion mercuriale* (Charpentier, 1840) dans la Réserve naturelle régionale des dunes et hauts de Dannes-Camiers (Pas-de-Calais) (Odonata, Zygoptera: Coenagrionidae). *Martinia* 26(3/4): 131-137. (in French, with English summary) [A monitoring of *C. mercuriale* and its habitat in the dunes and hills of the Dannes-Camiers Regional Natural Reserve (Pas-de-Calais department, France) revealed that an anthropogenic caused seasonal variation of the water depth could be related with the population decline between 2006 and 2007 compared with 2008 and 2009.] Address: Vanappelghem, C., 14, rue Brûle Maison, 59000 Lille, France. E-mail: cedvana@free.fr

10467. Watson, G.S.; Watson, J.A.; Hu, S.; Brown, C.L.; Cribb, B.W.; Myhra, S. (2010): Micro and nanostructures found on insect wings – designs for minimising adhesion and friction. *International Journal of Nanomanufacturing* 5(1/2): 112-128. (in English) ["Adhesion and friction have been measured on insect wings where contamination (water and/or contaminating particles) can potentially have a detrimental effect on their flight capabilities or daily functioning. Adhesion forces as low as 2 nN were recorded in air for particles with radii of 10-15 nm, and 20 nN for particles of 31 nm radius. The effective coefficients of friction were in the range of 0.01 to 0.10. The low adhesion and frictional values demonstrate that only very low out-of-plane and in-plane forces are required to

remove contaminants of nanometre and micron dimensions from the cuticle membranes. Many of the surfaces demonstrate superhydrophobic properties and will not only reduce the effects of contact with surfaces but also promote a self-cleaning function for removing foreign bodies. It has also been demonstrated that surface structures and properties can be duplicated on polymer surfaces by using the wing membrane as a 'natural template'. (Authors) *Rhyothemis phyllis chloe* is among the insects studied.] Address: Watson, G.S., School of Pharmacy and Molecular Sciences, James Cook University, Townsville, QLD 4811, Australia

10468. Wellenreuther, M.; Sánchez-Guillén, R.A.; Cordero, A.; Hansson, B. (2010): Development of 12 polymorphic microsatellite loci in *Ischnura elegans* (Odonata: Coenagrionidae). *Molecular Ecology Resources* 10: 576-579. (in English) ["We isolated and characterised 12 polymorphic microsatellite loci 35 for *I. elegans* by screening a genomic library enriched for microsatellite motifs. The loci showed high variability for the number of alleles, and the expected and observed heterozygosities, and thus will be useful for future molecular studies. Cross-amplification in *I. graellsii*, *I. ramburii* and *I. pumilio* showed that the majority of the microsatellites also produced polymorphic products in these species." (Authors)] Address: Wellenreuther, Maren, Department of Animal Ecology, Ecology Building, Lund University, SE-22362 Lund, Sweden. E-mail: Maren.wellenreuther@zoekol.lu.se

10469. Whisenant, A.; Snyder, W. (2010): Bioassessment of Lake Mexia. *Water Quality Technical Series. WQTS-2010-01*: 70 pp. (in English) [Lake Mexia, USA was investigated in the 2002 A concern, due to depressed dissolved oxygen concentrations, was raised following the taxa list prepared for the impaired water bodies. In response to the concern, a dissolved oxygen monitoring project and concurrent bioassessment were conducted [...] in 2002 and 2003. The bioassessment included fish, benthic macroinvertebrate, zooplankton, aquatic macrophyte and shoreline habitat surveys. *Argia* sp., *Enallagma/Coenagrion*, *Acanthagrion* sp., *Epithea* sp., and *Gomphus* sp. are listed from the locality.] Address: Whisenant, A., Water Resources Branch, Texas Parks and Wildlife Department, Tyler, TX, USA

10470. Yang, G.-h.; Mao, B.-y.; Zhang, D.-z. (2010): A new species of the genus *Nychogomphus* from Yunnan, China (Odonata, Gomphidae). *Acta Zootaxonomica Sinica* 35(4): 880-882. (in Chinese, with English summary) ["*Nychogomphus bidentatus* n.sp. is described and figured. This new species is similar to *N. flavicaudus* and *N. lui* in the colour pattern of thorax, but can be separated from the later two species by the following distinct characters: 1) antehumeral stripe complete; 2) superior appendages of male with two subapical teeth; 3) inferior appendages black. Holotype male, China, Yunnan, Lingcang, Gengma (98°50'N, 23°25'E), 7 Aug. 2004, collected by MAO Ben-Yong, deposited at Dali University, Yunnan, China. Etymology. The name *bidentatus* is derived from the Latin, in reference to the two subapical teeth present on male superior appendages." (Authors)] Address: Yang, G.-h., College of Science and Chemistry, Dali University, Yunnan 671000, China

10471. Yurchenko, Yu.A.; Belevich, O.E. (2010): Daily dynamics of distribution of *Enallagma cyathigerum* (Charpentier, 1840) (Odonata, Coenagrionidae) in different biotopes of the forest-steppe zone of the southern part of West Siberia. *Euroasian entomological journal* 9(2): 280-

284. (in Russian, with English summary) [Barabinskoy steppe in the south of Western Siberia, Russia; the selection of biotopes within the habitat of *E. cyathigerum* depends on its physiological development status. Immediately after emergence, dragonflies dismigrate from the water. "After reaching maturity, they prefer open habitats, away from water, where they copulate during the first half of the day. As the mated pairs return to the water for oviposition, during the second half of the day, the number of individuals in all terrestrial habitats decreases sharply. Near-water habitats are transient. To move in strong winds (up to 7 m/s), *E. cyathigerum* uses the space between plants over the soil surface." (Authors)] Address: Belevich, O.E., Inst. Anim. Syst. & Ecol., Russ. Acad. Sci., Frunze 11, RUS-630091 Novosibirsk

10472. Zawal, A. (2010): New locality of *Crocothemis erythraea* in western Poland. *Odonatrix* 6(1): 6-8. (in Polish, with English summary) [17.07.2008; Dzwonów (53°24'43"N, 15°12'37"E) is the northernmost site of this species in Poland.] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

10473. Zawal, A.; Stojanovski, S.; Smiljkov, S. (2010): Preliminary investigation on Odonata from the lake Orchid (Macedonia). Second Balkan Conference on Biology 21-23 May 2010, Plovdiv. 50 Years University of Plovdiv: 636-638. (in English) [476 specimens of imaginal Odonata - collected in June 2009 at 21 stations - resulted in 17 species. Only 12 of these are presented in the paper.] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

10474. Zhukov, O.N.; Bezmaternykh; D.M. (2010): [Zoo-benthos of lakes in the northern region of Kazakhstan]. *World of science, culture and education* 6(25): 277-281. (in Russian) [In 2009 and 2010, 15 lakes have been investigated. 58 species of benthic invertebrates were identified, including *Coenagrion vernale* (= *C. lunulatum*); this taxon is reported for three of the 15 lakes.] Address: Zhukov, O.N., Et. IWEP SB RAS, Barnaul, Russia. E-mail: jukova@iwep.asu.ru

10475. Zoder, S. (2010): *Libellula fulva* MÜLLER, 1764 (Spitzenfleck) am Unteren Inn (Odonata, Anisoptera, Libellulidae). *Mitteilungen der Zoologischen Gesellschaft Braunau* 10(1): 91-94. (in German) [Bayern, Germany; four records of the regionally rare *L. fulva* are documented: (1) 24.05.2010, Schambach, near Geigen (48.19°53.48"N, 13.15°10.59"E), Bad Füssing / LK Passau; *Coenagrion ornatum* also occurred in the same stretch of the ditch, (2) 05.06.2010, near Grießer (48.17°29.15"N, 13.7°54.10"E), Ering, LK Rottal-Inn. (3) 02.07.2008, 25.05.2009, "Biotop" Eglsee (48°14'37"N, 13°07'15"E), Ering. (4) 05.06.2009, (48°17'05"N, 13°00'00"E), Simbach am Inn/LK Rottal-Inn.] Address: Zoder, S., Am Ziegelstadelberg 17, 94094 Rottalmünster, Germany

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10476. Acharya, S. (2011): Presage Biology: Lessons from nature in weather forecasting. *Indian Journal of Traditional Knowledge* 10(1): 114-124. (in English) ["The method used by local and indigenous peoples for predicting rainfall and other weather conditions solely on the

basis of bio-indicators – the phenology of plants and behavior of animals – is coined as a new term: Presage Biology. Some of these activities of floral and faunal diversity are described in their application to predict oncoming rain, based a literature review as well as personal observations of present author as well as other reference sources pertaining to India and different parts of the world. ... When humidity reaches saturation, a couple of hours before dragonflies move in swarms indicating rain." (Author)] Address: Dept of Botany, Tipura (Central) Univ., Suryamaninagar 799130, West Tripura, India. E-mail: phytosandeep@yahoo.com

10477. Acorn, J.H. (2011): Sand hill arthropods in Canadian grasslands. In: *Arthropods of Canadian Grasslands (Volume 2): Inhabitants of a Changing Landscape*. Edited by K. D. Floate. Biological Survey of Canada: 25-43. (in English) ["Sand hill environments in the Canadian grasslands can be classified as sandstone outcrops, upland dunes, sand features associated with water, non-human disturbances, anthropogenic disturbances, beach dunes, or sandbars. Insects and other arthropods use these environments for burrow construction, access to sand-associated host plants, open ground predation and scavenging, thermoregulation, and locomotion in a quiet substrate. The arthropod faunas of sand hills in the Canadian grasslands are diverse, include organisms that are specific to sand hills, and include a number of rare or endemic taxa. Dune stabilization is cause for conservation concern, whereas the threat of global warming may reverse the stabilizing trend and create larger areas of open drifting sand. .. Various Anisoptera are often found perched on open ground, including non-vegetated sand, from which they fly up in pursuit of prey and potential mates (Dunkle 2000). Typical open-ground species include *Ophiogomphus severus* and *Stylurus intricatus*, as well as species in the genus *Sympetrum*. Most other anisopterans prefer to perch in vegetation, as do species of Zygoptera. However, on sand hill sites near water, various damselflies (e.g., *Enallagma* spp., *Coenagrion* spp., *Lestes* spp.) will forage in the relatively open vegetation on and around open sand patches." (Author)] Address: Acorn, J.H., Department of Renewable Resources, 751 General Services Building, University of Alberta, Edmonton, Alberta, Canada, T6G 2H1

10478. Adeogun, A.O.; Fafioye, O.O. (2011): Impact of effluents on water quality and benthic macroinvertebrate fauna of Awba stream and reservoir. *J. Appl. Sci. Environ. Manage.* 15(1): 105-113. (in English) [Nigeria; the paper includes the following nearctic Odonata taxa: "*Macromia magnifica*, *Herlocordulia* [sic] species, *Progomphus* species".] Address: Adeogun, A.O., Department of Zoology, University of Ibadan, Ibadan, Nigeria. E-mail: ainaadeogun@yahoo.com

10479. Adriaens, T.; Vercruyse, W.; Feys, S. (2011): An exceptional dragonfly spring in 2011. *Libellenvereniging Vlaanderen - nieuwsbrief* 5(2): 4-7. (in Dutch, with English summary) ["A very sunny and dry spring clearly led to a number of exceptional observations of dragonflies in Belgium and further western Europe. After a message from Portugal telling that thousands of *Anax ephippiger* migrated north it was hoped that a few of these would be seen in the low countries as well. In Belgium between 22th of April and 24th of May at least 12 specimens of this species were observed, an unequalled number for the country. *Brachytron pratense* had been historically known from the neighbourhood of Ghent and had been rediscovered in 2002. But this spring this rather rare spe-

cies was found in a lot of sites in the province of Eastern Flanders and was even discovered for the first time in the province of Western Flanders." (Authors)] Address: Adriaens, T., Instituut voor Natuurbehoud, Kliniekstr 25, B-1070 Brussel, Belgium. E-mail: tim.adriaens@instnat.be

10480. Aguilera Arango, A.; Isaza Guzmán, G.; González, R. (2011): Diversidad y abundancia de la arthropofauna en bromelias de bosques de Manglar de la Bahía de Buenaventura (Valle, Colombia). *Boletín del Museo de Entomología de la Universidad del Valle* 12(1): 1-11. (in Spanish, with English summary) [2047 specimens from 42 arthropod genera were collected that breed in bromeliads (*Guzmania musaica* and *Tillandsia* sp.) of mangrove swamps, near the village of Punta Soldado in the Buenaventura's bay (Colombia). Samples include 41 (3.95%) specimens of *Leptagrion* sp.] Address: Aguilera Arango, Gustavo Isaza Guzmán lexis, Universidad del Valle, sede Pacifico. Depto de Biología, Avenida. Simón Bolívar Km 9 Buenaventura, Colombia. E-mail: 23@yahoo.com

10481. Anderson, C.N.; Grether, G.F. (2011): Multiple routes to reduced interspecific territorial fighting in *Hetaerina* damselflies. *Behavioral Ecology* 22(3): 534-534. (in English) ["Interspecific territoriality may be adaptive if territories contain depletable resources that are valuable to both species, but it can also arise as a maladaptive by-product of intraspecific territoriality. In the latter scenario, sympatric species ought to diverge in ways that reduce interspecific fighting. We studied 4 *Hetaerina* damselfly species that can be found in sympatry in North America. Prior work showed that sympatric populations have diverged from each other in wing coloration and competitor recognition in 2 of the 4 sympatric species pairs (*H. titia* / *H. occisa*, *H. titia*/*H. americana*). Here, we show that sympatric populations of these 2 species pairs overlap completely in habitat use, and yet, interspecific territorial fights occur much less frequently than intraspecific fights. Experimentally manipulating the wing coloration of male *H. occisa* and *H. americana* to more closely resemble *H. titia* increased the rate of interspecific fights, which provides direct evidence that divergence in wing coloration is partly responsible for the low rate of interspecific fights. We found that interspecific fighting is also reduced in the other 2 species pairs (*H. occisa* / *H. cruentata*, *H. americana* / *H. cruentata*), even though prior work showed that heterospecific territory intruders are attacked just as aggressively as conspecific territory intruders. In these cases, however, the sympatric species differ sufficiently in habitat use to reduce the interspecific encounter rate and thereby account for the reduced rate of interspecific fighting. Thus, interspecific fighting is reduced relative to intraspecific fighting in all 4 species pairs, albeit through different mechanisms.] Address: Anderson, C.N., Department of Ecology and Evolutionary Biology, University of California, Los Angeles, 621 Charles E. Young Drive South, Los Angeles, CA 90095-1606, USA. E-mail: cndanderson1980@gmail.com

10482. Andrew, R.J.; Thaokar, N.; Dhamani, A.A. (2011): Oviposition and details of egg shell fine structure in *Ceragrion coromandelianum* (Fabricius) (Zygoptera: Coenagrionidae). *Odonatologica* 40(3): 169-178. (in English) ["In central India, floating leaves of *Nymphaea nouchali* form a perfect site for landing and oviposition for *C. coromandelianum*. Experiments with *N. nouchali* leaves suggest that oviposition occurs preferentially within distinct region of the leaf lamina. Oviposition is maximal in the lateral region of the lamina (LRL) which was the most popular site over the whole period of observation and

least in the petiolar region (PRL) while at the basal and apical regions (BRL & ARL) the total number of oviposition are similar to each other and intermediate between the lateral and petiolar regions. There is a direct correlation between the position of leaf lamina region used for oviposition and the day of oviposition. There is also a direct association between the day of the bouts of oviposition and the position of the leaf lamina region used for oviposition. In *C. coromandelianum*, visual and tactile cues play an important role in leaf lamina preference. It is not the toughness of the leaf lamina (thickness of the epidermis) but its submergence which is an important decisive factor for oviposition. 1 Scanning electron microscopic examination of the egg reveals that it is elongate and cylindrical with a pointed anterior and rounded posterior end. The egg chorion is composed of an outer, thin, lightly corrugated exochorion and an inner, thick, smooth, non-porous endochorion. The anterior end is surrounded by 5 micropylar orifices. Each orifice is semicircular and continues as a long horizontal streak on the endochorion and concludes at a bifid terminal point. This forms the entry point of the micropylar chute which penetrates the endochorion. The vitelline envelope below the endochorion is thin and smooth." (Authors)] Address: Andrew, R.J., Post Graduate Dept of Zoology, Hislop College, Civil lines, Nagpur-440001, India. E-mail: rajuandrew@yahoo.com

10483. Anjos-Santos, D.; Pessacq, P.; Costa, J.M. (2011): Description of the last instar larva of *Neoneura kiautai* Machado (Odonata: Protoneuridae). *Zootaxa* 2916: 65-68. (in English) ["Here we describe the last instar larva of *Neoneura kiautai* Machado, 2007 based on specimens collected in Rio de Janeiro State, Brazil, therefore increasing the known distribution area of this species formerly known only from Minas Gerais and Espírito Santo States, Brazil (Machado, 2007)."] (Authors)] Address: Anjos-Santos, D., Museu Nacional, Univde Federal do Rio de Janeiro, Depto de Entomologia, Setor de Insetos Aquáticos, Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, Brazil. E-mail: danielleanhos2@yahoo.com.br

10484. Ashton, H. (2011): "Damselfly Genera of the New World: An Illustrated and Annotated Key to the Zygoptera". *Reference Reviews* 25(6): 36-37. (in English) [Book review of: Rosser W. Garrison, Natalia von Ellenrieder & Jerry A. Louton. 2010, The Johns Hopkins University Press, Baltimore. ISBN 978-8018-9670-5. 490 pp, 2586 fgs., 24 color pls., \$125.00. (Incl. additions and corrections for previous book, *The Dragonfly Genera (Odonata: Anisoptera) of the New World, 2006*, by the same authors)] Address: not stated

10485. Aweng-Eh, R.; Ismid, S.; Maketab, M. (2011): Effects of land use on benthic macroinvertebrate assemblages at three rivers in Endau catchment area, Kluang, Johor, Malaysia. *Journal of Applied Sciences in Environmental Sanitation* 6(2): 97-103. (in English) ["Study was conducted for six times from November 2008 to June 2010 to determine the effect of land use on benthic macroinvertebrate assemblages in Mengkibol, Madek and Dengar rivers. Eight stations were selected which two stations from each river except Dengar which has two sampling reach comprised of four stations. A 500 meter reach of the stream was selected for each sampling site. One sampling reach comprises of two sampling stations where one station is located at the upper reach, while the other station is situated at the lower reach. Surber Net measuring 500 micron mesh size combined with a rectangular quadrat of 30 cm x 30 cm (0.09 m²) was used to

sample macroinvertebrates. The results showed that undisturbed river has complete sensitive taxa namely Ephemeroptera, Plecoptera and Trichoptera (EPT). Meanwhile, there were only two sensitive taxa namely Ephemeroptera and Trichoptera were found in the river which flows through palm oil plantation. Similar scenario was found in the river which flows through logging area where there were also two sensitive taxa namely Ephemeroptera and Trichoptera found in this river. In addition, the results obtained for urban river was the other way round where there was an absent of all three sensitive taxa (EPT) in the river which flows through urban area. Most of the macroinvertebrate taxa that were found in this station are pollution resistant taxa comprised Diptera, Odonata, Mesogastropoda, Basommatophora, Hirudinea and Haptotaxida. The results can be use as a biological indicator for river water quality assessment." (Authors) Records of Odonata are as follows: Forest (Un-disturbed): none; Agriculture (Palm Oil): "Arigomphus, Hagenius, Dromogomphus, Gomphaeschna, Somatochlora"; Logging: Arigomphus, Dromogomphus; Urban (Kluang Town): Ophiogomphus, Helocordulia. Identification was done using keys from North America.] Address: Aweng-Eh, R., Faculty of Agro Industry and Natural Resources, Universiti Malaysia Kelantan (UMK), Malaysia. E-mail: aweng@umk.edu.my

10486. Bader, T.J.; Bednarz, J.C. (2011): Parental care and diet of Mississippi Kites (*Ictinia mississippiensis*) in eastern Arkansas. *Journal of Raptor Research* 45(2): 109-118. (in English, with Spanish summary) [USA; Odonata were the second most common food item (26.1%) fed to the nestlings.] Address: Bader, T., USDA-Agriculture Research Service, Stuttgart National Aquaculture Research Center, PO Box 1050, Stuttgart, AR 72160, USA. E-mail: troybader@hotmail.com

10487. Bahaar, S.W.N.; Bhat, G.A. (2011): Taxocoenosis and distribution of nektonic fauna in the rice fields of Kashmir (J and K) India. *Pakistan Journal of Biological Sciences* 14(8): 483-489. (in English) [The study includes records of unidentified Odonata larvae.] Address: Bhat, G.A., Terrestrial Ecology Laboratory, Dept of Environmental Science, Univ. of Kashmir, Srinagar-190 006, J and K, India

10488. Ballare, E.F.; Ware, J.L. (2011): Dragons fly, biologists classify: an overview of molecular odonate studies, and our evolutionary understanding of dragonfly and damselfly (Insecta: Odonata) behavior. *International Journal of Odonatology* 14(2): 137-147. (in English) ["Here, we review the history of odonate systematics, with an emphasis on discrepancies among studies. Over the past century, relationships among Odonata have been reinterpreted many times, using a variety of data from wing vein morphology to DNA. Despite years of study, there has been little consensus about odonate taxonomy. In this review, we compare odonate molecular phylogenetic studies with respect to gene and model selection, optimality criterion, and dataset completeness. These differences are discussed in relation to the evolution of dragonfly behaviour." (Authors)] Address: Ware, Jessica L., Rutgers, The State Univ. of New Jersey, Cook College, 93 Lipman Drive, New Brunswick, New Jersey 08901, USA

10489. Bazin, N. (2011): Un point sur la saisie des libellules et des papillons. *Actualités naturalistes de la Drôme Julliet* 2001 - No 3: 8-10. (in French) [This paper lists some books and www-links related to French Odonata.] Address: not stated

- 10490.** Beganyi, S.R.; Batzer, D.P. (2011): Wildfire induced changes in aquatic invertebrate communities and mercury bioaccumulation in the Okefenokee Swamp. *Hydrobiologia* 669(1): 237-247. (in English) ["Fire is an important natural disturbance in the Okefenokee Swamp. From April–June 2007, wildfire burned 75% of the wetland area. With the existence of extensive pre-fire data sets on community structure and total mercury of invertebrates, the fire presented an opportunity to assess impacts of wildfire on invertebrates. Post-fire collection of samples occurred in September, December, and May, 2007–2009. Sample sites included 13 burned and 8 non-burned (reference) sites. Comparisons of data among pre-fire, post-fire reference, and post-fire burned sites revealed that the major difference between pre-fire communities and post-fire communities was a decrease in the number of water mites. We also found a decrease in mercury concentrations in amphipods, odonates, and crayfish post-fire. The differences between pre-fire and post-fire samples may be confounded by drought conditions during the baseline study. NMDS ordinations and ANOSIM tests suggested that habitat was an important factor; communities in burned cypress differed from reference cypress. Unexpectedly, burned sites had lower mercury concentrations in odonates and crayfish, with variation again being greatest in cypress stands. These findings and others suggest mercury levels do not follow a predictable pattern but can vary with pre-fire concentrations, variation in water levels, and burn intensity. We found that wildfire in the Okefenokee had little impact on invertebrates in prairies and scrub-shrub thickets, but can affect indicator organisms (Oecetis, Ischnura, and Sigara) in cypress stands. Our study suggests that vegetation type and burn intensity may have impacts on the invertebrate communities and mercury concentrations of organisms." (Authors)] Address: Bowman, Sarah, Department of Evolution, Ecology, and Organismal Biology, 300 Aronoff Laboratory, 318W. 12th Avenue, Columbus, OH 43210, USA. E-mail: Bowman.1210@osu.edu
- 10491.** Beisel, J.-N.; Peltre, M.-C.; Usseglio-Polatera, P. (2011): Einfluss der Salzbelastung auf die aquatische Biozönose der Mosel. Abschlussbericht. Laboratoire des Interactions Ecotoxicologie, Biodiversité, Ecosystèmes (LIEBE) - CNRS UMR 7146, A272010rev17052011. Im Auftrag der IKSMS, UPV-Metz, CNRS UMR 7146: 62 pp. (in German) [The paper includes a passing note on fluctuating asymmetry by larval *Calopteryx splendens* along a salinity gradient along the river Meurthe, France] Address: <http://www.iksms-cipms.org/servlet/is/391/>
- 10492.** Berck, K.-H.; Stübing, S. (2011): Ein Beleg der Pokaljungfer *Erythromma lindenii* (Sélys, 1840) aus Hessen im Jahr 1954. *Libellen in Hessen* 4: 60-61. (in German) [A small collection of 18 specimens of Odonata collected in the 1950th in Hessen, Germany contained interesting records from the faunistic point of view and gives a little insight in range extension processes. *Erythromma lindenii*, very rare in Germany in the 1950th, was recorded 1954 near Rödelheim. *Lestes barbarus* was found at 26-VIII-1956 near Bad Homburg. *Sympetrum depressiusculum* was recorded in summer 1955 near Rödelheim.] Address: Stübing, S., Am Eichwald 27, 61231 Bad Nauheim. E-mail: stefan.stuebing@gmx.de
- 10493.** Boissinot, A. (2011): Nouvelle station de *Coenagrion pulchellum* pour les Deux-Sèvres. *La Virgule, Bulletin de liaison sur les insectes et autres invertébrés du Poitou-Charentes* 2: 24. (in French) [2-VI-2010, Gourgé, Department Deux-Sèvres, France] Address: not stated
- 10494.** Borisov, S.N. (2011): Migrant dragonflies in Middle Asia. 1. *Anax ephippiger* (Burmeister, 1839) (Odonata, Aeshnidae). *Euroasian Entomological Journal* 10(2): 125-130. (in Russian) ["Data on the distribution, phenology and autumnal migrations of *A. ephippiger* in Middle Asia, Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan and Tajikistan are presented. The period of spring arrivals lasts 2.5 months from April to mid-June and the hatching period lasts from late May to September. Annual (2008–2010) autumnal migrations in a southern direction were established in Chok-Pak mountain range by ornithological traps from 28 August to 13 October. A fast univoltine life-cycle within pre-imaginal development and prolonged pre-reproductive period, including wintering migrations, is probably characteristic for *A. ephippiger* in Middle Asia." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru
- 10495.** Botero-Botero, A.; Ramírez-Castro, H. (2011): Trophic ecology of *Brycon henni* (Pisces: Characidae) in the Portugal de Piedras river, upper Cauca basin, Colombia. *Rev. MVZ Córdoba* 16(1): 2349-2355. (in Spanish, with English summary) [Trichoptera, Diptera and Odonata contributed significantly to the diet of *B. henni*.] Address: Botero-Botero, A., Unid Nacional Experimental de los Llanos "Ezequiel Zamora" - UNELLEZ (Guanare, Venezuela), Fundación Neotrópica-Colombia, La Tebaida, Quindío, Colombia. E-mail: albotero33@yahoo.com
- 10496.** Bouton, N.; Iserbyt, A.; van Gossum, H. (2011): Thermal plasticity in life-history traits in the polymorphic blue-tailed damselfly, *Ischnura elegans*: No differences between female morphs. *Journal of Insect Science* 11 (112): 11 pp. (in English) ["Female polymorphism is observed in various animal species, but is particularly common in damselflies. The maintenance of this polymorphism has traditionally been explained from frequency and density dependent sexual conflict, however, the role of abiotic factors has recently attracted more interest. Here, the role of ambient temperature in shaping life-history was investigated for the three female morphs of *I. elegans*. Eggs were obtained from the three mature female morphs for two populations in the Netherlands. Using a split-brood design, eggs of both populations were divided between a cold and a warm treatment group in the laboratory, and egg survival and hatching time were measured. Significant thermal plasticity was found in both hatching time and egg survival between both temperature treatments. However, individuals born to mothers belonging to different colour morphs did not differ in their response to temperature treatment. Independent of colour morph, clear differences in both life-history traits between the populations were found, suggesting local adaptation. Specifically, individuals from one population hatched faster but had lower egg survival in both thermal regimes. The selection force establishing fast hatching could be (facultative) bivoltinism in one of the populations compared to univoltinism in the other. This would be in line with the more southern (and more coastal) location of the presumed bivoltine population and the inverse relation between voltinism and latitude known from earlier studies. However, other natural selection forces, e.g. deterioration of the aquatic habitat, may also drive fast hatching." (Authors)] Address: Bouton, N., Evolutionary Ecology Group, Dept of Biology, University of Antwerp, Groenenborgerlaan 171, 2020 Antwerp, Belgium. E-mail: nielsbouton@yahoo.com

10497. Brasil, M.A.; Freitas Horta, G. de.; Fraxe Neto, H.J.; Barros, T.O.; Colli, G.R. (2011): Feeding ecology of *Acanthochelys spixii* (Testudines, Chelidae) in the Cerrado of Central Brazil. *Chelonian Conservation and Biology* 10(1): 91-101. ["We studied the diet of *Acanthochelys spixii* in a wild population in the Cerrado of central Brazil for 19 months, investigating ontogenetic, sexual, and inter-individual variation. The diet consisted mainly of nymphs of Odonata, although other insects, amphibians, and plant material were also present. We observed no ontogenetic shifts in diet composition (e.g., no shift from carnivorous juveniles to herbivorous adults), which can be related to the high abundance of prey at the study site. There was no association between prey size and turtle carapace length, with larger animals still taking small prey. Dietary niche overlap was high, and there was no difference in niche breadth between sexes. However, differences in diet composition suggested differential habitat use, with males using more the periphery and females using more the center of ponds. Diet composition varied more among males than among females, which can result from higher diversity of prey at the pond margins, higher movement rates, or larger home range of males. The high frequency of empty stomachs (41%) reflected life-history characteristics of turtles (e.g., low metabolism, ectothermy, late sexual maturity, and great longevity). The importance of prey categories sensitive to pollution in the diet of *A. spixii* highlights the integrity of the study sites and the vulnerability of these populations to the rapid degradation of Cerrado biome." (Authors)] Address: Fraxe Neto, H.J., Programa de Pós-Graduação em Biologia Animal, Universidade de Brasília, 70910-900 Brasília, DF, Brazil. E-mail: hfraxe@senado.gov.br

10498. Broglio-Micheletti, S.M.F.; Campello Diniz, M.C.; Da Silva-Dias, N.; Nascimento de Araujo, A.M.; Girón-Pérez, K.; Da Silva Madalena, J.A. (2011): Insects associated to *Alpinia purpurata* (Vieill.) K. Schum. (Zingiberaceae) in Maceió and Rio Largo, AL, Brazil. *Revista Caatinga* 24(1): 1-8. (in Portuguese, with English summary) ["Due the fast growing in flowers and ornamental plants production and their high export potential, it is important to identify the insects species associated with *Alpinia purpurata* (Vieill.) K. Schum crops and to establish their role in this agroecosystem/production system The insects were collected from *A. purpurata* cv. Pink Ginger and Red Ginger plants cultivated in two farms with different agroecological characteristics, located in two recognized tropical flower production areas/regions, Maceió and Rio Largo cities/localities, Alagoas state, during one year. They were identified and its frequency analyzed according with a numerical scale. According to the results was collected 790 insects of which 69 were identified to specific level, belonging to 59 families of 9 ordens. Results showed Hymenoptera individuals as the most frequent, mainly predator ants and/or associated with phytophagous insects (sucking), besides natural enemies, followed by Hemiptera and Lepidoptera orders, which involved recognized agricultural pests. Insects belonging to the order Odonata ("Coenagrionidae, Libellulidae") and Orthoptera were found less frequently." (Authors)] Address: Broglio-Micheletti, Sonia, Depto de Fitossanidade, CECA/UFAL, Rod. BR 104, Km 85, 57100-000, Rio Largo - AL, Brazil. E-mail: soniamfbroglio@gmail.com

10499. Broyer, J.; Curtet, L. (2011): The influence of fish farming intensification on taxonomic richness and biomass density of macrophyte-dwelling invertebrates in French fishponds. *Knowledge and Management of Aquatic Eco-*

systems (2011) 400, 10: 12 pp. (in English, with French summary) ["Fishponds are man-made ecosystems where fish farming may strongly interfere with biodiversity. Intensified practices could be suspected to have a negative impact on animal and plant communities. We investigated the hypothesis that, in French fishponds, taxonomic richness and biomass density of macrophyte-dwelling macro-invertebrates could be influenced by fish stock density and pond fertilization. With a sample of 95 water bodies from three of the most important fishpond regions, studied in 2000, 2001 or 2002, we compared a series of models in which macrophyte cover (in three classes), emergent shore vegetation (in % of pond area) and invertebrate biomass in pond sediment were also considered. Among explanatory variables, macrophyte and helophyte abundance were included in the best models explaining variation in invertebrate taxonomic richness and in biomass density. Taxonomic richness was lower when abundance of both macrophytes and emergent shore vegetation was low (< 10% and < 7.5%, respectively). Biomass density was higher when macrophyte cover was >= 10% provided that emergent vegetation was abundant (>=7.5%). We conclude that fish farming intensification in French fishponds may affect aquatic invertebrate communities, mainly through its impact on the development of aquatic vegetation." (Authors) Odonata are treated at the family level.] Address: Broyer, Joel, Office National de la Chasse et de la Faune Sauvage, Direction des études et de la recherche, 01330 Birieux, France. E-mail: joël.broyer@oncfs.gouv.fr

10500. Buden, D.W. (2011): The Odonata of Fais Island and Ulithi and Woleai Atolls, Yap State, Western Caroline Islands, Federated States of Micronesia. *Micronesica* 41(2): 215-222. (in English) ["51 adults of nine species of Odonata were collected by the author on Ulithi Atoll, Fais Island, and Woleai Atoll, Micronesia, between December 2007 and December 2009. Together with a previously Yap and Ulithi, they include 13 first island records and three easternmost records for the Caroline Islands. Breeding on one or more of the islands is confirmed for seven species. Five of the nine species (*Anax guttatus*, *Diplacodes bipunctata*, *Pantala flavescens*, *Tholymis tillarga*, and *Tramea transmarina*) are widespread throughout Micronesia and are the species most likely to be encountered on the smallest and most remote islands, often with very limited available water." (Author) The rest of the nine species are: *Anaciaeschna jaspidea*, *Macrodiplax cora*, *Rhyothemis phyllis*, and *Neurothemis terminata*. *Agriocnemis femina* was collected on Mogmog Island on 25-X-2001.] Address: Buden, D.W.; Division of Natural Sciences and Mathematics, College of Micronesia-FSM, P.O. Box 159, Kolonia, Pohnpei, Federated States of Micronesia 96941. E-mail: donbuden@comfsm.fm

10501. Butler, S.G. (2011): Description of the last instar larva of *Ictinogomphus acutus* (Laidlaw) from Sarawak, with a key to the larvae of the congeneric species (Anisoptera: Gomphidae). *Odonatologica* 40(2): 123-129. (in English) ["A male final instar larva is described, illustrated and compared with the exuviae of congeneric species. The exuviae of *I. decoratus melaenops* (Sel.), which also occurs in Sarawak (Malaysia), differ from *I. acutus* by having apical margin of labium convex to straight, without strong marginal teeth; no processes between eye and antennae; lateral ventral head processes are not visible dorsally; dorsal spines are highly arched; and anal appendages extend beyond spines on segment 9." (Author)] Address: Butler, S.G., Red Willow, All Stretton,

Shropshire SY6 6HN, UK. E-mail: sgbutler15@btopen-world.com

10502. Byers, E.; Norris, S. (2011): Climate change vulnerability assessment of Species of Concern in West Virginia. Project Report. Elizabeth Byers and Sam Norris, West Virginia Division of Natural Resources, P.O. Box 67, Elkins WV 26241, USA. February 14, 2011: 72 pp. (in English) ["This project assessed and ranked the relative climate change vulnerability of 185 animal and plant species in West Virginia. Most species were selected based on their status as Species of Greatest Conservation Need within the West Virginia Wildlife Conservation Action Plan." *Leucorrhinia glacialis* (Index score: Highly vulnerable), *Aeshna mutata*, *Calopteryx amata*, *Telebasis byersi* (Index score: Moderately vulnerable), *Cordulegaster erronea*, *Gomphus fraternus* (Index score: Presumed stable) were assessed for climate change vulnerability, with a wide range of resulting scores. "Some of these species are mobile and already on the southern edge of their range, and are predicted to shift their populations entirely out of West Virginia due to climate change stress. Species associated with ephemeral wetlands and headwater streams tend to have the highest risk, especially where these are tied to cold-temperature habitats. Dietary specialization confers additional risk for half of the species assessed." (Authors)] Address: Elizabeth Byers & Sam Norris, West Virginia Division of Natural Resources, P.O. Box 67, Elkins WV 26241. USA

10503. Carriço, C.; Costa, J.M.; Santos, T.C. (2011): Description of the larva of *Neocordulia machadoi* Santos, Costa & Carriço, 2010 (Odonata: Corduliidae) from Brazil. *Biota Neotropica* 11(2): 71-73. (in English, with Portuguese summary) [The larva of *N. machadoi* is described and illustrated based on an exuvia collected at Cachoeira da Eubiose stream, São Tomé das Letras, Minas Gerais State, Brazil. (21° 43' 0" S 44° 58' 60" W; 15.X.2009, J.M. Costa & C. Carriço leg. (emerged 02.XI.2009).] Address: Carriço, C., Instituto de Biologia, Programa de Pós-graduação em Biologia Animal - PPGBA, Universidade Federal Rural do Rio de Janeiro UFRJ, BR 465, Km 7, CEP 23890 -000, Seropédica, Rio de Janeiro - RJ, Brazil. E-mail: carrico82@hotmail.com

10504. Chetelat, J.; Amyot, M.; Garcia, E. (2011): Habitat-specific bioaccumulation of methylmercury in invertebrates of small mid-latitude lakes in North America. *Environmental Pollution* 159(1): 10-17. (in English) ["We examined habitat-specific bioaccumulation of methylmercury (MeHg) in aquatic food webs by comparing concentrations in pelagic zooplankton to those in littoral macroinvertebrates from 52 midlatitude lakes in North America. Invertebrate MeHg concentrations were primarily correlated with water pH, and after controlling for this influence, pelagic zooplankton had significantly higher MeHg concentrations than littoral primary consumers but lower MeHg than littoral secondary consumers. Littoral primary consumers and pelagic zooplankton are two dominant prey for fish, and greater MeHg in zooplankton is likely sufficient to increase bioaccumulation in pelagic feeders. Intensive sampling of 8 lakes indicated that habitat-specific bioaccumulation in invertebrates (of similar trophic level) may result from spatial variation in aqueous MeHg concentration or from more efficient uptake of aqueous MeHg into the pelagic food web. Our findings demonstrate that littoralepelagic differences in MeHg bioaccumulation are widespread in small mid-latitude lakes." (Authors) Greater MeHg in Odonata compared to all other invertebrates was probably due to their higher trophic

level.] Address: Chételat, J. Groupe de recherche interuniversitaire en limnologie, Département de sciences biologiques, Université de Montréal, Montréal, Québec H3C 3J7, Canada

10505. Cicek, K. (2011): Food composition of Uludag frog, *Rana macrocnemis* Boulenger, 1885 in Uludag (Bursa, Turkey). *Acta Herpetologica* 6(1): 87-99. (in English) ["Feeding habit and food preferences of *R. macrocnemis* were studied in 2006 and 2007 in Uludag (Bursa, Turkey). Stomach contents of 165 (87 males, 58 females, 20 juveniles) individuals were analyzed and a total of 2,129 prey items were determined. It was found that the species fed mainly on a variety of invertebrates and especially on insects (96.5%). The most frequently consumed prey items were Coleoptera (62.8%), Diptera (14.4%), and Hymenoptera (9.8%). There was no significant sex- and age-dependent difference in the feeding regime. It appears that the species is feeding less in the breeding period and more in the post-breeding period. It was also evident that there was an increase in the consumption of Coleoptera depending on the elevation." (Author) Odonata contributed with ca 8% to the insect diet.] Address: Çiçek, K., Ege University, Faculty of Science, Biology Department, Zoology Section, 35100, Bornova, Izmir, Turkey. E-mail: kerim.cicek@ege.edu.tr

10506. Conn, A.T.; Ling, C.S.; Burgess, S.C. (2011): Biomimetic Analysis of Insect Wing Kinematics for Flapping MAVs. *International Journal of Micro Air Vehicles* 3(1): 1-11. (in English) ["Despite significant interest for over a decade in developing micro air vehicles (MAVs) that mimic the flight performance exhibited by insects, no design has achieved this challenge. This has principally been due to limitations in actuation devices, which have resulted in constrained flapping motions that require conventional rudder and aileron control surfaces. Recent advances in "artificial muscle" actuation technologies mean that reproducing the complex wing kinematics of insects with sufficient power density for MAV flight has become feasible. Consequently, there is a need to analyse the wing kinematics of insects and how they are modulated for controlled, manoeuvrable flight. It is also important to understand how wing kinematics affect the unsteady aerodynamic mechanisms that crucially augment lift and thrust force production. In this paper a biomimetic analysis of insect wing kinematics based on established biological literature is presented, that aims to aid the development of agile and controllable flapping MAVs." (Authors) References to Odonata are made] Address: Conn, A.T., Dept of Mechanical Engineering, Univ of Bristol, Bristol, U.K.

10507. Conniff, K.L.; van der Poorten, N.E.; Gunasingha, S. (2011): Description of the female of *Mortonagrion ceylonicum* Lieftinck, 1971 and amended description of the male (Zygoptera, Coenagrionidae) with notes on habitat, distribution and behaviour. *International Journal of Odonatology* 14(1): 49-53. (in English) ["The female of *M. ceylonicum* is described and figured for the first time. The female was described briefly by Laidlaw (1924) but was not assigned to a genus or species. An amended description of the male is also provided. Additional notes on habitat, distribution and behaviour are given." (Author)] Address: Conniff, Karen L., IWMI, PO Box 2075, Colombo 1, Sri Lanka. E-mail: karoconniff@gmail.com

10508. Contreras-Garduno, J.; Cordoba-Aguilar, A.; Martinez-Becerril, R.I. (2011): The relationship between male wing pigmentation and condition in *Erythrodiplax funerea* (Hagen) (Anisoptera: Libellulidae). *Odonatologica* 40(2):

89-94. (in English) ["Theory predicts that sexual traits ought to be related to physiological indicators of condition. In Zygoptera, for example, wing pigmentation expression (i.e. a sexual trait) correlates positively with male immune response, fat reserves and muscle mass. Here, it is for the first time investigated for anisopteran, whether such relationships hold in male *E. funerea*. Males in territorial activity, were collected and challenged to induce a melanization-based immune response. Male wing pigmentation was then correlated with melanin, fat reserves and muscle mass. Unlike previous results in Zygoptera, pigmentation was negatively related with immune response but no significant relation was found with fat and muscle mass. Furthermore, immune response showed no relationship with fat content or muscle mass. Possibly, the extremely high levels of male aggression observed in this species may have caused males to make an unusually high allocation of resources to wing pigmentation which may have impaired immune response." (Authors)] Address: Contreras-Garduno, J., Departamento Biología, División de Ciencias Naturales y Exactas, Universidad de Guanajuato, campus Guanajuato. Noria Alta s/n, Noria Alta, MX-36050 Guanajuato, Guanajuato, Mexico. E-mail: jcont@ecologia.unam.mx

10509. Corbi, J.J.; dos Santos, F.A.; Zerlin, R.; dos Santos, A.; Froehlich, C.G.; Trivinho-Strixino, S. (2011): Assessment of chromium contamination in the Monte Alegre stream: a case study. Brazilian archives of biology and technology 54(3): 613-620. (in English) [São Paulo, Brazil. The aim of this work was to study the contamination by chromium of the sediments of the Monte Alegre stream and of the larvae of Odonata (studied at the family level) as well as the possible impact caused by them on the stream macroinvertebrates community. It was found that chromium contaminated the sediments and the aquatic biota although, the stream macroinvertebrates community structure did not appear to be modified.] Address: Corbi, J.J., Depto de Biologia; Fac. de Filosofia Ciências e Letras; Univde de São Paulo; Ribeirão Preto - SP - Brasil. E-mail: julianocorbi@yahoo.com.br

10510. Corbi, J.J.; Froehlich, C.G.; Trivinho Strixino, S.; dos Santos, A. (2011): Evaluating the use of predatory insects as bioindicators of metals contamination due to sugarcane cultivation in neotropical streams. Environ Monit. Assess. 177(1-4): 545-554. (in English) ["Streams located in areas of sugarcane cultivation receive high concentrations of metal ions from soils of the adjacent areas causing accumulation of metals in the aquatic sediment. This impact results in environmental problems and leads to bioaccumulation of metal ions in aquatic organisms. In the present study, metal concentrations in different predatory insects were studied in streams near sugarcane cultivation and compared to reference sites. Possible utilisation of predatory insects as bioindicators of metal contamination due to sugarcane cultivation from 13 neotropical streams was evaluated. Ion concentrations of Al, Cd, Cr, Cu, Zn, Fe, and Mn in adult Belostomatidae (Hemiptera) and in larvae of Libellulidae (Odonata) were analysed. Nine streams are located in areas with sugarcane cultivation, without riparian vegetation (classified as impacted area) and four streams were located in forested areas (reference sites). Metal concentrations in insects were higher near sugarcane cultivations than in control sites. Cluster analysis, complemented by an ANOSIM test, clearly showed that these insect groups are good potential bioindicators of metal contamination in streams located in areas with sugarcane cultivation and can be

used in monitoring programmes. We also conclude that Libellulidae appeared to accumulate higher concentrations of metals than Belostomatidae." (Authors)] Address: Corbi, J.J., Depto de Biologia, Faculdade de Filosofia Ciências e Letras, Universidade de São Paulo-USP, CEP: 14040-900, Ribeirão Preto, SP, Brazil, julianocorbi@yahoo.com.br

10511. Craves, J.A.; O'Brien, D. (2011): *Tamea calverti* (Odonata: Libellulidae): New for Michigan with notes on other new reports for the Great Lakes region. The Great Lake Entomologist 44(1-2): 78-82. (in English) ["Beginning in late summer 2010, the Neotropical *T. calverti* was observed in a major northward movement in eastern North America. This species appeared for the first time in three Great Lakes states and Canada (Ontario). A specimen from Michigan is the first and only voucher in the Great Lakes, and an observation in Minnesota established a new northernmost report for North America." (Authors)] Address: Craves, Julie, Rouge River Bird Observatory, University of Michigan-Dearborn, Environmental Interpretive Center, Dearborn, MI 48128, USA. E-mail: jcraves@umd.umich.edu

10512. da Silva, F.H.; Favero, S.; Sabino, J.; dos Anjos Ganes, S.J. (2011): Biotic indexes for the evaluation of environmental quality in stretches of the Correntoso river, Pantanal do Negro, Mato Grosso do Sul State, Brazil. Acta Scientiarum. Biological Sciences, Maringá 33(3): 289-299. (in Portuguese, with English summary) ["Six collections were taken in different seasonal periods; ebb, dry and wet. The organisms were collected using a mesh D net sweeping five times through the roots of macrophyte banks at each sample. Three environments were compared (open, intermediary, closed) by adding the information from six collection sites. Family richness, absolute and relative abundance of insect samples and an evaluation of water quality were analyzed by using the BMWP index, BMWP-ASPT index, IBF index and Shannon diversity index, with log₂. A total of 60 families from 12 orders of Insecta Class (including Odonata) were recorded, totalling 19,773 specimens. Among the indexes applied, the BMWP index was the one that best represented the conditions of the studied environment." (Authors)] Address: da Silva, F.H., Programa de Pós-graduação em Meio Ambiente e Desenvolvimento Regional, Universidade para o Desenvolvimento do Estado e da Região do Pantanal, Rua Alexandre Herculano, 1400, 79037-280, Jardim Veraneio, Campo Grande, Mato Grosso do Sul, Brasil. E-mail: ambienteffhs@yahoo.com.br

10513. Dahanukar, N.; Diwekar, M.; Paingankar, M. (2011): Rediscovery of the threatened Western Ghats endemic sisorid catfish *Glyptothorax poonaensis* (Teleostei: Siluriformes: Sisoridae). Journal of Threatened Taxa 3(7): 1885-1898. (in English) [India; The diet of *G. poonaensis* includes a zygopteran larva.] Address: Dahanukar, N., Indian Institute of Science Education and Research, Sai Trinity, Garware Circle, Pune, Maharashtra 411021, India. Email: n.dahanukar@iiserpune.ac.in

10514. De Knijf, G.; Muusse, T. (2011): Predation of *Brachytron pratense* on *Libellula quadrimaculata* and on *Cordulia aenea*. Brachytron 14(1): 54-58. (in Dutch, with English summary) ["During a first visit to the nature reserve De Weerribben (Overijssel, the Netherlands) on 9 May 2009, a female *B. pratense* was observed during a successful kill. Its prey turned out to be a *L. quadrimaculata* which was caught in flight. After having eaten the eyes and weak parts of the head, the female *B. pratense*

flew off. A second visit to the same locality on 20 May 2011 resulted in the observation of a male *B. pratense* which caught a *C. aenea*. Some time later a second male was seen attacking another *C. aenea*. The thorax of the latter was partly eaten by *B. pratense*. After one minute the male *Brachytron* flew away, leaving behind the still living male of *C. aenea*. To our knowledge, these are the first published reports of hunting behaviour by *B. pratense* on other dragonflies." (Authors)] Address: Muusse, T., Billitonstraat 19, 3312SB Dordrecht, The Netherlands. E-mail: theomuusse@chello.nl

10515. Demayo, C.G.; Harun, S.A.; Torres, M.A.J. (2011): Procrustes analysis of wing shape divergence among sibling species of *Neurothemis* dragonflies. *Australian Journal of Basic and Applied Sciences* 5(6): 748-759. (in English) ["This study was conducted to determine wing shape divergence in several species of *Neurothemis* dragonflies collected from Northern Mindanao, Philippines. These includes the species *N. terminata terminata* (Ris, 1911), *N. fluctuans* (Fabricius, 1793), *N. ramburii ramburii* (Kaup & Brauer, 1866). The identification of these species are sometimes difficult as the males of these species have similarities in their colored wings ranging from red to brown. For the females, *N. terminata terminata* also show extensive female-limited polymorphism expressed as intra-specific color variations. Since the quantitative description, analysis and interpretation of shape and shape variation in biology have become a fundamental area of research; the geometric method of morphometrics was used in this study aimed at comparing the shapes themselves. In this methodology, the generalized least square fitting analysis done via procrustes superimposition of landmarks from the fore- and hind wings was used. The landmark data were converted to shape residuals via Procrustes-fitting and is comprised of three steps: (1) translation to a common centroid, (2) rotation to a common centroid size and (3) rotation to minimize sum of squared differences between landmark sets. To illustrate ordination of the shapes' consensus, the consensus shape data (mean shape) of the separate populations was measured by a relative warp ordinations plot using tpsRelw 1.36. Results of the relative warp analysis showed significant variation among the *Neurothemis* species. The first extracted relative warp showed differences in the shape of the pterostigma and disparity in the distance between the distal end of the radial planate supplement and the distal margin of the wings bounded by the end points of the intercalary vein and the radial branch. Differences in the shape of the pterostigma were also observed and accounting for the variations in the shapes of the hind wing. Distance matrices were also constructed for the four data sets: left and right fore-wing; left and right hind wing. Results of the comparison via correlation analyses of the four matrices of distances among the species are indicative of the significant contribution of the shape of the fore-wing as compared to the hind wing in discriminating among species. The results of the present study clearly show the importance of geometric morphometric analysis and the utility of wing morphology in the taxonomy and discrimination of sibling species of *Neurothemis*." (Authors) Reagan Villanueva wrote on 02.08. 2011: The species they labelled as *N. fluctuans* is actually a small *N. ramburii*.] Address: Demayo, C.G., Dept of Biological Sciences, College of Science and Mathematics, MSU-Iligan Institute of Technology, Iligan City, Philippines. E-mail: cgdemayo@gmail.com

10516. Diao, P.-p.; Yu, A.-c. (2011): Odonata in the Siming Mountains, Ningbo. *Chinese Journal of Applied Entomology* 48(2): 435-441. (in Chinese, with English summary) ["Field surveys were conducted on the Odonata in the Siming Mountains of the Ningbo Region from 2009 to 2010. 460 Odonata specimens were collected, and a total of 43 species in 32 genera and 9 families identified. The Libellulidae were the dominant family (17 species, 39.5%) of which *Orthetrum* was the dominant genera (5 species, 15.6%). 25 genera (78.1%) were represented by single species. Oriental and Oriental-Palearctic Realm species were the most common. Water pollution and over-utilization of marshes are the main threats to the Odonata and other local aquatic organisms." (Authors)] Address: Diao, P.-p., College of Modern Science and Technology, China Jiliang University, Hangzhou, China

10517. Dominguez-Granda, L.; Lock, K.; Goethals, P.L.M. (2011): Application of classification trees to determine biological and chemical indicators for river assessment: case study in the Chaguana watershed (Ecuador). *Journal of Hydroinformatics* 13(3): 489-499. (in English) ["Benthic macroinvertebrates were sampled in the Chaguana river basin in SW Ecuador in March (wet season) and September (dry season) of 2005 and 2006. Aquatic insects dominated the macrobenthos, with Trichoptera, Diptera, Ephemeroptera, Hemiptera and Odonata being the orders with the highest diversity and Ephemeroptera and Diptera being most abundant. No systematic differences in richness and abundance were observed between dry and wet seasons, which is in agreement with the literature. It is concluded that, in the neotropics, macroinvertebrates can probably be sampled for water quality assessments during the whole year: however, sampling soon after spates should be avoided. Using multivariate analysis, stations could be clustered into three groups based on their macroinvertebrate community composition: sites with low, intermediate and high human impact. Classification trees indicated that stations with low human impact had low conductivities, while stations with high conductivities were characterised as highly impacted if the dissolved oxygen concentration was low and intermediately impacted if the dissolved oxygen concentration was high. Classification trees also indicated that Leptophlebiidae (Ephemeroptera) were characteristic for sites with low impact; in sites with intermediate impact, this family was absent but Hydropsychidae (Trichoptera) were present; when both families were absent, impact was high." (Authors)] Address: Lock, K., Ghent Univ., Laboratory of Environmental Toxicology and Aquatic Ecology, J. Plateastraat 22, B-9000 Gent, Belgium. E-mail: Koen.Lock@UGent.be

10518. Dressler, B. (2011): Arktische Smaragdlibelle *Somatochlora arctica*, Wiederfund im Spessart. *Libellen in Hessen* 4: 50-52. (in German) [Documentation of records of *S. arctica* without locality data from the Spessart middle range mountain, Hessen, Germany from 22-VII and 02-IX-2010.] Address: Dressler, B., Samlandweg 75, 61118 Bad Vilbel, Germany

10519. Dronzikova, M.V. (2011): Data on the fauna of Odonata of the Tom' River basin. *Amurian zoological journal* 3(2): 107-123. (in Russian, with English summary) ["Basing on collections mostly from Kuznetskaya Depression and Gornaya Shoria Mts., data on distribution of 48 species of Odonata in the Tom' River basin (West Siberia) are reported, 13 species added to the fauna from literature sources. In additions, collections made at Lake Teletskoe, NE Altai, are reported as well.

Coenagrion lanceolatum is reported for the environs of Guryevsk town (Kuznetskaya depression) and Lake Teletskoe, that considerably extends its known range to the west. *Anax parthenope parthenope*, probably a southern colonist, is reported from Kemerovo Province; its steady population existing within the city of Novokuznetsk. New data on the life history of some species at Novokuznetsk are reported." (Author)] Address: Dronzikova, M.V., Kuzbass State Pedagogical University, Pionersky Ave. 13, Novokuznetsk, 654027, Russia. E-mail: m_dronzikova@mail.ru

10520. Dumont, H.J.; Kiany, M.; Sadeghi, S. (2011): First record of *Rhodischnura nursei* (Morton) from Iran (Zygoptera: Coenagrionidae). *Odonatologica* 40(3): 251-254. (in English) ["*R. nursei* is for the first time reported from the South of Iran, a considerable widening of the range of this rather ill-known species towards the West, and redefining its geographical range as West-Oriental and rather typical of semi-arid climates. The nearest certified record from Pakistan is situated some 1000 km NE of the locations in Iran, but it can be supposed that numerous populations live in the gap. The specimens, collected in Rudan and Ziarat Ali, Hormozgan province, S Iran, lived along the grassy shores of 2 slow-flowing rivers, a habitat that is also typical of the species further East. A female found at Sarbaz, Beluchistan, confirms that this small and inconspicuous species may be widespread in suitable biotopes of southern and eastern Iran, and probably in the West of Pakistan as well." (Authors)] Address: Kiany, M., Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, I. R. Iran. E-mail: mohsen.kiany1@gmail.com

10521. Facco Jacomassa, F.A. (2011): Observations of a nest of the Plumbeous Kite, *Ictinia plumbea* (Gmelin, 1788) (Falconiformes: Accipitridae) in southern Brazil. *Revista Biotemas* 24(1): 77-82. (in Portuguese, with English summary) ["[...] In early November, the presence of nestlings was confirmed (one in each breeding season), and this time the parents fed the chicks with small insects (Hymenoptera and Coleoptera) and carried out the maintenance of the nest. The nestlings that were developing into young birds were fed with larger insects (Odonata, Lepidoptera – *Myelobia smerintha* and Orthoptera – *Tropidacris collaris*). [...]"] (Author)] Address: Facco Jacomassa, F.A., Laboratório de Ornitologia e Animais Marinhos, Bloco D, Centro 2, Universidade do Vale do Rio dos Sinos, Avenida Unisinos, 950 – B, CEP 93.022-000, São Leopoldo – RS, Brasil. E-mail: fabioafj@gmail.com

10522. Ferraz Luiz, T.; Roquetti Velludo, M.; Carvalho Peret, A.; Luiz Rodrigues, J.; Moldenhauer Peret, A. (2011): Diet, reproduction and population structure of the introduced Amazonian fish *Cichla piquiti* (Perciformes: Cichlidae) in the Cachoeira Dourada reservoir (Paranaíba River, central Brazil). *Rev. Biol. Trop.* 59(2): 727-741. (in English) ["The Blue Peacock Bass (*Cichla piquiti*), native to the Tocantins-Araguaia river basin of the Amazon system, was introduced into the basin of the Paranaíba River, Paraná River system. Cachoeira Dourada reservoir is one of a series of dams on the Paranaíba River in central Brazil, where this fish has become established. A study of its feeding spectrum, combined with information about its reproductive characteristics and population structure, would enable the current state of this species in the reservoir to be assessed and might provide useful data for the management of other species native to this habitat. This study showed that the peacock bass has no predators or natural competitors in the reservoir and that

reproduces continuously, with high reproductive rates, and has a smaller median length at first maturity (L50) than other species of *Cichla*. Its successful establishment in habitats strongly affected by human activity should cause changes in the whole structure of the local fish communities. Nonetheless, in this reservoir, there appears to be some sharing of the functions of this species with native carnivorous fish, a situation that may be sustained by the presence of a wide variety of foraging fish." (Authors) Odonata were found in 0,81% of the stomachs of *C. piquiti*.] Address: Ferraz Luiz, Tatiane, Population Dynamics Laboratory, Department of Hydrobiology, Federal University of São Carlos (UFSCar) Washington Luís Highway (SP-310), km 235. São Carlos, SP, Brazil. Zip Code 13565-905. E-mail: tatianeferrazluiz@hotmail

10523. Fulan, J.A.; Raimundo, R.; Figueiredo, D.; Correia, M. (2011): Abundance and diversity of dragonflies four years after the construction of a reservoir. *Limnetica* 29(2): 279-286. (in English, with Portuguese summary) [Southern Portugal, 38°08'N, 7°35'E. "Few studies have investigated the impacts of river impoundments on reservoir constructions. Reservoir construction deeply changes dragonflies' habitat structures, especially in relation to shoreline vegetation. This study investigated the effects of the impoundment of the Guadiana River and its tributaries on dragonflies four years after the construction of a reservoir. A total of 17 dragonfly species (11 Zygoptera and ten Anisoptera), representing six families, were recorded in 21 sites in the years 1999 and 2003. *Aeshna mixta*, *Coenagrion caeruleum*, *C. scitulum*, *Sympetrum foscolum*, *S. meridionale* and *S. striolatum* were sampled just before the impoundment took place, and *Anax parthenope*, *Onychogomphus forcipatus*, *Orthetrum coerulescens*, *Trithemis annulata*, *Platycnemis acutipennis* and *P. latipes* were recorded only after the construction of the reservoir. We concluded that the construction of the Alqueva Reservoir four years earlier did not change the dragonfly species richness, possibly because of species overlap, but that the species composition was modified. Changes in marginal vegetation may have been important to new species compositions." (Authors)] Address: Fulan, J.A., Unive Federal do Amazonas (UFAM). CEP: 69800-000, Humaitá, AM, Brasil. E-mail: joaofulan@ig.com.br

10524. Fulan, J.A.; Davanso, R.C.S.; Henry, R. (2011): A profundidade como fator determinante na variação anual da densidade dos macroinvertebrados associados à *Salvinia auriculata* Aublet. *Revista Brasileira de Biociências* 9(2): 214-219. (in Portuguese, with English summary) ["(The depth as a factor in determining annual change density of macroinvertebrates associated with *Salvinia auriculata* Aublet). The aim of this work was to study the effects of water annual variation of Paranapanema River and others variables on macroinvertebrates that lives in macrophytes roots, from March 2006 to February 2007. The sampled was realized with a hand-net (mesh size: 0.25 mm) and 0.07 m² circle area. We measured air and water temperature, depth, dissolved oxygen, pH, K25 and suspended matter. The normality was tested and a Canonical Correspondence Analysis (CCA) was realized. Telebasis showed high density in period studied. There was a high variation in depth: 6.07 m in April 2006 to 1.83 m in November 2007. The CCA showed that Culicidae, Ephemeroptera, Ostracoda, Calopterygidae, Coryphaeschna and Cyanallagma were significative correlated with the depth. We concluded that the effect of the depth on larvae Odonata can not have been direct, but indirect by the effect in your substrate as aquatic plant." (Au-

thors)] Address: Fulan, J.A., Universidade Federal do Amazonas (UFAM). CEP: 69800-000, Humaitá, AM, Brasil. E-mail: joaofulan@ig.com.br

10525. Gall, B.G.; Brodie III, E.D. Brodie, Jr. E.D. (2011): Survival and growth of the caddisfly *Limnephilus flavastellus* after predation on toxic eggs of the Rough-skinned Newt (*Taricha granulosa*). *Can. J. Zool.* 89: 483-489. (in English) ["*T. granulosa* possesses a powerful neurotoxin, tetrodotoxin, in the skin that is secondarily deposited in the ova. Although assumed to serve an antipredator function in the eggs, empirical evidence of the toxin's role in preventing egg predation is lacking. In this study, we characterized the aquatic macroinvertebrate community at a location sympatric with extremely toxic newts and estimated the abundance of caddisflies. We tested aquatic macroinvertebrates sympatric with toxic newts for their capacity to consume the toxic eggs, and examined the propensity of egg predation and its effect on growth of the only known predator of newt eggs, caddisfly larvae. Limnephilid caddisfly larvae were the only invertebrate observed to consume substantial quantities of toxic newt eggs. Survival and growth of *L. flavastellus* continued when larvae consumed toxic eggs and did not differ from *L. flavastellus* that also had access to an alternative food source (detritus). *L. flavastellus* that had access to eggs + detritus consumed a similar number of eggs compared with those provided with eggs only. These results, combined with the abundance of caddisflies, suggest that caddisflies are important predators of eggs of *T. granulosa*." (Authors) Macroinvertebrates collected at Soap Creek ponds and tested for their propensity to consume toxic eggs of *T. granulosa* included Odonata. Eggs were offered to Libellulidae (n specimens=11), Aeshnidae (n=1) and Coenagrionidae (n=6). In any case the offered eggs were consumed.] Address: Gall, B.G., Dept of Biology, Utah State University, 5305 Old Main Hill, Logan, UT 84322, USA. E-mail: brian.gall@usu.edu

10526. Ganai, A.H.; Parveen, S.; Abdel Mola, H.R., Ahmad, U.; Kabir, H.A. (2011): Diversity and community structure of aquatic insects in some derelict waterbodies of Aligarh, Uttar Pradesh, India. *J. Curr. Sci.* 16(1): 155-163. (in English) [Monthly population densities of the taxa (all at the order level) are presented and discussed. "Odonata formed the fifth (from six) most dominant group of the aquatic insects in the selected ponds. The population density of Odonata ranged from minimum of (3 No./m²) during November. 2009 to a maximum of (63 No./m²) in June, 2009 in pond I, whereas, it varied from Nil during, January. 2010 to (15 No./m²) in April and June 2009 in pond II. Odonate insects were collected mainly during March to October, 2009 with abundance in summer." (Authors)] Address: Ganai, A.H., Limnology Research Laboratory, Department of Zoology, Aligarh Muslim University, Aligarh, (U.P.), India

10527. Gassmann, D. (2011): *Pseudagrion lorenzi* sp. nov., a new damselfly species from New Britain island, Papua New Guinea (Odonata: Coenagrionidae). *International Journal of Odonatology* 14(2): 149-162. (in English) ["*Pseudagrion lorenzi* sp. nov. is described from New Britain island, Papua New Guinea. Male and female characters are illustrated by means of scanning electron microscopy. A differential diagnosis with *Pseudagrion civicum* Lieftinck, 1932 from New Guinea and *Pseudagrion incisurum* Lieftinck, 1949 from the Solomon Archipelago is provided. The female of *P. incisurum* is described for the first time." (Authors)] Address: Gassmann, D., National Centre for Biodiversity (NCB Naturalis), PO Box

9517, NL-2300 RA Leiden, The Netherlands. E-mail: dirk.gassmann@ncbnaturalis.nl

10528. Gergs, A.; Classen, S.; Hommen, U.; Preuss, T.G. (2011): Identification of realistic worst case aquatic macroinvertebrate species for prospective risk assessment using the trait concept. *Environmental Science and Pollution Research* 18(8): 1316-1323. ["Approaches in environmental risk assessment for pesticides are becoming more and more realistic. Thereby, risk assessment has to be protective in a way that no long-lasting (adverse) effects on populations will occur in the environment. Since this imperative includes species generally showing high population vulnerability due to their life history traits, prospective risk assessment should be based on realistic worst cases. Based on life history traits, the purpose of the current study was to verify whether a worst case combination of low potential for intrinsic recovery and low ability for recolonisation can be found in the field. Methods: Combinations of traits related to dispersal ability and reproduction of macroinvertebrates were investigated using monitoring data from edge of field water bodies in Germany. The relative distribution of traits was analyzed across different agricultural regions and across sites of different potential for exposure to pesticides. Species were sorted in a tiered approach in order to gain a list of realistic worst case species. Results: Life history traits were found equally distributed across different regions. Thereby, dispersal ability and voltinism were not randomly combined. Within the data analysed, low dispersal ability was found to be exclusive to semivoltine taxa. Owing to their appearance in reference sites, poor dispersal ability and a long time reproduction, three species were considered potentially worst case. Conclusions: The trait approach was found to be suitable in comparing trait distributions within different regions and in compiling a list of critical taxa for consideration in environmental risk assessment." (Authors) The paper includes a few passing notes on voltinism and dispersal of Odonata.] Address: Gergs, A., Institute for Environmental Research, RWTH Aachen University, Aachen. Germany. E-mail: andre.gergs@bio5.rwth-aachen.de

10529. Goncalves, C.; Pereira Souza, U.; Volcan, M.V. (2011): The opportunistic feeding and reproduction strategies of the annual fish *Cynopocilius melanotaenia* (Cyprinodontiformes: Rivulidae) inhabiting ephemeral habitats on southern Brazil. *Neotropical Ichthyology* 9(1): 191-200. (in English, with Portuguese summary) [Odonata larvae play a minor role as food of *C. melanotaenia*.] Address: Gonçalves, Cristina da Silva, Programa de Pós-Graduação em Ciências Biológicas, Universidade Estadual Paulista "Júlio de Mesquita Filho", Departamento de Zoologia, Av. 24-A, 1515, 13506-900 Rio Claro, SP, Brazil. cristina.silva.goncalves@gmail.com

10530. Gonzales Soriano, E.; Noguera, F.; Onate Ocaña, L. (2011): A biodiversity hotspot for odonates in Mexico: the Huasteca Potosina, San Luis Potosí. *Odonatologica* 40(3): 179-190. (in English) ["The Huasteca Potosina (HP) represents the second hotspot for Odonata diversity in Mexico. A total of 11 families, 49 genera and 126 species for the region are recognized. Estimated richness values using the nonparametric estimators ICE and Chao² were 174.3 and 204.55 species respectively. The Odonata diversity of the HP is surpassed in Mexico only by that of the region of Los Tuxtlas with 139 species" (Authors)] Address: Gonzales Soriano, E., Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México, Avenida Universidad 3000, MX-

04510 Ciudad Universitaria, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

10531. González-Tokman, D.; Córdoba-Aguilar, A.; González-Santoyo, I.; Lanz-Mendoza, H. (2011): Infection effects on feeding and territorial behaviour in a predatory insect in the wild. *Animal Behaviour* 81(6): 1185-1194. (in English) ["Sick animals may change their feeding behaviour to compensate for infections. However, there is little information regarding whether infection affects (1) feeding behaviour of predators, (2) feeding behaviour using an experimental approach in the wild, (3) other costly behaviours and/or (4) physiological components of condition. We experimentally infected males of the predatory damselfly *Hetaerina americana* in a field experiment. We hypothesized that infection would reduce feeding behaviour. We further predicted a reduction in territorial activity, an increase in immune response (measured by the activity of phenoloxidase, PO) and a reduction of fat reserves and flight-associated muscle mass (two traits usually traded off with immune ability and territorial behaviour). We also infected males in a laboratory experiment that controlled for food supply and territorial activity, and measured the same physiological characters. Immune challenges in the field experiment unexpectedly increased feeding rate but did not change territorial activities. Muscle mass was reduced in the field but not in the laboratory, probably because of differences in the presence of energetically expensive territorial activities. In the laboratory, starvation and infection reduced PO activity and fat stores but did not affect muscle mass. Thus, our field and laboratory results support the idea that increased feeding compensates for infections in predators." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Univ. Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

10532. Gosden, T.P.; Stoks, R.; Svensson, E.I. (2011): Range limits, large-scale biogeographic variation, and localized evolutionary dynamics in a polymorphic damselfly. *Biological Journal of the Linnean Society* 102: 775-785. (in English) ["Studies of heritable colour polymorphisms allow investigators to track the genetic dynamics of natural populations. By comparing polymorphic populations over large geographic areas and across generations, issues about both morph stability and evolutionary dynamics can be addressed, increasing our understanding of the potential mechanisms maintaining genetic polymorphisms. In the present study, we investigated population morph frequencies in a sex-limited heritable colour polymorphic damselfly (*Ischnura elegans*), with three discrete female morphs. We compared the frequencies of these three female morphs in 120 different populations from ten European countries at differing latitudes and longitudes. There were pronounced differences in morph frequencies both across the entire European biogeographic range, as well as at a smaller scale within regions. We also found considerable between-population variation at the local scale within regions, particularly at the edges of the range of this species. We discuss these findings in the context of recent models of adaptive population divergence along the range of a species. This polymorphism is thus highly dynamic, with stable morph frequencies at the core of the species range but fluctuating morph dynamics at the range limits. We finish with a discussion of how local interactions and climatic factors can be expected to have a strong influence on the biogeographic patterns in this species and other sexually se-

lected polymorphisms." (Authors)] Address: Gosden, T.P., School of Biological Sciences, Univ. of Queensland, St Lucia 4072 QLD, Australia. E-mail: t.gosden@uq.edu.au

10533. Grant, P.B.C.; Samways, M.J. (2011): Micro-hotspot determination and buffer zone value for Odonata in a globally significant biosphere reserve. *Biological Conservation* 144(2): 772-781. (in English) ["Reserves are frequently constrained in design and size by various financial, social or political factors. Maintenance of existing reserves must therefore rely on strategic management practices, and prioritization of conservation activities within them. Identification of global and regional hotspots have been effective for prioritizing conservation activities. Yet, identification of micro-hotspots, or overlapping areas of endemic and rare species that are under threat at the landscape scale, have largely been ignored. From a reserve management point of view, knowledge of critical micro-hotspots within a reserve, are focal points for directing cost effective, conservation initiatives, especially removal of invasive alien plants which are a major threat to biodiversity. Using diversity patterns of dragonfly assemblages, many endemic and threatened, within a biosphere reserve located in the core of a global biodiversity hotspot, we investigated the concept of micro-hotspots. As biosphere reserves contain zones with varying degrees of anthropogenic impact, we also investigated the value of buffer and transition zones for complementing the dragonfly fauna of the reserve core. We found a distinct micro-hotspot within the protected core zone which shows concordance for both endemism and species richness. We conclude that focused conservation actions to remove invasive alien plants within this micro-hotspot would help insure its continued integrity. Furthermore, while there is greater habitat degradation within the buffer and transition zones, they support many additional species, but not those necessarily endemic or threatened. The complementary value of buffer and transition zones therefore lies in increasing habitat heterogeneity and species richness of the whole reserve." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

10534. Guillermo-Ferreira, R.; Del-Claro, K. (2011): Resource defense polygyny by *Hetaerina rosea* Selys (Odonata: Calopterygidae): Influence of age and wing pigmentation. *Neotrop. entomol.* 40(1): 78-84. (in English) ["Current evidence suggests that in *Hetaerina* damselflies males exhibit lek mating system. In this study, in order to answer if the same occurs in *H. rosea*, we manipulated vegetation substrates used as territories and quantified the number of visiting females, males defending territories and fight intensity. We also examined whether body size and wing pigmentation are selectable traits in male-male competition, and if age affects male territorial behaviour. Our results showed that males with larger pigmented areas won more contests, independently of body size. Old males changed from territoriality to sneaking strategy. Contrary to other *Hetaerina* species, males of *H. rosea* do not display lek behaviour, but defend resources according to the resource defense polygyny strategy." (Authors)] Address: Del-Claro, K., Instituto de Biologia, LECl, Univ Federal de Uberlândia, CP 593, 38400-902, Uberlândia, MG, Brasil. E-mail: delclaro@ufu.br

10535. Hardiman, N.; Burgin, S. (2011): Effects of trampling on in-stream macroinvertebrate communities from canyoning activity in the Greater Blue Mountains World Heritage Area. *Wetlands Ecology and Management* 19(1):

61-71. (in English) ["Perceived growth in the adventure recreation sport of canyoning in the Greater Blue Mountains World Heritage Area (Australia) has raised concerns with park management that such activity is resulting in unsustainable visitor impacts to canyon ecosystems. Three levels of trampling intensity were applied within an upland section of a canyon stream to assess the impact of trampling on benthic macroinvertebrate communities. After an initial detrimental effect from trampling, there was a rapid recovery of the macroinvertebrate community. Recovery occurred within one day of trampling ceasing, and overall community composition was similar among treatments after 15 days. However, by day 15 the untrampled sites showed a substantial decrease in animal abundance. This indicated that adjacent habitat contributed greatly to the recolonisation of animals into trampled areas." (Authors) The study includes one specimen of Corduliidae.] Address: Burgin, Shelley, College of Wealth and Science, Univ. of Western Sydney, South Penrith Distribution Centre, Locked bag 1797, Sydney, NSW 1797, Australia. E-mail: s.burgin@uws.edu.au

10536. Haritonov, A.; Popova, O. (2011): Spatial displacement of Odonata in south-west Siberia. *International Journal of Odonatology* 14(1): 1-10. (in English) ["A brief account is presented of mass dragonfly migrations observed previously in Russia and West Siberia in particular. A mass migration in *Libellula quadrimaculata* is described in detail. It occurred on 1 July 1981 in the south-western part of the West Siberian Plain in the valley of the Ishym River. From 1968 to 2008 we studied population dynamics, spatial distribution and displacement in dragonflies in the West Siberian forest-steppe. Detailed research was conducted at the biological station of the Russian Academy of Sciences near the Chany Lake. Mass migrations in *L. quadrimaculata* and some *Leucorhinia* spp. followed situations with an extremely high population density and local mass aggregations and occurred with a period of c.10 years, correlated with fluctuation of water level in the region, mainly in the south. It is suggested that dragonfly migration not only optimizes their population size but increases the rate of transport of chemical elements and organic matter to dry land from eutrophic water bodies, which increases the importance of dragonflies to ecosystems at large." (Authors)] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia. E-mail: pc@eco.nsc.ru

10537. Haritonov, A.Yu.; Popova, O.N. (2011): [Dragonfly (Odonata) migration in the south west Siberian plain]. *Zoologicheskii zhurnal* 90(3): 302-310. (in Russian) ["Brief information on mass dragonfly migrations observed previously in Russia, and in Western Siberia in particular, is presented. From 1969 to 2009, the authors studied the dynamics of dragonfly population, their spatial distribution and displacements in the West-Siberian forest-steppe. The main studies were conducted in the Chany Lake basin (the Biological Station of the Institute of Animal Systematics and Ecology, Siberian Division, Russian Academy of Sciences). The spatial redistribution of dragonflies is regarded as a balance of homing and wandering activities. Homing results in a relative stability of local dragonfly populations and communities. Wandering is a result of dispersal of dragonflies from their emergence sites and colonization of new habitats that is especially important due to the short time of existing the larval biotopes - shallow water bodies. The formation of more or less constant

migration routes is a peculiar variant of wandering activities. Mass exodus from native habitats at excessive growth of the population density takes special place in dragonfly migrations. Exodus flight leads to death of all or most individuals not only. In addition, it optimizes not only the number of dragonfly populations, but also intensifies the removal of chemical elements and organic matter from eutrophic water bodies. An original generalized classification of special displacement of dragonflies is proposed." (Authors)] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia. E-mail: pc@eco.nsc.ru

10538. Hasumi, M.; Hongorzul, T.; Terbish, K. (2011): Animal species diversity at a land-water ecotone in Mongolia. *Limnology* 12(1): 37-45. (in English) [The biodiversity of wetland ecosystems has received scant attention in Mongolia. We measured amphibian and macroinvertebrate species diversity at a complicated land-water ecotone of a pond within a wetland complex in Shaamar during July 2005. From our study area (0.5-ha grassland and an adjacent pond), we sampled 4,926 animals including 1 mammal, 4 amphibian, and 26 aquatic macroinvertebrate (>2 mm) species with a biomass of 4,444 g. Among these, a backswimmer (*Notonectidae* sp. 1) was a dominant species, representing 65% of the total number of animals collected (3,209) and 22% of the mass (999 g). Our study area was small but contained 4 amphibian species (*Hyla japonica*, *Rana amurensis*, *Bufo raddei*, and *Salamandrella keyserlingii*) in a mixed community with Shannon Diversity Index (H') of 1.678 and Pielou's Evenness Index (J') of 1.211. No larvae or tadpoles of any amphibian species were found in the pond, indicating their early metamorphosis. H' and J' with 26 macroinvertebrate species were estimated to be 1.828 and 0.561, respectively. This suggests that low macroinvertebrate species diversity relative to high species richness is due to low evenness resulting from considerable numbers of a backswimmer. In 6 sites sampled in the pond, mean water pH revealed high alkalinity (range 9.01–10.45). The presence of our taxa in a highly alkaline environment indicates that they may be alkaliphilic." (Authors) The paper includes records of "Aeshnidae sp., Libellulidae sp. 1, Libellulidae sp. 2, *Cercion* sp.".] Address: Hasumi, M., Biological Institute, Faculty of Science, Niigata University, Niigata 950-2181, Japan. E-mail: mhasumi@bio.sc.niigata-u.ac.jp

10539. Henry, J.R. (2011): A comparative study of dragonfly flight in variable oxygen atmospheres. M.Sc. thesis, Arizona State University: V + 39 pp. ["One hypothesis for the small size of insects relative to vertebrates, and the existence of giant fossil insects, is that atmospheric oxygen levels have constrained body sizes because oxygen delivery would be unable to match the needs of metabolically active tissues in larger insects. This study tested whether oxygen delivery becomes more challenging for larger insects by measuring the oxygen-sensitivity of flight metabolic rates and behaviour during hovering for 11 different species of dragonflies that range in mass by an order of magnitude (*Aeshna multicolor*, *Anax junius*, *Libellula comanche*, *L. luctuosa*, *L. saturata*, *Macrodiplox balteata*, *Pachydiplax longipennis*, *Pantala flavescens*, *P. hymenaea*, *Tramea lacerata*, *T. onusta*). Animals were flown in 7 different oxygen concentrations ranging from 30% to 2.5% to assess the sensitivity of their behaviour and flight metabolic rates to oxygen. I also assessed the oxygen-sensitivity of flight in low-density air (nitrogen re-

placed with helium), to increase the metabolic demands of hovering flight. Lowered atmosphere densities did induce higher metabolic rates. Flight behaviours but not flight metabolic rates were highly oxygen-sensitive. A significant interaction between oxygen and mass was found for total flight time, with larger dragonflies varying flight time more in response to atmospheric oxygen. This study provides some support for the hypothesis that larger insects are more challenged in oxygen delivery, as predicted by the oxygen limitation hypothesis for insect gigantism in the Paleozoic." (Authors)] Address: not stated

10540. Herzog, S.K.; Martínez, R.; Jørgensen, P.M.; Tiessen, H. (eds) (2011): Climate change and biodiversity in the tropical Andes. Inter-American Institute for Global Change Research (IAI) and Scientific Committee on Problems of the Environment (SCOPE). ISBN: 978-85-99875-05-6: 348 pp. (in English) [The paper includes a passing reference to Odonata: "In rivers of the Ecuadorian páramo, dominant groups include Planariidae (Turbellaria), Oligochaeta, Hyalellidae (Amphipoda), Baetidae (Ephemeroptera), Hydroptilidae, Limnephilidae (Trichoptera), Chironomidae, Simuliidae (Diptera), and Elmidae (Coleoptera) (Jacobsen 2008). In general, diversity decreases with elevation for these orders, and this pattern is particularly pronounced in Hemiptera and Odonata, which do not occur in the high zone of Ecuador (Encalada 1997) despite being very diverse in the lowlands (Jacobsen 2004). Several important families, such as Gripopterygidae (Plecoptera), Anomalosychidae, and Limnephilidae (both Trichoptera), on the other hand are restricted to high-Andean elevations." (Authors)] Address: <http://www.icsu-scope.org/Latest%20News/CCampBiodiversityinTropicalAndes.pdf>

10541. Honkanen, M. (2011): Perspectives on variation in species richness: area, energy and habitat heterogeneity. *Jyväskylä Studies in Biological and Environmental Science* 219: 46 pp. (in English) ["Species richness (i.e. number of species) tends to differ from one area to another. Two major patterns observed in the nature are 1) species-area relationship which states that larger areas contain usually larger species richness, and 2) species-energy relationship which postulates that the amount of energy encompassed in the area determines species richness. Even though both of these relationships may result from multiple mechanisms, which may be also intertwined, for instance through heterogeneity of habitats, they are not often studied simultaneously. In addition to broaden our theoretic knowledge understanding the mechanisms that produce species richness could help us to protect biodiversity. I studied the effects of area, energy, and habitat heterogeneity on species richness and related adjacent mechanisms in three taxa. My results showed that bird species richness was determined mainly by total energy (measured as tree volume and growth) in an area through its effects on the number of individuals. Bird species richness was further limited by the density of energy and its spatial dispersion, most likely because increased habitat heterogeneity benefits specialists. Also aquatic macrophyte species richness was determined by a multiple of factors and one of them was potential productivity (a measure of energy). Whilst potential productivity increased species richness, species turnover showed a unimodal relationship with it. Thus, potential productivity may decrease the regional species diversity as the species turnover between lakes may be reduced. Finally, Odonata species richness was determined by habitat heterogeneity (measured as aquatic macrophyte species

density), and the relationship was shaped by just a handful of common species. My results help to build up the theoretic knowledge about the mechanisms behind species richness patterns and have important implications for species conservation." (Author)] Address: Honkanen, Merja, University of Jyväskylä, Department of Biological and Environmental Science, P.O. Box 35, FI-40014 University of Jyväskylä, Finland

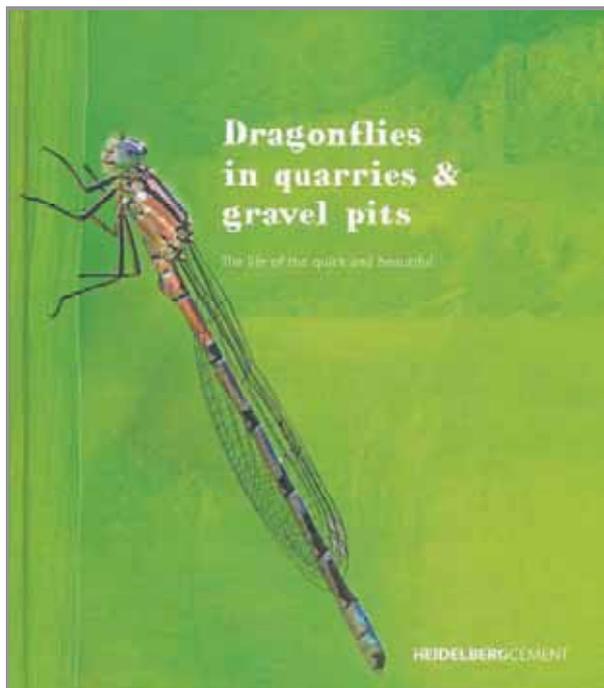
10542. Horn, M.Y.; Rodrigues, K.A.; Anzotegui, L.M. (2011): Primeras evidencias de interacción insecto-planta en el Neógeno del noroeste de la Argentina. *Rev. bras. paleontol.* 14(1): 87-92. (in Portuguese, with English summary) ["This study provides the first evidence for plant-insect associations from fossil leaf impressions of the San José and Palo Pintado formations, dated as middle and upper Miocene age, from northwestern Argentina. The size, shape and arrangement of leaf damage on several plant hosts consists of various chew marks made by mandibulate insects occurring along the leaf blades of *Malvaciphyllum quenquiadensis* Anzotegui and *Cristalli* (Malvaceae), hole feeding along the leaf edge of *Nectandra saltensis* Anzotegui (Lauraceae), mines within the internal tissues of *M. quenquiadensis*, and oviposition scars in *Cedrela* sp. (Meliaceae). Based on specific, identifiable features of the plant damage, the likely producers responsible for this damage include external foliage feeders such as Orthoptera, Phasmoptera and Coleoptera; leaf miners from the Lepidoptera but possibly Hymenoptera and Diptera; and ovipositing insects representing the Odonata. Many of these insect groups were previously known from earlier Paleogene deposits of Argentina, and similar ovipositional damage has been documented from the early Eocene of Rio Negro and middle Eocene of Chubut in Patagonia, indicating geochronological continuity and occurrence in marsh and open woodland plant communities under warm and seasonal climatic conditions." (Authors)] Address: Horn, Marcicel Yanina, Secretaría General de Ciencia y Técnica, Universidad Nacional del Nordeste, Centro de Ecología Aplicada del Litoral, Ruta 5, km 2,5 3400, Corrientes, Argentina. E-mail: yaninahorn@hotmail.com

10543. Horn, R. (2011): Zwei Funde der Südlichen Heide libelle *Sympetrum meridionale* (Sélys 1841) in Nordhessen. *Libellen in Hessen* 4: 48-49. (in German) [24-VIII-2006, NSG near Felsberg-Altenburg, Hessen, Germany; 12-IX-2010, Riedforst near Melsungen, Hessen, Germany] Address: Horn, R., Aussiedlerhof 2, 34212 Melsungen-Kirchhof, Germany. E-mail: Reinhard-Horn@t-online.de

10544. Infante-Rodriguez, D.A.; Novelo-Gutierrez, R.; Mercado, G.; Williams, T. (2011): Spinosad toxicity to *Simulium* spp. larvae and associated aquatic biota in a coffee-growing region of Veracruz State, Mexico. *Journal of Medical Entomology* 48(3): 570-576. (in English) ["Spinosad is a naturally derived insecticide that has shown potential as a mosquito larvicide. To determine the activity of spinosad against blackflies, late-instar larvae from a community comprising *Simulium tritatum* (63.6%) and seven other species, including three known vectors of onchocerciasis in Mexico (*S. metallicum*, *S. ochraceum*, and *S. callidum*), were subjected to concentration-mortality laboratory bioassays following World Health Organization guidelines. Cephalic capsule measurements confirmed the relatively homogeneous distribution of experimental larvae. The 50% lethal concentration of spinosad was estimated at 1.48 ppm spinosad (95% confidence interval: 1.07-2.33) for a 10-min exposure period, whereas

larvae treated with 0.05 ppm of the organophosphate temephos experienced 61% mortality. Immature aquatic insects were identified to genus and tested for their susceptibility to spinosad in the laboratory. After exposure to 12 ppm spinosad for 10 min, ephemeropterans, odonates, trichopterans, and hemipterans did not experience significantly increased mortality over that of untreated controls, whereas a significant increase in mortality was observed in spinosad-treated Plecoptera (P 0.001). Tilapia and trout fry exposed to 12 ppm spinosad for 10 min did not experience increased mortality at 24-h postexposure over that of the controls. We conclude that spinosad is less toxic than temephos to these blackfly species, but is likely to have a low impact on nontarget members of the aquatic community." (Authors)] Address: Williams, T., Instituto de Ecología AC, AP 63, Xalapa, Veracruz 91070, Mexico

10545. INULA (2011): Dragonflies in quarries & gravel pits. The life of the quick and beautiful. Biodiversity in mineral extraction sites 1: 98 pp. (in English) [This splendid illustrated book combines general information on dragonflies exemplified on typical habitats of gravel pits. On page 94/95 a list of 48 species from 16 localities studied in 2010 and scattered over Germany (Niedersachsen, Baden-Württemberg, Nordrhein-Westfalen, Mecklenburg-Vorpommern, Bayern) is presented. A German version of the book is also available.] Address: HeidelbergCement AG, Berliner Straße 6, 69120 Heidelberg, Germany. E-mail: michael.rademacher@htc-gmbh.com

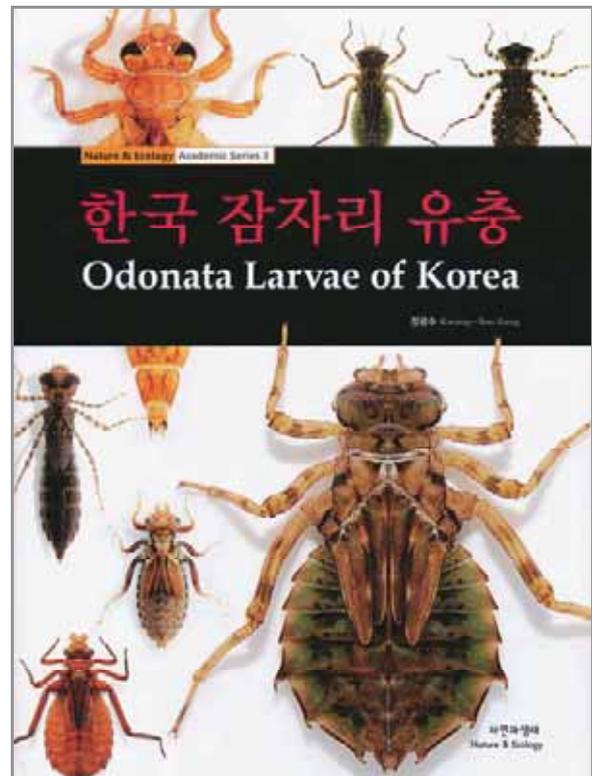


10546. Itoh, S. (2011): A new record of *Sympetrum speciosum speciosum* Oguma, 1915 from Miyagi Prefecture, the northern Honshū, Japan. Tombo 53: 99-100. (in Japanese) [14-X-2010] Address: Itoh, S., Kinoshita 4-9-7-102, Wakabayashi-ku, Sendai-shi, Miyagi, 984-0047 Japan

10547. Janananda, B.G. (2011): Characterization of changes in Megalagrion opsin genes to detect signatures of selection. Open Access Theses. Paper 259: Master of Science thesis, Department of Biology (Arts and Sciences), University of Miami. 59 pp. (in English) ["Megalagrion damselflies have radiated into new breeding habitats in-

dependently at least six times in the Hawaiian archipelago, and have evolved bright body coloration numerous times. We hypothesize that these radiations are correlated with specific changes in the opsin proteins. We isolated and characterized two opsin genes from nine different Megalagrion species. The opsin phylogeny is consistent with the phylogeny based on breeding habitat preference of Megalagrion species supporting the correlation between the evolutionary changes of vision and habitat shifts. dN/dS ratios of opsin sequences show that these genes are evolving under purifying selection, though some sites of the opsin genes might be evolving under positive selection. Two terrestrial-breeding Megalagrion species show higher rates of opsin gene evolution that are correlated with a rapid transformation in their breeding habitats from aquatic to terrestrial. These results support the hypothesis that opsin gene evolution has played a role in Megalagrion radiation in Hawaii." (Author)] Address: E-mail: bhagya@bio.miami.edu

10548. Jung, K.-S. (2011): Odonata Larvae of Korea. Nature & Ecology. Academic Series 3. 400 pp (In Korean). Orders should be directed to: E-mail: econature@econature.co.kr or the author: tootootoo@korea.com



10549. Kalkman, V.J.; Villanueva, R.J.T. (2011): A synopsis of the genus *Rhinagrion* with description of two new species from the Philippines (Odonata: Megapodagrionidae). International Journal of Odonatology 14(1): 11-31. (in English) ["A synopsis is given of the knowledge of the genus *Rhinagrion*. The males of two new species are described from the Philippines: *R. schneideri* sp. nov. (holotype: Samar Island, Hinubangan, San Isidro, 31 March–5 April 1992) and *R. reinhardi* sp. nov. (holotype: Mindanao Island, Surigao del Sur, Carmen, 24-IV-1995). *Rhinagrion yokoi* is synonymized with *R. hainanense* and *R. viridatum* is removed from synonymy with *R. mimma*. A key to the males is given and the distribution of all species is discussed and maps are provided. The scant information available on behaviour and habitat is summarized." (Authors)] Address: Kalkman, V.J., European In-

vertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

10550. Kalnins, M.; Bernard, R.; Mikelson, I. (2011): Protected aquatic insects of Latvia – *Nehalennia speciosa* (CHARPENTIER, 1840) (Odonata: Coenagrionidae). *Latvijas entomologs* 50: 41-54. (in English) ["*N. speciosa* "is protected by the Regulations of the Cabinet of Ministers of Latvia. Published and all known unpublished data have been used to present and analyse its distribution, population size, habitat selection and conservation status. The distribution of *N. speciosa* has been mapped using a basic grid of 5x5 km squares in the Baltic grid system. In total, *N. speciosa* has been recorded from 36 squares and 38 localities occurring sparsely or in small concentrations over a large part of the country apart from its western territories. The majority of the recent localities are situated in northeastern and southeastern Latvia. The known pattern of the species' distribution partly results from the abundance and density of appropriate habitats and possibly a climatic influence. However, this also may be a consequence of an insufficient and uneven odonatalogical exploration of the country. The majority of the species' populations seem to be small. *N. speciosa* has mostly been recorded in primary habitats in Latvia, such as complexes of lakes with *Sphagnum* fens, transition mires and bogs, with a diverse, not only small, size of water body. *N. speciosa* inhabits spatially restricted fragments of these habitats, i.e. a transition-mire zone bordering the open water table or fen and boggy patches with a higher water level, both habitats overgrown with a specific vegetation predominated by narrow-leaved sedges. Post-excavation peaty pools in degraded raised bogs with natural regeneration play a major role among rare secondary habitats of the species. The flight season of the *N. speciosa* in Latvia ranges mainly from mid June to late July. The conservation status of the species in Latvia is described and conservation measures are suggested." (Authors)] Address: Kalnins, M., Nature Conservation Agency, Siguldas novads, Baznīcas iela 7, LV-2150, Sigulda, Latvia. E-mail: martins.kalnins@daba.gov.lv

10551. Kawashima, I.; Sasamoto, A.; Phan, Q.T.; Do, M.C. (2011): First discovery and description of female and larva of *Rhinagrion hainanense* Wilson and Reels, 2001 (= *R. yokoi* Sasamoto, 2003) (Zygoptera: Megapodagrionidae) from Vietnam. *Tombo* 53: 93-99. (in English) ["In this paper, we revise *Rhinagrion yokoi* Sasamoto, 2003 as a junior synonym under *R. hainanense* Wilson & Reels, 2001. We describe the female and larval morphology of *R. hainanense* for the first time. The larval characteristics of *R. yokoi* agree with those of the genus *Rhinagrion*, and can be distinguished from the allied species, *R. mima* (Karsch, 1891), by the caudal gills. The male marking variation is also briefly mentioned." (Authors)] Address: Phan Quoc Toan, Vietnam National Museum of Nature, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam. E-mail: phanquoctoan84@gmail.com

10552. Khan, F.R.; Irving, J.R.; Bury, N.R.; Hogstrand, C. (2011): Differential tolerance of two *Gammarus pulex* populations transplanted from different metallogenic regions to a polymetal gradient. *Aquatic Toxicology* 102(1-2): 95-103. (in English) ["The River Hayle, Cornwall, UK exhibits pronounced Cu and Zn concentration gradients which were used to compare the metal handling abilities of two populations of *Gammarus pulex* (Crustacea: Amphipoda). One population was native to the Hayle region (Drym) and presumably has been historically impacted

by elevated Cu and Zn levels, whilst naïve gammarids were collected from the River Cray, Kent, UK. Both populations were subject to a 32 day in situ exposure at four R. Hayle sites (Drym, Godolphin, Relubbus and St. Erth). Mortality (LT50), Cu and Zn accumulation and sub-cellular distribution, and oxidative stress (malondialdehyde production) increased with the expected Cu and Zn bioavailabilities at the four sites (i.e. Godolphin > Relubbus > St. Erth > Drym). The naïve population experienced greater metal induced effects in terms of Cu and Zn accumulation, oxidative stress responses and lower LT50s. Analysis of Cu and Zn sub-cellular distribution, however, revealed no significant differences in metal handling. In both populations each metal was localised predominantly to the sub-cellular fraction containing metal bound to metallothionein-like proteins (MTLP) or that holding both metal-rich granules (MRG) and exoskeleton, MTLP and MRG binding being indicative of metal detoxification. However, a greater capacity for detoxified metal storage is not a mechanism implicated in the perceived tolerance of the historically impacted gammarids. Instead our results suggest that the historically impacted population was adapted for lower uptake of Cu and Zn leading to lower bioaccumulation, stress response and ultimately mortality. These results demonstrate not only the usefulness of the in situ methodology, but also that differences in population exposure history can cause significant differences in metal responses during exposure at higher concentrations." (Authors) Larvae of *Cordulegaster boltonii* settled at one of the five studied sections the river. Hydrochemical parameters at the section Relubbus of River Hayle are: heavy metals in dissolved water: Cu: 10.7 ± 0.9 Zn: 664.5 ± 43.9 ; heavy metals in sediment: Cu: 1279.6 ± 17.6 Zn: 479.2 ± 68.0 ; Total hardness: 96.6 ± 2.1 ; pH: 6.68 ± 0.03 ; Conductivity: 69.6 ± 0.1] Address: Khan, F.R., Nutritional Sciences Division, King's College London, Franklin-Wilkins Building, 150 Stamford Street, London SE1 9NH, UK.

10553. Kiauta, B. (2011): Obituary: Professor Dr Tone Wraber (1938-2010) in memoriam. *Notulae odonatologicae* 7(7): 67-68. (in English) [T. Wraber, a profiled botanist, also was interested in dragonflies, especially in the associations between plants and ovipositing odonates.] Address: Kiauta, B., P.O. Box 124, NL-5854 ZJ Bergen/LB, The Netherlands. E-mail: mb.kiauta@12move.nl

10554. Kingston, N. (2011): Checklist of protected & rare species in Ireland. Unpublished National Parks & Wildlife Service Report: 16 pp. (in English) [According to the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000 the following Odonata species are legally protected in Ireland: *Somatochlora arctica*, *Cordulia aenea*, *Coenagrion lunulatum*, *Ischnura pumilio*, and *Lestes dryas*.] Address: not stated

10555. Kiyoshi, T.; Takahashi, J.-I.; Yamanaka, T.; Tanaka, K.; Hamasaki, K.; Tsuchida, K.; Tsubaki, Y. (2011): Taxonomic uncertainty of a highly endangered brook damselfly, *Copera tokyoensis* Asahina, 1948 (Odonata: Platycnemididae), revealed by the mitochondrial gene genealogy. *Conservation Genetics* 12(3): 845-849. (in English) ["In the Japanese main islands, two brook damselfly species are sympatrically distributed. One is highly endangered damselfly, *Copera tokyoensis*, Asahina, 1948, and the other is a congeneric common species, *C. annulata* (Selys, 1863). Mitochondrial gene genealogy reconstructed by the maximum likelihood method showed that they are not reciprocally monophyletic. These two congeneric species might have experienced mitochondrial introgres-

sions possibly through hybridizations. The effect of hybridization against endangered species is generally poorly understood. Taxonomic uncertainty might also explain this situation because extremely dispersed pattern of the haplotype network could not be appeared by once or twice hybridization. Three closely located populations of *C. tokyoensis* in the Kanto district showed significant population differentiation. It might suggest the low dispersal tendency of this endangered species." (Authors)] Address: Yamanaka, T., National Institute for Agro-Environmental Sciences, 3-1-3 Kannondai, Tsukuba, 305-8604, Japan. E-mail: apple@affrc.go.jp

10556. Knijf, G. de; Flenker, U.; Vanappelghem, C.; Mancini, C.O.; Kalkman, V.J.; Demolder, H. (2011): The status of two boreo-alpine species, *Somatochlora alpestris* and *S. arctica*, in Romania and their vulnerability to the impact of climate change (Odonata: Corduliidae). *International Journal of Odonatology* 14(2): 111-126. (in English) ["It is expected that climate change will have a great impact on many species and habitats. This will be greater if populations are found at the edge of their range or are isolated, and could lead to regional extinction. Here we investigate the possible impact on two boreo-alpine dragonfly species, *Somatochlora alpestris* and *S. arctica*, at their range margins. Both species were unknown for most parts of south-eastern Europe. In 2007 we found 15 localities for *S. alpestris* and two for *S. arctica* in the Carpathian Mountains of Romania. Both species are there confined to mountain peat bogs. All localities are situated between 1300 m and 2100 m altitude, with the majority restricted to a small range between 1600 m and 1800 m. Based on the factor altitude we predict a hypothetical distribution map for *S. alpestris*. The underlying models exclusively rely on the ultimate factor "altitude" and explain more than 60% of the deviance. In addition, we assessed the impact of climate change for two scenarios: a 1.5°C temperature increase and a 3°C increase. The first resulted in altitudinal range shifts of +200 m and in a distributional shrinkage of 40%, the latter corresponds to an upward range shift of 600 m and a loss of 90% of the area. Habitat specialists, especially those at their margins of distribution, are hardly able to keep pace with climate change. It seems unlikely that mountain peat bogs will develop at rates comparable to those of current climate change. This may effect regional extinctions of boreo-alpine species." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstr. 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

10557. Knijf, G. De (2011): Trip report of the excursion to the National Park Weerribben (The Netherlands) on 7th of May 2011. *Libellenvereniging Vlaanderen - nieuwsbrief* 5(2): 13-15. (in Dutch, with English summary) ["We first visited a the freely accessible part of the Weerribben, called Woldlakebos. Here we found two males of *Sympecma paedisca*, several individuals, most of them tenerals of *Aeshna isocetes*, *Leucorrhinia pectoralis* and *L. rubicunda*. The most common species here were *Coenagrion pulchellum*, *Brachytron pratense* and *Cordulia aenea*. In the afternoon, we had the chance to go to a strictly protected part of the Weerribben where more than 50 adults of *Coenagrion armatum* could be observed. Other interesting species here were *Sympecma paedisca* and *Leucorrhinia pectoralis*." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

10558. Kosterin, O.E.; Skalon, N.V.; Skalon, T.N. (2011): Interesting findings of Odonata in the Kuznetskiy Alatau

Mts. north-eastern foothills. *Amurian zoological journal* III(2): 124-127. (in Russian, with English summary) ["A small collection taken on July 3, 2010 at Lake Ishkol' situated at NE foothills of the Kuznetskiy Alatau Mts., in Sharypovo District of Krasnoyarskiy Krai Province, yielded 8 Odonata species of which 4 were important faunistic findings: the known Siberian ranges of the western species *Coenagrion pulchellum*, *Leucorrhinia albifrons* were extended to the north-east and the earlier presumed Central Siberian range disjunctions were filled for *Coenagrion glaciale* and *Leucorrhinia caudalis*." (Authors) The records also include the following taxa: *Enallagma cyathigerum* risi, *Erythromma najas*, *Leucorrhinia rubicunda*, and *Libellula quadrimaculata*.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

10559. Kosterin, O.E. (2011): Odonata of the Cambodian coastal regions revisited: beginning of dry season in 2010. *International Dragonfly Fund - Report* 40: 1-108. (in English) ["Results of the odonatological survey of the coastal SW regions of Cambodia on November 28 - December 11, 2001, are presented, including field notes, enumeration of all records by locality, discussion of interesting specimens and their taxonomy and of seasonality aspects. Fifteen (14 named) species have been added to the known fauna of Cambodia: *Aristocypha fenestrella* (Rambur, 1842), *Rhinagrion viridatum* Fraser, 1938, *Letes elatus* Hagen in Selys, 1862, *L. platystylus* Rambur, 1842, *Aciagrion tillyardi* Laidlaw, 1919, *Agriocnemis f. femina* (Brauer, 1868), *Archibasis viola* Lieftinck, *Ceragrion calamineum* Laidlaw, 1951, *Mortonagrion aborense* (Laidlaw, 1914), *M. falcatum* Lieftinck, 1934, *Pseudagrion microcephalum* (Rambur, 1842), 1948, *Paragomphus capricornis* (Förster, 1914), *Hemicordulia undescr. spec.*, *Macrodiplax cora* (Brauer, 1867), *Nannophya pygmaea* Rambur, 1842, plus a provisionally identified *Ceragrion indochinense* Asahina, 1976. The country list now achieves 106 named species (not counting *Prodasi-neura verticalis sensu* Asahina, 1983, *C. indochinense* and *Hemicordulia* sp.). *Coeliccia megumii* Asahina, 1984 is synonymised with *C. kazukoae* Asahina, 1984. The differences between *Ceragrion olivaceum* Laidlaw, 1914 and *C. calamineum* Lieftinck, 1951 are discussed." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

10560. Kouamé, M.K.; Dietoa, M.Y.; Edia, E.O.; Da Costa, S.K.; Ouattara, A.; Gourène, G. (2011): Macroinvertebrate communities associated with macrophyte habitats in a tropical man-made lake (Lake Taabo, Côte d'Ivoire). *Knowledge and Management of Aquatic Ecosystems* 400, 03: 18 pp. (in English, with French summary) ["An ecological study was done on Lake Taabo with the main objective of characterising macroinvertebrate communities associated with the microhabitats created mainly by *Eichhornia crassipes* and other littoral native macrophytes. We sampled organisms in patches of those aquatic macrophytes. Also, some abiotic variables (temperature, transparency, turbidity, pH, TDS, conductivity, dissolved oxygen, NH, NO, NO₂, PO and SiO) were measured. Overall, forty-three taxa of macroinvertebrates were identified. Ten of them were exclusively associated with water hyacinth while five were only associated with littoral macrophytes. Macroinvertebrate taxa with some of the highest family richness were Gastropoda, Coleoptera, He-

teroptera, Odonata and Diptera. The taxon with highest density in both microhabitats was Chironomidae. Although higher values of taxonomic richness (Rs), the Shannon index (H') and evenness (J) were obtained with the water hyacinth habitat, significant differences between the two microhabitats were not observed. Canonical Correspondence Analysis revealed that samples of *E. crassipes* collected in the dry season were characterised by Gastropoda and Odonata, as well as higher values of transparency and ammonia-nitrogen. Baetidae, Hydrophilidae, Chironomidae, Ceratopogonidae, Coenagrionidae, Naucoridae and Ostracoda were most abundant in both *E. crassipes* and littoral macrophyte habitats during the rainy season. This season was characterised by higher levels of nitrates and conductivity." (Author) Taxa are treated at the family level.] Address: Kouamé, M.K., Laboratoire d'Environnement et de Biologie Aquatique (LEBA), UFR – Sciences et Gestion de l'Environnement, Université d'Abobo-Adjamé, Abidjan, Côte d'Ivoire. E-mail: martinkouame@yahoo.fr

10561. Křoupalová, V.; Bojková, J.; Schenková, J.; Pařil, P.; Horsák, M. (2011): Small-scale distribution of aquatic macroinvertebrates in two spring fens with different groundwater chemistry. *International Review of Hydrobiology* 96(3): 235-256. (in English) ["We examined responses of macroinvertebrate assemblages to environmental and temporal variations along spring source-spring brook transects in two fen habitats, sharply differing in groundwater chemistry, and compared the patterns among individual taxonomical groups. We hypothesised a different importance of environmental heterogeneity and seasonal changes primarily linked to strong tufa precipitation, which causes stronger environmental filtering in the calcareous fen. In concordance, we observed that assemblages of the more homogenous calcareous fen primarily changed over time, due to seasonal shifts in source availability and favourable conditions. Their spatial distribution was determined by the amount of CPOM, tufa crusts and temperature variation, but a substantial part of the assemblage exhibited spatial uniformity (Plecoptera, Clitellata, and especially Trichoptera and Diptera). The assemblages of the more heterogeneous Sphagnum-fen were primarily driven by water pH and substrate and the season was a notably weaker predictor. We found that different macroinvertebrate groups can display various responses to the measured variables shaping the overall pattern obtained based on the whole community. Further, greater environmental heterogeneity can result in temporally stable species distribution patterns even at very small spatial scales within a single site." (Authors) The study includes data on *Aeshna cyanea*, *Cordulegaster boltonii*, and *Pyrrosoma nymphula*.] Address: Kroupalová, Vendula, Department of Botany and Zoology, Faculty of Science, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic. E-mail: kroupalova@seznam.cz

10562. Kuitunen, K.; Gorb, S.N. (2011): Effects of cuticle structure and crystalline wax coverage on the coloration in young and old males of *Calopteryx splendens* and *Calopteryx virgo*. *Zoology* 114(3): 129-139. (in English) ["Male secondary sexual characters, such as colour patterns, are often investigated at the macroscale level. However, micro- and nanoscale levels of morphological investigations may reveal functional features responsible for a particular coloration, thus providing more information, e.g., about the condition dependence of male sexual characters. The aim of this paper was to investigate cuticle colour and its structure in males of two con-

generic damselfly species, *Calopteryx splendens* and *Calopteryx virgo*, and reveal possible colour changes with age. According to spectrometer measurements, *C. splendens* males were bluer and had a greater saturation of blue in their abdomen than *C. virgo* males, which were, in turn, greener and had more green saturation. Although the two species differed in the number of structural layers and the spacing of the layers, it seems that intactness of the wax crystals covering the epicuticle was most often the morphological trait which was related to the colour parameters measured from males' cuticles. The effect of the crystalline wax coverage on cuticle colour was also confirmed by removing the wax using chloroform: after the treatment, the hue was bluer, the cuticle had a greater brightness and greater blue saturation, but less green saturation. Age differences influencing the colour and structure of the cuticle were also observed: older males had more blue and green saturation and had more intact wax coverage than did younger males. Although multilayer reflection should be responsible for the iridescent colour of males, our results suggest that wax coverage plays an important role in the colour tuning of the male cuticle. This may have a considerable signal function, indicating the males' viability to competing males or to females." (Authors)] Address: Kuitunen, Katja, Centre of Excellence in Evolutionary Research, Department of Biological and Environmental Sciences, University of Jyväskylä, P.O. Box 35, FI-40014 Jyväskylä, Finland. E-mail: katja.m.m.kuitunen@jyu.fi

10563. Lacerda, C.H.F.; Hayashi, C.; Galdioli, E.M.; Fernandes, C.E.B. (2011): Predation of *Piaractus mesopotamicus* and *Oreochromis niloticus* larvae by *Pantala flavescens* with different length classes. *Acta Scientiarum. Biological Sciences* 33(4): 377-382. (in English, with Portuguese summary) ["We used 120 larvae of *P. mesopotamicus*, 120 of *O. niloticus*, and also 24 larvae of *P. flavescens*, distributed in 24 aquariums. An aquarium (2 L) containing one larvae of Odonate and 10 larvae of fish were considered an experimental unit. After the beginning, each three hours (18:00, 21:00, ..), the remnant larvae of fish (alive) in each experimental unit was quantified, and we replaced the consumed larvae, so that we always had 10 larvae of fish at each aquarium after each counting. For both fish species, there was a slight increase in consumption by the Odonate with intermediate size, but the values did not differ statistically ($p > 0.05$). Larvae of Odonate in the treatments with greater length presented a lower consumption ($p < 0.05$) than in other treatments." (Authors)] Address: Lacerda, C.H.F., Laboratório de Ecologia e Gerenciamento de Ecossistemas Costeiros e Estuarinos, Depto de Oceanografia, Univde Federal de Pernambuco, Cidade Universitária, 50740-550, Recife, Pernambuco, Brazil. E-mail: lacerdachf@hotmail.com

10564. Lagrue, C.; Azémar, F.; Besson, A.; Lamothe, S.; Lecerf, A. (2011): Novel ligature methods for studying sublethal effects of sit-and-wait predators: test using *Cordulegaster boltonii* (Donovan, 1807) larvae (Anisoptera: Cordulegasteridae). *Odonatologica* 40(2): 95-103. (in English) ["A novel method of labial palp ligature was tested as a substitute for palp ablation for studying sublethal effects of larvae of *C. boltonii* on prey populations and their consequences for ecosystem functioning. Two alternative types of ligature were designed to test for neutral or aggressive, but non-lethal, predator-prey interaction effects. Ligature efficiency in preventing prey capture was very high and the effects on larval survival and

emergence success were negligible. Potential advantages and drawbacks, compared to other methods, are discussed. The results indicate that this fully reversible method should be applied whenever possible, especially for naturally rare or endangered odonate species." (Authors)] Address: Lagrue, C. Université de Toulouse, UPS, INP, EcoLab (Laboratoire d'écologie fonctionnelle), 29 rue Jeanne Marvig, 31055 Toulouse, France. E-mail: clement.lagrue@gmail.com

10565. Lambret, P.H.; Stoquert, A. (2011): Diel pattern of activity of *Lestes macrostigma* at a breeding site (Odonata: Lestidae). *International Journal of Odonatology* 14(2): 175-191. (in English) ["Monitoring methods always recommend gathering data during the maximal activity of adults. Hence monitoring the threatened *Lestes macrostigma* requires knowledge of its activity pattern. Dragonfly "activity" is ambiguous and its intensity can be assessed in different ways, including by the threshold of response to a predator stimulus, i.e. "awareness". We studied the daily pattern of activity of *L. macrostigma* at the breeding site by monitoring the frequencies of behaviours, especially those of different flights, flight duration and speed, and awareness. We also assessed the abundance together with the probability to detect the species. The pattern of behaviour was characterized by reproduction but also feeding and roosting. Flight activity was more intense in early morning for males, around midday for pairs, and in the evening for males and females. Flight speed was highest around midday. These patterns were related to ambient temperatures and to a trade-off between the needs to mate and to feed. Awareness was almost constant all day long, suggesting new insights on daily activity variations in the Odonata, especially when perching. Slight differences between males and females indicated opposite trends. The pattern of abundance was singularly trimodal. This abundance depends on the true presence at the breeding site and to a probability of detection. The timing of monitoring is therefore not to be related to the activity per se, but to the abundance of adults. We recommend gathering data on *L. macrostigma* during early morning." (Authors)] Address: Lambret, P.H., Marais du Vigueirat, 13104 Mas-Thibert, France. E-mail: philambret@hotmail.com

10566. Lamond, B. (2011): Arrow Clubtail in Waterworks Park - Part 2. *The Wood Duck* 64(6): 132. (in English) [*Stylurus spiniceps*; 18-IX-2010, Waterworks Park, Brantford, Ontario, Canada.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

10567. Lamond, B. (2011): Arrow Clubtail in Waterworks Park Brantford - Part 1. *The Wood Duck* 64(5): 109. (in English) [female *Stylurus spiniceps*, 6-IX-2010, Grand River in Brantford, Ontario Canada.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

10568. Lamond, B. (2011): Mottled Darner at Point Pelee National Park. *The Wood Duck* 64(7): 154-155. (in English) [*Aeshna clepsydra*, 9-X-2010, Point Pelee National Park, Ontario, Canada.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

10569. Lamond, B. (2011): Four species of Saddlebags at Point Pelee National Park. *The Wood Duck* 64(9): 206-207. (in English) [8-X-2010, Point Pelee, Ontario, Canada; records of the following species are documented: *Anax junius*, *Libellula pulchella*, *Pachydiplax longipennis*, *Erythemis simplicicollis*, *Sympetrum vicinum*, *S. corruptum*, *Pantala flavescens*, *P. hymenaea*, *Tramea calverti*, *T. lac-*

erata, *T. carolinea*, *Tramea onusta*.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

10570. Leggett, R.; Kirchoff, B.K. (2011): Image use in field guides and identification keys: review and recommendations. *AoB PLANTS* 2011 plr004 doi:10.1093/aob-pla/plr004: 37 pp. (in English) ["Background and aims: Although illustrations have played an important role in identification keys and guides since the 18th century, their use has varied widely. Some keys lack all illustrations, while others are heavily illustrated. Even within illustrated guides, the way in which images are used varies considerably. Here, we review image use in paper and electronic guides, and establish a set of best practices for image use in illustrated keys and guides. Scope: Our review covers image use in both paper and electronic guides, though we only briefly cover apps for mobile devices. With this one exception, we cover the full range of guides, from those that consist only of species descriptions with no keys, to lavishly illustrated technical keys. Emphasis is placed on how images are used, not on the operation of the guides and key, which has been reviewed by others. We only deal with operation when it impacts image use. Main points: Few illustrated keys or guides use images in optimal ways. Most include too few images to show taxonomic variation or variation in characters and character states. The use of multiple images allows easier taxon identification and facilitates the understanding of characters. Most images are usually not standardized, making comparison between images difficult. Although some electronic guides allow images to be enlarged, many do not. Conclusions: The best keys and guides use standardized images, displayed at sizes that are easy to see and arranged in a standardized manner so that similar images can be compared across species. Illustrated keys and glossaries should contain multiple images for each character state so that the user can judge variation in the state. Photographic backgrounds should not distract from the subject and, where possible, should be of a standard colour. When used, drawings should be prepared by professional botanical illustrators, and clearly labelled. Electronic keys and guides should allow images to be enlarged so that their details can be seen. [...] Fig. 5 Facing pages from *Damselflies of Chicagoland* (Garrison 2010) showing the use of marginal coloured bands (Table 1: Best Practice 2) to indicate seasonal appearance (left margin of left page), species group (lower right corner of right page) and size (upper right corner of right page). The solid rectangle in the size band indicates the minimum body length. The solid and hashed bands, taken together, indicate the maximum length." (Authors)] Address: Kirchoff, B.K., Dept Biology, Univ. of North Carolina at Greensboro, PO Box 26170, Greensboro, NC 27402, USA. E-mail: kirchoff@uncg.edu

10571. Lenkungsgruppe des AK Libellen in Hessen (2011): Aufruf zur Suche nach der Gefleckten und der Schwarzen Heidelibelle (*Sympetrum flaveolum*, *S. danae*). *Libellen in Hessen* 4: 59. (in German) [*Sympetrum danae* and *S. flaveolum* seem to suffer significant depression in regional occurrence. The members of the dragonfly working group in Hessen, Germany are asked to give special emphasis on both species during field studies.] Address: c/o Stübing, S., Am Eichwald 27, 61231 Bad Nauheim. E-mail: stefan.stuebing@gmx.de

10572. Letsch, H.O.; Kjer, K.M. (2011): Potential pitfalls of modelling ribosomal RNA data in phylogenetic tree reconstruction: Evidence from case studies in the Metazoa. *BMC Evolutionary Biology* 2011, 11:146: 12 pp. (in Eng-

lish) ["Background: Failure to account for covariation patterns in helical regions of ribosomal RNA (rRNA) genes has the potential to misdirect the estimation of the phylogenetic signal of the data. Furthermore, the extremes of length variation among taxa, combined with regional substitution rate variation can mislead the alignment of rRNA sequences and thus distort subsequent tree reconstructions. However, recent developments in phylogenetic methodology now allow a comprehensive integration of secondary structures in alignment and tree reconstruction analyses based on rRNA sequences, which has been shown to correct some of these problems. Here, we explore the potentials of RNA substitution models and the interactions of specific model setups with the inherent pattern of covariation in rRNA stems and substitution rate variation among loop regions. Results: We found an explicit impact of RNA substitution models on tree reconstruction analyses. The application of specific RNA models in tree reconstructions is hampered by interaction between the appropriate modelling of covarying sites in stem regions, and excessive homoplasy in some loop regions. RNA models often failed to recover reasonable trees when single-stranded regions are excessively homoplastic, because these regions contribute a greater proportion of the data when covarying sites are essentially downweighted. In this context, the RNA6A model outperformed all other models, including the more parametrized RNA7 and RNA16 models. Conclusions: Our results depict a trade-off between increased accuracy in estimation of interdependencies in helical regions with the risk of magnifying positions lacking phylogenetic signal. We can therefore conclude that caution is warranted when applying rRNA covariation models, and suggest that loop regions be independently screened for phylogenetic signal, and eliminated when they are indistinguishable from random noise. In addition to covariation and homoplasy, other factors, like non-stationarity of substitution rates and base compositional heterogeneity, can disrupt the signal of ribosomal RNA data. All these factors dictate sophisticated estimation of evolutionary pattern in rRNA data, just as other molecular data require similarly complicated (but different) corrections." (Authors)] Address: Letsch, H.O., Zoologisches Forschungsmuseum Alexander Koenig, Zentrum für molekulare Biodiversitätsforschung, Adenauerallee 160, 53113 Bonn, Germany. E-mail: h.letsch.zfmk@uni-bonn.de

10573. Li, Y.-j.; Nel, A.; Ren, D.; Pang, H. (2011): A new genus and species of hawk dragonfly of uncertain affinities from the Middle Jurassic of China (Odonata: Aeshnoptera). *Zootaxa* 2927: 57-62. (in English) ["The new aeshnopteran genus and species *Sinocymatophlebiella hastinercus* is described from the Middle Jurassic Jiulongshan Formation of Inner Mongolia. It shows important similarities with the Jurassic genus *Cymatophlebiella* from Karatau, suggesting they could belong to the same family, but the latter genus is too poorly known to accurately establish its affinities. The present discovery supports the evolutionary scenario of a Jurassic rapid and massive diversification of the Aeshnoptera, followed by important extinctions during the Late Mesozoic." (Authors)] Address: Ren, D., College of Life Sciences, Capital Normal Univ. Beijing 100037, China. E-mail: rendong@mail.cnu.edu.cn

10574. Lin, S.-C.; Huang, C.-C.; Chiu, C.-H.; Yang, P.-S.; Shieh, S.-H. (2011): Relationships between water quality variables and benthic invertebrate assemblages in mountain ponds of northeastern Taiwan. *Taiwan Journal of Biodiversity* 13(1): 37-51. (in Chinese, with English sum-

mary) ["A seasonal survey of water quality and benthic macroinvertebrates was conducted for a mountain lake Chia-Lo and three mountain ponds, Che-Tui, Hao-Mai, and Wei-Tan, in the northeastern Taiwan, 2002 to 2003. A total of 14,719 specimens of benthic macroinvertebrates were collected. They were consisted of 22 taxa, of that seven taxa belonged to Odonata, six taxa to Diptera, three taxa to Tricoptera, two taxa to each of Hemiptera and Coleoptera, and a taxon to each of Oligochaeta and Ephemeroptera. *Notonecta saramao* and *Sympetrum speciosum taiwanum* were found to be the endemic species. Relationships between the water quality and the benthic macroinvertebrate assemblages were assessed with the coinertia analysis. The results showed that turbidity and ammonia were related to water saprobity, and pH and total hardness to water acidification. They were the most important water quality variables that explained the formation and distributional pattern of macroinvertebrate assemblages in the mountain ponds. Oligochaeta was recommended as a bio-indicator for the water saprobity, and *Dicrotendipes* sp. and *Cloeon* sp. for water acidification." (Authors) The following odonate taxa have been sampled: *Ceragrion fallax fallax*, *Lestes cyaneus*, *Aeshna petalura taiyal*, *Anax nigrofasciatus*, *Sympetrum speciosum taiwanum*, *Orthetrum japonicum internum*, and *O. melania*.] Address: Shieh, S.-H., Dept of Ecology, Providence University, Taichung, Taiwan. E-mail: shshieh@pu.edu.tw

10575. Lingenfelder, U. (2011): *Coenagrion scitulum* im südwestdeutschen Raum – eine aktuelle Übersicht (Odonata: Coenagrionidae). *Libellula* 30(1/2): 51-64. (in German, with English summary) ["Recently, *C. scitulum* has been expanding strongly in southwestern Germany and adjacent regions, as evidenced by lots of new records in the last five years (2006-2010). This expansion can be regarded as another example of Mediterranean animals expanding northwards, caused by climatic change. Including the summer of 2010, records of *C. scitulum* are known from 34 localities in Rheinland-Pfalz (2006-2010), eight localities in the Saarland (2008-2010), four localities in Hessen (2008, 2010) and five localities in Alsace, north-eastern France (2007-2009). In 2010 the species was also rediscovered in Baden-Württemberg. The flight period of *C. scitulum* in southwestern Germany starts in mid-May and ends in early August. Sites with reproduction are predominantly stillflat and warm standing waters with rich aquatic vegetation.] Address: Lingenfelder, U., Seeburgstr. 1, 67716 Heltersberg, Germany. E-mail: u.lingenfelder@vr-web.de

10576. Lorenzo-Carballa, M.O.; Beatty, C.D.; Haitlinger, R.; Valdecasas, A.G.; Utzeri, C.; Vieira, V.; Cordero-Rivera, A. (2011): Larval aquatic and terrestrial mites infesting parthenogenetic *Ischnura hastata* (Odonata: Coenagrionidae) from the Azores islands. *Experimental and Applied Acarology* 54(3): 225-241. (in English) ["We report here the prevalence of parasitism by water mites (*Arrenurus* sp.) and terrestrial mites (*Leptus killingtoni*) on parthenogenetic *I. hastata* from the Azores islands. *L. killingtoni* was only found on the island of Pico, and the prevalence of infestation was highly variable among the different ponds studied, ranging from 0 to 41%. *L. killingtoni* was observed on three of the four odonate species from the archipelago: *I. hastata*, *I. pumilio*, and *Sympetrum fonscolombii*, all of them new hosts for this species. Aquatic mites have been found parasitizing *I. hastata* females on the island of São Miguel. The prevalence of mite parasitism by *Arrenurus* sp. on *I. hastata* was very low, ranging from 12% (2003) to 1% (2008), and in most

of the studied ponds, no mites were found attached to females. Although *I. hastata* coexists with a sexual congener species in the Azores (*I. pumilio*), they are syntopic in only a small fraction of ponds. Therefore, a comparison between *I. hastata* and *I. pumilio* was insufficient to test the predictions of the Red Queen Hypothesis, and further research on parasitism rates in both species needs to be done. In any case, the low prevalence of mite parasitism found in the Azores, coupled with the fact that most of the populations in the archipelago are almost free from competitors and predators, could explain the persistence of these *I. hastata* parthenogenetic populations, despite their low levels of genetic variation." (Authors)] Address: Cordero Rivera, A., Depto de Ecología e Biología Animal, Univ. de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

10577. Lotfy, N.M.; Hassanein, M.A.; Abdel-Gawad, F.K.; El-Taweel, G.E.; Bassem, S.M. (2011): Detection of *Salmonella* spp in aquatic Insects, fish and water by MPN-PCR. *World Journal of Fish and Marine Sciences* 3(1): 58-66. (in English) ["Salmonellosis had become an increasing problem in industrialized countries during the last few decades. The natural habitat of *Salmonella* spp. is the gastrointestinal tract of mammals, birds and reptiles. Therefore, *Salmonella* species may reach aquatic environments through faecal contamination and it has been isolated from freshwater fish culture ponds in many countries. This accounts for the occasional detection of *Salmonella* from fish and fishery products. The present study focused on the use of some aquatic insects and fish as bioindicators for transmission of *Salmonella* in the River Nile, Egypt. Six hundred and seventy *Salmonella* isolates were isolated from aquatic insects, fish and water during the year 2009/2010. Seven hundred and ten random isolates of typical colonies of salmonellae were determined by MPN method and then confirmed by PCR and nested PCR. Five hundred and fourteen isolates were *Salmonella* spp. +ve when tested by PCR from which only 144 isolates were +ve when tested by the nested PCR assay. Results also indicated that PCR and the nested PCR assay are rapid and simple assays for sensitive and specific identification of *Salmonella* spp. in water, fish and aquatic insects. It could be concluded that aquatic insects and fish could act as bioindicators of zoonotic diseases. [...] In the control point in the main stream of River Nile before branches 55 isolates were tested for the presence of *Salmonellae*; 78% were *Salmonellae* spp. +ve from which 25.6% were +ve when tested by Nested PCR." (Authors) This sample point resulted also in records of *Enallagma* (*Azuragrion*) *vansomereni*.] Address: Fagr Abdel-Gawad, Department of Water Pollution, National Research Center, Dokki, Giza, Postal code 12622, Egypt. E-mail: fagrabdlgawad@gmail.com

10578. Lozano, F.; Muzón, J.; Palacio, A. del (2011): Description of final stadium larva of *Erythrodiplax connata* and *E. basifusca* and redescription of that of *E. minuscula* (Odonata: Libellulidae). *International Journal of Odonatology* 14(2): 127-135. (in English, with Spanish summary) ["In this contribution the final stadium larvae of *E. connata* and *E. basifusca* are described and that of *E. minuscula* is redescribed. Diagnoses are provided for the larvae of the genus *Erythrodiplax* and for those included in the *connata* group. *E. connata* lacks lateral spines on abdominal segments, a character which has not been observed in any other larvae of the genus. Finally, due to the fact that the larvae of *E. connata* could not be reared successfully until emergence, differences with other sympatric

Patagonic Libellulidae are discussed." (Authors)] Address: Muzón, J., Inst. Limnol. "Dr. R.A. Ringuelet", C.C. 712, AR-1900 La Plata, Argentina. E-mail: muzon@ipla.edu.ar

10579. Mahmoud, S.; Abbas, J. (2011): Impacts of habitat destruction on wetland biodiversity. *World Applied Sciences Journal* 12(10): 1897-1902. (in English) ["As more human demand on water resources impacts all part of the world, tirese ecosystems have been always being damaged by human. This study was carried out during Aug-2010 between Suloukli and Shormast wetlands in the north of Iran to assess the degree of water pollution via contrasting biodiversity of wetlands. In this study 31 and 16 species macrofauna and species macrophytes were identified in Suloukli and Shormast wetlands respectively. The Shannon-Wiener index ($H = 3.737$ Bit. per ind) calculated for Suloukli that was more than value ($H = 2.773$) of Shormast and rarefaction statistical method estimated in these areas that showed the values of expected number of species of the Shormast was lower than Suloukli wetland. It was concluded that Shormast wetland was stressed with physical pollutions of tourism such as infusion of solid garbages and yachting." (Authors) The list of taxa includes *Ischnura elegans*, *Anax imperator*, *Libellula depressa*, and *Sympetrum* sp.] Address: Mahmoud, S., Dept of Environment & Energy, Islamic Azad Univ. Science and Research Branch, Tehran, Iran

10580. Makbun, N.; Kulsarin, J.; Buranapanichpan, S.; Hämäläinen, Doi Suthep-Pui M. (2011): Additional records of Odonata from National Park, Chiang Mai province, Thailand. *Notulae odonologicae* 7(7): 61-65. (in English) ["A total of 83 species were recorded ... during June 2009 and December 2010. A list of these is presented together with some comments. Three Zygoptera and five Anisoptera species are recorded from the Park for the first time. These additions increase the total number of the known odonate species from Doi Suthep-Pui and its immediate surroundings to 134 species (61 Zygoptera and 73 Anisoptera)." (Authors)] Address: Makbun, N., Entomology Division, Department of Entomology and Plant Pathology, Faculty of Agriculture, Chiang Mai University, 239 Huay Keaw Rd, Suthep, Muang, Chiang Mai, 50200, Thailand. E-mail: duen@hotmail.com

10581. Matushkina, N.A.; Lambret, P. (2011): Ovipositor morphology and egg laying behaviour in the dragonfly *Lestes macrostigma* (Zygoptera: Lestidae). *International Journal of Odonatology* 14(1): 69-82. (in English) ["*L. macrostigma* is a stenotopic dragonfly species of Western Palaearctic distribution that has high conservation status almost throughout its range. It inhabits mainly brackish water with a typical plant species, sea club-rush *Bolboschoenus maritimus*. Due to the absence of special investigations, the nature of this insect-plant association is not clearly understood, but it was supposed that *L. macrostigma* prefers egg laying in *B. maritimus*. In this paper we describe the ovipositor morphology and the egg laying behaviour of *L. macrostigma* in detail. The cutting ovipositor reveals several morphological peculiarities recorded previously in other lestids. The internal surface of the valves reveals rich microsculpture. Numerous single and clustered sensilla of different shape are found on the valves and styli and are probably involved in oviposition-plant recognition by females and/or in production of an egg clutch. Oviposition is carried out in stems of *B. maritimus* and *Juncus maritimus*. An egg clutch consists of a row of single eggs deposited in line along the long axis of a plant. Results are discussed in the light of possible morphological and behavioural adaptation to oviposition

into specific plant substrates." (Authors)] Address: Lambret, P.H., Marais du Vigueirat, 13104 Mas-Thibert, France. E-mail: philambret@hotmail.com

10582. McMurray, P.D.; Simon, T.P. (2011): New county distribution records of dragonflies and damselflies (Odonata) in Florida, Kentucky, and Tennessee. *Journal of the Kentucky Academy of Science* 72(1): 59-62. (in English) ["A total of 30 new odonate county distribution records are presented for counties in Florida, Kentucky, and Tennessee. The known odonate fauna of Madison County, Kentucky, is increased from 16 to 27 species and the fauna of Claiborne County, Tennessee, is increased from 18 to 27 species. Libellulidae and Coenagrionidae species accounted for the majority of the new records, 15 and 7, respectively." (Authors)] Address: McMurray, P.D., Indiana State Univ., Biology Dept., 600 Chestnut Street, Science Building Room 281, Terre Haute, Indiana 47809, USA. E-mail: paul.mcmurray79@gmail.com

10583. McPeck, M.A.; Symes, L.B.; Zong, D.M.; McPeck, C.L. (2011): Species recognition and patterns of population variation in the reproductive structures of a damselfly genus. *Evolution* 65(2): 419-428. (in English) ["The selection pressures imposed by mate choice for species identity should impose strong stabilizing selection on traits that confer species identity to mates. Thus, we expect that such traits should show nonoverlapping distributions among closely related species, but show little to no variance among populations within a species. We tested these predictions by comparing levels of population differentiation in the sizes and shapes of male cerci (i.e., the clasper structures used for species identity during mating) of six *Enallagma* damselfly species. Cerci shapes were nonoverlapping among *Enallagma* species, and five of six *Enallagma* species showed no population variation across their entire species ranges. In contrast, cerci sizes overlapped among species and varied substantially among populations within species. These results, taken with previous studies, suggest that cerci shape is a primary feature used in species recognition used to discriminate conspecific from heterospecifics during mating." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

10584. Melo, M.C.; Scheibler, E.E. (2011): Description of the immature stages of *Sigara* (*Tropocorixa*) *jensenhaarupi* (Hemiptera: Heteroptera: Corixidae: Corixini), with ecological notes. *Revista Mexicana de Biodiversidad* 82: 117-130. (in English, with Spanish summary) [Argentina; the authors established a high diversity of macroinvertebrates associated with *S. (T.) jensenhaarupi*. Odonata species sampled in northern Mendoza included adults and larvae of: *Ischnura ultima*, *I. fluviatilis*, *I. cf. fluviatilis*, *Andinagrion peterseni*, *Rhionaeschna variegata*, *R. absoluta*, *Progomphus joergenseni*, *Erythrodiplax connata*, *E. corallina*, and *Dasythemis mincki clara*. The collection at Loicas (a temporary pond) revealed larvae of *R. variegata*, *Cyanallagma interruptum*, and *A. peterseni*.] Address: Melo, María, Depto Sistemática, Instituto de Limnología "R.A. Ringuelet" (ILPLA) (CCT La Plata CONICET- UNLP), C.C. 712, 1900 La Plata, Argentina. E-mail: cecimelo@ilpla.edu.ar

10585. Meyer Guevara, M. (2011): Insectos acuáticos y calidad del agua en la cuenca y embalse del río Peñas Blancas, Costa Rica. *Rev. Biol. Trop.* 59(2): 635-654. (in Spanish, with English summary) ["Aquatic insects and water quality in Peñas Blancas watershed and reservoir. - The aquatic insects have been used to evaluate water

quality of aquatic environments. The population of aquatic insects and the water quality of the area were characterized according to the natural and human alterations present in the study site. During the monthly-survey, pH, DO, temperature, water level, DBO, PO₄ and NO₃ were measured. Biological indexes (abundance, species richness and the BMWP-CR) were used to evaluate the water quality. No relation between environmental and aquatic insects was detected. Temporal and spatial differences attributed to the flow events (temporal) and the presence of Peñas Blancas reservoir (spatial). In the future, the investigations in Peñas Blancas watershed need to be focused on determining the real influence of the flows, sediment release and the possible water quality degradation because of agriculture activities." (Author) Odonata are treated at the genus level: *Hetaerina*, *Cora*, *Argia*, *Heteragrion*, *Palaemnema*, *Phyllogomphoides*, *Brechmorhoga*, *Perithemis*.] Address: Meyer Guevara, Mora, Unidad de Cuenca del río Peñas Blancas, UEN Proyectos y Servicios Asociados, Instituto Costarricense de Electricidad, San José, Costa Rica, Apdo. 10032-1000; entomomeyer@gmail.com

10586. Miriglu, A.; Kartal, V.; Salur, A. (2011): Odonata of the eastern Black Sea region of Turkey, with some taxonomic notes. *Odonatologica* 40(2): 105-122. (in English) ["The work is based on a collection of 2759 specimens, referable to 50 species/subspecies brought together during 2005-2007 from 154 localities. *Sympecma fusca*, *Coenagrion ornatum*, *Erythromma viridulum orientale*, *Anax parthenope*, *Onychogomphus forcipatus albotibialis*, *O. lefebvrei*, *Sympetrum depressiusculum* and *S. meridionale* are new for the region. The *O. lefebvrei* record is the northernmost one within Turkey. Geographic distribution and taxonomic characters of *Calopteryx splendens amasina*, *C. s. waterstoni*, *C. virgo festiva*, *Ischnura elegans ebneri*, *I. e. pontica*, *Onychogomphus lefebvrei* and *Sympetrum haritonovi* are discussed." (Authors)] Address: Miriglu, A., Department of Biology, Faculty of Arts and Sciences, Ondokuz Mayıs University, 55139 Samsun, Turkey. E-mail: alimiroglu@gmail.com

10587. Moreno Pallares, M.I. (2011): Distribución espacio-temporal de náyades de odonatos en los humedales La Vaca y Santa María del Lago, Bogotá, Colombia. M.Sc. thesis. Departamento de Biología, Facultad de Ciencias, Universidad Nacional de Colombia, Sede Bogotá: (in Spanish, with English summary) ["We evaluated the spatial and temporal variation of communities of dragonflies naiads and the association to the habitat rehabilitation status in wetlands la Vaca and Santa María del Lago. There were carried out four samples in each wetland during a year. Using standard techniques for collecting macroinvertebrates, in stations at the entry, exit and water mirrors of the wetlands. We found a gradient in the distribution of the abundance of nymphs observed in both wetlands, where naiads community had the most of number of individuals in the spatial sampling stations that are located at larger distances from the dumping sites. Comparing the composition between wetlands, heterogeneity was found in both wetland communities through assessment of beta diversity. The gradient in the distribution of the abundance of naiads observed in both gradients in both wetlands is more suited to a species response in terms of tolerance to environmental variables. The two wetlands showed aggregate variable decreased to the water outlets in the concentrations of solids, BOD₅, COD, nitrogen, phenols, SAAM, nutrients in the microbiological factors, which matched the increase of

naiads in points distant from the dumping. The spatial distribution of Odonata in terms of biotic and abiotic parameters showed that the composition of nymphs can provide information on the ecological conditions of the system it inhabits." (Author)] Address: not stated

10588. Moya, N.; Domínguez, E.; Goitia, E.; Oberdorff, T. (2011): Desarrollo de un índice multimétrico basado en macroinvertebrados acuáticos para evaluar la integridad biológica en ríos de los valles interandinos de Bolivia. *Ecología Austral* 21: 135-147. (in Spanish, with English summary) ["We developed a multimetric index that could discriminate natural from anthropogenic variability in 91 sites (63 reference sites and 28 disturbed sites) fairly evenly distributed across the upper Grande River Basin (Bolivia). To do so, we examined 12 candidate metrics for their potential to indicate degradation and reflecting different aspects of macroinvertebrate assemblage structure and function. Initially, using the reference sites, we developed statistical models describing the response of the different metrics to the natural environmental variability. In a second step, using sites experiencing three types of anthropogenic disturbances (i.e., agriculture, urban and mining activities), we quantified the deviation in the response of each metric model between reference and disturbed conditions. From the initial 12 metrics, we retained only 5 metrics in the final index (total richness, total abundance, richness of Ephemeroptera, Plecoptera and Trichoptera (EPT), percentage of EPT abundance and percentage of scrapers abundance). These metrics were the most effective ones in responding to anthropogenic disturbances. Our final index performed well in discriminating between reference and disturbed sites, giving a significant negative linear response to a gradient of physical and chemical anthropogenic disturbances. This index can be used as a monitoring tool to evaluate the biological integrity and aquatic biodiversity of the Bolivian inter-Andean valleys streams." (Authors) "Odonata" are treated at the family level: "Coenagrionidae, Aeshnidae, Corydalidae, Arctiidae"] Address: Moya, N., UMR BOREA, IRD 207, Unidad de Limnología y Recursos Acuáticos (ULRA), Universidad Mayor de San Simón, Cochabamba, Bolivia. E-mail: nabor.moya@gmail.com

10589. Murakami, T.; Hodoki, Y. (2011): Comparison of population density and species composition of aquatic insect between the upstream and downstream reaches of a flood control dam without impoundment; a case study of the Masuda-gawa Dam in Shimane Prefecture, Japan. *Kaname Osamu* 57: 75-79. (in Japanese, with English summary) ["We compared the population density and species composition of aquatic insect communities up- and downstream of two types of dams to evaluate the effects of rivercrossing construction on benthic invertebrates. One is the Masuda-gawa Dam, a so called "dry dam" or "uncontrolled dam" because its invariably open gates are set at the bottom of the construction to maintain river continuity, and the other is the Sasaura Dam with a reservoir behind the construction: Both are located on the Masuda River System, Shimane Prefecture. Population densities and species compositions upstream the two dams did not show large difference, and were dominated by several insect species belonging to Heptageniidae (Ephemeroptera). In the downstream reaches of both dams, however, the population density of two net-spinning caddis flies (Hydropsychidae, Trichoptera), which are frequently found in high densities in Japanese dammed rivers, was higher than the up-stream reaches; by 50-fold in the case of Sasaura Dam and by 7-fold in the Masuda-

gawa Dam. The difference in the density increment of net-spinning caddis flies between the two dams may indicate that dry dam poses less influence on lotic environment." (Authors) In the case of the taxon "Gomphidae" at Masuda-gawa Dam the ratio between up- and downstream density was 0,4 (96 : 37), and at Sasakura Dam 1,1 (43 : 48).] Address: not transliterated into English

10590. Murphy, J.F.; Nagorskaya, L.L.; Smith, J.T. (2011): Aquatic macroinvertebrate communities in lakes exposed to Chernobyl-derived ionising radiation. *Journal of Environmental Radioactivity* 102(7): 688-694. (in English) ["Littoral (lake shore) macroinvertebrate communities were studied in eight natural lakes affected by fallout from the Chernobyl accident. The lakes spanned a range in ¹³⁷Cs contamination from 100 -15500 kBq m² and estimated external dose rates ranged from 0.13 - 30.7 nGy h⁻¹. General linear models were used to assess whether abundance of individuals, taxon richness, Berger-Parker dominance and Shannon-Wiener diversity varied across the lakes. Step-wise multiple regressions were used to relate variation in total abundance, taxon richness, Berger-Parker dominance, Shannon-Wiener diversity, taxon richness within major groups of macroinvertebrates and abundance of the more common individual taxa to the measured environmental characteristics (conductivity, pH, total hardness and phosphate; lake area, lake maximum depth and total external dose) of the lakes. No evidence was found in this study that the ecological status of lake communities has been influenced by radioactive contamination from the Chernobyl accident. Indeed, the most contaminated lake, Glubokoye, contained the highest richness of aquatic invertebrates. Taxon richness in the eight study lakes varied from 22 (Svyatskoe #7) to 42 (Glubokoye) which spans a range typical for uncontaminated lakes in the region. Since ⁹⁰Sr is readily-absorbed by Mollusca, estimated dose rates to this group exceeded those for other invertebrate groups in two lakes (Perstok and Glubokoye). However this study found no association between mollusc diversity or abundance of individual snail species and variation between lakes in the external radiation dose. Indeed Glubokoye, the lake most contaminated by ⁹⁰Sr, had the highest richness of freshwater snails per sample (an average of 8.9 taxa per sample)." (Authors) The study includes the following Odonata species: *Coenagrion armatum*, *C. hastulatum*, *Aeshna viridis*, *A. cyanea*.] Address: Smith, J.T., School of Earth & Environmental Sciences, University of Portsmouth, Burnaby Bldg, Burnaby Road, Portsmouth PO1 3QL, UK. E-mail: Jim.Smith@port.ac.uk

10591. Nagy, H.B.; László, Z.; Köver, S.; Szállassy, N.; Dévai, G. (2011): Population size effects on the behaviour of *Libellula fulva* (Odonata: Libellulidae) males, a five year study. *North-western journal of zoology* 7(1): 39-46. (in English) ["We tested the hypothesis that population density alters male territorial and mating behaviour of dragonflies. We predicted that males at higher densities fight more and mate less. During five years we studied two *Libellula fulva* populations along two small lowland creeks in East Hungary. Using mark-resight method we marked a total number of 1454 dragonfly males. Our results show that on the two study sites there were different population densities. At higher population densities the number of matings per male decreased, but population size had no effect on the frequency of intraspecific fights. However, the long run study showed remarkable difference from the outcome of partial analyzes which underlines the importance of studies overtaken through several years."

(Authors)] Address: Nagy, H. Beáta, Department of Hydrobiology, University of Debrecen, H-4032 Debrecen, Egyetem tér 1, Hungary. E-mail: nagy.beata@gmail.com

10592. Nasadiuk, I. (2011): Structure of larvae communities of some water insects from streams within the city of Uzhgorod. *Sci. Bull. Uzhgorod Univ. (Ser. Biol.)* 30: 113-117. (in Ukrainian, with English summary) [Ukraine; data on the biomass of *Gomphus vulgatissimus* are presented.] Address: Nasadiuk, I., Uzhgorod national university, A. Voloshina St. 32, Uzhgorod 88000, Ukraine, e-mail: Nasadiukilia@mail.ru

10593. Nelson, B.; Ronayne, C.; Thompson, R. (2011): Ireland Red List No.6: Damselflies & Dragonflies (Odonata). National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland: 27 pp. (in English) ["Based on almost 32,000 records for Ireland, the 24 species of resident Odonata are evaluated for their conservation status using International Union for the Conservation of Nature (IUCN) criteria (IUCN, 2001, 2003). Four (17%) of the Irish species are assessed as threatened, and one species as near threatened. The populations of all five species need to be thoroughly surveyed and monitoring programmes for each initiated. Causes of the decline in each species need to be determined, existing and possible threats identified, and protective measures introduced. The remaining species are all assessed as least concern. The Irish odonate fauna is a limited one, reflecting the recent geological history of the island; its location off the western edge of the European continent; the climate, and the range of habitats present. Despite this, the fauna is not without interest and in particular when compared to that of Great Britain. The most interesting species of the Irish fauna is *Coenagrion lunulatum* which is mainly a northern Eurasian species that is absent from Great Britain. The Irish population of *Lestes dryas* is also of interest because of its association with the turloughs of the western limestone. Three of the threatened odonates, *Somatochlora arctica*, *Cordulia aenea* and *C. lunulatum*, are found in low nutrient status wetlands and the change brought about by enrichment of these habitats is regarded as the primary threat to these species. The decline of these should act as a warning of the negative trend in the state of these wetlands which are a distinctive feature of many Irish counties. These three are also predominantly northern species and the Irish populations lie at the southern edge of their ranges. In the long term the impact of climate change may be significant. Climate change may actually benefit the remaining threatened species, *Ischnura pumilio*, and the near threatened *L. dryas*, but the immediate threat to these species is habitat loss. Both these damselflies are dependent on specific hydrological conditions which are easily damaged and altered." (Authors)] Address: Thompson, R., 8 Weaver's Court, Banbridge, Co. Down BT32 4RP, Ireland

10594. Neseemann, H.; Tachamo Shah, R.D.; Shah, D.N.; Sharma, S. (2011): Morphological characters of *Epiophlebia laidlawi* Tillyard larvae, with notes in the habitat and distribution of the species in Nepal (Anisozygoptera: Epiophlebiidae). *Odonatologica* 40(3): 191-202. (in English) ["Based on 78 specimens recorded from 14 forest streams at the elevations between 1800 and 2850 m a.s.l. in central Nepal, nine larval instars are described and illustrated. *E. laidlawi* is for the first time documented from the Sim and Indrawati watersheds. The habitats are described and clearly indicated that the species is widespread but has a restricted range. The protection of the habitats is essential

for its conservation." (Authors)] Address: Neseemann, H., Centre for Environmental Science, Central University of Bihar, BIT Campus, Patna 800 014, Bihar, India. E-mail: hneseemann2000@yahoo.co.in

10595. Nomura, F., do Prado, V.H.M., da Silva, F.R., Borges, R.E., Dias, N.Y.N. and Rossa-Feres, D. d. C. (2011): Are you experienced? Predator type and predator experience trade-offs in relation to tadpole mortality rates. *Journal of Zoology* 284(2): 144-150. (in English) ["Cryptic behavior and unpalatability are common defensive strategies that occur in different taxonomic groups, but the effectiveness of these defensive strategies is context dependent, varying with predator type and co-occurring species. We tested this assumption by measuring the mortality rates of *Eupemphix nattereri* (cryptic behavior) and *Rhinella schneideri* (unpalatable) tadpoles in association with the predatory fish *Oreochromis niloticus* (vertebrate) and the dragonfly larvae of *Aeshna* sp. (invertebrate). We designed a second experiment to evaluate whether fish predators are capable of learning to avoid unpalatable prey once they have encountered it. Our results showed that fish preyed selectively on palatable tadpoles, avoiding unpalatable tadpoles and that the odonate larvae were more efficient in preying on the more active unpalatable tadpoles and less efficient in capturing those tadpoles that presented cryptic behaviors. Additionally, our data suggest that the antipredator traits of tadpoles can interact with each other, with cryptic tadpoles showing lesser mortality when co-occurring with unpalatable tadpoles and odonate predators. Unpalatable tadpoles also increase the mortality of cryptic tadpoles in the presence of experienced fish predators. These prey traits interact in modifying the prey preference of the predator, which constitutes a prey-induced trait-mediated interaction (TMI). This type of TMI is dependent on the system complexity (number of predator and prey species interactions) and could define food web properties, such as the role of predators and the number of competitor species in the system." (Authors)] Address: Nomura, F., Departamento de Ecologia, Universidade Federal de Goiás, Goiânia, GO, Brazil. E-mail: faustonomura@yahoo.com.br

10596. Nordström, K.; Bolzon, D.M.; O'Carroll, D.C. (2011): Spatial facilitation by a high-performance dragonfly target-detecting neuron. *Biology Letters* 7(4): 588-592. (in English) ["Many animals visualize and track small moving targets at long distances—be they prey, approaching predators or conspecifics. Insects are an excellent model system for investigating the neural mechanisms that have evolved for this challenging task. Specialized small target motion detector (STMD) neurons in the optic lobes of the insect brain respond strongly even when the target size is below the resolution limit of the eye. Many STMDs also respond robustly to small targets against complex stationary or moving backgrounds. We hypothesized that this requires a complex mechanism to avoid breakthrough responses by background features, and yet to adequately amplify the weak signal of tiny targets. We compared responses of dragonfly STMD neurons to small targets that begin moving within the receptive field with responses to targets that approach the same location along longer trajectories. We find that responses along longer trajectories are strongly facilitated by a mechanism that builds up slowly over several hundred milliseconds. This allows the neurons to give sustained responses to continuous target motion, thus providing a possible explanation for their extraordinary sensitivity." (Authors)] Address: Nordström, Karin,

Department of Neuroscience, Uppsala University, PO Box 593, 751 24 Uppsala, Sweden. E-mail: karin.nordstrom@neuro.uu.se

10597. Nwani, C.D.; Odoh, G.E.; Ude, E.F.; Okogwu, O.I. (2011): Food and feeding habits of *Gnathonemus petersii* (Osteichthyes: Mormyridae) in Anambra River, Nigeria. *Int. Aquat. Res.* 3: 45-51. (in English) [The most dominant food group - expressed as 'index of food significance' - was Insecta (IFS = 48.23) (IFS of anisopteran larvae: 1,77) followed by detritus (IFS = 31.07) while the least was Arachnida (IFS = 0.20).] Address: Nwani, C.D., Department of Applied Biology, Ebonyi State University, P.M.B. 053, Abakaliki, Nigeria. E-mail: didigwunwani@yahoo.com

10598. Ohtaka, A.; Narita, T.; Kamiya, T.; Katakura, H.; Araki, Y.; Im, S.; Chhay, R.; Tsukawaki, S. (2011): Composition of aquatic invertebrates associated with macrophytes in Lake Tonle Sap, Cambodia. *Limnology* 12(2): 137-144. (in English) ["Faunal composition of aquatic invertebrate communities associated with submerged parts of several species of macrophytes were studied in different areas in littoral Lake Tonle Sap in Cambodia, with special reference to those in root systems (interrhizon) of a free-floating water hyacinth (*Eichhornia crassipes*). Nine phyla of invertebrates were collected, of which oligochaetes, shrimps and *Limnoperna* mussels were abundant along with meiobenthic crustaceans. The macrophyte-associated invertebrates in Lake Tonle Sap might be unique in having abundant sessile animals, such as sponges, bryozoans and *Limnoperna* mussels. The *Limnoperna* mussels attached to macrophytes were more abundant in offshore and inundated forest than in secluded vegetational stands toward the shoreline. It suggests that water movement can be an important factor determining the distribution and abundance of the sessile animals by controlling larval dispersions and might be associated with the hydrological characteristic of the lake, i.e., the lake opens to the large Mekong River with drastic seasonal changes in water level." (Authors) Taxa - including Odonata - are treated at the order level.] Address: Ohtaka, A., Faculty of Education, Hirotsuki University, Hirotsuki, Aomori 036-8560, Japan. E-mail: ohtaka@cc.hirotsuki-u.ac.jp

10599. Oke, O.A. (2011): Inventory of insect species on *Eichhornia crassipes* (Water Hyacinth) on Ogun river, South - Western, Nigeria. *Journal of Emerging Trends in Engineering and Applied Sciences (JETEAS)* 2(3): 379-382. (in English) [Insecta "were surveyed with the objective of determining if any of them could serve as a bio-control agent of water hyacinth. They were collected by means of using insect sweep net, on monthly basis for 18 months. The insect species collected included [...] *Acisoma panorpoides* [...]. Adult insect species performed different kinds of activities on the water hyacinth such as feeding, resting, mating and tunneling into the petiole of water hyacinth. However, all these activities of the insects had no visible damaging effects on the growth and proliferation of water hyacinth on Ogun River, hence they could not be used as bio-control agents for water hyacinth." (Author)] Address: Oke, O.A., Dept of Biological Sciences, Univ. of Agriculture, Abeokuta, Nigeria

10600. Olthoff, M.; Menke, N.; Rodenkirchen, J. (2011): *Leucorrhinia caudalis* in der Ville bei Köln: Wiederfund für Nordrhein-Westfalen (Odonata: Libellulidae). *Libellula* 30(1/2): 1-12. (in German, with English summary) ["Between 2008 and 2011, *L. caudalis* was recorded in the 'Ville' lakeland, an agglomeration of more than 40 anthro-

pogenic lakes situated in a brown coal strip mining reclamation area close to Cologne (North Rhine-Westphalia, Germany). The species had been observed in North Rhine-Westphalia for the last time more than 60 years ago. It has been rediscovered at three of the Ville lakes. In addition, the occurrences of endangered species like *Aeshna isoceles*, *Brachytron pratense* and *Libellula fulva*, which have colonized most of the Ville lakes in the meantime, is remarkable." (Authors)] Address: Olthoff, M., Martin Luther-Str. 1a, 48147 Münster, Germany. E-mail: mattias.olthoff@gmx.de

10601. Orr, A.G.; Ngiam, R.W.J. (2011): A description of the larva of *Heliaeschna uninervulata* Martin (Odonata: Aeshnidae) from Singapore, with notes on its relationships. *International Journal of Odonatology* 14(2): 163-169. (in English) ["The larva of *H. uninervulata* is described and figured for the first time. Its characters mostly fall within the limits of variation of *Gynacantha* species. Comparison of the larval characters of *H. filostyla*, the only other member of the genus for which the larva is known, suggests that it is not congeneric with *H. uninervulata*." (Authors)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

10602. Oscoz, J.; Galicia, D.; Miranda, R. (eds.) (2011): Identification Guide of Freshwater Macroinvertebrates of Spain. Springer: 300 pp. (in English) ["Identification keys of the most important taxonomic groups of benthic invertebrates recorded in Spanish watersheds are displayed. Some non-Iberian taxa are included, with the aim to facilitate correct taxonomic classification. Identification keys are accompanied by a series of plates. These plates include photographs of the most important taxonomic groups, with more or less detail, to facilitate group identification." (Authors) Odonata are treated on pages 33-34 and 87-94. Compilers are Francisco Javier Ocharan, David Outomuro and Antonio Torralba-Burrial, Dept of Biology of Organisms and Systems, University of Oviedo, Catedrático Rodrigo Uría s/n, Oviedo, E-33071 Spain.] Address: Oscoz, J., Dept of Zoology and Ecology, School of Sciences, University of Navarra, Irunlarrea 1, Pamplona 31008, Spain. E-mail: joscoz@alumni.unav.es

10603. Pan, B.-z.; Wang, Z.-Y.; He, X.-B. (2011): Studies on assemblage characteristics of macrozoobenthos in the West River. *Acta hydrobiologica Sinica* 35(5): 1-6. (in Chinese, with English summary) ["To conserve and manage the West River, field investigations of macrozoobenthos were conducted in November 2009 (at low water level) and May 2010 (at high water level). Altogether 70 taxa of macrozoobenthos belonging to 30 families and 59 genera were identified (including *Lamelligomphus* sp., *Leptogomphus* sp., *Megalogomphus* sp.). ... The average density and biomass of total macrozoobenthos were 140 ind/m² and 0.23 g dry weight/m², respectively. Macrozoobenthic density peaked in the cobbles, while biomass reached the maximum in the bedrock. Detrended Correspondence Analysis (DCA) revealed that substrate played an important role in structuring macrozoobenthic assemblages. The higher substrate stability was more favorable to survival of benthic animals. Macrozoobenthic assemblages in soft sediment were characterized by dominance of collector-gatherers (mainly Tubificidae and Chironominae), while macrozoobenthos in stone substrates were dominated by scrapers (e.g. *Semilucospora* spp.) or collector-filterers (e.g. *Limnoperna lacustris*). In recent years, channel regulation projects have

led to reduction of habitat quality and habitat loss, which will have a negative impact on survival of benthic animals." (Authors)] Address: Pan, B.-z., State Key Laboratory of Hydroscience and Engineering, Tsinghua University, Beijing 100084, China

10604. Papazian, M.; Viricel, G. (2011): Anomalie morphologique chez *Calopteryx xanthostoma* (Charpentier, 1840) (Odonata Calopterygidae). *L'entomologiste* 67(3): 113-114. (in French) [A male *Calopteryx xanthostoma* with pseudopterostigmata is documented.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France. E-mail: mpapazian@ecologie.re

10605. Parry, G.S.; Burton, S.; Cox, B.; Forman, D.W. (2011): Diet of coastal foraging Eurasian otters (*Lutra lutra* L.) in Pembrokeshire south-west Wales. *European Journal of Wildlife Research* 57(3): 485-494. (in English) ["The importance of the marine environment to Eurasian otters is currently poorly understood. Wales is one of the few countries where coastal activity has been recorded and an increase in marine otter sightings could indicate remarkable developments within Welsh populations. The trophic niche of coastal otter populations around Pembrokeshire was investigated over a 12-month period. Marine activity was more widespread than previously thought and marine prey formed the largest component of otter diet, although, otters also consumed freshwater and terrestrial prey throughout the year. Otter diet was very diverse compared to other European coastal populations and a spring contraction in trophic niche width coincided with the estimated timing of breeding activity. Seasonal variation in prey composition was predominantly due to differences in the consumption of alternate prey types. In areas where wetlands are fragmented and populations of freshwater fish are declining, the marine environment may become an increasingly important habitat for otters. It is necessary to define the historical importance of coastal populations to otter conservation. Coastal areas are often subject to pressure from human activities, so the impact of disturbance needs to be assessed. Importantly, there is no verified otter survey method for coastal areas, so the use of marine habitat is likely to be underestimated." (Authors) Odonata contributed with 0,2% of relative frequency of occurrence to the otter diet on the Pembrokeshire coast between July 2007–June 2008.] Address: Forman, D.W., Dept of Pure and Applied Ecology, Conservation Ecology Research Team, School of the Environment and Society, Swansea Univ., Singleton Park, Swansea SA2 8PP. UK. E-mail: d.w.forman@swansea.ac.uk

10606. Paulson, D.R.; Dunkle, S.W. (2011): A Checklist of North American Odonata. Including English Name, Etymology, Type Locality, and Distribution. Originally published as Occasional Paper No. 56, Slater Museum of Natural History, University of Puget Sound, June 1999; completely revised March 2009; updated February 2011: 86 pp. (in English) ["The checklist includes all 461 species of North American Odonata considered valid at this time. For each species the original citation, English name, type locality, etymology of both scientific and English names, and approximate distribution are given. Literature citations for original descriptions of all species are given in the appended list of references." (Authors)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

10607. Payne, J.L.; McClain, C.R.; Boyer, A.G.; Brown, J.H.; Finnegan, S.; Kowalewski, M.; Krause, R.A.; Lyons,

S.K.; McShea, D.W.; Novack-Gottshall, P.M.; Smith, F.A.; Spaeth, P.; Stempien, J.A.; Wang, S.C. (2011): The evolutionary consequences of oxygenic photosynthesis: a body size perspective. *Photosynth. Res.* 107: 37-57. (in English) ["The high concentration of molecular oxygen in Earth's atmosphere is arguably the most conspicuous and geologically important signature of life. Earth's early atmosphere lacked oxygen; accumulation began after the evolution of oxygenic photosynthesis in cyanobacteria around 3.0–2.5 billion years ago (Gya). Concentrations of oxygen have since varied, first reaching near-modern values *600 million years ago (Mya). These fluctuations have been hypothesized to constrain many biological patterns, among them the evolution of body size. Here, we review the state of knowledge relating oxygen availability to body size. Laboratory studies increasingly illuminate the mechanisms by which organisms can adapt physiologically to the variation in oxygen availability, but the extent to which these findings can be extrapolated to evolutionary timescales remains poorly understood. Experiments confirm that animal size is limited by experimental hypoxia, but show that plant vegetative growth is enhanced due to reduced photorespiration at lower O₂:CO₂. Field studies of size distributions across extant higher taxa and individual species in the modern provide qualitative support for a correlation between animal and protist size and oxygen availability, but few allow prediction of maximum or mean size from oxygen concentrations in unstudied regions. There is qualitative support for a link between oxygen availability and body size from the fossil record of protists and animals, but there have been few quantitative analyses confirming or refuting this impression. As oxygen transport limits the thickness or volume-to-surface area ratio — rather than mass or volume — predictions of maximum possible size cannot be constructed simply from metabolic rate and oxygen availability. Thus, it remains difficult to confirm that the largest representatives of fossil or living taxa are limited by oxygen transport rather than other factors. Despite the challenges of integrating findings from experiments on model organisms, comparative observations across living species, and fossil specimens spanning millions to billions of years, numerous tractable avenues of research could greatly improve quantitative constraints on the role of oxygen in the macroevolutionary history of organismal size. [...] Despite widespread awareness of Late Paleozoic gigantism, there have been few attempts to determine whether organisms the size of Carboniferous giants would be prohibited at present-day oxygen levels or whether the magnitude of temporal variation in maximum size within the relevant taxa has been of the magnitude predicted by modeled changes in pO₂. Okajima (2008) (*Lethaia* 41(4): 423-430) was the first to examine the link between insect size and oxygen concentration quantitatively through the Phanerozoic, using newly compiled data on the sizes of fossil dragonflies. She found that the variation in maximum size of dragonflies through time has been much greater than predicted by variation in atmospheric oxygen concentrations, assuming respiration via diffusion through tracheae, and assuming that the sizes of Carboniferous dragonflies represent an oxygen-limited maximum size. If oxygen limited maximum body size in the Carboniferous, it has not consistently done so during other periods. Alternatively, if oxygen is limiting in the modern, then anatomical or physiological differences must exist between the Protodonata and Odonata to explain the inability of the Odonata to achieve similarly large sizes. The latter interpretation is suggested by the fact that all of the largest Paleozoic specimens belong to the Protodonata;

Paleozoic members of the Odonata exhibit sizes comparable to the largest in the Mesozoic and Cenozoic. Alternatively, the simplifying assumption of oxygen diffusion through tracheae may be inaccurate; there is emerging evidence for active tracheal breathing in insects (Socha et al. 2008; Westneat et al. 2003). Okajima (2008) proposed still another alternative: although variation in oxygen may have contributed to size evolution, maximum size of Mesozoic and Cenozoic dragonflies was limited by ecological competition with flying vertebrates. A further possibility, not examined by Okajima (2008), is that the trend in maximum size of fossils is poorly correlated with the true evolutionary pattern. Temporal variation in the quality of the insect fossil record (Labandiera 2005; Smith and Cook 2001) makes it difficult to determine the extent to which variation in maximum size in the fossil record reflects biological reality versus variation in the quality of available material. For example, the Carboniferous contains an unusually extensive record of the coastal marsh environments that may be most likely to house large insects." (Authors)] Address: Payne, J.L., Dept of Geological and Environmental Sciences, Stanford Univ., 450 Serra Mall, Bldg. 320, Stanford, CA 94305, USA. E-mail: jlpayne@stanford.edu

10608. Perez-Gelabert, D.E.; Bastardo, R.H.; Medrano, S. (2011): Entomofauna del Parque Nacional Loma Nalga de Maco y Alrededores, provincia Elías Pina, República Dominicana. *Novitates Caribaea* 4: 80-90. (in Spanish, with English summary) ["Data derived mainly from the published zoological literature are compiled on the diversity of insects known from Parque Nacional Loma Nalga de Maco and surroundings located in northwestern Dominican Republic. A total of 133 species belonging to 9 insect orders were found. We recommend a basic inventory specifically dedicated to the insects of this protected area." (Authors) The following Odonata species are listed from Rio Limpio: *Enallagma coecum*, *Ischnura ramburii*, *Phyllolestes ethelae*, *Dythemis rufinervis*, *Erythemis vesiculosa*, *Macrothemis celeno*, *Orthemis ferruginea*, and from Loma de Las Tayotas: *Scapanea frontalis*. The complete data set results from Flint, O. S., Jr., R. H. Bastardo y D. E. Perez-Gelabert. 2006. Distribution of the Odonata of the Dominican Republic. *Bulletin of American Odonatology*, 9: 67-84.] Address: Perez-Gelabert, D.E., Department of Entomology, U. S. National Museum of Natural History, Smithsonian Institution, P. O. Box 37012, Washington, DC 20013-7012, USA. E-mail: perezd@si.edu

10609. Perez-Gutierrez, L.A.; Palacino-Rodriguez, F. (2011): Updated checklist of the Odonata known from Colombia. *Odonatologica* 40(3): 203-225. (in English) ["The checklist includes 335 species, of which 98 species are added to the latest figure published, while 21 previously listed species are removed from the list since they were based on unverifiable records. The number of species hitherto known from Colombia is low if compared to that from some other S American countries, such as Brazil (660 species), Venezuela (487) and Peru (368). A summary of the exploration of Odonata diversity in Colombia is provided." (Authors)] Address: Perez-Gutierrez, L.A., Depto de Biología, Facultad de Ciencias Básicas, Universidad del Atlántico, km 7 antigua vía Puerto Colombia, Barranquilla, Colombia; E-mail: talysker@gmail.com

10610. Perez-Gutierrez, L.A.; Montes-Fontalvo, J.M. (2011): Rediscovery of *Mesagrion leucorrhinum* (Zygoptera: Megapodagrionidae): a "formal" description of female and ultimate stadium of larva with notes on habits. *International Journal of Odonatology* 14(1): 91-100. (in Eng-

lish) ["Adult female and ultimate stadium larva of *Mesagrion leucorrhinum* are formally described and illustrated based on material from three locations in Antioquia, Meta and Cundinamarca Departments, Colombia. The species is sexually dimorphic. The female is distinguishable from other related genera by a pair of notches in the prothoracic anterior lobe and shares with *Heteropodagrion* and *Dimeragrion* females a yellowish, scarcely sclerotized region dorsally between the posterior margin of S7 and anterior border of S8. The larva is very similar to *Heteropodagrion*. Differences for separating them are: the pro-, meso- and metathoracic supracoxal processes are less prominent in *Mesagrion*, and the length of the terminal filament of the middle gill is notably longer in *Mesagrion*. The specimens were also compared with other related genera. Observations on habits are added." (Authors)] Address: Perez-Gutierrez, L.A., Grupo de investigación en Biodiversidad del Caribe colombiano, Depto de Biología, Univ. del Atlántico, km 7 antigua vía Puerto Colombia, Barranquilla, Colombia. E-mail: talysker@gmail.com

10611. Petrulevicius, J.F.; Huang, D.; Nel, A. (2011): A new genus and species of damselfly-dragonfly (Odonata: Isophlebioidea: Campterothlebiidae) in the Middle Jurassic of Inner Mongolia, China. *Acta Geologica Sinica* 85(4): 733-738. (in English) ["The campterothlebiid new genus and species *Ctenogampsophlebia reni* is described from the Middle Jurassic of Inner Mongolia, China. It shows close similarities with the Lower to Middle Jurassic genera *Gampsophlebia*, and *Petrophlebia*, with closed and short subdiscoidal cells, confirming the attribution of these two other genera to the Campterothlebiidae." (Authors)] Address: Huang, D.-y., Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China. E-mail: huangdiyong@sina.com

10612. Phan, Q.T.; Hämäläinen, M. (2011): *Matrona taoi* spec. nov., a new damselfly species from northern Vietnam (Odonata: Calopterygidae). *Zootaxa* 2927: 63-68. (in English) ["*Matrona taoi* Phan & Hämäläinen, spec. nov. (holotype male, from Vietnam, Phu Tho province, Xuan Son National Park, Xom Coi, alt. 442 m, 15 xi 2010, deposited in Vietnam National Museum of Nature, Hanoi) is described from both sexes, illustrated and compared with other species in the genus." (Authors) Erratum: "The figure legend on p. 65 should read: FIGURES 3-4. *Matrona taoi* sp. nov. 3) habitus of paratype male (right hind wing incomplete at base); 4) habitus of paratype female."] Address: Phan, Q.T., Dept of Biology, Vietnam National Museum of Nature, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam. E-mail: phanquoctoan84@gmail.com

10613. Qian, C.; Wang, Z.-m.; Zhao, D.-f. (2011): New record of Odonata in the Northeast area and Jilin Province in China. *Journal of Jilin Agricultural University* 2/2011: 1-4. (in Chinese, with English summary) [New records in Northeast area are *Sympetrum ruptum*, *Libellula basilinea* McLachlan, 1894 (= *L. quadrimaculata*), *Somatochlora dido* and *Ischnura elegans*. In addition to these species, *S. croceolum* and *S. imitans* are new for the Jilin province.] Address: Qian, C., College of Agronomy, Jilin Agriculture Univ., Changchun 130118, China

10614. Rajabi, H.; Moghadami, M.; Darvizeh, A. (2011): Investigation of microstructure, natural frequencies and vibration modes of dragonfly wing. *Journal of Bionic Engineering* 8(2): 165-173. (in English) ["Investigation on the microstructural and morphological aspects of dragonfly wings was carried out using scanning electron micro-

scope. Then, based on this study and the previous reports, a precise three-dimensional numerical model was developed and natural frequencies and vibration modes of dragonfly forewing were determined by finite element method. The results shown that dragonfly wings are made of a series of adaptive materials, which form a very complex composite structure. This bio-composite fabrication has some unique features and potential benefits. Furthermore, the numerical results show that the first natural frequency of dragonfly wings is about 168 Hz and bending is the predominant deformation mode in this stage. The accuracy of the present analysis is verified by comparison of calculated results with experimental data. This paper may be helpful for micro aerial vehicle design concerning dynamic response." (Authors)] Address: Rajabi, H., Faculty of Engineering, Islamic Azad Univ., Lahijan Branch, Lahijan, Iran. E-mail: harajabi@hotmail.com

10615. Rak, A.-E.; Said, I.; Mohamed, M.; Abas, A. (2011): Effect of logging activities on water quality and benthic macroinvertebrate assemblages of Madek River Basin, Kluang, Johor, Malaysia. *Journal of Applied Sciences and Environmental Management* 15(2): 337-340. (in English) ["The study was conducted to determine the effect of logging activities on water quality and benthic macroinvertebrate assemblages for the Madek River basin. The study area was situated in Kluang, Johor, Malaysia. Two sampling stations 500 meters apart are upstream and the other, downstream located at Madek River which flows through a logging area in Kluang Forest Reserve were identified. The sampling was conducted four (4) times from November 2008 to August 2009. ... There were only two sensitive taxa namely Ephemeroptera and Trichoptera found in this station. ..." (Authors)] The benthic macro-invertebrate composition for Madek River "includes" the Nearctic genera *Arigomphus* and *Dromogomphus*.] Address: Rak, Aweng-Eh, Faculty of Agro Industry and Natural Resources, Universiti Malaysia Kelantan (UMK), Malaysia. E-mail: aweng@umk.edu.my

10616. Reels, G.T. (2011): Emergence patterns and adult flight season of Anisoptera at a managed wetland site in Hong Kong, southern China. *International Journal of Odonatology* 14(1): 33-48. (in English) ["Anisoptera emergence in the seasonal tropics was monitored at a 35-ha managed wetland site in Hong Kong from February 2004 to November 2007. Exuviae records of 18 species from multiple emergence screens, exuviae traps and transect surveys were combined. The presence of adults during this period was also monitored. The study site comprised a mosaic of ponds separated by narrow bunds. Exuviae of larvae living amongst dense submerged vegetation, and adults of crepuscular species, were probably underrecorded. Anisoptera emergence was strongly seasonal in all four years, commencing in March, with EM50 – the point at which 50% of the annual population has emerged, expressed as number of days since the start of emergence – falling between April and June, for most species; but emergence also showed considerable inter-year variation, particularly after EM50. Emergence of three species continued into December in at least one year. Extended emergence periods were generally ascribed to multivoltinism associated with unregulated life cycles, presumably facultative in the case of tropical-temperate species. The migrant *Pantala flavescens* showed no clear seasonality in emergence patterns. Composite species emergence periods over the four years ranged from two to 11 months, with no clear difference between tropical and tropical-temperate species. No species were

univoltine. Adult flying seasons usually commenced in March or April, and in eight species continued until at least November, although it is unlikely that any adults survived to the following spring. Five species were on the wing for six months or less. There was considerable phenological variation among species, with life histories commonly intermediate between those of equatorial and higher latitude species." (Author)] Address: Reels, G., H-3-30 Fairview Park, Yuen Long, Hong Kong. E-mail: gtreels@gmail.com

10617. Reeves, M.K.; Perdue, M.; Blakemore, G.D.; Rinnella, D.J.; Holyoak, M. (2011): Twice as easy to catch? A toxicant and a predator cue cause additive reductions in larval amphibian activity. *Ecosphere* 2(6) art 72: 20 pp. (in English) ["Toxicants may harm predators or prey differentially, hindering clear determination of multiple stressor effects on predation dynamics in polluted aquatic systems. We built on a prior field study in which we demonstrated that a chemical contaminant, copper (Cu) and odonate predators were correlated with more frequent observations of skeletal abnormalities in Alaskan wood frog (*Rana sylvatica*) tadpoles. Our prior study established a multiple stressor effect linked to an important environmental phenomenon (malformed amphibians) but did not provide clear mechanisms that might guide management. We here investigated behavioral mechanisms because of their potential to produce large changes in predation dynamics, and because in published studies low concentrations of Cu produced behavioral changes in predator-detection in fish. Surprisingly, low but environmentally relevant concentrations of Cu (5 µg/L) combined with chemical cues from a predator (*Aeshna sitchensis*) to produce large changes in the behavior of larval amphibians. Experiments demonstrated that a low concentration of Cu did not inhibit the ability of wood frog tadpoles to detect chemical cues of predators by olfactory means, but produced strong behavioral effects, causing tadpoles to reduce activity and alter microhabitat use. These results occurred with Cu at an exposure level lower than any we could find reported as toxic to amphibians in the literature. When Cu and predator cues were administered together, the activity reduction was additive and stronger at earlier life stages. We suggest that Cu intoxication would be disadvantageous to larval amphibian prey with prolonged exposure to predators during development, and we present field data from 2010 that support this assertion. Our study demonstrates the need to use sensitive behavioral assays and to investigate multiple stressor mechanisms to understand how multiple threats combine to affect organisms in nature." (Authors)] Address: Reeves, Mari K., United States Fish and Wildlife Service, Anchorage Fisheries and Ecological Services Office, 605 West 4th Avenue, Room G-61, Anchorage, Alaska 99501 USA. E-mail: marireeves@fws.gov

10618. Riedel, I.R.; Marinoni, R.C.; Martins-Opohs, N. (2011): Spatio-temporal trends of insect communities in southern Brazil. *Journal of Entomology*, 2008: 1897-1902. (in English) ["In this study, insect seasonality using Malaise traps at eight stations was investigated from abundance collections taken between August 1986 and July 1988 in four climatic regions and one transitional region of Paraná State, Southern Brazil. Temperature and humidity were also measured to represent environmental conditions at the eight stations One station was located in the coastal region, one in the coastal mountain range, one in the first and third plateaus and three stations were located in the second plateau. All insects were counted

aiKl identified to order. Randomization-based techniques were used to assess insect abundance variation by season for the nine most abundant taxa. An Analysis of Similarity (ANOSIM) using stations and seasons as factors and a non-metric multidimensional scaling (NMDS) to assess the 2-D projection of station along axes of abundance were used to assess insect community dissimilarities. A Mantels test assessed correlations between the abundance similarity matrix and the matrix for the environmental factors. Of the most common orders, the most abundant was Diptera, followed by Hymenoptera, Lepidoptera, Collembola, Homoptera, Coleoptera, Psocoptera, Orthoptera and Hemiptera. Insect orders were generally most abundant during the spring and summer, but least abundant during the winter. Following ANOSIM analysis, station location and season best explained variations in abundance. The NMDS analysis found that the coastal station differed most from all the other stations. Humidity was positively correlated with insect abundance." (Authors) Taxa including Odonata are treated at the order level.] Address: Riedel, I.R., Gulf Coast Research Laboratory, University of Southern Mississippi, 703 E. Beach Dr. Ocean Springs, MS 39564, USA

10619. Robson, B.J.; Chester, E.T.; Austin, M. (2011): Why life history information matters: drought refuges and macroinvertebrate persistence in non-perennial streams subject to a drier climate. *Marine and Freshwater Research* 62(7): 801-810. (in English) ["In some arid, semi-arid or Mediterranean climate regions, increased water extraction combined with climate change will prolong periods of drought in non-perennial streams, but the effects on macroinvertebrate populations are poorly understood. Drought refuges allow species to survive drying but their use depends on species' traits, and refuge availability depends on landscape structure. This review evaluates the utility of existing ecological concepts for predicting the role of drought refuges for sustaining biodiversity in non-perennial streams. We also suggest traits that may determine invertebrate species' resistance or resilience to prolonged drying. Parts of the likely responses by populations to increased stream drying are described by existing ecological concepts, such as the biological traits of species and their interaction with the habitat template, barriers to dispersal and metapopulation dynamics, the use of drought refuges, habitat fragmentation and population and landscape genetics. However, the limited knowledge of invertebrate life histories in non-perennial streams restricts our ability to use these concepts in a predictive manner. In particular, reach or pool occupancy by species cannot be accurately predicted, but such predictions are necessary for evaluating potential management actions such as the use of environmental flows to sustain drought refuges during dry periods." (Authors) The paper includes several references to Odonata.] Address: Robson, Belinda, School of Environmental Sciences, Murdoch University, 90 South Street, Murdoch, WA 6150, Australia. E-mail: b.robson@murdoch.edu.au

10620. Rondineli, G.; Gomiero, L.M.; Carmassi, A.L.; Braga, F.M.S. (2011): Diet of fishes in Passa Cinco stream, Corumbatai River sub-basin, São Paulo state, Brazil. *Braz. J. Biol.* 71(1): 157-167. (in English, with Portuguese summary) [576 stomachs of 28 fish species were analysed for diet. They contained "immature" Odonata as well as "immature" additional specimens from different insect orders. Possibly "immature" should be read as "larvae" (pers. comm.).] Address: Rondineli, Giulianna, Departamento de Produção Vegetal, Centro de Ciências Agrár-

ias, Univde Federal do Espírito Santo – UFES, Alto Universitário, s/n, Guararema, CP 16, CEP 29500-000, Alegre, ES, Brazil. E-mail: giulianna.rondineli@gmail.com

10621. Rosa, B.F.J.V.; da Silva, M.V.D.; de Oliveira, V.C.; Martins, R.T.; da G. Alves, R. (2011): Macroinvertebrates associated with bryophyta in a first-order Atlantic forest stream. *Zoologia* 28(3): 351-356. (in English) ["During three months of the dry season of 2007 and three months of the rainy season of 2008, samples of bryophytes attached to stones were collected randomly, along a 100 m stream reach. ... Chironomidae larvae were dominant in the two periods of study, followed by Ceratopogonidae in the rainy season, and Naididae in the dry season. The orders EPT contributed 14 families. ... This habitat provides refuge during spates, and thus minimizes downstream transport of the macroinvertebrate fauna." (Authors) Few specimens of "Calopterygidae and Coenagrionidae" were found during the rainy season; Odonata are classified as "adominant".] Address: Rosa, Beatriz, Laboratório de Invertebrados Bentônicos, Programa de Pós-graduação em Ciências Biológicas, Comportamento e Biologia Animal, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Juiz de Fora. 36036-330 Juiz de Fora, Minas Gerais, Brazil. E-mail: beatrizjabour@yahoo.com.br

10622. Rosset, V.; Oertli, B. (2011): Freshwater biodiversity under climate warming pressure: Identifying the winners and losers in temperate standing waterbodies. *Biological Conservation* 144(9): 2311-2319. (in English) ["Climate warming is affecting the biodiversity all around the world, resulting in the expansion or contraction of the geographical range of species, and leading to colonisation (winners) and extinction (losers) events in ecosystems. It is crucial for the conservation of biodiversity to identify these potential winners and losers. We focus here on small standing waterbodies in Switzerland and on five taxonomic groups: vascular plants, snails, beetles, dragonflies and amphibians. We first assessed the sensitivity of each species to climate warming through their thermal preferences, using current altitudinal and latitudinal distribution, as a surrogate for temperature. We then evaluated the resilience of species to perturbations through five ecological and biogeographical criteria applicable to the perturbation "warming": dispersal ability, degree of habitat specialisation, geographical extent in the study area, future trend in geographical extent, and future trend of habitat availability for species. Potential winners and losers of a warming climate could be quantified through their thermal preferences. The proportion of potential losers ranged from zero species for snails to 33% of the regional species pool for dragonflies. The set of potential winners was much larger, ranging from 53% for amphibians to 61% for dragonflies. A multimetric index combining the five resilience criteria enabled the further prioritisation of the species along a gradient of extinction risk. This potential threat from climate warming is not reflected by the current Red Lists of dragonflies and amphibians, suggesting that conservation management could gain from a complementary label indicating the degree of sensitivity to warming. Highlights: › Climate warming will lead to colonisation (winners) and extinction (losers) events. › We quantified the potential winners and losers in Swiss small standing waterbodies. › The proportion of losers was smaller than the proportion of winners. › A resilience index further prioritizes the species along an extinction risk gradient. › The potential threat from climate warming is not reflected by the current Red Lists." (Au-

thors)] Address: Rosset, Véronique, University of Applied Sciences Western Switzerland, Hepia, Geneva Technology, Architecture and Landscape, 1254 Jussy-Geneva, Switzerland. E-mail: veronique@rosset.org

10623. Ruzzante, D.E.; Walde, S.J.; Macchi, P.J.; Alonso, M.; Barriga, J.P. (2011): Phylogeography and phenotypic diversification in the Patagonian fish *Percichthys trucha*: the roles of Quaternary glacial cycles and natural selection. *Biological Journal of the Linnean Society* 103: 514-529. (in English) ["Current patterns of genetic and morphological diversity are the product of historical climatic and geomorphological events, and of contemporary selection processes acting upon this diversity. Here we examine the phylogeographic and phenotypic patterns of diversity within *Percichthys trucha*, a widely distributed Patagonian fish species complex that inhabits Andean and steppe freshwater environments. Molecular analysis (mtDNA control region) of 21 populations distributed throughout its latitudinal range revealed little evidence of phylogeographic structure and no evidence of species-level genetic divergence east of the Andes. The complex, however, exhibits high levels of intra- and interpopulation phenotypic variation. Patterns of among-population divergence in morphology were most easily explained by differences in predation pressure among populations; dorsal fin spines (commonly a defensive characteristic) were longer in environments with greater densities of potentially piscivorous fish. Trophic characters were highly variable within populations, suggesting an important role for resources in generating within-population morphological variation. The very shallow levels of divergence shown by the molecular data most likely reflect the historical mixing of populations as a result of the climatic and landscape changes that affected Patagonia throughout the Quaternary. The phenotypic divergences, in contrast, are probably the result of differing contemporary selection regimes acting on currently disjoint populations. [...] The two diet items with the highest loading on PC1 are Odonata and Chironomid larvae and pupae [...] Some of the variation in diet could be associated with variation in morphology: for instance, populations that relied heavily on Odonata tended to have relatively short gill rakers and jaws compared with those that did not feed on Odonata. We do not know the nature of any links between diet and trophic morphology for *Percichthys*: adult morphology is almost certainly influenced by the diet of early developmental stages, and diet can also be affected by predation regime." (Authors)] Address: Ruzzante, D., Dept of Biology, Dalhousie University, Halifax, Nova Scotia, B3H 4J1, Canada. E-mail: daniel.ruzzante@dal.ca

10624. Rychła, A.; Benndorf, J.; Buczyński, P. (2011): Impact of pH and conductivity on species richness and community structure of dragonflies (Odonata) in small mining lakes. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 179(1): 41-50. ["Although acidification in freshwaters reduces the richness of aquatic species in general, dragonflies are less affected. However, detailed knowledge regarding the effects of very acidic (pH < 4.0) and highly conductive (> 700 $\mu\text{S cm}^{-1}$) water on dragonfly species richness and composition is still scarce. To assess this, 19 anthropogenically influenced waters with a wide range of pH (2.64 - 6.81) and conductivity (113 - 2620 $\mu\text{S cm}^{-1}$) were investigated in the Muskau Arch area (western Poland, eastern Germany). Of the 41 dragonfly species found, 31 were autochthonous. Both total (St) and autochthonous (Sa) species richness correlated positively with pH and negatively with conductivity. How-

ever, the correlations for autochthonous species were strongly influenced by the samples from the extremely acidic (pH 2.64 - 2.86) and most ion-rich (conductivity > 1200 $\mu\text{S cm}^{-1}$) waters, where no species developed. The Sa values from acidic waters with slightly higher pH values (between 3.0 and 4.0) did not differ significantly from those found in neutral waters. Nevertheless, species preferring acidic or neutral conditions, respectively, were clearly separated, showing a direct or indirect effect of pH on the community structure in the area. We thus conclude that only pH values below 3.0 and conductivity above 1200 $\mu\text{S cm}^{-1}$ have a detrimental effect on dragonflies. Other acidic waters are suitable habitats for specialists, which do not develop in neutral waters. Thus, moderate acidification enhances the dragonfly species richness of a region like the Muskau Arch area." (Authors)] Address: Rychła, Anna, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Department of Limnology of Stratified Lakes, Alte Fischerhütte 2, 16775 Stechlin, Germany. E-mail: a.rychla@igb-berlin.de

10625. Šacha, D. (2011): How many dragonflies are there in your garden pond? *Notulae odonatologicae* 7(7): 66-67. (in English) ["In an old, small garden pond in the city of Liptovský Mikuláš, N Slovakia (max. depth ca 30 cm, water volume ca 150 l, cleaned and aried-out annually before winter), *Pyrrhosoma nymphula* (26 larvae), *Aeshna cyanea* (7) and *Libellula depressa* (36) were observed in 2009, but in 2010 only *A. cyanea* could be recorded, with an abundance of 190 larval individuals." (Author)] Address: Šacha, D., Podtatranského 31, SK-031-01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@vazky.sk

10626. Samways, M.J.; Sharratt, N.J.; Simaika, J.P. (2011): Effect of alien riparian vegetation and its removal on a highly endemic river macroinvertebrate community. *Biological Invasions* 13(6): 1305-1324. (in English) ["Invasive alien trees along river banks can reduce indigenous biodiversity, while their removal can restore it. We assessed here family- and species level responses of river benthic macroinvertebrate assemblages to three riparian vegetation types (natural, alien trees, cleared of alien trees) in the Cape Floristic Region biodiversity hotspot. High species beta diversity of this highly endemic fauna meant that between-river, as well as seasonal effects, dominated assemblage patterns. SASS5, a qualitative, rapid bioassessment technique, based on the sensitivity of the families present, was used as a measure of river health and, indirectly, of water quality. SASS indicated a decline in water quality conditions after alien clearing, a likely response to the greater insolation and apparent erosion of cleared banks, resulting in elevated temperatures and suspended solids and lowered oxygen levels. Overall, cleared and natural sites were more similar to each other than to alien sites, suggesting some post-clearing recovery. However, many sensitive, endemic taxa survived in alieninvaded sites, and more than in the natural sites. These endemic species made use of shady, cool, high oxygen levels under the alien tree canopy. However, endemics declined in overall abundance in sites cleared of aliens, being replaced by more tolerant, widespread taxa. Clearance of the alien trees opened up the rivers to sunny conditions, which had a major impact on community composition. Vegetation types, oxygen levels and river width were important environmental variables affecting these macroinvertebrate responses. Re-establishment of invertebrate biodiversity matched that of indigenous vegetation, with the most sensitive endemic taxa only recovering after establishment of bushy

indigenous and shade-producing fynbos. Therefore, for biodiversity conservation objectives to be achieved, it is essential that indigenous plants are maintained and encouraged during and after clearing to ensure the recovery of endemic and sensitive taxa." (Authors) All taxa are identified on the species level and include Ephemeroptera, trichoptera, Odonata, and Plecoptera.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

10627. Sánchez-Guillén, R.A.; Wellenreuther, M.; Cordero-Rivera, A.; Hansson, B. (2011): Introgression and rapid species turnover in sympatric damselflies. *BMC Evolutionary Biology* 11:210. (in English) ["Background: Studying contemporary hybridization increases our understanding of introgression, adaptation and, ultimately, speciation. The sister species *Ichnura elegans* and *I. graellsii* are ecologically, morphologically and genetically similar and hybridize. Recently, *I. elegans* has colonized northern Spain, creating a broad sympatric region with *I. graellsii*. Here, we review the distribution of both species in Iberia and evaluate the degree of introgression of *I. graellsii* into *I. elegans* using six microsatellite markers (442 individuals from 26 populations) and five mitochondrial genes in sympatric and allopatric localities. Furthermore, we quantify the effect of hybridization on the frequencies of the genetically controlled colour polymorphism in females of both species. Results: In a principal component analysis of the microsatellite data, the first two principal components summarised almost half (41%) of the total genetic variation. The first axis revealed a clear separation of *I. graellsii* and *I. elegans* populations, while the second axis separated *I. elegans* populations. Admixture analyses showed extensive hybridization and introgression in *I. elegans* populations, consistent with *I. elegans* backcrosses and occasional F1-hybrids, suggesting hybridization is on-going. More specifically, approximately 58% of the 166 Spanish *I. elegans* individuals were assigned to the *I. elegans* backcross category, whereas not a single of those individuals was assigned to the backcross with *I. graellsii*. The mitochondrial genes held little genetic variation, and the most common haplotype was shared by the two species. Conclusions: The results suggest rapid species turnover in sympatric regions in favour of *I. elegans*, corroborating previous findings that *I. graellsii* suffers a mating disadvantage in sympatry with *I. elegans*. Examination of morph frequency dynamics indicates that hybridization is likely to have important implications for the maintenance of multiple female morphs, in particular during the initial period of hybridization." (Authors)] Address: Cordero Rivera, A., Depto de Ecología e Biología Animal, Univde de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

10628. Sasamoto, A.; Yokoi, N.; Teramoto, T. (2011): Description of a new *Sinorogomphus* from Northern Laos (Odonata: Chlorogomphidae). *International Journal of Odonatology* 14(1): 83-89. (in English) ["*Sinorogomphus hiten* sp. nov. is described and illustrated from both sexes (holotype male: Laos, Oudomxay province [20°36'14" N, 102°3'21" E, 1075 m a.s.l.], deposited in the National Science Museum, Tokyo, Japan). This is also a first record of the genus from Laos. The new species is easily differentiated from the other congeners in the male by its characteristic anal appendages, i.e. a moderately obtuse ventral spine on cerci and conspicuous paired bifurcate dorsal spines on epiproct, and by the undeveloped valvulae

lae vulvae in the female. Additionally we briefly mention our observations of the species in the field." (Authors)] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: aksmt@sea.plala.or.jp

10629. Schletterer, M.; Schönhuber, M.; Füreder Sathe, T.V. (2011): Laboratory mass culture technique for *Paramecium caudatum* (Protozoa: Paramecidae). *J. Curr. Sci.* 16(1): 133-135. (in English) ["*P. caudatum* is found in freshwater ponds, pools, ditches, rivers, lakes etc. and useful for rearing of dragonfly naiads *Crocothemis servillia servillia*. Dragonfly naiads are used in biological control of mosquitoes. Early instar naiads preferably feed on *paramecium*. Therefore, mass culture technique for *P. caudatum* has been developed under laboratory conditions (27±1°C, 75±1%R.H., 10 hr photoperiod). The glass aquarium of size 45 x 22 x 28 cm (Length x width x height) was used for mass culture of *P. caudatum*. ½ Lit of *paramecium* initial culture obtained from glass jar method was taken in 5 lit of distilled water in glass aquarium equipped with sliding cap, an aerator, some hydrilla plants and *paramecium* food (500 gm of folks and corn husk with equal proportion, growth medium with 50 drops of skimmed milk to develop bacteria as food for *paramecium*). The *paramecium* can reproduce by simple division 2-3 times per day. Thus, huge number of *paramecium* can be developed. The culture was allowed to reproduce 4 days to one week and then replaced and or used." (Author)] Address: Sathe, T.V., Dept of Zoology, Shivaji Univ., Kolhapur 416 004, Maharashtra, India

10630. , L. (2011): Biodiversity of diatoms and macroinvertebrates in an east European lowland river, the Tudevka River (Tver Region, Russia). *Boreal Environment Research* 16: 79-90. (in English) ["The Middle reaches (3Trubi and Krasny Stan) were characterised by *Paraleptophlebia cf cincta*, *Sialis morio*, *Erbpobdella octoculata* and a diverse Odonata fauna." (Authors)] Address: Schletterer, M., University of Innsbruck, Institute of Ecology, Dept River Ecology and invertebrate Biology, Technikerstr. 25. A-6020 Innsbruck, Austria. E-mail: schletterer@gmx.at

10631. Schmidt Dalzochio, M.; Costa, J.M.; Uchoa, M.A. (2011): Diversity of Odonata (Insecta) in lotic systems from Serra da Bodoquena, Mato Grosso do Sul State, Brazil. *Rev. Bras. entomol.* 55(1): 88-94. (in English, with Portuguese summary) ["A systematic survey was carried out in four lotic systems from Serra da Bodoquena, the largest natural forests of the State, from August 2007 to November 2008. 548 specimens belonging to 33 species, distributed in 5 families were sampled. Libellulidae was dominant, with 13 species, followed by Gomphidae, Coenagrionidae, Protoneuridae and Calopterygidae." (Authors)] Address: Schmidt Dazochio, Marina, Laboratório de Ecologia e Conservação de Ecossistemas Aquáticos, Universidade do Vale do Rio dos Sinos, Av. Unisinos, 950, Cristo Rei, 93022-000 São Leopoldo-RS, Brazil. E-mail: mahsdalzochio@gmail.com

10632. Schröter, A. (2011): Review of the distribution of *Somatochlora sahlbergi* (Odonata: Corduliidae). *International Dragonfly Fund - Report* 41: 1-27. (in English) ["Based on data collected from literature, museum collections, national databases and personal communications, an up-to-date map of the worldwide distribution of *Somatochlora sahlbergi* is presented. A new hypothesis is presented indicating that occurrences are at least regionally correlated with *palsa mires*. Two examples of larval habitats in Europe are illustrated and described, including the

first observation of reproduction in Norway and the first record of co-occurrence with Zygoptera in Europe. The exuvia of *S. sahlbergi* is illustrated and distinguishing features briefly discussed." (Author)] Address: Schröter, A., Rasenweg 10, D-37130 Gleichen, Germany. E-mail: asmustim@gmx.de

10633. Shah, R.D.T.; Shah, D.N.; Neseemann, H. (2011): Development of a macroinvertebrate-based Nepal Lake Biotic Index (NLBI): an applied method for assessing the ecological quality of lakes and reservoirs in Nepal. *Int. J. Hydrology Science and Technology* 1(1/2): 125-146. (in English) ["In Nepal, the impairment status of lakes and reservoirs has generally been measured and classified based on nutrient concentrations and physico-chemical parameters, typically with no direct measurement of biological communities. In response to the recent focus on the bioassessment of lakes and reservoirs, the macroinvertebrate-based Nepal Lake Biotic Index (NLBI) has been developed. Benthic samples were collected from reference and impaired lakes during 2006 and 2009 from two ecological zones: Terai-Siwaliks and Mid-Hills. We used a tolerance score based on a ten-point scoring system ranging from very pollution sensitive to very pollution tolerant taxa to calculate the NLBI. In reference to the transformation scale, the calculated NLBI describes the lake water quality as high, good, fair, poor and bad. Candidate metrics of richness measures and tolerance measures discriminated well between the reference and impaired lakes (Mann-Whitney U test, $p < 0.01$). The relationships between the biological metrics and the environmental variables were also established with the lake water quality class (LWQC). Further, the validation of the NLBI performance was done by assessing nine lakes/reservoirs from both the zones. Thus, the index presented here provides an effective method to measure the ecological condition of lakes and reservoirs in Nepal." (Authors) Taxa - including Odonata - are treated at the order level.] Address: Shah, R.D.T., Hindu Kush Himalayan Benthological Society, Bhaktapur, P.O. Box 20791, Sundhara, Kathmandu, Nepal. E-mail: ramdevishah@hkhbenso.org

10634. Sharma, K.K.; Chowdhary, S. (2011): Macroinvertebrate assemblages as biological indicators of pollution in a Central Himalayan River, Tawi (J&K). *International Journal of Biodiversity and Conservation* 3(5): 167-174. (in English) [Jammu and Kashmir, India; "Benthic macroinvertebrate assemblages at sub-tropical River of Jamu, River Tawi, corresponding to different catchment land uses, were assessed in 2008 to 2009 as indicators of water quality. The relative diversity, species richness, dominance, evenness indices, physico-chemical parameters and percentage of Annelida + Arthropoda + Mollusca (AAM) individuals were determined. Significant spatio-temporal variation was observed in relative diversity, with Diptera dominating the study area instead of Annelida, Odonata, Ephemeroptera, Hemiptera and Gastropoda. Significant relationships were recorded between physico-chemical parameters [...] and the occurrence of specific genera. Significant changes in macroinvertebrate assemblages were primarily due to changes in water quality. As elsewhere, macroinvertebrate communities proved to be good indicators of water quality and should be used as bioindicators in long-term monitoring of this river." (Authors) The taxa list includes "Ophiogomphus sps., Perithemis sps., Progomphus sps." probably identified by use of "Pennak, R.W. (1978). Fresh water invertebrates of United States."] Address: Sharma, K.K., Dept of Zoology,

University of Jammu-180006, Jammu and Kashmir, India. E-mail: prof.ksharma@gmail.com

10635. Sheewai, P.; Tan, J.; Ngiam, R.W.J. (2011): New record of dragonfly, *Zygomma obtusum* Albarada, 1881 in Singapore (Odonata: Anisoptera: Libellulidae). *Nature in Singapore* 4: 241-244. (in English) [30-III-2011, forest edge in Pulau Ubin, Singapore] Address: Ngiam, R.W.J., National Biodiversity Centre, National Parks Board, 1 Cluny Road, Singapore 259569. E-mail: ngiamwenjiang@nparks.gov.sg

10636. Shoukry, N.M.; Morsy, T.A. (2011): Arthropod borne diseases at Toshka, Upper Egypt. *World Journal of Zoology* 6(2): 126-133. (in English) ["The Egyptian Government plan to move in 25 years from an inhabited area of 6-25% of the total Nile land area to a larger one to compensate the huge increase of Egyptian populations. The decision was recently made to begin a development project at Toshka, on the western bank of the River Nile, Upper Egypt. Toshka depression is more or less close to Wadi Halfa of Sudan. Therefore, it was necessary to develop of Toshka on the west bank of the River Nile. Consequently, two specialized teams, one is national and the other is from WHO, were interested to study the health risk impact of the project on the vector-borne diseases and pests and to plan recommendations for prevention and feasible control of these diseases. The present study was initiated during spring of 2007 & 2008, as spot light survey, on wild rodents and the arthropods having medical and/or veterinary importance. Whilst *Psammomyes obesus* Cretzschmar, 1828 was the only recognized rodent, the following arthropods were identified: the scorpion, *Buthus quinquestriatus* Hanté en E., the insects, *Cephus tabidus* (F.), *Ischnura senegalensis* (Rambur, 1842), *Mantis religiosa* Linnaeus, 1758 and *Tabanus taeniola* Palisot de Beauvois, *Culicoides riethi* Kieffer, *Anopheles sergenti* Theobald and *Phlebotomus papatasi* (Scopoli). The medical, veterinary and agriculture importance of each species have been discussed and feasible control measures were suggested." (Authors) In contrast to this statement any medical, veterinary or agricultural importance of *I. senegalensis* is not discussed.] Address: Morsy, T.A., Dept of Parasitology, Faculty of Medicine, Ain Shams University, Cairo, 11566, Egypt. E-mail: morsyegypt2000@yahoo.com.

10637. Silva, F.L.; Oliveira, H.R.N.; Escarpinati, S.C.; Fonseca-Gessner, A.A.; Paula, M.C. (2011): Colonization of leaf litter of two aquatic macrophytes, *Mayaca fluviatilis*, *Aublet* and *Salvinia auriculata*, *Aublet* by aquatic macroinvertebrates in a tropical reservoir. *Ambi-Água, Taubaté* 6(1): 30-39. (in English, with Portuguese summary) ["Decomposition and colonization of *S. auriculata* and *M. fluviatilis* by macroinvertebrates were analyzed during 40 days to determine whether differences existed on colonization by aquatic macroinvertebrates of two macrophytes with distinct habits (submerged versus fluctuant). Leaf litter of *S. auriculata* and *M. fluviatilis* were incubated in 24 litter bags (12 of each species), in a small reservoir surrounded by a cerrado fragment with low level of anthropic impact. After 10, 20, 30 and 40 days, the litter bags were removed and aquatic macroinvertebrates community was analyzed. 220 macroinvertebrates were associated with *S. auriculata* and 261 were associated with *M. fluviatilis*, identified in 24 taxa. Both macrophyte species were colonized mainly by macroinvertebrate predators. *Ablabesmyia* with predator and collector food mechanisms was present in all sampling. The data showed an expressive increase of abundance during the process of decomposi-

tion and a decrease at the end of the experiment, in both macrophytes. Cluster analysis permitted inference that the colonization of the leaf litter by macroinvertebrates was determined by incubation time of leaf litter not by the habit of macrophytes (submerged or fluctuant)." (Authors) A single specimen of "Lestidae" was found among leaf litter of *M. fluviatilis* on the tenth and twentieth days.] Address: da Silva, F.L., Univde Federal de São Carlos - UFSCar, Depart. de Hidrobiologia, Laboratório de Entomologia Aquática, Brasil. E-mail: fabelha@hotmail.com

10638. Soluk, D.A.; Zercher, D.S.; Worthington, A.M. (2011): Influence of roadways on patterns of mortality and flight behavior of adult dragonflies near wetland areas. *Biological Conservation* 144(5): 1638-1643. (in English) ["The relatively low population size and long adult lifespan of dragonflies (Odonata, Anisoptera) makes them one of the few non-vertebrate groups likely to be impacted by direct roadway mortality. We studied adult dragonfly mortality and behaviour associated with roadways for a number of species. Daily mortality rates for dragonflies were estimated from standardized surveys along predetermined lengths of roads. Relative abundance and flight behaviour around and across roadways, a potentially important mortality factor, was determined from timed roadside observations. Observed flight behaviour provided no evidence that roads act as significant barriers to dispersal for adult dragonflies. Estimated mean number killed ranged from 2 to 35 dragonflies/km/day. Species varied greatly in their susceptibility to motor vehicles. Two species (*Plathemis lydia* and *Libellula luctuosa*) made up more than 70% of the dead dragonflies collected, but only represented 14% and 31% of live dragonflies observed, respectively. The relatively low flight heights of these two species over roads (typically under 2 m) may explain their susceptibility; however, another common species (*Tamea lacerata*) also exhibited low flight height but did not experience high mortality, possibly because of its increased flight agility. Large numbers of adult dragonflies were killed over the entire flight season by motor vehicle collisions, exhibiting the need for assessing the long-term impact of roadway mortality on dragonfly population dynamics." (Authors)] Address: Zercher, Deanna, The Nature Conservancy, 11304 North Prairie Road, Lewistown, IL 61542, USA. E-mail: dzercher@tnc.org

10639. Spyra, A. (2011): Autochthonic and allochthonic plant detritus as zoobenthos habitat in anthropogenic woodland ponds. *Oceanological and Hydrobiological Studies* 40(1): 27-35. (in English) ["Regardless of origin, all water bodies situated inside forests form a unique habitat for many freshwater animals due to the allochthonous detritus covering the bottom, composed mostly of leaves from waterside trees. For many years these woodland ponds have been considered to be advantageous to regional biodiversity. Investigations were carried out in eight anthropogenic woodland ponds, formed as a consequence of coal mining activities, situated in forest complexes in Upper Silesia (Southern Poland), to evaluate the impact of allochthonic and autochthonic plant detritus on the formation of zoobenthic communities, together with insolation intensity. In sites covered by a layer of allochthonic plant matter, zoobenthos were more abundant compared to places covered by autochthonic detritus. The density of zoobenthos in sun-exposed sites was two to three times greater than in shaded sites." (Author) Taxa - including Coenagrionidae, Aeschnidae, Libellulidae - are treated at the family level.] Address: Spyra, Aneta, Dept of Hydrobiology Faculty of Biology and Environmental Pro-

tection, The University of Silesia, ul. Bankowa 9, 40-007 Katowice, Poland. E-mail: aneta.spyra@us.edu.pl

10640. Staniczek, A.H.; Bechly, G.; Godunko, R.J. (2011): Coxoplectoptera, a new fossil order of Palaeoptera (Arthropoda: Insecta), with comments on the phylogeny of the stem group of mayflies (Ephemeroptera). *Insect Systematics & Evolution* 42(2): 101-138. (in English) ["*Mickoleitia longimanus* gen. et sp.n. is described from the Lower Cretaceous limestone of the Crato Formation in Brazil. It is attributed to a new family Mickoleitiidae and a new fossil insect order Coxoplectoptera within the palaeopterous Ephemera, based on the presence of an elongated costal brace. This fossil insect exhibits a very peculiar combination of derived characters like specialized forelegs with strongly elongated, free coxae, single-clawed pretarsus, and distinctly skewed pterothorax as in dragonflies. On the other hand, several plesiomorphies are present that exclude this taxon from modern Ephemeroptera, namely large hind wings with widened anal area and numerous cross veins that separate the elongate costal brace from the costal margin. Fossil larvae described by Willmann as larval *Cretereismatidae* are herein attributed to Mickoleitiidae fam. n., based on the shared presence of broad hind wing buds with distinctly broadened anal area, wing bud venation similar to the adult holotype, and subchelate forelegs with elongate free coxae. These larvae are also highly autapomorphic in the structure of their abdominal gills and laterally flattened body with vertically oval section that is unique within Ephemera. On the other hand they possess plesiomorphic lateral wing pads with pronounced articulation like Palaeozoic pterygote larvae, while wing pads in modern insects are always secondarily fused to the tergum. A similar fossil larva from the Jurassic of Transbaikals was earlier described as *Mesogenesia petersae* and classified within modern mayflies. It is herein attributed to Mickoleitiidae fam.n. Coxoplectoptera are recognized as putative sister group of modern Ephemeroptera based on the shared presence of only 7 pairs of abdominal gills, while Permoplectoptera still have retained 9 pairs of gills. The phylogenetic reclassification of the mayfly stem group by Willmann is critically discussed and modified." (Authors) Phylogenetic relationships to dragonflies are discussed.] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

10641. Strobbe, F.; McPeck, M.A.; De Block, M.; Stoks, R. (2011): Fish predation selects for reduced foraging activity. *Behavioral Ecology and Sociobiology* 65(2): 241-247. (in English) ["Despite the importance of foraging activity for the growth/predation risk trade-off, studies that demonstrated predator-induced survival selection on foraging activity under semi-natural conditions are relatively rare. Here, we tested for fish-induced selection for reduced foraging activity in two larval *Enallagma* damselflies using a field enclosure experiment. Fish imposed considerable mortality in both damselfly species and survival selection on foraging activity could be detected in *Enallagma geminatum*. We did not detect selection in *E. hageni*, probably because this species already was not eating very much in the absence of fish compared to *E. geminatum*. Both species responded strongly to the presence of predators by reducing their foraging activity. The documented survival selection on foraging activity was detected despite the already low activity levels in fish lake prey species and despite strong predator-induced plasticity in this trait." (Authors)] Address: Stoks, R.,

Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: rob-by.stoks@bio.kuleuven.ac.be

10642. Stübing, S. (2011): Hinweise zu Vorkommen und Bestimmung der Gefleckten Smaragdlibelle *Somatochlora flavomaculata* (Vander Linden, 1825) in Hessen. Libellen in Hessen 4: 53-58. (in German) [*Somatochlora flavomaculata* is very rare in Hessen, Germany. It was discovered in July 2010 at two localities in the valley of the river Kinzig. The author presents a brief compilation of records in Hessen, and gives notes on the habitat and field characters of *S. flavomaculata*.] Address: Stübing, S., Am Eichwald 27, 61231 Bad Nauheim. E-mail: stefan.stuebing@gmx.de

10643. Suhail, M.A.; Arshad, M.; Arif, J.; Gogi, M.D. (2011): Conservation of beneficial insects for sustainable agriculture. In: H. Gökçekuç et al. (eds.): *Survival and Sustainability, Environmental Earth Sciences, Part 9*. Springer-Verlag Berlin Heidelberg: 1463-1468. (in English) ["Insects are the most diverse group of organisms and are 3/4th of all described forms of life. Potentially they are highly indicative of environmental change through close adaptation to their environment. Migratory insect species are at the verge of extinction owing to increasing trend in global warming. Insect fauna also represent the majority of links in the community food chain and they likely have the largest biomass of the terrestrial animals. While the positive values of the insect fauna is remarkably more than that of their negative values. They act as pollinators and bio-control agents in the agro-ecosystem and have better impact for the development of sustainable agriculture. Thus, knowledge about them is fundamental to study the environment. One to three million insect species are identified worldwide while 2,000 from Pakistan. Out of which more than 954 species from 10 orders are identified/explored by the "Insect Biodiversity and Biosystematics Lab", Department of Agri-Entomology, University of Agriculture, Faisalabad, Pakistan. Of the described species in the order Orthoptera (Grasshoppers, Crickets, 279), Odonata (Dragonflies, 130), Lepidoptera (Moths and Butterflies, 82), Diptera (Syrphids, Fruitflies, Clypterate species 187), Homoptera (Aphids, Whiteflies, 65), Thysanoptera (Thrips, 52), Neuroptera (Antlion, Chrysopids, 42), Dictyoptera (Mantids, 32), Hemiptera (Reduviid & Anthocorid Bugs, 11) and Hymenoptera (Braconids, 17). The abundance of bee forage plants throughout the year determines the growth of honey bee colonies and hence the productivity of bee farming. Pakistan is endowed with more than 700 plant species. Out of which entomophilous crops cover 7.3 million hectares of land and forest more than 10 million hectares which can support 0.4–0.5 million honey bee colonies. Despite fairly abundant floral sources and quite suitable climatic conditions for keeping bees in the country, honey production (1000 tonnes) from 3,00,000 colonies is much below to its exploitable potential. All of this work has been completed by students M.Sc/Ph.D theses research and many students are working on different groups of insect fauna and their biodiversity. Eleven species of scarabid beetles (Coleoptera) have been identified recently on molecular level by DNA characterization. Many other identified species specimens, are placed in the departmental insectarium, which are not mentioned in this report." (Authors)] Address: Suhail, M.A., Dept of Agricultural Entomology, Insect Biodiversity and Biosystematics Research Laboratory, University of Agriculture, Faisalabad, Pakistan. E-mail: dranjumsuhailuaf@yahoo.com

10644. Suvorov, A. (2011): Comparative molecular genetics of *Nehalennia speciosa* (Charpentier) from geographically distant populations (Zygoptera: Coenagrionidae). *Odonatologica* 40(2): 131-136. (in English) ["The populations from western Russia, the Russian Far East and Japan are compared using Cytochrome Oxidase I (COI) gene and Internal Transcribed Spacer 1 (ITS1) region of rDNA sequences. The exceptionally low variation is discussed." (Author)] Address: Suvorov, A., Dept of Entomology, Faculty of Biology, Lomonosov Moscow State University, 119992 Moscow, Russia. E-mail: antony.suvorov@gmail.com

10645. Szkokan-Emilson, E.J.; Wesolek, B.E.; Gunn, J.M. (2011): Terrestrial organic matter as subsidies that aid in the recovery of macroinvertebrates in industrially-damaged lakes. *Ecological Applications* 21: 2082-2093. (in English) ["The importance of allochthonous carbon to the productivity of stream ecosystems in temperate ecozones is well understood, but this relationship is less established in oligotrophic lakes. The nearshore littoral zones, at the interface of terrestrial and aquatic systems, are areas where the influence of terrestrial subsidies is likely greatest. We investigated the response of nearshore communities to variation in the quantity and composition of allochthonous materials, determined the landscape characteristics that regulate the variation of this subsidy, and explored the potential for terrestrial restoration practices to influence the export of organic matter to lakes. Stepwise multiple regressions revealed that diversity of nearshore macroinvertebrate families increased with the amount of fine particulate organic matter (FPOM) captured in sediment traps. The quantity of FPOM (g) increased with forest cover, and the relative amount of FPOM (percentage of total particulate material) in the traps increased with surface area of wetland in the catchments. These models suggest that terrestrially derived subsidies are important in smelter-impacted watersheds, and that the restoration of forests and wetlands will speed the return of nearshore consumer community diversity in industrially damaged lakes." (Authors) Predators include (at the family level) Aeshnidae, Coenagrionidae, Corduliidae, and Libellulidae.] Address: Szkokan-Emilson, E.J., Cooperative Freshwater Ecology Unit, Biology Dept, Laurentian Univ., 935 Ramsey Lake Road, Sudbury, Ontario P3E 2C6 Canada. E-mail: exszkokanemilson@laurentian.ca

10646. Takhelmayum, K.; Gupta, S. (2011): Distribution of aquatic insects in phumdis (floating island) of Loktak Lake, Manipur, northeastern India. *Journal of Threatened Taxa* 3(6): 1856-1861. (in English) ["A study was made on the temporal fluctuations of distribution of aquatic insects around Phumdi Live (PL), Phumdi Mixed (PM) and Phumdi Dry (PD) areas of Loktak Lake. Phumdis are a heterogeneous mass of soil, vegetation and organic matter. The study revealed the presence of predators, and the absence of herbivores and detritivores in both PL and PM, the PD area was totally devoid of insects. Although both the habitats supported the same predator groups hemiptera and odonata, diversity and density in terms of family and species were higher in PL than in PM. Temporal fluctuations revealed that the Shannon-Weiner's Diversity Index values were highest in June for both PL (0.726) and PM (0.47). In both the sites the highest density was recorded in February. The relative abundance of hemiptera was higher than that of odonata in most of the months in PL. Phumdi Mixed was represented by one species of hemiptera only, in the month of February and dominated by odonates otherwise. Community composi-

tion of Odonata larvae did not show any difference between the two habitats. Although the study revealed low diversity and density of insects in both sites, the PL community provided a better habitat to aquatic insects than that of PM. These are of value as fish food and in turn for fish production." (Authors) (Most probably mis-) Identified taxa are *Tramea* sp., *Leucorrhinia* sp., and *Sympetrum* sp.] Address: Gupta, S., Dept of Ecology & Environmental Science, Assam University, Silchar, Assam 788011, India. E-mail: susmitau@rediffmail.com

10647. Tennessee State Parks Division of Resource Management. All Taxa Biodiversity Inventory (ATBI) (2011): Odonata (Damselflies and Dragonflies) of Tennessee. leaflet: (in English) ["The leaflet gives a checklist of the Tennessee, USA-Odonata currently known. I suppose it is intended for ticking and giving to the authoritatives, while no communication data are included. Curious paper ... It may be useful to visit the following page: <http://tn.gov/environment/parks/atbi/>. On the top there is a picture of a *Gomphus sandrius*, the Tennessee Clubtail, which occurs in only five counties in the Central Basin area of Middle Tennessee, USA." (Author)] Address: see <http>

10648. Terzani, F.; Cianferoni, F.; Giugliano, L.; Mazza, G.; Rocchi, S.; Zinetti, F. (2011): Segnalazioni faunistiche italiane, 503: *Lestes virens virens* (Charpentier, 1825) (Odonata: Lestidae). *Boll. Soc. ent. ital.* 143(1): 40. (in Italian) [Tuscany, Italy, Arcipelago Toscano, Isola di Capraia, Stagnone 14-IX-2007] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

10649. Theischinger, G.; Richards, S.J. (2011): *Nannophlebia kalkmani* spec. nov., a remarkable new species from Papua New Guinea (Anisoptera: Libellulidae). *Odonatologica* 40(2): 137-142. (in English) ["The new species is described from the foothills of the Muller Range, Western Province, Papua New Guinea. Holotype male: Gugusu, alt. 515 m a.s.l., 4-IX-2009; deposited at RMNH, Leiden. Diagnostic characters of the adult male are illustrated and the affinities of the species are discussed." (Authors)] Address: Richards, S.J., Herpetology Dept, South Australian Museum, North Terrace, Adelaide, S.A. 5000, Australia. E-mail: steve.richards@samuseum.sa.gov.au

10650. Tomazelli Jr., O.; Franco, G.M.S.; Casaca, J.M.; Munarini, A.C. & Dal Magro, J. (2011): Effect of the *Melia azedarach* L. on the predation of common carp fingerlings (*Cyprinus carpio*) by larvae of *Neuraeschna* (Odonata: Aeshnidae). *Braz. J. Aquat. Sci. Technol.* 15(1): 19-25. (in Portuguese, with English summary) ["The presence of larvae of predator insects in fish farming ponds is one of the factors that contribute to the reduction of the survival of fingerlings and consequently to the decrease of production profits. Dragonflies ... are among the insects that have a harmful effect on fish farming. The larvae are aggressive carnivores and predate post-larvae fish and fingerlings, and thus become economically relevant plagues. The objective of this work is to study the occurrence of Odonata larvae in fish ponds and evaluate the effect of *Melia azedarach* extract adsorbed in silica to control Odonata larvae predation on common carp. ... *Neuraeschna* ... was used in the biological tests. During the predation tests of common carp fingerlings (*C. carpio*) by the *Neuraeschna* larva, the average consumption was of 5,2 and 7,2 fingerlings in the treatments with and without Cinamono Ethanolic extract (EEC), respectively. The

adoption of good practises in Aquaculture and the sustainability of fish farming require the adoption of natural products." (Authors)] Address: Dal Magro, J., Programa de Pós-Graduação em Ciências Ambientais, Universidade Comunitária da Região de Chapecó, Caixa Postal 1141, CEP 89.809-000, Chapecó – SC, Brazil. E-mail: jacir@unochapeco.edu.br

10651. Trapero-Quintana, A.; Reyes-Tur, B.; Mateu-Arebalo, J. (2011): Distancia sobre el agua durante la emergencia en larvas de Odonata para tres cuerpos dulceacuícolas de Cuba Oriental. *Dugesiana* 17(2): 103-111. (in Spanish, with English summary) ["The distance reached over the water surface at the time of emergence by species of Odonata in three ecosystems from the Santiago de Cuba province, was estimated. A positive correlation between height and species size was found in the three localities. The greater heights were registered in Guásima and Arroyo, the best conserved areas and with a few stressing elements. In general, anisopterans reached the superior heights, whereas zygopterans tend to be close to the water surface. Females reached major heights than the males." (Authors)] Address: Reyes-Tur, B., Univ. de Oriente. Depto de Biología. Patricio Lumumba s/n 90500. Santiago de Cuba, Cuba. E-mail: breyes@cnt.uo.edu.cu

10652. Tschanz, B.; Hegglin, D.; Gloor, S.; Bontadina, F. (2011): Hunters and non-hunters: skewed predation rate by domestic cats in a rural village. *Eur. J. Wildl. Res.* 57: 597-602. (in English) [Finstersee (70 households, 0.25 km², 47°10'N 8°37'E), Switzerland; "Domestic cats *Felis catus*, as companion animals provided with supplemental food, are not limited by the availability of wild prey and locally occur at extraordinary high densities. There is growing concern about the potential impact of large cat numbers on native prey populations. In the present study, we quantified the minimum number of animals killed in a rural village in Switzerland by asking owners (1) to estimate the predation rate in advance and (2) to record prey animals returned home by their pets. The frequency distribution of the numbers of prey items was markedly skewed: 16% of the cats accounted for 75% of prey, irrespective of sex, age or breed. A large fraction of owners considerably overestimated their cat's predation, indicating that surveying predation rates by means of a questionnaire alone is not sufficient. The observed average rate of predation within 48 days in spring was 2.29 prey items/cat/month (N=32 cats); major prey types were rodents (76.1%) and birds (11.1%). The absolute number of prey items taken per area is striking and indicates that cat predation represents an important factor in ecosystems. Its role may be momentous in intensively fragmented urban habitats, where cat densities are especially high." (Authors) 25 of the prey items accounted to insects and included four Odonata specimens.] Address: Bontadina, F., SWILD, Urban Ecology and Wildlife Research, Wuhstr. 12, 8003, Zürich, Switzerland. E-mail: fabio.bontadina@swild.ch

10653. Tumilovich, O.N. (2011): Emperor Dragonfly, *Anax imperator* (Leach, 1815). In: W.P. Dedkov, G.W. Grishanov (eds), *Red Data Book of the Kaliningrad Region. Animals, Plants, Funges, Ecosystems.* The Publishing House of the Immanuel Kant State University of Russia, Kaliningrad: 95. (in Russian) [distribution map of *A. imperator* in the Kaliningrad region of Russia (situated between Poland and Lithuania)] Address: Tumilovich, Olga, Kaliningrad State Technical University, 236000 Kaliningrad, Russia. E-mail: Leventetuibrambler.ru

10654. Tunmore, M. (2010): Reports from Costal Stations - 2008: Lizard Peninsula. *Atropos* 39: 39-41. (in English) [*Sympetrum fonscolombii*; at light: *Aeshna mixta* and *Sympetrum striolatum*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freeseerve.co.uk

10655. Uieda, V.S.; Pinto, T.L.F. (2011): Feeding selectivity of ichthyofauna in a tropical stream: space-time variations in trophic plasticity. *Community Ecology* 12(1): 31-39. (in English) ["In studies on the partitioning of resources, one issue which has been largely neglected is the change in feeding habits based on the availability of food in the environment, an aspect which is dealt with here with regard to the ichthyofauna of a tropical stream. Feeding preference was analyzed for eight species of fish which consumed high percentages of aquatic insects, based on a collection of fish and invertebrates during both the dry season (June 2006) and the wet season (December 2006) and in two different stretches of the stream, one of which shaded by gallery forest ("closed area") and the other just bordered by herbaceous vegetation ("open area"). Based on a quantitative analysis of the composition of the benthic fauna and the diet of the ichthyofauna, the electivity index was calculated in order to assess potential alterations in the feeding preferences in line with seasonal and spatial modifications to the structure of the habitat and the supply of food. The analysis of the abundance of aquatic insects in the environment showed a predominance of Ephemeroptera in all situations analyzed (areas and seasons), with this insect group being the food item preferred by the majority of fish. However, space-time variations were observed in prey selection by the ichthyofauna. The analysis of supply, consumption and preference demonstrated somewhat varied situations for the majority of species, with both high and low selectivity for items consumed in low and high percentages, with the preferred item varying both spatially and seasonally. The sole exception to this was *Phalloceros harpagos*, choosing Diptera-Chironomidae in all the situations analyzed." (Authors) Odonata are represented at the family level by Aeshnidae, Calopterygidae, Coenagrionidae, and Corduliidae] Address: Uieda, V.S., UNESP — Univ Estadual Paulista Department of Zoology C.P. 510 18618-970 Botucatu, SP Brazil. E-mail: vsuieda@ibb.unesp.br

10656. van Damme, K.; Banfield, L. (2011): Past and present human impacts on the biodiversity of Socotra Island (Yemen): implications for future conservation. *Zoology in the Middle East, Supplementum* 3: 31-88. (in English) ["The Socotra Archipelago (Yemen) is globally recognized for its outstanding biodiversity and endemism, designated on this basis a UNESCO World Heritage Site in 2008. The island underwent long geological and political isolation, ensuring preservation of unique ecosystems until the start of the new millennium. Now, Socotra Island is undergoing rapid development, out of balance with conservation. Major causes for biodiversity loss in other global insular ecosystems such as habitat fragmentation and degradation, pollution, invasive species and the impact of tourism, are becoming pressing issues that deserve close attention. Unsustainable resource use, the loss of traditional land management and illegal trade in biota are worrying phenomena that further increase the pressures on Socotra's ecosystems. We provide the first comprehensive review of potential human impacts on Socotra before the 21st century, an updated discussion of some of the principal threats to its biodiversity in recent

times, discussing local examples within a historical context of known extinction processes on islands, and underline the importance of traditional knowledge in the protection of Socotran ecosystems." (Authors) The paper includes references to the local extinction of *Rhyothemis semihyalina* (Odonata) in the Hadiboh Plain.] Address: Van Damme, K., Department of Biology, Ghent University, K. L. Ledeganckstr. 35, 9000 Ghent, Belgium. E-mail: kay.vandamme@gmail.com.

10657. Van Duzor, R.G. (2011): Community structure and secondary production of aquatic macroinvertebrates in coastal wetland ponds of the west copper river Delta, Alaska, following tectonic uplift. M.Sc. thesis, Dept Biology, Loyola University Chicago: 75 pp. (in English) ["The Great Alaska Earthquake of 1964 (magnitude 9.2) greatly altered the coastal landscape in southcentral Alaska and had particularly dramatic effects on the Copper River Delta (CRD), an ecologically and economically important area within the Chugach National Forest. The earthquake caused tectonic uplift (up to 3.5m) of the CRD coastal tidal marsh and transformed it into a perched freshwater marsh. Copper River Delta ponds, which are crucial habitat to a myriad of migrating songbirds, shorebirds, and waterfowl, are of particular interest to wildlife managers in the CRD and along the Pacific coasts of North, Central and South America. This study was conducted to characterize the general ecology of CRD ponds, with particular focus on aquatic insect communities. Twelve ponds in two geomorphologic zones were studied to compare physicochemical characteristics, aquatic insect community structure and annual secondary production. Six ponds were in the Uplifted Marsh (UM), which was formed as a result of the tectonic uplift, and six ponds were in the Outwash Plain (OP), an area that was present before the earthquake and was relatively unaffected by tectonic activity. Uplifted Marsh and OP ponds were similar with respect to basic physicochemical parameters. *Callicorixa vulnerata* (Uhler 1861) (Hemiptera: Corixidae) was the numerically dominant non-dipteran taxon in 11 of the 12 study ponds and represented 30-81% of all non-dipterans collected. Densities of the numerically dominant predators, *Aeshna* spp. and *Enallagma* spp. were higher in OP ponds (<1-20/m²) compared to UM ponds (<1-4/m²), and production was 5X higher in OP than in UM ponds (507 vs. 97 mg AFDM/m² /yr). In contrast, secondary production of aquatic insect primary consumers such as *Agrypnia* spp. (Trichoptera: Phryganeidae) and *Nemotaulius hostilis* (Hagen 1873) (Trichoptera: Limnephilidae), although found in relatively low densities (<1-3.3/m²), was almost 10X higher in UM ponds than in OP ponds (246 vs. 30 mg AFDM/m² /yr). Overall, annual secondary production of non-dipterans was greater in UM ponds than in OP ponds (3091 vs. 2205 mg AFDM/m² /yr). Results from this study indicate distinct differences in aquatic insect community structure, secondary production, and functional feeding group composition in UM and OP ponds. Creation of the UM ecosystem by tectonic disturbance increased the availability of suitable habitats for aquatic insects, particularly primary consumers, e.g., Trichoptera, and omnivores, e.g., *C. vulnerata*, which subsequently colonized UM ponds to take advantage of the newly abundant primary food resources (aquatic vegetation). In comparison, more mature OP ponds supported higher densities of aquatic insect predators, particularly Odonata, while supporting lower densities of Trichoptera and *C. vulnerata*." (Author)] Address: not stated

10658. van Hardenbroek, M.; Heiri, O.; Wilhelm, M.F.; Lotter, A.F. (2011): How representative are subfossil assemblages of Chironomidae and common benthic invertebrates for the living fauna of Lake De Waay, the Netherlands? *Aquatic Science* 73: 247-259. (in English) ["The distribution of benthic invertebrates and their subfossil remains was examined within the basin of De Waay, a dimictic, eutrophic lake in the Netherlands. We focused on Chironomidae, but also report the abundances of 11 invertebrate groups that potentially produce chitinous remains that are preserved in the fossil record, although their remains could only be identified at a coarser taxonomic resolution. Most living invertebrates sampled in different seasons were constrained to the littoral zone, with the exception of a few taxa (*Ceratopogonidae*, *Chaoborus flavicans*, and *Chironomus*) that are adapted to low oxygen conditions in the seasonally anoxic profundal zone. In contrast, assemblages of invertebrate remains in lake surface sediments were similar in the entire lake basin, suggesting that considerable numbers of invertebrate remains are transported and redeposited off-shore in Lake De Waay, due to its steep bathymetry. These results indicate that a single sediment sample obtained from the centre of this lake contains subfossil invertebrate remains originating from the entire lake basin. In Lake De Waay, the majority of taxa found in the living assemblages were identified as remains in lake surface sediments, at least for the Chironomidae that could be identified at a similar taxonomic level in living and subfossil assemblages. [...] Our results indicate that subfossil assemblages in surface sediment samples provide spatially integrated and representative samples of the living assemblage. However, a combined approach examining both the living benthic invertebrate fauna and invertebrate remains in lake surface sediments will potentially give a more complete and detailed overview of benthic invertebrates in a lake ecosystem than an approach based exclusively on one of these groups." (Author) *Aeshna mixta* and *Ischnura elegans* were representatives of the living assemblage, "Odonata" of the subfossil.] Address: van Hardenbroek, M., Laboratory of Palaeobotany & Palynology, Institute of Environmental Biology, Palaeoecology, Utrecht University, Budapestlaan 4, 3584 CD Utrecht, The Netherlands. E-mail: m.r.vanhardenbroek@uu.nl

10659. Vantiegheem, P.; De Groote, D.; Dewolf, J. (2011): Rediscovery of *Leucorrhinia caudalis* (Charpentier, 1840) in Belgium after a century of absence. *Libellenvereniging Vlaanderen - nieuwsbrief* 5(2): 2-3. (in Dutch, with English summary) [21-V-2011; "A population of *L. caudalis* was found at an old sand pit in Fouches, province of Luxembourg, in the very south of Belgium. In the following weeks the species was seen at four other places. These constitute the first sightings and the discovery of a population of *Leucorrhinia caudalis* in Belgium since the records of the 19th century." (Authors)] Address: Vantiegheem, P. E-mail: ptr.vantiegheem@gmail.be

10660. Varsani, A. (2011): Novel virus from dragonflies. *Microbiology Today* Aug. 2011: 192-193. (in English) [For details see: OAS No. 10298.]

10661. Vilenica, M.; Micetić Stanković, V.; Franković, M. (2011): Dragonfly fauna (Insecta, Odonata) in the Turo-polje region (Croatia). *Natura Croatica* 20(1): 141-158. (in English, with Croatian summary) ["This study presents the results of dragonfly fauna research in the Turo-polje region of Croatia. Faunal analyses were conducted in the period from 1986–2009, with some interruptions, while an ecological analysis (composition of dragonflies ac-

ording to habitat characteristics such as vegetation structure, air temperature, cloudiness) was conducted in the period 2007–2009. Faunal and ecological analyses were carried out at seventeen and nine localities, respectively. A total of 35 dragonfly species was recorded, indicating high species richness in comparison to the total number of 67 species known in Croatia. Zoogeographic analysis of the recorded dragonfly species showed the domination of the Holo-Mediterranean element which indicates complex glaciation and interglaciation processes during the geological past in Europe, when the Croatian territory served as a refugium. The results show that the distribution and abundance of dragonflies are indicative of habitat characteristics (vegetal structure, cloudiness and air temperature). Dragonflies prefer mosaic habitats (diverse vegetation structure) with average air temperatures ranging from 26–28°C and sunny weather. Since this research was conducted in only a part of the whole Turo-polje region, and only adult specimens were sampled, further research should be focused on the life cycles of dragonflies and their distribution throughout the entire Turo-polje region." (Authors)] Address: Vilenica, Marina, Faculty of Teacher Education, University of Zagreb, Dept in Petrinja, Trg Matice hrvatske 12, 44250 Petrinja, Croatia. E-mail: marina.vilenica@gmail.com

10662. Villanueva, R.J.T. (2011): Odonata fauna of Dimabok Lake and its surroundings, Davao Oriental, Mindanao Island, Philippines. *International Dragonfly Fund - Report* 38: 1-29. (in English) ["During three visits in October and December 2010 and May 2011, a total of 56 Odonata species was recorded. All species reported here represent first Odonata records in the area. The most noteworthy discoveries were one novelty (*Hydrobasileus vittatus*) to the Philippine fauna and two first records (*Tetracanthagyna brunnea* and *Aethriamanta gracilis*) from Mindanao Island. Seven species represent either new species to science or potentially new species; one *Drepanosticta* and one *Amphicnemis* are new to science, and another *Drepanosticta*, *Amphicnemis*, *Pseudagrion*, *Gomphidia* and *Urothemis* are potentially new to science." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000 Philippines. E-mail: rjtvillanueva@gmail.com

10663. Villanueva, R.J.T.; Gil, J.R.S. (2011): Odonata Fauna of Catanduanes Island, Philippines. *International Dragonfly Fund - Report* 39: 1-38. (in English) ["During a two week survey in April 2011, twenty six sites on Catanduanes Island, Philippines were explored. 42 Odonata species are new island records, raising the known species of the island into 60. Among the new island records are three *Amphicnemis* species new to science." (Authors)] Address: Gil, J.R.S., #310 Rizal Avenue Extension Street, San Vicente, Virac, Catanduanes, 4800 Philippines. E-mail: giljohnronel@yahoo.com

10664. Villanueva, R.J.T.; Schorr, M. (2011): Two new damselfly species from Polillo Island, Philippines (Odonata: Platystictidae). *Zootaxa* 3017: 46-50. (in English) ["*Drepanosticta wildermuthi* spec. nov. and *Sulcosticta vantoli* spec. nov. are described and illustrated. The two species are compared with their nearest relatives, *D. moorei* van Tol & Müller and *S. viticula* van Tol, respectively. *Drepanosticta wildermuthi* spec. nov. has shorter anterior lobe processes compared to *D. moorei*. *Sulcosticta vantoli* spec. nov. has a simpler paraproct structure compared to *S. viticula*." (Authors)] Address: Schorr, M., Schulstr. 7B, 54314 Zerf, Germany. E-mail: bierschorr@online.de

- 10665.** Wan, F.-x.; Jiang, Y.-h.; Wan, J. (2011): Description of *Bayadera bidentata* Needham and *Asiagomphus cuneatus* (Needham) larvae from Huangshan Mountain, China (Zygoptera: Euphaeidae; Anisoptera: Gomphidae). *Odonatologica* 40(2): 143-147. (in English) ["The morphology of the last instar larvae is described and illustrated for the first time, based on specimens from Anhui. Notes on their ecology and habitat are provided." (Authors)] Address: Wan, F.-x., Nanjing Forestry University, Nanjiang, Jiangsu-210037, China
- 10666.** Wang, Q.; Yuan, X.-z.; Liu, H. (2011): Community and biodiversity of aquatic insects attached on the stones in upland headwater stream of southwestern China: A case study of Yudu stream in Chongqing. *Acta Hydrobiologica Sinica* 35(5): 1-6. (in Chinese, with English title) [The taxa list includes "Euphaeidae"; in general the abundance of Odonata at the four sampling sites was very low.] Address: Yuan, X.-z., College of Resource and Environment Science, Chongqing University, Chongqing 400030, China. E-mail: xzyuan63@yahoo.com.cn
- 10667.** Weihrauch, F.; Karle-Fendt, A.; Krach, J.E.; Lohr, M.; Seidenbusch, R. (2011): *Coenagrion scitulum* in Bayern: Richtigstellung und Statusbericht (Odonata: Coenagrionidae). *Libellula* 30(1/2): 33-42. (German, with English summary) ["The published first record of *C. scitulum* in Bavaria (Germany) pertained in fact to misidentified exuviae of *C. puella* or *C. pulchellum*. The reasons for this misidentification are analysed and new features for the discrimination of *C. scitulum* exuviae from other, similar species are presented. In addition, all hitherto known records of *C. scitulum* in Bavaria are listed, including the actual first record. All records but one were hitherto taken in the lowlands of river Danube in the region of Ingolstadt, and a further distribution of *C. scitulum* along the Danube is regarded as most likely." (Authors) Address: Weihrauch, F., Jägerstr. 21A, 85283 Wolnzach, Germany. E-mail: florian.weihrauch@t-online.de
- 10668.** Weinländer, M.; Füreder, L. (2011): Crayfish as trophic agents: Effect of *Austropotamobius torrentium* on zoobenthos structure and function in small forest streams. *Knowledge and Management of Aquatic Ecosystems* (2011) 401, 22: 15 pp. (in English, with French summary) [Austria; "Crayfish are among the largest and most threatened invertebrates in freshwater habitats. Due to their size, behaviour and feeding activity they may affect structure and function of aquatic ecosystems and their organisms. Despite their importance in many freshwaters and available information on their ecology for several species little is known about the European crayfish *A. torrentium*. In order to evaluate the potential effects of indigenous crayfish presence on the structural and functional composition of the zoobenthic community, we measured population size and densities of three *A. torrentium* populations and compared macroinvertebrate assemblages and physicochemical parameters in three streams with and three without crayfish. The experimental setup considered crayfish effects at a large scale in defined reaches of pristine headwaters in association with the whole benthic fauna under natural conditions. Presence of *A. torrentium* significantly affected zoobenthic abundance, diversity and the relative proportions of functional feeding groups. In crayfish streams, especially Trichoptera and collector gatherers were more abundant and diverse, while sites without crayfish had significantly higher abundances and diversities of shredders and wood feeders. Our study provided strong evidence that the presence of the indigenous crayfish *A. torrentium* had important effects on the trophic cascades of headwater stream communities." (Authors) Odonata are only treated at the order level.] Address: Alpine Stream Ecology and Invertebrate Biology, Institute of Ecology, University of Innsbruck, Technikerstr. 25, 6020 Innsbruck, Austria. E-mail: martin.weinlaender@student.uibk.ac.at
- 10669.** Wellenreuther, M.; Sanchez-Guillen, R.A.; Cordeiro-Rivera, A.; Svensson, E.I.; Hansson, B. (2011): Environmental and climatic determinants of molecular diversity and genetic population structure in a coenagrionid damselfly. *PLoS ONE* 6(6): e20440. doi:10.1371/journal.pone.0020440: 16 pp. (in English) ["Identifying environmental factors that structure intraspecific genetic diversity is of interest for both habitat preservation and biodiversity conservation. Recent advances in statistical and geographical genetics make it possible to investigate how environmental factors affect geographic organisation and population structure of molecular genetic diversity within species. Here we present a study on a common and wide ranging insect, the blue tailed damselfly *Ischnura elegans*, which has been the target of many ecological and evolutionary studies. We addressed the following questions: (i) Is the population structure affected by longitudinal or latitudinal gradients? (ii) Do geographic boundaries limit gene flow? (iii) Does geographic distance affect connectivity and is there a signature of past bottlenecks? (iv) Is there evidence of a recent range expansion and (v) what is the effect of geography and climatic factors on population structure? We found low to moderate genetic sub-structuring between populations (mean $F_{ST} = 0.06$, $D_{est} = 0.12$), and an effect of longitude, but not latitude, on genetic diversity. No significant effects of geographic boundaries (e.g. water bodies) were found. F_{ST} - and D_{est} -values increased with geographic distance; however, there was no evidence for recent bottlenecks. Finally, we did not detect any molecular signatures of range expansions or an effect of geographic suitability, although local precipitation had a strong effect on genetic differentiation. The population structure of this small insect has probably been shaped by ecological factors that are correlated with longitudinal gradients, geographic distances, and local precipitation. The relatively weak global population structure and high degree of genetic variation within populations suggest that *I. elegans* has high dispersal ability, which is consistent with this species being an effective and early coloniser of new habitats." (Authors)] Address: Wellenreuther, Maren, Section for Animal Ecology, Ecology Building, Lund University, Sölvegatan 37, SE-223 62 Lund, Sweden. E-mail: maren.wellenreuther@zoekol.lu.se
- 10670.** White, E.; Zaremba, V.; Diehl, S. (2011): Flying jewels of New York. *New York State Conservationist* 65(6): 2-7. (in English) [This general account on the New York, USA-Odonata includes the note from Bill Chase on page 6 "Searching for Dragons -Finding Myself". For details see: <http://www.dec.ny.gov/docs/administrationpdf/0611consmagweb.pdf>.] Address: not stated
- 10671.** Wiesenborn, W.D. (2011): UV-excited fluorescence on riparian insects except Hymenoptera is associated with nitrogen content. *Psyche* Volume 2011, Article ID 875250: 6 pp. (in English) ["I photographed ultraviolet-excited fluorescence of external resilin on insects in 7 orders, 17 families, and 18 genera collected from shrubs and trees alongside the Colorado River in western Arizona, USA. The localized blue-fluorescence characteristic of resilin was emitted by a variety of structures including sutures and wing articulations on Odonata and Diptera and

membranous wings, compound eyes, or ocelli on Hemiptera, Neuroptera, and Hymenoptera. Different widespread, but blotchy, light-blue fluorescence was observed on cuticles of immature Orthoptera and adult Hemiptera. Insects in Hymenoptera and Coleoptera fluoresced least. Ranked amounts of fluorescence, relative to body area, were positively correlated with ranked nitrogen contents (%N of body dry-mass) of insects in genera excluding Hymenoptera. Nitrogen concentrations in insect exoskeletons appear to increase as abundances of resilin and other fluorescent, elastic proteins increase. These structural compounds may be an important nitrogen source for insectivorous vertebrates." [Figure 3 shows the blue fluorescence in UV light on ventrolateral and dorsal views of the thorax of *Pachydiplax longipennis*.] "Most fluorescence ... was produced by translucent white cuticle attached to the axillary and humeral plates below the base of each front and hind wing. The articulations above the wings similarly fluoresced blue. Broad bands of whitish cuticle ventrally joining the thorax and abdomen also fluoresced. Narrow bands of fluorescence were detected between the front coxa and trochanter, at the bases of the middle and hind coxae, and at the margins of the abdominal sternum." (Author) Address: Wiesenborn, W.D., USDI Bureau of Reclamation, Lower Colorado Regional Office, P.O. Box 61470, Boulder City, NV 89006, USA

10672. Winter, A.-E., de (2011): *Somatochlora flavomaculata* in the Eemshaven. *Brachytron* 14(1): 49-53. (Dutch, with English summary) ["This article describes the observation of *Somatochlora flavomaculata* in the Eemshaven harbour area, Groningen, in the Northern part of the Netherlands on 27 June 2008. Other observations in the Northern part of the Netherlands are discussed as well as wandering individuals in the rest of the country. The species is known to wander and has even been found in the Wadden Islands. The nearest populations in the Netherlands are in swamps and peat moor areas of North-west Overijssel / South-east Friesland, 80 km to the South and West of the Eemshaven area. The species also occurs in North-west Germany, where in 2008 a new population was discovered in Ochsenweide, Niedersachsen, a moorland that lays 50 km to the East of the Eemshaven area. Wandering *Somatochlora flavomaculata* individuals observed elsewhere could originate from the nearby Dutch or German populations." (Author) Address: Winter, A.-E., de, Landschapsbeheer Groningen, Talmaweg 23, 9981 CW Uithuizen, The Netherlands. E-mail: a.e.de.winter@Landschapsbeheergroningen.nl

10673. Winterbourn, M.J.; Pohea, S.R.; Ball, O.J.-P. (2011): Establishment of larval populations of the dragonfly *Tramea loewii* Kaup, 1866 (Odonata: Libellulidae) in lakes of northern New Zealand. *New Zealand Journal of Zoology* 38(2): 173-179. (in English) [*T. loewii* "was first seen in New Zealand in 2005, on the Aupouri Peninsula, Northland, and is likely to be self-introduced from Australia. To determine whether the species had become established on the Peninsula, an aquatic survey of 17 lakes was carried out in November 2008. Larvae were found in eight lakes, including six at the southern end of the Peninsula. Most colonised lakes were surrounded by pasture and had dense marginal beds of sedges and rushes where most larvae were collected. Six of an estimated 14 larval instars were found, the penultimate (F-1) and antepenultimate (F-2) instars being most common. The most abundant prey items in the guts of 17 late-instar larvae were Corixidae, chironomid larvae and damselfly larvae. The potential effect of *T. loewii* on resident lake faunas is dis-

cussed briefly." (Authors)] Address: Winterbourn, M.J., School of Biological Sciences, University of Canterbury, Christchurch, New Zealand. Email: michael.winterbourn@canterbury.ac.nz

10674. Yoshida, M. (2011): Odonata in the upper and middle reaches of the Yahagi River, 2nd report. *Yahagi Research* 15: 27-42. (in Japanese, with English translation of title) [A total of 63 Odonata species down- and upstream of a dam in the Yahagi River, Japan were recorded. 62 species were found downstream of the dam, and only 33 species were recorded in the upstream stretch of the river. The running waters dwelling species were lacking from the upstream sections of the river.] Address: not transliterated into English

10675. Yu, X.; Bu, W. (2011): A description of the remarkable larva of *Pseudolestes mirabilis* Kirby (Odonata: Pseudolestidae). *International Journal of Odonatology* 14 (2): 105-110. (in English) ["The larva of the Chinese endemic *Pseudolestes mirabilis* is described and figured for the first time. Specimens were collected from Hainan, the only known locality for this species. The presence of ventral paired gill tufts on S10 and sack-like caudal gills indicate that among other zygopteran families this species may be most closely related to the Amphipterygidae, but other characters, especially those of the adult suggest it may be sufficiently unique to warrant placement in its own family." (Authors)] Address: Yu, X., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, 300071, PR China. E-mail: nk_yuxin@yahoo.cn

10676. Zaldívar Ezquerro, C.; Rodríguez, P.C.; Latasa Asso, T. (2011): Provisional catalogue and biogeographical analysis of the Odonata of La Rioja (Spain). *Boletín de la S.E.A.* 48(1): 389-393. (in English, with Spanish summary) ["49 species are included (23 Zygoptera and 26 Anisoptera) in the provisional catalogue, of which 22 species are recorded from La Rioja, Spain for the first time. A biogeographical analysis of these taxa is also provided." (Authors)] Address: Zaladrana Odonatology Group and the Institute of La Rioja Studies Research Plan: "Order of Odonata insects in the autonomous region of La Rioja", C/. General Urrutia, 61 F. 26006 Logroño (La Rioja, Spain. E-mail: carlos.zaldivar@larioja.org

10677. Zhang, H.-j.; Sei, L. (2011): Study on *Gynacantha* genus (Odonata: Aeshnidae) from China. *Journal of Anhui Agricultural Sciences* 39(13): 7562-7564, 7566. (in Chinese, with English summary) [Nine *Gynacantha* species are known from China. *G. japonica* Barteneff, 1909 and *G. saltatrix* Martin, 1909 are new records for Shaanxi Province. Information on the distribution of the taxa in China are given. The species are illustrated and keyed.] Address: Zhang, H.-j., Shaanxi Bioresource Key Laboratory, Shaanxi Univ. of Technology, Hanzhong, Shaanxi 723000, China

10678. Zhang, Z.-q. (2011): Describing unexplored biodiversity: Zootaxa in the International Year of Biodiversity. *Zootaxa* 2768: 1-4. (in English) [In the International Year of Biodiversity (2010), Zootaxa published 30 Odonata species new to science including three new genera.] Address: Zhang, Z.-q., Landcare Research, Private Bag 92170, Auckland 1142, New Zealand. E-mail: ZhangZ@landcareresearch.co.nz

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1997

10679. Carl, M. (1997): Die stillgelegte Kiesgrube Jesenwang - Artenreservoir für den Landkreis Fürstentfeldbruck (Oberbayern). 1. Bestandsaufnahme der Wasserinsekten (Ephemeroptera, Odonata, Heteroptera, Planipennia, Coleoptera, Trichoptera). Nachrichtenblatt der Bayerischen Entomologen 46(3/4): 81-89. (in German, with English summary) [The aquatic insect fauna of a gravel-pit in southern Bavaria was studied. The 80 species include 11 common Odonata species.] Address: Carl, M., Gollnbergstr. 12, 82299 Türkenfeld, Germany

10680. Onore, G. (1997): A brief note on edible insects in Ecuador. Ecology of food and nutrition 36(2-4): 277-285. (in English) ["Ecuador still conserves the ancestral tradition of entomophagy, notably in the countryside where the native population is relatively isolated from technological progress. Eighty-three (83) edible species are listed for the country; none of them are a main dish but many of the insects are used to complement other animal protein sources in the diet. The most common edible insects belong to the orders Coleoptera and Hymenoptera, which are consumed either in the larval or adult stage." (Author) *Aeshna brevifrons* is reported as part of the food of the ethnic group of Quichuas.] Address: Giovanni Onore, G., Departamento de Biología, Pontificia Universidad Católica del Ecuador, Apartado 17.01.2184, Quito, Ecuador. E-mail: GONORE@puce.edu.ec

1998

10681. Zilihona, I.; Heinonen, J.; Nummelin, M. (1998): Arthropod diversity and abundance along the Kihansi gorge (Kihansi River) in the southern Udzungwa Mountains, Tanzania. Journal of East African Natural History 87: 233-240. (in English) ["Arthropod diversity and abundance at the order level was investigated along the Kihansi Gorge in the southern Udzungwa Mountains between June and August 1997 by using sweep netting, timed Lepidoptera counts, malaise-traps, solar powered lighttraps, baited pitfall-traps, sticky-traps and baited butterfly traps. The study was undertaken to predict the possible effects of damming the Kihansi River above the fierce waterfall in the gorge. The gorge was divided into four micro-habitats, two of which are affected by

waterfall spray (open spray, forest spray), and two of which were not affected directly by the waterfall (forest and riverine sites). The highest arthropod diversity was found in the forest spray, whereas the open spray contained the least. The forest spray area harboured the rarest arthropod orders. Arthropods are most abundant in the riverine site where 31 % of all sampled arthropods were recorded. The forest spray channel, forest site and open spray channel follow with 28%, 23 % and 18 % of the sample respectively. It is suggested that the Mhalala Stream should be diverted to the gorge to replace the dammed Kihansi River. This would maintain at least partially the extraordinary micro-climate of the gorge and possibly retain the specialised arthropod community." (Authors) A single zygopteran specimen (no species details) was found.] Address: Zilihona, I., Tanzania Forestry Research Institute, Silvicultural Research Centre, P.O. Box 95, Lushoto, Tanzania

1999

10682. Sierro, A.; Keim, C. (1999): Activité entomologique valaisanne pour 1997 et 1998. Observations rassemblées dans le cadre de la Société entomologique valaisanne (SEV) sous l'expertise de Gilles Carron, Paul Marchesi et Christophe Praz. Bull. Murithienne 117: 61-71. (in German/French) [Switzerland. Records of the following species are documented: *Sympetma paedisca*, *Ischnura elegans*, *Coenagrion puella*, *Erythromma najas*, *E. viridulum*, *Somatochlora flavomaculata*, *Libellula depressa*, *Orthetrum cancellatum*, *Sympetrum depressiusculum*, and *S. fonscolombii*] Address: Sierro, A., Chelin, 3978 Flanthey, Switzerland

2000

10683. Kefford, B.J. (2000): The effect of saline water disposal: implications for monitoring programs and management. Environmental Monitoring and Assessment 63: 313-327. (in English) ["In an effort to combat rising groundwater tables and expanding saline lakes, saline water has been disposed of into the aquatic environment, despite there being little information as to the environmental effects. Monitoring of the effect of saline lake water disposal on aquatic macroinvertebrates and water quality was conducted in the Barwon River, south west Victoria, Australia, in association with toxicity tests.

The disposal of saline lake water was associated with changes in macroinvertebrate community structure. Contrary to expectations, increases in electrical conductivity (a measure of salinity) was not the only water quality parameter associated with saline water disposal. An experiment was conducted where the toxicity of saline lake water was compared to that of a prepared solution of the same electrical conductivity. Toxicity was greater in the saline lake water than the prepared solution. The results suggest that saline water disposal is impacting on macroinvertebrate fauna but electrical conductivity is not the only factor responsible. These results have consequences for both management of aquatic resources and for monitoring programs which are discussed." (Author) Odonata (*Nososticta*, *Austrolestes annulosus* and *Ischnura heterostrieta*) were reported with an increase in abundance.] Address: Kefford, B.J., Dept of Biotechnology and Environmental Biology, RMIT University, PO Box 71, Bundoora, 3083, Victoria, Australia. E-mail: ben.kefford@rmit.edu.au

10684. Sierro, A.; Keim, C.; Marchesi, P. (2000): Activité entomologique pour 1999 et 2000. Observations rassemblées dans le cadre de la Société sous l'expertise de Gilles Carron. Bull. Murithienne 118: 93-103. (in German/French) [Switzerland. records of the following species are documented: *Calopteryx virgo*, *C. splendens*, *Lestes viridis*, *Sympetma fusca*, *S. paedisca*, *Erythromma najas*, *E. lindeni*, *Ischnura pumilio*, *Aeshna caerulea*, *Anacischna isosceles*, *Anax parthenope*, *A. ephippiger*, *Cordulegaster bidentata*, *C. boltonii*, *Somatochlora arctica*, *S. flavomaculata*, *Orthetrum coerulescens*, *Leucorrhinia albifrons*, *Sympetrum fonscolombii*, and *S. depressiusculum*] Address: Sierro, A., Chelin, 3978 Flanthey, Switzerland

2001

10685. Kawashima, I. (2001): Description of the female adult of *Oligoaeschna niisatoi* Karube, 1998 (Aeshnidae). Tombo 43: 18-20. (in English) [The female adult of *O. nusatoi* is described, based on materials from northern Vietnam: Materials examined: 2 females, Mt. Pia Oac, Cao Bang Province, N. Vietnam, 17-V-1998.] Address: Kawashima, I., Nagasawa 1-50-9, Yokosuka-shi, Kanagawa, 239-0842 Japan

10686. Naraoka, H. (2001): Discovery of *Ischnura elegans elegans* (Van der Linden) in Aomori Prefecture (Coenagrionidae). Tombo 43: 29-30. (in Japanese, with English summary) ["In Japan, *Ischnura elegans elegans* has so far been recorded from northern and eastern Hokkaido. In autumn of 2000, I collected 6 males of this species at a pond, Uchmuma (40° 56' N141° 20' E), Rokkasho village, Aomori Prefecture. On average the body sizes of the specimen from Uchinuma were smaller than those from Hokkaido. The dates of collection (17 Sept. -1 Oct.) at Uchinuma were far later than those in Hokkaido (June - August). These facts suggest that the generation time (the length of one generation) may be reduced in the Uchinuma population." (Author)] Address: Naraoka, H., Motozumi 36-71, Fukunoda, Itayanagi, Kitatsugaru-gun, Aomori 038-3661, Japan. E-mail: sbnkq127@ybb.ne.jp

10687. Ohshima, Y.; Karube, H. (2001): Discovery of *Davidius moiwanus sawanoi* from Okayama Prefecture. Tombo 43: 12-13. (in Japanese, with English summary) ["*D. moiwanus sawanoi* has hitherto been known only

from Yahata-kogen, northwestern Hirosima Prefecture, excepting a record at Izumo, Shimane Prefecture, Japan. In the spring of 2000, several adults and larvae of this subspecies were collected from a valley in northern Okayama Prefecture. This habitat is 150 km distant from the east end of Yahata-kogen. Some features of the morphology of this subspecies and the habitat are briefly described." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

10688. Rademacher, M. (2001): Steiniges Ödland – Das verkannte Paradies. Publisher: HeidelbergCement AG, Berliner Straße 6, 69120 Heidelberg, Germany: 24 pp. (in German) [This is a tie-in to a film produced by the HeidelbergCement AG, Heidelberg, Germany to demonstrate biodiversity in excavated quarries. Odonata are represented by *Orthetrum brunneum*, *Libellula depressa*, *Anax imperator*, and *Enallagma cyathigerum*. They are illustrated and briefly introduced into habitat and habits.] Address: HeidelbergCement AG, Werk Schelklingen, Zementwerk1/1, 89601 Schelklingen, Germany. E-mail: michael.rademacher@htc-gmbH.com

10689. Wada, S. (2001): The first records of *Macromia daimoi* from Fukui Prefecture. Tombo 43: 37-38. (in Japanese, with English summary) [Some larvae and adults of *M. daimoi* were collected at the Mmamigawa River, Obama-sni, Fukui Prefecture, Japan. These are the first records of the species from Fukui Prefecture.] Address: not stated

2002

10690. Eislöffel, F. (2002): Die Fauna des Soonwaldes. In: Kirschner, Monika & Hans-Werner Ziemer (Redaktion): Die Soonwaldkonferenz. Zukunftsregion zwischen Hunsrück und Nahe 25. Oktober bis 26. Oktober 2002: 22-26. (in German) [The paper gives a condensed overview on the regional fauna and highlights in the eastern part of the Middle range mountain Hunsrück, Rheinland-Pfalz, Germany. Extensive odonatalogical studies on the Soonwald-Odonata were published by the author in 1985 and 1989. Special emphasis is given to the species of brooks and boggy ponds.] Address: Schlotmann, F., Weserstraße 11, D-55296 Harxheim, Germany. E-mail: frank.schlotmann@gmx.net

10691. Garcia-Aviles, J. (2002): Biodiversidad de los humedales del Parque Regional del Sureste. II. Libéllulas. Consejería de Medio Ambiente. Centro de Investigaciones Ambientales de la Comunidad de Madrid "Fernando González Bernáldez". Serie Documentos 36: 60 pp. (in Spanish) [A total of 53 Odonata species is known from the municipal of Madrid, Spain. A study of the regional fauna of the Parque Regional del Sureste resulted in 17 species. These are mapped, and briefly characterised in a monographic style presenting information on general distribution, regional distribution in the park, faunistic data prior the study, habitat preferences and phenology. In addition, similar information is also provided for the rest of the Odonata fauna of the Madrid municipal.] Address: not stated

10692. Marches, P.; Sierro, A.; Fournier, J. (2002): Chronique entomologique valaisanne pour 2001 et 2002. Observations rassemblées dans le cadre de la Société entomologique valaisanne (SEV). Bull. Murith-

ienne 120: 25-32. (in Bilingual in French and German) [Switzerland; The paper includes records of *Calopteryx virgo*, *C. splendens*, *Lestes sponsa*, *Coenagrion hastulatum*, *Aeshna isosceles*, *A. juncea*, *A. mixta*, *Cordulia aenea*, *Somatochlora alpestris*, *Crocothemis erythraea*, *Leucorrhinia dubia*, *L. albifrons*, *Orthetrum cancellatum* and *O. coerulescens*.] Address: Marches, P., Route du Châtel 57, 1880 Bex

10693. Tatenhorst, L.; Kaschek, N.; Meyer, E.I. (2002): Der Steinbeißer (*Cobitis taenia* L.): Aspekte zur Ökologie einer bedrohten Art. Schöling-Verlag, Münster: 133 pp + 9 pp Anhang. (in German) [*Calopteryx splendens* and *Ischnura elegans* were found to co-occur with the fish species *C. taenia* along the brook Steinfurter Aa, Nordrhein-Westfalen, Germany.] Address: Meyer, Elisabeth, Westfälische Wilhelms-Universität Münster, Institut für Evolution und Ökologie der Tiere, Abteilung Limnologie, Hüfferstr. 1, 48149 Münster, Germany. E-mail: meyer@uni-muenster.de

2003

10694. Boulton, A.J. (2003): Parallels and contrasts in the effects of drought on stream macroinvertebrate assemblages. *Freshwater Biology* 48(7): 1173-1185. (in English) [(1) It is axiomatic that unusually long dry periods (droughts) adversely affect aquatic biota. Recovery after drought is rapid by macroinvertebrates that possess strategies to survive drying or are highly mobile but other taxa take longer to recolonise depending on the timing, intensity, and duration of the dry phase. (2) Although drought acts as a sustained 'ramp' disturbance, impacts may be disproportionately severe when certain critical thresholds are exceeded. For example, ecological changes may be gradual while a riffle dries but cessation of flow causes abrupt loss of a specific habitat, alteration of physicochemical conditions in pools downstream, and fragmentation of the river ecosystem. Many ecological responses to drought within these habitats apparently depend on the timing and rapidity of hydrological transitions across these thresholds, exhibiting a 'stepped' response alternating between gradual change while a threshold is approached followed by a swift transition when a habitat disappears or is fragmented. (3) In two Australian intermittent streams, drought conditions eliminated or decimated several groups of macroinvertebrates, including atyid shrimps, stoneflies and free-living caddisflies. These taxa persisted during the early stages of the drought but did not recruit successfully the following year, despite a return to higher-than-baseflow conditions. This 'lag effect' in response to drought emphasises the value of long-term survey data. Although changes in faunal composition were inconsistent among sites, marked shifts in taxa richness, abundance and trophic organisation after the riffle habitat dried provide evidence for a stepped response. (4) Responses by macroinvertebrate assemblages to droughts of differing severity in English chalk streams were variable. The prolonged 1988-92 drought had a greater impact than shorter droughts in the early 1970s but recovery over the next 3 years was swift. Effects of the 1995 summer drought were buffered by sustained groundwater discharge from the previous winter. These droughts tended to reduce available riverine habitats, especially via siltation, but few taxa were eliminated because they could recolonise from perennial sections of the chalk streams. (5) In the contrasting environments

of the intermittent streams studied in England and Australia, there are parallels in the rapid rates of recolonisation. However, recruitment by taxa that lack desiccation-resistant stages or have limited mobility is delayed. Currently, long-term data on these systems may be insufficient to indicate persistent effects of droughts or predict the impacts of excessive surface or groundwater abstraction or the increased frequency and duration of droughts expected with global climate change." (Author) The paper includes a reference to Odonata.] Address: Boulton, A.J., Ecosystem Management, University of New England, Armidale, NSW, 2351, Australia. E-mail: abouton@metz.une.edu.au

2004

10695. Alling, V.; Andersson, P.; Fridriksson, G.; Rubio Lind, C. (2004): Oskarshamn site investigation. Biomass production of Common reed (*Phragmites australis*), infauna, epiphytes, sessile epifauna and mobile epifauna. Common reed biotopes in Oskarshamn's model area. Svensk Kärnbränslehantering AB, Swedish Nuclear Fuel and Waste Management Co, Box 5864, SE-102 40 Stockholm, Sweden: 19 pp + app.. (in English) ["The aim of the study was to determine and estimate the total amount of Common reed biomass, *Phragmites australis*, both standing crop and the rhizome biomass, in SKB's regional modelling area in Simpevarp, Oskarshamn. The biomasses of infauna and mobile epifauna are determined as well as the carbon content in the sediment. The grand mean value for reed biomass in the Oskarshamn area is 1,254.3 g/m². Mean value for reed rhizome biomass in the same area is 3,705.6 g/m². The result from the standing crop biomass measurement corresponds with earlier studies of reed biomass, but the mean biomass value for the rhizome was almost the double. Two of the infauna taxa, Diptera and Gastropoda, were found in all of the five sites where Gastropoda represented the greatest biomass and Diptera the highest abundance. Epiphytes, such as macro algae, could not be detected on any reed straws. The mobile epifauna sampling did result in a relative high number of different taxa. Gastropoda and Anisoptera were the taxa that showed the highest biomass value with a relatively low abundance number. Taxa showing the reversed relation between biomass and abundance were Isopoda and possibly Diptera. Carbon content of the sediment, sampled in the edge of the reed stands was approx 11% with high variation between the sites." (Authors)] Address: Svensk Kärnbränslehantering AB, Swedish Nuclear Fuel and Waste Management Co, Box 5864, SE-102 40 Stockholm, Sweden

10696. Arab, A.; Lek, S.; Lounaci, A.; Park, Y.S. (2004): Spatial and temporal patterns of benthic invertebrate communities in an intermittent river (North Africa). *Ann. Limnol. - Int. J. Lim.* 40(4): 317-327. (in English) ["The spatial and temporal distribution patterns of benthic macroinvertebrates were studied in an intermittent river in Algeria (Chelif wadi, North Africa), by using the self-organizing map (SOM), an unsupervised artificial neural network. The samples were collected monthly at 8 sampling sites (630 to 20 m above sea level) and community variation was analysed in space and time. Overall, the study sites showed a very poor macroinvertebrate fauna: more than 60% of samples contained less than 11 species, and 99% had less than 30 species.

Furthermore, most species displayed very low abundance: 66% of the species were represented by less than 20 individuals (abundance). Among the identified taxa, Chironomidae was the dominant taxon at all sampling sites except at the most upstream site (630 m a.s.l.) where it was replaced by Coleoptera. Concerning monthly changes, the species richness was very low in August and October. Through the learning process of the SOM, samples were classified into four clusters by the SOM, and the classification was mainly related to the location of the sampling sites. Benthic macroinvertebrates were divided into four classes, which revealed the influence of pollution on their longitudinal distribution in this stream. According to the distribution gradients of the environmental variables on the SOM map, their influence on the classification of the sampling sites could be assessed effectively." (Authors) The following taxa - based on larval identification - are listed: *Erythronema lindenii*, *Platynemis acutipennis*, *Coenagrion armatum*, *Stylurus flavipes*, *Gomphus pulchellus*, *Libellula depressa*, *Libellula quadrimaculata*, *Somatochlora arctica*, *Libellula fulva*, and *Gomphus vulgatissimus*.] Address: Park, Y.S., Laboratoire Dynamique de la Biodiversité (LADYBIO), UMR 5172, CNRS - Université Paul Sabatier, 118 route de Narbonne, 31062 Toulouse cedex 4, France. E-mail: park@cict.fr

10697. Matsubara, K. (2004): Daily activity and reproductive behaviors of *Calopteryx atrata* Selys (Zygoptera: Calopterygidae). *Tombo* 47: 47-52. (in Japanese, with English summary) ["The daily activity and reproductive behaviours of a territorial damselfly *C. atrata* were investigated at the upper Tafuse River in Saga-shi, Saga Prefecture, Northern Kyushu. The average number of active males did not notably change from early morning to late afternoon, and almost all active males were territorial. Although the average number of active females was always less than that of active males, the female numbers increased from 10:00 am to 17:00 pm, when reproductive behaviour was frequently observed, and fell abruptly in the late afternoon when females flew to roosting sites for the night. A territorial male established a territory containing one or more oviposition sites and several perching sites. The territorial and mating behaviours of *C. atrata* males were frequently observed from early morning and their frequency peaked around noon, thereafter decreasing until late afternoon. On the other hand, feeding flights were observed less frequently in the daytime but their frequency increased abruptly during the late afternoon, when the territorial and mating behaviours of males were less. Territorial males defended against intruding conspecific males by aerial displays. They normally chased intruders out of their territories with brief pursuit flights. On the other hand, escalated combats sometimes occurred between territorial males and intruders. During these combats, flight speed increased, involving back-and-forth chasing and circling or spiralling by both males, lasting much longer (up to an hour or more) over other oviposition sites. When a territorial male found a female approaching an oviposition site within his territory, he began a pair-forming display and courtship flight. After copulation, the males performed a non-forming display and courtship flight. After copulation, the male performed a non-contact guarding behaviour for the ovipositing female inside his territory. During her oviposition, he chased approaching males out of his territory." (Author)] Address: Matsubara, K., Department of Applied Biological Sciences, Faculty of Agriculture, Sa-

ga University, Honjo 1, Saga 840-8502, Japan. E-mail: mkd0335@hotmail.com

10698. Torralba-Burial, A.; Ocharan, F.J. (2004): Presencia y comportamiento invernal de adultos de *Sympetrum striolatum* en el NE de España (Odonata: Libellulidae). *Boln Asoc. esp. Ent.* 28(3/4): 189-191. (in Spanish, with English translation of title) [At Hoya de Huesca (Bandaliés, NE Spain) several territorial *S. striolatum* males were observed on 26 & 29-XII-2001, 13 & 21-I-2002 and 2-II-2002 (medium air temperature, range 5.5-7.0°C).] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

2005

10699. Borisov, S.N. (2005): Summer migration of species of *Sympetma* Burmeister, 1839 (Odonata, Lestidae) in northern Tien-Shan. *Euroasian ent. J.* 4(3): 256. (in Russian, with English summary) ["The details are provided on the migration of *S. gobica*, *S. fusca* and *S. paedisca* from the lowlands to the foothills of northern Tien-Shan in June 2005." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

10700. Eggers, T.O. (2005): Wirkung extremer Wasserstände auf die Benthoszönose der Mittleren Elbe. *Deutsche Gesellschaft für Limnologie (DGL): Tagungsbericht 2004* (Potsdam): 314-318. (in German, with English summary) ["In the last both summers extreme water discharges could be recognized at the River Elbe. In the summer 2002 the discharge of the Elbe was very high, while in 2003 the discharge was very low. Both extreme discharges influenced the aquatic macroinvertebrate assemblage significantly. This effect could be noticed on soft substrates within the groyne fields as on the hard substrate and littoral sections along the groynes." (Author)] Address: Eggers, T.O., Zoologisches Institut, TU Braunschweig, Spielmannstr. 8. 38092 Braunschweig, Germany. E-mail: t.eggers@tu-braunschweig.de

10701. Gunzburger, M.S.; Travis, J. (2005): Critical literature review of the evidence for unpalatability of amphibian eggs and larvae. *Journal of Herpetology* 39(4): 547-571. (in English) ["We examined 142 papers, which contained 603 separate predator-prey trials, to investigate whether unpalatability is an important defense against predation for amphibian eggs and larvae. Although unpalatability is often cited as an antipredator defense, it was rarely demonstrated that 89% of the trials that we reviewed found prey to be palatable. The most extensively studied taxa, the genera *Bufo* and *Rana*, were diagnosed unpalatable at rates comparable to all other taxa. Diagnoses of unpalatability were not always consistent for a prey species across different predators and were influenced by experimental method. Despite these limitations and our conservative definition of unpalatability, several patterns emerged. First, across all taxonomic groups, eggs and hatchlings were unpalatable more often than mobile larval stages. Second, species that breed in temporary ponds were more likely to be palatable to fish predators than those that breed in permanent habitats. Third, fish and caudates were more likely to find amphibian prey unpalatable than insect

predators. We conclude that unpalatability is rare, but when it occurs, it is a property of an ensemble (predator, prey, and alternative prey) and a life-history stage in a particular circumstance but is not a species-specific attribute. We suggest methods of experimentation that could strengthen future research on the palatability of amphibian eggs and larvae. [...] The most common predators used in trials were salamander adults and larvae, which found prey unpalatable in 15 of 123 trials. Other predators finding prey unpalatable in some trials were aquatic insects (odonate naiads, coleopterans, heteropterans, and others), snakes (*Thamnophis* spp.), tadpoles, snails, mammals, and turtles. Vertebrate predators (fish and salamander adults and larvae) were twice as likely to find prey unpalatable than insect predators (Odonata, Hemiptera, and Coleoptera; $\chi^2 = 5.16$, $P = 0.023$). (Authors)] Address: Gunzburger, Margaret, United States Geological Survey, Florida Integrated Science Center, 7920NW71st Street, Gainesville, Florida 32653-3701, USA. E-mail: margaretagunzburger@usgs.gov

10702. Kazantzidis, S.; Goutner, V. (2005): The diet of nestlings of three Ardeidae species (Aves, Ciconiiformes) in the Axios Delta, Greece. *Belg. J. Zool.* 135(2): 165-170. (in English) ["The diets of the little egret (*Egretta garzetta*), the night heron (*Nycticorax nycticorax*) and the squacco heron (*Ardeola ralloides*) were studied by analyzing nestling regurgitations collected during five breeding seasons (1988-1990 and 1994-1995) at a heronry in the Axios Delta (Northern Greece). In total, 267 regurgitations from little egrets, 247 from night herons and 19 from squacco herons (only in 1995) were collected and analyzed. Each prey item was identified to the lowest possible taxon. The dry mass of each prey taxon was also estimated from oven-dried prey specimens collected in the field. Little egret: At least 58 different taxa were identified among 5,108 prey items (1,499 g dry mass). By number, fish were the most important prey category (39.6%), followed by insects (32.1%) and amphibians (24.9%) (Fig.1). From a total of 22 fish species identified, *Aphanius fasciatus*, *Gambusia affinis* and *Gasterosteus aculeatus* represented 85.5% of all items. Of at least 27 species of insects, the majority were larvae of Odonata, Dytiscidae and Hydrophilidae (94.3% of all insect larvae). Among imagoes, *Gryllotalpa gryllotalpa* and *Zygoptera* spp. (Odonata) prevailed, making up 72.2% of all items." (Authors) Approximately 90% less Odonata contributed to the diet of Night herons and Squacco herons.] Address: Kazantzidis, S., Forest Research Institute, National Agricultural Research Foundation, GR-57006 Vassilika, Thessaloniki, Greece. E-mail: savkaz@fri.gr

10703. Onore, G. (2005): Edible insects in Ecuador. Paoletti M.G. (ed.) 2005. *Ecological Implications of Minilivestock. Potential of Insects, Rodents, Frogs and Snails* Science Publishers, Enfield N.H., USA: 343-352. (in English) ["In Ecuador the ancestral tradition of entomophagy still exists, particularly in the countryside where the native population is relatively isolated from technological progress. 82 edible species are listed for the country; none is a main dish but many are used to complement other animal protein sources in the diet. The most common edible insects belong to orders Coleoptera and Hymenoptera and are consumed at either the larval or the adult stage." (Author) *Aeshna brevifrons* is counted to the food of the ethnic group of Quichuas.] Address: Onore, G., Departamento de Bio-

logia, Pontificia Universidad Católica del Ecuador, Apartado 17-01-2184, Quito, Ecuador. E-mail: GON-ORE@puce.edu.ec

10704. van Duinen, G.-J.; Dees, A.; Esselink, H. (2005): Baseline survey of aquatic invertebrates in the wetland restoration area of Raessaare Bog. Report Bargerveen Foundation/Department of Animal Ecology, Radboud University Nijmegen, The Netherlands: 17 pp. (in English) [Faunistic data taken from the Raessaare bog, SW Estland, include *Aeshna subarctica*, *Anax imperator*, *Coenagrion hastulatum*, *Leucorrhinia rubicunda*, *Libellula quadrimaculata*, *Orthetrum cancellatum*, *Somatochlora arctica*, *S. flavomaculata*, *S. metallica*, and *Sympetrum danae*.] Address: Bargerveen Foundation/Department of Animal Ecology, Radboud University Nijmegen, P.O. Box 9010, NL-6500 GL Nijmegen, The Netherlands. E-mail: G.vanDuinen@science.ru.nl

10705. Ward-Campbell, B.M.S.; Beamish, F.W.H.; Kongchaiya, C. (2005): Morphological characteristics in relation to diet in five coexisting Thai fish species. *Journal of Fish Biology*: 1266-1279. (in English) ["Morphological characteristics and intestinal content were analysed for five species of coexisting freshwater fishes in Thailand: *Rasbora caudimaculata*, *Schistura desmotes*, *Dermogenys pusillus*, *Xenentodon cancila* and *Monopterus albus* (all found in riffle habitats in Thai streams). *R. caudimaculata*, *S. desmotes* and *D. pusillus* fed predominantly on ephemeropterans, hymenopterans and dipterans, *X. cancila* fed predominantly on fishes, and larger aquatic invertebrates such as Odonata, and *M. albus* fed on detritus as well as invertebrate prey such as crustaceans and Odonata. Intestine length, mouth height, mouth width, eye position and mouth orientation varied among all five species. Canonical analysis of discriminance of mouth height, width and intestine length showed a clear dispersion of species, which was supported by intestine content. Evolutionary processes leading to the present differences in morphological characters resulted in each of the five species consuming a different portion of the available resource base, thereby facilitating coexistence." (Authors)] Address: Ward-Campbell, B.M.S., Department of Biology, Burapha University, Bangsaen, Chonburi 20131, Thailand. E-mail: bwardcampbell@hotmail.com

10706. Wendler, S. (2005): Jungfernzeugung auf den Azoren. *Biologie in unserer Zeit* 35(5): 299. (in German) [Brief report on the parthenogenetic reproduction of *Ischnura hastata* on the Azores, Portugal directed to teachers and students.] Address: not stated

2006

10707. Borisov, S.N. (2006): Dragonfly night breeding (Odonata) in temperate latitudes western Asia. *Siberian Journal of Ecology* 13(4): 449-455. (in Russian, with English summary) ["The night emergence was established for 30 species and subspecies of dragonflies in temperate latitudes of West Asia. This phenomenon is most characteristic of the plains in Middle Asia, where 20 species with night transformation are known; for a half of them, it is obligate. In southern mountains and in West Siberia, the night emergence was observed for seven taxons. The adaptive value of dragonfly issue and flying away from water reservoirs during the dark period lies in avoidance of extremely high day temperature, dryness and insolation, on the one hand, and

preying on the other." (Author) Results and discussion consider the following species *Anormogomphus kirtschchenkoi*, *Lindenia tetraphylla*, *Sympecma gobica*, *S. fusca*, *S. paedisca*, *Coenagrion armatum*, *Ophiogomphus reductus*, *Stylurus flavipes*, *Anax ephippiger*, *Lestes macrostigma*, *Anax imperator*, *A. parthenope*, *Aeshna grandis*, *A. crenata*, *A. mixta*, *A. affinis*, *Crocothemis servilia*, *C. erythraea*, *Sympetrum vulgatum vulgatum*, *S. vulgatum decoloratum*, *S. flaveolum*, *S. striolatum*, *S. fonscolombii*, *S. meridionale*, *S. arenicolor*, *Orthetrum sabina*, *O. brunneum*, *O. albistylum*, *Selysiothemis nigra*, and *Pantala flavescens*.] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

10708. Bowman, N. (2006): Reports from Coastal Stations - 2005: Eccles-on-sea, Norfolk. *Atropos* 27: 70-71. (in English) ["It was also a quiet year for Odonata with even the resident population of *Erythromma viridulum* present in depressingly low numbers. However, some fresh primary migrants were noted, particularly on 29 August when 80 were counted, including some 30 pairs in tandem." (Author)] Address: not stated

10709. Canedo, C.; Garcia, J.P.; Fernandes, R.; Pomal, J.P. (2006): Diet of *Pipa carvalhoi* (Amphibia, Pipidae) is not influenced by female parental care. *Herpetological Review* 37(1): 44-45. (in English) [Odonata larvae contributed between 0 – 0.2% to the diet, while chironomid larvae were consumed exclusively to near 100%.] Address: Canedo, C., Departamento de Vertebrados, Museu Nacional/UFRJ, Quinta da Boa Vista, 20940-040 Rio de Janeiro, RJ, Brazil. E-mail: canedo@mn.ufrj.br

10710. Clancy, S. (2006): Reports from Coastal Stations - 2005: Dungeness area, Kent. *Atropos* 27: 60-62. (in English) ["Odonata records of interest in the area included at least nine different male *Anax parthenope* in the Dungeness area as follows: two at Cooke's Lake on 22 June, two at the Water Tower pits on 23 June with one still there on 24th, one at the Water Tower Pits on 3 July, one on Lade Pit on 17 July, one at Hooker's Pits on 20 July, one at the Long Pits on 1 August, and one at New Diggings on 25 and 27 August. In contrast, there were only three records of single male *Sympetrum fonscolombii* on the RSPB Reserve during the season, these occurring on 23 June and 3 /11 July." (Author)] Address: not stated

10711. Deans, M. (2006): Reports from Coastal Stations - 2005: Bawdsey Peninsula, Suffolk. *Atropos* 27: 68-69. [*Sympetrum striolatum* at artificial light on 17-VIII, 22-IX, and 7-X-2006.] Address: not stated

10712. Dewick, S. (2006): Reports from Coastal Stations - 2005: Curry Farm, Bradwell-on-sea, Essex. *Atropos* 27: 66-67. (in English) ["Little significant recording of Odonata was attempted in 2005, but it is worth noting that Common Darter *Sympetrum striolatum* once again continued to be seen in numbers very late in the year, the last being seen on 22 November (three). Night-time immigration appears to have been very limited, the only records of this species in the light-trap being singles on 25 & 31 July, 16 & 29 August and 3, 20, 21 & 27 September, two being noted on 11 September. A single Migrant Hawker *A. mixta* was also recorded at light on 15 August." (Author)] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

10713. Harvey, R. (2006): Reports from Coastal Stations - 2005: Minsmere RSPB Reserve, Suffolk. *Atropos* 27: 69-70. (in English) ["It was an excellent year for *Aeshna isosceles* with records on 20 dates from 2 June to 20 July. This compares with sightings on ten dates from 9 June to 10 July in 2004. The peak count was five on 26 June. A female observed ovipositing on the levels on 17 July was the first definite proof of breeding on the reserve. In contrast there were no records of *Erythromma viridulum* at the regular locations." (Author)] Address: not stated

10714. Hunter, I. (2006): Reports from Coastal Stations - 2005: Elms Farm, Icklesham, East Sussex. *Atropos* 27: 59-60. (in English) [*Erythromma viridulum* in high abundances is reported.] Address: not stated

10715. Jarman, N. (2006): Reports from Coastal Stations - 2005: Kingsdown Beach, Kent. *Atropos* 27: 62-63. (in English) [UK; *Erythromma viridulum*] Address: not stated

10716. Knill-Jones, S. (2006): Reports from Coastal Stations - 2005: Isle of Wight. *Atropos* 27: 56-57. (in English) [UK; records of *Erythromma viridulum*, *Brachytron pratense*, and *Sympetrum flaveolum* are reported.] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freereserve.co.uk

10717. Kovács, T.; Kovács, T. sr (2006): Records of larval Ephemeroptera, Odonata and Plecoptera from the upper part of the Hungarian section of Ipoly River, with notes on aquatic Heteroptera and Coleoptera. *Folia Historico-Naturalia Musei Matraensis* 30: 159-165. (in Hungarian, with English summary) [Records of *Calopteryx splendens*, *C. virgo*, *Erythromma najas*, *E. viridulum*, *Ischnura elegans pontica*, *Stylurus flavipes*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Onychogomphus forcipatus*, and *Somatochlora metallica* are presented] Address: Kovács, T., Mátra Museum. H-3200 Gyöngyös, Kossuth Lajos u. 40., Hungaria. E-mail: koati@t-online.hu

10718. Lambrechts, J.; Knijf, G. de (2006): Dragonflies in the Høge Kempen National Park. *LIKONA* 2005: 50-57. (in Dutch, with English summary) [50 Odonata species are documented for the Park; it which is considered an odonate hotspot in Flanders (Belgium). The odonate fauna is reviewed with species presented mostly with their vernacular names. Special emphasize is given to *Coenagrion hastulatum*, *Cordulegaster boltonii*, *Somatochlora arctica* and *S. flavomaculata*.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

10719. Lyons, R. (2006): Dan Hull gets county record. *Proof sheet* 14(2): 1. (in English) [*Libellula saturata*, 18-IX-2006, at Shore Acres, Coos County, Oregon, USA.] Address: c/o Proof Sheet, Oregon Coast Photographers' Association INC., P.O. Box 5646, Charleston, OR 97420, USA

10720. Martin, J. (2006): Lebendnachweise der Kleinen Flussmuschel (*Unio crassus* PHILLIPSSON, 1788) im Rahmen einer Molluskenbergung am Komplexbauwerk Wehr und Schleuse Kossenblatt. *Naturschutz und Landschaftspflege in Brandenburg* 15(1): 13-16. (in German) [In the framework of a study in *Unio crassus* in Brandenburg, Germany, also records of larval *Aeshna*

sp., *Gomphus vulgatissimus*, and *Somatochlora metallica* were made.] Address: Martin, J., Kopernikusstr. 34, 14482 Potsdam, Germany

10721. Morgan, L. (2006): Reports from Coastal Stations - 2005: Skomer Island NNR, Pembrokeshire. *Atropos* 27: 74-75. (in English) ["A total of seven species of Odonata was recorded in 2005. *Enallagma cyathigerum* and *Ischnura elegans*, both breeding species, were recorded in their highest annual numbers with a daily maximum of 30 and 50 respectively on 27 June. A single *Orthetrum cancellatum* on 10 July was a new record for the Island — this species may become a more regular Island visitor in future years with its breeding range now expanded to include Pembrokeshire. A single *Libellula depressa* on 19 June was the first record of this species since 2000." (Author)] Address: not stated

10722. Odin, N. (2006): Reports from Coastal Stations - 2005: Landguard Bird Observatory, Suffolk. *Atropos* 27: 67. (in English) [UK; *Sympetrum striolatum*, *Coenagrion puella*] Address: not stated

10723. Parr, A.J. (2006): Dragonflies at Light: an appeal for information. *Atropos* 27: 87. (in English) ["Although dragonflies are normally day-flying, some records of nocturnal activity are not unknown. Typically such records refer to individuals caught in MV moth traps, or attracted to streetlights and other types of light. It is planned to take a closer look at such records in a future issue of *Atropos*. While there is some literature available, a lot of information must also exist only in field notebooks. I would be pleased to hear from anyone who has any information relating to Odonata at light. This might involve either dragonflies or damselflies, and while the analysis will have a strong UK bias, information from abroad would also be gratefully received. Please send information to me at the address below or to the *Atropos* editorial address." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

10724. Parr, A.J. (2006): Migrant dragonflies in 2005 including recent decisions and comments by the Odonata Record Committee. *Atropos* 27: 33-38. (in English) [UK; the following species are involved: *Lestes barbarus*, *Pyrrhosoma nymphula*, *Erythromma viridulum*, *Aeshna mixta*, *Anax imperator*, *A. parthenope*, *Libellula depressa*, *L. fulva*, *Orthetrum cancellatum*, *Sympetrum striolatum*, *S. fonscolombii*, *S. flaveolum*, *S. sanguineum*, *S. danae*] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

10725. Scott, D.A. (2006): Reports from Coastal Stations - 2005: Dursey Island, Co. Cork. *Atropos* 27: 75- [Ireland; *Sympetrum striolatum*] Address: not stated

10726. Scott, M.A.; Scott, W.J.; Scott, T.R. (2006): Reports from coastal stations - 2005: Longstone Heritage Centre, St Mary's, Isles of Scilly. *Atropos* 27: 47-49. (in English) ["Five species of Odonata were recorded. The highlight was *Anax parthenope* seen and photographed on 25 September, this being the first for the Isles of Scilly. Also new for the site was *Pyrrhosoma nymphula* on 9 June (possibly another first for the Islands). *Ischnura elegans* were present during June/July and several larvae were found on 10 June. Only three singles each of *Sympetrum striolatum* and *Aeshna mixta*

were seen in August/ September." (Authors)] Address: not stated

10727. Solly, F. (2006): Reports from Coastal Stations - 2005: Isle of Thanet. *Atropos* 27: 64-65. (in English) ["Dragonfly recording was limited to the Kingsgate area, a lack of standing water reducing the potential. However, a good range of species for the site was recorded in the spring/early summer period. A *Brachytron pratense* on 15 May was only the third area record, whilst single *Libellula quadrimaculata* on 1 June and *Orthetrum cancellatum* on 7 June were the second Thanet records. This season's only *Anax imperator* was noted on 28 May, and *Libellula depressa* occurred on four dates between 28 May and 22 June. Damselfly records are always unusual on Thanet so records of up to three *Coenagrion pulchellum* on three dates between 26 May & 2 June, *Coenagrion puella* on 6 June, single *Ischnura elegans* on 17 & 30 June, and *Enallagma cyathigerum* on 17 June were well above average. *Sympetrum striolatum* was recorded from 1 July but remained scarce until 30 were seen on 2 August, after which it was present on most days until late October. The year's first record of *Aeshna mixta* involved 20 on 1 August, this species occurring most days after this until mid-October." (Author)] Address: not stated

10728. Spence, B. (2006): Reports from Coastal Stations - 2005: Spurn Point, east Yorkshire. *Atropos* 27: 72-73. (in English) [UK; "The season started off quite well for Odonata with very good numbers of *Libellula quadrimaculata*, *Orthetrum cancellatum* and *Anax imperator* in late June. However, after this numbers dropped considerably and the rest of the season produced very much below average numbers for all species. The only records of note were single *Sympetrum fonscolombii* on 22 & 27 June and 5 & 10 July." (Author)] Address: not stated

10729. Troake, P. (2006): Reports from Coastal Stations - 2005: Gibraltar Point, Lincolnshire. *Atropos* 27: 71-72. (in English) [UK; *Sympetrum fonscolombii*; *Lestes sponsa*] Address: not stated

10730. Tunmore, M. (2006): Reports from Coastal Stations - 2005 : Lizard Peninsula, Cornwall. *Atropos* 27: 49-51. (in English) ["It was generally a poor year for Odonata, one highlight being a *Ceriagrion tenellum* seen near Predannack on 17 July. Records of single *Aeshna mixta* at light on 10 September and Common Darter *Sympetrum striolatum* on 24 September were suggestive of immigration, but it was one of the worst recent years for *S. fonscolombii* with five seen on Goonhilly Downs on 9 July, two near Predannack on 10 July, followed by two at Windmill Farm on 17 July and one there on 10 August." (Author)] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.free-serve.co.uk

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10731. Bouwman, J.; Bakker, S.; de Boer, P.; van Hijum, E.; Hylkema, G. (2007): Beheerplan De Wylde-merk 2008-2012. Rapport VS2007.034, De Vlinderstichting, Wageningen: 15 pp. (in Dutch) [In 2007, De Wylde-merk was established as the first dragonfly sanctuary of the Netherlands. A management plan was prepared for the site. A total of 10 different pools or reed-

beds are identified as as suitable habitat for dragonflies. Conservation measures that must be taken to improve the habitat function are suggested.] Address: De Vliinderstichting, Postbus 506, 6700 AM Wageningen, The Netherlands

10732. Faucheux, M. (2007): Sensilla and cuticular structures in the marval caudal appendages of *Erythromma lindenii* (SÉLYS, 1840), (Odonata: Zygoptera: Coenagrionidae). *Entomology Bulletin* 77: 113-120. (in English, with French summary) ["The cuticular structures and the sensilla on the larval caudal appendages (caudal lamellae) of *E. lindenii* have been studied using scanning electron microscope. Four types of sensilla are visible on the external face of the two lateral lamellae and both faces of median lamella. The aporous sensilla filiformia are vibroreceptors which detect a predatory or hostile presence. The aporous sensilla campaniformia are proprioceptors which may play the role of osmoreceptors here. An olfactory function is presumed for the multiporous sensilla coeloconica and a tactile function for the aporous spatula-shaped sensilla chaetica. The sensilla filiformia and the sensilla campaniformia have already been described on the caudal lamellae of Odonata. The sensilla coeloconica and the spatula-shaped sensilla chaetica are observed for the first time on these appendages." (Author)] Address: Faucheux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Université de Nantes, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex 03, France. E-mail: faucheux.michel@free.fr

10733. Faucheux, M. (2007): Multiporous and aporous sensilla on the larval antennae of the relict dragonfly *Epiophlebia superstes* (SÉLYS, 1889) (Odonata, Anisozygoptera: Epiophlebiidae). *Entomology Bulletin* 77: 121-128. (in English, with French summary) ["The larval antennal sensilla of the relict dragonfly, *E. superstes* have been studied by means of scanning electron microscope. Five types of sensilla are present: curved aporous sensilla chaetica, aporous sensilla filiformia, multiporous sensilla coeloconica, sensilla ampullacea and sensilla basiconica. A tactile function is attributed to the curved sensilla chaetica, a chemoreceptive function to the sensilla ampullacea and sensilla basiconica, a chemoreceptive or hygroreceptive function to the sensilla coeloconica, a vibroreceptive function to the sensilla filiformia. *Epiophlebia*, which lives in the turbulent waters of mountain streams, differs from the other larvae of Zygoptera and Anisoptera, whose habitat is calm water, by the reduced number of sensilla filiformia. *Libellula depressa*, a previously studied anisopteran species, and *Epiophlebia* (Anisozygoptera) both possess sensilla coeloconica. The presence of sensilla coeloconica is common both to the antennae of the final-stadium larva of *Epiophlebia* and of adult Odonats." (Author)] Address: Faucheux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Université de Nantes, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex 03, France. E-mail: faucheux.michel@free.fr

10734. Holuša, O.; Jeziorski, P. (2007): Collection of dragonflies (Insecta: Odonata) in the Ostravian Museum (Czech Republic). *Práce a Stud. Muz. Beskyd (Přir. Vědy)* 19: 143-150. (in Czech, with English summary) [The collections of the Ostravian Museum, Ostrava town harbour 718 specimens in 39 species. "The material was collected mainly in the northern Moravia and Silesia (Czech Republic), but also in Bohemia, Slovakia and Croatia, Macedonia, Hungaria during the years 1920-

1982. Besides rather common dragonfly species in the whole territory of the Czech Republic, the collection also includes several scarce and rare ones, such as *Coerulescens*, *Orthetrum albistylum*, *O. coerulescens*, and *Sympetrum depressiusculum*." (Authors)] Address: Holuša, O., Bruzovská 420, 738 01 Frýdek - Místek, Czech Republic. E-mail: holusao@ email.cz

10735. Martins, F.A.; Del Claro, K. (2007): Distribuição espacial e abundância de *Oxyagrion microstigma* (Odonata: Coenagrionidae) em uma área de Cerrado. *Anais do VIII Congresso de Ecologia do Brasil*, 23 a 28 de Setembro de 2007, Caxambu - MG: 1-2. (in Portuguese) [The territorial behaviour of *O. microstigma* is briefly described and further work in this species is suggested.] Address: Martins, F.A., Universidade Federal de Uberlândia, Instituto de Biologia, Laboratório de Ecologia Comportamental e Interações, Rua Ceará, s/nº Bloco 2D - Campus Umuarama, 38400902, Uberlândia, MG - Brasil - Caixa Postal: 593

10736. Naraoka, N.; Iakahashi, K. (2007): The landing from the water and the terrestrial period before emergence of the final instar larvae of *Epiophlebia superstes* Selys (Anisozygoptera: Epiophlebiidae). *Tombo* 49: 15-21. (in Japanese, with English summary) ["The exiting of the final instar larvae of *Epiophlebia superstes* from water to terrestrial hiding sites before emergence was investigated in the spring of 2005 and 2006, at a mountain stream (width: 2-3 m, water depth: 20-60 cm, altitude: 520-550 m) in Nurukawa-mura, Hirakawa-shi, Aomori prefecture, Japan. The number of larvae walking on the snow (snow depth: 3-4 m) was counted during the period from 3 to 29 April. Over 14 days during 2005 and 2006, we found 193 and 188 larvae on the snow, respectively. Most of the larvae climbed and crawled westward (90.3%) on the snow cover from the mountain stream in the morning, while some larvae climbed and crawled eastward (25.8%) or changed their course to the east from the west as the sun moved from the east to the south (ca. 10 : 30). The larvae moved to land without snow cover 13-36 m away from the stream, and hid under fallen leaves. It took 1.5-4.5 hours to move from the stream to the hiding sites. When hiding sites were not available, the larvae continued walking on the snow for 5-6 hours travelling as far as 40-60 m from the stream. Exiting from the water was observed from 8:00 to 15:00 h with a peak between 10:00-11:00 h, and were mostly in the morning (67.7%) rather than in the afternoon (33.3%). The number of exits from the water was also influenced by weather conditions: 33 + 11 (s.d.) (n=5) on fine days, 24+11(s. d.) (n=7) on fine-cloudy days and 4±2 (s. d.) (n=5) on cloudy days. Walking velocities of the larvae on slope (0-80) and on vertical surfaces (90°C) on the snow were 8-66 (n=89) and 15.3 ±5. 2 (s. d.) (n=23) cm/minute, respectively. The larvae moved faster at higher ambient temperature. The body temperature of larvae varied between 3.5 and 15.5°C, with a mean of 7±3.8°C (s. d.) (n=17 Fig. 5), which correlated with the ambient temperature. We could not observe any adult emergence in May or early July, the time that is supposed to be the emergence period for this species in the study area (Naraoka, 2004). Some larvae were collected in mid and late April and were brought to the lower altitudes (16 m) to observe their emergence periods. The larvae collected in mid April emerged 30.2 ±1.3 (s. d.) days (n=5) after exiting the water but those collected in late April emerged 24.0 ± 1.2 (s. d.) days (n=5) after leaving the water. Also,

some exiting larvae were collected in late April, and were kept in containers in the study area. They emerged 29.3 ± 1.3 (s. d.) days (n=4) after departing the stream (Tabl. 2). We concluded that the final instar larvae of *E. superstes* leave the water area before their emergence during April, and their terrestrial period of life is 25-35 days." (Authors)] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagi-cho, Kita-gun, Aomori Prefecture, 038-3661, Japan

10737. Nishiura, N. (2007): Records of *Sympetrum fonscolombii* and *S. uniforme* in Osaka Prefecture. Tombo 49: 27-29. (in Japanese, with English summary) [A male of the migrating species, *S. fonscolombii* was collected for the first time from Osaka Prefecture, Japan (20-XI-2005), and two males of the "Red listed" species *S. uniforme* were captured at the same place and at the same day. Therefore, "it would be plausible to guess that the insects arrived at the capture sites riding in the same wind."] Address: not stated in English

10738. Sasamoto, A. (2007): Description of a new *Nososticta* species from Biak Island, Indonesia (Zygoptera: Protoneuridae). Tombo 49: 1-4. (in English, with Japanese summary) ["*Nososticta hiroakii* sp. nov. (holotype male, Biak Island, Indonesia), is described and illustrated. This new species is distinguished from the allied species, *N. circumscripta* (Selys, 1886) and *N. exul* (Selys, 1886) by maculation and coloration of thorax, and by wing venation." (Author)] Address: Sasamoto, A., 108 Ujien, 9-1 Gokasyo-Hirano, Uji, Kyoto, 611-0011 Japan

10739. Takahashi, K. (2007): Other Miscellaneous Insects. Flora and fauna inventory report Tanzawa Ooyama. Tanzawa Ooyama Scientific Research Survey: 311-408. (in Japanese) [Records of the following species are presented: *Calopteryx atrata*, *C. cornelia*, *Mnais* spp., *Lestes sponsa*, *L. temporalis*, *Sympetma paedisca*, *Indolestes peregrinus*, *Mortonagrion selenion*, *Aciaagrion migratum*, *Ischnura asiatica*, *Paracercion calamorum*, *P. sieboldii*, *P. hieroglyphicum*, *Epiophlebia superstes*, *Tanypteryx pryeri*, *Sarasaeschna preyri*, *Boyeria maclachlani*, *Planaeschna milnei*, *Aeschnophlebia longistigma*, *Gynacantha japonica*, *Polycanthagyna melanictera*, *Aeshna juncea*, *Anaciaeschna martini*, *Anax parthenope julius*, *A. nigrofasciatus*, *Anisogomphus maacki*, *Asiagomphus melaenops*, *Davidius nanus*, *D. fujiana*, *Lanthus fujiacus*, *Stylogomphus suzukii*, *Sinogomphus flavolimbatus*, *Nihonogomphus viridis*, *Onychogomphus viridicostus*, *Sieboldius albardae*, *Sinicinogomphus clavatus*, *Anotogaster sieboldii*, *Epopthalmia elegans*, *Macromia amphigena*, *Somatochlora uchidai*, *Lyriothemis pachygastra*, *Libellula quadrimaculata asahinai*, *Orthetrum albistylum speciosum*, *O. japonicum*, *O. triangulare melania*, *Deielia phaon*, *Crocothemis servilia mariannae*, *Sympetrum pedemontanum elatum*, *S. darwinianum*, *S. frequens*, *S. eroticum*, *S. parvulum*, *S. risi*, *S. infuscatum*, *S. baccha matutinum*, *S. speciosum*, *S. croceolum*, *Pseudothemis zonata*, *Rhyothemis fuliginosa*, and *Pantala flavescens*.] Address: not stated

10740. Thomas, B. (2007): Kleinvieh & Co: Sonstige. Naturspiegel 65: 26. (in German) [*Sympetrum striolatum* was recorded at 15-XII-2006 in Lüseckamp/Niederkrüchten and *Leucorrhinia rubicunda* at 4.IV-2005 in NSG Heidemoore. These are phenologically interesting data for Nordrhein-Westfalen, Germany, and western central Europe.] Address: Thomas, Barbara, P.-Ther-

stappen-Str. 92, 41334 Nettetal, Germany. E-mail: barbara-thomas@web.de

10741. Vanappelghem, C. (2007): Protocol du Nouvel Atlas des Odonates de la région Nord-Pas-de-Calais. *Le Héron* 40(1): 43-52. (in French) [This manual introduces in mapping the Odonata in Nord-Pas-d-Calais, France.] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

2008

10742. Arbeitskreis Libellen des Entomologischen Fachausschusses des NABU Brandenburg; Müller, O.; Dieke, M.; Lemke, M. (Red.) (2008): 27. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen in Potsdam, 07.-09. März 2008. Abstracts zur 27. Jahrestagung der Gesellschaft deutschsprachiger Odonatologen in Potsdam, 07.-09. März 2008: 82 pp. (in German) [In the framework of the 27th meeting of the German speaking Odonatologists, the following lectures were held: Katrin Vohland: Der Klimawandel und seine Auswirkungen auf die belebte Umwelt; Oliver Schweiger: Artenarealverschiebung als Folge des Klimawandels; Frank Suhling: Ökologische Folgen von Klimaveränderungen für Libellen: Überlegungen und Fakten; Jürgen Ott: Auswirkungen der Klimaänderung auf die Verbreitung der Libellen in Deutschland und Europa - ein Rückblick und aktuelle Trends; Göran Sahlén & Ida Flenner: Dragonfly community reorganisation in boreal forest lakes: rapid species turnover driven by global warming?; Thomas Brockhaus: *Somatochlora alpestris* auf dem Berge. Glaziale Lebensräume und rezente Refugien eiszeitlicher Libellen. Ida Flenner: Global warming - effects on life cycle of *Orthetrum cancellatum*: do populations from different latitudes respond differently? Eberhard G. Schmidt: Fritz Peus (1904-1978) Ein Berliner mit westfälischen Wurzeln (Poster); Hajnalka Gyulavári, Beáta Nagy, Csaba, Cserhádi, István Grigorsky, Margit Miskolczi & György Dévai The characterization of an Hungarian population of *Chalcolestes viridis* possessing a controversial taxonomical status (Poster); Rüdiger Mauersberger & Michael Kruse: Libellenland Brandenburg; Oliver Brauner: Beobachtungen zum Vorkommen einiger südlich verbreiteter Libellenarten unter dem Einfluss der klimatischen Entwicklungen in Brandenburg; Helmut Donath: Welche Libellenarten sind durch den Klimawandel besonders bedroht? Ergebnisse nach 30 Jahren Faunistik im Gebiet des Naturparks Niederlausitzer Landrücken; Paweł Buczyński: Expansion nach Norden - Neues von mediterranen Libellenarten in Polen; Georg Rüppell & Dagmar Hilfert-Rüppell: Warum holen die Männchen von *Calopteryx splendens* bei Verfolgungsflügen die Weibchen nicht ein?; Gerrit Joop: Gestresste Libellen: Einfluss natürlicher Feinde auf das Immunsystem; Kamilla Koch: Wen stört's ... Der Einfluss von Störungen durch Männchen auf das Eiablageverhalten von Weibchen; Hanno Schmidt & Kamilla Koch: Wie sicher kann Mann sich sein: Vaterschaftstests bei *Orthetrum coerulescens*; Karl Westermann: Zur Problematik der Bestimmung des Geschlechterverhältnisses einer großen Population von *Onychogomphus forcipatus* bei der Emergenz; Reinhard Jödicke: Hochsommer im April 2007: Einfluss der Wärme auf den Saisonbeginn von Moorlibellen in Nordwestdeutschland; Eberhard G. Schmidt: Achtzig Jahre Libellenerfassungen in einem nordwestdeutschen Hochmoor (Weißes Venn NW Dülmen/Westmünsterland); Georg

Rüppell & Dagmar Hilfert-Rüppell: Libellen - immer neue Fragen; Stanislav Gorb: Dragonfly functional morphology and its relevance for bionics; Andreas Martens: Großlibellenlarven mit kellenförmiger Fangmaske als effektive Prädatoren von Schwimmkäfern: von Freilandbefunden zur strikten Habitattrennung auf einer tropischen Insel zum experimentellen Beweis; Klaus Guido Leipelt: Ökomorphologie der Beine von Larven und Imagines bei Großlibellen; Dirk J. Mikolajewski: Wenn Dornen zu Fallen werden: Antagonistische Selektion durch Fische und invertebrate Prädatoren; Natalia Matushkina: Phylogenetic implication of the ovipositor-related characters in Odonata (Poster); Andreas Pix: Variabilität und Individualität im Feinadernetz des Anisopterenflügels (Poster); Anna Farkas, Anikó Mári, Éva Prill, Margit Miskolczi, Tibor Jakab & György Dévai Analysis of body mass, body size and energy content data on Gomphidae (Poster); Hansruedi Wildermuth: Der Kleine Blaupfeil *Orthetrum coerulescens* an kleinen Moorgräben: ein Naturschutzprojekt; Viola Clausnitzer: Status der Libellen weltweit - erste Ergebnisse des „Red List Index Projektes“; Boris Schröder: Modellierung von Atlasdaten durch Verbreitungsmodelle - ökologisches Verständnis, Verbreitungsvorhersagen und Ableitung von Schutzmaßnahmen; Klaus-Jürgen Conze, Mathias Lohr, Thomas Brockhaus, Rüdiger Mauersberger & Frank Suhling: Libellen in Deutschland - Arbeitsstand und Fragestellungen für das Atlasprojekt auf Bundesebene; Éva Prill, Anna Farkas, Tibor, Jakab & György Dévai Vergleichende Analyse kalorimetrischer Untersuchungsergebnisse bei Libellen; Tom Kirschey & Jens Meisel: Die Libellen im 100-Seen-Programm des NABU Brandenburg; Holger Hunger: Das Artenschutzprogramm Libellen des Landes Baden-Württemberg]

10743. Balian, E.V.; Segers, H.; Leveque, C.; Martens, K. (2008): The Freshwater Animal Diversity Assessment: an overview of the results. *Hydrobiologia* 595: 627-637. (in English) ["We present a summary of the results included in the different treatments in this volume. The diversity and distribution of vertebrates, insects, crustaceans, molluscs and a suite of minor phyla is compared and commented upon. Whereas the available data on vertebrates and some emblematic invertebrate groups such as Odonata (n = 5,680 species) allow for a credible assessment, data are deficient for many other groups. This is owing to knowledge gaps, both in geographical coverage of available data and/or lack of taxonomic information. These gaps need to be addressed urgently, either by liberating data from inaccessible repositories or by fostering taxonomic research. A similar effort is required to compile environmental and ecological information in order to enable cross-linking and analysis of these complementary data sets. Only in this way will it be possible to analyse information on freshwater biodiversity for sustainable management and conservation of the world's freshwater resources." (Authors)] Address: Balian, Estelle, Freshwater Laboratory, Royal Belgian Institute of Natural Sciences, Vautierstraat 29 B-1000, Brussels, Belgium. E-mail: Estelle.Balian@naturalsciences.be

10744. Belova, Y.N. (2008): Chapter 2. Order Odonata. In: Belova, Y.N.; Dolganova, M.N.; Kolesova, N.S.; Shabunov, A.A.; Filonenko, I.V.: Diversity of insects of the Vologda region. Vologda: Center of operative printing "Kopernik". 368 pp. ISBN 978-5-87822-369-0: 16-25. (in Russian, with English summary) [This study on the fauna of the Vologda region, Russia includes 33

Odonata species. These are treated on pages 16-25. Records and habitat preferences are documented. Most records result from 2003-2005 study period.

10745. Cannings, R.A. (2008): Dunes, dragonflies and dikdiks: a short trip to Namibia and South Africa. *Boreus* 28(1): 32-34. (in English) [Brief report from a trip in April and May 2007 to southern Africa. It includes some notes on the WDA congress in Namibia.] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street Victoria, British Columbia V8W 9W2. Canada. E-mail: rcannings@royalbcmuseum.bc.ca

10746. Domek, P.; Joniak, T.; Piotrowicz, R. (2008): Spatial and seasonal variation of macrozoobenthos in disharmonic lakes of the Drawa National Park. In: R. Goldyn, P. Klimaszyk, N. Kuczyńska-Kippen & R. Piotrowicz (eds): The Functioning and Protection of Water Ecosystems. Department of Water Protection, Faculty of Biology, Adam Mickiewicz University, Poznań 2008: 39-44. (in English) ["The spatial and seasonal variation in species composition, density and biomass of macrozoobenthos in three disharmonic lakes of the Drawa National Park in the profundal zone and in the peatbog zone were compared. Investigations in all the lakes indicated higher values of all parameters in spring than in autumn. The profundal zone was dominated by Diptera, while the littoral zone was dominated by Ephemeroptera. The total biomass of organisms in the profundal zone was much higher than in the peatbog zone. The greatest biomass of a single species was noted in the oligohumic lake, 16 698 mg·m⁻² for *Chaoborus flavicans* (Meig.) (Diptera: Chaoboridae). The peatbog zone was a better habitat for macroinvertebrates than the profundal zone. A great influence on the deep-water biocoenosis of benthic fauna was exerted by the quality of the bottom sediments." (Authors) Odonata taxa recorded are: *Aeshna* sp., *Cordulia aenea*, *Enallagma cyathigerum*, *Gomphus vulgatissimus*, and *Ischnura elegans*.] Address: Domek, P., Dept of Water Protection, Fac. Biology, Adam Mickiewicz Univ., Umultowska 89, 61-614 Poznań, Poland. E-mail: domekp@amu.edu.pl

10747. Eagles-Smith, C.A.; Suchanek, T.H.; Colwell, A.E.; Anderson, N.L. (2008): Mercury trophic transfer in a eutrophic lake: The importance of habitat-specific foraging. *Ecological Applications* 18(8) Supplement, 2008: A196-A212. (in English) ["Mercury (Hg) trophic transfer and bioaccumulation in fish from a mineimpacted eutrophic lake were examined in relation to foraging habitat, trophic position, and size. Diet analysis indicated that there were clear ontogenetic shifts in foraging habitats and trophic position. Pelagic diet decreased and benthic diet increased with increasing fish length in bluegill, black crappie, inland silverside, and largemouth bass, whereas there was no shift for prickly sculpin or threadfin shad. Stable carbon isotope values ($\delta^{13}C$) were inversely related to the proportion of pelagic prey items in the diet, but there was no clear relationship with benthic foraging. There were distinct differences between pelagic and benthic prey basal $\delta^{13}C$ values, with a range of approximately 28‰ in pelagic zooplankton to approximately 20‰ in benthic caddisflies. Profundal prey such as chironomid larvae had intermediate $\delta^{13}C$ values of approximately 24‰, reflecting the influence of pelagic detrital subsidies and suppressing the propagation of the benthic carbon isotope signal up the food chain. Fish total mercury (TotHg) concentrations varied with habitat-specific foraging, trophic position,

and size; however, the relationships differed among species and ages. When controlling for the effects of species, length, and trophic position, TotHg and $\delta^{13}\text{C}$ were positively correlated, indicating that Hg trophic transfer is linked to benthic foraging. When examined on a species-specific basis, TotHg was positively correlated with $\delta^{13}\text{C}$ only for bluegill, largemouth bass, and threadfin shad. However, diet-based multiple regression analyses suggested that TotHg also increased with benthic foraging for inland silverside and black crappie. In both species, benthic prey items were dominated by chironomid larvae, explaining the discrepancy with $\delta^{13}\text{C}$. These results illustrate the importance of foraging habitat to Hg bioaccumulation and indicate that pelagic carbon can strongly subsidize the basal energy sources of benthic organisms." (Authors) Diet items of the studied fishes include Odonata.] Address: Eagles-Smith, C., US Geological Survey, Western Ecological Research Center, Davis Field Station, One Shields Avenue, Davis, California 95616 USA. E-mail: ceagles-smith@usgs.gov

10748. Jackson, J.I.; Boutle, R. (2008): Ecological functions within a sustainable urban drainage system. 11th International Conference on Urban Drainage, Edinburgh, Scotland, UK, 2008: 10 pp. (in English) ["Sustainable Urban Drainage Systems (SUDS) are regarded as engineering solutions to urban storm water control and flood risk. Additional benefits from SUDS in the built environment include sediment entrapment and remediation of water quality from urban runoff through the use of retention/detention systems. Biodiversity value of SUDS is alluded to but few studies have evaluated conservation potential or monitored ecological processes that may occur within them." (Authors) Biodiversity (including Odonata) was studied at the family level.] Address: Jackson, Janet, School of Applied Scienc., Park Campus, Boughton Green Road, Northampton, NN2 7AL, UK. E-mail: janet.jackson@northampton.ac.uk

10749. Kuczyńska-Kippen, N. (2008): Spatial distribution of zooplankton communities between the Sphagnum mat and open water in a dystrophic lake. Polish Journal of Ecology 56(1): 57-64. (in English) ["Composition and dynamics of zooplankton (Rotifera, Crustacea) communities were studied in a dystrophic lake (Drawieński National Park, northern Poland). This lake is a typical mid-forest lake of a small area (ca. 0.65 ha) but relatively deep ($Z_{\text{max}} = 6.8\text{m}$) and covered with a peat (Sphagnum sp.) mat. The study was made in the shallow part of the lake ($Z = 0.5\text{m}$). Zooplankton was collected twice in August 2004, in triplicate subsamples, taken from three stations (1. under the peat mat, 2. the transitional zone between the peat mat and open water area and 3. open water zone) from two different sites within the same lake." (Author) The following Odonata taxa are listed: *Cordulia aenea*, *Enallagma cyathigerum*, *Ischnura elegans*, *Pyrrhosoma nymphula*, and *Leucorhinia* sp."] Address: Kuczyńska-Kippen, Natalia, Dept of Water Protection, Institute of Environmental Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland. E-mail: kippen@hot.pl

10750. Lee, E.-H.; Jang, H.-K.; Paik, M.-Y.; Yoon, J.; Kim, J.G.; Bae, Y.J. (2008): A preliminary study on a restoration of habitats for *Nannophya pygmaea* Rambur (Odonata: Libellulidae). Kor. J. Env. Eco. 22(1): 35-42. (in Korean, with English summary) ["This study was conducted to provide basic information that can be used to restore habitats of *N. pygmaea*. *N. pygmaea* is

an endangered species of wildlife fauna in Korea and its habitats are distributed very scarcely in Korea. Ten wetland sites throughout Korea, where *N. pygmaea* inhabited were investigated from June 2006 to August 2007. Investigation was made on landscape properties, habitat sizes, vegetation types, water environments, and water sources. *N. pygmaea* was generally found in the abandoned paddy fields surrounded by mountains. The habitats ranged from 113.4 m² to 1,153.1 m² in area, and were mostly dominated by *Juncus effusus* and *Persicaria thunbergii*. The water level was 2.6-7.3 cm, and the water temperature ranged from 16°C to 27.8°C. The elevation of the habitats ranged from 139 to 243 m a.s.l., which was mostly lower than that of other high mountain wetland habitats. In conclusion, the habitats of *N. pygmaea* can be restored at wetlands, which have similar condition with field habitat such as abandoned paddy fields in the beginning stage of oligotrophy. Because *N. pygmaea* is sensitive to microtopography and other surrounding environments, the approach to restore the habitats for *N. pygmaea* should consider those microhabitat conditions shown in this study." (Authors)] Address: Lee, Eun-Heui, Division of Environmental Life Sciences, Seoul Women's Univ., Korea.

10751. Légaré, S.; Labonté, P.; Champoux, L. (2008): Impacts des précipitations acides sur la faune benthique des lacs québécois. Naturaliste Canadien 132 (2): 67-74. (in French, with English summary) ["Despite significant reductions in emissions observed in Canada and the United States for three decades, acid rain still represent one of the most serious threats to ecosystems in eastern Canada. The Canadian Wildlife Service has set up a monitoring network to document the current impacts and long-term acid deposition on aquatic fauna. Between 2001 and 2003, the animal communities of 33 lakes in southern Quebec have been inventoried. The results show that the acidity of water affects benthic invertebrates by reducing their abundance and the number of taxa present. Some families of amphipods, gastropods and mayflies appear particularly vulnerable to acidification and have good potential as bio-indicator for monitoring on the long term. An increase in the number of taxa was observed from east to west of the study area. Other chemical, physical, biological and geographical influence community composition and should be considered." (Authors) Canonical Correspondance Analyses also included at the family level Gomphidae and Corduliidae] Address: Légaré, S. E-mail: Stephane.legare@ec.gc.ca

10752. Ott, J. (2008): Libellen als Indikatoren der Klimaänderung – Ergebnisse aus Deutschland und Konsequenzen für den Naturschutz. Insecta 11: 75-89. (in German) [The author reviews his recent (1988-2008) research on Odonata as indicators of climatic change in Germany and on implications of the latter for nature conservation. Emphasis is given to *Crocothemis erythraea*.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

10753. Subramanian, K.A.; Samir, A.; Ramachandra, T.V. (2008): Odonates as indicators of riparian ecosystem function-A case study from south western Karnataka. Fraseria (N.S.) 7: 83-95. (in English) ["The influence of riparian land use on the diversity and distribution were investigated by sampling 113 localities covering 4 districts in south-western Karnataka, India. A total of 55 species in 12 families were recorded. Streams, rivers and lakes had higher diversity than marshes and

sea coast. However, lakes had low endemism than streams and rivers. Streams flowing through evergreen forests had higher diversity and endemism. Human impacted riparian zones such as paddy fields had relatively lower species richness. However, streams flowing through forestry plantations had higher diversity than other natural riparian zones such as dry deciduous, moist deciduous and semi evergreen forests. Myristica swamps-a relict evergreen forest marsh had low diversity and high endemism. Odonate communities of lentic ecosystems, and human impacted streams and rivers were characterized by widespread generalist species. Endemics and habitat specialists were restricted to streams and rivers with undisturbed riparian zone. The study documents possible odonate community change due to human impact: The influence of riparian landuse change on odonate community is also discussed." (Authors)] Address: Subramanian, K.A., Zoological Survey of India, Western Regional Station, Pune-411 044 Maharashtra, India. E-mail: subbuka.zsi@gmail.com

10754. Ware, J.L. (2008): Molecular and morphological systematics of Libelluloidea (Odonata: Anisoptera) and Dictyoptera. Dissertation, Graduate School-New Brunswick Rutgers, The State University of New Jersey: III + 260 pp. (in English) ["Libelluloidea are highly successful dragonflies with unique behaviour and life histories. The systematics of Libelluloidea (Odonata: Anisoptera) has historically been in conflict, with little agreement about the number of families that are comprised in this large, heterogeneous group. For my PhD thesis, I have assembled the most comprehensive molecular and morphological libelluloid dataset to date, in an attempt to revise and simplify libelluloid taxonomy, and to answer questions about the evolutionary history of the group. I ran Bayesian and parsimony analyses to recover phylogenetic hypotheses with which I explore the success of Libelluloidea. Divergence estimation, a method by which nodes of a tree are dated, was first explored under different evolutionary models for a subset of libelluloid taxa in order to determine whether treatment of hydrogen-bonded ribosomal nucleotides affected the age of divergence estimates. Using methodology based on these results, I was able to estimate divergence dates and diversification rates for the first large-scale dating analysis of dragonflies. On a smaller scale, I also completed a study of *Syncordulia*, a vulnerable genus of endemic South African libelluloid dragonflies whose systematics was not yet confirmed. Additional studies of phylogenetic methodology were undertaken in my thesis work for another large and heterogeneous group, the Dictyoptera (Mantodea, Blattodea and Isoptera). In this study, the effect of outgroup selection was determined using a broad, comprehensive taxon set for which we had both molecular and morphological data. These results suggest that the evolution of sociality, on which much of the recent discussion in dictyopteran systematics has focused, cannot be reliably determined when different outgroups recover dramatically conflicting topologies." (Author)] Address: Ware, Jessica L., Rutgers, The State University of New Jersey, Cook College, 93 Lipman Drive, New Brunswick, New Jersey 08901, USA. E-mail: jware@amnh.org

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10755. Broyer, J.; Curtet, L.; Bouniol, J.; Vieille, J. (2009): L'habitat de *Leucorrhinia pectoralis* Charpentier,

1825 (Odonata, Libellulidae) dans les étangs piscicoles de la Dombes (Ain). Bulletin mensuel de la Société linéenne de Lyon 78: 77-84. (in French, with English summary) [On the basis of a study of 50 fishponds in 2000 and 47 in 2008 in the Dombes region (Ain-Department, France), the habitat of *Leucorrhinia pectoralis* is analysed. "This species was found in ponds characterized by areas of medium size (about 0.60 m) helophytes in more than 60% of the perimeter, with patches free of emergent vegetation in about one third of their total surface area and connected over a distance of more than 100 m to surrounding littoral woods which may be present in 30 to 80% of pond's periphery. Habitat units with both helophytes and littoral woods seem to secure adequate shelters which enable to tolerate the presence of high fish stock density in water bodies." (Author)] Address: Broyer, Joel, Office National de la Chasse et de la Faune Sauvage, Direction des études et de la recherche, 01330 Birieux, France. E-mail: joel.broyer@oncfs.gouv.fr

10756. Collen, B.; Ram, M.; Dewhurst, N.; Clausnitzer, V.; Kalkman, V.; Cumberlidge, N.; Baillie, J.E.M. (2009): Broadening the coverage of biodiversity assessments. In: Vié, J.-C., Hilton-Taylor, C. & Stuart, S.N. (eds.) (2009): *Wildlife in a Changing World – An Analysis of the 2008 IUCN Red List of Threatened Species*. Gland, Switzerland: IUCN. 180 pp: 67-75. (in English) [The chapter includes information on three species with restricted range (*Platycnemis pempipes*, *Amanipodagrion gilliesi*, *Oreocnemis phoenix*), impact of climate change on *Hemiphysalis mirabilis*, and a reference to *Viridithemis viridula* (known from a single female, Madagascar).] Address: IUCN, Rue Mauverney 28, CH-1196 Gland, Switzerland

10757. Dijkstra, K.D.; Tchiboza, S.L.; Ogbogu, S.S. (2009): Chapter 5. The status and distribution of dragonflies (Odonata). In: Darwall, W.R.T., & K.G. Smith (Editors). *The Status and Distribution of Freshwater Biodiversity in Western Africa*. IUCN: 41-55. (in English) [An overview of the regional Odonata fauna in relation to the freshwater ecoregions is presented. Species, conservation status, patterns of species richness, and the major threats to dragonflies are outlined. Conservation recommendations, i.e. conservation measures and the required research, are suggested. Information is organised in the following chapters: 5.1 Overview of the regional Odonata in relation to the freshwater ecoregions; 5.1.1 Widespread endemics of western Africa; 5.1.2 Xeric freshwaters and Lake Chad basin; 5.1.3 Savannah dry forest rivers and inner Niger delta; 5.1.4 Large river deltas; 5.1.5 Moist forest rivers; 5.1.6 Highland and mountain systems; 5.2 Conservation status; 5.3 Patterns of species richness; 5.4 Major threats to dragonflies; 5.4.1 Habitat degradation; 5.4.2 Damming large rivers; 5.4.3 Mining; 5.5 Conservation recommendations; 5.5.1 Conservation measures; 5.5.2 Research action required; 5.6 References.] Address: Dijkstra, K.D., Curator of invertebrates, National Zoological Collection of Suriname, University of Suriname, P.O. Box 9212, Paramaribo, Suriname. E-mail: Dijkstra@naturalis.nnm.nl

10758. Henriques-Oliveira, A.L.; Nessimian, J.L. (2009): Phoresy and commensalism of Chironomidae larvae (Insecta: Diptera) in the state of Rio de Janeiro, Brazil. *Lundiana* 10(1): 11-18. (in English) ["Chironomid larvae are frequently found living in phoretic or commensal association with aquatic animals in all regions of the

world. In Brazil, new records have been available in the literature in the last years mainly for the state of São Paulo. In collects performed in several streams and rivers in the state of Rio de Janeiro and bordering areas, chironomid larvae were found living in association with Corydalidae (Megaloptera); Perlidae (Plecoptera); Leptophlebiidae (Ephemeroptera); Aeshnidae and Libellulidae (Odonata: Rhionaeschna punctata, Elasmotheremis cannaeriodes, Brechmorhoga sp.), Sericostomatidae (Trichoptera); Elmidae (Coleoptera) and catfishes of the families Trichomictoridae and Loricariidae (Pisces). These new records are presented in the present study." (Authors)] Address: Henriques-Oliveira, Ana Lucia, Lab. de Entomologia, Departamento de Zoologia, Instituto de Biologia, CCS, Universidade Federal do Rio de Janeiro, Ilha do Fundão, CP 68044, CEP 21944-970 Rio de Janeiro, RJ., Brazil. E-mail: anahenri@biologia.ufrj.br

10759. Holuša, O. (2009): [Mysterious forest dragonflies. Where can we see our Cordulegaster species?]. Vesmír 88: 2-4. (in Slovakian) [The paper presents pictures of larvae and imagines of the three Slovakian Cordulegaster species *C. bidentata*, *C. boltonii*, and *C. heros* together with their habitats.] Address: Holuša, O., Muzeum Beskyd, prirodovedné oddelení, Zámecké náměstí 1264, CZ-738 01 Frydek-Místek. E-mail: holusao@post.cz

10760. Kim, D.G.; Yoon, T.J.; Oh, C.G.; Kim, J.G.; Lee, E-H.; Bae, Y.J. (2009): Laval growth rate of *Nannophya pygmaea* (Odonata: Libellulidae), an endangered dragonfly in Korea. Korean Journal of Limnology 42(3): 290-294. (in Korean, with English summary) ["Larval development of *N. pygmaea* was studied using an introduced larval population in an artificial wetland habitat. Artificial habitat was created in a green house which imitated a small wetland in Boryeong-si, Chungcheongnam-do, Korea, where *N. pygmaea* inhabited. A total of 300 *N. pygmaea* larvae were introduced to the artificial habitat in June 2007. Larvae were recaptured five times between June 2007 and November 2008 for measurement of body length. As a result, the initial and recaptured populations (Recaptured I, II, III, IV, and V populations, respectively) contained two body size groups [initial 6.20±0.34mm and 7.94±0.46mm (mean ± SD); Recaptured I 2.84±0.43mm and 5.16±0.83 mm; Recaptured II 5.96±0.66mm and 8.02±0.35mm; Recaptured III 5.97± 0.73 mm and 7.82 ±0.37 mm; Recaptured IV 7.04 ± 0.93 mm and 8.52 ±0.39 mm; Recaptured V 5.72±0.60mm and 7.71 ±0.30 mm]. Our rearing experiment evidenced that the recaptured I-V populations are the offspring of the initial population and the offspring grew approximately 3 mm at 470 degree days. It was also estimated that *N. pygmaea* larvae need approximately 100 degree days to grow 0.7 mm in body length." (Authors)] Address: Bae, Y.J., College of Life Sciences and Biotechnology, Korea University, Seoul 136-701, Korea. E-mail: yjbae@korea.ac.kr

10761. Kiss, B.; Juhász, P.; Müller, Z.; Ködöböcz, V. (2009): Adatok a Kis-Balaton és közvetlen környéke vízi makroszkópikus gerinctelen (Bivalvia, Gastropoda, Malacostraca, Ephemeroptera, Odonata, Heteroptera, Coleoptera és Trichoptera) faunájának ismeretéhez. Folia Historico-Naturalia Musei Matraensis 33: 61-72. (in Hungarian, with English summary) [Presens/absence data of 142 macrozoobenthic taxa are presented from the territory of Lake Kis-Balaton, and its surroundings, Hungary. Record data of 14 Odonata species are documented: *Anaciaeschna isosceles*, *Anax imperator*,

Brachytron pratense, *Libellula fulva*, *Orthetrum albistylum*, *O. cancellatum*, "*Crocothemis servilia*", *Calopteryx splendens*, *Coenagrion puella*, *C. pulchellum* interruptum, *Erythromma najas*, *E. viridulum*, *Ischnura elegans pontica*, and *Platycnemis pennipes*.] Address: Kiss, B., BioAqua Pro Kft., H-4032 Debrecen, Soó R. 21. Hungary. E-mail: bkiss@bioaquapro.hu

10762. Lagunov, A.V. (2009): ["Red Book" Invertebrates in the city of Chelyabinsk]. Proceedings of the Chelyabinsk Scientific Center 3(45): 23-27. (in Russian) [The paper includes records of (1) *Calopteryx virgo*: Chelyabinsk (River Valley. Miass) in Miass on Simskom, Mynyar ponds in the vicinity of borhood Castle, Kyshtym and Ozersk, near the village. Koelga, Breda, and vicinity Magnitogorsk, (2) *Calopteryx splendens*: Magnitogorsk, Miass and Chelyabinsk, near the Castle near Shem, (3) *Aeshna viridis*: in the vicinity of Chebarkul and Magnitogorsk and (4) *Ophiogomphus cecilia*: in Magnitogorsk.] Address: Lagunov, A.V., Ilmen State Reserve, Ural Division, Miass, etc. Avtozavodtsev, 16, 456 317, Russia. E-mail: lagunov@mineralogy.ru

10763. Mitra, A.; Mitra, B. (2009): Pictorial Handbook on Common Dragon and Damselflies (Odonata: Insecta) of Mangroves of Sunderbans, India. Zoological Survey of India: viii + 56 pp. (in English) ["Contents: Acknowledgements. 1. Introduction. General morphology. Habit, habitat and behavioural patterns. Economic importance. Systematic list. Field Identification. I. Closed Wing Pond Damselflies: Superfamily Coenagrionoidea. Family Coenagrionidae. Subfamily Pseudagrioninae: 1. Genus *Ceriagrion*: i. *Ceriagrion cerinorubellum* (Brauer, 1865). ii. *Ceriagrion coromandelianum* (Fabricius, 1798). 2. Genus *Pseudagrion*: iii. *Pseudagrion australasiae* Selys, 1876. iv. *Pseudagrion decorum* (Rambur, 1842). Subfamily Coenagrioninae: 3. Genus *Cercion*: v. *Cercion malayanum* (Selys, 1876). Subfamily Ischnurinae: 4. Genus *Ischnura*: vi. *Ischnura senegalensis* (Rambur, 1842). vii. *Ischnura aurora aurora* (Brauer, 1865). Subfamily Agriocnemidinae: 5. Genus *Agriocnemis*: viii. *Agriocnemis pygmaea* (Rambur, 1842). Subfamily Argiinae: 6. Genus *Onychargia*: ix. *Onychargia atrocyana* Selys, 1865. II. Angle Wing Club-Tails: Superfamily Aeshnoidea. Family Gomphidae. Subfamily Lindeniinae: 7. Genus *Ictinogomphus*: x. *Ictinogomphus rapax* (Rambur, 1842). III. Dippers and Perchers: Superfamily Libelluloidea. Family Libellulidae. Subfamily Brachydiplactinae: 8. Genus *Brachydiplax*: xi. *Brachydiplax sobrina* (Rambur, 1842). Subfamily Libellulinae: 9. Genus *Lathrecista*: xii. *Lathrecista asiatica asiatica* (Fabricius 1798). 10. Genus *Orthetrum*: xiii. *Orthetrum sabina sabina* (Drury, 1770). Subfamily Symptetrinae: 11. Genus *Acisoma*: xiv. *Acisoma panorpoides panorpoides* Rambur, 1842. 12. Genus *Brachythemis*: xv. *Brachythemis contaminata* (Fabricius, 1793). 13. Genus *Bradinopyga*: xvi. *Bradinopyga geminata* (Rambur, 1842). 14. Genus *Crocothemis*: xvii. *Crocothemis servilia servilia* (Drury, 1770). 15. Genus *Diplacodes*: xviii. *Diplacodes trivialis* (Rambur, 1842). 16. Genus *Neurothemis*: xix. *Neurothemis tullia tullia* (Drury, 1773). Subfamily Trithemistinae: 17. Genus *Trithemis*: xx. *Trithemis pallidinervis* (Kirby, 1889). Subfamily Trameinae: 18. Genus *Rhyothemis*: xxi. *Rhyothemis variegata variegata* (Linnaeus, 1763). 19. Genus *Pantala*: xxii. *Pantala flavescens* (Fabricius, 1798). 20. Genus *Tramea*: xxiii. *Tramea virginia* (Rambur, 1842). 21. Genus *Tholymis*: xxiv. *Tholymis tillarga* (Fabricius, 1798). Subfamily Urothemistinae: 22. Genus *Macrodiplax*: xxv. Macro-

diplox cora (Brauer, 1867). 23. Genus *Urothemis*: xxvi. *Urothemis signata signata* (Rambur, 1842). Suggested readings. Related websites." (Authors)] Address: Mitra, A., Northern Regional Station, Zoological Survey of India, 218 Kaulagarh Roads, Dehra Dun - 248195, India

10764. Ngiam, R.W.J. (2009): The biology and distribution of *Pseudagrion rubriceps rubriceps* Selys, 1876 (Odonata: Zygoptera: Coenagrionidae) in Singapore. *Nature in Singapore* 2: 209-214. (in English) [An oviposition was recorded at 29-I-2009 in Toa Payoh Town Park, Singapore. The partners were paired with the female submerged during the oviposition.] Address: Ngiam, R.W.J., National Biodiversity Centre, National Parks Board, 1 Cluny Road, Singapore 259569, Republic of Singapore. E-mail: ngiam wenjiang@nparks.gov.sg; yanrobin@hotmail.com

10765. Pliūraitė, V.; Mickeniėnė, L. (2009): Benthic macroinvertebrate communities in agriculturally impaired streams. *Environmental Research, Engineering and Management* 3(49): 10-20. (in English, with Lithuanian summary) [12 Lithuanian streams were studied for their macrozoobenthos with emphasis on impacts caused by agricultural use of adjacent lands. The total of 67 taxa includes *Calopteryx splendens* (1 loc.) and *Gomphus vulgatissimus* (3 loc.).] (Authors)] Address: Pliūraitė, Virginija, Institute of Ecology of Vilnius University, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: virga@eko.lt

10766. Samokhin, D.M. (2009): [Current status of red-listed insect species in the reserve "Voroninsky"]. *Proceedings of the National Nature Reserve "Voroninsky" 1*: 141-155. (in Russian) [Inzhavinsky and Kirsanovsky Districts of the Tambov Region, Russia; *Anax imperator*, *Aeshna cyanea*, *A. juncea*, *A. viridis* and *Sympetrum pedemontanum* are listed together with some basic information on habitats and phenology.] Address: not stated

10767. Solly, F.; Milton, P.; Sawyer, D.; Hodge, T.; Hunt, B. (2009): Reports from Coastal Stations - 2009: Isle of Thanet, Kent. *Atropos* 39: 55-56. (in English) [UK; records of *Erythromma viridulum*, *Orthetrum cancellatum* and *Sympetrum fonscolombii* are briefly discussed.] Address: not stated

10768. Toyosaki, I.; Takashi, Y.; Oohara, K. (2009): Records of *Trithemis aurora* (Odonata, Libellulidae) in Tokushima Prefecture, Shikoku, Japan. *Bulletin of the Tokushima Prefectural Museum* 19: 39-44. (in Japanese) [The northward range extension of *T. aurora* is documented with details.] Address: Toyosaki, I., Tokushima Prefectural Museum, Bunka-no-Mori Park, Hachimancho, Tokushima 770-8070, Japan

10769. Tumilovich, O.A. (2009): On dragonfly fauna of Kaliningrad district. *151(2)*: 192-196. (in Russian, with English summary) [31 dragonfly species were revealed in the Kaliningrad district. *Sympetrum depressiusculum*, *S. fonscolombii*, and *Chalcolestes viridis* were found for the first time. *Libellula quadrimaculata* is the most abundant and dominant regional species.] Address: Tumilovich, Olga, Kaliningrad State Technical University, 236000 Kaliningrad, Russia. E-mail: Leventetuirambler.ru

10770. Weitzel, M. (2009): Bemerkenswerte Spätherbst- und Winterbeobachtungen von Köcherfliegen und Libellen im extrem milden Winter 2006/2007 aus dem Moselgebiet. *Dendrocopos* 36: 81-85. (in German) [This

paper includes several outstanding interesting data on phenology of Odonata in the Trier-region, Rheinland-Pfalz, Germany. Imaginal specimens were found from *Calopteryx splendens* on 26/27.III.2007 and 10.IV.2007; *Calopteryx virgo* on 29.III. and 12.IV.2007; *Lestes sponsa* on 26.11. and 23.12.2006 and 1.1.2007; *Pyrrhosoma nymphula* on 8.III./26.III. and 6.IV.2007; *Ischnura elegans*: mass emergence on 2.IX.2006; *Enallagma cyathigerum* on 26.XI.2006; *Coenagrion puella* on 31.III. 2007; *Erythromma lindenii* on 30.X.2006; *Aeshna mixta* on 25.XI.2006; *Aeshna cyanea* on 25.XI., 31.XII.2006, 19.I. 2007; *Gomphus vulgatissimus* freshly emerged in mid October 2006; *Gomphus pulchellus* freshly emerged on 2.IX.2006; *Sympetrum striatum* on 26.XI.2006, 9.I. and 18.I.2007; *Sympetrum sanguineum* 27.XI.2006.] Address: Weitzel, M., Graf-Reginar-Str. 43, 54294 Trier, Germany. E-mail: matthias-weitzel@web.de

10771. Winkler, C.; Klinge, A.; Drews, A. (2009): Verbreitung und Gefährdung der Libellen Schleswig-Holsteins – Arbeitsatlas 2009. *Faunistisch-Ökologische Arbeitsgemeinschaft Schleswig-Holstein (FÖAG) e.V. und Ökologie-Zentrum der Christian-Albrechts-Universität Kiel in Kooperation mit dem Landesamt für Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein (Herausgeber): II + 43 pp.* (in German) [66 Odonata species are mapped, their threats and populations trends are assessed and classified in a Red List. The maps differ between records from 1850-1995 and 1996-2009. Seven of the species must be assessed as extinct, six have been recorded only very rarely as single individuals, and 53 are currently resident.] Address: Drews, A., Landesamt für Landwirtschaft, Umwelt und ländliche Räume, Hamburger Chaussee 25, 24220 Flintbek. Germany. E-mail: arne.drews@llur.landsh.de

10772. Zia, A., M. A. Rafi, Z. Hussain and M. Naeem. (2009): Occurrence of Odonata in Northern Areas of Pakistan with seven new records. *Halteres* 1(1): 48-56. (in English) ["Detailed surveys were carried out from two districts viz. Poonch and Sudhnoti of Kashmir Valley during summer seasons of 2007 and 2008 to make an updated record of inhabiting Odonata. Ten localities were selected on the basis of variables keeping in view the habitat requirements of Odonata. The present study provides a record of 16 anisopterous species spreading to 9 genera and 29 zygopterous species spreading to 14 genera. Among these *Lestes patricia* is a new record for the country. The distribution, synonymy, richness and abundance of the species are discussed in this paper. The Kashmir Valley is rich in insect biodiversity, the odonate fauna of this valley needs to be further explored." (Authors)] Address: Rafi, M.A., National Insect Museum, National Agriculture Research Centre, Islamabad – Pakistan

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10773. Altamiranda-S., M.; Perez-G., L.A.; Gutierrez-M., L.C. (2010): Composition and microhabitat preference of Odonata larvae (insecta) in the San Juan de Tocagua swamp (Atlántico, Colombia). *Caldasia* 32(2): 399-410. (in Spanish, with English summary) ["We evaluated the response of the assembly of Odonata larvae to the available substrates on the shoreline of the Swamp San Juan de Tocagua, Atlántico, Colombia. We sampled the habitats from September 2006 to March 2007 to estimate diversity, richness and abundance of larval odonates. We also measured physical

and chemical parameters of the water body. The species showed a broad occupancy of the substrate, with greater cover and permanence on the floating macrophytes and the muddy bottom. The species of the bottom of the swamp were not associated with a particular type of texture. The measured physicochemical factors were not associated with the diversity, richness and abundance of the larvae in the system, suggesting that the variation in the values of these parameters does not explain the response of the assembly during the study." (Authors) The following taxa are involved into the study: *Ischnura ramburii*, *Telebasis* sp., *T. salva*, *T. filiola*, *Triacanthagyna septima*, *Coryphaeschna adnexa*, *Dythemis sterilis*, *Erythemis plebeja*, *E. attala*, *Erythrodiplax umbrata*, *E. fervida*, *Miathyria simplex*, *Perithemis mooma*, and *Tramea onusta*.] Address: Altamiranda-S., M., Universidad Nacional de Colombia sede Medellín, Apartado 3840, Medellín, Colombia. E-mail: maltamiranda@gmail.com.

10774. Balzan, M.V. (2010): An integrative ecological approach towards insect conservation in a Mediterranean agricultural landscape: The case of Insect (Odonata) fauna in the Maltese Islands. 40th Anniversary Conference. Gesellschaft für Ökologie. Book of Abstracts August 30th to September 03rd, 2010: 364. (in English) [Verbatim: An integrative ecological approach to the assessment of conservation of insect groups within highly modified Mediterranean agricultural landscapes is proposed. A hierarchical multiscale analysis was carried out and investigated how habitat characteristics at multiple scales, ranging from the immediate habitat structure to the local agricultural landscape characteristics, influence a target group (Insecta: Odonata) distributions. Multivariate statistical procedures were used to analyse the relationship between Odonata assemblage patterns and environmental variables. Moreover, stakeholders were considered as an inherent part of the landscape, and consequently local ecological knowledge together with stakeholders' perception of insect conservation was carried out. Results from this study suggest that Odonata populations are influenced by habitat characteristics at multiple scales, ranging from the physical properties and characteristic vegetation to landscape composition and diversity. Concurrently, this study identified farmers' perception of insects in agricultural landscapes, their conservation, cause of decline of 'beneficial' species, and persistent pest problems arising from resource management actions. Grounded in these findings, an iterative and integrative ecosystem-based management approach is proposed for the conservation of insect species in the agricultural landscapes.] Address: Balzan, M.V., Malta College of Arts, Science and Technology

10775. Bazova, N.V.; Bazov, A.V. (2010): Ecology of odonate larvae (Odonata) in the Selenga river. Eurasian Entomological Journal 9(2): 285-289. (in Russian, with English summary) [Between 1987-2005, data on the occurrence, abundance and biomass of *Ophiogomphus* sp. larvae in the channel part of the Selenga (from its outlet on Lake Baikal to the Mongolian border), are analysed, based on 2316 quantitative samples, taken from 25 vertical sections from beneath the ice (December and March). Habitat parameters were noted to a depth of 1-2 m, with a low stream velocity (0.0-0.4 m/s). During the under-the-ice period, larvae move to the deeper parts of the channel because of the significant fall of water level and the increasing of the ice thickness near

the bank (up to 2 m). This is considered as a normal behaviour in *Ophiogomphus* sp.] Address: Bazova, N.V., Institute of General and Experimental Biology, ul. Sakhyanovoy 6, Ulan-Ude, 670042 Russia

10776. Bowman, N. (2010): Reports from Coastal Stations - 2009: Eccles-on-Sea, Norfolk. Atropos 39: 62. (in English) ["Odonata were generally scarce during 2009. The resident *Erythromma viridulum* population seemed at a very low ebb until numbers of presumed immigrants appeared in mid-August." (Author) see also Harvey & Higott (2009)] Address: not stated

10777. Brucet, S.M.; Boix, D.; Quintana, X.D.; Jensen, E.; Nathansen, L.W.; Trochine, C.; Meerhoff, M.; Gascon, S.; Jeppesena (2010): Factors influencing zooplankton size structure at contrasting temperatures in coastal shallow lakes: Implications for effects of climate change. Limnol. Oceanogr. 55(4): 1697-1711. (in English) ["We assessed the importance of temperature, salinity, and predation for the size structure of zooplankton and provided insight into the future ecological structure and function of shallow lakes in a warmer climate. Artificial plants were introduced in eight comparable coastal shallow brackish lakes located at two contrasting temperatures: cold-temperate and Mediterranean climate region. Zooplankton, fish, and macroinvertebrates were sampled within the plants and at open-water habitats. The fish communities of these brackish lakes were characterized by small-sized individuals, highly associated with submerged plants. Overall, higher densities of small planktivorous fish were recorded in the Mediterranean compared to the cold-temperate region, likely reflecting temperature-related differences as have been observed in freshwater lakes. Our results suggest that fish predation is the major control of zooplankton size structure in brackish lakes, since fish density was related to a decrease in mean body size and density of zooplankton and this was reflected in a unimodal shaped biomass-size spectrum with dominance of small sizes and low size diversity. Salinity might play a more indirect role by shaping zooplankton communities toward more salt-tolerant species. In a global-warming perspective, these results suggest that changes in the trophic structure of shallow lakes in temperate regions might be expected as a result of the warmer temperatures and the potentially associated increases in salinity. The decrease in the density of large-bodied zooplankton might reduce the grazing on phytoplankton and thus the chances of maintaining the clear water state in these ecosystems." (Authors) Macroinvertebrate predators of zooplankton sampled include coenagrionid larvae and *Ischnura elegans*.] Address: Brucet, Sandra, National Environmental Research Institute, Dept of Freshwater Ecology, Aarhus University, Silkeborg, Denmark. E-mail: sandra.brucet-balmana@jrc.ec.europa.eu

10778. Cade, M. (2010): Reports from Coastal stations - 2009: Portland Bird Observatory, Dorset. Atropos 39: 44-45. (in English) [*Sympetrum fonscolombii* was recorded on five dates between 28 May and 23 June 2009.] Address: not stated

10779. Clancy, S. (2010): Reports from Coastal Stations - 2009: Dungeness area, Kent. Atropos 39: 50-53. (in English) [Records of *Sympetrum fonscolombii* and *Anax parthenope* are documented] Address: not stated

10780. Deans, M. (2010): Reports from Coastal Stations - 2009: Bawdsey Peninsula, Suffolk. Atropos 39:

58-59. (in English) [*Chalcolestes viridis*, *Sympetrum striolatum* (at light)] Address: not stated

10781. Dekeukeleire, D. (2010): Waarneming van een mannetje Bosbeekjuffer (*Calopteryx virgo*) aan de Sassegembeek te Oubraken. *Limoniet* 2010(1/2): 70. (in Dutch) [18-VII-2010, 50°47'N 3°44'E, Oubraken, provincie Oost-Vlaanderen, Belgium] Address: Dekeukeleire, D. E-mail: daan.dekeukeleire@gmail.com

10782. Dewick, S. (2010): Reports from Coastal Stations - 2009: Curry Farm, Bradwell-on-Sea, Essex. *Atropos* 39: 56-57. (in English) [*Sympetrum striolatum* was active on 10-XII-2009.] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

10783. Diehl, D.A.; Lücke, Y.A. (2010): Die aktuelle Situation der Libellen im Landkreis Darmstadt-Dieburg. *Collurio* 28: 122-130. (in German) [Hessen, Germany; the regional status/threats of the following Odonata species are outlined: *Aeshna affinis*, *Anaciaeschna isoceles*, *Calopteryx virgo*, *Cordulegaster bidentata*, *Crocothemis erythraea*, *Erythromma najas*, *E. viridulum*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Orthetrum brunneum*, *Sympetrum pedemontanum*, *S. danae*, and *S. fonscolombii*.] Address: Diehl, D.A., Naturkunde-Institut Langstadt, Breuberger Weg 4, 64832 Langstadt, Germany. E-mail: biologodd@aol.com

10784. Dronsikova, M.V. (2010): Behaviour of *Libellula quadrimaculata* (Linnaeus, 1758) larva (Odonata, Libellulidae) and its modification during ontogenesis. *Euroasian ent. J.* 9(2): 255-262. (in Russian, with English summary) ["A series of aquarian experiments to study the behaviour of larvae of dragonflies *L. quadrimaculata* from egg to imago have been undertaken. The complexity and individuality of larvae behaviour during ontogenesis is revealed. Many features in behaviour become apparent following the 6th larval stage and allows consider development of behaviour in ontogenesis. Larval aggression against conspecific individuals chiefly depends on their experience in earlier contacts. It is found that *L. quadrimaculata* larvae have a tendency to spatial aggregation, the number of clusters changing with increasing of larval sizes and age." (Author)] Address: Dronsikova, M.V., Kuzbass St. Pedag. Acad., Pros. Pionerskiy 13, RUS-654027 Novokuznetsk

10785. Druvietis, I.; Sprinģe, G.; Briede, A.; Kokoritē, I.; Pārele, E. (2010): A comparative assessment of the bog aquatic environment of the Ramsar site of Teiči Nature Reserve and North Vidzeme Biosphere Reserve, Latvia. In: M. Klavinš (ed.): *Mires and Peat*. University of Latvia Press. 216 pp.: 19-40. (in English) [In most cases Odonata - listed in appendix 2 - are treated at the genus level.] Address: Druvietis, I., Institute of Biology, Univ. of Latvia, Miera St 3, Salaspils, LV-2169, Latvia.

10786. Gligorović, B.; Pešić, V.; Zeković, A. (2010): A contribution to the knowledge of the dragonflies (Odonata) of the river Brestica (Montenegro). *Natura Montegrina*, Podgorica 9(2): 151-159. (in English, with Serbian summary) ["In 2007 Odonata fauna along the River Brestica in the surrounding of Spuz was studied. 273 specimens classified into 19 species were collected. Species structure of collected specimens in this area is interesting because the River Brestica is one of the few absolutely flat rivers in Montenegro." (Authors)] Address: Gligorović, B., Dept of Biology, Faculty of Sci-

ences. Univ. of Montenegro. Cetinjski put b.b., 81000 Podgorica. Montenegro. E-mail: bogid@t-com.me

10787. Gligorović, B.; Pešić, V.; Gligorović, A. (2010): A contribution to the knowledge of the dragonflies (Odonata) from the River Morača (Montenegro). *Acta entomologica serbica* 15(2): 149-159. (in English, with Serbian summary) [The records of 35 species (including *Coenagrion ornatum*, *Gomphus schneideri*, *Stylurus flavipes*, *Lindenia tetraphylla*, *Somatochlora meridionalis*) are presented. *Trithemis annulata* is for the first time recorded from Montenegro. *Calopteryx s. splendens* occurs in the upper and middle and *C. s. balcanica* in the lower course of the river. *O. c. coerulescens* is recorded from Lukovci and Manastirski Lug, *O. c. anceps* from Podgorica. Records of *Platycnemis pennipes nitidula*, *Chalcolestes viridis* and *C. parvidens* are briefly discussed.] Address: Gligorović, B., Univ. Montenegro, Fac. of Sci., Dep.t of Biology, Cetinjski put b.b., 81000 Podgorica, Montenegro. E-mail: bogic1@t-com.me

10788. Haritonov, A.Yu. (2010): A dedication to Dr Boris Feodorovich Belyshev on his 100th birthday: retrospective and perspectives of odonatology in Siberia. *Eurasian entomological journal* 9(2): 223-230. (in Russian) ["A biographical sketch on the outstanding odonatologist Boris Feodorovich Belyshev is presented, with an analysis of his scientific work and that of the scientific school he founded. A comprehensive list of his odonatalogical publications is also provided." (Author)] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Acad. of Sciences, Frunze str. 11, RUS-630091 Novosibirsk, Russia. E-mail: pc@eco.nsc.ru

10789. Harvey, R.; Higgott, J. (2010): Reports from Coastal Stations - 2006: Minsmere RSPB Nature Reserve, Suffolk. *Atropos* 39: 60-61. (in English) [Records of *Sympetrum fonscolombii*, *Anaciaeschna isosceles*, *Erythromma najas* and *E. viridulum* are reported. *E. viridulum* was recorded on 17-VIII during a major influx of the ladybird beetle *Coccinella septempunctata*, and thus may have indicated a fresh immigration from continental Europe.] Address: not stated

10790. Heads, M. (2010): Point of view: Old taxa on young islands: A critique of the use of island age to date island-endemic clades and calibrate phylogenies. *Systematic Biology* 60: 1-15. (in English) ["The age of a clade has been estimated by using the age of its oldest fossils, the age of islands or strata that the clade is endemic to, and the age of tectonic events that are spatially related to the clade's geographic distribution (Heads 2005a). These dates can be used to calibrate a phylogeny and to calculate the ages of other related clades. This paper focuses on the use of islands in calibration, but the two other methods are also discussed briefly." (Author) The paper includes a reference to *Megalagrion*.] Address: Heads, M., Buffalo Museum of Science, 1020 Humboldt Parkway, Buffalo, NY 14211-1293, USA. E-mail: michael.heads@yahoo.com

10791. Holuša, O.; Kúdela, M. (2010): New records of *Cordulegaster heros* (Odonata: Cordulegasteridae) on its northern area border in Slovakia. *Acta Musei Beskydensis* 2: 75-87. (in English, with Slovakian summary.) [During 1997-2009, the regional occurrence of *C. heros* was studied in the southern part of Slovakia. So far, four regions with its occurrence are known now: the Borská nížina Lowland, the Malé Karpaty Mts. in the western Slovakia, the Revúcka vrchovina Highlands

and the Stolické vrchy Hills in central Slovakia. The species was found - based on records of larvae - at 44 localities, situated an altitude between 194 and 516 m a.s.l. and a concentration of records between 201-300 m a.s.l. The distribution in Slovakia is mapped, and some characteristic habitats are pictured.] Address: Holusa, O., Department of Forest Protection and Game Management, Faculty of Forestry and Wood Technology, Mendel University of Agriculture and Forestry Brno, Zemědělská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

10792. Holusa, O. (2010): The results of the faunistic research of dragonflies (Insecta: Odonata) in the region of Místek town. *Acta Musei Beskydensis* 2: 63-74. [Between 1992 to 2009, 38 Odonata species were found at 25 localities in the region of Místek town in the northern Moravia, Czech Republic. Regionally rare species are: *Anax parthenope*, *A. ephippiger*, *Crocothemis erythraea*, *Orthetrum brunneum* and, *Sympetrum pedemontanum*. Emphasis is given to the habitats of *Cordulegaster bidentata* and *Onychogomphus forcipatus*. The common occurrence of *Orthetrum albistylum* in the region is also emphasized.] Address: Holusa, O., Dept of Forest Protection and Game Management, Faculty of Forestry and Wood Technology, Mendel University of Agriculture and Forestry Brno, Zemědělská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

10793. Hunter, I.; Hunter, S. (2010): Reports from Coastal Stations - 2009: Elms Farm, Icklesham, East Sussex. *Atropos* 39: 49-50. (in English) [Abundance of *Erythromma viridulum* accounted to 331 individuals.] Address: not stated

10794. Jarman, N.; Morris, T. (2010): Reports from Coastal Stations - 2009: Kingsdown Beach and St Margaret's at Cliffe, Kent. *Atropos* 39: (in English) [UK; *Sympetrum fonscolombii* at 29-VIII and 5-IX-2009] Address: not stated

10795. Kaize, J.; Kalkman, V.J. (2010): On a collection of dragonflies (Odonata) from the Island of Mioswaar (Papua Barat, Indonesia). *SUGAPA (Suara Serangga Papua)* 5(2): 71-76. (in English) ["A total of 28 species of dragonflies were collected during fieldwork from the 18th to 27th of August 2009. One of these (*Argiolestes* roon) has since been described as new to science while several others are still undescribed (*Argiolestes* spec.) or might be new to science. This small collection shows that the Island of Mioswaar has a rich and diverse dragonfly fauna comparable with that of the mainland. A number of the species have their main range or their nearest relatives on the Bird's Head Peninsula showing that the dragonfly fauna of Mioswaar is more related with that of the Bird's Head than with that of the vast other part of the mainland of New Guinea." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

10796. Kern, D. (2010): *Fliegende Edelsteine. Libellen im Landkreis Diepholz*. WM-Verlag, Weyhe-Melchiorshausen: 156 pp. (in German) [This regional faunistic research (Niedersachsen, Germany) is based on more than 8000 data from 57 Odonata species sampled over 30 years. It introduces the regional natural history, maps all records and presents threats to each Odonata species. The study is arranged in a monographic style

with photographs to each species.] Address: Kern, D., Taxusweg 2, D-27232 Sulingen, Germany

10797. Knill-Jones, S. (2010): Reports from Coastal Station - 2009: Isle of Wight, Hampshire. *Atropos* 39: 45-47. (in English) [*Cordulia aenea*, *Brachytron pratense* and *Sympetrum fonscolombii* were brought on record.] Address: not stated

10798. Latha, C.; Thanga, V.S.G. (2010): Choice of bio-indicator species for estuaries of south Kerala: An approach based on macroinvertebrate. *The Ecoscan* 4(4): 285-289. (in English) ["Spatial and temporal patterns of macroinvertebrate community structure were used to assess the water quality of two estuaries in south Kerala viz., Kadinamkulam and Veli. A total of 14,660 individuals representing 24 taxa and 3 phyla viz., Mollusca, Arthropoda and Annelida were collected from the sampling sites. The dominance of taxa varied with seasons as well as sites. Species abundance was highest at V2 followed by K. Species richness, abundance and diversity were found to be lowest in site K2. Diversity index ranged from 0.27 to 2.33. At V1, there was no significant difference ($p > 0.05$), K1 was found to be significantly different from K2 and V2; K2 was significantly different from sites K3 and V3; K3 differed significantly from V2 ($p < 0.05$); V3 was significantly different from V2 ($p < 0.01$). Kadinamkulam was found to be highly polluted than Veli considering the richness and abundance of macroinvertebrates in the estuaries. The indicator species chosen for Kadinamkulam was Culicidae and Chironomidae; whereas they were Peracaridae and Planorbidae for Veli. [...] Corduliidae, Aeshnidae, Coenagrionidae were present only in V1 and V2." (Authors)] Address: Latha, C., Department of Zoology, M. S. M College, Kayamkulam, University of Kerala - 690 502, India. E-mail: lathachin@yahoo.co.in

10799. Löschau, M. (2010): Rotfußfalke (*Falco vespertinus*) auf nächtlicher Libellenjagd bei Vollmond. *Otis* 18: 115. (in German, with English summary) [Zachow, Havelland, Brandenburg, Germany; a female *F. vespertinus* successfully caught dragonflies at night under a full moon.] Address: Löschau, M., Falstaffweg 46, 13593 Berlin, Germany. E-mail: martin.loeschau@web.de

10800. Lojková, S. (2010): Contribution to the knowledge of dragonflies (Odonata) of selected localities of Bratislava. *Folia faunistica Slovaca* 15(16): 135-142. (in Slovakian, with English summary) [Slovakia; In 2008, the Odonata of 12 localities in the Malé Karpaty Mts (DFS-090) and the Podunajská rovina lowland (DFS-790) were studied. 29 species were identified representing 41 % of Odonata the species reported for Slovakia. Of special interest are the species protected by European law: *Cordulegaster heros* and *Leucorrhinia pectoralis*] Address: Lojková, Sona, Katedra zoológie, Prírodovedecká fakulta UK v Bratislave, Mlynská dolina B-1, 84215 Bratislava. Slovakia. E-mail: lojkova@fns.uniba.sk

10801. McNeely, J. (2010): Monitoring climate change with Dragonflies: Foreword. *BioRisk* 5 (Special issue: Monitoring climatic change with dragonflies): 1-2. (in English) ["Monitoring Climate Change with Dragonflies provides an important new tool for dealing with arguably the most important environmental challenge facing modern humanity. It provides a solid foundation on which subsequent research can be built, and can help ensure that responses to climate change are as appro-

priate as possible." (Author)] Address: McNeely, J.A., IUCN, Gland, Switzerland. E-mail: jam@iucn.org

10802. Odin, N. (2010): Reports from Coastal Stations - 2009: Landguard Bird Observatory, Suffolk. *Atropos* 39: 57-58. (in English) [Records of *Sympetrum fonscolombii* on 21-VII and of *Chalcolestes viridis* on 14-IX-2009.] Address: not stated

10803. Oregon Biodiversity Information Center (2010): Rare, Threatened and Endangered Species of Oregon. Institute for Natural Resources, Portland State University, Portland, Oregon: 105 pp. (in English) [USA; only *Eretogomphus compositus* and *Gomphus lynnae* are checklisted.] Address: Publishers: 1322 S.E. Morrison St., Portland, OR 97214-2531, USA

10804. Orr, A.G.; Kalkman, V.J. (2010): *Arrhenocnemis parvibullis* sp. nov. (Odonata: Platycnemididae), a new calicnemiine damselfly from Papua New Guinea, with a description of the female of *A. amphidactylis* Lieftinck, 1949. *Australian Entomologist* 37(4): 137-146. (in English) ["*Arrhenocnemis parvibullis* (Odonata: Platycnemididae), from the Muller Range of Papua New Guinea is described and its habits and habitat discussed. It represents the third species of this distinctive genus, known from just 16 specimens. The recently discovered female of *A. amphidactylis* is described for the first time." (Authors)] Address: Orr, B., Griffith School of Environment, Griffith University, Nathan, Qld. 4111, Australia

10805. Parr, A. (2010): Migrant dragonflies in 2009, including recent decisions and comments by the Odonata Records Committee. *Atropos* 39: 26-33. (in English) ["The 2009 season saw major arrivals of *Sympetrum fonscolombii* during the late spring and summer, and a significant hot weather movement of many migratory/dispersive species during a short period around the end of June/early July. Other significant finds included the discovery of singleton *Lestes barbarus* at three sites on the East Anglian coast during August. The highlight of the year was, however, the discovery of large numbers of *Lestes viridis* in southeast Suffolk, under circumstances strongly suggestive of the presence of a recently-established breeding population." (Author) A total of 18 Odonata species is documented and discussed.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

10806. Paulson, D.A. (2010): Review: GARRISON, R. W., VON ELLENRIEDER, N., AND LOUTON, J. A. 2010. *Damselfly Genera of the New World, an Illustrated and Annotated Key to the Zygoptera*. The Johns Hopkins University Press, 490 pp., 2586 figs., 108 maps. ISBN 978-0-8018-9670-5. Hardback, \$84.37 (amazon.com). *Florida Entomologist* 93(4): 666. (in English) [Verbatim: "This book follows by four years its companion volume on the Anisoptera of the New World by the same authors (Garrison et al. 2006, reviewed in *Florida Entomologist* 90: 290-291). Although about the same number of genera (124 Anisoptera, 118 Zygoptera) are treated in the two books, the dragonflies are treated in 368 pages with 1626 figures, the damselflies in 490 pages with 2586 figures. This points out the considerably greater degree of work and detail the authors put into the second volume. In addition, while preparing to write and writing this volume, the first two authors have become the pre-eminent odonate taxonomists of the New World tropics, publishing no fewer than 17 papers (since 2000) to clarify the taxonomy of numerous

groups, some of them large. Before this, the largest family, Coenagrionidae, was a taxonomic quagmire, and now a fair modicum of order has emerged from the chaos. How else to build a key to genera that actually works? This book easily lives up to the expectations promised by the dragonfly volume, including comprehensive, extremely well illustrated keys; detailed morphological descriptions of each genus; and brief descriptions of natural history wherever known. The writing is clear, but its conciseness fails to convey how much work at the microscope must have gone into the keys and descriptions. And most of us will be unable to imagine the amount of time that went into producing the figures. They are meticulous and superb, by the standards of any scientific illustrator. They are lavishly provided, often more than one species in a genus. I am constantly engaged by the morphological diversity of damselflies that one can see under magnification, and this book shows it all. Many of them were used before, in their recently published papers, but the majority appear uniquely in this book. Having worked with the authors on several genera, I can add that they are impeccably accurate. The three-dimensional rendering of medio-dorsal views of terminal appendages is so much more helpful than the old standard of dorsal and lateral views that one wonders why the excellent illustrators of a century ago didn't come up with it. There are a lot more photos in this book than in the dragonfly book, 81 vs. 24, and the beauty and variety of New World damselflies are shown off to the fullest. All the families are represented, and there was a real effort made to get all the genera. Many have not been photographed. Everything about this volume invites the term "comprehensive." The maps of generic ranges are of great value to the biogeographer and might be used to point out poorly surveyed regions. The long list of references provides access to the taxonomic and biological literature of all New World damselflies, and to that all-important opportunity to identify specimens to species. The list that attributes a locality to every figure is a nice touch. If there are mistakes in the volume, I did not find them with my level of scrutiny. The very timely Appendix lists additions and corrections to the Anisoptera volume, and such a list will doubtless be generated for this volume in a few years. Like Philip Corbet's grand book on Odonata (Corbet 1999), the two superb volumes from these authors are perfectly placed to show us what still needs to be done: 1) databasing and georeferencing existing collections to give an even clearer picture of regional biodiversity; 2) many more surveys and much more collecting over neotropical regions that are still poorly known; 3) modern taxonomic revisions of genera that have not yet received that treatment; and 4) sets of keys to species, especially regional keys such as those by Lencioni (2005, 2006). Finally, regional photo-illustrated field guides to all species!" Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

10807. Rozner, G.; Lökkös, A.; Ferincz, A. (2010): Preliminary studies on the distribution of Large Golden Ringed Dragonfly (*Cordulegaster heros* Theischinger, 1979) and Golden Ringed Dragonfly (*Cordulegaster bidentata* Selys, 1843) in the Kőszeg-mountains. *Folia Historico-Naturalia Musei Matraensis* 34: 37-40. (in English) ["In former studies the occurrence of *C. bidentata* was reported from the Kőszeg Mountainins, Bakony Mountains and Northern Mountains, *C. heros* was found in the Mecsek, the Sopron Mountains, the Örség and nowa-

days it has been observed in the Zselic Hills. In the years 2008 and 2010 our examinations confirmed the occurrence of *C. heros* also in several waterflows of Kőszeg Mountains." These findings enlarge the known regional range of distribution of *C. heros*, and evidence the co-occurrence of the two species in Hungary.] Address: Rozner, G., Managership of Balaton-felvidéki National Park, H-8229 Csopak, Kossuth u. 16, Hungary

10808. Sacha, D. (2010): Results of the research on dragonflies (Odonata) in the area within the Pieniny National Park. Pieniny – Przyroda i Czlowiek 11: 69-79. (in Slovakian, with English summary) ["There are 34 species of Odonata reported from 15 sites in the area within the Pieninský národný park administration. [...] 14 species were reported in this territory for the first time, 14 species are Redlisted in Slovakia, 7 are protected under national law, 1 is a species of Community interest. The most interesting findings are: *Coenagrion hastulatum*, *Sympetrum pedemontanum*, *Orthetrum coerulescens*, *Leucorrhinia dubia*, *L. pectoralis* and *L. rubicunda*." (Author)] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: du-san.sacha@vazky.sk

10809. Sato, T.; Tsurusaki, N. (2010): Preliminary report of insect fauna occurring in the Tottori Sand Dunes. Bulletin of the Tottori Prefectural Museum 47: 45-81. (in Japanese, with English summary) ["On the basis of literature records and specimens newly obtained, a total of 600 insect species belonging to 130 families of 13 orders (excluding Endognatha) are catalogued as a preliminary list of insect fauna of the Tottori Sand Dunes (s.str., Tottori City, Honshu, Japan), which is the largest coastal dunes in Japan facing the Sea of Japan to the north." (Authors) 38 Odonata species are reported.] Address: Sato, T., Suzukake-dai 1-38-306, Sanda City, Hyogo Prefecture, 669-1322 Japan. E-mail: satotakamushi@yahoo.co.jp

10810. Sharma, C.; Saini, D.S. (2010): Studies on the zygopterous dragon fly larval forms from Rewa. International journal of pharmacy & life sciences 1(6): 350-356. (in English) [India; *Pseudagrion decorum*, *Ischnura delicata* and *I. senegalensis* is described ("principal morphological changes and extent of variations occurring during development") and compared.] Address: Sharma C., Zoological Laboratory, Janata P.G. College, Rewa, (M.P.) - India

10811. Spence, B. (2010): Reports from Coastal Stations - 2009: Spurn Point, East Yorkshire. Atropos 39: 63-64. (in English) ["It was not a particularly outstanding year for Odonata and the only notable event was a small arrival of Red-veined Darter *Sympetrum fonscolombii* on 14 June, when nine were seen. However, with calmer weather during August up to 20 Small Red-eyed Damselfly *Erythromma viridulum* were counted on several dates during the month." (Author)] Address: not stated

10812. Taylor, R.E.; Forman, D.W.; Greig, C.; Parry, G.S. (2010): Otters, the unexpected entomophage? The Biologist 57(3): 121-125. (in English) [In April - June, "Aeshna" was found in 10 - 15 % of otter spraints from rivers in Gower, UK, between January 2005 and December 2007.] Address: Forman, D.W., Conservation Ecology Research Team, Department of Pure and Applied Ecology at the School of the Environment and Society, Swansea University, Singleton Park, Swansea SA2 8PP, UK. E-mail: d.w.forman@swansea.ac.uk

10813. Toth, S. (2010): Dragonfly fauna of the Transdanubium hills and surroundings. Natura Somogyiensis 16: 5-188. (in Hungarian, with English summary) [Hungary, Balaton region and Mecsek Mountains; records of 58 Odonata species are documented in detail and mapped. The phenology of most of the species is illustrated, and the historical development of regional odonatological faunistics is presented.] Address: Toth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

10814. Tunmore, M. (2010): Reports from Costal Stations - 2008: Lizard Peninsula. Atropos 39: 39-41. (in English) [*Sympetrum fonscolombii*; at light: *Aeshna mixta* and *Sympetrum striolatum*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freeserve.co.uk

10815. van Dijk, T. (2010): Effects of neonicotinoid pesticide pollution of Dutch surface water on non-target species abundance. MSc Thesis, Sustainable Development, Track Land use, Environment and Biodiversity (SD: LEB), Utrecht University: 75 pp. (in English) ["Conclusions: Neonicotinoid pesticides are applied in the largest amounts where potatoes, horticultural products and chicory are grown. In these areas, which are mainly found in the Dutch provinces of Zuid-Holland, Noord-Holland, Zeeland and Groningen, imidacloprid can be found in the surface water in concentrations often far exceeding the MTR norm of formerly 13 ng/l and presently 67 ng/l. Neonicotinoid pesticides work by inhibiting nerve impulses in susceptible species, particularly insects, which leads to their demise and, at lower concentrations, several sublethal effects including reduced learning and signalling, and starvation of the individual or colony. The effects of neonicotinoid pesticides on many non-target species have been reported in scientific literature – in this study, toxicity data from previous research were listed for 44 different species. Flying insects quite consistently appeared to be the most vulnerable to neonicotinoids, and therefore species abundance of three orders of flying insects was combined with imidacloprid concentrations in the Dutch surface water, to see whether any correlation between these properties existed. Six other orders, of aquatic insects and crustaceans, were also included in this analysis. Species abundance for the flying insect order Diptera tends to decrease with increasing imidacloprid concentration. This was shown by all three different methods of analysis used: classification by number of times the MTR norm, classification by groups with equal n, and visualisation of data in scatter plots. All methods yielded significant results for Diptera. The order Hydracarina showed an opposite effect, as abundances were higher at high imidacloprid concentrations. Results for the other orders were often more ambiguous. However, after a square root transformation had been applied to the data, the significance of the finding that Coleoptera, Amphipoda and Odonata are negatively influenced by the presence of imidacloprid was shown to be at a 93, 89 and 87% confidence level, respectively. Also, the scatter plots of transformed data for all orders showed declining trend lines for separate species and sometimes for all species together, and these were significant for Diptera and all species of Amphipoda together, and had a relatively high level of significance for a species of Trichoptera and most species of Heteroptera. This indicates that if the amount of data available had permitted

analysing separate species, more significant differences might well have been found, as the presence of insensitive species may have distorted results for the entire order. If analysis of separate species had been possible, the hypothesis drafted for this study might have been confirmed unequivocally. As is, the hypothesis has been confirmed for Diptera, and, less strongly, for Coleoptera, Amphipoda, Heteroptera and Odonata. It was invalidated for Hydracarina, and for the other orders results were ambiguous." (Author)] Address: not stated

10816. Vieira, C.; Goncalves, V.; Cardoso, A.C.; Patanita, I. (2010): Registo de quatro novas especies de Odonata para a Ribeira do Vasco, Sitio de Interesse Comunitario do Guadiana (Portugal). Boletim de la S.E.A. 47(2): 461-462. (in Portuguese) [2009, *Sympecma fusca*, *Coenagrion caerulescens*, *Gomphus graslinii*, *Libellula quadrimaculata*] Address: not available

10817. Yum, J.W.; Lee, H.Y.; Bae, Y.J. (2010): Taxonomic review of the Korean Zygoptera (Odonata). Entomological Research Bulletin 26: 41-55. (in English) ["Korean Zygoptera are reviewed and catalogued with synonyms, type and bibliographic information, Korean localities, distribution, and taxonomic remarks. As a result, 35 nominal species belonging to 4 families are included as follows. Calopterygidae: *Calopteryx atrata*, *C. japonica*, *Matrona basilaris*, and *Mnais pruinosa*; Coenagrionidae: *Aciagrion migratum*, *Ceriagrion auranticum*, *C. melanurum*, *C. n nipponicum*, *Coenagrion concinuum*, *Coe. ecornutum*, *Coe. hastulatum*, *Coe. hylas*, *Coe. lanceolatum*, *Enallagma cyathigerum*, *E. deserti*, *Ischnura asiatica*, *I. elegans*, *I. senegalensis*, *Mortonagrion selenium*, *Nehalennia speciosa*, *Paracercion calamorum*, *P. hieroglyphicum*, *P. melanotum*, *P. plagiosum*, *P. sieboldii*, and *P. v-nigrum*; Platycnemididae: *Copera annulata*, *C. tokyoensis*, and *Platycnemis phyllopora*; Lestidae: *Indolestes peregrinus*, *Lestes dryas*, *L. japonicus*, *L. sponsa*, *L. temporalis*, and *Sympecma paedisca*. *Calopteryx cornelia* Selys, *Agrionemis pygmaea* Rambur, *Platycnemis foliacea sasaki* Asahina, and *Lestes hanlimensis* Kim are inappropriately known Zygoptera species in Korea." (Authors)] Address: Bae, Y.J., Division of Life Sciences, College of Life Sciences and Biotechnology, Korea University, 5-ga, Anam-dong, Seongbuk-gu, Seoul 136-701, Korea. E-mail: yjbae@korea.ac.kr

10818. Zhang, H.; Hämäläinen, M.; Tong, X. (2010): *Indocypha catopta* sp. nov. from Guizhou, China (Odonata: Chlorocyphidae). International Journal of Odonatology 13(2): 231-240, pl. III. (in English) ["*Indocypha catopta* sp. nov. (holotype male: China, Guizhou, Maolan National Nature Reserve 28 vii 2008, to be deposited in the Collection of Aquatic Insects and Soil Animals, Department of Entomology, South China Agricultural University, Guangzhou) is described, illustrated and compared with all known *Indocypha* species. The uncertain taxonomic status of some Chinese *Indocypha* species is briefly discussed. The correct spelling of the species-group name of *I. silbergliedi* is established." (Authors)] Address: Zhang, H., Dept of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou-510642, China. E-mail: zhanghaomiaoo6988@gmail.com

10819. Abbott, J.C. (2011): The female of *Leptobasis melinogaster* González-Soriano (Odonata: Coenagrionidae). International Journal of Odonatology 14(2): 171-174. (in English) ["The female of *L. melinogaster* is formally described and illustrated. Female *L. melinogaster* can be distinguished from the seven other known congeners by the shape and presence of a ventral lobe below the rounded lateral margins of the posterior and median lobes of the prothorax as well as by the dark apices on the femora." (Author)] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., Univ. of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

10820. Abbott, J.C. (2011): Dragonflies and Damselflies (Odonata) of Texas. Odonata Survey of Texas. Vol. 5. Austin, Texas: VI + 322 pp. (in English) [Information on Texas, USA Odonata is provided in the following chapters: Statistical Summary of Odonata in Texas; Abundance & Distribution of Texas Odonata; Diversity of Texas Odonata by County; Checklist of Dragonflies & Damselflies of Texas; Dragonflies and Damselflies of Texas Conservation Ranks; Seasonality of Odonata in Texas; Dragonflies & Damselflies of Texas Listed by County; Distribution Maps of Texas Odonata; Appendix: (1) Collection Guidelines for the Odonata Survey of Texas. (2) The Dragonfly Society of the Americas Guidelines for Collecting. (3) Specific Collecting & Preservation Instructions. (4) Guidelines for Field Notes & Data Recording. (5) Odonata Field Guides, Resources, Societies, & Suppliers (6) Glossary of Terms Relating to Odonata. (7) Index of maps.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

10821. Abdel-Gawad, F.K.; Hassanein, M.A.; Lofty, N.M.; Bassem, S.M. (2011): Evaluation of DNA damage in fish and aquatic insects induced by environmental pollutants in River Nile. World Applied Sciences Journal 14(7): 1085-1090. (in English) ["The development of comet assay for aquatic organisms is of particular relevance in light of the importance of fisheries testing for environmental pollutants. Various tests in organisms have been utilized for the detection and identification of toxic substances in the air, water and soil. In the present study, the comet assay was applied on fish and aquatic insects to conduct an environmental assessment of River Nile. The collected samples from the mixed point of waste water represented the highest degree of DNA damage concerning damage stages and comet% followed by the mixed point of agriculture drain when compared with samples collected from control site. Results of DNA damage by one way ANOVA analysis of tail moment of fish and aquatic insects collected from this study demonstrates the potential application of the comet assay to different aquatic sites were not significantly different from samples collected from control site ($P=0.08$). While when analyzing other comet parameters (comet% and tail length) samples were significantly different ($P=0.04$). The results suggested a genotoxicity of the aquatic environment at River Nile and that the comet assay in fish and aquatic insects provided adequate sensitivity to be utilized as a tool in the monitoring of water pollution and environmental risk assessment." (Authors) The study includes *Enallagma (Azuragrion) vansomeri*.] Address: Fagr Abdel-Gawad, Dept of Water Pollution, National Research Cen-

ter, Dokki, Giza, Postal code 12622, Egypt. E-mail: fagr-abdlgawad@gmail.com

10822. Ahani, M. (2011): Environmental assessment of downstream water from Latian Dam using benthics as a biological index. International Conference on Chemical, Environmental and Biological Sciences (ICCEBS'2011): 302-307. (in English) [Iran; "This paper reports the results of a study on the environmental assessment of the downstream water using benthics as a biological index of water quality in Jajrood River. The research was carried out at four sampling sites of a downstream section of Latian Dam in the fall-winter and spring seasons. Using the Hilsenhoff Biotic Index to assess water quality at the sampling sites, the monthly and seasonal flow water changes were investigated in the Jajrood catchment for a period of 30 years. Statistical investigations indicate that spring is the wettest season in the Jajrood catchment, and the result of a paired t-test indicates that the seasonal differences of all benthic families except Rhyacophilidae is significant. According to the Hilsenhoff Biotic Index results, the water quality downstream of Latian Dam was average at three sampling sites, and the water quality was only good at site 2. The dominant benthic families were Chironomidae and Caenidae. In this study, the presence of pollution-tolerant families in the sampling sites indicates that these sites are ecologically unhealthy and that the flow water at the downstream section of Latian Dam differs considerably from the environmental flow water requirements of aquatic ecosystems during the fall-winter and spring seasons." (Author) Odonata (Platycnemidae, Coenagrionidae) are only represented in spring in low abundances.] Address: Ahani, M., Department of Environment planning and management, Faculty of Environment, Tehran University, Tehran, Iran. Email: Monireh Ahani@yahoo.com

10823. Akin, S.; Sahin, C.; Verep, B.; Turan, D.; Mutlu Gözler, A.; Bozkurt, A.; Çelik, K.; Çetin, E.; Aracı, A.; Sargın, Y (2011): Feeding habits of introduced European perch (*Perca fluviatilis*) in an impounded large river system in Turkey. African Journal of Agricultural Research 6(18): 4293-4307. (in Akin, S., Faculty of Agriculture, Department of Fisheries and Aquatic Sciences, Gaziosmanpasa University 60240 Tokat, Turkey. E-mail: senol.akin@gop.edu.tr) ["The feeding habits of perch were documented by analyzing gut contents of more than 3300 specimens collected seasonally at nine stations located along the impounded large river in Turkey. Perch largely preferred fish (36%), insects (54%), other crustaceans (16%) and daphnia (13%). Spatial analysis showed that perch substantially preferred fish in the river section above the dam lakes and insects, crustacean and fish in the river section below the dam lake and in dam lakes. The perch at every size seemed to prefer fish with the highest and lowest percentage obtained for 0 to 80 and 141 to 200 mm. Insects and crustaceans were important for 81 to 140 mm and 0 to 120 mm length, respectively. Crustaceans were important in June, November and July. Insects and fish except for June 2009 constituted an important portion of the diets during every sampling month. The perch showed a piscivory feeding habit, a result obtained by trophic level calculated by stomach contents (3.87) and stable isotope (3.91) methods. Trophic level change little during the ontogeny with relatively higher value obtained for the larger length. The perch inhabiting in the river section above the dam lakes had the highest trophic level compared to the other sites. Diet breadth of perch was

lower and higher for larger and middle length (101 to 140 mm), respectively. The diet breadth was higher in dam lakes, indicating opportunistic feeding habits in lakes. Being the most abundant fish species in the study system and showing predatory feeding habits suggested that perch may have an effect on local fish assemblage and itself through predation." (Authors) The diet includes very few Odonata specimens.] Address: not stated

10824. Amaya Vallejo, V.; Novelo-Gutierrez, R. (2011): The larva of *Palaemnema mutans* Calvert, 1931 (Odonata: Platystictidae). Zootaxa 3049: 59-63. (in English, with Spanish summary) ["The larva of *P. mutans* is described, illustrated, and compared with larvae of the genus described to date. *P. mutans* differs from the other species in having a shorter body length, a larger number of teeth in the internal molar lobe of the left mandible and shorter caudal lamellae, as well as an apical filament proportionally longer than in any other species. The hypopharynx is described for the first time for the genus. This is the first record of *P. mutans* for Colombia." (Authors)] Address: Amaya Vallejo, Vanessa, Universidad de los Andes, Laboratorio de Zoología y Ecología Acuática LAZOE. Cra 1 N°18A- 12, Lab J307 Bogotá, Colombia. E-mail: stolenseason@gmail.com

10825. Ammerschlaeger, J.; Hübner, T.; Kiel, E.-F. (2011): Maßnahmen zur Anpassung an den Klimawandel in NRW. Möglichkeiten, die Auswirkungen des Klimawandels auf Arten und Lebensräume abzuschwächen. Natur in NRW 4/11: 11-14. (in German) [Measures to deaden climatic effects on the regional fauna are discussed. Dragonflies most serious susceptible by the effects and therefore of concern are *Somatoclora arctica*, *S. flavomaculata*, *Thecagaster bidentata*, *Aeshna subarctica elisabethae*, *Leucorrhinia dubia*, *L. rubicunda*, *Coenagrion lunulatum*, and *C. hastulatum*.] Address: Hübner, T., LANUV, Leibnitzstr. 10, 45659 Recklinghausen, Germany. E-mail: thomas.huebnerlanu.nrw.de

10826. Andrew, R.J.; Thakkar, N.; Dhamani, A.A. (2011): Eggshell ultrastructure of the damselfly *Ceragrion coromandelianum* (Zygoptera: Coenagrionidae). National Seminar on Biodiversity and Intangible Natural Heritage on 28th September, 2011. Organised by National Museum of Natural History Zoological Survey of India, Tansen Marg, New Delhi (MoEF, Govt. of India), M-Block, New Alipore, Kolkata (MoEF, Govt. of India) on September 28th, 2011: 23. (in English) [Verbatim: Scanning electron microscopic examination of the egg of *C. coromandelianum* reveals that it is elongate and cylindrical with a pointed anterior and rounded posterior end. The egg chorion is composed of an outer, thin, lightly corrugated exochorion and an inner, thick, smooth, non-porous endochorion. The anterior end is circumscribed by five micropylar orifices. Each orifice is semicircular and continues as a long horizontal streak on the endochorion and concludes at a bifid terminal point. This forms the entry point of the micropylar chute which penetrated the endochorion. The vitelline envelope lodged below the endochorion is thin and smooth.] Address: Dhamani, A.A., Nevjabai Hitkarini College, Brahmapuri, Dist.- Chandrapur (MS), India

10827. Andrew, R.J. (2011): Diversity in the egg shell ultrastructure of dragonflies (Insecta: Odonata). National Seminar on Biodiversity and Intangible Natural Heritage on 28th September, 2011. Organised by National Museum of Natural History Zoological Survey of India,

Tansen Marg, New Delhi (MoEF, Govt. of India), M-Block, New Alipore, Kolkata (MoEF, Govt. of India) on September 28th, 2011: 24-25. (in English) [Verbatim: The present report describes the ultrastructural diversity of the egg shell of five odonates exhibiting different mode of oviposition and fertilization. The dragonflies lay eggs in and around water bodies because of their amphibiotic nature. The type of water body and substrate used for oviposition has a profound influence on the ultrastructural modifications of the eggshell. The eggshell is divided into an external chorion and an inner vitelline envelope. The chorion is further differentiated into an outer exochorion and an inner endochorion. Both the layers of the chorion exhibit ultrastructural radial and regional complexities. Scanning electron microscopic investigations reveal that the radial complexity is customized in accordance with the mode of oviposition whereas the regional complexity is modified for effective fertilization and complements the fertilization pore of the vagina. The functional significance of the egg chorion is described, classified and discussed in the light of recent literature.] Address: Andrew, R.J., Shri Dnyanesh Mahavidyalaya, Navargaon, Dist. Chandrapur- 441 223, (MS), India

10828. Angert, A.L.; Crozier, G.G.; Rissler, L.J.; Gilman, S.E.; Tewksbury, J.J.; Chunco, A.J. (2011): Do species traits predict recent shifts at expanding range edges. *Ecology Letters* 14: 677-689. (in English) ["Although some organisms have moved to higher elevations and latitudes in response to recent climate change, there is little consensus regarding the capacity of different species to track rapid climate change via range shifts. Understanding species abilities to shift ranges has important implications for assessing extinction risk and predicting future community structure. At an expanding front, colonization rates are determined jointly by rates of reproduction and dispersal. In addition, establishment of viable populations requires that individuals find suitable resources in novel habitats. Thus, species with greater dispersal ability, reproductive rate and ecological generalization should be more likely to expand into new regions under climate change. Here, we assess current evidence for the relationship between leading-edge range shifts and species traits. We found expected relationships for several datasets, including diet breadth in North American Passeriformes and egg-laying habitat in British Odonata. However, models generally had low explanatory power. Thus, even statistically and biologically meaningful relationships are unlikely to be of predictive utility for conservation and management. Trait-based range shift forecasts face several challenges, including quantifying relevant natural history variation across large numbers of species and coupling these data with extrinsic factors such as habitat fragmentation and availability. [...] British Odonata: Lm analyses of Odonata range shifts yielded low to moderate explanatory power ($R^2 = 0.10-0.24$; Table 3). Egg habitat, which is associated with clutch size, had a marginally significant positive effect in most top-ranked models and was the variable with highest relative importance (Table 3), but confidence intervals surrounding the model-averaged regression coefficient for egg habitat contained zero (Fig. 1c). In phylogenetically corrected analyses, egg habitat became a statistically significant predictor variable (Fig. 2c; Table 3). Specifically, exophytic species (large clutches laid on water or land) shifted 0.83 standard deviations (65.69 km) further north, on average, than endophytic species (small clut-

ches laid in plants)."] Address: Angert, Amy, Department of Biology and Graduate Degree Program in Ecology, Colorado State University, Fort Collins, CO 80523, USA. E-mail: amy.angert@colostate.edu

10829. Appel, E.; Gorb, S.N. (2011): Resilin-bearing wing vein joints in the dragonfly *Epiophlebia superstes*. *Bioinspiration & Biomimetics* 6(4) 046006 doi: 10.1088/1748-3182/6/4/046006: 11 pp. (in English) ["In this study, we compared the dorsal and ventral patterns of three vein joint types and three types of resilin patches in the wings of the dragonfly *E. superstes*. The joint types were classified according to their general structure and the resilin patch types according to their arrangement at joints and in the adjacent wing membrane. Resilin patches are found in both dorsal and ventral pleat valleys of the corrugated wings of *E. superstes*, which results in different patterns of resilin distribution on the dorsal and ventral sides of the wing. In addition to its probable function in conferring flexibility to stressed joints, resilin may also have a damping function. Our results suggest that resilin patches in the leading edge may be loaded in compression, whereas in the trailing area, they may be involved in angle widening and thus loaded in tension. Possible adaptations to the deformability of different areas of the wing, e.g. during the process of camber formation, are discussed."] Address: Gorb, S.N., Functional Morphology and Biomechanics, Zoological Institute, Christian-Albrecht University of Kiel, 24098 Kiel, Germany. E-mail: sgorb@zoologie.uni-kiel.de

10830. Appel, E.; Gorb, S.N. (2011): Resilin in dragonfly wings. Abstracts - DGaaE-Entomologentagung 21.-24.3.2011 Berlin: 27. (in English) ["Resilin is well known for its rubber-like properties, including long-range (visco-) elasticity, ability to store kinetic energy, absorb shocks, and enhance flexibility of cuticular structures. In insect flight systems it has already been described in vein joints, veins, folding lines, transitions between veins and wing membrane, as well as in wing hinges and elastic muscle tendons in various species, including Coleoptera and Dermaptera. In contrast to wings of neopteran insects, where resilin plays a crucial role in wing folding, examinations on the distribution of resilin in wings of Odonata is especially important for understanding wing mechanics during flight, because the rather stiff corrugated wings of representatives of this order cannot be folded. Previously, only wings of the damselfly *Enallagma cyathigerum* Charp. (Coenagrionidae) have been studied (Gorb, 1999). In the present study we combined (1) fluorescence microscopy, (2) scanning electron microscopy, and (3) simple mechanical tests to elucidate the distribution of resilin patches in wings of the basal anisozygopteran species, *Epiophlebia superstes* Selys (Epiophlebiidae). Resilin patches are mainly located in wing vein joints situated in pleat valleys, thus their distribution distinctly differs between the dorsal and ventral wing sides. Our morphological results complement data from previous experimental studies (Wootton & Newman, 1986; Kim et al., 2009) to suggest that resilin is involved in either compression or tension, depending on the location in either narrow pleats at the leading edge (compression) or shallower pleats at the trailing area (allowing the angle widening). This morphological basis enables rather stiff, ultralight, and corrugated wings to bear deformations, e.g. during camber formation, without material damage or fatigue, thus enabling the strong lift production Odonata are

known for." (Authors)] Address: Appel, Esther, Dept of Functional Morphology and Biomechanics, Zoological Institute, Christian Albrechts University, Kiel, Germany, estherappel@gmx.de

10831. Asimea, O.A.; Zakka, U. (2011): The effect of petroleum waste on insect occurrence, speciation and distribution at the Brass Terminal in Niger delta area of Nigeria. *Journal of Emerging Trends in Engineering and Applied Sciences* 2(5): 782-786. (in English) ["Species occurrence and distribution of insects was investigated around Brass oil terminal where petroleum waste was constantly released into the Brass river through a man made canal. Random soil samples were collected from various locations distributed between Brass community and the oil terminal. At each sampling location, the soil samples were analysed for physico-chemical parameters using standard methods. Insects were collected using sweep net and traps. Electrical conductivity, pH and nutrient parameters of soil were within acceptable limits, microclimatic conditions like ambient temperature and relative humidity were within permissible range. Twenty-eight species of insects representing 23 families in 9 orders was recorded at Okpoma community that recorded 28.49 mg/kg THC and 12.85 mg/kg TPH. Twenty five insect species representing 17 families in 8 orders were recorded at the tank farm that had 51.09 mg/kg and 40.69 mg/kg TPH and only 5 species representing 4 families were encountered along the banks of effluent canal that had a value of 1261.41 mg/kg and 935.85 mg/kg TPH. Species common in hydrocarbon contaminated environment were *Camponotus sericeus*, *Crioceris latipennis* (Chrysomelidae), *Gryllus pennsylvanicus*, and *Allonemobius fasciatus* (Gryllidae). These species were able to tolerate hydrocarbon impacted environment. The aim of this investigation is to identify insect species that thrive in petroleum waste polluted environment and to explore their use as bio indicators of petroleum hydrocarbon pollution." (Authors) *Agriocnemis pygmaea*, *A. femina*, *Umma longistigma*, and *Orthetrum abbotti* are listed in the appendix to the paper.] Address: Zakka, U., Department of Crop and Soil Science, Faculty of Agriculture, University of Port Harcourt, Nigeria

10832. Bae, Y.J. (2011): Odonata. Insects of Korea 4 (1): Korea University. 72 pp. (in English) [The paper exclusively includes 39 Zygoptera. The species are treated in a monographic style including information on synonymy, morphology of imagines and larvae, (regional) distribution and records from Korea. The following species are excluded from the Korean list of Odonata: *Calopteryx cornelia*, *Agriocnemis pygmaea*, *Platycnemis foliacea sasakii*, and *Lestes hanllimensis* Kim, 1998. (Kim, J.H., 1998. The Odonata and Orthoptera, etc. of Korea in Color. Kyo-Hak Publ., Seoul. pp. 18-98. (in Korean).] Address: Bae, Y.J., Division of Life Sciences, College of Life Sciences and Biotechnology, Korea University, 5-ga, Anam-dong, Seongbuk-gu, Seoul 136-701, Korea. E-mail: yjbae@korea.ac.kr

10833. Bagachanova, A.K.; Vinokurov, N.N.; Evdokarova, T.G.; Ermakova, Yu.V.; Nogovitsyna, S.N.; Popov, A.A. (2011): Taxonomic diversity of insects from the relic steppes of the Mid Lena River valley (Central Yakutia). *Arid Ecosystems* 1(1): 38-45. (in English) [Odonata are represented by 12 species without giving any details.] Address: Bagachanova, A.K., Institute for Biological Problems of the Cryolithozone, Siberian Branch, Russian Academy of Sciences, pr. Lenina 41, Yakutsk, 677007 Russia. E-mail: vinok@ibpc.ysn.ru

10834. Baierl, E. (2011): Ein Algerischer Sandläufer *Psammotromus algirus* erbeutet ein Paarungsrad von *Orthetrum chrysostigma* (Squamata: Lacertidae; Odonata: Libellulidae). *Libellula* 30(1/2): 89-91. (in German, with English summary) ["On 13-VI-2005, on Rio Genal in Andalusia, Spain, a Large *Psammotromus* was observed and photographed capturing and feeding on a mating wheel of *O. chrysostigma*." (Author)] Address: Baierl, E., Neisser Str. 3, 40880 Ratingen, Germany. E-mail: edgar.baierl@t-online.de

10835. Bakare, S.S.; Andrew, R.J. (2011): The genital ducts of the male dragonfly *Anax guttatus* (Anisoptera: Aeshnidae). National Seminar on Biodiversity and Intangible Natural Heritage on 28th September, 2011. Organised by National Museum of Natural History Zoological Survey of India, Tansen Marg, New Delhi (MoEF, Govt. of India), M-Block, New Alipore, Kolkata (MoEF, Govt. of India) on September 28th, 2011: 23-24. (in English) [Verbatim: Light and transmission electron microscopic (TEM) studies reveal marked variations in the ultra structure of the male genital duct as it terminates into the sperm sac. TEM studies show two types of cells, the brush border cells with short motile irregular microvilli and the smooth border cells in the wall of vasa deferentia. Moreover, the seminal vesicles contain only the cells with brush border. Large number of electron dense granules and cell-coat particles accumulate in the lumen of vasa deferentia. A dense layer of globules mostly mucoproteins aggregate around the hyaline cap of the sperm bundles in the vasa deferentia. The chemical composition varies in the seminal fluid of vasa deferentia, seminal vesicles and sperm sac. Changes occur in the seminal fluid as it moves down successively through the vas deferens, seminal vesicle and ultimately in the sperm sac. The seminal fluid is stored and condensed in the sperm sac. Histochemical studies demonstrate chemical composition of the seminal fluid as a mixture of protein, carbohydrate and lipid. Presence of dense quantity of DNA and RNA in the nuclei and cytoplasm of the epithelial cells and mercury bromophenol blue stained granular material suggests that the central canal, vasa deferentia and seminal vesicles are well-equipped with the cellular machinery required for protein synthesis. Histochemical tests demonstrate, in addition, large amount of mucopolysaccharides and lipids. SDS-PAGE of seminal fluid reveals 7 and 12 protein bands in the vasa deferentia and seminal vesicles, respectively.] Address: Andrew, R.J., Shri Dnyanesh Mahavidyalaya, Navargaon, Dist. Chandrapur- 441 223, (MS), India

10836. Barrios, M.; Wolff, M. (2011): Initial study of arthropods succession and pig carrion decomposition in two freshwater ecosystems in the Colombian Andes. *Forensic Science International* 212(1-3): 164-172. (in English) ["Entomological succession and trophic roles of arthropods associated with different stages of carcass decomposition were studied to estimate the post-mortem submersion interval in two freshwater ecosystems in the Colombian Andes, at an altitude of 2614 m. Pig carcasses were employed as models placed 68 m apart, one in a stream (lotic) and another in an artificial lake (lentic). Decomposition time to skeletal remains was 74 days in the lake and 80 days in the stream. Six phases of decomposition were established: submerged fresh, early floating, floating decay, bloated deterioration, floating remains and sunken remains. A total of 18,832 organisms associated with the carcasses were

collected: 11,487 in the lake (four orders, 19 families and 33 species) and 7345 in the stream (eight orders, 15 families and 25 species). Organisms were classified in the following ecological categories: shredders, collectors, predators, necrophagous, sarcosaprophagous and opportunists. Physical and chemical properties of the habitats, such as water temperature, CO₂ and conductivity, varied according to rainfall. In the lake, shredders (Coleoptera: Tropisternus sp. and Berosus sp.) and collectors (Diptera: Chironomus sp.) were found to be associated with submerged phases. Predators (Odonata) were only present during the first phases. Coleoptera (Dytiscidae) were found during floating decay and bloated deterioration stages. In the stream, shredders (Hyalella sp.) and collectors (Simulium sp.) were found during all stages, whereas the predator Oxelytrum discolle was found exclusively during the floating stages, during which body temperature increased in a fashion similar to active decay in terrestrial environments." (Authors)] Address: Wolff, Marta, Grupo de Entomología Universidad de Antioquia, Medellín, Colombia. E-mail: mariabape@gmail.com

10837. Baudermann, S.; Martens, A. (2011): Ortstreue und tagesrhythmischer Ortswechsel der Larven von Cordulegaster bidentata in Quellrinnensalen (Odonata: Cordulegastridae). Libellula 30(3/4): 133-144. (in German, with English summary) ["C. bidentata colonizes spring runnels with minimal water depth. The significance of small depressions as microhabitats and the activity patterns of the larvae in such border zones are not well known. In August and September 2010, respectively, in two spring runnels in the Kocher valley near Künzelsau, Baden-Württemberg, Germany, the daily movement of the larvae has been investigated. Tin cans, serving as artificial pools, were buried at the bottom of the very shallow water in an area of 4 m² at both localities. Prepared with removable plastic containers inserted in the tin frame, the presence of larvae was recorded every 12 h for ten days. The artificial pools were regularly colonized by C. bidentata larvae after a short time. Immigration and emigration took place during night as well as during daytime, with a significant preference for the nighttime." (Authors)] Address: Baudermann, Sandra, Eichholzweg 3, 74653 Künzelsau, Germany. E-mail: sbaudermann@yahoo.de

10838. Bedjanič, M. (2011): Coenagrion hastulatum (Charpentier, 1825), new for the dragonfly fauna of Bosnia and Herzegovina (Odonata: Coenagrionidae). Natura Sloveniae 13(2): 31-36. (in English, with Slovenian summary) ["At the high-altitude Donje Bare and Gornje Bare Lakes in the surroundings of Tjentište village, Zelengora Mts., Sutjeska National Park, SE Bosnia and Herzegovina, Coenagrion hastulatum was recorded on 26 June 2011. The occurrence of the species on the southern border of its European range is outlined and discussed. Faunistic records on a total of 22 species observed at 11 localities in the southeastern part of the country between 26 and 29 June 2011 are appended." (Author)] Address: Bedjanič, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjazbedjanic@yahoo.com

10839. Benigno, G. (2011): Invertebrate drift in neighboring perennial and seasonal tributaries of the Sacramento River. Master of Science thesis, Biological Sciences California State University, Chico: IX + 33 pp. (in English) ["While seasonal floodplains are known to provide abundant food and important rearing habitat for na-

tive and anadromous fish in California, the value of other types of seasonally aquatic habitats is less well understood. The use of seasonally flowing tributaries of the Sacramento River as non-natal rearing habitat for salmonids and as spawning areas for native fish has been previously documented. In order to evaluate food availability in Sacramento River tributaries, I compared invertebrate drift in a seasonal tributary with a neighbouring perennial tributary through the duration of seasonal tributary flow, from November 2005 through June 2006. I compared drift density, taxonomic diversity, and community composition between the two tributary types. Overall drift abundance was greater in seasonal tributary samples. Taxonomic richness in the seasonal tributary was comparable to the perennial tributary, although community composition was different between the two tributary types. Specifically, chironomid larvae and small crustaceans were abundant in seasonal tributary drift, while terrestrial invertebrates were the primary component of perennial tributary drift. The results illustrate that seasonally flowing tributaries can provide greater prey availability to fish that use these habitats compared with perennial tributaries." (Author) The taxa list includes a few Odonata.] Address: Benigno, Gina, Biology Department, California State Univ., Chico, CSU Chico, Holt Hall, Chico, CA 95927, USA

10840. Beukema, J. (2011): Recensis: Juwelenschwinger/Gossamer Wings. D. Hilfert-Rüppell & G. Rüppell, 2007; Die Prachtlibellen Europas. G. Rüppell, 2005. Brachytron 14(1): 67-68. (in Dutch) [review] Address: Beukema, J.J., Linieweg 19, NL-1783 BA Den Helder, The Netherlands, E-mail: jsr@nioz.nl

10841. Borisov, S.N. (2011): Migrant dragonflies in Middle Asia. 2. Sympetrum fonscolombii (Selys, 1840) (Odonata, Libellulidae). Eurasian Entomological Journal 10(4): 415-421. (in Russian, with English summary) ["Data on the distribution, phenology and migrations of Sympetrum fonscolombii in Middle Asia are presented. The first spring-time generation is represented by immigrant specimens from the southern part of the range. Pre-imaginal development lasts about 2 months. Development of two generations during summer and autumn is probable. In autumn the dragonflies migrate in a southerly direction. 2008–2010 migrations were studied in the Chok-Pak mountain range in Western Tien-Shan Mountains (N42.53°, E70.60°) by «Rybachinsky-type» by means of ornithological traps. Migrations lasted from the end of August until October. The intensity of migrations increased with the onset of cold air masses. Sequential expansion of different generations is probably characteristic, being an adaptive strategy of S. fonscolombii aimed at maximising the use environmental resources both spatially and temporally." (Author)] Address: Borisov, S.N., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

10842. Bosch, J.G. van 't, (2011): Rare dragonflies in the Netherlands in 2002, 2003, 2004 and 2005, CWNO-reports 4. Brachytron 14(1): 40-48. (in Dutch, with English summary) ["This is the fourth report of the Dutch Committee for records of rare odonates (CWNO). In this report, records from the period 2002-2005 are reviewed. Acceptability is judged independently by each of the committee members, based on the documentation available (e.g. descriptions, drawings, pictures or collected material). Only accepted records are reviewed.

wed. Of each accepted record the Province, nearby city, location, date, number, gender and observers are given. In most cases only the first record is given; subsequent records of the same individual or population are accepted on the basis of the first record and are not reviewed. From this record on, observations marked with an asterisk *, are regarded as a 'known location'. New records from a known location will not be reviewed in future. The three categories of species that are considered by the CWNO are described. The third category is a new one: only proof and indication of reproduction are currently considered for *Anax parthenope* and *Aeshna affinis*. Species that are no longer considered by the CWNO are *Crocothemis erythraea* (after 2003) and *Orthetrum coerulescens* (after 2006). Records of these species in 2002-2005 are not reviewed in this article. 2002 – A new population of *Sympetrum depressiusculum* was discovered near Budel (Noord-Brabant/ Limburg). Several new populations of *Somatochlora flavomaculata* were found. 2003 – The most spectacular discovery in 2003 was the first observation for The Netherlands of *Coenagrion scitulum* near Tegelen (Limburg). Subsequent searches did not result in additional observations. The fourth ever observation (fifth individual) of *Anax ephippiger* for the Netherlands was at Schiermonnikoog (Friesland). The fourth population of *Somatochlora arctica* was discovered at Vragenderveen (Gelderland). 2004 – The most memorable in 2004 was the third ever observation for The Netherlands of *Sympetrum meridionale*, at Cadzand-bad (Zeeland) 2005 – The most spectacular event in this four-year period was without doubt the discovery of a population of *Leucorrhinia albifrons* near Oldeberkoop (Friesland). The previous observation was a single male in 1994 at nearby Appelscha. The fourth ever observation of *S. meridionale* was at Berghem (Noord-Brabant). The fifth population of *Somatochlora arctica* and the first population for Overijssel was discovered at Landgoed Twickel." (Author) Records of the followingspecies are presented in some details: *Cordulegaster boltonii*, *Leucorrhinia albifrons*, *L. pectoralis*, *Coenagrion armatum*, *C. scitulum*, *C. hastulatum*, *Calopteryx virgo*, *Sympecma paedisca*, *Aeshna affinis*, *A. subarctica elisabethae*, *Anax parthenope*, *A. ephippiger*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Somatochlora arctica*, *S. flavomaculata*, *Crocothemis erythraea*, *Orthetrum brunneum*, *O. coerulescens*, *Sympetrum depressiusculum*, *S. meridionale*] Address: Bosch, J.G. van 't, Newtonplein 62, 2562 JX Den Haag. E-mail: cwno@brachytron.nl

10843. Brandt, K.; Buchwald, R. (2011): Die Bedeutung von Kompensationsgewässern für die Libellenfauna der Stadt Oldenburg (Odonata). *Libellula* 30(3/4): 111-132. (in German, with English summary) ["As only very few natural standing waters still exist, compensation ponds have a potentially high value for the aquatic fauna and flora in the city of Oldenburg (Lower Saxony, Germany). In order to analyse their value for the odonate fauna a study of 17 ponds in Oldenburg was carried out in 2009. Altogether 28 species of Odonata were recorded and 21 species were regarded as potentially or definitely autochthonous at one or some pond(s). These 28 species amount to 39 % of the total odonate fauna of the region Weser-Ems. The total odonate fauna of the standing water bodies of Oldenburg comprises 32 species. Therefore, 66 % of its potential fauna was recorded at the 17 compensation ponds. We found a wide range of 0-19 species of Odonata at one pond. Both the open water surface and the period in which a pond

dries up in the summer months are decisive for odonate diversity. Furthermore, some influence of the trophic level on the species diversity could be recognized. Among others, *Coenagrion puella*, *Ischnura elegans*, *Pyrrhosoma nymphula* and *Libellula quadrimaculata* were the species with the highest frequency, all being widespread and euryoecious. In addition, rather rare and stenoecious species were found at single ponds. We summarize that some compensation ponds in the city of Oldenburg are species-rich and have a high value for the dragonfly fauna of the region; the same is true for the total species diversity of all studied ponds for the Odonata diversity of Oldenburg. With this study other authors' results regarding compensation ponds and/or urban waters are discussed and modifications suggested, but in essence they are confirmed." (Authors)] Address: Brandt, Kirsten, Kaiser-Friedrich-Str. 15, 53113 Bonn, Germany. E-mail: Kirsten.Brandt@gmx.net

10844. Brochard, C.; van der Ploeg, E. (2011): Looking for the best spot: how far will *Cordulegaster insignis* walk? *Brachytron* 14(1): 64-66. (in Dutch, with English summary) ["In this short portrait, some of the habitat preferences, larval ecology and emerging behaviour of *Cordulegaster insignis* are discussed. During a search for larval skins in Mugla province, Turkey, 70 exuviae were found during three visits. They were mainly found in trees, at an altitude varying from a few cm to 8 m from the ground. The maximum distance from the nearest water was 30 meters." (Authors)] Address: Brochard, C., Marsstraat 77, 9742 EL Groningen, The Netherlands

10845. Brockhaus, T. (2011): Informationen zum Projekt der Libellenfauna Deutschlands. *Libellennachrichten* 26: 5-7. (in German) [The author reports on the current status of the book on the German Odonata-fauna.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

10846. Buckland-Nicks, A. (2011): Mercury bioaccumulation in dragonflies (Odonata: Anisoptera) from two lakes in Kejimikujik National Park, Nova Scotia. In: Atlantic Division of the Canadian Association of Geographers. Programm and Abstracts 23th Annual Meeting and Conference October 14th - 16th, 2011 Mount Allison University, Sackville, NB: 8. (in English) [Verbatim: Anisoptera are important vectors for mercury in aquatic and terrestrial food chains. Dragonfly naiads, adults, and exuviae were collected from two acidic lakes in Kejimikujik National Park, Nova Scotia (Canada) in order to compare mercury bioaccumulation patterns between their life stages and body sections. Samples were dried, digested, and analyzed for methylmercury (MeHg), divalent mercury (Hg(II)), and total mercury (THg) using gas chromatography-atomic fluorescence spectroscopy (AFS). MeHg concentrations in naiad and adult dragonflies were comparable to fish, at 234 ± 113 ng g⁻¹ d.w. (n=64) and 232 ± 68 µg g⁻¹ d.w. (n=28), respectively. There was no significant difference between naiad and adult MeHg concentrations (p>0.05). Mean MeHg concentration in exuviae (6 ± 4 ng g⁻¹ d.w.; n=32) was 50-fold lower than naiads and adults, however Hg(II) concentrations were not significantly different. Emerging adults had between 1.5 and 3-fold higher Hg(II) than naiads and adults but similar MeHg. Within the naiad population, MeHg and THg increased with age and weight, with a large increase in variation. The oldest

and heaviest naiads had both the lowest and highest MeHg. Bioaccumulation patterns of Hg(II) in dragonfly life stages may indicate MeHg detoxification mechanisms. However, the adults still have a high potential for transferring substantial amounts of MeHg to terrestrial predators.] Address: Buckland-Nicks, Amy, Department of Earth and Environmental Science, Acadia University, Wolfville, NS, USA. E-mail: a.buckland@gmail.com

10847. Buczyński, P.; Dawidowicz, Ł.; Wagner, G.; Jarska, W. (2011): *Anax ephippiger* (Burmeister, 1839) (Odonata: Aeshnidae) in Polish part of the Lithuanian Lake District. *Odonatrix* 7(2): 48-49. (in Polish, with English summary) ["One hunting female of *A. ephippiger* was recorded on June 3, 2011, in a xerothermic meadow near the Lake Perty in Kleszczówek in NE Poland (54°16'40" N, 22°53'50" E). It is the northernmost record of the species in Poland so far. The area of studies is probably situated within the migrating route of the species whose migrations reach Latvia in this part of Europe. The recorded specimen belonged to the first generation, no data on reproduction and development of the second generation is available." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

10848. Busch, R.; Masius, P. (2011): Erstnachweise von *Anax parthenope* und *Leucorrhinia caudalis* auf der Insel Usedom (Odonata: Aeshnidae, Libellulidae). *Libellula* 30(3/4): 151-155. (in German, with English summary) [Mecklenburg-Vorpommern, Germany; "On 27-VI-2011, a female *L. caudalis* was observed laying eggs at the Lake 'Krebssee' near Korswandt. *A. parthenope* was recorded at four different sites between 27-VI- and 29-VII-2011. Considering available odonatological data, it is certain that all sites were populated only very recently. Reflecting that the rediscoveries of both species in Mecklenburg-West Pomerania dated from 1999, the ongoing spread in distribution is discussed." (Authors)] Address: Busch, R., Waldstr. 27A, 56479 Westernohe, Germany. E-mail: busch.westernoh@freenet.de

10849. Butkas, K.J.; Vadeboncoeur, Y.; Vander Zanden, M.J. (2011): Estimating benthic invertebrate production in lakes: a comparison of methods and scaling from individual taxa to the whole-lake level. *Aquatic Sciences - Research Across Boundaries* 73(1): 153-169. (in English) [Sparkling Lake, Wisconsin, USA. "Studies of aquatic invertebrate production have been primarily conducted at the level of individual taxa or populations. Advancing our understanding of the functioning and energy flow in aquatic ecosystems necessitates scaling-up to community and whole-lake levels, as well as integrating across benthic and pelagic habitats and across multiple trophic levels. In this paper, we compare a suite of non-cohort based methods for estimating benthic invertebrate production at subpopulation, habitat, and whole-lake levels for Sparkling Lake, WI, USA. Estimates of the overall mean benthic invertebrate production (i.e. whole-lake level) ranged from 1.9 to 5.0 g DM m⁻² y⁻¹, depending on the method. Production estimates varied widely among depths and habitats, and there was general qualitative agreement among methods with regards to differences in production among habitats. However, there were also consistent and systematic differences among methods. The size-frequency method gave the highest, while the regression model of Banse and Mosher (*Ecol Monogr* 50:355-379, 1980) gave the lowest production estimates. The regression model of Plan-

te & Downing (*Can J Fish Aquat Sci* 46:1489-1498, 1989) had the lowest average coefficients of variation at habitat (CV = 0.17) and whole-lake (CV = 0.08) levels. At the habitat level, variance in production estimates decreased with sampling effort, with little improvement after 10-15 samples. Our study shows how different production estimates can be generated from the same field data, though aggregating estimates up to the whole-lake level does produce an averaging effect that tends to reduce variance." (Authors) Odonata taxa - with the exception of *Hagenius brevistylus* - are treated at the family level.] Address: Vander Zanden, M.J., Center for Limnology, Univ. of Wisconsin-Madison, 680 N. Park St., Madison, WI 53706, USA. E-mail: mjevanderzand@wisc.edu

10850. Cannings, R. (2011): Book review: *Dragonflies and Damselflies. Model Organisms for Ecological and Evolutionary Research*. Córdoba-Aguilar, A. [ed.]. 2008. *Dragonflies and Damselflies. Model organisms for ecological and evolutionary research*. Oxford University Press, Oxford, UK. pp. Hardback, ISBN 978-0-19923069-3. £73 (£18.25-special discount for direct orders to publisher). Paperback, ISBN 978-0-19956758-4. £32.50. *Florida Entomologist* 94(3): 727-728. (in English) [book review] Address: Cannings, R., Royal British Columbia Museum 675 Belleville St., Victoria BC Canada, V8W 9W2 RCanning@royalbcmuseum.bc.ca

10851. Cano-Villegas, J.F. (2011): Actualización del catálogo odonológico de la provincia de Córdoba (Andalucía, España) (Insecta: Odonata). *Boletín de la S.E.A.* 48(1): 479-483. (in Spanish, with English summary) [The author presents data on the presence of six species not previously recorded from Córdoba province (Spain), and one recorded only once. Records of *Erythromma viridulum*, *Coenagrion scitulum*, *Paragomphus genei*, *Orthetrum trinacria*, *Orthetrum brunneum*, *Sympetrum meridionale*, and *Trithemis kirbyi* are documented in details and mapped.] Address: Cano Villegas, F.J., C/Montemayor, 4 1°-2; 14003-Córdoba, Spain. E-mail: ficanovi2@hotmail.com

10852. Cardoza Martínez, G.F.; Estrada Rodríguez, J.L.; Alonzo Rojo, F.; Mar Tovar, C.L.; Gelwick, F. (2011): Espectro trófico del bagre *Ictalurus punctatus* (Siluriformes: Ictaluridae), en la presa Lázaro Cárdenas, Indé, Durango, México. *Hidrobiológica* 21(2): 210-216. (in Spanish, with English summary) [9.4% of studied stomachs (n=240) of *Ictalurus punctatus* included Odonata as diet.] Address: Cardoza Martínez, G.F., Centro de Estudios Ecológicos, Escuela Superior de Biología, Universidad Juárez del Estado de Durango, Avenida Universidad S/N, Fraccionamiento Filadelfia Gómez Palacio, Durango. 35010 México. E-mail: E-mail: biologogabriel@hotmail.com

10853. Carriço, C.; Costa, J.M.; Mallet, J.; Silva, F.M.; Carvalho Queiroz, M.M. (2011): First record of *Phyllocycla hamata* Belle, 1990 (Insecta: Odonata: Gomphidae), from Mato Grosso state, Brazil. *Check List* 7(6): 837-838. (in English) ["Six males of *P. hamata* were collected in the Reserva Florestal da Usina Hidroelétrica da Fumaça, Jauru Salto Mato Grosso state, Midwestern Brazil and represent the first record for that state. The specimens examined have been deposited in the Museu Nacional, UFRJ, Rio de Janeiro, RJ, Brazil. This species is included in the *volsella* group and can be separated from the other species in this group by the cerci shorter than segment 10 (S10), with a very long

internal hook." (Authors)] Address: Carriço, C., Universidade Federal do Rio de Janeiro, Depto de Entomologia Museu Nacional, Quinta da Boa Vista s/n. CEP 20940-040. São Cristóvão, Brazil. E-mail: carrico82@hotmail.com

10854. Carriço, C.; Costa, J.M.; Santos, T.C.; Anjos-Santos, D. (2011): Description of the last instar larva of *Phyllocycla gladiata* (Hagen in Selys) (Anisoptera: Gomphidae). *EntomoBrasilis* 4(1): 26-29. (in English, with Portuguese summary) ["The larva of the last instar of *P. gladiata* is described and illustrated based in only one exuviae, collected at Camorim River, Jacarepaguá, Rio de Janeiro State, Brazil. Exuviae is deposited in the Museu Nacional (UFRJ), Rio de Janeiro, Brazil." (Authors)] Address: Costa, J.M., Depto de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

10855. Chester, E.T.; Robson, B.J. (2011): Drought refuges, spatial scale and recolonisation by invertebrates in non-perennial streams. *Freshwater Biology* 56(10): 2094-2104. (in English) ["1. If resistance traits drive recolonisation after drought, then drought refuges should contribute strongly to assemblage composition within streams. If resilience traits drive recolonisation, macroinvertebrates emerging from refuges may disperse widely, colonising many streams. To determine whether the contribution of drought refuges to macroinvertebrate recolonisation in non-perennial streams was mostly local (within stream) or broader scale (across streams), we measured the association between the composition of invertebrate assemblages in different types of in-stream drought refuge and the assemblage composition of streams when flow resumed. 2. We sampled 16 streams of varying hydrological regime on the western side of the Victoria Range in the Grampians National Park, Victoria, Australia. Drought refuges (perennial pools, dry sediment, damp sediment, seeps, patches of leaf litter, beneath stones) were identified and sampled during autumn. Most taxa were found in perennial pools; few taxa were found aestivating beneath stones or having desiccation-resistant stages in dry sediment. Perennial pools and perennially flowing reaches were the refuges that harboured the greatest diversity of macroinvertebrate taxa. 3. Streams were sampled again during spring. Assemblage composition of non-perennial reaches in spring was unrelated to composition in nearby refuges in the previous autumn. In contrast, assemblage composition in perennial reaches during spring was strongly correlated with composition during autumn. Therefore, drought refuges did not directly influence assemblage composition locally within non-perennial streams. Rather, both perennially flowing reaches and perennial pools acted as drought refuges across the broader landscape. Resilience traits are likely to drive recolonisation in these streams. 4. Monitoring of drought refuges in a particular stream will therefore not predict species composition when flow resumes. Drought refuges are likely to sustain biodiversity over larger spatial scales such as groups of streams or whole drainage networks. Consequently, stream networks will need to be managed as entities rather than as single waterways and the focus of drought refuge protection should be on perennial pools and reaches." (Authors) The following Odonata are reported: *Procordulia jacksoniensis*, *Austroaeschna subapicalis*, *Austargiolestes* sp.] Address: Robson, Belinda, School of Environ-

mental Science, Murdoch Univ., South St, Murdoch, WA 6150, Australia. E-mail: b.robson@murdoch.edu.au

10856. Cicek, K.; Ayaz, D. (2011): Food composition of the European pond turtle (*Emys orbicularis*) in Lake Sülüklü (Western Anatolia, Turkey). *Journal of Freshwater Ecology* 26(4): 571-578. (in English) ["We examined the seasonal changes in the food composition of *E. orbicularis* in Lake Sülüklü (Manisa, Turkey) during spring and summer 2010. The stomach contents of 110 (40 males, 62 females, eight juveniles) *E. orbicularis* individuals were analyzed, and 461 prey items were found. Gastropods (2.2%), earthworms (0.4%), insects (67.2%), fishes (6.9%), amphibians (15.0%), and plant material (8.2%) constituted the food of the species. Food consisted primarily of insects and other invertebrates during the breeding season and of vertebrate and plant material (especially seeds and roots) during the post-breeding season. Based on these results, the European pond turtle is a generalist opportunistic omnivore whose diet is most strongly influenced by prey availability ... Terrestrial prey items (adult Odonata, Anisobalidae, Cicadidae, adult Hymenoptera, Formicidae, Cerambycidae, Staphylinidae, Muscidae, and Culicidae) constituted only 8.7% of the stomach contents." (Authors)] Address: Cicek, K., Zoology Section, Dept of Biology, Faculty of Science, Ege Univ., TR-35100 Bornova, Izmir, Turkey

10857. Cordoba-Aguilar, A.; Gonzalez-Tokman D.M. (2011): Male harassment and female energetics in the territorial damselfly *Hetaerina americana* (Fabricius) (Zygoptera: Calopterygidae). *Odonatologica* 40(1): 1-15. (in English) ["The possible energetic costs due to male harassment in *H. americana* females were explored by investigating: (a) changes in thoracic and abdominal fat during / adulthood, (b) the fat budget after each of the 2 matings that females engage in during 2 seasons of varying male harassment, (c) the fat imbalance due to male harassment in the thorax (where fat is used mainly for flying) and abdomen (where fat is used to produce eggs), (d) whether re-mating takes longer when harassment is high compared to when harassment is low, and (e) the feeding rate after each mating in both seasons to see whether female balance the energetic resources they spend. Females gained fat resources after emergence but lost fat when they became old. Fat decreased more in the 'high harassment' season than in the 'low harassment' season; in the former, fat was reduced more intensively after a second mating. Thoracic fat decreased to a lower level after the second mating in the 'high harassment' season compared with the 'low harassment' season. When harassment was high, re-mating took longer than when harassment was low. Feeding was similar between seasons. These results suggest substantial energetic costs for females due to male harassment." (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

10858. Cortes, L.; Almeida, M.C.; Pinto, N.S.; De Marco, P. (2011): Fogo em Veredas: Avaliação de Impactos sobre Comunidades de Odonata (Insecta). *Biodiversidade Brasileira* 1(2): 128-145. (in Portuguese, with English summary) ["The marshes are open areas of Cerrado (Brazilian savannas), which play an essential role in protecting water sources. Moreover, the marshes are also considered of great importance to direct use of rural people living in the Cerrado. These

conflicts of use of the marshes are now a major challenge for biodiversity conservation. This study aimed to test the effect of fire on the richness and composition of Odonata (dragonflies) in burned and unburned marshes within the Estação Ecológica Serra Geral do Tocantins (EESGT). Species richness was estimated for each of the sampled marshes through non-parametric method of first order Jackknife. The analysis of indicator species was made by IndVal. The similarity in community composition of Odonata were obtained through the index of Chao. In total we sampled 33 species of Odonata, distributed among five families. No species of Odonata were associated specifically with burned or unburned environments. The marshes burned recently showed a greater similarity in community composition of Odonata than unburned marshes and the same pattern is evident when considering only the suborder Zygoptera. This work with Odonata communities has shown that there is impact of fire on species composition of the suborder Zygoptera which has less ability to disperse. This reinforces the idea that the fire is known to be one of the main threats to protected areas of the Cerrado and a threat to the biodiversity of EESGT marshes. If decisions of fire management are taken, it is crucial that it come together with research monitoring marshes in EESGT." (Authors) Address: Côrtes, Lara, Instituto Chico Mendes de Conservação da Biodiversidade/ICMBio, Estação Ecológica Serra Geral do Tocantins, Avenida Beira Rio Quadra 02 número 06 Centro, Rio da Conceição, Tocantins, Brazil, 77303-000. E-mail: lara.cortes@icmbio.gov.br

10859. Couteyen, S.; Papazian, M. (2011): Redescription of the male *Coenagriocnemis reuniense* (Fraser, 1957), with notes on the mesostigmal plate and key to the males of the genus (Zygoptera: Coenagrionidae). *Odonatologica* 40(1): 39-44. (in English) ["*Coenagriocnemis* Fraser, 1949, an endemic genus to the Mascarene Archipelago (Indian Ocean), is currently represented by 4 species. After examination of its male anal appendages, *C. reuniense* male an endemic species to La Réunion, is redescribed. The mesostigmal plate, which has a very unusual structure, is illustrated and commented upon. A key to the *Coenagriocnemis* males is provided." (Authors)] Address: Couteyen, S., UMR PVBMT (Peuplements végétaux et bio-agresseurs en milieu tropical), Université de la Réunion, Faculté des sciences et technologies, 15 Avenue René-Cassin, BP 7151, F-97715 Saint-Denis cedex, France. E-mail: scouteyen@ecologie.re

10860. Crespo, J.G. (2011): A review of chemosensation and related behavior in aquatic insects. *Journal of Insect Science* 11(62): 1-39. (in English, with Spanish summary) ["Insects that are secondarily adapted to aquatic environments are able to sense odors from a diverse array of sources. The antenna of these insects, as in all insects, is the main chemosensory structure and its input to the brain allows for integration of sensory information that ultimately ends in behavioural responses. Only a fraction of the aquatic insect orders have been studied with respect to their sensory biology and most of the work has centred either on the description of the different types of sensilla, or on the behaviour of the insect as a whole. In this paper, the literature is exhaustively reviewed and ways in which antennal morphology, brain structure, and associated behaviour can advance better understanding of the neurobiology involved in processing of chemosensory information are

discussed. Moreover, the importance of studying such group of insects is stated, and at the same time it is shown that many interesting questions regarding olfactory processing can be addressed by looking into the changes that aquatic insects undergo when leaving their aquatic environment." (Author) Odonata are treated at pages 8-12.] Address: Crespo, J.G., Department of Biology, University of Utah, Salt Lake City, UT 84112, USA

10861. Curry, B. (2011): Striped Saddlebags (*Tremea calverti*). New to Canada. *The Wood Duck* 64(8): 178-179. (in English) [29-IX-2010; Point-Pelee Nationalpark, Ontario, Canada] Address: not stated

10862. da Costa, J. M. (2011): First records of some species of some dragonfly (Odonata) species in the Narew National Park. *Odonatrix* 7(2): 50-51. (in English, with Polish summary) [2010, Narew National Park, Poland; *Leucorrhinia dubia*, *L. rubicunda* and *L. pectoralis* were added to the regional list increasing the known Odonata to 47 species.] Address: Joao Matos da Costa, Narwia.ski Park Narodowy, Kurowo 10, 18-204 Kobylin Borzomy, Poland. E-mail: joao.mcosta@npr.pl

10863. Davis, R.B.; Nicholson, D.B.; Saunders, E.L.; Mayhew, P.J. (2011): Fossil gaps inferred from phylogenies alter the apparent nature of diversification in dragonflies and their relatives. *BMC Evolutionary Biology* 2011, 11:252 doi:10.1186/1471-2148-11-252: (in English) ["Background: The fossil record has suggested that clade growth may differ in marine and terrestrial taxa, supporting equilibrium models in the former and expansionist models in the latter. However, incomplete sampling may bias findings based on fossil data alone. To attempt to correct for such bias, we assemble phylogenetic supertrees on one of the oldest clades of insects, the Odonatoidea (dragonflies, damselflies and their extinct relatives), using MRP and MRC. We use the trees to determine when, and in what clades, changes in taxonomic richness have occurred. We then test whether equilibrium or expansionist models are supported by fossil data alone, and whether findings differ when phylogenetic information is used to infer gaps in the fossil record. Results: There is broad agreement in family-level relationships between both supertrees, though with some uncertainty along the backbone of the tree regarding dragonflies (Anisoptera). "Anisozygoptera" are shown to be paraphyletic when fossil information is taken into account. In both trees, decreases in net diversification are associated with species-poor extant families (Neopetalidae, Hemiphlebiidae), and an upshift is associated with Calopterygidae + Polythoridae. When ghost ranges are inferred from the fossil record, many families are shown to have much earlier origination dates. In a phylogenetic context, the number of family-level lineages is shown to be up to twice as high as the fossil record alone suggests through the Cretaceous and Cenozoic, and a logistic increase in richness is detected in contrast to an exponential increase indicated by fossils alone. Conclusions: Our analysis supports the notion that taxa, which appear to have diversified exponentially using fossil data, may in fact have diversified more logistically. This in turn suggests that one of the major apparent differences between the marine and terrestrial fossil record may simply be an artifact of incomplete sampling. Our results also support previous notions that adult colouration plays an important role in odonate radiation, and that Anisozygoptera should be grouped in a single inclusive taxon with Anisoptera,

separate from Zygoptera." (Authors)] Address: Davis, R.B., Dept Biol., Univ. of York, York, YO10 5YW, UK. E-mail: davis@ut.ee

10864. De Marmels, J.; Neiss, U.G. (2011): Description of the larva of *Gynacantha auricularis* Martin, 1909 (Odonata: Aeshnidae). *Zootaxa* 3137: 64-68. (in English) ["The ultimate stadium larva of *G. auricularis* is described and illustrated based on exuviae of a male and a female reared larvae from Manaus, Brazil. The larva resembles that of *G. gracilis* in having a small lateral spine also on abdominal segment 5, while the prementum morphology and size and distribution and number of palpal setae are similar to those species with lateral spine absent on segment 5. The larvae were found in rainwater pools with abundant leaf litter, in the interior of Amazonian lowland forest." (Authors)] Address: Neiss, U.G., Coordenação de Pesquisas em Entomologia, Instituto Nacional de Pesquisas da Amazônia/INPA, Caixa Postal 478, CEP 69011-970, Manaus, AM., Brazil. E-mail: ulisses.neiss@gmail.com

10865. Do, M.C. (2011): *Burmagomphus schneideri* sp. nov., a new dragonfly from the south of Vietnam (Odonata: Gomphidae). *International Journal of Odonatology* 14(3): 223-231. (in English) ["*B. schneideri* sp. nov. (Rung Giong, Kanak commune, K'fBang district, 14°8'42.05"N, 108°36'37.33"E Gia Lai Province in the southern part of Vietnam, leg. Do, 27-IV-2010, to be deposited in Vietnam National Museum of Nature) is described from the male sex and compared with males of the closely related species *B. vermicularis* and *B. arboreus*. Full illustrations of topotypical male *B. vermicularis* are provided the first time (Huu Lien, Lang Son, North Vietnam)."] (Author)] Address: Do, M.C., 409 – 57A, Tap the Bo Thuy San, 22/20 Nguyen Cong Hoan, Hanoi, Vietnam. E-mail: docuong@gmail.com

10866. Do, M.C. (2011): *Coelliccia sasamotoi* sp. nov. from Vietnam and Laos (Odonata: Platycnemididae). *International Journal of Odonatology* 14(3): 193-197. (in English) ["*C.a sasamotoi* sp. nov. is described based on specimens of both sexes collected from central Vietnam and Laos. It differs from related species in details of coloration, the shape of the male terminalia, and the shape of the posterior lobe of the female pronotum." (Author)] Address: Do, M.C., 409 – 57A, Tap the Bo Thuy San, 22/20 Nguyen Cong Hoan, Hanoi, Vietnam. E-mail: docuong@gmail.com

10867. Dobrzańska, J.; Filipowicz, S.; Sikora, A.; Pełnia-Iwanicka, E. (2011): Dragonflies (Odonata) of chosen oxbow lakes of the Vistula river in Warsaw. *Odonatrix* 7(2): 33-40. (in Polish, with English summary) ["The aim of this study was to assess the species assemblage of dragonflies of three chosen oxbow lakes of the Vistula river within the borders of Warsaw, Poland. There were: Goławskie Lake, Powsinkowskie Lake and Wilanowskie Lake. The inventory of Odonata was conducted from May to October 2010. In overall, 24 species of Odonata were recorded. Most of them are considered to be common or very common in Poland. It was observed that the less surroundings of the lake were altered by human the more dragonflies from Siberian and West Siberian faunal elements were recorded. Due to the fact that researches were conducted only on three lakes this observations do not authorize us to state general conclusions about influence of urbanization on species assemblage of dragonflies. Authors are going to study this issue in further researches." (Au-

thors)] Address: Dobrzańska, Julia, Katedra Kształtowania Środowiska, Wydział Budownictwa i Inżynierii Środowiska, Szkoła Główna Gospodarstwa Wiejskiego w Warszawie, Nowoursynowska 159, 02-776 Warszawa, Poland. E-mail: juliadobrzanska@sggw.pl

10868. Dolata, P.T. (2011): The site of the Lilypad Whiteface *Leucorrhinia caudalis* (Charpentier, 1840) (Odonata: Libellulidae) and the Goldeneye *Bucephala clangula* (Linnaeus, 1758) (Aves: Anseriformes) in the River Noteć valley near Czarnków (northern Wielkopolska). *Odonatrix* 7(2): 55-57. (in Polish, with English summary) [16-VI-2010, *L. caudalis* was found on the peat excavation near Czarnków in north part of the Wielkopolska region (Czarnków-Trzcianka district, Poland; 52°55'08" N, 16°32'26" E, UTM: XU06).] Address: Dolata, P.T., Południowowielkopolska Grupa Ogólnopolskiego Towarzystwa Ochrony Ptaków, ul. Wrocławska 60 A/7, 63-400 Ostrów Wielkopolski, Poland. E-mail: p.dolata@op.pl

10869. Donoughe, S.; Crall, J.D.; Merz, R.A.; Combes, S.A. (2011): Resilin in dragonfly and damselfly wings and its implications for wing flexibility. *Journal of Morphology* 272(12): 1409-1421. (in English) ["Although there is mounting evidence that passive mechanical dynamics of insect wings play an integral role in insect flight, our understanding of the structural details underlying insect wing flexibility remains incomplete. Here, we use comparative morphological and mechanical techniques to illuminate the function and diversity of two mechanisms within Odonata wings presumed to affect dynamic wing deformations: flexible resilin vein-joints and cuticular spikes. Mechanical tests show that joints with more resilin have lower rotational stiffness and deform more in response to a load applied to an intact wing. Morphological studies of 12 species of Odonata (*Calopteryx augustipennis*, *Lestes rectangularis*, *Ischnura verticalis*, *I. posita*, *Enallagma divagans*, *Aeshna verticalis*, *Aeshna constricta*, *Sympetrum vicinum*, *S. rubicundulum*, *Erythemis simplicicollis*, *Somatochlora tenebrosa*, *Epitheca cynosura*) reveal that resilin joints and cuticular spikes are widespread taxonomically, yet both traits display a striking degree of morphological and functional diversity that follows taxonomically distinct patterns. Interestingly, damselfly wings (suborder Zygoptera) are mainly characterized by vein-joints that are double-sided (containing resilin both dorsally and ventrally), whereas dragonfly wings (suborder Epiprocta) are largely characterized by single-sided vein-joints (containing resilin either ventrally or dorsally, but not both). The functional significance and diversity of resilin joints and cuticular spikes could yield insight into the evolutionary relationship between form and function of wings, as well as revealing basic principles of insect wing mechanical design." (Authors)] Address: Donoughe, S., Dept of Cell and Developmental Biology, Univ. of Pennsylvania Medical School, Philadelphia, Pennsylvania. E-mail: donoughe@fas.harvard.edu

10870. Dow, R.A. (2011): *Mortonagrion indraneil* spec. nov. from Borneo, and a redescription of *M. arthuri* Fraser (Odonata: Zygoptera: Coenagrionidae). *Zootaxa* 3093: 35-46. (in English) ["*M. indraneil* spec. nov. is described from locations in Sarawak, Malaysian Borneo. Both sexes of *M. arthuri* Fraser are re-described based on recent material. Records of *M. amoena* Ris from Borneo in fact refer to *M. indraneil*; there is no evidence that *M. amoena* occurs on Borneo. Relationships between *Argiocnemis*, *Agriocnemis* and *Mortonagrion* are discussed." (Author)] Address: Dow, R.A., NCB Natu-

ralis, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

10871. Dow, R.A.; Ngiam, R.W.J. (2011): *Chlorogomphus manau* sp. nov. from Sarawak, Malaysia (Odonata: Chlorogomphidae). *International Journal of Odonatology* 14(3): 269-274. (in English) ["*Chlorogomphus manau* sp. nov. (holotype male: Borneo, Sarawak, Kapit Division, Hose Mountains, 15 April 2011, RMNH) from Malaysia is described from the male and compared with other regional *Chlorogomphus* species." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

10872. Dow, R.A.; Ngiam, R.W.J. (2011): Two damselflies new to Singapore: *Amphicnemis bebar* Dow, Choong & Ng and *Teinobasis cryptica* Dow (Odonata: Zygoptera: Coenagrionidae). *Nature in Singapore* 4: 393-396. (in English) [Recent records of *A. bebar* and *T. cryptica* increase the list of Odonata species known to Singapore to 127.] Address: Ngiam, R.W.J., National Biodiversity Centre, National Parks Board, 1 Cluny Rd, Singapore 259569. E-mail: ngiamwenjiang@nparks.gov.sg

10873. Edwards, G.M. (2011): The functional morphology and ecology of jet propulsion swimming in larval dragonflies under predation from suction-feeding fish. Ms.Thesis, Integrative Biology, University of Guelph, Ontario, Canada: 82 pp + VI app. (in English) ["A functional understanding of how phenotypic traits may affect growth, reproduction and survival is necessary to understand their ecological and evolutionary consequences. Larval anisopteran dragonflies swim using jet propulsion, likely controlled by abdominal traits and perhaps to escape fish predators. I investigated whether abdominal morphology explains swimming performance and if either explains the distribution of larvae among ponds that vary in predation risk. I recorded and measured the swimming performance of dragonflies responding to simulated attack and tested relationships with abdominal traits expected to influence jet thrust force generation. Variation in swimming performance was explained by abdomen dry weight, ventral surface area, and abdominal segment 10 width across genera as hypothesized. High-performance dragonflies were more likely to occur in ponds containing predatory fish. This is the first investigation of the morphology responsible for jet propulsion, and the relationship between swimming performance and larval dragonfly ecology." (Author)] Address: not stated

10874. Eggens, G.; Bouwman, J.H. (2011): From salty polder to dragonfly jewel. *Brachytron* 14(1): 3-13. (in Dutch, with English summary) [The Netherlands; "The relatively recent origin of the Dutch Province of Flevoland enables us to obtain new insights into the colonisation of 'new' land by dragonflies. After a slow start many species seem to have found Flevoland. Especially the species of lowland peat-marshes seem to have profited from the new water surfaces available there. Rare species such as *Leucorrhinia pectoralis* and *Libellula fulva* already reproduce here and species such as *Aeshna viridis* and *Somatochlora flavomaculata* are likely to make an appearance soon. Fen species and species of running water also have colonised Flevoland successfully. In view of all recent and planned nature developments, the future of dragonflies in Flevoland looks very bright." (Authors)] Address: Eggens, G., Wittesteijn 24, 8303 XV Emmeloord, The Netherlands. E-mail: vlinders.libellen.eggens@home.nl

10875. Fairweather, A.D.; McAlpine, D.F. (2011): History and status of the Natural History Society of New Brunswick entomology collection: 1897-1931. *J. Acad. Entomol. Soc.* 7: 14-19. (in English, with French summary) ["The Natural History Society of New Brunswick (NHSNB; 1862-1932) played a key role in the creation of the New Brunswick Museum (NBM), transferring its insect collection to the NBM upon the museum's opening in 1932. Here we review the history of the NHSNB insect collection, amassed mainly between 1897 and 1910, and report on the collectors involved and the experts and institutions sourced for specimen exchange and assistance with insect identification. The NHSNB entomology collection provides an important historical perspective on the early development of entomological research in Atlantic Canada and illustrates the wide-ranging scientific contacts established by one entomologist working in the Maritimes in the late 19th and early 20th centuries. William McIntosh, the principal collector, established contacts with various well-known amateur and professional entomologists across Canada and in the northeastern United States, gaining identification assistance in particular from specialists associated with the U.S. National Museum-U.S. Department of Agriculture. An inventory of the extant NHSNB insect specimens shows that 7,248 of an estimated 19,467 specimens present in 1914 remain, principally Lepidoptera, Coleoptera, Hymenoptera and Diptera. Despite losses, specimen records of scientific significance remain. About 30% of the 142 odonate species currently known from the Maritimes and southeastern Quebec are first documented on the basis of NHSNB specimens collected from 1898—1900, a 1906 specimen of *Eumorpha labruscae* (Lepidoptera: Sphingidae) remains the only one from Canada, and beetles that document the first occurrence of adventives help to establish timelines for the introduction of non-native Coleoptera to the Maritimes." (Authors)] Address: McAlpine, D.F., New Brunswick Museum, 277 Douglas Avenue, Saint John, New Brunswick E2K 1E5, Canada. E-mail donald.mc-alpine@nbm-mnb.ca

10876. Ferreira, S.; Boudot, J.-P.; Tarroso, P.; Brito, J.C. (2011): Overview of Odonata known from Mauritania (West Africa). *Odonatologica* 40(4): 277-285. (in English) ["The current knowledge on the odonate fauna of Mauritania (20 species) is summarized based on literature and unpublished records. In all, 55 localities are listed along with their precise topographic positions. The fauna of Mauritania is poorly explored: 8 species are known from a single locality and *Trithemis annulata*, widespread in Africa, is brought here on record for the country for the first time." (Authors)] Address: Ferreira, Sonia, CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairão, PT-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

10877. Ferreira, S.; Boudot, J.-P.; Tarroso, P.; Brito, J.C. (2011): Overview of Odonata known from Mauritania (West Africa). *Odonatologica* 40(4): 277-285. (in English) ["The current knowledge on the Odonata fauna of Mauritania (20 species) is summarized based on literature and unpublished records. In all, 55 localities are listed along with their precise topographic positions. The fauna of Mauritania is poorly explored: 8 species are known from a single locality and *Trithemis annulata*, widespread in Africa, is brought here on record for the country for the first time." (Authors)] Address: Ferreira,

Sonia, CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairão, PT-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

10878. Ferreira, N.; Feijó, C.; Giorgi, A.; Leggieri, L. (2011): Effects of macrophyte heterogeneity and food availability on structural parameters of the macroinvertebrate community in a Pampean stream. *Hydrobiologia* 664(1): 199-211. (in English) ["Environmental heterogeneity in natural ecosystems influences several parameters at the population and community levels. In freshwater ecosystems, habitat heterogeneity can be provided by macrophyte species with different structural shapes. Previous studies suggest that aquatic plants with more complex architectures will support higher number, biomass, and taxon richness of macroinvertebrates than plants with simpler shape. We investigated the influence of macrophyte structural heterogeneity (quantified by fractal dimension) and food availability (represented by epiphytic biomass) on several parameters (number of individuals, biomass, body size distribution, taxon richness, and diversity) of the macroinvertebrate community in a Pampean stream. Four submerged macrophyte species (*Egeria densa*, *Elodea ernstae*, *Ceratophyllum demersum*, and *Stuckenia striata*) and associated macroinvertebrates were sampled in late spring, summer, and autumn. Plants were photographed and fractal dimension was estimated from the images by the box-counting method. Fractal dimension was independent of plant surface area per unit of macrophyte biomass and differed significantly among species. Mean fractal dimension varied between 1.29 and 1.62, and increased following the sequence *E. densa* -> *S. striata* -> *E. ernstae* -> *C. demersum*. Macrophyte species with higher fractal dimension supported a greater abundance of macroinvertebrates, especially those of small body size (500–1,000 µm); but fractal dimension was unrelated to macroinvertebrate biomass, richness, and diversity. However, overall animal biomass was significantly associated to the epiphytic abundance. Consequently, macrophyte heterogeneity influences macroinvertebrate density and body size distribution, while animal biomass depends on epiphytic food resources provided by plants. ... Other groups such as Odonata (8%) ... were also present." (Authors) "] Address: Ferreira, N., Leggieri Instituto de Ecología y Desarrollo Sustentables (INEDES) and Departamento de Ciencias Básicas, Univ. Nacional de Lujan, B6700APJ, Ruta 5 y Avenida Constitución, Ciudad de Lujan, Buenos Aires, Argentina. E-mail: nicolasferreiro@conieet.gov.ar

10879. Festi, A. (2011): *Aeshna subarctica elisabethae*, new to the fauna of Italy (Odonata: Aeshnidae). *Libellula* 30(1/2): 65-76. (in English, with Italian and German summaries) ["In August 2009 a single adult male of *A. subarctica elisabethae* was collected at the 'Lago Nero' peat bog (municipality of Capriana; province Trento, northeastern Italy). This specimen represents the first Italian record of the species and adds a further record of *A. subarctica* to the few known records in the southern Alps. During a targeted search in the summer of 2010, the species was found in three other sites in the region Trentino-South Tyrol in northern Italy, where it now has to be considered as autochthonous." (Author)] Address: Festi, A., Dreiheiligenstr. 24, 39100 Bozen, Italy. E-mail: alex.festi@rolmail.net

10880. Flenker, U. (2011): Odonata of the Romanian Carpathians with notes on *Somatochlora alpestris* and

on the first Romanian record of *Aeshna subarctica* (Odonata: Corduliidae, Aeshnidae). *Libellula* 30(3/4): 183-201. (in English, with German summary) ["The Odonata fauna of the Romanian Carpathians was investigated during a summer expedition from 18-VII- to 14-VIII-2009. The work was mostly focused on boreo-alpine species. It is demonstrated that *Somatochlora alpestris* is present in all parts of the Romanian Carpathians. *Aeshna subarctica* has been detected in Romania for the first time. The corresponding record represents the first known occurrence of this species in a rather large area. *Aeshna juncea* is much more widespread in the region than has been known before. *Aeshna cyanea* is present and abundant in forested areas. *Sympetrum danae* has been recorded for the first time in the Romanian western Carpathians." (Author)] Address: Flenker, U., Manfred Donike Institute, German Sport Univ. Cologne, Am Sportpark Müngersdorf 6, 50933 Köln, Germany. E-mail: u.flenker@biochem.dshs-koeln.de

10881. Friman, M. (2011): Vantaan Vestran sudenkorennot [The dragonflies of Vestra/Vantaa]. *Crenata* 4: 36-39. (in Finnish, with English summary) [The article reviews the dragonfly fauna of Vestra, a district of Vantaa. The presented area measures 5, 2 square kilometres and is situated at the western edge of Helsinki Metropolitan Area. Between 1998 and 2010 a total of 26 species have been encountered, inter alia, *Ophiogomphus cecilia* and *Coenagrion armatum*. (Asmus Schröter)] Address: Reference address: Finnish Dragonfly Society/ Suomen sudenkorentoseura ry. www.sudenkorento.fi; Jussi Mäkinen makisenjussi@gmail.com

10882. Fritzlar, F.; Brettfeld, R.; Petzold, F. (2011): Dr. Wolfgang Zimmermann erhielt Medallie "Für Verdienste um die Entomologie". *Landschaftspflege und Naturschutz in Thüringen* 48(2): 108-109. (in German) [Wolfgang Zimmermann is the most profiled odonatologists in Thüringen, Germany. In April 2011, he was awarded with the medal of German "Entomofaunistic Society" due to his merits in entomology.] Address: Petzold, F., Pappelallee 73, 10437 Berlin, Germany

10883. Fulan, J.A.; Henry, R.; Souza Davanso, R.C. (2011): Effects of daily changes in environmental factors on the abundance and richness of Odonata. *Acta Limnologica Brasiliensia* 23(1): 23-29. (in English, with Portuguese summary) ["Aim: The aim of this work was to investigate the effects of daily changes in surface water abiotic factors on the abundance of Odonata larvae and the genus richness in a lateral lake isolated from a tropical river during the nycthemeral cycle in dry and wet seasons; Methods: Macrophytes were sampled on a single day at 6-hours intervals for 24 hours (at 12:00 AM, 6:00 AM, 12:00 PM and 6:00 PM) in dry and wet periods. At each site, abiotic factors were measured as follows: air temperature, surface water temperature, dissolved oxygen, pH, and electric conductivity. Canonical correspondence analysis (CCA) of abiotic and biological data and sampling periods was made using CANOCO program; Results: A total of 249 and 265 Odonata larvae from six genera (*Acanthagrion*, *Cyanalagma*, *Telebasis*, *Erythemis*, *Erythrodiplax* and *Tauriphila*) were sampled in association with macrophytes in wet and dry seasons, respectively. *Telebasis* presented the highest frequency of occurrence and was collected in all nycthemeral cycle sampling periods in both seasons. The highest abundance of dragonflies was recorded at 6:00 AM and 12:00 AM in wet and dry seasons, respectively. Anoxia was detected in wet sea-

son during the entire nycthemeral cycle, while in the dry season, the highest variability in oxygen content was observed during sunlight. Canonical correspondence analysis showed that the abundances of Telebasis and Erythemis were positively related to water electrical conductivity, temperature, and depth, while for Acanthagrion and Tauriphila, abundance showed a positive relationship to water oxygen and pH. The variability of the abundance of Odonata due to surface water temperature, dissolved oxygen, electrical conductivity, pH, and depth during the daily cycle was therefore evidenced; Conclusions: We suggested that the better sampling period Odonata larvae must be carried in the morning, since that we recorded the highest densities of both wet and dry stations at that hour. We point out that our data must to be examined with caution because the low sampling effort and the reduced taxonomic resolution." (Authors)] Address: Fulan, J.A., Universidade Federal do Amazonas (UFAM). CEP: 69800-000, Humaitá, AM, Brasil. E-mail: joaofulan@ig.com.br

10884. Gandara, J.A.; Rodríguez, R.E., Ramos, T.S. (2011): Notas corológicas de Orhetrum brunneum (Fonscolombe, 1837) (Odonata, Libellulidae) y aportación de una nueva cita para Galicia (N.W. Península Ibérica). Archivos Entomológicos 5: 149-152. (in Spanish, with English summary) [Unpublished and bibliographical distributional records of *O. brunneum* for the NW of the Iberian Peninsula are compiled, reporting also a new record for Galicia: León and Zamora (Spain), Ourense (Galicia), Bragança, Vila Real (Portugal).] Address: Gándara, J., Barrio do Souto, 10 B. 36740 San Salvador de Tebra, Tomiño (Pontevedra), Spain. E-mail: lcgandara@yahoo.es

10885. Gassmann, D. (2011): Expeditionsbericht: Conservation International Rapid Biodiversity Assessment der Nakanai Mountains, New Britain (Papua-Neuguinea). GbFS (Gesellschaft für Biologische Systematik) news 25: 28-31. (in German) [Report from an expedition realised from 2.-27-IV-2009 with focus on odonatalogical results, and including some notes on regional odonatological history.] Address: Gassmann, D., Institute of Evolutionary and Ecological Sciences, Leiden University, c/o National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: gassmann@naturalis.nnm.nl

10886. Geraeds, R.P.G.; Haese, U. (2011): Rheophile Libellen in einigen grenzüberschreitenden Wasserläufen im deutsch-niederländischen Naturpark Maas-Schwalm-Nette. Natuurhistorisch Maandblad 100(10): 199-204. (in German, with English summary) ["A few brooks and rivers that cross the German-Dutch border in the Maas-Swalm-Nette nature park are of special value regarding rheophilic dragonflies, and the distribution of some of these species in the Netherlands is mainly – or even completely – restricted to a few of these streams. As a result, the Dutch parts of the brooks and rivers have been closely investigated. Since the distribution of most of these species in the German parts of these streams was unknown, however, surveys in 2009 and 2010 recorded rheophilic dragonflies in the Swalm, Roer, Rode Beek and Kitschbach streams in the border region. Species that were surveyed included *Calopteryx splendens*, *C. virgo*, *Cordulegaster boltonii*, *Gomphus flavipes*, *G. vulgatissimus*, *Ophiogomphus cecilia* and *Onychogomphus forcipatus*. *C. splendens* is the most common species in the area; it occurs in all streams on both sides of the border. The *C. virgo* is rare and was found only along the Rode Beek brook, in the

German as well as Dutch parts. *C. boltonii* appears to be plentiful along the Rode Beek. In 2010, it was also found upstream of the Dalheimer Mühle in Germany, its first record in Germany. In 2007, two larvae were caught in the Dutch part of the river Swalm, near the border. The species was also occasionally spotted along the German part of the Swalm in the past. A few exuviae were found there in 2010, making it clear that there is also a population in Germany. The presence of *G. flavipes* is restricted to the Dutch part of the river Roer, where the species mainly inhabits the downstream parts. Only one specimen was spotted in the study area, near Vlodrop, in 2010. *G. vulgatissimus* is a widespread species along the running waters we investigated. It occurs on both sides of the Dutch-German border along the Swalm, Roer and Kitschbach. This species was first spotted along the German part of the Roer in 2009. *O. cecilia* was known to live along the Dutch parts of the rivers Swalm and Roer, and the German Kitschbach brook. In 2009 and 2010, the species was also found along the German parts of the Swalm and Roer, though it was not spotted along the Kitschbach in these years. *O. forcipatus* very rarely appears in the study area. This species was spotted only twice in the past: along the Roer in 2000 and along the Rode Beek in 2008. The Roer harbours a small population downstream of the study area. The animal that was seen along the Rode Beek brook was probably a drifter from the Roer population." (Authors)] Address: Haese, U., Am Gut Bau 28, 52072 Aachen, Germany

10887. Giugliano, L.; Terzani, F. (2011): The dragonflies of the retrodunal wetlands in the Migliarino, San Rossore, Massaciuccoli Regional Park (Odonata). Boll. soc. entomol. ital. 143(1): 3-13. (in Italian, with English summary) ["The biodiversity of the Regional Park of Migliarino, San Rossore and Massaciuccoli has been the subject of monitoring studies since a long time. The scope of this study is to fill the knowledge gap about the Odonata inhabiting the park, as at the present time there is no specific knowledge about the Odonata community located in the retrodunal ponds of park. Past surveys, although undertaken only sporadically, have produced a census of 29 species and samples have been collected – 28 in adult phase, 13 in larval phase and 11 like exuviae. The results of this study evidenced many interesting issues in terms of conservation, with several aspects which encourage further research." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

10888. Gliwa, B.; Stukonis, V. (2011): *Erythromma viridulum* (Odonata: Coenagrionidae) - A new species to Lithuania. New and rare for Lithuania insect species 23: 5-7. (in English, with Lithuanian summary) [Radviliškis district, Lithuania; *Erythromma viridulum* Lake Kragai, 05-VIII-2007, 7 ind. (1 dead male, 3 tandems), 24-VII-2008, 8 ind. (4 tandems); pond Juodupio Tvenkinys, 29-VIII-2011, ~50 ind.] Address: Gliwa, B., Lithuanian Entomological Society, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: gliwa@sargeliai.org

10889. Gordon, S. (2011): 2011 Oregon Aeshna Blitz. Bulletin of the Oregon Entomological Society Fall 2011: 1-2. (in English) [USA; Brief report on some new faunistic and phenological data obtained during the 2011 Oregon Aeshna Blitz held at Horse Lake in Douglas County on 27-VIII-2011.] Address: not stated

- 10890.** Gospodinova, H.; Wunsch, H.-W.; Heydrich, S. (2011): Erster Entwicklungsnachweis von *Epietheca bimaculata* in Nordrhein-Westfalen (Odonata: Corduliidae). *Libellula* 30(1/2): 13-18. (in German, with English summary) ["On 25-IV-2011, at a pond in the 'Wahner Heide', near the Cologne-Bonn airport, the emergence of a female of *E. bimaculata* was documented by photographs. Ecdysis started on 11:16 h CEST and was completed by 12:45 h when the female took her maiden flight. This is the first record of the species for 27 years and the first evidence of reproduction of *E. bimaculata* in North Rhine-Westphalia, Germany at all." (Authors)] Address: Wunsch, H.-W., Am Burgberg 11, 50126 Bergheim, Germany. E-mail: willi@waldschrat-online.de
- 10891.** Graves, P.H.; Ciccotto, P.J. (2011): The nymphal odonate fauna of two watersheds in the Lower Potomac River Basin, Maryland, with emphasis on rare taxa. *Northeastern Naturalist* 18(4): 445-456. (in English) ["Sixty percent of Maryland's odonate species are considered to be in need of conservation. To prioritize areas for the protection of biodiversity, the Maryland Department of Natural Resources (MD DNR) has identified 10 watersheds with the highest rates of occurrence of imperiled and rare stream species, including odonates. We examined the lotic-breeding odonate fauna of two of these high priority watersheds to determine the distribution and status of several imperiled odonate species in Maryland. Odonate nymphs from two Lower Potomac River basin watersheds, Zekiah Swamp Run and Breton Bay, were collected by volunteers and MD DNR's Maryland Biological Stream Survey from 2000–2010 and were identified to species level when possible. Thirty-four species were collected during this survey, 10 of which are state-listed species. The data collected in this survey detail the distributions, habitats, and microhabitats of rare odonates in two priority watersheds in Maryland that can be used to aid in the conservation of these species and their habitats." (Authors)] Address: Graves III, P.H., Monitoring and Non-tidal Assessment Division, Maryland Department of Natural Resources, 580 Taylor Avenue, Tawes Building C-2, Annapolis, MD 21401. USA. E-mail: pgraves@dnr.state.md.us.
- 10892.** Guillermo-Ferreira, R.; Del-Claro, K. (2011): Oviposition site selection in *Oxyagrion microstigma* Selys, 1876 (Odonata: Coenagrionidae) is related to aquatic vegetation structure. *International Journal of Odonatology* 14(3): 275-279. (in English) ["Oviposition site selection is crucial in the life history of odonates since females must find a suitable habitat to enhance larval survival and development. Males perch at these sites to get access to females to mate. Here we studied how different types of vegetation influence site selection of the damselfly *O. microstigma* in a Neotropical savanna pond. We identified and quantified the aquatic plants on the study site and investigated the relationship between plant species density, male site fidelity and female oviposition. The results showed that male density increased with higher densities of the Cyperaceae *Eleocharis* sp. but with lower densities of the Pontederiaceae, *Pontederia parviflora*. The number of males was also positively correlated with the number of ovipositing females and the duration of oviposition bouts. The females were found ovipositing on sites with *Eleocharis* sp., which was used as an oviposition substrate. We suggest that the species composition of aquatic vegetation in the environment, as well as the distribution and abundance of plants, can be a major determinant factor of damselfly habitat selection." (Authors)] Address: Guillermo-Ferreira, R., Departamento de Biologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil. E-mail: delclaro@ufu.br
- 10893.** Hanel, L. (2011): [*Anaciaeschna isoceles* again in Podblanicko]. *Pod Bláníkem* 15(3): 5. (in Czech) [Czech Republik, near Vlašim (49°42'15"N 14°53'54"E), 5-VI-2011] Address: Hanel, L., Správa chránené krajinné oblasti Blaník, 257 06 Lounovice pod Bláníkem 8, Czech Republic. E-mail: blanik@schkocr.cz
- 10894.** Hasty, J.M.; Yang, P. (2011): Survey of immature mosquito predators from Taro fields on the Island of Kauai, Hawaii. *Proceedings of the Hawaiian Entomological Society* 43: 13-22. (in English) ["A survey of predators of immature mosquitoes was conducted on the island of Kauai, Hawaii, in taro fields, major larval mosquito habitat of *Culex quinquefasciatus* Say. The survey consisted of examinations of samples from taro field water in two series: monthly at five locations and weekly at two of the same five locations. Copepods (*Macrocyclus albidus* Jurine), mosquito eating fish (*Gambusia affinis* Baird and Girard and *Poecilia reticulata* Peters) and aquatic insects, including backswimmers (*Buenoa pallipes* Fabricius) and larvae of *Odonata* spp., were the most commonly observed predators. While copepods were observed at all locations, backswimmers and mosquito fish were variably present. Copepod populations from all locations fluctuated during the surveys. For the two sites sampled on a weekly basis, adult mosquito counts were higher at Lihue (65.60 per gravid-trap-day) than at Hanapepe (39.91) while larvae were more frequently present at Hanapepe (79% of weeks) than Lihue (33%). There was no clear relationship at these sites between the relative abundance of the most frequently collected mosquito-feeding insects, copepods, and numbers of adult mosquitoes trapped." (Authors)] Address: Hasty, J.M., Department of Health, Sanitation Branch, Vector Control Section, 99-945 Halaia Valley St. Aiea, HI 96701, USA
- 10895.** Heijligers, H. (2011): De Ravenvennen. *Libellenreservaat in Limburg*. *Vlinders* 2/2011: 26-27. (in Dutch) [30 Odonata species occur within the nature reserve De Ravenvennen, The Netherlands. The location is briefly introduced, but no details on its fauna are given.] Address: Heijligers, H.W.G., Lottumseweg 27, NL-5872 AA Broekhuizen, The Netherlands
- 10896.** Hermans, J.; Sennert, G. (2011): Die Libellenfauna des Naturparks Maas-Schwalm-Nette. *Naturhistorisch Maandblad* 100(10): 216-225. (in German, with English summary) ["The dragonfly fauna of the Maas-Schwalm-Nette nature park is extremely rich, with 57 species found in this region between 1980 and 2010. One of the most important reasons for this large number of species is the diversity of biotopes and habitats. The area includes many types of water body: stagnant and running waters, nutrient-poor to nutrient-rich waters with several transitional stages in between, waters fed by percolating groundwater and water bodies in various stages of vegetation development. Other reasons for the presence and settlement of so many species include improved water quality, targeted habitat management of fens and pools involving the development and restoration of biotopes and habitats, and changing climate conditions. The article briefly summarises de-

velopments in the distribution patterns of some species. Examples of species whose populations and distribution patterns have stabilized include *Coenagrion lunulatum*, *Aeshna juncea*, *Leucorrhinia rubicunda* and *L. dubia*. Some species, such as *Sympecma fusca*, *Somatoclora flavomaculata* and *Aeshna isosceles*, have benefited from the current climate change and extended their area of distribution. The rise in average annual temperatures has allowed some Mediterranean dragonfly species to extend their distribution northward and establish viable populations in several locations. Examples of such species are *Crocothemis erythraea* and *Orthetrum brunneum*. *O. coerulescens* is a dragonfly that took advantage of the restoration of some habitats in heath and moorland biotopes, where new small streams were created." (Authors)] Address: Hermans, J.T.; Hertestraat 21, 6067 ER Linne, The Netherlands

10897. Hodge, P.J. (2011): Insect survey at Markstakes Common, East Sussex. Report No.1 for site visits on 21st June, 29th July & 13th September 2010 (<http://www.chaileycommons.org.uk/USERIMAGES/EntomologicalSurveyMarkstakesCommon,2010%5B1%5D.pdf>): (in English) [UK; *Coenagrion puella*; *Pyrhosoma nymphula*] Address: Hodge, P.J., Consultant Entomologist, 8 Harvard Road, Ringmer, Lewes, East Sussex, BN8 5HJ, UK. E-mail: peter.hodge@mypostoffice.co.uk

10898. Höpstein, G. (2011): Der Südliche Blaupfeil (*Orthetrum brunneum*) in der Sandgrube bei Remschütz. Landschaftspflege und Naturschutz in Thüringen 48(2): 95-98. (in German, with English summary) [Thüringen, Germany. In July 2008, a small reproductive population of *O. brunneum* was observed. No specimens in 2009 could be traced, but at 26-VI-2010 a few exuviae and again a small reproductive population were found.] Address: Höpstein, G., Flecke 17, 07422 Bad Blankenburg, Germany

10899. Holuša, O. (2011): Observation of swarming behaviour in *Selysiotthemis nigra* on the island of Evia, Greece (Odonata: Libellulidae). *Libellula* 30(3/4): 233-236. (in English, with German summary) ["On 10-VII-2009 a group of about 80 adults of *S. nigra* was observed near Kalyvia in northern Evia. The group consisted of both sexes and flew in a space of 80 x 30 m over the road and in adjacent non-forest areas. It is suggested that the aggregation was part of a migrating swarm." (Author)] Address: Holuša, O., Department of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

10900. Hopkins, G.R.; Gall, B.G.; Brodie, D.E. (2011): Ontogenetic shift in efficacy of antipredator mechanisms in a top aquatic predator, *Anax junius* (Odonata: Aeshnidae). *Ethology* 117(12): 1093-1100. (in English) ["The ability of prey to escape predation often lies in the occurrence and efficacy of their predator avoidance and antipredator behaviours, which are often coupled with specialized morphology. How the use and efficacy of these behaviours change throughout ontogeny may be indicative of the vulnerability and ecological roles these animals experience throughout their lives. We examined the antipredator behaviour of a large dragonfly nymph, *Anax junius*, from a historically fishless pond where these animals have traditionally been classified as top predators. These dragonfly nymphs displayed a series of distinct aggressive antipredator behaviours

when grasped that involved stabbing with lateral and posterior spines and seizing with labial hooks. Larger (older) nymphs displayed these aggressive behaviours significantly more than smaller (younger) animals in simulated predation trials. During encounters with live larval salamander predators (*Ambystoma tigrinum*), all large nymphs, but only 12.5% of small nymphs successfully escaped predation attempts by the amphibians through the use of antipredator behaviour. Large nymphs were also significantly more active than smaller nymphs in the presence of salamander larvae. Despite often being considered top predators in fishless ponds, our study demonstrates that their true role is more complex, depending on ontogeny and body size, and that effective antipredator behaviour is likely necessary for survival in these systems." (Authors)] Address: Hopkins, G.R., Dept of Biology, Utah State University, 5305 Old Main Hill Logan, UT 84322, USA. E-mail: garth.hopkins@usu.edu

10901. Hunger, H. (2011): Wiederfund von *Coenagrion scitulum* in Baden-Württemberg nach fast 90 Jahren (Odonata: Coenagrionidae). *Libellula* 30(1/2): 43-50. (in German, with English summary) [*Coenagrion scitulum* "had hitherto been recorded in Baden-Württemberg, Germany, only once, back in 1922. In the line of an increasing number of sightings in the neighbouring regions since the beginning of the 21st century, *C. scitulum* was rediscovered in May 2010 ca 12 km southwest of Freiburg im Breisgau." (Author)] Address: Hunger, H., INULA - Institut für Naturschutz und Landschaftsanalyse, August-Ganther-Str. 16, 79117 Freiburg i.Br., Germany. E-mail: holger.hunger@inula.de

10902. Ilvonen, S.; Ilvonen, J.J.; Kaunisto, K.M.; Krams, I.; Suhonen, J. (2011): Can infection by eugregarine parasites mediate species coexistence in *Calopteryx damselflies*? *Ecological Entomology* 36(5): 582-587. (in English) ["1. Parasitism may be an important factor determining the coexistence of closely related species. Although host-parasite interactions can affect the ecology and distribution of the host species, virtually nothing is known about how other interspecific interactions affecting the host, such as competition or predation, relate to the parasite burden of the host. 2. We studied parasite-mediated competition between two closely related *Calopteryx damselflies*, *C. virgo* L. and *C. splendens* Harris. We investigated a total of 31 populations, including 18 allopatric and 13 sympatric populations. We measured the occurrence of gut parasites, eugregarines. 3. We found that the prevalence of gregarines was higher in *C. virgo* than in *C. splendens*. On average, more than half of the *C. virgo* individuals were infected by eugregarines both in allopatric and sympatric populations. However, hardly any allopatric *C. splendens* populations had gregarines, but most of sympatric populations had infected individuals. 4. According to our results, co-existence of the host species affects the likelihood of the subordinate species showing higher levels of parasitism. Interspecific aggression, lower species genetic heterozygosity, and the difference in host species immunity are proposed as possible explanations for greater parasite burdens in the inferior species at sympatric sites." (Authors)] Address: Suhonen, J., Dept of Biology, Section of Ecology, University of Turku, FI-20014 Turku, Finland. E-mail: juksuh@utu.fi

10903. Iserbyt, A.; van Gossom, H. (2011): Show your true colour: cues for male mate preference in an intra-specific mimicry system. *Ecological Entomology* 36(5):

544-548. (in English) ["1. Polymorphism limited to the female sex occurs in a variety of animal species and has been shown to be an attractive model system for examining general questions in signal detection theory. 2. When observed in damselflies, typically one female morph is an example of sexual dimorphism, whereas the other is considered as a functional malemimic that resembles the male's phenotype in several traits. 3. While several studies focused on male harassment and subsequent cost/benefit trade-offs in female morphs, it remains understudied at the proximate level, which precise cues are relevant to mate-searching males for discriminating among potential mates. 4. In the present study, we scored male mate preference to natural and manipulated phenotypes in the polymorphic damselfly *Nehalennia irene* Hagen. 5. In contrast to expectation, male preference did not change when colour was manipulated and male preference remained consistently for andromorph > male > gynomorph across treatments. 6. This suggests that cues other than body coloration primarily affect male mate preference in the present study system." (Authors)] Address: Iserbyt, A., Evolutionary Ecology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium. E-mail: arne.iserbyt@ua.ac.be

10904. Iskaros, I.A.; Gindy, N.N.; El Dardir, M. (2011): Long - term fluctuations of macrobenthic invertebrates in Aswan Water Reservoir, Egypt. *International Journal of Environmental Science and Engineering* 1: 37-48. (in English) [The list of taxa includes also unidentified Odonata (larvae of Zygoptera).] Address: Iskaros, I.A., National Institute of Oceanography and Fisheries, Aswan, Egypt

10905. Jeong, J.-C.; Cha, J.-Y.; Kwon, J.-M.; Choi, J.-K.; Nam, S.-H.; Choi, M.; Kim, Y.; Cho, Y. (2011): Historical review of the insect fauna and protected species in Byunsanbando National Park. *Journal of National Park Research* 2(2): 85-128. (in Korean, with English summary) [The insect fauna in Byunsanbando National Park, Korea comprises of 1,365 species, and includes 24 Odonata species. These are listed in a table.] Address: Cho, Y., Department of Biology, Daejeon University, Daejeon 300-716, Korea. E-mail: themoth@dju.kr

10906. Johnson, J. (2011): The brief history of *Paltothermis lineatipes* in Oregon. *Bulletin of the Oregon Entomological Society* Fall 2011: 3. (in English) [Little Cottonwood Creek, Pueblo Mountains a few miles south of Fields, Oregon, USA. The author reports on the first record of *P. lineatipes* on 25-VIII-2011.] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jjjohnson@comcast.net

10907. Johnson, J. (2011): Desert odonate trip (17–19 June 2011). Odonate species list. *Bulletin of the Oregon Entomological Society*. Summer 2011: 6. (in English) [Oregon, USA. For the trip-details see Lyons (2011): "With the extended cool wet period this spring, we were too early for most species. The following species were seen, photographed or collected: *Rhionaeschna* sp. (presumably *californica*), *Libellula composita*, *L. nodisticata*, *Plathemis subornata*, *Erythemis collocata*, *Sympetrum corruptum*, *Argia alberta*, *Ischnura cervula*, *I. denticollis*, *I. perparva*, and *Amphiagrion abbreviatum*." (Author)] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jjjohnson@comcast.net

10908. Johnson, J. (2011): Snaketail emergence. *Bulletin of the Oregon Entomological Society* Summer 2011:

10. (in English) [Depiction of an emerging female *Ophigomphus severus* on the Burnt River in Baker County, Oregon, USA, on 3 July 2011.] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jjjohnson@comcast.net

10909. Juen, L.; De Marco, P. (2011): Odonate biodiversity in terra-firme forest streamlets in Central Amazonia: on the relative effects of neutral and niche drivers at small geographical extents. *Insect Conservation and Diversity* 4: 265-274. (in English) ["1. The Amazon region is formed primarily by a dense network of acid and nutrient-poor streamlets. The stability of environmental conditions coupled with spatial constraints to dispersal turns these streamlets into an interesting arena to compare neutral and niche drivers for community organisation. Here, we evaluated the relative importance of local environmental conditions and regional dispersal limitation to determine beta-diversity and distributional patterns of species richness of the adult Odonata assemblage present in the Adolpho Ducke Forest Reserve (Manaus, Amazon) river basins. 2. Samples were taken in 24 streamlets distributed in four river sub-basins (pairwise distances up to 10 km) during the rainy season. The samples consisted of visual surveys for adult individuals of Odonata present in 100 m transects along each streamlet; each transect was divided into 20 segments of 5 m. 3. A total of 17 species were observed and 23 (± 4.8) were estimated using a jackknife procedure. Four sub-basins were statistically similar based on species richness and beta-diversity. Distance among the streamlets had a low predictive power for species richness, while beta-diversity patterns were mainly explained by local environmental variables (channel width and depth). The low values of the beta-diversity index may be attributed to the high similarity of the environment, which presented little variation in abiotic conditions. 4. Low dispersal constraints and environmental stability are the primary explanations for low beta-diversity at this spatial extension. Nevertheless, the importance of local environmental variables to determine beta-diversity suggests its inclusion as criteria for setting conservation priorities for this group." (Authors)] Address: Correspondence: Leandro Juen, Programa de Pós Graduação em Ecologia e Evolução, Depto de Ecologia, Univ. Federal de Goiás, 74001-970 Goiânia, Goiás, Brazil. E-mail: leandrojuen@yahoo.com.br

10910. Kaize, J.; Kalkman, V.J. (2011): Records of dragonflies (Odonata) from Kabupaten Asmat and Kabupaten Mappi (Papua, Indonesia). *SUGAPA (Suara Serangga Papua)* 5(3): 99-107. (in English, with Papuan summary) ["Records of dragonflies collected at Katan and Senggo (both Kabupaten Mappi) and at Vriendschap River (Kabupaten Asmat) in 2009 are presented. In total 47 species belonging to seven families were collected, the majority of these belong to the Coenagrionidae (14 species) or to Libellulidae (26 species). The collection includes several poorly known species such as *Plagulibasis ciliata* and *Nososticta rangifera*. *Austrocnemis maccullochi* is recorded for Indonesia for the first time. One male of an undescribed *Palaiargia* is briefly characterized but is not officially described." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

10911. Kalkman, V.J.; Theischinger, G.; Richards, S.J. (2011): Dragonflies and Damselflies of the Muller

Range, Papua New Guinea. In: Richards, S.J. and Gamui, B.G. (editors). 2011. Rapid Biological Assessments of the Nakanai Mountains and the upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments. RAP Bulletin of Biological Assessment 60. Conservation International. Arlington, VA: 175-181. (in English) ["We conducted a survey of dragonflies at three elevations in the Muller Range of centralwestern Papua New Guinea (PNG) from 4-25 September 2009. Thirty-six species were documented, of which 31 were found only at the lowland site. Diversity at Camp 1 (Gugusu; ~500 m) was similar to that documented from the limited number of other sites studied in the central mountain range, and the dragonfly community conformed with a number of patterns previously observed at low elevations in the central ranges: (1) Higher level taxonomic diversity (number of families) is high in proportion to the number of species; (2) the majority of species are dependent on running water; (3) most of the species associated with running water are endemic to New Guinea while most species occupying standing water habitats are more widespread and often also occur outside New Guinea. At least six species new to science were found at Gugusu reinforcing the view that many species of dragonflies still await discovery in New Guinea. This is probably especially so for the southern slopes of the central mountain range in PNG because this area remains relatively unexplored. Diversity was extremely low at Camp 2 (Sawetau; 1,600-2,000 m; 1 species) and Camp 3 Apalu Reke; 2,875 m; 4 species). The karst area at camp 2 is largely devoid of aquatic habitats and hence has a very poor dragonfly fauna. Camp 3 was above the altitudinal limit of all but a few species. However the discovery of the presumed larvae of *Papuagrion* at Camp 3 constitutes the first record of larvae of this genus. Its life-style (aboreal and semi-terrestrial) is unique among dragonflies and warrants more research. We also report on a small collection of dragonflies assembled during the 2008 RAP survey at Tualapa near Wanakipa Village in the upper Strickland River catchment on the northern edge of the Muller Range. Opportunistic collecting at elevations between 845-1,422 m around Tualapa Camp documented 18 species of dragonflies including only the second records of the poorly known *Hylaeargia magnifica* and the recently described *Argiolestes verrucatus*." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

10912. Kalniņš, M. (2011): Spāru (Odonata) dienvīdu sugu izplatība Latvijā un blakus teritorijās. Latvijas Universitātes 69. zinātniskā konference. Bioloģijas sekcija, Zooloģijas un dzīvnieku ekoloģijas apakšsekcija, 2011. gada 3.-4. februāris: 1 p. [The range extension in the past 20 years of 19 southern Odonata in Latvia is commented: *Lestes barbarus*, *L. viridis*, *Sympetrum fusca*, *Coenagrion ornatum*, *Erythromma viridulum*, *Aeshna affinis*, *A. crenata*, *A. serrata*, *Anax parthenope*, *A. ephippiger*, *Orthetrum albistylum*, *O. coerulescens*, *O. brunneum*, *Sympetrum depressiusculum*, *S. fonscolombii*, *S. meridionale*, *S. eroticum*, *S. pedemontanum*, *Crocothemis erythraea*. Published records of *S. eroticum* and *S. meridionale* are considered doubtful.] Address: Kalniņš, M., University of Latvia, Faculty of Biology, Kronvalda bulv. 4, LV 1586, Riga, Latvia. E-mail: martins.kalnins@daba.gov.lv

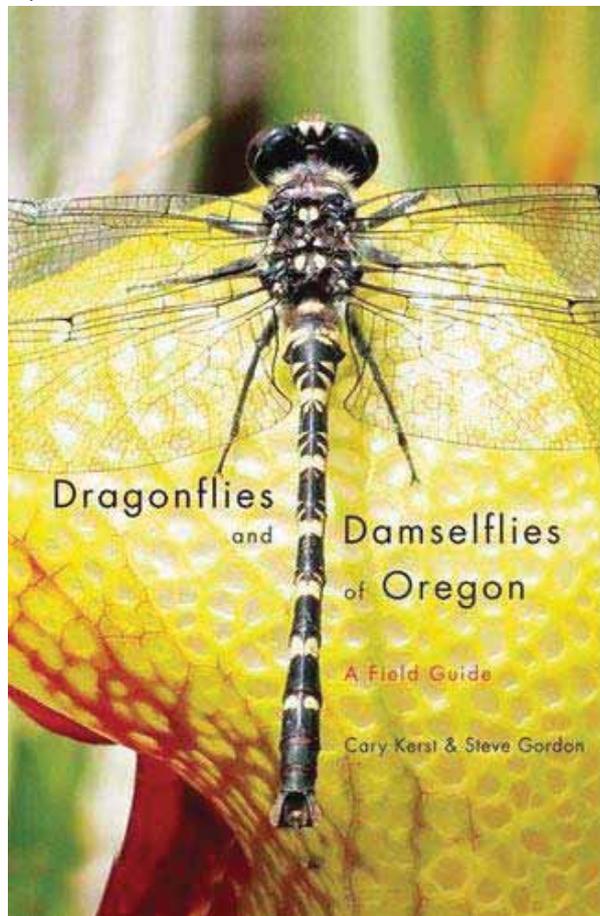
10913. Karraker, N.E. (2011): Are toad tadpoles unpalatable: evidence from the behaviour of a predatory dragonfly in South China. *Amphibia-Reptilia* 32(3): 413-418. (in English) ["Predators are important determinants of amphibian community structure in aquatic habitats, and larval odonates can be significant predators of amphibian larvae. Despite their toxicity as adults, the palatability of bufonid eggs and tadpoles to vertebrate and invertebrate predators remains widely debated. I tested the palatability of hatchling tadpoles of the Asian common toad (*Bufo melanostictus*) and four other amphibians in Hong Kong to larvae of the dragonfly *Pantala flavescens*. Attempted predation of *Bufo melanostictus* hatchling tadpoles by *P. flavescens* resulted in 100% mortality of hatchlings, but none were consumed. All other amphibians were palatable to *P. flavescens*. Development of toxins may not protect early-stage bufonids from invertebrate predators that detect prey by visual cues and then make a debilitating strike. These findings present the first report of unpalatability of bufonid tadpoles to an invertebrate predator and provide evidence that unpalatability of early stage bufonids to odonates may decrease through ontogeny." (Author)] Address: Karraker, Nancy, School of Biological Sciences, University of Hong Kong, Hong Kong SAR, China. E-mail: karraker@hkucc.hku.hk

10914. Keller, D.; Brodbeck, S.; Flöss, I.; Vonwil, G.; Holderegger, R. (2011): Ausbreitung und Besiedlungsgeschichte der Zierlichen Moosjungfer *Leucorrhinia caudalis* in der Schweiz (Odonata: Libellulidae). *ENTOMO HELVETICA* 4: 139-152. (in German, with English and French summaries) ["*Leucorrhinia caudalis* is considered a threatened dragonfly species in Central Europe. In Switzerland, the species was formerly widespread in the lowlands, but only a single known population was left in the 1980s. However, a spread has been observed in the 1990s, where close-by ponds at a distance of 0.5–7 km have been colonised. Additionally, two new populations at distances of 30 km and 50 km were discovered in the 2000s. In the present study, a combination of a mark-resight study with genetic methods was applied to investigate current migration and genetic footprints of colonisation history in Switzerland. Both the mark-resight and the genetic study showed that *L. caudalis* is a sedentary species that migrates only rarely, seldom exceeding distances of 5 km. The genetic results reflected the recent colonisation history in Switzerland. The oldest and largest population was genetically the most variable and acted as source for recent colonisations. The close-by but only recently founded populations also showed high genetic variability, implicating that close ponds are relatively easily colonised and establish well if functional connectivity is ensured." (Authors)] Address: Keller, Daniela, Eidg. Forschungsanstalt WSL, Zürcherstr. 111, CH-8903 Birmensdorf, Switzerland. E-mail: daniela.keller@wsl.ch

10915. Kerst, C. (2011): Pins to envelopes. *Bulletin of the Oregon Entomological Society* Fall 2011: 5. (in English) [Verbatim: The Oregon State University Arthropod Collection has a number of cabinet drawers of pinned Odonate specimens. Pinned specimens require considerable cabinet space for storage, and specimens are less secure from damage by pests. The modern method of storing Odonata specimens is to place them in polypropylene envelopes after processing. The data for each specimen is printed on a 3 × 5 card and placed inside the envelope. I have begun the process of mov-

ing the pinned specimens into envelopes. This is a time-consuming procedure involving relaxing specimens in a moist air-tight environment. After relaxing, the specimens are removed from pins, positioned, and placed in an acetate envelope along with labels. After air drying, the specimen data are entered into a spreadsheet from which the 3 × 5 cards are printed. The original data labels are glued to the cards along with a bar code and placed in the poly envelopes along with the specimen. The end of the poly envelopes is folded over and taped closed. Specimens are well protected in these envelopes and hopefully will be useful for another hundred years. Data for specimens are also then available in the collection's database. There are a few interesting specimens that I have come across to date. A specimen of *Gomphus lynnae* from Rome, Oregon was collected in 1952. This species was described by Dennis Paulson in 1983. There is a specimen of *Aeshna palmata* collected by P. P. Calvert on 22 July 1896, and a specimen of *Rhionaeschna californica* labeled J. G. Needham from 5 July of the same year. Both specimens are from Olympia, Washington. It's a delight to come across specimens collected by these pioneering odontologists.] Address: not stated

10916. Kerst, C.; Gordon, S. (2011): *Dragonflies and Damselflies of Oregon. A Field Guide.* Oregon State University Press. 304 pp. (in English) ["Growing interest in watching and identifying dragonflies and damselflies has sharpened the need for an authoritative resource like *Dragonflies and Damselflies of Oregon*, a definitive field guide devoted solely to dragonflies and damselflies found in the state. Cary Kerst and Steve Gordon include information on identification, as well as biology and behaviour, using common terms useful to the novice and experienced enthusiast alike. The book features stun-



ning colour photographs of male and female of all species currently known in Oregon, along with helpful illustrations and charts with important identification characteristics. *Dragonflies and Damselflies of Oregon* presents the life cycle and larval habits of dragonflies and damselflies, along with photographs of the larvae of families. The Oregon range for each species is mapped, and the size range of adults is provided in text and illustration. The book also includes a description of the best sites in Oregon to observe these amazing insects, a useful tool for viewing uncommon species in spectacular settings." (Publisher)

10917. Kolshorn, P. (2011): *Kleinvieh & Co: Libellen.* *Naturspiegel* 83: 26. (in German) [Regional data of *Leucorrhinia pectoralis* and *Anax parthenope* from De Wittsee/Nettetal and *Elmpter Schwalmbruch/Niederkrüchen*, Nordrhein-Westfalen, Germany are documented.] Address: not stated

10918. Kosterin, O.E.; Zaika, V.V. (2011): *Fauna of dragonflies and damselflies (Odonata) of Tuva.* *Amurian zoological journal* III(3): 210-245. (in Russian, with English summary) ["The known odonate fauna of Tuva in Siberia, Russia, is documented. It includes 47 species. In the southern Ubsu-Nur depression 29 species were recorded (2 just there); in the Central Tuvinian depression 34 species (6 just there) and in the Todzha depression 32 species (9 just there). The fauna of the more humid taigaous region of Todzha contains lacks 7 species found elsewhere in Tuva. In spite of Todzha's position in the north-east, its fauna shows a more western character and includes a population of *Calopteryx splendens* with a high proportion of two morphs of an-drochromic females and a male morph with wings coloured to the tips. Todzha is inhabited by *Enallagma c. cyathigerum* with a variably melanised abdomen, while in the Central Tuvinian and Ubsu-Nur depressions, *E. c. risi* occurs. In Turan and the Upper Kaa-Khem basin, intergradation between both taxa takes place. In Todzha, *Somatochlora exuberata* and *S. metallica abocanica* are sympatric without intermediate forms and with habitat segregation, thus proving their status as separate species. Todzha is inhabited by *Ophiogomphus obscurus* while the rest of Tuva harbours *O. spinicornis*. The status of vicariant western/eastern pairs of taxa in the genus *Leucorrhinia*: *dubia/orientalis* and *rubicunda/intermedia*, is discussed in detail." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

10919. Kuitunen, K. (2011): *Sudenkorentolajien risteytyminen [Hybridization in dragonflies].* *Crenata* 4: 4-9. (in Finnish, with English summary) [In animals, matings between species or interspecific hybridization can occur in nature. Here, I review existent literature about matings between heterospecifics and occurrence of hybrids in Odonates. It seems that tandems between species are relatively common, especially within genera. However, these tandems do not always lead to matings and more rarely to origin of hybrid individuals. Premating reproductive isolation and hybridization has been studied in more detail with *Calopteryx* damselflies, and it seems that within this genus hybridization might occur because of the behaviour of males. (Asmus Schröter)] Address: Reference address: Finnish Dragonfly Society/ Suomen sudenkorentoseura ry. www.sudenkorento.fi; Jussi Mäkinen makisenjussi@gmail.com

- 10920.** Lambertz, M.; Schmied, H. (2011): Records of the exotic damselfly *Ischnura senegalensis* (Rambur, 1842) from Bonn (Germany). *Bonn zoological Bulletin* 60(2): 211-213. (in English, with German summary) ["We report on specimens of the damselfly *Ischnura senegalensis* (Odonata: Zygoptera: Coenagrionidae) accidentally introduced to western Germany. The odonates were encountered in Bonn and their origin could clearly be correlated with commercially distributed exotic aquarium plants." (Authors)] Address: Lambertz, M., Institut für Zoologie, Rheinische Friedrich-Wilhelms-Universität Bonn, Poppelsdorfer Schloß, 53115 Bonn, Germany. E-mail: lambertz@uni-bonn.de
- 10921.** Lambertz, M.; Spieth, V.; Denking, J.; Traunspurger, W. (2011): On dragonfly nymphs (Insecta: Odonata: Anisoptera) from the caldera of the Cerro Azul volcano, Isla Isabela (Galápagos Archipelago, Ecuador). *Bonn zoological Bulletin* 60(2): 207-210. (in English, with German summary) ["We describe nymphs of *Pantala hymenaea*, encountered during an expedition to the caldera of the Cerro Azul volcano on Isabela island in February 2009. This faunistic shortnote provides the first specieslevel identification of odonates from a caldera lake of an active Galápagos volcano." (Authors)] Address: Lambertz, M., Institut für Zoologie, Rheinische Friedrich-Wilhelms-Universität Bonn, Poppelsdorfer Schloß, 53115 Bonn, Germany. E-mail: lambertz@uni-bonn.de
- 10922.** Lange, M.; Weisser, W.W.; Gossner, M.M.; Kowalski, E.; Türke, M.; Joner, F.; Fonseca, C.R. (2011): The impact of forest management on litter-dwelling invertebrates: a subtropical-temperate contrast. *Biodivers. Conserv.* 20: 2133-2147. (in English) [In Brazil, the study was conducted in the Sao Francisco de Paula National Forest, Rio Grande do Sul State, Brazil. In Germany, the study was conducted in the area of Hainich-Dün, a range of hills in the North-West of Thuringia. "Land use intensification in forests is a main driver of global biodiversity loss. Although historical state of land use differs between subtropical and temperate zones, gradients of land-use intensities similarly range from unmanaged to very intensively managed forests. Irrespective of similar land use forces in both climate zones, comparative studies on land use effects are still rare. Such studies are, however, promising in discovering more general impacts and geographical specifics of land use intensification. We studied litter-dwelling invertebrates along a gradient of increasing land use intensity in subtropical forests in Southern Brazil and temperate forests in Central Europe using similar sampling designs. Effects of land use intensity on the entire community were analyzed on the level of orders and feeding guilds. In both climate zones a similar number of individuals were caught when standardized to 100 pitfall trap days, but taxa richness was higher in the subtropics. Moreover, community composition differed between both climate zones. In both regions, land use intensity did not affect taxa richness, but invertebrate abundance was affected in opposite ways; while increasing land use intensity resulted in a decrease of invertebrate abundance in the subtropics, an increase was observed in the temperate zone and this was mostly consistent regarding different feeding guilds. Management practices should take into account that the effect of land use intensity on biodiversity can differ drastically among climatic regions." (Authors) Taxa including Odonata are treated at the order level.] Address: Lange, M., Inst. Ecol., Friedrich-Schiller-
Univ. Jena, Dornburger Str. 159, 07743 Jena, Germany. E-mail: m.lange@uni-jena.de
- 10923.** Lencioni, F.A.A. (2011): Rediscovery of *Telebasis erythrina* (Selys, 1876), with notes on habitat and conservation (Zygoptera: Coenagrionidae). *Odonatologica* 40(4): 327-331. (in English) ["*T. erythrina* was previously known from 5 males, all collected in Minas Gerais (Brazil). 4 males of the type series are deposited in IRSN and the fifth specimen, collected in Santa Barbara, MG, Private Reserve Peti, 18-X-1980, is deposited in ABMM collection (now UFMG). Recently the species has been rediscovered in São Paulo state, and data on habitat and conservation are presented here for the first time." (Author)] Address: Lencioni, F.A.A., Rua Anibal 216, Jardim Coleginho, Vila Zezé, BR-12310-780 Jacareí, São Paulo, Brazil. E-mail: odonata@zygoptera.bio.br
- 10924.** Lewington, R. (2011): Artwork versus photography, set specimens versus natural posture. *Atropos* 43: 3-11. (in English) [The author, one of the most profiled insect illustrators worldwide, discusses pros and contras of illustration versus photographs and shows on several examples how both can/must be combined. He also uses examples from the brilliant European Odonata fieldguide prepared from K.D. Dijkstra and himself.] Address: Lewington, R., 22 Chambray Close, Appleford on Thames, Oxfordshire, OX14 4NT, UK. E-mail: rlawington@btopenworld.com
- 10925.** Li, Y.-j.; Nel, A.; Ren, D.; Zhang, B.-l.; Pang, H. (2011): New discoveries of Neogene hawk dragonflies (Insecta, Odonata, Aeshnidae) from Shandong province in China. *Zoosystema* 33(4): 577-590. (in English, with French summary) ["*Epiaeschna matutina* (Zhang, 1989) is re-described and species diagnosis is amended. Two new species, *Aeshna shanwangensis* n. sp. and *Aeshna forficatum* n. sp., are described from the Middle Miocene deposit of Shanwang Formation, Shandong Province, East China. Comparison with other related fossil and recent species is provided." (Authors)] Address: Li, Y.-j., State Key Laboratory of Biocontrol & Institute of Entomology, Sun Yat-Sen Univ., Guangzhou 510275, China. E-mail: liyongjunsysu@126.com
- 10926.** Liebelt, R.; Lohr, M.; Beinlich, B. (2011): Zur Verbreitung der Gestreiften und der Zweigestreiften Quelljungfer (*Cordulegaster bidentata* und *C. boltonii*) im Kreis Höxter (Insecta, Odonata, Cordulegasteridae). *Beiträge zur Naturkunde zwischen Egge und Weser* 22: 3-18. (in German) [The paper broadly introduces into the two taxa emphasizing morphological, ecological and phenological characters and information. The focus is set on the regional distribution in the western part of Nordrhein-Westfalen, Germany.] Address: Liebelt, R., Büro für Ökologie u. Landschaftsplanung, Altes Forstamt 1, 37691 Boffzen, Germany. E-mail: ralf.liebelt@freenet.de
- 10927.** Lyons, R. (2011): New County record for *Aeshna constricta*, the Lance-tipped Darner (Odonata: Aeshnidae). *Bulletin of the Oregon Entomological Society* Fall 2011: 4-5. (in English) [The new record comes from second week of August 2011/or 2010?; edge of Ladd Marsh (a few miles SE of LaGrande, Union Co.) in the NE corner of the state (45° 17.24' N 117° 57.80' W).] Address: not stated
- 10928.** Lyons, R. (2011): Desert Odonate Hunt 2011. *Bulletin of the Oregon Entomological Society* Summer 2011: 2-5. (in English) [Report on a trip to the desert region of eastern Oregon, USA on 17–19 June, 2011: "It

could have been a more productive trip at least as far as the odonates go, but it was fun to get back out to the desert with friends. And, I found some katydids during the daytime, in vegetation - rare event for me! - I had a good time and look forward to next year's trip." For species details see: Johnson (2011).] Address: E-mail: pondhawk@uci.net

10929. Lyons, R.E.; Wong, D.C.; Kim, M.; Lekieffre, N.; Huson, M.G.; Vuocolo, T.; Merritt, D.J.; Nairn, K.M.; Dudek, D.M.; Colgrave, M.L.; Elvin, C.M. (2011): Molecular and functional characterisation of resilin across three insect orders. *Insect Biochemistry and Molecular Biology* 41(11): 881-890. (in English) ["Resilin is an important elastomeric protein of insects, with roles in the storage and release of energy during a variety of different functional categories including flight and jumping. To date, resilin genes and protein function have been characterised only in a small number of flying insects, despite their importance in fleas and other jumping insects. Microscopy and immunostaining studies of resilin in flea demonstrate the presence of resilin pads in the pleural arch at the top of the hind legs, a region responsible for the flea's jumping ability. A degenerate primer approach was used to amplify resilin gene transcripts from total RNA isolated from flea (*Ctenocephalides felis*), buffalo fly (*Haematobia irritans exigua*) and dragonfly (*Aeshna* sp.) pharate adults, and full-length transcripts were successfully isolated. Two isoforms (A and B) were amplified from each of flea and buffalo fly, and isoform B only in dragonfly. Flea and buffalo fly isoform B transcripts were expressed in an *Escherichia coli* expression system, yielding soluble recombinant proteins Cf-resB and Hi-resB respectively. Protein structure and mechanical properties of each protein before and after crosslinking were assessed. This study shows that resilin gene and protein sequences are broadly conserved and that crosslinked recombinant resilin proteins share similar mechanical properties from flying to jumping insects. A combined use of degenerate primers and polyclonal sera will likely facilitate characterisation of resilin genes from other insect and invertebrate orders." (Authors)] Address: CSIRO Livestock Industries, St Lucia, QLD 4067, Australia. E-mail: Russell.Lyons@csiro.au

10930. Machado, A.B.M.; Lencioni, F.A.A. (2011): *Austrotepuibasis* gen. nov. with descriptions of three new species from Brazil (Zygoptera: Coenagrionidae). *Odonatologica* 40(1): 27-37. (in English) ["*Austrotepuibasis* is described along with 3 new species, viz.: *A. alvarengai* sp. n. (holotype male: Mato Grosso, SINOP, X-1970), *A. demarmelsi* sp. n. (holotype male: Pará, Fordlândia, II-1957), and *A. manolisi* sp. n. (holotype male: Mato Grosso, Alta Floresta, Cristalino Jungle Lodge, Rio Cristalino, 10-IX-2006). The new genus is close to *Tepuibasis* De Marmels, 2007 with which it shares the presence of an articulated ventrobasal lobe on cercus and differs mainly by the absence of the spiny auricle-like processes in penis, absence of dorsal cleft on female tergum of S10 and other structural and colour characters. Whereas *Tepuibasis* is endemic to the high Pantepui region of Venezuela, *Austrotepuibasis* occurs in low altitude Amazon region of the Tapajós-Xingu province in Brazil." (Authors)] Address: Machado, A.B.M., Depto Zool., Inst. Cienc. Biol., Univ. Federale de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

10931. Mäkinen, J.; Metsälä, P.; Tuohimaa, J. (2011): *Sudenkorentokatsaus 2010* [Dragonfly review 2010].

Crenata 4: 10-35. (in Finnish, with English summary) ["The article presents the most interesting dragonfly (Odonata) records from Finland in 2010. For each observed species the following information is presented: first and last records of the summer, greatest sums and northernmost records. *Anax imperator* and *Sympetrum pedemontanum* were found for the first time in Finland. *A. imperator* photographed in Lågskär, Åland Islands, 12.07.2010. A male *S. pedemontanum* was collected in Hanko 30.07.2010. Seven new provincial records were made: *Sympecma paedisca* in Etelä-Häme, *Somatochlora alpestris* in Etelä-Savo, *Somatochlora flavomaculata* in Pohjois-Pohjanmaa, *Orthetrum coerulescens* in Pohjois-Häme, *Sympetrum sanguineum* in Pohjois-Häme and Pohjois-Karjala and *Sympetrum vulgatum* in Kainuu. A map of Finnish biogeographical provinces is shown in the end of the article. Tabel 1 (Taulukko 1) presents the total number of records of each species, as well as their rankings between 2008 and 2010. Picture 1 (Kuva 1) presents the number of dragonfly species in 50x50 km squares reported in Finland in 2010. Most of the records for this article were gathered from Hatikka database (www.hatikka.fi). The records were made by 100 observers. Their names (abbreviations are used for the members of the Finnish Dragonfly Society) are presented in the end of the article. (Asmus Schröter)] Address: Reference address: Finnish Dragonfly Society/ Suomen sudenkorentoseura ry. www.sudenkorento.fi; Jussi Mäkinen makisenjussi@gmail.com

10932. Maker, P. (2011): Vagrant Emperor *Anax ephippiger* (Burmeister) in Cornwall. *Atropos* 43: 44-45. (in English) [14-X-2010, Dodman Head on the south Cornwall coast, UK; "As it turned out this record was just the beginning of an unprecedented occurrence of this species in Britain. Two mid-winter records (Pembrokeshire and Cornwall) were followed by an influx of the species in April with many more sightings in Cornwall. Indeed, I was lucky enough to see another male at Windmill Farm NR on 24 April; there were at least two more at this site the following day." (Author)] Address: Maker, P., 2 Southleigh, South Street, Grampound Road, Truro, TR2 4DZ, UK

10933. Manger, R. (2011): Copula of *Sympecma fusca* and *Sympecma paedisca* observed for the second time in the Netherlands. *Brachytron* 14(1): 59-63. (in Dutch, with English summary) ["In 2008, a copula of *S. fusca* and *S. paedisca*, with oviposition ensuing, was observed in the Dutch region of De Weerribben, Overijssel. The year before that, a similar copula was observed in a different location. The earlier copula took a shorter time than the 2008 one. It would seem that in areas where both species reproduce, *S. fusca* behaves dominantly towards *S. paedisca*. The increasing spread of *S. fusca* northward as seen in the last few decades could cause competition in the use of reproduction waters in De Weerribben and similar areas between the two species. It is not known whether interbreeding between the two species could actually lead to (viable) progeny." (Author)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

10934. Marinov, M.; Doscher, C. (2011): Spatial modelling of Odonata habitats in the Pacific. 1: Introduction to the techniques in spatial modelling. *Odonatologica* 40 (4): 287-304. (in English) ["The habitat modelling schemes are briefly reviewed with emphasis on their implication in various fields of science. The best practical so-

lutions for habitat modelling encompassing large geographical units are sought. They are exploited and considered for a macro-scale project aiming in producing predictive habitat models for Odonata species inhabiting a vast territory of the Pacific. The present publication is the first part of a series of papers dealing with this mapping scheme. It represents the study area, explains some common terminology used in Geographical Information Systems (GIS)-based modelling and ecology, and introduces the methodology developed specifically for the purposes of the current investigation." (Authors)] Address: Marinov, M., Freshwater Ecology Research Group, University of Canterbury, Private Bag 4800, Christchurch-8140, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

10935. Martínez, E.; da Silva, G.; Romay, C.D. (2011): First records of *Anax parthenope* (Odonata: Aeshnidae) for Galicia and data on its habitat and behaviour. *Chiloglossa* 3: 7-13. (in Galician, with English summary) [The first records of *A. parthenope* for Galicia are presented. They were obtained in five municipalities in the western Spanish coast (Sanxenxo - two places -, Barro, A Illa de Arousa, Vimianzo and Cedeira) between 26/06/2010 and 31/08/2010, and referred to a minimum of 25 individuals. The study presents very detail data on species habitat and behaviour, including an observation of its reproduction in Vimianzo.] Address: Martínez, E., Lugar de Gondarifo, 13, 36990 Sanxenxo (Galicia), Spain. E-mail: emidoel@yahoo.es.

10936. Martínez-Coronel, M.; Pérez-Gutiérrez, M. (2011): Composición de la dieta de *Craugastor lineatus* (Anura: Craugastoridae) de Chiapas, México. *Acta Zoológica Mexicana* (n. s.) 27(2): 215-230. (in Spanish, with English summary) ["The ontogenetic and seasonal changes in the diet of *C. lineatus* were described. We obtained 121 prey items from 54 stomachs by dissection, prey and prey parts were counted and identified to ordinal level. Twenty two food categories were identified. Frogs consumed mainly Aranae, Chilopoda, Coleoptera, Hymenoptera, Isopoda, Orthoptera, and plants, although the representation of each category varied ontogenetically and temporally. The maximum length of the prey items was positively correlated with frog body size; meanwhile, the number of prey items was negatively correlated with frog body size. Juveniles consumed more Coleoptera and Isopoda, while adults captured more Aranae, Orthoptera and Chilopoda. Sixteen items were consumed in wet season, with Diptera, Isopoda, Lepidoptera and Acari as exclusive. During the dry season were ingested 18 items, with Phasmatoidea, Odonata, Psocoptera, Diplopoda and Pseudoscorpionida as exclusive." (Authors)] Address: Martínez-Coronel, M., Departamento de Biología, UAM-I. Av. San Rafael Atlixco 186, Col. Vicentina, CP. 09340, México, D. F. E-mail: marti17@hotmail.com

10937. Matushkina, N.A.; Klass, K.-D. (2011): Morphology of female external genitalia in *Phenes raptor* (Odonata: Petaluridae). *International Journal of Odonatology* 14(3): 199-215. (in English) ["The exoskeleton of the female genitalic region in *Phenes raptor* is described based on light microscopy and scanning electron microscopy. It is shown that in this species the pattern of sclerites, articulations, processes, and apodemes is overall the same as in other ovipositor-bearing Odonata, i.e. Zygoptera, the anisozygopteran *Epiophlebia*, and the anisopteran Aeshnidae. However, many morphological details differ among all these taxa. Fifty-four characters

were scored for *P. raptor* in order to be included in a previously compiled dataset for phylogenetic analysis of ovipositor-bearing Odonata. These characters include only few specific similarities between *P. raptor* and either Aeshnidae or *Epiophlebia*. Instead, *P. raptor* shows a number of features that are unique among ovipositor-bearing Odonata. Absence of serration on the ovipositor in *P. raptor* and reduction of the interlocking mechanism connecting the two first valves medially is probably correlated with the endosubstratic egg-laying of the female. The ovipositor bears numerous sensilla of different shape, which probably detect suitable places for oviposition." (Authors)] Address: Matushkina, Natalia, Department of Zoology, Biological Faculty, Kyiv National University, vul. Volodymirs'ka 64, Kyiv, 01033, Ukraine. E-mail: odonataly@gmail.com

10938. McCauley, S.J.; Rowe, L.; Fortin, M.J. (2011): The deadly effects of "nonlethal" predators. *Ecology* 92: 2043-2048. (in English) ["Nonconsumptive predator effects are widespread and include plasticity as well as general stress responses. Caged predators are often used to estimate nonconsumptive effects, and numerous studies have focused on the larval stages of animals with complex life cycles. However, few of these studies test whether nonconsumptive predator effects, including stress responses, are exclusively sublethal. Nor have they assessed whether these effects extend beyond the larval stage, affecting success during stressful life-history transitions such as metamorphosis. We conducted experiments with larvae of *Leucorrhinia intacta* that exhibits predator-induced plasticity to assess whether the mere presence of predators affects larval survivorship, metamorphosis, and adult body size. Larvae exposed to caged predators with no ability to attack them had higher levels of mortality. In the second experiment, larvae reared with caged predators had higher rates of metamorphic failure, but there was no effect on adult body size. Our results suggest that stress responses induced by exposure to predator cues increase the vulnerability of prey to other mortality factors, and that mere exposure to predators can result in significant increases in mortality." (Authors)] Address: McCauley, S.J., Dept of Biological Sciences, California Polytechnic State University, San Luis Obispo, California 93407-0401 USA. E-mail: smccauley@calpoly.edu

10939. Menetrey, N.; Oertli, B.; Lachavanne, J.-B. (2011): The CIEPT: A macroinvertebrate-based multimeric index for assessing the ecological quality of Swiss lowland ponds. *Ecological Indicators* 11(2): 590-600. (in English) ["Since ponds are limnologically different from rivers and lakes, and as there is a lack of specific methods to assess their ecological quality, we developed a method to assist managers in routine biomonitoring of ponds. For this work, a total of 36 lowland permanent ponds were selected from an existing dataset of 134 Swiss ponds that were classified along a gradient from reference to degraded sites. Site degradation was characterised by seven variables indicative of pond ecological condition: (i) one descriptor of plant communities (macrophyte species richness); (ii) one descriptor of trophic state (total phosphorus and total nitrogen (PN)), and (iii) five anthropogenic stressors linked to land use (percentage of semi-natural areas within a 50-m radius of the site, connectivity with other wetlands within 1 km, percentage of agricultural activities and pastures in the pond catchment, and dominant land use in terms of surface area). A total of 55 potential

macroinvertebrate and amphibian metrics were tested to assess their relationship to site degradation. The metrics were based on taxonomic richness (total and selected macroinvertebrate groups), intolerance of degradation, conservation values, and biological/ecological traits. The selection of the metrics to be integrated into the index followed a stepwise procedure. To be selected, a metric had to fulfil four criteria. It must have: (1) a significant relationship with at least one of the seven indicators of pond ecological condition; (2) the ability to discriminate between reference and degraded sites; (3) a relative scope of impairment inferior to 1 (low inherent variability of a metric); (4) no redundancy with other metrics used in the index. To produce the index, 18 combinations of selected metrics were tested. The final index (CIEPT) was built using three metrics: genera richness of Coleoptera (C), macroinvertebrate family richness (I), and Ephemeroptera, Plecoptera and Trichoptera (EPT) family richness. The CIEPT responded significantly to pond ecological condition and was tested successfully with an external dataset to confirm suitability. The CIEPT index could be a useful and relatively low cost tool to assist site managers in assessing the ecological quality of ponds." (Authors) Taxa (including Odonata) are treated at the order level.] Address: Menetrey, Nathalie, Laboratory of Ecology and Aquatic Biology, University of Geneva, Ch. des Clochettes 18, 1206 Geneva, Switzerland

10940. Metsälä, P. (2011): Koivuluoto 7.-8.8.2010. *Crenata* 4: 42-43. (in Finnish) [The article presents a trip report to Koivuluoto, a small and remote island ca. 30 km southwest from the city of Kotka, Finland. A total of 16 species could be recorded during the trip, inter alia, *Aeshna serrata* and *Sympecma paedisca*. (Asmus Schröter)] Address: Reference address: Finnish Dragonfly Society/ Suomen sudenkorentoseura ry. www.sudenkorento.fi; Jussi Mäkinen makisenjussi@gmail.com

10941. Meurgey, F. (2011): Redescription of the larva of *Argia concinna* (Ramburg, with the description of that of *A. telesfordi* Meurgey from the West Indies (Zygoptera: Coenagrionidae). *Odonatologica* 40(1): 45-50. (in English) ["The last instar larva of *A. concinna* is redescribed, based on specimens from Guadeloupe, and that of *A. telesfordi* is described and illustrated for the first time, based on specimens from Saint Vincent in the Lesser Antilles. Notes on their ecology and larval habitat are provided." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

10942. Millán, A.; Velasco, J.; Gutiérrez-Cánovas, C.; Arribas, P.; Picazo, F.; Sánchez-Fernández, D.; Abellán, P. (2011): Mediterranean saline streams in southeast Spain: What do we know? *Journal of Arid Environments* 75(12): 1352-1359. (in English) ["Many Mediterranean streams in arid and semiarid areas are naturally saline systems due to the presence of evaporitic rocks of Miocene or Triassic origin. Despite the fact that these aquatic ecosystems are rare in Europe, they are common in southeast of Spain. The environmental constraints of these semiarid saline streams are imposed by both geological and climatic conditions. This paper is a compilation and summary of the principal results obtained from various studies on semiarid saline streams in the Iberian southeast. Available data for these typical environments in the region covers diverse issues such as those regarding their physical and chemical features,

typology, biodiversity, community structure and ecosystem functioning, as well as different ecological and evolutionary aspects of their biota (e.g. ecophysiological responses, life cycles and phylogeography). Issues concerning the conservation of these habitats, such as the main human uses, impacts, threats and their management are also summarised. Finally, topics in need of further research are provided. The current knowledge of saline streams in southeastern Spain highlights the physical and ecological singularity of these environments, and their high conservation value. Saline streams are particularly interesting due to their halotolerant/halophilic biota and high number of rare and endemic species. ... Odonata (*Aeshnidae*, *Libellulidae* and *Coenagrionidae*) [...] are scarce with most inhabiting hyposaline streams (Mellado et al., 2008)." (Authors) (Mellado, A., Suárez, M.L., Vidal-Abarca, M.R., 2008. Biological traits of stream macroinvertebrates from a semiarid catchment: patterns along complex environmental gradients. *Freshwater Biology* 53: 1-21.)] Address: Millán, A., Depto de Ecología e Hidrología, Facultad de Biología, Univ. de Murcia, Campus de Espinardo, 30100 Murcia, Spain. E-mail: acmillan@um.es

10943. Mlynarek, J.J.; Bert, D.G.; Peralta-Vázquez, G.H.; James, J.A.; Forbes, M.R. (2011): Relationships between gregarine infection in damselflies, wetland type, and landscape characteristics. *The Canadian Entomologist* 143(5): 460-469. (in English) ["Although human-modified landscapes are characterized by the loss of natural habitats, new habitats also can be created and exploited by many species. The importance of landscape change to invertebrate associations (particularly host-parasite associations) is understudied. Our objective was to determine whether prevalence and intensity of gregarine parasitism in *Ischnura verticalis* differed between 17 artificial and 7 natural wetlands in landscapes that varied in amount of forest and wetland cover and road density determined at spatial extents of 500m and 1km from each wetland. Wetlands were located in and around Ottawa, Ontario, and Gatineau, Quebec, Canada. Wetland type did not account for significant variation in principal components based on forest and wetland cover and road density at either spatial extent. Gregarine prevalence was higher in damselflies collected from natural wetlands than in those collected from artificial wetlands and was positively associated with increasing forest cover. In contrast, gregarine intensity was inversely related to road density. Our results suggest that parasitism of damselflies by gregarines is associated with wetland type and landscape characteristics, although the mechanisms producing such relationships are unknown." (Authors)] Address: Mlynarek, Julia, Dept Biol., Carleton Univ., 1125 Colonel By Drive Ottawa, ON Canada K1S 5B6. E-mail: jmlynare@connect.carleton.ca

10944. Monnerat, C.; Hoess, R. (2011): Libellen aus Jordanien, dem Westjordanland und dem Libanon, gesammelt von Johann Friedrich Klapperich zwischen 1956 und 1969 (Odonata). *Libellula* 30(1/2): 77-88. (in German, with English and French summaries) ["This collection of J.F. Klapperich (1913-1987) is deposited in the Natural History Museum of Geneva, Switzerland. It consists of 224 specimens representing 21 species, all labelled with date and locality. This material, collected by Klapperich during several voyages, is of great historical importance. It gives information on an otherwise almost neglected period between older studies and

more recent investigations in Jordan that began in the 1980s. Looking back, this material represents the earliest record for Jordan for twelve species. Special emphasis is put on *Crocothemis sanguinolenta*, *Diplacodes lefebvrei*, *Onychogomphus lefebvrei*, *Orthetrum trinacria* and *Pantala flavescens*." (Authors)] Address: Monnerat, C. CSCF, 14 rue des Terreaux, CH-2000 Neuchâtel, Switzerland. E-mail: christian.monnerat@cscf.unine.ch

10945. Muusse, T.; Veurink, G. (2011): *Leucorrhinia caudalis* found reproducing in De Weerribben. *Brachytron* 14(1): 14-27. (in Dutch, with English summary) ["Recent discoveries show a viable population of *L. caudalis* in the two adjoining nature reserves of De Weerribben and De Wieden in the eastern part of The Netherlands. The species had been thought to be extinct for the last forty years, until the accidental discovery of specimens in 2009 and 2010. In 2011 this led to a sustained search effort which was crowned with success. The species shows a marked preference for clear water with a submerged vegetation for ovipositing. Males prefer floating lily pads as a basis for guarding their territories, but make do with other perches at need. Protection of the habitat is in order. Current maintenance policies of both nature reserves seem to fulfil the requirements, offering hope for the future. The species has also been rediscovered in Belgium and Luxemburg. On the European Red List the species is still marked as 'near threatened'." (Authors)] Address: Muusse, T., Billitonstraat 19, 3312 SB Dordrecht, The Netherlands. E-mail: pr.nvl@brachytron.nl

10946. Muzon, J. (2011): *Comentario Bibliográfico: Garrison, R.W., N. von Ellenrieder & J.A. Louton. 2010. Damselfly Genera of the New World. An illustrated and annotated key to the Zygoptera. The Johns Hopkins University Press, Baltimore, EUA. 490 pp., 2.586 figuras, 24 láminas color y 108 mapas. ISBN 13: 978-0-8018-9670-5, ISBN 10: 0-8018-9670-3. Rev. Soc. Entomol. Argent. 70(1-2): 147. (in Spanish) [review paper]* Address: Muzón, J., Instituto de Limnología "Dr. Raúl A. Ringuelet", CC 712, 1900 La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

10947. Nagel, L.; Mlynarek, J.J.; Forbes, M.R. (2011): Immune response to nylon filaments in two damselfly species that differ in their resistance to ectoparasitic mites. *Ecological Entomology* 36(6): 736-743. (in English) ["1. Insects commonly resist parasites using melanotic encapsulation. Many studies measuring immune response use the amount of melanin deposited on an artificial object that has been inserted into the animal as a proxy of the amount of resistance that the host is capable of mounting to natural parasites. 2. The relevance of this methodology to immune response in natural insect populations needs further study. Here, we examined two temperate damselfly species to elucidate the relationships among damselfly size, natural resistance to mites, and the immune response mounted by the same damselflies against nylon filaments. 3. The damselfly species that had high rates of melanotic encapsulation of mites in nature deposited more melanin on the nylon inserts than the species with low rates of natural resistance. 4. In females of this species, those that had resisted mites naturally melanised the nylon filament more aggressively than those that did not resist mites. 5. Our results show some support for the use of nylon filaments to assess natural patterns of immune response in these damselflies, but also suggest that cau-

tion should be used in interpreting the responses." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

10948. Naraoka, H. (2011): Report on the number of dorsal and lateral spines of the larvae of the gomphid dragonfly, collected in Aomori prefecture (Odonata: Gomphidae). *New Entomol.* 60(1,2): 12-14. (in Japanese, with English summary) [From 1961 to 2009, 105 exuviae of *Gomphus postocularis* were collected in Aomori Prefecture, northern Japan. More than 93% of the exuviae, exhibited the dorsal and lateral spines on the 9th and 7th-9th abdominal segments, respectively. All exuviae were quite small in size. These results demonstrate the exuviae belonging to the northern Japanese type of *G. postocularis*. In comparison the southern Japanese type of the species has dorsal spines along the 8th-9th, and lateral spines along the 6th-9th abdominal segments.] Address: Naraoka, H., Motoizumi 36-71, Fukunoda, Itayanagi, Kitatsugaru-gun, Aomori 038-3661, Japan. E-mail: sbnkq127@ybb.ne.jp

10949. Ngiam, R.W.J.; Davison, G.W.H. (2011): A checklist of dragonflies in Singapore parks (Odonata: Anisoptera, Zygoptera). *Nature in Singapore* 4: 349-353. (in English) ["In total, 51 species of odonates from six families were recorded from the 19 parks surveyed, accounting for 42% of odonate species extant in Singapore." (Authors)] Address: Ngiam, R.W.J.C, Cluny Rd, Singapore 259569. E-mail: ngiamwenjiang@nparks.gov.sg

10950. Niehuis, M. (2011): Zum 65. Geburtstag von Gerd Reder. *Fauna und Flora in Rheinland-Pfalz* 12(1): 329-339. (in German) [Rheinland-Pfalz, Germany; G. Reder is a well known worker on Hymenoptera with a broad field of interests in regional fauna including Odonata.] Address: Niehuis, M., Im Vorderen Großthal, 76857 Albersweiler, Germany. E-mail: Niehuis@t-online.de

10951. Obolewski, K.; Gotkiewicz, W.; Strzelczak, A.; Osadowski, Z.; Astel, A.M. (2011): Influence of anthropogenic transformations of river bed on plant and macrozoobenthos communities. *Environmental monitoring and assessment* 173(1-4): 747-763. (in English) ["This study describes the influence of urban area on plant communities and benthic invertebrates inhabiting the Slupia River (northern Poland). Ten plant communities and 37 macrozoobenthos taxa (including "Aeshnidae" and *Lestes viridis*) were determined during four seasonal samplings at 25 sampling sites (October 2005 and January, April, and August 2006). The obtained data set was statistically evaluated in order to reveal the influence of anthropogenic transformations on the investigated communities against the background of other abiotic factors. Multivariate regression tree (MRT) method was used for vegetation, while for benthic fauna, both MRT and artificial neural network (ANN) methods were applied. The following explanatory variables were used: season, water temperature, and salinity; location of a sampling site; degree of human impact on the riverbed; microhabitat; and substrate type. MRT analyses showed significant differences in plant community structure depending on the location of a sampling site, indicating the influence of anthropogenic pressure, while macrozoobenthos composition differed significantly only between seasons. The overall ANN

model proved the importance of type and location of a sampling site for the approximation of benthic fauna density. Additionally, influence of the explanatory variables on the consecutive macrozoobenthos taxa was analyzed on the basis of separate ANN." (Authors)] Address: Astel, A.M., Institute of Biology and Environmental Protection, Pomeranian Academy in Słupsk, 22b Arciszewskiego St., 76-200 Słupsk, Poland. E-mail: astel@apsl.edu.pl

10952. Olthoff, M.; Hannig, K.; Wittjen, K.; Zimmermann, T. (2011): Biologische Vielfalt auf dem Truppenübungsplatz Borkenberge. Vereinbarkeit von militärischer Nutzung und Naturschutz. *Natur in NRW* 3/11: 37-41. (in German) [Nordrhein-Westfalen, Germany. The paper briefly highlights *Leucorrhinia pectoralis*, *Somatochlora arctica*, *Orthetrum coerulescens* and *Ceragrion tenellum*.] Address: Olthoff, M., Biologische Station Zwillbrock e.V., Zwillbrock 10, 48691 Vreden, Germany. E-mail: matthias.olthoff@gmx.de

10953. Orendt, C.; Faasch, H. (2011): First record of *Lipiniella moderata* Kalugina, 1970 (Diptera, Chironomidae) from Germany. *Lauterbornia* 72: 7-12. (in German, with English summary) [Niedersachsen; *Ischnura elegans* was co-occurring.] Address: Orendt, C., WaterBio-Assessment, Brandvorwerkstr. 66, 04275 Leipzig, Germany. E-mail: orendt@hydro-bio.de

10954. Orłowski, G.; Karg J.; Czarnicka J (2011): Frugivory and size variation of animal prey in Black Redstart *Phoenicurus ochruros* during summer and autumn in south-western Poland. *Ornis fennica* 88: 161-171. (in English) [Analyses of faeces of the Black Redstart *Phoenicurus ochruros* from the countryside of south-western Poland revealed a significant increase in the proportion of plant items (mainly berries of *Sambucus nigra* / *racemosa*) between July and October; for animal prey items an inverse trend was found. During summer-autumn, no significant trends in the mass of all animal prey were found. The most numerous animal prey were three genera of ants (*Lasius*, *Formica* and *Myrmica*; 44.1% by number of all animal prey). Large numbers of undamaged seeds of several species of shrubs in the analyzed faeces, including non-native species, indicate that the Black Redstart is a potential disperser of woody plants in rural landscapes of Europe." (Authors) The diet also includes an unidentified Libellulidae.] Address: Orłowski, G., Institute for Agricultural and Forest Environment, Polish Academy of Sciences, Bukowska 19, 60-809 Poznań, Poland. E-mail orlog@poczta.onet.pl

10955. Ouden, A. den; Roosmalen, J. van (2011): Favorite hibernating spots of *Sympetma fusca*. *Brachytron* 14(1): 28-39. (in Dutch, with English summary) ["In the period between 2006 and 2011, hibernating *S. fusca* have been studied at several sites in the Dutch provinces of Noord-Brabant, Limburg, Gelderland and Noord-Holland. Observations have been made on habitat preference and weather-driven behaviour of the species in winter. Furthermore, experience on the best search strategy was gained. Most hibernating damselflies of the inland populations were found in bushes of *Calluna vulgaris* or, less often, tussocks of *Molinia caerulea*. Most hibernating damselflies of the coastal dunes population were found on branches of *Salix repens*. All locations had a southward exposure in common, offering sunny conditions. They were all shielded from the wind by surrounding forest edges. The damselflies were most easily found during bleak weather con-

ditions, when they are unable to turn away from the observer. The light-colored thorax and globular eyes are the features easiest to spot. During cold periods the damselflies choose lower positions in the vegetation compared to warmer periods. During snowfall they are often completely buried. Survival has been reported after night temperatures down to -18 °C. The results of this study show many similarities with previous studies on hibernating *S. paedisca*, although the latter species has been found to hibernate on locations much further away from suitable reproduction waters. Further study is required to obtain more information on hibernating *Sympetma* species and might help to explain the changing distribution patterns of these species in The Netherlands." (Authors)] Address: Ouden, A. den, Dr. Kanterslaan 166, 5361 NK Grave, The Netherlands. E-mail: andeno@planet.nl

10956. Palacino-Rodriguez, F. (2011): Taxonomía y filogenia del género *Erythemis* Hagen, 1861 (Odonata: Libellulidae). Universidad Nacional de Colombia, Facultad de Ciencias, Departamento de Biología Sede, Bogotá: 141 pp. (in Spanish, with English summary) ["*Erythemis* Hagen, 1861 (Odonata: Libellulidae) is a genus comprised of ten species distributed in the Nearctic and the Neotropics. Currently, the taxonomy of the group is based on characters of the thorax, hind femur, genitalia and wings. However, it is possible to confuse species groups as *Erythemis attala* - *E. plebeja* and *E. credula*, a situation that is repeated in *E. haematogastra* - *E. carmelita* - *E. mithroides* and *E. simplicicollis* - *E. collocata* and *E. vesiculosa*. The problems for the species made it necessary to revise the characters currently working and propose other to help recognize the variability within species, between species and propose to define phylogenetic relationships within the group. The characters were examined in specimens from five entomological collections in the country and two overseas, after examination, were assessed with multivariate approaches such as discriminant analysis and Principal Component Analysis. For phylogenetic analysis we used parsimony method, including as outgroup species of related genera *Sympetrum*, *Libellula*, *Perithemis*, *Rhodopygia*, *Pantala*, *Miathyria* and *Brachymesia*. For the basic tree search heuristic method was used with the software under the package Nona Winclada softwares. Dichotomous keys were developed, and diagnosis for males and females of the species and developed a hypothesis about the phylogenetic relationships within the group. The most reliable morphometric characters for separating the species are related to the wings and coloration. The characters of colour are highly variable and present overlap between some species, but in other cases, help to differentiate them. The review of a female close to *E. attala* and a male close to *E. mithroides* show that their characteristics apart from the rest of the species the genre, but more samples need to be included in the analysis to establish it as a new species. The complexity and ambiguity of some characters proposed in the literature led to his careful review to re-code and assess their taxonomic value, finding that this information is useful in separating species of the genus. Of the 109 characters are only nine peer reviewed, finding that *Erythemis* is not a natural group as a recodification of the character associated with the posterior femoral structure showed that it is shared by *Rhodopygia* and *Erythemis* genus, and *Libellula* and *Perithemis*. According to these results, it is necessary to explore a greater number of characters of the genitalia and care-

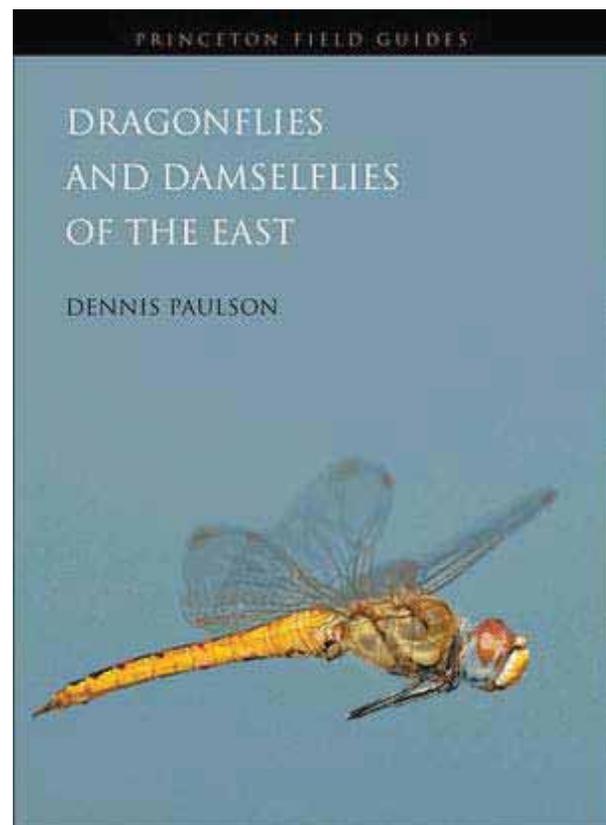
fully review the length and width ratio of hind femur to assess if the thickened condition presents this structure helps to resolve conflicts. It is also necessary to reassess the largest possible number of characters and other outgroups species, in order to find homologous characters to help resolve relationships within this genus and other genera of Libellulidae." (Author)] Address: Palacino-Rodríguez, F., Instituto de Ciencias Naturales, Universidad Nacional de Colombia, A. A. 7495, Bogotá - Colombia. E-mail: fpalacino@unal.edu.co

10957. Palatitz, P.; Fehervari, P.; Soltsz.; Kotyman, L.; Neidert, D.; Harnos, A. (2011): Exploratory analyses of foraging habitat selection of the Red-footed falcon (*Falco vespertinus*). *Acta Zoologica Academiae Scientiarum Hungaricae* 57(3): 255-268. ["The foraging habitat selection of *F. vespertinus* was investigated in a characteristic Hungarian habitat between 2006–2008. Potentially available habitat types were assessed within a 10 km² study site with remote sensing technologies. Altogether 18 adult birds were equipped with tail-mount VHF radio-tags and individually followed until visual contact to record location and foraging behaviour. Foraging areas were assessed with 100% Minimum Convex Polygons (MCP), global Manly's selectivity measures were used to detect population level habitat preference, and the eigenanalysis of selection ratios was carried out to partition the variability in individual habitat preference. We found large individual variability in the extent of foraging areas. Females had significantly smaller foraging areas compared to males, while males at the largest colony had significantly larger foraging areas compared to males of the smaller colonies. Global Manly's selectivity measures showed that birds significantly avoided intertilled crops, water surface" (in spite the fact that Odonata strongly contribute to the diet of this falcon species) ", woods and artificial surfaces. The eigenanalysis of selection ratios partitioned individual habitat selection rates into two distinct groups; the first using grasslands and alfalfa while the second group of birds preferring grasslands and cereals. Positive habitat preference towards arable habitat types, indicate that species specific conservation efforts of this declining raptor should also focus on agricultural land use practices." (Authors)] Address: Palatitz, P., MME / BirdLife Hungary, H-1121 Budapest, Költő u. 21, Hungary. E-mail: palatitz.peter@mme.hu

10958. Parr, A.J. (2011): The Vagrant Emperor Anax ephippiger in Britain and Europe during early 2011. *J. Br. Dragonfly Society* 27(2): 80-87. (in English) ["Early 2011 saw major movements of *A. ephippiger* in southern and western Europe. These peaked during April and resulted in the largest arrivals of Vagrant Emperor ever seen in Britain. Oviposition was even observed at a site on the Lizard Peninsula in Cornwall on 26 April, this being the first recorded instance in the UK. British records of Vagrant Emperor during January-May 2011 are detailed and some meteorological background to the movements is presented." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

10959. Paulson, D.R. (2011): *Dragonflies and Damselflies of the East*. Princeton University Press. 576 pp. (in English) ["This is the first fully illustrated guide to all 336 dragonfly and damselfly species of eastern North America—from the rivers of Manitoba to the Florida cypress swamps—and the companion volume to Dennis Paulson's acclaimed field guide to the dragonflies and damselflies of the West. *Dragonflies and Damselflies of the East* features hundreds of color photos that depict all the species found in the region, detailed line drawings to aid in-hand identification, and a colour distribution map for every species—and the book's compact size and user-friendly design make it the only guide you need in the field. Species accounts describe key identification features, distribution, flight season, similar species, habitat, and natural history. Paulson's authoritative introduction offers a primer on dragonfly biology and identification, and also includes tips on how to study and photograph these stunningly beautiful insects." (Publisher)]

son's acclaimed field guide to the dragonflies and damselflies of the West. *Dragonflies and Damselflies of the East* features hundreds of color photos that depict all the species found in the region, detailed line drawings to aid in-hand identification, and a colour distribution map for every species—and the book's compact size and user-friendly design make it the only guide you need in the field. Species accounts describe key identification features, distribution, flight season, similar species, habitat, and natural history. Paulson's authoritative introduction offers a primer on dragonfly biology and identification, and also includes tips on how to study and photograph these stunningly beautiful insects." (Publisher)]



East features hundreds of color photos that depict all the species found in the region, detailed line drawings to aid in-hand identification, and a colour distribution map for every species—and the book's compact size and user-friendly design make it the only guide you need in the field. Species accounts describe key identification features, distribution, flight season, similar species, habitat, and natural history. Paulson's authoritative introduction offers a primer on dragonfly biology and identification, and also includes tips on how to study and photograph these stunningly beautiful insects." (Publisher)]

10960. Pavitt, A. (2011): The Future of British Odonata. Determining temporal range dynamics from distribution patterns and dispersal. M.Sc. thesis, Imperial College London, Silwood Park: 7 + 69 pp. (in English) ["Temporal range dynamics (range shift and change index), dispersal morphometrics (wing length, wing aspect ratio, and thoracic volume), and distribution pattern (residual D) were investigated in British Odonata. Initial analyses discounted range shift from this study due to the absence of evidence that the data were showing directional shift rather than non-directional expansion. A significant proportion of change index (Teller et al. 2002) was described by combining the three dispersal traits and residual D. Species with increasing range size were those with long, broad wings, large thoracic volumes and a more aggregated distribution. This morphology is found in the anisopteran (dragonflies) suborder, which showed a substantially greater increase in occupancy than the smaller and weaker zygopteran (damselflies). In a preliminary investigation into the extant representativeness of museum collections, there was found to be no differences in wing length with recently caught, wet specimens." (Author)] Address: not stated

- 10961.** Pawłowski, J. (2011): Polish Carpathian Mts. as a refugium of the endangered species of invertebrates. *Roczniki Bieszczadzkie* 19: 231-245. (in Polish, with English summary) [The focus is set on species listed in the Polish Red Data Book of Animals. The list of species includes *Nehalennia speciosa*, *Somatochlora alpestris*, and *S. arctica*.] Address: Pawłowski, J., Muzeum Przyrodnicze ISiEZ PAN, ul. Św. Sebastiana 9, 31-049 Kraków, Poland. pawlowski@muzeum.pan.krakow.pl
- 10962.** Pérez-Gutiérrez, L.A.; Montes-Fontalvo, J.M. (2011): Description of the last stadium larvae of *Argia medullaris* Hagen in Selys and *A. variegata* Förster (Odonata: Coenagrionidae). *International Journal of Odonatology* 14(3): 217-222. (in English) ["Detailed descriptions and illustrations are provided of the ultimate instar larvae of *Argia medullaris* and *Argia variegata* from Colombia. The principal features are outlined and compared with other species. *Argia medullaris* differs from other species of the genus by the parallel width of the lateral gills and prominent ligula; the *A. variegata* larva can be separated from other species by the absence of setae and spines on male and female gonapophyses and its peculiar madicolous habit." (Authors)] Address: Pérez-Gutiérrez, L.A., Grupo de investigación en Biodiversidad del Caribe colombiano, Depto de Biol., Univ. del Atlántico, km 7 antigua vía Puerto Colombia, Barranquilla, Colombia. E-mail: talysker@gmail.com
- 10963.** Persson, S. (2011): Is the dragonfly composition changing in Central Sweden? Examensarbete/ Bachelor's thesis; Högskolan i Halmstad • Box 823 • 301 18 Halmstad: 15 pp. (in English) ["The dragonfly communities in Sweden may be affected in many ways. Loss of habitats, habitat alteration or even environmental toxins might have a negative impact on the communities. A new threat to the communities and to the species in general is climate change. In this study I examined whether the dragonfly composition had changed in an area in central Sweden between 1997 and 2010. I did a nestedness matrix to see if the dragonfly composition (only using partivoltine species) was more or less nested in 2010 than it was in 1997, i.e. if there was more unexpected species recorded in the area. I also looked at the surrounding of the lakes and whether the species were considered to be generalist species or specialist species. I found that the dragonfly composition had changed during these 13 years and that the composition was more nested in 1997 than in 2010, i.e. there was more unexpected species in the 2010 survey. I also recorded seven new species for the area and that six species had disappeared. Six species had gone from being generalists to being specialists. The surroundings had not changed significantly and I thus see climate change as a possible explanation to these changes." (Author)] Address: Persson, Suzanna / Sah-lén, G., Högskolan i Halmstad, Box 823, 301 18 Halmstad, Sweden
- 10964.** Petrulevieius, J.F.; Wappler, T.; Nel, A.; Rust, J. (2011): The diversity of Odonata and their endophytic ovipositions from the Upper Oligocene Fossilagerstätte of Rott (Rhineland, Germany). *ZooKeys* 130: 67-89. (in English) [A commented list of fossil Odonata from the Oligocene outcrop of Rott is given, together with descriptions of new traces of oviposition in plant tissues, very similar to ichnotaxa already known from the early Eocene Laguna del Hunclo floras of Patagonia. The joint presences of odonatan larvae and traces of oviposition demonstrate the autochthony of these insects in the palaeolake of Rott, confirming the existence of a diverse and abundant aquatic entomofauna, a situation strikingly different to that in the contemporaneous Oligocene palaeolake of Céreste (France).] (Authors)] Address: Wappler, T., Steinmann Institut für Geologie, Mineralogie, Paläontologie, Univ. Bonn, Nussallee 8, 53115 Bonn, Germany. E-mail: twappler@uni-bonn.de
- 10965.** Piatti, L.; Souza, F.L. (2011): Diet and resource partitioning among anurans in irrigated rice fields in Pantanal, Brazil. *Braz. J. Biol.* 71(3): 653-661. (in English, with Portuguese summary) [Odonata contributed to the diet of *L. chaquensis* and *L. podicipinus*.] Address: Piatti, Liliana, Programa de Pós-Graduação em Ecologia e Conservação, Universidade Federal de Mato Grosso do Sul – UFMS, CEP 79070-900, Campo Grande, MS, Brazil. E-mail: lilianapiatti@gmail.com
- 10966.** Pinto, A.P.; Lamas, C.J.E. (2011): Description of the female of *Navicordulia aemulatrix* Pinto & Lamas and additional notes on the male (Odonata: Cordulidae). *Neotropical Entomology* 40(6): 698-703. (in English) ["The female of *N. aemulatrix* is described and illustrated for the first time based on a single specimen from the same locality of the type series (state of Santa Catarina, [municipality of São Bento do Sul, 26°14'58"S, 49°22'59"W, railroad station] Rio Vermelho, 29.I.1952, in MZSP). In addition, further morphological notes for the male are provided based on three specimens collected at the type locality and at a new locality in the state of Santa Catarina (Timbó municipality). The pronotal process present in *N. aemulatrix* is re-evaluated and considered non-homologous to that found in *Neocordulia setifera* (Hagen in Selys) as previously suggested." (Authors)] Address: Pinto, A.P., Museu de Zoologia, Univ de São Paulo, Av. Nazaré 481, Ipiranga, 04263-000, São Paulo, SP, Brazil. E-mail: odonataangelo@hotmail.com
- 10967.** Pinto, N. (2011): Occurrence of *Orthemis cultriformis* (Calvert) (Odonata: Libellulidae) to the Goiás State (Brazil). *EntomoBrasilis* 4(1): 36-37. (in Portuguese, with English summary) [The record was collected during August 2009, at Lago Samambaia, Samambaia Campus of Universidade Federal de Goiás.] Address: Pinto, N.S., Universidade Federal de Goiás, Instituto de Ciências Biológicas. Campus Samambaia, Brazil. E-mail: nelsonsilvapinto@gmail.com
- 10968.** Pix, A. (2011): Variation des Analdreiecks bei *Cordulegaster bidentata* (Odonata: Cordulegastridae). *Libellula* 30(1/2): 25-32. (in German, with English summary) ["In 208 anal triangles of male *C. bidentata* that were photographed between 2004 and 2010 in the Weser Hills in Hesse, Germany, cell numbers varied from two to six cells. The most frequent forms were those with three and four cells. Furthermore, between forms of similar cell number topological different types were observed." (Author)] Address: Pix, A., Mönchehofstr. 1, 34127 Kassel, Germany. E-mail: andreas.pix@t-online.de
- 10969.** Pix, A. (2011): Ein Gynander von *Cordulegaster bidentata* aus dem Weserbergland (Odonata: Cordulegastridae). *Libellula* 30(1/2): 19-24. (in German, with English summary) ["A gynandromorph adult of *C. bidentata* was photographed on 07-vii-2008 in the Reinhardswald (Hesse, Germany) near the village of Reinhardshagen. The base of the left hind wing had the shape of a male wing, the right one of a female wing. There were also some peculiarities on the body, mainly a du-

bious thorn on the ninth abdominal segment and asymmetric colour patterns on the abdomen. The individual was recorded among 528 cases of resting male *C. bidentata* that have been documented by photographs during seven years." (Author) Address: Pix, A., Mönchehofstr. 1, 34127 Kassel, Germany. E-mail: andreas.pix @t-online.de

10970. Pozdeev, I.V. (2011): Benthosfauna of some watercourses and waterbodies of Udmurtyia. Bulletin of the Udmurt State University. 75(3): 75-84. (in Russian, with English summary) [Udmurt Republic, Russia, rivers Kama, Cheptsya, Kil'mez' and their tributaries & the Votkinsk reservoir; *Aeshna caerulea* is listed from the river Kama (!) and *Epithea bimaculata* from the river Cheptsya.] Address: Pozdeev I.V., candidate of biology, State Research Institute of Lake and River Fisheries, 614002, Perm, Chernyshevskogo st., 3, Russia. E-mail: pozdeevivan@mail.ru

10971. Prunier, F. (2011): Aportacion al conocimiento de la odonatofauna (Insecta: Odonata) de las Sierras de Cazorla, Segura y Las Villas (Jaen, sureste de España). Boletín de la S.E.A. 48(1): 472-474. (in Spanish, with English summary) [Records of 34 Odonata species are documented. New dragonfly records from the Sierras de Cazorla, Segura y Las Villas Natural Park, are *Aeshna affinis* and *Libellula quadrimaculata*. Data of the legally protected species *Coenagrion mercuriale*, *Gomphus graslini*, *Macromia splendens*, and *Oxygastra curtisii* are noteworthy.] Address: Prunier, Florent, Asociación de Educación Ambiental El Bosque Animado. C/ Maestro Priego López, 7, 2D 14004 Córdoba, Spain. E-mail: aaelbosqueanimado.info@gmail.com

10972. Pynnönen, P. (2011): Keisarikorento Virossa ja Ruotsissa [Emperor Dragonfly in Estonia and Sweden]. *Crenata* 4: 41. (in Finnish, with English summary) [In the context of the first Finnish record of *Anax imperator* the current status of the species in adjacent Estonia and Sweden is briefly reviewed. (Asmus Schröter)] Address: Reference address: Finnish Dragonfly Society/Suomen sudenkorentoseura ry. www.sudenkorento.fi; Jussi Mäkinen makisenjussi@gmail.com

10973. Qiu, L.; Zhan, Z.; Lin, R.; Wu, W.; Chen, Y. (2011): Investigation and study on natural enemies in Longan orchards in Fujian province. *Journal of Agriculture* 2011: 17-22. (in Chinese, with English summary) [China; the list of taxa amounts to 144 species (Arachnida, insecta), and includes *Orthetrum sabina*, *Pantala flavescens*, *Crocothemis servilia*, *Sinictinogomphus clavatus*, *Agriocnemis femina*, *A. pygmaea*, and *Pseudagrion* sp.] Address: Qiu Liangmiao, Institute of Plant Protection, Fujian Academy of Agricultural Sciences, Fuzhou 350013, Fujian, China. E-mail: bjndqlm@163.com

10974. Rabina, E.; Llamas, A. (2011): Nueva cita de la libélula *Gomphus vulgatissimus* L., 1758 para la Península Ibérica en Ancín, Navarra. *Munibe (Ciencias Naturales-Natur Zientziak)* 59: 4 pp; no pagination. (in Spanish, with English summary) [26-V-2010, "Ríos Ega-Urederra (ES ES2200024)", Ancín, Navarra (30TWN6523), Spain.] Address: Rabina, E., Gestión Ambiental, Viveros y Repoblaciones de Navarra, C/ Padre Adoain, 219, 31015 Pamplona / Iruña, Spain

10975. Rada, B.; Santic, M. (2011): The Iliric Biotic Index for Karst Rivers in Croatia. *Science Prospects* 5 (20): 146-149. (in English) [In this study we present the

results of a ten year survey of the aquatic macroinvertebrate fauna along the four karst rivers: Jadro, Trnovnica, Grab and Ruda, all of them situated in the Middle Dalmatia region of Croatia, in an attempt to construct the Iliric Biotic Index, which will be more applicable for the water quality analysis than the most frequently applied biotic index in Croatia, the Italian Modification of Extended Biotic Index. The rivers geologically belong to the Dinaric karst, unique geological phenomena in Europe. The Iliric Biotic Index was proposed as the standard of karst river water quality in Croatia in accordance with the EU Water Framework Directive." (Authors) Odonata are assessed as "macroinvertebrate group with families without indicator values for karst rivers."] Address: Rada, B., University of Split, Split, Croatia

10976. Ramírez, A.; Altamiranda-Saavedra, M.; Gutiérrez-Fonseca, P.; Springer, M. (2011): The neotropical damselfly genus *Cora*: new larval descriptions and a comparative analysis of larvae of known species (Odonata: Polythoridae). *International Journal of Odonatology* 14(3): 249-256. (in English, with Spanish summary) ["The final larval stadium of four species of *Cora* are described and compared with known species in the genus. *Cora skinneri* Calvert, 1907, *C. semiopaca* Selys, 1878 and *C. lugubris* Navás, 1934 are described and illustrated for the first time using material from Costa Rica for the first two and from Colombia for the latter. A redescription of *C. marina* Selys, 1868 from specimens collected in Costa Rica is also included for comparison. Although all species are very similar as larvae, two major groups can be differentiated based on the shape of the caudal gills. The three species here described for the first time are very similar, but can be separated from each other using a combination of characters." (Authors)] Address: Ramírez, A., Institute for Tropical Ecosystem Studies, Univ. of Puerto Rico, PO Box 190341, San Juan, 00919 Puerto Rico. E-mail: aramirez@ramirezlab.net

10977. Reis, E.F.; Pinto, N.S.; Carvalho, F.G.; Juen, L. (2011): Environmental integrity effect on fluctuating asymmetry in *Erythrodiplax basalis* (Libellulidae: Odonata) (Kirby). *EntomoBrasilis* 4(3): 103-107. (in Portuguese, with English summary) ["Constituted by simple and cheaply techniques, measures of changes in ontogenetic development are good biomonitoring tools. One of these techniques commonly used is the Fluctuating Asymmetry (FA). In this study, we explore the effects of riparian vegetation removal on the levels of FA on hind wings traits of *E. basalis*. The results showed that traits present normal distribution and zero mean, which allows us to assume that observe levels of asymmetry are FA. It was also evident that FA indexes are not correlated to the wing length, and present low levels of measurement error. There is no significantly evidence of increase in the FA levels in degraded areas in comparison with preserved areas for the measured variables (wing length, wing width on the nodus level, distance between triangle and nodus and distance between anal loop and nodus). The hypothesis that individuals collected in altered areas present higher levels of FA in wing traits was not corroborated. This may result from the fact that *E. basalis* is a species with good dispersal capability, and the specimens sampled in disturbed areas may have developed elsewhere and were only using the areas as a point of foraging and therefore was not detected AF. Another factor that corroborates this prediction is the fact that other studies using

Zygoptera species that have lower dispersal ability, significant levels of physical activities has been detected." (Authors)] Address: Ferreira dos Reis, Eva, Pontifícia Universidade Católica de Goiás, Brazil. E-mail: evadosreis@hotmail.com.

10978. Ribeiro Loiolal, G.; De Marco, P. (2011): Behavioral ecology of Heteragrion consors Hagen (Odonata, Megapodagrionidae): a shade-seek Atlantic forest damselfly. *Revista Brasileira de Entomologia* 55(3): 373-380. (in English, with Portuguese summary) ["The intensity of the inter- and intra-sexual selection can affect male behavioural traits as territorial fidelity and aggressiveness allowing the existence of different strategies. However, its differential success could be affected by environmental – as the diel variation in temperature – and physiological constrains – as the variation in thermoregulatory abilities. In this context, we present a behavioural analysis of *H. consors* trying to characterize its mating system, diel activity pattern, temporal budget, territoriality and reproductive biology. These data were obtained based on field observations using the focal individual method and mark-recapture techniques in 120 m of a shaded Atlantic Forest stream in Brazil. The males of this species were territorial, varying in its local fidelity, while the females appear sporadically. Males were perched in the majority of the time, but were also observed in cleaning movements, longitudinal abdominal flexion, wing flexion and sperm transfer during perch. The males presented a perched thermoregulatory behaviour related to an exothermic regulation. Foraging and agonistic interactions were rare, but dominate the other behavioural activities. Abdominal movements associated to long lasting copula pointed to the existence of sperm competition in this species. Males performed contact post-copulatory guarding of the females. These observations pointed to a non-resource mating system for this species." (Authors)] Address: Ribeiro Loiolal, G., Programa de Pós-Graduação em Ciências Biológicas, Biologia Animal, Universidade Federal do Espírito Santo, Departamento de Ciências Biológicas, Avenida Marechal Campos 1468, Maruípe, 29040-090 Vitória-ES, Brasil. E-mail: geovannirl@hotmail.com

10979. Riva-Murray, K.; Chasar, L.C.; Bradley, P.M.; Burns, D.A.; Brigham, M.E.; Smith, M.J.; Abrahamsen, T.A. (2011): Spatial patterns of mercury in macroinvertebrates and fishes from streams of two contrasting forested landscapes in the eastern United States. *Ecotoxicology* 20(7): 1530-1542. (in English) ["Controls on mercury bioaccumulation in lotic ecosystems are not well understood. During 2007–2009, we studied mercury and stable isotope spatial patterns of macroinvertebrates and fishes from two medium-sized (80 km²) forested basins in contrasting settings. Samples were collected seasonally from multiple sites across the Fishing Brook basin (FBNY), in New York's Adirondack Mountains, and the McTier Creek basin (MCSC), in South Carolina's Coastal Plain. Mean methylmercury (MeHg) concentrations within macroinvertebrate feeding groups, and mean total mercury (THg) concentrations within most fish feeding groups were similar between the two regions. However, mean THg concentrations in game fish and forage fish, overall, were much lower in FBNY (1300 and 590 ng/g dw, respectively) than in MCSC (2300 and 780 ng/g dw, respectively), due to lower trophic positions of these groups from FBNY (means 3.3 and 2.7, respectively) than MCSC (means 3.7 and 3.3, respectively). Much larger spatial variation in to-

pography and water chemistry across FBNY contributed to greater spatial variation in biotic Hg and positive correlations with dissolved MeHg and organic carbon in streamwater. Hydrologic transport distance (HTD) was negatively correlated with biotic Hg across FBNY, and was a better predictor than wetland density. The small range of landscape conditions across MCSC resulted in no consistent spatial patterns, and no discernable correspondence with local-scale environmental factors. This study demonstrates the importance of local-scale environmental factors to mercury bioaccumulation in topographically heterogeneous landscapes, and provides evidence that food-chain length can be an important predictor of broad-scale differences in Hg bioaccumulation among streams." (Authors) The guild of predators is represented by "Aeshnidae and Libellulidae." Address: Riva-Murray, Karen, U.S. Geological Survey, 425 Jordan Road, Troy, NY 12180, USA. E-mail: krmurray@usgs.gov

10980. Rogers, J. (2011): The Gardener's Corner: A bit about dragonflies. September 14, 2011 – The SCOPE: 10. (in English) [General account on Odonata.] Address: not stated

10981. Roland, H.-J.; Sacher, T.; Roland, N. (2011): New records of Odonata for Cambodia - results from a trip through various places of the country - November 14th - December 1st 2010. *International Dragonfly Fund - Report 35: 1-22.* (in English) ["On our trip to Cambodia from November 14th to December 1st 2010 eight new species for the country have been verified. These are *Libellago lineata*, *Lestes praemorsus*, *Argiocnemis rubescens*, *Pseudagrion pruinosum*, *Epophthalmia frontalis*, *Indothemis carnatica*, *Indothemis limbata*, and *Orthetrum glaucum*. This publication raises the list of Cambodian Odonata to over 90 published species. This figure is considered as less than half of the actual species number that inhabits the country. Given the scarce observations based on opportunistic samples only and largely insufficiently land coverage we predict that a few new species to the science are to be expected from the future research. This opens still many opportunities to study dragonflies in Cambodia at locations nobody ever has looked for Odonata before." (Authors)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

10982. Rolfe, A.K. (2011): Diet of three mormoopid bats (*Mormoops blainvillei*, *Pteronotus quadridens*, and *Pteronotus portoricensis*) on Puerto Rico. Masters Theses and Doctoral Dissertations. Paper 349. <http://commons.emich.edu/theses/349>: VII + 98 pp. (in English) [This study used visual analysis to determine the percent volume and percent frequency of orders of insects in the guano of the bats. The most common orders for all three species were Coleoptera, Hymenoptera, and Lepidoptera, although the relative proportions of these orders differed among species. Odonata were also found in 13–21% of the pellets.] Address: not stated

10983. Romay, C.D.; Cordero-Rivera, A.; Romeo, A.; Cabana, M.; Cabana, D.X.; Fernández-Martínez, M.Á. (2011): Galician names for the dragonflies and damselflies of the Iberian Peninsula. *Chioglossa* 3: 21-36. (in Galician, with English summary) ["A list of Galician names for the 77 species of dragonflies of the Iberian Peninsula is proposed. Traditional names of Anisoptera and Zygoptera are used, with modifiers proposed by the authors." (Author)] Address: Cosme D. Romay, C.D., G.

N. Hábitat, Rúa Camariñas, 8, baixo, 15002 A Coruña (Galicia), Spain. E-mail: cdromay@gmail.com

10984. Rudolph, R. (2011): J.W. Goethes Wasserpapillon: Geschichte eines Libellengedichtes. *Odonatologica* 40(4): 305-315. (in German, with English summary) ["In 1770 the young Johann Wolfgang (von) Goethe (1749-1832), the German poet, universally acknowledged to be one of the giants of world literature, published his earliest poems, among which 'Die Freuden' refers to Odonata. As a metaphor, Goethe's poem depicts the irritating flight pattern as well as the changing reflections of body and wing colour of *Calopteryx* damselflies. The text of this poem is near to plagiarism, for it is but an abridged translation of the French poem 'Le plaisir et le papillon' by A.M.H. Blin de Sainmore, published in 1764. Goethe substitutes a damselfly, a "Wasserpapillon", for the butterfly of the French poem. Some linguistic aspects of the term "Wasserpapillon" are discussed." (Author)] Address: Rudolph, R., Kloosterweg 25, NL-5853 EE Siebengewald, The Netherlands

10985. Šácha, D. (2011): New records of dragonflies (Insecta: Odonata) of mountain ranges in Liptov and Spiša regions. *Folia faunistica Slovaca* 16(2): 109-114. (in Slovakian, with English summary) ["A research of dragonflies was carried out on 10 wetland sites in the Nízke Tatry and the Kozie chrby Mts, plus occasional observations on 3 sites in Tatry and the Vel'ká Fatra mountain ranges (Northern Slovakia) in 2005–2009. There were 22 species reported, among them 5 are protected and 9 are redlisted in Slovakia. A male of *Sympetrum fonscolombii* was observed in the altitude of 978 m, which is the highest record of this species in Slovakia. A new site of *Somatochlora alpestris* was discovered in the Nízke Tatry Mts, and presence of *Aeshna subarctica* was confirmed in Tatry Mts." (Author)] Address: Šácha, D., Podtatranského 31, SK-031-01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@vazky.sk

10986. Šácha, D.; Bedjanič, M. (2011): Rediscovery of the endangered River Clubtail *Gomphus flavipes* (Charpentier, 1825) in Slovenia after half a century (Odonata: Gomphidae). *Natura Sloveniae* 13(2): 37-43. (in Slovenian, with English summary) ["The species was recorded on 15 July 2011 along the Mura River side arm channel east of Petišovci, NE Slovenia. Its currently known distribution in Slovenia and neighbouring countries is presented. Due to its status as a protected species according to Annex IV of the EU Habitat Directive and up to now also the status of probably extinct and protected species according to Slovene legislation, the need for preservation of its habitats as well as need for further field studies in Slovenia are exposed." (Authors)] Address: Bedjanič, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjazbedjanic@yahoo.com

10987. Saikko, P.; Pynnönen, P.; Soilevaara, L. (2011): Keisarikorento (*Anax imperator*) ensi kertaa Suomessa 12.7.2010 Lemlandin Lågskärillä [The first Finnish record of Emperor Dragonfly (*Anax imperator*) on Lågskär, Lemland municipality, Åland Islands]. *Crenata* 4: 40. (in Finnish, with English summary) ["*A. imperator* was recorded for the first time in Finland on 12.7.2010 at Lemland, Lågskär island in Åland archipelago. A male patrolled one day on a small pond and it was no seen on following days. (Asmus Schröter)] Address: Reference address: Finnish Dragonfly Society/ Suomen sudenko-

rentoseura ry. www.sudenkorento.fi; Jussi Mäkinen makisenjussi@gmail.com

10988. Sang, A.; Teder, T. (2011): Dragonflies cause spatial and temporal heterogeneity in habitat quality for butterflies. *Insect Conservation and Diversity* 4: 257-264. (in English) ["1. Mortality caused by natural enemies is an essential but largely overlooked aspect of habitat quality for herbivorous insects. Quantitative data on mortality sources and their spatiotemporal variation are especially scarce for adult insects. 2. Here we report the results of an extensive field study aimed to quantify spatial and seasonal variation in dragonfly predation on adult butterflies in their natural habitats in temperate calcareous grasslands. We rely on direct observations of actual predation events during standardised transect walks. 3. Dragonflies were found to exert high mortality in butterflies. Their impact on butterflies was dependent on predator abundance, which strongly varied among habitat patches and during the season. This suggests that dragonflies can generate substantial spatiotemporal heterogeneity in habitat quality for butterflies in terms of survival. 4. Obtaining prior knowledge of where and when predators are abundant, and avoiding such sites for butterfly conservation, could considerably improve the efficiency of butterfly conservation practices." (Authors)] Address: Sang, Anu, Dept of Zoology, Institute of Ecology and Earth Sciences, Univ. of Tartu, Vanemuise 46, 51014 Tartu, Estonia. E-mail: anu.sang@ut.ee

10989. Santolamazza, S.; Baquero, E.; Cordero-Rivera, A. (2011): Incidence of *Anagrus obscurus* (Hymenoptera: Mymaridae) egg parasitism on *Calopteryx haemorrhoidalis* and *Platycnemis pennipes* (Odonata: Calopterygidae: Platycnemididae) in Italy. *Entomological Science* 14(3): 366-369. (in English) ["Very little is known about the incidence of egg parasitoids in odonates, perhaps because Odonata eggs are well protected by stems or leaves, sometimes below water. In Central Italy (Pontecorvo, Frosinone Province) two damselflies, *Calopteryx haemorrhoidalis* and *Platycnemis pennipes*, occur in high densities. In August 2007 we collected 30 stems of the aquatic plant *Potamogeton* sp. used as substrate for oviposition and incubated eggs in the laboratory. Most stems (24 for *C. haemorrhoidalis* and 23 for *P. pennipes*) contained Odonata eggs. Parasitoids emerged from 12 stems, with a mean parasitism of 2% for *C. haemorrhoidalis* and 6% for *P. pennipes*, and a maximum of 14% and 50%, respectively. Furthermore, we observed egg-laying of 19 females of *C. haemorrhoidalis* and 11 of *P. pennipes*, and marked the stems where oviposition was observed. Clutches remained in the river for five days and were then collected and incubated. Parasitoids emerged from 11 of 30 stems, with an average parasitism of 8% for *C. haemorrhoidalis* and 3% for *P. pennipes* (maximums of 50% and 29%, respectively). All parasitoids belonged to the family Mymaridae, and were identified as *Anagrus* (*Anagrus*) *obscurus* Förster, 1861, sensu Soyka, 1955. This is the first time that this species is described as an egg parasitoid of odonates, and that the egg parasitoid of *C. haemorrhoidalis* and *P. pennipes* is identified. Our data suggest that egg parasitism might be a significant selective factor for both odonates in the studied locality, affecting female oviposition behaviour." (Authors)] Address: Santolamazza, Serena, Misión Biológica de Galicia (CSIC), Departamento de Genética Vegetal, P.O.

Box 28, 36080 Pontevedra, Spain. Email: anaphes@gmail.com

10990. Sawamura, M. (2011): [Heterogenic copula between a male *Sympetrum frequens* and a female *S. croceolum*]. *New Entomol.* 60(1, 2): 14. (in Japanese) [06-XII-2010; Omachi pond, Gyotoku, Japan] Address: not stated

10991. Schlotmann, F. (2011): Die Entwicklung der Libellenfauna (Insecta: Odonata) des Soonwaldes (Rheinland-Pfalz) im Lauf von drei Jahrzehnten - eine Analyse ökologischer Faktoren. *Fauna und Flora in Rheinland-Pfalz* 12(1): 241-265. (in German, with English summary) ["Due to the dominance of oligo- and dystrophic ponds the community of damselfly and dragonflies in the Soonwald forest is characterized by moorland species. According to different current publications these species are decreasing in many parts of Europe. This can best be explained by increasing competition of ubiquitous species that are expanding their ranges into the specific bog habitats as an effect of the man made climate change. Stemming against this trend in the Soonwald forest the species of the peatbog habitats have yet managed to keep their populations while competitors like *Anax imperator*, *Libellula depressa* und *Sympetrum striolatum* have started to colonise the ponds of the area. A significant increase of Mediterranean species couldn't be proved yet, but first tendencies could be found: The darters *Sympetrum sanguineum* and *S. striolatum* have started to crowd out the genus' species of the Eurosiberian element which are *S. danae*, *S. flaveolum* and *S. vulgatum*. In general many population trends on the local scale go in line with the trends that have been described on a Western European scale. These are the increases of *Calopteryx virgo*, *Lestes virens*, *A. imperator*, *Cordulia aenea* and *S. sanguineum* as well as the decreases of *Enallagma cyathigerum* and *Leucorrhinia rubicunda*. The only ecological parameter that seemed to have significantly influenced the composition of the species community within the three decades was drought resistance. Species that winter in the egg stage had been increasing significantly. This mirrors the progressing problem of pond desiccation in the Soonwald forest which is caused by forestry (drainage and melioration), abstraction of drinking water (sinking of the ground water table) and subtle changes in the precipitation regime driven by the man made climate change. These are also the main challenges for conservation efforts in other peatlands in western and central Europe." (Author)] Address: Schlotmann, F., Weserstr. 11, D-55296 Harxheim, Germany. Email: frank.schlotmann@gmx.net

10992. Schmidt Dalzochio, M.; Souza, L.O.I.; Uchoa, M.A.; Costa, J.M. (2011): First Records of Odonata (insecta) from the Bodoquena Mountains, Mato Grosso do Sul, Brazil. *EntomoBrasilis* 4(3): 135-138. [21 Odonata species are reported from six regional streams, located at deciduous and semideciduous Atlantic forest.] Address: Costa, J.M., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, São Cristóvão, BR-20942-040 Rio de Janeiro, Brazil. E-mail: jcosta@acd.ufrj.br

10993. Schröter, A. (2011): A mass migration of *Aeshna affinis* in southern Kyrgyzstan: attempt to provide a spatial and temporal reconstruction (Odonata: Aeshnidae). *Libellula* 30(3/4): 203-232. (in English, with German summary) ["A mass migration of *A. affinis* is reported for

the first time. The phenomenon with preceding mass emergence took place in June 2009 in the Jalalabad province in southern Kyrgyzstan. The genesis of the mass migration is summed up, reconstructed and compared with common hypotheses and literature. With reference to the ecology of *A. affinis* in Europe, the prevailing ecological and climatic conditions are discussed." (Author)] Address: Schröter, Asmus, Rasenweg 10, 37130 Gleichen, Germany. E-mail: AsmusTim@gmx.de

10994. Schweighofer, W. (2011): Ein Jahr mit *Sympetma fusca* in Niederösterreich (Odonata: Libellulidae). *Libellula* 30(3/4): 157-172. (in German, with English summary) ["In pre-alpine Lower Austria the spatial and temporal presence of *S. fusca* in its terrestrial habitats was investigated. A mark-recapture study from early September to mid-November 2010 gave information regarding individual displacement. During October one male moved at least 4.6 km and crossed the river Danube. From September on, the new generation entered supposed hibernation sites and stayed there in an active state until the onset of winter in early November. Observations indicated that the species predominantly hibernated in leaf litter. The first hibernating individuals re-appeared in mid-March near the breeding site and started to oviposit two weeks later. Most of the marked individuals retrieved in spring had hibernated not more than 200 m away from the water." (Author)] Address: Schweighofer, W., Otscherblick 10, A-3661 Artstetten, Austria. E-mail: wolfgang.schweighofer@schule.at

10995. Sharma, G.; Dhadeech, S.N. (2011): Comparative studies on the reproductive behaviour of damselfly, *Neurobasis chinensis chinensis* (Linnaeus) at Ravi river, Chamba (H. P.) and of dragonfly, *Orthetrum sabina sabina* (Drury) at Kailana lake, Jodhpur (Rajasthan). National Seminar on Biodiversity and Intangible Natural Heritage on 28th September, 2011. Organised by National Museum of Natural History Zoological Survey of India, Tansen Marg, New Delhi (MoEF, Govt. of India), M-Block, New Alipore, Kolkata (MoEF, Govt. of India) on September 28th, 2011: 64-65. (in English) [Verbatim: The reproductive behaviour of *N. chinensis* was studied three times around Ravi river, Chamba, Himachal Pradesh during September-October, 2007. Courtship is well marked and male demonstrate a circular territory with a radius of about 2-4 m, guarded or defended by the resident male from the intruding conspecific males by wing opening or abdomen raising. As female entered into the territory, the male started following her and got success to bind in tandem link, catching hold her prothorax by its anal appendages. The before wheel tandem lasted for 3-5 minutes. After that the female tried to interlock its vulvar region with the secondary copulatory apparatus of male to form the spectacular courtship wheel. The courtship wheel lasts for about 4-6 minutes and is performed of perching on vegetation or stone near water body. After finding suitable oviposition spot, the male releases the grip on female prothorax. The after wheel tandem lasted for 5-7 minutes. Oviposition is endophytic among the aquatic vegetation. The female went down underwater till their thorax wings and head above water using her ovipositor to grip the oviposited vegetation. This underwater oviposition continued for 6-8 minutes. During oviposition the male hovers in air around female to defend her from intruding intra- or interspecific males. The duration of reproductive behaviour of *N. chinensis* lasts for 18-26 minutes. The repro-

ductive behaviour of *O. sabina* was studied five times in Kailana lake, Jodhpur, Rajasthan, India during January, 2008 to July, 2008. Courtship is well marked and male demonstrate a circular territory with a radius of about 1-3 meters, guarded or defended by the resident male from the intruding conspecific males. As female entered into the territory, the male started following her and got success to bind in tandem link, catching hold her prothorax by its anal appendages. Before wheel tandem lasted for 5-12 seconds. After that the female tried to interlock its vulvar region with the secondary copulatory apparatus of male to form the copulatory wheel. The courtship wheel lasts for about 4-9 minutes and is performed of perching on vegetation or boundary wall of water body. After completion of copulation, the male release the grip on female prothorax, hovers around and guarded female from the intruding conspecific males during oviposition. Oviposition is exophytic, the eggs are laid by dripping the tip of the abdomen several times in water and lasts for 2-4 minutes. The duration of reproductive behaviour lasts for 10-15 minutes. The study reveals that there is variation in reproductive behaviours of both the species in all the stages.] Address: Sharma, G., Zoological Survey of India, Desert Regional Centre, Jhalamand, Pali Road, Jodhpur-342 005, Rajasthan, India. E-mail: drgaurav.zsi.india@gmail.com

10996. Sharma, G.; Choudhary, M.S. (2011): Status of damselflies and dragonflies (Odonata: Insecta) in North India with a note on the swarms of *Pantala flavescens* (Fabricius) in Rajasthan, India-Gaurav Sharma and Mahinder Singh Choudhary. National Seminar on Biodiversity and Intangible Natural Heritage on 28th September, 2011. Organised by National Museum of Natural History Zoological Survey of India, Tansen Marg, New Delhi (MoEF, Govt. of India), M-Block, New Alipore, Kolkata (MoEF, Govt. of India) on September 28th, 2011: 10-11. (in English) [Verbatim: So far 164 species and subspecies of Odonata under 70 genera are recorded from North India (Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Uttarakhand, Uttar Pradesh & Rajasthan). The swarms *P. flavescens* a migratory species in India, was recorded in the months of May to August, 2008. The swarms in the agricultural fields are many a times mistaken by farmers in Rajasthan as those of desert locust, *Schistocerca gregaria* (Forsk.)]. Every year the Locust Warning Organisation. Established by Ministry of Agriculture, Government of India receives complaints from farmers regarding outbreak of desert locust, but at many a times these are swarms of *P. flavescens*. There is therefore, an urgent need to publish monographs to create awareness among farmers on the biology and behaviour of dragonfly and desert locust, so that they can differentiate between the two and register correct recordings to the government.] Address: Sharma, G., Zoological Survey of India, Desert Regional Centre, Jhalamand, Pali Road, Jodhpur-342 005, Rajasthan, India. E-mail: drgaurav.zsi.india@gmail.com

10997. Sherratt, T.N.; Hassall, C.; Laird, R.A.; Thompson, D.J.; Cordero-Rivera, A. (2011): A comparative analysis of senescence in adult damselflies and dragonflies (Odonata). *Journal of Evolutionary Biology* 24 (4): 810-822. (in English) ["Any population whose members are subject to extrinsic mortality should exhibit an increase in mortality with age. Nevertheless, the prevailing opinion is that populations of adult damselflies and dragonflies do not exhibit such senescence. Here,

we challenge this contention by fitting a range of demographic models to the data on which these earlier conclusions were based. We show that a model with an exponential increase in age-related mortality (Gompertz) generally provides a more parsimonious fit than alternative models including age-independent mortality, indicating that many odonates do indeed senesce. Controlling for phylogeny, a comparison of the daily mortality of 35 odonate species indicates that although male and female mortalities are positively correlated, mortality tends to be higher in males of those species that exhibit territoriality. Hence, we show for the first time that territoriality may impose a survivorship cost on males, once the underlying phylogenetic relationships are accounted for." (Authors)] Address: Sherratt, T.N., Dept of Biology, Carleton Univ., 1125 Colonel By Drive, Ottawa, ON, Canada K1S 5B6. E-mail: sherratt@ccs.carleton.ca

10998. Shibaeva, M.N.; Matveeva, Y.P.; Masyutkina, Y.A. (2011): [Diversity, bioindication and ecological status of zoobenthos species in the lakes of Kaliningrad]. *Bulletin of the Baltic Federal University. Immanuel Kant*. 2011 7: 91-696. (in Russian, with English summary) [This article presents the results of a research on zoobenthos species composition in the Kaliningrad region, Russia. Odonata taxa listed are as follows: *Coenagrion puella*, *Coenagrion* sp., *Erythromma najas*, *Ischnura pumilio*, *Libellula depressa*, *Platycnemis pennipes*, and *Sympetrum* sp.] Address: Shibaeva, Maria, Associate Professor, Kaliningrad State Technical University, Russia. E-mail: msh@klgtu.ru

10999. Sloane, T. (2011): Freshwater invertebrates of Inner Sister Island. In: Harris, S.; Reid, A. (eds.): *Inner (West) Sister Island Scientific Expedition 2010*. Hamish Saunders Memorial Trust, New Zealand and Resource Management and Conservation Division, DPIPWE, Hobart, Nature Conservation Report Series 11/2: 136 pp. (in English) [Tasmania, Australia: "Inner Sister Island, at 748 hectares, is one of the largest of the approximately one hundred outer islands in the Furneaux Group in eastern Bass Strait. The island occurs at 39°41'48" latitude, 147°54'56" longitude. The island is about 5 km from west to east and 2.7 km north to south at its widest." In December 2011, two Odonata species were recorded. "Nymphs of the widespread *Hemicordulia tau* were collected in Elbow pond. This species is well known for colonising ephemeral habitats and has considerable thermal and salinity tolerance. Adults of *Adversaeschna brevistyla* were seen around the central part of the island, and smaller dragonflies seen in the same area were possibly adults of *H. tau*." (Author)] Address: Resource, Management and Conservation Division, Department of Primary Industries, Parks, Water and Environment, GPO Box 44 Hobart TAS 7001, Australia. www.dpipwe.tas.gov.au

11000. Stanton, D.J.; Allcock, J.A. (2011): Habitat characteristics and odonate communities at selected sites used by *Mortonagrion hirosei* Asahina (Zygoptera: Coenagrionidae) in Hong Kong. *Journal of Threatened Taxa* 3(12): 2242-2252. (in English, with Chinese abstract) ["*M. hirosei*, a Near Threatened species, is recorded from several isolated sites across its entire range in eastern Asia. Previous research has indicated a strong affinity for brackish wetlands, including reedbeds and marshes, where potential predation or competition by other odonates is reduced. Results from surveys conducted in Hong Kong during 2009-2011 provide information on the habitat at a number of sites occupied

by *M. hirosei* and report on the presence of populations in mangrove and mangrove-mosaic habitats as well as brackish marsh, often in association with a diversity of other odonates. Information is also provided on two previously unreported sites in Hong Kong. These new findings indicate that the species uses a greater diversity of habitats than the odonate-poor *Phragmites* reedbeds in which it has been well-studied in Japan, and consequently may be more widespread than previously supposed. Given that coastal habitats are threatened throughout its range, it is hoped this broader understanding of the species' habitat requirements will encourage others to explore other coastal sites and to aid in its conservation." (Authors)] Address: Stanton, D.J., Asia Ecological Consultants Ltd., 127 Commercial Centre, Palm Springs, Yuen Long, Hong Kong. Email: davidstanton@asiaecol.com.hk

11001. Starr, F.; Starr, K. (2011): New arthropod records from Maui Nui. Bishop Museum Occasional Papers 109: 35-42. (in English) [Verbatim: "Odonata: Libellulidae: *Tramea lacerata* Hagen, 1862 New island record: Well distributed throughout the mainland U.S. and the Hawaiian islands since at least 1935 (Williams, 1936), *Tramea lacerata* (black saddlebags, raggedy skimmer) was previously known from all the main Hawaiian islands except Ni'ihau and Kaho'olawe (Nishida, 2002). this large distinctive skimmer is here documented from Kaho'olawe, where several were found hawking for insect prey by a wetland and nearby kiawe (*Prosopis pallida*) trees. Material examined. Kaho'olawe: Kaukukapapa, near wetland, 10 ft [3 m], 27 Dec 2010, Starr, Starr, & Bruch 101227-01 (1 specimen)."] Address: Starr, F., United States Geological Survey Biological Resources Division, P.O. Box 369, Makawao, Hawaii 96768, USA

11002. Steele, D.B.; Siepielski, A.M.; McPeck, M.A. (2011): Sexual selection and temporal phenotypic variation in a damselfly population. *Journal of Evolutionary Biology* 24(7): 1517-1532. (in English) ["Temporal variation in selection can be generated by temporal variation in either the fitness surface or phenotypic distributions around a static fitness surface, or both concurrently. Here, we use within- and between-generation sampling of fitness surfaces and phenotypic distributions over 2 years to investigate the causes of temporal variation in the form of sexual selection on body size in the damselfly *Enallagma aspersum*. Within a year, when the average female body size differed substantially from the average male body size, male body size experienced directional selection. In contrast, when male and female size distributions overlapped, male body size experienced stabilizing selection when variances in body size were large, but no appreciable selection when the variances in body size were small. The causes of temporal variation in the form of selection can only be inferred by accounting for changes in both the fitness surface and changes in the distribution of phenotypes." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

11003. Suceška, S.; Karacic, J. (2011): Balkan goldenring, *Cordulegaster heros* Theischinger, 1979 (Odonata: Cordulegasteridae), a new species of Odonata in the fauna of Bosnia and Herzegovina. *Acta entomologica serbica* 16(1/2): 1-7. (in English) [Boračko Lake, Bosnia and Herzegovina; from 11th July to 29th August 2011, the authors collected five male individuals of *C. heros*.]

Address: Suceška, Sabina, University of Sarajevo, Faculty of Sciences, Department for Biology, Zmaja od Bosne 33-35, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: ssuceška@hotmail.com

11004. Suriano, M.T.; Fonseca-Gessner, A.A.; Roque, F.O.; Froehlich, C.G. (2011): Choice of macroinvertebrate metrics to evaluate stream conditions in Atlantic Forest, Brazil. *Environ. Monit. Assess.* 175: 87-101. (in English) ["The development of biomonitoring programs based on the macroinvertebrate community requires the understanding of species distribution patterns, as well as of the responses of the community to anthropogenic stressors. In this study, 49 metrics were tested as potential means of assessing the condition of 29 first- and second-order streams located in areas of differing types of land use in São Paulo State, Brazil. Of the sampled streams, 15 were in well-preserved regions in the Atlantic Forest, 5 were among sugarcane cultivations, 5 were in areas of pasture, and 4 were among eucalyptus plantations. The metrics were assessed against the following criteria: (1) predictable response to the impact of human activity; (2) high taxonomic resolution, and (3) operational and theoretical simplicity. We found that 18 metrics were correlated with the environmental and spatial predictors used, and seven of these satisfied the selection criteria and are thus candidates for inclusion in a multimetric system to assess low order streams in São Paulo State. These metrics are family richness; Ephemeroptera, Plecoptera and Trichoptera (EPT) richness; proportion of Megaloptera and Hirudinea; proportion of EPT; Shannon diversity index for genus; and adapted Biological Monitoring Work Party biotic index." (Authors) The basal analysis included "Odonata".] Address: Suriano, Marcia Thais, Laboratório de Entomologia Aquática. FFCLRP, Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil. E-mail: marciasuriano@yahoo.com.br

11005. Taylor, P. (2011): Review: Dragonflies & damselflies in the hand. *Nature Manitoba News* 3(6): 8-9. (in English) [Dragonflies and Damselflies in the Hand: An Identification Guide to Boreal Forest Odonates in Saskatchewan and Adjacent Regions, by Gordon Hutchings and David Halstead. *Nature Saskatchewan Special Publication No. 29*, 158 pages, \$24.95. Available from Nature Saskatchewan: email: info@naturesask.ca, call (306) 780-9273 or mail 206 - 1860 Lorne St., Regina, SK S4P 2L7.] Address: not stated

11006. Teixeira da Silva, E.; Ribeiro Filho, O.P.; Neves Feio, R. (2011): Predation of native anurans by invasive bullfrogs in southeastern Brazil: Spatial variation and effect of microhabitat use by prey. *South American Journal of Herpetology* 6(1): 1-10. (in English, with Portuguese summary) ["Invasive predators are one of the causes of population declines of anurans around the world. The American Bullfrog (*Lithobates catesbeianus*) stands out among these predators. Based on field observations and stomach content analysis, predation on native anurans by invasive Bullfrogs was investigated in two localities of Southeastern Brazil. The spatial variation in predation and similarity in microhabitat use by native species and Bullfrogs were also determined. Anurans of the families Bufonidae, Hylidae, Leiuperidae and Microhylidae were found among Bullfrog prey. The species preyed upon had medium to high similarity with Bullfrogs regarding microhabitat use. Anurans had high relative importance in the diet of adult Bullfrogs from the site where natural vegetation is preserved. Thus, the

possible negative impact of predation by Bullfrogs can be more significant on anuran species which use microhabitats similar to those used by the invasive frogs. This impact may also be higher in preserved sites, increasing the necessity of monitoring and controlling the spread of this invasive species to natural areas. However, as factors other than predation are known to contribute toward negative impacts, further studies are required to clarify the status of invasive Bullfrogs in Brazil." (Authors) Diet also included Odonata larvae and imagines.] Address: Teixeira da Silva, E., Centro de Estudos em Biologia, Instituto Superior de Educação, Centro Universitário de Caratinga, Rua Niterói 230, CEP 35300-345, Caratinga, MG, Brasil. E-mail: etsbio@yahoo.com.br

11007. Tennessen, K.J. (2011): *Perigomphus angularis* spec. nov. from central Ecuador (Odonata: Gomphidae). *Zootaxa* 2915: 66-68. (in English) [Description of the new species on the basis of one male is presented from Morona Santiago Province, Ecuador. The type locality is a small stream 1 km S of Rio Pasanac bridge, Hwy. 45 (1°57'0.4"S, 077°51'46.8"W; elev. 820 m.a.s.l.). The record was obtained on 16 Sept. 2005, K. J. Tennessen leg. (FSCA).] Address: Tennessen, K.J., P.O. Box 585, Wautoma, Wisconsin 54982, USA. E-mail: ktennessen@centurytel.net

11008. Teske, A. (2011): Herbstlebensräume von *Sympetma paedisca* (BRAUER, 1877) und *S. fusca* (VANDER LINDEN, 1820) im Bereich Thülsfelder Talsperre (LK Cloppenburg). *Drosera* 2010: 149-158. (in German, with English summary) ["From 2009 until 2011, the occurrence, autumn habitats, and behaviour of *S. paedisca* and *S. fusca* were studied in the north-west of Lower Saxony, Germany. At the beginning of autumn 2010, one large occurrence of *S. paedisca* and two smaller ones were recorded in the area of the Thülsfelder Talsperre. *S. fusca* was found exclusively in the area of the large occurrence of *S. paedisca*. The sites are microclimatically favoured open forest areas with withered grass, *Calluna vulgaris*, withered *Tanacetum vulgare* and piles of dead wood. Whether these sites are only late summer habitats respectively autumn or winter habitats remains to be clarified. As no further occurrence of *S. paedisca* was confirmed the population and suitable habitats in the area of the Thülsfelder Talsperre have a high nature conservation value. Possible reasons of endangering and measures to protect *Sympetma*-species are discussed as well as appropriate methods to find out late summer and autumn habitats." (Author)] Address: Teske, Ariane, AG Terrestrische Ökologie, Institut für Biologie und Umweltwissenschaften (IBU), Fakultät V, Universität Oldenburg, 26111 Oldenburg, Germany. E-Mail: teske.loek@web.de

11009. Tumore, M. (2011): Some news from the first half of the year. *Atropos* 43: 85. (in English) [UK; "The first half of 2011 was very exciting indeed for Odonata and Lepidoptera enthusiasts alike. The year had barely begun when a Vagrant Emperor *Anax ephippiger* was spotted in Pembrokeshire on 9 January, closely followed by another in Cornwall on 19 February. These two records came hot-on-the-heels of the individual recorded in Cornwall in October 2010, which was the first documented British record in a decade. [...] Following the rediscovery in Britain of *Coenagrion scitulum* last year, the species has appeared again on the Isle of Sheppey, Kent. In June many observers have been able to see this mythical damselfly for the first time in

Britain." (Author)] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freereserve.co.uk

11010. van Grunsven, R. (2011): *Recensis: A distribution atlas of dragonflies (Odonata) in Poland.* R. Bernard, P. Nuczynski, G. Tonczyk & J. Wendzonka, 2009. *Brachytron* 14(1): 70-71. (in Dutch) [review] Address: not stated

11011. Vilariño, V.S. (2011): Nuestra fauna: Odonatos del Cañón de Río Lobos. *Boletín electrónico de la Casa del Parque del Cañón del Río Lobos* 9: 10-20. (in Spanish) [Castilia & Leon, Spain; 27 Odonata species are briefly introduced; each species is presented by a photograph.] Address: Vilariño, V.S., Spain. E-mail: salvilvi@jcy.es

11012. Villanueva, R.J.T. (2011): Odonata of Siargao and Bucas Grande islands, The Philippines. *International Dragonfly Fund - Report 34: 1-25.* (in English) ["Odonata were recorded and voucher specimens were collected between August 3-13 and August 16-20, 2010. This account lists 51 species of Odonata for both islands, 47 species in Siargao and 24 species in Bucas Grande. Thirty seven species are new island records for Siargao Island while the 24 species recorded in Bucas Grande represent the first island records. Three species are new to science, and two of which (*Drepanosticta schorri* n. sp., *Pseudagrion schieli* n. sp.) are described in the present paper. Four species previously listed (Hämäläinen & Müller, 1997) remained elusive during the present survey." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

11013. Wahizatul, A.A.; Long, S.H.; Ahmad, A. (2011): Composition and distribution of aquatic insect communities in relation to water quality in two freshwater streams of Hulu Terengganu, Terengganu. *Journal of Sustainability Science and Management* 6(1): 148-155. (in English) ["The impact of human disturbance and agricultural activity on aquatic insect communities in two freshwater streams (Sungai Peres and Sungai Bubu) in Hulu Terengganu, Terengganu, Malaysia were studied. A total of 3409 individuals of aquatic insects representing 42 families from 9 orders were successfully collected from August until November 2006. [...] (Authors) Odonata are treated at the family level.] Address: Wahizatul, A.A., Department of Biological Sciences, Faculty of Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia. E-mail: wahizatul@umt.edu.my

11014. Wan, F.-x.; Jiang, Y.-h.; Wan, J. (2011): Descriptions of *Anax immaculifrons* Rambur and *Tetracanthagyna waterhousei* McLachlan exuviae from China (Anisoptera: Aeshnidae). *Odonatologica* 40(4): 339-345. (in English) ["The male and female exuviae of the 2 specimens are described and illustrated from Zhuhai (Guangdong) and some notes on larval ecology and behaviour are provided. Larval morphology of the Guangdong *A. immaculifrons* is compared to that of the larvae from the westernmost known population of this sp., i.e. from the island of Karpathos, Greece." (Authors)] Address: Wan, F.-x., Nanjing Forestry University, Nanjiang, Jiangsu-210037, China

11015. Wasscher, M. (2011): *Recensis: Die Falkenlibellen Europas.* H. Wildermuth, 2008. *Brachytron* 14(1): 68-69. (in Dutch) [review] Address: Wasscher, M.,

Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands,
E-mail: marcel.hilair@12move.nl

11016. Watanabe, M.; Suda, D.; Iwasaki, H. (2011): The number of eggs developed in the ovaries of the dragonfly *Sympetrum infuscatum* (Selys) in relation to daily food intake in forest gaps (Anisoptera: Libellulidae). *Odonatologica* 40(4): 317-325. (in English) ["Daily food intake of *S. infuscatum* was estimated using the quantity of faeces produced. Dry weight of faeces excreted during 24 h after capture was measured for each sex of both sexually immature and mature stages. The grain-like faeces (faecal pellets) contained many fragments of cuticle of prey insects. In the laboratory, there was a relationship between the amount of daily faeces excreted and the quantity of daily food intake. Although both sexes excreted a similar amount of faeces in the immature stages, mature females had greater faecal weight than males, suggesting that females fed on more prey than males. The estimated daily dry weight of prey insects was about 17.7 mg in females. The relationship between the number of mature eggs in the ovaries and the quantity of food intake indicated that about 8 days were needed to accumulate enough mature eggs in the ovaries to lay in rice paddy fields. The duration of the mature stage in // was one and a half months, hence the number of visits to rice paddy fields must be 6, confirming the importance of food intake during visits to the forest gaps between bouts of oviposition." (Authors)] Address: Watanabe, M., Graduate School of Life and Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan

11017. White, H. (2011): Natural history of Delmarva dragonflies and damselflies. University of Delaware Press. 284 pp. (in English) ["This book provides the first

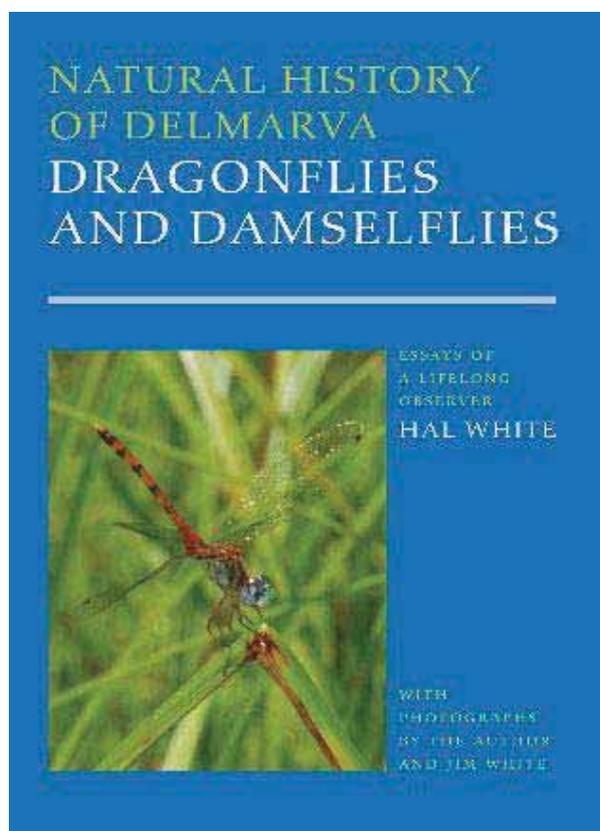
selfies of the Delmarva Peninsula. It includes colour photographs of all 129 species known to occur in the region. Each species serves as a prompt for a short essay. The collection offers an eclectic introduction to the world of dragonflies and the people who study them. There is something here for everyone from the casual reader to the expert." (Publisher) Address: White, III, H.B., Department of Chemistry and Biochemistry, University of Delaware, Newark, Delaware 19716, USA

11018. Wildermuth, H. (2011): Werden Weibchen von Großlibellen häufiger zur Beute von Webbspinnen als Männchen? (*Odonata*: Anisoptera; Araneae). *Libellula* 30(3/4): 173-181. (in German, with English summary) ["Single females of *Leucorrhinia pectoralis*, *Libellula quadrimaculata* and *Sympetrum striolatum* trapped in orb webs of *Larinioides cornutus* and *Argiope bruennichi* in Switzerland as well as a female *Brachythemis contaminata* attacked by a wolf spider (*Pardosa pseudoannulata*) in Thailand are described and photographically documented. It is discussed if and why more females than males of some anisopteran species may be prone to predation by spiders." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

11019. Wildermuth, H. (2011): Ein Betonbehälter für Gießwasser als Entwicklungshabitat von *Aeshna cyanea* und *Libellula depressa* (*Odonata*: Aeshnidae, Libellulidae). *Libellula* 30(3/4): 145-150. (in German, with English summary) ["During emptying a small concrete water tank for the annual cleaning procedure in late autumn 2011, one fully grown larva of *Aeshna cyanea* and 167 half grown to fully grown larvae of *Libellula depressa* appeared. The larvae must have developed in one season. It is discussed what the larvae might have been feeding on in a tank that was lacking any vegetation." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

11020. Xu, Q.-h.; Zhang, H.-m. (2011): The last-stadium larva and systematic status of *Planaeschna suichangensis* Zhou & Wei, 1980 (*Odonata*: Anisoptera: Aeshnidae). *Zootaxa* 3049: 64-68. (in English) ["The final stadium larva of *Planaeschna suichangensis* is described and illustrated. Its larval morphological characters indicate that *P. suichangensis* is a valid species closer to *P. risi* than to *P. taiwana*." (Authors)] Address: Zhang, H., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com

11021. Yu, X.; Bu, W. (2011): A preliminary phylogenetic study of Megapodagrionidae with focus on the Chinese genera *Sinocnemis* Wilson & Zhou and *Priscagrion* Zhou & Wilson (*Odonata*: Zygoptera). *Hydrobiologia* 665: 195-203. (in English) ["A cladistic analysis of the megapodagrionid damselflies was performed on a data matrix of 44 morphological characters and 39 terminal taxa with emphasis on defining the phylogenetic position of the Chinese genera *Sinocnemis* Wilson & Zhou and *Priscagrion* Zhou & Wilson which have rarely been used in a cladistic study before. *Sinocnemis* is recovered as the sister group to all other reduced-venation groups, including *Chorismagrion* + *Perissolestes*, *Hemiphlebia*, and all coenagrionoids; *Priscagrion* is close to *Austroargiolestes*. *Sinocnemis henanensis* is confirmed as a good species." (Authors)] Address: Yu, X., Institute



comprehensive coverage of the dragonflies and dam-

of Entomology, College of Life Sciences, Nankai Univ., Tianjin 300071, China. E-mail: nkyuxin@yahoo.cn

11022. Yu, X.; Bu, W. (2011): Chinese damselflies of the genus *Coenagrion* (Zygoptera: Coenagrionidae). *Zootaxa* 2808: 31-40. (in English) ["We review and update species of *Coenagrion* recorded from China, including distributional information. A key to the males is provided including figures of the genital ligula and caudal appendages. A distributional record of *Coenagrion armatum* is excluded from China. *Coenagrion bifurcatum* Zhu & Ou-yan, 2000, is assigned as a junior synonym of *Coenagrion johanssoni* (Wallengren, 1894). *Coenagrion chusanicum* Navás, 1933 is assigned as a junior synonym of *Paracercion hieroglyphicum* (Brauer, 1865). *Coenagrion dorothea* Fraser, 1924 is newly combined as *Paracercion dorothea* (Fraser, 1924) comb. nov. *Coenagrion impar* Needham, 1930 and *Cercion yunnanensis* Zhu & Han, 2000 are both treated as junior synonyms of *Paracercion dorothea*. *Coenagrion holdereri* (Förster, 1900) is redescribed here based on fresh specimens." (Authors)] Address: Yu, X., Institute of Entomology, Life Sciences College, Nankai University, Tianjin, 300071 China. E-mail: nkyuxin@yahoo.cn

11023. Zabłocki, P.; Wolny, M. (2011): First record of the Vagrant Emperor *Anax ephippiger* (Burmeister) (Odonata: Aeshnidae) for the Opolskie Voivodship (Southwest Poland). *Forum Faunistyczne* 1(1): 35-38. (in Polish, with English summary) [13-VII-2011, one male of *A. ephippiger*, sandpit near Grabówka village (UTM: CA07), Poland.] Address: Zabłocki, P., Dział Przyrody Muzeum Śląska Opolskiego, ul. Leśnicka 28, 47-154 Góra Św. Anny, Poland. E-mail: przyroda@muzeum.opole.pl

11024. Zagainova, O.S., Markov, N.I. (2011): The diet of Asian badger, *Meles leucurus* Hodgson, 1847, in Samarovskii Chugas Nature Park, Western Siberia. *Russian Journal of Ecology* 42(5): 414-420. (in English) [The diet structure of *M. leucurus* on Bol'shoi Chukhtinskii Island (Khanty-Mansi Autonomous Area) was studied by means of coprological analysis. Two unidentified Odonata contributed to the food of the badgers.] Address: Zagainova, O.S., Institute of Plant and Animal Ecology, Ural Branch, Russian Academy of Sciences, ul Vos'mogo Marta 202, Yekaterinburg, 620144 Russia. E-mail: zagainovao@mail.ru

11025. Zhang, H.; Kalkman, V.J.; Tong, X. (2011): A synopsis of the genus *Philosina* with descriptions of the larvae of *P. alba* and *P. buchi* (Odonata: Megapodagrionidae). *International Journal of Odonatology* 14(1): 55-68. (in English) ["A synopsis of the genus *Philosina* is provided. Larvae of the two known species, *P. alba* and *P. buchi* are described for the first time. The distribution of both species is discussed and information on behaviour and habitat is summarized. The specialized larvae of *Philosina* show a strong resemblance to those of *Rhinagrion*, suggesting that they are sister genera. The unique characters of the larva, especially the arrangement and structure of the caudal lamellae, mean that neither genus fits into any of the currently recognized families of Zygoptera. It is noted that these genera could be placed in their own family. However, caution is exercised pending a better understanding of the family Megapodagrionidae based on DNA work, and they are therefore retained in Megapodagrionidae." (Authors)] Address: Zhang, H., Department of Entomology, College of Natural Resources and Environment, South

China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomia6988@gmail.com

11026. Zhang, H.-j.; Huo, K.-k. (2011): A study of the genus *Coeliccia* Kirby, 1890 from Shaanxi (China), with the description of *C. wilsoni* Zhang & Yang spec. nov. (Zygoptera: Platycnemididae). *Odonatologica* 40(1): 51-56. (in English) ["The new species is described and illustrated. Holotype male and allotype female: China, Shaanxi prov., Nanzheng co., alt. 1200 m a.s.l., 28-VII-2006; deposited in the Shaanxi Bio-Resource Key Laboratory, Shaanxi University of Technology, Hanzhong, China. Figs of the penile structure and the dorsum of the male caudal appendages of *C. sexmaculata* Wang are also provided." (Authors)] Address: Zhang, H.-j., Shaanxi Bio-Resource Key Laboratory, Shaanxi University of Technology, Hanzhong-723000, China. E-mail: hjzhang663@sohu.com

11027. Zia, A.; Naeem, M.; Rafi, M.A.; Naz, F.; Afshen, S.; Ilyas, M. (2011): Damselflies (Zygoptera: Odonata) of Pakistan: Part 1. *Journal of Insect Science* 11:102: 27 pp. (in English) ["The present study is an effort to document bio-geographical distribution for Zygoptera of Pakistan. Damselflies were collected throughout the country and territory of Azad Jammu and Kashmir during 2004-2009. A total of 2692 specimens were collected yielding 9 families, 21 genera, and 48 species and subspecies. Three of these species, *Libellago lineata lineata* (Burmeister), *Elatoneura atkinsoni* (Selys), and *Elatoneura souteri* (Fraser), are recorded for the first time from Pakistan. Distribution, habitats, previous records, and zoogeographic affiliation for all collected taxa are discussed. Help was also taken from published literature on Zygoptera of Pakistan, and specimens housed at National Insect Museum were also studied. In total, 53 species are accounted for providing an updated record for all modern taxa of damselfly fauna of Pakistan." (Authors)] Address: Zia, S.A., National Insect Museum, National Agriculture Research Centre, Islamabad, Pakistan

11028. Żurawlew, P. (2011): The locality of *Sympetrum meridionale* (Selys, 1841) (Odonata: Libellulidae) in the Sieradz Basin (Central Poland). *Odonatrix* 7(2): 54-55. (in Polish, with English summary) ["On August 12, 2010 during the inspection of ca. 1000-meter long stretch of a ditch situated in meadows (51°43'31" N, 18°38'09" E), extending along the rampart of Jeziorsko reservoir in Proboszczowice, Poland (UTM: CC33), at least 20 males and 5 females of *S. meridionale* were found. The discovery of this locality is another evidence of the expanding range of this species towards the north." (Authors)] Address: Żurawlew, P., Kwileń 67a, 63-313 Chocz, Poland. E-mail: grusleon@gmail.com.pl

11029. Żurawlew, P. (2011): Rediscovery of *Onychogomphus forcipatus* (Linnaeus, 1758) in an isolated distribution island within the GnieŹnieńskie Lakeland (central-western Poland). *Odonatrix* 7(2): 52-53. (in Polish, with English summary) [8-VII-2010 and 9-VII-2011 in Przybrodzin, near Lake Powidzkie, Poland (UTM: XU91; 52°25'45" N, 17°55'47" E)] Address: Żurawlew, P., Kwileń 67a, 63-313 Chocz, Poland. E-mail: grusleon@gmail.com.pl

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1997

11030. Prejs, A.; Koperski, P.; Prejs, K. (1997): Food-web manipulation in a small, eutrophic Lake Wirbel, Poland: the effect of replacement of key predators on epiphytic fauna. *Hydrobiologia* 342: 377-381. (in English) ["The effect of fish removal on the invertebrate fauna associated with *Stratiotes aloides* was studied in a shallow, eutrophic lake. The biomass of invertebrate predators was approximately 2.5 times higher in the invertebrate dominated year (1992) than in the fish-dominated year (1991), while the density of non-predatory invertebrates in 1991 was ca half that in the invertebrate-dominated year. The decrease was due to a sharp fall in the density of epiphytic chironomids, with the density of plant-mining chironomids being far less affected. Marked declines in the density of non-predatory invertebrates in the invertebrate-dominated year were most probably caused by invertebrate predators. Once freed from suppression induced by fish, invertebrate predators were able to control the density of epiphytic prey more effectively than fish. ... In summer 1991, prior to fish removal, the total biomass of predators was estimated at 15 g f.w m² of which fish accounted for 90%. In summer 1992, after rotenone treatment, the total biomass of predators was 10 g f.w. m², of which approximately 90% was made up by invertebrates. The increase in the biomass of invertebrate predators in 1992 resulted from sharp rises in the biomass of Odonata larvae, Heteroptera and Argyroneta aquatica, which were particularly distinct in late spring (June), early summer (July) (Heteroptera and *A. aquatica*) and summer (July–September) (Odonata). In the case of Odonata biomass and density, the significance of differences between 1991 and 1992 was confirmed by Student's test (biomass: P = 0.01, density: P = 0.003)." (Authors)] Address: Prejs, A., Department of Hydrobiology, University of Warsaw, Banacha 2, 02-097 Warsaw, Poland

1998

11031. Sabine, M.E.J. (1998): Macroinvertebrate communities of different-aged beaver ponds. Master of Science thesis, University of New Brunswick: 81 pp. (in English) ["Previous studies of waterfowl utilization of beaver ponds for breeding and brood-rearing have found higher waterfowl use of new beaver ponds (c 5

years old) than old beaver ponds. These studies have concluded, based on waterfowl use only, that new beaver ponds are more productive for waterfowl than old beaver ponds. I tested the hypothesis that productivity in beaver ponds, in terms of macroinvertebrates and water quality, declined with beaver pond succession. In 1993 and 1994, fifteen and nine beaver ponds, respectively, of three different age groups (new, mid-aged, old) were sampled for invertebrates and water quality to quantify differences among age groups. No significant differences ($p < 0.05$) were found in invertebrates or water quality among different age classes. Significant differences were found in most measures over the different sampling periods, with invertebrates being higher in the earlier sampling periods, while nutrients were higher in the later sampling periods. The former is most likely due to a peak in insect emergence early in the summer, while the latter is probably a result of a water level drop between periods. Highly significant differences were also noted for most measures among individual ponds, and this pond variability probably masked any patterns of different age classes. Nutrients and invertebrates were relatively low throughout the study area, which may also have hidden any true differences in age classes of beaver ponds. Because of the low productivity in the study site, beaver pond management for waterfowl would not be feasible or cost-effective in this area." (Authors) Odonata are treated at the family level.] Address: not stated

11032. Yabu, S.; Nakashima, A.; Akiyama, T.; Takefuji, M.; Nagano, O. (1998): Studies on the formation of wetland type biotope with recycled water in the industrial open space of the bay coast. *Environmental Engineering Research* 35: 295-303. (in English) [The paper reports on the ability of *I. senegalensis*, *Crocothemis servilia*, *A. parthenope julius*, and *Orthetrum albistylum speciosum* to use eutrophicated water bodies as habitat.] Address: Yabu, S., Fac. of Systems Engineering, Wakayama University, Japan

1999

11033. Comisión Centroamericana de Ambiente y Desarrollo (CCAD); IUCN; WWF (1999): Listas de Fauna de Importancia para la Conservación en Centroamérica y México: listas rojas, listas oficiales y especies en Apéndices CITES.. WWF Centroamérica. San José,

Costa Rica: 230 pp. (in Spanish) [Odonata are redlisted country wise for Guatemala, El Salvador, Costa Rica, Nicaragua, Panama, Belize, Honduras, and Mexico. For details see: <http://acesortguatemala.org/docs/listadode-faunaaproteger.pdf>]

11034. Amakye, J.S. (1999): Effect of Temephos 20EC on non-target saxicolous fauna of a tropical African Island river at first treatment. *West African journal of applied ecology* 7: 109-121. (in English) ["River Musola on Bioko Island in the Republic of Equatorial Guinea was treated with temephos 20EC, a Simutium larvicide, in March 1999 under a pilot experiment to eradicate *Simulium damnosum* s.l. from that island. The mean density of the saxicolous macroinvertebrates prior to temephos treatment of the river was $5.946.7 \pm 2,065.7$ individuals m^2 . The density of macroinvertebrates observed 24 h after treatment with temephos was $4.062.2 \pm 2,588.0$ individuals m^2 , indicating 31.7% reduction in the density of the population. There was 100% reduction in density of Odonata, Hydroptilidae, Ecnomidae, Leptoceridae and Tanyptodinae in the post treatment samples. Baetidae and Orthocladiinae were affected significantly by temephos ($P \leq 0.1$). Whereas impact of temephos on *Cheumatopsyche digitata* (Trichoptera: Hydropsychidae) was marginal (-16.7%), there was complete loss of *C. falcifera* (100%) from the river, following treatment with the larvicide, indicating differential response to the larvicide by these sympatric species. In general, 'Filtering Collectors' (73%) dominated the saxicolous biocoenosis prior to treatment with temephos. However, no 'Grazers' or 'Scrapcrs' were present in the saxicolous community of the section of the river studied during the pretreatment period. The 100% reduction in density observed for many taxa in the biocoenosis, in the immediate post treatment period was attributed to the low discharge of the river and the low population densities of the various taxa observed at the time of the experiment, as well as the extremely heterogeneous nature of the river bottom. It is proposed that the gallery forests be maintained to aid conservation of the faunistic diversity of the river." (Author)] Address: Amakye, J.S., CSIR-Water Research Institute, P O Box AH 38, Achimota, Ghana. E-mail: wri@ghana.com

11035. Holíř, J. (1999): Příspěvek k poznání vážek (Odonata) Žamberka a okolí [Contribution to the knowledge of dragonflies (Odonata) of Žamberk and neighborhood]. *Orlické hory a Podorlicko*, 1999/9: 190-191. (in Czech) [Czech Republic; between June and October 1995, at five localities 16 Odonata species have been recorded. Habitats are briefly characterised, and record data are presented.] Address: not stated

2000

11036. Dondini, G.; Vergari, S. (2000): Carnivory in the greater noctule bat (*Nyctalus lasiopterus*) in Italy. *J. Zool.*, London 251: 233-236. (in English) [In 59 faces of *N. lasiopterus*, nine fragments of Libellulidae were found.] Address: Dondini, G., Museo di Storia Naturale, sezione di Zoologia 'La Specola', Università di Firenze, Via Romana 17, 1-50125 Firenze, Italy

11037. Huertas Dionisio, M.; Sánchez Rodríguez, J.L. (2000): Los odonatos de la provincia de Huelva (Andalucía, España). *Boletín de la Sociedad Entomológica Cordobesa* 12: 35-81. (in Spanish, with English summary) [54 Odonata species are briefly introduced and

their regional distribution basing on current and literature data is mapped.] Address: Huertas Dionisio, M., Berdigón 9, 4°, 21003 Huelva, Spain.

2001

11038. Fukui, M. (2001): Annual fluctuation of the population of *Libellula angelina* at Okegayanuma, Iwata, Shizuoka Prefecture. *Tombo* 43: 41-44. (in Japanese, with English summary) ["The annual fluctuation of the population of *L. angelina*, was investigated in Okegayanuma, Iwata, Shizuoka Pref., Japan. Imagines were counted by observation, from 1991 to 2000 (each year between Apr. 29. and May 3 on every day). Exuviae were collected every second or third day from 1993 to 2000 between Apr. 10 to May 20. Compared with 1994, the population of *L. angelina* had decreased sharply to one-sixth in 1995 due to a heat wave and drought during the previous summer. Moreover, the population had decreased to only 47 individuals in 1999 due to a sudden increase in the population of American crawfish. From 1999, a species conservation plan for *L. angelina* was started by Iwata Minami High School students." (Author)] Address: Fukui, M., 60-1. Kamo, Kikugawa-cho. Ogasa-gun. Shizuoka, 439-0031, Japan

11039. Fukui, M.; Ema, S. (2001): New records of *Anaiaeschna jaspidea* from Shizuoka Prefecture. *Tombo* 43: 40. (in Japanese, with English title) [Japan; 1-X-2000] Address: Fukui, M., 60-1. Kamo, Kikugawa-cho. Ogasa-gun. Shizuoka, 439-0031, Japan

11040. Futahashi, R. (2001): A new record of *Sympetrum maculatum* from Shizuoka Prefecture. *Tombo* 43: 38-39. (in Japanese, with English summary) [A male of *S. maculatum* was a new record for Shizuoka Prefecture. This is an unusual migratory record because of the following facts: the locality, Enshu-hama (Hamamatsu), is more than 70 kilometers away from the nearest habitats known at present; no other sighting has thus been recorded there despite the investigations carried out by many odonatologists; the captured individual was found just after a typhoon and no plant translocation from other habitats has been recorded in the area.] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11041. Futahashi, R.; Futahashi, H.; Araki, Y. (2001): Recent findings concerning Odonata in Hokuriku district. *Tombo* 43: 31-36. (in Japanese, with English summary) [Japan; "*Lyriothemis pachygastra* was recorded for the first time from Toyama Prefecture. *Sympetrum s. speciosum* was newly recorded from the Noto peninsula. Exuviae and larvae of *Aeshna mixta soneharai* were recorded from Toyama Prefecture, Hokuriku district for the first time. Four migratory species, *Anax guttatus*, *Sympetrum cordulegaster*, *S. depressiusculum* and *Trapezostigma virginia* were recorded at several sites in Toyama and Ishikawa Prefecture. Some males that seemed to be hybrids between *Anax n. nigrofasciatus* and *Anax parthenope julius* were recorded at several sites in Toyama Prefecture. Some adults of *Aeschnophlebia longistigma*, which usually disappear by the end of August were recorded in September. Recent records of the following 5 sharply decreased species in this area were reported: *Gynacantha japonica*, *Asiagomphus pryleri*, *Gomphus postocularis*, *Somatochlora clavata*, *Sympetrum maculatum*. Distributional records of Odonata in the Hokuriku district were reported including

several species rare in this area: *Cercion sexlineatum*, *Sympetma paedisca*, *Aeshnophlebia anisoptera*, *Davidius moiwanus taruu*, *Stylogomphus suzuku*, *Sympetrum striolatum imitoides*." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11042. Kano, K. (2001): A cleaning behavior of *Davidius moiwanus moiwanus* (Okumura) after oviposition. Tombo 43: 57-58. (in Japanese, with English summary) ["A cleaning movement of a female of *D. m. moiwanus* was observed at a small stream at the Shiga Heights, Nagano Prefecture, Japan, on July 20, 2000. The female, after oviposition, moved onto a mugwort leaf near the waters edge with some eggs attached to her abdominal tip. She repeatedly rubbed her abdominal tip by bending her abdomen against the underside of the leaf and scraped off the eggs into the water. This behaviour lasted for 30 seconds. As the eggs are not very sticky, the behaviour should be regarded as a selfcleaning rather than epiphytic oviposition, which has been reported in *Malgassophlebia*, *Tetrathemis* and *Micrathyria*." (Author)] Address: Kano, K., 5-19-17-601 Koishikawa, Bynkyo-ku, Tokyo, 112-0002, Japan

11043. Karube, H.; Yeh, W.C. (2001): *Sarasaeschna* gen. nov., with descriptions of female *S. minuta* (Asahina) and male peile structure in *Linaeschna* (Anisoptera: Aeshnidae). Tombo 43: 1-8. (in English) [A new genus, *Sarasaeschna* gen. nov. is established to accommodate the species currently classified under *Lieftinck's pryeri* - Section of *Oligoaeschna* auct. with the description of the unknown female of *S. minuta* (Asahina) and comments on male penile structures of *Linaeschna polli* Martin.] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

11044. Kita, H. (2001): *Rhyothemis fuliginosa* Selys carrying her exuvia on the tip of abdomen. Tombo 43: 28. (in Japanese, with English summary) ["In Chiba Prefecture on July 25, 1999, I observed a female of *R. fuliginosa* carrying her exuvia on the posterior end of abdomen. She was able to drink water from the pond surface in flight even though she was handicapped." (Author)] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan

11045. Kita, H.; Futahashi, R. (2001): A female hybrid between *Anax nigrofasciatus nigrofasciatus* Oguma, 1915 and *A. parthenope julius* Brauer, 1865 (Aeshnidae) from Miyagi Prefecture. Tombo 43: 54-55. (in Japanese, with English summary) ["One female specimen, which is supposed to be the interspecific hybrid between *Anax n. nigrofasciatus* and *A. parthenope julius*, was captured in Miyagi Pref., N. Honshu, Japan, in 1973. The following are the main characteristics of this specimen: 1) a T-shaped black stripe on the top of the antefrons like *A. n. n.*, and a light blue stripe running along the black line like *A. p.j.* 2) the thickness of each black line on the 1st and the 2nd lateral sutures is intermediate between the two species 3) the whole shape of each light-coloured spot on the abdomen is similar to that of *A. p.j.* 4) the size of the silvery white spot on the underside of the 3rd abdominal segment and the tip shape of its cercus is intermediate between the two species 5) wings are similar to those of mature *A. n. n.*, uniformly transparent, having blackish antenodals and 6) the brown femurs are characteristic of *A. p. j.*, but the number of the prickles is similar to that of an ordinary *A. n. n.*" (Au-

thors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11046. Knysh, N.P. (2001): About pinning (catching) of prey by Red-backed Shrike. Berkut 10(2): 218-225. (in Russian, with English summary) [Sumy (NE Ukraine): 50°55'11"N, 34°46'55"E. The prey items of *Lanius collurio* include one imago of *Anaciaeschna isocetes* and two of unidentified Aeshnidae. Diet was analysed between 1967 and 2001, and refers to 1234 objects pinned on thorns and knots of plants.] Address: Knysh, N.P., Sumy Pedagogical University, Dep. of Zoology, Romenska str. 87, 40002 Sumy, Ukraine

11047. Kojo, T. (2001): An observation of a long roosting time in *Pantala flavescens* Fabricius. Tombo 43: 56. (in Japanese, with English summary) ["A young female of *P. flavescens* rested for more than 19 hours from 15:30, 19th to 10:40, 20th August 2000, on a branch of bamboo at a garden among condominiums in a suburb of Saitama Prefecture, Japan." (Author)] Address: not stated in English

11048. Roque, F.O.; Trivinho-Strixino, S. (2001): Benthic macroinvertebrates in mesohabitats of different spatial dimensions in a first order stream (Sao Carlos - SP). Acta Limno. Bras. 13(2): 69-77. (in English, with Portuguese summary) [Brazil. Odonata are treated at the family level.] Address: Roque, F.O., Programa de Pós Graduação em Ecologia e Recursos Naturais UFSCar, Brazil. E-mail: pfor@iris.ufscar.br

11049. Willet, J. (2001): Dragonflies and damselflies: Opportunities for further recording in the Forth Valley. Forth Naturalist and Historian 24: 57-64. (in English) [The author provides background information to Odonata, and suggests locations where Odonata recording could be focussed. Status and distribution of the 15 species found in the Forth Valley, Scotland, UK are outlined.] Address: not stated

11050. Yokoi, N. (2001): Nine species of dragonflies records for the first time in Laos. Tombo 43: 25-28. (in Japanese, with English summary) ["The author visited Lak Sao, central Laos near the Vietnam boundary, in March 2000 and studied dragonflies which inhabited a mountain stream there. The mean temperature was around 20°C in the mountain zone, and most of the dragonflies were still at the early adult stage. Seven newly recorded species of dragonflies were taken from Lak Sao. In particular, the Chinese species *Leptogomphus elegance*, *Megalogomphus sommeri* and *Macromia hamifera* were recorded for the first time from Indochina. An additional two species were later collected from south Laos and Vietnam bringing the reported total of species in this paper to nine." (Author)] Address: Yokoi, N., 2-37-11, Kaisei, Koriyama, Fukushima, 963-8851 Japan

11051. Yokoyama, T. (2001): Larval growth of some dragonflies at the veranda of a condominium in Sapporo. Tombo 43: 58-59. (in Japanese, with English summary) [The larval growths, from hatching to the beginning of the first winter, of seven Odonata species (*Anax parthenope julius*, *Coenagrion lanceolatum*, *Orthetrum triangulare melania*, *Aeshna nigroflava*, *Somatochlora graesseri aureolora*, *Paracercion c. calamorum*, and *Somatochlora uchidai*) were observed in Sapporo, Hokkaido, Japan.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2002

11052. Brooker, J.S. (2002): *Enallagma civile* (Odonata: Coenagrionidae) life history and production in a west Texas playa. Master of Science (Biology), University of North Texas: 46 pp. (in English) ["This study was conducted to describe the life history of *E. civile* and the other Odonates that inhabit playa habitats in the Southern High Plains of Texas. It was learned that *E. civile* has a low secondary production estimate of 66.8 mg/m². It was also determined that this species had a developmental time of approximately 21 days in a playa setting. Another important fact was that *E. civile* was the earliest colonizer of all of the Odonate species studied. It was recorded in the playa at least one week earlier than all of the other Odonates. Odonate populations in the playa continued to increase in size throughout the study. Some populations grew more quickly than others. For instance, *Lestes disjunctus*, had the population that grew the slowest. Its average population estimate per m² changed from 0 to approximately 3 in an eight-week time period. On the opposite end of the spectrum, *E. civile*, had an average population estimate per m² which increased in size from 2 to approximately 670 naiads in the same eight-week time period. When the playa began to lose water and thus dwindled in size, the Odonate populations all had significant decreases in size. The naiads either became prey for another organism, emerged or died due to lack of water or lack of food. None of the species in this study were able to continue increases in their population sizes during this time. The period after this drought is what is unique. Some of the species continued to have numbers that dwindled, while others maintained relatively similar amounts of naiads. One species, *Anax junius*, actually had a population explosion after the drought when the playa began to refill close to the beginning of September. During the course of this study, much was learned about the niches that Odonates occupy in a playa. The populations of some prominent dragonfly species were studied and their quantities were estimated for different periods during one season. Sizes of head capsules were studied in an effort to determine the development of Odonate populations over a period of time. In addition, field sampling showed high points in population sizes and trends in growth. Research was conducted of the life histories of Odonates and a lot of information was gained about the productivity of dragonflies. This study was a valuable proponent to the collection of information available about playa habitats." (Author)] Address: Jennifer Suzanne Booker, not further details

11053. Herren, B.; Herren, K. (2002): Die Libellen der Gemeinde Burgdorf und angrenzender Gebiete. Das Burgdorfer Jahrbuch 69: 65-76. (in German) [The paper introduces the biology of dragonflies and gives a brief local history of dragonfly faunistic studies in Burgdorf (Switzerland) and adjacent localities. Thirty species have been recorded at seven localities, between 1990 and 2001.] Address: Herren, B. & K., Oberfelderstr. 46, CH-3550 Langnau, Switzerland. E-mail: schule.rosig@bluewin.ch

11054. Jeschke, J.M. (2002): Funktionelle Reaktionen von Konsumenten: die SSS Gleichung und ihre Anwendung. Dissertation, Fakultät für Biologie, Ludwig-Maximilians-Universität München: 192 pp. [Chapter 5 of the thesis "Correlates and Consequences of Predator Confusion" uses Odonata in laboratory experiments: "When confronted by a swarm of their prey, many predators

become confused and are thus less successful in their attacks. It is unknown how widespread this confusion effect is and largely unknown which predator or prey traits facilitate or impede it. We therefore performed corresponding experiments in the predator-prey systems *Aeshna cyanea* (Odonata) – *Daphnia magna* (Crustacea), *Libellula depressa* (Odonata) – *D. magna*, *Chaoborus obscuripes* (Diptera) - *Daphnia obtusa*, and *Triturus alpestris* (Alpine newt) – *D. obtusa*. We combine our results with literature data and find that predators have become confused in 70% of the 20 predator-prey systems studied to date. Tactile predators appear to be generally susceptible, whereas visual predators seem susceptible only if their prey is highly agile. This difference arguably results from the superiority of the latter in singling out individual prey. To allow a better understanding of the ecological, ethological, and evolutionary consequences of predator confusion, we examine its effects on functional responses. We theoretically and empirically show that the widespread assumption confusion would let a functional response become dome-shaped is not necessarily true. The response can alternatively remain qualitatively unchanged and is affected only in a quantitative way. Thus, a non-dome-shaped response is no indication for the absence of predator confusion." (Author) Additional reading: Jeschke, J.M.; Tollrian, R. (2005): Effects of predator confusion on functional responses. *Oikos* 111: 547-555; Jeschke, J.M.; Tollrian, R. (2007): Prey swarming: which predators become confused and why? *Animal behaviour* 74: 387-393.] Address: Jeschke, J.M., Department Biologie II, Ludwig-Maximilians-Universität München, Karlstr. 25, 80333 München, Germany

11055. SaintOurs, F. (2002): Drainage to Dragonflies: Conservation of aquatic invertebrates in rivers and streams of eastern Massachusetts. Fall 2002 Conservation Perspectives. <http://www.nescb.org/epublications/fall2002/saintours.html> (1 of 13)6/3/2005 3:31:12 AM: 13 pp. (in English) [The author outlines some general remarks on the potential of Odonata as monitoring organisms for aquatic systems health.] Address: SaintOurs, F., Dept of Biology, University of Massachusetts Boston, USA. E-mail: fred.saintours@umb.edu

2003

11056. Kipping, J. (2003): Odonata recorded from the Okavango Delta. In: Alonso, L.E. & Nordin L.-A. (2003): A rapid biological assessment of the aquatic ecosystems of the Okavango Delta, Botswana: High water survey. RAP Bulletin of Biological Assessment 27, Conservation International, Washington DC: 137-139. (in English) ["Comprehensive collections of Odonata were made by JK at the geo-reference sites in the Upper Panhandle (UPH) but following his return to Maun on June 9th, only occasional specimens were collected in the other three focal areas. A further list was however compiled by JK from the HOORC site at the western end of Chief's Island, a habitat typical of much of the CHI focal area. These records are combined into a systematic checklist of species known from the delta but to avoid confusion regarding distribution patterns across the delta, this list is given below and is excluded from Appendix 3, the main species-list. This appendix is divided into four sections. Section 1 lists the species collected by JK in the UPH focal area; section 2 lists those collected by other team members in the LPH, MGR and

CHI focal areas; section 3 gives the combined checklist and section 4 contains ecological notes by JK on habitat use by Odonata at the HOORC site on Chief's Island." (Author) For details see: <http://www.biocart.de/naturschutz/pdf/RAP-Botswana.pdf>] Address: Kipping, J., BioCart - Ökologische Gutachten & Studien, Albrecht-Dürer-Weg 8, 04425 Taucha, Germany. E-mail: BioCartKipping@web.de

11057. Paukert, C.P.; Willis, D.W. (2003): Aquatic invertebrate assemblages in shallow prairie lakes: fish and environmental influences. *Journal of Freshwater Ecology* 18(4): 523-536. (in English) [Nebraska Sandhill region, Nebraska, USA. 30 natural lakes were studied for their fauna. Nine Odonata species were recorded. No species details are given.] Address: Paukert, C.P., Dept for Wildlife & Fisheries Services, P.O. Box 2140B, South Dakota State Univ., Brookings, SD, 57007, USA

11058. Veling, K.; Mensing, V. (2003): Butterfly and dragonfly observations. *Vlinders* 18(1): 8-9. (in Dutch, with English summary) [The authors provide Instructions for the collecting of reliable distribution data in the Netherlands.] Address: Veling, K., De Vlinderstichting Postbus 506, 6700 AM Wageningen, The Netherlands. E-mail: Kars.Veling@vlinderstichting.nl

11059. Ades, G.W.J.; Kendrick, R.C. (2004): Hong Kong Fauna. A checklist of selected taxa. 2. ed.. Fauna Conservation Department, Kadoorie Farm & Botanical Garden Company: 91 pp. (in English) [Based on the publications of K.D. Wilson, the list compiles 35 Zygoptera (plus two subspecies) and 74 Anisoptera.] Address: Kadoorie Farm and Botanic Garden (KFBG) Corporation, Lam Kam Road, Tai Po, New Territories, Hong Kong. E-mail: info@kfbg.org

11060. Barnes, D.K. (2004): Use of benthic macroinvertebrates to assess impacts of agricultural land use in nontidal coastal plain streams. MSc. Thesis, Department of Environmental Sciences, University of Virginia: X + 151 pp. (in English) ["During recent history, anthropogenic activities in coastal watersheds have played a major role in increasing nutrient transport to rivers and offshore waters, often with detrimental consequences. Research on nutrient enrichment has focused primarily on lakes, rivers, and estuaries, while enrichment in coastal plain streams has been greatly understudied. Benthic macroinvertebrates are often extremely sensitive to enrichment, and as a result, are commonly used in biomonitoring of nutrient pollution. This study examined the impacts of agricultural land use in coastal streams on Virginia's Eastern Shore, through assessment of macroinvertebrate community structure and monitoring of a variety of chemical and physical parameters. Nine catchments ranging in agricultural land use from 28 to 91 % of watershed area were sampled seasonally from June 2003 to March 2004. Water and sediments were analyzed for nutrients, chlorophyll, organic matter, and dissolved oxygen. To assess macroinvertebrate community structure, sediment cores were collected, sieved through 0.5 mm mesh, and organisms retained on the sieves were identified to genus where possible. Twenty-one metrics of community structure were calculated, including measures of taxonomic richness, taxonomic composition, tolerance, feeding roles, and delta¹⁵N signatures. Though nitrate fluxes were higher in watersheds with higher % agriculture, elevated loadings were not related to changes in autotrophic biomass, decomposition, or macroinvertebrate commu-

nities that were predicted to occur with increasing nutrient enrichment. Therefore, the sampling reaches are likely on the low end of the nutrient enrichment spectrum, perhaps because of depleted nutrient concentrations potentially resulting from low surface runoff and/or retention by riparian vegetation. However, the streams are probably towards the high end of the scale with respect to allochthonous organic enrichment. Increased inputs of riparian detritus were linked to elevated decomposition, increased abundance of macroinvertebrates, and a shift in community structure toward dominance by tolerant taxa, all patterns which were hypothesized to occur in response to nutrient enrichment. Overall, nutrient pollution from cropland agriculture in coastal watersheds with flat topography and forested riparian zones was insufficient to produce undesirable changes in nontidal streams. In these systems, local factors were more important than watershed land use in dictating macroinvertebrate community structure." (Author) Taxa - including Odonata - are treated at the genus level.] Address: not stated

11061. Eda, S. (2004): Annual meeting of the Japanese Society for Odonatology in 2004. *Tombo* 47: 58. (in Japanese, with English caption.) [The Annual meeting of the Japanese Society for Odonatology was held at Prefectural Museum of Nature and Human Activities in Sanda city, Hyogo Prefecture, on November 20 and 21, 2004 and 86 members attend.] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

11062. Futahashi, R. (2004): Record of the migrant species, *Sympetrum fonscolombii*, in Kôto-ku, Tokyo. *Tombo* 47: 46. (in Japanese, with English summary) [A male of *S. fonscolombii* was captured in Koto-ku, Tokyo, on 23-X-2004. This is the second record of the species from Kanto district, Japan.] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11063. Futahashi, R.; Hayashi, F. (2004): Distribution patterns of two damselfly species, *Mnais costalis* and *M. strigata*, in the Boso peninsula, Chiba prefecture. *Tombo* 47: 41-46. (in Japanese, with English summary) ["A total of 106 *Mnais* damselflies collected from the Boso Peninsula, Chiba Prefecture, central Japan, were classified into *M. strigata* Selys, 1853 (48 males, 9 females), *M. costalis* Selys, 1869 (40 males, 8 females), and their hybrid F1 (1 female) based on DNA sequences of a nuclear ribosomal internal transcribed spacer 1 (ITS 1). The peculiar forma *edai* Asahina, 1976 known from this peninsula was identified as one wing-colour form of *M. strigata*. The two species were distributed parapatrically with a narrow contact zone; i. e., *M. strigata* was restricted to the southern mountainous area of the Boso Peninsula, while *M. costalis* was distributed in the northern area of the Kanto plain. The two species were quite similar in their external morphology, excluding some different relationships between head width and forewing length and between pterostigma length and widths." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11064. Futahashi, R.; Hayashi, F. (2004): DNA analysis of hybrids between *Sympetrum e. eroticum* and *S. bacha matutinum*. *Tombo* 47: 31-36. (in English, with Japanese summary) ["The parent species of interspecific hybrids can be determined using nuclear and mito-

chondrial DNA analyses, as the latter is inherited maternally. In this study, we examined DNA from three field-caught individuals that appeared morphologically to be hybrids between two *Sympetrum* dragonflies, *S. eroticum eroticum* (Selys, 1883) and *S. baccha matutinum* Ris, 1911. All three hybrids had mixed nuclear DNA sequences (ribosomal RNA internal transcribed spacers 1 and 2 regions) of *S.e.e.* and *S.b.m.*, but had mitochondrial DNA sequences (large subunit ribosomal RNA gene) of *S.b.m.* only. This suggests that these hybrids were derived from interspecific mating between male *S.e.e.* and female *S.b.m.* Interspecific mating tandems have been reported in the field, and all but one involved male *S.e.e.* X female *S.b.m.* Therefore, male *S.e.e.* are apt to catch females of another species, and the direction of gene flow with hybridization between the two species is non-reciprocal." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11065. Hämäläinen, M.; van Tol, J. (2004): Note on the nomenclature of the Japanese *Mnais* species. Tombo 47: 12. (in English) [Verbatim: Hayashi & al. (2004) revised the taxonomy of the Japanese *Mnais* taxa. Two good species, *M. costalis* Selys, 1869 and *M. strigata* Selys, 1853 were recognized and *M. nawai* Yamamoto, 1956 was downgraded to synonymy with *M. costalis*. The authors claimed that *Mnais strigata* is the correct name of the taxon traditionally called *M. pruinosa* Selys, 1853 and presented the latter as a synonym. The act was justified as follows: "... *M. strigata* appeared before *M. pruinosa* in Selys' (1853) paper; so by page precedence *strigata* is the valid name. However, this act was not in agreement with the International Code of Zoological Nomenclature (ICZN, 1999). The descriptions of *Mnais strigata* and *M. pruinosa* were printed on p. 20 and 20-21, respectively, in Selys Longchamps (1853). When these taxa are ranked as synonyms, the correct name must be selected according to the rules of Article 24 (Precedence between simultaneously published names, spellings or acts). Article 24. 2.1 determines that the precedence is fixed by the action of the first author citing in a published work those names or acts and selecting from them; this author is termed the "First Reviser". In this case Selys Longchamps (1873) was the "First Reviser", since on p. 473 (p. 9 in reprint) he explicitly considered *costalis* and *strigata* as varieties of *Mnais pruinosa*, thus giving precedence to the name *pruinosa*. Consequently: *Mnais pruinosa* Selys, 1853; Synonym: *Mnais strigata* Hagen in Selys, 1853.] Address: Hämäläinen M., Dept Applied Zool., P.O. Box 27, FIN-00014 University of Helsinki, Finland; E-mail: mati.hamalainen@helsinki.fi

11066. Kopij, G.; Nuttall, R.J.; de Swardt, D.H. (2004): An analysis of avian (Aves) stomach contents from South Africa. Durban Museum Novitates 29: 21-30. (in English) ["Stomachs were taken from birds collected during the years 1983-1998, mainly in the semi-arid grasslands and associated habitats of central South Africa, especially from the Free State Province. For each species for which stomach contents were analysed, the following information is given: age and sex of specimen(s) (if known), locality of collection, and dietary items found in the stomach. Previously, only anecdotal, or very general information on the diet of many southern African bird species has been available." (Authors) Odonata were found - partly in considerable amounts - in the stomachs of the following species: Black-necked Grebe (*Podiceps nigricollis*), Dabchick (*Tachybaptus ru-*

ficollis), Yellow-billed Egret (*Egretta intermedia*), Squacco Heron (*Ardeola ralloides*), Sacred Ibis (*Threskiornis aethiopicus*), Glossy Ibis (*Plegadis falcinellus*), African Spoonbill (*Platalea alba*), Black-winged Stilt (*Himantopus himantopus*), Burchell's Courser (*Cursorius rufus*), White-winged Tern (*Chlidonias leucopterus*), and White-throat (*Sylvia communis*.)] Address: Kopij, G., Dept Biol., National University of Lesotho, P.O. Roma 180, Lesotho. E-mail: g.kopij@nul.ls

11067. Kosterin, O.E. (2004): Odonata. In: Ministry of Nature Resources of Russian Federation Sokhondo Biosphere Nature Reserve & Russian Academy of Sciences, Siberian Branch Institute of Systematics and Ecology of Animals Siberian Zoological Museum: Biodiversity of the Sokhondo Nature Reserve. Arthropoda. Novosibirsk - Chita 2004: 81-87. (in Russian) [The Sokhondo Nature Reserve is situated in the Kyra district of the Zabaikalsky Territory in the highest part of Khen-tei-Chikoi Upland, Russia. Its area occupies 2110 km² (for a map see: <http://arctoa.ru/ru/Archive-ru/18/7afonina-sokhondo.pdf>). The following species are discussed in detail: *Lestes dryas*, *L. sponsa*, *Sympecma paedisca*, *Coenagrion hylas*, *C. johanssoni*, *C. armatum*, *C. glaciale*, *C. lunulatum*, *C. ecornutum*, *Erythromma najas humerale*, *Enallagma cyathigerum*, *Anax parthenope*, *Aeshna juncea*, *Aeshna crenata*, *Aeshna caerulea*, *Ophiogomphus obscurus*, *Ophiogomphus spinicornis*, *Cordulia aenea*, *Somatochlora exuberata*, *Somatochlora graeseri*, *Somatochlora alpestris*, *Somatochlora shalbergi*, *Epitheca bimaculata*, *Pantala flavescens*, *Libellula quadrimaculata*, *Sympetrum danae*, *Sympetrum pedemontanum*, *Sympetrum vulgatum imitans*, *Leucorrhinia (rubicunda) intermedia*, and *Leucorrhinia (dubia) orientalis*.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

11068. Monnerat, C.; Hoess, R.; Juillerat, L. (2004): *Sympetrum depressiusculum* (Odonata: Libellulidae) en 2002 et 2003 dans la région des Trois lacs. Bulletin roman d'entomologie 22(1): 39-45. (in French, with German summary) [In 2002, *S. depressiusculum* was found at eight localities in Seeland, Switzerland. The authors suppose a significant influx from that species. Most productive localities were the water bodies resulting from a mitigation measure in 1999 in the Staatsmoos bei Müntschemier (BE). There, at 13-VII-2003 a successful reproduction was noticed. In spite of this, in 2003 only few specimens could be observed. The authors suppose the lack of source populations and suboptimal regional habitats.] Address: Monnerat, C. CSCF, 14 rue des Terreaux, CH-2000 Neuchâtel, Switzerland. E-mail: christian.monnerat@cscf.unine.ch

11069. Oates, J.F.; Bergl, R.A.; Linder, J.M. (2004): Africa's Gulf of Guinea Forests: Biodiversity Patterns and Conservation Priorities. *Advances in Applied Biodiversity Science* 6: 90 pp. (in English) [Verbatim: Odonata have been surveyed in southwest Cameroon by Vick (1999), who has carried out field work at several sites over three years, and examined literature and museum records. Vick lists 179 known species and estimates that the fauna probably contains at least 200 species. He speculates that "few parts of Africa of equivalent area can match" the dragonfly species richness of S.W. Cameroon — he notes that Belize (similar in area to southwest Cameroon) has 170 recorded species and that Kenya (which is 24 times larger) has 194 species.

He also observes that the area is rich in ancient relicts and endemics, although he does not list them specifically.] Address: Conservation International, Center for Applied Biodiversity Science, 1919 M Street, NW, Suite 600, Washington, DC 20036, USA

11070. Preston, D.J.; McShane, M.K.K.; Evenhuis, N. L.; Samuelson, G.A.; Arakaki, K.T.; Polhemus, D.A. (2004): Arthropod survey of the Waiākea 1942 Lava Flow Natural Area Reserve and selected Kīpuka within the Mauna Loa Kīpuka Mosaic, Hawai'i. Contribution No. 2004-009 to the Hawaii Biological Survey: II + 44 pp. (in English) [USA; the following species were observed: *Anax strenuus*, *Pantala flavescens*, *Megalagrion amaurodytum peles*, *M. calliphya microdemas* and *Megalagrion hawaiiense*.] Address: Polhemus, D.A., Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawaii, 96817-2704, USA

11071. Sasamoto, A. (2004): On the true taxonomic status of *Stylogomphus lawrenceae malayanus* (Anisoptera: Gomphidae). *Tombo* 47: 27-30. (in English) ["*S. lawrenceae malayanus* Sasamoto, 2001 from the Malay Peninsula is regarded as a good species based on the comparison of its type specimens with the specimens including some paratypes of *S. lawrenceae* Yang et Davies, 1996." (Author)] Address: Sasamoto, A., 190-4 Yakuoji, Tawaramoto-chō, Shiki-gun, Nara, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

11072. Tsuyuki, K.; Sudo, S. (2004): The properties of wing and airflow of flying insects. 24th International Congress of the Aeronautical Sciences: 10 pp. ["This paper describes the results of some experiments concerning wing morphology and flight performance of several flying insects; cicadas, dragonflies (*Sympetrum frequens*) and bumblebees. Firstly, the surface shapes of three insect wings were visualized by a distinct three-dimensional image. The surface shapes showed a difference of functions for flapping flight between each wing. Secondly, the distribution of velocity fields around a flapping dragonfly, a flapping bumblebee and a flapping cicada were visualized with a PIV system to identify the airflow generated by the wings. Periodical vortex rings were observed in the result with the bumblebee. Finally, the successful observation of a flapping cicada the free flight is reported." (Authors)] Address: Sudo, S., Faculty of Systems Science and Technology, Akita Prefectural University, Yurihonjo 015-0055 Japan. E-mail: sudou@iwakimu.ac.jp

11073. Yodo, T; Iguchi, K. (2004): Feeding habits of the alien species, Smallmouth Bass in the Nogu River, Central Japan. *Suisanzoshoku* 52(4): 395-400. (in Japanese, with English summary) ["Stomach contents of 82 larvae and juveniles and 30 young and adults of smallmouth bass *Micropterus dolomieu* collected in the Nogu River, Nagano Prefecture were examined. The Nogu River is a moderate to rapidly flowing stream and the current velocities of sampling stations were 16.5 to 73.4 cm/s (mean, 57.3). Smallmouth bass larvae and juveniles mainly fed on aquatic insects which were represented by chironomid larvae or baetid nymphs. Although, aquatic insects such as baetid and heptageniid nymphs were also important prey of young and adult smallmouth bass, they fed on various prey including fishes with a well developed swimming ability such as ayu *Plecoglossus altivelis altivelis* or masu salmon *Oncorhynchus masou masou*. With growth their main prey items shifted from stationary to slow moving benthic

and finally to free swimming species. We conclude that smallmouth bass damage to the stream-dwelling fishes as competitors for prey resources in addition to the direct predator." (Authors) Diet is listed at the family level including Gomphidae, Libellulidae, and Corduliidae.] Address: Yodo, T., Dept of Life Sciences, Faculty of Biore-sources, Mie Univ., 1515 Kamihama, Tsu, Mie 514-8507, Japan

2005

11074. Abbott, J. (2005): New and notable records of Odonata from Texas. *Southwestern entomologist* 30(3): 169-174. (in English) ["A dramatic increase in interest in the North American Odonata fauna in the last few years has led to many new discoveries, particularly in southern areas where subtropical species seem to be expanding their range northward. I report the occurrence of eight Odonata species previously unknown from Texas: *Argia oenea*, *Enallagma antennatum*, *Leptobasis melinogaster*, *Aeshna persephone*, *Anax concolor*, *Phyllocycla breviphylla*, *Erythemis attala*, and *E. mithroides*. These discoveries include four species previously unknown from the United States and the first occurrence of the genus *Leptobasis* in the country. Additionally, I discuss recent records of several other species rarely reported from Texas." (Author)] Address: Abbott, J.C., Patterson Labs 219, School Bio. Sci., Univ. Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

11075. Boissinot, A. (2005): Deux nouvelles espèces d'insectes pour les Deux-Sèvres cet été – Une Libellule: *Sympetrum danae*. *Bull. Deux-Sèvres Nature Environnement* 34-2: 26-27. (in French) [zone humide du For-gineau, Cantal, France, August 2005.] Address: Deux-Sèvres Nature Environnement, 7 rue Crèmeau, 79000 NIORT, France. E-mail: contact@dsne.org

11076. Paulson D.R. (2005): Dragonflies in the canopy. *WHAT'S UP? The Newsletter of The International Canopy Network* 12(1): 7-8. (in English) [Verbatim: In the past few years, I have made dry-season visits to undisturbed rainforest sites in southern Venezuela and southern Peru, and it got me thinking about dragonflies and their use of three-dimensional space in forests. We know very little about this. When we see them in forested areas, it's either at or near ground level or - if in clearings or light gaps - perhaps in flight well above us, cruising around after flying insects. These recent visits are the first ones during which I have actively searched for dragonflies in the tropical rainforest canopy. Unfortunately, I could do so only from ground level, as neither of these sites had canopy access, so I was limited to what I could see by scanning with binoculars. I know that many odonates perch on tips of leaves and twigs, so I spent time scanning such potential perches, and if conditions were right, I could sometimes see they were occupied. It's well known that productivity is higher where there is sunlight, and of course there is much more sunlight at the upper levels of the canopy than down on the forest floor, where the aquatic breeding habitats for most dragonflies are located. Thus dragonflies feeding in rain forests should tend to move upward into the canopy, all other things being equal. In Venezuela, where the forest was fairly open, we saw numerous anisopterans perched high in the trees, usually on twigs. They varied in size but were obviously libellulids, including at least *Erythrodiplax*, *Micrathyria*, and *Orythemis*. The most easily identifiable were the little black-

winged beauties of the genus *Zenithoptera*, which perch with wings drooped and form tiny black parasols at the tips of upward pointing twigs and vines. The pale line through midwing distinguishes them easily from *Diastatops*, a related genus with all black or black and red wings, which I saw once in a similar situation. In Peru, we saw *Zenithoptera* again in the same sorts of places, as well as *Micrathyria*, *Misagria*, and *Orthemis* well up in the trees. However, *Erythrodiplax* in that forest usually perched low. At least some of these dragonflies were surely spending the dry season as immatures, delaying reproductive activity until the rains began, but others were probably reproductively active. While watching odonates at a sun-drenched grass bed in a small forest swamp completely surrounded by trees, I saw several *Zenithoptera fasciata* drop vertically out of the canopy like a falling leaf, land in the sun on the grass with wings closed, then droop them suddenly to catch the sun with their brilliant blue upper surfaces. Each of these individuals stayed for only a minute or two, then suddenly ascended back into the canopy, disappearing as mysteriously as they appeared. I assume they were visiting the mating rendezvous site, although surprisingly briefly. I spent time along a small sandy stream in the Peruvian forest, and at one place the stream was wide enough to present a vertical wall of foliage on either side, well insolated at midday. I scanned this foliage wall with binoculars and found damselflies mostly of the genera *Argia* and *Hetaerina* spread all across it, perched on leaf tips. I saw none above about 10 meters in height, but it surely became more difficult to see them at higher levels if they were up there. Among them was a female *Heteragrion* and a female of the rare *Heliocharis amazona*. As I watched, one after another launched itself out into the open at intervals after flying insect prey. Open air, sunshine, and abundant perch sites combined to make this an ideal spot for a damselfly picnic. These odonates all forage by sallying forth to capture flying insects, as far as I know, and their perches, right out in the open, are just as appropriately situated for them as they are for flycatchers, jacamars, and other sallying birds of the same habitat. One morning it was exceptionally windy, with tall canopy trees swaying and creaking, and this was the final bit of evidence that convinced me the canopy was full of odonates. There were more individuals and more species in evidence along the trail than I saw at any other time, and I could explain their presence only by the hypothesis that the winds had forced them down to lower levels. With limited evidence, I believe that rain forests are full of dragonflies at all levels, especially during the dry season when they're not breeding. They may be there as well during the wet season. I know people who have observed dragonfly behavior in and above rainforest canopies from canopy walkways and towers, but I haven't been so fortunate. This remains a dream that I hope to fulfill sometime, somewhere.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

11077. Serafin, E. (2005): Feeding strategies of dragonfly larvae, or how to get out a caddisfly from its case. *Odonatrix* 1(2): 25-26. (in Polish, with English summary) ["This note presents the techniques of foraging of dragonfly larvae on caddisfly larvae, with some comments on dealing with caddis cases. Researches showed that the success of dragonflies in catching larval caddisflies were associated with rupturing a case as well as its construction. Hard and strongly built cases

were a handicap for obtaining larvae by dragonflies." (Author)] Address: Buczyńska, Edyta, Konrada Wallenroda Str. 2b/37, 20-607 Lublin, Poland

11078. Ternois, V. (2005): L'Agrion de Mercure *Coenagrion mercuriale* (Charpentier, 1840): synthèse de trois années d'observations dans le Nord-est aubois et la frange haut-marnaise limitrophe (Odonata, Zygoptera, Coenagrionidae). *Naturelle, Le bulletin de l'association des Naturalistes de Champagne-Ardenne* Mai 2005: 45-53. (in French) [Champagne-Ardenne, France; the author reports on regional efforts to study *C. mercuriale*. He gives suggestions for further studies on phenology, habitat preferences and co-occurring species.] Address: Ternois, V., 22, route de Sauvage-Magny 52220 Anglus, France. E-mail: vincathe@wanadoo.fr

11079. Willet, J. (2005): New dragonfly in central Scotland. *BRISC Recorder News* No 59: 4-5. (in English) [*Aeshna cyanea*, Plean Country Park, five miles east of Stirling, UK, 22-VIII-2005] Address: not stated

2006

11080. Indermühle, N.; Oertli, B. (2006): Restoration of riverine ponds along the Rhone River (Teppes de Verbois, Canton of Geneva, Switzerland): what is the gain for Odonata? *Archives des Sciences A* 59(2-3): 243-250. (in English, with French summary) ["The Teppes de Verbois Site is a recent example of riverine pond restoration in the canton of Geneva (Switzerland). Between 1999 and 2001, four permanent and several small temporary ponds (total surface of the waterbodies: about 7 ha) have been dug on the site of an ancient gravel pit. During 2004, the four permanent ponds were sampled for Odonata once a month from May to September. Adult Odonata were identified and their abundance estimated. A total of 25 species was identified, representing more than half of the species occurring in the canton of Geneva. Two species among them are Swiss Red List species: *Orthetrum albistylum* (EN) and *Gomphus pulchellus* (VU). They are considered as target species for the management of the restored Teppes de Verbois site. The creation of these off-channel habitats appears to have very positive impacts on Odonata. On the level of the canton, the species richness of the Teppes de Verbois has reached (and partly even out-matched) the richness of the other nature reserves, after only four years of colonisation. On a regional scale, the new ponds improve the network of alluvial habitats, allowing each Odonata metapopulation to become more abundant and to find more breeding sites. On a national and international level, the high abundance of *Gomphus pulchellus* is of particular interest, as this dragonfly is the only European endemic species occurring in the canton of Geneva." (Authors)] Address: Oertli, B., Dept of Nature Management, University of Applied Sciences of Western Switzerland, EIL HES de Lullier-Geneva, 150 route de Présinge, CH-1254 Jussy, Switzerland. E-mail: beat.oertli@etat.ge.ch

11081. Kim, S.-T.; Jung, M.P.; Kim, H.S.; Shin, J.-H.; Lim, J.-H.; Kim, W.T.; Lee, J.H. (2006): Insect fauna of adjacent areas of DMZ in Korea. *Journal of Ecology Field Bulletin* 29(2): 125-141. (in English) ["Insect fauna in adjacent areas of Demilitarized Zone (DMZ) in Korea was surveyed seasonally in 2001 - 2003. The survey area was divided into 3 regions (eastern mountain, middle inland, and western coastal regions) in accord-

ance with administrative districts and topography. Sampling methods such as sweeping, sieving, beating, brushing and suction were used depending on the environmental and military conditions. Total 361 genera and 437 species of 116 families belonging to 14 orders were identified. Among these, 46 species were new to insect fauna of DMZ areas. Species richness was the highest in the eastern mountain region. Numbers of habitat-common and -specific species were 96 (22%) and 195 (47.2%), respectively. The insect species community similarity was highest (0.64) between eastern mountain region and western coastal region. Insect orders showing high species richness were Coleoptera (38.9%), Lepidoptera (19.2%), Orthoptera (9.4%), and Hemiptera (9.2%). These results will be useful information for study of history on the change of insect fauna and future conservation in DMZ areas." (Authors) The paper lists 10 Odonata species from the Eastern mountain and Middle inland regions.] Address: Kim, Seung-Tae, Dept of Forest Environment, Korea Forest Research Institute, Seoul 130-712, Korea. Lee, J.H.: E-mail: jh7lee@snu.ac.kr

11082. Lailvaux, S.P.; Irschick, D.J. (2006): A functional perspective on sexual selection: insights and future prospects. *Animal Behaviour* 72: 263-272. (in English) ["A large number of sexual selection studies have focused on examining the morphological and behavioural factors involved in male combat and female choice, such as whether large males achieve higher reproductive success compared with smaller males. However, until recently, the mechanistic reasons why such cues are linked to male dominance or female choice have been elusive. An emerging body of work shows that physiological and whole-organism performance capacities are important in individual reproductive success. Males with high performance or other physiological capacities (e.g. endurance, biting) often enjoy an advantage over males with poorer performance capacities during male-male contests. In contrast, few studies have examined links between performance and female choice. Here, we highlight recent key literature integrating sexual selection, performance and physiology. We also point to areas where a more rigorous investigation of underlying physiological processes may yield insights into sexual selection. In particular, we note that current progress in several important areas may be hampered by an inadequate physiological understanding of condition. We suggest a conceptual approach that may shed light on the physiological factors underlying condition, and we point out several other potentially important avenues for future research." (Authors) The review includes studies on *Calopteryx maculata* and *C. virgo*.] Address: Lailvaux, S.P., Functional Morphology Laboratory, Department of Biology, University of Antwerp, Universiteitsplein 1, Wilrijk B-2610, Belgium. E-mail: slailvaux@gmail.com

11083. Reis Monteiro, B. (2006): Distribuição dos Lepidópteros e Odonatas da Reserva Natural da Serra da Malcata. Universidade de Aveiro, Departamento de Biologia. Ano lectivo: 2005/2006: 121 pp. (in Portuguese) [Portugal; the paper lists and maps 22 Odonata species from the nature reserve. The list includes *Coenagrion caerulescens*, *Oxygastra curtisii* and *Macromia splendens*. For details see: <http://portal.icnb.pt/NR/rdonlyres/148CB72B-A944-4DCF-8B1C-FE469FEBA9DE/0/RNSMLepidopterosOdonatasDistribuicao2006.pdf>] Address: not stated

11084. Biggs, K.; Manolis, T. (2007): Dragonflies of North America. A color and learn book with activities. Azalea Creek Publishing: 48 pp. (in English) ["Colour & learn about the gorgeous dragonflies & damselflies of North America. Colouring pages about the life history and biology of Odonata. Colouring pages for 37 common species of Dragonflies and Damselflies. Includes activities: crossword puzzle, other word games, and cut out finger puppets. Small coloured images for all the pages are provided on the inside covers. Available on a CD-ROM (interactive PDF format): (ISBN 0-9677934-5-9): The same pages as the book, but interactive, and with one bonus page! Colour the pages over and over again! Colour some pages to look like juvenile males; others as mature males or females. Print multiple copies of all or some of the pages for your classroom &/or friends." (Publisher) For more details see: <http://southwestdragonflies.net/ColoringBook/#CD>] Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol CA, 95472, USA. E-mail: bigsnest@sonic.net

11085. Dyuzhaeva, I.V. (2007): Concerning the role of the Samara State University Botanical Garden in urban insects preservation. *Samara Luka: Bull.* 16(1-2): 174-181. (in Russian, with English summary) ["During 30-years researches within the botanical garden territory, 773 species of insects from 15 groups, 123 families and 553 genera have been revealed. After 1990 here about 50 species of insects have ceased to meet or became extremely rare." (Author) Taxa - including Odonata - are treated at the family level.] Address: not stated

11086. Faucheux, M.; Meurgey, F. (2007): Première description des sensilles sur l'antenne larvaire d'un Anisoptère; *Aeshna cyanea* (Odonata: Anisoptera; Aeshnidae). Comparaison avec les antennes des Zygoptères. *Bull. Soc. Sci. Nat. Ouest Fr.* 29(4): 192-202. ["The sensilla on the larval antennae of *A. cyanea* have been described by means of scanning electron microscopy and compared with those of Zygoptera, the larval antenna comprises a scape, a pedicel and a 5-segmented flagellum. No sensillum has been observed on the scape. The pedicel bears two sensillum types: typical aporous sensilla chaetica and spatula-shaped aporous sensilla chaetica. A few aporous sensilla filiformia are distributed on the whole length of the flagellomeres. Other sensilla filiformia are lined up to a circle at the apex of these flagellomeres. An aporous curved sensilla chaeticum occurs at the apex of the 4th flagellomere. Two sensilla campaniformia are located on the 5th flagellomere. Judging from their morphological characteristics and their position on the antennae, the typical sensilla chaetica of the pedicel are proprioceptors, those of the flagellum are tactile; the spatula-shaped sensilla chaetica are proprioceptors; the sensilla filiformia are vibroreceptors; the curved sensillum chaeticum is a proprioceptor making possible the positioning of the flagellomeres, and the apical sensilla campaniformia probably provide an osmoreceptive function. No chemoreceptor has been observed. The larval antennal sensory equipment of the anisopteran *Aeshna cyanea* resembles that of the larvae of Zygoptera." (Authors)] Address: Faucheux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Université de Nantes, 2 rue de la Houssinière, B.P. 92208, F-44322 Nantes Cedex 03, France. E-mail: faucheux.michel@free.fr

11087. Gabriels, W. (2007): Multimetric assessment of freshwater macroinvertebrate communities in Flanders, Belgium. PhD thesis. Faculty of Bioscience Engineering, Ghent University, Belgium. ISBN-number: 978-90-5989-203-3: 207 pp + appendices. (in English) [Since the Belgian Biotic Index (BBI) does not meet all the requirements of the European Water Framework Directive (WFD; EU, 2000), a new index, the Multimetric Macroinvertebrate Index Flanders (MMIF) for assessing rivers and lakes is proposed. This index is developed using the database of macroinvertebrate samples provided by the Flemish Environment Agency. The MMIF is calculated based on macroinvertebrate community data obtained using the same sampling and identification procedure as the BBI. The index calculation is a type-specific multimetric system based on five equally weighted metrics, which are taxa richness, number of Ephemeroptera, Plecoptera and/or Trichoptera taxa, number of other sensitive taxa (including Odonata at the family level), the Shannon-Wiener diversity index, and the mean tolerance score. The final index value is expressed as an EQR ranging from zero for bad status to one for high status. The MMIF combines the robustness of the BBI and the long-term experience in Flanders with the flexibility of multimetric indices, while at the same time taking into account the technical requirements of the WFD. For details see: <https://archive.ugent.be/retrieve/4808/Gabriels2007PhD-thesis.pdf>] Address: not stated

11088. Henriques-de-Oliveira, C.; Baptista, D.F.; Nessimian, J.L. (2007): Sewage input effects on the macroinvertebrate community associated to *Typha domingensis* Pers in a coastal lagoon in southeastern Brazil. *Braz. J. Biol.* 67(1): 73-80. (in English, with Portuguese summary) ["This study was carried out at Imboassica Lagoon, located in an urban zone in the municipality of Macaé, Rio de Janeiro state, Brazil. This lagoon has been subject to anthropogenic impacts due to the increasing city population, such as the input of sewage. Areas of variable degree of anthropogenic influence in the lagoon were compared regarding the structure of the macroinvertebrate community associated to *Typha domingensis* leaves. For sampling, we used 35 x 20 cm net plastic bags, with 6.8 mm mesh containing *T. domingensis* leaves for colonization. Two different sampling stations were selected: station A, under direct input of sewage; and station B with lesser sewage influence. The bags were removed after 20, 40 and 75 days of colonization. For each sample the Shannon-Wiener Diversity, Pielou Evenness, Jaccard Similarity Indices, Correspondence Analysis and taxonomic richness were calculated. A total of 31,874 individuals were sampled, belonging to 34 taxa. The main taxonomical groups were: Oligochaeta (41%), Chironomidae (40%), Ancyliidae (4.6%), Polymitarcyidae (4%) and Thiaridae (3%). At station A, the taxonomic richness, the Evenness and Diversity values were lower than in station B. On the other hand, the total density was three times higher in station A than in B. It was already possible to discriminate the community structure of each sampling station in the first sampling. Trichoptera and Ephemeroptera were the main exclusive groups of station B and are considered good water quality indicators due to their high sensibility to contamination. The major contribution to discriminate between the macroinvertebrate communities of the two sample stations came from Chironomidae, Oligochaeta and Ephemeroptera." (Authors) Taxa including Odonata are treated at the family or genus level. Odonata, mainly Coenagrionidae, represented

only 0.5% of all specimens collected.] Address: Henriques-de-Oliveira, C., Laboratório de Entomologia, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, CP 68044, CEP 21944-970, Cidade Universitária, Rio de Janeiro, RJ, Brazil. E-mail: crikes@acd.ufrj.br

11089. Holuša, O. (2007): Výsledky faunistického průzkumu vážek (Odonata) na území národního parku Podyjí a na několika lokalitách v okolí. *Thaynesia (Znojmo)* 7: 239-247. (in Czech, with English summary) [Czech Republic; between 1999 and 2005, 33 Odonata species were found at 19 localities within the boundaries of the National park of Podyjí and in its surroundings. Of regional interest are *Anax parthenope*, *Crocothemis erythraea*, *Leucorrhinia pectoralis*, and *Coenagrion scitulum*.] Address: Holuša, O., Mendelova zemědělská a lesnická Univerzita v Brně, Lesnická a dřevařská fakulta, Ústav lesnické botaniky, dendrologie a geobiocenologie, Zemědělská 3, 613 00 Brno, Bruzovská 420, 73 801 Frýdek-Místek. E-mail: holusao@email.cz

11090. KNNV (Koninklijke Nederlandse Natuurhistorische Vereniging) (2007): Verslag van het kamp Elbeta-lae in Gartow (D), Gehouden van 8 t/m 22 juli 2007. KNNV- AKC Kamp Gartow am See 2007. <http://www.knnv.nl/akc/2007%20verslagen/Gartow/Gartow.pdf>: 23 pp. (in Dutch) [Niedersachsen, Germany. An excursion to the floodplain of the river Elbe resulted in the observation of 22 Odonata species. These are documented without any details in a cumulative list.] Address: not stated

11091. Meurgey, F. (2007): A contribution to the knowledge of the Odonata of Dominica (British West Indies) November 11 - December 07 2006. *NHMN (Nantes Museum of Natural History) Contribution to odonatology* 4: 22 pp. (in English) ["The dragonfly fauna of the Lesser Antilles actually counts 135 species - 59 without Trinidad, which is definitely South American - there are 37 species in Guadeloupe (Meurgey, 2006b) and 24 in Martinique (Meurgey, 2005). It seems that the paucity of species in Dominica is due to 1) the lack of standing water habitats (95% of Odonata reproduce in standing water), and 2) the lack of studies, with only two surveys. The number of species from Martinique, which is quite equal to those from Dominica, is due to a high level of disturbances, pollutions and urbanization. We think that the fauna of Dominica could be reach 30-35 species. The origin of the dragonfly fauna of the Lesser Antillean Islands is still poorly known. Dominica is situated near the middle of the Lesser Antilles and its dragonfly fauna is mainly composed with South American species. These species have strongest relative abundances and, in general, are the most frequently observed. There is no endemic species on Dominica. Two species, however, have a worldwide distribution restricted to some Lesser Antilles islands (Guadeloupe, Dominica and Martinique): *Argia concinna* and *Protoneura ailsa*. Antillean species: Four species restricted to the West Indies occurs in Dominica. *Enallagma coecum* is mentioned from Cuba to Ste Lucia, but seems to be replaced in the Greater Antilles by *Enallagma cardenium*. *Orthemis macrostigma*, at that time, occurs only in the Lesser Antilles and seems to be replaced by others undescribed species in the Greater Antilles. *Tramea insularis* is mentioned in the Greater Antilles from Cuba to Puerto-Rico, and in the Lesser Antilles, only on Guadeloupe and Dominica. Finally, *Brechmorhoga grenadensis* is restricted to some Lesser Antillean islands (Guadeloupe,

Dominica, Martinique, Grenada). South American and Central American species: On the 25 species occurring in Dominica, 17 have a South American or Central American centred distribution. Some of these species occurs both in Central and South America: *Ischnura hastata*, *Ischnura ramburii*, *Lestes forficula*, *Lestes tenuatus*, *Telebasis corallina*, *Anax concolor*, *Rhionaeschna psilus*, *Triacanthagyna trifida*, *Brachymesia furcata*, *Brachymesia herbida*, *Erythemis vesiculosa*, *Erythrodiplax umbrata*, *Dythemis sterilis*, *Miathyria marcella*, *Micrathyria aequalis*, *Micrathyria didyma*, *Tramea abdominalis*. Wide ranging species: This group comprises *Anax ephippiger* and *Pantala flavescens*, which is a cosmopolitan species, present in all continents, excepted Europe. Considered as a pioneer in newly or disturbed habitats, with a short larval development, *Pantala flavescens* is scarce on Dominica and fairly common in neighbouring islands. More astounding is the lack of *Anax junius* on Dominica. This North American species occurs both in the Antilles and South America, as well as Russia, east Asia and Polynesia. Common in Guadeloupe and Martinique, where this species regularly breed, it was never mentioned from Dominica." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

11092. Thompson, D.J.; Watts, P.C.; Saccheri, I.J. (2007): 12. Conservation genetics for insects. Stewart, A.J.A., T.R. New & O.T. Lewis (eds): *Insect Conservation Biology: Proceedings of the Royal Entomological Society's 23rd Symposium: The 22nd Symposium of the Royal Entomological Society: 280-300.* (in English) ["The importance of inbreeding and genetic drift for population persistence is likely to vary considerably among insect species, depending on their genetic load (of deleterious mutations) and the need to adapt to environmental change over differing spatial and temporal scales. It would therefore be valuable to collect more data on inbreeding depression in insects and also to characterize the ecological context of selective environments, which determine the relative magnitude of hard versus soft selection and the demographic consequences of selection. While purely ecological management is aimed at maintaining a given census population size, genetic management is focused on the maintenance of effective population size. As we have discussed, these two measures of population size may differ by an order of magnitude or more, but in most insects both remain something of a mystery. This said, we summarize the features that predispose many insects to such genetic effects ... The second major genetic issue is the number of founders or immigrants that should be introduced. Inbreeding depression can be largely avoided with effective population sizes greater than 50 (1% inbreeding per generation), which may be equivalent to 100 or 1000 individuals. Maintaining genetic diversity, particularly the contribution of rare alleles, would require an effective population size closer to 1000 (Nunney and Campbell, 1993). ... We can illustrate (at least the first of these issues in practical terms by returning to the endangered damselfly *Coenagrion mercuriale*. ... Newly restored habitat close to existing sites can expect natural recolonization in ecological time (or could be augmented from existing strong populations in the Itchen Valley or Beaulieu Heath, New Forest). Those populations in which genetic erosion has taken place, for example Nant Isaf in Anglesey and the Devon sites of Aylesbeare Common and Colaton Ra-

leigh Common, should clearly be augmented from the UK stronghold sites. The issue is straightforward for the Devon sites where the habitat and phenology is similar to key sites within New Forest, so the source for the material to be reintroduced can be identified clearly. The issue is less clear-cut for the Nant Isaf site, which is one of only two fen sites for *C. mercuriale* in the UK. The other fen site, in Oxfordshire, is also genetically depauperate, whereas the UK stronghold sites are not fens. We can be less confident that augmentation would be successful, though there would appear to be no options other than waiting for the Nant Isaf population to become extinct." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

11093. van Nieukerken, E.J.; Huijbregts, J. (2007): *Tijdschrift voor Entomologie* 150 volumes: one and a half century of Systematic Entomology in a changing world. *Tijdschrift voor Entomologie* 150: 245-261. (in English) ["The *Tijdschrift voor Entomologie* started in 1857 and 1858 with volume 1, and has now existed for 150 years. A brief history is presented, and details are given on editors (including biographies), composition, publication dates, indexes, authorship, division of articles over biogeographic regions and taxonomic groups, illustrated with graphs and tables. The complete index of 150 volumes is published online at the same time as this issue, as are pdf files of volumes 141 to 148, and some papers of this issue." (Authors) The paper also includes a portrait of Jan van Tol, leading taxonomist in south-east Asian Odonata.] Address: van Nieukerken, E.J., National Museum of Natural History Naturalis, PO Box 9517, 2300 RA Leiden, The Netherlands. E-mail: nieukerken@naturalis.nl

11094. Wildermuth, H. (2007): *Salamander, Prachtlibelle und Quelljungfer. Naturschutzinventar fünf ausgewählter Fließgewässer-Organismen und ihrer Lebensräume in der Gemeinde Rüti ZH 2005-2007.* © 2007 Prof. Dr. Hansruedi Wildermuth, Haltbergstrasse 43, 8630 Rüti. hansruedi@wildermuth.ch: 42 pp. (in German) [Between April 2005 and May 2007, the system of running waters (37 brooks and ditches) in Rüti, Switzerland, was studied for selected species focusing on *Calopteryx splendens*, *C. virgo*, *Cordulegaster bidentata*, and *C. boltonii*. Characteristic species of the water bodies are *C. virgo* and *C. boltonii* (and *Salamandra salamandra*, Amphibia). Rare are *C. splendens* and *C. bidentata*. The distribution patterns and underlying ecological factors are discussed in detail. Both, natural and/or anthropogenic factors limit the usability of the water bodies as habitat. Measures to improve habitats for the studied species are proposed.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

2008

11095. Baus, E. (2008): Une menace de plus pour la biodiversité? *Science Connection* 21: 35-37. (in French) [Belgium; the paper briefly refers to present discussion of climate change as an addition threat for biodiversity. *Crocothemis erythraea* is noted and pictured.] Address: Baus, Erika c/o Editeur responsable: Philippe Mettens, Rue de la Science, 8, B - 1000 – Bruxelles, Belgium

11096. Bonifait, S.; Defos du Rau, P.; Soulet, D. (2008): Les Odonates de la Réserve Nationale de Chasse et de Faune Sauvage d'Orlu (département de l'Ariège, France). *Martinia* 24(2): 35-44. (in French, with English summary) ["20 Odonata species were identified during a survey realized in 2004 in the Orlu protected area (Ariège Pyrenees, montane ecosystem: 915-2765 m). In addition to adult survey, further data were obtained from searches of larvae and exuviae. A small population of *Coenagrion mercuriale* was found between 1300 and 1425 m, a new altitudinal limit for this species, as far as we know. The odonate community of Orlu includes few species but shows comparatively high inter-site variability, especially in flowing habitats. Lentic habitats are characterized by a boreo-montane assemblage richer and typical of peaty ponds, composed of *C. hastulatum*, *Aeshna juncea*, *Leucorrhinia dubia*, *Enallagma cyathigerum*, *Libellula quadrimaculata* and *Somatochlora metallica*. The degree of wetlands' use by cattle and fishery management are the main conservation issues for Odonates in the Orlu protected area." (Authors)] Address: Bonifait, S., ONCFS – Cellule technique, D.R. Sud-Ouest, 10 bis route d'Ax, F-31120 Portet sur Garonne, France. E-mail: sylvainbonifait@yahoo.fr

11097. Ellenrieder, N. von; Lozano, F. (2008): Blues for the red Oxyagrion: a redefinition of the genera *Acanthagrion* and *Oxyagrion* (Odonata: Coenagrionidae). *International Journal of Odonatology* 11(1): 95-113. (in English, with Spanish summary) ["Examination of diagnostic features for all known species of *Acanthagrion* and *Oxyagrion* shows color pattern alone not to be a reliable diagnostic character. Both genera are redefined based on morphological characters, and some colour pattern characters which further aid in their diagnoses. A preliminary phylogenetic analysis indicates both genera are monophyletic. They are distinguished from other genera of Neotropical coenagrionids by their decumbent cerci with a dorso-basal tubercle in males correlated with the presence of paired mesepisternal fossae in females. *Acanthagrion* and *Oxyagrion* can be unequivocally distinguished from each other by the minimum width of abdomen, shape of distal portion of genital ligula and position of lateral lobes of genital ligula relative to flexure in males, development of mesepisternal carinae and of dark mid-dorsal and humeral stripes in females, and ratio of caudal lamellae to abdominal length in ultimate larval instars. According to our redefinition we transfer *A. ablutum* (a 'blue' species), *A. hermosae* and *A. imeyiense* to *Oxyagrion*, and *O. egleri* to *Acanthagrion*. The generic placement of '*A. taxaense*' and '*O. pseudocardinale*' is deemed doubtful." (Authors)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

11098. Geraeds, R.P.G. (2008): Two larvae of the Golden-ringed dragonfly found in the Swalm brook. *Natuurhistorisch Maandblad* 97(5): 122-124. (in Dutch, with English summary) ["During a survey of the Swalm brook by the fish study group of the Natuurhistorisch Genootschap on 29 September 2007, a larva of the Golden-ringed dragonfly (*Cordulegaster boltonii*) was caught, near the German border. Since this species is very rare in the Netherlands, the site was visited again on 5 October 2007, and a second larva was found at this location. Until recently, the populations of *C. boltonii* in the Meinweg and Haeseraalbroek nature reserves were the only known populations in the Netherlands, but the species

has frequently been spotted at other locations since the end of the previous century. Also, two new breeding sites have been found in the province of Limburg, viz. the Aalsbeek/Molenbeek and Venbeek brooks. Since the Dutch part of the Swalm brook does not appear to be an ideal breeding water for *C. boltonii*, it is not likely that this brook actually hosts a population. The larvae probably reached the Dutch part of the Swalm by larval drift from the upstream German part or from one of its tributaries. It is thus possible that *C. boltonii* may some day colonise smaller streams like the Eppenbeek and Teutebeek brooks in the Swalm valley." (Author)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

11099. Hothem, R.L. (2008): Mercury contamination in Foothill Yellow-legged Frogs (*Rana boylei*) and invertebrates from Harley Gulch, California, 2007. Administrative Report. Prepared for: The Bureau of Land Management, U.S. Department of the Interior, U.S. Geological Survey, Western Ecological Research Center: 24 pp. (in English) [USA "Fish and wildlife may bioaccumulate mercury (Hg) to concentrations that adversely affect their reproduction, growth, and survival. In May 2007, we collected aquatic invertebrates and *Rana boylei* from sites within the Harley Gulch watershed for comparison with those collected from Harley Gulch in earlier years and from reference sites. Aquatic invertebrates were analyzed for both total Hg and MeHg. Methylmercury concentrations in water striders and larval dragonflies collected in 2007 were higher from below the confluence of the west and east forks of Harley Gulch (lower Harley Gulch) than from the East Fork. Dragonflies ("*Aeshnidae*, *Libellulidae*") from the West Fork wetland pond were also higher than the East Fork. All samples had higher MeHg concentrations than references collected from the Bear River at the Highway 20 Bridge in 1999-2002. The 2007 samples, collected at Harley Gulch in the spring (May) had lower concentrations of Hg than the samples collected in the fall (October) of 2002. All frogs were analyzed for total Hg at a contract laboratory; selected frogs were also analyzed for methylmercury (MeHg). Mercury concentrations in frogs from lower Harley Gulch in 2007 were similar to frogs collected in 1997 and 1998 from lower Harley Gulch and from upstream in the Turkey Run and Abbot Mine drains. Mercury concentrations in foothill yellow-legged frogs collected from lower Harley Gulch were significantly higher than both frogs collected from the east branch of Harley Gulch in 2007 and those from three reference sites sampled in 1997. In 31% of the frogs collected from lower Harley Gulch in 2007, the concentration of total Hg exceeded the FDA criterion (1.0 ig/g) for regulation of commercial fish, and all frogs exceeded the EPA criterion (0.3 ig/g) for issuance of human health advisories for fish consumption. The Hg concentrations in frogs collected from lower Harley Gulch and the mine drains in 1997-1998 and from lower Harley Gulch in 2007 all exceeded the MeHg criterion for the protection of piscivorous wildlife (0.077 ig/g). Mercury bioaccumulation in frogs and invertebrates corroborated previous findings that identified the presence of significant sources of Hg within the Harley Gulch subwatershed." (Author)] Address: Hothem, R.L., Dixon Field Station, U.S. Geological Survey, Western Ecological Research Center, 6924 Tremont Road, Dixon, CA 95620, USA

11100. Jakab, T.; Dévai, G. (2008): The occurrence of the riverine dragonfly-species (Odonata: Gomphidae) in

Hungary according to data of larvae and exuviae. Acta Biol. Debr. Oecol. Hung 18: 53-65. (in Hungarian, with English summary) [Records of *Gomphus vulgatissimus*, *Stylurus flavipes*, *Ophiogomphus cecilia*, and *Onychogomphus forcipatus* in southwestern Hungary (River; Dráva, Gyöngyös (Kőszeg), Hernád, Ipoly, Kerka, Maros, Rába, Sajó, Szamos or upper reaches of the Tisza) are documented and mapped.] Address: Jakab, T., Kosuth Lajos Gimnázium, 5350 Tiszafüred, Baross Gábor út 36, Hungary

11101. Kamsia, B.; Zainodin, J.; Darmesah, G.; Noraini, A.; Amran, A. (2008): Effect of water parameters on Ephemeroptera abundance in Telipok River, Sabah Malaysia. WSEAS Transactions on Environment and Development 5(4): 447-451. (in English) ["This research was conducted to investigate the relationship between Ephemeroptera with water parameter such as pH, conductivity, turbidity, dissolved oxygen and total suspended solid in Telipok River, Sabah (Malaysia) using multiple linear regression. There were 32 possible models were considered in this work derived from the four significant correlation coefficients (between the dependents and independents variables). Eight selection criteria (8SC) were used in selecting a best model which signified the abundance of Ephemeroptera in the river. In order to understand the effect of the water parameters on Ephemeroptera numerical illustrations given in this work." (Authors) Odonata (not further detailed) are well represented at all sampling stations.] Address: Kamsia, B., Environmental Science Programme, School of Science & Technology, Universiti Malaysia Sabah, Locked bag 2073, 88999 Kota Kinabalu, Malaysia. bkamsia@ums.edu.my

11102. Kucuk, S.; Alpbaz, A. (2008): The impact of organic pollution on the Kirmir Creek and Sakarya River in Turkey. Water Resources 35(5): 591-597. (in English) ["The qualitative and quantitative characteristics and seasonal distribution of macroinvertebrates in the Kirmir Creek are determined by samples of bottom sediments and water." (Authors) Taxa including Libellulidae are treated at the family level.] Address: Kucuk, S., Adnan Menderes University, Faculty of Agriculture 09100, Aydin, Turkey

11103. Rijpkema, B. (2008): De natuur dichtbij: Ontdek Vlinders & Libellen – Op pad in 25 bijzondere gebieden. KNNV Uitgeverij, Zeist. ISBN 978-90-5011-272-7: 128 pp. (in Dutch) [The author introduces the butterfly and dragonfly fauna of 25 Dutch nature reserves. She invites people to walk through these reserves and get acquainted with the species diversity "from bogs to dunes, from forests to heathland". Background information, as pictures to identify the species and trails where to explore the species, will help to spend some pleasurable times. Be inspired by the crisp text and beautiful pictures, pull on your hiking shoes and explore the Dutch wealth of butterflies and dragonflies!]

11104. Timms, B.V. (2008): The ecology of episodic saline lakes of inland eastern Australia, as exemplified by a ten year study of the Rockwell-Wombah Lakes of the Paroo. Proceedings of the Linnean Society of New South Wales 129: 1-16. (in English) ["Studies on salt lakes are mostly snapshots of their unique characteristics and relationships. Longer term studies provide different perspectives on variability in hydrology, salinity and biological communities. Such a study on five lakes near the Paroo River in the northwestern Murray-

Darling Basin showed most hold water episodically for about 80% of the time, but each fluctuate over a characteristic salinity range : unnamed lake 0.6 - 19 gL⁻¹, Wombah 1.2-30 gL⁻¹, North Blue 0.3 - 31 gL⁻¹, Mid Blue 0.7 - 103 gL⁻¹, and Bulla 1.8 - 262 gL⁻¹. Generally, instantaneous biodiversity is low and not necessarily correlated with salinity, but unlike southern seasonal salt lakes, species accumulation lists are long, approaching 80 species of invertebrates, 50 bird species and a few fish species per lake. Diversity is promoted by salinity fluctuation and habitat heterogeneity. Most species reach peak abundance in any season as long as conditions are within their physiological salinity tolerances. Invertebrate fauna is of inland affinities, but with some localized substractions and additions explained by hydrology and/or salinity; waterbird numbers are influenced by events elsewhere in Australia as well as by local conditions. Like most naturally salinised lakes, production can be high, especially at low to moderate salinities and algal blooms occur naturally from time to time." (Author) Littoral invertebrates in the five lakes include the following Odonata species: *Austrolestes annulosus*, *Ischnura heterosticta*, *Xanthagrion erythroneurum*, *Diplacodes bipunctata*, *Hemicordulia tau*, *Hemianax papuensis*, and *Tramea loewii*.] Address: Timms, B., School of Environmental and Life Sciences, University of Newcastle, Callaghan, NSW, 2308, Australia. Email: brian.timms@newcastle.edu.au

11105. Zawal, A.; Jaskuła, R. (2008): First data for parasitizing on *Sympetrum meridionale* (Selys [sic]) by *Arrenurus* (Acari: Hydrachnidia) larvae from Montenegro. Natura Montenegrina 7(3): 354-359. (in English) ["Six males of *S. meridionale* from Montenegro were found with 158 parasitic larvae of *A. papillator*. All the larvae were attached to lower surface of wings. More larvae were attached to the 2nd pair of wings (85 larvae) and a little fewer were attached to the 1st pair of wings (56 larvae). The water mite larvae preferred Cu-1 veins for attaching followed by M4 veins." (Authors)] Address: Jaskuła, R., Department of Invertebrate Zoology & Hydrobiology, University of Łódź, 90-237 Łódź, Banacha 12/16, Poland. E-mail: radekj@biol.uni.lodz.pl

2009

11106. Chan, T. (2009): Taxonomic studies of the larval stage of Aeshnidae (Odonata) in Taiwan. Master thesis, Graduate Institute of Biological Resources and Technology, National Dong Hwa University, Taiwan: V + 110 pp. (in Chinese, with English summary) ["The Aeshnidae is the second largest family of Odonata in Taiwan, with 23 species now assigned to 9 genera. Seventeen species of larval aeshnids from 8 genera collected in Taiwan were taxonomically studied. Based on literature records and examination of an extensive collection, of larval of *Periaeschna magdalena* Martin, 1909, *Planaeschna risi risi* Asahina, 1964, *P. taiwana* Asahina, 1951, *Aeshna petalura taiyal* Asahina, 1938, *Polycanthygyna erythromelas* (McLachlan, 1896), *Polycanthygyna melanictera* (Selys, 1883), *Anaciaeschna jaspidea* (Burmeister, 1839), *A. martini* Selys, 1897, *Anax nigrofasciatus nigrofasciatus* Oguma, 1915, *A. panyheus* Hagen, 1867, *A. parthenope julius* Brauer, 1865, *Gynacantha japonica* Barteneff, 1909, *G. ryukyuensis* Asahina, 1962 are redescribed. The larval *Sarasaeschna pyanan* (Asahina, 1951), *S. lienii* (Yell & Chen, 2000), *Planaeschna ishigakiam flavostria* Yeh, 1996, *Polycantha-*

gyna ornithocephala (McLachlan, 1896) are described and illustrated for the first time. In addition, a key to all 17 larval aeshnids species is provided for identification. Description, diagnostic characters, distribution and habitats of each species are provided." (Author)] Address: not stated

11107. Ferenti, S.; Covaciu-Marcov, S.-D. (2009): The food composition of some *Bombina* populations from Livada forest (Satu Mare county, Romania). *Bihorean Biologist* 3(2): 143-150. (in English) [Odonata larvae contributed very little to the diet of the six *Bombina* hybrid populations from Livada Forest.] Address: Ferenti, Sara, University of Oradea, Faculty of Sciences, Universitatii Str., No. 1, 410087- Oradea, Romania. E-mail: ferentisara@yahoo.com

11108. Guerbaa, K.; Doucet, G.; Hennequin, E.; Lolive, N. (2009): Les Odonates de l'étang de Landes (Lussat, 23). *Epops* 78: 32-40. (in French) [The lake is situated near Lussat, Département de la Creuse, Région Limousin, France. 48 Odonata species are briefly introduced including 15 redlisted French species: *Aeshna isoceles*, *A. affinis*, *A. mixta*, *Anax parthenope*, *Brachytron pratense*, *Epitheca bimaculata*, *Lestes virens*, *L. barbarus*, *L. dryas*, *Coenagrion hastulatum*, *C. pulchellum*, *C. scitulum*, *Sympetrum danae*, *S. meridionale*, *S. vulgatum*.] Address: Société Limousine d'Odonatologie – 11 rue Jauvion, 87000 Limoges. assoslo@wanadoo.fr

11109. Lissak, W.; Nowak, M. (2009): Bodenständigkeitsnachweis des Kleinen Blaupfeils (*Orthetrum coerulescens*) (Fabricius, 1798) im nördlichen Vorland der Schwäbischen Alb. *Mercuriale* 9: 15-20. (in German) [Several observations of *O. coerulescens* in 2008 and 2009 along the Streifenbach near Eislingen/Fils, Landkreis Göppingen, Baden-Württemberg, Germany are reported. This stretch of the brook was heavily modified in the course of construction measures along a street, but providing a suitable habitat for this species of shallow slightly running waters.] Address: Lissak, W., Schubartstr. 12, D-73092 Heiningen, Germany. E-mail: W.Lissak@naturschutzzentrum-schopfloch.de

11110. Musée Vert (2009): Libellules entre ciel et eau. Musée Vert, Le Mans: 6 pp. (in French) [This is a brochure on a dragonfly exhibit, organized 4 Feb. - 26 July 2009, by the Muséum d'histoire naturelle de Nantes.] Address: Musée Vert, muséum d'histoire naturelle du Mans, 204, avenue Jean Jaurès 72100 Le Mans, France. E-mail: musee.vert@ville-lemans.fr

11111. Perinkova, P.; Fischer, O.A. (2009): Dragonflies (Insecta: Odonata) of Trebic Region and its surroundings. *Acta rerum naturalium* 7: 103-120. (in Czech, with English summary) ["In total 38 dragonfly species were found in 134 localities of the Trebic Region and its surroundings (Czech Republic, Southwest Moravia, 49°27' - 48°58'N 15°36' -16°18'E) in 2001-2004 and 2006-2007. An atypical intra-species tandem of two males of *Leucorrhinia pectoralis* was observed. Nine dragonfly imagoes of four species were obtained by short-term breeding of the last instar larvae in a laboratory. The number of species was influenced by elevation, the numbers of the species were 38 and 19 at elevations of 241 - 449 m and 600 - 650 m a.s.l., respectively. The occurrence of dragonfly species in localities was confirmed by findings of 87 dragonfly exuvia and 318 imagoes collected. The most important localities with 17, 16, and 15 dragonfly species found were Oslavicka and Rapotice, Budisov near Trebic, and Hrutov, respectively.

The area under study is therefore valuable and interesting from a faunistic point of view." (Authors) The following species are of regional interest: *Lestes barbarus*, *L. virens*, *L. dryas*, *Erythromma viridulum*, *Coenagrion hastulatum*, *Aeshna isoceles*, *Anax parthenope*, *Orthetrum albistylum*, *Crocothemis erythraea*, *Sympetrum danae*, *L. pectoralis* and *Onychogomphus forcipatus*.] Address: Perinkova, P., Muzeum Vysociny Trebic, Prirodovedne prac., Zámek c 1, CZ-674 01 Trebic, Czech Republic. E-mail: p.perinkova@zamek-trebic.cz

11112. Reece, B.A. (2009): Diversity, distribution, and development of the Odonata of the southern high plains of Texas. Ph.D. thesis, Graduate Faculty of Texas Tech University: IX + 117 pp. (in English) ["The diversity, distribution, and developmental patterns of odonates were examined in the playa system of the Southern High Plains of Texas, USA from 2003-2008. Comparisons were made in these factors between playas surrounded by the two dominant forms of land use (cropland, grassland). Controlled field and lab experiments were performed to examine the causal relationship between environmental variables and growth, development, and survival of larvae of a focal species. Land-use type did have an influence on certain variables, but not consistently or on all variables. Over one hundred new county records were discovered, indicating how little is known about this system. In addition, the dragonfly holdings at the Museum of Texas Tech University were sorted, identified, and compiled, revealing numerous other new county records." (Author)] Address: Reece, B.A., Dept of Biological Sciences, Texas Tech University, Lubbock, TX 79409-3131, USA. E-mail: b.reece@ttu.edu

11113. Rödder, D.; Dambach, J. (2009): Modelling future trends of relict species. In: Habel, J.C. & T. Assmann (eds.): *Relict Species: Phylogeography and conservation biology*. Springer, Berlin: 373-383. (in English) ["Distribution patterns of species vary over space and time. This becomes most evident considering the differences between the current and Last Glacial Maximum (LGM, 21,000 BP) distribution patterns of species in the Northern hemisphere. Most warm-adapted species experienced reduction and fragmentation of ranges because of intrusion by uninhabitable continental ice sheets causing distributional shifts and fragmentation of primary habitats. On the other hand, cold-adapted species were able to expand their ranges. Today, ranges of those species are restricted to current refugia as can be observed in glacial relict species. Understanding refugial distributions of species has been a core task in historical bio-geography. Before the 1990s, refugia were preliminarily identified based on disjunctions of species distributions, distribution patterns of sister species, and the fossil records. More recently, phylogeographic approaches based on intraspecific molecular analyses and spatial modelling approaches based on ecological properties of species have been developed." (Authors) *Aeshna caerulea* and *Bombina variegata* are used as model organisms. Today's distribution of *A. caerulea* was taken from Kuhn & Burbach (1998) and Sternberg & Buchwald (2000) and its potential distribution computed with Maxent 3.2.1 derived from current climatic conditions. Higher Maxent values suggest higher climatic suitability. Figure 2b,c show potential distributions of *A. caerulea* assuming two different paleoclimatic scenarios depicting climatic conditions as expected for 21,000 BP (b) CCSM; 2C: MIROC; for details see Rödder et al. 2008, Chap. 22. Areas of currently known dis-

tribution of *A. caerulea* are highly congruent with the proposed potential distribution of the CEM even in small and disjunctive ranges. Projections of the CEM onto palaeoclimatic scenarios suggest potential migration pathways during the LGM connecting most current refugia." Address: Rödder, D., Dept of Biogeography, Univ. of Trier, D-54286 Trier, Germany. E-mail: roedder@uni-trier.de

11114. Suhling, F.; Samways, M.J.; Simaika, J.P.; Kipping, J. (2009): Chapter 5. The status and distribution of dragonflies (Odonata). In: Darwall, W.R.T., Smith, K.G., Tweddle, D. & Skelton, P. (eds): The status and distribution of freshwater biodiversity in southern Africa. Gland, Switzerland: IUCN and Grahamstown, South Africa: SAIAB. ISBN: 978-2-8317-1126-3: viii + 120 pp. (in English) ["The southern African region covered here contains 22 of the freshwater ecoregions defined by Thieme et al. (2005). These 22 ecoregions are categorized under six major habitat types, which are the basis for this report. The biological distinctiveness and current conservation status of each ecoregion, summarized from Appendix D of Thieme et al. (2005), is listed in Table 1.1 in Chapter 1 of this report. We comment here on the status of these ecoregions relative to the occurrence of endemic, rare and threatened dragonfly species." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

11115. Tumilovich, O.A. (2009): New species of odonatafauna of the Kaliningrad region. Abstract. International conference "Biodiversity, protection and prospects of Baltic seashore habitats. Klaipeda 09-11 September 2009." Vilnius: 49-50. (in English) [Between 2004 and 2007, 35 Odonata species were recorded in this westernmost Russian exclave between Poland and Lithuania. New regional records are *Chalcolestes viridis*, *Ceragrion tenellum*, *Sympetrum depressiusculum*, and *S. fonscolombii*. Polish Odonata experts doubt the existence of a *C. tenellum* population in the region.] Address: Tumilovich, Olga, Kaliningrad State Technical University, 236000 Kaliningrad, Russia. E-mail: Levente@rambler.ru

11116. Vinnersten, T.Z.; Lundström, J.O.; Petersson, E.; Landin, J. (2009): Diving beetle assemblages of flooded wetlands in relation to time, wetland type and Bti-based mosquito control. *Hydrobiologia* 635: 189-203. (in English) ["The aquatic predatory insect assemblages, especially adult dytiscid assemblages, were studied in eight open temporary wetlands (wet meadows) and two forested wetlands (alder swamps) around Lake Färnebofjärden in the River Dalälven floodplains, central Sweden during spring and summer floods from 2002 to 2006." A total of 6,863 aquatic predatory insects caught in activity traps included 10 specimens of *Coruliidae*, 5 of *Coenagrionidae*, 2 of *Libellulidae* and each 1 of *Aeshnidae* and *Lestidae*.] Address: Vinnersten, T.Z.P., Department of Ecology and Evolution/Population Biology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18 D, 752 36 Uppsala, Sweden. E-mail: Thomas.Persson@ebc.uu.se

11117. Ware, J.L.; Louton, J. (2009): In the muck: collecting, rearing and imaging dragonfly and damselfly larvae for Encyclopedia of Life Odonata pages. *The Bug Dispatch* 1(2): 3-4. (in English) [The paper discusses in detail the "preparation of specimens for digital photography, with the goal to produce a large number

of useful images in a reasonable amount of time." Address: Ware, Jessica, Division of Invertebrate Zoology, American Museum of Natural History, 79th and Central Park West, New York, NY, 10024, USA. E-mail: jware@amnh.org

11118. Zhang, Z.-s.; Wang Q.-c.; Lü, X.-g.; Zheng, D.-m.; Sun, X.-j.; Zhang, X.-y.; Zhang, S.-q. (2009): Heavy metal contents in insects collected from the Huludao City suffering pollution by zinc smelting and Chlor-Alkali production. *Environmental Science* 30(7): 2077-2081. (in Chinese, with English summary) [Verbatim: 14 insect species (including "dragonfly larvae"), which were classified to three groups: the herbivorous, the polyphagous and the carnivorous, and earthworms were collected from the grasslands in Huludao City, Liaoning Province, China. [...] Mercury, cadmium and lead contents were 0.168, 9.19 and 12.58 mg·kg⁻¹ in the herbivorous insects, 0.375, 24.43 and 17.71 mg·kg⁻¹ in the polyphagous insects, 0.928, 29.78 and 18.39 mg·kg⁻¹ in the carnivorous insects. It showed that heavy metal pollution in biota in Huludao City was heavy. Bioaccumulation abilities to heavy metals significantly differed with insect species. Snails and dragonflies could accumulate more mercury than the other insects, and spiders could accumulate the most cadmium and lead in all species. These three metals investigated in insects were all sorted as the herbivorous < the polyphagous < the carnivorous. Cadmium and lead contents between the polyphagous and the carnivorous varied slightly. Correlation analysis showed that cadmium and lead contents were significantly related, but mercury and cadmium or mercury and lead were not. It indicated that cadmium and lead in insects were from the same pollution sources while mercury was more complex.] Address: Zhang, Z.-s., Key Laboratory of Wetland Ecology and Environment, Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Changchun 130012, China

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11119. Acuna Cors, A.M. (2010): Etnoecología de insectos comestibles y su manejo tradicional por la comunidad indígena de los Reyes Metzontla, Municipio de Zapotitlán Salinas, Puebla. Tesis. Maestro en Ciencias, Especialista en Estrategias para el Desarrollo Agrícola Regional. Colegio de Postgraduados, Puebla: XII + 199 pp. (in Spanish, partly English) [The ethnology of edible insects and their traditional use by the indigenous community of Los Reyes Metzontla, Municipality of Zapotitlán Salinas, Puebla, Mexico is studied. The thesis includes a few remarks on Odonata as human food referring to a broader Mexican context. Immature Anax-specimens were collected mainly in the lakes of Xochimilco and Texcoco. Indians of central Mexico ate dragonfly larvae which taste like shrimp; these larvae are of considerable nutritional value as sources of protein and calories. According to studies done by Ramos-Elorduy (1998), the protein content of the larvae is 56.22% providing 431.33 kcal calories per 100g.] Address: not stated

11120. Anwander, H. (2010): Kartierung von Storchschnabelbläuling, Sumpfschrecke, Laubfrosch und Co. Ausarbeitung eines Pflegekonzepts für das Erlentbachtal. Auftraggeber: Landschaftspflegeverband Günzburg e.V., 89335 Ichenhausen: 25 pp. (in German) [The paper refers to *Calopteryx virgo*, and shows a picture of

a male *C. virgo* caught in a spiders net.] Address: Anwander, H., Am Sandberg 7, 89358 Kammeltal-Ettenbeuren, Germany. E-mail: asw.anwander@t-online.de

11121. Bechly, G. (2010): Fossile Insekten aus den Plattenkalke der Crato-Formation. Katalog Mineralientage München 2010: 105-111. (in German) [Among many impressive photographs of different taxa, the odonate *Cratostenophlebia schwickerti* is portrayed.] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, 70191 Stuttgart, Germany. E-mail bechly@gmx.de

11122. Beintema, A.J.; van der Winden, J.; Baarspul, T.; de Krijger, J.P.; van Oers K.; Keller, M. (2010): Black Terns *Chlidonias niger* and their dietary problems in Dutch wetlands. *Ardea* 98: 365-372. (in English) ["Black Terns have shown a decrease of well over 90% as a breeding bird in The Netherlands during the twentieth century. Two hypotheses have been put forward for this decline: the disappearance of the floating plant Water Soldier *Stratiotes aloides*, which used to be the favourite nesting substrate of the terns, and a decrease of available insect food for the chicks, notably dragonflies. Both effects are attributed to eutrophication of surface waters. Reproductive bottlenecks vary greatly among areas and habitats. In river landscapes, no signs of food shortage could be found, and loss of nesting substrate has been successfully compensated for by offering artificial nest rafts. Extremely low fledging success in moors and in lowland grasslands is caused by food problems. In this case, artificial rafts are less successful. With decreased insect availability, fish and earthworms have become more important in the chicks' diet, but these are less reliable as a food source. Fledging success greatly depends on the amount of fish in the diet. Also, a minimum amount of fish is always needed to cover the calcium need of the chicks. In north-eastern Poland, there were no problems with either nesting places or food for the chicks." (Authors) Frequency of Odonata as diet depends on the habitat. The study also analysed Calcium content in Odonata. ("Aeshna spec., *Libellula quadrimaculata*, *Sympetrum cyathigerum* [sic], *Lestes sponsa* and *Lestes spec.*")] Address: Beintema, A.J., Alterra, P.O. Box 47, 6700 AA Wageningen, The Netherlands. E-mail: albert@beintema.nl

11123. Bernard, R.S. (2010): Découverte de *Perithemis tenera* (Say, 1839) (Odonata: Libellulidae), une nouvelle libellule pour le Québec. *Le Naturaliste canadien* 134 (1): 23-24. (in French) [Canada; Centre d'interprétation de la nature du lac Boivin, Montérégie near Granby (45° 29' 41,9" N, 72° 41 '19,3" E), 15-VIII-2007] Address: Bernard, Roxanne Sarah. E-mail: roxannesbernard@hotmail.com

11124. Buczyński, P.; Żurawlew, P.; Michalczyk, W. (2010): New data on the occurrence of *Crocothemis erythraea* (Brullé, 1832) (Odonata: Libellulidae) in Poland. *Odonatrix* 6(2): 50-60. (in Polish, with English summary) [The paper documents data of *C. erythraea* from 22 Polish localities recorded in 2009. 20 localities are new additions to the known sampling sites of *C. erythraea* in Poland. The paper discusses the range extension and presents data on a second generation of the species and its phenology.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska Univ., Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

11125. Chaudhry, M.T. (2010): Systematics of dragonflies (Anisoptera: Odonata) of Pakistan. Ph.D. thesis, Department of Entomology, Faculty of Crop and Food Sciences, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan: 14 + 190 pp. (in English) ["Extensive field survey to collect Anisopterous fauna of Pakistan was carried out during 2006 – 2009 in different Agro ecological regions of Pakistan. A total of 1349 specimen belonging to 5 families, 39 genera and 68 species were collected and identified. ... Seven species, viz, *Anaciaeschna jaspidea*, *Anax indicus*, *Gynacanthaeschna sikkima*, *Ephthalma vittata vittata*, *Macromia moorei*, *Onychogomphus biforceps*, and *Rhodthemis rufa* are reported first time from Pakistan and have been added to the existing anisopterous fauna of the country. Details for the collected material i.e. valid names, their synonyms, measurement of body parts (abdomen, forewing and hindwing length), habitat description, date of collection, distribution range in Pakistan as well as international distribution and differential characters from published description for new records to country have been provided. Coloured images of new to Pakistan species, geographical and climatic condition of all sixty-eight species are also presented first time. Taxonomic keys for families, genera and species are also presented. Check lists of all ten agroecological regions are presented first time from Pakistan. As a whole 68 species were recorded from Pakistan with 153 new localities record for 45 species, which include 61 species of Anisoptera that have been reported previously from Pakistan. It was an addition to science and this addition will explore new areas of biological control." (Author)] Address: Chaudhry, M.T., PMAS-Arid Agriculture Univ., Rawalpindi (Pakistan). Dept. of Entomology, Pakistan. E-mail: chtariq273@hotmail.com

11126. Da Costa, J. M. (2010): New data of the Odonata order in the Narew National Park. *Odonatrix* 6(2): 33-36. (in English) [In 2009, the author studies of 6 areas of the Narew National Park, Poland resulted in 23 Odonata species. An additional study of published and unpublished inventarisations proved the occurrence of 44 species within the boundaries of the park.] Address: Joao Matos da Costa, J.M., Narwiański Park Narodowy, Kurowo 10, 18-204 Kobylin Borzomy, Poland. E-mail: joao.mcosta@nnp.pl

11127. Das, S.K.; Sahu, H.K.; Rout, S.D. (2010): Odonates of Baripada Division of Similipal Biosphere Reserve. Tigerpaper - Regional Quarterly Bulletin on Wildlife and National Parks Management 24(2): 13-16. (in English) ["This study records the distribution of 31 species of odonates in the Baripada Division of SBR [...] *Pantala flavescens* and *Orthetrum sabina* were more abundant during the monsoon season. [...] *Ischnura aurora* was more abundant than others inside the study area. [...] The prey of the adults consists mostly of the harmful insects of crops, orchards and forests, and thus has a regulatory impact on agroforestry. Their aquatic larvae constitute a natural biological control over mosquito larvae and thus help to control several epidemic diseases like malaria, dengue, filarial, etc. (Mittra, 2002). But several developmental activities such as the construction of buildings, roads, and stone crushers in the peripheral areas have a direct impact on the population of the odonates as their habitats and food are being destroyed by such activities. In temperate regions, the greatest threat to many Odonata species is the intensification of modern agriculture (Moore,

1991a). It may lead to the local extinction of sensitive species. Public awareness is required to conserve these odonates and their habitats. An extensive odonatological survey needs to be carried out to explore the rich diversity of these elegant insects." (Authors) Address: Das, S.K., Department of Wildlife and Conservation Biology, North Orissa University, Sri Ramchandra Bihar, Takatpur, Baripada, Orissa-757003, India. E-mail: sunit.das219@gmail.com

11128. Davenport, J.M.; Chalcraft, D.R. (2010): COS 116-3: Contrasting effects of different types of habitat complexity on predator-prey interactions. The 95th ESA Annual Meeting (August 1 -- 6, 2010): (in English) [Verbatim: Background/Question/Methods: Habitat complexity is often viewed as an important factor that can reduce the impact of predators on prey by providing refugia for prey. Sit-and-wait predators, however, may perform better in complex environments that provide more perches or hiding places for the predator. Although natural environments are composed of many structural elements (types of habitat complexity) few researchers have examined how multiple types of habitat complexity affect predator-prey interactions. We conducted an experiment in artificial ponds to examine how different types of habitat complexity (amount of benthic leaf litter versus amount of emergent vegetation) influence the effect of a sit-and-wait top predator (larval dragonflies; *Anax* spp.) on fitness components of an intermediate predator (larval salamanders; *Ambystoma opacum*). We expected that 1) increasing amounts of emergent vegetation will enhance the effect of *Anax* on *A. opacum* fitness components by increasing perch sites for *Anax* to hunt from, 2) increasing amounts of litter will reduce the effect of *Anax* on *A. opacum* fitness components by providing benthic refugia for *A. opacum*, and 3) the effect of emergent vegetation on the foraging success of *Anax* will be greatest in ponds with less leaf litter due to the fact that there is less refuge space. Results/Conclusions: We observed a trend in ponds with no *Anax* for *A. opacum* to have higher survivorship when there was a low amount of leaf litter present in the pond. *Anax* reduced *A. opacum* survivorship but the extent of reduction depended on the amount and type of habitat complexity present. Specifically, increasing amounts of emergent vegetation in ponds with low amounts of litter enhanced the negative effect of *Anax* on *A. opacum* survival. Increasing amounts of emergent vegetation in ponds with a high abundance of leaf litter, however, caused non-linear changes in the effect of *Anax* on *A. opacum*. Although a high abundance of emergent vegetation in ponds with a high abundance of litter enhanced the effect of *Anax* on *A. opacum* survival, a low abundance of emergent vegetation in ponds with a high abundance of litter reduced the effect of *Anax* on *A. opacum* survival. Our study found that the amount of habitat complexity may have unexpected effects on intermediate predator performance in the absence of top predators. Our results also demonstrate that different types of habitat complexity can alter predator-prey interactions in different ways – some forms of complexity benefit the predator while other forms benefit prey.] Address: Davenport, J.M., East Carolina University, USA

11129. Díaz, F.; Schmitt, F. (2010): Primer registro de Garza chiflón (*Syrigma sibilatrix*) en Chile. Boletín Chileno de Ornitología 16(1): 48-50. (in Spanish, with English summary) [The first record of the Whistling Heron is

documented. The specimen was observed trying to catch flying dragonflies. It is unclear if this attempt was successful.] Address: Díaz, F., Gonzalo Barros 099, Lampa, Chile. E-mail: fdiazsegovia@gmail.com

11130. Domaine, E.; Desrosiers, N.; Skinner, B. (2010): Les insectes susceptibles d'être désignés menacés ou vulnérables au Québec. Naturaliste Canadien 134(2): 16-26. (in French) [In 2006, 30 species of insects were added to the list of wildlife species likely to be classified as threatened or vulnerable in Quebec, Canada. Among them are ten Odonata species (*Lestes vigilax*, *Nasiaeschna pentacantha*, *Gomphaeschna furcillata*, *Gomphus ventricosus*, *Ophiogomphus anomalus*, *Somatochlora incurvata*, *Williamsonia fletcheri*, *Erythemis simplicicollis*, *Erythrodiplax berenice*, *Sympetrum corruptum*). Updated relevant information for each species is given to assess their precarious status: regional distribution, habitat, life cycle, diet, factors that threaten them and important information for conservation.] Address: Domaine, Eric. E-mail: e.domaine@bphenviro.com

11131. Downie, J.R.; Hancock, E.G.; Muir, A.P. (2010): The diet of the paradoxical frog *Pseudis paradoxa* in Trinidad, West Indies. The Herpetological Journal 20(2): 111-114. ["The diet of adult and late metamorphic *P. paradoxa* in Trinidad was assessed from stomach contents. *P. paradoxa* consumed a wide taxonomic and size range of invertebrates, mostly insects, but also arachnids, crustaceans (crabs) and annelids. There was little evidence for ontogenetic changes in prey taken, but larger females had taken larger prey than smaller individuals. Although most prey items could have been captured above the water surface, some must have been taken below the surface. The significance of these findings is discussed in the light of *Pseudis*'s unique life history and evolution (individuals are essentially full size at metamorphosis; adults are fully but secondarily aquatic) and in comparison with previous reports." (Authors) Imaginal Odonata accounted to 8.7%, and larval to 1.4% of all prey items. Compared with the mass of the additional prey, Odonata seem to have a significant contribution to nutrition of *P. paradoxa*.] Address: Muir, Anna, Institute of Biodiversity, Animal Health and Comparative Medicine, Room 411, Graham Kerr Building, University of Glasgow, G12 8QQ, UK

11132. Duan, C.-f.; Pan, J.; Zhao, P. (2010): Checklist of Odonata in the collection of Kaili university. Journal of Kaili University 28(3): 47-49. (in Chinese, with English summary) [39 Odonata species are reported resulting on a collection of 300 specimens collected during 2002 to 2009 in Qiandongnan Miao and Dong Autonomous Prefecture of Guizhou Province, China.] Address: College of the Environmental and Life Sciences, Kaili University, Kaili, Guizhou, 556011, China

11133. Falkowski, M. (2010): Inwentaryzacja przyrodnicza oraz analiza wpływu planowanej małej retencji w Nadleśnictwie Celestynów na środowisko przyrodnicze [Inventory of nature and assessment of the impact on the natural environment by planned small retention reservoirs in the forest district Celestynów]. EcoFalk: 38 pp. (in Polish) [Poland; the study of biota resulted in nine common Odonata species.] Address: EcoFalk, Michał Falkowski, Biuro Badań, Monitoringu i Ochrony Przyrody, ul. Sokołowska 83/17, 08-110 Siedlce, Poland. E-mail: mfzuraw@wp.pl

11134. Ferro, M.L.; Parys, K.A.; Gimmel, M.L. (2010): Dragonflies and Damselflies of Louisiana. CreateSpace: 182 pp. (in English) ["Celebrate the beauty and diversity of nature with this field guide to Louisiana's dragonflies and damselflies. This level of detail can't be found in any other guide currently available; it provides both top and side high resolution scanned images of 118 species of dragonflies and damselflies known from the state of Louisiana and adjoining states. All species are represented by life-sized images, and smaller species are shown as both life-sized and enlarged images. In addition, both male and female specimens are provided for most species. A photographic "head shot" of each species is also included and most species showing variation in colour pattern are represented by multiple photographs. Close-up photographs illustrating taxonomically important characters are given for most species."] (Publisher)] Address: www.createpace.com/

11135. Frank, M. (2010): Zum Vorkommen der Feuerlibelle (*Crocothemis erythraea* Brullé) in Nordwestmecklenburg im fünften Jahr nach der Erstfeststellung dort. Virgo - Mitteilungsblatt des Entomologischen Vereins Mecklenburg 13(2): 72-74. (in German) [Between 2005 and 2010, imagines of *C. erythraea* were observed in each year at carp-production water bodies near Schönberg, Germany. In spite of these observations no proof of successful reproduction was obtained although breeding is considered as very probable.] Address: Frank, M., Zur Traubenmühle 5A, 55268 Nieder-Olm, Germany. E-mail: mikel.frank@gmx.de

11136. Gauquie, B. (2010): Habitats de l'Orthétrum brun (*Orthetrum brunneum*) et de l'Orthétrum bleuissant (*Orthetrum coerulescens*) sur le territoire du Parc naturel des Plaines de l'Escaut et dans le bassin carrier tournois. Les Naturalistes belges 91(3-4): 37-53. (in French, with English summary) ["During this last five years, I undertook a specific search on two rare *Orthetrum* species in Belgium (*O. coerulescens* and *O. brunneum*), both recently discovered in Western Hainaut province. The exploration area is Tournai and the territory of the Natural Park of the Plains of the Schelde, which extends east to west from Bernissart to Antoing. *O. brunneum* was found on five sites and *O. coerulescens* on three sites. Following data analysis, it seems that in the region *O. coerulescens* is more a stenotopic species, selecting only limestone quarries and *O. brunneum* is an eurytopic species, occupying more varied environments, nevertheless at least four abiotic parameters characterize in common the breeding sites of the two species: a sunny environment, a shallow water, with good physicochemical conditions and constantly renewing seepage, or flow resurgence. If these ecological requirements are met, it appears that, among other factors (biotic or abiotic), the vegetation structure is of crucial importance for the reproduction of either species. At sites with still water, *O. brunneum* proves to be a pioneer species essentially, eventually disappearing when the vegetation becomes too high. For *O. coerulescens*, eutrophication is really a non-favourable factor, but the vegetal cover did not appear to be influential."] (Author)] Address: Gauquie, B., Chargé de mission Ressources et milieux naturels, Parc naturel des Plaines de l'Escaut, rue des Sapins 31, 7603 Bon-Secours, Belgium. E-mail: bgauquie@plainesdelescaut.be

11137. Gołab, M.J.; Potoczek, M.; Śniegula, S. (2010): New records of *Cordulegaster bidentata* Sélys, 1843 (Odonata: Cordulegastriidae) from the Beskid Wyspowy

Mts. and the Bieszczady Mts. Wiad. entomol. 29(3): 205. (in Polish, with English translation of the title) [Beskid Wyspowy: Słopnice (UTM: DA50), 17 VIII 2009. 1 male, 9 IX 2009; Beskid Wyspowy: Chomranice (DA70), 7 VIII 2008. 1 larva, 27 VII 2009, 1 male, 2 XI 2009; Bieszczady: Ustrzyki Górne vic. (FV14), 10 IX 2008. 2 males] Address: Gołab, Maria, Institute of Nature Conservation, Mickiewicza 33, Kraków, Poland. E-mail: marysiagolab@gmail.com

11138. Gonzalez, S.C.; Touchon, J.C.; Vonesh, J.R. (2010): PS 19-152: The interactions between competition, predation, and phenotypic plasticity on the survival and growth of two Neotropical hyliid tadpoles. The 95th ESA Annual Meeting (August 1 -- 6, 2010): (in English) [Verbatim: Background/Question/Methods: Recent literature reviews reveal that competition typically has stronger effects on growth than the presence of predators, while predation has larger effects on survival. Further, past studies show that predators typically lessen the negative effect of competition on growth and also make interspecific competition beneficial for the survival of focal species. We examine the independent and combined effects of competition and predation for survival and growth of the tadpoles of two co-occurring Neotropical hyliid frogs (*Agalychnis callidryas* and *Dendropsophus ebraccatus*). Our experiment crossed tadpole species composition (single and mixed at single total density) with the presence or absence of a free-roaming predator (*Anax* sp. dragonfly larva) using a 3x2 factorial design. Six replicates were conducted in 300 L mesocosms at the Smithsonian Tropical Research Center, Gamboa, Panama. Results/Conclusions: Dragonfly larvae were effective predators of both species, but had larger effects on *A. callidryas* survival. *A. callidryas* grew faster in the presence of *D. ebraccatus*, suggesting it is a more effective competitor. *A. callidryas* reduced *D. ebraccatus* growth in the absence of dragonflies; however, this effect disappeared when predators were present. Though our results are largely consistent with similar previous studies, one interesting difference did emerge. Not only did predation have larger effects on survival than competition, but predator presence resulted in a much larger reduction in tadpole growth than competition – even though predation increased per capita resource levels. This can be attributed to either changes in feeding behaviour or metabolic costs of alteration of phenotypically plastic traits. Thus, in our study, predator effects dominated survival and growth and highlight the importance of top-down effects, as well as costs associated with phenotypic plasticity, in shaping interactions between these species.] Address: not stated

11139. Gonzalez-Bellido, P.T.; Olberg, R.; Leonardo, A. (2010): Attack of the dragonfly: receptive fields and anatomy of the target selective descending neurons. Abstracts of the 9th International Congress of Neuroethology, Salamanca (Spain) 2-7 August 2010. P 396: 650. (in English) ["Dragonflies detect prey against a clear sky and then follow an interception trajectory to capture their target. These flights typically last 350ms from take-off to interception, and the accuracy afforded by the dragonfly retina is paramount for success. Despite this, little is known about the spatial and temporal response properties of the neurons underlying this behaviour. We have begun to record intracellularly in libellulid dragonflies (*L. lydia* and *L. luctuosa*) from a class of neurons that respond solely to small moving targets (Ol-

berg, 1986). Using a custom-built 360Hz DMD projector, we have begun to make 0.25° resolution measurements of target-selective descending neuron (TSDN) spatiotemporal receptive fields, in an effort to develop quantitative circuit models of these cells. After mapping a TSDN receptive field, the cell is filled with a tracer dye (Lucifer yellow and/or neurobiotin) to confirm its identity, its three-dimensional structure, and its pre- and post-synaptic targets. Standard histological techniques do not adequately preserve the fragile structure of the dragonfly nerve cord. In libellulids, the diameter of TSDN axons ranges from 16-25µm, while the cervical connective is only 230µm wide - over 1/3 the volume of the cord is comprised of the cytosol within these axons. Consequently, it is necessary to embed the cord in resin to prevent rupture during semi-thin sectioning. The dehydration required for resin causes major deformation and shrinkage of the cervical connective in protocols in which osmium is omitted to preserve fluorophore signals. Whole-mounted cords are sufficiently transparent for 2-photon imaging, but the brain and ganglia are too thick to be optically sectioned in this manner. We will discuss the development of a tissue clearing protocol suitable for large insects, that preserves the anatomy of the ventral cord, keeps background fluorescence low, fluorophore signal high and antigenicity intact." (Authors)] Address: Olberg, R.M., Dept of Biological Sciences, Union College, Schenectady, NY 12308, USA. E-mail: olberg@union.edu

11140. Groner, M.L.; Buck, J.C.; Blaustein, A.R.; Rolins-Smith, L.A.; Reinert, L.K.; Relyea, R.A. (2010): COS 39-8: Scared sick? Effects of sublethal exposure to predators and pesticides on life history traits and disease susceptibility in wood frogs. The 95th ESA Annual Meeting (August 1 -- 6, 2010): (in English) [Verbatim: Background/Question/Methods: Recent reviews hypothesize that pathogen-associated amphibian declines may be exacerbated by immunosuppression triggered by exposure to contaminants and/or stress hormones released in response to environmental changes. Currently, there are few empirical data in support of these hypotheses. We exposed wood frog tadpoles (*Rana sylvatica*) to sublethal concentrations of malathion (0, 10, 100 ppb), and cues from caged dragonfly predators (*Anax junius*). We measured effects of these treatments on life history traits (growth, development and survival) and the susceptibility of wood frog metamorphs to the fungal pathogen *Batrachochytrium dendrobatidis* (B.d.). Results/Conclusions: Both treatments had mild negative effects on wood frog development, but not growth. Survival was also slightly lower in the highest pesticide treatment when predators were present, but not when predators were absent, supporting past evidence that these stressors can have synergistic negative effects on survival. Surprisingly, mortality rates in frogs exposed to B.d. were lower in individuals stressed by predator cues, while malathion did not effect survival. Overall these data fail to show that contaminants and predator stress cause higher rates of mortality associated with B.d., although they do show that environmental context can alter life history traits and disease susceptibility. Further tests are needed to show whether such stressors alter immune system function and if these results are robust for other pathogens.] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

11141. Grunsven, R.H.A.; Termaat, T. (2010): Record of young *Aeshna mixta* at an unusual location. *Brachytron* 13(1/2): 44-46. (in Dutch, with English summary) ["A teneral female *A. mixta* was seen on the ferry Pride of Bilbao, 40 kilometers west of the tip of Brittany, France. Age estimation of teneral dragonflies is discussed. This records shows that teneral looking dragonflies might have covered quite a long distance." (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

11142. Guan, Z.; Brydegaard, M.; Lundin, P.; Wellenreuther, M. (2010): Insect monitoring with fluorescence lidar techniques: field experiments. *Applied Optics* 49(27): 5133-5142. (in English) ["Results from field experiments using a fluorescence lidar system to monitor movements of insects are reported. Measurements over a river surface were made at distances between 100 and 300 m, detecting, in particular, damselflies entering the 355 nm pulsed laser beam. The lidar system recorded the depolarized elastic backscattering and two broad bands of laser-induced fluorescence, with the separation wavelength at 500 nm. Captured species, dusted with characteristic fluorescent dye powders, could be followed spatially and temporally after release. Implications for ecological research are discussed." (Authors) The paper includes a reference to Odonata] Address: Guan, Zuguang, Department of Biology, Lund University, SE-223 62 Lund, Sweden. E-mail: zuguang.guan@fysik.lth.se

11143. Haislip, N.A.; Hoverman, J.T.; Miller, D.L.; Gray, M.J. (2010): COS 53-6: Predators and infectious diseases: Does the threat of predation increase susceptibility to Ranavirus in larval anurans. The 95th ESA Annual Meeting (August 1 -- 6, 2010): (in English) [Verbatim: Background/Question/Methods: The emergence of infectious diseases has sparked concern throughout the scientific community because they threaten global biodiversity, and consequently can impact the structure and function of ecological communities. Ecological stressors may be important components contributing to the emergence of infectious diseases. While organisms are surrounded by a diversity of ecological stressors, predation risk is one of the common stressors in nature. In response to predators, prey can adaptively alter their behaviour, morphology, and life history traits. Although enhancing survival, the stress of predators can suppress immune function, which may increase susceptibility to pathogens. Thus, predator-rich communities may be hotspots for disease emergence. For over three decades, amphibian populations have been declining across the globe. While there are many hypothesized causes of these declines, the emergence of infectious diseases is receiving increased attention. More specifically, ranaviruses have been reported as the etiologic agent in amphibian die-offs on five continents, in four Canadian provinces, and in over thirty U.S. states, infecting dozens of species. Other than the association with amphibian die-off events, little is known about the ecology of the amphibian-ranavirus system. Our goal was to determine if the risk of predation increases the susceptibility of tadpoles from four amphibian species (*Hyla chrysoscelis*, *Lithobates clamitans*, *Lithobates sylvaticus*, and *Pseudacris feriarum*) to ranaviral infection and disease. Our experimental design was a factorial combination of two virus treatments and three predator treatments. The virus treatments consisted of a no-virus control and a virus exposure of 103 plaque-

forming units mL⁻¹. The predator treatments were a no-predator control and predator cues from either larval dragonflies (*Anax* sp.) or adult water bugs (*Belostoma flumineum*). Each of the six treatments was replicated five times for a total of thirty experimental units. Results/Conclusions: We found that tadpoles of the four species reduced activity by 22-48% following continuous exposure to invertebrate predator cues. In addition, virus exposure resulted in reduced activity for *Hyla chrysoscelis* and *Lithobates clamitans*, and significantly reduced survival by 17-100% across all species. Exposure to predator cues did not affect survival or infection rates, and did not interact with the virus treatments. Together, our results suggest that the expression of adaptive inducible defenses in anuran larvae does not increase ranaviral disease risk. However, additional studies are needed that test other natural (e.g., competition) and anthropogenic (e.g., pesticide) stressors to understand disease risk within natural communities.] Address: not stated

11144. Hermans, J.T. (2010): De Libellenfauna van Zuid-Limburg. *Natuurhistorisch Maandblad* 99(9): 189-200. (in Dutch, with English summary) ["The article presents an overview of our present knowledge about the dragonflies of the southern part of the province of Limburg. 55 species of dragonflies were observed between 1990 and 2007. Dragonflies of oligotrophic waters (moorland pools or bogs) such as *Ceriagrion tenellum*, *Leucorrhinia rubicunda*, *Aeshna juncea* or *Somatochlora arctica* are restricted to the area around the villages of Brunssum and Schinveld. Species such as *Ischnura elegans*, *Coenagrion puella*, *Aeshna cyanea* and *Libellula depressa*, which show no preference for a particular type of water, are widespread and abundant in Southern Limburg. Species which prefer running waters are found in the valleys of the river Meuse and the larger brooks, such as Geul and Gulp. Some dragonfly habitats, such as pools and limestone quarries, are discussed separately. Several pools in the Mergelland (the southwestern part of Southern Limburg) have disappeared and many are in a deplorable state due to lack of maintenance. The most common species breeding in such pools are *A. cyanea*, *I. elegans* and *L. depressa*. Limestone quarries are of great importance for dragonflies. The sheltered situation and the continuing limestone extraction provide a special and warm habitat. Most of the dragonfly species recorded there, like *Ischnura pumilio*, *Orthetrum brunneum* and *O. coerulescens* need the dynamic environment found in these quarries." (Author)] Address: Hermans, J.T.; Hertestraat 21, 6067 ER Linne, The Netherlands. E-mail: j.hermans@trian-gel-linne.nl

11145. Holland, M.P.; Marino, J.A. (2010): PS 15-120: Predator cues and parasitism: Effects of two stressors on anuran larvae. The 95th ESA Annual Meeting (August 1 -- 6, 2010): (in English) [Verbatim: Background/Question/Methods: Parasite infection and predatory stress often simultaneously impact wildlife populations, with potentially complex effects on the traits and fitness of the affected animals. For instance, nonconsumptive predator effects may decrease the ability of a potential prey individual to tolerate intense macroparasite infections. In this study, we examined the responses of green frog (*Rana clamitans*) larvae to echinostome (Digenea: Echinostomatidae) parasite infection and predator chemical cue. In two aquaria experiments, we measured activity levels, growth, and mor-

ality of larvae after exposure to echinostome cercariae, larval *Anax* (Odonata) predator cue, or the combination of cercariae and predator cue. Due to the costs associated with each stressor, we predicted that the combination treatment would result in synergistic effects on behaviour, growth, and mortality. Results/Conclusions: As expected, individuals exposed to predator cue showed decreased activity levels and growth in comparison to controls. Exposure to predator cue did not affect mortality. Infected individuals showed decreased activity level and higher mortality, but growth was not affected. Contrary to our predictions, we did not observe an interaction between these stressors with respect to either traits or mortality. These results suggest that, at least at a small scale, we can treat these stressors as additive. However, further studies that incorporate additional interactions between these natural enemies may demonstrate other important synergisms.] Address: Holland, Manja P., University of Michigan, USA

11146. Koleček, J. (2010): First record of the Dark Whiteface (*Leucorrhinia albifrons*) in the district Vsetín (Eastern Moravia, the Czech Republic). *Acta Carp. Occ.* 1: 97-98. (in Czech, with English summary) ["*L. albifrons* is considered to be a critically endangered species in the Czech Republic. This report gives the first information of occurrence in the region based on an observation of one mature male at pond in Valašskáé Bystrice village (Eastern Moravia, Vsetín district) on 27.vii.2008 at altitude 600 m a.s.l. Occurrence of this species is unusual in this higher altitude in the Czech Republic." (Author)] Address: Koleček, J., Katedra zoologie, Přírodovědecká fakulta Univerzity Palackého, tř. Svobody 26, CZ-771 46 Olomouc, Czech Republic. E-mail: j.kolecek@email.cz

11147. Kranenborg, B.; van Vliet, T.; Termaat, T.; Keteelaar, R. (2010): Index of almost 40 years of publications by the Dutch Society for Dragonfly Studies. *Brachytron* 13(1/2): 65-96. (in Dutch, with English summary) ["In this index we present an overview of all articles published in magazines and journals of the Dutch Society for Dragonfly Studies and its predecessors. It encompasses the following magazines: Contactbrief NLO, Contactblad NLO, Libellennieuwsbrief, NVL-nieuwsbrief and *Brachytron*. In total 453 articles of 200 authors are presented in this index. A separate index of keywords is published on the website of the Dutch Society for Dragonfly Studies (www.brachytron.nl) and can be downloaded." (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands

11148. Meutter, F. van de (2010): Colonisation and habitat preference of *Crocothemis erythraea* in De Maten (Genk, Belgium). *Brachytron* 13(1/2): 32-40. (in Dutch, with English summary) ["This study describes the arrival and colonization of a pond complex situated in North-eastern Belgium by *C. erythraea*. The presence of *C. erythraea* was monitored by both samplings for larvae and observations of adults. The prevalence of adults and especially larvae increased exponentially during the course of this study, indicating that a large metapopulation could be established within only a few years. The presence of *C. erythraea* larvae was positively related to low cover of floating-leaved vegetation and a high raver of submersed filamentous algae and other vegetation. The presence of adults was positively related to water temperature, possibly reflecting a preference for ponds with a high insolation. We found a weak match between ponds where patrolling males were

seen and the presence of larvae, possibly indicating that different pond types are selected, although we may have missed larvae occurring at low densities. The colonization of the study area is part of an ongoing northern range shift of this species and exemplifies how quickly a locality may be colonized, and next could serve as a source of dispersal that engage in new colonization events." (Author)] Address: Van de Meutter, F., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: frank.vandemeutter@bio.kuleuven.ac.be

11149. Nikulin, A.D. (2010): Variability of foraging behaviour of bats (Chiroptera, Vespertilionidae) in European part of Russia. *Plecotus et al.* 13: 44-47. (in Russian, with English summary) [In total, 5517 fragments of arthropods from droppings of 374 specimens of 11 bat species have been identified. Eleven orders of insects have been revealed: Ephemeroptera, Dermaptera, Hemiptera, Neuroptera, Coleoptera, Diptera, Lepidoptera, Trichoptera, Hymenoptera, Orthoptera, Odonata and one order of spiders (Aranei). No species details are given.] Address: Nikulin, A.D., St. Petersburg State University, University Nab. 7/9, St. Petersburg 199034, Russia. Nidus@inbox.ru

11150. Ott, J. (2010): The big trek northwards: recent changes in the European dragonfly fauna. In: Settele, J., L. Penev, T. Georgiev, R. Grabau, V. Grobelnik, V. Hammen, S. Klotz, M. Kotarac & I. Kuehn (Eds): *Atlas of Biodiversity Risk* Pensoft Publishers. Sofia: 82-83. (in English) [This is a somewhat simplistic and monocausal author conclusion on current range extensions in some European resp. African dragonflies, and omitting e.g. recent or former studies on *Erythromma viridulum* and *Anax parthenope*.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

11151. Ott, J. (ed.) (2010): Monitoring climate changes using Dragonflies. *BioRisk* 5 (Special issue: Monitoring climatic change with dragonflies): 286 pp. (in English) [Contents: Foreword by Jeff McNeely - Editor's foreword by Jürgen Ott - Climate change impacts on biodiversity: the ALARM approach for the assessment of multiple risks and the consequences for dragonflies by Josef Settele et al. - Trends in occurrence of thermophilous dragonfly species in North Rhine-Westfalia (NRW) - The „Arbeitskreis (AK) Libellen Nordrhein-Westfalen (NRW)“ by Klaus Juergen Conze, Nina Groenhagen, Mathias Lohr & Norbert Menke - Do climatic changes influence dispersal and population dynamics of dragonflies in the western Peruvian Andes? by Joachim Hoffmann - Impacts of extreme weather and climate change on South African dragonflies by Michael Samways - Climate and evaluational range in a South African dragonfly assemblage by Michael Samways & Augustine Niba - Southern dragonflies expanding in Wallonia (south Belgium): a consequence of global warming? By Philippe Goffart - Dragonfly and Damselfly (Insecta: Odonata) Distributions in Ontario, Canada: Investigating the Influence of Climatic Change by Christopher D. Beatty, Stewart Fraser, Felipe Perez-Jvostov & Thomas N. Sherratt - The local species richness of Dragonflies in mountain waterbodies: an indicator of climatic warming? by Beat Oertli - Monitoring of Odonata in Britain and possible insights into climate change by Adrian Parr - Effects of climatic changes on dragonflies - results and recent trends in Europe by Jürgen Ott - When south goes north: Mediterranean dragonflies (Odonata) conquer

Flanders (North-Belgium) - Geert De Knijf & Anny Anselin - Changes in the range of dragonflies in the Netherlands and the possible role of temperature change by Tim Termaat, Vincent J. Kalkman & Jaap H. Bouwman - Monitoring the effects of conservation actions in agricultural and urbanized landscapes - the dragonfly example - by Hansruedi Wildermuth - Anthropogenic climate change impacts on ponds: a thermal mass perspective by John H. Matthews - Expansion of *Crocothemis erythraea* in the Ukraine by Lyudmyla A. Khrokalo.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

11152. Parkinson, D. (2010): Plateau des Tailles: Réponse positive des libellules suite aux travaux de restauration du projet LIFE. *Les Naturalistes belges* 91(3-4): 55-67. (in French, with English summary) ["In peatlands of the southern slope of the plateau des Tailles, Belgium, numerous water bodies were created during "plateau des Tailles" LIFE Nature project. Dragonflies found on restored sites were surveyed annually from 2006 to 2010. Following restoration's work, the number of dragonfly species recorded increased from 15 to 28. Several endangered species have expanded their range and their numbers. Through their response to the restoration works, the species studied show very different dispersal abilities and ecological requirements. Odonata are an excellent indicator taxonomic group to assess the quality of peatlands restoration." (Author)] Address: Parkinson, D., Les Floxhes, 4, 4160 Anthisnes, Belgium. E-mail: denis.parkinson@gmail.com

11153. Ren, L.-f.; et al. (2010): Study on Fauna and Diversity of Odonata in Xuzhou, Jiangsu Province. *Journal of Anhui Agricultural Sciences* 38(23): 12525-12527, 12534. (in Chinese, with English summary) [China; 21 Odonata species are listed and discussed from different point of views with respect to diversity and distribution patterns.] Address: Ren, Li-fen, Biochemical and Environmental Engineering College, Nanjing Xiaozhuang University, Nanjing, Jiangsu 211171, China

11154. Ruiters, E.J.; Kleukers, R.M.J.C.; Verstrael, T.J. (2010): Cooperation for dragonflies. *Brachytron* 13(1/2): 47-54. (in Dutch, with English summary) ["In 2007 the Dutch Society for Dragonfly Studies (NVL) celebrated its 10th anniversary. For ten years the NVL closely cooperated with Dutch Butterfly Conservation (De Vlinderstichting) and European Invertebrate Survey (EIS-NL). This cooperation turned out to be successful and resulted in some remarkable projects. For example: the realization of the atlas on Dutch dragonflies in 2002. This publication appeared as volume 4 in the series *Fauna of The Netherlands*. Another notable event was the Dutch/German symposium at Kranenburg (Germany) in 2004. Cooperation across borders is one of the main goals of the NVL, because after all dragonflies do not acknowledge borders and conservation is a matter of international importance. At this moment the NVL is involved by the realization of an Atlas on European Dragonflies (Kalkman, in prep.). On a national scale the NVL is working on more ecological knowledge of specific species. In 2002-2007 the ecology of *Sympecma paeidisca* was studied, resulting in a special edition of *Brachytron* which presented the results (*Brachytron* 11 (1). 2007). This publication appeared courtesy of Dutch Butterfly Conservation and EIS-NL. Hopefully, the successful cooperation between the three organizations will be preceded for at least another ten years." (Authors)] Address: Ruiters, E., [Cornells Houtmanstraat 10](mailto:Ruiters@houtmanstraal.nl)

8023 EA Zwolle, The Netherlands. E-mail: e.j. ruiters@planet.nl

11155. Schrijvershof, P. (2010): *Coenagrion scitulum* near Cadzand-Bad in Zeeuws-Vlaanderen, The Netherlands in 2007. *Brachytron* 13(1/2): 41-43. (in Dutch, with English summary) ["On June 24, 2007, four males of *C. scitulum* were recorded in the Kievittepolder, near Cadzand-Bad in Zeeuws-Vlaanderen (Zeeland). This is the second documented record of this species in The Netherlands. The discovery took place after records earlier that year along the northern part of the west coast of Belgium. On July 1st, others recorded the species at the same locality and at a second site near Cadzand-Bad. Reproductive behaviour was observed and photographed. It is likely that *C. scitulum* will settle in The Netherlands and will be expanding its range in years to come." (Author)] Address: Schrijvershof, P.G., Corellistraat 14, 2901 KB Capelle a/d IJssel, The Netherlands. E-mail: Marike.paul@hetnet.nl

11156. Settele, J.; Fanslow, G.; Fronzek, S.; Klotz, S.; Kühn, I.; Musche, M.; Ott, J.; Samways, M.J.; Schweiger, O.; Spangenberg, J.H.; Walther, G.R.; Hammen, V. (2010): Climate change impacts on biodiversity: a short introduction with special emphasis on the ALARM approach for the assessment of multiple risks. *BioRisk* 5 (Special issue: Monitoring climatic change with dragonflies): 3-29. (in English) [This introduction reference extensively to Odonata, mainly on the publications of J. Ott.] Address: Settele, J., UFZ, Helmholtz Centre for Environmental Research, Department of Community Ecology, Theodor-Lieser-Str. 4, 06120 Halle, Germany. E-mail: Josef.Settele@ufz.de

11157. Silver, C.A. (2010): Macroinvertebrate communities of temporary prairie pothole wetlands. M.Sc. thesis, Dept Biol. Sci., University of Calgary: XI + 143 pp. (in English) ["Macroinvertebrate communities were sampled in rotationally grazed, temporary wetlands in the prairie pothole region. Seven wetlands were grazed when temporary wetlands contained water (early grazed), and six wetlands were grazed when temporary wetlands were dry (late grazed). Late grazed wetlands contained more abundant and diverse macroinvertebrate communities than early grazed wetlands. Phylogenetic comparison of macroinvertebrates from temporary wetlands with those from permanent wetlands suggested the temporary community was influenced by environmental filtering, while the permanent community was influenced by biotic interactions, indicating fewer groups were able to survive the short wet period of temporary wetlands, compared to permanent wetlands. Both taxonomic and functional traits perspectives demonstrated that rotational grazing created two distinct habitats, by allowing late grazed wetlands to escape grazing pressure during the wet season. Given contrasting patterns observed between permanent and temporary wetlands, macroinvertebrate diversity at the landscape level is best served by maintaining wetlands of varying permanence." (Author) Taxa including Odonata are treated at the genus level.] Address: Silver, Carly Ann, Dept of Biological Sciences, University of Calgary, T2N 1N4, Calgary, Alberta, Canada. E-mail: carlysilver8@gmail.com

11158. Smith, G.R.; Boyd, A.; Dayer, C.B.; Ogle, M.E.; Terlecky, A.J.; Dibble, C.J. (2010): Effects of sibship and the presence of multiple predators on the behavior of Green Frog (*Rana clamitans*) tadpoles. *Ethology* 116 (3): 217-223. (in English) ["In nature, prey are exposed

to multiple predators simultaneously. We examined the effects of the cues of two potential predators, mosquitofish and odonate larvae, individually and in combination on the behaviour of *R. clamitans* tadpoles. In addition to examining the behavioural response of green frog tadpoles to multiple predators, we examined variation in behaviour among tadpoles from different egg masses (i.e. different sibships). Sibships differed in activity level and there was a significant predator cue by sibship interaction. Two sibships were relatively more active in the control and odonate predator cue treatments but showed reduced activity in treatments containing mosquitofish cues, whereas the remaining sibships showed consistently low levels of activity in all predator cue treatments, including the control. The use of the vegetated side of the aquarium did not differ between tadpoles exposed to the different predator cues. Sibship had no effect on tadpoles' use of the vegetated side of the aquarium, and there was no interaction between sibship and predator cue. Our results suggest that green frogs did not respond to simultaneous exposure to multiple predator cues any differently than they did to exposure to individual predator cues. More importantly, our results suggest variation, possibly genetically based, in behavioural responses of tadpoles to predators, and thus selection on these behaviours is possible. Of particular interest is that there was variation in behavioural responses to a non-native predator (*Gambusia affinis*), suggesting an evolutionary response to an invasive predator is possible." (Authors)] Address: Smith, G.R., Dept Biol., Denison Univ., Granville, OH 43023, USA. E-mail: smithg@denison.edu

11159. Sudo, S (2010): Micro swimming robots based on small aquatic creatures. In: Amitava Mukherjee (ed.), *Biomimetics Learning from Nature*, ISBN 978-953-307-025-4, 534 pages, Publisher: InTech 2010: (in English) ["Conclusion: The swimming behaviour of small aquatic creatures was analyzed using the high speed video camera system. Based on the swimming analysis of the aquatic creatures, the micro swimming mechanism and micro diving robot propelled by alternating magnetic field were produced. The swimming characteristics of the micro mechanism and micro diving robot were developed. The swimming mechanism and diving robot swam successfully in the water. Frequency characteristics of the swimming mechanism and diving beetle robot were examined. The diving robot showed the higher swimming velocities at $f_0=4-12\text{Hz}$. These experiments show the possibility of achievement of the micro robot driving by the wireless energy supply system. The results obtained are summarized as follows: (1) In the power stroke of the diving beetle swimming, hind legs are extended and driven backward to generate forward thrust. While in recovery stroke, hind legs are returned slowly to their initial position. (2) In forward swimming of the dragonfly nymph, only the fore pair and the middle pair of legs are active as a thrust generator. The orbits of fore- and middle-legs show almost the same, and draw the circle partially of the orbit. (3) The micro swimming mechanism composed of the NdFeB permanent magnet and film fin are driven by the alternating magnetic field. The swimming velocity of the micro mechanism depends on the frequency of alternating magnetic field at the constant voltage. (4) Flow visualization around the micro mechanism was created by the motion of powder and slow shutter speed photographic technique. The forward and backward surface flows and vortex flows around the micro mechanism were

generated by the robot driving. (5) Visualization photographs of flow field around the tethered opossum shrimp show the generation of tow vortices in right and left sides of the body. (6) The diving robot can dive into the water by sweeping the frequency of magnetic field. The diving robot can swim backward by the change of magnetic field frequency." (Author)] Address: Sudo, S., Faculty of Systems Science and Technology, Akita Prefectural University, Yurihonjo 015-0055 Japan. E-mail: sudou@iwakimu.ac.jp

11160. Tończyk, G. (2010): Dragonflies and damselflies (Odonata) of the Tatra Mountains - history and present-day. In: Mirek Z. (ed) Nauka a zarządzanie obszarem Tatr i ich otoczeniem. Tom II: Człowiek i środowiska. Tatrzański Park Narodowy, Polskie Towarzystwo Przyjaciół Nauk o Ziemi - Oddział Krakowski, Zakopane: 101-105. (in Polish, with English summary) ["Studies upon Odonata in the Tatra Mts. have long, nearly 150 year old tradition. So far almost 20 scientific papers concerning this group have been published. The studies were conducted since the mid 19th century, with particular intensity in 1920s. The list of species reported in the publications counts from 25 to 39 species. Such a big count difference results from unprecise delimitation of the Tatra and Podtatrze areas as well as from including in the list occasional visitors from neighbouring regions. Unfortunately, lack of contemporary studies makes impossible to define the present state of odonatofauna in the Tatra Mts. Only 14 species are represented in the data collected after 1990. Also, it is hard to precise the number of species breeding and developing in this area - most probably it is 26 species. In most valuable species, one can include locally occurring *Somatochlora alpestris*, and *S. arctica*, the latter recently not confirmed from the area. Both species are included in the Polish Red List of Threatened Odonata Species, respectively in categories NT and EN. In the Polish section of the Tatra Mts., Toporowe tarns and Smreczyński tarn can be recognised as centres of their breeding and diversity." (Author)] Address: Tończyk, G., Zakład Limnologii i Ekologii Bezkręgowców, Katedra Zoologii Bezkręgowców i Hydrobiologii Uniwersytetu Łódzkiego, ul. Banacha 12716, PL-90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

11161. Veling, K. (2010): Dragonfly working groups: more than the sum of its parts. *Brachytron* 13(1/2): 55-64. (in Dutch, with English summary) ["At least 38 dragonfly working groups exist in The Netherlands, ranging from working groups studying dragonflies only, to working groups studying other insect groups as well. Group excursions, inventories of nature areas, identification courses and publication of regional distribution atlases are among the many activities organised by working groups. Studying dragonflies together is very stimulating and has several advantages. By working together, mapping the dragonflies of a whole region becomes possible in an effective way. The amount of work can be divided and members can replace each other during vacations. During the process, less experienced dragonfly enthusiasts learn quickly from more experienced recorders. Furthermore, working groups have a more formal position, e.g. when giving advices to nature managers. But the main reason for many people to join a dragonfly working group might well be that watching dragonflies together is just much more fun!" (Author)] Address: Veling, K., De Vlinderstichting Postbus 506,

6700 AM Wageningen, The Netherlands. E-mail: Kars.Veling@vlinderstichting.nl

11162. Wasscher, M.; Goudsmits, K. (2010): *Coenagrion scitulum* back in Northwestern Europe. *Brachytron* 13(1/2): 19-25. (in Dutch, with English summary) ["On 16 June 2003 the *C. scitulum* was recorded for the first time in The Netherlands. The second author collected the species in the central part of the province of Limburg, south of Tegelen. Characteristics of identification, European flight season and preferred habitat are given. The occurrence of the species in Northwestern Europe is described. It was present in Belgium from ca. 1850 until 1973, with two records at only short distance of the Dutch border. It appeared in Northern France before 1990 in Champagne-Ardenne and in 1991 in Lorraine, in Luxemburg in 1997, Wallonia in 1998, Flanders in 1999 and in the Eifel in Germany in 2002. *C. scitulum* is listed as Least Concern on the forthcoming European Red list." (Authors)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: m.wasscher@broekhuis.nl

11163. WWF Japan; Yasumura, S. (Ed.) (2010): Nansei Islands Biological Diversity Evaluation Project Report. WWF Japan, Nihonseimei-Akabanebashi Bld. 6F 3-1-14, Shiba, Minato-ku, Tokyo, Japan (Publ.): 214 pp. (in English) [The following Odonata species were selected as indicator species: *Chlorogomphus okinawensis*, *Chlorogomphus brunneus keramensis*, *Rhipidolestes amamiensis*, and *Zyxomma obtusum*.] Address: not stated

11164. Yu, W.-y.; Li, Z.-h.; Song, D.-j.; Hua, C.; Hu, N.; Ji, J.; Yuan, X.-j.; Yang, X.; Zhou, J. (2010): Studies on diversity of Odonata in Zijin mountain, Lao mountain and Jiangjun mountain of Nanjing. *Journal of Yangzhou University (Agricultural and Life Science Edition)* 31(2): 91-94. (in Chinese, with English summary) [China; the regional survey conducted between 2005 and 2007, resulted in 43 Odonata species.] Address: Yu, W.-y., Dept of Life Sci, Nanjing Xiaozhuang Univ, Nanjing 211171, China. E-mail: ywy138519@126.com

11165. Zhang, X.-j.; et al. (not stated) (2010): Study on molecular phylogeny to the species of Anisoptera (Insecta: Odonata) based on CO II complete genes. *Journal of Anhui Agri. Sci.* 38(5): 2264-2267. (in Chinese, with English summary) [Verbatim: "Objective: The research aimed to study the molecular phylogeny to the species of Anisoptera (Insecta: Odonata) based on CO II complete genes. Method: Non-special primers were designed on the CO II genes of Odonata. CO II complete genes of 6 genera, including 8 species of 5 families in Anisoptera, had been sequenced and analyzed. The phylogenetic trees were reconstructed using ClustalX1. 8, ContigExpress, MEGA2. 1, PHYL IP3. 6a and MrBayesV3. 0 softwares, and maximum parsimony and maximum likelihood methods, respectively. Results: The results show that A + T contents of CO II genes of Libellulidae are lower (68.6%) in Insecta, which proves Odonata is an original group. Every sequence includes 2 Cys, which differs from the other groups of Insecta. Do not agree with the view of raising Macrominae into Macromidae. Agree with the views of putting both Aeshnidae and Cordulegastridae into Aeshnidae, and raising Gomphidae into a superfamily. Order of the evolution relationship of 5 families is: Gomphidae -> Cordulegastridae -> Aeshnidae -> Corduliidae -> Libellulidae. Conclusion: The study can provide the relative basis for

molecular phylogeny study of Odonata." The study includes the following taxa: *Orthetrum albistylum*, *O. sabina*, *Sympetrum eroticum*, *S. kunckeli*, *Epophthalmia elegans*, *Anax parthenope julius*, *Anotogaster kuchenbeiseri*, *Davidius bicornutus*, and *Pseudagrion civicum*.] Address: Zhang, X.-j., Dept of Laboratory Medicine, Bengbu Medical College, Bengbu, Anhui 233000, China

11166. Żurawlew, P.; Pawlak, S.; Dolata, P.T. (2010): Data on the occurrence of *Sympetrum meridionale* and *S. pedemontanum* in the southern Great Poland and in the Wieluń Land. *Odonatrix* 6(1): 30-32. (in Polish, with English summary) [Eight sites for *S. meridionale* and one for *S. pedemontanum* are documented.] Address: Żurawlew, P., Kwileń 67A, 63-313 Chocz, Poland. E-mail: grusleo@wp.pl

2011

11167. Adandedjan, D.; Laleye, P.; Ouattara, A.; Gourene, G. (2011): Distribution of benthic insect fauna in a West African Lagoon: The Porto-Novo Lagoon in Benin. *Asian Journal of Biological Sciences* 4(2): 116-127. (in English) ["The distribution of aquatic insect fauna of Porto-Novo lagoon was studied through seasonally sampling from July 2007 to June 2008. A total of 52 taxa belonging to 7 orders and 29 families were recorded. The richest taxonomic diversity was observed for Heteroptera, Ephemeroptera and Odonates. Certain species such as *Diplonychus* sp. (Belostomidae), *Chironomus* sp., *Chironomus formosipennis* and *Polypedium fuscipenne* (Chironomidae) and *Libellulidae* (*Libellula* sp.) were the most constant taxa observed during the sampling period. The distribution pattern observed thanks to the Kohonen map (SOM) is characterized by a rich assemblage and varied from upstream to downstream. The highest specific diversity (69.29%) was got during the low rainy season (October) and the lowest (29.8%), during the high dry season (February). This pattern resulted from the species reproductive process of most insects orders, in relation with a decrease of the rate of the salinity and an increased water temperature. But then, the low rate of species richness recorded during the dry season will be explained by the lacking of efficient recruiting and a strong predation during this period. Besides, hydrological factors and human activities could be also the important factors of controlling the distribution of this fauna. The invasion of the lagoon by the floating vegetation can be advanced as a factor of forage of the temporal variations of the organisms." (Authors) The identification of Odonata is suspicious, because the taxa list includes European representatives.] Address: Adandedjan, D., Laboratoire d'Hydrobiologie et d'Aquaculture, FSA-UAC, Faculté des Sciences Agronomiques- Université d'Abomey-Calavi, 01 BP 526 Cotonou Bénin

11168. Ahmadi, R.; Mohebbi, F.; Hagigi, P.; Esmaily, L.; Salmanzadeh, R. (2011): Macro-invertebrates in the wetlands of the Zarrineh estuary at the south of Urmia Lake (Iran). *Int. J. Environ. Res.* 5(4): 1047-1052. (in English) ["This research summarizes the data on benthic macro invertebrates collected from 25 points in the Urmia Lake wetlands during November 2008 to February 2009. The purpose of the study was to assess the effects of elevated salinity and nutrient (nitrogen and phosphorus) levels on macro invertebrate abundance and composition. A total of 32 taxa were collected, and the common taxa, including Chironomidae (midges), Corixidae (wa-

ter boatmen), Erythemis (damselflies) [sic], Ephemerella (mayflies), Hyalella (amphipods), and snails. Samples at ponds with salinities greater than 10 ppt showed a shift in community composition to salt-tolerant taxa and a reduction in total diversity. The corixid *Trichocorixa verticalis*, the brine shrimp *Artemia partenogenetica*, and the dipteran *Ephydra* are salt-tolerant species that only occur at high salinity levels. Ponds relatively high in nutrients had fewer total taxa, reduced abundance and diversity of aquatic beetles, lower diversity index values, and a greater dominance by chironomids than ponds low in nutrients. It is suggested to allocate about 10 × 10⁶ cubic meters freshwater of the represented rivers to these wetlands to improve their trophic condition and transfer their hypereutrophic waters into the Urmia Lake for more production of the macro invertebrates both in the wetlands and on the lake." (Authors) Identification is said to be realised by Watson, J.A.L. & Arrell, A.F. (1991). *Odonata* (Dragonflies and Damselflies). Ch. 17 in CSIRO (ed) *The Insects of Australia*. A textbook for students and research workers. Carlton, Melbourne University press, pp. 294-310. Even in this case it is an enigma to identify and find *Erythemis* - an American species - in Iran.] Address: Ahmadi, R., Iranian Artemia Research Center, P.O. Box: 57157-1367 Urmia, Iran. E-mail: rezaahmadi1342@gmail.com

11169. Anderson, C.N.; Cordoba-Aguilar, A.; Drury, J. P.; Grether, G.F. (2011): An assessment of marking techniques for odonates in the family Calopterygidae. *Entomologia Experimentalis et Applicata* 141(3): 258-261. (in English) ["Herein, we describe an alternative ... marking technique for calopterygid damselflies and evaluate potential effects on biology and behaviour. Briefly, abdominal sections 3–6 are marked with unique combinations of paint marks. We report on the use of this marking technique from two calopterygid populations ... Results: For *H. titia*, probabilities of resighting, given a specific colour ranged from 46.4 to 51.6%. No single colour significantly affected the probability of resighting (Table 1). In *C. haemorrhoidalis*, probabilities of resighting given a specific colour ranged from 70.9 to 77.4%. As with *H. titia*, no colour significantly affected the probability of resighting in the *C. haemorrhoidalis* study (Table 2). A significantly higher proportion of *C. haemorrhoidalis* was resighted in the census following abdomen marking (73.8%) than in the census following wing marking (55.0%; $v_2 = 6.13$, d.f. = 1, $P = 0.013$). In the *H. titia* territory intrusion tests, the average rate of attack toward abdomen marked conspecific intruders was not significantly different from the rate of attack toward unmanipulated intruders (signed-rank test: $z = 1.193$, $P = 0.23$; $n = 14$)."] (Authors)] Address: Anderson, C.N., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Circuito Exterior s/n, Apdo. Postal 70-275, México D.F. 04510, Mexico. E-mail: cndanderson1980@gmail.com

11170. Andrew, R.J.; Verma, P.; Rathodi, M.K. (2011): Post ovipositional changes in the egg chorionic ultrastructure of the dragonfly *Pantala flavescens* (Fabricius) (Insecta: Odonata: Anisoptera). *Biological Forum* 3(2): 22-24. (in English) ["The ultrastructure of the egg chorion of *P. flavescens* is described using the light and scanning electron microscope. The egg of *Pantala flavescens* is oval and the chorion is distinctly divided into an outer exochorion and an inner endochorion. The egg measures about $720 \pm 20 \times 530 \pm 10 \mu\text{m}$ in unwetted condition. The endochorion is light yellow, but turns

brown within a few hours in water. The exochorion which envelopes the endochorion as a thin covering which expands into a transparent thick, sticky, jelly-like structure when it comes in contact with water and therefore, the egg in wet condition bloats and measures $870 \pm 20 \times 550 \pm 20 \mu\text{m}$. The apically placed micropylar apparatus is nipple shaped, formed of a small sperm storage chamber (atrium) and a median projecting micropylar stalk. The stalk is of 'concave cone' type and possesses a pair of subterminal orifices. A circular groove demarcates the exochorion and the micropylar apparatus." (Authors)] Address: Andrew, R.J., Dept Zool., Shri Shivaji ESA's Science College, Congress Nagar, Nagpur - 440012 (MS), India

11171. Arimoro, F.O.; Nwadukwe, F.O.; Mordi, K.I. (2011): The influence of habitat and environmental water quality on the structure and composition of the adult aquatic insect fauna of the Ethiope River, Delta State, Nigeria. *Tropical zoology* 24(2): 159-171. (in English) ["The abundance and taxonomic richness of the adult aquatic insect fauna were determined at two sites located 2 km apart on the Ethiope River. Adults were collected by ultraviolet light traps and sweep nets on seven occasions between May and November 2010. Twenty-eight (28) different taxa were identified and 869 individuals were caught at sites 1 and 2 combined. The orders represented were Diptera, Odonata, Trichoptera, Ephemeroptera and Plecoptera in decreasing order of abundance. The distribution of these organisms varied from site 1 to 2 according to the different human activities, abiotic factors and riparian vegetation at the sites. Generally, the most dominant taxonomic order was Diptera, closely followed by Odonata, while the least dominant was Plecoptera. Margalef's species richness (d), Shannon-Weiner diversity and evenness (E) indices were significantly higher ($P < 0.05$) at site 1." (Authors)] Address: Arimoro, F.O., Dept of Animal & Environmental Biology, Delta State Univ., P. M. B. 1, Abraka, Nigeria. E-mail: fransarimoro@yahoo.com

11172. Arnaiz, O.L.; Wilson, A.L.; Watts, R.J.; Stevens, M.M. (2011): Influence of riparian condition on aquatic macroinvertebrate communities in an agricultural catchment in south-eastern Australia. *Ecol. Res.* 26: 123-131. (in English) ["Riparian vegetation is known to affect aquatic macroinvertebrate communities through contributions of organic matter and shading. Despite the widespread degradation of riparian vegetation in Australia, there are relatively few studies examining the effect of changes in riparian vegetation on in-stream macroinvertebrate assemblages on individual catchments. In particular, information is lacking on the responses of macroinvertebrate communities in catchments dominated by agriculture, where farms that are managed at the paddock scale result in riparian vegetation condition varying over relatively short distances. In this study, macroinvertebrate assemblages were assessed from 12 reaches along a 25-km section of a small agricultural stream in southeastern Australia. Riparian condition was assessed using in-stream coarse woody debris (CWD) levels and the rapid appraisal of riparian condition (RARC) index, a numerical system for categorising the health of riparian areas that incorporates sub-indices reflecting habitat continuity, vegetation cover, plant debris levels, native vegetation dominance, and other indicative features. There was a significant positive correlation between RARC scores and macroinvertebrate taxon richness ($p < 0.01$), and also between

CWD scores and macroinvertebrate taxon richness ($p < 0.05$). In contrast, there was no significant correlation observed between riparian condition and the other macroinvertebrate indices (abundance, Shannon diversity, SIGNAL and SIGNAL2). Macroinvertebrate communities were significantly different in stream reaches from different riparian condition categories (ANOSIM; $p < 0.05$). Our results indicate that efforts to rehabilitate riparian vegetation may have a positive effect on in-stream biota even when implemented at a relatively small scale by individual landholders. ... Corduliidae (Odonata) were unique to 'very poor' riparian condition reaches." (Authors)] Address: Stevens, M., E H Graham Centre for Agricultural Innovation (Industry & Investment NSW and Charles Sturt University), Yanco Agricultural Institute, Private Mail Bag, Yanco, NSW 2703, Australia. E-mail: mark.stevens@industry.nsw.gov.au

11173. Arulprakash, R.; Gunathilagaraj, K. (2011): Odonate (Insecta) fauna of temporary water bodies of Salem, Tamil Nadu. *Bugs R All* 17: 30. (in English) [Six temporary water bodies, which dry up in the summer month, in the Salem district of Tamil Nadu, India were sampled for their Odonata species composition. Sampling was done in July - September, 2006 and January - April, 2007. A total of 205 individuals were collected and total to 15 species. These are listed in a table together with their habitats and number of individuals collected.] Address: Arulprakash, R., Dept Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore 641003, India. E-mail: avrarulprakash@gmail.com

11174. Averill, M. (2011): *Sympetrum fonscolombii* in Lanzarote, an example of coping with arid climates. *Agrion* 16(1): 10-11. (in English) ["The observation on 9-III-2010, in Lanzarote, arose after having struggled to find any standing water and was at a place where rain water had collected. Wet weather in February had led to water building up in an area dissected by a gully beside the road at W $13^{\circ} 29.272'$, N $29^{\circ} 04.291'$, half a kilometre west of Guatiza. The silty ponded water had very little emergent vegetation, and other than the bare banks the only supports were dead woody stems. The only species in fact found at the site was *S. fonscolombii* and these were freshly emerged adults. Approximately 200 exuviae were hanging in the bushes. Judging by the silt marks on the vegetation, levels had been much higher and as the summer months approached the water would eventually dry out. There have been 14 species of dragonfly recorded for the Canary Isles (Weihrauch 2011) but Lanzarote would have less than this due to the dry conditions and lack of permanent water bodies, which pose a problem for breeding species." (Author)] Address: Averill, M., 49 James Road, Kidderminster, Worcs, UK, DY10 2TR. E-mail: mike.averill@blueyonder.co.uk

11175. Azarak, P.A.; do Nascimento, S.P.; de Carvalho, C.M. (2011): Anfíbios do lavrado de Roraima. *Biologia Geral e Experimental* 11(1): 4-14. (in Portuguese, with English summary) [The paper presents identification keys and comments on habitats, reproduction and diet of 16 species of anurans from the lavrado of Roraima, region of Tepequém, Brasil. The diet of a few species also includes Odonata.] Address: Azarak, Priscila, Instituto Nacional de Pesquisas da Amazônia, Núcleo de Pesquisas de Roraima, Rua Cel. Pinto 341, Boa Vista, Rr, CEP 69301-315, Brasil. E-mail: priscilazarak@hotmail.com

11176. Bakare, S.S.; Andrew, R.J. (2011): Spermatogenesis and sperm bundle formation in the dragonfly *Anax guttatus* (Burmeister) (Insecta: Odonata: Aeshnidae). *The Bioscan* 6(4): 587-590. (in English) ["In *A. guttatus*, the freshly moulted adults contain primary spermatogonia to fully-formed spermatozoa indicating commencement of spermatogenesis in the ultimate nymphal stage. All the progametes of a single cyst exhibit a single stage of spermatogenesis. Vigorous process of spermiogenesis occurs in the adult dragonfly, leading to the formation of spermatozoa and sperm bundle. The "shuttle cock" shaped sperm bundles are formed with a conical head cap. The central canal secretes thick viscous seminal fluid around the sperm bundle which facilitates downward migration of sperm bundles from the central canal to the vas deferens. In mature adults, the vasa deferentia, seminal vesicles and sperm sac are completely packed with the sperm bundle embedded in viscous seminal fluid secreted by epithelial cells of the genital ducts. The acellular wall of cyst containing mature spermatozoa undergoes ultrastructural changes which help the sperm bundle to move towards the central canal." (Authors)] Address: Andrew, R.J., Dept of Zoology, Hislop College, Civil Lines, Nagpur - 440 001 (M.S.) India. E-mail: rajuandrew@yahoo.com

11177. Baker, R.A. (2011): Parasites of damselflies and dragonflies: a review of recent work. *J. Br. Dragonfly Society* 21(2): 88-104. (in English) ["Odonata are invaded by a number of parasites which occur as both endoparasites (gregarines and trematodes) and ectoparasites (blood sucking flies and aquatic mites). Recently published material brings to light new work on the impact of these parasites on their hosts, the life cycle of some of the parasites and the ecology and behaviour of their parasitic association." (Author)] Address: Richard A. Baker, R.A., Faculty of Biological Sciences, University of Leeds, Leeds LS2 9JT, UK

11178. Baumart, J.; Dalosto, M.; Santos, S. (2011): Effects of carbofuran and metsulfuron-methyl on the benthic macroinvertebrate community in flooded ricefields. *Acta Limnologica Brasiliensia* 23(2): 138-144. (in English, with Portuguese summary) ["This study evaluated the effect of the insecticide carbofuran and the herbicide metsulfuron-methyl on the abundance and diversity of benthic macroinvertebrates in a paddy ricefield. To achieve this goal, two pesticide treatments [the insecticide carbofuran (IC) and the herbicide metsulfuron-methyl (HM)] and a control (Co) treatment with no added pesticide were established in an experimental area of the Plant Science Department of the Federal University of Santa Maria. Soil samples were collected in triplicate from each treatment 30 days before and 1, 10, and 51 days after the pesticide application, for macrofauna identification. Among the 21 taxa identified, Trichoceridae was present only in Co, Hydroptilidae was recorded only in IC, and Corixidae in HM. In Co, the most abundant group was Annelida, while in IC and HM Diptera (Chironomidae) was dominant. Significant differences were observed between Co and IC, in the density of Odontoceridae (Control>IC) and Hydrophilidae (Control<IC), and between Co and HM in the density of Odontoceridae (Control>HM) and Hirudinea (Control<HM). In spite of the possible negative effects of the pesticides on the benthic community, the assemblages recovered rapidly." (Authors) Odonata are treated at the family level; to the abstracters it remains unclear in what extent they are afflicted by the insecticides.] Ad-

dress: Baumart, Joele, Programa de Pós-Graduação em Biodiversidade Animal, Centro de Ciências Naturais e Exatas, Departamento de Biologia, Laboratório de Carcinologia, Universidade Federal de Santa Maria – UFSM, CEP 97105-900, Santa Maria, RS, Brazil. E-mail: jobaumart@gmail.com

11179. Behr, H. (2011): Nachweis einer dritten Moosjungfer-Art am Waldsee bei Kleekamp (NWM): Östliche Moosjungfer, *Leucorrhinia albifrons* (Burmeister, 1839). *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 14(1): 85-86. (in German) [*L. albifrons*, Waldsees near Kleekamp, Nordwestmecklenburg, MTB 2135/4, Germany; 2.6.2011] Address: Behr, H., Herrengrabenweg 57, 19061 Schwerin, Germany. E-mail: hauke-behr@web.de

11180. Bentley, G.; Tyrrell, M. (2011): Maiden flight behaviour in the Hairy Dragonfly *Brachytron pratense* (Müller). *J. Br. Dragonfly Society* 27(2): 132-133. (in English) [Northamptonshire, UK. "An account is presented of observations of recently emerged *B. pratense* taking maiden flights immediately on wing opening, followed by extended periods resting in trees with wings closed." (Authors)] Address: Bentley, G., 21 Cotswold Avenue, Northampton, Northants, NN5 6BT, UK

11181. Bernard, R.; Heiser, M.; Hochkirch, A.; Schmitt, T. (2011): Genetic homogeneity of the Sedgling *Nehalennia speciosa* (Odonata: Coenagrionidae) indicates a single Würm glacial refugium and trans-Palaeartic postglacial expansion. *Journal of Zoological Systematics and Evolutionary Research* 49(4): 292-297. (in English) ["The phylogeographic structures of taiga species often support the hypothesis of East Palaeartic refugia for these taxa, but the phylogeographic structures of northern temperate and southern boreal bog species are still poorly understood. Therefore, we analysed the genetic diversity and differentiation of a stenotopic damselfly, *N. speciosa*, across its trans-Palaeartic range by means of sequencing two mitochondrial gene fragments, 16S rRNA-ND1 and cytochrome c oxidase II. Only four single nucleotide polymorphisms were detected over the 1130 sequenced nucleotides. This low genetic diversity and differentiation and thus the lack of phylogeographic structure imply postglacial expansion from a single Würm Ice Age refugium, most likely located in the Far East of Asia, i.e. Manchurian refugium. From here, the species could have colonized large parts of the Palaeartics, including Europe, during the postglacial." (Authors) Individuals from 12 localities all over the natural range of *N. speciosa* were collected. Five of these localities are in Europe: one in Bavaria (Germany), three in Poland and one in Lithuania. The remaining seven localities are in Asia, two of them in the West Siberian Lowland, one in the Amur Province, one in the Russian Far East and three in Japan.] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

11182. Bernard, R.S.; Savard, M.; Crépin, D. (2011): L'inventaire de libellules à la pointe Taillon: une diversité étonnante! *Bulletin de conservation. Les parcs nous ont dévoilé...* 2011: 18-20. [Nine localities in Pointe-Taillon National Park, Québec, Canada were studied for their Odonata fauna between June 1 and August 9, 2010. A total of 51 species is listed in a table.] Address: Bernard, Roxanne Sarah. E-mail: roxannesbernard@hotmail.com

11183. Boda, R.; Rozner, G.; Czirok, A.; Szivak, I.; Csabai, Z. (2011): New data on the distribution of *Cordulegaster heros* Theischinger, 1979 in Mecsek Mountains and its surroundings. *Acta Biol. Debr. Oecol. Hung.* 26: 21-28. (in English, with Hungarian summary) [*C. heros* is a Natura 2000 species and the only legally strictly protected dragonfly in Hungary. Older Hungarian records of the species are known from Sopron Mountains, Őrség and Mecsek, and more recently from the Zselic Hills and Kőszeg Mountains. Between 2008 and 2010, 468 individuals of *C. heros* from 69 sampling sites along the Mecsek Mountains and its surroundings could be added to the list of localities with records of this rare and endangered species.] Address: Boda, R., University of Pécs, Department of Ecology and Hydrobiology, Ifjúság útja 6, H-7624 Pécs, Hungary. E-mail: reka86@gamma.ttk.pte.hu

11184. Boets, P.; Lock, K.; Goethals, P.L.M. (2011): Using long-term monitoring to investigate the changes in species composition in the harbour of Ghent (Belgium). *Hydrobiologia* 663: 155-166. (in English) ["The macroinvertebrate community of the harbour of Ghent was studied by analysing 135 samples taken at different sampling locations from 1990 until 2008. The results showed that the current Crustacea and Mollusca communities are mainly represented, in terms of abundances, by alien species. In total, seven alien and four indigenous crustacean species were found. Mollusc diversity was higher, with a total of 14 species, four of which were alien. Macroinvertebrate diversity was very low at the beginning of the 1990s, but increased due to the improvement of the chemical water quality achieved by sanitation and stricter environmental laws. This is reflected by the dissolved oxygen concentration, which increased from an average of 2 mg/l to an average of 9 mg/l, allowing more sensitive species to establish. Since 1993, the number of alien taxa has augmented, whereas the number of native taxa has remained stable. The improvement of the chemical water quality and the simultaneous increase in total number of species were also reflected in an increase of the Multimetric Macroinvertebrate Index Flanders, which is used to assess the ecological water quality in Flanders. Due to intensive international boat traffic and the low species diversity, the harbour of Ghent is highly vulnerable for invasions. Stronger regulations and a better understanding about the contribution of shipping, shortcuts via artificial water ways, habitat degradation and environmental pollution are required to reduce the further spread of alien species." (Authors) *Coenagrion puella*, *Ischnura elegans*] Address: Boets, P., Laboratory of Environmental Toxicology and Aquatic Ecology, Ghent University, J. Plateaustraat 22, 9000 Ghent, Belgium. E-mail: pieter.boets@ugent.be

11185. Bourret, A.; McPeck, M.A.; Turgeon, J. (2011): Regional divergence and mosaic spatial distribution of two closely related damselfly species (*Enallagma hageni* and *Enallagma ebrium*). *J. Evol. Biol.* 25(1): 196-209. (in English) ["North American *Enallagma* damselflies radiated during the Pleistocene, and species differ mainly by reproductive structures. Although morphologically very different, *Enallagma hageni* and *Enallagma ebrium* are genetically very similar. Partitioning of genetic variation (AFLP), isolation by distance and clustering analyses indicate that these morphospecies are locally differentiated genetically. Spatial analyses show that they are rarely sympatric at local sites, and their

distributions form a mosaic of patches where one is clearly dominant over hundreds of square kilometers. However, these morphospecies are also not genetically more similar when they are sympatric, indicating that hybridization is probably not occurring. Given that these morphospecies are ecologically equivalent, strong assortative mating, reproductive interference and fast post-glacial recolonisation may explain the origin and maintenance of these distributional patches across eastern North America. By limiting opportunities for gene flow, reproductive interference may play an unsuspected role in accelerating genetic differentiation in the early phases of nonecological speciation." (Authors)] Address: Turgeon, Julie, Dépt de biologie, Univ. Laval, 1045 avenue de la Médecine (Vachon 3048), Quebec City, QC G1V 0A6, Canada. E-mail: julie.turgeon@bio.ulaval.ca

11186. Buczyński, P. (2011): First records of *Lestes barbarus* (Fabricius, 1798) and *Erythromma viridulum* (Charpentier, 1840) (Odonata: Lestidae, Coenagrionidae) in islands Wolin and Uznam. *Odonatrix* 7(2): 57-58. (in Polish, with English summary) [In August 2011, on the islands of Uznam and Wolin (northwestern Poland) two autochthonous populations of *L. barbarus* and *E. viridulum* were found. *L. barbarus* was recorded in a sand-excavation in Świnoujście while *E. viridulum* in a park pond in Świnoujście and a ditch in the bird sanctuary „Karsiborska Kępa”. The author discusses the importance of anthropogenic waters on range expansion of thermophilous dragonflies towards the north.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

11187. Buczyński, P. (2011): Polish and dedicated to Poland odonatological papers. 9. The year 2010. *Odonatrix* 7(2): (in Polish, with English summary) [73 publications from 2010 are added to the list of Polish papers on Odonata.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

11188. Cabana, M.; Romeo, A.; Cordero, A. (2011): Primeiras citas de *Sympetrum flaveolum* (Odonata: Libellulidae) en Galicia. *Chioglossa* 3: 15-19. (in Galician, with English summary) [First records of *S. flaveolum* in Galicia (NW Spain) are documented. In 2010, the species was found in mountain ponds, between 1300 and 1500 m.a.s.l., in localities of Lugo and Ourense provinces.] Address: Cabana O., M., Dpto. de Biología Animal, Biología Vegetal e Ecoloxía, Facultade de Ciencias. Univ. da Coruña, Campus da Zapateira, s/n. 15.071 A Coruña, Spain. E-mail: mcohyala@yahoo.es

11189. Chovanec, A.; Schindler, M. (2011): Gewässertypspezifische Bewertung von Restrukturierungsmaßnahmen an einem Tieflandbach durch libellenkundliche Untersuchungen (Insecta: Odonata). *Beiträge zur Entomofaunistik* 12: 25-40. (in German, with English summary) ["Dragonfly surveys as a tool for assessing the restoration of a small lowland brook. The ecological status of a restored stretch of a small river in the lowland areas of eastern Austria was assessed by a dragonfly survey. Restoration measures were carried out in a retention area by river widening and the construction of back waters. The assessment which is oriented towards the Water Framework Directive (WFD) is based on the comparison between the status quo and a river-type-specific reference condition; key elements are the species composition and the Odonata Habitat Index (OHI).

A total of 21 species were recorded at two sites situated in the restored area, 16 species of them were classified as autochthonous. The species list and OHI values reflect the broad range of relevant dragonfly habitats. The ecological status of this river stretch was ranked as class II ("good ecological status") in the 5-tiered WFD classification scheme. Species numbers recorded at two canalised and straightened stretches of the river system (6 species / 5 autochthonous species) and OHI values show a significant deviation from the river-type-specific reference condition." (Authors)] Address: Chovanec, A., Krottenbachgasse 68, 2345 Brunn am Gebirge, Österreich. E-Mail: a.chovanec@kabsi.at

11190. Clausnitzer, V.; Dijkstra, K.D.; Kipping, J. (2011): Globally threatened dragonflies (Odonata) in Eastern Africa and implications for conservation. *Journal of East African Natural History* 100(1&2): 89-111. (in English) ["This paper presents the status of East African dragonfly species (Odonata) listed globally as threatened on "The IUCN Red List of Threatened Species". The area considered includes Ethiopia, Kenya, Uganda, Burundi, Rwanda, Tanzania and Malawi. From a total of 323 species known from these countries, 31 are listed in one of the categories "Near Threatened", "Vulnerable", "Endangered" and "Critically Endangered", while nine are marked as "Data Deficient". Ecoregions with high numbers of threatened species are the Ethiopian and East African montane forests, Eastern Arc forests and Northern Zanzibar-Inhambane coastal forest mosaic. The highest species diversity is found in the Albertine Rift montane forests ecoregion. Information concerning the distribution, conservation status and biology of these species is given and conservation issues are discussed." (Authors)] Address: Clausnitzer, Viola, Senckenberg Museum of Natural History Görlitz, PF 300154, 02806 Görlitz, Germany. E-mail: viola.clausnitzer@senckenberg.de

11191. Crabtree, A.G. (2011): Modelling a small pond odonate population: Exploring the complex life history dynamics of *Pachydiplax longipennis* (Odonata: Libellulidae). M.Sc. thesis. Northern Illinois University: 150 pp. (in English) ["Members of the insect order Odonata are excellent examples of organisms that demonstrate complex life histories. Both the larval and adult stages must be studied to understand the dynamics of such species. A population of *P. longipennis* was studied at a small fishless pond in north central Illinois in 2008 and 2009. Additionally, a dynamic population model of the species was developed using the graphical modelling software, STELLA, to further understand the life history dynamics of *P. longipennis*. The larval dragonfly community in the pond was composed of nine species, all of which were also present as adults. The adult dragonfly community contained an additional four species, for a total of 13. Although, the maximum larval density of *P. longipennis*, which occurred in the middle of the summer, was ~15 m² in 2008 and 2009, mean density was higher in 2009. Based on this maximum density, it was estimated the maximum larval population size for the pond was ~170,000. Head capsule width and total length of larvae were used to identify 14 larval instar classes for the species. Changes in head capsule width between adjacent instar classes generally conformed to Dyar's Ratio, with the exception of the changes between the first and last two instars. Skipping of instar classes was common among larvae reared in the lab. Mean maximum *P. longipennis* adult abundance occur-

red in July in both 2008 and 2009. It was higher in 2008 than that observed in 2009, ~12 per 10 m sector versus 8 per 10 m sector. The estimated adult population size in 2009 based on mark-recapture data using Craig's estimation method was 2,000. Average clutch size, determined from six captured, mated females, was 1,238±431 eggs per clutch. Average clutch survivorship was 27.51%±16.38. A density-ceiling model generated a stable population of *P. longipennis* larvae and adults that cycled in 54 week intervals. Short term (2 years) results predicted an early instar larval population of ~175,000 individuals, a late instar larval population of ~40,000, and an adult population of ~4,000. Long term (20 years) results predict early instar larval population of ~300,000 individuals, a late instar larval population of ~75,000, and an adult population of ~6,000. Long term estimates were comparable to those predicted by larval and adult sampling. Sensitivity analysis of varying mortality rates found that changing early instar larval mortality rate had a significant impact on observed abundances in all modelled life stages, while changes in breeding adult mortality had little effect. Simulations of ten different survivorship scenarios of larval and adult mortality resulted in three specific categories of response in terms of larval and adult abundances: one or both reached carrying capacity, both went extinct, or either or both stabilized at an intermediate abundance. Scenario results also suggested a greater importance of larval stage mortality rates, similar to the results of the sensitivity analysis. A density-dependent model generated unrealistic results in both short term and long term simulations." (Author)] Address: not stated.

11192. Daraž, B. (2011): New localities of *Nehalennia speciosa* (Charpentier, 1840) in southeastern Poland (Odonata: Coenagrionidae). *Odonatrix* 7(1): 14-18. (in Polish, with English summary) ["Two new localities of *N. speciosa* were found in 2010 in southeastern Poland, in the south of the Sandomierz Basin (Kotlina Sandomierska), in two nature reserves: "Bagno Przeclawskie" (50°11'15"N, 21°25'15" E, UTM: EA35.35) and "Torfy" (50°02'38" N, 21°17'45" E, EA24).] Address: Daraž, B., ul. Kościelna 41, 35-505 Rzeszów, Poland. E-mail: bda-raz@poczta.onet.pl

11193. David, S. (2011): Výskyt a ekologická charakteristika *Somatochlora meridionalis* Nielsen, 1935 na Slovensku [Occurrence and ecological characteristics of *Somatochlora meridionalis* Nielsen, 1935 in Slovakia]. In: Stoukal, E. (ed.) 2011: Zborník abstraktov z konferencie 18. Feriencove dni 2011, Bratislava, 24.-25.11. 2011. *Faunima*, Bratislava, 34 pp: 9. (in Slovakian) [In Slovakia, *S. meridionalis*, is known from five localities (šahy, 1974, 1 female, leg. J. švec; Tešmak, 1996 1 male, leg. S. David; Bol', 2003, 1 male, leg. G. Tóthová; Veličná, 2008, 1 male, leg. K. Janeková; Chrastnice, 2010-2011, 1 male larva, leg. S. David).] Address: David, S., Katedra ekologie a environmentalistiky FPV UKF v Nitre, Tr. A. Hlinku 1, 949 74 Nitra, Slovakia. stanislav.david@savba.sk, stanislav.david@gmail.com

11194. Day, L. (2011): Odonata seen at Tatai, Koh Kong Province, Cambodia. *International Dragonfly Fund - Report 42*: 7-10. (in English) ["32 Odonata species have been recorded in March 2011 near Tatai River situated at the foothills of the Cardamon Mountains, Cambodia. The list of taxa including *Heliaeschna crassa* Krüger, 1899 and *Orchithemis pulcherrima* Brauer, 1878 which are new additions to the Cambodian Odonata fauna."

(Author)] Address: Day, L., P.O. Box 67, Nathon, Koh Samui, Surat Thani, 84140, Thailand

11195. Delclos, P.; Rudlof, V.H.W. (2011): Effects of size structure and habitat complexity on predator-prey interactions. *Ecological Entomology* 36(6): 744-750. (in English) ["(1) A predator's ability to suppress its prey depends on the level of interference among predators. While interference typically decreases with increasing habitat complexity, it often increases with increasing size differences among individuals. However, little is known about how variation in intrinsic factors such as population size structure alters predator-prey interactions and how this intrinsic variation interacts with extrinsic variation. (2) By experimentally varying the level of vegetation cover and the size structure of the predatory *Ischnura posita*, we examined the individual and interactive effects of variation in habitat complexity and predator size structure on prey mortality. (3) Copepod prey survival linearly increased as the *I. posita* size ratio decreased and differed by up to 31% among different predator size structures. Size classes had an additive effect on prey survival, most likely because intraspecific aggression appeared size-independent and size classes differed in microhabitat preference: large *I. posita* spent 14% more time foraging on the floor than small larvae and spent more time in the vegetation with increasing habitat complexity. Despite this difference in microhabitat use among size classes, habitat structure did not influence predation rates or interference among size classes. (4) In general, results suggest that seasonal and spatial variation in the size structure of populations could drive some of the discrepancies in predator-mediated prey suppression observed in nature, and this variation could exceed the effects of variation in habitat structure." (Authors)] Address: Rudolf, V.H.W., Department of Ecology and Evolutionary Biology, Rice University, Houston, TX 77005, USA. E-mail: Volker.rudolf@rice.edu

11196. Deutschmann, U. (2011): Auswertung des Fotowettbewerbs des Entomologischen Vereins Mecklenburg e.V. für das Jahr 2011. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 14(1): 91-92. (in German) [The winner of a regional photo competition was Michael Frank, Nieder-Olm with „Blaue Augen im Flug“ (Flying blue eyes), showing a male *Aeshna affinis*. The third place was a picture of *Coenagrion puella* with a small Hymenoptera sitting on the eyes of the damselfly: „Der falsche Landeplatz“ (wrong landing site), Rolf Ludwig, Schwerin.] Address: Deutschmann, U., Feldstr. 5, 19067 Dobbin am See, OT Buchholz, Germany. E-mail: uwedeutschmann@web.de

11197. Dufrene, M.; Baltus, H.; Cors, R.; Fichet, V.; Moës, P.; Warlomont, P.; Dierstein, A.; Motte, G. (2011): Bilan du monitoring des libellules dans les sites restaurés par le projet LIFE « Tourbières » sur le Plateau de Saint-Hubert. *Les Naturalistes Belges* 92(3-4): 37-54. (in French, with English summary) ["The project LIFE «Tourbières», that got started in 2003 and ended in 2007, has allowed the restoration of more than 600 ha of wet areas on the Plateau de Saint-Hubert. The creation of more than 3000 pools and water surfaces with a large surface diversity represents an huge potential of habitats for Dragonflies. The monitoring program launched at the end of the project reveals that the species number has doubled there in five years to reach 37 species. Numerous rare species in Ardenne and on the plateau are now occupying numerous habitat patches.

Logically, the abundance of several pioneer species like *Libellula depressa*, *Orthetrum coerulescens*, *Ischnura pumilio*, ... are well developed. However, typical peat-bog species like *Aeshna juncea*, *Leucorrhinia dubia* and *Somatochlora arctica* show also a large extension. The monitoring program should be re-launched this winter to follow the dynamic of this biological group." (Authors)] Address: Dufrene, M., Service Public Wallon (SPW) - Direction Générale Opérationnelle (DG03) - Département de l'Etude du Milieu naturel et agricole (DEMna), Av. Maréchal Juin, 23, B-5030 Gembloux, Belgium. E-mail: Marc.Dufrene@spw.wallonie.be

11198. Epstein, D.M. (2011): 15N tracer and modelling analyses of nutrient transport through lakes in a subalpine watershed. M.Sc. thesis, Ecology, Utah State University, USA. All Graduate Theses and Dissertations. Paper 932. <http://digitalcommons.usu.edu/etd/932>: 107 pp. (in English) ["Lakes have historically been overlooked as important nutrient processors within their watersheds. In general ecologists have focused on streams as zones of uptake and transformation, while viewing lakes as simple nutrient traps. However, recent research has highlighted the large influence that lakes may have on water chemistry within their watersheds. Within the field of limnology, researchers have traditionally focused on the pelagic zone for in-lake production. Further research in shallow lakes has highlighted the role benthic production within the littoral zone plays in the lake ecosystem. The greater influence of lakes is highlighted when comparing watersheds containing lakes with watersheds composed of solely stream channels. To assess the influence that lakes have on water chemistry and nutrient transport, both field and modelling analyses were performed for Bull Trout Lake, Idaho. In 2008 a large field sampling effort was conducted along with a 15N tracer experiment to characterize the limnology of Bull Trout Lake (Idaho) and nitrogen uptake and transport through the lake. Following the termination of the field season a multi-lake ecosystem model was developed with the use of a one-dimensional lake water quality model. Results from both experiments demonstrated the role of Bull Trout Lake as a nutrient processor and source within its watershed and further suggested the added influence additional lakes might have on water chemistry. The outcomes of the tracer study indicated that pelagic primary producers have the first opportunity to assimilate nitrogen delivered by the inflow stream; however, nutrients incorporated into plants within the littoral zone are held on to longer. Further the tracer experiment demonstrated the small role that large organisms have in ecosystem nutrient dynamics. The multi-lake model demonstrated the effect of BTL as a nutrient source within the watershed and indicated that although multiple lakes in sequence may have additive effects, most of this influence is expressed in the first two lakes of a series. Our research provides examples of valuable tools in limnological research. While whole-lake tracer studies have rarely been performed, they are extremely effective in understanding ecosystems. Additionally, even though lake models may be simplifications of natural systems, they can provide an efficient means of understanding lake functioning and testing hypotheses." (Author) The thesis includes data on Odonata, but without any taxonomic details.] Address: Epstein, D.M., Utah State University

11199. Ferreira Rezende, C.; Mazzoni, R.; Pellegrini Caramaschi, E.; Rodrigues, D.; Moraes, M. (2011): Prey

selection by two benthic fish species in a Mato Grosso stream, Rio de Janeiro, Brazil. *Rev. Biol. Trop.* 59(4): 1697-1706. ["Key to understand predator choice is the relationship between predator and prey abundance. There are few studies related to prey selection and availability. Such an approach is still current, because the ability to predict aspects of the diet in response to changes in prey availability is one of the major problems of trophic ecology. The general objective of this study was to evaluate prey selection by two species (*Characidium cf. vidali* and *Pimelodella lateristriga*) of the Mato Grosso stream, in Saquarema, Rio de Janeiro, Brazil. Benthos and fishes were collected in June, July and September of 2006 and January and February of 2007. Fish were collected with electric fishing techniques and benthos with a surber net. ... The most abundant families in both benthos and diet of both fish species were the same, indicating that these species consume mainly most abundant prey in the environment. We concluded that prey selection occurs even for preys that had small abundance in the environment. However, it is the availability of the macroinvertebrate resources that determines the major composition of items in diet of fish, demonstrating that the abundance is the factor that most influences the choice of prey." (Authors) Relative density (%) of Odonata during the five sampling months (150 samples) accounted to 0.32%. Odonata contributed 0.47% and 1.25% to the diet items in *Characidium cf. vidali vidali* and *Pimelodella lateristriga* respectively.] Address: Ferreira Rezende, Carla, Laboratório de Ecologia de Peixes, Instituto de Biologia, Departamento de Ecologia, Universidade Federal do Rio de Janeiro, Av. Mal. Trompowski, s/n CCS Bloco Alha do Fundão, 21941-590, Rio de Janeiro, RJ, Brazil. E-mail: carlarezende

11200. Fincke, O.A.; Tylczak, L.A. (2011): Effects of zebra mussel attachment on the foraging behaviour of a larval dragonfly, *Macromia illinoiensis*. *Ecological Entomology* 36(6): 760-767. (in English) ["(1) Larvae of *M. illinoiensis* are often colonised by the zebra mussel, *Dreissena polymorpha* Pallas, a recent invader to North America. To determine how mussel attachment affects an individual's foraging behaviour, we quantified capture of *Hexagenia limbata* Hexes mayfly prey and the distance moved by newly-molted final instars before and after an individual's colonisation with zebra mussels. (2) In night trials, larvae sprawled above the sand, and caught more mayflies than individuals in daytime trials, but the estimated distance travelled did not differ. When resting under a layer of sand with only its eyes exposed during the day, an individual could capture a mayfly prey using a sit-and-wait ambush strategy. When sprawled above the sand, some larvae caught prey that rested on their legs. (3) When mussel-free, individuals captured more prey than they did when carrying zebra mussels, although mussel attachment per se did not affect the estimated distance that a larva moved. (4) During day trials, but not night ones, the increasing mussel load of colonised individuals decreased prey capture and the distance moved in an apparent step-wise function. Although the number of mussels carried did not differ, night foragers carried a heavier load. Independent of time of the day, the distance an individual travelled when mussel-free was predictive of the number of prey it caught when colonised, suggesting that the greater general activity of some individuals helped mitigate negative effects that mussel attachment had on prey capture. (5) Our results add to a growing number of nega-

tive effects of zebra mussel colonisation on sprawling and hiding dragonfly larvae. Although the impact of these costs on dragonfly populations remains to be determined, a decrease in this guild of predators whose life cycle spans aquatic and terrestrial habitats might have cascading effects across ecosystems." (Authors)] Address: Fincke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

11201. Fleck, G. (2011): Phylogenetic affinities of Petaluridae and basal Anisoptera families (Insecta: Odonata). *Stuttgarter Beiträge zur Naturkunde A, Neue Serie* 4: 83-104. (in English, with German English) ["The petalurid genus *Phenes* has a larval proventriculus with only four dental folds. This genus is considered as the sister group of remaining Petaluridae and placed in the *Pheninae* subfam. nov. Two possible phylogenies of the Petaluridae are proposed and diagnoses of Tachopteryginae, Tanypteryginae, and Petalurinae are amended. The Petalurinae are split into Petalurini tribe nov. and Uropetalini tribe nov. The Petaluridae, Austropetalidae and Aeshnidae are gathered in the new clade Siphonoprocta taxon nov. with Petaluridae sister taxa of (Aeshnidae + Austropetalidae). The relative positions of the main basal clades Gomphida, Siphonoprocta and Cavilabiata are not solved. Within Cavilabiata the Cordulegastroidea and Neopetalidae are considered sister taxa and are gathered in the Cordulegastroidea comb. nov., and the Chlorogomphidae are considered to represent the sister group of all remaining Cavilabiata or to represent the sister group of the Cordulegastroidea." (Author)] Address: Fleck, G., Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany. E-mail: gfleck@uni-bonn.de

11202. Flynn, K.E.; Moon, D.C. (2011): Effects of habitat complexity, prey type, and abundance on intraguild predation between larval odonates. *Hydrobiologia* 675 (1): 97-104. (in English) ["Intraguild predation is an important interaction in which predators feed on a shared prey as well as on each other. It occurs frequently between larval odonates in freshwater lentic communities, and understanding the factors influencing this interaction remains an important objective. An experiment carried out in mesocosms and utilizing a factorial design investigated the strength of intraguild interactions between *Sympetrum vicinum*, and *Enallagma civile*, under two levels each of habitat complexity (high or low), prey abundance (high or low) and prey type (amphipods or blackworms). Effects of treatments on size, mortality and emergence of larval odonates were evaluated. Shared prey abundance had little impact on intraguild interactions, affecting only the mass of the intraguild prey *E. civile*. Habitat complexity affected the size of *E. civile*, as length and wet mass were significantly greater in low complexity mesocosms. Prey type seemed to be the most important factor in the experiment, influencing all response variables measured. When shared prey consisted of larger, more active blackworms, intraguild predation decreased, and *E. civile* experienced lower mortality, achieved greater length and mass, and had greater emergence success. Results of this study suggest that prey type and habitat complexity can be more important than prey abundance in mediating intraguild predation." (Authors)] Address: Moon, D.C., Dept Biol. Univ. of North Florida, Jacksonville, FL, USA. E-mail: dmoon@unf.edu

11203. Fritz, L.L.; Heinrichs, E.A.; Machado, V.; Andreis, T.F.; Pandolfo, M.; de Salles, S.M.; de Oliveira, J.V.; Fiuza, L.M. (2011): Diversity and abundance of arthropods in subtropical rice growing areas in the Brazilian south. *Biodiversity and conservation* 20(10): 2211-2224. (in English) ["This paper describes a survey of arthropods in rice-growing areas of Rio Grande do Sul, Brazil, undertaken to identify the main groups of insect pests and their natural enemies present in three producing regions during the stages of crop development. The study was conducted during the crop years 2007/2008 and 2008/2009 in the municipalities of Cachoeira do Sul, Eldorado do Sul and Capivari do Sul. A total of 44,231 arthropods were collected: 26,821 in 2007/2008 and 17,410 in 2008/2009. Spatial and temporal patterns were analyzed utilizing the 28 principal families and applying the Morisita–Horn coefficient and the Detrended Correspondence Analysis (DCA). Both results demonstrated variances of abundance and richness from 1 year to the next in the evaluated areas. The results indicate that the arthropod communities in southern Brazilian rice crop agro-ecosystems are formed of a few families with high abundance and a large number of other smaller families. Among the phytophagous arthropods found, Pentatomidae, Orthoptera and planthoppers were predominant while the natural enemies were mainly predatory mites, spiders, Hymenoptera and Odonata. This study demonstrates that irrigated rice fields located in subtropical areas of the Brazilian South sustain a great variety of arthropods which facilitate studies on bio-diversity conservation and the development of sustainable management of the pests." (Authors)] Address: Heinrichs, E.A., Dept of Entomology, University of Nebraska, Lincoln, Entomology Hall, Lincoln, NE 68583-0816, USA. E-mail: eheinric@vt.edu

11204. Gliwa, B. (2011): On the names of dragonflies and damselflies. New and rare for Lithuania insect species 23: 115-119. (in Lithuanian, with English summary) ["The paper criticizes the common view in Lithuania to call the scientific names of taxa "Latin" and introducing an additional layer of "Lithuanian scientific names". It is outlined that the scientific names aren't Latin but following the ICZN rules only. They can be seen as a part of the sociolect used by Lithuanian zoologists, which is a subset of the Lithuanian language. There is no need for additional Lithuanian taxa names in science. However, vernacular names can be useful in a wider discussion. Wherever possible, traditional names should be used. Adaption of the scientific names or translation are recommended ways of forming. Creation of new ad hoc names should be limited to a minimum. There is no need to normalize vernacular names." (Author)] Address: Gliwa, B., Lithuanian Entomological Society, Akademijos 2, 08412 Vilnius, Lithuania. E-mail: gliwa@sargeliai.org

11205. Gonzalez, S.C.; Touchon, J.C.; Vonesh, J.R. (2011): Interactions between competition and predation shape early growth and survival of two Neotropical hyliid tadpoles. *Biotropica* 43(5): 633-639. (in English, with Spanish abstract) ["Experimental studies in temperate regions have revealed that competition and predation interact to shape aquatic communities. Predators typically reduce the effect of competition on growth and competitors provide alternative prey subjects, which may also alter predation. Here, we examine the independent and combined effects of competition and predation on the survival and growth of hatchling tadpoles of two widespread co-occurring Neotropical hyliid frogs

(*Agalychnis callidryas* and *Dendropsophus ebraccatus*). Using 400 L mesocosms, we used a 2 × 3 factorial substitutive design, which crossed tadpole species composition with the presence or absence of a free-roaming predator (*Anax amazili* larva). Dragonflies were effective predators of both species, but had larger effects on *A. callidryas* survival. Both species had similar growth rates when alone, whereas *A. callidryas* grew 30% faster than *D. ebraccatus* when they co-occurred, suggesting interspecific rather than intraspecific competition had relatively stronger effects on *D. ebraccatus* growth, while the opposite was true for *A. callidryas*. Predator presence dramatically reduced growth rates of both species and erased this asymmetry. Results suggest that the effects of predator induction (i.e., nonconsumptive effects) on growth were larger than both consumptive and competitive effects. Our study demonstrates that predators have strong effects on both survival and growth of prey, highlighting the potential importance of predators in shaping prey populations and tropical aquatic food web interactions." (Authors)] Address: Vonesh, J.R., Tyson Research Center, Washington Univ. at St. Louis, P.O. Box 258, Eureka, MO 63025, USA

11206. Greeney, H.F.; Dyrz, A. (2011): Breeding biology of Pale-edged Flycatcher (*Myiarchus cephalotes*) in northeastern Ecuador. *Ornitología Colombiana* 11: 49-57. (in English, with Spanish summary) ["We made observations on the reproductive habits of *M. cephalotes* nesting in nest boxes and under the eaves of human dwellings in northeastern Ecuador. We found a total of six nests, likely built by the same two pairs. Nest construction lasted around 23 days at one nest and was performed only by the female. Most clutches are initiated during the drier months, but there may be some breeding year-round. Clutch size ranged from two to three eggs. Only females incubated and spent the night on the nest. Patterns of attendance during incubation were fairly regular and eggs were covered for 62% of daylight hours. Incubation period was 18 days at two nests. At two nests eggs hatched synchronously and at a third two eggs hatched 24 h prior to the final egg. The nestling period was 18 days. Based on observations of one banded pair in 2008 and 2009, females provide the majority of nestling care (61%). Nestlings were provisioned with a large percentage of adult Lepidoptera and cicadas, with females bringing predominantly Lepidoptera and males favouring cicadas. After leaving the nest, young birds remained with their parents for at least 10 weeks and were still provisioned by them for at least the first nine weeks." (Authors) Odonata accounted to 2.1% of the nestlings diet.] Address: Greeney, H.F., Yanayacu Biological Station & Center for Creative Studies c/o Foch 721 y Amazonas, Quito, Ecuador. E-mail: revmmoss@yahoo.com

11207. Gros, P. (2011): Aufruf zur Erfassung der Libellenfauna Salzburgs. *Salzburger Entomologische Arbeitsgemeinschaft / Haus der Natur. Newsletter* 2/2011: 6-9. (in German) [The author presents the current status on data recording on the Odonata fauna of the Federal State Salzburg, Austria. Understudied regions are listed.] Address: Gros, P., Haus der Natur, Museumsplatz 5, A-5020 Salzburg, Austria. E-Mail: patrick.gros@hausdernatur.at

11208. Gros, P. (2011): Die Südliche Heidelibelle *Sympetrum meridionale* (Sélys 1841) nun auch in Salzburg nachgewiesen: Ein bislang unpublizierter Fund (Insecta: Odonata). *Mitteilungen aus dem Haus der Natur* 19:

98-99. (in German, with English summary) ["S. meridionale is newly reported for the Austrian county of Salzburg. During a revision of the dragonflies' collection of the Museum "Haus der Natur" (Salzburg), a 55 years old specimen belonging to that species was found." (Author)] Address: Gros, P., Haus der Natur, Museumsplatz 5, 5020 Salzburg, Austria. E-mail: patrick.gros@hausdernatur.at

11209. Gros, P. (2011): Endlich ein Beleg zur eindeutigen Untermauerung des ehemaligen Vorkommens der Vogel-Azurjungfer *Coenagrion ornatum* (Selys 1850) aus der Umgebung der Stadt Salzburg (Insecta: Odonata). Mitteilungen aus dem Haus der Natur 19: 95-97. (in German, with English summary) ["In central Europe, *C. ornatum* is obviously a rare and declining species. In the Austrian county of Salzburg, this species was reported only once (St. Quentin 1959). Unfortunately, no collection specimen was known so far, though *C. ornatum* can be very easily confused with close related species. During a revision of the dragonflies' collection of the Museum "Haus der Natur" (Salzburg), a 70 years old specimen belonging to that species was found, confirming its historical occurrence in Salzburg." (Author)] Address: Gros, P., Haus der Natur, Museumsplatz 5, 5020 Salzburg, Austria. E-mail: patrick.gros@hausdernatur.at

11210. Gualdoni, C.M.; Duarte, C.A.; Medeot, E.A. (2011): Estado ecológico de dos arroyos serranos del sur de Córdoba, Argentina. *Ecología Austral* 21: 149-162. (in Spanish, with English summary) ["Ecological status of two mountain streams of the south of Córdoba, Argentina: The development of methodology that allows us to assess the environmental deterioration of fluvial systems from the biotic components has been of high attention in the last time. With the aim to evaluate the ecological state of two mountains streams in sections that cross communes of tourist interest, indexes of water and riparian forest quality were combined. In each stream, two stations were selected, one downstream and the other upstream of the recreation areas. Environmental data were registered and benthos samples were collected in the main geomorphological units, during high and low water periods. Metric indexes and Índice Biótico Carcarañá (IBC) based on benthic macroinvertebrates were calculated, and the marginal forest quality was determined by the Riparian Quality Index (QBR). The results were integrated by a modification of index ECOSTRIMED to evaluate the ecological status of the fluvial system. In both streams, the physico-chemical variables showed normal values and the metric indexes determined that the water quality vary between "moderately deteriorated" and "little deteriorated", whereas the IBC revealed a "unpolluted environment" in all sampling situations. Application of QBR showed that the riparian forest with important alterations and extreme degradation were located close to urban areas, while in the other reaches the alteration degree was translated in judgments of acceptable and good quality. When combining the results of the metric indexes with those of the QBR, in both streams were obtained quality judgments that indicated "good" and "intermediate" ecological status in the stretches located upstream of urban areas and "intermediate" in the stretches downstream of recreation areas. The results of this study contribute to corroborate that, from a biological perspective; the application of a set of metric is the most efficient and economic methodology, to evaluate the quality of the water since they integrate infor-

mation derived from diverse aspects of the benthonic community. Although in the studied streams the water didn't have very good biological quality, in urban reaches, the degradation or elimination of the marginal vegetation was the main determinant of the altered ecological quality." (Authors) Taxa - including Odonata - are treated at the order level.] Address: Gualdoni, Cristina, Dto. de Ciencias Naturales, Facultad de Ciencias Exactas, Físico-Químicas y Naturales, Universidad Nacional de Río Cuarto. Río Cuarto, Córdoba, Argentina. E-mail: cgualdoni@exa.unrc.edu.ar

11211. Gutierrez, Jr., P.M.; Torres, M.A.J.; Demayo, C.G. (2011): Thin-plate spline (TPS) and correlation based on distances (CORIANDIS) analyses as tools for the analysis of morphological differences in dragonfly wings. 2011 2nd International Conference on Environmental Science and Technology, IPCBEE vol. 6, IACSIT Press, Singapore: V2-375-V2-379. (in English) ["This study was aimed to analyzed the morphological disparity in the wing shape and venation of five different dragonfly species namely: *Pantala flavescens*, *Aethriamanta brevipennis*, *Libellula incestra*, *Libellula croceipennis*, and *Gomphus externus* using Thin-Plate Spline (TPS) coupled with CORIANDIS analysis. These were done for triangle, anal loop and outline shape of the left and right forewings and hindwings of the dragonfly samples. Results showed that the locations of the species in the "compromise" space reflect a high similarity between species 2 and 3 (*A. brevipennis* and *L. incestra* respectively) however, species 1, 4 and 5 (*P. flavescens*, *L. croceipennis* and *G. externus*, respectively) show disparity with each other. Furthermore, there is congruence of anal loops (left forewings and right forewings) characters in species 1 (*P. flavescens*) and the triangle left forewing and anal loop right forewing in species 4 (*L. croceipennis*). Stacked bar graphs also shows that species 1 (*P. flavescens*) departs considerably from other species, although this seems to be largely a function of disparity of character 1 (triangle right forewing) alone. Species 3 and 4 (*L. incestra* and *L. croceipennis* respectively) show close similarity of outline left hind wing (dark red). The high similarity of the character is maybe due to the fact that these two different species belong to the same genus. Species 2 and 3 (*A. brevipennis* and *L. croceipennis*) also indicate close similarity of outline left hind wing and anal loop right hind wing characters (dark red and yellow-green respectively). Species 5 (*G. externus*) indicates high level disparity of outline left hind wing (dark red) character from other dragonfly species. Results of this study suggests that Thin-Plate Spline (TPS) and CORIANDIS analysis can be used as a tool for morphological disparity in dragonfly wings using various characters like triangle, anal loop and outline." (Authors) Comment of Reagan Villanueva: "Well, you are right about the ID. They listed 2 species totally impossible in the country and two near impossible. I think the right ID is *Rhodothemis rufa* for *Libellula croceipennis*, *Aethriamanta brevipennis* is *Orthemum prunosum clelia* (young male), *Libellula incestra* as *Potamarcha congener*; *Gomphus externus* as *Ictinogomphus tenax* female. The good thing, the *Pantala* is correctly identified."] Address: Gutierrez, Jr., P.M., Misamis Occidental National High School, Gov. Anselmo Bernad St., Poblacion 1, Oroquieta City, Philippines. E-mail: gutierrezpedrojr@yahoo.com

11212. Gyulavári, H.A.; Felföldi, T.; Benken, T.; Szabó, L.J.; Miskolczi, M.; Cserhádi, C.; Horvai, V.; Márialigeti,

K.; Dévai, G. (2011): Morphometric and molecular studies on the populations of the damselflies *Chalcolestes viridis* and *C. parvidens* (Odonata, Lestidae). *International Journal of Odonatology* 14(4): 329-339. (in English) ["Morphometric and genetic differences were analysed for two closely related damselflies, *Chalcolestes viridis* and *C. parvidens*. A total of 305 male individuals were collected from six European countries (Austria, Croatia, Germany, Greece, Hungary and Portugal). Measurements from a total of 28 populations of *C. viridis* and *C. parvidens* and several intermediate forms were collected to determine if they can be definitely distinguished using simple morphometric characters. DNA sequences from two independent loci (nuclear ribosomal ITS region and mitochondrial cytochrome oxidase I gene) were analysed to test whether these taxa represent separate monophyletic groups as well as to compare the genetic distance with those found between well-accepted European *Lestes* species. Discriminant analysis revealed that *C. viridis* and *C. parvidens* are differentiated in morphometric space. Individuals with intermediate anal appendage traits overlapped with both *C. viridis* and *C. parvidens* which raised the possibility that they are merely subspecies of a single species. However, genetic analysis of both investigated DNA regions showed that the two *Chalcolestes* taxa did not share haplotypes, indicating their status as true species. Furthermore, they formed a monophyletic group separated from the investigated *Lestes* species, supporting the recognition of the genus *Chalcolestes*. The two *Chalcolestes* species are very closely related compared with European *Lestes* species, suggesting that their divergence occurred relatively recently." (Authors)] Address: Gyulavári, Hajnalka Anna, Dept of Hydrobiology, Univ. of Debrecen, Egyetem t. 1. H-4032, Debrecen, Hungary. Email: hgyulavari@gmail.com

11213. Hämäläinen, M. (2011): *Dysphaea haomiao* sp. nov. from China and Vietnam (Odonata: Euphaeidae). *International Journal of Odonatology* 14(4): 305-311. (in English) ["*Dysphaea haomiao* sp. nov. (holotype male, China, Guizhou, Libo County, Xiaoqikong Scenic Area, Zhangjiang River, alt. c.450 m, 7 May 2007) is described and illustrated for both sexes. The male differs from its closest congeners, *Dysphaea basitincta* and *D. gloriosa*, by the blackish, completely opaque coloration of its wings." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

11214. Hamasaki, K.; Yamanaka, T.; Tanaka, K.; Nakatani, Y.; Iwasaki, N.; Sprague, D.S. (2011): Environmental characteristics accounting for odonate assemblages in rural reservoir ponds in Japan. *JARQ* 45(2): 187-196. (in English) ["To clarify the effect of environmental factors on odonate assemblages in rural reservoir ponds, we surveyed the odonate adults in 70 study ponds in Ibaraki Prefecture, Japan, during three sampling periods in 2005. Cluster analysis, indicator species analysis (INSPAN), and non-metric multidimensional scaling (NMDS) were used in combination to determine the relationship between odonate assemblages and environmental variables, i.e., biotic, physicochemical, and regional variables (the types of land use surrounding the ponds). A total of 41 odonate species were recorded in the study ponds, and 24 of them, excluding rare species, were used for each analysis. The study ponds were classified into six groups, and significant indicator species were selected from four of these

groups. Examination of the correlation between each environmental variable and NMDS axes 1 and 2 revealed the profound effects of the presence of forest, paddy field, or open area around the ponds on the indicator species composition of each group. It was also revealed that the aquatic vegetation and forests around the ponds provide desirable conditions for the odonates and, in contrast, concrete revetment has a detrimental effect. These results suggest that the recent decrease of forests around ponds and the reconstruction with concrete revetment will have a negative effect on the odonate assemblages in ponds." (Authors)] Address: Hamasaki, K., Biodiversity Division, National Institute for Agro-Environmental Sciences (NIAES) (Tsukuba, Ibaraki 305-8604, Japan. E-mail kenjih@affrc.go.jp

11215. Hardersen, S.; Leo, P. (2011): Dragonflies of Iglesiasiente (SW Sardinia) and additional records of rare or poorly known species from Sardinia (Odonata). In: Nardi G., Whitmore D., Bardiani M., Birtele D., Mason F., Spada L. & Cerretti P. (eds), *Biodiversity of Marganai and Montimannu (Sardinia). Research in the framework of the ICP Forests network. Conservazione Habitat Invertebrati* 5: 243-253. (in English, with Italian summary) ["This paper presents the current knowledge on the odonate fauna of the Iglesiasiente (SW Sardinia). Historical data and recent investigations have resulted in a total of 28 species (11 Zygoptera and 17 Anisoptera) for this area, representing 67% of the species known from Sardinia. Additionally, new data are presented for other areas of Sardinia on the following species, considered rare and/or protected: *Lestes macrostigma*, *Sympetma fusca*, *Coenagrion scitulum*, *Lindenia tetraphylla*, *Orthemum nitidinerve*, *O. trinacria* and *Brachythemis impartita*." (Authors)] Address: Leo, P., Via Tola 21, 09128 Cagliari, Italy. E-mail: piero.leo@tiscali.it

11216. Harris, W.E.; Forman, D.W.; Battell, R.D.; Battell, M.T.R.; Nelson, A.K.; Brain, P.F. (2011): Odonata colour: more than meets the eye?. *International Journal of Odonatology* 14(3): 281-289. (in English) ["Interpretations of behavioural visual cues, based on human perception of colour, may mislead because of the difference in our visual range compared to other animals. Investigations into ultraviolet (UV) reflectance have shown that this can be an important mode of communication in many animals. The present study focused on 10 species of British Odonata (*Brachytreron pratense*, *Aeshna mixta*, *A. cyanea*, *A. grandis*, *Sympetrum striolatum*, *S. sanguineum*, *Libellula depressa*, *L. quadrimaculata*, *Calopteryx splendens*, *Coenagrion puella*). Digital photography was used to capture images of UV reflectance of the body using a Schott UV pass filter to eliminate all other portions of the spectrum. Percentage cover of UV reflectance was determined and all but one of the 10 species sampled were found to reflect UV in one or both sexes. Most of the reflectance tended to occur on the ventral surface. Patterns of UV reflectance varied among species suggesting a variety of possible functions that are briefly discussed. A potential evolutionary mechanism for the development of UV reflectance in Odonata is proposed." (Authors)] Address: Forman, D.W., Pineham House, Haversham, Milton Keynes, Buckinghamshire, MK19 7DP, UK. E-mail: d.w.forman@swansea.ac.uk

11217. Hassall, C.; Hollinshead, J.; Hull, A. (2011): Environmental correlates of plant and invertebrate species richness in ponds. *Biodiversity and Conservation* 20: 3189-3222. (in English) ["Ponds (lentic water bodies <2

ha) constitute a considerable biodiversity resource. Understanding the environmental factors that underlie this diversity is important in protecting and managing the habitat. We surveyed 425 ponds for biological and physical characteristics with 78 of those also surveyed for chemical characteristics. A total of 277 invertebrate species and 265 plant species were found. Species richness varied between 2 and 99 (mean 27.2 ± 0.6 SE) for invertebrates and 1 and 58 (mean 20.8 ± 0.4 SE) for plants. Generalised additive models were used to investigate variables that correlate with the species richness of plants and invertebrates, with additional models to investigate insect, Coleoptera, Odonata, Hemiptera, Trichoptera and Mollusca species richness. Models performed reasonably well for invertebrates in general ($R^2 = 30.3\%$) but varied between lower-order invertebrate taxa (12.7–34.7%). Ponds with lower levels of shading and no history of drying contained higher numbers of species of plants and all invertebrate groups. Aquatic plant coverage positively correlated with species richness in all invertebrate groups apart from Trichoptera and the presence of fish was associated with high invertebrate species richness in all groups apart from Coleoptera. The addition of chemistry variables suggested non-linear relationships between oxygen demand and phosphate concentration and higher-order richness. We demonstrate that the composition of biological communities varies along with their species richness and that less diverse ponds are more variable compared to more diverse ponds. Variables positively correlated with richness of one taxon may be negatively correlated with that of another, making comprehensive management recommendations difficult. Promoting a high landscape-level pond biodiversity will involve the management of a high diversity of pond types within that landscape." (Authors) Address: Hassall, C., Dept of Biology, Carleton University, Ottawa, ON K1S 5B6, Canada. E-mail: chassall@connect.carleton.ca

11218. Haught, S.; von Hippel, F.A. (2011): Invasive pike establishment in Cook Inlet Basin lakes, Alaska: diet, native fish abundance and lake environment. *Biol. Invasions*. 13: 2103-2114. (in English) ["Northern pike (*Esox lucius*) were introduced to the northern Susitna Basin of south-central Alaska in the 1950's, and have since spread throughout the upper Cook Inlet Basin. Extirpations of several native fish populations have been documented in this area. It is hypothesized here that invasive pike remodel the ecology of lakes by removing vulnerable prey types and that these changes are reflected in the diet of invasive pike. Trends in pike diet suggest that pike switch to less desirable but more abundant macroinvertebrate prey as preferred fish prey are eliminated. The impacts of pike introduction were studied in detail for one species of resident fish, the threespine stickleback (*Gasterosteus aculeatus*). Stickleback abundance decreases as pike invasion progresses. Conductivity is a significant environmental predictor of stickleback abundance, with higher conductivity apparently mitigating population reduction. Higher conductivity water may lessen the physiological costs of developing more robust armor, which reduces vulnerability to predation. Maximum lake depth also appears to predict stickleback abundance, though this trend was only marginally significant. Deeper lakes may provide an open-water refuge from pike predation by allowing stickleback to exist outside of the pike inhabited littoral zone. These findings indicate the importance of diverse habitat types and certain chemical and physical charac-

teristics to the outcome of invasion by fish predators." (Authors) Where stickle backs were absent, more Odonata larvae were preyed by pikes.] Address: Haught, S., Department of Biological Sciences, University of Alaska Anchorage, 3211 Providence Dr., Anchorage, AK 99508-4614, USA. E-mail: stormyhaught@gmail.com

11219. Hochebner, T. (2011): Neue faunistische Nachweise vom GÜPL Völtendorf. *LANIUS-Information* 20(1/2): 4-5. (in German) [Niederösterreich, Austria; *Lestes dryas*: 11.8.2008 and 14.08.2008; *Sympetrum pedemontanum*: 14.8.2008] Address: not stated

11220. Holuša, O. (2011): A dark colour form of *Cordulegaster heros* (Odonata: Cordulegasteridae). *Cas. Slez. Muz. Opava (A)* 60: 235-237. (in English) [11-VII-2010, 40 males and 5 females of *C. heros* were found at the Kamenný potok stream, Modra-Piesok village, in the southern part of the Malé Karpaty Mts (48°22'17"N, 17°17'59"E, 332 m a.s.l.) Western Slovakia. Differences between the typical abdominal colour pattern and the dark colour form are described.] Address: Holuša, O., Dept. of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, CZ-613 00 Brno. E-mail: holusao@post.cz

11221. Ignatavicius, G.; Raulinaitis, M.; Gerdvilis, N. (2011): Assessment of the effects of mechanical bottom sludge removal from lakes Didžiulis and Lentvaris (Trakai District) based on macrozoobenthos indicators. *Environmental Engineering. The 8th International Conference*, May 19–20, 2011, Vilnius, Lithuania: 115-119. (in English) [Lithuania; "Two lakes in Trakai district – Didžiulis and Lentvaris were heavily polluted in the past by discharges of municipal wastewater without proper treatment. This anthropogenic impact resulted in large amounts of bottom sludge in both lakes, high amounts of biogenic substances and deterioration of water ecosystems. In both lakes, methods of mechanical lake restoration were applied in 2008 by removing 80000 m³ of bottom sludge from the northern part of Lake Didžiulis and 60000 m³ of bottom sludge from the southern part of Lake Lentvaris. The objectives of this article are 1) to examine composition of local macrozoobenthos communities in both lakes prior and after sludge removal and 2) evaluate changes and trends of ecological status in restored parts of both lakes by using two most popular in Lithuania indices based on macrozoobenthos: Trent Biotic Index and Danish River Fauna Index." (Authors) The list of taxa includes *Erythromma najas*, *Ischnura elegans*, *Platycnemis pennipes*, *Gomphus vulgatissimus*, *Epithea bimaculata* and *Leucorrhinia dubia*] Address: Ignatavicius, G., Vilnius university, Universiteto str. 3, LT-01513 Vilnius, Lithuania. E-mail: gytautas.ignatavicius@gf.vu.lt

11222. Ishizawa, N. (2011): Behaviour of dragonflies during the 2009 partial solar eclipse in Japan (Odonata: Libellulidae). *International Journal of Odonatology* 14 (4): 313-319. (in English) ["Behaviour of dragonflies was observed during the partial solar eclipse in Saitama, Japan, on 22 July 2009. The solar eclipse started at 09:54 h, reached its maximum magnitude of 74.9% at 11:12 h, and ended at 12:29 h. Light intensity at the peak of the eclipse was 1005 lx, a reduction by 28.2% of that at the start, and the ambient temperature was rather constant because of cloudiness. Dragonflies were active until immediately before the eclipse maximum and thereafter ceased their movements; one *Orthetrum*

albistylum speciosum male perched atypically with its body axis nearly parallel to its perch. They resumed activities after a long delay, c.40 minutes after the peak. One female of *Pseudothemis zonata* oviposited near a perching male soon after the peak, but the male did not interfere with it. The inactivation of dragonflies in a solar eclipse may be related to the light intensity." (Author)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozawa City, Saitama Pref., Japan. E-mail: greffect708@jcom.home.ne.jp

11223. Jeziorski, P.; Holuša, O. (2011): *Gomphus pulchellus* Sélys, 1840 does not belong to the dragonfly (Odonata) fauna of the Czech Republic. *Cas. Slez. Muz. Opava (A)* 60: 217-222. (in English, with extensive Czech summary) [*Gomphus pulchellus* is eliminated from the Czech list of Odonata. "This decision is based on the revision of the material deposited in all major Czech and Slovak museums, on the revision of several other dragonfly collections, as well as on an extensive faunistic research carried out by the authors during the last twenty years. In addition, the published data were critically evaluated. In summary, no documented specimens in museums or private collections was found, and there are no recent records from the Czech Republic. Hence deletion of *G. pulchellus* from the species list of the Czech Republic is suggested. Reasons for the absence in the Czech Republic are discussed." (Authors)] Address: Jeziorski, P., Na Bělidle 1, CZ-735 64 Havířov-Suchá, Czech Republic. E-mail: jezirko@post.cz

11224. Jones, G. (2011): Challenges facing conservation of rare damselfly and stonefly in Cairngorms. *Scottish Invertebrate News* 2(2): 10. (in English) ["*Coenagrion hastulatum* is listed as endangered on the Odonata Red Data List for Great Britain 2008 and most of its known UK breeding sites are in the Cairngorms National Park. As one of our most endangered damselflies it also appears on the Scottish Biodiversity List. In 1996 the Northern damselfly was confirmed as breeding at 21 of 26 historic sites. Of these, only 10 were found to be producing more than 100 adults. A high proportion of these were on the RSPB's Abernethy Reserve. Two additional sites for the species have recently been identified, one of which has historic records of Northern damselfly up until 1914. However, it is a both are currently threatened as they are within the footprint of proposed developments: a large new town. An Camas Mor, on Rothiemurchus Estate (the other side of the River Spey from Aviemore) and a supermarket car park for a new Tesco store in Aviemore. Understanding the factors that limit the dispersal of the Northern damselfly could guide conservation efforts for the shrinking semi-natural habitat around Aviemore. If breeding lochans are saved, attention will need to be given to the management of nearby scrubby-ground that is used for foraging and during maturation of recently emerged adults." (Author)] Address: not stated

11225. Kálmán, A.; Boda, R.; Kálmán, Z.; Mauchart, P.; Rozner, G.; Szivák, I.; Soós, N.; Csabai, Z. (2011): Contribution to the aquatic macroinvertebrate fauna of the Zselic hill region, SW Hungary. *Acta Biol. Debr. Oecol. Hung.* 26: 99-115. (in English, with Hungarian summary) [Records of *Aeshna affinis*, *Libellula quadrimaculata*, *Orthetrum cancellatum*, *O. coerulescens*, *Sympetrum striolatum*, *Calopteryx virgo*, *Lestes sponsa*, *Platycnemis pennipes*, and *Ischnura elegans* are documented.] Address: Kálmán, A., Vak Botlyán utca 118/A, H-

8651 Balatonszabadi, Hungary. E-mail: xelgon001@gmail.com

11226. Kalniņš, M. (2011): The distribution of southern dragonfly (Odonata) species in Latvia and adjacent territories. *Environmental and Experimental Biology* 9: 43-52. (in English) ["The aim of the present study was to summarize published and unpublished information on changes of the dragonfly fauna in Latvia and adjacent territories during the last 20 years and to provide a prognosis of future changes. All published and unpublished data were summarized for the selected species. Unsystematic inspection of the potential habitats was carried out in the field, mostly in southern and central parts of the country. The identification of specimens in collections was checked. In total 19 species were identified whose borders of distribution areas or separate localities are relatively close to the territory of Latvia or which are known as species that rapidly disperse in the northern direction. Seven of these species are mentioned in the literature as probable for Latvia. Five of the species that are included in the lists were recorded for the first time in Latvia during the last 20 years." (Author) The following species are discussed in detail: *Lestes barbarus*, *Chalcolestes viridis*, *Sympetma fusca*, *Coenagrion ornatum*, *Erythromma viridulum*, *Aeshna affinis*, *A. serrata*, *A. crenata*, *Anax parthenope*, *A. ephippiger*, *Orthetrum coerulescens*, *O. albistylum*, *O. brunneum*, *Sympetrum depressiusculum*, *S. fonscolombii*, *S. meridionale*, *S. eroticum*, *S. pedemontanum*, and *Crocothemis erythraea*.] Address: Kalniņš, M., Nature Conservation Agency, Siguldas novads, Baznīcas iela 7, LV-2150, Sigulda, Latvia. E-mail: martins.kalnins@daba.gov.lv

11227. Karlsson, T. (2011): The Sedgling *Nehalennia speciosa* in Sweden (Odonata: Coenagrionidae). *Entomologisk Tidskrift* 132(3): 129-140. (in Swedish, with English summary) ["*N. speciosa* is redlisted as endangered in Sweden. This paper presents the current knowledge of the species in Sweden. Records of the species, its distribution and status are presented, and the habitat at the current localities for the species are described. *Nehalennia speciosa* was considered extinct in Sweden, but during the period 2006-2011 six new localities have been found. The species is generally thought being highly stenotopic. It is confined to water with low trophy, pH and conductivity, and with a specific vegetation consisting of submerged vegetation (*Sphagnum* mosses and *Utricularia*) and formations of narrow-leaved plants (mostly selected *Carex lasiocarpa* and *C. limosa*). The habitat in Sweden seems, however, to differ some. The current localities for the species are nutrient poor wetlands with a vegetation like the one described above (*C. lasiocarpa* predominates), but they are all mires rich in minerals with fairly high pH (7.0-8.0) and conductivity (11.7-15.5). Changes in vegetation structure (mainly domination of *Phragmites australis*) are the main threat to the species, and management by mowing is needed." (Author)] Address: Karlsson, T., Västanågatan 27B, 582 35 Linköping, Sweden. E-mail: tommy.karlsson@bredband.net

11228. Kharitonov, A.Yu.; Popova, O.N. (2011): Migrations of dragonflies (Odonata) in the south of the West Siberian plain. *Entomological Review* 91(4): 411-419. (in English) ["The paper presents a summary of mass dragonfly migrations observed previously in Russia, in particular in West Siberia. From 1969 to 2009, the authors studied the dynamics of dragonfly population,

their spatial distribution and movements in the West Siberian forest-steppe. The main studies were conducted in the Lake Chany basin (the Biological Station of the Institute of Animal Systematics and Ecology, Siberian Division, Russian Academy of Sciences). The spatial redistribution of dragonflies is regarded as a balance of homing and wandering behaviour. Homing results in a relative stability of local dragonfly populations and assemblages, while wandering leads to dispersal of dragonflies from their emergence sites and colonization of new habitats; the latter is especially important due to the ephemeral nature of many shallow reservoirs where the nymphs develop. The formation of more or less constant migration routes is a peculiar variant of wandering activities. A special type of dragonfly migrations is mass exodus from native habitats, triggered by excessive population growth and leading to elimination of all or most individuals. Such migrations not only optimize the size of dragonfly populations but also facilitate removal of nutrients and organic matter from eutrophic water bodies. An original generalized classification of dragonfly migrations is proposed." (Authors)] Address: Haritonov, A.Y., Institute of Systematics & Ecology of Animals, SB RAS, Frunze str. 11, Novosibirsk 630091, Russia. E-mail: haritonov59@gmail.com, pc@eco.nsc.ru

11229. Kische-Machumu, M.A.; Witte, F.; Wanink, J.H.; Katunzi, E.F.B. (2011): The diet of Nile perch, *Lates niloticus* (L.) after resurgence of haplochromine cichlids in the Mwanza Gulf of Lake Victoria. *Hydrobiologia* 682: 111-119. (in English) ["Haplochromine cichlids used to be the main prey of the introduced Nile perch, *Lates niloticus*, in Lake Victoria. After depletion of the haplochromine stocks at the end of the 1980s, Nile perch shifted to the shrimp *Caridina nilotica* and to a lesser degree to its own young and the cyprinid *Rastrineobola argentea*. In the present study, we investigated the Nile perch diet in the northern Mwanza Gulf after resurgence of some of the haplochromine species and compared it with data collected in the same area in 1988/1989. It became clear that haplochromines are again the major prey of Nile perch. The dietary shift from invertebrate feeding (shrimps) to feeding on fish (haplochromine cichlids) occurs at a smaller size than it did when Nile perch were taking primarily dagaa and juvenile Nile perch as their fish prey. The apparent preference for haplochromines as prey has reduced the degree of cannibalism considerably, which may have a positive impact on Nile perch recruitment." (Authors) The quantity of Odonata didn't change between the two periods compared.] Address: Kische-Machumu, M.A., Tanzania Fisheries Research Institute, P.O. Box 78850, Dar es Salaam, Tanzania. E-mail: mkishe@yahoo.com

11230. Klemmer, A.J. (2011): The influence of stream-derived detritus subsidies on lake benthic community composition and trophic interactions. M.Sc. thesis, Fac. Grad. Studies (Forestry), University of British Columbia, Vancouver: XII + 77 pp. (in English) ["Cross-ecosystem subsidies are important for the structure and functioning of communities within many ecosystems. Increases in subsidies have been modelled to increase trophic cascade strength within recipient systems, because of the donor-controlled addition of a resource. Streams receive high inputs of detrital subsidies and what is not processed within the system is transported downstream. Therefore, streams that flow into lakes have the potential to provide large amounts of detritus to lakes compared to the transfer of detritus from forested lake

edges. I hypothesized that streams would increase detritus standing stocks around stream mouths in lakes, that streams would affect the benthic invertebrate community composition, and that those effects would change with distance from the lake shore. To test this I conducted a survey of detritus standing stocks and benthic invertebrate communities at six stream/lake interface and six forest/lake interface sites within two lakes. I found that streams and distance into lakes affected detritus standing stocks, but the effect was only seen when individual pairings of stream and forest sites were examined. I also found that headwater streams significantly altered invertebrate community composition in the lake littoral zone, even up to a distance of 27 meters into the lakes, with some taxa only found at stream/lake interfaces. These results suggest that streams alter the amount of basal resources through subsidies and contribute to whole lake biodiversity. My second hypothesis was that increased detritus in lakes would increase trophic cascade strength. To test this hypothesis, I conducted an in-lake cage experiment in which I manipulated detritus standing stocks (5 densities) and presence of a top-predator (trout). I found that increasing subsidies altered strength of trophic cascades. But unexpectedly, low detritus treatments experienced the strongest positive effect on algal biomass. At intermediate detritus levels there was a switch in the indirect effects of predators, and at the highest detritus densities predators had a negative indirect effect on algal biomass. These results provide evidence that along a gradient of detritus subsidies, trophic cascade strength experiences threshold responses in where predators may have strong, but opposite indirect effects on primary production." (Author) Taxa including Odonata are treated at the genus level.] Address: not stated

11231. Kloskowski, J. (2011): Differential effects of age-structured common carp (*Cyprinus carpio*) stocks on pond invertebrate communities: implications for recreational and wildlife use of farm ponds. *Aquacult. Int.* 19: 1151-1164. (in English) ["Sustainable development of common carp *Cyprinus carpio* pond fisheries in Europe postulates their multifunctional use, integrating exploitation of aquaculture resources with recreational services and maintenance of high levels of local biodiversity. Age classes of farmed carp are grown separately and pond ecosystems may be differently affected by different ontogenetic stages of fish. To examine these relationships, a study was conducted on spring and summer diet of carp, invertebrate abundance and community structure, and water quality characteristics in ponds stocked with three carp age classes in SE Poland. With the exception of young-of-the-year fish in spring, benthic dipterans prevailed in the diets of all carp age classes and their consumption increased from spring to summer. Zooplankton featured in the diet of carp only in spring. Medium- and large-sized cladocerans predominated among microcrustaceans found in the guts of one- and two-year-old carp. Consequently, in summer, total biomass of medium- and large-sized cladoceran grazers was substantially lower in ponds stocked with older-age fish than in ponds used for production of 1-summer-old fingerlings. The relatively sparse submerged vegetation cover and low water transparency in ponds with older fish stocks compared to ponds with young-of-the-year carp indicate a transition to a turbid water state mediated by a trophic cascade mechanism in the presence of older-age fish. ... Densities of macroinvertebrates were significantly affected by the age of carp in the ponds.

With the exception of Diptera there were differences in the densities of all individual macroinvertebrate groups between pond categories. In all macroinvertebrate taxa, densities decreased with carp age, but the differences between pond categories were significant only in Ephemeroptera and Odonata between 0+ and older carp cohorts." (Authors)] Address: Kloskowski, J., Department of Nature Conservation, Institute of Biology, M. Curie-Skłodowska University, Akademicka 19, 20-033 Lublin, Poland. E-mail: januszkl@poczta.umcs.lublin.pl

11232. Knott, K.E.; Keränen, I.; Kuitunen, K.; Wellenreuther, M. (2011): Microsatellite markers for identifying hybrids of the damselflies *Calopteryx splendens* and *C. virgo*. *Molecular Ecology Resources* 11: 757-758. (in English) ["*Calopteryx splendens* and *C. virgo* hybridize in nature. We developed nineteen microsatellite loci for molecular identification of hybrids. Lack of shared alleles at several loci allowed unquestionable identification. Seventeen loci are polymorphic in at least one of the target species, broadening the utility of the loci for population genetic studies." (Authors)] Address: Knott, Emily, Department of Biological and Environmental Science, 15 University of Jyväskylä, PO Box 35, FIN-40014 Jyväskylä, Finland. E-mail: emily.knott@jyu.fi

11233. Koch, K.; Fuchs, N.; Sahlén, G. (2011): Morphology of follicle cells of Libellulidae (Odonata). *International Journal of Odonatology* 14(3): 257-267. (in English) ["In libellulids, mature oocyte size varies within and between individual ovaries. The regulating mechanism is not yet understood. Variations in the contents of the follicle cells, and thereby their ability to secrete material into the oocyte, might explain some of the observed differences in oocyte size. We therefore investigated the follicle cell surface, the interstitial space width between follicle cells and between follicle cells and oocytes, the number of nuclei, and the cell compartment proportions using scanning and transmission electron microscopy. In all investigated species, the follicle cells were covered by a basal lamina. We found cytoplasmic microvilli and septate junctions. As we could not find any pores or other structures on the cell surface, endocytosis seems to be the only mechanism transporting material into the follicle cells. Larger follicle cells had larger interstitial gaps between follicle cells and oocytes, larger nuclei and a larger mitochondrial area. Larger interstitial spaces between follicle cells and oocytes may afford more room that can be filled with material from the follicle cell layer. More mitochondria could provide more energy/ATP needed for the transport of the material. The quantity of free ribosomes and the mean number of nuclei seemed to be even more important to the productivity of the follicle cell. All these variations in cell contents cause productivity differences among follicle cells and may explain some of the size differences between oocytes within individual ovaries in libellulids." (Authors) Studied specimens: *Crocothemis erythraea* (n = 15), *Leucorrhinia dubia* (n = 16), *Pantala flavescens* (n = 7), and *Sympetrum striolatum* (n=5)] Address: Koch, Kamilla, Department of Ecology, University of Mainz, Becherweg 13, 55128 Mainz, Germany. Email: Kochka@uni-mainz.de

11234. Kosterin, O.E.; Holden, J. (2011): Some photographic records of Odonata in Cambodia. *International Dragonfly Fund - Report* 42: 1-6. (in English) ["Between 2006 and 2011, 22 Odonata species were photographed in southwestern Cambodia. *Agriocnemis lacteola* Selys, 1877 and *Coelicia yamasakii* Asahina, 1984 are

new additions to the regional fauna." (Authors)] Address: Holden, J., 67 High Street, Meppershall, Beds, UK. E-mail: jeremyholden1@yahoo.co.uk

11235. Kovács, T.; Olajos, P.; Szilágyi, G. (2011): Records of Ephemeroptera, Odonata and Plecoptera from Lithuania, with notes on aquatic arthropods. *Folia historico naturalia musei Matraensis* 35: 21-32. (in English) [Records of 19 Odonata species are documented. Legally protected species are *Gomphus flavipes* and *Ophiogomphus cecilia*.] Address: Kovács, T., Mátra Museum, Kossuth Lajos u. 40, H-3200 Gyöngyös, Hungary. E-mail: koati@t-online.hu

11236. Krčmar, S.; Bogdanovc, T.; Mikuška, A.; Jukić, M.; Zahirović, Ž. (2011): Poster: Contributions to the knowledge of the insects fauna on the Bansko Hill area: Horse flies (Diptera: Tabanidae) and Dragonflies (Odonata). *SIEEC* 22: 1 pp. (in English) [Bulgaria; Verbatim: The studies of horse flies and dragonflies of the Bansko Hill surroundings were carried out from April to September 2010. The following methods were used: collecting by canopy traps with attractants or entomological nets, the method of strolling and observing. Mapping and digital analyses of the data were done using ArcView 9.2 program. On the basis of the 362 collected specimens of horse flies and literature data a total of 19 species of 6 genera and 2 subfamilies were recorded. On the basis of the 618 collected individuals at different stages of life (larvae - exuvia and adult individuals), a total of 27 species of ... Odonata were recorded. ... *Coenagrion ornatum*, *Anax ephippiger*, *Libellula fulva*, *Orthetrum coerulescens* and *Sympetrum flaveolum* are new for the Bansko Hill. ... The dragonfly species with highest abundance based on frequency of encounter were: *Aeshna mixta*, *C. puella*, *Ischnura elegans*, *O. albistylum*, *S. striolatum*. *Sympecma fusca*, *S. depressiusculum* and *S. fonscolombii* had lowest abundance. ... See also: <http://bib.irb.hr/prikazi-rad?rad=525955>] Address: stjepan@unios.hr

11237. Kweka, E.J.; Zhou, G.; Gilbreath, T.M.; Afrane, Y.; Nyindo, M.; Githeko, A.K.; Yan, G. (2011): Predation efficiency of *Anopheles gambiae* larvae by aquatic predators in western Kenya highlands. *Parasites & Vectors* 2011, 4:128: 7 pp. (in English) ["Background: The current status of insecticide resistance in mosquitoes and the effects of insecticides on nontarget insect species have raised the need for alternative control methods for malaria vectors. Predation has been suggested as one of the important regulation mechanisms for malaria vectors in long-lasting aquatic habitats, but the predation efficiency of the potential predators is largely unknown in the highlands of western Kenya. In the current study, we examined the predation efficiency of five predators on *Anopheles gambiae* s.s larvae in 24 hour and semi-field evaluations. Methods: Predators were collected from natural habitats and starved for 12 hours prior to starting experiments. Preliminary experiments were conducted to ascertain the larval stage most predated by each predator species. When each larval instar was subjected to predation, third instar larvae were predated at the highest rate. Third instar larvae of *An. gambiae* were introduced into artificial habitats with and without refugia at various larval densities. The numbers of surviving larvae were counted after 24 hours in 24. In semi-field experiments, the larvae were counted daily until they were all either consumed or had developed to the pupal stage. Polymerase chain reaction was used to confirm the presence of *An. gambiae* DNA in predator

guts. Results: Experiments found that habitat type ($P < 0.0001$) and predator species ($P < 0.0001$) had a significant impact on the predation rate in the 24 hour evaluations. In semi-field experiments, predator species ($P < 0.0001$) and habitat type ($P < 0.0001$) were significant factors in both the daily survival and the overall developmental time of larvae. Pupation rates took significantly longer in habitats with refugia. *An. gambiae* DNA was found in at least three out of ten midguts for all predator species. *Gambusia affinis* was the most efficient, being three times more efficient than tadpoles. Conclusion: These experiments provide insight into the efficiency of specific natural predators against mosquito larvae. These naturally occurring predators may be useful in biocontrol strategies for aquatic stage *An. gambiae* mosquitoes. Further investigations should be done in complex natural habitats for these predators." (Authors) The dragonfly larvae's efficacy in reducing the survival rates of third instar larvae of *An. gambiae* s.s was assessed in semi-field experimental settings. Their efficiency was estimated as high as 59.6%.] Address: Kweka, E.J., Centre for Global Health Research, Kenya Medical Research Institute, P. O. Box 1578, Kisumu 40100, Kenya. E-mail: pat.kweka@gmail.com

11238. Lambert, J.-L.; Ternois, V. (2011): Nouvelles découvertes de *Boyeria irene* (Fonscolombe, 1838) en Champagne-Ardenne et premières mentions pour le département de la Marne (Odonata, Anisoptera: Aeshnidae). *Martinia* 27(2): 101-113. (in French, with English summary) ["*B. irene* is a recent acquisition of Odonata distribution in the French Champagne-Ardenne region. The first observation of this species seems to date back from 1995, in the Aube department. During the last decade, the species was suspected to be present in the Marne department in 2004, was rediscovered in the Aube department in 2006 and was mentioned for the first time in the Haute-Marne in 2007. Observations have increased in the region during the past few years, suggesting the presence of well established populations. When unpublished IBGN data (equivalent to BMWP in the UK) were discovered, targeted prospections were organized in 2010, with the aim to check their reliability. These field investigations not only confirmed these historical data, but also allowed us to discover new localities. The authors present the conditions in which *B. irene* was discovered and update its distribution map in the region." (Authors)] Address: Ternois, V., CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.pays.soulaines@wanadoo.fr

11239. Landis, D.A.; Fiedler, A.K.; Hamm, C.A.; Cuthrell, D.L.; Schools, E.H.; Pearsall, D.R.; Herbert, M.E.; Doran, P.J. (2011): Insect conservation in Michigan prairie fen: addressing the challenge of global change. *Journal of Insect Conservation* 16(1): 131-142. (in English) ["Prairie fen is a globally rare, groundwater dependent peatland community restricted to discrete portions of the glaciated north central USA. Prairie fen harbours a diverse flora composed of sedge wetland and tallgrass prairie species ... Here we investigate how global change drivers, including land use change, climate change, and invasive species, may interact to threaten this important community. Specifically, we examine how characteristics of prairie fen habitats—e.g., formation and distribution—interact with the biology of rare fen insects to suggest appropriate short to long term conservation strategies. Our results suggest that

prairie fen associated insects are rare for a variety of reasons, including host plant specialization, habitat specialization, and shifting landscape context that limits opportunities for dispersal. We recommend that current conservation efforts focus on stabilization and restoration of existing prairie fens, coupled with directed surveys to monitor population change in insects of concern, and restoration of the landscape matrix to facilitate metapopulation dynamics. In the future, due to the severely fragmented nature of Michigan landscapes, captive rearing and assisted migration may be necessary to conserve some prairie fen insect species. Overall, the effective conservation of fen associated insects will require a shared vision by multiple actors and a willingness to pursue that vision over a long time frame." (Authors) Tab. 1 list insects of conservation concern in prairie fen and associated aquatic communities in Michigan, USA, including *Cordulegaster erronea* and *Williamsonia fletcheri*.] Address: Landis, D.A., Department of Entomology, 204 Center for Integrated Plant Systems, Michigan State University, East Lansing, MI 48824-1311, USA. E-mail: landisd@msu.edu

11240. Lawrence, J.E.; Deitch, M.J.; Resh, V.H. (2011): Effects of vineyard coverage and extent on benthic macroinvertebrates in streams of Northern California. *Annales de Limnologie - International Journal of Limnology* 47(4): 347-354. (in English) ["Vineyards are a dominant feature of many landscapes in Mediterranean-climate regions. We examined the effects of streamflow declines, associated with vineyard water-withdrawals for frost protection, on benthic-macroinvertebrate communities at three sites along three small streams in the Mediterranean-climate region of Northern California. One site was heavily affected by water withdrawals for frost protection, the other two were not. In addition, we examined relationships between vineyard coverage and benthic-macroinvertebrate community response using data from 59 sampling events at 39 sites along 35 small streams in Napa County, California. We tested three a priori hypotheses in terms of the response of biological traits of benthic macroinvertebrates to high vineyard coverage: (1) proportion of individuals with semi-voltine (i.e., one generation every 2 years) life cycles would be lower compared to those with uni- and multi-voltine cycles, (2) proportion of individuals able to undergo diapause would be higher, and (3) proportion of individuals with the ability to burrow into the substrate would be higher. In the three-site study, we found that vineyard water-withdrawals for frost protection coincided with consistently lower values in both the benthic-macroinvertebrate index of biotic integrity (B-IBI) developed for Northern California streams and the ratio of Ephemeroptera–Plecoptera–Trichoptera to Odonata–Coleoptera–Hemiptera individuals (EPT/OCH), a metric developed for European Mediterranean streams. In the broader-scale study, we observed that vineyard-coverage levels above about 20% coincided with lower values of the B-IBI. The semi-voltine life-cycle trait was lower above this level, whereas the diapause and burrowing traits were not affected." (Authors)] Address: Lawrence, J.E., Department of Environmental Science, Policy, and Management, University of California, Berkeley, CA 94720-3114, USA. E-mail: jlawrence@berkeley.edu

11241. Liechti, T.; Jödicke, R. (2011): Nachweis von *Sympetma fusca* unter Laubstreu (Odonata: Lestidae). *Mercuriale* 11: 39-42. (in German, with English summary) ["On a sunny day in late autumn *S. fusca* was ob-

served in northern Switzerland leaving its concealment in leaf litter and warming up in the sun until it was able to fly. Hiding of imagoes ready for hibernation under dead leaves was assumed but never observed before. This new evidence of concealment is discussed in the context with many recent winter records of individuals perching freely in the vegetation." (Authors)] Address: Liechti, T., creato - Genossenschaft für kreative Umweltplanung, Limmatauweg 9, CH - 5408 Ennetbaden, Switzerland. E-mail: t.liechti@creato.ch

11242. Lillig, M. (2011): Im Gespräch mit Dr. Bernd Trockur. Umweltmagazin Saar 2/2011: 35. (in German) [B. Trockur is a leading regional odonatologist, engaged in the fauna of the German federal state Saarland. Some brief information is given on personal motivation to treat Odonata, the regional situation in the framework of global warming and measures to enhance regional dragonfly populations.] Address: Lillig, M., Krämersweg 55 66123 Saarbrücken, Germany: E-mail: martin.lillig@t-online.de

11243. Lorenzo-Carballa, M.O.; Hadrys, H.; Cordero-Rivera, A.; Andres, J.A. (2011): Population genetic structure of sexual and parthenogenetic damselflies inferred from mitochondrial and nuclear markers. *Heredity* 108: 386-395. (in English) ["It has been postulated that obligate asexual lineages may persist in the long term if they escape from negative interactions with either sexual lineages or biological enemies; and thus, parthenogenetic populations will be more likely to occur in places that are difficult for sexuals to colonize, or those in which biological interactions are rare, such as islands or island-like habitats. *Ischnura hastata* is the only known example of natural parthenogenesis within the insect order Odonata, and it represents also a typical example of geographic parthenogenesis, as sexual populations are widely distributed in North America, whereas parthenogenetic populations of this species have only been found at the Azores archipelago. In order to gain insight in the origin and distribution of parthenogenetic *I. hastata* lineages, we have used microsatellites, mitochondrial and nuclear DNA sequence data, to examine the population genetic structure of this species over a wide geographic area. Our results suggest that sexual populations of *I. hastata* in North America conform to a large subdivided population that has gone through a recent spatial expansion. A recent single long distance dispersal event, followed by a demographic expansion, is the most parsimonious hypothesis explaining the origin of the parthenogenetic population of this species in the Azores islands." (Authors)] Address: Lorenzo-Carballa, Olalla, Departamento de Ecología e Bioloxía Animal, Grupo de Ecología Evolutiva e da Conservación, Universidade de Vigo, EUET Forestal, Campus Universitario, Pontevedra, España 36005, Spain. E-mail: olalla.lorenzo@uvigo.es

11244. Mancu, C.-O. (2011): The dragonfly (Insecta: Odonata) collection of Iasi Museum of Natural History (Romania). *Travaux du Muséum National d'Histoire Naturelle «Grigore Antipa»* 54(2): 379-393. (in English, with French and Romanian summaries) ["The dragonfly specimens deposited in the Iasi Museum of Natural History were inventoried and analyzed, resulting a total of 3162 adult specimens from 45 species. The majority of these specimens were collected by Constantin Visarion Mândru in 51 localities of Romania. The material includes important new distribution records of three *Natura* 2000 species (*Coenagrion ornatum*, *Cordulegaster*

heros and *Gomphus flavipes*). *Coenagrion scitulum*, *Somatochlora meridionalis* and *Sympetrum danae* are species rarely reported from Romania." (Author)] Address: Mancu, C., Babe-Bolyai University, Biology and Geology Faculty, Ecology and Taxonomy Department 5-7 Clinicilor Str., 400006, Cluj-Napoca, Romania. E-mail: cosminovidiu@yahoo.com

11245. Marinov, M. (2011): Dragonflies (Insecta: Odonata) from the Western Rhodopes (Bulgaria and Greece). In: Beron P. (ed) *Biodiversity of Bulgaria. 4. Biodiversity of Western Rhodopes (Bulgaria and Greece) II*. Pensoft & Nat. Mus. Natur. Hist. Sofia: 145-161. (in English) ["A total of 52 Odonata species are reported here for the Western Rhodopes with six new species for the region: *Lestes barbarus*, *L. macrostigma*, *Erythromma najas*, *Cordulegaster bidentata*, *Sympetrum vulgatum*, *S. flaveolum*. At least 58 species could be expected within the Western Rhodopes area. The same number was given as probable for the eastern part of the mountain by MARINOV 2004." (Publisher) *Note of the editor*: This paper is a poor reprint of the original publication Marinov, M., 2007. Odonata of The Western Rhodopes, with special reference to the wetlands North of the town of Smolyan, South Bulgaria. *Notulae Odonatologicae* 6(9): 97-108. It suffers several major faults, which are entirely due to the lack of communication between the editors of the volume and the author of the paper. The later saw it already integrated amongst other articles and printed out without being able to make any final comments and suggestions for improvement. People interested in the region are advised to search for the original paper and not consider this low quality reprint in their research.]]

11246. Maroneze, D.M.; Tupinambas, T.H.; Alves, C.B.M.; Vieira, F.; Pompeu, P.S.; Callisto, M. (2011): Fish as ecological tools to complement biodiversity inventories of benthic macroinvertebrates. *Hydrobiologia* 673: 29-40. (in English) ["Sampling benthic macroinvertebrates in large rivers has several limitations, arising not only from the selectivity of traditional sampling gears but also from difficulty in capturing organisms that inhabit the deeper zones and high current velocities. Considering the importance of benthic macroinvertebrates as a food resource for fishes, the sampling restrictions in sediment collection done by dredges, and the importance of surveying benthos biodiversity, the objective of this study was to evaluate the stomach contents of five commonly occurring insectivorous fish species as a means of complementing a benthic macroinvertebrate inventory. Three sampling campaigns (fish and benthic macroinvertebrate) were conducted in a reach of the Araguari River (Minas Gerais, Brazil), approximately 9 km long and 90 m wide. *Astyanax altiparanae* Garutti & Britski 2000, *Leporinus friderici* (Bloch 1794), *Leporinus amblyrhynchus* Garavello & Britski 1987, *Iheringichthys labrosus* (Lütken 1874) and *Pimelodus maculatus* Lacepede de 1803 were the fish species collected and studied. To determine benthic macroinvertebrate taxonomic richness, a total of 54 Van Veen sediment samples were obtained. We compared lists of the benthic taxa found in fish stomachs with those from the sediment samples. The differences in the taxonomic composition of the benthic macroinvertebrate communities between the sediment samples and each fish species stomachs contents were assessed through NMDS and ANOSIM analyses, using a Sorensen similarity index with the presence/absence of taxa data. Independ-

ent of sampling period, additional benthic macroinvertebrate families or classes were provided by identifying fish stomach contents. We found a total of 30 taxa in this study (including "Coenagrionidae, Gomphidae, Libellulidae"), including 5 unique taxa (or 17% of the total) in the sediment samples, 9 unique taxa (30%) in the stomach samples, and 16 taxa (53%) common to both. The NMDS and ANOSIM analyses showed a significant separation between Van Veen sediment samples and two fish species stomach contents— *L. amblyrhynchus* and *P. maculatus*. These results indicate that fish can be used as additional samplers and are an efficient method to complement the benthic taxonomic inventory obtained through traditional sediment sampling techniques in large areas, as river segments and catchments." (Authors)] Address: Callisto, M., Laboratório de Ecologia de Bentos, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Av. Antônio Carlos, 6627, C.P. 486, Pampulha, CEP 30161-970 Belo Horizonte, MG, Brazil. E-mail: callistom@ufmg.br

11247. Martins, F.A.; del Claro, K. (2011): Natural history in dragonfly (Odonata) interactions of Cerrado vegetation. *Capa* 5(2): 20 pp. (in Portuguese, with English summary) ["The description of dragonfly species natural history involves the study of important features on Odonata community, as interspecific and intraspecific interactions and climatic parameters. This study aimed to investigate the most important features those can contribute to the inclusion of *Ischnura ramburii* in interaction ecology studies on Cerrado. The study was conducted at a permanent pond, in a nature reserve at Clube de Caça e Pesca Ipororó de Uberlândia. Behaviour observations were done and species biology data were quantified. Predation behaviour usually occurs on the pond, in areas with prey abundance. Individuals use their legs to catch their prey. The breeding happens in the air. The oviposition is endofitic and during it, female and male remain on tandem position. Female eventually remains submerged during the egg lay. On agonistic interactions between intraspecific and interspecific males were observed the behavioural patterns: i) tolerance; ii) perch; iii) caution display and; iv) attack. Besides this, faceoff, behaviour in which two damselflies stand face to face for some seconds, was observed in this species. It was verified higher abundance on the hottest months of the year (spring and summer). It wasn't found a direct correlation between the environment middle temperature and abundance of individuals, along the seasons ($r_s = 0,800$; $p > 0,05$), but is verified a trend to correlation." (Authors)] Address: Martins, F.A., Laboratório de Ecologia Comportamental e Interações, Instituto de Biologia, Universidade Federal de Uberlândia, Rua Ceará, s/nº Bloco 2D - Campus Umuarama, 38400-902, Uberlândia, MG - Brasil - Caixa Postal: 593. E-mail: fernandaalvesmartins@yahoo.com.br

11248. Mathys, B.A. (2011): First record of Aplomado Falcon (*Falco femoralis*) for the West Indies. *The Wilson Journal of Ornithology* 123(1): 179-180. (in English) [Puerto Rico; "I was able to observe the falcon for ~8 hrs over 5 days. It was perched on fence posts or small trees (<7 m tall) for the majority of this time. Its observed hunting style was similar to a female Merlin that I observed daily at the lagoon. This Merlin successfully captured dragonflies, and the Aplomado Falcon's prey items were assumed to be similar. However, no specific prey items were identified." (Author)] Address: Mathys,

B.A., Natural Sciences and Mathematics, The Richard Stockton College of New Jersey, P. O. Box 195, Pomona, NJ 08240, USA. E-mail: Blake.Mathys@stockton.edu

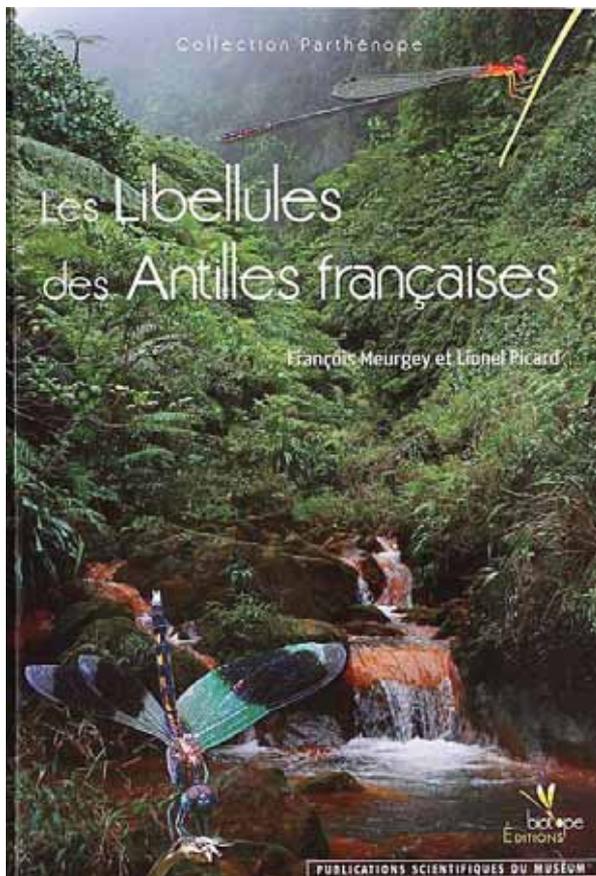
11249. Matushkina, N.A. (2011): Morphology of exophytic ovipositors in dragonflies (Odonata: Gomphidae, Corduliidae, Libellulidae), with particular reference to ovipositor muscles and sensilla. *International Journal of Odonatology* 14(3): 223-248. (in English) ["A comparative study of female external genitalia was carried out in representatives of three dragonfly families that lay eggs exophytically, with special emphasis placed on skeletal musculature and sensilla. Female external genitalia are characteristically represented by the vulvar lamina and rudiments on the 9th sternum. In a gomphid, *Gomphus vulgatissimus*, and a cordulid, *Cordulia aenea*, the vulvar laminae bear numerous styloconic sensilla and sparse campaniform sensilla. In addition, the rudiments of *C. aenea* are richly furnished with basiconic sensilla, each with an apical pore. In corduliids and libellulids the ovipositor musculature is formed by two antagonistic muscles, contractions of which cause up- and downward movements of the middle part of the 9th sternum, where rudiments are usually located. Characteristically, gomphid females lack both the ovipositor-related muscles and rudiments. Based on the present results, the rudiments may be reasonably homologized with the gonapophyses of the 9th segment of the plesiomorphic well-developed ovipositor. The proposed functional interpretations of the ovipositor derivatives in Odonata with exophytic oviposition are discussed in light of their egg laying behaviour." (Author) The analysis includes the following taxa: *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Lindenia tetraphylla*, *Cordulia aenea*, *Epithea bimaculata*, *Somatochlora metallica*, *Orithetrum cancellatum*, *Sympetrum vulgatum*, and *S. sanguineum*.] Address: Matushkina, Natalia, Department of Zoology, Biological Faculty, Kyiv National University, vul. Volodymirs'ka 64, Kyiv, 01033, Ukraine. E-mail: odonataly@gmail.com

11250. Mayon, N. (2011): Répartition de deux Gomphidae rhéophiles (*Gomphus vulgatissimus* et *Onychogomphus forcipatus*) le long de la Sûre: premiers résultats, tendances et hypothèses. *Les Naturalistes Belges* 92(3-4): 55-66. (in French, with English summary) [Belgium; west of the border to Luxembourg; "The distribution of *G. vulgatissimus* and *O. forcipatus* has been studied in four sites along the Sure river, based on exuviae findings. The results showed significant differences in species ratio between sites, suggesting a downstream gradient. Those results were thus examined under the habitat point of view. Although additional studies are requested to closely characterize the distribution of the two species, it is likely that the results revealed a distribution dependent of habitat types present at each place rather than a strict longitudinal distribution. However, this hypothesis must be considered with reserve due to the single sampling method." (Author)] Address: Mayon, N., Parc Naturel Haute-Sûre et Forêt d'Anlier. Chemin du Moulin 2, B-6630 Martelange, Belgium. E-mail: nicolas@parcnaturel.be

11251. Mayoral, H. (2011): Particle size, critical shear stress, and benthic invertebrate distribution and abundance in a gravel-bed river of the Southern Appalachians. M.Sc. Thesis, College of Arts and Sciences, Georgia State University: X + 66 pp. (in English) ["To determine the relationship between the abundance and den-

sity of benthic invertebrates, and the critical shear stress of individual grain sizes, a reach along Smith Creek, was divided into ten 2m x 2m quadrants. Within each quadrant, five randomly selected clasts for each grain size ranging from 2.26 to 25.6 cm were cleaned for benthic invertebrates. Wolman pebble counts for each quadrant were also conducted and used to determine the critical Shields stress per grain size fraction from the model given by Wiberg and Smith (1987) that explicitly accounts for particle hiding/sheltering effects in mixed-bed rivers. Particle entrainment values were then compared with estimated bankfull Shields stress values to determine sediment transport potential during bankfull flow. Invertebrate abundance was strongly positively correlated with critical Shields stress up to the 18.0 cm grain size, indicating a preference for certain grain sizes; while density was positively correlated with all grain sizes present." (Author) Among 9114 collected specimens only one Odonata was represented.] Address: Mayoral, Helen, College of Arts and Sciences, Georgia State University, USA. E-mail: hmayoral1@student.gsu.edu

11252. McAlpine, D.F. (2011): Insect Collections of Canada Series: New Brunswick Museum, Saint John, NB. Newsletter of the Biological Survey of Canada 30 (1): 8-16. (in English) [The paper includes a picture of Paul Brunelle, and some passing references on regional representation of specimens in the collection.] Address: McAlpine, D.F., Research Curator, Zoology Section, & Head, Department of Natural Science, E-mail: donald.mcalpine@nbm-mnb.ca



11253. Meurgey, F.; Picard, L. (2011): Les libellules des Antilles françaises: Ecologie, biologie, biogéographie et identification. Collection Parthénope. Biotopie. 440 pp. (in French) [This is a richly illustrated field guide to the

dragonflies of the French Antilles. It contains chapters describing the environment of the Antilles, the morphology and biology, and biogeography and ecology of dragonflies, as well as measures taken towards their protection and conservation. Furthermore the guide provides determination keys and 41 species accounts. In addition, it describes several walks around islands of particular interest to people wanting to observe dragonflies.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

11254. Miroglu, A. (2011): First record of the Black Darter, *Sympetrum danae* (Sulzer, 1776) (Odonata: Libellulidae), from Turkey. *Zoology in the Middle East* 53: 129-130. (in English) ["I collected a female at Taslidere (Ardahan region), eastern Turkey, at 1901 m a.s.l., on 27.vii.2010. Taçhdere is situated at 41°03'N, 42°51'E. The habitat consists of high elevation ponds and a sluggish stream, and is associated with sedges and bulrush species. The material is deposited in the collection of the Biology Department of Ondokuz Mayıs University, Samsun (Turkey). This is the first record from Turkey." (Author)] Address: Miroglu, A., Ondokuz Mayıs University, Faculty of Science and Arts, Department of Biology, 55139, Kurupelit, Samsun, Turkey

11255. Mochon, A. (2011): Découverte de la courtisane d'Amérique (*Hetaerina americana*), odonate, au Québec. *Le naturaliste canadien* 135(2): 34-37. (in French) [Records of *H. americana* in Québec, Canada are documented: (1) 12-IX-2009, Yamaska River (45,324905°N; 72,649808°E) (31H/07), near Bromont, and (2) 29-VIII-2010, Yamaska Nord River (45,415431°N; 72,626556°E) (31H/07), app. 1 km near Réservoir Choynière.] Address: not stated

11256. Mochon, A. (2011): La découverte de la courtisane d'Amérique (Odonata: *Hetaerina americana*) au Québec. *Bulletin de conservation. Les parcs nous ont dévoilé...* 2011: 21-23. (in French) [The recent records of *H. americana* in Québec, Canada are documented in detail: (1) 12-IX-2009, Yamaska River (45,324905°N; 72,649808°E) (31H/07), near Bromont, and (2) 29-VIII-2010, Yamaska Nord River (45,415431°N; 72,626556°E) (31H/07), app. 1 km near Réservoir Choynière. The paper also includes brief notes on *Gomphaeschna furcillata* and *Enallagma civile*.] Address: not stated

11257. Molina, C.I.; Gibon, F.-M.; Oberdorff, T.; Dominguez, E.; Pinto, J.; Marin, R.; Roulet, M. (2011): Macroinvertebrate food web structure in a floodplain lake of the Bolivian Amazon. *Hydrobiologia* 663: 135-153. (in English) ["Two stable isotopes $\delta^{13}C$ and $\delta^{15}N$ were used to identify the energy sources and trophic relationships of the main freshwater macroinvertebrates in a floodplain lake of the Beni River (Bolivian Amazonia). Four energy sources (seston, bottom sediment, periphyton, and aquatic macrophytes) and macroinvertebrate communities were collected during three periods of the river hydrological cycle. Macroinvertebrates showed greater temporal variation in isotope values than their food sources. Six trophic chains were identified: four were based on seston, periphyton, C3 macrophytes, and bottom sediments, and the last two chains on a combination of two carbon sources. One mixed seston and periphyton sources during the wet season while the other mixed periphyton and macrophytes sources during the wet and dry seasons. Periphyton was the most

important energy source supporting the highest number of trophic levels and consumers. The macrophytic contribution was only significant during the dry season. Bottom sediments constituted a marginal energy source. As each season is associated with different physical and chemical conditions, processes organizing macroinvertebrate food web structure in the Beni floodplain seem strongly linked to hydrological seasonality." (Authors) The authors analyzed 243 macroinvertebrate samples representing 38 taxa. The dominant taxa were *Belostoma* sp., (Hemiptera), *Dythemis* sp., *Limnetron* sp. (Odonata), *Hydrophilus* spp. (Coleoptera), *Palaeonetes ivonicus* (Crustacea, Decapoda) and *Pomacea scalaris* (Mollusca, Gasteropoda). Ten out of the 38 taxa are Odonata (treated at the genus level).] Address: Molina, C.I., Instituto de Ecología, Unidad de Limnología, UMSA, Casilla Postal #10077, La Paz, Bolivia. E-mail: camoar6088@gmail.com

11258. Moser, I. (2011): Bestandesaufnahmen der Kleinen Binsenjungfer, der Sumpfgrippe und der Sumpfschrecke im Feuchtland ausserhalb der Naturschutzgebiete Bannriet, Spitzmäder, Eich und Burst. Ergebnisse 2011. Editors: Verein Pro Riet Rheintal, Altstätten, Switzerland: 23 pp. (in German) [In 2011, 14 localities improved by nature conservation measures (ceasing melioration, building water bodies) between 1994 and 2007 were studied with respect to occurrence of *Lestes virens*. All these habitats are situated outside legally protected areas. *L. virens* was established in seven of the fourteen localities. It was confirmed as reproducing in three of them.] Address: Verein Pro Riet Rheintal, Schwalbenweg 16, 9450 Altstätten, Switzerland. www.pro-riet.ch

11259. Muehlbauer, J.D.; Doyle, M.W.; Bernhardt, E.S. (2011): Macroinvertebrate community responses to a dewatering disturbance gradient in a restored stream. *Hydrology and Earth System Sciences* 15: 1771-1783. (in English) [North Carolina, USA; "Dewatering disturbances are common in aquatic systems and represent a relatively untapped field of disturbance ecology, yet studying dewatering events along gradients in non-dichotomous (i.e. wet/dry) terms is often difficult. Because many stream restorations can essentially be perceived as planned hydrologic manipulations, such systems can make ideal test-cases for understanding processes of hydrological disturbance. In this study we used an experimental drawdown in a 440 ha stream/ wetland restoration site to assess aquatic macroinvertebrate community responses to dewatering and subsequent rewetting. The geomorphic nature of the site and the design of the restoration allowed dewatering to occur predictably along a gradient and decoupled the hydrologic response from any geomorphic (i.e. habitat heterogeneity) effects. In the absence of such heterogeneous habitat refugia, reach-scale wetted perimeter and depth conditions exerted a strong control on community structure. The community exhibited an incremental response to dewatering severity over the course of this disturbance, which was made manifest not as a change in community means but as an increase in community variability, or dispersion, at each site. The dewatering also affected inter-species abundance and distributional patterns, as dewatering and rewetting promoted alternate species groups with divergent habitat tolerances. Finally, our results indicate that rapid rewetting – analogous to a hurricane breaking a summer drought – may represent a recovery process rather than an additional dis-

turbance and that such processes, even in newly restored systems, may be rapid." (Authors) The supplementary material lists *Anax*, *Enallagma*, *Ischnura*, *Erythemis*, *Miathyria*, and *Pachydiplax*.] Address: Muehlbauer, J.D., Curriculum for the Environment & Ecology, University of North Carolina, Chapel Hill, NC, USA. E-mail: jeffreym@unc.edu

11260. Müller, J.; Steglich, R. (2011): Fundort- und Artenliste eigener Libellen-Nachweise (Odonata) in Sachsen-Anhalt für die Jahre 2009 und 2010. *halophila - Mitteilungsblatt der Fachgruppe Faunistik und Ökologie, Staßfurt* 54: 15-19. (in German) [Records from 47 localities in Sachsen-Anhalt, Germany are documented.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

11261. Ndome, C.B.; Udo, I.U.; Akpan, I.I.; Udom, C. (2011): Effect of water quality and bottom soil properties on the diversity and abundance of macrozoobenthic fauna of some tropical growth-out earthen fish ponds. *Ecologia* 2(1): 12-22. (in English) ["This study was conducted to investigate the effect of water quality and bottom soil properties on the diversity and abundance of macrobenthic fauna in some tropical grow-out earthen fish ponds. The aim was to enhance the proper management of soil and water qualities in relation to various groups of benthic organisms found in ponds. Physico-chemical parameters, bottom soil properties and benthic community assemblages were studied in three selected commercial fish farms in Calabar, Cross River State, Nigeria. ... In general, Farms with optimum physicochemical parameters, high sand and low clay content had the highest assemblages of macrobenthic organisms. Farm managers should pay particular attention to the physico-chemical parameters and soil properties as they are determinant factors of macrobenthic assemblage within the fish ponds. These will enhance high productivity of the grow-out fish ponds since they form the major bulk of fish food." (Authors) Relative abundance of dragonfly larvae was estimated as 9.6, 15.6, and 21.7% for each of the three studied farms.] Address: Udo, I.U., Dept of Fisheries and Aquaculture, Institute of Oceanography, University of Calabar, P.M.B. 1115, Calabar, Cross River State, Nigeria

11262. Nelson, B. (2011): A review of notable records of Irish odonates post DragonflyIreland (2004-2010), including confirmation of the Golden-ringed Dragonfly *Cordulegaster boltonii* (Donovan) on the Irish list. *J. Br. Dragonfly Society* 27(2): 105-131. (in English) ["Notable records of Irish odonates in the period post DragonflyIreland (2004-2010) are presented, including confirmation of *C. boltonii* on the Irish list. Range expansions of several species are documented and the occurrences of migrant species are reviewed and discussed. An updated Irish checklist is provided and reference made to the Irish Red List." (Author)] Address: Nelson, B., National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, 7 Ely Place, Dublin 2, Ireland. E-mail: brian.nelson@environ.ie

11263. Obara, K.; Mishima, H.; Yodoe, K. (2011): Insects Fauna in the Sada-cho, Shimane Prefecture. *Bull. Hoshizaki Green Found.* 5: 139-160. (in Japanese, with English summary) [Japan; from May to October 2000, 647 species belonging to 13 orders were recorded. The following Odonata are listed from the region: *Ischnura asiatica*, *Cercion calamorum calamorum*, *C. sieboldii*, *Copera annulata*, *Lestes temporalis*, *Calopteryx atrata*,

C. cornelia, *Mnais pruinosa*, *M. nawai*, *Epiophlebia superstes*, *Asiagomphus melaenops*, *Davidius nanus*, *Stylogomphus suzukii*, *Onychogomphus viridicostus*, *Sieboldius albardae*, *Anotogaster sieboldii*, *Planaeschna milneii*, *Anax nigrofasciatus nigrofasciatus*, *A. parthenope julius*, *Macromia amphigena amphigena*, *Orthetrum albistylum speciosum*, *O. japonicum japonicum*, *O. triangulare melania*, *Crocothemis servilla mariannae*, *Sympetrum darwinianum*, *S. frequens*, *S. eroticum eroticum*, *S. parvulum*, *S. pedemontanum elatum*, *S. infuscatum*, *S. croceolum*, *Pantala flavescens*] Address: Otsu, 426-7, Izumo City, Shimane Prefecture, 693-0011, Japan

11264. Outomuro, D.; Ocharan, F.J. (2011): The larval-life history of *Calopteryx virgo meridionalis* in northern Spain and the voltinism of the south-western European species of the genus *Calopteryx* (Odonata: Calopterygidae). *Entomologia generalis* 33(1-2): 125-135. (in English, with German summary) ["A larval population of *C. virgo meridionalis* was monitored in northern Spain for a period of 18 months. Larvae were measured in the field and then released. Egg hatching was followed by rapid larval growth. Last stadium larvae were first collected in January. The larval life history and the developmental curve of the study population support a univoltine cycle with only one developing cohort throughout the year. Re-analysing previously published data, the developmental curves of several species of *Calopteryx* Leach 1815, from south-western Europe were compared. Results are discussed within the context of latitudinal shifts of voltinism and evidence a decrease in developmental time southwards, i.e. from semivoltinism to univoltinism. However, other factors such as altitude, local environmental conditions and specific larval requirements must also be considered." (Authors)] Address: Outomuro Priede, D., Dpto. Biología de Organismos y Sistemas, Universidad de Oviedo, C/ Catedrático Rodrigo Uria, s/n, E-33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

11265. Pan, B.-Z.; Wang, H.-J.; Liang, K.-M.; Wang, H.-Z. (2011): Macrozoobenthos in Yangtze floodplain lakes: patterns of density, biomass, and production in relation to river connectivity. *Journal of the North American Benthological Society* 30(2): 589-602. (in English) ["A systematic investigation of macrozoobenthos was conducted in Yangtze floodplain waters to reveal patterns of density, biomass, and production in relation to river connectivity. In the Yangtze connected lakes, 78 taxa belonging to 33 families and 62 genera were identified. Macrozoobenthos density was 327 individuals/m², biomass was 1.40 g dry mass/m², and production was 3.23 g dry mass m² y⁻¹. The assemblages were characterized by high diversity, high production, and high bivalve-filterer abundance. The key factor determining the macrozoobenthic assemblages was river connectivity. As river connectivity increased, 3 types of response patterns were observed: 1) density, biomass, and production of collector-filterers (mainly *Bivalvia*), shredders (e.g., *Stictochironomus*), and predators (e.g., *Dytiscidae*) showed unimodal changes, i.e., first increased and then decreased; 2) density, biomass, and production of collector-gatherers (mainly *Tubificidae* and *Chironomidae*) decreased continuously; and 3) density of scrapers (mainly *Gastropoda*) decreased, whereas their biomass and production changed unimodally. At an intermediate level of river connectivity, biomass and production of total macrozoobenthos reached maxima, whereas density decreased with increasing river connectivity.

Previous research showed that a diversity of zoobenthos also peaks at moderate connectivity with rivers. Therefore, to maintain high productivity as well as high biodiversity in the Yangtze floodplain, protecting the remnants of riverconnected lakes and linking disconnected lakes freely with the mainstream are crucial." (Authors) The list of taxa includes for Dongting Lake '*Dromogomphus* sp.', a nearctic species not occurring in China.] Address: Wang, H.-Z., State Key Laboratory of Freshwater Ecology and Biotechnology, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan, Hubei 430072, China. E-mail: wanghz@ihb.ac.cn

11266. Parr, A.J. (2011): Migrant and dispersive dragonflies in Britain during 2010. *J. Br. Dragonfly Society* 21(2): 69-79. (in English) ["The year 2010 was a relatively low-key one for many of our commoner migrant species but some highly noteworthy events took place with rarer species. Literally dozens of *Aeshna affinis* were seen in southeast England during late July-August, principally around the Thames Estuary. With oviposition being noted, it is even possible that local breeding populations may become established. Southeast England also saw several records of *Lestes barbarus* during the year, as well as the discovery of new sites for *Lestes viridis* away from the recently-established Suffolk population. Perhaps the highlight of the year was the re-discovery of *Coenagrion scitulum*, after an absence from the UK of nearly 60 years. Arrivals of this species must however have taken place prior to 2010, since, in addition to adults, small numbers of exuviae were also discovered, indicating that successful breeding had already taken place. Clearly Britain's dragonfly fauna is currently going through a period of considerable flux." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

11267. Parr, A.J. (2011): The Vagrant Emperor *Anax ephippiger* in Britain and Europe during early 2011. *J. Br. Dragonfly Society* 21(2): 80-87. (in English) ["Early 2011 saw major movements of *A. ephippiger* in southern and western Europe. These peaked during April and resulted in the largest arrivals of Vagrant Emperor ever seen in Britain. Oviposition was even observed at a site on the Lizard Peninsula in Cornwall on 26 April, this being the first recorded instance in the UK. British records of Vagrant Emperor during January-May 2011 are detailed and some meteorological background to the movements is presented." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

11268. Peck, S.B. (2011): CDF Checklist of Galapagos Dragonflies and Damselflies - FCD Lista de especies de Libélulas, caballitos del diablo de Galápagos. In: Bungartz, F., Herrera, H., Jaramillo, P., Tirado, N., Jiménez-Uzcategui, G., Ruiz, D., Guézou, A., Ziemmeck, F. (eds.). Charles Darwin Foundation Galapagos Species Checklist - Lista de Especies de Galápagos de la Fundación Charles Darwin. Charles Darwin Foundation / Fundación Charles Darwin, Puerto Ayora, Galapagos. Last updated 13 Apr 2011: 3 pp. (in English) [The paper compiles published records reaching up to 2001.] Address: <http://www.darwinfoundation.org/datazone/checklists/terrestrial-invertebrates/odonata/>

11269. Petruck, A.; Stöffler, U. (2011): On the history of chloride concentrations in the River Lippe (Germany) and the impact on the macroinvertebrates. *Limnologica*

- Ecology and Management of Inland Waters 41(2): 143-150. (in English) ["The River Lippe is situated at the northern part of the Rhenish-westphalian coal mining area, Germany and has a long history of being affected by mining water discharge. There has, however, been a massive decrease in the discharge of mining water over the past few decades. While early in the last century concentrations of up to 3500 mg l⁻¹ of chloride were observed, the mean concentration is now below 400 mg l⁻¹. At the same time the water quality has improved greatly so factors other than chloride concentration may be influencing the macroinvertebrate community. Macroinvertebrate data collected from three sites along the River Lippe was analyzed for a change in the occurrence of salt tolerant species in an area where mining water discharge ended in 2000. It was found that also during the period of discharges the macroinvertebrate community was dominated by freshwater species and therefore the impact of mining water discharges in the upper River Lippe is considered to be minor. It was also found that for some species (*Nais elinguis*, *Bithynia tentaculata* and *Gammarus tigrinus*) their proposed salinity preference did not correlate with their occurrence in the field. This may be an area that requires further research. ... The predominant taxa of the collected individuals were Crustacea (18.24%), Gastropoda (15.59%), Ephemeroptera (10.61%) Odonata (10.40%), Diptera (9.75%), Trichoptera (9.63%), Lamellibranchata (6.73%) and Coleoptera (5.02%) ..."] (Authors)] Address: Petruck, A., Emschergerossenschaft/Lippeverband Essen, Kronprinzenstr. 24, 45128 Essen, Germany. E-mail: petruck.andreas@eglv.de

11270. Petrulevicius, J.F.; Wappler, T.; Nel, A.; Rust, J. (2011): The diversity of Odonata and their endophytic ovipositions from the Upper Oligocene Fossilagerstätte of Rott (Rhineland, Germany). *ZooKeys* 130: 67-89. (in English) ["A commented list of fossil Odonata from the Oligocene outcrop of Rott is given, together with descriptions of new traces of oviposition in plant tissues, very similar to ichnotaxa already known from the early Eocene Laguna del Huncó floras of Patagonia. The joint presences of odonatan larvae and traces of oviposition demonstrate the autochthony of these insects in the palaeolake of Rott, confirming the existence of a diverse and abundant aquatic entomofauna, a situation strikingly different to that in the contemporaneous Oligocene palaeolake of Céreste (France)."] (Authors)] Address: Wappler, T., Steinmann Institut für Geologie, Mineralogie, Paläontologie, Universität Bonn, Nussallee 8, 53115 Bonn, Germany. E-mail: twappler@uni-bonn.de

11271. Pinto, A.P.; Lamas, C.J.E. (2011): *Oligoclada mortis* sp. nov. from Rondônia State, Brazil, and distributional records of other species of the genus (*Odonata*: Libellulidae). *International Journal of Odonatology* 14(4): 291-303. (in English) ["*Oligoclada mortis* sp. nov. (holotype male deposited in MZSP: Brazil, Rondônia State, Porto Velho municipality, gT[ransec t]5-21, seg[ment]12 (09.35 19 S, 65.02 50 W, 106m asl, 13 v 2010, leg. Nogueira & Mendes) is described and illustrated based on two males. The new species fits within Borrer's Group III, differing from all other described species in the genus by the combination of an entirely black labium, a large posterior hamule, sickle-shaped and ventrally longer than the genital lobe, and long cerci, with the ratio between epiproct and cerci less than 0.67. A key to males of the seven species of Group III and distributional records based on the specimens de-

posited in the DZRJ and MZSP Brazilian collections are also presented. The new species is the eighth species of *Oligoclada* reported from Rondônia, this being the richest Brazilian State for this genus." (Authors)] Address: Pinto, A.P., Museu de Zoologia, Universidade de São Paulo, Av. Nazaré 481, Ipiranga 04263-000, São Paulo, SP, Brazil. E-mail: odonataangelo@hotmail.com

11272. Piper, W. (2011): *Libellennachrichten mit neuem Herausgeber*. *Libellennachrichten* 26: 14. (in German) [Martin Lemke is introduced as new co-editor of the newsletter of the German speaking odonatologists.] Address: Piper, W., Kollenhof 31, D-22527 Hamburg, Germany. E-mail: info@werner-piper.de

11273. Poiron, C.; Meurgey, F. (2011): The Odonata of St Lucia (Lesser Antilles) - Survey Report March 9-30 2011. *L'Herminier Natural History Society - Contribution to odonatology # 2*: 21 pp. (in English) ["The dragonfly fauna of the Lesser Antilles actually numbers 48 valid species (Meurgey & Poiron, in prep). There are 38 species in Guadeloupe (Meurgey, 2006b), 30 in Martinique (Meurgey, 2005) which both are the richest islands. Species richness decrease to the south with only 7 species in St. Vincent (Meurgey, 2010) and 19 in Grenada (Meurgey, 2009). Saint Lucia appear as a medium rich island, and the paucity of species could be due to 1) the lack of standing water habitats (95% of Odonata reproduce in standing water), and 2) the lack of studies, with only two surveys known to us. Among surveyed stations, 62% belongs to lotic habitats and 30% to lentic habitats. The remaining pertain to specific habitats: trail, grassland, ditch... The number of species in Martinique, which is quite equal to those of St Lucia, is due to a high level of disturbances, pollutions and urbanization. We think that the fauna of St Lucia could reach 30-35 species. Hurricane Tomas passed by the Island in November 2010. He especially opened many forested areas. We observed that several streams and rivers are now open, without canopy and colonized by vagrant species such as *Pantala flavescens*, *Orthemis macrostigma* or *Tramea abdominalis*. We also saw trees down across rivers creating microhabitats and promoting the development of some species such as *Protoneura ailsa*. This information must be verify with further surveys before and after the passage of an hurricane. It is difficult to have an idea of what species could be present in these habitats before Tomas. As for other islands, the odonate fauna of St Lucia is dominated by wide ranging species. Two of them, *Ischnura ramburii* and *O. macrostigma* are the commonest species in a great variety of habitat. The most interesting thing is that these two common species are followed by Lesser Antillean endemics (*P. ailsa* and *Dythemis sterilis*), which have been recorded from 20 (26%) and 27 (36%) localities respectively." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

11274. Popoola, K.O.K.; Otalekor, A. (2011): Analysis of aquatic insects' communities of Awba Reservoir and its physico-chemical properties. *Research Journal of Environmental and Earth Sciences* 3(4): 422-428. (in English) ["This study was conducted to assess the Awba reservoir insects' communities and the health status through the determination of insects' abundance, composition, distribution and water qualities parameters. Water samples and insects were collected bi-weekly from August through December, 2009. Insects were

sampled using standard entomological methods, while water samples was analyzed using standard Winkler's titrimetric and APHA methods to determine the chemical properties. Water analyses and insects' identifications were conducted in the laboratory in Dept of Zoology, University of Ibadan, Oyo State. The results show that only DO and phosphate-phosphorus had significant difference ($p < 0.05$). A total of 1,154 insects were recorded, Chironomidae and Culicidae were most abundant. The chemical properties and the distinct taxa found in the water suggest that the water body is polluted and may be dangerous to the health of people around the reservoir." (Authors) The paper contains information on heavy metal (zinc, copper, lead, cadmium) impact on Odonata identified at the genus level.] Address: Popoola, K., Department of Zoology, University of Ibadan, Oyo State, Nigeria

11275. Rocha-Ramírez, A.; Peñaloza-Daniel, A. (2011): *Caecidotea xochimilca* (Isopoda, Asellidae), a new species from Lake Xochimilco, Mexico, with a key to Mexican species of the genus *Caecidotea*. *Crustaceana* 84(1): 93-106. (in English, with Spanish abstract) [*Caecidotea xochimilca* n. sp. is described from specimens found in the roots of the water hyacinth in Lake Xochimilco, Mexico City. Those alkaline waters also harbour *Ischnura denticollis* and *Rhionaeschna multicolor*.] Address: Rocha-Ramírez, A., Laboratorio de Ecología, Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México, Av. de los Barrios #1, Los Reyes Iztacala, CP 54090 Tlalnepantla, Estado de México, Mexico

11276. Russo, L.; Stehouwer, R.; Heberling, J.M.; Shea, K. (2011): The composite insect trap: An innovative combination trap for biologically diverse sampling. *PLoS ONE* 6(6): e21079. doi:10.1371/journal.pone.0021079: 7 pp. (in English) ["Because insects are so diverse, most trapping methods are specifically tailored to a particular taxonomic group. For scientists interested in the broadest possible spectrum of insect taxa, whether for long term monitoring of an ecosystem or for a species inventory, the use of several different trapping methods is usually necessary. We describe a novel composite method for capturing a diverse spectrum of insect taxa. The Composite Insect Trap incorporates elements from four different existing trapping methods: the cone trap, malaise trap, pan trap, and flight intercept trap. ... We collected almost 15,000 specimens of 21 different orders ... over a period of three months during the summer of 2009. All of these specimens were identified to the order level. At this resolution, we found great diversity. The majority of the insects in the traps were Diptera (56%), Hemiptera (26%), Coleoptera (7%), and Hymenoptera (7%), but there were representatives from the insect orders Blattodea, Collembola, Dermaptera, Ephemeroptera, Lepidoptera, Mecoptera, Neuroptera, Odonata, Orthoptera, Plecoptera, Psocoptera, Thysanoptera, Trichoptera, and non insect arthropods such as Acari (mites), Araneae, Opiliones, and Diplopoda." (Authors)] Address: Russo, Laura, Biology Dept, Pennsylvania State University, University Park, Pennsylvania, USA. E-mail: lar322@psu.edu

11277. Šácha, D. (2011): Addition to the knowledge of dragonflies (Insecta: Odonata) of the Turiec region. *Folia faunistica Slovaca* 16(3): 151-155. (in Slovakian, with English summary) [In 2007, nine wetland sites in the Turiec region (Northern Slovakia) were studied for their Odonata. A total 25 species is reported, including 6

legally protected and 8 redlisted Slovakian species. Species of community interest according the European law are *Leucorrhinia pectoralis* reported for the first time from Turiec region, *Coenagrion ornatum* and *Ophiomphus cecilia*.] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: du-san.sacha@vazky.sk

11278. Sánchez-Guillén, R.A.; Hansson, B.; Wellenreuther, M.; Svensson, E.I.; Cordero-Rivera, A. (2011): The influence of stochastic and selective forces in the population divergence of female colour polymorphism in damselflies of the genus *Ischnura*. *Heredity* 107(6): 513-522. (in English) ["Disentangling the relative importance and potential interactions of selection and genetic drift in driving phenotypic divergence of species is a classical research topic in population genetics and evolutionary biology. Here, we evaluate the role of stochastic and selective forces on population divergence of a colour polymorphism in seven damselfly species of the genus *Ischnura*, with a particular focus on *I. elegans* and *I. graellsii*. Colour-morph frequencies in Spanish *I. elegans* populations varied greatly, even at a local scale, whereas more similar frequencies were found among populations in eastern Europe. In contrast, *I. graellsii* and the other five *Ischnura* species showed little variation in colour-morph frequencies between populations. FST-outlier analyses revealed that the colour locus deviated strongly from neutral expectations in Spanish populations of *I. elegans*, contrasting the pattern found in eastern European populations, and in *I. graellsii*, where no such discrepancy between morph divergence and neutral divergence could be detected. This suggests that divergent selection has been operating on the colour locus in Spanish populations of *I. elegans*, whereas processes such as genetic drift, possibly in combination with other forms of selection (such as negative frequency-dependent selection), appear to have been present in other regions, such as eastern Europe. Overall, the results indicate that both selective and stochastic processes operate on these colour polymorphisms, and suggest that the relative importance of factors varies between geographical regions." (Authors)] Address: Sánchez-Guillén, Rosa, Depto de Ecología e Biología Animal, E.U.E.T. Forestal, Univ. de Vigo, Pontevedra, Spain. E-mail: rguillen@uvigo.es

11279. Schmera, D.; Baur, B. (2011): Testing a typology system of running waters for conservation planning in Hungary. *Hydrobiologia* 665(1): 183-194. (in English) ["Landscape and site classifications are increasingly being used in conservation planning and biodiversity management. We examined the utility of a simple typology system for predicting the conservation value of running-water sites in Hungary using aquatic invertebrates. Aquatic invertebrates (444 species) were collected by kick and sweep sampling technique, in a few cases also with a net, at 317 running-water sites covering the entire area of Hungary. On the basis of three criteria (naturalness, altitude and size of catchment area) we obtained a typology scheme distinguishing five running-water types: artificial lowland stream, natural highland river, natural highland stream, natural lowland river and natural lowland stream. We expressed the conservation value of each site using the numbers of native species, unique native species, red-list species, protected species and alien species. Furthermore, the conservation value of each river type was expressed by a measure of beta diversity. Our results show that any interpretation

of the effect of a single criterion might be misleading. Consequently, the use of the whole typology system is recommended. The study revealed that all stream types are valuable to a certain extent because they maintain distinct biological communities. We found that the conservation value of artificial watercourses is comparable to that of natural running-water sites. We identified that natural lowland rivers and artificial lowland streams are the ones mostly exposed to species invasions. These findings are essential in maintaining and protecting conservation values of any freshwater ecosystem, and may contribute to management decisions on running waters in Hungary." (Authors) Odonata are included into this study; but no species details are given.] Address: Schmera, D., Section of Conservation Biology, Department of Environmental Sciences, University of Basel, St. Johanns-Vorstadt 10, 4056 Basel, Switzerland. E-mail: denes.schmera@unibas.ch

11280. Seibert, J.R.; Phelps, Q.E.; Tripp, S.A.; Garvey J.E. (2011): Seasonal diet composition of adult Shovel-nose Sturgeon in the Middle Mississippi River. *The American Midland Naturalist* 165(2): 355-363. (in English) ['Coenagrionidae' and 'Gomphidae' contributed 1,39% to the mass of diet from 123 specimens of shovel-nose sturgeon (*Scaphirhynchus platyrhynchus*) in the Middle Mississippi River (MMR) between Cairo, IL and St. Louis, MO (RKM 0–320), USA. "Dominant prey items throughout all seasons (winter, spring, summer and fall) were Chironomidae, Hydropsychidae, Ephemeridae and Corophiidae respectively. Corophiidae is an exotic amphipod that has not previously been documented in the MMR. The total abundance of diet items was high during winter through spring and low during summer through fall. Ephemeridae dominated in winter. Hydropsychidae was the most important prey item during spring through summer. Corophiidae dominated diets in the fall. Temperature and perhaps low river discharge appeared to affect prey consumed, with high temperatures and low discharge during summer through fall causing low energy intake, lowered condition and likely poor growth." (Authors)] Address: Phelps, Q.E., Fisheries and Illinois Aquaculture Center, Department of Zoology, Southern Illinois University, Carbondale 62901, USA. E-mail: qphelps@siu.edu

11281. Shama, L.S.; Campero-Paz, M.; Wegner, K.M.; De Block, M.; Stoks, R. (2011): Latitudinal and voltinism compensation shape thermal reaction norms for growth rate. *Molecular Ecology* 20(14): 2929-2941. (in English) ["Latitudinal variation in thermal reaction norms of key fitness traits may inform about the response of populations to climate warming, yet their adaptive nature and evolutionary potential are poorly known. We assessed the contribution of quantitative genetic, neutral genetic and environmental effects to thermal reaction norms of growth rate for populations of *Ischnura elegans*. Among populations, reaction norms differed primarily in elevation, suggesting that time constraints associated with shorter growth seasons in univoltine, high-latitude as well as multivoltine, low-latitude populations selected for faster growth rates. Phenotypic divergence among populations is consistent with selection rather than drift as QST was greater than FST in all cases. QST estimates increased with experimental temperature and were influenced by genotype by environment interactions. Substantial additive genetic variation for growth rate in all populations suggests that evolution of trait means in different environments is not constrained. Heritability of

growth rates was higher at high temperature, driven by increased genetic rather than environmental variance. While environment-specific nonadditive effects also may contribute to heritability differences among temperatures, maternal effects did not play a significant role (where these could be accounted for). Genotype by environment interactions strongly influenced the adaptive potential of populations, and our results suggest the potential for microevolution of thermal reaction norms in each of the studied populations. In summary, the observed latitudinal pattern in growth rates is adaptive and results from a combination of latitudinal and voltinism compensation. Combined with the evolutionary potential of thermal reaction norms, this may affect populations' ability to respond to future climate warming." (Authors)] Address: Shama, Lisa, Lab. Aquatic Ecol. & Evolutionary Biology, Univ. of Leuven, Ch. Deberiotstr. 32, BE-3000 Leuven, Belgium. E-mail: lisa.shama@awi.de

11282. Siregar, A.Z.; Rawi, C.S.M.; Nasution, Z. (2011): Abundance and diversity of Odonata in upland rice field at Manik Rambung, north of Sumatera. *Proceedings of the 7th IMT-GT UNINET and the 3rd International PSU-UNS Conferences on Bioscience*: 55-61. (in English) [19 species (*Argiocnemis rubescens*, *Argiocnemis femina*, *A. pygmaea*, *Ischnura senegalensis*, *Pseudagrion microcephalum*, *P. pruinatum*, *P. rubriceps*, *Ictinogomphus acutus*, *Acisoma panarpoides*, *Crocothemis servilia*, *Diplacodes trivialis*, *Neurothemis fluctuans*, *N. terminata*, *Orthetrum sabina*, *O. testaceum*, *Pantala flavescens*, *Potomarcha congener*, *Tholymis tillarga*, *Trithemis aurora*) are recorded from a ten ha rice field plot in Manik Rambung village, Simalungun District, North of Sumatra (2°53' 52.8"N 99° 00'24.4"E). The farmers practice rice culture by combining it with fish farming during the season of paddy planting.] Address: Nasution, Z., Dept. Agrotechnology Universitas Sumatera Utara, Malaysia. E-mail: zuliyanti@yahoo.com

11283. Soto, D.X.; Roig, R.; Gacia, E.; Catalan, J. (2011): Differential accumulation of mercury and other trace metals in the food web components of a reservoir impacted by a chlor-alkali plant (Flix, Ebro River, Spain): Implications for biomonitoring. *Environmental Pollution* 159(6): 1481-1489. (in English) ["Comparative studies of biomonitors of trace metal contamination are relatively scarce. We took advantage of a point source pollution in a reservoir (Flix, Spain) to compare trace metal (Hg, Pb, Cd, Se, As, Zn, Cu, Cr) bioaccumulation patterns among 16 food web components. Our results indicate that most organisms are suitable for Hg biomonitoring, whereas other metals are better monitored by only some of them. Biofilms and zebra mussel were the organisms with larger and more diverse biomonitoring capacity. However, we show that using groups of biomonitors increase the scope and strengths of the conclusions and specific goals can be better addressed. We conclude providing an overview of the strengths and weaknesses of the main organisms considered for biomonitoring trace metals in rivers and reservoirs." (Authors) Fig. 5. presents data on mercury and other trace metal concentrations in Coenagrionidae (*Erythromma* sp., *Ischnura* sp.) from the Flix reservoir.] Address: Soto, D., Centre for Advanced Studies of Blanes (CEAB-CSIC), Accés a la Cala St. Francesc 14, 17300 Blanes, Spain

11284. Tajiri, R.; Misaki, K.; Yonemura, S.; Hayashi, S. (2011): Joint morphology in the insect leg: evolutionary history inferred from Notch loss-of-function phenotypes in *Drosophila*. *Development* 138: 4621-4626. (in Eng-

lish) ["Joints permit efficient locomotion, especially among animals with a rigid skeleton. Joint morphologies vary in the body of individual animals, and the shapes of homologous joints often differ across species. The diverse locomotive behaviours of animals are based, in part, on the developmental and evolutionary history of joint morphogenesis. We showed previously that strictly coordinated cell-differentiation and cell-movement events within the epidermis sculpt the interlocking ball-and-socket joints in the adult *Drosophila* tarsus (distal leg). Here, we show that the tarsal joints of various insect species can be classified into three types: ball-and-socket, side-by-side and uniform. The last two probably result from joint formation without the cell differentiation step, the cell-movement step, or both. Similar morphological variations were observed in *Drosophila* legs when Notch function was temporarily blocked during joint formation, implying that the independent acquisition of cell differentiation and cell movement underlay the elaboration of tarsal joint morphologies during insect evolution. These results provide a framework for understanding how the seemingly complex morphology of the interlocking joint could have developed during evolution by the addition of simple developmental modules: cell differentiation and cell movement. ... The proximal tarsal joint of the bristletail (*Archeognatha*), the tarsal joints of the firebrat (*Apterygota*) and those of *Orthetrum albistylum*, *Epiophlebia superstes*, *Ischnura senegalensis* (Paleoptera) consisted of two pieces of hard cuticle that lined the cavity and were positioned side by side, without one enwrapping the other." (Authors)] Address: Tajiri, R., Laboratory for Morphogenetic Signaling, RIKEN Center for Developmental Biology, Kobe 650-0047, Japan. E-mail: rtajiri1@gmail.com

11285. Taniwaki, R.H.; Smith, W.S. (2011): Using benthic macroinvertebrates for biomonitoring the anthropic activity in the drainage basin of Itaparanga reservoir, Votorantim – SP, Brazil. *J. Health. Sci. Inst.* 29(1): 7-10. (in Portuguese, with English summary) [The Itaparanga reservoir is the main supply source of potable water for the Sorocaba region, and it supplies the municipalities of Ibiúna, Piedade, São Roque, Cotia, Vargem Grande Paulista, Mairinque, Alumínio and Votorantim. Four sets of samples were taken over the period between September 2008 and April 2009, with each set consisting of following 5 sampling points: two from the lakes adjacent to the reservoir, one from a nearby stream, one from a point in the Itaparanga reservoir and one from the local Chave Waterfall. ... 22 taxa were found including 'Gomphidae, Coenagrionidae, Libellulidae, Aeshnidae, and Protoneuridae.' Using the BMWP biotic index, the authors assess overall condition as acceptable, although there is some evidence of contamination.] Address: Taniwaki, R.H., Rua João Delgado Hidalgo, 164 – Apto. B-73, Sorocaba-SP, CEP 18016-180, Brasil. E-mail: rht.bio@gmail.com

11286. Ternois, V.; Lambert, J.-L.; Druart, D. (2011): Du nouveau sur la présence de l'Aesche paisible *Boyeria irene* (Fonscolombe, 1836) en Haute-Marne (Odonata: Anisoptera: Aeshnidae). *Bulletin de la Société de sciences naturelles et d'archéologie de la Haute-Marne* 10: 17-20. (in French) [The authors provide an updated review of all known published and personal observations of *B. irene* in the French Department Haute-Marne.] Address: Ternois, V., CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.pays.soulaines@wanadoo.fr

11287. Thompson, D.J.; Hassall, C.; Lowe, C.D.; Watts, P.C. (2011): Field estimates of reproductive success in a model insect: behavioural surrogates are poor predictors of fitness. *Ecology Letters* 14(9): 905-913. (in English) ["Understanding, and therefore measuring, factors that determine fitness is a central problem in evolutionary biology. We studied a natural population of *Coenagrion puella* over two entire breeding seasons, with over a thousand individuals uniquely marked and genotyped, and all mating events at the rendezvous site recorded. Using a parentage analysis, fitness of individuals in the first generation was quantified as the numbers of offspring that survived to maturity. Although mating behaviour can be predicted by environmental and demographic variables, the numbers of mature offspring produced (fitness) cannot, and crucially, are poorly correlated with behavioural observations of mating. While fitness of both sexes was positively related to mating behaviour and to female's ectoparasite burden, these behavioural observations explained little more variance in offspring production than environmental and demographic variables. Thus, we demonstrate that behavioural measures of reproductive success are not necessarily reliable estimates of fitness in natural populations." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), Univ. of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

11288. Torreias, S.R.; Ferreira-Keppler, R.L. (2011): Macroinvertebrates inhabiting the tank leaf terrestrial and epiphyte bromeliads at Reserva Adolpho Ducke, Manaus, Amazonas. *Braz. Arch. Biol. Technol.* 54(6): 1193-1202. (in English) ["The aim of this work was to investigate the diversity of macroinvertebrates and also verify if the abundance and diversity of Diptera were influenced by the abiotic factors. The samples were collected from the epiphytic and terrestrial bromeliads *G. brasiliensis* (1 and 3m) in wet and dry seasons at Reserva Adolpho Ducke analyzed total of 144 samples were analyzed from a total of 15,238 individuals collected. These contained 14,097 insects and, among these, 8,258 were immature Diptera, represented by eight most abundant families: Chironomidae, Ceratopogonidae and Culicidae. The relationship of Diptera diversity was influenced by the seasons and stratifications ($p=0.01$); the abundance was influenced by the volume of water ($p=0.02$) and the relationship between the season and volume of water in the terrestrial bromeliads was significant ($p=0.01$). This study represented the first contribution to knowledge of community of macroinvertebrates associated to bromeliads *G. brasiliensis* in Central Amazon." (Authors) Conagrionidae (predator) are represented by 50 specimens equal 0.33% of all arthropoda (100% = 15,238).] Address: Torreias, Sharlene Roberta da Silva, Coordenação de Biodiversidade/ INPA; C. P.: 478; 69011-970; Manaus - AM - Brazil. E-mail: rtorreias@gmail.com

11289. Torres-Cambas, Y.; Cordero-Rivera, A. (2011): Limited spermathecal sperm removal ability in the damselfly *Hypolestes trinitatis* (Gundlach) (Odonata: Megapodagrionidae). *International Journal of Odonatology* 14(4): 321-328. (in English) ["It has been hypothesized that sperm removal ability in male Odonata has promoted sexual conflict over the sperm stored in the reproductive tract of the female. Although there is evidence supporting this hypothesis, most studies have been conducted in a small number of species from spe-

cific families. We explored sperm removal ability in the Antillean Megapodagrionidae, *H. trinitatis* through examination of specialized structures on the genital ligula ("penis") and through measurement of sperm volumes stored in the sperm storage organs (bursa copulatrix and spermathecae) at different stages of the copula. Males removed sperm from the bursa, but not from the spermathecae. The penis has four finger-like terminal processes covered by spines which could contribute to sperm removal. Given the width of the penile processes, males could introduce them into the spermathecae to remove sperm; however this does not seem to occur. A possible explanation for the sperm removal pattern of *H. trinitatis* could be that the penile processes are prevented to reach the sperm stored due to their position in relation to the spermathecae during the copulation." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

11290. Torres-Cambas, Y.; Fonseca-Rodríguez, R. (2011): Sex ratio, survival, and recapture rate in a Cuban population of the damselfly *Hypolestes trinitatis* (Odonata: Megapodagrionidae). *Acta ethologica* 14: 69-76. (in English) ["Male-biased sex ratios in adult odonate populations have been the subject of vigorous discussion between the students of this order of insects. The debate has centered on whether the observed male bias in many populations is real, perhaps due to unequal survival rates, or whether it is an artifact caused by differences in recapture probabilities. A mark-recapture study to assess the relative contribution of survivorship and recapture rates on male-biased sex ratio was performed in a Cuban population of the damselfly *Hypolestes trinitatis*. Maximum likelihood theory and Akaike information criterion were used for parameter estimation and model selection, respectively. Females in the sample were outnumbered two to one by males. Estimated recapture and survival rates were 0.188 (females) and 0.638 (males), and 0.933 (females) and 0.944 (males), respectively. Recapture rates only partially explained the bias since the population sex ratio estimated after correcting for differences in this parameter was male biased (1.5). The observed higher survival probabilities in males could have generated the male-biased population sex ratio. Therefore, we concluded that the observed male-biased population sex ratio in *H. trinitatis* is real." (Authors)] Address: Y. Torres-Cambas, Y., Depto de Biología, Facultad de Ciencias Naturales, Univ. de Oriente, Patricio Lumumba s/n, 90500 Santiago de Cuba, Cuba. E-mail: ytorres@cnt.uo.edu.cu

11291. Trewick, S.A.; Wallis, G.P.; Morgan-Richards, M. (2011): The invertebrate life of New Zealand: A phylogeographic approach. *Insects* 2(3): 297-325. (in English) ["Phylogeography contributes to our knowledge of regional biotas by integrating spatial and genetic information. In New Zealand, comprising two main islands and hundreds of smaller ones, phylogeography has transformed the way we view our biology and allowed comparison with other parts of the world. Here we review studies on New Zealand terrestrial and freshwater invertebrates. We find little evidence of congruence among studies of different taxa; instead there are signatures of partitioning in many different regions and expansion in different directions. A number of studies have revealed unusually high genetic distances within putative species, and in those where other data confirm this

taxonomy, the revealed phylogeographic structure contrasts with northern hemisphere continental systems. Some taxa show a signature indicative of Pliocene tectonic events encompassing land extension and mountain building, whereas others are consistent with range expansion following the last glacial maximum (LGM) of the Pleistocene. There is some indication that montane taxa are more partitioned than lowland ones, but this observation is obscured by a broad range of patterns within the sample of lowland/forest taxa. We note that several geophysical processes make similar phylogeographic predictions for the same landscape, rendering confirmation of the drivers of partitioning difficult. Future multi-gene analyses where applied to testable alternative hypotheses may help resolve further the rich evolutionary history of New Zealand's invertebrates." (Authors) The paper briefly refers on Nolan, L.; Hogg, I.D.; Sutherland, D.L.; Stevens, M.I.; Schnabel, K.E. allozyme and mitochondrial DNA variability within the New Zealand damselfly genera *Xanthocnemis*, *Austrolestes*, and *Ischnura* (Odonata). *New Zeal. J. Zool.* 2007, 34, 371-380.] Address: Trewick, S.A., Phoenix Lab, Ecology Group, Inst. Natural Resources, Massey Univ., Private Bag 11-222, Palmerston North 4442, New Zealand

11292. von Ellenrieder, N. (2011): Odonata (dragonflies and damselflies) of the Kwamalasamutu region, Surinam. O'Shea, B.J., L.E. Alonso, & T.H. Larsen, (eds.). 2011. A Rapid Biological Assessment of the Kwamalasamutu region, Southwestern Suriname. *RAP Bulletin of Biological Assessment* 63. Conservation International, Arlington, VA: 56-78. (in English) ["94 Odonata species, representing one-third of the species known from Suriname, were registered at forest rivers, streams, and swamps; in particular 57 species were found at the Kutari River Site (Camp 1), 52 at the Sipaliwini River Site (Camp 2), and 65 at the Werehpai Site (Camp 3). 14 species represent new records for Suriname, of which four, belonging to the genus *Argia*, are new to science, and five represent first records of a species at a new locality since their original descriptions, increasing considerably their known extent of occurrence. The results indicate a healthy watershed and well preserved forest at all three sites; if forest cover and stream morphology are maintained in the area, the present odonate assemblages are expected to persist." (Author)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Rd, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

11293. Walia, G.K.; Kaur, H.; Kaur, J. (2011): Karyotypic variations in the chromosome complement of *Pantala flavescens* (Fabricius) of the family Libellulidae (Anisoptera: Odonata). *Cytologia* 76(3): 301-307. (in English) ["Male germ cell complement of *P. flavescens* has been investigated. Specimens were collected from the surrounding area of the Harike wetlands in the Punjab state of India. The species possesses $2n$ male=23m as the diploid chromosome number, which is less than the type number, $2n$ male=25m, of the family. In the chromosome complement, one autosomal bivalent is extraordinarily large due to the fusion of 2 autosomes and is responsible for the reduction in chromosome number. Precocious segregation of the m bivalent has also been noticed in some meiotic cells. This type of variations in the chromosome number and behaviour of m chromosomes indicate that the species is under the process of karyotypic evolution." (Authors)] Address: Walia, G.K., Department of Zoology, Punjabi University

11294. Watt, T. (2011): New pond gets approval of Emerald damselflies. *Scottish Invertebrate News* 2(2): 7. (in English) [Verbatim: The North East Ranger Service has been watching damselflies starting to colonise the new pond at Castle Fraser in Aberdeenshire, just five months after it was dug on a snowy day in March. Pairs of *Lestes sponsa* have been seen flying together around the pond and then settling on emergent vegetation to lay their eggs. The neighbouring flight pond at Castle Fraser is home to 10 species of dragonflies and damselflies including *Coenagrion hastulatum*, which is a red data book species found in the British Isles only in a few locations in Scotland. They also have the most northern record in Britain of the azure damselfly, which is more common further south. The new pond was created to provide a safety net in case anything happened to the existing populations of these and the other damselflies, and also to allow their populations to hopefully increase.] Address: not stated

11295. Watts, P.C.; Thompson, D.J. (2011): Developmental plasticity as a cohesive evolutionary process between sympatric alternate-year insect cohorts. *Heredity* 108(3): 236-241. (in English) ["Many species, particularly insects, pass through a series of distinct phases during their life history, with the developmental timing directed towards appropriate resources. Any factor that creates variation in developmental timing may partition a population into discrete populations—or 'cohorts'. Where there is continued failure to recruit outside the natal cohort then alternate cohorts will have their own internal dynamics, eventually leading to independent demographic and evolutionary trajectories. By contrast, continued variation in development rates within a cohort—cohort splitting—may homogenise otherwise independent demographic units. Using a panel of 14 microsatellite loci, we quantify the genetic signature of apparent demographic isolation between coexisting, but alternate, semivoltine cohorts of *Coenagrion mercuriale* at locations that span its distribution in the UK. We find consistently low levels of genetic divergence between sympatric cohorts of *C. mercuriale*, indicative of developmental plasticity during the larval stage (unregulated development) whereby some individuals complete their development outside the predominant 2-year (semivoltine) period. Thus, individuals that alter their developmental rate successfully recruit to a different cohort. Despite maintaining contrasting population sizes, gene flow between alternate cohorts broadly is sufficient to place them on a similar evolutionary trajectory and also buffers against loss of genetic diversity. Such flexible larval development permits a response to local conditions and may facilitate response to environmental change."] Address: Watts, P.C., School of Biological Sciences, The Biosciences Building, Crown Street, University of Liverpool, Liverpool, L69 7ZB, UK. E-mail: p.c.watts@liv.ac.uk

11296. Weech, S.A.; Scheuhammer, A.M.; Wayland, M. E. (2011): Selenium accumulation and reproduction in birds breeding downstream of a uranium mill in northern Saskatchewan, Canada. *Ecotoxicology* 21(1): 280-288. (in English) ["Selenium (Se) concentrations in aquatic invertebrates and bird eggs collected along the treated effluent receiving environment of the Key Lake uranium mill in northern Saskatchewan were significantly greater than from nearby reference areas, and in some cases (e.g., eggs of common loons — *Gavia immer*) were higher than commonly used thresholds for adverse re-

productive effects in birds (i.e., 5 µg/g dry weight in diet; 12–15 µg/g dry weight in eggs). Mean Se concentrations in tree swallow (*Tachycineta bicolor*) eggs reached a maximum of 13.3 µg/g dry weight at the point of treated effluent discharge and exhibited a gradient of decreasing Se concentrations with increasing distance from the effluent discharge, probably reflecting both effluent dilution and local site fidelity by nesting swallows. In some cases, high intra-clutch variability in Se concentrations in mallard (*Anas platyrhynchos*) and tree swallow eggs was observed in high-Se sites, suggesting that a single egg randomly sampled from a nest in an area of higher Se exposure may not be representative of Se concentrations in other eggs from the same nest. Overall, tree swallow reproductive success was similar in both exposed and reference areas... Odonata larvae, Trichoptera larvae and Hirudinea tended to have the highest Se concentrations, whereas near-surface insects such as Corixidae, Gerridae) and Gyrinidae had lower Se concentrations. In general, Se concentrations in invertebrates tended to be highest at Wolf and Unknown lakes, which are closest to the treated effluent discharge."] (Authors)] Address: Weech, S., Minnow Environmental Inc, 101-1025 Hillside Avenue, Victoria, BC V8T 2A2, Canada. E-mail: sweech@minnow-environmental.com

11297. Weidel, B.; Carpenter, S.R.; Kitchell, J.F.; Vander Zanden, M.J. (2011): Rates and components of carbon turnover in fish muscle: insights from bioenergetics models and a whole-lake ¹³C addition. *Can. J. Fish. Aquat. Sci.* 68: 387-399. (in English, with French summary) ["Stable isotopes are widely employed to describe energy flow in aquatic communities, though interpretation of results can be confounded by the fact that organisms integrate over vastly different time scales. We used results from a 56-day whole-lake ¹³C addition and a bioenergetic modelling approach to estimate dorsal muscle carbon turnover rates in a natural setting for three sizes of bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), and yellow perch (*Perca flavescens*). Generally, dynamic ¹³C models with a metabolic tissue replacement term were better supported than models predicting isotopic change from growth alone, except when relative growth rates were highest (age 0 bluegill). Across species and size classes, the percentage of carbon change due to tissue replacement was variable (2%–80%) and independent of fish size. The half-life of ¹³C in age 0 fishes was similar and ranged from 8 to 18 days. In contrast, adult tissue half-lives were much longer (116–173 days). Based on these and previously published estimates, fish mass (g) was a strong predictor of fish carbon turnover rates, \ln : $\log(I) = -3.65 - 0.20 \log(\text{mass})$, $r^2 = 0.71$."] (Authors) Benthic diet classifications included Odonata. Odonata larvae contributed significantly to the diet of the studied fish species.] Address: Weidel, B., Center for Limnology, University of Wisconsin, Madison, Wisconsin 53706, USA. E-mail: weidel@wisc.edu

11298. Weihrauch, F. (2011): A review of the distribution of Odonata in the Macaronesian Islands, with particular reference to the Ischnura puzzle. *J. Br. Dragonfly Society* 27(1): 28-46. (in English) ["The Macaronesian Islands, comprising five archipelagoes in the North Atlantic Ocean (Azores, Madeira, Savage Islands, Canary Islands and Cape Verde Islands), do not harbour many species of Odonata. Acknowledged records of 20 species (7 Zygoptera, 13 Anisoptera) are known today from

Macaronesia. However, a unique mixture of one endemic and 19 species that originated from three continents makes these islands a very attractive travel destination for odonatologists. In this study, the existing literature on the occurrence of Odonata in Macaronesia is summarised and evaluated. Special account is given concerning the historical development of the knowledge of the distribution of *Ischnura* species in Macaronesia." (Author)] Address: Weihrauch, F., Jägerstr. 21A, 85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de

11299. Westermann, K. (2011): Die Asiatische Keiljungfer (*Gomphus flavipes*) am Restrhein zwischen Weisweil (Landkreis Emmendingen) und Rust (Ortenaukreis) – eine neu eingewanderte oder bisher übersehene Art?. *Naturschutz südl. Oberrhein* 6: 155-156. (in German, with English summary) [2008; "During daily collections of *Onychogomphus forcipatus* exuviae along a 200m control section on branches of the river Rhine in the district of Emmendingen, Baden-Württemberg, Germany, nine exuviae of *G. flavipes* were found. An additional search at five spots along a 5 km section of the river Rhine was made. One to nine exuviae per spot and a total of 19 exuviae of *G. flavipes* were counted." (Authors)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

11300. Westermann, K. (2011): Erfolgreiche Entwicklung der Kleinen Königslibelle (*Anax parthenope*) in einem Hochwasserkanal. *Naturschutz südl. Oberrhein* 6: 153-154. (in German, with English summary) [Baden-Württemberg, Germany; "In the lower reaches of the Leopoldskanal, an overflow channel with temporarily high discharge, a small number of exuviae of *A. parthenope* were found in 2005 and 2009." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

11301. Westermann, K. (2011): Zweigipfelige Emergenzperiode der Kleinen Zangenlibelle (*Onychogomphus forcipatus*) im Fluss-System Elz-Leopoldskanal-Restrhein. *Naturschutz südl. Oberrhein* 6: 157-166. (in German, with English summary) [Baden-Württemberg, Germany; "In 2006, 2008, 2009, and 2010 a total of 14900 exuviae of *O. forcipatus* were collected at six sampling sections along the Elz-Leopoldskanal-Restrhein river system. The sampling sections were up to 25 km away from each other. The emergence period was between 40 and 76 days along the different sections. It began as early as 21st of May. The last imagines emerged on 12th of August. The emergence period always consisted of two main peak phases of mostly two to three weeks followed by a longer phase of lower emergence. Weather and water discharge had no effect on the seasonal pattern of emergence. It is possible that individuals from different larval stadia emerged during the different emergence phases. There may have been different conditions for development during the different phases. On isolated days the emergence rates were significantly decreased due to flooding, persistent strong winds or continuous rain. At one section the emergence rates increased significantly on three days following flooding during the previous nights. The floodings possibly caused drifting of larvae that were ready to emerge." (Author)] Address: Westermann, K., Buchenweg 2, D-79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

11302. Wildermuth, H. (2011): Beeinflussen Elritzen die Libellenfauna kleiner Moorgewässer? (Teleostei: Cyprini-

dae; Odonata). *Libellula* 30(3/4): 93-110. (in German, with English summary) ["Nine small man-made moorland ponds, three containing minnow *Phoxinus phoxinus*, one inhabited by minnow and goldfish *Carassius gibelio forma auratus*, and five without fish, were studied in a long-term study near Zürich, Switzerland, with respect to their dragonfly fauna. The species composition and the developmental success of the Anisoptera were assessed for each pond on the basis of continuous exuviae collecting. In fish-free water bodies, the numbers of indigenous Odonata species and the abundance of exuviae were significantly higher than in minnow-inhabited waters. *L. pectoralis* only emerged from ponds lacking fish. The impact of minnow populations on the invertebrates of small artificial peat ponds is discussed with regard to practical implications for nature conservation." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

11303. Wildermuth, H. (2011): Libellenausstellung im Naturschutzzentrum Neeracherried (Schweiz). *Libellen-nachrichten* 26: 16-18. (in German) [Report on an exhibition devoted to Odonata in Neerach, Switzerland] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

11304. Wilson, R.J.; Maclean, I.M.D. (2011): Recent evidence for the climate change threat to Lepidoptera and other insects. *J. Insect Conserv.* 15: 259-268. (in English) ["Climate change is now estimated by some biologists to be the main threat to biodiversity, but doubts persist regarding which species are most at risk, and how best to adapt conservation management. Insects are expected to be highly responsive to climate change, because they have short life cycles which are strongly influenced by temperature. Insects also constitute the most diverse taxonomic group, carrying out biotic interactions of importance for ecological functioning and ecosystem services, so their responses to climate change are likely to be of considerable wider ecological significance. However, a review of recent published evidence of observed and modelled effects of climate change in ten high-ranking journals shows that comparatively few such studies have focused on insects. The majority of these studies are on Lepidoptera, because of the existence of detailed contemporary and historical datasets. These biases in published information may influence conclusions regarding the threat of climate change to insect biodiversity. Assessment of the vulnerability of insect species protected by the Bern Convention on the Conservation of European Wildlife and Natural Habitats (including Odonata) also emphasises that most information is available for the Lepidoptera. In the absence of the necessary data to carry out detailed assessments of the likely effects of climate change on most threatened insects, we consider how autecological studies may help to illuminate the potential vulnerability of species, and draw preliminary conclusions about the priorities for insect conservation and research in a changing climate." (Authors)] Address: Wilson, R.J., Centre for Ecology and Conservation, University of Exeter, Cornwall Campus, Penryn TR10 9EZ, UK. E-mail: R.J.Wilson@exeter.ac.uk

11305. Wu, C.; Zhang, A. (2011): Catalogue of Odonata from Beijing and geographical distribution. *Journal of Beijing university of agriculture* 26(3): 15-19. (in Wu, C., College of Plant Science and Technology, Beijing University of Agriculture, Beijing 102206, China) ["In order

to understand the biodiversity of Odonata insects from Beijing, specimens were collected by sweep net and naiad breeding from 2008 to of 2010. The collection sites include water areas from Yanqing, Huairou, Miyun, Mentougou, Fangshan, Pinggu, Changping, Daxing and downtown parks. A catalogue of 62 species of 41 genera of 9 families of Odonata from Beijing was provided (3 species recorded in literatures included) based on identification of more than 400 specimens and the geographical distribution of dragonflies is briefly analyzed. One family and 16 species are firstly reported for Beijing and some mistaken identifications are revised. The result shows the Palaearctic species are predominant in Odonata fauna from Beijing accounting for 53.2% and water pollution is the main reason leading to species decrease of Odonata from plain areas of Beijing." (Authors)] Address: E-mail: zhangaihuan@126.com

11306. Yakovlev, A.V.; Yakovlev, V.A. (2011): [Ecology of aquatic ecosystems (Part 2: Protected species of aquatic organisms in Republic of Tatarstan): training manuals for training and field practice]. Kazan University: 34 pp. (in Russian) [The paper briefly introduces morphology, habitat and biology of *Aeshna grandis* and *Calopteryx virgo*.] Address: not stated

11307. Zessin, W.; Brauckmann, C.; Gröning, E. (2011): *Rasnitsynala sigamborum* gen. et sp. n., a small odonopterid ("Eomeganisoptera", "Erasipteridae") from the early Late Carboniferous of Hagen-Vorhalle (Germany). *ZooKeys* 130: 57-66. (in English) ["Besides *Erasipteroides valentini* (Brauckmann in Brauckmann, Koch & Kemper, 1985), *Zessinella siope* Brauckmann, 1988, and *Namurotypus sippeli* Brauckmann & Zessin, 1989, *Rasnitsynala sigamborum* gen. et sp. n. is the fourth species of the Odonatoptera from the early Late Carboniferous (Early Pennsylvanian: Namurian B, Marsdenian) deposits of the important Hagen-Vorhalle Konservat-Lagerstätte in Germany. With its wing-span of about 55 mm it is unusually small even for the "Eomeganisoptera". Its venation resembles other small "Eomeganisoptera", in particular *Z. siope*. This is why it is here assigned to the probably paraphyletic "Erasipteridae" Carpenter, 1939." (Authors)] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schweinin.de

2012

11308. Ajuzie, C.C. (2012): Macroinvertebrate communities in two tropical reservoirs (Lamingo and Liberty reservoirs) in Jos, Nigeria. *Nature and Science* 10(2): 8-18. (in English) [The reservoirs are located in the biotite granite-rockstream Lamingo village in Jos North Local Government Area of Plateau state, Nigeria. Taxa are treated at the family level, including Gomphidae and Libellulidae.] Address: Ajuzie, C.C., Applied Fisheries and Hydrobiology Unit, Department of Zoology, University of Jos, Nigeria. E-mail: efulecy@yahoo.com

11309. Almeida, D.; Copp, G.H.; Masson, L.; Miranda, R.; Murai, M.; Sayer, C.D. (2012): Changes in the diet of a recovering Eurasian otter population between the 1970s and 2010. *Aquatic Conservation: Marine and Freshwater Ecosystems* 22(1): 26-35. (in English) ["... Otter spraints from the River Glaven catchment (north Norfolk, eastern England) were collected seasonally between 2009 and 2010 from three habitat types (ponds, 'retenus' (small in-stream reservoirs), and stream

stretches). ... Otter diet composition varied greatly, with predation on aquatic invertebrates, crayfish, fish, and tetrapods. Fruit seeds were also found in the spraints. Diet generally reflected habitat, ... Of the minor prey types, terrestrial invertebrates were represented by snails (Gastropoda: Helicidae) and beetles (Coleoptera: Geotrupidae, Tenebrionidae). Apart from crayfish, freshwater invertebrates included snails (Gastropoda: Lymnaeidae), shrimps (Amphipoda: Gammaridae), dragonfly nymphs (Odonata: Anisoptera), adults of water skaters (Heteroptera: Gerridae), adults of water boatmen (Heteroptera: Notonectidae), caddisfly larvae (Trichoptera) and adults of diving beetles (Coleoptera: Dytiscidae)." (Authors)] Address: Copp, G.H., Salmon & Freshwater Team, Cefas, Pakefield Road, Lowestoft, Suffolk NR33 OHT, U.K. E-mail: gordon.copp@cefas.co.uk

11310. Anderson, C.N.; Grether, G.F.; Cordoba-Aguilar, A. (2012): Characterization of 12 microsatellite loci in the waterfall damselfly (*Paraphlebia zoe*) for use in population genetic applications. *Conservation Genetics Resources* 4(1): 175-177. (in English) ["*P. zoe*, is distributed in cloud forest areas in the Mexican states of Veracruz, Hidalgo, and San Luis Potosi. We developed twelve microsatellite loci for *P. zoe* from representative samples from the state of Veracruz. Microsatellites were tested for polymorphism on a panel of 24 individuals. The number of alleles ranged from 3 to 11, observed heterozygosity from 0.083 to 0.875, and the fixation index from 0.021 to 0.563. These loci are the first to be described and characterized for *P. zoe* and should prove useful for population genetics in support of the conservation of this vulnerable species." (Authors)] Address: Anderson, C.N., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Circuito Exterior s/n, Apdo. Postal 70-275, México D.F. 04510, Mexico. E-mail: cndanderson1980@gmail.com

11311. Aweng, E.R.; Suhaimi, O.; Nur Izzati, S. (2012): Benthic macroinvertebrate community structure and distribution in Sungai Pichong, Gunung Chamah, Kelantan, Malaysia. *American International Journal of Contemporary Research* 2(1): 163-167. (in English) [Only 'Aeshnidae' are mentioned.] Address: Aweng, E.R., Faculty of Agro Industry and Natural Resources, Universiti Malaysia Kelantan (UMK), Malaysia

11312. Bonada, N.; Doledec, S.; Statzner, B. (2012): Spatial autocorrelation patterns of stream invertebrates: exogenous and endogenous factors. *Journal of Biogeography* 39: 56-68. (in English) ["Aim To investigate spatial autocorrelation of taxonomic stream invertebrate groups (richness and composition) at a large geographical scale and to analyse the importance of exogenous and endogenous factors. Location The Mediterranean Basin. Methods For exogenous factors, we used large-scale factors related to climate, geology and river zonation; for endogenous factors, we used the dispersal mode of each taxonomic group. After describing and analysing spatial patterns of genus richness and genus composition of stream invertebrate groups in the Mediterranean Basin, we computed Moran's I before and after accounting for the exogenous factors and related it to the endogenous factors. Results In relation to genus richness, most of the taxonomic groups did not show significant spatial autocorrelation, suggesting that no main large-scale exogenous or endogenous factors were important and that local-scale factors were probably controlling taxonomic richness. In contrast, for ge-

nus composition, all taxonomic groups except Odonata had significant spatial autocorrelation before accounting for the environment. After accounting for the environment, most taxonomic groups still had a significant spatial autocorrelation, but it decreased with their increasing dispersal ability (from Crustacea to Coleoptera). Thus, spatial taxonomic composition of groups with the strongest dispersal potential is mainly related to exogenous factors, whereas that of groups with weaker dispersal potential is related to a combination of exogenous and endogenous factors. Main conclusions Our results illustrate the importance of dispersal as an endogenous factor causing spatial autocorrelation and suggest that ignoring endogenous factors can lead to misunderstandings when explaining large-scale community patterns." (Authors) Address: Bonada, N., Grup de Recerca Freshwater Ecology & Management (FEM), Departament d'Ecologia, Facultat de Biologia, Universitat de Barcelona, Barcelona, Diagonal 645, 08028 Barcelona, Catalonia, Spain

11313. Bonato, K.O.; Delariva, R.L.; da Silva, J.C. (2012): Diet and trophic guilds of fish assemblages in two streams with different anthropic impacts in the northwest of Paraná, Brazil. *Zoologia* 29(1): 27-38. [The diets of the fish assemblages in two streams in the Maringá region of Paraná are described. The assemblages are under the influence of different anthropogenic impacts. Fish were collected every two months from October 2006 to October 2007. Volumetric method was used to analyze the stomach contents of 599 fish belonging to 15 species. With the exception of *Pimelodella gracilis* (Valenciennes, 1835) and *Rhamdia quelen* (Quoy & Gaimard, 1824) Odonata larvae seem to play a minor role as fish diet.] Address: Delariva, Rosilene, Centro de Ciências Biológicas e da Saúde, Universidade Estadual do Oeste do Paraná. Rua Universitária 2069, Caixa postal 711, 85819-110 Cascavel, PR, Brazil. E-mail: rldelariva@hotmail.com

11314. Brandon, A. (2012): North Wales Dragonfly Newsletter No. 60. 8th March 2012. North Wales Dragonfly Newsletter 60: 12 pp. (in English) [UK; The paper presents detailed distribution maps of the following Odonata species: *Aeshna cyanea*, *A. grandis*, *A. juncea*, *A. mixta*, *Anax imperator*, *Gomphus vulgatissimus*, *Sympetrum danae*, *S. sanguineum*, *S. striolatum*, *Orthetrum cancellatum*, *O. coerulescens*, *Calopteryx splendens*, *C. virgo*, *Lestes sponsa*, *Platycnemis pennipes*, *Coenagrion mercuriale*, *C. puella*, *C. pulchellum*, *Enallagma cyathigerum*, *Ischnura elegans*, *I. pumilio*, *Pyrrhosoma nymphula*, *Erythromma najas*, and *Ceriagrion tenellum*.] Address: Brandon, A., North Wales Dragonfly Recorder, Bryn Heilyn, Rowen, Conwy LL32 8YT, UK. E-mail: allanrowenconwy@sky.com

11315. Brinesh, R.; Janardanan, K.P. (2012): Studies on the life-cycle of *Ganeo tigrinus* Mehra & Negi, 1928 (Digenea). *Systematic Parasitology* 82(1): 13-19 (in English) ["The life-history stages of *G. tigrinus* infecting the Indian bull frog *Hoplobatrachus tigerinus* (Daudin) are described, those from cercaria to egg-producing adult having been established in the laboratory. Non-irradiated xiphidiocercariae are released by the planorbis snail *Indoplanorbis exustus* (Deshayes). Metacercariae occur in the haemocoel of dragonfly nymphs (Libellulidae) and become infective to the frog *H. tigerinus* within 15 days. The pre-patent period is 45 days. Growth and development of both metacercariae and adults are described in detail. Comments on the systematic position

of *Ganeo Klein*, 1905 are included." (Authors) Address: Brinesh, R., Dept of Zoology, University of Calicut, Kerala 673 635, India. E-mail: brineshr@gmail.com

11316. Butler, G.L.; Wooden, I.J. (2012): Dietary habits of a large, long-lived endangered Australian percichthyid, the eastern freshwater cod *Maccullochella ikei*. *Endang. Species Res.* 16: 199-209. (in English) ["The diet of *M. ikei* Rowland, 1985 was studied over 2 consecutive years in the Mann and Nymboida River system, Australia, to determine summer and winter feeding habits. Food items were extracted using non-destructive gastric lavage. In total, 268 *M. ikei* were gut-flushed over the 2 yr of the study; 191 contained at least 1 food item. A large variety and broad size range of items were recovered, from small aquatic insects to relatively large terrestrial animals. We found significant differences between the food items consumed by *M. ikei* in summer and winter. Seasonal differences related to the increased occurrence of crustaceans, small fish and terrestrial animals in the diet of *M. ikei* during winter, and more aquatic insects and molluscs in summer. Food items differed significantly among size classes, with larger *M. ikei* consuming fewer crustaceans and more large fish and terrestrial animals. Our study revealed that *M. ikei* displays high plasticity in seasonal dietary habits, changes diet and foraging tactics as it grows, and appears to not always consume what would be considered optimal forage...." (Authors) Aquatic insects were nearly exclusively represented by Odonata (*Hemicordulia intermedia*, *H. tau*, *Hemigomphus* sp., *Hemianax papuensis*, Zygoptera) and estimated to app. 10% of the total food weight.] Address: Butler, G.L., Department of Primary Industries NSW, Grafton Fisheries Centre, PMB 2, Grafton, New South Wales 2460, Australia. E-mail: gavin.butler@industry.nsw.gov.au

11317. Chand, S. (2012): *Journal of Experimental Zoology, India* 15(1): 213-218 (in English) [A continuous forty hours of treatment of last instar naiad of *T. auroa* under LC₅₀ concentration, 5.12×10⁻⁷ and 7.60×10⁻⁸ ppm of chlorpyrifos and quinalphos respectively has proved toxic and induced histopathological derangements in various tissues of midgut. The mesenteron has observed to be prone to both the pesticides. The chlorpyrifos separated the epithelial folds and widen the inter fold space up to the basement membrane. The quinalphos penetrated inside the epithelial folds and damaged cellular mass. Both the pesticides induced the movement of cytoplasmic contents at various degrees towards the apical end of the epithelial folds. This movement presumed to be the genesis of intense vacuolation at the basal ends of all the epithelial cells. The continuous pressure of the internal cellular contents and weekend cell boundaries have caused the violent exclusion of cell contents. The nuclear membrane at many places damaged by chlorpyrifos and severely affected by quinalphos." (Author) Address: Chand, S., Dept Zol., R.P.G. College, Jamuhai, Jaunpur - 222 001, India

11318. Chand, S. (2012): Impact of pyrethroid and organophosphorus pesticides on the level of various amino acids in the gut tissues of naiad of *Trithemis aurora* (Burm.) dragonfly (Libellulidae: Odonata). *Journal of Experimental Zoology, India* 15(1): 291-298 (in English) [The occurrence and level of various amino acids in different regions of gut tissues of last instar naiad of *T. aurora* were analysed through the one dimensional paper chromatography. In various regions of gut there observed the levels of different amino acids. Among twenty

four amino acids several amino acids were observed missing in various gut tissues. Several amino acids were observed in moderate concentration and several amino acids in high concentration. Some of the amino acids were in feeble concentration. Impact of pyrethroid and organophosphorus pesticides was observed on the level of various essential and non essential amino acids in gut regions. The 2.691×10^{-5} , 2.5×10^{-3} , 5.12×10^{-7} , 7.6×10^{-8} ppm of LC₅₀ concentrations of cypermethrin, deltamethrin, chlorpyrifos and quinalphos applied respectively for 40 hrs. to observe the impact of these pesticides on the distribution and level of various amino acids. It was found that there was a great change in the distribution and level of various amino acids in various regions of gut under pesticidal stress." (Author) Address: Chand, S., Dept of Zoology, R.P.G. College, Jammu, Jaunpur - 222 001, India

11319. Clausnitzer, V.; Dijkstra, K.D.B.; Koch, R.; Boudot, J.-P.; Darwall, W.R.T.; Kipping, J.; Samraoui, B.; Samways, M.J.; Simaika, J.P.; Suhling, F. (2012): Focus on African freshwaters: hotspots of dragonfly diversity and conservation concern. *Frontiers in Ecology and the Environment* 10(3): 129-134. (in English) ["This is the first continent-wide overview of insect diversity and status sufficiently fine-scaled to be used in conservation planning. We analyze patterns of richness and the conservation status of African Odonata to determine threats to species and freshwater habitats, location of diversity hotspots, necessary conservation actions, and research gaps. Major centers of dragonfly diversity in Africa are tropical forest areas that include highlands. Most threatened species – as classified by the International Union for Conservation of Nature global Red List – are concentrated in highlands from Kenya to South Africa (together with the Cape Floristic Region), western Africa (including mountains on the Cameroon–Nigeria border), and Ethiopia. Currently available knowledge can be applied throughout Africa's freshwater systems to help minimize or mitigate the impact of future development actions, allowing dragonflies to act as "guardians of the watershed". The private sector can be advised to safeguard sensitive habitats and species when selecting sites for development. Key sites and species for monitoring can be identified by checking the distribution of threatened species at www.iucnredlist.org." (Authors)] Address: Clausnitzer, Viola, Heinzstr. 3, 02826 Görlitz, Germany. E-mail: violacl@t-online.de

11320. Combes, S.A.; Rundle, D.E.; Iwasaki, J.M.; Crall, J.D. (2012): Linking biomechanics and ecology through predator–prey interactions: flight performance of dragonflies and their prey. *The Journal of Experimental Biology* 215: 903-913. (in English) ["Aerial predation is a highly complex, three-dimensional flight behavior that affects the individual fitness and population dynamics of both predator and prey. Most studies of predation adopt either an ecological approach in which capture or survival rates are quantified, or a biomechanical approach in which the physical interaction is studied in detail. In the present study, we show that combining these two approaches provides insight into the interaction between hunting dragonflies (*Libellula cyanea*) and their prey (*Drosophila melanogaster*) that neither type of study can provide on its own. We performed >2500 predation trials on nine dragonflies housed in an outdoor artificial habitat to identify sources of variability in capture success, and analyzed simultaneous predator–prey flight kinematics from 50 high-

speed videos. The ecological approach revealed that capture success is affected by light intensity in some individuals but that prey density explains most of the variability in success rate. The biomechanical approach revealed that fruit flies rarely respond to approaching dragonflies with evasive maneuvers, and are rarely successful when they do. However, flies perform random turns during flight, whose characteristics differ between individuals, and these routine, erratic turns are responsible for more failed predation attempts than evasive maneuvers. By combining the two approaches, we were able to determine that the flies pursued by dragonflies when prey density is low fly more erratically, and that dragonflies are less successful at capturing them. This highlights the importance of considering the behaviour of both participants, as well as their biomechanics and ecology, in developing a more integrative understanding of organismal interactions." (Authors)] Address: Combes, S.A., Harvard University, Concord Field Station, 100 Old Causeway Road, Bedford, MA 01730, USA. E-mail: scombes@oeb.harvard.edu

11321. Curry, C.J.; Zhou, X.; Baird, D.J. (2012): Congruence of biodiversity measures among larval dragonflies and caddisflies from three Canadian rivers. *Freshwater Biology* 57(3): 628-639. (in English) ["(1) Scientists tasked with collecting taxon richness and assemblage variation data for conservation purposes have identified biomonitoring studies as potential sources of information. This approach assumes that biodiversity patterns revealed by biomonitoring reflect those of the wider community, an assumption not thoroughly tested in riverine ecosystems. (2) We compared patterns of taxon richness and assemblage variation in an important biomonitoring group (Trichoptera) with a group with high conservation significance (Odonata) at 34 sites across three fifth-order catchments. We also explored the effect of abundance on observed patterns by rarefying the larval Trichoptera data set. (3) Our results indicate that Trichoptera do not fully reflect site-scale taxon richness or assemblage variation in Odonata. The magnitude of odonate assemblage variation was much greater than that of Trichoptera for one of the catchments. Odonata and Trichoptera richness was moderately correlated in two catchments, while assemblage variation was strongly correlated in another pair of catchments. However, comparisons based on rarefied data eliminated differences in the magnitude of assemblage variation and strengthened correlations in richness and assemblage variation, suggesting the lack of congruence in these measures might be due to differences in abundance among groups. Further, incomplete taxonomy may mask additional assemblage variation, particularly in Trichoptera. (4) Conservation planning in riverine ecosystems based on proxies derived from biomonitoring data should proceed cautiously until we understand how well the resulting information reflects biodiversity patterns in under-sampled taxa and habitats. Future studies of biodiversity congruence should consider both richness and assemblage variation as each provides valuable information for conservation-related decisions. The taxonomic resolution and relative abundance of comparison groups can potentially impact the strength, direction and statistical significance of patterns. Researchers should employ species-level taxonomy and account for differences in abundance among groups through rarefaction where at all possible and DNA-based taxonomy methods can support this." (Authors)] Address: Colin J. Curry, Canadian Rivers Insti-

tute and Department of Biology, University of New Brunswick, PO Box 4400 Fredericton, New Brunswick, Canada E3B 5A3. E-mail: colin.curry@unb.ca

11322. Dallas, H.F.; Rivers-Moore, N.A. (2012): Critical thermal maxima of aquatic macroinvertebrates: towards identifying bioindicators of thermal alteration. *Hydrobiologia* 679: 61-76. (in English) ["Water temperature is an important abiotic driver of aquatic ecosystems. It influences many aspects of an organism's existence including its growth, feeding and metabolic rates; emergence; fecundity; behaviour and ultimately survival. All organisms have an optimum temperature range within which they survive and are able to thrive. Determining upper thermal limits provides insight into the relative sensitivity of organisms to elevated temperatures. Thermally sensitive taxa may be useful as bioindicators of thermal alteration and used in the generation of target thermal thresholds for aquatic systems. This study determined the upper thermal limit (CT_{max}) of a range of aquatic macroinvertebrates from rivers in the south-western Cape, South Africa, using the dynamic Critical Thermal Method. The study focused on the taxonomic level of family as an initial screening tool for ranking thermal sensitivity. Of the 27 families examined, four were both thermally sensitive and highly suitable as test organisms, including Paramelitidae, Notonemouridae, Telo-ganodidae and Philopotamidae. Five families were moderately sensitive and highly suitable, including Palae-monidae, Heptageniidae, Leptophlebiidae, Corydalidae and Aeshnidae. Preliminary experiments to determine potential sources of variation in CT_{max} revealed that thermal sensitivity was relatively uniform within families, but that acclimation temperature influenced CT_{max}. Further investigation of the influence of thermal history, acclimation temperature and rate of temperature change on CT_{max} is necessary. Target water temperatures for river management will be derived using CT_{max} data, in addition to longer duration experimental data, which will be linked to in situ temperature data." (Authors)] Address: Dallas, Helen, Freshwater Research Unit, Department of Zoology, University of Cape Town, Private Bag X3, Rondebosch 7700, South Africa. E-mail: helen.dallas@uct.ac.za

11323. de Sousa, V.T.T.; Barreto, T.F.; Rossa-Feres, D. (2012): Predation risk and jumping behavior in *Pseudopaludicola aff. falcipes* tadpoles. *Behavioral Ecology* 22(5): 940-946. (in English) ["Tadpoles of *Pseudopaludicola aff. falcipes* are capable of jumping out of small temporary puddles where they occur. In this system, odonate naiads are the main predators. Considering the hypothesis that jumping behaviour represents an anti-predator tactic, we addressed the following predictions: 1) tadpoles will jump more frequently from puddles with predators than from puddles without predators; 2) tadpole mortality will increase if tadpoles are prevented from jumping; 3) it would be more common to find tadpoles in puddles where predators are absent; and 4) predator and prey coexistence would be more probable in large puddles than in small ones. To test predictions 1) and 2), we conducted 2 laboratory experiments. In Experiment 1, we evaluated the jump frequency of tadpoles in 3 treatments (tadpoles in the presence or absence of a predator, or using an inanimate object as predator presence control). In Experiment 2, we compared tadpole survival in 2 conditions: Tadpoles were allowed or not to jump. To test predictions 3) and 4), we conducted a field study to determine how predators and

prey are distributed throughout the habitat. Experiments demonstrated that jumping behaviour occurred more frequently when a predator was present and that tadpoles prevented from jumping were more susceptible to predation. The field study indicated that tadpoles and odonate naiads were distributed in a negatively associated, but puddle-size dependent pattern. Our results are congruent with the predictions, therefore, confirming the jumping behaviour as an effective antipredator tactic." (Authors)] Address: de Sousa, Verônica Thiemi, Depto de Zoologia e Botânica, Universidade Estadual Paulista—UNESP, Rua Cristóvão Colombo, 2265, Jardim Nazareth, CEP 15054-000, São José do Rio Preto—SP, Brasil. E-mail: veronicathiemi@hotmail.com

11324. Di, T.N.; Liu, L.J.; Jia, Z.X.; Li, J.Q.; Zhou, H.; Li, X.Y.; Chen, L.Q. (2012): Laser bionic strengthening local grid of mould surface. *Journal Applied Mechanics and Materials* 101-102: 893-896. (in English) ["For the short life of enterprise hot work die directly caused to problems in the waste of resources and the rising cost of production. Based on studying the biological prototype of crack-resistance of dragonfly wings and finding surface thermal fatigue crack is one of the main factors affecting life of the hot work mould, it is put forward thoughts about the local laser bionic strengthening the grid mould surface. Different from the traditional mould surface integral laser transformation hardening (LTH) technology, by using laser melting simulating dragonfly wings to block localized crack in the partial surface of mold, bionic strengthened die life is improved within 1~1.5 times. Experiment results on die steel shows that it is provided a new method to improve the service life of die casting mold and promoting this technology will bring significant economic benefits for the mold industry." (Authors)] Address: Di, Tienan, Ningbo Institute of Technology, Zhejiang University, Ningbo. 315100, China. E-mail: waynedil@163.com

11325. Didham, R.K.; Blakely, T.J.; Ewers, R.M.; Hitchings, T.R.; Ward, J.B.; Winterbourn, M.J. (2012): Horizontal and vertical structuring in the dispersal of adult aquatic insects in a fragmented landscape. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 180(1): 27-40 (in English) ["Determining the relative importance of longitudinal dispersal of adult aquatic insects along stream corridors versus their lateral dispersal through upland terrestrial habitats is crucial to understanding the impact of land-use change on ecological and evolutionary processes within streams. However, there is a curious mismatch between trap capture studies, which find low lateral movement rates away from streams, and many population genetic studies, which show low levels of genetic divergence among streams, implying high rates of lateral movement. Here, we take advantage of a serendipitous observation of high relative capture frequencies of adult aquatic insects in the forest canopy, to question whether the flight-height preferences of adults might resolve this apparent 'interbasin dispersal paradox'. In a large-scale study of the effects of habitat fragmentation on invertebrate community structure, 347 passive flight interception traps were deployed at ground level (10,211 trap-days sampling effort) and canopy level (7,595 trap-days) to determine not only the horizontal component of land-use impacts on adult aquatic insects, but also the vertical component of adult movement through the forest canopy in a heavily-fragmented landscape. Two-thirds of adult aquatic insects (Ephemeroptera, Pleco-

ptera, Trichoptera, Megaloptera and Odonata [Austrolestes colenonis]) were captured in the forest canopy, rather than at ground level. Multivariate ordination analysis showed that vertical trapping height and surrounding terrestrial land use had the greatest effects on species composition of dispersing adults, whereas distance to the nearest stream had no significant effect. Of the species that were abundant enough to test statistically, the majority of caddisfly and mayfly species were captured significantly more frequently in the canopy than expected by chance alone, whereas stoneflies were more frequently captured at ground level. These results provide a unique insight into the possible reason why long-distance dispersal of aquatic adults has so rarely been observed. The prosaic explanation may simply be that adults of many species disperse through the forest canopy, and well above ground level." (Authors) Address: Didham, R., School of Animal Biology, University of Western Australia, 35 Stirling Highway, Crawley WA 6009, Australia. E-mail: raphael.didham@uwa.edu.au

11326. Dow, R.A.; Ng, Y.F.; Choong, C.Y. (2012): Odonata of Sungai Bebar, Pahang, Malaysia, with four species recorded for the first time from mainland Asia. *Journal of Threatened Taxa* 4(3): 2417-2426. (in English, with Malaysian summary) ["Records are presented of Odonata collected in September 2009 from the Sungai Bebar and the surrounding area, in Pekan Forest Reserve, southeastern Pahang, Peninsular Malaysia. A total of 50 species from nine families were collected. Two of the species listed, *Amphicnemis bebar* and *A. hoisen*, were first discovered during this survey. Another four previously known species were recorded in mainland Asia for the first time: *Elatoneura coomansi*, *Elatoneura longispina*, *Brachygonia ophelia* and *Tyriobapta laidlawi*." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow230@yahoo.co.uk

11327. Dow, R.A.; Ngiam, R.W.J. (2012): Odonata collected in the Hose Mountains, Kapit Division, Sarawak, Malaysia in April 2011. *International Dragonfly Fund - Report 44*: 1-18. ["The results of an odonatological expedition to the Hose Mountains in central Sarawak, Malaysian Borneo made in April 2011 are presented. During the two-week expedition more than sixty-three species of Odonata were collected, bring the number of species of Odonata known from the Hose Mountains to over ninety-three; a number greater than that recorded from a some of Sarawak's National Parks. Species of particular interest collected on the expedition include *Drepanosticta* new species, *Protosticta ?tubau* Dow, 2010 and, most notably, *Chlorogomphus manau* Dow & Ngiam, 2011, which was discovered during the expedition" (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow230@yahoo.co.uk

11328. Ehisianya, C.N.; Emeasor, K.C.; Echendu, T.N. C.; Egesi, C.N.; Mbanaso, E.N.A. (2012): Preliminary sampling of arthropod fauna of transgenic cassava in confined field trial. *African Journal of Biotechnology* 11(21): 4802-4809. (in English) ["Water (Basin and pitfall) and sweepnet traps were used to ascertain the population dynamics of the arthropod fauna of transgenic cassava in a confined field trial (CFT) at National Root Crops Research Institute (NRCRI), Umudike, Nigeria. The trial took place from August to November, in 2009 and February to July, in 2010 to identify the major arthropods associated with the crop and to monitor

changes in their populations for effective management. Trapped arthropods were sorted and identified by means of a hand lens and a taxonomic key and their relative abundance determined. Most of the order (seven out of the eight recorded) were trapped in the basin and sweepnet traps. Twenty families and numerous mostly unidentified genera and species were collected during the sampling period. Isoptera were the most abundant group, most of which were trapped while foraging and prospecting for nectar, mate, oviposition site, or were accidentally caught. This was followed by Coleoptera and Orthoptera. The least abundant order was Spirostreptida. Basin traps capture the highest number of arthropods of diverse families, followed by pitfall then sweepnet. A lower arthropod weekly mean abundance was recorded in 2009 (129.55) than in 2010 (132.08)." (Authors) *Anax* sp. accounted in 2009 to a relative abundance in catches of app. 7%, and in 2010 of app. 1%.] Address: Ehisianya, C.N., National Root Crops Research Institute, Umudike, Abia State, Nigeria. E-mail: colpino@yahoo.co.uk

11329. Ferreira, G.L.; Flynn, M.N. (2012): Índice biótico BMWP' na avaliação da integridade ambiental do Rio Jaguari-Mirim, no entorno das Pequenas Centrais Hidrelétricas de São Joaquim e São José, município de São João da Boa Vista, SP. *RevInter Revista Intertox de Toxicologia, Risco Ambiental e Sociedade* 5(1): 128-139. (in Portuguese, with English summary) [Brazil, BMWP' index (Biological Monitoring Working Party); "Seven sampling sites in Jaguari-Mirim River were established, around the São Joaquim and São Jose PCHs (Small Power Plants). At each sampling site sediment was collected in September, 2008 and March, 2009. The local benthic community at each site was sieved and identified to family level, when possible. A total of 2,341 individuals, 1,262 in the dry period (September) and 1,079 in the wet period (March) were counted and identified. Water quality for each sampling point was classified as good, acceptable, doubtful, critical or very critical in accordance to BMWP' index values. The majority of the sites attained the classification doubtful for water quality. It was concluded that the local benthic community was considered disturbed." (Authors) Only 'Gomphidae' are represented at the sampling sites.] Address: E-mail: m.flynn@intertox.com.br. Finland. <http://www.helcom.fi>

11330. Fleck, G.; Neiss, U.G. (2012): A new species of the genus *Aeschnosoma* Selys, 1870 (Odonata: Anisoptera: Corduliidae s.s.). *Zootaxa* 3159: 47-58. (in English) ["The larva, the adult male and the adult female of *Aeschnosoma hamadae* sp. nov. are described and illustrated. This species belongs to the *A. elegans* group of species. A comparison with other species of this group is given." (Authors)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleckgunther@gmail.com

11331. Fleck, G.; Neiss, U.G.; Hamada, N. (2012): The larva of *Dictierias* Selys, 1853 (Odonata: Heliocharitidae [= Dicteriidae]), and taxonomic and phylogenetic notes on Heliocharitidae. *Zootaxa* 3164: 32-40. (in English) ["The larva of *Dictierias* Selys, 1853, a monotypic genus, is described and illustrated for the first time. It is morphologically very close to the larva of *Heliocharis* Selys, 1853. The larvae of these two genera are compared, and a larval diagnosis for the family is provided. The family Heliocharitidae (= Dicteriidae) shares derived characters with some Calopterygoidea and is pro-

bably related to Calopterygidae. The larvae of Heliocharitidae are also amazingly similar to those of some Megapodagrionidae, and long-legged Megapodagrionidae related to Megapodagrion could be related to the family Heliocharitidae and could represent a basal stem within the Calopterygoidea." (Authors)] Address: Hamada, N., Instituto Nacional de Pesquisas da Amazônia/ INPA, Coordenação de Pesquisas em Entomologia/ CPEN, Caixa Postal 478, CEP 69011-970, Manaus, AM, Brazil. E-mail: nhamada@inpa.gov.br

11332. Forbes, M.R.; Mlynarek, J.J.; Allison, J.; Hecker, K.R. (2012): Seasonality of gregarine parasitism in the damselfly, *Nehalennia irene*: understanding unimodal patterns. *Parasitol. Res.* 110(1): 245-250. (in English) ["We studied parasitism by gut protozoans (Apicomplexa: Eugregarinidae) in *N. irene*. We tested whether there was any seasonal pattern, as has been found for other parasites of damselflies and which has implications for selection on emergence and breeding. Using aggregate data from 12 date-by-site comparisons involving five sites, we found that both prevalence and intensity of gregarine parasitism were seasonally unimodal. Parasitism first increased and then declined seasonally after peaking midseason. This damselfly species has shown seasonal increases in density followed by declines at several sites including a site sampled in this study. Therefore, similar seasonal changes in a directly transmitted parasite were expected and are now confirmed. Other factors that might account for seasonal changes in parasitism by gregarines are either unlikely or can be discounted including sampling of older damselflies mid-season but not late in the season, or sex biases in parasitism and overrepresentation of the more parasitized sex mid-season." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton Univ., 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

11333. Getachew, M.; Ambelu, A.; Tikub, S.; Legesse, W.; Adugna, A.; Kloos, H. (2012): Ecological assessment of Cheffa Wetland in the Borkena Valley, northeast Ethiopia: Macroinvertebrate and bird communities. *Ecological Indicators* 15(1): 63-71. (in English) ["A comparative study of macroinvertebrates and bird communities was undertaken to assess the ecological integrity and human impact in Cheffa Wetland, northeastern Ethiopia. The study was undertaken from February to May 2010. Physicochemical parameters of the water, birds, macroinvertebrates - including Odonata, but no taxonomic details on macroinvertebrates are given - and human impact classes were assessed at 10 sites in the wetland exposed to different anthropogenic activities. [...] The results revealed that human interference in wetland may result in serious ecological imbalances in the natural life cycle and impact on human welfare. Long-term studies are required to predict changes in wetland ecology and population dynamics, with the objective of developing appropriate measures by federal, regional and local stakeholders to ensure wetland restoration and sustainability." (Authors)] Address: Ambelu, A., Dept of Environmental Health Sciences & Technology, Jimma University, P.O. Box 378, Jimma, Ethiopia. E-mail: argaw.ambelu@ju.edu.et, aambelu@yahoo.com

11334. Giugliano, L.; Hardersen, S.; Santini, G. (2012): Odonata communities in retrodunal ponds: a comparison of sampling methods. *International Journal of Odonatology* 15(1): 13-23. (in English) ["Dragonflies are commonly used as indicators of environmental quality

and different methods have been employed to monitor odonate assemblages, such as surveys of all adults, evaluations based on breeding adults, sampling of larvae and collection of exuviae. Results obtained with different sampling methods may not be interchangeable, as the different life stages (e.g. larvae, adults) differ in mobility (aquatic, aerial) and as they are subjected to different ecological constraints. Therefore generalization about habitat quality based on only one survey method might be questionable. Additionally, detectability of species might vary when different methods are used. In this study, nine retrodunal ponds in the Migliarino, San Rossore, Massaciuccoli Regional Park (Tuscany, Italy) were repeatedly and contemporaneously sampled during May–September 2008 with the following methods: all adults, breeding adults, larvae and exuviae. In total, 22 species were detected and the results showed that the four methods were not interchangeable. First, some species were only found using certain methods. Second, univariate measures of diversity obtained with the four sampling methods were considerably different. Alpha diversity was maximal when computed on all adults and minimal with exuviae; breeding adults and larval collection had intermediate values. Beta diversity showed an inverse trend, with the lowest value for "all adults" surveys and higher values for all the others. Finally, congruence among the assemblages revealed by the four methods was generally low. The results show that the four survey techniques are not interchangeable and that monitoring of Odonata has to be based on a carefully chosen method, which should reflect the aim of the study." (Authors)] Address: Hardersen, S., Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, I-46045 Marmirolo (MN), Italy. E-mail: s.hardersen@gmail.com

11335. Goertzen, D. (2012): Biodiversität im städtischen Raum: Analyse und Entwicklung von Managementkonzepten für städtische Stillgewässer am Beispiel der Libellenfauna von Großstädten. *Treffpunkt Biologische Vielfalt* 11: 125-129. (in German) [The paper discusses the following questions using an example from the urban environment in Dortmund, Nordrhein-Westfalen, Germany. What factors are relevant for urban waterbodies? How many Odonata species are living in such waterbodies? What can be done to increase biodiversity in these habitats?] Address: Goertzen, Diana, Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c, 38106 Braunschweig, Germany. E-mail: diana.goertzen@industrielibellen.de

11336. Greenwood, M.J.; Harding, J.S.; Niyogi, D.K.; McIntosh, A.R. (2012): Improving the effectiveness of riparian management for aquatic invertebrates in a degraded agricultural landscape: stream size and land-use legacies. *Journal of Applied Ecology* 49: 213-222. [New Zealand; "(1) Riparian management has been embraced by water and land managers globally to offset the deleterious effects of intensive agricultural land use on aquatic ecosystems. However, the documented responses of stream communities to riparian management have been variable, particularly in highly degraded systems. (2) We used boosted regression trees and structural equation models to assess the effects of riparian condition and stream size on the invertebrate communities of 64 agricultural waterways on the Canterbury Plains, New Zealand. We hypothesized that small streams would be more degraded than larger wa-

terways but would show a greater increase in the abundance of pollution-sensitive aquatic invertebrates in response to riparian management. We also predicted that land-use legacies of poor in-stream habitat would reduce the effectiveness of current riparian management. The two strongest determinants of community structure were primarily in-stream habitat, where sedimentation and low water velocity had negative impacts on stream communities, and stream size, with smaller waterways generally more impacted than large waterways. Not surprisingly, with >150 years of agriculture and patchy riparian management on the plains, current management has not greatly improved in-stream habitat and thus had little effect on the abundance of sensitive aquatic insect (EPT) taxa. (3) Managed streams did, however, have more pollution-sensitive communities in general. This was largely mediated by decreased stream temperature, narrower/deeper channels and greater organic matter resources in streams with riparian planting and restricted stock access. Thus, if water velocity and sedimentation issues can be mitigated, then riparian management should become more effective. (4) Synthesis and applications. Within the context of a degraded agricultural landscape, we identified factors limiting the effectiveness of riparian management for stream invertebrate communities. Riparian management should primarily target and protect small streams and those without degraded in-stream habitat. Intensive management, such as in-stream habitat or channel morphology modification, may be needed to address historical factors (e.g. low velocity and sedimentation), which otherwise may continue to limit community recovery." (Authors) *Austrolestes colenisonis* and *Xanthocnemis* are listed in the supplementary material.] Address: Greenwood, Michelle, School of Biological Sciences, University of Canterbury, Private Bag 4800, Christchurch, New Zealand. E-mail: m.greenwood@niwa.co.nz

11337. Hager, B.J.; Kalantari, N.J.; Van Scholte, A. (2012): The distribution of *Cordulegaster* (Odonata: Cordulegasteridae) nymphs in seeps and springs of Nelson Swamp (Madison County, NY). *Northeastern Naturalist* 19(sp6): 67-76 (in English) ["Given the presence of foraging and reproducing adult *Cordulegaster* (spiketail) dragonflies in Nelson Swamp (Madison County, NY), we examined nymph distribution and abundance in the seeps and springs found within the swamp. From 9 September–4 November 2010, we surveyed 8 sites along Chittenango Creek in order to determine: (1) the species present and their distribution / occurrence among sites, (2) factors influencing species presence and abundances, and (3) patterns in size and age distribution among and within sites. For sites, we delineated habitat zones (inlet, middle, outlet), determined the benthic substrate, and measured shoreline perimeters. For nymphs, we measured head width, body length, and wing pad length and identified some to species. The majority of spiketails we identified were *C. diastatops*; *C. maculata* was also present. Most nymphs occurred in inlets with muck and cobble bottoms and in water depths less than 10 cm. Spiketail densities ranged from 0.13–8.13 individuals/m of shoreline. Smaller individuals occurred in cobble substrate, while muck substrates had individuals of larger size and greater abundance. We demarcated at least 2 age cohorts of nymphs based on their body measurements in relation to growth patterns observed in other spiketail species." (Authors) Address: Hager, Barbara, Environmental Studies Pro-

gram, Cazenovia College, 22 Sullivan Street, Cazenovia, NY 13035. USA. E-mail: bhager@cazenovia.edu.

11338. Harabis, F.; Dolný, A. (2012): Underground mining can contribute to freshwater biodiversity conservation: Allogenic succession forms suitable habitats for dragonflies. *Biological Conservation* 145: 109-117 (in English). ["Human-induced changes negatively affect all components of freshwater ecosystems and comprise the major cause of global loss of diversity and the biotic homogenization of freshwater faunas. The high diversity of dragonflies in heavily industrialized areas is therefore paradoxical, to say the least. We compared diversity of dragonflies in three main freshwater habitat types (natural and human-made) occurring in Upper Silesia (Central Europe). We used multivariate methods and diversity indices for a general analysis, comprising both species richness and the species composition of assemblages. We recorded 50 species in mine subsidence pools from the total of 54 sampled species. These included a high proportion of habitat specialists (typically threatened species). We emphasize that secondary habitats (e.g. spontaneously originated mine subsidence pools) should not a priori be regarded as ecological traps, because these often are the available habitats with highest quality. These habitats significantly outweigh ponds in species richness and proportion of habitat specialists. The conservation potential of specific secondary habitats lies in the fact that these habitats can substitute for very rare natural wetlands often restricted to higher elevations. We assume that high diversity in this type of secondary habitats is not random, but rather that it depends on environmental heterogeneity caused by a specific allogenic succession process occurring as a direct consequence of mining. Highlights: *Dragonflies as bioindicators in lentic habitats of strongly man-modified landscape. *Several specific secondary habitats substitute for natural habitats. *High species richness and habitat specialists in mine wetlands are not random. *This phenomenon is closely associated with a specific allogenic succession. *The secondary habitats should not a priori be regarded as ecological traps." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

11339. Harabis, F.; Dolný, A. (2012): Human altered ecosystems: suitable habitats as well as ecological traps for dragonflies (Odonata): the matter of scale. *Journal of Insect Conservation* 16(1): 121-130. (in English) ["Habitat loss and degradation can be considered as major threats to freshwater invertebrates. These often irreversible processes lead to reduction of habitat patch quality and cause local extinctions of dragonflies, notably of habitat specialists. However, the biodiversity of specific secondary habitats is very high. Here, we present findings from a 10-year study that intensively monitored odonate fauna in the Upper Silesian industrial coal region having many secondary habitats characterized by very frequent disturbances due to soil instability. We evaluated qualitative changes in the dragonfly assemblages on 10 patches using a modified dragonfly biotic index. Data analysis was supplemented by a model examining population dynamics of the threatened dragonfly *Leucorrhinia pectoralis*, using the capture-mark-recapture method, as an effective indicator of habitat quality. We show that dynamics of environmental conditions in secondary habitats are reflected in popula-

tion dynamics of dragonfly populations and assemblages. As frequency of *L. pectoralis* population extinctions within the patch is considerable and independent of size and spatial isolation of single habitats, these can be regarded as ecological traps. Nevertheless, the metapopulation dynamics may be a key adaptation of dragonflies to frequent freshwater habitat disturbances. We suggest that local extinctions are effectively balanced with (re-)colonization of newly emerging freshwater habitats. These findings have implications for potential conservation management of specific human-made habitats, because secondary habitats with a great diversity of succession stages arising directly as a consequence of environmental instability may be considered as partial alternatives to natural habitats in cultural landscapes." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

11340. Hassall, C.; Thompson, D.J. (2012): Study design and mark-recapture estimates of dispersal: a case study with the endangered damselfly *Coenagrion mercuriale*. *Journal of Insect Conservation* 16: 111-120. (in English) ["Accurate data on dispersal ability are vital to the understanding of how species are affected by fragmented landscapes. However, three factors may limit the ability of field studies to detect a representative sample of dispersal events: (1) the number of individuals monitored, (2) the area over which the study is conducted and (3) the time over which the study is conducted. Using sub-sampling of mark-release-recapture data from a study on *C. mercuriale*, we show that maximum dispersal distance is strongly related to the number of recaptured individuals in the mark-release-recapture study and the length of time over which the study is conducted. Median dispersal distance is only related significantly to the length of the study. Spatial extent is not associated with either dispersal measure in our analysis. Previously consideration has been given to the spatial scale of dispersal experiments but we demonstrated conclusively that temporal scale and the number of marked individuals also have the potential to affect the measurement of dispersal. Based on quadratic relationships between the maximum dispersal distance, recapture number and length of study, we conclude that a previous study was of sufficient scale to characterise the dispersal kernel of *C. mercuriale*. Our method of analysis could be used to ensure that the results of mark-release-recapture studies are independent of levels of spatial and temporal investment. Improved confidence in dispersal estimates will enable better management decisions to be made for endangered species." (Authors)] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), Univ.Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

11341. Horst, J. (2012): Synergistic effects of stress and pesticides on the growth and development of *Hyla versicolor* (Eastern gray tree frog). Bachelor of Arts, Biology. The College of Wooster: (in English) ["Amphibian populations have been significantly declining worldwide over the past twenty years, and the possible causes of such declines are currently under research. This study was undertaken to determine the synergistic effects of stress and pesticides on *H. versicolor*. Experimentation took place in twenty 150 gal cattle tanks. Treatments in-

cluded a blank control, a pesticide control, predator stress with pesticide, and drought stress with pesticide. All pesticide treatments included Roundup® at ecologically relevant concentrations of 3 ppm. Predator stressed treatment groups were exposed to *Anax* sp. (dragonfly larvae) predator cues, and drought stressed treatment groups were manipulated by removing water every four days. Survivorship, weight at metamorphosis, and days to metamorphosis data were analyzed. Survivorship (K-W test; chi square = 15.727, $p = 0.001$) and days to metamorphosis (ANOVA; $F = 21.508$, $df = 3$, $p = 0.00$) were significantly negatively affected when tadpoles were exposed to multiple stressors. Survivorship of the predator/pesticide treatment was significantly lower than that of drought/pesticide treatment groups. Days to metamorphosis were also significantly fewer when exposed to Roundup® alone. Mass at metamorphosis was not significantly affected (ANOVA; $F = 1.555$, $df = 3$, $p = 0.239$). The synergism of Roundup® and stressors that tadpoles commonly encounter significantly affected *H. versicolor* larvae survivorship and growth." (Author)] Address: not stated

11342. Hosmani, S. (2012): Diversity and nestedness pattern of adult Odonata assemblages around Hadhinaru lake of Mysore, Karnataka. *Abhinav* 1(3): 20-28. (in English) [India; 23 Odonata species are listed.] Address: Hosmani, S., Dept of Biotechnology, SBRR Mahajana First Grade College, Jayalakshampuram, Mysore, India. E-mail: profsph@yahoo.co.in

11343. Hubenov, Z. (2012): Estimation of the faunistic diversity of the Kresna Gorge. *Historia naturalis bulgarica* 20: 107-120. (in English, with Bulgarian summary) ["A total of 3199 species has been established in the Kresna Gorge, belonging to 355 families, 75 orders, 16 classes and 5 types. The taxa with Mediterranean type of distribution for some of the investigated groups are over 70%. Three hundred and eighteen species are rare (19.4%), endemics - 83 species (4.6%) and relicts - 16 species (5.3% of the Bulgarian relicts). The number of taxa with conservation significance is about 400 (12.5%), of which 42 species are of the highest category – world importance." (Authors) The paper refers to the 21 Odonata species document from the region according Marinov (2001): Dragonflies (Odonata) of Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 109-113.] Address: Zdravko Hubenov, national Museum of natural History – bAS, Tsar osvoboditel blvd. 1, 1000 Sofia, Bulgaria. E-mail: zhubenov@nmnhs.com

11344. Hunger, H.; Schiel, F.-J. (2012): Description of *Protallagma hoffmanni* sp. nov. from the Peruvian Andes (Odonata: Coenagrionidae), including description of its larva. *Zootaxa* 3202: 28-50. (in English, with Spanish summary) ["*P. hoffmanni*, is described, illustrated, and diagnosed based on a series of males, females, and larvae collected at Laguna Querococha (male holotype: Ancash region, Peru, S 09° 43' 33.6" W 077° 19' 51.8", 3,980 m a.s.l., MHNL)." (Authors)] Address: Hunger, H., Institut für Naturschutz und Landschaftsanalyse (INU-LA), August-Ganther-Straße 16, D-79117 Freiburg, Germany. E-mail: holger.hunger@inula.de

11345. Ishizawa, N. (2012): Oviposition behaviour of *Sympetrum frequens* (Selys) (Odonata: Libellulidae). *International Journal of Odonatology* 15(1): 1-12. (in English) ["Oviposition behaviour by *S. frequens*, a species

endemic to Japan, has been observed throughout its entire breeding season, which extended for about one month after the harvest of rice. Approximately 50% of oviposition events occurred during the first week of the reproduction period. Sunny oviposition sites were preferentially selected by ovipositing pairs. The starting time of oviposition was highly correlated with the ambient temperature (T_a), the days elapsed since the beginning of the oviposition period, and the weather of the day. The mean duration of oviposition (DO) was 325.0 ± 194.7 s in tandem oviposition (TO) and 152.5 ± 101.8 s in oviposition of the female alone (single oviposition; SO), and DO was poorly correlated with T_a . Dip rate (DR) was constant throughout the oviposition bout; however, wing-stroke frequency (WSF) of the tandem male declined from the start of oviposition to its end. The WSF of males in TO was 39.4 ± 2.8 Hz, significantly higher than that of tandem females (34.5 ± 3.0 Hz, $p < 0.0001$), but that of females in SO was as high as that of tandem males (39.7 ± 3.7 Hz). WSF was negatively correlated with T_a . In TO the male expends more energy than the female and it controls flight direction, so for the female TO is energetically less costly than SO. Furthermore, flying-oviposition into mud is more effective than non-contact flying-oviposition as the number of eggs per dip in the former exceeds one and more eggs are deposited per time unit than in the latter." (Author)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozava City, Saitama Pref., Japan. E-mail: greffect708@jcom.home.ne.jp

11346. Jaffar, A.R. (2012): Observations of the dragonfly, *Camacina gigantea* (Brauer) at the Night Safari, Singapore (Insecta: Odonata: Libellulidae. Nature in Singapore 5: 7-11. (in English) [Seven male *C. gigantea* were sighted at a pond in the Gaur exhibit on 29 Sep. 2011.] Address: Jaffar, A.R., Night Safari, 80 Mandai Lake Road, Singapore 729826. E.mail: razak.jaffar@wrs.com.sg

11347. Ji, J.; Zhang, Y.; Chen, X.; Lin, J.; Sun, L. (2012): The effect of repeated release of the predatory mite *Neoseiulus (Amblyseius) cucumeris* on arthropod communities in citrus ecosystems. Biodiversity Science 20(1): 24-31. (in Chinese, with English summary) ["In order to study the effect of repeated release of *N. cucumeris* on the species composition and diversity of arthropod community in citrus ecosystems, we established bio-control orchards, natural orchards and chemical control orchards in the Mawei and Jin'an experimental field of Fuzhou, China. Our results indicated that the species richness of bio-control orchards was higher than that of natural or chemical control orchards at both sites. Diversity and evenness indices were higher in bio-control orchards than those of other orchards in the Mawei site, and those of chemical control orchards were the lowest. Among the variously managed orchards in Jin'an, evenness and diversity indices were highest in the natural orchards and lowest in chemical orchards. Our study suggests that citrus ecosystem arthropod diversity can be enhanced by releasing *N. cucumeris* to fight against the citrus pest mites while reducing the spraying of pesticide." (Authors) Odonata species have been recorded from Biocontrol and Chemical Control orchards.] Address: Zhang, Y., Institute of Plant Protection, Fujian Academy of Agricultural Sciences, Fuzhou 350013

11348. Jiménez-Cortés, J.G.; Serrano-Meneses, M.A.; Córdoba-Aguilar, A. (2012): The effects of food short-

age during larval development on adult body size, body mass, physiology and developmental time in a tropical damselfly. Journal of Insect Physiology 58(3): 318-326. (in English) ["Few studies have looked jointly at the effects of larval stressors on life history and physiology across metamorphosis, especially in tropical insects. Here we investigated how the variation of food availability during the larval stage of the tropical and territorial *Hetaerina americana* affects adult body size and body mass, and two physiological indicators of condition – phenoloxidase activity (an indicator of immune ability) and protein concentration. We also investigated whether larval developmental time is prolonged when food is scarce, an expected situation for tropical species whose larval time is less constrained, compared to temperate species. Second instar larvae were collected from their natural environments and reared in one of two diet regimes: (i) "rich" provided with five *Artemia salina* prey every day, and (ii) "poor" provided with two *A. salina* prey every day. In order to compare how distinct our treatments were from natural conditions, a second set of last-instar larvae were also collected and allowed to emerge. Only body size and phenoloxidase increased in the rich regime, possibly to prioritize investment on sexually selected traits (which increase mating opportunities), and immune ability, given pathogen pressure. The sexes did not differ in body size in relation to food regimes but they did differ in body mass and protein concentration; this can be explained on the basis of the energetically demanding territorial activities by males (for the case of body mass), and female allocation to egg production (for the case of protein). Finally, animals delayed larval development when food was scarce, which is coherent for tropical environments. These findings provide key insights in the role of food availability in a tropical species." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

11349. Johansson, H.; Ingvarsson, P.K.; Johansson, F. (2012): Cross-species amplification and development of microsatellites for six species of European coenagrionid damselflies. Conservation Genetics Resources 4(1): 191-196. (in English) ["We describe the cross-amplification and development of new loci for six species of closely related European damselflies. First, twenty-nine published microsatellites for the damselflies *Coenagrion puella* and *C. mercuriale* were multiplexed using M13-tagged primers, tested on 23 individuals, and then cross-species amplified on 21–26 individuals of *C. armatum*, *C. johanssoni*, *C. pulchellum* and *C. scitulum*. Second, sixteen new primers were developed for use in *C. armatum*, *C. johanssoni* and *C. scitulum*, and screened on 21 individuals. Values for observed heterozygosities and number of alleles ranged between 0.00–0.87 and 2–19 respectively (over all loci and species). For all species the tested loci provide a minimum of 1–8 usable markers for population genetic studies." (Authors)] Address: Johansson, Helena, Department of Biosciences, Helsinki University. P.O. Box 65. 00014 Helsinki. Finland. E-mail: helena.z.johansson@helsinki.fi

11350. Kanai, K.; Moriyama, T.; Nakamine, K. (2012): The recorded insects on Kuro-shima (Osumi Islands) in October of 2010. Research Report of Kagoshima Prefectural Museum 31: 73-78. (in Japanese, with English title) [The Osumi Islands are the northernmost group of

the Satsunan Islands, which are part of the Ryukyu Archipelago, and lie south of the Osumi Peninsula about 60 km from Kyu-shu (30°48'N 130°25'E), Japan. The islands are of volcanic origin and have a total area of approximately 1,030 km². The climate is subtropical. Records of *Agriocnemis femina*, *Ischnura asiatica*, *Orthetrum glaucum*, *Pantala flavescens*, *Trithemis aurora* are documented.] Address: Kanai, K., Kagoshima Prefectural Museum, 1-1 Shiroyama-cho, Kagoshima City, 892-0853, Japan

11351. Kim, M.; Yoo, J.-c. (2012): Diet of yellow bitterns (*Ixobrychus sinensis*) during the breeding season in South Korea. *Journal of Ecology and Field Biology* 35(1): 9-14. (in English) ["Yellow bitterns are a small wetland bird common to Asian countries including South Korea, Japan, and China. The aim of this study is to describe diet of yellow bitterns during the breeding season in artificial wetland of northeastern South Korea between May to August 1999-2001. For the purposes of this paper, we observe the frequency of nest visiting by parents during the chick rearing period. A total of 98 boluses regurgitated by 52 chicks aged 1 day to 11 days after hatching form the sample and are shown to contain 323 food items. A bolus contained mean 3.8 items and weighs 0.2 g to 7.7 g. The most regularly occurring food items recorded are fish (63%) and insects (33%). In terms of fish, top mouth minnows (*Pseudorasbora parva*) and crucian carps (*Carassius auratus*) are frequently observed. In terms of insects, there are mosquitoes (Diptera), instars of dragonfly (Libellulidae), damselflies (Coenagrionidae) and water bugs (*Diplonychus japonicus*). Yellow bitterns were also shown to feed on bullfrogs (*Rana catesbeiana*), shrimp (Palaemonidae), and spiders (Araneae). The size of fish in a bolus ranged from 15.56 mm to 93.73 mm (mean, 37.08 mm). The amount of food can be observed to increase with the age of chicks ($r = 0.279$, $P = 0.025$, $N = 64$) but parents did not provide larger fish as chicks grew. Parent birds visited nests more frequently when they have a larger brood ($F_{1,21} = 14.529$, $P = 0.001$). Our results suggest that fish is the most important prey during the breeding season and that age of chicks is related to amount of diet in yellow bitterns." (Authors)] Address: not available

11352. Koizumi, N.; Quinn, T.W.; Jinguji, H.; Nishida, K.; Watabe, K.; Takemura, T.; Mori, A. (2012): Development and characterization of 23 polymorphic microsatellite markers for *Sympetrum frequens*. *Conservation Genetics Resources* 4(1): 67-70. (in English) ["23 polymorphic microsatellite markers for *Sympetrum frequens* were developed and characterized. The number of distinct alleles per locus in 32 individuals ranged from 2 to 23. The observed heterozygosity ranged from 0.031 to 0.938, while the expected heterozygosity varied from 0.031 to 0.922. No loci deviated significantly from Hardy-Weinberg equilibrium, no linkage disequilibrium was observed between pairs of loci and no loci showed evidence of null alleles. These microsatellite markers are expected to contribute to future investigations of genetic variation and structure in *S. frequens* populations." (Authors)] Address: Koizumi, N., Institute for Rural Engineering, National Agriculture and Food Research Organization, Tsukuba, Ibaraki 305-8609, Japan. E-mail: koizumin@affrc.go.jp

11353. Kontula, T.; Haldin, J. (Eds.) (2012): Checklist of Baltic Sea Macro-species. *Baltic Sea Environment Proceedings* 130: 203 pp. (in English) [Odonata species are listed together with their rough regional distribution.]

Address: Published by: Helsinki Commission, Katajanokanlaituri 6 B, FI-00160 Helsinki

11354. Kosterin, O.E. (2012): Odonata of the Cambodian coastal regions in late rainy season of 2011. *International Dragonfly Fund - Report 45*: 1-102. (in English) ["Results of the odonatological survey of the coastal SW regions of Cambodia in August 12-28, 2011 are presented. Those include general notes on the Odonata fauna in late rainy season, enumeration of all records by locality, discussion of interesting specimens and their taxonomy, and notes on habitats and habits of some species. Of 87 named Odonata species encountered during the trip, 15 are reported for the first time for Cambodia, namely *Aciagrion hisopa* (Selys, 1876), *Anax immaculifrons* Rambur, 1842, *Burmagomphus divaricatus* Lieftinck, 1964, *Gomphidictinus perakensis* (Laidlaw, 1902), *Merogomphus parvus* (Krüger, 1899), *Nepogomphus walli* (Fraser, 1924), *Idionyx thailandica* Hämäläinen, 1985, *Macromia cupricincta* Fraser, 1924, *Macromia septima* Martin, 1904, *Macromia rapida* Martin, 1907, *Agrionoptera insignis* (Rambur, 1842), *Lyriotheemis elegantissima* Selys, 1883, *Onychothemis testacea* Laidlaw, 1902, *Orthetrum luzonicum* (Brauer, 1868), *Orthetrum testaceum* (Burmeister, 1839). The country list now reaches 125 named species.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

11355. Kraus, F.; Medeiros, A.; Preston, D.; Jarnevich, C.S.; Rodda, G.H. (2012): Diet and conservation implications of an invasive chameleon, *Chamaeleo jacksonii* (Squamata: Chamaeleonidae) in Hawaii. *Biological Invasions* 14(3): 579-593. (in English) [Diet sample of 34 *C. jacksonii* from Maui, Hawai'i, USA included two specimens of *Megalagrion blackburni*.] Address: Medeiros, A., US Geological Survey Pacific Island Ecosystems Research Center, Haleakala Field Station, P.O. Box 369, Makawao, HI 96768, USA. E-mail: acm@aloha.net

11356. Lawrence, J.E.; Deitch, M.J.; Resh, V.H. (2012): Effects of vineyard coverage and extent on benthic macroinvertebrates in streams of Northern California. *Annales de Limnologie* 47(4): 347-354. (in English) ["Vineyards are a dominant feature of many landscapes in Mediterranean-climate regions. We examined the effects of streamflow declines, associated with vineyard water-withdrawals for frost protection, on benthic-macroinvertebrate communities at three sites along three small streams in the Mediterranean-climate region of Northern California. One site was heavily affected by water withdrawals for frost protection, the other two were not. In addition, we examined relationships between vineyard coverage and benthic-macroinvertebrate community response using data from 59 sampling events at 39 sites along 35 small streams in Napa County, California. We tested three a priori hypotheses in terms of the response of biological traits of benthic macroinvertebrates to high vineyard coverage: (1) proportion of individuals with semi-voltine (i.e., one generation every 2 years) life cycles would be lower compared to those with uni- and multi-voltine cycles, (2) proportion of individuals able to undergo diapause would be higher, and (3) proportion of individuals with the ability to burrow into the substrate would be higher. In the three-site study, we found that vineyard water-withdrawals for frost protection coincided with consistently lower values in both the benthic-macroinvertebrate index of biotic in-

tegrity (B-IBI) developed for Northern California streams and the ratio of Ephemeroptera–Plecoptera–Trichoptera to Odonata–Coleoptera–Hemiptera individuals (EPT / OCH), a metric developed for European Mediterranean streams. In the broader-scale study, we observed that vineyard-coverage levels above about 20% coincided with lower values of the B-IBI. The semi-voltine life-cycle trait was lower above this level, whereas the diapause and burrowing traits were not affected." (Authors)] Address: Lawrence, J., Dept Environ. Science, Policy & Management, Univ. of California, Berkeley, CA 94720-3114, USA. E-mail: jlawrence@berkeley.edu

11357. Li, J.-k.; Nel, A.; Zhang, X.-p.; Fleck, G.; Gao, M.-x.; Lin, L.; Zhou, J. (2012): A third species of the relict family Epiophlebiidae discovered in China (Odonata: Epiproctophora). *Systematic Entomology* 37(2): 408-412. (in English) ["Epiophlebia sinensis sp.n., a third species of the relict odonatan family Epiophlebiidae, is described from two male adults collected in Heilongjiang province, China. The new species lives in an environment rather similar to that of the two other species, *E. superstes* and *E. laidlawi*, i.e. along cold streams in a coniferous and deciduous forest. Possible explanations for the lack of fossil Epiophlebiidae and the biogeography of these damselfly-dragonflies are proposed." (Authors)] Address: Zhang, X.-p., Key Lab. of Remote Sensing Monitoring of Geographic Environment, College of Heilongjiang Province, Harbin Normal University, 150000 Harbin, China. E-mail: hellozxp@163.com

11358. Li, Y.-j.; Nel, A.; Ren, D.; Pang, H. (2012): A new damselfly-dragonfly from the Lower Cretaceous of China enlightens the systematics of the Isophlebioidea (Odonata: Isophlebioptera: Campterophlebiidae). *Cretaceous Research* 34: 340-343. (in English) ["A new genus and species of isophlebioid, *Parafleckium senjituense*, is described from the Lower Cretaceous Yixian Formation in China. As it has several significant structures currently considered as typical of either the Campterophlebiidae or the Isophlebiidae, and it helps to clarify knowledge of the morphology and taxonomy of this group of damselfly-dragonflies. We propose an emendation of the diagnoses of these two families." (Authors)] Address: Li, Y.-j., State Key Lab. of Biocontrol and Institute of Entomology, Sun Yat-Sen University, Guangzhou 510275, China. E-mail: liyongjunsysu@126.com

11359. Lozano, F.; Muzon, J.; Scattolini, C. (2012): Description of the final stadium larva of *Telebasis obsoleta* (Selys, 1876) (Odonata: Coenagrionidae). *Zootaxa* 3186: 54-58. (in English, with Spanish summary) ["The final stadium larvae of *Telebasis obsoleta* is described and illustrated based on one reared specimen from Argentina. Notes on habitat and new provincial records of Odonata are also provided. The larva of *Telebasis obsoleta* has five palpal setae, a feature shared only with the larva of *T. demerara*. All other known *Telebasis* species have six or seven palpal setae. *Telebasis obsoleta* and *T. demerara* can be distinguished by the presence of two small denticles near the tip of the prementum in *T. obsoleta*, and by the colour pattern of the distal half of the caudal lamellae." (Authors)] Address: Lozano, F., Centro Regional de Estudios Genómicos (UNLP) Av. Calchaquí km 23,4, 1888, Florencio Varela, Buenos Aires, Argentina. E-mail: federicolozano82@gmail.com

11360. McClure, C.J.W.; Rolek, B.W.; McDonald, K.; Hill, G.E. (2012): Climate change and the decline of a once common bird. *Ecology and Evolution* 2(2): 370-

378. (in English) ["Climate change is predicted to negatively impact wildlife through a variety of mechanisms including retraction of range. We used data from the North American Breeding Bird Survey and regional and global climate indices to examine the effects of climate change on the breeding distribution of the Rusty Blackbird (*Euphagus carolinus*), a formerly common species that is rapidly declining. We found that the range of the Rusty Blackbird retracted northward by 143 km since the 1960s and that the probability of local extinction was highest at the southern range margin. Furthermore, we found that the mean breeding latitude of the Rusty Blackbird was significant and positively correlated with the Pacific Decadal Oscillation with a lag of six years. Because the annual distribution of the Rusty Blackbird is affected by annual weather patterns produced by the Pacific Decadal Oscillation, our results support the hypothesis that directional climate change over the past 40 years is contributing to the decline of the Rusty Blackbird. Our study is the first to implicate climate change, acting through range retraction, in a major decline of a formerly common bird species." (Authors) The breeding success and site selection of Rusty Blackbirds is closely tied to shallow water and macroinvertebrate prey, particularly odonates (Matsuoka et al. 2010). Therefore, the decline of the species is discussed in the framework of altering diet availability, mainly Odonata.] Address: McClure, C.J.W., Dept of Biological Sciences, 331 Funchess Hall, Auburn University, Alabama 36849, USA. E-mail: chrimcc@gmail.com

11361. McGuffin, M.; Baker, R.L. (2012): Larval *Ischnura verticalis* (Odonata: Coenagrionidae) respond to visual cues of predator presence. *Journal of Insect Behavior* 25(2): 143-154. (in English) ["Larvae of some species of damselflies respond to chemical cues of fish predators but, while larvae of many species are thought to detect prey through vision, there is little evidence that larvae respond to visual cues of predator presence. This laboratory study indicated larval *Ischnura verticalis* behaviours are affected by visual cues and, to a much lesser extent, chemical cues of fish; there was no significant interaction between the effects of visual and chemical cues. Responses to chemical cues of fish did not depend on whether fish were fed *I. verticalis* larvae versus commercial fish food. Larvae were more active in the spring than the fall when they were likely in diapause. Results suggest larvae can use vision to detect large, active predators but can also detect predators through olfaction when visual cues are unreliable." (Authors)] Address: Baker, R.L., Dept Ecology & Evol. Biology, Univ. of Toronto, 25 Willcocks Street, Toronto, ON, Canada M5S 3B2. E-mail: robert.baker@utoronto.ca

11362. Müller, O.; Taron, U.; Jansen, A.; Schneider, T. (2012): Description of the larva of *Boyeria cretensis* Peters and comparison with *B. irene* (Fonscolombe) (Anisoptera: Aeshnidae). *Odonatologica* 41(1): 47-54. ["*B. cretensis* larva, endemic to the Mediterranean island of Crete, is described and illustrated from specimens collected at the Mili river near Rethymno in NW Crete, Greece and biometric data are provided from larval stadia F-0 to F-6. Based on a biometric analysis, exuviae of the W Palaearctic *B. cretensis* and *B. irene* have been compared. In respect to some characters only small morphological differences have been found. However, major differences exist in the length of the body, abdomen, cerci, prementum and paraprotects; also in the paraprotect-epiproct ratio; this applies to both

males and females. Measurements of *B. irene* need to be taken from a wider geographical range to cover the variation in this species; this is discussed." (Authors)] Address: Müller, O., Birkenweg 6d, D-15306 Libbenichen, Germany. E-mail: olemueller@bioscience-art.de

11363. Neiss, U.G.; Hamada, N. (2012): Larvae of *Epipleoneura manauensis* Santos and *Roppaneura beckeri* Santos with a key to the genera of known Neotropical Protoneuridae larvae (Odonata: Zygoptera). *International Journal of Odonatology* 15(1): 31-43. (in English, with Spanish summary) ["The larva of *E. manauensis* is described and illustrated based on last-stadium larvae and exuviae of reared larvae collected in a black-water stream in Manaus, Amazonas State, Brazil. The larva of *R. beckeri* is described and illustrated based on exuviae of reared larvae collected from the water accumulated in the axils (phytotelmata) of *Eryngium floribundum* (Umbelliferae), in Florestal, Minas Gerais State, Brazil. The larva of *E. manauensis* can be distinguished from that of *E. metallica*, the only other species in the genus *Epipleoneura* with described larvae, by the presence of four palpal setae (three in *E. metallica*) and by the transverse dark band on the distal third of the gills (colour pattern absent in *E. metallica*). The larva of *R. beckeri* can be distinguished from all other described Neotropical Protoneuridae larvae by the presence of eight to nine palpal setae. An illustrated key to the genera of known Neotropical Protoneuridae larvae is provided." (Authors)] Address: Neiss, U.G., Instituto Nacional de Pesquisas da Amazônia/INPA, Coordenação de Biodiversidade/CBio, Avenida André Araújo, n. 2936, Caixa Postal 478, CEP 69011-970, Manaus, Amazonas, Brazil. E-mail: ulisses.neiss@gmail.com

11364. Nel, A.; Bechly, G.; Prokop, J.; Béthoux, O.; Fleck, G. (2012): Systematics and evolution of Paleozoic and Mesozoic damselfly-like Odonoptera of the 'Protozygopteran' grade. *Journal of Paleontology* 86: 81-104. (in English) ["The Paleozoic to Mesozoic grade 'Protozygoptera' is revised. It appears to be composed of two main lineages, namely the superfamily Permagrionoidea, and the Archizygoptera. The latter taxon forms a monophyletic group together with Panodonata (= crown-Odonata plus their closest stem-relatives). Therefore, the 'Protozygoptera' as previously understood is paraphyletic. Diagnostic characters of the 'Protozygoptera', Permagrionoidea, and Archizygoptera are re-evaluated. The *Permolestidae* is considered as a junior synonym of the *Permagrionidae*. The following new taxa are described: *Permolestes sheimogorai* new species, *Permolestes soyanaensis* new species, *Epilestes angustapterix* new species, *Solikamptilon pectinatus* new species (all in *Permagrionidae*); *Lodeviidae* new family (for *Lodevia*); *Luseiidae* new family (including *Luseia breviata* new genus and species); *Kennedyia azari* new species, *Kennedyia pritykinae* new species, *Kennedyia ivensis* new species, *Progoneura grimaldii* new species (all in *Kennedyidae*); *Engellestes chekardensis* new genus and species (in *Bakteniidae*); and *Azaronera permiana* new genus and species (in *Voltzialestidae*). The *Kaltanoneuridae* and *Oboraneuridae* are revised. The evolution of protozygopteran Odonoptera during the transition from the Permian to the Triassic is discussed. The larger taxa of the permagrionoid lineage apparently did not cross through the Permian–Triassic boundary, unlike the more gracile Archizygoptera. This last group shows a remarkable longevity from the late Carboniferous to the Early Cretaceous. It also presents a great

taxonomic and morphological stability, with genera ranging from the Permian to the Triassic, and a wing venation pattern nearly unchanged from the late Carboniferous to the Late Triassic. The mass extinction at the end of the Permian period seemingly had a minor effect on these tiny and delicate insects." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

11365. Ng, Y.F.; Choong, C.Y., Centre for Insect Systematics, Faculty of Sciences and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor D.E. Malaysia. E-mail: ngyf@ukm.my; cychoon@ukm.my

11366. Ngiam, R.W.J.; Leong, T.M. (2012): Larva of the phytotelm-breeding damselfly, *Pericnemis stictica* Selys from forests in Singapore (Odonata: Zygoptera: Coenagrionidae). *Nature in Singapore* 5: 103-115. (in English) ["The final instar larva of *P. stictica* is described and illustrated here for the first time, based on the exuviae of specimens reared in captivity. The emergence sequence was documented for a male and a female specimen. The larvae were obtained from phytotelms in forests at the Bukit Timah Nature Reserve and Central Catchment Nature Reserve. A comparison is made with the only other known species in the genus, *P. triangularis* Laidlaw (from Borneo). Possible future research on the biology and conservation of *P. stictica* is suggested." (Authors)] Address: Leong, T., Dept Biol. Sci., Nat. Univ. of Singapore 14 Science Drive 4, Singapore 117543, Republic of Singapore. E-mail: dbsleong@nus.edu.sg

11367. Novelo-Gutiérrez, R.; Gómez-Anaya, J.A. (2012): Description of the larva of *Argia percellulata* (Odonata: Coenagrionidae). *International Journal of Odonatology* 15(1): 45-50. (in English) ["The larva of *Argia percellulata* is described and figured. It falls into the group of *Argia* larvae with a very prominent ligula and one palpal seta, but differs from its closest relatives by having tibiae usually with two well-defined dark rings, posterior margin of sternite 6 smooth, and posterior margin of sternite 7 smooth medially and with spiniform setae laterally. Larvae were found under cobblestones in open, wide, shallow streams where the water flow was slow to moderate, close to the shoreline within a cloud forest. The larva is compared with four other species apparently closely related." (Authors)] Address: Novelo-Gutiérrez, R., Depto de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparato Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

11368. Ohba, S.-y.; Inatani, Y. (2012): Feeding preferences of the endangered diving beetle *Cybister tripunctatus orientalis* Gschwendtner (Coleoptera: Dytiscidae). *Psyche*, Article ID 139714, doi:10.1155/2012/139714: 3 pp. (in English) ["The numbers of *C. tripunctatus orientalis* (Cto) diving beetles are declining in most regions of Japan, and it is included in the Red Data List of species in 34 of 47 prefectures of Japan. However, basic ecological information about Cto, such as its feeding habits, remains unknown. In order to elucidate the feeding habits of Cto larvae, feeding preference experiments were carried out in 2nd and 3rd instar larvae. The number of Odonata nymphs consumed was significantly higher than the number of tadpoles consumed, indicating that Cto larvae prefer Odonata nymphs to tadpoles. In addition, all the first instar larvae of Cto developed into second instars when they were supplied

with motionless Odonata nymphs, but their survival rate was lower when they were supplied with motionless tadpoles. These results suggest that Cto larvae prefer insects to vertebrates." (Authors)] Address: Ohba, Shinya, Center for Ecological Research, Kyoto University, Otsu 520-2113, Japan. E-mail: oobug@hotmail.com

11369. Outomuro, D.; Bokma, F.; Johansson, F. (2012): Hind wing shape evolves faster than front wing shape in Calopteryx damselflies. *Evolutionary Biology* 39(1): 116-125. (in English) ["Wing shape has been shown in a variety of species to be influenced by natural and sexual selection. In damselflies, front- and hind wings can beat independently, and functional differentiation may occur. Males of Calopteryx damselflies show species-specific nuptial flights that differ in colour signalling with the hind wings. Therefore, hind wing shape and colour may evolve in concert to improve colour display, independent of the front wings. We predicted that male hind wing shape evolves faster than front wing shape, due to sexual selection. Females do not engage in sexual displays, so we predicted that females do not show differences in divergence between front- and hind wing shape. We analysed the non-allometric component of wing shape of five European Calopteryx taxa using geometric morphometrics. We found a higher evolutionary divergence of hind wing shape in both sexes. Indeed, we found no significant differences in rate of evolution between the sexes, despite clear sex-specific differences in wing shape. We suggest that evolution of hind wing shape in males is accelerated by sexual selection on pre-copulatory displays and that this acceleration is reflected in females due to genetic correlations that somehow link the rates of wing shape evolution in the two sexes, but not the wing shapes themselves." (Authors)] Address: Outomuro, D., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo. 33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

11370. Pompilio, L.; Rivella, E.; Buffa, G.; Filippa, G.; Freppa, M. (2012): Torbiere e libellule nelle Montagne dell'Ossola. Arpa Piemonte, Via Pio VII, 9 – 10135 Torino – Italia: 56 pp. (in Italian) [Italy; nine Odonata species (*Ischnura pumilio*, *Coenagrion puella*, *Aeshna cyanea*, *A. juncea*, *Somatochlora arctica*, *S. alpestris*, *Libellula quadrimaculata*, *Sympetrum sanguineum*, *Leucorrhinia dubia*) are briefly treated in a monographic style. Their distributions in Piemonte e Valle d'Aosta and in Italy are mapped.] Address: Arpa Piemonte, Via Pio VII, 9, 10135 Torino, Italy. www.arpa.piemonte.it

11371. Popova, O.N.; Kharitonov, A.Yu. (2012): Estimation of the carry-over of substances by dragonflies from water bodies to land in the forest-steppe of West Siberia. *Contemporary problems of ecology* 5(1): 34-39. (in English) ["The results of many years' monitoring of the number and distribution of dragonflies in the Chany area of the Baraba forest-steppe are presented. An estimation of the biomass carry-over by dragonflies from water bodies to land ecosystems is given. The data presented provide evidence of the important role of dragonflies in the migration of substances from water bodies to land." (Authors)] Address: Haritonov, A.YU.; Laboratory of Insect Ecology, Biological Institute of the Siberian Branch of the Academy of Sciences, Frunze str. 11, 630091 Novosibirsk, Russia. E-mail: pc@eco.nsc.ru

11372. Ratti, J.; Vachtsevanos, G. (2012): Inventing a biologically inspired, energy efficient micro aerial vehicle. *Journal of Intelligent & Robotic Systems* 65(1-4):

437-455. (in English) ["In recent years, research efforts have focused on the design, development and deployment of unmanned systems for a variety of applications ranging from intelligence and surveillance to border patrol, rescue operations, etc. Micro Aerial Vehicles are viewed as potential targets that can provide agility and accurate small area coverage while being cost-effective and can be easily launched by a single operator. The small size of MAVs allows such flight operations within confined space but the control effectors must provide sufficient maneuverability, while maintaining stability, with only limited sensing capability onboard the platform. To meet these challenges, researchers have long been attracted by the amazing attributes of biological systems, such as those exhibited by birds and insects. Birds can fly in dense flocks, executing rapid maneuvers with g-loads far in excess of modern fighter aircrafts, and yet never collide with each other, despite the absence of air traffic controllers. This paper introduces a novel framework for the design and control of a Micro Air Vehicle. The vehicle's conceptual design is based on biologically-inspired principles and emulates a dragonfly (Odonata-Anisoptera). A sophisticated multi-layered Hybrid & Linear/Non-Linear controller to achieve extended flight times and improved agility compared to other Rotary and Flapping Wing MAV designs. The paper addresses the design and control features of the proposed QV design and gives an overview on the developmental efforts towards the prototyping of the flyer. The potential applications for such a high endurance vehicle are numerous, including air-deployable mass surveillance in cluster and swarm formations. The disposable nature of the vehicle would help in battle-field deployment as well, where such a MAV would be made available to soldiers for proximity sensing and threat level assessment. Other applications would include search and rescue operations and civilian law-enforcement." (Authors)] Address: Vachtsevanos, G., Intelligent Control Systems Laboratory, School of Electrical & Computer Engineering, Georgia Institute of Technology, 777 Atlantic Dr. NW., Atlanta, GA 30332-0250, USA. E-mail: gjv@ece.gatech.edu

11373. Relyea, R.A. (2012): New effects of Roundup on amphibians: Predators reduce herbicide mortality; herbicides induce antipredator morphology. *Ecological Applications* 22: 634-647. (in English) ["The use of pesticides is important for growing crops and protecting human health by reducing the prevalence of targeted pest species. However, less attention is given to the potential unintended effects on nontarget species, including taxonomic groups that are of current conservation concern. One issue raised in recent years is the potential for pesticides to become more lethal in the presence of predatory cues, a phenomenon observed thus far only in the laboratory. A second issue is whether pesticides can induce unintended trait changes in nontarget species, particularly trait changes that might mimic adaptive responses to natural environmental stressors. Using outdoor mesocosms, I created simple wetland communities containing leaf litter, algae, zooplankton, and three species of tadpoles (wood frogs [*Rana sylvatica* or *Lithobates sylvaticus*], leopard frogs [*R. pipiens* or *L. pipiens*], and American toads [*Bufo americanus* or *Anaxyrus americanus*]). I exposed the communities to a factorial combination of environmentally relevant herbicide concentrations (0, 1, 2, or 3 mg acid equivalents [a.e.]/L of Roundup Original MAX) crossed with three predator-cue treatments (no predators, adult

newts [*Notophthalmus viridescens*], or larval dragonflies [*Anax junius*]). Without predator cues, mortality rates from Roundup were consistent with past studies. Combined with cues from the most risky predator (i.e., dragonflies), Roundup became less lethal (in direct contrast to past laboratory studies). This reduction in mortality was likely caused by the herbicide stratifying in the water column and predator cues scaring the tadpoles down to the benthos where herbicide concentrations were lower. Even more striking was the discovery that Roundup induced morphological changes in the tadpoles. In wood frog and leopard frog tadpoles, Roundup induced relatively deeper tails in the same direction and of the same magnitude as the adaptive changes induced by dragonfly cues. To my knowledge, this is the first study to show that a pesticide can induce morphological changes in a vertebrate. Moreover, the data suggest that the herbicide might be activating the tadpoles' developmental pathways used for antipredator responses. Collectively, these discoveries suggest that the world's most widely applied herbicide may have much further-reaching effects on nontarget species than previously considered." (Author)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

11374. Ren, H.-H.; Wang, X.-S.; Chen, Y.-L.; Li, X.-D. (2012): Biomechanical behaviors of dragonfly wing: relationship between configuration and deformation. *Chinese Physics B* 21(3) (034501): 10 pp. (in English) ["In this paper, the natural structures of a dragonfly wing (*Pantala flavescens*), including the corrugation of the chordwise cross-section, the sandwich microstructure veins, and the junctions between the vein and the membrane, have been investigated with experimental observations, and the morphological parameters of these structural features are measured. The experimental result indicates that the corrugated angle among the longitudinal veins ranges from 80° to 150°, and the sandwiched microstructure vein mainly consists of chitin and protein layers. Meanwhile, different finite element models, which include models I and I* for the planar forewings, models II and II* for the corrugated forewings, and a submodel with solid veins and membranes, are created to investigate the effects of these structural features on the natural frequency/modal, the dynamical behaviours of the flapping flight, and the deformation mechanism of the forewings. The numerical results indicate that the corrugated forewing has a more reasonable natural frequency/modal, and the first order up-down flapping frequency of the corrugated wing is closer to the experimental result (about 27.00 Hz), which is significantly larger than that of the planar forewing (10.94 Hz). For the dynamical responses, the corrugated forewing has a larger torsional angle than the planar forewing, but a lower flapping angle. In addition, the sandwich microstructure veins can induce larger amplitudes of torsion deformation, because of the decreasing stiffness of the whole forewing. For the submodel of the forewing, the average stress of the chitin layer is much larger than that of the protein layer in the longitudinal veins. These simulative methods assist us to explain the flapping flight mechanism of the dragonfly and to design a micro aerial vehicle by automatically adjusting the corrugated behaviour of the wing." (Authors)] Address: Wang, X.-S., Dept of Engineering Mechanics, AML, Tsinghua University, Beijing 100084, China. E-mail: xshuwang@tsinghua.edu.cn

11375. Šácha, D.; Racko, L. (2012): New site of the species of the Community interest *Coenagrion ornatum* (Odonata: Coenagrionidae) in Northern Slovakia. *Folia faunistica Slovaca* 17(1): 7-9. (in Slovakian, with English summary) [The rare *C. ornatum* was found near Šuja village, Strážovské hills and Zilina Valley (49°03'44" N, 18°37'05" E), 476 m a.s.l. Larvae and exuvia of *C. ornatum* were located along a small, shallow and slow flowing sunlit springfen creek with carbonate geology. Emergence took place on vegetation just above the water, up to 10 cm from the surface. Co-occurring species are *Calopteryx virgo*, *Lestes sponsa*, *Pyrrhosoma nymphula*, *Coenagrion puella*, *Enallagma cyathigerum*, *Ischnura elegans*, *I. pumilio*, *Platycnemis pennipes*, *Aeshna cyanea*, *Libellula depressa*, *Orthetrum coerulescens*, *O. brunneum*, *Sympetrum pedemontanum* and *S. sanguineum*. *Thecagaster bidentata*, typical for such habitats, was not found. This record is the 5th for Slovakia.] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@vazky.sk

11376. Salur, A.; Dogan, Ö.; Yagiz, Y. (2012): Odonata Fauna of Pülümür (Turkey: Tunceli prov.). *Munis Entomology & Zoology* 7(1): 359-362. (in English) [Between July and September 2010, 24 Odonata species were recorded at 14 localities. All these are first regional records. Species are presented with details about their localities.] Address: Salur, A., Hitit Üniversitesi, Faculty of Arts & Sciences, Department of Biology, 19030 Çorum, Turkey. E-mail: alisalur@gmail.com

11377. Salur, A.; Miroglu, A.; Okçu, B. (2012): Odonata fauna of Tokat province (Turkey). *Munis Entomology & Zoology* 7(1): 339-343. (in English) [30 Odonata species from the Tokat province in the central part of Black Sea Region of Anatolia were recorded between 2005 and 2010. The localities of these records are documented.] Address: Salur, A., Hitit Üniversitesi, Faculty of Arts & Sciences, Department of Biology, 19030 Çorum, Turkey. E-mail: alisalur@gmail.com

11378. Sánchez-Guillén, R.A.; Wellenreuther, M.; Cordero-Rivera, A. (2012): Strong asymmetry in the relative strengths of prezygotic and postzygotic barriers between two damselfly sister species. *Evolution* 66(3): 690-707. (in English) ["One of the longest debates in biology has been over the relative importance of different isolating barriers in speciation. However, for most species, there are few data evaluating their relative contributions and we can only speculate on the general roles of pre- and postzygotic isolation. Here we quantify the absolute and cumulative contribution of 19 potential reproductive barriers between two sympatric damselfly sister species, *Ischnura elegans* and *I. graellsii*, including both premating (habitat, temporal, sexual and mechanical isolation) and postmating barriers (prezygotic: sperm insemination success and removal rate, oviposition success, fertility, fecundity; postzygotic: hybrid viability, hybrid sterility and hybrid breakdown). In sympatry, total reproductive isolation between *I. elegans* females and *I. graellsii* males was 95.2%, owing mostly to a premating mechanical incompatibility (93.4%), while other barriers were of little importance. Isolation between *I. graellsii* females and *I. elegans* males was also nearly complete (95.8%), which was caused by the cumulative action of multiple prezygotic ($n = 4$, 75.4%) and postzygotic postmating barriers ($n = 5$, 7.4%). Our results suggest that premating barriers are key factors in preventing gene flow between species, and that the relative strengths of premating barriers is highly asym-

metrical between the reciprocal crosses." (Authors)] Address: Sánchez-Guillén, Rosa, Depto de Ecología e Biología Animal, E.U.E.T. Forestal, Universidade de Vigo, Pontevedra, Spain. E-mail: rguillen@uvigo.es

11379. Sánchez-Herrera, M.; Ware, J.L. (2012): Biogeography of dragonflies and damselflies: Highly mobile predators. In: Stevens, L. (Ed.): *Global Advances in Biogeography*. InTech: 291-306. (in English) ["Conclusion: The biogeography of Odonata is a rich area of study that needs further attention. As one of the basal-most taxa in Insecta (Grimaldi and Engel, 2005), our understanding of the origin of flying insects will be greatly improved by additional study, particularly through research that includes thorough analyses of stem and crown group taxa. Future work should explore the biogeography of lesser-studied zygopteran groups from South America, and expand understanding of species rich groups like the Libelluloidea and Gomphidae. Odonata have been heralded as model indicators for climate change, due in part to their great dispersal capabilities, and earlier emergence has been documented in our warming climate (e.g., Hassell et al., 2007). Range expansion of tropical taxa is predicted into higher latitudes. Although some Odonata ranges fluctuate with environmental changes, northward range expansions have been reported over the last 40 years among several European taxa (e.g., Hickling et al., 2005). The future biogeographical distribution of Odonata undoubtedly will be influenced directly and indirectly by anthropogenically altered climate." (Authors)] The paper reviews the following subjects: "2. What are dragonflies and damselflies? Real hunters; 2.1 Ecology and behaviour; 2.2 Species diversity and biogeography; 2.3 Dispersal in Odonata, flight behaviour and migration; 3. Anisoptera phylogeny; 3.1 Biogeography of the dragonfly superfamily Libelluloidea and Australian endemism; 4. Biogeography of Zygoptera." For details see: <http://www.intechopen.com/books/global-advances-in-biogeography/biogeography-of-dragonflies-and-damselflies-the-highly-mobile-predators->] Address: Ware, Jessica, Rutgers, Univ. of New Jersey, Cook College, 93 Lipman Drive, New Brunswick, New Jersey 08901, USA. E-mail: jware@amnh.org

11380. Shinohara, S.; Obata, A.; Seki, M.; Ichihara, K.; Ishida, E.H. (2012): Study of airfoils for the unique micro wind turbine blade. Design for innovative value towards a sustainable society: 691-696. (in English) ["An airfoil of insect's wing is completely different from the conventional streamlining airfoil, and it has very thin corrugated cross section. As you can see from the flight of insects, their wings are used in the low speed region, functioning in a speed region different to the ones in which streamlining airfoil is used. Studies on the aerodynamic characteristics of the corrugated wing in the low speed region are very limited, with many aspects still remaining unknown. In order to clarify aerodynamic characteristics of corrugated airfoil in the low speed region, we have developed our own system composed of micro three-component balance and swirl-type experimental water channel, and investigated the aerodynamic characteristics of the corrugated airfoil and curved plate having smooth cross section in the low speed regions ($Re=7,000$ and $11,000$). This investigation revealed that, in the low speed regions the aerodynamic characteristics of the corrugated airfoil was equivalent to or superior than those of the curved plate, and it was also found that the aerodynamic characteristics of the

curved plate were very susceptible to the changes in Reynolds number whereas those of the corrugated wing were insusceptible to the changes. In the past, a small wind turbine has not been paid much attention as a source of alternative energy because of its low availability in low wind speed region and of its difficulty in handling it. All of these issues inherent in the small wind turbine will be solved by adopting the corrugated wing in the wind turbine. All of these findings from our investigation are reported in this paper." (Authors)] The paper includes references to Odonata wing morphology.] Address: Seki, M., Department of Aerospace Engineering, and Micro Flying Robot Laboratory, Nippon Bunri University, 1727 Ichigi, Oita 870-3979, Japan

11381. Smith, A.J.; Cook, T.J. (2012): Revision of the genus *Prismatospora* and description of *Prismatospora cloptoni* n. sp. (Apicomplexa: Actinocephalidae: Acanthosporinae) from naiads of the Green Darner, *Anax junius* (Odonata: Anisoptera: Aeshnidae), in east Texas, U.S.A. *Comparative Parasitology* 79(1): 9-14. (in English) ["*Prismatospora cloptoni* n. sp. (Apicomplexa: Eugregarinida: Actinocephalidae: Acanthosporinae) is described from naiads of *A. junius* collected from the pond at the Sam Houston State University Center for Biological Field Studies, Walker County, Texas, USA. This is the second species described in the genus, and it confirms the generic hypothesis of *Prismatospora*. The generic diagnosis is revised to reflect common characters of its constituent species." (Authors)] Address: Cook, Tamara J., Department of Biological Sciences, Sam Houston State University, Box 2116, Huntsville, Texas 77341-2116, USA. E-mail: tcook@shsu.edu

11382. Sun, J.; Bhushan, B. (2012): The structure and mechanical properties of dragonfly wings and their role on flyability. *Comptes Rendus Mécanique* 340(1): 3-17. (in English) ["Dragonfly wings possess great stability and high load-bearing capacity during flapping flight, glide, and hover. Scientists have been intrigued by them and have carried out research for biomimetic applications. Relative to the large number of works on its flight aerodynamics, few researchers have focused on the insect wing structure and its mechanical properties. The wings of dragonflies are mainly composed of veins and membranes, a typical nanocomposite material. The veins and membranes have a complex design within the wing that give rise to whole-wing characteristics which result in dragonflies being supremely versatile, maneuverable fliers. The wing structure, especially corrugation, on dragonflies is believed to enhance aerodynamic performance. The mechanical properties of dragonfly wings need to be understood in order to perform simulated models. This paper focuses on the effects of structure, mechanical properties, and morphology of dragonfly wings on their flyability, followed by the implications in fabrication and modelling." (Authors)] Address: Bhushan, B., Nanoprobe Laboratory for Bio- & Nanotechnology and Biomimetics (NLB2), The Ohio State University, 201 W. 19th Avenue, Columbus, OH 43210-1142, USA. E-mail: bhushan.2@osu.edu

11383. Takahara, T.; Kohmatsu, Y.; Maruyama, A.; Yamaoka, R. (2012): Predator-specific inducible morphological changes in two Japanese anuran tadpoles. *Herpetology Notes* 5: 43-47. (in English) ["We evaluated inducible morphological changes in tadpoles of two anuran species, the Japanese tree frog (*Hyla japonica*) and the wrinkled frog *Glandirana* (*Rana*) *rugosa*, against two predator types, which were represented by

a predatory fish (*Carassius auratus*) and the nymph of a dragonfly (*Anax parthenope julius*). In the presence of fish cues, *H. japonica* developed shallower tail fins, whereas *G. rugosa* did not exhibit such morphological change. Both tadpole species developed deeper tail fins in the presence of dragonfly nymph cues. The predator specific responses for the species' tadpoles are likely to optimize avoidance of lethal attacks by predators. The interspecific differences in inducible morphological defence traits might be related to the balance with the effects of other defensive traits and explained by the frequency and time of their encounters with predators." (Authors)] Address: Takahara, T., Graduate School of Science and Technology, Matsugasakigogyokaido, Sakyo-ku, Kyoto Institute of Technology, Kyoto 606-8585, Japan. E-mail: takahara@hiroshima-u.ac.jp

11384. Tango, L.K.; Foote, D.; Magnacca, K.N.; Foltz, S.J.; Cutler, K. (2012): Biological inventory of anchialine pool invertebrates at Pu'uuhouua o Honaunau National Historical Park and Pu'ukohola Heiau National Historic Site, Hawai'i Island. Pacific Cooperative Studies Unit Technical Report No. 181. 24 pp (in English) ["A single male *Megalagrion xanthomelas*, was sighted perched on sedges at the water hole at Waikulu (site 9). Another male and a tandem pair of this endemic damselfly were also observed at the Makaloa pond (site 3) along with several male non-indigenous *Ischnura ramburii*. A lone indigenous *Pantala flavescens* was observed near the trail leading to Waikulu spring and later one was observed flying over Haleipalala. A tandem pair of the indigenous *Anax junius* was observed ovipositing at the water's edge at the Makaloa pond. These same two native dragonflies, *A. junius* and *P. flavescens*, were observed at PUHE along with the adventive *Tamea lacerata* and *I. ramburii*. *Megalagrion* damselflies were not observed at PUHE." (Authors)] Address: Tango, Lori, Pacific Cooperative Studies Unit, Univ. of Hawai'i at Manoa, Dept Botany, 3190 Maile Way Honolulu, Hawai'i 96822, USA

11385. Termaat, T.; Kalkman, V.J. (2012): Odonata Red List Report 2011 using Dutch and IUCN criteria. *Brachytron* 14(2): 75-187. (in Dutch, with English summary) ["In this report a proposal is published for a revised Red List for Dragonflies. When the Dutch Ministry of Economic Affairs, Agriculture and Innovation publishes this list in the government gazette, the Red List of 1997 will be replaced. In addition, this report presents a regional Red List following the internationally used criteria of IUCN, so that the situation in The Netherlands can be compared with that in other countries. All 65 species regularly reproducing in The Netherlands were assessed in order to decide whether they should be red-listed according to the criteria of the Dutch government. Red List species are species that became extinct after 1900 and species that are threatened. The threatened species are subdivided in four categories. ... The 2011 Red List includes the following numbers of species per category: 5 Extinct in The Netherlands, 4 Critically endangered, 6 Endangered, 6 Vulnerable, and 2 Susceptible. Thus, the Red List comprises 23 species (35% of the assessed species). The other 42 species are Not threatened at present. In order to make a clean comparison between the new Red List and the 1997 Red List, the latter has been reconstructed using the current improved method and partly with additional data. The reconstructed 1997 Red List comprises 27 species (44% of the assessed species). These are categorised

as follows: 8 species Extinct in the Netherlands, 4 Critically endangered, 8 Endangered, 6 Vulnerable en 1 Susceptible. The other 34 species were Not threatened at present. A comparison between both Red Lists shows a fairly positive picture. The 2011 Red List includes three species less than the 1997 list, despite the fact that four species appear on the Red List for the first time (two of which after becoming recently established). Three species previously extinct in The Netherlands have reappeared. And most species of running waters and fens show a positive trend. Species of softwater lakes are increasing too, but alarming exceptions exist. According to the IUCN criteria, which chiefly assess the situation over the past ten years, 19 species feature on the Red List. These are categorized as follows: 3 Regionally Extinct, 2 Critically Endangered, 4 Endangered, 3 Vulnerable, and 7 Near Threatened. By IUCN criteria, the other 46 species are assessed as not threatened and belong to Least Concern. The most important causes of decline of dragonflies are habitat destruction due to intensified use of land and environmental problems such as acidification, eutrophication, and desiccation. These threats were strongest in the period 1950-1980. Most habitat-specialised species had their strongest decline during those years. From the 1990s onward many species have reversed their negative trend, due to improvement of the environment and nature restoration measures. The higher number of warm summers has also had a positive influence on some species. Potential negative effects of climate change on northern and northeastern dragonfly species are still insufficiently known. To enable Red List updating, the data collected by volunteers within the framework of distribution research and the Dutch Dragonfly Monitoring Scheme are indispensable." (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands. E-mail: tim.termaat@vlinderstichting.nl

11386. Theischinger, G.; Jacobs, S. (2012): Surprise re-discovery of *Acanthaeschna victoria*, a key taxon in dragonfly evolution (Odonata, Aeshnoidea, Telephlebitidae). *Agrion* 16(1): 3-9. (in English) ["During monitoring by the Office of Environment and Heritage in south-eastern New South Wales a rather large number of larvae of the rare and elusive dragonfly species *A. victoria*, a key taxon in dragonfly evolution, were found at three new localities. The southernmost of these at Nadgee extends the range of the species south by more than 200 km to 5 km from the NSW/Victoria border and suggests that the species will eventually be found in Victoria. Rearing of the larvae in Sydney confirmed the hitherto only supposed identity of the larvae, and provided for the first time information on the morphology of the female larva and on the coloration of the subadult imagines. The rearing also provided new information on food of the larvae, life history and phenology. Some of the reared subadults were released in their natural habitat, and specimens were preserved for future DNA analysis for phylogenetic studies. A thought is given to the possible future usage – when more data are available – of *A. victoria* as an indicator species for ecological condition and climate change." (Authors)] Address: Theischinger, G., Water Science, Office of Environment & Heritage, Dept of Premier & Cabinet, PO Box 29, Lidcombe NSW 1825, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

11387. Umar, D.M.; Marinov, M.G.; Schorr, M.; Chapman, H.M. (2012): Odonata attracted by light - a new topic for myth-busters. *International Dragonfly Fund* -

Report 43: 1-52. (in English) ["Six Odonata species were collected during night light trapping on the Mambilla Plateau, Taraba State Nigeria. Being predominantly diurnal insects, Odonata captured in light traps have always been considered as an anomaly. The new data initiated an extensive interrogation of all records on Odonata collected near artificial light sources. A total of 415 records (402 published and 13 new) are presented here with a summary of previous discussions and new discussion points. The general conclusion is that Odonata are mainly confused by, rather than attracted to the light. New avenues for further research in this field are suggested based on previous important studies undertaken on Odonata morphology and physiology." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

11388. Verdonschot, R.C.M.; Peeters, E.T.H. (2012): Preference of larvae of *Enallagma cyathigerum* (Odonata: Coenagrionidae) for habitats of varying structural complexity. *Eur. J. Entomol.* 109(2): 229-234. (in English) ["In macrophyte-rich lentic ecosystems, higher numbers of damselfly larvae occur in areas where there is structurally complex vegetation than in those where the plant architecture is relatively simple. Biotic interactions rather than morphological constraints are considered to underlie this pattern. We investigated whether the preference of the larvae of *E. cyathigerum* for a particular habitat was retained in absence of prey, predators and / or conspecifics. A series of laboratory choice experiments was conducted in which combinations of sediment and artificial plants differing in structural complexity were offered simultaneously to the larvae. Larvae preferred patches with structurally complex vegetation over patches with simply structured vegetation or lacking vegetation. Patches with simply structured vegetation were preferred over those with bare sediment, but the number of larvae showing a clear choice, which is regarded as an indication of the strength of the preference for a particular habitat, was relatively low compared to the number of individuals responding when complex vegetation was present. Based on the results presented, we conclude that the preference of *E. cyathigerum* larvae for structurally complex vegetation is independent of the presence of predators, prey or competitors. This suggests that this behaviour of the larvae is either learned or an innate response." (Authors)] Address: Verdonschot, R. Dept of Freshwater Ecology, Centre for Ecosystem Studies, Alterra, Wageningen UR, P.O. Box 47, 6700 AA, Wageningen, The Netherlands. E-mail: ralf.verdonschot@wur.nl

11389. Willigalla, C.; Fartmann, T. (2012): Patterns in the diversity of dragonflies (Odonata) in cities across Central Europe. *Eur. J. Entomol.* 109: 235-245. (in English) ["Urbanisation is an important cause of species extinctions. Although urban water systems are also highly modified, studies on aquatic or semi-aquatic organisms are rare. The aim of this study is to identify the factors that determine species richness of Odonata in 22 Central European cities and along an urban-rural gradient within six of them. With 64 indigenous species in total and an average of 33 species per city, the species richness of Odonata in Central European cities is comparatively high. A generalised linear model indicates that species richness is positively related to city area. Additional predictors are climatic variables (temperature amplitude, sunshine duration and July temperature) and the year last studied. Since most cities are usually lo-

cated in areas with naturally high habitat heterogeneity, we assume that cities should be naturally rich in dragonflies. The role of city area as a surrogate for habitat and structural richness most likely explains why it is strongly associated with Odonata species richness. The relationship between species richness and the climatic variables probably reflects that Odonata species richness in Central Europe is limited by warm and sunny conditions more than by availability of water. The temporal effect (the year last studied) on species richness is likely to be a consequence of the recent increase in Mediterranean species associated with global warming. Urbanisation clearly has an adverse effect on the species diversity of Odonata. Species richness increases along a gradient from the centre of a city to the rural area and is significantly highest in rural areas. This pattern probably reflects a gradient of increasing habitat quality from the centre of cities to rural areas. Moreover, the number of water bodies is generally very low in the city centres. Based on our results, we make recommendations for increasing the abundance and number of species of dragonflies in cities." (Authors)] Address: Fartmann, T., Dept Community Ecol., Inst. Landscape Ecology, Univ. of Münster, Robert-Koch-Str. 28, 48149 Münster, Germany. E-mail: fartmann@uni-muenster.de

11390. Wohlfahrt, B.; Vamosi, S.M. (2012): Predation and habitat isolation influence the community composition-area relationship in dytiscid beetles (Coleoptera: Dytiscidae). *Community Ecology* 13(1): 1-10 (in English) ["A major goal in ecology remains the understanding of patterns in diversity and distributions of species in natural communities. The species-area relationship is an important tool for investigating differences among communities, and may be also influenced by habitat isolation and dominant predator presence. In this two-year study, we evaluated the influences of habitat area, isolation and predation on community composition of dytiscids in two geographical regions dominated by different top predators (large predaceous dragonfly larvae or fish). Contrary to expectations, surface area, isolation and predator presence/absence alone did not significantly influence dytiscid species richness and total abundance, but in association with other environmental variables, such as submerged macrophyte growth forms. Components of habitat heterogeneity likely outweighed effects of area and predation regime on prey species diversity. However, differences in the set of abundant species were best explained by habitat surface area. Thus, in contrast to species diversity, gradients in community composition were not outweighed by components of heterogeneity. In this study, predator presence was not correlated with habitat isolation. Instead, our results revealed that the effect of predator presence/absence on prey community composition and the resulting set of coexisting species may depend on habitat isolation. Within regions, the effect of large predaceous dragonfly larvae on species composition may depend on pond surface area, whereas the presence of fish influenced species composition alone and in association with area. We advocate that regional differences in environmental gradients be considered when community composition is evaluated." (Authors)] Address: Wohlfahrt, Bianca, Department of Biological Sciences, Univ. of Calgary, 2500 University Drive NW, Calgary, T2N 1N4, Canada. E-mail: bianca_wohlfahrt@freenet.de

11391. Wong, D.C.C.; Pearson, R.D.; Elvin, C.M.; Merritt, D.J. (2012): Expression of the rubber-like protein,

resilin, in developing and functional insect cuticle determined using a *Drosophila* anti-rec 1 resilin antibody. *Developmental Dynamics* 241(2): 333-339. (in English) ["Background: The natural elastomeric protein, insect resilin, is the most efficient elastic material known, used to store energy for jumping and flight in a variety of insects. Here, an antibody to recombinant *Drosophila melanogaster* pro-resilin is used to examine resilin expression in *Drosophila* and a wider range of insects. Results: Immunostaining of *Drosophila* embryos reveals anti-resilin reactivity in epidermal patches that exhibit a dynamic spatial and temporal expression through late embryogenesis. Resilin is also detected in stretch receptors in the embryo. In developing adult *Drosophila*, resilin pads are described at the base of wings and at the base of flexible sensory hairs in pupae. Resilin is also detected in embryos of the tephritid fruitfly, *Bactrocera tryoni*, and two well-known concentrations of insect resilin: the flight muscle tendon of the dragonfly and the pleural arch of the flea. Conclusions: The anti-Rec1 antibody developed using *Drosophila* pro-resilin as antigen is cross-reactive and is useful for detection of resilin in diverse insects. For the first time, resilin expression has been detected during embryogenesis, revealing segmental patches of resilin in the developing epidermis of *Drosophila*." (Authors) Odonata are discussed at the order level.] Address: Merritt, D., School of Biological Sciences, The University of Queensland, Brisbane, Queensland, Australia. E-mail: d.merritt@uq.edu.au

11392. Xu, Q.-h. (2012): A description of the final stadium larva of *Leptogomphus elegans* Lieftinck, with a discussion of taxonomic characters of the larvae of the genus *Leptogomphus* Selys (Odonata: Gomphidae). *International Journal of Odonatology* 15(1): 25-29. (in English) ["The final stadium larva of *L. elegans* is described and illustrated for the first time. The taxonomic characters of the larvae of the genus *Leptogomphus* Selys are discussed and summarized." (Author)] Address: Xu, Q.-h., Department of Biological and Environmental Engineering, Zhangzhou City University, Zhangzhou, Fujian 363000, PR China. E-mail: qihanx@yahoo.com.cn

11393. Yu, X.; Hämäläinen, M. (2012): A description of *Echo perornata* spec. nov. from Xizang (Tibet), China (Odonata: Calopterygidae). *Zootaxa* 3218: 40-46. (in English) ["*Echo perornata*, spec. nov. (holotype male, China, Xizang Autonomous Region [Tibet], Motuo [Medog], alt. 850m, 1 vii 1983) is described and illustrated for both sexes. The new species has a pale pterostigma shaped quite similarly to that of *Echo margarita* Selys, 1853, but it differs in wing colour pattern and structure of the penis. *E. margarita* is recorded from China (Yunnan, Ruili) for the first time." (Authors)] Address: Yu, X., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, 300071, China. E-mail: nkyuxin@yahoo.cn

11394. Yu, G.a.; Huang, H.Q.; Wang, Z.; Brierley, G.; Zhang, K. (2012): Rehabilitation of a debris-flow prone mountain stream in southwestern China – Strategies, effects and implications. *Journal of Hydrology* 414–415: 231-243. (in English) ["Rehabilitation of Shengou Creek, a small, steep mountain stream in southwestern China that is prone to debris flows, started more than 30 years ago through an integrated program of engineering applications (check dams and guiding dikes), biological measures (reforestation), and social measures (reducing human disturbance). Small and medium-sized check

dams and guiding dikes were constructed on key upper and middle sections of the creek to stabilize hillslopes and channel bed. Meanwhile, *Leucaena leucocephala*, a drought-tolerant, fast-growing, and highly adaptive plant species, was introduced to promote vegetation recovery in the watershed. The collective community structure of tree, shrub, and herb assemblages in the artificial *L. leucocephala* forest, which developed after 7 years, enhanced soil structure and drastically reduced soil erosion on hillslopes. Cultivation of steep land was strictly controlled in the basin, and some inhabitants were encouraged to move from upstream areas to downstream towns to reduce disturbance. These integrated measures reduced sediment supply from both hillslopes and upstream channels, preventing sediment-related hazards. The development of natural streambed resistance structures (mainly step-pool systems) and luxuriant riparian vegetation aided channel stability, diversity of stream habitat, and ecological maintenance in the creek. These findings are compared with Jiangjia and Xiaobaini Ravines, two adjacent non-rehabilitated debris-flow streams which have climate and geomorphologic conditions similar to Shengou Creek. Habitat diversity indices, taxa richness, biodiversity, and bio-community indices are much higher in Shengou Creek relative to Jiangjia and Xiaobaini Ravines, attesting to the effectiveness of rehabilitation measures" (Authors) The density of benthic macroinvertebrates (ind/m²) including Gomphidae, Aeshnidae, Cordulegasteridae and Euphaeidae is presented in table 5.] Address: Huang, H.Q., Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, 11A Datun Road, Chaoyang District, Beijing 100101, China. E-mail: huanghq@igsrr.ac.cn

11395. Zhu, B.L.; Wu, H.P.; Xiao, T.H. (2012): Study of aerodynamic interactions of dual flapping airfoils in tandem configurations. *Applied Mechanics and Materials* 160: 301-306. (in English) ["The unsteady viscous flow fields of dual flapping airfoils in tandem configurations are simulated by a Navier-Stokes Solver based on dynamic deformable hybrid meshes. Aerodynamic interactions of three motion models are studied including flapping fore airfoil with fixed aft airfoil, two airfoils flapping in phase and out-of-phase. The results indicate that the aft airfoil in the wake of the flapping fore airfoil has great influence on the aerodynamic performance. When the fore airfoil flaps with a fixed aft airfoil, the thrust generation and thrust propulsive efficiency were enhanced by 65% and 44% respectively, compared to that of single flapping airfoil. When the two airfoils stroke in phase, the thrust generation is twice over that of single flapping airfoil. However the out-of-phase stroking has relatively much lower thrust...In fact, the flapping wing MAV's cruising speed is about several meter per second. The aerodynamic force of dual flapping airfoils was studied based on like dragonfly wing [7-8], now it is still difficult that apply to MAV due to complexity of flapping configuration." (Authors)] Address: Zhu, B., Nanchang Hangkong University, Nanchang 330063. China. E-mail: Jzhubaoli@126.com



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1998

11396. Bambaradeniya, C.N.B.; Fonscka, K.T.; Ambagahawatte, C.L. (1998): A preliminary study of fauna and flora of a rice field in Kandy, Sri Lanka. *Cey. J. Sci. (Bio. Sci.)* 25: 1-22. (in English) ["A study of the fauna and flora of a rice-field ecosystem was carried out during a single cultivation cycle, in a terraced paddy field (0.5ha) located at Ampitiya, Kandy during May-October 1992. The occurrence of animals and plants was studied in relation to the different ecological phases of the paddy field, growth stage of the paddy plant, and agronomic practices. A total of 77 species of invertebrates, 45 species of vertebrates and 34 species of weeds was recorded from the study site. 95% of the invertebrate fauna consisted of arthropods, represented by 53 families in four classes. About half of the vertebrates recorded were birds consisting of 22 species in 14 families. Monocot weeds belonging to the families Commelinaceae, Cyperaceae and Poaceae dominated the field at different stages of the cultivation cycle. The aquatic phase encompassing the vegetative and reproductive stages of the rice plant supported the greatest number of invertebrate fauna (68 species). The application of insecticides resulted in a considerable decrease in the numbers of invertebrate fauna." (Authors) The list of taxa includes *Orthetrum sabina*, *Neurothemis tullia* and *Agriocnemis* spp.] Address: Bambaradeniya, C.N.B., Dept of Zoology, University of Peradeniya, Peradeniya, Sri Lanka

11397. Nel, A.; Bechly, G.; Jarzembowski, E.; Martinez-Delclòs, X. (1998): A revision of the fossil petalurid dragonflies (Insecta: Odonata: Anisoptera: Petalurida). *Paleontologia Lombarda Nuova serie X*: 1-68. (in English, with French and Italian summaries) ["A new family, genus and species of Petalurida, *Cretapetalura brasiliensis* gen. nov. et sp. nov. (Cretapetaluridae fam. nov.) is described from the Lower Cretaceous Santana Formation of the Araripe Basin of Brazil, and a new subfamily, genus and species of Petalurida, *Pseudocymatophlebia henningi* gen. nov. et sp. nov. (Pseudocymatophlebiinae subfam. nov. in Aktassiidae) is described from the Lower Cretaceous Weald Clay of England. A new species *Aktassia pritykinae* sp. nov. is described from the Lower Cretaceous of Mongolia. The description of new material enables us to revise the phylogenetic position of the

genera *Protolindenia* Deichmüller 1886, *Aeschnogomphus* Handlirsch 1906, *Mesuropetala* Handlirsch 1906, and *Cymatophlebia* Deichmüller 1886 from the Upper Jurassic of Germany, and to designate neotypes for *Protolindenia wittei* and *Mesuropetala koehleri*. *Aeschnogomphus* and *Aktassia* Pritykina 1968 are considered to be sister-genera within the Petalurida - Aktassiidae (subfamily Aktassiinae stat. nov.). *Aeschnogomphus buchi* (Hagen 1848) is recognized as valid name for *Aeschnogomphus charpentieri* (Hagen 1848). *Mesuropetala*, formerly considered to be a petalurid, is regarded as a basal Aeshnoptera; and *Protolindenia*, formerly considered to be a gomphid, is transferred to the Petalurida, as most basal member of the stem-group of Petaluridae. The phylogenetic positions of *Mesuropetala auliensis* Pritykina 1968, *Mesuropetala costalis* Pritykina 1968, *Protolindenia aktassica* Pritykina 1968 (in *Kazakhophlebiella* gen. nov. et comb. nov.) and *Protolindenia deichmuelleri* Pritykina 1968 (in *Pritykiniella* gen. nov. et comb. nov.) (all Upper Jurassic taxa from Karatau, Turkestan, Russian Federation), are discussed. Also, the phylogenetic positions of *Miopetalura shanwangica* Zhang 1989 and *Miopetalura orientalis* (Hong 1985) (Middle Miocene of China) are discussed and these taxa are transferred from the Petaluridae to the Gomphides- Lindeniinae and Anisoptera incertae sedis respectively. The English Lower Cretaceous *Aeschnopsis perampla* (Brodie 1845) and *Cymatophlebiopsis pseudobubas* Handlirsch 1939 are revised, synonymised and considered to belong to Anisoptera incertae sedis. The Lower Cretaceous genus *Necrogomphus* Campion 1923 with two species *N. petrificatus* (Hagen 1850) and *N. jurassicus* (Giebel 1850) is revised and also referred to Anisoptera incertae sedis. The phylogenetic positions of *Protolindenia*, *Aeschnogomphus*, *Aktassia*, *Pseudocymatophlebia* gen. nov., and *Cretapetalura* gen. nov. within the Petalurida are discussed and a phylogenetic analysis of the fossil and extant Petalurida is presented. The Petalurida are identified as sister-group of all remaining extant Anisoptera (Euanisoptera). The new phylogenetic system of Anisoptera by Bechly (1996) is confirmed, and new phylogenetic definitions of the taxon names of Petalurida are proposed. The evolution and historical biogeography of Petalurida is discussed." (Authors)] Address: Nel, A., Lab. Ent., Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimr1.mnhn.fr

11398. Poinar, G.O.; Bozidar, I.; Curcic, P.M.; Coken-dolpher, J.C. (1998): Arthropod phoresy involving Pseudoscorpions in the past and present. *Acta arachnol.* 47(2): 79-96. (in English) ["Pseudoscorpions form phoretic associations with a wide range of arthropods, including at least 44 families of insects and three families of arachnids. The present work brings up to date phoretic associations between pseudoscorpions and different arthropods and discusses the long-standing controversy over whether this behaviour is basically a predatory response or adapted solely for dispersal. That phoresy in pseudoscorpions is of long standing and obligatory in many cases is demonstrated by its continuance for millions of years, as shown by the fossil record. A member of the Chthoniidae attached to a moth in Baltic amber is reported for the first time." (Authors)] The paper refers to Dunkle, S.W. (1984): First record of pseudoscorpions phoretic on dragonflies. *Notul. Odonatol.* 2: 48] Address: Poinar, Jr., G.O., Dept of Entomology, Oregon State Univ., Corvallis, Oregon 97331, USA.

1999

11399. Zamora-Munoz, C.; Soler, J.J. (1999): Asymmetry and sexual selection in insects. *Bol. S.E.A.*: 703-712. (in Spanish, with English summary) [This review paper refers in a chapter to *Coenagrion puella* (Harvey, I.F.; Walsh, K.J., 1993: Fluctuation asymmetry and lifetime mating success are correlated in males of the damselfly *Coenagrion puella* (Odonata: Coenagrionidae). *Ecol. Entomol.* 18(3): 198-202.)] Address: Zamora Muñoz, Carmen, Departamento de Biología animal y ecología, Facultad de Ciencias, Universidad de Granada, 18071-Granada, Spain. E-mail: czamora@ugr.es

2000

11400. Yousuf, M.; Abbasi, M.L.; Khaliq, A. (2000): Description of a new allotype of *Bayadera longicauda* Fraser (Euphaeidae: Odonata) from Azad Kashmir. *Pakistan Entomologist* 22(1-2): 45-46. (in English) ["A single female specimen of *Bayadera longicauda* Fraser has been collected from Muzaffarabad district of Azad Kashmir. As it represents a new allotype, its detailed description is given." (Authors)] Address: Yousuf, M., Dept. of Agricultural Entomology, University of Agriculture, Faisalabad, Pakistan

2001

11401. Gaino, E.; Rebor, M. (2001): Apical antennal sensilla in nymphs of *Libellula depressa* (Odonata: Libellulidae). *Invertebrate Biology* 120(2): 162-169. (in English) ["In an ultrastructural study of the apical antenna of the last nymphal stages of *L. depressa*, we found long sensilla trichodea, 2 sensory pegs, and a coeloconic sensillum on the last article of the flagellum (the distal part of the antenna). The long sensilla trichodea are mechanoreceptors, almost identical to the long filiform hairs of some terrestrial insects and the first sensilla of this kind to be described in aquatic insects. Particular attention was given to the complex coeloconic sensillum, a compound sensillum innervated by 2 groups of 3 neurons wrapped in a dendritic sheath. A cuticular sleeve envelops the distal portion of the outer dendritic segment. The cuticle of the coeloconic sensillum shows

wide channels and is contiguous to the underlying granular and fibrillar layer. Similar structures on the antennae of the adults of other dragonflies were identified as chemoreceptors in previous studies. We hypothesize that this larval coeloconic sensillum might likewise have a chemosensory function, responding to molecules that diffuse through the cuticle and the underlying granular and fibrillar layer, as no clear pore or pore-tubule system is visible. Alternative functions are also explored on the basis of morphological details." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

2002

11402. HYDRA Institut Konstanz (2002): Koordinierte biologische Untersuchungen am Hochrhein 2000; Makroinvertebraten. Schriftenreihe Umwelt Nr. 345: 98 pp. (in German, with French, Italian and English summaries) ["The present report gives the results of the third part of a long-term monitoring of the macroinvertebrates on the High Rhine riverbed. In 2000, as in previous investigations, representative cross-sections of the river were examined with the help of a diver. In comparison with the results for 1990 and 1995, conspicuous changes in the benthic population could be observed in the navigable part of the river. A dense scheme of additional riparian samples produced new faunistic and zoogeographical information. Based on the biological characterisation now available, current deficits are shown and the requirements for ecological improvement are formulated." (Authors)] The study includes records of *Calopteryx splendens*, *C. virgo*, *Platycnemis pennipes*, *Ischnura elegans*, *Gomphus simillimus*, *G. vulgatissimus*, and *Onychogomphus forcipatus*] Address: HYDRA, Institut für angewandte Hydrobiologie, Büro Peter Rey, Fürstenbergstr. 25, 78467 Konstanz, Germany. E-mail: hydra.konstanz@hydra-institute.com

11403. Robson, B.; Sherwood, J.; McKay, S.F.; Kelly, L.M. (2002): Floodplain wetlands of the Gellibrand estuary: What type of invertebrate community?. *Ecological management & restoration* 3(2): 139-141. (in English) ["Along the south coast of Australia, wetlands on the floodplains of lowland rivers and estuaries have been severely altered by agriculture and urbanization. Efforts to restore or rehabilitate these wetlands are hampered by insufficient knowledge of the original condition of these wetlands, or their variability in time and space. This research describes the macroinvertebrate community of wetlands on the floodplain of the Gellibrand River and estuary, which has suffered comparatively few human impacts. The aim of the research was to describe the variability of macroinvertebrate communities as a baseline for the future management of these wetlands, and to contribute to the general understanding of estuary-floodplain wetlands, thereby improving the basis for their management. The Gellibrand River has a catchment area of approximately 1200 km² draining the western slopes of the Otway Ranges, and entering the Southern Ocean at Princetown. From a mean annual flow of 315 000 mL, 25 000 mL are removed per annum for agricultural and domestic use (O'May & Wallace 2001), and flows are closer to natural regimes than most other Western Victorian rivers. The estuary is a bar-built, salt-wedge estuary that becomes completely blocked by the sand bar in most years, during summer

and autumn. Over past decades, the estuary mouth has been opened artificially in most years. to prevent flooding of agricultural land and roads adjacent to the wetlands. At its maximum, the salt-wedge penetrates approximately 10 km upstream from the river mouth, but the estuary may also be completely fresh during high winter discharge (Mckay 2000). The wetlands surrounding Princetown cover 119 ha and are listed as nationally important (Environment Australia 2001). This listing regards the wetlands as an important habitat for animals at vulnerable stages of their life cycle and a refuge from adverse conditions, such as drought. They are a good example of coastal brackish and freshwater marshes, with an important ecological and hydrological role as part of a large wetland complex." (Authors) The list of taxa includes seven Odonata larvae, but no details are given.] Address: Robson, Belinda, School of Ecology & Environment, Deakin Univ., PO Box 423, Warrnambool, Vic 3280. E-mail: brobson@deakin.edundau

11404. Slaats, J. (2002): Libellen kijken in Nederland: Deurnesche Peel. *Brachytron* 6(1): 25-27. (in Dutch) [This regenerated bog is situated along the border of the two Netherlands provinces Noord-Brabant and Limburg. 37 Odonata species are listed from the locality including *Coenagrion lunulatum* and *Leucorrhinia rubicunda*.] Address: Slaats, J., Astense Weg 6, 5768 PD Meijel, The Netherlands. E-mail: jsl@occ.nl

11405. Wakasugi, K.; Osada, M.; Mizutani, M.; Fukumura, K. (2002): Measurement of the dispersal distance of the *Ischnura asiatica*. Appropriate spacing of sanctuaries for aquatic animal life. *Transactions of the Japanese society of irrigation, drainage and reclamation engineering* 70(3): 421-426. (in Japanese, with English summary) ["One of the major concerns in rural areas these days is destruction of habitats of aquatic animal life and consequent loss of biodiversity, partly attributed to implementation of farmland consolidation projects. To cope with this problem, increasing efforts have been made to create animal sanctuaries in and around project areas. What we have yet to know, however, is how best to space these sanctuaries across the tracts of consolidated farmland. Obviously an index for their minimal spacing required is the dispersal distance of the aquatic life in question. In this study, we targeted at the aquatic dragonflies of the *Ischnura asiatica*, supposedly low in flight ability, and investigated how far they flew away from their breeding ground and what environmental factors affected where they reappeared, using the mark-and-recapture method. We conducted the field survey in Utsunomiya City during the August-September period, 2000. The survey revealed that they moved no farther than 1.1-1.2km and submerged fallow paddies greatly affected where they reappeared." (Authors)] Address: not available

11406. Wasscher, M.; de Groot, T. (2002): De Vechtplassen. *Brachytron* 6: 10-12. (in Dutch) [Bog between Utrecht and Randneen, The Netherlands; 29 species are checklisted from the locality.] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: marcel.hilair@12move.nl

2003

11407. Hutchinson, R.; Goulet, H. (2003): Book Reviews: Ontario Odonata. Volume 3 (including observations for the year 2001). Edited and compiled by Paul

M. Catling, Colin D. Jones and Paul Pratt. 2002. The Toronto Entomologists' Association, Toronto, Canada. *The Canadian Field-Naturalist* 117(3): 487. (in English) ["The third volume (208 pages) on Odonata (the order that includes dragonflies and damselflies) of Ontario is now available. About 25 papers are included, treating new Ontario records, notes on Odonata species rarely captured, changes in distribution patterns, annotated lists of Odonata from a region, characterization of species commonly confused, book reviews, an up-to-date checklist of 166 species (80% of the Canadian fauna!) and changes in abundance for many species since Walker's work in the 1940s, and a checklist of species. The lists of Ontario records are most impressive, comprising about 62% of Volume 3, and summarizing in a database format the information about species, locality, number of males, females and immatures for each record. Though the bulk of the records are for 2001, additional records not previously published cover the years 1996 to 1998. The total number for these four years is an impressive 6059 records. Including similar lists in volumes 1 and 2, 15370 records are now databased for 1996 to 2001. Specimens in collections previously added to about 13000 Ontario specimens. This is an exceptional contribution to the natural history of Ontario, providing a solid base to show the distribution of each species, and for the conservation of Ontario Odonata. Hopefully in time, this information could lead to books on Odonata of Ontario. About 1800 databased specimens of Odonata of Ontario are deposited as voucher in the Canadian National Collection, which has been massively upgraded in the past two years (Figure 1). Among the many articles, the one by Paul Catling on the characterization of males and females of *Lestes disjunctus* and *L. forcipatus* was most welcome. Both species have often been confused by many students. The editors intend to produce this type of document for another two years. By then it is hope that about 25000 records will have been entered. These records will become the base for future work on Odonata of Ontario as well as a time capsule at the very end of the 20th and beginning of the 21st century. We must congratulate the 31 contributors listed with their address and e-mail coordinates on page 105. Such a massive effort could not be done singly. To purchase copies of the 2000, 2001 and 2002 documents, contact Alan J. Hanks, 34 Seaton Drive, Aurora, Ontario, Canada L4G 2K1; Phone: (905) 727-6993, e-mail: A.Hanks@aci.on.ca." (Authors)] Address: Goulet, H., K. W. Neatby Building, 960 Carling Avenue, Ottawa, Ontario K1A 0C6 Canada

11408. Tóth, S. (2003): Dragonfly (Odonata) fauna of the Látrányi Puszta Nature Conservation Area. *Natura Somogyiensis* 5: 85-97. (in Hungarian, with English summary) [Hungary; 22 Odonata species are reported during a baseline study in 2000 and 2001. Among others, a good population of *Coenagrion ornatum* is worth to be reported.] Address: Tóth, S., Széchenyi u. 2, 8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

11409. Xu, D.-i.; Li, Z.-s.; Liu, Y.-f.; Zhuang, J.-x.; Wei, G.-r.; You, M.-s. (2003): Investigation on arthropod species in paddy fields. *Jour. of Northwest Sci-Tech Univ. of Agri. and For. (Nat. Sci. Ed.)* 31(5): 101-105. (in Chinese, with English summary) [Gutian, Fujian Province, China. The list of 208 taxa includes *Pantala* sp. and *Crocothemis* sp.] Address: Xu, D.-i., College of Plant Protection, Fuifan Agriculture and Forestry University, Fuzhou, Fujian 350002, China.

11410. Zhang, B.; Pang, H.; Jia, F.; Hang, G. (2003): An investigation of Odonata from Dawuling Natural Reserve of Guangdong. *Natural Enemies of Insects* 25(2): 55-58. (in Chinese, with English summary) [Records of 49 Odonata species from Dawuling Natural Reserve, Guangdong, China are reported. Four species (*Nepogomphus walli*, *Sympetrum uniforme*, *Ischnura mildredae* and *Calicnemis erythromelas*) are new additions to the regional fauna. All specimens are deposited in the Zhongshan University.] Address: Pang, H., Institute of Entomology and State Key Laboratory for Biocontrol, Zhongshan University, Guangzhou, China 510275, China. E-mail: lsshpang@zsu.edu.cn

2004

11411. Fore, L.S. (2004): Development and testing of biomonitoring tools for macroinvertebrates in Florida streams. Final Report. Prepared for: Russel Frydenborg & Ellen McCarron, Florida Department of Environmental Protection, 2600 Blair Stone Rd., Tallahassee, FL 32399-2400, USA: IV + 62 pp + app. (in English) ["Florida DEP assesses the chemical, physical and biological condition of hundreds of stream sites each year. This study used measures of hydrologic condition, riparian and channel habitat condition, water chemistry, and intensity of human land use to define a gradient of human disturbance for stream sites. I evaluated the sensitivity and tolerance of over 1000 stream macroinvertebrate taxa using the human disturbance gradient (HDG). I tested for correlation between the HDG and 36 biological measures of the stream macroinvertebrate assemblage (metrics) and selected the 10 most highly correlated metrics within six categories of biological organization. The six categories (and their selected metrics) were taxonomic richness (total number of taxa, number of Trichoptera taxa, and number of Ephemeroptera taxa); feeding group (percentage filterer individuals); voltinism (long-lived taxa richness); habit (clinger taxa richness); community structure (percentage dominance of the most abundant taxon and percentage Tanytarsini midges); and sensitivity and tolerance (sensitive taxa richness and percentage very tolerant individuals). Metrics were combined into an overall stream condition index (SCI) by transforming metric values into unit-less scores and summing the scores. The SCI was highly correlated with HDG for an independent data set (Spearman's $r = -0.81$, $p < 0.001$). SCI was independent of watershed size and geographic region (panhandle, peninsula and northeast). Across 10 years of sampling, the index showed a similar response to the HDG. SCI was somewhat higher for winter vs. summer samples (3.5%). A large portion of the variability of SCI was due to subsampling in the laboratory (49%). Confidence intervals based on estimates of SCI variance defined 3.7 categories of biological condition that the SCI could detect assuming a single sample. For two site samples, the SCI could detect five categories of biological condition. Biological metrics were also tested for a second stream macroinvertebrate sampling protocol (BioRecon) based on sorting of invertebrates in the field and taxonomic identification in the laboratory. Of the 10 SCI metrics, six taxa richness metrics were tested using BioRecon data; all were highly correlated with both SCI and HDG. From these metrics the BioRecon index was calculated as the sum of scores for the six metrics. The BioRecon index could detect 2.5 categories of biological condition for one sample and 3.5 categories for two

samples. ... Included in the list were all taxa in the Cordulegastridae and selected taxa in the families Aeshnidae, Gomphidae and Libellulidae ..."] (Authors)] Address: Fore, Leska, Statistical Design, 136 NW 40th St., Seattle, WA 98107, USA. E-mail: leska@seanet.com

11412. Rodrigues, D.J.; Uetanabaro, M.; Prado, C.P.A. (2004): Seasonal and ontogenetic variation in diet composition of *Leptodactylus podicipinus* (Anura, Leptodactylidae) in the southern Pantanal, Brazil. *Rev. Esp. Herp.* 18: 19-28. (in English, with Portuguese summary) ["The foraging strategies of amphibians allow them to capture a wide variety of prey, diet variation being generally associated with morphological, physiological, and behavioural traits that facilitate the location, identification, and digestion of food items. Herein we present the diet composition of *L. podicipinus* and variations regarding the number and type of prey consumed by juveniles, males and females during the wet and dry seasons, in the southern Pantanal, Brazil. Sampling was conducted at three different times during the dry season, and three different times during the wet season between June 1998 and May 1999. The quantitative analysis showed that the diet of *L. podicipinus* is composed mainly by Coleoptera (51.0%), Hymenoptera (9.1%), Diptera (8.7%), Aranae (5.3%), and Orthoptera (4.7%). In the wet season, males captured more prey than juveniles and females, but in the dry season there were no differences. Males and females ingested larger prey compared to juveniles. The frog *L. podicipinus* is an opportunist and generalist predator, and the availability of prey in the environment may be an important factor determining its diet composition in the Pantanal." (Authors) Odonata larvae occurred in low frequencies in the stomachs analyzed.] Address: Rodrigues, D.J., Departamento de Biologia, Universidade Federal de Mato Grosso do Sul, Caixa Postal 549, 79070-900, Campo Grande, MS, Brazil. E-mail: poxo@inpa.gov.br

11413. Suh, A.N. (2004): Dragonfly assemblage dynamics and conservation at small reservoirs in KwaZulu-Natal, South Africa. Ph.D.-Thesis. University of KwaZulu-Natal, Pietermaritzburg: XX + 177 pp. (in English) ["A study of the odonate fauna was carried out at the edge of a major escarpment, in eastern South Africa, using the same methodology as has been used in the temperate regions to obtain a sub-tropical perspective. The study used the macroecology approach to compare patterns and responses of these animals (at the developmental stages of larva, teneral and adults) to seasonal, topographical and anthropogenic disturbances. The habitats used were small, but well-established reservoirs located at five elevational gradients: Stainbank Nature Reserve (100 m), Krantzklouf Nature Reserve (450 m), National Botanical Gardens Pietermaritzburg (790 m) Cedara (1050 m) and Mondi Goodhope Estate (1350 m). Although this is essentially a local component of a larger macroecological study, it is shown that even though species and identities differ between temperate, tropical and sub-tropical ecoregions, the general pattern of community response to these variables is similar. Odonate species phenologies in this sub-tropical study showed great similarity to their tropical counterparts by reason of their adults being highly elevation-tolerant, with long flight periods and over-lapping generations. Yet they also show temperate characteristics by overwintering principally as larvae and eggs. The Libellulidae, followed by the Coenagrionidae were the most abundant, elevation-tolerant families, with national ende-

mics constituting only 6.5% of the total species sampled. Classification and ordination methods identified and characterised sub-sites to ecologically meaningful biotopes for odonates. This also allowed inferences as to how the various landscape disturbances at the five elevations affect species richness and abundance. Species that responded to these impacts were potential indicator groups that can assist in the planning and management of the landscape for conservation of biodiversity. Some management recommendations for these landscapes are given. Individual odonate species developmental stages and their environmental relations were investigated using both univariate and multivariate analyses. The solutions to these analyses were then used to describe how odonate species are distributed along major environmental gradients. It was shown that regional processes e.g. elevation and insolation alongside local variables e.g. pH, marginal grasses, percentage shade, exposed rock, marginal forest, marsh and flow greatly accounted for adult (aerial stage) assemblage variation and distribution. Turbidity, floating/submerged vegetation and water depth (also influenced by regional factors), highly explained larval (aquatic stage) variation. Elevation has therefore, an indirect effect in that it determines climate, which in turn, determines soil and vegetation types which then determine species presence and absence. Also, although these artificial water bodies do not increase the 'extent of species occurrence', they are important in increasing their 'area of occupancy'. Dragonflies play a major role in conservation. The Japanese culture has strongly illustrated how dragonflies feature in everyday life more than any other country in the world. While many parks and Botanical Gardens feature dragonfly trails in their nature trails in Britain, this does not necessarily cater for threatened species. Conservation of invertebrates in urban environments in South Africa for example by ecological landscaping designed to encourage dragonflies has been particularly rewarding. A core of regularly occurring odonate species occupied the dragonfly trail at the National Botanical Gardens in Pietermaritzburg, while other species visited the study site at irregular periods. This is likely to be the case for a longer term, say ten years or more. Also, the trail, with updated information on species phenologies, variability and habitat preferences continues to play a valuable role in sensitising an increasingly urbanised population to biodiversity and conservation issues. Odonates remain a major component when assessing ecological components of aquatic biotopes, with the assemblage composition at anyone locality capable of changing over time. This has been extensively illustrated in the northern hemisphere. Medium to longer term changes in odonate population at established reservoirs as demonstrated in this study at the National Botanical Gardens in Pietermaritzburg, South Africa, makes it possible to determine whether a species in a conservation area is being given enough protection from local anthropogenic impacts and effects of unpredictable weather conditions. This in turn enables one to understand how concepts of residency and succession underpin conservation management decisions. In conclusion, this study has addressed some salient aspects of species inventory, monitoring and conservation practice at a local scale that also play a central role in conventional biodiversity conservation practice of a global nature. Information on species phenologies enhances their awareness-raising in addition to providing valuable insights into their population dynamics and conservation, especially for those under threat.

In addition, baseline data from this study and similar ones is useful in conserving biodiversity (as subjects) or in multi-taxa studies (as tools) in conserving ecosystems and/or landscapes. Finally, the macroecological approach employed in this study has great potential for teasing apart local effects from regional and/or global ones, and can contribute to the conservation of biodiversity at both small and large scales." (Author)] Address: Suh, Augustine c/o Samways, M.J., Dept Ento. & Nematol., Univ. Stellenbosch, Priv. Bag X1, 7602, Matieland, South Africa. E-mail: samways@sun.ac.za

2005

11414. Buczyński, P. (2005): Materials to the knowledge of dragonflies (Odonata) of Lublin region. Part III. Collection of the Department of Zoology and Hydrobiology of the University of Agriculture in Lublin. *Wiad. entomol.* 24(4): 197-212. (in Polish, with English summary) ["The Odonata collection of the University of Agriculture in Lublin, Poland made between 1950 and 1993 is documented. Nearly all specimens result from the Lublin region in SE Poland. The collection includes 40 species, and the most interesting are: *Sympecma paedisca*, *Coenagrion lunulatum*, *Nehalennia speciosa*, *Aeshna viridis*, *Orthetrum brunneum*, *O. coerulescens*, *Leucorrhinia caudalis*, *L. pectoralis*. The larvae collected during the studies in a lake littoral with the use of light traps (white, yellow, red, green and blue light) are a curiosity. Despite systematic studies conducted in two lakes near Sosnowica (1967-68, 100 samples), the larvae were caught only twice to yellow light. Six specimens represent *Enallagma cyathigerum*, *Coenagrion puella*, *C. pulchellum*, and *Erythromma najas*. It is very probable that those species, very numerous in the littoral of lakes of Western Polesie, were collected by chance; this was certainly not related to positive phototaxy." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

11415. Krech, M.; Biele, S. (2005): Odonatologische Untersuchungen an Kleingewässern in der Rostocker Heide (Hansestadt Rostock) unter besonderer Berücksichtigung der FFH-Arten *Leucorrhinia albifrons* und *Leucorrhinia pectoralis*. *Archiv der Freunde der Naturgeschichte in Mecklenburg* 44: 91-103. (in German) [Mecklenburg-Vorpommern, Germany; between 2003 and 2005, a total of 36 Odonata species is reported. Species of special interest are *Lestes barbarus*, *Erythromma viridulum*, and the *Leucorrhinia rubicunda*, *L. dubia*, *L. albifrons* and *L. pectoralis*. Water level fluctuation, desiccation and shade are triggers for changes of habitat characteristics caused by succession of vegetation and silting up.] Address: Krech, M., Auf der Großen Mühle 7, D-99198 Erfurt-Linderbach, Germany

2006

11416. Ackerman, J. (2006): Lustkämpfe der Libellen. Die wilden Zeiten der Paarung. *National Geographic Deutschland* 2006(4): 90-105. (in German) [This is a popular account on dragonfly biology based on meetings/interviews with Philip Corbet and Ola Fincke.] Address: Ackerman, Jennifer, 500 Camden Place, Winnipeg, Manitoba, Canada R3G 2V7. E-mail: joeackerman@hotmail.com

11417. De Vries, H.H.; Mensing, V. (2006): Kansen voor de groene glazenmaker in Noord-Brabant. Rapport VS 2006.007. De Vlinderstichting, Wageningen: 24 pp. (in Dutch) [The study outlines the ecology of *Aeshna viridis*, and documents in detail potential habitats of that species in the province Noord-Brabant, The Netherlands.] Address: Mensing, V. c/o Postbus 506, 6700 AM Wageningen, The Netherlands

11418. Eales, H.T. (2006): A survey of the dragonflies and butterflies on selected Northumbrian water sites in Northumberland and Durham, 2006. <http://www.nwl.co.uk/Dragonflyandbutterflysurvey2006.pdf>. II, 29 pp. (in English) [UK; 16 Odonata species from eight localities are documented.] Address: Eales, H.T., 11 Ennerdale Tee, Low Westwood, Durham, NE 17 7PN, UK

11419. Escoto Rocha, J.; Escoto Moreno, A.; Delgado Saldivar, L. (2006): Odonata de los Estados de Guanajuato, Jalisco y San Luis Potosí, Depositados en la Colección Entomológica de la Universidad Autónoma de Aguascalientes. *Investigación y Ciencia* 14(34): 31-35. (in Spanish) [The following 16 Odonata species are deposited in the the entomological collection of the University of Aguascalientes, Mexico: *Lestes alacer*, *Hetaerina occisa*, *Hetaerina titia*, *Argia barreti*, *Ischnura demorsa*, *Libellula saturata*, *Sympetrum illotum*, *Sympetrum corruptum*, *Macrothemis pseudimitans*, *Brechmorhoga mendax*, *Pantala flavescens*, *Dythemis sterilis*, *Pseudoleon superbus*, *Tauriphila azteca*, *Rhionaeschna multicolor*, and *Phyllogomphoides duodentatus*.] Address: Escoto Rocha, J., Av. Universidad # 940, Ciudad Universitaria, C. P. 20131, Aguascalientes, Ags. Mexico. E-mail: jerjaem@yahoo.com

11420. Rainey, W.E.; Power, M.E.; Clinton, S.M. (2006): Temporal and spatial variation in aquatic insect emergence and bat activity in a restored floodplain wetland. Final Report to CALFED. <http://baydelta.ucdavis.edu/files/crg/reports/AquaticInsectBatRaineyetal2006.pdf>. 54 pp. (in English) [The paper includes a passing reference on preying of the Hoary bat *Lasiurus cinereus* on Odonata]

11421. Santos Moreira, J.P. (2006): Caracterização da Fauna Odonotológica da Zona do Parque Natural do Alvão. Relatório de Estágio. Licenciatura em Ecologia Aplicada. Universidade de Trás-os-Montes e Alto Douro. Vila Real: 61pp. (in Portuguese) [Parque Natural do Alvão, Portugal; between May and September 2006, 19 Odonata species were sampled at 28 locations within the boundaries of the park. The species are treated in a monographic way. The regional distribution is mapped.] Address: not stated

11422. Schmidt, Eb. (2006): Libellen beobachten in der Stadt am Kleingarten-Teich. *Naturzeit im Münsterland* 3(5): 14-16. (in German) [The author introduces the biology of Odonata and gives hints how to observe dragonflies from a deck chair.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

11423. Tom, S.; Foote, D.; Ziegler-Chong, S. (2006): Thermoregulation in montane and coastal species of native Hawaiian damselflies - from May 31, 2005 to August 5, 2005. *Hohonu* 6: 93-96. (in English) ["Thermoregulation in native Hawaiian damselfly genus *Megalagrion* can be used to determine slight changes in temperature in regards to global warming. Hawaiian damselflies are an indicator species of habitat health and degradation. Through field and lab experiments the males and

females of the *M. calliphya* and *M. xanthomelas* species were found to have different thermoregulatory processes due to their different colorations and place in which they inhabit. The temperature differences exhibited by different sexes and between two female colour morphs show that there is a significant difference, and may be the cause of their different behaviour choices." (Authors)] Address: not stated

11424. Zhang, D.-h.; Zhang, Z.-g. (2006): A summary of resource of Odonata in Shanxi province. *Journal of Agricultural Sciences* 27(1): 45-50. (in Chinese, with English summary) [117 Odonata species are listed] Address: Zhang, D.-h., School of Life Science, Ningxia University, Yinchuan 750021, China

2007

11425. Bechly, G. (2007): [Book Review] Rosser W. Garrison, Natalia von Ellenrieder & Jerry A. Louton (2006): *Dragonfly Genera of the New World*. *Aquatic Insects* 29(1): 72-75. (in English) [review] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail bechly@gmx.de

11426. Bouwman, J.; de Boer, P.; van Hijum, E.; Hylkema, G. (2007): Wyldemerck eerste officiële libellenreservaat [Wyldemerck - the first official dragonfly sanctuary. *Vlinders* 3 2007: 18-19. (in Dutch) [After several years of planning and construction, in May 12, 2007 near Bar in Gaasterland, The Netherlands, a sanctuary and special reserve for dragonflies was opened. Access is given to several habitat types by walking along the shorelines of the habitats which provide an optimal view to the species. At six places tables with information on Odonata are presented.] Address: Bouwman, J.H., Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

11427. Holuša, O.; Mückstein, P. (2007): Dragonflies (Odonata) of the Zárské vrchy Mts, Faunistic-ecological study. *Parnassia* 2: 77 pp. (in Czech, with English summary) [Czech Republic; 42 Odonata species from 59 localities are reported, mapped and discussed in great detail. The regional list also includes the legally protected species *Leucorrhinia albifrons* and *L. pectoralis*.] Address: Holuša, O., Bruzovská 420, CZ-738-01 Frýdek-Místek, Czech Republic

11428. Kalashian, M. Yu.; Danchenko, A.V.; Khachatryan, H.G.; Karagyan, G.H. (2007): Must be conserved. IUCN Red List Species of Invertebrate Animals in the Fauna of Armenia. Prepared within the CEPF/ WWF funded project "Create baseline data on rare invertebrate animal for the National red book and prepare materials for the Caucasus Red Book and IUCN's Red list". Published with support of UNEP/ Armenia "Implementation of the Article 6 of the UN Framework Convention on Climate Change in Armenia" Project and WWF Armenian Branch: 28 pp. (in Armenia, Russian, and English) [Distribution in Armenia, and some ecological and conservational key factors are given for *Onychogomphus assimilis*.] Address: not stated

11429. Lockwood, M. (2007): Els odonats del Parc Natural de la Zona Volcànica de la Garrotxa. *Annals de la Deligació de Garrotxa de la ICHN* 2: 49-53. (in Catalan) [NE Catalonia, Spain; records of 35 Odonata spe-

cies are listed.] Address: Lockwood, M., La Devesa, 3, 1", E-17850 Besalu, Spain. E-mail: mike@walkingcatalonia.net

11430. Malkmus, R. (2007): Ein neuer Spessartbewohner - die Frühe Heidelbelle. *Spessart* 101(9): 23. (in German) [Heigenbrücken, Bayern, Germany, 24-V-2007; *Sympetrum fonscolombii*] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

11431. Meurgey, F. (2007): Étude sur l'écologie et la distribution de *Protoneura romanae* (Zygoptera; Protoneuridae) espèce endémique de la Guadeloupe. Parc National de Guadeloupe / Muséum d'Histoire Naturelle de Nantes: 31 pp. + annexes. (in French) [In a detailed study, the author outlines the spatial and altitudinal distribution of *P. romanae*. Its larval habitat features and ecology are described too.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

11432. Trueman, J.W.H. (2007): A brief history of the classification and nomenclature of Odonata. *Zootaxa* 1668: 381-394. (in English) ["The classification of insect order Odonata is traced from Linnaeus' *Systema Naturae*, through 19th and 20th century morphology-based taxonomies, to molecular phylogenies published before November, 2007. Past and present nomenclatural difficulties are reviewed and the current situation in regard to rival taxonomies is outlined. Ordinal classifications based on morphological data continue to suffer from intractable uncertainty concerning wing vein homologies between Odonata and other Pterygota, but molecular analyses may soon show where the phylogenetic tree of Odonata should be rooted. The natural classification will become much clearer once this has been achieved." (Author)] Address: Trueman, J.W.H., School of Botany and Zoology, The Australian National Univ., Canberra, Australia. E-mail: John.Trueman@anu.edu.au

11433. Tsuyuki, K.; Sudo, S.; Igarashi, S. (2007): Aerodynamic characteristics of flapping motion of a two-dimensional wing model shaped like a dragonfly wing section. *Journal of the Japan Society for Aeronautical and Space Sciences* 55(No. 645): 459-466. (in English) ["This paper describes the aerodynamic characteristics of flapping motion of a dragonfly wing model. The orbit and feathering angle of a dragonfly wing were measured using a high-speed video camera. The measurement data was used to formulate two mathematical models: linear and Fourier models. The aerodynamic characteristics of a thin plate and dragonfly wing models, which were investigated using a numerical simulation, revealed that the linear model generated a high vertical force during descent and high thrust force during ascent. Although the Fourier model could not generate a high thrust force during ascent, it generated a higher vertical force than the linear model. During the flapping motion in both the models, a marginal difference was observed between the forces generated at the top and bottom. When the feathering angle approached the stroke angle, the resultant force direction acting on the wing models was reversed." (Authors)] Address: Sudo, S., Akita Prefectural University, Ebinokuchi 84-4, Yurihonjo-shi 015-0055, Japan, E-mail sudo@akita-pu.ac.jp

11434. van der Straaten, J. (2007): Hoe fotografeer je vlinders (en libellen)? [How to shoot butterflies (and dragonflies)?]. *Vlinders* 2 2007: 12-14. (in Dutch) [The

paper introduces to butterfly and dragonfly photography techniques.] Address: not stated

2008

11435. Benard, M.F.; McCauley, S.J. (2008): Integrating across life-history stages: consequences of natal habitat effects on dispersal. *Am. Nat.* 171(5): 553-567. (in English) ["Ecological and evolutionary processes are affected by forces acting at both local and regional scales, yet our understanding of how these scales interact has remained limited. These processes are fundamentally linked through individuals that develop as juveniles in one environment and then either remain in the natal habitat or disperse to new environments. Empirical studies in a diverse range of organisms have demonstrated that the conditions experienced in the natal habitat can have profound effects on the adult phenotype. This environmentally induced phenotypic variation can in turn affect the probability that an individual will disperse to a new environment and the ecological and evolutionary impact of that individual in the new environment. We synthesize the literature on this process and propose a framework for exploring the linkage between local developmental environment and dispersal. We then discuss the ecological and evolutionary implications of dispersal asymmetries generated by the effects of natal habitat conditions on individual phenotypes. Our review indicates that the influence of natal habitat conditions on adult phenotypes may be a highly general mechanism affecting the flow of individuals between populations. The wealth of information already gathered on how local conditions affect adult phenotype can and should be integrated into the study of dispersal as a critical force in ecology and evolution." (Authors) The paper includes references to Odonata.] Address: McCauley, S.J., Center for Population Biology, Univ. of California, Davis, CA 95616, USA. E-mail: sjmccauley@ucdavis.edu

11436. Jeworutzki, L.; Frobels, K. (2008): Die Gestreifte Quelljungfer in der Hersbrucker Alb. <http://www.bund-naturschutz.de/uploads/media/3-22.1.0801.pdf>: 19 pp. [Germany; condensed version of a presence-absences study of the larvae of *Cordulegaster bidentata* in Bavarian springs. The results are mapped and many instructive photographs are published from habitats and threats for the species. For a full version of the paper see: <http://www.bund-naturschutz.de/uploads/media/3-22.1.0801.pdf>]

11437. Kukuła, K.; Bylak, A.; Kukuła, E.; Wojton, A. (2008): The influence of European beaver *Castor fiber* L. on fauna in the mountain stream. *Roczniki Bieszczadzkie* 16: 375-388. (in Polish, with English summary) [Niedźwiedzi stream, a tributary of the San, in the Bieszczady National Park, E Poland; Odonata are listed at the genus level.] Address: Kukuła, K., Uniwersytet Rzeszowski, Katedra Biologii Środowiska, ul. Cegielniana 12, PL-35-959 Rzeszów, Poland. E-mail: kku-kula@univ.rzeszow.pl

11438. Malkmus, R. (2008): Wo sich Libellen wohlfühlen - die Steinbacher Sandgrube. *Spessart* 102(8): 14-15. (in German) [near Lohr, Bayern, Germany; 32 Odonata species including *Sympetrum depressiusculum* are documented from the study site.] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

11439. Marczak, D. (2008): Z Kampinoskiego Parku Narodowego. Ważki. [From the Kampinoski National Park. Dragonflies]. Parki Narodowe 3/2008: 17-19. (in Polish) [A total of 45 Odonata species are known from the Polish National Park Kampinoski located north-west of Warsaw. Details are given of *Aeshna affinis*, *A. viridis*, *Ophiogomphus cecilia*, *Leucorrhinia albifrons* and *Sympetrum pedemontanum*.] Address: Marczak, D. E-mail: owady@kampinoski-pn.gov.pl

11440. Martin, M. (2008): Diversity of dragonflies (Odonata) and protected species in Estonia. Ent. Tidskr. 129 (2008) Poster abstracts: 230-231. (in English) [Verbatim: Dragonflies are relatively large and conspicuously active insects. Despite of this more thorough data about ecological features of different species, including biotopical preferences and zoogeographical distribution is still not characterized in Estonia. The accumulation of new material is very occasional. Mainly only faunistic data has been collected and lists of species for several districts have been established. All data we have now is very fragmented and based only on occasional observations. There have been written only two more thorough papers concerning the dragonfly fauna in Estonia: First was made by H. Kauri in 1942 (MSc Theses, unpublished) second by Janika Ruusma in 1980 (Graduation Theses, unpublished). The first records about Estonian dragonflies can be found from year 1778. Nowadays 54 species of dragonflies have been registered. Among these species seven species - *Cordulegaster boltonii*, *Eitheca bimaculata*, *Libellula fulva*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Sympecma paedisca* (All category III, Rare) and *Anax imperator* (IV, Care demanding) are listed in our Red Databook. From year 2004 only 5 NATURA 2000 species – *Ophiogomphus cecilia* (II,IV category by EU habitats directive), *Aeshna viridis* (IV), *Leucorrhinia albifrons*, (IV) *L. caudalis*, (IV) and *L. pectoralis* II,IV). protected in Estonia (Category III). Among these protected species *Aeshna viridis* Eversman is the most rare one, whose distribution data has been rarely updated over past ten years. For *Ophiogomphus cecilia* more distribution data has been collected. Among protected *Leucorrhinia* species, *Leucorrhinia albifrons* is most common. This species is common inhabitant of all bogs water bodies over all territory except island Hiiumaa. Two other species *L. caudalis* and *L. pectoralis* have been very rare in Estonia until now. But in recent years these two species have become quite common in small water bodies in South-East and East Estonia. By opinion of authors there were two main reasons: 1) under changing social conditions fishing-nets were allowed to use to catch fish from small lakes. Before it was not allowed. After this from several lakes big fish, dangerous for dragonfly nymphs, were captured out; 2) distribution of beavers. These creatures have created several small water bodies. It seems that conditions in these water bodies were very acceptable for these two species.] Address: Martin, M., Institute of Zoology and Hydrobiology of University of Tartu, Estonia

11441. Ruf, T. (2008): Ein Neuankömmling im Main-Spessart: Der Südliche Blaupfeil. Spessart 102(8): 16. (in German) [Bayern, Germany; two regional records of *Orthetrum brunneum* from June 2008 are briefly documented.] Address: not stated

11442. Sudo, S.; Takagi, K.; Tsuyuki, K.; Yano, T.; Nishida, K. (2008): The dragonfly flight by a pair of wings and frequency characteristics of wings. Proceedings of the

XIth International Congress and Exposition, June 2-5, 2008 Orlando, Florida USA. Society for Experimental Mechanics Inc.: 8 pp. ["This paper describes the dragonfly flight by a pair of wings and the frequency characteristics of dragonfly wings related to the aerodynamic characteristics. In the first place, free flight by two pairs of wings and a pair of wings of dragonflies was analyzed with a high-speed video camera system. It was confirmed that the dragonfly can fly by a pair of wings. In the second place, the tethered flight of a fly was also studied for comparison. It was confirmed that insect wings undergo strong deformation during the flight. In the third place, the surface shape of dragonfly wings was measured by the three-dimensional, optical shape measuring system. It was clear that the difference of elevation was especially remarkable between the longitudinal veins at the leading edge part. In the fourth place, the dynamic responses of dragonfly wings to the excitation vibration were examined over the relatively wide range of frequency. It was found that natural frequency of dragonfly wings was related to the flapping frequency of the dragonfly." (Authors) *Sympetrum infuscatum*] Address: Sudo, S., Akita Prefectural University, Ebinokuchi 84-4, Yurihonjo-shi 015-0055, Japan, E-mail sudo@akita-pu.ac.jp

11443. Zia, A.; Naeem, M.; Rafi, A.; Hassan, S.A. (2008): A list of damselflies (Zygoptera: Odonata) recorded from Azad Jammu and Kashmir (AJ&K). Pakistan Journal of Scientific and Industrial Research 51(6): 329-332. (in English) ["In the intensive survey of the valley of Kashmir for updating the record of damselflies inhabiting the region, a total of 15 genera and 31 species of damselflies were collected during the summer season of three consecutive years (2005-2007) which are reported." (Authors)] Address: Zia, A., National Insect Museum, NARC-Islamabad, Pakistan

2009

11444. Girilovich, I.S.; Dzhus, M.A. (2009): Nature monument of republic importance "Oak Forest". Belarus Natn. Univ. (BGU), Minsk: 93 pp. (in Russian) [The protected area (surface 24 ha) is situated SW of Minsk (Belarus). *Gomphus vulgatissimus*, *Calopteryx splendens*, *C. virgo*, *Leucorrhinia dubia*, *L. pectoralis*, *L. rubicunda*, *Somatochlora flavomaculata*, *S. metallica*, *Letes dryas*, *L. sponsa*, *L. virens*, *Libellula fulva*, *Libellula quadrimaculata*, and *Sympetrum flaveolum* are listed on pp. 75-76.] Address: Publishers: Prospect Nezavisimosti 4, BY-220050 Minsk, Belarussia

11445. Holuša, O. (2009): The finding of *Somatochlora sahlbergi* (Odonata: Corduliidae) in the northern Norway. Acta Musei Beskydensis 1(1): 97-102. (in English, with Czech summary) [Gandvik, Sor-Varanger, province of Finnmark, northern Norway (N 70°00'16.65", E 29°15'02.21", altitude 81 m a.s.l.), 29-VII-2001; the habitat is described and the ecological requirements and distribution of the species are briefly discussed.] Address: Holuša, O., Dept of Forest Protection and Game Management, Faculty of Forestry and Wood Technology, Mendel University of Agriculture and Forestry Brno, Zemědělská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

11446. Huskens, K. (2009): Libellen gekiekt. Minicursus libellenfotografie [Dragonflies snapped. Basic course in dragonfly photographing]. Vlinders 3 2 009: 10-13. (in

Dutch) [The author gives some basic information on dragonfly photographing.] Address: Huskens, K., De Vlinderstichting, Postbus 506, 6700 AM Wageningen, The Netherlands

11447. Koopmans, I. (2009): Jaarverslag 2008. *Vlinders* 2/2009: 15-18. (in Dutch) [Highlights from the current work realised in 2008 and including several projects on Odonata are briefly introduced.] Address: Koopmans, Ineke, De Vlinderstichting, Postbus 506, NL 6700 AM Wageningen, The Netherlands

11448. Lin, J.-L.; Wei, C.-Y.; Lin, C.-Y. (2009): Aerodynamic performance of thin wings at low Reynolds numbers. *Aircraft Engineering and Aerospace Technology* 81(1): 51-58. (in English) ["Purpose: The purpose of this paper is to explore the aerodynamic performance of wings with different shapes at low Reynolds numbers. Design/methodology/approach: The airfoils of these wings are made from aluminum plates, and the maximum chord length and wingspan are 15 cm. Wings A-D are plates with 6 percent Gottingen camber but different wing platforms. The forward-half sections of wings E and F are dragonfly-like, whereas the rear-half sections of wings E and F are flat and positively cambered, respectively. The aspect ratios of these wings are close to one, and the ratios of plate thickness to the maximum chord length are 1.3 percent. Experimental results indicate that the wings with Gottingen camber have a superior lift and lift-to-drag ratio, whereas the wings with dragonfly-like airfoils perform well in terms of drag and pitch moment. Findings: The aerodynamic measurements of the wings demonstrate that the wing with the Gottingen camber airfoil, a swept-back leading edge and a straight trailing edge is suitable for the use in micro aerial vehicle (MAV). An MAV is fabricated with this wing and the aerodynamic performance of the MAV is examined and compared with the bare wing data. Originality/value: This paper develops several criteria to the design of MAV-sized wings. For example, the thickness ratio of airfoil must be small, usually less than 2 percent. Besides, the airfoil must be cambered adequately. Furthermore, a wing platform with a swept-back leading edge and a straight trailing edge would contribute to the successful flights of MAVs." (Authors)] Address: Lin, J.-L., Department of Aeronautics and Astronautics, Air Force Academy, Gangshan, Taiwan

11449. Lockwood, M. (2009): Les poblacions de *Coenagrion hastulatum*, *Sympetrum pedemontanum* i *Sympetrum vulgatum* a la Cerdanya, 2008. *Ker - Revista de l'Associació Grup de Recerca de Cerdanya* 1(1): 14-25. (in Catalan) [Cerdanya is a region of the eastern Pyrenees divided between France and Spain. Regional records of the three taxa are documented and discussed in great detail.] Address: Lockwood, M., Grupo Oxygastra, Institució Catalana d'Història Natural, Carrer del Carme, 47; 08001 Barcelona, Spain. E-mail: mike@walkingcatalonia.net

11450. Malkmus, R. (2009): *Cordulegaster bidentata*. *Die Gestreifte Quelljungfer im Spessart*. *MKK-Mitteilungsblatt. Zentrum für Regionalgeschichte* 34: 8. (in German) [Bayern, Germany, 2009; new records from the krenal and epithrithral of the streams Kahl and Laufach resp. their tributaries, are documented.] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

11451. Malkmus, R. (2009): Die Geburt einer Libelle. *Spessart* 103(5): 17-19. (in German) [Bayern, Germany; the emergence of *Gomphus pulchellus* is reported and

illustrated in detail.] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

11452. Malkmus, R. (2009): Neu für den Spessart - Die Gestreifte Quelljungfer. *Spessart* 103(9): 22. (in German) [Bayern, Germany, 2009; new records of *Cordulegaster bidentata* from the krenal and epithrithral of the streams Kahl and Laufach resp. their tributaries, are documented.] Address: Malkmus, R., Schulstr. 4, 98759 Wiesthal, Germany

11453. Moody, D. (2009): Mating behaviour in male territoriality *Enallagma vesperum* (Odonata: Coenagrionidae) on ponds in Ohio and northern Michigan. *Ohio Journal of Sciences* 109(3): 67-70. (in English) ["The crepuscular damselfly *E. vesperum*, was studied to document and clarify mating behaviour. This paper is a descriptive synthesis of observations which answer basic questions regarding mating behaviour of *E. vesperum*. Beginning in July 2004 and continuing in the summers through September 2009, approximately 140 hours of direct observation on a lake in Northern Michigan and a lake and two ponds in Ohio were logged to support the results and conclusions. The literature regarding mating behaviour in *E. vesperum* provides little information about male territoriality. The results from this six-year study offer strong evidence of male territory selection and territory defense. Copulatory behaviour and ovipositional behaviour were also recorded. In most coenagrionid species, males remain in tandem with ovipositing females unless the females submerge. In this study, however, females were observed ovipositing in tandem or individually into surface vegetation." (Author)] Address: Moody, D.L., Biology Dept, Univ. of Findlay, Findlay, OH, USA. E-mail: moody@findlay.edu

11454. Reimer, R.W.; Feulner, G.R.; Hornby, R.J. (2009): Errata and Addenda: Updated illustrated checklist of dragonflies of the UAE – including a third species of *Ischnura* damselfly. *Tribulus* 18: 28-36. (in English) [*I. fontainei* is added to the checklist United Arab Emirates Odonata, bringing the status of the known species up to 27. Some errors in the identification of the photographs in that paper are corrected.] Address: Feulner, G.R., P.O. Box 31045, Dubai, United Arab Emirates. E-mail: grfeulner@gmail.com

11455. *Salwinia Ekoklub* (Ed.) (2009): *Bioróżnorodność rzeki Tugi. Przewodnik. - Biodiversity of the River Tuga. A guide.* *Salwinia Ekoklub, Nowy Dwór Gdański*: iv + 39 pp. (in Polish) [Poland; six Odonata species are listed for Tuga River. Due to mislabelling of the specimen (*P. Bucz.*), the representation of *Coenagrion armatum* is wrong] Address: not stated

11456. Schmidt, Eb. (2009): Am Beispiel Karpfenanzucht im Teichgut Hausdülmen. *Artenvielfalt durch Fischkultur. Naturzeit im Münsterland* 6(1): 14-15. (in German) [The author outlines the importance of carp breeding ponds for biodiversity. The ecological situation of carp pond management is compared with primary habitats in the pre-Alps region and water bodies in continental climates influence by nival discharge regimes.] Address: Schmidt, E., Coesfelder Str. 230, 48249 Dülmen, Germany

11457. Sircom, J. (2009): Determinants of the biodiversity and composition of stream insect communities. Ph. thesis. Dalhousie University Halifax, Nova Scotia: 111 pp. (in English) ["The North Mountain of the Annapolis Valley, NS, in eastern Canada, is a ~200 km basalt

ridge drained by many small first or second order streams in independent catchments. The area is fairly uniform geologically, presenting an opportunity to compare streams of similar chemistry, slope and aspect that vary in other respects, such as invertebrate community structure. In this thesis, I examine two macroinvertebrate functional groups to determine key factors influencing their abundance, composition and diversity across catchments. Chapters 2 and 3 are concerned with the predatory invertebrate guild in eight of the streams, in two groups separated by ~65 km. In Chapter 2, I assessed factors influencing composition of the predator guild using similarity matrices. Similarity in predator composition declined with distance, and streams that were more similar in disturbance (spates) were more similar in predator composition. Similarity within one family, Rhyacophilidae, was related to similarity in fish population. Chapter 3 reports the results of laboratory experiments involving two widespread species. Field data suggested an asymmetric interaction between *Sweltsa onkos* (Plecoptera: Chloroperlidae) and *Rhyacophila vibox* (Trichoptera: Rhyacophilidae); behavioural observations in artificial streams supported this. In the presence of *R. vibox*, *S. onkos* had higher mortality and injury rates, and grew less. The results of these chapters suggest that, although disturbance is important in shaping community structure, the results of interspecific interactions can be detected at large scales. *S. onkos* can only attain high numbers in streams where fish predation reduces the abundance of *R. vibox*. Chapter 4 examines biodiversity patterns in the macroinvertebrate detritivore guild in 25 streams encompassing ~80 km of the ridge. Using density and richness of the detritivore community, detrital resource quantity, and top predator abundance, I looked for evidence in support of several mechanisms that can lead to positive species-energy relationships. Patterns conformed to expectations of the 'More Individuals Hypothesis'. It appears that taxonomic richness of the detritivore guild increases with detrital resource availability because more taxa can attain their minimum viable population size where more resources are available." (Author) The thesis includes a few references to Odonata.] Address: not stated; Sircom, Julie

11458. Tatarinov, A.G.; Kulakova, O.I. (2009): [Dragonflies]. [Fauna of the European North-East of Russia. T. 10]: 214 pp. (in Russian, with English summary) [50 Odonata species from the European northeastern Russia are keyed (larvae and imagines) and mapped.] Address: not stated

11459. Veling, K. (2009): Fotowedstrijd blijkt succes. *Vlinders* 1 2009: 4-9. (in Dutch) [Nine photographs with dragonflies are presented.] Address: Veling, K., De Vlinderstichting, Postbus 506, 6700 AM Wageningen, The Netherlands

11460. Zhao, Y.; Tong, J.; Sun, J.; Chen, D.; Zhang, J. (2009): Collection and processing of the point clouds of dragonfly *Pantala flavescens* Fabricius wing by reverse engineering. *Journal of Agricultural Mechanization Research* 31(11): 18-21. (in Chinese, with English summary) ["The digital point groups of geometrical surfaces of *P. flavescens* membranous wings were obtained through measuring with a 3D scanner. Using reverse engineering software, imageware, the scanning data point groups of the dragonfly wing were processed, including of deleting error points, smoothing the scanning data by Gaussian filter and reducing the data by chordal

deviation method. Based on the shape features of the dragonfly wing, the boundary curves were picked up by circle-select points from the scanning data point groups and then were connected two by two to form a whole. The 3-dimensional models of the dragonfly wing were reconstructed with the boundary curves and the scanning data point groups." (Authors)] Address: Zhao, Y., College of Mechanical and Power Engineering, Henan Polytechnic University, Jiaozuo 454000, China

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11461. Aly, M.Z.Y.; Osman, K.S.M.; Ibraheem E.E.; Nour, A.N. (2010): Diversity of some aquatic and aerial odonatus dwellers of the River Nile in Upper Egypt. *Egypt. Acad. J. biolog. Sci.* 3(2): 83-93. (in English, with Arabian summary) [This study is unquestionably a result of the great personal enthusiasm and broad literature review on ecology of Odonata. Unfortunately the authors used for identification of imagos the German books of Sternberg & Buchwald (1999, 2000), and for larvae Carchini (1983) with its Italian focus.] Address: Aly, M.Z.Y., Department of Zoology, Faculty of Science, South Valley University, Egypt

11462. Banerjee, S.; Aditya, G.; Saha, N.; Saha, G.K. (2010): An assessment of macroinvertebrate assemblages in mosquito larval habitats—space and diversity relationship. *Environmental Monitoring and Assessment* 168: 597-611. (in English) ["The aquatic bodies designated as mosquito larval habitats are diverse in size and species composition. The macroinvertebrate predators in these habitats are elements that influence the abundance of mosquito species, providing a basis for biological control. Assessment of species assemblage in these habitats will indicate the possible variations in the resource exploitation and trophic interactions and, therefore, can help to frame biological control strategies more appropriately. In the present study, the species composition is being investigated in five different mosquito larval habitats at a spatial scale. A random sample of 80 each of the habitats, grouped as either small or large, was analyzed in respect to the macroinvertebrate species assemblage. The species composition in the habitats was noted to be an increasing function of habitat size (species number = $1.653 + 0.819$ habitat size) and, thus, the diversity. The relative abundance of the mosquito immatures varied with the habitat, and the number of useful predator taxa was higher in the larger habitats. In the smaller habitats—plastic and earthen structures and sewage drains, the relative and absolute number of mosquito immatures per sampling unit were significantly higher than the pond and rice field habitats. This was evident in the cluster analysis where the smaller habitats were more related than the larger habitats. The principal component analysis on the species diversity yielded four and six components, respectively, for the smaller and larger habitats for explaining the observed variance of species abundance. The species composition in the habitats was consistent with the earlier findings and support that the abundance of coexisting macroinvertebrate species regulates the relative load of mosquito immatures in the habitats. The findings of this study may be further tested to deduce the relative importance of the habitats in terms of the productivity of mosquito immatures at a temporal scale." (Authors) The paper includes a reference to a zygopteran specimen.] Address: Banerjee, S., Dept of Zoology,

Univ. of Calcutta, 35 Ballygunge Circular Road, Kolkata, 700019, India. E-mail: soumyajitb@gmail.com

11463. Borah, P.; Kumar Acharjee, B.; Das, M.; Kumar Saikia, P. (2010): Diversity and distribution of damselflies in Gauhati University campus, Assam, India. *NeBIO* 3(2): 33-36. (in English) [Seven taxa (*Archilestes californica* [sic!], *Ceriagrion coromandelianum*, *Rhodischnura nursei*, *Agriocnemis pygmaea*, *Dysphaea ethela*, *Ischnura aurora*, Unidentified) are listed.] Address: Acharjee, B.K., Kendriya Vidyalaya, Dimapur – 797106, Nagaland, India. E-mail: biswajitacharjee79@gmail.com

11464. Bota-Sierra, C.; Baena-Bejarano, N.; Bermudez, R.C. (2010): Primeros registros de *Gomphomacromia fallax* (Odonata: Corduliidae) en Colombia. *Revista Colombiana de Entomología* 36(2): 333-334. (in Spanish, with English summary) [Four records of *G. fallax* from 2008 and 2009 extends the northern range of its known distribution in South America. The species is found in the forested areas of the Colombian Andes between 1.700 and 2.800 m a.s.l.] Address: Bota-Sierra, C., Estudiante de Biología de la Univ. del Antioquia. Grupo de Entomología Universidad de Antioquia. A.A. 1226, Colombia. E-mail: corneliobota@gmail.com

11465. Chaudhry, M.T.; Aslam, M. (2010): *Anax indicus* Lieftinck, 1942 (Odonata: Anisoptera: Aeshnidae) an addition in the fauna of Pakistan. *Pakistan J. Zool.* 42(1): 99-101. (in English) ["*A. indicus* is recorded for the first time from Pakistan; it is the fourth species of the genus to be recorded from the country. A key to all species of *Anax* known from Pakistan is presented." (Authors)] Address: Chaudhry, M.T., Department of Entomology, PMAS, Arid Agriculture University, Rawalpindi, Pakistan. E-mail: chtariq273@hotmail.com

11466. Chen, Y.H.; Zhao, Y.; Huang, W.M.; Shu, D.W. (2010): Kinematics of dragonfly (*Sympetrum flaveolum*) flight. 6th World Congress of Biomechanics (WCB 2010). August 1-6, 2010 Singapore, IFMBE Proceedings 31(1): 56-59. (in English) ["The kinematics of the flapping flight of *S. flaveolum* is investigated. The flapping patterns of the hindwing are recorded and studied thoroughly using a high speed video camera with the highest shuttle speed and resolution as reported so far on study of insect flights. The overall results indicate that the flapping pattern of a dragonfly hindwing at the nodus and the pterostigma can be either a simple figure-eight or a double figure-eight, which is a new discovery. The angle of attack and the wing attitude are studied quantitatively. The relative position of the leading edge and trailing edge implies the presence of lift-enhancing mechanisms after stroke reversal. It is also found that the spanwise leading edge spar of a dragonfly wing is not one rigid piece, but two pieces hinged at the nodus with physical constraint of fort}' degrees. The elastic modulus of the costa of a hindwing is estimated through vibration tests using a vibrometer." (Authors)] Address: Chen, Y.H., School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

11467. Dmitriew, C. (2010): Evolutionary ecology of growth in insects: What maintains variation in growth trajectories at the phenotypic and genotypic levels? Doctoral thesis, Department of Ecology and Evolutionary Biology, University of Toronto: VI, 222 pp. (in English) ["Growth rates are highly variable, both within and among genotypes and populations. The resolution of the trade-off between size and age at maturity has been

the study of extensive research by life historians. The fitness advantages of large body size and rapid development time are well supported, leading to two predictions. First, realized growth rates should be maximized. Second, growth rate will be subject to strong stabilizing or directional selection, and consequently, low genetic variability. In real populations, despite the advantages of rapid growth, animals often, in fact, grow at rates lower than the maximum rate that is physiologically possible, even in the absence of external constraints on growth rate (e.g. resource restriction or risk of predation while foraging). This implies that growth may have direct fitness consequences that are independent of the size and age of maturity, thereby lowering the optimal rate of growth. In addition to inducing plastic declines in growth rate, such costs may also select for lower intrinsic rates of growth. Despite the strong fitness effects arising from attaining a large body size quickly, variation in growth rate persists at both the phenotypic and genetic levels. The evolutionary and ecological factors contributing to this variation in growth rate are the focus of this thesis. Growth rate variation in insect model species was produced by the manipulation of resource levels during development. By comparing fitness-associated traits and body composition of adults from different treatment groups, I identify direct costs of rapid growth that could explain why animals benefit from growth at submaximal rates. In the second part of the thesis, the relationship between environmental variation and genetic variance in growth rate is investigated by quantitative genetic analysis of body size at different ages and in different growth environments. The results of this analysis suggest that environmental stress can lead to increased genetic variance via decanalization. This has consequences for the evolvability of growth rates in changing environments." (Author) See also: Dmitriew, C., Cooray, M. & Rowe, L. 2007. Effects of early resource-limiting conditions on patterns of growth, growth efficiency and immune function at emergence in a damselfly (Odonata: Coenagrionidae). *Can. J. Zool.* 85: 310-318.] Address: Dmitriew, C., Dept of Ecology and Evolutionary Biology, University of Toronto, Toronto ON M5S 3G5, Canada. E-mail: dmitriew@zoo.utoronto.ca

11468. Donnelly, N. (2010): Book Review: "Field Guide to the Dragonflies and Damselflies of New Jersey", by Allen E. Barlow, David M. Golden, and Jim Bangma. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, 2009, 285 pages (many in color), spiral bound. The price is \$36 and it can be ordered through the Conserve Wildlife New Jersey Foundation, <<http://www.conservewildlifenj.org/support/cwf/publications.html>>. *Argia* 22(1): 18-19. (in English) [„This New Jersey guide now fills an important gap: thorough coverage of the heart of the Middle Atlantic states. It will be very useful from Maryland to southern New England, and west at least through Pennsylvania and New York. The guide is arranged in three parts. The first, and shortest, part is introductory and covers study techniques and basic morphology. The second, and longest, part covers the description, habits, habitat of each New Jersey species. The individual accounts are fairly exhaustive, including description, statement of abundance, similar species, where and when to find them, behaviour, and overall range. For a few confusing groups there are black and white illustrations of body parts necessary for identification. The third section consists of very good colour illustrations of each species, with a county-level range map for New Jersey. These il-

illustrations are all photos, and I think the printing has been faithful to the colours." (Author)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

11469. Doucet, G. (2010): Clé de détermination des exuvies des Odonates de France. Site Internet: <http://guillaume.doucet.free.fr/>: 64 pp. (in French) [The first part of the book, devoted to the physiognomy of exuviae, describes their structure and the associated terminology. The second part, which is in the form of a dichotomous key, allows determination of exuviae species (or subspecies) level. The guide is illustrated with over 200 photos, and allows identification of more than 70 taxa or two-thirds of French odonates.] Address: SFO, 7, rue Lamartine, F-78390 Bois d'Arcy, France

11470. Gauci, C.; Sciberras, A. (2010): First records of *Orthetrum chrysostigma* (Odonata: Libellulidae) Burmeister, 1839 in the Maltese Islands. *Central Mediterranean Naturalist* 5(2): 78-80. (in English) [Four records between 2008-2010 of *O. chrysostigma* from Malta are documented.] Address: Sciberras, A., 131, "Arnest", Arcade Str., Paola, Malta. E-mail: bioislets@gmail.com

11471. Goenendijk, D. (2010): Mysterious and beautiful, the Northern Emerald. *Vlinders* 3/2010: 18-21. (in Dutch, with English summary) ["*Somatochlora arctica* is one of the least known and rarest dragonflies of north-west Europe; in the Netherlands it is listed as a threatened species. One of the most characteristic species of living raised bog, its decline has been paralleled by the loss and degradation of such wetland habitat. We set up a Species Protection Plan which came into action in 2005. Seven Dutch populations are now known. Priority was given to locating the breeding grounds and understanding the adult's behaviour. Both males and females were seen frequenting small pools of about a metre deep. The surface was almost completely covered with rather dried out looking *Sphagnum* moss, often with other bog plants growing in it. We saw females ovipositing, and found larvae in various stages and their empty skins (exuviae). These pools have been targeted for conservation measures. On the short term, managers are given on-site advice either on how to protect them or how to dig new ones, depending on the local situation. On the long term, it is important that hydrological plans for the restoration of the bog include such pools, thus ensuring suitable breeding grounds for this rare and beautiful species." (Authors)] Address: Groenendijk, D., De Vlinderstichting, Postbus 506, 6700 AM Wageningen, The Netherlands. E-mail: dick.groenendijk@vlinderstichting.nl

11472. Gordon, D.P. (2010): New Zealand inventory of biodiversity Vol. 2. Kingdom Animalia. Chaetognatha, Ecdysozoa, Ichnofossils. 544 pp. Canterbury University Press: 250-252. (in English) [On pages 250-252, the author introduces to the biology of the regional Odonata fauna.] Address: Canterbury University Press, University of Canterbury, Private Bag 4800, Christchurch 8140, New Zealand

11473. Hannon, E.R.; Hafernik, J.E. (2010): Reintroduction of the San Francisco fork-tail damselfly into an urban park, California, USA. In: Soorae, P. S. (ed.) (2010) *Global re-introduction perspectives: Additional case-studies from around the globe*. IUCN/SSC Reintroduction Specialist Group, Abu Dhabi, UAE, xii + 352 pp: 33-36. (in English) ["Feasibility: Most of the watershed that drains into Glen Canyon has been lost to

urbanization. However, *I. gemina* persists in small, isolated wetlands similar to those in the canyon. Because adults usually move only short distances during their lifetimes, damselflies released at a site have a good chance of remaining and reproducing at that site enhancing prospects for success. The Glen Park neighbourhood also is home to a group of citizens committed to maintaining native plants and animals in Glen Canyon. Their participation in active management of introduction sites could be key to future success. Implementation: We conducted a project during 1996 and 1997 to re-introduce *I. gemina* into Glen Canyon. The receiving site for adult damselflies was a linear asphalt channel on the rim of the easternmost slope of Glen Canyon Park. The channel carries water from a permanent seep. This channel was the sole breeding area for *I. gemina* in Glen Canyon prior to its local extinction (Garrison & Hafernik, 1981b; Hafernik & Garrison, 1986). We surveyed surrounding wetlands on the San Francisco Peninsula to find a source of stock for reintroduction. Our surveys indicated that the nearest large population of *I. gemina* was in a wetland approximately 12 km south of Glen Canyon. We assessed biotic and abiotic characteristics of the receiving site and found adequate larval food for *I. gemina* in the channel and in newly created ponds in the canyon bottom. Neither habitat contained fish, although the ponds contained larval dragonflies (*Aeshna* sp.), which could prey on *I. gemina* larvae. To restore habitat for *I. gemina*, we cleared aquatic vegetation that had grown in and over the channel. This work left the site relatively free of aquatic vegetation with open and sun-exposed areas. In addition, the California Conservation Corps implemented a habitat restoration project in the bottom of the canyon. They removed riparian trees and shrubs (e.g., *Salix* spp.) from a large seep and constructed three new pond-like habitats in Islais Creek near the seep. At the source site, we collected approximately 40 mating pairs on three separate days. This number was deemed appropriate since it was not likely to negatively impact the source population, it provided an adequate sample of genetic diversity of the source population, and it allowed new releases to approximate the number of adult damselflies previously found at the channel. We carefully transferred damselflies into small plastic vials with a source of moisture. We transported them to our laboratory in a cooler containing ice to limit stress from handling, warm temperatures, and light. In the laboratory, we marked individuals on their wings with a unique number using an indelible ink pen. We released the damselflies at the channel the following morning to give them a chance to feed before their midday peak mating period. We chose mating pairs because they provided an equal number of males and females for reintroduction. Secondly, it assured that individuals transferred were reproductively active, which increased the chance of oviposition at the receiving site. Thirdly, pairs are conspicuous while unpaired females are usually cryptically coloured and forage and rest away from the water (Hafernik, 1989). Lastly, we chose mating adults because juvenile damselflies are more easily damaged in handling than reproductively mature ones. We re-introduced captured adults instead of lab-reared adults because re-introducing mated females maximized the likelihood of establishing a new population quickly. Alternatively, another life history stage, such as eggs or larvae, could have been used for the reintroduction. However, this procedure would have been more labour intensive and would not have allowed comparison of the behaviour of newly released

adults with prior research in the canyon. Post-release monitoring: We monitored the re-introduced population daily to estimate mortality and movement patterns and to observe their behaviour. After a large initial decrease in recapture rate compared to previous years, survival and movement patterns were similar to those of previous studies. As in previous studies, some damselflies dispersed from the channel to the ponds below. We observed damselflies behaving normally and mating and ovipositing into aquatic vegetation. At least two generations of new adults were observed in 1996. In 1997, damselflies emerged in the spring, but did not persist into the fall. Subsequent yearly visits to Glen Canyon have found no individuals of *I. gemina*. Future plans by the City of San Francisco call for re-introducing the damselfly again if it is not observed in the next five years. Success will require active management of wetlands in the canyon to control invasive vegetation. Additional re-introductions are being considered in restored wetlands in the Presidio of San Francisco, a U.S. National Park. Reason(s) for success/failure: (1) Successfully trans-located the species. (2) Species behaviour upon release was not impacted. (3) Unable to maintain or "re-create" natural processes to keep habitat suitable through time." (Authors)] Address: Hafernik, J.E., Dept of Biology, San Francisco State Univ., 1600 Holloway Ave., San Francisco, CA 94132, USA. E-mail: hafernik@sfsu.edu

11474. Heidemann, H.; Dommanget, J.-L. (2010): Analyse d'ouvrage: Protéger et favoriser les libellules. Guide pratique de protection de la nature par Hansruedi Wildermuth et Daniel Küry. *Martinia* 26(1-2): 58-60. (in French) [Review of Wildermuth, H.; Küry, D. (2009): Libellen schützen, Libellen fördern. Leitfaden für die Naturschutzpraxis. Beiträge zum Naturschutz in der Schweiz 31. 88 pp.] Address: Dommanget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

11475. Henheik, H. (2010): Die Libellenfauna des Landkreises Reutlingen. *Mercuriale* 10: 15-34. (in German, with English summary) ["Distribution, frequency and phenology of the Odonata species of a 40 x 40 km area located on the central Swabian Alb (Baden-Württemberg, Germany) have been described for the past 10 years. In this karst landscape, which holds few surface waters, 48 species were detected. Reproductive activities were recorded for 36 of these species. Some of them did not breed regularly.] Address: Henheik, H., In Angeräcker 1, 72829 Engstingen, Germany. E-mail: hhenheik@googlemail.com

11476. Holly, M. (2010): Ważki w Bieszczadach [Dragonflies in Bieszczady Mts]. *Bieszczady* 10/2010: 19-21. (in Polish) [Poland; the author introduces into the regional Odonata fauna and outlines faunistic interesting species.] Address: Holly, M., Ośrodek Naukowo-Dydaktyczny Bieszczadzkiego Parku Narodowego, ul. Belska 7, PL-38-700 Ustrzyki Dolne, Poland. E-mail: marekholly@wp.pl

11477. Kalkman, V.J. (2010): Odonata - libellen. In: J. Noordijk, R.M.J.C Kleukers, E.J. van Nieuwerkerken, A.J. van Loon (eds.): *De Nederlandse biodiversiteit: Hoofdstuk 5: 203-205.* (in Dutch) [Brief general introduction in dragonfly biology and biodiversity in The Netherlands.] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

11478. Kampwerth, U. (2010): „Die Letzten werden die Ersten sein“: Koexistenz von Cordulegaster-Larven und Köcherfliegen (Trichoptera: Limnephilidae) in temporären Fließgewässern. *Mercuriale* 10: 1-13. (in German, with English summary) ["In the past 20 years, larvae of the dragonflies *Cordulegaster boltonii* and *C. bidentata* have been found with high constancy in temporary woodland streams which are also known to be habitats of the caddisflies *Stenophylax mitis* and *Glyptotaelius pellucidus*, respectively. The question arises whether any relationship between these dragonflies and these caddisflies exists which could explain the frequent coexistence in evolutionary terms. ..."] (Author) Drought resistance of eggs and larvae, use of temporary running waters as habitat and advantage of *Cordulegaster* oviposition near egg deposits of *G. pellucidus* are discussed in detail.] Address: Kampwerth, Ute, Steubenstr. 202, 63225 Langen, Germany. E-mail: Ute.Kampwerth@googlemail.com

11479. Kjærstad, G.; Andersen, T.; Brittain, J.E.; Olsvik, H. (2010): Norsk Rødliste for arter 2010. The 2010 Norwegian Red List for Species. *Døgnfluer, øyenstikkere, steinfluer, vårfluer - Ephemeroptera, Odonata, Plecoptera, Trichoptera.* In: Kålås, J.A., Viken, Å., Henriksen, S. & Skjelseth, S. (red.) 2010. Norsk rødliste for arter 2010. Artsdatabanken, Norge Sjøtun, K., Fredriksen, S., Heggøy, E.: 227-234. (in bilingual Norwegian and English) [The following species are redlisted: *Brachytron pratense*, *Calopteryx splendens*, *Coenagrion lunulatum*, *Epitheca bimaculata*, *Gomphus vulgatissimus*, *Lestes dryas*, *Leucorrhinia albifrons*, *Leucorrhinia caudalis*, *Leucorrhinia pectoralis*, *Libellula depressa*, *Onychogomphus forcipatus*, *Orthetrum cancellatum*, *Platycnemis pennipes*, *Somatochlora flavomaculata*, *S. sahlbergi*, and *Sympetrum sanguineum*. "Sympetrum vulgatum, has been removed from the Red List. It has been increasingly observed since 2006 and seems to have expanded its range, probably in response to the rising temperature associated with climate change. The majority of dragonfly species have been moved from the two highest categories of threat (CR and EN) to VU or to NT, primarily due to an increasing frequency of observations and better knowledge about their occurrence." (Authors)] Address: Olsvik, H., N-6694 Foldfjorden, Norway. E-mail: haolsvik@frisurf.no

11480. Kosterin, O.E.; Zaika, V.V. (2010): Odonata of Tuva, Russia. *International Journal of Odonatology* 13 (2): 277-327, pl. IVb. (in English) ["The odonate fauna of Tuva in Siberia, Russia, is documented, based mainly on data from expeditions in 1990, 2000 and 2004, and examination of collections preserved in Novosibirsk. The checklist of Tuvian Odonata presently includes 47 species. In the southern Ubsu-Nur depression 29 species were recorded (two just there); in the Central Tuvian depression 34 species (six just there) and in the Todzha depression 32 species (nine just there). The fauna of the more humid taiga region of Todzha, separated from the arid remainder of Tuva by the Obruchev Mts, contained some forest species but lacked seven species found elsewhere in Tuva. In spite of Todzha's position in the north-east, its fauna showed a more western character and included a population of *Calopteryx splendens* with a high proportion of androchromic females and males with wings coloured to the tips. Todzha was also inhabited by *Enallagma c. cyathigerum* with a variably melanized abdomen, while in the Central Tuvian and Ubsu-Nur depressions, *E. c.*

risi occurred. In Turan and the Upper Kaa-Khem basin, intergradation between both taxa took place. In Todzha, *Somatochlora exuberata* and *S. metallica abocanica* were sympatric without intermediate forms and with habitat segregation, thus proving their status as separate species. Todzha was also inhabited by *Ophiogomphus obscurus* while the rest of Tuva harboured *O. spinicornis*. (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

11481. Łabędzki, A.; Chrzanowski, A.; Kuźmiński, R.; Mazur, A.; Rutkowski, P. (2010): The Natura 2000 system and the problem of dragonfly protection in Poland. *Zarządzanie Ochroną Przyrody w Lasach IV*: 94-104. (in Polish, with English summary) ["As a result of forest habitat survey carried out in the years 2006-2007 in State Forests, it was found that many insect species are present in a much higher number of sites than previously thought. The success of the survey was much due to the composition of teams that carried out the survey. Prevention of forest damaging insects connected with performance of forest management tasks may pose a direct threat to dragonfly refuges. In Poland there exists a dissonance between the red list of Polish dragonflies and the protection measures with respect to these insects [Bernard et al. 2002, 2009]. The list of protected species includes all endangered species, but only to a limited extent it translates to real protection policy and practical protection measures. The species *Leucorrhinia pectoralis* and *Ophiogomphus cecilia* are among those unthreatened which was confirmed in the course of the survey carried out. The scope of survey did not include the *Coenagrion ornatum* (Selys) species. Currently, it is a critically endangered species in Poland which, in order to be preserved in national habitats, requires active protection measures that should be undertaken as a priority." (Authors) The Polish distribution of *Ophiogomphus cecilia*, *Coenagrion ornatum*, and *Leucorrhinia pectoralis* is mapped in detail.] Address: not stated

11482. López, L.I.; Gutiérrez, P.; Mora, J.M. (2010): Macrofauna Acuática de la Quebrada Santa Inés, Subcuenca del Río Yeguaré, Honduras. *Ceiba* 51(1): 17-28. (in Spanish, with English summary) ["Santa Inés is a stream of the Yeguaré River sub basin, located in the departments of Francisco Morazán and El Paraíso, Honduras. Santa Inés supplies water to several human communities. Three stations were sampled to study the macroinvertebrate community composition of the Santa Inés stream. A group of 3,525 individuals was collected in the stream belonging to 55 families. The dominant group was Ephemeroptera, an order generally abundant in mountain streams. On the trophic structure, predators were constant along the stream, while filter-feeding insects were the second dominant group in Santa Inés with 25% of the individuals. Santa Inés contains a high structural complexity, where all possible trophic groups of aquatic macroinvertebrates in a river system are represented. The micro basin geography of the Santa Inés stream, the current land use and the community of aquatic macroinvertebrates found in the stream makes it an ideal study subject under the River Continuum Concept." (Authors) 18% of specimens belong to the Odonata. All are treated at the genus level.] Address: López, Lucía Isabel, Consultora Ambiental, Zamorano, Honduras. E-mail: luciaisa2@gmail.com

11483. Lorenzo-Carballa, M. O.; Cordero-Rivera, A.; Andrés, J.A. (2010): Islands and parthenogenesis: genetical and ecological correlates of asexual reproduction in *Ischnura hastata* (Insecta: Odonata, Coenagrionidae). In: Pérez-Mellado, V. & Ramon, M. M. (eds.), *Islands and Evolution*, Institut Menorquí d'Estudis. *Recerca*, 19. Maó, Menorca: 281-307. (in English, with Spanish summary) ["The concept of "geographic parthenogenesis" refers to the observed pattern of non-overlapping distributions of sexual and parthenogenetic lineages of the same species. Hypotheses proposed to explain this phenomenon mostly lay on the idea that parthenogenetic lineages can persist in the long term if they are able to escape from the interaction with either sexual lineages and/or biological enemies (namely, predators and parasites). Therefore parthenogenetic reproduction will be more likely to occur in places that are difficult for sexuals to colonize or in stable environments. Islands have been traditionally regarded as ideal habitats for parthenogens, due mainly to their isolation and to the fact that they usually have less number of species than mainland (and thus the number of biological interactions in islands will be also lower). The analysis of patterns of mite ectoparasitism in sexual and parthenogenetic populations discards host-parasite interactions as the cause of geographic parthenogenesis in this species. The low incidence of parasitism observed in the parthenogenetic populations, where no mites have been found at most of the studied ponds, is likely to be due to the lack of parasites in the islands. Therefore, the habitat stability of the Azores, coupled with a low incidence of biological interactions must have allowed the persistence of this parthenogenetic population despite the lack of genetic variation observed, thus adding new evidence on the importance of islands as favorable habitats for parthenogenetic reproduction." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

11484. Marinov, M. (2010): Spatial modelling of dragonfly habitats in New Zealand (Odonata: Insecta). Dissertation. Master of Applied Sciences, Environmental Management. Lincoln University: VI + 69 pp. (in English) ["While New Zealand is poor in Odonata species the 17 species thus far established have great natural importance (Moore 1989). Ten of them are endemic to the islands representing the country. Those include four genera known to occur only in this part of the world (Rowe 1987). This poses a great responsibility on New Zealand to protect this natural treasure. Damselflies and dragonflies are considered well protected within the national parks, but the loss of habitats could severely impact them in the future. This suggests that a habitat assessment should be prepared for the whole country that will serve as base-line data set for monitoring the development of the natural environment for the Odonata species in New Zealand. 14 species have been selected for this analysis. Their biological features and ecological requirements were considered in preparing a working habitat assessment methodology. Habitat models were developed using ArcGIS 9.2 software. Multistep spatial analysis was carried out to reclassify the layers containing the important information on the land topology representing crucial elements in the Odonata species habitats. The final outputs are individual species maps where the New Zealand territory is marked with four different colour classes corresponding to the ranks of im-

portance that each area is considered to have for individual species. The models are named probabilistic in that they reveal the areas where the ecological demands of the species are approached at a maximum level. However, they should not be used as distribution maps. Probabilistic models are contrasted against deterministic models used in other Odonata habitat models. The strengths and weaknesses are discussed and some important conclusions and recommendations are described and suggested." (Author) Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: mgmarinov@yahoo.com

11485. Marinov, M.; McHugh, P. (2010): Comparative study of the Chatham Islands Odonata: morphological variability, behaviour and demography of the endemic *Xanthocnemis tuanuii* Rowe, 1987. International Dragonfly Fund - Report 30: 1-44. (in English) ["Faunistic investigations on adult insects and molecular research on larvae have identified the existence of at least four species of Odonata on the Chatham Islands. The species resemble their New Zealand counterparts, although there are morphological deviations from the typical diagnostic features. Molecular evidence is not concordant with earlier morphological results as far as the genus *Xanthocnemis* is concerned. Genetic data suggest there are two species on the island while morphological investigations revealed just one. This topic needs further clarification and is given special attention in the present study. The main aim of the present study is to establish the taxonomic position of Chatham Island *Xanthocnemis* species and its relation to New Zealand main island fauna. It also provides some data on the biology of the local species and estimates of key demographic parameters (i.e., survival and abundance). The results show that Chatham Islands inhabitants are close morphologically to their New Zealand main island counterparts. Between-island differences in wing area and abdomen-to-body length ratio were found, but were largely attributable to the harsh environment on the Chatham Islands and its influence on body size. Chatham *Xanthocnemis* exhibited low survival rates and a great diversity of female colour morphs and certain behavioural traits (like underwater oviposition), which are suspected to be due to a composite influence of low summer temperatures, constant winds, and low pH. Ultimately, the taxonomic status of the Chatham Island *Xanthocnemis* species needs further confirmation based on molecular analysis of adults." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: mgmarinov@yahoo.com

11486. Randsdale, N. (2010): Dragonflies of La Brenne & Vienne. Naturetrek Tour Report 23 - 30 June 2010: 13 pp. (in English) ["This two-centre holiday in central-western France gave us an excellent insight into both the dragonfly fauna and abundant butterflies, birds and other wildlife of the region. After spending the first few days in the Brenne, land of a thousand lakes, we visited the myriad ponds of the Pinail reserve on our way to Moulismes, where we spent two days visiting small étangs, gravel pits, rivers and streams in the southern Vienne. This wide range of sites and habitats yielded a final total of 41 species of dragonflies – an excellent total by European standards. The group also saw 40 species of butterflies, including 6 fritillary species, 14 orchid species, and 97 bird species, not to mention a wide range of other animals and plants that the combined talents of the group helped to find and identify. The cold

spring had not done us many favours when looking for one or two of the scarcer odonata species, but as ever, there were compensations, namely orchid species still in full bloom, and still lots of the 'early' butterflies." (Author)] Address: Naturetrek Cheriton Mill Cheriton Alresford Hampshire SO24 0NG England

11487. Sadeghi, S.; Kiani, M. (2010): The study of wing shape variation of *Calopteryx splendens* (Odonata: Calopterygidae) in Zagros Mountain sides. 16th National and 4th International Conference of Biology, Ferdowsi University of Mashhad, Mashhad, Iran, 14-16 September 2010: 591. (in bilingual in Farsi and English) [Verbatim: *Calopteryx splendens* Harris (1782) is a widespread damselfly, found in most of Europe, large parts of Siberia and much of west and central Asia. There is great variation among males in wing coloration. Traditionally subspecific taxa have been distinguished by the size and position of the pigmented wing spot, and by (mating) behavior. About a dozen of subspecies have been recognized, all of which are more or less geographically confined, but often with overlapping ranges and strong variation in wing spot size. We used geometric morphometrics method to quantify morphological data and analyze the wing shape of *C.splendens* populations irrespective of wing spot, than traditional morphometrics method, in Zagros Mountainsides. In this study six similar populations which are systematically known as *C.s.intermedia*, based on their wing spot size, were evaluated. Nineteen different points were digitized as landmarks on left fore wing of males using GPA (Generalized Procrustes Analysis). Our results in geometric morphometrics (regardless of wing spot) confirmed significant wing shape differences between entire populations except Markazi and Lorestan. These observations suggest that wing spot similarity necessarily cannot reflect the full genetic similarity and evolutionary grouping of populations and therefore, is not an infallible character in *Calopteryx splendens* subspecies.] Address: Kiany, M., Payam-e Noor University, Bam, Iran. E-mail: mohsen.kiany1@gmail.com

11488. Smith, P.H. (2010): Dragonflies and climate change. *Coastlines* 2010(1): 17. (in English) [Sefton Coast, North West of England, near Liverpool, UK. "Up to 1991, only 14 species had been recorded in the Sefton Coast sanddune system, ten of them breeding here. Today, the total number recorded is 20, of which 14 are probably breeding. This represents a 43% increase in dragonfly diversity in only 20 years. The extra species fall mainly into two groups: (a) Those with mainly southern British distributions that have moved north; (b) Long-distance migrants from continental Europe, these appearing during summer heat-waves. Of the first group, two dragonflies, *Anax imperator* and *Sympetrum sanguineum* had already arrived here by 1990. *A. imperator* was first seen during the hot summer of 1976 but did not become well-established until the mid-1990s. *S. sanguineum* first appeared in 1989 at a time when the nearest breeders were in south Cheshire. Again, by the mid-1990s, this attractive insect had viable breeding populations in several duneland ponds. More recent colonists are *Libellula depressa* (established mid-1990s), *Aeshna mixta* (early 2000s) and *Orithetrum cancellatum* (mid-2000s). Three species fall into the migrant group: *Sympetrum flaveolum*, *S. fonscolombii* and *Anax parthenope*. Occasional individuals have appeared here only in warm summers, such as those of 1995, 1999, 2003 and 2006. Most recently, the brief

heat-wave of early July 2009 saw an influx of *S. fonscolombii* up to eight being seen at Sands Lake, Ainsdale. *Calopteryx splendens* fits less easily into the above categories. Although it has greatly increased in north-west England, this seems more to do with improving water-quality in the slow-moving rivers and streams where it breeds, than to increasing temperatures. This distinctive insect now occurs abundantly on Downholme Brook, just inland of Formby, so it is perhaps not surprising that there have been two recent sightings in the dunes. Following their arrival on the Sefton Coast, most of the dragonflies mentioned above have continued to move north and are now becoming established in Scotland. Many studies, both in this country and in Europe, have linked these trends to climate change. Other species may soon follow, one possibility being *Erythromma viridulum*, which first appeared on the Essex coast in 1999. It now breeds over large parts of south-east England and, by 2006, had reached Derbyshire and Humberside. Recent poor summers have slowed its progress but it should get here eventually." (Author)] Address: Smith, P.H., c/o Ed.: L. Lander, Sefton Council Planning & Development Dept, Magdalen House, 30 Trinity Rd, Bootle, L20 3NJ, UK

11489. Tavares, J.; Vieira, V.; Teixeira, T.; Teixeira, M.; Oliveira, L. (2010): Lepidópteros, odonatos e himenópteros (Insecta) observados na ilha de Santa Maria, Açores. XIV Expedição Científica do Departamento de Biologia - Santa Maria 2009 - Rel. Com. Dep. Biol. 36: 113-120. (in Portuguese, with English summary) [Santa Maria island (Azores, Portugal); July 12-19, 2009, *Ischnura hastata*, *I. pumilio*, *Anax imperator* and *Sympetrum fonscolombii*] Address: Tavares, J., Depto de Biologia da Universidade dos Açores, Rua da Mãe de Deus, 13-A Apartado 1422 - 9501-801 Ponta Delgada, Portugal

11490. Thompson, D.J.; Watts, P.C. (2010): Dragonflies of the New Forest. In: A. Newton eds. Biodiversity in the New Forest. Newbury, Berkshire, Pisces Publications. 248 pp: 36-45. (in English) [UK; "In this chapter we discuss the odonate diversity of the New Forest from a UK perspective, specifically addressing the issue of why there are more species than might be expected given the area and latitude of the National Park. Second, we consider those species resident in the New Forest that are of conservation interest nationally. Finally, we examine in detail the jewel in the crown of the New Forest's odonates, southern damselfly *Coenagrion mercuriale*, which is rare, threatened and protected throughout Europe, and for which the New Forest is an internationally important area." (Authors) Alongside with other data the paper includes information on imaginal mobility, population growth plotted against season, and dispersal.] Address: Thompson, D.J., Population Biology Research Group, School of Biological Sciences (Nicholson Building), University of Liverpool, P.O. Box 147, Liverpool, L69 3BX, UK. E-mail: d.j.thompson@liv.ac.uk

11491. Thompson, D.J. (2010): Re-introduction of the Southern Damselfly to Venn Ottery Common, Devon, UK. In: Soorae, P. S. (ed.) (2010) Global re-introduction perspectives: Additional case-studies from around the globe. IUCN/SSC Re-introduction Specialist Group, Abu Dhabi, UAE, xii + 352 pp: 29-32. (in English) ["Following the publication of the UK's Biodiversity Action Plan in 1994 a steering group was set up to look after the interests of the southern damselfly. It contained representatives from English Nature, the Countryside Council for Wales, the Environment Agency, the Wildlife Trusts and

Liverpool University, a centre of expertise in dragonfly and damselfly research. One of the aims of the plan devised by this group was to research the ecology of the species and ultimately to begin re-introductions into sites from which it had gone extinct in the UK. One of the early findings of a Studentship funded by the group was that southern damselfly sites had declined in number by more than 30% since 1960. Once the habitat requirements of the southern damselfly had been established the search began for sites from which it had gone extinct and for which habitat restoration was feasible. Venn Ottery Common, a Devon Wildlife Trust reserve lost southern damselfly in 1989, largely due to injudicious ditch digging which altered water courses to the detriment of southern damselfly, coupled with a relaxation of grazing which led to the spread of tussocks of *Molinia caerulea* which effectively covered the runnels passing down the site. It was chosen as the first re-introduction site for four reasons. First, it had lost southern damselfly relatively recently and water chemistry tests revealed that the water quality was within the range acceptable. Second, there was a strong resolve on the part of the site owners, Devon Wildlife Trust to restore southern damselfly to the site and to raise funds so to do. Third, there was enthusiastic local support from the two people most responsible for improving the status of southern damselfly on two other sites on the East Devon Pebble Beds, Aylesbeare and Colaton Raleigh Commons (Kerry, 1989). Finally there was the possibility that a meta-population structure might be established, and with it gene flow between populations (Thompson, Watts & Saccheri, 2007). From 2002 onwards researchers at Liverpool University had estimated genetic variation in all the known sites for southern damselfly in the UK and had determined population sizes and some of them. Beaulieu Heath in the New Forest was chosen as the donor site for the re-introduction on the grounds that it had the highest population density recorded in the UK and contained the most genetically diverse population. Licences to undertake the work were obtained at the national level from Natural England, from the Forestry Commission representing the donor site and from Devon Wildlife Trust representing the recipient site. On 10th June 2007, 57 mature individuals were taken from Beaulieu Heath to Venn Ottery Common in three modified cylindrical butterfly rearing cages. The water level at Venn Ottery had dropped surprisingly in the ten days since the site had been visited previously. The decision was taken to stop the re-introduction until the water supply at Venn Ottery was more reliable, but the animals transported were released in any case. Between the summer of 2007 and spring 2009 Devon Wildlife Trust make great efforts to secure the water supply to the runnels in which southern damselfly was likely to breed. Large numbers of birch trees were removed and Devon cattle were brought in to graze the site. In addition a fast-flowing, unsuitable stream on the edge of the site was transformed by the introduction of eleven dams which produced in parts conditions for southern damselfly similar to those at the other two East Devon Pebblebed sites. Growth of *Potamogeton polygonifolius*, a favoured oviposition plant for southern damselfly, was encouraged. By summer 2009 conditions at Venn Ottery were looking much better, with a steady flow of water down the runnels into which it was hoped that southern damselflies would breed. The re-introduction program was set to proceed. It was given a timely boost by the discovery of some breeding adults on the site, which must have been descendants of the

cohort introduced in 2007. Four hundred females and 100 males were transported from Beaulieu Heath to Venn Ottery Common over the course of ten days in six different batches. The car journey lasted roughly three hours but only three individuals did not survive the journey. Exclusively mated females (distinguishable by their muddy abdomen tips) were taken in the first two trips. Females store sperm and oviposit alone in the absence of males. As males were re-introduced later during the programme they would mate with females on site and by removing sperm deposited during previous matings in the New Forest (a unique feature of damselfly mating behaviour) would guarantee the highest genetic diversity per introduced female. Almost all individuals seemed unaffected by the car journey and many had begun to show reproductive behaviour within minutes of being released at Venn Ottery. Southern damselflies have a two-year life cycle in the UK. The first monitoring took place in 2009 in order to check whether any of the 2007 pilot introductions had bred. ... The pilot reintroduction in 2007 led to breeding adults being recorded on site in 2009, prior to the main re-introduction effort." (Author)] Address: Thompson, D.J., School of Biological Sciences, University of Liverpool, Crown Street, Liverpool, L69 7ZB, UK. E-mail: d.j.thompson@liv.ac.uk

11492. Yu, W.-y.; Li, C.-h.; Huang, C.; Liu, J.; Jian, Y.-p.; Hu, N.; Ji, J. (2010): On fauna and diversity of Odonata in Nanjing, Jiangsu province. Resources and environment in the Yangtze basin 19(05): 514-521. (in Chinese, with English summary) [China; between 2005 and 2008, 45 Odonata species have been recorded.] Address: Yu, W.-y., Dept of Life Science, Nanjing Xiaozhuang College, Nanjing, 211171, China

2011

11493. Adnan, M.; Raza, S.A. (2011): Taxonomic studies of damselflies (Zygoptera: Odonata): With special emphasis on rice ecosystem of district Gujrat. VDM Verlag Dr. Müller: 56 pp. (in English) [nv, "Zygopterans are economically very important because they have a role in insect pest management; especially they mostly feed on the pests of rice like water fleas, larvae of mosquitoes and bugs. Rice is one of the major crops grown in Gujrat, so current project was designed to explore the Zygopterous fauna of District Gujrat. Adult samples were caught with a light and strong insect collecting net having a handle 2ft length and ring diameter of about 20 cm. Ethyl acetate as a killing chemical was used in glass jars. After softening with water bath, samples were placed and stretched over thermopore sheets and pinned properly and carefully. Identification was carried out by using standard keys. Seven species of damselflies were recorded from 14 different localities of Distt. Gujrat (July-August, 2010). The species recorded from the distt. Gujrat were *Agriocnemis pygmaea*, *Ceragrion coromandelianum*, *Pseudagrion hypermelas*, *Pseudagrion spencei*, *Enallagma parvum*, *Ischnura aurora* and *Rhodischnura nursei*. *Ischnura aurora* is the most common and abundant specie found in all localities of the district while *Pseudagrion spencei* is rare in this district." (Publisher)]

11494. Almeida, E.; Nunes, A.; Andrade, P.; Alves, S.; Guerreiro, C.; Rebelo, R. (2011): Antipredator responses of two anurans towards native and exotic predators. *Amphibia-Reptilia* 32: 341-350. (in English) ["When faced with the risk of predation, tadpoles of many am-

phibian species are known to modify their phenotype. In this work we studied the effect of an exotic species, the red swamp crayfish (*Procambarus clarkii*), on the phenotype of two species of amphibians with different reproduction habitats: the Iberian painted frog, *Discoglossus galganoi*, that normally reproduces in temporary water bodies and the common toad, *Bufo bufo*, that reproduces in permanent water bodies. The responses were compared with the ones shown in the presence of a native predator, dragonfly (Aeshnidae) larvae. Behaviour, growth and morphology of tadpoles were monitored in a factorial experiment with five treatments. Our results showed that only the permanent habitat species altered its behaviour and life-history traits in the presence of *P. clarkii*; however, this was mediated by chemical cues from consumed conspecifics. Antipredator responses of *B. bufo* towards the exotic crayfish were similar to the ones towards the native predator, while *D. galganoi* responded to the dragonfly larvae but not to *P. clarkii*. This may be the result of infrequent colonization events of temporary habitats by the crayfish. Therefore, the consequences of the introduction of *P. clarkii* might be more serious for *D. galganoi* and other species living in temporary habitats. Species breeding in permanent habitats, more prone to having generalized antipredator responses, may be relatively protected against this exotic crayfish although the effectiveness of these responses still needs to be tested." (Authors)] Address: Almeida, Erika, Centro de Biologia Ambiental, D.B.A., F.C.U.L., Bloco C2, Piso 3, 1749-016 Lisboa, Portugal. E-mail:erikaroldao@gmail.com

11495. Aluthwattha, R.G.S.T. (2011): Population structure and dynamics of *Nerothemis tullia* [sic] (Odonata: Libellulidae) with water availability in rice field ecosystem. Proceedings of 16th International Forestry and Environment Symposium 2011. Sixteenth Annual Symposium organized by Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka was held on 28 - 29 October 2011 at Golden Rose Recreation Complex, 261, Maharagama Road, Boralesgamuwa, Sri Lanka: (in English) [Verbatim: Dragonflies are important insects in rice field ecosystem (RFE) as pest predators. Rice fields in return serve as a good breeding and feeding ground for dragonflies though RFE undergo several changes during a crop cycle. However habitat conditions vary mainly on the climatic regions and farming practices. The selected RFE in wet zone lowland for sampling comprised deferent habitats, two shallow streams, non cultivated fields, cultivated fields, small water pools, ponds and water wells. The most common dragonfly in marshes and paddy fields, *Neurothemis tullia* was studied to understand its population structure and dynamics with the water availability. Sampling was conducted from May 2010 to November 2010 covering one cultivation cycle. Two sampling methods i.e., random sampling along 5m X 50m transects and systematic sampling in pre-identified colonies were used. Colonies were identified in advanced, numbered consecutively and every third colony was observed. *N. tullia* adult male, adult female, juvenile male and teneral female were distinguish by general morphological characters and recorded separately. Activeness of *N. tullia* individuals were recorded as number of catches (of prey) or tries for per 10 minutes. Other associated Odonata were also recorded. Water level and flow rate in streams were measured as indicators of water availability in RFE. Systematic sampling recorded higher density (2.50 individuals/m²)

while random sampling produced lesser density (0.19 individuals/m²). However random sampling method recorded higher diversity of Odonata in RFE. Number of individuals were positively correlated ($r = 7.68$) with water level. Flow rate had no significance relationship with individual density. Activity of colony peaks between 9.00 hr to 11.00 hr and minimum around 13.00 hr. Second peak occurred around 16.00 hr - 17.00 hr. Number of both male and female juveniles sharply reduced towards the drier months whilst number of both adult male and female increased. During the dry period in September, density reduced to minimum and juveniles became scarce. In November with the beginning of rain, number and activity of *N. tullia* increased and more colonies observed at water holes and in field proper of paddy fields. Sampling along transects can be recommended for study of Odonata diversity whilst systematic sampling is more suitable for study of population dynamic and structure. The study is being continued for second crop cycle. Though common species are neglected in conservation practices, consequences of sudden decline in common species that occur in higher number, such as *N. tullia* is unpredictable. This study implies the necessity of their conservation as they have complex ecosystem interactions and intense ecosystem service.] Address: not stated

11496. Arulprakash, R.; Gunathilagaraj, K. (2011): Impact of agrochemicals on the abundance and diversity of Odonata in rice fields. *Indian Journal of Plant Protection* 39(3): 191-195. (in English) ["A study was designed to ascertain the impact of agrochemicals on the biodiversity of Odonata in rice fields at a Wetland farm. Adult Odonata diversity was assessed at weekly intervals from two rice fields, one with normal application of agrochemicals and other without any agrochemicals application (control). Eighteen and ten species of Odonata were recorded in Control Rice Field (CRF) and Agrochemicals Applied Rice Field (AARF), respectively. Odonata abundance, diversity and species richness was higher in CRF than AARF. Among the different stages of the rice crop, active tillering stage had Maximum abundance, diversity and species richness of Odonata. Among the families, Libellulidae was dominant in both CRF and AARF. *Diplacodes trivialis* and *Pantala flavescens* were dominant in CRF and AARF, respectively and *Ischnura aurora* was abundant in both CRF and AARF. Eight species of Odonata, which were present in CRF and absent in AARF, may be identified as indicator Odonata species for agrochemicals contamination in rice ecosystem." (Authors)] Address: Arulprakash, R., Dept of Agricultural Entomology, Agricultural Research Station, Pattukkottai-614 602, Tamil Nadu, India. E-mail: avrarulprakash@gmail.com

11497. Babu, R.; Mitra, A. (2011): A record of *Gomphidia t-nigrum* Sel. from Himachal Pradesh, India (Anisoptera: Gomphidae). *Notul. odonatol.* 7(8): 75-76. (in English) ["On 22-IV-2006, the first author collected a male from the vegetation along the Savah river, Rampur, Una (31°26'N/76°15'E, alt. 396 m a.s.l.). So far this species is not known to have been reported from Western Himalaya earlier. The specimen agrees fairly well with Fraser's (1934) description, save for the length of hindwing (38-40 mm) and the number of cells in anal triangle (5-7)." (Authors)] Address: Babu, R., Zool. Survey of India, M-Block, New Alipore, Kolkata-700 053 India

11498. Babu, R. (2011): Observations on Odonata behaviour during the nearly total solar eclipse of 22 July

2009 in India. *Notul. odonatol.* 7(8): 69-70. (in English) ["The observations were carried out on the southern fringe of Calcutta. When the eclipse was approaching the near-totality phase, all Zygoptera and Anisoptera became motionless. This is ascribed to the drop of temperature, since the sky was moderately overcast during the eclipse and the decrease in light intensity was in the early morning less apparent." (Author)] Address: Babu, R., Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053 India

11499. Bönsel, A.; Frank, M. (2011): Eine Momentaufnahme von *Crocothemis erythraea* (Brulle, 1832) und *Aeshna affinis* Vander Linden, 1820 in der nordostdeutschen Jungmoränenlandschaft von Mecklenburg-Vorpommern (Odonata). *Entomologische Nachrichten und Berichte* 55(1): 37-42. (in German, with English summary) [Mecklenburg-Vorpommern, Germany; records of *C. erythraea* (32 localities, 7 with exuviae) and *A. affinis* (25 localities, 3 with exuviae) are mapped and discussed in terms of global warming.] Address: Bönsel, A., Krähenberger Holz 8, 18337 Marlow, Germany

11500. Boyce, D. (2011): Invertebrate survey of blanket bog on Dartmoor, 2010. privately published: 37 pp. (in English) [UK; *Aeshna juncea* and *Sympetrum danae* are listed.] Address: not stated

11501. Buy, DD.; Matushkina, N. (2011): Sex differences in the wing fluctuating asymmetry in a damselfly *Calopteryx splendens* (Odonata, Calopterygidae). Proceedings of the International Conference "Fundamental problems of entomology in the XXI century ". St. Petersburg, 16-20 May 2011. Edited by E. Kipyatkova and D.L. Musolina. - St. Petersburg: Publishing House of St. Petersburg State University, 2011, 198 pp: 23. (in Russian) [Verbatim: Fluctuating asymmetry (FA) is defined as small random deviations from perfect bilateral symmetry in living organisms (Van Valen, 1962). It is believed that elevated levels of FA may indicate that the stabilizing mechanisms are not able to fully compensate for the deviations of which are caused by negative factors such as extreme environmental conditions (including its pollution) or limited gene flow. The study of dragonflies in the FA aims to describe the state of the population as a whole, its individual members or to identify the signs, subject to a special press stabilizing selection. In the latter case, the study mainly relate to the wings of males who use drawing as a demonstration of a wing element or territorial and sexual behaviour. The aim of our work was to compare the level of dimensional parameters of wing FA in representatives of different sexes damselflies *Calopteryx splendens*. Males of this species have a spot on the distal halves of both pairs of wings, which, during the special demonstration flights are presented conspecific males (under the protection of the territory) and females (courtship). And in the process of courting the front wings of males *S. splendens* remain almost stationary. Wings of females of this species are transparent, and, apparently, the signal is not important. Material for our study included 36 females and 49 males selected on the river Vorskla (50°17'37 "N 34°49'40" E). We studied three characteristics lengths covered with the distance from the base of vein M before the end of bk (wing length), distance from base to knot M (the length of the proximal part of the wing), the distance from the knot before the end of R.2 (the length of the distal part of the wing). It is shown that the FA distal parts of the forewings of males was significantly (approximately 2.5-fold) than in females. However, within

the same sex FA of forewing most of the indicators was significantly higher than the rear. Length of the proximal and distal parts of the wing significantly correlated in females and males do not correlate. The results allow to conclude tentatively that male *C. splendens* dimensional characteristics of the distal part of the front wing, the carrier signal spot, may have a stronger influence of stabilizing selection, but this hypothesis requires further experimental verification.] Address: Matushkina, Natalia, Department of Zoology, Biological Faculty, Kyiv National University, vul. Volodymirs'ka 64, Kyiv, 01033, Ukraine. E-mail: odonataly@gmail.com

11502. Cabana Otero, M.; Barreiro, A.R.; Cordero Rivera, A. (2011): Primeras citas de *Lestes sponsa* (Hansemann, 1823) y nuevas observaciones de *Aeshna juncea* (Linnaeus, 1758) (Odonata) en Galicia (Noroeste de la Península Ibérica). *Boletín de la SEA* 49: 341-343. (in Spanish, with English summary) [Galicia (north-western Spain); four records of *Lestes sponsa* (2010/11) and one of *A. juncea* (2010) are documented, mapped and discussed in detail. Co-occurring species are listed.] Address: Cabana Otero, M., Depto de Biología Animal, Biología Vegetal e Ecología. Facultad de Ciencias. Univ. de da Coruña. Campus da Zapa-teira, s/n. 15071 A Coruña, Spain. E-mail: mcohyala@yahoo.es

11503. Chowdhury, S.H.; Mohiuddin, M. (2011): A check-list of the Odonata from the eastern region of Bangladesh With sometaxonomic notes. *University Journal of Zoology, Rajshahi Universit* 30: 61-66. (in English) ["A survey of the Odonate fauna was conducted in the Sylhet and Srimangal Districts of Sylhet Division and Chittagong, Khagrachari, Rangamati, Bandarban and Cox's Bazar Districts of Chittagong Division. The designated areas were visited periodically for nearly seven years from 1994 to 2000. The present paper includes a list of the odonate species collected during the survey period. A total of 764 specimens were collected which comprised 49 species of Anisoptera in 32 genera, and 47 species of Zygoptera in 18 genera. Of these 15 species in 8 genera of the former and 27 species in 11 genera in the latter suborder are new records from Bangladesh. The collection also includes females of three species and males of two species that happen to be new to science. The specimens are preserved in our personal collection." (Authors)] Address: Chowdhury, S.H., Department of Zoology, University of Chittagong, Chittagong 3114, Bangladesh

11504. de Ávila, A.C.; Stenert, C.; Maltchik, L. (2011): Partitioning macroinvertebrate diversity across different spatial scales in southern Brazil coastal wetlands. *Wetlands* 31: 459-469. (in English) ["The main goals of this study were: (1) test how beta diversity of aquatic macroinvertebrates varies among samples from different spatial scales in permanent and intermittent wetlands; and (2) test how beta diversity of aquatic macroinvertebrates varies among different wetland habitat types. Four collections were carried out over 1 year in 16 freshwater coastal wetlands in southern Brazil. The habitat types identified were: 1) hydrophytes, represented by submersed and floating plants; 2) reed-like emergent plants; and 3) leafy emergent plants. Additive partitioning of diversity was used to decompose the total variation in macroinvertebrate composition (regional diversity) into alpha (fine spatial scale) and beta components (intermediate and broad spatial scales). A total of 51,290 macroinvertebrates distributed among 63 families were collected (including: Aeshnidae, Coenagri-

onidae, Libellulidae). Additive partitioning of diversity showed similar patterns for both permanent and intermittent wetlands. In general, alpha diversity component was much lower than beta components. The beta diversity was greater among wetlands than among distinct habitats within wetlands. We found a strong evidence of scale dependence on diversity partitioning of macroinvertebrate communities, with beta diversity at broad spatial scale making a large contribution to total diversity in coastal wetlands of southern Brazil." (Authors)] Address: Maltchik, L., Lab. de Ecologia e Conservação de Ecossistemas Aquáticos, Universidade do Vale do Rio dos Sinos, UNISINOS, Av. Unisinos, 950, CEP 93022-000, Sao Leopoldo, Rio Grande do Sul, Brasil. E-mail: maltchik@unisinos.br

11505. Edward, J.B.; Ugwumba, A.A.A. (2011): Macroinvertebrate fauna of a tropical southern reservoir, Ekiti State, Nigeria. *Continental Journal of Biological Sciences* 4(1): 30-40. (in English) ["A survey of the macroinvertebrate fauna of Egbe Reservoir, Ekiti State, Nigeria was carried out. Sampling of surface waters and macroinvertebrates was carried out twice in a month from September 2004 to December 2006. Physico-chemical parameters determined include pH, conductivity, alkalinity, dissolved oxygen and biochemical oxygen demand (BOD) using APHA methods. Macroinvertebrates were collected by kick sampling and with Van veen grab. Data analysis was done using descriptive statistics, Duncan multiple range, pearson correlation, paired t tests and diversity indices. 18 taxa of macroinvertebrates in two Phyla of Mollusca and Arthropoda were identified. Gastropods had the highest numerical abundance (41.8 %), diversity ($d=0.61$, $H=1.56$) and evenness ($J=0.87$). Odonata and Ephemeroptera (Insecta) had the lowest diversity ($d=0.00$, $H=0.00$ and $d=0.14$, $H=0.13$) and numerical abundance (0.4% and 6.3%, respectively). The gastropod, *Melanoides tuberculata*, which is the most abundant macroinvertebrate is an indicator of polluted water. This suggests that the reservoir may be tending towards organic pollution. This is further confirmed by the low abundance of Ephemeroptera and Odonata which are indicators of clean water. Measures should be taken to prevent the reservoir from further deterioration and eventual eutrophication." (Authors)] Address: Edward, J.B., Dept of Zoology, University of Ado Ekiti, P.M.B. 5363, Ado Ekiti Ekiti State, Nigeria

11506. Faucheux, M.J. (2011): Présence constante des sensilles chétiformes incurvées et des sensilles filiformes sur les antennes des larves d'Odonates. Étude d'*Argia concinna* (Rambur, 1842), espèce endémique de Guadeloupe et Dominique (Odonata: Zygoptera: Coenagrionidae: Arginae). *Bulletin de la Société des sciences naturelles de l'Ouest de la France* 33(4): 186-194. (in French, with English summary) ["The larval antennae of *A. concinna*, an endemic species of the Lesser Antilles which lives in the troubled waters of mountain streams are here studied by means of scanning electron microscope. Five types of sensilla are identified: aporous sensilla chaetica which are tactile mechanoreceptors, numerous aporous sensilla filiformia present on both faces and with a vibroreceptive function, a proprioceptive sensillum campaniformium at the apex of the pedicel and another sensillum campaniformium at the base of the first flagellomere, aporous curved sensilla chaetica which are proprioceptors acting on the joints of the flagellomeres: F 2-F 3, F 3-F 4, a flattened and curved aporous sensillum chaeticum adjacent to F 4-F

5. These results underline the numerical importance of the sensilla filiformia in relation to life in a troubled environment." (Author)] Address: Fauchoux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Faculté des Sciences et des Techniques, 2 rue de la Housinière, B.P. 92208, 44322 Nantes, France. E-mail: fauchoux.michel@free.fr

11507. Ferreira, W.R.; Paiva, L.T.; Callisto, M. (2011): Development of a benthic multimetric index for biomonitoring of a neotropical watershed. *Braz. J. Biol.* 71(1): 15-25. (in English, with Portuguese summary) ["Biotic indices are important tools for evaluating water quality in Biomonitoring Programmes of river basins. The objective of this study was to develop a Benthic Multimetric Index (BMI) to evaluate the water quality in a Neotropical catchment in southeastern Brazil. Thirty metrics were evaluated and six were selected to calculate the BMI: family richness, % Oligochaeta, % Chironomidae + Oligochaeta (% CHOL), % EPT (Ephemeroptera, Plecoptera and Trichoptera), % Collector-gatherers, and BMWP-CETEC biotic index. Sampling was carried in triplicate at 21 sampling sites (8 in the river channel and 13 in the tributaries) during 4 annual collecting trips from June 2004 to November 2007, making a total of 945 samples. Scores (5, 3 or 1) were attributed to each chosen metric and were added up to establish the water quality criteria (a score of 6-12 – poor; 13-18 – intermediate; 19-24 – good; and 25-30 – very good water quality). Our results indicated that 48% of the sampling sites analysed in the catchment basin presented very good water quality, 14% good quality, 19% regular, and 19% poor water quality. This methodology proved to be an efficient tool for evaluating water quality in the Biomonitoring Programme of the Velhas River basin, and that it may serve to evaluate water quality in other river basins in South America." (Authors) The paper includes references to Odonata without giving any details.] Address: Ferreira, W., Laboratório de Ecologia de Bentos, Departamento de Biologia Geral, Universidade Federal de Minas Gerais – UFMG, Rua Marley Moura Abreu, 79, Vale do Jatobá, CEP 30668-530, Belo Horizonte, MG, Brazil. E-mail: wander@icb.ufmg.br

11508. Feulner, G.; Karki, N. (2011): Damsel in disguise. *Gazelle*, Dubai 26(3): 4. (in English) [Verbatim: Damselflies of the genus *Ischnura* (bluetails) are notoriously difficult to distinguish in the field. For the three species present in the UAE and Northern Oman (*I. evansi*, *I. senegalensis* and *I. fountainae*), Bob Reimer of Al-Ain has recently sorted out visual identification of the males (see *Tribulus* vol. 18), but identification of *Ischnura* females continues to tax even experts. One reason is that the females of most species exhibit multiple colour patterns, including a pattern that mimics that of the male (androchrome colouration), featuring a blue band around the penultimate abdominal segment. We were forcefully reminded of the phenomenon of androchrome colouration in late January when we observed a 'male' *Ischnura* in a large irrigation ditch at the Ruwayah plantations. As we watched (and attempted to confirm an identification), the 'male' curled its abdomen and began to deposit eggs on a sloping reed stem, where it angled beneath the water. It was obviously a female! The same animal continued to edge backwards along the reed, still looping its abdomen and depositing eggs at increasingly lower levels, until its head was c.3cm below the water surface. The androchrome female remained fully submerged for approximately 5 minutes. When it

ascended the reed and re-emerged at the surface, a real male was waiting ahead of it; whether this was by design or inadvertence, we cannot say. Within another minute, the pair attempted copulation in the wheel position; the male grasped the female's neck but the (androchrome) female seemed only half-hearted and failed in her efforts to maintain a reciprocal hold on the male. Three times in the course of several minutes the tandem pair fell onto the surface of the water in the channel, but each time they were able to take flight and find a perch. In the end, however, they disengaged and went their separate ways, evidently without consummation. Another noteworthy point about this observation is that it was made in late January, and a second observation, of the sister species *I. senegalensis*, was made a day later at Dubai's "Pivot Fields". Thus, although it is sometimes said that the local damselflies emerge only "later in the season" than most of the dragonflies, this is not strictly true in all cases.] Address: Feulner, G.R., P.O. Box 31045, Dubai, United Arab Emirates. E-mail: grfeulner@gmail.com

11509. Fliedner-Kalies, T.; Fliedner, H. (2011): Libellen im Kanton Schwyz. *Ber. schwyz. naturf. Ges.* 16: 208 pp. (in German) [Following a long lasting inventory a total of 62 species of canton Schwyz (Switzerland) are presented monographically. The introductory chapters present an outline of the history of exploration of the regional Odonata fauna and of general Odonata biology, descriptions of Odonata biotopes and information on the impact of climate change. The concluding chapter is devoted to Odonata protection and conservation. An exhaustive regional bibliography is appended. Each species is presented with a brief description of the taxa, sections on distribution, habitats, biology and the conservation status, with photographs of both sexes, a phenology graph and a distribution map.] Address: Publishers: Arvenweg 10, CH-8840 Einsiedeln, Switzerland

11510. Fontaneto, D.; Tommaseo-Ponzetta, M.; Galli, C.; Riséd, P.; Glewe, R.H.; Paoletti, M.G. (2011): Differences in fatty acid composition between aquatic and terrestrial insects used as food in human nutrition. *Ecology of Food and Nutrition* 50(4): 351-367. (in English) [Italy; "Edible insects may be a source of long-chain polyunsaturated fatty acids (LC-PUFA). The aim of this article is to test for differences in aquatic and terrestrial insects used in human nutrition. We implemented linear models and discovered that differences in the proportion of LC-PUFA between aquatic and terrestrial insects do exist, with terrestrial insects being significantly richer in particular omega-6 fatty acids. In conclusion, any kind of insect may provide valuable sources of LC-PUFA. Because terrestrial insects are more abundant and easier to collect, they can be considered a better source of LC-PUFA than aquatic ones." The study includes *Gomphus vulgatissimus*. "Odonata were consumed in northern Italy in Piedmont region until the early 1940s. Children used to extensively collect adult dragonflies, mainly of the genus *Gomphus*, in May–June, open their thorax and suck the muscular content, known as the "dragonfly tuna" (Boano et al. 2007, and pers. comm. from C. Cerri and C. Cantoia)." (Authors)] Address: Fontaneto, D., Department of Invertebrate Zoology, Swedish Museum of Natural History, Stockholm, Sweden. E-mail: d.fontaneto@imperial.ac.uk

11511. García-Alzate, C.A.; Román-Valencia, C.; González, M.I.; Barrero, A.M. (2011): Composition and temporal variation of aquatic insect community (Insecta) in

Sardineros Creek, Verde River drainage, upper Cauca, Colombia. *Rev. Invest. Univ. Quindío* 21: 21-28. (in Spanish, with English summary) ["We reviewed the composition and variation of aquatic insects from Sardineros Creek, a tributary of Verde river, Quindío river, Upper Cauca, Colombia. 2743 specimens were collected in low rainfall and 1020 during high rainfall. Diptera and Trichoptera were the most abundant. Diversity indices of Shannon-Wiener, Simpson's dominance were low in both climatic periods, while the Margalef richness was high. The index indicated a low diversity as a result of the reduced dissolved oxygen and increased conductivity during the period of high rainfall, which made the declining water quality as good (BMWP/Col: 191) during the low rainfall to acceptable (BMWP/Col: 65) at the high rainfall. Hotelling's T-Squared test probe significant differences between seasons in the community structure ($P=0,042$, $F= 4, 6$) and proportion test explain the structure change in 74% of the families analyzed; we propose that seasonality was the variable that most influences in the abundance and diversity of aquatic insects." (Authors) Taxa are treated at the family level and include Brechmorhoga, Progomphus, Phyllogomphoides, Hetaerina, and Aeshna.] Address: García-Alzate, C.A., Universidad del Quindío, Laboratorio de Ictiología, A. A. 2639, Armenia, Quindío, Colombia. E-mail: cagarcia@uniquindio.edu.co

11512. Gligorović, B.; Pešić, V.; Gligorović, A. (2011): Contribution to the knowledge of the dragonflies (Odonata) of the Plavsko lake area (Montenegro). *Natura Montenegrina, Podgorica* 10(3): 237-243. (in English) [15 species] Address: Gligorović, B., Dept of Biology, Faculty of Sciences, University of Montenegro, Cetinjski put b.b., 81000 Podgorica, Montenegro, E-mail: bogic1@cg.yu

11513. Guillermo-Ferreira, R.; Del-Claro, K. (2011): Territoriality and male-biased sexual size dimorphism in *Argia reclusa* (Odonata: Zygoptera). *Acta ethologica* 15(1): 101-105. (in English) ["In Odonata, many species present sexual size dimorphism (SSD), which can be associated with male territoriality in Zygoptera. We hypothesized that in the territorial *A. reclusa*, male-male competition can favour large males, and consequently, drive selection pressures to generate male-biased SSD. The study was performed at a small stream in southeastern Brazil. Males were marked, and we measured body size and assessed the quality of territories. We tested if larger territorial males (a) defended the best territories (those with more male intrusions and visiting females), (b) won more fights, and (c) mated more. Couples were collected and measured to show the occurrence of sexual size dimorphism. Results indicated that males are larger than females, and that territorial males were larger than non-territorial males. Larger territorial males won more fights and defended the best territories. There was no difference between the mating success of large territorial and small non-territorial males. Although our findings suggest that male territoriality may play a significant role on the evolution of sexual size dimorphism in *A. reclusa*, we suggest that other factors should also be considered to explain the evolution of SSD in damselflies, since non-territorial males are also capable of acquiring mates." (Authors)] Address: Guillermo-Ferreira, R., Departamento de Biologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil. E-mail: delclaro@ufu.br

11514. Hämäläinen, M. (2011): Notes on the taxonomic status of *Vestalis submontana* Fraser, 1934 from South India (Zygoptera: Calopterygidae). *Notul. odonatol.* 7(8): 71-73. (in English) ["*V. submontana* Fraser, 1934 (type locality: India, [Tamil Nadu], Nilgiris, Gudalur) is upgraded to full species and *V. gracilis montana* Fraser, 1934 is synonymised with it. Distinguishing characters separating *V. submontana* from its South Indian congeners are provided." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

11515. Himmler, H. (2011): Rezensionen: Fauna und Flora in der Großregion 1: Atlas der Libellen. Bernd Trockur, Jean-Pierre Boudot, Violaine Fichet, Philippe Goffart, Jürgen Ott & Roland Proess, 2010, 201 Seiten, durchgehend farbig bebildert. 978-3-938381-31-1, 24,90 €. *Pollichia-Kurier* 27(4): 49-50. (in German) [review] Address: Himmler, H., c/o POLLICHIA, Bismarckstr. 33, 67433 Neustadt a. d. Weinstraße, Germany

11516. Hoess, R. (2011): Libellen. *Berner Naturschutz* 5.2011: 8 pp. (in German) [The author introduces the regional Odonata fauna of Kanton Bern, Switzerland and informs on habitats and threats of the 59 species occurring there.] Address: Hoess, R., Normannenstr. 35, 3018 Bern, Switzerland. E-mail: ReneHoess@1st.ch

11517. Honkanen, M.; Sorjanen, A.-M.; Mönkkönen, M. (2011): Deconstructing responses of dragonfly species richness to area, nutrients, water plant diversity and forestry. *Oecologia* 166(2): 457-467. ["Understanding large-scale variation in species richness in relation to area, energy, habitat heterogeneity and anthropogenic disturbance has been a major task in ecology. Ultimately, variation in species richness results from variation in individual species occupancies. We studied whether the individual species occupancy patterns are determined by the same candidate factors as total species richness. We sampled 26 boreal forest ponds for dragonflies and studied the effects of shoreline length, water vascular plant species density (WVPSD), availability of nutrients, intensity of forestry, amount of Sphagnum peat cover and pH on dragonfly species richness and individual dragonfly species. WVPSD and pH had a strong positive effect on species richness. Removal of six dragonfly species experiencing strongest responses to WVPSD cancelled the relationship between species richness and WVPSD. By contrast, removal of nine least observed species did not affect the relationship between WVPSD and species richness. Thus, our results showed that relatively common species responding strongly to WVPSD shaped the observed species richness pattern whereas the effect of least observed, often rare, species was negligible. Also, our results support the view that, despite of the great impact of energy on species richness at large spatial scales, habitat heterogeneity can still have an effect on species richness in smaller scales, even overriding the effects of area." (Authors)] Address: Honkanen, M., Department of Biological and Environmental Science, University of Jyväskylä, P.O. Box 35, 40014 Jyväskylä, Finland. E-mail: merja.t.honkanen@jyu.fi

11518. Iorio, E.; Delfosse, E. (2011): Découverte de l'araignée *Dolomedes fimbriatus* (Clerck, 1757) (Araneae, Pisauridae) et de la libellule *Oxygastra curtisii* (Dale, 1834) (Odonata, Corduliidae) dans la vallée de la Brague (Alpes-Maritimes, France). *Revue de l'Association Roussillonnaise d'Entomologie* 20(1): 34-40. (in

French, with English summary) [21-VIII-2010; "The discoveries of the spider *Dolomedes fimbriatus* and of the dragonfly *Oxygastra curtisii* at Biot (Alpes-Maritimes department, France), beside the Brague river - between «les Soullières» and «les Chappes» (IGN 1/25000), 15 m a.s.l. 43°37.571' N; 07°04.250' E (WGS 84) - are detailed by the authors who also briefly recall their general distribution and their ecological preferences. The bibliographical data show that *D. fimbriatus* was previously known only by two old (more of 70 years) and doubtful stations in Provence-Alpes-Côte d'Azur region, and that *O. curtisii* has only been observed in one other river of the Alpes-Maritimes department 80 years ago. After the available chorological and ecological data and the rarefaction of their life environments in Alpes-Maritimes department, both species are considered as being rare in the concerned department and even throughout the French coastal Mediterranean area for *D. fimbriatus*." (Authors)] Address: Iorio, E., ECO-MED, Pôle Entomologie, Tour Méditerranée, 65 av. Jules Cantini, 13298 Marseille Cedex 20, France. E-mail: e.iorio@ecomед.fr

11519. Iorio, E. (2011): Observation de *Gomphus graslinii* Rambur, 1842 dans les Bouches-du-Rhône (Odonata, Anisoptera: Gomphidae). *Martinia* 27(1): 39-43. (in French, with English summary) [21-VI-2010; "G. graslinii has been observed for the first time in Provence-Alpes-Côte d'Azur region, in the vicinity of the city of Arles (Bouches-du-Rhône department, France), on the part of the Canal de la Vallée des Baux located between "the Barbegal" Castel and the "étang de la Gravière", nearby the latter. Several other species have been listed in this place, among which *Oxygastra curtisii*. This canal seems to be convenient to the reproduction of *G. graslinii* and *O. curtisii*." (Author)] Address: ECO-MED (Ecologie & Médiation), Pôle Entomologie, Tour Méditerranée, 65 av. Jules Cantini, F-13298 Marseille Cedex 20 France. E-mail: e.iorio@ecomед.fr

11520. Iserbyt, A.; Bots, J.; Van Dongen, S.; Ting, J.J.; Van Gossum, H.; Sherratt, T.N. (2011): Frequency-dependent variation in mimetic fidelity in an intraspecific mimicry system. *Proceedings of the Royal Society B: Biological Sciences* 278(1721): 3116-3122. (in English) [*Nehalennia irene*; "Contemporary theory predicts that the degree of mimetic similarity of mimics towards their model should increase as the mimic/model ratio increases. Thus, when the mimic/model ratio is high, then the mimic has to resemble the model very closely to still gain protection from the signal receiver. To date, empirical evidence of this effect is limited to a single example where mimicry occurs between species. Here, for the first time, we test whether mimetic fidelity varies with mimic/model ratios in an intraspecific mimicry system, in which signal receivers are the same species as the mimics and models. To this end, we studied a polymorphic damselfly with a single male phenotype and two female morphs, in which one morph resembles the male phenotype while the other does not. Phenotypic similarity of males to both female morphs was quantified using morphometric data for multiple populations with varying mimic/model ratios repeated over a 3 year period. Our results demonstrate that male-like females were overall closer in size to males than the other female morph. Furthermore, the extent of morphological similarity between male-like females and males, measured as Mahalanobis distances, was frequency-dependent in the direction predicted. Hence, this study provides direct quantitative support for the prediction

that the mimetic similarity of mimics to their models increases as the mimic/model ratio increases. We suggest that the phenomenon may be widespread in a range of mimicry systems." (Authors)] Address: Iserbyt, A., Evolutionary Ecology Group, University of Antwerp, Groenenborgerlaan 171, 2020 Antwerp, Belgium. E-mail: arne.iserbyt@ua.ac.be

11521. Itoh, S., Nakase, J.; Naraoka, H. (2011): Occurrence of *Tramea virginia* (Rambur, 1842) in Miyagi Prefecture, Tohoku District, Japan. *Tombo* 53: 121-122. (in Japanese, with English summary) ["*T. virginia*, distributed in southwestern Japan, was recorded from Miyagi prefecture, northeastern Honshu, Japan in 2010. The occurrence of this migratory species is discussed in relation to the summer meteorological conditions of that year." (Authors)] Address: Itoh, S., Kinoshita 4-9-7-102, Wakabayashi-ku, Sendai-shi, Miyagi, 984-0047 Japan

11522. Jeremis, M.; Ritschel, G. (2011): Die Naturausstattung im Schluckenauer Zipfel. *Berichte der Naturforschenden Gesellschaft der Oberlausitz* 19: 3-16. (in German, with English summary) [*Lestes dryas*, *Anaciaeschna isosceles*, *Ophiogomphus cecilia*, *Cordulegaster bidentata*, and *Leucorrhinia dubia* are briefly discussed from this most northern part of Czech Republic (Din, region Ústí nad Labem)] Address: not stated

11523. Karube, H. (2011): Vietnamese Odonata collected in 1992-2003 surveys (2) Macromiidae and Corduliidae. *Tombo* 53: 81-91. (in English, with Japanese summary) ["This is the second report of Vietnamese Odonata collected in 1992-2003 based on my own collection and the National Science Museum's collection. In this part, I report 13 species belonging to the families Corduliidae and Macromiidae. Among the 13 species, one novel species is described from the family Corduliidae, in the genus *Idionyx*, under the name *Idionyx asahinai* sp. nov. This species resembles *I. carinata* described from southern China, but can be easily distinguished by simpler male inferior appendage and unicorn-shaped female ocellar tubercle. Moreover, the following 6 species were recorded from Vietnam for the first time; *Epopthalmia frontalis frontalis* Selys, 1871, *Macromia clio* Ris, 1916, *Macromia cupricincta* Fraser, 1924, *Macromia genialis shanensis* (Fraser, 1927), *Idionyx victor* Hamalainen, 1991, and *Idionyx carinata* Fraser, 1926." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

11524. Karube, H.; Futahashi, R.; Odajima, T.; Odajima, A.; Odojima, K. (2011): An occurrence of a South-eastern Asiatic species, *Pseudagrion australasiae* Selys in Japan: a possible case of accidental introduction. *Tombo* 53: 111-114. (in Japanese, with English summary) ["In 2009, we found a mature male of a South-eastern Asiatic species, *Pseudagrion australasiae* Selys, 1876 in Kanagawa prefecture, central Honshu, for the first time in Japan. As the great distance from the source can hardly be covered by migration by the insects themselves, it is plausible that eggs or larvae of this species were transported into Japan without intention through import of aquatic plants from Southeast Asia." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

11525. Kerst, C.; Gordon, S. (2011): Dragonflies and damselflies of Oregon. A field guide. Oregon State University Press. ISBN 978-0-87071-589-1: 304 pp. (in

English) ["Growing interest in watching and identifying dragonflies and damselflies has sharpened the need for an authoritative resource like *Dragonflies and Damselflies of Oregon*, a definitive field guide devoted solely to dragonflies and damselflies found in the state. Cary Kerst and Steve Gordon include information on identification, as well as biology and behaviour, using common terms useful to the novice and experienced enthusiast alike. The book features stunning colour photographs of male and female of all species currently known in Oregon, along with helpful illustrations and charts with important identification characteristics. *Dragonflies and Damselflies of Oregon* presents the life cycle and larval habits of dragonflies and damselflies, along with photographs of the larvae of families. The Oregon range for each species is mapped, and the size range of adults is provided in text and illustration. The book also includes a description of the best sites in Oregon to observe these amazing insects, a useful tool for viewing uncommon species in spectacular settings. *Dragonflies and Damselflies of Oregon* is an essential reference for odonatists, entomologists, birders, butterfly watchers, fishermen, wetland experts, naturalists, gardeners, artists, photographers, and all outdoor enthusiasts. 91 species descriptions, with ID charts; Full-colour photographs of all species known in Oregon, with illustrations and charts; Description of 30 best locations in Oregon to observe dragonflies; Tables of illustrations used as pictorial keys; Useful appendices and index" (Publisher)] Address: Publisher: Oregon State University Press, 121 The Valley Library, Corvallis, OR 97331, USA

11526. Ledger, M.E.; Edwards, F.K.; Brown, L.E.; Milner, A.M.; Ward, G. (2011): Impact of simulated drought on ecosystem biomass production: an experimental test in stream mesocosms. *Global Change Biology* 17(7): 2288-2297. (in English) ["Climate models predict widespread shifts in precipitation patterns and increases in the frequency of extreme events such as droughts, but consequences for key processes in affected ecosystems remains poorly understood. A 2-year manipulative experiment used a series of stream mesocosms to test the effect of recurrent drought disturbance on the composition and secondary production of macroinvertebrate consumer assemblages and functional groups. On average, secondary production in drought-disturbed communities (mean $4.5 \text{ g m}^{-2} \text{ yr}^{-1}$) was less than half of that that in controls (mean $10.4 \text{ g m}^{-2} \text{ yr}^{-1}$). The effects of the drought differed among functional feeding groups, with substantial declines for detritivore shredders (by 69%) and engulfing predators [including *Cordulegaster boltonii*] (by 94%). Contrasting responses were evident among taxa within most functional feeding groups, ranging from extirpation to irruptions in the case of several small midge larvae, but production of most species was suppressed. Taxon-specific responses were related to body mass and voltinism. The ratio of production to biomass (community P/B) increased under drought, reflecting a shift in production from large long-lived taxa to smaller taxa with faster life cycles. This research provides some of the first experimental evidence of the profound effects that droughts can have on both the structure and functioning of aquatic ecosystems." (Authors)] Address: Ledger, M., School of Geography, Earth & Environ. Sci., Univ. Birmingham, Edgbaston, Birmingham B15 2TT, UK. E-mail: m.e.ledger@bham.ac.uk

11527. Liess, M.; Beketov, M. (2011): Traits and stress: keys to identify community effects of low levels of toxicants in test systems. *Ecotoxicology* 20(6): 1328-1340.

(in English) ["Community effects of low toxicant concentrations are obscured by a multitude of confounding factors. To resolve this issue for community test systems, we propose a trait-based approach to detect toxic effects. An experiment with outdoor stream mesocosms was established 2-years before contamination to allow the development of biotic interactions within the community. Following pulse contamination with the insecticide thiacloprid, communities were monitored for additional 2 years to observe long-term effects. Applying a priori ecotoxicological knowledge species were aggregated into trait-based groups that reflected stressor-specific vulnerability of populations to toxicant exposure. This reduces inter-replicate variation that is not related to toxicant effects and enables to better link exposure and effect. Species with low intrinsic sensitivity showed only transient effects at the highest thiacloprid concentration of 100 lg/l. Sensitive multivoltine species showed transient effects at 3.3 lg/l. Sensitive univoltine species were affected at 0.1 lg/l and did not recover during the year after contamination. Based on these results the new indicator SPEARmesocosm was calculated as the relative abundance of sensitive univoltine taxa. Long-term community effects of thiacloprid were detected at concentrations 1,000 times below those detected by the PRC (Principal Response Curve) approach. We also found that those species, characterised by the most vulnerable trait combination, that were stressed were affected more strongly by thiacloprid than non-stressed species. We conclude that the grouping of species according to toxicant-related traits enables identification and prediction of community response to low levels of toxicants and that additionally the environmental context determines species sensitivity to toxicants." (Authors) *Aeshna* sp., *Ischnura elegans*, *Leucorrhinia* sp., *Libellula quadrimaculata*, *Orthetrum coerulescens*, and *Sympetrum striolatum* are assessed as "non-sensitive univoltine taxa".] Address: Liess, M., Department System-Ecotoxicology, UFZ - Helmholtz Centre for Environmental Research, Leipzig 04318, Germany. E-mail: matthias.liess@ufz.de

11528. Lökkös, A.; Jäch, M.A.; Kovacs, T. (2011): First record of *Hydraena schuleri* Ganglbauer, 1901 (Coleoptera: Hydraenidae) in Hungary. *Folia Historico-Naturalia Musei Matraensis* 35: 109-110. (in English) [*H. schuleri* is recorded for the first time from Hungary (Mátra and Pilis Mountains). The locality in the Mátra Mountains (N47°52'37.2", E19°57'57.1", 520 m, UTM grid: DU20) is a typical shaded mountain stream. From this area several interesting insect species are known including *Cordulegaster bidentata* (Kovács & Ambrus 2010).] Address: Lökkös, A., University of Pannonia, Georgikon Faculty, Dept of Animal Sciences and Animal Husbandry, H-8360 Keszthely, Hungary. E-mail: a.lokkos@gmail.com

11529. Lüderitz, V.; Speierl, T.; Langheinrich, U.; Völkl, W.; Gersberg, R.M. (2011): Restoration of the Upper Main and Rodach rivers – The success and its measurement. *Ecological Engineering* 37(12): 2044-2055. (in English) ["Large-scale restoration of streams and rivers is a mandatory prerequisite for the implementation of the European Water Framework Directive (WFD) to reach good ecological status of water bodies. This contribution analyzes the success of the largest river restoration in Germany at the Upper Main (Bayern). Sections with a length of more than 18 km were restored be-

tween 1990 and 2008, including re-connection of former oxbow-lakes, multiple-channelling, and establishment of wide riparian buffer zones. Measuring the success of restoration by means of a multimetric assessment system, we found a clear success of restoration indicated by the status of hydromorphology and by the biological parameters, including macroinvertebrates, fishes, and macrophytes. Unlike non-restored reaches, the restored reaches attained a good ecological status. As such, the restoration of the Upper Main is shown to be a pilot project for the implementation of the WFD on a large scale." (Authors) With the exception of *Ophiogomphus cecilia*, all species listed below profit from restoration measures: *Aeshna cyanea*, *Calopteryx splendens*, *Coenagrion puella*, *Cordulegaster boltonii*, *Gomphus pulchellus*, *G. vulgatissimus*, *Ischnura elegans*, *Onychogomphus forcipatus*, *Platycnemis pennipes*, and *Pyrrosoma nymphula*.] Address: Lüderitz, V., University of Applied Sciences Magdeburg, Dept of Water and Waste Management, Breitscheidstr. 2, 39114 Magdeburg, Germany. E-mail: Volker.Luederitz@HS-Magdeburg.de

11530. Malikova, E.I.; Medvedev, A.F. (2011): New record of *Sympetrum risi* Bartenev, 1914 in Amur region. *Amurian zoological journal* III(3): 246-247. (in Russian, with English summary) [All *S. risi* specimens were collected in Amurskaya oblast in vic. of Blagoveshchensk (50°33'60"N, 127°39'27" E; 19.08.2011) and Raichikhinsk (49°47'36" N, 129°23'06" E; 15.09.2011). Diagnostic characters of *S. risi* and its relative *S. infuscatum* Selys, 1883 are discussed. Two colour morphs are noted in the females of *S. risi*, with heteromorph females closely resembling *S. infuscatum*.] Address: Malikova E.I., Department of Zoology, Blagoveshchensk State Pedagogical University, Lenina str. 104, Blagoveshchensk, 675000, Russia. E-mail: emalikova@inbox.ru

11531. Manger, R. (2011): Interspecific mating of *Sympetma fusca* (Vander L.) and *S. paedisca* (Brauer) observed for the second time in The Netherlands (Zygoptera: Lestidae). *Notul. odonatol.* 7(8): 74-75. (in English) ["On 26 April 2008, interspecific mating of *S. fusca* male and *S. paedisca* female, with oviposition ensuing, was observed in the Weerribben, in NE Netherlands. In 2007, a similar mating was brought on record from Drenthe, but its duration was shorter. It would seem that, in areas where both species reproduce, *S. fusca* behaves dominantly. The increasing expansion of *S. fusca* northward, as seen in the last few decades, could cause competition between the 2 species in the use of waters suitable for reproduction in the Weerribben and in similar areas. It is not known whether interbreeding could lead to viable progeny." (Author)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

11532. Marinov, M. (2011): Damselflies and Dragonflies of the Nakorotubu Range, Ra and Tailevu Provinces, Viti Levu, Fiji. In: Morrison, C., Nawadra, S., and Tuiwawa, M. (ed.). A rapid biodiversity assessment of the Nakorotubu Range, Ra and Tailevu Provinces, Fiji. *RAP Bulletin of Biological Assessment* 59: 90-128. (in English) ["A total of 32 Odonata taxa were found during the RAP-Fiji in the Nakorotubu range, Ra and Tailevu Provinces, Fiji. These taxa represent more than 50% of the all species recorded for the whole Fijian archipelago and about 78% of the species established for Viti Levu. The significance of the group for environmental appraisals is discussed, individual behavioural traits and short ecological information are provided for each spe-

cies observed during the investigation, and a preliminary habitat classification scheme is suggested for the species collected from the study area. Due to problems with species taxonomy only general conservation recommendations are proposed without specifying local management actions that need to be taken." (Author)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

11533. Mola, L.M.; Rebagliati, P.J.; Rodríguez Gil, S.G.; Adilardi, R.S. (2011): Variaciones meióticas y evolución cromosómica en insectos y arácnidos con cromosomas holocinéticos. *Journal of Basic & Applied Genetics* 22(1) (Article 12): 6 pp. (in Spanish, with English summary) ["Cytogenetic studies in model groups of insects (Odonata [*Rhionaeschna bonariensis*] and Heteroptera) and arachnids (Dysderoidea and Buthidae) with holokinetic chromosomes allowed us to identify differences in autosomes and sex chromosomes meiotic behaviour (pre-or post-reductional meiosis, chiasmatic or achiasmatic meiosis, telokinetic or holokinetic activity). Also, we detected differences in the frequency and distribution of chromosomal mutations (fusions, fragmentations and translocations both in homozygosity or heterozygosity) in the karyotype evolution mechanisms." (Authors)] Address: Mola, L.M., Lab. de Citogenética y Evolución, Depto de Ecología Genética y Evolución. Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires. Intendente Güiraldes y Costanera Norte, 1428 Ciudad Universitaria. Ciudad Autónoma de Buenos Aires. Argentina. E-mail: limola@ege.fcen.uba.ar

11534. Neff, M.R.; Jackson, D.A. (2011): Effects of broad-scale geological changes on patterns in macroinvertebrate assemblages. *Journal of the North American Benthological Society* 30(2): 459-473. (in English) ["Understanding the broad-scale factors that influence biological communities has long been a goal of community ecology. We used benthic macroinvertebrate data to identify broad geographical patterns in macroinvertebrate community composition and specifically to examine the influence of the Precambrian Shield on stream abiotic and biotic conditions. The Precambrian Shield is a geological feature that encompasses most of northern North America. Geology differs between Shield and off-Shield areas, creating distinctly different physical and chemical conditions in aquatic systems. We focused our regional scale study on south-central Ontario, where both Shield and off-Shield conditions are found in adjacent areas. We used constrained and unconstrained multivariate analyses to examine patterns in biotic, abiotic, and spatial variables. Our results showed that, in low-order lotic systems, macroinvertebrate communities differ between Shield and off-Shield streams. Shield streams have higher dissolved O₂, velocity, and discharge, larger amounts of woody debris, and greater canopy cover than off-Shield streams. In contrast, off-Shield streams have higher conductivity, alkalinity, pH, turbidity, and water temperature, and frequently are surrounded by meadow, cultivated, or pastured land. In general, macroinvertebrate communities at off-Shield sites had a greater proportion of taxa preferring pool or depositional habitats, whereas macroinvertebrate communities at Shield sites contained taxa typically associated with riffles or erosional habitats. Analysis of spatial location indicated that the Shield/off-Shield distinction probably is the result of a combination of intertwined abiotic and spatial factors." (Authors) Taxa including

Odonata are treated at the family level.] Address: Neff, Margaret, Department of Ecology and Evolutionary Biology, University of Toronto, Toronto, Ontario M5S 3G5 Canada. E-mail addresses: maggie.neff@utoronto.ca

11535. Nesemann, H.; Sharma, G.; Sinha, R.K. (2011): Benthic macro-invertebrate fauna and "marine elements" sensu Annandale (1922) highlight the valuable dolphin habitat of river Ganga in Bihar - India. *TAPROBANICA: The Journal of Asian Biodiversity* 3(1): 18-30. (in English) ["From the main channel of River Ganga 95 invertebrate taxa (including *Asiagomphus* spec. and *Macrogomphus* spec.) have been recorded in the endangered Gangetic Dolphin (*Platanista gangetica*) habitat over an observation period of ten years. Mollusks, Annelids and Arthropods are the dominating benthic groups that constitute the detritivores, filter-feeders and sediment feeders, scrapers/grazers and herbivores. The benthic sediment fauna is rich in diversity and high in abundance. This enables carnivores to occupy a large variety of specialized ecological niches. ... Only two taxa are certainly recognized as non-indigenous neozoans, whereas the remaining fauna shows pristine and stable ecological conditions. In this aspect River Ganga differs from regulated large rivers, where faunal change has largely replaced the original species inventory. Despite the heavy pollution in parts of the river, the original composition of biological diversity is still persisting in the middle reaches of the Ganga. This provides hope for the survival of the Gangetic Dolphin." (Authors)] Address: Sharma, G., Zoological Survey of India, Gangetic Plains Regional Centre, Road No. 11-D, Rajendra Nagar, Patna-800 016, India. E-mail: gprszsapatna@rediffmail.com

11536. Nesemann, H.; Shah, R.D.T.; Shah, D.N. (2011): Key to the larval stages of common Odonata of Hindu Kush Himalaya, with short notes on habitats and ecology. *Journal of Threatened Taxa* 3(9): 2045-2060. (in English) ["The order Odonata is one of the most widely studied groups among insects from the oriental region. They colonize in both stagnant and running water bodies of wide water quality. Hitherto, the existing literature on the Odonata contained numerous publications with coloured figures of adults, helpful for identification. Identification key with figures on larval stages, using their coloration as distinguishing characters are largely missing. The current work attempts to provide an identification key to aquatic larvae of the most common families of Zygoptera, Anisoptera and Anisozygoptera with colour illustrations. The specimens were collected from Nepal and India (northern part). Each family is represented by several examples to demonstrate the range of morphological variability. This key helps determination of aquatic larvae Odonata up to family level without enormous efforts in field and laboratory." (Authors)] Address: Nesemann, H., Centre for Environmental Science, Central University of Bihar, BIT Campus, Patna, Bihar 800014, India. E-mail: hnese-mann2000@yahoo.co.in

11537. Neves dos Santos, A.F.G.; Neves dos Santos, L.; Araújo, F.G. (2011): Digestive tract morphology of the Neotropical piscivorous fish *Cichla kelberi* (Perciformes: Cichlidae) introduced into an oligotrophic Brazilian reservoir. *Rev. Biol. Trop. (Int. J. Trop. Biol.)* 59(3): 1245-1255. (in English, with Portuguese summary) [Odonata were found in 11.36% in the diet of 254 *C. kelberi* stomachs collected in Lajes Reservoir.] Address: Araújo, F.G., Departamento de Biologia, Universidade

Federal Rural do Rio de Janeiro, Antiga BR 465, Km 47, Seropédica, Brasil. E-mail: gerson@ufrjr.br

11538. Nilsson, E.; Solomon, C.T.; Wilson, K.A.; Willis, T.V.; Larget, B.; Vander Zanden, M.J. (2011): Effects of an invasive crayfish on trophic relationships in north-temperate lake food webs. *Freshwater Biology* 57(1): 10-23. (in English) ["(1) The introduction of invasive species is one of the main threats to global biodiversity, ecosystem structure and ecosystem processes. In freshwaters, invasive crayfish alter macroinvertebrate community structure and destroy macrophyte beds. There is limited knowledge on how such invasive species-driven changes affect consumers at higher trophic levels. (2) In this study, we explore how the invasive rusty crayfish *Orconectes rusticus*, a benthic omnivore, affects benthic macroinvertebrates, as well as the broader consequences for ecosystem-level trophic flows in terms of fish benthivory and trophic position (TP). We expected crayfish to decrease abundance of benthic macroinvertebrates, making most fish species less reliant on benthic resources. We expected crayfish specialists (e.g. *Lepomis* sp. and *Micropterus* sp.) to increase their benthic dependence. (3) In 10 northern Wisconsin lakes, we measured rusty crayfish relative abundance (catch per unit effort, CPUE), macroinvertebrate abundance, and C and N stable isotope ratios of 11 littoral fish species. We used stable isotope data and mixing models to characterise the trophic pathways supporting each fish species, and related trophic structure to crayfish relative abundance, fish body size and abiotic predictors using hierarchical Bayesian models. (4) Benthic invertebrate abundance was negatively correlated with rusty crayfish relative abundance. Fish benthivory increased with crayfish CPUE for all 11 fish species; posterior probabilities of a positive effect were >95%. TP also increased slightly with crayfish CPUE for some species, particularly smallmouth bass, largemouth bass, rock bass and Johnny darter. Moreover, both fish body size and lake abiotic variables explained variation in TP, while their effects on benthivory were small. (5) Rusty crayfish abundance explained relatively little of the overall variation in fish benthivory and TP. Although rusty crayfish appear to have strong effects on abundances of benthic macroinvertebrates, energy flow pathways and trophic niches of lentic fishes were not strongly influenced by invasive rusty crayfish." (Authors) Odonata are represented in some of the studied lakes but not treated.] Address: Nilsson, E., Department of Biology /Limnology and Marine Ecology, Ecology Building, Lund University, SE-223 62 Lund, Sweden. E-mail: erika.ja.nilsson@gmail.com

11539. Ohba, S.-Y.; Trang Huynh, T.T.; Le, L.L.; Ngoc, H.T.; Hoang, S.L.; Takagi, M. (2011): Mosquitoes and their potential predators in rice agroecosystems of the Mekong delta, southern Vietnam. *Journal of the American Mosquito Control Association* 27(4): 384-392. (in English) ["*Culex tritaeniorhynchus*, *Cx. gelidus*, and *Cx. quinquefasciatus*, known vectors of Japanese encephalitis (JE), are distributed in rice agroecosystems in Asian countries. Very few integrated studies on the breeding habitats of rice-field mosquitoes, including JE vectors, have been conducted in Vietnam. We investigated the mosquito fauna and potential predators (including 'Zygoptera' and 'Anisoptera') in 8 rice growing areas in the Mekong Delta region of southern Vietnam, during the wet and dry seasons of 2009. Mosquitoes and their predators were collected from a variety of aquatic habi-

tats (rice fields, ponds, wetlands, shrimp ponds, ditches, canals, and rivers). [...] Based on a stepwise generalized linear model, the abundance of mosquitoes and their predators in rice fields was high when the rice plant length was short and water depth was shallow. Therefore, the use of insecticides during the earlier stages of rice growth should be avoided in order to preserve the predator populations." (Authors)] Address: Ohba, S.-Y., Department of Vector Ecology & Environment, Institute of Tropical Medicine (NEKKEN), Nagasaki University, Sakamoto, Nagasaki 852-8523, Japan. E-mail: oobug@ecology.kyoto-u.ac.jp

11540. Ozono, A.; Futahashi, R.; Ozono, A. (2011): An interspecific hybrid between *Anax parthenope julius* female and *A. panybeus* male. *Tombo* 53: 115-118. (in Japanese, with English summary) ["A male interspecific hybrid between *Anax panyheus* Hagen, 1867 and *Anax parthenope julius* Brauer, 1865 was recorded from Amami-Oshima Island, Kagoshima Prefecture, Japan, which shows intermediate characteristics between both species. The results of nuclear and mitochondrial DNA analyses suggest that this specimen was derived from interspecific mating between a male *Anax panyheus* and a female *Anax parthenope julius*." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11541. Pfau, H.K. (2011): Functional morphology of the head movability and arrestment of *Aeshna cyanea* and some other dragonflies (Insecta: Odonata). *Entomologia generalis* 33(4): 217-234. (in English) ["The functional morphology of the neck sclerites and muscles, which are responsible for head movability and arrestment, is described. The musculature is divided (unsharp) in muscles for head-movements and muscles for head-arrestment and disengagement. A new mechanism of the cervicalia is described: the cervicalia-1/-3 constitute, together with the propleural suspension, a kinematic system with 5 links and 5 joints, which is activated by two pairs of antagonistic muscles. The muscles determine (on both sides) the distance between a pad of the cervical sclerite 2 and the head (which is articulated frontally to the cervicalia-1) by an alteration of both the lateral and longitudinal distances. -The head-suspension of dragonflies represents a serious mechanical weak point [Mittelstaedt 1950, Gorb 1998]. Since the head is continuously adjustable nearer or farther to the pads of the cervicalia-2, a gradual adaptation to risks of injury is possible. By strong contraction of the arrester-muscles an elastic bending property of the cervicalia-1 is utilized. The tangential approach and differently strong hooking of microtrichia fields effect a variable frictional damping of passive deflections of the head. Pressure-spring and tension-spring properties, mainly of the proximal bending zone of the cervicalia-1, also serve to protect the vulnerable head-joint. - The evolution of the punctiform head-articulation of the Odonata is reconstructed. Based on the different relative size of the cervical sclerites, the efficiency of different head-arrester systems is evaluated. Epallage fatigue, *Epiophlebia superstes* and the Anisoptera indicate an improved effectiveness of the head-arrester functions, which is possibly correlated to enhanced flight capabilities and increased risks of head-joint damage." (Author)] Address: Pfau, H.-K., Rathenastr. 14, 65326 Aarbergen, Germany. E-mail: clauspfau@web.de

11542. Regan, E.; Nelson, B.M McCormack, S.; Nash, R.; O'Connor, J.P. (2011): Countdown to 2010: Can we

assess Ireland's insect species diversity and loss?. *Proceedings of the Royal Irish Academy* 110(2): 109-117. (in English) ["In light of the Convention on Biological Diversity, this paper summarises the known insect species numbers for Ireland and questions whether this is a true reflection of our insect diversity. The total number of known species for Ireland is 11,422. Using species accumulation curves and a comparison with the British fauna, this study shows that the Irish list is incomplete and that the actual species number is much higher. However, even with a reasonable knowledge of the species in Ireland, insects are such speciose, small, and inconspicuous animals that it is difficult to assess species loss. It is impossible to know at one point in time the number of insect species in Ireland and, although it is useful to summarise the known number of species, it is essential that biodiversity indicators, such as the Red List Index, are developed. ... For example, while 32 species of the Odonata have been recorded in Ireland, only 24 (75%) of these species are known to have established breeding populations (Nelson and Thompson 2004)."] Address: Regan, E., School of Natural Sciences, Trinity College Dublin, National Biodiversity Data Centre, Dublin 2, WIT West Campus, Waterford, Ireland

11543. Reinhardt, K (2011): *Ischnura pumilio* (Charp.) on the island of Giglio: first record from the Tuscan archipelago, Italy (Zygoptera: Coenagrionidae). *Notul. odonatol.* 7(8): 76. (in English) [17-IX-1997, single female specimen.] Address: Reinhardt, K., Dept Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

11544. Rojas-Riano, N.C. (2011): First record of the damselfly genus *Anisagrion* (Odonata: Coenagrionidae) from Colombia. *Revista Colombiana de Entomología* 37(1): 164-165. (in English, with Spanish summary) ["The genus *Anisagrion* and the species *A. inornatum* are reported for the first time from Colombia. Currently the genus is known from Central America, Venezuela, and Ecuador. ... 3 male *Anisagrion inornatum* (Selys, 1876): Colombia. Boyacá Department. Santa María. Icacuye. 4°53'42,8"N 73°16'43"W. 843 m.a.s.l. 28-dec-2008. A. Penagos & F. Palacino. Insect Collection of the Instituto de Ciencias Naturales [ICN 043490, 043491, 043494]."] (Author)] Address: Rojas-Riano, Nancy, Biologist. Graduate student M.Sc., Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Sede Bogotá. Carrera 30 no. 45-03 AA. 7495. Bogotá D.C., Colombia. E-mail: ncrojasr@unal.edu.co

11545. Sakenin, H.; Samin, N.; Shakouri, M.J.; Mohebbi, H.R.; Ezzatpanah, S.; Moemen Beitollahi, S. (2011): A faunistic survey of the insect predators in some regions of Iran. *Calodema* 142: 1-10. (in English) ["The use of biological control is a fundamental tactic for pest suppression within an effective Integrated Pest Management (IPM) program. Biological control refers to the use of natural enemies against a pest population to reduce the pest's density and damage to a level lower than would occur in their absence. Biological control is designed with predators, parasitoids and pathogens. Some of these predaceous insects from many regions of Iran are studied in this paper. A total of 89 insect predator species from six orders ... were collected as biological control agents in agroecosystems of some regions of Iran." (Authors): *Cordulegaster picta*, *Cordulia aenea*, *Gomphus davidi*, *Libellula pontica*, *Orthetrum coerulescens*, *Sympetrum pedemontanum*.] Address:

Sakenin, H., Department of Plant Protection, Islamic Azad University, Qaemshahr Branch, Mazandaran, Iran. E-mail: hchelave@yahoo.com

11546. Sandaas, K. (2011): Forekomst av øyestikkeren bred blålibelle *Libellula depressa*. Ås kommune Akershus 2010. Med tillegg om Nesodden, Frogn, Enebakk og Oppegård kommuner: 1-7. (in Norwegian) [Records of *L. depressa* in Ås, Norway from 2003 and 2010 are compiled and discussed.] Address: Sandaas, K., Naturfaglige konsulenttjenester, Øvre Solåsen 9, 1450 Nesoddtangen, Norway. E-mail: kjell.sandaas@gmail.com

11547. Sano, K.; Miyoshi, K.; Ishikawa, S.; Liepvisay, N.; Kurokura, H. (2011): Impact of predation by water insects on fish seed production in Lao PDR. *Japan Agricultural Research Quarterly* 45(4): 461-465. (in English) ["The predation of cultured larval fish by water insects presents a serious issue for aquaculture development in rural areas of the Lao People's Democratic Republic (Lao PDR). In this study, the species composition of predatory water insects was monitored in a fish nursing pond. Laboratory predation experiments were then performed to examine the predation potential of water insects on 3 major cultured fish species, including *Barbonymus gonionotus*, *Cirrhinus cirrhosus*, and *Cyprinus carpio*. ... The results suggested that larvae of Coenagrionidae, Libellulidae, and Dytiscidae and adults and larvae of Notonectidae are potential predators of fish seed in nursing ponds. In this survey, predatory water insects were removed by drying the pond, and then filtering water using fine mesh nets after the pond had been refilled. The biomass of Coenagrionidae, Libellulidae, and Dytiscidae larvae was low 3 days after refilling and increased gradually over time, which suggests that the drying and filtering methods were effective for the removal of larvae of these 3 families, because they cannot fly. Coenagrionidae, Hydrophillidae and Dytiscidae individuals spawn the eggs on vegetation growing in the water. The removal of plants may therefore be more effective for the extirpation of these water insects than drying out the pond." (Authors)] Address: Sano, K., Fisheries and Aquaculture International Co. Ltd., Shinjuku, Tokyo 160-0004, Japan. E-mail: s-kousuke@mtj.biglobe.ne.jp

11548. Schiel, F.-J. (2011): Breiten sich Kleine und Glänzende Binsenjungfer (*Lestes virens*, *L. dryas*) derzeit in der Oberrheinebene aus? (Odonata: Lestidae). *Mercuriale* 11: 11-16. (in German, with English summary) ["Since 2000, *L. virens* has been recorded at 14 sites in the upper Rhine valley of the German federal state of Baden-Württemberg and *L. dryas* at six sites. Between 1958 and 1999, the former species was recorded at eight sites, the latter at three sites in this part of the upper Rhine valley. This significant increase in records suggests a range extension of both species. Most records are from the nature area „Hardtebenen“ in the surroundings of Karlsruhe - characterized by sandy soils - and the wet lowland nature area „Kinzig-Murg-Rinne“ in the neighbouring south. The distribution of both species in the upper Rhine valley east of the River Rhine in Baden-Württemberg corresponds with that of the valley west of the River Rhine in Alsace (France) and the German federal state of Rhineland-Palatine." (Author)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

11549. Sciberras, A. (2011): First record of a successful breeding of *Anax ephippiger* Burmeister, 1839 in the Maltese Islands (Insecta, Odonata). *Naturalista sicil.* Ser. IV, 35(2): 157-162. (in English, with Italian summary) [teneral male, il-Qammieh, 23-VIII-2010] Address: Sciberras, A., 131, "Arnest", Arcade Str., Paola, Malta. E-mail: bioislets@gmail.com

11550. Sciberras, A. (2011): Dragonfly migration causes sensation. *The Sunday Times*, April 17th: 68. (in English) [18-III-2011, around 4000 *Anax ephippiger* were seen NE of Gozo, Malta.] Address: Sciberras, A., 131, "Arnest", Arcade Str., Paola, Malta. E-mail: bioislets@gmail.com

11551. Sheshurak, P.N.; Voblenko, A.S.; Kedrov, B.Yu.; Gromova, A.G.; Gavriley, M.A. (2011): Animals as prey of the Domestic cat (*Felis catus* Linnaeus, 1758) in the Chernigov region (Ukraine). *Prirodnichy Almanac* 16: 178-186. (in Russian, with Ukrainian and English summaries) [The prey of *F. catus* includes *Aeshna mixta*, *Orthetrum cancellatum*, *Sympetrum flaveolum*, *S. vulgatum*, *S. danae*, and *S. sanguineum*.] Address: Sheshurak, P.N., Nizhyn State University. Nikolai Gogol Nezhyh, Chernihiv region, Ukraine. E-mail: sheshurak@mail.ru

11552. Siesa, M.E. (2011): Freshwater communities and biological invasions: Odonata, Amphibia and *Procambarus clarkii*. Tesi di Dottorato. Scuola di Dottorato in Terra, Ambiente e Biodiversità, Corso di Dottorato di Ricerca in Scienze Naturalistiche e Ambientali, XXIII ciclo, Dipartimento di Biologia, Università degli studi di Milano: 144 pp. (in English) ["This research work analyses processes and dynamics occurring during the early stages of a biological invasion in freshwater habitats. I analysed processes determining the *Procambarus clarkii* invasion and the impact on native amphibians and odonates that have complex life cycles, I surveyed 148 among temporary and permanent wetlands of running and standing waters in a region that is at the edge of the invasion range of *P. clarkii*. I performed repeated sampling sessions in each wetland obtaining both qualitative and quantitative data on freshwater communities, I characterized each wetland using standard parameters, and I used GIS software for the description of the surrounding landscape. I analysed all data using spatial models and considering the spatial autocorrelation (for details see chapter 2). Data analysis showed that the environmental features are important in determining the early phases of the crayfish invasion; in the study area, *P. clarkii* spreads more frequently in association with large and permanent wetlands in human-altered landscapes, and the autocorrelation of its populations is stronger at distances up to 2500 m suggesting that dispersion affect invasion processes up to this distance (chapter 2). Further analysis showed that environment shapes both alien invasive species (AIS) and freshwater communities, but considering the optimal environmental features for *P. clarkii* and for amphibians and odonates, I observed important differences related to wetland size, depth, hydroperiod, exposition, presence of aquatic macrophytes, and surrounding landscape features (chapters 2, 3, and 5). The observed relationships among distribution and composition of native communities and distribution of *P. clarkii* suggests that the invasive crayfish has only a limited direct impact on adult amphibians and odonates, but the analysis of juvenile stages of native communities (larvae of amphibians, larvae and exuviae of odonates) showed the dra-

matic loss of their abundance and richness in wetlands invaded by the crayfish, indicating that, despite adults attempt reproduction in invaded sites, *P. clarkii* causes, with its activities, the fall down of their reproductive success (chapters 4 and 5). This research confirms the strong negative impact of AIS on native communities. My data indicate that *P. clarkii* determines the loss of reproductive sites, and the decrement of the reproductive success when native populations use the invaded sites for breeding (chapters 4, 5, and 6). This research highlights the importance of studying the early stages of an invasion, confirming that in this phase AIS populations have larger environmental needs that might make them more vulnerable at management actions (chapters 2, 3, and 6). Through the analysis and description of the mechanisms determining the AIS impact on native communities, this research helps to identify the ongoing processes at early stages of the AIS invasion, and the consequences that the invasive crayfish will have in the near future, allowing managers to start conservation actions before that the invasion consequences become irreversible." (Author)] Address: not stated

11553. Sivaperuman, C.; Kumar Shah, S.; Venkataraman, K. (2011): New records of odonates from Andaman and Nicobar Islands. *Biological Forum* 3(2): 69-70. (in English) [*Zygomma petiolatum*, *Tramea limbata similata*, *Diplacodes nebulosa*, and *Cratilla lineata* are listed without details; the first three species were probably found in 2007 and *C. lineata* in 2005.] Address: Sivaperuman, C., Zoological Survey of India, Andaman and Nicobar Regional Centre, Port Blair

11554. Souto, R.; Facure, K.G.; Pavanin, L.A.; Jacobucci, G.B. (2011): Influence of environmental factors on benthic macroinvertebrate communities of urban streams in Vereda habitats, Central Brazil. *Acta Limnologica Brasiliensia* 23(3): 293-306. (in English, with Portuguese summary) ["Aim: Veredas and the aquatic and semi-aquatic communities play a key role in watershed protection in the Cerrado Biome. Information about the effects of physical and chemical variables and habitat integrity on benthic communities has been increased in recent years; however, there is no study evaluating the influence of urbanization on macroinvertebrates of Vereda streams. Thus, improving the knowledge of the relationship between abiotic properties and benthic fauna is very important for understanding the functioning of ecological processes and health of aquatic ecosystems. This study investigated the influence of physical and chemical variables on benthic macroinvertebrate communities along a gradient of anthropogenic disturbance in four Vereda streams in Uberlândia (MG), one in a preserved area and three in the urban area; Methods: samplings were collected during the dry and rainy seasons; Results: principal component analysis separated the stream in the preserved area from those in the urban area by having lower values of BOD, COD, sediment size, conductivity, detergents, pH, deposited solids and total dissolved solids. Pollution sensitive groups (e.g., Ephemeroptera and Trichoptera) were associated to the stream in the preserved area, and more tolerant groups (e.g., Chironomidae and Oligochaeta) had greater abundance in the streams of the urban area. Canonical Correspondence Analysis indicated that dissolved oxygen, conductivity, BOD, oil and grease, and turbidity explained 56% of the variance in the distribution and abundance of macroinvertebrates; Conclusions: Benthic communities of Vereda streams in urban areas in

the Cerrado Biome seem to be highly affected by human activities that increase water organic pollution and sedimentation." (Authors) Odonata are treated at the family level.] Address: Pavanin, L.A., Instituto de uímica, Universidade Federal de Uberlândia-UFU, CEP 38408-100, Uberlândia, MG, Brazil. E-mail: pavanin@ufu.br

11555. Španić, R.; Cipčić, A.; Bogdanović, T.; Franković, M. (2011): State of research into dragonflies (Odonata) of Karlovac county, Croatia, with special reference to NATURA 2000 species. *Entomologia Croatica* 15: 209-221. (in English, with Croatian summary) ["42 dragonfly species were previously reported for Karlovac County. Historical as well as recently collected but unpublished records add seven more species to records for the analysed territory, raising the number of dragonfly species to 49. Analysis revealed uneven temporal and spatial distribution of records, showing that the SE part of the county (Kordun subregion) is the most underexplored. Although most of the published and unpublished data were collected during the last 25 years it is obvious that odonatological inventory was not conducted systematically but rather accidentally. Furthermore, only three NATURA 2000 species (*Cordulegaster heros*, *Leucorrhinia pectoralis* and *Ophiogomphus cecilia*) with very low number of records have been reported for Karlovac County." (Authors)] Address: Španić, R., Institute for Research and Development of Sustainable Ecosystems, Jagodno 100A, Novo Čiče 10415, Croatia, robertspanic047@yahoo.com

11556. Stih, A.; Zdravec, M.; Hlavati, D.; Koren, T. (2011): First data about the dragonfly (Insecta, Odonata) fauna in the Vugrovec area, Zagreb and the first checklist of the dragonflies of Zagreb. *Entomologia Croatica* 15(1-4): 223-235. (in English) ["The fauna of Zagreb has been well investigated during the last two centuries, which is evident from a series of publications. Even so, only limited data on dragonfly fauna of Zagreb have been published, and there is no current checklist. During the three years period (2009-2011) we conducted a survey of the dragonfly and damselfly fauna (Insecta, Odonata) in Vugrovec village, located on the eastern slopes of Mt Medvednica. The aim of this study is to present the first data on dragonflies from the Vugrovec area and to compile the first checklist of dragonflies of Zagreb. The suborder Zygoptera is represented in Vugrovec by 4 families and 5 species, while the suborder Anisoptera is represented by 4 families and 9 species in the area. After a review of all the available literature, in conjunction with the newly collected data, a checklist of dragonflies of Zagreb was created, including 44 species, 14 of which are listed in the Red Book of Dragonflies of Croatia. This indicates a high richness in comparison to the 70 known species from Croatia." (Authors)] Address: Koren, T., Science and Research Centre Koper, University of Primorska, Koper, Slovenia

11557. Sućeska, S.; Karačić, J. (2011): Lesser Empor dragonfly *Anax parthenope* (Selys, 1839) (Insecta: Aeshnoidea: Aeshnidae), a new species on Odonata of Bosnia and Herzegovina. *Natura Montenegrina* 10(4): 467-472. (in English) [Boracko Lake, 29-VII-2011] Address: Sućeska, Sabina, University of Sarajevo, Faculty of Sciences, Department for Biology, Zmaja od Bosne 33-35, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: ssuceska@hotmail.com

11558. Takahashi, Y.; Morita, S.; Yoshimura, J.; Watanabe, M. (2011): A geographic cline induced by negative frequency-dependent selection. *BMC Evolutionary Biology* 2011, 11:256: 10 pp. (in English) ["Background: Establishment of geographic morph frequency clines is difficult to explain in organisms with limited gene flow. Balancing selection, such as negative frequency-dependent selection (NFDS), is instead suggested to establish a morph frequency cline on a geographic scale at least theoretically. Here we tested whether a large-scale smooth cline in morph frequency is established by NFDS in the female-dimorphic damselfly, *Ischnura senegalensis*, where andromorphs and gynomorphs are maintained by NFDS. Results: We found a large-scale latitudinal cline in the morph frequency: andromorph frequency ranged from 0.05 (South) to 0.79 (North). Based on the empirical data on the numbers of eggs, the number of ovariole, abdomen length and latitude, the potential fitness of andromorphs was estimated to be lower than that of gynomorphs in the south, and higher in the north, suggesting the gene-by-environment interaction. From the morph-specific latitudinal cline in potential fitness, the frequency of andromorphs was expected to shift from 0 to 1 without NFDS, because a morph with higher potential fitness wins completely and the two morphs will switch at some point. In contrast, NFDS led to the coexistence of two morphs with different potential fitness in a certain geographic range along latitude due to rare morph advantage, and resulted in a smooth geographic cline of morph frequency. Conclusion: Our results provide suggestive evidence that the combination of NFDS and gene-by-environment interaction, i.e., multi-selection pressure on colour morphs, can explain the geographic cline in morph frequency in the current system." (Authors)] Address: Takahashi, Y., Division of Ecology and Evolutionary Biology, Graduate School of Life Sciences, Tohoku University, 6-3, Aoba, Aramaki, Aoba, Sendai, Miyagi 980-8578, Japan. E-mail: takahashi.yum@gmail.com

11559. Torralba Burrial, A.; Alonso-Naveiro, M. (2011): Biodiversidad de odonatos de la sierra de Fonfria y cuenca del Jiloca (Teruel): análisis de comunidades. *Xiloca* 39: 151-168. (in Spanish, with English summary) ["Odonata communities from 21 localities in Fonfria Mountains and Jiloca River Basin (province of Teruel) were surveyed. 35 species were found during this study. Community analysis shown three groups: 1) temporary and semitemporary ponds of Fonfria Mountains; 2) Huerva River, some fluvial reaches and other ponds, and 3) rest of the fluvial reaches of Pancrudo and Jiloca Rivers. Biogeographical analysis shown high percentage of Mediterranean elements, mainly Holomediterranean and Ibero-Maghrebian; Ethiopian elements were scarce." (Authors)] Address: Alonso-Naveiro, Maria, Departamento de Biología de Organismos y Sistemas. Universidad de Oviedo. 33071 Oviedo, Spain

11560. Trung, H.D.; Le Trong Son, Mai Phu Quy (2011): Preliminary data on the aquatic insect in Hai Van area, Thua Thien - Hue province. *Vietnam Journal of Biology* 33(3): 9-14. (in English) [10 Odonata species contribute with 18,87% to the total of 53 species recorded.] Address: not accessible

11561. Uwimana, C. (2011): Impact of rice cropping on abundance of benthic macroinvertebrates in Nyanza, Sovu and Kibabara marshes, Huye district. Memoir submitted for partial fulfillment of the award of Bachelor's degree in Biology, National university of Rwanda,

Faculty of Science, Biology Department, Option: Zoology and conservation, Huye: 19 pp. (in English) [Rwanda; "The main purpose of this study was to assess the impact of rice cropping on water quality using benthic macroinvertebrates communities as bioindicators. The study was developed in Munyazi stream and surrounding rice irrigated fields in Nyanza, Sovu and Kibabara marshlands and the samples were collected in August during dry season and also maturation/cut period, three sites in Munyazi stream and other three sites in surrounding rice irrigated fields. 16 organisms were identified on order level, thus many of them could be identified on family level; Gastropoda of Planorbidae family were the most abundant taxa along with Ephemeroptera and Hemiptera, but the Ephemeroptera taxa was only found in Munyazi stream sample sites. The results showed a bare presence or absence of organisms sensitive to pollution in rice irrigated fields sample sites such as Ephemeroptera, Plecoptera and Trichoptera but also showed the presence, sometimes highly presented, in Munyazi stream sample sites. The rice cropping affected significantly the diversity and distribution of benthic macroinvertebrates organisms, meaning affecting water quality ($t=2.67, df=50, p=0.01$). The type of crops management and irrigation techniques, the use of pesticides are the main cause of the low diversity and low richness in benthic macroinvertebrates communities of rice irrigated fields. The benthic biodiversity loss observed in some sample sites, prove that environmental alteration is caused by rice cropping techniques, is at the origin of habitats reduction and degradation, simplification of ecosystem and impoverishment of water quality." (Author) In Munyazi Stream and surrounding rice fields Odonata accounted to 26% to sampled specimens.] Address: Uwimana, Catherine; no stated

11562. van Swaay, C.; Termaat, T.; Plate, C.; Plantenga, W. (2011): Wel geteld, niets gezien [Well counted, nothing seen]. *Vlinders* 2011: 14. (in Dutch) [Monitoring transect counts without study site records of butterflies or dragonflies between 1999 and 2010 are presented. In the case of butterflies, an increase of such zero-hits and and decrease of butterfly number is evident. In the case of dragonflies, zero-hits got more less and abundance of Odonata seems to have increased.] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands. E-mail: tim.termaat@vliinderstichting.nl

11563. Vega-Sanchez, Y.; Isarraras-Hernandez, L.; Castillo-Ayala, P.; Mendoza-Cuenca, L. (2011): Morfología alar y territorialidad en *Hetaerina vulnerata*. *Biológicas* 13(1): 29-35. (in Spanish, with English summary) ["The ubiquity of territorial defense in males of Calopterygidae is an interesting feature to evaluate the implications of morphological traits, sexual cues and ecological factors associated with territorial behaviour in odonates. The males of the genus *Hetaerina*, defend permanent territories in sunny areas close to riverbanks, through ritualized fights, chasing and displaying their wing against intruding males. It has been suggested that these traits have been evolved by sexual selection mainly because male's quality is expressed by honest signals, such as wing pigmentation levels, body size, thorax size (estimated of the amount of fat and muscle flight), and wings size. However, there is little evidence of variation in these traits among populations and alternative mating strategies which are common within *Hetaerina* genus. In this paper we document that

those traits not involved in territorial defense in males of *Hetaerina vulnerata* (Selys, 1853) not vary between populations, while the morphological traits involved in the success of male territorial behaviour are modified between populations and mating strategies. Our results highlight the importance of ecological features and levels of anthropogenic disturbance of natural populations in the reproductive success and the evolution of mating systems in Odonata." (Authors)] Address: Mendoza-Cuenca, L., Lab. de Ecología de la Conducta, Facultad de Biología. Univd Michoacana de San Nicolás de Hidalgo. Edificio "R", Ciudad Universitaria, Av. Francisco J. Múgica s/n. Col. Felicitas del Río, C.P. 58030. Morelia, Michoacán, México. E-mail: lmendoza@lca.unam.mx

11564. Wu, F.c.; Meng, W.; Cao, Y.-j.; Li, H.-x.; Zhang, R.-q.; Feng, C.-l.; Yan, Z.-g. (2011): Derivation of aquatic life water quality criteria for cadmium in freshwater in China. *Research of Environmental Sciences* 24(2): 172-184. (in Chinese, with English summary) ["Cadmium is a poisonous heavy metal which is toxic, hard to degrade and easy to reside. It can cause adverse effects on aquatic organisms and ecosystems. In order to control effectively the adverse effects which Cd might bring to aquatic life in Chinese freshwaters, it is urgent for China to derive regional aquatic life criteria for Cd, which could provide a basis for the establishment and revision of water quality standards. In this study, all available toxicity data of Cd to Chinese representative species in freshwater were collected in order to protect the freshwater ecosystem and biota system. Three widely used criteria derivation methods concerning the assessment factor method, toxicity percentile rank method and species sensitivity distribution method were used to derive aquatic life criteria for Cd. Meanwhile, the criteria values for freshwater in China and the derivation process were studied and compared among the three methods. The results showed that for the assessment factor method, the criteria of freshwater Cd was expressed by one value, which was 0.15 µg/L; for toxicity percentile rank method, the criteria included criteria maximum concentration and criteria continuous concentration, which were 7.30 µg/L and 0.12 µg/L, respectively; for species sensitivity distribution method, the criteria of short term hazardous concentration and long term hazardous concentration were 32.50 µg/L and 0.46 µg/L, respectively. Finally, this study analyzed the advantages and disadvantages of these three methods and compared the difference of the Cd criteria in this research and other existing reference values in China and abroad. In addition, the possible reasons which caused this difference and the key factors which influenced the aquatic life criteria were also discussed." (Authors) The paper refers Tollett et al. 2009. Differential toxicity to Cd, Pb, and Cu in dragonfly larvae (Insecta: Odonata). *Arch. Environ. Contam. Toxicol.* 56(1): 77-84 where they report about to *Pachydiplax longipennis* tolerance to different metal concentrations.] Address: Wu, F.c., State Environmental Protection Key Laboratory for Lake Pollution Control, Chinese Research Academy of Environmental Sciences, Beijing 100012, China

11565. Xu, M.; Fincke, O.M. (2011): Tests of the harassment-reduction function and frequency-dependent maintenance of a female-specific color polymorphism in a damselfly. *Behav. Ecol. Sociobiol.* 65: 1215-1227. (in English) ["Colour polymorphisms have provided classical examples of how frequency-dependent selection maintains genetic variation in natural populations. Here

we tested for the first time, the hypothesized adaptive function of a female-specific colour polymorphism in odonates to lower male harassment towards females generally. Under conditions controlling for sex ratio, population density and morph frequency, we also tested two major frequency-dependent selection hypotheses for the maintenance of the polymorphism. Using groups of captive *Enallagma hageni*, whose females are either green or a male-like blue, we varied morph frequency at two sex ratios. We quantified sexual harassment towards females by visual observations, and by the presence of dust on females that was transferred from dusted males. Per capita harassment rate for the female-monomorphic treatments did not differ from that of the female polymorphic treatments. At a male-biased sex ratio, per capita harassment rate towards blue, but not green females increased with morph frequency, providing partial support for frequency-dependent selection resulting from male learning of female morphs. Even at high frequency, green females were not harassed more than blue, contrary to the prediction that males should always recognize green females as mates. Moreover, frequency-dependent harassment towards blue females was not detectable using harassment measured with dust evidence, which greatly underestimated the incidence of sexual harassment. Our findings identified problems with the use of insectaries and the dusting technique to quantify male sexual harassment towards females, as well as with a past insectary experiment on *Ischnura elegans* that failed to demonstrate frequency-dependent harassment." (Authors)] Address: Xu, Mingz, Ecology and Evolutionary Biology Program, Department of Zoology, University of Oklahoma, Norman, OK 73019, USA. E-mail: xumingzi@ou.edu

11566. Yamasaki, T. (2011): In Memoriam: Syoziro Asahina (1913–2010). *Species Diversity* 16: 81-83. (in English) [Obituary] Address: Yamasaki, T., Tokyo Metropolitan University, 1-1 Minami-Osawa, Hachioji, Tokyo, 192-0397 Japan. E-mail: peripatus@jcom.home.ne.jp

11567. Yu, W.-y.; Li, Z.-h.; Zhou, J.; Yuan, X.-j.; Yang, X. (2011): A study on the fauna and variety of Odonata insects in Nanjing Jiangjun mountain. *Journal of Nanjing Xiaozhuang University* 6: 77-79. (in Chinese, with English summary) [Without giving species (n = 24) details, several ecological indices are applied on Odonata fauna of Nanjing Jiangjun mountain, China.] Address: Yu, W.-y., Institute of Applied Ecology, Nanjing Xiaozhuang University, Nanjing 211171, China

11568. Yu, W.-y.; Li, Z.-h.; Hunga, C.; Wang, Q. (2011): Odonata fauna and its diversity in Jiangsu Province of China. *Chinese Journal of Ecology* 30(7): 1375-1381. (in Chinese, with English summary) [Applying line transect methodology, a total of 53 species were recorded between 2005 and 2010. Several ecological indices are calculated.] Address: Yu, W.-y., Institute of Applied Ecology, Nanjing Xiaozhuang University, Nanjing 211171, China. E-mail: ywy138519@126.com

2012

11569. Ahn, S.J.; Park, C.G. (2012): Terrestrial Insect Fauna of the Junam Wetlands Area in Korea. *Korean Jour. Appl. Entomology* 51(2): 111-129. (in Korean, with English summary) ["Terrestrial insect fauna was surveyed in the Junam wetland area, which consists of the Junam, Dongpan, and Sannam wetlands, by visual

counting and pictures. A sweep net collection was conducted from May to October 2010. A neighboring artificial lotus wetland was also surveyed for comparison. A total of 5,730 insects were surveyed, representing 268 species in 85 families and 12 orders. Sixty-three species of coleopterans were surveyed, followed by 60 species of Lepidoptera, and 37 species of Hemiptera. Coleopteran individuals were 25.9% of the total insect numbers surveyed, comprising most abundant group. This was followed by Odonata, Lepidoptera, and Orthoptera at 22.3%, 15.4%, and 12.7%, respectively. In total, 197 species were surveyed in the Dongpan wetland, 175 in the Junam wetland, and 154 species in the Sannam wetlands. However, only 86 species were surveyed in the artificial lotus wetland. *Galerucella nipponensis* in Coleoptera, *Crocothemis servilia mariannae* in Odonata, and *Polygonia c-aureum* in Lepidoptera were the most abundant in all four wetlands. Community analyses showed that the dominance index was highest in the artificial lotus wetland at 0.25 and lowest in Junam wetland at 0.08. Diversity indices were relatively high in all wetlands at 4.48, 4.44, 4.28, and 3.87 in Junam, Dongpan, Sannam, and the artificial lotus wetland, respectively. The insect fauna similarity index was highest in the Junam and Dongpan wetlands at 0.96. The lotus wetland showed the lowest similarity of the three wetlands with values of 0.45-0.53." (Authors)] Address: Park, C.G., Institute of Agriculture and Life Sciences, Gyeong-sang National University, Jinju 660-701, Rep. of Korea. E-mail: parkeg@gnu.ac.kr

11570. Altamiranda-S. M.; Ortega-M., O. (2012): Estructura poblacional de *Polythore gigantea* (Odonata: Polythoridae) en sistemas lóticos con diferentes estados de conservación en Antioquia, Colombia. *Rev. Biol. Trop.* 60(3): 1205-1216. (in Spanish, with English summary) ["Population structure of *Polythore gigantea* (Odonata: Polythoridae) in lotic systems with different conservation states in Antioquia-Colombia. The knowledge about population structure and dynamics of some Neotropical species, especially those living in lotic systems is still barely studied. This study had the aim to assess if the conservation status of some lotic systems, is related to some demographic variables of *P. gigantea*, so this may be used as a model for ecological monitoring. For this, we evaluated the population structure of *P. gigantea* three times per month (almost one sampling event every eight days) in four streams of the state of Antioquia, Colombia, from March-June 2009. The specimens were collected using entomological nets along a transect of 200m in the littoral zone of each stream. The insects were marked on the wings and the population size was estimated with the mark-recapture method. Our results showed that the largest population size was recorded for the stream "La Catedral" with approx 299 individuals, followed by the stream "La Doctora" with 218 individuals. Nevertheless, no significant differences in population size among the evaluated streams were found; and no statistical relationships were found between vegetation variables and the population size of *P. gigantea*. However, taking into account the limited dispersal capacity of *P. gigantea*, its survival in the studied streams was considered to be at risk, due to the continuous modification of large riparian forest areas, which cause the increase of forest patches, with different levels of interconnection, and hinder long-term permanence of populations." (Authors)] Address: Altamiranda-S. M. Universidad Nacional de Colombia sede Medellín, Grupo de investigación en ecología y sistemática de in-

sectos (GIESI), Calle 59A No 63-20, Medellín Colombia. E-mail: maltamiranda2@gmail.com

11571. Amava-Perilla, C.; Fajardo-Medina, G.E.; Moreno-Fonseca, C.J.; Holwell, G. (2012): Dragonfly (Anisoptera:Odonata) diversity from the northern Meta region of Colombia. *Entomology: Te Tai Tokerau. 61st conference of the New Zealand Entomological Society, Whangarei, New Zealand. 17th-20th April, 2012: 24.* (in English) [Verbatim: The dragonflies (Odonata: Anisoptera) are highly diverse in the tropics, representing a major predatory component of ecosystems at both the larval and adult stages. We assessed diversity of dragonflies, for 14 sampling sites in the north of Meta region of Colombia, South America. Sampling took place biannually during May and November for 2003-2011. All the collected material was preserved in acetone immersion for 12 hours and identified to species. We collected 946 individuals from 86 species representing three families: Libellulidae, Aeshnidae and Gomphidae. These ranged from the highly abundant *Uracis imbuta* (Libellulidae) representing 237 collected specimens with a large distribution in the localities, through to species where only a single individual was collected. We compared the previous study lists made in the country and we report for the first time 17 new reports for the country and 15 new reports for Meta region.] Address: Amava-Perilla, Catalina, School of Biological Science, Univ. of Auckland, New Zealand. E-mail: cama012@aucklanduni.ac.nz.

11572. Amaya-Vallejo, V.; Novelo-Gutierrez, R. (2012): *Desmogomphus anchicayensis* spec. nov. from Colombia (Anisoptera: Gomphidae). *Odonatologica* 41(1): 25-29. (in English) ["The new species is described and illustrated based on larvae collected in the Anchicayá zone, Valle del Cauca, Colombia. Holotype Male: F2 larva, 12-IX-2008; deposited in Instituto de Ecología, Xalapa, Mexico. It differs from the two described congeners in the position of dorsal and lateral abdominal hooks, the presence of a beveled edge in the dorsal surface of the prementum and an angled ventral margin of the paraprocts. Specimens are rare and difficult to collect because they inhabit threatened habitats in an area restricted to researchers." (Authors)] Address: Amaya-Vallejo, V., Laboratorio de Zoología y Ecología Acuática, LAZOE, Universidad de los Andes, Cra 1, N°18A-12, Lab J307, Bogotá, Colombia. E-mail: stolenseason@gmail.com

11573. Ananian, V.; Tailly, M. (2012): *Cordulegaster vanbrinkae* Lohmann, 1993 (Odonata: Anisoptera) discovered in Armenia. *International Dragonfly Fund - Report* 46: 1-11. (in English) ["On 13 July 2010, in a woodland near the village of Verin Khotanan, Armenia, five males of *Cordulegaster vanbrinkae* were captured. These specimens are documented, compared with the holotype from Iran and discussed in detail. The current protection situation of this species in Armenia is briefly commented. In addition, the locus typicus information of the holotype from Iran is corrected and detailed." (Authors)] Address: Ananian, V., 1 179 Bashinjaghian Str., apt. 23, 0078, Yerevan, Armenia. Gomphus@gmx.com

11574. Anderson, D. (2012): Field meeting to Strumpshaw Fen, Norfolk 24th June 2012. *Wild about Beds - Newsletter of the Bedfordshire Natural History Society* 163: 12. (in English) [Verbatim: This joint meeting of the BNHS, the Beds Bird Club and the British Dragonfly Society took place on one of those unfortunate days as far as dragonfly watching was concerned. The tempera-

ture was just 13°C and overcast, but 16 hardy souls assembled for the meeting. We started in the RSPB Reserve Reception area and were immediately rewarded with good views of two Otters, a fly-past pair of Bearded Tits and distant views of several Marsh Harriers. On leaving Reception we made our way out into the meadows and dykes, but very soon the rain came in increasing force with the most spectacular displays of rolling thunder and strong winds; not in any way dragonfly watching conditions! In the afternoon in only light rain we did find a few Azure, Blue-tailed and Large Red Damselflies and one each of Four-spotted Chaser, Scarce Chaser and Black-tailed Skimmers, but that was our total, with none of the hoped for Norfolk Chasers or Swallowtail Butterflies. We did see a few piles of Chinese Water Deer droppings, but that was about all. We will just have to go again another day, or another year, for Strumpshaw Fen is a great site.] Address: <http://www.bnhs.co.uk/main/docs/wab163.pdf>

11575. Andrew, R.J. (2012): Effect of paper mill effluent on the egg chorion of the dragonfly *Anax guttatus* (Burmeister) (Anisoptera: Aeshnidae). *Odonatologica* 41(1): 31-36. (in English) ["The egg of *A. guttatus* is endophytic and is cylindrical with a pointed anterior and a rounded posterior end. The chorion is divided into 2 layers, a thin, outer exochorion and a tough, thick, inner endochorion. The exochorion is modified anteriorly into a collar which is sculptured with 18-20 tiers of rectangular hexagonal impressions. Profound morphological and structural modifications are found in the eggs incubated in paper mill effluent for 5 days. The eggs became distorted due to swelling and the posterior rounded end became angular. The membranous exochorion degraded and transformed into thin, plate-like flakes which are shed, exposing the endochorion. The non-laminated, uniformly thick endochorion is converted into a laminated structure of overlapping plates with uneven thickness. The collar became pitted with minute perforations and started to disintegrate and detach from the egg and the hexagonal impressions became obliterated. 100% mortality was found in paper mill effluent treated eggs for 5 days, whereas eggs kept in pond water only had 10-13% mortality." (Author)] Address: Andrew, R.J., Post Graduate Dept of Zoology, Hislop College, Civil lines, Nagpur-440001, India. E-mail: rajuandrew@yahoo.com

11576. Andrew, R.J. (2012): Field notes on emergence of *Pantala flavescens* (Fabricius) in central India (Anisoptera: Libellulidae). *Odonatologica* 41(2): 89-90. (in English) ["A total of 611 exuviae were collected within a period of 45 days during April-May, 2004 from the walls of an open cement drain at Nagpur, India. The daily record of this collection revealed that 50% of the total emergence was completed by the 14th day and the sex ratio is considerably in favour of males (1.4:1). The females emerge earlier (protogyny) and the ME50 for female and male was observed on the 10th and 18th day, respectively. Protogyny probably provides adequate time for the female to develop her ovaries. 194 exuviae (31.75%) were collected from the north wall, which was completely in shade, and 417 (68.25%) from the south wall, which receives sunlight throughout the day. On the north wall, 44.7% exuviae were collected at a height of 30-45 cm from the water level, while from the south wall, 57.2% exuviae were collected at a height up to 15 cm and 28.4% between 15-30 cm. The present findings indicate that sunlight and temperature not only determi-

ne the choice of direction of the emerging larva but also initiate an early commencement of Stage I of metamorphosis (shortening the time between the surfacing of the larva and splitting its thoracic cuticle), which results in the shorter distance climbed by the larvae on the south wall for the final moult." (Author)] Address: Andrew, R.J., Dept of Zoology, Hislop College, Civil Lines, Nagpur- 440010, MS, India. E-mail: rajuandrew@yahoo.com

11577. Anonymus (2012): Tesco, the Lochan and the Damsel Fly. The Cairngorms Campaigner Spring 2012: 9. (in English) [Verbatim: Tesco, wanting to build a new supermarket Aviemore, have wanted the destruction of a small lochan on the site on grounds of safety. However the lochan, described by Aviemore Community Council as a "cesspit" and by ecological consultants for Tesco as having the very highest conservation value, harbours the northern damselfly (*Coenagrion hastulatum*). This species is on the Scottish Biodiversity List, which is a list of species considered by Scottish Ministers to be of principal importance to conservation. The Northern Damselfly is listed as 'endangered' on the Odonata Red Data List for Great Britain 2008. The solution recommended by CNPA planners is to relocate the species to other nearby sites prior to development. However, relocation can be a tricky thing. As the Park Authority's own Biodiversity Officer put it in his advisory paper on the issue, "...a translocation programme is not a quick or guaranteed option. It is handicapped by the lack of knowledge of the key habitat requirements for this species, and the need for a suitable donor site nearby. A donor site must not hold a current population of Northern damselfly and should meet the habitat requirements of the species. There is a complex process involved and this can take a number of years, hence the preference for retaining the population in situ." After all, if the species is present on one site and not others close by, there is probably a reason. In other words, you can relocate the species, but that is no guarantee it will thrive there. Therein lay the problem as the CNPA planner is recommending relocation, but that development would go ahead before it is known whether it has been successful. Badenoch and Strathspey Conservation Group, diligent as ever, wrote to the Authority questioning the legality of this procedure. Currently, it seems that Tesco may now have realised that translocating this species is a longer term project than formerly realised.] Address: Cairngorms Campaign, PO Box 10037, Alford, AB33 8WZ, UK

11578. Anonymus (2012): Bedfordshire's Steve Cham wins national conservation award. Wild about Beds - Newsletter of the Bedfordshire Natural History Society 163: 2. (in English) [Verbatim: The 2011 Marsh Award for Insect Conservation was given to Steve Cham for his outstanding and exemplary contribution to Insect Conservation. Steve Cham has had a lifetime fascination for Natural History with his interest in Entomology nurtured while working at Rothamsted Experimental Station during the early part of his career. Having moved on he continued his interest and personal research as a volunteer. He has been a member of the British Dragonfly Society (BDS) since its formation in 1983 and has published a number of papers in its journal. Steve became national co-ordinator for the Dragonfly Recording Network (DRN) after the scheme was transferred from the BRC. He was quick to see the benefits to conservation of providing Odonata data to the NBN and the

DRN dataset was used as a pilot during the development of the gateway. Steve has also been an active member of the Dragonfly Conservation Group of the BDS for over a decade and has been involved in a number of conservation initiatives that benefit these insects. Steve is author of several books on Dragonflies including the Dragonflies of Bedfordshire and a two volume field guide to the larvae and exuviae of British Dragonflies. He is also co-author of Dragonflies of Hampshire. Steve lectures on his favourite subject and is the leader on various courses. His photographs have been used widely. Steve is currently involved on the working party for the next national atlas of British Dragonflies.] Address: <http://www.bnhs.co.uk/main/docs/wab163.pdf>

11579. Anonymus (2012): A new partnership explores the world through the eyes of dragonflies. *flylines* July 2012: 6-7. (in English) [Verbatim: When one watches the stained-glass wings of dragonflies as they flit across ponds and alight upon reeds, it's hard to imagine that these seemingly fragile creatures can migrate thousands of miles. Many don't know that, in fact, there may be as many as 16 dragonfly species in North America that migrate at least occasionally, including five that are regular migrants. Large groups of dragonflies have frequently been documented heading south in the fall, some flying over large bodies of water despite their apparent fragility. The research, however, on the phenomenon of dragonfly migration is still in its infancy. There is so much more to learn. Therefore, a number of individuals and organizations have gotten together to form the Migratory Dragonfly Partnership (MDP), coordinated by The Xerces Society in Portland, Oregon, and sponsored by US Forest Service International Programs. The purpose of the partnership is to develop a network of citizen scientist monitors across Canada, Mexico, and the United States in order to track the spring and fall movement of the best-known migratory dragonflies in North America. The MDP will develop tools and resources to enable participants to monitor the timing, location, duration, and direction of travel of dragonfly flight and to identify the species involved. Regular monitoring and centralized reporting among participants across three nations will help us answer some of the many questions currently surrounding dragonfly migration and provide information needed to create cross-border conservation programs to protect and sustain the phenomenon. One of the first projects will be Dragonfly Pond Watch, a volunteer-based program to investigate the annual movements of two major migratory dragonfly species in North America: *Anax junius* and *Tamea lacerata*. By visiting the same wetland or pond site on a regular basis, participants will note the arrival of migrant dragonflies moving south in the fall or north in the spring, as well as record when the first resident adults of these species emerge in the spring. People should care about dragonflies for two reasons: First, they are great indicators of water quality in wetlands. Dragonflies are excellent species for monitoring the current biological condition of wetlands and for predicting future changes in those environments. Also, they are voracious predators on insect pests, including mosquitoes and a variety of biting flies. Dragonflies can't eliminate mosquitoes or other pesky flies, but the number would be much worse without hungry dragonflies eating their fill. Our studies will help us learn more about the life cycles of these critically important species. For information about the Migratory Dragonfly Partnership, please contact: Scott Hoffman Black, The Xerces So-

ciety, 628 NE Broadway, Suite 200, Portland, OR 97232. Tel: (503)232-6639, E-mail: dragonfly@xerces.org. You can also visit <http://migratorydragonflypartnership.org> and <http://www.xerces.org/dragonfly-migration/projects>.] Address: <http://gis.fs.fed.us/global/wings/newsletter/2012/july2012watanewsletter.pdf>

11580. Anusa, A.; Ndagurwa, H.G.T.; Magadza, C.H.D. (2012): The influence of pool size on species diversity and water chemistry in temporary rock pools on Domboshawa Mountain, northern Zimbabwe. *African Journal of Aquatic Science* 37(1): 89-99. (in English) ["The effect of pool size (area and depth) on species diversity and physicochemical characteristics of rock pool habitats on Domboshawa Mountain, northern Zimbabwe, was studied from December 2006 to May 2007. Pools were categorised based on maximum depth. Pool duration was a key factor structuring pool communities, driving their species diversity and nutrient content. Active predatory insects (Coleoptera, Odonata, Hemiptera) and zooplankton (Cladocera, Copepoda, Rotifera species) were associated with long-lived pools. As pool duration increased, early phytoplankton communities dominated by short-residence green algae were replaced by blue-green algae. The number of species present increased as pool area increased. Using depth as a proxy for disturbance, species composition in rock pools was influenced by the duration of inundation. A unique rock pool community with a filter-feeding component dominated by Cladocera, and from which large branchiopods were absent, is described. Nutrient status and community diversity in rock pools are determined by pool size, and pool depth, a proxy for habitat duration, is a major structuring factor in these temporary aquatic habitats." (Authors)] Address: Anusa, A., Tropical Resources Ecology Programme (TREP), Department of Biological Sciences, Faculty of Science, University of Zimbabwe, PO Box MP 167, Mount Pleasant, Harare, Zimbabwe

11581. Balzan, M.V. (2012): Associations of dragonflies (Odonata) to habitat variables within the Maltese Islands: A spatiotemporal approach. *Journal of Insect Science* 12:87 available online: insectscience.org/12.87: 18 pp. (in English) ["Relatively little information is available on environmental associations and the conservation of Odonata in the Maltese Islands. Aquatic habitats are normally spatio-temporally restricted, often located within predominantly rural landscapes, and are thereby susceptible to farmland water management practices, which may create additional pressure on water resources. This study investigates how odonate assemblage structure and diversity are associated with habitat variables of local breeding habitats and the surrounding agricultural landscapes. Standardized survey methodology for adult Odonata involved periodical counts over selected water-bodies (valley systems, semi-natural ponds, constructed agricultural reservoirs). Habitat variables relating to the type of water body, the floristic and physiognomic characteristics of vegetation, and the composition of the surrounding landscape, were studied and analyzed through a multivariate approach. Overall, odonate diversity was associated with a range of factors across multiple spatial scales, and was found to vary with time. Lentic water-bodies are probably of high conservation value, given that larval stages were mainly associated with this habitat category, and that all species were recorded in the adult stage in this habitat type. Comparatively, lentic and lotic seminatural water-bodies were more diverse than agricultural reservoirs

and brackish habitats. Overall, different odonate groups were associated with different vegetation life-forms and height categories. The presence of the great reed, *Arundo donax* L., an invasive alien species that forms dense stands along several water-bodies within the Islands, seems to influence the abundance and/or occurrence of a number of species. At the landscape scale, roads and other ecologically disturbed ground, surface water-bodies, and landscape diversity were associated with particular components of the odonate assemblages. Findings from this study have several implications for the use of Odonata as biological indicators, and for current trends with respect to odonate diversity conservation within the Maltese Islands." (Author)] Address: Balzan, M.V., Institute of Life Sciences, Scuola Superiore Sant'Anna, Piazza Martiri della Libertà, Pisa, PI, Italy. E-mail: m.balzan@sss.up.it

11582. Barndt, D. (2012): Beitrag zur Kenntnis der Arthropodenfauna der Zwischenmoore Butzener Bagen, Trockenes Luch und Möllnsee bei Lieberose (Land Brandenburg) (Coleoptera, Heteroptera, Hymenoptera part., Auchenorrhyncha, Saltatoria, Diptera part., Diplopoda, Chilopoda, Araneae, Opiliones, u.a.). Märkische Entomologische Nachrichten 14(1): 147-200. (in German, with English summary) ["Two sphagnum-dominated mires and one calcareous fen in the eastern part of Germany were investigated. The paper presents 562 species of Arthropods identified in the years 2008 and 2009 using pitfall traps. The study determines the endangerment and dispersion of the species. 4 species were recorded for the first time in Brandenburg and 1 species was rediscovered. - 63 species that are typical for transitional mires or lagg zones were detected; of these, 19 species are critically endangered (CR) or endangered (EN). The calcareous fen Möllnsee could not be analyzed because of overflowing damage caused by mismanagement; the results of two alternative habitats are given. The aim of this research is to assist adequate restoration for those highly endangered fen systems." (Author) Odonata were not part of the study. The following species are reported based on historical data: *Coenagrion hastulatum*, *Aeshna juncea*, *Leucorrhinia albifrons*, *L. caudalis*, *L. dubia*, *L. pectoralis* and *L. rubicunda*.] Address: Barndt, D., Bahnhofstr. 40d, 12207 Berlin-Lichterfelde Ost, Germany. E-mail: dr.barndt@kabelmail.de

11583. Beaumont, E.; Beaumont, A. (2012): Large White-faced Darter *Leucorrhinia pectoralis* (Charpentier) in Suffolk. *Atropos* 46: 11-13. (in English) [Second record of *L. pectoralis* in UK: 16-VI-2012, Dunwich Heath, Walberswick, Suffolk] Address: Edwina & Alan Beaumont, 52 Squires Walk, Lowestoft, Suffolk, NR32 4LA, UK

11584. Bedjanič, M.; Vinko, D. (2012): New records of *Epallage fatime* (Charpentier, 1840) in Macedonia (Odonata: Euphaeidae). *Natura Sloveniae* 14(1): 15-22. (in English, with Slovenian summary) ["Formerly known from Macedonia only from two old records made in the southeasternmost part of the country, the species has been newly recorded on 20-VII-2008 at the Luda Mara stream south of Kavadarci (S Macedonia), on 24-VII-2008 at the Konska Reka stream west of Gevgelija (SE Macedonia) and on 26-IV-2010 at the Sermeninska Reka stream northwest of Gevgelija (SE Macedonia). At all localities, the species' development has been confirmed. Its currently known distribution in Macedonia and the neighbouring countries is presented and a short

zoogeographical discussion provided." (Authors)] Address: Vinko, D., Slovenska 14, SI-1234 Mengeš, Slovenia; E-mail: damjan.vinko@gmail.com

11585. Bitzer, L.J. (2012): Chronic toxicity testing in mining influenced streams of West Virginia. Theses and Dissertations. Paper 252: 119 pp. (in English) ["Whole effluent toxicity (WET) tests have become a common tool in the evaluation of effluent for discharge acceptability. In this study, four years of toxicity data from 119 sampling locations were analyzed to determine relationships with ions and conductivity as indicators of toxicity. West Virginia Stream Condition Index (WVSCI) scores were also examined to evaluate correlations between stream scores, conductivity, and IC25 endpoints from toxicity results. Conductivity was not an indicator of toxicity in the range of conductivities tested. Streams dominated by mining effluent sometimes exhibited toxicity to *Ceriodaphnia dubia*; however, toxicity was not found to be related to ionic concentration in the range tested. Although mortality and reproductive impairment were often demonstrated in the mining effluent dominated streams, there were no relationships established between survival and reproductive endpoints and the ionic concentrations. Benthic macroinvertebrate communities in the streams sampled indicated some level of impairment. Only a weak relationship was demonstrated between habitat assessment scores and WVSCI scores. No apparent relationship between conductivity and WVSCI was observed. ... The results showed that, under conditions of constant acid mine drainage, the Odonata, Ephemeroptera and Plecoptera were completely eliminated. The Trichoptera, Megaloptera and Diptera were reduced in number of species." (Author)] Address: not stated. Bitzer, Leah J.

11586. Borisov, S.N. (2012): Migrant dragonflies in Middle Asia. 3. *Pantala flavescens* (Fabricius, 1798) (Odonata, Libellulidae). *Eurasian Entomological Journal* 11(1): 37-41. (in Russian, with English summary) ["Data on the distribution, phenology and migrations of *P. flavescens* in Middle Asia are presented. The first spring-time generation is represented by immigrant specimens from the southern part of the range. Pre-imaginal development lasts about two months. Large numbers of specimens are recorded from rice fields. After emergence, adult dragonflies can accumulate locally, but in late summer or early autumn the second generation of dragonflies probably migrate in a southerly direction. Directional flights were recorded at the beginning of August in East Pamir." (Author)] Address: Borisov, S.N., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze Street 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

11587. Borisov, S.N. (2012): Translatitudinal migrations of dragonflies (Odonata) in Middle Asia. *Proceedings of the Russian Entomological Society* 83(1): 62-72. (in Russian, with English summary) ["Characteristic seasonal translatitudinal migrations are observed for three Middle Asian species of dragonflies (*Sympetrum fonscolombii*, *Pantala flavescens*, *Anax ephippiger*). In the spring, viripotent adults of dragonflies arrive from the southern parts of their ranges to Middle Asia where the second generation develops. In the autumn, descendants of immigrants come back to the south. Live strategy of *Anax p. parthenope* remains unknown, and at present we can ascertain only obligate character of the autumn southward migrations of these dragonflies. The

annual natural autumn migrations of *S. fonscolombii*, *A. ephippiger* and *A. p. parthenope* are observed during three seasons (2008–2010) on the pass Chokpak in Western Tien Shan with the help of ornithological traps. The autumn migrations of *P. flavescens* were also observed in August, 1980 in the East Pamir. Consecutive moving of different generations of dragonflies' migrants is the strategy achieves the fullest use of the environment resources. It also includes dwelling behind the northern limits of the basic ranges where overwintering of immature stages is impossible. Other adaptive importance of this strategy is hedge from possible disappearance (drying) of reservoirs suitable for larvae development. Initially this ability was probably developed in species migrants in the conditions of a monsoon climate where they develop in the seasonal temporary reservoirs filled with monsoon rains." (Author)] Address: Borisov, S.N., Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, Novosibirsk 630091, Russia. E-mail: borisov-s-n@yandex.ru

11588. Boudot, G.-P.; De Knijf, G. (2012): Nouvelles données sur les Odonates du Maroc oriental et méridional (Odonata). *Martinia* 28: 1-28. (in French, with English summary) ["During four spring and summer Odonatological trips in Morocco carried out from 2009 to 2011 with the intention to contribute to the management plan of the Moulouya valley and to gain additional information on the overall Odonatological richness of the country, 45 species were observed. *Cordulegaster boltonii algerica* and *Pyrrosoma nymphula* were found for the first time east of the Moulouya River that extends their range of about 90 km to the east in the country. *Selysiothemis nigra* was found in the north-east, in a locality where it was not recorded earlier. *Orthetrum ransonnetii* was found in three new localities and was documented for the first time far out of the Saharan fringes, i.e. in the High Atlas Mountains, 1800 m a.s.l., an area with a significant snow cover in winter. New and flourishing populations of *Cordulegaster princeps* were found in formerly poorly accessible areas, so that the range of this High and Middle Atlas endemic appears now more continuous than in the past. The IUCN status of threatened species is specified." (Authors)] Address: Boudot, J.-P., LIMOS, UMR CNRS 7137, Universités de Nancy, Faculté des Sciences, B.P. 239, F-54506 - Vandoeuvre-lès-Nancy Cedex, France. E-mail: jean-pierre.boudot@limos.uhp-nancy.fr

11589. Brandon, A. (2012): Odonata news and events from across the vice counties of Anglesey, Merionethshire, Caernarvonshire, Denbighshire and Flintshire. *North Wales Dragonfly Newsletter* 65: 9 pp. (in English) [The following contents are presented: New records for 10 km squares (hectads); Tetrad SH51 finally yields up some dragonflies; New Small Red Damsel locality in Merionethshire; Variable Azure Bluets in Snowdonia; More news of melanistic Common Bluets; Forthcoming dragonfly events; Snowdonian dragons and damsels: Field trip to the Gwydyr Forest, Sunday 22nd July; Some topical species.] Address: Brandon, A., North Wales Dragonfly Recorder, Bryn Heilyn, Rowen, Conwy LL32 8YT, UK. E-mail: allanrowenconwy@antispam sky.com

11590. Brekelmans, F. (2012): Gaffelilbel terug in Noord-Brabant sinds 1935. Bureau Waardenburg BV, Culemborg. Persbericht. 31 juli 2012: (in Dutch) [Ophiogomphus cecilia back in Noord-Brabant. Last record

dates back to 1935. 27-VIII-2012, River Dommel near Valkenwaard, The Netherlands.] Address: Bureau Waardenburg BV, Postbus 365, 4100 AJ Culemborg, The Netherlands

11591. Bried, J.T.; Hager, B.J.; Hunt, P.D.; Fox, J.N.; Jensen, H.J.; Vowels, K.M. (2012): Bias of reduced-effort community surveys for adult Odonata of lentic waters. *Insect Conservation and Diversity* 5(3): 213-222. (in English) ["(1) Repeat surveys are needed to capture a representative spectrum of adult odonate richness at a site, but specifics on frequency and duration of surveys and associated inferential biases are poorly understood. (2) Weekly 1 h surveys of mature male dragonflies and damselflies were repeated at least 15 times at 19 ponds, lakes and wetlands scattered throughout North America. For each site, we tallied the data remaining when the weekly frequency was reduced to 75% (every 1.5 weeks), 50% (biweekly), 33% (triweekly), and 25% (monthly) and the 1 h survey to 50, 40, 30, 20 and 10 min subsets. (3) Reducing the original effort by half (i.e. to 30 min biweekly) retained about 80% of the species on average. The smallest effort (10 min monthly) retained about 49% of species. The greatest rate of information loss occurred between 20 and 10 min. (4) Across-site analysis found that data subsets correlated to the original data set ($r > 0.81$) despite up to 50% species loss. Strong correlations ($r = 0.98$) remained with 10–15% species loss. (5) Biweekly surveys lasting 20–40 min each may provide a representative and cost-effective sample of adult odonate richness in lentic study sites. Losing a handful of species should not greatly undermine richness and compositional comparisons among sites." (Authors)] Address: Bried, J., Albany Pine Bush Preserve Commission, Albany, NY, USA. E-mail: jbried@albanypinebush.org

11592. Brockhaus, T. (2012): Die Gemeine Keiljungfer *Gomphus vulgatissimus* (L., 1758) nach über 100 Jahren wieder in der Region Chemnitz (Odonata: Gomphidae). *Mitteilungen Sächsischer Entomologen* 98: 19-20. (in German) [Germany, Sachsen, Chemnitz-Einsiedel, 31-V-2011, three ind. *G. vulgatissimus* along the river Zwönitz (RW 4569559, HW 5627224).] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

11593. Brockhaus, T. (2012): Westpaläarktische Verbreitungsmuster von Libellen - Zeugnisse einer kaltzeitlichen Libellenfauna? Die Beispiele *Sympecma paedisca* und *Somatochlora metallica* (Odonata: Lestidae, Corduliidae). *Libellula Supplement* 12: 211-226. (in German, with English summary) ["Western Palaearctic distribution patterns of dragonflies - evidence of glacial faunal relicts? The examples of *Sympecma paedisca* and *Somatochlora metallica* (Odonata: Lestidae, Corduliidae) - The Western range margins of the transpalaearctic species, *S. paedisca* and *S. metallica*, have a particular shape and populations disjunct from the main range. Current theory suggests that these distribution patterns arose from a recolonisation after the Pleistocene. In this study I propose that these patterns are better explained by processes that happened during, rather than after, the Pleistocene. Specifically, *S. paedisca* probably recolonised the Western range during the warmer interglacial periods. *Somatochlora metallica* probably is a eurythermic glacial species whose historic Doggerland range was divided during the last glacial period in a Southern and a northern part. The testing of these hypotheses will be possible by genetic studies.

The colonisation hypotheses of the two species are supported by a number of shared ecological characters:

- They have a transpalearctic distribution with clearly disjunct populations at the range margins.
- They are cold stenothermic, or eurythermic. None are habitat specialists in their main range but become habitat specialists towards the range margins.
- These species are also able to survive under current, often anthropogenic, large-scale landscape changes and to colonise new habitats within their range.
- The species have reduced dispersal ability on their Western palearctic range margins, though the reasons are unknown." (Author)]

Address: Brockhaus, T., An der Morgensonne 5, 09387 Jahnsdorf/Erzgebirge, Germany. E-mail: t.brockhaus@t-online.de

11594. Brucet, S.; Boix, D.; Nathansen, L.W.; Quintana, X.D.; Jensen, E.; Balayla, D.; Meerhoff, M.; Jeppesen, E. (2012): Effects of temperature, salinity and fish in structuring the macroinvertebrate community in shallow lakes: Implications for effects of climate change. *PLoS ONE* 7(2): e30877. doi:10.1371/journal.pone.0030877: 11 pp. (in English) ["Climate warming may lead to changes in the trophic structure and diversity of shallow lakes as a combined effect of increased temperature and salinity and likely increased strength of trophic interactions. We investigated the potential effects of temperature, salinity and fish on the plant-associated macroinvertebrate community by introducing artificial plants in eight comparable shallow brackish lakes located in two climatic regions of contrasting temperature: cold-temperate and Mediterranean. In both regions, lakes covered a salinity gradient from freshwater to oligohaline waters. We undertook day and night-time sampling of macroinvertebrates associated with the artificial plants and fish and free-swimming macroinvertebrate predators within artificial plants and in pelagic areas. Our results showed marked differences in the trophic structure between cold and warm shallow lakes. Plant-associated macroinvertebrates and free-swimming macroinvertebrate predators were more abundant and the communities richer in species in the cold compared to the warm climate, most probably as a result of differences in fish predation pressure. Submerged plants in warm brackish lakes did not seem to counteract the effect of fish predation on macroinvertebrates to the same extent as in temperate freshwater lakes, since small fish were abundant and tended to aggregate within the macrophytes. The richness and abundance of most plant-associated macroinvertebrate taxa decreased with salinity. Despite the lower densities of plant-associated macroinvertebrates in the Mediterranean lakes, periphyton biomass was lower than in cold temperate systems, a fact that was mainly attributed to grazing and disturbance by fish. Our results suggest that, if the current process of warming entails higher chances of shallow lakes becoming warmer and more saline, climatic change may result in a decrease in macroinvertebrate species richness and abundance in shallow lakes. ... The only taxa not related to salinity were Malacostraca, Odonata and Polychaeta, but the relative abundances of these taxon groups were low at all salinities. Diptera, one of the most salinity-tolerant groups, dominated in most of the lakes in the two climatic regions." (Authors)]

Address: Brucet, Sandra, National Environmental Research Institute, Department of Freshwater Ecology, Aarhus University, Silkeborg, Denmark. E-mail: sandra.brucet-balmana@jrc.ec.europa.eu

11595. Büsse, S.; von Grumbkow, P.; Hummel, S.; Shah, D.N.; Tachamo Shah, R.D.; Li, J.; Yoshizawa, K.; Wedmann, S.; Hörnschemeyer, T. (2012): Phylogeographic analysis elucidates the influence of the ice ages on the disjunct distribution of relict dragonflies in Asia. *PLoS ONE* 01/2012; 7(5):e38132. DOI:10.1371/journal.pone.0038132: 8 pp + suppl.. (in English) ["Unusual biogeographic patterns of closely related groups reflect events in the past, and molecular analyses can help to elucidate these events. While ample research on the origin of disjunct distributions of different organism groups in the Western Palearctic has been conducted, such studies are rare for Eastern Palearctic organisms. In this paper we present a phylogeographic analysis of the disjunct distribution pattern of the extant species of the strongly cool-adapted *Epiophlebia* dragonflies from Asia. We investigated sequences of the usually more conserved 18 S rDNA and 28 S rDNA genes and the more variable sequences of ITS1, ITS2 and CO2 of all three currently recognised *Epiophlebia* species and of a sample of other odonatan species. In all genes investigated the degrees of similarity between species of *Epiophlebia* are very high and resemble those otherwise found between different populations of the same species in Odonata. This indicates that substantial gene transfer between these populations occurred in the comparatively recent past. Our analyses imply a wide distribution of the ancestor of extant *Epiophlebia* in Southeast Asia during the last ice age, when suitable habitats were more common. During the following warming phase, its range contracted, resulting in the current disjunct distribution. Given the strong sensitivity of these species to climatic parameters, the current trend to increasing global temperatures will further reduce acceptable habitats and seriously threaten the existences of these last representatives of an ancient group of Odonata." (Authors)]

Address: Büsse, S., Johann-Friedrich-Blumenbach-Institute of Zoology and Anthropology, Department of Morphology, Systematics and Evolutionary Biology, Georg-August-University Göttingen, Göttingen, Germany

11596. Bußmann, M. (2012): Libellen auf Boa Vista, Kapverdische Inseln (Odonata). *Libellula* 31(1/2): 61-75. (in German, with English summary) [Cape Verde: "During a stay from 15- to 29-xii-2010, seven dragonfly species were recorded: *Anax ephippiger*, *A. imperator*, *Crocothemis erythraea*, *Orthetrum trinacria*, *Pantala flavescens*, *Sympetrum fonscolombii*, and *Trithemis annulata*, most species both as adults and as exuviae. *Anax imperator* and *S. fonscolombii* were recorded on Boa Vista for the first time." (Author)]

Address: Bußmann, M., Amselstr. 18, 58285 Gevelsberg, Germany. E-mail: m.bussmann@maerkischer-kreis.de

11597. Caesar, R.M. (2012): Phylogeny of the genus *Argia* (Odonata: Coenagrionidae) with emphasis on evolution of reproductive morphology. Dissertation, Doctor of Philosophy, The Ohio State University: XVIII + 191 pp. (in English) ["The damselfly genus *Argia* is found throughout the New World where some species are common and abundant members of lotic freshwater and adjacent ecosystems. *Argia* species are not only important predators of aquatic and terrestrial invertebrates but are themselves an important prey item to a variety of other insects and vertebrates. The distribution of species is highly variable within the genus and some species are locally threatened or endangered due to range limitation and habitat loss. Odonata may be use-

ful indicators of aquatic ecosystem health as well as indicators of climate change. There are approximately 120 species described with at least twenty suspected undescribed species. The taxonomy of the North American species is well known, but the Central and South American species are in need of revision. The phylogeny of the genus has never been studied using modern, repeatable methods. Therefore the evolutionary history of the genus has never been thoroughly explored. The reproductive biology of Odonata is unique among insects and provides a model system for testing hypotheses related to character evolution by sexual selection and other mechanisms of evolution. *Argia* species have unique morphologies of male and female secondary sexual characters, the modified cerci and paraprocts of males and the corresponding plates of the female pro- and meso-nota that are grasped by males during copulation and oviposition. The patterns of variation in these structures, both within and among species, may reveal the extent to which sexual and natural selection help shape the current diversity of the group. This dissertation presents phylogenetic hypotheses for the genus *Argia* using data from external morphology and ribosomal DNA. Maximum parsimony and maximum likelihood analyses were performed on the data, resulting in topologies that are mostly congruent, well-resolved, and moderately to highly supported. The variation in male cercus morphology is examined using three dimensional morphometrics where shape is quantified from computer tomography models. The phylogenetic hypotheses are used to examine patterns of cercus variation across the genus. The same methods are applied to populations of the widespread species *Argia moesta* in an attempt to test whether intrasexual selection applies to these important reproductive structures." (Author)] Address: Caesar, R.M., Dept of Entomology, Ohio State Univ., Columbus, OH, USA. E-mail: caesar.6@osu.edu

11598. Cham S. (2012): A study of Southern Hawker *Aeshna cyanea* emergence from a garden pond. *J. Br. Dragonfly Society* 28(1): 1-20. (in English) ["The construction in 2001 of a garden pond in close proximity to the author's house provided an opportunity for close study of emergence patterns, behaviour and predation of Southern Hawker *Aeshna cyanea*. This study discusses the impact of weather conditions and predation on emergence success over a period of several years. Exhaustive daily exuviae counts reveal differences in patterns of emergence in each year, influenced by larval development as well as periods of heavy rain and low temperatures. Predation by birds and wasps had a significant effect on the survival of emerging adults in some years." (Author)] Address: Cham, S., 24 Bedford Avenue, Silsoe, Bedford, MK45 4ER UK. E-mail: SteveCham1@compuserve.com

11599. Chand, S. (2012): Organophosphorus pesticides inflicted impairments in the midgut histo-architecture of naiad of *Trithemis aurora* (Burm.) (Odonata: Libellulidae). *Journal of Experimental Zoology, India* 15 (1): 213-218. (in English) ["A continuous forty hours of treatment of last instar naiad of *T. aurora* under LC50 concentration, 5.12×10^{-7} and 7.60×10^{-8} ppm of chlorpyrifos and quinalphos respectively has proved toxic and induced histopathological derangements in various tissues of midgut. The mesenteron has observed to be prone to both the pesticides. The chlorpyrifos separated the epithelial folds and widen the inter fold space up to the basement membrane. The quinalphos pene-

trated inside the epithelial folds and damaged cellular mass. Both the pesticides induced the movement of cytoplasmic contents at various degrees towards the apical end of the epithelial folds. This movement presumed to be the genesis of intense vacuolation at the basal ends of all the epithelial cells. The continuous pressure of the internal cellular contents and weekend cell boundaries have caused the violent exclusion of cell contents. The nuclear membrane at many places damaged by chlorpyrifos and severely affected by quinalphos." (Author)] Address: Chand, S., P G Department of Zoology, R.P.G. College Jamuhai, Jaunpur - 222 002, India.

11600. Chen, Y.; Wang, X.; Ren, H.; Yin, H.; Jia, S. (2012): Hierarchical dragonfly wing: Microstructure-bio-mechanical behavior relations. *Journal of Bionic Engineering* 9(2): 185-191. (in English) ["The dragonfly wing, which consists of veins and membrane, is of biological hierarchical material. We observed the cross-sections of longitudinal veins and membrane using Environmental Scanning Electron Microscopy. Based on the experiments and previous studies, we described the longitudinal vein and the membrane in terms of two hierarchical levels of organization of composite materials at the micro- and nano-scales. The longitudinal vein of dragonfly wing has a complex sandwich structure with two chitinous shells and a protein layer, and it is considered as the first hierarchical level of the vein. Moreover, the chitinous shells are concentric multilayered structures. Clusters of nano-fibrils grow along the circumferential orientation embedded into the protein layer. It is considered as the second level of the hierarchy. Similarly, the upper and lower epidermises of membrane constitute the first hierarchical level of organization in micro scale. Similar to the vein shell, the membrane epidermises were found to be a paralleled multilayered structure, defined as the second hierarchical level of the membrane. Combining with the mechanical behaviour analysis of the dragonfly wing, we concluded that the growth orientation of the hierarchical structure of the longitudinal vein and membrane is relevant to its biomechanical behaviour." (Authors)] Address: Wang, X., Department of Engineering Mechanics, AML, School of Aerospace, Tsinghua University, Beijing 100084, P. R. China. E-mail: xshwang@tsinghua.edu.cn

11601. Chowdhury, S.H. (2012): Importance of the Eastern Region of Bangladesh in Insect Conservation with Special Reference to Odonata. *Proceedings of the International Conference on Biodiversity – Present State, Problems and Prospects of its Conservation*. January 8-10, 2011. University of Chittagong, Chittagong 4331, Bangladesh: 11-13. (in English) ["Studies on Odonata of the eastern region of Bangladesh revealed some interesting intraspecific variations. The landscape of this region with hills and forests has resulted into isolated habitats for the weak-flying odonates. Such isolation causes intensive inbreeding and resultant intraspecific variations are likely to lead to speciation. Early measures of protection of this area are recommended for conservation of odonate species." (Author)] Address: Chowdhury, S.H., Ex-Faculty, Department of Zoology, University of Chittagong, Chittagong 4331, Bangladesh. E-mail; shafique1939@yahoo.com

11602. Cicort-Lucaciu, A.-S.; Covaciu-Marcov, S.-D.; Bogdan, H.V.; Sas, I. (2012): Implication upon herpetofauna of a road and its reconstruction in Carei Plain Natural Protected Area (Romania). *Ecologia Balkanica* 4(1): 99-105. ["In autumn 2011 we monitored a 5 km

long road, paved with cobblestone, situated in Carei Plain Natural Protected Area, a road that is due to be modernized and continued across the border into Hungary. Dead bodies from eight different animal groups were observed on the road, amphibians presenting the greatest amount. The most frequent were the *Triturus dobrogicus* corps, a species with conservation importance. The amphibians were affected in the areas where the road is neighbouring the wetlands, while on the opposite pole sits the area with acacia plantations. The high number of mortalities recorded on the road, despite the low traffic speed, is alarming. It is likely that the modernization of the road that will surely increase its traffic and the speed of the vehicles, will make the situation even worse. However, the rebuilding could contribute to the reduction in the impact on amphibians, if certain measures are considered while planning the action. Thus, in the areas near the wetlands, there should be undercrossings, fences and speed limits. In this way, the modernization would at least represent an experiment regarding the diminution of the road's impact on amphibians." (Authors) The victims of traffic include Odonata which are not further specified or quantified.] Address: Cicort-Lucaciu, A.-S., University of Oradea, Faculty of Sciences, Department of Biology, Universitatii str. 1, Oradea 410087, Romania. E-mail: cicortlucaciu@yahoo.com

11603. Clapham, M.E.; Karr, J.A. (2012): Environmental and biotic controls on the evolutionary history of insect body size. *Proceedings of the National Academy of Sciences* 109(2): 10927-10930. (in English) ["Giant insects, with wingspans as large as 70 cm, ruled the Carboniferous and Permian skies. Gigantism has been linked to hyperoxic conditions because oxygen concentration is a key physiological control on body size, particularly in groups like flying insects that have high metabolic oxygen demands. Here we show, using a dataset of more than 10,500 fossil insect wing lengths, that size tracked atmospheric oxygen concentrations only for the first 150 Myr of insect evolution. The data are best explained by a model relating maximum size to atmospheric environmental oxygen concentration (pO_2) until the end of the Jurassic, and then at constant sizes, independent of oxygen fluctuations, during the Cretaceous and, at a smaller size, the Cenozoic. Maximum insect size decreased even as atmospheric pO_2 rose in the Early Cretaceous following the evolution and radiation of early birds, particularly as birds acquired adaptations that allowed more agile flight. A further decrease in maximum size during the Cenozoic may relate to the evolution of bats, the Cretaceous mass extinction, or further specialization of flying birds. The decoupling of insect size and atmospheric pO_2 coincident with the radiation of birds suggests that biotic interactions, such as predation and competition, superseded oxygen as the most important constraint on maximum body size of the largest insects." (Authors)] Address: E-mail: mclapham@ucsc.edu.

11604. Contador, T.A.; Kennedy, J.H.; Rozzi, R. (2012): The conservation status of southern South American aquatic insects in the literature. *Biodivers. Conserv.* 21: 2095-2107. (in English) ["We provide a comprehensive review of publications regarding the conservation of aquatic and terrestrial insects at a global scale and with an emphasis on southern South America. We reviewed three prominent conservation journals (*Conservation Biology*, *Biodiversity and Conservation*, and *Biological*

Conservation) and found that only 5 % of all the works published between 1995 and 2008 focus on the conservation of aquatic insects. The highest percentage of publications on the conservation of aquatic insects comes from Europe (2.3 %), while the lowest percentage comes from South America (0.1 %). To assess the trends of aquatic insect research in southern South America, we conducted a literature search using *Zoological Records*, *Biological Abstracts*, and *Current Contents*. We conclude that there is a gap in research regarding the conservation of freshwater and terrestrial insects, as reflected by the low amount of publications that specifically focus on the description and identification of new insect species and their conservation. In order to help overcome this gap in conservation research, we propose three ideas that could help enhance the research and conservation initiatives regarding these organisms: (1) focus research on understudied regions of the world, such as the Magellanic sub-Antarctic ecoregion, (2) increase the amount of funding available for taxonomic research focused on the description and identification of new aquatic and terrestrial insect species, and (3) increase the amount of public education programs which focus on field experiences and direct encounters with aquatic insect biodiversity and their habitats." (Authors) The total number of publications about the orders Plecoptera, Trichoptera, Ephemeroptera, Odonata, and Diptera (Chironomidae), published between the years 1975 and 2010 in southern South America is figured.] Address: Contador, Tamara, Dept of Biological Sciences, University of North Texas, Denton, TX, USA. E-mail: tac0097@unt.edu

11605. Contreras-Garduno, J.; Villanueva, G.; Alonso-Salgado, A. (2012): Phenoloxidase production: The importance of time after juvenile hormone analogue administration in *Hetaerina americana* (Fabricius) (Zygoptera: Calopterygidae). *Odonatologica* 41(1): 1-6. (in English) ["It has been suggested that juvenile hormone (JH) negatively affects the phenoloxidase (PO), a key enzyme of the immune response in invertebrates. However, this negative effect has only been recorded over a short time period (2 to 3 h) after the administration of JH (or a JH analog). In the present study, using *H. americana*, it was corroborated that PO decreased a short time (3 h) after the administration of methoprene, a JH analog (JHa), but no effect was observed 24 h after the JHa application. This suggests that the time after the application of JHa should be taken into account in order to assess its actual effect on the immune response and PO expression and in studies that use the JH as a link between secondary sexual characters and immune response." (Authors)] Address: Contreras-Garduno, J., Depto de Biología, División de Ciencias Naturales y Exactas, Univ. de Guanajuato, Noria Alta s/n, Noria Alta, MX-36050 Guanajuato, Guanajuato, Mexico

11606. Cordoba-Aguilar, A.; Ruiz-Silva, D.; Gonzalez-Tokman, D.; Contreras-Garduno, J.; Peretti, A.; Moreno-Garcia, M.A.; Rantala, M.J.; Koskimäki, J.; Kortet, R.; Suhonen, J. (2012): No firm evidence of immunological costs of insect oviposition and copulation: A test with dragonflies (ygoptera). *Odonatologica* 41(1): 7-15. (in English) ["The immune response is a costly trait as investment in immunity is frequently traded off against life history components. In insects, for example, experimental tests have provided evidence that oviposition and copulatory activities impair immune ability in the form of encapsulation ability. Here such tests are repli-

cated by using four zygopteran spp., viz. *Argia joergenseni*, *Calopteryx splendens*, *C. virgo* and *Hetaerina americana* having encapsulation, phenoloxidase and nitric oxide activity 1 three key components in the insect immune response 1 as dependent variables. The results provide no consistent results. Only in *A. joergenseni* there was any evidence of oviposition activity (or, in the case of *H. americana*, submergence) affecting encapsulation, but neither in *C. splendens* nor in *H. americana* did copulation have any such effect. In *H. americana*, nitric oxide activity was lower in // that had been submerged but there was no effect on phenoloxidase activity. Thus, former observations indicating that oviposition and copulation negatively affect the immune response, cannot be generalized" (Authors)] Address: Cordoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

11607. Costa-Pereira, R.; Severo-Neto, F. (2012): Diving out: *Bryconops caudomaculatus* jumps out of water to catch flies. *Revista Chilena de Historia Natural* 85: 241-244. (in English, with Spanish captions) [*Bryconops caudomaculatus* (Günther, 1864) (Characiformes, Iguanodontidae). "We collected data on a lentic backwater on the Cravari river (12°31'49" S / 57°52'51" W), Mato Grosso, Brazil, during November 2009. ... All 34 stomachs were full and we found 23 food items in the diet of *B. caudomaculatus*. Allochthonous food items (IAi = 0.98) had an alimentary importance far greater than autochthonous (IAi = 0.02), and were present in 97 % of stomachs. Flying adults of Phoridae flies were the most frequent and important food items. Furthermore, one of the individuals of *B. caudomaculatus* had 42 Phoridae flies in its stomach content. Other groups of Diptera, mainly Chironomidae adults, were also found in stomach contents. Non-flying terrestrial insects (Coleoptera, Homoptera, Cercopidae and Hymenoptera-Formicidae) and aquatic larvae (Odonata, Ephemeroptera and Diptera) showed low alimentary index." (Authors)] Address: Costa-Pereira, R., Programa de Pós-Graduação em Ecologia e Conservação, Universidade Federal de Mato Grosso do Sul, Brazil. E-mail: brycon@ymail.com

11608. Cothran, R.D.; Chapman, K.; Stiff, A.R.; Relyea, R.A. (2012): "Cryptic" direct benefits of mate choice: choosy females experience reduced predation risk while in precopula. *Behavioral ecology and sociobiology* 66(6): 905-913. (in English) ["Despite the central role that female mate choice plays in the production of biological diversity, controversy remains concerning its evolution and maintenance. This is particularly true in systems where females are choosy but do not receive obvious direct benefits such as nuptial gifts that increase a female's survival and fecundity. In the absence of such direct benefits, indirect benefits (i.e., the production of superior offspring) are often invoked to explain the evolution of mate choice. However, females may receive less obvious, or "cryptic," direct benefits, particularly in species with prolonged pre-mating interactions (e.g., precopulatory mate guarding). We assessed the "cryptic" direct benefits of female choice for large male size in two species of freshwater amphipods that do not receive obvious direct benefits. Females paired with large males experienced decreased predation from fish. However, we found that the size of a female's mate did not affect her predation risk against predatory dragonflies or the harassment she received

by single males while paired. Our results demonstrate that even when females receive no traditional direct benefits, female choice for large male size can still provide important direct benefits. Such "cryptic" direct benefits may be common, especially in species with prolonged mating interactions, and are likely important for fully understanding the evolution of mate choice." (Authors)] Address: Relyea, R.A., Dept Biol. Sciences, University of Pittsburg, Pittsburgh, Pennsylvania 15260, USA. E-mail: rarelyea@pitt.edu

11609. Couteyen, S.; Papazian, M. (2012): Catalogue et affinités géographiques des Odonata des îles voisines de Madagascar (Insecta: Pterygota). *Ann. soc. entomol. Fr. (n.s.)* 48(1-2): 199-215. (in French, with English summary) ["Catalogue and geographical affinities of the Odonata of the neighbouring islands of Madagascar (Insecta: Pterygota). A thorough bibliographic analysis shows that 71 species and sub-species of Odonata are recorded in the neighbouring islands of Madagascar, from the archipelagos of Mascarenes, Comoros and Seychelles. In these islands, the maximum endemism rate is about 34%, but more significant in Mascarenes (34%) than in Comoros (23%) or in Seychelles (19%). The odonatological fauna is dominated by the Libellulidae (36 taxa) and Coenagrionidae (18 taxa). Each archipelago owns at least one of the 23 endemic taxa found in these islands. Seychelles have two endemic monospecific genera: *Allolestes* et *Leptocnemis*. Mascarenes have two endemic genera: *Thalassothemis* and *Coenagriocnemis*. The last one demonstrated a progressive radiation in the archipelago. The neighboring islands of Madagascar are characterized by a radiation of two genera at regional level, viz. *Hemicordulia* and *Gynacantha*. The geographical affinities of this fauna are mainly Afrotropical. Colonization from Africa is not a random sample of the continental pool, but a selection of a few species with specific abilities. In the neighbouring islands of Madagascar, the specific richness of the populations of Odonata with African affinities decreases with the geographical isolation." (Authors)] Address: Couteyen, S., Association Réunionnaise d'Ecologie (AReE) 188 Chemin Nid-Joli, F-97430 Le Tampon, La Réunion, France. E-mail: scouteyen@ecologie.re

11610. Das, S.K.; Ahmed, R.A.; Sajan, S.K.; Dash, N.; Sahoo, P.; Mohanta, P.; Sahu, H.K.; Rout, S.D.; Dutta, S.K. (2012): Diversity, distribution and species composition of odonates in buffer areas of Similipal Tiger Reserve, Eastern Ghat, India. *Academic Journal of Entomology* 5(1): 54-61. (in English) ["A total of 58 species representing 37 genera from 9 family were recorded from the multiple use area of the reserve. (Table 1) Libellulidae was the dominant family with 31 species, followed by Coenagrionidae (11), Calopterygidae (3), Platycnemididae (3), Protoneuridae (2), Lestidae (2), Chlorocyphidae (2), Gomphidae (2) and Aeshnidae (2). *Orthetrum* was found to be the most species rich genera with 7 species." (Authors)] Address: Department of Wildlife and Conservation Biology, North Orissa University, Sriram Chandra Vihar, Takatpur-757003, Baripada, Orissa, India

11611. Do, M.C.; Bui, M.H.; Vu, V.L. (2012): Description of female of *Nihonogomphus schorri* Do & Karube from Huu Lien Nature Reserve, Lang Son province, North Vietnam (Anisoptera: Gomphidae). *Odonatologica* 41(2): 173-175. (in English) ["The female, collected from the type locality of the species, Huu Lien Nature

Reserve, Lang Son Province, North Vietnam, is described and illustrated in detail." (Authors)] Address: Do, M.C., 1 409 – 57A, Tap The Bo Thuy San, 22/20 Nguyen Cong Hoan, Ba Dinh, Hanoi, Vietnam. E-mail: docuong@gmail.com

11612. Dow, R.; Orr, B. (2012): *Telosticta*, a new damselfly genus from Borneo and Palawan (Odonata: Zygoptera: Platystictidae). *The Raffles Bulletin of Zoology* 60(2): 361-397. (in English) ["*Telosticta* new genus is described from Borneo and Palawan, with genotype *Protosticta feronia* Lieftinck. Other previously named species transferred to *Telosticta* are *Drepanosticta dupophila* Lieftinck, *Protosticta paruatia* van Tol, and *P. tubau* Dow. Eleven new species are described: *T. belalongensis*, *T. berawan*, *T. bidayuh*, *T. janeus*, *T. dayak*, *T. gading*, *T. kajang*, *T. longigaster*, *T. santubong*, *T. serapi*, and *T. ulubaram*. The relationships of *Telosticta* within the Platystictidae are discussed." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

11613. Ellwood, E.R.; Diez, J.M.; Ibáñez, I.; Primack, R.B.; Kobori, H.; Higuchi, H.; Silander, J.A. (2012): Disentangling the paradox of insect phenology: are temporal trends reflecting the response to warming? *Oecologia* 168(4): 1161-1171. (in English) ["The strength and direction of phenological responses to changes in climate have been shown to vary significantly both among species and among populations of a species, with the overall patterns not fully resolved. Here, we studied the temporal and spatial variability associated with the response of several insect species to recent global warming. We use hierarchical models within a model comparison framework to analyze phenological data gathered over 40 years by the Japan Meteorological Agency on the emergence dates of 14 insect species (including *Orthetrum albistylum* and *Sympetrum frequens*) at sites across Japan. Contrary to what has been predicted with global warming, temporal trends of annual emergence showed a later emergence day for some species and sites over time, even though temperatures are warming. However, when emergence data were analyzed as a function of temperature and precipitation, the overall response pointed out an earlier emergence day with warmer conditions. The apparent contradiction between the response to temperature and trends over time indicates that other factors, such as declining populations, may be affecting the date phenological events are being recorded. Overall, the responses by insects were weaker than those found for plants in previous work over the same time period in these ecosystems, suggesting the potential for ecological mismatches with deleterious effects for both suites of species. And although temperature may be the major driver of species phenology, we should be cautious when analyzing phenological datasets as many other factors may also be contributing to the variability in phenology." (Authors)] Address: Ellwood, Elizabeth, Dept of Biology, Boston University, Boston, MA 02215, USA. E-mail: eellwood@bu.edu

11614. Emiliyamma, K.G.; Palot, M.J.; Radhakrishnan, C. (2012): *Microgomphus souteri* Fraser, a new addition to the Odonata (Insecta) fauna of Kerala, southern India. *Journal of Threatened Taxa* 4(6): 2667-2669. (in English) [06-VI-2010, 1 male, Aralam Wildlife Sanctuary, Kannur District, Kerala, India] Address: Emiliyamma, K.G., Zoological Survey of India, Western Ghat Regional Centre, Jaferkhan Colony, Eranhipalam P.O.,

Kozhikode, Kerala 673006, India. E-mail: kgemily@gmail.com

11615. Endersby, I. (2012): Watson and Theischinger: the etymology of the dragonfly (Insecta: Odonata) names which they published. *Journal and Proceedings of the Royal Society of New South Wales* 145(443 & 444): 34-53. (in English) ["Tony Watson and Günther Theischinger have been prolific publishers on the taxonomy of Australian Odonata since the late 1960s. Between them they have named about 12% of the Australian genera and 28% of the species. The etymology of the scientific name of each of their taxa is given as quoted in the original description or deduced." (Author)] Address: Endersby, I., 56 Looker Road, Montmorency, VIC 3094 Australia. E-mail: endersby@mira.net

11616. Endersby, I.D. (2012): Etymology of the dragonflies (Insecta: Odonata) named by R.J. Tillyard, F.R.S. *Proceedings of the Linnean Society of New South Wales* 134: 1-16. (in English) ["R.J. Tillyard described 26 genera and 130 specific or subspecific taxa of dragonflies from the Australasian region. The etymology of the scientific name of each of these is given or deduced." (Author)] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@mira.net

11617. Endersby, I.D. (2012): Etymology of the Dragonflies (Insecta: Odonata) named by R.J. Tillyard - Corrigendum. *Proceedings of the Linnean Society of New South Wales* 134(1): 3 pp. (in English) [The following corrections should be made to the previous paper - Endersby, I.D. (2012). Etymology of the dragonflies (Insecta: Odonata) named by R.J. Tillyard, F.R.S.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@mira.net

11618. Farag Mahmoud, M. (2012): Insects associated with Sesame (*Sesamun indicum* L.) and the impact of insect pollinators on crop production. *Pestic. Phytomed.* (Belgrade) 27(2): 117-129. (in English, with Serbian summary) ["A survey of insects associated with sesame, *Sesamun indicum* L. (Pedaliaceae) was conducted at the Agriculture Research Farm of The Faculty of Agriculture, University of Suez Canal during the growing seasons 2010 and 2011. All different insect species found on the experimental site were collected for identification. Sampling was done once a week and three times a day. Three methods were used to collect insects from the sesame plants (a sweep net, pitfall traps, digital camera and eye observation). A total of 31 insect species were collected and properly identified during the survey. Insects recorded on the plants were divided into four groups, true pollinators (Hymenoptera), other pollinators (Diptera, Coleoptera and Lepidoptera), pests (Orthoptera, Odonata [*Ischnura senegalensis*, *Crocotemis erythraea*], Hemiptera and Homoptera) and natural enemies (Coleoptera, Hymenoptera, Neuroptera and Dictyoptera). For studying the impact of insect pollination on sesame production, the experiment was divided in two: opened and non-opened pollination of sesame. 50 plants from nonopened pollination were covered with a perforated paper bag to allow the air to pass through and to prevent insects from approaching the plants. Quantitative and qualitative parameters were measured as follows: pod weight, number of seeds in each pod, weight of 1000 seeds, germination (%), seedlings vigour and oil content (%). Results clearly demonstrate that the opened pollination improved the

crop production." (Author)] Address: Farag Mahmoud, M., Suez Canal University, Faculty of Agriculture, Plant Protection Department, 41522 Ismailia, Egypt. E-mail: mfaragm@hotmail.com

11619. Fauchaux, M. (2012): Comparaison des antennes larvaires et de leurs sensilles chez deux espèces d'Argia, *A. concinna* (Rambur, 1842) et *A. telesfordi* Meurget, 2009, endémiques des Petites Antilles (Odonata: Zygoptera: Coenagrionidae). *Bull. Soc. Sc. Nat. Ouest de la France, nouvelle série* 34(2): 76-81. (in French, with English summary) ["The larvae of *A. concinna* and *A. telesfordi* live in different biotopes, the first in white water and on gravelly soil, the second in streams of almost stagnant water with a muddy bottom. The study of larval antennal sensilla of *A. telesfordi* has been carried out and compared with sensilla of *A. concinna* previously described so as to discover the impact of the biotope on sensory equipment. *A. telesfordi* possesses the same sensillum types as *A. concinna*, that is: sensilla chaetica, curved sensilla chaetica, flattened and curved sensilla chaetica, sensilla filiformia and sensilla campaniformia. These five types are all non-porous sensilla. The resemblance between the types, the location and number of sensilla of both species is so surprising that one might think that we have to do with the same species. The antennal larval sensory equipment of the two species is by no means influenced by the lives of the latter in different biotopes." (Author)] Address: Fauchaux, M.J., Laboratoire d'Endocrinologie des Insectes Sociaux, Faculté des Sciences et des Techniques, 2 rue de la Houssinière, B.P. 92208, 44322 Nantes, France. E-mail: fauchaux.michel@free.fr

11620. Fleck, G. (2012): Preliminary notes on the genus *Aeschnosoma* Selys 1870 (Odonata: Anisoptera: Corduliidae s. str.). *Ann. soc. entomol. Fr. (n.s.)* 48(1-2): 225-228. (in English, with French summary) ["Three new species of the genus *Aeschnosoma* are briefly described and illustrated. *A. pseudoforcipula* n. sp. and *A. heliophila* n. sp., both from the Brazilian Central Plateau are respectively related to the two Amazonian species *A. forcipula* Hagen in Selys 1871, and *A. auripennis* Geijskes 1970. *A. louissirius* n. sp. from Northern Brazil is not closely related to any known species. Based on larval and adult derived characters, the genus *Aeschnosoma* appears closely related to the Australian genus *Pentathemis* Karsch 1890, and also to the Madagascan genus *Libellulosoma* Martin 1907. The clade *Aeschnosomata* nov. is erected to receive the three genera. Some putative plesiomorphies would place this clade sister group of the remaining Corduliidae s.str." (Author)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleckgunther@gmail.com

11621. Fleck, G.; Neiss, U.G. (2012): The larva of the genus *Paracordulia* Martin, 1907 (Odonata: Corduliidae s.s.) and a generic key to the larvae of Corduliidae s.l. occurring in South America. *Zootaxa* 3412: 62-68. (in English) ["The ultimate stadium of a larva of the genus *Paracordulia* Martin, 1907 is described and illustrated for the first time. It represents the last New World corduliid larva unknown at the generic level. The reared female differs slightly from other known female specimens, and thus no species name can be assigned to it. A key to the South American genera of corduliid larvae is given." (Authors)] Address: Neiss, U.G., Instituto Nacional de Pesquisas da Amazônia/INPA, Coordenação de Biodiversidade/CBio, Avenida André Araújo,

n. 2936, Caixa Postal 478, CEP 69011-970, Manaus, Amazonas, Brazil. E-mail: ulisses.neiss@gmail.com

11622. Fraker, M.E.; Luttbeg, B. (2012): Predator-prey space use and the spatial distribution of predation events. *Behaviour* 149(5): 555-574. (in English) ["In many systems, predators and prey interact spatially. A number of game theoretic models (joint ideal free distributions, IFD) have suggested that a population-level distribution of mobile predators and mobile prey in which predators match the distribution of the prey's resources and prey are more evenly distributed will be stable. However, prey can often manage their exposure to predation risk by adjusting their space use and their level of apprehension or vigilance, while predators have been shown to behaviourally manage the risk level perceived by their prey. We used a system of predatory larval *Anax junius* and southern leopard frog (*Rana sphenoccephala*) tadpoles to explore how these species respond spatially to habitat features when alone (non-game situations) and together (game situations), then how predation events are distributed in relation to these features. In game and non-game situations, dragonflies avoided each other and showed no preference for tadpole resource patches, while tadpoles favoured their resource patches, avoided caged, feeding dragonflies, and used a combination of avoidance and activity reduction to reduce their predation risk. Predation events were generally distributed closer to resource patches and farther from caged predators. The results suggest that dragonflies and tadpoles do not directly follow joint IFD predictions, but manage fear and risk through their behavioural strategies. The results also suggest that stationary or slowly-changing habitat features can anchor predator-prey spatial distributions, but that they are likely to be temporally variable in some systems." (Authors)] Address: Fraker, M.E., Dept of Zoology, Oklahoma State Univ., Stillwater, OK 74078-3052, USA

11623. Franković, M. (2012): On a small Odonata collection from the Hatta Pools, northern Oman. *Notul. odonatol.* 7(9): 80-82. (in English) ["Records are provided for 14 species. *Orthetrum abbotti* Calvert is recorded for the first time from the southern part of the Arabian peninsula." (Author)] Address: Franković, M., State Agency for Environment Protection, Avenija Vukovar 78, 10000 Zagreb, Croatia

11624. Franković, M.; Ozimec, R. (2012): An unusual record of *Calopteryx virgo* (L.) larva emerging in the Mاتیšičeva cave system, Karlovac county, Croatia (Zygoptera: Calopterygidae). *Notul. odonatol.* 7(9): 86-87. (in English) ["The Matesiceva cave system near the town of Slunj, located in the Kordun area of central Croatia, the second author (RO) found on 15-V-1999 a last instar of a living *C. virgo* larva climbing up from water on the cave wall, some 40 cm above the water table. The water and air temperatures were 10.2 and 10.0°C, respectively. Since larval and adult dragonflies mainly depend on vision as a primary sense (F. Johansson, 1992, *Notul. odonatol.* 3: 139-141) and the larva was found in complete darkness, some 400 m from the Matesiceva cave entrance (Fig. 1), it was obvious that the possible emergence was to end the life of this individual." (Authors)] Address: Franković, M., State Agency for Environment Protection, Avenija Vukovar 78, 10000 Zagreb, Croatia

11625. Futahashia, R.; Kuritab, R.; Manoc, H.; Fukatsua, T. (2012): Redox alters yellow dragonflies into

red. Proceedings of the National Academy of Sciences 109(31): 12631-12626. (in English) ["Body colour change associated with sexual maturation—so-called nuptial coloration—is commonly found in diverse vertebrates and invertebrates, and plays important roles for their reproductive success. In some dragonflies, whereas females and young males are yellowish in colour, aged males turn vivid red upon sexual maturation. The male-specific coloration plays pivotal roles in, for example, mating and territoriality, but molecular basis of the sex-related transition in body coloration of the dragonflies has been poorly understood. Here we demonstrate that yellow/red colour changes in the dragonflies are regulated by redox states of epidermal ommochrome pigments. Ratios of reduced-form pigments to oxidized-form pigments were significantly higher in red mature males than yellow females and immature males. The ommochrome pigments extracted from the dragonflies changed colour according to redox conditions in vitro: from red to yellow in the presence of oxidant and from yellow to red in the presence of reductant. By injecting the reductant solution into live insects, the yellow-to-red colour change was experimentally reproduced in vivo in immature males and mature females. Discontinuous yellow/red mosaicism was observed in body coloration of gynandromorphic dragonflies, suggesting a cell-autonomous regulation over the redox states of the ommochrome pigments. Our finding extends the mechanical repertoire of pigment-based body colour change in animals, and highlights an impressively simple molecular mechanism that regulates an ecologically important colour trait." (Authors)] Address: Futahashia, R., Biomedical Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba 305-8566, Japan. E-mail: ryo-futahashi@aist.go.jp

11626. Gainzarain, J.A. (2012): La fauna de libélulas del parque natural de Izki. *sustrai* 98: 66-71. (in Spanish) [General account on the Odonata of the natural Park Izki, Alava Province, Spain.] Address: not stated

11627. Gołąb, M.J.; Śniegula, S. (2012): Changes in reproductive behavior in adult damselfly *Calopteryx splendens* (Odonata: Calopterygidae) in response to flood. *Entomological Science* 15(3): 280-287. (in English) ["The reproductive behaviour *C. splendens* males and females inhabiting the Nida River, south Poland, was studied and compared during a pre-flood and a post-flood year. The flood disturbance in 2010 caused a decrease in aquatic macrophytes, thus reducing availability of potential territories and consequently, significantly influencing male behaviour towards a frequent non-territorial strategy. Many males in the post-flood population had damaged wings due to extremely aggressive contests. Male–male tandems were commonly observed; this is an uncommon behaviour in *C. splendens*. Although the sex ratio was male-biased throughout the whole study, we observed more males in the post-flood year. We also observed less-frequent copulations and ovipositions during the post-flood year. The only unchanged characteristic was population density, which did not differ before and after the flood disturbance. Floods have significant impact on damselfly reproductive sites and this, due to changes in behaviour and sex ratio, may result in further consequences on population dynamics." (Author)] Address: Gołąb, Maria J., Dept of Ecosystem Conservation, Institute of Nature Conservation, Polish Academy of Sci., Mickiewicza 33, 31-120 Kraków, Poland. Email: marysiagolab@gmail.com

11628. Golfieri, B.; Surian, N.; Hardersen, S.; Maiolini, B. (2012): Assessment of morphological and ecological conditions of Italian alpine rivers using the Morphological Quality Index (IQM) and Odonata. *IS.Rivers* 2012. 1ère conférence internationale sur les Recherches et Actions au service des fleuves et grandes rivières 26 au 28 juin 2012 / Lyon - FRANCE: 3 pp. (in English, with French summary) ["In the recent years many assessment methods have been developed to evaluate ecological and morphological conditions of rivers considering the requirements of the EU Water Framework Directive. Bioindicators are commonly aquatic organisms, but their use could lead to an incomplete evaluation of the status for the whole river corridor, for instance in large gravel-bed rivers. Dragonflies instead, as proposed in previous works, should offer a more complete evaluation of the ecological conditions of the river-floodplain system, due to the environmental characteristics that they indicate. In this study, the Italian Morphological Quality Index (IQM), joined with an Odonata based assessment system, are used to analyze the relationships between the ecological and morphological status of the fluvial environment. Another aim of the research is to test dragonflies as an ecological indicator over a set of reaches with different channel morphologies and human impacts. Preliminary results from five reaches show a good correspondence between the two assessment systems, confirming the positive correlation between ecological and morphological conditions of river reaches and the good potential of Odonata as bioindicators in riverine ecosystems." (Authors)] Address: Golfieri, B., Dipartimento di Geografia, Università degli Studi di Padova, Via del Santo 26, 35123 Padova, Italia. E-mail: brunogolfieri@libero.it

11629. Gonçalves, J.F.; Rezende, F.; França, J.; Callisto, M. (2012): Invertebrate colonisation during leaf processing of native, exotic and artificial detritus in a tropical stream. *Marine and Freshwater Research* 63(5): 428-439. (in English) ["The relationship between leaf breakdown and colonisation by invertebrates in tropical aquatic ecosystems is poorly understood, especially in regard to the added problem of the potential effects of exotic species. To assess the colonisation by invertebrates during leaf breakdown in a third-order headwater stream in south-eastern Brazil, we conducted an experiment using the native species *Miconia chartacea*, the exotic species *Eucalyptus grandis* and artificial leaves. We hypothesised that the quality of the detritus and the leaf shape influence invertebrate colonisation because of the quality of the food and refuge offered by leaf detritus. Invertebrate density and richness were higher on leaves of *E. grandis* than on those of *M. chartacea*. Taxon richness did not differ among *M. chartacea* and the two sizes of artificial leaves offered, probably as a function of the chemical composition of *E. grandis*. Total invertebrate density was significantly higher in the organic detritus, suggesting that detritus provides food for the organisms. Our results indicate that the colonisation of invertebrates is probably affected by the chemical composition of detritus. Contrary to expectations, the community of invertebrates had no difficulty in colonising *E. grandis*, although it is an exotic species. In addition, the shredder activity did not influence leaf breakdown. These results may indicate that the invertebrates in this stream tend to behave as generalist feeders." (Authors) Taxa including Odonata are treated at order level.] Address: Gonçalves Jr., J.F., Universidade Federal de Minas Gerais, Instituto de Ciências Biológicas,

Departamento de Biologia Geral, Laboratório de Ecologia de Bentos, CP. 486, Belo Horizonte, MG, 30161-970, Brazil. Email: jfjunior@unb.br

11630. Greig, H.S.; Kratina, P.; Thompson, P.L.; Pajunen, W.J.; Richardson, J.S.; Shurin, J.B. (2012): Warming, eutrophication, and predator loss amplify subsidies between aquatic and terrestrial ecosystems. *Global Change Biology* 18: 504-514. (in English) ["The exchange of organisms and energy among ecosystems has major impacts on food web structure and dynamics, yet little is known about how climate warming combines with other pervasive anthropogenic perturbations to affect such exchanges. We used an outdoor freshwater mesocosm experiment to investigate the interactive effects of warming, eutrophication, and changes in top predators (including 'Ischnura' and 'Libellula') on the flux of biomass between aquatic and terrestrial ecosystems. We demonstrated that predatory fish decoupled aquatic and terrestrial ecosystems by reducing the emergence of aquatic organisms and suppressing the decomposition of terrestrial plant detritus. In contrast, warming and nutrients enhanced cross-ecosystem exchanges by increasing emergence and decomposition, and these effects were strongest in the absence of predators. Furthermore, we found that warming advanced while predators delayed the phenology of insect emergence. Our results demonstrate that anthropogenic perturbations may extend well beyond ecosystem boundaries by influencing cross-ecosystem subsidies. We find that these changes are sufficient to substantially impact recipient communities and potentially alter the carbon balance between aquatic and terrestrial ecosystems and the atmosphere." (Authors)] Address: Greig, H.S., School of Biological Sciences, University of Canterbury, Christchurch 8140, New Zealand. E-mail: hamish.greig@canterbury.ac.nz

11631. Guan, Z.; Han, B.-P.; Vierstraete, A.; Dumont, H.J. (2012): Additions and refinements to the molecular phylogeny of Calopterygidae s.l. (Zygoptera: Calopterygidae). *Odonatologica* 41(1): 17-24. (in English) ["Of 8 previously unstudied calopterygine taxa, the ITS 1 and 2 was sequenced and inserted into a pre-existing phylogenetic tree of all Eurasian and American genera. ITS is mainly appropriate for looking at shallow phylogenetic relationships, and resolved the relationship within and between genera best, with weak support for relationships at the subfamily level. Thus, *Atrocalopteryx-Matrona* was found to be a complex but very robust clade, while *Vestalis* s.l. was confirmed to consist of 2 distinct genera. The generic versus specific or subspecific status of few other taxa is discussed. Within *Mnais* and *Vestalis*, the position was tested of 2 suspected "aberrant" members, *M. gregoryi* and *V. beryllae*. Both were confirmed to belong to the genera to which they had been traditionally assigned." (Authors)] Address: Han, B.-P., Institute of Hydrobiology, Jinan University, Guangzhou-510632, China. E-mail: tbphan@jnu.edu.cn

11632. Guan, Z.; Han, B.-P.; Dumont, H.J. (2012): *Atrocalopteryx melli orohainani* ssp. nov. on the island of Hainan, China (Zygoptera: Calopterygidae). *Odonatologica* 41(1): 37-42. (in English) ["The new subspecies is described from the mountain core of Hainan, southern China, where it usually occurs at altitudes not lower than 300 m a.s.l. It lives on the same type of small, shaded rivers as the nominate ssp. on the continent, and is distinguished by its larger size, slightly less enfeathered wings, and a 2.6% difference in the sequence of

the barcoding portion of the mitochondrial DNA-cytochrome c oxidase subunit I gene (COI). Holotype male: Diaoluoshan mountain, 6-VIII-2011; deposited in the Inst. Hydrobiol., Jinan Univ., Guangzhou. It is argued that this geographically defined ssp. evolved because of persistent poor gene flow with continental populations, caused by the lowland "panhandle" between Hainan and the continent. This barrier was probably functioning equally well during interglacials (like at present) as during pleniglacials (when Hainan was connected to the mainland), because lack of suitable environments (small sized running waters), and dry and cold conditions continued to limit the contact with *A. melli* of the mainland." (Authors)] Address: Han, B.-P., Institute of Hydrobiology, Jinan University, Guangzhou-510632, China. E-mail: tbphan@jnu.edu.cn

11633. Günther, A. (2012): Wiederfund von *Somatochlora arctica* in Brandenburg (Odonata: Corduliidae). *Libellula Supplement* 12: 143-150. (in German, with English summary) ["*S. arctica* belongs to the very rare dragonfly species in the lowlands of Central Europe and was regarded as extinct or presumably extinct in the state of Brandenburg (Germany) since 1984. After a visual observation in 2001, the rediscovery for Brandenburg succeeded in 2008 in a peat bog southwest of Eisenhüttenstadt. At this site the species was also recorded in 2012." (Author)] Address: Günther, A., TU Bergakademie Freiberg, Institut für Biowissenschaften, AG Biologie/Ökologie, Leipziger Str. 29, 09599 Freiberg, E-mail: andre.guenther@ioez.tu-freiberg.de

11634. Hämäläinen, M.; Valtonen, P. (2012): Recollections of Günther Peters' visit to Finland in 1986. *Libellula Supplement* 12: 23-28. (in English, with German summary) ["The authors recount some personal memories of three day-trips they arranged to facilitate Günther Peters' studies on aeshnids during his two week research visit to Finland in July 1986. G. Peters' predictions of the future increase of Finnish dragonfly diversity, and how they have been come true, are briefly discussed." (Authors)] Address: Valtonen, P., Kaukolankuja 2, FI-36200 Kangasala, Finland. E-mail: pho.valtonen@elisanet.fi

11635. Haislip, N.A.; Hoverman, J.T.; Miller, D.L.; Gray, M.J. (2012): Natural stressors and disease risk: does the threat of predation increase amphibian susceptibility to ranavirus?. *Canadian Journal of Zoology* 90(7): 893-902. (in English, with French summary) ["Emerging infectious diseases have been identified as threats to biodiversity, yet our understanding of the factors contributing to host susceptibility to pathogens within natural populations remains limited. It has been proposed that species interactions within communities affect host susceptibility to pathogens, thereby contributing to disease emergence. In particular, predation risk is a common natural stressor that has been hypothesized to compromise immune function of prey through chronic stress responses possibly leading to increased susceptibility to pathogens. We examined whether predation risk experienced during the development of four larval anuran species increases susceptibility (mortality and infection) to ranaviruses, a group of viruses responsible for amphibian die-offs. Using controlled laboratory experiments, we exposed each species to a factorial combination of two virus treatments (no virus or virus) crossed with three predator-cue treatments (no predators, larval dragonflies, or adult water bugs). All four amphibian species reduced activity by 22%-48% following continuous exposure to predator cues. In addition,

tion, virus exposure significantly reduced survival by 17%–100% across all species. However, exposure to predator cues did not interact with the virus treatments to elevate mortality or viral load. Our results suggest that the expression of predator-induced plasticity in anuran larvae does not increase ranaviral disease risk." (Authors)] Address: Hoverman, J.T., Center for Wildlife Health, Department of Forestry, Wildlife, and Fisheries, University of Tennessee, Knoxville, TN 37996, USA. E-mail: jason.hoverman@gmail.com

11636. Hamilton, R.; Kourtev, P.S.; Post, C.; Dillard, J.; Knepper, K.J.; Cowart, R. (2012): Physicochemical characteristics and benthic macroinvertebrate communities in temporary surface waters of Northern Stark County, Ohio. *The Open Entomology Journal* 6: 1-12. (in English) ["Natural habitats located in urbanized regions are increasingly being impacted by residential, commercial and agricultural development, but little is known about their biotic and abiotic characteristics. Temporary aquatic habitats are less protected by environmental regulations than permanently flooded habitats, and they have been historically understudied. We sampled temporary aquatic habitats including vernal pools, other emergent wetlands and intermittent streams in northeastern Ohio over a two-year period to characterize the macroinvertebrate communities and abiotic characteristics of each habitat type. Duration of inundation of the habitat was the single largest contributing factor to benthic macroinvertebrate community structure. Macroinvertebrate community variability was greater among habitat types than within types suggesting that different habitats type do play a role in selecting for different invertebrate species. Macroinvertebrate abundance and diversity, and functional feeding group patterns differed among seasons. Dissolved oxygen, oxidation-reduction potential and conductivity explained a significant portion of the variability in macroinvertebrate community structure, and these differed among habitat types. Our results suggest that abiotic characteristics have a greater role in determining macroinvertebrate community structure than habitat type." (Authors) Taxa including Aeshnidae, Lestidae and Libellulidae are treated at family level.] Address: Hamilton, R., Dept of Biological Sciences, Kent State University at Stark, North Canton, OH 44720, USA

11637. Hartung, M. (2012): Bestimmung von Exuvien der Gattung *Aeshna* in Mitteleuropa mittels einer Matrix mit reellen Zahlen (Odonata: Aeshnidae). *Libellula Supplement* 12: 123-131. (in German, with English summary) ["Determination of the exuviae of the genus *Aeshna* in Central Europe using a matrix of real figures (Odonata: Aeshnidae) - The identification of exuviae is possible using different methods. Schmidt (1936) had published a table with measurement results of the exuviae belonging to the genus *Aeshna*. Based on this table an identification matrix was created using a modified calculation method according to Lapage et al. (1973). The modification consisted in the transformation of the calculation for the use of real figures, which are commonly used for the measurement of insects. Twenty exuviae of *Aeshna cyanea* controlled by adult emergence were measured according to Schmidt (1936). These measurements were standardized. The mean of results was used as a new value in the identification matrix. The newly identified exuviae were identified as *A. cyanea* in 19 of 20 specimens." (Author)] Address: Hartung, M., An der Kirche 17, 14947 Nuthetal, OT Liebätz, Germany. Email: aeh.matthias.hartung@t-online.de

11638. Hassall, C. (2012): Predicting the distributions of under-recorded Odonata using species distribution models. *Insect Conservation and Diversity* 5(3): 192-201. (in English) ["(1) Absences in distributional data may result either from the true absence of a species or from a false absence due to lack of recording effort. I use general linear models (GLMs) and species distribution models (SDMs) to investigate this problem in North American Odonata and present a potential solution. (2) I use multi-model selection methods based on Akaike's information criterion to evaluate the ability of water-energy variables, human population density, and recording effort to explain patterns of odonate diversity in the USA and Canada using GLMs. Water-energy variables explain a large proportion of the variance in odonate diversity, but the residuals of these models are significantly related to recorder effort. (3) I then create SDMs for 176 species that are found solely in the USA and Canada using model averaging of eight different methods. These give predictions of hypothetical true distributions of each of the 176 species based on climate variables, which I compare with observed distributions to identify areas where potential under-recording may occur. (4) Under-recording appears to be highest in northern Canada, Alaska, and Quebec, as well as the interior of the USA. The proportion of predicted species that have been observed is related to recorder effort and population density. Maps for individual species have been made available online (<http://www.odonatacentral.org/>) to facilitate recording in the future. (5) This analysis has illustrated a problem with current odonate recording in the form of unbalanced recorder effort. However, the SDM approach also provides the solution, targeting recorder effort in such a way as to maximise returns from limited resources." (Author)] Address: Hassall, C., Biology Dept, Carleton Univ., Ottawa, ON K1S 5B6, Canada. E-mail: chassall@connect.carleton.ca

11639. Helm, S.R. (2012): Notes on prey of a Green Heron from Oregon. *Northwestern Naturalist* 93(1): 85-87. (in English) [*Butorides virescens* was observed to catch three "bright orange dragonflies (Odonata) in 5 attempts".] Address: Steven R. Helm, S.R., US Army Corps of Engineers, PO Box 2946 (CENWP-PM-E), Portland, OR 97208, USA. E-mail: steve.r.helm@usace.army.mil

11640. Hepenstrick, D.; Holderegger, R.; Keller, D. (2012): Monitoring von Populationen der Helm-Azurjungfer *Coenagrion mercuriale* (Odonata: Coenagrionidae): Was taugen zwei Begehungen pro Saison? *Entomologia Helvetica* 5: 139-145. (in German, with English and French summaries) ["Conservation measures of endangered zygopteran species are frequently accompanied by minimal monitoring. Such a monitoring comprises two censuses per year, in which the number of imagines is determined. For *C. mercuriale* we have evaluated whether minimal monitoring results in a reliable assessment of population size. Therefore, we compared two different datasets, collected from the same populations on the Swiss Plateau in 2009. One dataset represented minimal monitoring with two censuses per year. The other dataset presented a more profound estimation of real population sizes. For this latter dataset, counts were conducted on every day with suitable weather conditions during the reproductive phase. Statistical evaluation showed a high agreement of the two methods. Therefore, we conclude that even minimal monitoring results in a reliable assessment of popula-

tion size. This result may also hold true for other damselfly species." (Authors)] Address: Hepenstrick, D., ZHAW Institut für Umwelt und Natürliche Ressourcen, Grüental, Postfach, CH-8820 Wädenswil, Switzerland. E-mail: daniel.hepenstrick@zhaw.ch

11641. Hettyey, A.; Rölli, F.; Thürlimann, N.; Zürcher, A.-C.; van Buskirk, J. (2012): Visual cues contribute to predator detection in anuran larvae. *Biological Journal of the Linnean Society* 106(4): 820-827. (in English) ["The ability of prey to detect predators directly affects their probability of survival. Chemical cues are known to be important for predator detection in aquatic environments, but the role of other potential cues is controversial. We tested for changes in behaviour of *Rana temporaria* tadpoles in response to chemical, visual, acoustic, and hydraulic cues originating from dragonfly larvae (*Aeshna cyanea*) and fish (*Gasterosteus aculeatus*). The greatest reduction in tadpole activity occurred when all cues were available, but activity was also significantly reduced by visual cues only. We did not find evidence for tadpoles lowering their activity in response to acoustic and hydraulic cues. There was no spatial avoidance of predators in our small experimental containers. The results show that anuran larvae indeed use vision for predator detection, while acoustic and hydraulic cues may be less important. Future studies of predator-induced responses of tadpoles should not only concentrate on chemical cues but also consider visual stimuli." (Authors)] Address: Buskirk, J. v., Inst. Zool., Univ. of Zürich, 8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

11642. Hobson, K.A.; Soto, D.X.; Paulson, D.R.; Wasenaar, L.I.; Matthews, J.H. (2012): A dragonfly ($\delta^2\text{H}$) isoscape for North America: a new tool for determining natal origins of migratory aquatic emergent insects. *Methods in Ecology and Evolution* 3(4): 766-772. (in English) ["(1) Tracking insect migration at continental scales is intractable using exogenous markers because of tiny body size and high improbability of recapture. Naturally occurring endogenous isotopic markers, such as tissue $\delta^2\text{H}$ and $\delta^{18}\text{O}$, are a means of assigning origins to both vertebrate and invertebrate populations, but the success depends upon derivation of a robust algorithm linking measured tissue isotope values with large-scale geospatial isotopic patterns (isoscapes) in the terrestrial hydrosphere. (2) We derived a North American dragonfly wing $\delta^2\text{H}$ and $\delta^{18}\text{O}$ isoscape from known-origin dragonflies of three species (*Aeshna interrupta*, *A. umbrosa* and *Pachydiplax longipennis*) obtained across North America. A strong relationship ($r^2 = 0.75$) was found between wing $\delta^2\text{H}$ and hydrologic geospatial $\delta^2\text{H}$ patterns, and between wing $\delta^2\text{H}$ and $\delta^{18}\text{O}$ ($r^2 = 0.92$). The strong coupling between emergent insect tissue and hydrologic spatial patterning suggested that this dragonfly isoscape may be applicable to other aquatic emergent migratory insects in North America and elsewhere. (3) As a proof of concept, we used the wing isoscape algorithm to map the probability of natal origin of *Anax junius* migrating through southern Texas. Results showed that these Texan dragonflies were a mix of local and far-distant migrant (e.g. northern United States) individuals. We suggest that this isoscape algorithm opens new opportunities to quantify the migration and natal origins of dragonflies and other aquatic emergent insects where conventional methods have failed." (Authors)] Address: Hobson, K.A., Environment Canada, 11 Innovation Blvd., Saskatoon, SK, Canada S7N 3H5. E-mail: keith.hobson@ec.gc.ca

11643. Hoffmann, J. (2012): Zum achzigsten Geburtstag von Professor Dr. Günther Peters. *Libellula Supplement* 12: 3-17. (in German) [Introduction to the Günther Peters festschrift on the occasion of his 80th birthday.] Address: Hoffmann, J., Hallesdorfer Str. 21, 22179 Hamburg, Germany. E-mail: hoffmann.joa@t-online.de

11644. Huang, S.C.; Reinhard, J.; Norval, G. (2012): The reproductive biology and daily activity patterns of *Ischnura heterosticta* (Burmeister) in eastern Australia (Zygoptera: Coenagrionidae). *Odonatologica* 41(2): 99-107. (in English) ["The reproductive behaviour was observed at a pond in Fig Tree Pocket, Brisbane, Australia, from Oct. 2010 to Jan. 2011. In total, 769 individuals were marked in the field for observations pertaining to the daily activity patterns and reproductive cycle of this sp. Forty-one *I. heterosticta* pairs were collected and kept in the laboratory for detailed observations of the reproductive behaviours, copulation duration and oviposition, and to determine the duration of larval development. It started to form mating pairs from ca 5:00 to 9:00 am, foraged from ca 9:00 am to 13:00 pm, and finally females oviposited mainly from ca 13:00 pm to 16:30 pm. Oviposition usually occurred in the following days after mating. Mating pairs formed the tandem position for about 13 s, then copulated in the wheel position on average for 195 min, and upon completion of insemination formed a tandem position again for about 12 s. On average, females spent 145 min in actual oviposition, laying several hundred eggs on floating vegetation. Ovipositing females were not guarded by males. The eggs hatched within 10 to 21 days, and the larvae took 3 to 5 months to develop into adults." (Authors)] Address: Huang, S.C., Queensland Brain Institute, University of Queensland, Brisbane, QLD 4072, Australia. E-mail: shaochang.huang@uqconnect.edu.au

11645. Husain, A.; Husain, H.J.; Sharma, G. (2012): New records of dragonflies (Insecta: Odonata: Anisoptera) from Chhatarpur District, Bundelkhand, Madhya Pradesh, India with their conservation status and distribution. *Journal on New Biological Reports* 1(1): 12-16. (in English) ["*Orthetrum pruinosum neglectum*, *Potamarcha congener*, *Diplacodes trivialis*, *Bradinopyga geminata*, *Pantala flavescens* and *Trithemis aurora* are being recorded for the first time from Chhatarpur district of Bundelkhand Division in Madhya Pradesh. *O. pruinosum neglectum*, *P. congener*, *D. trivialis* and *T. aurora* are new to this Division of Madhya Pradesh. All the six species dealt here are classified as 'Least Concern' under Lower Risk category of IUCN red List of Threatened Species." (Authors)] Address: Sharma, G., Zoological Survey of India, 535, New Alipore, Kolkata-700 053, India. E-mail: drgaurav.zsi.india@gmail.com

11646. Hyslop, E.J.; Hunte-Brown, M. (2012): Longitudinal variation in the composition of the benthic macroinvertebrate fauna of a typical North coast Jamaican river. *Rev. Biol. Trop.* 60(1): 291-303. (in English) ["Benthic macroinvertebrate fauna plays a major role in river ecosystems, especially those of tropical islands. Since there is no information on the distribution of benthic invertebrates along a Jamaican river, we report here on the composition of the benthic fauna of the Buff Bay river, on the Northern coast of Jamaica. A total of 14 samples were collected from five sites, using kick nets and a Surber sampler, between May 1997 and October 1998. We also examined the applicability of the rhithron/potamon model, and some of the premises of

the River Continuum Concept (RCC) in relation to the distribution of invertebrate taxa. The results showed a total of 38 taxa of identified invertebrates. A group of dominant taxa, composed mainly of immature stages of insects, occurred at all sites. Two notable characteristics of the river were the absence of a true potamonic fauna and the low representation of the shredder functional feeding group in the community. We conclude that, while there was minor variation in the composition of the benthic macroinvertebrate fauna among the sites, this was a response to local conditions within the river system. The characteristics of the community did not conform to either of the models." (Authors) The following taxa are listed: *Scapania frontalis*, *Dythemis rufinervis*, *Orthemis ferruginea*, and *Enallagma* sp.] Address: Hyslop, E.J., Department of Life Sciences, University of the West Indies, Mona campus, Kingston 7, Jamaica. E-mail: eric.hyslop@uwimona.edu.jm

11647. Iorio, E. (2012): Nouvelles données sur la répartition et l'écologie de *Sympetrum depressiusculum* (Selys, 1841) dans les Bouches-du-Rhône (Odonata, Anisoptera: Libellulidae). *Martinia* 28(1): 25-36. (in French, with English summary) [In "2010 and 2011, the autochthony of *S. depressiusculum* has been emphasized in several new locations in Saint-Martin-de-Crau and Salon-de-Provence (Bouches-du-Rhône department, southern France). These locations are sedimentation tanks along motorways with clear and well brightened up waters on a muddy/rocky substratum, with many helophytes and with winter desiccation. The dominant plant species in the ponds where *S. depressiusculum* reproduces are, in decreasing order of frequency/abundance: *Typha domingensis*, *Cyperus eragrostis*, *Scirpoides holoschoenus* and *Schoenoplectus lacustris*. The Odonatological regular cortège is, in decreasing order of frequency/abundance: *Ischnura elegans*, *S. fonscolombii*, *Crocothemis erythraea*, *Orthetrum cancellatum* and *Anax imperator*. The odonatological occasional cortège is, in decreasing order of frequency/abundance: *S. sanguineum*, *O. coerulescens*, *O. brunneum*, *Anax parthenope*, *O. albistylum* and *S. striolatum*. Several cases of predation on *S. depressiusculum* and other Anisoptera species by *Argiope bruennichi* (Scopoli, 1772) (Araneae: Araneidae) have been observed. This spider seems to be an efficient predator in this kind of habitat." (Author)] Address: Iorio, E., ECO-MED (Ecologie & Médiation), Pôle Entomologie, Tour Méditerranée, 65 av. Jules Cantini, F-13298 Marseille Cedex 20, France. E-mail: e.iorio@ecomed.fr

11648. Irineu de Souza, L.O.; Pepinelli, M.; Neiss, U.G. (2012): The larva of *Neoneura ethela* Williamson, 1917 (Odonata: Protoneuridae). *Zootaxa* 3318: 63-67. (in English) ["The last-instar larva of *N. ethela* is described and illustrated based on one larva collected from a thermal water river in Brazil, State of Goiás and reared in the laboratory. The larva of *N. ethela* can be distinguished from all other South America *Neoneura* larvae by the following combination of characters: one pair of premental setae, S8-10 with a row of short spines along distal border, lateral gills a little longer than length of abdomen, ventral border of lateral gill armed with a row of about 24 spines. We provide a key to the species of known South American larvae of *Neoneura*." (Authors)] Address: Neiss, U.G., Instituto Nacional de Pesquisas da Amazônia/INPA, Coordenação de Biodiversidade/CBio, Avenida André Araújo, n. 2936, Caixa

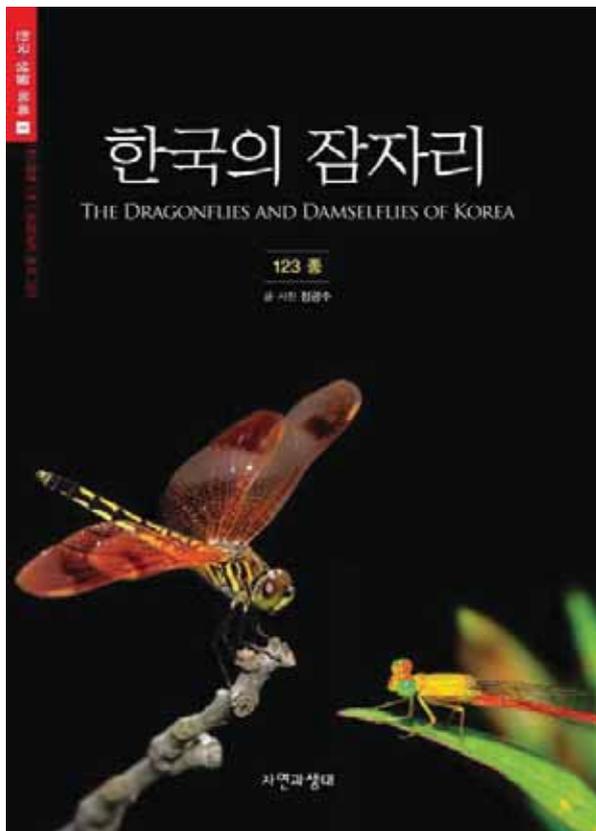
Postal 478, CEP 69011-970, Manaus, Amazonas, Brazil. E-mail: ulisses.neiss@gmail.com

11649. Iserbyt, A.; Van Gossum, H.; Stoks, R. (2012): Biogeographical survey identifies consistent alternative physiological optima and a minor role for environmental drivers in maintaining a polymorphism. *PLoS ONE* 7(2): e32648. doi:10.1371/journal.pone.0032648: 10 pp. (in English) ["The contribution of adaptive mechanisms in maintaining genetic polymorphisms is still debated in many systems. To understand the contribution of selective factors in maintaining polymorphism, we investigated large-scale (>1000 km) geographic variation in morph frequencies and fitness-related physiological traits in the damselfly *Nehalennia irene*. As fitness-related physiological traits, we investigated investment in immune function (phenoloxidase activity), energy storage and fecundity (abdomen protein and lipid content), and flight muscles (thorax protein content). In the first part of the study, our aim was to identify selective agents maintaining the large-scale spatial variation in morph frequencies. Morph frequencies varied considerably among populations, but, in contrast to expectation, in a geographically unstructured way. Furthermore, frequencies co-varied only weakly with the numerous investigated ecological parameters. This suggests that spatial frequency patterns are driven by stochastic processes, or alternatively, are consequence of highly variable and currently unidentified ecological conditions. In line with this, the investigated ecological parameters did not affect the fitness-related physiological traits differently in both morphs. In the second part of the study, we aimed at identifying trade-offs between fitness-related physiological traits that may contribute to the local maintenance of both colour morphs by defining alternative phenotypic optima, and test the spatial consistency of such trade-off patterns. The female morph with higher levels of phenoloxidase activity had a lower thorax protein content, and vice versa, suggesting a trade-off between investments in immune function and in flight muscles. This physiological trade-off was consistent across the geographical scale studied and supports widespread correlational selection, possibly driven by male harassment, favouring alternative trait combinations in both female morphs." (Authors)] Address: Iserbyt, A., Evolutionary Ecology Group, Antwerp Univ., Antwerp, Belgium. E-mail: arne.iserbyt@ua.ac.be

11650. Janssens, L.; Stoks, R. (2012): How does a pesticide pulse increase vulnerability to predation? Combined effects on behavioral antipredator traits and escape swimming. *Aquatic Toxicology* 110-111: 91-98. (in English) ["An increasing number of studies have documented that sublethal pesticide exposure can change predator-prey interactions. Most of these studies have focused on effects of long-term pesticide exposure on only one type of antipredator traits and have not directly linked changes in these traits to mortality by predation. To get a better mechanistic understanding of how short-term pesticide pulses make prey organisms more vulnerable to predation, we studied effects of 24 h exposure to a sublethal concentration of the insecticide endosulfan and the herbicide Roundup on the major antipredator traits and the resulting mortality by predation in larvae of the damselfly *Enallagma cyathigerum*. A pulse of both pesticides affected antipredator traits involved in avoiding detection by predators as well as traits involved in escape after detection. After a pesticide pulse, larvae increased activity levels and even further in-

creased the number of walks when predation risk was present. Further, an endosulfan pulse tended to reduce escape swimming speed. In contrast, previous exposure to Roundup caused the larvae to swim faster, yet less often when attacked. Importantly, although both studied pesticides induced maladaptive changes in overall activity, only for endosulfan this resulted in an increased mortality by predation. Our study highlights that considering changed predator-prey interactions may improve ecological risk evaluations of short pesticide pulses, yet also underscores the need (1) to consider effects on all important antipredator traits of the prey as trait compensation may occur and (2) to effectively score the outcome of predator-prey interactions in staged encounters." (Authors)] Address: Janssens, Lizanne, Laboratory of Aquatic Ecology and Evolutionary Biology, Univ. of Leuven, Deberiotstr. 32, 3000 Leuven, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

Jung, K.-S. (2012): The dragonflies and damselflies of Korea. Checklist of organisms in Korea 1. 272 pp. (in Korean) [http://www.econature.co.kr/?mid=ecobook-&search_target=extra_vars5&search_keyword=20120320&document_srl=72694]



Address: Jung, Kwangsu, 102-601., Dalvitmaul apt., Hwajung-dong, Koyangsi, 412-270, Gyunggido, Korea. E-mail: tootootoo@korea.com

11651. Kadoya, T.; Washitani, I. (2012): Use of multiple habitat types with asymmetric dispersal affects patch occupancy of the damselfly *Indolestes peregrinus* in a fragmented landscape. *Basic and Applied Ecology* 13: 178-187. (in English, with German summary) ["To appropriately predict the patch occupancy of animals, it is often essential to consider not only the habitat structure but also shifts in the habitat requirements of animals with changes in life stage. In addition, asymmetric dis-

persal among different types of habitat patches is likely to accompany use of multiple habitat types due to differences in the ease with which migrants can find the habitats, to changes in the dispersal ability of animals according to their life stage, or to both factors. However, few studies have explicitly elucidated the contribution of these processes to patch connectivity and to predictions of patterns of patch occupancy. In the present study, we evaluated the effects of multi-type habitat use on patch connectivity of the damselfly *Indolestes peregrinus*. After emergence, adults of this species move from their native ponds to woodlands for hibernation and return to aquatic habitats for oviposition in the next spring. We recorded the occurrence of *I. peregrinus* at newly created artificial ponds and attempted to explain patch occupancy using a series of Bayesian statistical models, which incorporate (1) local environment only, (2) both local environment and single-type habitat use connectivity, and (3) both local environment and multi-type habitat use connectivity. In addition, we considered two situations in the third model: symmetric or asymmetric dispersal. Comparing the performance of the candidate models revealed that the best model was the third model assuming asymmetric dispersal and it explained 18.8% of the deviance. The result suggests that multi-type habitat use is important for determining patch connectivity of *I. peregrinus*, and that there is asymmetry in the connectivity from pond to woodland patches and vice versa for the damselfly. Both multi-type habitat use and asymmetric dispersal processes are likely to apply to many other taxa and landscapes." (Authors)] Address: Kadoya, T., Center for Environmental Biology and Ecosystem Studies, National Institute for Environmental Studies, 16-2 Onogawa, Tsukuba, Ibaraki 305-8506, Japan. E-mail: kadoya@nies.go.jp

11652. Kalkman, V.J.; Kleukers, M.J.C.R.; Tavares, J.T. (2012): First well documented records of *Orthetrum trinacria* for Greece and Turkey (Odonata: Libellulidae). *Libellula* 31(1/2): 89-96. (in English, with German summary) ["Two records of *O. trinacria*, one taken in Turkey and the other in Greece, are documented by photographs. Former records of *O. trinacria* from Greece and Turkey are considered as doubtful, making these observations the first well documented for this species in both countries. Range expansion of dragonflies in the eastern Mediterranean is discussed and it is suggested that the present records of *O. trinacria* in Greece and Turkey might be a first indication that this species will become established along the coastal regions of the eastern Mediterranean." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

11653. Kalkman, V.J.; Orr, A.G. (2012): The Australian monsoon tropics as a barrier for exchange of dragonflies (Insecta: Odonata) between New Guinea and Australia. *Hydrobiologia* 693: 55-70. (in English) ["Recent studies show a remarkable scarcity of faunal exchange events between Australia and New Guinea in the Pleistocene despite the presence of a broad land connection for long periods. This is attributed to unfavourable conditions in the connecting area associated with the long established northern Australian Monsoon Climate. This would be expected to have impacted strongly on freshwater faunas with the following results: (1) limited overlap in species, (2) most higher taxonomic groups pre-

sent in both areas sharing no species or even genera and (3) shared species dominated by lentic species with high dispersal capacity. Testing these predictions for dragonflies showed the turnover in the family, genus and species composition between Australia and New Guinea to be higher than anywhere in the world with only 50% of families and subfamilies, 33% of the genera and 8% of the species being shared. Only one of the 53 shared species favours lotic waters compared with 64% of the 652 combined Australian–New Guinean species. These results agree with our predictions and indicate that the dragonfly fauna of Australia and New Guinea have effectively been separated during the Pleistocene probably due to the prolonged unfavourable climatic conditions in the intervening areas" (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

11654. Keller, D.; van Strien, M.J.; Holderegger, R. (2012): Do landscape barriers affect functional connectivity of populations of an endangered damselfly? *Freshwater Biology* 57(7): 1373-1384. (in English) ["(1) Landscape genetic approaches were used to assess functional connectivity of populations of the endangered damselfly *Coenagrion mercuriale* in a fragmented agricultural landscape in Switzerland. Spatial genetic clustering methods combined with interpolation by kriging and landscape genetic corridor analysis were applied to identify landscape elements that enhance or hinder dispersal and gene flow. (2) Spatial genetic clustering analysis divided the sampled populations into a northern and a southern genetic group. The boundary between the two groups coincided with a hill ridge intersecting the study area. Landscape corridor analysis identified five landscape elements that significantly affected gene flow. Elevation change, Euclidian distance, patches of forest and flowing waterbodies acted as barriers, whereas open agricultural land enhanced gene flow between populations of *C. mercuriale*. (3) This study showed that movement of *C. mercuriale* was not restricted to its preferred habitat (i.e. streams). Populations linked via continuous open agricultural land were functionally well connected if they were not more than about 1.5–2 km apart. In contrast, substantial elevation change and larger forest patches separated populations. These findings may serve as a basis to define conservation units and should be considered when planning connectivity measures, such as determining the locations of stepping stones, or the restoration of streams." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr. 111, CH-8903 Birmensdorf, Switzerland. E-mail: daniela.keller@wsl.ch

11655. Keppner, E.J. (2012): Occurrence of the Widow Skimmer (*Libellula luctuosa*) in Holmes County, Florida. *Argia* 24(2): 21-22. (in English) [USA; May 19, 2012] Address: Keppner, E.J. E-mail: ekeppner@bellsouth.net

11656. Khelifa, R.; Zebba, R.; Kahalerras, A.; Mahdjoub, H. (2012): Clutch size and egg production in *Orthetrum nitidinerve* Selys, 1841 (Anisoptera: Libellulidae): effect of body size and age. *International Journal of Odonatology* 15(2): 51-58. (in English) ["Clutch size is an important fitness component often quantified artificially by inducing oviposition in libellulid females. Female behaviour and egg production of the yellow-veined skimmer, *Orthetrum nitidinerve*, were studied in northeast Algeria during its reproductive season. Data on reproductive

behaviour and biology of this Mediterranean endemic species has not been published previously. Males guarded territories within the wetland while females came only to lay their eggs and then went back to terrestrial habitat. In this study we induced oviposition, which depletes all the female eggs, to obtain estimations of egg deposition rate and subsequently clutch size. On average an induced clutch was ca. 2200 eggs while a natural one was about 970 eggs. Artificial clutches were positively correlated to body length but negatively related to mature lifespan. The rate of egg deposition was higher in the afternoon than in the morning, probably because of differences in temperature. During their mature lifespan females oviposited between one and three artificial clutches." (Authors)] Address: Khelifa, R., Dépt d'écologie et du génie de l'environnement, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre et de l'Univers, Université, 08 Mai 1945, Guelma, 24000, Algeria

11657. Khelifa, R. (2012): Description of the final instar larva of *Calopteryx exul* Selys, 1853 (Zygoptera: Calopterygidae). *International Journal of Odonatology*: 107-114. (in English) ["The last instar larva of *C. exul* is described and illustrated based on larvae collected from the Seybouse River (northeast Algeria) and reared in the laboratory. A comparative analysis of three other congeneric species is presented." (Author)] Address: Khelifa, R., Département d'Écologie et du Génie de l'Environnement, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre et de l'Univers, Université 08 Mai 1945, Guelma, 24000, Algeria

11658. Klecka, J.; Boukal, D.S. (2012): Who eats whom in a pool? A comparative study of prey selectivity by predatory aquatic insects. *PLoS ONE* 7(6): e37741: 13 pp. (in English) ["Predatory aquatic insects are a diverse group comprising top predators in small fishless water bodies. Knowledge of their diet composition is fragmentary, which hinders the understanding of mechanisms maintaining their high local diversity and of their impacts on local food web structure and dynamics. We conducted multiple-choice predation experiments using nine common species of predatory aquatic insects, including adult and larval Coleoptera, adult Heteroptera and larval Odonata, and complemented them with literature survey of similar experiments. All predators in our experiments fed selectively on the seven prey species offered, and vulnerability to predation varied strongly between the prey. The predators most often preferred dipteran larvae; previous studies further reported preferences for cladocerans. Diet overlaps between all predator pairs and predator overlaps between all prey pairs were non-zero. Modularity analysis separated all primarily nectonic predator and prey species from two groups of large and small benthic predators and their prey. These results, together with limited evidence from the literature, suggest a highly interconnected food web with several modules, in which similarly sized predators from the same microhabitat are likely to compete strongly for resources in the field (observed Pianka's diet overlap indices >0.85). Our experiments further imply that ontogenetic diet shifts are common in predatory aquatic insects, although we observed higher diet overlaps than previously reported. Hence, individuals may or may not shift between food web modules during ontogeny." (Authors) The following Odonata species were used in the experiment: *Coenagrion puella* (F-0) (water column), *Libellula depressa* (F-2), *Libellula depressa*

(F-0), *Sympetrum sanguineum* (F-0) and *Anax imperator* (F-0) (all: bottom).] Address: Klecka, J., Department of Ecosystems Biology, Faculty of Science, University of South Bohemia, České Budějovice, Czech Republic. E-mail: kleckj01@prf.jcu.cz

11659. Knillmann, S.; Stampfli, N.C.; Noskov, Y.A.; Bekeov, M.A.; Liess, M. (2012): Interspecific competition delays recovery of *Daphnia* spp. populations from pesticide stress. *Ecotoxicology* 21(4): 1039-1049. (in English) ["Xenobiotics alter the balance of competition between species and induce shifts in community composition. However, little is known about how these alterations affect the recovery of sensitive taxa. We exposed zooplankton communities to esfenvalerate (0.03, 0.3, and 3 lg/L) in outdoor microcosms and investigated the longterm effects on populations of *Daphnia* spp. To cover a broad and realistic range of environmental conditions, we established 96 microcosms with different treatments of shading and periodic harvesting. Populations of *Daphnia* spp. decreased in abundance for more than 8 weeks after contamination at 0.3 and 3 lg/L esfenvalerate. The period required for recovery at 0.3 and 3 lg/L was more than eight and three times longer, respectively, than the recovery period that was predicted on the basis of the life cycle of *Daphnia* spp. without considering the environmental context. We found that the recovery of sensitive *Daphnia* spp. populations depended on the initial pesticide survival and the related increase of less sensitive, competing taxa. We assert that this increase in the abundance of competing species, as well as sub-lethal effects of esfenvalerate, caused the unexpectedly prolonged effects of esfenvalerate on populations of *Daphnia* spp. We conclude that assessing biotic interactions is essential to understand and hence predict the effects and recovery from toxicant stress in communities." (Authors) The paper contains a passing reference to Odonata.] Address: Knillmann, Saskia, Department of System Ecotoxicology, Helmholtz Centre for Environmental Research, UFZ, Permoserstrasse 15, 04318 Leipzig, Germany. E-mail: saskia.knillmann@ufz.de

11660. Koch, K.; Ziegler, D.A.; Griebeler, E.M. (2012): Nischenmodell für *Sympetrum striolatum* (Odonata: Libellulidae). *Libellula Supplement* 12: 151-160. (in German, with English summary) ["In this study, we assessed whether it is possible to establish ecological niche models for euryoecious species using *Sympetrum striolatum* as a model species. Presence-only data of this species, climate and land use data at the resolution of ordinance survey type maps (OSM) from six different Southern German federal states and from the time period 1950-2006 were used for modelling. Based on these data we calculated four different models applying the Software Max-Ent. Each model initially considered 19 pairwise uncorrelated environmental variables plus one climate and one precipitation variable based on different periods: "no egg or larval development", with averaged mean monthly temperatures below 4°C (December-February), "larvae", with averaged mean monthly temperatures above 4°C (March-November), "adult", the main flight season of *S. striolatum* (June-October), and "whole life cycle" the mean annual temperature. In general, model accuracy and performance was low. Nevertheless, all models identified the same variables as the most important predictors of the spatial distribution of *S. striolatum*. The different temperature variables showed the highest independent contribution to the overall vari-

ance explained by the models, whereas the contribution of the fraction of conifer forest, the fraction of soil with pH 7.5-8, and the difference between maximum and minimum altitude in meters within an OSM was lower. As the environmental variables identified by the models are consistent with the biology of our model species, we conclude that ecological niche models are reliable for euryoecious species." (Authors)] Address: Koch, Kamilla, Abteilung Ökologie, Institut für Zoologie, Johannes Gutenberg-Universität Mainz, Johann-Joachim-Becherweg 13, D-55128 Mainz, Germany. E-mail: kochka@uni-mainz.de

11661. Kosterin, O.E. (2012): A rapid survey of Odonata on Bokor Plateau, Preah Monivong National Park, Cambodia. *Cambodian Journal of Natural History* 2012(1): 75-88. (in English, with Cambodian summary) ["Bokor Plateau, in the coastal area of Cambodia, supports a mixture of upper hill evergreen forest and wetlands, including Sphagnum peat-moss bogs, at approximately 1,000 m elevation. Despite being within Preah Monivong National Park, the recent construction of a resort on the plateau has destroyed most of its accessible wetlands before their biodiversity was fully investigated. The findings of three rapid surveys, which preceded the loss of the wetlands, are presented here. During six days in total, 45 species of Odonata were recorded on Bokor Plateau (1 Calopterygidae, 1 Euphaeidae, 2 Chlorocyphidae, 2 Lestidae, 11 Coenagrionidae, 1 Platycnemididae, 1 Protoneuridae, 1 Aeshnidae, 2 Corduliidae and 23 Libellulidae), comprising 10 lotic and 35 lentic species. Only four species, *Aciagrion tillyardi*, *Idyonyx ?thailandica*, *Lyriothemis elegantissima* and *Orthetrum pruinatum neglectum*, were not recorded at lower elevations during the same period. *Aciagrion tillyardi* appeared to breed in peat-moss habitats on the plateau, but no obligate peat-moss species were found. Numerous non-breeding individuals of the common species *Ceriagrion olivaceum*, *Neurothemis intermedia*, *Potamarcha congener* and *Tholymis tillarga* were found on the plateau in December, and *Pantala flavescens* in April and to a lesser extent in August, most of which had probably dispersed from lower elevations to forage. No very rare or localised endemic species were detected, but this may be explained by the short survey period." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

11662. Kuitunen, K.; Haukilehto, E.; Raatikainen, K.J.; Hakkarainen, H.; Miettinen, M.; Hogmander, H.; Kotiaho, J.S. (2012): Do allopatric male *Calopteryx virgo* damselflies learn species recognition? *Ecology and Evolution* 2(3): 615-621. (in English) ["There is a growing amount of empirical evidence that premating reproductive isolation of two closely related species can be reinforced by natural selection arising from avoidance of maladaptive hybridization. However, as an alternative for this popular reinforcement theory, it has been suggested that learning to prefer conspecifics or to discriminate heterospecifics could cause a similar pattern of reinforced premating isolation, but this possibility is much less studied. Here, we report results of a field experiment in which we examined (i) whether allopatric *Calopteryx virgo* damselfly males that have not encountered heterospecific females of the congener *C. splendens* initially show discrimination, and (ii) whether *C. virgo* males learn to discriminate heterospecifics or learn to associ-

ate with conspecifics during repeated experimental presentation of females. Our experiment revealed that there was a statistically nonsignificant tendency for *C. virgo* males to show initial discrimination against heterospecific females but because we did not use sexually native individuals in our experiment, we were not able to separate the effect of innate or associative learning. More importantly, however, our study revealed that species discrimination might be further strengthened by learning, especially so that *C. virgo* males increase their association with conspecific females during repeated presentation trials. The role of learning to discriminate *C. splendens* females was less clear. We conclude that learning might play a role in species recognition also when individuals are not native but have already encountered potential conspecific mates." (Authors)] Address: Kuitunen, Katja, Dept of Biological and Environmental Science, Centre of Excellence in Evolutionary Research, Univ. of Jyväskylä, P.O. Box 35, FIN-40014 Jyväskylä, Finland. E-mail: katja.m.m.kuitunen@jyu.fi

11663. Kumar Das, M.; Bordoloi, S. (2012): Diversity of fish and insect fauna of Diyung Thiep watershed, Arunachal Pradesh. International journal of advanced biological research 2(2): 289-292. (in English) [The taxa list includes *Cordulegaster* sp., *Sympetrum* sp., and the Nearctic *Argia* sp.] Address: Biodiversity laboratory, Resource Management and Environment Division, Institute of advanced study in Science and Technology, Paschim Boragaon, Bigyan Path Garchuk, Guwahati-781035, Assam, India

11664. Lau, D.C.P.; Vrede, T.; Pickova, J.; Goedkoop, W. (2012): Fatty acid composition of consumers in boreal lakes – variation across species, space and time. *Freshwater Biology* 57(1): 24-38. (in English) [Sweden] "(1) Fatty acids (FAs) have been widely applied as trophic biomarkers in aquatic food web studies. However, current knowledge of inter- and intraspecific variation in consumer FA compositions across spatial and temporal scales is constrained to a few pelagic taxa. (2) We analysed the FAs of 22 taxa of benthic macroinvertebrates (including 'Aeshna spp., Corduliidae, Zygoptera'), zooplankton and fish collected from the littoral, pelagic and profundal habitats of nine boreal oligotrophic lakes over spring, summer and autumn. We quantified and compared the FA variance partitions contributed by species identity (i.e. an integrative effect of phylogenetic origin, life history and functional feeding guild of individual taxa), site and season using partial redundancy analysis both on all consumers and on benthic arthropods alone. (3) Species identity alone contributed 84.4 and 72.8% of explained FA variation of all consumers and benthic arthropods, respectively. Influences of site, season and all joint effects accounted for 0–11.3% only. Fatty acid profiles of primary consumers differentiated below class level, but those of predators were distinguishable only when they became more taxonomically distinct (i.e. among classes or higher). (4) Pelagic and profundal consumers showed stronger reliance on autochthonous resources than did their littoral counterparts as reflected by their higher x3 to x6 FA ratios. Polyunsaturated FAs (PUFAs) were increasingly retained with trophic levels, and saturated FAs (e.g. FA 16 : 0) gradually reduced. Ecologically, this trade-off enhances the trophic transfer efficiency and confirms the importance of PUFA-rich autotrophs in aquatic food webs. (5) Our findings indicate strong interspecific differences in FA requirements and assimila-

tion among aquatic consumers from a wide range of taxonomic levels, habitats and lakes. Consumers were able to maintain homeostasis in FA compositions across spatial and temporal changes in resource FAs, but consumer homeostasis did not limit the effectiveness of FAs as trophic biomarkers." (Authors)] Address: Lau, Danny, Department of Aquatic Sciences and Assessment, Swedish University of Agricultural Sciences, Box 7050, 75007 Uppsala, Sweden. E-mails: danny.lau@slu.se, dcplau@gmail.com

11665. Lee, Y.-H.; Lin, C.-P. (2012): Morphometric and genetic differentiation of two sibling gossamer-wing damselflies, *Euphaea formosa* and *E. yayeyamana*, and adaptive trait divergence in subtropical East Asian islands. *Journal of Insect Science* 12 | Article 53: 17 pp. (in English) ["Insular species frequently demonstrate different tendencies to become smaller or larger than their continental relatives. Two sibling gossamer-wing damselflies, *E. formosa* (Odonata: Euphaeidae) from Taiwan and *E. yayeyamana* from the Yaeyama Islands of Japan, have no clear structural differentiation, and can only be recognized by their geographical distribution, sizes, and subtle differences in wing shape and coloration. This study combined morphometric and genetic techniques to investigate the adaptive significance of trait divergence and species status in these two *Euphaea* damselflies. Phylogenetic analyses of the mitochondrial *cox2* sequences demonstrated that the two damselflies are monophyletic lineages and constitute valid phylogenetic species. The landmark-based geometric morphometrics indicated that the two damselflies are different morphological species characterized by distinctive wing shapes. The larger *E. formosa* exhibited broader hind wings, whereas *E. yayeyamana* had narrower and elongated forewings. The body size and wing shape variations among populations of the two species do not follow the expected pattern of neutral evolution, suggesting that the evolutionary divergence of these two traits is likely to be subjected to natural or sexual selection. The decreased body size, elongated forewings, and narrower hind wings of *E. yayeyamana* may represent insular adaptation to limited resources and reduced territorial competition on smaller islands." (Authors)] Address: Lin, C.-P., Department of Life Sciences and Center for Tropical Ecology and Biodiversity, Tunghai University, Taichung, 40704, Taiwan. E-mail: treehops@thu.edu.tw

11666. Lee, Y.-H.; Lin, C.-P. (2012): Pleistocene speciation with and without gene flow in *Euphaea* damselflies of subtropical and tropical East Asian islands. *Molecular Ecology* 21(15): 3739-3756. (in English) ["Climatic oscillations during the Pleistocene period could have had a profound impact on the origin of tropical species by the alternation of allopatric isolation and interpopulation gene flow cycles. However, whether tropical speciation involves strictly allopatric isolation, or proceeds in the face of homogenizing gene flow, is relatively unclear. Here, we investigated geographical modes of speciation in four closely related *Euphaea* damselfly species endemic to the subtropical and tropical East Asian islands using coalescent analyses of a multilocus data set. The reconstructed phylogenies demonstrated distinct species status for each of the four species and the existence of two sister species pairs, *Euphaea formosa*/*E. yayeyamana* and *E. decorata*/*E. ornata*. The species divergence time of the sibling *Euphaea* damselflies dates back to within the last one Mya of the Middle to

Lower Pleistocene. The speciation between the populous *E. formosa* of Taiwan and the less numerous *E. yayeyamana* of the Yaeyama islands occurred despite significant bidirectional, asymmetric gene flow, which is strongly inconsistent with a strictly allopatric model. In contrast, speciation of the approximately equal-sized populations of *E. decorata* of the southeast Asian mainland and *E. ornata* of Hainan is inferred to have involved allopatric divergence without gene flow. Our findings suggest that differential selection of natural or sexual environments is a prominent driver of species divergence in subtropical *E. formosa* and *E. yayeyamana*; whereas for tropical *E. decorata* and *E. ornata* at lower latitudes, allopatric isolation may well be a pivotal promoter of species formation." (Authors)] Address: Lin, C.-P., Department of Life Science & Center for Tropical Ecology and Biodiversity, Tunghai University, Taichung 40704, Taiwan. E-mail: treehops@thu.edu.tw

11667. Leslie, A.W.; Smith, R.F.; Ruppert, D.E.; Bejleri, K.; McGrath, J.M.; Needelman, B.A.; Lamp, W.O.P (2012): Environmental factors structuring benthic macroinvertebrate communities of agricultural ditches in Maryland. *Environ. Entomol.* 41(4): 802-812. (in English) ["Agricultural drainage ditches are artificial structures used to optimize soil hydrology for crop production and secondarily have been co-opted as a tool to manage the quality of water draining from agricultural lands. We investigated the relationship between the aquatic macroinvertebrate community and environmental variables associated with physical and biogeochemical processes that affect water quality. Aquatic macroinvertebrates were sampled along with physical and chemical measures of the soil and water from 29 agricultural drainage ditches on the Eastern Shore of Maryland. Cluster analysis and multivariate ordination showed that ditches that had higher flow velocities supported communities of lotic invertebrates (i.e., Stenelmis, Prosimulium) versus those that had properties of linear wetlands, which supported communities of lentic invertebrates (i.e., Oligochaeta, Caecidotea). Taxon richness varied from four to 31 taxa per ditch, and was higher within ditches that had higher flow velocities. Small ditches had low diversity, but may have provided refugia from fish predators. Macroinvertebrate communities did not show a significant linear relationship with water quality or with nutrient concentrations within the soil or water. The addition of flow-control structures designed to improve the quality of water draining from agricultural lands may decrease the quality of ditches as habitat for certain aquatic macroinvertebrates. Management decisions for drainage ditches may consider tradeoffs between the benefits of ditches as a source of biodiversity and as a tool for improving water quality." (Authors) Taxa are treated at genus level and include *Dromogomphus*, *Libellula*, *Amphiagrion*, and *Argia*.] Address: Leslie, A.W., Dept of Entomology, Univ. of Maryland, College Park, MD 20742, USA. E-mail: aleslie@umd.edu

11668. Letsch, H.O.; Meusemann, K.; Wipfler, B.; Schütte, K.; Beutel, R.; Misof, B. (2012): Insect phylogenomics: results, problems and the impact of matrix composition. *Proc. R. Soc. B* 279(1741): 3282-3290. (in English) ["In this study, we investigated the relationships among insect orders with a main focus on Polyneoptera (lower Neoptera: roaches, mantids, earwigs, grasshoppers, etc.), and Paraneoptera (thrips, lice, bugs in the wide sense). The relationships between and within these groups of insects are difficult to resolve because only

few informative molecular and morphological characters are available. Here, we provide the first phylogenomic expressed sequence tags data ('EST': short sub-sequences from a c(copy) DNA sequence encoding for proteins) for stick insects (Phasmatodea) and web-spinners (Embioptera) to complete published EST data. As recent EST datasets are characterized by a heterogeneous distribution of available genes across taxa, we use different rationales to optimize the data matrix composition. Our results suggest a monophyletic origin of Polyneoptera and Eumetabola (Paraneoptera + Holometabola). However, we identified artefacts of tree reconstruction (human louse *Pediculus humanus* assigned to Odonata or Holometabola (insects with a complete metamorphosis); mayfly genus *Baetis* nested within Neoptera), which were most probably rooted in a data matrix composition bias due to the inclusion of sequence data of entire proteomes. Until entire proteomes are available for each species in phylogenomic analyses, this potential pitfall should be carefully considered." (Authors) *Ischnura elegans* was included in analyses.] Address: Harald O. Letsch, H.O., Dept für Tropenökologie und Biodiversität der Tiere, Universität Wien, Rennweg 14, 1030 Wien, Austria. E-mail: harald.letsch@univie.ac.at

11669. Li, Y.J.; Han, G.; Nel, A.; Ren, D.; Pang, H.; Liu, X.L (2012): A new fossil petalurid dragonfly (Odonata: Petaluroidea: Aktassiidae) from the Cretaceous of China. *Alcheringa* 36(3): 319-322. (in English) [oas 36; "Pseudocymatophlebia boda n. sp. is described from Lower Cretaceous strata of Inner Mongolia, China. It provides additional morphological characters for this genus, which has been previously recorded from the Lower Cretaceous of England. Together with *Aktassia*, it is the second aktassiid genus with a very wide distribution, even though this family remains known only from Eurasia. Furthermore, a new name, *Brachaktassia* gen. nov., is proposed to replace the brachiopod genus *Aktassia* Popov, 1976." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

11670. Li, Y.; Nel, A.; Ren, D.; Pang, H. (2012): New gomphaeschnids and progobiaeschnids from the Yixian Formation in Liaoning Province (China) illustrate the tremendous Upper Mesozoic diversity of the aeshnopteran dragonflies. *Geobios* 45(4): 339-350. (in English) ["One new genus and five new species of Odonata are described and figured from the Yixian Formation of northeastern China, viz. two gomphaeschnids *Sinojoria magna* nov. sp. and *S. cancellosa* nov. sp., plus three progobiaeschnids *Mongoliaeschna hadrens* nov. sp., *M. exiguusens* nov. sp., and *Decoraeschna preciosus* nov. gen., nov. sp. These new discoveries confirm the apparently sudden great diversification in China of the clade Aeshnoptera during the Middle-Upper Jurassic, together with the Upper Mesozoic to modern lineages of dragonflies. At the same time some 'ancient' groups of Odonata became extinct." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

11671. Li, Y.-J.; Nel, A.; Ren, D.; Zhang, B.-L.; Pang, H. (2012): Reassessment of the Jurassic damsel-dragonfly genus *Karatawia* (Odonata: Campteropteropterygidae). *Zootaxa* 3417: 64-68. (in English) ["A new species *Karatawia sinica* Li, Nel et Ren, sp. nov. is described from the Middle Jurassic Jiulongshan Formation, and compared with the other species of this genus. As it is based on a

new fossil with fore- and hindwings preserved, it confirms the attribution of *Karatawia sibirica* to this genus, of *Karatawia* to the Campteroptlebiidae, and the synonymy of the *Karatawiidae* with this family. Otherwise, the two other species *K. mongolica* and *K. shurabica*, which are based on more incomplete specimens, are more properly to be considered as Campteroptlebiidae incertae sedis." (Authors)] Address: Ren, D., College of Life Science, Capital Normal University, 105 Xisanhuanbeilu, Haidian District, Beijing 100048, China. E-mail: rendong@mail.cnu.edu.cn

11672. Lin, S.-C.; Chen, Y.-F.; Shieh, S.-H.; Yang, P.S. (2012): Patterns of mitochondrial and wing morphological differentiation in Taiwanese populations of *Psolodesmus mandarinus* McLachlan (Zygoptera: Calopterygidae). *Odonatologica* 41(2): 109-121. (in English) ["To investigate the patterns of molecular and morphological differentiation, the mitochondrial cytochrome oxidase I and 16S ribosomal DNA genes and wing morphology data were analyzed. Both phylogenetic and population genetic analyses revealed two lineages, an Eastern and a Western lineage existing on each side of the longitudinal Central Mountain Range. For wing traits, the latitudinal clines mainly altered across the populations in northern Taiwan and the transition zone was broad. For female wing size, however, the latitudinal cline shifted at 24.19 degrees N latitude, which is close to the current criteria (24.33 degrees N latitude line) for dividing 2 geographical subspecies, *P. m. mandarinus* and *P. m. dorothea*." (Authors)] Address: Yang, P.S., Department of Entomology, National Taiwan University, Taipei 106, Taiwan. E-mail: psyang@ntu.edu.tw

11673. Lis, L.; Buczyński, P. (2012): *Leucorrhinia pectoralis* (Charpentier, 1825) (Odonata: Libellulidae) in secondary habitats in the former sulphur mine "Jeziórko" near Tarnobrzeg (Sandomierz Basin). *Odonatrix* 8(1): 19-22. (in Polish, with English summary) ["In the year 2011, *L. pectoralis* was recorded in the former borehole sulphur mine „Jeziórko” (E of Tarnobrzeg, south-eastern Poland). The species was observed in two drainage canals of mining subsidence (sites 1 and 3) as well as along the road running through the area of flood lands in mining subsidence (site 2). At sites 2 and 3 the species was very numerous (on May 28, more than 100 specimens per 100m of observation transect), at site 3 numerous territorial males were observed. For the *L. pectoralis* the examined areas are typical secondary habitats to which this species is being adapted and in the suitable stages of succession it often forms large populations in Poland. New data is essential for the knowledge about the distribution of this species in Poland (Bernard et al. 2009). It fills the gap on the map of distribution situated between central Poland and the Lublin Region. It is also the first one from the central part of the Sandomierz Basin, the area with very little data in general so far. This situation results mainly from the lack of respectively targeted studies on odonatofauna of this macroregion." (Authors)] Address: Lis, L., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: lisulis@o2.pl

11674. Liu, V. (2012): Dragonflies and Damselflies of Las Galarias. *The Hum...* 7(1): 3-4. (in English) [Verbatim: Almost all dragonflies and damselflies (order: Odonata, or Odes for short) are dependent upon freshwater habitats in which the larval stages grow and develop, and we have plenty of those here at Reserva Las Galarias (RLG)! On sunny days they are often ob-

served throughout the reserve and can most frequently be found along the forest creeks and boggy areas of Peccary Trail, with the pond being a particular hotspot. Having been successful in obtaining identifications for many of the butterfly species on the reserve, we decided to try our luck with odes and sent off some photos to Bill Haber and Dave Wagner ("Odonata of Ecuador" project) with the ambitious hope that they might also be willing to help us identify what we have. With many thanks to Bill and Dave, we can report that 20 different species have been identified at RLG, with some additional 'interesting' species yet to be confirmed. Odes occur in greater abundance and higher diversity at lower elevations, but at higher elevations, such as RLG, there is a greater possibility of endemic species being found. We are still excitedly awaiting the identifications for our 'interesting' species. To check out Bill and Dave's on-going website-based inventory of the Odes of Ecuador, which will soon include records from RLG, visit their website at: <http://efg.cs.umb.edu/~whaber/OdonataofEcuador/index.html>] Address: Liu, Vicki, c/o Las Galarias Foundation Inc., 24140 Gessner Rd., North Olmsted, OH 44070, USA

11675. Locklin, J.L.; Huckabee, J.S.; Gering, E.J. (2012): A method for rearing large quantities of the damselfly, *Ischnura ramburii* (Odonata: Coenagrionidae), in the laboratory. *Florida Entomologist* 95(2): 273-277. (in English, with Spanish summary) ["Laboratory based experimental designs typically require large sample sizes of genetically related organisms at the same developmental stage. Several described methods for rearing damselflies have been published, but these methods require laborious techniques when rearing large quantities of damselflies simultaneously. We have developed a relatively easy and inexpensive method for rearing large quantities of a coenagrionid damselfly that streamlines previously published methods and employs new techniques that increase efficiency and yield. Culturing large numbers of damselflies in the laboratory is manageable and opens diverse research avenues." (Authors)] Address: Locklin, J.L., Department of Biology, Temple College, 2600 South First St., Temple, TX 76504, USA. E-mail: jason.locklin@templejc.edu

11676. Lozano, F.; Anjos-Santos, D. (2012): *Acanthagrion hildegarda* Gloger, 1967 (Odonata: Zygoptera: Coenagrionidae): New records and geographic distribution map. *Check List* 8(1): 177-180. (in English) ["*A. hildegarda* is a common inhabitant of lentic environments in Argentina and Uruguay. However, precise georeferenced data are scarce in the literature. This work provides the first updated georeferenced list of localities and map of distribution of *A. hildegarda*, including new country records for Brazil and departamental records for Uruguay, accompanied by illustrations and scanning photographs of its main diagnostic characters." (Authors)] Address: Lozano, F., Instituto de Limnología "Dr. R.A. Ringuelet" (CONICET – CCT La Plata), C.C. 712, 1900, La Plata, Argentina. E-mail: lozano@ilpla.edu.ar

11677. Lunde, K.B.; Resh, V.H. (2012): Development and validation of a macroinvertebrate index of biotic integrity (IBI) for assessing urban impacts to Northern California freshwater wetlands. *Environmental Monitoring and Assessment* 184(6): 3653-3674. (in English) ["Despite California policies requiring assessment of ambient wetland condition and compensatory wetland mitigations, no intensive monitoring tools have been developed to evaluate freshwater wetlands within the

state. Therefore, we developed standardized, wadeable field methods to sample macroinvertebrate communities and evaluated 40 wetlands across Northern California to develop a macroinvertebrate index of biotic integrity (IBI). A priori reference sites were selected with minimal urban impacts, representing a best-attainable condition. We screened 56 macroinvertebrate metrics for inclusion in the IBI based on responsiveness to percent urbanization. Eight final metrics were selected for inclusion in the IBI: percent three dominant taxa; scraper richness; percent Ephemeroptera, Odonata, and Trichoptera (EOT); EOT richness; percent Tanyptodinae/Chironomidae; Oligochaeta richness; percent Coleoptera; and predator richness. The IBI (potential range 0–100) demonstrated significant discriminatory power between the reference (mean=69) and impacted wetlands (mean=28). It also declined with increasing percent urbanization ($R^2=0.53$, $p<0.005$) among wetlands in an independent validation dataset ($n=14$). The IBI was robust in showing no significant bias with environmental gradients. This IBI is a functional tool to determine the ecological condition at urban (stormwater and flood control ponds), as well as rural freshwater wetlands (stockpools, seasonal wetlands, and natural ponds). Biological differences between perennial and nonperennial wetlands suggest that developing separate indicators for these wetland types may improve applicability, although the existing data set was not sufficient for exploring this option." (Authors) Taxa are treated at the genus level.] Address: Lunde, K.B., Environmental Science, Policy, and Management, University of California, Berkeley, 130 Mulford Hall #3114, Berkeley, CA 94720, USA. E-mail: klunde@berkeley.edu

11678. Maasri, A.; Gelhaus, J. (2012): Stream invertebrate communities of Mongolia: current structure and expected changes due to climate change. *Aquatic Biosystems* 2012, 8:18 doi: 10.1186/2046-9063-8-18: 24 pp. (in English) ["Background: Mongolia's riverine landscape is divided into three watersheds, differing in extent of permafrost, amount of precipitation and in hydrological connectivity between sub-drainages. In order to assess the vulnerability of macroinvertebrate communities to ongoing climate change, we consider the taxonomic and functional structures of stream communities in two major watersheds: The Central Asian Internal Watershed (CAIW) and the Arctic Ocean Watershed (AOW), together covering 86.1% of Mongolia's surface area. We assess the consequences of the hydrological connectivity between sub-drainages on the nestedness and distinctness of the stream communities. And accordingly, we discuss the expected biotic changes to occur in each watershed as a consequence of climate change. Results: Gamma and beta diversities were higher in the CAIW than the AOW. High community nestedness was also found in the CAIW along with a higher heterogeneity of macroinvertebrate assemblage structure. Assemblages characteristic of cold headwater streams in the CAIW, were typical of the drainages of the Altai Mountain range. Macroinvertebrate guilds of the CAIW streams exhibited traits reflecting a high stability and low resilience capacity for eutrophication. In contrast, the community of the AOW had lower nestedness and a combination of traits reflecting higher stability and a better resilience capacity to disturbances. Conclusion: Higher distinctness of stream communities is due to lower connectivity between the drainages. This was the case of the stream macroinvertebrate communities of the two major Mongolian watersheds,

where connectivity of streams between sub-drainages is an important element structuring their communities. Considering differences in the communities' guild structure, hydrological connectivity and different magnitudes of upcoming impacts of climate change between the two watersheds, respective stream communities will be affected differently. The hitherto different communities will witness an increasing differentiation and divergent adaptations for the upcoming changes. Accordingly, in an increasing awareness to protect Mongolia's nature, our results encourage adapting conservation planning and management strategies specifically by watershed." (Authors) The taxa list includes *Lestes*, *Ophiogomphus*, and *Leucorrhinia*.] Address: Maasri, A., The Academy of Natural Sciences of Drexel University, 1900 Ben Franklin Parkway, Philadelphia, PA 19103-1195, USA. E-mail: alainmaasri@gmail.com

11679. Machado, A.B.M. (2012): *Leptagrion cyanostigma* sp. nov. from Brazil with a study of blue pterostigma in Zygoptera (Odonata: Coenagrionidae). *International Journal of Odonatology* 15(2): 81-86. (in English) ["A new species, *Leptagrion cyanostigma* sp. nov., is described and illustrated based on 1 male and 1 female collected in the State of Bahia, Brazil. The species is generically unique by having a blue pterostigma with a black center. A survey of other Zygoptera possessing blue pterostigmata is carried out." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

11680. Machado, A.B.M. (2012): On the generic status of *Schizocordulia* Machado, 2005 (Anisoptera: Corduliidae). *Odonatologica* 41(1): 43-45. (in English) ["R.W. GARRISON et al. (2006, *Dragonfly genera of the New World*, Hopkins Univ. Press, Baltimore) synonymized *Schizocordulia* Machado, 2005 with *Aeschnosoma* Selys, 1870, alleging that the characters used to separate them are specific rather than generic. However, a study of the literature revealed that except for size all these characters have always been regarded as generic and therefore *Schizocordulia* is revalidated as a good genus." (Authors)] Address: Machado, A.B.M., Depto de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Avenida Antônio Carlos, 6627, Caixa Postal 486, BR-31270-901, Belo Horizonte, Minas Gerais, Brasil. E-mail: angelo@icb.ufmg.br

11681. Maltchik, L.; Schmidt Dalzochio, M.; Stenert, C.; Rolon, A.S. (2012): Diversity and distribution of aquatic insects in Southern Brazil wetlands: implications for biodiversity conservation in a Neotropical region. *Rev. Biol. Trop.* 60(1): 273-289. (in English) ["The selection of priority areas is an enormous challenge for biodiversity conservation. Some biogeographic methods have been used to identify the priority areas to conservation, and panbiogeography is one of them. This study aimed at the utilization of panbiogeographic tools, to identify the distribution patterns of aquatic insect genera, in wetland systems of an extensive area in the Neotropical region (~280 000km²), and to compare the distribution of the biogeographic units identified by the aquatic insects, with the conservation units of Southern Brazil. We analyzed the distribution pattern of 82 genera distributed in four orders of aquatic insects (Diptera, Odonata, Ephemeroptera and Trichoptera) in Southern Brazil wetlands. Therefore, 32 biogeographic nodes corresponded to the priority areas for conservation of the aquatic

insect diversity. Among this total, 13 were located in the Atlantic Rainforest, 16 in the Pampa and three amongst both biomes. The distribution of nodes showed that only 15% of the dispersion centers of insects were inserted in conservation units. The four priority areas pointed by node cluster criterion must be considered in further inclusions of areas for biodiversity conservation in Southern Brazil wetlands, since such areas present species from different ancestral biota. The inclusion of such areas into the conservation units would be a strong way to conserve the aquatic biodiversity in this region." (Authors)] Address: Maltchik, L., Lab. Ecol. & Conservation of Aquatic Ecosystems, Av. Unisinos, 950 CEP 93.022-000, UNISINOS, São Leopoldo, RS, Brazil; UNISINOS, São Leopoldo, Brazil. E-mail: maltchik@unisinos.br

11682. Mantle, B.L.; La Salle, J.; Fisher, N. (2012): Whole-drawer imaging for digital management and curation of a large entomological collection. *ZooKeys* 209: 147-163. (in English) ["Whole-drawer imaging is shown to be an effective tool for rapid digitisation of large insect collections. On-line, Whole-drawer images facilitate more effective collection management, virtual curation, and public engagement. The Whole-drawer imaging experience at the Australian National Insect Collection is discussed, with an explanation of workflow and examples of benefits." (Authors)] Figure 8 presents a whole-drawer image of dragonfly specimens used for a pilot study investigating the error associated with direct and indirect measures of morphological characters, such as wing length.] Address: Mantle, Beth Louise, Australian National Insect Collection, CSIRO Ecosystem Sciences, GPO Box 1700, Canberra, ACT, 2601, Australia. E-mail: beth.mantle@csiro.au

11683. Martens, A.; Grabow, K.; Radkowsch, A. (2012): Ganzjährige Flugzeit von *Ischnura elegans* in Mitteleuropa durch Nutzung von Tropengewächshäusern (Odonata: Coenagrionidae). *Libellula* 31(1/2): 1-6. (in German, with English summary) ["In the water-lily house of the Botanical Garden of the KIT in Karlsruhe, Germany, adults of *I. elegans* were recorded several times between November 2010 and mid-January 2011, and on 13-i-2011 an egg clutch and several larvae. In the heated greenhouse of another Botanical Garden in Karlsruhe situated next to the palace of Karlsruhe, a female *I. elegans* emerged on 15-i-2012. Heated greenhouses with pools offer a good opportunity for year-round development in odonates. With open windows and gardening activities of the staff a good exchange with the free-living population is given. *Ischnura elegans* seems to be the only odonate species north of the Alps being able to survive under indoor conditions; this ability offers the opportunity for a habitat change, a continuous development and a year-round flight season of this species." (Authors)] Address: Martens, A., Biologie, Pädagogische Hochschule Karlsruhe, Bismarckstraße 10, D-76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de

11684. Martin, S.; Bertaux, A.; Le Ber, F.; Maillard, E.; Imfeld, G. (2012): Seasonal changes of macroinvertebrate communities in a stormwater wetland collecting pesticide runoff from a vineyard catchment (Alsace, France). *Archives of Environmental Contamination and Toxicology* 62(1): 29-41. (in English) ["Agricultural land use may influence macroinvertebrate communities by way of pesticide contamination associated with agricultural runoff. However, information about the relation between runoff-related pesticides and communities of benthic macroinvertebrates (including not further de-

tailed Odonata) in stormwater wetland that receive agricultural runoff does not currently exist. Here we show changes in macroinvertebrate communities of a stormwater wetland that collects pesticide-contaminated runoff from a vineyard catchment. 16 runoff-associated pesticides, including the insecticide flufenoxuron, were continuously quantified at the inlet of the stormwater wetland from April to September (period of pesticide application). In parallel, benthic macroinvertebrate communities, pesticide concentrations, and physicochemical parameters in the wetland were assessed twice a month. Twenty-eight contaminated runoffs ranging from 1.1 to 114 m³ entered the wetland during the study period. Flufenoxuron concentrations in runoff-suspended solids ranged from 1.5 to 18.5 µg kg⁻¹ and reached 6 µg kg⁻¹ in the wetland sediments. However, flufenoxuron could not be detected in water. The density, diversity, and abundance of macroinvertebrates largely varied over time. Redundancy and formal concept analyses showed that concentrations of flufenoxuron, vegetation cover, and flow conditions significantly determine the community structures of stormwater wetland macroinvertebrates. This study shows that flow conditions, vegetation cover, and runoff-related pesticides jointly affect communities of benthic macroinvertebrates in stormwater wetlands." (Authors)] Address: Imfeld, G., Laboratory of Hydrology and Geochemistry of Strasbourg, Univ. of Strasbourg/ENGEES, UMR 7515 CNRS 1, rue Blessig, 67084 Strasbourg, France. E-mail: imfeld@unistra.fr

11685. Martínez-Sanz, C.; Cenzano, C.S.S.; Fernández-Aláez, M.; García-Criado, F. (2012): Relative contribution of small mountain ponds to regional richness of littoral macroinvertebrates and the implications for conservation. *Aquatic Conservation: Marine and Freshwater Ecosystems* 22(2): 155-164. (in English) ["Biodiversity is a central concept in conservation programme design. Until recently, ponds were neglected habitats probably owing to their small size and to the ignorance of their real conservation value. The classical theory of species-area relationship (SAR) might apparently support such a view by predicting low richness values in small habitat patches. SAR theory does not take into account the fact that groups of small habitat patches can significantly contribute to regional richness, regardless of their overall small area. This work intends to contribute to the SLOSS (single large or several small) debate with data on littoral macroinvertebrates from mountain ponds. Do groups of small ponds support communities with higher biodiversity than a single large lake? Littoral macroinvertebrate richness, both local and regional, were measured in 17 ponds and one large lake from Sanabria Natural Park (NW Spain). In order to guarantee valid comparisons among systems, observed and estimated richness, as well as rarefaction methods were used. Although local richness in the lake was much higher than in any single pond, regional richness of ponds widely exceeded the value measured in the lake regardless of their small overall area. Six to seven ponds were enough to obtain an accumulated average richness equivalent to that in the lake. This pattern may be caused partly by increased habitat heterogeneity as proposed by the niche theory. Metacommunity theory might help to explain the high regional richness measured in the group of ponds in the study area. Whatever the explanation, it is evident that groups of mountain ponds strongly contribute to regional richness, a conclusion that should be taken into account by management programmes. There is a gap in this re-

spect in European legislation (the EC Habitats Directive and Water Framework Directive), which fails to include groups of ponds as an additional habitat category." (Authors) The following taxa have been listed from these ponds, but their identification remains unclear because they are associated with running waters: *Coenagrion/Ischnura*, *Erythromma lindenii*, *Enallagma*, *Lestes*, *Boyeria irene*, *Cordulegaster*, *Gomphus*, *Onychogomphus* cf. *forcipatus*, and *Sympetrum*.] Address: Martínez-Sanz, C., Area of Ecol., Fac. Biology and Environmental Science, Univ. of León, Campus de Vegazana, s/n. C.P. 24071, León, Spain. E-mail: cmars@unileon.es

11686. Mauersberger, R. (2012): Über Neuansiedlungen von *Nehalennia speciosa* in Brandenburg und Mecklenburg-Vorpommern (Odonata: Coenagrionidae). *Libellula Supplement* 12: 199-209. (in German, with English summary) ["New colonizations of *Nehalennia speciosa* in Brandenburg and Mecklenburg-Vorpommern, Germany (Odonata: Coenagrionidae) - From 2006 to 2012 the new colonization of seven habitats in the north of Brandenburg and the south of Mecklenburg-Vorpommern was recorded. Most of the sites are influenced by rising water levels, e.g. because of the rewetting of mires. Two successful examples of colonization by artificial introduction of individuals are given. All habitats are mesotrophic but with a high variability of calcium carbonate content." (Author)] Address: Mauersberger, R., Prenzlauer Allee 66, 17268 Templin, Germany. E-mail: rue.mau@web.de

11687. Michalski, J.; Opper, S. (2012): *Lanthanusa bilineata* sp. nov. from New Guinea (Odonata: Libellulidae). *International Journal of Odonatology* 15(2): 75-80. (in English) ["*Lanthanusa bilineata*, a new libellulid from the mountains of central New Guinea (holotype male: Mekil Research Station (04°48' S, 141°39' E), leg. 1 September 2004, dep. at RMNH, Leiden), is described. The new species combines characteristics previously used to distinguish between *Huonia* and *Lanthanusa* with wing venation characteristic of the genus *Huonia* and accessory genitalia characteristic of *Lanthanusa*. We propose a revision of the *Huonia/Lanthanusa* complex to clarify the characteristics distinguishing the genus *Lanthanusa*." (Authors)] Address: Michalski, J., 223 Mount Kemble Avenue, Morristown New Jersey 07960, USA. E-mail: huonia@aol.com

11688. Mickovic, B.; Lenhardt, M.; Đikanovic, V.; Skoric, S.; Strelnikova, A. (2012): Diet of juvenile sterlets (*Acipenser ruthenus* Linnaeus 1758) from the Danube river by Belgrade. *BALWOIS 2012 – Ohrid, Republic of Macedonia – 28 May, 2 June 2012*: 4 pp. (in English) [Serbia; "...stomach content in juvenile sterlets are presented. The fishes were collected during the period June – November 2003, at four sampling sites along the course of the Danube River through the Belgrade Region. A total of 178 fish of 0+ and 1+ age were examined. ... 37 species from 12 macrozoobenthic-groups have been found." In August, the diet included one specimen of *Gomphus* sp. "In general, the range of food items taken indicates that sterlet in Danube is a generalized invertebrate predator, which probably takes food items according to their abundance and seasonal occurrence." (Authors)] Address: Mickovic, B., Institute for multidisciplinary research, University of Belgrade, Belgrade, Serbia. E-mail: baneklej@imsi.rs

11689. Moisan, P.; Labandeira, C.C.; Matushkina, N.A.; Wappler, T.; Voigt, S.; Kerp, H. (2012): Lycopsid-arthro-

pod associations and odonatopteran oviposition on Triassic herbaceous Isoetites. *Palaeogeography, Palaeoclimatology, Palaeoecology* 344–345: 6-15. (in English) ["Associations between lycopsid and herbivorous arthropods are rare in the fossil record and equally sparse among the three surviving lineages of Lycopodiaceae, Selaginellaceae and Isoëtaceae. However, from the Middle–Upper Triassic Madygen Formation of southwestern Kyrgyzstan, we describe the first association between an isoetalean host, Isoetites (a quillwort), and a pattern of elliptical egg insertion scars that altered the host's live plant tissues. This ovipositional damage, in some cases deployed in a stereotypical zigzag pattern, was most likely caused by small damselfly-like insects from the extinct suborder Archizygoptera of the order Odonoptera (dragonflies). If this identification is correct, it indicates considerable behavioral stasis of dragonflies extending deep into the Mesozoic. Our detection of lycopsid ovipositional damage adds to the list of major plant hosts from the preangiospermous Mesozoic that were resources for host use by egg-laying dragonflies, particularly horsetails, ferns, and seed plants that included conifers, peltasperms, corystosperms, ginkgophytes, bennettitaleans and probably cycads. Highlights: We describe the first record of oviposition on lycopsids. This ovipositional damage was likely caused by small damselfly-like insects. Lycopsids are the least herbivorized group of vascular plants in time and space." (Authors)] Address: Matushkina, Natalia A., Dept of Zoology, Biological Faculty, National Taras Shevchenko Univ. of Kyiv, vul. Volodymirs'ka, 64, Kyiv UA-01033, Ukraine. E-mail: odonatally@gmail.com

11690. Müller, J. (2012): Zur Wiederentdeckung von *Cordulegaster bidentata* im Osthartz (Odonata: Cordulegasteridae). *Libellula Supplement* 12: 177-186. (in German, with English summary) ["Including the rediscovery of *C. bidentata* in 1992 after 80 years in the eastern part of the Harz Mountains in seven areas with a main presence in the Zillierbachtal and its side valleys near Wernigerode, Saxony-Anhalt, Germany, the species has been recorded 36 times in 12 years, including four times in larval stage. The localities are situated between 300 and 546 m above sea level in headwaters in spruce and mixed forest areas. The classification in a Red List is briefly discussed." (Author)] Address: Müller, J., Frankefelde 3, D-39116 Magdeburg, Germany. E-mail: faunoek.jmueller@t-online.de

11691. Müller, O.; Schiel, H.-J. (2012): Description of the final instar larva of *Rhionaeschna elsia* (Calvert, 1952) (Odonata: Aeshnidae). *Libellula Supplement* 12: 133-142. (in English, with German summary) ["The final instar larva of *Rhionaeschna elsia*, a species endemic to the Coastal desert of Peru, is described and depicted for the first time and compared with the last larval instars /exuviae of the closely related species of the 'Neureclipta group'. Whereas the prementum is very similar in all five species, exuviae of *R. elsia* can be clearly distinguished from those of *R. absoluta*, *R. bonariensis* and *R. diffinis* by its comparatively long cerci and the very short lateral spines on segments 6 to 9. Especially, the lateral spine on segment 6 is significantly shorter than that of the other species and was even missing completely in two of the six exuviae investigated. In both features *R. elsia* is very similar to *R. galapagoensis*, as described by Needham (1904)." (Authors)] Address: Müller, O., Birkenweg 6d, 15306 Lin-

dendorf-Libbenichen, Germany. E-mail: mueller.ole@googlegmail.com

11692. Nation, J.L. (2012): Review: Paulson, Dennis. 2011. Dragonflies and Damselflies of the East. Princeton University Press, Princeton, NJ, USA. 538 pp. Paperback, ISBN 978-0-691-12283-0 (also available in hardback). \$29.95 (pbk). Florida Entomologist 95(2): 532. (in English) [Verbatim: With publication of Dragonflies and Damselflies of the East and the previously published Dragonflies and Damselflies of the West (2009), Dennis Paulson has made available the first comprehensive field guides to all the Odonata in the United States and Canada. One of the author's goals with these two volumes is to make it possible to "identify any of the 461 species of dragonflies and damselflies now known to occur in the United States and Canada." A second goal is to provide natural history about each species to stimulate both amateur and professional interest, perhaps making knowledge and pleasure in Odonata rival that of butterflies and birds. The present book is beautifully illustrated with colour photographs of the male and female of each species (no female photo available for a few species) and a colour coded map of the US and Canada where the species is found. The entire book is printed on acid-free glossy paper. The first 47 pages of the book give general background about dragonflies and damselflies, general natural history, colours, comments about common names that are only recently available for many of the species, how to collect and preserve odonates, threats to the conservation of odonates, and a couple of pages explaining the general nature of the species accounts given with each species. The section on how to collect, label, preserve, and store odonates will be valuable to young collectors, as is the section of labeled illustrations of the morphological and anatomical features needed to identify species in this introductory section. The photographer is identified with each photo, and where no name is given, the photo is by Paulson himself. In the 14 cm × 21.5 cm-format of the paperback volume that I have, the male and female color pictures with accompanying text typically comprise about 1 page (although a new species does not necessarily start at the top of each page). In a green colour bar across the page above the text about each species Paulson gives the common name, scientific name, total body length in mm and hindwing length in mm. Below the bar is the text including Description, Identification, Natural history, Habitat, Flight Season, Distribution (in addition to the colour coded map) and occasionally a comment about the species or former common name. Illustrations and text on damselflies, the Zygoptera, begin on page 49 (and continue to page 164) with damselflies organized into the Broad-winged Damsel family, the Spreadwing family, and the Pond Damsel family. Pages 165 to 517 comprise dragonflies, the Anisoptera, organized by families as follows: Petaltails, Darners, Clubtails, Spiketails, Cruisers, Emeralds, and Skimmers. On page 519 Paulson lists 4 species now found in the west that were not known there in his 2009 book on western dragonflies and damselflies. There is a list of books, some technical publications, and websites for Odonata on pages 521-522, a glossary on pages 523-525, and finally an index listing common and scientific names and page or pages where the species is described or illustrated. The photos are numbered, but apparently only indicate sequential position in the book. Dragonflies and Damselflies of the East is a valuable book for anyone interested in insect natu-

ral history and conservation. The price is fantastic for such a thorough and beautiful book. I recommend this book for every professional and amateur entomologist as a wonderful addition to a personal library; for collectors of odonates, it is indispensable.] Address: Nation, J.L., Univ. of Florida, Gainesville, USA. E-mail: jln@ufl.edu

11693. Nel, A.; Ilger, J.-M.; Brauckmann, C.; Prokop, J. (2012): *Bechala sommeri* Ilger & Brauckmann, 2012 enlightens the Namurian griffenfly diversity (Insecta: Odonoptera: Bechalidae). *Insect Systematics & Evolution* 43(2): 161-169. (in English) ["*B. sommeri* Ilger, the type species of the type genus of the early Late Carboniferous (Namurian) family Bechalidae Ilger & Brauckmann, 2012, is redescribed. It does not belong to the order Megaseoptera as previously proposed. The taxon is clearly attributable to Odonoptera for the typical venation characters as CuA separating from MP obliquely, a true arculus with concave RP and convex MA emerging from a composite vein R+MA, short ScP, and presence of convex intercalaries IR2 and IR1 between the main branches of RP3/4, RP2 and RP1. We transfer this taxon with the monospecific family Bechalidae to Odonoptera. A new diagnosis is given for Bechalidae and its type genus *Bechala*. Furthermore, the presence of an oblique subnodal crossvein very far from the ending of ScP and close to the base of RP2 confirms the hypothesis that the subnodus is a structure originally independent of the nodus with a different function in relation to wing tracheation. The Bechalidae are included in a clade (Meganeuridae-Sinierasipteridae-Bechalidae-Lapeyridae-Nodialata), in contrast to a sister group relationships between the two clades Meganisoptera (=Namurotypidae-Paralogidae-Kargalotypidae-Kohlwaldiidae-Meganeuridae) and Odonatoclada (=Lapeyridae-Nodialata), while the potential relationships between the Campylopteridae and the Lapeyridae and Nodialata are rejected. *Bechala* represents a 'damselfly-like' ecological niche in the Namurian, showing the high diversity of the earliest known Odonoptera, strongly suggesting an Early Carboniferous, if not Late Devonian age for this pterygote clade." (Author)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrns1.mnhn.fr

11694. New, T.R. (2012): Book review: Dennis Paulson: Dragonflies and damselflies of the east. Princeton University Press, Princeton, New Jersey, 2011, 538 pp. *Journal of insect conservation* 16: 645. (in English) [review] Address: New, T.R., Department of Zoology, La Trobe University, Melbourne, VIC 3086, Australia. E-mail: T.New@latrobe.edu.au

11695. Ng, Y.F.; Choong, C.Y.; Dow, R.A. (2012): Odonata records from Kuala Tahan, Pahang, Peninsular Malaysia in December 2010. *Notul. odonatol.* 7(9): 82-86. (in English) ["Odonata records from the Kuala Tahan area in Pahang, Peninsular Malaysia are presented. 65 species were collected in the area in December 2010, of which 43 appear to be the first records for the area and two of which are the first records from Pahang state. *Chalybeothemis chini* is reported away from its type locality for the first time." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

11696. Nilsson-Örtman, V.; Stoks, R.; De Block, M.; Johansson, F. (2012): Generalists and specialists along a latitudinal transect: patterns of thermal adaptation in six species of damselflies. *Ecology* 93(6): 1340-1352.

(in English) ["Tropical organisms colonizing temperate environments face reduced average temperatures and dramatic thermal fluctuations. Theoretical models postulate that thermal specialization should be favoured either when little environmental variation is experienced within generations or when among-generation variation is small relative to within-generation variation. To test these predictions, we study six temperate species of damselflies differing in latitudinal distribution. We developed a computer model simulating how organisms experience environmental variation (accounting for diapause and voltinism) and performed a laboratory experiment assaying thermal sensitivities of growth rates. The computer model showed opposing latitudinal trends in among- and within-generation thermal variability: within-generation thermal variability decreased towards higher latitudes, whereas relative levels of among-generation thermal variability peaked at mid-latitudes (where a shift in voltinism occurred). The growth experiment showed that low-latitude species were more thermally generalized than mid- and high-latitude species, supporting the prediction that generalists are favoured under high levels of within-generation variation. Northern species had steeper, near-exponential reaction norms suggestive of thermal specialization. However, they had strikingly high thermal optima and grew very slowly over most of the thermal range they are expected to experience in the field. This observation is at present difficult to explain. These results highlight the importance of considering interactions between life-history and environmental variation when deriving expectations of thermal adaptation." (Authors)] Address: Nilsson-Örtman, V., Umeå University, Dept. of Ecology and Environmental Science, Sweden. E-mail: viktor.nilsson@emg.umu.se

11697. Nuno de Santos, L. (2012): New data on the distribution of *Orthetrum trinacria* in the Algarve, southern Portugal (Odonata: Libellulidae). *Libellula* 31(1/2): 77-87. (in English, with German summary) ["Data on the occurrence of *O. trinacria* in the Algarve were published for the first time in 2002, and since then the species was considered uncommon and showing a limited distribution in the region. Between March and October 2011 I carried out a systematic survey, gathered unpublished records from different sources dating from 2007 to 2011, and concluded that the species is nowadays widespread in the Algarve, living in many permanent lentic systems. A large number of artificial ponds recently built and scattered throughout the region, plus the dispersion capacity of the species, as well as global warming, are potential causes to explain this apparent colonization, but additionally an increase in field research should not be underestimated." (Authors)] Address: Nuno de Santos, L., Universidade do Algarve, Campus de Gambelas, P-8005-139 Faro, Portugal. E-mail: odonata@nsloureiro.pt

11698. O'Donnell, E. (2012): Site guide: Cape Clear Island, West Cork, Ireland. *Atropos* 46: 15-25. (in English) [The site description includes a checklist of 11 Odonata species] Address: O'Donnell, E., Knockea, Lyre, Clonakilty, West Cork, Ireland. E-mail: Bobolink300@gmail.com

11699. Olberg, R.M. (2012): Visual control of prey-capture flight in dragonflies. *Current Opinion in Neurobiology* 22(2): 267-271. (in English) ["Interacting with a moving object poses a computational problem for an animal's nervous system. This problem has been elegantly solved by the dragonfly, a formidable visual predator on

fly. The dragonfly computes an interception flight trajectory and steers to maintain it during its prey-pursuit flight. This review summarizes current knowledge about pursuit behaviour and neurons thought to control interception in the dragonfly. When understood, this system has the potential for explaining how a small group of neurons can control complex interactions with moving objects. Highlights: *To catch prey the dragonfly computes an interception flight trajectory. *Target-Selective Descending Neurons (TSDNs) control prey capture flights. *Constant-angle strategies underlie interception of moving objects. *Proportional navigation results in a constant-bearing interception strategy. *This model illustrates control of complex behaviour by a small number of neurons." (Author)] Address: Olberg, R.M., Dept of Biological Sciences, Union College, 807 Union Street, Schenectady, NY 12308, USA. E-mail: olbergr@union.edu

11700. Orwa, P.O.; Raburu, P.; Njiru, J.; Okeyo-Owuor, J.B. (2012): Human Influence on macroinvertebrate community structure within Nyando wetlands, Kenya. *International Journal of Aquatic Science* 3(2): 21 pp. (in English) ["The study set out to investigate the changes in macroinvertebrate community along different disturbance gradients within Nyando wetlands with an aim of determining how macroinvertebrates in Nyando wetlands respond to human disturbances. Triplicate macroinvertebrate samples were collected monthly from October 2010 to April 2011 using a scoop net (500 µm mesh size) in three transects. They were sorted live, counted and identified to genus level. Water samples for total phosphorus and total nitrogen were collected and analyzed using standard methods. Physico-chemical parameters were taken in-situ using electronic meters. Macroinvertebrates were analyzed for richness, diversity, dominance, and abundance. The abundance and diversity was correlated with physico-chemical parameters using Pearson correlation analysis. Kruskal-Wallis test was used to test spatial differences in macroinvertebrate community and repeated measures ANOVA to test variation in water quality parameters. A total of 45 genera were identified with hemipterans dominating. The statistical analysis revealed significant spatiotemporal differences in macroinvertebrate abundance and water quality parameters. Macroinvertebrate abundance showed a strong negative correlation with nutrient levels. Sites with higher disturbance recorded lower richness and abundance compared to the less disturbed sites. The results indicated that macroinvertebrates in Nyando wetlands respond to human disturbance and can be used to monitor ecological integrity of the wetland." (Authors) Taxa identification (including Odonata) was made using two keys not specified for African taxa.] Address: Orwa, P.O., Department of Fisheries and Aquatic Sciences, Chepkoilel University College, Eldoret, Kenya. E-mail: patorwa@yahoo.com

11701. Phoenix, J. (2012): *Aeshna subarctica* im sächsischen und böhmischen Erzgebirge/Krusné hory (Odonata: Aeshnidae). *Libellula Supplement* 12: 107-111. (in German, with English summary) ["Distribution of *A. subarctica elisabethae* in the Saxon and Czech Ore Mountains: Compilation of historical and actual records with supplementary observations in its Contemporary habitats in the Western part of the Ore Mountains." (Author)] Address: Phoenix, J., Goethestr., 22, 01824 Königstein, Germany. E-mail: juergen.phoenix@t-online.de

11702. Pinto, Â.P.; Garrison, R.W.; Paulson, D.R.; Donnelly, T.W.; May, M.L. (2012): Case 3584 *Erythemis*

Hagen, 1861: proposed precedence over *Lepthemis* Hagen, 1861 (Insecta, Odonata). Bulletin of Zoological Nomenclature 69(2): 92-100. (in English) ["The purpose of this application, under Articles 23.9.3 and 81.1 of the Code, is to conserve the widespread usage of the generic name *Erythemis* Hagen, 1861 for a group of common dragonflies from the New World over the simultaneously published nominal genus *Lepthemis* Hagen, 1861, selected to take precedence by the First Reviser action (Article 24.2), whenever these names are considered to be synonyms. This proposal seeks to achieve the least change in the nomenclature of the species currently placed in these two genera, in strict accordance with Principle 4 of the Code." (Authors)] Address: Pinto, A.P., Museu de Zoologia, Universidade de São Paulo, Av. Nazaré 481, Ipiranga 04263-000, São Paulo, SP, Brazil. E-mail: odonataangelo@hotmail.com

11703. Pinto, N.S.; Juen, L.; Cabette, H.S.R.; De Marco, P. (2012): Fluctuating asymmetry and wing size of *Argia tinctipennis* Selys (Zygoptera: Coenagrionidae) in relation to riparian forest preservation status. Neotropical entomology 41(3): 178-185. (in English) ["Effects of riparian vegetation removal on body size and wing fluctuating asymmetry (FA) of *A. tinctipennis* studied in the River Suiá-Miçú basin, which is part of the Xingu basin in Brazilian Amazonia. A total of 70 specimens (n=33 from preserved and n=37 from degraded areas) was measured. Five wing measures of each wing (totalizing ten measured characters) were taken. Preserved and degraded points presented non-overlapped variations of a Habitat Integrity Index, supporting the environmental differentiation between these two categories. FA increases in degraded areas approximately four times for the width between the nodus and proximal portion of the pterostigma of forewings (FW), two times for the width of the wing in the region of nodus of FW, and approximately 1.7 times for the number of postnodal cells of FW. The increase is almost five times for the width between the nodus and the proximal portion of the pterostigma of hind wings (HW), three times for the number of postnodal cells of HW, and approximately 1.6 times the width between quadrangle and nodus of HW. Individuals of preserved sites were nearly 3.3% larger than for degraded sites, based on mean hind wing length. Our results supports that the development of *A. tinctipennis* in degraded areas is affected by riparian vegetation removal and may reflect in wing FA variations. Consequently, these FA measures may be a useful tool for bioassessment using Odonata insects as a model." (Authors)] Address: Pinto, A.P., Museu de Zoologia, Universidade de São Paulo, Av. Nazaré 481, Ipiranga 04263-000 São Paulo-SP, Brazil. E-mail: odonataangelo@hotmail.com

11704. Pokhrel, L.R.; Dubey, B. (2012): Potential impact of low-concentration silver nanoparticles on predator-prey interactions between predatory dragonfly nymphs and *Daphnia magna* as a prey. Environ. Sci. Technol. 46(14): 7755-7762. (in English) ["This study investigated the potential impacts of low-concentration citrate-coated silver nanoparticles (citrate-nAg; 2 µg L⁻¹ as total Ag) on the interactions of *Daphnia magna* Straus (as a prey) with the predatory *Anax junius* nymph using the behavioral, survival, and reproductive endpoints. Four different toxicity bioassays were evaluated: (i) horizontal migration; (ii) vertical migration; (iii) 48-h survival; and (iv) 21-day reproduction; using four different treatment combinations: (i) *Daphnia* + citrate-nAg; (ii) *Daphnia* +

Predator; (iii) *Daphnia* + citrate-nAg + Predator; and (iv) *Daphnia* only (control). *Daphnia* avoided the predators using the horizontal and vertical movements, indicating that *Daphnia* might have perceived significant risk of predation. However, with citrate-nAg + predator treatment *Daphnia* response did not differ from control in the vertical migration test, suggesting that *Daphnia* were unable to detect the presence of predator with citrate-nAg treatment and this may have potential implication on daphnids population structure owing to predation risk. The 48-h survival test showed a significant mortality of *Daphnia* individuals in the presence of predators, with or without citrate-nAg, in the test environment. Average reproduction of daphnids increased by 185% with low-concentration citrate-nAg treatment alone, but was severely compromised in the presence of predators (decreased by 91.3%). *Daphnia* reproduction was slightly enhanced by ca. 128% with citrate-nAg + predator treatment. Potential mechanisms of these differential effects of low-concentration citrate-nAg, with or without predators, are discussed. Because silver dissolution was minimal, the observed toxicity could not be explained by dissolved Ag alone. These findings offer novel insights into how exposure to low-concentration silver nanoparticles could influence predator-prey interactions in the fresh water systems." (Authors)] Address: Brajesh Dubey, B., Environmental Engineering, School of Engineering, Univ. of Guelph, 50 Stone Road East, Guelph, Ontario, Canada. E-mail: bdubey@uoguelph.ca.

11705. Pryke, J.S.; Samways, M.J. (2012): Conservation management of complex natural forest and plantation edge effects. Landscape Ecology 27(1): 73-85. (in English) ["Timber plantation forestry is a major threat to indigenous grassland biodiversity, with ecological networks (ENs) currently being used to mitigate this threat. Being composed mostly of linear corridors, ENs create more edge than would occur naturally. To determine the minimum width of corridors for maximising biodiversity conservation, we need first to establish the extent of edge effects from plantation blocks into corridors. We compared arthropod diversity along transects that ran from within plantation blocks into grassland corridors. We also studied the edge effects of natural forest adjacent to natural grasslands within ENs. Sites in grasslands of neighbouring protected areas acted as natural reference sites against which the biodiversity of the EN transects were compared. Two types of exotic plantation trees and various tree age classes were studied. We found a 32 m edge zone from plantation blocks into grassland corridors. Few significant edge effects from plantation blocks occurred at greater distances than this, which suggested that grassland corridors with a width <64 m are essentially all edge. However, and importantly, this situation was complex, as different arthropod taxonomic groups responded differently to edges of plantation blocks and natural forest patches. Natural forest supported many additional species, not just within the forest, but also in associated grassland corridors. This means that maintaining natural forest imbedded within the ENs will protect both indigenous grassland and indigenous forest species as well as help maintain biodiversity across this timber production landscape. ... Dragonflies responded in a similar way to butterflies, with an increase in species richness between the wooded areas and the open grassland corridors, although no edge effect was noticeable for either the plantation blocks or natural forest patches." (Authors)] Address: Samways, M.J., Dept Entomol. &

Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

11706. Raebel, E.M.; Merckx, T.; Feber, R.E.; Riordan, P.; Thompson, D.J.; Macdonald, D.W. (2012): Multi-scale effects of farmland management on dragonfly and damselfly assemblages of farmland ponds. *Agriculture, Ecosystems & Environment* 161: 80-87. (in English) ["Agricultural intensification has contributed to severe declines in odonate (dragonfly and damselfly) populations. Odonates require healthy waterbodies for their larval stages and resource-rich terrestrial landscapes as adults. As such, farmland management at both local and larger landscape scales may be needed to reverse population declines. We sampled odonate adults and exuviae from lowland farmland ponds in England, to investigate relationships between odonate species richness and surrounding land-use. The more mobile dragonflies (Anisoptera) were influenced most strongly by landscape variables at the largest scale (i.e. 1600 m radius), while less mobile damselflies (Zygoptera) were affected by variables at more local scales (i.e. 100/400 m radii). A greater number of landscape variables affected exuvial species richness compared to adult species richness. Exuvial species richness was higher when 2 m wide cross-compliance buffer strips around ponds were present. However, no ponds in the study had buffer strips that were established through England's basic agri-environment scheme (Entry Level Scheme: ELS) agreements, and we observed a negative relationship between ELS area and exuvial species richness. Exuvial species richness increased with the amount of water, but not the number of ponds, in the landscape surrounding a focal pond. The observed odonate responses to local and surrounding land-use lend support to the development of agri-environment scheme policies that encourage landscape-scale, as well as local, scheme implementation and management. We predict that both landscape-scale and quality-targeted management of farmland ponds would benefit odonates, irrespective of mobility level and life-stage." (Authors)] Address: Raebel, Eva, Wildlife Conservation Research Unit, Department of Zoology, University of Oxford, The Recanati-Kaplan Centre, Tubney House, Abingdon Road, Tubney, Abingdon OX13 5QL, UK. E-mail: evamraebel@gmail.com

11707. Reels, G.T. (2012): The curious case of the cannibal coenagrionid. *Insect news* 4: 13-14. (in English) [Verbatim: It has often struck me that members of the coenagrionid genus *Ceriagrion* appear to be unusually voracious predators of other zygopterans. However, an observation that I made two years ago indicated that one species, at least, is even capable of reckless acts of cannibalism. At ca 1030h on 25 July 2008 I was walking along a small stream at Luk Keng. N.T., Hong Kong (altitude ca. 20 m a.s.l.) when I noticed a male *Ceriagrion auranticum* grappling with a mature female of the same species. The male had seized the female's thorax just above the wing bases with his mandibles. At first I assumed that this was simply a clumsy mating attempt, particularly since the female was making little obvious effort to free herself. However, in the ensuing five minutes, the male, rather than letting go and trying to mate, proceeded to munch his way up the female's thorax, until he reached the pronotum. The entangled pair made several short flights during this period, possibly because I was disturbing them while trying to photograph the action, or maybe because the female, hav-

ing realised she was not hosting an amorous suitor, was belatedly attempting to escape. The male then spent some time chewing through the female's head attachment until her head fell off. Then he dragged the body to another perch to devour the thorax. Gruesome stuff.] Address: Reels, G., H-3-30 Fairview Park, Yuen Long, Hong Kong. E-mail address: gtreels@gmail.com

11708. Richardson, A. (2012): Assessment of locations of refugia for ancient and relictual invertebrate fauna within the proposed ENGO forest conservation areas. IVG FC Report 3A Ancient Fauna Refugia. A report for the Tasmanian Forest Agreement. March 2012: 17 pp. (in English) [Tasmania, Australia. *Hemiphlebia mirabilis*, *Synthemiopsis* and *Archipetalia* are considered.] Address: Richardson, A., Sch. Zool., Univ. Tasmania, P.O. Box 252-C52, Hobart, TAS 7001, Australia

11709. Ryan, K.; Salvaggio, C. (2012): A feature-based classifier for dragonflies and damselflies. Rochester Institute of Technology, College of Science, Center for Imaging Science, Rochester, New York, United States: 9 pp. (in English) ["Unique patterns present in the wings of Odonata can be used to determine their family, genus, and species. A method for classifying Odonata using a particular pattern known as the triangle was developed using scanned images of the wings. Digital image processing techniques, such as image segmentation and feature detection, are used to determine properties of the triangle useful for classification. These properties are then compared against a triangle property database of known Odonata. A prototype implementing this method has been shown to demonstrate a high degree of accuracy." (Authors) The following species are included in the study: *Aeshna canadensis*, *A. verticalis*, *Gomphus lividus*, *G. spicatus*, *Sympetrum obtrusum*, and *S. rubicundulum*.] Address: Ryan, Kyle, Salvaggio, C., Rochester Institute of Technology, 54 Lomb Memorial Drive Chester F. Carlson Center for Imaging Science, Rochester, USA. E-mail: kjr6491@rit.edu; salvaggio@cis.rit.edu

11710. Šácha, D.; Racko, L. (2012): First observation of *Libellula fulva* (Odonata: Libellulidae) in Northern Slovakia. *Folia faunistica Slovaca* 17(2): 179-182. (in Slovakian, with English summary) [June 2011, near Žilina (49°11'01" N, 18°52'23" E, 390 m a.s.l.)] Address: Šácha, D., Podtatranského 31, 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@vazky.sk

11711. Sadeghi, S.; Kiany, M. (2012): Wing shape variation in *Calopteryx splendens* (Harris) populations in the Zagros mountains, Iran (Zygoptera: Calopterygidae). *Odonatologica* 41(2): 123-134. (in English) ["*C. splendens* is found in most of Europe, large parts of Siberia and much of west and central Asia. There is great variation among males in wing coloration. Traditionally, sub-specific taxa have been distinguished by the size and position of the pigmented wing spot and by mating behaviour. About a dozen subspecies have been recognized, all of which are more or less geographically confined, but often with overlapping ranges and strong variation in wing spot size. Here, a geometric morphometrics is used to quantify morphological data and analyze the wing shape independent of wing spot size in 6 Zagros mountain populations, traditionally known as *C. s. intermedia*, based on wing spot size. 19 different points were digitized as landmarks on the left forewings of males, using GPA (Generalized Procrustes Analysis). The results reveal significant wing shape differences

between all populations except Markazi and Lorestan on the one hand and Fasa and Kazeroon on the other hand. These observations confirm the role of geographic (here Dena, Oshtoran Kooh and Zard Kooh mountains of more than 4000 m altitude) and climatic barriers in population isolation, but also suggest that wing spot similarity does not necessarily reflect the full genetic similarity and evolutionary grouping of populations. Based on the wing shape analyzed, *C. splendens* is split into 2 distinguishable population groups in central and southern Zagros with 2 different gene pools, even though they show the same wing spot size, i.e., a long-term isolation among the groups investigated has occurred and the wing spot is not an infallible character for identifying *C. splendens* subspecies." (Authors)] Address: Kiany, M., Payam-e Noor University, Bam, Iran. E-mail: mohsen.kiany1@gmail.com

11712. Saha, N.; Aditya, G.; Banerjee, S.; Saha, G.K. (2012): Predation potential of odonates on mosquito larvae: implications for biological control. *Biological Control* 63(1): 1-8. (in English) ["Predation potential of the larval odonates *Ceriatrigon coromandelianum* and *Brachydiplax chalybea* on the II and IV instar larvae of *Culex quinquefasciatus* was evaluated under simulated natural conditions in the laboratory. A type II functional response was exhibited by the odonates, with the attack rate and handling time differing significantly between prey sizes for *C. coromandelianum*. The per capita prey consumption varied between vegetated and open habitat conditions and between the days as reflected through the Clearance Rate (CR). Results of univariate ANOVA revealed that prey consumption varied significantly ($P < 0.05$) with the prey and predator densities for both the odonate predators, whereas habitat structure had significant effects only in case of *B. chalybea*. Thus, the use of larvae of *C. coromandelianum* and *B. chalybea* can facilitate conservation and biological control simultaneously under suitable habitat conditions." (Authors)] Address: Saha, Nabaneeta, Department of Zoology, University of Calcutta, 35 Ballygunge Circular Road, Kolkata 700019. India. E-mail: nabaneetasaha@gmail.com

11713. Sakai, M.; Natuhara, Y.; Imanishi, A.; Imai, K.; Kato, M. (2012): Indirect effects of excessive deer browsing through understory vegetation on stream insect assemblages. *Population ecology* 54(1): 65-74. (in English) ["Over the past decade, the abundance of sika deer has rapidly increased around Japan. Previous studies have showed overabundance of deer causes drastic reduction of forest understory vegetation, leading excessive soil erosion. However, no study has investigated the effects of excessive deer browsing on aquatic insect assemblages via sediment runoff. These effects are important to understand whether the terrestrial alteration by deer influences aquatic ecosystems. In a primary deciduous forest catchment in Ashiu, Kyoto, a deer exclusion fence has been in place since 2006. We compared forest floor cover, overland flow, stream environment, and aquatic insect assemblages in first-order streams and catchments inside and outside of the deer-exclosure from May-2008 to April-2009. The floor inside the deer-exclosure catchment was covered by lush understory vegetation, whereas outside was almost bare. The overland flow runoff rate at midslope and the dominance of fine sediment deposition in the streambed were higher outside than inside. Among aquatic insects, burrowers, which are tolerant against

fine sediment deposition, were significantly more abundant outside than inside, whereas clingers exhibited the opposite patterns. Collector-gatherers, which feed on fine detritus, were significantly more abundant outside than inside. Meanwhile, filterers were more abundant inside. The Simpson's diversity index of the aquatic insect assemblages was higher inside than outside. These results suggest that the demise of understory vegetation due to excessive deer browsing has indirectly caused changes in the aquatic insect assemblages of this catchment via increased sediment runoff and subsequent sandy sedimentation of the streambed." (Authors) Richness and abundance of aquatic insect during the course of the study resulted in Odonata as follows: Exclosure catchment (without deer): 7 taxa, 13 specimens; Control catchment (with deer): 8 taxa 39, specimens] Address: Sakai, M., Graduate School of Global Environmental Studies, Kyoto University, Japan

11714. Samraoui, F.; Nedjah, R.; Bouchecker, A.; Alfahhan, A.H.; Samraoui, B. (2012): Patterns of resource partitioning by nesting herons and ibis: How are odonata exploited? *Comptes Rendus Biologies* 335: 310-317. (in English, with French summary) ["Herons and ibis are colonially nesting waders which, owing to their number, mobility and trophic role as top predators, play a key role in aquatic ecosystems. They are also good biological models to investigate interspecific competition between sympatric species and predation; two processes which structure ecological communities. Odonata are also numerous, diverse, mobile and can play an important role in aquatic ecosystems by serving as prey for herons and ibis. A relationship between prey size and bird predator has been observed in Numidia wetlands (NE Algeria) after analyzing food boluses regurgitated by six species of birds (Purple Heron, Black-crowned Night Heron, Glossy Ibis, Little Egret, Squacco Heron and Cattle Egret) during the breeding period, which also shows a temporal gradient for the six species. Both the Levins index and preliminary multivariate analysis of the Odonata as prey fed to nestling herons and ibis, indicated a high degree of resource overlap. However, a distinction of prey based on taxonomy (sub-order and family) and developmental stage (larvae or adults) reveals a clear size dichotomy with large-sized predators (Purple Heron, Black-crowned Night Heron and Glossy Ibis) preying on large preys like Aeshnids and Libellulids and small-sized predators feeding mainly on small prey like Zygoptera. Overall, the resource utilization suggests a pattern of resource segregation by coexisting nesting herons and ibis based on the timing of reproduction, prey types, prey size and foraging microhabitats." (Authors)] Address: Samraoui, B., Laboratoire de Recherche des Zones Humides, Université d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@yahoo.fr

11715. Schiel, F.-J.; Buchwald, R. (2012): Parasitierung von *Lestes dryas* durch die Wassermilbe *Arrenurus papillator* in einer mittellitalienischen Karst-Hochebene (Odonata: Lestidae; Hydrachnidia). *Libellula* 31(1/2): 31-39. (in German, with English summary) ["Infestation of *Lestes dryas* by the water mite *Arrenurus papillator* in a karst high plain in central Italy (Odonata: Lestidae; Hydrachnidia) – A population of *L. dryas* was investigated between 06-vii-2009 and 11-vii-2009 in the Pian Piccolo di Castelluccio, Perugia province, Umbria, Italy. More than 49 % of the captured imagines (1,014 of 2,058) were infested by water mites. The degree of infestation

was 52 % of males, and 33 % of females. The proportion of infested individuals decreased during the six days' survey. The mite-load per adult ranged from one to 36 larval mites with a median value of nine mites ($n = 165$). The decreasing infestation rate in the observation period suggests an infection during emergence. The mite larvae, attached to both *L. dryas* and the syntopic *Sympetrum flaveolum*, were identified as *Arrenurus papillator*." (Authors)] Address: Buchwald, R., Institut für Biologie und Umweltwissenschaften, Carl von Ossietzky Universität, IBU-A1, 26111 Oldenburg, Germany. rainer.buchwald@uni-oldenburg.de

11716. Schmidt, E.G. (2012): Die ökologische Nische von *Sympetrum depressiusculum* in Nordwestdeutschland (Odonata: Libellulidae). *Libellula Supplement* 12: 161-176. (in German, with English summary) ["*S. depressiusculum* is a Southern Continental species of lowland river marshes and mires. The natural distribution area reaches Germany in the pre-alpine region and the Upper Rhine valley. Oviposition takes place in marsh ponds and mires, which are dry during winter and flooded late in spring, usually during May, when the sun is high. Then thermic conditions are best for development of eggs and larvae and also structure and food supply fit well. In other parts of Germany, similar conditions are simulated by breeding of carp, another Southern Continental species with a similar preference of micro-habitat for breeding. Therefore, at these carp breeding ponds *S. depressiusculum* is established far north of its natural margin of distribution. In northwestern Germany the warm Atlantic climate is rather unsuitable, and the species is dependent there on carp breeding ponds. For hunting and resting, the species prefers marshland with tall herb Vegetation and similar plants surrounding the breeding ponds. Here, the males search for females late in the morning and rest in tandem position until early noon. Then copulation takes place near the water, followed by egg-laying in tandem position over shallow water between the low bank weeds. Egg-laying can also be seen at unsuitable ponds (e.g. with permanent water) with similar bank Vegetation. Hence, the establishment of the species can only be proved by emergence, not solely by reproductive activities. The carp breeding ponds in northwestern Germany are stocked until autumn. Therefore egg-laying by *S. depressiusculum* on dry ground, as in its primary natural range, is unusual. These carp breeding ponds are also valuable for nature conservation because of rare Vegetation and birds. Carp breeding ponds are therefore an example for a classical management form that casually serves for nature conservation. Actually carp breeding in northwestern Germany cannot survive the cut-throat competition with cheap imports from climatically favoured countries as, e.g., Hungary. So nature conservation must help." (Author)] Address: Schmidt, E., Coesfelder Str. 230, 48249 Dülmen, Germany

11717. Schmidt Dalzochio, M.; Stenert, C.; Maltchik, L. (2012): Odonata, Aeshnidae, *Anax amazili* (Burmeister, 1839): First record for southern Brazil. *Check List* 8(3): 551-553. (in English) [*A. amazili* occurs, in South America, from French Guiana to Argentina. In Brazil it is distributed in the northeast and southeast of the country. Records - made in 2002 and 2009 - from the state of Rio Grande do Sul in southern Brazil, extend its current distribution about 1000 km to the south of the continent.] Address: Stenert, Cristina, Laboratório de Ecologia e Conservação de Ecossistemas Aquáticos, Univer-

sidade do Vale do Rio dos Sinos. Av. Unisinos, 950, 93022-000, São Leopoldo, RS, Brasil. E-mail: cstenert@unisinos.br

11718. Schorr, M. (2012): Beitrag zur Kenntnis der Gattung *Ophiogomphus* in der Mongolei auf Basis der Aufsammlung von Günther Peters aus dem Jahre 1964 sowie Erstnachweis von *Ophiogomphus obscurus* Bartenev, 1909 für die Mongolei (Odonata: Gomphidae). *Libellula Supplement* 12: 187-198. (in German, with English summary) ["The Odonata collected by Günther Peters during 1964 in Mongolia, and identified as *Ophiogomphus cecilia*, were reexamined. The specimens were identified as *O. reductus* and *O. spinicornis*. The prothorax is a useful morphological character to distinguish between these two species. *Ophiogomphus obscurus*, collected in 2004 at the Ider Gol, a headwater river of the Selenge River in northern Mongolia, is a new species to the dragonfly fauna of the country." (Author)] Address: Schorr, M., Schulstr. 7B, 54314 Zerf, Germany. E-mail: bierschorr@online.de

11719. Schröter, A. (2012): Obere vertikale Verbreitungsgrenze und Habitatspektrum von *Aeshna juncea* im kirgisischen Tian Shan (Odonata: Aeshnidae). *Libellula Supplement* 12: 49-76. (in German, with English summary) ["Based on the hitherto highest Central Asian locality with reproduction record of *A. juncea* at a mountain lake (3,016 m a.s.l.) in the central Tian Shan in Kyrgyzstan the present knowledge on ecology and altitudinal distribution of the species in Kyrgyzstan and Central Asia is reviewed. In context with further records referring to oviposition in a fast flowing mountain river fed by snow water, determinants for the upper altitudinal limit, cold tolerance and specific habitat preferences in Central Asia are discussed. With reference to European populations of *A. juncea* at the upper altitudinal and at the northern latitudinal limit, the prevailing specific climatic and ecological conditions in Kyrgyzstan are outlined and compared. Moreover, with reference to Kyrgyz specimens, the taxon *A. juncea mongolica* Bartenev, 1929 is critically reviewed." (Author)] Address: Schröter, A., Rasenweg 10, 37130 Gleichen, Germany. E-mail: asmustim@gmx.de

11720. Schröter, A.; Schneider, T.; Schneider, E.; Karjalainen, S.; Hämäläinen, M. (2012): Observations on adult *Somatochlora sahlbergi* – a species at risk due to regional climate change? (Odonata: Corduliidae). *Libellula* 31(1/2): 41-60. (in English, with German summary) ["Behavioural and autecological observations on adults of *Somatochlora sahlbergi* from northern Finland are presented with hitherto unpublished new aspects of imaginal behaviour. A new interpretation and evaluation of possible threats to its survival is considered in the light of new insights into the chorology and habitat preferences of the species. Threats to the restricted Fennoscandian population, chiefly resulting from the rapidly changing ecological conditions in its subarctic ecosystem, triggered by current trends in regional climate change, are outlined." (Authors)] Address: Schröter, A., Rasenweg 10, 37130 Gleichen, Germany. E-mail: AsmusTim@gmx.de

11721. Seehausen, M. (2012): *Ischnura ramburii* mit Wasserpflanzen nach Europa importiert (Odonata: Coenagrionidae). *Libellula* 31(1/2): 7-13. (in German, with English summary) ["The present study describes the first European record of the American damselfly *I. ramburii* (Selys, 1850). The larva was found on aquatic

plants from a pet shop in Wiesbaden, Hesse, Germany. Identification is specified in comparison to species of the quite similar-looking European *Ischnura elegans*-Group and the differences between *Ischnura ramburii* and the Afro-Asian *Ischnura senegalensis* (Rambur, 1842) are mentioned according to circa 50 individuals of each species from the Bavarian State Collection of Zoology in Munich. The main difference is the curve at the hind margin of the pronotum: It is much broader in *I. ramburii* than in *I. senegalensis*. Specific distribution routes of the aquatic plants are still unknown because the distributor predominantly imports plants from Asia and also has a nursery for rearing in the Netherlands. But maybe he had imported plants for rearing from America containing eggs of *I. ramburii*. The exuvia and the imago are stored in the zoological collection of the Wiesbaden Museum, Hesse, Germany." (Author)] Address: Seehausen, M., Museum Wiesbaden Hessisches Landesmuseum für Kunst und Natur, Friedrich-Ebert-Allee 2, 65185 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

11722. Seidl, I. (2012): Management-intervention costs for damselfly *Coenagrion mercuriale* in the Oberaargau. In: Swiss Federal Institute for Forest, Snow and Landscape Research WSL (ed) 2012: ENHANCE. Enhancing ecosystem connectivity through intervention – benefits for nature and society? Final Report. Birmensdorf, Swiss Federal Research Institute WSL, 81 pp: 79-81. (in English) ["One of the species investigated in Oberaargau that potentially benefits management-interventions is *C. mercuriale*, a focus species of Smaragd. Thanks to the Smaragd-Project and its conservation schemes, there is detailed knowledge and experience about useful protection measures. Also data is available about the cost the various measures involve. Based on the study of the conservation cost for Swiss biotopes (Ismail et al. 2007), the management-intervention costs for the damselfly have been calculated. Cost data were gathered from reports of Trägerverein SMARAGD-Gebiet Oberaargau, from the Federal office of agriculture and in an interview with a conservation consultant. Preliminary costs are: 2500 CHF per year and municipality with rivers providing a habitat for the damselfly, and 3700 CHF per year and ha riverbank (buffer zone). Furthermore, there are non-recurring cost of 1500 CHF/ha riverbank. Thanks to the Smaragd-Project and generous funding by various organisations, suitable measures have been realised." (Author)] Address: Seidl, Irmi, Swiss Federal Research Institute WSL, Zürcherstr. 111; 8903 Birmensdorf, Switzerland

11723. Seifert, L.I.; Scheu, S. (2012): Linking aquatic and terrestrial food webs – Odonata in boreal systems. *Freshwater Biology* 57(7): 1449-1457. (in English) ["(1) It is increasingly realised that aquatic and terrestrial systems are closely linked. We investigated stable isotope variations in Odonata species, putative prey and basal resources of aquatic and terrestrial systems of northern Mongolia during summer. (2) In permanent ponds, $\delta^{13}\text{C}$ values of Odonata larvae were distinctly lower than those of putative prey, suggesting that body tissue comprised largely of carbon originating from isotopically light carbon sources. Presumably, prey consumed during autumn and winter when carbon is internally recycled and/or methanotrophic bacteria form an important basal resource of the food web. In contrast, in a temporary pond, $\delta^{13}\text{C}$ values of Odonata larvae were similar to those of putative prey, indicating that their

body carbon originated mainly from prey species present. (3) Changes in $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values between larvae and adults were species specific and reflected differential replacement of the larval isotopic signature by the terrestrial diet of adult Odonata. The replacement was more pronounced in Odonata species of permanent ponds than in those of the temporary pond, where larvae hatched later in the year. Replacement of larval carbon varied between tissues, with wings representing the larval isotopic signature whereas thoracic muscles and eggs reflected the $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values of the terrestrial diet of adults. (4) The results suggest that because of their long larval development, Odonata species of permanent ponds carry the larval signature, which is partly replaced during their terrestrial life. Terrestrial prey forms the basis for egg production and thus the next generation of aquatic larvae. In temporary ponds, in contrast, Odonata species rely on prey from a single season, engage in a prolonged aquatic phase and hatch later, leaving less time to acquire terrestrial prey resources for offspring production. Stable isotope analysis provided important insights into the food webs of the waterbodies and their relationship to the terrestrial system. ... Odonata species included *Aeshna crenata*, *A. juncea* and *Leucorrhinia orientalis* at site 1, *A. crenata*, *A. juncea*, *Coenagrion johanssoni* and *L. orientalis* at site 2, *A. crenata* and *L. orientalis* at site 3, and *Lestes sponsa*, *Symetrum danae* and *S. flaveolum*." (Authors)] Address: Seifert, Linda I., Department of Animal Ecology, Johann Friedrich Blumenbach Institute of Zoology and Anthropology, Georg August University Göttingen, Berliner Str. 28, 37073 Göttingen, Germany. E-mail: linda.seifert@uni-potsdam.de

11724. Shapoval, A.P.; Buczyński, P. (2012): Remarkable Odonata caught in ornithological traps on the Courish Spit, Kaliningrad Oblast, Russia. *Libellula* 31(1/2): 97-109. (in English, with Russian and German summaries) ["With respect to the distribution of Odonata, the European part of Russia belongs to the most poorly studied areas of Europe. Records of 12 dragonfly species at the northern limits of their distribution are provided and discussed based on materials collected on the Courish Spit, Kaliningrad Oblast, western Russia, in ornithological "Rybachy" traps in the years 2007-2011. Six species were recorded for the first time in the Kaliningrad Oblast (*Aeshna affinis*, *Orthetrum albistylum*, *O. brunneum*, *O. coerulescens*, *Crocothemis erythraea*, and *Sympetrum meridionale*), and occurrence of two species was confirmed (*Lestes viridis* and *Sympetrum fonscolombii*). The data suggests that the migration route of dragonflies runs along the coast of the Baltic Sea." (Authors)] Address: Shapoval, A.P., Biological Station Rybachy, Russian Academy of Sciences, Zoological Institute, St. Petersburg, 199034 Russia. E-mail: apshap@mail.ru

11725. Sharkey, C.R. (2012): The role of polarized light in prey capture in an aquatic predator. *Frontiers in Behavioral Neuroscience*. Conference abstract. Tenth International Congress of Neuroethology, College Park, Maryland USA, 5 Aug - 10 Aug, 2012 doi: 10.3389/conf.fnbeh.2012.27.00187: (in English) ["Sensitivity to polarized light has been demonstrated, through behavioural and electrophysiological studies, to be a common component of arthropod visual systems. Amongst terrestrial insects, polarized light has been shown to influence behaviours such as navigation (Dacke et al., 2011), signalling (Sweeney et al., 2003) and the detec-

tion of water bodies (Schwind, 1991). Different areas of insect eyes have evolved specialized polarization detectors for different visual tasks. The function of polarization sensitivity (PS) in aquatic insects, however, is less clear. Whilst dragonfly adults have been shown to possess PS in the ventral region of the eye, thought to aid water and horizon detection in the terrestrial environment (Laughlin, 1976), the visual system of dragonfly larvae is less well characterized, and the potential for aquatic insect larvae to possess polarization vision was previously unknown. The central aim of this study was to discover if polarization vision in dragonfly larvae is adapted to the specific visual environment of aquatic larvae versus its future aerial adult requirements. By removing the front analyser of a liquid crystal display (LCD) monitor, the intensity contrast of displayed objects and patterns is removed from the screen and, instead, only polarized light is emitted with the normal intensity contrast of displayed objects replaced by a polarization angle "contrast". We used this system to present polarized stimuli on a polarized background with a contrasting angle of polarization. This technology, first used by Pignatelli et al. (2011), allows us to manipulate the angles of polarization presented and to present moving polarization stimuli. The angular difference between stimuli and background was varied across trials to test the minimum angular difference dragonfly (*Anax* sp.) larvae are able to detect. Animals demonstrated tracking, hunting, and prey capture behaviours when presented with a moving polarization stimulus 0.4 by 0.4cm in size. The time for which animals tracked the stimulus decreased as angular polarization contrast was reduced. Results suggest that the minimum angular discrimination lies between 26 and 22 degrees, a value much higher than that known for cuttlefish, octopus and fiddler crabs (Pignatelli et al., 2011; How et al., 2012). Parallel experiments using a similar stimulus made visible as intensity contrast rather than a polarization angle contrast, showed that animals responded decreased as intensity contrast was lowered, but animals responded more strongly to intensity than polarization contrast. These findings will be discussed in light of the animal's visual environment and visual physiology. The structure of the larval retina has also been examined, using transmission electron microscopy, to locate potential polarization sensitive cells. Microvilli of photoreceptor cells show similarities in both structure and shape to adult ventral retinal photoreceptors. However, unlike the adult ventral retina, our behavioural work shows larval polarization spectral sensitivity lies outside the UV spectral range (Laughlin, 1976). This is the first behavioural data that suggests the innate use of polarization sensitivity in prey capture." (Author)] Address: Sharkey, Camilla, Univ. Bristol, Ecology of Vision Group, Bristol, BS8 1UG, UK, cs7750@bristol.ac.uk

11726. Shi, S.-x.; Liu, Y.-z.; Chen, J.-m. (2012): Journal of Hydrodynamics, Ser. B 24(3). An experimental study of flow around a bio-inspired airfoil at Reynolds number 2.0×10^3 : 410-419. (in English) ["The fluid flow around a bio-inspired airfoil with corrugated surfaces and its smooth counterpart at chord Reynolds number $Re = 2.0 \times 10^3$ and different Angle-Of-Attack (0° , 4° , 8° and 12°) were measured by using Particle Image Velocimetry (PIV). The global characteristics of the fluid flow around two airfoils were analyzed by ensemble-averaged velocity field, distribution of reverse flow intermittency, and time-series flow visualizations. At 0° , no significant variation of the global flow patterns was recog-

nized for both configurations. The statistical results of reverse flow intermittency results demonstrated that the protruding peaks of the corrugated airfoil delay flow separation occur at 4° . At large AOAs (8° and 12°), however, the flow is massively separated in both configurations, the combination of large separation bubble above the corrugated airfoil and small recirculation zones in the upstream upper valley results in earlier separation of the flow. At $AOA=8^\circ$, the wake region behind the corrugated airfoil is considerably shortened in comparison to the smooth one, indicating a remarkable reduction of the time-mean lift and drag forces, however, at 12° , the wake region behind the corrugated one is slightly larger than that behind the smooth one. For the case of 8° and 12° , the time-series flow visualizations demonstrate the intensified vortex shedding process of the corrugated airfoil, which would give rise to enhanced dynamic loading. Due to the fact that dragonfly wing is practically flexible, it is speculated that the wing structure of a gliding dragonfly might be sophisticatedly deformed in response to the periodic loading to reduce the drag." (Authors)] Address: Shi, S.-x., Key Laboratory of Education Ministry for Power Machinery and Engineering, School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

11727. Simonis, P.; Berthier, S. (2012): How nature produces blue color. Photonic crystals - Introduction, applications and theory. In: Alessandro Massaro (Ed.): Electrical and Electronic Engineering. Publisher: InTech, March, 2012. ISBN 978-953-51-0431-5. 344 pp: 3-24. (in English) ["Tyndall scattering has long been recognized to be responsible for blue coloration of the sky (Tyndall, 1869) and the colour of blue eyes (Mason, 1924). It appears when small particles or voids with dimensions of the order of the wavelength of blue light (about 500 nm) are present in the propagation medium. In that case, the small wavelengths of the incident white light will be scattered and the longer wavelengths will pass undisturbed through the medium. Thus, the red and yellow wavelengths are transmitted and the blue and violet colours are scattered by the composite medium, giving out a non-iridescent light blue diffusion spectrum. In this phenomenon, the particle's sizes and refractive indexes control the coloration. As shown here above, the intensity of the reflected light by such a system is inversely proportional to the 4th power of the wavelength. The amplitude of the reflected light and its angular distribution will depend on the particle's sizes. [...] Scattered blues have early been assigned to insects. The scattering occurs in the epidermal cells beneath a transparent cuticle. In the odonate order such as aeschnids, agrionids and libelluloids (*Libellula pulchella*, *Mesothemis simplicicollis*, *Enallagma cyathigerum*, *Aeshna cyanea*, *Anax walsinghami*) the bright blue diffuse coloration on their body or wings (Mason, 1926; Parker, 2000; Parker, 2005; Veron, 1973) originates from scattering centers under the cuticle. Dragonflies (Mason, 1926) and some other adult insects can also develop a waxy bloom on the surface of their cuticle. The Tyndall effect is then produced by this waxy material and coloration can be destroyed by washing it with a wax solvent (Parker 2000)." (Author)] Address: Simonis, Priscilla, Institut des Nanosciences de Paris (INSP), University Pierre et Marie Curie, Paris, France

11728. Sivaperuman, C.; Kumar Shah, S. (2012): Species diversity and abundance of Odonata in Ritchie's

Archipelago, Andaman and Nicobar islands. *Biological Forum Spl. Iss.* 4(1): 65-69. (in English) ["The Ritchie's Archipelago is a cluster of smaller islands which lie some 25-30 km east of Andaman. This study was conducted during 2008-2011. Different islands in the Ritchie's archipelago were surveyed to assess the species diversity and distribution of Odonates. Total of thirty one species belong to 8 families were recorded during the study period. Highest number of species was observed from the family Libellulidae. The diversity index was varied in different islands. The distribution patterns and diversity of dragonflies are discussed in this paper. An extensive Odonatological survey needs to be carried out to explore the rich diversity of these graceful insects and come up with a representative checklist of Odonates for Ritchie's Archipelago." (Authors)] Address: Sivaperuman, C., Zoological Survey of India, Andaman and Nicobar Regional Centre, Port Blair- 744 102, India. E-mail: csivaperuman@yahoo.co.in

11729. Śniegula, S.; Johansson, F.; Nilsson-Örtman, V. (2012): Differentiation in developmental rate across geographic regions: a photoperiod driven latitude compensating mechanism? *Oikos* 121: 1073-1082. (in English) ["Genetic differentiation and phenotypic plasticity in growth rates along latitudinal gradients may benefit our understanding of latitudinal compensating mechanisms in life history patterns. Here we explore latitudinal compensatory growth mechanisms with respect to photoperiod in northern and southern populations of two damselfly species, *Coenagrion puella* and *C. pulchellum*. In addition we compared size of field-collected adults from southern and northern populations. Eggs from females in copulating tandems were collected at two or three localities for each species in each geographic region. Eggs were transported to the laboratory and the experiment started when the eggs hatched. The role of photoperiod on the expression of larval growth rate was evaluated under controlled laboratory conditions. Both species had lower growth rate when reared in the northern photoperiod, which is counter to expectations if species use photoperiodic cues to trigger compensatory growth. Instead, both species displayed countergradient variation in growth rates, which probably enable northern populations to compensate for the shorter growth season in the north. The smaller size of field-collected adults from northern populations also supports the view that these species compensate for the shorter growth season by investing in growth and development but accomplish this at the expense of decreased final size." (Authors)] Address: Śniegula, S., Dept of Ecosystem Conservation, Inst. Nature Conserv., Polish Academy of Sci., al. Mickiewicza 33, 31-120 Kraków, Poland. E-mail: szymon.sniegula@gmail.com

11730. Sommerkamp, A. (2012): Libellen. Fliegende Edelsteine. *Mein schöner Garten* 7/2012: 94-95. (in German) [This is a popular account on dragonflies in a well known German garden magazine.] Address: not stated

11731. Stenert, C.; Maltchik, L.; Rocha, O. (2012): Diversity of aquatic invertebrates in rice fields in southern Brazil. *Biology and Conservation* 7(1): 67-77. (in Portuguese, with English summary) ["Irrigated rice fields have been cultivated for thousands of years, and a high diversity of invertebrate species has been associated with these agricultural areas. Investigations on the structure and diversity of aquatic invertebrates in rice fields are scarce in southern Brazil. Thus, the main goal

of this study was to conduct an inventory of the aquatic invertebrate diversity in rice fields and irrigation canals in an important rice cultivation area in Rio Grande do Sul to preserve the biota in these agroecosystems. Six collections were carried out along a cultivation cycle (June 2005 – June 2006) in six rice fields and four irrigation canals in the Coastal Plain of Rio Grande do Sul. A total of 26,579 individuals in 119 invertebrate taxa distributed among seven Phyla were collected over the cultivation cycle investigated in rice fields and irrigation canals. The arthropods were the invertebrates which showed the greatest amount of sampled taxa. Collectors, predators, and omnivores were the prevalent functional feeding groups in this study. Naididae, Chironomidae, Spongillidae, Libellulidae (differed at the genus level), and Tubificidae families were those which showed the highest number of genera and species. The invertebrate composition was different between rice fields and irrigation canals over the rice cultivation cycle. Besides, some were more frequent over the rice cultivation period whereas other ones were more associated with the non-cultivation period. Rice fields and irrigation canals are systems colonized by a variety of aquatic and terrestrial invertebrates, and they present a high biologic diversity which can be hardly found in other cultivation areas." (Authors)] Address: Maltchik, L., Universidade do Vale do Rio dos Sinos, Laboratório de Ecologia e Conservação de Ecossistemas Aquáticos. Avenida Unisinos, 950. CEP 93022-000. São Leopoldo, RS, Brazil. E-mail: maltchik@unisinos.br

11732. Stoks, R.; Córdoba-Aguilar, A. (2012): Evolutionary ecology of Odonata: A complex life cycle perspective. *Annual Review of Entomology* 57: 249-265. (in English) ["Most insects have a complex life cycle with ecologically different larval and adult stages. We present an ontogenetic perspective to analyze and summarize the complex life cycle of Odonata within an evolutionary ecology framework. Morphological, physiological, and behavioural pathways that generate carry-over effects across the aquatic egg and larval stages and the terrestrial adult stage are identified. We also highlight several mechanisms that can decouple life stages including compensatory mechanisms at the larval and adult stages, stressful and stochastic events during metamorphosis, and stressful environmental conditions at the adult stage that may overrule effects of environmental conditions in the preceding stage. We consider the implications of these findings for the evolution, selection, and fitness of odonates; underline the role of the identified numerical and carry-over effects in shaping population and metapopulation dynamics and the community structure across habitat boundaries; and discuss implications for applied conservation issues." (Authors)] Address: Stoks, R., Lab. voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

11733. Subramanian, S.V. (2012): Application of auto-tracking to the study of insect body kinematics in maneuver flight. Master of Science in Engineering, Wright State University, Mechanical Engineering, Dayton: XI + 147 pp. (in English) ["There is a need to explain the complex phenomena that underlies the seemingly effortless flight modes of the dragonfly (Anisoptera). However, measuring the body kinematics during flight is labour intensive. Thus a robust system was developed that automatically tracks and quantifies the body kinematics of a dragonfly during voluntary and escape take-offs, as

well as maneuvers. Ultimately, the tool, which was developed using a custom code in C++ using the open source library OpenCV (Open Computer Vision), would be used to analyze bulk samples of high speed videos providing raw images at the rate of approximately 1000 frames per second from pair-wise orthogonal positions in space. As a result, there would be a considerably large database of information which may then be used to formulate, generalize and classify standard flight strategies used. Perceptibly, there is also a need to validate the outputs of this tool by comparing it to the outputs of a manual reconstruction." (Author)] Address: Subramanian, S.V., 209 Russ Engineering Center, 3640 Colonel Glenn Highway, Dayton, Ohio, 45435, USA

11734. Suri Babu, B.; Sharma, G. (2012): On some aspects of territoriality and reproduction of *Pseudagrion microcephalum* (Rambur) (Insecta: Odonata: Zygoptera: Coenagrionoidea). *Biological Forum Spl. Iss.* 4(1): 25-31. (in English) ["The territoriality and reproductive behaviour of *Pseudagrion microcephalum* (Rambur) has been studied in detail in a temporary monsoon pond, Jagdalpur, District Bastar, State Chhattisgarh, India. The territoriality is strongly demonstrated by males towards both conspecific and heterospecific males. Precopulatory courtship display is present and brief, lasted for 8 to 13 seconds ($X=9.5$; $N=30$). Intramale sperm translocation has occurred after the seizure of the female only and lasted for 10 to 20 seconds ($X=14.25$; $N=10$). The copulatory wheel was formed during the perched condition and stage I lasted for 15 to 35 minutes ($X=25.15$; $N=20$) and stage II lasted for 05 to 08 minutes ($X=6.5$; $N=20$). The surface and below water oviposition is performed by both in tandem and female alone in underwater guarded by male on the above water surface. Behavioural comparisons of various stages have been drawn with other members of the genus *Pseudagrion* Selys." (Authors)] Address: Suri Babu, B., Forensic Science Laboratory, Police Control Room, Jagdalpur-494001 (M.P.), India. E-mail: drsuri@rediffmail.com

11735. Takahara, T.; Kohmatsu, Y.; Maruyama, A.; Doi, H.; Yamanaka, H.; Yamaoka, R. (2012): Inducible defense behavior of an anuran tadpole: cue-detection range and cue types used against predator. *Behavioral Ecology* 23(4): 863-868. (in English) ["Inducible behavioural defense in response to predator cue detection is a key phenomenon in predator-prey interactions. The mechanisms by which prey use chemical/visual cues to avoid predation remain little known. We hypothesized that the distance at which prey species detect predator cues would be related to avoiding detection by the predator. To test this hypothesis, we performed laboratory experiments using an anuran tadpole (*Hyla japonica*) and a predatory dragonfly nymph (*Anax parthenope julius*). Tadpole activity level was reduced as a function of exposure to chemical cues from the dragonfly predator, but activity levels did not change when tadpoles were exposed to potential visual cues from the dragonfly. The distances over which tadpoles detected predator cues were longer than those over which the dragonfly predator detected tadpoles. The differences in cue-detection ranges between tadpoles and dragonfly predators are related both to predator avoidance by tadpoles and effective foraging strategies by dragonfly predators. Chemical cue detection as a trigger of inducible defense by prey species may shape predator-prey relationships in aquatic habitats." (Authors)] Address:

Takahara, T., Institute for Sustainable Sciences and Development, Hiroshima Univ., 701-3, ASOM, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima, 739-8530 Japan. E-mail: takahara@hiroshima-u.ac.jp

11736. Tennessen, K.J. (2012): Two new species of *Metaleptobasis* from Central Ecuador (Odonata: Coenagrionidae). *International Journal of Odonatology* 15(2): 87-97. (in English) ["Two new species of *Metaleptobasis* from Ecuador are described and illustrated. *Metaleptobasis gibbosa* (holotype male, allotype female: Ecuador, Pastaza Province, forest wetlands, Los Copales, between Mera and Shell, 01°29'30" S, 078°04'19" W, elevation 1070 m, 20-22 September 2005, leg. K. J. Tennessen; deposited in Florida State Collection of Arthropods) appears related to *M. mauffrayi* based on large, scythe-shaped posterior hamules; it differs by having cerci about 0.8 times the length of paraprocts, paraprocts wide in proximal half and posterior margin of S10 straight in dorsal view; the female has small denticles on the posteroventral margin of S8 but lacks a distinct vulvar spine. *Metaleptobasis knopfi* (holotype male, allotype female: Ecuador, Sucumbios Province, swamp-forest and stream, 52 km NE of Chaco, 00°00'04" S 077°24'07" W, elevation 685 m, 18 August 1980, leg. K. W. Knopf; deposited in Florida State Collection of Arthropods) appears related to *M. minteri* based on colour pattern, small posterior hamule and morphology of the genital ligula; it differs by having rear of head completely tan, S10 produced posteromedially and cerci more than half as long as paraprocts; the female of *M. knopfi* has larger, more erect mesepisternal horns than *M. minteri*." (Author)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennesen@centurytel.net

11737. Theischinger, G. (2012): Classification of the *Austroaeschna* group of genera including the introduction of four new subgenera [*Glaciaeschna* subgen. nov., *Montiaeschna* subgen. nov., *Occidaeschna* subgen. nov. and *Petersaeschna* subgen. nov.]. *Libellula Supplement* 12: 29-48. (in English, with German summary) ["A brief account in German language is given of the fieldwork of Günther Peters in Australia for the completion of a phylogenetic study of the Gondwanian aeshnids of this continent (Peters & Theischinger 2007). The *Austroaeschna* group of genera as defined based on this study includes the genera *Austroaeschna* Selys, *Austrophlebia* Tillyard and *Dromaeschna* Förster, with *Austroaeschna* comprising the subgenera *Austroaeschna* s. str. and *Pulchraeschna* Peters & Theischinger. 4 more monophyla of *Austroaeschna* are introduced as the new subgenera *Glaciaeschna*, *Montiaeschna*, *Occidaeschna* and *Petersaeschna*. Apomorphic and additional unspecified, mostly diagnostic characters are given, and relationships are discussed." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

11738. Tiple, A.D.; Paunikar, S.; Talmale, S.S. (2012): Dragonflies and Damselflies (Odonata: Insecta) of Tropical Forest Research Institute, Jabalpur, Madhya Pradesh, central India. *Journal of Threatened Taxa* 4(4): 2529-2533. (in English) [Gour River on Mandla Road (79°59'23.500E 21°08'54.300N) about 10km south east of Jabalpur. The campus is spread over an area of 1.09km²; semi-arid type of climate with a mean annual precipitation of 1358mm. A total of 48 species were recorded, among them, eight previously unrecorded spe-

cies were included in the check list of Madhya Pradesh. "Of the total 48 species 15 were very common, 15 were common, 16 rare and two very rare in occurrence. Most odonates recorded belong to the Libellulidae (20 species) with one new record (i.e., *Orthetrum luzonicum*). Coenagrionidae (13) species were recorded with one new record (*Agriocnemis femina*). The family Gomphidae includes three species with one new record (i. e. *Macrogomphus annulatus*). Aeshnidae (four) species were recorded with two new records (i.e., *Anax imbecillifrons*, *Hemianax ephippiger*). Only two species were recorded from the Protoneuridae, Lestidae. Family Platycnemididae, Chlorocyphidae and Macromiidae (with one new record, *Epophthalmia vittata*) recorded one species respectively from Madhya Pradesh." (Authors)] Address: Tiple, A.D., Forest Entomology Division, Tropical Forest Research Institute, Jabalpur, Madhya Pradesh 482021, India. E-mail: 1 ashishd-tiple@yahoo.co.in

11739. Trapero-Quintana, A.; Reyes-Tur, B.; Cuellar Araujo, N. (2012): Morphofunctional groups of Odonata larvae in three freshwater ecosystems from eastern Cuba. *Odonatologica* 41(2): 135-150. (in English) ["Five morphofunctional groups were determined, based on the morphological characters of the exuviae and the behaviour of the larvae, in three freshwater habitats from Santiago de Cuba. The exuviae were collected weekly over a year, within an 8 m transect and 1 m wide. in the water-ground transition, directly on vegetation, rocks or ground. The most diverse group was the lamellates with 12 species, followed by the epibenthonics with 11; the least diverse was the hidden group which included the only 2 Gomphidae known from Cuba, together with *Cannaphila insularis funerea* and *Orthemis ferruginea*, all gallery diggers. The Zygoptera were represented by over 25% of the species observed in each habitat, whilst the Aeshnidae always had less than 10% of the individuals. The Libellulidae, the most diverse family within the Anisoptera, accounted for the greatest diversity among the morphofunctional groups." (Authors)] Address: Reyes-Tur, B., Depto de Biología, Universidad de Oriente, Ave. Patricio Lumumba s/n 90500, Santiago de Cuba, Cuba. E-mail: breyes@cnt.uo.edu.cu

11740. Treiber, R.; Moratin, R. (2012): Libellen des Oberrheins - Les libellules du Rhin Supérieur. *Naturschutzzentrum Kaiserstuhl* (Hrsg.): 36 pp. (in bilingual in German and French) [Germany, France, River Rhine-region; 58 regional odonate species are briefly introduced (morphological key characteristics, photograph), and overview of the biology and ecology of Odonata is given. Six additional species from adjacent regions are shown by photographs.] Address: Treiber, R., c/o Naturschutzzentrum Kaiserstuhl, Bachenstr. 42, 79241 Ihringen, Germany. E-mail: reinhold.treiber@gmx.de

11741. Tubić, B.; Zorić, K.; Vasiljević, B.; Tomović, J.; Atanacković, A.; Marković, V.; Paunović, M. (2012): Saprobiological analyze of the Ibar River based on aquatic macroinvertebrates. *BALWOIS 2012 - Ohrid, Republic of Macedonia* - 28 May, 2 June 2012: 5 pp. (in English) ["In this paper aquatic macroinvertebrate community of the Ibar River (Serbia) was presented. Community structure and composition, together with field data, were used to estimate water status of the river including the characterisation of the species with regard to saprobic conditions and preference to the mineral substrate type. Sampling was carried out during 2011 at five sampling sites. A total of 57 taxa (including Gom-

phus vulgatissimus and *Onychogomphus forcipatus*) have been identified. Insect were found to be the dominant component of the community in regard to taxa richness and abundance. According to the ecological classification of the taxa with regard to saprobic conditions the most species belong to the beta-mesosaprobic group. Species that preferred macrolithal type of substrate, lithophilous species, were significantly represented. Recorded community indicates indicates good to poor ecological status of the Ibar River (I–V class according national classification scheme)." (Authors)] Address: Tubić, Bojana, Institute for Biological Research "Siniša Stanković", Belgrade, Serbia

11742. van der Porten, N. (2012): *Macromidia donaldi* pethiyagodai subsp. nov. from Sri Lanka (Odonata: Corduliidae). *International Journal of Odonatology* 15(2): 99-106. (in English) ["*M. donaldi* pethiyagodai subsp. nov. (holotype male: Sri Lanka, Ratnapura District, near Kudawe, 6°26'N, 80°25'E, 03 July 2007; paratype female, same location, 17 April 2008, to be deposited in the Sri Lanka National Museum, Colombo) is described and figured. Its phenotype differs from that of *M. d. donaldi* from India. This is the first record of the genus *Macromidia* from Sri Lanka. The habitat characteristics and species behaviour are briefly outlined." (Author)] Address: van der Poorten, Nancy, 17 Monkton Ave., Toronto, Ontario M8Z 4M9, Canada. E-mail: nmgvdp@gmail.com

11743. Van Praet, N.; Covaci, A.; Teuchies, J.; De Bruyn, L.; Van Gossum, H.; Stoks, R.; Bervoets, L. (2012): Levels of persistent organic pollutants in larvae of the damselfly *Ischnura elegans* (Odonata, Coenagrionidae) from different ponds in Flanders, Belgium. *Science of the total environment* 423: 162-167. (in English) ["We investigated the accumulation of persistent organic pollutants in *I. elegans* in 16 ponds in Flanders, widely differing in the surrounding land use. Concentrations of polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), p,p'-dichlorodiphenyldichloroethylene (p,p'-DDE) and hexachlorobenzene (HCB) were measured. From all targeted PBDE-congeners, only three congeners (IUPAC nos. 47, 99, 100) were above the limit of quantification (LOQ). The Σ PBDE concentrations ranged from < LOQ up to 0.51 ng g⁻¹ ww. From the targeted PCB-congeners, thirteen were detectable (IUPAC nos. 95, 99, 101, 105, 118, 138, 149, 153, 156, 170, 180, 183, and 187). A high variation in Σ PCB concentrations was observed between the ponds, ranging from < LOQ (0.67 ng g⁻¹ ww) up to 9.91 ng g⁻¹ ww in the damselflies from the pond at Sijsele. In all investigated Flemish ponds, p,p'-DDE concentrations were > LOQ (0.20 ng g⁻¹ ww) with values up to 3.30 ng g⁻¹ ww in the pond at Hamme. In fifteen ponds, the HCB concentrations were > LOQ (0.05 ng g⁻¹ ww) with values up to 0.24 ng g⁻¹ ww. For the available data in the literature a comparison with different species was done for some of the sampled ponds. The monitored ponds can be separated in three groups based on their contamination. The first group is characterised by a relative low POP content (Σ PBDEs, Σ PCBs, HCB). Group 2 contained more HCB and p,p'-DDE than the overall mean while this was the case for PBDEs and PCBs in group 3. The vectors of both contaminated groups are situated nearly perpendicular which is suggesting a different pollution sources." (Authors)] Address: Van Praet, N., Dept of Biology, Ecophysiology, Biochemistry & Toxicology Group, University of Antwerp, Groenenborgerlaan 171, 2020 Antwerp, Belgium. E-mail: nander.vanpraet@ua.ac.be

- 11744.** van Strien, M.J.; Keller, D.; Holderegger, R. (2012): A new analytical approach to landscape genetic modelling: least-cost transect analysis and linear mixed models. *Molecular Ecology* 21(16): 4010-4023. (in English) ["Landscape genetics aims to assess the effect of the landscape on intraspecific genetic structure. To quantify interdemelandscape structure, landscape genetics primarily uses landscape resistance surfaces (RSs) and least-cost paths or straight-line transects. However, both approaches have drawbacks. Parameterization of RSs is a subjective process, and least-cost paths represent a single migration route. A transect-based approach might oversimplify migration patterns by assuming rectilinear migration. To overcome these limitations, we combined these two methods in a new landscape genetic approach: least-cost transect analysis (LCTA). Habitat-matrix RSs were used to create least-cost paths, which were subsequently buffered to form transects in which the abundance of several landscape elements was quantified. To maintain objectivity, this analysis was repeated so that each landscape element was in turn regarded as migration habitat. The relationship between explanatory variables and genetic distances was then assessed following a mixed modelling approach to account for the nonindependence of values in distance matrices. Subsequently, the best fitting model was selected using the statistic. We applied LCTA and the mixed modelling approach to an empirical genetic dataset on the endangered damselfly, *Coenagrion mercuriale*. We compared the results to those obtained from traditional least-cost, effective and resistance distance analysis. We showed that LCTA is an objective approach that identifies both the most probable migration habitat and landscape elements that either inhibit or facilitate gene flow. Although we believe the statistical approach to be an improvement for the analysis of distance matrices in landscape genetics, more stringent testing is needed." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr. 111, CH-8903 Birmensdorf, Switzerland. E-mail: daniela.keller@wsl.ch
- 11745.** Vandekerkhove, J.; Namiotko, T.; Hallmann, E.; Martens, K. (2012): Predation by macroinvertebrates on *Heterocypris incongruens* (Ostracoda) in temporary ponds: impacts and responses. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 181(1): 39-47. (in English) ["We conducted laboratory experiments to assess the potential impact of different macroinvertebrate taxa on populations and individuals of the ostracod *H. incongruens* a common inhabitant of temporary ponds. Our data show that nymphs of *Anax imperator* and adults of the pigmy backswimmer (*Plea minutissima* (Leach, 1817)), and to a lesser extent adults of the common backswimmer (*Notonecta glauca* Linnaeus, 1758), can dramatically reduce population densities of *H. incongruens*, and potentially also alter the size structure of the populations. Direct and indirect interactions among predators significantly reduced the predation efficiency of predators when multiple predatory species were combined. In consequence, predation pressure estimates should not be based on predator densities in biotically diverse systems. We also demonstrate that the predation pressure on *H. incongruens* is reduced through behavioral adaptations, such as migration to the open water and reduction of swimming activity. These behaviors are induced by taxon-specific chemical cues." (Authors)] Address: Namiotko, T., University of Gdańsk, Department of Genetics, Laboratory of Lim-
- nozoology, Kladki 24, 80-822 Gdańsk, Poland. E-mail: namiotko@biotech.ug.gda.pl
- 11746.** Vasin, A.E.; Gherasimov, Y.L.; Djuzhaeva, I.V.; Satchkova, Y.V.; Selezneva, E.S. (2012): Invertebrates in the ecosystem of pond on Amineva Street in the Samara city in 2010. *Vestnik of Samara State University, Natural Science Series, Biology* 94(3/2): 45-52. (in Russian, with English summary) [Russia; *Coenagrion armatum*, *C. hastulatum*, *Erythromma najas* and *Sympetrum flaveolum* are listed from the study site.] Address: Vasin, A.E., Dept of Zoology, genetics, and general ecology of Samara State University, ul. Acad. Pavlov, 1, 443 011, Samara, Russia. E-mail: yuger55@list.ru
- 11747.** Vianna, D.M.; De Marco, P. (2012): Higher-taxon and cross-taxon surrogates for Odonate biodiversity in Brazil. *Natureza & Conservação* 10(1): 34-39. (in English) ["Odonate distributional patterns have recently become a focus of a global biodiversity evaluation, but it may present large gaps in biogeographical information, especially in tropical areas, which suggests the need of a surrogate approach for setting conservation priorities. Here we assemble available information of distribution of Brazilian odonate species and try to evaluate two different surrogate possibilities: i) a higher-taxon approach based on genera richness, and ii) a cross-taxon approach using the larger-sized Libellulidae species. The species richness distribution pattern shows a bias toward areas near research centers or with easy accessibility. Only 29% of the territory had any distributional information about odonates. A higher association of genera richness and species richness was observed and remained high even after controlling for differences in sampling effort. Libellulidae species richness was also a good surrogate, despite the low cover of available information of Brazilian territory. Our results support the use of higher-taxon over other approaches but highlight the importance of intensify sampling especially at the Cerrado, Caatinga and Amazonian biomes." (Authors)] Address: De Marco Júnior, P., Departamento de Biologia Geral, Universidade Federal de Goiás – UFG, Campus II, CP 24241, CEP 74690-970, Goiânia, GO, Brazil. E-mail: pdemarco@icb.ufg.br
- 11748.** Vieira, V. (2012): Teratologias alar e abdominal observadas em *Sympetrum fonscolombii* (Sélys, 1840) (Odonata: Libellulidae) dos Açores. *Boletín de la Sociedad Entomológica Aragonesa* 50: 541-542. (in Portuguese, with Spanish and English summaries) ["Wing teratology is reported in the male of *S. fonscolombii*. Also, the description is included of a teratological female presenting a deformed, strangled abdomen. The teratology is probably caused by extension problems during emergence. These cases constitute the first known cases of teratology of this species involving the Azores." (Author)] Address: Vieira, V., Univde dos Açores, Depto de Biologia & Grupo da Biodiversidade dos Açores, Rua da Mãe de Deus, Apart. 1422, 9501-801 Ponta Delgada (Açores), Portugal. E-mail: vvieira@uac.pt
- 11749.** Vilas Souto, J. (2012): *Aeshna isoceles* (Müller, 1767) (Odonata: Aeshnidae), primera cita para Galicia (N.O. Península Ibérica). *Archivos Entomológicos* 7: 83-84. (in Galician, with Spanish & English summaries) [*A. isoceles*, first record for Galicia, Spain, 16-VI-2012, near Laxe (A Coruña), Lagoa de Traba (UTM 29TMH98)] Address: Vilas Souto, J., c/ Feliciano Barrera 11-D- 2ªA. E-15706 Santiago de Compostela (A CORUÑA) Spain. E-mail: roi-77@hotmail.com

11750. Villanueva, R.J.T. (2012): Three new species, *Diplacina guentherpetersi* sp. nov., *D. holgerhungeri* sp. nov. and *D. paragua* sp. nov., from the Philippines (Odonata: Libellulidae). *Libellula Supplement* 12: 227-236. (in English, with German summary) ["Three new species of the genus *Diplacina* from the Philippines are described and illustrated. The northernmost species of the genus *Diplacina guentherpetersi* sp. nov., was collected on the Calayan Island (Masidel River, Centro II, Calayan, Calayan Island, Philippines, 26-iv-2008, leg. R.J. Villanueva). Two males of *Diplacina holgerhungeri* sp. nov. are from Polillo Island [Malat River, Burdeos, Polillo Island (Quezon Province), Philippines, 22-23-ii-2012, leg. H. Cahilog], while two other males are from the same island (Salipsip area, Polillo, Polillo Island, Philippines, 20-21-iv-2009, leg. R.J. Villanueva). A small species, *Diplacina paragua* sp. nov., is from Palawan Island (Tinadtad Falls, Irawan, Puerto Princesa, Palawan Island, Philippines, 29-i-2010, all six specimens leg. R.J. Villanueva & H. Cahilog)." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., 8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

11751. Vyas, V.; Bharose, S.; Yousuf, S.; Kumar, A. (2012): Distribution of macrozoobenthos in River Narmada near water intake point. *Journal of Natural Sciences Research* 2(3): 18-24. (in English) ["...Presently, the study was carried out on a selected reach of river Narmada (India) near water intake point. Aim of the study was to assess the distribution of macrozoobenthos near water intake point on river Narmada. Loss in the distribution of macrozoobenthos fauna was recorded in lower reaches and in front of water intake point which indicates that ecological conditions are degrading and in near future situation can be alarming in the respect of ecology." (Authors) The paper includes the neotropical taxon *Aphylla*, and seems to be one of these increasing obscure papers without consideration of regional taxonomic literature.] Address: Kumar, A., Department of Environmental Sciences and Limnology, Barkatullah University, Bhopal- 462-026, India. E-mail: ankitlimno@yahoo.co.in

11752. Watanabe, M.; Kato, K. (2012): Oviposition behaviour in the dragonfly *Sympetrum infuscatum* (Selys) mistaking dried-up rice paddy fields as suitable oviposition sites (Anisoptera: Libellulidae). *Odonatologica* 41 (2): 151-160. (in English) ["Tandem oviposition behaviour of *S. infuscatum* was studied in rice paddy fields that were dried due to agricultural procedures in the cool temperate zone of Japan. Oviposition site selection is probably mainly visual because every tandem pair is attracted to structurally similar rice paddy fields without any water. Observations of flying behaviour of tandems was carried out on sunny days without winds. All pairs flew about to search for a suitable oviposition site in the rice paddy fields. They hovered to start oviposition while in tandem. Females of tandems flicked their abdomen while on the wing to aid egg release; each height of these oviposition flights was measured. They separated after completion of the oviposition bout. Vertical changes in the air temperature, relative humidities and light intensities above and below the top of the rice plants were measured. Oviposition site selection was related to the vertical decline of vapour pressure above the rice plants, suggesting that the horizontal surface of rice paddy fields horizontally reflects highly polarized light. Eggs that had fallen on dried-up rice paddy soil diapaused throughout the winter and started to develop the

following spring when the field was filled with enough water for rice planting. Therefore, there is a mechanism for suitable habitat selection for larval development under seasonal changes in man-made water supplies for the cultivation of rice plants." (Authors)] Address: Kato, K., Graduate School of Life and Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: kankyo.envr.tsukuba.ac.jp

11753. Wellenreuther, M.; Larson, K.W.; Svensson, E.I. (2012): Climatic niche divergence or conservatism? Environmental niches and range limits in ecologically similar damselflies. *Ecology* 93(6): 1353-1366. (in English) ["The factors that determine species' range limits are of central interest to biologists. One particularly interesting group are odonates (dragonflies and damselflies), which show large differences in secondary sexual traits and respond quickly to climatic factors, but often have minor interspecific niche differences, challenging models of niche-based species co-existence. We quantified the environmental niches at two geographic scales to understand the ecological causes of northern range limits and the co-existence of two congeneric damselflies (*Calopteryx splendens* and *C. virgo*). Using environmental niche modelling, we quantified niche divergence first across the whole geographic range in Fennoscandia and second only in the sympatric part of this range. We found evidence for interspecific divergence along the environmental axes of temperature and precipitation across the northern range in Fennoscandia, suggesting that adaptation to colder and wetter climate might have allowed *C. virgo* to expand further northwards than *C. splendens*. However, in the sympatric zone in southern Fennoscandia we found only negligible and non-significant niche differences. Minor niche differences in sympatry lead to frequent encounters and intense interspecific sexual interactions at the local scale of populations. Nevertheless, niche differences across Fennoscandia suggest that species-differences in physiological tolerances limit range expansions northwards, and that current and future climate could have large effects on the distributional ranges of these and ecological similar insects." (Authors)] Address: Wellenreuther, Maren, Dept of Biology, Univ. of Lund, Sweden. E-mail: maren.wellenreuther@biol.lu.se

11754. Wiederman, S.D.; O'Carroll, D.C. (2012): Feature saliency in a dragonfly neuron. *Front. Behav. Neurosci.* Conference Abstract: Tenth International Congress of Neuroethology, College Park, Maryland USA, USA, 5 Aug - 10 Aug, 2012. doi: 10.3389/conf.fnbeh.2012.27.00223: 1 p. (in English) ["*Hemicordulia tau* pursues moving prey, often against a cluttered, visual surround. This already complex small target detection task may even occur in the presence of multiple target-like features (e.g. other potential prey and conspecifics). Yet this is only one of many challenging visual behaviours exhibited by these impressive predators, despite a small brain. To understand the neural basis for such behaviour we use electrophysiological techniques to record intracellularly from feature detecting neurons, referred to as small target motion detectors (STMDs). STMDs likely underlie the dragonfly's ability to discriminate prey motion as they provide velocity-tuned responses selective for objects of no more than a few degrees size (O'Carroll 1993). One such neuron, the centrifugal STMD (CSTMD1) is a potential candidate for mediating higher-order mechanisms of attention towards targets in the presence of distractors. CSTMD1 gives a

locally enhanced response when a target moves along a continuous trajectory (Nordström et al. 2011). Furthermore, the neural response is entirely suppressed by the presence of a second object in a visual region of the other eye (Bolzon et al. 2009). CSTMD1 takes dendritic input from one eye and has an axon that traverses the brain. The neuron arborizes in two regions on the contralateral side, with one output aligning with the input of the mirror-symmetric CSTMD1. It is possible that the two CSTMD1 neurons work together in transferring target information from one side of the brain to the other during target pursuit, but the details of these mechanisms remain unclear. To elucidate a functional role for CSTMD1, we presented two target stimuli of varying sizes and contrasts. We found that a second 'distracter' target presented in the excitatory receptive field, suppresses the response of the neuron as its size is increased. Conversely, a second feature presented to the contralateral eye reveals inhibition that is itself size-tuned. Finally, we investigated how the saliency of two targets (of varying size and contrast) is encoded by the neuron through a simple form of selective attention. Putting this all together, the neuron is inhibited by either a large feature in the ipsilateral (excitatory) visual field or a small target in the contralateral eye. Additionally, if presented with multiple targets in the excitatory region, the neuron exhibits a simple form of visual attention via a competitive winner-takes-all interaction. This research was supported by the US Air Force Office of Scientific Research (FA2386-10-1-4114)." (Authors)] Address: Wiederman, S.D., The University of Adelaide, School of Medical Sciences, Adelaide, SA, 5005, Australia. E-mail: steven.wiederman@adelaide.edu.au

11755. Wildermuth, H. (2012): *Aeshna caerulea* in den Schweizer Alpen (Odonata: Aeshnidae). *Libellula Supplement* 12: 77-106. (in German, with English summary) ["The present knowledge on the horizontal and vertical distribution, phenology, ecology and behaviour of *A. caerulea* in Switzerland is reviewed with a side glance on the remaining occurrences of the species in Europe. In the Swiss Alps *A. caerulea* has been recorded on 71 squares of 1 km² from 2000 to 2011 and observed to breed between 1318 m and 2230 m a.s.l. The lower vertical distribution is probably confined by the mild climatic conditions and interspecific competition while the upper limit is mainly restricted by the lack of suitable breeding habitats with lush Vegetation, organic matter and corresponding thermal conditions. Larval habitats, emergence, reproductive behaviour and thermoregulation are described in detail and photographically documented. The species is endangered prevailing by grazing livestock that destroys the breeding habitats, but also by tourism and climate change. Possible Conservation measures are suggested and discussed." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

11756. Wildermuth, H. (2012): Die Verbreitung der an Libellen (Odonata) parasitierenden Gnitze *Forcipomyia paludis* (Macfie, 1936) in der Schweiz (Diptera: Ceratopogonidae). *Entomo Helvetica* 5: 71-83. (in German, with English and French summary) ["All hitherto known records of *Forcipomyia paludis* in Switzerland are listed in detail and mapped. This species has been found attached to 25 odonate species at 33 localities that are mainly situated on the Swiss Plateau between 196 and 640 m a.s.l." (Author)] Address: Wildermuth, H., Halt-

bergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

11757. Wong, K.-C.; Yeh, W.-C.; Chan, T.-W. (2012): Description of the final stadium larvae of *Polycanthagyna ornithocephala* (McLachlan, 1896) from Taiwan, with a key to the known larvae of the genus (Odonata: Anisoptera: Aeshnidae). *Zootaxa* 3238: 64-68. (in English) ["The final stadium larvae of *Polycanthagyna ornithocephala* is described and compared to those of its congeners occurring in Taiwan. A key is provided to identify the known larvae of three *Polycanthagyna* species. General habitus of adult and larva are also discussed." (Authors)] Address: Wong, K.-C., Dept of Natural Resources and Environmental Studies, National Dong Hwa Univ., No. 1, Sec. 2, Da Hsueh Rd., Shoufeng, Hualien 97401, Taiwan. E-mail: kcwong@mail.ndhu.edu.tw

11758. Wünsch, H.-W.; Gospodinova, H. (2012): Deutsche Wespe *Vespula germanica* erbeutet *Sympetrum striolatum* vor dem Jungfernflug (Hymenoptera: Vespidae; Odonata: Libellulidae). *Libellula* 31(1/2): 25-30. (in German, with English summary) ["On 01-vii-2011 at a pond near Siegburg-Stallberg, North Rhine-Westphalia, Germany, a freshly emerged individual of *S. striolatum* lacking the abdomen was seen crawling on a leaf of stinging nettle. Several metres away a wasp was devouring the abdomen of the dragonfly. It is discussed why the dragonfly was still able to walk after the loss of the abdomen." (Authors)] Address: Gospodinova, Heide, Am Burgberg 11, 50126 Bergheim, Germany. E-mail: willli@waldschrat-online.de

11759. Xu, Q.-h. (2012): Description of the last instar larva of *Amphigomphus hansonii* Chao, with notes on the systematic status of the genus *Amphigomphus* Chao (Anisoptera: Gomphidae). *Odonatologica* 41(1): 55-59. (in English) ["The larva is described and illustrated based on 2 specimens from Fujian province (China), and a comparison with *Nihonogomphus lieftincki* and *Orientogomphus armatus* larvae is provided. Judging from larval morphological characters, the genus *Amphigomphus* is closer to *Orientogomphus* than to *Nihonogomphus*." (Author)] Address: Xu, Q.-h., Department of Biological and Environmental Engineering, Zhangzhou City University, 10 Xi-Yang-Ping Road, Zhangzhou Fujian-363000, China. E-mail: qihanx@yahoo.com.cn

11760. Yam, L.Y. (2012): *Anax indicus* Lieftinck, 1942 (Odonata: Aeshnidae, Anax) - a new record for Hong Kong. *Insect News* 4: 2-4. (in English) [25-IX- 2010, at Yuen Tun Ha (Tai Po, Hong Kong); a Chinese vernacular name is proposed and the species is compared with *Anax guttatus* and *A. parthenope julius*] Address: Yam, L.Y., The Hong Kong Polytechnic University, Hung Horn, Hong Kong, eddieyly@yahoo.com.hk

11761. Yoshihara, A.; Miyazaki, A.; Maeda, T.; Imai, Y.; Itoh, T. (2012): Spectroscopic characterization of dragonfly wings common in Japan. *Vibrational Spectroscopy* 61: 85-93. (in English) ["A series of Fourier Transform infrared (FT-IR) absorption, X-ray diffraction (XRD), and Brillouin light scattering (BLS) studies on the wings of six species of dragonfly common in Japan, including the largest *Anotogaster sieboldii* and much smaller *Lestes temporalis*, was performed at room temperature. XRD and FT-IR results indicate that dragonfly wing is comprised of a randomly oriented microcrystalline or an amorphous-like α -chitin. We observed a pair of longitudinal acoustic (LA) phonon peaks and a broad quasi-elastic scattering peak in backscattering BLS spectra.

LA phonon frequencies and full widths at half maximum were found to be 19.5 ± 0.4 GHz and 1.0 ± 0.2 GHz for the 488 nm excitation and independent of their sizes and species." (Authors)] Address: Yoshihara, A., Dept of Basic Sciences, Ishinomaki Senshu Univ., Ishinomaki, 986-8580 Miyagi, Japan. E-mail: yosihara@isenshu-u.ac.jp

11762. Yu, X.; Bu, W.-J. (2012): Erratum - YU, X. & BU, W.-J. (2011) Chinese damselflies of the genus *Coenagrion* (Zygoptera: Coenagrionidae). *Zootaxa* 2808, 31-40. *Zootaxa* 3152: 68: 68. (in English) ["Among the SEM photos for male caudal appendages (Figures 1-11), figure 10 should be *C. tengchongensis* and figure 11 should be *C. lunulatum*." (Authors)] Address: Yu, X., Institute of Entomology, Life Sciences College, Nankai University, Tianjin, 300071 China. E-mail: nkyuxin@yahoo.cn

11763. Zessin, W.; Brauckmann, C. (2012): Eine neue fossile Libelle: *Paralogobora guentherpetersi* gen. nov., sp. nov. aus dem Unterperm von Obora, Tschechische Republik, und eine neue Gattung: *Oligomazon* gen. nov. für *Oligotypus makowskii* (Meganisoptera: Paralogidae). *Libellula Supplement* 12: 237-245. (in German, with English summary) ["A new fossil dragonfly: *Paralogobora guentherpetersi* gen. nov., sp. nov. from the Early Permian of Obora, Czech Republic, and a new genus: *Oligomazon* gen. nov. for *Oligotypus makowskii* (Meganisoptera: Paralogidae) - With *Paralogobora guentherpetersi* gen. nov. and sp. nov. a new Permian (Late Autunian) genus and species from Obora, Czech Republic, is described and assigned to the family Paralogidae Handlirsch 1906, which is only documented by a few Late Carboniferous and Early Permian taxa: *Paralogus aeschnoides* Scudder 1893 from the Westphalian D of Silver Spring, Rhode Island, USA; *Paralogus hispanicus* Nel et al. 2009 from the Late Carboniferous/Early Permian transitional beds of Cantera de Ladrillos, Cordoba, Spain; *Oligotypus tillyardi* Carpenter 1931 from the Early Permian (Artinskian, Wellington Formation) of Elmo, Kansas, USA, and the contemporaneous Midco Insect Beds of Noble County, Oklahoma, USA, as well as *Oligotypus makowskii* Carpenter & Richardson 1971 from the Westphalian C/D (Pit 11) of Mazon Creek, Illinois, USA. The new species is not only the smallest, but also the stratigraphically youngest one of the Paralogidae. For *Oligotypus makowskii* a new genus is introduced: *Oligomazon* gen. nov." (Authors)] Address: Zessin, W., Lange Str. 9, 19230 Jasnitz, Germany. E-mail: zessin@zoo-schweinin.de

11764. Zhan, K.; Ji, B.-Z.; Liu, S.W.; Qing, Z.H. (2012): Research of bionic design on tools with chewing mouthparts of insects. *Advanced Materials Research* 426: 270-274. (in English) ["Bionic design is a new method in engineering design. The mouthparts especially for the chewing ones of the insects are discussed in this article. To improve the tool life and cutting properties are always the critical for the cutting tool design aim. The foreground of cutting tool design is discussed using the mouthpart of insect as bionic design object. The basic structure of the chewing mouthpart, type of mandibles, geometry, hardness, and element contained, moving mechanism and so on will be described. The research can also make direction at new tool material and tool geometry parameter design." (Authors) The paper includes a reference to Odonata.] Address: Zhang, K., College of mechanical engineering and electronics. Nanjing University of Aeronautics and Astronautics, Nanjing 210016. P.R. China. E-mail: zhangkai360973@163.com

11765. Zhao, H.X.; Yin, Y.J.; Zhong, Z. (2012): Multi-levels, multi-scales and multi-functions in the fine structure of the wing veins in the dragonfly *Pantala flavescens* (Fabricius) (Anisoptera: Libellulidae). *Odonatologica* 41(2): 161-172. (in English) ["The internal fine structure of the wing veins is explored and the relationships between the structures and the functions of dragonfly wing veins are revealed. SEM photographs of the cross-sections of dragonfly wing veins have shown that: (a) the micro/nano structures vary along the axis of a vein, i.e. different cross-sections have different micro/nano structures. 1 (b) In a given cross-section, the micro/nano structures are at multi-levels and multi-scales. 1 (c) At a large scale, the structures of the veins are of diversities and disorders. The larger the size scale, the more complicated the structures and the higher are the diversities and disorders. The smaller the size scale, the simpler are the structures, and the higher are the unifications and orders. 1 (d) At nano scale, we may induce an unified assembling mode for the vein's structures, i.e. "nano fibres -> nano layers (or nano bunches)". 1 (e) Both the mechanical and the biological functions of the micro/nano structures of the veins are optimized." (Authors)] Address: Zhong, Z., School of Aerospace Engineering and Applied Mechanics, Tongji Univ., Shanghai 200092, China. E-mail: zhongk@tongji.edu.cn

11766. Zimmermann, W. (2012): Günther Peters als Lehrer und Freund eines späten Studenten. *Libellula Supplement* 12: 19-21. (in German, with English summary) ["Günther Peters as a teacher and friend of a late Student - Some personal reminiscences of the author relating to situations he has experienced during his life together with Günther Peters are briefly outlined." (Author)] Address: Zimmermann, W., Thomas-Müntzer-Str. 05, 99423 Weimar, Germany. E-mail: wolfgang.zimmermann.we@kabelmail.de

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<http://quiettraveler.wordpress.com/2012/07/01/dragonflies-and-damselflies/>

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1997

11767. Hahn, N.S.; Agostinho, A.A.; Goitein, R. (1997): Feeding ecology of curvina *Plagioscion squamosissimus* (Hechel, 1840) (Osteichthyes, Perciformes) in the Itaipu Reservoir and Porto Rico floodplain. *Acta limnologica Brasiliensia* 9: 11-22. (in English, with Portuguese summary) [Fish samplings were carried out from November 1983 to September 1988, at different sites of the Paraná River basin (Brazil), comprising the section between the Paranapanema and Iguazu Rivers. The stomach contents analysis of all individuals of Itaipu Reservoir and Porto Rico' area showed that curvina feeds basically on fish (> 80%) and insects (> 18%). At Itaipu Reservoir, among the insects, Odonata were represented by 18.5% of the food items, while at Porto Rico they accounted to 6.23% of the diet.] Address: Hahn, N.S., Núcleo de Pesquisas em Limnologia, Ictiologia e Aquicultura (NUPELIA), Universidade Estadual de Maringá, Av. Colombo, 5.790, 87020-900 - Maringá - PR - Brasil

1998

11768. Nilsson, A.N.; Malmqvist, B.; Báez, M.; Blackburn, J.H.; Armitage, P.D. (1998): Stream insects and gastropods in the island of Gran Canaria (Spain). *Annls Limnol.* 34(4): 413-435. (in English, with French summary) ["The current status of the stream-living insects and gastropods of the island of Gran Canaria in the Atlantic Canary Islands is documented. Data from semi-quantitative kick samples taken in 11 streams are supplemented by non-standardized collecting in the same and ten additional streams. The kick samples included some 9,000 specimens of 98 taxa, and in total 123 taxa were recorded from the studied streams in 1994 and 1995. The stream fauna was dominated by Diptera with some 80 taxa, followed by Coleoptera with 37 species known from the island. The kick samples yielded 11-36 species per stream and visit, whereas up to 48 species were scored when all collecting methods were included. Local diversity given as Fisher's α ranged from 3.2 to 10.3. Clustering showed only weak spatial patterns and resulted in much higher similarities among localities when based on the semi-quantitative samples than when based on presence/absence including records from all collecting methods. Species distributions among localities

were not significantly nested. The faunal similarity with the adjacent island of Tenerife is striking. Six of the Tenerife species are seemingly absent from Gran Canaria, whereas Gran Canaria has 13 species not found in Tenerife. Most of the 22 aquatic insect species in Gran Canaria only known from older records, prefer lentic habitats not included in our study. All except one of the five species endemic to Gran Canaria are considered extinct or on the edge of extinction. Increased future extinction rates are predicted as a response of the extreme habitat loss, with only three permanent streams known on the island today." (Authors) The following Odonata taxa are listed: Libellulidae indet., *Orthetrum chrysostigma*, *Sympetrum fonscolombii*, *Trithemis artemisa* and *Zygonyx torrida*.] Address: Nilsson, A.N., Department of Animal Ecology, University of Umea, SE-901 87 Umea, Sweden

11769. Onore, G.; Cevallos, V. (1998): Massive movement of *Panoquina sylvicola* in southern Ecuador (Lepidoptera: Hesperidae). *Tropical Lepidoptera* 9(1): 28. (in English) ["A large mass of *P. sylvicola* (Herrich-Schäffer), accompanied by limited numbers of *Siproeta epaphus* Latreille (Nymphalidae) and an unidentified species of Aeshnidae dragonfly (Odonata), were observed moving west to east near Loja, Ecuador, on 18 April 1992." (Authors)] Address: Onore, G., Dept. de Biología, Pontificia Universidad Católica del Ecuador, 12 de Octubre y Rocca, Quito, Ecuador

1999

11770. Glotzhober, R.C. (1999): Three new state records of Odonata from Ohio, with additional county records. *Ohio Biological Survey Notes* 2: 25-33. (in English) ["Since 1995 the members of the Ohio Odonata Survey have newly recorded three dragonfly species to the state list: *Lanthus vernalis*, *Neurocordulia molesta*, and *Somatochlora incurvata*. In addition, survey workers have collected a total of 712 new county records. The total Odonata species and subspecies in Ohio now numbers 159." (Author)] Address: Glotzhober, R., Ohio Natural history society, 1982 Velma Ave., Columbus OH 43211-2497, USA. E-mail: bglotzhober@ohiohistory.org

11771. Labhart, T.; Meyer, E.P. (1999): Detectors for polarized skylight in insects: A survey of ommatidial specializations in the dorsal rim area of the compound eye. *Microsc. Res. Tech.* 47: 368-379. (in English) ["Apart

from the sun, the polarization pattern of the sky offers insects a reference for visual compass orientation. Using behavioral experiments, it has been shown in a few insect species (field crickets, honey bees, desert ants, and house flies) that the detection of the oscillation plane of polarized skylight is mediated exclusively by a group of specialized ommatidia situated at the dorsal rim of the compound eye (dorsal rim area). The dorsal rim ommatidia of these species share a number physiological properties that make them especially suitable for polarization vision: each ommatidium contains two sets of homochromatic, strongly polarization-sensitive photoreceptors with orthogonally-arranged analyzer orientations. The physiological specialization of the dorsal rim area goes along with characteristic changes in ommatidial structure, providing actual anatomical hallmarks of polarized skylight detection, that are readily detectable in histological sections of compound eyes. The presence of anatomically specialized dorsal rim ommatidia in many other insect species belonging to a wide range of different orders indicates that polarized skylight detection is a common visual function in insects. However, fine-structural disparities in the design of dorsal rim ommatidia of different insect groups indicate that polarization vision arose polyphyletically in the insects." (Authors) The study includes data on *Sympetrum striolatum*.] Address: Labhart, T., Zoologisches Institut der Universität Zürich, 8057 Zürich, Switzerland

2000

11772. Wegner, E. (2000): Freshwater and land arthropods endangered with mosquito control treatments. *Wiad. entomol.* 18, Suppl. 2: 275-283. (in Polish, with English summary) ["Mosquito control in Poland is based almost solely on the use of broad-spectrum insecticides, which affect most arthropods. The tendency to control mosquitoes in Poland increases and there is a danger of annihilation of a great number of arthropod species in areas subject to mosquito control treatments unless modern microbial control means are employed in Poland. For this reason there is a necessity of a programme of mosquito control based on the environmentally aware methods. The specialists in biology and ecology of animals, especially those who deal with invertebrates, which co-occur with larvae or adult mosquitoes, would be very helpful to give their suggestions concerning protection for nontarget animals (including Odonata). On the basis of this information an environmentally acceptable programme and a detailed scenario of treatment actions would be proposed." (Author)] Address: Wegner, Elżbieta, Muzeum i Instytut Zoologii PAN, ul. Wilcza 64, 00-679 Warszawa, Poland. E-mail: wegner@robal.miiz.waw.pl

2001

11773. Eda, S. (2001): Obituary of Imato Sonehara. *Tombo* 43: 60. (in Japanese, with English title) [brief obituary with reference to *Aeshna mixta soneharai* Asahina]

11774. Kagimoto, B. (2001): The historical background of the discovery of *Orthetrum poecilops miyajimaense* Yuki et Doi, 1938. *Tombo* 43: 45-50. (in Japanese, with English summary) ["*Orthetrum poecilops miyajimaense*, was discovered by Jiro Yuki at Yamashiroura in Miyajima (Itsukushima) island, Hiroshima Prefecture, Japan.

Yuki was a member of the Hiroshima Mountaineering Club, and joined a walking hemircular tour of Miyajima island on June 21, 1936. On the touring course, unfamiliar dragonflies were found in a place called Yamashiroura. In 1938, Yuki described these dragonflies as a new species, *Orthetrum miyajimaense* together with Hironobu Doi, who was an amateur odonatologist. In this paper, it was written that on the day Yuki collected these insects, the weather was fine. However, by checking an old record of weather conditions, I have confirmed that the day was cloudy. A study on the relationship between Yuki and Doi revealed that they were members of the Chosen Natural History Society, and Giichi Shigemura, who was Yuki's teacher in the middle school, was Doi's superior officer in the Imperial Gift Science Museum." (Author)] Address: not stated

11775. Ramos Hernández, J.M.; de Armas, L.F. (2001): Distribución geográfica de *Remartinia secreta* y *Crocothemis servilia* en Cuba (Odonata: Aeshnidae, Libellulidae). *Cocuyo* 10: 12-13. (in Spanish) [Records of both species are detailed; no maps are given.] Address: Ramos Hernandez, J.M., C # 9 e/ Algerdo Ferrer y Agramonte, Cabaiguán, Sancti-Spiritus, Cuba 62400

2002

11776. Fischer, U. (2002): Weiterer Fund der Südlichen Mosaikjungfer (*Aeshna affinis* V. D. Linden, 1820) in Thüringen. *Mitteilungen des Thüringer Entomologenverbandes* 9(2): 23-24. (in German) [30-VII-2002, "Teiche Zeulenroda-Troppach", Landkreis Greiz, Thüringen, Deutschland] Address: Fischer, U., A.-Günther-Str. 12, 08340 Schwarzenberg, Germany

11777. Sformo, T. (2002): Minimum flight temperature and thermoregulatory performance of sub-arctic dragonflies. Society for Inetgrative and Comparative Biology 2002 Annual Meeting. Anaheim, California, January 2-6: (in English) [Verbatim: "Sub-arctic dragonflies (Odonata: Anisoptera), an order of insect previously not studied in Alaska, provide a unique system with which to examine questions of thermal biology. Two potential adaptations are the ability to initiate flight at low temperature and to thermoregulate. To establish minimum flight temperatures, I record the lowest temperature at which a species can maintain level flight, both in the lab and in the field. To determine thermoregulating ability, I measure thoracic temperature (T_{th}) of individual dragonflies using a thermocouple. T_{th} is then compared to the dragonfly model providing the operative environmental temperature (T_e). By regressing T_{th} on T_e, the slope of the regression line indicates thermoregulatory ability (Thermoregulation Performance Index). I predict that northern dragonflies will have lower minimum flight temperatures than comparable species from lower latitudes. I also predict a general pattern wherein more massive species are able to thermoregulate by both physiological and behavioural means, while less massive species rely solely on behavioural repositioning. The relationship between T_{th} of living specimens and T_e is examined for each species and compared across species to examine relative thermoregulating ability. I show, contrary to speculation by Vogt and Heinrich (1983), that minimum flight temperature of northern dragonflies are not different from comparable species from Maine, although they differ from species in Florida. Minimum temperatures range from 14°C for *S. danae* to 22°C for aeshnids. Finally, I conclude that the relative thermoregulating ability is a function of mass,

which ranges from 0.09g for the least to 0.86g for the most massive, while the Thermoregulatory Performance Index ranges from 0.90 (a thermal conformer) to 0.14 (a thermal regulator), respectively.]" Address: Sformo, T., Univ. Alaska, Fairbanks, AK, 99701, USA. E-mail: rfts@uaf.edu

2003

11778. Goudsmits, K. (2003): *Coenagrion scitulum*, the first record for the Netherlands. *Brachytron* 7(1): 27-29. (in Dutch, with English summary) [June 16, 2003, a male *C. scitulum* was captured near Tegelen in the south eastern part of The Netherlands.] Address: Goudsmits, K., Eerste Dorpstraat 7a, NL-3701 HA Zeist, The Netherlands

11779. Woods, M.; McDonald, R.A.; Harris, S. (2003): Predation of wildlife by domestic cats *Felis catus* in Great Britain. *Mammal Review* 33(2): 174-188. (in English) ["A questionnaire survey of the numbers of animals brought home by domestic cats *Felis catus* was conducted between 1 April and 31 August 1997. A total of 14 370 prey items were brought home by 986 cats living in 618 households. Mammals made up 69% of the items, birds 24%, amphibians 4%, reptiles 1%, fish <1%, invertebrates 1% and unidentified items 1%. A minimum of 44 species of wild bird, 20 species of wild mammal, four species of reptile and three species of amphibian were recorded." (Authors) Among the prey items, Odonata accounted to 25 specimens, representing 0.6% of all prey items.] Address: McDonald, R.A., The Game Conservancy Trust, Forest in Teesdale, Barnard Castle DL12 0HA, UK. E-mail: rmcdonald@gct.org.uk

2004

11780. Butler, H.J.B.; Kok, O.B. (2004): Dietary composition of cattle egrets (*Bubulcus ibis*) in the central Free State. *SA Tydskrif vir Natuurwetenskap en Tegnologie* 23(4): 90-98. (in Dutch, with English summary) ["Analysis of 152 stomach samples of adult *B. ibis* collected over a period of five years in the central Free State showed this species to be mainly insectivorous. The Insecta, occurring in almost all stomach samples, are represented by prey items from 13 orders of which the Orthoptera, followed by the Coleoptera, Isoptera, Diptera and Lepidoptera, showed the highest frequency of occurrence. Amongst the non-insect invertebrates, the Araneae and Solifugae occurred most frequently. Based on dry mass the Orthoptera and Isoptera constitute by far the most important components. Prey items of vertebrates combined represent only ca. 10% of the diet. Overall, the stomach contents of 75 chicks correspond with that of the adults, except that vertebrates make a significant contribution to the diet during the first week of the nesting phase. In general cattle egrets can be considered opportunistic feeders that concentrate on easily obtainable food sources which become sporadically available (partly because of their regular association with mammalian hosts)." (Authors) Odonata contribute only very little to the diet of *B. ibis*.] Address: Kok, O.B., Departement Dierkunde en Entomologie, Universiteit van die Vrystaat, Posbus 339, Bloemfontein, 9300, South Africa. E-mail: kokob.sci@mail.uovs.ac.za

11781. Dicke, M. (2004): From Venice to Fabre: insects in western art. *Proc. Neth. Entomol. Soc.* 15: 9-14. (in

English) ["Insects are not only special to entomologists, they have also been a source of inspiration to artists throughout the centuries. From the 13th century until present artists have depicted insects in twodimensional and three-dimensional works. Insects have often been used as symbols for the brevity of life, for the transcendence of the soul, but also because of the beauty of their forms and colours. Some artists paint or sculpt with insects themselves, either dead or still alive. Over the past 7 years I have visited 180 art museums and recorded the representation of insects in the works on display. As a result I have gained an entomological view of the history of art. This has provided insight both in the history of art itself as well as in the role of insects in its development. At present I have seen 3,045 works of art in which insects are represented. The majority occur in the Netherlandish still-lives of the 17th and 18th centuries, in surrealist works and in Jugendstil works. Some artists have depicted only a single insect while others have represented over 100 insects in a single work of art. Of some artists I know only a single work with insects, while of others more than 100 works are known." (Author) Approximately 450 paintings created between 13th-21st centuries include Odonata.] Address: Dicke, M., Laboratory of Entomology, Wageningen University, P.O. Box 8031, NL-6700 EH Wageningen, The Netherlands; E-mail: marcel.dicke@wur.nl

11782. Kharchenko, L.P.; Mikhaylov, V.A.; Gramma, V.N.; Malovichko, L.V. (2004): Insects in nutrition of *Merops apiaster* (Aves: Coraciiformes: Meropidae) (Third report). *The Kharkov Entomological Society Gazette* 2003 (2004) 11(1-2): 137-142. (in Russian) [125 fecals of *Merops apiaster* contain fragments of 2 250 specimens of insects from 10 orders and 52 families. Dominating taxa belong to the Hymenoptera, mostly the honey-bee. The following Odonata taxa have been found: *Calopteryx splendens*, *Calopteryx* sp., *Lestes* sp., *Coenagrion* sp., *Anax* sp., *Aeshna* sp., *Cordulia aenea*, *Sympetrum* sp. and *Libellula* sp.] Address: Kharchenko L. P., Department of Zoology, Kharkov State Pedagogical University, ul. Blukhera 2, Kharkov, 61168, Ukraine

11783. Müller, J. (2004): Flugkünstler mit Vorliebe für Fast Food. In: Röller, O. & J. Müller: *Naturschätze aus der Pfalz*. *Pollichia Sonderdruck* Nr. 9: 112-115. (in German) [Rheinland-Pfalz, Germany. General introduction to dragonflies, and brief notes on the (regional) activities of Jürgen Ott related to Odonata.] Address: POL-LICHIA, Bismarckstr. 33, 67433 Neustadt/Weinstraße, Germany. E-mail: hauptverein@pollichia.de

11784. Wade, S.; Corbin, T.; McDowell, L.M. (2004): *Critter Catalogue*. A guide to the aquatic invertebrates of South Australian inland waters. Environment Protection Authority. ISBN 1 876562 67 6: VI + 186 pp. (in English) [Odonata (larvae) are introduced on pages 100-103.] Address: Environment Protection Authority, GPO Box 2607, Adelaide SA 5001, Australia

2005

11785. Brunelle, P.M. (2005): *Odonata Survey 2005: (Damselflies and Dragonflies)*, Whites Point Property, Digby County, Nova Scotia. Prepared for: Bilcon of Nova Scotia Corp., P.O. Box 2113, Digby, Nova Scotia, Canada B0V 1A0: 17 pp. (in English) [6-8-VIII-2005; "We visited all freshwater and brackish habitats at the appropriate time of day and weather condition for effec-

tive sampling of these insects. I documented all aquatic habitats, and we took 51 records of 21 species. Only one species we encountered is of some conservation concern - *Lestes forcipatus*, which is ranked as undetermined due to past confusion with the similar and common *L. disjunctus* - the balance being species common in Nova Scotia. I suggest in Table 1 other Odonata species which may be found in the aquatic habitats of the property, depending upon season of survey. The principal Odonata diversity on the property occurs in man-made habitats. Whether this diversity will persist through active industrial activities will be dependent upon the nature of those activities. During the reclamation phase of the project, efforts should be made to ensure that the freshwater aquatic habitats recover their diversity in Odonata. This may be beneficial, as small still-water habitats are rare along North Mountain, and that area of the province may host migratory Odonata (*Anax junius* in particular) which would benefit from the presence of those habitats. At this time, there is no indication of rare Odonata in the natural bog and stream habitats present on the property, and hence no particular concern that the still-water species will compete with them. If rare Odonata are discovered in the future outside of the man-made habitats, consideration should be given to removing the constructed still-water habitats during the reclamation phase." (Author)] Address: Brunelle, P.M., 6044-1 Compton Avenue, Halifax, Nova Scotia, Canada B3K 1E7. E-mail: pmb@ns.sympatico.ca

11786. Febria, C.M.; Magnusson, A.K.; Williams, D.D. (2005): Seasonal abundance and prey selection of the nymphs of three sympatric species of *Sympetrum* (Odonata: Libellulidae) in an intermittent pond. *Canadian Entomologist* 137: 723-727. (in English) ["Odonates are obligate predators, and the composition of their diet is reflective of their microhabitat and effectiveness in detecting and capturing prey. In an intermittent woodland pond in southern Ontario, Canada, three species of *Sympetrum* were found to coexist: *S. internum*, *S. costiferum*, and *S. obtrusum*. *Sympetrum* species spend most of their life cycle in the aquatic stage and consume prey at all nymphal stadia. They overwinter in the egg stage, hatch in early spring, and typically emerge in late June to late July. To better understand the role of coexisting *Sympetrum* nymphs in this intermittent pond environment, and to evaluate potential mechanisms behind their coexistence, we collected seasonal abundance and body size data for 2 years and analyzed gut contents of each species. In addition, we experimentally tested the prey selection and predatory rate of two different size classes of *Sympetrum* nymphs and two of their potential competitors, *Lestes* sp. and *Acilius* sp. (Coleoptera: Dytiscidae), in laboratory microcosms." (Authors)] Address: Febria, Catherine, Surface and Groundwater Ecology Research Group, Dept Life Sciences, Univ. Toronto at Scarborough, Ontario, Canada M1C 1A4. E-mail: catherine.febria@utoronto.ca

11787. Nel, A.; Petrulevicius, J.F.; Jarzembowski, E.A. (2005): New fossil Odonata from the European Cenozoic (Insecta: Odonata: Thaumateuridae, Aeshnidae, ? Idionychidae, Libellulidae). *Neues Jahrbuch für Geologie und Paläontologie - Abhandlungen* 235(3): 343-380. (in English) ["A new genus and species of the fossil subfamily Thaumateuridae: *Dysagrioninae Primorilestes violetae* is described from the Early Oligocene of the Far East of Russia. The aeshnid *Aeschnophlebia andreasi* sp. n. is described from the Late Eocene/Early

Oligocene of the UK. *Oligoaeschna* (?) *anglica* Cockerell & Andrews, 1916 is redescribed on the basis of new, more complete material from the same strata. The hindwing structures of *Oligoaeschna jungi* Piton & Theobald, 1939 are described on the basis of a complete wing from the Oligocene of France. *Aeshna stavropolensis* sp. n. (Aeshnidae), *Mioidionyx stavropolensis* gen. n. sp. n. (?Idionychidae), two wings attributed to *Sympetrum* aff. *elongatum* Gentilini, 1989, and two unnamed Pantalinae (Libellulidae) are described from the Middle Miocene of Stavropol (North Caucasus, Russia). *Libellula ukrainensis* sp. n. is described from the Late Miocene of Crimea (Ukraine). The libellulid *Jeanlegrandia oligocenica* gen. n. sp. n. is described from the Late Oligocene of France. These new discoveries confirm the high diversity of the Cenozoic odonofauna of the Palaearctic Region." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

2006

11788. Holland, R.A.; Wikelski, M.; Wilcove, D.S. (2006): How and why do insects migrate? *Science* 313: 794-796. (in English) ["Countless numbers of insects migrate within and between continents every year, and yet we know very little about the ultimate reasons and proximate mechanisms that would explain these mass movements. Here we suggest that perhaps the most important reason for insects to migrate is to hedge their reproductive bets. By spreading their breeding efforts in space and time, insects distribute their offspring over a range of environmental conditions. We show how the study of individual long-distance movements of insects may contribute to a better understanding of migration. In the future, advances in tracking methods may enable the global surveillance of large insects such as desert locusts." (Authors) Several references to Odonata (*Rhionaeschna bonariensis*, *Anax junius*) are made.] Address: Wikelski, M., Department of Ecology and Evolutionary Biology, Princeton Univ., Princeton, NJ 08544, USA. E-mail: wikelski@princeton.edu

2007

11789. Cottle, N. (2007): *Brachythemis leucostica* (Burmeister, 1839) (Anisoptera: Libellulidae): A new dragonfly species for Cyprus, and *Trithemis arteriosa* (Burmeister, 1839) (Anisoptera: Libellulidae): a rarely recorded dragonfly species in Cyprus. *Bulletin of the Amateur Entomologists Society* 66: 59-62, plate 4. (in English) [*Brachythemis impartita* was observed on 11-VIII-2006 at Akhna Dam, Cyprus (35.02.50N 033.47.55E, 34 metres ASL). Records on *Trithemis arteriosa* from five localities are documented.] Address: Cottle, N., c/o CAO, JSSU(CYP), BFPO 59., Cyprus. E-mail: nwcottle@gmail.com

11790. Unrine, J.M.; Hopkins, W.A.; Romanek, C.S.; Jackson, B.P. (2007): Bioaccumulation of trace elements in omnivorous amphibian larvae: Implications for amphibian health and contaminant transport. *Environmental Pollution* 149: 182-192. (in English) ["Despite the influence that amphibians have on the flow of energy and nutrients in ecological systems, the role that amphibians play in transporting contaminants through food webs has received very little attention. This study

was undertaken to investigate bioaccumulation of trace elements (Mn, Se, V, As, Pb, Zn, Hg, Cd, Cu) in amphibians relative to other small aquatic organisms in a contaminated wetland. We collected bullfrog larvae (*Rana catesbeiana*) along with three other species of small vertebrates and four species of invertebrates (*Tramea* sp., *Erythemis* sp.) from a site contaminated with a wide array of trace elements and analyzed them for trace element concentrations and stable nitrogen and carbon isotope composition. We found that amphibian larvae accumulated the highest concentrations of most trace elements, possibly due to their feeding ecology. These results suggest that omnivorous amphibian larvae can serve as a critical link for trace element trophic transfer. Their propensity to accumulate trace elements may have important implications for amphibian health in contaminated environments and should be further investigated." (Authors)] Address: Urine, J.M., Savannah River Ecology Laboratory, University of Georgia, P.O. Drawer E, Aiken, SC 29802, USA. E-mail address: urine@srel.edu

11791. Wang, Z. (2007): The Fauna Dragonflies of Henan Odonata. Henan Science and Technology Press: 189 pp, 43 plates. (in Chinese) [96 Odonata species of the Henan province (China) are treated in a monographic way. All species are documented on colour plates. The book includes sections on morphology of imagines and larvae plus identification keys. Each species is represented with information on synonymy, morphology, b&w drawings, regional distribution and phenology.] Address: Wang Zhi-guo, Henan Academy of Science, Zhengzhou, Henan, 450002 China

11792. Winkel, S.; Kuprian, M. (2007): Die Helm-Azurjungfer (*Coenagrion mercuriale*) bei Gelnhausen (Main-Kinzig-Kreis). Mitteilungsblatt Zentrum für Regionalgeschichte 33: 60-65. (in German) [Hessen, Germany; on 12-VII-2006, along a ditch of 140 m length, 88 males of *C. mercuriale* were recorded.] Address: Winkel, Sibylle, Pommernstr. 7, D-63069 Offenbach, Germany. E-mail: Si-winkel@t-online.de

11793. Zhang, D.-z. (2007): Research on the resource of the dragonfly and damselfly in Ningxia. Journal of Anhui Agri. Sci. 35(27): 8538-8539, 8553. (in Chinese, with English summary) [38 species from the Ningxia province, China are documented] Address: Zhang, D.-z., School of Life Science, Ningxia University, Yinchuan, Ningxia 750021, China

2008

11794. Andrew, R.J.; Subramaniam, K.A.; Tiple, A.D. (2008): Common Odonates of Central India. E-book for "The 18th International Symposium of Odonatology", Hislop College, Nagpur, India: 50 pp. (in English) [The book introduces 45 Indian Odonata species found in the water bodies of the forest surrounding the City of Nagpur, India.] Address: Andrew, R.J., Department of Zoology, Shri Shivaji ESA's Science College, Congress Nagar, Nagpur - 440012 (MS), India

11795. Balik, S.; Rusen Ustaoglu, M.; Özdemir Mis, D.; Aygen, C.; Tasdemir, A.; İlhan, A. (2008): First observations on the aquatic fauna inhabiting freshwaters ponds of Turkish Republic of Northern Cyprus. E.U. Journal of Fisheries & Aquatic Sciences 25(4): 347-351. (in Turkish, with English summary) ["Aquatic fauna of 12 reser-

voirs located in Turkish Republic of Northern Cyprus were investigated during the period of 16-22 June 2002. Some of the physico-chemical features of the sampling localities were determined as well. Total of 62 taxa comprising 24 rotifers, 16 crustaceans, 18 insects and 3 fishes and one amphibian were determined. All of the determined taxa except *Rana ridibunda* were firstly reported from Turkish Republic of Northern Cyprus." (Authors) The Odonata taxa list includes *Anax* sp., *Leucorrhinia* sp., and *Coenagrion* sp.] Address: Balık, S., Ege Üniversitesi, Su Ürünleri Fakültesi, Su Ürünleri Temel Bilimler Bölümü, Yıcsular Biyolojisi Anabilim Dalı, Bornova 35100, İzmir, Turkey. E mail: m.rusen.ustaoglu@ege.edu.tr

11796. Fulan, J.A.; Raimundo, R.; Figueiredo, D. (2008): Habitat characteristics and dragonflies (Odonata) diversity and abundance in the Guadiana River, eastern of the Alentejo, Portugal. Boln. Asoc. esp. Ent. 32(3-4): 327-340. (in English, with Spanish summary) ["In this study, we investigated the environmental variable that affected the dragonfly diversity and abundance in the Guadiana River in the period of March to July in 1999 and 2000. A total of 105 sites were investigated where 19 species of dragonflies, ten species of Anisoptera and nine species of Zygoptera were recorded. Canonical Correspondence Analysis (CCA) indicated that environmental factors were related to some species. *C. lindennii*, *C. tenellum*, *C. caerulescens*, *C. scitulum*, *E. viridulum* and *I. pumilio* (all Zygoptera) occurred in conditions of a relatively high percentage of cover of reeds. The occurrence of Anisoptera species such as *C. boltonii*, *O. caerulescens* and *O. nitidiverve* were influenced by shade." (Author)] Address: Fulan, J.A., Department of Zoology, Institute of Biosciences, State University of São Paulo, Campus of Botucatu, 18618-000 Botucatu, SP, Brazil; E-mail: joaofulan@ig.com.br

11797. Muramy, D.; Kovacs, T. (2008): Review and contribution to the Odonata fauna of Maramures, Romania. Studia Universitatis "Vasile Goldis", Seria Stiintele Vietii (Life Sciences Series) 18(Suppl.): 229-234. ["An annotated list of the 36 Odonata species reported from Maramures, Romania, and data of the Odonata material collected between 2004 and 2008 are given. Eleven species (*Lestes sponsa*, *Platycnemis pennipes pennipes*, *Enallagma cyathigerum*, *Ischnura pumilio*, *Anaciaeschna isosceles isosceles*, *Anax imperator*, *A. parthenope*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus forcipatus*, *Orthetrum cancellatum cancellatum*, *Sympetrum danae*) are new records for the area. Taxonomical characters of the *Leucorrhinia dubia dubia* population found in the Rodna Mts are briefly discussed, and notes given on the faunistic rarities of the peat bogs of Maramures." (Authors)] Address: Murányi D., Hungarian Natural History Museum, Department of Zoology, Baross u. 13, H-1088, Budapest, Hungary, Tel. +36-1-267-7007, Fax. +36-1-3171-669, email: muranyi@zool.nhmus.hu

11798. Villeda Callejas, María del Pilar; Barrera Escorcia, Héctor; Lara Vázquez, José Ángel; Ruiz Puga, Pablo (2008): Histología del tubo digestivo de *Dythemis velox* (Libellulidae: Odonata). Revista de Zoología 19: 1-6. (in Spanish, with English summary) ["In the present work we analyze the morphology and the histology of digestive apparatus of *Dythemis velox*. It is observed that the estomodeo lacks of gastric caeca, and in a cross section are the layers of the circular muscle, the longitudinal muscle, epithelia that consist of a layer of cylindrical cells, and the intimate one that limits the lumen.

The mesodeo is limited by the cardiac valve in the previous end, and folds conformed by longitudinal muscle and followed of a columnar epithelia with microvilli that rest on a basal membrane, it lacks of a cuticular layer and in its place we observed a thin peritrophic membrane. The Proctodeo has great amount of folds towards the lumen of epithelial cells covered by a fine cuticular membrane. We conclude that the histology of the digestive tract of *D. velox* is very similar to that observed by other authors in saproxylofagous coleopterans." (Authors)] Address: Villeda Callejas, María del Pilar, Laboratorio de Zoología, UNAM. Av. de los Barrios No. 1, Los Reyes Iztacala, Tlalnepantla, Estado de México. México C.P. 54090 correo: mapilivilleda @ yahoo.com.mx

2009

11799. Clarke, D. (2009): Males of the Common Blue Damselfly (*Enallagma cyathigerum*) targeting an ovipositing female Emperor Dragonfly (*Anax imperator*). *The Carlisle Naturalist* 17(1): 11-12. (in English) [Verbatim: On the calm sunny afternoon of 4th July 2008 a female Emperor Dragonfly was ovipositing near the edge of one of the pools on Scaleby Moss, Carlisle. Whilst watching her I noticed that she was being 'harassed' by several males of the Common Blue Damselfly, which were frequent, though not in 'swarming' numbers. I took some photographs, and two in particular confirm what I saw. In one shot, two Common Blue males are apparently 'buzzing' her (from in front and behind) and in the other a male is actually perched on her arched abdomen, facing forwards, his head just behind her wing bases, whilst she is laying eggs into vegetation just below the water surface. The Emperor showed no apparent response to this attention. At first glance this behaviour looked rather like aggression, but the biological advantage to a small weak predator of attacking a very much larger and aggressive one would seem limited, to say the least - and insects don't act like small birds mobbing raptors. My preferred explanation was that the coloration of this female Emperor - a typical greenish form with dark dorsal abdominal strip - was sufficiently similar to that of the normal colour phase of a female Common Blue as to present a 'super-stimulus' to males of that species, releasing a mating behavioural response. The alternative - which I am very reluctant to concede - is that what I saw was purely coincidental: the 'buzzing' Blues were just going about their business; the Emperor just happened to be a convenient perch for one of them. As opportunities to watch Emperors up here are still relatively few (though increasing), I had submitted this note to the Newsletter of the British Dragonfly Society. It appears in issue No. 54, along with a couple of very good images of the same behaviour taken in southern England, so this may actually be a frequent phenomenon.] Address: Clarke, D., Burnfoot, Cumwhitton, Brampton, Cumbria CA8 9EX, UK

11800. Farkas, A.; Jakab, T.; Schnitthen, C.; Dévai, G. (2009): Folyami szitakötök (Odonata: Gomphidae) populációinak exuviumokon alapuló felmérése a Szamos olcsvai szakaszán. *Hidrológiai Közlöny* 89(6): 101-104. (in Hungarian, with English summary) [Exuviae of *Gomphus vulgatissimus*, *Stylurus flavipes* and *Ophiogomphus cecilia* were collected on 3, 20 m long shorelines on the left bank of River Szamos between Olcsva and Olcsvaapáti belonging to the settlement Olcsva,

Hungary. Data are analysed in terms of emergence curve, abundance, sex-ratio, phenology and substrate preference.] Address: Farkas, Anna, Department of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

11801. Farkas, A.; Jakab, T.; Dévai, G. (2009): Assessment of riverine dragonfly populations (Odonata: Gomphidae) on the basis of exuviae on the reach of the river Tisza at Váosnaményi. *Acta biologica Debrecina. Supplementum oecologica hungarica* 20: 65-78. (in Hungarian, with English summary) [Exuviae of *Gomphus vulgatissimus*, *Stylurus flavipes* and *Ophiogomphus cecilia* were collected on three, 20 m long shorelines on the left bank of River Tisza, belonging to the settlement Vásárosnamény, Hungary. Data are analysed in terms of emergence curve, abundance, sex-ratio, phenology and substrate preference.] Address: Farkas, Anna, Department of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

11802. Glitz, D. (2009): Libellen. Geländeschlüssel für Rheinland-Pfalz und das Saarland. NABU Rheinland-Pfalz. Mainz: 108 pp. (in German) [This is an identification key to the Odonata of the federal states Rheinland-Pfalz and Saarland (Germany). It includes dichotomous keys, black & white drawings and a section of informative colour photographs of the species. Photographs of species, habitats and examples of habitat conservation measures are added to the book on a CD.] Address: NABU Rheinland-Pfalz e.V., Frauenlobstr. 15-19, 55118 Mainz, Germany. E-mail: Kontakt@NABU-RLP.de

11803. Holuša, O. (2009): Notes to the first record of *Somatochlora meridionalis* (Odonata: Corduliidae) in the Czech Republic. *Acta Musei Beskydensis* 1(1): 89-95. (in English, with Czech summary) [July 2006, near Vlachovice-Vrbitice village, SE Czech Republic, foothills of the Bílé Karpaty Mts.] Address: Holuša, O., Department of Forest Protection and Game Management, Faculty of Forestry and Wood Technology, Mendel University of Agriculture and Forestry Brno, Zemědělska 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

11804. Jinguji, H.; Ueda, T.; Goka, K.; Hidaka, K.; Matsura, T. (2009): Effects of Imidacloprid and Fipronil insecticide application on the larvae and adults of *Sympetrum frequens* (Libellulidae: Odonata). *Transactions of the Japanese Society of Irrigation, Drainage and Rural Engineering* 77(1) (259): 35-41. (in Japanese) ["The insecticides fipronil and imidacloprid are effectively used against sucking insect pests of rice. Since these agents are absorbed by rice seedlings and stored in their tissues, they are usually applied to nursery boxes before planting. The effects of imidacloprid and fipronil on the life history of *S. frequens* larvae and adults were monitored using an experimental micro-paddy lysimeter (350mm× 500mm× 300mm (H)) for the duration of the cultivation period. Three lysimeters were treated with imidacloprid, three with fipronil, and the remaining three were left untreated and were used as controls. Three hundred eggs were laid on the soil surface of each of the nine lysimeters and the larval populations, larval development, and emergence patterns of *Sympetrum frequens* were observed in each lysimeter. The absence of *S. frequens* larvae from fipronil-treated-lysimeters

was most remarkable and exuviae were not observed. Imidacloprid-treated-lysimeters had approximately 60% of the larvae observed in control lysimeters. In addition, larvae in the imidacloprid lysimeter had lower mean specific growth rates and the length of adult wings was decreased relative to those observed in the control lysimeter. Emergence in imidacloprid lysimeters was also significantly lower than it was in the control. The application of fipronil and imidacloprid to seedling in the nursery box, and the subsequent transplanting of these into an experimental lysimeter, was associated with a decrease in the abundance of *S. frequens* larvae and adults." (Authors)] Address: Jinguji, H., School of Food, Agricultural and Environmental Sciences, Miyagi University, 2-2-1 Hatatate, Taihaku-ku. Sendai. Miyagi 982-0215, Japan. E-mail: jinguji@myu.ac.jp

11805. Kooi, R.E. (2009): Jan van Tol, a born manager in entomology. *Entomologische Berichten* 69(1): 16-17. (in Dutch, with English summary) ["Jan became a member of The Netherlands Entomological Society (NEV) around 1980. When he visited his secondary school he was already interested in aquatic entomology. He finished his biology study at the Leiden University in 1976. Between 1977 and 1986 Jan was the coordinator of EIS-Nederland. In that time he became involved in the research work of DC Geijskes on dragonflies. In 1986 he got the opportunity to become a curator of the National Museum of Natural History at Leiden (= currently Naturalis). His research field is the diversity, phylogeny and biogeography of Odonata of Southeast Asia. Jan was president of the NEV from 1998 to 2008." (Author)] Address: unknown

11806. Meschini, A.; Massa, B.; Bruno, M. (2009): Dieta, ritmi di foraggiamento ed importanza degli Anfibi durante l'allevamento dei pulli di Ghiandaia marina *Coracias garrulus* nella Maremma laziale. *Alula* XVI(1-2): 249-251. (in Italian, with English summary) [Maremma lazio is the area north of Rome and south of Tuscany, Italy. The study demonstrates that in European Roller (Aves: *Coracias garrulus*) the chicks diet comprises in 52.83% of amphibians. Odonata account to 5.66%.] Address: Meschini, A., S.R.O.P.U. (Stazione Romana per l'Osservazione e la Protezione degli Uccelli) c/o LYNX Natura e Ambiente srl – Via Britannia, 36 – Roma, Italy. E-mail: a.meschini@gmail.com

11807. Nicolai, B.; Mammen, K. (2009): Bedeutende Libellen-Vorkommen im Nordharzvorland: Helm-Azurjungfer *Coenagrion mercuriale* - Kleiner Blaupfeil *Orthetrum coerulescens* und Südlicher Blaupfeil *Orthetrum brunneum* (Odonata). *Abhandlungen und Berichte aus dem Museum Heineanum* 8: 17-34. (in German, with English summary) [In 2008 and 2009, *C. mercuriale*, *O. brunneum* and *O. coerulescens* were recorded along ditches near Halberstadt, Sachsen-Anhalt, Germany. Information on habitat, biology, phenology, threats and conservation measures are provided.] Address: Nicolai, B., Museum Heineanum, Domplatz 36, 38820 Halberstadt, Germany. E-mail: nicolai@halberstadt.de

11808. Rosset, V. (2009): Local biodiversity should increase with climate change: case-study for ponds from the Swiss National Park. 4th Symposium of the Hohe Tauern National Park, Conference Volume for Research in Protected Areas, September 17th to 19th, 2009, Castle of Kaprun: 283-286. (in English) ["Climate change is expected to have a significant impact on biodiversity worldwide (Thomas et al. 2004). Many studies focus on

responses to climate change at the regional level, such as species distribution shifts, and evidence that enrichment of regional biodiversity could happen in many areas of the world (Hickling et al. 2006). Less is known, however, about the consequences of climate change on the species richness in ecosystems (local scale). Alpine areas are particularly sensitive to climate change (Beniston 2003). Small waterbodies like ponds are abundant and widespread, and because of their small size they shelter simple communities, particularly at high altitude. Therefore, alpine ponds should play an important role as sentinel and early warning systems in the assessment of the future changes in local biodiversity. The Macun ponds of the Swiss National Park are part of a unique and exceptional area for such investigation and monitoring. ... predictions for alpine ponds evidence that a temperature increase would enhance pond diversity for the five taxonomic groups: +139% for vascular plants, apparition of Gastropoda, + 185% for Coleoptera, +454% for Odonata ..." (Author)] Address: Rosset, Veronique, Department of Nature Management, Hepia University of Applied Sciences Western Switzerland, hepia Geneva technology, architecture and landscape, CH 1254 Jussy-Geneva, Switzerland. E-mails: veronique.rosset@hesge.ch

11809. Ruppell, G.; Hilfert-Ruppell, D. (2009): Flugmanöver von *Calopteryx splendens* (Calopterygidae, Odonata) an der Oker nördlich von Braunschweig, analysiert mit einer neuen Zeitlupentechnik. *Braunschweiger naturkundliche Schriften* 8(2): 421-438. (in German, with English summary) ["By means of a new digital slow motion technique flight manoeuvres of *C. splendens* were filmed and analysed in the summer 2008 at the Oker River north of Braunschweig, Germany. This new method allowed to detect new details even in basic flight behaviour. Furthermore rare manoeuvres were analyzed: compensation movements after crashing by gusts, changing the direction of flight, escaping manoeuvres from *Anax imperator*, aggressive flights between females and a crash with male and female. In all this flight manoeuvres *C.splendens* showed that the special mode of wing beating by moving both wing pairs in parallel is useful not only for signalling but for a very good manoeuvrability, too." (Authors)] Address: Hilfert-Ruppell Dagmar, Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

11810. Schröder, R.; Walguarnay, J.W.; Butler, M.A. (2009): The damselfly compound eye in stream habitat: Biological design for object detection in a dark complex habitat. *Proceedings of the Army Science Conference (26th)* Held in Orlando, Florida on 1-4, December 2008: 8 pp. (in English) ["Habitats characterized by high spatial variation in absolute light levels and spectral quality present a challenge to animals that rely on visual orientation and visual target discrimination. Insects, in particular, face several difficulties in visual performance related to the small absolute size and simplicity of visual components comprising their compound eyes, including the lack of a focusing mechanism, relatively limited light capture and coarse spatial resolution. Therefore, an understanding of the morphological and behavioural means by which insects overcome these limitations in order to perform highly demanding visual tasks can provide insight into both ecological specialization and artificial visual system optimization. We investigated optical geometry, perch orientation and microhabitat selec-

tion in the Hawaiian damselfly *Megalagrion xanthomelas*, a sit-and-wait predator that intercepts aerial prey among heterogeneous vegetation bordering streams and wetlands. We found that while the eyes of *M. xanthomelas* are roughly spherical, maximum visual acuity appears concentrated in an oblong region shifted below the equatorial frontal plane. This optical geometry corresponds well with typical orientations of damselflies resting on perches and suggests an arrangement maximizing detection of prey or conspecifics travelling along stream margins. We discuss the visual morphology and behaviour of *M. xanthomelas* in relation to available light environments and in comparison to the visual systems of other species." (Authors)] Address: Butler, Marguerite, University of Hawaii, Department of Zoology, 2538 McCarthy Mall, 96822 Honolulu, HI, USA. E-mail mbutler@hawaii.edu

11811. van Tol, J.; Reijnen, B.T.; Thomassen, H.A. (2009): Phylogeny and biogeography of the Platystictidae (Odonata). PhD Thesis. University of Leiden: 3-70. (in English) ["Conclusions: Methods. – We used both morphological and molecular characters for our phylogenetic analyses. Although the most parsimonious tree of the morphological character set showed many homoplasies, the strict consensus tree of the parsimony analysis was highly resolved, although the branches are poorly supported. However, we consider the significant congruence of this consensus tree with a tree based on molecular characters of a smaller taxon sample, a distinct indication of the robustness of the morphological character analysis. Relationships. – To establish the relationships and estimate the age of the odonate family Platystictidae, we studied a wide assemblage of species of southeast Asia representing the Zygoptera families Lestidae, Platystictidae, Platycnemididae, Protoneuridae, Megapodagrionidae and Coenagrionidae. Based on molecular characters, we ascertained that the Platystictidae represents an ancient monophyletic lineage of the Zygoptera. We confirmed the monophyly of the Platycnemididae, and the sister group relationship of the presently recognized subfamilies. The Protoneuridae were established as the sister group of the Platycnemididae. The family Megapodagrionidae seems to be a para- or even polyphyletic assemblage, which clearly needs further revision. Previous studies, such as Rehn (2003), found a different topology in the phylogenetic reconstruction of the Zygoptera, but our results agree broadly with Bybee et al. (2008), who added molecular characters to the morphological dataset of Rehn (2003). For a further understanding of the phylogeny of Zygoptera, we suggest inclusion of various small families of southeast Asia, such as the Isostictidae, a further expansion of the Coenagrionidae taxon sampling, and, in our set, addition of taxa of the New World. The subfamily Sinostictinae (only studied on morphology) 4 represents the most basal clade in the phylogeny of the Platystictidae. The Palaemnematinae of the New World are the sister group of the Platystictinae in our analysis based on a limited taxon sample. Based on our morphological study, it appeared that the Palaemnematinae are not monophyletic, but share a common ancestor with the genus *Platysticta* (Sri Lanka) and some species of *Drepanosticta* confined to New Guinea. Characters. – We have used the topology of the phylogenetic tree based on molecular characters to analyse the changes in character states of the morphological characters. We found that not many morphological characters exclusively define monophyletic groups as based on the mo-

lecular character set. Parallel development of the same character state appeared to be a common phenomenon. This conclusion was confirmed by our independent analysis of the morphological data set plotted on the tree based on molecular characters. Our results confirmed the supposition by Orr (2003) that *Protosticta Selys sensu Davies & Tobin (1984)* cannot be considered an monophyletic group. The reduction of the Ab vein has occurred several times during evolution (Fig. 51). On the other hand, some other wing venational character states, such as the position of the IR3, only developed once. Somewhat unexpectedly, also some characters of the anal appendages appeared to be very homoplastic. A long and conspicuous dorsal denticle on the superior appendage of the male evolved various times. For a further understanding of the phylogeny of the Platystictidae, we suggest a more extensive taxon sampling first, and an increased number of genetic markers in the molecular analyses. Biogeography. – The present 'tropical amphi-transpacific distribution' of the Platystictidae evolved from African ancestors that reached Asia via India, and the New World via the 'North Atlantic Land Bridge'. The evolution of the subfamily Platystictinae can be understood in relation to the palaeogeography of the Malesian region since the Eocene. Our limited taxon sample for molecular characters permitted only a very rough indication of a biogeographical scenario. Our reconstruction of the phylogeny based on the morphological characters, including more species of Platystictidae, permitted a more detailed scenario. Based on the occurrence of basal clades in southeast China (*Sinostictinae*) and Sri Lanka (*Platysticta* and some *Drepanosticta*), in combination with the presence of this family in the New World, we consider an origin of the ancestors of this family in Africa (where it does not occur at present) as the most likely scenario. The American taxa must have dispersed from Eurasia (Europe) via the North Atlantic Land Bridge during the Eocene, while the Asian clade dispersed into the region after India and Asia made their first contact about 50 Ma. Whether the species of New Guinea used a route via Asia (pre-Eocene Papuan Arc, suggesting evolution of the family in Asia), or via Australia (no recent representative in that continent), needs further study, including estimates of cladogenesis using a molecular clock. The cladogram of the Platystictinae and the present distribution of the species, indicate an eastward dispersal in which Sulawesi has played a prominent role. The widespread occurrence of one lineage from the Philippines to the northern Moluccas and New Guinea is presumably due to a geologically recent dispersal, probably during the Miocene or later. This study of the Platystictidae confirms the complicated nature of the historical biogeography of southeast Asia. A similar study of the Calicnemiinae (*Platycnemididae*) (Gassmann 2005, van Tol & Gassmann 2007) revealed a different scenario. The family *Platycnemididae* is very diverse at the genus level in New Guinea, is very speciose with two closely related genera in the Philippines, but is unknown from Sulawesi and Halmahera. New Guinea was apparently populated from the mainland of southeast Asia via the Izu-Bonin Arc, whereafter this group dispersed into western direction to reach the Philippines. Ancient lineages of the Calicnemiinae are found on New Guinea, as is also the case in the Platystictidae and various other groups of aquatic insects. Polhemus (1995) has stressed the role of a 'pre-Eocene' arc for aquatic Heteroptera. Such an arc may also have played a role in the origin of present distribu-

tion patterns in the Calicnemiinae and the Platystictidae. The historical biogeography of Malesia certainly asks for more, well-founded phylogenies of groups with similar ecology. The importance of estimates of timing of cladogenesis of those groups should be emphasized. This is considered the most reliable method to study the congruence between different cladograms, and area cladograms, in order to arrive at a reconstruction of the distributional history of the biotas of southeast Asia and the West Pacific. Species diversity. – Finally, it is an intriguing question how the huge diversity of the endemic flora and fauna of Malesia evolved. The present and palaeo-geography of the region strongly suggest that dispersal is the overwhelmingly universal mechanism in which the islands of Malesia were populated. Species with high dispersal power will be most successful in populating vacant islands, and are the most likely candidates as inhabitants of isolated islands. However, dispersive species frequently reach the same places, so that even such relatively isolated populations cannot evolve isolating mechanisms due to frequent gene flow between populations. Thus, dispersive species usually have large distributional ranges. On the other hand, it is unlikely that species with low dispersal power will ever reach isolated islands. The composition of island biotas was described in the dynamic equilibrium model of island biogeography by MacArthur & Wilson (1963, 1967), which is mainly a theory on an ecological time scale. Whittaker et al. (2008) recently proposed ‘a general dynamic theory of oceanic island biogeography’, in which also the geological life cycle of islands is incorporated. During the life cycle of an island, the complexity of habitats increases in relation to the development of an increasingly complex topography. Such conditions may provide opportunities for radiation of local plant and animal groups, as well as for individuals that newly reach the island. Small distributional ranges in Malesia are common in very different groups of plants and animals. The present distributional patterns of biotas are supposed to reflect events in the geological past, and congruent patterns of area relationships are frequently found in southeast Asia. Such patterns are usually attributed to vicariance events, but palaeogeographical data of southeast Asia hardly support the hypothesis that splitting of islands has frequently occurred. We presume that the dynamics of origin, movements with the continental plates, and final disappearance of the islands of the archipelago have been a more dominant driving force in the evolution of taxa. The resulting variation in proximity of islands to other islands or continental fragments during their geological history provided an environment in which completely different biotas could be ‘exchanged’. This aspect provides a further dimension in Whittaker’s et al. (2008) theory on island biogeography. Apparently, the biotas of Malesia evolved in a fragile balance, in which rare occasions of (common) dispersal events were interrupted with long periods without dispersal and radiation of local populations. The isolation of the islands in the Indo-Australian region during the Cenozoic strongly depended on the continuous reorganisation of the islands. During periods of low colonization rate, founder populations usually evolve isolating mechanisms (see Heaney, 2000). Specimens from new dispersal events, even from the same source population, may then no longer be able to mix with descendants of previous dispersal events, enabling the involvement of new species in the same area. In some cases, the flora and fauna of present-day larger islands, such as Sulawesi and New Guinea, which are them-

selves combinations of palaeo-islands that merged in the geological past, reflect the highly complex nature of evolution on the palaeo-islands, and the subsequent evolution of the biotas after the amalgamation of their habitats.” (Authors)] Address: Tol, J. van, National Museum of Natural History, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands

11812. Bouwman, J.H. (2010): Two new populations of *Somatochlora arctica* in Overijssel. *Brachytron* 13(1/2): 26-31. (in Dutch, with English summary) [“In 2008 two new populations of *S. arctica* were discovered in the southeastern part of the province for Overijssel, The Netherlands. These populations are the second and third for Overijssel. One population is located at the crossborder nature reserve Witte veen where it can be found in a peat area which is dominated by *Eriophorum angustifolium*, *Molinea caerulea* and *Sphagnum*-mosses. The second population is located in both the Overijssel as the Gelderland part of Het Lankeet. During the first visit the actual reproduction site couldn’t be found. In late summer 2008 the probable reproduction site was found. This beautiful peat area is dominated by *Narthecium ossifragum*, *Eriophorum angustifolium* and *Sphagnum* species like *S. cuspidatum* en *S. magellanicum*. On the 20th of May 2009 31 exuviae and several juveniles were found here, which shows that a big population is present here. Probably more populations can be found in the next years.” (Author)] Address: Bouwman, J.H., Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

11813. Briggs, N.; Schneider, E.G.; Sones, J.; Puryear, K. (2010): Inventory of Odonata (Dragonflies and damselflies) at Gateway National Recreation Area. Natural Resource Technical Report NPS/NCBN/NRTR—2010/296: XV + 79 pp. (in English) [New York & New Jersey, USA; “In order to expand knowledge of odonate biodiversity and to make recommendations for management, we conducted a comprehensive baseline inventory of Odonata at Gateway National Recreation Area (GATE). During 2004 and 2005 we conducted a checklist inventory at sites where odonates could potentially breed, as well as at potential migratory and foraging sites. Checklist walks are unrestricted, complete searches that provide an efficient means for initial determination of species presence. During the combined 2004 and 2005 field seasons, 37 species of odonates were documented across 38 sites surveyed. Two New York state listed species were observed, *Ischnura ramburii* and *Libellula needhamii*. Of the 4,671 individuals sighted during 2004 and 2005, 353 were collected as voucher specimens, representing 35 of the 37 species recorded. The most abundant odonate species at GATE were *Enallagma civile*, *Pachydiplax longipennis*, *Ischnura hastata*, and *Epiaeschna heros*. GATE is located within the odonate migration corridor and offers critical habitat for migrating odonates. Migrating odonates were observed during both years of this study in the Jamaica Bay Unit at Fort Tilden and at Breezy Point. The Jamaica Bay Unit showed the greatest species richness of the three Park Units at GATE. In particular, Big John’s Pond and West Pond at Jamaica Bay Wildlife Refuge contained permanent water and supported considerable odonate activity, including two state-listed species, *I. ramburii* and *L. needhamii*. The Staten Island Unit generally lacks permanent water and abundant habitat that can be used for breeding by odonates. Nonetheless,

sites containing permanent water, such as Freshwater Pond and Peeper Road, provided good foraging and breeding habitat for a suite of odonate species, including two state-listed species, *I. ramburii* and *L. needhamii*. The Sandy Hook Unit contains several unique coastal habitats, including sand dunes, salt and freshwater marshes, and freshwater ponds that provided valuable foraging, breeding, and migratory habitats for odonate species. Of particular importance to breeding odonates were freshwater ponds such as Newest, North, and Exclamation Point Pond. Overall, GATE contains several marshes and coastal ponds that are appropriate for odonate reproduction, as well as several sites that offer good foraging and critical migration habitat." (Authors)] Address: Rhode Island Natural History, P.O. Box 1858, Kingston, Rhode Island 02881, USA

11814. Brunelle, P.M. (2010): Dragonflies and damselflies (Odonata) of the Atlantic Maritime Ecozone. In: D.F. McAlpine and I.M. Smith (eds.). Assessment of Species Diversity in the Atlantic Maritime Ecozone. NRC Research Press, National Research Council Canada, Ottawa, ON: 333-369. (in English, with French summary) ["The 142 Odonata species recorded from the Atlantic Maritime Ecozone include 28% of the North American total, a large percentage for a comparatively small area. This diversity is due to the great breadth of aquatic habitat types in the ecozone. There has been a dramatic increase in knowledge of the odonates of the region in the last 20 years, much of it provided by informed amateur surveyors. Based on this information, federal and provincial governments and conservation authorities have recently been able to assign status ranks to odonate species. These ranks greatly facilitate consideration of the odonates when assessing human impact in the environment, and encourage further study of these insects. However, much remains to be done. Many species have not been adequately surveyed; subnational status ranks for numbers of odonates occurring in the Atlantic Maritime Ecozone are "undetermined", indicating the need for further focussed survey. This chapter includes a synopsis of species characteristics and conservation status, along with information on habitat preferences. A review of surveys and survey efforts is also provided, as are suggestions that should help guide future efforts that will increase our understanding of the order in the ecozone." (Author)] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada. E-mail: paulmbrunelle@gmail.com

11815. Chertoprud, M.V. (2010): Diversity and classification of rheophilic communities of macrobenthos in middle latitudes of European Russia. *Journal of General Biology* 72(1): 51-73. (in Russian, with English summary) ["Based on original data (450 samples from 115 streams of European Russia middle latitudes – from Pskov to Kostroma Regions) the attempt is made to describe the overall diversity of rheophilic communities dwelling on streams bottom and in macrophytes. In total, 39 community types were identified by the Braun-Blanquet method; their taxonomical and structural characteristics are described; the associations with biotopes are outlined; and a biotopical nomenclature is proposed. All communities are subdivided into four biotopical classes: crenal (springs and springbrooks with mixed substrates), rhithral (stony and woody substrates), phythal (macrophytes), and pelal (soft ground). It is shown that all communities may be divided by their organization as R-type or M-type community. 36 out of 39

studied communities belong to R-type and are characterized mainly by prevalence of insect, unstable dominance, and rather distinct association to the biotope. In M-type communities (3 out of 39 studied communities) eurybiontic mollusk *Viviparus viviparus* and amphipod *Dikerogammarus haemobaphes* predominate; these communities are interbiotopic, with stable species structure and high total abundance. The effect of the study spatial scale on the definition of communities is discussed along with problems of the communities dynamics." (Author) *Calopteryx splendens* is listed as species of the Hypoxylorhithral, Limnophytal and Rhizorheophytal coenoses and *Platycnemis pennipes* of the Rhizorheophytal coenosis.] Address: Chertoprud, M.V., Moscow Lomonosov State University, Faculty of Biology, 119992 Moscow, Leninskie Gory, Russia. E-mail: lymnaea@yandex.ru

11816. Faschinger, C. (2010): Zur Evolution der Linse in verschiedenen Augen: Erstaunliches. *Spektrum der Augenheilkunde* 24(3): 174-180. (in German, with English summary) ["After the evolution from epithelial cells to eye spots, which can detect light, the development went further on to compound eyes or single-chambered eyes. But the real improvement in creating a good picture was the evolution of the lens. Lenses have the main property of refraction of the light. They are found on top of the compound eyes as chitin lenses or crystalline cones in every single ommatidium with many different refractory properties as well as in single-chambered eyes either as a gelatinous mass or as an epithelial lens-shaped part inside the eye ball. Sometimes a lens is not enough to gather information and an additional mirror helps to survive. Some of the wonderful curiosities that happened in nature are described." (Author) The paper includes references to Odonata.] Address: Faschinger, C., Universitäts-Augenklinik der Medizinischen Universität Graz, Auenbruggerplatz 4, 8036 Graz, Austria. E-mail: christoph.faschinger@meduni-graz.at

11817. Hamill, S.E. (2010): Recovery strategy for the Rapids Clubtail (*Gomphus quadricolor*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario: vi + 15 pp. (in English) ["*G. quadricolor* is a small, brightly coloured dragonfly which lives in clear, cool, medium to large rivers with wooded shorelines, gravel shallows, and muddy pools. Adult males perch on exposed rocks in the rapids. Adult females inhabit shoreline forests, moving to the rapids when ready to mate. Eggs are laid over the rapids and the nymphs live in quiet, muddy, downstream pools. This species is a globally rare to uncommon dragonfly found throughout Eastern North America, in a range extending from Maine to Minnesota, including southern Ontario. In Ontario it has been found in only four rivers: the Credit, the Thames, the Humber and the Mississippi. The population in the Credit River may be extirpated. The species is listed as endangered on the Species at Risk in Ontario (SARO) List under the Endangered Species Act, 2007. Threats to survival and recovery include dam construction, shoreline alteration, pollution, removal of shoreline forests, exotic predatory species, roadkill and climate change. Limiting factors include low population numbers, limited distribution and apparent sensitivity to specific habitat features. Knowledge gaps include a lack of understanding of the reasons for its limited distribution and for its habitat sensitivity. The recovery goal is to ensure the long-term survival of *G. quadricolor* in the

province by protecting existing populations and by restoring populations in appropriate habitat where feasible. The recovery objectives are to: (1.) protect, maintain and improve habitat in the four rivers in Ontario where *G. quadricolor* has been found; (2.) implement a monitoring program for the locations where *G. quadricolor* is known to exist; (3.) conduct additional inventory for *G. quadricolor* in suitable habitat; and, 4. initiate research to address knowledge gaps for *G. quadricolor*. It is important to ensure adequate protection of habitat and water quality for the species' survival and recovery. The locations where the species has been found in the Credit, Thames, Humber and Mississippi Rivers should all be prescribed as habitat in a habitat regulation. At each location, the area prescribed as habitat should include the section of the river containing the rapids and the pools below the rapids, plus the wooded shores on either side extending inland to include any forest which is within 800 metres of the shoreline."(Author)] Address: not stated

11818. Jinguji, H.; Tsuyuzaki, H.; Ueda, T. (2010): Effects of temperature and light on the hatching of overwintering eggs in three Japanese Sympetrum species. *Paddy and Water Environment* 8(4): 385-391. (in English) ["The aim of the present study was to obtain quantitative information on egg hatching with respect to temperature and light to clarify the effect of cultivation methods on three Japanese Sympetrum species. Eggs of three Sympetrum species were collected on October 2005 at Akita prefecture located at north of Japan, and the eggs had been laid on soil surface of paddy field till April 2006. The eggs (3 trays with 50 eggs each) were held under four constant temperatures (8, 13, 18 and 23°C) with a photoperiod (L:D 14:10; relative light intensity 3,000 Lux) and 23°C in darkness. No *S. infuscatum* eggs, but 67 and 60% *S. frequens* and *S. darwinianum* hatched in constant darkness. This result suggests that *S. frequens* and *S. darwinianum* do not require light for hatching, but *S. infuscatum* requires light for hatching. Eggs of *S. darwinianum* and *S. infuscatum* did not hatch at 8°C. In *S. frequens*, some eggs hatched but the hatching rate was significantly lower at 8°C than at higher temperatures ($P < 0.05$). At higher temperatures, the hatching rate did not differ significantly for three Sympetrum species. At 13°C, *S. infuscatum* hatched fastest, 0.18 for *S. infuscatum*, 0.11 for *S. darwinianum* and 0.08 for *S. frequens*. The mean head width of second stadium larva of *S. frequens*, *S. darwinianum* and *S. infuscatum* were 0.4 ± 0.01 , 0.4 ± 0.01 and 0.6 ± 0.01 mm (SD), respectively. These results suggest that *S. infuscatum* may have a competitive advantage over *S. frequens* and *S. darwinianum* under conditions that favour *S. infuscatum* through hatching speed." (Authors)] Address: Jinguji, H., School of Food, Agricultural and Environmental Sciences, Miyagi University, 2-2-1 Hatate, Taihaku-ku, Sendai. Miyagi 982-0215, Japan. E-mail: jinguji@myu.ac.jp

11819. Klymko, J. (2010): Odonate Surveys on the Tusket, Medway, and Lahave Rivers. Atlantic Canada CDC Canada Atlantique. Report to Nova Scotia Species at Risk Conservation Fund, December 21, 2010: 12 pp. (in English) ["The 2010 fieldwork on major rivers in southern Nova Scotia has significantly increased our understanding of the distribution and status of several rare dragonfly and damselfly species. The surveys demonstrate that exuvia-based collecting can detect elusive species, and can turn up new species on wa-

terways where adults have been well-surveyed. The occurrence of *Ophiogomphus anomalus* in Nova Scotia indicates appropriate habitat may occur for the COSEWIC Special Concern Pygmy Snaketail in Nova Scotia. Most importantly findings indicate there is still much to be learned about Nova Scotia's Odonata. Additional fieldwork on large Nova Scotia rivers would certainly produce new locations for rare species, and likely add species to the provincial list. Large Nova Scotia rivers that have received little attention to date include the St. Mary's (15 records, no exuvia), Clyde (41 records, 1 exuvia), Annapolis River (37 records, 1 exuvia), Roseway (5 records, no exuvia), Stewiacke (3 records, no exuvia), Musquodobit (3 records, 1 larva) (ADIP 2010)." (Author)] Address: Klymko, J., Zoologist, Atlantic Canada Conservation Data Centre. E-mail: jklymko@mta.ca

11820. Kovacs, T.; Ambrus, A.; Robotka, A.G. (2010): New data to the occurrence of the riverine dragonfly-species (Odonata: Gomphidae) in North-West Hungary. *Hidrológiai Közlöny* 90(6): 75-77. (in Hungarian, with English summary) [Records of *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Onychogomphus forcipatus* and *Stylurus flavipes* from 27 sampling sites along four rivers in north-west Hungary are published.] Address: Kovács, K., North Transdanubian Regional Environmental, Nature Conservation and Water Management Inspectorate, Laboratory, Török Ignác u. 68., H-9028 Győr, Hungary

11821. Krakowska, K. (2010): [Three fish ponds. Guide on the educational path in the community of Żmigród]. Fundacja EkoRozwoju, Wrocław: 57 pp. (in Polish) [Poland, 60 km N of Warsaw. On pages 35-37 a few Odonata species are briefly introduced.] Address: Fundacja EkoRozwoju, 50-134 Wrocław, ul. Białoskórnicza 26, Poland

11822. Lambret, P. (2010): Une enquête sur *Lestes macrostigma* (Eversmann, 1836) (Odonata, Zygoptera: Lestidae). *Martinia* 26 (3-4): 178-181. (in French, with English translation) ["The workshop on *L. macrostigma* held during the Odonatological meeting of Saint-Laurent (France), June 26th–28th, 2010, is dealt with. After a recall about the conservation status of the species, the author presented an online survey about its French-Mediterranean distribution and its habitat. Basing on recent studies, a monitoring scheme is proposed and discussed by the participants." (Author)] Address: Lambret, P., Marais du Vigueirat, F-13104 Mas-Thibert, France. E-mail: philambret@hotmail.com

11823. NPTS (2010): Research and monitoring. Annual report 2009. Nature Protection Trust of Seychelles Research and monitoring. Annual report 2009: 28 pp. (in English) ["2.5.3. Odonata ...: Jardin Marron - *Allolestes maclachlani* and *Leptocnemis cyanops* abundant in forest; Grande Barbe - *Ceragrion glabrum* observed 31st March; *Tramea limbata* at coast, *Tenibasis alluaudi* at south end of Grande Barbe in December. This species has now been found in all the wooded parts of Grande Barbe; Mon Plaisir - two *Zygonyx luctifera* observed patrolling small canopy gaps on 29th March; La Passe - *Tramea limbata* present all year but uncommon until December; Anse Patates - one pair of *Orthetrum stemmale* in December." (Authors)] Address: Gerlach, R., PO Box 207, Victoria, Mahé, Seychelles. E-mail: jstgerlach@aol.com

11824. Rebora, M.; Piersanti, S. Gaino, E. (2010): The antennal sensory function in the oldest pterygote in-

sects: an ultrastructural overview. In: A. Méndez-Vilas and J. Díaz (Eds.): *Microscopy: Science, Technology, Applications and Education*. Vol 4(1): 137-145. (in English) ["Paleoptera (Odonata and Ephemeroptera) represent the oldest pterygote insects. In consideration that antennae are one of the main site of not-visual insect perception, ultrastructural investigations under SEM and TEM have been recently performed on the flagellum of species belonging to several families of Odonata and Ephemeroptera, to clarify the sensory function of the antennae in Paleoptera. These antennae appear very reduced and are constituted by scape, pedicel and an aristate flagellum, mainly monoarticulated in Ephemeroptera and composed of 1-4 flagellomeres in Odonata. Several sensory structures have been identified on the ventro-lateral side of the flagellum in both orders with two main possible functions: thermo-hygroreception and olfaction. Studies on the sensory biology of these aquatic insects can contribute to clarify interesting aspects of their biology. In addition, studies on Paleoptera sensilla light into the evolution of insect sensory abilities." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

11825. Rybak, J.; Pasternak, G. (2010): Analysis of water quality in the area of Wrocław's aquiferous layers with macroinvertebrates as bioindicators. *Ochrona Środowiska* 32(2): 27-34. (in Polish, with English summary) ["For the purpose of this study, seven biotic systems were chosen to assess the quality of wet pond water within the aquifer of Wrocław and in the bordering old Olawa river basin: BMWP-PL, ASPT, BBI, FBI, TBI, CBS and EPT. They all entail zoobenthic communities (including *Platycnemis pennipes*), whose composition changes with increasing pollution of the aquatic environment. The results obtained were compared with the values of some physicochemical parameters of the water, which enabled the applicability of the biotic systems to be evaluated. The water within the area under study was also analyzed for biodiversity. For this purpose calculations were performed to determine the domination and frequency of particular species and families at the sampling sites, as well as to establish the values of the Hurlbert and Margalef biodiversity indices. Both physicochemical and biological parameters make it clear that water quality in the area of the aquiferous layers is generally poor: species of comparatively high resistance to water pollutants were found to occur even at sampling sites characterized by great biodiversity. Water quality in all of the wet ponds examined has been classified either as acceptable or in some instances even as unacceptable. The results obtained support the applicability of the BMWP-PL index and recommend its use on a larger scale in Poland." (Authors)] Address: Rybak, Justyna, G. Pasternak: Politechnika Wrocławska, Wydział Inżynierii Środowiska, Zakład Biologii i Ekologii, Wybrzeże S. Wyspiańskiego 27, 50-370 Wrocław, Poland. E-mail: justyna.rybak@pwr.wroc.pl

11826. Tatarkiewicz, D. (2010): Sites of the emergence of *Libellula fulva* (Odonata: Libellulidae) in the forest of Puszcza Notecka. *Odonatrix* 6(1): 21-29. (in Polish, with English summary) [The paper details the environmental characteristics of the emergence sites taken between 2002-2004 near a village Chojno, Poland (52°41'N 16°12'E).] Address: Tatarkiewicz, D., Department of Biology and Environmental Protection, University School of Physical Education, Królowej Jadwigi St.

27/39, 61-871 Poznań, Poland. E-mail: dawid.tatarkiewicz@poczta.fm

11827. Tennessen, K (2010): Brief notes on *Ischnura* behavior. *Argia* 22(3): 17-18. (in English) [Verbatim: *Ischnura verticalis*: Females of some species of *Ischnura* mate only once in their lifetime, and they probably mate that one time early in their adult existence. Ola Fincke (1987) reported monogamy to be the norm in *Ischnura verticalis* (Say), the Eastern Forktail. She found that young females (mostly orange) and mature females (mostly grayish-blue) reject approaching males, whereas females that have aged and darkened somewhat but have not yet turned blue were often receptive, once, to mating attempts by males. Furthermore, females that copulated for more than 20 minutes could not be induced to mate again, apparently receiving enough sperm to serve their needs for the rest of their lives (i.e., to fertilize all eggs they may develop). This knowledge helps explain much of the behaviour of the two sexes of this species compared to most other coenagrionids, such as males being nonaggressive towards other males and females ovipositing alone and not being "bothered" much by intruding males. The signals that unreceptive females of *I. verticalis* show males are quite striking. Grieve (1937) was the first to observe females flexing their abdomen ventrally and fanning their wings at approaching males, but he misinterpreted this posturing as an attempt by females to attract males and assumed it was courtship behaviour. Bick (1966) correctly interpreted this behaviour as a signal to a male that the female was unreceptive to mating. I have seen this behaviour numerous times. The following photos (Fig. 1) I took in central Wisconsin show a male hovering near a female and the female wing-whirring and bending the apical half of her abdomen downward to refuse his approach. Males usually leave such females after a few seconds. This scenario (not the posture) is remindful of the age-old rejection at a high school dance, so it's hard for us fellows not to feel sorry for these "ambitious" males. *Ischnura hastata*: This species might also be monogamous, although literature on the natural history of this species is sparse. A population in the Azores is actually parthenogenetic (Lorenzo-Carballo & Cordero-Rivera, 2009); it is the only odonate known to be able to produce viable eggs without sperm, and all resulting offspring are female. However, all known mainland North American populations consist of both males and females. Very little is known about mating and oviposition in this species. Recently, I found several populations in Wisconsin Marquette, Shawano and Waushara counties) and so far have observed oviposition only once, at a ditch-like wetland in Marquette County. A female perched on the surface of the stem of a small rush that had fallen into the water and repeatedly poked her ovipositor into that stem and a nearby stem (Fig. 2). I was able to get two photographs before a male *I. verticalis* pounced on her, at which she flew into nearby vegetation. Further patient observation of this species will likely be rewarded with much-needed knowledge of its reproductive behaviour.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

11828. Yakubovich, V.S. (2010): First record of the dragonfly *Orthetrum albistylum speciosum* (Uhler, 1858) (Odonat: Libellulidae) from Khabarovskii Krai. *Far Eastern Entomologist* 219: 11-12. (in English, with Russian summary) [The following records are communicat-

ed: Khabarovskii krai, vicinity of Khabarovsk: Bolshshekheksirsky State Nature Reserve, mouth of Chirki River; 48°11'4" N, 134°40'5" E, 6-8.VII 2009, 6 males, 2 females; vicinity of Korfovskii, 48°12'5"N, 135°2'7" E, 21.VI 2008, 1 female; vicinity of Chernaya Rechka, 48°27'1" N, 135°18'2" E, 30.VI 2010, 2 males.] Address: Yakubovich, V.S., Department of Biology, Far Eastern Medical University, Murav'ev-Amursky Street 35, Khabarovsk 680000, Russia. E-mail: Presid11@mail.ru

2011

11829. Abbott, J.C. (2011): Damselflies of Texas. A Field Guide. University of Texas Press. ISBN: 978-0-292-71449-6: 292 pp. (in English) ["Damselflies of Texas ... covers 77 of the 138 species of damselflies known in North America, making it a very useful guide for the entire United States. Each species account includes: illustrations of as many forms (male, female, juvenile, mature, and colour morphs) as possible, common and scientific names, with pronunciation, distribution map, key features, identifying characteristics, discussion of similar species, status in Texas, habitat, seasonality, and general comments. In addition to photographing damselflies in the wild, the author and illustrator have developed a new process for illustrating each species by scanning preserved specimens and digitally painting them. The resulting illustrations show detail that is not visible in photographs. The book also contains chapters on damselfly anatomy, life history, conservation, names, and photography, as well as a list of species that may eventually be discovered in Texas, state and global conservation rankings, seasonality of all species in chronological order, and additional resources and publications on the identification of damselflies." (Publisher) 632 color photos, 79 b&w illus., 80 maps, 4 tables.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabott@mail.utexas.edu

11830. Alvarez Gandara, J.; Estévez Rodríguez, R.; Ramos, T.S. (2011): Notas corológicas de *Orthetrum brunneum* (Fonscolombe, 1837) (Odonata, Libellulidae) y aportación de una nueva cita para Galicia (N.W. Península Ibérica). Archivos entomológicos 5: 149-152. (in Spanish, with English summary) [Unpublished and bibliographical distributional records of *O. brunneum* for the NW of the Iberian Peninsula are compiled (Castilla y Leon, Galicia, Portugal).] Address: José Álvarez Gándara 1, Rafael Estévez Rodríguez 2 & Tito Salvadores Ramos 3 1 Barrio do Souto, 10 B. E-36740 San Salvador de Tebra, Tomiño (PONTEVEDRA). E-mail: lcgandara@yahoo.es

11831. Beckmann, H.; Berlin, A.; Blumrich, B.; Eitner, M.; Gottschalk, H.-J.; Gräwe, D.; Thiele, V.; Wolf, F.; Zilch, M. (2011): Insektenfauna des Garder Sees und seiner Seeterrassen (Landkreis Güstrow, Mecklenburg-Vorpommern) sowie Vorschläge für Maßnahmen der ökologischen Sanierung. Archiv der Freunde der Naturgeschichte in Mecklenburg 50: 5-38. (in German, with English summary) [Germany, Mecklenburg-Vorpommern; in 2008 and 2009, 10 odonata species have been recorded including *Libellula fulva*.] Address: Thiele, V., Ahornring 10, 19292 Möllen, Germany. E-mail: mv.thiele@t-online.de

11832. Brook, J.; Brook, G. (2011): The Dainty Damselfly *Coenagrion scitulum* (Rambur) in Kent. Atropos 42:

9-13. (in English) [21-VI-2010, Isle of Sheppey, Kent, UK; discovery, identification and habits of the species are outlined.] Address: Brook, J., Barrack Cottages, Lower street, Broomfield, Maidstone, Kent, ME17 1PU, UK

11833. Buczyński, P.; Lewandowski, K. (2011): Dragonfly (Odonata) fauna of Olsztyn (Poland). In: Piotr Indykiewicz, Leszek Jerzak, Jörg Böhner, Brendan Kavanagh (eds.): URBAN FAUNA: Studies of animal biology, ecology and conservation in European cities: 109-119. (in English) ["The field studies presented in this paper were conducted in 1987-2004 and encompassed the Rivers Łyna and Wadąg, streams near Lake Skanda and in the Słoneczny Stok residential estate (usually regulated), eutrophic lakes Skanda, Redykajny and Tyrsko, small water bodies in various parts of the city (city center, Stoneczny Stok, Gutkowo, Municipal Forest, Mazurskie Estate, Jaroty), oxbow lakes, glacial lakes, and a fen near Lake Skanda. A total of 1 914 larvae (including 1 891 identified at the species level), 28 exuviae and 1 268 imagines of 49 dragonfly species were collected, accounting for 67% of the Polish dragonfly fauna. The finding of an imago of *Sympetrum striolatum* was an important faunistic discovery which confirmed the taxon's presence in the Masurian Lakeland. So far, this species had been sighted only in larval form, and, therefore, its occurrence was uncertain. *Sympetma paedisca*, *Lestes viridis* and *Aeshna cyanea* were recorded for the first time in the Olsztyn Lakeland. For all analyzed localities, the most diverse dragonfly fauna was found in small water bodies and streams. Rivers were characterized by the lowest faunistic diversity. The abundance of the odonata fauna in small water bodies can be attributed to a high number of small ponds in post-glacial regions, which differ in stability, trophy levels and vegetation cover. A comparison between the highly developed city center and suburban districts revealed that the qualitative diversity of dragonfly fauna in peripheral areas was twice as high as that reported for downtown Olsztyn." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

11834. Chandra, K. (2011): Insect Diversity of Sikkim, India. In: Arrawatia, M.L. & S. Tambe (eds.): Biodiversity of Sikkim. Exploring and Conserving a Global Hotspot. Published by: Information and Public Relations Department, Government of Sikkim, Gangtok: 181-206. (in English) [A total of 5892 species belonging to 2382 genera under 261 families and 22 orders of Insect is reported from the Indian state of Sikkim. The taxa are documented order wise at family level; 65 Odonata species are represented] Address: Chandra, K., Zoological Survey of India, Vijay Nagar, Jabalpur-482 002, Madhya Pradesh, India. E-mail: kailash611@rediffmail.com

11835. Chelmick, D. (2011): An invasion of the Southern Migrant Hawker *Aeshna affinis* Vander Linden in 2010. Atropos 42: 3-7. (in English) [19-VII-2010, Hadleigh, Essex, UK. The paper also discusses additional records from this invasion and gives information on identification of the species.] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

11836. Chelmick, D. (2011): Vernacular names — Only for the Brits! Atropos 44: 49-50. (in English) [Verbatim: "Odonata is an insect order that has only come to public awareness in recent years. When I started my research

there were no vernacular names, but recent publications have changed all this and a range of English names have been invented, presumably, in order to popularise these insects and make them available to the wider world. I question the need and offer three examples. In the 1980s a particular project was to study the dragonfly *Epiheca bimaculata* in one of its key habitats, the Ardennes in northern France. I spent three days with Gennaro Coppa, who was a dedicated field-worker but whose English was non-existent. Fortunately, thanks to my 'menu French' and the fact that we both knew our dragonflies by their scientific names, we were able to converse and spent the evenings drinking beer and musing over the specific habitat requirements of *Sympetrum danae*, etc. Two years ago I was at a famous wetland in Central Spain known as the Tablas de Daimiel; it was thrashing down with rain but there on the boardwalk was a lone birdwatcher huddled behind his scope, ignoring the elements. 'I am studying *Locustella luscinioides*' he told me, then, realising that I was British, fumbled around in his notebook for his list and translated: Savi's Warbler. This autumn we took a trip to Romania (a walking holiday); the leader was a good birder but kept having to refer to a list whenever a new bird appeared. I found this strange, and upon enquiring I realised that he knew his birds by scientific names so when we found *Loxia curvirostra* he had to refer to his list in order to produce the name Crossbill. Normally he only needs the list for British groups. I am well aware that the British attitude to language is that 'we had to learn English so why shouldn't everyone else', but as a result we are becoming the naturalist laughing stock of Europe, relying upon names that nobody else needs. In addition to their irrelevance, vernacular names for dragonflies can be downright misleading. *Aeshna isosceles* (Norfolk Hawker) does occur in Norfolk but its range extends across central Europe to Mongolia. *Onychogomphus uncatatus* is known, confusingly, as the Large Pincertail and also as the Blue-eyed Hooktail. The species is virtually identical in size with its congener *Onychogomphus forcipatus*, which is known as the Small Pincertail. Even more confusing is the fact that the Blue-eyed Hooktail has green eyes in certain states and especially in females, and the Green-eyed Hooktail has blue eyes in the south of its range! Scientific names are not difficult to learn, are universal in use and provide common communication across all languages—why use anything else?" (Author)] Address: Chelmick, D., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david-chelmick.com

11837. Cousins, L.; Tansley, D.; Hepburn, L. (2011): Investigation into the dietary habits of the Eurasian otter (*Lutra lutra*) in the county of Essex. IUCN Otter Spec. Group Bull. 28(2): 76-83. (in English, with French and Spanish summary) ["Monitoring throughout the county of Essex (UK) has shown annual widening of otter distribution. There is, however, room for expansion and some areas remain uncolonised. This paper reports a snapshot study of spraints collected from within the areas of known distribution, providing additional insight on a growing population. Prey remains were identified to family level and data used to calculate trophic breadths over the range of stream orders. Investigative comparisons were used to detect changes in diet with stream order. Further consideration was given to the importance of crayfish predation (e.g. the signal crayfish *Pacifastacus leniusculus*). Within the sample (n= 54)

from four stream orders (Strahler 2-5), fish occurred most frequently (67%). Other groups included; invertebrates 20%, birds 7% and mammals 6%. Crayfish comprised 4% of the sample. There were no significant differences between Trophic Niche Breadth and stream order ($H^* = 2.73$, $P > 0.05$), a finding strengthened by subsequent statistical analysis of the data. Dietary composition was consistent within the range and period studied. Extended research could determine seasonal variation and the extent to which available prey assemblage limits distribution against wider environmental and biological variables." (Authors) Odonata contributed with 6% to prey items extracted from otter spraint (n=54).] Address: Cousins, L., Essex Wildlife Trust, Abbots Hall Farm, Great Wigborough, Colchester. CO5 7RZ, UK. E-mail: lcousi@essex.ac.uk

11838. Da Silva, F.L.; Mayer Pauleto, G.; Ruiz, S.S.; Biscalquini Talamoni, J.L. (2011): Aquatic macroinvertebrates survey and assessment of two artificial reservoirs into conservation units from the southeast region of Brazil. *Pan-American Journal of Aquatic Sciences* 6(1): 57-64. (in English, with Portuguese summary) ["This study aims to inventory and assess the aquatic macroinvertebrates fauna in two artificial reservoirs into conservation units with differences regarding conservation level and to anthropogenic impacts. The samplings were carried out in Caetetús Ecological Station and Bauru City Zoological Park, where some physical and chemical variables also were measured. The results obtained indicated that the Caetetús Ecological Station is more effective in the conservation of the diversity of aquatic macroinvertebrates compared to Bauru City Zoological Park. These results can be attributed to the strong anthropogenic impact suffered by the reservoir in Bauru and demonstrate the importance of these areas in maintaining the diversity of aquatic macroinvertebrates community." (Authors) Odonata taxa are treated at family level.] Address: Da Silva, F.L., Universidade Federal de São Carlos – UFSCar, Programa de Pós-graduação em Ecologia e Recursos Naturais, Laboratório de Entomologia Aquática, Departamento de Hidrobiologia, Rodovia Washington Luís, km 235, 13565-905, São Carlos, SP, Brasil. E-mail: fabelha@hotmail.com

11839. Fujino, Y.; Wada, S. (2011): Records of *Sympetrum croceolum croceolum* (Selys, 1883) (Odonata: Libellulidae) at Nakaikemi Marsh, Tsuruga, Fukui Prefecture, Japan. *Bulletin of the Fukui City Museum of Natural History* 58: 65-66. (in Japanese, with English summary) ["In 2008 and 2011, some adults of *S. c. croceolum* were found by Noriko Uenoyama, Hiroshi Ikegami and Yuma Fujino at Nakaikemi Marsh, Tsuruga, central Honshu, Japan, and the species was newly added to the fauna of the marsh copiously reported in Research Report from the National Institute for Environmental Studies, Japan, No. 176, 2003, including 70 species of Odonata." (Authors)] Address: Fujino, Y., 1-10-11, Tsunai-cho, Tsuruga City, Fukui, 914-0056, Japan

11840. Gómez-Anaya, J.A.; Novelo-Gutiérrez, R.; Campbell, W.B. (2011): Diversity and distribution of Odonata (Insecta) larvae along an altitudinal gradient in Coalcomán mountains, Michoacán, Mexico. *Rev. Biol. Trop. (Int. J. Trop. Biol.)* 59(4): 1559-1577. (in English) ["Evaluating components of landscape diversity is essential for the implementation of efficient conservation strategies. We evaluated the diversity of Odonata larval assemblages from the Coalcomán mountains (CM), Michoacán, Mexico, and related it to local (site-level) habi-

tat variables. Larvae were collected from shores, riffles and pools in five streams, counted and identified to species, twice per season during 2005. The Shannon Diversity Index (H'), Margalef's Richness Index (R), Simpson's Index as a dominance measure (D) and Pielou's Equitability (J) were used to describe the assemblages, and Renyi's Diversity Profiles were used to order diversity. A Bray-Curtis Similarity Index (BC) was used to evaluate beta diversity. Theoretical richness was estimated using non-parametric and parametric methods. A Canonical Correspondence Analysis (CCA) was applied to explore the relationships of species with site-level environmental variables. A total of 12 245 larvae from 75 species, 28 genera and 8 families were recorded. Over all sites, the dominant species were *Erpetogomphus elaps*, *Macrothemis pseudimitans* and *Argia pulla*. The number of species per locality ranged from 18 to 36, and a high number of species (76%) occurred with relative abundances lower than 1%. A differential distribution of species and abundance in streams, time and strata was observed. Renyi's diversity profiles showed diversity was higher in spring and on shores. Most BC similarity values were smaller than 25%, indicating a high turnover rate in the CM. The high turnover rate reflects a differential distribution of the species along the altitudinal gradient, supporting the hypothesis of Mexico as a betadiverse country. According to the slope of Clench's curve, a reliable list of species was gathered. The CM larval assemblage is currently the largest reported for Mexico, and our results support previous proposals of the CM as a species-rich area for conservation." (Authors)] Address: Gomez-Anaya, J.A., Instituto de Ecología, A.C., Apartado Postal 63, MX-91070, Xalapa, Veracruz, Mexico. E-mail: antonio.gomez@in-econol.edu.mx

11841. Hollingworth, L. (2011): A Bizarre Sighting of Common Blue Damselfly *Enallagma cyathigerum*. *Atropos* 44: 48. (in English) ["On 10 July 2011 I visited College Lake, Buckinghamshire. A Common Blue Damselfly *Enallagma cyathigerum* attracted my attention, which upon closer inspection appeared to have two bodies hinged at the top. When it flew the bodies opened like a pair of scissors. Can anyone explain what has caused this and whether it is very unusual? - The photo clearly shows a normal 'blue-phase' female Common Blue Damselfly that is also bearing the abdomen of a male, attached in the manner seen during mating i.e. with the male's claspers grasping around the rear of the female's pronotum (the small plate behind the head). What has actually happened is that a pair in tandem or in cop. has been caught by a predator, which has then removed/eaten the male's thorax. This has in turn allowed the female to escape, but with the abdomen of the male still attached. Although in most instances of pair predation a female can presumably escape simply by the pair separating, sightings of females with portions of a male abdomen attached are also reported from time to time. How long the link will persist is unknown but may apparently be some while, the male of course no longer being able to loosen his grip." (Eds.)] Address: Hollingworth, L., 23 Meadow Close, Trimley St Martin, Felixstowe, Suffolk, IP11 0UL, UK

11842. Holuša, O.; Dalecký, V.; Holušová, K. (2011): First record of larvae of *Cordulegaster heros* (Odonata: Cordulegastridae) in the Czech Republic. *Acta Musei Beskidensis* 3: 65-69. (in English, with Czech summary) [Two larvae of *C. heros* were found on 15-X-2011 at the

villages of Kudlovice (Kudlovický potok stream) and Jankovice (Jankovický potok stream) on the southern slopes of the Chriby Hills in the Czech Republic.] Address: Holuša, O., Muzeum Beskyd, přírodovědné oddělení, Zámecké náměstí 1264, CZ-738 01 Frýdek-Místek. E-mail: holusao@post.cz

11843. Just, J. (2011): *Australolestes* nom. nov. for *Austrolestes* Just, 1998 (Crustacea, Amphipoda, Ischyroceridae, Siphonocetini) homonym of *Austrolestes* Tillyard, 1913 (Insecta, Odonata). *Crustaceana* 84(3): 383. (in English) [Verbatim: "Just (1998) described *Austrolestes* subgen. nov. (type species: *Austrolestes berentsae* Just, 1998) in the siphonocetine amphipod genus *Ambicholestes* Just, 1998. Tillyard (1913) described *Austrolestes* gen. nov. (Odonata). Hence, *Austrolestes* Just, 1998 is a junior homonym of *Austrolestes* Tillyard, 1913. A new name is therefore required for *Austrolestes* Just, 1998. I hereby propose the name *Australolestes* for this subgenus. Component species: *Ambicholestes* (*Australolestes*) *berentsae* Just, 1998, *A. (Australolestes) minutus* Just 1998, *A. (Australolestes) thetis* Just, 1998. References: JUST, J., 1998. Siphonocetinae (Crustacea: Amphipoda: Ischyroceridae) 7: Australian concholestids, *Ambicholestes* n. gen., with a description of six new species, and a new, restricted diagnosis for *Caribboecetes* Just, 1983. *Records of the Australian Museum*, 50 (1): 27-54. TILLYARD, R. J., 1913. On some Australian Anisoptera, with descriptions of new species. *Proceedings of the Linnean Society of New South Wales*, 37: 404-479."] Address: Just, J., Museum of Tropical Queensland, 72-102 Flinders Street, Townsville, Queensland 4810, Australia. E-mail: jean-just@mail.dk

11844. Karube, H. (2011): Two new species of the family Aeshnidae (Anisoptera) from central Vietnam. *Tombo* 53: 75-80. (in English, with Japanese summary) ["Two new species of the genera *Cephalaeschna* and *Planaeschna* are described from central Vietnam. *Cephalaeschna asahina* sp. nov. is related to *C. klotsi* Asahina, 1982 from Fukien, China. It is easily distinguished from the latter by its head structure, body maculation and male caudal appendages. It is the southernmost recorded occurrence of the genus. The *Planaeschna asahina* sp. nov. is the 7th member of the genus from Vietnam. It is easily separated from other members of the genus by its peculiar thoracic and abdominal maculation, but is clearly related to *P. tamdaoensis* Asahina, 1996. These two new species were discovered in the mountain zone of Bach Ma national park of central Vietnam, which is known for the rich diversity of its Odonata fauna." (Author)] Address: Karube, H., Kanagawa Pref. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

11845. Kawashima, I.; Suzuki, Y. (2011): A intergeneric tandem formation observed between a male *Orthetrum albistylum speciosum* (Uhler) and a female *Sympetrum frequens* (Selys). *Tombo* 53: 110. (in Japanese, with English summary) [11-X-2010; "A case of intergeneric connection between a male of *Orthetrum albistylum speciosum* (Uhler, 1853) and a female *Sympetrum frequens* (Selys, 1883) was observed in Miura-shi, Kanagawa Prefecture, C. Honshu, Japan." (Authors)] Address: Kawashima, I., Nagasawa 1-50-9, Yokosuka-shi, Kanagawa, 239-0842 Japan

11846. Kawashima, I.; Tsuji, I. (2011): An intergeneric tandem formation observed between a male *Anax parthenope julius* Brauer and a female *Boyeria maclachlani*

Selys. Tombo 53: 91-92. (in Japanese, with English summary) [The intergenetic connection was observed in Sagami-gawa River, Kanagawa Prefecture, C. Honshu, Japan. "Such chances are supposed to be very rare, because the two species have usually territories in different environments, i.e. the former species on still water such as ponds and marshes, while the latter on flowing waters." (Authors)] Address: Kawashima, I., 1-50-9 Nagasawa, Yokosuka, Kanagawa, 239-0842 Japan

11847. Kitayama, T. Futahashi, R. (2011): The first record of an interspecific hybrid between *Anax nigrofasciatus nigrofasciatus* Oguma, 1915 and *Anax parthenope julius* Brauer, 1865 from Okayama Prefecture, Honshu, Japan. Tombo 53: 119-120. (in Japanese, with English summary) ["A male of interspecific hybrid between *Anax nigrofasciatus nigrofasciatus* Oguma, 1915 and *Anax parthenope julius* Brauer, 1865 was recorded in Tomihara, Kita-ku, Okayama-shi, Okayama Prefecture, Honshu, Japan. This is the first record from Okayama Prefecture. This specimen has intermediate characteristics between *A. n. n.* and *A. p. j.*, and mixed nuclear DNA sequences of these two species. Notably, this specimen caught a female of *A. p. j.* but failed to mate." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Bldg 501, Kashiwa, Chiba, 377-8562, Japan

11848. Lara, J.; Barrientos, C.; Ardiles, K.; Moreno, L.; Figueroa, R.A.; González-Acuña, D. (2011): Biología reproductiva del Trabajador (*Phleocyptes melanops*) en el centro-sur de Chile. *Ornitología Neotropical* 22: 121-130. (in Spanish, with English summary) ["We studied the breeding biology of the Wren-like Rushbird (*P. melanops*) during three reproductive seasons from 2005 to 2008 in the Santa Elena lagoon, province of Ñuble, south-central Chile. ... Prey delivered to nestling and fledglings were nymphs and naiads of Odonata (48.6% of all item prey), spiders (20%), naiads of Diptera (11.4%), Oligochaeta (11.4%), Acrididae (5.7%), and Neuroptera (2.3%)...." (Authors)] Address: González-Acuña, D., Facultad de Ciencias Veterinarias, Universidad de Concepción, Casilla 537, Chillán, Chile. E-mail: danigon@udec.cl

11849. Lemke, M.; Germann, A. (2011): Ein Beitrag zur Libellenfauna (Insecta: Odonata) des ehemaligen Westwalls im Saarland. *Abhandlungen de Delattinia* 37: 155-170. (in German, with French and English summaries) ["This paper reports on dragonflies living in three anti-tank ditches that were part of the former Siegfried Line in the Saarland. Three anti-tank ditches were explored - Niederwürzbach, Lautzkirchen and Webenheim - inhabited by a great variety of species: 33 at Niederwürzbach, 27 at Lautzkirchen, and 29 at Webenheim. For several species evidence of reproduction was found by mating behaviour and ovipositions. On the other hand proof of reproduction success was found by observations of emergences and findings of exuviae. The very large population of *Libellula fulva* found in the anti-tank ditch at Niederwürzbach, the observation of *Ophiogomphus cecilia*, which is listed in the appendices II and IV of the FFH-Directive as well as the autochthonous population of *Epiheca bimaculata* in the anti-tank ditch at Webenheim are especially mentionable. In addition, several endangered species were found." (Authors)] Address: Lemke, M., Burgstr. 5, 66453 Medelsheim, Germany. E-mail: info@libelleninfo.de

11850. Lillo, F.; Faraone, F.P.; Lo Valvo, M. (2011): Can the introduction of *Xenopus laevis* affect native amphibian populations? Reduction of reproductive occurrence

in presence of the invasive specie. *Biol. Invasions*. 13: 1533-1541. (in English) ["Biological invasions are regarded as a form of global change and potential cause of biodiversity loss. *Xenopus laevis* is an anuran amphibian native to sub-Saharan Africa with strong invasive capacity, especially in geographic regions with a Mediterranean climate. In spite of the worldwide diffusion of *X. laevis*, the effective impact on local ecosystems and native amphibian populations is poorly quantified. A large population of *X. laevis* occurs in Sicily and our main aim of this work was to assess the consequences of introduction of this alien species on local amphibian populations. In this study we compare the occurrence of reproduction of native amphibians in ponds with and without *X. laevis*, and before and after the alien colonization. The results of our study shows that, when *X. laevis* establishes a conspicuous population in a pond system, the populations of *Discoglossus pictus*, *Hyla intermedia* and *Pelophylax synklepton esculentus* show clear signs of distress and the occurrence of reproduction of these native amphibians collapses. In contrast, the populations of *Bufo bufo* do not appear to be affected by the alien species. Since the Sicilian population of *X. laevis* shows a strong dispersal capacity, proportionate and quick interventions become necessary to bound the detriment to the Sicilian amphibians populations." (Authors) The diet of *Pelophylax esculentus* included 8,5%, that of *X. laevis*; no Odonata species were recorded.] Address: Lo Valvo, M., Dipartimento di Biologia Animale "G. Reverberi", Università di Palermo, Via Archira 18, 90123 Palermo, Italy. E-mail: mlovalvo@unipa.it

11851. Lopes Lionello, C.; José dos Santos-Wisniewski, M.; Zaitune Pamplin, P.A. (2011): Caracterização da fauna de insetos aquáticos e diagnóstico ambiental do Córrego dos Aflitos (Alfenas, MG). *Revista de biologia e ciências da terra* 11(1): 97-107. (in Portuguese, with English summary) [Corrego dos Aflitos, located in Alfenas, Minas Gerais, Brazil; the list of taxa includes *Orthemis* and *Anatya*.] Address: Lopes Lionello, C., Graduanda do curso de Ciências Biológicas da Universidade Federal de Alfenas, Brazil. Email: crisleo-nello@hotmail.com

11852. Masdeu, M.; Teixeira-de Mello, F.; Loureiro, M.; Arim, M. (2011): Feeding habits and morphometry of *Iheringichthys labrosus* (Lütken, 1874) in the Uruguay River (Uruguay). *Neotropical Ichthyology* 9(3): 657-664. (in English, with Spanish summary) ["Body size and diet of organisms are fundamental attributes which determine their ecology and natural history. *I. labrosus* is one of the most common fish species of the Uruguay River. However, its natural history is poorly known and there is little information about its diet and interactions with other species. This paper describes the feeding habits of this species, relating feeding patterns to the size classes and morphometry of individuals and to the temporal variations. Fishes were captured in May and November of 2006 in three zones of the lower Uruguay River. A total of 101 stomach contents was analyzed (standard length: 60-224 mm). The species exhibited a broad feeding spectrum with most items belonging to the benthic community. We found significant diet differences between size classes and studied months. However, we have not found a close relationship between changes in morphometric variables and diet shifts between size classes." (Authors) Odonata contributed little to the diet.] Address: Masdeu, M., Grupo de Ecología y Rehabilitación

itación de Sistemas Acuáticos, Departamento de Ecología y Evolución, CURE-Facultad de Ciencias, Universidad de la República, CP 20000 Maldonado, Uruguay. E-mail: malvinish@hotmail.com

11853. Maxell, B.J.; Piovoa-Scott, J.; Lawler, S.P.; Pope, K.L. (2011): Indirect effects of introduced trout on Cascade frogs (*Rana cascadae*) via shared aquatic prey. *Freshwater Biology* 56(5): 828-838. (in English) [California, USA; "(1) The introduction of trout to montane lakes has negatively affected amphibian populations across the western United States. In northern California's Klamath-Siskiyou Mountains, introduced trout have diminished the distribution and abundance of a native ranid frog, *Rana* (= *Lithobates*) *cascadae*. This is primarily thought to be the result of predation on frog larvae. However, if trout feed on larval aquatic insects that are available to *R. cascadae* only after emergence, then resource competition may also affect this declining native amphibian. (2) Stomach contents of *R. cascadae* were compared between lakes that contained trout and those from which introduced trout were removed. Total prey mass in stomach contents relative to frog body mass was not significantly different between lakes with fish and fish removal lakes, but in the former *R. cascadae* consumed a smaller proportion of adult aquatic insects. The stomach contents of fish included larvae of aquatic insects that are, as adults, eaten by *R. cascadae*. (3) *Rana cascadae* consumed fewer Trichoptera and more Orthoptera at lakes with higher densities of fish. At lakes with greater aquatic habitat complexity, *R. cascadae* consumed more Hemiptera: Gerridae and terrestrial spiders (Araneae). (4) We suggest that reductions in the availability of emerging aquatic insects cause *R. cascadae* to consume more terrestrial prey where trout are present. Thus, introduced trout may influence native amphibians directly through predation and, indirectly, through pre-emptive resource competition." (Authors) Stomach contents of *R. cascadae* averaged among fish-removal lakes (n = 3 lakes, 35 frogs) [A] and those with fish (n = 4 lakes, 13 frogs) [B] expressed as per cent by number (A: 11%; B: 3% in Odonata), per cent by estimated weight (A: 9.5%, B: 1.6% in Odonata)] Address: Maxell, B.J., Dept of Ecology & Evolutionary Biology, Campus Box 334, University of Colorado, Boulder, CO 80309-0334, USA. E-mail: maxwell.b.joseph@colorado.edu

11854. McLoughlin, S. (2011): New records of leaf galls and arthropod oviposition scars in Permian-Triassic Gondwanan gymnosperms. *Australian Journal of Botany* 59(2): 156-169. (in English) ["Single, midrib-positioned galls and midrib-flanking oviposition scars are described from four species of Permian glossopterid foliage from Australia and South Africa. Several of these traces have been mistaken previously for glossopterid reproductive organs or fructification detachment scars. A single Early Triassic corystosperm leaf from Australia is reported bearing multiple disc-like galls on both the midrib and pinnules. A Middle Triassic taeniopterid gymnosperm leaf from Australia is described hosting oviposition scars between consecutive secondary veins flanking the midrib. These fossils attest to a much richer record of plant-arthropod interactions in the late Palaeozoic and early Mesozoic of high-latitude Gondwana than previously reported, and indicate that herbivory and reproductive strategies involving galling and foliar ovipositioning were re-established relatively soon after the end-Permian mass extinction event that saw major

turnovers in both the flora and insect fauna." (Author) The paper includes references to Odonata.] Address: McLoughlin, S., Department of Paleobotany, Swedish Museum of Natural History, Box 50007, SE-104 05, Stockholm, Sweden. Email: steve.mcloughlin@nrm.se

11855. Miyake, M.; Miyashita, T. (2011): Identification of alien predators that should not be removed for controlling invasive crayfish threatening endangered odonates. *Aquatic Conservation: Marine and Freshwater Ecosystems* 21(3): 292-298. (in English) ["(1.) When multiple invasive species coexist in the same ecosystem and their diets change as they grow, determining whether to eradicate any particular invader is difficult because of complex predator-prey interactions. (2.): A stable isotope food-web analysis was conducted to explore an appropriate management strategy for three potential alien predators (snakehead *Channa argus*, bullfrog *Rana catesbeiana*, red-eared slider turtle *Trachemys scripta elegans*) of invasive crayfish *Procambarus clarkii* that had severely reduced the densities of endangered odonates (*Libellula angelina*) in a pond in Japan. (3.): The stable isotope analysis demonstrated that medium- and small-sized snakeheads primarily depended on crayfish and stone moroko *Pseudorasbora parva*. Both adult and juvenile bullfrogs depended on terrestrial arthropods, and juveniles exhibited a moderate dependence on crayfish. The turtle showed little dependence on crayfish. (4.): These results suggest that eradication of snakeheads risks the possibility of mesopredator release, while such risk appears to be low in other alien predators" (Authors)] Address: Miyashita, T., Laboratory of Biodiversity Science, School of Agriculture and Life Sciences, University of Tokyo, Yayoi, Tokyo 113-8656, Japan. E-mail: tmiya@es.a.u-tokyo.ac.jp

11856. NPTS (2011): Research and monitoring. Annual report 2010. Nature Protection Trust of Seychelles Research and monitoring. Annual report 2010: 20 pp. (in English) ["2.5.3. Odonata ...: Jardin Marron - *Allolestes maclachlani* and *Leptocnemis cyanops* abundant in forest. General *Allolestes* in June; *La Passe* - *Tramea limbata* present all year. *Orthetrum semmale* present January - March, September - December. *Anax guttatus* present January - March." (Authors)] Address: Gerlach, R., PO Box 207, Victoria, Mahé, Seychelles. E-mail: jstgerlach@aol.com

11857. Pérez, N.S.; Palomares, G.M.; Alabau, A.L. (2011): Libélulas de Venta del Moro. *El Lebrillo Cultural* 28: 21-37. (in Spanish) [Venta del Moro is a municipality in the comarca of Requena-Utiel in the Valencian Community, Spain. Between 27-IV and 5-XI-2010, at 36 sampling sites, a total of 29 Odonata species was recorded.] Address: not stated

11858. Piersanti, S.; Rebor, M.; Almaas, T.J.; Salerno, G.; Gaino, E. (2011): Electrophysiological identification of thermo- and hygro-sensitive receptor neurons on the antennae of the dragonfly *Libellula depressa*. *Journal of Insect Physiology* 57(10): 1391-1398. (in English) ["Recent ultrastructural investigations on Odonata antennal flagellum describe two types of sensilla styloconica, T1 and T2. The styloconic sensilla are located in pits, at the bottom of deep cavities, and share common features typical of thermo-hygroreceptors. In order to ascertain if the Odonata antennae are involved in hygroreception and thermoreception, we carried out electrophysiological recordings (single cell recordings, SCR) from adult males and females of *L. depressa*. After con-

tact was established, the antenna was stimulated by rapid changes in temperature and humidity. The present research shows the occurrence of a dry (DC), a moist (MC) and a cold (CC) receptor neurons on the antennal flagellum of *L. depressa*. These data demonstrate for the first time the presence of functional thermo-hygroreceptors on the antennal flagellum of dragonflies. The present results extend our knowledge of the not visual sensory modalities of Odonata, a field of research unexplored so far." (Authors)] Address: Piersanti, Silvana, Dipartimento di Biologia Cellulare e Ambientale, Via Elce di Sotto 1, 06123 Perugia, Italy. E-mail: silvanapiersanti@tiscali.it

11859. Pozdeev, I.V. (2011): Benthofauna of some watercourses and waterbodies of Udmurtia. Bulletin of Udmurt University, Biology, Earth sciences 2011(3): 75-84. (in Russian, with English summary) [The article presents the species list of benthic taxa inhabiting the rivers Kama, Cheptsya, Kil'mez' and their tributaries as well as the Votkinsk reservoir in the territory of Udmurt Republic. 125 taxa include *Aeshna squamata* (*A. caerulea*) and *Epiheca bimaculata*.] Address: Pozdeev I.V., candidate of biology, State Research Institute of Lake and River Fisheries, 614002, Perm, Chernyshevskogo st., 3, Russia. E-mail: pozdeevivan@mail.ru

11860. Pulfer, T.L.; Bahlai, C.; Mousseau, L. (2011): Recovery Strategy for Laura's Clubtail (*Stylurus laurae*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario: v + 23 pp. (in English) ["*S. laurae* is a member of the dragonfly family Gomphidae. It is found from Texas and the Florida Panhandle up to southwest Ontario, where it is found in the Norfolk Sand Plains physiographic region. Currently there are only two known populations in Ontario – Big Creek and Big Otter Creek. *S. laurae* is listed as an endangered species on the Species at Risk in Ontario (SARO) List and was assessed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). *S. laurae* requires a high quality aquatic environment and a vegetated riparian area, preferably consisting of mature forests. It is generally found in or near small to medium sized streams with sand or silt substrate and overhanging trees or shrubs. Adults use riffles in the stream for foraging, mating and probably to lay eggs. Eggs or recently emerged larvae are carried downstream to pools. Adults are short-lived with breeding and egg-laying occurring within weeks of adult emergence. The main threat to the survival and recovery of *S. laurae* is habitat degradation or alteration to both the aquatic and terrestrial habitat. Aquatic habitat threats include changes to water flow rate, pH, dissolved oxygen, temperature, nutrient load, pollution, dam construction and changes to water quality. Terrestrial habitat threats include shoreline alteration and loss of riparian habitat. Invasive species (especially Round Goby) and road mortalities are also thought to negatively affect *S. laurae*, but the pressures these are exerting on the population are unknown and require further study. Limiting factors include a limited distribution and apparent sensitivity to specific habitat features. Knowledge gaps include an overall lack of species-specific information (including mating and foraging behaviours, physical tolerances to changes in stream condition and pesticides or herbicides), quantitative assessment of road mortalities and extent of the distribution in Ontario. The recovery goal is to ensure a viable, self-sustaining

population of *S. laurae* in Ontario. The protection and recovery objectives are to: *protect, maintain and enhance the quantity and quality of existing *S. laurae* habitat; *reduce or mitigate threats to *S. laurae* and its habitat where feasible; and *increase knowledge of *S. laurae* biology in Ontario including distribution, abundance, life history and habitat needs. It is recommended that all stream reaches (aquatic resource areas [Aquatic resource areas are aggregations of stream segments with similar physical and biological characteristics] as defined by OMNR) currently occupied by *S. laurae*, as well as the naturally vegetated areas on either side of the stream, extending inland 200 metres (the typical distance the dragonflies travel between reproductive and roosting habitats) be prescribed as habitat under the Endangered Species Act, 2007." (Authors)] Address: not stated

11861. Rivers-Moore, N.A.; Goodman, P.S.; Nel, J.L. (2011): Scale-based freshwater conservation planning: towards protecting freshwater biodiversity in KwaZulu-Natal, South Africa. *Freshwater Biology* 56(1): 125-141. (in English) ["(1.) River systems have strong linear linkages. Innovative solutions to capture these linkages are required from aquatic conservation planners. (2.) We apply an approach to freshwater conservation planning to freshwater ecosystems of KwaZulu-Natal (South Africa), using generic conservation planning software. We used a two-step, hierarchical process to capture catchment- and local-scale dynamics, where priority primary catchments were first identified and then used at a second level for selecting priority subcatchments, which served as planning units at a finer scale. (3.) We set quantitative targets for defined freshwater biodiversity features. Priority planning units at both catchment levels were selected using modified weighted cost discounts and penalties, which included the presence of priority estuaries and free-flowing rivers, planning units falling within priority primary catchments, planning units identified as important in an existing terrestrial conservation plan and the degree of catchment degradation. Ecological processes were incorporated by discounting planning units important for surface and groundwater yield. (4.) Upstream–downstream connectivity was achieved by linking adjoining subcatchments associated with main rivers and wetlands and enhanced by setting high targets for subcatchments through which eels (*Anguilla mossambica*) must migrate. (5.) The hierarchical approach of selecting priority primary catchments and using these to affect subcatchment costs, plus the use of high targets for migratory fish species, is applicable to any freshwater conservation plan to favour planning unit selection within selected basins, while facilitating connectivity in upstream–downstream subcatchments." (Authors) The list of freshwater features used in the plan to achieve gamma, beta and alpha biodiversity representation includes *Aciagrion pinheyi*, *Agriocnemis ruberrima ruberrima*, *Chlorolestes draconicus*, *Pseudagrion umsingaziense*, *Urothemis luciana*] Address: Rivers-Moore, N.A., Ezemvelo KZN Wildlife, PO Box 13053, Cascades 3202, South Africa. E-mail: blackfly1@vodamail.co.za

11862. Rizzo, A.; Arcagni, M.; Arribère, M.A.; Bubach, D.; Ribeiro Guevara, S. (2011): Mercury in the biotic compartments of Northwest Patagonia lakes, Argentina. *Chemosphere* 84(1): 70-79. (in English) ["We report on total mercury (THg) concentrations in the principal components of food webs of selected Northern Patagonia

Andean Range ultraoligotrophic lakes, Argentina. The THg contents were determined using Instrumental Neutron Activation Analysis in muscle and liver of four fish species occupying the higher trophic positions (the introduced *Salmo trutta*, *Oncorhynchus mykiss* and *Salvelinus fontinalis*, and the native *Percichthys trucha*) accounted for eight lakes belonging to Nahuel Huapi and Los Alerces National Parks. We studied the food web components of both the West and East branches of Lake Moreno, including benthic primary producers such as biofilm, mosses, and macrophytes, three plankton fractions, fish, riparian tree leaves, and benthic invertebrates, namely decapods, molluscs, insect larvae, leeches, oligochaetes, and amphipods. Mercury concentrations in fish muscle varied in a wide range, from less than 0.05 to 4 µg g⁻¹ dry weight (DW), without a distribution pattern among species but showing higher values for *P. trucha* and *S. fontinalis*, particularly in Lake Moreno. The THg contents of the food web components of Lake Moreno varied within 4 orders of magnitude, with the lower values ranging from 0.01 to 0.5 µg g⁻¹ DW in tree leaves, some macrophytes, juvenile salmonids or benthic macroinvertebrates, and reaching concentrations over 200 µg g⁻¹ DW in the plankton. Juvenile *Galaxias maculatus* caught in the pelagic area presented the highest THg contents of all fish sampled, reaching 10 µg g⁻¹ DW, contents that could be associated with the high THg concentrations in plankton since it is their main food source. Although Lake Moreno is a system without local point sources of contamination, situated in a protected area, some benthic organisms presented high THg contents when compared with those from polluted ecosystems." (Authors) Taxa including Odonata are treated at order level.] Address: Rizzo, A., Laboratorio de Análisis por Activación Neutrónica, Centro Atómico Bariloche, CNEA, and CONICET, Av. Bustillo km 9.5, 8400 Bariloche, Argentina

11863. Saunders, P. (2011): Records of Vagrant Emperor Anax epiphigger at Dungeness RSPB Reserve, Kent, April 2011. *Atropos* 44: 56-57. (in English) [UK; 23-IV-2011.] Address: Saunders, P., 7a Surrey Road, Nunhead, London, SE15 3A, UK

11864. Schmidt Dalzochio, M.; Urakami, Y.; Machado, I.F. (2011): *Mecistogaster amalia* (Burmeister) Odonata: Pseudostigmatidae: First Record from Rio Grande do Sul State, Brazil. *EntomoBrasilis* 4(2): 78-79. (in English, with Portuguese summary) ["*Mecistogaster* is a New World genus of Pseudostigmatidae (Odonata) that is poorly studied due to its preference for flying in forest clearings and trails. In Brazil, only one endemic species, *Mecistogaster amalia* (Burmeister), is known. The distribution of *M. amalia* extends from Southeast Brazil (Rio de Janeiro and São Paulo states) to Argentina. Herein, we report *M. amalia* for the first time in Rio Grande do Sul State, Southern Brazil. This record extends the species' range ca. 630 km from the previous report at Paranaense Forest in Misiones province." (Authors)] Address: Schmidt Dalzochio, Marina, University of Vale do Rio dos Sinos (UNISINOS), Laboratory of Ecologia e Conservação de Ecossistemas Aquáticos, Brazil. E-mail: mahsdalzochio@gmail.com

11865. Schwander, T.; Leimar, O. (2011): Genes as leaders and followers in evolution. *Trends in Ecology and Evolution* 26(3): 143-151. (in English) ["A major question for the study of phenotypic evolution is whether intra- and interspecific diversity originates directly from genetic variation, or instead, as plastic responses to

environmental influences initially, followed later by genetic change. In species with discrete alternative phenotypes, evolutionary sequences can be inferred from transitions between environmental and genetic phenotype control, and from losses of phenotypic alternatives. From the available evidence, sequences appear equally probable to start with genetic polymorphism as with polyphenism, with a possible dominance of one or the other for specific trait types. We argue in this review that to evaluate the prevalence of each route, an investigation of both genetic and environmental cues for phenotype determination in several related rather than in isolated species is required." (Authors) The paper includes a section of female polymorphisms in *Ischnura*.] Address: Schwander, Tanja, Wissenschaftskolleg zu Berlin, Wallotstr. 19, 14193 Berlin, Germany. E-mail: tanja.schwander@gmail.com

11866. Sharma, S. (2011): Book Review: Nature's Delight. Dragonflies of India: a field guide by K.A. Subramanian, published by Vigyan Prasar, A-50, Institutional Area, Sector-62, NOIDA-201309, U.P.; Pages: 168; Price: Rs.125/-; ISBN No.: 978-81-7480-192-0. *Science Reporter*, November 2011: 53. (in English) [Extensive book review.] Address: Sharma, S., Flat No.101 (FF), H2/21, Bengali Colony, Mahavir Enclave, Palam, New Delhi-110045, India. E-mail: suryakantsharma03@yahoo.co.in

11867. Shin, I.K.; Yi, H.B.; Bae, Y.J. (2011): Colonization and community changes in benthic macroinvertebrates in Cheonggye Stream, a restored downtown stream in Seoul, Korea. *J. Ecol. Field Biol.* 34(2): 175-191. (in English) ["Colonization patterns and community changes in benthic macroinvertebrates in the Cheonggye Stream, a functionally restored stream in downtown Seoul, Korea, were studied from November 2005 to November 2007. Benthic macroinvertebrates were quantitatively sampled 15 times from five sites in the stream section. Taxa richness (59 species in total) increased gradually over the first year, whereas the density revealed seasonal differences with significantly lower values in the winter season and after flood events. The benthic macroinvertebrate fauna may have drifted from the upstream reaches during floods and from the Han River, arrived aerially, or hitchhiked on artificially planted aquatic plants. Oligochaeta, Chironomidae, Psychodidae, and Hydropterygidae were identified as major community structure contributors in the stream. Swimmers and clingers colonized relatively earlier in the upper and middle reaches, whereas burrowers dominated particularly in the lower reaches. Collector-gatherers colonized at a relatively early period throughout the stream reaches, and collector-filterers, such as the net-spinning caddisfly (*Cheumatopsyche brevilineata*), predominated in the upper and middle reaches after a 1-year time period. Cluster analyses and multi-response permutation procedures demonstrated that the Cheonggye Stream shares more similarities with the Jungnang Stream than with the Gapyeong Stream. Detrended correspondence analysis and nonmetric multidimensional scaling demonstrated that physical environmental factors (depth, current velocity, dissolved oxygen, and pH) as well as nutrients (total nitrogen and total phosphorous), water temperature, and conductivity could affect the distribution of benthic macroinvertebrates in the study stream... Larvae of *Anax parthenope julius*, *Orthetrum albistylum speciosum*, *Ischnura asiatica*, *Cercion calamorum*, *Cercion hieroglyphicum*, and *Coenagrionoidae* sp.), aquatic

bugs (*Ranatra chinensis*), and aquatic beetles (*Potamonectes hostilis*, *Potamonectes* sp., *Hydaticus* sp., and *Dytiscidae* sp.) were found among the artificially planted aquatic plants along the stream margins during the initial study period. These aquatic insects belong to a typical lentic fauna in Korea and were probably introduced with aquatic plants when they were planted in the restored stream section. The majority of these species disappeared several months after their occurrence. The restored Cheonggye Stream was opened to the public on October 1, 2005, but pilot operations were conducted prior to the opening ceremony while the channel was under construction with artificial plantations." (Authors)] Address: Bae, Y.J., Korean Ent. Institute, Korea University, Seoul 136-701, Korea. E-mail: yjbae@korea.ac.kr

11868. Siepielski, A.M.; Mertens, A.N.; Wilkinson, B.L.; McPeck, M.A. (2011): Signature of ecological partitioning in the maintenance of damselfly diversity. *J. Anim. Ecol.* 80(6): 1163-1173. (in English) ["1. Ecological differences among co-occurring taxa are often invoked as an explanation for the maintenance of biodiversity. Whether these differences facilitate coexistence, which allows unequal competitors to remain in systems and thus maintain biodiversity, is still unclear. 2. Here, we used observational and experimental studies to test for ecological partitioning in ways that would promote coexistence among three co-occurring damselfly genera. We evaluated two necessary conditions for coexistence: (i) that the damselfly genera differ in their abilities to engage in interactions with other damselfly genera and environmental conditions such that their relative abundances covary differently along environmental gradients and (ii) that an increase in intrageneric abundance is more detrimental to performance-related demographic features of each genus than increases in intergeneric abundances. 3. Observational studies across 40 lakes showed that relative abundances of each genus covaried differently along an environmental gradient of lake abiotic and biotic features consistent with ecological partitioning. Field experiments in which we manipulated both intra- and intergeneric densities demonstrated that per capita growth rates of each genus are negatively density-dependent and are only limited by increases in intra- not intergeneric densities. 4. Collectively, these results show a clear signature of ecological partitioning among each genus, which should prevent competitive exclusion and maintain each genus in this system. The results do not guarantee local coexistence among the three genera but are consistent with criteria that should promote their coexistence. Our results also suggest that a food web model coupling keystone predation and apparent competition is likely necessary to explain the ecological dynamics of persistence among these genera." (Authors)] Address: McPeck, M., Dept Biol. Sci., Dartmouth College, Hanover, New Hampshire 03755, USA. E-mail: mark.mcpeek@dartmouth.edu

11869. Sivaperuman, C.; Kumar Shah, S.; Raghunathan, C.; Ramakrishna (2011): Diversity and distribution of odonates in Great Nikobar Biosphere Reserve (GNBR), Andaman and Nikobar islands. In: B.K. Tyagi & V. Veer, [Eds], *Entomology: ecology and biodiversity*. Scientific Publishers (India), Jodhpur, ISBN 978-81-7233-727-8: 119-127. (in English) [Between 2008-2010 at 11 localities 20 Odonata taxa were recorded.] Address: Sivaperuman, C., Zool. Surv. India, Andaman & Nikobar Isis Centre, Port Blair-744 102, Andaman & Nikobar Isis, India

11870. Solomon, C.T.; Carpenter, S.R.; Clayton, M.K.; Cole, J.J.; Coloso, J.J.; Pace, M.L.; Vander Zanden, M.J.; Weidel, B.C. (2011): Terrestrial, benthic, and pelagic resource use in lakes: results from a three-isotope Bayesian mixing model. *Ecology* 92(5): 1115-1125. (in English) [Wisconsin-Michigan border region, USA; "Fluxes of organic matter across habitat boundaries are common in food webs. These fluxes may strongly influence community dynamics, depending on the extent to which they are used by consumers. Yet understanding of basal resource use by consumers is limited, because describing trophic pathways in complex food webs is difficult. We quantified resource use for zooplankton, zoobenthos, and fishes in four low-productivity lakes, using a Bayesian mixing model and measurements of hydrogen, carbon, and nitrogen stable isotope ratios. Multiple sources of uncertainty were explicitly incorporated into the model. As a result, posterior estimates of resource use were often broad distributions; nevertheless, clear patterns were evident. Zooplankton relied on terrestrial and pelagic primary production, while zoobenthos and fishes relied on terrestrial and benthic primary production. Across all consumer groups terrestrial reliance tended to be higher, and benthic reliance lower, in lakes where light penetration was low due to inputs of terrestrial dissolved organic carbon. These results support and refine an emerging consensus that terrestrial and benthic support of lake food webs can be substantial, and they imply that changes in the relative availability of basal resources drive the strength of cross-habitat trophic connections." (Authors) Odonata are treated at family level: Corduliidae, Libellulidae.] Address: Solomon, C.T., Dept of Natural Resource Sciences, McGill University, Ste. Anne de Bellevue, Montreal, Quebec H9X 3V9 Canada. E-mail: chris.solomon@mcgill.ca

11871. Tam, T.W.; Leung, K.K.; Kwan, B.S.P.; Wu, K.K.Y.; Tang, S.S.H.; So, I.W.Y.; Cheng, J.C.Y.; Yuen, E.F.M.; Tsang, Y.M.; Hui, W.L. (2011): *The Hong Kong Dragonflies*. AFCD, Friends of Country Park and Cosmos Books Ltd. Hong Kong: 367 pp. (in bilingual in Chinese and English) ["Although Hong Kong is famous for its skyscrapers, this city has a rich and unique diversity of dragonflies. Since the first local record made in 1854, a total number of 116 dragonfly species, including two endemic species, has been recorded in Hong Kong. *The Dragonflies of Hong Kong* opens the door to the understanding and identification of these 116 dragonfly species by providing a comprehensive key of adults, and descriptions of their characteristics (larva and both male and female adults), living habits, habitat, update distributional data and local status. With its easy-to-read text in Chinese and English and over 400 spectacular photographs, this book is an essential reference for ecologists and anyone interested in these "winged jewels" of Hong Kong." (Publisher)] Address: Agriculture, Fisheries and Conservation Department, 5/F, Cheung Sha Wan Government Offices, 303 Cheung Sha Wan Road, Kowloon, China. E-mail: mailbox@afcd.gov.hk

11872. Tunmore, M. (2011): An influx of insects along the north Norfolk coast. *Atropos* 42: 84-85. (in English) [Verbatim: "On 21 July 2010, whilst visiting friends in North Norfolk, I went for a walk along the nearby coast. It was a dry, warm and largely sunny day with a westerly breeze of approximately Beaufort Force 4. I began my walk at Brancaster beach, walking east along the dunes at the edge of the golf course to the beach chalets and returning via the same route to the car-park. As

I walked I disturbed small numbers of Common Darter *Sympetrum striolatum* (approximately four), a Migrant Hawker *Aeshna mixta* and the occasional Blue-tailed Damselfly *Ischnura elegans* (approximately six) and Common Blue Damselfly *Enallagma cyathigerum* in the dunes, there being no nearby freshwater. As I approached the beach chalets I disturbed several damselflies from a small Hawthorn *Crataegus monogyna*, which returned to alight on the branches of the bush. Upon closer investigation I found a total of 15 Small Red-eyed Damselfly *Erythromma viridulum* perched in this and two adjacent hawthorns, again with no nearby freshwater source. Later that afternoon I visited Titchwell RSPB reserve and walked down to the sea and west along the dunes. At the furthest point I disturbed an Anax imperator and a Painted Lady *Vanessa cardui* in the dunes and encountered an abundance of Silver Y *Autographa gamma* with an estimated 90,000 present in an area of sea lavender *Limonium* spp. At nearby Scott Head NNR summer warden Neil Lawton reported a similar mass arrival of Silver Y on this and the preceding day with 'several hundred thousand' present on 21 July. Via the Atropos Flight Arrivals webpage he also reported an arrival of Odonata on the island on 20/21 July with 10 Small Red-eyed Damselfly (including two in a moth-trap), two Emperor and small numbers of *S. striolatum*, *A. mixta*, *Orthetrum coerulescens*, *I. elegans* and *E. cyathigerum*. Overnight moth-trapping there on 20 July produced an estimated 6,000 Silver Y, one Small Mottled Willow *Spodoptera exigua* and seven Marbled Clover *Heliopsis virescens*. Clearly it was a significant period for insect immigration along this part of the North Norfolk coast." Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atropos.freeserve.co.uk

11873. Varadinova, E.D.; Pechlivanov, L.Z.; Stoichev, S.A.; Uzunov, Y.I. (2011): Recovering and succession of the species diversity of macrozoobenthos in Srebarna Biosphere Reserve (North-East Bulgaria). *Acta zool. bulg.* 63(1): 85-95. (in English) ["Development of the taxonomic composition of bottom macroinvertebrate fauna in Srebarna Lake Reserve is studied with a view to the changes in the environment after its reconnection with Danube River. A regime switching in the succession of the bottom invertebrate community in Srebarna Lake occurs expressed by considerable changes of its species composition after its reconnection of the with Danube by a new canal. Higher species richness in the peripheral pools of the wetland was recorded in comparison with the main open water body. Within the wetland area the local habitat parameters (modified by the flooding regime) are the leading factor that recently directly controls the bottom community development patterns and the spatial distribution of species. Succession of the faunistic complex of secondary aquatic organisms in Srebarna Lake are considered different than these in the communities of primary aquatic species being independent of the water flow." (Authors) Table 1 includes 39 Odonata species.] Address: Varadinova, Emilia, Institute of Biodiversity & Ecosystem Research, Bulgarian Academy of Sciences, 2, Yuri Gagarin Str., 1113 Sofia, Bulgaria. E-mail: emilia.varadinova@gmail.com

11874. Verdonschot, R.C.M.; Keizer-Vlek, H.E.; Verdonschot, P.F.M. (2011): Biodiversity value of agricultural drainage ditches: a comparative analysis of the aquatic invertebrate fauna of ditches and small lakes. *Aquatic Conservation: Marine and Freshwater Ecosystems* 21(7): 715-727. (in English) ["Drainage ditches are a common aquatic habitat in the lowland agricultural landscape of north-western Europe. The invertebrate fauna of these waters is poorly known compared with that of the semi-natural wetland fragments found in this region. While most wetlands are designated as nature reserves, drainage ditches are generally viewed purely as hydrological infrastructure in support of agriculture. To assess the conservation value for aquatic invertebrates of these man-made habitats compared with that of wetland fragments, the taxonomic composition and life-history characteristics of invertebrate assemblages inhabiting nine small lakes and nine ditches in peatlands in the Netherlands were compared, as well as the environmental characteristics potentially influencing assemblage structure. Although ditches comprised a smaller water volume, contained less diverse vegetation, displayed larger fluctuations in nutrient concentrations and were regularly managed, the total number of invertebrate taxa recorded per taxonomic group was comparable with that in small lakes, as was the number of nationally uncommon to very rare taxa. Similarity in life-history characteristics between the two water-body types was high, except that a higher proportion of atmospheric air breathers was found in ditches, and more plant miners and collector-filterers in small lakes. On a regional scale, a relatively high inter-ditch taxon dissimilarity was observed, resulting in total diversity estimates for ditches exceeding those of small lakes. This study showed that drainage ditches can be a significant habitat type for aquatic invertebrates. In the Netherlands, water bodies in peatland agricultural areas can contain a diverse invertebrate fauna, similar to that of water bodies in nearby nature reserves. ... Heteroptera and Coleoptera accounted for a significantly larger proportion of the assemblage in drainage ditches, while Odonata and Chironomidae were relatively more abundant in small lakes. (Authors)"] Address: Verdonschot, R., Freshwater Ecology, Centre for Ecosystem Studies, Wageningen, The Netherlands. E-mail: ralf.verdonschot@wur.nl

11875. Villanueva, R.J.T.; van der Ploeg, J.; van Weerd, M. (2011): *Drepanosticta hamalaineni* spec. nov. and *Sulcosticta sierramadrensis* spec. nov. from the northern Sierra Madre Natural Park, Luzon, The Philippines (Zygoptera: Platystictidae). *Odonatologica* 40(4): 333-338. (in English) [*D. hamalaineni* sp. n. (holotype male: Dipinintahikan area, Dipagsangan, Palanan, Isabela, Luzon Island, the Philippines, 12/20-IX-2008, to be deposited in RMNH, Leiden) and *S. sierramadrensis* sp. n. (holotype male, same locality, date and deposition) are diagnosed, described and illustrated." (Authors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

11876. Winkler, C.; Drews, A.; Behrends, T.; Bruens, A.; Haacks, M.; Jödicke, K.; Röbbelen, F.; Voß, K. (2011): Die Libellen Schleswig-Holsteins Rote Liste. 3. Fassung, September 2011 (Stand: November 2010). Schriftenreihe: LLUR SH – Natur - RL 22: 85 pp. (in German) [Red list of the Federal State Schleswig-Holstein, Germany. App. 50% of the regional fauna are extinct or threatened. Each of these species is introduced with details on distribution, population trends, habitats and causes of threat.] Address: Landesamt für Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein (LLUR), Hamburger Chaussee 25, 24220 Flintbek, Germany

11877. Yap, C.K.; Rahim Ismail, A. (2011): Relationships of distribution of macrobenthic invertebrates and the physico-chemical parameters from Semenyih River by using correlation and multiple linear stepwise regression analyses. *Pertanika J. Trop. Agric. Sci.* 34(2): 229-245. (in English) ["The distribution of macrobenthic invertebrates at Semenyih River has been described by Yap et al. (2003a), but their relationships with physico-chemical characteristics of the river have yet to be established. By using correlation and multiple linear stepwise regression, it was found that BOD₃, orthophosphate, total suspended solids and turbidity were important in structuring the stream macrobenthic invertebrate communities because they determined whether organisms could colonize and persist in the stream habitats. Thus, the invertebrates are useful as bioindicators to the health of the river ecosystem, complementing water quality analysis. Impacts of anthropogenic inputs can therefore be assessed based on the macrobenthic invertebrates' different species distribution." (Authors)] The mean number of specimens of *Leucorrhinia* sp. and *Ophiogomphus* sp. at the sampling stations of Sg. Semenyih in June, 1997 are presented. Both genera are not represented in the Malaysian fauna.] Address: Yap, C.K., Department of Biology, Faculty of Science, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia. E-mail: yapckong@hotmail.com

2012

11878. Abowei, J.F.N.; Ukoroije, B.R. (2012): The identification, types, taxonomic orders, biodiversity and importance of aquatic insects. *British Journal of Pharmacology and Toxicology* 3(5): 218-229. (in English) [The paper briefly introduces several insect orders including Odonata.] Address: Abowei, J.F.N., Department of Biological Sciences, Faculty of Science, Niger Delta University, Wilberforce Island, Nigeria

11879. Alquier, D.; Danflou, S.; Fusari, M.; Haber, E.; Pelozuelo, L. (2012): Observation d'une importante population de *Coenagrion caerulescens* (Fonscolombe, 1838) dans le département du Tarn (Odonata, Zygoptera: Coenagrionidae). *Martinia* 28(1): 57-64. (in French, with English summary) ["A population of *C. caerulescens* has been discovered in the western part of the Tarn Department in southern France which is, according to available information, one of the largest in France and probably in Europe. The presence of this species has been reported to national and local authorities to ensure its conservation despite the lack of legal protection at French and European levels." (Authors)] Address: Alquier, D., 110 rue de la Madeleine, F-81600 Gaillac, France. E-mail: david.alquier@sfr.fr

11880. An, R.-j.; Dan, K.; Li, A.-a.; Zhang, D.-M. (2012): Survey research on species of predatory natural enemy in paddy ecosystem of Tongliao areas. *Journal of Agriculture* 2012, 2(2): 21-25. (in Chinese, with English summary) [The fauna of paddy fields in Tongliao area (43° N 122° E; northeastern China, Inner Mongolia) includes *Anotogaster sieboldii*, *Pantala flavescens*, *Symptetrum meridionale*, and *Crocothemis servillia*.] Address: An, R.-j., College of Agriculture, Inner Mongolia University for the Nationalities, Tongliao 028043, Inner Mongolia, China. E-mail: anruijun1@163.com

11881. Ananian, V. (2012): New finds of 'critical' species of Odonata in Armenia – *Onychogomphus assimilis*

and *Libellula pontica*. *Brachytron* 15(1): 36-42. (in English) ["*Onychogomphus assimilis* and *Libellula pontica* are among the rarest and least known dragonflies in Armenia. Information on the distribution of the two species in Armenia was limited to few isolated locations reported half a century ago. The present paper presents new finds of these species from several new locations and discusses their conservation issues in the country." (Author)] Address: Vasil Ananian, V., Acopian Center for the Environment, 40 Baghramian Ave, Yerevan, 0019, Armenia. E-mail: gomphus@gmx.com

11882. Andem, A. B.; Okorafor, K.A.; Udofia, U.; Okete, J.A.; Ugwumba, A.A.A. (2012): Composition, distribution and diversity of benthic macroinvertebrates of Ona river, south-west, Nigeria. *European Journal of Zoological Research* 1(2): 47-53. (in English) ["Macrobenthic invertebrates' fauna of Ona River at Apata, Ibadan south-west, Oyo State, Nigeria was conducted from October, 2010 to March, 2011. Benthic samples were collected from five different stations along the river. Three phyla of macrobenthic invertebrates were encountered in the river. They were Arthropoda, represented by 3 genera, *Chironomus* (Diptera), *Progomphus* [sic] (Odonata) and *Isoperla* (Plecoptera); ... *Chironomus* larvae dominated the macrobenthic invertebrates with a total relative abundance of 59.1% while *Isoperla* larvae were the least abundant, 0.19% by number. All the macrobenthic invertebrates recorded were pollution-tolerant/Clean water species. The increase in the ecological potential of Ona River throughout the study period was best highlighted by the presence of indicator species." (Authors)] Address: Andem, A.B., Department of Zoology and Environmental Biology, University of Calabar, Cross River State, Nigeria

11883. Anjos-Santos, D., Pessacq, P. (2012): Description of the last instar larva of *Forcepsioneura sancta* (Hagen in Selys 1860) (Odonata: Protoneuridae). *Zootaxa* 3495: 79-82. (in English) [The last instar larva of *F. sancta* based on specimens collected in Rio de Janeiro State, Brazil, is described. The main diagnostic characters for the known larvae of Neotropical Protoneuridae genera are presented in a table.] Address: Anjos-Santos, D., Laboratorio de Investigaciones en Sistemática y Ecología animal (LIESA). Sarmiento 849, 9200, Esquel, Chubut, Argentina. E-mail: danielleanjos2@yahoo.com.br

11884. Arango, A.M.; Portillo, J.L.; Parra-Tabla, V.; Hernández Salazar, L.T.; Morales Mávila, J.E.; Gray, V.R. (2012): Effect of the spider *Peucea viridans* (Oxyopidae) on floral visitors and seed set of *Cnidocolus multilobus* (Euphorbiaceae). *Acta Botánica Mexicana* 100: 1-14. (in English, with Spanish summary) [The authors studied the interaction between the plant *Cnidocolus multilobus*, its floral visitors and the predator spider *P. viridans*. The diet of *P. viridans* was composed exclusively of arthropods (spiders 32%, insects 68%). Two of the 141 insect prey items were Odonata.] Address: Gray, V.R., Universidad Veracruzana, Instituto de Neuroetología, 91190 Xalapa, Veracruz, México. E-mail: vrico@uv.mx

11885. Arimoro, F.O.; Obi-Iyeko, G.E.; Obuken, P.J.O. (2012): Spatiotemporal variation of macroinvertebrates in relation to canopy cover and other environmental factors in Eriora River, Niger Delta, Nigeria. *Environ. Monit. Assess.* 184(10): 6449-6461. (in English) ["Canopy cover is well known to influence the distribution of macroinvertebrates in temperate streams. Very little is known

about how this factor influences stream communities in Afrotropical streams. The effects and possible interactions of environmental factors and canopy cover on macroinvertebrate community structure (abundance, richness, and diversity) were examined in four stations in Eriora River, southern Nigeria bimonthly from May to November 2010. The river supported diverse macroinvertebrates in which the upstream sampling stations with dense canopy cover were dominated by Decapoda, Ephemeroptera, Odonata, Gastropoda, Trichoptera, and Coleoptera while Diptera and Coleoptera were the benthic organisms found predominant at downstream stations with less canopy cover. Some caddisfly species such as *Agapetus agilis*, *Trichosetodes* species and the stonefly *Neoperla* species were present upstream and were found to be potential bioindicators for a clean ecosystem. The blood worm *Chironomus* species and *Tabanus* sp. were abundant at the downstream of the river and are considered potential bioindicators for an organically degrading ecosystem. Some environmental factors varied temporally with significantly higher macroinvertebrate abundance and richness in May. We found out that canopy cover and environmental factors affected macroinvertebrates abundance, diversity, and richness and that the individual taxon had varying responses to these factors. These results help identify the mechanisms underlying the effects of canopy cover and other environmental factors on Afrotropical stream invertebrate communities." (Authors)] Address: Arimoro, F.O., Dept of Animal & Environ. Biology, Delta State Univ., P. M. B. 1, Abraka, Nigeria. E-mail: fransarimoro@yahoo.com

11886. Armitage, P.A.; Hawczak, A.; Blackburn, H.H. (2012): Tyre track pools and puddles – Anthropogenic contributors to aquatic biodiversity. *Limnologia - Ecology and Management of Inland Waters* 42(4): 254-263. (in English) ["Twelve sites of tyre track pools and puddles situated in woodland, heath and pasture in Dorset UK were examined to determine their macroinvertebrate species richness and community changes over the course of one year. 174 taxa were found with Diptera (59) and Coleoptera (48) contributing 61% of the total. The most frequently occurring and ubiquitous groups were nematoceran dipterans, Oligochaeta, Coleoptera, Crustacea and Lamellibranchiata. Species richness varied with season and on average was highest in March and November samples. On average only 26% (range 16–40%) of the combined total number of taxa found in spring (March) and autumn (November) samples from a site were also found there in each of these seasons individually, indicating a high species turnover through the year. The tyre track pools contributed to local aquatic biodiversity by adding 29 taxa to previously published taxa lists from aquatic habitats in the area. The relative richness of the tyre track pools is attributed to their successional variation in a heterogeneous landscape. Conservation value of 9 of the 12 sites was rated Very high to High and nine regionally notable or rare taxa were recorded. It is suggested that the important conservation status of the tyre track pools warrants greater recognition and further intensive study." (Authors) The list of taxa includes *Pyrrhosoma nymphula*, *Aeshna cyanea*, *Libellula* sp., *L. depressa*, and *Sympetrum* sp.] Address: Armitage, P.A., Freshw. Biol. Ass., River Laboratory, East Stoke, Wareham, Dorset BH20 6BB, UK. E-mail: parmitage@fba.org.uk

11887. Asquith, C.M.; Vonesh, J.R. (2012): Effects of size and size structure on predation and inter-cohort

competition in red-eyed treefrog tadpoles. *Oecologia* 170: 629-639. (in English) ["Individual and relative body size are key determinants of ecological performance, shaping the strength and types of interactions within and among species. Size-dependent performance is particularly important for iteroparous species with overlapping cohorts, determining the ability of new cohorts to invade habitats with older, larger conspecifics. We conducted two mesocosm experiments to examine the role of size and size structure in shaping growth and survival in tadpoles of the red-eyed treefrog (*Agalychnis callidryas*), a tropical species with a prolonged breeding season. First, we used a response surface design to quantify the competitive effect and response of two tadpole size classes across three competitive environments. Large tadpoles were superior per capita effect competitors, increasing the size difference between cohorts through time at high resource availability. Hatchlings were better per biomass response competitors, and maintained the size difference between cohorts when resource availability was low. However, in contrast to previous studies, small tadpoles never closed the size gap with large tadpoles. Second, we examine the relationship between body size, size structure, and predation by dragonfly nymphs (*Anax amazili*) on tadpole survival and growth. Hatchlings were more vulnerable to predation; predator and large competitor presence interacted to reduce hatchling growth. Again, the size gap between cohorts increased over time, but increased marginally more with predators present. These findings have implications for understanding how variation in resources and predation over the breeding season will shape population size structure through time and the ability of new cohorts to invade habitats with older conspecifics." (Authors)] Address: Asquith, C.M., Department of Biology, Virginia Commonwealth University, 1000 West Cary Street, P.O. Box 842012, Richmond, VA 23284-2012, USA. E-mail: jrvolesh@vcu.edu

11888. Baird, I.R.C. (2012): The wetland habitats, biogeography and population dynamics of *Petalura gigantea* (Odonata: Petaluridae) in the Blue Mountains of New South Wales. PhD thesis, University of Western Sydney: (in English) ["*Petalura gigantea* is a poorly understood dragonfly with a long-lived fossorial larval habit that is unique to the Petaluridae. The species has been recorded from bogs, swamps and seepages of the coast and ranges of New South Wales, including a small number of records in the Blue Mountains. This topographically and hydrogeologically complex landscape includes a widely distributed network of wetlands characterised by considerable heterogeneity in patch size, quality and geographic separation. It provided the opportunity to elucidate the biogeography, and investigate population dynamics of this species at a landscape scale, within the context of metapopulation theory. This study was undertaken between late 2003 and early 2010. The objectives of the biogeographic component were to identify where *P. gigantea* occurs within the Blue Mountains and why it occurs there. Typologies of existing wetlands were reviewed, and a set of 22 types was identified for use in this thesis. A total of 284 swamps were surveyed, with *P. gigantea* recorded in 111 of these. The species was recorded from 6 swamp types, with potential habitat identified in an additional four swamp types. Hydrogeomorphically, these upland mires range from hanging swamps and localised seepage springs to valley-fill impeded-drainage swamps. *Petalura gigantea* has been observed utilising each of

these hydrogeomorphic expressions across a wide range of slopes and patch sizes. All of these swamp types may be considered groundwater dependent ecosystems. Hydrogeomorphic context and climate were found to be responsible for the development of peatland soils and suitable mire habitat, although selected wetland typologies varied in their usefulness as predictors of habitat suitability. Swamp types used by the species are characterised by considerable spatio-temporal heterogeneity in hydrology and spatial heterogeneity in the distribution of organic-rich soils, within and between swamps. Breeding sites are characterised by a groundwater regime that provides sufficient surface wetness to minimise risk of desiccation of eggs and early larval instars, supports the development of organic-rich peatland soils suitable for larval burrowing, and maintains some groundwater within the burrow throughout the larval stage. *Petalura gigantea* is considered to be an obligate, groundwater dependent, mire-dwelling species. Systematic exuviae surveys and modified 'Pollard Walk' imago surveys were used to study population dynamics at varying spatio-temporal scales, ranging from seasonal demographics within patches to comparison of changing relative abundance of imagines among years, both for and among patches. Seasonal demographics studied included sex ratio at emergence, pattern and duration of the emergence season, duration of the flying season and pattern of changing relative abundance of imagines across the flying season. This set of studies has identified a number of patterns in the landscape scale population dynamics of *P. gigantea* in the Blue Mountains. These include peak abundance years followed by a number of years of low or nil abundance in a large proportion of sites. The difference in relative abundance of male imagines among years was significant for each of the three main swamp types studied. Spatial synchrony in peak abundance years among sites in geographic proximity, and density-dependent male dispersal (in addition to female dispersal) from small sites with large emergence events that contributed to potential dispersal 'halo' effects, were also confirmed. These characteristics suggest a complex, spatially structured population, with patches of different sizes, quality and geographic distance, linked by variable between-patch movements across the network over varying temporal scales. These findings are consistent with metapopulation theory, and suggest a complex dynamic when the long larval stage, some likelihood of cohort splitting, landscape factors (patch size, patch quality, geographic distance, matrix effects) and stochastic exogenous factors (e.g., climate, fire) are considered. This longitudinal, landscape-scale study is the first for any petalurid and the first demographic study for any *Petalura* species. This research will further inform the dialogue in relation to the population dynamics of patchily distributed dragonflies in the context of metapopulation theory, including dynamics such as spatial synchrony, density-dependent dispersal, patch stepping stone and rescue effects. In addition to identified anthropogenic threats, a potential reduction in groundwater availability, a more intense fire regime and potential compounding effects of rapid climate change, may be the greatest threats to the persistence of these mire ecosystems and groundwater dependent species such as *P. gigantea*. The egg and early larval stages are identified as the critical phases, where climatic and fire effects may significantly reduce reproductive success. The improved understanding of the biogeography, habitat requirements and population dynamics of *P. gigantea* resulting from this

study provides a stronger foundation for conservation of the species and these mire ecosystems. *Petalura gigantea* is well placed to act as a flagship for their conservation." (Author) Available from: <http://handle.uws.edu.au:8081/1959.7/509925>.] Address: Baird, I.R.C., 3 Waimea St, Katoomba NSW 2780, Australia. ianbaird@mountains.net.au

11889. Bates, L.M.; Hall, B.D. (2012): Concentrations of methylmercury in invertebrates from wetlands of the Prairie Pothole Region of North America. *Environmental Pollution* 160(1): 153-160. (in English) ["Prairie wetlands may be important sites of mercury (Hg) methylation resulting in elevated methylmercury (MeHg) concentrations in water, sediments and biota. Invertebrates are an important food resource and may act as an indicator of MeHg exposure to higher organisms. In 2007–2008, invertebrates were collected from wetland ponds in central Saskatchewan, categorized into functional feeding groups (FFGs) and analyzed for total Hg (THg) and MeHg. Methylmercury and THg concentrations in four FFGs ranged from 0.2–393.5 ng·g⁻¹ and 9.7–507.1 ng·g⁻¹, respectively. Methylmercury concentrations generally increased from gastropods with significantly lower average MeHg concentrations compared to other invertebrate taxa. Surrounding land use (agricultural, grassland and organic agricultural) may influence MeHg concentrations in invertebrates, with invertebrate MeHg concentrations being higher from organic ponds (457.5 ± 156.7 ng·g⁻¹) compared to those from grassland ponds (74.8 ± 14.6 ng·g⁻¹) and ponds on agricultural lands (32.8 ± 6.2 ng·g⁻¹). Highlights: *MeHg concentrations ranged from 0.2 to 393.5 ng·g⁻¹ and generally increased with trophic level. *Gastropods had significantly lower average MeHg concentrations compared to other invertebrates. *Surrounding land use may influence MeHg concentrations in invertebrates. *MeHg concentrations were higher in organic ponds compared to grassland and agricultural ponds." (Authors) Taxa including Odonata are treated at family level. Average MeHg concentrations varied greatly among ponds for all four invertebrate groups. Average within pond invertebrate MeHg concentrations ranged from 3.3 - 1391.0 ng·g⁻¹ in Odonata.] Address: Hall, Britt, Dept of Biology, Univ. of Regina, 3737 Wascana Parkway, Regina, SK S4S 0A2, Canada. E-mail: britt.hall@uregina.ca

11890. Beattie, R.G. & Nel, A., (2012): A new dragonfly, *Austroprotolindenia jurassica* (Odonata: Anisoptera), from the Upper Jurassic of Australia. *Alcheringa* 36(2): 189-193. (in English) ["*Austroprotolindenia jurassica* gen. et sp. nov., a new Mesozoic Australian dragonfly, is described from the Talbragar Fossil Fish Bed (Upper Jurassic) of eastern Australia. It shows some similarities with the Eurasian Mesozoic petalurid family Protolindeniidae, but its incomplete state of preservation prevents us assigning it to a particular anisopteran clade." (Authors)] Address: Beattie, R.G., PO Box 320, Berry 2535, NSW, Australia. E-mail: rgbeattie@bigpond.com

11891. Bernard, R. (2012): East Palaearctic *Somatochlora graeseri* Selys occurs as a postglacial relict in Europe west of the Urals (Anisoptera: Corduliidae). *Odonatologica* 41(4): 309-325. (in English) ["The East Palaearctic *S. graeseri* is characterized by a current disjunct distribution. New data from northern European Russia significantly modify the earlier known pattern of its distribution. The first European record west of the Urals is reported from the environs of Pinega village (Arkhangelsk province, Pinega region). The distribution

range of this species presented here is similar to that of *Coenagrion hylas* and *C. glaciale*. Like these species, *S. graeseri* is a postglacial relict in Europe and representative of a cold-stenothermal fauna that probably colonized the continent during the late Pleistocene and early Holocene. During the Atlantic period they withdrew far to the East, remaining only as isolates in the Urals and in Europe. The survival of *S. graeseri* in the presumptive isolate of its distribution range in the Pinega region is probably a consequence of a specific combination of severe climate and habitat/microclimatic conditions, influenced by karst. The habitat conditions of the new locality are analysed in the context of the species' requirements. The spiny exuviae of *S. graeseri* and details of the female abdominal pattern are presented and compared with those of Siberian and Far Eastern individuals to show the morphological variation of the species. The diagnostic features of the exuviae, such as the large and specifically shaped lateral and dorsal spines, the thoracic banded pattern and the laterosternal sclerites on the fourth to sixth segments of the abdomen, are described." (Author)] Address: Bernard, R., Department of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

11892. Bhardwaj, H.; Srivastava, M. (2012): A study on insect visitors of certain Cucurbit vegetable crops in an agro-ecosystem near Bikaner, Rajasthan, India. *Journal Academica* 2(3): 99-126. (in English) [Verbatim: "Only ...*Pantala flavescens* was observed to visit flowers present in the agro-ecosystem studied. It was documented throughout the period of study. The number of visits ranged from 1 to 40/man/ h on different flowers. These were also seen to visit the flowers mostly in the forenoon... *Argiocnemis femina* adults were seen from April to October and their number of visits ranged from 1 to 7/man/ h on different flowers. Its maximum number was noticed in the month of April. They visited flowers of *Cucumis* and *Lagenaria*, although *Luffa* flowers were also in their full bloom showing their preference. It was a rare visitor. These were also reckoned more during forenoon."] Address: Srivastava, M., Laboratory of Entomology, Department of Zoology, Govt. Dungar College, Bikaner 334003, Rajasthan, India

11893. Bischoff, W. (2012): Prof. Dr. Günther Peters zum achtzigsten Geburtstag. *Die Eidechse* 23(1): 1-3. (in German) [This is a tribute on the occasion of the eightieth birthday of the odonatologist Professor Günther Peters including a short retrospective of his life and work; the focus is set on reptiles.] Address: not stated

11894. Bitsch, J. (2012): The controversial origin of the abdominal appendage-like processes in immature insects: Are they true segmental appendages or secondary outgrowths? (*Arthropoda hexapoda*). *Journal of Morphology* 273(8): 919-931. (in English) ["In this article, I review the major characteristics of different types of appendage-like processes that develop at the abdominal segments of many immature insects, and I discuss their controversial morphological value. The main question is whether the abdominal processes are derived from segmental appendages serially homologous to thoracic legs, or whether they are "secondary" outgrowths not homologous with true appendages. Morphological and embryological data, in particular, a comparison with the structure and development of the abdominal appendages in primitive apterygote hexapods, and data from developmental genetics, support the hy-

pothesis of appendicular origin of many of the abdominal processes present in the juvenile stages of various pterygote orders. For example, the lateral processes, such as the tracheal gills in aquatic nymphs of exopterygote insects, are regarded as derived from lateral portions of appendage primordia, homologous with the abdominal styli of apterygotan insects; these processes correspond either to rudimentary telopodites or to coxal exites. The ventrolateral processes, such as the prolegs of different endopterygote insect larvae, appear to be derived from medial portions of the appendicular primordia; they correspond to coxal endites. These views lead to the rejection of Hinton's hypothesis (Hinton [1955] *Trans R Entomol Soc Lond* 106:455-545) according to which all the abdominal processes of insect larvae are secondary outgrowths not derived from true appendageanlagen." (Author)] Address: Bitsch, J., 30 rue du lac d'Oô, F-31500, Toulouse, France. E-mail: collette.bitsch@orange.fr

11895. Blanke, A.; Wipfler, B.; Letsch, H.; Koch, M.; Beckmann, F.; Beutel, R.; Misof, B. (2012): Revival of Palaeoptera—head characters support a monophyletic origin of Odonata and Ephemeroptera (*Insecta*). *Cladistics* 28: 560-581. (in English) ["The earliest branching event in winged insects, one of the core problems regarding early insect evolution, was addressed using characters of the head. The head is arguably one of the most complex body regions in insects and the phylogenetic information content of its features has been demonstrated. In contrast, the wings and other body parts related to the flight apparatus and sperm transmission are not useful in the context of this problem, as the outgroups (silverfish and bristletails) are wingless and transmit spermatophores externally. Therefore, they show profound differences in the organization of the postcephalic body, and assessment of homology and subsequent phylogenetic analysis of features of these body regions is extremely difficult. The core of this study is the investigation of head structures of representatives of the major clades of dragonflies. A detailed description of the head of *Lestes virens* is presented and was used as a starting point for the compilation of a character set and a character state matrix for the entire *Dicondylia* (winged insects + silverfish), with a main focus on the placement of dragonflies and consequently the basal branching event within winged insects. Our results indicate a sister-group relationship between a clade Palaeoptera (dragonflies + mayflies) and the megadiverse monophyletic lineage Neoptera. We show that despite considerable structural similarity between the odonate and neopteran mandible, the muscle equipment in dragonflies is more plesiomorphic with respect to *Dicondylia* than previously known. Odonata and Ephemeroptera also share presumably derived features of the antenna, maxilla, and labial musculature. Parsimony analyses of the head data unambiguously support a clade Palaeoptera." (Authors)] Address: Blanke, A., Forschungsmuseum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany. E-mail: blanke@uni-bonn.de

11896. Bogdan, H.V.; Covaciu-Marcov, S.D.; Cupsa, D.; Cicort-Lucaciu, A.S.; Sas, I. (2012): Food composition of a *Pelophylax ridibundus* (*Amphibia*) population from a thermal habitat in Banat region (Southwestern Romania). *Acta zool. bulg.* 64(3): 253-262. (in English) ["The food of *Pelophylax ridibundus* population from the thermal habitat from Carpinis presents great differences depending on the period. The feeding of frogs was

more reduced throughout the winter, due to low temperatures, but also during autumn, due to the drought. Although the basic lines set by the previous studies on the feeding of amphibians in thermal waters are being followed, the facts here show more nuanced reality. Thus, not just low temperatures, but also other meteorological factors (drought or heavy rains) can induce important modifications in the feeding of amphibians. The feeding of *P. ridibundus* population was affected by the variation of such meteorological conditions throughout the entire year of our study. The trophic offer of the habitat was rather reduced, but the terrestrial environment had plenty of preys for the population to feed accordingly. Thus, the number of prey taxa was high, but also very variable among the study periods." (Authors) Odonata are of minor importance as diet of the frog species] Address: Bogdan, Horia, University of Oradea, Faculty of Sciences, Dept of Biology; 1, Universitatii, Oradea 410087, Romania. E-mail: sever.covaciu@yahoo.com

11897. Bogdanović, T.; Marković, D.; Katusić, L. (2012): Critically endangered species of dragonfly (Odonata) in the regional park Mura-Drava. Knjiga sažetaka / Proceeding of Abstracts. 11. Hrvatski biološki kongres / 11th Croatian Biological Congress Šibenik, Croatia, 16-21. IX 2012: 203. (in English, with Croatian summary) [Verbatim: During the period from 2011 - 2012, the first systematic investigations of dragonflies of the Regional park Mura –Drava were carried out at 55 locality. The following methods were used: the method of collecting by entomological nets, the method of strolling and observing (linear transect) and the method of taking photographs. Mapping and digital analyses of the data were done by GIS technology, and the ArcView 9.0 program was used. The difference within the composition of the data chosen by the given parameters was done by cluster analysis and the ordination method of the multidimensional scaling of the statistical programme PRIMER 5.0. It was used the Bray-Curtis index of similarity. For the cluster analysis the group average method was used. On the basis of the 1136 collected individuals at different stages of life, a total of 52 species, ... of the order Odonata were established. The established qualitative structure of the dragonflies of the research area represents 72,85% of the total number of species in Croatia which proves that the investigated area is significant for the protection of the biodiversity of the dragonfly fauna. Data relating to the distribution and fluctuation of 4 critical endangered species and change in their populations well as the results of some eco-research show that the dragonflies is a very sensitive species and that the survival of stabile population directly depends on the human activity.] Address: Bogdanović, T., Dept of Biology, University of J. J. Strossmayer, Osijek, Trg Ljudevita Gaja 5, HR-31000 Osijek, Croatia. E-mail: tbogdanovic@biologija.unios.hr

11898. Bogdanović, T.; Franković, M.; Marguš, D. (2012): Dragonflies (Odonata) in the National Park „Krka“ – Endangerment and status. 11. Hrvatski biološki kongres / 11th Croatian Biological Congress Šibenik, Croatia, 16-21. IX 2012: 66-67. (in Croatian & English) [Verbatim: The first systematic studies of dragonflies in the National Park "Krka" were carried out from April to September 2010 at 55 localities. The following methods were used: collecting by entomological net and the linear transect method by strolling and observing. Mapping and digital analyses of the data were done by GIS technology, and the ArcView 9.0 program was used.

The difference within the composition of the qualitative and quantitative data structure was done by cluster analysis and the ordination method of the multidimensional scaling using statistical programme PRIMER 5.0. The Bray-Curtis index of similarity was used. For the cluster analysis the group average method was used. On the basis of the 1274 collected individuals at different stages of life, a total of 40 species, 23 genera, 9 families and 2 suborders of the order Odonata were established. Six species making an appearance for the first time in the area investigated have been determined: Data relating to the distribution and fluctuation of critically endangered species and changes in their populations, as well as the results of some eco-researches show that the dragonfly species are a very sensitive and that the survival of stabile population directly depends on the human activity. The established dragonfly species assemblage on surveyed area represents 54.8% of the Croatian dragonfly fauna, which proves the importance of this area to protect the biodiversity of fauna dragonfly] Address: Bogdanović, T., Josip Juraj Strossmayer University, Department of Biology, Ulica Cara Hadrijana 8/A, 31000 Osijek, Croatia. E-mail: tbogdanovic@biologija.unios.hr

11899. Bolotov, I.N.; Bepalaya, Yu.V.; Usacheva, O.V. (2012): Ecology and evolution of hydrobionts in hot springs of the subarctic and arctic: Formation of similar assemblages, adaptation of species, and microevolutionary processes. *Biology Bulletin Reviews* 2(4): 340-348. (in English) ["In the Subarctic and Arctic, the fauna of hydrothermal systems is considered to be an allochthonous, migration-mediated system comprised of the representatives of different taxa, which are characterized by a set of preadaptations to life in hot springs. These adaptations evolved before species had colonized this thermal anomalous environment. Hot springs characterizing by a constant temperature and hydrochemical regime appear to be the favourable sites compared to the usual local environment. The short-term existence of thermal springs on the geological time scale and their evolutionary evanescence serve as preconditions for the low fauna endemism that make up the taxa on the intraspecific and species levels. The taxonomical status of many of these forms has not yet been defined with certainty, since populations of new species and intraspecific taxonomic categories of molluscs that inhabit thermal pools may evolve similar morphological, physiological, and biochemical features independently; i.e., they may exhibit convergent similarity." (Authors) The paper refers on an older study with larval records of unidentified Odonata from thermals springs.] Address: Bolotov, I.N., Institute of Environmental Problems of the North, Urals Branch, Russian Academy of Sciences, Arkhangelsk, Russia. E-mail: inep@yandex.ru

11900. Borisov, S.N. (2012): Migrant dragonflies in Middle Asia. 4. *Anax parthenope parthenope* (Selys, 1834) (Odonata, Aeshnidae). *Euroasian entomological journal* 11(3): 239-248. (in Russian, with English summary) ["Data on the distribution, phenology and migrations of *Anax p. parthenope* in Middle Asia are presented. Northern limit of species range coincides with Northern boundary of Middle Asia, isolated local populations are recorded in the South of the Urals and Siberia. Annual (2008–2010) autumnal migrations in a southern direction were established in Chok-Pak mountain range (N 42°31', E 70°36') by ornithological traps.

Migration flights were recorded from the end of August to the end of October. Two seasonal cohorts with different life-cycles, migrating and residential, are supposed for Middle-Asian populations." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

11901. Bots, J.; Breuker, C.J.; Kaunisto, K.M.; Koskimäki, J.; van Gossum, H.; Suhonen, J. (2012): Wing shape and its influence on the outcome of territorial contests in the damselfly *Calopteryx virgo*. *Journal of insect science* 12:96: 13 pp. (in English) ["Male mating success is often determined by territory ownership and traits associated with successful territory defense. Empirical studies have shown that the territory owner wins the majority of fights with challenging males. Several physical and physiological traits have been found to correlate with resource holding potential. In addition, in aerial insects, wing design may also have a strong influence on resource holding potential, since it determines efficiency and precision during flight. However, this possibility has not yet been thoroughly evaluated using the modern technique of geometric morphometrics to analyze shape. Therefore, this study examined whether wing shape affects the outcome of male-male contests in the territorial damselfly, *Calopteryx virgo*. Wing shape and also traditional flight-related morphological measures were compared between 27 pairs of winners and losers from experimental territorial contests. Contrary to expectations, there were no differences between winners and losers in all studied wing traits (shape, length, width, total surface, aspect ratio, and wing loading). However, highly significant differences in wing shape and size were detected between the fore- and hindwing. It is currently not known how these differences relate to flight performance, since previous biomechanical studies in damselflies assumed fore- and hindwings to have an identical planform." (Authors)] Address: Bots, Jessica, Evolutionary Ecology Group, University of Antwerp, Antwerp, Belgium. E-mail: jessica.bots@ua.ac.be,

11902. Bried, J.T.; D'Amico, F.; Samways, M.J. (2012): A critique of the dragonfly delusion hypothesis: why sampling exuviae does not avoid bias. *Insect Conservation and Diversity* 5(5): 398-402. (in English) ["(1.) A recent study comparing adult and exuvial odonate richness concluded that adult surveys overestimate the number of species reproducing successfully. The authors called this phenomenon the "dragonfly delusion" and recommended that only exuviae be used for bio-monitoring and habitat quality assessment. However, they drew this conclusion from limited surveys and detection-naïve analysis and failed to acknowledge that exuvial richness is typically biased low. (2.) Here, we quantify the exuvial bias using two related metrics: (i) species detectability from concurrent adult and exuvial surveys and (ii) estimated exuvial species richness at a site based on imperfect detectability and the regional pool (cumulative total across study sites) of exuvial species observed. (3.) Using concurrent adult and exuvial data from lakes in south-west France, we found that detectability was generally lower in 1-h exuvial searches than in 20-min adult searches and that exuvial surveys may lead to strong negative bias in richness estimation. This suggests the alleged delusion of adult surveys was exaggerated. (4.) Controlling for species de-

tection probability is crucial in making unbiased inferences on how many odonate species occupy a site and, by extension, comparing adult and exuvial species richness. Exuviae sampling avoids positive bias, not bias in general, and requires either relatively intensive search effort, statistical accounting of false species absences, or acceptance of negatively biased richness." (Authors)] Address: Bried, J., Albany Pine Bush Preserve Commission, Albany, NY, USA. E-mail: jbried@albanypinebush.org

11903. Buczyński, P.; Dawidowicz, Ł.; Jarska, W.; Tończyk, G. (2012): On the occurrence of *Cordulegaster boltonii* (Donovan, 1807) (Odonata: Cordulegasteridae) in the western part of the Lithuanian Lake District (Poland). *Zoology and Ecology* 22(3-4): 198-202. (in English, with Polish summary) ["The authors analyse three sites of occurrence of *C. boltonii* in the western part of the Lithuanian Lake District (Suwałki Region, north-east Poland). The area is situated within a distance of over 300 km between large agglomerations of the species' sites in the Tuchola Forest (north Poland) and in south-east Lithuania. Only one historical site is known so far from the study area (from 1911). A small but permanent distribution island probably exists in the study area, although *C. boltonii* is rare and develops in small populations. A research programme is required to explain the size of the distribution island, its relations to the sites in Lithuania and the status and threats to the species." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

11904. Buczyński, P.; Zawal, A. (2012): Dragonflies (Odonata) of the nature reserve "Zródliśko Skrzykowe". *Parki nar. Rez. Przyr.* 31(3): 23-30. (in Polish, with English summary) [In 2006, ten Odonata species were recorded in the "Zródliśko Skrzykowe" nature reserve (NW Poland). Most valuable record was the regionally rare *Cordulegaster boltonii*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

11905. Burkle, L.A.; Mihaljevic, J.R.; Smith, K.G. (2012): Effects of an invasive plant transcended ecosystem boundaries through a dragonfly-mediated trophic pathway. *Oecologia* 170: 1045-1052. (in English) ["Trophic interactions can strongly influence the structure and function of terrestrial and aquatic communities through top-down and bottom-up processes. Species with life stages in both terrestrial and aquatic systems may be particularly likely to link the effects of trophic interactions across ecosystem boundaries. Using experimental wetlands planted with purple loosestrife (*Lythrum salicaria*), we tested the degree to which the bottom-up effects of floral density of this invasive plant could trigger a chain of interactions, changing the behaviour of terrestrial flying insect prey and predators and ultimately cascading through top-down interactions to alter lower trophic levels in the aquatic community. The results of our experiment support the linkage of terrestrial and aquatic food webs through this hypothesized pathway, with high loosestrife floral density treatments attracting high levels of visiting insect pollinators and predatory adult dragonflies. High floral densities were also associated with increased adult dragonfly oviposition and subsequently high larval dragonfly abundance in the aquatic community. Finally, high-flower treatments were coupled with changes in zooplankton species richness and shifts in

the composition of zooplankton communities. Through changes in animal behaviour and trophic interactions in terrestrial and aquatic systems, this work illustrates the broad and potentially cryptic effects of invasive species, and provides additional compelling motivation for ecologists to conduct investigations that cross traditional ecosystem boundaries." (Authors) The following Odonata species are included: Imagines: *Anax junius*, *Erythemis simplicicollis*, *Libellula luctuosa*, *Libellula saturata*, *Libellula pulchella*, *Pachydiplax longipennis*, *Tramea lacerata*. Larvae: *Anax junius*, *Erythemis simplicicollis*, *Libellula pulchella*, *Libellula saturata*, *Libellula* sp., *Pachydiplax longipennis*, *Pantala flavescens*.] Address: Burkle, Laura, Department of Ecology, Montana State University, Bozeman, MT 59717, USA. E-mail: Laura.A.Burkle.Adv08@alum.dartmouth.org

11906. Butler, S.G. (2012): Description of the last instar larva of *Brachydiplax farinosa* Kruger from Borneo (Anisoptera: Libellulidae). *Odonatologica* 41(3): 277-282. (in English) ["A male final instar larva from Sarawak is described and illustrated, and compared with that of *Brachydiplax chalybea flavovittata* Ris, using also notes and illustrations of congeners gleaned from literature." (Author)] Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, United Kingdom. E-mail: sgbutler15@btopenworld.com

11907. Bybee, S.M.; Johnson, K.K.; Gering, E.J.; Whiting, M.F.; Crandall, K.A. (2012): All the better to see you with: a review of odonate color vision with transcriptomic insight into the odonate eye. *Organisms diversity & Evolution* 12(3): 241-250. (in English) ["Although Odonata represent some of the most advanced visual systems among insects, odonate visual systems are not as well understood as those of model or more economically important insects. Yet, with their large and complex eyes, aquatic and terrestrial life stages, entirely carnivorous lifestyle, exceptional mating behaviours, diversity in coloration, occupancy of diverse light environments, and adult success that is completely dependent on vision, it would seem studying the visual system of Odonata at the molecular level would yield highly rewarding scientific findings related to predator/prey interactions, the physiological and molecular shifts associated with ecological shifts in light environments, and the role of vision on behavioural ecology. Here, we provide a review of odonate colour vision. The first odonate opsin sequences are published using a degenerate PCR approach for both dragonfly and damselfly lineages as well as a transcriptome approach for a single species of damselfly. These genetic data are combined with electrophysiology data from odonates to examine genotype/phenotype relationships in this visual system. Using these data, we present the first insights into the evolution and distribution of the visual pigments (opsins) among odonates. The integration of molecular and behavioural studies of odonate vision will help answer long-standing questions about how sensory systems and coloration may coevolve." (Authors)] Address: Bybee, S., Graduate Research Assistant: Branham Laboratory, Dept Entomology & Nematology, Univ. of Florida. Natural Area Drive, P.O.Box 110620, Gainesville, FL 32611-0620, USA. E-mail: seth.bybee@gmail.com

11908. Camara, I.A.; Diomande, D.; Bony, Y.K.; Ouattara, A.; Franquet, E.; Gourene, G. (2012): Diversity assessment of benthic macroinvertebrate communities in Banco National Park (Banco Stream, Côte d'Ivoire). *African Journal of Ecology* 50(2): 205-217. (in English, with

French summary) ["In the present study, a first inventory of benthic macroinvertebrates in the Banco Stream, Côte d'Ivoire, and the correlations between environmental variables and taxonomic richness were analysed. Seven stations were sampled monthly over a 1-year period, using a hand net (10 × 10 cm, 250 µm mesh, 50 cm length). 132 macroinvertebrate taxa were recorded. These taxa were distributed among 74 families and 15 orders belonging to Insecta (118 taxa; 89% of total richness), Oligochaeta (seven taxa), Crustacea (five taxa) and Mollusca (two taxa). Kruskal-Wallis test revealed significant difference (at least $P < 0.05$) in macroinvertebrate richness between upstream stations (S1 and S2) and stations S4, S5 and S6. Chironominae and Tanypodinae (Insecta) were the two very frequent taxa in all the stations. Lumbriculidae (Oligochaeta), *Desmocarlis trispinosa* (Crustacea) and *Eurymetra* sp. (Insecta) were frequently found in the samples. Hierarchical cluster analysis revealed three groups of sampling stations according to taxonomic similarity. Taxonomic richness was significantly and negatively correlated with conductivity, while it was significantly and positively correlated with substrate types (woody debris and gravel). Due to the fact that Banco stream is the locality type of an endemic shrimp species (*Macrobrachium thysi*), this basin is of high conservation priority" (Authors) Samples were dominated by insects: Coleoptera (22%), Odonata (20.3%), Diptera (16.9%) and Trichoptera (14%)." (Authors)] Address: Camaral, Idrissa Adama, Laboratoire d'Environnement et de Biologie Aquatique, UFR-Sciences et Gestion de l'Environnement, Université d'Abobo-Adjamé, Abidjan 02, Ivory Coast. E-mail: camadams80@yahoo.fr

11909. Carle, F.L. (2012): A new *Epiophlebia* (Odonata: Epiophlebioidea) from China with a review of epiophlebian taxonomy, life history, and biogeography. *Arthropod Systematics & Phylogeny* 70(2): 75-83. (in English) ["*Epiophlebia diana* sp.n. is described from larval specimens collected in the mountains of western Sichuan Province, China. Epiophlebian taxonomy, life history, and biogeography are reviewed, and keys provided for determination of the known adults and larvae of *Epiophlebia* Calvert, 1903. Classification of *Epiophlebia* is revised as follows: *Epiophlebia* s.str. with *E. superstes* (Selys, 1889) [type species] and *E. sinensis* Li & Nel, 2012; and *Rheoepiophlebia* subgen.n. with *E. laidlawi* Tillyard, 1921 [type species] and *E. diana* sp.n.. Behavioural, ecological and paleontological information is also evaluated and members of *Epiophlebia* acknowledged to have inhabited small high elevation streams of the east Palaearctic for possibly 180 million years. Likely reasons are proposed for the enduring survival of *Epiophlebia*, its lack of a fossil record and the extinction of related groups." (Author)] Address: Carle, F.L., Rutgers, The State University of New Jersey, Department of Entomology, 96 Lipman Drive, New Brunswick, NJ 08901, USA. E-mail: Carle@AESOP.Rutgers.edu

11910. Carrere, V., Blanchon, Y. (2012): Découverte de *Gomphus flavipes* (Charpentier, 1825) en Languedoc-Roussillon (Odonata, Anisoptera: Gomphidae). *Martinia* 28(1): 66. (in French) [France; records from Codolet (20-VII-2010) and Cuxac-d'Aude (19-V., 10-VI., 20-VI-2011) are documented.] Address: Carrere, V., 19 avenue Georges Clemenceau, F-13360 Roquevaire, France. E-mail: carrerevincent@free.fr

11911. Casallas-Mancipe, A.; Rache-Rodriguez, L.; Rincon-Hernandez, M. (2012): Postembryonic devel-

opment of *Ischnura chingaza* Realpe under captivity conditions (Zygoptera: Coenagrionidae). *Odonatologica* 41(4): 327-335. (in English) ["The larval stages were observed and characterized under controlled conditions. The larvae were measured and described in order to establish the differences between them, using morphometric characters such as head and premental width and length, number of premental and labial setae, the length of wing pads and legs, and total length without gills, also the growth ratio of different body parts was calculated. The most important character to distinguish larval stages was the head width. There was an increase in the number of premental setae during ontogeny. Comparisons in terms of size were made, showing that females are larger than males in all observed structures. *I. chingaza* has 11 larval stages; except for the pro-larva, all of them were observed." (Authors)] Address: Casallas-Mancipe, A., Licenciada en Biología, Universidad Pedagógica Nacional, 63rd Street 78-65, South Bogota, Colombia. E-mail: acarol29@yahoo.com.ar

11912. Catil, J.-M.; Rousset, T. (2012): Un tandem improbable: *Gomphus pulchellus* Selys, 1840 et *Gomphus vulgatissimus* (Linnaeus, 1758), (Odonata, Anisoptera: Gomphidae). *Martinia* 28(1): 65. (in French) [9-V-2011, Ordan-Larroque, Dept. Gers, France; an interspecific tandem between *Gomphus pulchellus* and *G. vulgatissimus* is documented. Address: Catil, J.-M., CPIE Pays Gersois, Au Château, F-32300 L'Isle de Noé, France. E-mail: jmcatil@yahoo.fr

11913. Catling, P.M. (2012): Book reviews: Assessment of species diversity in the Atlantic Maritime Ecozone. Edited by Donald F. McAlpine and Ian M. Smith. 2010. National Research Council Press, 1200 Montreal Road, Ottawa, Ontario K1A 0R6 Canada. 785 pages. 94.00 USD. Cloth. *The Canadian Field-Naturalist* 126: 73-75. (in English) [Verbatim: "Chapter 16 by Paul-Michael Brunelle features the 142 Odonata species that are known from AME. This chapter includes such complete information on biology, habitat and systematics, all very well illustrated, that with a basic knowledge of its content, and using it as a reference, the reader is well on the way to being an expert on the group in the region. Brunelle has coordinated the Atlantic Dragonfly Inventory Program (ADIP) and has contributed about ten thousand records himself. The value of that program is immediately apparent in the extensive information available for the assessment. The section on recommendations for improvements on monitoring is especially useful. There is a little more to say on the subject of biogeography. Distributions are changing in this region as southern and western species (*Ischnura hastata*, *Enallagma civile*, *Tramea lacerata*), move north as they have further to the west (Catling 2008, Catling et al. 2009, and references therein). There are some notable patterns that correspond to those of other groups and could be obtained from Appendix Table 1. Distributions in saltmarsh have been discussed and more information on occurrence in this habitat is recently available (Catling 2009). There are a few websites that are useful for dragonflies in the region and one is devoted to a portion of the AME (<http://www.odonatanb.com>)."] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catingpp@agr.gc.ca

11914. Chandler, D.S.; Manski, D.; Donahue, C.; Alyokhin, A. (2012): Biodiversity of the Schoodic Peninsula: Results of the Insect and Arachnid Bioblitzes at the Schoodic District of Acadia National Park, Maine.

Maine Agricultural and Forest Experiment Station, the University of Maine. Technical Bulletin 206: 210 pp. (in English) [Records of Odonata are documented in appendix 2 on pages 76-77: *Aeshna interrupta*, *Coenagrion resolutum*, *Enallagma civile*, *Ischnura verticalis*, *Nehalennia irene*, *Lestes rectangularis*, *Leucorrhinia frigida*, *L. hudsonica*, *L. proxima*, *Libellula pulchella*, *L. semifasciata*, *Sympetrum obtrusum*, *S. rubicundulum* and *S. vicinum*.] Address: Chandler, D.S., Dept of Biological Sciences, Univ. of New Hampshire, Durham, NH, USA

11915. Chessman, B.C. (2012): Biological traits predict shifts in geographical ranges of freshwater invertebrates during climatic warming and drying. *Journal of Biogeography* 39(5): 957-969. (in English) ["Aim: To test the ability of biological traits to predict climate-related changes in geographical ranges of running-water invertebrates. Location: The Australian state of New South Wales and the Australian Capital Territory. Methods: I analysed data from 8928 biomonitoring samples collected during a 16-year period of generally rising air temperatures and declining precipitation. I used quantile regression to test for expansions and contractions on the climatically cooler, warmer, drier and wetter edges of the ranges of 120 invertebrate taxa, and correlated these shifts with the traits of thermophily (degree of preference for high versus low temperature) and rheophily (preference for flowing versus still water). Results: The most commonly inferred range shifts were cool-edge expansion plus warm-edge contraction (71 taxa) and wet-edge expansion plus dry-edge contraction (71), but contractions from both cool and warm extremes (36) and from both dry and wet extremes (28) were also frequent. High-temperature preference was associated with cool-edge expansion and low-temperature preference with wet-edge expansion and contraction from all other extremes. A preference for flow was associated with wet-edge expansion and dry-edge contraction. Main conclusions: Trait analysis has potential for predicting which species will expand their ranges and which will contract, but needs to be coupled with assessment of how the landscape provides each species with opportunities to track or avoid climate change. Improved quantification of climatically relevant traits and integration of trait analysis with species distribution modelling are likely to be beneficial." (Authors) Taxa (including Odonata) are treated at family level.] Address: Chessman, B.C., Office of Environment and Heritage, PO Box 3720, Parramatta, NSW 2124, Australia. E-mail: bruce.chessman@environment.nsw.gov.au

11916. Chuang, S.-W.; Lih, F.-L.; Miao, J.-M. (2012): Effects of Reynolds number and inclined angle of stroke plane on aerodynamic characteristics of flapping corrugated airfoil. *Journal of Applied Science and Engineering* 15(3): 247-256. (in English) ["The effects of the Reynolds number and inclined angle of stroke plane on the generating lift and thrust forces of a flapping corrugated airfoil was studied by numerical simulations with dynamic deformable meshes. The chord Reynolds number (Re) based on the incoming airstream velocity is varied from 10^3 to 10^4 with interval of 10^3 . Two different inclined angles of stroke plane on the aerodynamic forces of corrugated airfoil were also considered. Due to the corrugated shape of dragonfly wings varied depending on the cross section location chosen, present tested profile of airfoil was selected from the mid-span of wing of an *Aeshna cyanea* dragonfly forewing. Unsteady flows over a corrugated thin airfoil and a flat-

plate executing flapping motion are computed with time-dependent two-dimensional laminar incompressible Navier-Stokes equations. The dynamic mesh technique is applied to model the flow field of cyclical flapping motion of a corrugated airfoil under different combinations of pitch angle and stroke amplitude. Instant vorticity contours over a complete flapping cycle of a corrugated airfoil and a flat-plate clearly reveals the flow mechanisms for lift force generation are dynamic stall, rotational circulation, and wake capture. The thrust force is dominated by the formation of leading edge vortex (LEV) and trailing edge vortex (TEV) shedding downstream to form a reverse von Karman vortex. Results indicated that there is little difference on the aerodynamic force between corrugated airfoil and flat-plate under tested range of flapping frequency. The mean lift force coefficient of corrugated airfoil was enhanced with the increasing of Re . Visible changes in the mean lift force coefficient can be identified from the variation of inclined angle of stroke plane at a fixed Re . The critical products of reduced frequency and stroke amplitude to generate the positive mean thrust force output of a corrugated airfoil was given in present work." (Authors)] Address: Chuang, S.-W., Institute of Weapon Systems, Chung Cheng Institute of Technology, National Defense University, Taoyuan, Taiwan 335, R.O.C.

11917. Cios, S. (2012): Oviposition by the Winter Damselfly *Sympecma* sp. (Odonata: Lestidae) on a car. *Odonatrix* 8(2): 63-64. (in Polish, with English summary) ["On 17 March 2012 at noon the author observed an individual of *Sympecma* sp. ovipositing on a sunlit car, the colour of which was metallic caper green pearl. It repeatedly touched the coat of the car with the ventral side of the body for ca. 20–30 seconds. Than it sat on the car and after a while flew away. Though oviposition on cars is well known in aquatic insects, there are relatively few such reports on the Zygoptera. This may be due to the fact that they tend to stay closer to water bodies, than Anisoptera dragonflies." (Author)] Address: Cios, S., ul. Stryjeńskich 6/4, 02-791 Warszawa, Poland. E-mail: tanislaw.cios@msz.gov.pl

11918. Cuber, P. (2012): The first record of Eurasian Baskettail *Epitheca bimaculata* (Charpentier, 1825) (Odonata: Corduliidae) in Silesian Province. *Odonatrix* 8(2): 52-54. (in Polish, with English summary) ["*E. bimaculata* is widely distributed in northern and eastern Poland. Its distribution becomes more local towards the west and south. It is the first record of this species in Silesian Province. The total number of seven exuviae was collected on the shores of ponds located close to Mochała on the territory of the "Forests over Upper Liswarta" Landscape Park." (Author)] Address: Cuber, P., Śląski Uniwersytet Medyczny w Katowicach, Wydział Farmaceutyczny z Oddziałem Medycyny Laboratoryjnej w Sosnowcu, Zakład Parazytologii, ul. Jedności 8, 41-200 Sosnowiec, Poland. E-mail: piotrc10@op.pl

11919. Cui, J.; Lackey, M.; Tew, G.; Crosby, A. (2012): Resilient synthetic PEG/PDMS hydrogels inspired by natural resilin. *Bulletin of the American Physical Society* 57(1) [APS March Meeting 2012, Monday–Friday, February 27–March 2 2012; Boston, Massachusetts]: 1 p. (in English) [Verbatim: Novel synthetic hydrogels are developed by incorporating hydrophobic polydimethylsiloxane (PDMS) into hydrophilic poly(ethylene glycol) (PEG)-based network using thiol-norbornene chemistry. The properties of these hydrogel are comparable to natural resilin, which is an elastic protein, exist-

ing in many insects, such as the tendons of flea and the wings of dragonfly, with extraordinary ability of mechanical energy storage. The energy storage efficiency (resilience) of the hydrogels is more than 97(%) even at tensile strains up to 170(%). In addition, the Young's modulus of the hydrogels ranges from 3 kPa to 300 kPa by increasing the volume fraction of the PDMS in the network. These unique properties are attributed to the well-defined network and negligible secondary structure, provided by the versatile and efficient chemistry.] Address: not stated

11920. Damm, S.; Hadrys, H. (2012): A dragonfly in the desert: genetic pathways of the widespread *Trithemis arteriosa* (Odonata: Libellulidae) suggest male-biased dispersal. *Organisms diversity & evolution* 12(3): 267-279. (in English) ["Water-dependent species inhabiting desert regions seem to be a contradiction in terms. Nevertheless, many species have evolved survival strategies for arid conditions. In Odonates, both larvae and adults require very different and complex water-associated habitat conditions. The present study investigates the genetic diversity, population structure and dispersal patterns of a desert inhabiting odonate species, *T. arteriosa*. Eight populations from the arid Namibia and four population sites in the more tropical Kenya were compared by using nine microsatellite loci, one non-coding nuclear fragment and the mtDNA fragment ND1. Microsatellite analyses as well as the nuclear fragment reveal a high allelic diversity in all populations with almost no genetic sub-structuring. In contrast, ND1 sequence analyses show sub-structuring and—with two exceptions—only private haplotypes. The conflicting patterns of nuclear versus mitochondrial markers suggest a male-biased dispersal in this species. Results indicate that male dispersal is dependent on the environmental stability of the habitat, while females are philopatric. This life history adaptation would allow females to save energy for mating and oviposition in the demanding environment of a desert region. The results give direct insights into the dispersal pathways of a desert-inhabiting, strongly water dependent flying insect." (Authors)] Address: Damm, Sandra, ITZ, Ecology & Evolution, TiHo Hannover, Bünteweg 17d, 30559 Hannover, Germany. E-mail: sandra.giere@ecolevol.de

11921. Davidson, S. (2012): *Pantala flavescens* an ancient mariner. *Agrion* 16(1): 15. (in English) [Verbatim: "In our winter when I can not see odonates I carry out research into the use of marine chronometers on sailing ships in the early 19th century. I was recently reading the Ship's Log of an East India Company ship called the Bombay sailing from Malacca to Canton in 1810 (India Office Records, 1810). I was surprised to read that Captain Archibald Hamilton recorded in his log on the 5th October 1810, mid-ocean between Cambodia, Malaya and Borneo, seeing 'Dragonflies'. They were I would suggest almost certainly *Pantala flavescens*. "Friday 5 October 1810 8 am near to Latitude 5 17' N Longitude 106 8' E. Observed a great number of dragonflies on board which had not been on board before". "Wednesday 10 October Have continued to see a number of dragonflies about the ship ever since the 5th instant more or less sometimes only flying about the Vanes at the Mast Head". Reference: India Office Records, 1810. Captain's Log HEIC Bombay L/MAR/B/48B. British Library"] Address: Simon Davidson. E-mail: simoncathlyn@hotmail.com

11922. De Block, M.; Stoks, R. (2012): Phosphoglucose isomerase genotype effects on life history depend on latitude and food stress. *Functional Ecology* 26(5): 1120-1126. (in English) ["(1.) Phosphoglucose isomerase (Pgi) genotypes differ in life-history traits and shifts in their frequencies are thought to contribute to latitudinal gradients in life history. Yet, it is unstudied whether the life-history effects of Pgi are invariant across latitudes. Further, while genetic variation at the Pgi locus is thought to be maintained by genotype-by-environment interactions and by life-history trade-offs involving resource allocation, the effects of food stress on Pgi genotype effects are largely unstudied. (2.) We compared Pgi allozyme genotype effects on life history between northern and southern populations of the damselfly *Ischnura elegans* in a common garden experiment where we manipulated food stress. (3.) Pgi genotypes differed in larval development time and body mass, but neither in larval growth rates nor in adult life span. (4.) The effect of the Pgi genotype on larval development time differed between latitudes, suggesting interactions with the latitude-specific genetic background and/or maternal effects. Pgi genotype effects on both development time and body mass were dependent on food stress and indicated a trade-off between both fitness-related traits associated with the Pgi gene. (5.) The newly identified interaction between the Pgi genotype and latitude, the poorly studied Pgi genotype-by-food stress interactions and the observed life-history trade-offs associated with the Pgi genotypes can all potentially contribute to maintaining genetic variation at the Pgi locus and to latitudinal patterns in life history. Both types of interactions may also explain the poorly understood differences in the Pgi genotype effects on life history among studies of the same species." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be



11923. Brochard, C.; Groenendijk, D.; van der Ploeg, E.; Termaat, T. (2012): *Fotogids Larvenhuidjes van Libellen*. KNNV Uitgeverij. 320 pp. ["For the first time there is now a Dutch field guide to help you name the exuviae. The first section provides background information on dragonflies and on the collection, preservation and identification of their exuviae. The second part describes the exuviae of the 80 most common dragonflies and damselflies of Northwest Europe. • Unique photographs of the exuviae, larvae, adult dragonflies and their habitats. • More than 80 species and complete for Northwest Europe. • Clear identification keys and species descriptions of exuviae Language: Dutch." (Publisher)]

11924. De Knijf, G. (2012): Trip report of the dragonfly excursion of 9th of June 2012 to the region of Boulogne (France). *Libellenvereniging Vlaanderen — nieuwsbrief* 6(2): 14-16. (in Dutch, with English summary) ["A visit to a small stream in the Dunes near the village of Camiers resulted in the very interesting observation of *Coenagrion mercuriale* (>20 ind.). Other species noteworthy here were *Coenagrion scitulum*, *Libellula fulva* and *Libellula quadrimaculata*. After this nice dune stream we headed southeast to an alkaline peatbog in the valley of Authie near the village of Roussent. Besides the more common species, we observed huge numbers of *Coenagrion pulchellum*, *Coenagrion scitulum* and *Libellula fulva* and a male of *Calopteryx splendens* was seen along the stream Authie." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

11925. De Knijf, G. Opdekamp, W. (2012): Europese primeur: populatie Rivierrombout ontdekt langs een kanaal. *Libellenvereniging Vlaanderen — nieuwsbrief* 6(2): 9-10. (in Dutch, with English summary) ["On July 28 2012, volunteers of the LVV and Natuurpunt discovered *Gomphus flavipes* at the Albertkanaal near Broechem (Antwerp). There are clear indications - many exuviae were found - that it concerns a population in the canal, a unique habitat for this dragonfly species in Europe. A more thorough publication is in preparation." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

11926. De Marmels, J. (2012): Review of the "metallic group" of species of *Argia* Rambur known from Venezuela, with description of the larva of *Argia jocosa* Hagen in Selys, 1865 (Odonata: Coenagrionidae). *International Journal of Odonatology* 15(3): 249-262. (in English) ["In Venezuela, the "metallic group" includes three species: *Argia cupraurea* Calvert, *Argia jocosa* Hagen in Selys, and *Argia orichalcea* Hagen in Selys. These are here diagnosed and illustrated, and their distribution in Venezuela is mapped. The larva of *A. jocosa* differs from the few other known larvae of the group in details of the prementum, labial palp and shape of caudal gills." (Author)] Address: Museo del Instituto de Zoología Agrícola "Francisco Fernández Yépez" (MIZA), Facultad de Agronomía, Universidad Central de Venezuela, Apartado 4579, Maracay, 2101-A, Venezuela

11927. Dijkstra, K.-D.B.; Kalkman, V.J. (2012): Phylogeny, classification and taxonomy of European dragonflies and damselflies (Odonata): a review. *Organisms diversity & evolution* 12(3): 209-227. (in English) ["Although Europe is the cradle of dragonfly systematics and despite great progress in the last 2 decades, many issues in naming its species and understanding their

evolutionary history remain unresolved. Given the public interest, conservation importance and scientific relevance of Odonata, it is time that remaining questions on the species' status, names and affinities are settled. We review the extensive but fragmentary literature on the phylogeny, classification and taxonomy of European Odonata, providing summary phylogenies for well-studied groups and an ecological, biogeographic and evolutionary context where possible. Priorities for further taxonomic, phylogenetic and biogeographic research are listed and discussed. We predict that within a decade the phylogeny of all European species will be known." (Authors)] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nrm.nl

11928. Dobrzańska, J. (2012): Global changes in the local scale, or about climate of cities and dragonflies (Odonata). Proc. 22th Congr. Pol. Hydrobiol., Cracow, Poland, 19–22 Sept. 2012 (www.iop.krakow.pl/zhp): (in English) [Verbatim: Odonata are presumed to be indicators of many environmental processes including climate change. It was already stated that increases in contribution, in terms of abundance and ranges, of Mediterranean species, in Poland, can be correlated with this global process. In my previous studies on dragonflies in Warsaw I suggested a possibility of analogous phenomenon in the local scale correlated with so-called „urban heat island”. In this study I continue researches at mentioned relationship analyzing species composition of chosen oxbow lakes of the Vistula River in Warsaw and surroundings. In the analysis I mainly focus on these factors which mostly can affect microclimate of studied reservoir. Among studied parameters the most important seem to be management of neighbouring land, size of the lake and distance from the city centre. City, as the specific ecosystem, influence on water ecosystems which are inside its borders and in the vicinity in special and multidimensional way. There are many aspects of dragonflies biology, out of which we can presume that these influence can sometimes be positive and in other cases negative. In presented deliberation chosen relationships related to city's influence on water ecosystems and their possible effects on dragonflies are going to be discussed.] Address: Dobrzańska, Julia, Warsaw Univ. of Life Sciences, Fac. of Civil & Environmental Engineering ul. Nowoursynowska 159, 02-776 Warszawa, Poland. E-mail: juliadobrzanska@sggw.pl

11929. Dolný A.; Harabiš F.; Bárta D.; Lhota, S.; Drozd, P. (2012): Aquatic insects indicate terrestrial habitat degradation: changes in taxonomical structure and functional diversity of dragonflies in tropical rainforest of East Kalimantan. *Tropical Zoology* 25(3): 141-157. (in English) ["As a group of freshwater invertebrates, dragonflies (Odonata) are commonly used as ecological indicators of freshwater ecosystems. Despite earlier studies suggesting that adult odonates may be good indicators for complex changes in a landscape, the utility of odonates as suitable indicators to indicate health of non-aquatic (forest) habitats remains poorly understood. This study analyses the adult dragonfly assemblage pattern against spatial and temporal disturbance characteristics in Indonesia's Sungai Wain Protection Forest. The core of this reserve comprises one of the few remaining fragments of primary rain forest along the East Kalimantan coast, whereas the rest of the reserve is covered by secondary forest, scrub, grassland, and farmland. Adult dragonfly assemblages at individual sampling sites were analysed

in relation to (1) their intensity, (2) frequency of human-caused disturbances, and (3) the time since the last such disturbance, while controlling random variables (type of aquatic and terrestrial habitat) were removed. This study tests the effect of these factors on (1) species richness, (2) proportion of Zygoptera, (3) proportion of forest specialists, and (4) proportion of Borneo's endemics. The human induced disturbances in the rain forest resulted in pronounced changes in the taxonomical composition and functional diversity of the odonate fauna. Results reported here demonstrate that gradual changes in the odonate assemblages correspond to the degree of anthropogenic influences on forest environments. Adult odonates comprise an appropriately sensitive and versatile indicator group for identifying changes in terrestrial forest environments as well as in freshwater habitats." (Authors)] Address: Ales. Dolný, A., Dept of Biology and Ecology and Institute of Environmental Technologies, Faculty of Science, University of Ostrava, CZ-710 00, Ostrava, Czech Republic. Email: ales.dolny@osu.cz

11930. Dorazio, R.M.; Rodriguez, D.T. (2012): A Gibbs sampler for Bayesian analysis of site-occupancy data. *Methods in Ecology and Evolution* 3(6): 1093-1098. (in English) ["(1.) A Bayesian analysis of site-occupancy data containing covariates of species occurrence and species detection probabilities is usually completed using Markov chain Monte Carlo methods in conjunction with software programs that can implement those methods for any statistical model, not just site-occupancy models. Although these software programs are quite flexible, considerable experience is often required to specify a model and to initialize the Markov chain so that summaries of the posterior distribution can be estimated efficiently and accurately. (2.) As an alternative to these programs, we develop a Gibbs sampler for Bayesian analysis of siteoccupancy data that include covariates of species occurrence and species detection probabilities. This Gibbs sampler is based on a class of site-occupancy models in which probabilities of species occurrence and detection are specified as probit-regression functions of site- and survey-specific covariate measurements. (3.) To illustrate the Gibbs sampler, we analyse site-occupancy data of *Aeshna cyanea*, a common dragonfly species in Switzerland. Our analysis includes a comparison of results based on Bayesian and classical (non-Bayesian) methods of inference. We also provide code (based on the R software program) for conducting Bayesian and classical analyses of site-occupancy data." (Authors)] Address: Dorazio, R.M., Southeast Ecological Science Center, U.S. Geological Survey, 7920 NW 71st Street, Gainesville, FL 32653, USA. E-mail: bdorazio@usgs.gov

11931. Dow, R.A.; Orr, A.G. (2012): *Drepanosticta simuni* spec. nov. from Borneo, with notes on related species (Zygoptera: Platystictidae). *Odonatologica* 41(3): 283-291. (in English) ["The new species is described from Gunung Mulu National Park in Sarawak, Malaysian Borneo and compared with its closest congeners, *Drepanosticta barbatula* Lieftinck and *D. drusilla* Lieftinck, which are also refigured. New distribution records for the latter 2 species are documented." (Authors)] Address: Dow, R.A., NCB Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands rory.dow230@yahoo.co.uk

11932. Dow, R.A. (2012): Odonata collected at Gunung Pueh, Kuching Division, Sarawak, Malaysia in October 2012. *International Dragonfly Fund - Report* 54: 1-21. (in English) ["Records of Odonata collected from Gu-

nung Pueh and the surrounding area, in west Sarawak, in October 2012, are presented. 67 species were collected; two species were recorded in Borneo for the first time: *Libellago stigmatizans* and *Copera ciliata*. Other notable records include *Podolestes chrysopus*, *Telosticta ?gading*, *Agriocnemis minima* and *Pseudagrion coomansi*. Some additional, previously unpublished, records from the most western part of Sarawak are included in two appendices." (Author)] Address: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

11933. Dow, R.A. (2012): Odonata collected around the Borneo Highlands Resort on Gunung Penrissen, Kuching Division, Sarawak, Malaysia in July 2012. International Dragonfly Fund - Report 50: 1-12. (in English) ["Records of Odonata collected above 800m a.s.l. on Gunung Penrissen in western Sarawak are presented. A short note on the location of Mount Merinjak, the type locality of several species, is included. Notable records include two new species from the Platystictidae, *Bornargiolestes* species and *Acrogomphus jubilaris*. Previously unpublished records from Annah Rais, a location at the foot of Gunung Penrissen, made in 2005 and 2006, are included in an appendix." (Author)] Address: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

11934. Durand, E.; Renoult, J.-P. (2012): Addition à l'odonatofaune de l'Adrar mauritanien. *Poiretia* 4: 7-17. (in French, with English summary) ["In September 2006 and March 2008, we visited the Adrar area in Mauritania. Eleven Odonata species were recorded during these two visits. Four new species were added to the species list of the Adrar plateau: *Diplacodes lefebvrii*, *Trithemis kirbyi*, *Orthetrum ransonnetii* and *Anax parthenope*, the last three being new to Mauritania as well. These observations increase to 22 the total number of species recorded in the Adrar region and to 23 for the whole of Mauritania. Lastly, we confirm that *Ischnura saharensis* and *I. senegalensis* are syntopic in the Adrar region." (Authors)] Address: Durand, E., Naturalia environnement : Site Agroparc, Le Moitessier, B.P. 41, 223 rue Lawrence Durrell, 84911 Avignon, cedex 9, France. E-mail: e.durand@naturalia-environnement.fr

11935. Edmonds, S.T.; O'Driscoll, N.J.; Hillier, K.; Atwood, J.L.; Evers, D.C. (2012): Factors regulating the bioavailability of methylmercury to breeding rusty blackbirds in northeastern wetlands. *Environmental Pollution* 171: 148-154. (in English) [USA, Canada "Rusty blackbirds are undergoing rapid population decline and have elevated Hg concentrations while breeding in the Acadian ecoregion of North America. Factors regulating the bioavailability of methyl-Hg (MeHg) within this population's habitat were determined using water, invertebrates, and blood from adult rusty blackbirds collected for Hg-speciation, along with additional water column parameters: MeHg and THg, dissolved organic carbon, pH, dissolved oxygen, conductivity, redox potential, and temperature. Both DO₂ and pH were negatively related to biota MeHg, while water MeHg concentrations were positively related. Both invertebrate MeHg concentration and %MeHg increased with trophic level. Invertebrate MeHg concentrations were among the greatest reported when compared with those reported elsewhere for wetlands and waterbodies—often several times greater for similar taxa—while percent MeHg of THg

were similar. An environment with high bioavailability of MeHg in combination with a high trophic position best explains elevated Hg concentrations for this species regional population. Highlights: *DO₂ and pH negatively correlate with wetland biota methylmercury. *Water MeHg concentrations positively correlate with wetland biota methylmercury. *Rusty blackbird blood-Hg correlates with MeHg in Araneae, Ephemeroptera, and Trichoptera, but not Odonata. *Habitat with high MeHg bioavailability and a high trophic position explains regionally elevated Hg in the rusty blackbird." (Authors)] Address: Atwood, J.L., Biodiversity Research Institute, 19 Flaggy Meadow Road, Gorham, ME 04038, USA. E-mail: jon.atwood@briloon.org

11936. Egler, M.; Buss, D.F.; Moreira, J.C.; Baptista, D.F. (2012): Influence of agricultural land-use and pesticides on benthic macroinvertebrate assemblages in an agricultural river basin in southeast Brazil. *Braz. J. Biol.* 72(3): 437-443. (in English, with Portuguese summary) ["Land-use alterations and pesticide run-offs are among the main causes for impairment in agricultural areas. We evaluated the influence of different land-uses (forest, pasture and intensive agriculture) on the water quality and on benthic macroinvertebrate assemblages on three occasions: in the dry season, wet season and at the end of the wet season. Macroinvertebrates responded to this gradient of impairment: agricultural sites had significantly lower richness numbers than forested and pasture sites, and all major invertebrate groups were significantly affected. Most taxa found in forested sites were found in pasture sites, but often with lower densities. In this case, the loss of habitats due to sedimentation and the lower complexity of substrates seem to be the disruptive force for the macroinvertebrate fauna." (Authors) Taxa are treated at order level and include Odonata.] Address: Baptista, D.F., Laboratório de Avaliação e Promoção da Saúde Ambiental – LAPSA, Instituto Oswaldo Cruz – IOC, Fundação Oswaldo Cruz – FIOCRUZ, Av. Brasil, 4365, Manguinhos, CEP 21040-360, Rio de Janeiro, RJ, Brazil. E-mail: darcilio@ioc.fiocruz.br

11937. Egler, M.; Buss, D.F.; Moreira, J.C.; Baptista, D.F. (2012): Influence of agricultural land-use and pesticides on benthic macroinvertebrate assemblages in an agricultural river basin in southeast Brazil. *Brazilian Journal of Biology* 72(3): 437-443. (in English, with Spanish summary) ["Land-use alterations and pesticide run-offs are among the main causes for impairment in agricultural areas. We evaluated the influence of different land-uses (forest, pasture and intensive agriculture) on the water quality and on benthic macroinvertebrate assemblages on three occasions: in the dry season, wet season and at the end of the wet season. Macroinvertebrates responded to this gradient of impairment: agricultural sites had significantly lower richness numbers than forested and pasture sites, and all major invertebrate groups were significantly affected. Most taxa found in forested sites were found in pasture sites, but often with lower densities. In this case, the loss of habitats due to sedimentation and the lower complexity of substrates seem to be the disruptive force for the macroinvertebrate fauna." (Authors) Taxa - including Odonata - are treated at order level.] Address: Baptista, D.F., Laboratório de Avaliação e Promoção da Saúde Ambiental – LAPSA, Instituto Oswaldo Cruz – IOC, Fundação Oswaldo Cruz – FIOCRUZ, Av. Brasil, 4365, Manguinhos, CEP 21040-360, Rio de Janeiro, RJ, Brazil. E-mail: darcilio@ioc.fiocruz.br

11938. Farkas, A.; Jakab, T.; Tóth, A.; Kalmár, A.F.; Dévai, G. (2012): Emergence patterns of riverine dragonflies (Odonata: Gomphidae) in Hungary: variations between habitats and years. *Aquatic Insects* 34(Supplement 1): 77-89. (in English) ["In this paper the results of a six-year study on riverine dragonflies (Odonata: Gomphidae) emergence based on the systematic collection of exuviae are presented. The exuviae were counted to determine variations in species composition, abundance and emergence pattern of gomphids at four different sites along the rivers Tisza and Szamos, as well as at a selected site in five different years. While the number of species decreased, the abundance of exuviae increased downstream the river Tisza. The total numbers of exuviae differed significantly between the dammed and non-dammed sites. The emergence of gomphids varied in initiation, synchronisation and also in duration between sites as well as between years. The onset of emergence was dependent mainly on the species-specific temperature sums, consequently earlier or later emergence resulted from the differences in the spring water temperature. The duration of emergence in *G. flavipes* and *G. vulgatissimus* was twice as long at the dammed site, characterised by a higher larval density, as at the other sites. In the degree of synchrony *G. flavipes* showed the emergence characteristics both of the spring and the summer species. Such interyear variations at the same site might have been attributed to the differences in annual fluctuations in the water temperature, indicating that rising temperatures may influence not only the onset of emergence but the synchrony as well." (Authors)] Address: Farkas, Anna, Department of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

11939. Ficetola, G.F.; Siesa, M.E.; De Bernardi, F.; Padoa-Schioppa, E. (2012): Complex impact of an invasive crayfish on freshwater food webs. *Biodiversity and Conservation* 21: 2641-2651. (in English) ["Invasive alien species can have complex effects on native ecosystems, and interact with multiple components of food webs, making it difficult a comprehensive quantification of their direct and indirect effects. We evaluated the relationships between the invasive crayfish, *Procambarus clarkii*, amphibian larvae and predatory insects, to quantify crayfish impacts on multiple levels of food webs, and to evaluate whether crayfish predation of aquatic insects has indirect consequences for their preys. We used pipe sampling to assess the abundance of crayfish, amphibian larvae and their major predators (Ditiscidae, Notonectidae and larvae of Anisoptera) in invaded and uninvaded ponds within a human dominated landscape. We disentangled the multivariate effects of *P. clarkii* on different components of food web through a series of constrained redundancy analyses. The crayfish had a negative, direct impact on both amphibian communities and their predators. Amphibian abundance was negatively related to both predators. However, the negative, direct effects of crayfish on amphibians were much stronger than predation by native insects. Our results suggest that this crayfish impacts multiple levels of food webs, disrupting natural prey-predator relationships." (Authors) Odonata included *Aeshna isoceles*, *A. cyanea*, *A. mixta*, *Libellula quadrimaculata*, *Orthetrum albistylum*, *O. cancellatum*, *Sympetrum sanguineum* / *S. striolatum*] Address: Ficetola, G.F., Dept of Environ Sciences, Univ. degli Studi di Milano Bicocca, Piazza

della Scienza 1, 20126 Milan, Italy. E-mail: francesco.cetola@unimib.it

11940. Fleck, G. (2012): The true larva and the female of *Aeschnosoma marizae* Santos, 1981 (Odonata: Anisoptera: Corduliidae s.s.). *Zootaxa* 3488: 80-88. (in English) ["The ultimate larval stadium and the adult female of *Aeschnosoma marizae* are described and illustrated for the first time. Larval comparison with other known species of the elegans group is given. Reared larvae of both sexes unambiguously attributed to *A. marizae* differ significantly from the previously described larvae attributed to this species, which probably do not belong to this species." (Author)] Address: Fleck, G., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: fleckgunther@gmail.com

11941. Florencio, M.; Díaz-Paniagua, C.; Gomez-Mestre, I.; Serrano, L. (2012): Sampling macroinvertebrates in a temporary pond: comparing the suitability of two techniques to detect richness, spatial segregation and diel activity. *Hydrobiologia* 689: 121-130. (in English) ["Recent and increasing interest in temporary ponds as biodiversity reservoirs fosters our need to test sampling techniques for characterising their biological communities. We compared the efficiency of dip-netting to that of fyke nets in sampling the macroinvertebrate assemblage of a temporary pond in Doñana National Park (SW Spain). We sampled the pond at four different times -morning, afternoon, evening and night- distinguishing between deep and shallow zones. In our sampling, dip-netting captured a higher number of taxa, and higher abundances of individuals than fyke nets. However, both techniques captured exclusive taxa, not recorded with the other device. Fyke nets distinguished between nocturnal and diurnal macroinvertebrates, and hence are more appropriate to study macroinvertebrate diel activity. We detected nocturnal activity in *Gerris thoracicus* larvae, and adults of *Colymbetes fuscus*, *Rhantus suturalis*, *Rhantus hispanicus* and *Hydrochara flavipes*. Conversely, larvae of *Sympetrum fonscolombii* and *Notonecta* spp., and adults of *Notonecta glauca* were mainly diurnal. The overall diel activity pattern of the macroinvertebrate assemblage depended on the diel activities of their integrating taxa and stages. Although dip-netting was more appropriate to sample macroinvertebrate assemblages in different microhabitats, fyke nets better captured nocturnal and fast-swimming invertebrates. Consequently, the joint use of both sampling techniques would capture a better picture of the representative macrofauna of a temporary pond than either one on its own." (Authors)] Address: Florencio, Margarita, Dept of Wetland Ecology, Donana Biological Station, CSIC, P.O. Box 1056, 41080 Seville, Spain. E-mail: margarita@ebd.csic.es

11942. Fontana-Bria, L.; Selfa, J. (2012): Revisió dels odonats valencians de la col·lecció d'artròpodes del Museu de Ciències Naturals de Barcelona. *Arxius de Miscel·lània Zoològica* 10: 1-8. (in Spanish, with English summary) [The arthropod collection at the Museu de Ciències Naturals de Barcelona (Spain) harbours a total of 33 Odonata specimens belonging to 12 species, which represent the 18% of the known species in the Valencian Country. Most of the records date from 1931, but also include records from *Anax ephippiger* from July 1902 and *Orthetrum nitidinerve* from 1905 and 1908] Address: Fontana-Bria, Laia, Lab. d'Investigació d'Entomologia, Dept. de Zoologia, Fac. de Ciències Biològiques, Univ. de Va-

lència, c/ Dr. Moliner 50, 46100 Burjassot, València, España (Spain). E-mail: laia.fontana@uv.es

11943. Gallardo, B.; Cabezas, I.; Gonzalez, E.; Comin, F.A. (2012): Effectiveness of a newly created oxbow lake to mitigate habitat loss and increase biodiversity in a regulated floodplain. *Restoration Ecology* 20(3): 387-394. (in English) ["In 2005, an oxbow lake was constructed in a degraded floodplain area of the Ebro River (NE Spain) to mitigate habitat loss. In this study, we address the effectiveness of this restoration project through the analysis of the macroinvertebrate community that colonized the newly constructed lake, in comparison with a nearby natural oxbow lake and the adjacent river channel. To that end, water and macroinvertebrate samples were taken every 2 months in 2006. Ground movements during construction, wind-driven bottom resuspension, shore scouring, and lack of vegetation resulted in distinctive water chemistry in the constructed and natural lakes. Regarding biodiversity, only 8 months after the digging of the constructed lake the abundance, richness, Shannon, and trait diversity of macroinvertebrates exceeded that of the natural lake. It is suggested that the constructed lake provided habitat for new mobile species that rapidly dispersed to other wetlands, thus enhancing the biological diversity of the floodplain at a local scale. Furthermore, biodiversity is predicted to continue increasing in the following years, although isolation can lead to early clogging of the system. By showing a dramatic increase in aquatic biodiversity in constructed wetlands, our study suggests that wetland construction can be very effective in mitigating habitat loss and increasing biodiversity in highly degraded floodplain areas. Further monitoring is nevertheless needed to evaluate the sustainability of the newly created habitat in the long term." (Authors) Taxa include Odonata and are treated at genus level.] Address: Gallardo, Belinda, Pyrenean Institute of Ecology (CSIC). Avda. de Montañana 1005, Zaragoza. 50192. Spain: E-mail: belinda@ipe.csic.es

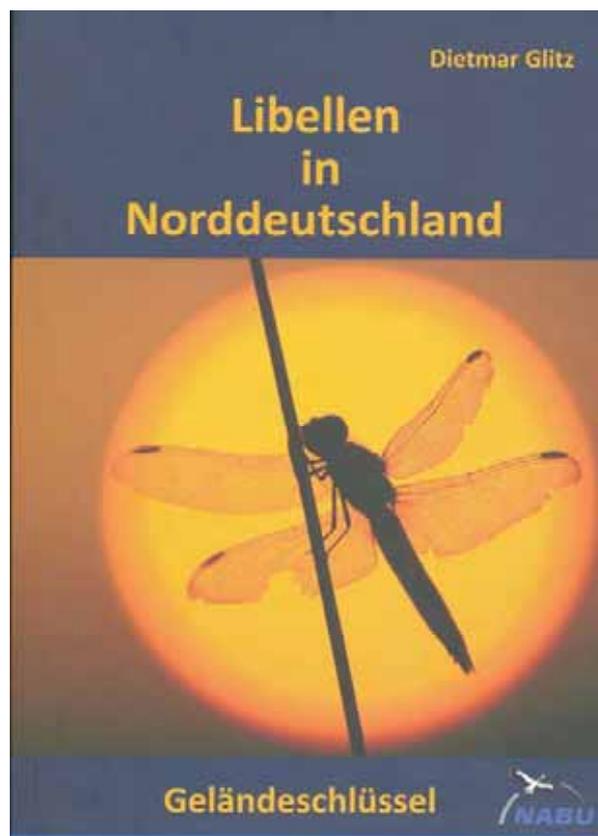
11944. Garrison, R.W. (2012): *Skialagma baueri* Förster 1906, a geographically misplaced damselfly, is a junior synonym of *Xiphiagrion cyanomelas* Selys 1876 (Odonata: Coenagrionidae). *Zootaxa* 3514: 84-88. (in English, with Spanish summary) ["Based on comparison of specimens and descriptions, *Skialagma baueri* Förster, 1906, described from São Paulo State, Brazil and known only from its type series, is found to be a junior synonym of *Xiphiagrion cyanomelas* Selys, 1876, a species from the Philippines and Southeast Asia." (Author)] Address: Garrison, R.W., Plant Pest Diagnostic Branch, California Department of Food and Agriculture, Sacramento, USA. E-mail: rgarrison@cdfa.ca.gov

11945. Gavira, O.; Carrasco, P. (2012): Nueva localidad de *Macromia splendens* (Odonata: Macromiidae) en el río Guadaiza (Málaga, España). *Zool. baetica* 23: 69-72. (in Spanish, with English captions) [On 08-IX-2012, a larva of *M. splendens* was collected in Guadaiza river (Benahavís, Málaga, Spain).] Address: Gavira, O., Camino Castillejos 9, 1.º D, 29010 Málaga, Spain. Email: ogavira@hotmail.com

11946. Gerlach, J. (2012): Red Listing reveals the true state of biodiversity: a comprehensive assessment of Seychelles biodiversity. *Phelsuma* 20: 9-22. (in English) [39% of Odonata species are redlisted; no details are given.] Address: Gerlach, J., Nature Protection Trust of Seychelles, PO Box 207, Mahe, Seychelles. E-mail: jst-gerlach@aol.com

11947. Ghahari, H.; Thipaksorn, A.; Naderian, H.; Sakenin, H.; Tajali, A.A. (2012): A faunistic study on the Odonata (Insecta) from Kurdistan province and vicinity, western Iran. *Linzer biol. Beitr.* 44/2: 1079-1085. (in English, with German summary) [Odonata from Kurdistan province, western Iran was studied in 2007 with subsequent research carried out in 2009 and 2010. A total of 25 species are represented, including records of *Ischnura intermedia*.] Address: Ghahari, H., Department of Plant Protection, Shahre Rey Branch, Islamic Azad University Tehran, Iran. E-mail: hghahari@yahoo.com

11948. Glitz, D. (2012): *Libellen in Norddeutschland – Geländeschlüssel*. 374 pp. Bezug: NABU-Mecklenburg-Vorpommern, Arsenalstr. 2, 19053 Schwerin, Germany. E-Mail: LGS@NABU-MV.de



11949. Gobbi, M.; Riservato, E.; Bragalanti, N.; Lencioni, V. (2012): An expert-based approach to invertebrate conservation: Identification of priority areas in central-eastern Alps. *Journal for Nature Conservation* 20(5): 274-279. (in English) ["The private and public agencies for nature protection often ask land managers to implement biodiversity conservation plans. Invertebrates constitute a substantial proportion of terrestrial and freshwater biodiversity and are critical to ecosystem functions. However, their inclusion in conservation planning and management is under represented, particularly in the Alps. In this paper we propose a new methodological solution and challenge for the identification of priority areas based on the integration of three approaches: invertebrate multi-taxa based; expert-based; and, GIS-based. The Trentino Province (eastern Italian Alps), was investigated as a case study. The first methodological step was to select a panel of nineteen experts which played a strategic role in the suggestion of 229 species (including Odonata), endangered or of

mandatory conservation interest. The second step was to find objective criteria for species prioritisation. These criteria, crossed with the experts taxonomical and ecological knowledge resulted in a list of 70 focal invertebrate species. The third step was to integrate with the GIS-based approach data layers from the habitat requirements of each of the 70 focal species to generate potential spatial-distributional maps. Potential distribution maps gave information about the sites (priority areas) in which the highest number of focal species could concentrate, thus suggesting where to focus future monitoring efforts. Several priority areas resulted outside the protected ones. Alluvial forest and hop-hornbeam woods were the habitats with the highest number of focal species, and thus they represent the habitats of major conservation interest and concern, because they are usually small, fragmented, and near urbanised areas located in the bottom of the valleys. The relatively simple processes involved in species and potential habitat distribution proposed in this paper can be conducted with a minimal amount of data, making it an attractive tool when time and funds are in short supply." (Authors)] Address: Gobbi, M., Department of Invertebrate Zoology and Hydrobiology, Museo delle Scienze, Via Calepina 14, I-38122, Trento, Italy

11950. González Soriano, E.; Trujano-Ortega, M.; Contreras-Arquieta, A.; García-Vásquez, U.O. (2012): New records of *Libellula pulchella* (Odonata: Libellulidae) and *Phyllogomphoides albrighi* (Odonata: Gomphidae) from the Cuatro Ciénegas Basin, Coahuila, Mexico. *Revista Mexicana de Biodiversidad* 83: 847-849. (in English, with Spanish summary) ["The first records of *Libellula pulchella* from México and for *Phyllogomphoides albrighi* from Coahuila are reported. These records extend the known geographic range of *Libellula pulchella* beyond south of Texas and *Phyllogomphoides albrighi* beyond west of Nuevo León. The specimens were collected in the Cuatro Ciénegas Basin, one of the most biologically interesting areas for the study of aquatic insects." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

11951. González-Soriano, E. (2012): *Argia mayi*, a new species from México (Zygoptera: Coenagrionidae). *Organisms Diversity & Evolution* 12(3): 261-265. (in English) ["A new species of *Argia* is illustrated and described from material collected in the states of Colima, Guerrero, Jalisco, Michoacán, Morelos and Oaxaca, México. *Argia mayi* n. sp. is morphologically similar to *Argia pocomana* Calvert. It differs from the latter by the morphology of the abdominal appendages in the males and by having four postquadrangular cells in FW in both sexes, blue on the dorsum of males restricted to S8-9 and an erect hind margin of the mesostigmal plate in females." (Author)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

11952. González-Tokman, D.M.; Munguía-Steyer, R.; González-Santoyo, I.; Baena-Díaz, F.S.; Córdoba-Aguilar, A. (2012): Support for the immunocompetence handicap hypothesis in the wild: hormonal manipulation decreases survival in sick damselflies. *Evolution* 66(19): 3294-3301. (in English) ["The immunocompetence handicap hypothesis (ICHH) states that hormones enhance sexual trait expression but impair immunity. Previous

tests of the ICHH have been hampered by experimental design problems. Here, we report on an experimental test of the ICHH that includes manipulations of both hormones and infections in males of the territorial damselfly, *Hetaerina americana*, with accurate survival measurements. We conducted a fully factorial experiment subjecting each individual to one of three topical treatments: methoprene (a juvenile hormone analog), acetone, or control, and one of three injection treatments: bacteria, PBS, or control. We measured survival of manipulated males in both the wild and in captivity. As predicted, survival was most heavily impaired in methoprene-bacteria males than in the other groups in the wild, and no survival differences emerged in captive animals. This result confirms that survival is one cost an animal pays for increased hormonal levels. This corroborates theoretical predictions of the ICHH." (Authors)] Address: González-Tokman, D.-M., Depto de Ecología Evolutiva, Instituto de Ecología, Univ.d Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510 Mexico D.F., Mexico. Email: danielgt@miranda.ecologia.unam.mx

11953. Groupe Odonates Bourgogne; Ruffoni, A. (coord.) (2012): Atlas préliminaire des odonates de Bourgogne (Odonata). Société d'histoire naturelle d'Autun, Société française d'Odonatologie: 43 pp, app.. (in French) [67 Odonata species are mapped and briefly introduced for the Burgundy, France (Départements Côte-d'Or, Nièvre, Saône-et-Loire, Yonne). Information are given on current regional distribution, habitat preferences, sibling species, phenology and biological behaviour.] Address: Ruffoni, A., Société d'histoire naturelle d'Autun, Maison du Parc, F-58230 Saint-Brisson, France. E-mail: shna.ruffoni@orange.fr

11954. Guan, Z.; Dumont, H.J.; Han, B.-p. (2012): *Archineura incarnata* (Karsch, 1892) and *Atrocalopteryx melli* (Ris, 1912) in southern China (Odonata: Calopterygidae). *International Journal of Odonatology* 15(3): 229-239. (in English) ["The calopterygines *Archineura incarnata* and *Atrocalopteryx melli* are subtropical habitat specialists, endemic to China, and sensitive to environmental change. We identified several sites with environmental deterioration from which the species seem to have disappeared; these species can be used as indicators of human disturbance. In this paper their distribution in China is mapped and information on their habitat is given, based on literature records (from 1892 until 2012) with supplements from field investigations in 2008–2011. We analysed Chinese literature, which contained much useful information. In all, 57 sites in 12 provinces were found to contain the two species. Suitable habitats occur in small shaded headwater streamlets for *A. melli*, in rocky streams for *Ar. incarnata*. The ranges of both species form an arc that descends from 30°N, then in the east curves inland at the level of the tropic. *Archineura incarnata* is clearly the more common species, but both are perhaps not so rare as hitherto believed. The majority of populations are situated in the provinces of Guangdong, Fujian and Guangxi. Several provinces merit more study, but the absence of both calopterygids from Yunnan might well be real. *Atrocalopteryx melli* populates the mountains of Hainan, while *Ar. incarnata* is absent from the island." (Authors)] Address: Han, B.-p., Institute of Hydrobiology, Jinan University, Guangzhou, 510632, China

11955. Guareschi, S.; Gutiérrez-Cánovas, C.; Picazo, F.; Sánchez-Fernández, D.; Abellán, P.; Velasco, J.; Millán, A. (2012): Aquatic macroinvertebrate biodiversity:

patterns and surrogates in mountainous Spanish national parks. *Aquatic Conservation: Marine and Freshwater Ecosystems* 22(5): 598-615. (in English) ["In Spain, national parks represent the mainstay of conservation policies and attempt to protect the most representative natural ecosystems. However, studies on the ecology and conservation of aquatic biodiversity within protected areas are still scarce. This study aimed at compiling an inventory of the macroinvertebrate families inhabiting the aquatic ecosystems of each mountainous Spanish national park (Sierra Nevada, Cabañeros, Ordesa, Picos de Europa, Aigüestortes and Monfragüe). The results were used to answer two questions: (i) Which environmental variables are related to macroinvertebrate composition and richness in these protected ecosystems? (ii) Which taxon or group of taxa could act as biodiversity surrogates? Sampling was carried out in 81 aquatic ecosystems across the six national parks during the summers of 2008–2010. The national parks with the highest richness were Picos de Europa and Cabañeros. Overall, the six parks incorporated 66.2% of the taxa included in the Iberian checklist. Multivariate techniques showed that maximum altitude and the presence of lotic habitats were the most important variables related to different community compositions. The best richness model included the presence of a lotic habitat, together with the percentage of the catchment area with non-irrigated agriculture and siliceous geology. Selecting several diverse lotic and lentic water bodies at different altitudes provides the best way of representing Iberian macroinvertebrate diversity. Coleoptera family richness may be used as a macroinvertebrate biodiversity surrogate in Iberian mountainous protected areas because it displayed the highest correlation with the other taxonomic groups and remaining richness values. Such an indicator could be complemented with the use of Odonata family richness for standing waters. The adequacy of Coleoptera and Odonata as biodiversity surrogates should be tested at a wider geographic scale, and other surrogacy concepts (e.g. community composition) considered for assessing the role of this network in the protection of rare and endemic species." (Authors)] Address: Guareschi, Simone, Departamento de Ecología e Hidrología, Universidad de Murcia, Campus de Espinardo, España. E-mail: simone.guareschi@um.es

11956. Guillermo-Ferreira, R.; Bispo, P.C. (2012): Male and female interactions during courtship of the Neotropical damselfly *Mnesarete pudica* (Odonata: Calopterygidae). *Acta ethologica* 15(2): 173-178. (in English) ["The courtship behaviour in calopterygid damselflies is well documented; however, the behaviour of the large Neotropical genus *Mnesarete* is still unknown. Thus, here we present the first description of male–female interactions in *Mnesarete pudica*, a common damselfly in the Neotropical savanna. The male–female interactions were composed of courtship displays, mounting, and chasing. The courtship behaviour lasted 5.23 ± 1.65 s and is very different from other calopterygids, consisting of hovering flights and the cross display made in front of females rather than on the oviposition site. The arrival and presence of females on a male territory are not sufficient to initiate sexual interactions; the male usually interacts with the female only after a patrolling flight. The females may present three distinct behaviours in response to male approach: (a) warding off signal (31.53%), (b) escape (28.83%), (c) and wing flipping (39.64%), which seems to stimulate male courtship. Females also may sit still, which induces males to react as if females were

signalling they are willing to mate. In this paper, we also suggest that male courtship behaviour is mediated by female signals." (Authors)] Address: Guillermo-Ferreira, R., Departamento de Biología, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil. E-mail: rhainerguillermo@yahoo.com.br

11957. Guillermo-Ferreira, R.; Bispo, P.C. (2012): Description of the larva of *Mnesarete pudica* (Hagen in Selys, 1853) (Odonata: Calopterygidae) and notes on known genera of South American Calopterygidae larvae. *Zootaxa* 3482: 77-81. (in English) ["The final instar larva of *Mnesarete pudica* is described and illustrated based on reared specimens collected in Brazil. This species can be distinguished from others by presenting: a) five palpal and three premental setae; b) no posterodorsal hooks on abdominal segments; c) lateral spines only in S9-10. *M. pudica* is compared to other South American calopterygids and biological notes are presented." (Authors)] Address: Bispo, P.C., Departamento de Ciências Biológicas, Faculdade de Ciências e Letras de Assis, Universidade Estadual Paulista, Assis, São Paulo, Brazil. E-mail: pcbispo@gmail.com

11958. Guillermo-Ferreira, R.; Del-Claro, K. (2012): Reproductive behavior of *Acanthagrion truncatum* Selys, 1876 (Odonata: Coenagrionidae). *International Journal of Odonatology* 15(4): 299-304. (in English) ["Behavioural data on Neotropical coenagrionids is still scanty, with very few studies on their reproductive behaviour. Here we present the first description of the reproductive behaviour of *A. truncatum* in a high density population in the Brazilian Neotropical savanna. The observations were made at a pond in an ecological reserve. Males remain at the water searching for females. Females remain in the surrounding vegetation and only approach the water to mate and oviposit. The mean duration of copulation was 25.6 ± 3.26 minutes. Copulations are concentrated between 12:00 and 14:00 h (71%). Females oviposit in tandem with males, sometimes submerging to oviposit. Oviposition took 43.08 ± 22.17 minutes. Female underwater oviposition seems to disrupt male guarding and females emerge from the water by themselves. Male–male interactions usually consist of chases and "facing off". This damselfly species is apparently non-territorial, since males did not defend resources and searched for females in the area." (Authors)] Address: Guillermo-Ferreira, R., Departamento de Biologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil. E-mail: rhainerguillermo@yahoo.com.br

11959. Guillermo-Ferreira, R.; Bispo, P.C. (2012): Description of the larva of *Mnesarete pudica* (Hagen in Selys, 1853) (Odonata: Calopterygidae) and notes on known genera of South American Calopterygidae larvae. *Zootaxa* 3482: 77-81. (in English) ["The final instar larva of *M. pudica* is described and illustrated based on reared specimens collected in Brazil. This species can be distinguished from others by presenting: a) five palpal and three premental setae; b) no posterodorsal hooks on abdominal segments; c) lateral spines only in S9-10. *M. pudica* is compared to other South American calopterygids and biological notes are presented." (Authors)] Address: Guillermo-Ferreira, R., Depto de Biologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Univ. de São Paulo, Ribeirão Preto, São Paulo, Brazil. E-mail: rhainerguillermo@yahoo.com.br

11960. Hadrys, H.; Simon, S.; Kaune, B.; Schmitt, O.; Schöner, A.; Jakob, W.; Schierwater, B. (2012): Isolation of Hox cluster genes from insects reveals an accelerated sequence evolution rate. *PLoS ONE* 7(6): e34682. doi:10.1371/journal.pone.0034682: 10 pp. (in English) ["Among gene families it is the Hox genes and among metazoan animals it is the insects (Hexapoda; including *Ischnura elegans* and *Sympetrum sanguineum*) that have attracted particular attention for studying the evolution of development. Surprisingly though, no Hox genes have been isolated from 26 out of 35 insect orders yet, and the existing sequences derive mainly from only two orders (61% from Hymenoptera and 22% from Diptera). We have designed insect specific primers and isolated 37 new partial homeobox sequences of Hox cluster genes (lab, pb, Hox3, ftz, Antp, Scr, abd-a, Abd-B, Dfd, and Ubx) from six insect orders, which are crucial to insect phylogenetics. These new gene sequences provide a first step towards comparative Hox gene studies in insects. Furthermore, comparative distance analyses of homeobox sequences reveal a correlation between gene divergence rate and species radiation success with insects showing the highest rate of homeobox sequence evolution." (Authors)] Address: Hadrys, Heike, ITZ, Ecology and Evolution, TiHo Hannover, Bünteweg 17d, D-30559, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

11961. Hämäläinen, M. (2012): *Platycnemis doi* sp. nov. from Huu Lien nature reserve in northern Vietnam (Odonata: Platycnemididae). *International Journal of Odonatology* 15(3): 223-228. (in English) ["*Platycnemis doi* sp. nov. (holotype male Vietnam, Lang Son province, Huu Lien nature reserve, Tan Lai, Hang Chau, altitude 200 m above sea level, 22 June 2010, deposited in RMNH, Leiden), is described on the basis of a series of male specimens. A preliminary description of the female based on a photograph taken in the field is included. The affinities of the new species are discussed." (Authors)] Address: Hämäläinen M., Dept Applied Zool., P.O.Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

11962. Hämäläinen, M. (2012): Sudenkorennot, Kalevala ja W. F. Kirby [Dragonflies, the Kalevala and W. F. Kirby]. *Crenata* 5: 34-37. (in Finnish, with English summary) ["The origin and nomenclatorial fate of the synonymized dragonfly genus-group names Aino Kirby, 1890 and Untamo Kirby, 1889 are discussed. These names were based on two characters from the Finnish national epic, the Kalevala, which was translated into English by W. F. Kirby in 1907. Among Odonata a third and surviving name from this source is the specific epithet of *Aristocypha aino* Hämäläinen, Reels & Zhang, 2009. The article also discusses the negative attitude among other odonatologists towards Kirby's radical changes in dragonfly nomenclature in his synonymic world catalogue (1890), with particular reference to Ferdinand Karsch's satirical 1896 article 'Kirby-Gomphus and Nunney-Gomphus'. Several other Kalevala-based scientific names in other insect groups and plants are listed." (Author)] Address: Hämäläinen M., Dept Applied Zool., P.O. Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

11963. Haileselasie, T.H. Teferi, M. (2012): Influence of water quality on the diversity and distribution of macroinvertebrates in Hiwane second order stream, northern Ethiopia. *Research Journal of Environmental and Earth Sciences* 4(4): 475-481. (in English) ["Understanding

the pattern and process related to biodiversity is a greatest challenge to the science of biological conservation. Furthermore, diversity of tropical aquatic ecosystems is severely threatened by anthropogenic activities. What is more, the continuum of most of the tropical river is interrupted by several man-made activities contributing to adverse effects which hamper provision of good quality of water. Traditionally the quality of water is assessed by physico-chemical means but recent studies have focused on the use of organisms (biota) in water quality assessment for streams and lakes. Here we assessed the influence of water quality on the diversity and distribution of macroinvertebrates in Hiwane second order stream with primary objective to determine the ecological water quality status of Hiwane stream at different sampling sites using rapid field assessment screening methodology. A total of 5 sites (stream sections) were selected and 4 of the sampling sites were within the city Hiwane. However, a reference site outside of the city of Hiwane was included. There were 29 taxa of benthic invertebrates belonging to Ephemeroptera, Odonata, Plecoptera, Coleoptera, Trichoptera, Diptera and Hirudenia, among others, recorded from the river. Among these, members of Trichoptera and Ephemeroptera were predominant in density. Furthermore, species diversity is positively correlated with water quality. Since, man-made activities has lead to depletion of biota, any human activity in the drainage area which may cause changes among physico-chemical parameter could lead to a severe impact on the benthic invertebrates of Hiwane stream river. Thus, we recommend that effluent from the town should be carefully managed." (Authors)] Address: Haileselasie, T.H., Mekelle University, College of Natural and Computational Sciences, Department of Biology, Ethiopia

11964. Hall, G.H. (2012): Pseudopupils in Odonata. *J. Br. Dragonfly Society* 28(1): 27-36. (in English) ["Preliminary studies have shown that pseudopupils are not always present in the eyes of immature dragonflies. Thus pseudopupils were absent in the eyes of a teneral *Aeshna juncea* and in the eyes of immature *danae* and *Cordulegaster boltonii*. In immature *A. juncea* there is some indication of their development and they are present, along with accessory pseudopupils, in the eyes of mature *Aeshna cyanea*, *S. danae* and *C. boltonii*. In contrast, pseudopupils were present in the eyes of newly emerged *Lestes sponsa*. The possible significance of these findings is discussed, including consideration that the presence or absence of pseudopupils may offer external criteria for determining the physiological age of dragonflies during maturation." (Author)] Address: Hall, G.H., Stonehaven, Darley, Harrogate, North Yorkshire, HG3 2QF, UK

11965. Hamill, S.E. (2012): Recovery strategy for the Pygmy Snaketail (*Ophiogomphus howei*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario: v + 13 pp. (in English) ["*O. howei* is a small, brightly-coloured dragonfly which lives in large rivers with steady flow. Adults forage in the canopy of forests surrounding the rivers. Eggs are laid into the water where they are carried downstream and eventually sink. During the day the larvae burrow into sand or gravel sediments. At night they come to the surface, drift with the current, and prey on other invertebrates or small fish. This species is a globally rare dragonfly which occurs only in Eastern North America. In Canada it has

been found in 11 locations in New Brunswick and at one site in Ontario. The Ontario location is on the Namakan River in the Rainy River district of northwestern Ontario. The species is listed as endangered on the Species at Risk in Ontario (SARO) List under Ontario's Endangered Species Act, 2007 (ESA). The greatest potential threat to *O. howei* in Ontario is the impoundment of running waters, but others include forest harvesting and invasive species. Other threats common to dragonflies, such as road-kill, recreation, construction and pollution, may be of lower concern due to the remote northern location. Limiting factors include a need for pristine conditions and the species' short travel distance. Knowledge gaps are many, but major ones are the complete lack of information on population size and the unknown precise egg-laying location in Ontario. The recovery goal is to ensure the long-term survival of *O. howei* in Ontario by protecting the existing population. The protection and recovery objectives are to: • protect and maintain the quality and quantity of habitat on the Namakan River in Ontario where *O. howei* occurs; • implement a monitoring program at the location where *O. howei* is known to exist; • conduct additional inventories for *O. howei* in suitable habitat. When adult *O. howei* and breeding sites are found, a habitat regulation should be developed to protect those areas, including the river and sections of the surrounding forest. It is recommended that 300 metres of forested habitat on either side of the river, expanding to a radius of 500 metres around the breeding site, be prescribed as habitat in the regulation." (Author)] Address: not stated

11966. Hammers, M.; van Gossum, H. (2012): Helping and misleading signals in female body coloration in *Ischnura elegans*. *Brachytron* 15(1): 16-24. (in Dutch, with English summary) ["Various animal species show coexistence of differently coloured and genetically inherited phenotypes. Sometimes these polymorphisms only occur in one sex, either only in males or only in females. When only occurring in females, this is considered to result from sexual conflict. Sexual conflict occurs when males and females differ in their optimal number of matings. In promiscuous species, male reproductive success typically increases with increasing numbers of matings, while for females just a few matings are optimal. Further matings are costly and reduce female reproductive success. In the damselfly *Ischnura elegans*, mature females occur as one of three differently coloured morphs. In addition, each of these morphs undergoes irreversible colour changes from immature to mature age. Intriguingly, one of the mature female morphs shows resemblance in phenotype to the conspecific male, specifically in body colouration (andromorph). The other two female morphs show different body colouration (gynomorphs). We explored three main questions concerning the occurrence and coexistence of these different female morphs in the damselfly *I. elegans*. Firstly, we asked whether variation in the relative frequencies of different female morphs occurs among populations and whether social or environmental factors can explain patterns in such variation. Among populations, large variation in female morph frequencies was observed, with andromorphs sometimes being the least, and sometimes being the most abundant female morph. Andromorph frequencies declined across populations with increasing ambient temperature. Secondly, we explored if males are aided by female body colouration to find and recognize suitable mating partners. Males appeared to avoid mating immature individuals, which

may be explained by differences in colour characteristics between immature and mature females. Thirdly, we asked whether andromorphs can be considered male-mimics that, as a result of their colour, succeed in reducing male harassment. Our work showed that andromorphs and males could not be distinguished based on colouration of their pale body parts. In line with this observation, males showed low mating interest for andromorphs, suggesting that andromorphs may indeed succeed in escaping from excessive male mating interest. Together our results show that colour signals by female damselflies may both help and hinder males in their mating decisions. Further, it appears that male harassment alone does not adequately explain female colour polymorphism in damselflies, and that other factors may play a significant role." (Authors)] Address: Hammers, M., Behavioural Ecology and Self-Organization Group & Animal Ecology Group, Centre for Ecological and Evolutionary Studies, University of Groningen, Postbus 11103, 9700 CC Groningen, The Netherlands. E-mail: martijnhammers@gmail.com

11967. Hannigan, E.; Kelly-Quinn, M. (2012): Composition and structure of macroinvertebrate communities in contrasting open-water habitats in Irish peatlands: implications for biodiversity conservation. *Hydrobiologia* 692: 19-28. (in English) ["The purpose of this study was to consider the relative importance of several habitat variables in explaining the patterns in the structure of macroinvertebrate assemblages in open-water habitats, in relatively intact bogs and fens, which should inform conservation strategies. It was hypothesised that variables relating to the size of the water body would differentiate the communities and that some species would be unique to certain conditions. The macroinvertebrate communities from pools >100 m², 10.1–100 m² and Sphagnum hollows were characterised using sweep sampling for eight intact peatland sites across four bog types, and related to habitat variables including pool size, Sphagnum cover and hydrochemistry. Results showed community composition and structure differed significantly between deep, permanent pools and shallow, drought-sensitive Sphagnum hollows, with larger invertebrates, such as Odonates and Dytiscinae, rarely found in the hollows. Sphagnum cover accounted for a substantial amount of the variation in community composition. An examination of life-history strategies found species dependent on predictable conditions for juvenile development to be more abundant in pools. In contrast, taxa that could delay juvenile development until conditions were favourable were more abundant in Sphagnum hollows. These results highlight the importance of habitat heterogeneity in maintaining macroinvertebrate diversity in peatlands. ... The overall faunal abundance of these sites was dominated by Diptera ([65%] whilst Coleoptera (*10%), Odonata (*10%), Trichoptera (*5%), Hemiptera (*5%) and Ephemeroptera (*5%) represented a small proportion of the fauna: *Lestes sponsa*, *Coenagrion puella/pulchellum*, *Enallagma cyathigerum*, *Ischnura elegans*, *Aeshna grandis*, *A. juncea*, *Libellula quadrimaculata* and *Sympetrum danae*." (Authors)] Address: Hannigan, E., Freshwater Biodiversity, Ecology and Fisheries Research Group, School of Biology and Environmental Science, Science Centre West, University College Dublin, Belfield, Dublin 4, Ireland. E-mail: edelhannigan@hotmail.com

11968. Hanson, M.A.; Herwig, B.R.; Zimmer, K.D.; Fieberg, J.; Vaughn, S.R.; Wright, R.G.; Younk, J.A. (2012):

Comparing effects of lake- and watershed-scale influences on communities of aquatic invertebrates in shallow lakes. *PLoS ONE* 7(9): e44644. doi:10.1371/journal.pone.0044644: 9 pp. (in English) ["Constraints on lake communities are complex and are usually studied by using limited combinations of variables derived from measurements within or adjacent to study waters. While informative, results often provide limited insight about magnitude of simultaneous influences operating at multiple scales, such as lake- vs. watershed-scale. To formulate comparisons of such contrasting influences, we explored factors controlling the abundance of predominant aquatic invertebrates in 75 shallow lakes in western Minnesota, USA. Using robust regression techniques, we modeled relative abundance of Amphipoda, small and large cladocera, Corixidae, aquatic Diptera, and an aggregate taxon that combined Ephemeroptera-Trichoptera-Odonata (ETO) in response to lake- and watershed-scale characteristics. Predictor variables included fish and submerged plant abundance, linear distance to the nearest wetland or lake, watershed size, and proportion of the watershed in agricultural production. Among-lake variability in invertebrate abundance was more often explained by lake-scale predictors than by variables based on watershed characteristics. For example, we identified significant associations between fish presence and community type and abundance of small and large cladocera, Amphipoda, Diptera, and ETO. Abundance of Amphipoda, Diptera, and Corixidae were also positively correlated with submerged plant abundance. We observed no associations between lake-watershed variables and abundance of our invertebrate taxa. Broadly, our results seem to indicate preeminence of lake-level influences on aquatic invertebrates in shallow lakes, but historical land-use legacies may mask important relationships" (Authors)] Address: Hanson, M.A., Wetland Wildlife Populations and Research Group, Minnesota Department of Natural Resources, Bemidji, Minnesota, USA. E-mail: mark.alan.hanson@state.mn.us

11969. Harabiš, F.; Dolný, A.; Šipoš, J. (2012): Enigmatic adult overwintering in damselflies: coexistence as weaker intraguild competitors due to niche separation in time. *Population ecology* 54: 549-556. (in English) ["Odonata, like most freshwater invertebrates, tend to overwinter in water due to the thermal properties of a water environment. Winter damselflies (genus *Sympecma*), however, hibernate as adults in terrestrial habitats. The strategy of adult overwintering combined with high mortality is associated with several unique adaptations to semiarid conditions, but winter damselflies maintain this unique life history throughout almost the entire Palaearctic. We assume that the unique strategy of adult overwintering in temperate zones is indirectly maintained by niche separation in time. We used phenological data from the Czech Republic to compare the seasonal phenology of *Sympecma* spp. with other coexisting odonate species. Seasonal population growth patterns between *S. fusca* and other coexisting species representing different life histories were compared using GLMMs and LME. The models showed negative non-linear dependence between the population growth of *S. fusca* and the estimated abundance of compared species. We found that the specific strategy of adult overwintering makes it possible to avoid seasonal maxima of competition and predation in adult and larval stages. Adults may benefit from free niches during spring while larvae may benefit from size advantage among intraguild competitors and optimal conditions for development." (Authors)] Address: Hara-

biš, F., Department of Ecology, Czech University of Life Sciences Prague, Kamycka 129, 165 21 Praha 6 – Suchbát, Czech Republic. E-mail: harabis.f@gmail.com

11970. Hayasaka, D.; Korenaga, T.; Sánchez-Bayo, F.; Goka, K. (2012): Differences in ecological impacts of systemic insecticides with different physicochemical properties on biocenosis of experimental paddy fields. *Ecotoxicology* 21(1): 191-201. (in English) ["The environmental risks of pesticides are typically determined by laboratory single-species tests based on OECD test guidelines, even if biodiversity should also be taken into consideration. To evaluate how realistic these assessments are, ecological changes caused by the systemic insecticides imidacloprid and fipronil, which have different physicochemical properties, when applied at recommended commercial rates on rice fields were monitored using experimental paddy mesocosms. A total of 178 species were observed. There were no significant differences in abundance of crop arthropods among the experimental paddies. However, zooplankton, benthic and neuston communities in imidacloprid-treated field had significantly less abundance of species than control and fipronil fields. Significant differences in abundance of nekton community were also found between both insecticide-treated paddies and control. Influences on the growth of medaka fish were also found in both adults and their fries. Both Principal Response Curve analysis (PRC) and Detrended Correspondence Analysis (DCA) showed the time series variations in community structure among treatments, in particular for imidacloprid during the middle stage of the experimental period. These results show the ecological effect-concentrations (LOEC ~ 1 µg/l) of these insecticides in mesocosms, especially imidacloprid, are clearly different from their laboratory tests. We suggest that differences in the duration of the recovery process among groups of species are due to different physicochemical properties of the insecticides. Therefore, realistic prediction and assessment of pesticide effects at the community level should consider not only the sensitivity traits and interaction among species but also the differences in physicochemical characteristics of each pesticide." (Authors) Taxa are treated at the order level, but included also *Ischnura senegalensis*.] Address: Terajima, M., Center for Infectious Disease & Vaccine Research, Univ. of Massachusetts Medical School, Worcester, MA 01655, USA. E-mail: Masanori.Terajima@umassmed.edu

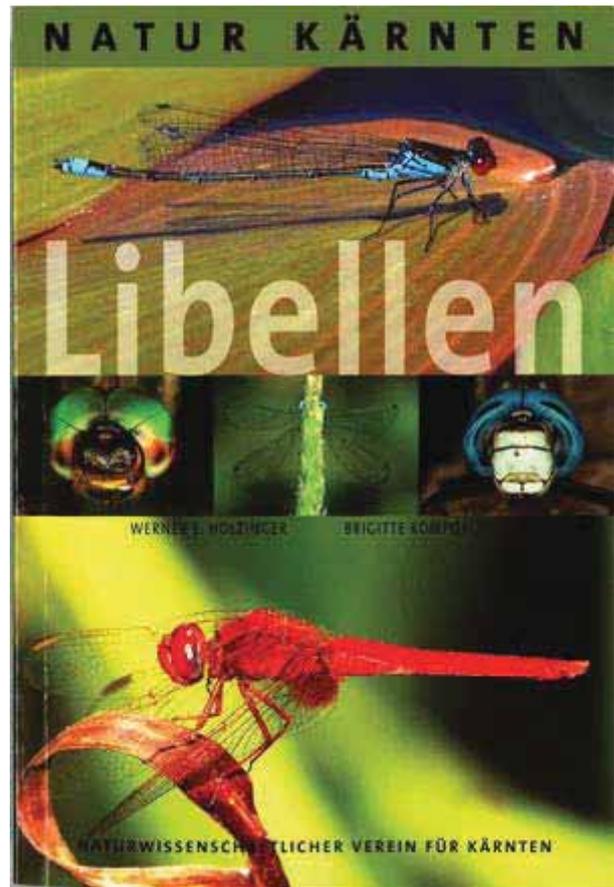
11971. Hellmann, G. (2012): Atlas der Libellen. Trockur, B., Boudot, J.-P., Fichet, V. et al. (2010): Atlas der Libellen – Fauna und Flora in der Großregion, Band 1. Hrsg.: Landesamt für Umwelt und Arbeitsschutz, Zentrum für Biodokumentation des Saarlandes, Am Bergwerk Reden 11, 66578 Landsweiler-Reden, info.biodoku@lua.saarland.de. 201 S., ISBN 978-3-938381-31-1, 24,90 €. *Natur in NRW* 1/2012: 49. (in German) [Review] Address: not stated

11972. Herrmann, J. (2012): Chemical and biological benefits in a stormwater wetland in Kalmar, SE Sweden. *Limnologia* 42: 299-309. (in English) ["A manmade stormwater wetland in Kalmar, SE Sweden, sized 1 ha and receiving water from residential and road areas, was monitored over the first years after inundation with respect to chemistry and biology. Water flow and chemistry was analysed in years 2–4, mainly on a monthly basis, but, in the final year, every second month. This revealed that total nitrogen, according to the Swedish Environmental Quality Criteria (EQC), typically showed moderate or

high concentrations, whereas total phosphorous levels were very high or extremely high. Metal (Cd, Cr, Cu, Pb and Zn) concentrations were low or moderate in terms of EQC. Yearly average reduction of nitrogen was 173 kg ha⁻¹ y⁻¹, tending to increase over time, and for phosphorous 12.1 kg ha⁻¹ y⁻¹, tending to decrease. Vegetation analysis was performed in years 1–4 by noting all species in 27 consecutive zones around the wetland system. This showed that one year after filling with water, the vegetation was already well established with >30 plant species in the entire pond system, and this increased only slightly. After four years, the shoreline vegetation cover had become denser, especially with larger graminoids such as common reed (*Phragmites australis*) and sea club-rush (*Bolboschoenus maritimus*), and submersed vegetation almost disappeared. There was a tendency for common species to become more dominant, and for less common species to become rarer. Using sweep net sampling of benthic invertebrates during years 0–2, ca 50 species/higher taxa were observed during the first year, largely because of the appearance of many beetles, especially dytiscids. However, these decreased the following years. Apart from these animals, in the first few months the invertebrate colonisation was dominated by chironomids and corixids, whereas later prominent increases were noticed for the isopod *Asellus aquaticus*, the snail *Physa fontinalis*, and the mayfly nymph *Cloeon dipterum*. The results are discussed in terms of wetland values for biodiversity and nutrient reduction, suggesting that these objectives seem possible to combine in stormwater wetlands." (Author) Odonata include the following taxa: *Ischnura elegans*, *Coenagrion* sp., *Lestes* sp., *Zygoptera* indet., *Libellula depressa*, *Libellulidae* indet. and *Aeshna grandis*.] Address: Hermann, J., School of Natural Sciences, Linnaeus University, SE-391 82 Kalmar, Sweden. E-mail: jan.herrmann@lnu.se

11973. Hof, C.; Brändle, M.; Dehling, M.; Munguia, M.; Brandl, R.; Araujo, M.B.; Rahbek, C. (2012): Habitat stability affects dispersal and the ability to track climate change. *Biology Letters* 8(4): 639-643. (in English) ["Habitat persistence should influence dispersal ability, selecting for stronger dispersal in habitats of lower temporal stability. As standing (lentic) freshwater habitats are on average less persistent over time than running (lotic) habitats, lentic species should show higher dispersal abilities than lotic species. Assuming that climate is an important determinant of species distributions, we hypothesize that lentic species should have distributions that are closer to equilibrium with current climate, and should more rapidly track climatic changes. We tested these hypotheses using datasets from 1988 and 2006 containing all European Odonata species. Bioclimatic envelope models showed that lentic species were closer to climatic equilibrium than lotic species. Furthermore, the models over-predicted lotic species ranges more strongly than lentic species ranges, indicating that lentic species track climatic changes more rapidly than lotic species. These results are consistent with the proposed hypothesis that habitat persistence affects the evolution of dispersal." (Authors)] Address: Hof, C., Center for Macroecology, Evolution and Climate, Department of Biology, University of Copenhagen, Copenhagen, Denmark. E-mail: christian.hof@sensckenberg.de

11974. Holzinger, W.E.; Komposch, B. (2012): Die Libellen Kärntens. Sonderreihe Natur Kärnten 6. 336 pp. Bezug: Naturwissenschaftlicher Verein für Kärnten, Museumgasse 2, Landesmuseum, 9020 Klagenfurt, Austria



11975. Home, J. (2012): The occurrence of the Broad-bodied Chaser *Libellula depressa* L. at a nature reserve in Hampshire over a period of 25 years and a description of pruinescence in females. *J. Br. Dragonfly Society* 28(1): 37-43. (in English) ["The main flight period of *L. depressa* is reported for the 26 year period 1985-2011 at a site in Southern England and it is noted that it has not changed over this period. The occurrence and development of pruinosity in some females at this site is described and discussed." (Author)] Address: Home, J., 78 Spring Lane, Bishopstoke. Eastleigh, Hants, S050 6BB, UK

11976. Home, J. (2012): Emergence, maturation time and oviposition in the Common Darter *Sympetrum striolatum* (Charpentier). *J. Br. Dragonfly Society* 28(2): 66-74. (in English) ["The most successful period of oviposition in 2005 occurred during the last half of September. However, 9% of the emergences in 2006 occurred from a pond exposed from mid-October through November 2005, indicating a second, smaller, peak of oviposition. Over the period 1990-2011 the average date for the first sighting of individuals was 17 June and the average date when first seen patrolling was 14 July. The mean time between emergence and patrolling was 28 days." (Author)] Address: Home, J., 78 Spring Lane, Bishopstoke, Eastleigh, Hants, S050 6BB, UK

11977. Horváth, G. (2012): Assessment of riverine dragonflies (Odonata: Gomphidae) and the emergence behaviour of their larvae based on exuviae data on the reach of the river Tisza in Szeged. *Tiscia* 39: 9-15. (in English) ["Abundance, phenology, sex ratio, emergence pattern, mortality and larval emergence behaviour of riverine Gomphidae were studied at the Lower-Tisza

reach at Szeged (168–173 rkm) during the emergence period in 2011. Three 20 meter long sampling sites were chosen and searched systematically for exuviae, dead specimens and dragonfly wings, which were left behind by bird predators. At the studied reach of the river two species form stable populations: *G. flavipes* and *G. vulgatissimus*. *G. flavipes* was much more abundant than *G. vulgatissimus*. Exuviae indicated the excess of females in the *G. vulgatissimus* population (although there were no significant difference between sexes), while in the case of *G. flavipes* the number of individuals in both sexes were almost the same. *G. vulgatissimus* started to emerge first as a 'spring species', while *G. flavipes* started to emerge about a month later showing the characteristics of a 'summer species'. The rate of mortality in the *G. flavipes* population during emergence was slight and quite normal compared to the abundance of the species. Selection of emergence support of *G. flavipes* showed that the significant majority of the larvae chose soil, but this could have been caused by the notable minority of other types of substrates at the sampling sites. The distance crawled by the larvae from the water-front to the emergence site differed significantly between the two species, *G. vulgatissimus* crawled further, and in the case of *G. flavipes* the effect of the measured background variables to the distance had not been proven." (Author)] Address: Horváth, G., Department of Ecology, University of Szeged, H-6726 Szeged, Középfásor 52., Hungary

11978. Hossie, T.J.; Murray, D.L. (2012): Assessing behavioural and morphological responses of frog tadpoles to temporal variability in predation risk. *Journal of Zoology* 288(4): 275-282. (in English) ["Finely tuned adjustment of an individual's phenotype can offer substantial fitness benefits when it is closely matched with environmental change. For instance, prey may be safeguarded against unnecessary costs to growth or development when their responses to temporally variable predation risk include plastic anti-predator defences. Yet, the correspondence between perceived predation risk and related responses should differ between behavioural and morphological phenotypes when risk fluctuates because behaviour can be modified quickly, whereas morphological phenotypes require time to build. Theoretical models predict intermediate expression when risk fluctuates rapidly relative to the time required to mount a response, whereas traits that can be modified relatively quickly should more closely track current conditions. Using a tadpole-dragonfly larva system, we sought to compare the expression of behavioural and morphological defences following exposure to constant versus variable predation risk. By varying the pattern and total duration of predator cue exposure, but not cue concentration, we quantified phenotypic plasticity and trait reversibility. Our results show that strong behavioural responses were limited to early ontogeny but closely matched current level of risk. The morphology of prey experiencing a weekly changing predator environment was intermediate to that of prey in the no-predator and constantly exposed treatments. Yet, prey exposed to a predator environment for the same total duration as the weekly changing environment, but in a different exposure pattern, was morphologically unresponsive to the onset of predation risk. Finally, unexposed tadpoles gained deeper tails and smaller relative body size in late development, coincident with limb bud development. Such changes are consistent with anti-predator response and represent either an innate response when prey are more

vulnerable or shape optimization when faced with increased drag. We conclude that phenotypic expression depends critically on patterns of temporal variability in the environment, although the actual extent of expression depends on the specific trait in question." (Authors)] Address: Hossie, T.J., Ottawa-Carleton Institute of Biology, Carleton University, 1125 Colonel By Dr., Ottawa, ON, Canada K1S 5B6. Email: thossie@connect.carleton.ca

11979. Huang, S.-C.; Reinhard, J. (2012): Color change from male-mimic to gynomorphic: a new aspect of signaling sexual status in damselflies (Odonata, Zygoptera). *Behavioral Ecology* 23(6): 1269-1275. (in English) ["Body colour variations are used by many animal species to communicate their sexual state and are believed to have evolved through sexual selection. In Zygoptera, females sometimes come in different colour morphs: gynomorphs and male-like andromorphs, pursuing different reproductive strategies. These distinct female colour morphs are usually mature females and their colour remains stable throughout the female's life. Here, we show for the first time that blue andromorph females of the Australian damselfly *Ischnura heterosticta*, are still sexually immature, and change their body colour to green-grey gynomorph when they are ready to mate. The colour change occurs within 24h and is irreversible. Males of *I. heterosticta* rarely recognize blue andromorphs as potential mates, but mistake them for other males. The andromorphs thus avoid male sexual harassment, giving them the advantage of additional time to forage and sexually mature. The colour change to gynomorph signals the readiness to mate, and the former andromorphs have equal mating success after the colour change as other gynomorph females. Our results demonstrate that andromorph *I. heterosticta* use a complete and unique body colour change from male-mimic to gynomorphic to signal sexual maturity and regulate reproduction. Our discovery gives rise to a novel hypothesis regarding maintenance of female-limited polymorphism in *Ischnura* damselflies via this colour change mechanism." (Authors)] Address: Huang; S.-C., Queensland Brain Institute, University of Queensland, Brisbane QLD 4072, Australia. E-mail: shaochang.huang@uqconnect.edu.au

11980. Hughes, M.E.; Fincke, OM, (2012): Reciprocal effects between burying behavior of a larval dragonfly (Odonata: *Macromia illinoensis*) and zebra mussel colonization. *Journal of Insect Behavior* 25: 554-568. (in English) ["Invasive zebra mussels (*Dreissena polymorpha*) often colonize dragonfly larvae, especially spawning species whose survivorship to emergence as terrestrial predators is consequently reduced. Using individuals of the sprawler, *Macromia illinoensis*, as their own controls, we compared the burying behaviour of penultimate instar larvae before (i.e. baseline) and after their colonization by zebra mussels under ambient conditions. Individuals that took longer to bury themselves when mussel-free had a higher rate of colonization by mussels over a five-day period compared to those that buried faster. In contrast, the depth at which individuals buried when mussel-free was not predictive of subsequent colonization rate. Although mean bury time did not differ between baseline and when an individual carried one or more mussels, colonized larvae buried more shallowly than when mussel-free. Moreover, attached mussels increased the risk of subsequent colonization by zebra mussels. After naturally losing all of their attached mussels, bury time and depth of individuals did

not differ from their baseline behaviour, indicating that the changes in the behaviour of colonized individuals were due to mussel loads and not their time in captivity. Under natural conditions, the positive feed-back between mussel attachment and increasing vulnerability to colonization helps explain how mussel loads, which are lost at molting, can accumulate quickly over the duration of the final larval stadium. Because zebra mussel attachment decreases the crypsis that that a *M. illinoensis* gains from burying, the invasive mussel may also make dragonfly larvae more detectable to visual predators." (Authors)] Address: Fincke, Ola M., Ecology & Evolutionary Biology Program, Dept of Zoology, Univ. of Oklahoma, Norman, OK 73019, USA. E-mail: fincke@ou.edu

11981. Humala, A.E.; Polevoi, A.V. (2012): Additions to the insect fauna of the "Kizhi Skerries" reserve. Proceedings of the Karelian Research Center 1(2012): 141-145. (in Russian, with English summary) [The following Odonata species are added to the Karelian (Russia) fauna: *Erythromma najas*, *Enallagma cyathigerum*, *Lesites dryas*, *Sympetrum danae*, *Leucorrhinia albifrons*, and *L. caudalis*.] Address: Humala, A., Forest Research Institute, Karelian Research Centre, Russian Academy of Sciences, 11 Pushkinskaya St., 185910 Petrozavodsk, Karelia, Russia. E-mail: humala@krc.karelia.ru

11982. Ingley, S.J.; Bybee, S.M.; Tennessen, K.J.; Whiting, M.F.; Branham, M.A. (2012): Life on the fly: phylogenetics and evolution of the helicopter damselflies (Odonata, Pseudostigmatidae). *Zoologica Scripta* 41(6): 637-650. (in English) ["Helicopter damselflies (Odonata: Pseudostigmatidae) form a relatively small, yet highly specialized group of odonates, including the largest extant odonate (wingspan of ~190 mm). Pseudostigmatids are found throughout Central and South America, with the exception of one species that is found exclusively in East Africa. Pseudostigmatids oviposit exclusively in phytotelmata and forage on orb-weaver spiders, which they pluck from webs. Pseudostigmatids also exhibit unique forms of both broad and narrow wings. Although the ecology of these behaviours and morphological features have been studied, their phylogenetic origins and evolutionary history are unknown. Here, we examine the origins of pseudostigmatid wing forms, oviposition in phytotelmata and spider feeding within a modern phylogenetic context, testing for single origins of each character. Phylogenetic analyses are based on 59 morphological characters and ~5 kb of sequence data. Our findings include a well-supported monophyletic Pseudostigmatidae and *Coryphagrion grandis* as sister to the Neotropical genera. The genus *Mecistogaster* is paraphyletic, with *Pseudostigma* nested within the clade. The genus *Microstigma* is supported as monophyletic and forms a sister group relationship to the clade of *Megaloprepus* and *Anomisma*. The sister group relationship to Pseudostigmatidae is less clear. On the basis of this phylogenetic analysis, we propose three new tribes (*Coryphagrionini*, *Microstigmatini* and *Mecistogastrini*). As Pseudostigmatidae is monophyletic, the behaviour of gleaning spiders from webs appears to derive from a single origin. There are two origins of broad wings within Pseudostigmatidae. Oviposition in phytotelmata most certainly evolved multiple times within Coenagrionoidea. These findings provide new insights into pseudostigmatid evolution that can be used to generate hypotheses regarding behaviour and morphological adaptation in this unique and threatened group of damselflies." (Authors)] Address: Ingley, S.J., Depart-

ment of Biology, 401 WIDB, Brigham Young University, Provo, UT 84602. E-mail: sjingley@byu.edu

11983. Jacquemin, G.; Vein, D. (2012): The aquatic insects of a standard small plain river in NE France, with emphasis on remarkable species. *Aquatic Insects* 34, Supplement 1: 11-22. (in English) ["A five-year macroinvertebrate study was conducted on a 55 km river (le Rupt-de-Mad, Lorraine region, north-eastern France), a standard for the region. A list of 300 species was drawn up, and remarkable species were listed for some better known orders: Ephemeroptera, Plecoptera, Trichoptera and Odonata. Some faunistic results are emphasised: about 42% of the identified species were more or less ubiquitous, 26% were meso- to polysaprobic species of potamon, present only in the main course of the river, while 31% were rather stenoecious species restricted to certain tributaries. Fifty-one remarkable species were listed, taking into account their regional status, according to IUCN categories: more than three quarters were hosted in the small tributaries, and 55% found exclusively in these latter (versus 23.5% only present in the main course of the river). Calcareous lotic tributaries were hosting particularly original communities with many remarkable species. Ephemeroptera, Plecoptera and Trichoptera were pertinent groups to assess the global faunistic interest of lotic habitats, but lentic habitats are probably better evaluated using other groups, e.g. Odonata and Coleoptera; the latter unfortunately poorly known from an ecological point of view." (Authors)] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

11984. Jaeschke, A.; Bittner, T.; Jentsch, A.; Reineking, B.; Schlumprecht, H.; Beierkuhnlein, C. (2012): Biotic interactions in the face of climate change: A comparison of three modelling approaches. *PLoS ONE* 7(12): e51472. (in English) ["Climate change is expected to alter biotic interactions, and may lead to temporal and spatial mismatches of interacting species. Although the importance of interactions for climate change risk assessments is increasingly acknowledged in observational and experimental studies, biotic interactions are still rarely incorporated in species distribution models. We assessed the potential impacts of climate change on the obligate interaction between *Aeshna viridis* and its egg-laying plant *Stratiotes aloides* in Europe, based on an ensemble modelling technique. We compared three different approaches for incorporating biotic interactions in distribution models: (1) We separately modelled each species based on climatic information, and intersected the future range overlap ('overlap approach'). (2) We modelled the potential future distribution of *A. viridis* with the projected occurrence probability of *S. aloides* as further predictor in addition to climate ('explanatory variable approach'). (3) We calibrated the model of *A. viridis* in the current range of *S. aloides* and multiplied the future occurrence probabilities of both species ('reference area approach'). Subsequently, all approaches were compared to a single species model of *A. viridis* without interactions. All approaches projected a range expansion for *A. viridis*. Model performance on test data and amount of range gain differed depending on the biotic interaction approach. All interaction approaches yielded lower range gains (up to 667% lower) than the model without interaction. Regarding the contribution of algorithm and approach to the overall uncertainty, the main part of explained variation stems

from the modelling algorithm, and only a small part is attributed to the modelling approach. The comparison of the no-interaction model with the three interaction approaches emphasizes the importance of including obligate biotic interactions in projective species distribution modelling. We recommend the use of the 'reference area approach' as this method allows a separation of the effect of climate and occurrence of host plant." (Authors)] Address: Jaeschke, Anja, Department of Biogeography, BayCEER, University of Bayreuth, Bayreuth, Germany. E-mail: anja.jaeschke@uni-bayreuth.de

11985. Jardine, T.D.; Kidd, K.A.; Rasmussen, J.B. (2012): Aquatic and terrestrial organic matter in the diet of stream consumers: implications for mercury bioaccumulation. *Ecological Applications* 22: 843-855. (in English) ["The relative contribution of aquatic vs. terrestrial organic matter to the diet of consumers in fluvial environments, and its effects on bioaccumulation of contaminants such as mercury (Hg), remains poorly understood. We used stable isotopes of carbon and nitrogen in a gradient approach (consumer isotope ratio vs. periphyton isotope ratio) across temperate streams that range in their pH to assess consumer reliance on aquatic (periphyton) vs. terrestrial (riparian vegetation) organic matter, and whether Hg concentrations in fish and their prey were related to these energy sources. Taxa varied in their use of the two sources, with grazing mayflies (Heptageniidae), predatory stoneflies (Perlidae), one species of water strider (Metrobates hesperius) and the fish blacknose dace (*Rhinichthys atratulus*) showing strong connections to aquatic sources while *Aquarius remigis* water striders and brook trout (*Salvelinus fontinalis*) showed a weak link to in-stream production. The aquatic food source for consumers, periphyton, had higher Hg concentrations in low pH waters, and pH was a much better predictor of Hg in predatory invertebrates (including Odonata) that relied mainly on this food source vs. those that used terrestrial C. These findings suggest that stream biota relying mainly on dietary inputs from the riparian zone will be partially insulated from the effects of water chemistry on Hg availability. This has implications for the development of a whole system understanding of nutrient and material cycling in streams, the choice of taxa in contaminant monitoring studies, and in understanding the fate of Hg in stream food webs." (Authors) Gomphidae, Cordulegastridae and Aeshnidae are grouped as Odonata.] Address: Jardine, T.D., School of Environment and Sustainability Toxicology Centre, University of Saskatchewan, Saskatoon SK Canada S7N 5B3. E-mail: t.jardine@griffith.edu.au

11986. Jödicke, R. (2012): Die Libellensammlung Lopau: Imagines (Odonata). *International Dragonfly Fund - Report* 47: 1-8. (in German, with English summary) ["The collection of Wolfgang Lopau contains 915 dragonfly imagoes of 80 taxa, which were predominantly taken in Greece. The focus of collecting activities was set on taxa with unsettled taxonomy. The collection is now deposited in the Senckenberg Institute and Museum Frankfurt." (Author)] Address: Jödicke, R., Am Liebfrauenbusch 3, 26655 Westerstede, Germany. E-mail: reinhard.joedicke@ewetel.net

11987. Johnson, J. (2012): Got clearance? The 2012 Aeshna Blitz at Three Forks, Oregon. *Bulletin of the Oregon Entomological Society* Fall 2012: 1-4. (in English) [The paper reports on an odonatological trip to Three Forks, Malheur Co., Oregon, 27 and 28 July 2012. A to-

tal of 26 species are reported.] Address: Johnson, J., 3003 Unander Avenue, Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

11988. Johnson, S.E.; Ugbah, N.K. (2012): The spatial games: investigating the spatial distribution of *Anax* and select prey as a function of predator-prey interactions. A Senior Project presented to the Faculty of the Biological Sciences Department California Polytechnic State University, San Luis Obispo in partial fulfillment of the requirements for the degree Bachelor of Science: 24 pp. (in English) ["Our study investigated the spatial distribution and movement behaviour of predatory dragonfly larvae (*Anax*) and of two prey types: mosquito larvae and amphipods. Predator-prey interactions have important consequences for the population dynamics of both predator and prey groups and these interactions can shape community structure. We measured behaviour of each prey type in the presence of the *Anax* predator and the behaviour of the predator in the presence of these alternative prey types. Observations were made in five-gallon aquaria where a grid pattern allowed us to track the number of moves made by individuals. We compiled data from ten, one hour trials for each predator-prey combination (*Anax* + amphipods and *Anax* + mosquito larvae). Prey species differed in their behaviour. Mosquito larvae spent more time near the water's surface, were more likely to utilize the artificial vegetation, and were more active than amphipods. On the other hand, amphipods utilized full range of the aquarium and had a greater number of moves than mosquito larvae. *Anax* behaviour was significantly different in the two prey treatments. *Anax* spent more time in the top portion of the aquarium during the mosquito treatments, utilized the artificial vegetation more in the amphipod treatments, had a greater number of moves in the amphipod treatments, and ate more amphipods than mosquito larvae. Our results indicate that *Anax* change their behaviour based on prey type." (Authors)] Address: not stated.

11989. Juen, L.; De Marco Jr, P. (2012): Dragonfly endemism in the Brazilian Amazon: competing hypotheses for biogeographical patterns. *Biodiversity and Conservation* 21(13): 3507-3521. (in English) ["Many hypotheses have been proposed to explain the origin and maintenance of the Amazonian diversity with special place for the theory of isolation by rivers and a set of hypothesis related to contemporary environmental dissimilarity. We explore those hypotheses here using the biogeographic distributional patterns of dragonflies in interfluvial areas of the Amazonian biome and also evaluate how differences among dispersal capabilities between the Anisoptera and Zygoptera suborders may contribute to those patterns. We used distributional information of 392 odonate species in the Amazonian forest in a cladistic analysis of distributions and endemism and the estimated faunistic similarity among interfluves with the Sorensen index. The environmental similarity among interfluves was analysed by discriminant analysis based on eight environmental metrics. Different metrics for geographic distance (connectivity) among interfluves were evaluated and their relation to the other variables tested by the Mantel test. The number of endemic species was linearly correlated to the area of the interfluves. General endemism patterns showed consistent resemblance to those reported for vertebrates, especially the similarity among the Rondônia and Inambari interfluves. Geographical distance has no predictive value for

dragonflies distribution, but the environmental similarity is a good predictor of proportion of shared species. The low dispersal group (Zygoptera) presented more clear patterns of distribution and a lower proportion of shared species among different interfluvies. The environmental similarity can be considered the determinant factor of the distribution of dragonflies, possibly due to environmental specificity evolved during a long history of some clades in this system. The low dispersal group (Zygoptera) retained more biogeographical information about possible historical factors that determine current distribution. Also, the transport of larvae by macrophyte banks, the lateral change of river courses, the reversal of the drainage basin, together with the capacity to disperse across rivers for some species may be explanations for the lack of effect of isolation by rivers, especially for Anisoptera." (Authors)] Address: Juen, L., Instituto de Ciências Biológicas, Universidade Federal do Pará, Rua Augusto Correia, N8 1 Bairro Guama, Belém, PA 66.075-110, Brazil. E-mail: leandrojuen@ufpa.br

11990. Kafutshi, R.K. (2012): Le régime alimentaire du Martin-pêcheur huppé *Alcedo cristata* pendant la période de reproduction dans la région de Kinshasa (R.D. Congo). *Malimbus* 34: 12-28. (in French, with English summary) ["The diet of the Malachite Kingfisher was investigated by study of 182 regurgitated pellets collected from 65 broods during the nesting period in the rainy seasons from 2004 to 2009, in two sites in the Kinshasa area. In total, 2619 undigested remains were identified in the pellets, revealing 1100 prey. The Malachite Kingfisher's diet is rich and diverse. The prey identified were 92.7 % fishes (*Oreochromis niloticus*, *Gambusia affinis* and *Hemichromis elongatus*), 5.9 % insects (Odonata and Orthoptera) and 0.5 % frogs." (Author)] Address: Kafutshi, R.K., Université de Kinshasa, Faculté des sciences, Département de Biologie, B.P. 190 Kinshasa XI, R.D. Congo, et Université de Liège, Département des sciences de la vie (Biologie des organismes et écologie), 27 Boulevard du Rectorat B22, 4000 Liège, Belgique. E-mail: bobkisasa@yahoo.fr

11991. Kalniņš, M. (2012): Dragonflies (Odonata) in Latvia – history of research, bibliography and distribution from 18th century until 2010. *Latvijas Entomologs* 51: 91-149. ["This work is to summarize large number of the available unpublished data and to make - distribution maps and to present the results in an article. The existing faunistic data were presented in 82 publications up to the end of 2010. Distribution maps were developed for 59 species. For several species of dragonflies were found notable changes in the distribution." (Author)] Address: Kalniņš, M., Nature Conservation Agency, Baznīcas iela 7, Sigulda, Siguldas novads, LV-2150, Latvia. E-mail: martins.kalnins@biology.lv

11992. Karthika, P.; Vadivalagan, C.; Gunasekaran, C.; Anandhakumar, S. (2012): DNA Barcoding of selected dragonfly species (Libellulidae and Aeshnidae) for species authentication with phylogenetic assessment. *European Journal of Experimental Biology* 2(6): 2158-2165. (in English) ["Dragonflies are the bio indicators of the aquatic ecosystem. Knowledge and studies on the diversity of dragonflies in India is very high. Identification by traditional taxonomy often leads to misidentification. Incidence of sexual dimorphism is found to be high particularly in the Libellulidae and Aeshnidae family. In order to resolve the above mentioned problem, the accurate identification of the dragonflies was carried out by DNA barcoding using COI gene. In the present study,

selected dragonfly species (*Bradinopyga geminata*, *Crocothemis servilia*, *Diplacodes trivialis* and *Anaciaeschna jaspidea*) of the family of Libellulidae and Aeshnidae were taken and along with three other evident species (*Pantala flavescens*, *Orthetrum sabina*, and *Brachythemis contaminata*) were retrieved from GenBank. The phylogenetic tree was created using NJ (Neighbour Joining) method to determine the origin and evolutionary relationships of the species. Similarity search was performed and conformed species were submitted to the NCBI and BOLD database for species authentication. The present study concluded that the DNA barcoding is an invaluable tool for the authentication of the species. Storage of this nucleotide information in a database like BOLD would greatly help in the identification up to sub species level." (Authors)] Address: Karthika, P., Conservation Biology Laboratory, Dept of Zoology, Bharathiar University, Coimbatore

11993. Karube, H.; Katatani, N. (2012): Occurrence of a new species of the genus *Hemicordulia* in northeastern Laos (Anisoptera: Corduliidae). *Tombo* 54: 71-74. (in English, with Japanese summary) [*Hemicordulia edai* sp. nov. is described from northeastern Laos. "It is related to *H. asiatica* Selys, 1878 from India and Burma, but can be easily distinguished from the latter by the structure of male superior appendages and female vulvar scale." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

11994. Kefford, B.J.; Hickey, G.L.; Gasith, A.; Ben-David, E.; Dunlop, J.E.; Palmer, C.G.; Allan, K.; Choy, S.C.; Piscart, C. (2012): Global scale variation in the salinity sensitivity of riverine macroinvertebrates: Eastern Australia, France, Israel and South Africa. *PLoS ONE* 7(5): e35224. doi:10.1371/journal.pone.0035224: 12 pp. (in English) ["Salinity is a key abiotic property of inland waters; it has a major influence on biotic communities and is affected by many natural and anthropogenic processes. Salinity of inland waters tends to increase with aridity, and biota of inland waters may have evolved greater salt tolerance in more arid regions. Here we compare the sensitivity of stream macroinvertebrate species to salinity from a relatively wet region in France (Lorraine and Brittany) to that in three relatively arid regions eastern Australia (Victoria, Queensland and Tasmania), South Africa (south-east of the Eastern Cape Province) and Israel using the identical experimental method in all locations. The species whose salinity tolerance was tested, were somewhat more salt tolerant in eastern Australia and South Africa than France, with those in Israel being intermediate. However, by far the greatest source of variation in species sensitivity was between taxonomic groups (Order and Class) and not between the regions. We used a Bayesian statistical model to estimate the species sensitivity distributions (SSDs) for salinity in eastern Australia and France adjusting for the assemblages of species in these regions. The assemblage in France was slightly more salinity sensitive than that in eastern Australia. We therefore suggest that regional salinity sensitivity is therefore likely to depend most on the taxonomic composition of respective macroinvertebrate assemblages. On this basis it would be possible to screen rivers globally for risk from salinisation." (Authors) The analysed data sets include from Israel: *Platycnemis* sp., *Pseudagrion* sp., *Lesites virens* and *L. barbarus*, and from France: *Boyeria irene*, *Ischnura elegans*, *Calopteryx splendens*, *C. virgo*,

Somatochlora metallica, *Onychogomphus forcipatus*, *Gomphus pulchellus*, *G. vulgatissimus*, *Coenagrion puella*, and *P. pennipes*.] Address: Kefford, B.J., Centre for Environmental Sustainability, School of the Environment, University of Technology Sydney, Broadway, New South Wales, Australia. E-mail: ben.kefford@rmit.edu.au

11995. Keller, D.; van Strien, M.J.; Ghazoul, J.; Holder-egger, R. (2012): Landscape genetics of insects in intensive agriculture: new ecological insights. In: Swiss Federal Research Institute WSL (ed) ENHANCE. Enhancing ecosystem connectivity through intervention - benefits for nature and society? Final Report. Birmensdorf, Swiss Federal Research Institute WSL: 27-35. (in English) ["Agricultural landscapes harbour various insect species, of which many became threatened due to fragmentation, habitat loss and agricultural intensification. Connectivity measures are being implemented to mitigate this trend. However, to determine whether structural connectivity measures are truly effective, the functional connectivity needs to be measured, which requires knowledge on species-specific migration rates as well as the identification of landscape elements enhancing or inhibiting migration. The latter is unknown for most insect species. Therefore, we studied the effects of landscape composition on migration and gene flow of insect species inhabiting an intensively managed agricultural landscape in the Oberaargau region in Switzerland. We focussed on five study species inhabiting different habitat types: ... [four grasshopper species] ... and a damselfly inhabiting ditches (*Coenagrion mercuriale*). For each of these species landscape elements that facilitated or inhibited migration and gene flow were assessed. Furthermore, we tested whether the reproductive habitat of a species was also the preferred migration habitat and whether this differed between short- and long-distance migration. Several landscape genetic approaches were applied to answer these issues. Transect analysis was used to identify landscape elements that enhance or inhibit gene flow within straight-line transects between pairs of populations. Because straightline transects assume rectilinear migration, we developed a new method, least-cost transect analysis (LCTA), which creates transects around least-cost paths to give a better representation of the landscape that a migrating individual may encounter. LCTA was used to assess most likely migration habitats for short- and long-distance dispersal and simultaneously identify landscape effects on gene flow. For both, the damselfly *C. mercuriale* and the wetland grasshopper *S. grossum*, short-distance migration occurred predominantly within their reproductive habitat. For long-distance dispersal, however, *C. mercuriale* preferred open agricultural landscapes, and *S. grossum* did not show any landscape preferences. This differentiation between short and long-distance dispersal was further analysed making use of population network topologies. With network topologies we discovered that the spatial configuration of populations may have influence on the detectability of a landscape effect on migration and should be considered in landscape genetic analyses. A simulation study is currently being set up to determine to what extent results from landscape genetic techniques are influenced by habitat fragmentation and abundance." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr. 111, CH-8903 Birmensdorf, Switzerland. E-mail: mailto:daniela.keller@wsl.ch

11996. Kerry, L.; Baker, R.A. (2012): The terrestrial mite *Leptus killingtoni* Turk (Acari: Erythraeidae) as a para-

site of the Small Red Damselfly *Ceragrion tenellum* and other odonates. *J. Br. Dragonfly Society* 28(1): 21-26. (in English) [Odonata from three commons on the East Devon Pebblebed Heaths (UK) were checked for mites. *L. killingtoni* was observed on the head, thorax, abdomen and legs of *C. tenellum*, *Pyrrhosoma nymphula*, *Coenagrion mercuriale*, *Orthetrum coerulescens* and *Cordulegaster boltonii*. *C. mercuriale* is a new host record. "The results for *C. tenellum* are - examined 123, infested 39, prevalence (percentage of individuals parasitized) 32%. Of the 56 mites observed, 23 (41%) were found on the legs and smaller numbers on other parts of the body; i.e. 2 (4%) on the head, 13 (23%) on the thorax, 10 (18%) on the abdomen and 6 (11%) on or near the eyes ... The majority of the odonates had only one mite per host." (Authors)] Address: Kerry, L., Mount Pleasant Cottage, Stoneyford, Colaton Raleigh, Sidmouth, Devon, EX10 OHZ, UK

11997. Klass, K.-D.; Matushkina, N.A. (2012): The exoskeleton of the female genitalic region in *Petrobiellus takunagae* (Insecta: Archaeognatha): insect-wide terminology, homologies, and functional interpretations. *Arthropod Structure & Development* 41(6): 575-591. (in English) ["The exoskeleton of the female genitalic region (abdominal venters 7-9) in *Petrobiellus takunagae* (Machilidae-Petrobiellinae) is studied using light microscopy and SEM. Sclerites are distinguished from membrane by the degree of cuticular flexibility. However, the microsculpture of the cuticle is shown to be useful in characterising the heterogeneity of the cuticle and in detecting weak sclerotisations. The morphology of *Petrobiellus* is compared with that in *Trigoniophthalmus alternatus* (Machilidae-Machilinae) described previously. While venter 7 is similar, venters 8 and 9 show many differences in the presence/absence or fusion/separation of particular sclerites. This suggests female genitalic morphology to be a valuable character system for phylogenetic and taxonomic work in Archaeognatha. Comparison with other insect orders is aimed at detecting homologous structures and conditions. Important points are: (1) *Petrobiellus* has a sclerotised genital lobe posteriorly on venter 7, similar to *Zygentoma* and *Dictyoptera*; it bears the gonopore. (2) *Petrobiellus* has a posterior sclerite on venter 9 that is very similar to a sclerite of Odonata. (3) The morphology of the coxal lobes of venter 9 (gonoplacs) suggests their function as a sheath of the ovipositor. From female genitalic morphology we deduce the process of oviposition, describing an external egg transportation tract." (Authors)] Address: Matushkina, Natalia A., Department of Zoology, Biological Faculty, National Taras Shevchenko Univ. of Kyiv, vul. Volodymirs'ka, 64, Kyiv UA-01033, Ukraine. E-mail: odonatally@gmail.com

11998. Koehler, C.; Liang, Z.; Gaston, Z.; Wan, H.; Dong, H. (2012): 3D reconstruction and analysis of wing deformation in free-flying dragonflies. *The Journal of Experimental Biology* 215(17): 3018-3027. (in English) ["Insect wings demonstrate elaborate three-dimensional deformations and kinematics. These deformations are key to understanding many aspects of insect flight including aerodynamics, structural dynamics and control. In this paper, we propose a template-based subdivision surface reconstruction method that is capable of reconstructing the wing deformations and kinematics of free-flying insects based on the output of a high-speed camera system. The reconstruction method makes no rigid wing assumptions and allows for an ar-

bitrary arrangement of marker points on the interior and edges of each wing. The resulting wing surfaces are projected back into image space and compared with expert segmentations to validate reconstruction accuracy. A least squares plane is then proposed as a universal reference to aid in making repeatable measurements of the reconstructed wing deformations. Using *Erythemis simplicicollis* as a demonstration, we quantify and visualize the wing twist and camber in both the chord-wise and span-wise directions, and discuss the implications of the results. In particular, a detailed analysis of the subtle deformation in the dragonfly's right hindwing suggests that the muscles near the wing root could be used to induce chord-wise camber in the portion of the wing nearest the specimen's body. We conclude by proposing a novel technique for modelling wing corrugation in the reconstructed flapping wings. In this method, displacement mapping is used to combine wing surface details measured from static wings with the reconstructed flapping wings, while not requiring any additional information be tracked in the high speed camera output." (Authors)] Address: Koehler, C., Dept of Computer Science and Computer Engineering, Wright State University, Dayton, OH 45435, USA. E-mail: ckoehler.11@gmail.com

11999. Korkeamäki, E.; Metsälä, P.; Parkko, P. (2012): *Isoukonkorenon (Aeshna crenata) elinympäristöt Salpausselän harjaluueella* [Habitat selection of *Aeshna crenata* in the Salpausselkä Ridge area]. *Crenata* 5: 29-33. (in Finnish, with English summary) ["*A. crenata*, is an impressive, but rare, localized and poorly known species in Europe. A total of 45 small ponds and lakes, situated within the Salpausselkä Ridge, north of Kouvola city in south-eastern Finland, were surveyed for populations of *A. crenata* during the period 30 June - 4 September 2011. Adults and exuviae were searched for in sunny weather. *A. crenata* was found in 18 ponds. The 16 other odonate species recorded in these ponds are listed in Table 1. *A. crenata* seems to have rather specialized habitat requirements in the study area. It occurs mainly in small, circular and oligotrophic ponds with slightly swampy shoreline. These ponds - 'suppa pits' - are typical glacial age formations in the Salpausselkä Ridge. Potential threats by the human activity to the populations of *A. crenata* are briefly discussed." (Authors)] Address: Korkeamäki, E., Karkunkatu 18 a 4 b, FIN-48600 Karhula, Finland.

12000. Kosterin, O.E.; Makbun, N.; Dawwrueng, P. (2012): *Burmagomphus asahinai* sp. nov., a new species from Cambodia and Thailand, with a description of the male of *B. graciosus* Chao, 1954. *International Journal of Odonatology* 15(4): 275-292. (in English) ["*Burmagomphus asahinai* sp. nov. (holotype male: Cambodia, Cardamom Mts., Koh Kong Province, Thma Bang District, 6 km SW of its centre, rapids at the Thma Bang River, 25 August 2011, RMNH) is described from Koh Kong Province of Cambodia and Nakhon Nayok, Chiang Mai and Parhuap Khiri Khan Provinces of Thailand and is compared with its nearest congeners. While the mesepisternum pattern is closest to that of *B. graciosus* Chao, 1954, the female head sculpture combines structures found separately in *B. graciosus* and *B. williamsoni* Forster, 1914. A redescription of *B. graciosus*, including the hitherto unknown male, is provided based on a pair from Guizhou Province, China." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences,

Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

12001. Krejčová, A.; Černohorský, T.; Pouzar, M. (2012): O-TOF-ICP-MS analysis of rare earth elements, noble elements, uranium and thorium in river-relating species. *International Journal of Environmental Analytical Chemistry* 92(5): 620-635. (in English) ["The determination of rare earth elements (REEs), Au, Pt, Ir, Pd, Th and U in various river species was performed by the orthogonal time-of-flight inductively coupled plasma mass spectrometry (o-TOF-ICP-MS). The method working conditions were optimised in order to minimise the presence and possible spectral interferences of oxides. Ratios MO⁺/M⁺ as well as interference of light REE and Ba oxides/hydroxides with high REEs were evaluated and confirmed to be insignificant. Using the internal standard Re, non-spectral matrix effects (originally decreasing of intensities up to 15%) were overcome and recoveries were found from 92 to 105% for all matrices analysed. For solutions, limits of detection (3s) were 0.14–0.82 for REEs, Th, U and Y, 1.18 for La, 4.3–5.6 for Au, Pt, Ir and Pd 11 for Sc (all in ng L⁻¹). The Principal component analysis was used for classification of samples according to their places of origin successfully. The o-TOF-ICP-MS was proved to be a very sensitive and suitable technique for bio-monitoring purposes and was employed in the analysis of biota samples (fish, insect, profiles, benthal growths) originated from five different places in the river Elbe (Czech Republic)." (Authors) The study includes four samples of 'Odonata'.] Address: Krejčová, Anna, Department of Environmental and Chemical Engineering, University of Pardubice, Studentská 573, CZ 532 10 Pardubice, Czech Republic. E-mail: anna.krejcov@upce.cz

12002. Kulijer, D.; Baker, R.A.; Zawal, A. (2012): A preliminary report on parasitism of Odonata by water mites from Bosnia and Herzegovina. *J. Br. Dragonfly Society* 28(2): 92-101. (in English) ["The following Odonata, infested with mites, have been collected from a number of sites in Bosnia and Herzegovina - *Aeshna isosceles*, *Sympetrum flaveolum*, *Coenagrion pulchellum*, *C. puella*, *C. scitulum*, *Enallagma cyathigerum*, *Erythromma najas*, *Ischnura elegans*, *I. pumilio*, *Lestes dryas*, *Platycnemis pennipes*, and *Pyrrosoma nymphula*. The preferred site of mite attachment on the body is the posterior ventral surface of the thorax, behind the third pair of legs. In all but one of the species of zygopteran, mites were also found between the first and second pair and/or the second and third pair of legs and, in several species, on the abdomen. Mite loads varied for different species but preliminary results suggest that the larger anisopteran can carry more mites (in *S. flaveolum* mean 42, range 1-91) than the zygopteran, the highest recorded in the latter being in *C. pulchellum* (mean 37, range 1-68) and the lowest in *L. dryas* (mean 4, range 1-11). More mites were found on female damselflies than on males. Three distinct sizes of larval mite have been noted, indicating stages in their engorgement on the host." (Authors)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina

12003. Kumar, C.S.; Nair, R.R.; Sivaramkrishnan, K.G.; Ganesh, D.; Janarthanan, S.; Arunachalam, M.; Sivaranban, T. (2012): Influence of certain forces on evolution of synonymous codon usage bias in certain species of three basal orders of aquatic insects. *Mitochondrial DNA* 23(6): 447-460. (in English) ["Forces that influence

the evolution of synonymous codon usage bias are analyzed in six species of three basal orders of aquatic insects. The rationale behind choosing six species of aquatic insects (three from Ephemeroptera, one from Plecoptera, and two from Odonata) for the present analysis is based on phylogenetic position at the basal clades of the Order Insecta facilitating the understanding of the evolution of codon bias and of factors shaping codon usage patterns in primitive clades of insect lineages and their subtle differences in some of their ecological and environmental requirements in terms of habitat–microhabitat requirements, altitudinal preferences, temperature tolerance ranges, and consequent responses to climate change impacts. The present analysis focuses on open reading frames of the 13 protein-coding genes in the mitochondrial genome of six carefully chosen insect species to get a comprehensive picture of the evolutionary intricacies of codon bias. In all the six species, A and T contents are observed to be significantly higher than G and C, and are used roughly equally. Since transcription hypothesis on codon usage demands A richness and T poorness, it is quite likely that mutation pressure may be the key factor associated with synonymous codon usage (SCU) variations in these species because the mutation hypothesis predicts AT richness and GC poorness in the mitochondrial DNA. Thus, AT-biased mutation pressure seems to be an important factor in framing the SCU variation in all the selected species of aquatic insects, which in turn explains the predominance of A and T ending codons in these species. This study does not find any association between microhabitats and codon usage variations in the mitochondria of selected aquatic insects. However, this study has identified major forces, such as compositional constraints and mutation pressure, which shape patterns of codon usage in mitochondrial genes in the primitive clades of insect lineages." (Authors)] Address: Sivaramakrishnan, K.G., Department of Zoology, Madras Christian College, Tambaram East, Chennai 600 059, Tamil Nadu, India. E-mail: kgskrishnan@gmail.com

12004. Kutsarov, X.; Bechev, D.; Kostadinov, R.; Marinov, M. (2012): The Bulgarian Odonata database – current status, organisation and a case study new entries. *ZooNotes* 33: 1-25. (in English) ["Bulgarian Odonata database is analysed for the period of the last 10 years. All new entries are summarised in individual species graphs representing the trends in data compilations. Special attention is paid on the role of communities in this process with a single study case which is evident of how a small contribution could elucidate important new information on some underexplored areas. It is concluded that for the past 10 years mountain areas and large Bulgarian rivers have been understudied. These should be the priority target areas in the investigations undertaken in near future." (Authors)] Address: Kutsarov, X., 1 Kalimok-Brushlen Ltd., 18 Panteley Kiselov Str., 7600 Tutrakan, Bulgaria. E-mail: kalimok@gmail.com

12005. Kyerematen, R.; Gordon, C. (2012): Aquatic insect fauna of three river systems in the Akyem Abuakwa traditional area of the eastern region of Ghana. *West African Journal of Applied Ecology* 20 (3): 73-82. (in English) ["Three river systems in the Akyem Abuakwa Traditional Area: Ayensu, Birim and Densu were sampled over a period of one year during the wet, dry and intermediate seasons for aquatic insect fauna. Fifteen sampling sites were chosen based on certain parameters such as accessibility as well as the inclusion of

high and low impact sites (i.e. close to or far from a town or village) or near areas with high human activity. and submerged Four sampling methods were employed: sweeping, core sampling, sieving and washing of stones, wood fragments objects as well as aquatic plants and leaves. Fifty seven (57) species of aquatic insects belonging to 26 families of 7 orders were recorded. Hemiptera, Ephemeroptera and Odonata were the most diverse and abundant orders with Hemiptera being the most diverse order with 17 species from 8 families. The most abundant species was *Rhagovelia obesa* (Hemiptera: Veliidae). The highest number of insects was collected in December while July recorded the lowest numbers. River Densu recorded the highest number of insects while River Birim recorded the highest diversity of insects with 36 species. River Ayensu had both the lowest numbers and diversity of insects." (Authors) The Odonata are a mixture from North-American/European and African taxa.] Address: Kyerematen, R., Dept of Animal Biology & Conservation Science, Univ. of Ghana, Legon, Ghana. E-mail: nkyerematen@ug.edu.gh

12006. Lai, G.-J.; Shen, G.-X. (2012): Experimental investigation on the wing-wake interaction at the mid stroke in hovering flight of dragonfly. *Science China. Physics, Mechanics & Astronomy* 55(11): 2167-2178. (in English) ["This paper focuses on flow structures of the wing-wake interaction between the hind wing and the wake of the forewing in hovering flight of a dragonfly since there are arguments whether the wing-wake interaction is useful or not. A mechanical flapping model with two tandem wings is used to study the interaction. In the device, two identical simplified model wings are mounted to the flapping model and they are both scaled up to keep the Reynolds number similar to those of dragonfly in hovering flight since our experiment is conducted in a water tank. The kinetic pattern of *Aeshna juncea* is chosen because of its special interesting asymmetry. A multi-slice phase-locked stereo particle image velocimetry (PIV) system is used to record flow structures around the hind wing at the mid downstroke ($t/T=0.25$) and the mid upstroke ($t/T=0.75$). To make comparison of the flow field between with and without the influence of the wake, flow structures around a single flapping wing (hind wing without the existence of the forewing) at these two stroke phases are also recorded. A local vortex identification scheme called swirling strength is applied to determine the vortices around the wing and they are visualized with the iso-surface of swirling strength. This paper also presents contour lines of ω_z at each spanwise position of the hind wing, the vortex core position of the leading edge vortex (LEV) of hind wing with respect to the upper surface of hind wing, the circulation of the hind wing LEV at each spanwise position and so on. Experimental results show that dimension and strength of the hind wing LEV are impaired at the mid stroke in comparison with the single wing LEV because of the downwash from the forewing. Our results also reveal that a wake vortex from the forewing traverses the upper surface of the hind wing at the mid downstroke and its distance to the upper surface is about 40% of the wing chord length. At the instant, the distance of the hind wing LEV to the upper surface is about 20% of the wing chord length. Thus, there must be a wing-wake interaction mechanism that makes the wake vortex become an additional LEV of the hind wing and it can partly compensate the hind wing for its lift loss caused by the downwash from the forewing. " (Authors)] Address: Shen, G.-X., FFFOM

Laboratory, School of Aeronautic Science and Engineering, Beihang University, Beijing 100191, China. E-mail: gxshen05@yahoo.com.cn

12007. Lambert, J.-L.; Neveu, G.; Millard, R., Genin, C. (2012): Première preuve de Pindigénat d'Ophiogomphus cecilia (Fourcroy, 1785) dans le Jura Franc-Comtois (Odonata, Anisoptera: Gomphidae). *Martinia* 28(1): 47-56. (in French, with English summary) ["O. cecilia is reported from the Hérisson River, a major tributary of the Ain River, Jura mountains, eastern France, 2011. This is the first evidence of the reproduction in the Jura mountains, as previously only a dead imago was known from the mouth of the Loue River in the Doubs River." (Authors)] Address: Lambert, J.-L., Onema, Service départemental de la Marne, F- 51520 La Veuve, France. E-mail: jean-luc.lambert@onema.fr

12008. Land Oberösterreich; Sefciuk, A. (Red.) (2012): Geschützte Tiere in Oberösterreich. 2. Aufl. Hrsg: Land Oberösterreich, Amt der Oö. Landesregierung, Abteilung Naturschutz, 4021 Linz, Bahnhofplatz 1, Austria: 152 pp. (in German) [The book outlines the legal protection of the fauna of the Federal State Oberösterreich, Austria, giving many illustrations of the protected species. All Odonata species are legally protected; on pages 106 and 107 a few examples of species are figured, including *Oxygastra curtisii* which is not occurring in Austria.] Address: <http://www.land-oberoesterreich.gv.at/files/publikationen/ntiere.pdf>;

12009. Larson, M.D. (2012): Diet of the Cascades frog (*Rana cascadae*) as it relates to prey availability in the Klamath Mountains of Northwest California. M. Sc. thesis, Humboldt State University, Natural Resources: Wildlife, California State University Campus, Arcata: 71 pp. (in English) ["Frogs in the family Ranidae are considered generalist predators that consume prey as it is encountered in the environment. However, few studies have attempted to quantify the types and relative amounts of prey available to these frogs so a thorough understanding of their foraging ecology as it relates to prey availability is lacking. This study examined the diet of *R. cascadae* as it relates to prey availability in a Klamath Mountain basin in northern California during their active season of 2007. Based on the analysis of 275 stomach samples, *Rana cascadae* consumed 3052 prey items from 110 invertebrate taxa confirming that this species is a generalist predator. However, an Index of Relative Importance indicated that five prey categories were most important in the diet: Acrididae, Aranae, Formicidae, insect larvae, and Tipulidae. Differences in diet were detected between sexes, life stages, and seasons. Adult females consumed more Acrididae in the summer than males or juveniles. Adult male and juvenile frogs showed selection for insect larvae and Tipulid flies during the summer. In the spring adult females and juveniles also selected Tipulid flies and adult males selected Elaterid beetles. All life-stages and both sexes appeared to avoid very small prey. Shifts in prey use with changes in ontogeny were documented, with frogs consuming more large prey and less small prey as they grew." (Author) Odonata contributed very low to the diet of the species.] Address: Humboldt State University, California State University Campus, 1 Harpst Street, Arcata, CA 95521, USA

12010. Lease, H.M.; Wolf, B.O. (2012): Lipid content of terrestrial arthropods in relation to body size, phylogeny, ontogeny and sex. *Physiological Entomology* 36(1): 29-38. (in English) ["Energy storage in arthropods has

important implications for survival and reproduction. The lipid content of 276 species of adult arthropods with wet mass in the range 0.2–6.13 g is determined to assess how lipid mass scales with body mass. The relative contribution of lipids to total body mass is investigated with respect to phylogeny, ontogeny and sex. The lipid content of adult insects, arachnids, and arthropods in general shows an isometric scaling relationship with respect to body mass (M) (Marthropod lipid = $-1.09 \times M^{dry}$ 1.01 and Marthropod lipid = $-1.00 \times M^{lean}$ 0.98). However, lipid allocation varies between arthropod taxa, as well as with sex and developmental stage within arthropod taxa. Female insects and arachnids generally have higher lipid contents than males, and larval holometabolous insects and juvenile arachnids have higher lipid contents than adults." (Authors) With the exception of Odonata, female insects and arachnids had higher lipid content than males at the level of order. Odonata are treated at family level.] Address: Lease, Hilary, Department of Biology, University of New Mexico, Albuquerque, New Mexico, USA. E-mail: hlease@unm.edu

12011. Lemelin, H.; Williams, G. (2012): Blossoms & butterflies, waterfalls & dragonflies: Integrating insects in the hospitality and tourism industries through swarm supposition. In: Sloan, P., C. Simons-Kaufman & W. Legrand (eds.): Sustainable hospitality as a driver for equitable development. Case studies from developing regions of the world. XXXVII, 450 pp. Taylor & Francis: 198-211. (in English) ["It is now widely agreed that the climate is changing, global resources are diminishing and biodiversity is suffering. These changes pose huge challenges on nations, organizations, businesses, communities and ultimately individuals. Developing countries, many of them considered by the World Tourism Organization to be Top Emerging Tourism Destinations (UNWTO, 2009), are already suffering the full frontal effect of environmental degradation with the UN recently reporting the existence of nearly half a million climate refugees in Africa and Asia in addition to huge swathes of the world's farming land and oceans becoming infertile. The challenge for developing countries is a triple-edged sword, how can economic prosperity be achieved without the perpetual depletion of nature's reserves, the destruction of rural habitat and the dislocation of traditional societies? Many emerging nations are looking increasingly to the tourism industry as the motor for economic development with hospitality businesses at the forefront. In line with this increasing economic necessity is the growth of concern in the West for environmental and societal stewardship. Expectations are high, Western consumers want classy lodgings and unspoilt landscapes in the knowledge that the room maid has enough money to feed and educate her family. This book is designed to give students and practitioners a guide for best practices of sustainable hospitality operations in developing countries. Based on case studies, it provides a road map of how to achieve the goals of sustainability giving benchmark examples. The book not only taps in a contemporary business subject but provides readers with a better understanding on how sustainable theories can be operationalized in hospitality and tourism business practices in developing countries. Provides an enhanced view on sustainability beyond the borders of developed countries Case studies include hands-on activities, creative business practices and applied sustainable development strategies Includes case study questions, advanced reading list and online resource features." (Publisher)] Address: Leme-

lin, H., Lakehead University, School of Outdoor Recreation, Parks and Tourism, 955 Oliver Rd., Thunder Bay, Ontario, P7B 5E1, Canada. E-mail: harvey.lemelin@lakeheadu.ca

12012. Lescak, E.A.; A. von Hippel, F.; Lohman, B.K.; Sherbick, M.L. (2012): Predation of threespine stickleback by dragonfly naiads. *Ecology of Freshwater Fish* 21(4): 581-587. (in English) [Alaska, USA; "Gasterosteus aculeatus populations that have evolved pelvic girdle reduction are most commonly found in lakes with low dissolved ion concentration, a lack of piscivorous fishes and abundant macroinvertebrate predators. Researchers have speculated that macroinvertebrates have a propensity to consume prey with pelvic spines. If this is true, perhaps macroinvertebrates use the stickleback's spines to facilitate capture and manipulation. This study tested whether dragonfly naiads ("Aeshna spp.") differentially prey upon stickleback possessing either a complete or reduced pelvis and documented naiad hunting and capturing behaviour. Results from an arena experiment suggest that naiads do not prey more heavily upon individuals with one pelvic phenotype over the other. However, results from trials where the naiads were presented with one stickleback with pelvic spines and another without suggest that naiads prey more heavily upon small stickleback with pelvic spines and large stickleback without pelvic spines and that they adjust their predatory behaviour based upon the pelvic phenotype of the prey." (Authors)] Address: Lescak, Emily, Department of Biological Sciences, University of Alaska Anchorage, 3211 Providence Dr., Anchorage, AK 99508, USA. E-mail: elescak@alaska.edu

12013. Lewylle, I.; Lambrechts, J.; De Knijf, G. (2012): Verslag van de Workshop Kempense heidelibel in Hasselt van 26/08/2012. Libellenvereniging Vlaanderen — nieuwsbrief 6(2): 2-8. (in Dutch, with English summary) ["A workshop on the Marshland darter *Sympetrum depressiusculum* was held by the Flemish dragonfly association together with Natuurpunt. Main conclusions are that this species is rapidly declining even in its Belgian strongholds (as in the whole of Europe); it is clearly time for a species protection plan including a decent monitoring scheme; the most favourable and adequate management measure is putting ponds temporarily dry, which is complex but feasible, even for volunteers in nature protection." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

12014. Li, C.; Dong, H.; Zhang, W. Gai, K. (2012): Flow modulation and force control in insect fast maneuver. *Bulletin of the American Physical Society* 57(17) [65th Annual Meeting of the APS Division of Fluid Dynamics, Sunday–Tuesday, November 18–20, 2012; San Diego, California]: 1 pp-[Verbatim: "In this work, an integrated study combining high-speed photogrammetry and direct numerical simulation (DNS) is used to study free flying insects in fast maneuver. Quantitative measurement has shown the significant differences between quad-winged flyers such as dragonfly and damselfly and two-winged flyers such as cicada. Comparisons of unsteady 3D vortex formation and associated aerodynamic force production reveal the different mechanisms used by insects in fast turn. This work is supported by NSF CBET-1055949." (Authors)] Address: not stated

12015. Li, Y.; Nel, A.; Ren, D.; Pang, H. (2012): Redescription of the damsel-dragonfly *Parafleckium senjituense* on the basis of a more complete specimen (Odonata: Isophlebioptera: Campterothlebiidae). *Zootaxa* 3597: 53-56. (in English) ["*P. senjituense* Li et al., 2012 is of great importance to clarify the phylogeny of the superfamily Isophlebioidea, as it has several significant structures considered as typical of either Campterothlebiidae or Isophlebiidae (Li et al. 2012). But the established genus and species was based on forewings only. We describe a new specimen, allowing precise description of some other important characters, especially those of the male hindwing. On the basis of this specimen, the diagnosis of *Parafleckium senjituense* is amended." (Authors)] Address: Pang, H., Key Laboratory of Biodiversity Dynamics and Conservation of Guangdong Higher Education Institute, Sun Yat-Sen University, Guangzhou, China. E-mail: lsshypang@mail.sysu.edu.cn

12016. Li, Y.J.; Han, G.; Nel, A.; Ren, D.; Pang, H.; Liu, X.L. (2012): A new fossil petalurid dragonfly (Odonata: Petaluroidea: Aktassiidae) from the Cretaceous of China. *Alcheringa* 36(3): 319-322. (in English) ["*Pseudocymatophlebia boda* n. sp. is described from Lower Cretaceous strata of Inner Mongolia, China. It provides additional morphological characters for this genus, which has been previously recorded from the Lower Cretaceous of England. Together with *Aktassia*, it is the second aktassiid genus with a very wide distribution, even though this family remains known only from Eurasia. Furthermore, a new name, *Brachaktassia* gen. nov., is proposed to replace the brachiopod genus *Aktassia* Popov, 1976." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

12017. Locklin, J.L.; Huckabee, J.S.; Gering, E.J. (2012): Streamlining techniques for rearing large quantities of the damselfly, *Ischnura ramburii* (Odonata: Coenagrionidae) in the laboratory. The Preliminary Program for 97th ESA Annual Meeting (August 5-10, 2012): (in English) [Verbatim: "Background/Question/Methods: Dragonflies and damselflies often served as model organisms for answering a range of ecological and evolutionary questions. Although aquatic naiads and terrestrial adults can be readily collected in the field, laboratory rearing permits researchers to regulate variables during development that are difficult to control in the field. In addition, many laboratory-based experimental designs typically require large sample sizes of genetically-related organisms at the same developmental stage. Several rearing methods have been published for Odonata, but they recommend methods that become laborious when rearing large quantities simultaneously. We reared large numbers (1,000+) of the coenagrionid damselfly, *Ischnura ramburii*, from field-collected adults (N=8) that were mated in the lab through emergence of their offspring while streamlining some previously published recommendations. We also estimated the duration of naiad survivorship in the lab without food by starving a subset of naiads (N=170). Results/Conclusions: Of the eight mated females, 157± 33.9 naiads female-1 were produced. 66.4% of the naiads successfully emerged as adults with males and females emerging a median of 75 and 77 days, respectively, after hatching. Much naiad mortality (23%) occurred during emergence when they failed to locate emergence substrates and drowned. Naiads survived a mean of 14.2 days without food, demonstrating that naiads can be maintained in the lab with infrequent feedings. We found that several previously published rearing recom-

mendations for small damselfly cultures can be modified to improve rearing efficiency. Culturing large quantities of damselfly in the lab is manageable and broadens the experimental designs of many diverse research avenues." Address: Locklin, J.L., Dept of Biology, Temple College, 2600 South First St., Temple, TX 76504, USA. E-mail: jason.locklin@templejc.edu

12018. Logan, J.D.; Janovy Jr., J.; Bunker, B.E. (2012): The life cycle and fitness domain of gregarine (Apicomplexa) parasites. *Ecological Modelling* 233: 31-40. (in English) ["Theoretical demographic models with accompanying experimental programs provide an important framework to study the life history of organisms. In this paper we examine the fitness characteristics of gregarine parasites (Apicomplexa) and how these evolutionary long-lived parasites are shaped by their own life cycle stages inside and outside a definitive insect host. Although gregarines have been investigated in experimental works, their fitness and population characteristics have not been subject to modeling efforts to help understand their longevity or interactions with their host species. We develop a dynamic, mechanistic population model represented by a system of two differential equations for two of the parasite stages: the mature parasite, or trophont, inside a definitive insect host, and the infectious oocyst stage in the water environment of the host. In contrast to many classical macroparasite models, the force of infection between oocysts and hosts is of sigmoid type. Inside the host, production of the water borne infectious state is modeled by linear production rate in the trophont population with a density-independent trophont mortality. We examine stability of model's equilibria for different parameter values and different host populations. This leads to the definition of a fitness parameter that acts as a bifurcation parameter for the model. The model shows good cause for the establishment and long-time persistence of this common, widespread parasite. It is parameterized by extensive data gathered at Cedar Point Biological Station, and numerical calculations based on those parameters illustrate the dynamics. Possible applications include parasite control in aquacultures." (Authors) The paper includes a few references to Odonata.] Address: Logan, J.D., Department of Mathematics, University of Nebraska Lincoln, Lincoln, NE 68588-0130, United States. E-mail: dlogan@math.unl.edu

12019. Ma, L.; Gu, W.; Wang, L.; Zhang, C.; Ding, X.; Meng, Q. (2012): Insect community niche in the Zhalong wetland. *Scientia silvae sinicae* 48(5): 81-87. (in Chinese, with English summary) ["The Zhalong wetland nature reserve (46°40'—47°20'N, 123°59'—124°40'E), situated in the west of Heilongjiang Province of China, is the largest and the most important *Grus japonensis* wetland nature reserve in China, providing indispensable livelihood for the red-crowned crane as well as a temporary habitat for the migrating birds in severe danger such as *Grus leucogeranus*, *Ciconia nigra*, *Cygnus cygnus*, *Anser albifrons* and *Ciconia boyciana*. In this paper, the niche and competition among species of insect community in different habitat in Zhalong wetland were studied. The results showed that there were obvious niche overlaps and competitions in different species which used the same resources. Space niche breadth index of main groups were similar, the same as time niche breadth index. Niche similarity coefficient of insect community indicated that the difference between each group was not big. Spider groups were important regu-

lators in the Zhalong wetland insect ecological system. But Orthoptera and Coleoptera, Odonata group space niches were not significantly overlapped. Spider groups mainly affected Orthoptera, but hardly affected other groups of predatory. This study indicates that some measures should be implemented in the habitat when the number of Orthoptera individual is very big to maintain a balance relationship between insect groups." (Authors) Taxa are treated at order level.] Address: Ma, L., Forestry School, Northeast Forestry University Harbin 150040, China

12020. Machado, A.B.M. (2012): *Carajathemis simone*, new genus and species from Brazil (Odonata: Libellulidae). *Anais da Academia Brasileira de Ciências* 84(4): 1039-1049. (in English, with Portuguese summary) ["*Carajathemis simone* n. gen., n.sp. from the state of Pará, Brazil, is described and illustrated based on 22 specimens collected in a "canga" (laterite) lake within the forest at the Flona de Carajás, Parauapebas Municipality. The new libellulid genus fits in the subfamily Sympetrinae and the male keys out to *Erythemis* in Garrison et al. (2006). The new taxon has a combination of characters that makes it different from all genera of Sympetrinae including *Erythemis*. The species is remarkable by its large size, pleural striping and especially by the complex and strongly dimorphic leg armature. It seems to be restricted to shallow, rainfall-dependent, iron-rich lakes." (Author)] Address: Machado, A.B.M., Depto de Zoologia, Inst. Cienc, Biol., Univ. Federales de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

12021. Manwar, N.A.; Rathod, P.P.; Raja, I.A. (2012): Diversity and abundance of dragonflies and damselflies of Chatri Lake region, in Pohara – Malkhed Reserve Forest, Amravati, Maharashtra (India). *International Journal of Engineering Research and Applications* (IJERA) 2(5): 521-523. (in English) [22 Odonata species are documented.] Address: Manwar, N.A., Shri Shivaji College of Arts, Commerce and Science, Akola - 444001, India

12022. Marinov, M. (2012): Odonata from the Kingdom of Tonga, with description of *Pseudagrion microcephalum* stainbergerorum ssp. nov. (Zygoptera: Coenagrionidae). *Odonatologica* 41(3): 225-243. (in English) ["The Odonate fauna from the Kingdom of Tonga have been reviewed using published literature combined with recent data by the author. Some important taxonomic considerations are discussed and a complete reference list is provided. A species checklist is presented with a total of sixteen taxa so far known for the island groups within the country. Seven new species for the Kingdom of Tonga are reported here including *P. m. stainbergerorum* ssp. nov. (holotype ♂: Tonga, Tongatapu Island, 26-IV-2010). The new subspecies is compared with its closest relatives known from elsewhere in the Pacific, their relationships briefly discussed, and suggestions for future studies given." (Author)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

12023. Marinov, M.G. (2012): Description of the larva of *Trineuragrion percostale* Ris (Odonata: Megapodagrionidae) with a key to the larvae of New Caledonian genera of Megapodagrionidae. *International Journal of Odonatology* 15(3): 241-248. (in English) ["The larva of *T. percostale* is described and illustrated based on an exuvia collected with the teneral female. Four more ex-

uviae sampled without imagines are added for comparison and discussion of morphological variations. This is the first time the larva has been associated with the correct species, although the larval description was given earlier. Lieftinck included it in his analysis of New Caledonian Odonata larval fauna under the name *Caledargiolestes uniseriatus* (by supposition). Variations in the morphological features between Lieftinck's specimens and those reported here are discussed. The key morphological features that differentiate larva of *T. percostata* from other Megapodagrionidae in the country are indicated." (Author) Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

12024. Marković, V.; Atanacković, A.; Tubić, B.; Vasiljević, B.; Kračun, M.; Tomović, J.; Nikolić, V.; Paunović, M. (2012): Indicative status assessment of the Danube River (Iron Gate sector 849 - 1,077 rkm) based on the aquatic macroinvertebrates. *Water Research and Management* 2(2): 41-46. [Along the Danube River in the Iron Gate Region (rkm 849 to 1077), a total of 61 macroinvertebrate taxa were recorded. Odonata taxa included *Aeshna mixta*, *Ischnura elegans*, *I. pumilio*, *Pyrhosoma nymphula* and *Sympetrum fonscolombii*.] Address: Marković, Vanja, University of Belgrade, Institute for Biological Research "Siniša Stanković", Despota Stefana 142, 11000 Belgrade, Serbia. E-mail: vanjam@ibiss.bg.ac.rs

12025. Martens, A.; Petzold, F.; Mayer, J. (2012): Die Verbreitung der an Libellen parasitierenden Gnitze *Forcipomyia paludis* in Deutschland (Odonata; Diptera: Ceratopogonidae). *Libellula* 31(1/2): 15-24. (in German, with English summary) ["An overview of the known records in Germany is given. So far, there are 34 localities known. One main group of records is situated in the central part of the North European Plain, another in the northern foothills of the Alps. It is suggested that a useful approach for gathering further information is to check odonate photographs. Special attention should be drawn to oval brownish spots on odonate wings." (Authors)] Address: Martens, A., Biologie, Pädagogische Hochschule Karlsruhe, Bismarckstraße 10, D-76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de

12026. Martens, A.; Günther, A.; Suhling, F. (2012): Diversity in mate-guarding types within the genus *Anax* (Odonata: Aeshnidae). *Libellula* Supplement 12: 113-122. (in English, with German summary) ["Observations of non-contact guarding in *Anax guttatus*, *A. immaculifrons*, *A. indicus*, and *A. speratus* are reported. In all four species males were observed following their mate and hovering above her intensively during oviposition. As a result, the genus shows a high diversity in mate-guarding types, including contact-guarding (i.e., tandem oviposition), noncontact guarding and unguarded oviposition. A review on mate-guarding known to occur in the genus *Anax* worldwide is also provided." (Authors)] Address: Martens, A., Biologie, Pädagogische Hochschule Karlsruhe, Bismarckstraße 10, D-76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de

12027. Matuszak, A.; Mörtl, M.; Quillfeldt, P.; Bauer, H.-G. (2012): Exclosure study on the exploitation of macrophytes by summering and moulting waterbirds at Lower Lake Constance. *Hydrobiologia* 697: 31-44. (in English) ["Owing to synchronous moult, most waterbird species are constrained by flightlessness and limited mobility for several weeks. As new feather production is

energy demanding, these birds need to choose a safe moulting site with appropriate food supply. Up to 20,000 waterbirds carry out moult at Lake Constance, gathering at sites where they find food close to safe hiding places from predators and human-caused disturbance. In this study, we focused on the food supply at one prominent moulting site, Mettnau Südbucht, at Lower Lake Constance. We aimed to determine the food items and quantity as well as their utilization by summering and moulting waterbirds. We conducted experiments with exclosure cages which protected macrophytes from bird grazing and compared these sites with unprotected grazed sites. In these experiments, we found that the summering and moulting waterbird community, dominated by Eurasian Coots (*Fulica atra* Linnaeus), caused a significant decline of the macrophyte biomass at 1.5-m depth (MWL), where they were responsible for a loss of over 40% of the total charophyte biomass. No grazing effect was found at a greater depth (2-m MWL). The available food consisted mostly of *Chara* spp. with a biomass density of about 350 g m². Animal food items were negligible: Macroinvertebrates, mainly *Asellus aquaticus* Linnaeus, that were associated with the macrophytes, made up only 2% of total biomass, and were very unevenly distributed." (Authors) Odonata are treated at suborder level.] Address: Matuszak, Anja, Max Planck Institute for Ornithology, Am Obstberg 1, 78315 Radolfzell, Germany. E-mail: matuszak@orn.mpg.de

12028. McCoy, M.W.; Touchon, J.C.; Landberg, T.; Warkeintin, K.M.; Vonesh, J.R. (2012): Prey responses to predator chemical cues: Disentangling the importance of the number and biomass of prey consumed. *PLoS ONE* 7(10): e47495. doi:10.1371/journal.pone.0047495: 5 pp. (in English) ["To effectively balance investment in predator defenses versus other traits, organisms must accurately assess predation risk. Chemical cues caused by predation events are indicators of risk for prey in a wide variety of systems, but the relationship between how prey perceive risk in relation to the amount of prey consumed by predators is poorly understood. While per capita predation rate is often used as the metric of relative risk, studies aimed at quantifying predator-induced defenses commonly control biomass of prey consumed as the metric of risk. However, biomass consumed can change by altering either the number or size of prey consumed. In this study we determine whether phenotypic plasticity to predator chemical cues depends upon prey biomass consumed, prey number consumed, or both. We examine the growth response of red-eyed treefrog tadpoles (*Agalychnis callidryas*) to cues from a larval dragonfly (*Anax amazili*). Biomass consumed was manipulated by either increasing the number of prey while holding individual prey size constant, or by holding the number of prey constant and varying individual prey size. We address two questions. (i) Do prey reduce growth rate in response to chemical cues in a dose dependent manner? (ii) Does the magnitude of the response depend on whether prey consumption increases via number or size of prey? We find that the phenotypic response of prey is an asymptotic function of prey biomass consumed. However, the asymptotic response is higher when more prey are consumed. Our findings have important implications for evaluating past studies and how future experiments should be designed. A stronger response to predation cues generated by more individual prey deaths is consistent with models that predict prey sensitivity to per capita risk, providing a more direct link between empirical and the-

oretical studies which are often focused on changes in population sizes not individual biomass." (Authors)] Address: McCoy, M.W., Department of Biology, East Carolina University, Greenville, North Carolina, USA. E-mail: mccoym@ecu.edu

12029. Meadows, A.J.; Owen, J.P.; Snyder, W.E. (2012): Complex predator effects on larval mosquitoes. The Preliminary Program for 97th ESA Annual Meeting (August 5 -- 10, 2012): [Verbatim: "The study of interactions among medically important mosquitoes and their predators has the potential to offer insight into patterns of population and disease outbreaks as well as control methods. The effects of predators on mosquitoes can be particularly complex: predators impact mosquitoes both by killing them, and by inciting predator-avoidance behaviors that carry energetic costs for those mosquitoes that avoid being killed. Here, we investigate the effects of a predator, *Erythemis simplicicollis* on varying densities of larval *Culex quinquefasciatus* (Diptera: Culicidae). First in laboratory microcosms and later in the field, we examined both mosquito survivorship and whether any non-lethal effects of predator exposure carry over to affect the size of adult mosquito. Survivorship from the larval to adult stage was measured along with wing length of adults. Results/Conclusions: We found, at most densities, dragonflies were successful in reducing survivorship of mosquito larvae as well as reducing wing length compared with no-predator controls. These data suggest larval predators can ultimately help regulate adult mosquito populations, both by reducing overall densities of mosquito adults and by reducing the robustness of those mosquitoes that evade predation. Ongoing field studies are examining how predator-community structure impacts mosquitoes through both lethal and non-lethal channels."] Address: Entomology, Washington State University, Pullman, WA, USA

12030. Melfi, J.; Lin, H.-t.; Mischiati, M.; Leonardo, A.; Wang, Z.J. (2012): Quantifying dragonfly kinematics during unsteady free-flight. *Bulletin of the American Physical Society* 57(17) [65th Annual Meeting of the APS Division of Fluid Dynamics, Sunday–Tuesday, November 18–20, 2012; San Diego, California]: 1 pp. (in English) [Verbatim: What make dragonflies such interesting fliers are the unsteady high-speed aerial maneuvers they perform. Until recently, the study of dragonflies in mid-flight has been limited to steady-state motions such as hovering and forward flight. In this talk, we report our kinematic analyses of the dragonfly flight recorded in a custom dragonfly arena at HHMI, Janelia Farm. Dragonfly's turning motions often involve all three degrees of freedom about its body axes: yaw, roll, and pitch. We examine the wing kinematics changes associated with different turning maneuvers, and seek the key variables in the wing kinematics that are responsible for each specific maneuver.] Address: Wang, Z. Jane, Theoretical and Applied Mechanics, Cornell University, Ithaca, NY 14853, USA. E-mail: jane.wang@cornell.edu

12031. Melters, D.P.; Paliulis, L.V.; Korf, I.F.; Chan, S.W.L. (2012): Holocentric chromosomes: convergent evolution, meiotic adaptations, and genomic analysis. *Chromosome Research* 20: 579-593. (in English) ["In most eukaryotes, the kinetochore protein complex assembles at a single locus termed the centromere to attach chromosomes to spindle microtubules. Holocentric chromosomes have the unusual property of attaching to spindle microtubules along their entire length. Our mechanistic understanding of holocentric chromosome func-

tion is derived largely from studies in the nematode *Caenorhabditis elegans*, but holocentric chromosomes are found over a broad range of animal and plant species. In this review, we describe how holocentricity may be identified through cytological and molecular methods. By surveying the diversity of organisms with holocentric chromosomes, we estimate that the trait has arisen at least 13 independent times (four times in plants and at least nine times in animals). Holocentric chromosomes have inherent problems in meiosis because bivalents can attach to spindles in a random fashion. Interestingly, there are several solutions that have evolved to allow accurate meiotic segregation of holocentric chromosomes. Lastly, we describe how extensive genome sequencing and experiments in nonmodel organisms may allow holocentric chromosomes to shed light on general principles of chromosome segregation."(Authors) The study includes references to 'Odonata'.] Address: Chan, S.W.L., Howard Hughes Medical Institute, Chevy Chase, MD, USA. E-mail: srchan@ucdavis.edu

12032. Meurgey, F.; Poiron, C. (2012): An updated checklist of Lesser Antillean Odonata. *International Journal of Odonatology* 15(4): 305-316. (in English) ["An updated checklist of known Odonata occurring in the Lesser Antilles is presented along with distributional information island by island. Twelve species are removed from previous listings and 16 new records are added, bringing the total number of species to 46. Of the new records, three correspond to the descriptions of new species and one is currently under taxonomic revision (*Brechmorhoga praecox grenadensis* Kirby)." (Authors)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

12033. Michailova, P.; Warchalowska-Sliwa, E.; Szarek-Gwiazda, E.; Kownacki, A. (2012): Does biodiversity of macroinvertebrates and genome response of Chironomidae larvae (Diptera) reflect heavy metal pollution in a small pond? *Environmental monitoring and assessment* 184(1): 1-14. (in English) ["The investigation was carried out on a small pond situated on a recent mine spoil at Boleslaw in the Olkusz region with Zn–Pb ore deposits. Water of the pond had pH 7.2–8.5 and low concentrations of heavy metals. Concentrations of Pb ($487 \mu\text{g g}^{-1}$) and Zn ($1,991 \mu\text{g g}^{-1}$) in the sediment were very high and potentially could lead to toxicological effects. In the pond, 48 taxa of macroinvertebrates belonging to Oligochaeta and water stages of Ephemeroptera, Odonata, Megaloptera, Trichoptera, Heteroptera, Coleoptera and Diptera (mainly Chironomidae family) were found. The influence of heavy metals on macroinvertebrates diversity was not found. Effect of heavy metal pollution was observed on the appearance of chromosome aberrations in the polytene chromosomes of Chironomidae larvae. It was manifested by two ways: (1) in *Kiefferulus tendipediformis* and *Chironomus* sp. chromosome rearrangements in fixed state (tandem fusion and homozygous inversions), indicated intensive process of speciation; (2) in *Chironomus* sp., *K. tendipediformis*, *Glyptotendipes gripekoveni* (Chironomidae) somatic chromosome rearrangements (inversions, deficiencies, specific puffs, polyploidy) affected few cells of every individual. The somatic functional and structural alterations in Chironomidae species are particularly suitable as biomarkers—they can be easily identified and used for detecting toxic agents in the environment." (Authors)] Address: Michailova, Paraskeva,

Institute of Zoology, Bulgarian Academy of Sciences, 1 Tzar Osvoboditel boulv, Sofia, Bulgaria. E-mail: michailova@zoology.bas.bg

12034. Michalski, J.; Richards, S.; Theischinger, G. (2012): An interesting new species of *Nososticta* Hagen from southern New Guinea (Odonata, Disparoneuridae). *Zootaxa* 3590: 73-78. (in English) ["*Nososticta acuminata*, a new disparoneurid damselfly from the Lakekamu Basin in Gulf Province of Papua New Guinea, is described. It is most similar to *N. smilodon* Theischinger & Richards, but the male has uniquely pointed superior anal appendages." (Authors)] Address: Michalski, J., 1223 Mount Kemble Avenue, Morristown New Jersey 07960, USA. E-mail: huonia@aol.com

12035. Mirrasouli, E.; Ghorbani, R. (2012): The biological assessment of the Zaringol stream using the structure of benthic macroinvertebrates (Golestan Province). *Journal of Fisheries* 64(4): 357-369. ["This study was conducted to assess water quality level of Zarin Gol stream on macrobenthic invertebrates. Macrobenthic fauna were sampled from 9 selected sampling stations along the stream with an average distance of 22 km by using a Surber sampler every 45 days during the year. Sampling was replicated 9 times in each sampling station. Collected samples were fixed with 4% formalin, isolated, and then identified. The number of total abundance of macrobenthic fauna were counted to 2749.021 ± 1301.8 (ind/m²) belonging to 15 orders and 81 groups (families and genus). The minimum and maximum of total abundance (ind/m²) was at station 1 (370.63 ± 231.1) and at station 5 (215. 73 ± 101.75), respectively. The main orders of macro benthic invertebrate communities in Zaringol stream included Diptera, Ephemeroptera, Trichoptera, Plecoptera, Oligocheta, Odonata and Amphipoda. Population structure of macro benthic invertebrates were analyzed by biotic Indices and the results showed significant differences in EPT and EPT/CHIR indices at different sampling stations (p<0.05). Hilsenhoff and Shannon diversity indices indicated no significant differences (p>0.05) along the stream. Evaluation of indicators revealed less water quality at stations 2 and 5 where located at the lowermost of fish farms. This reduction might be implicated to the effluents of water dams from fish farms running into the stream as diversity and total abundance (%) of succible macro-invertebrates decreased and that of resistant macrofauna increased due to water pollution. Hence, from the obtained results, this can be concluded that the use of benthic macro-invertebrates as bioindicator for the assessment of water quality of the stream is desirable."(Authors)] Address: E-mail: elhammirasooli@yahoo.com

12036. Mlynarek, J.J.; Hassall, C., Forbes, M.R. (2012): Higher gregarine parasitism often in sibling species of host damselflies with smaller geographical distributions. *Ecological Entomology* 37: 419-425. (in English) ["(1.) This study investigated inter-specific variation in parasitism by gregarines (Eugregarinorida: Actinocephalidae), among sibling species of Zygoptera, in relation to relative size of geographical ranges of host species. (2.) Gregarines are considered generalist parasites, particularly for taxonomically related host species collected at the same sites or area. Prevalence and median intensity of gregarine parasitism was obtained for 1338 adult damselflies, representing 14 species (7 sibling species pairs) across 3 families within the suborder Zygoptera. Damselflies were collected at three local sites in South-

eastern Ontario, during the same periods over the season. (3.) Five out of seven species pairs had significant differences in parasitism between sibling species. The less widespread host species was the more parasitised for three species pairs with significant differences in gregarine prevalence, and for two species pairs with differences in median intensity. The more widespread host had a higher intensity of infection as expected, in two species pairs. (4.) Future studies on ecological determinants of parasitism among related species should examine robust measures of abundance of species and representation of species regionally." (Authors)] Address: Forbes, M.R., Department of Biology, Carleton University, 209 Nesbitt Building, 1125 Colonel By Drive, Ottawa K1S 5B6, Canada. E-mail: mforbes6@gmail.com

12037. Mogali, S.M.; Saidapur, S.K.; Shanbhag, B.A. (2012): Tadpoles of the bronze frog (*Rana temporalis*) assess predation risk before evoking antipredator defense behavior. *Journal of ethology* 30(3): 379-386. (in English) ["Predation threat-associated behavioral response was studied in *R. temporalis* tadpoles to discover the importance of predators' visual and chemical cues (kairomones and diet-derived metabolites of consumed prey) in evoking antipredator behavior. The caged predators (dragonfly larvae) fed on prey tadpoles or insects (*Notonecta* spp.) and water conditioned with the predators provided the threat stimuli to the tadpole prey. The predators' visual cues were ineffective in evoking antipredator behaviors in the tadpole prey. However, exposure to caged tadpole-fed predators or water conditioned with tadpole-fed predators elicited predator avoidance behavior in the tadpoles; they stayed away from the predators, significantly reduced swimming activity (swimming time and distance traveled), and increased burst speed. Interestingly, exposure to water conditioned with starved predators did not elicit any antipredator behavior in the prey. Further, the antipredator responses of predator-experienced tadpoles were significantly greater than those exhibited by predator-naïve tadpoles. The study shows that *R. temporalis* tadpoles assess predation threat based exclusively on chemical cues emanating from the predators' dietary metabolites and that the inclusion of conspecific prey items in the diet of the predators is perceived as a threat. The study also shows that antipredator behavior in these tadpoles is innate and is enhanced during subsequent encounters with the predators." (Authors)] Address: Mogali, S.M., Department of Zoology, Karnatak University, Dharwad, 580 003, India

12038. Mollah, M.M.I.; Rahman, M.M. (2012): Abundance of predators in country bean field during summer season. *International Journal of Biosciences* 2(9): 65-70. (in English) [Arthropods are studied in an experimental field of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, Bangladesh during March to June 2009. "Damsel fly" contributed with 2.16 % to the predatory arthropods.] Address: Mollah, M.M.I., Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, Bangladesh. E-mail: mahimam@yahoo.com

12039. Müller, J. (2012): Rückenwind für Libelle. Einst rare Arten tauchen in der Pfalz häufiger auf. *Die Rheinpfalz* 130 vom 6. Juni 2012: (in German) [Report in a German newspaper on increasing records of *Leucorhinia pectoralis*, activities of regional odonatologists mapping Odonata and the work of Dr. J. Ott to coordinate the current activities in updating the German Red List of threatened Odonata.] Address: not stated

12040. Müller, R. (2012): Gefährdete Libellen im Gartenteich - ein Ausnahmegewässer in Berlin (Odonata). *Märkische Entomologische Nachrichten* 14(1): 201-204. (in German, with English summary) [At a temporary garden pond in Berlin-Lichtenberg, Germany, among other species the rare habitat specialist *Aeshna affinis*, *Ischnura pumilio*, *Lestes barbarus*, *L. dryas*, *Sympetrum danae* and *S. flaveolum* were observed.] Address: Müller, M., Augustastr. 2, 12203 Berlin, Germany. E-mail: hydrobiologie@t-online.de

12041. Mukherjee, S.; Ganguli, R. (2012): Nonlinear dynamic analysis of dragonfly inspired piezoelectric unimorph actuated flapping and twisting wing. *International Journal of Smart and Nano Materials* 3(2): 103-122. (in English) ["The nonlinear equations for coupled elastic flapping-twisting motion of a dragonfly-inspired smart flapping wing are used for a flapping wing actuated from the root by a PZT unimorph in the piezofan configuration. Excitation by the piezoelectric harmonic force generates only the flap bending motion, which, in turn, induces the elastic twist motion due to interaction between flexural and torsional vibration modes. An unsteady aerodynamic model is used to obtain the aerodynamic forces. Numerical simulations are performed using a wing whose size is the same as the dragonfly *Sympetrum frequens* wing. It is found that the value of average lift reaches its maximum when the smart flapping wing is excited at a frequency closer to the natural frequency in torsion. Moreover, consideration of the elastic twisting of the flapping wing leads to an increase in the lift force. It is also found that the flapping wing generates sufficient lift to support its own weight and carry a small payload. Therefore, the piezoelectrically actuated smart flapping wing based on the geometry of a *Sympetrum frequens* wing and undergoing flapping-twisting motions can be considered as a potential candidate for use in micro air vehicle applications." (Authors)] Address: Ganguli, R., Department of Aerospace Engineering, Indian Institute of Science, Bangalore-560012, India. E-mail: ganguli@aero.iisc.ernet.in

12042. Mukherjee, S.; Ganguli, R. (2012): A comparative study of dragonfly inspired flapping wings actuated by single crystal piezoceramic. *Smart structures and systems* 10(1): 67-87. (in English) ["A dragonfly inspired flapping wing is investigated in this paper. The flapping wing is actuated from the root by a PZT-5H and PZT-7%PT single crystal unimorph in the piezofan configuration. The nonlinear governing equations of motion of the smart flapping wing are obtained using the Hamilton's principle. These equations are then discretized using the Galerkin method and solved using the method of multiple scales. Dynamic characteristics of smart flapping wings having the same size as the actual wings of three different dragonfly species *Aeshna multicolor*, *Anax parthenope julius* and *Sympetrum frequens* are analyzed using numerical simulations. An unsteady aerodynamic model is used to obtain the aerodynamic forces. Finally, a comparative study of performances of three piezoelectrically actuated flapping wings is performed. The numerical results in this paper show that use of PZT-7%PT single crystal piezoceramic can lead to considerable amount of wing weight reduction and increase of lift and thrust force compared to PZT-5H material. It is also shown that dragonfly inspired smart flapping wings actuated by single crystal piezoceramic are a viable contender for insect scale flapping wing micro air vehicles." (Authors)] Address: Ganguli, R., Dept of Aerospace Engineering, Indi-

an Institute of Science, Bangalore-560012, India. E-mail: ganguli@aero.iisc.ernet.in

12043. Nava-Bolaños, A.; Córdoba-Aguilar, A.; Munguía-Steyer, R. (2012): A test of genital allometry using two damselfly species does not produce hypoallometric patterns. *Ethology* 118(2): 203-213. (in English) ["It is widely admitted that sexual selection is the responsible force behind genital traits. However, the particular mechanisms of genital evolution are still debated. Recently, studies of genital static allometry in insects have been used to elucidate such mechanisms. Insect genital traits are often reported to show negative allometry (i.e., a slope < 1), which has generated a number of ideas on how genital traits are selected. However, many studies that have inferred selection mechanisms have omitted consideration of the function of genital traits, used unreliable indicators of body size, and only rarely included female genitalia in their analysis. We investigated whether negative allometry operates for genitalia in *Protoneura cara* and *Ischnura denticollis*. Damselflies are suitable for genital allometry tests as their genital function and body size indicators (wing length and head width) are relatively well known and established. First, we show that the aedeagus is used to physically remove sperm from both sperm storage organs (bursa and spermatheca) and that wing length and head width correlate positively with other morphological traits for the two study species. Second, we estimated genital allometry by measuring aedeagal length, vaginal length, bursal volume, and spermathecal volume. Our results indicate no consistent allometric pattern. Allometry for aedeagal length and vaginal width was not the same. Thus, there was no support for a negative allometric relationship. We urge researchers investigating allometry to look directly at how genitalia function rather than inferring function from allometric relationships only." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, Mexico, D. F., Mexico. E-mail: acordoba@ecologia.unam.mx

12044. Nel, A.; Fleck, G. (2012): A new genus and species of Sieblosiidae from the Middle Miocene of Germany (Odonata: Epiproctophora). *Zootaxa* 3582: 64-68. (in English) ["*Germanostenolestes lutzi*, new genus and species of Sieblosiidae is described from the Middle Miocene of Öhningen (Germany). It probably belongs to the clade (Paraoligolestes + (Parastenolestes (Germanolestes + Stenolestes))) sensu Nel et al. (2005). It is the third representative of the Sieblosiidae described from this outcrop, showing that this family was still quite diverse in the Middle-Late Miocene." (Authors)] Address: Fleck, G., CNRS UMR 7205, Muséum National d'Histoire Naturelle, CP 50, Entomologie, 57 Rue Cuvier, F- 75231 Paris, France. E-mail: fleckgunther@gmail.com

12045. Nishiyama, Y. (2012): Miura folding: Applying origami to space exploration. *International Journal of Pure and Applied Mathematics* 79(2): 269-279. (in English) ["Miura folding is famous all over the world. It is an element of the ancient Japanese tradition of origami and reaches as far as astronomical engineering through the construction of solar panels. This article explains how to achieve the Miura folding, and describes its application to maps. The author also suggests in this context that nature may abhor the right angle, according to observation of the wing base of a dragonfly." (Author)] Address: Nishiyama, Y., Department of Business Infor-

mation, Faculty of Information Management, Osaka University of Economics 2, Osumi Higashiyodogawa Osaka, 533-8533, Japan

12046. Novelo-Gutiérrez, R. (2012): The larva of *Libellula foliata* (Kirby, 1889) (Odonata: Libellulidae). *Organisms diversity & evolution* 12(3): 307-311. (in English) ["The larva of *L. foliata* is described based upon mature larvae from the Biosphere Reserve of "El Triunfo" in the state of Chiapas. It belongs to the small group of species without dorsal protuberances, *L. composita* (Hagen), *L. comanche* Calvert and *L. saturata* Uhler. The following combination of characters permits the separation of *L. foliata* larva from the other aforementioned larvae: tergites 6–10 uniformly colored, no lateral spines on segments 8–9, 5–6 palpal setae and 3 long premental setae. After this finding, only the larvae of *Libellula gagei* Gloyd and *L. nodisticta* Hagen remain undiscovered for the Mexican species of *Libellula*." (Author)] Address: Novelo-Gutiérrez, R., Depto de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

12047. Odume, O.N.; Muller, W.J.; Arimoro, F.O.; Palmer, C.G. (2012): The impact of water quality deterioration on macroinvertebrate communities in the Swartkops River, South Africa: a multimetric approach. *Journal of Aquatic Science* 37(2): 191-200. (in English) ["A multimetric approach, using 21 metrics representing five categories — abundance, composition, richness, diversity and biotic indices — was applied to investigate the impacts of water quality deterioration on macro-invertebrate communities in the Swartkops River. Macroinvertebrates were sampled seasonally between August 2009 and July 2010 using the South African Scoring System version 5 (SASS5) protocol at one reference site upstream of Uitenhage and three downstream sites. Assessment of water quality impacts on macroinvertebrates was based on the discriminatory ability of metrics between the reference and impaired sites, and on their correlation with the physico-chemical variables. The metrics' discriminatory ability was explored using box plots, and their relationships with water chemistry variables elucidated with Pearson's correlation. Trichoptera abundance, %Chironomidae + Oligochaeta, %Ephemeroptera–Trichoptera–Odonata–Coleoptera (ETOC), %Trichoptera, Ephemeroptera–Plecoptera–Trichoptera (EPT) richness, ETOC richness, Margalef's family richness index, equitability, Shannon and Simpson diversity indices, SASS5 score and average score per taxon (ASPT) discriminated between the reference and impacted sites, and also exhibited significant correlations ($p < 0.05$) with water chemistry variables. Conversely, Gastropoda abundance, EPT abundance, ETOC abundance, EPT:Chironomidae ratio, %EPT, %Corixidae, %Oligochaeta + Hirudinae, Chironomidae + Oligochaeta abundance and Hemiptera + Diptera richness did not discriminate between the reference and impacted sites." (Authors)] Address: Odume, O.N., Unilever Centre for Environmental Water Quality, Institute for Water Research, Rhodes University, PO Box 94, Grahamstown, 6140, South Africa

12048. Ott, J. (2012): Zum starken Auftreten der Großen Moosjungfer – *Leucorrhinia pectoralis* (CHARPENTIER, 1825) – im Jahr 2012 in Rheinland-Pfalz nebst Bemerkungen zu *Leucorrhinia rubicunda* (L.) (Insecta: Odonata). *Fauna Flora Rheinland-Pfalz* 12(2): 571-590. (in German, with English summary) ["The expansion of *L. pectoralis* in Rhineland-Palatinate in 2012, which is

classified as "extinct" in the Red List, is reported. In the Palatinate the species was found in 13 waters, in one of them as autochthonous and in five others with pairing activities or oviposition. The reasons of this expansion are migrations from the feeder populations in the north and east, also due to the favourable warm and sunny spring weather, a general increase of the populations in the stem areas, as well as more local migrations from small "outpost"-populations. The species, being listed on the annexes II and IV of the European habitats directive, has now to be monitored according to the EC law. Beside *L. pectoralis* in the Palatinate also two individuals of the very rare *L. rubicunda* were registered this year." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

12049. Outomuro, D.; Cordero-Rivera, A. (2012): Allometry of secondary, primary, and nonsexual traits in the beautiful demoiselle (*Calopteryx virgo meridionalis*). *Canadian Journal of Zoology* 90(9): 1094-1101. (in English) ["The static allometry between the size of a trait and the body size results from the net selection forces acting on the evolution of both the trait and the body size. An increased knowledge of the functional significance of traits is necessary to understand observed allometric patterns. We studied several traits of males of *C. virgo meridionalis*, for which there is a good functional knowledge of the genitalic traits and ornaments. We found positive allometry for the wing spot size (considered a secondary sexual trait) and for the distal width (but not length) of the anal appendages, which are used for grasping the female prior to copulation. Regarding the male secondary genitalia, the length but not the width of the big horns of the aedeagus showed an isometric pattern. The aedeagus shaft length showed a negative allometric pattern, while its distal width did not show a significant regression. The slopes of the regressions were higher when using wing length than when using body length as estimators of body size, with the exception of wing spot length. Results are discussed based on the functional significance of the study traits, as well as the pre- and post-copulatory selective pressures acting on them." (Authors)] Address: Outomuro, D., Population and Conservation Biology, Department of Ecology and Genetics, Evolutionary Biology Centre, Norbyvägen 18D, 75236, Uppsala, Sweden. E-mail: outomuro.david@gmail.com

12050. Paepke, H.-J.; Günther, R.; Plötner, J. (2012): On the occasion of the eightieth birthday of Prof. Dr. Günther Peters. *Zoosystematics and Evolution* 88(2): 141-143. (in English) [On the occasion of the eightieth birthday of the odonatologist Professor Günther Peters a short retrospective of his life and work is offered.] Address: Günther, R., Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Invalidenstr. 43, 10115 Berlin, Germany. E-mail: rainer.guenther@mfn-berlin.de

12051. Palacino-Rodriguez, F.; Contreras-Sanchez, N.A.; Cordoba-Aguilar, A. (2012): Population structure in dry and rainy seasons in *Erythrodiplax umbrata* (Linnaeus) (Odonata: Libellulidae). *Odonatologica* 41(3): 245-249. (in English) ["Mark-recapture studies in adult Odonata have revealed that rainy periods have a negative impact on population size, recapture rate, survival probability and life expectancy. One reason for this is that rainy periods are usually associated with low temperatures which indirectly and directly affect individual condition. However, given that most studies have been

carried out in temperate environments it remains to be seen whether such phenomenon occurs in other places, i.e. tropical environments. Here, this question is approached by marking-recapturing the tropical *E. umbrata*, in a field site in central Colombia. Two seasons of opposite rainfall patterns were compared: a rainy and a dry season. After checking for no marking effects, no difference was found in population size and recapture rate. However, animals from the dry season had a higher survival and life expectancy compared to animals from the rainy season. These apparently conflicting results, suggest differential effects of seasonality. A population compensation may be occurring in the rainy season (with more animals emerging at this time compared to the dry season) despite the negative effects on survival. Thus, the principle that rainy periods have a negative impact in tropical odonate species seems supported." (Author)] Address: Palacino-Rodriguez, F., Laboratorio de Artropodos, Grupo de Biotecnología, Centro Internacional de Física (CIF), Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Apdo Postal 7495, Bogota D.C., Colombia

12052. Parr, A.J. (2012): Migrant and dispersive dragonflies in Britain during 2011. *J. Br. Dragonfly Society* 28(2): 56-65. (in English) ["The year 2011 was noteworthy for the large, indeed unprecedented, numbers of *Anax ephippiger* noted throughout the year. There were at least three immigration waves - a slow trickle of sightings during the late winter of 2010/11, a surge of records during April and early May, and then a final run of records during October and November. Both the spring and autumn influxes were associated with spells of unseasonably hot weather with winds from the far south. Arrivals of *Sympetrum fonscolombii* were also noted during these periods. Although the summer weather was, by contrast, less spectacular, there were still significant immigrations of *Anax parthenope*, as well as of further *S. fonscolombii*. Three sightings of *Aeshna isosceles* were also made well away from the species' current UK stronghold. Many of the other key events of the year related to the consequences of immigrations seen not in 2011 but in the preceding few years, where new local breeding populations of a number of species might potentially have become established. The recently-identified colony of *Coenagrion scitulum* in Kent appeared to remain stable and there was to be proof of successful breeding by *Aeshna affinis* following the 2010 invasion, when small numbers of exuvia were discovered at Hadleigh Country Park, Essex, during June. Numbers of mature adults seen later in the year were, however, low and give some concern as to the long-term viability of this colony. Numbers of *Lestes barbarus* seen at Cliffe, Kent, following breeding attempts also noted during 2010 were, however, higher and hopefully a stable colony may develop here." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

12053. Pawlak, S.; Wilzak, T. (2012): Natural values of the "Pastwa" mires in the middle Proсна river valley. *Przegląd Przyrodniczy* 23(1): 3-20. (in Polish, with English summary) [20 Odonata species have been observed, including *Ophiogomphus cecilia*, *Aeshna affinis*, *Somatochlora flavomaculata* and *Sympetrum meridionale*.] Address: Wilzak, T., ul. Widok 99/26, 62-800 Kalisz, Poland. E-mail: t.wilzak@wp.pl

12054. Petrulevicus, J.F.; Martins-Neto, R.G.; Azar, D.; Makhoul, E.; Nel, A. (2012): Full description of *Cordula-*

gomphus primaerensis from Santana Formation (Lower Cretaceous of Brazil) (Odonata: Aeshnoptera: Proterogomphidae). *Zootaxa* 3503: 55-60. (in English) ["Thanks to the discovery of a new specimen, we discuss and confirm the differences proposed by Petrulevičius and Martins-Neto, 2007 (in Bechly, 2007) between *Cordulagomphus* (*Procordulagomphus*) *primaerensis* Petrulevičius and Martins-Neto, 2007 and its close relative *Cordulagomphus* (*Procordulagomphus*) *michaeli* Bechly, 2007." (Authors)] Address: Petrulevicus, J.F., Museo de La Plata, División Paleozoología Invertebrados, Paseo del Bosque s/n, 1900 La Plata, and CONICET, Argentina. E-mail: levicius@museo.fcnym.unlp.edu.ar

12055. Petzold, F.; Seifert, D.; (†); Zimmermann, W. (2012): Untersuchungen zur Libellenfauna (Insecta: Odonata) im Ostthüringer Holzland durch Dieter Seifert (†) – ein beeindruckendes Beispiel ehrenamtlicher Forschung für den Naturschutz. *Landschaftspflege und Naturschutz in Thüringen* 49(1): 26-34. (in German, with English summary) ["From 2003 to 2010 the late D. Seifert studied the dragonfly fauna of 35 localities in the Ostthüringer Holzland region (Thuringia, Germany). Additional surveys by Zimmermann & Petzold followed in 2011. Here we represent results from five selected and most intensely surveyed localities of the protected areas „NSG An den Ziegenböcken“ and „FND Rote Pfütze“ in detail. 46 species were recorded in total, 14 of them are red listed in Thuringia and further four species are of other conservation concern. The peat bog habitats of the two protected areas „NSG An den Ziegenböcken“ and „FND Rote Pfütze“ are the most important reproduction sites of threatened species within the Ostthüringer Holzland region. Of the moorland species *Somatochlora arctica* the only reproducing population in Thuringia has been found here which is of national importance. Other remarkable species are *Aeshna juncea*, *Leucorhinia pectoralis* and *L. rubicunda*. Despite much conservation effort the current situation within the protected areas is unsatisfactory. The main conservation issue is formed by the disturbance of the natural water balance of the moorland and peat bog habitats. The application of existing management plans is urgently necessary and would help to preserve the unique character of the important area." (Authors)] Address: Petzold, F., Pappelallee 73, D-10437 Berlin, Germany. E-mail: falkpetzold@web.de

12056. Pickwell, A.; Gennard, D.E.; Taylor, P.; Chadd, R. (2012): The Norfolk Hawker *Aeshna isosceles* (Muller): a step further from the brink? *J. Br. Dragonfly Society* 28(1): 44-55. (in English) ["The change in the range of the Norfolk Hawker *Aeshna isosceles* between 1970 and 2009 was investigated using historic records from the Dragonfly Recording Network and an increase in range was confirmed. It is apparent that this range increase has been sustained by an increase in the number of breeding populations of *A. isosceles* and was in a generally southerly direction, although some westerly and northerly expansion has also occurred. This contrasts with the general northern range shift of most other British Odonata. The increase in the range and population numbers are considered most likely to be due to a combination of habitat restoration and improvement initiatives and water quality improvements, even though increases in recorder effort may have had an effect. Aspects of the habitat requirements of *A. isosceles* (Muller) were investigated using historic aquatic vegetation and salinity data collated with records of its distribution.

It is shown to utilise a wider variety of vegetation communities and to be more tolerant of salinity than was previously thought." (Authors)] Address: Pickwell, A., School of Life Sciences, University of Lincoln, Brayford Pool, Lincoln, LN6 7TS, UK

12057. Pilgrim, E.M.; von Dohlen, C.D. (2012): Phylogeny of the dragonfly genus *Sympetrum* (Odonata: Libellulidae). *Organisms diversity & evolution* 12(3): 281-295. (in English) ["The libellulid dragonfly genus *Sympetrum* has been recognized since 1833, but lacks any morphological synapomorphies to unite the taxon. Previous researchers have disagreed over which species belong in *Sympetrum*, bringing the monophyly of the genus into question. We use DNA sequence data from 6 genetic loci (16S, tRNA-valine, 12S, elongation factor 1 alpha, cytochrome oxidase subunit I, and the second internal transcribed spacer region) and 25 morphological characters (mainly genitalic) to test the monophyly of *Sympetrum* with Bayesian inference and maximum likelihood analyses. Under Bayesian inference, all *Sympetrum* species included in this study form a clade, which also contains the Hawaiian monotypic genus *Nesogonia*, often considered a close relative of *Sympetrum*. Phylogenetic analyses also reveal at least six strongly supported clades (treated as species groups) within *Sympetrum*, but relationships between these species groups remain unresolved or unsupported. Although the relationships between *Sympetrum* species groups remain unresolved, several species groups include taxa from multiple biogeographic regions/continents, and the species group sister to the rest of *Sympetrum* contains migratory species from the New World and Africa. This pattern suggests a complex biogeographic history in *Sympetrum* shaped by vicariance and dispersal. Preliminary estimates of the divergence dates of *Sympetrum* species groups outline a rapid radiation of the groups approximately 32-38 million years ago, possibly influenced by cooling and drying climates of the late Eocene and early Oligocene." (Authors)] Address: Pilgrim, E., U.S. Environmental Protection Agency, Molecular Ecology Research Branch, 26 Martin Luther King Drive, Cincinnati, OH 45268, U.S.A. E-mail: pilgrim.erik@epa.gov

12058. Pryke, J.S.; Samways, M.J. (2012): Importance of using many taxa and having adequate controls for monitoring impacts of fire for arthropod conservation. *J. Insect Conserv.* 16(2): 177-185. (in English) ["Fire is a key natural and anthropogenic disturbance factor across many ecosystems, and also an important conservation management tool. However, little is known about arthropod responses to fire, particularly in Mediterranean-type ecosystems, including the biodiverse Cape Floristic Region (CFR). We investigate here the relative variety of responses by different arthropod taxa to fire, and ask whether single-taxon or multi-taxon approaches better suit post-fire biomonitoring for conservation management. Sampling involved multiple techniques and was conducted before fire, 1 year after fire, and 3 years after fire, with unburned areas as controls. Before-and-after statistics were used to identify changes in arthropod populations and assemblages as a result of fire, and between treatment and control sites. However, this was against a background of the annual effects having a major influence on the arthropods, irrespective of fire. Abundance was so variable, even in control plots, that we found it an unreliable indicator of the impact of fire. Overall, arthropods were remarkably resilient to fire, with most taxa recovering in species richness and as-

semblage composition within 3 years of the fire. Although all taxa showed resilience to fire, there was nevertheless little congruence in temporal recovery of the various taxa. Our results highlight the shortcomings of monitoring fire impacts using only a single-taxon without prior testing for complementarity or sensitivity to fire, while emphasizing the importance of sampling a wide range of taxa to represent overall responses of compositional biodiversity. From this, we recommend, at least for the CFR, that a cross-section of taxa, such as butterflies, ants, and scarab beetles, be used for monitoring arthropods in recovery/fire management conservation programmes. We also recommend that such monitoring be considered against the background of large annual variation seen in unburned areas." (Authors) Odonata have been included into the sample protocol, but no results are presented.] Address: Pryke, J.S., Department of Conservation Ecology and Entomology, Stellenbosch University, Private Bag X1, Matieland 7602, South Africa. E-mail: jpryke@sun.ac.za

12059. Pujol-Buxó, E.; San Sebastián, O.; Garriga, N.; Llorente, G.A. (2012): How does the invasive/native nature of species influence tadpoles' plastic responses to predators? *Oikos* 122(1): 19-29. (in English) ["Although the purely ecological impacts of biological invasions have been well studied, a less thorough effort has been made in terms of their evolutionary ecology. Previous studies show that anti-predator phenotypic plasticity may be one of the major ecological forces driving survival and rapid evolution of prey facing new predators. In turn, this means that biological invasions embody a perfect case for studying the tradeoffs and evolution of phenotypic plasticity per se. Here, we studied the plastic responses of native (*Pelodytes punctatus*) and invasive (*Discoglossus pictus*) anurans facing a native (dragonfly *Anax* sp.) and two invasive (fish *Gambusia holbrooki* and crayfish *Procambarus clarkii*) predators. Marked responses were reported against the native predator from both the native and the invasive anuran, but they both responded mildly to the exotic predators as well. Native *P. punctatus* displayed a morphological reaction to invasive *P. clarkii* after scarcely 30 years of coexistence with this predatory crayfish and responded behaviourally to the invasive fish *G. holbrooki*. Invasive *D. pictus* reacted behaviourally to all predators, but unexpectedly only reacted morphologically to native *Anax* sp. All these results support high prey-predator specificity in these reactions and an evolutionary dissociation between behavioural and morphological plasticity in anurans. Each species displayed a particular set of tradeoffs between plastic responses and their costs, which is probably due to differences in ecological niche and evolutionary history, but interestingly we usually detected unexpected patterns in combinations using introduced predators. This suggests that perhaps singular plastic shifts usually occur when tadpoles face recently introduced species. Given the speed in which these evolutionary changes become noticeable and their potential in avoiding predation risk, this study supports that phenotypic plasticity might play an important role in population dynamics during biological invasions" (Authors)] Address: Pujol-Buxó, E., Depto de Biología Animal, Facultat de Biología, Univ. de Barcelona, Av. Diagonal 643, ES-08028 Barcelona, Spain. E-mail: eudaldp@hotmail.com

12060. Pulfer, T.L.; Evans, C.G.; Featherstone, D.; Post, R.; McCarter, J.I.; Laverty, J.F. (2012): Recovery strate-

gy for the Hine's Emerald (*Somatochlora hineana*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario: vi + 27 pp. (in English) ["*S. hineana* is a globally rare dragonfly restricted to southern Ontario, Wisconsin, Michigan, Illinois and Missouri. In Ontario it is only known to occur in the Minesing Wetlands located in the County of Simcoe. It is listed as endangered under Ontario's Endangered Species Act, 2007 due to its habitat specificity, potential threats and extremely limited geographic range. It has also been listed as endangered or extirpated throughout its known global range. The key features used to distinguish *S. hineana* from other similar species are the unique conformations of its sexual appendages on the end of the abdomen, dark metallic green thorax with two creamy yellow lateral stripes and its relatively large size (60-65 mm long and 90-95 mm wingspan). *S. hineana* is restricted throughout its range to calcareous wetlands (marshes, sedge meadows and fens) dominated by graminoid vegetation and fed primarily by groundwater seeps. Adult males occur in seepage areas and fens and adjacent margins, whereas females are usually found in dry meadows, sometimes in adjacent forest openings, only coming into wetlands to lay eggs. Adults may also utilize adjacent forests, gravel roads, trails and fields for foraging before returning to the wetlands to mate and lay eggs. *S. hineana* deposit eggs in shallow channels or sheetflow in areas of herbaceous vegetation in marshes, meadow marshes and fens. The larvae remain in cool, shallow, slowly-moving waters of spring-fed marshes, alkaline fens, mineral-rich fens with shallow creeks, springs, small pools, marl deposits and calcareous marshy streams for three to five years before emerging as adults. In some locations, larvae use crayfish burrows, mainly of Digger Crayfish or of Devil Crawfish (also known as Meadow Crayfish), as refuge habitat in the summer and winter months. Crayfish burrows are thought to be a critical component of *S. hineana* habitat where seasonal drought and freezing occurs and may be a factor limiting its distribution. The main threats to this species in Ontario are habitat loss due to changes in surface and sub-surface hydrology (including water quality), competition from invasive species (Garlic Mustard, Purple Loosestrife, Glossy Buckthorn and the non-native genotype of Common Reed) and vegetation succession from native species. The inter-species dependency of *S. hineana* on Digger Crayfish indicates that threats to the persistence of burrowing crayfish in Ontario would have a severe negative effect on *S. hineana*. The recovery goal for *S. hineana* is to prevent any loss of population or habitat functionality at extant sites or at any other extant locations which may be identified in the future in Ontario. The recovery objectives outlined to achieve this goal are as follows: • protect and maintain the quantity and quality of *S. hineana* habitat and habitat functionality, including the hydrological and hydrogeological function; • reduce or mitigate threats to *S. hineana* and its habitat; • increase knowledge of *S. hineana* biology in Ontario including distribution, abundance, life history and habitat needs; • increase public awareness and understanding of *S. hineana* and its habitat in Ontario. It is recommended that the area regulated as habitat include all extant locations. In Ontario, this currently includes only the Minesing Wetlands. In order to protect both the adult and larvae stages of *S. hineana*, it is recommended that the area prescribed as habitat include fen and wetland meadows, (i) where Hine's Emerald have been observed and (ii) that are connected by surface or ground water

to areas where *S. hineana* have been observed. In addition to these areas the prescribed habitat should also include 500 metres beyond each of these habitats. For the purposes of perching, movement and dispersal, all forests and dry meadows that are connected to the areas described above by surface water or groundwater should also be prescribed as habitat. To allow for migration and dispersal between patches it is recommended that corridors used by *S. hineana* be prescribed as habitat. Corridors are believed to be both natural (creeks, swales and other water features) and anthropogenic features (trails, utility rights-of-way and gravel roads) that have forested edges or riparian habitat (C. G. Evans and D. Featherstone, pers. comm. 2012). Due to the dependence of *S. hineana* habitat on groundwater recharge it is recommended that prescribed habitat include the Snow Valley Uplands, where the current groundwater infiltration regime is maintained." (Authors)] Address: not stated

12061. Raebel, E.M.; Merckx, T.; Feber, R.E.; Riordan, P.; Macdonald, D.W.; Thompson, D.J. (2012): Identifying high-quality pond habitats for Odonata in lowland England: implications for agri-environment schemes. *Insect Conservation and Diversity* 5(6): 422-432. (in English) ["(1.) Agricultural intensification has contributed to severe declines in odonate populations. The objective of our study is to benefit current measures for the conservation of odonates by establishing the conditions favourable to Odonata and focusing on ponds within agricultural land. (2.) Our landscape-scale study used exuvial counts and habitat measurements from 29 ponds across a catchment in England, over 3 years, to determine key factors affecting odonate abundance and species richness. (3.) Ponds dominated by floating and submerged vegetation were the most transparent, supported the highest abundance and species richness of exuviae, and were always fully or partially surrounded by buffer strips. Ponds lacking vegetation were turbid, yielding no exuviae even if they were buffered. English agri-environment schemes (AES) currently support pond and buffer strip creation and management. (4.) Abundance of exuviae was higher in recently created ponds compared to older ponds, whereas ponds that had dried out the previous summer had fewer exuviae. (5.) Species richness of exuviae decreased with increasing distance to the nearest viable pond, falling by more than 40% for distances over 100 m. (6.) We conclude that odonate conservation would be more effective if AES would consider the spatial scale at which ponds are created and the location, type, and quality of ponds targeted for buffer strips." (Authors)] Address: Raebel, Eva, Wildlife Conservation Research Unit, The Recanati-Kaplan Centre, Dept of Zoology, Univ. of Oxford, Tubney House, Abingdon Road, Tubney, Oxfordshire OX13 5QL, UK. E-mail: evamraebel@gmail.com

12062. Ramos, O.; van Buskirk, J. (2012): Non-interactive multiple predator effects on tadpole survival. *Oecologia* 169(2): 535-539. (in English) ["Interactions among and within three species of predators were estimated in terms of their effects on prey survival using short-term predation experiments. The prey were tadpoles (*Rana temporaria*), and the predators were dragonfly larvae (*Anax imperator*), newts (*Triturus alpestris*), and backswimmers (*Notonecta glauca*). Mortality rate per predator imposed by *Triturus* and *Notonecta* did not decline with predator density, whereas the predation rate of *Anax* was strongly reduced when the number of preda-

tor individuals increased. Impacts of all three predators were not altered by the presence of other species in pairwise combinations. This system is therefore characterized by interference between individual dragonflies but relatively independent effects of predator species. These results were largely predictable based on the natural history of the predators and are encouraging for attempts to model communities as assemblages of interacting species." (Authors)] Address: Buskirk, J. van, Institute of Zoology, University of Zürich, CH-8057 Zürich, Switzerland. E-mail: jvb@zool.unizh.ch

12063. Rasool, N.; Jan, U.; Shah, G.M. (2012): Feeding habits and diet composition of Brown trout (*Salmo trutta fario*) in the upper streams of Kashmir Valley. *International Journal of Scientific and Research Publications* 2(12): 1-8. (in English) ["Coenagrionidae' contribute with 0,45% to the diet of the trout (n = 108).] Address: Rasool, N., Department of Zoology, University of Kashmir, Pin-190006, India. E-mail: nusrat.r.k@gmail.com

12064. Rawi, C.S.; Al-Shamia, S.A.; Shah, A.S.R.; Ahmad, A.H.; Man, A. (2012): Effects of herbicides on Odonata communities in a rice agroecosystem. *Toxicological & Environmental Chemistry* 94(6): 1188-1198. (in English) ["The effects of the five herbicides propanil, quinclorax, molinate/propanil, 2,4-D amine, and bensulfuron on Odonata diversity and abundance at the experimental rice plots was investigated. A total of 13 Odonata morphospecies belonging to two families have been identified. Treated plots exhibited higher species richness (up to 12 species) than the control plot (8 species). *Ishnura* spp. was the most abundant species in the treated plots with a mean density of 194.2 individuals per m², (ind m²) followed by *Brachythemis contaminata* (152 ind m²) and *Agriocnemis* spp. (124 ind m²). In the control plots, *Agriocnemis* spp. was the dominant species (153 ind m²) followed by *Ishnura* spp. (143 ind m²) and *Neurothemis fluctuans* (59 ind m²). In the propanil-treated plot, the highest number of odonate species (10 species) was recorded followed by the plots treated with quinclorax and molinate/propanil (9 species). On the 2,4-D amine or bensulfuron-treated plots as well as the control plot, only eight odonate species were recorded. This study revealed that herbicide application had a positive effect on Odonata diversity. This seems reasonable as Odonata are non-target organisms for herbicides. Furthermore, the decomposed weeds resulting from herbicide application would enrich the water with necessary organic matter." (Authors)] Address: Che Salmah Md Rawi, School of Biological Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia. E-mail: alshami200@gmail.com

12065. Reels, G.; Dow, R.; Hämäläinen, M.; Do, M.C. (2012): Chapter 5. The status and distribution of dragonflies and damselflies (Odonata) in Indo-Burma. In: Allen, D.J., Smith, K.G., and Darwall, W.R.T. (Compilers). 2012. *The Status and Distribution of Freshwater Biodiversity in Indo-Burma*. Cambridge, UK and Gland, Switzerland: IUCN. x+158pp+4pp cover: 90-101. (in English) ["The present assessment covers some 473 odonate species (in 150 genera), of which approximately 160 (34%) are thought to be endemic or near-endemic in Indo-Burma (the real figure for endemics is uncertain, given that the region impinges on, and is biogeographically contiguous with, parts of Myanmar, China and the Malay Peninsula). 14 species are considered threatened. The region has a low proportion (30.5%) of species in the cosmopolitan families Coenagrionidae and Libellulidae, most members

of which are associated with open, lentic or slow-flowing waters. The majority of species are forest- and lotic-associated, reflecting the historical biogeography of the region. New species are still being described from Indo-Burma on a fairly regular basis (for example, Do 2011a, 2011b; Do & Karube 2011; Sasamoto et al. 2011) and it is likely that the real total exceeds 500 species (Hämäläinen 2004). Knowledge of Odonata across the region is very uneven. Hämäläinen (2004) briefly summarised the history of dragonfly studies in Thailand, Viet Nam, Lao PDR and Cambodia, noting that Thailand, the most accessible and best-studied country, had the most diverse odonate fauna (c.350 species), while Cambodia's odonate fauna was the most poorly known. This is largely still the case, with Cambodia and eastern Myanmar having the least-studied odonate faunas in Indo-Burma. Knowledge of the Cambodian fauna has however improved considerably in the last two years. Kosterin (2010, 2011) made two short surveys in the Cardamom Mountain foothills in southwestern Cambodia in April at the end of the dry season ('perhaps the worst time for Odonata') and November–December 2011, in which he made 29 new species records for that country – a powerful indication of how poorly known the Cambodian odonate fauna is. In combination with other recent work (Roland and Roland 2010, Day 2011, Kosterin and Holden 2011, Roland et al. 2011) this has brought the known total to 110 species, but there is clearly much still to be done. The Laotian fauna is rather better understood, mainly due to the efforts of Dr Naoto Yokoi, who added more than one hundred new species records over the period 1994 to 2003 (Hämäläinen 2004), bringing the Lao PDR total to in excess of two hundred species. Studies of Vietnamese Odonata have advanced considerably in recent years, to the point that a useful annotated checklist of 235 species was recently published (Do and Dang 2007), with maps showing species distributions at provincial level." (Authors)] Address: Reels, G., 87 Lychee Road North, Fairview Park, Yuen Long, Hong Kong. E-mail: gtreels@gmail.com

12066. Ren, Y.; Dong, H. (2012): On the optimal dynamic camber formation in insect flight. *Bulletin of the American Physical Society* 57(17) [65th Annual Meeting of the APS Division of Fluid Dynamics, Sunday–Tuesday, November 18–20, 2012; San Diego, California]: 1 pp. (in English) [Verbatim: "It is widely thought that wing flexibility and wing deformation could significantly affect aerodynamic force productions over completely rigid wings in insect flights. However, there is a lack of quantitative discussion of dynamic formation of wing camber and its effect on wing's aerodynamic performance. In this work, a deformable wing is used to model the wing camber and its dynamic formation. A Direct Numerical Simulation (DNS) based computational optimization frame has been developed to obtain the optimal dynamic camber formation of dragonfly in takeoff and cruising flight. Comparative study is then performed between the optimized flexible wing and real dragonfly wing. Results have shown the maximum camber happens around 30% (downstroke) and 80% (upstroke) of one wing beat. Force production and unsteady flows of the flexible wing are also discussed."] Address: not stated

12067. Roland, H.-J.; Grabow, K.; Martens, A. (2012): Aerial dispersal of freshwater gastropods by dragonflies (Odonata). *International Journal of Odonatology* 15(4): 317-318. (in English) [Mecklenburg-Vorpommern; Ger-

many; "At a ditch near Tribsees in northeastern Germany a young individual of the freshwater snail *Lymnaea stagnalis* was photographed while attached to the dorsum of the abdomen of a female *Aeshna viridis*, after the odonate took off after oviposition in *Stratiotes aloides*. This is the first known case for odonate-born dispersal of freshwater gastropods." (Authors)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

12068. Rossaro, B.; Boggero, A.; Lods-Crozet, B.; Free, G.; Lencioni, V.; Marziali, L.; Wolfram, G. (2012): A benthic quality index for European alpine lakes. *Fauna norvegica* 31: 95-107. (in English) ["The development of benthic quality indices for European lakes is hindered by the lack of information concerning many national lake types and pressures. Most information is from north European lakes stressed by acidification and from deep lakes subjected to eutrophication; for other lake types (the ones included in the Mediterranean areas for example) and for other pressures (hydro-morphological alteration, toxic stress) there is practically no information about the response of benthic macro-invertebrates; this hinders the possibility of an intercalibration of the indices among the member states (MS) in the EU. In the present communication three benthic quality indices are proposed considering the littoral, sublittoral and profundal zone in 5 reference and 7 non reference lakes from the Alpine region in response to eutrophication. The sensitivity values of the 177 species (including *Somatochlora metallica*, *Gomphus vulgatissimus*, *Platycnemis pennipes*) found in these lakes were calculated taking a weighted average of the values of environmental variables from lakes in which the species were present. The indicator taxa which prevailed in these lakes were Chironomids and Oligochaetes. A coinertia analysis emphasized the importance of trophic variables (transparency, nitrates, total phosphorous) in explaining the species distribution, but geographic (altitude) and morphometric (depth, volume) variables were also important. The indices enabled a separation of reference from non-reference lakes and to assign the non-reference lakes to different quality classes in agreement with the Water Framework Directive." (Authors)] Address: Rossaro, B., DeFENS - Department of Food Environmental and Nutritional Sciences, Università degli Studi di Milano, Via Celoria 2 - I 20133 Milano, Italy. E-mail: bruno.rossaro@unimi.it

12069. Rubach, M.N.; Baird, D.J.; Boerwinkel, M.-C.; Maund, S.J.; Roessink, I.; Van den Brink, P.J. (2012): Species traits as predictors for intrinsic sensitivity of aquatic invertebrates to the insecticide chlorpyrifos. *Ecotoxicology* 21: 2088-2101. (in English) ["Ecological risk assessment (ERA) has followed a taxonomy-based approach, making the assumption that related species will show similar sensitivity to toxicants, and using safety factors or species sensitivity distributions to extrapolate from tested to untested species. In ecology it has become apparent that taxonomic approaches may have limitations for the description and understanding of species assemblages in nature. Therefore it has been proposed that the inclusion of species traits in ERA could provide a useful and alternative description of the systems under investigation. At the same time, there is a growing recognition that the use of mechanistic approaches in ERA, including conceptual and quantitative models, may improve predictive and extrapolative power. Purposefully linking traits with mechanistic effect

models could add value to taxonomy-based ERA by improving our understanding of how structural and functional system facets may facilitate inter-species extrapolation. Here, we explore whether and in what ways traits can be linked purposefully to mechanistic effect models to predict intrinsic sensitivity using available data on the acute sensitivity and toxicokinetics of a range of freshwater arthropods exposed to chlorpyrifos. The results of a quantitative linking of seven different endpoints and twelve traits demonstrate that while quantitative links between traits and/or trait combinations and process based (toxicokinetic) model parameters can be established, the use of simple traits to predict classical sensitivity endpoints yields little insight. Remarkably, neither of the standard sensitivity values, i.e. the LC50 or EC50, showed a strong correlation with traits. Future research in this area should include a quantitative linking of toxicodynamic parameter estimations and physiological traits, and requires further consideration of how mechanistic trait-process/parameter links can be used for prediction of intrinsic sensitivity across species for different substances in ERA." (Authors) The study also uses *Anax imperator* as model organism] Address: Van den Brink, P.J., Dept of Aquatic Ecology & Water Quality Management, Wageningen Univ., P.O. Box 47, 6700 AA Wageningen, The Netherlands. E-mail: paul.vandenbrink@wur.nl

12070. Rudolf, V.H.W. (2012): Seasonal shifts in predator body size diversity and trophic interactions in size-structured predator-prey systems. *Journal of Animal Ecology* 81(3): 524-532. (in English) ["(1.) Theory suggests that the relationship between predator diversity and prey suppression should depend on variation in predator traits such as body size, which strongly influences the type and strength of species interactions. Prey species often face a range of different sized predators, and the composition of body sizes of predators can vary between communities and within communities across seasons. (2.) Here, I test how variation in size structure of predator communities (*Plathemis lydia*) influences prey survival using seasonal changes in the size structure of a cannibalistic population as a model system. Laboratory and field experiments showed that although the per-capita consumption rates increased at higher predator-prey size ratios, mortality rates did not consistently increase with average size of cannibalistic predators. Instead, prey mortality peaked at the highest level of predator body size diversity. (3.) Furthermore, observed prey mortality was significantly higher than predictions from the null model that assumed no indirect interactions between predator size classes, indicating that different sized predators were not substitutable but had more than additive effects. Higher predator body size diversity therefore increased prey mortality, despite the increased potential for behavioural interference and predation among predators demonstrated in additional laboratory experiments. (4.) Thus, seasonal changes in the distribution of predator body sizes altered the strength of prey suppression not only through changes in mean predator size but also through changes in the size distribution of predators. In general, this indicates that variation (i.e. diversity) within a single trait, body size, can influence the strength of trophic interactions and emphasizes the importance of seasonal shifts in size structure of natural food webs for community dynamics." (Author)] Address: Rudolf, V.H.W., Dept of Ecology & Evolutionary Biology, Rice Univ., Houston, TX 77005, USA. E-mail: volker.rudolf@rice.edu

12071. Ruffoni, A. (2012): Première mention de *Sympetrum flaveolum* (Linnaeus, 1758) en Bourgogne et dans le département de la Nièvre (Odonata, Anisoptera: Libellulidae). *Martinia* 28(1): 43-45. (in French, with English summary) [4-IX-2011, Montsauche-les-Settons (Département de la Nièvre, Parc naturel régional du Morvan), France] Address: Ruffoni, A., Société d'histoire naturelle d'Autun, Maison du Parc, F-58230 Saint-Brisson, France. E-mail: shna.ruffoni@orange.fr

12072. Runemark, A.; Wellenreuther, M.; Jayaweera, H.H.E.; Svanberg, S.; Brydegaard, M. (2012): Rare events in remote dark field spectroscopy: an ecological case study of insects. *IEEE Journal of Selected Topics in Quantum Electronics* 18(5): 1573-1582. (in English) ["In this paper, a novel detection scheme for the monitoring of insect ecosystems is presented. Our method is based on the remote acquisition of passive sunlight scattering by *Calopteryx splendens* and *C. virgo*. Procedures to identify rare events in remote dark-field spectroscopy are explained. We further demonstrate how to reduce the spectral representation, and how to discriminate between sexes, using a hierarchical clustering analysis. One-day cycle showing the temporal activities of the two sexes as well as data on activity patterns in relation to temperature and wind is presented. We also give a few examples of the potential use of the technique for studying interactions between sexes on a time scale of milliseconds." (Authors)] Address: Brydegaard, M., Lund University, Lund, Sweden. E-mail: mikkel.brydegaard@fysik.lth.se

12073. Santos, L.B.; dos Reis, N.R.; Orsi, M.L. (2012): Trophic ecology of *Lontra longicaudis* (Carnivora, Mustelidae) in lotic and semilotic environments in south-eastern Brazil. *Iheringia, Sér. Zool.* 102(3): 261-268. (in English, with Portuguese summary) ["The implantation of a hydroelectric power plant along a river alters the dynamics of the watercourse, transforming a lotic environment into a lentic or semilotic one, what can damage the otter's feeding. From April 2008 to March 2009 we analysed the otter's food habits in lotic (streamlet) and semilotic (hydroelectric reservoir) environments of Paranapanema Valley, in southeastern Brazil. Aiming to compare the otter's diet of these two environments, we analyzed statistically the frequency of occurrence of main items in the scats. Fishes represent the base of the diet both in the reservoir and in the streamlet and, despite of the total otter's diet showing up similarities in the two environments, the results evidenced modifications on the fish species consumed between them. In the reservoir the otters ate more exotic fish *Oreochromis niloticus* (Linnaeus, 1758) probably because it is an easy capture prey in this place. The fact that the otters get established and feed in the reservoir doesn't mean that this structure is benefic to the species because the food supplied for it consists mainly of exotic fish species." (Authors) In a single case, an unidentified dragonfly belongs to the diet of the otter.] Address: Santos, Livia, Universidade Estadual de Londrina, Rodovia Celso Garcia Cid, PR-445, Km 380, Caixa Postal 6001, 86051-980, Londrina, PR, Brasil. E-mail: liviabertolla@yahoo.com.br

12074. Schmit, O.; Martens, K.; Mesquita-Joanes, F. (2012): Vulnerability of sexual and asexual *Eucypris virens* (Crustacea, Ostracoda) to predation: an experimental approach with dragonfly naiads. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 181(3): 207-218. (in English) ["Through the animal kingdom,

sexual reproduction often increases predation risk. Sexual mates are usually more detectable by predators because of (visual, acoustic or chemical) sexual signalling, increased mobility during mate search, or higher visual detectability and reduced alertness of mating pairs, amongst other behaviours. In previous studies, we found that macroinvertebrate predator taxa were more common in ponds whose *Eucypris virens* ostracod populations were parthenogenetic than in populations with males present. Here, we investigate if there is a causal relationship between predation and the *E. virens* reproductive mode. We experimentally tested whether groups of sexual and parthenogenetic *E. virens* individuals were equally vulnerable to predation by dragonfly naiads. A first experiment with a balanced mixture of sexual and asexual ostracod prey was designed. In a second experiment, they were exposed separately to predation in distinct groups. Our results indicate an intense predation pressure on *E. virens*, which increased with predator size. No significant differences were found between parthenogens and sexual *E. virens* when offered mixed to *Sympetrum* odonate predators, and only a slightly higher vulnerability of asexuals was noted when offered separately. The absence of an adverse effect of sexual behaviour on predation vulnerability suggests that the association between mode of reproduction and predator abundance observed in the field is not due to the differential vulnerability of sexual and asexual *E. virens*. The faster population growth potential of parthenogens might allow them to persist in ponds where a strong top-down control could limit survival of sexuals. Alternatively, the observed field association may not indicate a causal relationship, rather the independent effects of habitat temporality on predator abundance and on the *E. virens* reproductive mode." (Authors)] Address: Martens, K., Royal Belgian Institute of natural Sciences, Freshwater Biology, Vautierstraat 29, 1000 Brussels, Belgium

12075. Schneider, E.; Simons, M.E. (2012): Ein Brief von Michel-Edmond Baron de Selys Longchamps (1813 - 1900) an Friedrich Förster (1864 - 1918). *International Dragonfly Fund - Report* 51: 1-8. (in German, with English and French summaries) ["In the odonatological reprint collection of the Natural History Museum Senckenberg (Frankfurt a.M., Germany) an original letter of Michel-Edmond Baron de Selys Long-champs (Liège, Belgium) to the German odonatologist Friedrich Förster (Schopfheim), dated 15 February 1896, was found. The document is not only proof of a contact between two scientists but gives also an idea of how Selys planned and prepared the publication of his research. The facsimile of the letter as well as a typographic transcript and a German translation are provided." (Authors)] Address: Schneider, W., Entomologie II, Forschungsinstitut und Naturkundemuseum Senckenberg, Senckenberganlage 25, 60325 Frankfurt a.M., Germany. E-mail: Fri.Wol@t-online.de

12076. Selvakumar, R.; Karthikeyan, K.; Radhakrishnan, P. (2012): Analysis on surface nanostructures present in hindwing of dragon fly (*Sympetrum vulgatum*) using atomic force microscopy. *Micron* 43(12): 1299-1303. (in English) ["The present study involves the analysis of surface nanostructures and its variation present in the hind wing of *S. vulgatum* using atomic force microscopy (AFM). The hindwing was dissected into 4 parts (D1-D4) and each dissected section was analyzed using AFM in tapping mode at different locations. The AFM analysis revealed the presence of irregular

shaped nanostructures on the surface of the wing membrane with size varying between 83.25 ± 1.79 nm to 195.08 ± 10.25 nm. The size and shape of the nanostructure varied from tip (pterostigma) to the costa part. The membrane surface of the wing showed stacked arrangement leading to increase in size of the nanostructure. Such arrangement of the nanostructures has led to the formation of nanometer sized valleys of different depth and length on the membrane surface giving them ripple wave morphology. The average roughness of the surface nanostructures varied from 18.58 ± 3.12 nm to 24.25 ± 8.33 nm. Surfaces of the wings had positive skewness in D1, D2 and D4 regions and negative skewness in D3 region. These surface nanostructures may contribute asymmetric resistance under mechanical loading during the flight by increasing the bending and torsional resistance of the wing. Highlights: *The atomic force microscopy of dragon fly wings (*Sympetrum vulgatum*) indicates the presence of distinct multilayers in the wing membrane with irregular shaped nanostructure with size varying from 89.91 ± 0.0195 nm to 345.36 ± 0.0471 nm. *The size of the nanostructure differed from the tip (pterostigma) to the costa part of wing attached to the abdomen. *The arrangement of the nanostructure resembled ripple wave morphology. *At present, the modelings of dragon fly wing are carried out considering only the venation and not the sub-micron to nano sized structures present in the wing. *This study clearly indicates that since the distribution and arrangement of nanostructure within the wing varies, its influence in flight mechanism should not be neglected during designing/modeling of wings." (Authors)] Address: Selvakumar, R., Nanobiotechnology Laboratory, Nanotech Research Facility, PSG Institute of Advanced Studies, Coimbatore 641 004, India. E-mail: selvabiotech@gmail.com

12077. Senzota, R. (2012): Wildlife mortality on foot paths of the University of Dar es Salaam, Tanzania. *Tropical Ecology* 53(1): 81-92. (in English) ["Human population on the University of Dar es Salaam, Mlimani Campus, has increased substantially in recent years. It is expected that the number of small animals trampled and killed by pedestrians is correspondingly increasing but no baseline study has hitherto been conducted. Between May 2007 and August 2008, over 1,000 animals trampled by humans walking along foot paths at the main Campus of the University of Dar es Salaam, Tanzania, were identified and enumerated. Human presence along foot paths was also recorded as well as animals killed by vehicles on roads of the campus and surrounding areas. Variations between foot paths, months, seasons and level of human abundance were examined. Invertebrates were the most common animal kills on foot paths while most vertebrate kills were along roads. Foot path deaths peaked during semester periods when pedestrian numbers increased. Types and numbers of animals killed differed between foot paths, apparently in relation to adjacent habitat. Tunnels placed at various sections of the paths would facilitate small animals crossings and reduce mortality. Despite having the highest concentration of pedestrians, a bridge path (path C) scored one of the lowest death tolls." (Author) Six out of eight studied foot paths contained no killed Odonata specimens. Each of the the other two paths had Odonata species which were approximately 1% of the total number of dead insect taxa established for for them.] Address: Senzota, R., Department of Zoology and Wildlife Conservation, University of Dar es Salaam, P.O. Box

35064, Dar es Salaam, Tanzania. E-mail: senzota@udsm.ac.tz

12078. Shanker, C.; Katti, G.; Padmavathi, C. (2012): Organic amendments and their impact on arthropod diversity in rice (*Oryza sativa* L.) fields of Hyderabad, India. *Journal of Tropical Agriculture* 50(1-2): 63-66. (in English) ["Organic manuring influences the diversity of arthropods and their functional significance in rice fields. Arthropod diversity under eight organic manure regimes consisting of farmyard manure (FYM), vermicompost (VC), poultry manure (PM), neem cake (NC), FYM + 50% recommended fertilizer dose (50%RFD), VC+50% RFD, RFD, and unfertilized control (UC) was assessed in a randomized block design experiment. The doses of organic amendments were adjusted to give the recommended level of 120 kg N ha^{-1} . Arthropod sampling was carried out by sweep-nets, vacuum sampling, and straining. Higher abundance of arthropods was observed in plots treated with VC and NC with the spider *Tetragnatha* sp. being the dominant species. Simpson's index indicated that the maximum diversity was observed in PM treated plots (0.022) while the least was in RFD plots (0.183)." (Authors) *Agriocnemis femina*, *A. pygmaea* and *Orthetrum sabina* are among the predatory insects reported.] Address: Shanker, C., Directorate of Rice Research, Rajendranagar, Hyderabad 500030, India. E-mail: chitrashanker@gmail.com

12079. Sharma, I.; Dhanze, R. (2012): Evaluation of macrobenthic fauna in hill stream environment of Western Himalaya, India. *Journal of Threatened Taxa* 4(9): 2875-2882. (in English) ["The purpose of this study is to evaluate seasonal occurrence of macrobenthic fauna in the tributaries of river Beas. The seasonal diversity of macrobenthic fauna was calculated in relation with physico-chemical parameters which revealed that benthic diversity is largely controlled by temperature, water current and volume of water. The width and depth of the streams exhibited an inverse relation with benthic fauna. An inverse relation between temperature and benthos was recorded at the sites located at higher elevation whereas a direct relation was inferred at the lower elevation. The peak of benthic fauna was recorded during winter season at all sampling sites. The benthic fauna was mainly represented by eight groups out of which four are highly distributed at all the sites among which Ephemeroptera were most dominating taxa in the River. Simple correlations were applied for benthos and abiotic factors, which revealed that water temperature, dissolved oxygen, alkalinity, depth and width influenced the invertebrate's distribution and abundance. ...The Odonata were seen only at Tripal and Bathoo during winter season but their maximum population was reported from Tripal where it formed 0.16 to 40% of total benthos." (Authors)] Address: Sharma, I., Zoological Survey of India, High Altitude Regional Centre, Solan, Himachal Pradesh 173211, India. Email: induzsi@gmail.com

12080. Shull, D.R.; Chase, K.; Paulson, G.S. (2012): Phoretic relationship between *Hydra* sp. (Anthomedusae: Hydridae) and a damselfly nymph (Odonata: Calopterygidae). *Entomological News* 122(2): 154-156. (in English) [Verbatim: "During April 2007, we collected an immature *Calopteryx* sp. with a *Hydra* sp. attached to its dorsum in Burd Run, Shippensburg, Pennsylvania. This is the first record of phoretic behaviour by *Hydra* sp. ... *Hydra* sp. is attached by its basal disc near the base of the wing pads of the damselfly in a location that would probably not impede the mobility of the damselfly. The

permanence of this relationship is not determined. A moulting event could easily dislodge the Hydra sp. from the damselfly. However, the Hydra sp. is well located to switch to the newly emerged Calopteryx sp. The nature of the relationship between these two species is also unclear, but it is possible that the Hydra sp. may benefit from the relationship in a manner similar to that hypothesized by Dossdall and Parker (1998) for the phoretic association between *Nanocla dius branchicolus* (Diptera: Chironomidae) and *Argia moesta* (Odonata: Coenagrionidae). They suggested that the relationship benefited *N. branchicolus* by reducing interspecific competition for food, and reducing energy expenditure associated with relocation. Hydra spp. are relatively sedentary, typically found on rocks and vegetation. Lomnicki and Solbodkin (1966) describe an interesting mode of locomotion in response to overcrowding or lack of food where Hydra sp. produces a bubble and floats to the surface of the water to move short distances in relatively still waters. Much like the floating behaviour, Hydra sp. may utilize the damselfly nymph for dispersal over greater distances or perhaps forage in more prey-abundant areas on the back of a predatory insect." Address: Shull, D.R., Dept of Biology, Shippensburg University, 1871 Old Main Drive, Shippensburg, PA 172572299 USA. E-mail: dushull@pa.gov

12081. Simaika, J.P.; Samways, M.J. (2012): Using dragonflies to monitor and prioritize lotic systems: a South African perspective. *Organisms Diversity & Evolution* 12(3): 251-259. (in English) ["The ever-worsening condition of streams due to local, regional, and global demands on water has resulted in the development of increasingly streamlined, rapid assessment methods using macroinvertebrates. Biotic indices in particular are versatile and robust, although not always easy to use. For example, the family-level South African Scoring System is an effective water quality measure, but is time-consuming and requires high-level expert training. The index could be used alongside the species-level Dragonfly Biotic Index (DBI), originally developed for monitoring habitat integrity, with which it is significantly and strongly correlated. We review here the relevant biotic indices in stream biomonitoring and their advantages and disadvantages, and present a new extension of the DBI, the Habitat Condition Scale (HCS). The HCS enables comparison and ranking of sites in terms of their habitat condition. Indeed, the DBI is a very flexible index, having been used in site selection and prioritization for conservation, as well as the measurement of habitat recovery. The theoretical framework behind the index demonstrates the potential of the index to track biotic changes due to climate change. The index could also be easily adapted for use in other biogeographical regions, given that species distributions, threat levels and sensitivities are well-known, and that there is an adequate number of endemic species. However, like all benthic macroinvertebrate indices, the DBI cannot always identify exactly which in-water impacts have an effect and to what extent. The real power of the DBI lies in being able to quantify community response to known physical changes on the riverscape and across the region" (Authors)] Address: Simaika, J.P., Centre for Invasion Biology, Department of Conservation Ecology and Entomology, Stellenbosch University, P Bag X1, Matieland 7602, South Africa. E-mail: simaika@sun.ac.za

12082. Sivaperuman, C.; Kumar Shah, S.; Venkataraman, K. (2012): Diversity and distribution of odonates

in Ritchie's Archipelago, Andaman and Nicobar Islands. In: K. Venkataraman, Raghunathan, C. & C. Sivaperuman (eds.): *Ecology of faunal communities on the Andaman and Nicobar Islands*. Springer, Heidelberg: 209-218. (in English) ["The diversity and distribution of odonates were examined in Ritchie's Archipelago, Andaman and Nicobar Islands. This study was conducted during 2008–2011, and line transect method was used to assess the population of odonates. A total of 31 species of odonates that belong to eight families were recorded. The diversity and distribution of odonates in different islands in this archipelago have been discussed in this chapter." (Authors)] Address: Sivaperuman, C., Zool. Surv. India, Andaman & Nicobar Isis Centre, Port Blair-744 102, Andaman & Nicobar Isis, India. E-mail: csivaperuman@yahoo.co.in

12083. Śniegula, S.; Nilsson-Örtman, V.; Johansson, F. (2012): Growth pattern responses to photoperiod across latitudes in a northern damselfly. *PLoS ONE* 7(9): e46024. doi:10.1371/journal.pone.0046024. (in English) ["Background: Latitudinal clines in temperature and seasonality impose strong seasonal constraints on ectotherms. Studies of population differentiation in phenotypic plasticity of life history traits along latitudinal gradients are important for understanding how organisms have adapted to seasonal environments and predict how they respond to climate changes. Such studies have been scarce for species with a northern distribution. Methodology/Principle Finding: Larvae of the northern damselfly *Coenagrion johanssoni* originating from semi-voltine central, partivoltine northern, and partivoltine northernmost Swedish populations were reared in the laboratory. To investigate whether larvae use photoperiodic cues to induce compensatory growth along this latitudinal gradient, larvae were reared under two different photoperiods corresponding to a northern and southern latitude. In addition, field adult size was assessed to test the strength of possible compensatory growth mechanisms under natural conditions and hatchling size was measured to test for maternal effects. We hypothesized that populations originating from lower latitudes would be more time constrained than high-latitude populations because they have a shorter life cycle. The results showed that low-latitude populations had higher growth rates in summer/fall. In general northern photoperiods induced higher growth rates, but this plastic response to photoperiod was strongest in the southernmost populations and negligible in the northernmost population. During spring, central populations grew faster under the southern rather than the northern photoperiod. On the other hand, northern and northernmost populations did not differ between each other and grew faster in the northern rather than in the southern photoperiod. Field sampled adults did not differ in size across the studied regions. Conclusion/Significance: We found a significant differentiation in growth rate across latitudes and latitudinal difference in growth rate response to photoperiod. Importantly, growth responses measured at a single larval developmental stage in one season may not always generalize to other developmental stages or seasons." (Authors)] Address: Śniegula, S., Department of Ecosystem Conservation, Institute of Nature Conservation, Polish Academy of Sciences, Mickiewiczza Av. 33A, 31-120 Krakow Poland. E-mail: ssniegula81@gmail.com

12084. Söndgerath, D.; Rummland, J.; Suhling, F. (2012): Large spatial scale effects of rising temperatures: model-

ling a dragonfly's life cycle and range throughout Europe. *Insect Conservation and Diversity* 5(6): 461-469. (in English) [(1.) Rising environmental temperature will likely affect life cycle and range of species. To forecast such effects in an odonate, we simulated the continent-wide life cycle distribution pattern and range of a dragonfly applying a dynamic population model. (2.) The model was used to investigate how much of the current voltinism patterns and distribution range of the species are correctly predicted by using temperature and day length as the only environmental factors. We forecasted the range and voltinism changes on a European extent for the year 2050 using one GCM (CSIRO) driven by one greenhouse gas emission scenario (b2a) according to the IPCC. (3.) The model run lead to 80% correctly predicted distribution range, with a sensitivity of 94% and a specificity of 55%, the latter because of high error in predicting absence in southern Europe. (4.) The projected voltinism ranged from 1 to 2 years per generation in southern latitudes to 5 years in the north. A comparison with field data indicated correct predictions in 50% of all cases, while the other 50% were slight over- or underestimates by half a year per generation. (5.) We conclude that the model led to sufficient predictions of range as well as of life cycle pattern in central and northern Europe. Wrong predictions of presence for southern Europe may be caused by factors not recognised in the model, likely competition by con generics, while incorrect voltinism was possibly because of habitat effects. (6.) Simulations with increased temperature scenarios implied a future northward shift of the fundamental niche and a decreased development duration towards the northern range." (Authors)] Address: Söndgerath, Dagmar, Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c, 38106 Braunschweig, Germany. E-mail: d.soendgerath@tu-bs.de

12085. Steinhoff, P. (2012): Records of Odonata from Phong Nha-Ke Bang National Park and its Buffer Zone, Central Vietnam. *Entomologie heute* 24: 37-49. (in English, with German summary) ["From September 2010 until August 2011, the dragonfly fauna of several habitats in the Phong Nha-Ke Bang National Park and its buffer zone in Central Vietnam was investigated. It is the first time that research on dragonflies was undertaken in that area. The habitats surveyed in the buffer zone were rivers, water-filled bomb craters, paddy fields and forest streams, while the habitats where research on dragonflies was carried out inside the national park were forest rivers and forest streams. In total, 61 species were determined at 16 different sites, while the identification of 15 more species was possible just at genus level; an identification of the species requires further research. The species were identified either in the field, with the help of photographs or (when a specimen was collected) in the laboratory. The differences of the habitats surveyed and the species found at each location are discussed and compared with the knowledge of the dragonfly fauna of Vietnam. Furthermore, an outlook on further research in the future is given." (Authors)] Address: Steinhoff, P., Trelleborger Weg 1, 17493 Greifswald, Germany. E-Mail: philipsteinhoff@gmail.com

12086. Striniqi, A.; Oga, J. (2012): Contribution to the knowledge of some aquatic insect species in Shkodra Lake. *BALWOIS 2012 - Ohrid, Republic of Macedonia* - 28 May, 2 June 2012: 7 pp. [The Shkodra lake is a lake on the border of Montenegro with Albania, the largest lake in the Balkan Peninsula. 44 insect taxa only are

treated at the family level.] Address: Striniqi, A., Department of Bio-Chemistry, The University of Shkodra Luigj Gurakuqi, Shkodra, Albania

12087. Sultana, R.; Kala, D.S. (2012): Water body quality analysis by benthic macroinvertebrates. *Int. J. Pharm. Bio. Sci.* 2(1): 269-279. (in English) [The paper includes references to Odonata.] Address: Kala, D.S., University engineering College, Kakatiya university, Warangal, India. E-mail: dr.shashidsk@yahoo.com

12088. Svensson, E.I. (2012): Non-ecological speciation, niche conservatism and thermal adaptation: how are they connected? *Organisms diversity & evolution* 12(3): 229-240. (in English) ["During the last decade, the ecological theory of adaptive radiation, and its corollary "ecological speciation", has been a major research theme in evolutionary biology. Briefly, this theory states that speciation is mainly or largely the result of divergent selection, arising from niche differences between populations or incipient species. Reproductive isolation evolves either as a result of direct selection on mate preferences (e.g. reinforcement), or as a correlated response to divergent selection ("by-product speciation"). Although there are now many tentative examples of ecological speciation, I argue that ecology's role in speciation might have been overemphasised and that non-ecological and non-adaptive alternatives should be considered more seriously. Specifically, populations and species of many organisms often show strong evidence of niche conservatism, yet are often highly reproductively isolated from each other. This challenges niche-based ecological speciation and reveals partial decoupling between ecology and reproductive isolation. Furthermore, reproductive isolation might often evolve in allopatry before ecological differentiation between taxa or possibly through learning and antagonistic sexual interactions, either in allopatry or sympatry. Here I discuss recent theoretical and empirical work in this area, with some emphasis on odonates and suggest some future avenues of research. A main message from this paper is that the ecology of species differences is not the same as ecological speciation, just like the genetics of species differences does not equate to the genetics of speciation." (Authors)] Address: Svensson, E.I., Section for Animal Ecology, Ecology Building, Lund Univ., SE-223 62 Lund, Sweden. E-mail: erik.svensson@zoekol.lu.se

12089. Swaegers, J.; Mergeay, J.; Maes, G.E.; Van Houdt, J.K.J.; Larmuseau, M.H.D.; Stoks, R. (2012): Microsatellite marker development and putative SNP detection for a northward expanding damselfly species using next generation sequencing. *Conservation Genetics Resources* 4(4): 1079-1084. (in English) ["In this study we used Roche's 454 sequencing to develop genetic markers for *Coenagrion scitulum*, a Mediterranean damselfly currently expanding its range northward. With a modest amount of sequencing we detected 6,318 potential microsatellite markers and 832 putative single nucleotide polymorphisms (SNPs). From the potential microsatellite markers we developed thirteen novel microsatellite markers. Among other applications, these markers can be used to unravel the micro-evolutionary consequences of range expansion in this species." (Authors)] Address: Swaegers, J., Lab.Aquatiscche Ecologie, K.U.Leuven, De Beriotstraat 32, 3000 Leuven, Belgium. E-mail: janne.Swaegers@bio.kuleuven.be

12090. Tachamo Shah, R.D.; Narayan Shah, D.; Domisch, S. (2012): Range shifts of a relict Himalayan dragonfly in the Hindu Kush Himalayan region under cli-

mate change scenarios. *International Journal of Odonatology* 15(3): 209-222. (in English) ["Although understanding of geographic range shifts of many species in response to global climate change is expanding steadily, little is known about the Himalayan fauna, which in particular is affected by relatively faster warming rates than other parts of the world. Anticipated increases in temperature and changes in hydrological regimes will have significant adverse impacts on the habitat suitability for many species. This threat will even be higher to endemic and already threatened species due to their restricted distribution and narrow climate tolerance ranges. We investigated the range shifts of a relict Himalayan dragonfly (*Epiophlebia laidlawi*), a species that is endemic to the Hindu Kush Himalayan region. Currently, the species is only known from few localities in Bhutan, India and Nepal. For conservation of the species, it is necessary to foresee potential suitable habitat areas and range shifts due to global climate change. Here, we first estimated the current potential geographic distribution by identifying the suitable habitat area in the region using bioclimatic envelope models, by means of consensus projections of six algorithms as implemented in the BIOMOD-package in the software program R. We then used the current distribution to render future projections under the A2a and B2a IPCC emission scenarios for the years 2050 and 2080. Models predict that the suitable habitat area of the species will shift on average 374 m and 599 m uphill under the extreme (A2a) climate warming scenario, and 294 m and 342 m uphill under the moderate (B2a) scenario by 2050 and 2080, respectively. Future suitable habitat areas are projected to remain only in the high mountains of eastern Nepal. The results will help conservationists to delineate priority habitats in the first step towards the species conservation in the region." (Authors)] Address: Ram Devi Tachamo Shaha, Hindu Kush Himalayan Benthological Society, P.O. Box 20791, Sundhara, Kathmandu, Nepal

12091. Takahashi, Y.; Morimoto, G.; Watanabe, M. (2012): Ontogenetic colour change in females as a function of antiharassment strategy. *Animal Behaviour* 84(3): 685-692. (in English) ["Mate choice by females is an important component of sexual selection in many species. Theoretically, female sexual traits may be influenced by selection acting on the females via male mate choice, while the evolutionary consequences of male mate preferences are largely unknown, especially in the context of sexual conflict. We tested whether male mate choice affects the evolution of female colour in the damselfly *Ischnura senegalensis* in which females exhibit dimorphism consisting of a gynomorph that experiences ontogenetic colour change and an andromorph that does not. We first quantitatively confirmed that only gynomorphs change their body colour in relation to sexual maturation. In field experiments, males were unwilling to mate with sexually immature gynomorphs, although they attempted to mate with immature andromorphs. This is because males changed their mating preference for female colour depending on previous copulation experiences with sexually mature females. As a result, immature andromorphs received more male harassment than sexually immature gynomorphs, and then showed decreased food intake. Immature-specific colour functioned to avoid costly male harassment during female prereproductive stages, suggesting that ontogenetic colour changes in females have evolved as an antiharassment strategy of females

via male mate choice. Highlights: *Female damselfly experienced ontogenetic colour change. *Females with immature-specific colour efficiently avoided male harassment. *Avoiding harassment increased food intake in females. *Male choice may lead to the evolution of antiharassment strategy in females." (Authors)] Address: Takahashi, Y., Division of Ecology & Evolutionary Biology, Graduate School of Life Sciences, Tohoku University, Miyagi, Japan. E-mail: takahashi.yum@gmail.com

12092. Tampus, A.D.; Tobias, E.G.; Amparado, R.F.; Bajo, L.; Sinco, A.L. (2012): Water quality assessment using macroinvertebrates and physico-chemical parameters in the riverine system of Iligan City, Philippines. *AES Bioflux* 4(2): 59-68. (in English) ["The water quality in the riverine systems (Mandulog and Iligan) of Iligan City decreases as it approaches the downstream. Canonical Correspondence Analysis (CCA) was used to determine which physico-chemical parameters would influence the assemblage of macroinvertebrates. Results revealed that Total Suspended Solids (TSS) affect the groups Plecoptera, Tricoptera, Diptera and Simuliidae while nitrate affects Plecoptera and Gomphidae. Principal Component Analysis (PCA) was used to determine which physico-chemical parameters describe the sampling sites. Out of the ten physico-chemical parameters that were determined, only the pH, silicate and nitrate showed significant correlation that describe the sampling sites. These results indicated that the sampling sites within the two rivers show similar chemical attributes." (Authors)] Address: Tampus, Annielyn D., Department of Biological Sciences, College of Science and Mathematics, Mindanao State University-Iligan Institute of Technology, Tibanga, Iligan 9200, Philippines. E-mail: nyleinna@yahoo.com

12093. Tennessen, K.J. (2012): The nymph of *Anisagrion Selys 1876*, based on the discovery of *A. inornatum* (Selys, 1876) in Ecuador (Odonata: Coenagrionidae). *Organisms diversity & evolution* 12(3): 297-300. (in English) ["The final instar nymph of *Anisagrion inornatum* is described and illustrated based on five specimens (one reared) from southern Ecuador. It is the first to be discovered for the genus. The nymph of *Anisagrion inornatum* differs from its closest relative, *Apanisagrion lais*, by: (1) antenna shorter in relation to head length (ratio 1.35 in *An. inornatum* vs 1.55 in *Ap. lais*); (2) fewer palpal and premental setae (5 palpal and 4 or 5 premental setae in *An. inornatum* vs 6-8 palpal and 5-8 premental setae in *Ap. lais*); (3) venter of S3-S8 with medial dark stripe. The nymphs were found in a slow shallow seep overgrown with emergent wetland plants." (Author)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

12094. Trapero-Quintana, A.; Novelo-Gutierrez, R. (2012): Description of the final stadium larva of *Erythrodiplax bromeliicola* Westfall 2000 (Odonata: Libellulidae) with notes on variation in adults from Cuba. *Zootaxa* 3545: 59-66. (in English, with Spanish summary) ["The final stadium larva of *E. bromeliicola* is formally described and illustrated. The light brown scape and pedicel and creamy pale flagellum of the antenna, plus the abundant short, reddish, spiniform setae on the integument of the body surface and epiproct, comprise an exclusive combination of characters in the larva of *E. bromeliicola*. Information on larval habitat and a key for the larvae of the five *Erythrodiplax* species occurring in Cuba are provided. Details on morphological variation

of an adult population from Cuba are also provided." (Authors)] Address: Trapero-Quintana, A., Universidad de Oriente. Patricio Lumumba s/n, Santiago de Cuba, 90500, Cuba. E-mail: atrapero@cnt.uo.edu.cu ;

12095. Tsui, M.T.K.; Blum, J.D.; Kwon, S.Y.; Finlay, J.C.; Balogh, S.J.; Nollet, Y.H. (2012): Sources and transfers of methylmercury in adjacent river and forest food webs. *Environ. Sci. Technol.* 46(20): 10957-10964. (in English) ["Nearly all ecosystems are contaminated with highly toxic methylmercury (MeHg), but the specific sources and pathways leading to the uptake of MeHg within and among food webs are not well understood. In this study, we report stable mercury (Hg) isotope compositions in food webs in a river and an adjacent forest in northern California and demonstrate the utility of Hg isotopes for studying MeHg sources and cross-habitat transfers. We observed large differences in both $\delta^{202}\text{Hg}$ (mass-dependent fractionation) and $\Delta^{199}\text{Hg}$ (mass-independent fractionation) within both food webs. The majority of isotopic variation within each food web could be accounted for by differing proportions of inorganic Hg [Hg(II)] and MeHg along food chains. We estimated mean isotope values of Hg(II) and MeHg in each habitat and found a large difference in $\delta^{202}\text{Hg}$ between Hg(II) and MeHg ($\sim 2.7\%$) in the forest but not in the river ($\sim 0.25\%$). This is consistent with in situ Hg(II) methylation in the study river but suggests Hg(II) methylation may not be important in the forest. In fact, the similarity in $\delta^{202}\text{Hg}$ between MeHg in forest food webs and Hg(II) in precipitation suggests that MeHg in forest food webs may be derived from atmospheric sources (e.g., rainfall, fog). Utilizing contrasting $\delta^{202}\text{Hg}$ values between MeHg in river food webs (-1.0%) and MeHg in forest food webs ($+0.7\%$), we estimate with a two-source mixing model that $\sim 55\%$ of MeHg in two riparian spiders is derived from riverine sources while $\sim 45\%$ of MeHg originates from terrestrial sources. Thus, stable Hg isotopes can provide new information on subtle differences in sources of MeHg and trace MeHg transfers within and among food webs in natural ecosystems. In the riparian zone, one of the two emerged aquatic insects (damselfly adults) displayed MeHg isotopic compositions similar to their river counterparts while another emerged aquatic insect (dragonfly adults) displayed much higher $\delta^{202}\text{Hg}$ MeHg. This suggests that damselfly adults may retain aquatic MeHg and perhaps continue feeding on other emerged aquatic insects, but dragonfly adults appear to feed on terrestrial insects that are enriched with $\delta^{202}\text{Hg}$ MeHg. This is possible because dragonflies are stronger fliers than damselflies (e.g., higher flying velocities 43), and dragonflies may spend more time integrating prey in forests (i.e., away from river), whereas damselflies likely remain around the river to feed." (Authors)] Address: Tsui, M.T.K., Department of Earth and Environmental Sciences, University of Michigan, Ann Arbor, Michigan 48109, USA. E-mail: mtktsui@umich.edu.

12096. van Kleef, H.H.; van Duinena, G.-J.A.; Verberka, W.C.E.P.; Leuven, R.S.E.W.; van der Velde, G.; Esselink, H. (2012): Moorland pools as refugia for endangered species characteristic of raised bog gradients. *Journal for Nature Conservation* 20(5): 255-263. (in English) ["In intact raised bog landscapes transitions from ombrotrophic into minerotrophic conditions occur. These gradients are lost from many bogs due to peat harvesting and drainage, and are difficult to restore. To determine which endangered species are characteristic

of pristine raised bog gradients and their current status in degraded bogs, plants and macroinvertebrates were surveyed in Estonian intact raised bogs and Dutch degraded bog remnants. Dutch national distribution data were used to determine whether communities with these species occurred outside bog habitats. Water chemistry data were used to describe associated environmental conditions. Intact bog gradients were the preferred habitat for six plant species and fifteen macroinvertebrate species, all of which are endangered. In degraded bogs these species were scarce or not recorded. In intact bogs these species lived at sites where runoff from the bog massif came into contact with regional ground water resulting in a gradient in pH, alkalinity, Ca, Fe and ionic ratio. Analysis of Dutch national distribution data revealed aggregations of these endangered species in moorland pools. These pools contained water chemistry gradients similar to those found in pristine bogs, which occurred at sites where groundwater seepage and stream water came in contact. In the past, stream water has been used to increase pH and trophic status of moorland pools facilitating fisheries. Today, this practice offers a conservation strategy for the protection of endangered species for which no short-term alternatives are available." (Authors) The following Odonata species are included in the analysis: *Coenagrion hastulatum*, *Somatochlora arctica*, *S. flavomaculata*, *Aeshna subarctica*, *Leucorrhinia albifrons*, and *L. dubia*.] Address: van Klee, H.H., Bargerveen Foundation, Radboud University Nijmegen, P.O. Box 9010, 6500 GL Nijmegen, The Netherlands

12097. Verberk, W.C.E.P.; Calosi, P. (2012): Oxygen limits heat tolerance and drives heat hardening in the aquatic nymphs of the gill breathing damselfly *Calopteryx virgo* (Linnaeus, 1758). *Journal of Thermal Biology* 37(3): 224-229. (in English) ["Thermal limits in ectotherms may arise through a mismatch between O_2 supply and demand. At higher temperatures, the ability of their cardiac and ventilatory activities to supply O_2 becomes insufficient to meet their elevated O_2 demand. Consequently, higher levels of O_2 in the environment are predicted to enhance heat tolerance, while reductions in O_2 are expected to reduce thermal limits. Here, we extend previous research on thermal limits and oxygen limitation in aquatic insect larvae and report critical upper temperatures in nymphs of *C. virgo* exposed to different levels of O_2 . In addition, we explore the potential for a mechanistic link between O_2 conditions and thermal plasticity by exposing nymphs to two consecutive extreme heat events, using different levels of O_2 in the second exposure. As predicted, hypoxia severely lowered critical temperatures. However, thermal tolerance was not improved under hyperoxia. Damselfly nymphs may be precluded to take advantage of hyperoxia if O_2 uptake and delivery is controlled locally near the caudal gills where most of the gas exchange occurs. The same asymmetrical effects of hypoxia and hyperoxia on heat tolerance in terrestrial insects could be similarly explained if tracheal opening and/or ventilation are not centrally regulated. Prior exposure to hypoxia enhanced critical thermal maxima in subsequent heat exposures and hyperoxia negated this hardening effect, indicating potential for oxygen-driven heat hardening in these aquatic insects. Our study provides broad confirmation for oxygen limitation as a key mechanism setting upper thermal limits, pointing to a vital role for heat shock proteins in reducing O_2 requirements by slowing down rates of protein denaturation." (Au-

thors)] Address: Verberk, W.C.E.P., Department of Animal Ecology and Ecophysiology, Institute for Water and Wetland Research, Radboud University, Toernooiveld 1, 6525 ED Nijmegen, The Netherlands. E-mail: wilco@aquaticecology.nl

12098. Villanueva, R.J.T.; van Weerd, M.; Cahilog, H. (2012): Odonata recorded in February 2012 in Isabela and Aurora Provinces, Luzon Island and Polillo Island, Philippines. International Dragonfly Fund - Report 49: 1-42. (in English) ["In February 2012, Odonata were recorded and voucher specimens collected in Luzon, The Philippines. The focus of study was set on localities near Dinapigue and San Mariano (Isabela Province), sites in Casiguran (Aurora Province) and on Polillo Island (Quezon Province). 60 Odonata species were recorded. Three are new to science and have been formally to be described. Four species were recorded for the first time in Luzon. *Amphicnemis furcata* and *Diplacodes nebulosa* were rediscovered after several decades since they were last documented from Luzon." (Authors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

12099. Villanueva, R.J.T. (2012): Review of the Philippine taxa formerly assigned to the genus *Amphicnemis* Selys. Part I: Overview and descriptions of three new genera (Odonata: Coenagrionidae). Zool. Med. Leiden 86 (8): 579-604. (in English) ["The Philippine species formerly assigned to the genus *Amphicnemis* Selys are reviewed. Three new genera *Luzonobasis* gen. nov., *Pandanobasis* gen. nov. and *Sangabasis* gen. nov. are erected. *Amphicnemis isabela* is synonymised with *Amphicnemis glauca* and transferred to *Luzonobasis* gen. nov. *Amphicnemis cantuga* and *A. mcgregori* are transferred to *Pandanobasis* gen. nov. *Amphicnemis braulitae*, *A. circularis*, *A. dentifer* and *A. furcata* are transferred to *Sangabasis* gen. nov. The rest of the Philippine *Amphicnemis* species are transferred to the genus *Pericnemis* Hagen. Two new species are described: *Pandanobasis curacha* spec. nov. and *P. daku* spec. nov." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

12100. Vivier, N. (2012): Nicole Caulier-Mathy et Nicole Haesenne-Peremans (éd.), Une vie au fil des jours. Journal d'un notable politicien et naturaliste, Michel Edmond de Selys Longchamps (1823-1900), Bruxelles, Académie royale de Belgique, Commission royale d'histoire, 2008, 2 vol., 1747 p. Histoire, économie & société 31: 124-125. (in English) [Book review of the publication with the diary of Michel Edmond de Selys Longchamps.] Address: not stated

12101. Wankhade, V.; Manwar, N.; Dahihande, A. (2012): Effect of water pollution on assemblage and community structure of dragonfly at three ecosystems of Pune (India). Golden Research Thoughts 2(3): 1-6. (in English) [Anisoptera at three water bodies: Pune University pond (seasonal and nonpolluted), Mula-Mutha sangam (lotic, perenneal and polluted) and Pashan Lake (lentic, perenneal and polluted) were studied.] Address: Wankhade, V., Department of Zoology University of Pune, MS India 07. E-mail- varsha2w@rediffmail.com

12102. Ware, J.; Karlsson, M.; Sahlen, G.; Koch, K. (2012): Evolution of reproductive strategies in libellulid dragonflies (Odonata: Anisoptera). Organisms Diversity & Evolution 12(3): 313-323. (in English) ["In Libellulidae,

oocyte production has been assumed to be continuous, with periods of egg-laying interspersed with periods of resting/eating; however, recent work suggests that two types of oocyte production are common: either (a) continuous or (b) step-wise. These are mirrored in the arrangement of the ovarioles in the ovaries. Likewise, two types of mate-guarding behaviour have been observed in Libellulidae: (1) non-contact guarding and (2) tandem guarding in which the male either hovers above the female or is physically attached to her during oviposition. Using molecular (mitochondrial and nuclear) data we explored the evolution of female reproductive traits, focusing on ovariole morphology, as well as guarding behaviour, in Libellulidae. Continuous egg production appears to have evolved more than once, as have tandem and non-contact guarding. We discuss how the evolution of different ovariole types and guarding behaviour may have been influenced by habitat instability, dispersal and crowded oviposition sites; thus, migratory behaviour or habitat availability may have been the driving force of ovariole evolution." (Authors)] Address: Ware, Jessica L., Rutgers, The State University of New Jersey, Cook College, 93 Lipman Drive, New Brunswick, New Jersey 08901, USA. E-mail: jware@amnh.org

12103. Wasscher, M.T. (2012): The mansion, diaries and watercolours of Selys. Notul. odonatol. 7(10): 92-95. (in English) ["Notes are given on the mansion and family tomb at Wareme (Belgium) and the discoveries of the published diaries and large collection of unpublished watercolours by Michel Edmond de Selys Longchamps (1813-1900)." (Author)] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: marcel.hilair@12move.nl

12104. Wildermuth, H. (2012): Libellenausstellung im Naturschutzzentrum Neeracherried (Neerach, ZH). Entomo Helvetica 5: 173-174. (in German) [The author introduces the didactical concept of an exhibition in the Neeracherried, Switzerland. Morphology, biology, physiology are exemplified using in most cases *Anax imperator*.] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

12105. Wu, H. (2012): Huizhou Dragonflies. China Forestry Publishing House: 191 pp. (in bilingual in Chinese and English) ["Until relatively recent times, dragonflies were studied by only a few entomologists, but in this new century they are receiving ever increasing attention from nature lovers all over the world. Many now derive great pleasure from the hobby of observing and photographing dragonflies, in the way they have long watched and photographed birds. Numerous new books introducing dragonflies, enabling their identification and reporting their regional or local diversity are being published in many countries. The present book by Wu Hongdao is among the first of its kind from the mainland of China. The bilingual text is limited, but the superb colour photos provide an excellent introduction to the diverse and colourful world of south Chinese dragonflies. Although, the area of Huizhou City covers only 6% of the land area of Guangdong province and a tiny 0.11% of the whole of China, this area is home to at least 174 species of dragonflies -about 70% of species known from Guangdong and one quarter of the total Chinese dragonfly fauna. This is mainly because the area of Huizhou City includes several well preserved protected areas. The most famous is Nankunshan provincial reserve, which is especially rich in dragonfly species and has been particularly well studied. Within

Huizhou City there are also suitable wetland habitats outside protected areas, in both lowlands and mountain. The first book illustrating Chinese dragonflies was Edward Donovan's famous classic *AN Epitome of the Natural History of the Insects of China*, published in London in 1798. Two of its 50 fine hand-coloured copper-engraved plates illustrate six dragonfly species. All of these, including the beautiful *Neurobasis chinensis*, the first dragonfly from China and the whole of Asia to be scientifically named, are also to be founded in Wu's book. Since the time of Donovan the world has changed in many ways. However, the beauty and diversity of insects continues to fascinate us, and books showcasing their splendor are still being published." (from the preface of Matti Hämäläinen & publisher)]

12106. Xu, Q.-h. (2012): *Periaeschna yazhenae* sp. nov. from Fujian, China (Odonata: Anisoptera: Aeshnidae). *Zootaxa* 3526: 72-78. (in English) ["*P. yazhenae* sp. nov. is described, illustrated and diagnosed from its congeners. Description of the final stadium larva of the new species is also provided. The new species is closely similar to *P. zhangzhouensis* Xu 2007 due to the high similarity of anal appendages, but is easy to separate from that species by the following characters: distal 1/4 of cercus narrowest and with truncated apex; abdominal segments 1–9 with simpler and less developed dorsal markings and with more complicated and more developed ventrolateral and ventral markings; and wings tinted with brownish-black at extreme base." (Author)] Address: Xu, Q.-h., Dept of Biological & Environmental Engineering, Zhangzhou City Univ., Zhangzhou, Fujian 363000, China. E-mail: qihxan@yahoo.com.cn

12107. Yang, P.-s. (2012): A study of the geographical differentiation and conservation among *Psolodesmus mandarinus* populations (Calopterygidae: Odonata). Dissertation, Institute of Entomology, National Taiwan University: 115 pp. (in Chinese, with English summary) ["To investigate the phylogenetic relationship and geographical variation of wing colour among the *Psolodesmus mandarinus* three subspecies, a combination of molecular, morphological, and behavioural approaches was used to guide this research and develop the conservation strategies. Firstly, the molecular phylogenetic analysis of nuclear and mitochondrial genes revealed considerable divergence between Yaeyama's populations (subspecies *kuroiwa*) and Taiwanese populations (included subspecies *mandarinus* and *dorothea*). Furthermore, two mitochondrial lineages (east and west) existed in Taiwan. The eastern Taiwan lineage included these individuals belonging to *dorothea*, and the western Taiwan lineage included both *dorothea* and *mandarinus*. Because of the genetic diversity of mitochondrial gene was much lower in northwestern Taiwan region and two subspecies shared a common haplotype, it is probable the populations of *mandarinus* were derived from the northward expansion of *dorothea* populations. Secondly, Yaeyama's populations (*kuroiwa*) and Taiwanese populations (*mandarinus* and *dorothea*) could be exactly discriminated by the morphometrical analysis of wing pterostigma. Previous studies reported the wing colour differences between *mandarinus* and *dorothea*, our results illustrated that the wing colour traits gradually changed across the populations in northern Taiwan. It would be hard to discriminate two subspecies and determine the distribution limits. In contrast, the female wing size shifted dramatically at 24.19 degree (between central and northern Taiwan) which

was close to the current criteria (24.33 degree) for dividing two subspecies. Because of both the wing colour trait and female wing size changed across the populations of *mandarinus* in northern Taiwan, it is probable these traits may form co-adapted trait complexes and to cope with a different selection regime in northern Taiwan. Thirdly, the field observations of mating behaviour in *mandarinus* and *dorothea* populations demonstrated that two subspecies possessed the same kind of female preference for exaggerated male coloration. Thus, the differentiation of wing colour trait could not be interpreted only by using sexual selection. If the wing colour trait and life history trait formed co-adapted trait complexes in northern Taiwan, the fitness of female preference would be difference between *mandarinus* and *dorothea*. Because of the positive fitness effect in female preference for *mandarinus* populations, wing colour traits gradually changed across the northern Taiwan. On the contrary, the negative fitness effect in female preference for *dorothea* populations, the hyaline wing is maintained by a combination of sexual selection and natural selection. Finally, *Psolodesmus* is the only one endemic genus of damselflies in Taiwan and Yaeyama. The variety of wing colour provided an ideal explanation case for biodiversity education. It also could be used as a biological indicator for monitoring stream ecosystem and global warming. Above all, we suggested developing an educational and recreational program for pursuing the goals of research, conservation and sustainable utilization." (Author)] Address: not stated

12108. Zhang, H.; Hämäläinen, M. (2012): *Matrona annina* sp. n. from southern China (Odonata, Calopterygidae). *Tijdschrift voor Entomologie* 155 (2012) 285–290: 285-290. (in English) ["*Matrona annina* sp. n. from Guangdong and Guangxi (China) is described and illustrated for both sexes. The new species differs from its sympatric congener *M. basilaris* Selys, 1853 by its brown wings, reduced bluish-white reticulation at wing base and in details of the structure of the superior anal appendages. An NJ-tree derived from the ITS region (ITS1, 5.8S gene, and ITS2) of *M. annina* and *M. basilaris* specimens, collected from the same stream, is presented. A mean of 3.4% difference in the ITS sequences was found between the two species." (Authors)] Address: Zhang, H., Institute of Hydrobiology, Chinese Academy of Sciences, Donghuanlu Road, Wuchang, Wuhan City, Hubei province, China. E-mail: zhanghaomiao6988@gmail.com

12109. Zhu, G.; Chmura, A.; Zhang, L. (2012): Morphology, echolocation calls and diet of *Scotophilus kuhlii* (Chiroptera: Vespertilionidae) on Hainan Island, South China. *Acta Chiropterologica* 14(1): 175-181. (in English) ["*S. kuhlii* is distributed in many urban environments, yet the ecology of this species is poorly known. The morphology, echolocation call structure, diet, and foraging areas of *S. kuhlii* were studied on Hainan Island, south China from March to November 2006. ... call shape suggests that this species is adapted to forage in open environments. Data from mist-netting and acoustic detection indicated that *S. kuhlii* foraged mainly around the crown of trees and street lights. Nine insect orders were recorded in its diet, with Lepidoptera (97.46%, by frequency) and Coleoptera (64.72 ± 2.37%, by volume) constituting the main prey, together with Hemiptera (19.99 ± 1.25%) and Hymenoptera (9.43 ± 1.14%). There was significant seasonal variation in the diet of *S. kuhlii*: Coleoptera increased from

March to May, and then decreased to August, while Hemiptera and Hymenoptera showed the inverse trend." (Authors) Odonata were occasionally recorded in the faeces, but no details are given.] Address: Zhang, L., Guangdong Entomological Institute, 105 Xingang Xi Road, Haizhu District, Guangzhou, 510260, China. E-mail: zhanglb@gdei.gd.cn

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12110. Almeida, D.; Merino-Aguirre, R.; Angeler, D.G. (2013): Benthic invertebrate communities in regulated Mediterranean streams and least-impacted tributaries. *Limnologia* 43(1): 34-42. ["Flow regulation is generally perceived to negatively influence fluvial ecosystems through alterations of natural habitat conditions, particularly in highly variable Mediterranean streams. However, the detection of impact may depend on chosen metrics, requiring a multiple-lines-of-evidence approach for ecologically relevant impact assessment. In this study, we compare the community structure, the trophic function, the microhabitat influence and the body condition of benthic invertebrates between the regulated Bullaque River and unregulated tributaries (Guadiana River basin, central Spain). Invertebrates and physical microhabitats were studied seasonally in 2010. Total abundance, EPT abundance, Rheoindex and LIFE metrics were higher in the regulated river during summer, whereas Shannon diversity was lower. Rheoindex and LIFE were higher in the tributaries during winter. Filterers were very abundant in spring and summer in the tributaries and the regulated stream, respectively. Deposit feeders dominated during summer in the tributaries. Despite these differences, ANOSIM revealed similar community structure and feeding groups characteristics in both fluvial system types. In addition, body condition, measured as fluctuating asymmetry level, indicated that damming created favourable developmental conditions for several invertebrate species in the Bullaque River. This suggests that damming surprisingly buffered from the adverse environmental conditions inflicted by seasonal summer droughts, which occur recurrently in Mediterranean areas. Results also suggest that the application of fluctuating asymmetry could therefore be promising for revealing integral ecological responses to different and often combined forms of anthropogenic and natural disturbance. ... A total of 12 species were selected to determine body conditions (fluctuating asymmetry (FA) levels): *Baetis fuscatus* (L.), *B. rhodani* (Pictet), *Caenis luctuosa* (Burmeister), *Ecdyonurus angelieri* Thomas, *Serratella ignita* (Poda), *Leuctra geniculata* (Stephens), *Platycnemis latipes* Rambur, *Onychogomphus uncutus* (Charp.), *Micronecta meridionalis* (Costa), *Hydropsyche exocellata* Dufour, *H. instabilis* (Curtis) and *Rhyacophila relicta* McLachlan." (Authors)] Address: Almeida, D., Department of Ecology, Complutense University of Madrid, 2 José Antonio Novais Street, E-28040 Madrid, Spain. E-mail: dalmeida@bio.ucm.es

12111. Barry, M.J.; Sval, S. (2013): Metabolic responses of tadpoles to chemical predation cues. *Hydrobiologia* 700: 267-276. (in English) ["Life-history theory predicts that predator-induced defences should incur fitness costs. In larval amphibians, the most frequently reported cost is reduced energy intake due to lower foraging rates; however, recent reports suggest that this trade-off may be uncoupled through morphological and physiological adaptations. Metabolism is a measure of

energy expenditure and plasticity in respiration may potentially offset other costs of predator-induction. The aim of this study was to measure the indirect effects of dragonfly larvae on the respiration rate of tadpoles of the Arabian toad (*Bufo arabicus*) over time and at different predator concentrations. We performed two experiments. In the first experiment (time-response), we exposed tadpoles either to the indirect presence of odonate larvae or predator-free conditions and measured respiration rates 3, 5, 8, 11, 13, 15, 19 and 26 days after the start of the experiment. In the second experiment (dose-response), we used three levels of predator chemicals, equivalent to 1 predator per 10, 100 or 1,000 l plus controls. The respiration rate of predator-exposed tadpoles varied initially, but was 56.3% of controls after 26 days. In the dose-response experiment, the respiration rate of all predator-exposed tadpole groups was reduced by between 19.1 and 27.2% after 21 days. The study demonstrates a mechanism by which tadpoles may be able to adjust their physiology to partially offset the costs of lower energy intake due to predator avoidance. ... Larval dragonflies were collected from a nearby wadi and maintained on a diet of tadpoles when not being used for experiments. In the time-response experiment, final instar Aeshnidae (*Anax* sp.) and final instar Libellulidae (*Trithemis* sp.) were used. In the dose-response experiment, only *Anax* sp. were utilised." (Authors)] Address: Barry, M.J., Department of Biology, Sultan Qaboos University, Al Khoud, P.O. Box 36, Muscat 123, Sultanate of Oman. E-mail: mjbarry@squ.edu.om

12112. Cañedo-Argüelles, M.; Kefford, B.J.; Piscart, C.; Prat, N.; Schäfer, R.B.; Schulz, C.-J. (2013): Salinisation of rivers: An urgent ecological issue. *Environmental Pollution* 173: 157-167. (in English) ["Secondary salinisation of rivers and streams is a global and growing threat that might be amplified by climate change. It can have many different causes, like irrigation, mining activity or the use of salts as deicing agents for roads. Freshwater organisms only tolerate certain ranges of water salinity. Therefore secondary salinisation has an impact at the individual, population, community and ecosystem levels, which ultimately leads to a reduction in aquatic biodiversity and compromises the goods and services that rivers and streams provide. Management of secondary salinisation should be directed towards integrated catchment strategies (e.g. benefiting from the dilution capacity of the rivers) and identifying threshold salt concentrations to preserve the ecosystem integrity. Future research on the interaction of salinity with other stressors and the impact of salinisation on trophic interactions and ecosystem properties is needed and the implications of this issue for human society need to be seriously considered." (Authors) The paper includes a reference to Odonata.] Address: Cañedo-Argüelles, M., Freshwater Ecology and Management (F.E.M.) Research Group, Departament d'Ecologia, Universitat Barcelona, Diagonal 643, 08028 Barcelona, Catalonia, Spain. E-mail: mcanedo.fem@gmail.com

12113. Drinan, T.J.; Foster, G.N.; Nelson, B.H.; O'Halloran, J.; Harrison, S.S.C. (2013): Macroinvertebrate assemblages of peatland lakes: Assessment of conservation value with respect to anthropogenic land-cover change. *Biological Conservation* 158: 175-187. (in English) ["Small blanket bog lakes can contain many rare and threatened aquatic invertebrate species. Their conservation value, however, is threatened throughout Eu-

rope by peat extraction and particularly conifer afforestation, which can compromise the physico-chemical habitat quality of peatland lakes through excessive inputs of forestry-derived dissolved and particulate substances. To quantify the effect of conifer plantation forestry on the conservation value of these habitats, we compared the hydrochemistry and assemblages of aquatic Coleoptera, Heteroptera and Odonata of replicate lakes across three distinct catchment land uses: (i) unplanted blanket bog only present in the catchment, (ii) mature conifer plantation forests only present in the catchment and (iii) catchments containing mature conifer plantation forests with recently clearfelled areas. All three catchment land uses were replicated across regions of sedimentary and igneous geology. Lakes with afforested catchments, in both geologies, had elevated concentrations of plant nutrients, total dissolved organic carbon and heavy metals, the highest concentrations being recorded from the clearfell lakes. Coleoptera and Heteroptera assemblages responded strongly to forestry-mediated changes in water chemistry, whereas Odonata assemblages responded more to catchment geology – geology being confounded by altitudinal differences between lakes. The greatest species-quality scores (SQSs) and species richness were recorded from the clearfell lakes. Three of the four International Union for the Conservation of Nature (IUCN) nationally red-listed species recorded during this study were, however, absent from clearfell lakes. Our findings demonstrate that plantation forestry can have a profound impact on the aquatic macroinvertebrate assemblages and conservation value of small blanket bog lakes, primarily via eutrophication. Despite indices such as SQS scores and species richness appearing to reveal a beneficial response of blanket bog lake communities to habitat deterioration, they mask that certain 'emblematic' species are being severely negatively impacted by the disturbance caused by plantation forestry. Considering the need for fertiliser to produce economically viable plantation forest crops, coupled with the inefficiencies of peat soils in retaining applied nutrients, the degradation of peatland lakes is likely to become more prevalent as plantation forestry continues to expand worldwide." (Authors)] Address: Drinan, T.J., School of Biological, Earth & Environmental Sciences, University College Cork, Distillery Fields, North Mall, Cork, Ireland. E-mail: tom-drinan@gmail.com

12114. Herbst, D.B.; Medhurst, R.B.; Roberts, S.W.; Jellison, R. (2013): Substratum associations and depth distribution of benthic invertebrates in saline Walker Lake, Nevada, USA. *Hydrobiologia* 700: 61-72. (in English) ["Walker Lake, a terminal salt lake in western Nevada, is undergoing rapid changes because of falling lake level and rising salinity, affecting the potential habitat of benthic invertebrates that supply food to native fish and birds. Benthic invertebrate surveys were conducted within different substratum size classes and macrophyte beds in the nearshore littoral shallows (1 m) and in the deeper offshore littoral (2–10 m) and profundal ([10 m) zones of the lake. Samples were dominated by the chironomid midges *Cricotopus ornatus* and *Tanytus grodhausi*; the damselfly *Enallagma clausum*; and an oligochaete worm of the genus *Monopylephorus*. Midges showed distinct depth preferences, with *Cricotopus* found primarily in the shallow littoral, and *Tanytus* found in the lower littoral and profundal regions. *Enallagma* occurred throughout the littoral region but was reduced in abundance below 10 m. *Cri-*

cotopus and *Enallagma* were most abundant on cobble rock substratum and macrophytes. Sand and small gravel substrata supported few invertebrates except oligochaetes, which were most common in shallow littoral areas. The extent of *Ruppia* beds was determined using hydroacoustic sounding and showed that these beds were most well-developed in a zone from 1.25 to 5 m depth. The estimated area of productive shallow littoral zone habitat at different lake levels showed that coverage was lowest near the current surface elevation. Rising lake levels would result in expansion of suitable habitat area, and while falling levels could also expand nearshore habitat, this would likely occur on areas of poorer substratum quality and under high salinities that may inhibit growth." (Authors)] Address: Herbst, D.B., R. Jellison Sierra Nevada Aquatic Research Laboratory, Univ. of California, 1016 Mt. Morrison Road, Mammoth Lakes, CA 93546, USA. E-mail: herbst@lifesci.ucsb.edu

12115. Kosterin, O.E. (2013): Brief Odonata survey in North Ethiopia during heavy rainy season of 2012. *International Dragonfly Fund - Report 56: 1-54.* (in English) ["A survey of Odonata in North Ethiopia, on the route Debre Libanos – Bahir Dar – Woldia – Hayk – Mile – Awash – Debre Zeyit crossing the provinces of Oromia, Amhara and Afar, in July 29 - August 10, 2012 yielded 38 species, including two endemics of Ethiopia and five species not hitherto reliably reported for this country in the literature: *Pseudagrion commoniae*, *P. hamoni*, *P. salisburyense*, *Bradinopyga strachani* and *Ictinogomphus ferox*. The number of Odonata species recorded in Ethiopia thus reached 104. 17 main localities were visited, on average showing 4.9 species per locality. A small branch of Jara River, Amhara, was the richest one (15 species). Comments on specimens of *Pseudagrion spernatum* and *Nesciothemis farinosa* and notes on the country in general and particular habitats of Odonata are provided." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bio-net.nsc.ru

12116. Moller, A.P.; Nishiumi, I.; Suzuki, H.; Ueda, K.; Mousseau, T.A. (2013): Differences in effects of radiation on abundance of animals in Fukushima and Chernobyl. *Ecological Indicators* 24(1): 75-81. (in English) ["Radioactive contamination can negatively affect the abundance of living beings through the radiation and chemical toxic effects of radionuclides or the effects of mutation accumulation over time. If radiotoxic effects were the main determinant of the abundance of organisms, we should expect a reduction in abundance immediately following radioactive contamination, while we should expect a gradual increase in negative effects over time if mutation accumulation was the main determinant. In particular, we should expect the main effects at the recently contaminated site in Fukushima to mainly be due to radiotoxicity, while effects at Chernobyl which has been contaminated since 1986 should be a mixture of radiotoxic and mutation accumulation effects. We censused spiders, grasshoppers, dragonflies, butterflies, bumblebees, cicadas and birds at 1198 sites in Chernobyl and Fukushima-Daiichi, where major nuclear accidents happened 25 years and 6 months ago, respectively. The mean level of radiation was higher and less variable at Fukushima than at Chernobyl, implying that we should expect more negative effects on the abundance of animals at Fukushima if immediate ef-

fects of radiation were important. While all taxa showed significant declines in abundance with increasing level of background radiation in Chernobyl, only three out of seven taxa showed such an effect at Fukushima. The effect of radiation on abundance differed between the two areas for butterflies, dragonflies, grasshoppers and spiders, but not for birds or bumblebees. These findings are consistent with the main effects of radiation on the abundance of animals at Fukushima being due to radiotoxicity while those at Chernobyl may be due to a mixture of radiotoxicity and mutation accumulation, because chronic exposure have been present for many generations thereby allowing for accumulation of mutations." (Authors)] Address: Møller, A.P., Laboratoire d'Ecologie, Systématique et Evolution, CNRS UMR 8079, Université Paris-Sud, Bâtiment 362, F-91405 Orsay Cedex, France

12117. Nilsson-Örtman, V.; Stoks, R.; De Block, M.; Johansson, H.; Johansson, F. (2013): Latitudinally structured variation in the temperature dependence of damselfly growth rates. *Ecology Letters* 16(1): 64-71. (in English) ["The Metabolic Theory of Ecology predicts that the slope of the rate-temperature relationship, E, remains consistent across traits and organisms, acting as a major determinant of large-scale ecological patterns. Although E has recently been shown to vary systematically, we have a poor understanding of its ecological significance. To address this question, we conducted a common-garden experiment involving six damselfly species differing in distribution, estimating E at the level of full-sib families. Each species was sampled throughout its latitudinal range, allowing us to characterise variation in E along a latitudinal gradient spanning 3600 km. We show that E differs among populations and increases with latitude. E was right-skewness across species, but this was largely an artefact of the latitudinal trend. Increased seasonality towards higher latitude may contribute to the latitudinal trend in E. We conclude that E should be seen as a trait involved in local adaptation." (Authors) *Coenagrion mercuriale*, *C. scitulum*, *C. puella*, *C. pulchellum*, *C. armatum*, *C. johanssoni*] Address: Nilsson-Örtman, V., Department of Ecology and Environmental Science, Umeå University, Umeå, Sweden. E-mail: viktor.j.nilsson@gmail.com

12118. Raubenheimer, D.; Rothman, J.M. (2013): Nutritional ecology of entomophagy in humans and other primates. *Annu. Rev. Entomol.* 58: 141-160. (in English) ["Entomophagy is widespread among nonhuman primates and is common among many human communities. However, the extent and patterns of entomophagy vary substantially both in humans and nonhuman primates. Here we synthesize the literature to examine why humans and other primates eat insects and what accounts for the variation in the extent to which they do so. Variation in the availability of insects is clearly important, but less understood is the role of nutrients in entomophagy. We apply a multidimensional analytical approach, the right-angled mixture triangle, to published data on the macronutrient compositions of insects to address this. Results showed that insects eaten by humans spanned a wide range of protein-to-fat ratios but were generally nutrient dense, whereas insects with high protein-to-fat ratios were eaten by nonhuman primates. Although suggestive, our survey exposes a need for additional, standardized, data." (Authors) The paper includes a reference to Odonata] Address: Raubenheimer, D., Institute of Natural Sciences, Mas-

sey University, Auckland 0632, New Zealand. E-mail: d.raubenheimer@massey.ac.nz

12119. Schneider, W.; Nasher, A.K. (2013): Dragonflies from mainland Yemen and the Socotra-Archipelago - additional records and novelties 1-13. *International Dragonfly Fund - Report 57*: 1-13. (in English, with German Summary) ["The odonatological results of two field trips to mainland Yemen carried out mainly in summer 2005 and winter 2007, and to Socotra in winter 1999 are put on record. At 30 localities, 33 dragonfly species were collected, respectively observed (3). One species, *Azuragrion somalicum* is new for mainland Yemen, and a second, *Pseudagrion niloticum*, is new for mainland Yemen and the Arabian Peninsula. Three species, *Azuragrion somalicum*, *Orthetrum julia*, and *Sympetrum fonscolombii* are new records for Socotra." (Authors)] Address: Schneider, W., Entomology II, Research Institute & Natural History Museum Senckenberg, Senckenberganlage 25, 60325 Frankfurt a.M., Germany. E-mail: fri.wol@t-online.de; wolfgang.schneider@senckenberg.de

12120. Theischinger, G. (2013): A new species of *Austropetalia* Tillyard from north-eastern New South Wales, Australia (Anisoptera, Austropetaliidae). *International Dragonfly Fund - Report 58*: 1-8. (in English) ["A new species, *Austropetalia annaliese*, is described, illustrated and compared to its congeners. The female holotype (New South Wales, Barrington Tops, 12 December 1981) will be deposited in the Collection of the Australian Museum, Sydney, Australia." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

12121. Wasscher, M.T.; van't Bosch, J.G. (2013): The true identity of *Neoneura bilinearis* Selys, 1860, with the synonymy of *N. gaida* Rácenis, 1953, and the description of *N. confundens* sp. nov. (Odonata: Protoneuridae). *Zootaxa* 3599: 19-36. (in English) ["Study of rough notes and sketches made by D.C. Geijskes in 1972 and the recently found original drawings by E. de Selys Longchamps done in 1884 from the male syntype of *Neoneura bilinearis* Selys, 1860, shows the syntype male and female (now lost for several decades) of *N. bilinearis* refer to the same species later described as *Neoneura gaida* Rácenis, 1953. Therefore *N. gaida* is considered a junior synonym of *N. bilinearis* Selys, 1860. A neotype is chosen for the true *N. bilinearis* (neotype ♂, Suriname, Kabalebo, 15 viii 1965, in RMNH). *N. bilinearis* sensu Williamson (1917) is redescribed as *Neoneura confundens* sp. nov. (holotype ♂, Suriname, Jodensavanna, Koela-kreek, 13 ii 1946, in RMNH). *N. confundens* has a wide distribution in South America north of the Tropic of Capricorn, but it is lacking from the central and lower Amazon. It occurs in several colour morphs and also varies in male appendage, genital ligula, and female pronotum morphology." (Authors)] Address: Wasscher, M.T., Minstraat 15 bis, 3582 CA Utrecht, The Netherlands. E-mail: marcel.hilair@12move.nl

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1997

12122. Fahrngruber, H.; Wenger, A. (1997): Nachweis von *Gomphus flavipes* (Charpentier, 1825) bei Krems / NÖ. *Lanius*, Krems 1996-1997: 73-75. (in German) [As a result of a road kill, *Stylurus flavipes* was found on 24-VII-1997 along the river Krems, near Senftenberg, Niederösterreich, Austria] Address: not stated

12123. Taylor, P.D. (1997): Empirical explorations of landscape connectivity. Proceeding of the sixth annual International Association for Landscape Ecology (UK Region) conference, 9th-11th September 1997. Eds: Cooper, A. and J. Power. *IALE* (UK): 11-18. (in English) ["Movement plays a fundamental role in the dynamics of populations, and is influenced by differences in the patterning of resources on the landscape. The interaction between the ability of an organism to move through different types of landscape and the relative size and positioning of resources in the landscape is termed landscape connectivity. Experimental manipulations have been made to measure landscape connectivity for two species of damselflies (*Calopteryx maculata* and *C. aequabilis*) in completely forested, completely open and mixed landscapes. Experimentally, individuals have been translocated between landscapes to measure aspects of how they move through the different types of landscapes. I present an overview of these experiments and results and then discuss their importance as methods for further exploring the important concept of connectivity." (Author)] Address: Taylor, P., Biology Department, Acadia University, Wolfville, Nova Scotia, Canada B4P 2R6. E-mail: ptaylor@resalliance.org

12124. Wenger, A. (1997): Die Libellenfauna eines Folienteiches. *Lanius*, Krems 1996-1997: 57-62. (in German) [In early 1996, a garden pond was created. The development of the colonisation by dragonflies in 1996 and 1997 is outlined. *Anax imperator* inspected the pond before it was filled with water.] Address: not stated

1999

12125. Hambrook, J.A.; Armitage, B.J.; Vis, M. (1999): Algal and macroinvertebrate assemblages of selected Ohio springs. *Ohio Biological Survey Notes* 2: 1-24. (in English) ["A qualitative study of the algal flora, macroinvertebrate fauna, and water quality of ten Ohio springs

was conducted during July-September 1996. The springs were primarily in central and northern Ohio on a variety of surficial geology settings including karst, till, and exposed bedrock. Water quality varied with the groundwater source and local environment (agriculture, woodland). The algal community varied greatly in diversity among sites. One woodland site (Styx River) had only three taxa. In contrast, Cedar Bog (an open alkaline fen) had a great diversity of diatoms (246 taxa) with a total of 258 taxa. At most locations, between 15 and 56 taxa were reported. Like the algal community, the diversity of the macroinvertebrate fauna differed considerably among sites, ranging from 2 to 40 identified taxa. This variation may have been due to the sitespecific differences in water chemistry and/or habitat. Computation of Jaccard similarity coefficients for both the algal and macroinvertebrate data resulted in low similarity values among sites. The data collected provide a basis for proposed sampling methods (spring biotic survey protocols) that could be used for the range of spring/seep types found in Ohio." (Authors) The following taxa are listed: *Anax junius*, *Cordulegaster* sp., *Libellula* sp., *Pachydiplax longipennis*, *Enallagma* sp., *Ischnura verticallis*, *Lestes rectangularis*.] Address: Vis, M., Dept of Environmental & Plant Biology, Ohio Univ., Athens, OH 45701, USA

2001

12126. Goddard, S. (2001): The Scarce Chaser (*Libellula fulva*) on the River Stour. *Trans. Suffolk Nat. Soc.* 37: 81-82. (in English) [Recent records between 1997 and 2000 along the River Stour, UK are brought on record.] Address: Goddard, S., 47 Colchester Road, Ipswich IP4 3BT, UK

12127. Sugimura, M.; Futahashi, R. (2001): Second record of an interspecific hybrid between *Sympetrum eroticum eroticum* (Selys, 1883) and *Sympetrum parvulum* (Bartenev, 1912) (Libellulidae). *Tombo* 43: 51-54. (in Japanese, with English summary) [Japan; a supposed interspecific hybrid between the two taxa, is reported.] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

2002

12128. Malavasi, D. (2002): Note sull'odonatofauna delle zone umide della Bassa Pianura modenese. *Natu-*

ra Modenese 6: 59-64. (in Italian, with English summary) ["Notes on dragonfly community of the Modena lowland wetlands: Notes on Odonata living in man-made wetlands, ponds and canals in Modena lowlands, are reported. The area is a typical intensive agriculture-based lowland,... The following list includes all the species observed: *Sympecma fusca*, *Lestes barbarus*, *Platycnemis pennipes* *Ischnura elegans*, *Enallagma cyathigerum*, *Erythromma lindeni*, *Coenagrion puella*, *Erythromma najas*, *Aeshna cyanea*, *A. mixta*, *A. affinis*, *Anax imperator*, *Hemianax ephippiger*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Libellula depressa*, *L. fulva*, *Orthetrum brunneum*, *O. albistylum*, *O. cancellatum*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. meridionale*, *S. sanguineum*." (Author)] Address: Malavasi, D., Studio Associato GECCO, Via San Faustino, 23, 41037 Mirandola, Italy. E-mail: davidemalavasi.eco@libero.it

12129. Matushkina, N.A.; Gorb, S.N. (2002): A checklist of substrates for endophytic oviposition of some European dragonflies (Insecta: Odonata). *J. Kharkov Ent. Soc.* 10: 108-118. (in Russian) ["Compiled from original and literature data, we have drawn up a list of endophytic oviposition substrates for some European dragonflies. This list can be used for ecological and faunistic studies in a variety of aquatic ecosystems. In some cases, the list can help predict the occurrence of a species in a given area." (Authors)] Address: Gorb, S.N., Functional Morphology and Biomechanics, Zoological Institute, Christian-Albrecht University of Kiel, 24098 Kiel, Germany. E-mail: sgorb@zoologie.uni-kiel.de

12130. Sherman, N. (2002): The discovery and observations of Small Red-eyed Damselfly (*Erythromma viridulum*) at a Suffolk site in 2001. *Trans. Suffolk Nat. Soc.* 38: 124-125, pl. (in English) [15-VIII-2001, without locality dates.] Address: Sherman, N., 98, Dover Road, Ipswich, Suffolk IP3 8JH

12131. Zhou, J.; Xie, J.-h.; Dai, Q.; Zeng, Y.-j.; Liu, J.-x.; Zhang, W.-g.; Zhang, S.-y. (2002): Feeding behavioral strategy of *Rhinolophus pearsoni* in summer. *Zoological Research* 2002(2): 120-128. (in Chinese, with English summary) [According to table 1, the diet of 32 specimens of *R. pearsoni* contained 912 specimens of Aeshnidae.] Address: Zhou, J., Institute of Zoology, the Chinese Academy of Sciences, Beijing 100080, China

2003

12132. Underwood, D.K. (2003): Occurrence of the Small Red-eyed damselfly *Erythromma viridulum* in west Suffolk during 2002. *Trans. Suffolk Nat. Soc.* 39 (2003): 60-62. (in English) [This paper reports on the first record of *E. viridulum* in Long Melford, UK on 4 August 2002. Several more specimens were seen later on until 1 September. The known data of *E. viridulum* in England are mapped.] Address: Underwood, D.K., 29 Cordell Road, Long Melford, Sudbury, Suffolk, CO10 9EH, UK; E-mail: darrenunderwood@clara.co.uk

2004

12133. Kelliher, E. (2004): Investigating fluctuating asymmetry of the larval damselfly, *Calopteryx maculata* (Odonata: Calopterygidae). *Undergraduate Review* 1(10). Available at: <http://vc.bridgew.edu/undergradrev/vol1>

/iss1/10: 29-40. (in English) ["Fluctuating asymmetry (FA), or subtle random deviations from perfect bilateral symmetry, has recently become a useful tool in allowing researchers to understand more about an organism's health, fitness, developmental stability and environmental stressors. Ultimately, FA studies can be used as an indirect measurement of the quality of an aquatic system over time. We measured and examined the femur segments of the larval damselfly, *C. maculata* from sites on the Town, Hockomock, and Salisbury Plain Rivers, of Plymouth County, Massachusetts to determine FA levels. After accounting for measurement error, preliminary results show that variations in symmetry are not correlated to individual trait size. Also, the Hockomock River site showed FA levels three times higher than the Salisbury Plain river, and twice that of the Town River. Finally, severe femur deformation of some individuals at all sites suggests that other, more serious developmental or environmental factors may be inhibiting normal development. Results from a simple two-way ANOVA of differences in right and left femur segments and a Kolmogorov Smirnov test for normality strongly suggest that the first femur of *C. maculata* is a useful trait for FA measurement." (Author)] Address: not stated

12134. Leeming, D.; Warrington, S. (2004): An aquatic invertebrate survey of Ickworth Park, Suffolk. *Trans. Suffolk Nat. Soc.* 40: 55-71. (in English) [At eight of the twelve studied ponds the following Odonata were recorded: *Calopteryx splendens*, *Coenagrion puella*, *Enallagma cyathigerum*, *Pyrrhosoma nymphula*, *Ischnura elegans*, *Aeshna cyanea*, *A. grandis*, *Libellula depressa*, *Sympetrum striolatum*, and *S. sanguineum*.] Address: Warrington, S., Regional Nature Conservation Advisor, East of England, The National Trust, The Dairy House, Ickworth, Bury St. Edmunds, IP29 5QE, UK. E-mail: stuart.warrington@nationaltrust.org.uk

2005

12135. Martinov, V.V.; Martinov, A.V. (2005): To the knowledge of dragonflies (Insecta: Odonata) of the Nature Reserve 'Medobory' and surrounding areas. *The Kharkov Entomological Society Gazette* 2004 (2005) 12(1-2): 23-24. (in Russian, with English summary) [The Nature Reserve 'Medobory' is located in Gusiatsinsky District of the Ternopol Region. Odonata of the reserve were collected during field studies in May and August, 2004. The total of twenty-five species represents 33.8 % of the Ukrainian Odonata fauna.] Address: Martynov V. V., Dept of Zoology, Biological Faculty, Donetsk National University, ul. Shchorsa 46, Donetsk, 83050, Ukraine. E-mail: martynov@dongu.donetsk.ua

12136. Mauersberger, R.; Buczyński, P. (2005): Materials to the knowledge of dragonflies (Odonata) of the Pomeranian Lakelands. *Wiad. entomol.* 24(4): 243-244. (in Polish) [Records of 26 Odonata species from 14 localities from northern Poland are documented.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

12137. Smith, J. (2005): Complementarity between two metrics which use invertebrates to assess riparian conditions of rivers. M. S. Thesis. University of KwaZulu-Natal, Pietermaritzburg: 98 pp + app. (in English) ["Conservation of streams involves an understanding of their physical, chemical and biological entities. SASS5 is a

biomonitoring method developed to monitor the habitat quality of a water body. It is based on differential scores attributed to various macroinvertebrate families with varying degrees of sensitivity to anthropogenic impact. This method, however, does not assess impacts on particular species. Odonata are good candidates for study at the species level as they are well researched and males are easily identified. As adults, they are known to be sensitive indicators of both riparian and river conditions. Yet Odonata cannot be an umbrella taxon for all other taxa. Therefore, the main aim of this study is to determine the complementarity of the two metrics (Odonata assemblages and SASS5), establishing whether Odonata assemblages offer additional information on, or insight into, riverine habitat quality as portrayed by SASS5. To accomplish this, certain objectives were addressed. 1) The variation of SASS5 scores and 2) Odonata assemblages between river systems, structural habitat types (open or closed canopies) and compositional habitat types (indigenous or alien vegetation). 3) Whether SASS5 scores vary to the same extent, and, 4) on the same spatial scale (river system and point localities) as Odonata abundance and species richness. The relationship between these two metrics was determined along three rivers in the Pietermaritzburg basin. Sampling units (SUs) with extremes in vegetation structure (sunlight and shaded SUs) and vegetation composition (alien or indigenous) were selected. Using this range of environmental conditions placed environmental extremes on the macroinvertebrate populations at point localities and having three different river systems added the dimension of variation over a broader scale, thus stretching the two metrics to investigate whether both responded similarly or in different ways. Results indicated that both metrics provide a similar portrait of overall river conditions. At the smaller spatial scale, the Odonata assemblage, unlike SASS, was highly sensitive to the riparian vegetation. Odonata species were less sensitive to vegetation composition but differentially sensitive to vegetation structure. However, landscape context is also important, with point localities being affected by the neighbouring dominant habitat type. Larval Odonata alone did not provide this information. Overall, aquatic macroinvertebrates and adult Odonata provide a highly complementary pair of metrics that together provide large spatial scale (river system) and small spatial scale (point localities) information on the level of impact of stressors such as riparian invasive alien trees." (Author)] Address: Smith, Jenny, School of Botany and Zoology, University of KwaZulu-Natal, P/Bag X01, Pietermaritzburg, South Africa

2006

12138. Morris, K. (2006): Suffolk dragonflies 2005. *Trans. Suffolk Nat. Soc.* 42: 68. (in English) ["Not a great year for migrants but a few interesting records along the coast. More importantly at least five of our Odonates continued their territorial expansion in Suffolk. Both *Libellula fulva* and *Platycnemis pennipes* pushed further up the River Stour with the former well into Sudbury and the latter just short although another small colony has recently appeared north of Sudbury in the Glemsford area. *L. fulva* wasn't found on this river until the 1990s but is now abundant either side of Bures. *P. pennipes* seemed to disappear from Suffolk in the 1960s but was rediscovered by Arthur Watchman at Stratford St Mary in 1988. Two other hawkers are mak-

ing steady progress in establishing themselves in a wider area of our county. *Aeshna isosceles* can now be seen along the coast as far south as Aldeburgh with up to six hawking on the RSPB North Warren reserve – it was also reported as locally abundant further north and even found in central Lowestoft. Our earliest dragonfly – *Brachytron pratense* – only used to be found near the coast in Suffolk. Now it appears to be turning up almost anywhere. However it should be remembered that the hawkers normally take at least two years to go through their aquatic maturation process and therefore may not yet emerge every year in their new territories. Last but not least the new (1998) damselfly to England – *Erythromma viridulum* – can now be seen in most parts of the county where there is suitable habitat and certainly seems to have the ability to colonise faster than its larger relative *E. najas*." (Author)] Address: Morris, K., Arisaig, Back Lane, Monks Eleigh, Suffolk, IP7 7BA, UK. E-mail: dragons@arisaig.net

12139. Perez-Gelabert, D.E. (2006): Arthropods of Hispaniola (Dominican Republic and Haiti). A checklist and bibliography of species. *Zootaxa* 1831: 1-530. (in English, with Spanish summary) [Odonata are checklisted on pages 285-287.] Address: Perez-Gelabert, D.E., Integrated Taxonomic Information System (ITIS) and Dept of Entomology, U. S. National Museum of Natural History, Smithsonian Institution, P. O. Box 37012, Washington, DC 20013-7012, USA. E-mail: perezd@si.edu

2007

12140. Camousseight, A.; Vera, A. (2007): Estado del conocimiento de los Odonata (Insecta) de Chile. *Boletín del Museo Nacional de Historia Natural, Chile* 56: 119-132. (in Spanish, with English summary) ["A total of 47 species distributed in 23 genera and 9 families are recognized; the endemism reaches 29.8% of the species." (Authors)] Address: Camousseight, A., Museo Nacional de Historia Natural, Casilla 787, Santiago, Chile. acamousseight@mnhn.cl

12141. Hagen, H. von (2007): Drachenfliegen und Wasserjungfern: Libellen. In: *Naturschutzgruppe Witten - Biologische Station e.V. (Hrsg.): Natur zwischen Ruhr und Ardey. Erleben, verstehen und schützen. Comedia.* Bochum: 77-83, 213. (in German) [This contribution on the regional natural history introduces into the dragonfly fauna. Appendix 2 lists the species known to occur near Witten, Nordrhein-Westfalen, Germany.] Address: von Hagen, H., Akazienweg 28, 58452 Witten, Germany. E-mail: h.vonhagen@web.de

12142. Ibrahim, H.; Dauti, E.; Gashi, A.; Trozic-Borovac, S.; Skrijelj, R.; Grapci-Kotori, L. (2007): The impact of sewage effluents in water quality and benthic macroinvertebrate diversity of the Prishtina river (Kosova). *Entomol. rom.* 12: 227-231. (in English) ["From December 2004 until November 2005 macrozoobenthos specimens were collected every month with Surber net in six selected stations of the Prishtina River. The Hilsenhoff Family Biotic Index (FBI) and Shannon Weaver Index of Diversity on family level were used to indicate organic and nutrient pollution. In total 7 947 specimens belonging to 56 families of macrozoobenthos groups were found, mainly consisting of aquatic insects. The FBI results during the one-year period show that station P3 has the lowest value (4.6) and thus the best quality of water, while the highest value of this index was regis-

tered in station P5 (8.1) where the impact from sewage input is huge and obvious. The lowest value of Shannon Weaver Diversity Index was registered in station P5 (0.33) while the highest value was found in station P3 (4.04). These results show that biodiversity of aquatic insects (and macrozoobenthos in general) is seriously threatened in the last three stations of Prishtina river because of the direct discharge of sewage waters." (Authors) Taxa (including Odonata) are treated at family level.] Address: Ibrahim, H., Faculty of Mathematical and Natural Sciences, University of Prishtina, Kosovo

12143. Rodrigues, R.C.; Teixeira, R.A.; Campos, L.A. (2007): Comunidade de insetos bentônicos em rio impactado por mineração de carvão em Treviso, Santa Catarina Community of benthic insects in a river impacted by coal mining in Treviso, Santa Catarina. *Tecnologia e Ambiente* 13: 14 pp-["The diversity of benthic insects under a pollution gradient by coal mining effluents was analyzed in the Mãe Luzia river, southern Santa Catarina (Brazil). Insects were collected biweekly from September 2004 to August 2005 at three sites presenting different contamination levels. Temperature, discharge, pH and conductivity were measured during field sampling. An entomological net (mesh of 1 mm) was used in transects of 20 m disturbing the substratum at each 1 m. The insects were identified to family level and for each site the diversity index of Shannon-Wiener and the equitability index of Pielou were calculated. Canonical Correspondence Analysis (CCA) was used to search for similarity patterns among the sites and the correlation between biotic and abiotic variables. A total of 14,025 specimens were registered belonging to 35 families of nine orders. Hydropsychidae (Trichoptera) was the most abundant family followed by Elmidae (Coleoptera) and Psephenidae (Coleoptera). Abundance and richness were inversely proportional to the pollution impact degree, whereas the highest values of diversity and equitability were found at the intermediary site. CCA indicated better correlation between the conductivity and the diversity of benthic insects. These analysis evidenced differences between the sample units of the two less disturbed sites, being useful to detect subtle variations in the lotic environment." (Authors) Taxa including Odonata are treated at family level.] Address: Rodrigues, R.C., Programa de Pós-Graduação em Ciências Ambientais, Universidade do Extremo Sul Catarinense, Av. Universitária 1105, Cx.P. 3167 CEP 88806-000 Criciúma, Santa Catarina, Brazil. E-mail: renatacrbio@yahoo.com.br

12144. Tamai, M.; Wang, Z.; Rajagopalan, G.; Hui, H.; He, G. (2007): Aerodynamic performance of a corrugated dragonfly airfoil compared with smooth airfoils at low Reynolds numbers. *Proceedings of the 45th AIAA Aerospace Sciences Meeting and Exhibit*, Reno, Nevada, 8-11 January 2007 (10.2514/6.2007-483): 12 pp. (in English) ["An experimental study was conducted to investigate the flow behaviour around a corrugated dragonfly airfoil compared with a traditional, streamlined airfoil and a flat plate. The experimental study was conducted at the chord Reynolds number of $Re_C = 34,000$, i.e., the regime where Micro-Air-Vehicles (MAV) usually operate, to explore the potential applications of such bio-inspired airfoils for MAV designs. The measurement results demonstrated clearly that the corrugated dragonfly airfoil has much better performance over the streamlined airfoil and the flat plate in preventing large-scale flow separation and airfoil stall at the test low Reynolds number

level. The detailed PIV measurements near the noses of the airfoils elucidated underlying physics about why the corrugated dragonfly airfoil could suppress flow separation and airfoil stall at low Reynolds numbers: Instead of having laminar separation, the protruding corners of the corrugated dragonfly airfoil were found to be acting as "turbulators" to generate unsteady vortices to promote the transition of the boundary layer from laminar to turbulent rapidly. The unsteady vortex structures trapped in the valleys of the corrugated cross section could pump high-speed fluid from outside to near wall regions to provide sufficient energy for the boundary layer to overcome the adverse pressure gradient, thus, discourage flow separations and airfoil stall." (Authors)] Address: Zu, H., Dept of Aerospace Engineering, and AIAA Senior Member, USA. E-mail: huhui@iastate.edu

12145. Wang, Z.-g. (2007): Catalogue of Chinese dragonflies. *Henan Science* 25(2): 1-20. (in Chinese) [The paper lists 659 Odonata species/subspecies belonging to 154 genera and 19 families.] Address: Wang Zhi-guo, Henan Academy of Science, Zhengzhou, Henan, 450002 China

2008

12146. Calle, P.; Beekers, B.; Wijnhoven, H.; Schaffers, J. (2008): De Fauna van de Gelderse Poort. Een overzicht van de interessante ontwikkelingen in de periode 2004-2007. Stichting Flora- en Faunawerkgroep Gelderse Poort. Met financiële ondersteuning van de Provincie Gelderland, Staatsbosbeheer & ARK: 46 pp. (in Dutch) [Netherlands; 45 Odonata species have been recorded, 19 of them are mapped in detail.] Address: Calle, P., Begijnenstraat 36, 6511 WP Nijmegen, The Netherlands. E-mail: pepijnecalle@yahoo.com

12147. Chaput-Bardy, A. (2008): Structure des populations sur un réseau hydrographique dendritique. These de doctorat. Université d'Angers: VII + 139 pp. (in French, with English summary) ["River networks are characterised by a hierarchical branching structure and spatio-temporal heterogeneity. Indeed, longitudinal (physico-chemical parameters, water flow), lateral (connectivity between the main course and secondary channels) and time dimensions (seasonal variations) influence habitat heterogeneity. These variations in environmental parameters are gradual along branches (physico-chemical gradients) or discrete between branches (habitat heterogeneity) of the river network. Then landscape structure influences distribution, dispersal and gene flow of freshwater organisms. This work aimed to test (i) the effect of river network geometry on dispersal and gene flow, and (ii) the effect of environmental variations on distribution and phenotypic traits related to dispersal. We used empirical and theoretical approaches by studying a damselfly species, *Calopteryx splendens* across the River Loire and fitting an individual based-model to simulate gene flow in synthetic river networks. Then we showed a discontinuous distribution of individuals along watercourses and a morphological cline across the Loire River. This cline was due to physico-chemical characteristics of water. Morphological variations did not influence dispersal abilities but affected survival. Survival and densities were the main factors influencing dispersal in *C. splendens*. Genetical analyses showed an isolation by distance pattern and a strong genetic structure, but no genetic groups were defined in the catchment. These results can be ex-

plained by overland gene flow between watercourses and a metapopulation structure at the catchment scale. This is the first study performed in a large river network in environmental conditions. Furthermore we realised the Gene-Net software to test the effects of the river network on population genetic structure of freshwater organisms." (Author)] Address: Chaput-Bardy, Audrey, Laboratoire Paysages et Biodiversité, UFR Sciences, 2 bd Lavoisier, 49045 ANGERS Cedex, France.

12148. Coles, J.O. (2008): An integrated assessment of heavy metal contamination of sediments in the Halls Mill Creek watershed in Mobile, Alabama. MSc. thesis, University of South Alabama: 93 pp. (in English) ["Halls Mill Creek and its tributaries, Milkhouse and Second Creeks, are part of the Dog River Watershed that drains most of metropolitan Mobile, AL. Suburban development in West Mobile has created a large non-point source of the metal contaminants of lead, copper, cadmium and chromium. As part of an integrated assessment of sediment quality in the Halls Mill Creek Watershed sediment physicochemical properties including metal concentrations, percent organic content, and particle size distributions were analyzed. A whole sediment contact toxicity bioassay with the freshwater amphipod *Hyalella azteca* (Hyalellidae; Amphipoda) was conducted and *Progomphus obscuris* larvae were examined as bioindicators of heavy metal contamination of sediments. Field collected sediments contained concentrations of lead, copper, cadmium and chromium below toxic effects threshold levels and did not result in reduced survival and growth in *H. azteca*. *P. obscuris* larvae accumulated metals to detectable levels however relationships between sediment and tissue concentrations were not seen."(Author) <http://www.docin.com/p-226807678.html>] Address: not stated

12149. Dyatlova, E.S. (2008): Zoogeographic analysis of dragonfly fauna (Insecta: Odonata) of south-western Ukraine. The Kharkov Entomological Society Gazette 2007 (2008) 15(1–2): 21-27. (in Russian, with English summary) ["An analysis of the dragonfly fauna of south-western Ukraine was carried out, based on established odonatological zoogeographical classification. The odonate fauna of SW Ukraine was compared with other European countries. It was established that the fauna of the study area has the greatest similarity with certain Balkan countries (Serbia, Bulgaria, Bosnia and Herzegovina, Montenegro, Romania), south-eastern Ukraine and Hungary (82–75 %) and the least similarity with certain Baltic countries (Latvia, Sweden, Estonia and Finland) (58–49 %). As a result of zoogeographic analysis it was established that genera of the boreal faunistic complex dominate (72.4 %), genera of Sonore (42.6 %) and European-Siberian (21.3 %) groups predominating. Amongst the boreal species complex, 68.09 % belong to the European-Siberian group and 29.79 % to the Mediterranean group." (Author)] Address: Dyatlova, Elena, Inst. Zool., Fac. Biol., I.I. Mechnikov Univ. Odesa, Odessa, Ukraine. E-mail: lena.dyatlova@gmail.com

12150. Harter, N. (2008): Note sur la présence de l'Orthétrum à stylets blancs (*Orthetrum albistylum*) pour le département de la Marne (51). *Naturelle* 2: 32-33. (in French) [17-VII-2007, Réserve Naturelle du Mesnil-sur-Oger, France] Address: Harter, N., 6 rue haute 08090 Fagnon, France. E-mail: harter.chiro@mail.com

12151. Martin, M.; Luig, J.; Ruusmaa, J.; Heidema, M. (2008): Distribution maps of Estonian insects. 3. Odo-

nata. Maps 166-219. *Eesti Loodusfoto*. Tartu: 64 pp. (in Bilingual in Estonian and English) ["According to insect collections and publications, 54 species of Odonata are recorded from Estonia. For each species, a distribution map based on 10 x 10 km international UTM grid is provided. Records from before 1950 and 1950 onwards verified by the authors, as well as records from published or unpublished sources not verified by the authors are denoted with different symbols." (Authors)] Address: not stated

12152. Ternois, V.; Druart, D. (2008): Nouvelles observations d'Orthétrum à stylets blancs *Orthetrum albistylum* (Selys, 1848) dans le département de la Haute-Marne (Odonata, Anisoptera, Libellulidae). *Bull. Soc. Sc. Nat. et Arch. de la Haute-Marne*, 7 (nouvelle série): 14-17. [Seven new records from the 2007 season in northern France are presented as well as data on habitat and phenology of *O. albistylum*.] Address: Ternois, V., /c CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.vincent.ternois@wanadoo.fr

12153. Ternois, V.; Druart, D.; Brouillard, Y.; Lambert, J.-L. (2008): Première mention de *Ceriatrum tenellum* (De Villers, 1789) dans le département de la Haute-Marne et état des connaissances pour l'Aube (Odonata, Zygoptera, Coenagrionidae). *Naturelle* 2: 26-31. (in French) [Bourbonne-les-Bains, France; 13-VI and 13-VII-2007; a graph with phenology and a distribution map of the species for the Champagne-Ardenne-region are presented in addition.] Address: Ternois, V., /c CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.vincent.ternois@wanadoo.fr

12154. Thaler, B. (2008): Die Wirbellosenfauna des Völser Weiher (Schlerngebiet, Südtirol). *Gredleriana* 8: 519-536. (in German, with English summary) ["In the frame of the "Habitat Schlem" project, the invertebrate assemblages of the Völser Weiher, meio- and macrozoobenthos as well as Zooplankton, were analyzed. Altogether 120 taxa were found, 33 of which not yet recorded for South Tyrol. Zoobenthos was composed of 99 crustacean and macroinvertebrate taxa, the majority of which found in the eulittoral. Tire richest group was the one of the Diptera with mainly Chironomidae taxa, followed by Oligochaeta and Crustacea. In terms of abundance the Crustacea clearly dominated in the eulittoral, mostly represented by *Macrotyclops albidus* and *Alonarfifinis*. Among the macroinvertebrates the highest relative abundance was shown by the Oligochaeta with *Sh/laria Incustris* as the most frequent species, the Diptera (*Dicrotendipcs tritonus*) and the Ephemeroptera (*Caenis horaria*). Tire zoobenthos of tire sublittoral zone was almost exclusively represented by Oligochaeta, Chironomidae and Crustacea. Tire Zooplankton was composed of 16 rotifer species, 10 cladoceran and 4 copepod species. Tire quantitatively most important species were *Keratella cochlearis* among rotifers, *Ceriodaphnia pulchella* among cladocerans and *Mesocyclops leuckarti* among copepods. Tire Zooplankton community was characterized by a high percentage of rotifers. Tire ecological status of Völser Weiher, according to the European Water Framework Directive (2000/60/EC), was found to be good both evaluating it with Zooplankton and with eulittoral zoobenthos." (Authors) The list of taxa includes *Coenagrion puella* group, *Ischnura* sp., *Anax imperator*, *Cordulia aenea*, *Libellula depressa*, and several early unidentified larval

stadia of different Odonata taxa.] Address: Thaler, Bertha, Biologisches Labor, Unterbergstr. 2, 39055 Leifers (BZ), Italy. E-mail: Bertha.Thaler@provinz.bz.it

2009

12155. Covey, S. (2009): Views and Reviews: The Dragonflies of Lesbos by John Bowers. Friends of Green Lesbos, Lesbos, Greece, 2009. 91 pp., 25 colour plates. Sbk. ISBN 978-960-930703-1. £15.00. Atropos 38: 58-59. (in English) [Extensive book review.] Address: not stated

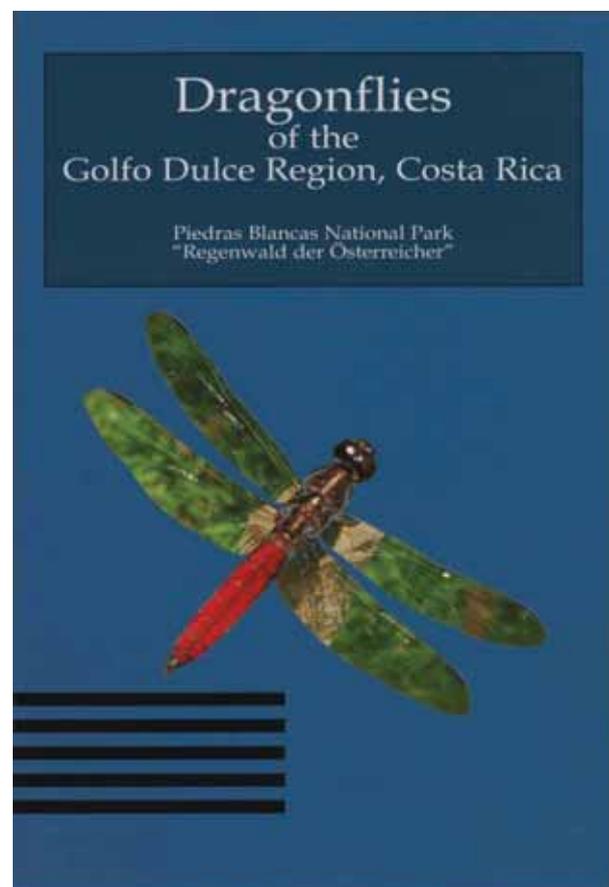
12156. Dunkley, J. (2009): Red-veined Darter *Sympetrum fonscolombii* in Northamptonshire. Atropos 38: 64-65. (in English) ["A significant local find of six *S. fonscolombii* was made at Upton on 27 June 2009 by local stalwarts Nick Roberts and Mark Piper; these were hawking over a recently constructed pond serving as a stormwater balancing vessel for adjacent new roadworks, illustrating how Odonata may opportunistically make use of any available water offering favourable habitat. I visited the site the next day, but the sky had clouded over and despite searching there was no further sign that afternoon. I returned on 29 June at 08.00 hrs. It was already very warm, but it took another hour or more for the target to appear, by which time Bob Bullock had arrived and we were soon watching up to six *S. fonscolombii*, including an ovipositing pair in tandem. Following Mark Tyrrell's prediction that confirmation of breeding should be looked for from mid-September onwards, visits by he and I on 19 and 22 September respectively produced not only teneral but also exuviae. The species remained present into October with estimated numbers running into double figures, providing much pleasure to local Odonata enthusiasts. As a bonus Mark Tyrrell found a 'wandering' male of *S. danae* at the same site on 19 September, following a male in Northampton on 10 September (Doug Goddard), which I was also lucky to see. These constitute the first records for the County." (Author)] Address: Dunkley, J., 10 Stonelea Road, Syweil, Northampton, NN6 OAZ, UK

12157. Garzon Sanabria, C.; Realpe, E. (2009): Diversidad de Odonata (Insecta) en la reserva natural Cabildo-Verde (Sabana de Torres-Santander, Colombia), Una aproximación hacia la conservación (Dragonfly diversity (Insecta) in the natural reserve Cabildo-Verde (Sabana de Torres-Santander, Colombia), an conservation approach). *Caldasia* 31(2): 459-470. (in Spanish, with English summary) ["We studied the diversity of Odonata in six sampling stations in the Sabana de Torres county, department of Santander, Colombia. Four stations were located within the Natural reserve Cabildo Verde, an area long the western hall slope of the Eastern cordillera, in the Magdalena's river mid valley. The remaining two were located outside of this reserve. The species composition was analyzed using an euclidian distance analysis. We found 245 adult individuals belonging to seven families, 22 genera and 39 species in the Sabana de Torres; 33 species, most of them in the suborder Zygoptera were found in the Natural Reserve Cabildo verde. The Shannon-Weaver value for the natural reserve was of $H' = 2,972$ and outside of the reserve $H' = 2,645$, both relatively high in comparison to other studies. There was not significant differences in the number of species inside and outside of the reserve (Chi-squared, $X^2 = 1,51$, $Gl=1$, $p > 0.05$); however, the composition of dragonflies within the re-

serve was given mainly by stenotopic species, especially those in the families Protoneuridae and Perilestidae. Such species are abundant in the studied area, occurring in streams with high vegetal coverage in primary and secondary forests." (Authors)] Address: Garzon Sanabria, Carolina, Laboratorio de Zoología y Ecología Acuática (LAZOE), Universidad de los Andes, Apartado 4976, Bogotá D.C., Colombia. lc.garzon88@uniandes.edu.co

12158. Glitz, D. (2009): Libellen: Das rheinland-pfälzische Naturerbe. Wir stellen Ihnen die Vielfalt der bedeutendsten Arten in Rheinland-Pfalz vor. *Naturschutz in Rheinland-Pfalz* 3/2009: 4-5. (in German) [The paper introduces *Oxygastra curtisii*, *Ophiogomphus cecilia* and an identification guide focussed on the regional Odonata species of Rheinland-Pfalz. In addition it reports on the conservation measures directed to Odonata.] Address: Glitz, D. c/o NABU Rheinland-Pfalz e.V., Frauenlobstr. 15-19, 55118 Mainz, Germany. E-mail: Kontakt@NABU-RLP.de

12159. Schneeweih, S.; Albert, R.; Huber, W.; Weisenhofer, A. (2009): Dragonflies of the Golfo Dulce Region, Costa Rica: Piedras Blancas National Park "Regenwald der Österreicher". Verein zur Förderung der Tropenstation La Gamba, Vienna. 56 pp. (in English) [This booklet about the dragonflies of the Piedras Blancas National Park, Costa Rica, features the majority of the species of the region. Species descriptions and many colour photographs enable the reader to identify dragonflies. The booklet also includes an introduction to dragonflies and to the region's natural history." (Publisher) Address: Fakultätszentrum für Biodiversität der Universität Wien, Tropenstation La Gamba, Rennweg 14, A-1030 Wien, Austria. E-mail: tropenstation.botanik@univie.ac.at



12160. Weber, G.; Boomers, J.; Cölln, K.; Jakubzik, A.; Ricono, K. (2009): Die Rückbesiedlung der ehemaligen Deponie Eskesberg durch Tiere und Pflanzen nach Abschluss der Sanierung - Vorstellung des begleitenden Biomonitorings. Jahresbericht des Naturwissenschaftlichen Vereins Wuppertal 61: 145-158. (in German, with English summary) [Nordrhein-Westfalen, Germany; 16 Odonata species have been recorded within the recolonisation period of five years. Only *Ischnura pumilio* and *Lestes sponsa* are presented in greater details.] Address: Weber, G., C/o NVW, Soldnerstr. 22, 44801 Bochum, Germany. E-mail: nvwuppertal@online.de

12161. Woodward, S. (2009): Mix up with a mixta. Leicestershire Entomological Society. Newsletter 41: 8. (in English) ["Dragonflies are generally reckoned to have good eyesight, but this male *Sympetrum sanguineum* is trying to couple with a male *Aeshna mixta*. The hawk was having none of it, so after about ten seconds of wingclattering and abdomen-waving, the darter was repelled. Eggleton Reserve, Rutland Water, SK881075, 30 Aug 2009." (Author)] Address: Woodward, S., Highfield Rd, Groby, Leicester LE6 0GU, UK. E-mail: grobysteve@metronet.co.uk

2010

12162. Abbott, J.C. (2010): Dragonflies and Damselflies (Odonata) of Texas. Odonata Survey of Texas. Vol. 4. Austin, Texas: VI + 312 pp. (in English) [The book contains updated through 2009 references to the 234 species of odonates distributed throughout Texas, USA. Included in this volume are detailed species distribution and seasonality information arranged so that users can quickly and easily search by scientific name, county name, or flight season.] Address: Odonata Survey of Texas c/o John C. Abbott, Ph.D. Section of Integrative Biology1, University Station #L7000, The University of Texas at Austin, Austin, Texas 78712 USA. E-mail: jcabbott@mail.utexas.edu

12163. Bauer, S. (2010): Zielarterfassung. Naturschutz im Landkreis Ravensburg 5: 367 pp. (in German) [Baden-Württemberg, Germany; the author presents basic data on the regional umbrella species including regional distribution, habitat requirements and threats. Odonata are represented by *Coenagrion mercuriale*, *Orthetrum coerulescens*, *Cordulegaster bidentata*, *C. boltonii*, *Erythromma najas*, *Coenagrion pulchellum*, *Anax parthenope*, *Anaciaeschna isoceles*, *Epitheca bimaculata*, *Libellula fulva*, *Lestes barbarus*, *L. dryas*, *L. virens*, *Sympecma fusca*, *S. paedisca*, *Sympetrum flaveolum*, *Aeshna subarctica elisabethae*, *Somatochlora arctica*, *Leucorrhinia pectoralis*, *L. dubia*, and *L. rubicunda*.] Address: Bauer, S., Im Tobel, 88353 Immenried, Germany. E-mail: Josef.Bauer@Landkreis-Ravensburg.de

12164. El Haissoufi, M.; Bennis, N.; El Mohdi, O.; Millan, A. (2010): Analyse préliminaire de la vulnérabilité des odonates (Odonata) du Rif occidental (nord du Maroc). Boletín de la S.E.A. 46(1): 345-354. (in French, with Spanish and English summaries) ["The Odonata fauna of the Western Rif is well-known for its richness and diversity. In fact, 49 species out of the 61 which live in Morocco occur in this region alone. The analysis of the level of vulnerability shown by the species that occur in this region has shed light on those species most

vulnerable at the regional and national scale. *Hemianax ephippiger*, *Calopteryx exul*, *Oxygastra curtisii*, *Zygonyx torridus*, *Aeshna mixta* and *Orthetrum brunneum* are highly vulnerable at the regional scale and are therefore proposed for inclusion in the future red list of threatened species of the Western Rif. The degree of national vulnerability, studied here only for *C. exul* and *Gomphus simillimus maroccanus*, two Maghrebian and Moroccan endemics, respectively, revealed an average degree of vulnerability for both species. Protection measures should focus on these two species, especially because their natural habitats are being affected by different types and patterns of stress and disturbance." (Authors)] Address: El Haissoufi, M., Laboratoire Diversité & Conservation des Systèmes Biologiques. Département de Biologie, Université Abdelmalek Essaâdi, Tétouan, Maroc. E-mail: elhaissoufism@yahoo.fr.

12165. Grand, D. (2010): *Leucorrhinia pectoralis* (Charpentier, 1825) dans la Dombes (département de l'Ain): éléments de biologie (Odonata, Anisoptera: Libellulidae). *Martinia* 26(3-4): 151-166. (in French, with English summary) ["The author first summarizes the biology, the ecology and the status of *Leucorrhinia pectoralis* in France and Europe. He brings then the results of a 3 years study of this species at the pond of Pizay, in the Dombes area, especially during emergence with attention to the metamorphosis substrates, exuviae location and sex-ratio. Some parameters influencing larval densities were examined as well as adults behaviours such maturation, territoriality, reproduction and displacements. The distribution of the species within Dombes area is finally considered together with its possible evolution regarding drought periods, agricultural practices and urban development." (Author)] Address: Grand, D., Impasse de la Voûte, F-69270 St. Romain-au-Mont d'or, France. E-mail: danielgrand@yahoo.fr

12166. Koch, L. (2010): Neu entstandene Kleingewässer entwickeln sich zu Libellen-Biotopen. Beiträge zur Heimatkunde der Stadt Schwelm und ihrer Umgebung N.F. 59: 19-38. (in German) [Nordrhein-Westfalen, Germany; 17, mostly widespread Odonata species are reported.] Address: Koch, L., Heinrich-Heine-Str. 5, 58256 Ennepetal, Germany. E-mail: L-Koch@t-online.de

12167. Lambret, P. (2010): Dynamique d'une population d'adultes de *Lestes macrostigma* (Eversmann, 1836) et implications pour son suivi: l'exemple de la Camargue (Odonata, Zygoptera: Lestidae). *Martinia* 26(1-2): 19-28. (in French, with English translation) ["The emergence curve, the flight period (phenology) and the number of adults which are detected along the day have been studied in *L. macrostigma* by the visual transect count method in a temporary pool of Camargue. Results are discussed in the light of other findings across the range of this threatened species. The consequences in term of survey and monitoring are highlighted." (Author)] Address: Lambret, P., Marais du Vigueirat, F-13104 Mas-Thibert, France. E-mail: philambret@hotmail.com

12168. Lambret, P. (2010): Un mâle de *Lestes macrostigma* (Eversmann, 1836) prisonnier de *Juncus maritimus*. *Martinia* 26(1/2): 49-51. (in French, with English summary) [1-VII-2009, Marais du Vigueirat, Camargue, France; a male of *L. macrostigma* that has been 'captured' by *Juncus maritimus*: its right forewing was pierced by a stem of the plant.] Address: Lambret, P., Amis des Marais du Vigueirat, F-13104 Mas Thibert, France. E-mail: philambret@hotmail.com

12169. Martire, D. (2010): Les Libellules et Ephemeres de la Reunion. BIOTOPE. Mèze: 72 pp. (in French) [The book covers 21 Odonata and 2 Ephemeroptera species found on the island of Reunion. These are attractively illustrated with colour photos. The book presents an identification key to Odonata, many colour photos and distribution maps of the species.] Address: Biotope, 22, boulevard Maréchal Foch, BO 58, 34140 Mèze, France

12170. Meyabeme Elono, A.L.; Liess, M.; Duquesne, S. (2010): Influence of competing and predatory invertebrate taxa on larval populations of mosquitoes in temporary ponds of wetland areas in Germany. *Journal of Vector Ecology* 35(2): 419-427. (in English) ["Abundances of mosquito larvae and associated invertebrate communities were assessed in 27 temporary ponds during the spring season in wetland areas of Germany. Four genera of mosquitoes were identified: *Aedes*, *Anopheles*, *Culex*, and *Culiseta*. We focused our analyses on *Aedes* spp. because this genus was the most abundant (92% of total abundance) and frequently encountered mosquito (present in 65% of investigated sites). The abundance of *Aedes* spp. was negatively associated with the abundance of competitors for food, and to a lesser extent with those of intraguild predators and strict predators. The influence of these natural antagonists on larvae of *Aedes* was stronger in ponds with higher levels of dissolved oxygen ($53 \pm 4\%$) than in ponds with lower levels ($16 \pm 1\%$). The overall abundance of antagonists explained 42% of the variation in abundance of *Aedes* spp. at sites with higher levels of dissolved oxygen. Of this explained variation, competitors accounted for 34.7%, whereas the abundance of intraguild predators and strict predators accounted for only 6.8 and 0.5%, respectively. Therefore, the promotion of competing species might be an appropriate ecological approach for the control of *Aedes* spp. in temporary ponds in these areas." (Authors) Samples including Odonata originate from Rosslau (Sachsen-Anhalt), Spree-wald (Brandenburg) and Leipzig (Sachsen).] Address: Liess, M., UFZ – Helmholtz Centre for Environmental Research, Department of System Ecotoxicology, Permoserstr.15, 04318 Leipzig, Germany

12171. Molina, C.I.; Gibon, F.M.; Duprey J.L.; Dominguez E.; Guimarães, J.R.; Roulet, M. (2010): Transfer of mercury and methylmercury along macroinvertebrate food chains in a floodplain lake of the Beni River, Bolivian Amazonia. *Sci. Total. Environ.* 408(16): 3382-3391. (in English) ["We have evaluated the mercury and methylmercury transfers to and within the macroinvertebrate communities (including *Tremea* sp.) of a floodplain lake of the Beni River basin, Bolivia, during three hydrological seasons and in two habitats (open water and vegetation belt). Using the stable isotopes $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$, six trophic chains were identified during a previous study. Four are based on only one source: seston, organic matter from the bottom sediment, periphyton and macrophytes. Two are based on mixed sources (seston and periphyton in one case, periphyton and macrophytes in the other). During sampling, we found only one taxon that had surface sediment organic matter as food source and very few taxa whose trophic source was constituted by macrophytes. The periphyton was the most important source during all seasons; it produced the longest chain, with three trophic positions. Whatever the season and trophic source, all collected macroinvertebrates contained methyl mercury and the

latter was biomagnified in all trophic chains that we identified. The biomagnification of methylmercury through invertebrate trophic chains accurately reflected the existence and length of these chains. Biomagnification was virtually non-existent in the sediment-based chain, low and restricted to the dry season in the macrophyte-based chain. It was significant in the seston-based chain, but limited by the existence of only two trophic levels and restricted to the wet season. Finally, it was very effective in the periphyton-based chain, which offers the highest rate of contamination of the source but, above all, the largest number of trophic levels." (Authors)] Address: Molina, C.I., Instituto de Ecología, Unidad de Limnología, UMSA, Casilla postal #10077, La Paz, Bolivia. E-mail: camoar6088@gmail.com

12172. Specht, W. (2010): Zur Libellenfauna im Diabassteinbruch Wolfshagen, Landkreis Goslar (Niedersachsen) - ein Zwischenbericht (Odonata). *Mitteilungen des Naturwissenschaftlichen Vereins Goslar* 11: 81-164. (in German, with English summary) ["Dragonfly fauna of a quarry (Diabas-Steinbruch) near Wolfshagen, region Goslar (Lower Saxony, Germany) - an interim report (Odonata). During a number of studies in the quarry called "Diabas-Steinbruch" east of Wolfshagen in the time between 1992 and 2004, there was also carried out a survey of the occurrence of dragonflies within that quarry. On the basis of the results from those years, a total of 10 other species could be recorded in 2008 and 2009 raising the total number of species up to 33.18 out of these species are certainly indigenous to the place. This group includes the very rare *Leucorrhinia albifrons* and the Mediterranean species *Sympetrum fonscolombii* and *Crocothemis erythraea*. *Ischnura pumilio*, discovered in 2000 and 2004, was not found again. The rare dragonfly accounted to *Aeshna viridis* in 2004 could not be confirmed due to a mistake with identifying this specimen. The diversify and the large quantities of the dragonfly fauna in this protected biotope can possibly be explained with the presence of a micro-climate and a special water structure. The absence of fish and of human use are surely the most important reasons." (Author)] Address: Specht, W., Am Gemeindehof 6, 38690 Vienenburg, Germany. E-Mail: wolfgangspecht@web.de

12173. Thipaksorn, A.; Ruangsittichai, J. (2010): Diversity of rice Odonate insects in Lopburi Province, Thailand. *New Entomol.* 59(3,4): 37-42. ["From 2005 to 2008 in-season rice cropping period, 16 odonate insects were collected from pre-germinated direct seeded rice fields in Lopburi Province, an important rice field area of Central plain, Thailand. Within all rice odonate species, three predominant species, *Agriocnemis pygmaea*, *A. femina femina* and *Ischnura senegalensis*, had the highest numbers of individuals. The percentage of 3 species was 56.19% of the total collected. The sub-dominant species were *Diplacodes trivialis*, *I. aurora aurora*, *Crocothemis servilia servilia* and *Brachythemis contaminata*. The highest mean zygopteran species catch was founded from tillering to flowering rice growth stages and will decreasing of their number in milk grain to mature grain stages. On the other hand, the highest mean anisopteran species catch was founded from tillering to milk grain stages and rapidly decreasing of their number in dough grain stage. The number of species and individuals of rice odonates are increasing correlated to specific rice growth stages." (Authors)] Address: Thipaksorn, A., Department of Zoology, Faculty

of Science, Kasetsart University, Chatuchak, Bangkok 10900 Thailand. E-mail: athipaksorn@yahoo.com

12174. Trevor, D.; Caston, M.; Zwelabo, S. (2010): An assessment of the effect of industrial and sewage effluent on aquatic Invertebrates: A case study of a southern urban stream, Zimbabwe. *Journal of Sustainable Development* 3(2): 210-214. (in English) ["The impact of industrial effluent discharged in Mazai stream was assessed through physical-chemical parameters and also by bio-monitoring of benthic macro-invertebrates. Samples were collected at three sites, one before the effluent discharge point into the stream (site 3) and two sites which were located downstream after the discharge points (sites 1 and 2). High levels of chemical pollutants were recorded at sites 1 and 2 (ZINWA red category) whereas site 3 (reference site) consisted of relatively clean water (ZINWA blue category). This was confirmed by the biological evaluation process. The SASS4 scores at sites 1 and 2 indicated a deterioration of water quality while site 3 there was good water quality with high species diversity. Detrended correspondence analysis (DCA) showed that pollution sensitive taxa such as Hemiptera, Trichoptera, Coleoptera and Odonata were dominant at site 3 whilst the other sites were dominated by pollution tolerant species such as Chironomids. Continuous discharge of effluent could lead to extreme degradation of Mazai stream hence loss of biodiversity of macro-invertebrates." (Authors)] Address: Trevor, D., Dept Biol. Sci., Midlands State Univ., P. Bag 9055, Gweru, Zimbabwe. E-mail: tdube@msu.ac.zw

12175. van Swaay, C.A.M.; Groenendijk, D.; Termaat, T.; Plate, C.L. (2010): Vlinders en libellen geteld: jaarverslag 2009. Rapport VS2010.001, De Vlinderstichting, Wageningen: 36 pp. (in Dutch, with English summary) ["Butterflies and dragonflies are counted using a line-transect method. Butterfly transects are visited every week, dragonfly transects once every fortnight. The length of the transects is variable and depends on habitat quality and availability. In addition, single species transects are exclusively counted for a specific threatened butterfly or dragonfly. Indices were calculated using the computer program TRIM (Trends and Indices for Monitoring Schemes). This program was developed by CBS for the analysis of time series of counts with missing observations. The butterfly indices are calculated using a weighting procedure. The reference value of the year 2000 is set to 100. The dragonfly indices are not weighted yet and in most cases 2000 is used as the first year in the trend calculation and, therefore, set to a reference value of 100. Results of 2009: [...] Like in other years, in 2009 Odonata were counted every fortnight between May and September at 422 sites. The average number of dragonflies per transect was a little higher than in most previous years. Like in most other years *Enallagma cyathigerum* was the most common species (over 86,000 individuals). *Ischnura elegans*, with over 15,000 individuals, was the most widespread species. It was seen on about 81% of the plots. For most species indices are presented. As shown in previous years, an alarming decreasing trend was detected in 2009 again for *Aeshna viridis* and *Coenagrion hastulatum*. Other Red List species, like *Sympecma fusca*, *Lestes virens*, *Leucorrhinia dubia* and *Libellula fulva*, show a positive trend.(Authors)] Address: Termaat, T., De Vlinderstichting, Postbus 506, 6700 AM Wageningen, The Netherlands. E-mail: info@vlinderstichting.nl

12176. Woodward, S. (2010): Black Darter seen at Grace Dieu Wood. *Leicestershire Entomological Society. Newsletter* 43: 8. (in English) [Verbatim: The Black Darter *Sympetrum danae* is Britain's smallest dragonfly. As a heath and moorland species, it is very thinly scattered in the lowlands and there are less than ten records for Leicestershire (Ian Merrill). On a recording excursion to Grace Dieu Wood, Thringstone, on 15 August, ... found one by some small pools that had formed in forestry machinery wheel ruts, SK433175. There was only one insect, a male, and it was not found on subsequent visits, however these pools have been productive for other dragonfly species this year and there are certainly many nymphs lurking in there...] Address: Woodward, S., Highfield Rd, Groby, Leicester LE6 0GU, UK. E-mail: grobysteve@metronet.co.uk

2011

12177. Bence, S.; Blanchon, Y.; Braud, Y.; Deliry, C.; Durand, E.; Lambret, P. (2011): Liste Rouge des Odonates de Provence-Alpes-Côte d'Azur. *Martinia* 27(2): 123-133. (in French, with English summary) [Basing on the results of a meeting of regional dragonfly experts on the 19th March, 2011 and applying the IUCN methods a regional Red List of endangered Odonata for Provence-Alpes-Côte d'Azur, France is published: "*Sympecma paedisca* is Regionally Extinct (RE). *Lestes macrostigma*, *Coenagrion caerulescens*, *Cordulegaster bidentata*, *Somatochlora m. meridionalis*, *Sympetrum depressiusculum* and *S. v. vulgatum* are Endangered (EN). *Coenagrion pulchellum*, *S. m. metallica*, *S. flavomaculata*, *S. alpestris*, *S. arctica* and *Leucorrhinia dubia* are Vulnerable (VU). *Lestes barbarus*, *L. dryas*, *L. virens vestalis*, *C. mercuriale*, *Brachytron pratense*, *Anax ephippiger*, *Gomphus vulgatissimus*, *G. simillimus*, *Onychogomphus uncutus*, *Cordulia aenea*, *Oxygastra curtisii*, *S. pedemontanum* and *Trithemis annulata* are Near Threatened (NT). Data are Deficient (DD) for *Aeshna grandis*, *G. flavipes* and *C. b. boltonii*. The IUCN methods were Not Applicable (NA) in the region for *C. hastulatum*, *Erythromma najas* and *G. graslinii*. Records of *Calopteryx v. virgo*, *Macromia splendens*, *Ophiogomphus cecilia*, *Epitheca bimaculata*, *L. albifrons* and *Pantala flavescens* are considered erroneous or unreliable. Other species which are present in the PACA region are classified Least Concern (LC). The main threats are habitat fragmentation and reduction of habitat quality. The current policies for biodiversity conservation should contribute to the reduction of the regional extinction risk. A new evaluation of this risk should be made in 2015." (Authors)] Address: Lambret, P., Coordinateur régional PACA du Plan d'Actions en faveur des Odonates, Amis des Marais du Vigueirat, F-13104 Mas Thibert, France. E-mail: p.lambret@espaces-naturels.fr

12178. Benken, T.; Komander, M. (2011): Die Senegal-Pechlibelle (*Ischnura senegalensis*) schlüpft in einem Aquarium bei Ulm. *Mercuriale* 11: 51-52. (in German, with English summary) ["We report on three specimens of *I. senegalensis* accidentally introduced to Germany in 2011. The odonates were encountered in the surroundings of Ulm (Baden-Württemberg) and we assumed the larvae were imported by exotic aquatic plants." (Authors)] Address: Benken, T., Nuitsstr. 19, D-76185 Karlsruhe, Germany. E-mail: Theodor@benken-online.net

12179. Benken, T.; Ehmman, H.; Miller, J.; Miller, E. (2011): Jäger als Gejagte - Libellenimagines als Nahrungsquelle. *Mercuriale* 11: 17-26. (in German) [Austria, France, Baden-Württemberg, Germany; Hornet attacks on *Epiheca bimaculata* and Aeshnidae as well as attacks of dragonflies, spiders and robberflies on Odonata are documented and discussed in detail.] Address: Benken, T., Nuitsstr. 19, D-76185 Karlsruhe, Germany. E-mail: Theodor@benken-online.net

12180. Chalar, G.; Arocena, R.; Pacheco, J.P.; Fabián, D. (2011): Trophic assessment of streams in Uruguay: A Trophic State Index for Benthic Invertebrates (TSI-BI). *Ecological Indicators* 11: 362-369. (in English) ["In this study we assessed the trophic status of 28 wadeable stream reaches of the Santa Lucía basin, an important economic region of Uruguay. We developed a Trophic State Index of Benthic Invertebrates (TSI-BI), the first of its kind for South American lotic systems. The methodological approach consisted of determining the ambient trophic gradient via canonical correspondence analysis based on the benthic invertebrate abundance matrix and an environmental variable matrix. The rescaled site scores served as environmental variables in the weighted averaging model (WA), to weight the benthic abundances and then find the optimum and tolerance of each of the sampled genus. These data were used to estimate the TSI-BI scores. These scores, in conjunction with the total phosphorus concentrations (TP), were used to group the study reaches when running a cluster analysis. The basic statistical parameters of the defined groups serve as an input to identify the threshold values of TP and TSI-BI corresponding with the different trophic states. The boundaries of TSI-BI and TP demarcating mesotrophic and eutrophic states were 8 and 71 g/l, respectively, and can be considered the limits between impaired and less altered reaches. The results also indicated that the trophic status of the reaches is related to land use intensity. A change in land use management seems to be critical for the preservation of one of the most important water supply systems in Uruguay." (Authors) 15 Odonata genera are integrated into the index.] Address: Guillermo Chalar, G., Section of Limnology, Department of Ecology, Faculty of Science, University of the Republic, Iguá 4225, Piso 9, Montevideo CP: 11400, Uruguay. E-mail: gchalar@fcien.edu.uy

12181. Contreras-Garduño, J.; Córdoba-Aguilar, A.; Azpilicueta-Amorín, M.; Cordero-Rivera, A. (2011): Juvenile hormone favors sexually-selected traits but impairs fat reserves and abdomen mass in males and females. *Evolutionary Ecology* 25(4): 845-856. (in English) ["The physiological mechanism underlying resource allocation in sexual selection studies has been little studied. One candidate is hormones as these favour resource allocation to reproductive traits but impair survival due to a resource over-expenditure directed to the former traits. We have investigated whether a juvenile hormone analog (JHa, methoprene) administered topically is involved in the resource allocation to wing pigmentation (an ornamental trait), fat reserves and flight muscle mass in both sexes of *Calopteryx haemorrhoidalis* and *C. virgo*. We also investigated the possible negative effect of such implementation on abdomen mass (an indirect measure of egg production) and field-based survival in adult males of *C. haemorrhoidalis* and *C. splendens*. We found that males and females treated with JHa, against a control group, developed higher wing pigmentation and showed reduced fat reserves

but had no change in muscle mass. In females, JHa decreased abdominal weight (an indicator of fecundity) and in males, survival was impaired only in *C. splendens*. These results support the idea that JH induces resource allocation to wing pigmentation, a sexually selected trait in both sexes. Thus, this study suggests that the action of JH could be a mechanistic link between ornaments and physiological condition in both males and females." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

12182. Grand, D.; David, G.; Diebolt, L. (2011): Réapparition de *Gomphus simillimus* Selys, 1840 dans le Grand Lyon (Odonata, Anisoptera: Gomphidae). *Martinia* 27(1): 61. (in French, with English summary) [Saint-Priest (Rhône), France, 30-VI-2010] Address: Grand, D., Impasse de la Voûte, F-69270 Saint-Romain-au-Mont-d'Or, France. E-mail: danieljgrand@yahoo.fr

12183. Grand, D.; Pont, B.; Krieg-Jacquier, R.; Barlot, R.; Feuvrier, B.; Bazin, N.; Biot, C.; Deliry, C.; Gaget, V.; Michelot, J.-L.; Michelot, L. (2011): *Gomphus flavipes* (Charpentier, 1825) redécouvert dans le bassin hydrographique du Rhône (Odonata, Anisoptera: Gomphidae). *Martinia* 27(1): 9-26. (in French, with English summary) ["After a short statement about the larval habitats of *Gomphus flavipes* and its European and French conservation status, places where this species was recently discovered or rediscovered in the Rhône River basin are noted, among which two are described. The hypothesis of a coming back from the Loire and Rhine watersheds against the maintenance of overlooked local populations throughout the 20th century is discussed. The report ends with an assessment of the conservation status of *G. flavipes* populations in the Rhône River basin." (Authors)] Address: Grand, D., Impasse de la Voûte, F-69270 Saint-Romain-au-Mont-d'Or, France. E-mail: danieljgrand@yahoo.fr

12184. Grand, D.; Garnier, G. (2011): Rencontre avec *Hemianax ephippiger* (Burmeister, 1839) dans le bas Bugéy (Ain) (Odonata, Anisoptera: Aeshnidae). *Martinia* 27(1): 31-32. (in French) [France, lacs de Conzieu, 22-VIII-2009] Address: Garnier, G., Géraldine, CREN Rhône-Alpes, Antenne de l'Ain, château Messimy, F-01800 Charnoz-sur-Ain, France

12185. Greven, H. (2011): Johann Leonhard Frisch (1666-1743) - ein wenig bekannter Pionier entomologischer Forschung. *Entomologie heute* 23: 145-206. (in German, with English summary) ["Johann Leonhard Frisch, pedagogue, linguist and entomologist, was born in 1666 in Sulzbach (Bavaria). He was a universal scholar of the Early Enlightenment. Among others he wrote aside from his job the "Description of various insects of Germany" („Beschreibung von allerley Insecten in Teutschland"), which was issued between 1721 and 1738 in 13 parts. Certainly, he was physico-theologically motivated, but this motivation is far less insistently expressed as by his contemporaries or subsequent "entomologists". The text often impresses with thorough descriptions of 300 "insects", in many cases including their developmental stages. Approximately 260 specimen are Hexapoda, from which many can be determined to the species level. The remaining "insects" belong to various "worms" such as arachnids, millipeds, molluscs, with careful observations of their living and

with ingenious and often amazing conclusions. In addition, he included 41 copper plates with 296 figures (tables; some with more than one figure) of different quality, which were engraved by his sons Philipp Jacob and Ferdinand Helfrich. Surely, meaningfulness of these plates (in combination with the text) is underestimated until now. Also noticeable are the short summaries, occasionally with critical annotations, of the entomological works of some famous naturalists of the Renaissance and the Early Enlightenment, among others Aldrovandi, Mofett, and Swammerdam. At the beginning of the 20th century Bodenheimer has thoroughly acknowledged Frisch, but later appreciations are either totally missing, are short, or focus on Frisch's main interest in parasites and store pests. Contrary to these approaches, I show exemplarily by some less spectacular details (e.g., striking legs of water scorpions, breathing of dragonfly-nymphs, parturition of aphids etc.), how precisely Frisch has observed his objects and how acutely he has commented his finding." (Author) The paper includes many figures and references to Odonata.] Address: Greven, H., Zoologie II, Heinrich-Heine-Universität, Universitätsstr. 1., 40225 Düsseldorf, Germany. E-mail: grevenh@uni-duesseldorf.de

12186. Hubregtse, V. (2011): Ovipositing Odonata: Dragonflies and damselflies at a flood-retarding basin. The Victorian Naturalist 128(4): 138-143. (in English) [A personal narrative is presented which explains the author's experience of watching the reproduction process of Odonata. The afternoon of 9 February 2011 was pleasantly warm, calm and sunny, so I decided to go for a walk around the flood-retarding basin in the north-east section of Monash University's Clayton campus, in suburban Melbourne. The basin, some 200m long and approximately 80m across at its widest point, is always interesting to visit, and this time I was about to see something special.] Address: unknown

12187. Klausnitzer, H. (2011): Bericht über die 11. Zentrale Tagung der Entomofaunistischen Gesellschaft und die 97. Tagung der Thüringer Entomologen. Entomologische Nachrichten und Berichte 55(1): 89-92. (in German) [The report on the meeting of the two German entomological societies includes pictures of Joachim Müller and Wolfgang Zimmermann, well known odonatologists. W. Zimmermann was rewarded for his great contributions to knowledge of Odonata and Ephemeroptera. The laudatio was held by J. Müller.] Address: Klausnitzer, Hertha, PF 202731, 01193 Dresden, Germany

12188. Middlemis-Maher, J.; Werner, E.E.; Denver, R.J. (2011): Stress hormones mediate predator-induced phenotypic plasticity in amphibian tadpoles. Front. Endocrinol. Conference Abstract: ISAREN 2011: 7th International Symposium on Amphibian and Reptilian Endocrinology and Neurobiology. doi: 10.3389/conf.fendo.2011.03.00031: (in English) ["Amphibian tadpoles mount behavioural, physiological and morphological responses to predation. Tadpoles rapidly reduce activity level when exposed to chemical cues of predation; with chronic exposure, tadpoles develop relatively smaller bodies and larger tails. The larger tail may serve as a lure to distract predator strikes from the more vulnerable body, or may confer enhanced burst locomotion for escape. In many vertebrates, exposure to predators also influences the activity of the hypothalamo-pituitary-adrenal (interrenal; HPI) axis. Here we investigated the effects of predator cues on activity of the tadpole HPI

axis and the relation to predator-induced responses in tadpole behaviour and tail morphology. We exposed wood frog tadpoles (*Rana sylvatica*) to the nonlethal presence of a predator (dragonfly larvae fed conspecific tadpoles) in outdoor mesocosms, and measured whole body CORT content by radioimmunoassay. Exposure to predator cue reduced CORT by ~30% compared with controls at 4 hours, but increased CORT by ~2 fold after 4 or 8 days. In a laboratory experiment, exposure either to predator cue or to CORT for 3 days (130 nM added to the aquarium water), caused tadpoles to develop a larger tail relative to their body. Importantly, the effect of predator cue on tail morphology was blocked by treatment with the corticosteroid synthesis inhibitor metyrapone (110 µM). Short term treatment with CORT (1-3 hours) increased tadpole activity, and lead to higher mortality than controls in the presence of an unrestrained predator. By contrast, chronic exposure to CORT (8 days) showed a trend towards increased survivorship of tadpoles with free predators. Our results support the hypothesis that tadpoles mount a dual physiological and phenotypic response to predation, suppressing behaviour and CORT in the short term, but increasing CORT with longer exposure which induces changes in tail and body morphology." (Authors)] Address: Denver, R.J., University of Michigan, Molecular, Cellular and Developmental Biology, Ann Arbor, USA. E-mail: Rdenver@umich.edu

12189. Naraoka, H. (2011): Reproductive behavior of *Coenagrion terue* (Asahina, 1949) (Zygoptera, Coenagrionidae), with special reference to repeated interruptions of the copulation and a long pre-ovipositional tandem linkage. Tombo 53: 101-109. (in Japanese, with English summary) ["The reproductive behaviour and prolonged pre-oviposition tandem in *C. terue* are described based on observations in northern Japan, in 2003-2007. The number of females was much smaller than that of males at the oviposition site. Tandem formation was observed at the roosting site in early morning and at the oviposition site in late morning, between 6:00-15:00h. However, males rarely succeeded in holding females, because most females avoided males by doing "face to face hovering". When a rejective female was seized by a male, she did a peculiar "abdominal oscillation", and consequently tandem was shortly dissolved. Copulation was observed from 6:10-14:30h. Oviposition started after 9:00h. When pairs were created early in the morning, they did not necessarily start to copulate soon, but did copulate at various time between 6:00-12:00h with a peak of 9:00-11:00h. The duration of copulation, observed in field and cage, before 9:00h (mean 41.7 ± 22.3 min), was longer than that after that time (mean 33.0 ± 12.1 min), but the difference was not significant. Mean copulation duration was 38.1 ± 19 min (n=34). Copulation was divided into 3 stages; I: 35.4 ± 19.1 min, II: 77.8 ± 32.7 sec, and III: 110.7 ± 43.4 sec. In copulations continuing over 24 min, "breaks" of 1-3 times were observed. Tandem pairs created before 9:00 h rested at 0.5-3 hours in some points of pre, mid and post-copulation, the same after 9:00 h did rarely rest until copulation and oviposition. Pre-oviposition rest was negatively and significantly correlated with tandem formation time during the day. Long tandem duration before oviposition can be regarded as pre-oviposition guarding." (Author)] Address: Naraoka, H., Motoizumi 36-71, Fukunoda, Itayanagi, Kitatsugaru-gun, Aomori 038-3661, Japan. E-mail: sbnkq127@ybb.ne.jp

12190. Parr, A. (2011): Migrant Dragonflies in 2010. Including recent decisions and comments by the Odonata Records Committee. *Atropos* 42: 23-28. (in English) [Observation details are presented on *Calopteryx splendens*, *Lestes barbarus*, *L. viridis*, *Coenagrion scitulum*, *Ischnura elegans*, *Erythromma viridulum*, *Aeshna affinis*, *A. grandis*, *A. mixta*, *Anax ephippiger*, *A. parthenope*, *Sympetrum danae*, *S. flaveolum*, *S. fonscolombii* and *S. striolatum*. *Ischnura senegalensis* and *Crocothemis servilia* were recorded in Britain as obvious accidental introductions.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

12191. Pfau, H.K. (2011): Functional morphology and evolution of the male secondary copulatory apparatus of the Anisoptera (Insecta: Odonata). *Zoologica* 156: 103 pp. (in English) ["In this study, the functions and mechanical interactions of different parts of the secondary copulatory apparatus of Anisoptera are reconstructed in detail and possible evolutionary pathways are described. Whereas in Zygoptera and Anisozygoptera the vesica spermalis of the third abdominal segment is a single segmented intermediate sperm-storage, this organ is subdivided into four segments in the Anisoptera. The evolutionary consequences of acquiring new functions as secondary (in reality tertiary) "penis" and sperm-syringe are one focus of this study. The secondary copulatory apparatus of male dragonflies (Odonata), located at the second and third abdominal segment, consists of a number of sequentially arranged devices. These serve (1) as support of the female ovipositor, (2) for carrying out preparatory actions for filling an intermediate sperm-storage, (3) for levering and inserting a secondary "penis" (in the primitive case the ligula) and (4) as transmitter of sperm to the female vagina. Each subtask affords a sequence of actions of the corresponding sclerites and muscles of this apparatus. An impressive variety of different solutions to perform and secure the filling of the sperm-reservoir of the vesica spermalis in the Anisoptera is described. In the primitive case a laborious and time-consuming procedure - which probably depends on interrelated functions of the ligula and female ovipositor - is carried out. Reduction of the ovipositor in different lines of the Anisoptera apparently initiated evolutionary modifications, which finally led to more sophisticated modes of preparing filling and protection. Another focus are the auxiliary devices and techniques in the Anisoptera for emptying the sperm-reservoir of the vesica spermalis. For instance, two different types of sperm-pumps are incorporated in its distal segment ("glans"). These pumps - which extend the function of a hydraulically working gland-structure, the erectile organ - show an opposite co-ordination of sperm-suction and -ejection in connection with compression and decompression movements. It was tried to reconstruct a transitional system to close a serious gap in the phylogenetic interpretation. A comparative investigation of different "glans" led to the discovery of different "ways" of combining the emptying-mechanism of the sperm-reservoir with an intensification of the sperm-jet and a "washing out" of sperm of the male predecessor (sperm displacement). The different stages of evolution of the glans, which reflect phylogenetic splittings, are outlined and discussed. This study is of great interest to biologists interested in the functional morphology of the Odonata. It does not merely rely on painstaking comparisons of morphological details, but integrates func-

tional points of view to use the heuristic power of hypothetical approach." (Publisher)] Address: Pfau, H.K., Rathenastr. 14, D-65326 Aarbergen, Germany. E-mail: clauspfau@web.de

12192. Prys Witt, K.-P. (2011): Die Asiatische Keiljungfer (*Gomphus flavipes*) in der Leine bei Neustadt am Rübenberge. Beiträge zur Naturkunde Niedersachsens 64(4): 96-98. (in German) [25./26-VII-2006, River Leine, Neustadt a. Rbge., Niedersachsen, Germany] Address: Prys Witt, K.-P., Lessingstr. 2, 31535 Neustadt a.Rbge., Germany

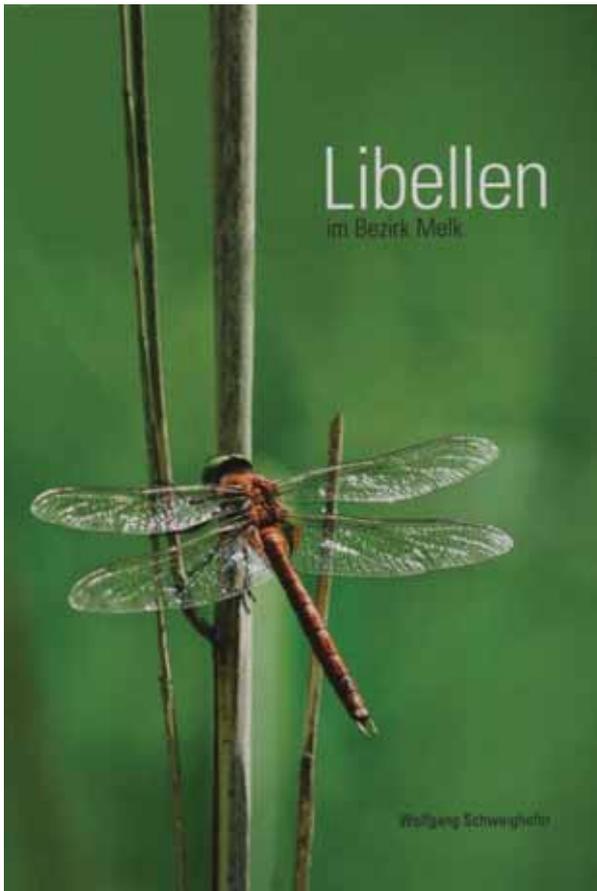
12193. Raescu, C.-S.; Dumbrava-Dodoaca, M.; Petrovici, M. (2011): Macrozoobenthic community structure and dynamics in Cerna River (western Romania). *Aquaculture, Aquarium, Conservation & Legislation* 4(1): 79-87. (in English, with Romanian and Hungarian summaries) ["In order to determine water quality in Cerna River, researchers carried out analyses into the structure and dynamics of benthic macroinvertebrates communities as well as into the physical-chemical factors. 12 Groups of macroinvertebrates were identified. Density, abundance and frequency values recorded for benthic communities varied according to the physical-chemical conditions specific to each sample collecting station. Researchers noticed a direct influence of Baile Herculane town and dam upon the community submitted to study, the maximum density and percentage numerical abundance being established for Oligochaeta and Diptera, benthic groups tolerant to changes in aquatic ecosystems qualitative parameters. The community of organisms including Ephemeroptera, Trichoptera, Plecoptera, Odonata and Coleoptera was characterized by a decrease in density and abundance values upstream - downstream as water quality is more and more degraded. This deterioration is also emphasized by the biotic index EPT/Ch values." (Authors)] Address: Dumbrava-Dodoaca, Malina, West Univ. of Timisoara, Faculty of Chemistry, Biology & Geography, Timisoara, Romania. E-mail: malinadumbrava@yahoo.com

12194. Ren, G.-d.; Ning, J. (2011): Differentiation and phylogeny of metathoracic pleural sclerites in selected pterygote insects. *Entomotaxonomia* 33: 81-93. (in Chinese, with English summary) ["Sixteen representative species of Pterygota are selected to analyse the development of morphological characteristics of metathoracic pleural sclerites in different taxa. A well-resolved cladogram of preliminary evolutionary relationships is produced with the topology: [Ephemeroptera + (Odonata + Neoptera)]+ [Plecoptera+(Megaloptera+Neuroptera+(Orthoptera+(Hemiptera+(Coleoptera+(Mecoptera+Lepidoptera+(Hymenoptera+Diptera)))))]. This analysis indicates that Palaeoptera and Neoptera are clearly separated. Ephemeroptera is more distantly related to Neoptera while Odonata has a closer relationship. The taxonomic status and evolutionary relationships of Neoptera are discussed and some arguments are made that are in conflict with the current classification system." (Authors)] Address: Ren, G.-d., College of Life Sciences, Hebei Univ., Baoding, Hebei 071002, China

12195. Runze, K.; Baier, H. (2011): Biotop- und Artenmonitoring in Mecklenburg-Vorpommern heute -auf einem schmalen Pfad zwischen Verpflichtungen und Ressourcen. *Artenschutzreport* 27: 26-40. (in German) [The paper outlines history and present status of monitoring activities in Mecklenburg-Vorpommern, Germany. Odonata are represented by *Aeshna viridis*, *Leucorrhin-*

ia albifrons, L. caudalis, L. pectoralis, Stylurus flavipes, and Sympecma paedisca. Records of these species are plotted in map 8.] Address: Runze, Katrin, Landesamt für Umwelt, Naturschutz und Geologie Mecklenburg-Vorpommern, Goldbergerstr. 12, 18273 Güstrow, Germany. E-mail: katrin.runze@lung.mv-regierung.de

12196. Schweighofer, W. (2011): Libellen im Bezirk Melk. Beiträge zur Bezirkskunde Melk 9. 207 pp. (in German) [Austria; detailed account on the regional dragonfly fauna including distribution maps] Herausgeber: Kuratorium zur Herausgabe einer Bezirkskunde für den Bezirk Melk, Abt Karl-Str. 25a, 3390 Melk, Austria. Address of author: Schweighofer, W., Ötscherblick 10, 3661 Artstetten, Austria. E-mail: wolfgang.schweighofer@schule.at



12197. Semwal, N.; Akolkar, P. (2011): Suitability of irrigation water quality of canals in NCR Delhi. International Journal of Basic and Applied Chemical Sciences 1(1): 60-69. (in English) ["Within the acceptable range of pH in water quality, deficiency and excess of various levels of critical pollutants such as, Total Dissolved Salts (TDS), Electrical Conductivity, Sodium Adsorption Ratio (SAR) and Boron determined the suitability of water for irrigation, in four major canals of Delhi. Canal waters were deficient in minimum SAR levels of 0.046 to 2.33. Average Boron levels of 0.639 to 0.807 mg/l were good enough for irrigation to sensitive group of crops, 0.639 mg/l to 0.807 mg/l levels were excellent for irrigation to semi tolerant group of crops and 1.22 to 1.966 mg/l of Boron levels were good for irrigation to tolerant group of crops. Excellent to good irrigation water was indicated by clean to slight pollution in biological water quality of Gang Canal and Western Yamuna Canal and medium to high salinity hazards supported moderate to

heavy pollution in biological water quality of Agra Canal and Hindon Canal." (Authors) Odonata are treated at family level.] Address: Semwal, N., Central Pollution Control Board (Ministry of Environment & Forests, Govt of India), Parivesh Bhawan, East Arjun Nagar, Delhi 110 032, India. E-mail: nripsemwal@yahoo.co.in

12198. Ternois, V.; Lambret, J.-L. (coord.) (2011): Oxygastra curtisii (Dale, 1834) en Champagne-Ardenne: bilan du programme régional 2007-2009 (Odonata, Anisoptera: Corduliidae). Martinia 27(1): 45-60. (in French, with English summary) ["Little attention has been paid to O. curtisii in the Champagne-Ardenne region, France. Until the beginning of the years 2000, the species was considered rare and observations were spread all over the region. In 2005, many individuals were observed in gravel pits in the Aube department. This supposed this kind of habitat to be attractive for the species. In this context, the CPIE (Permanent Center for Environmental Initiatives) of the Pays de Soulaines and the Onema (National Office of Waters and Aquatic Habitats) led some investigations over several alluvial valleys in the region. The present paper gives both the results gathered from 2007 to 2009 and the regional status of O. curtisii. It provides also a new distribution map of the species for the Champagne-Ardenne region." (Authors)] Address: Ternois, V., CPIE du Pays de Soulaines, Domaine de Saint-Victor F-10200 Soulaines-Dhuys, France. E-mail: cpie.vincent.ternois@wanadoo.fr

12199. Ulmer, A. (2011): Sympetrum pedemontanum (Allioni, 1766) nouveau pour les départements de la Loire et de la Haute-Loire, et sites majeurs pour S. depressiusculum (Selys, 1841) dans ces deux départements. Martinia 27(2): 95-100. (in French, with English summary) ["This paper deals with the discovery of Sympetrum pedemontanum, which is new to the Loire and the Haute-Loire departments. Numbers of S. depressiusculum were also present. Some observations indicate that the breeding of both species is highly probable. The importance of these findings at a local scale is discussed." (Author)] Address: Ulmer, A., Le Colombier, F-42140 - Chazelles-sur-Lyon, France. E-mail: andre.ulmer@free.fr

12200. Vieira, V.; Teixeira, T.; Teixeira, M.; Oliveira, L. (2011): Novos Dados sobre Lepidópteros, Odonatos e Himenópteros (Insecta) da Ilha de São Jorge, Açores. XV Expedição Científica do Departamento de Biologia - São Jorge 2011 - Rel. Com. Dep. Biol. 40: 107-116. (in Portuguese, with English summary) [São Jorge island (Azores, Portugal), July 25-31, 2011, Ischnura hastata, I. pumilio, Anax imperator, Sympetrum fonscolombii] Address: Vieira, V., Universidade dos Açores, Departamento de Biologia e Grupo de Biodiversidade dos Açores (CITA-A), Apartado 1422, PT-9501-801 Ponta Delgada, Açores, Portugal

2012

12201. Abraham, L. (2012): "On the other hand, what is this Eastern aeschnoides?" (Morton 1926) – an undescribed Palpares species from the Eastern Mediterranean (Neuroptera: Myrmeleontidae). Natura Soggyiensis 22: 65-102. (in English) ["This paper summarizes the history of Palpares libelloides (Linnaeus, 1764) and related taxa described from the Mediterranean in the neuropterological literature. Based on these

results *Palpares assyriorum* sp. n. from Syria, Jordan, Turkey and Israel is described. *Libellula turcica* Petiver & Empson, 1767 is a new homonym of *Libellula* Linnaeus 1758 (Odonata) (hom. n.) and a new synonym of *Palpares libelloides* (Linnaeus, 1764) (syn. n.). *Palpares aeshnoides* is a nomen nudum, only a collection name. *Palpares chrysopterus* Navás, 1910 is a valid taxon and *Palpares turcicus* Koçak, 1976 (syn. n.) is a new junior synonym of *Palpares chrysopterus* Navás, 1910." (Author)] Address: Ábrahám, L., Somogy County Museum, Natural History Department, H-7400 Kaposvár, P.O. Box 70, Hungary E-mail: labraham@smmi.hu

12202. Acatrini, C.-M.; Ghibusi, E.-A.; Petrovici, M.; Pirvu, M. (2012): Macrozoobenthic communities structure characteristic of certain tributaries of the Siret river from Harghita, Maramures and Vrancea Mountains and Moldovei Plateau. *Annals of West University of Timisoara, ser. Biology* 15: 141-148. (in Romanian, with English summary) [Romania; "35 qualitative macrozoobenthic samples were collected in 2011 from many Siret river tributaries coming from the Harghita Mountains (5 stations), Maramures Mountains (14 stations), Moldavian Plateau (4 stations) and Vrancea Mountains (12 stations). Laboratory analysis of samples revealed the existence of the following 15 groups of benthic invertebrates: Ephemeroptera, Plecoptera, Trichoptera, Oligochaeta, Diptera (Chironomidae, Simuliidae, Ceratopogonidae, Limoniidae), Gastropoda, Bivalva, Coleoptera, Acarina, Odonata, Hirudinea, Isopoda, Heteroptera, Turbellariata and Collembola). Groups that have the highest frequencies were mayflies and dipterans (each with a frequency of 97.1%), followed by caddisflies (80%), amphipods (68.6%), oligochaetes (57.1%) and stoneflies (54.3%). Presence of sensitive groups to water quality degradation (Ephemeroptera, Trichoptera and Plecoptera) with high frequency shows good quality water at most stations investigated." (Authors)] Address: Acatrini, Cristina-Mariana, West University of Timisoara, Faculty of Chemistry-Biology-Geography, Department of Biology and Chemistry, Pestalozzi, 16, 300115, Romania. E-mail: milcapetrovici@yahoo.com

12203. Andrew, R.J.; Thakkar, N.; Verma, P. (2012): Ectoparasitism of anisopteran dragonflies (Insecta: Odonata) by water mite larvae of *Arrenurus* spp. (Arachnida: Hydrachnida: Arrenuridae) in central India. *Acarina* 20(2): 194-198. (in English) ["There is no report on the frequency, species selection and site specificity of water mites' ectoparasitism within and among dragonfly species of India. Here, we present a field survey of the species selection and site specificity of ectoparasite larval arrenurid mites on anisopteran adults at Nagpur city of central India. Since the female odonates returns to water to oviposit, it would be of some advantage for the mite to show a female-biased parasitism in order to return to water easily and continue the remaining aquatic part of their life cycle. A total of 204 specimens of anisopteran odonates belonging to 11 species were examined for the presence of larval *Arrenurus* spp. as ectoparasites during the post-monsoon (August–September 2010) and summer (March–April 2011) months from a large pond in central India. Only 14 dragonfly specimens of six species (*Acisoma panorpoides*, *Brachythemis contaminata*, *Crocothemis servilia*, *Diplacodes trivialis*, *Neurothemis t. tullia*, and *Trithemis pallidinervis*) were found to be parasitized (overall prevalence of 6.86%). The prevalence for *C. servilia* was 28.6%, followed by *T. pallidinervis* and *A. panorpoi-*

des at 21.4%. The total number of parasites recorded was 465 at an average of 33.26 per specimen. The parasite load per host species was the highest in *T. pallidinervis* (92.6) followed by *C. servilia* (24). In *C. servilia*, *A. panorpoides* and *D. trivialis* the mites were attached ventrally to the thorax and were mostly arranged in a 'v' or triangular shape, while in *B. contaminata* and *T. pallidinervis* the mites were found all over the ventral abdomen. In one *T. pallidinervis* male and one *C. servilia* female, mites were found both on the thorax as well as the abdomen. The maximum number of mites found on an individual dragonfly was on the female abdomen of *T. pallidinervis* (114), while only one mite was found on the thorax of a male *C. servilia*. Mite infestation was sex-biased — 71.0% and 85.7% of infested odonates were females in August–September and March–April, respectively." (Authors)] Address: Andrew, R.J., Post Graduate Department of Zoology, Hislop College, Nagpur, 440 001, India. E-mail: rajuandrew@yahoo.com

12204. Aslan, B.; Karaca, I. (2012): Insect fauna of Kovada Lake National Park Basin (Isparta, Turkey). *Türk. entomol. derg.* 36(4): 473-489. (in English, with Turkish summary) ["The study was conducted to determine insect fauna of Kovada Lake National Park Basin in Isparta province of Turkey between April 2007 and October 2008. In the study, various collecting methods, including pitfall trap, sweeping, air-sweepnet, drop sheet and light trap were used in nine different habitats selected from the region. The insect specimens were collected by weekly samplings. A total of 240 insect species and subspecies belonging to 75 families and 11 orders were recorded from the national park basin." (Authors) The following Odonata species are listed: *Aeshna mixta*, *Cercion lindenii lindenii*, *Coenagrion ornatum*, *C. puella puella*, *Onychogomphus forcipatus*, *Crocothemis erythraea*, *Orthetrum brunneum*, *O. cancellatum cancellatum*, *Libellula depressa*.] Address: Aslan, B., Department of Medical and Aromatic Plants, Tefenni Vocational School of Higher Education, Mehmet Akif Ersoy University, 15600, Tefenni, Burdur, Turkey. E-mail: aslanb@mehmetakif.edu.tr

12205. Balter, M.; Zinman, A. (2012): The design, construction, and application of a 3D flying prey simulator to aid in the investigation of neuronal control in dragonflies. *Proceedings of The National Conference, On Undergraduate Research (NCUR) 2012, Weber State University, Ogden Utah, March 29 – 31, 2012: 61-68.* (in English) ["The goal of this interdisciplinary research project is to investigate the neuronal control of flying prey interception in dragonflies by designing, constructing, and programming an apparatus to simulate the complex motions of a flying insect. Our three-dimensional motion device is capable of mimicking a flying insect by moving a small glass bead accurately up to speeds of 1 m/s. Dragonflies are highly efficient aerial predators that have the remarkable capability of intercepting and capturing small insects in flight. This complex process generally occurs in less than 300 ms, with success rates as high as 97%1. Prey capture behaviour requires both rapid visual processing and information transmission, resulting in the evolution of large neurons in the control pathway. Eight pairs of large neurons, called Target-Selective Descending Neurons (TSDNs), are implicated in steering the interception flight. These neurons descend from the brain of the dragonfly to the wing motor regions of the thorax, transmitting visual information about prey movement. Our stimulus device will be used

to determine the way in which the TSDN's encode information about object movement in three dimensions. To date, visual neuron studies have been mostly restricted to two dimensions, the x-direction (left - right) and the y-direction (up - down), recording responses to images displayed on a flat projection screen. However, Dr. Olberg of the Biology Department at Union College hypothesized that the z-dimension (front - back) movement is vital to understanding the exact roles of these neurons in prey interception. An understanding of visually guided prey interception by dragonflies, could lead to the development of effective guidance mechanisms for military or civilian use. The device consists of 80/20 extruded aluminum parts, timing belts and pulleys, ball bearings, metal axles, and DC brushed motors with encoders. The device is computer controlled by Simulink and Real Time Windows Target, which are components of MATLAB." (Authors)] Address: Balter, M., Mechanical Engineering and Biology Departments, Union College, 807 Union Street, Schenectady, NY 12308 USA

12206. Balter, M. (2012): The design, construction, and application of a 3D flying prey simulator. Thesis. Rutgers University: (in English) ["The goal of this research project is to investigate the neuronal control of flying prey interception in dragonflies by designing, constructing, and programming an apparatus to simulate the complex motions of a flying insect. Our three-dimensional motion device is capable of mimicking a flying insect by moving a small bead accurately up to speeds of 1 m/s in any direction. Dragonflies are efficient aerial predators that can intercept and capture small insects in flight. Our stimulus device will be used to determine the way in which dragonfly neurons encode information about object movement in three dimensions. Sinusoidal position tracking experiments using multiple input frequencies were conducted using the apparatus. The results indicate that the machine operates smoothly with little variability between trials. Preliminary dragonfly testing with the apparatus showed favourable results, indicating proof of concept... This machine is programmed to move an analogue of a small flying insect (bead) in front of a dragonfly causing the dragonfly to react as if it were prey. Assists the research of Dr. Robert Olberg. Work has been presented and published at the 2012 National Conference on Undergraduate Research, while lead to an invitation into the Union College Chapter of Sigma Xi. Has currently been submitted for publication to the 2012 ASME Dynamic Systems and Controls Conference." (Author)] Address: Balter, M., Mechanical Engineering & Biology Depts, Union College, 807 Union Str., Schenectady, NY 12308 USA

12207. Bechly, G. (2012): An interesting new fossil relict damselfly (Odonata: Zygoptera: Coenagrionoidea) from Eocene Baltic amber. *Palaeodiversity* 5: 51-55. (in English, with German summary) ["A new fossil genus and species of damselfly, *Balticoagrion paulyi* n. gen., n. sp. (Odonata: Zygoptera: Coenagrionoidea: Familia incertae sedis) is described from Eocene Baltic amber. This fossil taxon does not fit into any known fossil or Recent family-group taxon and is here tentatively considered as relict taxon and potential stem group representative of Coenagrionoidea. The same piece of amber also contains a piece of skin from a small reptile as syninclusion." (Author)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: guenter.bechly@smns-bw.de

12208. Benchalel, W.; Samraoui, B. (2012): Caractérisation écologique et biologique de l'odonatofaune de deux cours d'eau méditerranéens: l'oued El-Kébir et l'oued Bouaroug (Nord-Est de l'Algérie). *Méditerranée* 118: 19-27. (in French, with English summary) [Algeria; "A total of 13 species were identified in Oued El-Kébir, and 11 in Oued Bouaroug. Reproduction was proved for 5 species in Oued El-Kébir and 8 species in Oued Bouaroug. In both sites of study, the flight period of the species extends from the beginning of spring to the end of autumn. The follow-up of the larval development of some species has proved the univoltinism of *Boyeria irene*, *Calopteryx haemorrhoidalis*, *Coenagrion puella*, *Lestes viridis*, *Orthetrum chrysostigma*, *Pseudagrion subdilatata*. Other species such as *Orthetrum anceps* *Onychogomphus costae* *Paragomphus genei* are probably univoltine. But we lack data that confirms their univoltinism because of the sampling problem. As for *Gomphus lucasi* and *Onychogomphus uncutus*, these species are probably not univoltines. A morphometric characterization of the different larval stages (metric and numerical characters) has also been established for every species which the reproduction has been proved. Given the intense anthropic pressure in the sampled areas especially in Oued El-Kébir, the regression of the species' total number seems to be unfortunately irreversible. These hydrographical basins need to be immediately and effectively protected in order to keep this natural heritage." (Authors)] Address: Benchalel, W., Université Badji Mokhtar -Annaba, B.P. 12, 23000 Algeria. E-mail: wafachalel@yahoo.fr

12209. Benson, D. H.; Baird, I. R. C. (2012): Vegetation, fauna and groundwater interrelations in low nutrient temperate montane peat swamps in the upper Blue Mountains, New South Wales. *Cunninghamia* 12(4): 267-307. (in English) ["Newnes Plateau Shrub Swamps are a series of low nutrient temperate montane peat swamps around 1100 m elevation in the upper Blue Mountains, west of Sydney (lat 33° 23' S; long 150° 13'E). Transect-based vegetation studies show a closely related group of swamps with expanses of permanently moist, gently sloping peatlands. Vegetation patterns are related to surface hydrology and subsurface topography, which determine local peat depth. While there is evidence that a group of the highest elevation swamps on the western side of the Plateau are more dependent on rainwater, the majority of swamps, particularly those in the Carne Creek catchment, and east and south of it, may be considered primarily groundwater dependent with a permanently high watertable maintained by groundwater aquifers. An integral part of the swamps are a number of threatened groundwater dependent biota (plants-*Boronia deanei* subsp. *deanei*, *Dillwynia stipulifera*, dragonfly- *Petalura gigantea*, lizard- *Eulamprus leuraensis*), which are obligate swamp dwellers. This association of dependence leaves the entire swamp ecosystem highly susceptible to threats from any loss of groundwater, the current major one being the impact of damage to the confining aquicludes, aquitards, aquifers and peat substrates as a result of subsidence associated with longwall mining. Impacts on the swamps may also result from changes to hydrology through damming of creeks, mine waste water discharge, increased moisture competition from pine plantations, recreational motorbike and off-road vehicle tracks and climate change. If these groundwater dependent ecosystems do not receive protection from activities such as longwall mining subsidence, significant ecolog-

ical damage is unlikely to be avoided or able to be mitigated even where provisions of the Commonwealth Environment Protection and Biodiversity Conservation and NSW Threatened Species Conservation Acts apply to groundwater dependent swamps and biota. The importance of the highest elevation part of the Plateau for a number of restricted (some endemic) plant species is also discussed. This paper includes a synthesis of results of a study (by IRCB) of larval burrow morphology and groundwater dependence in *P. gigantea*" (Authors) Available from <http://www.rbgsyd.nsw.gov.au/science/Scientificpublications/cunninghamia/contentsbyvolume/volume12#twelve%20four>] Address: Baird, I., 3 Waimea St, Katoomba NSW 2780, Australia. E-mail: ianbaird@mountains.net.au

12210. Benzer, S.; Gül, A.; Yılma, M. (2012): Feeding properties of pike (*Esox lucius* L., 1758) living in Kapulukaya Dam Lake (Türkiye). *GEFAD / GUJGEF* 32(3): 697-714. (in Turkish, with English summary) [Among 328 pikes caught between November 2001 and October 2002, 58.82% had filled and 41.8% had empty digestive tracts. Odonata contributed significantly to the diet of pikes.] Address: Benzer, S., Gazi Üniversitesi, Gazi Eğitim Fakültesi, İktisadi İdari Bilimler Bölümü, Fen Bilgisi Öğretmenliği Anabilim Dalı, Ankara, Turkey. E-mail: sbenzer@gazi.edu.tr

12211. Bland, L.M.; Collen, B.; Orme, C.D.L.; Bielby, J. (2012): Data uncertainty and the selectivity of extinction risk in freshwater invertebrates. *Diversity and Distributions* 18(12): 1211-1220. (in English) ["Aim: To investigate the impact of different treatments of the IUCN Data Deficient (DD) category on taxonomic and geographical patterns of extinction risk in crayfish, freshwater crabs and dragonflies. Location: Global. Methods: We used contingency tables to evaluate taxonomic and geographical selectivity of data deficiency and extinction risk for three invertebrate taxonomic groups (crayfish, Odonata, and freshwater crabs) based on their IUCN Red List status. We investigated differences in patterns of data deficiency and extinction risk among taxonomic families, geographical realms and taxonomic families within geographical realms for each of the three groups. At each level, we evaluated the impact of uncertainty conferred by the conservation status of DD species on extinction risk patterns exhibited by that group. We evaluated three scenarios: excluding DD species, treating all DD species as non-threatened and treating all DD species as threatened. Results: At the global scale, DD species were taxonomically non-randomly distributed in freshwater crabs and dragonflies, and geographically non-randomly distributed in all three taxonomic groups. Although the presence of under- or over-threatened families and biogeographical realms was generally unchanging across scenarios, the strength of taxonomic and geographical selectivity of extinction risk varied. There was little consistent evidence for taxonomic selectivity of extinction risk at sub-global scales in freshwater crabs and dragonflies, either among biogeographical realms or among scenarios. Main conclusions: Global patterns of taxonomic selectivity and geographical selectivity were generally consistent with one another and robust to different treatments of DD species. However, sub-global scale conservation prioritization from these types of data sets will require increased investment to make accurate decisions. Given the current levels of data uncertainty, the relative importance of biological characteristics and threatening processes

in driving extinctions in freshwater invertebrates cannot be easily determined. We recommend that DD species should be given high research priority to determine their true status." (Authors)] Address: Bland, Lucie, Institute of Zoology, Zoological Society of London, Regent's Park, London, NW1 4RY, UK. E-mail: Lucie.bland@ioz.ac.uk

12212. Blanke, A.; Greve, C.; Wipfler, B.; Beutel, R.; Holland, B.; Misof, B. (2012): The identification of concerted convergence in insect heads corroborates Palaeoptera. *Systematic Biology* 62(2): 250-263. (in English) ["The relationships of the three major clades of winged insects - Ephemeroptera, Odonata and Neoptera - are still unclear. Many morphologists favor a clade Metapterygota (Odonata+Neoptera), but Chiasatomyaria (Ephemeroptera+Neoptera) or Palaeoptera (Ephemeroptera+Odonata) have also been supported in some older and more recent studies. A possible explanation for the difficulties in resolving these relationships is concerted convergence - the convergent evolution of entire character complexes under the same or similar selective pressures. In this study we analyse possible instances of this phenomenon in the context of head structures of Ephemeroptera, Odonata and Neoptera. We apply a recently introduced formal approach to detect the occurrence of concerted convergence. We found that characters of the tentorium and mandibles in particular, but also some other head structures, have apparently not evolved independently, and thus can cause artefacts in tree reconstruction. Our subsequent analyses, which exclude character sets that may be affected by concerted convergence, corroborate the Palaeoptera concept. We show that the analysis of homoplasy and its influence on tree inference can be formally improved with important consequences for the identification of incompatibilities between datasets. Our results suggest that modified weighting (or exclusion of characters) in cases of formally identified correlated cliques of characters may improve morphology based tree reconstruction." (Authors)] Address: Blanke, A., Zoologisches Forschungsmuseum Alexander Koenig, Zentrum für molekulare Biodiversität, Adenauerallee 160, 53113 Bonn, Germany

12213. Bo, T.; Fenoglio, S.; López-Rodríguez, M.J.; Tierno de Figueroa, J.M. (2012): Trophic behaviour of the dragonfly *Cordulegaster boltoni* (Insecta: Odonata) in small creeks in NW Italy. *Entomologica Fennica* 22: 255-261. (in English) ["*C. boltonii* is a widespread Odonata in Europe, which usually inhabits small lotic systems. In this study we analysed the gut contents of *C. boltoni* immature stages, collected in the Rocchetta Tanaro Natural Park (Italy, Piemonte). Two hundred and eleven individuals were collected, and their diet analyzed by dissection or clearing. Larvae appeared to be opportunistic predators, feeding on a variety of prey. Aquatic insects dominated their diet, while crustaceans, annelids, molluscs and terrestrial invertebrates were sporadically observed in the gut contents. An ontogenetic shift in the diet was detected, as small larvae consumed different prey than large ones. Our study suggests that *C. boltonii* is one of the dominant predators in the benthic communities of lowland small order streams of Piemonte, which, because of their environmental characteristics, are devoid of fish and stoneflies." (Authors)] Address: Fenoglio, S., University of Piemonte Orientale "Amedeo Avogadro", Via T. Michel, 11- 15121 - Alessandria - Italy. E-mail: fenoglio@unipmn.it

12214. Boscardin, J.; Corrêa Costa, E.; Garlet, J.; Cunha Bolzan, L.; Nascimento Machado, D.; Pedron, L. (2012): Índices faunísticos para a entomofauna coletada em plantios de *Eucalyptus* spp. VII Congresso de Medio Ambiente de la AUGM: 14 pp. (in Portuguese, with English summary) ["The genus *Eucalyptus* has become important for the economy of Brazil. However with the increase in areas with *Eucalyptus* sp. entomological problems tend to increase in the same proportions, as crops with this kind provide conditions for adaptation of pests, thereby requiring constant monitoring through surveys of insect populations. The objective of this study is the population survey of entomofauna by using light traps in *Eucalyptus* spp. The study was conducted in three *Eucalyptus* stands, belonging to the species: *E. dunni*, *E. grandis* and *E. grandis* x *E. urophylla* (clone hybrid), with three years of age. located on the Taquari farm, in São Francisco de Assis, Rio Grande do Sul To collect entomofauna light traps were used, one in every species tested, with samples taken monthly from August 2008 to July 2009. The insects collected were analyzed using indices of frequency, abundance, diversity and constancy. During the survey, we collected 3054 individuals in eight orders (Blatodea. Coleoptera. Dermaptera, Hemiptera, Hymenoptera, Lepidoptera. and Odonata [Libellulidae], Mantodea) and 34 families. The orders with the highest number of insects were collected: Coleoptera. Lepidoptera and Hemiptera with 61.18 and 12% of the total sample respectively. The orders Coleoptera and Lepidoptera. presented the families with the most significant indices, especially the families Elateridae, Ptilodactylidae and Staphylinidae, Scarabeidae order Coleoptera and Arctiidae and Noctuidae of the Lepidoptera order. Considering the results obtained in this survey, it is concluded that the area presents major groups, some with potential to become pests, and others considered as a tool in integrated pest management of insect pests in *Eucalyptus*. contributing to reduced use of chemicals in your control." (Authors)] Address: Boscardin, J., Univ. Federal de Santa Maria (UFSM), Centro de Ciencias Rurais, Campus Universitario, Bairro Camobi, Prédio 42, sala 3223, CEP 97105-900, Santa Maria, RS, Brasil. E-mail: boscardinj@gmail.com

12215. Brockhaus, T. (2012): Vorwort: Bibliografie der für Deutschland publizierten Libellenliteratur (Odonata). *Libellula*, Supplement 11: 3. (in German) [Introduction to the bibliographie of odonatological literature referring to Germany.] Address: Brockhaus, T., An der Morgensonne 5, 09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

12216. Buczyński, P.; Tończyk, G.; Buczyńska, E. (2012): Materials to the knowledge of some aquatic insects (Plecoptera, Odonata, Heteroptera, Trichoptera, Coleoptera) of the Gorce Mountains. *Teka Kom. Ochr. Kszt. Środ. Przyr. - OL PAN* 9: 16-27. (in English, with Polish summary) [In spring 2006, *Thecagaster bidentata* was the only odonate species recorded in Gorce Mountains and the Gorceński National Park, Poland.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

12217. Buczyński, P.; Bielak-Bielecki, P. (2012): *Crocothemis servilia* (Drury, 1773) (Odonata: Libellulidae) introduced with aquarium plants to Lublin (Poland). *Annales Universitatis Mariae-Curie Skłodowska Lubin - Polonia* 67(2) (Sectio C): 21-26. (in English, with Polish

summary) ["A larva of the Oriental dragonfly *Crocothemis servilia* was found in June 2012 in a pet shop in Lublin and brought up to the imago. This is the first record of this kind in Poland. There is evidence that the species was introduced with aquarium plants." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

12218. Cano-Villegas, F.J.; (2012): Notas sobre la situación de *Cordulegaster bidentata* Selys, 1843 (Odonata: Cordulegasteridae) en el Pirineo de Lerida (noreste de España). *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)* 51: 337-339. (in Spanish, with English summary) [Data on the reproduction in the Iberian Peninsula of the European endemic species *C. bidentata* is presented for the first time. Additionally, information about the composition of one of its larval colonies in Lerida is provided, pointing out that it shares its habitat with *C. boltonii*. This could be a sign of the deterioration of its colonies in the area." (Authors)] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: ficanovi2@hotmail.com

12219. Chae, J.S.; Park, M.K.; Kim, H.-C.; Jung, J.-Y.; Son, H.Y.; Ryu, S.-Y.; Shin, H.-J.; Sim, C.; Park, B.-K. (2012): Infection status of metacercaria in adult dragonflies from Republic of Korea. *International Journal of Veterinary Science* 1(2): 55-58. (in English) ["The dragonfly serves as a second intermediate host of some trematodes. Seven species of dragonflies, *Sympetrum darwinianum*, *Orthetrum albistylum*, *Lyriothemis pachygastra*, *Sympetrum eroticum*, *Crocothemis servilia*, *Pantala flavescens* and *Sympetrum pedemontanum* were surveyed. The most abundant species among these dragonflies were *S. darwinianum*, *S. eroticum* and *C. servilia* (2,118 and 620 and 334 individuals, respectively). And, the least abundant dragonflies were *S. pedemontanum*, *L. pachygastra* and *O. albistylum* (25, 57 and 62 individuals, respectively). Among these intermediate hosts, *S. eroticum* had the highest infestation rate of metacercaria per individual (11.71%). The infestation rates of two dragonflies, *S. darwinianum* and *S. pedemontanum* (8.58% and 4.56%, respectively) also were higher than those of the other four species. In artificial infection studies using animal hosts, we could identify the infections of adult *P. muris* and *P. japonicus* from only mouse, in which the infestation rates of *P. muris* and *P. japonicus* were 90% and 95% among 20-tested individuals, respectively. Interestingly, adult *L. liberum* was detected from only frog, *R. nigromaculata* and the rates of the infestation in frogs were 97.5% among 50-tested frogs. These results suggest that the population size of dragonfly is an important factor to carry high burden of metacercaria. Moreover, we discussed their epidemiological implications for human and animal infections." (Authors)] Address: Sim, Cheolho, Department of Biology, Baylor University, Waco, Texas 76798, USA. E-mail: cheolhosim@baylor.edu

12220. Chandana, E.P.S.; Rajapaksha, A.C.D.; Samarasekera W.G.K.H. (2012): A survey of odonate assemblages associated with selected wetland localities in southern Sri Lanka. *Asian Journal of Conservation Biology* 1(2): 67-73. (in English) [28 Odonate species were recorded at five different study sites. Ceylon endemics or rare species are *Pseudagrion rubriceps*, *Euphaea splendens*, *Onychothemis tonkinensis*, *Pseudagrion malabaricum* and *Indothemis limbata*.] Address: Chandana E.P.S., Department of Zoology, Faculty of Sci-

ence, University of Ruhuna, Matara, Sri Lanka. E-mail: epschandana@zoo.ruh.ac.lk

12221. Chelmick, D. (2012): Views and Reviews: Fotografien Larvenhuidjes van Libellen [Photo Guide to Dragonfly Exuviae] by C. Brochard, D. Groenendijk, E van der Ploeg, & T. Termaat. KNNV Uitgeverij, 2012. 320 pp., colour images throughout, Sbk, 175x245mm. ISBN 9789050114097. €49.95. *Atropos* 47: 65-66. (in English) [book review.] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

12222. Choong, C.Y.; Ng, Y.F.; Dow, R.A. (2012): Odonata (Insecta) from three forests of central Terengganu, Malaysia. *The Malayan Nature Journal* 64(2): 95-104. (in English) ["Records of Odonata collected at sites in central Terengganu, Peninsular Malaysia, in August 2011 are presented. A total of 90 species from 13 families were collected. Of these, 49 named species are the first confirmed records for Terengganu and another three species to which no definite name can be assigned at this time are also new records for the state. The collection included a new species of *Drepanosticta*, yet to be named. *Protosticta curiosa* was recorded for the first time in Malaysia. These records are combined with existing records of Odonata from Terengganu in the literature to produce a full list of the Odonata known from the state. At present 107 species from 13 families are known from Terengganu." (Authors)] Address: Choong, C.Y., School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. E-mail: rocoto98@yahoo.com

12223. Chun-Ying Gao, C.-Y.; Meng, G.-X.; Li, X.; Wu, M.; Liu, Y.; Li, X.-Y.; Zhao, X.; Lee, I.; Feng, X. (2012): Wettability of dragonfly wings: the structure detection and theoretical modeling. *Surface and Interface Analysis* 45(2): 650-655. (in English) ["Hydrophobic surfaces have gained extensive attention in recent decades for their potential applications. The hydrophobic properties of dragonfly's (*Pantala flavescens*) wings were measured, and the water contact angles (WCAs) of the distal and basal part of a dragonfly's wing were 134.9° and 125.8°, respectively. Images obtained by optical microscopy and scanning electron microscopy showed the microstructures and nanostructures on the wing surface. Microstructures appeared as cell block patterns, and the size of the blocks decreased from the basal to distal part. However, no significant differences of chemical composition between the two parts were detected by X-ray photoelectron spectroscopy. To understand the correlation between the structures and WCA, a double roughness structure model was built theoretically with simplified lattice patterns, and the theoretical model was well fitted with empirical wettability of the dragonfly's wing." (Authors)] Address: Feng, X., State Key Laboratory of Medicinal Chemical Biology, College of Life Science, Nankai University, Tianjin, 300071, China. E-mail: xzfeng@nankai.edu.cn

12224. Dehghani, R.; Zarghi, I.; Aboutalebi, M.; Barzegari, Z.; Ghanbari, M. (2012): Fauna and habitat diversity of aquatic arthropods city of Kashan in 2010. *Journal of North Khorasan University of Medical Sciences* 4(4): 603-610. (in Farsi, with English summary) [Iran; 61 out of 1724 insect samples belong to Odonata, but the results are not detailed.] Address: Zarghi, I.,

School of Health, Mashhad, University of Medical Sciences, Mashhad, Iran. E-mail: i.zarghi@gmail.com

12225. Dow, R.A.; Orr, A.G. (2012): The type repository of *Drepanosticta simuni* spec. nov. (*Zygoptera: Platystictidae*). *Odonatologica* 41(4): 347-348. (in English) [To ensure that the name *D. simuni*, described (2012) in *Odonatologica* 41: 283-291, is available, the type repository, omitted from the original description, is stated along with a diagnosis of the species. The type is deposited in Naturalis Biodiversity Centre, Leiden (RMNH).] Address: Orr, A.G., Griffith School of the Environment, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@bigpond.com

12226. Endersby, I. (2012): The naming of Victoria's dragonflies (Insecta: Odonata). *Proceedings of the Royal Society of Victoria* 123(3): 155-178. (in English) ["The chronology of the naming of Victoria's 76 species of Odonata is given, with short biographical notes on the authors. From a study of the original descriptions, the etymology of the 76 species and 44 genera known from the State is elucidated or inferred." (Author)] Address: Endersby, I., 56 Looker Road, Montmorency, Vic. 3094, Australia. E-mail: endersby@mira.net

12227. Festi, A. (2012): *Leucorrhinia pectoralis* (Charpentier, 1825) (Odonata: Libellulidae) presso il Lago di Monticolo – importante segnalazione per l'Alto Adige e l'Italia. *Gredleriana* 12: 201-208. (in Italian, with English summary) [11.05.2012, Lago Grande di Monticolo (WGS 84 46,420652 11, 285273), Province of Bolzano (Italy). Information is given about habitat, distribution in Italy and the conservation status.] Address: Festi, A., Via Penegal 7, I-39100 Bolzano, Italy. E-mail: alex.festi@rol-mail.net

12228. Foto, M.S.; Koji, E.; Ajeagah, G.; Bilong Bilong, C.; Njiné T. (2012): Impact of dam construction on the diversity of benthic macroinvertebrates community in a periurban stream in Cameroon. *International Journal of Biosciences* 2(11): 137-145. (in English) ["In the aim of evaluating the impact of a dam construction on the biodiversity of aquatic organisms, physicochemical variables coupled to benthic macroinvertebrates communities were analysed at the upstream and downstream of the Mefou stream dam from September 2009 to March 2010. Physicochemical results revealed a slightly acidic and well oxygenated water of the Mefou stream, being appropriated for the development of benthic macroinvertebrates organisms. Significant differences were observed for temperature and oxygen between the stations ($P < 0.05$). Of the 1801 individuals collected (4 phyla, 6 classes, 13 orders, and 47 families) arthropods (99.25%) dominated, while Annelids, Nematelminths and Mollusca were less represented (2 %). The Correspondence Canonic analysis (CCA) distinguished two sections on the stream: a superior section at the upstream of the dam which is characterised by much oxygenation and abundance of Atyidea (excellent bioindicators of good quality water) ($r = 0.04$; $P < 0.05$); an inferior section at the downstream of the dam, dominated by rheophil organisms (odonates). The relative abundance of odonates correlated with the values of water flow rates of each station ($r = 0.94$; $P < 0.01$). The presence of polluo-tolerant organisms (*Chironomidae* and *Haplotaenidae*) at station 3 could reflect anthropic action at the downstream of the dam. Shannon and Weaver ($H = 4.1 \pm 0.5$ bits) and Pielou index ($J = 0.8 \pm 0.1$ bits) revealed favourable conditions for the coexistence of

benthic macroinvertebrates. These results could provide viable information used in evaluating the water quality of lotic systems subjected to dam construction in Cameroon." (Authors)] Address: Foto, M.S., Dept of Animal Biology and Physiology, Faculty of Science, University of Douala, P.O Box 24157, Douala, Cameroon. E-mail: sfotomen@yahoo.fr

12229. Franzén, M.; Molander, M. (2012): Changes in the insect fauna in Padjelanta National Park. *Entomologisk Tidskrift* 132(2): 81-112. (in Swedish, with English summary) ["Arctic ecosystems and the trophic levels structuring them have recently been severely perturbed, although a relatively large proportion of the Arctic environment is protected. Temperatures have increased two to three times more rapidly in the Arctic compared to other regions, mammal populations have declined and the tree line has shifted to higher altitudes. However, knowledge of possible changes of the insect fauna in Arctic habitats is strikingly poor. In this study we compiled data from historical and recent surveys of six major insect taxa (Lepidoptera, Coleoptera, Hymenoptera (Aculeata), Odonata, Orthoptera and Diptera (Syrphidae) recorded in Padjelanta, the largest (1984 km²) National Park in Sweden. Padjelanta is situated in the Western part of the province Lule Lappmark and is dominated by alpine vegetation, with an average altitude of 800 m.a.s.l. (range: 550-1800 m.a.s.l.). Insects in Padjelanta have been studied occasionally since the beginning of the 1940s. We carried out a follow up study of the taxa listed above between 1998 and 2008 to study possible changes in the insect fauna. A total of 398 species belonging to the studied groups have been recorded in the park. Especially species rich groups are the bumblebees and butterflies, of which 16 and 26 species have been recorded. Red Listed species were represented by eight butterflies, but several other interesting and rare species were found, including the first records of the weevil *Dorytomus tortrix* and the chrysidid wasp *Chrysis angustula* in the province Lule lappmark. Only small changes in the fauna were detected; some species of Lepidoptera, Coleoptera and Aculeate wasps seem to have colonized the area over the last 65 years, but the overall rate of colonization has been low. We discuss changes in the alpine fauna, the Red List status of alpine insect species and threats to the environment. It is concluded that the alpine insect fauna warrants further attention and should be carefully monitored since environmental changes are expected to occur at an increased rate in the future." (Authors) *Aeshna caerulea*, *Somatochlora alpestris* and *S. arctica* are listed from the National Park.] Address: Franzén, M., UFZ Centre for Environmental Research, Dept of Community Ecology, Theodor-Lieser-Str. 4, 06120 Halle, Germany. E-post: markus.franzen@ufz.de

12230. Futahashi, R.; Yamamaka, T.; Uemura, Y.; Hisamatsu, M. (2012): Collection and photographic data on dragonflies and damselflies from Ibaraki prefecture. *Bulletin of Ibaraki Nature Museum* 15: 13-38. (in Japanese, with English summary) ["39 odonate species have so far been reported in Ibaraki Prefecture. Here we give a comprehensive list of Odonata collected from Ibaraki Prefecture based on the collections of Ibaraki Nature Museum and the authors' private collections, which consist of 87 species and one hybrid species. We also mention the following four species which are not included in these collections: *Stylurus oculatus*, *Sympetrum uniforme*, *Libellula angelina*, and *Tholymis tillar-*

ga. The former three species may have become extinct in Ibaraki Prefecture, and the last species seems to be a species migrating from a southern area." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology, 1-1-1 Higashi, Tsukuba, Ibaraki 305-8566, Japan

12231. Gaffin-Cahn, E. (2012): Neural responses to looming objects in the dragonfly. Thesis, Bachelor of Science in Neuroscience, University of Rochester: (in English) ["Dragonflies have high visual acuity, which, when combined with a remarkably fast visual response, allows them to hunt small insects with a high success rate. Rather than aiming at the prey's current location, the dragonfly predicts the prey's future location and intercepts the insect mid-flight. Eight bilateral pairs of large Target-Selective Descending Neurons (TSDNs) of the dragonfly ventral nerve cord respond to small, contrasting objects, which presumably represent potential prey. These interneurons are part of the neuronal circuitry that triggers small changes in wing angle and position to control flight during prey interception. In flight, dragonflies extend their legs out to catch the prey about 20 ms before contact. The current research investigates the role of the TSDNs in prey contact. Spiking traces from the nerve cord were recorded during the presentation of expanding black circles projected on a screen, which simulate approaching prey. Several loom sizes and speeds were used to cover a range of realistic and unrealistic rates of expansion. I hypothesized that the interneurons predict the time to contact (Tc) of the simulated looming stimuli. Looming-sensitive TSDNs fired at a consistent time before Tc, supporting the hypothesis." (Author)] Address: Elon Gaffin-Cahn, E. E-mail: egaffinc@caoslab.rochester.edu

12232. Herrera-Grao, T.; Núria Bonada, N.; Blanco-Garrido, O.G. (2012): First record of *Trithemis kirbyi* Selys, 1891 in Catalonia (Odonata, Libellulidae). *Boln. Asoc. esp. Ent.* 36(3-4): 457-459.[Spain, Arnes (Tarragona), in early August 2012]

12233. Hobbelen, P.H.F.; Samuel, M.D.; Foote, D.; Tango, L.; LaPoint, D.A. (2012): Modeling the impacts of global warming on predation and biotic resistance: mosquitoes, damselflies and avian malaria in Hawaii. *Theoretical Ecology* 6(1): 31-44. (in English) ["Biotic resistance from native predators can play an important role in regulating or limiting exotic prey. We investigate how global warming potentially alters the strength and spatial extent of these predator-prey interactions in aquatic insect ecosystems. As a simple model system, we use rock pools in streams of rainforests of Hawaii, which contain *Megalagrion calliphya* as predator and the invasive southern house mosquito *Culex quinquefasciatus* as prey. This abundant mosquito is the major vector of avian malaria transmission to native forest birds. We use mathematical modelling to evaluate the potential impacts of damselfly predation and temperature on mosquito population dynamics. We model this predator-prey system along an elevational gradient (749-1952 m elevation) and assess the effect of 1°C and 2°C climate warming scenarios as well as the effects of El Niño and La Niña oscillations, on predator-prey dynamics. Our results indicate that the strength of biotic resistance of native predators on invasive prey may decrease with increasing temperature because demographic rates of predator and prey are differentially affected by temperature. Future warming could therefore increase the abundance of invasive species by re-

leasing them from predation pressure. If the invasive species is a disease vector, these shifts could increase the impact of disease on both humans and wildlife." (Authors)] Address: Hobbelen, P.H.F., Rothamsted Research, Harpenden AL5 2JQ, UK. E-mail: peter.hobbelen@rothamsted.ac.uk

12234. Hobson, K.A.; Anderson, R.C.; Soto, D.X.; Wassenaar, L.I. (2012): Isotopic evidence that dragonflies (*Pantala flavescens*) migrating through the Maldives come from the northern Indian subcontinent. *PLoS ONE* 7(12): e52594. doi:10.1371/journal.pone.0052594: 4 pp. (in English) ["Large numbers of *P. flavescens* appear in the Maldives every October–December. Since they cannot breed on these largely waterless islands, it has recently been suggested that they are "falling out" during a trans-oceanic flight from India to East Africa. In addition, it has been suggested that this trans-oceanic crossing is just one leg of a multi-generational migratory circuit covering about 14,000–18,000 km. The dragonflies are presumed to accomplish this remarkable feat by riding high-altitude winds associated with the Inter-tropical Convergence Zone (ITCZ). While there is considerable evidence for this migratory circuit, much of that evidence is circumstantial. Recent developments in the application of stable isotope analyses to track migratory dragonflies include the establishment of direct associations between dragonfly wing chitin $\delta^2\text{H}$ values with those derived from long-term $\delta^2\text{H}$ precipitation isoscapes. We applied this approach by measuring wing chitin $\delta^2\text{H}$ values in 49 individual *P. flavescens* from the November–December migration through the Maldives. Using a previously established spatial calibration algorithm for dragonflies, the mean wing $\delta^2\text{H}$ value of -117 ± 16 ‰ corresponded to a predicted mean natal ambient water source of -81 ‰, which resulted in a probabilistic origin of northern India, and possibly further north and east. This strongly suggests that the migratory circuit of this species in this region is longer than previously suspected, and could possibly involve a remarkable trans-Himalayan high-altitude traverse." (Authors)] Address: Hobson, K.A., Environment Canada, Saskatoon, Saskatchewan, Canada. E-mail: Keith.Hobson@ec.gc.ca

12235. Hoffmann, J. (2013): Anmerkungen zur Beobachtung "Rotfußfalke auf nächtlicher Libellenjagd" von Martin Löschau (in *Otis* 18: 115). *Otis* 19 (2011): 135–138 (in German, with English summary) ["Our knowledge on nocturnal activities both of dragonflies as well as falcons is very fragmentary. The observed dragonflies are probably Migrant Hawkers (*Aeshna mixta*). Presumably, the observed Red-footed Falcon (*Falco vespertinus*) has joined to the migrating dragonfly swarm, which also came from eastern direction, and used this for a longer time as a food resource. Small falcons hiking with dragonfly swarms are also known from other regions. Preconditions for such nocturnal antipredation are abiotic factors such as UV-visibility." (Author) Address: Hoffmann, J., alauda, Liebigstr. 2-20, 22113 Hamburg; E-Mail: hoffmann@alauda.de

12236. Holuša, O.; Holušova, K. (2012): The first findings of larvae of *Cordulegaster insignis* (Odonata: Cordulegasteridae) in Macedonia. *Acta Musei Beskidensis* 4: 143–149. (in English, with Czech summary) ["Ten larvae of *C. insignis* were found on 6–VII-2012 at Novacani village near Veles town in central Macedonia. The finding of larvae of several instars shows the permanent occurrence of the species in Macedonia." (Authors)] Address:

Holuša, O., Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemeědělská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

12237. Holuša, O.; Krivan, V (2012): A population of *Cordulegaster insignis* (Schneider, 1845) in Macedonia (Odonata: Cordulegasteridae). *Acta Musei Moraviae, Scientiae biologicae* (Brno) 97(2): 1–5. (in English) ["Males of the species were found at 23-V-2010 and 19-VI-2011 at Novaeani village near the town of Veles (41°45' N 21°4'56'E) in central Macedonia. The occurrence of a population and other *Cordulegaster* species in Macedonia is discussed." (Authors)] Address: Holuša, O., Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemeědělská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz

12238. Horne, J. (2012): Emergence, maturation time and oviposition in the Common Darter *Sympetrum striolatum* (Charpentier). *J. Br. Dragonfly Society* 28(2): 66–74. (in English) ["The most successful period of oviposition in 2005 occurred during the last half of September. However, 9% of the emergences in 2006 occurred from a pond exposed from mid-October through November 2005, indicating a second, smaller, peak of oviposition. Over the period 1990–2011 the average date for the first sighting of individuals was 17 June and the average date when first seen patrolling was 14 July. The mean time between emergence and patrolling was 28 days." (Author)] Address: Horne, J., 78 Spring Lane, Bishopstoke, Eastleigh, Hants, S050 6BB, UK

12239. Hull, R.; Katete, R.; Ntwasa, M. (2012): Therapeutic potential of antimicrobial peptides from insects. *Biotechnology and Molecular Biology Review* 7(2): 31–47. (in English) ["The first antimicrobial peptides were isolated from the cecropia moth *Hyalophora cecropia* in 1980. Since then a plethora of antimicrobial peptides have been isolated from other arthropods, invertebrates and chordates. With the emergence of antibiotic resistant bacterial pathogens and the promising activity of these peptides, attempts are being made to use these peptides as new antimicrobial agents. Other researchers are interested in using these peptides to improve the resistance of crops and livestock to infections, while another line of research is interested in using these peptides to control vector borne diseases. Despite the promising antibacterial, antiviral, anti-protozoan and anti-tumor activity of these peptides, relatively few peptides have made it to clinical trials. Problems associated with the development of these peptides into effective antimicrobial agents include their higher cost, proteolysis or decreased activity in physiological environments and mass production. This review (including a reference to *Aeshna cyanea*) will focus specifically on the development of insect antimicrobial peptides into useful chemotherapeutic agents." (Authors)] Address: Ntwasa, M., School of Molecular and Cell Biology, University of the Witwatersrand, Wits, 2050, South Africa. E-mail: monde@biology.wits.ac.za

12240. Jeziorski, P.; Holuša, O. (2012): An updated checklist of the dragonflies (Odonata) of the Czech Republic. *Acta Musei Beskidensis* 4: 143–149. (in English, with Czech summary) [26 genera of Odonata with 73 species have been recorded in the territory of the Czech Republic, 71 species from Bohemia and 69 species from Moravia.] Address: Jeziorski, P., Na Bělidle 1, CZ-735 64 Havířov-Suchá, Czech Republic. E-mail: jezirko@post.cz

- 12241.** Jia, C.Y.; Wei, C.Y. (2012): Radio tracking of large Odonata species in forest fragments in Singapore. Project Report. Submitted to Nature Society (Singapore), Junior College Category, 2012; <http://www.nss.org.sg/documents/LGD%202012%20%20Radio%20Trackin%20Odonata%20NUS%20High%20Hwa%20Chong%20Inst.pdf>: 11 pp. (in English) ["Recent advances in technology allow radio tracking to be done for larger insects. Such studies have been done on Odonata, in the open fields of the UK. However, behaviour of larger Odonates in the tropical forests of the SE Asian region is not well known, especially when away from water bodies. Difficulty arises in following these large individuals through the dense forest undergrowth as the individuals fly or perch in the canopy foliage. This study thus aims to be a pilot study in the uses of radio tracking in collecting information on the spatial and temporal behaviour of large Singaporean Odonates, in particular the *Macrogomphus quadratus*. Radio tracking is done on foot and individuals are followed for as long as a signal is detected (an average of seven days). The *M. quadratus* is likely to be a percher in terms of its feeding behaviour as can be deduced from the signals received on the tracking receiver and also from visual observations of untagged individuals. As a pioneer work in the field of radio tracking in SE Asia, we hope that future work will be aided by our findings." (Authors)] Address: Jia, C.Y., NUS High School, Hwa Chong Inst., Little Green Dot Student Research Grant, 20 Clementi Avenue 1, Singapore 129957
- 12242.** Joest, R.; Vierhaus, H.; Wrede, J. (2012): Erstnachweis des Kleinen Blaupfeils *Orthetrum coerulescens* im Arnsberger Wald. *ABU info* 33-35: 38-39. (in German) [Landkreis Soest, Nordrhein-Westfalen, Germany; records from 2010 and 2011 are documented.] Address: Joest, R., Hellweg 41, 59505 Bad Sassendorf-Lohne, Germany
- 12243.** Kang, S.-R.; King, S.L. (2012): Influence of salinity and prey presence on the survival of aquatic macroinvertebrates of a freshwater marsh. *Aquatic ecology* 46(4): 411-420. (in English) ["Salinization of coastal freshwater environments is a global issue. Increased salinity from sea level rise, storm surges, or other mechanisms is common in coastal freshwater marshes of Louisiana, USA. The effects of salinity increases on aquatic macroinvertebrates in these systems have received little attention, despite the importance of aquatic macroinvertebrates for nutrient cycling, biodiversity, and as a food source for vertebrate species. We used microcosm experiments to evaluate the effects of salinity, duration of exposure, and prey availability on the relative survival of dominant aquatic macroinvertebrates (i.e., *Procambarus clarkii*, *Cambarellus puer*, Libellulidae, Dytiscidae cybister) in a freshwater marsh of southwestern Louisiana. We hypothesized that increased salinity, absence of prey, and increased duration of exposure would decrease survival of aquatic macroinvertebrates and that crustaceans would have higher survival than aquatic insect taxon. Our first hypothesis was only partially supported as only salinity increases combined with prolonged exposure duration affected aquatic macroinvertebrate survival. Furthermore, crustaceans had higher survival than aquatic insects. Salinity stress may cause mortality when acting together with other stressful conditions." (Authors)] Address: Kang, S.R., School of Renewable Natural Resources, Louisiana State Univ. AgCenter, Rm. 307, RNR Building, Baton Rouge, LA, 70803, USA. E-mail:
- 12244.** Karube, H. (2012): Vietnamese Odonata collected in 1992-2003 surveys (3) Cordulegastridae, genus *Anotogaster* with note on its systematic grouping. *Tombo* 54: 55-69. (in English) ["Here I report the following five species of the genus *Anotogaster* from Vietnam with full descriptions; *A. sakaii* Zhou, 1988, *A. chaoi* Zhou, 1998, *A. sapaensis* sp. nov., *A. gigantea* Fraser, 1924 and *A. klossi* Fraser, 1919. Among them, *A. sapaensis* is new to science, and related for *A. nipalensis*. *A. sakaii*, *A. chaoi* and *A. gigantea* are new records for Vietnam. The female of *A. chaoi* and the male of *A. klossi* are described for the first time. In northern Vietnam, I recorded 4 species from the same mountain, such a high species diversity is a unique characteristics of Indochina region. In addition, the key for grouping of this genus is discussed." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp
- 12245.** Kim, M.; Yoo, J.-c. (2012): Diet of yellow bitterns (*Ixobrychus sinensis*) during the breeding season in South Korea. *Journal of Ecology and Field Biology* 35(1): 9-14. (in English) ["Yellow bitterns (*Ixobrychus sinensis*) are a small wetland bird common to Asian countries including South Korea, Japan, and China. The aim of this study is to describe diet of yellow bitterns during the breeding season in artificial wetland of northeastern South Korea between May to August 1999-2001. For the purposes of this paper, we observe the frequency of nest visiting by parents during the chick rearing period. A total of 98 boluses regurgitated by 52 chicks aged 1 day to 11 days after hatching form the sample and are shown to contain 323 food items. A bolus contained mean 3.8 items and weighs 0.2 g to 7.7 g. The most regularly occurring food items recorded are fish (63%) and insets (33%). In terms of fish, top mouth minnows (*Pseudorasbora parva*) and crucian carps (*Carassius auratus*) are frequently observed. In terms of insects, there are mosquitoes (Diptera), instars of dragonfly (Libellulidae), damselflies Coenagrionidae) and water bugs (*Diplonychus japonicus*). Yellow bitterns were also shown to feed on bull frogs (*Rana catesbeiana*), shrimp (Palaemonidae), and spiders (Araneae). The size of fish in a bolus ranged from 15.56 mm to 93.73 mm (mean, 37.08 mm). The amount of food can be observed to increase with the age of chicks ($r = 0.279$, $P = 0.025$, $N = 64$) but parents did not provide larger fish as chicks grew. Parent birds visited nests more frequently when they have a larger brood ($F_{1,21} = 14.529$, $P = 0.001$). Our results suggest that fish is the most important prey during the breeding season and that age of chicks is related to amount of diet in yellow bitterns." (Authors)] Address: Yoo, J.-c., Korean Institute of Ornithology and Dept of Biology, Kyung Hee Univ., Seoul 130-701, Korea. E-mail: jcyoo@khu.ac.kr
- 12246.** Kipping, J.; Martens, A.; Suhling, F. (2012): Africa's smallest damselfly: a new *Agriocnemis* from Namibia (Odonata: Coenagrionidae). *Organisms Diversity and Evolution* 12(3): 301-306. (in English) [*Agriocnemis bumhilli* sp. n., a new damselfly from the Kwando River in northeastern Namibia is described. The new species is similar to *Agriocnemis angolensis* but characterized by unique male appendages, swollen abdominal segments 9 and 10, the complete absence of antehumeral stripes, and smaller size. The species is illustrated and

a photograph is provided. For comparison, an illustrated key to the other members of *Agriocnemis* within south-central Africa is provided." (Authors)] Address: Kipping, J., BioCart - Ökologische Gutachten & Studien, Albrecht-Dürer-Weg 8, D-04425 Taucha, Germany. E-mail: BioCartKipping@web.de

12247. Kipping, J. (2012): Zur aktuellen Verbreitung der in Fließgewässer siedelnden Libellenarten in der Umgebung von Altenburg mit besonderer Berücksichtigung von Pleiße und deren Nebengewässern (Insecta: Odonata). *Mauritiana* 23: 148-174. (in German, with English summary) ["The recent distribution of lotic dragonfly species in the surrounding of Altenburg with special account on the Pleiße River and its tributaries (Insecta: Odonata). Along the Pleiße River and its tributaries in the Altenburger Land district and adjacent areas all members of the Odonata families Gomphidae and Calopterygidae were not known to occur or extinct since the 1960th. Pollution with industrial and urban waste water was probably the main reason for decline and extinction of these species. With the regional collapse of water polluting industry in the river catchment and increasing efforts in water purification after 1990 the situation turned to the better and from this time onwards some of the species resettled formerly abandoned river stretches. The paper presented here gives an up to date overview about the recent distribution of *Gomphus pulchellus*, *G. vulgatissimus*, *Ophiogomphus cecilia* and *Calopteryx splendens* and *C. virgo* in the region. Some of the mentioned species are nowadays widely distributed and locally common. In Germany the lentic *G. pulchellus* has its easternmost occurrence near Altenburg." (Author)] Address: Kipping, J., BioCart - Ökologische Gutachten & Studien, Albrecht-Dürer-Weg 8, D-04425 Taucha, Germany. E-mail: BioCartKipping@web.de

12248. Klaus, D. (2012): Die Besiedlung künstlich geschaffener Kleingewässer in der Pleißeau durch Wasserinsekten und Amphibien. *Mauritiana* 23: 54-77. (in German, with English summary) ["The colonisation of artificially created ponds in the Pleiße-Floodplain by aquatic insects and amphibians. The newly created small bodies of water on the meadows of the Pleiße between Windischleuba and Remsa in 2009 were examined for their colonization by dragonflies, water bugs, water beetles and amphibians. As a result 14 species of dragonflies, 8 taxa of water bugs and 27 representatives of aquatic beetles were detected. So far only three amphibian species were found in these ponds. The insects were predominantly eurytopic and widespread species in Thuringia. But with the Scarce Blue-tailed Damselfly (*Ischnura pumilio*) - Red List of TH 3 (= "Vulnerable"), the diving beetle *Laccophilus poecilus* - RL TH: R (= "Rare"), and the green toad (*Bufo viridis*) - RL TH 1 (= "Critically endangered"), these bodies of water also presented a habitat to three species endangered in Thuringia." (Author)] Address: Klaus, D., Naturkundliches Museum Mauritium Altenburg, Parkstr. 1, 04600 Altenburg, Germany. E-mail: klaus@mauritianum.de

12249. Koike, S. Morimoto, H.; Goto, Y.; Kozakai, C.; Yamazaki, K. (2012): Insectivory by five sympatric carnivores in cool-temperate deciduous forests. *Mammal Study* 37(2): 73-83. (in English) ["We studied insectivory by five carnivores—the Asiatic black bear (*Ursus thibetanus*), Japanese marten (*Martes melampus*), Japanese badger (*Meles meles*), red fox (*Vulpes vulpes*), and raccoon dog (*Nyctereutes procyonoides*)—in a cool-temperate deciduous forest in Japan. From May

2003 to April 2005, we assayed 373 fecal samples (91 from bear, 158 from marten, 43 from badger, 36 from fox, and 45 from raccoon dog) for insects. Each carnivore species consumed a variety of insect species, some preferentially. Bears preferred colonial insects like ants and wasps; martens ate a variety of forest insects, such as ground beetles and arboreal insects; badgers preferred forest ground beetles; foxes ate ground beetles and grassland insects; and raccoon dogs ate a variety of species. Dietary preferences may reflect the feeding strategy, behaviour, or habitat preference of each carnivore species. Based on the habitat preferences of the insects, we could assign carnivores to particular microhabitats: bears and martens used forest in three dimensions, badgers inhabited forest in two dimensions, foxes used grassland and forest in two dimensions, and raccoon dogs inhabited grassland and forest in three dimensions. Identification of insects in feces may provide information on the dietary and habitat preferences of these carnivores.... Foxes foraged only on Coleoptera, Hemiptera, Orthoptera, and Odonata. Only foxes ate Odonata (grassland insects)." (Authors)] Address: Koike, S., Tokyo University of Agriculture and Technology, 3-5-8 Saiwai, Fuchu, Tokyo 183-8509, Japan. E-mail: koikes@cc.tuat.ac.jp

12250. Koleček, J. (2012): A new record of the Yellow-spotted Whiteface (*Leucorrhinia pectoralis*, Odonata: Libellulidae) in the district Vsetín (Eastern Moravia, the Czech Republic). *Acta Carpathica occidentalis* 3: 117-18. (in Czech, with English summary) [3-4 mature males were observed at the abandoned gravel pit near the Choryně village on 15.vi.2012 at altitude 270 m a.s.l.] Address: Koleček, J., Katedra zoologie, Přírodovědecká fakulta Univerzity Palackého, 17. listopadu 50, CZ-771 46 Olomouc, Czech Republic. E-mail: j.kolecek@email.cz

12251. Koren, T.; Trkov, D.; Vukotic, K.; Crne, M. (2012): New records of the rare dragonfly, Black Pennant – *Selysiotthemis nigra* (Vander Linden, 1825) (Insecta: Odonata) in Bosnia and Herzegovina. *Natura Sloveniae* 14(2): 65-69. (in English, with Slovenian summary) [Records of the species in summer 2012 from two localities in Bosnia and Herzegovina and three in Croatia all located in the Neretva River alluvium are documented and discussed.] Address: Koren, T., University of Primorska, Science and Research Centre, Institute for Biodiversity Studies, SI-6310 Izola, Giordana Bruna 6, Slovenia. E-mail: koren.toni1@gmail.com

12252. Kosterin, O.E.; Chartier, G.; Holden, J.; Mey, F.S. (2012): New records of Odonata from Cambodia, based mostly on photographs. *Cambodian Journal of Natural History* 2012(2): 150-163. (in English, with Cambodian summary) ["Nine species of Odonata – *Euphaea ochracea*, *Lestes nodalis*, *Gynacantha phaeomeria*, *Gynacantha demeter*, *Microgomphus chelifer*, *Amphithemis curvistyla*, *Orthetrum triangulare*, *Rhyothemis plutonia* and *Tetrathemis platyptera* – are reported for the first time for Cambodia, raising the number of named Odonata species recorded in this country to 135. All of the new records are based on photographs taken in nature apart from *E. ochracea*, which is supported by a voucher specimen. Also based on photographs, new distributional records for 93 Odonata species are provided for a number of localities in the Cardamom Mountains: the environs of Tatoi Village in Koh Kong Province, and the environs of Ou Saom and Pramoui villages, including parts of Phnom Samkos

Wildlife Sanctuary, in Pursat Province. Ectoparasitic midges in the genus *Forcipomyia* (Pterobosca) were recorded on one species in the family Coenagrionidae and 11 species in the family Libellulidae." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

12253. Kulijer, D.; Baker, R.A.; Zawal, A. (2012): A preliminary report on parasitism of Odonata by water mites from Bosnia and Herzegovina. *J. Br. Dragonfly Society* 28(2): 92-10. (in English) ["The following Odonata, infested with mites, have been collected from a number of sites in Bosnia and Herzegovina - *Aeshna isosceles*, *Sympetrum flaveolum*, *Coenagrion pulchellum*, *Coenagrion puella*, *Coenagrion scitulum*, *Enallagma cyathigerum*, *Erythromma najas*, *Ischnura elegans*, *Ischnura pumilio*, *Lestes dryas*, *Platycnemis pennipes*, and *Pyrrosoma nymphula*. The preferred site of mite attachment on the body is the posterior ventral surface of the thorax, behind the third pair of legs. In all but one of the species of zygopteran, mites were also found between the first and second pair and/or the second and third pair of legs and, in several species, on the abdomen. Mite loads varied for different species but preliminary results suggest that the larger anisopterans can carry more mites (in *S. flaveolum* mean 42, range 1-91) than the zygopterans, the highest recorded in the latter being in *C. pulchellum* (mean 37, range 1-68) and the lowest in *L. dryas* (mean 4, range 1-11). More mites were found on female damselflies than on males. Three distinct sizes of larval mite have been noted, indicating stages in their engorgement on the host." (Authors)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo

12254. Kulijer, D.; Vinko, D.; Billquist, M.; Mekkes, J.J. (2012): Contribution to the knowledge of the Odonata fauna of Bosnia and Herzegovina – Results of the ECOO 2012. *Natura Sloveniae* 14(2): 23-38. (in English, with Slovenian summary) ["As a part of the 2nd European Congress on Odonatology (ECOO 2012), which was held in the beginning of July 2012 in Belgrade (Serbia), a post congress excursion to Bosnia and Herzegovina was organized. Between 6 and 12 August 2012, altogether 36 localities in three biogeographical regions throughout Bosnia and Herzegovina were surveyed, and 52 dragonfly species were found. This represents 83% of the hitherto recorded dragonfly species for the country. The most significant results are the second record and a new locality of *Somatochlora metallica*, second record of *Coenagrion hastulatum*, and first observation of the strong population of *Lindenia tetraphylla* for the country. New records of rare and/or threatened species, i.e. *Coenagrion ornatum*, *Ceriagrion tenellum*, *Caliaeschna microstigma*, *Cordulegaster heros* and *Selysiotermis nigra*, are also reported. The records of the most interesting species are briefly discussed from the aspects of biogeography and nature conservation." (Authors)] Address: Vinko, D., Slovenska 14, SI-1234 Mengeš, Slovenia; E-mail: damjan.vinko@gmail.com

12255. Laister, G. (2012): Ortstreue und Ortswechsel von *Cordulia aenea* an Fortpflanzungsgewässern (Odonata: Corduliidae). *Libellula* 31(3/4): 155-178. (in German, with English summary) ["In a five-year study, data on site fidelity and change of location in *C. aenea* during the pre-reproductive and reproductive period was

collected using capture mark-recapture method. Five ponds, which were preferentially investigated in pairs in different years, were included in the study. Teneral individuals of *C. aenea* were marked at the pond that harboured the largest population. Immigration, unequal probability of individuals to gain a territory and mortality during pre-reproductive period presumably had the widest influence on the recapture rate of males marked as tenerals. Emigration was proved only to a lesser degree towards nearby ponds. In summary, it can be concluded that in spite of low recapture rates of teneral marked males we cannot assume that emigration plays a major part in the composition of a large population. In adult males site fidelity including an exchange of individuals between closely neighbouring ponds was found." (Author)] Address: Laister, G., Stadtgärten Linz, Abteilung Botanischer Garten und Naturkundliche Station, Roseggerstr. 20-22, A-4020 Linz, Austria. E-mail: Gerold.Laister@mag.linz.at

12256. Laister, G. (2012): Ortstreue und Gewässerwechsel von *Cordulegaster boltonii* (Odonata: Cordulegastriidae). *Libellula* 31(3/4): 113-130. (in German, with English summary) ["Site fidelity and movement to other brooks in *Cordulegaster boltonii* (Odonata: Cordulegastriidae) – In the year 2000, at three brooks in the area of Linz, Austria, site fidelity and movement to other brooks has been investigated. The brooks have been of different width and because of their characteristics of different suitability for *Cordulegaster boltonii*. It has been shown that site fidelity and movement to other brooks depends on how much a habitat meets the ecological needs of the species. Site fidelity was highest for males at the apparently favoured habitat. Ratio of males moving to other brooks was highest at brooks which represented less typical habitats. Some males have been found more frequently and for a longer time at the brook than other males." (Author)] Address: Laister, G., Stadtgärten Linz, Abteilung Botanischer Garten und Naturkundliche Station, Roseggerstr. 20-22, A-4020 Linz, Austria. E-mail: Gerold.Laister@mag.linz.at

12257. Lambert, J.L.; Neveu, G.; Millard, R.; Genin, C. (2012): Première preuve de l'indigénat d'*Ophiogomphus cecilia* (Fourcroy, 1785) dans le Jura Franc-Comtois (Odonata, Anisoptera : Gomphidae). *Martinia* 28(1): 41-48. (in French, with English summary) ["*O. cecilia* is reported from the Hérisson River, a major tributary of the Ain River, Jura mountains, eastern France, 2011. This is the first evidence of the reproduction in the Jura mountains, as previously only a dead imago was known from the mouth of the Loue River in the Doubs River." (Authors)] Address: Lambert, J.L., Onema, Service départemental de la Marne, F- 51520 La Veuve ; <jean-luc.lambert@onema.fr

12258. Lankika, M.D.H.; Karunaratne, M.M.S.C.; Conniff, K. (2012): Species composition of Odonate fauna in Meegahawatta, a wetland Aaea in Hanwella, Sri Lanka. *Journal of Tropical Forestry and Environment* 2(2): 37-42. (in English) ["Approximately 120 species of Odonata have been recorded in Sri Lanka to date. There are many gaps in our knowledge of Odonata taxonomy and distribution. The present study, therefore, was carried out to investigate adult Odonata species present in Meegahawatta area (1000m²) in Hanwella. The study was carried out using two fixed quadrats (20m x 10m) randomly established in two selected sites. Total number of individuals belonging to each species was counted fortnightly by using binoculars. A total of 27 species,

11 Zygoptera and 16 Anisoptera representing eight families were recorded. This comprised of three endemic Zygopteran species (*Libellago adami*, *Pseudagrion rubriceps ceylonicum* and *Prodiasineura sita*) and three endemic anisopteran species (*Epophthalmia vittata cyanocephala*, *Cyclogomphus gynostylus* and *Macrogomphus lankanensis*). Among those identified was one recently discovered and yet un-described Archibasis species. Of the three endemic Anisopteran species recorded, *C. gynostylus* and *M. lankanensis* are listed as vulnerable species in the IUCN Redlist of 2010. Although the Zygopterans showed higher Diversity Index and Evenness Index ($H' = 1.99$, $E = 0.83$) than the Anisopterans ($H' = 1.96$, $E = 0.32$), their Richness Index ($R = 1.67$) was less than that of the Anisopterans ($R = 2.49$). The most common Zygopteran species recorded was *Pseudagrion malabaricum* whereas *Neurothemis tulia tulia* was the most common anisopteran species." (Authors)] Address: Lankika, M.D.H., Department of Zoology, University of Sri Jayewardenepura, Nugegoda, Sri Lanka. E-mail: harshi87@hotmail.com

12259. Maag, N.; Gehrler, L.; Woodhams, D.C. (2012): Sink or swim: a test of tadpole behavioral responses to predator cues and potential alarm pheromones from skin secretions. *J. Comp. Physiol. A Neuroethol. Sens. Neural Behav. Physiol.* 198(11): 841-846. (in English) ["Chemical signalling is a vital mode of communication for most organisms, including larval amphibians. However, few studies have determined the identity or source of chemical compounds signalling amphibian defensive behaviours, in particular, whether alarm pheromones can be actively secreted from tadpoles signalling danger to conspecifics. Here we exposed tadpoles of the common toad *Bufo bufo* and common frog *Rana temporaria* to known cues signalling predation risk and to potential alarm pheromones. In both species, an immediate reduction in swimming activity extending over an hour was caused by chemical cues from the predator *Aeshna cyanea* (dragonfly larvae) that had been feeding on conspecific tadpoles. However, *B. bufo* tadpoles did not detectably alter their behaviour upon exposure to potential alarm pheromones, neither to their own skin secretions, nor to the abundant predator-defence peptide bradykinin. Thus, chemicals signalling active predation had a stronger effect than general alarm secretions of other common toad tadpoles. This species may invest in a defensive strategy alternative to communication by alarm pheromones, given that Bufonidae are toxic to some predators and not known to produce defensive skin peptides. Comparative behavioural physiology of amphibian alarm responses may elucidate functional trade-offs in pheromone production and the evolution of chemical communication." (Authors)] Address: Maag, N., Institute of Evolutionary Biology & Environmental Studies, University of Zürich, Winterthurerstr. 190, 8057 Zürich, Switzerland. E-mail: nino.maag@gmx.ch

12260. Machado, A.B.M. (2012): A new species of *Ischnura* (Odonata: Coenagrionidae) from high altitude eastern Andes, of Colombia. *Zoologia* 29(6): 598-600. (in English) ["*Ischnura mahechai* sp. nov. is described and illustrated based on specimens collected at the Eastern Andean mountain range of Colômbia. The species is close to *Ischnura cruzi* De Marmels, 1987 but differs from it by the structure of male anal appendages and female hind prothoracic lobe. The specimens were collected on a small Andine lake at 3,600 m, the 4th alti-

tudinal record for a resident odonate." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Instituto de Ciências Biológicas, Univ. Federal de Minas Gerais. Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brasil. E-mail: angelo@icb.ufmg.br

12261. Mäkinen, J. (2012): Eteläntytönkorento (*Coenagrion puella*) Suomessa [Coenagrion puella in Finland]. *Crenata* 5: 4-7. (in Finnish) [In Finland *C. puella* was a very rare and local species for many decades. It was first recorded in 1958 in Vehkalahti, where a population was found in a small river. The next two populations were also discovered in small streams in south-eastern Finland. *C. puella* was classified as endangered in the Finnish Red List between the years 1986 and 2001. In 2002 it began to expand its range rapidly. Within one decade it has become a common species in the Helsinki area. At present the northern border of the range (excluding the old population in Mäntyharju, still the northernmost in Finland) is 70-80 km north from the southern coast. The average speed of the expansion is estimated to have been 5-6 km per year during the past 11 years. (Asmus Schöter)] Address: makisenjussi@gmail

12262. Mäkinen, J., M. Friman, S. Karjalainen & J. (2012): Rahkonen (2012) Sudenkorentokatsaus 2011 [Report of dragonfly records made in Finland in 2011]. *Crenata* 5: 8-28. (in Finnish) [This article presents the most interesting Odonata records from Finland in 2011. Two new additions to the Finnish fauna were found: *Lestes virens* and *Sympetrum fonscolombii*. *L. virens* was recorded in Vantaa (27-28 August, by Miikka Friman) and *S. fonscolombii* in Helsinki (9 October, by Timo Päivinen). Only one individual of both species was observed. During 2011 seven new provincial records were made. These include the second observation of *Sympetrum pedemontanum* in Finland (Liperi, 27 July, by Kari Manner). A total of 59 dragonfly species have been recorded in the country by the end of 2011. (Asmus Schöter)] Address: makisenjussi@gmail

12263. Marinov, M. (2012): Description of female *Hemicordulia hilaris* Lieftinck, 1975 (Anisoptera: Corduliidae) with brief notes on the biogeography of the genus. *Rec. Auckland Mus.* 48: 97-105. (in English) ["Three *Hemicordulia* specimens in the Auckland Museum, collected from the Cook Islands and Fiji, were compared with recently sampled material from Fiji, Tonga and New Caledonia. They were determined to be conspecific with *H. hilaris*, originally described from New Caledonia and confirmed for other parts of the Pacific – Fiji, Samoa and Tonga. The female of *H. hilaris* is described here for the first time and morphological features that separate the species from other congeners are discussed." (Author)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

12264. Martens, A.; Schiel, F.J. (2012): Erste Ansiedlung der Quagga-Muschel *Dreissena rostriformis bugensis* (Andrusov) an einem isolierten See in Mitteleuropa (Bivalvia: Dreissenidae). *Lauterbornia* 75: 109-111. (in German, with English summary) ["On 27-05-2012 a specimen of *Dreissena rostriformis bugensis* attached on a dragonfly exuvia was recorded at a gravel-pit lake near Dettenheim north of Karlsruhe, Germany. In autumn 2012, the mussel was recorded at the underside of angler's boats and on aquatic vegetation in big numbers. The lake had no water exchange with the

River Rhine, and was used for gravel dredging, swimming, fishing with boats and sailing. This is the first record of *D. rostriformis bugensis* from an isolated lake in Central Europe." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

12265. Martens, A.; Zinecker, A. (2012): Springbrunnen – ein städtisches Extremhabitat als Entwicklungsgewässer von *Sympetrum fonscolombii* (Odonata: Libellulidae). *Libellula* 31(3/4): 211-221. (in German, with English summary) ["Waterspout fountains: an extreme urban habitat as breeding site of *Sympetrum fonscolombii* in Central Europe (Odonata: Libellulidae) – In September 2012, exuviae and fullgrown larvae of *S. fonscolombii* were found at fountains in the palace gardens of Karlsruhe, Bruchsal, Schwetzingen and Ludwigsburg, Baden-Württemberg, Germany. In Bruchsal the species emerged until 24-x-2012. Waterspout fountains are artificial urban habitats and form an extreme: They are filled with water between April and October and they are extremely poor in structures, microhabitats and species. So far, there were no reports of breeding odonates in that special type of urban waters. Having a rapid egg and larval development, *S. fonscolombii* prefers temporal ponds and is well-adapted to use these waters for successfully breeding; therefore, it profits from this urban habitat." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, 76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

12266. Martens, A. (2012): *Lestes macrostigma* (Eversmann, 1836) (Odonata, Zygoptera: Lestidae) en tant qu'hôte de *Forcipomyia paludis* (Macfie, 1936) (Diptera: Ceratopogonidae). *Martinia* 28(2): 107-108. (in French, with English summary) ["On 25 May 2010 in the National Natural Reserve of the Marais du Vigueirat (Carnegie, Southern France), photographs of several pre-reproductive *L. macrostigma* were taken having ceratopogonids –or biting-midges– on their wings." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

12267. Masunaga, K. (2012): The dragonfly and damselfly faunas of Lake Biwa and their long-term changes. In Kawanabe, H., M Nishino & M. Maehata (eds.): *Lake Biwa: Interactions Between Nature and People*. Springer: 117-118. (in English) [The Odonata fauna in Lake Biwa is summarized. "Ninety-nine species were recorded in 2000 from Shiga Prefecture, which surrounds the lake. Five species are treated as endangered, six as vulnerable species, and five as near threatened species in the 2005 edition of the Red Data Book Shiga. Ongoing threats to these insects, particularly their aquatic young, include deteriorating water quality, loss of aquatic habitats, and predation by nonnative species of fish." (Author)] Address: Masunaga, K., Lake Biwa Museum, 1091 Oroshimo-cho. Kusatsu. Shiga 523-0001, Japan. E-mail: moai@lbm.go.jp

12268. Matushkina, N.A.; Buy, D.D.; Borysenko, N.N. (2012): Current status of the dragonfly (Insecta, Odonata) fauna of the Kanive Nature reserve and vicinities. *Nature Reserves in Ukraine* 18(1-2): 87-91. (in English, with Ukrainian and Russian summaries) ["Forty dragonfly species are recorded from the Kanev Natural Reserve and vicinities, three of which (*Erythromma viridulum*,

Somatochlora flavomaculata, and *Stylurus flavipes*) were reported for the first time. Notes on biogeographic affinities, ecology and behaviour were added for these species. Current findings of some dragonfly species (*Sympecma fusca*, *Aeshna affinis*, *Brachytron pratense*, *Somatochlora metallica*, *Crocothemis erythraea*, and *Orthetrum albistylum*), rare or locally distributed in the Reserve, are added. Current status of the odonatofauna of the Reserve is discussed from the position of environment changes." (Authors)] Address: Matushkina, Natalia A., Department of Zoology, Biological Faculty, National Taras Shevchenko University of Kyiv, vul. Volodymyrs'ka, 64, Kyiv UA-01033, Ukraine. E-mail: odonataly@gmail.com

12269. McTavish, E.J.; Smith, G.K.; Guerrero, R.F.; Gering, E.J. (2012): Flight morphology variation in a damselfly with female-limited polymorphism. *Evolutionary Ecology Research* 14: 325-341. (in English) ["Background: Female-limited colour polymorphisms occur in many species of Odonata. Often one female morph appears male-like in coloration (androchromes) whereas one or more others are distinct from males (gynochromes). These androchromes are hypothesized to be male-mimics, thereby avoiding the harassment of excessive male mating attempts. Organism: *Ischnura ramburii*, Rambur's forktail, is a widespread New World species with androchrome and gynochrome females. It was introduced to the Hawaiian Islands in the mid-1970s and females were thought to be exclusively gynochromatic there. Questions: How do males and females differ in their flight apparatus? Do females with different colour morphologies also differ in flight morphology? Hypothesis: Because male-like coloration is sometimes associated with male-like flight behaviours, androchrome females should have more male-like wings than gynochrome females. Methods: We caught individuals of *I. ramburii* in the field from seven populations on three of the Hawaiian Islands and three populations in Texas (part of its native range). Using digitized wing and body images, we compared body size, wing size, and wing shape between sexes, between female morphs, and among geographic regions. Results: Male *I. ramburii* are smaller than females and have smaller, more slender wings. Although androchromes are absent from the Big Island of Hawaii, both androchrome and gynochrome females are common on Oahu and Kauai. Androchrome females are indistinguishable from gynochrome females in all aspects of their flight apparatus except for forewing size, which is smaller than that of gynochromes and thus more-male like. Wing shape and size vary geographically. Body- and wing-size differences between males and females are consistent across regions, although the degree and direction of sexual dimorphism in wing shape are not." (Authors)] Address: Guerrero, R.F., Univ. of Texas at Austin, Section of Integrative Biology, One University Station, C0930, Austin, TX 78712, USA. E-mail: r.guerrero@utexas.edu

12270. Mezquita-Aranburu, I.; Ocharan, F.J. (2012): Odonates from Gipuzkoa. *Munibe (Ciencias Naturales-Natur Zientziak)* 60: 51-75. (in Spanish, with English and Euskarian summaries) ["We present data on 42 species of Odonata found in Gipuzkoa (Basque Country, Spain) during a study conducted between 2006 and 2011, and also we do a literature review. Overall, 43 species have been detected, 21 Zygoptera (9 of them first seen in Gipuzkoa) and 22 Anisoptera (13 of them

first seen in Gipuzkoa). Particularly interesting are *Coenagrion mercuriale*, *C. scitulum*, *Oxygastra curtisii* and *Orthetrum albistylum*." (Authors)] Address: Mezquita-Aranburu, I., Sociedad de Ciencias Aranzadi / Aranzadi Zientzia Elkarte, Departamento de Entomología / Entomologia Departamentua, Zorroagagaina 11 • 20014 Donostia / San Sebastián, Spain. E-mail: mezquitaaranburu@gmail.com

12271. Mielewicz, M.; Liebisch, F.; Walter, A.; Greven, H. (2012): Infrarot (NIR)-Reflexion bei Insekten — phänetische Untersuchungen an 181 Arten. *Entomologie heute* 24: 183-216. (in German, with English summary) ["We tested a camera system which allows to roughly estimate the amount of reflectance properties in the near infrared (NIR; ca. 700-1000 nm). The effectiveness of the system was studied by taking photos of 165 insect species including some subspecies from museum collections (105 Coleoptera, 11 Hemiptera (Pentatomidae), 12 Hymenoptera, 10 Lepidoptera, 9 Mantodea, 4 Odonata, 13 Orthoptera, 1 Phasmatodea) and 16 living insect species (1 Lepidoptera, 3 Mantodea, 4 Orthoptera, 8 Phasmatodea), from which four are exemplarily pictured herein. The system is based on a modified standard consumer DSLR camera (Canon Rebel XSi), which was altered for two-channel colour infrared photography. The camera is especially sensitive in the spectral range of 700-800 nm, which is well-suited to visualize small scale spectral differences in the steep of increase in reflectance in this range, as it could be seen in some species. Several of the investigated species show at least a partial infrared reflectance. NIR-reflectance is especially pronounced in specimens of an overall white, red, orange and yellow colouration, but was also found in numerous green insects (e.g. the leaf katydids *Ancylecha fenestrata* and *Stipnochlora coulouiana* and the walking leaf *Phyllium celebicum*). In contrast, other green wings, as for example the metallic green wings of the butterfly *Troides priamus* or the metallic green elytra of several jewel beetles such as *Chrysaspis aurovittata*, do not reflect NIR-radiation... 3.2.5. Odonata (museum specimen): In contrast to the yellow spots on the abdomen of a female *Libellula depressa*, the dark body parts of Odonata species did not show any NIR-reflectance. Whitish transparent exuviae of various unclassified species generally showed a high reflectance (data not shown)." (Authors)] Address: Mielewicz, M., ETH Zürich, Institute of Agricultural Sciences, Universitätstr. 2, CH-8092 Zürich, Switzerland. E-Mail: michaemi@ethz.ch

12272. Moenickes, S.; Frassl, M.; Schlieff, J.; Kupisch, M.; Mutz, M.; Suhling, F.; Richter, O. (2012): Temporal patterns of populations in a warming world: a modelling framework. *Marine Biology* 159(11): 2605-2620. (in English) ["In this paper, we present an approach for describing the environmentally induced temporal pattern of structured populations by partial integro-differential equations. Populations are structured according to size or stage. Growth, energy allocation and stage transitions are affected by environmental conditions of which temperature, photoperiod, water depth and food supply were taken into account. The resulting modelling framework was applied to describe, analyse and predict alterations in populations with continuous development, populations with distinct state structures and interacting populations. Our exemplary applications consider populations of freshwater Amphipoda, Isopoda and Odonata. The model was capable of simulating life cycle altera-

tions in dependence on temperature in interaction with other environmental factors: (1) population dynamics, (2) seasonal regulation, (3) water depth-dependent dispersal, (4) intraguild predation and (5) consumer-resource dynamics." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

12273. Mohamed, Z. Y.A.; Osman, K.S.M.; Mohamed, I.E.E.; Bakry, S.M. (2012): Impact of water-pH values on the consumption capacity of certain aquatic insects preying on different medical snails. *Journal of Evolutionary Biology Research* 4(3): 39-51. (in English) ["The main aim of this work was to determine the consumption capacity of five aquatic insects (as predators) on four species of medical snails (as preys) tested under four values of pH at a constant and controlling temperature in the laboratory. The predators were represented by adults of two hemipterous species (*Limnogeton fieberi* Mayr, *Sphaerodema urinator* Duf.) and three larval odonatus species (*Anax imperator*, *Crocothemis erythraea* and *Ischnura pumilio*). Moreover, the four water-pH values were 5, 7, 9, and 11 at 30°C. On the other hand, the four prey of the medical snails were *Bulinus truncatus* Audouin, *Biomphalaria alexandrina* Ehrenb, *Cleopatra bulimoides* Olivier and *Melanoides tuberculata* Muller. All of individual fauna were collected from the River Nile in Qena. The acidic media were adjusted as a mixture of three acids phosphoric acid acetic acid boric acid. In contrast, the alkaline solution was prepared by sodium hydroxide. The results illustrate that, the maximum predation occurred under 7 pH and 9 pH at 30°C regardless of the laboratory conditions. It appeared that *Bulinus truncatus* was highly preferable snail species to these predators. *Biomphalaria alexandrina* which is the intermediate host of *Schistosoma mansoni* Bilharz, may be the lastly preferable snail species to these predators. The belostomatids (*Limnogeton fieberi* and *Sphaerodema urinator*), and the odonats (*A. imperator*, *C. erythraea* and *I. pumilio*), could be the highest successful predators on the harmful snails (*Bulinus truncatus*, *Melanoides tuberculata*, *Biomphalaria alexandrina* and *Cleopatra bulimoides*). Therefore, its use should be encouraged to be reared in large numbers and then released in the natural places of snails under 7 to 9 range values of water pH." (Authors)] Address: Mohamed, Z. Y., Zoology and Entomology Dept, Faculty of Science in Qena, South Valley University Egypt

12274. Moreno Pallares, M.I.; Guillot Monroy, G.H., (2012): Distribución espacial y temporal de náyades de odonatos en los humedales La Vaca y Santa María del Lago, Bogotá, Colombia. *Acta biol. Colomb.* 17(2): 281-294. (in Spanish, with English summary) ["We evaluated the spatial and temporal variation in communities of dragonfly's naiads and their association to the habitat rehabilitation status in LaVaca and Santa María del Lagowetlands. Four samplings were carried out in several sites of each during a year. Macroinvertebrates were collected at the entry and exit flow, and in open waters of the wetlands using standard techniques. We found a gradient in the distribution of the abundance of nymphs in both wetlands, where naiads community had the highest number of individuals in the places located farther from the dumping sites. Comparing the community composition between wetlands La Vaca and Santa María del Lago through the beta diversity, heterogeneity was found in both ecosystems. The gradient in the

distribution of the abundance of naiads observed in both wetlands fits with to a response of the species in terms of tolerance to the environmental variables." (Authors)] Address: Moreno Pallares, Maria, Universidad Nacional de Colombia, Sede Bogotá, carrera 30 # 45-03, Bogotá-Colombia, Edificio 421, oficina 205, extensión 11319. E-mail: mimorenop@unal.edu.co

12275. Murashige, T. (2012): The record of an aberrant dark form of male *Ischnura senegalensis* (Rambur). Tombo 54: 70. (in Japanese, with English summary) ["An aberrant dark form of the male of *Ischnura senegalensis* was recorded from Kishiwada city, Osaka prefecture, Japan. This specimen has a uniformly black coloration on the whole head, synthorax, legs, basal abdomen and its dorsum, with only faintly bluish parts on the 8th and 9th segments. The green colour of typical specimens is totally absent and replaced by black." (Author)] Address: not stated

12276. Nilsson, V. (2012): Thermal adaptation along a latitudinal gradient in damselflies. Doctoral thesis. Umeå University, Faculty of Science and Technology, Department of Ecology and Environmental Sciences: XII + 35 pp. (in English) ["Understanding how temperature affects biological systems is a central question in ecology and evolutionary biology. Anthropogenic climate change adds urgency to this topic, as the demise or success of species under climate change is expected to depend on how temperature affects important aspects of organismal performance, such as growth, development, survival and reproduction. Rates of biological processes generally increase with increasing temperature up to some maximal temperature. Variation in the slope of the initial, rising phase has attracted considerable interest and forms the focus of this thesis. I explore variation in growth rate-temperature relationships over several levels of biological organization, both between and within species, over individuals' lifetime, depending on the ecological context and in relation to important life history characteristics such as generation length and winter dormancy. Specifically, I examine how a clade of temperate damselflies have adapted to their thermal environment along a 3,600 km long latitudinal transect spanning from southern Spain to northern Sweden. For each of six species, I sampled populations from close to the northern and southern range margin, as well from the centre of the latitudinal range. I reared larvae in the laboratory at several temperatures in order to measure individual growth rates. Very few studies of thermal adaptation have employed such an extensive sampling approach, and my findings reveal variation in temperature responses at several levels of organization." (Author)] Address: Nilsson, V., Dept of Ecology & Environ. Sci., Animal Ecology Group, Umeå Univ., 90187 Umea, Sweden. E-mail: viktor.nilsson@emg.umu.se

12277. Nishadh, K.A.; Das, K.S.A. (2012): Metazoan community composition in tree hole aquatic habitats of Silent Valley National Park and New Amarambalam Reserve Forest of the Western Ghats, India. Journal of Threatened Taxa 4(14): 3312-3318. (in English) ["In a study of the metazoan community composition in tree hole aquatic habitat of a tropical rainforest, Silent Valley National Park, and the adjacent moist deciduous forest, New Amarambalam Reserve Forest, of the Western Ghats, 28 different species were recorded from 150 tree hole aquatic habitats with an average of 3-5 species per tree hole. Most of the recorded organisms (96.8%) belong to Odonata (no details on more detailed

taxonomic units), Heteroptera, Diptera, Coleoptera and Trichoptera. The study reports the first record of toe-winged beetle larvae (Ptilodactylidae) in a tree hole aquatic habitat. The most significant observation is the prolific occurrence of trichopteran larvae as the second most abundant taxa in tree holes of Silent Valley National Park, and this stands as the first comprehensive record of the entire order in the habitat studied. The study upholds the importance of less explored microhabitats in the Western Ghats region in terms of sustaining unique community composition in the most delicate and extreme habitat conditions. It also puts forward important ecological research questions on biodiversity ecosystem functionality which could impart important lessons for managing and conserving the diminishing tropical evergreen forests which are significant for these unique habitats." (Authors)] Address: Das, K.S.A., Centre for Conservation Ecology, Department of Zoology, M.E.S. Mampad College, Malappuram, Kerala 676542, India. E-mail: dasksa@gmail.com

12278. Nössing, T.B.; Festi, A.; Winkler, F.; Haller, R.; Lösch, B. (2012): Die Libellen (Odonata) der Etschtalsole zwischen Meran und Salurn (Südtirol, Italien). Gredleriana 12: 185-200. (in German, with English summary) ["The dragonfly fauna of the Adige valley in a total of 41 locations between Merano and Salorno (South Tyrol, Italy) was analyzed in the period 2009 -2011. The current species composition was compared with historical data. 40 species in the area could be identified, 33 of which can be classified as certainly or probably autochthonous for the area. As expected the wetland complexes of the biotopes Kalterer See and Castelfeder are the most species-rich sites. On the other hand the channels and the small wet biotopes showed a relatively poor dragonfly community. Compared to the historical data, the typically riverine species and the species of periodically flooded habitats have disappeared or result very rare in the present dragonfly fauna. The decline of these species may be associated with changes in the landscape and the changing of farming methods in the Adige valley." (Authors)] Address: Nössing, Tanja, Nicolodistr. 47, I-39100 Bozen, Italy. E-mail: tanja.noessing@rolmail.net

12279. Norgret, J.-Y.; Vitzthum, S. (2012): Insectes remarquables de Lorraine & d'Alsace. Édition serpenoise: 247 pp. (in French) [The book briefly introduces into habitats and Odonata species of northeastern France] Address: Édition serpenoise, BP 70090, 57004 Metz Cedex I

12280. Novak, C.W.; Goater, T.M. (2012): Introduced bullfrogs and their parasites: *Haematoloechus longiplexus* (Trematoda) exploits diverse damselfly intermediate hosts on Vancouver Island. Journal of Parasitology 99(1): 59-63. (in English) ["The lung fluke, *Haematoloechus longiplexus*, is the most prevalent and abundant parasite of introduced bullfrogs on Vancouver Island, British Columbia, Canada. The ecological success of this trematode in invasive bullfrogs is related to the fluke's ability to utilize native intermediate hosts for transmission. The purpose of this study was to identify the odonate species involved in the transmission of *H. longiplexus* to the introduced bullfrog. The prevalences and mean intensities of 21 species of odonates (nymphs and adults) were examined for metacercariae infections. *Haematoloechus longiplexus* is a second intermediate host specialist, being found only in damselflies. Six damselfly species exhibiting the 'climber' ecological

habit were identified as second intermediate hosts of *H. longiplexus*. *Enallagma carunculatum* (prevalence = 75.0%, mean intensity = 17.2 ± 10.8), *Ischnura cervula* (65.2%, 8.9 ± 4.3), *Ischnura perparva* (45.5%, 15.4 ± 10.3), and *Enallagma boreale* (40.7%, 4.8 ± 7.8) were the most commonly infected damselfly species. Metacercariae were absent in damselflies collected from sites lacking bullfrogs. *Haematoloechus longiplexus* was likely introduced along with the bullfrog, and subsequently adapted to the physid snail and diverse damselfly intermediate hosts present in ponds on Vancouver Island." (Authors) Address: Novak, C.W., Biology Dept, Vancouver Island University, Nanaimo, British Columbia, Canada V9R 5S5. E-mail: colin.novak@viu.ca

12281. Ogawa, H.; Nosaka, M.; Hashii, N.; Yokoyama, M.; Tsurusaki, N. (2012): Records of faunal survey of insects of Tottori Sand Dunes in 2011 with comments to the fauna of "Sakyo Oasis". Natural History Research of San'in 7: 31-40. (in Japanese, with English summary) ["On the basis of faunal surveys of Tottori Sand Dunes in 2010, a total of 83 species of insects are recorded. The number includes 21 insect species that were previously unknown from the sand dune area. Some remarks are made for the aquatic communities and orthopteran fauna in and around a pool called "Oasis", which is formed all year round except for the hottest season from mid July to September at the depression just below a ridge called "Umanose"."] (Authors) Three Odonata species were recorded: *Ischnura senegalensis*, *Pantala flavescens*, *Sympetrum risi*.] Address: Tsurusaki, N., Laboratory of Biology, Faculty of Regional Sciences, Tottori University, Koyama-Minami 4-101, Tottori, 680-8551 Japan. E-mail: E-mail: ntsuru@rstu.jp

12282. Olberg, S.; Lønnve, O.J. (2012): *Ischnura pumilio* (Charpentier, 1825) (Odonata, Coenagrionidae) in Norway. Norwegian Journal of Entomology 59: 229-233. ["A male of *I. pumilio* was captured near a pond at the bottom of a sandpit at Bergsdalen in Nittedal, north of Oslo, on 30 May 2012. The following month, several imagines were spotted and nymphs were caught in the pond. The species is new to the Norwegian fauna." (Authors) The paper also provides a recent distribution map of the species covering Sweden and Norway.] Address: Olberg, S., BioFokus, Gaustadalléen 21, NO-0349 Oslo, Norway. E-mail: stefan@biofokus.no

12283. Olthoff, M.; Ikemeyer, D. (2012): Dragonflies of a peat bog in northwestern Turkey (Odonata: Anisoptera, Zygoptera). Zoology in the Middle East 57: 142-146. (in English) [37 Odonata species were recorded in 2011 in the peat bog around Yenicaga lake, province Bolu, northwest Turkey ($40^{\circ}47'N$, $32^{\circ}1'E$). *Ischnura elegans*, *Coenagrion puella*, *Erythromma viridulum* and *Sympetrum sanguineum* were the most abundant species. *Leucorrhinia pectoralis*, *Cordulia aenea*, *Coenagrion pulchellum*, *C. scitulum*, *Pyrrhosoma nymphula*, *Lestes sponsa*, *L. dryas* and *Libellula quadrimaculata* are remarkable due their regional rarity or arealgeographic position in Turkey.] Address: Olthoff, M., Biologische Station Zwillbrock e.V., Zwillbrock 10, 48691 Vreden, Germany. E-mail: matthias.olthoff@gmx.de

12284. Omopariola, C.A. (2012): Survey of Aquatic Insects of Ogun River Nigeria and Its Physico-Chemical Properties. Undergraduate These, Biological Sciences, Federal University of Agriculture, Abeokuta: (in English) [Nigeria; "This study was carried out to determine the abundance, composition, distribution of aquatic insects

and physico - chemical factors of Ogun River. The aquatic insects were collected using sweep and pond net (0.5mm) from two study sites during February and middle April 2012. The water samples and insects were collected once in a week. Insects were sampled using standard entomological methods, while water samples was analysed using standard winkler's titrimetric and APHA methods to determine the chemical properties. Water analyses were conducted in the laboratory of Ogun State Water Corporation, Abeokuta, Ogun State. While insects identifications were done in the laboratory in the Department of Agricultural - Biology, University Of Ibadan. Results show that five orders and thirteen families were found with the highest number of aquatic insects from the order Odonata. The most abundant family were Coenagrionidae and Libellulidae respectively. Physico - chemical values, water temperature, pH, DO, Conductivity and Nutrient were measured. Only conductivity had the greater value among the water quality parameters. Bar chart were used to compare the physico - chemical parameters." (Author) Address: not stated

12285. Ortega, A.J.J.; Ramos-Elorduy, J.; Pino Moreno, J.M. (2012): Insectos comestibles en algunas localidades en la región centro del Estado de México: técnicas de recolección, venta y preparación. Dugesiana 19(2): 123-133. (in Spanish, with English summary) ["Edible insects in some locations in Central Region of Mexico State: Collection, techniques, sale and preparation: The goal of this research is to know the actual condition of some edible insect species inside a framework in some municipalities of Toluca, Almoloya de Juárez, Temoaya and Lerma at Mexico State. For this study we utilize the ethnographic method, doing a tracking and gathering of species. Tianguis and markets were also visited. We found various Lepidoptera larvae as those of agave plant, those of "capulín" tree, the "sacamiches" of the grass and some Coleoptera larvae as those of different kind of trees alive and many of death trees, as well as nymphs of dragonflies. We also analyzed, different aspects related with their common and ethnic names, as well as the diverse ways to prepare them and how they are sold." (Authors)] Address: Ramos-Elorduy, Julieta, Instituto de Biología UNAM, Departamento de Zoología Laboratorio de Entomología. E-mail: relorduy@ibiologia.unam.mx

12286. Ott, J. (2012): Die Speer-Azurjungfer, ein seltener Bewohner von Moorgewässern. Heimatjahrbuch des Landkreises Kaiserslautern 2011: 91-93. (in German) [General account on *Coenagrion hastulatum* with focus on the Pälzerwald-region, Rhineland-Palatinate, Germany.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

12287. Ozono, A.; Kawashima, I.; Futahashi, R. (2012): Dragonflies of Japan. Bunichi-Sogo Syuppan., Co. Ltd. 532 pp (in Japanese, with English summary) [This fully illustrated field guide covers the total of the 203 Odonata species of Japan. Every species is generously illustrated with fully-coloured photographs, colour distribution maps, and detailed line drawings to aid species identification. Key features for identification, distribution, seasons of occurrence, habitats, similar species, and current taxonomic status based on molecular phylogeny is described for every species.]



12288. Paunović, M.; Janović, J.; Kovačević, S.; Zorić, K.; Žganec, K.; Simić, V.; Atanacković, A.; Marković, V.; Kračun, M.; Hudrina, S.; Lajtner, J.; Gosstein, S.; Lucić, A. (2012): Macroinvertebrates of the natural substrate of the Sava River – Preliminary results. *Water Research and Management* 2(4): 33-39. (in English) [Croatia; "The objective of this study is to present the comparable data on macroinvertebrate communities from the natural bottom substrate along the middle and lower stretch of the Sava River. The study was carried out in September 2011 at eight sites of the sector between Zagreb - Martinska Ves and Belgrade – at the confluence into the Danube. The data presented could be used as baseline information for any future management of the main course of the Sava River." (Authors) Odonata are represented by *Calopteryx splendens*, *Erythromma lindenii*, *Coenagrion mercuriale* [sic], *Gomphus vulgatissimus*, *Pyrhosoma nymphula*, and *Platycnemis pennipes*.] Address: Paunovic, M., University of Belgrade, Institute for Biological Research "Sinisa Stankovic", 142 Despota Stefana Boulevard, Belgrade, Serbia, E-mail: mpaunovi@ibiss.bg.ac.rs

12289. Perez Gutierrez, L.A. (2012): *Archilestes choconus* spec. nov., a new damselfly from Colombia (Odonata: Lestidae). *Odonatologica* 41(4): 349-354. (in English) ["The new species is described and illustrated from the adults of both sexes. Holotype (male: Colombia, Choco dept., Salero alt. 129 m a.s.l., 10-VIII-2005. *A. choconus* sp. n. shows the following character combination: cercus with well developed medial tooth in basal third, distal portion of cercus elongate, curved inward and sharply pointed, paraproct vestigial, and colour pattern of pterothorax close similar to *A. neblina* Garrison, except for metepisternum, metepimeron and metasternum largely yellow. The new species is closely related to *A. guayaraca* De Marmels, *A. latialatus* Don-

nelly and *A. tuberalatus* (Williamson)."] (Author)] Address: Pérez Gutiérrez, L.A., Grupo de investigación en Biodiversidad del Caribe colombiano, Departamento de Biología, Universidad del Atlántico, km 7 antigua via Puerto Colombia, Barranquilla, Colombia. E-mail: leonperez@mail.uniatlantico.edu.co

12290. Pickess, B.P. (2012): Mixed pairings: are male Emerald Damselfly *Lestes sponsa* short-sighted or desperate? *Atropos* 47: 76-77. (in English) [Mixed pairings are documented: (1) Male *Lestes sponsa* coupled with a female *Pyrhosoma nymphula*. Arne, Dorset, UK 17 July 2012 and (2) Male *Lestes sponsa* coupled with a male *Enallagma cyathigerum*. Squirrel Cottage Lake, near East Holme, Dorset, UK 13 September 2012.] Address: Pickess, B.P., 8 Shaw Drive, Sandford, Wareham, Dorset, BH20 7BT, UK

12291. Plotnikova, S.I.; Svidersky, V.L.; Gorelkin, V. S. (2012): Peculiarities of structural-functional organization of the motor neuropil in the dragonfly thoracic ganglia. *Journal of evolutionary biochemistry and physiology* 48(5-6): 568-573. ["The study considers structural-functional relations in motor neuropil of the thoracic ganglia in dragonflies-insects capable of performing very complex and fast maneuvering in flight. The motor neuropil in dragonflies was shown to be more differentiated than in less mobile insects, while its motor nuclei are more outlined and approached to each other. There were revealed dendrites of the leg muscle motoneurons (intermediate nucleus), running to the anterior and posterior nuclei that contain dendrites of the wing muscle motoneurons. A possible role of such a dendrite approaching is discussed for close functional cooperation of wing and leg muscles essential for dragonflies to catch a large prey in flight by using their legs. Peculiarities of structural organization of the wing muscle motoneurons in dragonflies and locusts are considered to suggest the greater functional capabilities of motoneurons in the dragonfly motor apparatus." (Authors)] Address: Svidersky, V.L., Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia. E-mail: vlsvider@iephb.ru

12292. Postler, E.; Postler, W.; Schiel, F.-J.; Martens, A. (2012): Die Quagga-Muschel *Dreissena rostriformis bugensis* als neuer Aufsitzer von Libellenlarven (Bivalvia: Dreissenidae; Odonata: Gomphidae, Libellulidae). *Libellula* 31(3/4): 237-241. (in German, with English summary) ["The quagga mussel *Dreissena rostriformis bugensis* as a new epizoon of odonate larvae (Bivalvia: Dreissenidae; Odonata: Gomphidae, Libellulidae) – Individuals of *Dreissena rostriformis bugensis*, an invasive species rapidly spreading in navigable inland waters of Central Europe, were reported from two exuviae of *Gomphus vulgatissimus* collected at the Datteln-Hamm-Kanal near Bergkamen, Germany, on 03-v-2012 and from an exuvia of *Orthetrum cancellatum* collected at a gravel-pit lake on 27-v-2012 next to the Upper Rhine River near Dettenheim north of Karlsruhe, Germany. These seem to be the first records of *D. r. bugensis* epizoic on odonate larvae; so far all reports from North America and from Western and Central Europe deal with the zebra mussel *Dreissena polymorpha*. Further findings of *D. rostriformis* settling epizoically on odonate larvae are expected." (Authors)] Address: Postler, W., Hammer Str. 39, D-59174 Kamen, Germany. E-mail: w.postler@t-online.de

12293. Prpic, N.-M. (2012): Nomenclatural note on the identity of *Agrion viridis* Vander Linden, 1820: a plea for the selection of a neotype (Odonata: Zygoptera, Libellulidae). *Nachrichtenblatt der Bayerischen Entomologen* 61(3/4): 76-79. (in German, with English summary) ["It has been recognized previously that the name for the Western Willow Spreadwing, *Lestes viridis*, in its original combination *Agrion viridis* Vander Linden, 1825, is a junior homonym of *Agrion viridis* Vander Linden, 1820, which is regarded as a junior synonym of *Lestes barbara*. The junior homonym normally must be replaced by its junior synonym *Agrion leucopsallis* De Charpentier, 1825, which would remove a well established and widely used name from the Odonata. Here I show that *Agrion viridis* Vander Linden, 1820, is no synonym of *Lestes barbara*, but has been based on a heterogeneous type series that also contained several other *Lestes* species. Since no types are extant, it is suggested that a topotypic neotype should be selected to establish the identity of *Agrion viridis* Vander Linden, 1820, with the species currently called *Lestes viridis*. This action would conform to the regulations of the International Code of Zoological Nomenclature and preserve the usage of *Lestes viridis*." (Author)] Address: Prpic, N.-M., Georg-August-Universität Göttingen, Johann-Friedrich-Blumenbach-Institut für Zoologie und Anthropologie, Abteilung für Entwicklungsbiologie, GZMB Ernst-Caspari-Haus, Justus-von-Liebig-Weg 11, 37077 Göttingen, Germany. E-Mail: nprpic@uni-goettingen.de

12294. Prysitt, K.-P. (2012): Ein Vorkommen von der Pokaljungfer (*Erythromma lindenii*) bei Neustadt - Poggenhagen. *Mitteilungen der Arbeitsgemeinschaft Zoologische Heimatforschung Niedersachsen* 17/18: 10-11. (in German) [6-VIII-2006, gravel pit near Wunstorf, Niedersachsen, Germany] Address: Prysitt, K.-P., Lesingstr. 2, 31535 Neustadt a.Rbge., Germany

12295. Pugh, A.R. (2012): Effects of restoration on the waterways in the Styx River catchment. *The Weta* 44: 28-41. (in English) ["Riparian restoration of waterways is important in restoring, preserving, and enhancing their ecological and aesthetic values, particularly in lowland Canterbury where most waterways are severely degraded due to anthropogenic changes to the landscape. In order to assess the effects of riparian restoration in the Styx River catchment, aquatic macroinvertebrates were sampled at eight sites, seven within the Styx River catchment and a control site (there with *Xanthocnemis*). Comparisons were made between sites using the SQMCI biotic index, taxon richness and diversity, percentage EPT taxa, and by analysing macroinvertebrate community composition dissimilarity. The Styx River catchment is in relatively good condition compared to other lowland urban waterways in Canterbury; riparian restoration appears to be beneficial for the waterway macroinvertebrate communities, but currently unrestored sites require more than restoration of the riparian zone." (Author)] Address: Pugh, A.R., Dept of Ecology, Lincoln University, New Zealand. E-mail: Andrew.Pugh@lincolnuni.ac.nz

12296. Rebora, M.; Salerno, G.; Piersanti, S.; Dell'Otto, A.; Gaino, E. (2012): Olfaction in dragonflies: Electrophysiological evidence. *Journal of Insect Physiology* 58(2): 270-277. (in English) ["The problem of olfaction in Paleoptera (Odonata, Ephemeroptera) cannot be considered fully elucidated until now. These insects have been traditionally considered anosmic, because their brain lacks glomerular antennal lobes, typically in-

involved in Neoptera odor perception. In order to understand if the presumed coeloconic olfactory receptors described on the antennal flagellum of adult Odonata are really functioning, we performed an electrophysiological investigation with electroantennogram (EAG) and single cell recordings (SCR), using *Libellula depressa* as a model species. Odors representing different chemical classes such as (Z)-3-hexenyl acetate (acetate ester), (E)-2-hexenal, octanal (aldehydes), (Z)-3-hexen-1-ol (alcohol), propionic acid, butyric acid (carboxylic acids), and 1,4-diaminobutane (amine) were tested. Most of the tested chemicals elicited depolarizing EAG responses in both male and female antennae; SCR show unambiguously for the first time the presence of olfactory neurons in the antennae of *L. depressa* and strongly support the olfactory function of the coeloconic sensilla located on the antennal flagellum of this species. Electrophysiological activity may not necessarily indicate behavioural activity, and the biological role of olfactory responses in Odonata must be determined in behavioural bioassays. This study represents a starting point for further behavioural, electrophysiological, neuroanatomical and molecular investigation on Odonata olfaction, a research field particularly interesting owing to the basal position of Paleoptera, also for tracing evolutionary trends in insect olfaction. Olfaction in Paleoptera (Odonata/Ephemeroptera) is still an open question. *Libellula depressa* bears presumed olfactory sensilla on its antennae. We performed an electrophysiological investigation (EAG, SCR) on these antennae. Depolarizing EAG and SCR responses to chemicals were recorded in males and females. This is the first clear identification of olfactory receptor neurons in Odonata." (Authors)] Address: Rebora, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Via Elce di Sotto, 06123 Perugia, Italy. E-mail: rebora@unipg.it

12297. Rosario, K.; Dayaram, A.; Marinov, M.; Ware, J.; Kraberger, S.; Stainton, D.; Breitbart, M.; Varsani, A. (2012): Diverse circular single-stranded DNA viruses discovered in dragonflies (Odonata: Epiprocta). *Journal of General Virology* 93: 2668-2681. (in English) ["Viruses with circular single-stranded DNA (ssDNA) genomes that encode a replication initiator protein (Rep) are among the smallest viruses known to infect both eukaryotic and prokaryotic organisms. In the past few years an overwhelming diversity of novel circular Rep-encoding ssDNA (CRESS-DNA) viruses has been unearthed from various hosts and environmental sources. Since there is limited information regarding CRESS-DNA viruses in invertebrates, this study explored the diversity of CRESS-DNA viruses circulating among insect populations by targeting dragonflies (Epiprocta), top insect predators that accumulate viruses from their insect prey over space and time. Using degenerate PCR and rolling circle amplification coupled with restriction digestion, 17 CRESS-DNA viral genomes were recovered from eight different dragonfly species collected in tropical and temperate regions. Nine of the genomes are similar to cycloviruses and represent five species within this genus, suggesting that cycloviruses are commonly associated with insects. Three of the CRESS-DNA viruses share conserved genomic features with recently described viruses similar to the mycovirus *Sclerotinia sclerotiorum* hypovirulence-associated DNA virus 1, leading to the proposal of the Gemycircularvirus genus. The remaining viruses are divergent species representing four novel CRESS-DNA viral genera including a gokushovirus-like prokaryotic virus (microphage) and

three eukaryotic viruses with Repts similar to circoviruses. The novelty of CRESS-DNA viruses identified in dragonflies using simple molecular techniques indicates that there is an unprecedented diversity of ssDNA viruses among insect populations." (Authors)] Address: Ware, Jessica L., Rutgers, The State Univ. of New Jersey, Cook College, 93 Lipman Drive, New Brunswick, New Jersey 08901, USA. E-mail: jware@amnh.org

12298. Rosset, V.; Simaika, J.P.; Arthaud, F.; Bornette, G.; Samways, M.J.; Oertli, B.; Vallod, D. (2012): Comparative assessment of scoring methods of the conservation value of biodiversity in ponds and small lakes. *Aquatic Conservation: Marine and Freshwater Ecosystems* 23: 23-36. (in English) ["Fresh waters are among the most endangered ecosystems in the world. Practical tools to measure their biodiversity value are needed for their effective conservation. Besides species richness, other aspects of biodiversity, including the threat level of species also need to be considered. Currently, existing scoring methods for assessing the conservation value of freshwater fauna and flora assemblages are varied, and guidelines to select an appropriate method are lacking. In this paper, it is hypothesized that scores to assess the conservation value of assemblages can vary markedly according to the type of method used. To test this, four types of scoring methods were applied differing in the weight given to Red List categories and in the expression of the score, i.e. either using mean per species or the assemblage as a whole, on sets of dragonfly and macrophyte data collected from varied types of small lakes and ponds in three different countries (France, Switzerland and South Africa). The comparison of the different types of methods showed that the type of method used had a marked impact on the assessment of the conservation value of a water body: the expression per species or per assemblage as the weight given to Red List categories changed the value of a given water body. Overall, results also confirmed that the different types of methods could be applicable in different geographical areas and types of standing water bodies, independently of the original area where the method was developed. Results illustrated that, besides the species richness assessment commonly used, calculating conservation value as a mean per species is useful because it provides additional information. Overall, using methods expressed as a mean per species and coupling the Red List with other criteria gave the best performance." (Authors) The analysis includes Odonata identified at the order level.] Address: Rosset, Véronique, University of Applied Sciences Western Switzerland, hepia Geneva technology, architecture and landscape, 1254 Jussy-Geneva, Switzerland. E-mail: veronique@rosset.org

12299. Rudolph, R. (2012): Die Libellen der Germanengöttin Frigga. *Odonatologica* 41(3): 251-266. (in English) ["In 1919, the German author Hermann Löns published 'Wasserjungfern. Von Sommerboten und Sonnenkundern' (Voigtländer-Verlag, Leipzig), a collection of thirteen dragonfly stories written in a particular emotional style. Here Löns stated that in paganian Germanic times dragonflies had been consecrated to the goddess Frigga and that, therefore, early missionaries had damned dragonflies as diabolic, imposing on them the names 'Satansbolzen' and 'Teufelsnadel'. The 'Wasserjungfern' were reprinted many times up to today and these statements have become widespread popular belief in Germany. Their diction being close to Nazi-terminology,

Löns's statements as to Frigga and the damnation of dragonflies were amended from the first edition following WW II but appeared again in all later editions. Here it is shown, by analyzing mythological and earliest clerical as well as ethnographic and old entomological literature, that dragonflies never have been consecrated to a Germanic goddess and that no clerical damnation ever took place." (Author)] Address: Rudolph, R., Kloosterweg 25, NL-5853 EE Siebengewald, The Netherlands

12300. Sabagh, L.T.; Carvalho-e-Silva, A.M.P.T.; Rocha, C.F.D. (2012): Biota Neotropica 12(4). Diet of the toad *Rhinella icterica* (Anura: Bufonidae) from Atlantic Forest highlands of southeastern Brazil: 258-262. (in English, with Portuguese summary) ["In this study, we present some information of the regarding trophic niche from the anuran toad *R. icterica* living in high altitudes above 2000 m a.s.l. from a habitat of the Atlantic Forest Biome – the Altitude Fields in the Itatiaia National Park. We found 150 prey items in toad stomachs, belonging to five prey types, as well as skin remains and some remains of plant material. The index of relative importance indicated that most important prey types were beetles and ants, these last composing 70% of the diet numerically and the trophic niche breadth (B) was 1.81. The relatively low diversity of prey types we recorded in the diet of *R. icterica* of Itatiaia and numerically dominated by ants suggests some preference for this item. We do not found significant relationship between the toad measurements with the preys' measurements. We concluded that *R. icterica* toads at the highlands of Itatiaia feeds on arthropods, mainly ants and coleopterans and that the high consumption of preys with relatively small and similar size as ants in the diet prevents an expected relationship among frog body or mouth size and prey volume and size." (Authors) Odonata contributed with 1.3% (n=2) to the diet of 17 toad specimens.] Address: Sabagh, L.T., Laboratório de Ecologia de Vertebrados, Depto de Ecologia, Univ. do Estado do Rio de Janeiro – UERJ, Rua São Francisco Xavier, 524, Maracanã, CEP 20550-019, Rio de Janeiro, RJ, Brasil. E-mail: leandro.sabagh@gmail.com

12301. Sánchez, A.B. (2012): Confirmación de la presencia actual de *Lestes macrostigma* (Eversmann, 1832) (Odonata: Lestidae) en la provincia de Cádiz (sudeste de la Península Ibérica). *Boletín de la S.E.A.* 50(1): 565-566. (in Spanish, with English summary) ["Presence of populations of *L. macrostigma* in Cadiz province is confirmed, after more than 15 years without observations of this species, indicating the importance of these populations to guarantee the possible genetic flow between the populations of Doñana (Huelva and Seville) and the Natural Reservation Laguna de Fuente de Piedra (Malaga)." (Author)] Address: Sánchez, A.B., C/ Juan Ramón Jiménez 28. 11160 – Barbate (Cádiz, España) Arturo.libelula@gmail.com

12302. Santos Loureiro, N.; Pontes, L. (2012): The *Trithemis nigra* (Odonata: Libellulidae) of Príncipe Island, Gulf of Guinea. *African Journal of Ecology* 51: 180-183. (in English) ["Príncipe is a 114 km² volcanic island (1°36'N; 7°24'E) in the Gulf of Guinea, Africa. *T. nigra* was firstly described by Longfield (1936) as a subspecies of *Trithemis donaldsoni* (Calvert, 1899), after having examined two males collected by W.H.T. Tams in December 1932 and January 1933, at Príncipe Island, a former Portuguese colony in the Gulf of Guinea.... It seems that following the expedition of Tams, nobody re-

turned to Príncipe Island to add new field data concerning *T. nigra*... In this note, we present the results of a new survey carried out in March and August 2011. The occurrence of the species was confirmed and threats were evaluated. Fifteen localities were investigated in the August 2011 survey, and the species was found in five out of them... According to our observations, the habitat preference of *T. nigra* is for permanent lotic systems with abundant flowing freshwater and a mix of direct solar light and shades provided by the forest trees and shrubs. The 'Critically Endangered' category assigned in 1996 is maintained, the species was recognized as an endemism for Príncipe." (Authors)] Address: Santos Loureiro, N., Centre for Environmental Biology – ADC, Faculdade de Ciências da Universidade de Lisboa - Campo Grande Ed. C2, 1749-016 Lisboa, Portugal. E-mail: odonata@nsloureiro.pt

12303. Schneider, T.; Schneider, J. (2012): Sommerbeobachtungen von Libellen am unteren Nil in Ägypten (Odonata). *Libellula* 31(3/4): 257-266. (in German, with English summary) ["Summer observations of Odonata on the Lower Nile in Egypt – In June 2012, a total of 13 species was recorded on the River Nile south of Cairo. Of special interest was the first record of *Acisoma panorpoides* on the Nile in Egypt. This shows that the Nile can be used as a corridor by this species to reach the Mediterranean coast from tropical Africa. *Mesocnemis robusta*, a species which is classified as «critical relict» or «critically endangered» for North Africa, was found to be one of the most abundant dragonflies on the Nile. Some observations from the Nile Delta are added." (Authors)] Address: Schneider, T., Arnold-Knoblauch-Ring 76, 14109 Berlin/Wannsee, Germany. E-mail: thomas.rs@gmx.de

12304. Schorr, M.; Wolf, J. (2012): Bibliografie der für Deutschland publizierten Libellenliteratur (Odonata). *Libellula*, Supplement 11: 5-420. (in German, with English summary) ["This bibliography is a summary of over 6,400 titles about the Odonata of Germany. It starts with a quotation of 6,018 titles with relevance to Germany, including titles that originated in academic institutions. Besides individual studies, these were researched from about 1,000 periodicals from several countries. To ease the research on species, faunistic, biological, ecological, and geographical facts, all titles are tagged to approximately 1,000 words or phrases. Thanks to many parts also being in English, the contents of the quoted literature are also open to foreign users. The next chapter reviews around 400 quotations of unpublished titles about Odonata. Because of the nature of "grey literature" this chapter surely can only be a selection of an unknown amount of expertise and other unpublished literature." (Authors)] Address: Schorr, M., Schulstr. 7B, 54314 Zerf, Germany. E-mail: bierschorr@online.de

12305. Schröter, A.; Borisov, S.N. (2012): *Coenagrion scitulum* in Central Asia: a biogeographical analysis and rectification (Odonata: Coenagrionidae). *Libellula* 31(3/4): 267-283. (in English, with German summary) ["This study provides information on the occurrence of *Coenagrion scitulum* in Central Asia, in English for the first time. Based on critical evaluation of published and previously unpublished data, a schedule of records and an up-to-date distribution map is presented. With reference to occurrence of *C. scitulum* in Europe, specific chorological and ecological characteristics of Central Asian *C. scitulum* are discussed and by means of the example of a Kyrgyz population a regional habitat of *C. scitulum* is

described. *C. scitulum* is among those dragonfly species being widely distributed in Europe and whose eastern limit of distribution runs through Central Asia. Due to language barriers and insufficient communication, a considerable lack of knowledge of the proper distribution range of such species amongst European odonatologists seems to persist. This article addresses the knowledge gap and aims to rectify erroneous statements and establish the correct eastern limit of distribution of *C. scitulum* in European non-Russian-language odonatological literature." (Authors)] Address: Schröter, A., Rasenweg 10, 37130 Gleichen, Germany. E-mail: AsmusTim@gmx.de

12306. Selva Kumar, C.; Nair, R.R.; Sivaramakrishnan, K.G.; Ganesh, D.; Janarthanan, S.; Arunachalam, M.; Sivaruban, T. (2012): Influence of certain forces on evolution of synonymous codon usage bias in certain species of three basal orders of aquatic insects. *Mitochondrial DNA* 23(6): 447-460. (in English) ["Forces that influence the evolution of synonymous codon usage bias are analyzed in six species of three basal orders of aquatic insects. The rationale behind choosing six species of aquatic insects (three from Ephemeroptera, one from Plecoptera, and two from Odonata) for the present analysis is based on phylogenetic position at the basal clades of the Order Insecta facilitating the understanding of the evolution of codon bias and of factors shaping codon usage patterns in primitive clades of insect lineages and their subtle differences in some of their ecological and environmental requirements in terms of habitat-microhabitat requirements, altitudinal preferences, temperature tolerance ranges, and consequent responses to climate change impacts. The present analysis focuses on open reading frames of the 13 protein-coding genes in the mitochondrial genome of six carefully chosen insect species to get a comprehensive picture of the evolutionary intricacies of codon bias. In all the six species, A and T contents are observed to be significantly higher than G and C, and are used roughly equally. Since transcription hypothesis on codon usage demands A richness and T poorness, it is quite likely that mutation pressure may be the key factor associated with synonymous codon usage (SCU) variations in these species because the mutation hypothesis predicts AT richness and GC poorness in the mitochondrial DNA. Thus, AT-biased mutation pressure seems to be an important factor in framing the SCU variation in all the selected species of aquatic insects, which in turn explains the predominance of A and T ending codons in these species. This study does not find any association between microhabitats and codon usage variations in the mitochondria of selected aquatic insects. However, this study has identified major forces, such as compositional constraints and mutation pressure, which shape patterns of codon usage in mitochondrial genes in the primitive clades of insect lineages." (Authors)] Address: Selva Kumar, C. Department of Zoology, University of Madras, Chennai 600 025, Tamil Nadu, India

12307. Sharma, R.K.; Agrawal, N. (2012): Faunal diversity of aquatic insects in Surha Tal of District - Ballia (U. P.), India. *Journal of Applied and Natural Science* 4(1): 60-6. (in English) [The regional diversity of aquatic insect fauna was studied during 2006-08. Twenty nine species of aquatic insect were collected including *Mesogomphus lineatus*, *Potamarcha obscura*, *Ischnura aurora aurora*, *I. senegalensis* and *Agriocnemis pygmaea*.] Address: Sharma, R.K., Department of Zoology,

University of Lucknow, Lucknow-226007, India. E-mail: rajnish.enviro.80@gmail.com

12308. Sheikh, E.M.; Douglas, M. (2012): Biodiversity, phenology, and thermoregulatory strategies of odonates at Pierce Cedar Creek Institute. Undergraduate Research Grants for the Environment Report, Grand Rapids Community College: 24 pp. (in English) ["Forty-three species of dragonflies from five families and sixteen species of damselflies from three families were identified at Pierce Cedar Creek Institute in Hastings, Michigan (latitude 42.6459 and longitude -85.2908) between May 7 and August 10, 2012. Our study showed that Pierce Cedar Creek Institute provides habitat to a greater number and variety of odonates than expected. The diurnal phenology of the odonates varied by species, with smaller and medium dragonflies generally out earlier in the day and active into the afternoon, and large dragonflies are more active near dusk. We found that dragonflies and damselflies use a variety of active and passive thermoregulatory strategies. We found that the mean ΔT (the difference between ambient and thoracic temperature) as well as the heating / cooling curves and preferred flight temperatures, are positively correlated with increasing thoracic size of the odonate. In addition, we found that the flow of haemolymph from the wings to the thorax does not function to significantly regulate thoracic temperature." (Authors)] Address: Sheikh, Elaine M.

12309. St. Clair, C. (2012): Effects of atrazine exposure on immune function and cannibalistic behavior of dragonfly larvae. M.S. thesis, Murray State University: 74 pp. (in English) ["Chapter 1: Agricultural runoff containing herbicide is known to have adverse effects on freshwater organisms. Aquatic insects are particularly susceptible, and herbicide runoff has the potential to affect immunity in this group. I examined the effect of atrazine, an herbicide commonly used in the United States, on immune function in larvae of *Plathemis lydia* during a long-term exposure at ecologically relevant concentrations. Larvae were exposed to concentrations of 0, 1, 5 and 10 ppb atrazine for three or six weeks. Haemocyte counts, haemolymph phenoloxidase (PO) activity, cuticular and gut PO, encapsulation ability and post-encapsulation PO were measured at the end of each trial period as indicators of immune system strength. Atrazine concentration had a significant effect on haemocyte counts after controlling for the effect of larva size. There was a significant interaction between time and concentration for haemolymph PO, cuticular PO, and a marginal interaction for gut PO. Therefore, atrazine affects both haemocyte numbers and phenoloxidase activity over time in *P. lydia*. The exact impact of the changes is unclear. However, the changed immune function demonstrated in this study is likely to modify susceptibility to pathogens, alter wound healing and may decrease available energy for growth and metamorphosis. Chapter 2: Agricultural runoff containing herbicide is known to have adverse effects on freshwater organisms. Aquatic insects are particularly susceptible, and herbicide runoff has the potential to affect behaviour in this group. Here I examine the effects of short-term exposure to the herbicide atrazine on cannibalistic behaviour in larvae of *Libellula luctuosa*. Large focal larvae (> 12 mm length) were exposed to 0, 1, 10, or 100 ppb atrazine for 96 hours. A smaller (< 8 mm) conspecific was then placed with the focal larva, and its behaviour observed for 30 minutes. Time until

initiation of stalking and time until strike were noted. After the initial 30 minutes, each pair was checked at 2, 4, 6, 24 and 48 hours. Time of consumption and amount consumed were noted. The number of larvae that engaged in cannibalistic activity within the initial 30-minute observation period was significantly higher for controls compared to all experimental treatments. When stalking, striking and consumption times were examined together (a measure of overall response time) concentration had a significant effect, with the 10 ppb group taking significantly longer to cannibalize than the control group." (Author)] Address: not stated

12310. Stavenga, D.G.; Leertouwer, H.L.; Hariyama, T.; De Raedt, H.A.; Wilts, B.D. (2012): Sexual dichromatism of the damselfly *Calopteryx japonica* caused by a melanin-chitin multilayer in the male wing veins. PLoS ONE 7(11): e49743. doi:10.1371/journal.pone.0049743: 7 pp. (in English) ["Mature male *C. japonica* damselflies have dark-blue wings, due to darkly coloured wing membranes and blue reflecting veins. The membranes contain a high melanin concentration and the veins have a multilayer of melanin and chitin. Female and immature *C. japonica* damselflies have brown wings. We have determined the refractive index of melanin by comparing the differently pigmented wing membranes and applying Jamin-Lebedeff interference microscopy. Together with the previously measured refractive index of chitin the blue, structural colour of the male wing veins could be quantitatively explained by an optical multilayer model. The obtained melanin refractive index data will be useful in optical studies on melanized tissues, especially where melanin is concentrated in layers, thus causing iridescence." (Authors)] Address: Stavenga, D.G., Computational Physics, Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands, E-mail: D.G.Stavenga@rug.nl

12311. Stewart, S.S. (2012): Variation in fluctuating asymmetry among nine damselfly species. M.S. thesis. Dept. of Biology. Baylor University: (in English) ["Fluctuating asymmetry (FA), measured as random deviations from bilateral symmetry, likely results from developmental disturbances by internal or environmental stresses. However, comparisons of FA in single damselfly species from stressed environments have often been inconclusive. We measured levels of FA among multiple species of damselflies from the same environment to determine the relative roles of environmental stress and species specific developmental instability. Damselflies of nine species were collected from a central Texas wetland. Calculations of their FA were based on cell counts of four venation patterns in fore and hind wings. Significant FA of venation occurred in both sexes, both wing positions, and in each of four venation patterns of all nine species. Levels of FA were not significantly different between sexes or between wing positions for any of the nine species. However, FA varied significantly among the four venation patterns. Patterns with lowest mean cell counts had significantly higher FA than the other patterns, despite scaling to remove size bias. More broadly, a three-fold difference in overall FA occurred among the nine species and was not correlated with species mean weight or abdomen length. The wide range of FA levels among multiple species in the same environment casts doubt on the effective use of FA of a single species to indicate of environmental stress. Future research must examine the relative roles of species-specific predispositions for FA from internal genetic

stresses as well as external stressors." (Author) For a published version of the thesis see: Stewart, S.S.; Vodopich, D.S. (2013): Variation in fluctuating asymmetry among nine damselfly species. *International Journal of Odonatology* 16(1): 67-77.] Address: Stewart, Sherry, Department of Biology, Baylor University, Waco, TX, 76798-7388, USA

12312. Stobbe, H. (2012): Besondere Libellenfunde auf Kreta im Oktober 2011 (Odonata). *Libellula* 31(3/4): 251-256. (in German, with English summary) ["18 Odonata species were spotted in the Greek island of Crete during October 2011. A visual observation of a female *Calopteryx virgo festiva* on the Megalou Potamos documented the first re-sighting of this species after more than 150 years. Several males of *Trithemis arteriosa* flew on a reservoir near Skourvoula. This species is not only new for Crete but for the whole European continent. It is argued that both spp. most probably originated from the east, and came via southwestern Turkey and the Dodecanese Islands. Sightings of *Boyeria cretensis* in October confirm a long flying season until autumn. The check-list of Crete comprises 35 Odonata species so far." (Author)] Address: Stobbe, H., Wulksfelder Weg 9A, D-22889 Tangstedt, Germany. E-mail: Hartwig.Stobbe@t-online.de

12313. Suhonen, J.; Suutari, E.; Kaunisto, K.M.; Krams, I. (2012): Patch area of macrophyte *Stratiotes aloides* as a critical resource for declining dragonfly *Aeshna viridis*. *Journal of Insect Conservation* 17(2): 393-398. (in English) ["Currently, many rare and endangered species occur in fragmented habitats. Habitat patch size is often used as an easily measured surrogate of habitat quality and local population size. We investigated whether habitat patch size affects the presence and density of larvae of the endangered dragonfly *Aeshna viridis*, which for a large part of their life history depend on the macrophyte *Stratiotes aloides* rosette. The study was performed in four populations, two from Finland and two from Latvia. Our main result was that density of *A. viridis* and patch occupation increased with area of *S. aloides* patch. The results may be due to larvae actively avoiding enemies (higher survival) and/or to the possibility that females laid higher number of eggs in the large *S. aloides* patches. Our results indicate that local abundance and persistence of *A. viridis* population may depend on the few, large *S. aloides* patches rather than several small patches of equal total area." (Authors)] Address: Suhonen, J., Section of Ecology, Dept of Biology, University of Turku, 20014 Turku, Finland. E-mail: juksuh@utu.fi

12314. Taylor, D.J.; Titus-Mcquillan, J.; Bauer, A.M. (2012): Diet of *Chalcides ocellatus* (Squamata: Scincidae) from southern Egypt. *Bulletin of the Peabody Museum of Natural History* 53(2): 383-388. (in English) ["We studied the diet of the skink *C. ocellatus* (Forskål, 1775) from southern Egypt using stomach contents from a large series of specimens collected during the Yale University Prehistoric Expedition to Nubia. Only 2.5% of specimens contained identifiable prey items. Insect larvae, coleopterans and orthopterans were the most important prey items. The first two of these prey categories are typically among the most important in the diet of this species in other areas of its broad distribution. Males and females differed somewhat in their diets and had a dietary overlap of 0.607. Males had relatively larger head widths than females, but this is likely to be related to sexual selection rather than dietary segregation.

tion." (Authors) One female had preyed on an Odonata specimen.] Address: Taylor, D.J., Department of Biology, Villanova University, 800 Lancaster Avenue, Villanova PA 19085 USA. E-mail: dylan.taylor@villanova.edu

12315. Termaat, T.; Kalkman, V.J. (2012): De nieuwe Rode Lijst Libellen. *Vlinders* 2 2012: 4-7. (in Dutch, with English summary) ["The new Red List for dragonflies: Red Lists have to be updated every ten years, and as the previous Red List for dragonflies of the Netherlands was written in 1997, a new one was finally made in 2011. As the current method for evaluating species differs, the 1997 data had to be re-evaluated to make comparison of the lists possible. During the last fourteen years, the status of Dutch dragonflies has improved. Three nationally extinct species reappeared. Eight species have increased, now considered to be of least concern. Six more species have become less threatened. The downside is that two species which used to be of least concern are now vulnerable and one other species shifted from endangered to critically endangered. Environmental and nature conservation measures have mediated the positive picture for most dragonflies, but the improvements are not large enough for some of the most critical species. Climate change also plays a positive role for many species, but might be a risk for others. Dragonfly data collected by voluntary observers are crucial to be able to make Red Lists, now and in the future." (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands. E-mail: tim.termaat@vlinderstichting.nl

12316. Theischinger, G.; Richards, S.J. (2012): *Gynacantha heros* spec. nov., a large crepuscular species from Papua New Guinea (Anisoptera: Aeshnidae). *Odonatologica* 41(4): 355-359. (in English) ["The new species is described. Holotype male: Papua New Guinea, Sepik Basin, 31-V-2010, at light; deposited in the Museum & Art Gallery of the Northern Territory (NTM), Darwin, Australia. It is the 6th and the largest member of the genus recorded from the island of New Guinea. Characters of the adult male are illustrated and the affinities of the new species are discussed." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

12317. Theischinger, G.; Richards, S.J. (2012): *Akrothemis*, a new libellulid genus from Papua New Guinea (Anisoptera: Libellulidae). *Odonatologica* 41(4): 337-345. (in English) ["The new genus is established for *Oda risi* Champion, 1915. Photos of the holotype of *O. risi* are presented, and the supposed female of this species is described for the first time. A second species, *Akrothemis bimaculata* sp. n., from Papua New Guinea is described as new. Holotype female: Papua New Guinea, Kaugumi Camp, E Sepik Prov., alt 60 m a.s.l., 4-X-2010 (NTM 1008589). *Akrothemis* appears to belong in *Tetrathemistinae* and may be most closely related to a group of genera around *Tetrathemis* Brauer, 1868." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

12318. Thipaksorn, A.; Apiwathnasorn, C.; Ruangsittichai, J. (2012): Modified molecular techniques for detecting rice odonate insects in Thailand. *Munis Entomology & Zoology* 7(2): 852-856. (in English) ["Rice odonates are beneficial predators that can help control insect pests in rice, so playing a valuable role in the rice eco-

system. Morphological classification is not reliable at the taxonomic level for some species. Thus, molecular techniques may be used to resolve species more accurately. Normally, genetic DNA sequence amplification is used in molecular identification. This study modified and developed one stage of the DNA extraction process to permit DNA extraction from a single insect leg. After cytochrome oxidase subunit 1 (COI) amplification, nucleotide banding was conducted to determine the efficiency of the extracted DNA. The results showed that this modification to DNA extraction could yield sufficient DNA to amplify the COI gene, and thus be a practical tool for detecting odonates using molecular techniques." (Authors) *Agriocnemis pygmaea*, *Ischnura a. aurora*, *Ischnura senegalensis*, *Brachythemis contaminata*, *Diplacodes trivialis*] Address: Apiwathnasorn, C., Dept of Medical Entomology, Faculty of Tropical Medicine, Mahidol Univ., Ratchawithi Road, Ratchathewi, Bangkok 10400, Thailand. E-mail: tmjrs@mahidol.ac.th

12319. Tiple, A.D. (2012): Odonata fauna with their status of Achanakmar-Amarkantak Biosphere Reserve, Madhya Pradesh and Chhattisgarh. *International Journal of Biotechnology and Bio Sciences* 2(1): 97-101. (in English) ["The paper reports detailed entomological survey on the Odonata diversity in Achanakmar-Amarkantak Biosphere Reserve. During the course of study 70 species of Odonata belonging to 12 families is provided. The highest number of Odonate were recorded belonging to the Libellulidae (31 species), followed by Coenagrionidae (15), Gomphidae, (5), Protoneuridae (3) and Lestidae (3), Aeshnidae (4 species), Platynemididae (2 species), Calopterygidae and Chlorocyphidae (2 species) and Euphaeidae, Corduliidae and Macromiidae (one species). Of the total 67 species 23 were very common, 21 were common, 18 rare and 5 very rarely in occurrence. The observations support the high value of this Achanakmar-Amarkantak Biosphere Reserve for conservation of Odonata and research on their biology." (Authors)] Address: Tiple A. D., Department of Zoology, Vidyabharti College Seloo, Wardha, Maharashtra, India and Forest Entomology Division, Tropical Forest Research Institute, Jabalpur 482021, India. E-mail: ashishdtiple@yahoo.co.in

12320. Tyrrell, M. (2012): The impact of spring temperature on emergence patterns in five 'spring' species. *J. Br. Dragonfly Society* 28(2): 102-107. (in English) ["The first emergence dates for five 'spring' species were monitored at a single site over a seven season period. During this time, average spring temperature was also monitored and the two related to determine the impact of average air temperature on the first emergence of each species. It was noted that during warm springs, for example 2007 and 2011, the five species emerged significantly earlier than in an average spring, for example 2010. During a cold spring, for example 2012, first emergence coincided with the dates for average springs. This implies that, for these species, spring air temperature is only a critical factor determining emergence if it is high, in which case day length is not a trigger but sun intensity may be. Cooler temperatures in spring have little or no impact on first emergence compared to an average spring, in which case day length may then be the critical factor determining emergence." (Author)] Address: Tyrrell, M., 8 Warwick Close, Raunds, Northants, NN9 6JH, UK

12321. van der Poorten, N.; Conniff, K. (2012): The taxonomy and conservation status of the dragonfly fau-

na (Insecta: Odonata) of Sri Lanka. In: *The National Red List 2012 of Sri Lanka; Conservation Status of the Fauna and Flora*. Weerakoon, D.K. & S. Wijesundara Eds., Ministry of Environment, Colombo, Sri Lanka: 1-10. (in English) ["The current list for Sri Lanka includes 118 species in 12 families with a high degree of endemism: there are 47 endemic species and an additional 8 endemic subspecies. Three new endemic species are in the process of description. Since the last IUCN Red List publication (2007), five new endemic species have been described: *Drepanosticta bine*, *D. anamia*, *D. moja* (Bedjanic, M., 2010), *Lyriothemis defonsekai* (van der Poorten, 2009a) and *Libellago corbeti* (van der Poorten, 2009b)." (Authors)] Address: Conniff, Karen, C/O ICIMOD, Khumaltar, Lalitpur, G.P.O Box 3226, Kathmandu, Nepal

12322. Vercken, E.; Wellenreuther, M.; Svensson, E. I.; Mauroy, B. (2012): When asymmetrical fitness costs select for suboptimal traits: the cliff-edge hypothesis revisited. *PLoS ONE* 7(4): e34889. doi:10.1371/journal.pone.0034889: 9 pp. (in English) ["The cliff-edge hypothesis introduces the counterintuitive idea that the trait value associated with the maximum of an asymmetrical fitness function is not necessarily the value that is selected for if the trait shows variability in its phenotypic expression. We develop a model of population dynamics to show that, in such a system, the evolutionary stable strategy depends on both the shape of the fitness function around its maximum and the amount of phenotypic variance. The model provides quantitative predictions of the expected trait value distribution and provides an alternative quantity that should be maximized ("genotype fitness") instead of the classical fitness function ("phenotype fitness"). We test the model's predictions on three examples: (1) litter size in guinea pigs, (2) sexual selection in damselflies, and (3) the geometry of the human lung. In all three cases, the model's predictions give a closer match to empirical data than traditional optimization theory models. Our model can be extended to most ecological situations, and the evolutionary conditions for its application are expected to be common in nature.... Our second example deals with a secondary sexual trait in *Calopteryx splendens*, using survival and mate choice data obtained in the field ([30], M. Wellenreuther, E. Vercken and E. Svensson, unpublished data)." (Authors)] Address: Vercken, Elodie, Institut Sophia Agrobiotech, UMR 1355 ISA, Institut National de la Recherche Agronomique, Sophia-Antipolis, France. E-mail: elodie.vercken@sophia.inra.fr

12323. Villanueva, R.J.T.; Cahilog, H. (2012): Notes on a small Odonata collection from Tawi-Tawi, Sanga-Sanga and Jolo islands, Philippines. *International Dragonfly Fund - Report* 55: 1-32. (in English) ["Sulu region is among the least explored faunal region in the Philippine archipelago. Odonatologically, this region is poorly studied until recently. Presently a survey conducted in July 1 – 14, 2011 revealed ten new records in Tawi-Tawi raising the total number of Odonata to 54. Three new species records were made for Sanga-Sanga raising the known number in that island to 34. Three species were recorded for the first time in Jolo raising the total number to 18. One new species of damselfly was found and several questionable and possible new species of dragonflies were documented." (Authors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

- 12324.** Waldhauser, M. (2012): Dragonflies from the Western High Atlas, Morocco, with the first records of *Pyrrhosoma nymphula* in the High Atlas (Odonata: Coenagrionidae). *Libellula* 31(3/4): 243-250. (in English, with German summary) ["Fifteen species of Odonata were recorded during a short trip to the central part of the Moroccan Western High Atlas in May/June 2012. *Pyrrhosoma nymphula* was recorded in the High Atlas for the first time. *Cordulegaster princeps* was found in series of localities, west of pass Tizi-n-Test for the first time." (Author)] Address: Waldhauser, M., Petrovice 136, Jablonné v Podještědí, CZ-471 25, Czech Republic. E-mail: martinw@seznam.cz
- 12325.** Walter, S. (2012): Wiederfund der Zwerglibelle *Nehalennia speciosa* (Charpentier, 1840) in Sachsen (Odonata). *Entomologische Nachrichten und Berichte* 56(3-4): 252. (in German) [Sachsen, Germany, Muskauer Heide, 9-VI-2012] Address: Walter, Sabine, c/o Landschaftsplanung Dr. Böhnert & Dr. Reichhoff GmbH Freital, Dresdner Str. 77, 01705 Freital, Germany
- 12326.** Wildermuth, H. (2012): Extensiv genutztes Grünland als Reifungs-, Jagd- und Paarungshabitat von *Coenagrion puella* und *Enallagma cyathigerum* (Odonata: Coenagrionidae). *Libellula* 31(3/4): 223-235. (in German, with English summary) ["Extensively used meadows as habitat for maturation, forage and copulation of *C. puella* and *E. cyathigerum* (Odonata: Coenagrionidae) – The heterogeneously structured environment of an isolated pond in the Swiss Central Alps at 1,475 m a.s.l. was surveyed for maturing, foraging and copulating imagines of *C. puella* and *E. cyathigerum*. The individuals were distributed patchily and concentrated on extensively used grassland, grassy rock vegetation and shrubbery up to 780 m distant from the pond (max. abundance 30 individuals/10 m² 100-200 m distant from pond) while intensively exploited rich meadows that had been cut shortly before the start of the study were largely avoided (max. abundance 0.06 individuals/10 m² 100-200 m distant from pond). The extensively used grassland that was neither cut nor grazed during the survey not only served for maturation and foraging, but also as rendezvous and copulation site in 68 documented cases during a three days' study. The importance of extensively used grassland as terrestrial habitat in the life history of the two Zygoptera species is discussed." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wilder-muth.ch
- 12327.** Yakovlev, V.A.; Yakovleva, A.V.; Ilyasova, A.R. (2012): Insects in the invertebrate communities of the upper reaches of the Kuybyshev Reservoir, Russia. *Proceedings of the University of Kazan* 154(4): 188-198. (in Russian, with English summary) ["Based on the study of zoobenthos in the upper reaches (Volga, Kama, Volga-Kama, and Tetyushi) of the Kuybyshev Reservoir carried out in 1999–2008, about 150 taxons of insects of different ranks were revealed including 119 taxons with rank below genus. Insects made up from 41.5% (shallow shores) up to 55.0% (deep water areas) of the total taxon composition of benthal invertebrates. From the six orders (Ephemeroptera, Odonata, Hemiptera, Coleoptera, Trichoptera, Diptera), dipterans (67.2% of all insects) were characterized by the greatest diversity, basically due to chironomid larvae. Generally, the contribution of insects to the total abundance and biomass of zoobenthos is not significant; they considerably concede to homotopic invertebrates, especially molluscs, consisting mostly of invaders that have widely settled the Reservoir in the last two decades." (Authors)] The following taxa are listed: *Coenagrion armatum*, *C. puella*, *C. pulchellum*, *Coenagrion* sp., *Ischnura elegans*, *I. pumilio*, *Anax parthenope*, *Gomphus vulgatissimus* and *Orthetrum* sp.] Address: not stated
- 12328.** Yang, G.; Xu, J.; Yang, Z.; Mao, B. (2012): A summary of resource of Odonata in Yunnan province. *Journal of Dali University* 11(10): 59-65. (in Chinese, with English summary) [China; 210 Odonata species are checklisted.] Address: Yang, G., College of Agriculture and Biology Science, Dali University, Dali, Yunnan 671003, China
- 12329.** Zabłocki, P.; Wolny, M. (2012): The first locality of the Northern Emerald *Somatochlora arctica* (Zetterstedt, 1840) (Odonata: Corduliidae) in the Opole region (Southwest Poland) with commentary to the list of dragonflies of Opole voivodeship. *Park i nar. Rez. Przyr.* 31: 87-96. (in Polish, with English summary) [Kamieniec Nature Reserve, Opole vovodship, Upper Silesia, Poland, 8-IX-2012] Address: Wolny, M., Dział Przyrody Muzeum Śląska Opolskiego, ul. Leśnicka 28, 47-154 Góra Św. Anny, Poland. E-mail: m.wolny@poczta.onet.pl
- 12330.** Zabłocki, P.; Wolny, M. (2012): Materials to the knowledge of some protected, rare and interesting species of dragonflies (Insecta: Odonata) of Silesia (southwest Poland). *Opolski rocznik muzealny* 14: 9-48. (in Polish, with English summary) [Records of 31 Odonata species from Silesia are documented. A total of 314 specimens was collected from 101 localities located in 46 different UTM grid squares dating from years 2002, 2007-2012. 80% of the examined sites are located in the Opole voivodeship, 15% in the Lower Silesian voivodeship, and 5% in the Silesian voivodeship. All specimens are deposited in the collection of Nature Department of Opole Silesia Museum. The most significant findings for the Opole voivodeship are: *Sympetrum fonscolombii*, *S. pedemontanum*, *S. depressiusculum*, *Epithea bimaculata* and *Leucorrhinia caudalis*.] Address: Wolny, M., Dział Przyrody Muzeum Śląska Opolskiego, ul. Leśnicka 28, 47-154 Góra Św. Anny, Poland. E-mail: m.wolny@poczta.onet.pl
- 12331.** Zawal, A.; Szlauer-Łukaszewska, A. (2012): Water mite parasites (Hydrachnidia) of odonates from the Nature Reserve "Jezioro Szare", northwestern Poland. *Odonatologica* 41(3): 267-275. (in English) ["The relationships between larvae of *Arrenurus* s. str. and their Odonata hosts from Lake Szare are described. A total of 173 water mite larvae of *Arrenurus affinis/neumanilvietsi*, *A. bicuspidator*, *A. cuspidator*, *A. cuspidifer*, *A. tricuspator*, *A. robustus* and *Piona longipalpis* was collected. Of these, 151 were found on adult Odonata, 9 on odonate larvae and 13 on exuviae. Parasitic mite larvae were found on odonate adults but only phoretic mite larvae were found on the larvae and exuviae. The occurrence of parasites was most frequently and most numerous recorded on the thoracic segments of their hosts." (Authors)] Address: Zawal, A., Department of Invertebrate Zoology and Limnology, University of Szczecin, Wąska 13, PL-71-415 Szczecin, Poland
- 12332.** Zhuravchak, R.O.; Shidlovsky, L.V. (2012): The fauna of the projected Novelsky National Park. *Nature Reserves in Ukraine* 18(1-2): 42-50. (in Ukrainian, with English and Russian summaries) [*Enallagma cyathigerum*, *Sympetrum danae*, *S. sanguineum* and *S. vul-*

gatum are the only Odonata species so far known from the territory of the proposed National Park.] Address: not stated

12333. Zimmermann, F. (2012): Vielfalt gesichert? Ein Überblick zur aktuellen Gefährdungssituation von Arten und Lebensräumen in Brandenburg. *Naturschutz und Landschaftspflege in Brandenburg* 21(3): 96-110. (in German) [Populations of Mediterranean species and species of running waters have developed positively, while that of bogs decreased.] Address: Zimmermann, F., Landesamt für Umwelt, Gesundheit und Verbraucherschutz des Landes Brandenburg, Seeburger Chaussee 2, 14476 Potsdam, Germany

2013

12334. Abbasi, F.; (2013): Comparative analyses of the diet of the Spirlin (*Alburnoides eichwaldii*) in the Tilabad, Shirabad and Kaboodval Streams Golestan Province, Iran. *World Journal of Fish and Marine Sciences* 5(1): 79-83. (in English) [Odonata are preyed more accidentally and not at all studied localities.] Address: Abbasi, Fatemeh, Dept Fisheries, Gorgan University of Agriculture and Natural Resources, Gorgan, Iran

12335. Aden, C.; Kastner, F.; Loesbrock, J.; Krohn-Grimberghe, S. (2013): Neue Ansätze digitaler Artenerfassung für den ehrenamtlichen Naturschutz Ergebnisse der Entwicklung mobiler Lösungen in Niedersachsen. *Naturschutz und Landschaftsplanung* 45(4): 101-107. (in German, with English summary) ["The collection of data on flora and fauna by honorary nature conservation has been subject of changes in terms of techniques in the field and the flow of data. During the last years web portals have been established supported by open source software including free usable maps and forms for the recording of the observations as well as identification keys, species profiles and internet platforms. The portals are hosted by NGOs and public authorities. The method of Citizen Science seems to be very effective for data collection in a broad geographical range. Voluntary data collection has been additionally facilitated by the use of mobile devices such as smartphones, simplifying data flow from the field to the NGOs or nature conservation authorities. The paper summarises the current developments of voluntary data collection. It illustrates software developments such as the DragonflyApp (LibellenApp) and the web-based GIS portal eMapper. As an additional example the paper explains the standardized digital flow of data from the field up to the Lower Saxony Water Management, Coastal Defense and Nature Conservation Agency (NLWKN) which has also been implemented within the joint research project ARDINI. The apps have been developed to run on both operating systems (iOS/ Android). The application of modern techniques of the IT sector may encourage young people to participate in honorary nature conservation." (Authors)] Address: Kastner, Friederike, Carl von Ossietzky Universität Oldenburg, Institut für Biologie und Umweltwissenschaften, Ammerländer Heerstr. 114-118, 26129 Oldenburg, Germany. E-Mail: friederike.kastner@uni-oldenburg.de;

12336. Anderson, C.N.; Grether, G.F. (2013): Characterization of novel microsatellite loci for *Hetaerina americana* damselflies, and cross-amplification in other species. *Conservation Genetics Resources* 5(1): 149-151. (in English) ["*Hetaerina* damselflies are distributed

throughout the Neotropics. We developed eleven microsatellite loci for the damselfly *Hetaerina americana*. Microsatellites were tested for polymorphism on a panel of 24 individuals. The number of alleles ranged from 2 to 6, observed heterozygosity from 0.080 to 0.701, and the fixation index from -0.266 to 1.000. Cross-amplification was tested in 7 different species in the genus *Hetaerina* from the United States and Mexico. These microsatellite loci will be useful for studies of population structure and gene flow in *H. americana*." (Authors)] Address: Grether, G.F., Dept of Ecology and Evolutionary Biology, University of California, 621 Charles E Young Drive South, Los Angeles, CA, 90095. USA. E-mail: ggrether@obee.ucla.edu

12337. Andrew, R.J. (2013): Andromorphic female of the dragonfly *Neurothemis tullia tullia* (Drury) (Odonata: Libellulidae), central India. *Journal of Threatened Taxa* 5(1): 3571-3573. (in English) ["On 02 November 2010, we were observing the dragonflies of Telenkhedi Pond (west end) when we noticed a typical "male" of *Neurothemis t. tullia* behaving in an unusual manner. It was hovering above the shallow shore and flying low at regular intervals so as to dip the terminal abdominal segment in water, which is a typical female ovipositing behaviour of this species." (Authors)] Address: Andrew, R.J., Post Graduate Department of Zoology, Hislop College, Nagpur, Maharashtra 440001, India. E-mail: rajuandrew@yahoo.com

12338. Arle, J.; Wagner, F. (2013): Effects of anthropogenic salinisation on the ecological status of macroinvertebrate assemblages in the Werra River (Thuringia, Germany). *Hydrobiologia* 701: 129-148. (in English) ["For more than 100 years, the Werra River has been severely affected by intensive salinisation caused by potash fertilizer industries. We show considerable differences in macroinvertebrate assemblages between reaches without salinisation impact and downstream reaches with intense anthropogenic salinisation in the Werra. This is true for almost all biological metrics relevant for ecological status classification under the EU-Water Framework Directive (EU-WFD) (European Community, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, No. L 327/1, of 22 December 2000) and diversity measures (taxon richness, evenness). Macroinvertebrate assemblages at salinisation sites were completely dominated by three halophile neobiotic macroinvertebrate species (*Gammarus tigrinus*, *Corophium lacustre* and *Potamopyrgus antipodarum*). We compared anthropogenically salinised sites from the Werra with disturbed but non-salinised sites from the Werra and other German rivers. We used biological metrics developed for classifying the ecological status according to the EU-WFD. This comparison indicated a severe degradation at salinisation sites on the Werra and these fell into the worst ecological status class 'bad' according to the EU-WFD. Multivariate statistical analyses revealed anthropogenic salinisation as a key factor causing the differences in composition of macroinvertebrate assemblages in the Werra between salinisation and reference sites. Analyses of the long-term presence-absence data of macroinvertebrate assemblages indicated no marked improvement in the ecological status in the past 20 years." (Authors) The assessment also includes the Odonata-EPTCBO (Eph., Ple., Tri., Col., Bivalv., Odo.) index.] Address: Wagner, F.,

Institut für Gewässerökologie und Fischereibiologie Jena (IGF), Sandweg 3, 07745 Jena, Germany. E-mail: falko.wagner@igf-jena.de

12339. Arnold, A. (2013): Kleb-Labkraut als Falle für eine Prachtlibelle. *Mitteilungen Sächsischer Entomologen* 32: 12. (in German) [Altscherbitzer Park, north of Leipzig, Sachsen, Germany. A male *Calopteryx splendens* was caught by catchweed (*Galium aparine*). *G. aparine* is a scrambler, whose epidermis is barbed.] Address: Arnold, A., Zur schönen Aussicht 25, 04435 Schkeuditz, Germany

12340. Babu, R.; Subramanian, K.A.; Andrew, R.J. (2013): Obituary: Tridib Ran Jan Mitra. *Odonatologica* 42(1): 67-72. (in English) ["A brief biography and appreciation of the work of Dr T.R. Mitra (19 Feb. 1942-3 July 2012), the doyen of Indian odonatology, are followed by his odonatalogical bibliography (1967-2013). He described six new taxa from India and his works on the Indian odonate fauna will remain important references for a long time to come." (Authors)] Address: Subramanian, K.A., Zoological Survey of India, M-Block, New Alipore, Kolkata, West Bengal 700053, India. E-mail: subbu.ka.zsi@gmail.com

12341. Baird, R.C. (2013): Larval habitat and behaviour of *Phenes raptor* (Odonata: Petaluridae): a review of current knowledge, with new observations. *International Journal of Odonatology* 16(1): 79-91. (in English) ["*Phenes raptor* is one of only two petalurid dragonflies with a documented non-fossorial larval lifestyle. There have been few reported observations of larvae and their habitat, and the behaviour and ecology of this unique South American species remain largely unknown. This paper provides a review of previously published and unpublished information, and new observations on the habitat and behaviour of larvae and imagines. Larval habitat ranges from fens or seepages to moist terrestrial forest floor litter habitats. Better understanding the ecology and behaviour of the species will require observation of mating locations, additional observations of larvae in habitat and of oviposition and emergence sites across the species' broad geographic and bioclimatic range." (Author)] Address: Baird, R.C., 3 Waimea St, Katoomba NSW 2780, Australia

12342. Baker, K.S.; McIntyre, N.E. (2013): Associations between size and fitness of adult females in the model odonate: *Enallagma civile* (Odonata: Coenagrionidae). *The Southwestern Naturalist* 58(1): 91-96. (in English, with Spanish summary) ["During June 2009–June 2010, we collected 561 actively mating female familiar bluets *Enallagma civile*. Although only ca. 25% of these subsequently laid eggs in the laboratory, size of clutch averaged 250 eggs (range, 1–1,047). Overall, there was a high average rate of hatching success (75.8%). Size of females, in terms of width of head capsule, a non-labile trait in adults, was not significantly associated with metrics of fitness. Hatching success was associated positively with length of eggs (indicating that size of eggs may be an indicator of quality of eggs) and negatively related to duration of hatching." (Authors)] Address: McIntyre, Nancy, Dept of Biological Sciences, Texas Tech University, Lubbock, TX 79409-3131, USA. E-mail: nancy.mcintyre@ttu.edu

12343. Beatty, S.J.; Morgan, D.L.; Keleher, J.; Allen, M.G.; Sarre, G.A. (2013): The tropical South American cichlid, *Geophagus brasiliensis* in Mediterranean climatic south-western Australia. *Aquatic Invasions* 8: 21-36.

(in English) ["The highly endemic (82%) freshwater fishes of south-western Australia are imperiled due to severe habitat and water quality declines and impacts of introduced species. As a case study of the recent tropical aquarium fish introductions, the biology and ecology of the pearl cichlid *Geophagus brasiliensis* was determined in the Swan River catchment south-western Australia. Unlike endemic freshwater fish species of this Mediterranean climatic region, *Geophagus brasiliensis* underwent a protracted spawning period during the warmer period from December to May. It appeared that recruitment only occurred in lentic habitats; however the species also persists in downstream lotic habitats. Growth rate and maximum size (245 mm TL) of the species exceed all but one of the region's native freshwater fishes. Whilst minimum water temperature may help limit its establishment in many aquatic ecosystems, its salinity tolerance and omnivorous diet would facilitate its colonisation in this region, including freshwaters and estuaries. Past and future habitat and climatic change is predicted to continue to favour species from sub-tropical and tropical regions." (Author) Odonata larvae are preyed upon.] Address: Beatty, S.J., Freshwater Fish Group and Fish Health Unit, Murdoch University, South St, Murdoch, Western Australia, Australia 6150 E-mail: s.beatty@murdoch.edu.au

12344. Bechly, G.; Kin, A. (2013): First record of the fossil dragonfly family Eumorbaeschnidae from the Upper Jurassic of Poland. *Acta Palaeontologica Polonica* 58(1): 121-124. (in English) ["*Eumorbaeschna adriankini* sp. nov. is described as first fossil insect from the Upper Jurassic of Central Poland (Owadów-Brzezinki quarry, Tomaszów Mazowiecki area), and as first record of the family Eumorbaeschnidae (Odonata: Anisoptera: Aeshnoptera) outside the Solnhofen lithographic limestone." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: guenter.bechly@smns-bw.de

12345. Bedjanic, M. (2013): *Paragomphus campestris* spec. nov., a new endemic dragonfly from Sri Lanka (Anisoptera: Gomphidae). *Odonatologica* 42(1): 45-53. (in English) ["The new species is described and illustrated. Holotype male: Mawanella, Hingula Oya; Kegalle distr., Sabaragamuwa prov.; 22-IV-1976; deposited in State Collection of Zoology, Munich. The currently known information on its distribution, phenology and ecology is provided and discussed." (Author)] Address: Bedjanic, M., Rakovlje 42/A, SI-3314 Braslovce, Slovenia. E-mail: matjazbedjanic@yahoo.com

12346. Bernard, R.; Buczyński, P.; Tończyk, G. (2013): A distribution atlas of dragonflies (Odonata) in Poland – correction. *Odonatrix* 9(1): 31-32. (in Polish, with English summary) ["Due to an error in the database an incorrect UTM-square has been included and/ or a correct UTM-square has been lacking on the distribution maps for nine species in the "Atlas". For three further species, this error has resulted in incorrect colour of the circle, which reflects a period of data collecting, in one or two squares. The corrections for particular species both on maps and in the numbers of occupied squares recorded in the historical period are presented in the table." (Authors)] Address: Bernard, R., 1 Zakład Zoologii Ogólnej, Uniwersytet im. Adama Mickiewicza, ul. Umultowska 89, 61-614 Poznań, Poland. E-mail: rbernard@amu.edu.pl

12347. Bertoluci, J.; da Rocha, P.L.B.; Trefaut, R.M. (2013): Field evidence of coupled cycles of arthropod predator-tadpole prey abundance in six aquatic systems of an Atlantic Rainforest site in Brazil. The Herpetological Journal 23(1): 63-66 (in English) ["We evaluated the patterns of abundance association between tadpoles and their aquatic arthropod predators (including *Anax amazili*, *Aeshna punctata*, *Libellula herculea*) in natural communities of Atlantic Forest in south-eastern Brazil. We distributed 10 traps in each one of six aquatic systems and counted the numbers of tadpoles and of predators captured monthly for 13 months. For each system, we quantified the temporal association between tadpoles and predator abundances and measured its strength (using Spearman's rho coefficient) for time-lags ranging from -6 to +6 months, followed by testing the hypothesis that the strength of the association differs among time-lag values. The associations were always stronger in streams than in ponds, and strongest ($r^2 > 0.42$) and always significant ($p < 0.016$) when time-lag was zero months, resulting in significant differences of mean values of r^2 across time-lags ($p < 0.001$). A time-lag shorter than one month agrees with predictions from the model of predator-prey coupled cycles. The results also suggest that the importance of secondary factors driving abundance values in streams is stronger than in ponds, where conditions tend to be more unstable. To our knowledge, this is the first evidence of coupled cycles of predator-prey abundance with delayed dependence demonstrated with tadpoles and insects in aquatic forest systems." (Authors)] Address: Bertoluci, J, Endereço profissional Universidade de São Paulo, Escola Superior de Agricultura Luiz de Queiroz. Av. Pádua Dias, 11 Pavilhão da Horticultura 2 andar sala 18, Vila Independência 13418-900 – Piracicaba, SP - Brasil - Caixa-Postal: 9. E-mail: jaime.bertoluci@usp.br

12348. Bhandarkar, S.V.; Bhandarkar, W.R. (2013): A study on species diversity of benthic macro invertebrates in freshwater lotic ecosystems in Gadchiroli district Maharashtra. Int. J. of Life Sciences 1(1): 22-31. (in English) ["A study was conducted to evaluate the potential of benthic macro-invertebrates community assemblages in predicting the water quality status. Three sampling stations with various environmental quality gradients were selected at the Wainganga, Gadhavi and Khobragadhi River in Gadchiroli district in order to determine differences or changes in the benthos community associated with variability in water quality. The diversity indices like Shannon-Wiener index, Evenness or Shannon equitability index and Margalef's index were calculated. According to Shannon-Wiener index of species diversity, all the selected sampling sites fall under moderate pollution. The Shannon equitability index values showed a greater equitability in the apportionment of individuals among the species in all the sites while Margalef's index of species richness reveals that the site-I had more healthy body and have higher species diversity among all sampling sites. The species diversity of site-II is greater than site-III. The site-III had poorer in species diversity and nutrient material." (Authors) The taxa list includes "Aphylla nymph (Aeshnidae)", Gomphidae and Libellulidae.] Address: Bhandarkar, S.V., Department of Zoology, M. B. Patel College, Deori. Dist. Gondia. 441 901. MS. India. E-mail: sudhirsense@rediffmail.com

12349. Bin, L.; Mao, S. (2013): Aerodynamic interactions between wing and body of a model insect in forward

flight and maneuvers. Journal of Bionic Engineering 10(1): 19-27. (in English) ["The aerodynamic interactions between the body and the wings of a model insect in forward flight and maneuvers are studied using the method of numerically solving the Navier-Stokes equations over moving overset grids. Three cases are considered, including a complete insect, wing pair only and body only. By comparing the results of these cases, the interaction effect between the body and the wing pair can be identified. The changes in the force and moment coefficients of the wing pair due to the presence of the body are less than 4.5% of the mean vertical force coefficient of the model insect; the changes in the aerodynamic force coefficients of the body due to the presence of the wings are less than 5.0% of the mean vertical force coefficient of the model insect. The results of this paper indicate that in studying the aerodynamics and flight dynamics of a flapping insect in forward flight or manoeuvre, separately computing (or measuring) the aerodynamic forces and moments on the wing pair and on the body could be a good approximation." (Authors) The paper includes a reference to dragonflies.] Address: Bin, L., Ministry-of-Education Key Laboratory of Fluid Mechanics, Beihang University, Beijing 100191, P. R. China

12350. Bischof, M.M.; Hanson, M.A.; Fulton, M.R.; Kolka, R.K.; Sebestyen, S.D.; Butler, M.G. (2013): Invertebrate community patterns in seasonal ponds in Minnesota, USA: Response to hydrologic and environmental variability. Wetlands 33(2): 245-256. (in English) ["Seasonal ponds are common throughout forested regions of the north central United States. These wetlands typically flood due to snow-melt and spring precipitation, then dry by mid-summer. Periodic drying produces unique fishless habitats with robust populations of aquatic invertebrates. A basin's physical/chemical features, the absence of vertebrate predation, and especially the duration of seasonal flooding, have long been viewed as the major structuring influences on these communities, but previous studies have shown only limited effects of environmental variables on pond invertebrates. Applying ordination methods to data from weekly collections of invertebrates during 2008–2009, we tested influences of site-level environmental gradients on the presence and relative abundance of aquatic invertebrate communities in 16 seasonal ponds in a forested region of north central Minnesota, USA. We assessed invertebrate (including Odonata) community patterns in relation to pond size and depth, soil nutrients, canopy closure, hydroperiod, and predominant groundwater function (recharge, discharge, or flow-through). Patterns in pond invertebrate community composition were consistently related to pond depth, overhead canopy closure, and hydroperiod. Site-level hydrologic function showed weak relationships to seasonal patterns of invertebrate abundance. Although physical features of ponds had only modest influence on presence and abundance of invertebrates, weekly sampling improved models relating environmental variables to pond invertebrates." (Authors) Address: Hanson, M.A., Minnesota Department of Natural Resources, Wetland Wildlife Populations and Research Group, Bemidji, MN, 56601, USA. E-mail: mark.alan.hanson@state.mn.us

12351. Blanke, A.; Beckmann, F.; Misof, B. (2013): The head anatomy of *Epiophlebia superstes* (Odonata: Epiophlebiidae). Organisms Diversity & Evolution 13(1): 55-66. (in English) ["The relic dragonfly family Epiophlebi-

idae is recovered as sistergroup of Anisoptera (= Eiprocta) by most molecular and morphological analyses. However, in a recent study it was placed within Anisoptera as sister group of Cordulegastridae. In another study, several affinities to Zygoptera in the morphology of the ovipositor and the egg-laying behaviour were pointed out. Here, we present a detailed study of the outer, as well as the inner, head morphology of *Epiophlebia superstes*. Compared with the last detailed literature account, three additional mandibular muscles were discovered, as well as additional buccal and pharyngeal muscles. The results are compared with the anatomic features of Zygoptera and Anisoptera. A formal character evaluation focused on head characters confirms the sistergroup relationship of Epiophlebiidae and Anisoptera." (Authors)] Address: Blanke, A., Zentrum für molekulare Biodiversität, Zoologisches Forschungsmuseum Alexander Koenig, Adenauerallee 160, 53113, Bonn, Germany. E-mail: blanke@uni-bonn.de

12352. Bochumer Botanischer Verein (2013): GEO-Tag der Artenvielfalt am 16. und 17. Juni 2012 auf der Halde Hoheward in Herten. Jahrbuch des Bochumer Botanischen Vereins 4: 117-134. (in German) [Herten, Nordrhein-Westfalen, Germany; 11 Odonata species including *Erythromma najas* were recorded.] Address: Goertzen, Diana, Dornröschenweg 27, D-44339 Dortmund, Germany. E-mail: diana.goertzen@rub.de

12353. Bomfleur, B.; Decombeix, A.-L.; Escapa, I.H.; Schwendemann, A.B.; Axsmith, B. (2013): Whole-plant concept and environment reconstruction of a *Telemachus* conifer (Voltziales) from the Triassic of Antarctica. *International Journal of Plant Sciences* 174(3): 425-444. (in English) ["We present a whole-plant concept for a genus of voltzialean conifers on the basis of compression/impression and permineralized material from the Triassic of Antarctica. The reconstruction of the individual organs is based on a combination of organic connections, structural correspondences, similarities in cuticles and epidermal morphologies, co-occurrence data, and ex situ palynology. The affiliated genera of organs include trunks, branches, and roots (Notophytum); strap-shaped leaves with parallel venation (*Heidiphyllum* compressions and permineralized *Notophytum* leaves); seed cones (*Telemachus* and *Parasciadopitys*); pollen cones (*Switzianthus*); and bisaccate pollen of *Alisporites* type. Structural similarities lead us to suggest that *Parasciadopitys* is the permineralized state of a *Telemachus* cone and should be treated as a junior synonym. Biotic interactions involving the reconstructed conifer genus include plant-insect interactions (oviposition by Odonata) and not less than five different types of plant-fungal interactions, including two distinct endomycorrhizal associations, two probable seed parasites, and epiphyllous fungi. A representative whole plant is reconstructed as a 10–15-m-tall, seasonally deciduous forest tree with a vertical, narrow-conical crown shape. We interpret these *Telemachus* trees as the dominant components of peat-forming conifer swamps, forest bogs, and immature bottomland vegetation in the Triassic high-latitude river basins of southern Gondwana. In architecture, growth habit, and many ecological characteristics, the *Telemachus* conifers appear to be comparable to extant larch (*Larix*). Owing to the large amount and often exquisite preservation of the material, this conceptual whole-plant genus represents one of the most completely reconstructed ancient conifer taxa to date." (Authors)] Address: Bomfleur, B., Dept of Ecology & Evolu-

tionary Biology, University of Kansas, Lawrence, Kansas 66045, U.S.A., and Natural History Museum and Biodiversity Institute, University of Kansas, Lawrence, Kansas 66045, USA

12354. Bose, A.P.H.; Robinson, B.W. (2013): Invertebrate predation predicts variation in an autotomy-related trait in larval damselfly. *Evolutionary Ecology* 27(1): 27-38. (in English) ["Autotomy, the discarding of a prey appendage grasped by a predator, may evolve when the benefits of immediate survival outweigh the costs of appendage loss. In larval damselflies, joints connecting lamellae to the abdomen vary in size and shape within and among taxa suggesting that they may evolve under selection by invertebrate predators, such as dragonfly larvae. Assuming that joint width is proportional to the force required for autotomy, we tested if invertebrate predation favours smaller lamellar joints for autotomy or larger joints for structural support of lamellae for swimming. We compared the maximum joint widths of larval *Lestes* and *Enallagma* among ponds that varied in risk of invertebrate predation. Relative predation risk estimated as the frequency of regenerated lamellae within ponds was weakly and positively related to the relative abundance of larval dragonflies. The allometry of lamellar joint size decreased with increasing risk of invertebrate predation across ponds after controlling for variation in body size in *Lestes* congener but not in *Enallagma* species. Both species of *Lestes* had larger joint sizes than the five species of *Enallagma*, suggesting that the ancestral divergence of lamellar joints between these genera may influence contemporary responses to invertebrate predation." (Authors)] Address: Bose, Aneesh, Department of Integrative Biology, University of Guelph, 50 Stone Road East, Guelph, ON, N1G-2W1, Canada. E-mail: abose@uoguelph.ca

12355. Brandon, A. (2013): Odonata news and events from across the vice counties of Anglesey, Merionethshire, Caernarvonshire, Denbighshire and Flintshire. *Y Fursen - North Wales Dragonfly Newsletter* 70: 3 pp. (in English) [The author reports from the British Dragonfly Society Recorders Conference at CEH, Wallingford, UK in March 2013, and presents a brief report on the recent trends in UK species ranges: "The records show that since 1970 they are doing much better as a group than, say, butterflies. There are more species actually increasing their range than those in decline - 14% are increasing and 5% decreasing. The winners, i.e. those species that have expanded their ranges or are colonising new sites are: *Aeshna mixta*, *A. cyanea*, *Anax imperator*, *Brachytron pratense*, *Calopteryx splendens*, *Erythromma viridulum*, *Libellula fulva*, *L. quadrimaculata*, *Orthetrum cancellatum*, *Platynemis pennipes*, *Sympetrum sanguineum*. Distinct losers are: *Aeshna grandis*, *Coenagrion puella*, *C. pulchellum*, *Enallagma cyathigerum*, *Ischnura elegans* – this includes three of our most common damselflies!" Details on the current distribution of *C. pulchellum* in North Wales, UK are presented. The journal also advises to Odonata larva videos.] Address: Brandon, A., North Wales Dragonfly Recorder, Bryn Heilyn, Rowen, Conwy LL32 8YT., UK. E-mail: allanrowenconwy@antispam.sky.com

12356. Büsse, S.; Genet, C.; Hörschemeyer, T. (2013): Homologization of the flight musculature of Zygoptera (Insecta: Odonata) and Neoptera (Insecta). *PLoS ONE* 8(2): e55787. doi:10.1371/journal.pone.0055787: 16 pp, suppl. (in English) ["Among the winged insects (Pterygota) the Dragonflies and Damselflies (Odonata) are

unique for several reasons. Behaviourally they are aerial predators that hunt and catch their prey in flight, only. Morphologically the flight apparatus of Odonata is significantly different from what is found in the remaining Pterygota. However, to understand the phylogenetic relationships of winged insects and the origin and evolution of insect flight in general, it is essential to know how the elements of the odonatan flight apparatus relate to those of the other Pterygota. Here we present a comprehensive, comparative morphological investigation of the thoracic flight musculature of damselflies (Zygoptera). Based on our new data we propose a homologization scheme for the thoracic musculature throughout Pterygota. The new homology hypotheses will allow for future comparative work and especially for phylogenetic analyses using characters of the thoracic musculature throughout all winged insects. This will contribute to understand the early evolution of pterygote insects and their basal phylogenetic relationship." (Authors)] Address: Büsse, S., Georg-August-Universität Göttingen, Johann-Friedrich-Blumenbach-Institut für Zoologie & Anthropologie, Abteilung Morphologie, Systematik & Evolutionsbiologie mit Zoologischem Museum, Berliner Str. 28, 37073 Göttingen, Germany. E-Mail: sebastian.buesse@biologie.uni-goettingen.de

12357. Bußmann, M. (2013): Nachweise der Gestreiften Quelljungfer *Cordulegaster bidentata* Selys, 1843 (Odonata: Cordulegastriidae) in Quellbächen des Unteren Lennetales (Märkischer Kreis, NRW). *Natur und Heimat* 73(1): 1-10. (in German) [Märkischer Kreis, Nordrhein-Westfalen, Germany; *C. bidentata* was recorded in the crenal of ten from 33 studied running water bodies.] Address: Bußmann, M., Märkischer Kreis, Untere Landschaftsbehörde, Heedfelder Str. 45, 58509 Lüdenscheid, Germany

12358. Butcher, G. (coord.) (2013): The Mysterious Migratory Dragonfly. *Flylines Spring 2013*: 7-8. (in English) [Verbatim: For centuries, people around the world have reported seeing large swarms of dragonflies, migrating mostly in early fall. In the United States, up to 16 different species have been spotted in these autumnal flights. In spite of these numerous sightings and the fascination with dragonflies, these flights still remain a mystery. The US Forest Service and its partners, however, are working to increase our knowledge of this remarkable phenomenon. They are working together to delve deeper into the mystery of dragonfly migration, their biology and their breeding patterns. One partner organization, the Xerces Society, has convened a group of experts to form the Migratory Dragonfly Partnership. One of the first products of the partnership is a scientific review paper by Michael L. May: "A critical overview of progress in studies of migration of dragonflies (Odonata: Anisoptera), with emphasis on North America," in the *Journal of Insect Conservation* (www.migratorydragonflypartnership.org). In his review, the author discusses the task of greatly increasing our understanding of this phenomenon. Citizen science is another way in which we are gaining more than a glimpse into the world of dragonflies. Celeste Mazzacano, dragonfly partnership coordinator, is organizing a project, Pond Watch (www.migratorydragonflypartnership.org), which encourages the public to visit local dragonfly ponds often to determine which species are present and at which life-cycle stage. The project focuses on five major migratory species: *Anax junius*, *Tramea lacerata*, *Pantala flavescens*, *P. hymenaea*, and *Sympetrum corruptum*; however, the

study's techniques can be used on any dragonfly species of interest. Another project, Migration Monitoring Project (www.migratorydragonflypartnership.org) encourages people to report sightings during fall migration. Many observations of their flight have occurred at well-known sites for observing raptor migration, so it may be possible to combine efforts to monitor hawks, eagles, kites, and dragonflies from the same sites. Migratory Dragonfly Partnership researchers are taking the lead on a third major project that uses latitudinal differences in stable isotopes to determine the geographic origin of adult dragonflies. The scientists study emerging adults and exuviae (the "skin" that the emerging adults discard) to create an isotopic map of North America. Then they can compare the isotopes of migrating adults to determine their geographic origin. If all of this makes you want to get involved, be sure to visit the web site and start contributing your data. In addition, visit the web site to see if there will be a Migratory Dragonfly Short Course taught in your area. These short courses are a great way to learn how to participate firsthand.] Address: For more information on the Wings Across the Americas, visit <http://www.fs.fed.us/global/wings>

12359. Carlson, B.E.; Langkilde, T. (2013): A common marking technique affects tadpole behavior and risk of predation. *Ethology* 119(2): 167-177. (in English) ["In many studies, it is necessary for researchers to mark individual animals for later identification. It is often assumed in the interpretation of these studies that marks have no effects on the biology of the animals. This assumption is insufficiently tested, and, when it is, coarse assessments of negative effects are often used, such as survival and growth under simplified laboratory conditions. We examined the consequences of a common larval amphibian marking technique (staining with methylene blue) for wood frog tadpole behaviour and survival in an ecologically realistic scenario (predation). We measured a number of tadpole behavioural variables, under baseline conditions and in the presence of olfactory cues of a predator, for marked and unmarked tadpoles. We then exposed pairs of tadpoles (one marked and one unmarked) to one of two predators and tested for the effects of marking on the susceptibility of tadpoles to predation. We found that marking suppressed the increase in movement rate that typically occurred in (unmarked) tadpoles in the presence of predator cues. Marked tadpoles were significantly more likely to be captured by predators, an effect that could not be attributed to this difference in movement rate. These results raise concern about the use of this staining method and highlight the need for studies involving marked animals to thoroughly address any relevant effects the marks may have on the biology of the subjects." (Authors) Dragonfly predators were predominantly larvae of *Anax junius*.] Address: Carlson, B.E., Dept of Biology, The Pennsylvania State University, 208 Mueller Laboratory, University Park, PA 16802, USA. E-mail: bec169@psu.edu

12360. Chambers, D.L.; Wojdak, J.M.; Du, P.; Belden, L.K. (2013): Pond acidification may explain differences in corticosterone among salamander populations. *Physiological and Biochemical Zoology* 86(2): 224-232. (in English) ["Physiological tolerances play a key role in determining species distributions and abundance across a landscape, and understanding these tolerances can therefore be useful in predicting future changes in species distributions that might occur. Vertebrates possess

several highly conserved physiological mechanisms for coping with environmental stressors, including the hormonal stress response that involves an endocrine cascade resulting in the increased production of glucocorticoids. We examined the function of this endocrine axis by assessing both baseline and acute stress-induced concentrations of corticosterone in larvae from eight natural breeding populations of Jefferson's salamander *Ambystoma jeffersonianum*. We surveyed individuals from each pond and also examined a variety of environmental pond parameters. We found that baseline and stress-induced corticosterone concentrations differed significantly among ponds. Population-level baseline corticosterone concentrations were negatively related to pH and positively related to nitrate, and stress-induced concentrations were again negatively related to pH, positively related to nitrate, and positively related to temperature. We followed the field survey with an outdoor mesocosm experiment in which we manipulated pH and again examined baseline and acute stress-induced corticosterone in *A. jeffersonianum* larvae. As in the field survey, we observed an increase in the baseline corticosterone concentration of individuals exposed to the lowest pH treatment (pH 5–5.8). Examining physiological indices using a combined approach of field surveys and experiments can be a powerful tool for trying to unravel the complexities of environmental impacts on species distributions. [...] After 24 h, tadpoles from high-latitude populations, compared with those from low-latitude populations, had increased baseline corticosterone levels when reared with a nonlethal dragonfly predator, but this difference disappeared after 15 d of cohousing with a predator." (Authors)] Address: Belden, Lisa, 4092C Derring Hall, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061-0406, USA. E-mail: belden@vt.edu

12361. Chen, Y.H.; Skote, M.; Zhao, Y.; Huang, W.M. (2013): Stiffness evaluation of the leading edge of the dragonfly wing via laservibrometer. *Materials Letters* 97: 166-168. (in English) ["The material property of the leading edge vein (LEV) of the dragonfly wing is investigated. A new vibration method is developed using a laser vibrometer and mini-shaker. The natural frequency of a cantilevered LEV is determined via lateral oscillation. As a result, the elastic modulus of a LEV sample from a dragonfly wing is found to be in the range of the elastic hydrocarbon polymer, while a dead dragonfly is similar to low density polyethylene. The loss of water contents in the veins increases the stiffness of the LEV by approximately 20times. Highlights: *Material property of the costa of the dragonfly hindwing is investigated. *New vibration method is developed to obtain the elastic modulus of the costa. *Elastic modulus is 20 times lower for a fresh costa than a dead sample. *Material for an artificial model should be an elastic hydrocarbon polymer." (Authors)] Address: Skote, M., School of Mechanical and Aerospace Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798. E-mail: mskote@ntu.edu.sg

12362. Choong, C.Y.; Cheah, D.S.L. (2013): Odonata of Ayer Hitam Forest Reserve, Johor, Peninsular Malaysia. *Faunistic Studies in South-East Asian and Pacific Island Odonata* 2: 1-11. (in English, with Malay summary) ["Odonata records from Ayer Hitam Forest Reserve and the surrounding area in Johor, Peninsular Malaysia are presented. A total of 44 Odonata species from eight families were collected in the area in October

2012. All of these records are new to Ayer Hitam Forest Reserve. *Indothemis carnitica* is a new record for Malaysia." (Authors)] Address: Choong, C.Y., School of Environ. & Natural Resource Sciences, Fac. of Sci. & Tech., Univ. i Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. E-mail: rocoto98@yahoo.com

12363. Chowdhary, S.; Sharma, K.K. (2013): Evaluation of macrobenthic invertebrates in the longitudinal profile of a river (Tawi), originating from Shivalik hills. *Journal of Global Biosciences* 2(1): 31-39. (in English) [Identification of Nearctic(!) Odonata taxa was done at the genus level.] Address: Chowdhary, Samita, Dept of Zoology, Univ. of Jammu-180006, Jammu and Kashmir, India

12364. Daraż, B. (2013): Some dragonflies (Odonata) of Chingombe, Zambia, and some other localities in Zambia and Botswana. *Odonatrix* 9(1): 13-20. (in English, with Polish summary) ["During occasional observations at ten southern African localities in 2011, mainly in Zambia and additionally in Botswana, 24 dragonfly species were recorded. Sixteen species were recorded in Chingombe, central Zambia." (Author)] Address: Daraż, B., Kościelna Str. 41, 35-505 Rzeszów, Poland. E-mail: bdaraz@poczta.onet.pl

12365. Das, A.; Gupta, S.K. (2013): An initial survey on insect associated mites of South Bengal. *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)* 5(1): 7-8. (in English) ["A preliminary study related to mites associated in the insects is given in this article. Ten species of mites under nine families collected from six orders of insects from South Bengal are reported here giving collection data and biological information." (Authors) *Arrenurus* sp. is listed from an Odonata sampled at the Science City area.] Address: Das, A., PG Department of Zoology, Vidyasagar College, Kolkata, India

12366. De Block, M.; Pauwels, K.; Van Den Broeck, M.; De Meester, L.; Stoks, R. (2013): Local genetic adaptation generates latitude-specific effects of warming on predator-prey interactions. *Global Change Biology* 19(3): 689-696. (in English) ["Temperature effects on predator-prey interactions are fundamental to better understand the effects of global warming. Previous studies never considered local adaptation of both predators and prey at different latitudes, and ignored the novel population combinations of the same predator-prey species system that may arise because of northward dispersal. We set up a common garden warming experiment to study predator-prey interactions between *Ischnura elegans* damselfly predators and *Daphnia magna* zooplankton prey from three source latitudes spanning >1500 km. Damselfly foraging rates showed thermal plasticity and strong latitudinal differences consistent with adaptation to local time constraints. Relative survival was higher at 24 °C than at 20 °C in southern *Daphnia* and higher at 20 °C than at 24 °C, in northern *Daphnia* indicating local thermal adaptation of the *Daphnia* prey. Yet, this thermal advantage disappeared when they were confronted with the damselfly predators of the same latitude, reflecting also a signal of local thermal adaptation in the damselfly predators. Our results further suggest the invasion success of northward moving predators as well as prey to be latitude-specific. We advocate the novel common garden experimental approach using predators and prey obtained from natural temperature gradients spanning the predicted temperature increase in the northern popula-

tions as a powerful approach to gain mechanistic insights into how community modules will be affected by global warming. It can be used as a space-for-time substitution to inform how predator-prey interaction may gradually evolve to long-term warming." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robbystoks@bio.kuleuven.ac.be

12367. De Knijf, G.; Vanappelghem, C.; Demolder, H. (2013): Odonata from Montenegro, with notes on taxonomy, regional diversity and conservation. *Odonatologica* 42(1): 1-29. (in English) ["The Odonata fauna of Montenegro was investigated during 2 field trips in 2009 and in 2011. In all, 105 localities were visited resulting in 50 observed species (52 taxa). Important populations of *Lindenia tetraphylla* and *Selysiothemis nigra* were found, that of the former is probably the most important one in Europe. The presence of *Lestes parvidens*, *Caliaeschna microstigma*, *Cordulegaster heros* and *C. bidentata* is confirmed. *C. heros* individuals show clear variation from the nominal type and are of an intermediate form with the ssp. *pelionensis*. Several populations of *Gomphus schneiderii*, which differ in thoracic and abdominal markings from typical *schneiderii*, were detected and criteria are given for the differentiation with *G. vulgatissimus*. *Epiptera bimaculata* is a new species for Montenegro and represents the southernmost observation in its European range. The first populations of *Trithemis annulata* were discovered. A major emphasis was on the survey and diversity of the Mediterranean region. This region has a greater diversity than the Alpine region and several species of the Balkans are confined to it. Skadar lake has the greatest diversity of dragonflies and is home to several threatened and European protected species. Many populations of rare species in the coastal area are threatened by an increasing demand for water consumption by tourists and for agriculture use." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

12368. Degefu, F.; Lakew, A.; Tigabu, Y.; Teshome, K. (2013): The water quality degradation of upper Awash River, Ethiopia. *Ethiopian Journal of Environmental Studies and Management* 6(1): 58-66. (in English) ["Benthic macroinvertebrate based assessment of water quality in the upper Awash River, along the river course of about 500 kms was conducted on quarterly bases between September 2009 and August 2010. This paper reports the complete identification of macroinvertebrates together with measurements of physico-chemical parameters and heavy metal concentrations which were considered as a tool for assessing the water quality status of upper Awash river, Ethiopia. Benthic animals and water samples were collected from three different sampling sites located in the upper Awash River, and analyzed to evaluate stressor sources and the general stream water quality. The percentage abundance of families of various macroinvertebrates taxonomic groups was identified from all sites. Accordingly, Koka bridge site of the upper Awash River had low water quality status which is likely to be due to poor farming, untreated effluents from factories and poor provision of sanitation facilities to the riparian communities. Apparently, the concentrations of the selected nutrients and heavy metals did not differ significantly among the sampling sites (ANOVA, $P > 0.05$), presumably due to pollution of the whole stream reach by the catchment nutrient

sources. Ten orders of benthic macroinvertebrates consisting of 36 families were identified. The highest family richness was observed in Ginchi, slightly impacted site (1) whilst the least faunal diversity was observed in Koka Bridge (7 families) indicating the effect of water quality class differences among the sampling sites." (Authors) Taxa include Odonata and are treated at family level.] Address: Degefu, F., EIAR-National Fisheries and Aquaculture Research Center, P.O.Box 64, Sebeta, Ethiopia. E-mail: fasildeg2000@yahoo.com

12369. Demayo, C.G.; Rico, M.J.; Torres, M.A.J. (2013): Relative warp analysis of variations in the fore- and hindwings of selected populations of male *Neurothemis terminata terminata* (Ris, 1911). *Sci. Int. (Lahore)* 25(2): 277-284. (in English) ["Relative warp analysis of variations in the shape of the fore- and hind wings of male *N. terminata* was done on selected populations. To illustrate variations in wing shape, landmark data was subjected to relative warp analysis and the resulting scores were subjected to Multivariate Analysis of Variance (MANOVA) and Canonical Variate Analysis (CVA). The results display significant variations between populations on the wings of the male *N. terminata*. The results suggest that each population represents discrete panmictic units which could be due to the territorial behaviour of male dragonflies." (Authors)] Address: Demayo, C.G., Dept of Biological Sciences. College of Science and Mathematics, MSU-Iligan Institute of Technology, Iligan City, Philippines. E-mail: cgdemayo@gmail.com

12370. Domisch, S.; Araújo, M.B.; Bonada, N.; Pauls, S.U.; Jähnig, S.J.; Haase, P. (2013): Modelling distribution in European stream macroinvertebrates under future climates. *Global Change Biology* 19(3): 752-762. (in English) ["Climate change is predicted to have profound effects on freshwater organisms due to rising temperatures and altered precipitation regimes. Using an ensemble of bioclimatic envelope models (BEMs), we modelled the climatic suitability of 191 stream macroinvertebrate species from 12 orders across Europe under two climate change scenarios for 2080 on a spatial resolution of 5 arc minutes. Analyses included assessments of relative changes in species' climatically suitable areas as well as their potential shifts in latitude and longitude with respect to species' thermal preferences. Climate-change effects were also analysed regarding species' ecological and biological groupings, namely (1) endemicity and (2) rarity within European ecoregions, (3) life cycle, (4) stream zonation preference and (5) current preference. The BEMs projected that suitable climate conditions would persist in Europe in the year 2080 for nearly 99% of the modelled species regardless of the climate scenario. Nevertheless, a decrease in the amount of climatically suitable areas was projected for 57-59% of the species. Depending on the scenario, losses could be of 38-44% on average. The suitable areas for species were projected to shift, on average, 4.7-6.6° north and 3.9-5.4° east. Cold-adapted species were projected to lose climatically suitable areas, while gains were expected for warm-adapted species. When projections were analysed for different species groupings, only endemics stood out as a particular group. That is, endemics were projected to lose significantly larger amounts of suitable climatic areas than nonendemic species. Despite the uncertainties involved in modelling exercises such as this, the extent of projected distributional changes reveals further the vulnerability of freshwater organisms to climate change and implies a need

to understand the consequences for ecological function and biodiversity conservation." (Authors) The analysis includes *Calopteryx haemorrhoidalis*, *C. splendens*, *Gomphus pulchellus* and *Onychogomphus uncatu*.] Address: Domisch, S., Senckenberg Research Institute and Natural History Museum Frankfurt, Department of River Ecology and Conservation, Gelnhausen, Germany. E-mail: sami.domisch@senckenberg.de

12371. Dow, R.A.; Reels, G.T. (2013): Previously unpublished Odonata records from Sarawak, Borneo. Part I. Kuching Division excluding Kubah National Park, and Samarahan Division. *Faunistic Studies in South-East Asian and Pacific Island Odonata* 3: 1-25. (in English) ["Records of Odonata from Kuching and Samarahan, the western administrative divisions of Sarawak in Malaysian Borneo, are presented. Forty-two species are listed from Bako National Park, and eighty-nine species are listed from various other locations. Notable records, not yet published in detail elsewhere, include *Aciagrion fasciculare*, *Bornargiolestes* species, *Pericnemis* species of *triangularis*, *Coelliccia* new species and *Tetrathemis flavescens*." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

12372. El-Hawagry, M.S.; Khalil, M.W.; Sharaf, M.R.; Fadl, H.H.; Aldawood, A.S. (2013): A preliminary study on the insect fauna of Al-Baha Province, Saudi Arabia, with descriptions of two new species. *ZooKeys* 274: 1-88. (in English) [A total of 582 species and subspecies (few identified only to genus level) belonging to 129 families and representing 17 orders, have been recorded from Al-Baha Province. The list of taxa includes two Odonata species: *Anax parthenope* and *Trithemis artemiosa*.] Address: El-Hawagry, M.S., Basic Sciences Department, Community College, Al-Baha University, Al-Baha, Saudi Arabia, PO Box 1598, Project: Survey and Classification of Agricultural and Medical Insects in Al-Baha Province, Kingdom of Saudi Arabia. E-mail: el-hawagry@gmail.com

12373. Engel, M.S.; Kristensen, N.P. (2013): A history of entomological classification. *Annual Review of Entomology* 58: 585-607. (in English) ["The classification of insects has attempted to most effectively communicate information about this hyperdiverse lineage of life and, not surprisingly, has had a considerably rich historical development. This history can be coarsely segregated into four periods: the Pre-Linnean era, the first century spanning Linnaeus's *Systema Naturae* to Darwin's *On the Origin of Species*, the Darwinian era up to the Cladistic Revolution, and the Hennigian era leading to today. The major events of each of these episodes are briefly summarized and some of the more notable researchers highlighted, along with their influence on our current understanding of insect relationships and how this is reflected in the current classification of the Hexapoda." (Authors) The paper contains many references to Odonata.] Address: Engel, M.S., Division of Entomology, Natural History Museum, and Dept of Ecology & Evolutionary Biology, University of Kansas, Lawrence, Kansas 66045, USA. E-mail: msengel@ku.edu

12374. Favretto, M.A.; Bortolon dos Santos, E.; Geuster, C.J. (2013): Entomofauna do Oeste do Estado de Santa Catarina, Sul do Brasil. *EntomoBrasilis* 6(1): 42-63. (in Portuguese, with English summary) ["In this study is presented a list of 1328 insect species observed in west of Santa Catarina State, Brazil, in the

last eight decades. The species richness founds corresponds 1.47 % of the total of species registered in Brazil. The data set was compiled from collection records performed by F. Plaumann, in addition to the records from literature and personal observations. Here, we recorded a total of 17 orders of insects." (Authors) 58 Odonata taxa, mostly identified at the genus level, are listed.] Address: Favretto, M.A., Prefeitura Municipal de Campos Novos, Secretaria Municipal de Saude, Brazil. E-mail: marioarthur.favretto@hotmail.com

12375. Ferreira, G.A.; Nakano-Oliveira, E.; Genaro, G.; Lacerda-Chaves, A.K. (2013): Diet of the coati *Nasua nasua* (Carnivora: Procyonidae) in an area of woodland inserted in an urban environment in Brazil. *Revista Chilena de Historia Natural* 86: 95-102. (in English, with Spanish summary) ["Coatis are omnivores whose diet consists of small vertebrates, invertebrates, and fruit. In urban areas, they may ingest food waste that has been discarded in deposits near their habitat, or they may consume food offered by humans. The present work investigates the diet of coatis through analysis of 56 fecal samples collected from Morro Imperador, a fragment of woodland inserted into an urban center in the municipality of Juiz de Fora, State of Minas Gerais, Brazil. The results point to a diet with niche breadth of 0.4 in which the percentage of occurrence of insects (34.9 %) and fruit (19.9 %) comprise the main dietary items. The presence of food due to human action (direct or indirect) is also constant throughout the year (14.1 %), thereby demonstrating the ability of these animals to adapt to modified environments." (Authors) Frequency of occurrence and percentage of occurrence in Odonata: Aeshnidae FO:1.8, PO: 0.4.] Address: Ferreira, G.A., Programa de Pós Graduação em Biologia e Comportamento Animal, Universidade Federal de Juiz de Fora, Campus Universitário/sn, Juiz de Fora, MG, 36036-900, Brasil. E-mail: ferreira.g.a@hotmail.com

12376. Ferry, E.E.; Hopkins, G.R.; Stokes, A.N.; Mohammadi, S.; Brodie, E.D.; Gall, B.G. (2013): Do all portable cases constructed by caddisfly larvae function in defense? *Journal of Insect Science*: Vol. 13 | Article 5: 9 pp. (in English) ["The portable cases constructed by caddisfly larvae have been assumed to act as a mechanical defense against predatory attacks. However, previous studies have compared the survival of caddisflies with different cases, thereby precluding an analysis of the survival benefits of "weaker" case materials. The level of protection offered by caddisfly cases constructed with rock, stick, or leaf material, as well as a no-case control, was investigated against predatory nymphs of *Anax junius*. A valid supposition is that the cases made of stronger material are more effective at deterring predators. Yet, observations revealed that there was no difference in survival between the case types. All caddisflies with a case experienced high survival in comparison to caddisflies removed from their case. In addition, larvae with stick-cases experienced fewer attacks and captures by dragonflies. These results showed that the presence of a case, regardless of the material used in its construction, offers survival benefits when faced with predatory dragonfly nymphs." (Authors)] Address: Ferry, Emily, Dept of Biology, Utah State Univ., 5305 Old Main HL, Logan UT 84322, USA.

12377. Fleck, G.; El Adouzi, M. (2013): The larva of the genus *Palaeosynthemis* Förster, 1903 (Odonata: Anisoptera: Synthemistidae) and a generic key to the larvae of non-New Caledonian Synthemistidae. *Zootaxa* 3619

(5): 589-594. (in English) ["The larva of *Palaeosynthemis Förster*, 1903, based on *P. cyrene* (Liefinck, 1953), is described and illustrated for the first time. A diagnosis of the genus is given. A larval generic key to all known non-New Caledonian genera of Synthemistidae is provided." (Author)] Address: Fleck, G., CBGP (Centre de Biologie et de Gestion des Populations), Campus international de Baillarguet, CS 30016, 34988 Monferrier-sur-Lez cedex, France. E-mail: fleckgunther@gmail.com

12378. Friebe, J.G. (2013): Libellen am Wassergarten im Dornbirner Stadtpark (Vorarlberg / Österreich) (Insecta: Odonata). *inatura - Forschung online*, Nr. 3: 8 pp. (in German, with English summary) ["During the years 2010 to 2012 a total of 23 dragonfly and damselfly species (Odonata) have been observed in the vicinity of the «water garden» near the natural history museum «inatura» in Dornbirn (Vorarlberg / Austria). 22 species have been documented at species level. Solely some rare *Demoiselle* specimens (*Calopteryx* sp.) eluded photographic documentation thus inhibiting exact determination. Common species are typically ubiquitous without special demands regarding their habitat. Despite strong anthropogenic influence and «care» of the water garden they reproduce successfully. Remarkable, however, is the occurrence of some rare species (*Sympetrum depressiusculum*, *Sympetma paedisca*) well within the settlement area of Dornbirn. The documentation of Odonata will be continued. All observational data are documented in the biodiversity database (BioOffice 2.0) of the museum. They are also available online via the Biodiversity Portal GBIF (<http://www.gbif.at/>)." (Author)] Address: Friebe, G., Jahngasse 9, A-6850 Dornbirn, Austria. E-Mail: georg.friebe@inatura.at

12379. Frye, M.A. (2013): Visual attention: A cell that focuses on one object at a time. *Current Biology* 23(2): R61-R63. (in English) ["A new study has identified a remarkable neuron in the dragonfly brain that chooses and faithfully follows one and only one prey-like visual target, completely ignoring another, thereby demonstrating a form of competitive selection required for visual attention." (Author)] Address: Frye, M.A., Howard Hughes Medical Institute, Department of Integrative Biology and Physiology, Univ. of California, Los Angeles, CA 90095, USA. Electronic address: frye@ucla.edu.

12380. Fuller, C.A.; Gilmore, A.F. (2013): The combined effects of Atrazine and predation on the larval dragonfly *Ladona deplanata*. Kentucky Water Resources, Annual Symposium, March 18, 2013, Marriott's Griffin Gate Resort, Lexington, Kentucky: 57-58. (in English) [Verbatim: Agricultural pesticide contamination is ubiquitous in freshwater habitats and predicting the fate of these chemicals in natural communities is an important goal for ecologists. Atrazine is a common herbicide found in freshwater habitats worldwide with numerous negative effects on aquatic wildlife. Typical concentrations are relatively low (~100 ppb), yet have the ability to impair wildlife behaviour, physiology, and fitness traits. Recent research indicates that these effects are often magnified in the context of other community interactions. Because invertebrates are a keystone species in aquatic habitats we sought to determine how sublethal concentrations of atrazine (80 ppb) and predator cues (*Anax junius*) affect larval dragonflies (*Ladona deplanata*) throughout development. We used a split-plot experimental design with aquatic mesocosms to test the interaction of these stressors over a six-week period. We

examined the effects of both stressors on immune parameters, growth, and fat storage, phenotypically plastic traits that have fitness implications for adult dragonflies. Preliminary analyses using two-way ANOVAs indicate that both treatment effects on larvae were evident after two weeks of exposure with predator cues affecting growth and immune parameters over the entire six weeks. After two weeks of exposure, there was a significant treatment interaction on immune parameters, however by the end of the six-week period, treatment effects depended on the specific immune response measured. The effect of predator presence on hemocyte numbers persisted throughout the experiment, as did the effect of atrazine on phenoloxidase (PO) activity. The results of our study indicate that sublethal atrazine exposure affects immune function in larval dragonflies with implications for parasite resistance and the potential for tradeoffs between growth and immune investment. In the context of a natural community, sublethal herbicide exposure may be intensifying the effects of predators with implications for survival to metamorphosis and adult fitness. This study highlights the importance of conducting long-term exposure experiments of multiple stressors, in detecting differences in the sublethal effects of contaminants on aquatic invertebrates.] Address: Fuller, Claire, A., Department of Biology, Murray State University, Murray, KY 42071, USA. E-mail: claire.fuller@murraystate.edu

12381. Genoud, D. (2013): Présence de *Lestes virens vestalis* (Rambur, 1845) et *Lestes barbarus* (Fabricius, 1798) en Plaine de l'Ain (département de l'Ain) à proximité du Rhône. Discussion sur leur statut. *Sympetrum* 16: 22-23. (in French) [Records of the regionally rare *L. virens vestalis* and *L. barbarus* between 1995-1997 are documented. Gain and loss in the 2000th of the local populations are presented.] Address: Genoud, D., 2 domaine de Bellevue - 11290 Arzens, France

12382. Genoud, D. (2013): Présence de *Platycnemis acutipennis* (Selys, 1841) en Plaine de l'Ain (département de l'Ain) à proximité du Rhône. *Sympetrum* 16: 18-20. (in French) [France; records of *P. acutipennis* from 29.VII-1995, 29-VII-1996 as well as 6 and 23-VIII-2007 are presented.] Address: Genoud, D., 2 domaine de Bellevue - 11290 Arzens, France

12383. Genoud, D. (2013): Observation de *Boyeria irene* (Fonscolombe, 1838) en Plaine de l'Ain (département de l'Ain) à proximité du Rhône. *Sympetrum* 16: 24-25. (in French) [23-VIII-1997, Saint-Maurice-de-Reymen, France.] Address: Genoud, D., 2 domaine de Bellevue - 11290 Arzens, France

12384. Goertzen, D.; Suhling, F. (2013): Promoting dragonfly diversity in cities: major determinants and implications for urban pond design. *Journal of Insect Conservation* 17(2): 399-409. (in English) ["Urbanisation is increasing and it is essential to integrate biodiversity into the spatial planning of urban areas. This requires deeper understanding of biodiversity patterns in cities. We investigated which habitat variables are major determinants of dragonfly diversity and species assemblage structure in the municipal area of Dortmund (Germany). We sampled dragonfly larvae in 33 ponds situated in city parks, commercial, residential and agricultural areas. We recorded 30 autochthonous dragonfly species with species richness ranging from zero to 17. Additionally, we surveyed a set of environmental variables including habitat size, water level, pond structures

and vegetation as well as surrounding landscape and potential disturbances like waterfowl and fish. Multivariate methods were used to identify the major determinants of dragonfly diversity, abundance and assemblage structure. Analysis indicated that diversity of aquatic and terrestrial vegetation affected dragonfly diversity positively. City park ponds had low diversity, but *Ischnura elegans* was obviously promoted by the specific park pond conditions, including high waterfowl density. We found five assemblages mostly determined by generalistic species which were related to different pond types. Moderately disturbed ruderal and pioneer ponds in residential and agricultural areas also contained increased numbers of rare species. Our results indicate that urban ponds may have a great value for maintaining biodiversity, but various disturbances have negative impact. To promote urban biodiversity we suggest a natural design of well-vegetated ponds as well as a high diversity of different pond types and particularly a more-natural redesign of city park ponds." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, 38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

12385. Gonzalez-Bellido, P.T.; Peng, H.; Yang, J.; Georgopoulos, A.P.; Olberg, R.M. (2013): Eight pairs of descending visual neurons in the dragonfly give wing motor centers accurate population vector of prey direction. *Proceedings of the National Academy of Sciences* 110(2): 696-701. (in English) ["Intercepting a moving object requires prediction of its future location. This complex task has been solved by dragonflies, who intercept their prey in midair with a 95% success rate. In this study, we show that a group of 16 neurons, called target-selective descending neurons (TSDNs), code a population vector that reflects the direction of the target with high accuracy and reliability across 360°. The TSDN spatial (receptive field) and temporal (latency) properties matched the area of the retina where the prey is focused and the reaction time, respectively, during predatory flights. The directional tuning curves and morphological traits (3D tracings) for each TSDN type were consistent among animals, but spike rates were not. Our results emphasize that a successful neural circuit for target tracking and interception can be achieved with few neurons and that in dragonflies this information is relayed from the brain to the wing motor centers in population vector form." (Author) *Libellula luctuosa* was studied; additional results were obtained by using specimens of *L. lydia* and *L. pulchella*.] Address: Gonzalez-Bellido, Paloma, Allen Institute for Brain Science, Seattle, WA 98103, USA. E-mail: paloma@mbl.edu.

12386. Harabiš, F.; Tichanek, F.; Tropek, R. (2013): Dragonflies of freshwater pools in lignite spoil heaps: Restoration management, habitat structure and conservation value. *Ecological Engineering* 55: 51-61. (in English) ["Although numerous studies of several terrestrial groups have revealed high conservation potential of post-industrial sites, freshwater habitats in post-mining sites still remain little explored. Here we present a study of Odonata colonizing 61 freshwater pools newly established at 9 lignite spoil heaps in the north-western Czech Republic, Central Europe. We aimed mainly on effects of the three prevailing pool restoration methods (spontaneously inundated depressions at non-reclaimed sites, at reclaimed sites; and novel technically constructed ponds) along with several factors of the local habitat and surrounding landscape on species richness,

conservation values, and species composition of the dragonfly communities. By recording of 32 species of lentic dragonflies (including 8 threatened ones) and 2 additional threatened lotic species, we documented the conservation value of post-industrial habitats also for aquatic arthropods. None of the three restoration methods supported dragonfly communities of distinctly higher conservation value than did the two others, each method generated habitats for different threatened species. Similar patterns were revealed also for vegetation heterogeneity, bottom substrate, water shading, and surrounding terrestrial habitats. We thus conclude that a mosaic-like combination of the restoration methods and creating of heterogeneous water pools will be most effective for restoring of freshwater biodiversity in highly degraded sites." (Authors)] Address: Harabiš, F., Dept of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com

12387. Heino, J. (2013): Environmental heterogeneity, dispersal mode, and co-occurrence in stream macroinvertebrates. *Ecology and Evolution*: 12 pp. (in English) ["Both environmental heterogeneity and mode of dispersal may affect species co-occurrence in metacommunities. Aquatic invertebrates (including Odonata; all taxa are treated at order level) were sampled in 20–30 streams in each of three drainage basins, differing considerably in environmental heterogeneity. Each drainage basin was further divided into two equally sized sets of sites, again differing profoundly in environmental heterogeneity. Benthic invertebrate data were divided into three groups of taxa based on overland dispersal modes: passive dispersers with aquatic adults, passive dispersers with terrestrial winged adults, and active dispersers with terrestrial winged adults. The co-occurrence of taxa in each dispersal mode group, drainage basin, and heterogeneity site subset was measured using the C-score and its standardized effect size. The probability of finding high levels of species segregation tended to increase with environmental heterogeneity across the drainage basins. These patterns were, however, contingent on both dispersal mode and drainage basin. It thus appears that environmental heterogeneity and dispersal mode interact in affecting co-occurrence in metacommunities, with passive dispersers with aquatic adults showing random patterns irrespective of environmental heterogeneity, and active dispersers with terrestrial winged adults showing increasing segregation with increasing environmental heterogeneity." (Author)] Address: Heino, J., Finnish Environment Institute, Natural Environment Centre, Ecosystem Change Unit, P.O. Box 413, FI-90014, Oulu, Finland. E-mail: jani.heino@environment.fi

12388. Hunt, P. (2013): Favourite days: A summer holiday provided Peter Hunt with one of his favourite days spotting some of the dragonfly species of a Greek island. *Dragonfly News* 63: 20-21 (in English) [Thassos, Greece; records are documented with focus on *Sympetrum fonscolombii* and *Crocothemis erythraea*.] Address: not stated

12389. Ishaq, F.; Khan, A. (2013): Aquatic biodiversity as an ecological indicators for water quality criteria of River Yamuna in Doon Valley, Uttarakhand, India. *World Journal of Fish and Marine Sciences* 5(3): 322-334. (in English) [The taxa list includes *Agriion* and *Matrona*.] Address: Khan, A., Department of Biotechnology and Biochemistry, Division of Life Science, Sardar Bhagwan

Singh Post Graduate Institute of Biomedical Sciences and Research, Balawala, 248161, Dehradun, UK, India

12390. Jancowski, K.; Orchard, S.A. (2013): Stomach contents from invasive American bullfrogs *Rana catesbeiana* (= *Lithobates catesbeianus*) on southern Vancouver Island, British Columbia, Canada. *NeoBiota* 16: 17-37. (in English) ["Invasive alien American bullfrog populations are commonly identified as a pernicious influence on the survival of native species due to their adaptability, proliferation and consequent ecological impacts through competition and predation. However, it has been difficult to determine conclusively their destructive influence due to the fragmentary and geographically dispersed nature of the historical database. An expanding meta-population of invasive American bullfrogs, became established on southern Vancouver Island, in the mid- to late 1980s. An on-going bullfrog control program begun in 2006 offered a unique opportunity to examine the stomach contents removed from 5,075 adult and juvenile bullfrogs collected from 60 sites throughout the active season (April to October). Of 15 classes of organisms identified in the diet, insects were numerically dominant, particularly social wasps and odonates. Seasonality and site-specific habitat characteristics influenced prey occurrence and abundance. Native vertebrates in the diet included fish, frogs, salamanders, snakes, lizards, turtles, birds, and mammals, including some of conservation concern. Certain predators of bullfrog tadpoles and juveniles are commonly preyed upon by adult bullfrogs, thereby suppressing their effectiveness as biological checks to bullfrog population growth. Prey species with antipredator defences, such as wasps and sticklebacks, were sometimes eaten in abundance. Many prey species have some type of anti-predator defence, such as wasp stingers or stickleback spines, but there was no indication of conditioned avoidance to any of these. Results from this study reinforce the conclusion that, as an invasive alien, the American bullfrog is an opportunistic and seemingly unspecialized predator that has a uniquely large and complex ecological footprint both above and below the water surface." (Authors)] Address: Jancowski, K., Bullfrog-Control.com Inc., 69A Burnside Road West, Victoria, British Columbia, Canada, V9A 1B6. E-mail: bullfrog-control@shaw.ca

12391. Janssens, L.; Stoks, R. (2013): Exposure to a widespread non-pathogenic bacterium magnifies sublethal pesticide effects in the damselfly *Enallagma cyathigerum*: From the suborganismal level to fitness-related traits. *Environmental Pollution* 177: 143-149. (in English) ["While there is increasing concern that pesticide stress can interact with stress imposed by antagonistic species including pathogens, it is unknown whether this also holds for non-pathogenic bacteria. We exposed *Enallagma cyathigerum* damselfly larvae to the pesticide chlorpyrifos and a non-pathogenic *Escherichia coli* strain. Both exposure to chlorpyrifos and *E. coli* reduced growth rate and fat storage, probably due to the observed energetically costly increases in physiological defence (glutathione-S-transferase and Hsp70) and, for *E. coli*, immune defence (phenoloxidase). Moreover, these stressors interacted for both fitness-related traits. Most importantly, another fitness-related trait, bacterial load, increased drastically with chlorpyrifos concentration. A possible explanation is that the upregulation of phenoloxidase in the presence of *E. coli* changed into a downregulation when combined with chlorpyrifos. We

argue that the observed interactive, partly synergistic effects between pesticides and widespread non-pathogenic bacteria may be common and deserves further attention to improve ecological risk assessment of pesticides. Highlights: *Non-pathogens such as the bacterium *E. coli* are ignored in ecotoxicology. *Both *E. coli* and chlorpyrifos impaired fitness-related traits in damselfly larvae. **E. coli* modulated and magnified effects of chlorpyrifos on physiology and fitness. *Bacterial load was magnified >10× in the presence of chlorpyrifos. *Risk assessment of pesticides should consider synergisms with non-pathogens." (Authors)] Address: Janssens, Lizanne, Laboratory of Aquatic Ecology, Evolution and Conservation, University of Leuven, Charles Deberiotstraat 32, B-3000 Leuven, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

12392. Janssens, L.; Stoks, R. (2013): Synergistic effects between pesticide stress and predator cues: conflicting results from life history and physiology in the damselfly *Enallagma cyathigerum*. *Aquatic Toxicology* 132–133: 92-99. (in English) ["There is increasing awareness that the negative effects of anthropogenic stressors may be magnified in the presence of natural stressors. Very few of these studies have included physiology, yet including physiological studies may help learning about the mechanistic base of such synergisms at the life history level and identify synergistic interactions not translated in life history traits. We studied in *Enallagma cyathigerum* damselfly larvae potential synergistic effects between exposure to the pesticide glyphosate and predator cues on a key life history trait, growth rate, its associated behavioral trait, food intake, and three types of physiological traits known to be affected by both stressors in isolation: the stress protein Hsp70, energy storage and variables related to oxidative stress and damage. The pesticide and predator cues reduced growth rate in an additive way. Food intake increased under pesticide exposure and was not affected by the predator cues, indicating physiological mediation of the growth reduction. One potential physiological mechanism was that both stressors additively increased Hsp70 levels, this may also have contributed to the reduced levels of total carbohydrates when exposed to predator cues. Chronic exposure to predator cues reduced oxygen consumption, possibly to avoid too high costs of an increased metabolic rate. This reduction did not occur in the presence of the pesticide, reflecting the need for energetically expensive defence mechanisms (such as Hsp70 upregulation). When both stressors were combined, there was a reduction of the antioxidant enzyme superoxide dismutase activity (SOD) and an associated increase of oxidative damage in lipids. While synergistic interactions were not present for growth rate and food intake, they were identified for antioxidant defence and oxidative damage. This novel type of "hidden" synergistic interaction may have profound fitness implications, and when ignored will lead to underestimations of the impact of pollutants in natural populations where predators are omnipresent. Highlights: *Interactions between natural stressors and pesticides remain poorly understood. *Predation risk and glyphosate additively affected life history and behaviour. *We showed a novel type of synergistic interaction in terms of oxidative damage. *This hidden synergism can have severe fitness consequences and may be widespread." (Authors)] Address: Janssens, Lizanne, Laboratory of Aquatic Ecology, Evolution and Conservation, University of Leuven, Charles

Deberiotstr. 32, B-3000 Leuven, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

12393. Jinguji, H.; Quoc Thuyet, D.; Uéda, T.; Watanabe, H. (2013): Effect of imidacloprid and fipronil pesticide application on *Sympetrum infuscatum* (Libellulidae: Odonata) larvae and adults. Paddy and Water Environment 11: 277-284. (in English) ["The effect of imidacloprid and fipronil on *S. infuscatum* larvae and adults during the rice cultivation period was monitored using an experimental micro-paddy lysimeter (MPL) system. Twenty-two hatched larvae were laid on the soil surface of each MPL. MPLs were treated with imidacloprid, fipronil, and the control MPL was left untreated. The pesticide concentration, *S. infuscatum* larval and adult populations, and larval emergence time were monitored in each MPL. The maximum imidacloprid and fipronil concentration in paddy water was 52.8 µg/l at 1 day, and 1.3 µg/l at 6 h, respectively, after the pesticide application. Both pesticides dissipated quickly in paddy water, with half-lives of 8.8 and 5.4 days for imidacloprid and fipronil, respectively. The absence of *S. infuscatum* larvae and exuviae in the fipronil-treated MPL was remarkable. The larval survival decreased to 63.6 ± 18.2, 15.2 ± 2.6, and 0% in the control, imidacloprid-treated, and fipronil-treated MPLs, respectively, by 9 days after pesticide application. Emergence in the imidacloprid-treated MPL was also significantly lower than that in the control MPL. The observed decrease in the abundances of *S. infuscatum* larvae and adults in MPLs seems to be both directly and indirectly associated with nursery-box application of fipronil and imidacloprid." (Authors)] Address: Jinguji, H., School of Food, Agricultural and Environmental Sciences, Miyagi University, 2-2-1 Hatatate, Taihaku-ku, Sendai, Miyagi, 982-0215, Japan. E-mail: jinguji@myu.ac.jp

12394. Johansson, F.; Nilsson-Örtman, V. (2013): Predation and the relative importance of larval colour polymorphisms and colour polyphenism in a damselfly. Evolutionary Ecology 27(3): 579-591. (in English) ["Intraspecific body colour variation is common in many animal species. Predation could be a key selective agent giving rise to variation in body colour, and such variation could be due to genetics (polymorphisms) or phenotypic plasticity (polyphenisms). In this study we examined the degree of colour polymorphism and polyphenism in background colour matching in larvae of *Coenagrion armatum*. In addition, we tested if predation risk is reduced when larvae are exposed to a matching compared to a non-matching background. By raising families of larvae at three different background colours we showed that polymorphism explained about 20 % of the total variation and polyphenism about 35 %. In a predation experiment with fish, we showed that larvae with a body colour matching the background had a higher survival success compared to larvae with a non-matching background colour. We suggest that the background matching is adaptive in terms of survival from predation and that colour diversity is maintained because of spatial and temporal variation in the background experienced by damselfly larvae under field conditions." (Authors)] Address: Johansson, F., Department of Ecology and Genetics, Uppsala University, Uppsala, Sweden. E-mail: frank.johansson@ebc.uu.se

12395. Johnson, L.; Mantle, B.L.; Gardner, J.L.; Backwell, P.R.Y. (2013): Morphometric measurements of dragonfly wings: the accuracy of pinned, scanned and detached measurement methods. ZooKeys 276: 77-84. (in

English) ["Large-scale digitization of museum specimens, particularly of insect collections, is becoming commonplace. Imaging increases the accessibility of collections and decreases the need to handle individual, often fragile, specimens. Another potential advantage of digitization is to make it easier to conduct morphometric analyses, but the accuracy of such methods needs to be tested. Here we compare morphometric measurements of scanned images of dragonfly wings to those obtained using other, more traditional, methods. We assume that the destructive method of removing and slide-mounting wings provides the most accurate method of measurement because it eliminates error due to wing curvature. We show that, for dragonfly wings, hand measurements of pinned specimens and digital measurements of scanned images are equally accurate relative to slide-mounted hand measurements. Since destructive slide-mounting is unsuitable for museum collections, and there is a risk of damage when hand measuring fragile pinned specimens, we suggest that the use of scanned images may also be an appropriate method to collect morphometric data from other collected insect species." (Authors)] Address: Backwell, Patricia, Research School of Biology, The Australian National University, 116 Daley Road, Canberra, ACT 0200, Australia. E-mail: pat.backwell@anu.edu.au

12396. Jones, G. (2013): Sensory biology: Listening in the dark for echoes from silent and stationary prey. Current Biology 23(6): R249-R251. (in English) ["New research shows how bats use echolocation unexpectedly to detect silent and stationary prey in darkness. Bats may use acoustic search images to identify potential prey when prey-generated noises, visual and olfactory cues are absent.... Perhaps the bats possess an acoustic image of a dragonfly, and base their decision of whether or not to attack according to how close the acoustic image they receive is to their neural template of a prey item — in this case a dragonfly..." (Authors)] Address: Jones, G.; School of Biological Sciences, University of Bristol, Woodland Road, Bristol BS8 1UG, UK. E-mail: Gareth.Jones@bristol.ac.uk

12397. Joshi, S. (2013): Response to "Talmale, S.S. & A.D. Tiple (2013). New records of damselfly *Lestes thoracicus* Laidlaw, 1920 (Odonata: Zygoptera: Lestidae) from Maharashtra and Madhya Pradesh states, central India" with a note on identification of *Lestes concinnus* Hagen in Selys, 1862 and *L. umbrinus* (Selys, 1891). Journal of Threatened Taxa 5(7): 4125-4126. (in English) [The author discusses the taxonomic status of *L. thoracicus* in detail and concludes that the specimens collected by Talmale & Tiple (2013) are of *L. concinnus*.] Address: Joshi, S., Department of Zoology, St. Xavier's College- Autonomous, Mumbai, Maharashtra 400001, India. E-mail: shantanuvanellus@gmail.com

12398. Kabouche, B. (2013): Note sur les odonates de la région d'Oran (Algérie), compte-rendu de prospections (septembre 2011). Poiretia 5: 1-5. (in French, with English summary) ["A series of surveys carried out in September 2011 in the vicinity of Oran and Tlemcen permit to observe nine species of Odonata in six different locations. The presence of a Saharan species, *Trithemis kirbyi*, and a rare species in the Oran area, *Orthetrum trinacria*, is highlighted." (Author)] Address: Kabouche, B. LPO PACA (Ligue de Protection des Oiseaux, région Provence Alpes Côte d'Azur): 6, avenue Jean Jaurès, 83400 Hyères-les-Palmiers (France). E-mail: benjamin.kabouche@lpo.fr



12399. Karjalainen, S.; Hämäläinen, M. (2013): Demoiselle damselflies. Winged jewels of silvery streams. Publisher: Caloptera, www.caloptera.com. ISBN 978-952-93-1045-6. 224 pp (bilingual in Finnish and English) ["The demoiselle damselflies are among the most beautiful of all insects. They typically inhabit clear pristine streams, where they cavort jewel-like in the sun over the waters. The superb photographs in this book and an informative text introduce us to their fascinating world. Besides the familiar European species, the book also includes representatives of all Demoiselle genera from around the world, as well as their nearest relatives. This book is the product of a fruitful collaboration between an exceptionally gifted nature photographer and a well known scientific authority on these insects."] (Publisher) You can order the book from the publisher (Caloptera Publishing, Neidonpuistontie 6 D 8, FI-02400 Kirkkonummi, Finland) and pay with Paypal. Price of €36 includes worldwide economy postage. Economy shipping to most of the countries takes 8 to 15 business days. Email address for ordering: info@caloptera.com.

12400. Kaunisto, K.M.; Suhonen, J. (2013): Parasite burden and the insect immune response: interpopulation comparison. *Parasitology* 140(1): 87-94. (in English) ["The immune response affects host's survival and reproductive success. Insurmountable immune function has not evolved because it is costly and there is a trade-off between other life-history traits. In previous studies several factors such as diet and temperature have been proposed to cause interpopulation differences in immune response. Moreover, the insect immune system may be functionally more protective upon secondary exposure, thus infection history may associate with the immune response. Here we measured how geographical location and Parasite burden is related to variation in immune response between populations. We included 13 populations of *Coenagrion hastulatum* in Finland over a latitudinal range of 880 km to this study. We found that water mites associated strongly with the

immune response at interpopulation level: the more the mites, the higher the immune response. Also, in an alternative model based on AIC, latitude and individual size associated with the immune response. In turn, endoparasitic gregarines did not affect the immune response. To conclude, a positive interpopulation association between the immune response and the rate of water mite infection may indicate (i) local adaptation to chronic Parasite stress, (ii) effective 'induced' immune response against Parasites, or (iii) a combined effect of both of these." (Authors)] Address: Suhonen, J., Department of Biology, Section of Ecology, University of Turku, FI-20014 Turku, Finland. E-mail: jukseh@utu.fi

12401. Keränen, I.; Kahilainen, A.; Knott, E.; Kotiaho, J.S.; Kuitunen, K. (2013): High maternal species density mediates unidirectional heterospecific matings in *Calopteryx* damselflies. *Biological Journal of the Linnean Society* 108(3): 534-545. (in English) ["Hybridization is a well-known phenomenon, but there are still relatively few studies addressing the question of reproductive isolation between related sympatric animal species with largely overlapping ranges. Population density, relative abundance, and operational sex ratio (OSR) are among the factors known to have an influence on the frequency of heterospecific matings in sympatric populations. Here we had two aims. First, we used microsatellite markers and field observations to study the frequency of hybrids, and backcrosses, and the rate of heterospecific matings between two sympatric damselfly species *Calopteryx splendens* and *C. virgo*. Second, we investigated the role of population densities, relative abundances, and OSRs on conspecific and heterospecific mating rates. Altogether we genotyped 2104 individuals from both species and found four hybrids (0.19%), one of which was a backcross. Of all the 272 matings observed, 17 (6%) were between heterospecifics, and all of these were between a *C. splendens* male and a *C. virgo* female. In addition, all of the hybrids contained mitochondrial DNA (mtDNA) of *C. virgo*. We show that the population density of *C. virgo*, which was the maternal species of all the heterospecific matings and hybrid individuals, was the only significant factor covarying with the rate of the heterospecific matings. The OSRs did not correlate with the rate of con- or heterospecific matings. Studies on interspecific interactions in sympatric species can give information about the maintenance of reproductive isolation, and thus speciation." (Authors)] Address: Keränen, I., Department of Biological and Environmental Science, University of Jyväskylä, Jyväskylä, Finland. E-mail: inka.m.keranen@jyu.fi

12402. Khadijah, A.R.; Azidah, A.A.; Meor, S.R. (2013): Diversity and abundance of insect species at Kota Damansara Community Forest Reserve, Selangor. *Scientific Research and Essays* 8(9): 359-374. (in English) ["A study was conducted on the diversity and abundance of insect species at Kota Damansara Community Forest Reserve in order to determine the richness of the forest insect fauna. A total of 774 insects from 13 Orders and 79 Families were recorded. This study shows that Coleoptera (42.63%), Hymenoptera (17.96%), Diptera (10.08%) and Orthoptera (10.85%) were the most dominant Orders in the Forest Reserve. The highest insect diversity was observed in Diptera (Shannon's, $H' = 2.67$), while Dermaptera, Isoptera, Mantodea and Phasmatodea (Shannon's, $H' = 0.00$) were the lowest. However, the highest insect evenness was observed in Blattodea (Evenness, $E = 0.36$). This study also found that

the abundance of insects in Kemit zone was the highest (Margalef index, = 8.51) compared to other zone sites." (Authors) Odonata are poorly represented within the samples.] Address: Azidah, A.A., Institute of Biological Sciences, Fac. of Science, Univ. of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: azie@um.edu.my. T

12403. Khairiyah, M.H.S.; Izzati, M.R.N.; Faezah, P. (2013): Species richness and temporal variation in the dragonfly and damselfly fauna at National Botanical Garden Shah Alam. Humanities, Science and Engineering (CHUSER), 2012 IEEE Colloquium on 3-4 Dec. 2012: 442-447. (in English) ["A study on the species richness and temporal variation of insect under order Odonata was conducted at National Botanical Garden Shah Alam (NBGSA), Selangor. Samplings were conducted for three months from January 2012 to March 2012 using sweep net. Two trails were chosen at two different lakes and two different sessions which were morning session and evening session. Trail one was located at the innermost part of the forest that far human activities while trail two was located at middle of the forest with open area and near to human activities. A total of 420 odonates were successfully collected consist of four families and 23 morphospecies. The families identified were Lestidae, Libellulidae, Coenagrionidae and Gomphidae. The most abundant family was the Libellulidae with 341 individuals followed by Lestidae, Coenagrionidae and Gomphidae with 54, 16, and 9 individuals respectively. Trail one recorded the highest number of individuals collected with 250 individuals while trail two with 170 individuals had the lowest number of individual collected. Morning session was identified as the most active time for Odonata with 236 individuals collected rather than evening session with only 184 individuals. From the data analysis, Shannon-Weiner Diversity Index showed that there was no significant different ($p > 0.05$) between both trails and sessions. Overall study had shown area with high vegetation and located far away from human activities had the highest diversity of Odonata." (Authors)] Address: Khairiyah, M.H.S., Faculty of Applied Sciences, Universiti Teknologi MARA, 40450, Shah Alam, Selangor, Malaysia

12404. Kim, Y.H.; Lee, S.H. (2013): Which acetylcholinesterase functions as the main catalytic enzyme in the class Insecta? *Insect Biochemistry and Molecular Biology* 43(1): 47-53. (in English) ["Most insects possess two different acetylcholinesterases (AChEs) (i.e., AChE1 and AChE2; encoded by *ace1* and *ace2* genes, respectively). Among the two AChEs, AChE1 has been proposed as a major catalytic enzyme based on its higher expression level and frequently observed point mutations associated with insecticide resistance. To investigate the evolutionary distribution of AChE1 and AChE2, we determined which AChE had a central catalytic function in several insect species across 18 orders. The main catalytic activity in heads was determined by native polyacrylamide gel electrophoresis in conjunction with Western blotting using AChE1- and AChE2-specific antibodies. Of the 100 insect species examined, 67 species showed higher AChE1 activity; thus, AChE1 was considered as the main catalytic enzyme. In the remaining 33 species, ranging from Palaeoptera to Hymenoptera, however, AChE2 was predominantly expressed as the main catalytic enzyme. These findings challenge the common notion that AChE1 is the only main catalytic enzyme in insects with the exception of

Cyclorrhapha, and further demonstrate that the specialization of AChE2 as the main enzyme or the replacement of AChE1 function with AChE2 were rather common events, having multiple independent origins during insect evolution. It was hypothesized that the generation of multiple AChE2 isoforms by alternative splicing allowed the loss of *ace1* during the process of functional replacement of AChE1 with AChE2 in Cyclorrhapha. However, the presence of AChE2 as the main catalytic enzyme in higher social Hymenoptera provides a case for the functional replacement of AChE1 with AChE2 without the loss of *ace1*. The current study will provide valuable insights into the evolution of AChE: which AChE has been specialized as the main catalytic enzyme and to become the main target for insecticides in different insect species." (Authors) The study includes *Calopteryx atrata* and *Sympetrum pedemontanum*.] Address: Lee, S.H., Dept of Agricultural Biotechnology, Seoul National Univ., 599 Gwanakno, Gwanakgu, Seoul 151-742, Republic of Korea. E-mail: shlee22@snu.ac.kr

12405. Kin, A.; Gruszczynski, M.; Martill, D.; Marshall, J.D.; Błażejowski, B. (2013): Palaeoenvironment and taphonomy of a Late Jurassic (Late Tithonian) Lagerstätte from central Poland. *Lethaia* 46(1): 71-81. (in English) ["A rich assemblage of exceptionally preserved marine and terrestrial fossils occurs in finegrained limestones in the upper part of the Late Tithonian (Middle Volgian) shallowing upward carbonate sequence in Central Poland. The richest horizon, a deposit known locally as the Corbulomima horizon, is named after the shallow burrowing suspension feeding bivalve *Corbulomima obscura*, moulds of which occur in densities of up to 500 per square metre on some bedding planes. The fauna in this bed also includes organic and phosphatic remains of a wide range of other creatures including the exuviae of limulids and decapods, disarticulated fish skeletons and rare isolated pterosaur bones and teeth. There are also perfectly preserved dragonfly wings and beetle exoskeletons. The average stable carbon and oxygen isotope values for ostracod shells and fine-grained sediment from this horizon suggest precipitation of the calcium carbonate from warm seawater of normal marine salinity. The carbonate sediments overlying the fossiliferous horizon have been interpreted as nearshore to shoreface facies. These pass abruptly into coarse reworked intraclastic sediments interpreted as possible tsunami or storm surge over-wash deposits. The clasts in this deposit have more positive oxygen isotope values than those in the underlying limestone, which may indicate that they were lithified in a slightly more evaporative, perhaps intertidal, setting. The succession terminates with silicified fine-grained limestones likely to have formed in extremely shallow lagoonal environments. In contrast with the Solnhofen limestones of Lower Tithonian age in south-central Germany the Corbulomima horizon is interpreted as a transitional deposit formed in a shallow marine setting by rapid burial with elements of both Konservat- and Konzentrat-Lagerstätte preservation." (Authors) For the odonatological details see: Bechly, G.; Kin, A. (2013): First record of the fossil dragonfly family Eumorbaeschnidae from the Upper Jurassic of Poland. *Acta Palaeontologica Polonica* 58(1): 121-124.] Address: Martill, D., School of Earth & Environmental Sciences, University of Portsmouth, Burnaby Building, Burnaby Road, Portsmouth, PO1 3QL Portsmouth, UK. E-mail: david.martill@port.ac.uk

- 12406.** Koshelev, V.N.; Kolobov, V.Yu. (2013): Feeding of juvenile Kaluga and Amur sturgeon in the Amur river estuary. *Bulletin of Astrakhan State Technical University. Series: Fishing Industry* 2013(1): 20-28. (in Russian, with English summary) ["Data on feeding of juvenile kaluga and Amur sturgeon in the Amur river estuary are presented for the first time. It is established that kaluga main food consists of fishes (98.4 %), as mollusks are dominant in Amur sturgeon food composition (63.0 %). Kaluga main food components are fishes of Cyprinidae (43.1 %), Bagridae (24.5 %) and Osmeridae (19.1 %), Amur sturgeon dominant prey are mollusks of *Amuropaludina chloantha* (39.6 %) and *Corbicula* sp. (17.4 %). Dynamics of food composition in the period from May to October is described [including data on Odonata at the order level]. It is defined that there is no competitive activity between juvenile kaluga and Amur sturgeon in the Amur river estuary part." (Authors)] Address: Kolobov, V.Yu., Khabarovsk branch of the Pacific Research Fisheries Center; Junior Scientific Researcher of the Amur River Bioresources Laboratory, Russia. E-mail: kolobovv78@mail.ru
- 12407.** Kulijer, D.; Boudot, J.-P. (2013): First evidence of the occurrence of *Cordulegaster insignis* Schneider, 1845 in Serbia. *Odonatologica* 42(1): 55-62. (in English) ["Two *C. insignis* specimens from Serbia were found in the collection of the National Museum of Bosnia and Herzegovina. These constitute both the first record of the species in Serbia and its north-westernmost record worldwide. The distribution of the species in Europe and the taxonomic characters of the specimens are presented and discussed."(Authors)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zraaj od Bosne 3, BA-71000 Sarajevo, Bosnia and Herzegovina. E-mail: dejan.kulijer@gmail.com
- 12408.** Kulkarni, A.S.; Subramanian, K.A. (2013): Habitat and seasonal distribution of Odonata (Insecta) of Mula and Mutha river basins, Maharashtra, India. *Journal of Threatened Taxa* 5(7): 4084-4095. (in English, with Marathian summary) ["Catchment landscape degradation and habitat modifications of freshwater ecosystems are a primary cause of biodiversity loss in riverine ecosystems all over the world. Many elements of the flora and fauna of freshwater ecosystems are sensitive to the changes in catchment land use and habitat modification. These sensitive taxa are also reliable indicators of freshwater ecosystem health. In the current study we investigate the seasonal and habitat distribution of Odonata across riparian land use types in Mula and Mutha river basins, northern Western Ghats, Maharashtra. There was a difference in the species composition across land use types and across seasons with highest diversity and abundance during the post monsoon period. The highest Odonata diversity was observed in urban areas followed by forest and agriculture fields. There was a loss of 31% of the odonate fauna in the study area over 50 years which could be due to rapid industrialization and urbanization of the region and consequent degradation of freshwater ecosystems. The significance of catchment land use on Odonata diversity and its value in landscape monitoring is discussed." (Authors)] Address: Kulkarni, A.S., Agharkar Research Institute, Gopal Ganesh Agarkar Road, Pune, Maharashtra 411004, India. E-mail: aboli.kulkarni5@gmail.com
- 12409.** Li, Y.; Béthoux, O.; Pang, H.; Ren, D. (2013): Early Pennsylvanian Odonatoptera from the Xiaheyan locality (Ningxia, China): new material, taxa, and perspectives. *Fossil Record* 16(1): 117-139. (in English) ["Data on Odonatoptera species from the Xiaheyan locality (Ningxia, China; Early Pennsylvanian) described so far are complemented based on abundant new material. Several taxonomic and nomenclatural adjustments are proposed. The species *Tupus readi* Carpenter, 1933 is transferred to the genus *Shenzhousia* Zhang & Hong, 2006 in Zhang et al. (2006), and therefore should be referred to as *Shenzhousia readi* (Carpenter, 1933) n. comb. The monotypic genus *Sinomeganeura* Ren et al., 2008 is synonymized with *Oligotypus* Carpenter, 1931. As a consequence the type species of the former must be referred to as *Oligotypus huangheensis* (Ren et al., 2008) n. comb. The monotypic genus *Paragilsonia* Zhang, Hong & Su, 2012 in Su et al. (2012) is synonymized with *Tupus* Sellards, 1906. As a consequence the type-species of the former is to be referred to as *Tupus orientalis* (Zhang, Hong & Su, 2012 in Su et al. (2012)) n. comb. The monotypic genus *Sinierasiptera* Zhang, Hong & Su, 2012 in Su et al. (2012) is synonymized with *Erasipterella* Brauckmann, 1983. As a consequence the type-species of the former is to be referred to as *Erasipterella jini* (Zhang, Hong & Su, 2012 in Su et al. (2012)) n. comb. In addition *Aseripterella sinensis* n. gen. et sp. and *Sylphalula laliquei* n. gen. et sp. are described. The 'strong oblique distal' cross-vein, located in the area between RA and RP is found to occur more extensively than previously expected. It is believed to be a structure distinct from the subnodal cross-vein, and therefore deserves to be referred to by a distinct name (viz. 'postsubnodal cross-vein'). Odonatoptera from the Xiaheyan locality cover a broad range of sizes. Factors that could have promoted the evolution of large-sized Odonatoptera are briefly reviewed. The permissive conditions prevailing during the Pennsylvanian, and the existence of an elaborated food web, are emphasized as putative positive factors. The new taxonomic treatment suggests that genera documented in the Lower Permian, such as *Shenzhousia* and *Oligotypus*, stem from the early Pennsylvanian, and implies a high resilience of these taxa when facing the Pennsylvanian-Permian environmental perturbations." (Authors)] Address: Li, Y., College of Life Science, Capital Normal University, 105 Xisanhuanbeilu, Haidian District, Beijing 100048, China. E-mail: liyongjunsysu@126.com
- 12410.** Li, Y.; Nel, A.; Shih, C.; Ren, D.; Pang, H. (2013): The first eutheimistid damselfly from the Middle Jurassic of China (Odonata, Epiproctophora, Isophlebiptera). *ZooKeys* 261: 41-50. (in English) ["*Sinoeutheimis daohugouensis* gen. et sp. n. is the first record of the isophlebipteran family Eutheimistidae from Middle Jurassic of northeast China, while previously this family was restricted to the early Late Jurassic Kazakhstan. This new finding allows us to emend the family diagnosis with hindwing characters. This new species shows a mixture of characters alternatively present in different genera of the two families Eutheimistidae and Sphenophlebiidae." (Authors)] Address: Ren, D., State Key Laboratory of Biocontrol and Institute of Entomology / Key Laboratory of Biodiversity Dynamics and Conservation of Guangdong Higher Education Institutes Sun Yat-Sen University, Guangzhou, China. E-mail: rendong@mail.cnu.edu.cn
- 12411.** Locke, S.A.; Bulté, G.; Forbes, M.R.; Marcolli, D.J. (2013): Estimating diet in individual pumpkinseed sunfish *Lepomis gibbosus* using stomach contents, stable isotopes and parasites. *Journal of Fish Bi-*

ology 82(2): 522-537. (in English) ["The diets (including Odonata) of 99 pumpkinseed sunfish *Lepomis gibbosus* from a pair of small, adjacent lakes in Ontario, Canada, were estimated from their stomach contents, trophically transmitted parasites and stable isotopes of carbon and nitrogen in fish tissue. The three methods provided virtually unrelated information. There was no significant correlation in the importance of any prey item across all three methods. Fish with similar diets according to one method of estimating diet showed no tendency to be similar according to other methods. Although there was limited variation in fish size and the spatial scale of the study was small, both fish size and spatial origin showed comparatively strong associations with diet data obtained with all three methods. These results suggest that a multidisciplinary approach that accounts for fish size and spatial origins is necessary to accurately characterize diets of individual fish." (Authors)] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

12412. Lopes Junior, R.S.; Peixoto, P.E.C. (2013): Males of the dragonfly *Diastatops obscura* fight according to predictions from game theory models. *Animal Behaviour* 85(3): 663-669. (in English) ["Agonistic interactions between males for the ownership of mating territories are common among animal species. There are at least three theoretical models aimed to clarify the rules used by rivals to decide the contest winner: war of attrition model (WOA), sequential assessment model (SAM) and cumulative assessment model (CAM). However, few empirical investigations have simultaneously tested predictions from these three models, reducing our ability to infer each model's explanatory power. In this study, we used males of *D. obscura* to identify traits that affect individual fighting ability (resource-holding potential, RHP) and to test predictions derived from WOA, SAM and CAM models. For this, we identified morphological and physiological male traits related to chances of victory, timed contests between males and evaluated the relationship between male traits, contest duration and performance of costly behaviours. Individual body mass represented the main trait affecting RHP. Contest duration decreased with increasing winner body mass and increased with increasing loser body mass, rejecting the WOA model. The probability of physical contact increased with decreasing mass differences between rivals. Additionally, when considering pairs of rivals that showed similar mass differences, contest duration was unrelated to loser body mass. Since fights can lead to physical contact, body mass may affect the capacity to inflict costs on the rivals. Also, the relationships between contest duration and RHP and between the probability of physical contact and RHP difference between rivals indicate that males perform mutual assessment of fighting ability, as presumed by SAM. Highlights: *We identified male traits in *Diastatops obscura* that determine fighting ability. *We tested predictions from three game theory models regarding rules used by rivals. *Males previously present in territories were more likely to win. *Greater body mass was related to greater chances of victory in contests. *Males seem to perform mutual evaluation of fighting ability during the contest." (Authors)] Address: Peixoto, P.E.C., Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, Feira de Santana CEP 44031-460, Bahia, Brazil. E-mail: pauloerique@gmail.com

12413. Lou, M. (2013): Improving specimen identification: Informative DNA using a statistical Bayesian method. Open Access Dissertations and Theses. Paper 7637. <http://digitalcommons.mcmaster.ca/opedissertations/7637>: XI + 99 pp. (in English) ["This work investigates the assignment of unknown sequences to their species of origin. In particular, I examine four questions: Is existing (GenBank) data reliable for accurate species identification? Does a segregating sites algorithm make accurate species identifications and how does it compare to another Bayesian method? Does broad sampling of reference species improve the information content of reference data? And does an extended model (of the theory of segregating sites) describe the genetic variation in a set of sequences (of a species or population) better? Though we did not find unusually similar between-species sequences in GenBank, there was evidence of unusually divergent within-species sequences, suggesting that caution and a firm understanding of GenBank species should be exercised before utilizing GenBank data. To address challenging identifications resulting from an overlap between within- and between species variation, we introduced a Bayesian treeless statistical assignment method that makes use of segregating sites. Assignments with simulated and *Drosophila* (fruit fly) sequences show that this method can provide fast, high probability assignments for recently diverged species. To address reference sequences with low information content, the addition of even one broadly sampled reference sequence can increase the number of correct assignments. Finally, an extended theory of segregating sites generates more realistic probability estimates of the genetic variability of a set of sequences. Species are dynamic entities and this work will highlight ideas and methods to address dynamic genetic patterns in species." (Author) The paper includes a few references to Odonata.] Address: Lou, Melanie, McMaster University, 1280 Main St W Hamilton, ON L8S 4L8, Canada. E-mail: melanie.jj.lou@gmail.com

12414. Lozano, F. (2013): Description of three females of the genus *Acanthagrion* (Odonata: Coenagrionidae) with a key to the females of Argentina. *Zootaxa* 3646 (1): 23-38. (in English, with Spanish summary) ["The neotropical genus *Acanthagrion* Selys is composed of 44 species, of which the females of 31 species are currently known. In this contribution the females of *A. aepilolum* and *A. minutum* are described and that of *A. ascendens* is redescribed. Distribution maps and new records are provided for all three species. Finally, a key to females of the genus *Acanthagrion* from Argentina is provided.] Address: Lozano, F., Centro Regional de Estudios Genómicos (UNLP) Av. Calchaquí km 23.4, 1888, Florencio Varela, Buenos Aires, Argentina. E-mail: federicolozano82@gmail.com

12415. Lupi, D.; Rocco, A.; Rossaro, B. (2013): Benthic macroinvertebrates in Italian rice fields. *J. Limnol.* 72(1): 184-200. (in English) ["Rice fields can be considered man-managed temporary wetlands. Five rice fields handled with different management strategies, their adjacent channels, and a spring were analysed by their benthic macroinvertebrate community to i) evaluate the role of rice agroecosystem in biodiversity conservation; ii) find indicator species which can be used to compare the ecological status of natural wetlands with rice agroecosystems; and iii) find the influence of environmental variables on biodiversity. Different methods of data analysis with increasing degree of complexity – from diver-

sity index up to sophisticated multivariate analysis – were used. The investigation provided a picture of benthic macroinvertebrates inhabiting rice agroecosystems where 173 taxa were identified, 89 of which detected in rice paddies. Among them, 4 phyla (Mollusca, Annelida, Nematomorpha, and Arthropoda), 8 classes (Bivalvia, Gastropoda, Oligochaeta, Hirudinea, Gordioida, Insecta, Branchiopoda, and Malacostraca), 24 orders, 68 families, 127 genera and 159 species have been found. Ten threatened and 3 invasive species were detected in the habitats examined. The information obtained by the different methods of data analysis allowed a more comprehensive view on the value of the components of rice agroecosystems. Data analyses highlighted significant differences between habitats (feeding channel and rice field), with higher diversity observed in channels, and emphasised the role of the water chemical-physical parameters. The period of water permanence in rice fields resulted to be only one of the factors influencing the community of benthic macroinvertebrates. The presence of rare/endangered species allowed characterising some stations, but it was less informative about management strategies in rice paddies because most of these species were absent in rice fields." (Authors) The list of taxa includes 15 Odonata species.] Address: Lupi, Daniela, Univ. of Milan, Dept of Food, Environmental and Nutritional Sciences (DeFENS), Via Celoria 2, 20133 Milano, Italy. E-mail: daniela.lupi@unimi.it

12416. MacNeil, C.; Beets, P.; Lock, K.; Goethals, P.L.M. (2013): Potential effects of the invasive 'killer shrimp' (*Dikerogammarus villosus*) on macroinvertebrate assemblages and biomonitoring indices. *Freshwater Biology* 58(1): 171-182. (in English) ["(1.) Water quality monitoring data from 10 watercourses and laboratory mesocosm studies were used to assess the potential impacts of the crustacean amphipod invader *D. villosus* on resident macroinvertebrate assemblage structure in Central European fresh waters. (2.) The presence of *D. villosus* was associated with a decline in the prevalence of many native species, pollution sensitive as well as pollution tolerant, and changes in biotic indices, despite the trends of improved water quality coinciding with the invasion period. A general increase in the prevalence of other invaders was also noted. The potential impacts of *D. villosus* were substratum dependent, differing between stone, concrete and sand-dominated sites. (3.) Mean Multimetric Macroinvertebrate Index Flanders (MMIF) values were marginally lower when *D. villosus* was present ($P < 0.06$), as opposed to when other amphipod species or no amphipods were present, despite the improved water quality. Mesocosm studies showed that several macroinvertebrate taxa were completely eliminated in treatments with *D. villosus*, oligochaete worms, Caenidae mayfly, chironomids and tipulids being particularly vulnerable to *D. villosus* predation. Biological Monitoring Working Party (BMWP) scores were lower in mesocosms with *D. villosus* as opposed to the native *Gammarus pulex* or no amphipods at all. (4.) We predict that resident macroinvertebrate assemblages in both Central Europe and Britain will come under increasing pressure as *D. villosus* invasions progress. Consequently, macroinvertebrate biotic indices, such as the MMIF or BMWP, may need to be revised to account for changes in taxa sensitivities to water quality as well as increased predation and competition." (Authors) Larvae of *Ischnura elegans* were used for the experiments. They were preyed less frequently by *D. villosus* and only very rarely by *G. pulex*, opposite to worms, chirono-

mids and tipulids which were predated in all amphipod replicates. In field samples based on the samples from 1990 to 2009, Platycnemididae were effected negatively by invasive *D. villosus* especially in rivers with concrete substratum or stone substratum.] Address: MacNeil, C., Department of Environment, Food and Agriculture, The Isle of Man Government, Thie Slieau Whallian, Foxdale Road, St. Johns IM4 3AS, Isle of Man. E-mail: calummanx@hotmail.com

12417. Majumder, J.; Das, R.K.; Majumder, P.; Ghosh, D.; Agarwala, B.K. (2013): Aquatic insect fauna and diversity in urban fresh water lakes of Tripura, Northeast India. *Middle-East Journal of Scientific Research* 13(1): 25-32. (in English) ["Freshwater lakes are integral part of urban ecosystem and provide numerous benefits to human beings directly or indirectly. An inventory was carried out to study the aquatic entomofauna, their diversity and distribution in three urban freshwater lakes of Tripura, northeast India during January to May, 2012. A total of 2159 individuals representing 31 species belonging to 23 genera, 15 families and 4 orders were recorded. Maximum of 30 species and 1191 individuals of aquatic insects were recorded in vegetation rich Maharaja Bir Bikram College Lake and minimum of 11 species and 215 individuals were recorded in vegetation poor Laxminarayan Bari Lake. Insects belonging to the orders Hemiptera (32.26%) and Odonata (32.25%) showed higher species richness followed by those belonging to Coleoptera (25.81%) and Diptera (9.68%), respectively. Maximum diversity ($H_s = 3.03$) and least dominance ($D_s = 0.06$) and minimum diversity ($H_s = 1.50$) and maximum dominance ($D_s = 0.06$) of aquatic insects was recorded in Maharaja Bir Bikram College Lake and Laxminarayan Bari Lake, respectively. Richness estimators Chao 1 and Chao 2 provided the best predicted value of species richness. Three species are reported here for the first time from the state. Dominance of hemipteran and coleopteran insects suggested that urban lakes of Tripura are relatively less polluted." (Authors)] Address: Agarwala, B.K., Department of Zoology, Ecology and Biodiversity Laboratories, Tripura University, Suryamaninagar, Tripura 799 022, India

12418. Marinov, M.; Donnelly, N. (2013): *Teinobasis fatakula* sp. nov. (Zygoptera: Coenagrionidae), found on 'Eua Island, Kingdom of Tonga. *Zootaxa* 3609(6): 589-592. (in English) ["A recent study of the 'Eua Island in the Kingdom of Tonga has yielded a small Odonata fauna including the new species *Teinobasis fatakula* (Holotype male: Kingdom of Tonga, 'Eua Island, 21.3781° S, 174.9346° W, elevation 175 m; 14 July 2012, M. Marinov leg.). Because 'Eua has aquatic habitats unique within the Kingdom of Tonga, the new species is very likely endemic to that island and represents an extension of the verified range of the genus of at least 2800 km." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

12419. May, M.L. (2013): A critical overview of progress in studies of migration of dragonflies (Odonata: Anisoptera), with emphasis on North America. *J. Insect Conserv.* 17(1): 1-15. (in English) ["Migration by Odonata has been recorded sporadically for several centuries, but only recently have new technologies and a new wave of interest in these ancient insects sparked a concerted effort to understand the extent, behavioural mechanisms, adaptive significance, and ecological consequences of this phenomenon. Here I review our cur-

rent knowledge of these sometimes spectacular flights, focusing on the few species in North America that are known to migrate more or less annually. One of these, *Anax junius*, has been shown to traverse hundreds to thousands of kilometers from north to south during fall migration. *Pantala flavescens* is plausibly inferred to make an overseas flight from India to East Africa with the Northeast Monsoon, although its migrations in North America are less well understood. Large scale movements of these and other species raises questions about population connectivity, ecosystem impacts, the nature and evolution of cues that initiate migration, and effects of climate change on these phenomena." (Author)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

12420. Mchenga, I.S.S.; Ali, A.I. (2013): Macro-fauna communities in a tropical mangrove forest of Zanzibar Island, Tanzania. *Global Journal of Bio-Science and Biotechnology* 2(1): 260-266. (in English) [Odonata are treated at family level.] Address: Mchenga, I.S.S., Society for Environmental Research and Conservation, P.O. Box 2477, Zanzibar, Tanzania. E-mail: islamsalum@yahoo.co.uk

12421. Meyer-Rochow, B. (2013): Ethno-entomological observations from North Korea (officially known as the "Democratic People's Republic of Korea"). *Journal of Ethnobiology and Ethnomedicine* 2013, 9:7 doi:10.1186/1746-4269-9-7: 12 pp. (in English) ["In terms of scientific activities generally and ethnobiological pursuits in particular, North Korea, officially known as the Democratic People's Republic of Korea, is an almost blank entity on the quilt of global research. During a sabbatical semester at Pyongyang University of Science and Technology the author used this opportunity to gather some information on the uses of insect and other terrestrial arthropods as human food and components of traditional healing methods in that country. Despite the widely publicised shortcomings in the supply of food stuffs to the population of North Korea, insects are not generally seen as a source of food worthy of exploitation. However, the therapeutic use of insects, centipedes and scorpions to treat illnesses as diverse as the common cold, skin rashes, constipation, dysentery, nervous prostration, whooping cough, osteomyelitis, tetanus, and various forms of cancer is apparently still popular. The arthropods used therapeutically are credited with antiinflammatory, immunological and other health-promoting effects, because they are said to contain hormones, steroids, lipids and plant-derived alkaloids, all of which capable of exerting their effects on the human body." (Author) "Aeshnidae, Libellulidae, Crocothemis servilia" are used both as food and for therapeutic reasons. Regrettably no details are presented.] Address: Meyer-Rochow, B., School of Engineering and Science, Jacobs University Bremen, Research II (Rm.37), Bremen D-28759, Germany. E-mail: dence: b.meyer-rochow@jacobs-university.de

12422. Mitra, T.R.; Babu, R.; Subramanian, K.A. (2013): *Anax panybeus* Hagen, 1867: an addition to the Odonata (Aeshnidae) of India. *Journal of Threatened Taxa* 5(2): 3682-3683. (in English) ["Materials examined: 4868/H13, 1♂, 01.viii.1984, 27km on NS Road, Swarup Nullah, Great Nicobar Island; 4869/H13, 1♂, 01.viii.1984, 35km on NS Road, Shashtri Nagar, Great Nicobar Island, coll. S.S. Saha. The Specimens were deposited in

National Zoological Collection, Zoological Survey of India, Kolkata." (Authors)] Address: Subramanian, K.A., Zoological Survey of India, M-Block, New Alipore, Kolkata, West Bengal 700053, India. E-mail: subbuka.zsi@gmail.com

12423. Moon, D.C.; Silva, D. (2013): Environmental heterogeneity mediates a cross-ecosystem trophic cascade. *Ecological Entomology* 38: 23-30. (in English) ["(1.) The flow of energy and nutrients across ecosystem boundaries can have significant community-wide effects, but the role of productivity of the recipient habitat in mediating these effects remains unclear. This is especially true when organisms moving across ecosystem boundaries serve simultaneously as predators and prey. (2.) In this study, the effects of odonates, primarily *Enallagma civile*, on a salt marsh system were examined. Cages were used to exclude odonate predators, but not other arthropods, from experimental plots of the sea oxeye daisy, *Borrchia frutescens* (L.) in high and low productivity areas. The effects were assessed on the in situ arthropod community and the host plant. (3.) There were strong direct effects of predation on the herbivores *Pissonotus quadripustulatus* Van Duzee and *Asphondylia borrichiae* Rossi and Strong, with higher densities where damselflies were excluded. Damselflies also served as prey for web-building spiders. This resulted in lower spider densities inside cages, and a positive indirect effect on grasshopper densities. (4.) Direct and indirect effects of odonates were greater in the high productivity area, resulting in a trophic cascade, with greater damage and reduced flowering and density of the host plant inside cages. (5.) The results of this study support the subsidy hypothesis and show that theoretical models of trophic dynamics, which were developed to explain exchanges within ecosystems, may have predictive and explanatory value for exchanges across ecosystems as well." (Authors)] Address: Moon, D.C., Dept of Biology, University of North Florida, Jacksonville, Florida, USA. E-mail: dmoon@unf.edu

12424. Murphy, J.F.; Davy-Bowker, J.; McFarland, B.; Ormerod, S.J. (2013): A diagnostic biotic index for assessing acidity in sensitive streams in Britain. *Ecological Indicators* 24(1): 562-572. (in English) ["Despite the history of freshwater biomonitoring, there is still a dearth of proven indices that allow accurate status assessment while simultaneously diagnosing the cause of impairment, particularly when stressors are multiple. Here, we present an approach to developing diagnostic indices where the sensitivity of biota (including *Cordulegaster boltonii*) is quantified using multivariate ordination. We applied the approach to the development of an index to detect acidity in British streams. Using a 197-site calibration dataset, we quantified variation in macroinvertebrate assemblages and determined which environmental variables best described the pattern. We then ranked taxa along an acid-base gradient, having first considered the merits of factoring out confounding variation from natural environmental factors. The response of the new species-level Acid Water Indicator Community (AWICsp) index to variation in base-flow and storm-flow pH and acid neutralising capacity (ANC) was quantified using independent data. Performance was also compared with existing family-level and species-level indices. AWICsp was consistently the species-level diagnostic index most clearly related to base-flow pH, storm-flow pH and ANC, accounting for 38–56% of the variation in acid conditions among the 76

test sites. Given the need to develop bio-diagnostic indicators, these data illustrate how organisms can indicate causes of stream impairment using robust and objective procedures, and when applied to strong environmental gradients such as acid–base status. We suggest that given the necessary calibration data, this approach could be applied successfully to other widespread stressors with equally strong biological effects such as organic pollution and fine sediment deposition, particularly if used in combination with RIVPACS-type predictive bioassessment models." (Authors)] Address: Murphy, J.F., River Communities Group, School of Biological and Chemical Sciences, Queen Mary University of London, c/o FBA River Laboratory, East Stoke, Wareham, Dorset BH20 6BB, UK.

12425. Nautiyal, P.; Shivam Mishra, A. (2013): Variations in benthic macroinvertebrate fauna as indicator of land use in the Ken River, central India. *Journal of Threatened Taxa* 5(7): 4096-4105. (in English, with Marathian summary) ["Examination of benthic macroinvertebrates in semi-natural, urban and agricultural land use along the highland Ken River in central India reveals a significantly higher density in semi-natural compared with other two landuse. Insects dominate the fauna at seminatural (90%) and urban locations (93%) compared to agriculture sites (48%) where annelid share increases to 32%. The seminatural location characterized by rocky substrate support high relative abundance of Caenidae and Neoephemeridae. Their abundance decreases at urban locations. Brachycentridae, Chironomidae, Glossocolecidae, Nephthyidae, Thiariidae and Corbiculidae increased at urban and agriculture locations characterized by small-sized sediments, suggesting important role for substrate also. Ordination shows that the Caenidae and Heptageniidae are characteristic at semi-natural location, Leptophlebiidae, Hydroptychidae, Glossosomatidae at urban while Thiariidae and Chironomidae at agricultural locations. Functionally, the collectors dominate the fauna, as all three landuse, especially large tracts of agriculture, are a continuous source of particulate organic matter (POM) in the river." (Authors) The study includes Gomphidae.] Address: Shivam Mishra, A. Aquatic Biodiversity Unit, Department of Zoology & Biotechnology, H. N. B. Garhwal (Central) University, Srinagar, Garhwal, Uttarakhand 246174, India. E-mail: shivama2000@yahoo.co.in

12426. Nixon, M.R.; Orr, A.G.; Vukusic, P. (2013): Subtle design changes control the difference in colour reflection from the dorsal and ventral wing-membrane surfaces of the damselfly *Matronoides cyaneipennis*. *Optics Express* 21(2): 1479-1488. (in English) ["The hind wings of males of *M. cyaneipennis* exhibit iridescence that is blue dorsally and green ventrally. These structures are used semiotically in agonistic and courtship display. Transmission electron microscopy reveals these colours are due to two near-identical 5-layer distributed Bragg reflectors, one placed either side of the wing membrane. Interestingly the thicknesses of corresponding layers in each distributed Bragg reflector are very similar for all but the second layer from each outer surface. This one key difference creates the significant disparity between the reflected spectra from the distributed Bragg reflectors and the observed colours of either side of the wing. Modelling indicates that modifications to the thickness of this layer alone create a greater change in the peak reflected wavelength than is observed for similar modifications to the thickness of any

other layer. This results in an optimised and highly effective pair of semiotic reflector systems, based on extremely comparable design parameters, with relatively low material and biomechanical costs." (Authors)] Address: Nixon, M.R., School of Physics, University of Exeter, EX4 4QL, UK. E-mail: M.R.Nixon@exeter.ac.uk

12427. Nomura, F.; De Marco, P.; Carvalho, A.F.A.; Rossa-Feres, D.C. (2013): Does background colouration affect the behaviour of tadpoles? An experimental approach with an odonate predator. *Ethology Ecology & Evolution* 25(2): 185-198. (in English) ["Predation is a primary driver of tadpole assemblages, and the activity rate is a good predictor of the tadpoles' tolerance for predation risk. The conflicting demands between activity and exposure to predation can generate suboptimal behaviours. Because morphological components, such as body colouration, may affect the activity of tadpoles, we predict that environmental features that enhance or match the tadpole colouration should affect their survival or activity rate in the presence of a predator. We tested this prediction experimentally by assessing the mortality rate of tadpoles of *Rhinella schneideri* and *Eupemphix nattereri* and the active time on two artificial background types: one bright-coloured and one black-coloured. We found no difference in tadpole mortality due to the background type. However, *R. schneideri* tadpoles were more active than *E. nattereri* tadpoles, and the activity of *R. schneideri* was reduced less in the presence of the predator than that of *E. nattereri*. Although the background colouration did not affect the tadpole mortality rate, it was a stimulus that elicited behavioural responses in the tadpoles, leading them to adjust their activity rate to the type of background colour." (Authors)] Address: Nomura, F., Departamento de Ecologia, ICB, Universidade Federal de Goiás (UFG), CP 131, CEP 74001-970, Goiânia, Goiás, Brazil

12428. Novello-Gutierrez, R.; Che Salmah, M.R. (2013): Two interesting larvae of *Onychogomphus* from Malaysia (Anisoptera: Gomphidae). *Odonatologica* 42(1): 31-38. (in English) ["The larvae of *O. thienemani* and *Onychogomphus* sp. are described and illustrated. Both species are clearly separated from each other principally by the shape of post-clypeus, pronotum, size of ligula, and dorsal protuberance on abdominal segment 2. The most distinctive feature of these 2 larvae is the shape and position of the 3rd antennomere in a manner of a protecting shield in front of the head." (Authors)] Address: Che Salmah, M.R., Universiti Sains Malaysia, School of Biological Sciences, 11800 Pulau Pinang, Malaysia. E-mail: csalmah@usm.my

12429. Nunes, A.L.; Richter-Boix, A.; Laurila, A.; Rebelo, R. (2013): Do anuran larvae respond behaviourally to chemical cues from an invasive crayfish predator? A community-wide study. *Oecologia* 171(1): 115-127. (in English) ["Antipredator behaviour is an important fitness component in most animals. A co-evolutionary history between predator and prey is important for prey to respond adaptively to predation threats. When non-native predator species invade new areas, native prey may not recognise them or may lack effective antipredator defences. However, responses to novel predators can be facilitated by chemical cues from the predators' diet. The red swamp crayfish *Procambarus clarkii* is a widespread invasive predator in the Southwest of the Iberian Peninsula, where it preys upon native anuran tadpoles. In a laboratory experiment we studied behavioural antipredator defences (alterations in activity level and spa-

tial avoidance of predator) of nine anurans in response to *P. clarkii* chemical cues, and compared them with the defences towards a native predator, the larval dragonfly *Aeshna* sp. To investigate how chemical cues from consumed conspecifics shape the responses, we raised tadpoles with either a tadpole-fed or starved crayfish, or dragonfly larva, or in the absence of a predator. Five species significantly altered their behaviour in the presence of crayfish, and this was largely mediated by chemical cues from consumed conspecifics. In the presence of dragonflies, most species exhibited behavioural defences and often these did not require the presence of cues from predation events. Responding to cues from consumed conspecifics seems to be a critical factor in facilitating certain behavioural responses to novel exotic predators. This finding can be useful for predicting antipredator responses to invasive predators and help directing conservation efforts to the species at highest risk." (Authors)] Address: Nunes, Ana, Departamento de Biologia Animal, Centro de Biologia Ambiental, Faculdade de Ciências da Universidade de Lisboa, Bloco C2, Piso 5, Campo Grande, 1749-016, Lisbon, Portugal. E-mail: alnunes@fc.ul.pt

12430. Obasi, K.O.; Ijere, N.D.; Okechukwu, R.I. (2013): Species diversity and equitability indices of some fresh water species in Aba River and Azumini Blue River, Abia state Nigeria. *International Journal of Science and Technology* 2(3): 238-241. (in English) [The taxa list includes larvae of Aeshnidae.] Address: Obasi, K.O., Department of Biological Science, School of Science; Fed. Univ. of Tech. Owerri, Imo State, Nigeria

12431. Oliveira Junior, J.M.B.; Ramos Cabette, H.S.; Silva Pinto, N.; Juen, L. (2013): As variações na comunidade de Odonata (Insecta) em córregos podem ser explicadas pelo Paradoxo do Plâncton? Explicando a riqueza de espécies pela variabilidade ambiental. *Entomobrasilia* 6(1): 1-8. (in Portuguese, with English summary) ["Variations in Odonata (Insecta) community in streams may be predicted by the plankton paradox? Explaining species richness by environmental variability: The theory of Plankton Paradox postulates that environments that exhibit regular temporal fluctuations would present a high diversity of species, since such fluctuations would prevent the occurrence of competitive exclusion. This work aimed evaluate variations in adult Odonata community in catchment of River Suiá-Miçú, testing the hypothesis that sites with environmental variables with the largest amplitude of variation would present the highest species richness. Were sampled 11 water bodies in an area of transition Cerrado-Amazon Forest in east-central Mato Grosso state, Brazil. Environmental variables evaluated were: environmental integrity (HII) and range of variation of pH, conductivity, air temperature, water temperature, dissolved oxygen, ammonia, phosphorus and Mg⁺. Were collected 2.144 specimens, distributed in eight families, 41 genera and 78 species. Our hypothesis was not confirmed, since the multiple regression analysis performed between the estimated kind of richness Anisoptera and Zygoptera with range of variation of physical-chemical was not significant for any of the eight variables, as well as for HII. Our results suggest that variations in the community of Odonata in streams cannot be explained by Plankton Paradox. We believe that this result may have occurred due mainly to the low variations in environmental conditions discussed, action of other local processes such as competition and predation or differ-

ences ecophysiological result of body size variation and capacity of thermoregulation in the order of the adults studied." (Authors)] Address: Juen, L. Universidade Federal do Para, Brasil. E-mail: leandrojuen@ufpa.br

12432. Ott, J. (2013): Eine europaweit geschützte Libelle: die Große Moosjungfer hat sich im Raum Kaiserslautern angesiedelt. *Heimatjahrbuch Kaiserslautern* 2013: 90-92. (in German) [Rheinland-Pfalz, Germany. The authors outlines biology and habitat requirements of *Leucorrhinia pectoralis* in the district of Kaiserslautern and discusses the possible origin of the recently established local populations.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

12433. Parr, A.J. (2013): The Large White-faced Darter *Leucorrhinia pectoralis* (Charp.) in Britain during 2012. *J. Br. Dragonfly Society* 29(1): 40-45. (in English) ["*L. pectoralis* was noted in England on two occasions in 2012, these constituting only the second- and third-ever confirmed UK records of the species. This is discussed in the light of the migratory capabilities of *Leucorrhinia* species and the possibility that some earlier unexpected sightings from eastern England originally ascribed to White-faced Darter *L. dubia* may have been either *L. pectoralis* or *L. rubicunda*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

12434. Petrulevicius, J.F.; Nel, A. (2013): A new Frenguelliidae (Insecta: Odonata) from the early Eocene of Laguna del Hunco, Patagonia, Argentina. *Zootaxa* 3616 (6): 597-600. (in English) ["The discovery of a new specimen of Frenguelliidae, attributed to the new species *Frenguella iglesiasi*, in Patagonia, Argentina, is noteworthy for the knowledge of the diversity within this little-known family." (Authors)] Address: Petrulevicius, J.F., Museo de La Plata - UNLP - CONICET, División Paleozoología Invertebrados, Paseo del Bosque s/n, 1900 La Plata, Argentina. E-mail: levicius@museo.fcnym.unlp.edu.ar

12435. Pinguet, D. (2013): On the trail of the Orange-spotted Emerald. *Dragonfly News* 63: 22-24 (in English) [northern Portugal without locality dates, *Oxygastra curtisii*, *Macromia splendens*, *Gomphus graslinii*.] Address: not stated

12436. Ramírez, A.; Gutiérrez-Fonseca, P.E. (2013): The larvae of *Heteragrion majus* Selys and *H. atrolineatum* Donnelly, with a key to known species from Costa Rica (Odonata: Megapodagrionidae). *Zootaxa* 3609(1): 96-100. (in English, with Spanish summary) ["The final larval stadium of *Heteragrion majus* Selys, 1886 and *H. atrolineatum* Donnelly, 1992 are described and illustrated for the first time, using reared material from Costa Rica, and compared with other species of the genus known from the country. All species were very similar as larvae, but they can be separated by the presence and distribution of antennal setae, spines on the posterior margin of the abdominal segments, and size. A key to separate all five species known for Costa Rica is provided." (Authors)] Address: Ramírez, A., Department of Environmental Sciences, University of Puerto Rico, P.O. Box 190341, San Juan, Puerto Rico 00919. E-mail: aramirez@ramirezlab.net

12437. Ramirez-Gonzalez, R.; Yu, D.W.; Bruce, C.; Heavens, D.; Caccamo, M.; Emerson, B.C. (2013): PyroClean: Denoising pyrosequences from protein-coding

amplicons for the recovery of interspecific and intraspecific genetic variation. *PLoS ONE* 8(3): e57615. doi:10.1371/journal.pone.0057615: 11 pp. (in English) ["High-throughput parallel sequencing is a powerful tool for the quantification of microbial diversity through the amplification of nuclear ribosomal gene regions. Recent work has extended this approach to the quantification of diversity within otherwise difficult-to-study metazoan groups. However, nuclear ribosomal genes present both analytical challenges and practical limitations that are a consequence of the mutational properties of nuclear ribosomal genes. Here we exploit useful properties of protein-coding genes for cross-species amplification and denoising of 454 flowgrams. We first use experimental mixtures of species from the class Collembola to amplify and pyrosequence the 5' region of the COI barcode, and we implement a new algorithm called PyroClean for the denoising of Roche GS FLX pyrosequences. Using parameter values from the analysis of experimental mixtures, we then analyse two communities sampled from field sites on the island of Tenerife. Cross-species amplification success of target mitochondrial sequences in experimental species mixtures is high; however, there is little relationship between template DNA concentrations and pyrosequencing read abundance. Homopolymer error correction and filtering against a consensus reference sequence reduced the volume of unique sequences to approximately 5% of the original unique raw reads. Filtering of remaining non-target sequences attributed to PCR error, sequencing error, or numts further reduced unique sequence volume to 0.8% of the original raw reads. PyroClean reduces or eliminates the need for an additional, time-consuming step to cluster reads into Operational Taxonomic Units, which facilitates the detection of intraspecific DNA sequence variation. PyroCleaned sequence data from field sites in Tenerife demonstrate the utility of our approach for quantifying evolutionary diversity and its spatial structure. Comparison of our sequence data to public databases reveals that we are able to successfully recover both interspecific and intraspecific sequence diversity." (Author) The study includes Odonata ("Ophiogomphus"), a taxon not known from Teneriffa.] Address: Emerson, B.C., Island Ecology and Evolution Research Group, Instituto de Productos Naturales y Agrobiología (Consejo Superior de Investigaciones Científicas), La Laguna, Tenerife, Canary Islands, Spain. E-mail: bemerson@ipna.csic.es

12438. Rathod, P.P.; Manwar, N.A.; Pawar, S.S.; Raja, I.A. (2013): Diversity and abundance of dragonflies and damselflies (Order - Odonata) in agro ecosystems around the Amravati City (M.S.), India in monsoon season. *International Journal of Agriculture Innovations and Research* 1.5: 174-182. (in English) [Between July 2012 and October 2012, 31 Odonata species were reported. The authors calculated the Species diversity (H) and Evenness (E) as 3.012 and 0.877 respectively.] Address: Raja, I.A., Dept of Zoology, Shri Shivaji College of Arts, Commerce and Science, Akola - 444001. India. E-mail: medrraja@gmail.com

12439. Ren, H.; Wang, X.; Li, X.; Chen, Y. (2013): Effects of dragonfly wing structure on the dynamic performances. *Journal of Bionic Engineering* 10(1): 28-38. (in English) ["The configurations of dragonfly wings, including the corrugations of the chordwise cross-section, the microstructure of the longitudinal veins and membrane, were comprehensively investigated using the

Environmental Scanning Electron Microscopy (ESEM). Based on the experimental results reported previously, the multi-scale and multi-dimensional models with different structural features of dragonfly wing were created, and the biological dynamic behaviours of wing models were discussed through the Finite Element Method (FEM). The results demonstrate that the effects of different structural features on dynamic behaviours of dragonfly wing such as natural frequency/modal, bending/torsional deformation, reaction force/torque are very significant. The corrugations of dragonfly wing along the chordwise can observably improve the flapping frequency because of the greater structural stiffness of wings. In updated model, the novel sandwich microstructure of the longitudinal veins remarkably improves the torsional deformation of dragonfly wing while it has a little effect on the flapping frequency and bending deformation. These integrated structural features can adjust the deformation of wing oneself, therefore the flow field around the wings can be controlled adaptively. The fact is that the flights of dragonfly wing with sandwich microstructure of longitudinal veins are more efficient and intelligent." (Authors)] Address: Wang, X., Dept of Engineering Mechanics, AML, Tsinghua Univ., Beijing 100084, P. R. China. E-mail: xshwang@tsinghua.edu.cn

12440. Ren, L.-q.; Li, X.-j. (2013): Functional characteristics of dragonfly wings and its bionic investigation progress. *Science China Technological Sciences* 56(4): 884-897. (in English) ["Dragonfly is one of the most excellent nature flyers, and its wings exhibit excellent functional characteristics through the coupling and synergy of morphology, configuration, structure and material. The functional characteristics presented by dragonfly wings provide a biological inspiration for the investigation and development of aerospace vehicles and bionics flapping aircraft flapping-wing micro air vehicles. In recent years, some progresses have been achieved in the researches on the wings' geometric structure, material characteristics, flying mechanism and the controlling mode. In this paper, the functional characteristics of the dragonfly wings including flying, self-cleaning, anti-fatigue, vibration elimination and noise reduction are introduced and the effects of their morphology, configuration, structure and material on the functional characteristics are described. Moreover, the current state of the bionic study on the functional characteristics of dragonfly wings is analyzed and its application prospect is depicted." (Authors)] Address: Ren, L.-q., Key Laboratory of Bionic Engineering (Ministry of Education, China), Jilin University, Changchun, 130025, China. E-mail: lqren@jlu.edu.cn

12441. Renner, S.; Périco, E.; Sahlén, G. (2013): Dragonflies (Odonata) in Subtropical Atlantic Forest fragments in Rio Grande do Sul, Brazil: seasonal diversity and composition. *Scientia Plena* 9(1): 1-8. (in English, with Portuguese summary) ["One of the most endangered ecosystems in America is the Atlantic Forest, which demands emergency actions to protect its remnants as well its biodiversity. In this situation the species inventory can develop a management role for the future, determining specific areas that should be preserved as well the species composition and richness can be used as an indicator of a healthy ecosystem. The use of dragonfly species composition has proven its potential indication of quality habitats. The Odonata species actually still poorly known in the Neotropical region and has never been used as a tool to analyze the

actual conditions of aquatic environments particularly in the Subtropical Atlantic Forest, which occurs in south of Brazil. A systematic survey was carried out in aquatic systems located at remnants of forest from March 2011 to February 2012. A total of 565 specimens belonging to 34 species, distributed in 5 families were sampled. Libellulidae was dominant, with 14 species, followed by Coenagrionidae, Gomphidae, Lestidae and Aeshnidae. Through inventory survey we deepen the Odonata composition knowledge and performed a statistic analysis." (Authors)] Address: Ecologia e Sensoriamento Remoto, Centro Universitário Univates, 95900-000, Lajeado-RS, Brasil. E-mail: samuelrenner@hotmail.com

12442. Rizo-Patron, F.; Kumar, A.; McCoy Colton, M.B.; Springer, M.; Trama, F.A. (2013): Macroinvertebrate communities as bioindicators of water quality in conventional and organic irrigated rice fields in Guanacaste, Costa Rica. *Ecological Indicators* 29: 68-78. (in English) ["The purpose of this study was to compare how aquatic macroinvertebrates are affected by certain management practices and agrochemicals in organic and conventional rice cultivations (treatments) in northwestern of Costa Rica. We sampled macroinvertebrates in both treatments, at the water entrances (irrigation) and exits (drainage) during two cycles (8 months total) of rice field cultivation. We employed a water quality index using macroinvertebrates (BMWP/CR) as bioindicators in both management treatments. Insect family mean ($P = 0.0019$) and species mean richness ($P = 0.0340$) were greater in the organic vs. the conventional treatments as well as at the entrances rather than their exits. Both macroinvertebrates mean abundance ($P = 0.0281$) and insects mean abundances ($P = 0.0065$) were greater at the organic vs. the conventional treatments. The water quality index (BMWP/CR) was greater in the organic treatment at the entrance (124) comparing with the exit (72), and also at the conventional entrance (92) vs. the exit (66), thus showing that the management practices affected the macroinvertebrate community. The organic treatment showed the settlement of a greater number of families and species of macroinvertebrates both in general and in those considered sensitive to pollution than in the conventional treatment. This sensitive group of macroinvertebrates (Baetis sp., Fallceon sp., Leptohyphes sp., Tricorythodes sp., Farrowes sp., Phyllogomphoides sp., Hydroptila sp., Mayatrichia sp., Neotrichia sp., Oxyethira sp., Nectopsyche sp.1, Nectopsyche sp.2, Oecetis sp.) can be used as a bioindicators of water quality in these agroecosystems. On the contrary, more macroinvertebrates resistant to pollution were found in the conventional compared to the organic treatment, showing that aquatic macroinvertebrates respond to the type of management/products that are applied to the rice field." (Authors)] Address: Rizo-Patrón, F., Organization for Tropical Studies, Palo Verde Biological Station, Guanacaste, Costa Rica. E-mail: frizopatron@ibcperu.org

12443. Rosario, K.; Padilla-Rodriguez, M.; Kraberger, S.; Stainton, D.; Martin, D.P.; Breitbart, M.; Varsani, A. (2013): Discovery of a novel mastrevirus and alphasatellite-like circular DNA in dragonflies (Ephemeroptera) from Puerto Rico. *Virus Research* 171: 231-237. (in English) ["Geminiviruses have emerged as serious agricultural pathogens. Despite all the species that have been already catalogued, new molecular techniques continue to expand the diversity and geographical ranges of these single-stranded DNA viruses and their associated

satellite molecules. Since all geminiviruses are insect-transmitted, examination of insect vector populations through vector-enabled metagenomics (VEM) has been recently used to investigate the diversity of geminiviruses transmitted by a specific vector in a given region. Here we used a more comprehensive adaptation of the VEM approach by surveying small circular DNA viruses found within top insect predators, specifically dragonflies (Ephemeroptera). This 'predator-enabled' approach is not limited to viral groups transmitted by specific vectors since dragonflies can accumulate the wide range of viruses transmitted by their diverse insect prey. Analysis of six dragonflies collected from an agricultural field in Puerto Rico culminated in the discovery of the first mastrevirus (Dragonfly-associated mastrevirus; DfasMV) and alphasatellite molecule (Dragonfly-associated alphasatellite; Dfas-alphasatellite) from the Caribbean. Since DfasMV and Dfas-alphasatellite are divergent from the limited number of sequences that have been reported from the Americas, this study unequivocally demonstrates that there have been at least two independent past introductions of both mastreviruses and alphasatellites to the New World. Overall, the use of predacious insects as sampling tools can profoundly alter our views of natural plant virus diversity and biogeography by allowing the discovery of novel geminiviruses and associated satellite molecules without a priori knowledge of the types of viruses or insect vectors in a given area." (Authors)] Address: Varsani, A., School Biol. Sci., Univ. Canterbury, Private Bag 4800, Christchurch 8140, New Zealand. E-mail: arvind.varsani@canterbury.ac.nz

12444. Ruhi, A.; Boix, D.; Gascon, S.; Sala, J.; Quintana, X.D. (2013): Nestedness and successional trajectories of macroinvertebrate assemblages in man-made wetlands. *Oecologia* 171(2): 545-556 (in English) ["Current successional models, primarily those based on floral succession, propose several distinct trajectories based on the integration of two key hypotheses from succession theory: convergence versus divergence in species composition among successional sites, and progression towards versus deviation from a desired reference state. We applied this framework to faunal succession, including differential colonization between active and passive dispersers, and the nested patterns generated as a consequence of this peculiarity. Nine man-made wetlands located in three different areas, from 0–3 years from wetland creation, were assessed. In addition, 91 wetlands distributed throughout the region were used as references for natural macroinvertebrate communities. We predicted the following: (1) highly nested structures in pioneering assemblages will decrease to lower mid-term values due to a shift from active pioneering taxa to passive disperser ones; (2) passive idiosyncratic taxa will elicit divergent successional trajectories among areas; (3) the divergent trajectories will provoke lower local and higher regional diversity values in the mid-term assemblages than in pioneer assemblages. Our results were largely congruent with hypotheses (1) and (2), diverging from the anticipated patterns only in the case of the temporary wetlands area. However, overall diversity trends based on hypothesis (3) did not follow the expected pattern. The divergent successional trajectories did not compensate for regional biodiversity losses that occurred as a consequence of pioneering colonizer decline over time. Consequently, we suggest reconsidering wetland construction for mitigation purposes within mid-term time frames

(B3 years). Wetlands may not offset, within this temporal scenario, regional biodiversity loss because the ecosystem may not support idiosyncratic taxa from natural wetlands." (Authors) Supplementary data provide information at the species level, while the main paper analyses the taxa (including Odonata) at family level.] Address: Ruhí, A., Catalan Institute for Water Research (ICRA), Scientific and Technological Park of the University of Girona, H2O Building, Emili Grahit 101, 17003 Girona, Catalonia, Spain. E-mail: aruhi@icra.cat

12445. Rychła, A. (2013): New sites of the Golden-ringed Dragonfly *Cordulegaster boltonii* (Donovan, 1807) (Odonata: Cordulegasteridae) in the mid-western Poland. *Odonatrix* 9(1): 21-28. (in Polish, with English summary) ["*C. boltonii* has been known from 133 sites in Poland so far. Currently, the largest metapopulations are present in the Pomarenian's Lake District, Lubusz Land, Upper Silesia and Lesser Poland. However, the knowledge about the distribution of *C. boltonii* is still incomplete and any information is required since it has been vulnerable and consequently protected species in Poland. Therefore, new records of *C. boltonii* from mid-western Poland (southern Lubusz Land) are presented in this paper. The investigated area is situated on territories of communes Brody, Gubin, Lubsko and Tuplice in the Lubuskie District. In brief, it is lowland locally with varied relief structure of numerous morainic hills (altitudes to 120 a.s.l.) and depressions (altitudes to 50 a.s.l.), particularly covered by pine cultures with small participation of leaf forests. The main running waters like Pstrąg, Tymnica, Golec and Wełnica represent the type of lowland rivers dominated by sandy channel substrates and receive flows from numerous small tributaries in the area. The investigation was carried out from April to October 2011 in selected sections (length of 100–500 m) of all running waters. The occurrence of larvae, exuviae and imagines, as well as the general hydromorphological features of each habitat were noted. For larvae, 15 to 20 samples were taken with a hydrobiological scoop at each site. As result, *C. boltonii* was observed at 16 sites in 11 running waters (small rivers and streams). Larvae were found at 12 sites localized in 7 running waters, providing a breeding success of *C. boltonii* in these habitats. The highest number of larvae was found in small forest streams at sites 6 and 9, with 21 and 22 larvae respectively. The habitats of *C. boltonii* are small-mid lowland streams, rivers, and rarely ditches with the width range of 0,5–3,5 m and depth range of 10–100 cm; with swift current, sandy and sand-gravelled bottom partially covered with fine and grob detritus deposits. The flowing water is clear, but at the most sites brown coloured probably as a result of large iron content. Currently, the surface waters in the investigated are only under slight anthropogenic pressure, manifesting in low risk of dispersed nutrients inflows from the drainage basin and in temporary changing hydrological regime and water quality by fish ponds. Locally, the hydrological regime of some running waters is changed by beaver's dam constructions, which slow down the current. In fact, only imagines could be found at some sites downstream from the fish ponds (No. 2 and 7), suggesting that the larvae might avoid habitats localized directly beyond fish ponds. (sites No. However, with increasing distance from ponds, larvae could be observed again (sites No. 4a, 4b, 4c). Additionally, the significant hydromorphological changes occurred only locally (sites No. 3, 4a, 8 and 10) as a result of beaver's activity (several meters

above the dams). The larvae of *C. boltonii* weren't observed only the still water bodies. It indicates, that the beavers might have a negative influence only on short sections of habitats used by *C. boltonii* in this area. To conclude, the data indicate that the southern part of Lubusz Land is currently an important area for the development and protection of an intact population of *C. boltonii* in Poland." (Author)] Address: Rychła, Anna, ul. Osiedlowa 12, Ploty, 66-016 Czerwieńsk, Poland. E-mail: rychlan@op.pl

12446. Sacchi, R.; Hardersen, S. (2013): Wing length allometry in Odonata: differences between families in relation to migratory behaviour. *Zoomorphology* 132(1): 23-32. (in English) ["In insects, wing shape and body size are correlated with several aspects of behaviour, and the optimal morphology of wings is a trade-off between a number of functional demands in relation to behaviour (e.g. foraging, migration and sexual display). Dragonflies are spectacularly skilful flyers and present a range of different wing shapes, but to date, no detailed studies have been conducted in this group on wing length allometry in relation to body size. In this paper, we use published data on body length and wing length in all European and North American dragonflies to investigate differences in wing length allometries among Odonata taxa (suborders and families) and to relate these to behavioural patterns. We found different wing allometries between Zygoptera and Anisoptera, which are probably related to the flight mode and wing form of the two suborders. Among the Anisoptera, the Libellulidae showed a distinct wing length allometry from all other anisopteran families and migrants differed from non-migrant species. The first dichotomy is likely to reflect the adaptation of wing morphology of Libellulidae to sit-and-wait behaviour and to brief foraging flights (most species of this family are perchers) with respect to all other families, members of which are typically flyers. The second dichotomy reflects the trend of migrating species to have relatively longer wings than non-migrating members of the same family. Finally, wing length allometry differed among all the zygopteran families analysed, and this pattern suggested that each family evolved a particular wing morphology in response to peculiarities in behaviour, habitat and flight mode." (Authors)] Address: Hardersen, S., Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Corpo Forestale dello Stato, Strada Mantova, 29, 46045 Marmirolo (MN), Italy. E-mail: s.hardersen@gmail.com

12447. Sánchez-Guillén, R.A.; Martínez-Zamilpa, S.M.J.; Jiménez-Cortés, J.G.; Forbes, M.R.L.; Córdoba-Aguilar, A. (2013): Maintenance of polymorphic females: do parasites play a role? *Oecologia* 171(1): 105-113. (in English) ["The role of parasites in explaining maintenance of polymorphism is an unexplored research avenue. In odonates, female-limited colour polymorphism (one female morph mimicking the conspecific male and one or more gynochromatic morphs) is widespread. Here we investigated whether parasitism contributes to colour polymorphism maintenance by studying six species of female dimorphic damselflies using large databases of field-collected animals. We predicted that androchrome females (male mimics) would be more intensively parasitized than gynochrome females which is, according to previous studies, counterbalanced by the advantages of the former when evading male harassment compared to gynochrome females. Here we show that in *Ischnura denticollis* and *Enallagma no-*

vahispaniae, androchrome females suffer from a higher degree of parasitism than gynochromatic females, and contrary to prediction, than males. Thus, our study has detected a correlation between colour polymorphism and parasitic burden in odonates. This leads us to hypothesize that natural selection, via parasite pressure, can explain in part how androchrome and gynochrome female colour morphs can be maintained. Both morphs may cope with parasites in a different way: given that androchrome females are more heavily parasitized, they may pay a higher fecundity costs, in comparison to gynochrome females." (Authors)] Address: Sánchez-Guillén, Rosa, Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Ciudad, Universitaria, Apdo. Postal 70-275, México. E-mail: rguillen@uvigo.es

12448. Savard, M. (2013): Inventaire automnal des odonates au Saguenay–Lac-Saint-Jean: découverte d'une population du sympétrum tardif. *Le Naturaliste Canadien* 137(1): 25-32. (in French) [Between 18-IX and 12-X-2011, *Sympetrum vicinum* was found inhabiting the beaver ponds north of Lac Saint-Jean in the National Park Pointe-Taillon, Québec, Canada. This is the northernmost of the known distribution boundary of *S. vicinum*.] Address: Savard, M.; E-mail: michel.savard@ssss.gouv.qc.ca

12449. Sciberras, A.; Sammut, M. (2013): The occurrence of the Copper Emerald *Calopteryx haemorrhoidalis* (Vander Linden, 1825), records of rare species, changing population trends of some hitherto common species and recent colonisers in the Maltese Islands. *J. Br. Dragonfly Society* 28(1): 1-9. (in English) ["The first record of *C. haemorrhoidalis* from the Maltese Islands is reported. Historical and modern records for the Maltese Islands of the rare species, *C. virgo*, *Aeshna mixta* and *Selysiothemis nigra*, are discussed; also the changing population trends of hitherto common species such as *Orthetrum coerulescens anceps*, *Sympetrum fonscolombii* and *Sympetrum striolatum*." (Authors)] Address: Sciberras, A., 1133 'Arnest', Arcade Str, Paola, Malta. E-mail: bioislets@gmail.com

12450. Sesterhenn, T.M.; Reardon, E.E.; Chapman, L.J. (2013): Hypoxia and lost gills: respiratory ecology of a temperate larval damselfly. *Journal of Insect Physiology* 59(1): 19-25. (in English) ["Damselfly larvae, important predators and prey in many freshwater communities, may be particularly sensitive to hypoxia because their caudal lamellae (external gills) are frequently lost. In this study, we address how lost lamellae interact with low oxygen to affect respiration and behaviour of the widespread North American damselfly *Ischnura posita*. Results showed no effect of lost lamellae on resting metabolic rate or critical oxygen tension. Ventilation behaviours increased only when dissolved oxygen (DO) was at or below 25% saturation, and these behaviours were not affected by the number of lamellae. Use of the oxygen-rich surface layer occurred almost exclusively at the lowest dissolved oxygen level tested (10% saturation, 2.0 kPa). Damselflies that were missing lamellae spent more time at the surface than individuals with intact lamellae. The negative relationship between body size and time at the surface, and the negative relationship between body mass and critical oxygen tension suggest that larger *I. posita* may be more hypoxia tolerant than smaller individuals. Overall, *I. posita* was minimally affected by missing lamellae and seems well adapted to low DO habitats. Average critical oxygen

tension was very low (0.48 kPa, 2.4% saturation), suggesting that individuals can maintain their metabolic rate across a broad range of DO, and behaviours changed only at DO levels below the hypoxia tolerance thresholds of many other aquatic organisms." (Authors)] Address: Sesterhenn, T.M., Dept of Biology, Univ. of Kentucky, 101 Morgan Building, Lexington, KY 40506-0225, USA. E-mail: tsesterh@purdue.edu

12451. Siepielski, A.M.; McPeck, M.A. (2013): Niche versus neutrality in structuring the beta diversity of damselfly assemblages. *Freshwater Biology* 58(4): 758-768. (in English) ["(1.) Differences among communities in taxonomic composition – beta diversity – are frequently expected to result from taxon-specific responses to spatial variation in ecological conditions, through niche partitioning. Such process-derived patterns are in sharp contrast to arguments from neutral theory, where taxa are ecologically equivalent and beta diversity results primarily from dispersal limitation. (2.) Here, we compared beta diversity among assemblages of Zygoptera, for which previous experiments have shown that niche differences maintain genera within a community, but patterns of relative abundance for species within each genus are shaped primarily by neutral dynamics. (3.) Using null-model and ordination-based methods, we find that both genera and (in contrast to neutral theory) species assemblage composition vary across the landscape in a deterministic fashion, shaped by environmental and spatial factors. (4.) While the observed patterns in species composition conflict with theory, we suggest that this is a result of weak ecological filters acting to produce spatial variation in assemblages of ecologically similar species undergoing ecological drift within communities. Such patterns are especially likely in systems of relatively weak dispersers like damselflies." (Authors) The study includes the following taxa: *Enallagma divagans*, *E. ebrium/hageni*, *E. exulans*, *E. geminatum*, *E. minusculum*, *E. pictum*, *E. signatum*, *E. traveatum*, *E. vernale*, *E. vesperum*, *Argia*, *Ischnura*, *Lestes*, and *Nehalennia*.] Address: Siepielski, A.M., Department of Biology, University of San Diego, San Diego, CA 92110, USA. E-mail: adamsiepielski@sandiego.edu

12452. Sim, L.L.; Davis, J.A.; Strehlow, K.; McGuire, M.; Traylor, K.M.; Wild, S.; Papas, P.J.; O'Connor, J. (2013): The influence of changing hydroregime on the invertebrate communities of temporary seasonal wetlands. *Freshwater Science* 32(1): 328-342. (in English) ["Community dynamics in temporary waters are constrained by the hydroregime (depth, timing, duration, frequency, and predictability of water in an aquatic habitat), which in turn is influenced by climatic patterns and anthropogenic use of water in the landscape. Declining rainfall in regions with a Mediterranean climate, such as southwestern Australia, has decreased the depth and duration of water in temporary wetlands, potentially altering the composition of invertebrate communities. We used a long-term data set (6–25 y) to examine temporal changes in hydroregimes and aquatic invertebrate diversity (based on species presence/absence) at 9 seasonal wetlands. The study wetlands maintained distinctly seasonal hydroregimes, despite declining rainfall and the contraction of wetland hydroperiods. Distance-based redundancy analysis (dbRDA) indicated that conductivity, NO₃-+NO₂-, and turbidity were the most important factors explaining the changes in invertebrate community composition over time. Allocation of species into 4 trait-based groups based on their resilience to or

resistance of drought and their mode of recolonization of a water body upon rewetting revealed that the fauna is dominated by active dispersers. This result suggests that the proximity of source wetlands from which mobile invertebrate species and vertebrate vectors, such as waterbirds, can recolonize seasonal wetlands is an important factor influencing the invertebrate community response to rewetting. Despite the decline in water availability, we found little evidence of a shift to a more arid-adapted fauna. We suggest that the maintenance of a mosaic of wetlands of varying hydroregimes at the whole-landscape scale will be critical to the future persistence of aquatic invertebrate communities in Mediterranean regions where the frequency and intensity of droughts is predicted to increase... Group-3 taxa (colonists that do not need water for egg laying) were relatively rare. Those recorded included damselflies (Lestidae), mosquitoes (Culicidae), and dragonflies (Libellulidae)." (Authors)] Address: Davis, Jenny, Australian Centre for Biodiversity, School of Biological Sciences, Monash University, Wellington Road, Clayton, Victoria 3800, Australia. E-mail: jenny.davis@monash.edu

12453. Simaika, J.P.; Samways, M.J.; Kipping, J.; Suhling, F.; Dijkstra, K.-D.B.; Clausnitzer, V.; Boudot, J.-P.; Domisch, S. (2013): Continental-scale conservation prioritization of African dragonflies. *Biological Conservation* 157: 245-254. (in English) ["Indicators on the state of global biodiversity illustrate continued decline, while pressure on biodiversity keeps rising. This necessitates revisiting site prioritization and species protection for conservation. Patterns of richness and threat of four well-studied aquatic taxa, the fishes, crabs, molluscs and dragonflies largely coincide at the continental scale, at least in Africa. For this study, we focus on dragonflies, for which there is a point locality database, as a surrogate taxon, modelling the species at the fine-scale, using species distribution modelling. With this approach, we built a protected areas network using spatial planning software. Priority areas for dragonfly conservation largely coincided with analyses of global biodiversity hotspots. The Zambian swamps and woodlands, as well as the rainforests of the Lower Guinea and Congo Basin are emphasized as hotspots of dragonfly diversity. Among globally threatened species, 72% were recorded at least once in a protected area. Although the current reserve network covers 10.7% of the landscape, the proportional representation of species geographic distributions in reserves is only 1.2%. The reserve network is therefore inefficient concerning freshwater species, and many areas of conservation priority that are not formally protected remain. The advantage of operating at the fine scale, while covering a large geographic area is that it shifts the focus from the large-scale hotspots to smaller priority areas within and beyond hotspots. Also, by operating at the fine-scale for a large geographical area, the potential exists for local conservation managers to consider campaigning for the inclusion of the priority areas that are not formally protected, while adjacent to the existing reserve networks. Where this is not possible, we recommend monitoring these areas to detect future threats to the habitats that these might face." (Authors)] Address: Simaika, J.P., Dept of Conservation Ecology and Entomology, Stellenbosch University, P Bag X1, Matieland 7602, South Africa. E-mail: john.simaika@senckenberg.de

12454. Simon, S.; Narechania, A.; DeSalle, R.; Hadrys, H. (2013): Insect phylogenomics: Exploring the source

of incongruence using new transcriptomic data. *Genome Biol Evol.* 4(12): 1295-1309. (in English) ["The evolution of the diverse insect lineages is one of the most fascinating issues in evolutionary biology. Despite extensive research in this area, the resolution of insect phylogeny especially of inter-ordinal relationships has turned out to be still a great challenge. One of the challenges for insect systematics is the radiation of the polyneopteran lineages with several contradictory and/or unresolved relationships. Here, we provide the first transcriptomic data for three enigmatic polyneopteran orders (Dermaptera, Plecoptera and Zoraptera) to clarify on of the most debated issues among higher insect systematics. We applied different approaches to generate three data sets comprising 78 species and 1,579 clusters of orthologous genes. Using these three matrices we explored several key mechanistic problems of phylogenetic reconstruction including missing data, matrix selection, gene and taxa number/choice and the biological function of the genes. Based on the first phylogenomic approach including these three ambiguous polyneopteran orders we provide here conclusive support for monophyletic Polyneoptera, contesting the hypothesis of Zoraptera+Paraneoptera and Plecoptera+remaining Neoptera. In addition, we employ various approaches to evaluate data quality and highlight problematic nodes within the Insect Tree that still exist despite our phylogenomic approach. We further show how the support for these nodes or alternative hypotheses might depend on the taxon- and/or gene-sampling." (Authors) The analysis includes *Ischnura elegans*.] Address: Simon, Sabrina, ITZ, Ecology & Evolution, Stiftung Tierärztliche Hochschule Hannover, 30559 Hannover, Germany. E-mail: ssimon@amnh.org

12455. Smith, M.S. (2013): Another mixed damselfly pairing. *Atropos* 48: 85-86 (in English) [Mixed pairing of *Lestes barbarus* and *L. sponsa*. Winterton, Norfolk, 8 – IX-2012] Address: Smith, M.S., 15 St Edmund's Road, Lingwood, Norfolk, NR13 4LU, UK

12456. Smith, E.L.; Coté, D.; Colbo, M.H. (2013): An impoverished benthic community shows regional distinctions. *Northeastern Naturalist* 20(1): 91-102 (in English) ["Monitoring programs using benthic macroinvertebrates are well-used and expanding to areas where communities are species-poor. The sensitivity of these depauperate communities to environmental conditions, however, is not well known. In this study, impoverished benthic invertebrate communities were compared from three climatically and geologically distinct regions of Newfoundland. Differences in community structure were evident among regions at both the genus and family level. These results indicate that widely dispersing and depauperate macroinvertebrate communities can be sufficiently diverse to respond to regional variation in environmental conditions and therefore remain promising for detecting anthropogenic-induced changes... For example, species of Ephemeroptera number 35 in Newfoundland (106,000 km²) versus 160 species in Maine (91,650 km²) while Odonata number 38 species in Newfoundland and 128 species in the Canadian ..."] (Authors)] Address: Smith, Erica, Box One, Portage la Prairie, MB, Canada R1N 3P1. E-mail: SmithEricaL@gmail.com

12457. Stewart, S.S.; Vodopich, D.S. (2013): Variation in fluctuating asymmetry among nine damselfly species. *International Journal of Odonatology* 16(1): 67-77. (in English) ["Fluctuating asymmetry (FA), measured as

random deviations from bilateral symmetry, likely results from developmental disturbances by internal or environmental stresses. However, comparisons of FA in single damselfly species (Odonata: suborder Zygoptera) from stressed environments have often been inconclusive. We measured levels of FA among multiple species of damselflies from the same environment to determine the relative roles of environmental stress and species-specific developmental instability. Damselflies of nine species (*Argia sedulum*, *A. nahuana*, *A. immundum*, *Ischnura ramburii*, *I. hastata*, *I. posita*, *Enallagma civile*, *E. basidens*, *Telebasis salva*) were collected from a central Texas wetland. Calculations of their FA were based on cell counts of four clearly defined areas (venation patterns) in fore and hind wings. Significant FA of venation occurred in both sexes, both wing positions, and in each of four venation patterns of all nine species. Levels of FA were not significantly different between sexes or between wing positions for any of the nine species. However, FA varied significantly among the four venation patterns. Patterns with lowest mean cell counts had significantly higher FA than the other patterns, despite scaling to remove size bias. More broadly, a three-fold difference in overall FA occurred among the nine species and was not correlated with species mean weight or abdomen length. The wide range of FA levels among multiple species in the same environment calls for caution in designing studies that select a single species expected to be sensitive to environmental stress. Future research must examine the relative roles of species-specific predispositions for FA from internal genetic stresses as well as external stressors." (Authors)] Address: Stewart, Sherry, Department of Biology, Baylor University, Waco, TX, 76798-7388, USA

12458. Suhling, I.; Suhling, F. (2013): Thermal adaptation affects interactions between a range-expanding and a native odonate species. *Freshwater Biology* 58(4): 705-714. (in English) ["(1.) Increasing temperature and invading species may interact in their effects on communities. In this study, we investigated how rising temperatures alter larval interactions between a naturally range-expanding dragonfly, *Crocothemis erythraea*, and a native northern European species, *Leucorrhinia dubia*. Initial studies revealed that *C. erythraea* grow up to 3.5 times faster than *L. dubia* at temperatures above 16 C. As a result, we hypothesised that divergent temperature responses would lead to rapid size differences between coexisting larvae and, consequently, to asymmetric intraguild predation at higher ambient temperatures. (2.) Mortality and growth rates were measured in interaction treatments (with both species present) and non-interaction controls (one species present) at four different temperature regimes: at an ambient temperature representative of central Germany, where both species overlap in distribution, and at temperatures increased by 2, 4 and 6 C. (3.) The mortality of *C. erythraea* did not differ between treatment and control. In contrast, mortality of *L. dubia* remained similar over all temperatures in the controls, but increased with temperature in the presence of the other species and was significantly higher there than in the controls. We concluded that *L. dubia* suffered asymmetric intraguild predation, particularly at increased temperature. Reduced growth rate of *L. dubia* in the interaction treatment at higher temperatures also suggested asymmetric competition for prey in the first phase of the experiment. (4.) The results imply that the range expansion of *C. erythraea* may cause reduction in population size of

syntopic *L. dubia* when temperature rises by more than 2°C. The consequences for future range patterns, as well as other factors that may influence the interaction in nature, are discussed." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

12459. Sundermann, A.; Gerhardt, M.; Kappes, H.; Haase, P. (2013): Stressor prioritisation in riverine ecosystems: Which environmental factors shape benthic invertebrate assemblage metrics? *Ecological Indicators* 27: 83-96. (in English) ["Aquatic ecosystems are amongst the most heavily altered ecosystems and exhibit a disproportional loss of biodiversity. Numerous stressors, such as nutrient enrichment, contaminant pollution, sedimentation and alterations in stream hydrology and habitat structure, account for these losses. Understanding these forces is of utmost importance to prevent riverine ecosystems from further deterioration and to provide helpful insights for restoration practices. In the present study, we analyse the response of biological indicators to a large number of environmental factors. For this, benthic invertebrate assemblages (including Odonata at the order level) from 83 sites in Germany were described based on 25 metrics from four different metric types. The condition of the sites was described using 27 environmental factors: 13 for water quality, 4 for land use in the catchment and 10 for local scale habitat structure. The relative importance of single environmental predictors or predictor combinations for benthic invertebrate assemblages was analysed with single and multiple linear regression models. The results for the latter models were statistically supported via a bootstrap approach. The models revealed the importance of water quality and catchment-scale land use in explaining benthic invertebrate assemblages; in particular, chloride, oxygen, total organic carbon and the amounts of artificial surfaces and arable land were the most important predictors. Models including solely structural variables such as plan form, bank structures and substrate diversity had lower goodness of fit values than those for other variables. Regarding the four different assemblage metric types, functional metrics had on average lower goodness of fit values than composition/abundance, richness/diversity and sensitivity/tolerance metrics. Among the richness/diversity metrics, however, the model results for the Shannon–Wiener and Simpson diversity indices and evenness were poor. Our results show that catchment-related factors and water quality were of overriding importance in shaping biodiversity patterns and causing species loss. In contrast, structural degradation at a local scale was not the most significant stressor. This finding might explain why structural restoration at a reach scale often yields a low benefit–cost ratio and may be considered to represent inappropriate investment prioritisation." (Authors)] Address: Sundermann, Andrea, Senckenberg Research Institute and Natural History Museum Frankfurt, Department of River Ecology and Conservation, Clameystr. 12, 63571 Gelnhausen, Germany. E-mail: Andrea.Sundermann@senckenberg.de

12460. Takahara, T.; Doi, H.; Kohmatsu, Y.; Yamaoka, R. (2013): Different chemical cues originating from a shared predator induce common defense responses in two prey species. *Animal Cognition* 16(1): 147-153. (in English) ["In freshwater ecosystems, inducible defenses that involve behavioural or morphological changes in

response to chemical cue detection are key phenomena in prey–predator interactions. Many species with different phylogenetic and ecological traits (e.g., general activity patterns and microhabitats) use chemical cues to avoid predators. We hypothesized that prey species with a shared predator, but having different ecological traits, would be adapted to detect different chemical cues from the predator. However, the proximate mechanisms by which prey use chemical cues to avoid predation remain little known. Here, we tested our hypothesis by using fractionated chemical components from predatory dragonfly nymphs (*Anax parthenope julius*) to trigger anti-predator behavioural responses in two anuran tadpoles, the wrinkled frog *Glandirana* (*Rana*) *rugosa* and the Japanese tree frog *Hyla japonica*. *Glandiranarugosa* detected chemical cues that had either high or low hydrophobic properties, but *H. japonica* responded only to chemical cues with hydrophilic properties. During the normal behaviours of these tadpole species, *G. rugosa* remains immobile in benthic habitats, whereas *H. japonica* exhibits active swimming at the surface or in the middle of the water column. As we had hypothesized, these tadpole species, which have different general activity levels and microhabitats, detected different chemical cues that were exuded by their shared predator and responded by changing their activities to avoid predation. The specific chemical cues detected by each tadpole species are likely to have characteristics that optimize effective predator detection and encounter avoidance of the shared dragonfly predator." (Authors)] Address: Takahara, T., Graduate School of Science and Technology, Kyoto Institute of Technology, Sakyo-ku, Kyoto, 606-8585, Japan. E-mail: takahara@hiroshima-u.ac.jp

12461. Takahashi, Y.; Watanabe, M. (2013): Time constraints related to sexual maturation and prolonged copulation in the female-dimorphic damselfly *Ischnura senegalensis*. *Entomological Science* 16(1): 34-39. (in English) ["Time constraints are critical for reproductive success. To understand the spatiotemporal dynamics of morph frequency in the female-dimorphic damselfly *Ischnura senegalensis*, we compared two different morphs for two important time constraints on female reproductive output, i.e. post-emergence sexual maturation and prolonged copulation. The females of both morphs achieved sexual maturation 4–5 days after emergence, suggesting that the rate of sexual maturation does not result in morph-specific fitness. The copulation durations declined with the time of onset of copulation in both morphs. Consequently, all copulations terminated at approximately 12:00 hours. Because females show foraging and oviposition activity only after copulation, the copulation duration does not result in morph-specific time constraints. These two important time constraints do not account for morph-specific reproductive success and do not affect the evolutionary equilibrium of morph frequency in *I. senegalensis*." (Author)] Address: Takahashi, Y., Graduate School of Life Sciences, Tohoku University, 6-3, Aoba, Aramaki, Aoba, Sendai, Miyagi 980-8578, Japan. Email: takahashi.yum@gmail.com

12462. Talmale, S.S.; Tiple, A.D. (2013): New records of damselfly *Lestes thoracicus* Laidlaw, 1920 (Odonata: Zygoptera: Lestidae) from Maharashtra and Madhya Pradesh states, central India. *Journal of Threatened Taxa* 5(1): 3552-3555. (in English) ["05.xii.2010, two males and one female from Sukad River, Singhori Wildlife Sanctuary, District Raisen, Madhya Pradesh (23°14.68'N &

78°11.01'E) (ZSI,CZRC A/16755); 09.xii.2010, one male and one female from Bhagdehi, Singhori Wildlife Sanctuary, District Raisen, Madhya Pradesh (23°06.59'N & 78°15.22'E) (ZSI,CZRC A/16756); 20.vii.2011, one male from Danital Lake, Rani Durgavati Wildlife Sanctuary, District Damoh, Madhya Pradesh (23°32.86'N & 79°43.70'E) (ZSI,CZRC, A/16757); 03.vii.2010, one male and one female were collected from Futala Lake Nagpur, Maharashtra (20°9'N & 79°9'E) (ZSI, CZRC, A/16987)." (Authors)] Address: Talmale, S.S., Zoological Survey of India, Central Zone Regional Centre, Jabalpur, Madhya Pradesh 482002, India. E-mail: stalmale@yahoo.co.in

12463. Taylor, P. (2013): A change in status of the Willow Emerald Damselfly *Lestes viridis* (Vander Linden) in the United Kingdom. *J. Br. Dragonfly Society* 29(1): 65-68 (in English) ["The revised list of Odonata in the United Kingdom produced by Taylor et al. (2009) contained 42 species in Category A, a further 12 species in Category B and three species in Category C (former breeding species not recorded since 1970). This list was subsequently revised again (Taylor & Smallshire, 2010) following the discovery of *Coenagrion scitulum* in Kent during June and July 2010 - this discovery necessitating a move for the species from Category C to Category B (vagrant species). The sustained colonisation of *Lestes viridis* since 2009 now requires this species be moved from Category B to Category A (resident and/or migrant species recorded since 1970)." (Author)] Address: Taylor, Pam, Decoy Farm, Decoy Rd, Potter Heigham, Norfolk, NR29 5LX, UK

12464. Theischinger, G.; Tang, C. (2013): Diagnostic characters of the larvae of *Austropetalia* Tillyard (Anisoptera Austropetaliidae), including some mainly pictorial history. *Agrion* 17(1): 4-7. (in English) ["The two Australian species of *Austropetaliidae*, *Austropetalia patricia* (Waterfall Redspot) and *Austropetalia tonyana* (Alpine Redspot), were hitherto generally identified by their geographic distribution. Recently planned listing as VULNERABLE species necessitated a closer look at the larvae. As a result, it became possible to identify the available larval material of the two species on the basis of size and direction of the lateral abdominal lobes on segments 5-8 and to present diagnostic photos in the present article (Figs 1-10)." (Authors)] Address: Tang, Cheryl, Water Science, Office of Environment & Heritage, Department of Premier & Cabinet, PO Box 29, Lidcombe NSW 1825, Australia

12465. Theischinger, G.; Richards, S.J. (2013): *Palaeosynthemis elegans* spec. nov., a new dragonfly from Papua New Guinea (Anisoptera: Synthemistidae). *Odonatologica* 42(1): 63-66. (in English) ["The new species is described from the upper Sepik Basin in northern Papua New Guinea. Holotype ♂: PNG, West Sepic prov., Temporary Camp in upper Sepic Basin, alt. 290 m asl, during Feb. 2010; deposited in Mus. & Art Gallery, Darwin, Australia. Characters of the adult male are illustrated and the affinities of the new species are discussed." (Authors)] Address: Theischinger, G., NSW Dept of Premier & Cabinet, Office of Environment & Heritage, PO Box 29, Lidcombe, NSW 1825, Australia. E-mail: gunther.theischinger@environment.nsw.gov.au

12466. Thomas, J.A.; Trueman, J.W.H.; Rambaut A.; Welch, J.J. (2013): Relaxed phylogenetics and the palaeoptera problem: Resolving deep ancestral splits in the insect phylogeny. *Systematic Biology* 62(2): 285 - 297. (in English) ["The order in which the three groups

of winged insects (the Pterygota) diverged from their common ancestor has important implications for understanding the origin of insect flight. But despite this importance, the split between the Odonata (dragonflies and damselflies), Ephemeroptera (mayflies) and Neoptera (the other winged orders) remains very much unresolved. Indeed, previous studies have obtained strong apparent support for each of the three possible branching patterns. Here, we present a systematic reinvestigation of the basal pterygote split. Our results suggest that outgroup choice and limited taxon sampling have been major sources of systematic error, even for datasets with a large number of characters (e.g., in phylogenomic datasets). In particular, a dataset of 113 taxa provides consistent support for the Palaeoptera hypothesis (the grouping of Odonata with Ephemeroptera), while results from datasets with fewer taxa give inconsistent results, and are highly sensitive to minor changes in data and methods. We also focus on recent methods that exploit temporal information using fossil calibrations, combined with additional assumptions about the evolutionary process, and so reduce the influence of outgroup choice. These methods are shown to provide more consistent results, for example, supporting Palaeoptera, even for datasets that previously supported other hypotheses. Together, these results have implications for understanding insect origins and for resolving other problematic splits in the tree of life." (Authors)] Address: Thomas, Jessica, Dept of Biology, Univ. of York, York, YO10 5DD, UK. E-mail: jessicaathomas@gmail.com

12467. Tiitsaar, A.; Kaasik, A.; Teder, T. (2013): The effects of seasonally variable dragonfly predation on butterfly assemblages. *Ecology* 94(1): 200-207. (in English) ["Where predation is seasonally variable, the potential impact of a predator on individual prey species will critically depend on phenological synchrony of the predator with the prey. Here we explored the effects of seasonally variable predation in multispecies assemblages of short-lived prey. The study was conducted in a landscape in which we had previously demonstrated generally high, but spatially and seasonally variable dragonfly-induced mortality in adult butterflies. In this system, we show that patterns of patch occupancy in butterfly species flying during periods of peak dragonfly (in >90% *Orthetrum cancellatum*) abundance are more strongly associated with spatial variation in dragonfly abundance than patch occupancy of species flying when dragonfly density was low. We provide evidence indicating that this differential sensitivity of different butterfly species to between-habitat differences in dragonfly abundance is causally tied to seasonal variation in the intensity of dragonfly predation. The effect of dragonfly predation could also be measured at the level of whole local butterfly assemblages. With dragonfly density increasing, butterfly species richness decreased, and butterfly species composition tended to show a shift towards a greater proportion of species flying during periods of off-peak dragonfly abundance." (Authors)] Address: Tiitsaar, A., Dept of Zoology, Institute of Ecology and Earth Sciences, University of Tartu, Vanemuise 46, 51014 Tartu, Estonia. E-mail: anu.tiitsaar@ut.ee

12468. Tiple, A.; Chandra, K. (2013): Dragonflies and damselflies (Insecta, Odonata) of Madhya Pradesh and Chhattisgarh states, Central India. *Journal Care4Nature* 1(1): 3-11. (in English) [106 Odonata species from Madhya Pradesh and Chhattisgarh are listed and briefly discussed.] Address: Tiple, A., Forest Entomology Divi-

sion, Tropical Forest Research Institute, Jabalpur-482021, Madhya Pradesh, India. E-mail: ashishdtiple@yahoo.co.in

12469. Touchon, J.C.; McCoy, M.W.; Vonesh, J.R.; Warkentin, K.M. (2013): Effects of plastic hatching timing carry over through metamorphosis in red-eyed treefrogs. *Ecology* 94: 850-860. (in English) ["Environmentally cued plasticity in hatching timing is widespread in animals. As with later life-history switch points, plasticity in hatching timing may have carryover effects that affect subsequent interactions with predators and competitors. Moreover, the strength of such effects of hatching plasticity may be context dependent. We used red-eyed treefrogs, *Agalychnis callidryas*, to test for lasting effects of hatching timing (four or six days post-oviposition) under factorial combinations of resource levels (high or low) and predation risk (none, caged, or lethal *Pantala flavescens* dragonfly naiads). Tadpoles were raised in 400-L mesocosms in Gamboa, Panama, from hatching until all animals had metamorphosed or died, allowing assessment of effects across a nearly six-month period of metamorphosis. Hatching early reduced survival to metamorphosis, increased larval growth, and had context-dependent effects on metamorph phenotypes. Early during the period of metamorph emergence, early-hatched animals were larger than late-hatched ones, but this effect attenuated over time. Early-hatched animals also left the water with relatively longer tails. Lethal predators dramatically reduced survival to metamorphosis, with most mortality occurring early in the larval period. Predator effects on the timing of metamorphosis and metamorph size and tail length depended upon resources. For example, lethal predators reduced larval periods, and this effect was stronger with low resources. Predators affected metamorph size early in the period of metamorphosis, whereas resource levels were a stronger determinant of phenotype for animals that metamorphosed later. Effects of hatching timing were detectable on top of strong effects of larval predators and resources, across two subsequent life stages, and some were as strong as or stronger than effects of resources. Plasticity in hatching timing is ecologically important and currently underappreciated. Effects on metamorph numbers and phenotypes may impact subsequent interactions with predators, competitors, and mates, with potentially cascading effects on recruitment and fitness." (Authors)] Address: Touchon, J.C., Smithsonian Tropical Research Institute, Apartado Postal 0843-03092, Balboa, República de Panamá. E-mail: TouchonJC@si.edu

12470. Tweedy, B.; Drenner, R.W.; Murray Chumchal, M.; Kennedy, J.H. (2013): Effects of fish on emergent insect-mediated flux of methyl mercury across a gradient of contamination. *Environ. Sci. Technol.* 47: 1614-1619. (in English) [Texas, USA; "We examined the effects of fish predation on emergent insect-mediated methyl mercury (MeHg) flux across a gradient of MeHg contamination in experimental ponds. Emergent insects were collected from ponds with (n=5) and without fish (n=5) over a six-week period using floating emergence traps. We found that the potential for MeHg flux increased with Hg contamination levels of the ponds, but that the realized MeHg flux of individual insect taxa was determined by fish presence. Fish acted as size-selective predators and reduced MeHg flux by suppressing emergence of large insect taxa (Odonata) but not small insect taxa (chironomids and micro-caddis-

flies). MeHg flux by small insect taxa was correlated with concentrations of MeHg in terrestrial spiders along the shorelines of the study ponds, demonstrating for the first time the cross-system transport of MeHg by emergent insects to a terrestrial spider." (Authors)] Address: Tweedy, B., Dept of Biology, Texas Christian University, Winton Scott Room 401, 2800 South University Drive, Fort Worth, Texas 76129, USA

12471. van Strien, A.J.; Termaat, T.; Kalkman, V.; Prins, M.; De Knijf, G.; Gourmand, A.-L.; Xavier Houard, X.; Nelson, B.; Plate, C.; Prentice, S.; Regan, E.; Smallshire, D.; Vanappelghem, C.; Vanreusel, W. (2013): Occupancy modelling as a new approach to assess supranational trends using opportunistic data: a pilot study for the damselfly *Calopteryx splendens*. *Biodivers. Conserv.* 22(3): 673-686. (in English) ["There is limited information available on changes in biodiversity at the European scale, because there is a lack of data from standardised monitoring for most species groups. However, a great number of observations made without a standardised field protocol is available in many countries for many species. Such opportunistic data offer an alternative source of information, but unfortunately such data suffer from non-standardised observation effort and geographical bias. Here we describe a new approach to compiling supranational trends using opportunistic data which adjusts for these two major imperfections. The non-standardised observation effort is dealt with by occupancy modelling, and the unequal geographical distribution of sites by a weighting procedure. *C. splendens* was chosen as our test species. The data were collected from five countries (Ireland, Great Britain, the Netherlands, Belgium and France), covering the period 1990–2008. We used occupancy models to estimate the annual number of occupied 1 x 1 km sites per country. Occupancy models use presence-absence data, account for imperfect detection of species, and thereby correct for between-year variability in observation effort. The occupancy models were run per country in a Bayesian mode of inference using JAGS. The occupancy estimates per country were then aggregated to assess the supranational trend in the number of occupied 1 x 1 km². To adjust for the unequal geographical distribution of surveyed sites, we weighted the countries according to the number of sites surveyed and the range of the species per country. The distribution of *C. splendens* has increased significantly in the combined five countries. Our trial demonstrated that a supranational trend in distribution can be derived from opportunistic data, while adjusting for observation effort and geographical bias. This opens new perspectives for international monitoring of biodiversity." (Authors)] Address: van Strien, A.J., Statistics Netherlands, P.O. Box 24500, 2490 HA The Hague, The Netherlands. E-mail: asin@cbs.nl

12472. van Swaay, C.; Veling, K.; Termaat, T.; Huskens, K.; Plate, C. (2013): Vlinders en libellen geteld. Jaarverslag 2012. Rapport VS2013.003, De Vlinderstichting, Wageningen: 37 pp. (in Dutch, with English summary) ["The number of dragonfly transects has stabilized around 330 sites. About 40% of these transects are counted for one target species only. In 2012, 21 transects had more than 20 species. The most speciose transects had 27 species (2 transects, both in eastern Overijssel). The number of counted dragonflies per transect was below the long-term average, but a little higher than the previous two years. Like previous years, *Coenagrion*

puella was the most abundant species, *Ischnura elegans* was the most widespread species. Population indices are presented for most species in chapter 8. 22 species show a significant increase, 6 species are stable and 18 others are declining. For the first time significant trends are presented for three very rare species: *Coenagrion armatum*, *Leucorrhinia albifrons* and *L. caudalis* (all declining). *L. albifrons* was not observed in 2012. The coming field season will indicate if this species still exists in the Netherlands or not." (Authors)] Address: De Vlinderstichting, Mennonietenweg 10, Postbus 506, 6700 AM Wageningen, The Netherlands

12473. Vargas Salgado, L.G.; Carvalho, A.; Pinto A.P. (2013): Larval taxonomy of *Macrothemis* Hagen, 1868 (Odonata: Libellulidae), with descriptions of four larvae and a key to the fourteen known species. *Zootaxa* 3599 (3): 229-245. (in English) ["The ultimate larval stadia of *Macrothemis declivata*, *M. hemichlora*, *M. imitans imitans* and *M. tenuis* are described and illustrated for the first time, based on material from Brazil. Six of the most used keys to larvae of libellulid genera of the New World are evaluated with respect to the correct identification of the 27 known larvae of *Macrothemis*, *Brechmorhoga*, *Gynothemis* and *Scapanea*. *Macrothemis* species were wrongly identified in more than 50% of the trials, being keyed as *Brechmorhoga*, *Gynothemis* and even *Dythemis*. The genus *Macrothemis* and its relatives need to be reevaluated and adequately diagnosed based on larvae. A key to the 14 known larvae of species currently included in *Macrothemis* is presented." (Authors)] Address: Pinto A.P., Depto de Entomologia, Museu Nacional, Univ. Federal do Rio de Janeiro (UFRJ); Caixa Postal 68044, 21944-970, Cidade Universitária, Rio de Janeiro, RJ, Brazil. E-mail: odonata-angelo@hotmail.com

12474. Villanueva, R.J.T.; Cahilog, H. (2013): Small Odonata collection from Talaingod, Davao del Norte, Mindanao Island, Philippines. *International Dragonfly Fund - Report 59*: 1-26. (in English) ["Odonata survey was conducted in Talaingod, Davao del Norte, Mindanao Island. Four major sites were explored in Barangay Santo Niño from December 26 - 30, 2012. Thirty five species under eleven families including one new species were found re-presenting the first odonatological record in the province of Davao del Norte. Three species need further study while *Orthetrum glaucum* represents a new record for the island of Mindanao. *Coeliccia exoleta* population, a vulnerable species in the IUCN Red List of Threatened Species, was found." (Authors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

12475. Villanueva, R.J.T.; Medina, M.N.D.; Jumawan, K.M. (2013): *Pericnemis melansoni* sp. nov., a new damselfly (Odonata: Coenagrionidae) from Compostela Valley Province, Mindanao Island, Philippines. *Journal of Threatened Taxa* 5(7): 4110-4112. (in English) ["During a short biodiversity survey in Cabalian Creek, Nabunturan, Compostela Valley Province conducted by the second and third authors, specimens of *Pericnemis* were collected. Voucher specimens were given to the first author who confirmed they represented a species new to science. Due to the urgency of establishing the known habitat of the present species as a protected area, it is described here in advance of a complete treatment of the Philippine *Pericnemis*. Holotype: Male, ACN-2012-hol-1, 22.xi.2012, Cabalian Creek, Nabunturan, Com-

postela Valley Province, Mindanao Island, Philippines, K. Jumawan leg." (Authors)] Address: Villanueva, R., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

12476. Wang, C.; Zhou, H.; Zhang, Z.; Zhao, Y.; Cong, D.; Menga, C.; Zhang, P.; Ren, L.b (2013): Mechanical property of a low carbon steel with biomimetic units in different shapes. *Optics & Laser Technology* 47: 114-120. (in English) ["Inspired by the superior biomechanical properties of some biological compositions, an attempt to improve the mechanical property of low carbon steel with biomimetic units was made by using a laser remelting process. Three kinds of shapes including 'striation', 'spot' and 'gridding', were chosen for forming the biomimetic units. Microstructure and microhardness examinations demonstrated that desirable microstructural changes and regular hardness distribution were acquired in the units. The results of tensile tests indicated that the biomimetic specimens had an improvement in the strength and ductility simultaneously. The beneficial influence of laser processed biomimetic units on tensile behaviour can be attributed to the combined effects of the microstructural characteristics within the unit zone and the stress redistribution derived from the efficient stress transfer. By investigating the variation of plastic deformation in different regions of the specimens, the effect of unit shapes on tensile property was also compared and discussed. Highlights: *Low carbon steel with biomimetic units in different shapes was processed by laser. *Good combination of strength and ductility was obtained in biomimetic samples. *Mechanical property improvement was analyzed on basis of microstructural changes and stress transfer. *Effect of unit shapes on tensile property was compared and discussed.... Typical structural shapes of constriction units in biological compositions: (a) striation-shaped units in the tree leaf; (b) spot-shaped units in the elytrum of ground beetle; (c) gridding-shaped units in the dragonfly wing; (d) gridding-shaped units in the scale of butterfly wing." (Authors)] Address: Wang, C., The Key Lab of Automobile Materials, The Ministry of Education, Jilin University, No. 5988 Renmin Street, Changchun, Jilin 130025, PR China

12477. Wang, Y.; Engel, M.S.; Rafael, J.A.; Dang, K.; Wu, H.; Wang, Y.; Xie, Q.; Bu, W. (2013): A unique box in 28S rRNA is shared by the enigmatic insect order Zoraptera and Dictyoptera.. *PLoS ONE* 8(1): e53679. doi:10.1371/journal.pone.0053679: 13 pp. (in English) ["The position of the Zoraptera remains one of the most challenging and uncertain concerns in ordinal-level phylogenies of the insects. Zoraptera have been viewed as having a close relationship with five different groups of Polyneoptera, or as being allied to the Paraneoptera or even Holometabola. Although rDNAs have been widely used in phylogenetic studies of insects, the application of the complete 28S rDNA are still scattered in only a few orders. In this study, a secondary structure model of the complete 28S rRNAs of insects was reconstructed based on all orders of Insecta. It was found that one length-variable region, D3-4, is particularly distinctive. The length and/or sequence of D3-4 is conservative within each order of Polyneoptera, but it can be divided into two types between the different orders of the supercohort, of which the enigmatic order Zoraptera and Dictyoptera share one type, while the remaining orders of Polyneoptera share the other. Additionally, independent evidence from phylogenetic results support

the clade (Zoraptera+Dictyoptera) as well. Thus, the similarity of D3-4 between Zoraptera and Dictyoptera can serve as potentially valuable autapomorphy or synapomorphy in phylogeny reconstruction. The clades of (Plecoptera+Dermaptera) and ((Grylloblattodea+Mantophasmatodea)+(Embiodea+Phasmatodea)) were also recovered in the phylogenetic study. In addition, considering the other studies based on rDNAs, this study reached the highest congruence with previous phylogenetic studies of Holometabola based on nuclear protein coding genes or morphology characters. Future comparative studies of secondary structures across deep divergences and additional taxa are likely to reveal conserved patterns, structures and motifs that can provide support for major phylogenetic lineages." (Authors)] Address: Xie, Q., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, China. E-mail: qiangxie@nankai.edu.cn (QX)

12478. Watanabe, K.; Yamazaki, S.; Shoji, K.; Nagashima, Y.; Sato, K. (2013): Dragonfly fauna in Dainohara Forest Park. *Bulletin of Sendai Science Museum* 22: 82-83. (in Japanese) [17 species of dragonflies found in the Dainohara forest park (Miyagi Prefecture, Japan) from 2011 to 2012 are listed together with collection data.] Address: not transliterated

12479. Wellenreuther, M.; Sánchez-Guillén, R.A.; Cordero-Rivera, A.; Svensson, E.I.; Hansson, B. (2013): Male-biased recombination in odonates: insights from a linkage map of the damselfly *Ischnura elegans*. *Journal of Genetics* 92(1): 5 pp. (in English) ["Results: The two-point analyses detected that 13 of the 19 markers were linked to at least one other in our *I. elegans* mapping data set. These markers built up four linkage groups with two to five markers (figure 1). No markers were linked to more than one linkage group, and thus no conflicting assignments occurred. The parsimonious sex-average autosomal linkage map spanned 211.5 cM. A moderate degree of heterochiasmy was found, with a female map of 179.2 cM and a male map of 331.7 cM (paired t-test on log₁₀ map distances at the four linkage groups: $t = 3.295$, $df = 3$, $P = 0.046$). The female-to-male map ratio was 0.54, i.e. -0.27 on a log₁₀-scale. To compare the pattern of recombination in insects, we compiled data of sex-specific recombination, either from linkage mapping studies or recombination nodule counts, for 30 insect species (including *I. elegans*) (figure 2; details and references are given in table 2 in electronic supplementary material). Comparison of recombination rates within the class of Insecta showed that most species have higher recombination in females, contrasting the pattern found for *I. elegans*, and that achiasmatic recombination is widespread across multiple orders." (Authors)] Address: Wellenreuther, Maren, Section for Animal Ecology, Ecology Building, Lund University, Sölvegatan 37, SE-223 62 Lund, Sweden. E-mail: maren.wellenreuther@zoekol.lu.se

12480. Wheat, C.W.; Wahlberg, N. (2013): Explosion, the colonization of land and the evolution of flight in arthropoda. *Systematic Biology* 62(1): 93-109. (in English) ["The timing of the origin of arthropods in relation to the Cambrian explosion is still controversial, as are the timing of other arthropod macroevolutionary events such as the colonization of land and the evolution of flight. Here we assess the power of a phylogenomic approach to shed light on these major events in the evolutionary history of life on earth. Analyzing a large phylogenomic dataset (122 taxa, 62 genes) with a

Bayesian-relaxed molecular clock, we simultaneously reconstructed the phylogenetic relationships and the absolute times of divergences among the arthropods. Simulations were used to test whether our analysis could distinguish between alternative Cambrian explosion scenarios with increasing levels of autocorrelated rate variation. Our analyses support previous phylogenomic hypotheses and simulations indicate a Precambrian origin of the arthropods. Our results provide insights into the 3 independent colonizations of land by arthropods and suggest that evolution of insect wings happened much earlier than the fossil record indicates, with flight evolving during a period of increasing oxygen levels and impressively large forests. These and other findings provide a foundation for macroevolutionary and comparative genomic study of Arthropoda." (Authors) The paper includes references to dragonflies.] Address: Wheat, C.W., Dept of Biosciences, PL 65, Viikinkaari 1, 00014 University of Helsinki, Finland. E-mail: chris@christopherwheat.net

12481. Wildermuth, H. (2013): Libellengewässer, die kommen und gehen. Mskr. 8 pp. (in German, with English summary) ["Rise and fall of small dragonfly ponds (Odonata): The dragonfly fauna of two freshly created shallow ponds in open meadows country in the Swiss Plateau was monitored during summer 2012. Altogether 24 and 28 species were recorded, respectively, 17 and 15 of them certainly or most probably indigenous. The water bodies proved to be suitable for pioneer and regionally rare species such as *Ischnura pumilio*, *Orthetrum albistylum*, *O. brunneum*, *Sympetrum depressiusculum* und *S. fonscolombii*. The importance of shallow ponds as breeding habitats for dragonflies, the problems of rapid overgrowth and the possible maintenance measures for conservation of an optimal succession state are discussed." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

12482. Wildermuth, H. (2013): Die Libelle auf der Wäscheleine. *Mercuriale* 12(2012): 53-56. (in German, with English summary) ["An adult female *Sympetrum vulgatum* was observed in a garden using a washing line as perch from where it started irregularly to feeding flights for nearly seven hours during a warm and sunny day. The body was mostly held horizontally and probably cooled by a slight wind. Obelisk posture was only adopted at windless moments. On the same day at the same locality only a few metres apart a female *S. fonscolombii* used the tip of a slender inflorescence of *Lythrum salicaria* as starting point for hunting flights. The results are discussed relating to the percher mode for feeding and thermoregulation in *Sympetrum* spp." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

12483. Willet, J. (2013): Species Review 7: The Azure Hawker *Aeshna caerulea* (Ström). *J. Br. Dragonfly Society* 29(1): 1-19 (in English) ["In the British Isles *A. caerulea* is restricted to Scotland, where it is classified as Vulnerable and appears to be undergoing a decline, although it remains under-recorded. The characteristics of the larva and adult are described and its habitat, behaviour and distribution are discussed." (Author)] Address: Willet, J., 7 Muirden Rd, Maryburgh, IV7 8EJ, UK

12484. Winterbourn, M.J.; Pohe, S.R. (2013): Life histories of four dragonfly species (Odonata: Anisoptera) in northern New Zealand. *New Zealand Entomologist*

36(1): 8-14. (in English) ["Life histories of four dragonfly species were investigated in the littoral zone of Lake Heather, a shallow sand dune lake near Kaitiaki in the far north of New Zealand. All four species are self-introduced to New Zealand. Collections of larvae made in seven months from February 2011 to February 2012 were used to infer larval development. *Aeshna brevistyla*, the most abundant species, was semivoltine, *Tramea loewii* and *Hemicordulia australiae* were univoltine and, although difficult to interpret, our data suggest *Diplacodes bipunctata* was bivoltine with autumn and winter-spring generations. Adults of all four species were seen in December and February, *T. loewii* was also on the wing in late March, *A. brevistyla* in October and *D. bipunctata* in November." (Authors)] Address: Winterbourn, M.J., School of Biological Sciences, University of Canterbury, Private Bag 4800, Christchurch 8140, New Zealand. E-mail: michael.winterbourn@canterbury.ac.nz

12485. Wong-Muñoz, J.; Anderson, C.N.; Munguía-Steyer, R.; Córdoba-Aguilar, A. (2013): Body size and morph as drivers of copulation duration in a male dimorphic damselfly. *Ethology* 119(5): 407-416. (in English) ["Copulation duration is often highly variable within and among species. Here, we explore the roles of body size, male morph, morph frequency, and alternative reproductive tactics to explain copulation duration in the damselfly *Paraphlebia zoe*. *P. zoe* has two male morphs (pigmented or hyaline wings) which differ in reproductive tactics (territorial or non-territorial behaviours). We also analyze the effects of season as the frequencies of both morphs tend to vary along the reproductive season. In the first non-experimental year, we found that the relationship between body size and copulation duration depended on the time of year. Early in the season, body size positively correlated with copulation duration, while late in the year, body size negatively correlated with copulation duration. In the second experimental year (when we reversed the frequency of male morphs in the middle of the season: making pigmented males less frequent than hyaline males), size influenced copulation duration as well as morph – body size positively correlated with copulation duration, and hyaline males mated for longer than pigmented males. Contrary to our prediction, changes to the relative abundances of morphs did not influence copulation duration. Hyaline males may be under selection for longer copulation durations to compensate for their reduced access to females, as long copulations potentially lead to more rival sperm to be removed from the female sperm storage organs and/or increased mate guarding. We do not discard, however, other explanations that drive variation in copulation duration such as cryptic female choice and/or predation." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México D.F., México. E-mail: acordoba@ecologia.unam.mx

12486. Yang, J.; Gonzalez-Bellido, P.T.; Peng, H. (2013): A distance-field based automatic neuron tracing method. *BMC Bioinformatics* 2013, 14:93 (in English) ["Background: Automatic 3D digital reconstruction (tracing) of neurons embedded in noisy microscopic images is challenging, especially when the cell morphology is complex. Results: We have developed a novel approach, named DF-Tracing, to tackle this challenge. This method first extracts the neurite signal (foreground) from a noisy image by using anisotropic filtering and automat-

ed thresholding. Then, DF-Tracing executes a coupled distance-field (DF) algorithm on the extracted foreground neurite signal and reconstructs the neuron morphology automatically. Two distance-transform based "force" fields are used: one for "pressure", which is the distance transform field of foreground pixels (voxels) to the background, and another for "thrust", which is the distance transform field of the foreground pixels to an automatically determined seed point. The coupling of these two force fields can "push" a "rolling ball" quickly along the skeleton of a neuron, reconstructing the 3D cell morphology. Conclusion: We have used DF-Tracing to reconstruct the intricate neuron structures found in noisy image stacks, obtained with 3D laser microscopy, of dragonfly thoracic ganglia. Compared to several previous methods, DF-Tracing produces better reconstructions." (Authors)] Address: Yang, J., Key Laboratory of Medical Image Computing, Ministry of Education, Northeastern University, Shenyang, China. E-mail: yangjin-zhu@neusoft.com

12487. Yang, Y.; Wang, L.; Wei, S.; Song, G.; Kenoyer, J.M.; Xiao, T.; Zhu, J.; Wang, C. (2013): Nondestructive analysis of dragonfly eye beads from the Warring States Period, excavated from a Chu tomb at the Shenmingpu Site, Henan Province, China. *Microscopy and microanalysis* 19(2): 335-343. (in English) ["Dragonfly eye beads are considered to be the earliest types of glass objects in China, and in the past have been considered as evidence of culture interaction or trade between West and East Asia. In this article, synchrotron radiation microcomputed tomography and μ -probe energy dispersive X-ray fluorescence were used to determine the chemical composition, microstructure, and manufacturing technology of four dragonfly eye beads, excavated from a Chu tomb at the Shenmingpu site, Henan Province, China, dated stylistically to the Middle and Late Warring State Period (475 bc-221 bc). First, a nondestructive method was used to differentiate the material types including faience (glazed quartz), frit, glazed pottery (clay ceramic), and glass. Three beads were identified as faience and one bead as glazed pottery. The glaze recipe includes quartz, saltpeter, plant ash, and various copper, and is classified as belonging to the K₂O-CaO-SiO₂ glass system, which indicates that these beads were not imported from the West. Based on computed tomography slices, the manufacturing technology of the faience eye beads appears to include the use of an inner core, molding technology, and the direct application glazing method. These manufacturing features are consistent with the techniques used in China during this same time period for bronze mold-casting, proto-porcelain, and glass." (Authors)] Address: Wang, C., Laboratory of Human Evolution, IVPP, Beijing, China. E-mail: cswang@ucas.ac.cn

12488. Yong, H.S.; Lim, P.-E.; Tan, J.; Eamsobhana, P. (2013): Genetically determined colour polymorphism in larvae of *Ceriagrion chaoi* (Insecta: Odonata: Coenagrionidae). *The Raffles Bulletin of Zoology* 61(1): 47-51. (in English) ["Although genetically determined colour polymorphism is quite common in adult odonates, there is no report on this phenomenon in the larvae of any odonate species up to now. This paper reports, for the first time, the occurrence of two colour morphs (dark and brown) in both the male and female larvae of *C. chaoi*. The species identity of these colour morphs was confirmed by the partial sequences of 16S rRNA gene as well as observation on emergence. Only a single in-

variant haplotype was observed, which differed from a congeneric species *Ceriagrion cerinorubellum* (Brauer) by 39 base pairs. The partial sequences of 16S rRNA gene constitute the first report for these damselflies. Available data indicate that environment/habitat does not seem to play a role in the determination of the colouration in the larvae of *C. chaoi*. The inheritance and significance of the colour polymorphism however remain to be verified." (Authors)] Address: Yong, H.S., Inst. of Biological Sciences, Univ. of Malaya, 50603 Kuala Lumpur, Malaysia. Email: yong@um.edu.my

12489. Youngman, R. (2013): Altitude limits for the occurrence and breeding of some British dragonflies. *J. Br. Dragonfly Society* 29(1): 20-22 (in English) ["The altitude at which some species of dragonfly occur and/or breed has been determined at two locations in Inverness-shire, in the Central Highlands of Scotland The importance of aspects of temperature, rather than altitude itself, and of the role of the microclimate are discussed." (Author)] Address: Youngman, R., Blairchroisk Farm Cottage, Ballinluig, Perthshire, PH9 ONE, UK. E-mail: blairchroisk@btinternet.com

12490. Zhang, H.-J. (2013): *Cephalaeschna xiangensis* spec. nov., a new dragonfly from Shaanxi, China, with a key to the adults of the Chinese members of the genus (Anisoptera: Aeshnidae). *Odonatologica* 42(1): 39-43. (in English) ["The new species is described and illustrated. Holotype σ : Maliu village (107°32' E, 32°43' N, altitude 1200m), Xixiangco., Shaanxi prov., China; deposited in the Shaanxi Bioresource Key Lab., Hanzhong, China. A key to the adults of the Chinese *Cephalaeschna* species is provided." (Author)] Address: Zhang, H., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com

12491. Zhang, H.-m.; Tong, X.-o. (2013): Descriptions of the final instar larvae of seven Chinese Chlorogomphidae species, with taxonomic notes on adults (Odonata: Anisoptera). *Zootaxa* 3620 (2): 223-244. (in English) ["The larvae of seven species of Chlorogomphidae from South China are described based on reared larvae, i.e. *Chlorogomphus kitawakii* Karube, *C. nasutus* Needham, *C. papilio* Ris, *C. shanicus* Wilson, *C. usudai* Ishida, *C. yokoi* Karube and *Chloropetalia soarer* Wilson. The adult female of *C. kitawakii* is first described. Biological information on Chlorogomphidae is provided and a diagnosis of the family proposed." (Authors)] Address: Tong, X.-o., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou, 510642, Guangdong Province, P. R. of China. E-mail: xtong@scau.edu.cn

12492. Żurawlew, P.; Piecuch, T. (2013): Site of *Sympetrum pedemontanum* (O.F. Muller in Allioni, 1766) in the Wysoczyzna Kaliska (Southern Wielkopolska). *Odonatrix* 9(1): 29-30. (in Polish, with English summary) [Obra Canal near Talary (UTM: XT45) in southern Wielkopolska, Poland. 17.07.2009, 2.08.2012.] Address: Żurawlew, P., Kwień 67a, 63-313 Chocz, Poland. E-mail: grusleon@gmail.com

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1997

12493. Garrison, R.W. (1997): Odonata. Nomina Insecta Nearctica 4: 551-579. (in English) [This list includes all described Odonata of North America north of the Mexican border. Species occurring in the Antilles and Bahamas are considered to be Neotropical and are not included. Species misidentifications are not included.] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Dept of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

12494. Honsig-Erenburg, W.; Konar, M.; Huber, T.; Gutleb, B.; Wieser, G.; Friedl, T.; Mildner, P. (1997): Zoologische Exkursion des Naturwissenschaftlichen Vereines zur Kolpa (Slowenien). Carinthia II 187/107: 139-152. (in German, with English and Slovenian summaries) [An excursion of the "Naturwissenschaftlicher Verein für Kärnten", department of zoology, was performed between August 12th to 14th 1996 to the Kolpa river in the region of Dol (frontier Slovenia - Croatia). The macrozoobenthic samples include Calopteryx virgo, Gomphus vulgatissimus and Onychogomphus forcipatus.] Address: not stated

1998

12495. Schweighofer, W. (1998): Zur Libellenfauna (Odonata) des unteren Melktales (Niederösterreich). Lanius, Krems 1996-1997: 17-32. (in German) [In a quartz sand pit, in 1996/97, 31 Odonata species were recorded; the list of species included Lestes virens and Orthetrum albistylum. Along the river Melk, 1997, 14 species were recorded in 1997; the list of species included Gomphus vulgatissimus, Onychogomphus forcipatus and Ophiogomphus cecilia.] Address: Schweighofer, W., Ötscherblick 10, A-3661 Artstetten, Austria. E-mail: wolfgang.schweighofer@schule.at

12496. Tuxhorn, C.; McShaffrey, D. (1998): Flight velocities of Odonata measured using video techniques. Bull.

North American benthological society 15(1): 152. [Verbatim: We determined the flight velocity, based on over 2,800 flight segments of individuals of 4 spp. near Marietta, Ohio. A Panasonic Palmsight PV-1557 16x Optical Zoom camcorder was used to record flight of individuals at a pond on 3 dates in 1997. Recording was done between 1-4 pm. Distances on the monitor were determined by reference to mean lengths of individuals caught at the time of filming. The distance a specimen flew between frames was calculated by measuring the on-screen distance and dividing by the magnification factor. This distance was then multiplied by the time between video frames (0.03 sec) to determine velocity. Average flight velocity for all flight segments of the 4 spp. was 1.9 m/s (n=2844, sigma=0.59). Mean velocities were: Libellula luctuosa 1.7 m/s (n=737, sigma=0.48), L. lydia 2.0 m/s (n=1963, sigma=0.49), Pachydiplax longipennis 1.5 m/s (n=59, sigma=0.53), Tramea lacerata 2.5 m/s (n=85, sigma=0.85). Significant differences (t-test, alpha=0.05) were found between the flight velocities of all 4 spp. A positive correlation exists between the length of the species and average flight velocity. Address: not stated.

2000

12497. Santos Lopes, F.; De Marco, P. (2000): Comportamento territorial em insetos: aspectos conceituais e estudos de casos. Oecologia Brasiliensis 8: 193-222. (in Portuguese, with English summary) ["Our objective in this review, about insect territorial behaviour, isn't to provide an exhaustive discussion on this issue, but to establish the major theoretical aspects on this theme, for anyone that initiate their studies on it. The paper includes: a) a review about the concept of territoriality, based on the former ideas developed from vertebrate studies and its applicability to insects; b) the major problems in the use these concepts, in special mistakes with other terms related to the spatial distribution of individuals or other behaviours, associated to competition for resources; c) theoretical considerations on territoriality and, d) case studies in Odonata, as examples on those

issues." (Authors)] Address: De Marco, P., Laboratório de Ecologia Teórica e Síntese, Depto de Ecologia, Universidade Federal de Goiás, BR-74.001-970 Goiânia, Goiás, Brazil. E-mail: pdemarco@icb.ufg.br

12498. Tóth; S. (2000): Data to the dragonfly (Odonata) fauna of the Villány Hills, South Hungary. *Dunántúli Dolgozatok Term. Tud.* 10: 139-146. (in Hungarian, with English summary) [In 1999 and 2000, 39 Odonata species were recorded.] Address: Tóth, S., Széchenyi u. 2, H-8420 Zirc, Hungaria. E-mail: flycatcher@freemail.hu

2001

12499. Gapud, V.P.; Recuenco-Adorada, J.D. (2001): Contribution to the taxonomy of Philippine Megapodagrionidae (Odonata: Zygoptera). *Philippine Entomology* 15(2): 115-124. (in English) [*Argiolestes baltazarae* sp. nov., is described from the Northern Sierra Madre Natural Park, Philippines. *A. realensis* Gapud & Recuenco 1993 is redescribed, and the male of *Rhinagrion philippinum* is described. Illustrations and a key to Philippine species of Megapodagrionidae are provided.] Address: Gapud, V.P., Department of Entomology, College of Agriculture, Univ. of the Philippines Los Banos, College, Laguna 4031, Philippines. E-mail: vicgap@laguna.net

12500. Karube, H. (2001): New species of the genus *Chlorogomphus* from Yunnan, China (Cordulegastridae: Chlorogomphinae). *Tombo* 43: 9-11. ["A new chloromphid dragonfly from Yunnan, SW China, is described under the name of *Chlorogomphus daviesi* sp. nov. This species belongs to the *Chlorogomphus auratus* group, but is easily distinguished from other members mainly by the structures of male caudal appendages and penile organs. The Chinese chloromphid dragonflies have not been well studied so far. Thirteen (including five Taiwanese) species were recorded prior to 1994. Karube (1995) described *Chlorogomphus kitawakii* from Guangxi, Ishida (1996) described *C. usudai* from Hainan I., and Chao (1999) reviewed Chinese chloromphid dragonflies with descriptions of two new species." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

12501. Malikova, E.I.; Seidenbusch, R. (2001): Description of a female *Macromia manchurica* Asahina, 1964 (Macromiidae). *Tombo* 43: 21-22. (in English) [Southern Primorje, Oktyabrsky region, v. Novo-Georgievka, Russia, 6. VIII. 1989, S. Kulchitsky leg; the female of this rare Far Eastern species was unknown until present. "One female specimen of this species identified as *M. sibirica* Djakonov, 1926 (= *M. amphigena fraenata* Martin, 1905) was mentioned and depicted by Dr. S. Gorb (1991) and then sent to one of us (R. S.) together with a male specimen of true *M. amphigena fraenata*....The species can be easily distinguished from co-occurring *M. amphigena* by more developed yellow body mark-

ings : the yellow rings on the tergites IV-VII are not interrupted ; by a pale brown or chestnut labium, and the labrum with a pair of yellow spots; and by the shape of the genital plate. Asahina (1964) supposed that the larvae of *Macromia* sp. from the River Sintuhe (now R. Komissarovka) near village Ijinka, Primorje Territory, described by Popova (1953), were in fact *M. manchurica*. The finding of imago from a neighbouring locality confirmed this supposition." (Authors)] Address: Malikova, E.I., Dept of Zoology, Blagoveshchensk State Pedagogical University, Lenin Street, 104, Blagoveshchensk, 675000, Russia

12502. Matsuki, K. (2001): Description of the last instar larva of *Euphaea ochracea* Selys, 1859 from Thailand (Euphaeidae). *Tombo* 43: 23-24. (in English) [7-V-1985, Huey Kaeo, N. Thailand, K. Matsuki, leg.; the female exuvia is figured.] Address: Matsuki, K., 3-1575-14 Hasama-cho, Funabashi, Chiba, 274-0822, Japan

12503. Sasamoto, A. (2001): Description of a new subspecies of *Stylogomphus lawrenceae* Yang et Davies, 1996 from the Malay Peninsula (Anisoptera: Gomphidae). *Tombo* 43: 14-18. (in English) ["The adult and larva of *Stylogomphus lawrenceae malayanus* ssp. n. are described and illustrated (holotype: male, allotype: female, Tapah to Tana Rata, 19 miles point, Perak, Malaysia; 31. III. 1999, captured at larval stage and reared in room until emergence, and deposited in the National Science Museum, Tokyo). This is the first record of the genus *Stylogomphus* from the Malay Peninsula. This subspecies is almost identical with nominotypical subspecies in the shapes of male anal appendages, female valvula vulvae and occiput, although discriminated in the shapes of hamulus anterior and posterior, and thoracic markings. The genus *Stylogomphus* was established by Fraser in 1922 and contains 10 species, 2 of which have one subspecies each (Tsuda, 2000). *Stylogomphus* species hitherto have been known from E. Asia, N. India, Bangladesh, Nepal, continental China, Taiwan, N. Vietnam, and Japan, as well as one species from N. America. From N. Thailand only unidentified exuviae were reported by Matsuki (1988). In spring of 1999 in Cameron Highland, the Malay Peninsula, the larvae supposed as *Stylogomphus* were caught from a clean stream in tropical jungle, and then, reared in room until adult emergence. This species is not only a new record from the Malay Peninsula, but is also believed to be a new subspecies." (Author)] Address: Sasamoto, A., 190-4 Yakuoji, Tawaramoto-chô, Shiki-gun, Nara, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

2002

12504. Lynch, R.J.; Bunn, S.E.; Catterall, C.P. (2002): Adult aquatic insects: Potential contributors to riparian food webs in Australia's wet-dry tropics. *Austral Ecology* 27(5): 515-526. (in English) ["Changes in the abundance and biomass of aquatic and terrestrial aerial in-

sects with distance (mid-stream, 0, 10–15 and 160 m) from lowland streams were examined across the dry season landscape in Kakadu National Park, northern Australia. Malaise traps and sticky intercept traps were used to sample the insects at four streams, spaced over an area of 1650 km². Malaise and intercept catches were dominated by Diptera (flies and midges), both numerically and by biomass. Chironomid midges were the most abundant taxon, making up 43.4 and 51.0% of the malaise and intercept trap catches, respectively. However, most chironomids were small (less than 3 mm body length), contributing 34.9% to intercept trap biomass, but only 5.2% in malaise traps. Ceratopogonid midges and caddisflies (Trichoptera) accounted for most of the remaining adult aquatic insects. Major terrestrial components were Diptera and Hymenoptera in malaise traps and Coleoptera and Diptera in intercept traps. The total abundance and biomass of insects were much greater over streams and along the water's edge than in riparian (10–15 m) and savanna (160 m) habitats primarily because of the presence of large numbers of adult aquatic insects. The abundance and biomass of terrestrial insects in malaise traps showed no relationship with distance, but intercept trap catches suggested slightly greater abundances over the water and at the water's edge. The great abundance of aquatic insects relative to terrestrial insects close to streams suggests that they have the potential to be an important component of the diets of riparian insectivores, and predation may be an important pathway by which aquatic nutrients and energy are moved into terrestrial food webs." (Authors) The aquatic classification included those insects with at least one fully aquatic life stage: Odonata, Ephemeroptera, Trichoptera, Diptera (Chironomidae, Culicidae, Simuliidae), Neuroptera (Sisyridae) and Hemiptera (Veliidae, Corixidae). ... 523 odonates were caught in malaise traps.] Address: Bunn, S.E., Faculty of Environmental Sciences, Griffith University, Nathan, Queensland 4111, Australia. E-mail: s.bunn@mailbox.gu.edu.au

2003

12505. DuBois, R.B. (2003): Development of a citizen-based Odonata survey in northwestern Wisconsin. Wisconsin Department of Natural Resources, Final Report. 24 Oct. 2003: 8 pp. (in English) ["The objective of this project was to develop a network of citizen volunteers capable of assisting with surveys of Odonates in northwestern Wisconsin. As a part of this process determining effective methods of citizen contact, training, and reporting of records were established. The knowledge gained from this study was then used as a prelude to constructing a future statewide survey." (Author)] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12506. Tennessen, K.J. (2003): Odonata (Dragonflies, Damselflies). In: Resh, V.H. & R.T. Cardé (eds): Ency-

clopedia of insects. University of California, Berkeley. Academic Press. 1266 pp: 814-823. (in English) [Odonata are treated at pages 814-823. In general, many chapters contain references to Odonata.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

2004

12507. DuBois, R.B.; Pleski, J.M.; Smith, W.A.; Epstein, E.J.; Mead, K. (2004): First records for *Aeshna sitchensis* (Odonata: Aeshnidae) and *Enallagma clausum* (Odonata: Coenagrionidae) and a northwestern record for the state endangered *Somatochlora incurvata* (Odonata: Corduliidae) in Wisconsin. The Great Lakes Entomologist 37(3 & 4): 126-130. (in English) ["While surveying for Odonata in coastal peatlands and associated shoreline areas adjacent to Lake Superior in Wisconsin, two new state record species, *A. sitchensis* and *E. clausum* populations were documented. Also located was a robust population of the state-endangered *S. incurvata* at the northwestern edge of the known range of this species." (Authors)] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12508. Meurgey, F. (2004): Première observation d'*Anax junius* (Drury, 1773) en France (Odonata, Aeshnidae). Bulletin de la Société des Sciences naturelles de l'Ouest de la France 26(3): 176-177. (in French, with English summary) [14-IX-2003, Pointe St Gildas, France. During a study of spatial movements of some *Sympetrum* sp. along the coast of the Loire-Atlantique department, western France, a male *Anax junius* has been seen in flight on the beach. This specimen has been captured and it is actually stored in the Natural History Museum of Nantes.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

12509. Zhu, H. (2004): Odonata. In: Yang, X. (ed): Insects of the Great Yarlung Zangbo Canyon of Xizang, China. China Science and Technology University Press: 18-19. (in Chinese, with English summary) [In November 1998, the following taxa from Motuo/Medôg in eastern Tibet Autonomous Region, China are documented: *Palpopleura sexmaculata*, *Sympetrum hypomelas*, *Calicnemia* sp., *Aristocypha cuneata*, *Anotogaster kuchenbeiseri*, *Acisoma panorpoides*, *Crocothemis servilia*, *Orthetrum triangulare melania* (Selys, 1883) and *O. prunosum neglectum* (Rambur, 1842).] Address: Yang, X.-K., Key Lab. Zool. Syst. & Evolution, Chinese Academy of Sciences, 1 Beichen West Road, Chaoyang District, Beijing 100101, P.R. China. E-mail: yangxk@ioz.ac.cn

2005

12510. Brunelle, P.M.; deMaynadier, P. (2005): The Maine Damselfly and Dragonfly Survey: A Final Report. No-

vember 1 2005. Edition 2 (Revised). Prepared for: Maine Department of Inland Fisheries and Wildlife (MDIFW), 650 State Street, Bangor, Maine, USA 04401: 31 pp. (in English) ["MDDS Final Results: The goals of the MDDS project were two-fold: (1) To raise public awareness and concern for damselflies and dragonflies specifically, and invertebrate conservation generally, and, (2) To improve the Maine Department of Inland Fisheries and Wildlife's ability to protect those odonate species of greatest conservation concern. Underlying the achievement of both goals was the need for an improved understanding of the distribution and status of Odonata in Maine. The balance of this report provides a graphical and tabular summary of MDDS's final results. In summary, the project exceeded initial expectations for public participation and scientific contributions, as evidenced by the following summary statistics: Outreach Contributions: Volunteer participation statewide: >200; Volunteers trained in MDDS seminars: 95; Newsletters published (Mainensis): 4; Major press articles covering the project: 5; Website hits (<http://mdds.umf.maine.edu/~odonata/>): >16,000; Scientific Contributions: Total records submitted (% increase on 1999 baseline): 17,264 (229%); New Rare, Threatened, and Endangered species records: 297; New state species records: 10; New U.S. species records (Québec Emerald and Canada Whiteface): 2; Scientific publications completed or in progress (4 articles; 1 book): 5." (Authors) For details see: <http://mdds.umf.maine.edu/MDDS%20Final%20Report.pdf> Address: Brunelle, P.M., 6044-1 Compton Avenue, Halifax, Nova Scotia, Canada, B3K 1E7

12511. Feige, K.-D.; Jueg, U.; Zessin, W. (2005): Beitrag zur Fauna des Treptow-Sees (Landkreis Parchim) – Vögel, Weichtiere, Egel und Libellen. Mitteilungen der Naturforschenden Gesellschaft West-Mecklenburg 5(1): 54-63. (in German) [Mecklenburg-Vorpommern, Germany; 10 in most cases common Odonata species were observed at 3.7.04 and 21.8.04: *Lestes sponsa*, *Coenagrion puella*, *Pyrrhosoma nymphula*, *Ischnura elegans*, *Enallagma cyathigerum*, *Aeshna mixta*, *Libellula quadrimaculata*, *Orthetrum cancellatum*, *Sympetrum flaveolum*, *S. vulgatum*.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

12512. Labandeira, C.C. (2005): The fossil record of insect extinction. New approaches and future directions. *American Entomologist* • Spring 2005: 14-29. (in English) ["The fossil record of insect extinction at the family level is characterized by two basic modes: background extinction, which represents an ambient level of taxa extirpation, and mass extinctions, which are occasional severe events in which taxa are eliminated significantly above background levels. The most significant mass extinction, at the end-Permian (Permian-Triassic; P-T), divides the history of insects into two major evolutionary faunas: an earlier Paleozoic Evolutionary Fauna of apterygotes, paleopterans, and basal clades of or-

thopteroids and hemipteroids; and a subsequent Modern Evolutionary Fauna of more derived clades of orthopteroids and hemipteroids and especially holometabolous insects. In addition to the P-T event, four other extinctions are documented by multipletypes of data: Late Pennsylvanian, Late Jurassic, later Early Cretaceous; and the end-Cretaceous (Cretaceous-Paleocene; K-P). There also is an analogous record of insect origination that is characterized by major, above-background events. Four methods are used to detect insect extinction in the fossil record. The taxic approach is widely used, whereby the temporal durations of fossil taxa are tallied for each geologic unit of interest and analyzed in a manner analogous to demography used in ecology. By contrast, the phylogenetic approach uses clades as the basic units of interest. A recent approach uses proxy data such as quantification of plant-insect associations across major boundaries in lieu of an insect body-fossil record. Last, the clustering of times of origin from modern coevolved plant-insect associations provides data for likely interruptions from major paleoenvironmental perturbations. Pluralism, emphasizing multiple approaches to determine the ecological dynamics of insects during an extinction, is the best strategy to evaluate insect demise or survival in the fossil record." (Author) The paper includes several references to dragonflies.] Address: Labandeira, C., Dep Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0121, USA. E-mail: labandec@si.edu

2006

12513. DuBois, R.B.; Smith, W.; Tennessen, K.; Berg, M.; Remsburg, A. (2006): GLOM 2006 Informs Beginners and Showcases Rare Clubtails. *Argia* 18(3): 3-4. (in English) ["This report describes the events, presentations, and Odonata species recorded at the 6th Annual Great Lakes Odonata Meeting (GLOM) held July 22-25, 2006." (Authors)] Address: DuBois, R., Wisconsin Department of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12514. Jocqué, M.; Martens, K.; Riddoch, B.; Brendonck, L. (2006): Faunistics of ephemeral rock pools in southeastern Botswana. *Arch. Hydrobiol.* 165(3): 415-431. (in English) ["Rock pools on granite outcrops occur worldwide and are poorly studied, despite their intrinsic biological interest. In semi-arid Botswana, such habitats occur mainly on the granite outcrops in the southwestern Hardveld zone. To date, studies on these systems have focused mainly on individual species or particular interactions. By means of frequent sampling (every other day) during an entire wet phase (hydrocycle), we attempted to get a time integrated overview of invertebrate species composition in a set of 18 rock pools from two clusters (meta-communities). A faunal list (including *Pantala flavescens*) is presented and described. Rock

pool species were separated in permanent and ephemeral inhabitants, based on their strategy to survive or escape the frequent dry phases of their habitat, respectively. A new chydorid species, four new turbellarian taxa and two new ostracod species were discovered. All new taxa were permanent inhabitants, illustrating the need for more intense and time-integrated studies of these ephemeral systems and especially the permanent residents with specific adaptations to the vagaries of their variable habitat. The best sampling strategy to assess species richness in these rock pool systems is to randomly sample three to four pools in a cluster, each in the final phase of their hydrocycle." (Authors)] Address: Jocqué, M., K. U. Leuven, Laboratory of Aquatic Ecology, De Bériotstraat 32, 3000 Leuven, Belgium.

12515. Wang, B.; Huang, F (2006): Xizang insect differentiation. Henan Science and Technology Publishing House, Zhengzhou: 540 pp. (in Chinese with English abstract and Latin names) [Xizang (Tibet, China), 11 Odonata species are checklisted.] Address: not stated

2007

12516. DuBois, R.B. (2007): GLOM 2007 Visits Northeastern Illinois. *Argia* 19(4): 17-18. (in English) ["This report is a summary of the 7th Annual Great Lakes Odonata meeting (GLOM) held at the Volo Bog State Natural Area in Lake County, IL. The educational focus of this meeting was on the federally endangered *Somatochlora hineana* since the meeting was held close to some known Hine's Emerald habitat. Areas sampled for Odonata were not far from the Wisconsin state line, and habitats and species recorded were similar to those found in many areas in southern Wisconsin." (Author)] Address: DuBois, R., Wisconsin Department of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12517. DuBois, R.B. (2007): *Gomphus spicatus* (Odonata: Gomphidae) rediscovered in Illinois and *Libellula semifasciata* (Odonata: Libellulidae) recorded near Wisconsin DNR. *The Great Lakes Entomologist* 40(1&2): 99-100. (in English) ["A single adult female *L. semifasciata* was collected on a hiking trail along the Dead River (in Illinois, USA) on 10 June 2007. The finding of this dragonfly ... is noteworthy because that species has not been found in Wisconsin since Muttkowski (1908) reported it from Milwaukee County in 1903 (Smith et al. 2003; Wisconsin Odonata Survey 2008). Populations of *L. semifasciata* may persist, and should be looked for, in the southern tier of counties of Wisconsin, especially in Kenosha County near Lake Michigan." (Author)] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12518. DuBois, R.B.; Tennessen, K.J.; Berg, M. (2007): Efficacy of morphological characters for distinguishing

nymphs of *Epitheca cynosura* and *Epitheca spinigera* (Odonata: Corduliidae) in Wisconsin. *The Great Lakes Entomologist* 40(3&4): 129-139. (in English) ["Attempts to distinguish exuviae and last-instar nymphs of *E. cynosura* and *E. spinigera* using lateral spine characters have proven to be unreliable, and recent use of setae counts on only one side of the prementum or one labial palp have led to confusion because these structures often hold unequal numbers of setae on the two sides of the same specimen. Based on exuviae of 67 reared *E. cynosura* and 55 reared *E. spinigera* from lakes throughout Wisconsin, this study tested the efficacy of previously used character states for distinguishing these species and searched for new characters to improve the reliability of regional keys." (Authors)] Address: DuBois, R., Wisconsin Department of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12519. Fields, S.E.; Speer, H.; Castleberry, J.S.; Hook, M.W.; Hunsucker, R.; Lambert, D.M (2007): A listing of flora and fauna of Saint Helena Island, South Carolina with emphasis on historic Penn center. *Journal of the South Carolina Academy of Science* 4(1): 33-47. (in English) [USA; "We present baseline occurrence data for at least 306 taxa of plants and animals in the vicinity of Historic Penn Center on St. Helena Island, South Carolina. It is hoped that this list will be appended by future surveyors and can serve as an aid in the conservation of species and the preservation of the natural, as well as the cultural history of the site." (Authors) The list contains the following Odonata taxa: *Epiaeschna heros*, *Enallagma* spp., *Erythemis simplicicollis*, *Libellula axilena*, *L. semifasciata*, *Pachydiplax longipennis*] Address: Fields, S, School of the Environment, University of South Carolina, 702G Byrnes Bldg., Columbia, SC 29208, USA. E-mail: stevefields@chmuseums.org

12520. Goncalves, F.B. (2007): Análise comparativa de índices bióticos de avaliação de qualidade de água, utilizando macroinvertebrados, em um rio litorâneo do Estado do Paraná. Dissertação apresentada ao Programa de Pós-Graduação em Ecologia e Conservação, Setor de Ciências Biológicas Universidade Federal do Paraná, como requisito parcial para obtenção do grau de Mestre em Ecologia e Conservação: IX + 43 pp. [Brazil; this work aimed to compare four different biotic indices of water quality using benthic macroinvertebrate, in order to verify if there is one better to be applied in the coastal streams in the Paraná state; describe its communities and analyse its environmental condition through the functional feeding groups. Five biotic indices were chosen to it: 1- EPT INDEX (Percent of Ephemeroptera, Plecoptera and Trichoptera); 2- BMWP' (Biological Monitoring Work Party System); 3- BMWP'-ASPT (Average Score Per Taxon) and 4-HFBI (Hilsenhoff Family Biotic Index). They were applied in two different sites in a coastal stream in the Paraná state. The "do Pinto" stream headwaters' are placed in a protected area.

There are many input materials from headwaters to the mouth as organic house material, craps and funny activities. Five samples were taken between April of 2005 and April of 2006. It was observed the HFBI index does not represent the real conditions of the stream. This way, no one of the indices can be suggested as a better one, since everyone presented many differences among their scores and the structure of community. The functional feeding groups protocol suggested the stream as a not structured one, mainly in the inferior site that has an human influence." (Author) Odonata are treated at the family level.] Address: not stated

12521. Smolis, A.; Malkiewicz, A.; Stelmaszczyk, R.; Kadej, M. (2007): Nowe stanowiska trzepli zielonej *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785) w województwie dolnośląskim. *Przyroda Sudetów* 10: 85-88. (in Polish, with German and Czech summaries) [Records of *O. cecilia* from eleven localities, in most cases situated in the Odra valley (area of the Lower Silesian Voivodeship, Poland) are documented.] Address: Stelmaszczyk, R., Muzeum Przyrodnicze, Uniwersytet Wrocławski, ul. Sienkiewicza 21, 50-335 Wrocław, Poland. E-mail: stelma@biol.uni.wroc.pl

12522. Torralba Burrial, A.; Ocharan, F.J. (2007): Comparación del muestreo de macroinvertebrados bentónicos fluviales con muestreador surber y con red manual en ríos de Aragón (NE Península Ibérica). *Limnetica* 26(1): 13-24. (in Spanish, with English summary) ["Comparison between Surber and hand net sampling methods to survey benthic macroinvertebrates in rivers of Aragon (NE Iberian Peninsula) When monitoring the ecological state of rivers and other surface waters, the Water Framework Directive (Directive 2000/60/CE) establishes that the methods used should guarantee that the information given be of an equivalent scientific quality and comparability; for rivers and communities of benthic macroinvertebrates in shallow waters, it remits to the standards for the biological sampling with Surber and hand net. These sampling methods were compared in 15 sites located in the fluvial network of Aragon (NE Spain), including the different types of rivers and ecological states existent in it. Both methods provided similar results when employed with the same community, showing high correlation coefficients and slopes near 1, for number of taxa captured, number of EPT groups (Ephemeroptera, Plecoptera and Trichoptera), number of taxa included in the index IBMWP (formerly known as BMWP'), value of this index and of the IASPT. In spite of this high correlation, the Surber sampler presented a higher average efficiency in the total number of taxa captured than the hand net, capturing a slightly greater number of taxa, taxa included in the IBMWP among them (increasing the value of the index a little). Other advantages of Surber versus hand net are commented, especially that of allowing quantitative samplings." (Authors) Samples include Coenagrionidae, Calopterygidae, Aeshnidae, and Gomphidae (all at the family lev-

el).] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

12523. Torralba Burrial, A.; Ocharan, F.J. (2007): Presencia de *Hemianax ephippiger* (Burmeister, 1839) (Odonata: Aeshnidae) en la provincia de Huesca (NE España). *Boletín de la Sociedad Entomológica Aragonesa* 40: 426. (in Spanish) [18-VIII-2003, river Asabón, Salinas de Huesca (30TXM821980; alt. 604 m a.s.l.), Spain] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

2008

12524. Johansson, F.; Crowley, P.H. (2008): Larval cannibalism and population dynamics of dragonflies. In: Lancaster, J. & R.A. Briers (eds): *CAB International 2008. Aquatic insects: Challenges to populations. Proceedings of the Royal Entomological Society's 24th symposium*: 36-54. (in English) ["Cannibalism, the process of killing and eating conspecifics, is common among odonate larvae and is believed to influence odonate population dynamics. Here we attempt to summarize and consider interactions among key factors linked to cannibalism at both the individual and population levels. Through cannibalism, odonate larvae receive energy directly from the consumption of the conspecific, and indirectly from reduced exploitation competition because the per capita food supply may increase. Cannibalism might, however, also incur costs such as risk of death and pathogen infections. Alternative food availability, population density and size structure of the cannibalistic population, and habitat structure are environmental factors that affect cannibalism rate in odonate larvae on a short-term basis. Theoretical models predict that cannibalism reduces size variation under most cannibalism intensities and life histories. The models also show that cannibalism can – but will not always – stabilize population dynamics. Unfortunately few long-term studies examining the population dynamics on dragonfly larvae have been performed, and we urge more such studies." (Authors)] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

2009

12525. Bingham, S.N. (2009): Aquatic macroinvertebrate use of rootmat habitat created by eight woody riparian species. M.Sc. thesis, Graduate School of The Ohio State University: XII + 61 pp. (in English) [oas 38;"Rootmats are an instream habitat type created by fine roots of riparian vegetation that are exposed through natural erosion at the stream bank. Previous research indicated that rootmats may be important habitats for aquatic invertebrates and may have a distinct inverte-

brate composition compared to other instream habitat types. The objective of this study was to examine the invertebrate communities inhabiting rootmats of eight common woody riparian species in Cuyahoga Valley National Park, Ohio (CVNP). I collected 47 rootmat samples from pools across 10 CVNP streams. Coarse particulate organic matter, root morphology, and physicochemical variables were measured to characterize the local habitat at each location. Invertebrate community indices, multivariate techniques and univariate techniques were used to investigate the role of rootmats as habitat and determine whether any associations existed between invertebrate communities and eight woody riparian species. Additionally, invertebrate communities of rootmats were compared to adjacent riffles for eight sites. A total of 138 taxa were collected from rootmats across all woody species. Most (59%) of the taxa were gathering collectors and this suggests that fine particulate organic matter may be a dominant food source within or near rootmats. Additionally, 15% of the captures were predators, while scrapers, shredders and filtering collectors were present in similar proportions (8-9% each). *Paratanytarsus dissimilis* was the most abundant organism across the samples at nearly 250 organisms m². Other abundant taxa were Chironomidae *Calopteryx maculata*, *Caecidotea communis* (isopod), *Stenelmis* sp. and *Dubiraphia bivittata* (riffle beetles). Invertebrate diversity, species composition and functional feeding guilds differed among certain tree species. Specifically, rootmats of two willow species (*Salix interior* and *S. nigra*) were consistently similar to each other, and different from rootmats of *Carpinus caroliniana*, *Fraxinus pennsylvanica*, and *Acer saccharum*. Additionally, invertebrate species composition was different in adjacent rootmat and riffle habitats, but the habitats were similar in terms of diversity and abundance." (Author)] Address: not stated

12526. Bolzon, D.M.; Nordström, K.; O'Carroll, D.C. (2009): Local and large-scale inhibition in feature detection. *Journal of Neuroscience* 9(45): 14143-14150. (in English) ["Lateral inhibition is perhaps the most ubiquitous of neuronal mechanisms, having been demonstrated in early stages of processing in many different sensory pathways of both mammals and invertebrates. Recent work challenges the long-standing view that assumes that similar mechanisms operate to tune neuronal responses to higher order properties. Scant evidence for lateral inhibition exists beyond the level of the most peripheral stages of visual processing, leading to suggestions that many features of the tuning of higher order visual neurons can be accounted for by the receptive field and other intrinsic coding properties of visual neurons. Using insect target neurons as a model, we present unequivocal evidence that feature tuning is shaped not by intrinsic properties but by potent spatial lateral inhibition operating well beyond the first stages of visual processing. In addition, we present evidence for a second form of higher-order spatial inhibition—a

long-range interocular transfer of information that we argue serves a role in establishing interocular rivalry and thus potentially a neural substrate for directing attention to single targets in the presence of distracters. In so doing, we demonstrate not just one, but two levels of spatial inhibition acting beyond the level of peripheral processing." (Authors) *Hemicordulia tau*] Address: O'Carroll, D., Discipline of Physiology, School of Medical Sciences, University of Adelaide, Adelaide SA 5005, Australia

12527. Donohue, I.; Donohue, L.A.; Ní Ainín, B.; Irvine, K. (2009): Assessment of eutrophication pressure on lakes using littoral invertebrates. *Hydrobiologia* 633(1): 105-122. (in English) ["Until the E.U. Water Framework Directive listed benthic invertebrates as a biotic element to be used for ecological classification of lakes, techniques for the assessment of the response of littoral invertebrates to anthropogenic pressures were extremely limited compared with those of rivers and lake profundal zones. We describe here the development of an ecological classification model based on changes of littoral invertebrate assemblages across a gradient of eutrophication, which is the most widespread anthropogenic pressure on lakes across Europe. The model comprises three derived parameters, two of which were developed from taxon-specific optima along a total phosphorus gradient calculated using canonical correspondence analysis, and the third based on invertebrate abundance. Combining the parameter metrics, we can estimate the ecological quality ratio (EQR), relative to those from paleolimnologically-confirmed reference lakes. The model was tested using independent samples collected from both hard and soft substrata and across two seasons from 45 lakes, comprising three alkalinity groups (n = 15 in each), and across gradients in water column total phosphorus concentrations. For hard substrata, EQRs were related consistently and highly significantly to water column concentrations of total phosphorus, accounting for the majority of the variance in every alkalinity group. For samples taken from soft substrata, a significant relationship was found only for high alkalinity lakes, accounting for a moderate proportion of the variability in water column total phosphorus concentrations. Our results compare highly favourably with those from other aquatic ecological assessment methods, irrespective of the faunal or floral group upon which they are based, demonstrating that littoral invertebrate assemblages can provide a statistically robust prediction of nutrient status when samples are collected from hard substrata. While the method was developed specifically to assess nutrient pressures on littoral invertebrates, many lakes are subject to multiple pressures. The development of classification models that incorporate multiple pressures presents a particularly significant challenge for the implementation of the Water Framework Directive, requiring both reliable identification of minimally-impacted reference states and incorporation of pressures that are unlikely to interact in predictable

ways." (Authors) Taxa classified as 'sensitive' to total phosphorus used in the calculation of the %Sensitive to TP Metric include *Brachytron pratense*, *Coenagrionidae*, *Libellulidae*, *Orthetrum cancellatum*, and *O. coerulescens*.] Address: Donohue, I., School of Natural Sciences, Dept of Zoology, Trinity College Dublin, Dublin 2, Ireland. E-mail: ian.donohue@tcd.ie

12528. Drake, M. (2009): A survey of the aquatic invertebrates of RSPB Otmoor Reserve, Oxfordshire. Royal Society for the Protection of Birds: 22 pp. (in English) [UK; Aquatic invertebrates were sampled at 25 waterbodies at Greenaways field at RSPB's Otmoor Reserve on 24 – 25 July 2009. *Brachytron pratense* (scarce), *Anax imperator*, *Ischnura elegans*, *Pyrrhosoma nymphula*, *Coenagrionidae*, *Libellula depressa*, *Libellula quadrimaculata*, and *Sympetrum* sp. (all common) are listed.] Address: Drake, C.M., Orchid House, Burrigge, Axminster, Devon EX13 7DF, UK

12529. DuBois, R.B.; Pleski, J.M.; Smith, W.A.; Epstein, E.J. (2009): Odonata of coastal peatland habitats adjacent to Lake Superior in Wisconsin. *Great Lakes Entomologist* 42(3/4): 158-172. (in English) ["We sampled adults and exuviae of Odonata in eleven coastal fens and poor fens near Lake Superior in Douglas, Bayfield, and Ashland counties in Wisconsin to determine species that were breeding in these areas, and gain knowledge about their relative abundances, flight periods, and nymphal habitats. The flora in these fens was characterized by mats of *Sphagnum* mosses, a variety of ericaceous shrubs, and a number of sedges, among which *Carex lasiocarpa* was most dominant. We averaged seven visits per site from early June through September, 2004, to cover the flight periods of most species of Odonata at this latitude. Fifty species of Odonata were identified at the sites, 33 of which exhibited evidence of breeding. Species commonly breeding in the fens included *Lestes disjunctus*, *Coenagrion resolutum*, *Enallagma hageni*, *Nehalennia irene*, *Aeshna canadensis*, *Williamsonia fletcheri*, *Leucorrhinia frigida*, *L. glacialis*, *L. hudsonica*, *Libellula quadrimaculata*, *Sympetrum obtrusum*, and *S. vicinum*. Eight uncommon species were found to breed in at least one of the fens, including *L. eurinus*, *A. sitchensis*, *A. tuberculifera*, *A. verticalis*, *Somatochlora incurvata*, *W. fletcheri*, *Nannothemis bella*, and *S. danae*. *W. fletcheri* and *S. danae* were found to be more common in these habitats than previously thought, causing their rarity status with the Natural Heritage Inventory of the Wisconsin Dept of Natural Resources to be relaxed, and they will no longer be actively tracked. Emergence and flight periods of Odonata in coastal peatlands began at least a week later than in similar inland peatlands in these counties." (Authors)] Address: DuBois, R., Wisconsin Dept Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12530. DuBois, R.B. (2009): GLOM 2009 Visits Indiana Dunes National Lakeshore. *Argia* 2184): 4-5. (in Eng-

lish) ["The 9th annual Great Lakes Odonata Meeting (GLOM) was held during 10-12 July in Indiana Dunes National Lakeshore (IDNL). The IDNL has not previously received much attention from odonatologists. Surveys were done in the area from 1993-1997 and over 60 species of Odonata were recorded. At the 2009 meeting surveys were done and 42 species were recorded, including eight not found in the previous 1993-1997 survey." (Author)] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12531. Fiorenza, T.; Pecile, I. (2009): The Pygmy damselfly *Nehalennia speciosa* is still part of the Odonata fauna of Italy (Insecta, Odonata, Coenagrionidae). *Boll. Mus. civ. St. nat. Venezia* 60: 17-27. (in English, with Italian summary) ["Authors make a short synthesis on the presence and distribution of *N. speciosa* in Friuli, along with the results of the researches conducted in the Friuli-Venezia Giulia region. The confirmation of the Friulian presence, which was already known in the past, and its discovery in three unknown locations, testify that the species is still present in Italy." (Authors)] Address: Fiorenza, T., Via Morosina, 17/c, 33100 Udine. Italy. E-mail: Tizianofiorenza@libero.it

12532. Fulan, J.A. (2009): Metodologias de amostragem em macrófitas e seu efeito na abundância de odonata. A comparison of two sampling techniques in the study of the macrophytes and their effects on abundance of odonata. *Estud Biol.* 31(73/74/75): 67-73. (in Portuguese, with English summary) ["The aim of this work was assess the distribution of the abundance of Odonata on macrophytes utilizing distinct methods sampling insect net of 0,25 mm mesh size and square method. The samplings were realized in two lakes in its mouth zone into the Jurumirim Reservoir, São Paulo State, Brazil. Three stands of *E. azurea* and three of *S. auriculata* were assessed. In each sampling station were measured surface temperature, dissolved oxygen, pH and conductivity. It was realized two statistical analysis: the Student test to compare the abundances of Odonate with insect net and square and correlation between the abundances of Odonata and abiotic factors. The results showed that the abundances of Odonata did not differ significantly between insect net and square, however, insect net exhibited higher abundance in every one sites of sampling. Insect net also was efficient in the caught of small nymphs as *Telebasis* sp., *Tauriphila* sp. and *Erythemis* sp." (Author)] Address: Fulan, J.A., Doutorado (andamento), Depto de Zoologia, Instituto de Biociências, Univ. Estadual de São Paulo (UNESP), Botucatu, SP - Brazil. E-mail: joaofulan@ig.com.br

12533. Mohi-Ud-Din, I.; Singh, M.; Borana, K. (2009): Statistical approach to monthly variations of physico-chemical factors at Lower lake of Bhopal in relation to insect fauna. *Current World Environment* 4(1): 195-198.

(in English) [The monthly variations of insects was studied in Lower lake of Bhopal (India), during June 2002 to May 2004. The density of total population of insects ranged between 201 org/m² to 450 org/m² and dominated by Coleoptera during most of the study period. Taxa are treated at genus level and include Nearctic Odonata species.] Address: Mohi-Ud-Din, I., Sadhu Vaswani College, Bairagarh, Dept of Applied Aquaculture, Barkatullah University, Bhopal - 462 016, India

12534. O'Carroll, D.C.; Shoemaker, P.A. (2009): Mechanisms for visual detection of small targets in insects. AOARD-09-4058 / FA2386-09-1-4058. Final Performance Report, December 1, 2009: 26 pp. (in English) ["The grantee investigated insect visual detection of small targets against a cluttered, moving background. The work focused on deducing neural mechanisms that underlie this ability, to an understanding of the computational principles. Electrophysiology examined the complex function of small-target sensitive neurons (of dragonflies). Experiments explored the receptive field properties and underlying mechanisms involved in target detection, suggested the form of computational models, and focused anatomical investigations. Conceptual models were translated into numerical models that can be evaluated in simulations under a variety of conditions and compared with biological systems." (Authors)] Address: O'Carroll, D., Discipline of Physiology, School of Medical Sciences, University of Adelaide, Adelaide SA 5005, Australia

12535. Sutton, P.G. (2009): A checklist of the dragonflies (Odonata) of Corfu (Kérkira) including a new record for the Ionian Islands, the Black Pennant *Selysiothemis nigra* (Vander Linden, 1825). Bulletin of the Amateur Entomologists' Society 68(485): 136-144. (in English) [Greece; the checklist for the Odonata of Corfu now includes *S. nigra*, bringing the total number of species recorded from the island to 40, and the current total for the Ionian Islands to 41. The list also includes the very rare and threatened species *Pyrrhosoma elisabethae* and *Ceriagrion geogrifyi*.] Address: Sutton, P.G., 2 Fir Tree Close, Flitwick, Beds. MK45 1NZ, UK. E-mail: petersutton@freeuk.com

12536. Torralba-Burrial, A.; Alonso-Naveiro, M. (2009): Las comunidades de libélulas (Odonata) del Parque Natural de Sierra de Cebollera (La Rioja, N España). Zulia 27: 7-52. (in Spanish, with English summary) ["Odonata communities were sampled in 22 locations in Natural Park Sierra de Cebollera (La Rioja). 21 species were found; eleven have been not recorded before from La Rioja. Records of threatened dragonflies *Coenagrion caerulescens* and *Sympetrum flaveolum* are very interesting. The last species has great populations in Sierra de Cebollera. Dragonfly communities are analysed showed differences between running and stagnant waters. Biogeographical analysis shows a low percentage of Ethiopic elements and high percentage of West-

Mediterranean elements. A provisional checklist of La Rioja odonates is included." (Authors)] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

12537. Walia, G.K. (2009): The impact of industrial effluent on moulting and emergence in the damselfly *Ceriagrion coromandelianum* (Fabricius) (Odonata: Zygoptera: Coenagrionidae). National journal of Life Sciences 6(1): 99-102. (in English) ["The antipenultimate and penultimate larval instars of *C. coromandelianum* were reared in effluent free medium. The antipenultimate larvae required 32 days to become adult and penultimate larvae needed 9 days to become final instars. In sub lethal concentration of industrial effluent the moulting is arrested and all the antipenultimate larvae died in 25-32 days, while in case of penultimate larvae, all of them died within 15 days. However, few of them exhibited incomplete moulting but died without eclosion on the same day. Rate of oxygen consumption and various biochemical constituents in the tissues were decreased significantly in the effluent treated larvae. These could be the probable cause for the mortality of larvae under the toxicity of industrial effluent. As industrial effluent inhibits moulting thus juvenomimetic action could be attributed to it." (Author)] Address: Walia, Gurinder Kaur, Dept of Zoology & Environmental Sciences, Punjabi University, Patiala-147002, Punjab, India. E-mail: gurinderkaurwalia@yahoo.co.in

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12538. Henderson, C.L.; Adams, S. (il.). (2010): Butterflies, moths, and other invertebrates of Costa Rica: a field guide. Mariposas, polillas y otros invertebrados de Costa Rica: una guía de campo. Editorial Austin, TX, University of Texas Press, US: 173 pp. (in English) ["At the biological crossroads of the Americas, Costa Rica hosts an astonishing array of plants and animals-over half a million species! Ecotourists, birders, and biologists come from around the world, drawn by the likelihood of seeing more than three or four hundred species of birds and other animals during even a short stay. To help all these visitors, as well as local residents, identify and enjoy the wildlife of Costa Rica, Carrol Henderson published Field Guide to the Wildlife of Costa Rica in 2002, and it instantly became the indispensable guide. Now Henderson has created a dedicated field guide to more than one hundred tropical butterflies, moths, and other invertebrates that travelers are most likely to see while exploring the wild lands of Costa Rica. He includes fascinating information on their natural history, ecology, identification, and behaviour gleaned from his forty years of travels and wildlife viewing, as well as details on where to see these remarkable and beautiful creatures. The butterflies, moths, and other invertebrates are illustrated by over 180 stunning and colourful photographs, most of which were taken in the wild by Hen-

person. A detailed and invaluable appendix that identifies many of Costa Rica's best wildlife-watching destinations, lodges, and contact information for trip-planning purposes completes the volume." (Publisher) The book includes a brief chapter on Pseudostigmatidae.] Address: not stated

12539. Indermuehle, N.; Angélibert, S.; Rosset, V.; Oertli, B. (2010): The pond biodiversity index "IBEM", a new tool for the rapid assessment of biodiversity in ponds from Switzerland. Part 2. Method description and examples of application. *Limnetica* 29(1): 105-119. (in English, with Spanish summary) ["Ponds are now widely recognized to contribute significantly to regional freshwater biodiversity. Therefore, tools to easily and rapidly assess biological quality specifically for these aquatic habitats have been increasingly requested by conservation planners and nature managers. In close association with practitioners, we developed such a method for Switzerland; the pond biodiversity index "IBEM". The IBEM-Index is based on the assessment of the taxonomic richness of 5 groups: aquatic vegetation, Gastropoda, Coleoptera, adult Odonata and Amphibia. No abundance data are necessary and genus level identification is required for all groups except Amphibia (species level). The sampling methodology is a stratified random strategy and allows the use of richness estimators to transform the observed taxonomic richness (Sobs) into true taxonomic richness (Strue). As the IBEM assessment follows the methodology presented in the Water Framework Directive, it is based on the calculation of the ratio of true taxonomic richness (Strue) to reference-based predicted richness (Sref). Each of the five taxonomic groups is assessed separately and the overall biological quality of any given pond (i.e. the IBEM-Index) is the average of the five ratios. This score is later converted into one of five quality classes for each pond: bad (0 to 0.2), poor (> 0.2 to 0.4), moderate (> 0.4 to 0.6), good (> 0.6 to 0.8), and high (> 0.8 to 1). In this paper, the implementation of the IBEM-Index is described in detail. The sampling methodologies are developed (for the biodiversity and the environmental variables) as well as the assessment methodology. Finally, two examples are presented in detail, for a "good" quality pond and for a "bad" quality pond. The method implementation also includes a website (<http://campus.hesge.ch/ibem>) which allows the online calculation of the index, and provides support for both sampling and assessment methodologies to users. The IBEM-Index is a rapid assessment method which gives an overall value of pond biodiversity in terms of taxa richness and can be used, for example, in regional screenings or site monitoring in Switzerland. Moreover, as biodiversity is generally recognized as a good indicator of global ecological quality, the IBEM-Index can also be used to investigate ecosystem quality.] Address: Oertli, B., HEPiA Geneva, Univ. of Applied Sciences Western Switzerland, technology, architecture and landscape. 1254 Jussy-Geneva, Switzerland. E-mail: beat.oertli@hesge.ch

12540. Ramirez, A. (2010): Macroinvertebrados de agua dulce de Costa Rica I, Capítulo 5. Odonata. *Rev. Biol. Trop.* 58 (Suppl. 4): 97-136. [The chapter introduces into the morphology of Odonata and gives detailed keys at the genus level to identify the regional Odonata fauna (imagos, larvae)] Address: Ramírez, A., Inst. para Estudios de Ecosistemas Tropicales, Univ. de Puerto Rico, Puerto Rico. E-mail: alonso.ites@gmail.com

12541. Scott, R.W. (2010): The diversity and composition of benthic macroinvertebrate assemblages in streams in the Mackenzie River System, Northwest Territories. M.Sc. thesis, University of Waterloo, Ontario, Canada: X + 138 pp. (in English) [Impending natural resources development and concern about the effects of climate change have spurred increased efforts to study and monitor aquatic habitats in the Mackenzie River system. As part of Environment Canada's attempt to survey the system in advance of the construction of the Mackenzie Gas Pipeline, benthic macroinvertebrates were sampled at 50 streams spanning the geographical range of the Mackenzie system in the Northwest Territories, Canada, to assess spatial patterns in diversity and assemblage structure and the environmental factors driving them. Replicated, quantitative D-net samples were collected during the late summer of 2005 through 2008, mostly at crossings of the proposed pipeline route. 373 macroinvertebrate taxa were recorded, mainly aquatic insects, which were identified to the genus or species levels; other groups were identified to higher taxonomic levels. Ephemeroptera and Plecoptera diversity declined along a latitudinal gradient, while Trichoptera diversity declined in the middle of the latitudinal range and rose towards the far north. Chironomidae (Diptera) increased in diversity and abundance towards the far north, becoming dominant in the northern subarctic forest and lowland tundra of the Mackenzie Delta. Diversity, measured as the average generic richness per stream, correlated with a composite environmental variable representing stream size, but not much else; spatial trends in local generic richness were only apparent in the far north of the study area. Regional diversity was assessed using rarefaction curves and showed a clear decrease from south to north across the study area for most taxa; the major exception was the chironomid subfamilies Orthocladiinae and Chironomini, the former being diverse throughout the study area and the latter increasing in diversity on the tundra. Odonata, Hemiptera and Coleoptera were well-represented in the south of the study area, but decreased sharply in diversity and abundance in the north; another common order, Megaloptera, was entirely absent from the study area, as were crayfish. Community composition varied along a latitudinal gradient, with some species restricted to northern latitudes and many more species restricted to the southern areas. Composition varied by region, as did the environmental factors that control it. Streams in the north of the system are connected to hundreds of small lakes and tend to freeze in the winter,

which increases habitat stability; assemblages in this region were characterized by relatively large chironomids that are usually associated with lentic habitats and by a lack of taxa that are intolerant to freezing. Substrate was the main factor explaining differences in assemblage composition in this region. Just to the south, alluvial streams are more common and permafrost is continuous with very shallow active layers, which likely results in intense discharge peaks and ice scour in the spring and flashy summer hydrographs. Invertebrates in this region were mainly short-lived, small sized orthoclads, baetids and chloroperlids; the annual disturbance regime seems likely to be an important factor shaping community composition in this region. Many streams in this region received input from saline springs, resulting in perennial flow, and these streams harboured several taxa that were absent or rare in other streams at similar latitudes, including several stoneflies (e.g. *Pteronarcys*, *Sweltsa*); the presence of flow during the winter was found to be a major factor affecting community composition in this region, which surrounded the town of Norman Wells, NT. Nutrient dynamics appeared to be important in structuring benthic assemblages in the southern portion of the study region, with high-nutrient streams supporting a diverse fauna which included many taxa that were absent in the north, while communities in low-nutrient streams were more similar to the northern alluvial stream fauna. There was no spatial distinction between low- and high-nutrient streams in the southern region, and the difference may be due to the local conditions of permafrost, which is patchy and discontinuous in the region. Evidence that winter ice and permafrost conditions are important drivers of benthic invertebrate diversity and community composition in the Mackenzie system, along with the latitudinal gradients which are consistent with a temperature/climate gradient, raises the possibility that benthic assemblages may be useful as indicators of effects of global climate change on freshwater habitats in the Canadian north. More immediately, construction of the Mackenzie Gas Pipeline may affect stream habitat due to sedimentation, and plans for the operation of the pipeline have raised concerns about potential effects on permafrost conditions. Implications for development of a biomonitoring program utilizing benthic invertebrates and their potential as indicators of climate change are discussed." (Author) Mainly in table 10, the following Odonata taxa are listed: *Aeshna* sp., *Somatochlora minor*, *Epitheca canis*, *Amphiagrion* sp., *Coenagrion/Enallagma* sp., *Lestes unguiculatus*, *Ophiogomphus severus*.] Address: not stated

12542. Sy, T.; Schulze, M. (2010): *Leucorrhinia pectoralis* (Charpentier, 1825) – Große Moosjungfer. Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt Halle, Sonderheft 2/2010: 77-93. (in German) [The paper compiles the regional knowledge on ecology and distribution of *L. pectoralis* and assesses the current local status within the Natura 2000 network of protected areas in Sachsen-Anhalt, Germany.] Address: Sy, T.,

RANA - Büro für Ökologie und Naturschutz, Frank Meyer, Mühlweg 39, D-06114 Halle(Saale), Germany. E-mail: thoralf.sy@rana-halle.de

12543. Sy, T.; Schulze, M. (2010): *Ophiogomphus cecilia* (Fourcroy, 1785) – Grüne Keiljungfer. Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt Halle, Sonderheft 2/2010: 96-112. (in German) [The paper compiles the regional knowledge on ecology and distribution of *O. cecilia* and assesses the current local status within the Natura 2000 network of protected areas in Sachsen-Anhalt, Germany.] Address: Sy, T., RANA - Büro für Ökologie und Naturschutz, Frank Meyer, Mühlweg 39, D-06114 Halle(Saale), Germany. E-mail: thoralf.sy@rana-halle.de

12544. Sy, T.; Schulze, M. (2010): *Coenagrion mercuriale* Charpentier, 1840 – Helm-Azurjungfer. Berichte des Landesamtes für Umweltschutz Sachsen-Anhalt Halle, Sonderheft 2/2010: 63-76. (in German) [The paper compiles the regional knowledge on ecology and distribution of *C. mercuriale* and assesses the current local status within the Natura 2000 network of protected areas in Sachsen-Anhalt, Germany.] Address: Sy, T., RANA - Büro für Ökologie und Naturschutz, Frank Meyer, Mühlweg 39, D-06114 Halle(Saale), Germany. E-mail: thoralf.sy@rana-halle.de

12545. Torralba-Burrial, A.; Ocharan, F.J. (2010): Presencia de *Ischnura elegans* (Vander Linden, 1829) (Odonata: Coenagrionidae) en 1980 en Louro (Galicia, noroeste de España). Boletín de la Sociedad Entomológica Aragonesa 46(1): 466. (in Spanish, with English summary) ["The study of *Ischnura* material collected in 1980 in Louro shows that colonization of this coastal lagoon by *Ischnura elegans* occurred earlier than indicated by the scientific literature. This fact should be taken into account when evaluating the replacement processes of the Iberian-Maghrebian endemic *Ischnura graellsii* by its vicarious cogenetic *I. elegans*." (Authors)] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12546. Torralba-Burrial, A.; Ocharan, F.J. (2010): Primera cita de *Anax parthenope* (Selys, 1839) (Odonata: Aeshnidae) de La Rioja (España). Boletín de la Sociedad Entomológica Aragonesa 46(1): 418. (in Spanish, with English summary) [El Villar de Arnedo (La Rioja, Spain), 12-VIII-1994 Leg. María José Bañuelos. 30TWM78, 400 m a.s.l.] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Univ. de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12547. Torralba-Burrial, A.; Mezquita, I. (2010): De Monstruos y Prodigios (30): Teratologías alares en *Symptetrum Newman*, 1833 (Odonata: Libellulidae). Boletín de la S.E.A. 47: 463-466. (in Spanish, with English summary) ["Wing teratologies, possibly caused by extension

problems during emergence, are reported in three individuals of *Sympetrum fonscolombii*, one of *S. meridionale* and one of *S. striolatum*." (Authors)] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12548. Walther, G.-R.; Nagy, L.; Heikkinen, R.K.; Penuelas, J.; Ott, J.; Pauli, H.; Pöyry, J.; Berger, S.; Hickler, T. (2010): Observed climate-biodiversity relationships. In: Settele, J., L. Penev, T. Georgiev, R. Grabbaum, V. Grobelnik, V. Hammen, S. Klotz, M. Kotarac & I. Kuehn (Eds): Atlas of Biodiversity Risk. Pensoft Publishers, Sofia: 74-75. (in English) [The range expansion of *Crocothemis erythraea* in Germany in the course of the last decades of the twentieth century is presented in more details. Additional odonatan range extensions or extractions are briefly outlined.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O. GmbH@t-online.de

12549. Zhao, H.X.; Yin, Y.J.; Zhong, Z. (2010): Nano fibrous multilayered composites in pterostigma of dragonfly. Chinese Science Bulletin 55(18): 1856-1858. (in Chinese) ["The sections of the pterostigma of *Crocothemis servilla* are observed through FEG-ESEM, and interesting nano fibrous multilayered structures are discovered. The sleeve-like pterostigma has a center layer with the thickness of 2~3 µm. The center layer is composed of more than twenty ultra-thin nano layers with the thickness of 90~150 nm. Every ultra-thin nano layer is formed by parallel nano fibers adhered one-by-one. The marvelous nano fibrous multilayered structure provides reference for mankind to understand better the function of the pterostigma and to improve better the bionics manufactures." (Authors)] Address: Zhong, Z., School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai 200092, China. E-mail: zhongk@tongji.edu.cn

12550. Rao, D.V.; Chandra, K.; Devi, K. (2010 (?)): Endemic fauna of Andaman and Nicobar Islands, Bay of Bengal. Zoological Survey of India. Kolkata: 290 pp. (in English) [On page 14, eleven Odonata taxa are checked and discussed in more details on pages 147-149.] Address: Rao, D.V., Freshwater Biology Regional Centre, Zoological Survey of India, Hyderabad-500048

2011

12551. Babu, R. (2011): New distributional record of coenagrionids (Odonata: Zygoptera: Coenagrionidae) from Himachal Pradesh, India. Rec. zool. Surv. India 111(4): 73-77. (in English) ["A list of ten species under six genera of family Coenagrionidae (Zygoptera) constituting the first record from Himachal Pradesh State, along with necessary collection data and their distribution, has been provided. The distribution of three genera *Aciagrion* Selys, *Mortonagrion* Fraser and *Rhod-*

ischnura Laidlaw are new records to Himachal Pradesh. Three species *Aciagrion approximans*, *A. azureum*, and *Mortonagrion aborense* are reported for first time from the outside of Eastern India. *Agriocnemis splendidissima*, *Pseudagrion hypermelas*, and *P. microcephalum* have been recorded for the first time from the Western Himalaya Region." (Authors)] Address: Babu, R., Zoological Survey of India, "M"-Block, New Alipore, Kolkata-700 053

12552. Bagworth, T. (2011): Reports from Coastal Stations—2010: Gibraltar Point NNR, Lincolnshire. *Atropos* 42: 66. (in English) [UK, *Erythromma najas*, *E. viridulum*, *Brachytron pratense*, *Sympetrum flaveolum*, *S. fonscolombii*] Address: not stated

12553. Benken T.; Kommander, M. (2011): Die Senegal-Pechlibelle (*Ischnura senegalensis*) schlüpft in einem Aquarium bei Ulm. *Mercuriale* 11: 51-52. (in German, with English summary) [Baden-Württemberg, Germany; "We report on three specimens of *I. senegalensis* accidentally introduced to Germany in 2011. The odonates were encountered in the surroundings of Ulm and we assumed the larvae were imported by exotic aquatic plants." (Authors)] Address: Benken, T. Nuitsstr. 19, 76185 Karlsruhe, Germany. E-mail: theodor@benken-online.net

12554. Bowman, N. (2011): Reports from Coastal Stations—2010: Eccles-on-Sea, Norfolk. *Atropos* 42: 65-66. (in English) [UK, 19-VII-2010, influx of 50+ specimens of *Erythromma viridulum*] Address: not stated

12555. Burwell, C.J.; McDougall, A.; Nakamura, A.; Lambkin, C.L. (2011): New butterfly, hawkmoth (Lepidoptera) and dragonfly (Odonata) records from vegetated coral cays in the southern Great Barrier Reef, Queensland. *Australian Entomologist* 38(2): 75-88. (in English) [Cays, including the first data from Lady Elliot and North Reef Islands, are presented and previously published records summarised. ... Not surprisingly, the Odonata fauna of the Capricornia Cays is depauperate, with only 10 species recorded from our survey. Most are strong-flying species and/or species that are known to disperse or be blown long distances from their larval breeding sites. Seven are distributed throughout most or all of Australia with the other three occurring in northern and eastern Australia: *Diplacodes trivialis* occurring as far south as southern NSW, *Orthetrum sabina* as far south as south-eastern Queensland and *O. serapia* as far south as Rockhampton, central Queensland (Theischinger & Endersby 2009). Odonata are probably regular visitors to islands of the Capricornia Cays, but the absence of permanent water bodies means that they are unable to establish resident populations. However, on Lady Elliot Island there is a sizable depression which fills with rainfall and might provide temporary larval habitat for some dragonflies and damselflies. All 10 odonate species we collected from Lady

Elliot Island are known to breed in temporary water bodies (Watson et al 1991, Theisinger and Hawking 2006). We recorded only two dragonfly species from other islands: *Ischnura aurora* from Lady Musgrave and North Reef Islands and *Pantala flavescens* from North Reef Island." (Authors)] Address: Burwell, C.J., Biodiversity Program, Queensland Museum, PO Box 3300, South Brisbane, Qld 4101, Australia

12556. Clancy, S.P. (2011): Reports from Coastal Stations—2010: Dungeness area, Kent Sean. *Atropos* 42: 55-57. (in English) [UK, *Anax parthenope*, *Erythromma viridulum*] Address: not stated

12557. Deans, M.J. (2011): Reports from Coastal Stations—2010: Bawdsey Peninsula, Suffolk. *Atropos* 42: 62-63. (in English) [UK, *Chalcolestes viridis*, *Erythromma viridulum*] Address: not stated

12558. Dewick, S., (2011): Reports from Coastal Stations—2010: Curry Farm, Bradwell-on-Sea, Essex. *Atropos* 42: 61. (in English) [UK; *Calopteryx splendens*; *Sympetrum striolatum* at light trap] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

12559. DuBois, R.B. (2011): Comparison of field- and classroom-based forms of environmental education to motivate adult learner involvement in Citizen-Based Monitoring of Odonata. Master of Science in Education, University of Wisconsin – Superior: VII + 74 pp. (in English) ["Environmental education has been one of the primary means used to recruit volunteers for citizen-based monitoring partnerships. However, little research has been done to investigate the forms of environmental education that are most effective in promoting these partnerships or how to effectively motivate adult learners who will become meaningfully involved in them. This study sought to determine the relative effectiveness of two forms of short-term environmental education in motivating adult learners to become involved in a citizen-based monitoring activity related to dragonflies and damselflies (Odonata), called the Wisconsin Odonata Survey (WOS). The two forms of environmental education examined were 1) a classroom-based interactive lecture form in which PowerPoint presentations of learning content and accompanying question and answer periods were used in conjunction with exploration of display items and live specimens, and 2) a field-based guided discovery form in which learning content was delivered orally and with illustration poster boards, after which students observed odonate behaviour in the wild, captured and handled live specimens, and practiced making field identifications. Three replications of each form of education were examined during summer of 2010, and student intent to become involved with WOS was measured using survey questionnaires given to willing volunteers immediately after each education event and again through the mail after six weeks. Re-

sults were largely equivocal, but suggested the possibility of a weak advantage with the use of field-based guided-discovery learning over classroom-based interactive lecturing when recruiting citizen volunteers for WOS. Both forms of education had value in other areas including building a greater understanding of the need to protect odonates and their habitats, increasing interest in odonates, and prompting participants to learn more about them." (Author)] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12560. Ficsor, M.; Szabo, A. (2011): Contribution to the aquatic macroinvertebrate fauna of Szinva and its tributaries, NE Hungary. *Acta Biol. Debr. Oecol. Hung.* 26: 75-88. (in English, with Hungarian summary) [The list of taxa includes *Calopteryx splendens*, *Platycnemis pennipes*, *Coenagrion puella*, *Ischnura pumilio*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Orthetrum brunneum*, *O. cancellatum*, and *O. coerulescens*.] Address: Ficsor, M., North Hungarian Regional Environmental, Nature Conservation and Water Management Inspectorate, Laboratory, 4. Mindszent tér, H-3530, Miskolc, Hungary. E-mail: ficsor.mark@emikofe.kvvm.hu

12561. Fiedler, W. (2011): Kleines Drama im Teich. *Mindori* 22(Sommer 2011): 40-44. (in German) [Pictures of an *Aeshna* larva demonstrate preying of a newt larva and a mollusc.] Address: not stated

12562. Gnanasekaran, S.; Paulraj, M.G.; Sivasankaran, K.; Ignacimuthu, S. (2011): Diversity of Odonata (insecta) in the areas of Poondi reservoir (Tiruvallur district) in Tamil Nadu. *Hexapoda* 18(1): 19-24. (in English) ["The Odonata diversity and species composition in the surrounding areas of Poondi reservoir in Tiruvallur district of Tamil Nadu were studied from January 2009 to November 2010. The specimens were collected from agricultural crops, grasses, herbs and shrubs by sweeping net. Eighteen different species of Odonates belonging to 15 genera and four families were recorded during the study period. Family Libellulidae was predominant in this area with 11 species. Family Coenagrionidae was represented by five species. Other families viz., Lestidae and Gomphidae were represented by only one species each. The Shannon's and Simpson's diversity indices were maximum during Sep-Nov. 2009 with 2.381 and 0.8817 scores respectively. Maximum evenness of 0.6306 was recorded during Jun-Aug. 2010." (Authors)] Address: Ignacimuthu, S., Entomology Research Institute, Loyola College, Chennai – 600 034. Tamil Nadu, India. E-mail:entolc@hotmail.com

12563. Harvey, R.; Higgott, J. (2011): Reports from Coastal Stations—2010: Minsmere RSPB, Suffolk. *Atropos* 42: 63-64. (in English) [UK, *Anaciaeschna isosceles*] Address: not stated

- 12564.** Hodgson, K.I.; Howe, P. (2011): Reports from Coastal Stations—2010: Sandwich Bay Bird Observatory, Kent. *Atropos* 42: 59. (in English) [UK; *Lestes barbarus*, *Libellula fulva*, *L. quadrimaculata*, *Sympetrum fonscolombii*] Address: not stated
- 12565.** Hunter, I. Hunter, S. (2011): Reports from Coastal Stations—2010: Elms Farm, Icklesham, East Sussex. *Atropos* 42: 54-55. (in English) [UK, 27-VII-2010, maximum peak of 160+ specimens of *Erythroma viridulum*] Address: not stated
- 12566.** Ikemeyer, D.; Olthoff, M. (2011): Dragonfly survey in the peat bog of Yenicağa lake, province Bolu, Turkey. Report. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Eschborn. September 2011: 22 pp. (in English) ["A dragonfly investigation was carried out in the peat bog around Yenicağa lake in June and August 2011. During this investigation, 37 dragonfly species could be recorded. The peat bog is a valuable habitat for many dragonfly species. Highlights include *Leucorrhinia pectoralis* and *Cordulia aenea*, which were mainly found at peat cuttings. Further species like *Coenagrion pulchellum* or *Pyrrhosoma nymphula* tend to be confined to this habitat, too. Open bog habitats with shallow ponds and seasonally flooded depressions were important habitats for species like *Lestes dryas*, *Ischnura pumilio* or *Sympetrum flaveolum*. The banks of Yenicağa lake are characterized by high densities of *Sympetrum*-species among others. Furthermore, some running waters were investigated." (Authors)] Address: Ikemeyer, D., Biologische Station Zwillbrock e.V., Zwillbrock 10, 48691 Vreden, Germany. E-mail: info@bs-zwillbrock.de
- 12567.** Kawano, M.; Iwakiri, J.; Tachiyama, R.; Yamada, S. (2011): Estimation of water quality at Sakatani and Hiroto Rivers based on zoobenthos. Annual Report of the Miyazaki Prefectural Institute for Public Health and Environment 23: 112-118. (in Japanese, with English summary) ["The estimation of water quality based on ASPT (Average Score Per Taxon) is used a lot as an investigation indicating the river conditions. And the biological indicator by the zoobenthos is very important to make up for the chemical properties. Therefore, we have examined the water quality and biota of rivers flowing through Miyazaki prefecture since 1993. We investigated 3 points downward along the stream of Sakatani and Hiroto Rivers situated in the south part of the prefecture. In order to evaluate the river environment based on zoobenthos, we used ASPT and DI. Compared to the research in 1994, BOD (Biochemical Oxygen Demand) was significantly reduced. More species of zoobenthos were found, ASPT value was higher than 7.0 at all points except Obi. The result indicated that both rivers have generally maintained the water quality, biological condition and biodiversity at a good level." (Authors) The list of species includes *Sieboldius albarda*, *Sinogomphus flavolimbatus*, and *Onychogomphus viridicostus*.] Address: Kawano, M., Environmental Science Division, Miyazaki Prefectural Museum of Nature and History, 2-4-4 Jingu, Miyazaki, Miyazaki Prefecture 880-0053, Japan
- 12568.** Knill-Jones, S. (2011): Reports from Coastal Stations—2010: Isle of Wight. *Atropos* 42: 50-52. (in English) [UK, Brading Marsh, River Yar, *Libellula fulva*] Address: Knill-Jones, S.A., 2 School Green Road, Freshwater, Isle of Wight, PO40 9AL, UK
- 12569.** Kovács, K.; Csányi, B.; Deák, C.; Kálmán, Z.; Kovács, T.; Szekeres, J. (2011): Results of the Rába survey 2009 on aquatic macroinvertebrates 1. Faunistic results. *Acta Biol. Debr. Oecol. Hung.* 26: 135-151. (in Hungarian, with English summary) [In a joint Austrian-Hungarian study of the river Raab/Rába-system, in June 2009 eight Odonata species were collected: *Calopteryx splendens*, *C. virgo*, *Platycnemis pennipes*, *Ischnura elegans pontica*, *Stylurus flavipes*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Onychogomphus forcipatus*.] Address: Kovács, K., North Transdanubian Regional Environmental, Nature Conservation and Water Management Inspectorate, Laboratory, Török Ignác u. 68., H-9028 Győr, Hungary. E-mail: krik@freemail.hu
- 12570.** Lejfelt-Sahlén, A. (2011): *Sympetrum pedemontanum* – ny trollslända i Sverige. *fauna & flora* 106(3): 40-41. (in Swedish) [*S. pedemontanum* was recorded at 4-IX-2011, along the river Husqvarna at Ramsjöholm about 15 km NE Stockholm, Sweden. This is a new species for Sweden.] Address: Anna Lejfelt-Sahlén c/o Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@set.hh.se
- 12571.** Marquez Rodriguez, J. (2011): *Trithemis kirbyi ardens* (Gerstaecker, 1891) (Odonata: Libellulidae); datos de campo sobre su ecología en el Sur de España y primeros registros para la provincia de Sevilla (España). *Métodos en Ecología y Sistemática* 6(1-2): 10-20. (in Spanish, with English summary) ["In areas of the countryside of Seville (southern Spain) with a high burden and cattle farm, the number of odonates is reduced to a few species adapted to live in environments where there is a strongly marked by seasonal high temperatures and low rainfall in summer. The loss of natural habitats by human action or phenomena such as desertification, diffuse pollution of water by the subscriber of farmland, and the evidence of warming and climate change in countries like Spain, promote migration Odonata of African origin to Europe via the Mediterranean Sea. The observation of several adult specimens of *Trithemis kirbyi* at various locations near Corbones and Guadaira river valleys, to certify the first records of the species for the province of Seville and its colonization eroded by media exploitation of the earth, where most competitors are African species, ensuring suc-

successful expansion toward the north. (Author)] Address: Márquez Rodríguez, J., Departamento de Sistemas Físicos, Químicos y Naturales (Zoología). Universidad Pablo de Olavide, A-376 km 1, 41013 Sevilla, Spain. E-mail: jmarrod1@admon.upo.es

12572. Mezquita Aranburu, I.M.; Torralba Burrial, A. (2011): Primera cita de *Trithemis annulata* (Palisot de Beauvois, 1805) (Odonata, Libellulidae) para Navarra (norte de España). Boletín de la SEA 49: 360. (in Spanish, with English summary) [20-VIII-2010, male near Balsa del Pulguer (30TXM0690456752, 322 m asl), Cascante (Navarra), Spain] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

12573. Odin, N. (2011): Reports from Coastal Stations—2010: Landguard Bird Observatory, Suffolk. *Atropos* 42: 62. (in English) [UK, *Chalcolestes viridis*, *Anax imperator*, *Libellula depressa*] Address: not stated

12574. Premachandran, S.; Giacobello, M. (2011): The effect of wing corrugations on the aerodynamic performance of low-Reynolds number flapping flight. 17th Australasian Fluid Mechanics Conference, Auckland, New Zealand, 5-9 December 2010: 4 pp. (in English) ["The effect of wing corrugations on the aerodynamic performance of low Reynolds number hovering flight is investigated using two-dimensional Computational Fluid Dynamics. Corrugated sections with peaks that follow the contours of NACA sections are compared with the corresponding NACA airfoils, a flat plate of the same wall thickness as the corrugated sections, and a 1:4 ellipse. Simplified kinematics comprising combined heaving and pitching motions were simulated, and it was found that the thinner airfoil-type sections produced more lift than the thicker sections. The corrugated sections were found to perform similarly regardless of the size of the corrugated peaks and the orientation of the leading edge. The net vertical force in all of the corrugated cases was approximately the same as for the flat plate, indicating that wing corrugations produce no direct benefit in the generation of net vertical force for wings operating with hovering kinematics." (Authors) The paper includes references to dragonflies.] Address: Premachandran, S., Air Vehicles Division, Defence Science and Technology Organisation, 506 Lorimer St, Fishermans Bend VIC 3207, Australia

12575. Rai, K.R.K. (2011): Comparative studies on lentic environment of Mai pokhari, Ilam and Kechana jheel wetland ecosystems, Jhapa, Nepal (With reference to bottom dwelling fauna). *Nepalese Journal of Biosciences* 1: 32-36. (in English) ["Mai Pokhari is a mountain lake situated in midland at an altitude of 2150 m from sea level whereas Kechana jheel is situated in lowland (Tarai) at an altitude of 63 m from the sea level respectively. The lentic environments of the both lakes vary in

the composition of bottomdwelling fauna and limnetic fauna respectively. The comparative studies were carried out in two different years by sampling the macroinvertebrates periodically. The bottom-fauna at Mai pokhari was found higher than Kechana jheel. Mai pokhari is still in natural condition but Kechana jheel is losing its native entity because of aquaculture. Mainly, the abundance of Chironomids showed the stratification in Mai pokhari but abundance of Trichoptera and Coleoptera in Kechana jheel indicate unstable bottom condition because continuous application of manure for pre-conditioning it as a fish pond." (Author) Odonata abundance is less than 1% of total abundance of macrozoobenthos.] Address: Kalu Ram Khambu Rai, Dept Zoology, Mechi Campus, Tribhuvan University, Bhadrapur-5, Jhapa. E-mail: draikr@ntc.net.np

12576. Rojas-Riano, N.C. (2011): Sistemática del género *Polythore* Calvert, 1917 (Odonata: Polythoridae). Maestría thesis, Biología, línea Sistemática, Universidad Nacional de Colombia: 118 pp. (in English, with Spanish summary) ["The Neotropical damselfly genus *Polythore* is mainly distributed in western South America, in the foothills of the eastern slope of the Andes between Bolivia and Venezuela and in the Amazon region. In the present study, the 19 species of *Polythore* are revised based on morphological adult male characters from wing venation, wing pattern coloration, and genital ligula. Only general characters of females are included due to their polymorphism and to the limited availability of specimens in collections. Presence of supplementary sectors between RP2 and IR2 proximal to the pterostigma was found as a character that taxonomically defines the genus. Based on this character the new combination *P. chiribiquete* is proposed. The status of the populations proposed in the literature for species of the *picta* group is assessed by morphometric and multivariate analyses. Clear differentiation was found in populations of *P. procera* and *P. gigantea*. Populations of the remaining species differ only by characters proposed in the literature but not by other characters studied. Descriptions, illustrations, and an identification key to adult males are provided. A phylogenetic analysis of 49 species, including all the species of *Polythore* plus 29 out-group species, was performed based on wing venation, wing pattern coloration of male and female, and male genital ligula. Character coding and managing was conducted through DELTA package. Heuristic search tree was developed under the Ratchet method using NONA of the WinClada package. Partitioned analysis using male and female characters were designed and were compared with a total evidence analysis. Also, the relationship between morphological intraspecific variability and phylogenetic signal was studied using the species of *Polythore* as a model, through lineal and geometric morphometrics approach in two body regions: wings and genitalia. Total evidence analysis had the lowest percentage of strict homologies (22%), being near the percentage of partitioned analysis of female

characters (32%), while partitioned analysis of male characters had the highest percentage of strict homologies with 37%. The statistical support for individual clades was assessed with Bootstrap and Bremer values. A strict homology as support of the monophyly of Polythore was found. Of the six species groups proposed in the literature, only three were found to be natural groups. The sister group of Polythore is Euthore. Polythore williamsoni is registered for the first time for Colombia" (Author)] Address: Rojas-Riano, Nancy, Biologist. Graduate student M.Sc., Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Sede Bogotá. Carrera 30 no. 45-03 AA. 7495. Bogotá D.C., Colombia. E-mail: ncrojasr@unal.edu.co

12577. Scott, D.A. (2011): Reports from Coastal Stations—2010: Dursey Island, Co. Cork. *Atropos* 42: 71. (in English) [Ireland, *Aeshna juncea*, *Sympetrum striolatum*] Address: not stated

12578. Silveira, M.R.; Bemvenuti, M.; Moresco, A. (2011): Hábito alimentar de *Oligosarcus robustus* Menezes, 1969 e de *Oligosarcus jenynsii* (Günther, 1864), no sul do estado do Rio Grande do Sul. *Atlântica*, Rio Grande 33(1): 73-86. (in Portuguese, with English summary) ["The characiform fishes *O. robustus* and *O. jenynsii* inhabit the coastal lagoons of the extreme southern Brazil. They "were characterized according to their morphologic variation and feeding structures as well as to their feeding habit. Specimens were collected in two periods (July and December 2001) in the Flores, Nicola, Jacaré and Mangueira lagoons. The food range was determined using the frequency of occurrence (FO%) and gravimetric methods (G%). A total of 164 specimens were analyzed, 67 of which had empty stomachs. The most frequent food items for *O. robustus* were insects FO=58,6%, fish FO=46,3% and crustaceans FO=12,2%. For *O. jenynsii* insects were dominant FO=83,9%, followed by crustaceans FO=35,7% and fish FO=26,8%. Insects were more frequent during summer for both species, Ephemeroptera and Odonata were the dominant groups. Fish were the main item in the diet of *O. robustus* during winter while *O. jenynsii* maintained the preference for the same group of insects during the cold season. The feeding strategy determined by the Amundsen graphic method showed that *O. jenynsii* is generalist preferring insects throughout the year while *O. robustus* is generalist opportunistic choosing insects during summer and fish in the wintertime." (Authors)] Address: Silveira, Marta Rahal, Unive Federal do Rio Grande – Inst. de Oceanografia, Caixa Postal 474 - Rio Grande, RS, Brasil. 96.201-900. E-mail: martarahal@bol.com.br

12579. Simaika, J.P. (2011): Practical conservation planning from local to continental scales using freshwater invertebrates. Dissertation presented for the degree of Doctor of Philosophy in Conservation Ecology at the University of Stellenbosch: XVI + 123 pp. (in English)

["Dragonflies are a valuable tool for assessing aquatic systems and have been used as indicators of ecological health, ecological integrity, and environmental change, including climatic change. In four separate studies I explored the usefulness of dragonflies as surrogates in biomonitoring, site prioritization and indication of global climate change. In the use of dragonflies for biomonitoring, I field-tested a freshwater ecological integrity index, the Dragonfly Biotic Index (DBI), based on dragonfly assemblages at the local scale, and compared the DBI to a standard freshwater benthic macroinvertebrate-based freshwater health index. Overall, dragonflies were more sensitive to changes in river condition than were macroinvertebrates, and the DBI site value and macroinvertebrate scores were highly significantly correlated. I conclude that dragonfly assemblages in the form of a DBI are an excellent tool for environmental assessment and monitoring freshwater biodiversity, with the potential to replace benthic macroinvertebrate-based freshwater quality assessments. In the second study, I used the DBI to prioritize sites for conservation action in South Africa. Using a selected set of top prioritized sites, I compared the DBI's performance to that of a rarity-complementarity algorithm. Site prioritization using the DBI reveals that CFR sites protect Red Listed taxa rather well. The rarity-complementarity algorithm represents all species, but without greater emphasis on the rare and threatened species. I conclude that the DBI is of great value in selecting biodiversity hotspots, while the algorithm is useful for selecting complementarity hotspots. The third study was made possible by the recent completion of a continental assessment of freshwater biodiversity, which revealed that patterns of richness and threat of four well-studied aquatic taxa largely coincide at the continental scale. Using only dragonflies, I built a protected areas network for Africa using spatial planning software. I then compared the performance of the existing African reserve network and that of known global biodiversity hotspots against the model, and identified sites of conservation concern. Although the current reserve network covers 10.7% of the landscape, the proportional representation of species geographic distributions in reserves is only 1.1%. The reserve network is therefore inefficient, and many areas of conservation priority that are not formally protected remain. The advantage of operating at the fine scale, while covering a large geographic area is that it shifts the focus from the large-scale hotspots to smaller priority areas within and beyond hotspots. In the fourth study, I created species distribution models of dragonflies in an El Niño-prone biodiversity hotspot in South Africa, and predicted the changes in species richness, geographic range and habitat suitability, forty and eighty years from now. According to the model results of two different emissions scenarios, at least three species will be lost from the area by 2050, and four by 2080. The remaining species are predicted to persist with reduced geographical ranges, at generally higher elevations. Most species presented here thrive quite well in artificial

environments, that is, engineered ponds or dams. It is therefore unlikely that loss in connectivity will play a role for these species." (Author)] Address: Simaika, J.P., Department of Conservation Ecology and Entomology, Stellenbosch University, P Bag X1, Matieland 7602, South Africa. E-mail: john.simaika@senckenberg.de

12580. Siregar, A.Z.; Rawi, C.S.M.; Nasution, Z. (2011): Population density of damselfly *Agriocnemis femina* (Odonata: Coenagrionidae) in Manik Rambung ricefield, Simalungun-Sumatera Utara. *Jurnal Ilmu Pertanian KULTIVAR* 5(1): 23-31. (in English) [Indonesia; "The objective of this research was to study effect and correlation of physics-chemistries with density of *A. femina*. The method using Mark Release Recapture with 8 stations in Manik Rambung Village, Simalungun District. The result showed 2351 individuals of *A. femina*, consist of male 1345 individuals and female 1006 individuals. Recapture rates of males and females were 87% and 13%, while score of Lincoln's indices highest calculated in twelve sampling were 451 individuals. The result of analysis correlation showed humidity given effects on population of density *A. femina* recapture were 0.432." (Authors)] Address: Siregar, Ameilia, Postgraduate Student in School of Biological Sciences-University Science Malaysia, Malaysia. E-mail: zuli-yanti@yahoo.com

12581. Sivtseva, L.V. (2011): New data for distribution of rare species of dragonflies and damselflies (Odonata) in Yakutia . *Proceedings of the Russian Entomological Society* 82: 13-16. (in Russian, with English summary) ["A new data on the distribution of rare species of dragonflies and damselflies *Aeshna grandis*, *A. subarctica*, *Somatochlora arctica* and *S. sahlbergi* in Yakutia are given. *A. subarctica* is recorded for the first time for the Central Yakutia, and *S. arctica* is a new species for the Southern Yakutia." (Author)] Address: Sivtseva, L.V., Institute for Biological Problems of Cryolithozone SB RAS, Lenin av., 41, Yakutsk 677980, Russia. E-mail: sivtseval@mail.ru

12582. Solly, F.; Milton, P.; Sawyer, D. (2011): Reports from Coastal Stations—2010: Isle of Thanet, Kent. *Atropos* 42: 60-61. (in English) [UK, *Orthetrum cancellatum*, *Sympetrum fonscolombii*] Address: not stated

12583. Spence, B. (2011): Reports from Coastal Stations—2010: Spurn Point, East Yorkshire. *Atropos* 42: 67-68. (in English) [UK, *Calopteryx splendens* flow north-west along the seashore] Address: not stated

12584. Subramanian, K.A.; Kakkassery, F.; Nair, M.V. (2011): Chapter 5 "The status and distribution of dragonflies and damselflies (Odonata) of the Western Ghats. In: Molur, S., Smith, K.G., Daniel, B.A. and Darwall, W.R.T. (Compilers). 2011. *The Status and Distribution of Freshwater Biodiversity in the Western Ghats, India*. Cambridge, UK and Gland, Switzerland: IUCN, and Co-

imbatore, India: Zoo Outreach Organisation: 63-72. (in English) ["Conclusions and conservation recommendations: The river basins and associated freshwater ecosystems of the Western Ghats are global hotspots for odonates with high levels of endemism. Even though only 3.2% (four species) of the species are known threatened, over a quarter of the odonates in the region (46 species) have been assessed as DD. Many of these species are likely to be threatened as they are only known from historical records, often just the type specimens, and urgently need more survey work to identify their current ranges, populations and threats. Research is also required in those large areas where there is insufficient information on odonate diversity and distributions such as those south and north of the southern Karnataka–northern Kerala habitats and eastwards into the Deccan plateau. Many of the endemic odonates such as *Disparoneura apicalis* (VU) (Protoneuridae), *Platysticta deccanensis* (VU) (Platystictidae), *Melanoneura bilineata* (NT) (Protoneuridae) or *Idionyx* spp. (Cordulidae) are very narrowly distributed within the Western Ghats. The destruction of riverine habitats by hydro-electric and irrigation projects threatens the survival of these odonates, which depend on fast flowing torrential streams or stream associated habitats such as *Myristica* swamps. Destruction or alteration of a small catchment means likely extinction of these species. The protection of key habitats (fast flowing streams) for these species is an immediate priority. This is particularly urgent for species such as *Disparoneura apicalis*, *Calocypha laidlawi* and *Melanoneura bilineata*. Long term conservation of the odonate fauna of the region depends upon: (1) conservation of riparian forest cover, (2) prevention of flow modifications in streams and rivers, (3) conservation of *Myristica* swamps and high altitude peat bogs, and (4) prevention of use of pesticides and other agrochemicals in upper catchments of rivers." (Authors)] Address: Subramanian, K.A., Zoological Survey of India, M-Block, New Alipore, Kolkata, West Bengal 700053, India. subbuka.zsi@gmail.com

12585. Tabugo, S.R.M.; Torres, M.A.J.; Demayo, C.G. (2011): Determination of developmental modules and conservatism in the fore- and hind-wings of two species of dragonflies, *Orthetrum sabina* and *Neurothemis ramburii*. *International journal of agriculture & biology* 13: 541-546. (in English) ["The wings of dragonflies are highly compartmentalized as shown by the major and minor veins separating the different compartments or modules. There is a long term hypothesis that compartments of the wings as bounded by the veins may correspond to units of "gene regulation". Are the different compartments 'units of gene regulation' and is there genetic conservatism on the wings of the dragonfly? This study was therefore, conducted to evaluate whether there is a number and pattern of developmental modules in dragonfly wings and determine whether there exists genetic conservatism based on intra and inter-modular variations in the wings. The study was con-

ducted in two cosmopolitan species of Libellulid dragonflies. Different hypotheses were formulated and tested as to the possible spatial boundaries based on major wing venations. A priori models applying the tools of geometric morphometrics were constructed and statistically tested for the goodness of fit test (GoF) statistic by comparing the observed and expected covariance matrices. Jackknife support values for each variational model were also computed using Y^* as the GoF statistic. Results showed fair consistency in the observed number and patterns of hypothesized developmental modules implying that the wings of these species of dragonflies are highly conserved. It is concluded that there is genetic conservatism in the morphological spaces in the wings of the two species." (Authors)] Address: Demayo, C.G., Dept of Biol. Sciences, College of Science and Mathematics, MSU-Iligan, Institute of Technology, Iligan City, Philippines. E-mail: cgdemayo@gmail.com

12586. Torralba Burrial, A.; García Pérez, J.A.; García García, I. (2011): Primera cita de Gomphus pulchellus Selys, 1840 (Odonata: Gomphidae) para Asturias (Norte de España). Boletín de la SEA 49: 294. (in Spanish, with English summary) [28-V-2011, near Pesoz (29TPH7477296071, 255 m a.s.l.), Spain] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12587. Tunmore, M. (2011): Reports from Coastal Stations—2010: Lizard Peninsula. Atropos 42: 47-48. (in English) [UK; 10-X-2010; Sympetrum fonscolombii] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freesevice.co.uk

12588. Zhao, H.X.; Yin, Y.J.; Zhong, Z. (2011): Assembly modes of dragonfly wings. Microscopy Research and Technique 74(12): 1134-1138. (in English) ["The assembly modes of dragonfly wings are observed through FEG-ESEM. Different from airplane wings, dragonfly wings are found to be assembled through smooth transition mode and global package mode. First, at the vein/membrane conjunctive site, the membrane is divided into upper and lower portions from the center layer and transitioned smoothly to the vein. Then the two portions pack the vein around and form the outer surface of the vein. Second, at the vein/spike conjunctive site, the vein and spike are connected smoothly into a triplet. Last, at the vein/membrane/spike conjunctive site, the membrane (i.e., the outer layer of the vein) transitioned smoothly to the spike, packs it around, and forms its outer layer. In short, the membrane looks like a closed coat packing the wing as a whole. The smooth transition mode and the global package mode are universal assembly modes in dragonfly wings. They provide us the references for better understanding of the functions of dragonfly wings and the bionic manufactures of the

wings of flights with mini sizes." (Authors)] Address: Zhong, Z., School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai 200092, China. E-mail: zhongk@tongji.edu.cn

2012

12589. Abdelsalam, K.M. (2012): Benthic macro- and meso-invertebrates of a sandy riverbed in a mountain stream, central Japan. Limnology 13(1): 171-179. (in English) ["Quantitative samples of benthic invertebrates were collected from a sandy riverbed of a mountainous stream (Kozu site of Takami-gawa stream, Nara Prefecture), central Japan by core samplers in five sampling occasions through the years 2008–2009. A total of 120 taxa (including 'Davidius') were identified, representing 55 families and 97 genera. Insects formed about 92% of the total recorded taxa and 88% of individuals' abundance. A total of 111 taxa of aquatic insects, belonging to 49 families and 92 genera, were identified and represented by ten orders. Oligochaeta and Acari were dominant non-insect invertebrates. Diptera was the most diverse insect group, followed by Trichoptera and Ephemeroptera. Dominant taxa were mesoinvertebrates, younger stages of macroinvertebrates, both of which predominantly inhabit the interstitial zone of a sandy riverbed. Both taxon richness and invertebrate abundance were higher in February 2009 and lower in April and August 2008. A few major invertebrate taxa demonstrated distinct seasonal trends; i.e. Nymphomyia alba, Rheosmittia, and Corynoneura were abundant in February 2009. Newly hatched larvae of Larcasia akagiae were abundant in May 2008. This study also demonstrated the effectiveness of core samplers to collect small-sized benthic fauna that inhabit the interstitial or hyporheic zone of the sandy riverbed." (Author)] Address: Abdelsalam, K.M., Marine Biota Taxonomy Laboratory, National Institute of Oceanography and Fisheries (NIOF), Qayet Bay, Alexandria, Egypt. E-mail: kh.abdelsalam@gmail.com

12590. Álvarez Gándara, J.; Estévez Rodríguez, R. (2012): Primeros registros de Orthetrum brunneum (Fonscolombe, 1837) para la provincia de Lugo (Galicia, N.W. Península Ibérica) (Odonata, Libellulidae). Archivos entomológicos 7: 161. (in Spanish, with English summary) [12-VIII-2012; province of Lugo (Galicia, Spain), Vilalpape-Bóveda, 375 m.a.s.l., UTM10x10 29TPH21.] Address: Álvarez Gándara, J., Barrio do Souto, 10 B. E-36740 San Salvador de Tebra, Tomiño, Spain. E-mail: lcgandara@yahoo.es

12591. Ángeles Álvarez, M.; Torralba Burrial, A. (2012): Primera cita de Sympetrum meridionale (Selys, 1841) (Odonata: Libellulidae) para Asturias (norte de la Península Ibérica). Boletín de la SEA 51: 346. (in English) [07-X-2012, Llodero (WGS84: 30TTP6447430218; 0 m a.s.l.; Zeluán, Gozón), Asturias (Spain).] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

mos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12592. Ángeles Álvarez, M.; Martínez Rubio, A.; Bueno, J.; Noval, I.; Cimadevilla Suárez, C.; Torralba Burrial, A. (2012): Primeras citas de *Aeshna affinis* Vander Linden, 1820 (Odonata: Aeshnidae) para Asturias (norte de la Península Ibérica). *Boletín de la SEA* 51: 357-358. (in Spanish, with English summary) [Records of *A. affinis* from Asturias (Spain) are reported.] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Univ. de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12593. Balachandran, C.; Anbalagan, S.; Dinakaran, S. (2012): Influence of environmental parameters on the aquatic insect assemblages in Meghamalai hills, South India. *Life sciences Leaflets* 9: 72-81. (in English) ["In order to develop discreet management practices for lotic ecosystems, it is inevitable to gather subsequent information on their ecological status which involves monitoring the environmental parameters and biodiversity attributes. The distribution and composition of aquatic insect communities in streams at a local scale are considered to be primarily determined by environmental factors and interactive relationships within the system. The current study was carried out to investigate the effects of environmental variables on the assemblages of aquatic insects in the streams of Meghamalai hills. Six different streams in Meghamalai hills were selected as sampling sites and were examined for the water quality and aquatic insect assemblages. A total of 2139 individuals of aquatic insects, belonging to 10 orders, 28 families and 30 genera (including *Heliogomphus*), were collected from six streams. The collectors occupied a predominant group amongst all the functional feeding groups of insects followed by scrapers, predators and shredders. Higher diversity of aquatic insects was found at the middle order streams. The BMWP scores revealed that among the six sites studied, Site VI had the best water quality while Site III had the least water quality. Among the 12 environmental variables taken into account for the study, riparian vegetation, pH, conductivity, atmospheric temperature and stream order were found to be influencing the distribution of aquatic insects." (Authors)] Address: Balachandran, C., Energy & Wetlands Research Group, Centre for Ecological Sciences, Indian Inst. of Science, Bangalore, India. E-mail: bchandruji@gmail.com

12594. Bernard, R.; Buczyński, P. (2012): Wazki – Odonata. In: C. Błaszak, [Ed.], *Zoologia*, Vol. 2, Pt 1, Wydawnictwo Naukowe PWN, Warszawa: 131-144. (in Polish) [Odonata chapter in the Polish standard zoology handbook] Address: Bernard, R., Dept of General Zoology, Adam Mickiewicz University, Umultowska 89, PL-61-702 Poznań, Poland; E-mail: bernard@amu.edu.pl

12595. Bogan, M.T.; Boersma, K.S. (2012): Aerial dispersal of aquatic invertebrates along and away from arid-land streams. *Freshwater Science* 31(4): 1131-1144. (in English) [Arizona, USA; "Dispersal is an essential process in metapopulation and metacommunity dynamics. Most studies of aquatic invertebrate dispersal in streams have focused on in-stream drift of larvae. However, understanding aerial dispersal is important for predicting community assembly in isolated habitats after disturbance or stream restoration. We used artificial pools placed at 3 distances (5, 75, and 250 m) from 1 perennial and 1 ephemeral arid-land stream to examine aerial-dispersal dynamics of aquatic invertebrates over a 6-wk period in summer 2009. We also conducted a 2-wk experiment to examine the relationship between daily rainfall and disperser abundance at the perennial site. Sixty-six aquatic invertebrate taxa colonized the artificial pools. They represented 1/3 of taxa documented from neighbouring perennial streams. Abundance and species richness declined with distance away from both streams. This result suggests that ephemeral stream channels may serve as important aerial dispersal corridors for aquatic invertebrates even when no surface water is present. Mean species richness tripled after 58 mm of rain during the 4th wk of the experiment. Data from the 2-wk experiment highlighted the role of rainfall as a dispersal cue in this system. Amount of daily rainfall explained 48 to 77% of the variation in disperser abundance at 5, 75, and 250 m from the perennial site. We used spatiotemporal dispersal patterns observed in our study to identify 5 modes of aerial dispersal among 56 taxa: 1) widespread common, 2) widespread hap-hazard, 3) range-restricted, 4) cue-limited, and 5) infrequent. Classification of specific aerial-dispersal modes provides a conceptual framework for modelling spatially explicit community responses to disturbance, stream restoration, and climate-change-induced habitat contraction or expansion." (Authors) Odonata nymphs (unidentified Libellulidae) appeared in week 5.] Address: Bogan, M.T., Zoology Department, 3029 Cordley Hall, Oregon State University, Corvallis, Oregon 97331 USA. E-mail: boganmi@science.oregonstate.edu

12596. Brotons Padilla, M.; Ocharan, F.J.; Outomuro, D.; Torralba-Burrial, A. (2012): Odonatos del Parque Nacional de Cabañeros (Ciudad Real, España Central) (Insecta: Odonata). *Boletín de la Sociedad Entomológica Aragonesa* 50: 341-344. (in Spanish, with English summary) ["A total of 37 species of Odonata from Cabañeros National Park (central Spain) have been recorded, eight of which are also new to the province of Ciudad Real."] Address: Brotons Padilla, M., c/ Caldereros 14 1o b. 13300 Valdepenas, Spain. E-mail: brotonspadilla@gmail.com

12597. Caixero, A.P. (2012): Características espermáticas de quatro espécies de Odonata (Insecta). Tese apresentada á Universidade Federal de Viosa, como parte das exigências do Programa de Pós-Graduação

em *Biología Celular e Estructural*, para obtenção do título de *Doctor Scientiae*: x + 61 pp. (in Spanish, with English summary) ["... The ultrastructural features of the sperm has shown promise for phylogenetic analyzes in many insect groups, but such studies are still lacking for Odonata. Thus, this study aimed to describe the structure and ultrastructure of spermatozoa of species of Odonata suborders: Zygoptera and Anisoptera, searching for information that would assist in understanding the systematics of this group of insects. For this, sperm from seminal vesicles and testes of adult males of the *Ischnura fluviatilis*, *Pantala flavescens*, *Tramea abdominalis* and *Micrathyrja hesperis* were prepared for light and transmission electron microscopy. The sperm of these species have some characteristics similar to those presented by the sperm of most Pterygota. However, some differential characteristics stand out: lack of perforatorium in the acrosome and of paracrystalline material in the mitochondrial derivatives; flagellum very short, possibly immobile with small mitochondrial derivatives inspecies of Libellulidae; and lack of accessories bodies and microtubule arrangement 9+9+0 in species of the Trameinae subfamily. The analysis of the ultrastructure of spermatozoa enabled the differentiation of the two suborders of Odonata, as well as, the species of two Libellulidae subfamilies studied." (Author)] Address: not stated

12598. Chelmick, D. (2012): Observations of the Willow Emerald damselfly *Lestes viridis* (Vander Linden) in Britain. *Atropos* 46: 38-42. (in English) [History and distribution of *L. viridis* in UK; identification of imago; life history] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

12599. Chovanec, A.; Wimmer, R.; Rubey, W.; Schindler, M.; Waringer, J. (2012): Hydromorphologische Leitbilder als Grundlage für die Ableitung gewässertyp-spezifischer Libellengemeinschaften (Insecta: Odonata), dargestellt am Beispiel der Bewertung der restrukturierten Weidenbach-Mündungsstrecke (Marchfeld, Niederösterreich). *Wiss. Mitt. Niederösterreich. Landesmuseum* 23: 83-112. (in German, with English summary) ["Hydromorphological reference conditions as basis for deriving river-type-specific dragonfly communities (Insecta: Odonata): a case study at the rehabilitated downstream stretch of the Weidenbach (Lower Austria): The ecological status of the rehabilitated downstream stretch of the Weidenbach in the lowland areas of Lower Austria was assessed by dragonfly surveys at three sections. Key element of the assessment procedure, which is in compliance with the EU Water Framework Directive (WFD), is a comparison between the current situation and river-type-specific reference conditions. Hydromorphological references served as basis for deriving the reference dragonfly community. The section with the smallest deviation from the hydromorphological reference was colonised by a near river-type-specific dragonfly

community. Species composition, the Odonata Habitat Index, species-specific habitat values and flow preferences were considered in the assessment. A total of 27 species were recorded, 19 species of them were classified as autochthonous. All four species of the genus *Orthemtrum* occurring in Central Europe were found. The river stretch was ranked as class II ("good ecological status"), which represents the second best class and the quality target in the 5-tiered WFD classification scheme." (Authors)] Address: Chovanec, A., Krottenbachgasse 68, A-2345 Brunn am Gebirge, Austria. E-mail: a.chovanec@kabsi.at

12600. Cordero Rivera, A.; Torralba-Burrial, A.; Ocharan, F.J.; Cano, F.J.; Outomuro, D.; Azpilicueta Amorin, M. (2012): *Macromia splendens*. En: VV.AA., Bases ecológicas preliminares para la conservación de las especies de interés comunitario en España: Invertebrados. Ministerio de Agricultura, Alimentación y Medio Ambiente. Madrid: 67 pp. (in Spanish) [Odonata species protected under the European Community law are treated according the legal definitions of the Fauna, Flora, Habitat Directive. Information on identification, general distribution, ecology and habitat, 'favourable conservation status' on different geographic scales, conservation measures, and regional bibliography are given. This manual refers to the situation of *M. splendens* in Spain.] Address: Cordero Rivera, A., Depto de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

12601. Csányi, B.; Szekeres, J.; György, Á.I.; Szalóky, Z. (2012): Macrozoobenthon investigations along the Lower Danube between Calarasi and Braila, Romania. *Acta Biol. Debr. Oecol. Hung.* 28: 47-59. (in English, with Hungarian summary) [In the framework of the improving the navigability of the Lower Romanian Danube between Calarasi and Braila (375 fkm – 175 fkm) a detailed survey program of aquatic macroinvertebrates and fish was performed. On-site sampling of macroinvertebrates was carried out in early summer of 2011 between 31 May and 4 June. Altogether 16 Kick and Sweep multi-habitat samples in the littoral zone and 18 dredged samples in the deep water zone were collected. A motor boat was used in 11 sites of the main arm. Mussel populations were estimated along the banks with free diving method. There were Cnidaria (1), Annelida and leeches (7), snails (10), mussels (9), Malacostraca (18), Ephemeroptera (4) Odonata (2), Heteroptera (6), Trichoptera (4), Coleoptera (3) and Diptera (3) taxa detected. Results illustrate that in deep zones characterized by uniform moving sand fraction only has very scarce community with low taxon numbers. The littoral zone of the low discharge conditions that has low bed erosion and not significant sediment deposition contains very rich macroinvertebrate communities, especially at those sections that are having rocky habitats, as well. Interesting faunistic results were the detection

of the leech (*Batracobdelloides moogi*), a snail (*Theodoxus transversalis*), a very rare mussel (*Unio crassus*) and a brackish water invader Crustacea species (*Pseudocuma longicorne ponticum*) on this Danube section." (Authors) Stylurus flavipes] Address: Csányi, B., Environmental & Water Management Research Institute Non-profit Ltd., Nonprofit Kft., H-1095 Budapest, Kvaszay Jenő út 1, Hungary. E-mail: bela.csanyi@gmail.com

12602. Fukumoto, M.; Eda, S. (2012): New record of *Aciagrion migratum* Selys from the Saku area in Nagano prefecture. Tombo 54: 142. (in Japanese, with English summary) ["*A. migratum* has rapidly advanced northward in Japan recently, probably due to a warm change of climate. This species has been very rare in Nagano prefecture except in the southern district. In this paper, we reported it for the first time from Saku district, in the eastern area of Nagano prefecture." (Authors)] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

12603. Futahashi, R.; Sasamoto, A. (2012): Revision of the Japanese species of the genus *Rhipidolestes* (Megapodagrionidae) based on nuclear and mitochondrial gene genealogies, with a special reference of Kyushu-Yakushima population and Taiwan-Yaeyama population. Tombo 54: 107-122. (in English, with Japanese summary) ["Here we report a revision of Japanese *Rhipidolestes* (Megapodagrionidae) species based on nuclear and mitochondrial gene genealogies, along with morphological findings. In Japan, six *Rhipidolestes* species (*R. aculeatus* Ris, 1912, *R. okinawanus* Asahina, 1951, *R. hiraoui* Yamamoto, 1955, *R. asatoi* Asahina, 1994, *R. shozoi* Ishida, 2005, and *R. amamiensis* Ishida, 2005) and two subspecies (*R. aculeatus yakusimensis* Asahina, 1951, and *R. amamiensis tokunoshimensis* Ishida, 2005) have been described so far. Because the differences in morphological characteristics between each species/subspecies are subtle, it has been difficult to determine the phylogenetic classification of these groups. Based on the results of our molecular phylogenetic analyses using nuclear DNA (1TS1 and ITS2 regions) and mitochondrial DNA (16S ribosomal RNA and COI regions) sequences, we newly show that Kyushu-Yakushima and Taiwan-Yaeyama Islands populations apparently belong to different clades, *R. yakusimensis* stat. nov. and *R. aculeatus* (sensu stricto), respectively. We confirmed that *R. shozoi* and *R. okinawanus* in the Okinawajima Island can be clearly distinguished, whereas the differences between nominotypical *R. amamiensis* and *R. amamiensis tokunoshimensis* were rather obscure. We also recognized genetic differences between Kyushu and Yakushima populations of *R. yakusimensis*, between Yaeyama and Taiwan populations of *R. aculeatus*, and between middle Okinawajima and Tokashikijima populations of *R. okinawanus*, though we do not discuss them in detail at present. Overall, the results of molecular phylogeny in Japanese *Rhipidolestes* group coincided with the closeness of geographic distribution rather than the similarity of genital

morphology." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

12604. Gashaw, H.; Mengistu, S. (2012): Ecological assessment of lake Hora, Ethiopia, using benthic and weed-bed fauna. Momona - Ethiopian Journal of Science 4(2): 3-15. (in English) ["Urbanization and human settlement in close proximity to the Ethiopian lakes are among the potential causes of changes in water quality and quantity. The drastic changes occurred into one of the Bishoftu crater lakes (Kilole) best exemplify this phenomenon. The purpose of this study was ecological assessment of Lake Hora using benthic and weed-bed fauna. Samples of benthic and weed-bed were collected monthly from September 2009 to March 2010 at 3 sampling stations (A, B, C), with a standard Ekman grab. Station A is in front of Ras Hotel, Station B is place of Irecha and station C was to the south crater of the lake. The benthic and weed-bed fauna of Lake Hora included a total of 6958 individuals within 27 taxa belonging principally to Copepod (2812) and Chironomidae (1460) and Ecdyonuridae (735). A high number of organisms were observed mainly at stations B and A (3198 and 2342 respectively). The correlation result indicates that oxygen showed strong relation to benthic and weed bed fauna distribution and abundance. There were high number of individuals, taxa diversity, evenness and grate number of rare taxa of benthic and weed-bed fauna at stations A and B, but these stations were affected by the community around the lake area for different reasons (for example washing clothes, boat parking and others). However low density and abundance of macroinvertebrates at station C could be due to: low organic matter load at station C which was free of human interactions; steeply slope geographical setting of the profoundly and its catchment and low vegetation cover. The Family Biotic Index result for all the sampling stations was 7.55, according to Hilsenhoff Family Biotic Index this value is indicating likely severe organic pollution and very poor water quality in all sampling sites. As this research finding indicates Lake Hora needs protection management strategies to maintain its sustainable use." (Authors) Taxa including Coenagrionidae and Lestidae are treated at family level.] Address: Gashaw, H., Dept of Biology, Addis Ababa University, Addis Ababa, Ethiopia. E-mail: habibag2@gmail.com

12605. Germann, A. (2012): Die fliegenden Edelsteine der Saarpfalz. Libellen - pfeilschnell und farbenprächtig. Saarpfalz-Jahrbuch 2013: 161-167. (in German) [Saarland, Gerany; this is a general account on Odonata with many biological information and a brief introduction in the regional fauna of the Saar-Pfalz county.] Address: not stated

12606. Goffart, P.; Motte, G.; Vandevyvre, X. (2012): Un afflux exceptionnel de *Leucorrhinia* à gros thorax (*Leucorrhinia pectoralis*) en Wallonie en 2012. Les Nat-

uralistes belges 93(4): 85-94. (in French, with English summary) ["*L. pectoralis* is a rare species in Wallonia (South Belgium). However, during the 2012 season, this species has been encountered, sometimes numerous, on 24 sites scattered in diverse regions of the territory, while it has been noticed only very sporadically during the ten preceding years. The influx has been sudden, concentrated from the 24th to the 30th of May in each concerned part of the territory. It corresponded to a period of fine weather under the influence of continental currents with east winds. Dragonflies have been seen there again until mid-June in the Ardenne and Lorraine and early July in the Hainaut. Egg-layings were recorded at several sites. The possible origin, local and/or distant, of these white-faced darters is discussed in the light of available observations. The hypothesis of an influx from the eastern regions of Europe is privileged." (Authors)] Address: Goffart, P., Département de l'Etude du Milieu naturel et agricole (DEMna), Service Public Wallon (SPW) - DGARNE - Direction de la Nature et de l'Eau, Avenue Maréchal Juin, 23 - 5030 Gemnloux Belgium. E-mail : Philippe.GOFFART@spw.wallonie.be

12607. Hacet, N.; Çokkuvvetli, K.T. (2012): Records of Odonata from rice fields in the Edirne province in Turkish Thrace. *Notul. odonatol.* 7(10): 89-92. (in English) ["During the 2001 and 2009 surveys, 20 species were recorded. The most common of these were *Ischnura elegans*, *Crocothemis erythraea*, *Orthetrum albistylum* and *Sympetrum fonscolombii*, whereas *Gomphus flavipes*, *Ophiogomphus cecilia* and *Orthetrum cancellatum* occurred at a single locality each. *O. cecilia* represents the second record from Turkish Thrace. The role of Odonata in the bio-control of the pests in rice fields is discussed." (Authors)] Address: Hacet, N., Dept of Biology, Faculty of Science, Trakya University, 22030 Edirne, Turkey. E-mail: nhacet@hotmail.com

12608. Henderson, B.L.; Chumchal, M.M.; Drenner, R.W.; Deng, Y.; Diaz, P.; Nowlin, W.H. (2012): Effects of fish on mercury contamination of macroinvertebrate communities of grassland ponds. *Environmental Toxicology and Chemistry* 31(8): 870-876. (in English) ["Mercury is an environmental contaminant that negatively affects the health of vertebrate consumers such as fish, birds, and mammals. Although aquatic macroinvertebrates are a key link in the trophic transfer of Hg to vertebrate consumers, Hg contamination in macroinvertebrate communities has not been well studied. The purpose of the present study was to examine how Hg in macroinvertebrate communities is affected by the presence of fish. We sampled macroinvertebrates from five ponds with fish and five ponds without fish, at the Lyndon B. Johnson National Grassland in north Texas, USA. Ponds without fish contained a higher biomass of macroinvertebrates and taxa with higher concentrations of Hg, which led to a higher Hg pool in the macroinvertebrate community. A total of 73% of the macroinvertebrate biomass from ponds without fish was composed

of taxa with the potential to emerge and transport Hg out of ponds into terrestrial food webs. The results of the present study suggest that small ponds, the numerically dominant aquatic ecosystems in the United States, may be more at risk for containing organisms with elevated Hg concentrations than has been appreciated." (Authors) Taxa include Odonata and are treated at the genus level.] Address: Henderson, B.L., Institute for Environmental Studies & School of Geology, Energy, & the Environment, Texas Christian Univ., Fort Worth, Texas, USA.

12609. Hippke, M. (2012): Die Feuerlibelle *Crocothemis erythraea*, eine neue Libellenart für das LSG „Schlosspark Ludwigslust“. *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 15(1): 98. (in German) [Mecklenburg-Vorpommern, Germany; 30.06.2012] Address: Hippke, M., Wiesenring 29, 19370 Parchim, Germany. E-mail: mathias-hippke@web.de

12610. Horvai, V.; Czirok, A.; Lökkös, A.; Borza, P.; Bödis, E.; Deák, C. (2012): New faunistic data from the riparian zone of the Hungarian-Croatian reach of Drava River. *Acta Biol. Debr. Oecol. Hung.* 28: 109-120. (in Hungarian, with English summary) ["Samples were taken at four locations on Hungarian–Croatian reach of river Drava between 2008 and 2011. Among the 131 taxa that were identified, there were invasive ones, and also rare, sensitive ones indicating good water quality." (Authors) The following Odonata species are listed: *Calopteryx splendens*, *Coenagrion puella*, *Stylurus flavipes*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, and *Platycnemis pennipes*.] Address: Horvai, V., Carpathes Nature Conservation Foundation, Radnóti Miklós ltp. 5., H-7700 Mohács, Hungary. E-mail: horvaivaler@gmail.com

12611. Jacquemin, J.; Vein, D. (2012): The aquatic insects of a standard small plain river in NE France, with emphasis on remarkable species. *Aquatic Insects* 34 (Suppl): 11-22. (in English) ["A five-year macroinvertebrate study was conducted on a 55 km river (le Rupt-de-Mad, Lorraine region, north-eastern France), a standard for the region. A list of 300 species was drawn up, and remarkable species were listed for some better known orders: Ephemeroptera, Plecoptera, Trichoptera and Odonata (31 species). Some faunistic results are emphasised: about 42% of the identified species were more or less ubiquitous, 26% were meso- to polysaprobic species of potamon, present only in the main course of the river, while 31% were rather stenoecious species restricted to certain tributaries. 51 remarkable species were listed, taking into account their regional status, according to IUCN categories: more than three quarters were hosted in the small tributaries, and 55% found exclusively in these latter (versus 23.5% only present in the main course of the river). Calcareous lotic tributaries were hosting particularly original communities with many remarkable species. Ephemeroptera, Plecoptera

and Trichoptera were pertinent groups to assess the global faunistic interest of lotic habitats, but lentic habitats are probably better evaluated using other groups, e.g. Odonata and Coleoptera; the latter unfortunately poorly known from an ecological point of view." (Authors) 1. *Calopteryx splendens*; 2. *C. virgo*; 3. *Lestes sponsa*; 4. *Chalcolestes viridis*; 5. *Platycnemis pennipes*; 6. *Cercion lindenii*; 7. *Coenagrion mercuriale*; 8. *C. puella*; 9. *C. pulchellum*; 10. *Enallagma cyathigerum*; 11. *Ischnura elegans*; 12. *Pyrrhosoma nymphula*; 13. *Gomphus vulgatissimus*; 14. *Onychogomphus forcipatus*; 15. *Aeshna cyanea*; 16. *A. grandis*; 17. *A. isoceles*; 18. *A. mixta*; 19. *Anax imperator*; 20. *Brachytron pratense*; 21. *Cordulegaster bidentata*; 22. *Cordulia aenea*; 23. *Somatochlora metallica*; 24. *Leucorrhinia pectoralis*; 25. *Libellula depressa*; 26. *L. fulva*; 27. *L. quadrimaculata*; 28. *Orthetrum cancellatum*; 29. *Sympetrum sanguineum*; 30. *S. striolatum*; 31. *S. vulgatum*] Address: Jacquemin, G., Biologie des Insectes, Université H. Poincaré, Nancy 1, BP 239, F-54506 Vandoeuvre-lès-Nancy, France

12612. Jeziorski, P., Holuša, O. (2012): An updated checklist of the dragonflies (Odonata) of the Czech Republic. *Acta Mus. Beskid. 4*: 143-149. (in English, with Czech summary) ["The presented actualized checklist is a first critical list of the Odonata from the Czech Republic. The checklist summarizes all relevant data and all species are listed in the checklist on the basis of voucher specimens. The results are based on the revisions of collections, authors' faunistic research and literary data. So far 26 genera of Odonata with 73 species have been recorded in the territory of the Czech Republic, 71 species from Bohemia and 69 species from Moravia." (Authors)] Address: Jeziorski, P., Na Belidle 1, CZ-735 64 Havírov-Suchá, Czech Republic. E-mail: jezirko@post.cz

12613. Jumawan, K.M.; Medina, M.N.D.; Villanueva, R.J.T. (2012): Annotated list of Odonata from Mainit Hot Spring Protected Landscape, Compostela valley, Mindanao Island, Philippines. *Philippine Journal of Systematic Biology 6*: 14-27. (in English) ["Within the framework of the 'Rapid Biodiversity Survey of Mainit Hot Spring Protected Landscape' conducted by the Research and Development Centre of Assumption College of Nabunturan, an annotated list of Odonata was compiled, representing 41 species in 25 genera and 12 families from seven sites surveyed from December 2011 to February 2012. These records represent the baseline data for Mainit Hot Spring Protected Landscape and even for Compostela Valley Province. One species is potentially new to science; more than half of the records are forest dwelling endemics." (Authors)] Address: Medina, M.N.D., Research and Development Centre, Assumption College of Nabunturan, Nabunturan, Compostela Valley Province, 8801 Philippines. E-mail: miltonsept19@yahoo.com

12614. Jung, K.-S.; Park, D.-H.; Lee, J.-E. (2012): A study of the arrangements of wing and thoracic muscu-

lar structures on flight behavior of Odonata, with a note on backward flight of Zygoptera. *Tombo 54*: 133-138. (in English, with Japanese summary) ["The two suborders of Odonata, Zygoptera and Anisoptera, show different modes of flight behaviours, e.g. capturing their prey. In suborder Anisoptera, most species fly dynamically and are good at capturing preys in flight by grasping them in their legs. On the contrary, in suborder Zygoptera, species usually fly delicately and often use their mandibles to capture their prey. In addition, we observed that zygopteran species were sometimes flying backwards when they cannot advance forward in small space. Such backward flight is observed rarer in Anisoptera. For purpose to reveal the differences of these flight modes between two suborders, we compared the arrangement of wing and pterothorax with measuring the angles between dorsal carina to costal margin of wing or posterior thorax, and dissected pterothoracic muscular structures of both Zygoptera and Anisoptera. From our results, both suborders have six muscles are attached to each wing, however, differed in the attachment to wing and thorax, and distinct in thoracic proportion as angles of wing to pterothorax. Each arrangement is supposed to be suitable for the flight behaviour in each suborder, especially Zygoptera is better at delicate turning in flying including backward flight." (Authors)] Address: Jung, K.-S., Department of Biological Science, Andong National University, Andong 760-749, Korea. E-mail: tootootoo@korea.com

12615. Karube, H. (2012): *Onychogomphus viridicostus* (Oguma, 1926) (Odonata, Gomphidae). *Tombo 54*: 123-126. (in English, with Japanese summary) ["*Onychogomphus viridicostus* (Oguma, 1926) is transferred to the genus *Melligomphus* Chao, 1990 based on adult external morphology." (Author)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

12616. Karube, H.; Takizawa, H. (2012): A record of interfamilial tandem formation by a male of *Orthetrum glaucum* (Libellulidae) and a female of *Procordulia fusiformis* (Corduliidae) on Borneo island. *Tombo 54*: 151-152. (in Japanese, with English summary) ["An interfamilial tandem formation by *Orthetrum glaucum* male (Libellulidae) and *Procordulia fusiformis* female (Corduliidae) was observed on a road in a mountain area of Sabah, Borneo Island, Malaysia. *P. fusiformis* is an endemic species to the Bornean mountain area and was abundant in the observation site. The two species are of similar size, with the body colorations distinctively different from each other. The present case of the interfamilial tandem formation is consistent with the generalization by Corbet (1999) that the body size difference is important for a male in discriminating their mates from heterospecific ones." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

12617. Keller, D. (2012): Insect dispersal in fragmented agricultural landscapes. Diss. ETH No. 20663. A dissertation submitted to ETH Zürich: 142 pp. (in English) ["Preserving biodiversity and enhancing connectivity are two major goals of current conservation strategies in fragmented agricultural landscapes. Therefore, many European countries have implemented agri-environment schemes in order to foster biodiversity and connectivity. The expected positive effects on biodiversity could, however, not consistently be detected, and for many agricultural species, it remains unknown whether populations are functionally connected. As functional connectivity is sustained by dispersal and gene flow, connectivity measures should be based on knowledge of species-specific dispersal potential, dispersal habitats and landscape elements that impede or facilitate gene flow. However, such information is not available for most species, and especially so for many insect species. In this thesis, I wanted to gain knowledge on insect dispersal in intensively managed and fragmented agricultural landscapes, where diverse connectivity measures had been implemented. The main goals were to assess the reproductive habitats, dispersal abilities, dispersal habitats and landscape effects on gene flow of five insect species inhabiting an agricultural landscape in the Oberaargau region on the Swiss plateau. In chapter 1, I analysed dispersal ability and dispersal habitats of the threatened damselfly *Coenagrion mercuriale*, which inhabits streams and ditches flowing through agricultural land. With a mark-resight study, I detected frequently occurring dispersal over short distances (= 500 m). This short-distance dispersal was restricted to streams, i.e. the reproductive habitat of *C. mercuriale*. In a landscape genetic analysis, I also detected long-distance dispersal showing that populations were functionally connected by individuals moving over larger distances. While short-distance dispersal was confined to streams, this long-distance dispersal seemed to be more directed and seemingly followed more or less straight lines across agricultural land. Functional connectivity of populations of *C. mercuriale* as well as the effects of several landscape elements on gene flow were further analysed in chapter 2, where I applied spatial genetic clustering methods combined with interpolation by kriging and landscape genetic corridor analysis (= transect analysis). The analysed populations were divided into a northern and a southern genetic cluster, separated by a hill ridge intersecting the study area. Similarly, landscape corridor analysis identified elevation change, but also Euclidian distance, patches of forest and flowing water bodies as barriers to gene flow. Only open agricultural land seemed to enhance dispersal in *C. mercuriale*. This again 2 showed that dispersal was not restricted to the reproductive habitat of *C. mercuriale* and that populations separated by open agricultural land were well connected. To analyse how landscape elements affect dispersal and gene flow in another specialised insect species, I developed ten polymorphic microsatellite markers for the wetland grasshopper *Stethophyma grossum*, using the 454 next generation sequencing technol-

ogy (chapter 3). These newly developed markers were then applied to identify dispersal habitats of *S. grossum* and to assess the effects of population network topology and spatial scale (geographical distance thresholds) on landscape genetic analysis in chapter 4. Both spatial scale and population network topology proved to be important factors in landscape genetic analysis and all three approaches applied (i.e. isolation by distance patterns, population network topology, least-cost transect analysis) identified a scale threshold of 3-4 km, up to which landscape composition and configuration greatly influenced dispersal and gene flow. For dispersal among neighbouring populations (defined by a Gabriel graph) that were within its maximum dispersal distance (0-3 km), *S. grossum* preferred its reproductive habitat as dispersal habitat. In contrast, no clear most likely dispersal habitat could be identified when population network topology and spatial scale were not considered. [...] In conclusion, this thesis presented several approaches to assess landscape effects on dispersal and gene flow in agricultural insects. Moreover, it detected various aspects of insect dispersal in intensively managed fragmented agricultural landscapes, which should be considered in future studies. The analyses of five insect species showed that landscape effects on dispersal and gene flow mainly depend on species-specific dispersal ability, reproductive habitat specialisation and spatial population configuration. The latter phenomenon has, however, hardly been used in landscape genetic studies. Furthermore, I found that populations of all analysed species were functionally connected, even in the fragmented landscape of the study area. The species were well able to cross intensively managed open agricultural land and dispersal was not restricted to their reproductive habitats. For both specialised study species (i.e. *C. mercuriale* and *S. grossum*), dispersal habitats changed at different thresholds of spatial scale. Moreover, the consideration of population network topology as applied in the analysis of *S. grossum* (i.e. restricting the dataset to neighbouring populations within maximum dispersal distance) further improved results. For future landscape genetic analyses, these studies suggest a more thorough consideration of spatial scale, by differentiating between short- and long-distance dispersal, as well as by incorporating population network topology. All these findings, i.e. the identification of species-specific reproductive habitats, dispersal habitats, dispersal ability and the detection of landscape elements hindering or facilitating gene flow, will help planning future connectivity measures for the study species and can also give general guidelines for the conservation of insects in fragmented agricultural landscapes." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr. 111, CH-8903 Birmensdorf, Switzerland. E-mail: mailto:daniela.keller@wsl.ch

12618. Kisasa Kafutshi, R. (2012): Le régime alimentaire du Martin-pêcheur huppé *Alcedo cristata* pendant la période de reproduction dans la région de Kinshasa (R.D. Congo). *Malimbus* 34: 17-28. (in English) ["The

diet of the Malachite Kingfisher was investigated by study of 182 regurgitated pellets collected from 65 broods during the nesting period in the rainy seasons from 2004 to 2009, in two sites in the Kinshasa area. In total, 2619 undigested remains were identified in the pellets, revealing 1100 prey. The Malachite Kingfisher's diet is rich and diverse. The prey identified were 92.7 % fishes (*Oreochromis niloticus*, *Gambusia affinis* and *Hemichromis elongatus*), 5.9 % insects (Odonata and Orthoptera) and 0.5 % frogs." (Author)] Address: Kisasa Kafutshi, R., Université de Kinshasa, Faculté des sciences, Département de Biologie, B.P. 190 Kinshasa XI, R.D. Congo. E-mail: bobkisasa@yahoo.fr

12619. Kiyoshi, T.; Hosoya, T.; Konagaya, T.; Kuramitsu, K. (2012): A record of *Gynacanta japonica* Barteneff from Suwanose-jima Island. *Tombo* 54: 143-144. (in Japanese, with English summary) ["*G. japonica* was recorded for the first time from Suwanose-jima Island, Tokara Group, Kagoshima Prefecture, Japan in 2010. The environment of the island was mostly destroyed due to volcanism, and there are few regions with good forests for the species. Although this species has been recorded previously from the Tokara Group, only from Nakano-shima Is., our subsequent surveys (2008-2011) have failed to rediscover the species there." (Authors)] Address: Kiyoshi, T., Kyoto Univ, Grad. Sch. Sci, Dept Zool., Kyoto 6068502, Japan. E-mail: kiyoshi@zoo.zool.kyoto-u.ac.jp

12620. Klass, K.-D.; Matushkina, N.A.; Kaidel, J. (2012): The gonangulum: A reassessment of its morphology, homology, and phylogenetic significance. *Arthropod Structure & Development* 41(4): 373-394. (in English) ["The gonangulum is a sclerite in the female genitalic region of insects. Its presence or full development has long been considered an apomorphy supporting Zygentoma + Pterygota. Recent studies of female genitalia in several insect orders (K.-D. Klass and co-workers) revealed many new data on the gonangulum and homologous sclerotisations (laterocoxa LC9). Herein the gonangulum area is described (including articulations, muscle attachments, sulci) and compared among Archaeognatha, Zygentoma, Odonata, Dermaptera, Dictyoptera, and Notoptera. A wider perspective is provided to the topic by addressing some novel issues: identification of LC9 sclerotisations in non-insect taxa and in insects that secondarily lack an ovipositor; occurrence of homonomous sclerotisations in other abdominal segments of both sexes; morphological interpretation of LC9; and the role of paedomorphosis in LC9 evolution. As a result, there is currently no support for any insect lineage from this character system. For gonangulum-related characters both a significant intra-ordinal variation and frequent homoplasy are demonstrated using various Odonata, Dermaptera, and Dictyoptera as examples. Divergent fates of LC9 in simplified genitalia are shown using a dermapteran and an odonatan. We view all this as a showcase of how a renewed and more

detailed examination of a character system can dramatically change the phylogenetic evidence drawn from it." (Authors)] Address: Matushkina, Natalia, Department of Zoology, Biological Faculty, Kyiv National University, vul. Volodymirs'ka 64, Kyiv, 01033, Ukraine. E-mail: odonataly@gmail.com

12621. Korsun, O.V., Akulova G.A., Gordeev S.Yu., Gordeeva T.V., Budaeva A.A. (2012): Insects of the Onon-Balj National Park (Mongolia). *Amurian zoological journal* 4(1): 18-25. (in Russian, with English summary) ["The list of insects recorded from the Onon-Balj National Park and its vicinities (Khentii Aimag, Mongolia) is given. This is the first faunistic list of insects for the territory of the National Park. 1125 specimens of 336 species and 10 orders were collected and identified." (Author) The list of species collected between 26.07 and 03.08.2007 includes nine Odonata species, among them *Ophiogomphus obscurus*.] Address: Korsun, O.V., Zabaikalsky State Humanitarian Pedagogical University named after N. Chernishevsky, Department of Biology, Babushkina st. 129, Chita, 672007, Russia. E-mail: olegkorsun@mail.ru

12622. Kraemer, L.D.; Evans, D. (2012): Uranium bioaccumulation in a freshwater ecosystem: Impact of feeding ecology. *Aquatic Toxicology* 124-125: 163-170. (in English) ["The objectives of our study were: 1) to determine if there was significant uranium (U) bioaccumulation in a lake that had been historically affected by a U mine and 2) to use a combined approach of gut content examination and stable nitrogen and carbon isotope analysis to determine if U bioaccumulation in fish was linked to foodweb ecology. We collected three species of fish: smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca flavescens*) and bluegill (*Lepomis macrochirus*), in addition to several invertebrate species including freshwater bivalves (family: Sphaeriidae), dragonfly nymphs and snails (class: Gastropoda) and zooplankton (family: Daphniidae). Results showed significant U bioaccumulation in the lake impacted by historical mining activities. Uranium accumulation was 2-3 orders of magnitude higher in invertebrates than in the fish species. Within fish, U was measured in operculum (bone), liver and muscle tissue and accumulation followed the order: operculum > liver > muscle. There was a negative relationship between stable nitrogen ratios ($^{15}\text{N}/^{14}\text{N}$) and U bioaccumulation, suggesting U biodilution in the foodweb. Uranium bioaccumulation in all three tissues (bone, liver, muscle) varied among fish species in a consistent manner and followed the order: bluegill > yellow perch > smallmouth bass. Collectively, gut content and stable isotope analysis suggests that invertebrate-consuming fish species (i.e. bluegill) have the highest U levels, while fish species that were mainly piscivores (i.e. smallmouth bass) has the lowest U levels. Our study highlights the importance of understanding the feeding ecology of fish when trying to predict U accumulation. Highlights: *Significant U accumulation in

Bow Lake biota *U accumulation was higher in invertebrates than in fish *U biodilution occurred in the food-web *In fish U bioaccumulation: bluegill > yellow perch > smallmouth bass *U accumulation in fish is linked to feeding ecology." (Authors)] Address: Kraemer, Lisa, Trent University, 1600 West Bank Drive, Peterborough, ON, Canada, K9J 7B8. E-mail: lisakraemer@trentu.ca

12623. Lara, M.B.; Gallego, O.F.; Vaz Tassi, L. (2012): Mesozoic coleopteran faunas from Argentina: geological context, diversity, taphonomic observations, and comparison with other fossil insect records. *Psyche* Volume 2012, Article ID 242563: 14 pp. (in English) on bibliographical and unpublished materials (86 described species, 526 collected specimens). The material came from different geological units from the late Middle Triassic to the Late Triassic (Bermejo, Cuyo, and Malargüe basins) to the Middle-Late Jurassic and Early Cretaceous (Deseado Massif, Canadón Asfalto, and San Luis Basin). The coleopteran record is composed of 29 described species with 262 collected specimens (isolated elytra) mainly represented by Triassic species and only four specimens recorded in Jurassic units, all of them currently unpublished. These fossil coleopterans provide fundamental information about the evolution of insects in the Southern Hemisphere and confirm the Triassic Argentinean insect deposits to be among the most important in the world." (Authors) The paper contains many references to Odonata.] Address: Gallego, O.F., Micropaleontología, Depto de Biología, Facultad de Ciencias Exactas y Naturales y Agrimensura, Universidad Nacional del Nordeste and Área Paleontología, Centro de Ecología Aplicada del Litoral (CONICET), Casilla de Correo 128, 3400 Corrientes, Argentina. E-mail: ofgallego@live.com.ar

12624. Machado, A.B.M. (2012): The apicale species group of *Acanthagrion*, with description of four new species and a hook-moving apparatus (Zygoptera: Coenagrionidae). *Odonatologica* 41(3): 201-223. (in English) ["The 8 species of the group are studied and keyed. The lectotype of *A. apicale* is designated, redescribed and illustrated. From Brazil, *A. chicomendesi*, sp. n. (holotype male: Mato Grosso), *A. flaviae*, sp. n. (holotype male: Amazonas), *A. kaori* sp. n. (holotype male: Amazonas) and *A. triangulare* sp. n. (holotype male: Acre) are described. *A. apicale descendens* Fraser, 1946 is revalidated as species. A study of the penis lobes was performed, demonstrating that the median lobe is inflatable and mainly responsible for the lateral movement of the sclerotized hook, whose importance in copulation is discussed." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

12625. Mahabal, A.; Rane, P.D. (2012): Large-scale night congregation of Yellow-tailed Ashy Skimmers Po-

tamarcha congener (Rambur) at Gaganbawada, Maharashtra State: with notes on their camouflage and roosting behaviour. *Bugs R All* 19: 16-17. (in English) [Verbatim: "During the faunistic survey of Maharashtra State, we had camped at Gaganbawada (16°32'48"N 73°50'06"E) PWD Rest House, Kolhapur district, from 7-9 January, 2007. Gaganbawada is a small town situated in the Northern Western Ghats at a height of 614 meters asl, with an average rainfall of 2500 to 3000 mm. Surrounding this town a mixture of agricultural cropland, hilly areas with dry deciduous – mixed forest, medium and large - sized ponds and streams were noticed. Along these ponds and streams there was dense vegetation that included shrubs, trees and aquatic plants with some marshy areas. On the first evening (7/1/2007) we came across a large congregation of *P.* congener, on cultivated, medium sized 'Australian Pine' *Casuarina equisetifolia* Linnaeus (Casuarinaceae). On close observation it was noticed that these skimmers had chosen only the dry branches of the tree. Further, it was also observed that the resting position of the skimmers was the same as the branching pattern of needle-shaped green leaves. From a distance the colony of skimmers was totally camouflaged and this behaviour could be related to avoid predation of the colony at night time. The congregation of skimmers was also noticed on two other near-by *Casuarina* trees. We counted the number of dry branches occupied by these *P.* congener on all the trees as well as number of individuals resting on such branches. Roughly we then estimated the congregation to be of about 4000 skimmers. On this first day, the skimmers roosted in these trees overnight and next morning around 9 am they vacated the roost in swarms of 50 to 200 individuals. On second day (8/1/2007) in the evening they came back and roosted again on the same trees in similar fashion. During this night, with the help of torch light we collected few samples of these skimmers using insect net for confirming their identity. The roost was disturbed and some of them dispersed and got attracted to the light at verandah of the rest house. In general here we noticed that the females were much more than the males in such congregations (in the ratio of 7:3 approx.). On 9/1/2007 we moved to the next camp. We then contacted the caretaker of the Gaganbawada rest house and enquired about these skimmers and he informed us that the insects were still roosting on the trees on 9th January. *P.* congener are medium sized dragonflies with bluish black thorax and yellow tail with black markings. Their large colonies are often found within patches of forest or scrub associated with weedy ponds and marshes. These insects breed in marshes but their flight season is not known (Fraser, 1936; Subramanian, 2009). It is uncertain whether such large-scale congregation and overnight roosting of these skimmers is temporary or permanent or a local winter migratory behaviour. However, it can be inferred that because of agricultural crops and marshy places, plenty of food and breeding areas might be available to them along with

proper trees for safe roosting in this area of Gaganbawda." (Authors)] Address: Rane, P.D., Zoological Survey of India, W.R.C, Akurdi, Pune 411044, India

12626. Matsuda, I.; Umesaki, H. (2012): Records of the migrating species *Anax guttatus* caught in SaKai City and Taism-cho, Osaka Prefecture in 2004 and 2011. Tombo 54: 145-146. (in Japanese, with English summary) ["One of the authors, Matsuda, caught by "buri" (thread and stones for catching flying dragonflies) 3 males in 2004 and 3 males in 2011 (one male each on June 11, July 3 and 9) of *Anax guttatus* in Oizumi Park, Sakai City, Osaka Prefecture. Umesaki netted a male of the same species in Taishi-cho, Osaka Prefecture on July 9, 2011. This species is considered to be an immigrant from the south, and the first typhoon visited mainland Japan on July 12 in 2011. Thus, it seems noteworthy that 4 males were recorded before the typhoon visited." (Authors)] Address: Matsuda, I., 583 -087, 6 -11 Osaka Habikino Momoyamada 1-chome, Japan

12627. Mayon, N.; Terweduwe, S. (2012): Différents patterns d'émergence chez deux libellules rhéophiles: effet station ou mécanisme pour limiter la compétition? Les Naturalistes belges 93(4): 45-64. (in French, with English summary) ["We have compared the emergence patterns of *Gomphus vulgatissimus* and *Onychogomphus forcipatus* in different sites along a downstream gradient in the Sûre River (southern Belgium). Results confirm that *G. vulgatissimus* reacts as a spring species while *O. forcipatus* shows emergence characteristics of a summer species. In *G. vulgatissimus*, results suggest cohort splitting to take place at different levels in the various study sites. We discuss such differences with special focus on non-biotic (mainly temperature) and biotic (competition) parameters. In sites where both species are present, results show that the emergence cycles can be either contiguous or separated, suggesting an effect of interspecific competition. This work shows that emergence patterns in dragonflies are under the combined influence of numerous parameters. Therefore, they can be rather different even at a very local scale (i.e. a stream section)." (Authors)] Address: Mayon, N., Parc Naturel Haute-Sûre et Forêt d'Anlier. Chemin du Moulin 2, B-6630 Martelange, Belgium. E-mail: nicolas@parcnaturel.be

12628. McLamb, S. (2012): Not a total washout! The red-veined darter *Sympetrum fonscolombii* Selys, 1840 in Shropshire. Shropshire entomology 6: 9-10. (in English) [Recent records of *S. fonscolombii* in Shropshire, UK are compiled and briefly discussed. Though it is too early to summarise the field season with respect to dragonflies and damselflies I felt it important to point out that despite a largely soggy summer not all was lost and whilst the May monsoons briefly abated Red-veined darters *Sympetrum fonscolombii* Selys 1840, were spotted by Jim Almond at Venus Pool (SJ5406). Days later I was lucky enough to see them accompa-

nied by the experienced eyes of Bob Kemp who confirmed the identification. The darters stubbornly remained some distance out from the main bird hide though with the aid of a telescope the single pale stripe on the side of the thorax was clearly visible. This is illustrated here in Jim's photographs and one can also make out Shropshire Entomology – October 2012 (No.6): 10 the blue coloration in the lower half of the eye. The darters were clearly ovipositing and though this species is regarded as a scarce migrant there has been an increase in the number of breeding records in recent years (Smallshire & Swash, 2010). *S. fonscolombii* has been recorded in a number of locations this year including Staffordshire where interestingly it has been recorded for the last few years suggesting possible successful breeding as opposed to an influx of new migrants (British Wildlife, 2012). This is definitely a species to look out for and thanks to Jim is a great record for Shropshire. The only previous record was an anonymous sighting made at Whixall Moss in 1940.] Address: not stated

12629. Mediani, M.; Boudot, J.-P.; Benazzouz, B.; El Bella, T. (2012): Two dragonfly species (Insecta: Odonata) migrating at Dakhla (region of Oued Ad-Dahab Lagouira, Morocco). International Journal of Odonatology 15(4): 293-298. (in English) ["Large numbers of migrating imagos of *Anax ephippiger* were observed from the end of January to March 2012 at Dakhla Bay, Southern Morocco, in an area where long-lasting fresh and brackish waters are lacking, and thus which is unfavourable for the reproduction of Odonata. This supports well the classical scheme of northward mass migration of the species along the Atlantic coast of Africa, induced by autumnal mass emergences in the Sahel as a result of the summer African monsoon. Small numbers of *Sympetrum fonscolombii* were previously temporarily recorded from the same area in July 2011. They were probably nomadic individuals of which the origin could not be verified, but which could have been involved in long distance vagrancy, typical of the species, due to the scarcity of fresh and brackish water in the area." (Authors)] Address: Mediani, M., Laboratoire de Diversité et Conservation des Systèmes Biologiques, Faculté des Sciences, Département de Biologie, Université Abdelmalek Essaâdi-Tétouan, Morocco

12630. Mezquita Aranburu, I.; Ocharan, F.J. (2012): Odonatos de Gipuzkoa. Munibe (Ciencias Naturales-Natur Zientziak) 60: 25 pp. (in Spanish, with English and Euskarian summaries) ["We present data on 42 species of Odonata found in Gipuzkoa (Basque Country, Spain) during a study conducted between 2006 and 2011, and also we do a literature review. Overall, 43 species have been detected, 21 Zygoptera (9 of them first seen in Gipuzkoa) and 22 Anisoptera (13 of them first seen in Gipuzkoa). Particularly interesting are *Coenagrion mercuriale*, *C. scitulum*, *Oxygastra curtisii* and *Orthetrum albistylum*." (Authors)] Address: Mez-

quita Aranburu, I., Sociedad de Ciencias Aranzadi / Aranzadi Zientzia Elkarte, Depto de Entomología / Entomologia Departamentua, Zorroagaina 11 • 20014 Donostia / San Sebastián, Spain. E-mail: mezquitaaranburu@gmail.com

12631. Michalski, J. (2012): A Manual for the Identification of the Dragonflies and Damselflies of New Guinea, Maluku, & the Solomon Islands. Khanduanum Books: 561 pp. (in English) ["First comprehensive guide to all 620 species of dragonflies of New Guinea and the neighbouring islands, which is home to ten percent of the world's dragonfly fauna. Nearly half of the species are found nowhere else on Earth. Includes 1,275 illustrations and eight pages of colour plates showing representative species and habitats. Includes introductory sections on structure, habitat, history, collection and photography, as well as appendices discussing taxonomic questions and a full bibliography. Illustrated keys to all taxa, and illustrations of larval forms where known. Over the past ten years there has been a growing interest in the dragonflies of this remarkable part of the world. This manual brings together all of the published research on this fauna from its origins in the 1800s to the present." (Author)] Address: Michalski, J., 1223 Mount Kemble Avenue, Morristown New Jersey 07960, USA. E-mail: huonia@aol.com

12632. Motte, G., Vadevyvre, X.; Dufrene, M. (2012): Evolution des populations d'odonates des mares de Ben-Ahin 20 ans après la création de la Réserve Naturelle. *Les Naturalistes belges* 93(4): 65-84. (in French, with English summary) ["Twenty years after the establishment of Ben-Ahin Nature Reserve (1993), we followed the evolution of the dragonfly fauna between 1993 and 2011. A comparison of the data collected before and after 2003 shows that the species richness of the site remained stable. Four species were no longer observed (*Erythromma lindenii*, *E. viridulum*, *Lestes sponsa*, *Sympetrum vulgatum*) but this is attributed to sampling bias. And two new species have recently been recorded (*A. isosceles*, *O. brunneum*) but these observations were only of erratic individuals. No obvious changes in species phenology could be documented in relation to global warming. Recommendations for site management are also proposed at the end of this paper." (Authors)] Address: Dufrière, M., Service Public Wallon (SPW) - Direction Générale Opérationnelle (DG03) - Département de l'Etude du Milieu naturel et agricole (DEMna), Av. Maréchal Juin, 23, B-5030 Gembloux, Belgium. E-mail: Marc.Dufrene@spw.wallonie.be

12633. Naraoka, H. (2012): Discovery of *Platycnemis echigoana* Asahina (*Platycnemididae*) in Aomori Prefecture. *Tombo* 54: 139-141. (in Japanese, with English summary) ["The Japanese endemic species *Platycnemis echigoana* Asahina was previously recorded from only 4 prefectures; Niigata, Yamagata, Fukushima and Nagano. Here I report records of this species from Rok-

kasho village, Aomori Prefecture, more than 280 km away from the known habitats. On June 25, 2011, I discovered one immature male and one immature female of this species in a forest at Rokkasho village. I also found many mature adults during July and August, 2011 and observed reproductive behaviours. After September, I could not find any adult specimens." (Author)] Address: Naraoka, H., Motoizumi 36-71, Fukunoda, Itayanagi, Kitatsugaru-gun, Aomori 038-3661, Japan. E-mail: sbnkq127@ybb.ne.jp

12634. Nordström, K.; Bolzon, D.; O'Carroll, D. (2012): Underlying neuro-physiological mechanisms. *Front. Behav. Neurosci. Conference Abstract: Tenth International Congress of Neuroethology*. doi: 10.3389/conf.fnbeh.2012.27.00234: (in English) [Verbatim: As an animal moves through the world, its own movement generates widefield optic flow across the visual field that it can use for several behavioural tasks, such as maintaining a straight trajectory or avoiding obstacles. Behavioural evidence shows that many animals can also disambiguate the motion of discrete objects that move independently of the remaining visual surround from such self-generated optic flow. In the insect optic ganglia, we find neurons specialized for detecting these two types of motion: Some respond optimally to widefield optic flow whereas others are specifically tuned to the relative motion of discrete figures (Olberg, 1981). In the dragonfly lobula there are two types of neurons tuned to the relative motion of discrete figures: Small target motion detectors (STMDs) and bar cells (O'Carroll, 1993). Whereas STMDs are tuned to small figures (Nordström, 2012), the bar cell response increases with bar height, but there is no response to the type of widefield stimuli generated during ego-motion (O'Carroll et al., 2012). Bar cells thus respond specifically to the motion of elongated, discrete figures. We here investigate the neurophysiological mechanisms that underlie this tuning. In the vertebrate visual cortex bar sensitivity is generated by aligning output from rows of neurons with small receptive fields (simple cells). Vertebrate simple cells share several physiological properties with elementary STMDs (ESTDMs), the input elements to STMDs (Wiederman et al., 2008). To investigate whether dragonfly bar cells generate their specific sensitivity to elongated features by spatially pooling the input from a row of elementary small target tuned motion detectors, we quantify responses to key parameters involved in ESTMD tuning (Wiederman et al., 2008). We show that whereas the velocity tuning and the high gain to sub-pixel targets suggest that bar cells share input mechanisms with STMDs, other responses point to a different type of input. For example, as opposed to STMDs, bar cell responses are often contrast polarity invariant, and they respond equally well to a bar and to a single edge moving across the visual field. The neurons also show a surprisingly strong spatial summation. Early anatomical studies of the fly optic lobes showed that the column underlying each facet is represented by

up to 100 unique interneurons, leading to the suggestion that visual input is processed in many parallel streams (e.g. Fischbach & Dittrich, 1989). In support of this notion, local motion is computed differently in the inputs to SMTDs (Wiederman et al., 2008) and to the neurons coding for widefield optic flow (Hassenstein & Reichardt, 1956). Our findings that bar cells generate their specific sensitivity to discrete, elongated figures by using different visual input from the STMDs provide further evidence for the notion of parallel visual input pathways.] Address: Nordström, Karin, Uppsala University, Department of Neuroscience, Uppsala, 75124, Sweden. E-mail: Karin.Nordstrom@neuro.uu.se

12635. Ocharan, F.J.; Torralba-Burrial, A.; Outomuro, D.; Azpilicueta Amorín, M.; Cordero Rivera, A. (2012): *Leucorrhinia pectoralis*. En: VV.AA., Bases ecológicas preliminares para la conservación de las especies de interés comunitario en España: Invertebrados. Ministerio de Agricultura, Alimentación y Medio Ambiente. Madrid: 50 pp. (in Spanish) [Odonata species protected under the European Community law are treated according the legal definitions of the Fauna, Flora, Habitat Directive. Information on identification, general distribution, ecology and habitat, 'favourable conservation status' on different geographic scales, conservation measures, and regional bibliography are given. This manual refers to the situation of *L. pectoralis* in Spain.] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

12636. Ocharan, F.J., Torralba-Burrial, A., Outomuro, D., Azpilicueta Amorín, M. y Cordero Rivera, A. (2012): *Lindenia tetraphylla*. En: VV.AA., Bases ecológicas preliminares para la conservación de las especies de interés comunitario en España: Invertebrados. Ministerio de Agricultura, Alimentación y Medio Ambiente. Madrid: 49 pp. (in Spanish) [Odonata species protected under the European Community law are treated according the legal definitions of the Fauna, Flora, Habitat Directive. Information on identification, general distribution, ecology and habitat, 'favourable conservation status' on different geographic scales, conservation measures, and regional bibliography are given. This manual refers to the situation of *L. tetraphylla* in Spain.] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

12637. Özyurt, C.E.; Mavruk, S.; Kiyaga, V.B. (2012): Effects of predator size and gonad maturation on food preference and feeding intensity of Sander *Lucioperca* (Linnaeus, 1758). *Turkish Journal of Fisheries and Aquatic Sciences* 12: 1-8. (in English) [Seyhan Dam Lake, Turkey; a total of 3,921 dietary items belonging to 15 different taxonomic groups were identified in the 345 (57.3%) non-empty stomachs of Sander *Lucioperca*. Only one specimen of Odonata was found.] Address:

Özyurt, C.E., Department of Fishing and Fish Processing Technology, Faculty of Fisheries, Cukurova University, Adana, Turkey. E-mail: cozyurt@cu.edu.tr

12638. Ottburg, F.G.W.A.; Henkens, R.J.H.G. (2012): Combinatie van vaarrecreatie en beek gebonden natuur in Noord-Brabant. Kennis over ecologische effecten van kano's en fluisterboten, kwetsbaarheid van flora en fauna en handelingsperspectieven voor beheerder en gebruiker. alterra-rapport no. 2375: 113 pp. (in Dutch) ["Combining water recreation and stream-related nature in Noord-Brabant. Knowledge of the ecological effects of canoes and whisper-boats, sensitivity of flora and fauna and management prospects for manager and end user: Two small river systems (R5 and R6) in this Dutch province are suitable for canoes and whisper-boats. These streams also include several Habitat 2000 areas and are important for Red List species. A literature study was made of the ecological effects of this type of water recreation on habitats, vegetation, fish populations, waterfowl, and Odonata. Several species of water birds and Odonata were very susceptible to disturbance by boats. Two case studies, the Dommel and Bovenmark, were used in a local workshop to apply this knowledge to a local stream management plan. Supportive measurements included fixed stopping points for boats, zoning of streams for recreative use, and more education for users and staff." (Authors) For details see: <http://content.alterra.wur.nl/Webdocs/PDFFiles/Alterraraapporten/AlterraRapport2375.pdf>] Address: not stated

12639. Parr, A.J. (2012): Migrant and dispersive dragonflies in Britain during 2011. *J. Br. Dragonfly Society* 28(2): 56-65. (in English) ["The year 2011 was noteworthy for the large, indeed unprecedented, numbers of Vagrant Emperor *Anax ephippiger* noted throughout the year. There were at least three immigration waves - a slow trickle of sightings during the late winter of 2010/11, a surge of records during April and early May, and then a final run of records during October and November. Both the spring and autumn influxes were associated with spells of unseasonably hot weather with winds from the far south. Arrivals of *Sympetrum fonscolombii* were also noted during these periods. Although the summer weather was, by contrast, less spectacular, there were still significant immigrations of *Anax parthenope*, as well as of further *S. fonscolombii*. Three sightings of *Aeshna isosceles* were also made well away from the species' current UK stronghold. Many of the other key events of the year related to the consequences of immigrations seen not in 2011 but in the preceding few years, where new local breeding populations of a number of species might potentially have become established. The recently-identified colony of *Coenagrion scitulum* in Kent appeared to remain stable and there was to be proof of successful breeding by *Aeshna affinis* following the 2010 invasion, when small numbers of exuvia were discovered at Hadleigh Country Park, Essex, during June. Numbers of mature adults

seen later in the year were, however, low and give some concern as to the long-term viability of this colony. Numbers of *Lestes barbarus* seen at Cliffe, Kent, following breeding attempts also noted during 2010 were, however, higher and hopefully a stable colony may develop here." (Author)] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

12640. Paulson, D.R.; Dunkle, S.W. (2012): A checklist of North American Odonata. Including English name, etymology, type locality, and distribution. 2012 edition. Originally published as Occasional Paper No. 56, Slater Museum of Natural History, University of Puget Sound, June 1999; completely revised March 2009; updated February 2011 and February 2012. Copyright © 2012 Dennis R. Paulson and Sidney W. Dunkle 2009, 2011, and 2012 editions published by Jim Johnson: 86 pp. (in English) ["The checklist includes all 462 species of North American Odonata considered valid at this time. For each species the original citation, English name, type locality, etymology of both scientific and English names, and approximate distribution are given. Literature citations for original descriptions of all species are given in the appended list of references." (Authors)] Address: Dunkle, S.W., 8030 Lakeside Parkway, Apt. 8208, Tucson, AZ 85730, USA

12641. Pfaff, M. (2012): Die Dinos der Lüfte. Kraut & Rüben 5/2012: 42-45. (in German) [General account of dragonflies in a German garden journal.] Address: not stated

12642. Pinto, A.P.; Carvalho, A.C. (2012): Taxonomic and distributional notes on *Telebasis Selys*, 1865, with a redescription of *T. pallida* Machado, 2010, and an evaluation of the *T. racenisi* Bick & Bick, 1995 "complex" of species (Odonata, Coenagrionidae). *Deutsche Entomologische Zeitschrift* 59(2): 189-200. (in English) ["A full checklist of the species of *Telebasis Selys*, 1865, housed in the Brazilian collections Coleção Entomológica "Prof. José Alfredo Pinheiro Dutra", Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro (DZRJ), and Museu de Zoologia, Universidade de São Paulo (MZSP) is presented. A total of 325 specimens representing 19 species were studied. Ten new records for Brazilian States were found for *T. carmesina* Calvert, 1909 (Rio de Janeiro and Rio Grande do Sul), *T. corallina* (Selys, 1876) (Pernambuco), *T. demarara* (Williamson, 1917) (Maranhão), *T. filiola* (Perty, 1834) (Paraíba and Santa Catarina), *T. gigantea* Daigle, 2002 (São Paulo), *T. inalata* (Calvert, 1961) (Mato Grosso do Sul), *T. pallida* Machado, 2010 (Goiás) and *T. obsoleta* (Selys, 1876) (Mato Grosso do Sul), as well as a new record of *T. carminita* Calvert, 1909 for Suriname. *Telebasis pallida* Machado, 2010 is redescribed and diagnosed based on 14 males collected near the type locality, and its genital ligula is described and illustrated for the first time. Furthermore, the status of the three species of the *Telebasis*

racenisi Bick & Bick, 1995 "complex" is evaluated. Of these, *Telebasis pareci* Machado, 2010 syn. n. is proposed as junior subjective synonym of *Telebasis lenkoi* Machado, 2010, and a possible synonymy among the three species is discussed under *T. racenisi*." (Authors)] Address: Pinto, A.P., Programa de Pós-graduação em Ciências Biológicas (Zoologia), IB – USP, Universidade de São Paulo, SP, Brazil; Museu de Zoologia, Univde de São Paulo, Av. Nazaré 481, Ipiranga 04263-000, São Paulo, SP, Brazil. E-mail: odonataangelo@hotmail.com

12643. Raposeiro, P.M.; Cruz, A.M.; Hughes, S.J.; Costa, A.C. (2012): Azorean freshwater invertebrates: Status, threats and biogeographic notes. *Limnetica* 31(1): 13-22. (in English, with Spanish summary) ["This paper presents an updated catalogue of the freshwater invertebrates (including Odonata) of the Azores archipelago and reviews the published records to account for the current taxonomic status and changes in the nomenclature of the listed taxa. The number of freshwater invertebrate species that has been recorded in the Azores has risen sharply throughout the 20th century to 241 species based on field collections and the identification by several generations of local and foreign researchers. The freshwater fauna has been described as the following: (i) being "disharmonic", i.e., lacking taxa commonly found in continental freshwater systems such as the Plecoptera, and (ii) possessing a relatively high degree of endemism in selected groups. As expected, most recorded invertebrates are primarily of Palaearctic origin. However, endemic species make up 11 % of the freshwater invertebrate fauna, which emphasises the unique character of Azorean freshwater habitats, the importance of conservation measures and the need to continue the study of these systems." (Authors)] Address: Raposeiro, P.M., Research Centre in Biodiversity and Genetic Resources (CIBIO)-Açores and the Biology Department, University of Azores, Rua Mae de Deus 13A, 9501-855 Ponta Delgada, Açores, Portugal. E-mail: raposeiro@uac.pt

12644. Regan, E. (2012): Northern Emerald *Somatochlora arctica*. *Atropos* 45: 88. (in English) ["A male was discovered on Garinish Island, Co. Cork, Ireland, on 29 June (Regan, 2012). The island offers no suitable breeding habitat for the species, and this individual was presumably a wanderer. The nearest known site for this Irish rarity is some 24km away in County Kerry, though closer sites may yet be discovered. (A. Parr)"] Address: Regan, E., National Biodiversity Data Centre, WIT west campus, Waterford, Ireland

12645. Roberts, D. (2012): Responses of three species of mosquito larvae to the presence of predatory dragonfly and damselfly larvae. *Entomologia Experimentalis et Applicata* 145(1): 23-29. (in English) ["Although predators have been extensively used in the biological control of mosquito larvae, their efficacy will be reduced if the larvae are able to detect and respond to their presence.

This ability to detect and respond to the unseen presence of dragonfly or damselfly larvae was investigated for the larvae of three mosquito species (all Diptera: Culicidae) to see whether they either altered their rate of development or their feeding behaviour. The development of *Culex quinquefasciatus* Say and *Culiseta longiareolata* Macquart larvae was not affected by exudates from either predator, but *Culex sinaiticus* Kirkpatrick developed significantly slower when reared in the presence of a caged dragonfly larva and produced adults that were significantly smaller, indicating that they probably reduced feeding activity to make themselves less detectable to the predator. This only occurred when the dragonflies were fed in situ (in the presence of the mosquito larva) and not when removed for feeding, so that although this removed predator kairomones, other cues such as vibrations caused by movement of the predator may also be involved. In addition, the mosquito larvae responded to dragonfly larvae, but not to damselfly larvae. The depth of the water in which the mosquito larvae were reared had no effect on their response to the dragonfly. All three mosquito species significantly increased surface filter-feeding, when a predator was present in the water (compared with controls where no predator was present), at the expense of bottom scraping. In *Cx. sinaiticus* (but not the other two species), surface filter-feeding was greater when a dragonfly was present, compared with a damselfly. In the experimental conditions of one predator per 250 ml water, all three mosquito species were thus able to detect dragonfly and damselfly larvae (and distinguish between the two), but their response varied among species." (Author)] Address: Roberts, Derek, Department of Biology, Sultan Qaboos University, Al-Khod, Oman. E-mail: derekmr@squ.edu.om

12646. Rodríguez Martínez, S.; Torralba Burrial, A. (2012): Teratología en el paraprocto derecho de una exuvia de *Aeshna cyanea* (Müller, 1764) (Odonata: Aeshnidae). *Boletín de la SEA* 51: 321-322. (in Spanish, with English summary) [Pena, 29TPJ770195, 415 m a.s.l., El Franco, Asturias, Spain; description of a teratology in the caudal appendages of exuviae belonging to a female of *A. cyanea*.] Address: Rodríguez Martínez, S., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, c/ Catedrático Rodrigo Uria s/n, E-33071 Oviedo, Spain. E-mail: saul.riguez@gmail.com

12647. Röller, O. (2012): Aktuelle Meldungen der Grünen Keiljungfer (*Ophiogomphus cecila*) in der Pfalz. *POLLICHIA-Kurier* 28/4: 29-30. (in German) [Rheinland-Pfalz, Germany; 2011 data from a citizen science-project are presented.] Address: Röller, O., Gottlieb-Wenz-Straße 19, 67454 Haßloch, Germany. E-Mail: roeller@pollichia.de

12648. Sasamoto, A.; Watanabe, Y.; Kawashima, I. (2012): First instar larvae of the two subspecies of *Zygonyx iris*, *malayana* and *errans*, (Libellulidae) from Vi-

etnam and Borneo. *Tombo* 54: 127-132. (in English, with Japanese summary) ["In the genus *Zygonyx*, unique characteristics have been reported for adult morphology, behaviour, and final instar larval morphology. In this paper, we report the first description of first instar larvae from the genus *Zygonyx*, which also have unique morphology. The first instar larvae of *Z. iris malayana* and *Z. i. errans* had conspicuous fan-shaped setae on the back from head to abdomen while final instar larvae did not have these setae. This structure has not been reported in other libellulid species, which implies a unique taxonomic position for this genus." (Authors)] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: aksmt@sea.plala.or.jp

12649. Schmidt, E.G. (2012): Sicherung der Karpfenzucht im Teichgut Hausdülmen. *Naturschutzobjekt Karpfenstreckteiche*. *Naturzeit im Münsterland* 9(18): 14-15. (in German) [Nordrhein-Westfalen, Germany; the author introduces into the biodiversity of habitats depending on anthropogenic resp. agricultural use and details the positive effects with the example of carp breeding techniques and *Sympetrum depressiusculum*.] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

12650. Shirasawa, R. (2012): Twelve cases of abnormal connections of dragonflies observed in 2011. *Tombo* 54: 147-150. (in Japanese, with English summary) ["In 2011, twelve cases of abnormal connection of dragonflies were observed chiefly in Nagano and partly in Tsugata prefectures. The five cases are heterospecific heterosexual connection in the same genus such as *Lestes*, *Aeshna* and *Sympetrum*, however, one case consists of different genera, *Orthetrum* and *Sympetrum*. The five cases of homosexual conspecific connection were in *Lestes* and *Sympetrum*. Only one case of homosexual heterospecific connection was observed in *Lestes*." (Authors)] Address: Shirasawa, R., 398-0002, Nagano Prefecture Omachi God Sakae-cho, 6305 - 3

12651. Simoes, M.H.; Souza-Silva, M.; Lopes Ferreira, R.L. (2012): Species richness and conservation of caves in the Urucuia River sub-basin, a tributary of the San Francisco River: a case study in caves of Arinos, Minas Gerais, Brazil. *Revista Brasileira de Espeleologia* 2(2): 1-17. (in English) [Brazil; "Inadequate land use and the overexploitation of natural resources are causing serious impacts on cave environments and therefore the proposal of conservation actions become necessary. The objective of the present study was to gather information on the invertebrate fauna of seven caves in the region of Arinos, in the northwest of Minas Gerais state, proposing priorities and conservation measures. A total of 374 species were registered, seven with troglomorphic traits. The expansion of agricultural practices and the pollution of water bodies are the most worrisome threats. The recovery of the cave surround-

ings and the awareness of nearby landowners are priority actions to be developed. The creation of reserves and corridors make up alternatives for the conservation of this important heritage." (Authors) The list of taxa includes "Coenagrionidae (1), Libellulidae (1), Protoneuridae (1)".] Address: Simões, M.H., Universidade Federal de Lavras – UFLA, Laboratório de Ecologia Subterrânea, Setor de Zoologia/Departamento de Biologia, Brazil. E-mail: matsimoes@hotmail.com.

12652. Sinclair, K.A.; Xie, Q.; Mitchell, C.P.J. (2012): Methylmercury in water, sediment, and invertebrates in created wetlands of Rouge Park, Toronto, Canada. *Environmental Pollution* 171: 207-215. (in English) ["Thousands of hectares of wetlands are created annually because wetlands provide beneficial ecosystem services. Wetlands are also key sites for production of the bioaccumulative neurotoxin methylmercury (MeHg), but little is known about MeHg production in created systems. Here, we studied methylmercury in sediment, water, and invertebrates in created wetlands of various ages. Sediment MeHg reached 8 ng g⁻¹ in the newest wetland, which was significantly greater than in natural, control wetlands. This trend was mirrored in several invertebrate taxa, whose concentrations reached as high as 1.6 µg g⁻¹ in the newest wetland, above levels thought to affect reproduction in birds. The MeHg concentrations in created wetland invertebrate taxa generally decreased with increasing wetland age, possibly due to a combination of deeper anoxia and less organic matter accumulation in younger wetlands. A short-term management intervention and/or improved engineering design may be necessary to reduce the mercury-associated risk in newly created wetlands." (Authors) Most Odonata taxa in the newest constructed wetland had concentrations in excess of 1 µg g⁻¹, which is twice the current fish warning level for human consumption.] Address: Mitchell, C., Department of Physical and Environmental Science, University of Toronto Scarborough, 1265 Military Trail, Toronto, ON, Canada M1C 1A4. E-mail: carl.mitchell@utoronto.ca

12653. Stoks, R.; Swillen, I.; De Block, M. (2012): Behaviour and physiology shape the growth accelerations associated with predation risk, high temperatures and southern latitudes in *Ischnura damselfly* larvae. *Journal of Animal Ecology* 81(5): 1034-1040. (in English) ["(1) To better predict effects of climate change and predation risk on prey animals and ecosystems, we need studies documenting not only latitudinal patterns in growth rate but also growth plasticity to temperature and predation risk and the underlying proximate mechanisms: behaviour (food intake) and digestive physiology (growth efficiency). The mechanistic underpinnings of predator-induced growth increases remain especially poorly understood. (2) We reared larvae from replicated northern and southern populations of *Ischnura elegans* in a common garden experiment manipulating temperature and predation risk and quantified growth rate, food

intake and growth efficiency. (3) The predator-induced and temperature-induced growth accelerations were the same at both latitudes, despite considerably faster growth rates in the southern populations. While the higher growth rates in the southern populations and the high rearing temperature were driven by both an increased food intake and a higher growth efficiency, the higher growth rates under predation risk were completely driven by a higher growth efficiency, despite a lowered food intake. (4) The emerging pattern that higher growth rates associated with latitude, temperature and predation risk were all (partly or completely) mediated by a higher growth efficiency has two major implications. First, it indicates that energy allocation trade-offs and the associated physiological costs play a major role both in shaping large-scale geographic variation in growth rates and in shaping the extent and direction of growth rate plasticity. Secondly, it suggests that the efficiency of energy transfer in aquatic food chains, where damselfly larvae are important intermediate predators, will be higher in southern populations, at higher temperatures and under predation risk. This may eventually contribute to the lengthening of food chains under these conditions and highlights that the prey identity may determine the influence of predation risk on food chain length." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

12654. Sutton, P.G. (2012): Key identification features for the Red-veined Darter *Sympetrum fonscolombii* (Selys, 1840) and other Odonata in Corfu (Kérkira). *Bulletin of the Amateur Entomologists' Society* 71(501): 45-49. (in English) [Records of *S. fonscolombii*, *Lestes barbarus*, *Coenagrion pulchellum*, and *Ischnura elegans* are documented and discussed] Address: Sutton, P.G., 2 Fir Tree Close, Flitwick, Beds. MK45 1NZ, UK. E-mail: petersutton@freeuk.com

12655. Sviderskii, V.L.; Plotnikova, S.I.; Gorelkin, V.S.; Severina, I.; Isavnina, I.L. (2012): Functional role of dragonfly legs before and after hatching: reorganization of coordinating interactions. *Rossiiskii fiziologicheskii zhurnal imeni I.M. Sechenova* 98(11): 1432-1440. (in Russian, with English summary) ["The characteristics of a structure-functional organization of leg apparatus were examined in the dragonfly *Aeshna grandis*: larvae of the final stadium, which legs perform a locomotion function and adults (imago) rising on a wing, which legs lose a locomotion function and are used mainly for catching a prey in the air. It has been demonstrated that legs of the imago practically do not differ from those of the larva either in shape or in proportion of segments of the leg and all changes in the functional role of legs of the imago are implemented due to modifications of mechanisms of limb muscle control and an appropriate reorganization or coordinating interactions. As it is proved by the obtained data, this reorganization concerns

mechanisms of the generation of motor commands as well as close coordination of the activity of wing and leg apparatus and some others. The above mentioned mechanisms are discussed." (Authors)] Address: Svidersky, V.L., Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, Russia. E-mail: office@iephb.ru

12656. Tellez, D.; Chapelin-Viscardi J.-D. (2012): Une nouvelle station à *Leucorrhinia caudalis* (Charpentier, 1840) dans le département du Loiret (Odonata Anisoptera Libellulidae). *L'Entomologiste* 68(3): 191. (in French) [Arboretum, Grandes Bruyères (Ingrannes), France: 1 ind. in 2011, 3 ind. in 2012] Address: Laboratoire d'Eco-Entomologie, 5 rue Antoine Mariotte, 45000 Orléans, France

12657. Tijare, R.V.; Patil, K.G. (2012): Diversity of Odonata in and around Gorewada National Park, Nagpur, M.S. (India). *Bionano Frontier - Eco Revolution 2012 Colombo - Srilanka*: 182-183. (in English) ["The survey of odonates carried out from wetlands present in and nearby region of the Gorewada National park during the months July 2010 to June 2011. Total 29 species were observed in and around Gorewada national park, Nagpur belonging to 24 genera and 6 families. Odonate species *Orthetrum sabina*, *Neurothemis tullia*, *Diplacodes trivialis*, *Crocothemis servilia*, *Trithemis aurora*, *Bradinopyga geminata*, *Pantala flavescens*, *Acisoma panarpoides*, *Anax guttatus*, *Ceriagrion coromandelianum* were observed almost throughout the year. *Gynacantha bayadera* is crepuscular species observed breed in swamps and marshy area of forest and *Ischnura senegalensis* was pollution tolerant species found near the variety of stagnant and flowing water." (Authors)] Address: Govt. Institute of Science, Nagpur, 440 001, India. E-mail: rvtijare@rediffmail.com

12658. Tiple, A.D. (2012): Odonata (damselflies and dragonflies) fauna of Tadoba National Park and surroundings, Chandrapur, Maharashtra (Central India). *Bionano Frontier* 5: 149-152. ["A survey of fresh water body sites such as ponds, streams, fields grassland, and forests areas of Tadoba National Park, Chandrapur district area of 623 sq. km. from 2008 to 2010 to collect and record the Odonate faunal diversity and their status. A total of 64 species of Odonata belonging to 41 genera and 9 families viz. Gomphidae, Aeshnidae, Cordulidae, Libellulidae, Coenagrionidae, Platycenemididae, Protoneuridae, Chlorocyphidae and Lestidae were recorded. The checklist adds 24 new records for Tadoba National Park. The Odonates belong to the Libellulidae (33 species), followed by Coenagrionidae (14 species), Aeshnidae (5 species), Gomphidae, (3 species), Platycenemididae and Lestidae (3 species each), Protoneuridae (2), Macromiidae (1 species) and Chlorocyphidae (1 species). Of the total 64 species, 23 were abundant or very common, 24 were common, 12 rare and 5 very rarely in occurrence. The observations support the val-

ue of the National park (reserve forest) area in providing valuable resources for Odonata." (Author)] Address: Tiple, A.D., Dept of Zoology, Vidyabharti College, Seloo, Wardha 442104, Maharashtra, India. E-mail: ashishdtiple@yahoo.co.in

12659. Torralba Burrial, A.; Hernández Toledo, E. (2012): Confirmación de la presencia actual de *Onychogomphus costae* Sélys, 1885 (Odonata: Gomphidae) en Madrid (centro de la Península Ibérica). *Boletín de la SEA* 51: 347-348. (in English, with Spanish summary) [The current presence of *O. costae* in Madrid province (Spain) is reported. Only one previous record from this region existed, published in the early 20th century. The new locality is: Fuentiduena de Tajo, rio Tajo, 30TVK8699638899 (datum WGS84), 541 m a.s.l., 16/08/2012, 1 male, 1 female.] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

12660. Torralba-Burrial, A.; Ocharan, F.J.; Outomuro, D.; Azpilicueta Amorín, M.; Cordero Rivera, A. (2012): *Ophiogomphus cecilia*. En: VV.AA., Bases ecológicas preliminares para la conservación de las especies de interés comunitario en España: Invertebrados. Ministerio de Agricultura, Alimentación y Medio Ambiente. Madrid: 50 pp. (in Spanish) [Odonata species protected under the European Community law are treated according the legal definitions of the Fauna, Flora, Habitat Directive. Information on identification, general distribution, ecology and habitat, 'favourable conservation status' on different geographic scales, conservation measures, and regional bibliography are given. This manual refers to the situation of *O. cecilia* in Spain.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

12661. Torralba-Burrial, A.; Ocharan, F.J.; Outomuro, D.; Azpilicueta, M.; Cordero, A. (2012): *Gomphus graslinii*. En: VV.AA., Bases ecológicas preliminares para la conservación de las especies de interés comunitario en España: Invertebrados. Ministerio de Agricultura, Alimentación y Medio Ambiente. Madrid: 81 pp. (in Spanish) [Odonata species protected under the European Community law are treated according the legal definitions of the Fauna, Flora, Habitat Directive. Information on identification, general distribution, ecology and habitat, 'favourable conservation status' on different geographic scales, conservation measures, and regional bibliography are given. This manual refers to the situation of *G. graslinii* in Spain.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

12662. Torralba-Burrial, A.; Ocharan, F.J.; Outomuro, D.; Azpilicueta Amorín, M.; Cordero Rivera, A. (2012): *Coenagrion mercuriale*. En: VV.AA., Bases eco-

lógicas preliminares para la conservación de las especies de interés comunitario en España: Invertebrados. Ministerio de Agricultura, Alimentación y Medio Ambiente. Madrid: 98 pp. (in Spanish) [Odonata species protected under the European Community law are treated according the legal definitions of the Fauna, Flora, Habitat Directive. Information on identification, general distribution, ecology and habitat, 'favourable conservation status' on different geographic scales, conservation measures, and regional bibliography are given. This manual refers to the situation of *C. mercuriale* in Spain.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12663. Torralba-Burrial, A.; Ocharan, F.J.; Outomuro, D.; Azpilicuta Amorín, M.; Cordero-Rivera, A. (2012): *Oxygastra curtisii*. En: VV.AA., Bases ecológicas preliminares para la conservación de las especies de interés comunitario en España: Invertebrados. Ministerio de Agricultura, Alimentación y Medio Ambiente. Madrid: 97 pp. (in Spanish) [Odonata species protected under the European Community law are treated according the legal definitions of the Fauna, Flora, Habitat Directive. Information on identification, general distribution, ecology and habitat, 'favourable conservation status' on different geographic scales, conservation measures, and regional bibliography are given. This manual refers to the situation of *O. curtisii* in Spain.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

12664. Van Ryswyk, B. (2012): 2012 Hamilton Odonata Count Summary. *The Wood Duck* 66(2): 38-41. (in English) [Ontario, Canada, June 30 2012; "Our species count for the day was above average at 59 species, and we even managed to add one new species (*Basiaeschna janata*) to the list! Our cumulative species list (all species ever seen on the Count) is now at a whopping 90 species!" (Author)] Address: not stated

12665. Van Ryswyk, B. (2012): 2009 Hamilton Odonata Count Summary. *The Wood Duck* 66(2): 30-31. (in English) [Ontario, Canada; "The sixth annual Hamilton Odonata Count was held on July 4, 2009, and was quite successful considering the wet, cool spring that we had. We observed a total of 57 species on Count day (and an additional four species from count week). Location: The Hamilton Odonate Count uses a circle 15 miles in diameter, centred on the village of Kirkwall in Flamborough. Highlights of the 2009 count included four new species to the Count list, two on Count day and two during the Count week. New Count records were: *Epi-aeschna heros*, *Cordulegaster maculate*, *C. obliqua*, and *Somatochlora walshii*." (Author)] Address: not stated

12666. Vega-Sánchez, Y.M.; Camacho-Morales, E.; Chassin-Noria, O.; MendozaCuenca, L. (2012): Efecto

del tipo de hábitat, genética y selección sexual sobre la morfología alar en *Hetaerina* (Odonata: Calopterygidae). *Biológicas* 14(1): 53-60. (in Spanish, with English summary) ["Odonates exhibit distinctive behaviour among insects, particularly flight types associated with mating systems and therefore have been widely used as ecological and evolutionary models. As in other flying insects, the wing shape is under strong selective pressures because it determines not only flight efficiency but also their reproductive success. We evaluated the factors that shape the evolution of wing shape in three species of *Hetaerina*: *H. americana*, *H. cruentata* and *H. titia*, which have a wide geographical distribution in Mexico and can settle in different habitat types. These species also converge in a territorial lek mating system, where males gather in exhibition arenas where they perform ritualized flights, long-lasting and energy-demanding. We apply geometric morphometric techniques to independently evaluate the shape and size of individuals. Also genetic relationship analysis was made between populations of the three species using nuclear DNA sequences (ITS1, 5.8S and ITS2). Our results suggest that although there is convergence in the mating system and a genetic similarity within populations, the evolution of the forms of the wings in these three species is determined by the pressures associated to habitat similarity. Analysis of deformation show that the structural complexity and levels of competition for resources and sexual partners that are characteristic of tropical rain forests favour the evolution of wing designs that increase the maneuverability of individuals." (Authors)] Address: Mendoza Cuenca, L., Laboratorio de Ecología y Evolución de la Conducta, Fac. de Biología. Univ. Michoacana de San Nicolás de Hidalgo. Edificio "R", Ciudad Universitaria, Av. Francisco J. Múgica s/n. Col. Felicitas del Río, C.P. 58030. Morelia, Michoacán, México

12667. von Ellenrieder, N. (2012): The levis group of *Orthemis* revisited: a synopsis including a synonymy and description of six new species of *Orthemis* from South America (Odonata: Libellulidae). *International Journal of Odonatology* 15(3): 115-207. (in English) ["The levis and ferruginea groups of *Orthemis* are redefined. Six new species of *Orthemis* are described: *O. aciculata* sp. nov. (male holotype: Surinam, Para Dist., road near forest, Zanderij I (5°32' N, 55°10' W), 17 January 1957, leg. J. Belle [RMNH]), *O. celata* sp. nov. (male holotype: Brazil, Pará State, Rio Gurupí, Canindé (0°30'57' ' S, 51°14'00' ' W), 27-28 February 1966, leg. B. Malkin [RMNH]), *O. faaseni* sp. nov. (male holotype: Brazil, Rondônia State, Porto Velho (8°46' S, 63°54' W), 28 February 1922, leg. J.H. Williamson & J.W. Strohm [UMMZ]), *O. garrisoni* sp. nov. (male holotype: Panama, Panamá Prov., 7 km NW of Gamboa, Pipeline Road, trail near palm forest, 30 July 1979, leg. RWG & J.A. Garrison [FSCA]), *O. paulsoni* sp. nov. (male holotype: Ecuador, Sucumbios Prov., forest trail ca. 3 km W of Shushufindi (0°09'59' ' N, 76°41'30' ' W), 14 October 2009, leg. K.J. Tennessen [FSCA]), and

O. teres sp. nov. (male holotype: Bolivia, Cochabamba Dept., Chapare, Cristal Mayo (17°00'57' ' N, 65°38'09' ' W), October/November 1994, leg. R. Andreas [FSCA]). *Orthemis plaumanni* Buchholz is found to be a junior synonym of *O. ambinigra* Calvert. A lectotype is designated for *O. concolor* Ris. All species of the *levis* group and the new species of the *ferruginea* group described here are diagnosed, illustrated, mapped, and keyed." (Author)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

12668. Ware, J.L.; LaPolla, J.S. (2012): A tribute to Michael L. May. *Organisms diversity & evolution* 12(3): 205-207. (in English) [The editors dedicate this special issue of 'Organisms Diversity and Evolution' to Mike May. "We have titled it "Of Dragons and Damsels," because he has spent much of his career, as mentioned above, working on dragonflies and damselflies, but one of the features that we all admire in Mike is that he is such a polymath of entomological knowledge. The breadth of his knowledge has always been a source of admiration among his students. We have tried to include a breadth of papers to reflect Mike's own varied interests. We hope this serves as tribute to a man we all admire and respect, and someone from whom we expect still more great science to come." (Authors)] Address: Ware, Jessica, Rutgers, the State Univ. of New Jersey, Boyden Hall, room 406, 195 University Ave, Newark, NJ 07102, USA. E-mail: jware42@andromeda.rutgers.edu

12669. Weissinger, R.H.; Perkins, D.W.; Dinger, E.C. (2012): Biodiversity, water chemistry, physical characteristics, and anthropogenic disturbance gradients of sandstone springs on the Colorado plateau. *Western North American Naturalist* 72(3): 393-406. (in English, with Spanish summary) ["Springs located on the Colorado Plateau are highly threatened and represent a small percentage of the landscape; yet they are disproportionately important to diverse native flora and fauna. The relationships between anthropogenic disturbance, aquatic macroinvertebrate species composition, and environmental variables at these springs have received little study. We selectively visited 40 sandstone springs in southeastern Utah and southwestern Colorado to span a range of impacts. We classified the springs into impact categories based on a spring impact score, and we measured biodiversity (aquatic macroinvertebrates), water chemistry (nutrients, dissolved O₂, pH, specific conductivity, temperature, turbidity, coliform bacteria [*Escherichia coli*]), physical characters (solar radiation, substrate, vegetation cover, bank stability, discharge), and presence of anthropogenic disturbance. *Escherichia coli* abundance was higher in high impact categories, and turbidity increased with increasing disturbance. No differences in total N, total P, specific conductivity, flow, dissolved O₂, pH, or substrate were found among the

impact categories. Vegetation cover was higher in low impact categories than in moderate and high impact categories, while potential annual and growing-season solar radiation was lower in low impact categories than in high impact categories. Global and subsequent multiple response permutation procedure (MRPP) comparisons suggested strong differences in aquatic macroinvertebrates between low and high impact springs and no difference at moderate impact springs. Mean taxa richness (α -diversity), total taxa richness (γ -diversity), and percent of taxa richness composed of shredders peaked at moderate disturbance levels. The percentage of non-insect taxa richness was reduced in high impact categories, and Odonata were higher in low impact categories than in high impact categories. All high impact springs had both livestock use and vehicle use (roads or off-highway vehicles), and our data suggest that disturbances caused by one or both of these uses alter the aquatic macroinvertebrate assemblage. We suggest that disturbance may increase macroinvertebrate richness, where a mix of tolerant and intolerant species co-occur, until macroinvertebrate richness reaches a threshold; after surpassing this threshold, macroinvertebrate diversity decreases." (Authors)] Address: Perkins, D.W., Northern Colorado Plateau Inventory & Monitoring Network, National Park Service, Western State College, Environmental Studies Dept, Gunnison, CO 81231, USA. E-mail: dustinwperkins@nps.gov

12670. Yapó, M.L.; Atse, B.C.; Kouassi, P. (2012): Inventaire des insectes aquatiques des étangs de piscicoles au sud de la Côte d'Ivoire. *Journal of Applied Biosciences* 58: 4208-4222. (in French, with English summary) ["Objective: The main objective of this study was to determine the diversity of aquatic insect species in five fish farms ponds in the Southern Ivory Coast. It contributes to our knowledge of this ecosystem, which is not well known. Methods and Results: The samples were taken using a hand net and a Van veen grab. Specimens were identified to the lowest possible taxonomic level, by use of systematic and classification keys (Dejoux et al., 1981; Tachet et al., 2003; de Moor et al., 2003 a; 2003 b). Seventy-nine taxa belonging to 8 orders and 35 families were identified. Hemiptera and Coleoptera were the major insect taxa collected (with 21 taxa each). They were followed by Diptera (15 taxa), Odonata (11 taxa), Ephemeroptera (5 taxa) and by Trichoptera (4 taxa). Megaloptera and Lepidoptera (1 taxon each) were the less diversified. Conclusion and application: Eight new taxa for the Ivory Coast were harvested. Most of these taxa are cosmopolitan. They were found in most of the stations. This is a contribution to the list of aquatic insects for the scientific community." (Authors)] Address: Yapó, M.L., 1 Laboratoire de Zoologie- Biologie Animale, Université de Cocody, U.F.R Biosciences, 22 BP582 Abidjan 22 Côte d'Ivoire

12671. Zeybek, M.; Kalyoncu, H.; Ertan, Ö.O.; Çiçek, N.L. (2012): Benthic invertebrate fauna of Köprüçay

stream (Antalya). Süleyman Demirel Üniversitesi, Fen Bilimleri Enstitüsü Dergisi 16(2): 146-153. (in Turkish, with English summary) [Köprüçay Stream, Turkey; samples were collected at 7 stations between February 2008 – January 2009. The taxa listed are Gomphus sp., Octogomphus sp., Aeshna sp., Plathemis sp., Epallage fatime, Calopteryx splendens, Anax sp., and Anax longipes. The Nearctic taxa of course are misidentified.] Address: Zeybek, M., Süleyman Demirel Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü / ISPARTA, Turkey

12672. Zhang, Z.; Song, X.; Wang, Q.; Lu, X. (2012): Mercury Bioaccumulation and Prediction in Terrestrial Insects from Soil in Huludao City, Northeast China. Bull. Environ. Contam. Toxicol. 89(1): 107-112. (in English) ["Mercury accumulation was investigated by constructing and testing empirical equations based on mercury in soil (C_s) and in 10 terrestrial insects (C_i). C_s ranged from 0.13 to 41.01 mg/kg. C_i differed with species and the highest was found in dragonfly. C_s and C_i showed a good linear fit, and a simple equation was used in predicting C_i when insects were classified into one Insecta group ($r = 0.3399$, $p = 0.0037$). The taxonomy can affect validities of empirical equations, which fit field data well when insects were grouped by feeding habits, and when grouped by species, empirical equations were suitable only for certain insects." (Authors)] Address: Lu, X., Key laboratory of Wetland Ecology and Environment, Institute of Northeast Geography and Agroecology, Chinese Academy of Sciences, Changchun, 130012, China. E-mail: luxg@neigae.ac.cn

2013

12673. Abbott, J. (2013): Morph-specific and sex-specific temperature effects on morphology colour polymorphic damselfly *Ichnura elegans*. Animal Biology 63(2): 149-167. (in English) ["Colour polymorphic species with extensive ranges often exhibit large-scale geographic patterns of morph frequency variation. Because colour polymorphism is associated with correlated differences in multiple traits, such as thermal performance, a likely proximate explanation for such patterns is morph-specific responses to temperature variation. The colour polymorphic *Ichnura elegans* exhibits large-scale geographic variation in morph frequencies, but the possibility that temperature is a proximate explanation for the latitudinal cline in morph frequencies has only ever been tested within a single developmental stage (egg survival and hatching time), where no difference between the morphs was found. I therefore carried out a temperature manipulation on larvae of *I. elegans* which I raised to maturity in the laboratory. I found that individuals exhibited incomplete compensatory growth after being exposed to cold temperatures, and that individuals which did not emerge successfully and those that experienced cold temperatures had more juvenile morphology in the last instar. In addition, there were sex-specific and morph-specific effects of temper-

ature on adult morphology, such that sexual size dimorphism was increased when individuals experienced warm temperatures throughout the larval stage, and that cold temperatures tended to result in larger size of androchromes and their offspring compared to the other morphs. These results are generally consistent with the large-scale geographic variation in morph frequencies found in this species." (Author)] Address: Abbott, Jessica, 1. Section for Evolutionary Ecology, Department of Biology, Lund University, Sölvegatan 37 9 223 62 Lund, Sweden. Email: jessica.abbott@biol.lu.se

12674. Abed, R.M.M.; Barry, M.J.; Al Kindi, S.; Golubic, S. (2013): Structure and cyanobacterial species composition of microbial mats in an Arabian Desert stream. African Journal of Microbiology Research 7(15): 1434-1442. (in English) ["Microbial mats are often the dominant benthic biotype in desert streams, however information on such mats is very scarce. We investigated the gross morphology of microbial mats and their cyanobacterial species composition in a perennially flowing wadi in Northern Oman, in relation to current flow and other biotic and abiotic variables. Physical and chemical parameters at the six sites were generally similar with low concentrations of soluble phosphorus and nitrogen; however, flow rates varied greatly with the highest velocity being 50 cm/s. The mats varied greatly in their gross morphology with the four sites with the highest current velocities forming low laminated structures attached to cobbles, and the two sites with minimal or no flow forming complex three-dimensional structures or free floating balls 1 to 3 cm in diameter. The concentration of chlorophyll a varied between 2.6 (± 0.02) and 1.4 (± 0.11) mg chlorophyll a g⁻¹ mat fresh weight, with the highest concentration detected in the free floating balls. 21 cyanobacterial morphotypes belonging to 14 genera ... were identified with *Calothrix* and *Leptolyngbya* spp. as the most abundant. Cluster analysis of the cyanobacterial species composition showed that mats could have very different morphologies despite similar species compositions suggesting a high degree of plasticity of mat form. We conclude that microbial mats are important elements in Wadi ecosystems and have great variety of structure and community composition." (Authors) Odonata are treated as morphospecies.] Address: Abed, R.M.M., Biology Dept, College of Science, Sultan Qaboos Univ., P.O. Box: 36, postal code 123, Al Khoud, Sultanate of Oman. E-mail: rabad@mpi-bremen.de

12675. Al-Shami, S.; Heino, J.; Che Salmah, M.R.; Hassan, A.A.; Suhaila, A.H.; Madrus, M.R. (2013): Drivers of beta diversity of macroinvertebrate communities in tropical forest streams. Freshwater Biology 58(6): 1126-1137. (in English) ["(1.) There has recently been increasing interest in patterns of beta diversity but we still lack a comprehensive understanding of these patterns in various regions (e.g. the tropics), ecosystems (e.g. streams) and organism groups (e.g. invertebrates). (2.) Our aim was to investigate the patterns of beta diversity of stream ma-

croinvertebrates in relation to key environmental (i.e. stream size, pH and habitat degradation) and geographical variables (i.e. latitude, longitude, altitude) in a tropical region. We surveyed a total of 8–10 riffle sites in each of 34 streams (altogether 337 riffle sites were sampled) in Peninsular Malaysia to examine variation in macroinvertebrate community composition at within-stream and among-stream scales. (3.) Based on test of homogeneity of dispersion, we found that the streams studied differed significantly in within-stream variation in community composition (i.e. among-site variation of within stream beta diversity). The patterns were similar based on Bray–Curtis coefficient on abundance data, Sorensen coefficient on presence–absence data and Simpson coefficient on presence–absence data. We also found that within-stream beta diversity was significantly related to stream size, pH and latitude, with each of these variables individually accounting for around 20% of the variation in beta diversity in simple regressions, while the total variation explained by the three significant variables amounted to around 50% in multiple regressions. By contrast, habitat degradation, longitude and altitude were not significantly related to beta diversity. We also found that the factor drainage basin accounted for much of the variation in beta diversity in general linear models, suppressing the effects of environmental variables. (4.) We concluded that within-stream beta diversity is mainly related to a combination of the identity of a drainage basin and stream environmental factors. Our findings provide important background for stream environmental assessment and conservation planning by emphasising that (i) macroinvertebrate communities within streams are not homogeneous, but show considerable beta diversity, (ii) streams differ in their degree of within-stream beta diversity, (iii) stream size and water pH should be considered in applied contexts related to within-stream beta diversity and (iv) historical effects may be different in different drainage basins and may affect present-day patterns of within-stream beta diversity. ... However, dragonflies, fish and frogs showed negative responses to latitude, whereas caddisflies and salamanders showed no relationships with latitudinal gradients. ..." (Authors)] Address: Al-Shami, S.A., School of Biol. Sc., Univ. Sains Malaysia (USM), 11800 Penang, Malaysia. E-mail: alshami200@gmail.com

12676. Alvarez, H.A.; Serrano-Meneses, M.A.; Reyes-Márquez, I.; Jiménez-Cortés, J.G.; Córdoba-Aguilar, A. (2013): Allometry of a sexual trait in relation to diet experience and alternative mating tactics in two rubyspot damselflies (Calopterygidae: Hetaerina). *Biological Journal of the Linnean Society* 108(3): 521-533. (in English) ["Several arguments have been put forward to explain how sexual selection drives the evolution of sexual trait allometry, especially hyperallometry. The 'positive allometry theory' suggests that hyperallometry is a rule in all-secondary sexual traits, whereas the 'display hypothesis' suggests that only males in good condition will exhibit hyperallometric sexual display traits. In the present study, we investigated: (1) the condition-dependence nature (by

using two diet treatments that varied in the amount of food provided to the larvae) of a sexually selected trait (wing pigmentation; WP) in recently-emerged adults of *Hetaerina americana*, and (2) the scaling relationship between WP and body size (wing and body length) in *H. americana* and *H. vulnerata*, according to alternative reproductive tactics (ARTs; territorial and nonterritorial males). First, we found support that indicated that diet positively affected WP length, although there was no significant WP allometric pattern in relation to diet regimes. Second, WP was hyperallometric in both *Hetaerina* species. WP size was similar between ARTs and, in *H. americana* (but not *H. vulnerata*), nonterritorial males showed steeper slopes than territorial males when wing length was used. The results obtained support the notion that sexual traits are hyperallometric, although there is no clear pattern in relation to ARTs." (Authors)] Address: Serrano-Meneses, M.A., Laboratorio de Biología Evolutiva, Centro Tlaxcala de Biología de la Conducta, Universidad Autónoma de Tlaxcala, Tlaxcala, México. E-mail: serrano.meneses@gmail.com

12677. Álvarez Gándara, J.; Ferreiro Garrido, J.; Vilas Souto, J. (2013): *Orthetrum brunneum* (Fonscolombe, 1837), nueva cita para la provincia de Pontevedra (Galicia, NO Península Ibérica) (Odonata - Libellulidae). *Archivos Entomológicos* 8: 287-288. (in Spanish, with English summary) [After a period of more than 95 years, *O. brunneum* is recorded once again in the province of Pontevedra (Galicia, NW Iberian Peninsula): 04-X-2012, Salvaterra de Miño.] Address: Ferreiro Garrido, J., Barrio do Souto, 10B. E-36740 San Salvador de Tebra, Tomiño (Pontevedra), Spain. E-mail: meisok@gmail.com

12678. Anbalagan, V.; Paulraj, M.G.; Ignacimuthu, S. (2013): Odonata diversity (Insecta: Arthropoda) in rice and vegetable fields in a north-eastern district of Tamil Nadu, India. *Journal of Research in Biology* 3(4): 977-983. (in English) ["Odonata diversity in vegetable fields (brinjal and okra) and rice fields was studied from January 2005 to December 2008 in Tiruvallur district of Tamil Nadu. Totally 23 species of Anisoptera and 12 species of Zygoptera were recorded and all these species were grouped into eight families. In vegetable fields 31 species of Odonata were recorded under 22 genera. In rice fields the species richness (21 species) and total genera (16) were less than vegetable fields during the entire study period. Libellulidae was the large family in both vegetable and rice fields which comprised maximum number of species. *Pantala flavescens*, a migratory species, was the most dominant in numbers throughout the year. Diversity indices clearly showed that Odonata diversity was higher in vegetable fields than in rice fields." (Authors)] Address: Ignacimuthu, S., Entomology Research Institute, Loyola College, Chennai-34, India. E-mail: entolc@hotmail.com

12679. Anonymus (2013): Keynsham landmark appears on new book cover. *The Week in Bitton*, Corston,

Downend, Emersons Green, Hanham, Keynsham, Kingswood, Longwell Green, Mangotsfield, Oldland Common, Pucklechurch, Salford, Staple Hill, Stockwood, Warmley, Whitchurch, Wick & Willsbridge • Thursday 8 August 2013: 29. (in English) [Verbatim: "Keynsham landmark appears on new book cover The chimney of Cadbury's former power house appears in a painting on the front cover of a new book published by the Bristol Regional Environmental Records Centre (BRERC). Called Dragonflies and Damselflies of the Bristol Region, it is the fourth in a series of books that document local wildlife. Why put Keynsham on the front cover? The stretch of the River Avon along with the River Chew and other water-courses are particularly good sites for Odonata (an order of carnivorous insects that includes dragonflies and damselflies). Specialist species include the Scarce Chaser, that is often seen now but was not discovered in the Bristol area until 1986, and the delicate White-legged Damselfly that needs good, clean water to complete its life cycle. John Aldridge, from Keynsham and a volunteer for the BRERC, said: "A key message that should be taken forward is that the redevelopment at the former Cadbury site must be sympathetic to dragonflies and damselflies; this should not be too difficult as the flood plain is impossible to build on anyway. However, steps should be taken to ensure that the habitat is not damaged when work takes place." The hardback book contains many photographs, maps and text describing each species. It costs £19.50 and is available from BRERC. For more information call 0117 934 9833 or visit www.brerc.org.uk] Address: <http://theweekin.co.uk/wp-content/uploads/2013/08/Issue0281.pdf>

12680. Anonymus (2013): Beauties from the above skies. Journal - Parc National du Mont-Orford 2013-2014: 4 (in English) [Verbatim: The parc national du Mont-Orford team is very pleased with new discoveries made over time in the park that allow the team to pursue the mission of conservation, protection and development of our heritage. During the 2012 summer season, based on an exploratory survey of Odonata, a preliminary list of 26 species was drawn up in 3 field visits in the Lac-Stukely sector. This first summary-inventory showed a species not yet mentioned in the Estrie region: *Somatochlora tenebrosa*, a dragonfly rarely observed in Quebec. Another wonderful discovery was *Perithemis tenera*. This latter species was mentioned for the first time in Quebec in 2007. This is the second mention of this species for the Estrie region. ...] Address: <http://www.sepaq.com/dotAsset/35697.pdf>

12681. Bagworth, T. (2013): Reports from coastal stations - 2012: Gibraltar Point NNR, Lincolnshire. *Atropos* 48: 67-68. (in English) [UK, *Sympetrum fonscolombii*, *Calopteryx splendens*, *Aeshna grandis*] Address: not stated

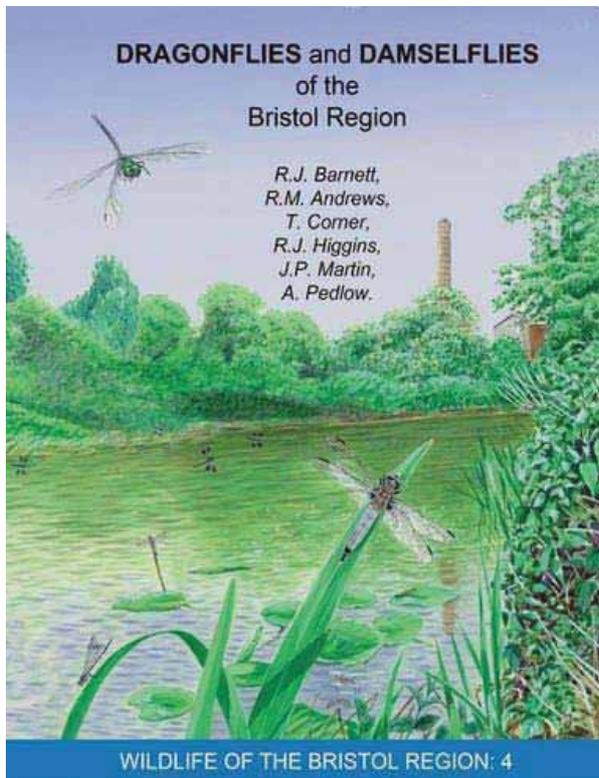
12682. Baker, R.A. (2013): Cynthia Evelyn Longfield (1896-1991) - the Irish connection and collections. *J. Br.*

Dragonfly Society 29(1): 23-39. (in English) ["Cynthia E. Longfield (1896-1991), traveller, explorer and dragonfly expert, was a remarkable woman in many ways. Internationally known as an odonatologist, she travelled throughout the five continents, most importantly sailing with other scientists to the South Pacific on the St. George expedition in 1924. She taught herself natural history at home and had wide interests including ornithology and botany. She always regarded herself as Irish, with her family estate in County Cork, to which she was to return on 'retirement' in 1957. She deposited her library and scientific papers at the Royal Irish Academy and a collection of her Odonata was donated to the Natural History Museum in Dublin. She worked for many years at the Natural History Museum in London as a volunteer, where she eventually specialized on African species of dragonflies and was made an Honorary Associate in 1948. Author or co-author of several books on dragonflies, she was elected the first Honorary member of the British Dragonfly Society and is remembered with affection and high regard by those who knew her." (Author)] Address: Baker, R.A., The Bungalow, St Johns Park, Menston, Ilkley, LS29 6ES, UK.

12683. Baker, R.A. (2013): Malcolm Burr (1878-1954) and Robert McLachlan (1837-1904), British workers on the Balkan fauna in 1898, with notes on the Odonata collected and identified. *Notul. odonatol.* 8(1): 1-3. (in English) ["2 British naturalists, a young student from Oxford University and an older expert on Odonata, collaborated on material from SE Europe in 1898. The first of these, M. Burr, collected the material while on a tour of the Balkans, Romania and Hungary in that year and R. McLachlan identified the specimens and published the work in the same year. The species list provides some of the earliest information on the Odon. from this part of the world, and is updated with additional notes." (Authors)] Address: Baker, R.A., Faculty of Biological Sciences, University of Leeds, Leeds, LS2 9JT, UK. E-mail: R.A.Baker@leeds.ac.uk

12684. Barnett, R.; Andrews, R.; Corner, T.; Higgins, R.J.; Martin, J.P.; Pedlow, A. (2013): Dragonflies and Damselflies of the Bristol Region. Bristol Regional Environmental Records Centre (BRERC): 214 pp. (in English) ["This book presents the culmination of thousands of sightings by both professional ecologists, biologists and amateur naturalists, brought together by BRERC to enable the status of our species in the region to be assessed. Wonderful colour photographs accompany the distribution maps which reveal where the different species occur around Bristol, Bath and the surrounding countryside. Expert authors analyse the threats and opportunities to the dragonfly populations; they have been subject to great changes over the last two hundred years, and will no doubt continue to change into the future. For example, the restoration of boating on the Kennet & Avon Canal has reduced the numbers of dragonflies, but at the same time, new species such as

Erythromma viridulum are colonising our area." (Publisher, <http://www.brerc.org.uk/services/publications.htm>) Address: BRERC: Bristol Central Library, College Green, Bristol, BS1 5TL, UK



12685. Bashar, K.; Reza, M.S. (2013): Dragonflies & damselflies in Bangladesh. Faunistic study of Odonata. Lambert Academic Publishing AG & Co. KG: 128 pp. (in English) [inv, "A faunistic study of Odonata was carried out in Bangladesh. A total of forty eight (48) species of Odonates belonging to thirty one genera, eight families and two sub-orders were recorded from the sampling areas. Among them, twenty five (25) species of Dragonflies under three families and twenty three (23) species of Damselflies under five families were recorded. The highest and lowest numbers of Odonata species were observed in Jahangirnagar university campus (31 species) and Bandarban (23 species) respectively. The diversity of Odonata species was peak during the post-monsoon season (45 species). Highest numbers of species were identified in Libellulidae family whereas lowest numbers were observed in Gomphidae, Lestidae, Calopterygidae and Protoneuridae family. Rhyothemis variegata was the dominant species (13.03%) of dragonfly but in damselfly, Agriocnemis pygmaea was the abundant species (13.97%) among all collected Odonata." (Authors)]

12686. Batty, P.M. (2013): The Brilliant Emerald Somatochlora metallica (Vander Linden) in Scotland, with particular reference to the Argyll sites and to larval habitat. J. Br. Dragonfly Society 29(1): 55-64. (in English) ["Since 2000, new S. metallica sites have been found in the Loch a' Chrion-doire area in Argyll. The sites are de-

scribed. The apparent range expansion is likely to be the result of increased recording in the area. Larvae were first found in Scotland in 2000. Their habitat is discussed. They are found in water 20-40 cm deep, underneath heather or sphagnum banks amongst sparse fibrous detritus. The banks are at water level and overhanging or undercut for between 30 and 150 cm. Larvae have also been found under stones in Slovenia." (Author)] Address: Batty, Pat M., Kirnan Farm, Kilmichael Gien, Lochgilphead, Argyll PA31 8QL, UK

12687. Bazin, N. (2013): Gomphus flavipes (Charpentier, 1825) redécouvert sur la Vallée du Rhône. Symptetrum 16: 30. (in French) [After 150 years of absence, G. stylurus was discovered at 27-VII-2007 in the region Rhône-Alpes, France.] Address: Bazin, N., Chemin d'Aurelle, le village, 07700 Bidon, France

12688. Bechly, G.; Poinar, G. (2013): Burmaphlebia reifi gen. et sp. nov., the first anisozygopteran damsel-dragonfly (Odonata: Epiophlebioptera: Burmaphlebiidae fam. nov.) from Early Cretaceous Burmese amber. Historical Biology: An International Journal of Paleobiology 25(2): 233-237. (in English) ["A new family, genus and species of damselfly, Burmaphlebia reifi gen. et sp. nov. (Burmaphlebiidae fam. nov.), is described as the second fossil odonate from Early Cretaceous Burmese amber. Its phylogenetic position is discussed and the fossil is attributed to a new family at the base of the anisozygopteran grade, probably closely related to the Recent relict group Epiophlebiidae. It is the first record of the 'anisozygopteran' grade from amber and the smallest known representative of this group." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: guenter.bechly@smns-bw.de

12689. Blanke, A.; Greve, C.; Mokso, R.; Beckmann, F.; Misof, B. (2013): An updated phylogeny of Anisoptera including formal convergence analysis of morphological characters. Systematic Entomology 38(3): 474-490. (in English) ["Family interrelationships among Anisoptera (dragonflies) are unresolved. Molecular markers applied thus far have not been particularly useful for resolving relationships at the family level. Previous morphological studies have depended heavily on characters of wing venation and articulation which are believed to display considerable degrees of homoplasy due to adaptations to different flight modes. Here, we present a comprehensive anatomical dataset of the head morphology of Anisoptera focusing on muscle organization and endoskeletal features covering nearly all families. The characters are illustrated in detail and incorporated into an updated morphological character matrix covering all parts of the dragonfly body. Phylogenetic analysis recovers all families as monophyletic clades except Corduliidae, Gomphidae as sister group to all remaining Anisoptera, and Austropetaliidae as sister group to Aeshnidae (=Aeshnoidea). The position of Petaluridae and

Aeshnoidea to each other could not be resolved. Libelluloidea is monophyletic with Neopetalia and Cordulegastridae as first splits. Chlorogomphidae is sister to monophyletic [Synthemistidae + ('Corduliidae + Libellulidae)]. In addition, we applied a recently published formal approach to detect concerted convergence in morphological data matrices and uncover possible homoplasies. Analyses show that especially head and thorax characters may harbour homoplasies. After exclusion of possible homoplastic characters, Gomphidae is corroborated as sister group to all remaining Anisoptera." (Authors)] Address: Blanke, A., Zentrum für molekulare Biodiversität, Zoologisches Forschungsmuseum Alexander Koenig, Adenauerallee 160, 53113, Bonn, Germany. E-mail: blanke@uni-bonn.de

12690. Blinova, I.V. (2013): A brief review of studies of insects and spiders in Murmansk region since 1900. Herald of the Kola Science Centre of the Russian Academy of Sciences 2013(1): 58-65. (in Russian, with English summary) ["Faunistic studies of insects and spiders on the Kola Peninsula have always been sporadic and were mostly conducted by visiting scientists. These studies were begun mostly by Finnish workers and were pursued actively between 1840 and 1934. Since 1930, arthropod exploration has been undertaken by some scientists at the Kola Science Centre, at regional Nature Reserves and by visiting zoologists as well. The number of arachnid and insect species in the region is c.4000, which is only a half of the corresponding number in Karelia. At least 400 species can be described as rare ones. The regional distribution of all arthropods is insufficiently known. The better explored areas include the Barents and White Sea coasts and the Khibiny Mountains. Soil invertebrates and amphibiotic & aquatic insects are among the most thoroughly studied. Invertebrate-plant interactions in the region's ecosystems, including life cycles and consortia, require for further study." (Author) The extensive list (n = 144) of regional publication also includes odonatological titles.] Address: Blinova, Ilona V., Head. Lab. population biology of plants. E-mail: ilbli@yahoo.com

12691. Booth, A.J.; Kadye, W.T.; Vu, T.; Wright, M. (2013): Rapid colonisation of artificial substrates by macroinvertebrates in a South African lentic environment. African Journal of Aquatic Science 38(2): 175-183. (in English) ["Macroinvertebrate colonisation patterns on artificial substrates were investigated in a small reservoir in the Eastern Cape, South Africa. Semi-closed 1 000 cm³ polythene netting cages filled with either brick, gravel, shredded plastic, or equal proportions of these three materials, were suspended above the benthic substrate. Gravel was preferred by caenid mayflies and chironomids, plastic by odonates, and brick by potamonautid crabs. Colonisation rates were rapid, with half the substrate-specific asymptotic diversity and richness being attained within a week. Overall, taxon richness on the substrates was similar to that in samples

collected with a sweep net, but diversity was almost half. Taxon richness was found to be highest on the gravel and brick substrates, and lowest on plastic. By contrast, macroinvertebrate communities on the plastic and mixed substrates were the most diverse and the most even. All substrates, with the exception of gravel, showed that the number of odonates was significantly positively correlated with the number of potential prey that included chironomid midges, caenid mayflies and caddisfly larvae. It is recommended that plastic be used to construct artificial substrates if a high macroinvertebrate diversity is required for monitoring purposes within lentic environments." (Authors)] Address: Booth, A.J., Department of Ichthyology and Fisheries Science, Rhodes University, PO Box 94, Grahamstown, 6140, South Africa

12692. Borisova, P.; Varadinova, E.; Uzunov, Y. (2013): Contemporary state of the bottom invertebrate communities of the Tundzha river basin (South-East Bulgaria). Acta zool. bulg. 65(1): 75-87. (in English) ["This paper presents the results of species content and structure of the macroinvertebrate communities alongside Tundzha River (South-East Bulgaria) and some of its tributaries for two periods of investigations: 1987 and 2009. The changes of macrozoobenthos community in Tundzha River are not just related with appearance or disappearance of the species but also with the restructuring of the quantitative and qualitative parameters. The dynamics of the benthos community is related with the improving of the water quality in the last two decades." (Authors)] Address: Uzunov, Y., Dept of Aquatic Ecosystems, Institute of Biodiversity & Ecosystem Research, Bulgarian Academy of Sciences, 1113 Sofia, 2 Gagarin Street, Sofia, Bulgaria. E-mail: uzunov@ecolab.bas.bg

12693. Bowman, N. (2013): Reports from coastal stations - 2012: Eccles-on-Sea, Norfolk. Atropos 48: 66-67. (in English) [UK, Sympetrum fonscolombii, Calopteryx splendens, Ischnura pumilio] Address: not stated

12694. Brandon, A. (2013): Odonata news and events from across the vice counties of Anglesey, Merionethshire, Caernarvonshire, Denbighshire and Flintshire. Y Fursen. North Wales Dragonfly Newsletter 71: 4 pp. (in English) [Documentation of emergence of Pyrrhosoma nymphula at 6th May 2013 in North Wales.] Address: Brandon, A., North Wales Dragonfly Recorder Bryn Heilyn, Rowen, Conwy LL32 8YT, UK. E-mail: allanrowenconwy@antispamsky.com

12695. Brochard, C.; van der Ploeg, E. (2013): Searching for exuviae of endemic Odonata species in Greece. Brachytron 15(2): 83-101. (in English, with Dutch summary) ["During two field trips to Greece in 2012, the first to Corfu in May 2012 and the second to Crete in June 2012, 37 species of dragonflies were observed. On Corfu, many larvae and exuviae of Pyrrhosoma elisabethae were found, both unknown to science. On Crete

a fair number of exuviae of *Coenagrion intermedium* and *Boyeria cretensis* were collected. *C. scitulum* and *Erythromma lindenii* are reported for the first time for Corfu and *Lindenia tetraphylla* was a new species of the dragonfly fauna of Crete. Also on Crete, *C. scitulum* is rediscovered at two localities after an apparent absence of more than 100 years. The identification of *Gomphus schneiderii* and the use of searching for exuviae are discussed near the larval habitat." (Authors)] Address: Brochard, C., Marsstraat 77, 9742EL Groningen, The Netherlands. E-mail: info@cbrochard.com

12696. Brochard, C.; van der Ploeg, E. (2013): A first acquaintance with the larvae of *Ceriagrion georgifreyi* and *Pyrrhosoma elisabethae*. *Brachytron* 15(2): 133-139. (in Dutch, with English summary) ["The larva of *Ceriagrion georgifreyi* was found for the first time during a field trip in South West Turkey (May 2011), while searching for exuviae for the project of creating a photographic guide of exuviae of European dragonflies. Also larvae of *Pyrrhosoma elisabethae* were found for the first time during a field trip on the island Corfu, Greece, for the same project in May 2012. Both species are very rare in Europe and both have a more common look-alike: *Ceriagrion tenellum* and *Pyrrhosoma nymphula*. The larvae of *Ceriagrion georgifreyi* and *Pyrrhosoma elisabethae* have been captured, photographed in an aquarium and then released again into their habitat. The habitat that the larvae use is described succinctly. Comparison for each species with its common look-alike shows that they have a very similar morphology. To identify them, many measurements of the exuviae collected during the field trips will be made. The results will be published in the key of the photographic guide of the exuviae of European dragonflies." (Authors)] Address: Brochard, C., Marsstraat 77, 9742EL Groningen, The Netherlands. E-mail: info@cbrochard.com

12697. Brown, A. (2013): Variation in the flexibility of potential anti-predator behaviours among larval damselflies. MSc thesis, Department of Integrative Biology, The University of Guelph, Ontario, Canada: VII + 53 pp. (in English) ["Heterogeneous environments play an important role in the evolution of traits when selection is diversifying between different conditions. One response is the capacity of individuals to beneficially adjust their phenotype to local conditions, such as different predators. In larval *Enallagma* damselflies, diversifying selection from predatory dragonfly larvae or predatory fish favours opposing traits, respectively high or low levels of activity, and so appears to drive the adaptive divergence of anti-predator specialists. However, little work has addressed: i) if anti-predator generalist species exist; ii) if anti-predator generalist species express adaptive flexible behaviour; iii) if adaptive flexible behaviour is influenced by prior experience with predators. I compared individual larval behaviour in the presence of fish, dragonfly larvae, or no predators, in four *Enallagma* species groups from ponds with and without fish preda-

tors. Ecological distributions suggest variation in degree of anti-predator generalization, and this was associated with increased responsiveness to predator treatment in the most likely ecological generalist. Responses to predators varied across different behaviours and sometimes were shaped by prior predation experience. Thus, a variety of adaptive strategies may have evolved to cope with heterogeneity in predation risk in larval damselflies." (Author)] Address: not stated

12698. Buczyński, P.; Ciechanowski, M.; Karasek, T. (2013): A peat bog in Martenki (the East-Pomeranian Lake District) – an interesting refugium of aquatic insect fauna. *Chrońmy Przyr. Ojcz.* 69(4): 315-321. (in Polish, with English summary) ["The peat bog in Martenki (the East-Pomeranian Lake District, northern Poland, 54°25'N, 18°20'E) is located at the bottom of the glacial drainage channel. It covers 2.29 ha. Transition mires and quaking bogs with *Sphagnum* spp., *Vaccinium oxycoccus*, *Drosera rotundifolia*, *Typha latifolia* and *Menyanthes trifoliata* are dominant vegetation. About half of the bog is covered with post-excavation peat pits filled with dystrophic waters, overgrown by *Potamogeton natans*. The site is a refugium for an interesting assemblage of aquatic insects, rich in tyrphobionts and tyrphophiles, thus requires legal protection. During preliminary hydrobiological studies, 24 species were recorded, belonging to Odonata (7), Heteroptera (5), Coleoptera (10), Trichoptera (1) and Lepidoptera (1)." (Authors) Odonata species are: *Coenagrion hastulatum*, *C. pulchellum*, *Erythromma najas*, *Aeshna grandis*, *A. subarctica*, *Leucorhinia pectoralis*, *L. rubicunda*.] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

12699. Buczyński, P.; Brożonowicz, A.; Czerniawska-Kusza, I. (2013): A disjunctive site of *Sympecma paedisca* (Brau.) (Odonata: Lestidae) in Opole Silesia (south-western Poland). *Cas. Sleż. Muz. Opava* (A) 62: 45-50. ["The occurrence of *S. paedisca* in a small water body in the Limestone Quarry "Górażdże" was recorded in 2010. This site is interesting because of the anthropogenic nature of ecosystem and its location 50 km west of the known range of the species." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

12700. Bush, A.; Theischinger, G.; Nipperess, D.; Turak, E.; Hughes, L. (2013): Dragonflies: climate canaries for river management. *Diversity and Distributions* 19(1): 86-97. (in English) ["Aim: Freshwater ecosystems are highly vulnerable to the effects of climate change. Where long-term datasets are available, shifts in species phenology, species distributions and community structure consistent with a climate change signal have already been observed. Identifying trends across the wider landscape, to guide management in response to

this threat, is limited by the resolution of sampling. Standard biomonitoring of macroinvertebrates for water-quality purposes is currently not well suited to the detection of climate change effects, and there are risks that substantial changes will occur before a management response can be made. This study investigated whether dragonflies, frequently recommended as general indicators of ecological health, are also suitable as indicators of climate change. Location: Data were analysed from standard bio-assessment monitoring at over 850 sites spanning a 9° latitudinal gradient in eastern Australia. Methods: Using variation partitioning, we analysed the proportion of assemblage turnover in dragonflies and other macroinvertebrate assemblages that can be explained by climate and other environmental drivers. We also tested whether the utility of dragonflies as indicators improved at higher taxonomic resolution and whether the turnover of dragonfly assemblages was congruent with that of other groups. Results: Climate explained three times as much variation in turnover of dragonfly species than dragonfly and other macroinvertebrate assemblages at family level. The dissimilarity of dragonflies and varying turnover in each macroinvertebrate assemblage meant surrogacy amongst groups were low. Main conclusions: On the basis of the influence of climate on turnover of macroinvertebrate assemblages, dragonfly species distribution appears highly sensitive to climatic factors, making this taxon a potential useful indicator of climate change responses. However, the low surrogacy amongst assemblages also suggests that a shift in the focus of conservation management from specific taxa to the functional composition of assemblages across a diverse range of habitats is needed." (Authors)] Address: Bush, A., Dept of Biol. Sciences, Macquarie University, North Ryde, Sydney, NSW 2109, Australia. E-mail: alex.bush@mq.edu.au

12701. Butler, S.G.; Kohler, H.-U. (2013): A preliminary list of Odonata from Langkawi Island, Straits of Malacca. *Notul. odonatol.* 8(1): 4-8. (in English) ["A list of 77 species hitherto discovered from the island is presented. Totals of genera are noted and a list of sites is included. The seasonality of Kedawi is briefly discussed, together with the so far observed effects this may have on the life cycles of certain species. Further areas for exploration are mentioned." (Author)] Address: Kohler, H.-U., Tulpenweg 107, CH-3098 Koeniz, Switzerland

12702. Cade, M. (2013): Reports from coastal stations - 2012: Portland, Dorset. *Atropos* 48: 47-49. (in English) [UK, *Aeshna cyanea*, *Pyrrhosoma nymphula*, *Symptetrum striolatum*] Address: not stated

12703. Calvao, L.B.; Vital, M.V.C.; Juen, L.; Lima Filho, G.F.; Oliveira-Junior, J.M.B.; Pinto, N.S.; De Marco, P. (2013): Thermoregulation and microhabitat choice in *Erythrodiplax latimaculata* Ris males (Anisoptera: Libellulidae). *Odonatologica* 42(2): 97-108. (in English) ["It was assessed whether solar incidence affects the spa-

tial distribution, microhabitat choice, territorial defense, time spent in behavioural categories, activity patterns, and abundance of *E. latimaculata*. The study was conducted in a semi-lotic area in the Cerrado in Aparecida de Goiânia, Goiás, Brazil, using the scan procedure with a fixed area, sampling 3 environments, viz. shade, partial shade, and an area with constant solar incidence. There was a higher abundance and activity concentration of this species. in areas with higher solar incidence than in other areas ($H = 19.180$; $P < 0.001$). This can be explained by the ecophysiological requirements of *E. latimaculata*, in which individuals need to be exposed to solar radiation to warm their bodies, allowing the beginning of their activities. Diurnal variation did not affect the behavioural pattern, indicating that individuals are ectothermic and need direct solar incidence on their bodies ($H = 12.193$; $P = 0.160$). They spend most of the time perching with wings dropped (41.448 ± 21.781 ; mean \pm SD) and displaying a territorial behaviour, making defense flights around the perch. In lentic water bodies females seem only to mate and oviposit (exophytic, directly into the water)." (Authors)] Address: De Marco, P., Laboratorio de Ecologia Teórica e Síntese, Departamento de Ecologia, Universidade Federal de Goiás, BR-74.001-970 Goiânia, Goiás, Brazil. E-mail: pdemarco@icb.ufg.br

12704. Campos, F.; Velasco, T.; Sánchez, G.; Santos, E. (2013): Odonatos de la cuenca alta del río Águeda (Salamanca, oeste de España) (*Insecta: Odonata*). *Boletín de la Sociedad Entomológica Aragonesa* 52: 234-238. (in Spanish, with English summary) [The dragonfly fauna was sampled in the high Águeda river basin (W of the Salamanca province, Spain). 39 species were recorded, 20 Zygoptera and 19 Anisoptera. Ten species occur only in ponds, 13 occur only in rivers and 16 species in both habitats. Three species are included into the Spanish Invertebrate Red List: *Macromia splendens* (CR), *Coenagrion mercuriale* (VU) and *Coenagrion scitulum* (VU). Furthermore, *Brachythemis impartita* is recorded for the first time in Castilla-León. Biogeographically, 64.1% of species are Mediterranean, 23.1% Ethiopian and/or Pontic-Eastern, and 12.8% are Eurosiberian and/or Holarctic." (Authors)] Address: Campos, F. Universidad Europea Miguel de Cervantes, Calle Padre Julio Chevalier 2, 47012 Valladolid, Spain. E-mail: fcampos@uemc.es

12705. Cayasan, R.D.; Limitares, D.E.; Gomid, J.V.S.; Nuñez, O.M.; Villanueva, R.J.T. (2013): Species richness of Odonata in selected freshwater systems in Zamboanga del Sur, Philippines. *Aquaculture, Aquarium, Conservation & Legislation. International Journal of the Bioflux Society* 6(4): 378-393. (in English) ["In this study, the species richness and relative abundance of Odonata were determined in 12 sampling sites in Zamboanga del Sur. Field work was conducted in August-December, 2012 using the random sampling method. Thirty-six species belonging to 10 families were docu-

mented of which 16 (44%) species are Philippine endemic. High species richness was recorded in Cabilinan Stream which is considered to be the most undisturbed site in the 12 sampling sites. Species richness was also considerably high in eight sampling sites despite habitat modification and water pollution from agricultural run-offs. The presence of Oriental species which are indicators of degraded environments suggests that the streams are disturbed. However, the presence of some endemic species indicates that these endemic fauna can thrive in disturbed habitats." (Authors)] Address: Cayasan, Roxanne, Dept of Biological Sciences, Mindanao State Univ. - Iligan Institute of Technology, Iligan City, Philippines

12706. Chahl, J; Dorrington, G.; Mizutani, A. (2013): The dragonfly flight envelope and its application to micro UAV research and development. 15th Australian International Aerospace Congress. Melbourne, Vic.: Australian International Aerospace Congress, 2013: 278-287. (in English) ["In this paper we present quantitative analysis of three dimensional trajectories of dragonflies under free flight conditions. The trajectories were captured while male insects were engaged in their normal behaviour of combat to protect oviposition sites along a stream. For the first time we have unambiguous measurements of speed, acceleration and turn rate of large dragonflies and the means by which comparative studies can be done against other species and in different environments. Using physical scaling laws we propose means by which this data set can be used to provide a comparison for larger flapping wing UAV concepts. Our ultimate goal is to provide a robust standard against which flapping wing aircraft performance can be compared so that appropriate evolutionary pressure can also be applied to technological developments, thus freeing resources for the truly viable designs." (Authors) *Hemianax papuensis* was studied, and peak speeds of 6.0 m/s (21.6 km/h) are observed.] Address: Chahl, J., Defence and Systems Institute, University of South Australia, Mawson Lakes, South Australia, 5095, Australia. E-mail: javaan.chahl@unisa.edu.au

12707. Chiyoda, S.; Sekiguchi, S. (2013): Insect fauna of Yato Kitano. *Furusato Fund natural environment research report 10*: 19-26. (in Japanese) [Saitama Prefecture, Japan. The following Odonata species are listed: *Ischnura asiatica*; *Lestes temporalis*; *Anotogaster sieboldii*; *Anax nigrofasciatus*; *Orthetrum albistylum speciosum*; *O. melania*; *Sympetrum frequens*; *S. parvulum*.] Address: Haicheng junior high school biology section.

12708. Cho, J.-Y.; Kim, G.; Kim, S.; Lee, H. (2013): Replication of surface nano-structure of the wing of dragonfly (*Pantala flavescens*) using nano-molding and UV nanoimprint lithography. *Electronic Materials Letters* 9(4): 523-526. (in English) ["The hydrophobicity of a dragonfly's wing originates from the naturally occurring nano-structure on its surface. The nano-structure on a dragonfly's wing consists of an array of nano-sized pil-

lars, 100 nm in diameter. We re-create this hydrophobicity on various substrates, such as Si, glass, curved acrylic polymer, and flexible PET film, by replicating the nano-structure using UV curable nano-imprint lithography (NIL) and PDMS molding. The success of the nano-structure duplication was confirmed using scanning electron microscopy (SEM). The hydrophobicity was measured by water-based contact angle measurements. The water contact angle of the replica made of UV cured polymer was $135^\circ \pm 2^\circ$, which was slightly lower than that of the original dragonfly's wing ($145^\circ \pm 2^\circ$), but much higher than that of the UV cured polymer surface without any nano-sized pillars (80°). The hydrophobicity was further improved by applying a coating of Teflon-like material." (Authors)] Address: Lee, H., Department of Materials Science and Engineering, Korea University, Seoul, 136-713, Korea. E-mail: heonlee@korea.ac.kr

12709. Clancy, S.P. (2013): Reports from coastal stations - 2012: Dungeness and Surrounding Area, Kent. *Atropos* 48: 53-55. (in English) [UK; *Anax parthenope*, *Erythromma viridulum*] Address: not stated

12710. Conesa García, M.A.; Sanchez, A.B. (2013): Algunos odonatos en la Reserva Natural Del Complejo Lagunar de Villafranca de los Caballeros (Toledo), España. *Zygonyx* 1: 9-10. (in Spain) [4-VII-2011, Nature Reserve of Villafranca de los Caballeros (Toledo), Spain: *Lestes barbarus*, *Lestes virens*, *Ischnura graellsii*, *Ischnura elegans*, *Enallagma cyathigerum*, *Anax imperator*, *Libellula depressa*, *Orthetrum cancellatum*, *Sympetrum meridionale*, *S. striolatum*, *Trithemis annulata*, and *Selysiothemis nigra*] Address: Conesa García, M.A. E-mail: mconesa@libelulas.org

12711. Conesa García, M.A. (2013): Algunos odonatos en la turbera del Área de Reserva "el Padul" (Granada), España. *Zygonyx* 1: 5-6. (in Spanish) [*Ischnura graellsii*, *Orthetrum cancellatum*, *Sympetrum fonscolombii*, *S. striolatum*, *Crocothemis erythraea*, *Trithemis annulata*, *Aeshna mixta*, and *Anax imperator* are documented for bog Reserve Area "Padul" (Granada), Spain.] Address: Conesa García, M.A. E-mail: mconesa@libelulas.org

12712. Conesa García, M.A.; Sanchez, A.B. (2013): Sobre la larva de *Gomphus vulgatissimus* (Linnaeus, 1758). *Zygonyx* 1: 7-8. (in Spain) [13-III-2012; larvae of *G. vulgatissimus* are documented in the river Cea at its junction with the river Esla (30T UN32, León, Spain)] Address: Conesa García, M.A.; E-mail: mconesa@libelulas.org

12713. Conesa García, M.A.; Cano Villegas, F. (2013): Claves para la identificación de las exuvias del género *Trithemis* Brauer 1868 (Odonata: Libellulidae) en la península ibérica. *Boln. Asoc. esp. Ent.* 37(1-2): 49-59. (in Spanish, with English summary) [Authors present detailed morphological and biometric data founding on Iberian Peninsula material to separate *Trithemis kirbyi* from *T. annulata*.] Address: Conesa García, M.A., Aso-

ciación Odonatológica de Andalucía. Laboratorio de Biología. UNED. Málaga, Spain. E-mail: mconesa@malaga.uned.es

12714. Craves, J.A.; O'Brien, D.S. (2013): The Odonata of Wayne county, MI: Inspiration for renewed monitoring of urban areas. *Northeastern Naturalist* 20(2): 341-362. (in English) ["Ninety species of Odonata are now verified by specimens for Wayne County, MI, a highly urbanized county in the southeastern corner of the state. This total represents 54% of the total number recorded in the state of Michigan. Thirty-three species not previously reported from Wayne County have been collected since 2000, despite a long history of collecting in the area and relatively little remaining appropriate habitat. These results suggest previous workers may have neglected to do much serious collecting here, and emphasize the need for collecting and monitoring Odonata in urban areas." (Authors)] Address: Craves, Julie, 1 Rouge River Bird Observatory, Environmental Interpretive Center, University of Michigan-Dearborn, Dearborn, MI 48128, USA. E-mail: jcraves@umd.umich.edu.

12715. Das, S.K.; Sahoo, P.K.; Dash, N.; Marathe, S.; Mahato, S.; Dashahare, A.; Mishra, P.S.; Prasad, A.; Rana, R. (2013): Odonates of three selected tiger reserves of Madhya Pradesh, Central India. *Check List* 9(3): 528-532. (in English) ["Odonates were recorded from three Tiger Reserves of Madhya Pradesh, Central India, including Kanha, Pench and Bandhavgarh, where 47 species were recorded within 7 families and 31 genera. We recorded 44 species from Kanha, 41 species from Pench and 37 species from Bandhabgarh Tiger Reserve. Thirty-five species were recorded in all three tiger reserves. ... In summer survey *Orthetrum sabina* was the most abundant species, while in winter the most abundant was *Agriocnemis pygmaea*." (Authors)] Address: Das, S.K., Wildlife Institute of India, P.O. Box-18, Chandrabani- 248001, Dehradun, India. Email: sunit.das219@gmail.com

12716. Dayaram, A.; Potter, K.A.; Moline, A.B.; Rosenstein, D.; Marinov, M.; Thomas, J.E. Rosario, K.; Breitbart, M.; Argüello-Astorga, G.R.; Varsani, A. (2013): High global diversity of cycloviruses amongst dragonflies. *Journal of general virology* 94(8): 1827-1840. (in English) ["Members of the *Circoviridae* family, specifically the *Circovirus* genus, were thought to infect only vertebrates; however, members of a sister group under the same family, the proposed *Cyclovirus* genus, have been detected recently in insects. In an effort to explore the diversity of cycloviruses and better understand the evolution of these novel single stranded DNA (ssDNA) viruses, here we present five cycloviruses isolated from three dragonfly species (*Orthetrum sabina*, *Xanthocnemis zealandica* and *Rhionaeschna multicolour*) collected in Australia, New Zealand and the United States of America. The genomes of these five viruses share similar genome structure to other cycloviruses, with a circu-

lar ~1.7 kb genome and two major bidirectionally transcribed open reading frames (ORFs). The genomic sequence data gathered during this study were combined with all cyclovirus genomes available in public databases to identify conserved motifs and regulatory elements in the intergenic regions, as well as determine diversity and recombinant regions within their genomes. The genomes reported here represent four different cyclovirus species, three of which are novel. Our results confirm that cycloviruses circulate widely in winged insect populations; in eight different cyclovirus species identified in dragonflies to date, some of these exhibit a broad geographical distribution. Recombination analysis revealed both intra- and inter-species recombination events among cycloviruses, including genomes recovered from disparate sources (e.g., goat meat and human faeces). Similar to other well-characterised circular ssDNA viruses, recombination may play an important role in cyclovirus evolution." (Authors)] Address: Varsani, A., School of Biological Sciences, University of Canterbury, Private Bag 4800, Christchurch 8140, New Zealand. E-mail: arvind.varsani@canterbury.ac.nz

12717. Deans, M.J. (2013): Reports from coastal stations - 2012: Bawdsey Peninsula, Suffolk. *Atropos* 48: 62-64. (in English) [*Aeshna cyanea* and *Sympetrum striolatum* were recorded at artificial light.] Address: not stated

12718. Dewick, S. (2013): Reports from coastal stations - 2012: Curry Farm, Bradwell-on-Sea, Essex. *Atropos* 48: 59-60. (in English) [UK, *Chalcolestes viridis*; *Sympetrum sanguineum* and *S. striolatum* were caught at artificial light.] Address: Dewick, S.; Curry Farm, Bradwell-on-Sea, Southminster, Essex, CM0 7NL, UK

12719. Dolný, A.; Mižicová, H.; Harabiš, F. (2013): Natal philopatry in four European species of dragonflies (Odonata: *Sympetrinae*) and possible implications for conservation management. *J. Insect Conserv.* 17(4): 821-829. (in English) ["In Europe, the species *Sympetrum depressiusculum* is classified as vulnerable with a high risk of extinction in the wild. It is a habitat specialist, the presumed main reason for its vulnerability is the destruction of its natural habitats. Other causes of its general extinction are unknown. Published information regarding dispersal rate and philopatry is not available, although these are evolutionary strategies that can play key roles in susceptibility to environmental change. We compared the rate of philopatry in *S. depressiusculum* and three other related, abundant but not endangered species of the same genus (*S. sanguineum*, *S. striolatum*, *S. vulgatum*). We collected data in a very isolated site in the Czech Republic, more than 100 km distant from another known population of the species. Using exuviae collection (total of 6,157 exuviae) and capture-mark-recapture (total of 2,188 adults marked) methods, we acquired data allowing us to compare the numbers of emerged individuals and adults returning to the ma-

ternal site. We found a difference of nearly an order of magnitude between the philopatry of *S. depressiusculum* and the three other species. While in *S. depressiusculum* philopatry was almost 100 %, in the other species it was 10 %. We suggest the high rate of philopatry can influence the vulnerability of *S. depressiusculum* in landscape altered by humans. Strict protection of the natal sites is very important for preserving species having this evolutionary strategy, and reintroductions and translocations should also be undertaken to reduce the extinction risk of this endangered species." (Authors)] Address: Dolný, A., Department of Biology and Ecology, Faculty of Science, Institute of Environmental Technologies, University of Ostrava, 710 00 Ostrava, Czech Republic. E-mail: ales.dolny@osu.cz

12720. Dompreeh, K.A.; Eghan, M.J.; Kotsedi, L.; Maa-za, M. (2013): Comprehensive optical study of the dragonfly *Aeshna cyanea* transparent wing. *Optics Communications* 297: 176-181. (in English) ["The optical properties of the transparent wings of *A. cyanea* were studied using a comprehensive set of optical measurements, experimental analysis and theoretical modelling which involves the use of a high level programming language to simulate the optical effects seen. With these, the relative refractive index of the Odonatan wing, the pruinosity associated with the microstructure and the chemical composition of the wings were studied. The Nystrom matrix techniques were applied to solve the surface currents JZ and HZ of the scattered fields for different incident angles from grazing and used to explain the pruinosity associated with the wings microstructure. The wing was found to be an Electro-Optic Material (EOM) associated with a number of Nonlinear Optical (NLO) responses having high frequency absorption for extreme UV and also, leaky multi-channeling wave guide." (Authors)] Address: Dompreeh, K.A., Nanosciences African Network (NANOAFNET), iThemba LABS-National Research Foundation, 1 Old Faure road, Somerset West 7129, P.O. Box 722, Somerset West, Western Cape Province, South Africa. E-mail: dompreeh@tlabs.ac.za

12721. Dow, R.A.; Reels, G.T.; Butler, S.G. (2013): Odonata of the Dulit range in Sarawak, Malaysian Borneo. *Notul. odonatol.* 8(1): 8-14. (in English) [Odonata records from the Dulit Range are presented. 111 species are now known from the Dulit Range. Notes on species of particular interest are included.] Address: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

12722. Dow, R.A.; Ngiam, R.W.J. (2013): *Prodasineura yulan* (Odonata: Zygoptera: Platycnemididae), a new species from Sarawak. *Zootaxa* 3670(1): 87-90. (in English) ["*Prodasineura yulan* is described from a male from Maludam National Park, Betong Division, Sarawak, Malaysian Borneo, small stream in disturbed peat swamp forest, 9-vii-2012, leg. R.W.J. Ngiam. To be deposited in

ZRC. It is allied to *Prodasineura interrupta*." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

12723. Earley, C.G. (2013): *Dragonflies: Hunting – Identifying - How and where they live.* Publisher Firefly Books Ltd: 32 pp. (in English) [This is an introductory North-American perspective on anisopteran Odonata for beginners.] Address: Firefly Books Ltd., 50 Staples Avenue, Unit 1, Richmond Hill, ON, Canada L4B 0A7

12724. Emiliyamma, K.G.; Jafer Palot, M.; Radhakrishnan, C.; Balakrishnan, V.C. (2013): *Lyriothemis acigastra*: a new addition to the Odonata fauna of Peninsular India. *Taprobanica* 5(1): 73-74. (in English) [Aravanchal and Madayipara areas in Kannur District of North Kerala, India during July to September, 2010.] Address: Emiliyamma, K.G., Zoological Survey of India (Western Ghats Regional Center) Kozhikode 673006, Kerala, India. E-mail: kgemily@gmail.com

12725. Fuentes-Rodroquez, F.; Juan, M.; Gallego, I.; Lusi, M.; Fenoy, E.; Leon, D.; Penalver, P.; Toja, J.; Casas, J.J. (2013): Diversity in Mediterranean farm ponds: trade-offs and synergies between irrigation modernisation and biodiversity conservation. *Freshwater Biology* 58(1): 63-78. (in English) ["(1.) Agricultural intensification has caused dramatic biodiversity loss in many agricultural landscapes over the last century. Here, we investigated whether new types of farm ponds (made of artificial substrata) in intensive systems and natural-substratum ponds in traditional farming systems differ in their value for aquatic biodiversity conservation. (2.) We analysed the main patterns of environmental variation, compared α -, β - and γ -diversity of macroinvertebrates (calculated at the order level and including Odonata) between ponds types and evaluated the role of submerged aquatic vegetation (SAV). Generalised additive models (GAM) were used to analyse the relationships of α - and β -diversity with environmental predictors, and variation partitioning to separate the effect of environmental and spatial characteristics on the variation in macroinvertebrate assemblages. Moran's eigenvector maps (MEMs) were used to define spatial variables. (3.) A principal coordinate analysis (PCoA) detected a primary environmental gradient that separated nutrient-rich ponds from those dominated by SAV; a secondary morphometric gradient distinguished natural-substratum ponds, with large surface area and structural complexity, from artificial-substratum ponds with steeper slopes. Natural-substratum ponds had almost twice the α - and γ -diversity of artificial-substratum ponds, and diversity significantly increased when SAV was present, particularly in artificial-substratum ponds. Total phosphorus (TP) strongly contributed to explain the patterns in diversity, while SAV was a significant predictor of assemblage composition and diversity. GAMs revealed optima of both α -diversity at intermediate SAV covers and β -diversity at intermediate-high TP concentrations. (4.) These findings have im-

portant implications for conservation planning. Adaptation of artificial substratum ponds by adding natural substratum and smoothing the gradient of pond margins would improve their conservation value. Development of SAV with occasional harvests and certain cautionary measures to control nutrient levels may also improve both the agronomical and environmental function of ponds." (Authors)] Address: Fuentes-Rodroquez, Francisca, Departamento de Biología Vegetal y Ecología, Facultad de Ciencias, Universidad de Almería, Almería, Spain E-mail: ffuentes@ual.es

12726. Garrison, R.W. (2013): Reviewed: Pfau Hans Klaus. 2011. Functional Morphology and Evolution of the Male Secondary Copulatory Apparatus of the Anisoptera (Insecta: Odonata). *Zoologica*, 156: 103 pages, 65 figures ISBN 978-3-510-55043-2 Paperback. 118.00 J (US\$147.57). Available from: Schweizerbart Science Publishers (Nägele u. Obermiller), Johannesstr. 3 A, 70176 Stuttgart, Germany; Tel. +49 (0) 711/351456-0, Fax +49 (0) 711/ 351456-99; mail@schweizerbart.de, www.schweizerbart.de. *Pan-Pacific Entomologist* 89(2): 122-123. (in English) [review] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

12727. Garwood, J.M.; Knapp, R.A.; Pope, K.L.; Grasso, R.L.; Magnuson, M.L.; Maurer, J.R. (2013): Use of historically fishless high-mountain lakes and streams by Nearctic River otters (*Lontra canadensis*) in California. *Northwestern Naturalist* 94(1): 51-66. (in English) ["In California, River Otters are most commonly associated with food-rich lowland aquatic habitats where they forage primarily on fish and crustaceans. Their distribution in high-elevation montane regions of the state, areas in which fish and crayfish were absent historically, is largely unknown. We compiled occurrence records of River Otters in California from elevations >1100 m, and evaluated them using evidentiary standards. Based on 126 records, we report the widespread presence of River Otters in the Klamath, southern Cascades, and Sierra Nevada mountain ranges, including at elevations exceeding 3000 m. Sixty-three percent of the records met our definition as "verified", and the remaining 37% were considered "unverified". The distribution of observations through time and habitats in which observations were made were similar between verified and unverified records. River Otter records spanned the period from 1900 to 2010, with 50% occurring between 1991 and 2010. Ninety-three percent of the water bodies with records of River Otters contained nonnative prey (fish and crayfish). Those lacking nonnative prey all supported native prey, including amphibians and reptiles. Based on records that contained River Otter foraging observations, nonnative fishes and crayfish were represented in 89% of the total accounts, and native frogs and invertebrates were represented in

22%. It remains unclear whether River Otters occurred in California's high-elevation water bodies prior to the introduction of fish and crayfish, and additional research is needed to understand the possible influence of nonnative prey in allowing River Otters to expand their distribution in these habitats. ... Two scats from different lakes contained the remains of large-bodied aquatic insects, including *Aeshna* spp. larvae, adult *Lethocerus* spp. (Hemiptera), and adult *Notonecta* spp. (Hemiptera)." (Authors)] Address: Garwood, J.M., California Department of Fish and Wildlife, 5341 Ericson Way, Arcata, CA 95521, USA. E-mail: justin.garwood@wildlife.ca.gov

12728. Gecheva, G.; Yurukova, I.; Cheshmedjiev, S.; Varadinova, E.; Belkinova, D. (2013): Integrated assessment of the ecological status of Bulgarian lowland and semi-mountain natural lakes. *Journal of Environmental Protection* 4: 29-37. (in English) ["This work focuses on an integrated approach for lake ecological status assessment, elaborated according to the requirements of the European Water Framework Directive (WFD). Data from five lowland and semi-mountain lakes in Bulgaria collected from two years (2011-2012) form the basis for an integrated assessment and the definition of reference conditions. Several metrics were applied in combination, to classify lakes into five ecological status classes. Assemblages of aquatic organisms: phytoplankton, macrophytes and benthic macroinvertebrates, together with 11 supporting physico-chemical parameters were studied. The assessed unique conditions suggested that reference conditions of Bulgarian lakes have natural variability. This first baseline study illustrated specific cases within the lake types that should be assessed in details before providing standardized classification systems in compliance with the requirements of WFD." (Authors) *Enallagma cyathigerum*] Address: Yurukova, Lilyana, Faculty of Biology, Plovdiv University "P. Hilendarski", Plovdiv, Bulgaria. E-mail: yur7lild@bio.bas.bg

12729. Geipel, I.; Kalko, E.K.V.; Wallmeyer, K.; Knörnschild, M. (2013): Postweaning maternal food provisioning in a bat with a complex hunting strategy. *Animal Behaviour* 85(6): 1435-1441. (in English) ["Highlights: • We studied postweaning maternal food provisioning in a free-living Neotropical bat. • Mothers provided their pups with prey items for 5 successive months after weaning. • Food provisioning presumably provides pups with two informational benefits. • Provisioned pups may acquire prey-handling skills and learn acoustic images of prey. • Social learning can facilitate the acquisition of the bats' complex hunting strategy. Adult animals of many taxa exhibit extended parental care by transferring food to inexperienced offspring, thus allocating nutritional and sometimes even informational benefits such as the acquisition of adult dietary preferences and foraging skills. In bats, postweaning food provisioning is severely understudied, despite the taxon's diverse and complex foraging strategies. The Neotropical common

big-eared bat, *Micronycteris microtis*, preys on relatively large insects gleaned from vegetation, finding its silent and motionless prey by echolocation. The demands of this cognitively challenging hunting strategy make *M. microtis* a likely candidate for maternal postweaning food provisioning. We studied five free-living mother–pup pairs in their night roost using infrared video recordings. Each mother exclusively fed her own pup and mother–pup recognition was mutual. Provisioned pups were volant and had started their own hunting attempts. Weaned pups were provisioned for 5 subsequent months with a variety of insects, reflecting the adult diet. Mothers transferred over 50% of their prey to pups. Maternal prey transfers declined as pups matured, whereas the pups' own prey captures increased. During prey transfers, aggressive behaviour between mothers and pups was rare. We argue that postweaning maternal food provisioning might yield two informational benefits for *M. microtis* pups. First, learning how to handle large and well-defended prey is mandatory for inexperienced pups and could be practised with prey items provided by their mothers. Second, acoustically characteristic echo images of prey items could be gained during mother–pup prey transfers, probably facilitating the successful acquisition of *M. microtis*'s complex hunting strategy." (Authors) The illustration shows the transfer of a large libellulid from mother to her pup.] Address: Geipel, Inga, Institute of Experimental Ecology, Faculty of Natural Sciences, University of Ulm, Ulm, Germany. E-mail: inga.geipel@uni-ulm.de

12730. Gibbons, M.E.; George, M.P. (2013): Clutch identity and predator-induced hatching affect behavior and development in a leaf-breeding treefrog. *Oecologia* 171(4): 831-843. (in English) ["For species with complex life cycles, transitions between life stages result in niche shifts that are often associated with evolutionary trade-offs. When conditions across life stages are unpredictable, plasticity in niche shift timing may be adaptive; however, factors associated with clutch identity (e.g., genetic or maternal) may influence the effects of such plasticity. The red-eyed treefrog (*Agalychnis callidryas*) is an ideal organism for investigating the effects of genetics and life stage switch point timing because embryos exhibit adaptive phenotypic plasticity in hatching time. In this study, we evaluated the effects of experimentally manipulated hatching time and clutch identity on antipredator behaviour of tadpoles and on developmental traits of metamorphs, including larval period, mass, SVL, and jumping ability. We found that in the presence of dragonfly nymph predator cues at 21 days post-oviposition, tadpoles reduced both their activity level and height in the water column. Furthermore, early-hatched tadpoles were less active than late-hatched tadpoles of the same age. This difference in behaviour patterns of early- and late-hatched tadpoles may represent an adaptive response due to a longer period of susceptibility to odonate predators for early-hatched tadpoles, or it may be a carry-over effect mediated by

early exposure to an environmental stressor (i.e., induction of early hatching). We also found that hatching time affected both behavioural traits and developmental traits, but its effect on developmental traits varied significantly among clutches. This study shows that a single early-life event may influence a suite of factors during subsequent life stages and that some of these effects appear to be dependent on clutch identity. This interaction may represent an evolutionary response to a complex life cycle and unpredictable environments, regardless of whether the clutch differences are due to additive genetic variance or maternal effects." (Authors)] Address: Gibbons, M.E., Department of Biology, Birmingham-Southern College, Birmingham, AL, 35254, USA, mgibbons@bsc.edu.

12731. Gobbi, M.; Riservato, E.; Bragalanti, N.; Lencioni, V. (2013): Dalle collezioni museali alla prima lista di specie prioritarie di invertebrati per il Trentino. *Museologia scientifica memorie* 9: 157-161. (in Italian, with English summary) ["From the museum collections to the first list of priority invertebrate species of Trentino: In this paper the first list of priority invertebrate species for the Trentino Province is presented. The list was drawn up starting from a list of 229 species in collaboration with a local network of entomologists and by using the expert based approach. Seventy species of conservation interest (including *Leucorrhinia pectoralis*, *Ophiogomphus cecilia*, *Sympecma paedisca*) were selected according to 10 objective criteria, and a database with 771 geo-referenced records was created. The database was integrated with spatial data from the Italian CKmap and from museums and private collections not included in the CKmap. For 42 species was possible to link the habitat typology (nat2000 and not), therefore to create a database specie-site and specie-habitat, and realize maps on the actual and potential distribution. Such list of species is an helpful tool to support stakeholder decisions regarding the designation of new protected areas or the extension of those already existing." (Authors)] Address: Gobbi, M., Sezione di Zoologia degli Invertebrati e Idrobiologia, Museo delle Scienze, Via Calepina, 14. I-38122 Trento, Italy. E-mail: mauro.gobbi@muse.it

12732. Gomides, S.C.; Ribeiro, L.B.; Peters, V.M.; Sousa, B.M. (2013): Feeding and reproduction ecology of the lizard *Tropidurus torquatus* (Squamata: Tropiduridae) in a rock outcrop area in southeastern Brazil. *Revista Chilena de Historia Natural* 86: 137-151. (in English, with Spanish summary) ['Zona da Mata mineira', state of Minas Gerais in southeastern Brazil (21°48'27.5"S; 43°35'31.7"W, altitude: 697 m).; "This work evaluates the diet and the reproductive cycle of *T. torquatus* in relation to seasonality in a rock outcrop formations in a remaining area of Atlantic Rainforest. The data indicate that the lizards feed mainly on arthropods and plant material. The female reproductive activity varies between seasons, while males contain sper-

matozoids throughout the year. The minimum body size at maturity of the individuals was larger when compared to other population of the same species studied by other authors. The data obtained in the present study confirm previous observations about the different patterns in diet composition and reproductive cycles of each population of this species in different latitude and occurrence areas, and provide the first study about this theme for *T. torquatus* in rock outcrops in Atlantic Forest of Minas Gerais state." (Authors) Odonata contributed with less than 1% of prey items of the diet of 55 lizard specimens, and only during the dry season.] Address: Gomes, S.C., Universidade Federal de Juiz de Fora, Instituto de Ciências Biológicas, Depto de Zoologia, Campus Universitário Martelos, 36036-900, Juiz de Fora, MG, Brazil. E-mail: samuelbio@hotmail.com

12733. González-Tokman, D.; González-Santoyo, I.; Córdoba-Aguilar, A. (2013): Mating success and energetic condition effects driven by terminal investment in territorial males of a short-lived invertebrate. *Functional Ecology* 27(3): 739-747. (in English) ["The terminal investment hypothesis has two predictions: in the face of an infection (i) mature males will increase investment to traits that increase mating success, while such investments will occur to a less extent in young males; and (ii) physiological costs of resource reallocation will be more severe for infected mature males than for infected young males. Although these predictions have been tested in long-lived vertebrates, prior studies have not examined actual resource allocation conflicts. Here, we have tested the above predictions and have investigated the energetic costs of increased mating by old males, using a short-lived invertebrate, the damselfly *Hetaerina americana*. Males of this species defend territories as the main way to obtain access to females. Using groups of infected vs. noninfected males of two different ages, we found that compared to young infected males, mature infected males defended territories for longer, had higher mating success and directed agonistic behaviour to conspecific males more frequently. Despite similar immune responses by mature and young males, infected mature males ended up with less fat reserves compared to infected young males. This suggests that resource allocation conflicts are more severe for mature than for young males. In general, these results suggest that the terminal investment hypothesis applies in males of short-lived invertebrates and that a cause of increased mating success for males of advanced ages is reduced energetic stores." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

12734. Grewe, Y.; Hof, C.; Dehling, M.; Brandl, R.; Brändle, M. (2013): Recent range shifts of European dragonflies provide support for an inverse relationship between habitat predictability and dispersal. *Global Eco-*

logy and Biogeography 22(4): 403-409. (in English) ["Aim: We compared the effects of recent shifts of northern range boundaries of odonates adapted to either lentic (standing water) or lotic (running water) habitats in Europe. Lentic species are thought to have a higher dispersal propensity than lotic species because of the lower spatial and temporal persistence of lentic habitats on average. Hence, we expected shifts in the range boundaries particularly of lentic species. Location: Europe. Methods: Our analyses are based on odonate distribution maps from two field guides that present the European ranges of dragonflies and damselflies in 1988 and 2006. We categorized species according to their preference for lentic or lotic habitats, and then assigned each species to a southern or a northern group according to the centre of its distribution. Shifts in northern range boundaries were calculated as the average distance between the 10 northernmost grid cells in 1988 and 2006. Range boundary shifts were also analysed with regard to prevalence, phenology, body size and wing size. Results: Lentic species of the southern group expanded their range boundaries on average 115 km northwards per decade, whereas lotic species of the southern group on average did not change their range boundaries. Northern lentic and lotic species showed no consistent trends in their changes in range boundaries. These results did not qualitatively change when we considered the effects of phylogeny, phenology, body size and wing size. Main conclusions: Our results support the hypothesis that species adapted to lentic habitats, which are assumed to be less persistent in time and space, disperse better than lotic species." (Authors)] Address: Brändle, M., Dept of Ecology – Animal Ecology, Fac. Biology, Philipps-Universität Marburg, Karl-von-Frisch Strasse 8, 35032 Marburg, Germany. E-mail: braendle@staff.uni-marburg.de

12735. Groselj, N. (2013): Facsimile and translation of two occasional dragonfly poems written by prominent Slovenian men of letters. *Notul. odonatol.* 8(1): 15-16. (in English) ["Two handwritten Slovenian texts by I. Geister and K. Gantar are facsimile reproduced and followed by English translations. Brief biographic notes on the 2 authors are included and a technical comment on the translations is added." (Author)] Address: Groselj, N., Ilirska 15, SI-1000 Ljubljana, Slovenia. E-mail: sestertia@hotmail.com

12736. Guillermo-Ferreira, R.; Silva Vilela, D. (2013): New records of *Forcipomyia* (*Pterobosca*) *incubans* (Diptera: Ceratopogonidae) parasitizing wings of Odonata in Brazil. *Biota Neotrop.* 13(1): 360-362. (in English, with Portuguese summary) ["*F. incubans* Macfie (1937) is recorded here for the first time for Brazil. Females were collected in the Brazilian Neotropical Savanna parasitizing the wings of *Erythrodiplax juliana* Ris (1911), *Erythrodiplax* aff. *anomala* Brauer (1865) and *Erythemis credula* Hagen (1861). A map of potential distribution of this species in the New World is also provided. The results suggest that its distribution may range from southern South

America to Mexico, with higher densities in the Brazilian and Colombian Tropical Rain Forests." (Authors)] Address: Guillermo-Ferreira, R., Departamento de Biología, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo – USP, CEP 14040-901, Ribeirão Preto, SP, Brazil. E-mail: rhainerguillermo@yahoo.com.br

12737. Guillermo-Ferreira, R.; Del-Claro, K. (2013): Mate recognition in *Acanthagrion truncatum* (Odonata: Coenagrionidae). *Acta Scientiarum. Biological Sciences* Maringá 35(3): 451-453. (in English, with Spanish summary) ["Sexual and species recognition, along with sexual colour dimorphism, play an important role in the reproduction of many animal species. In this article, it was investigated if males of the dimorphic Neotropical damselfly *Acanthagrion truncatum* are able to recognize mates and differentiate them between co-specific males and hetero-specific females of sympatric species. The results showed misguided mating attempts from males towards other males and *Homeoura chelifera* females. They also seem able to recognize *A. lancea* and *Telebasis carmesina* females as hetero-specifics. This study support the hypothesis that male-male interactions are misdirected sexual behaviour and that sympatric morphologically similar species may represent visual interference for mate searching males." (Author)] Address: Guillermo-Ferreira, R., Departamento de Biología, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Av. Bandeirantes, 3900, 14040-901, Ribeirão Preto, São Paulo, Brazil. E-mail: rhainerguillermo@yahoo.com.br

12738. Gupta, S.; Narzary, R. (2013): Aquatic insect community of lake, Phulbari anua in Cachar, Assam. *Journal of Environmental Biology* 34: 591-597. (in English) [The list of taxa includes the Nearctic 'Tramea' and 'Argia'.] Address: Gupta, Susmita, Department of Ecology & Environmental Science, Assam University, Silchar-788 011, India. E-mail: susmita.au@gmail.com

12739. Gvoždík, L.; Černická, E.; Van Damme, R. (2013): Predator-prey interactions shape thermal patch use in a newt larvae-dragonfly nymph model. *PLoS ONE* 8(6): e65079. doi:10.1371/journal.pone.0065079: 6 pp. (in English) ["Thermal quality and predation risk are considered important factors influencing habitat patch use in ectothermic prey. However, how the predator's food requirement and the prey's necessity to avoid predation interact with their respective thermoregulatory strategies remains poorly understood. The recently developed 'thermal game model' predicts that in the face of imminent predation, prey should divide their time equally among a range of thermal patches. In contrast, predators should concentrate their hunting activities towards warmer patches. In this study, we test these predictions in a laboratory setup and an artificial environment that mimics more natural conditions. In both cases, we scored thermal patch use of newt larvae (prey)

and free-ranging dragonfly nymphs (predators; *Aeshna cyanea*). Similar effects were seen in both settings. The newt larvae spent less time in the warm patch if dragonfly nymphs were present. The patch use of the dragonfly nymphs did not change as a function of prey availability, even when the nymphs were starved prior to the experiment. Our behavioural observations partially corroborate predictions of the thermal game model. In line with asymmetric fitness pay-offs in predator-prey interactions (the 'life-dinner' principle), the prey's thermal strategy is more sensitive to the presence of predators than vice versa." (Authors)] Address: Gvoždík, L., Institute of Vertebrate Biology AS CR, Brno, Czech Republic. E-mail: gvozdik@brno.cas.cz

12740. Hämäläinen, M.; Karube, H. (2013): Description of *Anisopleura bipugio* sp. nov. from southern Vietnam (Odonata: Euphaeidae). *Tombo* 55: 51-55. (in English) ["*Anisopleura bipugio* sp. nov. (holotype male from Bidoup-Nui Ba in Lam Dong province, southern Vietnam) is described and illustrated for the male sex. It differs from all known *Anisopleura* species by having long horns in the posterior lobe of the prothorax. Records of the two other *Anisopleura* species collected from Vietnam are listed." (Authors)] Address: Hämäläinen, M., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: libellago@gmail.com

12741. Hämäläinen, M. (2013): Description of *Bayadera kinnara* sp. nov. from Burma, with taxonomic notes on its congeners (Odonata: Euphaeidae). *Tombo* 55: 45-49. (in English) ["A new species *Bayadera kinnara* (holotype male from Northern Burma, Kachin State, South-Kumon Range, Zhan-Phut) is described for the male sex. The new species is compared with *Bayadera serrata* Davies & Yang, 1996 described from Yunnan, China. A new record of *B. serrata* from Vietnam is presented. *Bayadera chittaranjani* Lahiri, 2003 is transferred to the genus *Schmidtiphaea* Asahina, 1978. The mutual taxonomic status of *Schmidtiphaea chittaranjani* and *S. schmidi* Asahina, 1978 is preliminarily discussed." (Author)] Address: Hämäläinen, M., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: libellago@gmail.com

12742. Harvey, R.; Higgott, J. (2013): Reports from coastal stations - 2012: Minsmere RSPB, Suffolk. 64: 65. (in English) [UK, *Leucorrhinia pectoralis* in June 2012, *Chalcolestes viridis*, *Anaciaeschna isoceles*] Address: not stated

12743. Hassall, C. (2013): Time stress and temperature explain continental variation in damselfly body size. *Ecography* 36(8): 894-903. (in English) ["Body size is among the most important biological variables but despite much measurement of this trait, the factors driving its variation are not fully understood. Here, I describe variation in body size in *Calopteryx maculata* to estab-

lish whether variations in growth and development observed in response to experimental manipulation of temperature and time stress in the laboratory can be scaled-up to variation among natural populations. Nine hundred and seven specimens of *C. maculata* males were collected from 34 sites across the species' entire range in North America during the summer of 2010. A general measure of body size was derived from a series of wing and leg measurements. I compare the fit of models based on latitude (Bergmann's rule), temperature (the temperature–size rule) and seasonal effects (a combination of temperature and time stress) using Akaike's information criterion (AIC). The U-shaped relationship between size and latitude was best explained by a seasonality model containing both photoperiod and temperature. The presence of both these terms suggests that time stress dominates in the southern part of the range, reducing body size by accelerating development. However, the temperature–size rule dominates in the northern part of the range, increasing body size closer to the northern range margin. The best-fit model of geographic variation in size is in accordance with previous laboratory studies of temperature and photoperiod in damselflies and theoretical work, indicating that the findings from such studies can be applied to natural populations. These findings are likely applicable to any species with complex life histories inhabiting seasonal environments." (Author)] Address: Hassall, C., School of Biology, Univ. of Leeds, Woodhouse Road, LS2, 3JT, UK. E-mail: c.hassall@leeds.ac.uk

12744. Haywood, B.; Richter, R. (2013): The ancient greenling 'Hemiphlebia mirabilis' (Odonata: Hemiphlebiidae) in South Australia. *South Australian Naturalist* 87(1): 42-47. (in English) ["On the 13 December 2009 the first observation of *H. mirabilis* occurred for South Australia from the Piccaninnie Ponds Conservation Park in the far lower south-east of the state. This tiny damselfly was flying in a Twig-rush *Baumea arthropylla* swamp fringed with tea-tree (*Melaleuca squarrosa* and *Leptospermum continentale*) and was quite abundant. Subsequent observations have occurred in 2010 to 2013 at sites up to 60 km further north-west along the coast and as far-inland as the Mount Burr Range expanding our previous knowledge on distribution. Information is provided about habitat preference, fire history and flight period for South Australia." (Authors)] Address: Haywood, B., Conservation Planner, ForestrySA, PO Box 162, Mt Gambier, SA, 5290, Australia

12745. Heino, J. (2013): Does dispersal ability affect the relative importance of environmental control and spatial structuring of littoral macroinvertebrate communities? *Oecologia* 171(4): 971-980. (in English) ["Both spatial processes and environmental control may structure metacommunities, but their relative importance may be contingent on the dispersal ability of organisms. I examined the roles of spatial and environmental factors for the structuring of littoral macroinvertebrate communities

across a set of lakes in a boreal drainage basin. I hypothesized that dispersal ability would affect the relative importance of spatial processes and environmental control, and thus the biological data were divided into four groups of species differing in dispersal ability. In general, the group of the strongest aerial dispersers showed greatest relative pure environmental control and least pure spatial structuring of community structure and species richness, while spatial processes seemed to be more important for the other three dispersal ability groups. However, these results were contingent on the indirect measure of spatial processes, with the spatial variables and connectivity variables providing slightly different insights into the spatial processes and environmental control of metacommunity structuring. It appears, however, that dispersal ability has effects on the spatial processes and environmental control important in metacommunity organization, with strong dispersers being more under environmental control and less affected by spatial processes compared to weak dispersers." (Author) The paper includes references to *Aeshna grandis*.] Address: Heino, J., Ecosystem Change Unit, Finnish Environment Institute, P.O. Box 413, 90014, Oulu, Finland. E-mail: jani.heino@ymparisto.fi.

12746. Hilfert-Rüppell, D.; Rüppell, G. (2013): Do coloured-winged damselflies and dragonflies have flight kinematics different from those with clear wings? *International Journal of Odonatology* 16(2): 119-134. (in English) ["The flights of male odonates encountering conspecifics at their reproduction sites were investigated by means of slow-motion films. We recorded large and generally consistent differences between species with clear wings (SCLW) and species with coloured wings (SCOW). SCLW mostly fought having physical contact and moved their wings without pauses in wing beats (hereafter designated wing pauses), attacking the other males. During encounters, SCOW males showed pauses of all wings or of the fore or the hind wings only. The wing beat frequencies of SCOW therefore showed much greater variation than in SCLW. In Zygoptera SCOW, parallel flapping of both wing pairs was frequent. The two investigated species of Calopterygidae showed several special flight patterns when encountering other males. Male Anisoptera with coloured wings also used wing pauses, and often displayed their wing patterns by gliding and banking to the other male or by flying in an upright posture. Thus, we found that most odonate males with coloured wings, in the presence of rivals, exhibited special flight styles, implying signalling functions. We interpret wing pauses as an adaptive characteristic that allows rival males to evaluate the quality of their opponent by assessment of the coloured wings. Sexual selection is suggested as a possible cause for the evolution of these flights." (Authors)] Address: Hilfert-Rüppell, Dagmar, Institut für Fachdidaktik der Naturwissenschaften, Technische Universität, Braunschweig, Germany. E-mail: d.hilfert-rupepell@tu-bs.de

12747. Hodgson, I.; Beugg, J. (2013): Reports from coastal stations - 2012: Sandwich Bay Bird Observatory, Kent. *Atropos* 48: 57-58. (in English) [UK; *Sympetrum fonscolombii*, *Libellula fulva*, *L. quadrimaculata*] Address: not stated

12748. Hunter, I.; Hunter, S. (2013): Reports from coastal stations - 2012: Elms Farm, Icklesham, East Sussex. *Atropos* 48: 52-53. (in English) [UK; *Erythromma viridulum*, *Sympetrum fonscolombii*] Address: not stated

12749. Iserbyt, A.; Bots, J.; van Gossum, H.; Sherratt, T.N. (2013): Negative frequency-dependent selection or alternative reproductive tactics: maintenance of female polymorphism in natural populations. *BMC Evolutionary Biology* 2013, 13:139: 10 pp. (in English) ["Background: Sex-limited polymorphisms have long intrigued evolutionary biologists and have been the subject of long-standing debates. The coexistence of multiple male and /or female morphs is widely believed to be maintained through negative frequency-dependent selection imposed by social interactions. However, remarkably few empirical studies have evaluated how social interactions, morph frequencies and fitness parameters relate to one another under natural conditions. Here, we test two hypotheses proposed to explain the maintenance of a female polymorphism in a species with extreme geographical variation in morph frequencies (*Nehalennia irene*). We first elucidate how fecundity traits of the morphs vary in relation to the frequencies and densities of males and female morphs in multiple sites over multiple years. Second, we evaluate whether the two female morphs differ in resource allocation among fecundity traits, indicating alternative tactics to maximize reproductive output. Results: We present some of the first empirical evidence collected under natural conditions that egg number and clutch mass was higher in the rarer female morph. This morph-specific fecundity advantage gradually switched with the population morph frequency. Our results further indicate that all investigated fecundity traits are negatively affected by relative male density (i.e. operational sex ratio), which confirms male harassment as selective agent. Finally, we show a clear trade-off between qualitative (egg mass) and quantitative (egg number) fecundity traits. This trade-off, however, is not morph-specific. Conclusion: Our reported frequency- and density-dependent fecundity patterns are consistent with the hypothesis that the polymorphism is driven by a conflict between sexes over optimal mating rate, with costly male sexual harassment driving negative frequency-dependent selection on morph fecundity." (Authors)] Address: Iserbyt, A., Dept of Biology, Evolutionary Ecology Group, Groenenborgerlaan 171, Antwerp BE-2020, Belgium. E-mail: arne.iserbyt@ua.ac.be

12750. Johansson, H.; Stoks, R.; Nilsson-Örtman, V.; Ingvarsson, P.K.; Johansson, F. (2013): Large-scale patterns in genetic variation, gene flow and differentiation in five species of European Coenagrionid damselfly

provide mixed support for the central-marginal hypothesis. *Ecography* 36(6): 744-755. (in English) ["Recently, an increased effort has been directed towards understanding the distribution of genetic variation within and between populations, particularly at central and marginal areas of a species' distribution. Much of this research is centred on the central-marginal hypothesis, which posits that populations at range margins are sparse, small and genetically diminished compared to those at the centre of a species' distribution range. We tested predictions derived from the central-marginal hypothesis for the distribution of genetic variation and population differentiation in five European Coenagrionid damselfly species (*Coenagrion armatum*, *C. johanssoni*, *C. puella*, *C. pulchellum*, *C. mercuriale*). We screened genetic variation (microsatellites) in populations sampled in the centre and margins of the species' latitudinal ranges, assessed genetic diversity (HS) in the populations and the distribution of this genetic diversity between populations (FST). We further assessed genetic substructure and migration with Bayesian assignment methods, and tested for significant associations between genetic substructure and bioclimatic and spatial (altitude and latitude) variables, using general linearized models. We found no general adherence to the central-marginal hypothesis; instead we found that other factors such as historical or current ecological factors often better explain the patterns uncovered. This was illustrated in *C. mercuriale* whose colonisation history and behaviour most likely led to the observation of a high genetic diversity in the south and lower genetic diversity with increasing latitude, and in *C. armatum* and *C. pulchellum* whose patterns of low genetic diversity coupled with the weakest genetic differentiation at one of their range margins suggested, respectively, possible range shifts and recent, strong selection pressure." (Authors)] Address: Johansson, Helena, Centre of Excellence in Biological Interactions, Dept of Biosciences, Helsinki Univ., PO Box 65, FI-00014 Helsinki, Finland. E-mail: helena.z.johansson@helsinki.fi

12751. Johnston, P.R.; Rolff, J. (2013): Immune- and wound-dependent differential gene expression in an ancient insect. *Developmental & Comparative Immunology* 40(3-4): 320-324. (in English) ["Two of the main functions of the immune system are to control infections and to contribute to wound closure. Here we present the results of an RNAseq study of immune- and wound-response gene expression in *Coenagrion puella*, a representative of the odonates, the oldest taxon of winged insects. De novo assembly of RNAseq data revealed a rich repertoire of canonical immune pathways, as known from model insects, including recognition, transduction and effector gene expression. A shared set of immune and wound repair genes were differentially expressed in both wounded and immune-challenged larvae. Moreover three-fold more immune genes were overexpressed only in the immune-challenged treatment. This is consistent with the notion that the immune-system reads a balance

of signals related to wounding and infection and that the response is tailored accordingly. Highlights: *Infection transcriptome of an odonate, oldest group of pterygote insects. *Wounding and immune challenge lead to over-expression of immune genes. *More genes are overexpressed in immune-challenged vs. wounded individuals. *Odonates have a repertoire of immune transcripts comparable to more derived taxa." (Authors)] Address: Rolff, J., Evolutionary Biology, Inst. for Biology, Free University Berlin, Königin Luise Str. 1-3, 14195 Berlin, Germany. E-mail: jens.rolff@fu-berlin.de

12752. Kalkman, V.J.; Orr, A.G. (2013): Field Guide to the damselflies of New Guinea. *Brachytron* 16, Suppl.: 3-120. (in English, with Bahasa Indonesian) ["With this book in hand the reader can identify all genera and most species of damselflies occurring in New Guinea. It will doubtless stimulate people to explore their local streams and standing waters of New Guinea and to appreciate the wonderful diversity of damselflies and dragonflies to be found there. Over 500 copies are being donated to universities throughout New Guinea. As well as introducing students and researchers to the beauty of damselflies, the guide provides a basis to study them and use them in biodiversity studies supporting the conservation of freshwater habitats. The guide contains nearly 300 colour drawings and over 250 line drawings by Albert Orr and twenty-two colour photographs taken in the field by Stephen Richards. Many genera and most species included have never been depicted in colour before."] Approximately 60% of the known zygopteran taxa is figured and described. [Vincent Kalkman has had an interest in the damselflies and dragonflies of New Guinea since 2005. In 2006 and 2008 he conducted fieldwork with the Kelempok Entomologi Papua in the Indonesian part of the island and in 2009 he joined the expedition by Conservation International to Muller Range in Papua New Guinea. Albert Orr's interest in the insect fauna of New Guinea dates back to undergraduate days when he made two lengthy excursions in 1971 and 1973/4, collecting butterflies and dragonflies. He has authored and illustrated several identification guides to Asian dragonflies and damselflies [2003, 2005 and 2007), and the butterflies of Australia (2010). ... This field guide was made possible by grants from: Van Tienhoven Foundation, Van der Hucht De Beukelaar Stichting, the International Dragonfly Fund, Nederlandse Vereniging voor Libellenstudie, Theo Benken, Klaus-Jürgen Conze, Andre Günther, Holger Hunger, Dietmar Ikemeyer, Lutz & Ursel Koch, Martin Lemke, Ludwig Quandt, Richard Seidenbusch, Klaus-Peter & Mechtild Seiler, Wolfgang Schneider, Anke & Michael Tydecks-Jürging and Isolde Wiesmath." (Publisher)] Address: Kalkman, V.J., p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

12753. Katayama, M. (2013): Differential survival rates of damselfly larvae in the presence of newt and dragon-

fly predators. *International Journal of Odonatology* 16(2): 177-182. (in English) ["The damselfly species *Paracercion melanotum* has been found to be the most abundant species in damselfly larval communities on Okinawa-zima Island in southwest Japan. To clarify differential susceptibility to predation, a possible factor affecting relative population densities in larval communities, between *Paracercion melanotum* and a less common damselfly species, *Ischnura senegalensis*, laboratory experiments were conducted using three abundant predator species: the sword-tailed newt (*Cynops ensicauda popei*), anisopteran larvae (*Crocothemis servilia servilia*), and a planktivorous fish (*Poecilia reticulata*). *Paracercion melanotum* survived predation by the newt and the dragonfly well compared to *I. senegalensis*. Fishes consumed approximately equal numbers of the two damselfly species. From these results, the newt and the dragonfly were suggested as the most probable predators regulating damselfly larval communities on Okinawa-zima Island. Predators could be a crucial factor determining relative abundance in damselfly larval communities." (Authors)] Address: Katayama, M., Graduate School of Human and Environment Studies, Kyoto University, Yosida-Nihonmatsu, Sakyo ku, Kyoto, 6068501, Japan. Email: motok.k.ryuk@gmail.com

12754. Kaunisto, K.M.; Suhonen, J. (2013): Parasite burden and the insect immune response: interpopulation comparison. *Parasitology* 140(1): 87-94. (in English) ["The immune response affects host's survival and reproductive success. Insurmountable immune function has not evolved because it is costly and there is a trade-off between other life-history traits. In previous studies several factors such as diet and temperature have been proposed to cause interpopulation differences in immune response. Moreover, the insect immune system may be functionally more protective upon secondary exposure, thus infection history may associate with the immune response. Here we measured how geographical location and parasite burden is related to variation in immune response between populations. We included 13 populations of *Coenagrion hastulatum* in Finland over a latitudinal range of 880 km to this study. We found that water mites associated strongly with the immune response at interpopulation level: the more the mites, the higher the immune response. Also, in an alternative model based on AIC, latitude and individual size associated with the immune response. In turn, endoparasitic gregarines did not affect the immune response. To conclude, a positive interpopulation association between the immune response and the rate of water mite infection may indicate (i) local adaptation to chronic parasite stress, (ii) effective 'induced' immune response against parasites, or (iii) a combined effect of both of these." (Authors)] Address: Kaunisto, K.M., Section of Ecology, Dept of Biol., 20014 University of Turku, Finland. E-mail: kkauni@utu.fi

12755. Keller, D.; Seidl, I.; Forrer, C.; Home, R.; Holdegger, R. (2013): Schutz der Helm-Azurjungfer *Coen-*

agrion mercuriale (Odonata: Coenagrionidae) am Beispiel des Smaragd-Gebiets Oberaargau. Entomo Helvetica 6: 87-99. (in German, with English and French summaries) ["C. mercuriale is a critically endangered damselfly in Switzerland and is also a target species in the Emerald and Natura 2000 network of European protected areas. One of the most important sites of C. mercuriale in Switzerland is located in the Emerald area Oberaargau. Here, this damselfly species inhabits streams and ditches flowing through agricultural meadows. Within a larger research project, several studies have been performed on C. mercuriale in the Oberaargau region. (1) Conservation measures and their costs were assessed, (2) the effectiveness of the Emerald information campaigns were surveyed and analysed with a questionnaire, and (3) the connectivity of annually monitored populations was studied in a mark-recapture study and genetic analyses. Overall, these studies showed positive results. The calculations of conservation costs revealed a moderate amount of expenses for conservation measures of C. mercuriale. The survey indicated that local people were well informed about the protection of C. mercuriale because of the information campaigns. Furthermore, population monitoring indicated a positive development of local damselfly populations. Connectivity between populations located within the same stream system was ensured by frequent dispersal along the water courses across distances up to 0.5 km. However, dispersal across distances larger than 0.5 km occurred less often, but across open agricultural land. Such long-distance dispersal events are important for the interconnectivity of distant populations." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr. 111, 8903 Birmensdorf, Switzerland. E-mail: daniela.keller@wsl.ch

12756. Knill-Jones, S. (2013): Reports from coastal stations - 2012: Isle of Wight. 49: 50. (in English) [UK; immature *Anax parthenope* at 25-VII-2012] Address: Knill-Jones, S.A., 2 School Green Road, Freshwater, Isle of Wight, PO40 9AL, UK

12757. Kulijer, D.; De Knijf, G.; Frankovic, M. (2013): Review of the Odonata of Bosnia and Herzegovina. Odonatologica 42(2): 109-123. (in English) ["The current knowledge on the Odonata fauna of Bosnia and Herzegovina is summarized based on museum and private collections, literature and new unpublished data of the authors. In all, 63 species are known, including first reports of *Platycnemis pennipes nitidula*, *Anax parthenope*, *Gomphus flavipes*, *G. schneiderii*, *Cordulegaster heros* and *Selysiotthemis nigra* for the country. *Calliaeschna microstigma* is rediscovered after more than 100 yr. The first reliable data on the occurrence of *Somatochlora metallica* is reported. More than 1,400 new records were collected and a national odonatological database has been created. Annotations to the new species and to some other faunistically interesting species are given. Possible future additions to the fauna of Bosnia and

Herzegovina are discussed." (Authors)] Address: Frankovic, M., Oboj V. odvojak 10/1, HR-10000 Zagreb, Croatia. E-mail: svanimir@yahoo.com

12758. Lopez van Oosterom, M.V.; Ocón, C.S.; Brancolini, F.; Maroñas, M.E.; Sendra, E.D.; Rodrigues Capitulo, A. (2013): Trophic relationships between macroinvertebrates and fish in a pampean lowland stream (Argentina). Iheringia 103(1): 57-65. (in English, with Spanish summary) ["The diet and trophic relationships between the macroinvertebrates Phyllogomphoides joaquina Rodrigues Capitulo, 1992 and Coenagrionidae, Chironomidae (Diptera), *Diplodon delodontus* (Lamarck, 1919) (Bivalvia: Hyriidae), and *Pomacea canaliculata* (Lamarck, 1822) (Gastropoda: Ampulariidae) and the fishes *Pimelodella laticeps* Eigenmann, 1917 (Hepptapteridae) and *Bryconamericus iheringii* (Boulenger, 1887) (Characidae) in a temperate lowland lotic system in Argentina were assessed on the basis of gut contents and stable-isotope analyses. The feeding strategies were analyzed by the Amundsen method. Relative food items contribution for the taxa studied indicated a generalist-type trophic strategy. In macroinvertebrates, in general, the values of stable isotope confirmed the result of the analysis of gut contents. With the fish, stable-isotope analysis demonstrated that both species are predators, although *B. iheringii* exhibited a more omnivorous behaviour. These feeding studies allowed us to determine the trophic relationships among taxa studied. Detritus and diatoms were a principal source of food for all the macroinvertebrates studied. In La Chozza stream the particulate organic matter is a major no limited food resource, has a significant influence upon the community." (Authors)] Address: López van Oosterom, María V., Instituto de Limnología "Dr. Raúl A. Ringuelet", CCT - La Plata - CONICET, Universidad Nacional de La Plata (UNLP), Boulevard 120 y 62 s/n, (1900) La Plata, Buenos Aires, Argentina. E-mail: vanesa@ilpla.edu.ar

12759. Mäkinen, J. (2013): Toukkanahkojen etsintää Helsingin Uutelassa [In search of exuviae at Uutela (Helsinki)]. Crenata 6: 4-7. (in Finnish, with English summary) ["In the summer of 2012 the author spent several days searching for exuviae of *Aeshna* species in Uutela, a nature reserve area located in southeast Helsinki. A total of 1001 exuviae were found at two adjacent ponds. The most common species were *Aeshna serrata* (808 exuviae) and *Aeshna mixta* (188 exuviae). This was the second occurrence of confirmed reproduction of *A. mixta* in Finland, previously only one exuvia has been found. The size of *A. serrata* population was found to be much bigger than supposed." (Authors)] Address: Mäkinen, J. E-mail: makisenjussi@gmail.com

12760. Mahbob, M.A.E.; Mahmoud, H.H. (2013): The first report of preliminary list of the insect fauna of the Elkharaga city, New Valley, Egypt. Journal of Ecology and the Natural Environment 5(7): 125-132. (in English) [*Ischnura evansi* and *I. senegalensis* are documented.]

Address: Mahbob, M., Department of Mathematics and Science, Faculty of Education in the New Valley, Assiut University, Egypt.

12761. Mapi-ot, E.F.; Taotao, A.U.; Nuñeza, O.M.; Villanueva, R.J.T. (2013): Species diversity of adult Odonata in selected areas from Misamis Occidental Province, Philippines. *AAFL Bioflux* 6(4): 421-432. (in English) ["Odonata is considered an environmental indicator group of freshwater habitats. Thus there is a need to have a good baseline data to use it for monitoring fluvial habitats. However, species composition of Odonata in Misamis Occidental is poorly known. This study was conducted to determine the species diversity of Odonata in the municipality of Sinacaban and in the cities of Oroquieta and Ozamiz, Misamis Occidental, Philippines. Opportunistic sampling method using sweep nets was employed. There were 266 Odonata individuals collected comprising 22 species. Seven species (31.82%) are Philippine endemic. Low species diversity was recorded in all the sampling sites with more or less even distribution of species. Results indicate that the sampled areas are already disturbed." (Authors)] Address: Mapi-ot, Emmarie, Department Biological Sciences, Mindanao State University - Iligan Institute of Technology, Iligan City, Philippines; 2 D3C Gahol Apartment, Lopez Jaena St., Davao City, Philippines. E-mail: efmapiot@yahoo.com

12762. Marinov, M.; Richards, S. (2013): Notes on the female colour forms of *Synthemis miranda* Selys, 1871 (Odonata: Synthemistidae) in New Caledonia. *Australian Entomologist* 40(2): 57-64. (in English) ["Two female *Synthemis miranda* Selys specimens with strikingly different morphological features (mainly wing colouration) were collected in sympatry in Province Nord, New Caledonia. Both appear to be mature adults. Specimens with these two colour patterns have previously been reported in the literature but this paper presents the first record of their co-existence. We formally recognise the two forms based on colour pattern and note other morphological features that may also distinguish them. The validity of these additional characters requires confirmation through examination of further material." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

12763. Marinov, M.; Richards, S.; Theuerkauf, J. (2013): Damselflies and Dragonflies (Insecta: Odonata) of the Mt. Panié and Roches de la Ouaième region, New Caledonia. *A Rapid Biological Assessment of the Mt. Panié and Roches de la Ouaième region, province Nord, New Caledonia*: 113-130. (in English, with French summary) ["We surveyed odonates at 46 sites in north-eastern New Caledonia, including 38 primary sites in three catchments on and around Mt. Panié. A total of 23 species were recorded during this survey, which comprises 41% of the 56 species known for the country. The lowest number of species was documented within the La

Guen river catchment, where less species were found than in the Dané Yém river catchment despite only limited sampling (half a day) at this latter site. Localities within the La Guen catchment also appeared to suffer from higher disturbance compared to those in the We-wec river catchment where species richness was high. They had lower water pH, higher amounts of filamentous algae and an apparently low abundance of primary consumers (macroinvertebrates). Anthropogenic impacts, including bushfires and introduced mammals, may these differences. Our results suggest that odonates are useful bioindicators within the Mt. Panié area. This survey has provided baseline data on species occurrence and abundance at a range of sites, and identified several questions regarding disturbance to aquatic ecosystems that require further investigation." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@canterbury.ac.nz

12764. Mathieu, M. (2013): Présence d'*Oxygastra curtisii* (Dale, 1834) confirmée en Isère. *Sympetrum* 16: 32-33. (in French) [23-VI-2003, Département Isère, France.] Address: Mathieu, Marylin. E-mail: marilyn.mathieu@espaces-naturels.fr

12765. McGoff, E.; Solimini, A.G.; Pusch, M.T.; Jurca, T.; Sandin, L. (2013): Does lake habitat alteration and land-use pressure homogenize European littoral macroinvertebrate communities? *Journal of Applied Ecology* 50(4): 1010-1018. (in English) ["Beta diversity is the compositional heterogeneity of biotic assemblages among sites, and biotic homogenization is the decrease in beta diversity, facilitated by an increase in similarity of biotic communities over time. Environmental harshness decreases the importance of stochastic processes in structuring assemblages, resulting in a homogenization of the biota. We investigated if increasing nutrient enrichment, land-use pressure, and within-lake habitat alteration would decrease the beta diversity of macroinvertebrates in 46 lakes across Europe. Beta diversity was calculated using global multivariate dispersion. We utilized a structural equation modelling approach to account for hierarchical interdependence between potential impacts, that is the direct effects and correlations among the different impacts. We found clear indications that European macroinvertebrate communities are being homogenized by ongoing lake shore development. Increasing land-use pressure in the form of residential and commercial development had a direct negative effect on beta diversity (standardized coefficient = -0.40), as did roadways, albeit indirectly through an increase in engineering structures (standardized coefficient = -0.31). Increasing within-lake silt levels also homogenized macroinvertebrate communities (standardized coefficient = -0.18), independent of near shore land use. Our results indicate the negative effect of both the near shore land-use pressure and the within-lake habitat alteration on macroinvertebrate beta diversity, with significant inter-

actions between these pressures. Habitat protection should take a more holistic approach to assessing lake development pressure, over a range of scales, as a solely site specific approach is not always biologically meaningful. Thus, future management plans should carefully control and mitigate ongoing development pressure if lake ecosystem health and resilience is to be maintained. Synthesis and applications. This study is the first of its kind to demonstrate European-wide homogenization of littoral macroinvertebrate lake communities with increasing habitat alteration and land-use pressure. Significant interactions occur between different habitat scales, with no one scale entirely accounting for the homogenization effect. To avoid further biotic homogenization, development pressure must be carefully managed at multiple scales, and where possible, minimized. This presents a challenge, as globally there is an increasing expansion of the human population and a consequent increase in anthropogenic pressure across all habitats." (Authors) Mean, median and standard error (SE) of the number of animals per order per lake in decreasing order: Odonata: 48.1, 13.0, 18.5] Address: McGoff, Elaine, Department of Aquatic Sciences & Assessment, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden. E-mail: mcgoffe@tcd.ie

12766. Monteiro, C.; Couceiro, S.R.M.; Hamada, N.; Juen, L. (2013): Effect of vegetation removal for road building on richness and composition of Odonata communities in Amazonia, Brazil. *International Journal of Odonatology* 16(2): 135-144. (in English, with Spanish summary) ["This study showed that the main impact on Odonata species of removal of riparian vegetation for road building was on community composition, since species richness remained unaltered. This result, most evident in damselflies, was probably driven by the entry of generalist species that replaced specialist species after the impact. We collected adult odonates in forested and deforested streams in the surroundings of Manaus, Amazonas, northern Brazil. We collected 380 specimens belonging to 32 odonate species. *Erythrodiplax fusca* and *Argia* sp. 1 could be used in biomonitoring programs, since they were significantly associated with deforested streams. Using odonate community composition and key species appears to be more efficient in biomonitoring programs than simply using species richness." (Authors)] Address: Monteiro, C., Univ. Federal do Para, Laboratorio de Ecologia e Zoologia de Invertebrados, Instituto de Ciencias Biologicas, Rua Augusto Correia, N. 1 Bairro Guama, CEP 66.075-110, Belem, Para, Brazil. Email: claudiomonteiro80@hotmail.com

12767. Moore, C.; Deans, M.J. (2013): Reports from coastal stations - 2012: Dunwich Heath National Trust, Suffolk. *Atropos* 48: 65-66. (in English) [UK, *Leucorrhinia pectoralis* in June 2012] Address: not stated

12768. Nasasagare, R.P.; Ntakimazi, G.; Libois, R. (2013): Diet composition of young and adult Northern

Grey-headed Sparrow *Passer griseus* and adult Southern Red Bishop *Euplectes orix* in Burundi. *Malimbus* 35: 1-10. (in English, with French summary) ["We studied the diet composition of Northern Grey-headed Sparrow and Southern Red Bishop in four localities of the Rusizi Plain, northwest Burundi. We analyzed crop contents of 100 adults from each of the two species and the composition of food brought by parents to nestlings of the sparrow at ten nests. In all four sites, the sparrow's diet consisted primarily of rice. The bishop also fed mostly on rice grains but also ate Lepidoptera caterpillars, some other insects and wild grass seeds such as *Panicum* sp. and *Brachiaria* sp. For adults of both bird species, there was no significant variation in diet throughout the year. However, the diet of young sparrows was much more diverse and changed from the day of hatching until fledging. On the day of hatching, chicks ate mainly caterpillars but by the tenth day, food items comprised one third caterpillars, one third Orthoptera and the rest of other insects including Odonata, Dictyoptera, Isoptera and adult Lepidoptera. After this and until fledging, the chicks were fed increasingly on rice seeds. Simultaneously, the proportion of caterpillars taken gradually decreased until none was fed to the nestlings at the end of the nestling period. The items brought by parents also varied with time of day, with caterpillars and grasshoppers in higher proportions in the morning, decreasing around mid-day and then increasing in the evening." (Authors)] Address: Nasasagare, Régine Pacis, Zoogeographic Research Unit, Dept of Sciences "Biology, Ecology, Evolution", Univ. of Liège, Boulevard du Rectorat 27, 4000 Liège, Belgium. E-mail: rpnas@yahoo.fr

12769. Natsume, H. (2013): Two cases of unusual flight of male Odonata nearby the shiny surface of a parked car. *Tombo* 55: 88-90. (in Japanese, with English summary) ["A few mature males of *Zygomma petiolatum* were observed to fly over the surface of a metallic dark-green coloured car at Deep Water Bay in Hong Kong on July 11, 1993. Another observation was made at Kutchan town in Hokkaido, Japan, on August 8, 1998. A male *Aeshna juncea juncea* flew over a black vehicle for several minutes. In both cases their behaviours looked like patrol flight of territorial males at the water. The causes of these behaviours are briefly discussed." (Author)] Address: E-mail: romluna@y4.dion.ne.jp

12770. Natuhara, Y. (2013): Ecosystem services by paddy fields as substitutes of natural wetlands in Japan. *Ecological Engineering* 56: 97-106. (in English) ["This paper reviews research on the ecosystem services or multifunctionality of paddy rice cultivation in Japan, focusing on biodiversity as a basis for ecosystem services, with the aim of describing the current status and impact of the subject and exploring options for sustainable practices. Ecosystem services provided by paddy fields include; groundwater recharge, production of non-rice foods, flood control, soil erosion and landslide prevention, climate-change mitigation, water purification, culture and

landscape, and support of ecosystems and biodiversity. Among these services, the value of services that regulate ecosystem functions was estimated to be US\$ 72.8 billion in Japan. More than 5000 species have been recorded in paddy fields and the surrounding environment. Because paddy fields are artificially disturbed by water level management, plowing, and harvest, most species move between paddy fields and the surrounding environment. The linkage between paddy fields and the associated environment plays an important role in biodiversity. Two changes that have affected the ecosystem of paddy fields are modernization and abandonment of farming. Satoyama, a traditional socio-ecological production landscape, which provided a functional linkage between paddy fields and the associated environment has lost its functions. Biodiversity-conscious rice farming has been promoted by collaborations among farmers, consumers and governments. Biodiversity certification programs are successful examples of biodiversity-conscious framing. In these programs incentives include direct payments and/or premium prices paid by consumers, as well as farmers willingness to improve the safety of food and environment." (Author) The paper includes references to *Sympetrum frequens*.] Address: Natuhara, Y., Graduate School of Environmental Studies, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 468-8601, Japan. E-mail:natuhara@nagoya-u.jp

12771. Nguyen, S.H.T.; Webb, H.K.; Hasan, J.; Tobin, M.J.; Crawford, R.J.; Ivanova, E.P. (2013): Dual role of outer epicuticular lipids in determining the wettability of dragonfly wings. *Colloids and Surfaces B: Biointerfaces* 106: 126-134. (in English) ["Numerous natural surfaces possess superhydrophobicity and self-cleaning properties that would be extremely beneficial when applied in industry. Dragonfly wings are one example of such surfaces, and while their general surface structure is known, their precise chemical composition is not. Here, the epicuticular lipids of dragonfly wing membranes were characterized to investigate their significance in contributing to self-cleaning and superhydrophobic properties. After just 10 seconds of lipid extraction using chloroform, the water contact angles exhibited by the wings decreased below the accepted threshold for superhydrophobicity (150°). Infrared spectra collected at the Australian Synchrotron contained characteristic absorption bands of amide, ester and aliphatic hydrocarbons moieties on the wing surfaces, the latter of which was decreased post-extraction with chloroform. GCMS data analysis revealed that the epicuticular wax components were dominated by n-alkanes with even-numbered carbons, especially n-hexacosane, and palmitic acid. SEM and AFM data analysis conducted on the untreated and chloroform-extracted wing surfaces demonstrated that surface topography changed after extraction; the surface nanostructure was progressively lost with extended extraction times. The data presented here indicate that epicuticular lipids contribute not only to self-cleaning and superhydrophobic properties through

their inherent hydrophobic nature, but also by forming the physical structure of the wing surface. This knowledge will be extremely valuable for reconstruction of dragonfly wing structures as a biomimetic template." (Authors)] Address: Ivanova, Elena, Faculty of Life and Social Sciences, Swinburne University of Technology, PO Box 218, Hawthorn, VIC 3122, Australia. E-mail: eivanova@swin.edu.au

12772. Obolewski, K.T.; Strzelczak, A.; Astel, A.M.; Sawczyn, J. (2013): Short-term effects of stream restoration and management on macroinvertebrate communities in lowland streams. *International Journal of Engineering Research and Development* 6(4): 122-131. (in English) ["As a result of hydrotechnical treatments, a 2.5 km long reach of the lowland Kwacza River (Poland) was elongated to 3.5 km. Restoration triggered off short-term changes in the river ecosystem, which were studied through habitat and invertebrate analysis. Sampling was conducted at 10 sections before and after restoration. Invertebrates quickly colonized various habitats and thus improved biological diversity of the Kwacza River. The only taxon that increased its ecological importance was Gammaridae. In turn, Ephemeroptera concentrated at places with better oxygen conditions. The neural network model revealed that variables directly connected with restoration were not as important as primarily hypothesised." (Authors) Taxa (including Odonata) are treated at family level.] Address: Obolewski, K.T., Dept of Ecology, Pomeranian Univ. in Slupsk, Arciszewskiego 22b, 76-200 Slupsk, Poland

12773. Odin, N. (2013): Reports from coastal stations - 2012: Landguard Bird Observatory, Suffolk. *Atropos* 48: 61-62. (in English) [UK, *Leucorrhinia pectoralis* at 27-V-2012; *Chalcolestes viridis*, *Libellula quadrimaculata*] Address: not stated

12774. Okamoto, K.W.; Grether, G.F. (2013): The evolution of species recognition in competitive and mating contexts: the relative efficacy of alternative mechanisms of character displacement. *Ecology Letters* 16(5): 670-678. (in English) ["Sympatric divergence in traits affecting species recognition can result from selection against cross-species mating (reproductive character displacement, RCD) or interspecific aggression (agonistic character displacement, ACD). When the same traits are used for species recognition in both contexts, empirically disentangling the relative contributions of RCD and ACD to observed character shifts may be impossible. Here, we develop a theoretical framework for partitioning the effects of these processes. We show that when both mate and competitor recognition depend on the same trait, RCD sets the pace of character shifts. Moreover, RCD can cause divergence in competitor recognition, but ACD cannot cause divergence in mate recognition. This asymmetry arises because males with divergent recognition traits may avoid needless interspecific conflicts, but suffer reduced attractiveness to conspecific

ic females. Therefore, the key empirical issue is whether the same or different traits are used for mate recognition and competitor recognition." (Authors) Model organism is *Hetaerina*.] Address: Okamoto, K.W., Dept of Ecology & Evolutionary Biology, 621 Charles E. Young Drive South, University of California, Los Angeles, CA, USA. E-mail: kenichiokamoto@ncsu.edu

12775. Okuyama, H.; Samejima, Y.; Tsubaki, Y. (2013): Habitat segregation of sympatric *Mnais* damselflies (Odonata: Calopterygidae): microhabitat insolation preferences and competition for territorial space. *International Journal of Odonatology* 16(2): 109-117. (in English) ["Distribution and abundance of sympatric *Mnais costalis* and *M. pruinosa* damselflies were studied in a low mountain stream in Shiga, Japan, from 2008 through 2012. The reproductive seasons of the two species overlapped almost entirely: both species emerged in early May and disappeared in late June each year. Males of both species hold territories within the same stretch of the river; however, *M. costalis* was more abundant on the lower stream, while *M. pruinosa* was more abundant on the upper stream. Canopy openness varied at territorial sites. Results of these observations suggest that habitat segregation of the two species is due to different preference for light/shade conditions. Morisita's R_d index suggests that interspecific exclusion (or avoidance) contributes to the habitat segregation of the two species." (Authors)] Address: Tsubaki, Y., Center for Ecological Research, Kyoto Univ., 2-509-3 Hirano, Otsu, Shiga, Japan. Email: g0980134@yahoo.co.jp

12776. Onishi, Y.; Genkai-Kato, M. (2013): Benthic invertebrates and attached algae in the upstream region of the Kagami River, Kochi Prefecture. *Kuroshio Science* 6(2): 208-216. (in Japanese, with English summary) ["In lotic ecosystems, the downstream environments are affected by the upstream environments. Surveys were conducted for water chemistry, attached algae and benthic invertebrates in five headwater streams of the Kagami River, Kochi Prefecture, western Japan. The discharge rate among the streams ranged between 0.24 and 2.46 m³/s, but there was no correlation between the discharge rate and attached algae or benthic invertebrates. Attached algae were dominated by diatoms, and the density of chlorophyll *a* varied between 4.8 and 30.5 mg/m² depending on the streams. The invertebrate communities in the streams were dominated by mayflies, caddisflies and freshwater crabs. Streams with abundant freshwater crabs tended to have fewer aquatic insects and lower biodiversity, and vice versa. This indicates that the invertebrate community structure in the upstream region of the Kagami River is strongly affected by the abundance of freshwater crabs." (Authors) The list of taxa includes Odonata *Calopteryx cornelia* and 'Gomphidae'.] Address: Onishi, Yukiko, Department of Biology, Faculty of Science, Kochi University, 2-5-1 Akebono-cho, Kochi 780-8520, Japan

12777. Outomuro, D.; Adams, D.C.; Johansson, F. (2013): The evolution of wing shape in ornamented-winged damselflies (Calopterygidae, Odonata). *Evolutionary Biology* 40(2): 300-309. (in English) ["Flight has conferred an extraordinary advantage to some groups of animals. Wing shape is directly related to flight performance and evolves in response to multiple selective pressures. In some species, wings have ornaments such as pigmented patches that are sexually selected. Since organisms with pigmented wings need to display the ornament while flying in an optimal way, we might expect a correlative evolution between the wing ornament and wing shape. We examined males from 36 taxa of calopterygid damselflies that differ in wing pigmentation, which is used in sexual displays. We used geometric morphometrics and phylogenetic comparative approaches to analyse whether wing shape and wing pigmentation show correlated evolution. We found that wing pigmentation is associated with certain wing shapes that probably increase the quality of the signal: wings being broader where the pigmentation is located. Our results also showed correlated evolution between wing pigmentation and wing shape in hind wings, but not in front wings, probably because hind wings are more involved in signalling than front wings. The results imply that the evolution of diversity in wing pigmentations and behavioural sexual displays might be an important driver of speciation due to important pre-copulatory selective pressures." (Authors) *Archineura incarnata*, *Atrocalopteryx atrata*, *Caliphaea confusa*, *Calopteryx aequabilis*, *C. amata*, *C. cornelia*, *C. exul*, *C. haemorrhoidalis*, *C. maculata*, *C. splendens splendens*, *C. virgo meridionalis*, *C. virgo virgo*, *C. xanthostoma*, *Echo modesta*, *Hetaerina americana*, *H. titia*, *Matrona basilaris*, *Matronoides cyanipennis*, *Mnais andersoni*, *M. costalis*, *M. mneme*, *M. pruinosa*, *M. tenuis*, *Neurobasis chinensis*, *Phaon camerunensis*, *P. iridipennis*, *Phaon* sp. from Madagascar, *Psolodesmus mandarinus dorothea*, *Sapho bicolor*, *S. ciliata*, *S.o gloriosa*, *Umma longistigma*, *U. saphirina*, *Vestalis amoena*, *V. gracilis*, *V. lugens*] Address: Outomuro, D., Department of Ecology and Genetics, Evolutionary Biology, Centre, Uppsala University, Norbyvägen 18D, 752 36 Uppsala, Sweden. E-mail: outomuro.david@gmail.com

12778. Outomuro, D.; Ocharan, F.J.; Torralba-Burrial, A. (2013): Teratologías en adultos de *Calopteryx* Leach, 1815 (Odonata: Calopterygidae). *Boletín de la Sociedad Entomológica Aragonesa* 52: 265-268. (in Spanish, with English summary) ["Several teratologies are described in adult specimens of *Calopteryx virgo meridionalis*, *C. xanthostoma* and *C. haemorrhoidalis*. These teratologies are mainly associated with the wing pigmentation but also with the abdomen." (Authors)] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@oonreo.uniovi.es

12779. Outomuro, D.; Adams, D.C.; Johansson, F. (2013): Wing shape allometry and aerodynamics in ca-

lopterygid damselflies: a comparative approach. *BMC Evolutionary Biology* 2013, 13:118 doi:10.1186/1471-2148-13-118: 11 pp. (in English) ["Background: Wing size and shape have important aerodynamic implications on flight performance. We explored how wing size was related to wing shape in territorial males of 37 taxa of the damselfly family Calopterygidae. Wing coloration was also included in the analyses because it is sexually and naturally selected and has been shown to be related to wing shape. We studied wing shape using both the non-dimensional radius of the second moment of wing area (RSM) and geometric morphometrics. Lower values of the RSM result in less energetically demanding flight and wider ranges of flight speed. We also re-analyzed previously published data on other damselflies and dragonflies. Results: The RSM showed a hump-shaped relationship with wing size. However, after correcting for phylogeny using independent contrast, this pattern changed to a negative linear relationship. The basal genus of the study family, Hetaerina, was mainly driving that change. The obtained patterns were specific for the study family and differed from other damselflies and dragonflies. The relationship between the RSM and wing shape measured by geometric morphometrics was linear, but relatively small changes along the RSM axis can result in large changes in wing shape. Our results also showed that wing coloration may have some effect on RSM. Conclusions: We found that RSM showed a complex relationship with size in calopterygid damselflies, probably as a result of other selection pressures besides wing size per se. Wing coloration and specific behaviour (e.g. courtship) are potential candidates for explaining the complexity. Univariate measures of wing shape such as RSM are more intuitive but lack the high resolution of other multivariate techniques such as geometric morphometrics. We suggest that the relationship between wing shape and size are taxa-specific and differ among closely related insect groups." (Authors) *Archineura incarnata*, *Atrocalopteryx atrata*, *Caliphaea confusa*, *Calopteryx aequabilis*, *C. amata*, *C. cornelia*, *C. exul*, *C. haemorrhoidalis*, *C. maculata*, *C. splendens splendens*, *C. virgo meridionalis*, *C. virgo virgo*, *C. xanthostoma*, *Echo modesta*, *Hetaerina americana*, *H. titia*, *Matrona basilaris*, *Matronoides cyanipennis*, *Mnais andersoni*, *M. costalis*, *M. mneme*, *M. pruinosa*, *M.s tenuis*, *Neurobasis chinensis*, *Phaon camerunensis*, *P. iridipennis*, *Phaon sp.* from Madagascar, *Psolodesmus mandarinus dorothea*, *Sapho bicolor*, *S. ciliata*, *S. gloriosa*, *Umma longistigma*, *U. saphirina*, *Vestalis amoena*, *V. gracilis*, *V. lugens*] Address: Outomuro, D., Population and Conservation Biology, Dept of Ecology & Genetics, Evolutionary Biology Centre, Uppsala Univ., Norbyvägen 18D, 75236 Uppsala, Sweden. E-mail: outomuro.david@gmail.com

12780. Päivinen, T. (2013): Erikoisia havaintoja: isoukonkorento munii ja kuolee pian sen jälkeen [Remarkable observation: Siberian Hawker (*Aeshna crenata*) dies shortly after oviposition]. *Crenata* 6: 11. (in Finnish) ["A photo series of six pictures taken on 25-viii-2009 at

Nuoksio nationalpark (Espoo) impressively shows the process of dying of a Siberian Hawker immediately after oviposition. The documentation is subtitled: Isoukonkorentonaaraan kuolemantanssi heti munittuan [Dance of death of a female Siberian Hawker immediately after oviposition] (Asmus Schröter)] Address: not stated

12781. Päivinen T. (2013): Retkellä rajavyöhykkeellä Kiteenjoella [Excursion at the Finnish-Russian border area along Kiteenjoki river]. *Crenata* 6: 36-38. (in Finnish) [The author presents dragonfly observations made during two excursions in 2011 and 2012 along the border river Kiteenjoki in North Karelia region in Eastern Finland. The precise location of the 2,5km long river section is shown on a map and observation data are listed in a table. A total of 18 species has been recorded, most notably *Libellula fulva*, which is rare in Finland and which has one of its Finnish strongholds in the region described. (Asmus Schröter)] Address: not stated

12782. Paul, S.; Kakkassery, F.K. (2013): Taxonomic and diversity studies on Odonate nymphs by using their exuviae. *Journal of Entomology and Zoology Studies* 1(4): 47-53. (in English) [*Paragomphus lineatus*, *Anax guttatus*, *A. immaculifrons*, *Pantala flavescens*, and *Trithemis aurora* were identified by comparing the larval characters present on exuviae, collected from a temporary pond at Ammadam, Thrissur district, Kerala state, India.] Address: Kakkassery, F.K., Department of Zoology, St. Thomas' College, Thrissur Kerala 680001, India. E-Mail: kakkassery@yahoo.com

12783. Pérez Bilbao, A.; Benetti, C.J.; Garrido, J. (2013): Estudio de la calidad del agua del río Furnia (NO. España) mediante el uso de macroinvertebrados acuáticos. *Nova Acta Científica Compostelana (Biología)* 20: 1-9. (in Spanish, with English summary) ["In this work, the results of the study of the water quality of the Furnia River (Pon-tevedra, NW Spain) using the aquatic macroinvertebrate (including Odonata) assemblages are presented. Semi-quantitative surveys were carried out in autumn of 2007 and spring of 2008, and different indices based on these assemblages (abundance, richness, EPT, IASPT, Shannon-Wiener, IBMWP and % of feeding groups) were calculated. Several environmental variables that complemented the biological data were also measured. Although the indices decreased slightly along the water course, the results indicate a very good water quality of the Furnia River and a very diverse community of aquatic macroinvertebrates that must be conserved." (Authors) Taxa are treated at family level.] Address: Pérez Bilbao, Amaia, Depto de Ecología y Biología Animal, Campus Universitario As Lagoas- Marcosende Facultad de Biología, Univ. de Vigo, 36310 Vigo, Spain. E-mail: amaia@uvigo.es

12784. Peters, J.; Hettiarachichi, R. (2013): Visual motif patterns in separation spaces. *Theory and Applications of Mathematics & Computer Science* 3(2): 36-58. (in

English) ["This article introduces descriptive separation spaces useful in the discovery of what are known as motif patterns. The proposed approach presents the separation axioms in terms of descriptive proximities. Asymmetries arise naturally in the form of the separation of neighbourhoods of descriptively distinct points in what are known as Leader uniform topological spaces. A practical application of the proposed approach is given in terms of visual motif patterns, identification of nearness structures and pattern stability analysis in digital images." (Authors) On pages 45-47, *Aeshna* sp. is used to demonstrate the mathematical processing of image analysis.] Address: Peters, J., Computational Intelligence Lab., Univ. of Manitoba, Winnipeg, Manitoba R3T 5V6 Canada. E-mail: james.peters3@ad.umanitoba.ca

12785. Petrulevicius, J.F. (2013): Palaeoenvironmental and palaeoecological implications from body fossils and ovipositions of Odonata from the Eocene of Patagonia, Argentina. *Terrestrial Arthropod Reviews* 6(1-2): 53-60. (in English) ["Odonata are beginning to be well recorded in the Eocene of Patagonia, Argentina. They are represented by body fossils and traces in three localities. Oviposition scars are recorded in Río Pichileufú (Lutetian: 47.7 Ma; Río Negro province) and Laguna del Hunco (Ypresian: 52.2 Ma; Chubut province), nymphs in Confluencia (Ypresian; Río Negro), and adults (wings) in Laguna del Hunco. The absence of different stages in given localities could depend on different factors, such as as environmental, taphonomical and/or sampling bias. Laguna del Hunco is well sampled and the absence of nymphs seems to depend on taphonomical factors since there are other preimaginal aquatic inhabitants of the lake, such as Trichoptera nymph cases. Confluencia has not been well sampled and adults could be absent due to a sampling bias. The nymphs of Confluencia indicate a water body with low energy flux. Ovipositions in Laguna del Hunco and Río Pichileufú are made on terrestrial leaves of bushes and trees and have three different morphologies. Leaves are interpreted to be alive when oviposition was done as they show tissue reactions associated to the injuries. Wrinkled wings at Laguna del Hunco are interpreted to be signals of predation probably by birds or mammals." (Author)] Address: Petrulevicius, J.F., División Paleozoología Invertebrados, Museo de La Plata-UNLP-CONICET Paseo del Bosque s/n, La Plata (1900), Buenos Aires, Argentina, e-mail: levicius@fcnym.unlp.edu.ar

12786. Pouilly, M.; Rejas, D.; Perez, T.; Duprey, J.-L.; Molina, C.; Hubas, C.; Guimaraes, J.R.D. (2013): Trophic structure and mercury biomagnification in tropical fish assemblages, Iténez River, Bolivia. *PLoS ONE* 8(5): e65054. doi:10.1371/journal.pone.0065054: 9 pp. (in English) ["We examined mercury concentrations in three fish assemblages to estimate biomagnification rates in the Iténez main river, affected by anthropogenic activities, and two unperturbed rivers from the Iténez

basin, Bolivian Amazon. Rivers presented low to moderate water mercury concentrations (from 1.25 ng L⁻¹ to 2.96 ng L⁻¹) and natural differences in terms of sediment load. Mercury biomagnification rates were confronted to trophic structure depicted by carbon and nitrogen stable isotopes composition ($\delta^{15}\text{N}$; $\delta^{13}\text{C}$) of primary trophic sources, invertebrates and fishes. Results showed a slight fish contamination in the Iténez River compared to the unperturbed rivers, with higher mercury concentrations in piscivore species (0.15 $\mu\text{g g}^{-1}$ vs. 0.11 $\mu\text{g g}^{-1}$ in the unperturbed rivers) and a higher biomagnification rate. Trophic structure analysis showed that the higher biomagnification rate in the Iténez River could not be attributed to a longer food chain. Nevertheless, it revealed for the Iténez River a higher contribution of periphyton to the diet of the primary consumers fish species; and more negative $\delta^{13}\text{C}$ values for primary trophic sources, invertebrates and fishes that could indicate a higher contribution of methanotrophic bacteria. These two factors may enhance methylation and methyl mercury transfer in the food web and thus, alternatively or complementarily to the impact of the anthropogenic activities, may explain mercury differences observed in fishes from the Iténez River in comparison to the two other rivers." (Authors)] Address: Pouilly, M., Institut de Recherche pour le Développement - UMR Borea- Biologie des Organismes et des Ecosystèmes Aquatiques (MNHN, CNRS, IRD, UPMC), Paris, France. E-mail: pouilly@ird.fr

12787. Preston, D.L.; Orlofske, S.A.; Lambden, J.P.; Johnson, P.T.J. (2013): Biomass and productivity of trematode parasites in pond ecosystems. *Journal of Animal Ecology* 82(3): 509-517. (in English) ["Ecologists often measure the biomass and productivity of organisms to understand the importance of populations and communities in the flow of energy through ecosystems. Despite the central role of such studies in the advancement of freshwater ecology, there has been little effort to incorporate parasites into studies of freshwater energy flow. This omission is particularly important considering the roles that parasites sometimes play in shaping community structure and ecosystem processes. Using quantitative surveys and dissections of over 1600 aquatic invertebrate and amphibian hosts, we calculated the ecosystem-level biomass and productivity of trematode parasites alongside the biomass of free-living aquatic organisms in three freshwater ponds in California, USA. Snails and amphibian larvae, which are both important intermediate trematode hosts, dominated the dry biomass of free-living organisms across ponds (snails = 3.2 g m⁻²; amphibians = 3.1 g m⁻²). An average of 33.5% of mature snails were infected with one of six trematode taxa, amounting to a density of 13 infected snails m⁻² of pond substrate. Between 18% and 33% of the combined host and parasite biomass within each infected snail consisted of larval trematode tissue, which collectively accounted for 87% of the total trematode biomass within the three ponds. Mid-summer

trematode dry biomass averaged 0.10 g m², which was equal to or greater than that of the most abundant insect orders (Coleoptera = 0.10 g m², Odonata = 0.08 g m², Hemiptera = 0.07 g m² and Ephemeroptera = 0.03 g m²). On average, each trematode taxon produced between 14 and 1660 free-swimming larvae (cercariae) infected snail-1 24 h⁻¹ in mid-summer. Given that infected snails release cercariae for 3–4 months a year, the pond trematode communities produced an average of 153 mg m² yr⁻¹ of dry cercarial biomass (range = 70–220 mg m² yr⁻¹). Our results suggest that a significant amount of energy moves through trematode parasites in freshwater pond ecosystems, and that their contributions to ecosystem energetics may exceed those of many free-living taxa known to play key roles in structuring aquatic communities." (Authors)] Address: Preston, D.L., Department of Ecology and Evolutionary Biology, University of Colorado, Boulder, Colorado, USA. E-mail: daniel.preston@colorado.edu

12788. Pukhnarevich, D.A. (2013): Zoobenthos in the lower reaches of the Oka river. *Bulletin of the Lobachevsky State University of Nizhny Novgorod* 1(1): 128-135. (in Russian, with English summary) [oas 38;The bottom dwelling benthos of River Oka, the largest right tributary of the Volga (European part of Russia), includes *Chalcolestes viridis* and *Aeshna* sp.] Address: Pukhnarevich, D.A. E-mail: ecotox@mail.ru

12789. Qin, C.; Zhang, Y.; Yu, H.; Wang, B. (2013): Concordance among different aquatic insect assemblages and the relative role of spatial and environmental variables. *Biodiversity Science* 21(3): 326-333. (in Chinese, with English summary) ["Indicator groups are often used for biodiversity monitoring and conservation, however, the effectiveness of these groups in representing biodiversity is rarely tested. To explore community congruence among different aquatic insect groups and how this may be affected by spatial factors and environmental variables, we carried out an investigation on aquatic insects in April 2010 in 21 headwater streams within the Dongtiaoxi Basin, China. In total, we recorded 130 species from 92 genera, 44 families and 7 orders. We divided the stream insects into three groups, Coleoptera (C), Ephemeroptera + Plecoptera + Trichoptera (EPT), and Diptera + Megaloptera + Odonata (DMO). In Mantel tests, three aquatic insect groups showed significant cross-taxon concordance, C versus EPT ($r = 0.65$, $P < 0.001$), C versus DMO ($r = 0.67$, $P < 0.001$) and EPT versus DMO ($r = 0.82$, $P < 0.001$). According to variance partitioning procedures, environmental variables were the major determinants of aquatic insect community structures, while spatial factors were less important. Species composition in different taxon groups exhibited similar relationships to environmental gradients. Altitude, pH, mean velocity and concentration of oxygen were the most important drivers of aquatic insect assemblage patterns. Overall, our results indicated that, at least in the studied region, community

congruence among different aquatic insect groups was strong. We propose that one group, such as the EPT group, may be used as a biodiversity indicator in future cost-effective surveys." (Authors)] Address: Wang, B., Laboratory of Aquatic Insects and Stream Ecology, Dept of Entomology, Nanjing Agricultural Univ., Nanjing 210095, China. E-mail: wangbeixin@njau.edu.cn

12790. Ragaie, M.; Sabry, A.H. (2013): Insect wings as a solar cell system. *International Journal of Open Scientific Research* 1(3): 10-26. (in English) ["This work demonstrated that most flying insect species use their wings pigment to absorb light and reemits this light as fluorescence. *Orthetrum brunneum* [the species figured in the paper is *Anax ephippiger*]; seven-spotted lady beetle, *Coccinella septempunctata*; *Pentodon bispinosus* (Coleoptera) and sphingid moth, *Acherontia styx* were studied. The results showed that the yellow and black pigments which in the lady beetle adults wings have many elements such as carbon, nitrogen, oxygen, potassium, phosphor, sulphur, chloride and calcium. Magnesium, phosphor, sulphur and calcium not found in the posterior wings (which known that a membrane). The dragon fly adult also has a yellow pigment in all anterior and posterior wings. The results showed that the yellow pigment has silicon in yellow pigment except in central veins of wings. Carbon, nitrogen, oxygen, potassium, sodium and chloride were found in white grub adult wings. The adult of sphingid moth (which have yellow and black pigment in anterior and posterior wings) has silicon, aluminum and chloride which known as the main component in solar cell system. These elements were found in the yellow pigment in the anterior wings. Silicon and chloride not found in the black pigment in the adult wings. Data cleared that the flying insects use the colour in their wings as a solar system to generate the power. This mechanism can be used as an alternative source of energy in nature." (Authors)] Address: Ragaie, M., Pests and Plant Protection Department, National Research Center, Dokki, Giza, Egypt. E-mail: kazafyhassan@yahoo.com

12791. Rajabi, H.; Darvizeh, A. (2013): Experimental investigations of dragonfly wings functional morphology. *Chinese Phys. B* 22(8) 088702: 8 pp. (in English) ["Nowadays, the importance of identifying the dragonfly flight mechanism, as an inspiration for designing flapping wing vehicles, is well known. Experimental approach to understanding the complexities of the insect wings, as organs of flight, could provide significant outcomes for designing purposes. In this paper, a comprehensive investigation is carried out on the morphological and microstructural features of dragonfly wings. Scanning electron microscopy (SEM) and tensile testing are used to experimentally verify the functional roles of different parts of the wings. A number of SEM images of the wing elements such as nodus, leading edge, trailing edge, and vein sections, which play dominant roles in strengthening the whole structure, are presented. The

results from the tensile tests indicate that the nodus might be the critical region of the wings subjected to high tensile stresses. Considering the patterns of the longitudinal corrugations of the wings obtained in this paper, it can be supposed that they increase the load-bearing capacity, giving the wings an ability to tolerate dynamic loading conditions. In addition, it may be suggested that the longitudinal veins, leading, and trailing edges are structural mechanisms to further improve fatigue resistance by providing higher fracture toughness, preventing crack propagation, and allowing the wings to sustain a significant amount of damage without loss of strength." (Authors)] Address: Rajabi, H., Dept of Mechanical Engineering, Faculty of Engineering, The University of Guilan, Rasht, Iran. E-mail: harajabi@ahr.ac.ir

12792. Rákósy, L.; Heiser, M.; Mancu, C.-O.; Schmitt, T. (2013): Strong divergences in regional distributions in Romania: recent ecological constraints in dragonflies (Odonata) versus ancient biogeographical patterns in butterflies (Lepidoptera: Rhopalocera). *Insect Conservation and Diversity* 6(2): 145-154. (in English) ["(1.) While the biogeographical structuring of Europe as a whole is already relatively well understood, patterns at the more regional scale are still poorly explored. Especially the influence of differing ecological demands among species groups on regional distribution patterns is mostly unresolved. Therefore, we compare the distributions of strictly terrestrial butterflies with those of semi-aquatic dragonflies. (2.) We analysed a regionalised distribution of the 196 butterfly and 68 dragonfly taxa of Romania with cluster analyses and principal component analyses, and worked out the different faunal regions and faunal elements for this country. (3.) We obtained a clear regional structuring for the butterflies (e.g. Transylvanian Basin, Carpathians, SE Romania, W/SW Romania), but only a vertical structuring in the dragonflies from the Danube lowlands to the elevations of the Carpathians. (4.) This structure implies a recent distribution trigger based on ecological and climatic constraints in dragonflies with water and energy availability being of high importance. (5.) The more ancient biogeographical pattern in butterflies reflects the different biogeographical elements of Europe and the connections of the Carpathian regions to the Balkan Peninsula and the Eastern European steppes, with energy being of considerably higher importance for butterfly occurrences than water availability." (Authors)] Address: Schmitt, T., Biogeographie, Fachbereich VI, Gebäude N, Raum 303, Universität Trier, D-54286 Trier, Germany. E-mail: thsh@uni-trier.de

12793. Riva-Murray, K.; Bradley, P.M.; Chasar, L.C.; Button, D.T.; Brigham, M.E.; Scudder Eikenberry, B.C.; Journey, C.A.; Lutz, M.A. (2013): Influence of dietary carbon on mercury bioaccumulation in streams of the Adirondack Mountains of New York and the Coastal Plain of South Carolina, USA. *Ecotoxicology* 22: 60-71. (in English) ["We studied lower food webs in streams of

two mercury-sensitive regions to determine whether variations in consumer foraging strategy and resultant dietary carbon signatures accounted for observed within-site and amongsite variations in consumer mercury concentration. We collected macroinvertebrates (primary consumers and predators [including Aeshnidae and Libellulidae]) and selected forage fishes from three sites in the Adirondack Mountains of New York, and three sites in the Coastal Plain of South Carolina, for analysis of mercury (Hg) and stable isotopes of carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$). Among primary consumers, scrapers and filterers had higher MeHg and more depleted $\delta^{13}\text{C}$ than shredders from the same site. Variation in $\delta^{13}\text{C}$ accounted for up to 34 % of within-site variation in MeHg among primary consumers, beyond that explained by $\delta^{15}\text{N}$, an indicator of trophic position. Consumer $\delta^{13}\text{C}$ accounted for 10 % of the variation in Hg among predatory macroinvertebrates and forage fishes across these six sites, after accounting for environmental aqueous methylmercury (MeHg, 5 % of variation) and base-N adjusted consumer trophic position ($D\delta^{15}\text{N}$, 22 % of variation). The $\delta^{13}\text{C}$ spatial pattern within consumer taxa groups corresponded to differences in benthic habitat shading among sites. Consumers from relatively more-shaded sites had more enriched $\delta^{13}\text{C}$ that was more similar to typical detrital $\delta^{13}\text{C}$, while those from the relatively more-open sites had more depleted $\delta^{13}\text{C}$. Although we could not clearly attribute these differences strictly to differences in assimilation of carbon from terrestrial or inchannel sources, greater potential for benthic primary production at more open sites might play a role. We found significant variation among consumers within and among sites in carbon source; this may be related to within-site differences in diet and foraging habitat, and to among-site differences in environmental conditions that influence primary production. These observations suggest that different foraging strategies and habitats influence MeHg bioaccumulation in streams, even at relatively small spatial scales. Such influence must be considered when selecting lower trophic level consumers as sentinels of MeHg bioaccumulation for comparison within and among sites." (Authors)] Address: Riva-Murray, Karen, U.S. Geological Survey, 425 Jordan Road, Troy, NY 12180, USA. E-mail: krmurray@usgs.gov

12794. Roland, H.-J.; Stübing, S.; Holtzmann, J.; von Blanckenhagen, B.; Hill, B.T.; Seehausen, M. (2013): Aktuelle Verbreitungskarten auf Grundlage von Daten der Jahre 2007 bis 2012. Libellen in Hessen - Supplement 1: 74 pp. (in German) [Hessen, Germany; on the base of 48,391 data sets, distribution maps for the 60 regional Odonata species are compiled.] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: Hjuergenroland@aol.com

12795. Rosça, I.; Gherghel, I.; Strugariu, A.; Zamfirescu, S.R. (2013): Feeding ecology of two newt species (*Triturus cristatus* and *Lissotriton vulgaris*) during the repro-

duction season. Knowledge and Management of Aquatic Ecosystems (2013) 408, 05: 5 pp. (in English, with French summary) ["The aim of this study was to provide an in-depth survey of feeding ecology and trophic interactions of two syntopic newt species (*Triturus cristatus* and *Lissotriton vulgaris*) inhabiting aquatic breeding habitats from the eastern Romanian Carpathian Mountains. We sampled 736 individuals from both species. The trophic spectrum was based mostly on Asselidae (>30%). Our results show that both species may be considered generalists because their niche breadth is higher than 0.5, with largely overlapping trophic niches (>70%), which may indicate food competition." (Authors) Only in 1999, 1.05% of 186 analysed stomachs of *Lissotriton vulgaris* contained Coenagrionidae.] Address: Gherghel, I., Dept of Zoology, Oklahoma State University, 501 Life Sciences West, 74078 Stillwater, Oklahoma, USA. E-mail: iulian.gherghel@okstate.edu

12796. Rudolf, V.H.W.; Rasmussen, N.L. (2013): Ontogenetic functional diversity: Size-structure of a keystone predator drives functioning of a complex ecosystem. Ecology 94(5): 1046-1056. (in English) ["A central challenge in community ecology is to understand the connection between biodiversity and the functioning of ecosystems. While traditional approaches have largely focused on species-level diversity, increasing evidence indicates that there exists substantial ecological diversity among individuals within species. By far, the largest source of this intraspecific diversity stems from variation among individuals in ontogenetic stage and size. Although such ontogenetic shifts are ubiquitous in natural communities, whether and how they scale up to influence the structure and functioning of complex ecosystems is largely unknown. Here we take an experimental approach to examine the consequences of ontogenetic niche shifts for the structure of communities and ecosystem processes. In particular we experimentally manipulated the stage-structure in a keystone predator, larvae of the dragonfly *Anax junius*, in complex experimental pond communities to test whether changes in the population stage/size-structure of a keystone species scale up to alter community structure and ecosystem processes, and how functional differences scale with relative differences in size among stages. We found that the functional role of *A. junius* was stage specific. Altering what stages were present in a pond lead to concurrent changes in community structure, primary producer biomass (periphyton and phytoplankton), and ultimately altered ecosystem processes (respiration and net primary productivity), indicating a strong, but stage-specific trophic cascade. Interestingly the stage-specific effects did not simply scale with size or biomass of the predator, but instead indicated clear ontogenetic niche shifts in ecological interactions. Thus, functional differences among stages within a keystone species scaled up to alter the functioning of entire ecosystems. Therefore, our results indicate that the classical approach of assuming an average functional role of

a species can be misleading because functional roles are dynamic and will change with shifts in the stage-structure of the species. In general this emphasizes the importance of accounting for functional diversity below the species level to predict how natural and anthropogenic changes alter the functioning of natural ecosystems." (Authors)] Address: Rudolf, V., Rice University, Department of Ecology & Evolutionary Biology. E-mail: volker.rudolf@rice.edu

12797. Sanchez, A.B. (2013): Odonatological conference at Natural park "Los Alcornocales", Cádiz, España. Zygonyx 1: 14-15. (in Spanish) [UTM-grid 30STF60; 9-VI-2012; checklist of 18 species observed.] Address: Bernal Sánchez, A. E-mail: arturolibelula@gmail.com

12798. Sánchez-Guillén, R.A.; Hammers, M.; Hansson, B.; Van Gossum, H.; Cordero-Rivera, A.; Galicia Mendoza, D.I.; Wellenreuther, M. (2013): Ontogenetic shifts in male mating preference and morph-specific polyandry in a female colour polymorphic insect. BMC Evolutionary Biology 2013, 13:116 doi:10.1186/1471-2148-13-116: 11 pp. (in English) ["Background: Sexual conflict over mating rates may favour the origin and maintenance of phenotypes with contrasting reproductive strategies. The damselfly *Ischnura elegans* is characterised by a female colour polymorphism that consists of one androchrome and two gynochrome female morphs. Previous studies have shown that the polymorphism is genetic and to a high extent maintained by negative frequency-dependent mating success that varies temporally and spatially. However, the role of learning in male mating preferences has received little attention. We used molecular markers to investigate differences in polyandry between female morphs. In addition, we experimentally investigated innate male mating preferences and experience-dependent shifts in male mating preferences for female morphs. Results: Field and molecular data show that androchrome females were less polyandrous than gynochrome females. Interestingly, we found that naïve males showed significantly higher sexual preferences to androchrome than to gynochrome females in experimental trials. In contrast, experienced males showed no preference for androchrome females. Conclusions: The ontogenetic change in male mate preferences occurs most likely because of learned mate recognition after experience with females, which in this case does not result in a preference for one of the morphs, but rather in the loss of an innate preference for androchrome females." (Authors)] Address: Sánchez-Guillén, Rosa Ana, Departamento de Ecología e Biología animal, Grupo de Ecología Evolutiva e da Conservación, Universidade de Vigo EUET Forestal, Campus de Pontevedra, Pontevedra 36005, Spain. E-mail: rguillen@uvigo.es

12799. Sanford, M.R.; Ramsay, S.; Cornel, A.J.; Marsden, C.D.; Norris, L.C.; Patchoke, S.; Fondjo, E.; Lanzaro, G.C.; Lee, Y. (2013): A preliminary investigation of

the relationship between water quality and *Anopheles gambiae* larval habitats in western Cameroon. *Malaria Journal* 2013, 12:225: 8 pp. (in English) ["Background: Water quality and anopheline habitat have received increasing attention due to the possibility that challenges during larval life may translate into adult susceptibility to malaria parasite infection and/or insecticide resistance. Methods: A preliminary study of *Anopheles gambiae* s.s. larval habitats in the north-west and south-west regions of Cameroon was conducted in order to detect associations between *An. gambiae* s.s. molecular form and 2La inversion distributions with basic water quality parameters. Water quality was measured by temperature, pH, conductivity, total dissolved solids (TDS) at seven sites in Cameroon and one site in Selinkenyi, Mali. Results: Principal components and correlation analyses indicated a complex relationship between 2La polymorphism, temperature, conductivity and TDS. Cooler water sites at more inland locations yielded more S form larvae with higher 2La inversion polymorphism while warmer water sites yielded more M form larvae with rare observations of the 2La inversion. Discussion: More detailed studies that take into account the population genetics but also multiple life stages, environmental data relative to these life stages and interactions with both humans and the malaria parasite may help us to understand more about how and why this successful mosquito is able to adapt and diverge, and how it can be successfully managed. ... There were no known predatory insects observed in the pools the mosquitoes were collected from at the time of collections. No beetles, dragonfly nymphs or aquatic hemipterans were observed. However, it is possible that predatory mosquito larvae may have been present as they would have been impossible to differentiate by sight. However, no predatory mosquito larvae were collected in the reared and preserved samples. The correlation between the larval sex ratio and temperature was not statistically significant ($\chi^2 = 11.433$, d.f. = 6, $P = 0.076$)."] (Authors)] Address: Lee, Y., Vector Genetics Laboratory, School of Veterinary Medicine, Univ. of California, Davis, CA, USA. E-mail: yoslee@ucdavis.edu

12800. Santos, J.M.; Encina, L.; Oliveira, J.M.; Teixeira, A. (2013): Feeding ecology of the Ruivaco *Achondrostoma oligolepis*, a Portuguese endemic cyprinid fish. *Limnetica* 32(1): 27-38. (in English, with Spanish summary) ["This study assessed the feeding ecology of the *A. oligolepis*, a Portuguese endemic resident cyprinid fish whose dietary habits are virtually unknown. Samples were taken seasonally in three medium-sized rivers representing a gradient of temporality. The stomach contents of 97 individuals (42-126 mm total length, TL) were analysed. Although there was no significant overall variation in diet composition between rivers, differences were found among seasons. A broad range of food categories was identified, although a smaller subset of primarily detritus (77.6 %) and plant material (18.4 %) constituted the base diet. Of the animal prey,

Coleoptera and Diptera were the most prevalent, occurring in 13.2 % and 9.8 % of the fish, respectively, and were consumed mainly in the spring. Based on the observed diet composition and feeding strategy, *A. oligolepis* could be considered a generalist, foraging on the most abundant and available prey." (Authors) Gomphidae and Aeshnidae contributed to the food of *A. oligolepis*.] Address: Santos, J.M., Centro de Estudos Florestais, Instituto Superior de Agronomia, Universidade Técnica de Lisboa, 1349-017 Lisboa, Portugal. E-mail: jmsantos@isa.utl.pt

12801. Sasamoto, A.; Do, C.; Van, L.V. (2013): Discovery of a new species of the genus *Planaeschna* from Northern Vietnam, with a first description of male *P. tomokunii*. *Zootaxa* 3652(5): 587-594. (in English) ["A new species of *Planaeschna* McLachlan, *P. guentherpetersi* sp. nov. (holotype male and paratype female) from Phu Tho province, northern Vietnam, is described and illustrated. In addition, the male of *P. tomokunii* Asahina, 1996, which was known from only the holotype female, is described for the first time, based on newly collected material of both sexes, from the type locality, Tam Dao, Vinh Phuc province, northern Vietnam." (Authors)] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

12802. Schneider, T.; Schneider, J.; Seidenbusch, R. (2013): Odonata of North-Israel with a focus on the Upper Jordan Valley (Upper Galilee) - an update and a comparison between observations a quarter of a century (Odonata). *Entomologische Zeitschrift* 123(3): 129-134. (in English, with German summary) ["In May 1986, in August 1987, and in May 2010 a total of 36 species of Odonata were observed in North-Israel. This represents about 70 % of the known number of species of North-Israel. The last odonatological survey of this rapidly changing region dates from 1975, and the present status of the odonatological fauna of North-Israel is not known. Extensive water extraction and massive water pollution by sewage-waters from fish ponds, agricultural run-offs, and saline water from salt springs at the Lower Jordan River and fish farming and fish introduction are the main recent causes of the decline of several Odonata species in North-Israel. *Onychogomphus macrodon*, still found in 1986, seems now extinct from Israel and is currently restricted to the territory of Turkey, where it is also severely threatened. *Agriocnemis sania*, still present in 1986 in low numbers on the Lower Jordan, has also disappeared from North-Israel like *Brachythemis fuscopalliat*a and the endemic subspecies *Rhythemis semihyalina syriaca* and *Urothemis edwardsi hulae*." (Authors)] Address: Thomas Schneider, T., Arnold-Knoblach-Ring 76, 14109 Berlin/Wannsee, Germany. E-Mail: thomas.rs@gmx.de

12803. Schneider, W. (2013): Obituary - Robert W. (Bob) Reimer. 18 December 1953 – 25 January 2012.

Agriion 17(1): 8-9. (in English) Address: Schneider, W., Entomology II, Research Institute and Natural History Museum Senckenberg, Senckenberganlage 25, 60325 Frankfurt a.M., Germany. Email: fri.wol@t-online.de

12804. Schulte, L.M.; Schulte, R.; Lötters, S. (2013): Avoiding predation: The importance of chemical and visual cues in poison frog reproductive behaviour. *Chemical Signals in Vertebrates* 12: 309-321. (in English) ["The detection of biological signals is especially important in predator-prey systems. Anuran amphibians have evolved a remarkable diversity of defense strategies against predators, but the most risk-free is the prevention of a possible danger. This is valid for the protection of offspring as well. The Neotropical poison frog *Ranitomeya variabilis* deposits both eggs and tadpoles in phytotelmata. The exploitation of these small pools is advantageous as it lowers the risk of offspring predation compared to larger water bodies. Nonetheless, there are potential predators in these pools as well. We analysed how the parent frogs avoid conspecific cannibalistic tadpoles and damselfly larvae of the species *Microstigma rotundatum*. We compared the use of chemical and visual cues and show that *R. variabilis* avoids conspecific tadpoles for the deposition of its offspring using chemical cues, while visual tadpole models alone were not avoided by the frogs. Damselfly larvae in contrast were avoided when present, but could not be detected by chemical cues alone. We suggest that the invertebrate predators mask their chemical cues, forcing the frogs to use other senses to detect them." (Authors)] Address: Schulte, Lisa, Department of Biogeography, Trier University, Universitätsring 15, 54286, Trier, Germany. E-mail: s6laschu@uni-trier.de

12805. Scott, M.A.; Scott, W.J. (2013): Reports from coastal stations - 2012: Longstone Centre, St Mary's, Isles of Scilly. *Atropos* 48: 43. (in English) [UK; 11-VIII-2012, *Sympetrum fonscolombii*] Address: not stated

12806. Sechler, D.R.; Phelps, Q.E.; Tripp, S.J.; Garvey, E.J.; Herzog, D.P.; Ostendorf, D.E.; Ridings, J.W.; Crites, J.W.; Hrabik, R.A. (2013): Effects of river stage height and water temperature on diet composition of year-0 sturgeon (*Scaphirhynchus* spp.): a multi-year study. *J. Appl. Ichthyol.* 29: 44-50. (in English) [Mississippi, USA; Odonata play a minor role in diet of year-0 *Scaphirhynchus* sturgeons.] Address: Sechler, D.R., Fisheries and Illinois Aquaculture Center, Dept of Zoology, Southern Illinois University, Carbondale, IL, USA

12807. Seymour, R.S.; Matthews, P.G.D. (2013): Physical gills in diving insects and spiders: theory and experiment. *J. Exp. Biol.* 216: 164-170. (in English) ["Insects and spiders rely on gas-filled airways for respiration in air. However, some diving species take a tiny air-store bubble from the surface that acts as a primary O₂ source and also as a physical gill to obtain dissolved O₂ from the water. After a long history of modelling, recent work with O₂-

sensitive optodes has tested the models and extended our understanding of physical gill function. Models predict that compressible gas gills can extend dives up to more than eightfold, but this is never reached, because the animals surface long before the bubble is exhausted. Incompressible gas gills are theoretically permanent. However, neither compressible nor incompressible gas gills can support even resting metabolic rate unless the animal is very small, has a low metabolic rate or ventilates the bubble's surface, because the volume of gas required to produce an adequate surface area is too large to permit diving. Diving-bell spiders appear to be the only large aquatic arthropods that can have gas gill surface areas large enough to supply resting metabolic demands in stagnant, oxygenated water, because they suspend a large bubble in a submerged web." (Authors)] The paper includes a passing reference to Odonata] Address: Seymour, R.S., Ecology & Evolutionary Biology, Univ. of Adelaide, Adelaide, SA 5005, Australia. E-mail: roger.seymour@adelaide.edu.au

12808. Shanku, A.G.; McPeck, M.A.; Kern, A.D. (2013): Functional annotation and comparative analysis of a zygopteran transcriptome. *G3 - Genes, Genomes, Genetics* 3: 763-770. (in English) ["In this paper we present a de novo assembly of the transcriptome of the damselfly, *Enallagma hageni*, through the use of 454 pyrosequencing. *E. hageni* is a member of the suborder Zygoptera within the order Odonata, and the Odonata are the basal lineage of the winged insects (Pterygota). To date, sequence data used in phylogenetic analysis of *Enallagma* species have been derived from either mtDNA or ribosomal nuclear DNA. This transcriptome contained 31,661 contigs that were assembled and translated into 14,813 individual open reading frames. Using these data, we constructed an extensive dataset of 634 orthologous nuclear protein-coding genes across 11 species of Arthropoda, and used Bayesian techniques to elucidate *Enallagma*'s place in the Arthropod phylogenetic tree. Additionally, we demonstrate that the *Enallagma* transcriptome contains 169 genes that are evolving at rates that differ relative to the rest of the transcriptome (29 accelerated and 140 decreased), and through multiple Gene Ontology searches and clustering methods, we present the first functional-annotation of any palaeopteran's transcriptome in the literature." (Authors)] Address: Shanku, A.G., Rutgers, The State University of New Jersey, Department of Genetics, Nelson Bio Labs-B416, 604 Allison Road, Piscataway, NJ 08854-8082. E-mail: alexander.shanku@rutgers.edu

12809. Shih, Y.T.; Ko, C.C.; Pan, K.T.; Lin, S.C.; Polaszek, A. (2013): *Hydrophylita* (*Lutzimicron*) *emporos* Shih & Polaszek (Hymenoptera: Trichogrammatidae) from Taiwan, parasitising eggs, and phoretic on adults, of the damselfly *Psolodesmus mandarinus mandarinus* (Zygoptera: Calopterygidae). *PLOS ONE* 8(7) e69331: 10 pp. (in English) ["*Hydrophylita emporos* n. sp. reared from eggs of *P. mandarinus* in Taiwan is described. This

is the first species of *Hydrophylita* to be described from the Old World, and the first record of phoresy in the genus. Adult females were observed aggregating at the base of the female damselfly's abdomen. When the damselfly begins ovipositing, females move to the tip of the abdomen, enter the water and quickly locate eggs for parasitising. The article contains links to video footage of this process." (Authors)] Address: Polaszek, A., Department of Life Sciences, Natural History Museum, London, UK. E-mail: ap@nhm.ac.uk

12810. Sidagyte, E.; Višinskiene, G.; Arbaciauskas, K. (2013): Macroinvertebrate metrics and their integration for assessing the ecological status and biocontamination of Lithuanian lakes. *Limnologica - Ecology and Management of Inland Waters* 43(4): 308-318. (in English) ["We present an assessment system for determining the ecological status (eutrophication and land use pressures) and non-indigenous macroinvertebrate species (NIMS) specific deviation from naturalness of Lithuanian lakes, using semi-quantitative sampling of littoral macroinvertebrates. This system includes two integrated indices, the multimetric Lithuanian Lake Macroinvertebrate Index (LLMI) and the Fauna Autochthony Index (FAI). The LLMI, developed for the assessment of ecological status, averages four metrics: the conventional Average Score Per Taxon (ASPT) and the first Hill's number (H1), as well as the newly validated number of Coleoptera, Ephemeroptera and Plecoptera taxa (#CEP) and the proportion of Coleoptera, Odonata and Plecoptera individuals (COP). Furthermore, the metrics of biocontamination were transformed into the WFD-compliant FAI for the NIMS-specific naturalness evaluation. The LLMI had significant correlations with total phosphorus, total nitrogen, chlorophyll a, biochemical oxygen demand, water transparency, the morphoindex and the combined trophomorphoindex. Relationships between the LLMI or its core metrics and biocontamination were not found; thus the LLMI and the FAI are not interdependent and have the advantage of separately accounting for pressures requiring different management techniques. Variation of the LLMI and the FAI did not differ between stony/pebbly and vegetated littoral mesohabitats suggesting that any of the mesohabitats or a multihabitat sampling technique can be suitable for a reliable evaluation of lake status. Aquatic beetles revealed themselves as good indicators of the trophic status, while caddisflies and conventional macroinvertebrate metrics ETO and EPT proved unworkable. The ineffectiveness of the latter metrics may be due to the relatively low trophic level in most of the studied lakes which resulted in an increment of caddisfly metrics with an increase of nutrient loads, as well as due to the susceptibility of caddisflies to the invasive species, the zebra mussel *Dreissena polymorpha* and amphipod *Pontogammarus robustoides*." (Authors)] Address: Šidagyte, E., Nature Research Centre, Akademijos St. 2, LT-08412 Vilnius, Lithuania. E-mail: e.sidagyte@gmail.com

12811. Singh, V.; Banyal, H.S. (2013): Odonate fauna of Khahhiar lake (Mini Switzerland) of Chamba district of Himachal Pradesh, India. *The Bioscan* 8(1): 281-287. (in English) [Between June 2008 and March 2012, 10 Odonata species were recorded.] Address: Singh, V., Dept of Biosciences, Himachal Pradesh Univ., Shimla - 171 005 (H.P.) India. E-mail: proliferate@yahoo.com

12812. Smetanin, A.N. (2013): On the insect fauna of the Kichiga river basin, northeastern Kamchatka. *Entomological Review* 93(2): 160-173. (in English) [189 species of insects from 55 families and 9 orders were found in the Kichiga River basin, northeastern Kamchatka Peninsula in 1987–1994. The list includes the following Odonata taxa: *Coenagrion johanssoni*, *Enallagma antiquum* (Belyshev, 1955; synonym of *Coenagrion hylas* or *johanssoni*?) *Aeshna juncea brachystigma* Sjöstedt, *A. coerulea*, *A. subarctica*, *Somatochlora arctica*, and *S. sahlbergi*.] Address: Smetanin, A.N., Russian State University of Tourism and Service, Kamchatka Branch, Petropavlovsk-Kamchatsky, Russia

12813. Smith-Patten, B.D.; Patten, M.A. (comp.) (2013): A checklist of Oklahoma Odonata (Dragonflies and Damselflies). Oklahoma Biological Survey, University of Oklahoma. leaflet: 2 pp. (in English) [State total: 161 species (14 June 2013); <http://www.biosurvey.ou.edu/patten/Oklahoma%20Odonata%20checklist%20revised%2014%-20June%202013.pdf>] Address: Smith-Patten, Brenda, Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma 73072, USA. E-mail: argia@ou.edu

12814. Smolinský, R.; Gvoždík, L. (2013): Does developmental acclimatization reduce the susceptibility to predation in newt larvae? *Biological Journal of the Linnean Society* 108(1): 109-115. (in English) ["Many organisms respond to the heterogeneity of abiotic environmental conditions by plastic modifications of their phenotypes (acclimation or acclimatization). Despite considerable research efforts in this area, the beneficial (adaptive) effect of acclimation or acclimatization is still debated. We examined whether the development of newt larvae (*Ichthyosaura alpestris*) under different natural light and thermal conditions subsequently altered their susceptibility to predation in sun-exposed versus shaded tanks in nature. During predation trials in various light and temperature conditions, newt larvae that developed in sun-exposed warmer tanks consistently suffered from higher predation by dragonfly nymphs (*Aeshna cyanea*) compared to larvae from shaded or colder tanks. We conclude that higher sun exposure during embryonic and larval development negatively affects antipredator performance even in sun-exposed tanks: this result is inconsistent with the beneficial acclimation hypothesis." (Authors)] Address: Gvoždík, L., Department of Population Biology, Institute of Vertebrate Biology AS CR, Konešín, Czech Republic. E-mail: gvozdk@brno.cas.cz

12815. Spence, B. (2013): Reports from coastal stations - 2012: Spurn Point, East Yorkshire. *Atropos* 48: 68-69. (in English) [UK; *Lestes sponsa*, *Sympetrum fonscolombii*] Address: not stated

12816. Subramanian, K.A.; Rangnekar, P.; Naik, R. (2013): *Idionyx* (Odonata: Corduliidae) of the Western Ghats with a description of a new species. *Zootaxa* 3652(2): 277-288. (in English) ["The status and distribution of *Idionyx* Hagen, 1867, of the Western Ghats, India, is updated and a new species *Idionyx goman-takensis* is described and illustrated based on male and female specimens from Kulem (=Collem), Goa, India. This new species can be differentiated from other species of *Idionyx* by long and slender cerci and epiproct, absence of teeth in the basal half of the cerci, and a tuft of golden hairs at the end of the lateral lobes of the epiproct. A revised key to the species of the genus is provided, and its diversity and ecology in the Western Ghats is discussed." (Authors)] Address: Subramanian, K.A., Zoological Survey of India, Kolkata, India-700 053. E-mail subbuka.zsi@gmail.com

12817. Subrero, E.; Poma, S.; Cucco, M. (2013): Gli Odonati come indicatori delle condizioni ambientali in aree di riqualificazione ambientale del Parco fluviale del Po. *Rivista piemontese di Storia naturale* 34: 127-146. (in Italian, with English summary) ["Odonata as bioindicators of restoration in the Po River Park.: Recently there has been an increase in environmental restoration activity aimed at restoring natural habitats in agricultural and/or degraded areas. Among the most threatened habitats the lowland wetlands show a particularly critical condition, due to human activities. In this study we used the Odonata (sampling the exuviae) as indicators of the effectiveness of environmental restoration. Our aim was to collect information about ecological succession of species in areas subject to management, and to assess the time necessary to reach the characteristics of natural wetlands. To this end, in the territory of the Po river Park (Piedmont, Italy), we compared 6 sites resulting from environmental remediation and 5 of natural origin. For each site, in May-September 2011, we collected quantitative sampling of Odonata exuviae (28 species found), qualitative surveys of prevalent aquatic plants (presence/absence), environmental physical-chemical parameters (pH, temperature, conductivity, dissolved oxygen), and we measured the cover of 16 land use categories near the sampling sites. The multivariate statistical analysis (Correspondence Analysis) showed that the Odonata population is related to the environmental condition in terms of land use and aquatic vegetation, while physical-chemical parameters were less important. The dragonfly species composition differed among sites resulting from environmental restoration, where the exuviae of *Ischnura elegans* and *Crocothemis erythraea* (pioneer species) were very abundant, and sites of natural origin, where the *C. erythraea* was absent and *I. elegans* was present in significantly small-

ler numbers, replaced by other more sensitive species. The site of Canale di Brema, characterized by lotic waters, is particularly relevant because exuviae belonging to the species *Gomphus flavipes* and *Ophiogomphus cecilia*, both included in the Habitats Directive 92/43/EEC lists, were found." (Authors)] Address: Subrero, Eerica, Università del Piemonte Orientale, DISIT, via T. Michel, 11 - 15121 Alessandria, Italy.

12818. Takahashi, Y.; Kawata, M. (2013): Alternative trait combinations and secondary resource partitioning in sexually selected color polymorphism. *Ecology and Evolution* 3(7): 2038-2046. (in English) ["Resource partitioning within a species, trophic polymorphism is hypothesized to evolve by disruptive selection when intra-specific competition for certain resources is severe. However, in this study, we reported the secondary partitioning of oviposition resources without resource competition in the damselfly *Ischnura senegalensis*. In this species, females show colour polymorphism that has been evolved as counteradaptation against sexual conflict. One of the female morphs is a blue-green (andromorph, male-like morph), whereas the other morph is brown (gynomorph). These female morphs showed alternative preferences for oviposition resources (plant tissues); andromorphs used fresh (greenish) plant tissues, whereas gynomorphs used decaying (brownish) plants tissues, suggesting that they chose oviposition resources on which they are more cryptic. In addition, the two-colour morphs had different egg morphologies. Andromorphs have smaller and more elongated eggs, which seemed to adapt to hard substrates compared with those of gynomorphs. The resource partitioning in this species is achieved by morphological and behavioural differences between the colour morphs that allow them to effectively exploit different resources. Resource partitioning in this system may be a by-product of phenotypic integration with body colour that has been sexually selected, suggesting an overlooked mechanism of the evolution of resource partitioning. Finally, we discuss the evolutionary and ecological consequences of such resource partitioning." (Authors)] Address: Takahashi, Yuma, Division of Ecology and Evolutionary Biology, Graduate School of Life Sciences, Tohoku University, Aoba, Sendai, Miyagi 980-8578, Japan. E-mail: takahashi.yum@gmail.com

12819. Takahashi, Y.; Kawata, M. (2013): A comprehensive test for negative frequency-dependent selection. *Population Ecology* 55(3): 499-509. (in English) ["Understanding the mechanisms that maintain genetic diversity within a population remains a primary challenge for evolutionary biology. Of the processes capable of maintaining variation, negative frequency-dependent selection (NFDS), under which rare phenotypes (or alleles) enjoy a high fitness advantage, is suggested to be the most powerful. However, few experimental studies have confirmed that this process operates in nature. Although a lot of suggestive evidence

has separately been provided in various polymorphic systems, these are not enough to prove the existence of NFDS in each system. Here we present a general review of NFDS and point out some problems with previous works to develop reasonable alternative research strategies for testing NFDS. In the second half of this paper, we focused on NFDS in *Ischnura senegalensis*, that shows female-limited genetic polymorphism. We show (1) the proximate causal mechanisms of the frequency-dependent process, (2) frequency-dependent inter-morph interaction, (3) rare morph advantage and (4) morph frequency oscillations in a natural population. These results provide unequivocal empirical support for NFDS in a natural system." (Authors)] Address: Takahashi, Y., Division of Ecology and Evolutionary Biology, Graduate School of Life Sciences, Tohoku University, 6-3 Aoba, Aramaki, Aoba, Sendai, Miyagi, 890-8578, Japan. E-mail: takahashi.yum@gmail.com

12820. Talucdher, R.; Shivakumar, K. (2013): Tensile properties of veins of damselfly wing. *Journal of Biomaterials and Nanobiotechnology* 4: 247-255. (in English) ["Microtension test of Costa and Radius veins of damselfly (*Lestes* sp.) wing was conducted to measure tensile strength and modulus. The specimens were classified into fresh and dry depending on when the samples were prepared and tested. Fresh samples tested immediately after extracting from the fly while the dry samples were tested one year after extraction and stored in a desiccator. Measured load-displacement response and fracture load were used to calculate modulus and strength. Field Emission Scanning Electron Microscope was used to measure the fracture morphology and cross-section of the vein. The results showed that the veins are brittle and fracture surface is flat. The average strength (232 - 285 MPa) and modulus (14 - 17 GPa) of the Costa and Radius veins were nearly same for both fresh and dry samples. The tensile modulus of the veins was 8% - 10% higher than the indentation (compressive) modulus and was nearly the same as that of human bones." (Authors)] Address: Shivakumar, K., Center for Composite Materials Research (CCMR), Department of Mechanical Engineering, North Carolina A & T State University (NC A & T SU), Greensboro, USA. E-mail: kunigal@ncat.edu

12821. Tang, H.-C.; Yeh, W.-C.; Chen, S.-L. (2013): Description of an endemic and endangered new *Sympetrum* species (Odonata: Libellulidae) from the subtropical area of Taiwan. *Zootaxa* 3693(3): 351-357. (in English) ["*Sympetrum nantouensis* sp. nov. collected from Nantou, Central Taiwan, is described and figured, with remarks on its ecology and oviposition behaviour. Judging from penile structure, it is considered to belong to the *infuscatum*-group, whose members are defined here by penile characters. In the *infuscatum*-group, *S. nantouensis* is most similar to *S. risi* Bartenev, but they are probably not very closely related to each other. *S. nantouensis* differs from *S. risi* mainly in having beak-

like cerci, well-lineated black and pale yellow pterothorax, and penile 4th segment with longer and apically upcurved cornua. This new species is distinct among its congeners in view of both biogeography and morphology because of its confined and peripheral existence and the odd shape of its cerci. All type specimens will be deposited at the Insect Collection of TFRI." (Authors)] Address: Tang, H.-C., Education Division, Taipei Zoo, Taipei, Taiwan. E-mail: tgx02@zoo.gov.tw

12822. Theischinger, G.; Richards, S.J. (2013): *Hylaeargia simplex* spec. nov., a third species of *Hylaeargia* Lieftinck from New Guinea (Zygoptera: Platycnemididae). *Odonatologica* 42(2): 157-161. (in English) ["The new species is described from the upper Sepik Basin. Holotype male: Papua New Guinea, West Sepik Prov., 30-XI-2009; deposited in the Museum & Art Gallery of the Northern Territory, Darwin, Australia. The adults of both sexes are illustrated, habitat conditions are given, and the affinities of the new species are discussed." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

12823. Torralba-Burrial, A.; da Silva, G.; Rodríguez-Martínez, S.; Menéndez, D.; García-García, I.; Fernández-González, A.; Fernández-Menéndez, D. (2013): Las comunidades de libélulas de la cuenca media-alta del río Tâmega (NE Portugal) (Insecta: Odonata). *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)* 52: 173-190. (in Spanish, with English and Portuguese summaries) ["The Odonata communities of the upper-middle basin of the Tâmega river (Portugal) were analysed by sampling of adults and exuviae in 2010 and 2011. Thirty-seven dragonfly species were found, which account for half of those known from the Iberian Peninsula and 60% of the Portuguese species. The most frequent species in the area were *Calopteryx virgo*, *Cordulegaster boltonii*, *Boyeria irene*, *Anax imperator*, *Pyrrhosoma nymphula*, *Platycnemis latipes*, *Onychogomphus uncatatus*, *Calopteryx xanthostoma* and *Orthetrum coerulescens*. Furthermore, large populations of *Macromia splendens*, *Oxygastra curtisii* and *Gomphus graslinii*, protected species included in Habitats Directive, were frequent in the area. *Coenagrion mercuriale*, another protected species, presented a more restricted distribution in the study area." (Authors)] Address: Torralba-Burrial, A., Cluster de Energía, Medioambiente y Cambio Climático, Campus de Excelencia Internacional, Universidad de Oviedo, Spain. E-mail: antoniotb@gmail.com

12824. Torralba-Burrial, A.; Ocharan, F.J. (2013): Iberian Odonata distribution: data of the BOS Arthropod Collection (University of Oviedo, Spain). *ZooKeys* 306: 37-58. (in English) ["Odonata are represented from the Iberian Peninsula by 79 species. However, there exists a significant gap in accessible knowledge about these species, especially regarding their distribution. This data paper describes the specimen-based Odonata data

of the Arthropod Collection of the Department of Biología de Organismos y Sistemas (BOS), University of Oviedo, Spain. The specimens were mainly collected from the Iberian Peninsula (98.63% of the data records), especially the northern region. The earliest specimen deposited in the collection dates back to 1950, while the 1980's and 2000's are the best-represented time periods. Between 1950 and 2009, 16,604 Odonata specimens were deposited and are documented in the dataset. Approximately 20% of the specimens belong to the families Coenagrionidae and Calopterygidae. Specimens include the holotype and paratypes of the Iberian subspecies *Calopteryx haemorrhoidalis asturica* Ocharan, 1983 and *Sympetrum vulgatum ibericum* Ocharan, 1985. The complete dataset is also provided in Darwin Core Archive format." (Authors)] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonio@b@hotmai.com

12825. Tunmore, M. (2013): Reports from coastal stations - 2012: Lizard Peninsula, Cornwall. *Atropos* 48: 44-45. (in English) [UK; *Sympetrum fonscolombii*] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: atropos@atroposed.freeseve.co.uk

12826. Tyrrell, M. (2013): Notes & Observations. *Dragonfly News* 63: 18-19. (in English) [UK; photographs of an attack of *Anax imperator* on *Cordulegaster boltonii*, *Ischnura elegans* preying on *Enallagma cyathigerum*, and *C. boltonii* preying on *Pyrrhosoma nymphula*.] Address: not stated

12827. Ulmer, A. (2013): *Calopteryx haemorrhoidalis* (Vander Linden, 1825) dans les vallons rhodaniens, une nouvelle espèce pour le département de la Loire. *Sympetrum* 16: 26-28. (in French) [In summer 1999, a male of *C. haemorrhoidalis* was found along the river Valencize, Massif du Pilat (Loire), France; this is a first record for the Département Loire.] Address: Ulmer, A., Coordinateur du GRPLS dans la Loire, Rue Caderot, Le Colombier, 42140 Chazelles-sur-Lyon, France

12828. Van, K.D.; Janssens, L.; Debecker, S.; De Jong, M.; Lambret, P.; Nilsson-Örtman, V.; Bervoets, L.; Stoks, R. (2013): Susceptibility to a metal under global warming is shaped by thermal adaptation along a latitudinal gradient. *Global Change Biology* 19(9): 2625-2633. (in English) ["Global warming and contamination represent two major threats to biodiversity that have the potential to interact synergistically. There is the potential for gradual local thermal adaptation and dispersal to higher latitudes to mitigate the susceptibility of organisms to contaminants and global warming at high latitudes. Here, we applied a space-for-time substitution approach to study the thermal dependence of the susceptibility of *Ischnura elegans* damselfly larvae to zinc in a common garden warming experiment (20°C and 24°C) with replicated

populations from three latitudes spanning >1500 km in Europe. We observed a striking latitude-specific effect of temperature on the zinc-induced mortality pattern; local thermal adaptation along the latitudinal gradient made Swedish, but not French, damselfly larvae more susceptible to zinc at 24°C. Latitude- and temperature-specific differences in zinc susceptibility may be related to the amount of energy available to defend against and repair damage since Swedish larvae showed a much stronger zinc-induced reduction of food intake at 24°C. The pattern of local thermal adaptation indicates that the predicted temperature increase of 4°C by 2100 will strongly magnify the impact of a contaminant such as zinc at higher latitudes unless there is thermal evolution and/or migration of lower-latitude genotypes. Our results underscore the critical importance of studying the susceptibility to contaminants under realistic warming scenarios taking into account local thermal adaptation across natural temperature gradients." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

12829. Vieira, V.; Cordero-Rivera, A. (2013): New data on the Odonata fauna from Graciosa Island (Azores). *Arquipelago. Life and Marine Sciences* 30: 78-81. (in English) ["Only two species of odonates, namely *Anax imperator* and *Sympetrum fonscolombii*, were found in Graciosa during June 07-15, 2004, and August 31-September 01, 2007. ... These species were common in ponds rich in *Potamogeton* and other macrophytes. No damselflies were found during the two surveys. Two *Ischnura* species are known from the Azores (*I. hastata*, *I. pumilio*). Lorenzo-Carballea et al. (2009) showed that in the Azores *I. hastata* is restricted to oligotrophic ponds, basing on studies in São Miguel and Pico. It was absent from all eutrophic ponds impacted by cattle grazing and by ponds subjected to water extraction by humans. This suggests that parthenogenetic populations of *I. hastata* are highly sensitive to eutrophication, which is different from the habitat preferences showed by sexual populations in the Americas." (Authors)] Address: Vieira, V.; Universidade dos Açores, Departamento de Biologia & Grupo da Biodiversidade dos Açores (CITA-A), Rua da Mãe de Deus, Apartado 1422, PT-9501-801 Ponta Delgada, Açores, Portugal. E-mail: vvieira@uac.pt

12830. Villanueva, R.J.T.; Cahilog, H. (2013): Odonata Fauna of Balabac Island, Philippines with descriptions of two new species. *International Dragonfly Fund - Report* 60: 1-34. (in English) ["The Odonata fauna of Balabac Island, Philippines was studied in March 2013. A total of 41 species under 33 genera were recorded. 28 species were recorded for the first time in the island. One genus - *Mortonagrion* was recorded for the first time in the Philippines. *Mortonagrion astamii* spec. nov. and *Prodasineura poncei* spec. nov. are new to science and are described. Three previously recorded species remained elusive and not seen during the survey." (Au-

thors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

12831. Wagler, R.; Wagler, A. (2013): Knowledge of arthropod carnivory and herbivory: Factors influencing preservice elementary teacher's attitudes and beliefs toward arthropods. *International Journal of Environmental & Science Education* 8(2): 303-318. (in English) ["Human negativity toward arthropods has been well documented but the factors that contribute to this negativity have been elusive. This study explored knowledge of arthropod carnivory (including *Hagenius brevistylus*) and herbivory as possible casual factors that contribute to the negative tendencies preservice elementary teachers have toward most arthropods. Specifically, this study investigated the effect knowledge of arthropod carnivory and herbivory had on United States kindergarten through sixth grade preservice elementary teacher attitude toward that arthropod and belief concerning the likelihood of incorporating information about that specific arthropod into their future science classroom. A cluster randomized design with a control group was used for the study. The treatment group consisted of 147 preservice elementary teachers and the control group consisted of 151. Unique to this study is the finding that arthropod carnivory and herbivory are causal factors that strongly affect preservice elementary teacher attitude and belief toward arthropods. When the participants of the study were made aware that an arthropod they thought was a herbivore was actually a carnivore, their attitude and likelihood of incorporation significantly declined. When the participants of the study were made aware that an arthropod they thought was a carnivore was actually a herbivore, their attitude and likelihood of incorporation significantly increased. Implications and future research are discussed." (Authors)] Address: Wagler, R., The University of Texas at El Paso, Department of Teacher Education, 500 West University Avenue, Education Building 601, El Paso, TX 79968, USA. E-mail: rrwagler2@utep.edu

12832. Walker, P.D.; Wijnhoven, S.; van der Velde, G. (2013): Macrophyte presence and growth form influence macroinvertebrate community structure. *Aquatic Botany* 104: 80-87. (in English) ["Multivariate analysis demonstrated that macroinvertebrate assemblages of macrophyte-dominated sub-habitats within a small eutrophic pond differed markedly from those of Bottom substrate and Open water habitats. Certain habitats (e.g. *Nymphaea* and *Phragmites*) appeared to be quite similar in their macroinvertebrate communities, whereas others appeared to be very distinct in terms of the species composition (e.g. Open water habitat). Analysis of functional feeding groups also revealed differences between habitats in terms of the community structure. Again, the Open water habitat exhibiting the most marked difference. Macrophyte growth form does not cause significant differences in macroinvertebrate species richness

and diversity but it has a significant effect on macroinvertebrate abundance. Habitats consisting of highly branched and dissected macrophyte growth forms provide more food resources and microhabitats supporting larger numbers of macroinvertebrates than macrophytes with firm undissected stalks and leaves. This study highlights the importance of maintaining the ecological quality of small freshwater habitats in order to promote macrophyte growth and thus maintain a high level of species richness within such ecosystems. Highlights: *We investigated how macrophytes influence macroinvertebrate communities, which is useful for predicting overall biodiversity. *The data presented show interesting results with respect to presence and growth form of the macrophytes within a single aquatic system. *Previous studies often used artificial structures/plants in waters with different physico-chemical conditions making comparisons difficult. *This study employed an alternative approach to minimise variation due to season, physico-chemical conditions and spatial variation." (Authors) The list of taxa includes *Ischnura elegans*, *Enallagma cyathigerum* and *Aeshna grandis*.] Address: Walker, P.D., Dept of Animal Ecology & Ecophysiology, Inst. for Water and Wetland Research, Faculty of Science, Radboud Univ. Nijmegen, Nijmegen, The Netherlands

12833. Wang, L.-J.; Cherng, J.-J.; Chang, Y.J.; Jiang, J.-L. (2013): Description of *Rhinocypha taiwana* sp. nov. from Taiwan, with a preliminary molecular phylogenetic analysis of the *Rhinocypha drusilla*-group (Odonata: Chlorocyphidae). *International Journal of Odonatology* 16(1): 93-107. (in English) ["*Rhinocypha taiwana* Wang & Chang, sp. nov. is described and illustrated for both sexes. The genetic distance of the cytochrome c oxidase I (COI) gene in *R. taiwana* and related species ranges from 4.2% to 10.4%. *R. taiwana* is shown to be a good species based on morphological and genetic criteria. It also is clearly retrieved as a distinct species based on COI phylogenetic analysis. The *R. drusilla* group is proposed and defined by a combination of characteristics which distinguish them from all other *Rhinocypha* species: male abdomen with reddish orange markings and S2 with a unique dorsal spade-shaped or similar marking. A key to the males of the six species of the *R. drusilla* group is provided. Two morphologically distinct continental species, *R. drusilla* and *R. arguta*, are shown to have a rather small genetic distance, only 1.2–1.7%. More material from the continental populations of this group is needed for further morphological and molecular studies." (Authors) *Rhinocypha arguta*, *R. drusilla*, *R. huai*, *R. ogasawarensis*, *R. taiwana*, *R. ueno*] Address: Wang, L.-J., Division of Forest Protection, Taiwan Forestry Research Institute, Taipei, Taiwan, ROC. E-mail: ljwang23@ms17.hinet.net

12834. Watanabe, K.; Takechi, L.; Hisamatsu, S. (2013): A new record of *Aeshna crenata* Hagen, 1856 from Ehime Prefecture, Japan Kohei. *Tombo* 55: 55-56. (in Japanese, with English summary) ["We collected a

final instar larva and five exuviae of *A. crenata* from a pond in Kumakogen Town, Ehime Prefecture. This is the first propagating record of the species from Shikoku Island." (Authors)] Address: Hisamatsu, S., Louisiana State Arthropod Museum, Louisiana State University AgCenter, 404 Lire Sciences Building, Louisiana State University, Baton Rouge, LA 70803. USA. E-mail: sthisamatsu@gmail.com

12835. Waters, R.M.; Burghardt, G.M. (2013): Prey availability influences the ontogeny and timing of chemoreception-based prey shifting in the Striped Crayfish Snake, *Regina alleni*. *Journal of Comparative Psychology* 127(1): 49-55. (in English) ["Striped crayfish snakes (*Regina alleni*) undergo a dietary shift from dragonfly larvae to crayfish during ontogeny. Godley (1980) suggested that this shift is attributable to crayfish availability rather than an initial preference for dragonfly larvae. We experimentally tested this hypothesis by measuring the chemosensory response of newborn snakes to prey odors at 2 ages and also after they were fed on either dragonfly larvae or crayfish. The results show that *R. alleni* respond equally to dragonfly larvae, hard crayfish, and soft crayfish before feeding experience. We also show that the maintenance of this preference over fish and control stimuli is subsequently determined by the prey type encountered, through an unusual interaction. Snakes fed dragonfly larvae increased their chemosensory response to both dragonfly larvae and crayfish, whereas snakes fed crayfish increased their response only to crayfish. Our study demonstrates that innate chemosensory responses to prey can be modified by prey availability and that they do not necessarily result from maturation alone. Such plasticity has adaptive value to newborn animals that must fend for themselves from birth and respond to changing environmental conditions." (Authors)] Address: Burghardt, G.M., Dept of Psychology and Department of Ecology and Evolutionary Biology, University of Tennessee, USA

12836. Weihrauch, F. (2013): 2013 International Congress of Odonatology Freising, Bavaria, 17-21 June 2013. *Agrion* 17(1): 15. (in English) [Primarily introduction into the coming 13th International Congress of Odonatology in Freising, Germany.] Address: Weihrauch, F., Jägerstr. 21A, 85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de

12837. Weihrauch, F. (2013): ICO 2013 Congress Programme. As of: 05.06.2013. Freising, Upper Bavaria / Germany, 17th to 22st June 2013. *International Congress of Odonatology. Freising: 16 pp.* (in English) [Timetable of the International Congress of Odonatology in Freising, Germany, June 2013] Address: Weihrauch, F., Jaegerstr. 21A, 85283 Wolnzach, Germany

12838. Wiederman, S.D.; Shoemaker, P.A.; O'Carroll, D.C. (2013): Correlation between OFF and ON channels underlies dark target selectivity in an insect visual

system. *The Journal of Neuroscience* 33(32): 13225-13232. (in English) ["In both vertebrates and invertebrates, evidence supports separation of luminance increments and decrements (ON and OFF channels) in early stages of visual processing (Hartline, 1938; Joesch et al., 2010); however, less is known about how these parallel pathways are recombined to encode form and motion. In *Drosophila*, genetic knockdown of inputs to putative ON and OFF pathways and direct recording from downstream neurons in the wide-field motion pathway reveal that local elementary motion detectors exist in pairs that separately correlate contrast polarity channels, ON with ON and OFF with OFF (Joesch et al., 2013). However, behavioural responses to reverse-phi motion of discrete features reveal additional correlations of the opposite signs (Clark et al., 2011). We here present intracellular recordings from feature detecting neurons in the dragonfly that provide direct physiological evidence for the correlation of OFF and ON pathways. These neurons show clear polarity selectivity for feature contrast, responding strongly to targets that are darker than the background and only weakly to dark contrasting edges. These dark target responses are much stronger than the linear combination of responses to ON and OFF edges. We compare these data with output from elementary motion detector-based models (Eichner et al., 2011; Clark et al., 2011), with and without stages of strong center-surround antagonism. Our data support an alternative elementary small target motion detector model, which derives dark target selectivity from the correlation of a delayed OFF with an undelayed ON signal at each individual visual processing unit (Wiederman et al., 2008, 2009)." (Authors)] Address: Wiederman, S.D., Adelaide Centre for Neuroscience Research, School of Medical Sciences, The University of Adelaide, Adelaide, SA 5005, Australia

12839. Wiederman, S.D.; Shoemaker, P.A.; O'Carroll, D.C. (2013): Modeling selective attention in an insect visual neuron. 6th Australian Workshop on Computational Neuroscience The University of Melbourne 30-31 January 2013: 68. (in English) [Verbatim: Whether considering a lion focused on a single zebra within a panicked herd, or a dragonfly capturing flies amidst swarms of prey and conspecifics, each animal selects a single object amongst distracting stimuli. Little is known about the neuronal mechanisms that allow animals to accomplish this 'attentional' task. Diverse evidence from functional imaging and physiology to psychophysics, highlights the importance of 'competitive selection' in attention for vertebrates, artificial intelligence and even in fruitflies. Although direct neural correlates for such attention are scarce, we have recently demonstrated responses from an identified dragonfly visual neuron, the 'centrifugal small target motion detector' (CSTMD1), that perfectly match a model for competitive selection within the limits of neuronal variability ($r^2=0.83$). Responses of CSTMD1 to individual moving targets differ in both magnitude and time course depending on loca-

tion of the target within the cell's receptive field. However, responses to two simultaneous targets almost always match those elicited by one of the two targets acting alone. Successive repetition of stimulus pairs over variable sizes, separation and contrasts all elicit responses equivalent to single targets, regardless of whether the 'winner' is the stronger stimulus if presented by itself. Here we examine winner-takes-all networks as putative components of the small target detection system, considering biologically plausible implementations and how they might contribute to the physiological responses of CSTMD1. By examining such competitive selection models we gain insight into how the pre-synaptic elements to CSTMD1 could be arranged to permit the 'absolute' encoding of a single target in a multiple target environment.] Address: Wiederman, S.D., Adelaide Centre for Neuroscience Research, School of Medical Sciences, The University of Adelaide, Adelaide, SA 5005, Australia

12840. Wiesenborn, W.D. (2013): Phosphorus contents in desert riparian spiders and insects vary among taxa and between flight capabilities. *Florida Entomologist* 96(2): 424-432. (in English) ["Phosphorus occurs in a variety of biological molecules including DNA and RNA, ATP and other adenine nucleotides, phosphorylated metabolites, and phospholipids. Variation in phosphorus content among spiders and insects would influence the element's uptake by insectivorous birds. I measured amounts of phosphorus in 3 families of spiders and 7 orders and 24 families of insects collected in riparian habitat next to the Colorado River in western Arizona. Relation between phosphorus mass and body dry-mass, $P \mu\text{g} = 9.6$ (body mg), in spiders and insects was not allometric. Phosphorus concentration, as a mean percentage of body dry-mass, was higher in spiders (1.33%) than in insects (0.96%). Phosphorus contents varied most among families but also among orders and genera. Insect predators contained higher phosphorus concentrations (1.01%) than insect herbivores (0.90%). Strong-flying insects, Odonata, Neuroptera, Diptera, and Hymenoptera except Formicidae, also contained higher phosphorus concentrations (1.04%) than weak flying or wingless insects (0.89%), Orthoptera, Hemiptera, Coleoptera, and Formicidae. Larger flight-muscles with higher concentrations of phosphorylated metabolites likely increase phosphorus contents in strong-flying insects. Birds that eat aerial insects may benefit from higher phosphorus contents in their prey." (Author)] Address: Wiesenborn, W.D., U.S. Bureau of Reclamation, Lower Colorado Regional Office, P.O. Box 61470, Boulder City, Nevada 89006, USA. E-mail: wwiesenborn@fastmail.fm

12841. Wildermuth, H. (2013): Entwicklung der Libellenfauna (Odonata) am Husemersee (Kanton Zürich) im Verlauf der letzten 130 Jahre. *Entomo Helvetica* 6: 7-21. (in German, with English and French summaries) ["Between 1885 and 2012 a total of 55 dragonfly species have been recorded in the Husemersee region.

While 14 of them have definitely disappeared, 31 species are still present and 10 are new to the locality. The locally extinct species are typical moorland species that have lost their habitats by intense peat exploitation during World War I and II. It is assumed that many of the newcomers have profited from the climate change. The extant dragonfly fauna is discussed in the context of the current habitat supply and measures for habitat management to promote the odonate populations are suggested." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

12842. Xu, M.X.; Wang, X.; Yan, X.J.; Lv, G.F.; Zheng, S.N.; Wang, H.B. (2013): Polarization imaging target detection method by imitating dragonfly compound eye LF-SF mechanism. *Applied Mechanics and Materials* 347-350: 3881-3884. (in English) ["Recently, water surface target detection and tracking for sea, lake, or river are challenging research topics. This paper presents a framework of target detection and tracing based on three-channel synchronization polarization imaging and imitation dragonfly compound eye LF-SF (large field-small field) mechanism. This framework can make full use of the advantages of polarization sensitivity of the compound eyes of a dragonfly, and be useful for effective water surface target detection and motion vector estimation." (Authors)] Address: Xu, M.X., Nanjing University of Science & Technology, Nanjing, China. E-mail: mengxi.xu@gmail.com

12843. Xu, Q.-h. (2013): *Idionyx pseudovictor* sp. nov. from Fujian, China (Odonata: Anisoptera: Corduliidae). *Zootaxa* 3683(1): 82-86. (in English) ["A new species of the genus *Idionyx* Hagen, *I. pseudovictor* sp. nov. from Fujian, China is described from the female, illustrated and diagnosed from its congeners. Description of the final stadium larva of the new species is also provided. The new species is closely similar to female *I. victor*. There are a series of relatively minor colour and pattern differences between these two female adults, as well as a series of obvious structural differences in larvae of these two species. The female adult of the new species can be separated from that of *I. victor* by the following characters: (1) labrum entirely yellow; (2) distal end of ventral synthorax entirely yellow; (3) abdominal S1-2 with complete middorsal yellow stripe; (4) valvula vulvae pointed triangularly, not projecting beyond apical border of 8th tergite. The larva of the new species can be separated from that of *I. victor* by the following characters: (1) body dark brown, covered with dense long hairs; (2) apical border of prementum with 10 spiniform setae on each side; (3) premental setae 5+3/5+3; (4) numerous fine bristles present on median lobe; (5) inner margin of palpal lobe with 6 large projections; and (6) movable hook long and acuminate." (Author)] Address: Xu, Q.-h., Dept of Biological and Environmental Engineering, Zhangzhou City University, Zhangzhou, Fujian 363000, China. E-mail: qhx363000@gmail.com

12844. Yakubovich, V.S. (2013): First record of the dragonfly *Orthetrum albistylum speciosum* (Uhler, 1858) (Odonata: Libellulidae) from Evreiskaya Avtonomnaya Oblast, Russian Far East. *Far Eastern Entomologist* 262: 7-8. (in English, with Russian summary) [Russia: Evreiskaya autonomnaya oblast, Oktyabrskii District, vicinity of Soyuznoe village, top of a hill near the Amur River, 6-9.VII 2012, 1 female (E.S. Koshkin leg.).] Address: Yakubovich, V.S., Dept of Biology, Far Eastern Medical University, Murav'ev-Amursky Street 35, Khabarovsk 680000, Russia. E-mail: Presid11@mail.ru

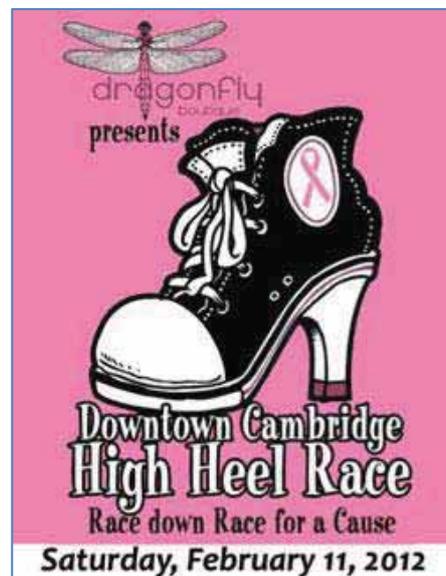
12845. Yu, X.; Chen, J. (2013): *Calicnemia soccifera* sp. nov. from Yunnan, China (Zygoptera: Platycnemididae). *International Journal of Odonatology* 16(2): 183-188. (in English) ["A new species, *Calicnemia soccifera* sp. nov. (holotype ♂: Jinping, Yunnan, China) is described and illustrated for both sexes. *C. miniata* is confirmed to occur in Xizang (Tibet), China, and preliminary taxonomic remarks on some Chinese species of *Calicnemia* are given." (Authors).] Address: Yu, X., Institute of Entomology, College of Life Sciences, Nankai Univ., Tianjin, 300071, PR China. E-mail: nkyuxin@yahoo.cn

12846. Zhang, H.-C.; Zheng, D.-R.; Wang, B.; Fang, Y.; Jarzembowski, E.A. (2013): The largest known odonate in China: *Hsiufua chaoi* Zhang et Wang, gen. et sp. nov. from the Middle Jurassic of Inner Mongolia. *Chinese Science Bulletin* 58(13): 1579-1584. (in English) ["A new genus and species, *Hsiufua chaoi* Zhang et Wang, is established based on a forewing from the Middle Jurassic Haifanggou Formation in Inner Mongolia, China and attributed to *Campteropteroidea*, *Isophlebioidea*, Odonata. It is the largest odonate known in China and the fourth in the world in terms of forewing length. The maximum size (based on forewing length) of Odonata is smaller in the Permian than in the Mesozoic which is probably due to competition for prey between Odonata and Protodonata in the Permian. The reason that the maximum size of Jurassic odonates is larger than that of their extant relatives is most probably less competition and lower predation pressure from contemporary aerial vertebrates." (Authors)] Address: Zhang, H.-C., State Key Laboratory of Palaeobiology & Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China. E-mail: hc Zhang@nigpas.ac.cn

12847. Zhao, H.; Yin, Y.; Zhong, Z. (2013): Arnold circulation and multi-optimal dynamic controlling mechanisms in dragonfly wings. *Acta Mechanica Sinica* 26(3): 237-244. (in English) ["This paper aims to reveal the multi-optimal mechanisms for dynamic control in dragonfly (*Pantala flavescens*, *Crocothemis servilia*) wings. By combining the Arnold circulation ("blood circulation") with such micro/nano structures as the hollow inside constructions of the pterostigma, veins and spikes, dragonfly wings can create variable mass, variable rotating inertia and variable natural frequency. This marvelous ability enables dragonflies to overcome the contradictory re-

quirements of both light-weight-wing and heavy-weight-wing, and displays the multi-optimal mechanisms for the excellent flying ability and dynamic control capacity of dragonflies. These results provide new perspectives for understanding the wings' functions and new inspirations for bionic manufactures." (Authors)] Address: Zhong, Z., School of Aerospace Engineering and Applied Mechanics, Tongji Univ., Shanghai 200092, China. E-mail: zhongk@tongji.edu.cn

12848. Zyla, D.; Wegierek, P.; Owocki, K.; Niedzwiedzki, G. (2013): Insects and crustaceans from the latest Early–early Middle Triassic of Poland. *Palaeogeography, Palaeoclimatology, Palaeoecology* 371: 136-144. (in English) ["Two stratigraphical horizons in the Palegi clay-pit, a new Triassic paleontological site within Buntsandstein deposits (latest Olenekian–early Anisian in age) in the Holy Cross Mountains (Poland), have yielded arthropod faunas comprising ca. 400 fossil specimens assigned to two subphyla: Crustacea (class Branchiopoda and Maxillopoda) and Hexapoda (class Insecta). The Palegi arthropod assemblage is similar to that described from the Middle Triassic of France and Germany but is dominated by remains of conchostracans and cockroaches. This new fauna expands our knowledge of the latest Early–early Middle Triassic diversity of insects and freshwater arthropods in the Germanic Basin. The newly discovered fauna represents one of the oldest Mesozoic records of insects described from the Buntsandstein facies of Europe, and provides important information to better appreciate the process of ecosystem recovery after the Permian–Triassic extinction. Highlights: *We describe a noteworthy Triassic arthropods assemblage from Germanic Basin. *Arthropod fossils occur in deposits interpreted as freshwater ponds. *This is the oldest record of insects from the Buntsandstein of Germanic Basin." (Authors) The paper includes references to Odonata.] Address: Niedzwiedzki, G. Department of Paleobiology and Evolution, Faculty of Biology, Warsaw University, S. Banacha 2 Street, 02-097 Warszawa, Poland. E-mail: grzegorz.niedzwiedzki@ebc.uu.se



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1997

12849. Jiu, O. (1997): Gomphidae in Heilongjiang Province. *Journal of Heilongjiang Nongken Normal College* 1997(03): 70-73. (in Chinese, with English summary) [10 species of Gomphidae from the Chinese Heilongjiang Province were keyed: *Stylurus flavipes*, *Shaogomphus postocularis epophthalmus*, *Anisogomphus maacki*, *Trigomphus citimus*, *Davidius lunatus*, *Nihonogomphus rutilus*, *Ophiogomphus obscurus*, *Sieboldius albardae*, *Sinictinogomphus clavatus*, *Gomphidia confluens*.] Address: not stated

1998

12850. Korsós, Z. & Mészáros, F. (1998): Diversity of the Hungarian fauna. *Természetvédelmi Közlemények* 7: 125-133. (in Hungarian, with English summary) [Hungarian Odonata diversity was quantified with 65 species.] Address: Korsós, Z. Természetvédelmi Múzeum, Áttattár 1088 Budapest, Baross u. 13, Hungary

12851. Yang, Z.; Ou, Y. (1998): The damselflies in the north of China. *Journal of Hanzhong Teachers College* 16: 57-61. (in Chinese, with English summary) [The paper refers to damselflies reported north of 38° northern latitude in China (Yinchuan, Yan'an, Taiyuan, Shijiazhuang, area north of Dalian latitude) (Liaoning, Hebei, Shanxi, Shaanxi, Ningxia. provinces). 37 species are keyed.] Address: Yang, Z., The Adults Educational College of Hanzhong Teachers College, Hanzhong, Shaanxi, 723000; Heilongjiang Nongken Teachers College, Acheng, 150301, China

1999

12852. Luo, G.; He, H. (1999): A primary study on dragonflies from Xunwu, Jiangxi Province. *Journal of Guangzhou Normal University (Natural Science)* 20(9): 85-86, 94. (in Chinese, with English summary) [In 1996 and 1997, 26 Odonata species were collected in Xunwu

area of Jiangxi Province, China.] Address: Luo, G., Dept. of Biology, Guangzhou Normal Univ. 510400, China

12853. Miyashita, M. (1999): Studies on conservation and restoration of the habitat of the damselfly *Mortonagrion hirosei*. *Proc. Envir. Syst. Res.* 27: 293-304. (in Japanese, with English summary) [Japan; "M. hirosei, was designated as an endangered species by the Environment Agency in 1991, because its habitat is vulnerable to the effects of land reclamation and river improvement. The low-flying insect lives in reed plains and measures about three centimeters long when fully grown. Relationships between the habitat of the damselfly, salinity, topography and vegetation were studied at 9 tidal rivers from Hinuma marsh in Ibaraki Prefecture to the Nagaitaura Bay in the Tsushima Islands. The larvae of the damselfly were collected only from the pool in a sunken place covered with dead leaves on the riverside. Salinity and the time required for the completion of the habitat of the damselfly were above 0.50.PERMIL. and about 4 years, respectively. The damselfly which lived on the riverside at Suigo-ohashi bridge across the Tonegawa River died out in 1998, because of reduced salinity of its habitat. It is supposed that the salinity of the habitat was the most important environmental element required for holding communities of the damselfly." (Author)]

12854. Orr, R. (1999): The dragonflies and damselflies of the Cove Point LNG Site, Calvert county, Maryland. <http://www.covepoint-trust.org/reports/orr-001.pdf>: 31 pp. (in English) ["The Cove Point Liquid Natural Gas Site (Cove Point Site) consists of 900 acres of undeveloped property in Calvert County, Maryland. The property is owned by the Cove Point LNG Limited Partnership and approximately 600 acres are subject to a conservation easement that was granted to the Maryland Environmental Trust and The Nature Conservancy to oversee. The Cove Point Site borders the western shore of the Chesapeake Bay, just south of Calvert Cliffs. A wide variety of pristine and managed aquatic water habitats oc-

cur at the Site including marshes, ponds, streams, and seeps. A survey was conducted for the Odonata of the Cove Point Site during 1998 and 1999 under a Cove Point Natural Heritage Trust Research Contract. Field data were collected on June 5, July 7, July 29, August 22, September 11, September 30, October 14 and December 2 in 1998. In 1999 field data were collected on January 3, March 31, April 23, April 30, May 21, June 6, July 8, September 3, and October 7. The survey was based mostly on adult odonates, but limited cast skins and larvae were also sampled. The species, date and habitat (along with any note-worthy behaviour or life-history observations) were recorded for 10,916 individual dragonflies and damselflies over the course of the survey. 53 species of Odonata were recorded at the Cove Point Site during the 1988-1999 season. 24 species were first records for Calvert County. *Gomphus rogersi*, is ranked as S1 in Maryland. *Cordulegaster bilineata* and *Somatochlora filosa* have tentative ranks of S2, *Archilestes grandis*, *Amphiagrion saucium*, *Anax longipes*, *Gomphaeschna furcillata*, *Celithemis fasciata*, and *Libellula axilena* have tentative ranks of S3. 34. *Erythemis simplicicollis* -- Eastern Pondhawk: *E. simplicicollis* hunts by staying on the ground and flying up to capture prey in the air. An interesting behavioural observation was noticed between the Eastern Pondhawk and one of its prey animals the tiger beetle *Cicindela hirticollis*, on the beach at Cove Point. The dragonfly would only take the tiger beetle when it was in flight which would occasionally happen when I disturbed the beetles while walking on the beach. If the beetle managed to land before being captured, the dragonfly would land next to it, often just a couple of inches away. I got the impression (but it does need to be further observed or tested) that the tiger beetle was behaviourally programmed to run and not fly away from the dragonfly -- thus avoiding capture. When I approached the tiger beetles they appeared to more readily take to the air than they did when a dragonfly was next to them. As a side note -- I have watched the Eastern Pondhawk hunt *Cicindela dorsalis* at Flag Ponds in the early 1990s but did not see any captured (only attempts). However, the Flag Ponds rangers informed me that they had seen them being taken. One thing that is for sure, is that at the beach at Cove Point, during the heat of the day, *E. simplicicollis* are an active predator of tiger beetles." (Author) For the complete study see: <http://www.cove-point-trust.org/studies.html>] Address: Orr, R., Columbia, Maryland 21044, USA

2000

12855. Liu, Z.-y.; Ling, Z.-q.; Liu, A.-y.; Yu, Z.-n. (2000): The SEM observation and analysis of pleomorphism of *Paecilomyces odonatae*. *Mycosystema* 19(1): 56-59. (in Chinese, with English summary) ["The SEM photographs showed clearly that *Paecilomyces odonatae* Liu, Liang & Liu possessed two sorts of conidiogenous structures, which were the *Paecilomyces*-type with ellipsoidal co-

nidia in chain and *Acremonium*-type producing cylindrical conidia in a slime head. The single spore strains obtained by single spore isolation were used in morphological observation and RAPD analysis. The results showed the cultural and morphological characteristics and the bands of DNA RAPD of the ellipsoidal single conidial strains were no much differences from those of cylindrical single conidial strains." (Authors).] Address: Liu, Z.-y., Lab. of Entomogenous Fungi, College of Biotechnology, Guizhou Univ., Guiyang, 550025, China

2001

12856. Ficsór, M.; Szabó, A. (2001): Contribution to the aquatic macroinvertebrate fauna of Szinva and its tributaries, NE Hungary. *Acta biol. debrecina Oecol. Hung.* 26: 75-88. (in English, with Hungarian summary) [Includes records of *Calopteryx splendens*, *Platycnemis pennipes*, *Coenagrion puella*, *Ischnura pumilio*, *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Orthetrum brunneum*, *O. cancelatum*, and *O. coerulescens*.] Address: Ficsór, M., North Hungarian Regional Environmental, Nature Conservation and Water Management Inspectorate, Laboratory, 4. Mindszent tér, H-3530, Miskolc, Hungary. E-mail: ficsor.mark@emikofe.kvvm.hu

2003

12857. Roy, A.H.; Rosemond, A.D.; Leigh, D.S.; Paul, M.J.; Wallace, J.B. (2003): Habitat-specific responses of stream insects to land cover disturbance: biological consequences and monitoring implications. *J. N. Am. Benthol. Soc.* 22(2): 292-307. (in English) ["Changes in catchment land cover can impact stream ecosystems through altered hydrology and subsequent increases in sedimentation and nonpoint-source pollutants. These stressors can affect habitat suitability and water quality for aquatic invertebrates. We studied the impact of a range of physical and chemical stressors on aquatic insects, and tested whether the effects of these stressors differed in 3 habitat types: riffles, pools, and banks. Our study was conducted in Piedmont streams in Georgia (USA) where catchment development pressure and the potential for aquatic biodiversity loss are high. We sampled 3 replicates of riffle, pool, and bank habitats within a 100-m reach of 29 streams (11-126 km²) that varied in catchment land cover. Correlations between environmental variables and aquatic insects (both richness and density) within habitat types indicated that riffle habitats (vs pool and bank habitats) exhibited the strongest relations with environmental variables. Riffle assemblages were negatively affected by both physical (e.g., bed mobility) and chemical (e.g., specific conductance, nutrient concentrations) variables. The density of aquatic insects in pools was also correlated to physical and chemical variables, but there were few relationships with pool or bank richness or bank density. Because of greater relative impacts of disturbance in riffles versus

banks, we found greater differences between riffle and bank richness in streams with greater sediment disturbance. The proportion of bank richness (bank richness / bank + riffle richness) increased with finer bed sediment ($r^2 = 0.43$) and increased bed mobility ($r^2 = 0.35$). We compared richness of facultative taxa (found in multiple habitats) between sites we characterized as minimally impacted and sediment-impacted. In riffles, richness of facultative taxa was lower in sediment-impacted vs minimally impacted sites (11.0 vs 20.2, $p = 0.002$, t-test), but was similar for both disturbance groups in banks (20.1 vs 22.7, $p > 0.05$, t-test). Our results suggest that taxa richness may be retained in bank habitats when riffle quality is poor and banks may serve as a refuge in highly disturbed systems. Such shifts in the distribution of benthos may be an early warning indicator of biotic impairment and have implications for biomonitoring and maintenance of habitat." (Authors) Taxa included Odonata and were treated at genus level.] Address: Roy, A.H., Institute of Ecology, The University of Georgia, Athens, Georgia 30602 USA. E-mail: aroy@uga.edu

12858. Zhu, C.-j.; Muraoka, J.; Mizuno, H. (2003): CG simulation of dragonflies based on aerodynamics. Information Processing Society of Japan SIG Notes 2003(15): 31-36. (in Japanese, with English summary) ["A dragonfly is a kind of familiar insect by which the sense of season can be shown. The expression of a dragonfly by CG can be expected as an element which will improve the sense of season in landscape simulation, virtual reality, etc. In this paper, the flight model of a dragonfly, based on aerodynamics, is proposed. In this model, a dragonfly can be made to fly in real time considering the force caused by the flapping of the wings. Steep rise, sudden stop, hover and rapid turn, which are the flight characteristics of a dragonfly, can be performed. Furthermore, depending on the control-points placed in the space, the flight route of a dragonfly can be established easily." (Authors)] Address: Zhu, C.-j., Tohoku Institute of Technology, Japan

2004

12859. Bunnell, F.L.; Campbell, R.W.; Squires, K.A. (2004): Allocating scarce resources for conservation in a species-rich environment: Guidelines from history and science. In: T.D. Hooper, editor. Proceedings of the Species at Risk 2004 Pathways to Recovery Conference. March 2-6, 2004, Victoria, B.C. Species at Risk 2004 Pathways to Recovery Conference Organizing Committee, Victoria, B.C.: 1-20. (in English) ["British Columbia is one of the most species-rich areas in north temperate regions. Its size, location, and topography encourage small incursions of species that are more abundant elsewhere. Given this richness, the province faces formidable challenges in the allocation of limited resources to conservation. The importance of making wise decisions is revealed by recent reviews of North American recovery expenditures that suggest that about 50% of

efforts have failed. Fortunately, lessons from history and science can help formulate guidelines. Part of history's lesson is that we begin too late, and that more resources should be allocated to preemptive measures. We consider criteria to prioritize species and four classes of action appropriate to conditions in British Columbia that can be used to guide the allocation of resources in a cost-effective fashion. For example, about 93% of global bird extinctions since the 1600s have been island endemics. British Columbia hosts at least 90 endemic taxa, of which about 66% are island dwelling. Because centres of endemism are concentrated, preemptive monitoring plans based on a frequency that reflects natural history characteristics and known threats are possible. From a review of natural history characteristics, we have collated lists of species that are appropriate to specific conservation actions (summarized here) and provide a checklist that should precede development of a recovery plan for any specific taxon." (Authors) The paper included several references to Odonata.] Address: Bunnell, F.L., Forest Sciences Dept, University of British Columbia, 270 - 2357 Main Mall, Vancouver, BC, V6T 1Z4, Canada. E-mail fbunnell@interchange.ubc.ca

12860. Jiang, Y. (2004): *Sympetrum infuscatum* as a medicinal dragonfly species in Heilongjiang. Quarterly of Forest By-product and Speciality in China 4(GSNO. 71): 29-30. (in Chinese, with English summary) [China; *S. infuscatum* was analysed for nutrient contents (protein and fat content resulted in 56.22% and 22.93% resp.) and medical/pharmacological purposes in traditional Chinese medicine.] Address: Jiang, Yuxia, Dept of Biology, Mudangjiang Teachers College, Mudangjiang 157012, China

12861. Morrison, F.; McLain, D.; Sanders, L. (2004): Dragonfly abundance and emergence behavior before and after bank stabilization on the Connecticut River in Gill, Massachusetts. <http://www.odes.millersriver.net/Speakers/fredmorrison.htm>: (in English) [Verbatim: While stabilization has become an important tool for reducing excessive riverbank erosion, the impacts on emerging dragonflies are unknown. To investigate the effects of bank stabilization, we surveyed a 1200-ft. stretch of eroding bank on the Connecticut River in Gill, Massachusetts for emerging dragonfly species before (2001) and after (2002-2003) bank stabilization. The site was stabilized in fall 2001 by grading the slope, planting with native vegetation, and adding a rock footing at the average water line. We collected exuviae from the entire site at least weekly from early June to late July each year. We also observed the behaviour of nymphs in the process of emerging from the river. In 2003, we added 4 reference sites for comparison between stabilized and natural habitat. Several of the 15 species showed marked increases in abundance following stabilization. The most dramatic change was with *Gomphus vastus*, which increased from 357 in 2001 to 12,270 in 2003. *Gomphus abbreviatus*, *Stylurus spiniceps*, *S. amnicola*

and *Dromogomphus spinosus* were more abundant after stabilization, but declined in the third year of the study. *Neurocordulia yamaskanensis* and *Macromia illinoisensis* declined in the second year and were most abundant in the third year. *Gomphus ventricosus* was only common in the third year, while *G. fraternus* was absent following stabilization. The changes in abundance between years could not be differentiated between cause-and-effect and natural fluctuations. However, notable changes occurred in the behaviour of emerging nymphs. After stabilization, *G. abbreviatus*, *S. spiniceps*, *S. amnicola*, and *D. spinosus* eclosed close to the water line when the river level was low on the riprap. This behaviour made them susceptible to being splashed by boat waves and submerged by rapidly rising water level. These species were much more abundant at the natural reference sites than at the stabilized sites. Nymphs of *S. spiniceps* crawled a significantly ($\alpha = 0.05$) shorter distance on the riprap (0.9 ft.) than on natural banks (11.2 ft.). Mortality of *G. abbreviatus* from boat waves and rising water was as high as 33% in 2002. While the impact of riprap on dragonfly populations is unknown, the observed mortality indicates that standard-sized riprap does not provide a favourable substrate for dragonfly emergence. Alternative stabilization methods should be explored that incorporate dragonfly conservation.] Address: Morrison, F., A Natural Focus, Montague Rd, Westhampton, MA 01027, USA. E-mail: anaturalfocus@crocker.com

12862. Xu, Q. (2004): A preliminary report of the investigation of dragonflies from Huboliao National Nature Reserve of Fujian. *Natural Enemies of Insects* 26(2): 81-85. (in Chinese, with English summary) [64 Odonata species were reported from Huboliao National Nature Reserve of Fujian, China including 10 species newly recorded in Fujian viz *Mnais andersoni*, *Rhinocypha perforata*, *Anisopleura furcata*, *Euphaea ornata*, *Pseudagrion rubriceps*, *P. spencei*, *Drepanosticta hongkongensis*, *Polycanthagyna erythromelas*, *Orthetrum triangulare*, and *Trithemis festiva*.] Address: Xu, Q., Zhangzhou Education College, Zhangzhou, Fujian 363000, China

12863. Yang, B.-s.; Ren, B.-z. (2004): Two new records of *Cordyceps* from northeastern China. *Journal of Jilin Agricultural University* 26(2): 148-150. (in Chinese, with English summary) ["*Cordyceps tricentri* Yasuda and *Cordyceps odonatae* Kobayasi were reported. The stroma of *Cordyceps tricentri* Yasuda, light yellow in colour, singly grew at the chest of host; its fertile part was clubbed or ellipsoidal; its pyrenocarp was under the skin of stroma, pitcher-shaped and its ostiole protruded a little; its ascospore was linear, and broke into secondary spores when mature. In China, they had only been reported in Zhejiang province, Hebei province, Yunnan province, Guangdong province, Guizhou province and Anhui province before. The stroma of *Cordyceps odonatae* Kobayasi, light yellow in colour, singly grew at the chest of host; its stalk curved; its fertile part

was long-ellipsoidal and with longitudinal grooves; its pyrenocarp was under the skin of stroma, pitcher-shaped and its ostiole was verrucous and protruded a little; its ascospore was linear, and broke into secondary columnar ascospore when mature. In China, it had only been reported in Guizhou province before." (Authors)] Address: Yang, B.-s., Institute of Mycology, Jilin Agricultural University, Changchun 130118, China

2005

12864. DuBois, R.B.; Smith, W.; Pleski, J.M.; Reese, M. (2005): Wisconsin Odonata Highlights in 2004. *Argia* 17(2): 4-6. (in English) [This report is a summary of research highlights pertaining to Odonata for Wisconsin in 2004. Records of *Aeshna sitchensis*, *Enallagma clausum*, *Somatochlora incurvata*, *Williamsonia fletcheri*, *W. lintneri*, *Coenagrion interrogatum*, and *Enallagma aspersum* were treated in detail.] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

12865. Fenoglio, S.; Bo, T.; Agosta, P.; Cucco, M. (2005): Mass loss and macroinvertebrate colonisation of fish carcasses in riffles and pools of a NW Italian stream. *Hydrobiologia* 532: 111-122. (in English) ["In this study, we analysed the decomposition of trout carcasses in a low-order Apennine stream, with the aim to investigate the mass loss rate in a Mediterranean lotic system, and to examine the influence of microhabitats on the invertebrates colonising fish carcasses. In May 2003, we put 56 dead rainbow trout (*Oncorhynchus mykiss*) in the stream, placing seven sets (four trout each) in both riffle and pool habitats. At four dates, we removed one trout per set to measure its dry mass and determine the associated macroinvertebrate assemblage. Fifty-eight macroinvertebrate taxa colonised the carcasses, with significant differences between the erosive and depositional microhabitats. Riffle trouts hosted richer and denser colonist communities than pool trouts. Chironomidae, *Serratella ignita*, *Habrophlebia* sp., *Dugesia* sp. and *Protonemura* sp. were the five most abundant taxa. Decomposition was initially very rapid in both environments and then tapered off over time. The mass loss rate was higher ($k = 0.057 \text{ day}^{-1}$) than that found in other studies. Higher Mediterranean temperatures probably increase the process. Although we found no significant difference between riffles and pools, mass loss was more regular in erosive habitats, underlining the importance of local, small-scale conditions. In small, low-order, heterotrophic streams, fish carcasses represent an important resource and shelter for rich and diversified invertebrate assemblages." (Authors) *Calopteryx virgo*, *Onychogomphus* sp., *Boyeria irene*, and *Chalcolestes viridis* were found to have settled on the carcasses.] Address: Fenoglio, S., University of Eastern Piedmont, Di.S.A.V., Via Cavour 84, I-15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

12866. Heckscher, C.M.; White, H.B. (2005): First Atlantic coastal plain occurrence of *Gomphus fraternus* Say (Odonata: Gomphidae). *Entomological News* 116(4): 271-272. (in English) [*G. fraternus*, 15-V-2002 and 13-V-2004, wooded north shore of Broad Creek, Sussex County, Delaware, USA at approximately 38°34'N, 75°38'W.] Address: Heckscher, C.M., Delaware Natural Heritage Program, Delaware Division of Fish and Wildlife, 4876 Hay Point Landing Road, Smyrna, Delaware 19977 USA. E-mail: christopher.Heckscher@state.de.us.

12867. Subramanian, K.A.; Sivaramakrishnan, K.G.; Gadgil, M. (2005): Impact of riparian land use on stream insects of Kudremukh National Park, Karnataka state, India. *Journal of Insect Science* 5:49: 10pp. (in English) ["The impact of riparian land use on the stream insect communities was studied at Kudremukh National Park located within Western Ghats, a tropical biodiversity hotspot in India. The diversity and community composition of stream insects varied across streams with different riparian land use types. The rarefied family and generic richness was highest in streams with natural semi evergreen forests as riparian vegetation. However, when the streams had human habitations and areca nut plantations as riparian land use type, the rarefied richness was higher than that of streams with natural evergreen forests and grasslands. The streams with scrub lands and iron ore mining as the riparian land use had the lowest rarefied richness. Within a landscape, the streams with the natural riparian vegetation had similar community composition. However, streams with natural grasslands as the riparian vegetation, had low diversity and the community composition was similar to those of paddy fields. We discuss how stream insect assemblages differ due to varied riparian land use patterns, reflecting fundamental alterations in the functioning of stream ecosystems. This understanding is vital to conserve, manage and restore tropical riverine ecosystems." (Authors) (Odonata) taxa were treated at the genus level.] Address: Subramanian, K.A., Centre for Ecological Sciences, Indian Institute of Science, Bangalore-560012, India. E-mail: subbu@ces.iisc.ernet.in

2006

12868. Holdt, E. von (2006): Die Libellen im Raum Hannover. Jubiläumsheft "125 Jahre HVV" (Hannoverscher Vogelschutzverein): 62-69. (in German) [The author introduced into the Odonata fauna of the town of Hannover, Niedersachsen, Germany and the region in the periphery of the settlement. Focus was set on rare species and species with recent range extensions or invasive behaviour.] Address: von Holdt, E., Offensteinstr. 13, 30451 Hannover, Germany. E-mail: ecvohe@t-online.de

12869. Karlsson, M. (2006): Relationship between mate-guarding strategies and the number of ovarioles in Libellulidae (Odonata). Master's thesis in Applied Ecol-

ogy at Halmstad University: 11 pp. ["In Libellulidae there are two types of egg-laying behaviour, non-contact guarding where the male accompany the female during oviposition and tandem guarding where the male is physically coupled with the female. These egg laying strategies also shows differences in egg size distribution and egg size. In species which perform non-contact guarding the egg size is inversely proportionate to the order of laying. In tandem species on the other hand, the egg size is more randomly distributed and the eggs are slightly larger than in non-contact species. To see if there is a difference in the female internal reproductive organs between the two guarding types, the ovariole number was counted. The result shows that in species which perform tandem guarding during oviposition have a fewer number of ovarioles compared to the non-contact species. This difference in ovariole number was also species specific. The impact on ecosystems is increasing and the survival of dragonflies or any other insects can no longer be taken for granted. Therefore this information can be valuable in conservation biology when new habitats are created for preservation of species." (Author) The following species were studied: (a) Non-contact guarders: *Trithemis kirbyi*, *Crocothemis erythraea*, *Leucorrhinia dubia*, *Libellula depressa* (b) Tandem guarders: *Sympetrum fonscolombii*, *Pantala flavescens*, *Philonomon luminans*, *Tramea basilare*, *Urothemis edwardsii*, *Diplacodes lefebvrii*, *S. vulgatum*, *S. danae*, *S. frequens*, *S. infuscatum*.] Address: not stated.

2007

12870. Campbell, W.B.; Novelo-Gutiérrez, R. (2007): Reduction in odonate phylogenetic diversity associated with dam impoundment is revealed using taxonomic distinctness. *Arch. Hydrobiol.* 168(1): 83-92. (in English) ["Taxonomic distinctness is a highly useful index combining species richness and taxonomic (phylogenetic) diversity to detect changes in the taxonomic structure of communities and assemblages. While analysis of an odonate assemblage before and after construction of a hydroelectric impoundment in the state of Hidalgo, Mexico, revealed no significant increase in average monthly species richness (although annual counts were slightly higher for the latter survey), taxonomic distinctness and its variation were reduced. The impoundment converted natural lotic conditions into lentic habitat with more littoral vegetation. Such conditions favoured plant-dependent species (mostly in the Zygoptera) with more species per genus and genera per family relative to those not dependent (mostly in the Anisoptera). High ratios reduce the average risk of losing higher taxonomic structure with loss of a species. Reduced taxonomic distinctness and its variation occurred at the expense of the Gomphidae and Corduliidae, and several genera in the Libellulidae having non-plant dependent species that favour inorganic substrate in flowing waters. The results contrast with the common assumption that higher odonate diversity occurs in lentic habitats. Seasonal pat-

terns of taxonomic distinctness appeared similar between surveys and may reflect reproductive and emergence cycles. The results support the use of taxonomic distinctness and its variation over species richness in ecological assessments and its application in further freshwater research. We encourage its use with aquatic insects, but recommend frequent sampling intervals to account for effects from emergence and reproductive behaviours. These results suggest new and added breadth to the value of taxonomic distinctness in ecological research regarding habitat change." (Authors)] Address: Novelo-Gutiérrez, R., Depto de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

12871. Dombrovsky, K.O. (2007): Biotopic allocation and dynamics of the number of damselfly larvae (Insecta, Odonata) of the Kakhovskoye water reservoir. Questions of aquatic entomology of Russia and adjacent lands: Materials of the Third All-Russia Symposium on Amphibiotic and Aquatic Insects. Voronezh State University. ISBN 978-5-9273-1169-9: 96-100. (in Russian, with English summary) [Between 1990 and 2000, in the floodplain waterbodies of the Kakhovskoye water reservoir, Ukraine the following Odonata species had been recorded: *Platycnemis pennipes*, *Erythromma najas*, *Enallagma cyathigerum*, *Coenagrion puella*, *C. hastulatum*, *Calopteryx splendens*, *Sympetrum sanguineum*, *Sympetma paedisca*, *Aeshna affinis*, *Anax imperator*, *Libellula depressa*, *Libellula quadrimaculata*, *Leucorrhinia pectoralis*, *Orthetrum cancellatum*, *Gomphus vulgatissimus*, *Somatochlora* sp., and *Ischnura elegans*] Address: Dombrovsky, K.O., Zaporizhzhya National University, Zaporizhzhya, Ukraine

12872. Praveen, J.; Chitra, S. (2007): Odonata watching in south Kerala. *Malabar Trogon* 5(2): 2-5. (in English) [The authors present data on Odonata species observed in three localities in South Kerala, India. A total of 11 hours were spent in the field for over five days in two trips (one during 21-23rd July 2007 and another during 24-25 August 2007). 30 Odonata species were checklisted and annotated.] Address: Praveen, J., B303, Shriram Spurthi, ITPL Main Road, Brookefields, Bangalore, India. E-mail: paintedstork@gmail.com

12873. Raju, D.V. (2007): Odonates of the Kuttanad wetland ecosystem. *Malabar Trogon* 5(1): 12-13. (in English) ["Kuttanad is primarily a deltaic formation of five-river systems, namely, Meenachil, Pamba, Manimala, Muvattupuzha and Achencovil, located in fertile lowlying areas of around Vembanad Lake. It spreads over Alappuzha, Kottayam and Pathanamthitta districts of Kerala, South West India and forms an integral part of the Vembanad-Kol Ramsar site." (Author) 45 Odonata species were listed.] Address: Raju, D.V., Valiyaparambil, Kuzhimattom.P.O, Kottayam, Kerala, India. E-mail: davidraju2007@gmail.com

12874. Vascotto, S.; Friesen-Pankratz, B. (2007): Phase I Ecological assessment of the Bear Rock and The Smokes. Report prepared for Tulita Dene Band by Rescan Environmental Services Ltd: 99 pp. (in English) [Northwest Territories, Canada; the study area is entirely within the Taiga Plains Ecozone. The majority of this ecozone is located in the southwesterly corner of the Northwest Territories, northeastern British Columbia, and northern Alberta. The ecozone is dominated by the Mackenzie River and its tributaries and is bordered to the west by cordilleran mountain ranges, to the east by Great Slave and Great Bear Lakes, and to the north by the Mackenzie Delta. 41 species of odonates were listed. Odonata species occurring in the Taiga Plains Ecozone with Territorial, Federal, or Global Status are: *Somatochlora sahlbergi*, *S. franklini*, *Stylurus notatus*, *Coenagrion resolutum*, *C. angulatum*, *C. interrogatum*, *Enallagma cyathigerum*, *Cordulia shurtleffi*, *Lestes congener*, *L. disjunctus*, *L. dryas*, *Aeshna eremita*, *A. interrupta*, *A. juncea*, *A. septentrionalis*, *A. sitchensis*, *A. subarctica*, *Ophiogomphus colubrinus*] Address: not stated

12875. Yu, W.-y.; Li, Z.-h.; Huang, C. (2007): Faunal study on Odonata in Haihui, Jiangxi province. *Sichuan Journal of Zoology* 26(1): 103-107. (in Chinese, with English summary) [31 of the 52 species recorded in 2004 and 2005 were new records for the Jiangxi Province, China.] Address: Yu, W.-y., Dept of Life Science, Nanjing Xiaozhuang University, Nanjing 210017, China. E-mail: zjyem@sina.com.cn

2008

12876. Ansori, I. (2008): Keanekaragaman nimfa Odonata (Dragonflies) di Beberapa Persawahan Sekitar Bandung Jawa Barat. *Jurnal Exacta* 6(2): 42-50. (in Indonesian, with English summary) [West Java, Indonesia; research on Odonata diversity was conducted in Antapani, Cigadung, Dago Pakar and Dago Pojok paddy fields located in Bandung. *Orthetrum sabina*, *Crocothemis servilia*, and *Anaciaeschna jaspidea* were recorded; *C. servilia* and *O. sabina* were dominant.] Address: Ansori, I., Program Studi Pendidikan Biologi Jurusan PMIPA FKIP UNIB

12877. Finch, O.-D. (2008): Die Tierwelt der Hunte im Spiegel des Aquariums. In: FANSA, M.: Beiträge zum Schauaquarium - Die Hunte: Ein Fluss durch norddeutsche Landschaften (= Schriftenreihe des Landesmuseums für Natur u. Mensch Oldenburg 58): 40-58. (in German) [Niedersachsen, Germany; the author briefly introduced into the rheophilous Odonata fauna of the river Hunte and its tributaries. Ditches in the region were inhabited by *Coenagrion mercuriale* and *C. ornatum*, and eutrophic permanent water bodies by *Aeshna viridis*.] Address: Finch, O.-D., Carl-von-Ossietzky Universität Oldenburg, Inst. Biol., AG Terrestrische Ökologie, PF 2503, 26111 Oldenburg, Germany. E-mail: oliver.d.finch@uni-oldenburg.de

12878. Grand, D.; Grossi, J.-L. (2008): Le marais de Chavas dans le nord de l'Isère et son peuplement odonatologique: inventaire, gestion et menaces. Particularités de la saison 2007. *Martinia* 24(2): 47-63. (in French, with English summary) [France; "Calopteryx haemorrhoidalis, already recorded in south Isère, has recently colonized the Charvas brook, whereas Leucorrhinia pectoralis extends its distribution area to the west of the region. The Charvas marsh has been strongly disturbed in the 30 last years, and the actual marsh represents only 21 % of its initial surface. In spite of this, it has conserved a high fauna and flora diversity. Its odonatofauna is composed of 47 species. But the future of this marsh seems threatened because of the anthropogenic extension and the climate change." (Authors)] Address: Grossi, J.-L., AVE-NIR, 10 rue Raspail, 38000-Grenoble, France

12879. Grütter-Schneider, E. (2008): Libellen im Oberaargau. Ein Beitrag zur Kenntnis der regionalen Fauna. *Jahrbuch des Oberaargaus* 51: 109-148. (in German) [The Oberaargau region is situated in the northeastern part of the Kanton Bern, Switzerland. In the past 30 years, the authors recorded 43 autochthonous Odonata species. These were presented in photographs and with information on morphology and habitat. Some records were documented with greater detail.] Address: not stated

12880. Heidecke, F. (2008): Die Goitzsche-Wildnis und ihre Libellenfauna (Odonata). *Naturschutz im Land Sachsen-Anhalt* 45: 26-35. (in German) [In 2004 and 2005, the Odonata fauna of the Goitzsche-brown coal mining area, Sachsen-Anhalt and Sachsen, Germany was studied for their Odonata fauna. A total of 38 was recorded. The species were assessed according to their habitat preferences and ability to colonize early successions states of vegetation development.] Address: Heidecke, F., Sieverstorstr. 57, 39106 Magdeburg, Germany. E-mail: libellenforscher@web.de

12881. Kolshorn, P. (2008): Kleinvieh & Co. *Naturspiegel* 70: 26. (in German) [17-XI-2008, *Sympecma fusca*, NSG Hülser Bruch, Krefeld, Nordrhein-Westfalen, Germany] Address: c/o Redaktion Naturspiegel, Hustenfeld 32, D-41379 Brüggen

12882. Luque, P.; Serra, A. (2008): *Macromia splendens* i *Gomphus graslinii*, dues noves espècies d'odonats per a Catalunya. *Butlletí Institució Catalana d'Història Natural* 74(2006): 113-116. (in Catalan) [River Igars, near Arnes, 31TBF6826, 555 m. a.s.l. 15-VI-2007, 23-VI-2007 and 07-VII-2007.] Address: Serra, A., Dept de Biologia Animal, Facultat de Biologia, Univ. de Barcelona, Avda. Diagonal, 645, Spain. E-mail: aserra@ub.edu

12883. Wildlife Conservation Society - Galle (2008): The study of the faunal diversity in Galle district, southern Sri Lanka. Final Report. Wildlife Conservation Society - Galle, Hiyare, Galle, Sri Lanka: iii + 44 pp. (in English) ["Out of 120 species of dragonflies recorded in Sri

Lanka, 62 species belonging to 12 families were recorded during this survey. This represents about 52% of the island's dragonfly fauna. Out of 62 species recorded from Galle district, 54 of them found in Kottawa-Kombala (Hiyare) forest Reserve. There were eighteen endemic and two nationally threatened species among them (IUCN Sri Lanka, 2007). *Elatoneura caesia* and *Macrogomphus lankensis* are the only nationally threatened species found in this survey. Un-described damselfly species belongs to genus *Drepanosticta* was recorded at Kanneliya & Hiyare in this survey and further analysis are ongoing to conform this finding." (Authors) Odonata species collected at 11 localities are presented on pages 15-16] Address: Wildlife Conservation Society - Galle, Biodiversity Education and Research Centre, Hiyare Reservoir, Hiyare, Galle, Sri Lanka. E-mail: info@wildlife.lk

2009

12884. Dziock, F.; Wacowska, K.; Siegl, S.; Briesenick, T.; Ernst, R. (2009): Erfassung und Bewertung der Vorkommen der Asiatischen Keiljungfer und Grünen Flussjungfer an der Elbe bei Roßlau. *Naturschutz im Land Sachsen-Anhalt* 46 (Sonderheft): 169-175. (in German) [Exuviae of *Stylurus flavipes* and *Ophiogomphus cecilia* were quantitatively sampled in groynes along a stretch of river Elbe, Sachsen-Anhalt, Germany. The conservation status of the local populations was assessed and causes of threats (gravelling of the sandy habitats between goynes) were briefly discussed.] Address: not stated

12885. Landmann, A. (2009): Die Höhenverbreitung als Indikator der Gefährdung von Insekten im Alpenraum. *Contributions to Natural History* 12: 829-856. (in German, with English summary) ["Altitudinal distribution as an indicator of threat in insects: an analysis of red data books from the Alps and adjoining regions. — The Alps represent one of the most important biodiversity hot spots in Europe but at the same time are the most developed mountain system in the world. However, human impact is very uneven within alpine landscapes. Topographical conditions restrict the space available for agriculture, settlements, traffic systems and industrial development. Human activities therefore have a focus at valley bottoms and other suitable lowland areas. While large nearly pristine areas still can be found at higher elevations, high local population densities together with intensive tourism have led to an over-exploitation and strong fragmentation of natural habitats at lower altitudes. Specialised lowland species can thus be expected to be under disproportionately strong pressure and should show an unfavourable conservation status. By contrast, species (groups) with broader altitudinal distribution or with preferences for higher elevations should experience less threat and this pattern should be expressed in the red data books as well (percentage of endangered species, distribution over threat-

categories). This hypothesis was tested using data concerning altitudinal distribution and national as well as regional red data books from different areas within the Alps (Switzerland, Austria, Tyrol, Carinthia) and at its northern border (Lower Austria, Bavaria). Dragonflies and grasshoppers were used for analysis because good and recent data are available for both groups and most regions. Species were first grouped into two (Odonata) to three (Saltatoria) main classes regarding their regional altitudinal distribution patterns: "valley (lowland) species", "midmountain species", and "mountain species", and their threat status was compared (separately per region) thereafter. For Tyrol and Switzerland more detailed data about vertical distribution (e.g. the absolute stretch of vertical distribution; the number of altitudinal zones used) exist and were directly correlated with threat status (red data categories). Overall the percentage of species regarded as "safe" (LC = least concern species) in recent red data books was significantly higher in species (species groups) belonging to the "midmountain" and especially the "mountain" groups than in species of the "valley group". The groups (esp. "valley" vs. "mountain") also strongly differed in the overall patterns (dimensions) of threat, valley species exhibiting a much higher proportion of species within the highest categories (CR = critically endangered, EN = endangered). Differences between "valley" and "mountain" species were higher in central parts of the Alps but comparatively low at the northern edge of the Alps, in Lower Austria and Bavaria. This fits to differences in overall landscape settings because both latter regions offer more area and more suitable habitats for sensitive lowland species. Moreover, for dragonflies as well as for grasshoppers, there was a clear trend of decreasing threat with increasing number of altitudinal zones inhabited in the Tyrol and Switzerland. Altitudinal distribution patterns might therefore be a useful indirect indicator of conservation problems (threat status) for animal groups in the Alps and adjoining regions, especially when more direct measures (e.g. data about population trends) are not available. However, further analysis for more and different animal groups are needed and called for to test this hypothesis." (Author)] Address: Landmann, A., Institut für Zoologie der Universität Innsbruck, Technikerstr. 25 & Institut für Naturkunde & Ökologie Karl Kapfererstr. 3, 6020 Innsbruck, Austria. E-mail: Armin.Landmann@uibk.ac.at

12886. Maynou i Sene, X. (2009): A contribution to the study of the Odonata of the Sant Llorenç del Muut Massif and Obac Range. Bull. Inst. Cat. Hist. Nat. 75(2007-2009): 85-98. (in Catalan, with English and Spanish summaries) ["An updated list of 28 species of Odonata recorded in the Sant Llorenç del Munt Massif and Obac Range (Catalonia) in 2007 and 2008 is provided, with an estimation of the degree of presence of each species. The list of species is compared to existing records, old and recent. The species-diversity observed in this study is similar to that in other Catalan nature reserves,

although most of the species found here can be considered ecological generalists. In this survey, data regarding reproduction and phenology are also provided for every species, the most important dragonfly sites are identified and actions for the conservation and improvement of the Odonata community richness are suggested." (Authors) Species of regional interest were *Sympetrum sinaiticum*, *Coenagrion caerulescens*, *C. mercuriale*, *Trithemis annulata*.] Address: Maynou i Sené, X., C. del Dr. Salva, 23. 08224 Terrassa, Spain. E-mail: xavier.maynou@gmail.com

12887. Wildlife Conservation Society - Galle (2009): The study of the faunal diversity in Matara district – southern, Sri Lanka. Final report. Wildlife Conservation society – Galle, Hiyare, Galle, Sri Lanka: III + 43 pp. (in English) ["Out of 120 species of dragonflies recorded in Sri Lanka, 51 species belonging to 10 families were recorded during this survey. This represents about 42% of the island's dragonfly fauna. There were seventeen (17) endemic and two (2) nationally threatened species among them (IUCN Sri Lanka, 2007). *Elatoneura caesia* and *Macrogomphus lankensis* are the only nationally threatened species found in this survey. The first record of Damselfly *Elatoneura tenax* from the Dediyaigala rain forest reserve that is the lowest elevation of this species recorded in Sri Lanka." (Authors) Checklist of Odonata species recorded during the survey at 14 localities is presented as appendix on pages 14-15.] Address: Wildlife Conservation Society - Galle, Biodiversity Education and Research Centre, Hiyare Reservoir, Hiyare, Galle, Sri Lanka. E-mail: info@wildlife.lk

2010

12888. Aguzzi, S. (2010): Studio sulla comunità di Odonati del Lago Boscaccio. Natura Boscaccio: i Quaderni - n. 1: 77 pp. (in Italian) [20 Odonata species were recorded at lake Boscaccio (Milano province, Italy). *Stylurus flavipes* was for the first time reported from the province and *Gomphus vulgatissimus* represents the first provincial record since the 1960s. Additional species of regional interest were *Orthetrum albistylum*, *Sympetrum pedemontanum*, *S. depressiusculum*, and *S. meridionale*.] Address: Aguzzi, S. c/o Dipto Biol. Anim., Univ. Pavia, Pavia, Italy

12889. Archer, M.W. (2010): Retention, movement, and the biotic response to large woody debris in the channelized Missouri River. M.Sc. Thesis, Graduate College at the University of Nebraska, Lincoln, Nebraska: X + 116 pp. (in English) ["Large woody debris (LWD) is an important component of a healthy aquatic ecosystem. However, little is known about the dynamics of LWD in a large, channelized river such as the Missouri River. My objectives were to first, assess the abundance of LWD found along the channelized portion of the Missouri River. Second, I documented movement of LWD that entered the river. Lastly, using PRIMER software I ana-

lyzed what effect, if any, river segments, bend types, and LWD had on the community composition of the macroinvertebrate and fish that inhabit the river. Abundance of LWD was greater along bends that have flow diverted away from the bank compared to bends that had recent modifications to divert flow to the shore (major modification bends) and areas with little bank armouring, such as, side channel chutes ($P < 0.05$). Recruitment of LWD into the river that could become available as aquatic habitat occurred mostly within 5 m of the bankfull width (BFW). Telemetry analysis of LWD showed that LWD located within the BFW of the river was often (63% of LWD) displaced downstream. Minimum distance of displaced LWD was 0.02 rkm, median distance was 146.50 rkm, and maximum distance was 1454.69 rkm. No differences were found in the community composition of macroinvertebrates between segments ($P = 0.43$) or between bend types (0.074). Community composition did differ between LWD and non-LWD sites ($P = 0.016$). Fish communities differed between the segments ($P = 0.043$) therefore further analyses were split between the segments. Segment 8 fish communities did not differ between bend types ($P = 0.35$) or between LWD and non-LWD sites ($P = 0.55$). Results were similar in Segment 9 (bend types ($P = 0.20$), LWD and non-LWD sites ($P = 0.19$)). Combining the macroinvertebrate communities and fish communities to test for differences in the combined biota community composition showed that differences did not exist between the segments ($P = 0.59$) or bend types ($p = 0.29$). However, the composition of the composite community was different between LWD and non-LWD sites ($P = 0.011$). My results suggest that while retention of LWD is low it still has an effect on the composition of the composite communities that inhabit the Missouri River." (Author Taxa including Odonata are treated at the order level.] Address: Archer, M.W., University of Nebraska at Lincoln, USA. E-mail: michael.archer@huskers.unl.edu

12890. Cobb, M. (2010): The damselfly enigma: better bigger or smaller? Outside JEB doi: 10.1242/?jeb.036665 September 1, 2010 J. Exp. Biol. 213: VI. (in English) [Verbatim: "Damselflies show abrupt, darting flight, which is the envy of aero-engineers. This amazing ability is used both to capture prey and, by males, to establish territories that can attract females. Insects are ectothermic, so maintaining this flying ability in the face of fluctuating environmental changes is a major challenge. Furthermore, body size has both a direct effect on manoeuvrability and an indirect effect, through its impact on heat retention. Two Japanese researchers from Kyoto University, Yuka Samejima and Yoshitaka Tsubaki, have studied how body size and temperature affect flight ability in this stunning insect. The damselfly they chose to study – *Mnais costalis* – lives by fast-flowing mountain streams and shows male polymorphism: orange-winged larger males tend to have territories while clear-winged smaller males do not. These morphs reflect different mating strategies, with smaller males

'sneaking' mating opportunities. The authors used an infrared thermographic camera to measure the surface temperature of males, which they manipulated in the laboratory by using a halogen lamp, and studied the flight performance of each male. They estimated maximum lifting force and size-corrected lifting force, which they measured by attaching weights to the insects' wings with fishing line. Size-corrected lifting force is an index of acceleration that is linked to the damselfly's superb aerial acrobatics. The authors found that both measures of flight performance were positively correlated with body temperature. This is not particularly surprising, as it is well known that insect flight muscle activity increases with temperature. However, although body size led to higher maximum lifting force, it was negatively correlated with size-corrected lifting force. Simply put, larger males were less agile. When the authors took their thermographic camera into the field, they discovered that the story was even more complex: larger, territorial, males showed substantial variation in body temperature, as their territory showed varying patches of light and shade. Smaller, non-territorial males, however, generally had higher body temperatures, as they tended to bask in sunlit areas, as part of their 'sneaky' mating strategy. This combination of behavioural ecology and physiology enriches our understanding of the maintenance of polymorphic mating strategies in this species. Due to their smaller body size and their more constant, higher body temperature, smaller males are apparently more agile, and therefore gain an advantage in terms of 'sneaky' mating and avoiding predation. However, their smaller size means that they are less able to lift females – essential during mating – or to combat larger males. The best strategy, it would appear, would be to be a large male with a perpetually sunlit territory. Indeed, the authors' unpublished data suggest that such males have higher reproductive success. However, such territories are rare and may be temporally or physically fragile; natural selection has led to the current polymorphism of alternative male strategies, with underlying alternative physiologies. Who would have thought that the beautiful flight of the damselfly concealed such complexity?" For the full paper see: Samejima, Y. and Tsubaki, Y. (2010). Body temperature and body size affect flight performance in a damselfly. *Behav. Ecol. Sociobiol.* 64, 685-692.] Address: Cobb, M., University of Manchester, UK. E-mail: cobb@manchester.ac.uk

12891. Cordero Rivera, A.; Córdoba-Aguilar, A. (2010): 15. Selective forces propelling genitalic evolution in Odonata. In: Edited by Janet Leonard and Alex Córdoba-Aguilar (eds.): *The Evolution of Primary Sexual Characters in Animals*. ISBN13: 9780195325553. 552 pp: 332-352. (in English) ["Conclusions and suggestions for future research: Although it seems that sexual selection, particularly sperm competition, is an important force shaping genital morphology and function, other selective forces cannot be disregarded. Other sexual selec-

tion forces are cryptic female choice and sexual conflict. A similar argument can be made for natural selection hypotheses, especially the lock and key hypothesis. Further investigations should test hypotheses from both sexual and natural selection. Our knowledge of genital functional morphology is still rather poor for many families of Anisoptera (but see Pfau 2005; for a comprehensive work see Siva-Jothy 1997), and this is especially true for females. Another research priority is tropical families, and also species-poor and primitive taxa, like the Hemiphysbiidae or Petaluridae. Furthermore, study of the genital morphology of highly diverse and localized taxa, like *Megalagrion* in Hawaii (Polhemus & Asquith 1996) or *Nesobasis* in Fiji (Donnelly 1990), both with more than 20 species, would be appropriate tests of hypotheses of genital evolution and speciation on islands. As we have mentioned above, there is limited evidence for mating frequency having negative effects on females, and we lack direct evidence for genital damage, two predictions derived from sexual conflict hypotheses, and therefore open to future studies. Finally, the lock-and-key and pleiotropy hypotheses are still not formally tested with odonates, a group that offers high rewards for future studies of genital diversity." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

12892. Eichinger, E.; Reinhard, U. (2010): Libellenwochenende - elsässisch-baden-württembergisches Austauschtreffen am 23.- und 24. Juli, diesmal in Baden-Württemberg. *Mercuriale* 10: 53-55. (in German) [Report on a dragonfly weekend in the Lake Constance region.] Address: Eichinger, Eva-Maria, Galgenbergstr. 18, 72072 Tübingen, Germany

12893. Gourmand, A.-L.; Vanappelghem, C. (2010): Protocole de suivi des espèces prioritaires. *Martinia* 26(3-4): 186-187. (in French, with English summary) ["Minutes of the workshop about the French Dragonfly monitoring scheme are summarized. The bases of this project are laid in accordance to the experience of the Dutch Monitoring Scheme." (Authors)] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

12894. Hideto, K (2010): [Dragonfly charm]. *Japic News* 313: 8-9. (in Japanese) [Kita Hideto is the responsible director of the pharmaceutical company Novartis for public relations. In this paper, he gives a personal insight in his relationship to dragonflies and introduces into some culture historical aspects of dragonflies in Japan.] Address: not stated

12895. Houard, X. (2010): Le Plan national d'actions (PNA) en faveur des Odonates menacés en France métropolitaine. *Martinia* 26(3-4): 182-185. (in French, with English summary) ["The French action plan for

threatened Odonata. Facing threats to Odonata and aware of issues related to the conservation of those insects which are typical and emblematic of wetlands, the French government launched a national plan of specific actions for their conservation. This plan covers the 18 most endangered dragonfly species in the metropolitan territory (*Lestes macrostigma*, *Sympecma paedisca*, *Coenagrion caerulescens*, *C. lunulatum*, *C. mercuriale*, *C. ornatum*, *Nehalennia speciosa*, *Aeshna caerulea*, *Gomphus flavipes*, *G. graslinii*, *Lindenia telraphylla*, *Ophiogomphus cecilia*, *Oxygastra curtisii*, *Macromia splendens*, *Leucorrhinia albifrons*, *L. caudalis*, *L. pectoralis*, *Sympetrum depressiusculum*). The main types of actions envisaged under this plan are summarized." (Author)] Address: Houard, X., Centre Entomologique de Ressources pour la Conservation, Office pour les insectes et leur environnement (Opie), BP 30, 78041 Guyancourt Cedex, France. E-mail: xavier.houard@insectes.org

12896. Ineichen, S.; Ruckstuhl, M. (2010): Stadtfauna: 600 Tierarten der Stadt Zürich. Haupt Verlag, Bern: 446 pp. (in German) [The chapter on Odonata is written by André Rey. On pages 124-143, he introduces into 38 Odonata species. Each is represented by a photograph, condensed information on habitat and morphology and a map with records in the town of Zürich, Switzerland. The record of *Gomphus simillimus* far away from the next known reproduction habitat along river Rhine is of special interest.] Address: Rey, A. E-mail: ar@andre-rey.ch

12897. Krieg-Jacquier, R. (2010): *Epithea bimaculata* (Charpentier, 1825) dans le département de l'Ain (Odonata, Anisoptera, Corduliidae). *Martinia* 26(3-4): 83-97. (in French, with English summary) ["This paper deals with the distribution of *Epithea bimaculata* in the Ain department (Rhône-Alpes region, France). After the review of the 19 sites where the species occurs, the author points out its possible univoltinism within two of them." (Author)] Address: Krieg-Jacquier, R., 18 rue de la Maçonne, 73000 Barberaz, France. E-mail: regis.krieg.jacquier@gmail.com

12898. Kunz, B. (2010): Ein ungewöhnliches Zuhause: Brutfürsorge der Krabbenspinne *Xysticus cristatus* in einer Vierfleck-Exuvie (*Libellula quadrimaculata*). *Mercuriale* 10: 51-52. (in German) [19-VI-2010, Heimatsee, Schwäbisch-Hall, Baden-Württemberg, Germany; The exuvia of *L. quadrimaculata* is used by a spider for oviposition] Address: Kunz, B., Hauptstr. 111, 74595 Langenburg, Germany. E-mail: libellen@berndkunz.de

12899. Leclerc, D.; Angelibert, S.; Rosset, V. (2010): Les Libellules (Odonates) des étangs piscicoles de la Dombes. *Martinia* 26(3-4): 98-108. (in French, with English summary) [A total of 34 species were observed between 2007 and 2009 in 79 fish ponds of the Dombes region, France. Their distribution and abundance were compared with the illustrated atlas of Odonata

from Rhône-Alpes (Deliry, 2008). *Coenagrion pulchellum*, *Enallagma cyathigerum*, *Erythromma lindenii*, and *Libellula fulva* were new for the Dombes area. "Finally our observations confirm the strong implantation of *Leucorrhinia pectoralis* in the fish ponds of the Dombes region and provide more accurate information on the habitat used by the adults of this species, which possesses a strong heritage value." (Authors)] Address: Leclerc, D., Haute École du Paysage, d'ingénierie et de l'Architecture (HEPIA), 150 route de Lullier, 1254 Jussy-Genève, Switzerland

12900. Lockwood, M. (2010): Nuevas citas de *Cordulegaster bidentata* Selys, 1842 (Odonata: Cordulegasteridae) de los Pirineos catalanes. *Boletín de la S.E.A.* 46(1): 506-508. (in Spanish, with English summary) ["New records of *C. bidentata* from the Catalan Pyrenees: New records of *C. bidentata* from the Catalan Pyrenees are described. The situation of the species in the region is also discussed, along with its possible choice of habitat." (Author)] Address: Lockwood, M., Grupo Oxygastra, Institució Catalana d'Història Natural, Carrer del Carme, 47; 08001 Barcelona, Spain. E-mail: mike@walkingcatalonia.net

12901. Ott, J. (2010): Résumé de la communication orale: Alien Invasive Species (AIS) - a threat for European dragonflies? *Martinia* 26(3-4): 167. (in English) [Verbatim: After the negative effects of climatic changes presently a new threat becomes more and more important for European dragonflies: Alien Invasive Species (AIS). As a consequence of the globalisation, introductions by aquarists and fishermen many new species can be found in the waters. Some of them also do reproduce and are increasing their ranges, out of these species some are having negative - some even dramatic - effects on the biocoenosis. In particular some fish (e.g. *Ctenopharyngodon idella*) and crayfish species (e.g. *Orconectes limosus*, *Procambarus* sp., *P. clarkii*) could be identified as dangerous for the native dragonfly fauna, as they are altering the biotic conditions or the food chain (e.g. reduction of water plants - lack of substrate for oviposition) or as they are strong direct predators for the larvae. As these AIS often are favoured by higher temperatures, climatic changes and AIS now may have synergistic and cumulative effects. After a short review on recent developments and trends of the distribution and ecology of Odonata in Europe the possible consequences for nature conservation and the future for native dragonfly populations are outlined. In this context also the results of a current research on the effects of crayfish on dragonfly larvae and other water organisms will be presented.] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

12902. Savart, J.-P. (2010): Contribution à l'étude des Odonates de Guadeloupe Observations sur trois sites à Pigeon (Commune de Bouillante, Côte-sous-le-Vent,

Basse-Terre). *Martinia* 26(3-4): 168-177. (in French, with English summary) ["The author studied three sites western from the mountains of Basse-Terre, in the vicinity of river Lostau, between its mouth and the central part of Guadeloupe National Parc. Fourteen species were recorded whom three are endemic to the island. With the aim to enhance the conservation of Odonata, especially transfer throughout the Lostau valley, the author emphasizes the role of artificial biotopes and proposes to create aquatic habitats and further, to favour education in order to involve as much people as possible not only in the improvement of knowledge of these insects but also in the conservation of their habitats." (Author)] Address: Savart, J.-P., Habitation Dumoulin, BP 2 Pigeon, 97125 Bouillante, Guadeloupe

12903. Schmitt, V. (2010): Inventaire des populations de *Coenagrion mercuriale* (Charpentier, 1840) dans le bassin de la Chiers (Odonata, Zygoptera: Coenagrionidae). *Martinia* 26(3-4): 123-131. (in French, with English summary) ["For the needs of the project Interreg IVa Big Region entitled "Preservation of the remarkable natural elements of the Chiers basin in the Belgian and French Lorraine", it was necessary to know better the localization of the populations of *C. mercuriale* in the Chiers watershed. The method used and the results are both described in this paper." (Author) 168 habitats were studied. 42 localities harboured local populations of *C. mercuriale*.] Address: Schmitt, V., Conservatoire des Sites Lorrains, 14 rue de l'Eglise, F-57930 Fénétrange, France

12904. Tabarroni, A. (2010): Odonata in the "Malmerendi" Collection, Faenza Civic Museum of Natural Sciences. (*Insecta Odonata*). *Quaderno di studi e notizie di storia naturale della Romagna* 31: 37-46. (in Italian) ["The dragonfly specimens preserved in the entomological collection of Domenico Malmerendi (1900-1980) have been identified. The whole collection is made up of approx. 81,000 specimens and is the principal component of the Civic Museum of Natural Sciences in Faenza (Ravenna, Italy). The Dragonfly section contains 80 specimens, belonging to 16 genera and 30 species. The peculiar interest of this collection is due to its confined geographic provenience and also to the period of time in which it was assembled." (Author)] Address: Tabarroni, A., via Domenico Zampieri, 24, 40129 Bologna, Italy. E-mail: altabar@tiscali.it

12905. Vanappelghem, C.; Hubert, B. (2010): Suivi de la population de *Coenagrion mercuriale* (Charpentier, 1840) dans la Réserve naturelle régionale des dunes et hauts de Dannes-Camiens (Pas-de-Calais) (Odonata, Zygoptera: Coenagrionidae). *Martinia* 26(3-4): 131-137. (in French, with English summary) ["A monitoring of *C. mercuriale* and of its habitat has been tested on a regional nature reserve in the Nord-Pas-de-Calais region, France. Species monitoring appeared to reflect real population trends, but the analysis of key habitat attrib-

utes monitoring could not clearly explain the observed population decline with changes in habitat. However an artificial seasonal variation of the water depth could be related with this decline." (Author)] Address: Vanappelghem, C., 14, rue Brûle Maison, F-59000 Lille, France. E-mail: cedvana@free.fr

12906. Wu, D.-h.; Wang J.-t.; Zhang, Y.; Wang, B.-x.; Li, Y.-q.; Shen, Y.f. (2010): River water bioassessment with benthic macroinvertebrate in Lianyungang, Jiangsu province. *The Administration and Technique of Environmental Monitoring* 22(1): 29-32. (in Chinese, with English summary) ["Benthic macroinvertebrates assemblages were collected from 7 sites of 5 Lianyungang rivers in May, 2008. A total of 67 macroinvertebrate taxa (no taxonomic details are given) were found including 18 genera in Diptera, 11 genera in Odonata, 24 species in Mollusca, 5 species and 4 genera in 4 families of Annelida. All sampling sites were plotted out 3 groups by CCA ordination analysis. The water quality was assessed by the Shannon-Wiener diversity index, Biotic Index and COD, the result of diversity index was quite different from those of BI and COD, while the results between BI and COD were similar. Based on above three indicators, the quality of Qianwei river was clean and other rivers were from slight to middle pollution. The Pearson's correlation analysis showed that BI corresponded strongly with TN ($r=0.913$, $p=0.004$) and Shannon-Wiener diversity index had no correlation with TN ($r=0.257$, $p=0.578$)."] (Authors)] Address: Wu, D.-h., Lab of Aquatic Insects and Stream Ecology, Department of Entomology, Nanjing Agricultural University, Nanjing, Jiangsu 210095, China

2011

12907. Ayme-Southgate, A.; Philipp, R.A.; Southgate, R.J. (2011): Projectin PEVK domain, splicing variants and domain structure in basal and derived insects. *Insect Molecular Biology* 20(3): 347-356. (in English) ["The third elastic filament of striated muscles consists of giant proteins: titin (in vertebrates) and kettin/projectin (in insects). In all three proteins, elasticity is at least partly associated with the so-called PEVK domain. The projectin PEVK domains of diverse insects are highly divergent compared with an otherwise conserved protein organization. We present the characterization of the PEVK domain in two dragonflies (*Pachydiplax longipennis*, *Libellula pulchella*) and in human lice. A conserved segment at the end of the PEVK, the NH(2)-terminal conserved segment-1 (NTCS-1), may serve as an anchor point for projectin to either myosin or actin, providing a mechanical link. The analysis of alternative splicing variants identifies the shortest PEVK isoform as the predominant form in the flight muscles of several insects, possibly contributing to myofibrillar stiffness."] (Authors)] Address: Ayme-Southgate A., Department of Biology, College of Charleston, Charleston, SC, USA. E-mail: southgatea@cofc.edu

12908. Barnard, P. (2011): Royal Entomological Society Book of British Insects. John Wiley & Sons: 368 pp. (in English) ["This book is the only modern systematic account of all 558 families of British insects, covering not just the large and familiar groups that are included in popular books, but even the smallest and least known. It is beautifully illustrated throughout in full colour with photographs by experienced wildlife photographers to show the range of diversity, both morphological and behavioural, among the 24,000 species. All of the 6,000 genera of British insects are listed and indexed, along with all the family names and higher groups. There is a summary of the classification, biology and economic importance of each family together with further references for detailed identification. All species currently subject to legal protection in the United Kingdom are also listed. The Royal Entomological Society (RES) ... began its famous Handbooks for the Identification of British Insects in 1949, and new works in that series continue to be published. The RES Book of British Insects has been produced to demonstrate the on-going commitment of the RES to educate and encourage each generation to study these fascinating creatures. This is a key reference work for serious students of entomology and amateur entomologists, as well as for professionals who need a comprehensive source of information about the insect groups of the British Isles they may be less familiar with."] (Publisher) Chap. 8 treats Odonata.] Address: Royal Entomological Society, The Mansion House, Chiswell Green Lane, St Albans AL2 3NS, UK

12909. Blanchon, V.; Durand, E.; Lambret, P. (2011): Redécouverte de *Gomphus flavipes* (Charpentier, 1825) en Provence-Alpes-Côte d'Azur (Odonata, Anisoptera: Gomphidae). *Martinia* 27(2): 121-122. (in French) [In June and July 2011, exuviae of *Stylurus flavipes* were found at the shore of the Isle of Saxy, Rhône, north of Arles (43,70972° N / 4,618611° E), France.] Address: Blanchon, V., Chemin de la Mourgatte, F-26200 Montélimar, France. E-mail: yoann.blanchon@orange.fr

12910. Bogan, M.T.; Lytle, D.A. (2011): Severe drought drives novel community trajectories in desert stream pools. *Freshwater Biology* 56: 2070-2081. (in English) [Arizona, USA; "(1.) Ecological communities can be relatively stable for long periods of time, and then, often as a result of disturbance, transition rapidly to a novel state. When communities fail to recover to pre-disturbance configurations, they are said to have experienced a regime shift or to be in an alternative stable state. (2.) In this 8-year study, we quantified the effects of complete water loss and subsequent altered disturbance regime on aquatic insect communities inhabiting a formerly perennial desert stream. We monitored two study pools seasonally for 4 years before and 4 years after the transition from perennial to intermittent flow to evaluate pre-drying community dynamics and post-drying recovery trajectories. (3.) Mean species richness

was not affected by the transition to intermittent flow, though seasonal patterns of richness did change. Sample densities were much higher in postdrying samples. (4.) The stream pool communities underwent a catastrophic regime shift after transition to intermittent flow, moving to an alternative stable state with novel seasonal trajectories, and did not recover to pre-drying configurations after 4 years. Six invertebrate species were extirpated by the initial drying event, while other species were as much as 40 times more abundant in post-drying samples. In general, large-bodied top predators were extirpated from the system and replaced with high abundances of smaller-bodied mesopredators. (5.) Our results suggest that the loss of perennial flow caused by intensified droughts and water withdrawals could lead to significant changes in community structure and species composition at local and regional scales." (Authors) *Libellula saturata* was a significant pre-drying indicator.] Address: Bogan, M.T., Department of Zoology, Oregon State University, Corvallis, OR, USA. E-mail: boganmi@science.oregonstate.edu

12911. Courant, S.; Meme-Lafond, B. (2011): Écologie et gestion des populations de *Leucorrhinia albifrons* (Burmeister, 1839) et *L. caudalis* (Charpentier, 1840) (Odonata, Anisoptera: Libellulidae) sur un étang du Saumurois (département du Maine-et-Loire). *Martinia* 27(2): 81-94. (in French, with English summary) ["*Leucorrhinia albifrons* and *L. caudalis* were discovered at a forest pool in Gennes (Maine-et-Loire) during summer 2009, several hundred miles away from their nearest breeding sites. The first is a new species to the Pays de la Loire, whereas the second was regularly observed at a site more and more altered since 2006. Following this discovery, a survey is carried out to study both the ecology of these *Leucorrhinia* species and the crucial habitat parameters for their survival. The research based on both exuviae' and adults' surveys brought us phenological and ecological data on these species, and emphasized the role of dense aquatic vegetation which allows the survival of larvae over their entire development period. Water quality and structure of vegetation also play a vital role for *L. caudalis* and *L. albifrons* during reproduction. The management plan based on these data provides suitable suggestions to ensure the optimal conditions for these Whitefaces." (Authors)] Address: Courant, S., LPO Anjou, 10 rue de Port Boulet, 49080 Bouchemaine, France. E-mail: courantsylvain@yahoo.fr

12912. Doucet, G.; Duret, B. (2011): Contribution à la connaissance de *Somatochlora metallica meridionalis* Nielsen, 1935 en Corse (Odonata, Anisoptera: Corduliidae). *Martinia* 27(1): 33-38. (in French, with English summary) ["The records dealing with *S. meridionalis* in Corsica since its discovery in 2001 are summed up. The discovery of this taxon in the Haute-Corse department in June 2009 extends its range considerably to the North in the island. The habitats from which it is known and the odonatological assemblages associated

to this Corduliidae are detailed." (Authors)] Address: Doucet, G., 74 rue de la Colonie, 75013 Paris, France. E-mail: guillaume.doucet@yahoo.fr

12913. Duda, J.J.; Beirne, M.M.; Larsen, K.; Barry, D.; Stenberg, K.; McHenry, M.L. (2011): Aquatic ecology of the Elwha River estuary prior to dam removal. In: Duda, J.J., Warrick, J.A., and Magirl, C.S., eds., 2011, Coastal habitats of the Elwha River, Washington - Biological and physical patterns and processes prior to dam removal: U.S. Geological Survey Scientific Investigations Report 2011-5120, 264 pp: 175-223. (in English) ["The removal of two long-standing dams on the Elwha River in Washington State will initiate a suite of biological and physical changes to the estuary at the river mouth. Estuaries represent a transition between freshwater and saltwater, have unique assemblages of plants and animals, and are a critical habitat for some salmon species as they migrate to the ocean. This chapter summarizes a number of studies in the Elwha River estuary, and focuses on physical and biological aspects of the ecosystem that are expected to change following dam removal. Included are data sets that summarize (1) water chemistry samples collected over a 16 month period; (2) beach seining activities targeted toward describing the fish assemblage of the estuary and migratory patterns of juvenile salmon; (3) descriptions of the aquatic and terrestrial invertebrate communities in the estuary, which represent an important food source for juvenile fish and are important water quality indicators; and (4) the diet and growth patterns of juvenile Chinook salmon in the lower Elwha River and estuary. These data represent baseline conditions of the ecosystem after nearly a century of changes due to the dams and will be useful in monitoring the changes to the river and estuary following dam removal." (Authors) Taxa (including Odonata) were treated at order level.] Address: not available

12914. Fiorenza, T.; Del Bianco, C.; Chiandetti, I.; Uboni, C.; Zandigiacomo, P. (2011): Gli Odonati del Friuli Venezia Giulia: risultati di uno studio triennale. *Bollettino Soc. Naturalisti "Silvia Zenari", Pordenone* 35: 109-122. (in Italian with English summary) ["During the period 2009-2011, a survey was carried out on the occurrence and distribution of Odonata in the Friuli Venezia Giulia region (north-eastern Italy). The aim of this study is to provide a regional Atlas of the Odonata at the end of 2013. Fifty-one species of Odonata have been found. This number agrees with the previous checklists of Kiauta (1969; 52 species) and Pecile (1984; 55 species). The occurrence of the Zygopteran *Nehalennia speciosa*, a threatened species, and of the Anisopteran *Cordulegaster heros*, a species widespread in the Balkan area and included in the Annexes II and IV of the Habitat Directive (Dir. 92/43/CEE) is extremely important from a naturalistic point of view. Both species are present in Italy only in Friuli Venezia Giulia. Further survey is expected to be planned in the next years, that will lead to the detection in the region of

about ten new species." (Authors)] Address: Fiorenza, T., Via Morosina 17/c, 33100 Udine, Italy. E-mail: E-mail: tizianofiorenza@libero.it

12915. Grand, D.; David, G.; Hahn, J.; Hentz, J.-L.; Krieg-Jacquier, R.; Roncin, P. (2011): *Gomphus flavipes* (Charpentier, 1825) à Lyon (Rhône) et nouvelles localités rhônalpines (Odonata, Anisoptera: Gomphidae). *Martinia* 27(1): 27-30. (in French, with English summary) ["In a previous communication, GRAND et al. (2011) reported the rediscovery of *Gomphus flavipes* in the Rhone hydrographic system, where this species had been found in 33 localities on the Rhône, the Doubs and the Saône rivers. Additional surveys conducted in mid-June 2009 and during summer 2010, allowed us to add 25 new municipalities for this species, its presence being mainly demonstrated by the finding of exuviae. All localities were located in the Ain and Rhone departments and two exuviae were found in the city of Lyon, one on the Saône and the other on the Rhone rivers." (Authors)] Address: Roncin, P., 36 chemin de l'Étang Neuf, 01000 Saint-Denis-lès-Bourg, France

12916. Gu, W.; Ma, L.; Ding, X.H.; Zhang, J.; Han, Z.W. (2011): Insect diversity of different habitat types in Zhalong Wetland, northeast China. *Chinese Journal of Applied Ecology* 22(9): 2405-2412. (in Chinese) ["In order to approach the effects of different habitat types in wetland on insect diversity, an investigation was conducted on the insects in eight types of habitats in Zhalong Wetland. A total of 5822 insects were collected, belonging to 143 species, 58 families, and 11 orders, among which, Orthoptera, Diptera and Odonata ("Libellulidae, Platycnemididae") were the dominant taxa. The species diversity was the highest in grassland meadow, and the Shannon diversity index and evenness index were higher in lakeside but the lowest in wet meadow. Cluster analysis and principal component analysis showed that the similarity of the insect community in the habitats was related to the water source status and vegetation type, and the species and individual number of predatory taxa had important regulation effects on the insect community stability. Lakeside had the strongest insect community stability, while wet meadow had the weakest one, indicating that habitat water source status could affect insect survival, and further, affect the species composition and distribution pattern of insect community." (Authors)] Address: Gu, W., School of Forestry, Northeast Forestry University, Harbin 150040, China. guwei20042109@yahoo.com.cn

12917. Houard, X.; Simon, A. (2011): Bilan à mi-parcours du projet d'atlas des Odonates de Normandie. *Martinia* 27(1): 1-6. (in French, with English summary) ["The Atlas Project of the Dragonflies of Normandy (France) was launched by the volunteer group CERCION in 2004. After the project has running on for six years the mid-term review which is proposed below marks the handover between the two coordinators of

the group. Several maps are presented demonstrating progress in regional mapping of Odonata fauna." (Authors)] Address: Houard, X., Groupe CERCION (Collectif d'Études Régional pour la Cartographie et l'Inventaire des Odonates de Normandie), E-mail: x.houard@gmail.com

12918. Juliand, P.; Guillon, B. (2011): In memoriam Renaud Bemhard. *Martinia* 27(2): 143-144. (in French) [Obituary.] Address: Juliand, P., Le serre F - 07110 Joannas, France. E-mail: christine.juliand@wanadoo.fr

12919. Kiran, C.G.; Raju, D.V. (2011): Checklist of Odonata of Kerala with their Malayalam names. *Malabar Trogon* 9(3): 31-35. (in English) [India; 147 Odonata species were listed.] Address: Raju, D.V., Valiyaparambil, Kuzhimattom.P.O, Kottayam, Kerala, India. E-mail: davidraju2007@gmail.com

12920. Labbaye, O. (2011): Les Odonates du marais de Larchant (département de la Seine-et-Marne). *Martinia* 27(2): 69-80. (in French, with English summary) [France; Odonata species of special interest for the Île-de-France region are *Anaciaeschna isosceles*, *Leucorhinia caudalis*, *L. pectoralis* and *Somatochlora metallica*.] Address: Labbaye, O., Office de Génie Ecologique-O.G.E. 5 boulevard de Créteil, 94100 Saint-Maur-des-Fossés, France. E-mail: o.labbaye@oge.fr

12921. Lambret, P. (2011): Cas d'un mâle d'*Anax parthenope* (Selys, 1839) se nourrissant au sol renversé sur le dos (Odonata, Anisoptera: Aeshnidae). *Martinia* 27(1): 66-67. (in French) [06-VI-2009, Marais Vigueirat, Camargue, France. *A. parthenope* preyed on a male of *Orthetrum cancellatum*. Landing on the ground, *O. cancellatum* clung to short grass stems, causing *A. parthenope* to turn to its back and to devour the prey in this position.] Address: Lambret, P., Cabane de Ligagneau, Marais du Vigueirat, F-13104 Mas-Thibert, France. E-mail: philambret@hotmail.com

12922. Lambret, P. (2011): Observation précoce d'un individu sénéscent de *Crocothemis erythraea* (Brullé, 1832) et discussion sur son origine (Odonata, Anisoptera: Libellulidae). *Martinia* 27(2): 135-137. (in French, with English summary) ["I observed in the beginning of May 2011 an old female of *C. erythraea* which had very damaged wings. This state indicates that this individual was old and could not have emerged in the area during the year of observation. It was rather an individual which succeeded in overwintering and/or which came from southern latitudes." (Author)] Address: Lambret, P., Cabane de Ligagneau, Route de l'Etoumeau 13104 Mas-Thibert, France. Email: philambret@hotmail.com

12923. Lambret, P. (2011): Rejet d'une proie capturée par un Zygoptère (Odonata) et implication en terme de chemioréception. *Martinia* 27(2): 141-142. (in French, with English summary) ["A female of *Lestes macrostigma*

ma which captured a Coleoptera Coccinellidae and abandoned it then has been photographed. It seems that the prey has been rejected because of distasteful reasons. This observation sustains the fact that Odonata have chemoreceptors which are dedicated to taste." (Author)] Address: Lambret, P., Cabane de Ligagneau, Route de l'Etoumeau 13104 Mas-Thibert, France. Email: philambret@hotmail.com

12924. Lin, B.; Hu, H.; Zhu, X. (2011): Preliminary investigation on the dragonfly resources in Jiangxi Jiulianshan National Nature Reserve. *Jiangxi Forestry Science and Technology* 2011(04): 41-43, 63. (in Chinese, with English summary) ["43 species of Odonata from Jiulianshan Nature Reserve including 8 families and 30 genera were reported in this paper. 5 species (*Vestalis gracilis*, *Ceriagrion latericum* ryukyuanum *Asahina*, 1967 [sic], *Gynacantha japonica*, *Idionyx claudia*, *Orthetrum luzonicum*) were new records of insect from Jiangxi province. Fauna analysis indicated that the dominant fauna in this region are Oriental. Of all these components in the fauna, there are 25 species of Oriental, 13 species of Palaear-oriental species, and 5 wide-spread species, which accounts for 58.14%, 30.23%, and 11.63% of all species, respectively. A few of them belong to Palaearctic species." (Authors)] Address: Lin, B., Jiulianshan National Natural Reserve Administration, Longnan Jiangxi 341700, China. Email: lbzh903@163.com

12925. Lindsay, M.K. (2011): Effects of a Freshwater Turtle (*Trachemys scripta elegans*) on Ecosystem Functioning in Experimental Ponds. Theses and Dissertations-Biology. Paper 38. Texas State University, San Marcos, Texas: XIII + 61 pp. (in English) [Man-made ponds located on Griffith League Ranch in Bastrop, Texas, USA. Turtles were found to have not significant influence on both taxa richness and individual abundance of Odonata.] Address: not stated.

12926. Luczak, C.; Godin, J.; Vanappelghem, C. (2011): Intérêt des listes d'espèces des Naturalistes du XIXe - XXe siècles: le cas du Nord - Pas-de-Calais, de l'ère Giard (XIXe siècle) à l'ère Kérautret (XXe siècle). In: Schmitt, F.G. (ed) *Observation des écosystèmes marins et terrestres de la Côte d'Opale: du naturalisme à l'écologie*. U.O.F., Paris. ISBN: 978-2951062528: 147-156. (in French, with English summary) ["Species list of Mammals, Birds, Dragonflies and Amphibians were compared at a century scale: end of the XIXth century versus end of the XXth century. Presence/absence data of breeding animals were used. The area covered was the Nord - Pas-de-Calais region, northern France (12 500 km²). Biases in data were identified and were taken into account in data selection and analysis (Sørensen index and McNemar test). Significant changes were detected for taxa with great dispersion ability: birds and dragonflies. When the results are viewed at a larger spatial scale in north-west Europe, species at their

southern distribution edge were still present in northern France, and species at their northern distribution edge were extending their range northward. These changes were supposed to be linked to climate changes." (Authors)] Address: Vanappelghem, C., 14, rue Brûle Maisson, F-59000 Lille, France. E-mail: cedvana@free.fr

12927. Meurgey, F.; Poiron, C. (2011): The true *Dythemis multipunctata* Kirby, 1894, from the West Indies and proposed new taxonomic status (Odonata: Anisoptera: Libellulidae). *Zootaxa* 3019: 51-62. (in English) ["The true *D. multipunctata* is illustrated and the female is described for the first time based on specimens from the type locality, St. Vincent (Lesser Antilles). The taxonomic status of the species is discussed, and notes on behaviour, habitat, and range distribution are provided. *D. multipunctata* is to be considered a subspecies of *D. sterilis* (Hagen), and mainland populations previously known as *multipunctata* are now to be called *D. nigra* Martin." (Authors)] Address: Poiron, Celine, Société d'Histoire Naturelle L'Herminier - Muséum d'Histoire Naturelle 12, rue Voltaire, 44000 Nantes, France. E-mail: celine-poiron@hotmail.fr

12928. Mitra, A.; Dow, R.; Subramanian, K.A.; Sharma, G. (2011): Chapter 5. The status and distribution of dragonflies and damselflies (Odonata) of the Eastern Himalaya. The status and distribution of freshwater biodiversity in the Eastern Himalaya: 54-66. (in English) ["5.5 Conclusions and conservation recommendations: Of the 367 species of Odonata considered present within the Eastern Himalayan assessment region, more than one third (135) are Data Deficient. This shows that there is lack of good quality research and recent data from the region. Lahiri (1989) has published a list of 78 Odonata species and subspecies that have not been reported from India since 1948 and 49 of these are part of present assessment. Thirty-eight of these 49 species are in the Data Deficient list of the present assessment. A further 13 of these 49 species were recorded from Nepal from the mid-1960s to late 1980s (Vick 1989), making the records around 30 years old, and records for many other species are of a similar age. Only 50 species of dragonflies have been reported from parts of eastern and southern Bhutan (Mitra 2008), much of Bhutan is still unexplored, a situation that is repeated across much of the assessment region, for example in Arunachal Pradesh in India, and in Myanmar. There is an urgent need for extensive, expert survey across the region. However fresh survey efforts are hampered by existing legislation in some regional countries which make it difficult to obtain permits for collection and loan of invertebrate specimens for scientific research; this is entirely counter productive for conservation efforts. Additional serious constraints include a lack of funding for fieldwork, and the need to train experts in taxonomy and field research methodologies. Moreover, large parts of the assessment region are affected by insurgency and political instability which has discouraged extensive

fieldwork in these areas; the mountainous and forested terrain in many parts of the region itself makes access difficult. Most species considered endemic to the region have been assessed as Data Deficient which raises doubts over their status as endemic to the region. Fieldwork in the unexplored areas within and outside the assessment region, and fresh fieldwork even in the relatively well known areas, might reveal that of some of these species are not actually endemic to the project region, but have wider ranges. Similarly, fieldwork is needed to determine the habitat requirements etc. for the Data Deficient species. Without extensive fieldwork the status of the Data Deficient species cannot change. Indeed, the lack of data can be considered to be a major threat to the Odonata of the region, as until this lack is remedied, proper conservation planning is not possible. The fundamental need is for extensive, good quality, fieldwork over the entire region. There is also a pressing need for high quality taxonomic work on the Odonata of the region. Revisions in many groups would likely result in the discovery that many of the currently Data Deficient species are in fact junior synonyms of better known species on the one hand, and in the discovery of new species in the region on the other. However such taxonomic work is made almost impossible by the lack of material for those groups where the taxonomical problems are most severe, by legislation that hampers international scientific collaboration in some countries, and by difficulties in locating and gaining access to type material for a number of species, as well as by poor maintenance of insect collections in many regional institutions. As far as the conservation of the Odonata fauna of the region is concerned, the only measures that are effective in protecting invertebrate populations are habitat protection measures, which need to be planned using the kind of data that we mostly lack for the region. Lahiri (1989) pointed out that most of the type localities of rare and endemic Odonata of eastern India concentrate in and around northern Bengal and Sikkim and Khasi Hills; however there has been insufficient sampling in other eastern Indian states such as Manipur, Arunachal Pradesh, and Nagaland. With their diverse ecosystems, these areas also sustain the majority of known Indian species. Identifying such pockets in other countries within the assessment region and giving at least parts of such pockets protected status would safeguard a high percentage of species and their habitats. For Odonata, if areas to be protected are chosen carefully, they do not have to be large, in practice more good might be done by protecting many small areas including examples of all habitat types in a particular region, than by protecting one or two large, but homogenous in terms of habitat, areas. To summarize, the following actions are recommended: (1). Funding should be made available for extensive expert sampling of Odonata across the project region, and for relevant training. (2). Priority should be given to taxonomic research. (3). Regional governments should review their existing legislation that affects scientific collection of in-

vertebrates, and loan and exchange of material with researchers in other countries, and remove or revise the ill-advised barriers to these activities that are currently in place. (4). When fresh data becomes available, and any taxonomic studies that are needed become available, Odonata experts should reassess the Odonata of the region currently placed in any category other than Least Concern, and, where necessary make recommendations on the protection of suitable habitat. 5. Standards of curation and storage of regional insect collections should be raised to prevent loss of type and other scientifically valuable material. The actions recommended above are mostly concerned with research, but until this research has taken place, actual conservation measures cannot be planned affectively." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

12929. Nelson, S.J.; Chen, C.; Roebuck, H.; Zoellick, B. (2011): Sensible sentinels: preliminary mercury data for dragonfly nymphs (Odonata: Anisoptera) across northern New England corroborate expected spatial pattern. Poster presentation. The 10th International Conference on Mercury as a Global Pollutant (ICMGP), 24–29 Jul 2011; Halifax, Canada: (in English) [Verbatim: Mercury (Hg) is a potent neurotoxin that is delivered to ecosystems via deposition from a global atmospheric pool, and ultimately bioaccumulates in aquatic and terrestrial foodwebs. Around the Gulf of Maine, research sites in 'pristine' areas have fish and other biota that exceed thresholds considered safe for human consumption or wildlife protection. All Maine, Vermont, and New Hampshire surface waters are under fish consumption advisory and are considered impaired with respect to Hg because of these patterns and the difficulty in predicting which systems are most affected. Together with a team of citizen scientists, we are evaluating the utility of dragonfly nymphs (Odonata: Anisoptera) as indicators of Hg status in the Gulf of Maine region. We propose that dragonfly nymphs will be good sentinels because they are: (1) widespread and found in most surface waters in the region, (2) long-lived in aquatic systems (1-5 yr as nymphs), (3) exhibit site philopatry, (4) important prey species for fish that are consumed by humans, and (5) simple to capture, process, and analyze at meaningful Hg concentrations. Specifically, because dragonfly nymphs are themselves predators, Hg concentrations are high enough for laboratory and statistical analyses to be meaningful. The average Hg concentration in dragonfly nymphs sampled across Maine was 0.097 ppm (wet weight basis), greater than the proposed wildlife safety criterion (0.077 ppm). At sites across the region (ME, NH, VT, and MA), we used our data to address hypotheses regarding whether Hg varied with body size or by family; these characteristics were less important than a field site's landscape setting. Data from a survey of a variety of surface water sites in or near four National Park areas in ME (Acadia), MA (Boston Harbor Island and Saugus Ironworks), and VT

(Marsh Billings Rockefeller) confirmed that Hg in dragonfly nymphs was more variable among sites than within a site, suggesting that they are useful indicators for Hg. Further, three years of research by citizen scientists has confirmed correlation between Hg in dragonfly nymphs and DOC in five streams within Sunhaze National Wildlife Refuge. Hg in dragonfly nymphs were related to concentrations in other media at three long term monitoring sites within Acadia National Park where Hg in mature forests has been shown to be greater than early successional forests. More research on dragonfly larval life history will help to develop a mechanistic understanding of this spatial variability in Hg bioaccumulation.] Address: Nelson, Sarah, Senator George J Mitchell Center for Environmental and Watershed Research and Department of Plant, Soil, and Environmental Sciences, University of Maine, Orono, ME, USA. E-mail: sarah.nelson@umit.maine.edu

12930. Ruffoni, A. (2011): Nouvelles stations pour *Oxygastra curtisii* et *Cordulegaster bidentata*, Odonates rares en Bourgogne. Rev. sci. Bourgogne-Nature 13: 63-64. (in French) [France; three exuvies of *O. curtisii*, Cure à Voutenay-sur-Cure (89), 28-VI- 2008; nine exuvies of *O. curtisii*, Varenne Saint-Germain (71) 1-VII-2008; two individuals of *C. bidentata*, 10-VII-2008, Arleuf (58); one male of *C. bidentata*, Quarré-les-Tombes (89), 27-VI-2009.] Address: Ruffoni, A., Société d'histoire naturelle d'Autun - Maison du Parc - 58230 Saint-Brisson, France. E-mail: shna.ruffoni@orange.fr

12931. Sansault, E. (2011): Découverte du premier site de reproduction de *Leucorrhinia caudalis* (Charpentier, 1840) en Indre-et-Loire (Odonata, Anisoptera: Libellulidae). *Martinia* 27(2): 115-120. (in French, with English summary) ["A breeding site of *L. caudalis* has been discovered in a small forest pond, north-west of Indre-et-Loire, France, on May 2008. The particular circumstances of this discovery and the following sightings of the species in this area are detailed. Conservation issues linked to the discovery of this endangered species into a protected high nature value area are discussed." (Author)] Address: Sansault, E., A.N.E.P.E. Caudalis. 118, rue de l'Ermitage, F-37100 Tours, France. E-mail: anepe.caudalis@gmail.com

12932. Schmid, F. (2011): Massenschlupf und weite Wanderungen schlüpfbereiter Larven des Zweifelflecks (*Epitheca bimaculata*) an einem See im oberschwäbischen Alpenvorland. *Mercuriale* 11: 27-30. (in German) [Baden-Württemberg, Germany; a mass emergence of *E. bimaculata* at 600 m.a.s.l. in May 2011 is reported. Emerging larvae were found up to 50 m from shore line and up to a height of 5 m.] Address: Schmid, F, Graben 23, 7225 Münsingen, Germany. E-mail: fcschmid@t-online.de

12933. Shah, D.N.; Tachamo Shah, R.D.; Pradhan, B.K. (2011): Diversity and community assemblage of littoral zone benthic macroinvertebrates in Jagadishpur

Reservoir. *Nepal Journal of Science and Technology* 12: 211-219. (in English) ["Littoral benthic macroinvertebrates diversity and community assemblage of Jagadishpur Reservoir were studied during post-monsoon (2008) and pre-monsoon (2009) seasons. Altogether twelve sites in the littoral zone of the reservoir were sampled for benthic macroinvertebrates (including Odonata) ... At each site, benthic macroinvertebrate samples were taken from different possible substrate types. The environmental variables of each site were collected based on Lentic Ecosystem Field Protocol during sampling. Biological metrics were used to describe the diversity and composition of benthic macroinvertebrates. The relationship between benthic macroinvertebrates assemblage and substrate types were examined by using principal component analysis. Cluster analyses were performed to describe the similarity among samples. In total, 50 taxa, belonging to 15 orders were recorded for littoral zone of the reservoir. The recorded higher number of taxa (family level) belonged to order Heteroptera and Diptera, and class Mollusca. Mollusca for post-monsoon and Diptera (particularly Chironomidae) for pre-monsoon shared the highest proportion in the total density. Shannon diversity index (H') for post-monsoon was 1.82 ± 0.46 and for pre-monsoon was 1.38 ± 0.53 and was significantly different between seasons ($p=0.01$). Principal component analysis revealed that increase in taxa numbers were positively correlated to soft substrates while negatively correlated to non-soft substrates in littoral zone of the reservoir. Cluster analyses discriminated the sites into two main groups for both seasons. The study concludes that benthic macroinvertebrates diversity is highly influenced by substrate types, water level fluctuation, and human accessibility to the reservoir. Therefore, in order to stabilize benthic macroinvertebrates diversity and their abundance, it is essential to maintain surface water level, stabilize bank substrate and minimize human pressure." (Authors)] Address: Shah, D.N., Hindu Kush Himalayan Benthological Society, Kathmandu, Nepal. E-mail: deepnarayanshah@hkhbenso.org

12934. Stryjecki, R. (2011): Invertebrate fauna of the Minina River, taking into account environmental factors. *Acta Biologica* 18: 37-48. (in English) [Poland; "A total of 5,613 macroinvertebrate specimens, belonging to 43 taxa (including "Anisoptera, Calopteryx sp., Zygoptera non det.") of varying systematic positions, were collected at four study sites in the Minina River. Dominant in the material collected were Gammarus sp. (33.9%), Chironomidae larvae (30.4%) and Ephemera sp. larvae (7.0%). More individuals (3,551) and taxa (39) were caught in the lentic zone than in the lotic zone (2,062 specimens and 30 taxa). The biological diversity index ranged from 1.57 to 3.14 within the sites and from 1.04 to 3.77 within habitats (zones of the river). The taxonomic composition and the abundance of the fauna were mainly influenced by biotic factors (e.g. amount of aquatic vegetation) and abiotic factors (e.g. water cur-

rent and type of bottom sediment), while human impact (presence of hydraulic structures, straightening of the river bed) did not significantly affect the fauna." (Author)] Address: Stryjecki, R., Dept of Zoology, University of Life Sciences in Lublin, ul. Akademicka 13, 20-950 Lublin, Poland. E-mail: robstry@wp.pl

12935. Turshak, L.G.; Mwansat, G.S. (2011): Insect diet of some Afrotropical insectivorous Passerines at the Jos Wildlife Park, Nigeria. *Science World Journal* 6 (4): 1-4. (in English) [Odonata contributed 2.29% to the diet of the studied birds. No details were given.] Address: Mwansat, G.S., Dept of Zoology, University of Jos, Nigeria. E-mail: georginamwansat@gmail.com

12936. Xu, H.-c.; Hao, X.-d.; Hung, J.-h.; Ye, T.-x.; Ye, L.-x. (2011): Insects diversity of Fengyanshan mountain in Zhejiang province. *Journal of the Zhejiang A&F University* 28(1): 1-6. (in Chinese, with English summary) [Taxa - including Odonata - are treated at the order level; no details are given.] Address: Xu, H.-c., Institute of Forest Protection, Zhejiang A&F University, Lin'an 311300, Zhejiang, China

12937. Xu, H.-x.; Xin, Z.-y.; Wang, X.-z.; Wang, H.-j. (2011): Investigation and study on insect and the fauna of Heihe Nature Reserve of Gansu province. *Journal of Gansu Forestry Science and Technology* 36(1): 19-24, 42. (in Chinese, with English summary) [In August and September 2008, the insect fauna of the Heihe Nature Reserve in Zhangye of Gansu, China was studied including *Crocothemis servilia*, *Pantala flavescens*, *Anax nigrofasciatus*, *Anax parthenope julius*, *Mnais gregoryi*; *Ophiogomphus spinicornis*, and *Libellula basilea*.] Address: Xu, H.-x., Forestry Sci-tech Extension Station of Gansu Province, Lanzhou 730046, China

2012

12938. Baeta, R.; Sansault, E.; Présent, J. (2012): Repartition et premiere estimation quantitative des populations de *Leucorrhinia caudalis* (Charpentier, 1840) en Indre-et-Loire (37), region Centre (Odonata, Anisoptera: Libellulidae). *Martinia* 28(2): 109-119. (in French, with English summary) ["Considered as threatened in France, *L. caudalis* is concerned by a National Action Plan. Following the discovery of a small population in 2008 in the Savigne basin (Indre-et-Loire - France), researches have been set up in 2011 and 2012 around the department of Indre-et-Loire. They led to the observation of 124 males, eight females, one larva and 30 exuviae in 10 localities, among which nine were unknown. The population size could therefore be estimated at several hundreds individuals in Indre-et-Loire. Three main areas have been identified: the Savigne basin (seven localities), the south Touraine (two localities) and the Champagne area (one locality). In France and Europe, several populations have been recently discovered, yet the only long term dataset available in Centre region (Brenne)

suggests a relatively negative trend. The Indre-et-Loire populations discovered recently are probably linked to the recent intensification of sampling efforts occurring in this department. In order to get a better understanding of the populations' distribution and functionality, useful field and genetic studies are proposed and detailed." (Authors)] Address: Sansault, E., Association Naturaliste d'Étude et de Protection des Écosystèmes (ANEPE) « Caudalis », 118 rue de l'Ermitage, 37100 Tours, France. E-mail: anepe.caudalis@gmail.com

12939. Bagworth, T. (2012): Reports from coastal stations - 2011: Gibraltar Point NNR, Lincolnshire. *Atropos* 45: 72. (in English) [Records of *Sympetrum fonscolombii*, *Aeshna cyanea*, *A. grandis* and *Calopteryx splendens* were documented.] Address: not stated

12940. Bamann, T.; Jebram, J. (2012): Nachweis der Grünen Flussjungfer (*Ophiogomphus cecilia*) an der nördlichen Ufer. *Mercuriale* 12: 11-14. (in German, with English summary) ["At 02-X-2012 seven adults – males and females – of *O. cecilia* were observed at the shoreline of the prealpine river Iller close to the City of Ulm (48°20'29" N, 10°00'33" O, 484 m a.s.l.) in the federal state of Baden-Württemberg, SW-Germany. The new records are presented and discussed." (Authors)] Address: Bamann, T., Altenhastr. 2, 71111 Waldenbuch, Germany. E-mail: t.bamann@web.de

12941. Bedjanič, M. (2012): On the synonymy of three endemic dragonfly species from Sri Lanka (Zygoptera: Platystictidae, Protoneuridae). *Notul. odonatol.* 7(9): 77-80. (in English) ["Based on re-examination of museum collections and newly available material *Drepanosticta fraseri* Lieftinck, 1955 is synonymised with *Drepanosticta submontana* (Fraser, 1931), *Drepanosticta sinhalensis* Lieftinck, 1971 is synonymised with *Drepanosticta lankanensis* (Fraser, 1931), while *Disparoneura ramajana* Lieftinck, 1971 is a synonym of *Elatoneura leucostigma* (Fraser, 1933)." (Author)] Address: Bedjanič, M., Kolodvorska 21b, SI-2310 Slovenska Bistrica, Slovenia. E-mail: matjazbedjanic@yahoo.com

12942. Bernal Sánchez, A. (2012): Confirmación de la presencia actual de *Lestes macrostigma* (Eversmann, 1832) [sic] (Odonata: Lestidae) en la provincia de Cádiz (sudeste de la Península Ibérica). *Boletín de la Sociedad Entomológica Aragonesa* 50: 565-566. (in Spanish, with English summary) ["Presence of populations of *L. macrostigma* in Cadiz province is confirmed, after more than 15 years without observations of this species, indicating the importance of these populations to guarantee the possible genetic flow between the populations of Donana (Huelva and Seville) and the Natural Reservation Laguna de Fuente de Piedra (Malaga)." (Author)] Address: Bernal Sánchez, A., C/ Juan Ramón Jiménez 28. 11160 - Barbate (Cádiz. Esparta), Spain. E-mail: ArturoJibelula@gmail.com

- 12943.** Borkenstein, A. (2012): Buntspechte erbeuten frisch geschlüpfte *Libellula quadrimaculata*. *Mercuriale* 12: 59-60. (in German, with English summary) [Niedersachsen, Germany; "Great spotted woodpeckers (*Dendrocopos major*) repeatedly approached to birch trees near a forest bog in northwestern Germany and caught several immature individuals of *Libellula quadrimaculata*. The dragonflies were most probably fed to their offspring." (Author)] Address: Borkenstein, Angelika, Lebensborner Weg 5, 26419 Schortens, Germany. E-mail: AngelikaBorkenstein@t-online.de
- 12944.** Bowman, N. (2012): Reports from coastal stations - 2011: Eccles-on-Sea, Norfolk. *Atropos* 45: 71-72. (in English) [UK, *Erythromma viridulum*] Address: not stated
- 12945.** Brunken, H.; Hein, M.; Klugkist, H. (2012): Auswirkungen ökologischer Grabenräumung auf Fische und die Grüne Mosaikjungfer (*Aeshna viridis*) in Bremer Natura-2000-Gebieten. *Natur und Landschaft* 87(8): 370-375. (in German, with English summary) ["Natura 2000 sites in the Weser river lowlands around Bremen, Germany, are known as important secondary habitats for typical floodplain species (e. g. Mud Loach *Misgurnus fossilis*, Spined Loach *Cobitis taenia*, Green Hawker *Aeshna viridis*) listed in Annexes II and IV of the Habitats Directive. Different methods of ditch maintenance, evaluated in a research and development project focusing on Water Soldier populations (*Stratiotes aloides*), revealed no impairments of the above mentioned target species. Different maintenance schemes were found to be favourable for fish and for dragonflies respectively. Ditch maintenance approaches should be modelled on natural floodplain dynamics to provide a habitat mosaic in terms of water level, intensity and time of ditch cleaning, ensuring a connected drainage system composed of different succession levels." (Authors) The number of specimens was higher in ditches maintained in autumn compared with ditches maintained in (late) summer.] Address: Klugkist, H., Senator für Umwelt, Bau und Verkehr, Bremen, Ansgaritorstr. 2, 28195 Bremen, Germany. E-Mail: henrich.klugkist@umwelt.bremen.de
- 12946.** Bühler, W. & H. Hunger (2012): (2012): Neue Funde der Gabel-Azurjungfer (*Coenagrion scitulum*) in Südbaden bei Buggingen, Gottenheim und Riegel (Odonata: Coenagrionidae). *Mercuriale* 12: 27-32. (in German, with English summary) ["Following the rediscovery of *C. scitulum* for Baden-Württemberg in 2010 and the finding of the species at a second site in 2011, seven new sites were found in the southern Upper Rhine Valley in 2012. The distance as the crow flies between the southernmost occurrence near Buggingen and the northernmost south of Riegel is 32 km. The species has established itself successfully at several waters. So far, the immigration into Baden-Württemberg has obviously taken place exclusively from the south or southwest." (Authors)] Address: Bühler, W., Birkenweg 18, 79288 Gottenheim, Germany. E-mail: Willy.Buehler@gmx.de
- 12947.** Cade, M. (2012): Reports from coastal stations - 2011: Portland, Dorset. *Atropos* 45: 52-54. (in English) [Probable *Anax ephippiger* were recorded at 23 April (Groove) and 24 April 2011 (Ferrybridge), UK.] Address: not stated
- 12948.** Cho, K.-T.; Kim, H.-W.; Kim, H.-R.; Jeong, H.-M.; Lee, K.-M.; Kang, T.-G.; You, Y.-H. (2012): Landscape ecological characteristics of habitat of *Nannophya pygmaea* Rambur (Libellulidae, Odonata), an endangered species for conservation. *Korea Society of Wetland* 14(4): 667-674. (in Korean, with English summary) ["This study was conducted to understand landscape ecological characteristics on habitats of *N. pygmaea*, an endangered species in South Korea. The ecological characteristics of the habitats were investigated in abandoned paddy fields where *N. pygmaea* populations have been found in Chungcheongnam-do Kongju, Gyeonggi-do Kwangju and Gyeongsangbuk-do Mungyeong from 2009 to 2010. We surveyed the dominant vegetation, areas, water depth and temperature, and plant height and coverage to compare the wetlands living *N. pygmaea* and not living *N. pygmaea*. As a result, habitats of *N. pygmaea* in all regions were dominated by *Salix koreensis* community. There is no significant difference in the water temperature, plant height and coverage among wetlands of the three different sites, but depth was varied within 2.5~9.5cm. The water depth of habitat was deeper in Gongju than the others. Percentage of open water was 1.7~6% in the wetlands living *N. pygmaea*. but it did not appear in the wetlands not living *N. pygmaea*. Therefore, the ecological characteristics of wetlands as abandoned paddy fields should be taken into account for *N. pygmaea* habitat conservation and restoration." (Authors)] Address: not available
- 12949.** Clancy, S.P. (2012): Reports from coastal stations - 2011: Dungeness Area, Kent. *Atropos* 45: 60-62. (in English) [Verbatim: The most exciting Odonata records of the year involved a series of records of *Hemianax ephippiger*: three were present along Dengemarsh Sewer from 23-24 April with one remaining on 25th, and an additional adult present elsewhere on the RSPB reserve on 24th. *Sympetrum fonscolombii* occurred on just a single occasion, at the Long Pits on 24 July. In addition to three records of *Anax parthenope* on the Reserve on 14 & 26 July, and 1 August, there were 22 records of this species at the Long Pits between 5 July and 17 August, with oviposition noted on 28 July and 17 August.] Address: not stated
- 12950.** Corso, A.; Janni, O.; Pavesi, M.; Sammut, M.; Sciberras, A.; Vigano, M. (2012): Annotated checklist of the dragonflies (Insecta Odonata) of the islands of the Sicilian Channel, including the first records of *Sympetrum*

trum sinaiticum Dumont, 1977 and *Pantala flavescens* (Fabricius, 1798) for Italy. *Biodiversity Journal* 3(4): 459-478. (in English) ["In this paper we report data on the historical and recent status of all Odonata species recorded for the Sicilian Channel islands: the Pelagie islands and Pantelleria, politically belonging to Italy, and Maltese Archipelago islands. The number of species known for the former group of islands raises from 7 to 20. Of these, 2 are new for the Italian fauna, namely *Sympetrum sinaiticum*, noticed through likely sightings starting from 2010 on Lampedusa, and confirmed through voucher specimens collected in April 2012, and *Pantala flavescens*, first noticed in October 2012 on Lampedusa and Linosa; while *Calopteryx* sp. cf. *haemorrhoidalis*, *Ischnura genei*, *Aeshna mixta*, *Orthetrum nitidinerve*, *O. coerulescens anceps*, *Crocothemis erythraea*, *Sympetrum striolatum*, *S. meridionale*, *Brachythemis impartita*, *Trithemis annulata* and *T. kirbyi*, already known for Italy, are new for the Italian islands of the Sicilian channel. The Maltese fauna includes at present 18 recorded species; the previously reported *Trithemis arteriosa* is to be deleted from the list, since the concerned specimen upon reexamination proved to be *T. annulata*." (Authors)] Address: Corso, A., MISC - Via Camastra, 10 - 96100 Siracusa, Italy. E-mail: voloerrante@yahoo.it

12951. Crabtree, A.G. (2012): Modeling a small pond odonate population: Exploring the complex life history dynamics of *Pachydiplax longipennis* (Odonata: Libellulidae). Thesis, Northern Illinois University. Biological Sciences. Proquest, Umi Dissertation Publishing: 152 pp. (in English) ["Members of the insect order Odonata are excellent examples of organisms that demonstrate complex life histories. Both the larval and adult stages must be studied to understand the dynamics of such species, A population of *P. longipennis* was studied at a small fishless pond in north central Illinois in 2008 and 2009. Additionally, a dynamic population model of the species was developed using the graphical modelling software, STELLA, to further understand the life history dynamics of *P. longipennis*. The larval dragonfly community in the pond was composed of nine species, all of which were also present as adults. The adult dragonfly community contained an additional four species, for a total of 13. Although, the maximum larval density of *P. longipennis*, which occurred in the middle of the summer, was ~15 m² in 2008 and 2009, mean density was higher in 2009. Based on this maximum density, it was estimated the maximum larval population size for the pond was ~170,000. Head capsule width and total length of larvae were used to identify 14 larval instar classes for the species. Changes in head capsule width between adjacent instar classes generally conformed to Dyar's Ratio, with the exception of the changes between the first and last two instars. Skipping of instar classes was common among larvae reared in the lab. Mean maximum *P. longipennis* adult abundance occurred in July in both 2008 and 2009. It was higher in 2008 than that observed in 2009, ~12 per 10 m sector versus 8 per 10 m sector. The

estimated adult population size in 2009 based on mark-recapture data using Craig's estimation method was 2,000. Average clutch size, determined from six captured, mated females, was 1,238+/-431 eggs per clutch. Average clutch survivorship was 27.51%+/-16.38. A density-ceiling model generated a stable population of *P. longipennis* larvae and adults that cycled in 54 week intervals. Short term (2 years) results predicted an early instar larval population of ~175,000 individuals, a late instar larval population of ~40,000, and an adult population of ~4,000. Long term (20 years) results predict early instar larval population of ~300,000 individuals, a late instar larval population of ~75,000, and an adult population of ~6,000. Long term estimates were comparable to those predicted by larval and adult sampling. Sensitivity analysis of varying mortality rates found that changing early instar larval mortality rate had a significant impact on observed abundances in all modelled life stages, while changes in breeding adult mortality had little effect. Simulations of ten different survivorship scenarios of larval and adult mortality resulted in three specific categories of response in terms of larval and adult abundances: one or both reached carrying capacity, both went extinct, or either or both stabilized at an intermediate abundance. Scenario results also suggested a greater importance of larval stage mortality rates, similar to the results of the sensitivity analysis. A density-dependent model generated unrealistic results in both short term and long term simulations." (Author)] Address: not stated

12952. Deans, M.J. (2012): Reports from coastal stations - 2011: Bawdsey Peninsula, Suffolk. *Atropos* 45: 68-69. (in English) [*Chalcolestes viridis* and *Erythromma viridulum* at several sites on the peninsula.] Address: not stated

12953. Defontaine, P. (2012): Richesse odonatologique d'une mare artificielle. *Martinia* 28(2): 69-82. (in French, with English summary) ["The observations made since 1996 on a garden pond are dealt with. Among the 38 odonata species observed, 19 reproduce among which nine do every year. The odonatological diversity of the pond has increased parallel to the vegetation development. Moreover, several species considered to be rare or endangered in the "Région Centre" have been observed (namely *Lestes dryas*, *Coenagrion mercuriale*, *Oxygastra curtisii*, *Somatochlora metallica*, *Brachytron pratense*, *Libellula fulva* and *Sympetrum danae*). Some of them occasionally breed in the pond." (Author)] Address: Defontaine, P., place Adrien Rozier, 12000 Rodez, France. E-mail: pdefontaine12@yahoo.fr

12954. Doucet, G.; Jacquot, P. (2012): Éléments sur l'émergence et les exuvies de *Nehalennia speciosa* (Charpentier, 1840) en France (Odonata, Zygoptera: Coenagrionidae). *Martinia* 28(2): 83-88. (in French, with English summary) ["This work is an assessment of the prevalent emergence conditions in the single French population of *N. speciosa*, located in a peat bog in the

south of the Jura department. Most of exuviae were found at the central pool and were located in deep tufts of Sedges at less than 10 cm above the water level. With a size ranging from 10 to 11.5 mm, the exuvia of *N. speciosa* is the smallest of all the exuviae of the French Odonata fauna." (Authors)] Address: Doucet, G., 28A, rue de la Colombière, F-21000 Dijon, France. E-mail: guillaume.doucet@yahoo.fr

12955. Doucet, G.; Ruffoni, A. (2012): *Leucorrhinia caudalis* (Charpentier, 1840), nouvelle espèce pour la Côte-d'Or (21) (Odonata, Anisoptera: Libellulidae). *Martinia* 28(2): 127-130. (in French, with English summary) [13-V-2012; "L. caudalis has been discovered in the Bourgogne region since 2006. It breeds in old gravel pits into which abundant aquatic vegetation is now developed. The observation of this protected species in a new department brings us to increase our investigations in the frame of the regional atlas project." (Authors)] Address: Doucet, G., 28A, rue de la Colombière, F-21000 Dijon, France. E-mail: guillaume.doucet@yahoo.fr

12956. Doucet, G.; Bedrines, G.; Foutel, C. (2012): Premier cas d'émergence à *Hemianax ephippiger* (Burmeister, 1839) en Bourgogne (Odonata: Anisoptera: Aeshnidae). *Martinia* 28(2): 121-122. (in French) [A teneral female of *A. ephippiger* was photographed at 30-VII-2012 near Saint-Seine-Sur-Vingeanne (Côte d'Or, 21), France. At the same site an exuvia of *A. ephippiger* was found at 4-VIII-2012.] Address: Doucet, G., 128A, rue de la Colombière, F-21000 Dijon, France. E-mail: guillaume.doucet@yahoo.fr

12957. Duquef, M. (2012): Reproduction probable d'*Hemianax ephippiger* (Burmeister, 1839) en Guyane (Odonata, Anisoptera: Aeshnidae). *Martinia* 28(2): 126. (in French) [A teneral female of *A. ephippiger* was captured at 21-III-2012 near Sinnamary, French-Guyana.] Address: Duquef, M., 25, rue Paul Baroux, F-80440 Blangy-Tronville, France. E-mail: mauriceduquef@yahoo.fr

12958. Feldwieser, G. (2012): Ein weiterer Fund der Grünen Flussjungfer (*Ophiogomphus cecilia*) im Südosten Baden-Württembergs. *Mercuriale* 12: 15-16. (in German, with English summary) [The observation of a male of *O. cecilia* at a gravel pit (MTB 7922 NO, 48°04'43" N, 9°27'21" O, 544 m a.s.l.) was recorded and shortly discussed." (Author)] Address: Feldwieser, G., Gonningerstr. 27, 72793 Pfullingen, Germany

12959. Fiedler, J. (2012): Blässhuhn mit erbeutetem Tandem der Kleinen Königslibelle (*Anax parthenope*). *Mercuriale* 12: 63. (in German) [NSG Kohlplattenschlag, Landkreis Karlsruhe, Baden-Württemberg, Germany, 10 vi 2008; an Eurasian Coot (*Fulica atra*) preyed on a tandem of *Anax parthenope*.] Address: not stated

12960. FRHO (2012): In Liechtenstein geschützte Arten (Stand 13. Juni 2012). FRHO, Vaduz, 10. August 2012:

[According to the "Verordnung über besonders geschützte Pflanzen- und Tierarten" (Liechtensteinisches Landesgesetzblatt, LGBl. 1996/136; online: <http://www.gesetze.li/Seite1.jsp?LGBl=1996136.xml&Searchstring=arten&showLGBl=true>), the following Odonata species are protected in the state of Liechtenstein: *Enallagma cyathigerum*, *Aeshna cyanea*, *Sympetrum sanguineum*, *Coenagrion pulchellum*, *Pyrrhosoma nymphula*, *Sympetrum fonscolombei*, *Sympetrum pedemontanum* [sic = pedemontanum], *Calopteryx splendens* [sic = splendens], *Sympetrum flaveolum*, *Somatochlora flavomaculata*, *Lestes sponsa* (sic = sponsa), *Sympetrum vulgatum*, *Cordulia aenea*, *Sympecma fusca*, *Cordulegaster bidentatus*, *Somatochlora metallica*, *Chalcolestes viridis*, *Lestes viridis* [sic], *Sympetrum striolatum*, *Anax imperator*, *Ischnura elegans*, *Aeshna grandis*, *Orthetrum cancellatum*, *Coenagrion mercuriale*, *Aeshna mixta*, *Coenagrion puella*, *Agrion puella* [sic], *Lestes virens*, *Leucorrhinia dubia*, *Ischnura pumilio*, *Orthetrum coerulescens* [sic = coerulescens], *Libellula depressa*, *Sympetrum danae*, *Orthetrum brunneum*, *Sympetrum depressiusculum*, *Aeshna juncea*, *Libellula quadrimaculata*, *Gomphus pulchellus*, and *Cordulegaster boltoni*. According to "Das Übereinkommen über die Erhaltung der europäischen wildlebenden Pflanzen und Tiere und ihrer natürlichen Lebensräume (Berner Konvention, LGBl. 1982/42)" *Coenagrion mercuriale* is protected.]

12961. Fulan, J.A.; Henry, R.; Davanso, R. (2012): Os efeitos da ação antrópica sobre a distribuição de macroinvertebrados no Rio Guareí, São Paulo - Anthropogenic action influence on macroinvertebrates distribution in Guareí River, São Paulo State - Brazil. *Estud Biol.* 34 (82): 51-56. (in Portuguese, with English summary) ["In this study, it was examined, during the period from March to December 2006, the effects of human disturbance on the macroinvertebrates that live near macrophytes in Guareí River, São Paulo State - Brazil. It was questioned if the high conductivity recorded in Guareí River affected the distribution of the macroinvertebrates and what were the most important variables that affect macroinvertebrates in a river with a strong nutrient concentration. The objective of this study was to investigate the effects of environmental variables on densities and composition of the macroinvertebrates. Three stands of aquatic plants were sampled with with 0.25 mm mesh net on a 0.07m² square metal frame. Air and water temperature, depth, pH, electrical conductivity, suspended solids, dissolved oxygen and macrophyte biomass were measured. A canonical correspondence analysis (CCA) was performed using the density of the macroinvertebrates and environmental variables. Chironomidae, Culicidae, Acanthagrion, *Coryphaeschna*, *Erythrodiplax*, *Miathyria marcella*, *Micrathyria*, *Gastropoda*, *Ostracoda* and *Hemiptera* were the only taxa that showed significant correlation with the axes. From the results, we can conclude that the high conductivity recorded in Guareí River due to the high amount of organic matter released during its course did not significantly affected the distri-

bution of the macroinvertebrates during the studied period. However, the ACC recorded that oxygen was the most significant environmental factor for the density variance of the macroinvertebrates, especially larval Odonata." (Authors)] Address: Fulan, J.A., Biólogo, Univ. Estadual Paulista Júlio de Mesquita Filho (Unesp), doutor, Universidade Federal do Amazonas (UFAM), Manaus, AM - Brasil. E-mail: joaofulan@ig.com.br

12962. Gabel, F.; Garcia, X.F.; Schnauder, I.; Püsch, M.T. (2012): Effects of ship-induced waves on littoral benthic invertebrates. *Freshwater Biology* 57: 2425-2435. (in English) ["(1.) Ship-induced waves can affect the physical characteristics of lake and river shorelines, and laboratory studies have shown effects on littoral invertebrates. Here, we explored whether these effects could be observed under field conditions along a natural lake shore affected by wave sequences (trains) produced by boats. (2.) Individuals of five invertebrate species (*Bithynia tentaculata*, *Calopteryx splendens*, *Dikergammarus villosus*, *Gammarus roeselii*, *Laccophilus hyalinus*) were exposed to waves with increasing shear stress in five habitats differing in structural complexity. (3.) Detachment of invertebrates increased with increasing shear stress and was best modelled using sigmoid response curves. Habitat structural complexity mitigated the effects of shear stress, and detachment rate was influenced more by habitat type than by species. A threshold (90% of the individual invertebrates unaffected) stress level of 0.64 N m² was found for a structurally complex reed habitat, compared to 0.37 N m² for a simple sand habitat. (4.) Shear stress associated with wave trains created by recreational boating at a distance of 35 m from the shore and at a speed of 11 km h⁻¹ resulted in 45% detachment of littoral invertebrates. Decreasing the boat-to-shore distance to 20 m increased wave shear stress by 30% and invertebrate detachments up to 75%. (5.) Disturbance of littoral habitats and invertebrate assemblages are widespread in inland waters used for recreational and/or commercial navigation. Our findings show that the integrity of littoral zones of navigable surface waters could be much improved by implementing management measures such as physically protecting complex habitats with dense reed belts and tree roots, and reducing boat speeds and increasing their minimum shoreline distance." (Authors)] Address: Gabel, Fredericke, Dept of Limnology of Shallow Lakes & Lowland Rivers, Leibniz-Institute of Freshwater Ecology & Inland Fisheries, Berlin, Germany

12963. Gabel, F. (2012): Impacts of ship-induced waves on benthic macroinvertebrates. Dissertation, Landwirtschaftlich-Gärtnerischen Fakultät, der Humboldt-Universität zu Berlin: 124 pp. (in English) ["Inland navigation constitutes a major human use of major rivers and lakes worldwide which is expected to increase in the future. Navigation does not only lead to river training and inputs of toxic compounds, but also significantly affects shore habitats by the ship-induced waves. In contrast to

the importance of such pressures, the effects of these hydrodynamic disturbances on benthic invertebrates in the littoral zones are poorly understood, even that invertebrates constitute a central element of littoral food webs. Hence, in this thesis I investigated i) the direct and immediate effects of ship-induced waves on benthic invertebrates (including *Calopteryx splendens*) in the littoral zone, ii) their subsequent effects on trophic interactions and iii) on the growth and fitness of invertebrates, and finally iv) the long-term effects on the community composition of benthic invertebrates in littoral zones. Both laboratory and field experiments showed increasing detachment of invertebrates with higher wave-induced shear stress, following a sigmoid response curve. Detachment was significantly mitigated by higher structural complexity of some habitats, as complex habitats dissipate wave energy and provide better fixing possibilities for invertebrates. Moreover dislodgement of invertebrates resulted in an elevated risk of being preyed upon by fusiform fish. In contrast, deep bodied fish reduced feeding under wave disturbance. Waves also reduced the growth and energy storage of native invertebrates via reduced feeding rate or increased energy expenditure, while non-native invertebrates were not affected. The cumulative impact of the demonstrated various mechanistic effects of ship-induced waves alters the community composition of benthic invertebrates. The abundance of native invertebrates and total species richness was shown to be lower at sites exposed to ship-waves, while non-native invertebrates increased in abundance. Thus, ship-induced waves affect benthic invertebrates on the individual, species, and community levels, as well as the interaction of trophic levels, and hence will alter the ecological structure and function of whole littoral zones. This knowledge on the pathways how ship-induced waves affect littoral zones may be also used to develop scientifically based and target-oriented management plans for surface waters used as inland waterways. Adverse effects of ship-induced waves may be mitigated by specifically protecting structural complex habitats such as tree roots and dense reed belts, and by minimizing wave generation by increasing minimum sailing distance to shore or by adjusting vessel speed." (Author)] Address: Gabel Friederike, Geographie Landschaftsökologie, Heisenbergstr. 2, 48149 Münster, Germany. E-Mail: gabel@igb-berlin.de

12964. Gäde, G.; Marco, H.G. (2012): The adipokinetic hormone (AKH) of one of the most basal orders of Pterygota: structure and function of Ephemeroptera AKH. *Journal of Insect Physiology* 58(11): 1390-1396. (in English) ["This is the first reported primary sequence of a bioactive peptide isolated from three Ephemeroptera families. Peptides of the adipokinetic hormone (AKH) family from the corpora cardiaca of nymphs of *Afronurus* spp. (Heptageniidae), *Siphonurus lacustris* (Siphonuridae) and *Ephemerella danica* (Ephemeridae) were investigated functionally in homologous (hypertrehalosaemic activity

demonstrated in *E. danica* nymphs) and heterologous (active in cockroach and locust) bioassays, and structurally by liquid-chromatography coupled with ion trap electrospray ionisation mass spectrometry. All species investigated synthesise the octapeptide code-named Anaim-AKH (pGlu-Val-Asn-Phe-Ser-Pro-Ser-Trp amide). Confirmation of this peptide being present in corpora cardiaca of *E. danica* nymphs was obtained via reverse phase-high pressure liquid chromatography. Phylogenetically, the presence of only one AKH peptide may constitute a basal condition; all other lower insect orders, e.g. Odonata, Blattodea, Orthoptera, amongst others, have more than one AKH analogue. We propose that Anaim-AKH is the ancestral peptide which may support the Palaeoptera hypothesis that mayflies (Ephemeroptera) and dragonflies (Odonata) form the Palaeoptera clade, the sister group of Neoptera. The structural data cannot, however, shed any light on the phylogenetic scenarios within Ephemeroptera itself. Finally, this study demonstrates the successful use of larvae as an alternative biological source to study neuropeptides in ephemeral, elusive or difficult to obtain adult insects." (Authors)] Address: Gäde, G., Zoology Department, University of Cape Town, Rondebosch, ZA-7701, Republic of South Africa.

12965. Ghetu, D. (2012): Preliminary study on Odonata larvae (Insecta: Odonata) from "Elesteiele Jijiei Si Miletinului" (ROSPA0042): Population dynamics and conservation issues. *Analele Stiintifice ale Universita.ii „Alexandru Ioan Cuza” din Iasi, s. Biologie animala* 58: 13-21. (in English, with Romanian summary) ["Recent studies on Odonata diversity from farm ponds revealed that species assemblages were not correlated with pond use or to landscape variables and farm ponds made a positive contribution to the maintenance of aquatic biodiversity. Our study was made in Oct. 2010-Oct. 2011 in the fish ponds and rivers from "Elesteiele Jijiei Si Miletinului" (ROSPA0042) on Odonata larvae. Population dynamics and diversity of Odonata species lead us to consider their importance in the assessment of biotic integrity and conservation of the wetlands and ponds." (Author) Data referred to *Calopteryx splendens*, *Ischnura elegans*, *Enallagma cyathigerum*, *Platycnemis pennipes*, *Orthetrum albistylum*, *O. cancellatum*, *Anax imperator*, *Onychogomphus forcipatus*.] Address: Ghetu, Diana, Fac. Biol., Alexandru Ioan Cuza Univ. of Ia.i, B-dul Carol I, no. 20A, 700505 Ia.i, Romania. E-mail: dianaghetu@yahoo.com

12966. Gil, J.A.; Chanonoa, G.C.; Coutino Jose, M.A. (2012): Estudio del ámbar con inclusiones biológicas de la Colección Paleontológica de la Secretaría de Medio Ambiente e Historia Natural, Chiapas, México. *Lacandonia* 6(1): 23-29. (in Spanish, with English summary) ["Paleontological Collection of the Secretaría de Medio Ambiente e Historia Natural preserves 215 pieces with biological inclusions that contain a total of 569 organisms. The total of studied organism 73.64 % corresponding to animals and the 26.36 % corresponding to vegetables, bellowing biological groups Magnoliopsida, Lilio-

psida, Coniferopsida, Polypodiopsida, Hepaticopsida, Bryopsida, Insecta, Arachnida, Chilopoda, Diplopoda and Crustacea. The best study biological group is Insecta, being determined the orders Archaeognatha, Thysanoptera, Diptera, Hymenoptera, Coleoptera, Homoptera, Isoptera, Trichoptera, Ephemeroptera, Hemiptera, Orthoptera, Blattodea, Psocoptera, Lepidoptera and Odonata. The order with the greatest number of individuals is Diptera with 143, while Odonata is only represented by one specimen (No further details are given). Have been described six new species, *Swietenia miocenica*, *Hymenaea allendis*, *Episinus penneyi*, *Culopila aguilerai*, *Plectropsyche alvarezii* and *Antillopsyche mexicana*. Additionally, with the pieces of the amber collection has participated in various cultural scientific events developments within and outside of the State." (Authors)] Address: Gil, J.A., Coordinación Técnica de Investigación, Secretaría de Medio Ambiente e Historia Natural y Facultad de Biología de la Universidad de Ciencias y Artes de Chiapas, Mexico.

12967. Gnanakumar, M.; Ansil, B.R.; Nameer, P.O.; Das, S. (2012): Checklist of Odonates of Chimmony Wildlife Sanctuary. *Malabar Trogon* 10(1&2): 3-6. (in English) [Chimmony Wildlife Sanctuary (10°26'N 10°26'N; 76°31'E 76°37'E) (Fig. 1) is situated in Thrissur District of Kerala, India. 55 odonate species including the Western Ghats endemic *Platysticta deccanensis* were recorded.] Address: Gnanakumar, M., Malabar Nat. Hist. Soc., Sushela Mandir, B. G. Road, Nadakavu Post, Calicut-673011, India. E-mail: kumargm33@gmail.com

12968. Hodgson, I.; Beugg, J. (2012): Reports from coastal stations - 2011: Sandwich Bay Bird Observatory, Kent. *Atropos* 45: 64-65. (in English) [UK; *Lestes barbarus*, *Sympetrum fonscolombii*, *Libellula fulva*, *L. quadrimaculata*, and *Anaciaeschna isoceles* were reported.] Address: not stated

12969. Huber, K. (2012): Die Bedeutung neuer Feuchtbiootope für Libellen. *Informativ. Ein Magazin des Naturschutzbundes Oberösterreich* 68: 9. (in German) [Machland, Oberösterreich, Austria. Shallow, well sunned ponds were created and observed for their colonisation by Odonata. The paper briefly outlines without details a few highlights, including the fact that all in Austria represented species of *Orthetrum* could be observed at one locality. *Coenagrion scitulum* could be observed for the first time in 2012 in this federal state.] Address: not stated

12970. Hunter, I.; Hunter, S. (2012): Reports from coastal stations - 2011: Elms Farm, Icklesham, East Sussex. *Atropos* 45: 58-59. (in English) [*Erythromma viridulum* peaked at 24-VIII-2011 to 366 individuals. *Anax ephippiger* was recorded at 13-IX-2011.] Address: not stated

12971. Iorio, E. (2012): Nouvelles observations de *Gomphus graslinii* Rambur, 1842 dans le Canal de la Vallée des Baux à Arles (Bouches-du-Rhône) (Odonata-

ta, Anisoptera: Gomphidae). *Martinia* 28(2): 103-106. (in French, with English summary) ["*G. graslinii* was again observed in the vicinity of the city of Arles (Bouches-du-Rhône department, France) along the Canal de la Vallée des Baux. This time, our observations have been done on the part of the Canal de la Vallée des Baux near the "Barbegal" Castel, of which one on the east of the road D 33. We totalize four contacts with four different specimens along the concerned canal. It suggests a regular presence of this species and supports its autochthony in this place." (Author)] Address: Iorio, E., ÉCO-MED (Écologie & Médiation), Pôle Entomologie, Tour Méditerranée, 65 av. Jules Cantini, F-13298 Marseille Cedex 20, France. E-mail: e.iorio@ecomedit.fr

12972. Jensen, J.K.; Nielsen, O.F. (2012): The Vagrant Emperor Anax ephippiger (Burmeister, 1839) (Aeshnidae, Odonata) found on the Faroe Islands in 2011. *Ent. Meddr.* 80: 3-6. (in Danish, with English summary) ["In the spring of 2011 three specimens of *A. ephippiger* were found on the Faroe Islands. Two were recorded on 13th and one on the 15th of April 2011, all males. There were no other sightings of the species later in 2011. No dragonflies (Odonata) breed in the Faroe Islands and there was only one earlier finding of a dragonfly, an introduced *Calopteryx virgo*." (Authors)] Address: Nielsen, O.F., Tulstrupvej 112, DK 8680 Ry, Denmark. E-mail: ofn.orth@tdcspc.dk

12973. Johnson, A.; Phillips, J. (2012): Reports from coastal stations - 2011: Hayling Island, Hampshire. *Atropos* 45: 56-57. (in English) [30-VII-2011, Anax imperator at MV light.] Address: not stated

12974. Jung, K.S. (2012): Odonatological research society of Korea (Osok). *Notul. odonatol.* 7(9): 87-88. (in English) [Verbatim: The Society was founded on 13 May 2006. By September 2011, it had 36 members; the current President is the author of this note. The objective of the Society is the study of odonate systematics, faunistics and distribution in the Korean peninsula. The results are published in the biennial OSOK-Report, the 3rd volume of which is in preparation now. So far 123 species are known to occur in Korea; 102 of these were recorded from South Korea, including 29 Zygoptera (4 families, 13 genera) and 73 Anisoptera (6 families, 39 genera). Since the establishment of the Society, its members brought on record *Paracercion sieboldii*, *Sympetrum fonscolombii* (both in 2007) and *Brachidiplax chalybea flavovittata* (in 2010) for the first time from South Korea. In 2011, an undescribed *Boyeria* species was discovered. The response of the odonates to the recent climate change is receiving particular attention by the Society. As climate-sensitive biological indicator species in Korea were selected *Ceriagrion nipponicum*, *Ischnura elegans*, *Sympetrum speciosum* and *S. striolatum*. Since 2009, the status and habitats of these species are regularly monitored. So far, Nannophya

pygmaea has been the sole species on the Odonata Red List of Korea. Following the suggestion by the Society, *Macromia daimoji* and *Libellula angelina* were added in 2011. The publication of the monographic works, *Dragonflies and damselflies of Korea* (2012, Ill-gongyuska, Seoul) and *Odonata larvae of Korea* (2011, Nature & Ecology Academic Series, Seoul), both by the author of this note, facilitates the work on the Korean odonates.] Address: Jung, K.S., 6F, IBS Building, 1572-18 Seocho-Dong, Seocho-ku, Seoul 137-070, Korea

12975. Kadye, W.T.; Booth, A.J. (2012): Detecting impacts of invasive non-native sharptooth catfish, *Clarias gariepinus*, within invaded and non-invaded rivers. *Biology and Conservation* 21(8): 1997-2012. (in English) ["In aquatic ecosystems, impacts by invasive introduced fish can be likened to press disturbances that persistently influence communities. This study examined invasion disturbances by determining the relationship between non-native sharptooth catfish *Clarias gariepinus* and aquatic macroinvertebrates in the Eastern Cape, South Africa. A Multiple Before-After Control-Impact (MBACI) experimental design was used to examine macroinvertebrate communities within two rivers: one with catfish and another one without catfish. Within the invaded river, macroinvertebrates showed little response to catfish presence, whereas predator exclusion appeared to benefit community structure. This suggests that the macroinvertebrate community within the invaded river was adapted to predation impact because of the dominance of resilient taxa, such as Hirudinea, Oligochaeta and Chironomidae that were abundant in the Impact treatment relative to the Control treatment. High macroinvertebrate diversity and richness that was observed in the Control treatment, which excluded the predator, relative to the Impact treatment suggests predator avoidance behaviour within the invaded river. By comparison, within the uninvaded river, catfish introduction into the Impact treatment plots indicated negative effects on macroinvertebrate community that was reflected by decrease in diversity, richness and biomass. A community-level impact was also reflected in the multivariate analysis that indicated more variation in macroinvertebrate composition within the Impact treatment relative to the Control in the uninvaded river. Catfish impact within the uninvaded river suggests the dominance of vulnerable taxa, such as odonates that were less abundant in the Impact treatment plots after catfish introduction. From a disturbance perspective, this study revealed different macroinvertebrate responses to catfish impact, and suggests that within invaded habitats, macroinvertebrates were less responsive to catfish presence, whereas catfish introduction within uninvaded habitats demonstrated invasion impact that was shown by a decrease in the abundance of vulnerable taxa. The occurrence of non-native sharptooth catfish within many Eastern Cape rivers is a concern because of its predation impact and potential to influence trophic interrelationships, and efforts should be

taken to protect uninvaded rivers, and, where possible, eradicate the invader." (Authors) Taxa including Odonata were treated at family level.] Address: Booth, A.J., Dept Ichthyology & Fishery Science, Rhodes University, P.O. Box 94, Grahamstown, 6140 South Africa. E-mail: t.booth@ru.ac.za

12976. Keil, P.; Buch, C.; Kowallik, C.; Rautenberg, T.; Schlüpmann, M. & Unseld, K. (2012): Bericht für das Jahr 2011. Jahresberichte der Biologischen Station Westliches Ruhrgebiet, Oberhausen 9, 90 S. 2. korrigierte Ausgabe: 92 pp. (in German) [This report on the activities of the Biologische Station Westliches Ruhrgebiet, Oberhausen for 2011, includes several brief notes on odonatological studies and documented interesting records.] Address: Biologische Station Westliches Ruhrgebiet e. V., Ripshorster Str. 306, 46117 Oberhausen, Germany

12977. Khelifa, R. (2012): Flight period, apparent sex ratio and habitat preferences of the Maghribian endemic *Calopteryx exul* Selys, 1853 (Odonata: Zygoptera). *Revue d'écologie* 68(1): 37-45. (in French, with English summary) [*Calopteryx exul* is an endangered endemic Odonata species restricted to the Maghreb that shows an increasing concern about its conservation status, due to substantial habitat loss. A study dealing with its flight period, the apparent sex-ratio of imagoes and adult habitat preferences was carried out in the Seybouse basin, northeastern Algeria, during two years. The flight period of the species begun on early May and ended on late July, showing a peak around late May / early June. Either a small second generation or delayed emergences was responsible of the record of scarce tenerals and immatures in early September. Additional larval investigations are needed to elucidate the origin of such late emergences. The maturation period was estimated to extend over 11-12 days. The apparent daily sex-ratio in the adult population present on site was mostly biased with 65 to 67% of females. Additional work addressing sex-ratio at emergence is needed to understand this disequilibrium. Multivariate analysis showed that adults of *C. exul* prefer relatively fast flowing shallow water when compared to its congeneric *C. haemorrhoidalis*, which was mainly observed at deeper, slower and very shaded running waters with dense banks vegetation. The population of *C. exul* dealt with in this study is currently the largest one reported so far in the Maghreb. Data on adult phenology and habitat preferences will allow future investigations about the present distribution of the species in Algeria and the whole Maghreb." (Author)] Address: Khelifa, R., Département d'écologie et du génie de l'environnement, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre et de l'Univers, Université 08 Mai 1945, Guelma 24000, Algeria

12978. Kiel, E.; Kastner, F.; Lühken, R.; Schröder, M. (2012): Die Wirbellosenfauna in Gräben Norddeutsch-

lands. *Natur und Landschaft* 87(8): 347-350. (in German, with English summary) [Oldenburg, Niedersachsen, Germany; "This article reviews macroinvertebrate studies on ditches in Europe. It focuses on aspects of biodiversity and the role ditches can play in meeting nature conservation objectives. By means of new data on dragonfly fauna and fundamental ecological aspects of specific ditches in northern Germany, we discuss the value of ditch systems in terms of nature conservation practice in an intensively used environment. Examples are given in order to explain the dimension of their positive impact. These data reveal the important ecological value ditch systems can have for rare and endangered aquatic species and the terrestrial fauna even in distant areas." (Authors) Special emphasis was given to the densities of *Aeshna viridis* in meadow ditches.] Address: Kiel, Ellen, AG Gewässerökologie und Naturschutz, Institut für Biologie und Umweltwissenschaften, Carl von Ossietzky Universität Oldenburg, Ammerländer Heerstr. 114 –118, 26129 Oldenburg, Germany. E-mail: ellen.kiel@uni-oldenburg.de

12979. Knill-Jones, S. (2012): Reports from coastal stations - 2011: Isle of Wight. *Atropos* 45: 54-56. (in English) [UK *Anax parthenope*, *Sympetrum fonscolombii*, *S. vulgatum*] Address: Knill-Jones, S.A., 2 School Green Road, Freshwater, Isle of Wight, PO40 9AL, UK

12980. Li, H.-x.; Zhang, R.-q.; Wu, F.-c.; Guo, G.-h.; Feng, C.-l. (2012): Comparison of mercury species sensitivity distributions of freshwater biota in China and the United States. *Acta Scientiae Circumstantiae* 32(5): 1183-1191. (in Chinese, with English summary) ["Based on single-species freshwater acute toxicity data in China and the United States, species sensitivity distributions (SSDs) of vertebrates (including fish) and invertebrates (including arthropods and non-arthropod invertebrates) to mercury were constructed, and species sensitivity to mercury in these two countries were compared. The results of this study indicated that there was no significant difference between sensitivity distributions of the Chinese and American taxa. However, the hazardous concentration for 5% of the species (HC5) range of Chinese species to short-term mercury exposure was lower than that of the American species, especially for non-arthropod invertebrates. HC5 for American non-arthropod invertebrates to mercury was 7D times larger than that for the corresponding Chinese species. Under the 95% protection level and including all the species, the tested invertebrates were more sensitive to mercury than the vertebrates in both China and the United States. However, in the lower taxonomic classification level, the sensitivity decreased in the order of arthropod > non-arthropod invertebrates > fish in China, but the order was arthropods > fish > non-arthropod invertebrates in the United States. Therefore, in determining the water quality criteria based on the sensitivity of all the species, we should also consider the influence of SSD of individual groups. The water quality

criteria derived from the species sensitivity distribution of American species may make the aquatic species in China out of protection." (Authors) The paper includes a reference to Odonata.] Address: Wu, F.-c., State Key Laboratory of Environmental Criteria and Risk Assessment, Chinese Research Academy of Environment Sciences, Beijing 100012, China. E-mail: wufengchang@vip.skleg.cn

12981. Lu, C.-w.; Yang, R.-g.; Chen, Y.; Zhang, B.-l.; Huang J.-h.; Zhou, S.-y. (2012): A preliminary study of Odonata in Mao'er Mt. Nature Reserve of Guangxi, China. *Journal of Guangxi Normal University (Natural Science Edition)* 30(1): 95-104. (in Chinese, with English summary) [The Odonata collection of Insect Collections of Guangxi Normal University includes 57 species from Mao'er Mt. Nature Reserve of Guangxi. Among them, 19 species were newly recorded in Guangxi: *Orthetrum testaceum*, *O. lineostigma*, *Sympetrum ruptum*, *S. kunckeli*, *Lyriothemis flava*, *Zygonyx iris insignis*, *Idionyx victor*, *Somatochlora dido*, *Anotogaster kuchenbeiseri*, *Cephalaeschna acutifrons*, *Gynacantha bayadera*, *Planaeschna shanxiensis*, *Asiagomphus hainanensis*, *Asiagomphus pacificus*, *Lamelligomphus ringens*, *Amphigomphus hansonii*, *Gomphidia kelloggi*, *Mnais andersoni*, and *Coeliccia sexmaculata*.] Address: Lu, C.-w., College of Life Science, Guangxi Normal University, Guilin Guangxi 541004, China

12982. Marković, V.; Vasiljević, B.; Atanacković, A.; Tomović, J.; Zorić, K.; Tubić, B.; Paunović, M. (2012): Status assessment of the Lim River based on macroinvertebrate communities. *BALWOIS 2012 - Ohrid, Republic of Macedonia - 28 May, 2 June 2012*: 4 pp. (in English) ["Status assessment of the Lim River was carried out by using aquatic macroinvertebrates as the most commonly used biological quality element. Investigation was performed during July 2011, and comprised five sites. The saprobic index (Zelinka-Marvan), BMWP and ASPT were calculated to assess of the level of environmental stress i.e. organic pollution. Water quality status according to Zelinka-Marvan index varied from 1.90 to 2.35. Values of BMWP biotic index ranged from 31 to 113 and for ASPT index from 5.17 to 6.65. According to results of the investigation, the ecological status of the water body the Lim River can be evaluated as high to good considering SI and ASPT values and high to moderate status in accordance with BMWP index." (Authors) Only *Gomphus vulgatissimus* was observed in the Lim River.] Address: Marković, Vanja, Institute for Biological Research "Siniša Stanković", Belgrade, Serbia

12983. Miszta, A.; Przondziono, K. (2012): [Dragonflies in the Katowice Forest Park, 2: composition of the odonate fauna during 2002-2011]. *Przyroda Górnego Śląska* 70: 7-10. (in Polish) [Poland; the regional fauna comprises of 38 Odonata species.] Address: Miszta, A.,

Centrum Dziedzictwa Przyrody Górnego Śląska, Katowice, Poland

12984. Miszta, A.; Cuber, P.; Dolný, A.; Liberski, J. (2012): Yellow-spotted Whiteface *Leucorrhinia pectoralis* (Charpentier, 1825) (Odonata: Libellulidae) in the Silesian Province in the years 2002–2012. *Odonatrix* 8(2): 33-42. (in Polish, with English summary) [*L. pectoralis* was studied at 244 sites in the Silesian Province in 2002–2012, and was recorded at 34 sites. "The comparison of the present with historical data from the years 1958–1965 showed that *L. pectoralis* vanishes from peat bogs in this region. The reason for this situation is deteriorating condition of these habitats, mainly because of their desiccation and industrial pollution. It was noted however, that the species is present in a relatively high number on forest sinkhole ponds emerging over coal exploitation areas in the central, industrialized part of the province. Approximately 20% of investigated sinkholes presented conditions favourable for the reproduction and development of *L. pectoralis*. However, these habitats are unstable and do not sustain permanent presence of the species." (Authors)] Address: Miszta, Alicja, Centrum Dziedzictwa Przyrody Górnego Śląska, ul. Św. Huberta 35, 40–543 Katowice, Poland. E-mail: a.miszta@cdpgs.katowice.pl

12985. Norval, G.; Huang, S.-C.; Mao, J.-J.; Goldberg, S.R.; Slater, K. (2012): Additional notes on the diet of *Japalura swinhonis* (Agamidae) from southwestern Taiwan, with comments about its dietary overlap with the sympatric *Anolis sagrei* (Polychrotidae). *Basic and Applied Herpetology* 26: 87-97. (in English) ["*Japalura swinhonis* is an endemic agamid lizard in Taiwan, and although its diet has been examined in northern Taiwan and Orchid Island, it has not been investigated in other parts of its range. Investigating the diet of a species from different parts of its range is crucial due to temporal and spatial variations in it. This study examined the dietary items of 47 *J. swinhonis* from Santzepu and Yunlin, southwestern Taiwan. We also reviewed the diet of *J. swinhonis* and compared it with that of *A. sagrei* from Santzepu, where these species are sympatric in anthropogenically created habitats such as *Areca* catechu plantations and fruit orchards. The diet of *J. swinhonis* from Santzepu was dominated by hymenopterans, followed by coleopterans, lepidopterans and trichopterans, while that of the *J. swinhonis* from Yunlin was dominated by isopterans, followed by hymenopterans, lepidopterans and coleopterans. The diet of *A. sagrei* from Santzepu was mainly dominated by hymenopterans, lepidopterans, araneids, hemipterans, coleopterans, dipterans, isopterans and orthopterans, in that order of frequency. From the results of this study it is evident that in areas where *J. swinhonis* and *A. sagrei* are sympatric there is a substantial dietary niche overlap, and competition for prey is very likely." (Authors) The paper includes a few references to Odonata as prey of *Anolis sagrei*.] Address: Norval, G., Applied Behavioural Ecology & Ecosystem Research

Unit, Department of Environmental Sciences, University of South Africa, Republic of South Africa. E-mail: gnovral@gmail.com

12986. Nowak, M. (2012): Intrasexueller Kannibalismus bei *Ischnura elegans*. *Mercuriale* 12: 61-62. (in German, with English summary) ["In 2008, a case of intrasexual cannibalism was observed in southern France (Pont de Gau, Carmargue): A copulating female was feeding on a immature female of the variation *Ischnura elegans f. violacea*." (Author)] Address: Nowak, M., Fuchseckstr. 16/1, 73114 Schlatt, Germany. E-mail: Nowak-Schlatt@t-online.de

12987. Odin, N. (2012): Reports from coastal stations - 2011: Landguard Bird Observatory, Suffolk. *Atropos* 45: 67-68. (in English) [UK; *Chalcolestes viridis*, *Brachytron pratense*] Address: not stated

12988. Orr, R. (2012): 2011-2012 Survey of the dragonflies and damselflies (Odonata) of the Cove Point LNG property (Calvert county, Maryland). <http://www.covepoint-trust.org/studies.html>: 20 pp. (in English) [USA; "Full property surveys for Odonata were completed in 1998-1999 and again in 2011-2012. In addition, a limited survey was completed along the LNG pipeline right-of-way in 2005. To date, 62 Odonata species have been recorded from the Cove Point LNG property. Seven of the sixty-two species were added since the end of the 1998-1999 survey. Two State-listed Maryland Endangered dragonflies (*Gomphus rogersi* and *Somatochlora filosa*) complete their life cycle on the property. The known larval site of *G. rogersi* is a small stream along the pipeline right-of-way while the larval site of *S. filosa* is Cove Point Marsh. Between the times of the two full property surveys, the larval site of *S. filosa* (Cove Point Marsh) was impacted by storm breaches resulting in saltwater from the Chesapeake Bay mixing with the freshwater of the marsh. In addition, the larval site of *G. rogersi* (along the LNG pipeline right-of-way) had been intersected by the placement of an additional underground pipeline. Both sites have undergone extensive environmental restoration in the hopes of returning these wetlands to their original condition. Before the 2011-2012 survey the fate of the two State-listed species that were first reported during the 1998-1999 survey were unknown. *S. filosa* and *G. rogersi* were relocated during the 2011-2012 survey. Both species were found in reduced numbers in comparison with the 1998-1999 survey. The reduction in the number of individual *S. filosa* is likely due to a decrease in the size of the larval habitat that is now restricted just to the northern section of Cove Point Marsh. The reduction in the number of individual *G. rogersi* is the result of a beaver dam that flooded the small stream where the larvae previously existed. Human intervention has returned the *G. rogersi* habitat to its 1999 condition by removing the dam plus restoring the surrounding environment from the burying of the new pipeline. The restoration of Cove

Point Marsh is currently in progress and it is reasonable to assume that when (or if) the southern section of Cove Point Marsh returns to a healthy freshwater habitat that *S. filosa* will recover to its earlier numbers." (Author) For the complete study see: <http://www.covepoint-trust.org/studies.html>] Address: Orr, R., Mid-Atlantic Invertebrate Field Studies, www.marylandinsects.com, USA. E-mail: odonata457@comcast.net

12989. Parr, A. (2012): Migrant dragonflies in 2011 including recent decisions and comments by the Odonata Records Committee. *Atropos* 45: 30-35. (in English) [Records of the following species are documented and discussed: *Lestes barbarus*, *Chalcolestes viridis*, *Coenagrion scitulum*, *Ischnura elegans*, *I. senegalensis*, *Erythromma viridulum*, *Aeshna affinis*, *A. mixta*, *Anaciaeschna isocetes*, *Anax ephippiger*, *A. imperator*, *A. parthenope*, *Somatochlora arctica*, *Sympetrum flaveolum*, *S. fonscolombii*, and *S. striolatum*.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

12990. Pepa, B.; Papparisto, A.; Keçi, E. (2012): Preliminary data of water quality of Osumi, Devolli and Shkumbini River based on benthic macro invertebrates during summer of year 2011. *BALWOIS 2012 - Ohrid, Republic of Macedonia - 28 May, 2 June 2012*: 1-12. (in English) ["Recently, monitoring of water quality of Albanian River has a high interest. Based on instructions of Water Frame Directive (WFD) for the water body study an efficient element in monitoring and assessment of water quality are benthic macro-invertebrates. Our study was focused on Osumi, Devolli and Shkumbini River during summer 2011, and the purpose is to show relations between benthic macro-invertebrates and water quality. For each River was monitored respectively three stations. Where Osumi River show that, the total number of organisms is 509 that are related to 18 taxons, and in Devolli River are found 389 organisms that are related to 17 taxons. While in Shkumbini River are found 809 organisms which are related to 25 taxons. The result has shown that: EPT-Biotic Index represent different values in different stations. Osumi River: St 1 =4.32, St 2=3.99, St 3 =5.1; Devoll River: St 1 =3.90, St 2=3.93, St 3 =3.76; Shkumbini River: St 1 =3.86, St 2=4.37, St 3 =3.96. Based to these data the water quality of each river is Good (bioclassification 3.75-6.5). Also two others parameters (SWRC-Biotic Index, Family- Biotic Index) are in accordance with EPT- Biotic. Three Rivers have a good water quality with a slight impact." (Authors) Taxa including Odonata were treated at the family or suborder level.] Address: Pepa, B., Faculty of Natural Sciences, Tirana University, Albania. E-mail: bledpepa@hotmail.com

12991. Pessacq, P.; Santos, T.C.; Costa, J.M. (2012): Checklist and updated distribution of Protoneuridae from Brazil. *International Journal of Odonatology* 15(2): 59-73. (in English) ["Protoneuridae are represented in

the Neotropics by 16 genera and 117 species, of which 64 species in 12 genera are known to occur in Brazil. Most of them are known only from the original descriptions or isolated records. During 2009 the Protoneuridae collection of MNRJ was revised; 2800 specimens were studied, belonging to 40 species in nine genera. As a result, the distribution of 25 species is extended, including 50 new records for several states and three new records for the country: *Epipleoneura lamina* Williamson, *Protoneura woytkowskii* Gloyd, and *Psaironeura remissa* (Calvert). The widest distributions are shown by *Neoneura sylvatica* Hagen in Selys, *Epipleoneura venezuelensis* Rácenis, and *Epipleoneura metallica* Rácenis, which are also recorded from the highest number of states: 11 and eight respectively. Additionally, the distribution of most species within previously recorded states is extended." (Authors)] Address: Pessacq, P., CONICET - Facultad de Ciencias Naturales, (LIESA), Universidad Nacional de la Patagonia San Juan Bosco, Sarmiento 849, 9200, Esquel, Chubut, Argentina. E-mail: pablopessacq@yahoo.com.ar

12992. Phiri, C.; Chakona, A.; Day, J.A. (2012): Body-size distribution, biomass estimates and life histories of common insect taxa associated with a submerged macrophyte *Lagarosiphon ilicifolius* in the Sanyati Basin, Lake Kariba, Zimbabwe. *African Journal of Aquatic Science* 37(3): 289-299. (in English) ["The body-size distributions and biomass estimates of *Caenis* (Ephemeroptera: Caenidae), *Cloeon* (Eph.: Baetidae), *Coenagrionidae* (Odonata), *Micronecta* (Hemiptera: Corixidae), *Chironominae* (Diptera: Chironomidae) and *Orthocladiinae* (Chironomidae), the most common and abundant insect taxa associated with a submerged macrophyte *Lagarosiphon ilicifolius* in Lake Kariba, are presented. *Caenis* has a univoltine life cycle, whilst *Cloeon*, *Coenagrionidae*, *Chironominae* and *Orthocladiinae* have multivoltine life cycles. Growth and reproduction of *Micronecta* occurred all year round. The *Coenagrionidae* had the highest mean biomass, which was significantly greater than those of the other taxa. *Caenis* and *Orthocladiinae* were sensitive to variations in water temperature and dissolved oxygen (DO) concentration, their highest biomasses occurring when temperatures were low and DO concentrations high. The biomasses of *Chironominae* and *Orthocladiinae* increased with rising water levels, but that of *Caenis* decreased. Total insect biomass was minimally affected by variations in water physico-chemical variables. The study suggests that water temperature, water level and DO concentration do have an effect on the biomasses of some insect taxa associated with *Lagarosiphon* in Lake Kariba. Mixing processes during de-stratification also affect the abundance and biomass of the insect taxa." (Authors)] Address: Phiri, C., University of Zimbabwe Lake Kariba Research Station, PO Box 48, Kariba, Zimbabwe

12993. Qiu, F.; Zhang, Q.; Li, C.-r.; Spatafora, J.; Fan, M.-z.; Li, Z.-z.; (2012): The genus *Cordyceps* and its al-

lies from Anhui. *Journal of Anhui Agricultural University* 39(5): 803-806. (in Chinese, with English summary) ["In this paper, 20 species of *Cordyceps* and its allies from some nature preserves in Anhui Province were reported as follows: *Cordyceps brongniartii* and its anamorph *Beauveria brongniartii*, *C. cylindrica* and its anamorph *Nomuraea atypicola*, *Metacordyceps guniujiangensis* and its anamorph *Metarhizium aff. cylindro-sporum*, *Ophiocordyceps heteropoda* var. *langyashanensis* and its anamorph *Hirsutella heteropoda*, *O. melolonthae*, *O. odonatae*, *O. gryllotalpae*, *C. kusanagiensis* and so on. Among them, *O. melolonthae* is a new record to China mainland and a minor error in original description of *O. odonatae* was revised. Specimens examined are deposited in Research Center on Entomogenous Fungi, Anhui Agricultural University (RCEFAAU)." (Authors)] Address: Qiu, F., Anhui Provincial Key Laboratory for Microbial Control, Hefei 230036, China. E-mail: chunruli@hotmail.com

12994. Rattu, A.; Atzeni, A.; Bzzato, E.; Cillo, D. (2012): 550 - *Selysiothemis nigra* (Van der Linden, 1825) (Odonata Libellulidae). *Boll. Soc. Entomol. Ital.* 144(3): 136. (in Italian) [A record from the isle of Sardegna, Italy is documented: prov. Cagliari, parco Naturale Regionale Molentargius - Saline, Quartu Sant'elena, Is Arenas, 7. & 13.VII.2010, A. Rattu & A. Atzeni leg., 3 specimens. (coll. Rattu); id., Stagno di Quartu S.e., 9.VII.2010, A. Rattu leg., 1 specimen. (coll. Rattu). *Aeshna mixta*, *Crocothemis erythraea*, *Brachythemis impartita* and *Orthetrum trinacria* were collected from the same habitat too.] Address: Rattu, A., via del pozzetto 2, 09130 Cagliari CA, Italy. E-mail: andrearattu@virgilio.it

12995. Sansault, E.; Baeta, R.; Présent, J. (2012): *Leucorrhinia pectoralis* (Charpentier, 1825), une nouvelle espèce pour l'Indre-et-Loire (37), région Centre (Odonata, Anisoptera: Libellulidae). *Martinia* 28(2): 123-125. (in French, with English summary) ["During various biodiversity surveys led by the non profit organization Caudalis in both May and June 2012, three sites hosting males of *L. pectoralis* were discovered in the basin of Savigné area, Indre-et-Loire, France. This discovery represents the first sightings of this species in Indre-et-Loire. One site in particular hosted a dozen of males showing territory behaviour. Even if autochthony can not be proved yet, all sites discovered perfectly match the species' ecological requirements." (Authors)] Address: Sansault, E., Association Naturaliste d'Étude et de Protection des Écosystèmes (ANEPE) « Caudalis », 118 rue de l'Ermitage, F-37100 Tours, France. E-mail: anepe.caudalis@g mail.com

12996. Schiel, F.-J.; Hunger, H. (2012): Vermehrtes Auftreten der Großen Moosjungfer (*Leucorrhinia pectoralis*) in der badischen Oberrheinebene 2012 (Odonata: Libellulidae). *Mercuriale* 12: 37-44. (in German, with English summary) ["In the German Federal State of Baden-Württemberg, the distribution of *L. pectoralis* is mainly

restricted to the southeastern prealpine region. In the Upper Rhine Valley, the species had so far only been recorded at 13 sites between 1959 and 2011; this included one site where the species has reproduced since 2008. In 2012, the species was surprisingly observed 13 times at eleven sites in the Upper Rhine Valley of Baden-Württemberg. Northernmost and southernmost site are about 135 km apart. In only one case a female was observed. All other observations referred to single or few males. The observations in the Upper Rhine Valley corresponded with an increased occurrence in large parts of central and western Europe. Therefore we conclude that there has been long distance dispersal from the northern parts of central Europe which has been favoured by northeasterly winds. It is very probable that this type of dispersal has also occurred to a extent in the past." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

12997. Schiel, F.-J. (2012): Nachtrag zur Verbreitung von Kleiner und Glänzender Binsenjungfer (*Lestes virens*, *L. dryas*) am Oberrhein (Odonata: Lestidae). *Mercuriale* 12: 23-26. (in German, with English summary) ["Three records of *L. virens* and one of *L. dryas*, documented by E. & K. Westermann from 1977 to 1981 and additionally recent findings of both species in 2012 are supplemented to the synopsis of Schiel (2011). Especially the records of E. & K. Westermann are important for our understanding of the distribution of these two species in the upper Rhine valley. In all *Lestes virens* was recorded at 26 sites in the upper Rhine valley of the German Land of Baden-Württemberg and *L. dryas* at 11 sites. Between 1958 and 1999 *L. virens* was recorded at 11 sites and between 2000 and 2012 at 18 sites. From 1922 to 1999 *L. dryas* was found at four sites in this part of the upper Rhine valley and from 2000 to 2012 at seven sites. New distribution maps are presented and the records are shortly discussed." (Author)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

12998. Schmid, F. (2012): Fehlpaarungen von *Sympetma fusca* und *S. paedisca* (Odonata: Libellulidae). *Mercuriale* 12: 33-36. (in German, with English summary) ["In 2011 and 2012, four heterospecific connections between *S. fusca* and *S. paedisca* were observed in the prealpine region of the German Land of Baden-Württemberg. One heterospecific copulation, observed at 04-V-2012, lead subsequently to an interspecific oviposition and was documented by photographs." (Author)] Address: Schmid, F., Graben 23, 72525 Münsingen, Germany. E-mail: fcschmid@t-online.de

12999. Schmid, F. (2012): Bemerkenswerte Schlupföhnen von Zweifleck (*Epithea bimaculata*) und Gemeiner Falkenlibelle (*Cordulia aenea*) an einem See im ober-schwäbischen Alpenvorland (Odonata: Corduliidae). *Mer-*

curiale 12: 57-58. (in German, with English summary) [Baden-Württemberg, Germany; "At a trunk of a *Larix decidua*-tree larvae of *Cordulia aenea* were proofed to climb up to 2.8 m and those of *Epithea bimaculata* up to 6.05 m above the ground." (Author)] Address: Schmid, F., Graben 23, 72525 Münsingen, Germany. E-mail: fcschmid@t-online.de

13000. Schmidt, B. (2012): Widerfund von *Leucorrhinia albifrons* (Burmeister, 1839) (Odonata: Libellulidae) in Baden-Württemberg. *Mercuriale* 12: 17-22. (in German, with English summary) ["On 09-VII-2012, two males of *L. albifrons* were observed at a shallow water shore with reed bed (*Schoenoplectus lacustris*) at lake Badsee, Allgäu (county of Ravensburg, prealpine region, southwest Germany). It's the third time this taxon has been recorded in Baden-Württemberg for the last 100 years. Locality, habitat and water body are described and the origin of the specimens is discussed." (Author)] Address: Schmidt, B.K., Alpenstr.27, 88045 Friedrichshafen, Germany. E-mail: Bertrand.Schmidt@gmx.de

13001. Scon; D.A. (2012): Reports from coastal stations - 2011: Dursey Island, Co. Cork. *Atropos* 45: 78-79. (in English) [UK; *Sympetrum fonscolombii*]

13002. Scott, M.A.; Scott, W.J. (2012): Reports from coastal stations - 2011: Longstone Centre, St Mary's, Isles of Scilly. *Atropos* 45: 44-45. (in English) [22 records of *Sympetrum fonscolombii* between 12 Oct. and 6 Nov 2011; *Anax ephippiger* on 15 Oct. 2011.] Address: not stated

13003. Shi, X.; Yu, H. (2012): Finite element analysis of dragonfly wing structural stiffness. *Nongye Jixie Xuebao* (Transactions of the Chinese Society of Agricultural Machinery) 43(1): 224-229. (in English) ["The dragonfly wings were taken as the study objects, CAD and finite element analysis software ANSYS were applied to establish the finite element model of dragonfly wings. Through static analysis, the main vein structure was determined as load-bearing structure in dragonfly wings, the main vein and secondary veins coordinating so as to make the overall structure more reasonable. According to the characteristics of dragonfly wings wrinkled structure, the mesh model of rectangular and staggered quadrilateral fold structure was established, different mechanical properties under load were analysed. The results showed that under the same uniform load, the greater the height of wrinkling was, the smaller structural deformation, and the greater structural stiffness would be. The analysis of quadrilateral mesh (no membrane) model in a different uniform deformation under load of the trend can be seen in the same wrinkle height, as the load increased, the deformation also increased, but as the wrinkle height increased, and with the smaller amount of deformation of the load increased, the quadrilateral mesh stiffness of the structure became slightly larger than staggered quadrilateral

mesh structure. Under the same load, the deformation of a membrane mesh structure was always less than no membrane mesh structure." (Authors)] Address: not stated

13004. Skalon, T.N.; Skalon, N.V. (2012): Some data on the fauna of Odonata in the Kuznetsk-Salair mountainous region and neighbouring areas of the west Siberian plain. *Bulletin of the Kemerovo State University - Journal of theoretical and applied research* 3(51): 17-21. (in Russian, with English summary) ["This article reports on the fauna of dragonflies from 12 regions of the Kuznetsk-Salair mountainous region and neighbouring region the West Siberian Plain: 1) Salair Ridge, 2) Yin basin (within Coos Netsuke steppe), 3) downstream river Tom, 4) middle course river Tom, 5) the upper reaches of Tom; 6) Shoria Mountain 7) western slope of Kuznetsk Alatau, 8) River basin of Yaya, 9) middle course Kiya; 10) upper reaches of river Kiya, 11) the eastern slope of the Kuznetsk Alatau (tributaries Chulyma - Uryup, Black Yus); 12) the eastern foothills of the Kuznetsk Alatau (Podzaplotskie bogs). 63 species of Odonata have been detected by now. New data on the distribution of these species within the investigated territory are provided." (Authors)] Address: not stated

13005. Smout, A.-M. (2012): Reports from coastal stations - 2011: *Anstruther, Fife. Atropos* 45: 75. (in English) [UK, Scotland; *Ischnura elegans*] Address: not stated

13006. Soontornprasit, K. (2012): Use of aquatic insects as bioindicators of water quality in Kwan Phayao, Phayao province. *Journal of Community Development Research* 5(1): 15-24. (in Thai, with English summary) ["This study measured the aquatic insect diversity and its application as a bioindicator to monitor water quality in Kwan phayao, Phayao Province, Thailand. Shannon-Wiener index were used to assess water quality. Physical, chemical and biological parameters were also measured to compare with the surface water quality standard of Thailand. Results indicated that 3,511 aquatic insect from 26 families in 6 orders (including Odonata, but without details) were identified. The most abundant family found during the year was Geridae in the Hemiptera order. Using aquatic insects as bioindicators, it can be concluded that all sampling sites were shown to standard for surface water quality CLASS 2, depending on land use and human activities. From the correlation analysis, biological indices were related to some physico-chemical properties of water quality. Diversity index were related to some parameters such as DO, alkalinity, temperature and conductivity ($p < 0.05$)."] (Author)] Address: Soontornprasit, K., Division of Fishery, Faculty of Agriculture and Natural Resources, University of Phayao, Phayao 56000, Thailand. E-mail: kanyanats@hotmail.com

13007. Spitzenberg, D. (2012): Dr. Joachim Müller zum 70. Geburtstag. *Naturschutz im Land Sachsen-Anhalt* 49: 80-82. (in German) [The author briefly outlines

some personal achievement in science and life of J. Müller, biologist and odonatologist with great reputation within Germany.] Address: Spitzenberg, D., Zur Tonkuhle 53 · 39444 Hecklingen, Germany. E-Mail: spitzenberg.dietmar@vodafone.de

13008. Stephan, U. (2012): Einfluss der Untersuchungsmethode auf die Erfassung von Cordulegaster Larven. *Mercuriale* 12: 45-52. (in German, with English summary) ["Two methods of sampling larval Cordulegaster were compared according to their efficiency: the "cullender method": the investigator use a sieve, e.g. a cullender, to remove substrate from the bottom of little streams or seepages and to sort out the larvae being contained in the substrate; the "tremor method": the investigator causes tremors by jumping up and down at the stream margin; some larvae react to the tremors by performing movements, e.g. rising their heads out of the substrate, and therefore reveal their positions. The tremor method was more efficient in collecting larvae, especially the larger ones (body length > 15 mm). However, small larvae (body length < 15 mm) could be more efficiently recorded by the cullender method. In addition, the suitability of the methods was affected by habitat structures: at dark, shady stretches and habitats with lots of leaf litter the cullender method should be used, whereas in stony reaches the tremor method is more suitable." (Author)] Address: Stephan, Ulrike, Im Westengarten 12, 79241 Ihringen, Germany. E-mail: stephan.ulrike@gmx.net

13009. Stephan, U.; Schiel, F.J. (2012): Nachruf auf Lothar Gilbert. *Mercuriale* 12: 65. (in German) [Obituary of L. Gilbert, a locally active member of the Schutzgemeinschaft Libellen in Baden-Württemberg.] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

13010. Su, Y.; Zhang, Z.; Hong, Y. (2012): Two new ancient griffenflies (Insecta Odonoptera) from the Namurian of Ningxia, China. *Insect Systematics & Evolution* 43: 1-10. (in English) ["Two new ancient griffenflies, members of the Qilianshan Entomofauna from the Namurian B-C (Upper Carboniferous) of Ningxia Hui Autonomous Region, are described. One species, *Sinierasiptera jini* Zhang, Hong & Su, sp.n., is placed in a new family *Sinierasipteridae* within Neodonoptera, and the other, *Paragilsonia orientalis* Zhang, Hong & Su, sp.n., in *Meganeuridae* (Tupinae). The phylogenetic position of the new family *Sinierasipteridae* is discussed." (Authors)] Address: Su, Y., School of the Earth Sciences and Resources, China University of Geosciences Beijing 100083, P. R. China

13011. Sullivan, S.M.P.; Rodewald, A.D. (2012): In a state of flux: The energetic pathways that move contaminants from aquatic to terrestrial environments. *Environmental Toxicology and Chemistry* 31(6): 1175-1183.

(in English) ["In this Focus article, we address ecological and societal issues related to the aquatic-to-terrestrial transport of aquatic contaminants, with the spotlight falling on flowing water ecosystems. We highlight the ways in which a new understanding of the aquatic-terrestrial interface has prompted an integrated view of cross-boundary contaminant flows within complex ecological networks. We pay particular attention to aquatic insects (including Odonata), which as an important source of energy for riparian consumers such as arthropods, birds, mammals, and reptiles, are especially likely to move contaminants into terrestrial ecosystems 4–6. The linkages among aquatic and terrestrial systems represent an emerging ecological and environmental issue. We believe that contextualizing contaminant fluxes within this framework will yield significant short- and long-term benefits to ecological health and human well-being." (Authors)] Address: Sullivan, S.M., School of Environment & Natural Resources, The Ohio State Univ., Columbus, Ohio, USA. E-mail: sullivan.191@osu.edu

13012. Tiple, A.D. (2012): Odonata (Damselflies and Dragonflies) fauna of Tadoba National Park and surroundings, Chandrapur, Maharashtra (Central India). *Bionano Frontier* 1: 149-152. (in English) ["A survey of fresh water body sites such as ponds, streams, fields grassland, and forests areas of Tadoba National Park, Chandrapur district area of 623 sq. km. from 2008 to 2010 to collect and record the odonate faunal diversity and their status. A total of 64 species of Odonata ... were recorded. The checklist adds 24 new records for Tadoba National Park. ... Of the total 64 species, 23 were abundant or very common, 24 were common, 12 rare and 5 very rarely in occurrence. The observations support the value of the National park (reserve forest) area in providing valuable resources for Odonata." (Author)] Address: Tiple A. D., Dept of Zoology, Vidyabharti College Seloo, Wardha, Maharashtra, India & Forest Entomology Division, Tropical Forest Research Inst., Jabalpur 482021, India. E-mail: ashishdtiple@yahoo.co.in

13013. Trautmann, S; Lötters, S; Ott, J; Buse, J; Filz, K; Rödder, D; Wagner, N; Jaeschke, A; Schulte, U; Veith, M; Griebeler, E-M; Böhning-Gaese, K. (2012): Auswirkungen auf geschützte und schutzwürdige Arten. In: Mosbrugger, V., Brasseur, G., Schaller, M. und Stribny, B. (Hrsg.) *Klimawandel und Biodiversität - Folgen für Deutschland*. WBG, Darmstadt, (2012), 260-289, ISBN 978-3534252350 (2012): 260-289. (in German) [On the basis of in most cases self-referring papers and monocausal interpretation of records, the usual speculations of Odonata (chap. 10.4) as climate change indicators are outlined. The paper lacks in any critical discussion on the data base on climatic induced range extensions vs. habitat availability or discussion while species as *Sympetrum pedemontanum* and *Erythromma viridulum* - for long years considered as indicators of climate change - are recently very rare or have lost most of their ranges in the past years.] Address: Ott, J., Fried-

hofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

13014. Tunmore, M. (2012): Reports from coastal stations - 2011: Lizard Peninsula, Cornwall. *Atropos* 45: 47-49. (in English) [Verbatim: It was a notable year for Odonata, which began early with a male *Anax ephippiger* ... at Kennack Sands on 19 February. This was the prelude to further occurrences during a period of exceptionally warm weather in April. Unidentified dragonflies seen near Goonhilly on 6 April and at Kynance on 19 April were almost certainly this species. More definite was a male present at Windmill Farm NR on 24 April, with two present on a different part of the reserve the next day and one present on 26th; two males were seen near Mullion on 24 April and an ovipositing pair was observed at a site near Predannack on 26th with at least one still present on 28th. A small arrival of *Sympetrum fonscolombii* also occurred at the same time with six present at Windmill Farm on 25 April and three near Mullion the same day. With exceptionally early emergences of resident Odonata also noted, some local observers were able to see nine species in the month of April. The summer brought a lull in Odonata immigration but small numbers of *S. fonscolombii* continued to be reported from Windmill Farm in early June and again in late July/August. An *Anax imperator* was present there between 28 July and 4 August, which was only the second record for the site. Signs of autumn migration included a *Sympetrum striolatum* in the moth-trap at Church Cove on 2 September and an *Aeshna mixta* in the trap at Cury Cross Lanes on 12 September. Two *S. fonscolombii* were at Cury Cross Lanes on 10 September, followed by one at Windmill Farm on 25 October, whilst a pair of *A. ephippiger* were seen ovipositing near Predannack on 28 October.] Address: Tunmore, M., 36 Tinker Lane, Meltham, Huddersfield, West Yorkshire HD7 3ES, UK. E-mail: Atropos@atroposed.freeserve.co.uk

13015. Velle, L. (2012): Inventaire des Odonates en forêts domaniales de Vierzon et de Vouzeron et première preuve de reproduction de *Leucorrhinia caudalis* (Charpentier, 1840) pour le département du Cher. *Martinia* 28(2): 89-102. (in French, with English summary) ["During an odonatological survey, 2009–2011, the author recorded 31 species of dragonflies from a dozen of forest ponds in the National Forest of Vierzon-Vouzeron, Cher department, Central France. This is more than half of the species known from this under prospected department. Two nationally protected species, which are also included in appendix II and/or IV of the "directive Habitats" have been discovered: *Leucorrhinia caudalis* and *L. pectoralis*. It is the first mention of the successful reproduction of *L. caudalis* in the Cher department. *Leucorrhinia pectoralis*, already known in this department, seems to be well present in the forested wetlands of this area." (Author)] Address: Velle, L., Office National des Forêts - Réseau entomologie Chemin

des Merlins, F-03340 Montbeugny, France. E-mail: laurent.velle@onf.fr

13016. Vircel, G. (2012): Nouvelle observation et nouvelle localité pour *Somatochlora metallica meridionalis* Nielsen, 1935 en Haute-Corse (2B) (Odonata, Anisoptera: Corduliidae). *Martinia* 28(2): 120. (in French) [*S. meridionalis* was recorded at 12-VII-2012 at the river Varagno near Poggio-di-Nazza, Haute-Corse, France (42°2'12,20"N, 9°19'18,58"E).] Address: Vircel, G., LPO PACA, Villa Saint-Jules, 6 avenue Jean Jaurès, F-83400 Hyères, France

13017. Vundtsettel, M.F.; Kuznetsova, N.V. (2012): Ecological characteristics of the river Yakhroma and its benthic fauna. *Vestnik of Astrakhan State Technical University. Series: Fishing Industry.* 2012(1) [ISSN 2073-5529]: 15-21. (in Russian, with English summary) [Yakhroma River, 55 kilometres north of Moscow; Dmitrovsky District of Moscow Oblast, Russia. 170 samples of zoobenthos between 2009-2011 resulted in 86 species from 16 orders. Odonata are represented by *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Calopteryx virgo*, *C. splendens*, *Chalcolestes viridis*, *Lestes sponsa*, *Orthetrum cancellatum*, *Platycnemis pennipes*, *Coenagrion armatum*, *Brachytron pratense*, *Aeshna grandis*, *Anax imperator*, and *Somatochlora metallica*.] Address: Vundtsettel, M.F., Astrakhan State Technical University, Dmitrov branch, Russia. E-mail: df-vmf@mail.ru

13018. Wildermuth, H. (2012): Libellengewässer, die kommen und gehen. *Mercuriale* 12: 1-10. (in German, with English summary) ["The dragonfly fauna of two freshly created shallow ponds in open meadows in the Swiss Plateau was monitored during summer 2012. Altogether 24 and 29 species were recorded, respectively, 16 and 15 of them certainly or most probably indigenous. The water bodies proved to be suitable for regionally rare species such as *Ischnura pumilio*, *Orthetrum albistylum*, *O. brunneum*, *Sympetrum depressiusculum* and *S. fonscolombii*. The importance of shallow ponds in open country as breeding habitats for dragonflies, especially during the early succession stages, the problems of rapid overgrowth or complete disappearance and the possible maintenance measures for conservation of an optimal succession state are discussed." (Author)] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

13019. Xu, J.; Wang, Q. (2012): Species diversity of flower-visiting insects at Huangjin Main Campus of Gannan Normal University. *Journal of Gannan Normal University* 3: 120-124. (in Chinese, with English summary) [*Crocothemis servilia*, *Orthetrum albistylum*, *Sympetrum croceolum*, *Agriocnemis femina*, *Ischnura senegalensis*, *Ceriatagrion melanurum*, and *Platycnemis foliacea* were among the insect species found using

flowers as perching substrate.] Address: Xu, J.s., School of Life and Environment Science, Gannan Normal University, Ganzhou 341000, China

13020. Ye, S.-s.; Wang, H.-q.; Chen, Y.; Fang, Y.; Li, K. (2012): Characterization of riparian insect communities in Lingang New Town of Shanghai. *Chinese Journal of Ecology* 31(5): 1207-1213. (in Chinese, with English summary) ["Lingang New Town is a rapidly developing coastal zone in Shanghai metropolitan region, China. To understand the characteristics of the riparian insect communities in the zone under effects of urbanization, an investigation was conducted in different habitats and seasons from October 2009 to September 2010. A total of 7755 insect individuals were collected, belonging to 199 species, 84 families, and 13 orders." (Authors) Odonata were represented by 2.3% of the specimens and only detailed as Libellulidae and Coenagrionidae.] Address: Li, K., Shanghai Key Laboratory for Ecology of Urbanization Process and Eco-Restoration, East China Normal University, Shanghai 200062, China. E-mail: kaili@bio.ecnu.edu.cn

13021. Yu, W.-y.; Li, Z.-h.; Luo, Q.-h.; Cai, Y.; Ren, Y.-h.; Zhao, L.; Chen, X.-r.; Zhou, S.-s. (2012): Study on fauna and diversity of Odonata in Maolan area of Guizhou. *Sichuan Journal of Zoology* 31(5): 828-833. (in Chinese, with English summary) [Transect counts in five localities (Maolan area, Guizhou province, China) in July, 2011 resulted in 65 Odonata species. The records were documented and analysed according to the known species biogeography.] Address: Yu, W.-y., Institute of Applied Ecology, Nanjing Xiaozhuang University, Nanjing 211171, China. E-mail: ywy138519@126.com

13022. Yu, X.; Bu, W.-j.; Zhu, L.; (2012): Research advances in eco-environment assessment using dragonfly as a bioindicator. *Chinese Journal of Ecology* 31(6): 1585-1590. (in Chinese, with English summary) [Odonata as bioindicators were discussed in terms of general environmental assessment, environment pollution degree assessment, environmental improvement assessment, climate change assessment, and large-scale environmental assessment.] Address: Zhu, L., College of Environmental Science and Engineering, Nankai University, Tianjin 300071, China. E-mail: zhulin@nankai.edu.cn

13023. Zoellick, B.; Nelson, S.J.; Schauffler, M. (2012): Participatory science and education: bringing both views into focus. *Front. Ecol. Environ.* 10(6): 310-313. (in English) ["Aligning the goals of scientists and participants becomes more challenging when citizen science moves into middle- and high-school classrooms. Here, we describe a logic model developed in association with the Acadia Learning Project, a collaboration among scientists, teachers, and students that successfully meets both research and educational needs. The logic model is intended to assist other classroom-based citi-

zen-science initiatives with project design and evaluation." (Authors) The paper includes references to Odonata.] Address: Nelson, Sarah, Senator George J Mitchell Center for Environmental and Watershed Research and Department of Plant, Soil, and Environmental Sciences, University of Maine, Orono, ME, USA. E-mail: sarah.nelson@umit.maine.edu

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13024. Abdelsalam, K.M.; Tanida, K. (2013): Diversity and spatio-temporal distribution of macro-invertebrates communities in spring flows of Tsuya Stream, Gifu Prefecture, central Japan. The Egyptian Journal of Aquatic Research 39(1): 39-50. (in Spatio-temporal; Macro-invertebrates; Diversity; Mother community; Springs) [Calopteryx atrata, Planaeschna milnei and Anotogaster sieboldii were listed from the stream.] Address: Abdelsalam, K.M., National Institute of Oceanography and Fisheries, Qayet Bey, El-Anfoushy, Alexandria, Egypt. E-mail: kh.abdelsalam@gmail.com

13025. Abhijna, U.G.; Ratheesh, R.; Biju Kumar, A. (2013): Distribution and diversity of aquatic insects of Vellayani lake in Kerala. Journal of Environmental Biology 34: 605-611. (in English) [The diversity of insect fauna of Vellayani lake in Kerala, India was represented by 60 insect species. Odonata count to 12.55% of the taxa.] Address: Kumar, B., Department of Aquatic Biology & Fisheries, University of Kerala, Thiruvananthapuram-695 581, India. E-mail: abiju@rediffmail.com

13026. Acquah - Lamptey, D.; Kyerematen, R.; Owusu, E.O. (2013): Using odonates as markers of the environmental health of water and its land related ecotone. International Journal of Biodiversity and Conservation 5(11): 761-769. (in English) ["The study of Odonata communities along wetlands requires the basic understanding of the abundance, distribution and number of species present. As habitat conditions change, they also exhibit changes in their diversity and distribution. Odonata assemblages were surveyed along the Densu River at Atewa Range Forest Reserve (ARFR) and Nsawam in the Eastern Region of Ghana and Weija in the Greater Accra Region of Ghana. Of the 177 species recorded for Ghana, 66 species (43 dragonfly and 23 damselfly species) were sampled along the Densu River. These belonged to eight families of which the Libellulidae dominated. The distribution of species was significantly different between the sites with the most diverse area being ARFR with 47 species. The various environmental variables along the river were recorded and their effects discussed." (Authors)] Address: Acquah - Lamptey, D., Department of Animal Biology and Conservation Science, P. O. Box LG67, University of Ghana, Legon, Ghana. E-mail: dalquino@gmail.com

13027. Adambukulam, S.P.; Kakkassery, F.K. (2013): Taxonomic studies of the last instar nymph of Lathre-

cista asiatica asiatica (Fabricius 1798) (Family: Libellulidae, Order: Odonata) by using its exuvia. Journal of Entomology and Zoology Studies 1(5): 103-109. (in English) ["L. a. asiatica is a monotypic cosmopolitan dragonfly species of the genus Lathrecista belonging to family Libellulidae, reported from peninsular India to Australia. No literature is available on the description of the nymph of this species, and the present paper describes the nymphal features of the last instar of Lathrecista asiatica asiatica by using its exuviae which was collected at the time of emergence of adult from a temporary pond in Ammadam, Thrissur district, Kerala, India." (Authors)] Address: Kakkassery, F.K., Department of Zoology, St. Thomas' College, Thrissur, India. E-mail: kakkassery@yahoo.com

13028. Afzal, G.; Mushtaq, S.; Rana, S.A.; Sheikh, M.A. (2013): Trophic niche breadth and niche overlap among different guilds of spider species in wheat agroecosystem. Pakistan Journal of Life and Social Sciences 11(2): 107-111. (in English) ["Trophic niche breadth and niche overlap of nine spiders including Pardosa timidula (Roewer, 1951), Hippasa olivacea (Thorell, 1887), Plexippus paykulli (Audouin, 1826), Oxyopes javanus (Thorell, 1887) (hunters), Leucauge decorata (Blackwall, 1864), Tetragnatha javana (Thorell, 1890), Neoscona mokerji (Tikader, 1980), Argiope aemula (Walckenaer, 1841) and Cyclosa spirefera (Simon, 1889) (web builders) inhabited in wheat fields of University of Agriculture, Faisalabad, Pakistan were verified. Study was planned to know how the most abundant spiders of wheat are coexisted in terms of habitat and food resources. Evidences of predation in fields were used to compute the coefficients of niche breadth and niche overlap. Diet breadth values were approximately 1 to 2 times greater than the minimum, which specifies substantial differing degree of feeding specialization. All overlap values were <1.00 (range, 0.05-0.92), which indicated that each species had its own feeding niche in the wheat ecosystem. It was concluded that separation of guild members in microhabitat, high plasticity in their foraging patterns may results in reduced competition and coexistence. Thus, such abundantly found spiders are highly responsible to enhance their biological control potential in wheat agroecosystems." (Authors) Odonata had been preyed by all spider species studied, but in most cases were rarely encountered in the spiders diet.] Address: Afzal, G., Department of Zoology & Fisheries, University of Agriculture, Faisalabad-38040, Pakistan

13029. Albrecht, M.P.; Reis, V.C.S.; Caramaschi, E.P. (2013): Resource use by the facultative lepidophage Roeboides affinis (Günther, 1868): a comparison of size classes, seasons and environment types related to impoundment. Neotropical Ichthyology 11(2): 387-394. (in English, with Portuguese summary) ["We report the consumption of scales and other food resources by the facultative lepidophage Roeboides affinis in the upper

Tocantins River where it was impounded by the Serra da Mesa Hydroelectric Dam. We compared the diet among size classes, between dry and wet seasons, and between sites with distinct water flow characteristics (lotic vs. lentic) related to the distance from the dam and phase of reservoir development. As transparency and fish abundance increased after impoundment, we expected a higher consumption of scales in lentic sites. Likewise, habitat contraction, higher transparency and decrease in terrestrial resources availability, would promote a higher consumption of scales. Scales were consumed by 92% of individuals and represented 26% of the total volume of resources ingested by *R. affinis*. Diet composition varied significantly among size classes, with larger individuals consuming more scales and larger items, especially odonates and ephemeropterans. Scale consumption was not significantly different between dry and wet seasons. *Roeboides affinis* incorporated some food items into the diet as a response to the impoundment, like other species. Scale consumption was higher in lotic sites, refuting our initial hypothesis, what suggests that the lepidophagous habit is related the rheophilic nature of *R. affinis*." (Authors)] Address: Albrecht, Miriam, Universidade Federal do Rio de Janeiro, Departamento de Ecologia, Av. Carlos Chagas Filho, 373, Cidade Universitária, 21941-902 Rio de Janeiro, RJ, Brazil. E-mail: albrechtmp@gmail.com

13030. Andrew, R.J. (2013): Odonates of Zilpi Lake of Nagpur (India) with a note on the emergence of the libellulid dragonfly, *Trithemis pallidinervis*. *Journal on New Biological Reports* 2(2): 177-187. (in English) ["Zilpi lake is a small water-body, formed by the construction of an earth fill dam in 1974 under the irrigation project of the Govt. of Maharashtra. The maximum live storage capacity of the dam is 1.51 MCM. It lies 25 km west of Nagpur city and is today a well known spot for scenic beauty and aquatic birds. A survey of dragonfly fauna of this lake was undertaken during the post monsoon period of 2012. A total of 34 odonate species belonging to the family- Coenagrionidae (7), Lestidae (1), Aeshnidae (3), Gomphidae (1) and Libellulidae (22) were found breeding in this lake. Except the *Diplacodes nebulosa* and *Rhodothemis rufa*, all other species are commonly found in the water bodies of central India. *Trithemis pallidinervis* abundantly breeds in this lake. Study of the emergence pattern of *T. pallidinervis* demonstrates that there is a direct correlation between choice of direction of the larva for emergence and the presence of emergent support and geographic condition of the water edge. 94% of the larvae of *T. pallidinervis* prefer the erect dried twigs of *Cassia tora* (Caesalpinaceae) to emerge. Maximum larvae (61%) preferred the west side of the lake for emergence because of the gradual sloping edge and large cluster of emergent support. The sex ratio is male biased (53.5% male, 46.5% female) and there was no correlation between the sex of the emerging larva and choice of direction." (Author)] Address: Andrew, R.J., Post Graduate Dept of Zoology,

Hislop College, Nagpur-440001, India. E-mail: rajuan-drew@yahoo.com

13031. Antoniazzi, C.E.; López, J.A.; Duré, M.; Falico, D.A. (2013): Alimentación de dos especies de anfibios (*Anura: Hylidae*) en la estación de bajas temperaturas y su relación con la acumulación de energía en Santa Fe, Argentina. *Rev. Biol. Trop. (Int. J. Trop. Biol.)* 61(2): 875-886. (in Spanish, with English summary) [The diet of *Hypsiboas pulchellus* includes a few Odonata.] Address: Antoniazzi, Carolina Elizabet, Universidad Nacional del Litoral, Facultad de Humanidades y Ciencias, Departamento de Ciencias Naturales, Ciudad Universitaria, Paraje el Pozo S/N (3000), Santa Fe, Argentina; caroantoniazzi@gmail.com

13032. Aspacio, K.T.; Yuto, C.M.; Nuñez, O.M.; Villanueva, R.J.T. (2013): Species diversity of Odonata in selected areas of Buru-un, Iligan City and Tubod, Lanao del Norte, Philippines. *ABAH BIOFLUX - Animal Biology & Animal Husbandry International Journal of the Bioflux Society* 5(2): 145-155. (in English) ["Odonata is known to be sensitive to structural habitat quality and is a valuable tool to evaluate landscape degradation. This study determined the species diversity of Odonata in Buru-un, Iligan City and Tubod, Lanao del Norte, Philippines. Eight sites were assessed on August 27 - 31, 2012 and on October 26 - 30, 2012 for a total of 98 man-hours. Sweep nets were used for collection. Twenty six species were identified from all sampling sites. Lake Babuyan (Site 4) and Kallangan Spring (Site 5) had the highest species richness. *Trithemis aurora*, an oriental species, was the most abundant species. Moderate species diversity was recorded with low endemism (35 %)."] (Authors)] Address: Nuñez, Olga, Department of Biological Sciences, Mindanao State University - Iligan Institute of Technology, Iligan City, Philippines. E-mail: olgamnuneza@yahoo.com

13033. Babu, R.; Subramanian, K.A.; Nandy, S. (2013): Endemic Odonates of India. Records of the Zoological Survey of India. Occasional Paper 347: 1-60. (in English) ["The paper deals with an updated list of 186 species /subspecies belonging to 67 genera of Odonates endemic to India have been compiled along with distribution of each taxon with respective citations. The distributions of more number of endemic species/subspecies are restricted in two biodiversity hotspots of India, Western Ghats and North east India." (Authors)] Address: Babu, R, Southern Regional Centre, Zoological Survey of India, Chennai - 600 028, India

13034. Bailowitz, R.; Danforth, D.; Upson, S. (2013): *Erpetogomphus molossus*, a new species from Sonora, Mexico (Odonata: Anisoptera: Gomphidae). *Zootaxa* 3734(5): 559-570. (in English) ["*E. molossus* is described from 3 male and 3 female specimens (holotype and allotype in collection of Instituto Biológico de la Universidad Nacional Autónoma de México) from the intermit-

tent pine-oak woodland of the Yécora municipio in east-central Sonora, Mexico. Diagnostic features of the new species include the seemingly bulbous tip (in lateral view) and prominent baso-ventral process of the male cerci and the notched and denticled posteromesal corners of the female subgenital plate." (Authors)] Address: Bailowitz, R., 15444 N. Indian Trail, Tucson, AZ 85750 USA. E-mail: raberg2@q.com

13035. Bajwa, Y.; Williams, V.; Ren, Y.; Dong, H. (2013): Investigation into the role of dragonfly wing flexibility during passive wing pitch reversal. *Bulletin of the American Physical Society* 58(18): o.p. (in English) ["Wing deformation is a characteristic part of flapping wing flight. In dragonflies, a torsion wave can be observed propagating from the tip to the root during stroke reversal. In this paper, we utilize high-speed photogrammetry and 3d surface reconstruction techniques to quantify wing deformation and kinematics of a dragonfly. We then use finite elements in the absolute nodal coordinate formulation to estimate strain energy in the wing during wing pitch reversal. We use this data to analyse the role of wing structure in facilitating wing rotation and bringing about the characteristic torsion wave. The influence of the elastic force in facilitating wing rotation is then compared with inertial and aerodynamic forces as well. A quantitative look into the variation of strain energy within the insect wing during wing rotation could lead to more efficient design of dynamic wing pitching mechanisms." (Authors)] Address: not stated

13036. Barry, M.J. (2013): Effects of fluoxetine on the swimming and behavioural responses of the Arabian killifish. *Ecotoxicology* 22(2): 425-432. (in English) ["The selective serotonin reuptake inhibitor fluoxetine has frequently been detected in surface waters around the world. Fluoxetine modulates levels of serotonin, a neurotransmitter that regulates several important physiological and behavioural processes including fear and anxiety, aggression, locomotion and feeding. In this study, groups of sub-adult Arabian killifish (*Aphanius dispar*) were exposed to either 0, 0.03, 0.3 or 3 µg/L fluoxetine hydrochloride for 7 days and their swimming behaviour and social interactions videotaped in a circular arena. The fish were subsequently exposed to a predator alarm chemical (from dragonfly larvae fed with *A. dispar*) and their short-term responses recorded. The video was analysed using the open-sourced software program Ctrax which objectively quantified swimming and social behaviours. Aggression (chasing behaviour was significantly reduced at 3.0 µg/L fluoxetine. After the addition of the predator alarm chemicals fish responded quickly, increasing the percentage of time spent drifting or motionless and reducing average swimming velocity. Controls and fish exposed to 0.03 or 3 µg/L fluoxetine reduced swimming speed by 20-30 % but returned to pre-exposure velocities within 6 min. Fish exposed to 0.3 µg/L fluoxetine reduced swimming speed by 38 % after addition of the predator alarm and did not return to

pre-exposure speeds during the recording period (19 min). Schooling behaviour was also affected by fluoxetine and predator alarm with fish exposed to 0.3 µg/L fluoxetine significantly reducing nearest neighbour distance and swimming speed relative to nearest neighbour the following addition of the predator alarm." (Author)] Address: Barry, M.J., Biology Department, Sultan Qaboos University, PO Box 36, Al Khoud, Muscat, 123, Sultanate of Oman. E-mail: mjbarry@squ.edu.om

13037. Barth, G.; Nel, A.; Franz, M. (2013): Two new odonate-like insect wings from the latest Norian of northern Germany. *Polish Journal of Entomology* 82(3): 127-142. (in English) ["Two new well preserved odonate (damselfly-dragonflies) insect wings from the latest Norian (Upper Triassic) of two different localities are described. Although the rather long distance of more than 250 km separates the localities, the holotypes occur in comparable lithologies and are thus described together. We describe an odonate forewing, *Italophlebia baueri* sp. n., from an abandoned quarry at Langenberg near Seinstedt north of the Harz Mountains (Lower Saxony), which is the first occurrence of this genus outside Italy. The second wing, *Triassothemis gartzii* sp. n., was found in the cored well Gartz 1 (NE Germany). In both occurrences the insect wings were associated with abundant autochthonous as well as allochthonous faunal and floral remnants of shallow subaquatic environments." (Authors)] Address: Barth, G., TU Bergakademie Freiberg, Bernhard-von-Cotta-Straße 2, D-09599 Freiberg, Germany

13038. Baturina, M.A.; Loskutova, O.A. (2013): Fauna of amphibious and aquatic insects of small waterbodies in the environs of Syktyvkar CITY (Komi Republic, Russia). *Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 21-25.* (in Russian, with English summary) ["The fauna of amphibious and aquatic insects has been studied in small rivers and small standing waterbodies in the environs of Syktyvkar. Occurrence frequency, abundance, biomass, and proportion of species in composition of zoobenthos are determined. A rare stonefly species, included in the Red Data Book of Komi Republic, is recorded." (Authors) The following taxa were listed: *Platycnemis pennipes*, *Coenagrion johanssoni*, *Coenagrion* sp., *Aeshna caerulea*, *Brachytron pratense*, *Gomphidae* sp., *Ischnura* sp., *Ophiogomphus* sp., *Epithea bimaculata*, and *Somatochlora metallica*.] Address: Baturina, M.A., Institute of Biology, Komi Scientific Centre, Ural Branch, Russian Academy of Sciences ul. Kommunisticheskaya 28, Syktyvkar, Komi Republic, 167982, Russia. E-mail: baturina@ib.komisc.ru

13039. Bedjanič, M.; van der Poorten, N. (2013): On the synonymy of two enigmatic endemic clubtails from Sri Lanka (Anisoptera: Gomphidae). *Agriion* 17(2): 44-47. (in English) ["Here, we report on an additional case of syn-

onymy recognized only recently while studying the type specimens and their photographs of two enigmatic Sri Lankan representatives of the family Gomphidae, namely *Heliogomphus ceylonicus* (Hagen in Selys, 1878) and *Anisogomphus solitaris* Lieftinck, 1971. ... Comparison of wing venation, thorax, prothorax and head colouration and markings revealed that both taxa are actually conspecific. Thus, *A. solitaris* and *H. ceylonicus* are synonymized, Hagen's senior species name having priority (ICZN, 1999). The systematic positioning of the species by Lieftinck (1971) in the genus *Anisogomphus* is retained until new material and data are available." (Authors)] Address: Bedjanič, M., Rakovlje 42a, SI-3314 Braslovèe, Slovenia. E-mail: matjazbedjanic@yahoo.com

13040. Benoit, J.M.; Cato, D.A.; Denison, K.C.; Moreira, A.E. (2013): Seasonal mercury dynamics in a New England vernal pool. *Wetlands* 33(5): 887-894. (in English) ["Mercury fluxes into and transformations within a small vernal pool in Massachusetts were investigated over a wet-dry-wet cycle. We measured the deposition of total mercury (HgT) and methyl mercury (MeHg) via litterfall between October 6 and December 2, 2010. Litterfall fluxes were 10 $\mu\text{g m}^{-2}$ and 80 ng m^{-2} , respectively, over that time period. Average HgT concentration in litterfall was 33 ± 2 ng gdw^{-1} ; 0.9 % was present as MeHg. The HgT content of the litter layer increased slightly throughout the year, reaching 55 ± 20 ng gdw^{-1} inside and 42 ± 7 ng gdw^{-1} outside the pool. Litter %MeHg increased only to 1.5 % on the forest floor, while it increased dramatically in the vernal pool after inundation in late November, reaching 9 % by early spring. Measurements in pool benthic invertebrates show that two types of shredders bioaccumulated MeHg 4–9-fold relative to the leaf litter substrate. Overall, our results indicate significant production and bioaccumulation of MeHg in this vernal pool. This de novo MeHg could impact resident amphibians or be exported to the surrounding forest." (Authors) The focus was set on Trichoptera, Diptera, Amphipoda, and Isopoda with only one passing reference to Odonata.] Address: Benoit, Janina, Chemistry Dept, Wheaton College, Norton, MA, 02766, USA. E-mail: jbenoit@wheatonma.edu

13041. Bernal Sánchez, A. (2013): Odonatological conference at Natural park "Los Alcornocales", Cádiz, España. *Zygonyx* 1: 14-15. (in English) ["On Saturday 9th June, 2012 we organized a visit in order to observe and take pictures of the emblematic species in the Natural Park "Los Alcornocales". It was a calm and profitable day in which we visited two specific areas in the grid 30STF60." 18 Odonata species are listed including *Macromia splendens*, *Gomphus graslinii*, and *Oxygastrea curtisii*.] Address: not stated

13042. Berquier, C. (2013): Première observation en France d'*Orthetrum trinacria* (Selys, 1841) sur l'île de Corse (Odonata, Anisoptera: Libellulidae). *Martinia* 29(1): 15-18. (in French, with English summary) ["For the first

time in France, *O. trinacria* was found on 14 June 2012 at a coastal wetland in the area of Bastia, Corsica island. This brings to 101 the number of taxa of the French metropolitan odonatological fauna. Considerations about the expansion of this species to the north as a consequence of global warming are dealt with." (Author)] Address: Berquier, C., Office de l'Environnement de la Corse - Observatoire Conservatoire des Insectes de Corse, F-20250 Corte, France. E-mail: cyril.berquier@oec.fr

13043. Bionda, R.; Mekkes, J.-J.; Pompilio, L.; Mosini, A. (2013): Gli Odonati del Parco Naturale delle Alpi Veglia e Devero e aree limitrofe. *Rivista piemontese di Storia naturale* 34: 115-126. (in Italian, with English summary) ["Dragonflies of the Alpi Veglia and Devero Natural Park and surroundings (Piedmont, northern Italy): We present the results of 4 years of dragonfly monitoring in the Alpi Veglia and Devero Natural Park and Alpc Devero Conservation Area, Western Alps, Italia, alongside with records from two neighbouring sites. Altogether we recorded 17 species. *Somatochlora arctica* and *Leucorrhinia dubia* are for the first time recorded for Piedmont." (Authors)] Address: Bionda, R., Ente di gestione delle Aree protette dell'Ossola, viale Pieri 27, 28868 Varzo VB, Italy. E-mail: rada.bionda@libero.it

13044. Blanchon, Y.; Ronne, C. (2013): Afflux d'*Hemianax ephippiger* (Burmeister, 1839) en région PACA en 2011 (Odonata, Anisoptera: Aeshnidae). *Martinia* Hors-série, *Hemianax ephippiger* - migration 2011, mai 2013: 61-64. (in French, with English summary) ["A large and unusual influx of *Hemianax ephippiger* has been observed in 2011 in the Provence-Alpes-Côte d'Azur région (southern France). The records distribution was bimodal between April and November. Abundance peaked in September. Most of observations occurred along the littoral fringe with groups including up to several thousands of individuals. Evidences of breeding were noted in the Camargue." (Authors)] Address: Ronne, Charlotte, 2 8, avenue des Alliés, 13360 Roquevaire, France. E-mail: charlotte.ronne@yahoo.fr

13045. Blanckaert, K.; Garcia, X.-F.; Ricardo, A.-M.; Chen, Q.; Pusch, M.T. (2013): The role of turbulence in the hydraulic environment of benthic invertebrates. *Ecology* 6(4): 700-712. (in English) ["The role of turbulence in the dislodgment of benthic stream invertebrates from the riverbed was investigated experimentally in a laboratory flume. For the first time, technological advances allowed measuring the spatio-temporal patterns of turbulent flow around two free-moving invertebrates (*Aeshna cyanea* and *Somatochlora flavomaculata*). A specific methodology was developed for the analysis of turbulence around benthic invertebrates. The results confirmed two hypotheses: (i) on the contrary to sediment particles, invertebrates are not only sensitive to the peak values of the turbulent flow forcing but also to the temporal fluctuations in this flow forcing; and (ii)

the dominant temporal fluctuations are not due to local turbulent structures of the size of the invertebrate, but to turbulent structures that scale with the flow depth and are inherited from upstream. In 15 of the 17 conducted tests, important turbulent events that scale with the flow depth accompanied by rapid temporal flow fluctuations occurred at the moment of dislodgement. The dominant forcing was consistently a threefold increase in shear stress, and was related to a sweep event in 12 of the 17 tests. Thereby, the increase in longitudinal velocity was typically about 40%, which led to a 100% increase in drag force in comparison with the time-averaged drag force. These results enable a new understanding of the detailed hydraulic conditions leading to passive drift of stream invertebrates. In addition, they open new perspectives to improve models predicting the distribution of benthic invertebrates based on hydrodynamics by accounting for turbulence." (Authors)] Address: Blanckaert, K., State Key Laboratory of Urban & Regional Ecology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Shuangqing Road 18, 100085 Beijing, China. E-mail: koen.blanckaert@epfl.ch

13046. Boeglin, Y. (2013): Premières données d'*Hemianax ephippiger* (Burmeister, 1839) pour le département de la Loire (Odonata, Anisoptera: Aeshnidae). *Martinia Hors-série, Hemianax ephippiger - migration 2011, mai 2013*: 73-75. (in French) [France; five records from the Loire department were documented.] Address: Boeglin, Y., 7 rue Jacquemard, F-42110 Feurs, France. E-mail: yoann.boeglin@live.fr

13047. Bogan, M.T.; Boersma, K.S.; Lytle, D.A. (2013): Flow intermittency alters longitudinal patterns of invertebrate diversity and assemblage composition in an arid-land stream network. *Freshwater Biology* 58(5): 1016-1028. (in English) [Arizona, USA; "(1.) Temporary streams comprise a large proportion of the total length of most stream networks, and the great majority of arid-land stream networks, so it is important to understand their contribution to biotic diversity at both local and landscape scales. (2.) In late winter 2010, we sampled invertebrate assemblages in 12 reaches of a large arid-land stream network (including perennial and intermittent headwaters, intermittent middle reaches and perennial rivers) in south-east Arizona, U.S.A. Intermittent reaches had then been flowing for c. 60 days, following a dry period of more than 450 days. We sampled a subset of the perennial study reaches three more times between 2009 and 2011. Since intermittent reaches were dry during these additional sampling periods, we used assemblage data from two other intermittent streams in the study network (sampled in 2004–05 and 2010) to explore interannual variability in intermittent stream assemblage composition. (3.) Invertebrate richness was lowest in intermittent reaches, despite their often being connected to species-rich perennial reaches. The assemblages of these intermittent reaches were not simply a subset of the species in perennial

streams, but rather were dominated by a suite of stoneflies, blackflies and midges with adaptations to intermittency (e.g. egg and/or larval diapause). On average, 86% of individuals in these samples were specialists or exclusive to intermittent streams. Predators were 7–14 times more abundant in perennial than in intermittent reaches. (4.) Despite being separated by long distances (12–25 km) and having very different physical characteristics, the assemblages of perennial headwaters and rivers were more similar to one another than to intervening intermittent reaches, emphasising the prime importance of local hydrology in this system. (5.) The duration and recurrence intervals of dry periods, and the relative importance of dispersal from perennial refuges, probably influence the magnitude of biological differences between neighbouring perennial and temporary streams. Although perennial headwaters supported the highest diversity of invertebrates, intermittent reaches supported a number of unique or locally rare species and as such contribute to regional species diversity and should be included in conservation planning... We found invertebrate predators to be 7–14 times more abundant in perennial headwater and river reaches than in intervening intermittent reaches. While we did not estimate predator biomass, the dominant predators in intermittent reaches (Dytiscidae) were of a similar size to those in perennial reaches (Odonata and Dytiscidae). This suggests that intermittent reaches of arid-land streams may provide a significant refuge from invertebrate predation pressure." (Authors)] Address: Bogan, M.T., Department of Zoology, Oregon State University, 3029 Cordley Hall, Corvallis, OR 97331, USA. E-mail: boganmi@science.oregonstate.edu

13048. Bosch, J.G. van't (2013): Rare dragonflies In the Netherlands in 2006-2009, CWNO-reports 5. *Brachytron* 15(2): 112-122. (in Dutch, with English summary) ["This is the fifth report of the Dutch Committee for records of rare odonates (CWNO). In this report, records from the period 2006-2009 are reviewed. Acceptability is judged independently by each of the committee members, based on the documentation available (e.g. descriptions, drawings, pictures or collected material). Only accepted records are reviewed. Of each accepted record the Province, nearby city and/or municipality, location, date, number, gender and names of the observers are given. If photographs are available, this is also mentioned. In most cases only the first record is given. Subsequent records of the same individual or population are accepted on the basis of the first record and are not reviewed. For these first observation the locations are marked with an asterisk *. These locations are regarded as a 'known location'. New records from a known location will not be reviewed in the future. 2006 - A male and a female *Leucorrhinia caudalis* were observed near Maastricht (Limburg). This was the first record of this species since 1970. Unfortunately the species was not found there in subsequent years. Reproduction of *Anax parthenope* was proven for the first time, at one

location in Gelderland and one location in Limburg. In 2006, a very large influx of *Sympetrum meridionale* took place with observations of at least 30 individuals accepted. There were only four previous records of this species. 2007 - The first population of *Coenagrion scitulum* was discovered at Cadzand-Bad (Zeeuws-Vlaanderen). The fifth ever observation of *Anax ephippiger* was near Zeist (Utrecht). The first known reproduction of *Sympetrum meridionale* took place at Westvoorne (Zuid-Holland). A maximum of 15 individuals was seen. Numbers of this species in other parts of the country were also high. At least three males of *Somatochlora flavomaculata* were found near Wassenaar (Zuid-Holland). 2008 - A male *Leucorrhinio caudalis* was seen at Ottema Wiersma reserve (Friesland). Two new populations of *Somatochlora arctica* were discovered in Overijssel. A female *Sympetrum depressiusculum* was found at Hoge Veluwe (Gelderland), far from the few known reproduction locations. Exceptional wanderers of *Somatochlora flavomaculata* were found at Eemshaven (Groningen) and on the Wadden Sea island Schiermonnikoog (Friesland). 2009 - A male *Leucorrhinia caudalis* was photographed in De Weerribben (Overijssel) by a group of Belgian observers. A male *Ophiogomphus cecilia* was photographed at Groote Peel (Limburg), away from the two rivers where populations are known. One of the highlights of 2009 was the observation of at least six males and one female *Onychogomphus forcipatus* along the river Grensmaas near Meers (Limburg). *Coenagrion scitulum* was found at four new locations in Zeeuws-Vlaanderen." (Author)] Address: van't Bosch, J., Newtonplein 62, 2562 JX Den Haag, The Netherlands. E-mail: johanvantbosch@yahoo.co.uk

13049. Bota-Sierra, C.A.; Wolff Echeverri, M.I. (2013): Taxonomic revision of *Mesamphiagrion* Kennedy, 1920 from Colombia (Odonata: Coenagrionidae), with the description of four new species. *Zootaxa* 3718(5): 401-440. (in English, with Spanish summary) ["The genus *Mesamphiagrion* Kennedy, 1920, occurs in the Pante-pui region and northern Andes in South America and is most speciose in Colombia where the genus is less known. In this work, we record 10 species of *Mesamphiagrion* from Colombia, including four new species (*Mesamphiagrion gaudiimontanum* Bota-Sierra sp. nov., *M. nataliae* Bota-Sierra sp. nov., *M. rosleri* Bota-Sierra sp. nov., and *M. santainense* Bota-Sierra sp. nov.). We also re-describe the male of *M. risi* (De Marmels 1997) and describe the females of *M. risi*, *M. ovigerum* (Calvert, 1909), and *M. occultum* (Ris, 1918), which were previously unknown. Descriptions, photographs, illustrations, distribution maps, natural history notes, and a diagnostic key for males and females of *Mesamphiagrion* from Colombia are provided." (Authors)] Address: Bota-Sierra, C.A., Grupo de Entomología Universidad de Antioquia (GEUA), Medellín-Colombia. AA 1226, Colombia. E-mail: corneliobota@gmail.com

13050. Boudot, J.-P. (2013): *Hemianax* versus *Anax ephippiger* (Burmeister, 1839) (Odonata: Anisoptera: Aeshnidae). *Martinia Hors-série, Hemianax ephippiger - migration 2011, mai 2013*: 3-11. (in French, with English summary) ["Since its description under the name *Aeschna ephippigera* by Burmeister (1839), the Vagrant Emperor has changed of genus name several times. During a long time, it was included in the genus *Hemianax*, then transferred in the genus *Anax*, basing mostly on wings venation parameters. However modern cladistic studies use much more structural and/or genetic criteria. Waiting for more information in this field, the SFO prefers to maintain the Vagrant Emperor in the genus *Hemianax*." (Author)] Address: Boudot, J.-P., Limos - UMR 7137 CNRS / Université de Lorraine, Faculté des sciences, BP 70239, F-54506 - Vandoeuvre-lès-Nancy cedex, France. E-mail: jean.pierre.boudot@numericable.fr

13051. Bouton, F.M. (2013): Observation d'*Hemianax ephippiger* (Burmeister, 1839) en Sarthe au printemps 2011 (Odonata, Anisoptera: Aeshnidae). *Martinia Hors-série, Hemianax ephippiger - migration 2011, mai 2013*: 65-68. (in French, with English summary) [In 2011, *H. ephippiger* has been recorded for the first time in the Sarthe department, France. During the spring, a few individuals and breeding behaviour were observed in two alluvial gravel pits.] Address: Bouton, F.M., 18, rue Saint Pavin de la Cité, 72000 Le Mans, France. E-mail: fmb72@yahoo.fr

13052. Brossman, K. (2013): Tails and toxins: Exploring life history traits and predator-induced defenses in Eastern Red-spotted newts (*Notophthalmus viridescens viridescens*). M.Sc. thesis, The Graduate School, The Huck Institute of Life Sciences, The Pennsylvania State University: 68 pp. (in English) [Pennsylvania, USA; Chapter 2. *N. v. viridescens* larvae alter morphological but not chemical defences in response to predator cues focus on tadpole-dragonfly (*Anax junius*, *Aeschna sitchensis*, *Gomphaeschna antilope*, and *Aeschna juncea*) interactions: "Prey traits are often modified in response to exposure to predators, a phenomenon known as predator-induced phenotypic plasticity. Morphological plasticity in response to predator cues is well documented in amphibians; however, predator-induced chemical defences have received relatively little attention. *N. v. viridescens*, which possesses tetrodotoxin – a toxin for chemical defence, is most vulnerable to predation during its larval stage. I assessed whether exposing Eastern Red-spotted Newt larvae to predator scent cues (from dragonfly larvae) would elicit change in their morphological and chemical defences. Newt larvae exposed to scent cues of predatory dragonfly larvae exhibited significantly deeper tail depths, which should enhance predator escape ability by allowing them to swim faster, but did not differ in mass, snout-vent length or tail length. Newt larvae toxin concentrations were not significantly affected by exposure to these predator cues. Larval toxicity may be maternally-derived and in-

flexible, or induced toxicity may only be detectable later in development. Predator-induced phenotypic plasticity, especially of chemical defences, warrants greater attention, as potentially important outcomes of species interactions remain unclear." (Author)] Address: Brossman, Kelly, The Pennsylvania State University, The Graduate School, The Huck Institute of Life Sciences

13053. Buczyński, P.; Zawal, A.; Dąbkowski, P.; Szlauer-Lukaszewska, A. (2013): Dragonflies (Odonata) of the nature reserve "Świdwie". *Parki Narodowe i Rezerваты Przyrody* 32(2): 3-13. (in Polish, with English summary) ["32 odonate species were recorded in the year 2010 in the nature reserve "Świdwie" (NW Poland). Ecological, zoogeographical and conservation aspects of the fauna were analysed." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

13054. Buczyński, P. (2013): Polish and dedicated to Poland odonatological papers. 11. The year 2012. *Odonatrix* 9(2): 72-76. (in Polish, with English summary) [The author presents a list of Polish and dedicated to Poland odonatological papers that were published in the year 2012. In the reported time period, 47 papers of various kind were published. One paper published in the year 2011 is given too." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

13055. Buczyński, P.; Tończyk, G. (2013): Dragonflies (Odonata) of Tuchola forests (northern Poland). 1. *Wdzydzki Landscape Park. Annales UMCS, Biologia* 68(1): 75-103. (in English, with Polish summary) ["The Wdzydzki Landscape Park lies in the Tuchola Forests which are among the areas of key importance for conservation of dragonflies in Poland. In the years 2002-2009, 55 dragonfly species were recorded in the park and its buffer zone. Lakes and Sphagnum bogs housed the highest species richness. Among the recorded species, one is included in the IUCN Red List of Threatened Species, two in the European Red List, two in the Polish Red List, ten species legally protected in Poland and ten "umbrella species". Peatbog lakes and Sphagnum bogs were most important for conservational issues. Dragonfly fauna of the studied area is among the species-richest in Poland. Its conservation value is high due to occurrence of stenotopic species, its importance for the conservation of rare and endangered species as well as for maintenance of odonatocoenoses typical of a range of natural waters. It results mostly from the forest coverage and high richness, variety and good ecological state of the surface waters. Interesting from the zoogeographical point of view was development of some thermophilic species in the lake littoral. It may be an indication of changes in thermal regime of surface waters, related to climate warming." (Authors)] Address:

Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

13056. Büsse, S.; Hörschemeyer, T. (2013): The thorax musculature of Anisoptera (Insecta: Odonata) nymphs and its evolutionary relevance. *BMC Evolutionary Biology* 2013, 13:237 doi:10.1186/1471-2148-13-237: 13 pp. (in English) ["Background: Among the winged insects (Pterygota) the Odonata (dragon- and damselflies) are special for several reasons. They are strictly aerial predators showing remarkable flight abilities and their thorax morphology differs significantly from that of other Pterygota in terms of the arrangement and number of muscles. Even within one individual the musculature is significantly different between the nymphal and adult stage. Results: Here we present a comparative morphological investigation of the thoracic musculature of dragonfly (Anisoptera) nymphs. We investigated representatives of the Libellulidae, Aeshnidae and Cordulegasteridae and found 71 muscles: 19 muscles in the prothorax, 26 in the mesothorax and 27 in the metathorax. Nine of these muscles were previously unknown in Odonata, and for seven muscles no homologous muscles could be identified in the neopteran thorax. Conclusion: Our results support and extend the homology hypotheses for the thoracic musculatures of Odonata and Neoptera, thus supplementing our understanding of the evolution of Pterygota and providing additional characters for phylogenetic analyses comprising all subgroups of Pterygota." (Authors)] Address: Büsse, S., Abteilung Morphologie, Systematik & Evolutionsbiologie, JFB-Institut für Zoologie & Anthropologie der Georg-August-Universität Göttingen, Germany. E-mail: sebastian.buesse@biologie.uni-goettingen.de

13057. Büsse, S.; Hörschemeyer, T. (2013): The thorax musculature of Anisoptera nymphs (Odonata). 6th Dresden Meeting on Insect Phylogeny, Dresden, September 27–29, 2013. Abstracts — Poster Presentations: 40-41. (in English) [Verbatim: Among the winged insects (Pterygota) the Odonata are special for several reasons. Their thorax morphology differs significantly from that of other Pterygota by a reduced number of muscles (e.g. Asahina 1954; Maloeuf 1935). Even within one individual, between the nymph and adult stage, the musculature is significantly different (e.g. Maloeuf 1935). Here we present a comparative morphological investigation of the thoracic musculature of Anisoptera nymphs. For representatives of the Libellulidae, Aeshnidae and Cordulegasteridae we describe 71 muscles, 19 muscles of the prothorax, 26 muscles of the mesothorax and 27 muscles of the metathorax. This includes nine muscles that were so far unknown in Odonata, as well as seven muscles for which no homologous muscles could be identified in the neopteran thorax. Our results support and extend the homology hypotheses for the thoracic musculature of Odonata and Neoptera (Büsse et al. 2013) thus supplementing our understand-

ing of the evolution of Pterygota and providing additional characters for phylogenetic analyses comprising all subgroups of Pterygota. References: Asahina S. 1954: A morphological study of a relic dragonfly *Epiophlebia superstes* Selys (Odonata, Anisozygoptera). Tokyo: The Japan Society for the Promotion of Science 153 pp. — Büsse S., Genet C., Hörnschemeyer T. 2013: Homologization of the flight musculature of Zygoptera (Insecta: Odonata) and Neoptera (Insecta). PLoS ONE 8(2): e55787. doi:10.1371/journal.pone.0055787 — Maloeuf N.S.R. 1935: The postembryonic history of the somatic musculature of the dragonfly thorax. Journal of Morphology 58: 87–115.] Address: Büsse, S., Abteilung Morphologie, Systematik & Evolutionsbiologie, JFB-Institut für Zoologie & Anthropologie der Georg-August Universität Göttingen, Germany

13058. Büsse, S. (2013): The Thorax of Odonata (Insecta) including remarks on evolution and phylogeny. Dissertation. Georg-August-Universität Göttingen: 211 pp., app.-I. ["The aim of my dissertation was to study the morphology and evolution of the thorax of damselflies and dragonflies (Odonata). One focus was the morphology of the thorax musculature and the homology between Odonata and a generalized Neoptera thorax as well as ground pattern of Pterygota (all winged insects). Furthermore, wing base skeletal element morphology was studied to extend and underscore the recent homology hypotheses. Beyond that, I examined the morphology, genetics and biogeography, and relating phylogeny of a very rare and enigmatic group of Odonata, *Epiophlebia*. *Epiophlebia* present a unique position within the Odonata. The group of *Epiophlebia* is closely related to all dragonflies but represents the only group of Odonata not belonging to dragonflies (Anisoptera) or damselflies (Zygoptera). The four known species of *Epiophlebia* are adapted to an extreme habitat in Asian mountain regions. They prefer cold and swiftflowing mountain streams at an altitude ranging from 1000 to 3500 meters above sea level (stenoecious lifestyle). The habitats of the *Epiophlebia* species are highly separated from each other on the Asian continent. Their respective range shows no overlap areas today, which typifies speciation via spatial isolation (separation). Results of genetic investigation of three of the four species' DNA segments (sequences) show surprising, extreme homogeneity. These results lead to a biogeographical scenario, which assumes a shared habitat of *Epiophlebia* during the Würm ice age (approximately 20,000 years ago). When the warming phase started, *Epiophlebia*-populations were separated into distinct populations each located in a different glacial refuge (simplified, cold withdraw areas). This short time frame could explain the genetic homogeneity observed. Nevertheless, the question of the species status of *Epiophlebia* remains: Is there only one species – *Epiophlebia superstes* – in four different populations or are there four different species? During a subsequent morphological study the species status at least of *Epiophlebia*

laidlawi Tillyard, 1921 could also be confirmed. Another study that draws directly on the genetic investigation of *Epiophlebia*, comprises a genetic sequence (S4-region of the 28s rRNA gene), which is suitable as a universal species identification tool for insects. Most insect specimens from all insect groups were successfully identified to species level with this tool. The investigation comprised 85 samples of 65 insect species, with at least one species per major clade of which the former represented a genus. We were able to demonstrate that our analysis system – which provides universal applicability and extended functionality – has advantages over the existing one (e.g. COI). The S4-method is applicable for degraded DNA that has, for example, been caused by aging, weathering or chemical influences. Investigation of the Odonata thorax comprised three studies. Two of the musculature and sclerites of adult Zygoptera flight apparatus and one of the entire nymphal Anisoptera thorax musculature. The aim was to understand and highlight peculiarities of the odonatan thorax. To obtain the data and reach the best overall result possible, traditional morphological methods – such as dissecting and hand drawing – were combined with one of the latest morphological methods, which included computer tomography (SR!CT) aided by 3D reconstruction. By doing this, we discovered a total of 11 new, previously unknown muscles for Odonata. These morphological data were used to present the first complete homologization scheme of Odonata and neopterous insect thorax musculature. Furthermore, the homologies of the skeletal elements of the flight apparatus were confirmed and distinctly enhanced. This study also mark the first time muscle attachment points were discussed as important homology criteria. As a whole, these homology assessments allow unprecedented direct comparison between Odonata, which have a highly derived flight apparatus, and all other insects. Insights into the evolution and ground pattern of Odonata, even of all winged insects (Pterygota), were consequently gained. The homologies enable comparison and provide a complete new set of characters for subsequent analysis of the relationship (phylogenetic analysis) of Pterygota. A key, wing base sclerites' characteristic – the subalare –, points to the phylogenetic hypothesis of Paleoptera [Odonata+Ephemeroptera (mayflies)]. A generalized Odonata thorax that includes all recently known muscles will allow simplified work and access to the complex structure for future studies and will aid in furthering knowledge. This generalized thorax might be the initial point for a hypothetical ground pattern of pterygote insects and will allow insights into the development and evolution of the insect flight apparatus." (Author)] Address: Büsse, S., Abteilung Morphologie, Systematik & Evolutionsbiologie, JFB-Institut für Zoologie & Anthropologie der Georg-August Universität Göttingen, Germany

13059. Büsse, S. (2013): Generalized Odonata thorax. 6th Dresden Meeting on Insect Phylogeny, Dresden,

September 27–29, 2013. Abstracts — Poster Presentations: 41. (in English) [Verbatim: The odonatan thorax is a highly specialized and therefore a highly derived character system (e.g. Asahina 1954; Büsse et al. 2013). The generalized odonatan thorax shows all the muscles that have been found in Odonata to date. It compiles all the results of Büsse et al. (2013) and Büsse & Hörnschemeyer (subm.) and is completed by four muscles located independently by both Asahina (1954) and Maloeuf (1935), only. For simplicity's sake, for comparison to Neoptera in particular, the generalized odonatan thorax is shaped like a nymphal thorax, which resembles the neopteran thorax. In order to present an overview, all structures, attachment points and directions have been simplified. It includes all muscles found homologous to Neoptera (Büsse et al. 2013; Büsse & Hörnschemeyer subm.) and the newly described Odonata muscles with no homologies to neopteran thorax (Büsse & Hörnschemeyer subm.). The aim of the generalized odonatan thorax is to gain clear understanding of Odonata's muscle setup. It also represents an initial attempt to develop a hypothetical odonatan ground pattern of a stem-group representative. References: Asahina S. 1954: A morphological study of a relic dragonfly *Epiophlebia superstes* Selys (Odonata, Anisozygoptera). Tokyo: The Japan Society for the Promotion of Science 153 pp. — Büsse S., Genet C., Hörnschemeyer T. 2013: Homologization of the flight musculature of Zygoptera (Insecta: Odonata) and Neoptera (Insecta). PLoS ONE 8(2):e55787. doi:10.1371/journal.pone.0055787 — Büsse S., Hörnschemeyer T. submitted: The nymphal thorax musculature of Anisoptera (Insecta: Odonata) and its evolutionary relevance. BMC Evolutionary Biology. — Maloeuf N.S.R. 1935: The postembryonic history of the somatic musculature of the dragonfly thorax. Journal of Morphology 58: 87–115.] Address: Büsse, S., Abteilung Morphologie, Systematik & Evolutionsbiologie, JFB-Institut für Zoologie & Anthropologie der Georg-August Universität Göttingen, Germany

13060. Butler, S.G.; Orr, A.G. (2013): The larva of *Heliaeschna simplicia* Karsch, 1891 (Anisoptera: Aeshnidae). *Odonatologica* 42(2): 151-156. (in English) ["The female larva is figured and described for the first time, based on exuviae from a reared specimen and an F larva collected from runnels in peat swamp forest in Sarawak, Malaysia. The larva is compared with those of *Heliaeschna filostyla* Martin, 1906 and *H. uninervulata* Martin, 1909, the only other species of the genus so far described, as well as certain other aeshnid genera. Notes on habitat and behaviour are included." (Author)] Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, UK. E-mail: sgbutler15@btopenworld.com

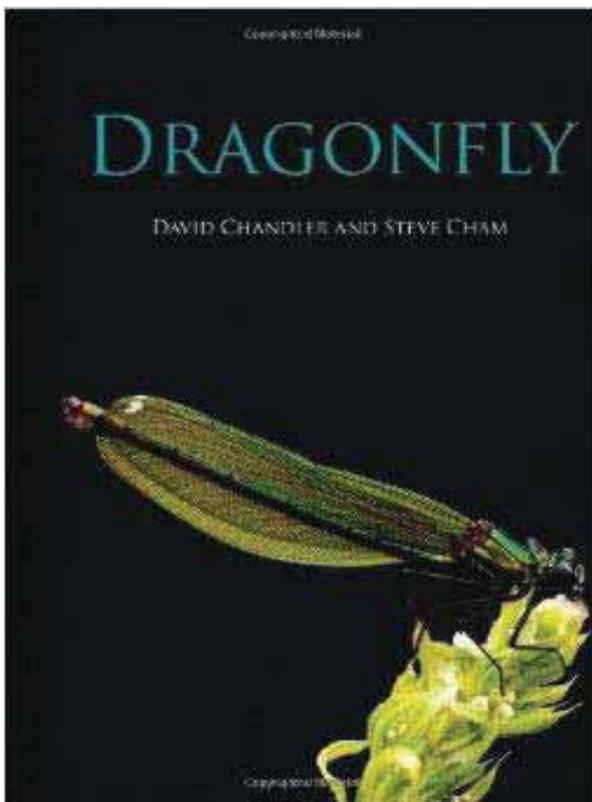
13061. Carle, F.L.; May, M.L.; Kjer, K.M. (2013): A supermatrix approach to the phylogeny of Odonata. 6th Dresden Meeting on Insect Phylogeny, Dresden, September 27–29, 2013. Abstracts — Oral Presentations: 21. (in

English) [Verbatim: Over the past decade, a number of research teams have explored the phylogeny of Odonata with molecular data. Each has targeted their own set of genes, and their own taxa, and little effort has been made to coordinate efforts, or consolidate data from multiple sources. Here we construct a supermatrix from 4 independent genes (28S, 18S; 12S, 16S, COI, COII; EF1a and H3) and over 500 species, representing all families of Odonata. Our phylogenetic results are largely congruent with those we reported in Carle et al. 2008, with monophyletic suborders (Anisoptera and Zygoptera). We find coenagrionoids and calopterygoids together with lepidoptera relatively basal. We find *Epiophlebia* as sister to Anisoptera, with aeshnoids at the base of the Anisoptera. We discuss our strategies for alignment, data exclusion, combining taxa, discovering contaminants and reducing missing data. References: Carle F.L., Kjer K.M., May M.L. 2008: Evolution of Odonata, with special reference to Zygoptera. *Arthropod Systematics & Phylogeny* 66: 37–44.] Address: Frank L. Carle (Rutgers University, Dept of Entomology, 93 Lipman Dr., New Brunswick, NJ 08901, USA

13062. Carvalho, F.G.; Pinto, N.S.; Oliveira Júnior, J.M.B.; Juen, L. (2013): Effects of marginal vegetation removal on Odonata communities. *Acta Limnologica Brasiliensia* 25(1): 10-18. (in English, with Portuguese summary) ["Aim: Here we assess the effects of habitat degradation on individuals of the two suborders of Odonata community of Borecaia river sub-basin. More specifically, we tested the hypothesis that Anisoptera richness would be positively affected by removal of vegetation; on the other hand, Zygoptera richness would be adversely affected by virtue of their ecophysiological requirements; Methods: We selected 10 streams of similar orders, six preserved and four degraded. Streams characterized as preserved had values of Index of Habitat Integrity (IHI) above 0.70 (0.77 ± 0.07 , mean \pm SD) and continuous forest on both sides with a minimum width of 70 meters. Each site was sampled three times on different days. The effect of vegetation removal on richness was assessed using richness estimated by first order Jackknife; Results: Decreased physical integrity (measured with IHI) of streams had no significant effect on the estimated richness to Odonata in general. However, the estimated richness of Anisoptera showed an inverse relationship with the integrity ($r^2 = 0.485$, $P = 0.025$), i.e., there was a reduction in their species richness with increasing integrity; Discussion: As a general pattern, Anisoptera presents higher richness in an altered site; on the other hand, Zygoptera presents higher richness in a preserved one. This pattern suggests that Odonata needs to be considered at the sub-order level to access the effects of habitat degradation on these insects. Because of its restrictions ecophysiological Odonata varied widely in their composition and species richness between the two types of environments, it reinforces the potential of the order of studies and environmental monitoring also shows that Zygoptera be more affected by changes in

habitat. However, further studies including more samples and different streams are need to confirm this pattern, being an interesting line of research for future works." (Authors)] Address: Carvalho, F.G., Curso de Especialização em Perícia Ambiental, Pontífica Universidade Católica de Goiás – PUC Goiás, Av. Universitária, 1069, Área 4, Bloco A, Campus I, Setor Universitário, CEP 74605-010, Goiânia, GO, Brazil. E-mail: nandocarvalhog@hotmail.com

13063. Catil, J.-M. (2013): Gomphus simillimus Selys, 1840 au menu des hirondelles de fenêtre (Delichon urbica) (Odonata, Anisoptera: Gomphidae). Martinia 29(1): 42. (in French) [9 vi 2011, Mauvezin (Gers [32], France); in the nest of a house martin (Delichon urbica), two teneral specimens of G. simillimus were found. Obviously they had not been consumed by the young. The author proposed that the gomphids had been too large to be devoured by the nestlings.] Address: Catil, J.-M., CPIE Pays Gersois, Au Château, F-32300 L'Isle de Noé, France. E-mail: jmcatil@yahoo.fr



13064. Chandler, D.; Cham, S. (2013): Dragonfly. New Holland's Natural History Monographs 4. 128 pp (in English). ["Supremely colourful, among the most voracious predators of the insect world and on the wing for more than 300 million years, dragonflies and damselflies capture the imagination in so many ways. Yet many aspects of their fascinating lives are little-known to humans. Dragonfly provides an insight into a hidden world through engaging text and stunning close-up photography. Dragonfly combines insightful writing with rarely seen images of the life and behaviour of the

world's dragonfly and damselfly species. There are chapters on subjects such as hunting, courtship and the emergence of the nymphs and their subsequent transformation into adult dragonflies. These insects are further brought to life through the personal experiences of the author and photographers, and these are woven into the text." (Publishers)]

13065. Chen, J.; Yu, X. (2013): Odonata diversity of the middle and lower reaches of the Red River basin, Yunnan, China. Journal of Insect Biodiversity 1(9): 1-11. (in English) ["Eighty six species of Odonata are recorded from the middle and lower reaches of the Red River basin. Archineura hetaerinoidea is recorded from China for the first time. Five genera and five species are new to Yunnan Province. Among the six types of odonate habitats, forest streams have the highest species diversity whereas ponds have the most species shared with other habitats. Both of these two habitats are important in biodiversity conservation and need urgent protection." (Authors)] Address: Yu, X., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, 300071, China. E-mail: lannysummer@163.com

13066. Chen, Y.H.; Skote, M.; Zhao, Y.; Huang, W.M. (2013): Dragonfly (Sympetrum flaveolum) flight: kinematic measurement and modelling. Journal of Fluids and Structures 40: 115-126. (in English) ["Highlights: • The kinematics of the wing is studied thoroughly using high-speed videography. • The costa is shown to be two parts hinged with physical constraint of forty degrees. • Two flapping patterns are revealed: simple figure-eight and a double figure-eight. • Kinematic modelling is established. • Previous misunderstandings regarding the wing rotation during pronation are clarified. The kinematics of the flapping hindwing of S. flaveolum is investigated. Several tracking points along the leading edge and trailing edge of the hindwing are recorded and studied using high-speed videography. By applying more tracking points along the leading edge around the nodus, it is shown that the leading edge is not one rigid piece, but two pieces hinged at the nodus with physical constraint of forty degrees. Such arrangement also eases the difficulties in rotating the wing during pronation by bending the leading edge forward and flattening the wing. From the kinematic experiments, two flapping patterns of the dragonfly wing are revealed as a simple figure-eight and a double figure-eight flapping pattern. Kinematic modelling of the two flapping patterns is then established by transforming the flapping motions into angular rotations about the pivoting wing root in a local body-fixed spherical coordinate system." (Authors)] Address: Skote, M., School of Mechanical & Aerospace Engineering, Nanyang Technological Univ., 50 Nanyang Av., Singapore 639798, Republic of Singapore. E-mail: mskote@ntu.edu.sg

13067. Cheng, S.; Cheng, L.; Zhang, C.; Wushu, Y.; Yuanrong, B.; Mao, Y. (2013): Observations on diet of Cab-

ot's Tragopan at Huanggangshan in Jiangxi Province, China. Chinese Journal of Zoology 48(1): 36-42. (in Chinese, with English summary) ["Food composition and behaviour of Tragopan caboti were studied with methods of field observation and captive observation simulated natural environment from May, 2004 to June, 2012 in Jiangxi Wuyishan National Nature Reserve. 78 species (categories) were recorded for food intake by T. caboti during the study period. Among of these foods, 74 species belong to higher plants in 39 families and 65 genera] ... including Odonata (without any taxonomic details) [respectively. Research results show that T. caboti is phytophagous and trophic broad with strong ability of ingestion learning and environment suitability. But the feeding habits of T. caboti are significant different in different environment condition." (Authors)] Address: Cheng, S., Jiangxi Wuyishan National Nature Reserve Yanshan 334500 China. E-mail: songlin513@126.com

13068. Cherevichko, A.V.; Mikhailov, A.E. (2013): Amphibiotic insects (Ephemeroptera, Odonata, Plecoptera, Trichoptera) in the benthos of intensely polluted small rivers in Pskov Oblast. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 233-236. (in Russian, with English summary) ["The composition of macrozoobenthos of some small rivers in Pskov Oblast has been studied in areas with intensely polluted with undertreated wastewaters of enterprises or populated areas. Considerably decreased species richness and abundance of amphibiotic insects have been revealed in areas of wastewater discharge, compared to background values of these parameters." (Authors) The following Odonata species were listed: Calopteryx splendens, C. virgo, Cordulia aenea, Gomphus vulgatissimus, Ischnura elegans, Leucorrhinia rubicunda, Libellula fulva, Lestes viridis, Platycnemis pennipes, and Sympetrum vulgatum.] Address: Cherevichko, A.V., Pskov Branch, State Res. Inst. of Lake & River Fisheries ul. Gorkogo 13, Pskov, 180007, Russia. E-mail: acherevichko@mail.ru

13069. Clausnitzer, H.-J.; Clausnitzer, C.; Hengst, R. (2013): Veränderung der Libellenfauna in 43 Jahren im NSG Breites Moor bei Celle, Niedersachsen (Odonata). Libellula 32(1/2): 31-44. (in German, with English summary) [Germany; "In total, 49 dragonfly species were observed. In the years 1970-2001, the species composition remained almost constant. In the years 2002-2012, however, the species number increased. Those species with a Mediterranean origin especially immigrated for the first time and became successfully established. On the other hand, two species reproduced no longer in the nature reserve. Climate change and habitat succession are discussed as causes for this development." (Authors)] Address: Clausnitzer, H.-J., Eichenstr. 11, 29348 Eschede, Germany. E-mail: H.-J.Clausnitzer@t-online.de

13070. Conniff, K.; Bedjanic, M. (2013): Two new endemic representatives of the genus Archibasis from Sri Lanka (Zygoptera: Coenagrionidae). Odonatologica 42(3): 189-202. (in English) ["A. lieftincki sp. n. (holotype male: Gin Ganga river at Deniyaya; Matara distr.; Southern prov.; N 6.34°, E 80.56°; 02-V-2003; to be deposited at Sri Lanka National Museum, Colombo) and A. oscillans hamvellanensis subsp. n. (holotype male: Hanwella; Colombo distr.; Western prov.; N 6.90°, E 80.09°; 06-11-2011; to be deposited at Sri Lanka National Museum, Colombo) are described as new to science. Distribution, habitat requirements and threat status of these two endemic taxa are briefly commented." (Authors)] Address: Conniff, Karen, do ICIMOD, GPO Box 3226 Kumalthar, Kathmandu, Nepal. E-mail: karoconniff@gmail.com

13071. Dayaram, A.; Potter, K.A.; Moline, A.B.; Rosenstein, D.D.; Marinov, M.; Thomas, J.E.; Breitbart, M.; Rosario, K.; Argüllo-Astorga, G.R.; Varsani, A. (2013): High global diversity of cycloviruses amongst dragonflies. Journal of General Virology 94: 1827-1840 (in English) ["Members of the family Circoviridae, specifically the genus Circovirus, were thought to infect only vertebrates; however, members of a sister group under the same family, the proposed genus Cyclovirus, have been detected recently in insects. In an effort to explore the diversity of cycloviruses and better understand the evolution of these novel ssDNA viruses, here we present five cycloviruses isolated from three dragonfly species (Orthemum sabina, Xanthocnemis zealandica and Rhionaeschna multicolor) collected in Australia, New Zealand and the USA, respectively. The genomes of these five viruses share similar genome structure to other cycloviruses, with a circular ~1.7 kb genome and two major bidirectionally transcribed ORFs. The genomic sequence data gathered during this study were combined with all cyclovirus genomes available in public databases to identify conserved motifs and regulatory elements in the intergenic regions, as well as determine diversity and recombinant regions within their genomes. The genomes reported here represent four different cyclovirus species, three of which are novel. Our results confirm that cycloviruses circulate widely in winged-insect populations; in eight different cyclovirus species identified in dragonflies to date, some of these exhibit a broad geographical distribution. Recombination analysis revealed both intra- and inter-species recombination events amongst cycloviruses, including genomes recovered from disparate sources (e.g. goat meat and human faeces). Similar to other well-characterized circular ssDNA viruses, recombination may play an important role in cyclovirus evolution." (Authors)] Address: Varsani, A., School of Biological Sciences, University of Canterbury, Christchurch 8140, New Zealand. E-mail: arvind.varsani@canterbury.ac.nz

13072. Davenport, J.M.; Chalcraft, D.R. (2013): Non-consumptive effects in a multiple predator system reduce the foraging efficiency of a keystone predator. Ecology and Evolution 3(9): 3063-3072. (in English) [

"Many studies have demonstrated that the nonconsumptive effect (NCE) of predators (*Anax* sp.) on prey traits can alter prey demographics in ways that are just as strong as the consumptive effect (CE) of predators. Less well studied, however, is how the CE and NCE of multiple predator species can interact to influence the combined effect of multiple predators on prey mortality. We examined the extent to which the NCE of one predator altered the CE of another predator on a shared prey and evaluated whether we can better predict the combined impact of multiple predators on prey when accounting for this influence. We conducted a set of experiments with larval dragonflies, adult newts (a known keystone predator), and their tadpole prey. We quantified the CE and NCE of each predator, the extent to which NCEs from one predator alters the CE of the second predator, and the combined effect of both predators on prey mortality. We then compared the combined effect of both predators on prey mortality to four predictive models. Dragonflies caused more tadpoles to hide under leaf litter (a NCE), where newts spend less time foraging, which reduced the foraging success (CE) of newts. Newts altered tadpole behaviour but not in a way that altered the foraging success of dragonflies. Our study suggests that we can better predict the combined effect of multiple predators on prey when we incorporate the influence of interactions between the CE and NCE of multiple predators into a predictive model. In our case, the threat of predation to prey by one predator reduced the foraging efficiency of a keystone predator. Consequently, the ability of a predator to fill a keystone role could be compromised by the presence of other predators." (Authors)] Address: Davenport, J.M., Divi. Biol. Sciences, Univ. of Montana, Missoula, Montana 59812, USA. E-mail: jon.davenport@mso.umt.edu

13073. De Knijf, G.; Adriaens, D.; Van Elegem, B.; Paelinckx, D. (2013): Natura 2000 habitats – more than floral Criteria and use of typical fauna species when assessing the conservation status of a Natura 2000 habitat. *Natuur.focus* 11(3): 109-120. (in Dutch, with English summary) ["The European Habitats Directive dictates that the assessment of the conservation status of a habitat type takes, amongst others, into account the conservation status of its typical fauna species. Therefore, a list of typical species for each habitat type is required, together with a description of the method used to assess their conservation status. When choosing typical fauna species the following considerations should be taken into account: 1) typical species should be good indicators for a favourable habitat quality, 2) it should be possible to detect typical species by non-destructive and inexpensive means and 3) the list of typical species should ideally remain stable over the mid- to long-term. Here we present a list of 153 typical fauna species for the different habitat types present in Flanders. Only species reproducing in a specific habitat type were selected. Distinction is made between species exclusively (type E) present in the habitat type, characteristic species (type K) having half of their popula-

tion reproducing in it, and species which are consistently present (type Ca and Cab), but not restricted to it. Assessment of the status of typical species can be based on best expert opinion, general national surveys, site-based sampling or Red List information. A typical species which is likely to become extinct within the next ten years will automatically lead to an overall unfavourable conservation status of that habitat type. Otherwise assessment will be based on the expected decline of a certain percentage of all typical species for a certain habitat type." (Authors) Odonata were prominently represented as indicator species for freshwater habitats: *Aeshna isocetes*, *A. juncea*, *Brachytron pratense*, *Calopteryx splendens*, *Coenagrion hastulatum*, *C. lunulatum*, *C. pulchellum*, *Cordulegaster boltonii*, *Gomphus vulgatissimus*, *Leucorhinia dubia*, *L. pectoralis*, *L. rubicunda*, *Libellula fulva*, *Somatochlora arctica*, *S. flavomaculata*, and *Sympetrum depressiusculum*.] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

13074. De Knijf, G.; Demolder, H. (2013): Early spring observations of Odonata from Cyprus. *Libellula* 32(1/2): 59-74. (in English, with German summary) ["During a two-week visit to the island of Cyprus in April 2012, 17 species of dragonfly were observed. In particular, the discovery of a large population of *Lestes macrostigma* is worth mentioning, as this species has not been reported in Cyprus for over 60 years. Concerning the flight period, very early records in the season for the eastern Mediterranean were noted for *Epallage fatime*, *Onychogomphus forcipatus albotibialis*, *Orthetrum taeniolatum* and *Selysiothemis nigra*. For the latter, this is the earliest observation date ever reported. Furthermore, several very old individuals of *Sympetrum meridionale* and *S. striolatum* were seen in early April, providing strong evidence for these species to be able to overwinter in small numbers as adults. These are the first worldwide records of overwintering for *S. meridionale* in the adult stage." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

13075. De Marmels, J.; Gaspar Neiss, U. (2013): Description of the larva of *Neuraeschna claviforcipata* Martin, 1909 (Insecta: Odonata: Aeshnidae). *Zootaxa* 3721 (1): 97-100. (in English) ["The ultimate stadium larva of *N. claviforcipata* is described and illustrated based on an F-0 exuvia of a reared female from northern Amazonas State, Brazil. This larva differs from the other two known larvae of the genus in lacking the spiny lateral prominence of the mandible, and in having only a short spine each side of the median cleft of the prementum; labium is shorter and cercus longer. Noteworthy is the presence of a hair brush on each occipital lobe behind mesal angle of compound eye. The larva was found in a small blackwater pool with abundant leaf litter in an open, "campina"-type habitat, with sandy soil and low, bushy vegetation." (Authors)] Address: De Marmels, J., Museo

del Instituto de Zoología Agrícola "Francisco Fernández Yépez" (MIZA), Facultad de Agronomía, Universidad Central de Venezuela, Apartado 4579, Maracay 2101-A, Venezuela. E-mail: demarmjc@gmail.com

13076. Dijkstra, K.-D.B.; Bechly, G.; Bybee, S.M.; Dow, R.A.; Dumont, H.J.; Fleck, G.; Garrison, R.W.; Hämäläinen, M.; Kalkman, V.J.; Karube, H.; May, M.L.; Orr, A.G.; Paulson, D.; Rehn, A.C.; Theischinger, G.; Trueman, J.W.H.; van Tol, J.; von Ellenrieder, N.; Ware, J. (2013): The classification and diversity of dragonflies and damselflies (Odonata). In: Zhang, Z.-Q. (Editor). Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. *Zootaxa* 3703 (1): 36-45. (in English) ["An updated classification and numbers of described genera and species (until 2010) are provided up to family level. We argue for conserving the family-group names Chlorocyphidae, Euphaeidae and Dicterididae, as well as retaining Epiophlebiidae in the sub-order Anisozygoptera. Pseudostigmatidae and New World Protoneuridae are sunk in Coenagrionidae and Old World Protoneuridae in Platycnemididae. The families Amphipterygidae and Megapodagrionidae as traditionally recognized are not monophyletic, as may be the superfamily Calopterygoidea. The proposal to separate Chlorogomphidae, Cordulegastridae and Neopetaliidae from Libelluloidea in their own superfamily Cordulegastroidea is adopted. Macromiidae, Libellulidae and Synthemitidae and a restricted Corduliidae are accepted as families, but many genera of Libelluloidea are retained as incertae sedis at present. 5952 extant species in 652 genera have been described up to 2010. These are placed here in 30 families; recent proposals to separate additional families from Amphipterygidae and Megapodagrionidae have not yet been incorporated." (Authors)] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nrm.nl

13077. Din, A.U.; Zia, A.; Bhatti, A.R.; Khan, M.N. (2013): Odonata naiads of Potohar Plateau, Punjab, Pakistan. *Pakistan J. Zool.* 45(3): 695-700. (in English) ["A series of collection surveys conducted during two consecutive years (2011-12) to explore Odonata naiads of Potohar plateau revealed 34 species under 6 families and 21 genera. Specimens were collected from different aquatic habitats that include almost all sort of waters including static, flowing, acidic, alkaline, brackish or saline. Details showing valid names, collection localities, ecological observations, number of individual male/female collected are provided for each species." (Authors) In any case, the identification of the Westmediterranean *Boyeria irene* should be revalidated.] Address: Zia, S.A., National Insect Museum, National Agriculture Research Centre, Islamabad – Pakistan. E-mail: saiyedahmed@yahoo.com

13078. Dow, R.A.; Reels, G.T.; Butler, S.G. (2013): Previously unpublished Odonata records from Sarawak,

Borneo. Part II. Kubah National Park. Faunistic Studies in South-East Asian and Pacific Island Odonata 6: 1-27. (in English, with Bahasa Melayu summary) [Malaysia; "Records of Odonata from Kubah National Park, near Kuching in west Sarawak, are presented. Eighty-five species are known from the national park. Notable records include *Drepanosticta drusilla*, *Rhinocypha* species cf. *spinifer*, *Bornagriolestes* species, *Anaciaeschna* species and *Macromidia genialis erratica*." (Authors)] Address: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

13079. Dow, R.A. (2013): *Drepanosticta burbachi* spec. nov. from Sarawak, Borneo, a new species allied to *D. dulitensis* Kimmins, with notes on related species (Zygoptera: Platystictidae). *Odonatologica* 42(3): 203-210. (in English) ["The new species is described and compared with its closest congener, *D. dulitensis*. Holotype male: Malaysia Sarawak, Kuching Division, Gunung Penrissen, Borneo Highlands Resort trail system, steep boulder stream, 24-VII-2012; deposited in RMNH, Leiden. New records for *D. dulitensis* are documented and the species is discussed." (Author)] Address: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

13080. Drissner, J.; Steigmüller, M.L.; Hille, K. (2013): Environmental education outside school: effects of a half-day teaching programme. *Education Journal* 2(6): 231-235. (in English) ["The "Green Classroom" in the Botanical Garden of the University of Ulm is a learning forum outdoor school that is used by about 2,500 school students annually. Its educational concept is based on experiential learning and is geared towards expanding students' biological knowledge and awareness of small animals such as invertebrates and insects. In the first study, 66 students (grade 4) were asked to draw a picture of a pond as a habitat. 33 of these students had previously visited the "Green Classroom" (intervention group). Students of the intervention group drew more of the smaller types of animals in their pictures and furthermore a bigger variety of species of animals and plants than the control group. In the second study, the same students (66, grade 4) were given a list of animal species, and were asked to tick those which are typical to a pond. Students who had visited the "Green Classroom" ticked more animals off correctly than their peers in the control group." (Authors) The pictures also represent dragonflies.] Address: Drissner, J., Botanical Garden, University of Ulm, D - 89081 Ulm, Germany. E-mail: juergen.drissner@uni-ulm.de

13081. Dubois, P. (2013): Observation d'un cas de coloration atypique chez *Orthetrum coerulescens* (Fabricius, 1798) (Odonata, Anisoptera: Libellulidae). *Martinia* 29(1): 9-14. (in French, with English summary) ["During July 2010, I made a picture of a male of *O. coerulescens*

which had transversal black strips on the abdomen (Alex, Drome region, France). Due to the publication of this observation on an Internet odonatist forum and thanks to further discussion, possible reasons for this uncommon pattern are proposed and similar observations are reported." (Author)] Address: Dubois, P., Goely, les Fougères, 42520 Macias, France. E-mail: pdubois@online.fr

13082. Dunbier, J.R.; Wiederman, S.D.; O'Carroll, D.C. (2013): Mapping predictive facilitation in a dragonfly target neuron. *Front. Physiol. Conference Abstract: International Conference on Invertebrate Vision*. doi: 10.3389/conf.fphys.2013.25.00002: n.p. (in English) [Verbatim: Dragonflies are masters of aerial pursuit, executing prey capture flights with a 97% success rate. In perching Libellulids, such flights are brief (average 184ms, [1]), although target motion is also tracked from the perch prior to take-off. However many dragonflies also engage in longer duration territorial and courtship pursuits of conspecifics, that can last tens of seconds. These chase sequences include changes in velocity and direction, as well as the possibility of target occlusion by matched background texture. Recent work shows that responses of dragonfly small target motion detector (STMD) neurons may be facilitated over prolonged time courses (up to 500ms) of continuous motion [2,3]. We hypothesize that such facilitation may play a role in increasing robustness by predictively increasing the gain of detectors in the direction of future travel. We tested this in CSTMD1, a dragonfly neuron recently shown to express a form of selective attention for one target in the presence of a distractor [4]. We presented single target stimuli that moved along an initial 'priming' path for 500ms before undergoing spatial, temporal or combined discontinuities in their trajectories. We quantified the facilitation state by comparing the neuronal response (spike rate) in a 200ms window following the discontinuity with that for a naive control, tested at the same receptive field location. We found that facilitation is initially spatially localized: only the smallest spatial displacement tested in the direction of target travel (4°) gives significantly stronger responses than control. When larger spatial displacements were combined with a delay in reappearance, however, responses were significantly elevated, even for a 20° displacement with a 500ms delay in reappearance. Backward displacements (i.e. across previously traversed location) yield strongly inhibited responses. This suggests that facilitation is mediated by a process of local gain modulation that actively spreads from the last seen location of a stimulus and in the approximate direction of travel. Such predictive modulation of local target salience may be a key mechanism for selective attention during target tracking. Acknowledgements: We thank the manager of the Botanic Gardens of Adelaide for allowing insect collection. Funding was received from the US Air Force Office of Scientific Research (grants FA2386-10-1-4114 and FA9550-09-1-0116). References: [1] Olberg, R. M., Worthington, A. H., and Venator, K. R. (2000). Prey pursuit and interception in dragonflies. *J. Comp. Physiol.*

A 186, 155–162. [2] Nordström, K., Bolzon, D. M., and O'Carroll, D. C. (2011). Spatial facilitation by a high-performance dragonfly target-detecting neuron. *Biol. Lett.* 7, 588–592. [3] Dunbier, J.R., Wiederman, S.D., Shoemaker, P.A. and O'Carroll, D.C. (2012). Facilitation of dragonfly target-detecting neurons by slow moving features on continuous paths. *Front. Neural Circuits* 6:79. [4] Wiederman, S.D. and O'Carroll D.C. (2013) Selective attention in an insect visual neuron. *Curr. Biol.* 23, 156–161.] Address: Dunbier, J.R., The University of Adelaide, School of Medical Sciences, Adelaide, Australia. E-mail: james.dunbier@adelaide.edu.au

13083. Dunbier, J.R., Wiederman, S.D.; Shoemaker, P.A.; O'Carroll, D.C. (2013): Facilitation of dragonfly target-detecting neurons by slow moving features on continuous paths. *Frontiers in Neural Circuits* 6(79): 11 pp. (in English) ["Dragonflies detect and pursue targets such as other insects for feeding and conspecific interaction. They have a class of neurons highly specialized for this task in their lobula, the "small target motion detecting" (STMD) neurons. One such neuron, CSTMD1, reaches maximum response slowly over hundreds of milliseconds of target motion. Recording the intracellular response from CSTMD1 and a second neuron in this system, BSTMD1, we determined that for the neurons to reach maximum response levels, target motion must produce sequential local activation of elementary motion detecting elements. This facilitation effect is most pronounced when targets move at velocities slower than what was previously thought to be optimal. It is completely disrupted if targets are instantaneously displaced a few degrees from their current location. Additionally, we utilize a simple computational model to discount the parsimonious hypothesis that CSTMD1's slow build-up to maximum response is due to it incorporating a sluggish neural delay filter. Whilst the observed facilitation may be too slow to play a role in prey pursuit flights, which are typically rapidly resolved, we hypothesize that it helps maintain elevated sensitivity during prolonged, aerobically intricate conspecific pursuits. Since the effect seems to be localized, it most likely enhances the relative salience of the most recently "seen" locations during such pursuit flights." (Authors)] Address: Dunbier, J.R., The University of Adelaide, School of Medical Sciences, Adelaide, SA 5005, Australia. E-mail: ames.dunbier@adelaide.edu.au

13084. Fate, C.; Lapeyrie, J.; Nel, A. (2013): A new Permagnionidae from the Middle Permian of the South of France (Odonatoptera: Protozgyoptera). *Zootaxa* 3702(4): 397-400. (in English) ["The new permagnionid protozgyopteran genus and species *Salagoulestes wesleyi* is described from the Middle Permian of Lodève Basin, Salagou Formation. It seems to be more closely related to the two genera *Scytolestes* and *Permagnion* than to any other Permagnionidae. It increases the diversity of the odonatopteran fauna in the Salagou Formation to 14 different species." (Authors)] Address:

Fate, Caitin, 1225 Sequoia Drive, San Anselmo, CA 94960, California, USA. E-mail: caitinfate@gmail.com

13085. Ferrand, M.; Dommanget, J.-L. (2013): *Hemianax ephippiger* (Burmeister, 1839) en Île-de-France en avril et mai 2011 (Odonata, Anisoptera: Aeshnidae). *Martinia* Hors-série, *Hemianax ephippiger* - migration 2011, mai 2013: 55-60. (in French, with English summary) ["The discovery of *H. ephippiger* in the région Ile-de-France is presented and discussed. The species was observed in two areas separated by a gap of ca. 40 km in the Yvelines department. The first is an open and vegetated settling tank. In April 2011, ten individuals were observed patrolling or hunting. The second site is a wet depression in which seven individuals were observed either in tandem or laying. The eggs were inserted into various substrates, namely stems, moss, plant debris, etc. No larval development could be observed. The authors suppose that other sites in the Paris basin were also invested by the great migratory." (Authors)] Address: Ferrand, M., SFO, 7 rue Lamartine, F-78390 Bois-d'Arcy, France

13086. Fleck, G.; Li, J.; Schorr, M.; Nel, A.; Zhang, X.; Lin, L.; Gao, M. (2013): *Epiophlebia sinensis* Li & Nel 2011 in Li et al. (2012) (Odonata) newly recorded in North Korea. *International Dragonfly Fund - Report* 61: 1-4. (in English) [A male of *E. sinensis* was collected in June 2012 in North Korea. The record was briefly documented and discussed.] Address: Li, J., P.O. Box 22, Vientiane, Laos. E-mail: lucanus123@163.com

13087. Frackiel, K.; Henel, A.; Taylor, J.R.E. (2013): Distribution and habitat selection of *Nehalennia speciosa* (Charpentier, 1840) (Odonata: Coenagrionidae) in Biebrza valley. *Odonatrix* 9(2): 55-64. (in Polish, with English summary) ["Eight new localities of *N. speciosa* were found in the Biebrza river valley, NE Poland, six of them in the Biebrza National Park (Figs 1, 2). The Biebrza river valley is famous as the largest complex of marshes in Poland and in Central Europe. *N. speciosa* has never been recorded there before. Six out of eight localities were found in the southern basin of the river that is best preserved, with vast areas of fen mires. The locality "Osowiec-Twierdza" (Fig. 1) represents small dystrophic water bodies with the *Sphagnum* moss mat; *N. speciosa* is present in the nearby *Carex rostrata* swamp. Habitats of the other seven localities (fen mires) are different from those most typical of the species in Poland as they do not contain *Sphagnum*. Additionally, these fen mires are floristically rich in comparison with many other habitats of *N. speciosa* in Poland. Locality "Bagno Ławki" is especially untypical as the plant community there is dominated by *Equisetum fluviatile* that is known from only very few other localities of *N. speciosa* in Poland. Special feature of five out of six localities in the lower basin of the Biebrza valley is the dominance of *Carex rostrata* that is a common characteristic of the localities in eastern Poland. The presence of *N. speciosa*, recorded in vast are-

as of fen mires of the Biebrza valley may suggest that other localities of the species are to be discovered there." (Authors)] Address: Frackiel, K., Biebrzański Park Narodowy, Osowiec-Twierdza 8, 19-110 Goniądz, Poland. E-mail: kfrackiel@biebrza.org.pl

13088. Frauendorf, T.C.; Colón-Gaud, C.; Whiles, M.R.; Barnum, T.R.; Lips, K.R.; Pringle, C.M.; Kilham, S.S. (2013): Energy flow and the trophic basis of macroinvertebrate and amphibian production in a neotropical stream food web. *Freshwater Biology* 58(7): 1340-1352. (in English) ["Despite the typically high taxonomic and functional diversity of tropical habitats, little is known about the roles of individual consumers in their ecosystem structure and function. We studied the trophic basis of production in a tropical headwater stream by identifying major sources of energy, measuring energy flow through consumers and characterising interactions among trophic levels and functional groups. We examined gut contents of 18 dominant macroinvertebrate (including *Heteragrion* and *Neurocordulia*) and two tadpole taxa and used these data, along with previously published estimates of secondary production, to quantify food-web structure and energy flow pathways. We also examined the prevalence of omnivory and patterns of resource consumption across seasons and habitats. Non-algal biofilm, a heterogeneous polysaccharidic matrix, was the most utilised food resource in the stream. Contrary to some studies of Old World tropical stream food webs, detrital energy sources were consumed at relatively high rates and contributed significantly to overall energy flow, although much of this was attributable to a single shredder taxon. Algal consumption rates were similar to values reported for temperate streams and were highest during the dry season. Omnivory was prevalent across all functional groups, particularly predators, suggesting traditional functional and trophic assignments based on temperate regions may not be appropriate for tropical systems. Seasonal patterns of resource consumption appeared linked to hydrological disturbance. This is the first study to provide quantitative estimates of energy flow through a neotropical stream food web. Extirpation and extinction rates in tropical freshwater habitats are high; our study provides baseline information for conservation and management of remaining systems, and for quantifying the consequences of further losses of biodiversity such as ongoing amphibian declines." (Authors)] Address: Frauendorf, Therese, Institute of Pacific Island Forestry, 60 Nowelo St., Hilo, HI 96720, USA. E-mail: tfrauend@hawaii.edu

13089. Fulan, J.A.; Davanso, R.C.S.; Henry, R. (2013): A profundidade como fator determinante na variação anual da densidade dos macroinvertebrados associados à *Salvinia auriculata* Aublet. *Revista Brasileira de Biociências* 9(2): 214-219. (in Portuguese, with English summary) ["The depth as a factor in determining annual change density of macroinvertebrates associated with *Salvinia auriculata*: The aim of this work was to study

the effects of water annual variation of Paranapanema River and others variables on macroinvertebrates that lives in macrophytes roots, from March 2006 to February 2007. The sampled was realized with a hand-net ... We measured air and water temperature, depth, dissolved oxygen, pH, K25 and suspended matter. The normality was tested and a Canonical Correspondence Analysis (CCA) was realized. Telebasis showed high density in period studied. There was a high variation in depth: 6.07 m in April 2006 to 1.83 m in November 2007. The CCA showed that Culicidae, Ephemeroptera, Ostracoda, Calopterygidae, Coryphaeschna and Cyanallagma were significative correlated with the depth. We concluded that the effect of the depth on larvae Odonata can not have been direct, but indirect by the effect in substrates as aquatic plants." (Authors)] Address: Fulan, J.A., Univ. Fed. Amazonas (UFAM). CEP: 69800-000, Humaitá, AM, Brasil. E-mail: joaofulan@ig.com.br

13090. Garcia-Trejo, F.; Hurtado-Gonzalez, S.L.; Soto-Zarazúa, G.; Alatorre-Jacome, O.; Gutiérrez-Yurrita, E. R.P.J. (2013): Ecophysiological responses to the effect of annual management on an endemic viviparous fish in central plateau of México. *Neotropical Ichthyology* 11(1): 117-123. (in English, with Spanish summary) ["Studies on the biological aspects of fish typically focus on species that currently have commercial value, causing species that lack such market value to be ignored. This is the case of several freshwater fish, specifically of several members of the Goodeidae family. In the State of Querétaro there are several species of this family characterized for being viviparous and having distinctive sexual dimorphism that may have commercial potential. The subject of this study is *Girardinichthys multiradiatus*, a viviparous fish endemic to the upper-half of the Lerma River basin. The lack of knowledge regarding its biology and ecology has prevented the development of guidelines to manage its habitat and to preserve its population. The objective was to determine the ecophysiological responses of *G. multiradiatus* to its environmental management. From the sampling (24 hours every two months) population structure and dynamics were analyzed throughout a hydrological cycle using meristic data (standard length). Trophic and ecophysiological responses to fluctuations in environmental factors were also identified. Although the mexcalpique is a polytrophic species, results show that it prefers feeding on Diptera or Cladocera, while detritus is the third substance frequently found in their stomachs. Environmentally, the water regime is responsible for fluctuations in the population dynamics of the species, while temperature changes are the most influence its energy balance. These results can guide efforts to conserve this species and its habitat." (Authors) Odonata contributed up to ca 3% to the diet items *G. multiradiatus*.] Address: Garcia-Trejo, F., División de Investigación y Posgrado, Fac. de Ingeniería, Univ. Autón. de Querétaro, Centro Universitario, Cerro de las Campanas S/N, C.P. 76010, Querétaro, Qro., México. E-mail: fernando.garcia@uaq.mx

13091. Garrison, R.W.; von Ellenrieder, N. (2013): A contribution to the study of the biodiversity of Odonata in Costa Rica with an emphasis on the genus *Argia* (Insecta: Odonata: Coenagrionidae). *International Dragonfly Fund - Report 62*: 1-23. (in English) ["A two week trip to Costa Rica was conducted between 26 May and 8 June 2013, sampling odonates in several provinces along the centre to the pacific southern portion of the country. A total of 86 species in 34 genera were found, including 16 species of the genus *Argia*. Lists of all species by locality, photographs of live specimens, and illustrations and notes of described species of *Argia* are presented to facilitate identification to other collectors." (Authors) Drawings of caudal appendages of *Argia adamsi*, *A. chelata*, *A. rogersi*, *A. terira*, *A. underwoodi* and *A. pulla* are presented.] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarison@cdfa.ca.gov

13092. Gaspar Neiss, U.; Fleck, G.; Alta Feitoza, L.A.; Hamada, N. (2013): Description of the adult male of *Aeschnosoma auripennis* Geijskes, 1970 (Odonata: Coruliidae s.s.). *Zootaxa* 3718(6): 596-599. ["The male of *A. auripennis* is described for the first time, based on a specimen reared from a larva collected in the Reserva Biológica do Uatumã, Amazonas State, Brazil. The species is newly reported from the Roraima State, Brazil." (Authors)] Address: Gaspar Neiss, U., Inst. Nacional de Pesquisas da Amazônia (INPA), Coordenação de Biodiversidade (CBio), Avenida André Araújo, n 2936, Caixa Postal 478, CEP 69067-375, Manaus, Amazonas, Brazil

13093. Gayet, P.; Ruffoni, A. (2013): *Afflux d'Hemianax ephippiger* (Burmeister, 1839) en Bourgogne au printemps 2011 (Odonata, Anisoptera: Aeshnidae). *Martinia Hors-série, Hemianax ephippiger - migration 2011*, mai 2013: 47-50. (in French, with English summary) ["In the frame of its massive migration during 2011, *H. ephippiger* has been observed several times in the Bourgogne region. The species is new for the Yonne department but was already recorded in the past from the three other departments of the region. The authors present the 2011 observations and their characteristics." (Authors)] Address: Gayet, P., 3, route de Perrigny, 71620 Guerfand, France. E-mail: gayet-philippe@orange.fr

13094. Gerlach, J. (ed.) (2013): Odonata, Hemiptera, Hymenoptera and other insects of the Seychelles islands. *Siri Scientific Press*: 400 pp. (in English) ["The Seychelles islands are biogeographically interesting, with ancient affinities to Africa and Asia, recent colonizing species from the Indo-Pacific and modern introductions. Until recently, relatively little was known about the biodiversity of the islands. This has changed through the publication of a series of monographs on the Seychelles fauna, presenting the latest information on all the terrestrial and freshwater animals of the is-

lands. In this current volume on the Odonata, Hemiptera, Hymenoptera and other insects of the Seychelles islands, 15 expert scientists from nine different countries have provided contributions that cover all 954 species of these insect orders and other orders not covered in previous volumes (e.g. Protura, Collembola, Diplura, Microcoryphia, Zygentoma, Thysanoptera, Psocodea, Neuroptera, Siphonaptera and Trichoptera) recorded from the islands. The volume includes taxonomic keys, diagnostic illustrations and descriptions for many species, in addition to distribution records and assessments of species conservation status as defined by the International Union for the Conservation of Nature (IUCN)."(Publisher)]

13095. Gliwa, B. (2013): Die Libellen der Moorgebiete "Praviršulio tyrelis" und "Didysis Tyrulis" in Litauen. Build and Conserve a Livable Environment in the Countryside. ISBN 978-609-95323-1-8: 164-198. (in German, with English and Lithuanian summary) ["Odonata of two nature reserve boglands in Lithuania: Praviršulis and Didysis Tyrulis. While Didysis Tyrulis has been largely destroyed due to peat cutting, Praviršulis remained healthy, however, with disorders of natural hydrological conditions in a large part. As a result Praviršulis contains still two natural lakes and plenty of raised bog and fen. By contrast, at Didysis Tyrulis one finds no natural water bodies at all but lots of secondary „lakes“ in the digged pools together with a dense set of ditches. Praviršulis is well researched in terms of dragonflies, 45 species have been recorded. Among them some species strongly specialized in bogland, e.g. Nehalennia speciosa, Somatochlora arctica. Due to still started research, only 27 species have been recorded at Didysis Tyrulis, among them rare species as Coenagrion armatum and Coenagrion lunulatum. As a surprise, a large of population of N. speciosa could be observed as well. This is the first report of this species in a renaturating habitat. Really large populations were recorded for Leucorrhinia rubicunda and L. pectoralis in 2012." (Author)] Address: Gliwa, B., Sargeliu bendruomenes centras, Sargeliai, Raseiniu r., LT-60443, Lithuania. E-mail: info@sargeliai.org

13096. Gonzalez-Bellido, P.T.; Peng, H.; Yang, J.; Georgopoulos, A.P.; Olberg, R.M. (2013): In dragonflies, descending visual neurons code prey direction in population vector form. Front. Physiol. Conference Abstract: International Conference on Invertebrate Vision. doi: 10.3389/conf.fphys.2013.25.00058: n.p. (in English) [Verbatim: The population vector is the weighted vectorial sum activity of an ensemble of neurons and it was first shown to predict the direction of an upcoming arm movement in monkeys (Georgopoulos et al. 1983, 1986). In this study we show that in the dragonfly Libellula luctuosa, the population vector algorithm also decodes the target direction information relayed from the brain to the wing motor centers by a group of 16 neurons. Moreover, these 16 neurons (named Target Selective De-

scending Neurons or TSDNs; Olberg 1986), perform such directional information coding with high accuracy across 360°. This is significant because the monkey motor cortex requires upwards of 200 neurons to achieve the same performance (Georgopoulos et al. 1988). To obtain the TSDNs directional tuning curves, we impaled a total of 51 TSDNs from 38 animals with sharp electrodes and recorded their responses to a battery of 3497 target trajectories. The target had a constant speed and size, but random location and direction. To confirm cell ID, Lucifer yellow was injected into 32 of the recorded cells. Although the preferred direction, receptive field and morphological traits (3D tracings) for each TSDN type were consistent among animals, spike rates were not. Importantly, the TSDN spatial (receptive field) and temporal (latency) properties matched the area of the retina where the prey is focused and the reaction time, respectively, during predatory flights. The findings of this study are published in Gonzalez-Bellido et al. 2013. References: Georgopoulos AP, Caminiti R, Kalaska JF, Massey JT. 1983. Spatial coding of movement: a hypothesis concerning the coding of movement direction by motorcortical populations. Experimental Brain Research Supplement 327-336; Georgopoulos AP, Kettner RE, Schwartz AB. 1988. Primate motor cortex and free arm movements to visual targets in three-dimensional space. II. Coding of the direction of movement by a neuronal population. Journal of Neuroscience 8: 2928-2937; Georgopoulos AP, Schwartz AB, Kettner RE. 1986. Neuronal population coding of movement direction. Science 233: 1416-19; Gonzalez-Bellido PT, Peng H, Yang J, Georgopoulos AP, Olberg RM. 2013. Eight pairs of descending visual neurons in the dragonfly give wing motor centers accurate population vector of prey direction. Proceedings of the National Academy of Sciences 110: 696-701.; Olberg RM. 1986. Identified target-selective visual interneurons descending from the dragonfly brain. Journal of Comparative Physiology. A, Sensory, Neural, and Behavioral Physiology 159: 827-840.] Address: Gonzalez-Bellido, Paloma, Marine Biological Laboratory, Marine Resources Center, Woods Hole, MA, 02543, USA. E-mail: pgonzalez@mbl.edu

13097. Grand, D. (2013): Les libellules du rio Cabriel, provinces d'Albacete, Cuenca et Valencia (Espagne) (Odonata): distribution et observations biologiques. Martinia 29(1): 1-8. (in French, with English summary) ["The part of the rio Cabriel which has been studied is located to the centre east of Spain, at the confines of the provinces of Albacete, Cuenca and Valencia. I investigated it along more than 120 km in July 2000, and then from late May to late September for six years (2006-2011). I observed 31 Odonata species of which Onychogomphus costae is cited for the first time from the province of Valencia. Brachythemis impartita was seen far from the maritime border of the province of Valencia, where it is usually know. Orthetrum chrysostigma and Trithemis annulata were found in few places of the rio

Cabriel. *Onychogomphus costae* and *Zygonyx torridus* are respectively considered as Endangered and Vulnerable by the IUCN European Red List. A monitoring of the main populations of both species will therefore be settled next years." (Author)] Address: deceased

13098. Gremyachikh, V.A.; Komov, V.T.; Trankvilevsky, D.V.; Shapovalov, M.I.; Motorin, A.A. (2013): Levels of mercury in water and amphibiotic insects from different waterbodies and watercourses of European Russia. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 46-51. (in Russian, with English summary) ["Data are provided on the levels of mercury in members of abundant species of amphibious insects of the orders Plecoptera, Coleoptera, Heteroptera, Trichoptera and Odonata collected in waterbodies and watercourses of Vologda, Voronezh, Novgorod and Yaroslavl Oblasts and the Republic of Adygea." (Authors) *Coenagrion* sp., *Aeschna* sp., *Anax imperator*, *Gomphus vulgatissimus*, *Calopteryx splendens*, *Somatochlora metallica*.] Address: Komov, V.T., Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences Borok, Nekouzsky District, Yaroslavl Oblast, 152742, Russia. E-mail: vkomov@ibiw.yaroslavl.ru

13099. Halupka, K.J.; Wiederman, S.D.; Cazzolato, B.S.; O'Carroll, D.C. (2013): Local facilitation improves success in closed loop simulations of insect small target pursuit. Front. Physiol. Conference Abstract: International Conference on Invertebrate Vision. doi: 10.3389/conf.fphys.2013.25.00001: (in English) ["Detecting and intercepting a small target is a computationally challenging task, but one solved elegantly by the small brain of flying insects, which have evolved several strategies for pursuit of either prey or conspecifics [1, 2]. Male houseflies track other flies, constantly updating their heading towards the target, based on an error angle between target and pursuer [3, 4], thus mimicking movements of the target on a spiralling flight path that ends in capture. By contrast, predatory dragonflies use an interception strategy, steering to minimise movement of the prey's image on the retina, resulting in a collision course [5]. To evaluate these two strategies for target pursuit against visual clutter, we developed a closed-loop model inspired by insect STMD (Small Target Motion Detector) neurons and pursuit behaviour, set in natural scenery. This allows quantification of the merits of alternative pursuit strategies and of key stages of visual processing that cannot yet be obtained from in-vivo analysis. We found that the velocity tuning of STMD neurons [6, 7] imposed a lower bound on the discriminable velocity of targets. However the intercept method enabled successful pursuits even when the target was moving significantly faster than pursuer. The preliminary stage of the detection algorithm is readily distracted by false positives generated by complex backgrounds. However, addition of a facilitation mecha-

nism, inspired directly by recent physiological analysis of dragonfly STMD neurons [8, 9] prevents such breakthrough responses by amplifying the weak signal of tiny targets moving on long trajectories. With this additional 2nd order salience-enhancing algorithm, we saw a significant improvement in successful target interception, from just over 50% to almost 80% (Chi square=5.87, p=0.015, n=44, Fig. 1). Acknowledgements: This work was supported by the US Air Force Office of Scientific Research (FA2386-10-1-4114) and the Australian Research Council (DP130104572). References: [1] RM Olberg. Visual control of prey-capture flight in dragonflies. *Curr Opin Neurol*, 22:267–271, 2012. [2] TS Collett and MF Land. Visual control of flight behaviour in the hoverfly. *J Comp Physiol., A*, 99(1):1-66, 1975. [3] MF Land and TS Collett. Chasing Behaviour of Houseflies (*Fannia Canicularis*). *J Comp Physiol A*, vol. 89, pp. 331-357, 1974. [4] C Wehrhahn, T Poggio, and L Bult-hoff. Tracking and chasing in houseflies. *Biol Cybern*, 45(2):123-130, 1982. [5] RM Olberg, A Worthington, and K Venator. Prey pursuit and interception in dragonflies. *J Comp Physiol., A*, 186(2):1-9, 2000. [6] SD Wiederman, PA Shoemaker, and DC O'Carroll. A model for the detection of moving targets in visual clutter inspired by insect physiology. *PLoS ONE*, 3(7):1-11, 2008. [7] KJ Halupka, SD Wiederman, BS Cazzolato, and DC O'Carroll. Discrete implementation of biologically inspired image processing for target detection. *Proc. ISSNIP*, 143-148, 2011. [8] K Nordström, DM Bolzon, and DC O'Carroll. Spatial Facilitation by a High-Performance Dragonfly Target-Detecting Neuron. *Biol Lett*, 2:588-592, 2011. [9] JR Dunbar, SD Wiederman, PA Shoemaker, and DC O'Carroll. Facilitation of Dragonfly Target-Detecting Neurons by Slow Moving Features on Continuous Paths. *Front Neural Circuits*, 6:1-11, 2012." (Authors)] Address: Halupka, Kerry, The University of Adelaide, School of Medical Sciences, Australia. E-mail: kerry.halupka@gmail.com

13100. Hamamoto, M.; Ohta, Y.; Hara, K.; Hisada, T. (2013): Three-dimensional free-flight analysis of the rapid turning of a dragonfly using fluid-structure interaction analysis. *Journal of Computational Science and Technology* 7(1): 75-88. (in English) ["Recent studies of the flapping flight of insects have succeeded in solving the unsteady aerodynamics of hovering and contributed to realizing bio-inspired micro aerial vehicles (MAVs). However, the effect of wing deformation on the aerodynamics has not been investigated because of a lack of appropriate analysis methods. As an initial step to creating a "total" simulator for flapping flight, we developed a free-flight simulator by combining fluid-structure interaction finite element analysis based on the arbitrary Lagrangian-Eulerian method, which can quantitatively treat the strong interaction between the wing deformation and its surrounding airflow, and a rigid body dynamics analytical solver. With biologically-inspired flapping motion, which mimicked the changes in the stroke motion of the wing, the numerical model of the dragonfly per-

formed rapid turning over 1200°/s of yaw angular velocity. Although the flapping motion for the left wing on the trigger flapping and the right wing on the resumed flapping (or its inversed combination) are identical, a considerable difference in the deformation of the wing during this identical flapping between the former and latter halves of the turn was observed. Thus, while these actuations were identical, the directions of the aerodynamic forces were largely controlled by passive deformations of the wings. These results meant that the effect of wing deformation on its aerodynamics should be taken into account and thus fluid-structure interaction analysis is required to effectively design the actuation of the wing on an artificial MAV." (Authors) Symptetrum] Address: Hamamoto, M., Advanced Technology Research Laboratories, Corporate Research and Development Group, Sharp Corporation, 2613-1 Ichinomoto-cho, Tenri, Nara 632-8567, Japan. E-mail: hamamoto.masaki@sharp.co.jp

13101. Hansen, G.J.A.; Hein, C.L.; Roth, B.M.; Vander Zanden, M.J.; Gaeta, J.W.; Latzka, A.W.; Carpenter, S.R. (2013): Food web consequences of long-term invasive crayfish control. *Canadian Journal of Fisheries and Aquatic Sciences* 70(7): 1109-1122. (in English) ["Controlling invasive species can restore ecosystems while also quantifying species interaction strengths. We experimentally removed invasive rusty crayfish (*Orconectes rusticus*) from a Wisconsin lake. Rusty crayfish abundance declined by 99% in eight years, did not significantly increase four years post-harvest, and no compensatory recruitment response was observed. Native crayfish (*O. virilis*) and sunfish (*Lepomis* spp.) abundances increased by two orders of magnitude as rusty crayfish abundance declined, and macrophyte cover increased significantly in 2-4 m waters. We expected benthic macroinvertebrate densities to increase as rusty crayfish were removed; however, fish consumption of invertebrates increased as rusty crayfish density declined, and macroinvertebrate responses varied among families and habitats. Total Gastropoda density increased 300-fold in cobble, while the density of one gastropod family declined in macrophytes. Ephemeroptera, Odonata, and Amphipoda densities also declined in certain habitats as rusty crayfish were removed, suggesting that they are indirectly facilitated by rusty crayfish. This study highlights the importance of considering indirect effects when assessing the impacts of invasive species, and demonstrates that these impacts may be reversed over relatively short timescales" (Authors)] Address: Hansen, Gretchen, Center for Limnology, University of Wisconsin-Madison, 680 N. Park Street, Madison, WI 53706, USA. E-mail: ghansen2@wisc.edu

13102. Hanun, S.O.; Dahelmi, S.S. (2013): Dragonflies species in Kandi Wildlife Park Area, Sawahlunto City, West Sumatra. *Jurnal Biologi Universitas Andalas* 2(1): 71-76. (in Indonesian, with English summary) [15 Odonata species were documented from the Kandi

Wildlife Park Area, Sawahlunto City, West Sumatra.] Address: Hanun, Silvy Olivia, Laboratorium Taksonomi Hewan, Jurusan Biologi, FMIPA Universitas Andalas, Kampus UNAND Limau Manis Padang – 25163, Indonesia. E-mail: oliviahhanum@gmail.com

13103. Heckmann, S.; Hörschemeyer, T.; Büsse, S. (2013): The thorax musculature of Zygoptera nymphs (Odonata). 6th Dresden Meeting on Insect Phylogeny, Dresden, September 27–29, 2013. Abstracts — Poster Presentations: 39. (in English) [Verbatim: Odonata are arguably the insect group with the most impressive flight skills (e.g. Corbet 1999). Each wing pair can be controlled independently and some species are even able to fly backwards (Hatch 1966). The muscles responsible for the wing movement are connected directly to the wings (Tannert 1958). This exclusively direct mechanism of wing movement distinctly sets Odonata apart from all other winged insects; where the wing beat is done mainly through a system of indirect muscles, many of which are highly reduced or missing in the Odonata (e.g. Snodgrass 1935). Here we present a comparative morphological investigation of the thoracic flight musculature of Zygoptera. The results for *Nealennia speciosa* and *Ischnura elegans* allow first insights into our comprehensive study. Nymphs are aquatic predators, which feed on other Arthropods, whereas adults are arial predators (e.g. Corbet 1999). The amount and kind of muscles therefore significantly differ between nymphal and adult Odonata, which are adapted to their respective habitat (e.g. Asahina 1954; Maloeuf 1935). We used synchrotron radiation micro computed tomography (S μ CT), aided by 3-D reconstruction to study the thorax of Zygoptera. The muscles were identified following the nomenclature introduced by Friedrich and Beutel (2008) as well as the homology hypothesis of Büsse et al. (2013) and Büsse & Hörschemeyer (subm.). References: Asahina S. 1954: A morphological study of a relic dragonfly *Epiophlebia superstes* Selys (Odonata, Anisozygoptera). Tokyo: The Japan Society for the Promotion of Science 153 pp. — Büsse S., Genet C., Hörschemeyer T. 2013: Homologization of the flight musculature of Zygoptera (Insecta: Odonata) and Neoptera (Insecta). *PLoS ONE* 8(2): e55787. doi:10.1371/journal.pone.0055787 — Büsse S., Hörschemeyer T. submitted: The nymphal thorax musculature of Anisoptera (Insecta: Odonata) and its evolutionary relevance. *BMC Evolutionary Biology*. — Corbet P.S. 1999: *Dragonflies: Behavior and Ecology of Odonata*. New York: Cornell Univ. Press. — Friedrich F., Beutel R. 2008: The thorax of *Zorotypus* (Hexapoda, Zoraptera) and a new nomenclature for the musculature of Neoptera. *Arthropod Structure & Development* 37: 29–54. — Maloeuf N.S.R. 1935: The postembryonic history of the somatic musculature of the dragonfly thorax. *Journal of Morphology* 58: 87–115. — Snodgrass R.E. 1935: *Principles of Insect Morphology*. New York: Mc Graw-Hill Book Company. — Tannert W. 1958: Die Flügelgelenkung bei Odonaten. *Deutsche Entomologische*

Zeitschrift 5: 394–455.] Address: Heckmann, Saskia, Abteilung Morphologie, Systematik & Evolutionsbiologie, JFB-Institut für Zoologie & Anthropologie der Georg-August Universität Göttingen, Germany

13104. Heger, P.; George, R.; Wiehe, T. (2013): Successive gain of insulator proteins in arthropod evolution. *Evolution* 67(10): 2945-2956. (in English) ["Alteration of regulatory DNA elements or their binding proteins may have drastic consequences for morphological evolution. Chromatin insulators are one example of such proteins and play a fundamental role in organizing gene expression. While a single insulator protein, CTCF (CCCTC-binding factor), is known in vertebrates, *Drosophila melanogaster* utilizes six additional factors. We studied the evolution of these proteins and show here that—in contrast to the bilaterian-wide distribution of CTCF—all other *D. melanogaster* insulators are restricted to arthropods. The full set is present exclusively in the genus *Drosophila* whereas only two insulators, Su(Hw) and CTCF, existed at the base of the arthropod clade and all additional factors have been acquired successively at later stages. Secondary loss of factors in some lineages further led to the presence of different insulator subsets in arthropods. Thus, the evolution of insulator proteins within arthropods is an ongoing and dynamic process that reshapes and supplements the ancient CTCF-based system common to bilaterians. Expansion of insulator systems may therefore be a general strategy to increase an organism's gene regulatory repertoire and its potential for morphological plasticity." (Authors) Several clades/orders were omitted for clarity. Ephemeroptera and Odonata are combined in Palaeoptera.] Address: Heger, P., Cologne Biocenter, Institute for Genetics, University of Cologne, Zùlpicher Str. 47a, 50674 Köln, Germany. E-mail: peter.heger@uni-koeln.de

13105. Heintzman, L. (2013): Examination of Polycyclic Aromatic Hydrocarbons in an urban stormwater system and bioaccumulation in Odonata. M.Sc. thesis, Biology, Texas Tech University: 94 pp. (in English) ["Polycyclic aromatic hydrocarbons (PAHs) are toxic organic pollutants produced from combustion processes. Associated with urban runoff they have been detected worldwide in urban wetlands. PAH contaminations in wetlands are known to be influenced by hydrology and environmental factors. Because PAHs and their associated metabolites are carcinogenic, mutagenic, and teratogenic, they pose significant risks to wetland-dependent organisms. Provided meager scientific data on PAHs in playa wetlands, I investigated the occurrence of 16 PAHs within playa surface water samples and tissues of amphibious organisms (Odonata, a flagship group of predatory wetland insects) from seven urban playas along a runoff gradient in Lubbock, Texas. PAH detections from surface water samples were highly variable across sites and dates, with naphthalene and pyrene occurring most often in water samples. Adult Odonata PAH detections were also variable but significantly different from corre-

sponding surface water samples (suggesting bioaccumulation rather than passive chemical exposure), with naphthalene and fluoranthene occurring most often. The number of specific PAH compound detections was significantly associated with percent impervious surface within 300 m of a playa, but not with gradient position or number of inflows. Therefore, results indicate that for urban playas of Lubbock, land-use factors are more important in determining PAH contamination than hydrologic factors." (Author)] Address: not stated

13106. Heiser, M.; Schmitt, T. (2013): Tracking the boundary between the Palaeartic and the Oriental region: new insights from dragonflies and damselflies (Odonata). *Journal of Biogeography* 40(11): 2047-2058. (in English) ["Aim: We aim to define the hotspots, faunal regions and faunal elements of Odonata in Eurasia. We describe the location and the extent of the transition zone between the Palaeartic and Oriental realms. Location: Eurasia. Methods: Odonata are suitable for this study because the number of species in the group is sufficient for the required analyses, their distributions are mostly known, and they are split into the highly dispersive Anisoptera and the weakly dispersive Zygoptera. For our analyses, Eurasia was classified into 63 regions, within which we determined the presence or absence of each of the 1765 Odonata species. We calculated species richness maps and performed cluster analysis and principal components analysis to extract faunal regions and elements. Results: Occurrence records of Eurasian Odonata were partitioned among three major biogeographical entities: (1) Europe, North Africa and North Asia; (2) India, Indochina and southern China; and (3) northern China, Korea and Japan. Each of these entities has further notable substructures and faunal elements, especially in Southeast Asia. The tropical rain forest region of Southeast Asia is the species diversity hotspot of odonates and has the highest number of (often localized) faunal elements. The northern border of the Oriental region reaches southernmost China and the southern slopes of the Himalayas, but the transitional zone between the Oriental and the Palaeartic region extends much farther north, and includes northern China, Japan and Manchuria. The lower dispersal ability of Zygoptera compared with that of Anisoptera is mirrored in various biogeographical patterns: (1) the Western Palaeartic influence on the Eastern Palaeartic is stronger in Anisoptera than in Zygoptera; (2) Zygoptera have more faunal elements on islands than do Anisoptera; and (3) Zygoptera are isolated by the Strait of Gibraltar, but do not show a finer-grained structure of their faunal elements on the mainland. Main conclusions: The less severe impact of the ice ages in Southeast Asia resulted in the evolution and survival of Odonata species in many regional refugia. These faunal elements have had a greater impact on the post-glacial colonization than previously thought and strongly influence the composition of Odonata in East Asia." (Authors)] Address: Schmitt, T., Biogeographie, Fachbereich

VI, Gebäude N, Raum 303, Universität Trier, 54286 Trier, Germany. E-mail: thsh@uni-trier.de

13107. Helmker, B.; Hörnschemeyer, T.; Büsse, S. (2013): The thorax musculature of *Epiophlebia* nymphs (Odonata). 6th Dresden Meeting on Insect Phylogeny, Dresden, September 27–29, 2013. Abstracts — Poster Presentations: 39–40. (in English) [Verbatim: *Epiophlebia* is the single taxon inside the recent Odonata, which combines characters of the Anisoptera and the Zygoptera. The four known species of *Epiophlebia* differ in only a few morphological features (e.g. Asahina 1961; Li et al.2011; Carle 2012). Recent publications (Büsse et al. 2012) show that the genetics of three of these species varies very little. This study investigates the thoracic musculature of different nymphal instars of *Epiophlebia laidlawi* and *E. superstes* in order to further reveal the relationship of the two species. Based on Maloeuf's (1935) nomenclature for the thoracic musculature of the Odonata and Asahina's (1954) studies on *E. superstes*, the nymphs were examined via Synchrotron radiation micro computer tomography (S μ CT). Furthermore the identified muscles were homologized with the ones found in the Zygoptera (Büsse et al. 2013) and Anisoptera (Büsse & Hörnschemeyer subm.), based on the nomenclature established by Friedrich & Beutel (2008). The thoracic musculature of *E. laidlawi* and *E. superstes* is highly similar. Every muscle described by Maloeuf (1935) and Asahina (1954) could be confirmed in both species. Five muscles differ from the description of both authors. In addition, thirteen new muscles could be identified, of which one might be unique to the Eiprocta. References: Asahina S. 1954: A morphological study of a relic dragonfly *Epiophlebia superstes* Selys (Odonata, Anisozygoptera). Tokyo: The Japan Society for the Promotion of Science 153 pp. — Asahina A. 1961: Is *Epiophlebia laidlawi* Tillyard (Odonata, Anisozygoptera) a good species? *International Revue der Gesellschaft für Hydrobiologie* 46: 441–446. — Büsse S., von Grumbkow P., Hummel S., Shah D.N., Tachamo Shah R.D., et al. 2012: Phylogeographic Analysis Elucidates the Influence of the Ice Ages on the Disjunct Distribution of Relict Dragonflies in Asia. *PLoS ONE* 7(5): e38132. doi:10.1371/journal.pone.0038132 — Büsse S., Genet C., Hörnschemeyer T. 2013: Homologization of the flight musculature of Zygoptera (Insecta: Odonata) and Neoptera (Insecta). *PLoS ONE* 8(2):e55787. doi:10.1371/journal.pone.0055787 — Büsse S., Hörnschemeyer T. submitted: The nymphal thorax musculature of Anisoptera (Insecta: Odonata) and its evolutionary relevance. *BMC Evolutionary Biology*. — Carle F.L. 2012: A new *Epiophlebia* (Odonata: Epiophlebioidea) from China with a review of epiophlebian taxonomy, life history, and biogeography. *Arthropod Systematics & Phylogeny* 70(2): 75–83. — Friedrich F., Beutel R. 2008: The thorax of *Zorotypus* (Hexapoda, Zoraptera) and a new nomenclature for the musculature of Neoptera. *Arthropod Structure & Development* 37: 29–54. — Li J.-K., Nel A., Zhang X.-P.,

Fleck G., Gao M.-X., et al. 2011: A third species of the relict family Epiophlebiidae discovered in China (Odonata: Eiproctophora). *Systematic Entomology* 37(2): 408–412. doi: 10.1111/j.1365–3113.2011.00610.x. — Maloeuf N.S.R. 1935: The postembryonic history of the somatic musculature of the dragonfly thorax. *Journal of Morphology* 58: 87–115] Address: Helmker, B., Abteilung Morphologie, Systematik & Evolutionsbiologie, JFB-Institut für Zoologie & Anthropologie der Georg-August Universität Göttingen, Germany

13108. Höpstein, G. (2013): Eine Kiesgrube im Saaletal bei Etzelbach als „Naturerbe" der NABU-Stiftung. *Landchaftspflege und Naturschutz in Thüringen* 50(2): 70–74. (in German, with English summary) ["The conservation of a gravel pit as a wetland near Etzelbach is described in the article. The effects of the development in the last five years after acquisition are illustrated. The focus of the research stands on dragonflies, grasshopper, fishes, amphibians, and reptiles. The gravel pit near Etzelbach is an important area for the development of dragonflies in the middle Saale valley. Typical representatives and characteristic species are *Erythromma viridulum*, *Orthetrum cancellatum*, and *Anax imperator*. Remarkable records are *Erythromma lindenii*, *Gomphus pulchellus* and *Anax parthenope*." (Author)] Address: Höpstein, G., Flecke 17, 07422 Bad Blankenburg, Germany

13109. Hykel, M. (2013): The occurrence and bionomy of *Cordulegaster bidentata* at selected localities in the Western Carpathians Mts. Bachelor's thesis, Department of Ecology and Environmental Sciences, Faculty of Science, Palacky University in Olomouc: VII + 29 + III pp. (in Czech, with English summary) [Czech Republic, Western Carpathians Mts., Palkovice hills, Šostýn hills. "Habitat of larvae were small streams and spring areas – width of watercourse 40–180 cm, depth of water column 4–45 cm, volume flow 25–80 cm³s⁻¹, shading 40–80% and riparian vegetation coverage 0–60%. Diurnal activity was observed on selected spring area in Palkovice hills. ... During the 8 days was found 41 males and 17 females. Reappearance was 29 males and 5 females. Diurnal activity of males was recorded from 8:30 until 17:44. Egg-laying was recorded between 8:27 to 17:29. The highest abundance was between 9:00–12:00 and between 16:00–16:30. The average interval visit of imagoes was 13 minutes." (Author)] Address: not stated

13110. Ikemeyer, D.; Olthoff, M. (2013): First record of *Onychogomphus assimilis* (Schneider, 1845) in northwestern Turkey. *Libellula* 32(1/2): 91–94. (in English, with German summary) ["In 2011 a male *O. assimilis* was recorded at the river Devrek in the province of Zonguldak in northwestern Turkey. Previously, the species in Turkey had only been found in rivers close to the Mediterranean Sea and some eastern provinces. The finding of *O. assimilis* indicates a population in the river systems of the Pontic Mountains in northern Turkey." (Au-

thors)] Address: Ikemeyer, D., Billerbecker Str. 6, 48329 Havixbeck, Germany. E-mail: dkjikemeyer@t-online.de

13111. Iorio, E. (2013): Nouveau record d'altitude en France pour *Aeshna affinis* Vander Linden, 1820 (Odonata, Anisoptera: Aeshnidae). *Martinia* 29(1): 19-22. (in French, with English summary) ["*Aeshna affinis* has been discovered at an altitude-record of 1325 m in a pond in the Hautes-Alpes department. Behaviour suggesting autochthony of this species in this pond have been observed." (Author)] Address: Iorio, E., ECO-MED (Ecologie & Mediation), Pole Entomologie, TourMediterranee, 65 av. Jules Cantini, 13298 Marseille Cedex 20, France. E-mail: e.iorio@ecomed.fr

13112. Johansson, N. (2013): The genetic effects (mtDNA COI) of the invasive *Anax imperator* on the native *Aeshna grandis* from populations in southern Sweden. B.Sc. thesis. Halmstad University: (in English) ["Climate change will increase the range of some species, including *A. imperator* which first was observed in Sweden in the year 2000 and are now observed annually in the region of Scania (Skåne) and other parts of southern Sweden. *A. grandis* is a common dragonfly from south to north of Sweden and at some places they now share the habitat with *A. imperator*. The changing climate will benefit *A. imperator* and the species will spread north in Sweden. How this will affect the native *A. grandis* is not yet known however this study may reveal some light on the subject. By extracting mtDNA from larvae of *A. grandis* from 16 different sites; 8 sites with observations of *A. imperator* and 8 without, it is possible to reveal if there is a genetic difference between locals within the invasive species range and outside it. This study have used the COI region in mtDNA in *A. grandis* larvae to reveal if the haplotypes in populations that inhabits same habitats as *A. imperator* are negatively affected or, contrary to different sources, they are able to co-exist. The mtDNA were sequenced, MEGA version 5 was used to construct phylogenetic trees and the program TCS was used to estimate the gene genealogies. In this study there was no correlation between habitats within *A. imperator* range and outside of its range, however it is interesting that the tree constructed in MEGA divides the larvae in two groups and the graph in TCS also divides the larvae into two groups. This could still be an effect of climate change; it could be the result of *A. grandis* from Europe immigrating to Sweden. Another hypothesis is two kinds of larvae: one fast-growing larvae which has already adapted to the rising temperatures and have a shorter larva-stage and one slower growing, not yet adapted to temperatures. It could also be a result of an ongoing sympatric speciation however further studies are required to investigate the two types and more importantly, the cause of the two types of larvae." (Authors)] Address: Johansson, Nathalie, Halmstad University, School of Business and Engineering (SET)

13113. Jolley, J.C.; Albin, E.S.; Kaemingk, M.A.; Willis, D.W. (2013): A survey of aquatic invertebrate communities in Nebraska Sandhill lakes reveals potential alternative ecosystem states. *Journal of Fish and Wildlife Management* 4(1): 151-162. (in English) ["Aquatic invertebrate communities are important to shallow lake ecosystem form and function, providing vital components to the food web that link primary producers to consumers and thereby important to lake management goals of maximizing food resources for birds, fish and mammals. We characterized lake invertebrate communities and physicochemical variables in six Nebraska Sandhill lakes and examined these characteristics within an alternative stable state framework. Surveys were conducted during 2005 within each of these six Nebraska Sandhill lakes by sampling aquatic macroinvertebrate abundance, zooplankton abundance and biomass, phytoplankton biomass, and physicochemical variables. When placed within an alternative stable state framework, the response variables exhibited a gradient of different ecosystem states. Two lakes appeared congruent with the clear water state (dense submergent vegetation, high invertebrate abundance and diversity, and low phytoplankton), two were congruent with the turbid water state (high phytoplankton, low vegetation coverage, low invertebrate abundance and diversity), while two lakes were intermediate, likely in a state of hysteresis. Principal component groupings further supported these findings by following similar lake-specific patterns with attributes of a clear water state (high secchi depth, abundant benthic macroinvertebrates) or turbid water state (total dissolved solids, biomass of small-bodied zooplankters) grouping meaningfully according to multiple lake states. . The lakes studied contained varied fish communities, which may have influenced the diversity, density, and biomass of invertebrate and zooplankton communities. Generally lakes dominated by piscivorous fish displayed the clear water state while those with abundant planktivores displayed the turbid water state. Shallow lakes containing dense invertebrate communities likely provide a rich food base to important fauna (migratory waterfowl) that aid in reaching desired management objectives for these systems. Multiple small lakes, in close proximity, displaying divergent ecosystem states invites the opportunity for more in-depth analyses of driving mechanisms that will undoubtedly add to our ability to effectively manage these systems in the future." (Authors) Taxa included Odonata and were treated at the family level.] Address: Jolley, J.C., United States Fish and Wildlife Service, Columbia River Fisheries Program Office, 1211 SE, USA. E-mail: jeffreyjolley@fws.gov

13114. Jones, R.W.; Obregon-Zuniga, A.; Guzman-Rodriguez, S. (2013): Preliminary assessment of biogeographic affinities of selected insect taxa of the state of Sonora, Mexico. In: Gottfried, Gerald J.; Ffolliott, Peter F.; Gebow, Brooke S.; Eskew, Lane G.; Collins, Loa C. *Merging science and management in a rapidly chang-*

ing world: Biodiversity and management of the Madrean Archipelago III and 7th Conference on Research and Resource Management in the Southwestern Deserts; 2012 May 1-5; Tucson, AZ. Proceedings. RMRS-P-67. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 133-137. (in English) ["The biogeographic affinities of butterflies (Lepidoptera: Papilionoidea and Hesperidae), Odonata, and ants (Hymenoptera: Formicidae) reported from the State of Sonora, Mexico were analysed using published species lists. The combined distribution of these taxa was proportionally greater (47.4%) for those species within the Mega-Mexico3 biogeographic category (Southwestern United States south to northern Central America). Formicidae was the most highly restricted taxon with greater proportions of Sonoran desert endemics. Butterflies had a greater proportion of tropical species (82.8%), whereas Odonata from Sonora were most widely distributed either north or south of Mega-Mexico. Differences in the biogeographic affinities of the three insect taxa are attributed to specificity of immature host plants and the distribution and persistence of species habitats." (Authors)] Address: Jones, R.W., Facultad de Ciencias Naturales, Universidad Autónoma de Querétaro, Querétaro, Qro., México

13115. Juslen, A.; Hyvärinen, E.; Virtanen, L.K. (2013): Application of the Red-List Index at a national level for multiple species groups. *Conservation Biology* 27(2): 398-406. (in English) ["The International Union for Conservation of Nature (IUCN) Red List Index (RLI) is recognized as one of the key indicators of trends in the status of species. The red-list assessment done by Finnish authorities of species in Finland is taxonomically one of the most extensive national assessments. We used the Finnish Red Lists from 2000 and 2010 to calculate for the first time the national RLIs for 11 taxonomic groups (including Odonata) at different trophic levels and with different life cycles. The red-list index is calculated on the basis of changes in red-list categories and indicates trends in the status of biological diversity of sets of species. The RLI value ranges from 0 to 1. The lower the value the faster the set of species is heading toward extinction. If the value is 1, all species in the set are least concern and if the value is 0, all species are (regionally) extinct. The overall RLI of Finnish species decreased. This means that, in Finland, these taxonomic groups were heading toward extinction faster in 2010 than in 2000. Of the analysed groups of organisms, RLIs of 5 decreased and RLIs of 6 increased. At the national level, the RLIs and status trends varied markedly between species groups. Thus, we concluded that generalizations on the basis of RLIs of a few taxa only may yield a biased view of ongoing trends in the status of biological diversity at the species level. In addition, one overall RLI that includes many different species groups may also be misleading if variation in RLI among species groups is not considered and if RLI values are not presented separately for each

group." (Authors)] Address: Juslén, A., Finnish Museum of Natural History, Zoology, FI-00014 University of Helsinki, Finland. E-mail: aino.juslen@helsinki.fi

13116. Karle-Fendt, A.; Stadelmann, H. (2013): Entwicklung der Libellenfauna eines regenerierenden Hochmoores nach Renaturierungsmaßnahmen (Odonata). *Libellula* 32(1/2): 1-30. (in German, with English summary) ["The Bavarian Felmer Moos (47°33'N, 10°15'E), a highly fragmented and disturbed bog, was regenerated stepwise since 1986. Starting in 2000, intensive monitoring of the odonate fauna was carried out in order to investigate possible relationships between the technical measures and the dynamics of the dragonfly species typical for moorland habitats and their populations. In total, 47 species of Odonata were recorded as imagines. By quantitative sampling of Anisoptera exuviae between 2001 and 2012 we tried to find a relation between selected species and different types of water bodies and their succession stages respectively. The results showed that the populations were strongly augmented by the increase of the number and size of water bodies as well as by the rising number of various succession stages. In years with unusually warm springs we observed conspicuous decline of the populations. From the results conclusions were drawn for the regeneration concept." (Authors)] Address: Karle-Fendt, A., Hofenerstr. 49, 87527 Sonthofen, Germany. E-mail: karle-fendt@t-online.de

13117. Kaunisto, K.M.; Viitaniemi, H.M.; Leder, E.H.; Suhonen, J. (2013): Association between host's genetic diversity and parasite burden in damselflies. *Journal of Evolutionary Biology* 26(8): 1784-1789. (in English) ["Recent research indicates that low genetic variation in individuals can increase susceptibility to parasite infection, yet evidence from natural invertebrate populations remains scarce. Here, we studied the relationship between genetic heterozygosity, measured as AFLP-based inbreeding coefficient f_{AFLP} , and gregarine parasite burden from eleven *Calopteryx splendens* populations. We found that in the studied populations, 5–92% of males were parasitized by endoparasitic gregarines (Apicomplexa: Actinocephalidae). Number of parasites ranged from none to 47 parasites per male, and parasites were highly aggregated in a few hosts. Mean individual f_{AFLP} did not differ between populations. Moreover, we found a positive association between individual's inbreeding coefficient and parasite burden. In other words, the more homozygous the individual, the more parasites it harbours. Thus, parasites are likely to pose strong selection pressure against inbreeding and homozygosity. Our results support the heterozygosity-fitness correlation hypothesis, which suggests the importance of heterozygosity for an individual's pathogen resistance." (Authors)] Address: Kaunisto, K.M., Section of Ecology, Department of Biology, University of Turku, FI-20014 Turku, Finland. E-mail: kkauni@utu.fi

13118. Kempster, C. (2013): The Abundance and biodiversity of arthropods in biofuel crops: Insects and arachnids in corn, switchgrass and native mixed grass prairie fields. M.Sc. thesis, Environmental Science at Rochester Institute of Technology, Rochester, New York 14623-5603: V + 80 pp. (in English) [Michigan, USA. "Concerns about fossil fuel prices and harmful effects have prompted research and investment in biofuel development. Biofuels have the potential to provide a stable fuel source that reduces carbon emissions. However, the ecological impacts of different crop choices should be examined. Arthropod communities in corn and switchgrass monocultures and mixed grass prairie polycultures were examined to determine the impact of the crop choice on the arthropod communities. Results show that, when compared to corn and switchgrass fields, mixed grass prairie fields had higher values for arthropod biomass, number, size, the number of orders present, the number of individuals in each order, and the overall arthropod diversity. Corn fields were dominated by Diptera (61.83%) and contained very low abundance of the other orders found in this study. Mixed grass prairie fields also showed Diptera as the most prevalent order (43.47%), followed by Hemiptera (17.89%) and Homoptera (13.65%), Hymenoptera (6.12%), Coleoptera (5.61%), with the others each less than 2.5%, Thysanoptera, Acari, Araneae, Lepidoptera, Orthoptera and Odonata. Switchgrass fields showed arthropod communities with diversity levels between that of corn and mixed grass prairies, with Diptera (39.33%), Coleoptera (17.91%) and Hemiptera (16.33%) dominating the community. Hymenoptera 5.53% and Lepidoptera, Odonata, Orthoptera, Thysanoptera, Acari and Araneae total 17%. Average arthropod abundance was 49.33 individuals and 98 milligrams in mixed grass prairie fields, 35.59 individuals and 49 milligrams in switchgrass fields, and only 23.93 individuals and 23 milligrams in corn fields. The average number of orders found was also correlated to field type, with 4.17 in corn fields, 5.53 in switchgrass fields, and 7.08 in mixed grass prairie fields. It is concluded that transitioning from planting fields with corn to growing mixed grass prairie, or switchgrass, for cellulosic ethanol and biodiesel production would increase the overall abundance and biodiversity of the arthropod community." (Author)] Address: Kempster, Caitlin. not stated

13119. Kerry, L. (2013): On the relationship between the Small Red Damselfly *Ceriatagrion tenellum* and the terrestrial mite *Leptus killingtoni*. J. Br. Dragonfly Society 29(2): 69-83. (in English) ["Larvae of the terrestrial mite, *Leptus killingtoni* were identified on a population of *Ceriatagrion tenellum* on the East Devon Pebblebed Heaths in 2011. An investigation was undertaken on the interaction between these species during the flight period in 2012. In total 567 individuals (382 males and 185 females) were caught and marked and the location of a total of 808 mites were noted (498 on first capture and a further 310 on recaptures). The highest numbers of *L.*

killingtoni were seen in the middle and driest period at the end of July. Only 19% of immature *C. tenellum* were found to have mites, whereas 36% of male and 49% of female mature damselflies had mites. Paired females were more likely to be infested than unpaired females and males (whether paired or not). Mites were recorded most often from areas more difficult to groom, with 26.6% recorded on the ventral surface of the thorax (and especially between the legs), 20.9% on the abdomen and 17.3% on the femur. Female melanogastrum were recaptured nearly twice as often as *typica*, despite similar numbers being marked." (Author)] Address: Kerry, L., Mount Pleasant, Stoneyford, Colaton Raleigh, Sidmouth, Devon. EX10 OHZ, UK

13120. Khelifa, R. (2013): Book review: Karjalainen S. & Hämäläinen M. 2013: *Demoiselle damselflies: Winged jewels of silvery streams*. Caloptera, Helsinki, 223 pp. (bilingual, Finnish and English). ISBN 978-952-93-1045-6. Price EUR 36.00 (hardcover). Eur. J. Entomol. 110(4): 703. (in English) [Book review.] Address: Khelifa, R., Faculty of Biological and Agricultural Sciences, Biology Department, University of Tizi Ouzou, Tizi Ouzou 15000, Algeria. E-mail: rassimkhalifa@gmail.com

13121. Kholmogorova, N.V. (2013): Amphibiotic insects of the Izh River. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 223-227. (in Russian, with English summary) ["Amphibiotic insects of the Izh River and the Izhevsk Reservoir have been studied. A significant reduction in the number of amphibionts in the regulated part of the river (the Izhevsk Reservoir, Russia), compared to the upper reaches of the river, and gradual recovery of their biodiversity with distance downstream from the dam has been revealed. A total of 183 species and higher taxa of amphibiotic insects have been recorded, including representatives of the following orders: Trichoptera, 35 species; Ephemeroptera, 24; Plecoptera, 1; Odonata, 16; Coleoptera, 51; Heteroptera, 18; Sialidae, 2; and Lepidoptera, 3." (Author) Only *Coenagrion hastulatum*, *Libellula depressa*, *Calopteryx splendens*, *Platycnemis pennipes*, and *Leucorrhinia pectoralis* were briefly mentioned in the text.] Address: Kholmogorova, N.V., Udmurt State University ul. Universitetskaya 1, Izhevsk, Udmurt Republic, 426034, Russia. E-mail: nadja-holm@mail.ru

13122. Kiauta, B. (2013): Obituary: Gordon Pritchard. *Odonatologica* 42(3): 257-261. (in English) ["A brief appreciation of the odonatological work of Dr G. Pritchard (1939-2012), Professor Emeritus of the University of Calgary (Canada), is followed by his odonatological bibliography (1963-2008). Among his main interests were, e.g., odonate prey capture and the structure and operation of the organs involved, the biology of *Argia vivida* in the Alberta (Canada) thermal springs, and various as-

pects of life history and behaviour. Other studies of importance include his work on the ecological classification of odonate mating systems, larval identification by means of cellulase acetate electrophoresis and egg development." (Author)] Address: Kiauta, B., P.O. Box 124, NL-5854 ZJ Bergen/LB, The Netherlands

13123. Kim, D.E.; Kim, J.M. (2013): Insect fauna of Ungok wetland in Gochang, Jeonbuk, Korea, designated as a wetland protection area at Ramsar Convention. *Journal of Environmental Science International* 22(9): 1141-1152. (in Korean, with English summary) [In 2011, a total of 149 species belonging to 11 orders and 57 families were recorded. Odonata were represented by 10.1% of the species (15 species): *Ceriagrion melanurum*, *Atrocalopteryx atrata*, *Calopteryx japonica*, *Orthetrum albistylum*, *O. japonicum*, *O. melania*, *Lyriothemis pachygastra*, *Crocothemis servilia mariannae*, *Sympetrum darwinianum*, *S. frequens*, *S. eroticum*, *S. infuscatum*, *S. kunckeli*, *S. parvulum*, and *Rhyothemis fuliginosa*.] Address: Kim, D.E., Ecosystem Assessment Division, National Institute of Environmental Research, Incheon 404-708, Korea. E-mail: un19781978@naver.com

13124. Kim, Y.H.; Kwona, D.H.; Lee, S.H. (2013): Biochemical characterization of two distinct acetylcholinesterases possessing almost identical catalytic activity in the damselfly *Vestalis gracilis*. *Journal of Asia-Pacific Entomology* 16(4): 465-471. (in English) ["Highlights: • Two acetylcholinesterases were identified in *Vestalis gracilis*. • Both VgAChE1 and VgAChE2 were almost equally active in *V. gracilis*. • Both VgAChE1 and VgAChE2 probably have similar neuronal functions. • VgAChEs were primarily associated with the membrane via the GPI anchor. • VgAChEs exhibited different sensitivities to insecticides. Most insects possess two different acetylcholinesterases (AChEs) (i.e., AChE1 and AChE2). It has been recently reported that only one AChE (either AChE1 or AChE2) has been selected for as the main synaptic enzyme and it varies with different insect lineages (Kim et al., 2012 and Kim and Lee, 2013). Interestingly, however, both AChE1 and AChE2 are almost equally active in a damselfly species, providing a unique example of the incomplete specialization of one AChE function after duplication, where, consequently, both AChE1 and AChE2 likely play a similar role in synaptic transmission. In this study, therefore, we investigated the tissue distribution patterns and the molecular and inhibitory properties of two AChEs (i.e., VgAChE1 and VgAChE2) from *V. gracilis* as a model species possessing two AChEs that are equally active. VgAChEs exhibited almost identical catalytic activity and were expressed in the central nervous system (CNS). The most predominant molecular form of both VgAChEs was a disulfide-bridged dimer, which is associated with the cell membrane via a glycosylphosphatidylinositol anchor. In an inhibition assay, however, VgAChE1 and VgAChE2 exhibited different sensitivities to organophosphate and carbamate insecticides de-

pending on the structure of the inhibitors. These findings suggest that both VgAChEs have neuronal functions. In addition, soluble monomeric and cleaved molecular forms were detected in both the CNS and peripheral nervous system tissues by an AChE2-specific antibody, implying that VgAChE2 probably shares both neuronal and non-neuronal physiological functions in *V. gracilis*. Our results support the notion that both VgAChEs, paralogous of each other, are involved in synaptic transmission, with VgAChE2 being in the early stage of acquiring non-neuronal functions." (Authors)] Address: Lee, S.H., Research Institute for Agriculture and Life Sciences, Seoul National University, 151-921, Republic of Korea. E-mail: shlee22@snu.ac.kr

13125. Koch, K.; Schneider, J.; Birkmann, L.; Weis, J.; Kotulla, A. (2013): Ein Vergleich zweier Großlibellenpopulationen (Odonata: Anisoptera) in Mainz. *Mainzer naturwissenschaftliches Archiv* 50: 321-331. (in German, with English summary) ["Over a period of two months we compared two populations of Anisoptera in the city of Mainz (Rhineland-Palatinate, Germany) by applying three methods: exuviae sampling, adult screening and mark-recapture. The areas under investigation comprised parts of the nature reserve Laubenheimer-Bodenheimer Ried as well as an assemblage of artificial ponds on the campus of the University of Mainz. The two habitats differed in size and structure. Nevertheless, partly the differences between the two populations in number of species and number of specimen, in sex ration, recapture rate, species diversity and the evenness were smaller than expected or even contrary to our expectations (species diversity of the exuviae). The cause of this observation might be that we worked less intensively on the larger area of Laubenheimer. However, we interpret our observation as a hint that even small artificial ponds can offer an adequate habitat for various Anisoptera." (Authors)] Address: Koch, Kamilla, Abteilung Ökologie, Institut für Zoologie, Johannes-Gutenberg-Universität Mainz, Johann-Joachim-Becherweg 13, 55128 Mainz, Germany. E-Mail: kochka@uni-mainz.de

13126. Krieg-Jacquier, R. (2013): In memoriam Daniel Grand. *Martinia* 29(1): 75-76. (in French) [France, personal obituary for one of the most expressed and productive French odonatologists of the past decades.] Address: Krieg-Jacquier, R., 18 rue de la Maconne, 73000 Barbezaz, France. E-mail: regis.krieg.jacquier@gmail.com

13127. Kulijer, D.; Zawal, A.; Baker, R.A. (2013): Further studies on the Odonata from Bosnia & Herzegovina and their mite parasites. *J. Br. Dragonfly Society* 29(2): 97-106. (in English) ["A brief review of the present knowledge of the Odonata from Bosnia and Herzegovina is followed by further work on their mite parasites; in particular their identification, distribution and host records. A total of 301 mites were mounted, counted and identified, most of them to species. *Arrenurus bicuspidator*, *A. bruzelii*, *A. cuspidator*, *A. cuspidifer*, *A. maculator* and *A.*

papillator were identified on 13 odonate host species, including three Anisoptera: *Aeshna isosceles*, *Sympetrum flaveolum* and *Anax imperator*. The Zygoptera were *Ischnura pumilio*, *I. elegans*, *Coenagrion puella*, *C. pulchellum*, *C. scitulum*, *Pyrrhosoma nymphula*, *Enallagma cyathigerum*, *Erythromma najas*, *Lestes dryas* and *Platycnemis pennipes*. Size measurements indicate that larval mites of the same species are much larger on anisopterans than on zygopterans and reasons for this are discussed." (Authors)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaj od Bosne 3, 71000 Sarajevo, Bosnia & Herzegovina

13128. La Porta, G.; Dell'Otto, A.; Speziale, A.; Goretti, E.; Rebori, M.; Piersanti, S.; Gaino, E. (2013): Odonata biodiversity in some protected areas of Umbria, central Italy. *Odonatologica* 42(2): 125-137. (in English) ["Odonate assemblages of 4 wetlands included in the Biotopes Inventory of Italy (Natura 2000 project) have been investigated. A total of 36 species has been recorded and no species-area relationship was found. The richness observed is about 60-90% of the potential richness of the biotopes. The occurrence of *Trithemis annulata*, previously unknown from the Umbria region, and new findings for the biotopes are reported. The odonate flight period spanned from early April to the end of November. Diversity and evenness profiles have shown more diverse communities at sites with a greater habitat heterogeneity and multivariate dispersion analysis has revealed higher homogeneity for Zygoptera than for Anisoptera." (Authors)] Address: La Porta, G., Dipartimento di Biologia Cellulare e Ambientale, Sezione di Biologia Animale e Ecologia, Università degli Studi di Perugia, 06123 Perugia, Italy. E-mail: gianandrea.laporta@unipg.it

13129. Lambret, P.; Boudot, J.-P. (2013): *Hemianax ephippiger* (Burmeister, 1839) (Odonata, Anisoptera: Aeshnidae): présentation générale. *Martinia* Hors-série, *Hemianax ephippiger* - migration 2011, mai 2013: 13-27. (in French, with English summary) ["The life history and behaviour of *H. ephippiger* are summarized in order to better understand the recent migratory activity of the species observed in Europe. The key criteria for a fast identification of the adults are given. *H. ephippiger* ranges from the South of Africa to the North of Europe and to India. It is autochthonous in the tropical zone and the Mediterranean where the larvae grow rapidly and preferentially in shallow waters, either permanent or temporary. The species is an obligate migrant which leaves early its native habitat, at the post-teneral stage. Following mass emergences, mass migrations bring the species to the north and the west and the latter has been observed as far as Iceland, Central Asia, French Guyana and the West-Indies. Such long-distance migrations are accompanied by successful local breeding and appear to be mostly passive, being allowed for by strong winds blowing into the same direction for several days. In Africa, migrations are initiated mostly from September to November, taking advantage of the mass

emergences launched by the rainfalls of the summer monsoon. Migrations occur first during the winter along the Atlantic African coast and are accompanied by local breeding and production of a new generation. They continue in Western Europe until the spring. More to the east, inland swarms fail to cross the Atlas range during the winter and accumulate in the Sahara before being able to start again northwards in spring. These two Coastal and inland migration pathways are accompanied by successful breeding in suitable habitats in the north of Africa, Mediterranean Europe and sometimes Central Europe. Similar migrations with successful local breeding are also known from the Arabian Peninsula, both along the coasts and inland. They seem to reach Anatolia and Central and Eastern Europe. Central Asian records could result from Indo-Iranian migrations. The secondary generations appearing north of the Saharan/Arabian belt may lead to new mass migrations in summer and autumn in Southern Europe. Due to the obligate migratory behaviour of the species, the European individuals leave their native habitats for unknown destinations; a return to Africa can be advocated but remains highly hypothetical. Egg laying in Europe in autumn is therefore very rare and in this case the European winter conditions make a larval development highly improbable, except in its southernmost parts of the continent. Other noteworthy behaviours of the species are reminded." (Authors)] Address: Lambret, P., Le Trident B2 n°55, rue de la Sansouïre, F-13310 St-Martin-de-Crau, France. E-mail: philambret@hotmail.com

13130. Lambret, P. (2013): De l'émergence et de la coloration chez *Lestes macrostigma* (Eversmann, 1836) (Odonata, Anisoptera: Lestidae). *Martinia* 29(1): 53-64. (in French, with English summary) ["Both the emergence and the colour pattern all along the imaginal life of *L. macrostigma* were studied from 2009 to 2013 in the national natural reserve of the Marais du Vigueirat. Between the break of the larval skin and the moment when the abdomen reaches its final length, the emergence lasted about two hours. Emergences mainly took place in early morning and the exuviae were found around 30 cm above the water table. The sex-ratio at emergence was close to 1 and both sexes emerged synchronously. The coloration of the imagines changed rapidly during the first days. That of the day of the emergence and/or the day after was unique, depending both on the time of emergence as well as the weather, so that it is possible to know if an individual has emerged the day or the day before its observation. The pruinosity seems to cover a maximal surface during the mating period and then decreases, whereas the abdominal tergites darken. The record of tenerals appears to be sufficient to show the autochthony of a population. Coloration patterns can help to identify local populations and their breeding localities." (Author)] Address: Lambret, P., Le Trident B2 n°55, rue de la Sansouïre, F-13310 Saint-Martin-de-Crau, France. E-mail: philambret@hotmail.com

13131. Lambret, P.; Gully, F. (2013): Nouveau cas d'aile de Zygoptère transpercée par une plante: *Ceriagrion tenellum* (Villers, 1789) (Odonata, Zygoptera: Coenagrionidae). *Martinia* 29(1): 46. (in French) [*C. tenellum* was trapped at the spine of a leaf of *Cirsium arvense* at 27 juin 2007, lake Roud ar Roc'h (Lannion, Department of Côtes-d'Armor, France).] Address: Lambret, P., Cabane de Ligagneau, Route de l'Etoumeau 13104 Mas-Thibert, France. Email: philambret@hotmail.com

13132. Lambret, P.; Deschamps, C. (2013): Bilan de la migration d'*Hemianax ephippiger* (Burmeister, 1839) en France en 2011 (Odonata, Anisoptera: Aeshnidae). *Martinia* Hors-série, *Hemianax ephippiger* - migration 2011, mai 2013: 29-46-appendix: 76-96. (in French, with English summary) ["The migration waves of *H. ephippiger* observed in Western Europe in 2011 was so huge that it remains unparalleled in human mind in the region. Basing on a large network of 177 volunteers, we gathered 560 data in France, distributed in 57 departments and covering 18 regions. Most of data were recorded from April to June, corresponding to a first immigration wave. A second wave ranged from July to November, with locally swarms of thousands individuals coming from the south. Immature imagoes were encountered throughout the presence of the species in the country, but some individuals were already very old during the spring immigration. Given the general lack of known significant winter larval development in Europe, spring adults originated most likely from Africa. They bred in France in various standing waters (ponds, gravel pits with well-developed vegetation, lakes...). Imagoes recorded in summer and autumn were in part the offspring of the spring breeders and in part new southern incomers. A wide coastal Atlantic pathway was especially used for this 2011 migration, although the Rhône river axis was more usual in previous migrations. For this reason, and because of its dramatic abundance, *H. ephippiger* is new to 31 French departments. The affinity of *H. ephippiger* for lowlands is obvious: 83.6 % of the observations referred to localities ranging from 0 to 200 m a.s.l. However, *H. ephippiger* was seen at 1428 m a.s.l and bred successfully still at 640 m a.s.l, the latter elevation being to our knowledge the highest known for the species in Europe. Few other noteworthy records about the behaviour of the individuals observed are given." (Authors)] Address: Lambret, P., Cabane de Ligagneau, Route de l'Etoumeau 13104 Mas-Thibert, France. Email: philambret@hotmail.com

13133. Li, Y.-J.; Nel, A.; Ren, D.; Pang, H. (2013): A new damselfly dragonfly from the Mesozoic of China with a hook-like male anal angle (Odonata: Isophlebioptera: Campteroptelebiidae). *Journal of Natural History* 47(29-30): 1953-1958. (in English) ["A new genus and species of campteroptelebiid dragonfly, *Angustiphlebia mirabilis* gen. nov. et sp. nov., is described from the Jiulongshan Formation in China. It has some remarkable venational structures, i.e. a hypertrophy of the male hind wing anal

angle, a quite long gaff, and a secondary branch of the anal anterior near subdiscoidal cell in hind wing, supporting the hypothesis of a sister-group relationship with the genus *Oreophlebia*. These new data will help to solve the phylogenetic relationships within the Campteroptelebiidae." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

13134. Lim, P.-E.; Tan, J.; Eamsobhana, P.; Yong, H.S. (2013): Distinct genetic clades of Malaysian Copera damselflies and the phylogeny of platycnemine subfamilies. *Scientific Reports* 3, Article number: 2977: 7 pp. (in English) ["The phylogenetic relationships of some taxa in the Platycnemidinae at the species and generic levels have been investigated. Phylogenetic trees were generated from both individual mitochondrial encoded COI, COII, 16S rDNA and nuclear encoded 28S rDNA and also combined sequences; these data indicate that the component taxa of the genus *Copera* belong to two distinct genetic clades – the marginipes group and the annulata group. There was no distinct genetic difference between the red-legged and yellow-legged morphs of *C. vittata*. Molecular data showed that the annulata group is considered a member of the genus *Platycnemis*, as originally proposed. The genus *Coeliccia*, a member of the subfamily Calicnemiinae (Platycnemididae), is not grouped with the Platycnemidinae. The Disparoneurinae of the 'Protoneturidae' showed a closer relationship to the Platycnemidinae than the Calicnemiinae. The dataset supports the placement of the Disparoneurinae as a subfamily of the Platycnemididae. This resolves the monophyly of Platycnemididae." (Authors)] Address: Lim, P.-E., Institute of Biological Sciences, University of Malaya, 50603 Kuala Lumpur, Malaysia [2] Institute of Ocean and Earth Sciences, University of Malaya, 50603 Kuala Lumpur, Malaysia.

13135. Liu, G.; Li, C.; Dong, H. (2013): Does dragonfly's abdomen flexion help with fast turning maneuvers? *Bulletin of the American Physical Society* 58(18): o.p. (in English) ["Dragonflies are able to achieve fast turning maneuvers during take-off flights. Both asymmetric wing flapping and abdomen flexion have been observed during the fast turning. It's widely thought that the asymmetric wing beats are responsible of producing the aerodynamic moment needed for the body rotation. However, the dynamic effect of the abdomen flexion is not clear yet. In this study, an integrated experimental and computational approach is used to study the underlying dynamic effect of dragonfly abdomen flexion. It's found that dragonfly abdomen tended to bend towards the same side as the body reorienting to. Quantitative analysis have shown that during take-off turning maneuver the abdomen flexion can modulate the arm of force by changing the position of the centre of mass relative to the thorax. As a result, roll and yaw moments produced by the wing flapping can be enhanced." (Au-

thors)] Address: Liu, G., Dept. of Mechanical and Aerospace Engineering, University of Virginia, USA

13136. Louboutin, B.; Jaulin, S.; Houard, X. (2013): Premières mentions pour *Leucorrhinia dubia* (Vander Linden, 1825) et *Coenagrion hastulatum* (Charpentier, 1825) dans l'Aude et observation d'une femelle andromorphe de *L. dubia* (Odonata: Libellulidae, Coenagrionidae). *Martinia* 29(1): 65-74. (in French, with English summary) ["A new breeding locality for *L. dubia* and *C. hastulatum* was discovered during an entomological survey conducted for the Office national des forêts (ONF) by the Office pour les insectes et leur environnement (Opie), at a small peaty pond in the La Fajolle forest (Aude department, France). The station is located in a mountainous area under continental bioclimatic influences. Although this area has been poorly prospected in the past, it appears potentially very rich and original from an entomological point of view. Detailed information is given on the habitat and the local Odonatological assemblage, and conservation prospects are mentioned. Finally, the capture of an andromorphic female of *L. dubia* at the site is emphasized." (Authors)] Address: Louboutin, B., Office pour les insectes et leur environnement (Opie), antenne du Languedoc-Roussillon, CBGP Campus de Baillarget - 34988 Monferrier-sur-Lez Cedex, France. E-mail: bastien.louboutin@insectes.org

13137. Manger, R.; Martens, A. (2013): First records of *Forcipomyia paludis* (Diptera: Ceratopogonidae), an ectoparasite of dragonfly adults, in The Netherlands. *Entomologische Berichten* 73(5): 182-184. (in English, with Dutch summary) ["On June 7th 2008, *Leucorrhinia pectoralis* individuals having the biting midge *Forcipomyia* (*Pterobosca*) *paludis* on their wings were photographed in National Park Weerribben-Wieden (The Netherlands). This ceratopogonid or biting midge is a temporary ectoparasite of dragonfly adults and the only ceratopogonid species known to specifically feed on this insect group in Europe. The photographs are the first evidence of the presence of *F. paludis* in The Netherlands, but reference material still has to be collected and stored. *Forcipomyia paludis* is already known from Ireland, England, France, Germany, Switzerland, Austria, Sweden, Poland, Italy and Croatia." (Authors) Five biting midges on a female *Crocothemis erythraea*, 05.vii.2008, National Park Weerribben-Wieden were documented.] Address: Manger, R., MangerEco, Stoepveldsingel 55, 9403 SM Assen, The Netherlands. E-mail: rene@mangereco.nl

13138. Manger, R. (2013): De Libellen von Kefalonia. Privately published. www.mangereco.nl: 5 pp. (in Dutch) [In endApril/May 2013, five localities on the island Kefalonia (Greece) were studied for their Odonata fauna. A total of 16 species including *Coenagrion pulchellum* and *C. scitulum* found were recorded.] Address: Manger, R., MangerEco, Stoepveldsingel 55, 9403 SM Assen, The Netherlands. E-mail: rene@mangereco.nl

13139. Marinov, M.; Chinn, W.; Edwards, E.; Patrick, B.; Patrick, H. (2013): A revised and updated Odonata checklist of Samoa (Insecta: Odonata). *Faunistic Studies in South-East Asian and Pacific Island Odonata* 5: 1-21. (in English) ["Odonata records of the Samoan Archipelago are updated and an updated checklist provided. It is part of an ongoing assessment of the fauna, taxonomy and distribution of the Pacific island dragonflies. The checklist follows recent reviews published/prepared about the Solomon Islands, New Caledonia, Fiji and Kingdom of Tonga. This study draws on recent dragonfly records following general insect surveys spanning 2008-2012 funded by Critical Ecosystem Partnership Fund (CEPF) via Conservation International (CI) to the authors and to Secretariat Pacific Regional Environment Program (SPREP) and also by funding from Japan International Cooperation Agency (JICA). Other unpublished data from Samoan Archipelago and Niue are included as well. All, but one, of the newly collected Odonata species are widespread within the Pacific region. *Hemicordulia cupricolor* is the only species from the recent collections which is endemic to Samoa, previously reported for Savai'i and Upolu Islands. It has never been confirmed since its original description in 1927. The new study shows the species as an inhabitant of high altitude zones of Savai'i. It is recommended inland areas of Savai'i and other islands within the Samoan Archipelago should be targeted in further field studies." (Authors) The study also discusses the knowledge on the taxonomic status between *Anaciaeschna jaspidea* and *A. melanostoma*.] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz

13140. Maxwell, J. (2013): Parametric investigations into fluid-structure interactions in hovering flapping flight. M.Sc. Thesis, Department of Mechanical Engineering, University of Maryland, College Park: XI + 128 pp. (in English) ["A parametric investigation into flapping flight is presented. For a Reynolds number of 75, harmonically forced flapping dynamics is studied. A wing section is modelled as two rigid links connected by a hinge with a torsion spring-damper combination. This section is wrapped in a smooth aerodynamic surface for immersion in the fluid domain. An immersed boundary method is employed on a two-dimensional structured Cartesian grid to solve the incompressible form of the Navier-Stokes equations for low Reynolds numbers by using a finite difference method. Fully coupled fluidstructure interactions are considered. Performance metrics, which include cycle-averaged lift, drag, power, and their ratios, are used to characterize the effects of different parameters and kinematics. Principal components of flow-field structures are quantified, and the system's response is correlated to performance. The thesis findings can serve as a basis to understand and identify flapping frequencies that provide high performance." (Author) Figure 3.3 presents a Principal component analysis of a dragonfly picture (*Anax junius*).] Address: not stated

13141. McLamb, S. (2013): Shropshire (VC40) Dragonfly Newsletter. Shropshire (VC40) Dragonfly Newsletter. Spring 2013: 7 pp. (in English) [Content: Flight Season 2012; First and Last Recorded Sightings 2012; Species: A total of 27 species were recorded in 2012 comprising 16 dragonfly and 11 damselfly species; New / Rediscovered Populations: *Sympetrum fonscolombii*, *Ischnura pumilio*; Missing In Action...: The most notable 'missing species' of 2012 was the Keeled Skimmer (*Orthetrum coerulescens*); Coming Soon to a Pond Near You?: *Erythromma viridulum*; BDS National Atlas; Shropshire Dragonflies- the next project!] Address: McLamb, Sue, mclamb1@btinternet.com.

13142. Medvedev, A.F.; Kosterin, O.E.; Malikova, E.I.; Schneider, W. (2013): Descriptions of *Somatochlora exuberata* Bartenev, *Leucorrhinia intermedia* Bartenev and *Sympetrum vulgatum grandis* Bartenev, the fate of A.N. Bartenev's type specimens and designation of the lectotype of *L. intermedia* (Anisoptera: Corduliidae, Libellulidae). *Odonatologica* 42(3): 211-228. (in English) ["Descriptions of *S. exuberata*, *L. intermedia* and *S. vulgatum grandis* were published simultaneously but 4 times in 2 languages and in 3 years, 1910, 1911 and 1912. One of the 1910 publications was fragmented and published in 4 subsequent journal issues, involving confusion with the order of parts and the paper title, but it is this publication which has priority. The date of publication of the above mentioned names is Oct. 1, 1910. Hence *Somatochlora exuberata* Bartenev, 1910 has priority over *Somatochlora japonica* Matsumura, 1911. Syntypes in Bartenev's own collections were most probably lost, as were most of his types, but some may remain in European collections as received by foreign odonatologists from Bartenev in exchange. A male syntype of *L. intermedia* from Ris' collection, kept in Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt/Main, Germany (FMS), is designated as the lectotype of this taxon." (Authors)] Address: Medvedev, A.F., Department of Hydrobiology, Faculty of Biology, Moscow State University, Leninskie Gory 1-12, Moscow, 119991, Russia

13143. Mikolajewski, D.J.; Wohlfahrt, B.; Joop, G.; Beckerman, A.P. (2013): Sexual size dimorphism and the integration of phenotypically plastic traits. *Ecological Entomology* 38(4): 418-428. (in English) ["Sexual size dimorphism (SSD) reflects adaptive differences in male and female reproductive roles. Understanding the mechanisms generating SSD is of broad ecological and evolutionary interest, because body size is closely linked to fitness. Sex-specific phenotypic plasticity in growth as a response to environmental conditions represents one of the major sources mediating variation in SSD. We investigated phenotypic plasticity associated with predation and seasonal time constraints in development as a source of SSD in *Coenagrion puella*. We complemented this with an analysis of trait correlations (integration) of body size with behavioural, physiological

and life-history traits to investigate how dimorphism manifests. Our results reveal that: (i) plasticity in SSD is mediated by environmental variation; and (ii) environment-dependent, sex-specific changes in the association of body size with growth rate and fat storage mediated changes in the offset of SSD. Our results highlight sex-specific trait responses to the environment channel manifestation of SSD. These findings may be crucial to understanding large parts of the widely documented intraspecific variation of SSD." (Authors)] Address: Mikolajewski, D.J., Laboratory of Aquatic Ecology and Evolutionary Biology, Katholieke Universiteit Leuven, Charles Debériotstraat 32, 3000 Leuven, Belgium. E-mail: d.j.mikolajewski@sheffield.ac.uk

13144. Miłaczewska, E. (2013): 10th National Symposium of the Odonatological Section of Polish Entomological Society – Izabelin, June 28–30, 2013] 77. *Odonatrix* 9(2): 77-80. (in Polish, with English summary) [The author discusses the symposium organized in June 2013 in the Kampinoski National Park (central Poland). One scientific session and a several field sessions took place. During the field sessions, at 16 sites 34 dragonfly species were found with one regional new species (*Erythromma viridulum*) which makes together 53 species known in this area. Moreover, the recently discovered population of *Nehalennia speciosa* at the transitional peat bog Długie Bagno was studied with respect to its numbers (at least several thousands of specimens) and the characteristic of its habitat." (Author)] Address: Miłaczewska, Ewa, ul. Cichociemnych 3 m. 13, 03-984 Warszawa, Poland. E-mail: ewa.milaczewska@gmail.com

13145. Mitra, A. (2013): Cinderella's new shoes – how and why insects remodel their bodies between life stages. *Current Science* 104(8): 1-9. (in English) ["Metamorphosis in insects is a remarkable phenomenon where the larva undergoes a striking morphological reorganization to give rise to the adult. Over the years, various physiological factors and pathways that govern metamorphosis have been discovered, and at the same time, some understanding about the origins of this phenomenon has also emerged. This review summarizes the current state of knowledge of both the mechanisms underlying metamorphosis, as well as the theories put forward to explain its evolution." (Author) The paper includes references to Odonata.] Address: Mitra, A., Department of Biology, Washington University in St Louis, Monsanto 411, Campus Box 1137, One Brookings Drive, St. Louis, MO 63130-4899, USA. E-mail: mitra.aniruddha@gmail.com

13146. Mittmann, K. (2013): Interessante Libellen am Silbersee in Bobenheim-Roxheim. *Pollichia Kurier* 29(4): 32. (in German) [Rheinland-Pfalz, Germany; the focus of the anecdotal observations was set on *Anax parthenope* and *Crocothemis erythraea*] Address: not stated

- 13147.** Monster, L. (2013): Vleugels van libel zijn natuurraadsel. Kunst- en vliegwerk. *Landleven* 18(5): 54-57. (in Dutch) [This is a popular account on dragonflies in a Dutch journal for garden lovers.] Address: Landleven, Postbus 4, 7000 BA Doetinchen, The Netherlands. E-mail: redactie@redactielandleven.nl
- 13148.** Moreno-Benítez, J.M.; Ripoll Rodríguez, J.; Toro, F.; Winter, P. (2013): Contribución al conocimiento de los odonatos (Odonata) de la provincia de Málaga (España). *Boletín de la Red de Observadores de Libélulas en Andalucía* 3: 77-107. (in Spanish, with English summary) ["Dragonflies (Odonata) records from the province of Malaga, Spain, during the period 2005-2012, are reported. The available literature is reviewed and the provincial catalogue is updated. Currently 56 species are known within Malaga." (Authors)] Address: E-mail: lorquini@gmail.com
- 13149.** Ndueze, O.U.; Noutcha, M.A.E.; Umeozor, O.C.; Okiwelu, S.N. (2013): Arthropods associated with wildlife carcasses in Lowland Rainforest, Rivers State, Nigeria. *European Journal of Experimental Biology* 3(5): 111-114. (in English) [Odonata belong to the arthropods associated with the carcass of the Mona monkey, *Cercopithecus mona*. "Odonata were probably transients, with no discernible impact on the decomposition process." (Authors)] Address: Ndueze, O.U., Entomology & Pest Management Unit, Department of Animal and Environmental Biology, University of Port Harcourt, Nigeria
- 13150.** Negi, R.K.; Mangain, S. (2013): Seasonal variation of benthic macro invertebrates from Tons River of Garhwal Himalaya Uttarakhand. *Pakistan Journal of Biological Sciences* 16: 1510-1516. (in English) ["Present investigation was carried out to assess the seasonal variation of benthic macro-invertebrates from the Tons river, a tributary of Yamuna River in Garhwal Himalaya, Uttarakhand during December, 2007 to November, 2009. The seasonal benthic diversity was correlated with various physic-chemical parameters which documented that the macrobenthic diversity is mostly regulated by the dissolved oxygen in the water while temperature and free CO₂ were found to be inversely correlated with the benthic fauna. Maximum diversity of benthos was reported at the upstream site ('H' 0.204) during the winter season while it was recorded minimum during the rainy season at all the sites. Maximum diversity is reported during the winter season at all the sites. The benthic fauna is represented by three phylum, 4 classes and 10 orders with Insecta emerging as the most dominant class. Maximum genera were reported from mid-stream site as it acts as ecotone between upstream and downstream." (Authors) The list of taxa includes Odonata at the genus level. Some of them were probably misidentified.] Address: Negi, R.K., Dept of Zoology and Environmental Sciences, Gurukula Kangri University, Haridwar UK-249404, India
- 13151.** Nel, A.; Krzeminski, W.; Szewo, J. (2013): *Elektroephaea* gen.n., the oldest representative of the modern Epallaginae from Eocene Baltic amber (Odonata: Zygoptera: Epallagidae). *Insect Systematics & Evolution* 44(2): 129-140. (in English) ["*Elektroephaea flecki* gen.n. sp.n., the oldest representative of the modern damselfly subfamily Epallaginae, is described from the Middle Eocene Baltic amber. This study confirms a Palaeocene age (or older) for the Epallagidae, previously supported by the presence of representatives of Eodichrominae from the Palaeocene-Eocene Mo-clay Formation of Denmark and from Baltic amber." (Autors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr
- 13152.** Netz, H. (2013): Paarung in der Libellen-Disco. Neuer Lebensraum für die Grüne Keiljungfer. *Naturschutz heute* 3/13: 14-15. (in German) [The paper reports on current attempts to improve habitats of *Ophiogomphus cecilia* in the region Fränkisches Becken, Bayern, Germany. The project is EU founded. For more details see: <http://www.lbv.de/unsere-arbeit/life-naturprojekte/life-projekt-keiljungfer/tagebuch.html>] Address: not stated
- 13153.** Nordström, K. (2013): Robust prey detection in a small nervous system. *PNAS* 110(2): 389-390. (in English) ["Vision plays a huge role for us humans, as well as for many other animals. If you have ever tried to walk in a straight line with your eyes closed, you know how important self-generated optic flow is for maintaining a straight trajectory. Besides such widefield optic flow cues, we can also visualize the motion of objects that move independently of the remaining visual surround. Such targets may represent the motion of a ball during a game of cricket, tennis, or baseball (take your pick, depending on your cultural heritage and location in the world). Despite the fact that you are moving, and thereby generating optic flow across your visual field, you can still visualize and identify the independent trajectory of the ball. Motion vision is not only important for human sports stars (1), but also for insects who use these cues for tasks such as maintaining a straight flight trajectory (2), avoiding colliding with approaching tree trunks, and, importantly, identifying targets such as potential prey (3), the subject of a paper published in PNAS (4). Studying the neurophysiology underlying target detection in human subjects, and other vertebrates, quickly becomes quite complicated. Besides the relative inaccessibility of the vertebrate visual cortex, there is the additional inconvenient complication of the eyes being able to move independently of the head (5). In insects, however, the eyes are fixed to the head's exoskeleton, which means we know what the insect looks at if we know what direction the head is facing. Intriguingly, however, despite vertebrates and insects being separated by huge evolutionary distances (6), and being equipped with completely different eyes (7), mo-

tion vision is coded in remarkably similar ways in the vertebrate visual cortex and the insect brain (8). We can therefore, somewhat surprisingly, use the insect visual system to understand ... Dragonflies have compound eyes, which limit the spatial resolution severely compared with the single lens eyes of vertebrates (7). In a compound eye, the maximum resolution is given by the spacing of the individual lenses. Dragonflies, and many other insects that depend on successful target detection, have therefore evolved areas in the compound eye with increased spatial resolution, called acute zones (16). The dragonfly's acute zone is located in the dorso-frontal visual field, in the same area as Gonzalez-Bellido et al. describe the peak TSDN sensitivity (4). This is also the part of the visual field where STMD receptive fields tend to cluster (17), and where dragonflies position their prey during target pursuit (3, 9). Taken together, this highlights the coevolution of optics, neural machinery and behaviour for optimizing successful target pursuit despite the limited hardware—in the form of poor and a small brain—provided." (Author)] Address: Nordström, Karin, Department of Neuroscience, Uppsala University, SE-751 24 Uppsala, Sweden. E-mail: karin.nordstrom@neuro.uu.se.

13154. Noskovič, J.; Rakovská, A.; Porhajašová, J.; Babošová, M.; Čeryová, T. (2013): Biological evaluation of the water quality in the water flow in the southwestern part of the Slovak Republic. *Research Journal of Agricultural Science* 45(2): 171-181. (in English) ["Assessment of the surface water quality in the whole Europe affected the Directive 2000/60/EC of the waters, according to which is the evaluation method of surface waters based on the the evaluation of the ecological and chemical status of the surface water bodies. For environmental assessment are key information on the qualitative and quantitative composition of communities aquatic organisms. On this basis, we collected 28 samples of water flow at 7 sites Caradice brook during year 2009, in the southwestern part of the Slovak Republic. In the water flow Ěaradice stream, which spring in the mountain of Pohronský Inovec and is righthand tributary of the Hron River, thus we obtained 30 776 individuals macrozoobenthos. By determining the mentioned number of the individuals, we found the presence of 146 kinds that were included into 16 systematic groups: Turbellaria, Oligochaeta, Hirudinea, Gastropoda, Bivalvia, Isopoda, Amphipoda, Ephemeroptera, Plecoptera, Odonata, Heteroptera, Megaloptera, Coleoptera, Trichoptera, Diptera, Chironomidae. From these systematic groups the largest number of representatives of the systematic group Amphipoda had regularly occurred at all sampling sites. Most widespread type of this systematic group and also the most numerous of all species of macroinvertebrate found in the waters of the Caradice stream was *Gammarus fossarum*, which we regard to its mass occurrence (28%) identified as eu-dominant species. The smallest numerous individuals were represented systematic group Megaloptera that

monitored the water flow occurred infrequently, so we included them to subprecedent species. The greatest constancy, i.e. stability of in the community had species *Eiseniella tetraedra*, *Gammarus fossarum*, *Pisidium obtusale*, which we evaluated as the species always present. The species of *Cloeon dipterum*, *Erpobdella octocolata*, *Hydropsyche angustipennis* was species the almost always present. The greatest frequency had family Chironomidae (100%). The Saprobic indices in the reporting period ranged from 1.7151 to 2.2399 on the basis of what we categorized the water from Caradice stream to the level of beta - mesosaprobity. The average annual value of the saprobic index of benthic invertebrates of Caradice brook (SAS=2,00) does not meet the requirements of the indicator of water quality - Part E "biological and microbiological parameters, which are set out in Government Regulation No. 269/2010 Coll. (SAS = 1,3)." (Authors)] Address: Noskovič, J., Dept of Environmental Sciences and Zoology, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra – Slovakia. E-mail: Jaroslav.Noskovic@uniag.sk

13155. Obasi, K.O.; Okechukwu, R.I.; Nwokocha, N.J. (2013): Species diversity and evenness of some organisms in Usumani and Imo Rivers, Abia State, Nigeria. *International Journal of Science and Technology* 2(9): 690-695. (in English) ["Shannon Weiner's diversity index (H), and Pileos's evenness index (J) or Equitability, were adopted in establishing the diversity and evenness of the species respectively. Results of the study show that the highest diversity index of 2.0312 and equitability (evenness) index of 0.8471 were recorded at Usumani river. At Imo river Uzuaku, diversity index of 0.6560 and equitability of 0.4076 were recorded. In addition, Imo river Owerrinta had diversity index of 0.7407 and equitability of 0.4134." (Authors) The material includes "Aeshna sp. dragonfly larvae".] Address: Obasi, K.O., Department of Biological Science, School of Science Federal University of Technology; Owerri, Nigeria.

13156. Obregon-Romero, R.; Cano-Villegas, J.; Tamajon-Gomez, R.; Lopez Tirado, J. (2013): Primeras citas de *Trithemis kirbyi* Selys, 1891 (Odonata, Libellulidae) en las provincias de Ciudad Real y Huelva, y nuevas aportaciones para la provincia de Badajoz (España). *Boletín de la SAE* 22: 88-93. (in Spanish, with English summary) [T kirbyi was recorded, for the first time, from Ciudad Real (first record from Castilla La Mancha) and Huelva (Andalusia). The presence in the province of Badajoz (Extremadura) was also confirmed. These records document the range extension of the species towards inland habitats and the Atlantic coast.] Address: Obregón-Romero, R., Dpto. Botánica, Ecología y Fisiología Vegetal. Área de Ecología. Campus de Rabanales. Universidad de Córdoba, Spain. E-mail: ra-faobregonr@gmail.com

13157. Olomukoro, J.O.; Osamuyiamen, I.M.; Dirisu, A.-R. (2013): Ecological survey of macrobenthic inver-

tebrates of selected ponds in Agbede flood plain, southern Nigeria. *Journal of Biology, Agriculture and Healthcare* 3(1): 23-29. (in English) ["Ecological study on three selected ponds of Agbede flood plain was fortnightly carried out between January and June, 2007 to assess and document the macrobenthic fauna composition, abundance and distribution, as well as the physicochemical status of some parameters in water which were collected and analyzed monthly. Benthos was sampled for using the Ekman Grab operated by hand in shallow waters together with the Kick sampling method. Among the eight physicochemical characteristics investigated, pH fluctuated from slightly acidic to slightly alkaline with range of values (5.90 – 7.35) at the studied stations. Significant difference ($P < 0.05$) was observed for biological oxygen demand (BOD5) and dissolved oxygen (DO). A total of ten (10) groups comprising macroinvertebrates taxa with one thousand and thirty one (1,031) individuals were recorded in this study. Most dominant groups were represented by Coleopterans (35.79% and 374 individuals), Hemiptera (20.19% and 211 individuals) and Dipterans (18.47% and 193 individuals). Evenness was highest in pond 1 (0.4973). The highest number of macroinvertebrates were collected from pond 2 (416) where no human activities occurred and however implied that human activities can rapidly alter any previously stable communities of aquatic environments." (Authors) Identification of taxa is obscure because the checklist includes Palaearctic and Nearctic taxa.] Address: Olumukoro, J.O., Department Of Animal And Environmental Biology, Faculty Of Life Sciences, University Of Benin, Benin City, P.M.B. 1154, Nigeria. E-mail: olomsjo@yahoo.com

13158. Orwa, P.O.; Raburu, P.O.; Kipkemboi, J.; Rongoei, P.; Owuor, O. (2013): Use of macroinvertebrate assemblage to assess the ecological integrity of Nyando Wetlands, Kenya. *Journal of Ecology and the Natural Environment* 587: 152-164. (in English) ["This study aimed to investigate changes in macroinvertebrate assemblage within Nyando wetlands and developed an index of biotic integrity for monitoring human disturbances. Triplicate macroinvertebrate samples were collected monthly for seven months using a scoop net. They were sorted live, counted and identified to genus level. Water samples for nutrients were collected and analyzed using standard methods. Physico-chemical parameters were taken in situ using electronic meters. Macroinvertebrates were analyzed for richness, diversity, dominance and abundance. Abundance was correlated with physico-chemical parameters. Kruskal-Wallis test was used to test spatial differences in macroinvertebrate community. Metrics for index of biotic integrity were chosen, tested, and a 5, 3, 1 scoring criteria was used. A total of 45 genera (including four Odonata genera) were identified and Kruskal-Wallis test analysis revealed significant spatial differences in macroinvertebrate abundance. Repeated measures ANOVA showed significant spatio-temporal differences. Tolerant ma-

croinvertebrates were abundant at the disturbed sites whereas intolerant taxa showed a strong negative correlation with nutrient levels. Sites with higher disturbance recorded a total index score far below the reference site score. The results indicated that macroinvertebrates in Nyando wetlands can be used to monitor its ecological integrity. The IBI developed should be used to protect the lake from eutrophication." (Authors)] Address: Orwa, P.O., Department of Fisheries and Aquatic Sciences, University of Eldoret, P.O. Box 1125, Eldoret, Kenya

13159. Outomuro, D.; Dijkstra, K.-D.B.; Johansson, F. (2013): Habitat variation and wing coloration affects wing shape evolution in dragonflies. *Journal of Evolutionary Biology* 26(9): 1866-1874. (in English) ["Habitats are spatially and temporally variable, and organisms must be able to track these changes. One potential mechanism for this is dispersal by flight. Therefore, we would expect flying animals to show adaptations in wing shape related to habitat variation. In this work, we explored variation in wing shape in relation to preferred water body (flowing water or standing water with tolerance for temporary conditions) and landscape (forested to open) using 32 species of dragonflies of the genus *Trithemis* (80% of the known species) (*Trithemis aconita*, *T. adelpha*, *T. aenea*, *T. aequalis*, *T. africana*, *T. annulata*, *T. arteriosa*, *T. aurora*, *T. basitincta*, *T. bifida*, *T. bredoi*, *T. dejouxi*, *T. dichroa*, *T. donaldsoni*, *T. dorsalis*, *T. ellenbeckii*, *T. festiva*, *T. furva*, *T. grouti*, *T. hartwigi*, *T. hecate*, *T. imitata*, *T. kalula*, *T. kirbyi*, *T. monardi*, *T. nuptialis*, *T. pluvialis*, *T. pruinata*, *T. selika*, *T. stictica*, *T. tropicana*, *T. wernerii*). We included a potential source of variation linked to sexual selection: the extent of wing coloration on hindwings. We used geometric morphometric methods for studying wing shape. We also explored the phenotypic correlation of wing shape between the sexes. We found that wing shape showed a phylogenetic structure and therefore also ran phylogenetic independent contrasts. After correcting for the phylogenetic effects, we found (i) no significant effect of water body on wing shape; (ii) male forewings and female hindwings differed with regard to landscape, being progressively broader from forested to open habitats; (iii) hindwings showed a wider base in wings with more coloration, especially in males; and (iv) evidence for phenotypic correlation of wing shape between the sexes across species. Hence, our results suggest that natural and sexual selection are acting partially independently on fore- and hindwings and with differences between the sexes, despite evidence for phenotypic correlation of wing shape between males and females." (Authors)] Address: Outomuro, D., Dept of Ecology and Genetics, Population Biology and Conservation Biology, Norbyvägen 18 D, 752 36 Uppsala, Sweden. E-mail: david.outomuro@ebc.uu.se

13160. Pacini, N.; Donabaum, K.; De Villeneuve, P.H.; Konecny, R.; Pineschi, G.; Pochon, Y.; Salerno, F.;

Schwaiger, K.; Tartari, G.; Wolfram, G.; Zieritz, I. (2013): Water quality management in a vulnerable large river: the Nile in Egypt 11(2). *International Journal of River Basin Management*: 205-219. (in English) ["We review the severe water management problems of the Nile Basin, where physical water scarcity is associated with high demographic growth, leading to a sharply-rising demand for competing water uses such as hydropower and large-scale irrigation. Rapid economic growth is perceived as the means to emerge from the poverty trap that afflicts livelihoods in the Upper Basin and vital wetland ecosystem services such as fish biomass, freshwater biodiversity, groundwater recharge, flow regulation and local climate moderation are threatened by the water development schemes and pollution that follow from this policy. Their cumulative impacts remain unaddressed. The High Aswan Dam's impacts on freshwater biodiversity are incompletely understood; a significant number of species may have become threatened as a result of its construction. Today the reservoir water quality is high, it is thought to support 47 fish species, its local human activities are restricted by central government regulations and recent estimates indicate that eutrophication threats are unlikely. Sediment and nutrient inputs coming into it from upstream will, however, continue to decrease in the near future as a result of newly built and planned dams in the upper basin. The dams will also reduce discharge and cause further loss of connectivity between the river and its floodplain; exacerbated by the possible completion of the Jonglei Canal bypassing the Sudd swamps. These impacts will affect the Nile's vulnerable aquatic biodiversity and regulatory services that are likely to affect local climate conditions. Under the current geopolitical scenario, management decisions that could favour participatory and sustainable options are over-ruled by high-level political trade-offs between the numerous riparian states. The financing of major hydropower developments by vested interests creates a scenario that is unlikely to favour sustainable resource management and conflict resolution.... Below Aswan, the whole river can be described as a potamon dominated by Odonata, Coleoptera, Corixidae and Chironomidae." (Authors)] Address: Pacinia, N., Dept of Environmental & Chemical Engineering, Univ. of Calabria, Arcavacata di Rende, Italy

13161. Panigalli, G.; Tessmann Soligo, K. (2013): Diversidade de insecta (Arthropoda) associada à carcaça de *Sus scrofa* L. em um fragmento de Mata Atlântica de Xanxerê Santa Catarina. *Unoesc & Ciência - ACBS, Joaçaba* 4(1): 15-26. (in Portuguese, with English summary) ["The lack of information about the insect fauna associated with decaying corpse of vertebrates in tropical motivated this study lifting Insecta (Arthropoda) carcass of *Sus scrofa* (Linnaeus 1758) in a fragment of Atlantic Forest in the town of Xanxerê, SC. The animal-bait was exposed in an environment characterized by rural mosaic of forest remnants and area of agricultural activity and observed until its skeletonization, the specimens being collected daily from Insecta associated with hous-

ing. We used metal cage, modified Shannon trap, pitfall traps, insect nets and bait-casting of the animal. We collected a total of 3,226 arthropods analyzed and classified into 44 species. The order Diptera was the most frequent, followed by Coleoptera, Lepidoptera, Hymenoptera, Hemiptera/Heteroptera, Orthoptera, Mantodea and Odonata." (Authors) A single Odonata-specimen was recorded; it was considered without any functional relationship to the carcass of *S. scrofa*.] Address: Panigalli, Gerusa, Mestre em Ciências Biológicas; Professora do Curso de Ciências Biológicas na Universidade do Oeste de Santa Catarina; Rua Dirceu Giordani, 696, Bairro Jardim Tarumã, 89820-000, Xanxerê, SC, Brasil. E-mail: gerusa.panigalli@unoesc.edu.br

13162. Panov, E.N.; Opaev, A.S. (2013): Behavior of males in a reproductive aggregation of the banded damselfly *Calopteryx splendens* (Insecta, Odonata). *Entomological Review* 93(7): 805-813. (in English) ["The view according to which damselfly males practice two alternative reproductive tactics of access to females is critically discussed. It is widely accepted that some males ("territorial" ones) have priority as potential female partners, while others ("sneakers" or "wanderers") are incapable of retaining an individual territory. They have a chance of mating only by intruding briefly into the area defended by a "territorial" male when a female is present there. Thus, the tactics of a "territorial" male consists in waiting for a female in its territory and copulating with it "by agreement," whereas non-territorial males resort to forced copulations. By observation of individually marked males (48 out of 118) it was shown that every male could be regarded as "territorial" during a certain period and as a "wanderer" before and after it. Thus, no correlation between the modes of space use by a male (residence/mobility) and the characters of its external morphology and/or signal behaviour appears to be possible in principle. According to the data obtained, a more plausible explanation is that the female chooses not the male but the best area for oviposition. In addition, it was ascertained that adherence to forced copulations cannot constitute successful "tactics" since they rarely result in insemination, neither by "territorial" nor "non-territorial" males. In other words, we are dealing not with certain alternative tactics (i.e., specialized adaptive mechanisms that have evolved in the species) but simply with the results of different sets of circumstances at a given moment." (Authors) Original Russian Text © E.N. Panov, A.S. Opaev, 2013, published in *Zoologicheskii Zhurnal*, 2013, Vol. 92, No. 1, pp. 24–33.] Address: Panov, E.N., Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, 119071, Russia. E-mail: panoven@mail.ru

13163. Payton, G. (2013): The effects of predator chemical cues on the behavior of spotted salamander larvae (*Ambystoma maculatum*). *BIOS 35502: Practicum in Field Biology, Advisor: Shayna Sura*: 15 pp. (in English) [Wisconsin, Michigan, USA "The detection of kair-

omones, or chemical cues released by hunting predators, is an important ability of prey that allows them to exhibit anti-predator behaviour, thus increasing their chance of survival and fitness. This study aims to elucidate the effect of the kairomones of two native predators, diving water beetle larvae and dragonfly larvae (Libellulidae), on the behaviour of spotted salamander larvae. Observational laboratory trials were conducted to determine the effect that the addition of kairomone-containing water had on the larvae's preference for depth and cover in their environment. I predicted that the larvae would prefer to live in a shallow environment when treated with dragonfly larvae chemical cues, a deep environment if exposed to diving water beetle chemical cues, and an even split between the two depths when exposed to the kairomones of both predators, based on the predators' different hunting methods. I also hypothesized that the salamander larvae would prefer to inhabit areas with foliage to areas with no foliage when treated with the kairomones of dragonfly larvae and/or diving water beetles. However, it was found that there was no significant difference in mean time spent in each quadrant between each of the treatments. Perhaps the effect of chemical cues is a learned trait for the salamander larvae, and thus the predator naïve larvae used in this experiment had no knowledge of the predators' effects or hunting techniques." (Author) For details see: <http://www3.nd.edu/~underc/east/education/documents/George2013.pdf> Address: not stated

13164. Pinto, H.A.; Melo, A.L. (2013): Metacercariae of Eumegacetes medioximus (Digenea: Eumegacetidae) in larvae of Odonata from Brazil. *Biota Neotropica* 13(2): 351-354. (in English, with Portuguese summary) ["During studies on the participation of larval Odonata in the life cycle of trematodes carried out at the Pampulha reservoir, Belo Horizonte, State of Minas Gerais, Brazil, between May and September 2011, larvae of *Orthemis discolor* and *Perithemis mooma* were found harbouring metacercariae identified as *Eumegacetes medioximus* Braun, 1901. This is the first report and morphological description of metacercariae of *E. medioximus* in the Neotropical region." (Authors)] Address: Pinto, H.A., Laboratório de Taxonomia e Biologia de Invertebrados, Departamento de Parasitologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais – UFMG, CP 486, CEP 30123-970, Belo Horizonte, MG, Brasil

13165. Prasad, K.K.; Ramakrishna, B.; Srinivasulu, C.; Srinivasulu, B. (2013): Odonate diversity of Manjeera Wildlife Sanctuary with notes on female polymorphism of *Neurothemis tullia* (Drury, 1773) (Odonata: Libellulidae) and some species hitherto unreported from Andhra Pradesh, India. *Journal of Entomology and Zoology Studies* 1(4): 99-104. (in English) [28 Odonata species were recorded from the Manjeera Wildlife Sanctuary between December 2010 to October 2012. *Anaciaeschna jaspidea*, *Coenagrion dyeri*, *Pseudagrion decorum*, and *Rhodischnura nursei* were reported for the

first time from Andhra Pradesh. Female polymorphism of *Neurothemis tullia* from the Manjeera Wildlife Sanctuary, Medak District, Andhra Pradesh was documented and discussed in detail.] Address: Prasad, K.K., Wildlife Biology and Taxonomy Lab, Department of Zoology, Osmania University, Hyderabad – 500 007, India. E-Mail: kpmanjeera@gmail.com

13166. Prorochuk, V. (2013): Rare insect species of the NNP "Gutsul'shchyna": [Current status and future conservation]. *Visnyk of the Lviv University. Series Biology* 61: 110-118. (in Ukrainian) [*Calopteryx virgo*, *Anax imperator*, *Cordulegaster bidentata*, and *Sympetrum pedemontanum* were among the 38 insect species introduced in the National park of "Hutsul'shchyna" and considered as rare inhabitants of the Park.] Address: Prorochuk, V., Natsional'nyy pryrodnyy park «Hutsul'shchyna» vul. Druzhby, 84, Kosiv, Ivano-Frankivs'ka obl. 78600, Ukraine. E-mail: gutsulpark@rambler.ru

13167. Prunier, F.; Ripoll Rodríguez, J.; Schorr, M. (2013): Citas bibliográficas de odonatos en Andalucía. *Boletín de la Red de Observadores de Libélulas en Andalucía* 3: 43-76. (in Spanish, with English summary) ["Bibliographical data on Andalusian, Spain dragonflies are abstracted and ordered by province and 10x10 kilometers squares. Doubtful records as well as species to be confirmed in the region are discussed. The Andalusian catalogue of dragonflies is updated." (Authors)] Address: Prunier, Florent, C/ Maestro Priego López, 7, 2D, 14004 Cordoba, Spain. E-mail: florent.prunier@yahoo.fr

13168. Prunier, F.; Ripoll Rodríguez, J.; Chelmick, D. (2013): Segundo Atlas de odonatos en Andalucía: incorporando 25 años de investigación. *Boletín de la Red de Observadores de Libélulas en Andalucía* 3: 5-41. (in Spanish, with English summary) [Spain; "The second Andalusian atlas of dragonflies is presented, updating the publication of the first in 1984. This work is based on the subsequent literature review and data of ROLA's recording scheme. For each species, a map represents the last period in which its presence has been detected (prior to 1984, 1984-2000, after 2000)."] Address: Prunier, Florent, C/ Maestro Priego López, 7, 2D, 14004 Cordoba, Spain. E-mail: florent.prunier@yahoo.fr

13169. Quina, C.L.; Pelli, A.; Costa Martins, A.G. (2013): Succession of benthic macroinvertebrates on rat carcasses in Uberaba river - MG. *SaBios-Revista de Saúde e Biologia* 8(2): 73-80. (in Portuguese, with English summary) ["There are patterns of ecological succession in different stages of decomposition in the rat carcasses. According to the stages of decomposition, the succession happens in stages characterized by defined groups and species. The aim of this research was to evaluate the ecological succession in animal carcasses in lotic environments. Five neonates rats previously sacrificed in cold anesthesia were evaluated. Within a bag of shade, the material was deposited in lotic environments and re-

moved in intervals of 1 to 4 days. The analysis was performed in the laboratory after sieving the sample solution and preserved in alcohol 75%. The material was sorted and identified under a stereoscopic microscope. Insecta was the dominant group. Trichoptera and Diptera were dominant with three families, followed by two Ephemeroptera families and one family of Coleoptera and Odonata ("Libellulidae") orders. Two orders of Crustacea, the phyla Annelida and Sarcodina were also observed. There was a succession of organisms related to functional or morphological behaviour. There was a tendency of increase in density and species richness and that the pattern of succession in artificial substrate - carcasses - reflects the environmental conditions." (Authors)] Address: Pelli, A., Universidade Federal do Triângulo Mineiro Departamento de Patologia, Genética e Evolução, Disciplina de Ecologia & Evolução Av. Frei Paulino, 30. Uberaba/MG - CEP 38025-180, Brazil. E-mail: apelli.oikos@icbn.uftm.edu.br

13170. Ramaker, A.J. (2013): First population of *Coenagrion scitulum* in Dutch Limburg. *Brachytron* 15(2): 123-127. (in Dutch, with English summary) ["In 2010 the second population of *C. scitulum* in the Netherlands was found in province of Limburg. The other population in the Province of Zeeland, was discovered in 2007. The discovery and the reproduction location are discussed, as well as the expansion in the north-west of Europe. Females of the population in Limburg are almost all of the multicoloured morph, which appears to be rarer in the populations in Zeeland and western Belgium." (Author)] Address: E-mail: dolf@goyatlah.nl

13171. Rebora, M.; Piersanti, S.; Gaino, E. (2013): The mechanoreceptors on the endophytic ovipositor of the dragonfly *Aeshna cyanea* (Odonata, Aeshnidae). *Arthropod Structure & Development* 42(5): 369-378. (in English) ["This study investigates the mechanoreceptors located on the cutting valvulae of the ovipositor of *A. cyanea*, using both SEM and TEM, with the aim of providing an overview of the sensory equipment of an odonatan endophytic ovipositor. Four kinds of sensilla have been described. Notwithstanding their different external and internal morphology, they show features typical of mechanoreceptors. Three of them are evident along the external surface of the two cutting valvulae in the form of sub-spherical pegs, pit organs type 1 (holes) and pit organs type 2 (depressions), these last similar to amphinematic scolopidia, while the fourth type is represented by subintegumental mononematic scolopidia having no direct relationship with the cuticle. In spite of their structural differences, the morphology of the described mechanoreceptors is consistent with performing a main role in allowing the perception of compression/ stretching of the thick cuticle of the valvulae and their bending due to the pressure acting on the distal end of the ovipositor during substrate penetration. Such an organization is coherent with the need of endophytic Odonata to be able to evaluate the stiffness of the plant where to lay eggs." (Authors)]

Address: Rebora, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebora@unipg.it

13172. Reeve, B.C.; Crespi, E.J.; Whipps, C.M.; Brunner, J.L. (2013): Natural stressors and ranavirus susceptibility in larval Wood Frogs (*Rana sylvatica*). *EcoHealth* 10(2): 190-200. (in English) ["Chronic exposure to stressors has been shown to suppress immune function in vertebrates, making them more susceptible to pathogens. It is less clear, however, whether many natural stressors are immunosuppressive. Moreover, whether stressors make disease more likely or more severe in populations is unclear because animals respond to stressors both behaviourally and physiologically. We tested whether chronic exposure to three natural stressors of wood frog tadpoles—high-densities, predator-cues, and low-food conditions—influence their susceptibility to a lethal ranavirus both individually in laboratory experiments, and collectively in outdoor mesocosms. Prior to virus exposure, we observed elevated corticosterone only in low-food treatments, although other treatments altered rates of growth and development as well as tadpole behaviour. None of the treatments, however, increased susceptibility to ranavirus as measured by the proportion of tadpoles that became infected or died, or the time to death compared to controls. In fact, mortality in the mesocosms was actually lower in the high-density treatment even though most individuals became infected, largely because of increased rates of metamorphosis. Overall we find no support for the hypothesis that chronic exposure to common, ecologically relevant challenges necessarily elevates corticosterone levels in a population or leads to more severe ranaviral disease or epidemics. Conditions may, however, conspire to make ranavirus infection more common in metamorphosing amphibians ... Predator cues were generated by feeding wood frog tadpoles to a dytiscid beetle larvae (Dytiscidae) or dragonfly larvae (families Libellulidae, Aeshnidae, and Corduliidae), each in 400 mL of water." (Authors)] Address: Brunner, J.L., School of Biol. Sciences, Washington State Univ., P.O. Box 644236, Pullman, WA, 99164, USA. E-mail: jesse.brunner@wsu.edu

13173. Renoult, J.P. (2013): Arrivée de la Libellule purpurine *Trithemis annulata* (De Palisot de Beauvois, 1805) dans la vallée du Rhône. *Sympetrum* 17: 81-82. (in French) [19-X-2008, camping 'La Brise' (GPS-43.4579/4.4396), Saintes-Maries de la Mer (Bouches-du-Rhône), France; one mature male and immature male and female.] Address: E-mail: jujurenoult@hotmail.com

13174. Röller, O.; Schotthöfer, A. (2013): Großes Ochsenauge und Großer Blaupfeil - zwei hierzulande gegenwärtig häufige Arten, die ebenso wie viele andere Arten unsere vermehrte Aufmerksamkeit verdienen. *Pollichia Kurier* 29(4): 32-35. (in German) [Rheinland-Pfalz, Germany. The phenology of *Orthetrum cancellatum* and *Libellula fulva* in the River Rhine alluvium was outlined on

the basis of citizen science data.] Address: Röller, O., c/o Pollichia, Bismarckstr. 33, 67433 Neustadt, Germany

13175. Roh, C.; Saxton-Fox, T.; Gharib, M. (2013): Characterization of ventilatory modes in dragonfly nymph. *Bulletin of the American Physical Society* 58(18): n.p. (in English) ["A dragonfly nymph's highly modified hindgut has multiple ventilatory modes: hyperventilation (i.e. jet propulsion), gulping ventilation (extended expiratory phase) and normal ventilation. Each mode involves dynamic manipulation of the exit diameter and pressure. To study the different fluid dynamics associated with the three modes, Anisopteran larvae of the family Aeshnidae were tethered onto a rod for flow visualization. The result showed distinct flow structures. The hyperventilation showed a highly turbulent and powerful jet that occurred at high frequency. The gulping ventilation produced a single vortex at a moderate frequency. The normal ventilation showed two distinct vortices, a low-Reynolds number vortex, followed by a high-Reynolds number vortex. Furthermore, a correlation of the formation of the vortices with the movement of the sternum showed that the dragonfly is actively controlling the timing and the speed of the vortices to have them at equal distance from the jet exit at the onset of inspiration. This behaviour prevents inspiration of the oxygen deficient expired water, resulting in the maximization of the oxygen intake." (Authors)] Address: not stated

13176. Ronne, C.; Blanchon, Y. (2013): Redécouverte de *Brachytron pratense* (Müller, 1764) dans le département du Var (Odonata, Anisoptera: Aeshnidae). *Martinia* 29(1): 43-45. (in French, with English summary) ["*B. pratense* has been found for the last time in the Var department at Hyeres in 1921. An exuvia of the species was found again on 29 April 2012 in Tourves. This data is the first proof of successful breeding in the department." (Authors)] Address: Ronne, Charlotte, 8, avenue des Allies, F-13360 Roquevaire, France. E-mail: charlotte.ronne@yahoo.fr

13177. Ruffoni, A.; Varanguin, N.; Millard, R. (2013): L'enquête *Coenagrion ornatum* (Selys in Selys et Hagen, 1850) en Bourgogne (Odonata, Zygoptera: Coenagrionidae): protocole et premiers résultats. *Martinia* 29(1): 23-41. (in French, with English summary) ["*C. ornatum* is a damselfly which is widespread in Central Europe, the Balkans and Asia Minor. The species shows a small disjunct area in Burgundy, France, from where it extends very rarely to the neighbouring departments of the Loire (Rhône-Alpes Region), Allier (Auvergne Region) and Cher (Centre Region). It turned extinct in northern Alsace, where population(s) were connected to the German ones and constituted the western limit of the continuous species range, shortly after its discovery. Its occurrence in the French northern Alps and the Jura Plateau had been claimed but remained never documented. First data from Burgundy available in 2002 remained scattered and the rarity of this species was underlined. In

2009, the new Burgundy Odonatological Group (GOB) decided to bring an important effort dealing with the distribution and the status of this species in Burgundy. This paper described the field protocol used as well as the first results." (Authors)] Address: Ruffoni, A., Société d'histoire naturelle d'Autun, Maison du Parc, F-58230 Saint-Brisson, France. E-mail: shna.ruffoni@orange.fr

13178. Rumpold, B.A.; Schlüter, O.K. (2013): Nutritional composition and safety aspects of edible insects. *Molecular Nutrition & Food Research* 57(5): 802-823. (in English) ["Insects, a traditional food in many parts of the world, are highly nutritious and especially rich in proteins and thus represent a potential food and protein source. A compilation of 236 nutrient compositions in addition to amino acid spectra and fatty acid compositions as well as mineral and vitamin contents of various edible insects as derived from literature is given and the risks and benefits of entomophagy are discussed. Although the data were subject to a large variation, it could be concluded that many edible insects provide satisfactorily with energy and protein, meet amino acid requirements for humans, are high in MUFA and/or PUFA, and rich in several micronutrients such as copper, iron, magnesium, manganese, phosphorous, selenium, and zinc as well as riboflavin, pantothenic acid, biotin, and in some cases folic acid. Liabilities of entomophagy include the possible content of allergenic and toxic substances as well as antinutrients and the presence of pathogens. More data are required for a thorough assessment of the nutritional potential of edible insects and proper processing and decontamination methods have to be developed to ensure food safety." (Authors) The analysis includes references to Odonata.] Address: Schlüter, O.K., Leibniz Institute for Agricultural Engineering Potsdam-Bornim, Max-Eyth-Allee 100, 14469 Potsdam, Germany. E-mail: oschlueter@atb-potsdam.de

13179. Ryazanova, G.I. (2013): Populational variability of wing venation in the dragonfly *Ischnura elegans* (Vander Linden, 1820). *Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 156-160.* (in Russian, with English summary) ["The number of wing cells was studied in four populations of *I. elegans* in 2010–2012. It is revealed that this characteristic has significant variability both within a season and between seasons in each population. Individuals emerging early in the season have a significantly greater number of cells in the wings than those emerging at the end of the season. Interseasonal changes in the number of cells in the wings in different populations are independent in direction and degree, indicating high phenotypic mobility. The lack of stable interpopulation differences in the studied characteristic does makes it impossible to use it for assessing the degree of isolation for populations." (Author)] Address: Ryazanova, G.I.,

Biological Faculty, Moscow Lomonosov State Univ., Moscow, 119992, Russia. E-mail: ryazanovagi@mail.ru

13180. Sansault, E.; Baeta, R.; Présent, J. (2013): Synthèse des observations d'*Hemianax ephippiger* (Burmeister, 1839) réalisées en 2011 en région Centre (Odonata, Anisoptera: Aeshnidae). *Martinia* Hors-série, *Hemianax ephippiger* - migration 2011, mai 2013: 69-72. (in French, with English summary) [Records (imagos, exuviae) from the departments Indre-et-Loire and Indre are documented.] Address: Sansault, E., A.N.E.P.E. Caudalis, 118, rue de l'Ermitage, 37100 Tours, France. E-mail: anepe.caudalis@gmail.com

13181. Sato, S.; Masuma, Y.; Hasegawa, Y.; Choi, M.-K.; Kassai, H. (2013): Fundamental study on ecosystem support canal using porous concrete. *Int. J. of Geomate* 4(2): 580-584. (in English) ["This research aimed to enhance the compressive strength of porous concrete as well as to develop the porous concrete that can support and improve the ecosystem preservation by itself. Several porous concrete specimens were prepared for the measurement of mechanical properties. As a result, it was confirmed that the radius of coarse aggregate affected significantly to mechanical properties of porous concrete under the same unit weight of cement. It was also revealed that strengths at age 28 days were stable despite of different sizes of coarse aggregate. The bio-adhesive ability of porous concrete specimen was evaluated against water bugs and adhesive algae. Every porous concrete specimen was soaked in same environmental condition at the bottom of actual concrete canal. From this experiment, it was confirmed that preference environment for some specific species of water bugs are possible to be supplied when the porosity and the size of coarse aggregate would be adjusted." (Authors) Calopterygidae, Gomphidae] Address: Shushi Sato, S., Faculty of Agriculture, Kochi University, Japan

13182. Schmidt Furieri, K.; Santos, J.S. dos (2013): As libélulas (Odonata: Insecta) da Reserva Natural Vale. XI Congresso de Ecologia do Brasil, Setembro 2013, Porto Seguro - BA: 3 pp. (in Portuguese) [Brasil; the Odonata collection of the reserve also included *Mecistogaster amalia* and *Leptagrion dispar*.] Address: Schmidt Furieri, Karina, Universidade Federal do Espírito Santo - UFES / Instituto de Pesquisas da Mata Atlântica - IPEMA, Brail. E-mail: kfurieri@gmail.com

13183. Schut, D.; de Vos, M.; Rademaker, J. (2013): *Calopteryx virgo* near Winterswijk: Did a rare damselfly of streams profit from restoration measures? *Brachytron* 15(2): 102-111. (in Dutch, with English summary) ["This article describes the population trends of *C. virgo* in several streams in the Winterswijk area (Gelderland), in the Eastern part of the Netherlands. From the mid 1970s a strong decline of the species was observed. The decrease can be attributed to decreasing water quality. Since the mid 1990s the species has recovered

and has recolonised its historic distribution area. The increase can be attributed to several restoration measures, improving the ecological quality of the streams. These measures focused both on water quality and stream morphology." (Authors)] Address: Schut, D., Pieter Postplein 20, 6543 LV Nijmegen, The Netherlands. E-mail: verhipsel@gmail.com

13184. Seehausen, M.; Schardt, L. (2013): Die exotischen Libellen des Naturhistorischen Museums Mainz / Landessammlung für Naturkunde Rheinland-Pfalz (Insecta: Odonata). *Mainzer naturwissenschaftliches Archiv* 50: 333-342. (in German, with English summary) [The exotic Odonata in the collection of the Mainz Museum of Natural History / State Collection of Natural History of Rhineland-Palatinate were identified and revised. The records originate from Rwanda, Peru, Cuba and the Dominican Republic. *Atoconeura pseudodoxia* from Rwanda represents the first documented proof for the so far unknown easternmost distribution of this species.] Address: Seehausen, M., Museum Wiesbaden, Naturhistorische Sammlungen, Friedrich-Ebert-Allee 2, 65183 Wiesbaden, Germany. E-Mail: malte.seehausen@museum-wiesbaden.de

13185. Sharkey, C.R.; Roberts, N.W.; Partridge, J.C. (2013): Dragonfly larval polarization sensitivity as a contrast enhancer in turbid water. *Front. Physiol. Conference Abstract: International Conference on Invertebrate Vision.* doi: 10.3389/conf.fphys.2013.25.00078: n.p. (in English) [Verbatim: A challenge faced by visual systems underwater is the presence of scattered light haze, or 'veiling light', that reduces the contrast of the scene. Light scattered underwater by sub-wavelength particles is polarized, forming a light field that is maximally polarized in a band orthogonal to the direction of the sun (Waterman, 2006). An animal able to filter out this scattered, polarized light would benefit from a greater perceived contrast, enhancing the detection of objects in an underwater scene (Rowe et al., 1995; Schechner et al., 2003). If this mechanism were present, it could potentially benefit an aquatic predator by enhancing prey detection. We compared the responses of three larval instars of dragonfly, *Anax imperator*, to moving gratings with a range of spatial frequencies, seen by the insects through turbid water under different illumination conditions. Animals were placed in an optomotor drum, with a surrounding circular tank filled with diluted milk; the grating to be tested being placed on the outside of the drum. The milky solution was illuminated from above through linear Polaroid filters with transmission axes aligned either radially or tangentially with respect to the drum, thereby creating either a weakly (10%) vertically polarized or a more strongly (30%) horizontally polarized light field, respectively. The head angles of animals, during the experiment, were measured and 'gain', the rotational velocity (degrees per second) of the animal's head was expressed as a fraction of that of the drum, used as a measure of their response. Data were

log transformed and analysed by fitting Linear Mixed Models. For all three larval instars, responses to the moving gratings were significantly stronger overall when the light field was polarized horizontally (?deviance=5.945, d.f.=1, p=0.015; Fig.1, bars represent SE) particularly at 0.09 cycles/degree. Animals responded differently to different spatial frequencies, exhibiting reduced responses at the highest and lowest frequencies tested. Responses to different spatial frequencies were dependent on instar, with response peaking at a lower frequency for earlier instars (?deviance=13.56, d.f.=6, p=0.035). The increase in response, observed when animals are in a horizontally polarized light field, may be due to a contrast-enhancing effect of polarization sensitivity, a suggestion supported by preliminary data, derived from on-going behavioural experiments. This contrast enhancing effect could increase the chance of a successful strike during hunting and increase the distance at which both predators and prey can be detected. References: Rowe, M. P., Pugh, E. N., Tyo, J. S., & Engheta, N. (1995). Polarization-difference imaging: a biologically inspired technique for observation through scattering media. *Optics letters*, 20(6), 608–610.; Schechner, Y. Y., Narasimhan, S. G., and Nayar, S. K. (2003). Polarization-based vision through haze. *Applied optics* 42, 511–525.; Waterman, T. H. (2006). Reviving a neglected celestial underwater polarization compass for aquatic animals. *Biological reviews of the Cambridge Philosophical Society* 81, 111–115.] Address: Sharkey, Camilla, The University of Bristol, Ecology of Vision Group, Bristol, BS8 1UG, United Kingdom. E-mail: cs7750@bristol.ac.uk

13186. Shep, H.; Konan, M.K.; Doumbia, L.; Ouattara, M.; Boussou, C.K.; Ouattara, A.; Gourène, G. (2013): Feeding relationships among *Tilapia zillii* (Gervais, 1848), *Tilapia guineensis* (Bleeker, 1862) and their hybrid in Ayamé man-made lake, Côte d'Ivoire. *Pakistan J. Zool.* 45(5): 1405-1414. (in English) ["The stomach contents of 122 specimens of *Tilapia zillii*, 121 of *Tilapia guineensis* and 227 of their hybrid were studied in Ayamé man-made lake during two years between August 1995 and September 1997 in order to analyze their diet composition and interspecific diet overlap. ... Diptera and macrophytes were the most important item in the diet of these species." (Authors) Odonata were of minor importance as food.] Address: Shep, H., Laboratoire d'Environnement et de Biologie Aquatique, Université Nangui Abrogoua, 02 BP 801 Abidjan 02, Ivory Coast

13187. Silina, A.E. (2013): Amphibiotic insects (Insecta) of Reservoirs of the Rovensky Nature Park. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 166-178. (in Russian, with English summary) ["Checklist and data on abundance of amphibiotic insects (Insecta), excluding Chironomidae, of the Rovensky Nature Park in Belgorod Oblast are

given. Two streams, two small rivers, the upper reaches of the Aydar River and two standing reservoirs are surveyed. A total of 169 species of amphibiotic insects from orders of Collembola, Plecoptera, Ephemeroptera, Odonata, Coleoptera, Trichoptera, Lepidoptera, Hymenoptera, Megaloptera and Diptera are recorded. Abundant and rare species are identified, and distribution of insects in the studied waterbodies is determined." (Author) The following Odonata species/taxa were listed: *Calopteryx splendens*, *C. virgo*, *Sympetma paedisca*, *Lestes dryas*, *Coenagrion hastulatum*, *C. pulchellum*, *Ischnura elegans*, *I. pumilio*, *Ischnura* sp., *Platycnemis pennipes*, *Aeshna grandis*, *A. caerulea*, *Aeshna* sp., *Anax parthenope*, *Gomphus vulgatissimus*, *Libellula fulva*, *Epiteca bimaculata*, *Sympetrum danae*, *S. striolatum*, *S. meridionale*, *S. sanguineum*, and *S. flaveolum*.] Address: Silina, A.E., Belogorye State Nature Reserve per. Monastyrsky 3, Borisovka, Belgorod Oblast, 309342, Russia. E-mail: allasilina@list.ru

13188. Silva-Méndez, G.; Lorenzo-Carballa, M.O.; Cordero-Rivera, A.; Watts, P.C. (2013): Microsatellite loci for two threatened dragonfly (Odonata: Anisoptera) species: *Oxygastra curtisii* (Dale, 1834) and *Macromia splendens* (Pictet, 1843). *Conservation Genetics Resources* 5(4): 1171-1174 (in English) ["Twenty one polymorphic microsatellite loci were isolated from *Macromia splendens* (n = 8 loci) and *Oxygastra curtisii* (n = 13 loci). Both species have their main distribution areas in southwestern Europe, with records in the north of Africa in the case of *O. curtisii*. *M. splendens* is listed as vulnerable by IUCN, while *O. curtisii* is regarded as near threatened. Genetic diversity was assessed in samples from the Iberian Peninsula representing two populations for each species. Number of alleles per locus ranged from 5 to 11 (*O. curtisii*) and between 4 and 16 (*M. splendens*), while mean expected heterozygosity varied between 0.118–0.745 (*O. curtisii*) and 0.130–0.849 (*M. splendens*). Five loci (four for *O. curtisii* and one for *M. splendens*) showed significant deviations ($P < 0.05$) from expected Hardy–Weinberg equilibrium conditions, with the locus from *M. splendens* experiencing null alleles. These loci are currently being used to assess spatial genetic structure in these protected species." (Authors)] Address: Silva-Ménde, G. da, Evolutionary Ecology and Conservation Group, Department of Ecology and Animal Biology, Universidad de Vigo, EUE Forestal, Campus Universitario A Xunqueira s/n, 36005, Pontevedra, Spain. E-mail: genarodasilva@uvigo.es

13189. Simon, S.; Brugler, M.R.; DeSalle, R.; Hadrys, H. (2013): First insights in the embryonic development of the damselfly *Ischnura elegans*. 6th Dresden Meeting on Insect Phylogeny, Dresden, September 27–29, 2013. Abstracts — Oral Presentations: 21-22. (in English) [Verbatim: The new sequencing technologies have massively increased the amount of data available for comparative transcriptomics which can be used to infer insect relationships but also to study the transcriptional

signatures and dynamics of developmental processes. In addition, for *Drosophila* species it has been shown that expression divergence correlate with sequence divergence among putative orthologous genes, making comparative gene expression analyses to a useful tool in molecular phylogenetics (Zhang et al. 2007; Kalinka et al. 2010). However, transcriptomic data across developmental stages are mainly available for derived holometabolous insects, especially drosophilid dipteran species. Here, we fill in an important gap for future comparative gene expression analyses by analyzing and comparing transcriptomic data across the embryonic development of *I. elegans*. Roche 454-multiplexed transcriptomic data was generated for four time-periods (day 1–3, 4–5, 6–7, 8–9) spanning the entire embryonic lifespan. The assembled 454 reads and comparative analyses between the different embryonic stages will provide the first insights in the temporal gene expression changes during early damselfly development. In addition, highquality ds cDNA libraries for each embryonic developmental stage (day) were generated for further in-depth gene expression analyses using quantitative RT-PCR. The long-term goal of this ongoing research project is to systematically search for expression divergence between distantly related insect species, their correlation to sequence divergence (known phylogenetic relationships) and to study their role in morphological changes. References: Kalinka A.T., Varga K.M., Gerrard D.T., Preibisch S., Corcoran D.L., Jarrells J., Ohler U., Bergman C.M., Tomancak P. 2010: Gene expression divergence recapitulates the developmental hourglass model. *Nature* 468: 811–814. — Zhang Y., Sturgill D., Parisi M., Kumar S., Oliver B. 2007: Constraint and turnover in sex-biased gene expression in the genus *Drosophila*. *Nature* 450: 233–237.] Address: Simon, Sabrina, Sackler Institute for Comparative Genomics, American Museum of Natural History, New York, NY 10024, USA

13190. Singh, K.M.; Singh, M.P.; Kumawat, M.M.; Riba, T. (2013): Entomophagy by the tribal communities of North East India. *Indian Journal of Entomology* 75(2): 132-136. (in English) ["A survey was conducted to document the edible insects available at East Siang District, Arunachal Pradesh and Bishnupur District, Manipur, northeast India. East Siang district is predominated by the Adi tribe and Bishnupur district by the Meitei community. The two ethnic groups, viz. Adi and Meitei accept insects as their food. Most of the edible insects belong to the order Hymenoptera, Hemiptera, Orthoptera, Odonata and Coleoptera. *Philosamia ricini* is a commercialized insect species as food in Arunachal Pradesh. Based on their resources, Adis of East Siang accepted more terrestrial insects compared to Meiteis of Bishnupur. Meitei community of Bishnupur consumed more aquatic insects. One or the other species of insects are available in all the seasons, however, more species are available in the warm season. Most of the insects are consumed after processing. Some points to

be considered for encouraging these edible insects as human food are also discussed." (Authors)] Address: Singh, K.M., College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh, India. E-mail: mamoento@gmail.com

13191. Sluvko, A.A. (2013): On the changes introduced in the Red Data Book of Astrakhan oblast: Order Odonata (Dragonflies and damselflies). Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. — Yaroslavl: Filigran, 2013. — 254 pp: 182-186. (in Russian, with English summary) [Russia; "The Red Data Book of the Astrakhan region is the official register of the state of rare and endangered species of the flora and fauna of Astrakhan Oblast. The first edition of the Red Data Book of Astrakhan Oblast was published in 2004. The second edition is currently in preparation. Work on the inventory of the dragonfly fauna and subsequent assessment of this fauna resulted in improvements of the checklist of species. Analysis of the data allowed to petition the commission on rare and endangered species of animals, wild plants and fungi of Astrakhan Oblast for including four dragonfly species with local distribution in Astrakhan Oblast into the Red Data Book of Astrakhan Oblast." (Author) *Onychogomphus forcipatus*, *Erythromma najas*, *Sympetrum pedemontanum*, and *S. danae* were detailed.] Address: Sluvko, A.A., Federal Service for Veterinary and Phytosanitary Surveillance (Astrakhan Oblast Department) ul. Admiralteyskaya 51, Astrakhan, 414040, Russia. E-mail: asluvko@mail.ru

13192. Smirnova, D.A.; Sklyarova, O.N.; Epova, Y.V. (2013): The amphibiotic insect fauna of the Tengiz-Korgalzhyn lake system (Kazakhstan) in 2012. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. — Yaroslavl: Filigran, 2013. — 254 pp: 187-189. (in Russian, with English summary) ["The amphibiotic insect fauna of the Tengiz-Korgalzhyn lake system (n = 10 lakes studied) was represented in 2012 by 56 species and taxa not identified to species. Chironomids were the most diverse group. It is noted that amphibiotic insect diversity depended on water salinity." (Authors) The single Odonata species listed was *Sympecma paedisca* from lake Bozaral.] Address: Smirnova, D.A., Kazakhstan Agency of Applied Ecology ul. Zvereva 47, Almaty, 050010, Kazakhstan. E-mail: d.smirnova@kape.kz

13193. Soboleva, V.A.; Golub, V.B. (2013): On the dragonfly and damselfly diversity (Insecta: Odonata) of the Tellerman Forest in Voronezh Oblast. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. — Yaroslavl: Filigran, 2013. — 254 pp: 189-195. (in Russian, with English summary) [Russia "A total of 18 species of 15 genera

and eight families of dragonflies are recorded from materials collected in August 2011 and May and June 2012 in the Tellerman upland oak forest (Voronezh Oblast). *Aeshna mixta* (Aeshnidae) is reported from Voronezh Oblast for the first time. *Sympetma paedisca* and *Stylurus flavipes*, species on the European Red List, and *Anax imperator* and *Calopteryx virgo*, included in the Red Data Book of Voronezh Oblast, are recorded in the forest. The basis of the zoogeographical structure of the dragonfly fauna of extreme eastern Central Russian Forest-Steppe is formed by species that have trans-Palaeartic and western Palearctic ranges occupying temperate latitudes." (Authors)] Address: Soboleva, V.A., Voronezh State University Universitetskaya pl. 1, Voronezh, 394006, Russia. E-mail: strekozavr@bk.ru

13194. Speh, E.; Lamy, A.-M. (2013): Découverte de *Gomphus graslinii* Rambur, 1842 dans le département du Cher, France (Odonata, Anisoptera, Gomphidae). *Martinia* 29(1): 47-48. (in French) [29 vi 2012, a female *G. graslinii*, was observed app 3.5 km away from the river Amon, Saint-Hilaire-en-Lignières, département Cher, France.] Address: Speh, Emmanuelle, Conservatoire d'espaces naturels de la région Centre, Antenne Cher/Indre, 16 rue du Bas-de-Grange, F-18100, Vierzon, France. E-mail: emmanuelle.speh@cen-centre.org

13195. Stanford, B.; Albertani, R.; Lacore, D.; Parker, G. (2013): Proper orthogonal decomposition of flexible clap and fling elastic motions via high-speed deformation measurements. *Experimental Mechanics* 53(7): 1127-1141. (in English) ["Many complex unsteady mechanisms are thought to facilitate the high efficiency and agility commonly observed in small biological flyers. One of these, the flexible clap and fling maneuver, has not been extensively studied; an experimental characterization is the focus of this work. The clap-fling mechanism is approximated with a single flexible membrane flapping wing, replacing the symmetry plane between two wings with a splitter plate simulating the pair wing. This produces a complex vibro-impact aeroelastic problem, the deformation resulting from which is measured with a high-speed visual image correlation system. A low-dimensional representation of the ensuing large data set is obtained with proper orthogonal decomposition. The POD modes, and the relative importance of each, can help elucidate crucial mechanisms and relationships within the flapping system, and are computed for various membrane wing structures and flapping frequencies, with or without the presence of the splitter plate." (Authors) The paper includes references to Odonata] Address: Albertani, R., U.S. Air Force Research Lab., Wright-Patterson AFB, OH, 45433, USA. E-mail: roberto.albertani@oregonstate.edu

13196. Sumanapala, A.P.; Bedjanic, M. (2013): Rediscovery of a long lost endemic damselfly *Sinhalestes orientalis* (Hagen in Selys, 1862) from Peak Wilderness Sanctuary, Sri Lanka (Zygoptera: Lestidae). *Asian Journal of Conservation Biology* 2(1): 44-47. (in English) ["S.

orientalis the only representative of its genus, is an endemic and globally critically endangered damselfly in Sri Lanka. It was first collected from Rambodde, Sri Lanka in 1858 and after that no new information on this species has been available. Here, we report on the re-discovery of *S. orientalis* from the Peak Wilderness Sanctuary, Sri Lanka after 154 years from its last and only record." (Authors)] Address: Sumanapala, A.P., Young Biologists' Association, Institute of Biology, 120/10, Vidya Mawatha, Colombo 7, Sri Lanka. E-mail: apsumanapala@gmail.com

13197. Tennessen, K.J.; Valley, S.A. (2013): New records for *Gomphus lynnae* Paulson (Odonata: Gomphidae), with a description of the nymph. *Proc. Ent. Soc. Washington* 115(4): 333-341. (in English) ["*Gomphus* (*Gomphurus*) *lynnae* Paulson, known from only a few localities in the states of Washington and Oregon, U.S.A., is reported from 10 localities in a 260 km stretch of the John Day River in Gilliam, Grant, Sherman, and Wheeler counties and a 59 km stretch of the Owyhee River in Malheur County, Oregon, all within the Columbia River watershed. We collected adults, nymphs and exuviae from several localities and two nymphs were associated with adults. Nymphs of this rare species have not been fully characterized. The nymph is described and illustrated; its closest congener is *G. externus* Hagen, from which it is distinguished by the lack of a distinct posterolateral spine on abdominal segment 6, shorter posterolateral spine on abdominal segment 9, and the presence of only two or three denticles, sometimes lacking, on the lateral margins of abdominal segment 8. Nymphs of *G. lynnae* occupy substrates of mixed sand and silt in riffle/run areas of large, slow flowing rivers." (Authors)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

13198. Tennessen, K.J.; Krotzer, R.S. (2013): Description of the last stadium nymph of *Leptobasis lucifer* (Odonata: Coenagrionidae). *Proc. Ent. Soc. Washington* 115 (2): 182-188. (in English) ["Nymphs of *L. lucifer* were collected in shallow water in a cypress (*Taxodium distichum* (Linnaeus) Richard (Taxodiaceae)) dome in southern Florida. They differ from *L. vacillans*, the only *Leptobasis* species previously described, by ratio of length of antennomere 2 to antennomere 1 (1.6 in *L. lucifer*, 1.4 in *L. vacillans*), cercus length (0.13–0.17 mm in *L. lucifer*, 0.08–0.13 mm in *L. vacillans*), and length—width ratio of caudal lamellae (> 4.0 in *L. lucifer*, < 4.0 in *L. vacillans*). *Leptobasis* is most similar to *Ischnura* Charpentier and *Enallagma* Charpentier; a combination of characters, including head width and the arrangement of setal bases on the lateral carinae of the abdominal segments, is necessary to separate these genera." (Authors)] Address: Krotzer, R.S., 2238 Haysop Church Road, Centreville, Alabama 35042, USA. E-mail: rskrotze@southernco.com

13199. Ternois, V. (2013): Premières mentions d'*Hemianax ephippiger* (Burmeister, 1839) pour la Champag-

ne-Ardenne (Odonata, Anisoptera: Aeshnidae). *Martinia Hors-série*, *Hemianax ephippiger* - migration 2011, mai 2013: 51-54. (in French, with English summary) ["*H. ephippiger* has been observed for the first time in the Champagne-Ardenne région during its mass migration in 2011. All data recorded in the region ($n = 8$) are dealt with." (Authors)] Address: Ternois, V., Société française d'Odonatologie (Champagne-Ardenne) s/c CPIE du Pays de Soulaïnes, Domaine de Saint-Victor, 10200 Soulaïnes-Dhuys, France. E-mail: cpie.vincent.temois@wanadoo.fr

13200. Thuyet, D.Q.; Watanabe, H.; Motobayashi, T.; Ok, J. (2013): Behavior of nursery-box-applied fipronil and its sulfone metabolite in rice paddy fields. *Agriculture, Ecosystems & Environment* 179(1): 69-77. (in English) ["Highlights: • Behaviour of insecticide fipronil in paddy environment was examined. • Fipronil concentrations in paddy water were different depending on the treatment. • Fipronil indicated half-lives less than 3.1 days in water and 26.4 days in soil. • Concentrations in root zone were about 10 times higher than in the inter-row zone. • Toxic metabolite fipronil sulfone was found in every water and soil samples. The granular insecticide fipronil has been widely applied in rice nursery boxes, both before transplanting (BT) and during at-sowing (AS) treatments to control insect pests at the early stages of rice cultivation in Japan. Although a potential effect of fipronil on paddy ecosystems and downstream aquatic environments has been observed, the environmental effect of this substance in paddy fields remains unsought. Here we investigate the environmental behaviour of nursery-box-applied granular fipronil and its sulfone metabolite in paddy water and paddy soils during BT and AS treatments performed in a paddy field in Japan. Although the fipronil concentrations in the paddy water in the AS treatment were significantly lower than those measured in the BT treatment, no significant differences were observed in the paddy soil between the two treatments. Fipronil was mainly found in the 0- to 5-cm surface soil layer of the rice-root zone, where its concentrations were approximately ten times higher than those in the soil of the inter-row zone. The insecticide concentration in the 0- to 1-cm layer of the inter-row zone in the surface soil was approximately 2.5 times higher than that in the 0- to 5-cm layer. The maximum concentrations of fipronil in the 0- to 1-cm surface soil layer ranged from 65.8 to 92.1 $\mu\text{g}/\text{kg}$ on the first day after rice transplanting (DAT), and the corresponding values in the paddy water ranged from 0.9 to 2.5 $\mu\text{g}/\text{L}$. The dissipation of fipronil from the paddy water and paddy soil was described by first-order kinetics. The compound's half-life (DT_{50}) was 0.9–3.1 days in paddy water and 12.3–26.4 days in paddy soil. Compared to the BT treatment, the AS treatment may pose a smaller risk to the paddy water and the adjacent environment. Fipronil sulfone was found in every water and soil sample, with the maximum concentrations ranging from 0.4 to 0.9 $\mu\text{g}/\text{L}$ in the paddy water and from 9.7 to

59.2 $\mu\text{g}/\text{kg}$ in the paddy soil on the third DAT. These values gradually decreased over time. Ecotoxicological risk assessments of fipronil products in rice paddies should not only consider the toxicity of fipronil itself but also that of fipronil sulfone because of its relatively high concentrations in paddy water and paddy soil. ...The studies of the environmental impact of fipronil on paddy fields suggest that the dragonfly (*Sympetrum* species) population has rapidly decreased since 1989, and that the observed reduction was positively correlated with the increased use of nursery-box-applied fipronil ..."] (Authors)] Address: Motobayashi, T., Tokyo University of Agriculture and Technology, 3-5-8, Saiwaicho, Fuchu, Tokyo 183-8509, Japan. E-mail: pochi@cc.tuat.ac.jp

13201. Touron-Poncet, H.; Bernadet, C.; Compin, A.; Bargier, N.; Céréghino, R. (2013): River classification as the basis for freshwater biological assessment in overseas Europe: Issues raised from Guadeloupe (French Lesser Antilles). *International Review of Hydrobiology* 98: 34-43. (in English) ["Over the past decade, Europe's Water Framework Directive (WFD) has prompted a large amount of ecological research aiming at establishing river typologies and ecological indicators in member States. Yet, the lack of robust bioindicators in Europe's overseas regions arguably reflects minimal knowledge of the distribution patterns of aquatic species in the Community's outermost areas. Specifically, there has been no published classification of rivers for any European overseas region. 51 sites were sampled for benthic invertebrates and environmental variables (land-cover, physical habitat, and water chemistry) in Guadeloupe, French Lesser Antilles. Redundancy analysis and k-means clustering were used to bring out spatial patterns in species composition in relation to environmental conditions. Our results highlighted the importance of land cover and geomorphology in delineating three ecological sub-regions (clusters) for freshwater invertebrates. Deviation from predictable community structure only occurred when river sites were subjected to harsh water chemistry alterations (urban runoff, wastewaters). Changes in species richness did not detect environmental stress efficiently within a given sub-region, probably because most sites are naturally species-poor due to the insular context and/or because disturbance is often weak. However, differences existed between clusters in terms of species identity and numerical dominance. Our a posteriori typology of sites was compared to local a priori expert opinion of river health, in an attempt to better characterize the network of survey sites, and to target sites for reference conditions." (Authors) Odonata in this study were represented by *Argia concinna*, *Enallagma coecum*, *Ischnura ramburii*, *Libellulidae* *Brechmorhoga*, *Macrothemis celeno*, and unidentified taxa.] Address: Céréghino, R., UPS EcoLab Univ. Toulouse, 118 Route de Narbonne, 31062 Toulouse Cedex 9, France. E-mail: regis.cereghino@univ-tlse3.fr

13202. Tummylovich, O.A. (2013): Interannual dynamics of the species composition and relative abundance of dra-

gonflies in one of the ponds of Kaliningrad. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 214-218. (in Russian, with English summary) ["Dragonfly larvae and changes in anthropogenic pressure on the ecosystem were monitored for 4 years (2005–2007) in one of the ponds of Kaliningrad. In 2004, the pond had virtually no anthropogenic pressure, and it was inhabited by seven species of dragonflies (*Libellula quadrimaculata*, *L. depressa* Enallagma cyathigerum, *Coenagrion hastulatum*, *C. pulchellum*, *Ischnura elegans*, and *Aeshna grandis*). Anthropogenic influence increased during the period of study, leading to degradation of aquatic vegetation, soil pollution, and disruption of the shoreline due to the increased recreational pressure. This was accompanied by a decrease in the occurrence frequency of all dragonfly species and average number of larvae per sample (from 2.71 to 0.31 individuals), and the gradual disappearance of six species. In 2007, only *L. quadrimaculata* remained in the pond, the most widespread and abundant species, not only in Kaliningrad Oblast, but throughout Russia and Europe." (Author)] Address: Tummylovich, O.A., Kaliningrad State Technical University Sovetsky prosp. 2, Kaliningrad, 236000, Russia. E-mail: levente@rambler.ru

13203. Valk, van der, R. (2013): Calculation of the maturation period of the Black Darter (*Sympetrum danae*). *Brachytron* 15(2): 128-132. (in Dutch, with English summary) ["The maturation period of *S. danae* was studied over a period of three years and calculated using the statistical model that Underhill & Zuchinni (1986) used to describe primary moult in birds. The development of the pterostigma colour was used as a measure for maturation. During the maturation period the pterostigma colour changes from white to intense black. To visualize this process the stages of the maturation were estimated in the field as follows: • stage "fresh": the colour of the pterostigma is practically white and the body is more or less pale; • stage "immature": the colour of the pterostigma is not white anymore but also not completely dark; • stage "mature": the colour of the pterostigma is black. In this manner the number of dragonflies in each stage is counted. As a result of this model the duration t in days of the maturation period (stage "immature") can be calculated. In addition two other parameters are calculated i.e. the mean starting date μ and the standard deviation σ of the starting dates. In this model it is assumed that the starting dates have a Gaussian distribution $N[\mu, \sigma]$. These parameters were calculated using a computer programme. The duration of the maturation period in the year 2007 stands out with respect to the year 2006. 2005 appeared to be a more average year. The duration of the maturation period of *S. danae* appears to depend strongly on weather conditions (Table 2). In 2005 the duration of the maturation period was seventeen days, which is in ac-

cordance with the duration mentioned in Nederlandse Vereniging voor Libellenstudie (2002). In years with more extreme weather conditions the duration of the maturation period may differ by as much as a factor three." (Author)] Address: Valk, van der, R., J. Buiskoolweg 10A, 9695 TT Bellingwolde, The Netherlands. E-mail: valk0078@kpnmail.nl

13204. Vassilenko, D.V. (2013): Dragonflies of the family Kennedyidae Tillyard, 1925 (Insecta: Odonata) in Permian odonatofaunas. Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences. – Yaroslavl: Filigran, 2013. – 254 pp: 32-35. (in Russian, with English summary) ["Kennedyid dragonflies are a group of protozopterans specialized on living among dense vegetation. The fossil record of Kennedyidae is extremely incomplete. Members of this family are invariably scant and rather uniform in Permian deposits, which is explained by their mode of life and low probability of their fossilization under typical sedimentation conditions. Owing to the fossil site Isady, which gives an idea of the fauna of a small waterbody and its environs, it has been shown that kennedyids played a very important role in such biotopes. The actual taxonomic diversity of the family was considerably higher than documented, not only because of the incompleteness of the fossil record, but also because of wing venation reduction, which results in low variation of venation even at the level of genera, and thus in underestimations of the number of identifiable species." (Author)] Address: Vassilenko, D.V., Borisiak Palaeontological Institute. Russian Academy of Sciences ul. Profsoyuznaya 123, Moscow, 117997, Russia. E-mail: lab@palaeoentomolog.ru

13205. Venkatesh, A.; Tyagi, B.K. (2013): Predatory potential of *Bradinopyga geminata* and *Ceriagrion coromandelianum* larvae on dengue vector *Aedes aegypti* under controlled conditions (Anisoptera: Libellulidae; Zygoptera: Coenagrionidae; Diptera: Culicidae). *Odonatologica* 42(2): 139-149. (in English) ["The predatory potential of *B. geminata* and *C. coromandelianum* larvae on *Aedes aegypti* larvae was investigated under laboratory condition with a view to screening these predators for use in the control of *Ae. aegypti* breeding in dengue prone areas. The feeding rate of 8th instar *B. geminata* on *Ae. aegypti* showed maximum predation on 1st instar larvae (86%), followed by 2nd, 3rd and 4th instars (72%, 66% and 48%), respectively. In the first hour, the consumption rate was maximal for all instars and a low intake (about 5%) was observed in subsequent hours. In 12th instar *B. geminata* larvae maximum predation was observed for the 1st and 2nd instar larvae (98%) of *Ae. aegypti*, followed by 3rd and 4th instars (92% and 78%), respectively. The feeding rate of 12th instar *C. coromandelianum* larvae on *Ae. aegypti* larvae showed that the maximum predation was of the 1st instar larvae (82%), followed by 2nd, 3rd and 4th in-

stars (51%, 35% and 24%) respectively. The first hour consumption rate was maximum for all instars and no significant intake was seen in the following hours. The predation of *Aedes* larvae by the 2 spp. of odonate larvae was compared for the 4 mosquito larval instars by using one way ANOVA. No significant difference was found between them for 1st instar larvae of *Ae. aegypti* but there was a significant difference ($P < 0.05$) in predation on the other 3 instars, with *B. geminata* consuming more mosquito larvae. A single anisopteran larva is sufficient for eliminating the huge mass of larval mosquitoes breeding in a cement tank or a cement cistern. Therefore, this biological control agent could be released to control *Aedes* larval production in areas of dengue epidemics." (Authors)] Address: Tyagi, B.K., Centre for Research in Medical Entomology, Indian Council of Medical Research, 4 Sarojini Street, Chinna Chokkikulam, Madurai-625 002, Tamil Nadu, India. E-mail: bktyagi@sify.com

13206. Walker, B. (2013): Some observations on the effect of temperature on dragonfly recording. *J. Br. Dragonfly Society* 29(2): 84-96. (in English) ["The British Trust for Ornithology added odonates to the species that contributors are asked to record from 2011. Records for the first two years of dragonfly records from this scheme have been analysed and indicate a marked difference in observations in the spring between 2011 and 2012. Spring 2011 was warmer than the recent average and noticeably warmer than in 2012 and dragonflies were recorded earlier in numbers in 2011 than in 2012. Based on a comparison of the records and the average weekly temperatures a correction factor is proposed to account for reduced dragonfly activity when temperatures are lower and it is suggested that this can explain some fluctuations in the raw data. It is also noted that the reduction in records from their peak can be described by a daily survival rate approach." (Author)] Address: Walker, B., 49 Roman Way, Wantage, Oxon OX12 9YF, UK

13207. Wang, C.-x.; Yu, W.-Y.; Li, Z.-h.; Cai, Y.; Ren, Y.-h.; Liu, Y. (2013): Study on fauna and diversity of Odonata in Yuntai mountain, Jiangsu Province. *Hubei Agricultural Sciences* 52(8): 1821-1832. (in Chinese, with English summary) [41 species were recorded between 2000 and 2010. The records were analysed according biogeographical regions.] Address: Wang, C.-x., Biochemical and Environmental Engineering college, Nanjing Xiaozhuang University, Nanjing 211171, China

13208. Warren, J.M.B. (2013): An assessment of benthic macroinvertebrate communities from three wadeable streams in central Texas. *Water Quality Technical Series Publication WQTS-2013-01. PWD PWD RP V3400-1784.* Texas Parks and Wildlife Department, Austin, TX: V + 16 pp. (in English) ["Benthic macroinvertebrates were collected and identified from three streams in the middle Brazos River Basin as a vehicle

for a biologist to gain experience in study design and working with an unfamiliar taxonomic group. The three streams selected for the study were among the few streams that continued to flow in the middle Brazos River Basin during an extreme drought in 2011. The sample sites were the Leon River at FM 1829, Salado Creek at Pace Park in Salado and Tehuacana Creek upstream of FM 2491. All three streams shared similar substrate and cover at the sample sites. Benthic macroinvertebrates were collected from riffles dominated by cobble, algae and leaf debris. Flow varied among the three streams, ranging from 1.0 ft³/s at Tehuacana Creek to 6.6 ft³/s at Salado Creek. Instantaneous physicochemical data varied among the three streams as well. Benthic macroinvertebrate taxa were most numerous at Salado Creek with 29 collected. Tehuacana Creek and Leon River taxa were 19 and 15, respectively. Numbers and types of individuals collected from each creek translated into an aquatic life use (ALU) scores that are the sum of 12 individual metrics. Salado Creek's ALU ranked high (score = 37), the Leon River scored intermediate (26), and Tehuacana Creek scored intermediate (28). Data results agreed with field observations and instantaneous physico-chemical data, and the study challenged the novice benthic macroinvertebrate taxonomist." (Authors) The list of taxa includes *Argia*, *Enallagma*, *Erpetogomphus*, and *Libellula*.] Address: Bronson Warren, Jennifer M., Water Resources Branch, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744, USA

13209. Wasserberg, G.; White, L.; Bullard, A.; King, J.; Maxwell, R. (2013): Oviposition site selection in *Aedes albopictus* (Diptera: Culicidae): Are the effects of predation risk and food level independent? *Journal of Medical Entomology* 50(5): 1159-1164. (in English) ["For organisms lacking parental care and where larval dispersal is limited, oviposition site selection decisions are critical fitness-enhancing choices. However, studies usually do not consider the interdependence of the two. In this study, we evaluated the effect of food level on the oviposition behaviour of *Aedes albopictus* (Skuse) in the presence or the absence of a nonlethal predator (caged dragonfly nymph). We also attempted to quantify the perceived cost of predation to ovipositioning mosquitoes. Mosquitoes were presented with oviposition cups containing four levels of larval food (fermented leaf infusion) with or without a caged libellulid nymph. By titrating larval food, we estimated the amount of food needed to attract the female mosquito to oviposit in the riskier habitat. As expected, oviposition rate increased with food level and decreased in the presence of a predator. However, the effect of food level did not differ between predator treatments. By calculating the difference in the amount of food for points of equal oviposition rate in the predator-present and predator-absent regression lines, we estimated the cost of predation risk to be 1950 colony-forming-units per millilitre. Our study demonstrated the importance of considering the possi-

ble interdependence of predation risk and food abundance for oviposition-site-seeking insects. This study also quantified the perceived cost of predation and found it to be relatively low, a fact with positive implications for biological control." (Authors)] Address: not available

13210. Weihrauch, F.; Erfurth, L. (2013): He who is too slow is punished by life: *Calopteryx virgo* (L.) entangled by the tendril of a vetch during emergence (Zygoptera: Calopterygidae). *Odonatologica* 42(3): 253-256. (in English) ["At a rivulet in the western fringe area of Munich, Germany, an immature male was photographed with its right forewing tightly entwined around by the tendril of a vetch. Obviously the tendril had entangled the not yet unfolded wing briefly after emergence. The living insect was unable to escape from its bonds. This is only the third published case of a biotic interaction of this type." (Authors)] Address: Weihrauch, F., Jägerstr. 21A, 85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de

13211. Więcek, M.; Martin, P.; Gąbka, M. (2013): Distribution patterns and environmental correlates of water mites (Hydrachnidia, Acari) in peatland microhabitats. *Exp. Appl. Acarol.* 61: 147-160. (in English) ["In Europe peatlands are wetlands of postglacial origin. Because of climatic changes and agricultural activities (i.e. drainage and peat extraction), they are one of the most endangered ecosystems worldwide. Water mites are well known as indicators of changing environments in other ecosystems such as springs and lakes. For our study we selected seven peatlands located in North-Western Poland and focused on water mite distribution and associated habitat and water quality variables. We described water mite fauna in various microhabitats (aquatic and semiaquatic) along the mineral-richness gradient to test whether this gradient is reflected in the composition of water mite assemblages. We selected conductivity, pH and vegetation as variables reflecting the poor-rich gradient. Additionally, we measured water depth, temperature and dissolved oxygen, which are often important parameters for water mites. We also noted presence of prey and host taxa of particular water mite species. Based on physicochemical parameters we identified three types of habitats harbouring three distinctive species groups of water mites. We were able to distinguish species that appear to be typical of spring fens (e.g. *Hygrobates norvegicus*, *Lebertia separata*), connected with acidic, nutrient poor pools (e.g. *Arrenurus neumani*, *A. pustulator*) and species seemingly typical of temporary habitats dominated by *Sphagnum* mosses (e.g. *Piersigia intermedia*, *Zschokkea oblonga*, *A. stecki*). The poor-rich gradient is strongly reflected in the composition of water mite assemblages. We also found strong correlations between the water mite fauna and both conductivity and pH gradient. Our results show that water conductivity is the most important of the examined factors, driving mite-species distribution in peat-

lands." (Authors) The paper includes many references to Odonata.] Address: Więcek, M., Dept of Animal Morphology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland. E-mail: roztoc@wp.pl

13212. Wildermuth, H. (2013): Buchbesprechungen: Karjalainen S. & M. Hämäläinen 2013. *Demoiselle Damselflies – Winged Jewels of Silvery Streams*. *Entomo Helvetica* 6: 198. (in German) [The review introduces into the wonderful book on the Calopterygoidea.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

13213. Wildermuth, H. (2013): SAGLS-Exkursion 2012 im Ronfeld am Baldeggersee. *Entomo Helvetica* 6: 190-191. (in German) [The 'Schweizerische Arbeitsgemeinschaft für Libellenschutz' (SAGLS) realised an excursion to the Baldeggersee region, Kanton Luzern, Switzerland. Most interesting species recorded were *Orthetrum albistylum*, *Sympetrum depressiusculum*, and *Anax parthenope*. For more details on the region see: <http://www.pronatura-lu.ch/ronfeld.php>.] Address: Wildermuth, H., Haltbergstr. 43, CH-8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

13214. Wildermuth, H. (2013): Natur- und Fotoreise zu den Heuschrecken Südfrankreichs. *Entomo Helvetica* 6: 192-195. (in German) [This extensive orthopterological report on a journey to southern France, includes some odonatological notes: records of Odonata from the Canal de Vergière, Crau, and Marais du Vigueirat, Camargue, Département Bouches-du-Rhône, as well as the river Hérault.] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

13215. Wu, X.; Li, F.; Cong, R.; Chu, B. (2013): Preliminary Analysis on Feeding Habits of *Megalurus pryeri* in Nanji Wetland, Jiangxi. *Sichuan Journal of Zoology*: 438-441. (in Chinese, with English summary) ["The feeding habits and food composition of marsh grassbird *Megalurus pryeri* in Nanji Wetland National Nature Reserve (Jiangxi province) were investigated during breeding season (April, 2011) and non-breeding season (November, 2011). The brood behaviour of parent birds was observed by using binoculars and cameras in breeding season, and the stomach contents of 7 dead individuals collected from bird banding in non-breeding season were examined also. The results showed that the marsh grassbird mainly eat arthropods including dragonfly insects, spiders, imago or larva of *Grillotapidae* (mole crickets) and *Lepidoptera* insects in breeding season. While the diet was made up of both arthropods (70.24%) and vegetation (29.76%) such as *Orthoptera*, *Coleoptera*, *Odonata*, *Lepidoptera* insects, spiders and seeds, foliage in non-breeding season. In conclusion, the feeding habits of mash grassbird are different in breeding and non-breeding season, and this difference is due to seasonal changing of food composition in the

habitats and that the nestlings need higher protein nutrition food." (Authors) Odonata contributed with 8.36% to the diet.] Address: Li, F., College of Wildlife Resources, Northeast Forestry University, Harbin 150040, China. E-mail: lifeng604@163.com

13216. Xu, Q.-h. (2013): Descriptions of the final stadium larva and female adult of *Coeliccia mingxiensis* Xu (Odonata: Zygoptera: Platycnemididae). *Zootaxa* 3721 (1): 92-96. (in English) ["The final stadium larva of *C. mingxiensis* is described and illustrated. The female adult is also described for the first time. The larva can be easily separated from all known *Coeliccia* larvae by the following distinct morphological characters: (1) prementum longest in all known *Coeliccia* larvae; median lobe with 4 pairs of premental setae and palpal lobe with 6 palpal setae; (2) caudal gills shortest of all known *Coeliccia* larvae when compared with body length; median gill rounded at apex and lateral gill with a small median projection at apex. The female is similar to the male in many respects, differing chiefly in several respects as follows: the transverse yellow band on vertex of head broader and straighter than in male; antehumeral stripe on mesepisternum somewhat incurved basally, not forming a strong hook, which is present in male; distal abdomen with obviously different colour pattern; anal appendages brownish-black, shorter than S10; vulvar scales robust, brownish-yellow, projecting well beyond end of abdomen." (Author)] Address: Xu, Q.-h., Department of Garden and Horticulture, Zhangzhou City University, Zhangzhou, Fujian 363000, China. E-mail: qhx363000@gmail.com

13217. Yapo, L.M.; Atsé, C.B.; Kouassi, P. (2013): Composition, abundance and diversity of aquatic insects in fishponds of southern Ivory Coast, West Africa. *Entomologie Faunistique – Faunistic Entomology* 66: 123-133. (in English, with French summary) ["Abundance, density, biomass, and diversity of aquatic insects collected in water column from fishponds in southern Ivory Coast were studied. Monthly samplings have been conducted from December 2007 to November 2008. A total of 27,381 individuals belonging to 64 taxa, 25 families and 6 orders (Ephemeroptera, Odonata, Hemiptera, Lepidoptera, Coleoptera, and Diptera) were collected. Among these six orders, Hemipterans dominated quantitatively and qualitatively aquatic insect's community structure. The most abundant species were *Anisops sardea* Kirkaldy 1904 (64.17%), *Plea pullula* Stål 1855 (5.87%), *Eurymetra* sp. (3.87%), *Amphiops* sp. (3.79%), *Mesovelgia* sp. (3.41%) and *Cloeon bellum* Navas 1931 (2.21%). A spatiotemporal variation was observed for the different recorded parameters (density, biomass, and diversity). The maximum abundance, density, and biomass were recorded during the rainy season in the station of Layo. The Shannon-Weaver index indicated that the highest diversity of aquatic insects was obtained during the rainy season in the stations of Banco, Anyama I and Anyama II. In contrast, evenness reached

maximum values during the dry season in the stations of Layo, and Banco. Local environmental conditions (i.e. temperature, dissolved oxygen, pH, transparency, conductivity, ammonium, nitrite and phosphorus) accounted for 91.70% of variation in aquatic insect assemblages using canonical correspondence analysis (CCA). Seasonal trends in aquatic insect community composition were also related to changes in environmental characteristics of the fishponds." (Authors)] Address: Atsé, C.B., Département Aquaculture, Centre de Recherches Océanologiques (CRO), BPV 18 Abidjan, Côte d'Ivoire. E-mail: atsebouacelestin@hotmail.com

13218. Youprom, P.; Panich-Pat, T.; Prommi, T.-O. (2013): Aquatic insect communities and water quality in wetland, northern Thailand. *Journal of Applied Sciences in Environmental Sanitation* 8(3): 161-169. (in English) [Nong Leng Sai wetland is situated in the north of the town of Phayao, Mae Chai District, Phayao Province. Aquatic insects were monthly collected from January to August 2009. The Hemiptera had the highest abundance with 43.34% of the total specimens, followed by Odonata (19.66%). Taxa are treated at the family level.] Address: Youprom, P., Faculty of Liberal Arts and Science, Kasetsart University, Kamphaeng Saen Campus, Nakhon Pathom, Thailand. E-mail: faastop@ku.ac.th

13219. Zhang, H.; Cai, Q.; Liao, M. (2013): Three new *Cephalaeschna* species from central China with descriptions of the hitherto unknown sex of related species (Odonata: Aeshnidae). *International Journal of Odonatology* 16(2): 157-176. (in English) ["Three new *Cephalaeschna* species, *C. discolor* sp. nov. (holotype male; Shennongjia National Nature Reserve, Shennongjia City, Hubei province, China, 16 August 2012), *C. mattii* sp. nov. (holotype male; Lujiahe River, Zigui County, Hubei province, China, 18 September 2012) and *C. solitaria* sp. nov. (holotype male; Dalongtan in Shennongjia National Nature Reserve, Shennongjia City, Hubei province, China, 19 July 2012) are described, illustrated in colour and compared with the known Chinese *Cephalaeschna*. All the holotypes are deposited in the Collection of Aquatic Animals, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan City, Hubei Province, China. The hitherto unknown male of *C. obversa* and female of *C. patrum* are also described and illustrated. Brief notes on biology of each species are also provided." (Authors)] Address: Zhang, H., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com

13220. Zhu, R.; Ayodeji Bode-Oke, A.; Yan Ren, Y.; Dong, H. (2013): Analysis of dragonfly take-off mechanism: Initial impulse generated by aerodynamic forces. *Bulletin of the American Physical Society* 58(18): o.p. ["Take-off is a critical part of insect flight due to not only that every single flight initiates from take-off, but also that the take-off period, despite its short duration, ac-

counts for a relatively large fraction of the total energy consumption. Thus, studying the mechanism of insect take-off will help to improve the design of Micro Air Vehicles (MAVs) in two major properties, the success rate and the energy efficiency of take-off. In this work, we study 20 cases in which dragonflies (species including *Pachydiplax longipennis*, *Epitheca cynosura*, *E. princeps* etc.) take off from designed platform. By high-speed photogrammetry, 3-d reconstruction and numerical simulation, we explore how dragonflies coordinate different body parts to help take-off. We evaluate how aerodynamic forces generated by wing flapping create the initial impulse, and how these forces help save energy consumption." (Authors)] Address: not stated

13221. Živić, I.; Živić, M.; Milošević, D.; Bjelanović, K.; Stanojlović, S.; Daljević, R.; Marković, Z. (2013): The effects of geothermal water inflow on longitudinal changes in benthic macroinvertebrate community composition of a temperate stream. *Journal of Thermal Biology* 38(5): 255-263. (in English) ["Highlights: • We monitored effects of water temperature increase on macrozoobenthos communities. • Water temperature increase severely decreased macrozoobenthos diversity. • Warm waters were dominated (98.9%) by Chironomidae, Mollusca and Oligochaeta. • Plecoptera, Coleoptera, Gammaridae, and Odonata completely disappeared in warm waters. • Significant warm waters annual temperature variations had profound influence too. Studies of macroinvertebrate communities in thermal streams are highly geographically localized and mostly faunistical, making the efforts to understand in situ water thermal regime effects on those biocoenoses barely achievable. We examined the effects of geothermal water inflow on benthic macroinvertebrate community composition in a temperate stream. Environmental data analysis has shown that water temperature is a major factor determining the faunistical composition, especially downstream of the geothermal water inflow situated some 20 m upstream of locality V3. The increase in mean annual water temperature from 11.5 ± 4.1 °C at locality V2 to 22.0 ± 5.0 °C at locality V3 induced an enormous shift in community composition from a diverse one, composed mainly of Gammaridae, Simuliidae, Chironomidae, Trichoptera and Ephemeroptera, and to a lesser extent of Plecoptera, Coleoptera, other Diptera, Hirudinea, Odonata, Mollusca and Oligochaeta, to a uniform one strongly dominated by Chironomidae, Mollusca and Oligochaeta, comprising $98.9 \pm 0.5\%$ of collected individuals. While the disappearance of Plecoptera and Ephemeroptera and the increase in representation of Mollusca and Oligochaeta at locality V3 might be solely explained by water temperature increase, in the case of Chironomidae the increase in water discharge and relatively high annual water temperature variation at locality V3 had additional positive effects. However, the latter factor induced disappearance of Gammaridae at locality V3. In addition to the increase in water temperature, increase of water velocity significantly determined the

longitudinal dynamics of Coleoptera." (Authors)] Address: Živić, Ivana, University of Belgrade, Faculty of Biology, Studentski trg 16, 11000 Belgrade, Serbia

13222. Zinman, A.R.; Balter, M.L.; Olberg, R.; Ramasubramanian, A.; Hodgson, D.A. Design, construction, and testing of a flying prey simulator. ASME 2012 5th Annual Dynamic Systems and Control Conference joint with the JSME 2012 11th Motion and Vibration Conference Volume 3: Renewable Energy Systems; Robotics; Robust Control; Single Track Vehicle Dynamics and Control; Stochastic Models, Control and Algorithms in Robotics; Structure Dynamics and Smart Structures; Fort Lauderdale, Florida, USA, October 17–19, 2012: 59-65. (in English) ["The goal of this research project is to investigate the neuronal control of flying prey interception in dragonflies by designing, constructing, and testing an apparatus to simulate the complex motions of a flying insect. Our three-dimensional motion device is capable of mimicking a flying insect by moving a small bead accurately up to speeds of 1 m/s in any direction. Dragonflies are efficient aerial predators that can intercept and capture small insects in flight. Our stimulus device will be used to determine the way in which dragonfly neurons encode information about object movement in three dimensions. Sinusoidal position tracking experiments using multiple input frequencies were conducted using the apparatus. The results indicate that the machine operates with good repeatability with little variability between trials. Preliminary dragonfly testing with the apparatus showed favourable results, indicating proof of concept." (Authors)] Address: Balter, M., Mechanical Engineering and Biology Departments, Union College, 807 Union Street, Schenectady, NY 12308 USA

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1997

13223. Han, F.-y. (1997): The dragonflies from Taiyuan city. *Journal of Shanxi University (Nat. Sci. Ed.)* 20(1): 96-98. (in Chinese, with English summary) [18 species had been collected in Taiyuan City, China. *Pseudothemis zonata*, *Sympetrum hypomelas*, *Enallagma cyathigerum*, *Lestes barbarus*, and *Lestes sponsa* are first records for Shanxi Province.] Address: Han F.y., Department of Life Science, Shanxi University, Taiyuan 030006, China

13224. Martens, A. (1997): Erfolgreiche Entwicklung der Eier von *Lestes viridis* (Vander Linden) nach Ablage in Koniferen (Zygoptera: Lestidae). *Libellula* 16(1/2): 65-68. (in German, with English summary) ["In October 1995, tandems oviposited in the bark of two-year-old twigs of *Pinus silvestris* at a bog lake near Gilliom (Lower Saxony, Germany). Other trees at this lake as well as at two other localities showed the typical markings of deposited eggs. In May 1996, hatched prolarvae and first larval instars were recorded from water filled traps hanging in *Pinus* trees." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, 76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

13225. Rintelen, T. von (1997): Eine Vogelreuse als Libellenfalle: Beobachtungen in der Vogelwarte Pape, Lettland. *Libellula* 16(1/2): 61-64. (in German, with English summary) ["A birdtrap as a collecting device for dragonflies: observations at the Bird Observatory of Pape, Latvia - From the middle of August to the middle of September 1995 the birdtrap was observed to be full with dragonflies, approx. 500-1000 specimens, at least 90% were alive. Most of the dragonflies belonged to the genus *Aeshna*, the remaining consisted of several libellulids and two *Somatochlora* species. The occurrence of four immature *Anax ephippiger* (Burmeister) specimens was of special interest and suggests an actual breeding in the area. This record of *A ephippiger* seems to be the first for Latvia." (Author)] Address: von Rintelen, T., Museum für Naturkunde der Humboldt-Universität zu Berlin, Institut

für Systematische Zoologie, Invalidenstr.e 43, 10115 Berlin, Germany

1998

13226. Jödicke, R. (1998): Herbstphänologie mitteleuropäischer Odonaten. 2. Beobachtungen am Niederrhein, Deutschland. *Opuscula zoologica Fluminensia* 159: 1-20. (in German) ["In a systematical investigation during several years, 12 species were recorded from mid October onwards. *Lestes virens vestalis* (20-XI), *L. viridis* (28-XI), *Aeshna cyanea* (23-XI), and *Sympetrum striolalum* (3-XII) were the last on wings. Additionally, autumnal records of all central European species are compiled from the literature and unpublished sources, and compared with the Lower Rhine situation. The results are discussed in terms of individual age, reproductive ability, and causes of mortality." (Author)] Address: Jödicke, R., Großenging 14, D-49699 Lindern, Germany

13227. Thorp, J.H.; DeLong, M.D.; Greenwood, K.S.; Casper, A.F. (1998): Isotopic analysis of three food web theories in constricted. *Oecologia* 117(4): 551-563. (in English) ["Analyses of stable isotope ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) and C:N ratios of food webs within a floodplain and a constricted-channel region of the Ohio River during October 1993 and July 1994 indicate that the increasingly influential flood pulse concept (FPC) does not, for either location, adequately address food web structure for this very large river. Furthermore, results of this study suggest that the riverine productivity model (RPM) is more appropriate than the widely known river continuum concept (RCC) for the constricted region of this river. These conclusions are based on stable isotope analyses of potential sources of organic matter (riparian C3 trees, riparian C4 grasses and agricultural crops, submerged macrophytes, benthic filamentous algae, benthic particulate organic matter, and transported organic matter containing detritus and phytoplankton) and various functional feeding groups of invertebrate and fish consumers. The FPC, which stresses the key contribution of organic matter,

particularly terrestrial organic matter, originating from the floodplain to riverine food webs, was judged inappropriate for the floodplain region of the Ohio River for hydrodynamic and biotic reasons. The rising limb and peak period of discharge typically occur in November through March when temperatures are low (generally much less than 10°C) and greater than bank-full conditions are relatively unpredictable and short-lived. The major food potentially available to riverine organisms migrating into the floodplain would be decaying vegetation because autotrophic production is temperature and light limited and terrestrial insect production is minimal at that time. It is clear from our data that terrestrial C4 plants contribute little, if anything, to the consumer food web (based on $\delta^{13}\text{C}$ values), and $\delta^{15}\text{N}$ values for C3 plants, coarse benthic organic matter, and fine benthic organic matter were too depleted ($\sim 7\text{--}12\%$ lower than most invertebrate consumer values) for this organic matter to be supporting the food web. The RPM, which emphasizes the primary role of autotrophic production in large rivers, is the most viable of the remaining two ecosystem models for the constricted-channel region of the Ohio based on stable isotope linkage between sources and consumers of organic matter in the food web. The most important form of food web organic matter is apparently transported (suspended) fine (FTOM) and ultra-fine particulate organic matter. We propose that phytoplankton and detritus of an autochthonous origin in the seston would represent a more usable energy source for benthic (bivalve molluscs, hydropterygids, caddisflies) and planktonic (microcrustaceans) suspension feeders than the more refractory allochthonous materials derived from upstream processing of terrestrial organic matter. Benthic grazers depend heavily on nonfilamentous benthic algae (based on gut analysis from a separate study), but filamentous benthic algae have no apparent connection to invertebrate consumers (based on $\delta^{13}\text{C}$ values). Amphipod and crayfish show a strong relationship to aquatic macrophytes (possibly through detrital organic matter rather than living plant tissue). These observations contrast with the prediction of the RCC that food webs in large rivers are based principally on refractory FTOM and dissolved organic matter from upstream inefficiencies in organic-matter processing and the bacteria growing upon these suspended or dissolved detrital compounds. The conclusions drawn here for the Ohio River cannot yet be extended to other floodplain and constricted-channel rivers in temperate and tropical latitudes until more comparable data are available on relatively pristine and moderately regulated rivers." (Authors) *Argia*, *Enallagma*, *Neurocordulia*] Address: Thorp, J.H., Department of Biology, University of Louisville, Louisville, KY 40292, USA

1999

13228. Juhász, P.; Kiss, B.; Olajos, P.; Grigorszky, I. (1999): Faunistical research on the 'sanctuary' oxbows of River Körös. *Crisicum* 2: 99-110. (in Hungarian, with English summary) [Hungaria; in 1998 at 12 localities 28

Odonata species were recorded. The list of species includes *Coenagrion pulchellum*, *Stylurus flavipes*, *Epitheca bimaculata*, *Anaciaeschna isosceles*, and *Anax parthenope*.] Address: Juhász, P., VITUKI Rt., H-1095 Budapest, Kvassay út 1., Hungaria

13229. Malavasi, D.; Tralongo, S. (1999): Osservazioni sulle comunità di Lepidotteri Ropaloceri e Odonati presenti nel Parco regionale dello Stirone. *Pianura* 11: 133-145. (in Italian, with English summary) [21 Odonata species were observed in the regional Park of the River Stirone, Italy. The list of species includes *Coenagrion mercuriale*.] Address: Malavasi, D., Studio Associato GECO, Via San Faustino, 23, 41037 Mirandola, Italy. E-mail: davidemalavasi.eco@libero.it

13230. Mitra, T.R. (1999): Geographical distribution and zoogeography of Odonata of Meghalaya, India. *Rec. zool. survey India, Occ. pap.* 170: 63 pp. (in English) [The state Meghalaya is situated in the North-eastern part of India. It was created in 1972; previous to this it was within Assam along with Arunachal Pradesh, Mizoram, Manipur, Nagaland. Its physiography is based on three hills - Garo, Khasi and Jaintia. The paper compiles 148 species and their known regional localities.] Address: deceased

2000

13231. Sivaramkrishnan, K.J.; Venkataraman, K.; Moorthy, R.K.; Subramaniam, K.A.; Utkarsh, G. (2000): Aquatic insect diversity and ubiquity of the Western Ghats, India. *Journal of the Indian Institute of Science* 80(6): 537-552. (in English) ["We studied the distribution of 4533 individuals of aquatic insects belonging to 72 genera, 45 families and 10 orders, collected from headwater stream riffles from 17 localities in the hills of southwestern India. The southern, wetter sites with lower human impacts favour specialised sensitive taxa. The ecological attributes are correlated across the taxonomic gradient, viz. family, genus and species levels, which would permit an efficient and participatory inventory as well as monitoring even at the family level." (Authors) Taxa include Odonata and are treated at family level.] Address: Utkarsh, G., RANWA. C-2611, Ketan Heights, Kothrud, Pune 411 029, India

2001

13232. Catling, P.M. (2001): Morphological evidence for the hybrid *Enallagma ebrium* x *hageni* (Zygoptera: Coenagrionidae) from Ontario. *Proceedings of the Entomological Society of Ontario* 132: 99-101. (in English) ["On 18-VI-2000, four species of Zygoptera including *Enallagma civile*, *E. cyathigerum*, *E. ebrium*, and *E. hageni*. were collected from Bumside gravel pit pond, 45.2272° N, 75.7780° W, 5 km NE of Richmond, Ottawa, Ontario. This extensive gravel pit pond had been created 10 years earlier. Subsequent examination of the material revealed a single male specimen of a probable hybrid of *E. ebrium* and *E. hageni*. ... The putative *Enallagma ebrium* x *hageni*

specimen has been placed with *E. ebrium* in the Canadian National Collection of Insects, Arachnids, and Nematodes (CNCI, Agriculture and AgriFood Canada, Ottawa)." (Author)] Address: Catling, P.M., 2326 Scrivens Drive, R.R. 3, Metcalfe, Ontario K0A 2P0, Canada. E-mail: brownell@achilles.net

2002

13233. Scholl, C. (2002): Report of the dragonflies at Store Mosse National Park, 2001. County Administration, Jönköping, Meddelande 02: 28: 20 pp. (in English) [16 spp., recorded in the Park (N of Värnamo, Sweden) during July-Aug. 2001, are listed, their local abundance is stated and habitat requirements are outlined. For the full paper see: <http://projektwebbar.lansstyrelsen.se/storemosse/SiteCollectionDocuments/sv/Publikationer/200228Report%20of%20The%20Dragonflies%20at%20Store%20Mosse%20National%20Park%202001.pdf>] Address: Scholl, Christiane c/o J. Rova, Länsstyrelsen i Jönköpings län, S-551 86 Jönköping, Sweden

2003

13234. Beatty, C.D. (2003): Habitat associations and life histories of Odonata in riverine wetlands of the Willamette Valley, Oregon. M.Sc. thesis, Oregon State University: 92 pp. (in English) ["This thesis explored the distributions and life histories of Odonata of the riverine wetlands of the Willamette Valley in western Oregon, USA. Odonate species distributions were characterized over two seasons in the autumn of 2000 and the spring of 2001-at twenty-seven wetlands located throughout the valley. Distributions of nymphs and adults were compared with wetland habitat conditions that may affect odonate diversity. Odonate nymph and adult distributions were analyzed through Hierarchical Agglomerative cluster analysis (HA). HA identified discrete clusters of sites based on the distributions of species in the genera *Aeshna*, *Erythemis*, *Lestes*, *Libellula*, *Pachydiplax*, *Sympetrum* and *Tamea*. To identify habitat associations with odonate species, nymph and adult data were analyzed by Non-metric Multidimensional Scaling (NMS). NMS revealed that odonate distributions are associated with site hydrology, water depth and temperature, the presence of large emergent plants (e.g. *Typha latifolia*), the presence of fish, and surrounding landcover. These data will provide guidance for wetland managers in the use of odonates as indicators of wetland health. To further examine the relationship between odonate species and their wetland habitats, quantitative life history data for the 27 odonate species were analyzed to determine functional associations between species attributes and the environments in which they are found. Oviposition location, presence of a resting egg, over-wintering life stage, nymphal foraging strategy and adult flight season were subjected to NMS, to determine biological similarities between species occupying particular locations. Life history patterns correlated strongly with hydrology. Analysis of sites by odonate species richness

found a relationship between richness and site hydrology, but failed to explain the distribution of several species associated with wetlands that dry during part of the year. We conclude from our results that species-level life history data are essential for explaining odonate distributions. We determined that the presence of odonate species in a wetland is indicative of habitat condition, that analysis of odonate distributions at the species level is necessary to understand habitat associations, and that analysis of life-history attributes provides a functional understanding of odonate distributions that measurements of species richness or the distributions of genera or families alone cannot explain." (Author)] Address: Beatty, C., Dept Biology, Santa Clara Univ., 500 El Camino Real, Santa Clara, California 95053-0268, USA. E-mail: cbeatty@scu.edu

13235. Englund, R.A.; Arakaki, K.; Preston, D.J.; Evenhuis, N.L.; McShane, M.K.K. (2003): Systematic inventory of rare and alien aquatic species in selected O'ahu, Maui, and Hawai'i Island streams. Contribution No. 2003-017 to the Hawaii Biological Survey: II + 14 pp. (in English) ["The Hawaii Biological Survey (HBS) of the Bishop Museum collected and identified aquatic insects and other stream invertebrates in selected Hawaiian streams as part of an inventory of rare native and new alien aquatic species. Three remote streams on each island (O'ahu, Maui, Hawai'i) were assessed during this study. The purpose of these surveys was to provide a systematic inventory in selected streams of rare native aquatic species and invasive alien species in remote and difficult to access portions of the Hawaiian archipelago. The results of this study also provided an indication of aquatic ecosystem health and native biodiversity in areas not normally accessible because of geographic constraints such as steep waterfalls and dense vegetation. These surveys provided a baseline inventory of aquatic insect species present in each stream assessed and also ensured museum specimens and related databases will be available for future researchers. Stream reaches examined during this study had little to no impacts from urbanization or irrigation diversions, with the Maui and Hawai'i Island streams found to be particularly pristine. A representative cross-section of pristine stream reaches was examined on each island surveyed. The aquatic insect fauna found during these surveys contained a remarkably high percentage of native species in streams surveyed among O'ahu, Maui, and Hawai'i Islands. Only the lowest surveyed elevations of Punalu'u Stream, O'ahu at 100-200 ft elevation (50-56%) and Kawainui Stream, O'ahu (57%) contained lower proportions of native aquatic insect species than the other streams assessed during these surveys. Punalu'u Stream was the only stream where a longitudinal transect was conducted from a low to high elevation (100- 900 ft), and the percent native species increased greatly as elevation increased. Hawai'i Island streams surveyed during this study yielded several range extensions and a rich assortment of aquatic insects that are either indicators of high water quality, or also can be considered uncommon. East Maui streams such as West

Wailua Iki and Kopiliula were also found to contain aquatic insects that are now extremely rare and sensitive to disturbance. The most significant finding of this study was the discovery of eight previously uncollected species of endemic Hawaiian aquatic insects; six new species were found on Maui and one each from O'ahu and Hawai'i Islands. All eight new species are Diptera that are the most diverse group of native aquatic insects in the Hawaiian archipelago. Aquatic Diptera are important in the diet of native Hawaiian stream fish; healthy and diverse populations will ensure an abundant year-round food supply for native fish such as *Lentipes concolor*. Additionally, at least five undescribed species of the aquatic moth *Hypomocoma* were collected during these surveys. Additionally, efforts at aquatic insect collections have been high between 1990-2003, and the collection of eight new species during this study greatly exceeds the rate found in the previous 13 years of intensive collections. This also illustrates how little basic information is known on the numbers and types of aquatic insects for Hawaiian inland waters, let alone their basic ecological, evolutionary, and life history parameters." (Authors) The following species had been found: *Anax junius*, *A. strenuus*, *Crocothemis servilia*, *Orthemis ferruginea*, *Pantala flavescens*, *Tramea abdominalis*, *Enallagma civile*, *Ischnura ramburii*, *I. posita*, *Megalagrion blackburni*, *M. calliphya*, *M. hawaiiense*, *M. n. nigrohamatum*, and *M. n. nigrolineatum*.] Address: Hawaii Dept of Land & Natural Resources, 1151 Punchbowl Street, Room 330, Honolulu, Hawai'i 96813, USA

2004

13236. Cieřta, M. (2004): Dragonflies (Odonata) and artificial garden ponds. *Vážký 2004. Sborník referátů VII. celostátního semináře odonatologů v Krušných horách. ZO ČSOP Vlařim, 2004: 89-90.* (in Czech, with English summary) [Czech Republic; "The list of observed Odonata in three new artificially constructed garden pools (locality Havířov, mapping square 6276, 265 m a.s.l.; area of pools: 10 x 10 m, 15 x 15 m and 1,5 x 3 m) is given in this article. During 2002-2004 the following species were found: • autochthonous species with successful breeding (18 species totally): *Aeshna affinis*, *A. cyanea*, *Anax imperator*, *Coenagrion puella*, *Enallagma cyathigerum*, *Erythromma najas*, *Ischnura elegans*, *Lestes barbarus*, *L. sponsa*, *L. viridis*, *Libellula depressa*, *Orthetrum cancellatum*, *Pyrrhosoma nymphula*, *Somatochlora flavomaculata*, *Sympetrum flaveolum*, *S. sanguineum*, *S. striolatum* and *S. vulgatum*. • allochthonous species (sporadic occurrence of imago, no larvae were found), 11 species totally: *Calopteryx splendens*, *C. virgo*, *Cordulia aenea*, *Crocothemis erythraea*, *Ischnura pumilio*, *Lestes virens*, *Libellula quadrimaculata*, *Orthetrum albistylum*, *Sympecma fusca*, *Sympetrum danae* and *S. meridionale*." (Author)] Address: Cieřta, M., Havířov-Město, Na Důlňáku 1376/8A, Czech Republic

13237. De Knijf, G.; Taily, M. (2004): Oviposition from *Aeshna cyanea*: some remarkable observations. *Gom-*

phus 20(1): 21-26. (in Dutch, with English summary) ["Three remarkable observations of oviposition by *Aeshna cyanea* are described. 1) on rocks forming a dam in full sunshine, at an at the time of observation dry pond, 2) in dead wood and bark of an elder (*Sambucus nigra*) at more than 4 m from the waterside and 3) in moss (*Amblystegium varium*) at 0,20 m above the water in mosses at 0,30 m above and 0,40 m from the waterside. Thus *A. cyanea* seems not to be linked strictly to water for its oviposition, but shows a predilection for moist, shadowed substrats like mosses, dead plants, branches, wood, mud and soil. The water level at the moment of hatching (shortly after the winter) is generally higher, so the prolarvae are at that time already in the water or have only a short distance to go; probably they are capable of jumping or creeping some meters to reach the water if necessary." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, 1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

2005

13238. Hillwalker, W.E. (2005): Selenium and trace metal accumulation in detrital-benthic food webs of lotic and lentic wetlands, Utah, USA. Ph.D. thesis, Oregon State University: 105 pp. (in English) ["Concentrations of selenium (Se), manganese (Mn), zinc (Zn), cadmium (Cd), lead (Pb) and arsenic (As) were measured in the water column, sediment and biota, in conjunction with selected physicochemical data, from representative wetland types at a mining site within Salt Lake County, Utah, USA. The selected field sites included Oolitic Pond (lentic) and Lee Creek (lotic), which are moderately contaminated brackish, alkaline aquatic wetlands managed by a copper mining industry. These fishless wetlands are located in a geographic region that poses risk to migratory shorebird populations from dietary Se. A spatial sampling study demonstrated the extent of variation in total Se concentration within the wetlands. With the exception of the sediment compartment, Se concentration did not differ significantly along the 2-mile length of Lee Creek or within the Pond. The differences in sediment total Se concentrations between the Creek East and West segments characterize lower Lee Creek as having two segments distinguished by unique processes that influence the sediment Se accumulation profiles. Se accumulation trends were observed temporally over 3-years (2000 to 2002) and over two seasons (spring and autumn). Total Se body burden in benthic invertebrates was more clearly associated with sediment/detritus Se concentrations than with surface water concentrations. Three invertebrate groups dominated the aquatic invertebrates assemblage in the lotic and lentic benthos; primary consumers (Chironomidae, Diptera), generalist feeders (Hemiptera) and predators (Odonata). The chironomid larvae accumulated 1.3 to 39 times the trace metal concentrations of the Hemiptera or odonate taxa, independent of trace metal type (essential or non-essential) or wetland occupation. Organism-specific factors, such as habitat selection and

preferential feeding habits, were proposed to influence benthic invertebrate accumulation profiles by modifying trace metal exposure. Mixed diets, trophic omnivory and the complexity of wetland biogeochemistry limit the power of stable nitrogen fractionation signatures to define benthic food web relationships. Wetland site-specific processes impacted Se accumulating efficiency, with trace metal concentrations from 4 to 7 times greater within the lentic benthic system than the lotic. The fractionation of the natural abundant stable carbon isotopes revealed the importance of sedimentary and detrital organic carbon as dietary sources for the benthic food web. Sediment organic content was not significantly associated with sediment, or invertebrate, Se accumulation profiles. Ecological risk assessments based on sound understanding of metal chemistry and the interactions between the sediment matrix and benthic organisms are necessary to provide tools for environmental management." (Author)] Address: Hillwalker, Wendy; E-mail: whillwalker@exponent.com

13239. Paez, A.K.; Stotz, D.F.; Shopland, J.M. (2005): Cuba: Peninsula de Zapata. Rapid Biological Inventories Report 07: 150 pp. (in bilingual Spanish and/or English) [Odonata recorded during the rapid biological inventory of the Zapata Peninsula, 8-15 September 2002, by Jorge Luis Fontenla are listed in Appendix 4. 18 Odonata species - exclusively Aeshnidae and Libellulidae - are listed. For details see: <http://fm2.fieldmuseum.org/rbi/pdfs/cuba07/cub07entireesp.pdf>] Address: The Field Museum, Environmental and Conservation Programs, 1400 South Lake Shore Drive, Chicago Illinois 60605-2496, USA

13240. The Field Museum (2005): Cuba: Parque Nacional La Bayamesa. Rapid Biological Inventories 13: 243 pp. (in English) [The following Odonata species are listed: *Triacanthagyna* sp., *Enallagma coecum*, *Scapanea frontalis*, *Hypolestes trinitatis*, *Neoneura maria*, and *Protoneura capillaris*] Address: The Field Museum, Environmental & Conservation Programs, 1400 South Lake Shore Drive, Chicago, Illinois 60605-2496, USA

2006

13241. Bo, T.; Cucco, M.; Fenoglio, S.; Malacarne, G. (2006): Colonisation patterns and vertical movements of stream invertebrates in the interstitial zone: a case study in the Apennines, NW Italy. *Hydrobiologia* 568: 67-78. (in English) ["We examined vertical migration and colonisation patterns of stream macroinvertebrates within the substratum of an Apennine creek in NW Italy. Macroinvertebrates was sampled at three depths in the streambed (0-5, 5-10, 10-15 cm) by means of artificial baskets filled with natural substratum. We placed 42 traps (5 x 5 x 15 cm), i.e. 21 top-opened (T-traps) and 21 bottom-opened (B-traps), each composed of three overlapping baskets (high-H, medium-M and low-L), to evaluate differences in the vertical movements. We also collected Surber samples to compare interstitial assemblages with streambed communities. The multilevel traps yielded 42 taxa, compared

with 60 taxa in the natural riverbed. Interstitial traps were rapidly colonised; both taxa richness and organism number increased during the 42-day study period. We found active migration in both vertical directions, but there were more invertebrates in the top-opened traps than in the bottom-opened traps. In the T-traps the most colonised baskets were those placed at the H level, while in the B-traps the L level baskets were more rapidly colonised. The interstitial assemblages differed markedly from the streambed communities in both composition and functional organisation, with more collector-gatherers and predators in the interstitial zone and more filterers and scrapers in the natural riverbed. In Apennine lotic systems, the interstitial zone is an important habitat for stream macroinvertebrates, although it may not be used by all species." (Authors) *Onychogomphus* sp., *Orthetrum* sp., *Calopteryx* sp.] Address: Bo, T., University of Piemonte Orientale, Di.S.A.V., Via Bellini 25, I-15100, Alessandria, Italy. E-mail: fenoglio@unipmn.it

13242. Fenoglio, S.; Bo, T.; Cucco, M.; Malacarne, G. (2006): Leaf breakdown patterns in a NW Italian stream: Effect of leaf type, environmental conditions and patch size. *Biologia*, Bratislava 61/5: 555-563. (in English) ["We studied the decomposition process and macroinvertebrate colonisation of leaf packs to determine to what extent leaf consumption and invertebrate abundance depend on the pollution level, season, leaf type and patch size. We exposed 400 leaf packs made of two leaf types, alder and chestnut, at two sites of the Erro River (NW Italy) with different environmental alteration levels. Leaf packs were set out as three patch sizes (alone, or in groups of 6 or 12). A first experiment was carried out in winter and a second in summer. Leaf packs were retrieved after 15, 30, 45 and 60 days of submersion to determine the leaf mass loss and to quantify the associated macroinvertebrates. Natural riverbed invertebrates were collected in the same areas. Patch size, season, leaf type and pollution level significantly affected mass loss. The breakdown process was faster for alder leaves, during summer, at the unpolluted site, and in smaller patches. Leaf type and patch size did not affect macroinvertebrate density and richness, but the highest taxon richness was found in winter and at the unpolluted site. There were more shredders and predators than in the natural riverbed. Our study supports two recent ideas regarding leaf processing in streams: that patch size influences the leaf breakdown rate and that the breakdown rate can be used to evaluate water quality and environmental health." (Authors) The data set includes Odonata.] Address: Fenoglio, S., University of Piemonte Orientale, Di.S.A.V., Via Bellini 25, I-15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

13243. Mekong River Commission; Burnhill, T. (2006): Identification of Freshwater Invertebrates of the Mekong River and Its Tributaries. Mekong River Commission. ISBN 9295061004, 9789295061002: 274 pp. (in English) ["The freshwater fauna of the Mekong River and its tribu-

teries ranks second in the world in terms of species richness. While a few of these species, such as the Mekong giant catfish and the Irrawady dolphin, are iconic symbols of the river that are known worldwide, the bulk of the faunal diversity comprises innumerable types of worms, snails, beetles, crabs, spiders and other bugs, which biologists group collectively as invertebrates. Although less charismatic, these animals are not only important elements of the wildlife of the river, they also play a vital role in the welfare of the millions of people who live off the natural resources of the Mekong River." (Eds.) Chapter 16 deals with Odonata larvae. For details see: zoo.sci.ku.ac.th/Research/boonsatean/Reboonsoong4.pdf Address: not available

13244. Torralba Burrial, A.; Ocharan, F.J. (2006): De Monstruos & Prodigios: Deformidad abdominal en *Pyrhosoma nymphula* (Sulzer, 1776) (Odonata: Coenagrionidae). *Boletín de la Sociedad Entomológica Aragonesa* 39: 437-438. (in Spanish) [Spain; abdomen and wing deformations in *P. nymphula* are documented.] Address: Torralba Burrial, A., Dept de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

13245. Wei, I.; Zhou, S.-y.; (2006): Characteristics of echolocation calls and summer diet of three sympatric insectivorous bats species. *Zoological Research* 27(3): 335-341. (in Chinese, with English summary) [The diet of *Taphozous melanopogon* includes Odonata.] Address: Zhang, Shu-yi, Inst. Zool., Chinese Acad. Sci., Beijing 100080, China. E-mail: zhangsy@ioz.ac.cn

2007

13246. Bo, T.; Fenoglio, S.; Malacarne, G.; Pessino, M.; Sgariboldi, F. (2007): Effects of clogging on stream macroinvertebrates: An experimental approach. *Limnologica* 37: 186-192. (in English) ["The influence of streambed sediment clogging on macroinvertebrate communities was investigated in the Lemme creek (NW Italy). To assess how fine sediment accumulation can influence the colonisation process and community composition of macroinvertebrates, we placed 48 traps in the riverbed. The traps consisted of boxes built with metal net (mesh 1 cm, height 15 cm, sides 5 cm) covered with nylon net except for the apex, allowing access exclusively from the top. We created four trap types filled with 100% gravel, 30% sand and 70% gravel, 70% sand and 30% gravel and 100% sand. After 20 and 40 days, we removed 6 traps / type. Macroinvertebrates rapidly colonised the traps, as we found no significant community differences between the two removal dates. Among the four trap types, we found significant differences in taxa number and abundance, which both decreased with increasing clogging. Thus, our study supports the hypothesis that clogging and the accumulation of fine substratum elements strongly affects benthic stream communities." (Authors) The study includes data on *Calopteryx virgo*, *Onycho-*

gomphus forcipatus, and *Boyeria irene*.] Address: Fenoglio, S., Univ. Piemonte Orientale, Di.S.A.V., Via Bellini n. 25, 15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

13247. Couteyen, S.; Papazian, M. (2007): Contribution à la connaissance des Odonates de l'île de la Réunion 8. Description de la larve de *Hemianax ephippiger* (Burmeister, 1839), une espèce nouvelle pour l'île (Odonata, Aeschnidae). *L'Entomologiste* 63(4): 187-189. (in French, with English summary) [A female of *Anax ephippiger* emerged near the village of Tampon.] Address: Couteyen, S., Association réunionnaise d'Écologie, 188 Chemin Nid Joli, F-97430 Le Tampon (la Réunion), France. E-mail: scouteyen@ecologie.re

13248. Green, D.; Moore, A.; Bell-Cross, S.; Lechmere-Oertel, H. (2007): Identifying an unusual insect form in San rock paintings of the southern Drakensberg, South Africa. *Southern African Humanities* 19: 69-81. (in English) ["Identifying images in San rock art is an essential prerequisite for analysis and interpretation. At site M4 in the southern Drakensberg, there are San rock paintings of some 600 insects depicted as though flying over and around a snake. To identify these flying insects we examine their morphology and depicted behaviour and compare these to a number of formally similar insect taxa—bees, locusts and grasshoppers, dragonflies, ant lions, flying ants, and flying termites. We conclude that the painted insects at M4 most closely resemble flying termites. This study has implications for the analysis and interpretation of certain insect terminology in Xam ethnography, and for gaining some understanding of the social and ritual symbolism of these flying insects in the rock art." (Authors)] Address: Green, Dawn, Dept Anthropology & Archaeology, Univ. of South Africa, PO Box 392, UNISA, 0003 South Africa. E-mail: dawn@yezinyanya.co.za

13249. Karube, H. (2007): On the scientific name of Japanese name "Kiuro - harabiro - tombo". *Tombo* 50: 71-72. (in Japanese, with English title) [The confusing taxonomy of the species is settled as follows: *Lyriothemis flava* Oguma, 1915: *Lyriothemis tricolor* Ris, 1919 > *Syn Lyriothemis tricolor* Ris, 1916 *Syn Lyriothemis flava* Oguma, 1922 > *Lyriothemis flava* Oguma, 1915] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

13250. Quiroz-Martinez, H.; Rodriguez-Castro, V.A. (2007): Aquatic insects as predators of mosquito larvae. *Journal of the American Mosquito Control Association* 23(sp2): 110-117. (in English) ["Mosquitoes are serious biting pests and obligate vectors of many vertebrate pathogens. Their immature larval and pupal life stages are a common feature in most tropical and many temperate water bodies and often form a significant proportion of the biomass. Control strategies rely primarily on the use of larvicides and environmental modification to

reduce recruitment and adulticides during periods of disease transmission. Larvicides are usually chemical but can involve biological toxins, agents or organisms. The use of insect predators in mosquito control has been exploited in a limited fashion and there is much room for further investigation and implementation. Insects that are recognized as having predatorial capacity with regard to mosquito prey have been identified in the Orders Odonata, Coleoptera, Diptera (primarily aquatic predators), and Hemiptera (primarily surface predators). Although their capacity is affected by certain biological and physical factors, they could play a major role in mosquito control. Furthermore, better understanding for the mosquitoes-predators relationship(s) could probably lead to satisfactory reduction of mosquito-borne diseases by utilizing either these predators in control programs, for instance biological and/or integrated control, or their kairomones as mosquitoes' oviposition repellents. This review covers the predation of different insect species on mosquito larvae, predator-prey-habitat relationships, co-habitation developmental issues, survival and abundance, oviposition avoidance, predatorial capacity and integrated vector control." (Authors)] Address: Rodríguez-Castro, Adriana, 2 Apartado Postal 105 – F, Ciudad Universitaria, San Nicolás de los Garza, Nuevo León, CP 66450, México

13251. Soldati, P. (2007): Les études entomologiques dans la réserve naturelle nationale de la Fort d'Orient (Aube): bilans quantitatifs et qualitatifs. *Cour. scient. PnrFO* 31: 67-76. (in French) [The Regional Park Fort d'Orient is situated in the French department Aube in the region Champagne-Ardenne. A list with a total of 963 insect species is compiled among them several Odonata species as the legally protected *Coenagrion mercuriale*, *Oxygastra curtisii* and *Leucorrhinia caudalis*. Also included are in the rare for France species such as *Sympetma fusca*, *Coenagrion scitulum*, *Gomphus simillinus*, *Onychogomphus forcipatus*, *Epitheca bimaculata* and *Somatochlora flavomaculata*.] Address: Soldati, P., c/o Association Champenoise de Sciences Naturelles, 7 rue du Maréchal Leclerc, 10600 La Chapelle St Luc, France

13252. Torralba Burrial, A.; Melero, Melero, Y.X.; Ocharan, F.J. (2007): Utilización de exuvias de *Orthetrum brunneum* (Fonscolombe, 1837) (Odonata: Libellulidae) como lugar de cría por *Sibianor aurocinctus* (Ohlert, 1865) (Araneae: Salticidae). *Boletín de la Sociedad Entomológica Aragonesa* 41: 344. (in Spanish) [Exuviae of *O. brunneum* are used for reproduction of the spider *Sibianor aurocinctus* (Ohlert, 1865) (Araneae: Salticidae). 27-VII-2004, Monegros (Huesca) (UTM 30T 733720, 4625127), Spain.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antiofb@hotmail.com

13253. Zhu, X. (2007): An utilization study of ornamental insect resource in Hunan province. *Journal of Hunan First Normal College* 7(4): 170-172. (in Chinese, with

English summary) [China; The following Odonata species are documented having an ornamental importance: *Anax parthenope julius*, *Sinictinogomphus clavatus*, *Gomphidia confluens*, *Epophthalmia elegans*, *Epitheca marginata*, *Crocothemis servilia*, *Orthetrum albistylum*, *O. japonicum internum*; *O. triangulara melania*, *Pantala flavescens*, *Pseudothemis zonata*, *Rhyothemis fuliginosa*, *Sympetrum eroticum ardens*, *S. darwinianum*, *Calopteryx atratum*, *Matrona basilaris basilaris*, *Copera annulata*.] Address: Zhu, X., Hunan Environmental and Biological Polytechnic, Hengyang, Hunan 421005, China

2008

13254. Anitha Rani, A.; Mahalingam, V. (2008): Record of a new gregarine parasite (*Xiphocephalus* sp.) of the dragonfly, *Diplacodes trivialis* (Rambur). *Entomon* 33(4): 285-288. (in English) ["A new species of the gregarine protozoan belonging to the genus *Xiphocephalus* was recorded parasitizing the adults of *D. trivialis* collected from the scrub jungle ecosystem. The uniqueness of the species is with the epimerite that is in the form of an elongated deltoid process with a bulbous terminal end." (Authors)] Address: Anitha Rani, A., G. S. Gill Research Institute, Guru Nanak College, Chennai-600 042, India

13255. Chan, T.-W.; Wong, K.-C. (2008): Taxonomic study of the larval stage of Aeshnidae (Odonata) in Taiwan. The 29 Annual Meeting of Taiwan Entomological Society - Abstract Booklet: 37. (in Chinese and English) [Verbatim: The Aeshnidae is the second largest family of Odonata in Taiwan, with some 23 species now assigned to 9 genera. Seventeen species of larval aeshnids from 8 genera collected in Taiwan were taxonomically studied. Based on literature records and examination of an extensive collection, a redescription of the larva of *Periaeschna magdalena* Martin, 1909, *Planaeschna risi risi* Asahina, 1964, *Planaeschna taiwana* Asahina, 1951, *Aeshna petalura taiyal* Asahina, 1938, *Polycanthagyna erythromelas* (McLachlan, 1896), *P. melanictera* (Selys, 1883), *Anaciaeschna jaspidea* (Burmeister, 1839), *A. martini* Selys, 1897, *Anax nigrofasciatus nigrofasciatus* Oguma, 1915, *A. panybeus* Hagen, 1867, *A. parthenope julius* Brauer, 1865, *Gynacantha japonica* Barteneff, 1909, *G. ryukyuensis* Asahina, 1962 is provided. Morphological characteristics of the larva of *Sarasaeschna pyanan* (Asahina, 1951), *Sarasaeschna lienii* (Yeh & Chen, 2000), *Planaeschna ishigakiana flavostria* Yeh, 1996, *Polycanthagyna ornithocephala* (McLachlan, 1896) is described and illustrated for the first time. In addition, all 17 larval aeshnids are keyed for reference in future research. For some more details see: <http://ndltd.ncl.edu.tw/cgi-bin/gs32/gsweb.cgi/login?o=dnclcdr&s=id=%22097NHLT5404004%22.&searchmode=basic>] Address: Chan, T.-W., Graduate institute of biological resources and technology, National Dong Hwa University, Taiwan

13256. Chang, C.-T.; Tsai, F.-Y.; Shih, M.-C.; Chi, K.-J. (2008): The role of pterostigma in wing mechanics of

dragonflies (Odonata, Libellulidae). The 29 Annual Meeting of Taiwan Entomological Society - Abstract Booklet: 72. (in Chinese and English) [Verbatim: Pterostigma is a thickened and darkened region on an insect wing, located distally from the wing base and near the leading edge. Because of interspecific variation in its size, morphology, and related position, pterostigma is often used as a trait for classification. To date, the only study that examined its mechanical function indicates that, in dragonflies, the pterostigma changes the distribution of wing mass, which may change the vibration characteristics of wings and consequently the flight performance. However, no direct empirical evidence has been reported to explain how it works. In this study, we aimed to examine how pterostigma affects the dynamic characteristics of wings in *Pantala flavescens*, a species commonly found in Taiwan. Scanning electron micrographs were taken in order to compare the thickness of pterostigma and wing cell. Direct measurements of pterostigma showed that it accounted for only 0.5% of the wing area, yet more than 2.5% of the wing mass. That is, the pterostigma is five times heavier than the rest of the wing. To examine the effects of pterostigma, we compared the vibration characteristics of complete wings with those without this structure. To this end, each wing sample was cut off from the thorax and glued onto an oscillator that provided different frequencies to vibrate the wing. High-speed videocamera was used to record the behaviour of the vibrating wing, from which we could quantify its deformation. Preliminary results reveal that the existence of pterostigma changes the wave amplitudes and shapes of a flapping wing, which implies a functional consequence in dragonfly flight.] Address: Chang, C.-T., Institute of Biophysics, National Chung Hsing University, Taiwan

13257. Fogarty, F.A.; Bybee, S.M.; Ingley, S.J.; Branham, M.A. (2008): Phylogenies of the Flatwing Damselflies: Molecular and morphological evidence (Odonata: Megapodagrionidae). <http://esa.confex.com/esa/2008/webprogram/Paper37035.html>. (in English) ["A phylogenetic analysis was carried out on the Neotropical flatwing damselflies (Odonata: Megapodagrionidae), using both morphological and molecular data. Megapodagrionidae has a worldwide distribution, yet its monophyly is questionable, as are the major groupings within the family (Bybee et al., 2008). Neotropical lineages were shown to be especially problematic. All 13 Neotropical genera were examined; in addition to 20 outgroup taxa (e.g., old world megapodagrionids: *Austroargiolestes*, *Caledopteryx*, *Pseudolestes* and *Rhipidolestes*; coenagrionoids; calopterygoids and *Thaumatoneura*. Analyses were rooted to *Lestes disjunctus*. 52 Morphological characters were coded for each taxon in the analysis. Molecular data was analyzed for six genes: 12s, 16s, 28s, COii, ND1 and h3 (~4800bp). Molecular data was combined with morphological data under Bayesian (MrBayes) and Parsimony (TNT) methods for tree reconstruction. Megapodagrionidae is not supported as monophyletic but the taxon sampling for old world groups is not exhaustive. Trees do not

reconstruct the Neotropical Megapodagrionidae as a monophyletic clade. Neotropical genera are distributed across several clades that include old world megapodagrionids (e.g., *Teinopodagrion* and *Allopodagrion*). Interestingly, *Thaumatoneura* (Central American) appears to be sister to *Paraphlebia* supporting this monospecific genus as a megapodagrionid, a relationship suggested by Calvert in 1902, but currently not supported by other phylogenetic studies. Though Megapodagrionidae is not monophyletic the most primitive lineage representing the group has its origins in the Neotropics. The larger monophyletic clade representing "Megapodagrionidae" has no clear pattern of distribution or correlation with geography among genera." (Authors)] Address: Bybee, S., Graduate Research Assistant: Branham Laboratory, Dept Entomology & Nematology, University of Florida. Natural Area Drive, P.O. Box 110620, Gainesville, FL 32611-0620, USA. E-mail: seth.bybee@gmail.com

13258. Lin, S.-C.; Chen, Y.-F.; Yang, P.-S. (2008): Taxonomy of the Sauter's clubtail (*Leptogomphus sauteri*) (Odonata: Gomphidae). The 29 Annual Meeting of Taiwan Entomological Society - Abstract Booklet: 34. (in Chinese and English) [Verbatim: *L. sauteri* is endemic to Taiwan and it includes two geographical subspecies (*L. s. sauteri* Ris and *L. s. formosanus* Matsumura). In order to compare both morphological and molecular difference between two subspecies, we collected the specimens around the Taiwan Island. The preliminary results indicate that there were relatively morphological variations in the body color and male genitalia. The diagnostic characters of these two subspecies can not easily be defined. Furthermore, the mitochondrial cytochrome oxidase I gene (mtCOI) was amplified using universal primers for these two subspecies. The other clubtail species from Taiwan and the Himaehosoi clubtail (*L. yayeyamensis* Matsumura) from Yaeyama Islands, Japan, were also amplified. Then, these molecular data were combined for analysis. The phylogenetic trees among mtDNA sequences were constructed using neighbour-joining methods and maximum parsimony methods. The results suggest that Sauter's clubtail would be divided into the Southern Taiwan group and the Central-Northern-Eastern Taiwan group. The geographical distributional limit of these two groups is relatively fit for the previous specimen records, but we still need more specimens to assess the diagnostic characters.] Address: Lin, Sue-Cheng, Dept of Entomology, National Taiwan Univ., Taiwan

13259. Mäkinen, J. (2008): Idänkirsikorento *Sympecma paedisca* Lappeenrannassa [*Sympecma paedisca* recorded in Lappeenranta, SE Finland]. *Crenata* 1: 38-39. (in Finnish) [Just emerged specimens of *S. paedisca* were found in Lappeenranta on 10-13 August 2007 by Jouko and Jere Rantanen. This is the first confirmed case of this species breeding in Finland. Earlier only migrant specimens were known from the coastal areas of the Gulf of Finland. A few other records of this species are listed. (Matti Hämäläinen / Asmus Schröter)] Address:

Mäkinen, J., Metsänhoitajankatu 12 B 16, FI-00790 Helsinki, Finland

13260. Subramanian, K.A.; Ali, S.; Ramachandra, T.V. (2008): Odonata as indicators of riparian ecosystem health a case study from south western Karnataka, India. *Fraseria* (N.S.) 7: 83-95. (in English) ["The influence of riparian land use on the diversity and distribution were investigated by sampling 113 localities covering 4 districts in south-western Karnataka. A total of 55 species in 12 families were recorded. Streams, rivers and lakes had higher diversity than marshes and sea coast. However, lakes had low endemism than streams and rivers. Streams flowing through evergreen forests had higher diversity and endemism. Human impacted riparian zones such as paddy fields had relatively lower species richness. However, streams flowing through forestry plantations had higher diversity than other natural riparian zones such as dry deciduous, moist deciduous and semi evergreen forests. Myristica swamps - a relict evergreen forest marsh had low diversity and high endemism. Odonate communities of lentic ecosystems, and human impacted streams and rivers were characterized by widespread generalist species. Endemics and habitat specialists were. restricted to streams and rivers with undisturbed riparian zone. The study documents possible odonate community change due to human impact: The influence of riparian landuse change on odonate community is also discussed." (Authors)] Address: Subramanian, K.A., Zoological Survey of India, Western Regional Station, PUNE, Maharashtra-410044, India. E-mail: subbuka.zsi@gmail.com

13261. Torralba Burrial, A.; Outomuro, D.; Ocharan, F.J. (2008): De Monstruos & Prodigios (19): Dos ejemplares teratológicos de *Coenagrion puella* (Linnaeus, 1758) (Odonata: Coenagrionidae). *Boletín de la Sociedad Entomológica Aragonesa* 42(1): 352. (in Spanish) [Asturias, Spain; two cases of teratologies are demonstrated.] Address: Outomuro, D., Dept de Biología de Organismos y Sistemas, Universidad de Oviedo. 33071 Oviedo, Spain. E-mail: outomuro.david@gmail.com

2009

13262. Bouchard, R. W. (2009): Chapter 5. Odonata (Dragonflies & Damselflies). *Guide to Aquatic Invertebrate Families of Mongolia* | 2009: 63-74. (in English) ["The guide to Mongolian aquatic invertebrate families is modified from a guide developed for the Upper Midwest of North America. Most of the illustrations in both guides are from species that occur in North America and in many cases are not known from Mongolia. In addition, the keys were also originally developed with North American taxa in mind. Despite this, many of the families and even genera occur in both North America and Mongolia and most illustrations and characters used in keys should be appropriate. I have added families known from Mongolia that were not included in the guide to invertebrates in the

Upper Midwest of North America. However, corrections and additions may still be needed to make the guide complete and accurate for use in Mongolia." (Author) Drafts for all chapters are now available, see: <http://www.entomology.umn.edu/midge/Projects/Biodiversity/Mongolia/Mongoliaguide.htm>] Address: Bouchard, R.W., Univ. Minnesota, Dept Entomology, 219 Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108, USA

13263. Cupsa, D.; Birkas, M.; Telcean, I. (2009): Studies upon the structure and dynamics of the benthic macroinvertebrate communities from two habitats of The Ier River's Channel (Bihor county, Romania). *Bihorean Biologist* 3(1): 59-70. (in English) ["The aim of the present study was to describe the structure and dynamics of the macrozoobenthic communities on a sandy and muddy substrate from Ier Channel, in order to show the importance of the composition of the substratum in the macrozoobenthic community settlement. During the study period (May-October 2006) we identified 43 species and 884 individuals of benthic organisms, especially Gastropoda and insect larvae. The number of species and individuals exhibited high variability on the sandy substrate. Groups with high density were Gastropoda, Trichoptera and Chironomidae larvae. The most frequent groups were Hirudinea, Gastropoda, Bivalvia and Chironomidae larvae. The most abundant species were found to be tolerant to water pollution and the sensitive groups were missing. The diversity indices showed a more diverse community on the muddy substrate and the value of the IBGN index revealed a poor water quality. ...The Odonata species have low densities and excepting *Ischnura elegans* they were found accidentally." (Authors) Additional species recorded are *Coenagrion pulchellum*, *Lestes sponsa*, *Libellula quadrimaculata*, *L. depressa*, and *Sympetrum sanguineum*.] Address: Cupsa, Diana, Univ. of Oradea, Faculty of Sciences, Dept of Biology, 1 Universitatii str., 410087, Oradea, Romania. E-mail: dcupsa@uoradea.ro

13264. Mayer, W.; Turk, J. (2009): Kommentierte Artenliste der Libellen (Odonata) im NSG Kühkopf-Knoblochsaue und Umgebung. *Collurio* 27: 43-60, 63-68. (in German) [The local list includes 46 species of the Odonata fauna known from Hessen, Germany. Each species is briefly characterised and commented upon.] Address: not known

13265. Mitra, A. (2009): Dragonfly fauna of Bhutan – An annotated and updated Check-list with ten new records. *Fraseria* (N.S.) 7(1/2): 205-109. (in English) ["In eastern Bhutan, 18 species and subspecies of dragonflies were collected from the Kuruchu Reservoir area at Mongar, eight from Samdrup Jongkhar, one from Kanglung and one from Yongphula. From southern Bhutan, six species and subspecies were collected from Sarpang, five from Gelephu and eight from Tsirang. Ten species and subspecies of these are new to Bhutan and include *Pseudagrion rubriceps*, *Drepanosticta carmichaeli*, *Lestes dorothea*, *Neurobasis* ch. *chinensis*, *Scalmogomphus* bis-

trigatus, *Diplacodes nebulosa*, *D. lefebvrei*, *Trithemis pallidinervis*, *Tramea virginia* and *Urothemis signata signata*. *Aeshna p. petalura* was encountered for the first time although Tsuda reported its presence in 1991. Specimens are deposited at the museum maintained by the Department of Zoology, Sherubtse College, Kanglung, Bhutan. An up-to date check-list of 50 species and subspecies of dragonflies known from Bhutan is also provided." (Author)] Address: deceased

13266. Parr, M.J. (2009): Tribute to Professor Stephen Corbet (21 May 1929 -13 Feb. 2008) given following the opening ceremony at the 6th WDA International Congress of Odonatology, Xalapa, Mexico, 13 June 2009. *Agrion* 13(2): 88-89. (in English) [Obituary.] Address: Parr, M.J., Hele Barton, 9c St James's St., South Petherton, Somerset, TA13 5BS, UK. E-mail: mima37@tiscali.co.uk

13267. Rafi, M.A., Khan, M.R.; Zia, A.; Shehzad, A. (2009): Diversity of Odonata in District Poonch and Sudhnoti of Kashmir Valley - Pakistan, with a new record for the country. *Halteres* 1(1): 28-35. (in English) ["Detailed surveys were carried out from two districts viz. Poonch and Sudhnoti of Kashmir Valley during summer seasons of 2007 and 2008 to make an updated record of inhabiting Odonata. Ten localities were selected on the basis of variables keeping in view the habitat requirements of Odonata. The present study provides a record of 16 Anisopteros species spreading to 9 genera and 29 Zygopterous species spreading to 14 genera. Among these *Lestes patricia* is a new record for the country. The distribution, synonymy, richness and abundance of the species are discussed in this paper. The Kashmir Valley is rich in insect biodiversity, the odonate fauna of this valley needs to be further explored." (Authors)] Address: Rafi, M.A., National Insect Museum, National Agriculture Research Centre, Islamabad - Pakistan. E-mail: arafiam@yahoo.com

13268. Rahman, M.H.; Miah, M.J.U.; Ali, H.; Alam, M.S.; Islam, M.A. (2009): Effect of fertilizer on the qualitative and quantitative abundance of benthic fauna in ponds. *J. Agrofor. Environ.* 3(1): 25-28. (in English) ["The present research was conducted to assess the effects of added fertilizers on the qualitative and quantitative abundance of benthic fauna in ponds for a period of six months from August, 2008 to January, 2009 in the Bangladesh Agricultural University, Mymensingh, Bangladesh. All the experimental ponds were rectangular in shape, each with surface area of 44 m² and the average depth of water was 1m. Three treatments such as GM [Goat manure + Urea: 3000+50 kg/ha], SM (Sheep manure + Urea: 3000+50 kg/ha) and C (control) were run in duplicates. Fertilizers were used fortnightly and benthos samples were collected randomly from the ponds at monthly intervals. Seven groups of benthic fauna viz. Oligochaeta, Chironomidae, Ceratopogonidae, Mollusca, Ephemeroptera, Odonata and Hirudinea were recorded throughout

the experimental period. The total average number in the abundance of benthic fauna was recorded as (2196.09 ± 216.35/m², 2108.49 ± 211.50/m² and 1397.36 ± 233.04/m²) in the treatments GM, SM and C respectively. The abundance of Oligochaeta and Chironomidae were found dominant with the treatments GM and SM in all the months during the whole study period. The maximum numbers of benthic fauna (2743.90 ± 457.32/m², 2515.24 ± 228.66/m² and 1905.50 ± 228.66/m²) were found with the treatments GM, SM, and C respectively in August, 2008 and minimum (1676.84 ± 304.88/m², 1600.62 ± 228.66/m² and 1219.52 ± 152.44/m²) were found with the treatments GM, SM and C respectively in January, 2009. The mean values of temperature (°C) [23.52 ± 1.78, 23.48 ± 1.82 and 23.70 ± 1.81], transparency (cm) [33.53 ± 0.90, 33.02 ± 0.89 and 33.08 ± 1.09], pH (8.03 ± 0.20, 8.18 ± 0.18 and 8.20 ± 0.19) and dissolved Oxygen (mg/l) [5.37 ± 0.35, 5.37 ± 0.37 and 5.67 ± 0.33] were found in the treatments GM, SM and C respectively. The fluctuations in abundance of benthic fauna were found to be more or less related with the pH, temperature, dissolved oxygen as well as transparency." (Authors)] Address: Rahman, M.H., Dept of Aquaculture, Dept of Fisheries Management, Bangladesh Agricultural University, Mymensingh

13269. Sánchez, A.; Pérez, J.; Jiménez, E. & Tovar, C. (2009): Los Odonatos de Extremadura. Clase insecta Orden Odonata. Junta de Extremadura, Consejería de Industria, Energía y Medio Ambiente (ed). Colección Medio Ambiente. ISBN: 978-84-606-4804-8: 339 pp. (in Spanish) [55 Odonata species have been recorded in the Spanish region Extremadura. In a monographic style, all species are presented together with data on morphology, phenology, legal protection status, biology and ecology of the species, habitat and regional distribution map. Addition chapters are directed to a general morphology and biology of the Odonata, including detailed figures and photographs and different aspects. A voluminous chapter approaches the conservation of dragonflies. In total, this is a sound handbook on the regional dragonfly fauna. A pdf of the book can be accessed at <http://extremambiente.gobex.es/files/bibliotecadigital/atlasodonatos.pdf>]

2010

13270. Bellingan, T.A. (2010): The diversity of aquatic insects in the Tsitsikamma region, with implications for aquatic ecosystem conservation. MSc. thesis, Rhodes University, Grahamstown: XVI + 187 pp. (in English) ["As a result of research carried out within the last decade to assess the diversity of macroinvertebrates of the Salt River in the Western Cape Province, South Africa, surveys of macroinvertebrates of 20 sites on 11 selected rivers from the same mountain range source were undertaken. This was done to make a preliminary assessment of the conservation status of the rivers of this region. Aquatic insects from the orders Ephemeroptera, Odonata, Plecoptera, Megaloptera, Trichoptera and the dipteran family Simuliidae were collected using techniques to

maximize the number of taxa found. The insects collected were identified to species level where possible. Water physicochemical parameters were recorded at all sites for each sampling trip to characterize these rivers and to establish a set of baseline data for future comparisons. These parameters included measurements made on site and analysis of the concentrations of all the major ions in water samples in the laboratory. .. A total of 31 species were collected from 20 genera, from nine families. The most common species collected were *Orthetrum julia capicola* and *Allocnemis leucosticta*, both occurring at 17 sites, followed by *Pseudagrion furcigerum*, occurring at 14 sites. Three species of Synlestidae were the next most common species, *Chlorolestes conspicuus*, *Chlorolestes umbratus* and *Ecchlorolestes nylephtha* occurred at 12 sites each. Unique or uncommon species are difficult to distinguish as 14 of the species were collected at two sites or fewer, making nearly half of the total number of species collected "rare" with respect to this study. "] Address: Bellingan, T.A., Rhodes University, P.O. Box 94, Grahamstown 6140, South Africa

13271. Boudot, J.-P. (2010): Spécificités du peuplement en Odonates du nord de l'Afrique et observations récentes d'espèces remarquables (Insecta: Odonata). *Martinia* 26(3-4): 109-122. (in French, with English summary) ["The author summarizes the main distinctive features of the Odonata fauna in Africa North of the 17th parallel and comments the most noteworthy recent discoveries. An overall predominance of European and European-derived species is recognized, except in Egypt where the Palearctic component is strongly depressed and the Afro-tropical component enhanced thanks to the so-called "Nile corridor effect". Among the recently discovered or confirmed species, *Orthetrum machadoi* is new for the whole Palearctic realm, *O. ransonnetii* is new to the Northern Maghreb, *Sympetrum sinaiticum* is new to Morocco and the African part of Egypt, *Selysiotthemis nigra* is new to Morocco, and *Agriocnemis sania* is new to the African part of Egypt." (Author)] Address: Boudot, J.-P., LIMOS, UMR CNRS 7137, Universités de Nancy, Faculté des Sciences, B.P. 239, F-54506 - Vandoeuvre-lès-Nancy Cedex, France. E-mail: jean-pierre.boudot@limos.uhp-nancy.fr

13272. Briggs, N.; Schneider, E.G.; Sones, J.; Puryear, K. (2010): Inventory of Odonata (Dragonflies and Damselflies) at Fire Island National Seashore. Natural Resources Technical Report NPS/NCBN/NRTR—2010/295. National Park Service. Fort Collins, CO: 78 pp. (in English) ["In order to expand knowledge of odonate biodiversity and to make recommendations for management, we conducted a comprehensive baseline inventory of Odonata at Fire Island National Seashore (FIIS), Suffolk County, New York. During 2004 and 2005 we conducted a checklist inventory at sites where odonates could potentially breed, as well as at potential migratory and foraging. Checklist walks are unrestricted, complete searches that provide an efficient means for initial determination of

species presence. During the combined 2004 and 2005 field seasons, 27 species of odonates were documented across 18 of the 34 sites surveyed. Two New York state listed species were observed, *Ischnura ramburii* and *Libellula needhamii*. Of the 847 individuals sighted during 2004 and 2005, 92 were collected as voucher specimens, representing 25 of the 27 species recorded. The most widely distributed species included *Anax junius*, *Erythrodiplax berenice*, *Libellula semifasciata*, and *Pantala hymenaea*. Of all sites surveyed during 2004 and 2005, Kismet Pond showed the greatest abundance (n = 481 individuals) and species richness (0.85) of odonates. Migration events were not observed during odonate surveys; however, a migration event was documented by one researcher at Bellport Beach at the Otis Pike Wilderness Area during 2004. Overall, FIIS contains few habitats that are appropriate for odonate reproduction; however, several sites offer good foraging and migration habitat." (Authors)] Address: Briggs, Nina, Rhode Island Natural History Survey, P.O. Box 1858, Kingston, RI 02881, USA

13273. Buczyński, P.; Cichocki, W.; Rozwałka, R. (2010): Rediscovery of *Somatochlora alpestris* (Selys, 1840) and new locality of *S. arctica* (Zetterstedt, 1840) in the Orawa - Nowy Targ Basin (Odonata: Corduliidae). *Odonatrix* 6(2): 42-46. (in Polish, with English summary) ["During studies on spiders of high peat bogs in Orawa - Nowy Targ Basin (southern Poland), a few larvae of two *Somatochlora* species were caught in Barber's traps. Larvae were found in traps situated by the edges of peat bogs, in places without isolated water bodies, in patches of damp Sphagnum. *Somatochlora alpestris* was caught in Puścizna Wielka (49°27'N, 19°46'E, UTM: DV17) and Baligówka (49°28'N, 19°50'E, DV18) peat bogs. Both localities are situated at the height of ca. 650 m a.s.l. New data confirm the occurrence of the species in peat bogs in the Orawa - Nowy Targ Basin: the last record from 78 years ago was given by Fudakowski (1932). Taking into consideration small effectiveness of Barber's traps in collecting dragonflies, even so scarce material shows that *S. alpestris* can be present in the area numerously and in many sites, however, this needs to be verified on the field. This species does not react on climatic changes as *Aeshna caerulea* whose range of occurrence moved from 840 to ca. 1400 m a.s.l. Together with data about good condition of mountain populations of this species it proves the validity of shifting *S. alpestris* in the Red list of Dragonflies of Poland from EN category to NT. New locality of *Somatochlora arctica* is a nature reserve „Bór na Czerwonem" (49°27'N, 20°02'E, DV37). This site is important for the protection of this species for its acreage has become even more fragmented in Poland." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

13274. Campos, F.; Santamaría, T.; Santos, E.; Velasco, T. (2010): Presencia de *Anax parthenope* (Selys, 1839)

(Odonata: Aeshnidae) en la provincia de Valladolid (España). Boletín de la S.E.A. 47: 382. (in Spanish) [15-VII-2010, Monasterio de Vega, province Valladolid, Spain (42°14'N 05°12'W, 768 m a.s.l., Fig. 1)] Address: Campos, A., Universidad Europea Miguel de Cervantes, Calle Padre Julio Chevalier, 2, E-47012 Valladolid, Spain. E-mail: campos@uemc.es

13275. Cuber, P. (2010): Lestids (Odonata: Zygoptera: Lestidae) rarely observed in Silesian Province. *Odonatrix* 6(2): 37-41. (in Polish, with English summary) [Poland; records of *Sympecma paedisca*, *Lestes dryas* and *Lestes barbarus* are documented. *S. paedisca* regularly occurs in the small reserve „Żabie Doły”; new localities were detected. Contrary to that, *Lestes dryas* and *L. barbarus* were recorded in smaller number and in fewer localities than it was in the past. The paper also documents an interspecific pairing between *S. paedisca* and *S. fusca*.] Address: Cuber, P., Śląski Uniwersytet Medyczny w Katowicach, Wydział Farmaceutyczny z Oddziałem Medycyny Laboratoryjnej w Sosnowcu, Zakład Parazytologii, ul. Jedności 8, 41-200 Sosnowiec, Poland. E-mail: piotrc10@op.pl

13276. Dejean, A.; Leroy, C.; Corbara, B.; Roux, O.; Céréghino, R.; Orivel, J.; Boulay, R. (2010): Arboreal ants use the "Velcro® principle" to capture very large prey. *PLoS ONE* 5 (6): 7 pp. (in English) ["Plant-ants live in a mutualistic association with host plants known as "myrmecophytes" that provide them with a nesting place and sometimes with extra-floral nectar (EFN) and/or food bodies (FBs); the ants can also attend sap-sucking Hemiptera for their honeydew. In return, plant-ants, like most other arboreal ants, protect their host plants from defoliators. To satisfy their nitrogen requirements, however, some have optimized their ability to capture prey in the restricted environment represented by the crowns of trees by using elaborate hunting techniques. In this study, we investigated the predatory behaviour of the ant *Azteca andreae* which is associated with the myrmecophyte *Cecropia obtusa*. We noted that up to 8350 ant workers per tree hide side-by-side beneath the leaf margins of their host plant with their mandibles open, waiting for insects to alight. The latter are immediately seized by their extremities, and then spread-eagled; nestmates are recruited to help stretch, carve up and transport prey. This group ambush hunting technique is particularly effective when the underside of the leaves is downy, as is the case for *C. obtusa*. In this case, the hook-shaped claws of the *A. andreae* workers and the velvet-like structure of the underside of the leaves combine to act like natural Velcro® that is reinforced by the group ambush strategy of the workers, allowing them to capture prey of up to 13,350 times the mean weight of a single worker." (Authors) The prey also includes a 10 cm large unidentified dragonfly.] Address: Dejean, A., Centre National de la Recherche Scientifique, Écologie des Forêts de Guyane (UMR-CNRS 8172), Campus Agronomique, Kourou, France, E-mail: alain.dejean@wanadoo.fr

13277. Duquef, Y.; Delasalle, J.-F.; Duquef, M. (2010): Le marais de Blangy-Tronville (Somme): 30 ans d'inventaires odonatologiques Synthèse et bilan 2010. *Martinia* 26(3-4): 71-80. (in French, with English summary) ["In the Picardie area (Somme department), the Blangy-Tronville marsh is located in the Somme valley. It includes a number of water bodies resulting from former peat extraction and shows a great floristic and faunistic value. The Odonatological surveys initiated in 1982 produced 38 species, among which *Oxygastra curtisii*. Records are shown according to chronology. Next studies will address the précisé status of the recorded species and will focus on the possible effects of climate global change." (Authors)] Address: Duquef, Y., 25 rue Paul Baroux, F-80440 Blangy-Tronville, France. E-mail: yannduquef@yahoo.fr

13278. Grand, D. (2010): Résumé du poster: Les Libellules endémiques de la Nouvelle-Calédonie. *Martinia* 26(3-4): 187. (in French) [This poster presentation deals on Odonata diversity of New Caledonia, an archipelago with a highly endemic odonate fauna.] Address: deceased

13279. Langford, T.; Jones, J.; Broadmeadow, S.; Armitage, P.; Shaw, P.; Davy-Bowker, J. (2010): 15 Biological diversity in New Forest streams. In: A. Newton eds. *Biodiversity in the New Forest*. Newbury, Berkshire, Pisces Publications. 248 pp: 157-171. (in English) [UK; the list of Odonata considers the following taxa: *Pyrrhosoma nymphula*, *Coenagrion puella* group (*C. puella*, *C. pulchellum*), *Calopteryx splendens*, *C. virgo*, *Cordulegaster boltonii*, *Aeshna mixta* group (*A. mixta*, *A. cyanea*), *Aeshna cyanea*, and *Orthetrum coerulescens*.] Address: Langford, T., Centre for Environmental Sciences, School of Civil Engineering and the Environment, Univ. of Southampton, Highfield, Southampton, Hampshire SO17 1BJ, UK

13280. Lohr, M. (2010): Libellen zweier europäischer Flusslandschaften. Besiedlungsdynamik und Habitatnutzung von Libellengemeinschaften am Unteren Allier (Frankreich) und an der Oberweser (Deutschland). *Arbeiten aus dem Institut für Landschaftsökologie Münster* 17: 183 pp. (in German, with French and English summaries) ["The odonates of two European fluvial landscapes - dynamics of colonisation and habitat selection by dragonfly assemblages in the alluvial floodplains of the Lower Allier (France) and the Upper Weser (Germany). The main aim of the present thesis is the description of the colonisation by dragonflies in alluvial floodplains of semi-natural and regulated rivers by the examples of the lower course of the place Allier (placecountry-region France) and the upper course of the place Weser (placecountry-region Germany). Therefore, spatio-temporal dynamics of the dragonfly assemblages is analysed. From the results recommendations for measures to regenerate alluvial floodplains are derived. The place Allier, where the study area is situated on its lower course («UR Allier»), is regarded as one of the last natural-like rivers of Central and place Western Europe due to a nearly unchanged morphological and hydrological dynamics. In

contrast, the place Upper Weser, where the study area «UR Weser» is situated, has been subject to deep anthropogenic changes since the Middle Ages. Beside river engineering measures, these changes also include water pollution by salts. Descriptions of the place Upper Weser from the 19th century permit the conclusion that the place Weser possessed comparable structures and was subject to a similar morphological dynamics as actually shown in the place Lower Allier. A total of 56 odonate species was recorded, 50 of them having been observed in the UR Allier and 43 in the UR Weser. Although the study areas show some climatic differences and the distance between them amounts to approximately 700 km, the proportion of species being present in both areas is high and currently comes up to 37 species. Three species found in the UR Allier appear in the appendix 2 of the FFH directive - *Coenagrion mercuriale*, *Oxygastra curtisii* and *Ophiogomphus cecilia*. The populations of *O. cecilia* observed in the UR Allier are probably the largest ones in Central and place Western Europe. In 1997, for the first time the species has been found in the UR Weser in the lower course of the river Diemel. Now it is probably autochthonous there. For 32 species the seasonal dynamics of emergence and flight periods in the UR Weser are characterised by phenograms. Therefore, the species are classified into six groups according to different types of life cycles. For *Ischnura elegans* and *Crocothemis erythraea*, evidences for a bivoltine development in at least some years were found. Observations of exceptionally early emergence of *Cordulegaster bidentata* point at a regulation of the emergence date by day length. Based on more than 10 000 data sets from the period of 1989-2005 the trends in occurrence of Odonata species are calculated and analysed for the UR Weser. A significant increase of occurrence can be stated for nine species, five species show a significant decline. A strong expansion of *Crocothemis erythraea* between 2000 and 2005 in the floodplain of the place Upper Weser is evident. This trend is part of an expansion of its distribution area in many parts of place Central Europe whereas the increase in occurrence of *Erythromma viridulum*, *Aeshna affinis* and *Gomphus pulchellus* is due to a regional outspread of these species. These positive trends must be regarded in context with the observed climate change, but should also have been advanced by an anthropogenic increase of habitat availability. Due to meteorological conditions *Sympetrum flaveolum* shows strong fluctuations. The negative trend in occurrence of *Lestes dryas* is a result of drought-effects on reproduction habitats due to lack of precipitation in some years. Founding on indicator and differential species eight different Odonata coenoses are described for the UR Allier on the basis of 61 sampling sites. The Odonata assemblages of 152 sampling sites in the UR Weser are classified to 16 coenoses. The coenosis of the main course of the place Allier is remarkable. Due to quasi-natural morphodynamical conditions it shows an exceptionally high species diversity of 19 species. Among others, six species of gomphids (*Gomphidae*) live in these habitats.

Considered as specialists of various sediments they can often be found side by side, although each species prefer habitats of different grain sizes. This is a consequence of the micro-spatial distribution of different sediments, which is typical of natural rivers. In contrast, the coenosis of the main course of the place Upper Weser has a very low diversity. Many species were probably only able to reproduce here since salt pollution had been reduced in the 1990s. For some species of gomphids settling in the place Allier, actually a positive trend in occurrence even in strongly regulated rivers in place Central Europe is observed where current velocity is secondarily reduced between groynes. In the future, some of them could also appear in the place Upper Weser if salt pollution will decrease. Permanent waters of former secondary channels have a high species diversity in both study areas. In the UR Allier the coenosis of these waters can be differentiated according to the influence of cattle grazing. Alluvial ponds situated in pasture areas are colonized by thermophilous species like *Orthetrum albistylum* and *Coenagrion scitulum* due to a poor shading of their habitats. Besides, species preferring ponds with a low cover of vegetation like *Orthetrum brunneum* and *Ischnura pumilio* are found here. Ponds lacking influence of cattle grazing show both higher vegetation density and shading. Here, *Aeshna affinis*, *Lestes dryas* and *L. barbarus* are breeding. In the UR Weser, alluvial ponds of former secondary channels are subject to strong water level fluctuations. Permanent waters as well as shallow zones drying up temporarily are present. According to these conditions the coenosis has a high species diversity including 31 species. Here, species of permanent waters live beside several species with tolerance of habitat drying like *Aeshna affinis*, *Lestes dryas* and *Sympetrum flaveolum*. In these waters species with different habitat preferences can be found jointly due to high hydrological dynamics being typical of alluvial ponds. Exclusively in the UR Weser gravel pits were studied. Their coenoses can be differentiated by vegetation development and shading. Only waters with intermediate stages of succession show a high species richness due to vegetation diversity. In the UR Weser, *Crocothemis erythraea* and *Gomphus pulchellus* are exclusively found here. Because of very important water depths and steep banks, these features not being typical for alluvial water bodies, gravel pits are only exceptionally colonized by species characterising alluvial floodplains. The development of dragonfly assemblages in three re-deepened ponds in a former secondary channel of the UR Weser shows that even in regulated alluvial landscapes dynamic processes can 'be reactivated with low expenditure. Only a few years later structure diversity had been promoted by these restoration measures, the ponds were colonized by diverse dragonfly assemblages being typical of alluvial waters. The proximity of different waters is very important. Hereby, the species can select those ponds offering their preferred habitat conditions according to the actual meteorological situation. Recommendations for the development and the restoration of alluvial floodplains

can be derived from the results of the study and the analysis. The main aim of floodplain restoration is the re-activation of hydrological and morphological processes. Therefore, regeneration measures are proposed, these having to be adjusted to the individual conditions of the alluvial landscape." (Author)] Address: Lohr, M., Fachgebiet Landschaftsökologie und Naturschutz, An der Wilhelmshöhe 44, 37671 Höxter, Germany. E-mail: Mathias.Lohr@hs-owl.de

13281. Lorenzo-Carballa, M.O.; Beatty, C.D.; Cordero-Rivera, A. (2010): Parthenogenesis in islands insects: The case study of *Ischnura hastata* Say (Odonata, Coenagrionidae) in the Azores. In: Artur R. M. Serrano, Paulo A. V. Borges, Mário Boeiro and Pedro Oromí (eds.): Terrestrial arthropods of Macaronesia - Biodiversity, ecology and evolution. Sociedade Portuguesa de Entomologia: 199-230. (in English) ["Conclusions: Despite the a priori advantages that islands represent for parthenogenetic reproduction, such as isolation from sexual competitors and lower "biological accommodation", the evidence of parthenogenetic forms of otherwise sexually reproducing species found inhabiting islands is still anecdotal (but see Aguin-Pombo et al., 2006). The case of *I. hastata* however, represents a clear classical example of geographic parthenogenesis, with sexual populations widely distributed in the continent and all-female populations found at the Azores islands. Cuellar (1994) has pointed out the importance of differences in vagility between sexual and asexual forms as a possible reason why asexuals can establish. In his review, the evolution of flightlessness in sexuals is offered as an example of a way that parthenogens could outcompete sexual populations through rapid colonisation of an area that sexuals, while reproductively more competitive, cannot invade as quickly. Odonates are extremely vagile animals and some species, such as *Pantala flavescens*, are almost cosmopolitan. In the American continent. *I. hastata* acts as a colonizer and shows a widespread distribution. Genetic data support these observations and indicate that populations probably interchange migrants. These features could have prevented purely parthenogenetic populations for becoming established in the original species' distribution area. Furthermore. *I. hastata* has been found in the Galápagos Islands, where both males and females have been reported (Peck, 1992). Thus the Azorean *I. hastata* is the first and unique case where parthenogenetic forms of this species have established. The great distance between the Azores archipelago and the American continent may have prevented sexual *I. hastata* to arrive and outcompete parthenogenetic populations. Also, the habitat of the Azores islands contains few competitors and predation rates are low, as is the incidence of parasitism by water mites (Lorenzo-Carballa et al., 2011), which would benefit parthenogenetic populations in the long term. Parthenogenesis in *I. hastata* has probably evolved spontaneously from sexual reproduction, which raises the possibility of finding spontaneous/facultative parthenogenesis in sexual populations in other locations. An important goal

for future work is to study and quantify the tytoparthenogenetic capacities of otherwise sexual *I. hastata* females; which will permit us to determine the biotic and abiotic conditions under which parthenogenesis will prevail over sexual reproduction. Finally, it is important to note that chance has probably played a major role in the establishment of the parthenogenetic *I. hastata* populations in the Azores, which makes them a unique case within the order Odonata and stresses the importance of conserving these populations." (Authors)] Address: Lorenzo-Carballa, Olalla, Departamento de Ecología e Biología Animal, Grupo de Ecología Evolutiva e da Conservación, Universidade de Vigo, EUET Forestal, Campus Universitario, Pontevedra, España 36005, Spain. E-mail: olalla.lorenzo@uvigo.es

13282. Mazzoni, R.; Nery, L.L.; Iglesias-Rios, R. (2010): Ecologia e ontogenia da alimentação de *Astyanax janeiroensis* (Osteichthyes, Characidae) de um riacho costeiro do Sudeste do Brasil. *Biota Neotrop.* 10(3): 53-60. (in English, with Portuguese summary) ["In the present work we aimed to describe the spatio-temporal and ontogenetic variations of *Astyanax janeiroensis* diet in Ubatiba stream, a coastal fluvial system from Serra do Mar. We analyzed 540 specimens collected monthly during twelve months in six sites differing in the degree of vegetal cover (opened and closed sites). We verified that *A. janeiroensis* is an omnivorous species whose diet is largely based on autochthonous items. The estimated intestinal coefficient was 0.74 (+ 1.2), being compatible with an omnivorous behaviour. We did not register differences in the diet from dry and rainy seasons. Nonetheless, we found differences in the diet from opened and closed sites. We registered quite absolute predominance of autochthonous items in the diet from the closed sites, whereas, in the opened ones we found similar ingestion of allo- and autochthonous items. Concerning juveniles and adult specimens, we found differences in the consumption of animal and vegetal items with a relative reduction of animal ingestion among adult specimens. The intestinal coefficient of adult specimens was higher than that of juveniles, corroborating the diet results." (Authors) Diet includes regularly Odonata.] Address: Mazzoni, Rosana, Dept de Ecologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro – UFRJ, CP 68020, Rio de Janeiro, RJ, Brasil. E-mail: mazzoni@uerj.br

13283. Santi, E.; Mari, E.; Piazzini, S.; Renzi, M.; Bacaro, G.; Maccherini, S. (2010): Dependence of animal diversity on plant diversity and environmental factors in farmland ponds. *Community Ecology* 11(2): 232-241. (in English) ["Farmland ponds represent habitats with a high conservation value that make a significant contribution to regional biodiversity. Understanding the influence of plant species composition and environmental variables in driving variations in animal species composition in ponds is an important issue in the fields of ecological research and conservation biology. Using variance partitioning techniques to quantify independent effects, we examined

how plant species composition, local-landscape configuration and physicochemical variables interact in influencing aquatic insect and amphibian community composition. The ponds investigated in this study were located in the Site of Community Importance — Special Protected Area (Natura 2000 Network) "Monte Labbro — Alta Valle dell'Albegna" (Tuscany, central Italy). Our results showed that: (i) plant community composition (such as *Carex hirta*, *Glyceria fluitans*, *Potamogeton natans*, *Typha latifolia*) is a good predictor for amphibian but not for aquatic insect species composition; (ii) aquatic insect species composition was more strongly affected by the landscape context, whereas for amphibians the local characteristics of the ponds were determining; (iii) the physicochemical context is a poor predictor for these animal taxa; (iv) lastly, and notably, the explanatory variables explained a high proportion of the total variation in amphibian and aquatic insect species composition. Our results have important implications with respect to the creation of new ponds, which should preferentially take place close to semi-natural grasslands and other wetlands, in order to maintain greater connectivity, and away from urban areas. Moreover, larger ponds are preferable for the preservation of pond biodiversity. The management and conservation of ponds is necessary to ensure the protection of habitats, the survival of individual species and overall pond biodiversity.... *Pyrrhosoma nymphula* and *Anax imperator* were positively correlated with the pond area, whereas *Orthetrum brunneum* and *Notonecta glauca* were negatively correlated with this factor. ...In contrast, *Ilyocoris cimicoides*, *Libellula depressa*, *Anax parthenope* and *Hyphydrus aubei* mainly occurred on sites situated at lower altitudes with a low cover of pastures. Ponds with higher frequencies of *Cloeon dipterum*, *Acilius sulcatus* and *Libellula quadrimaculata* were positively correlated with the presence of torrents (refuges). Finally, most of the aquatic insect species appear to be negatively correlated with high trampling intensity and high altitude." (Authors)] Address: Santi, Elisa, University of Siena BICONNET, Biodiversity and Conservation Network, Department of Environmental Science "G.Sarfatti" Via P.A. Mattioli 4 53100 Siena Italy. E-mail: elisa.santi @unisi.it

13284. Tończyk, G. (2010): Area of Poland as locus typicus for some dragonfly species. *Odonatrix* 6(1): 4-6. (in Polish, with English summary) ["In the year 1825 and 1840 Toussaint de Charpentier published two very important for European odonatology works describing new species of dragonflies. For 10 of them Śląsk (Silesia) was established as locus typicus, thus typical materials being the basis of species description came from the areas of Poland. Charpentier lived and worked in Brzeg, in the vicinities of Opole. Charpentier 1825: *Aeschna flavipes* = *Gomphus flavipes* (Charpentier, 1825); *Aeschna serpentina* = *Ophiogomphus cecilia* (Fourcroy, 1785); *Libellula bimaculata* = *Epithea bimaculata* (Charpentier, 1825); *Libellula pectoralis* = *Leucorrhinia pectoralis* (Charpentier, 1825); *Agrion hastulatum* = *Coenagrion hastulatum* (Charpentier, 1825). Charpentier 1840: *Agrion cyathigerum*

= *Enallagma cyathigerum* (Charpentier, 1840); *Agrion lunulatum* = *Coenagrion lunulatum* (Charpentier, 1840); *Agrion viridulum* = *Erythromma viridulum* (Charpentier, 1840); *Libellula striolata* = *Sympetrum striolatum* (Charpentier, 1840); *Libellula caudalis* = *Leucorrhinia caudalis* (Charpentier, 1840)." (Author)] Address: Tończyk, G., Katedra Zoologii Bezkręgowców i Hydrobiologii, Uniwersytet Łódzki, Banacha 12/16, 90-237 Łódź, Poland. E-mail: tonczyk.grzegorz@gmail.com

13285. Wildermuth, H. (2010): Weiterbildungsexkursion der Schweizerischen Arbeitsgemeinschaft für Libellenschutz SAGLS. *Entomo Helvetica* 3: 217-218. (in German) [20 odonatologists met at 20-VI-2009 to inform on habitat measures to promote Odonata in the Natur Sanctuary "Drumlinlandschaft Zürcher Oberland" between Wetzikon und Hinwil, Switzerland. The focus of measures is set on *Orthetrum coerulescens* and *Leucorrhinia pectoralis*.] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

13286. Zandigiacomo, P.; Buian, F.M. (2010): Reperti di *Selysiothemis nigra* (Odonata, Libellulidae) lungo il litorale Alto-Adriatico. *Boll. Soc. Naturalisti "Silvia Zenari"*, Pordenone 34: 77-84. (in Italian, with English summary) ["In the period 2004-2010, adults of *S. nigra* were observed in four littoral sites of the Veneto and Friuli Venezia Giulia regions (north-eastern Italy). All these records indicate that *S. nigra* is recently naturalized in more zones of the High-Adriatic littoral permanently, confirming the trend of the species to expand its distribution area towards North. This new phenomenon could be associated to the modification of the behaviour of several Odonata species owing to the so-called 'climate change'." (Authors)] Address: Zandigiacomo, P., Dipt di Biologia e Protezione delle Piante, Università degli Studi di Udine, Italy. E-mail: pietro.zandigiacomo@uniud.it

2011

13287. Ameilia, Z.S (2011): The use of Odonata as bio-indicator in environmental systems. *Universitas Sumatera Utara*; <http://repository.usu.ac.id/handle/123456789/28385>: 9 pp. (in English, with Indonesian summary) [Sumatra, Indonesia; Petani Streams, Sibolangit: *Heliogomphus retroflexus*, *Pantala flavescens*. Manik Rambung rice fields: *Pseudagrion microcephalum*, *Ischnura senegalensis*, *Agriocnemis femina*, *A. pygmaea*, *Ictinogomphus acutus*, *Gomphidia abbotti*, *Potamarcha congener*, *Orthetrum sabina*, *Diplacodes trivialis*, *Crocothemis servilia*, *N. terminata*, *N. ramburii*, *Tholymis tillarga*, and *Pantala flavescens*.] Address: Ameilia, Z.S., Lecturer Dept. Pest and Disease, Faculty of Agriculture USU, Medan 20155, Malaysia

13288. Brotóns Padilla, M.; Ocharan Larrondo, F.J. (2011): Catálogo odonológico crítico de la provincia de Ciudad Real (centro de España) (Insecta: Odonata). *Boletín de la SEA* 49: 351-353. (in Spanish, with English

summary) ["Odonatological records from the province of Ciudad Real (central Spain) are very scarce. They are limited to the records of L. Navas from Pozuelo de Calatrava and three other localities, as well as some scattered records from other authors in 14 papers published later. This lack of data can be extrapolated to the entire Southern Plateau with the exception of Extremadura, i.e. the Castilla-La Mancha administrative region. The main aim of the present paper is to establish a critical catalogue of Odonata for this province as a basis for further work on this insect group." (Authors)] Address: Ocharan, F.J., Dept Biología de Organismos y Sistemas. Univ. de Oviedo. 33071 Oviedo, Spain. E-mail: focharan@uniovij

13289. Campos, F.; Velasco, T.; Sanchez, S.; Sanz, G.; Garcia, V. (2011): Primera cita de *Anax ephippiger* (Burmeister, 1839) (Odonata: Aeshnidae) en las provincias de Valladolid y Zamora, España. *Boletín de la S.E.A.* 48(1): 461-462. (in Spanish, with English summary) [2011; three new localities of *A. ephippiger* are documented. Habitat data include water quality readings.] Address: Campos, A., Universidad Europea Miguel de Cervantes, Calle Padre Julio Chevalier, 2, E-47012 Valladolid. E-mail: fcampos@uemc.es

13290. Cao, L.-z. (2011): Investigations on Libelluloidea for [sic] Odonata in Guizhou province. *Journal of Anhui Agricultural Sciences* 39(31): 19033-19035, 19056. (in Chinese, with English summary) [The list of libellulid dragonflies comprises of 39 species. The publication provides a key for the 16 genera, and detailed keys to Orthetrum and Sympetrum species. Common Chinese names for libellulid genera and Orthetrum and Sympetrum species are proposed.] Address: Cao, L.-z., Jiangxi Normal University, Nanchang, Jiangxi 330022, China

13291. Carr, J.; Climate Change Unit - IUCN Global Species Programme (2011): A synthesis of existing species data of the West Africa region. UNEP-WCMC technical report: 25 pp. (in English) [Available data for the African countries Chad, Niger, Nigeria, Benin, Togo, Ghana, Ivory Coast, Liberia, Sierra Leone, Guinea, Guinea Bissau, Gambia, Senegal, Mauritania, Mali, and Burkina Faso are condensed in maps with the following contents: Species richness (297 Odonata species), density map of threatened species (18 Odonata species), density map of regionally endemic species (36 Odonata species), and density map of nationally endemic species (10 Odonata species). No species details are given.] Address: UNEP World Conservation Monitoring Centre (UNEP-WCMC), 219 Huntingdon Road, Cambridge CB3 0DL, UK. E-mail: protectedareas@unep-wcmc.org

13292. Cochet, A. (2011): Androchromie partielle chez une femelle de *Trithemis annulata* (Palisot de Beauvois, 1807) (Odonata, Anisoptera: Libellulidae). *Martinia* 27(2): 138. (in French) [A female of *T. annulata* with male characters of the face was photographed near Mont de Marsan, Département Landes, France at 23-IX-2011.] Ad-

dress: Cochet, A., 27 rue Louis Saint Sevin, 40000 Mont de Marsan, France. E-mail: alain.cochet7@orange.fr

13293. Dow, R.A.; Reels, G.T. (2011): Odonata from a remnant patch of disturbed peat swamp forest on the outskirts of Kuching, west Sarawak. *Agrion* 15(2): 50-51. (in English) [Verbatim: Before large-scale human alterations began, much of the surroundings of what is now Kuching, the state capital of Sarawak, consisted of various types of swamp forest, including much peat swamp forest. Later, rubber was planted in parts of this swamp forest. MA Lieftinck (1953: 236), under the description of *Podolestes harrissoni*, gave an incomplete list of species collected in "an old rubber garden" on the Matang Road outside of Kuching, on September 22, 1950. This list included a number of apparently very scarce species (eg *Amphicnemis madelenae*, *Nannophyopsis chalcosoma* and *Pseudagrion optera diotoma*). Since Lieftinck's day Kuching has expanded considerably and there has been extensive development along the Matang Road, so that most of the peat swamp/old rubber habitat has gone. However, one patch remains, although probably not for much longer. Indeed, it may already have been bulldozed; we last passed the site in July 2010, when building work was occurring immediately adjacent to it. We first visited this site in January 2006, and made return visits in 2008 and 2010. The site is small, consisting of disturbed peat swamp with many old rubber trees that are still being tapped (on his last visit, RAD was ordered out of the site by machete-wielding rubber tappers). This site is at least near to Lieftinck's site, but remarkably we have collected a number of species not found by Lieftinck, illustrating the biodiversity of this kind of habitat in west Sarawak, and the extreme localisation of some species. Most notable of our discoveries at the Matang road was *Pachycypha* sp. cf. *aurea*. *P. aurea*, a tiny chlorocyphid, was described from the south of Kalimantan, and remains the only named species in the genus, which has not been recorded outside of Kalimantan until now. Despite the small size of the Matang Road site, it was not until May 2010 that we found this minute taxon, along one short section of a tiny stream. Both sexes descended from the canopy only in full sunlight, typically perching high. They were at low densities, and no interactions were observed between the sexes. They typically returned to the canopy almost immediately after the sun became obscured by clouds. A full list of the 26 species we have collected at the site is given below. Most of them were not listed by Lieftinck, but probably a number of these were actually collected by him; six species (at least) collected by Lieftinck were not collected by us. At least two of the species listed here are as yet unnamed; descriptions of both are being prepared by RAD.] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

13294. Englund, R.A. (2011): Guam and Palau aquatic insect surveys. Contribution No. 2011-007 to the Pacific Biological Survey. Final Report. Prepared for: Southeast-

ern Ecological Science Center, U.S. Geological Survey, Gainesville, Florida: 21pp. (in English) ["From 15 to 26 March, 2010, collections of aquatic insects were made from freshwater habitats on the island Guam and the Republic of Palau. These surveys were part of a developing a regional biosecurity plan, and personnel from the Pacific Biological Survey of the Bishop Museum assisted scientists from the United States Geological Survey Southeast Ecological Science Center (USGS–SESC) based in Gainesville, Florida in obtaining data required for this plan. The results from these surveys will be used in conjunction with the USGS–SESC project entitled "Risk Analysis of Freshwater Nuisance Species Associated with Department of Defense Operations in Micronesia" that obtained critical baseline information regarding native and non–native freshwater invertebrates. The objective of these aquatic insect surveys was to provide a systematic inventory in selected streams on the islands Guam and in the Republic of Palau. Streams on both Guam and Palau were sampled for one week each. A total of 35 aquatic insect species were collected during surveys on Guam from 15–19 March, and 28 species were found on Palau from 21–26 March, 2010 (Tables 3–5). In the Republic of Palau, the vast majority of freshwater habitats are located on Babeldaob Island, so efforts were concentrated here. These results should be considered preliminary as this was a biological reconnaissance due to limited sampling time and effort for each site. However, this study does provide baseline information regarding particularly rich areas of biodiversity. Although reservoir habitats were assessed on Guam and Palau, lotic habitats were by far the most species-rich habitats. These surveys provided a baseline inventory of aquatic insect species present in each stream assessed and also ensured museum specimens will be available for future researchers. During the course of this study no obvious invasive aquatic invertebrates were observed in the streams sampled on Guam and Palau. All taxa identified to the species level were ascertained to be native species, and at least three species of aquatic Heteroptera on Guam were island endemics (*Limnogonus lundbladi*, *Microvelia mariannarum*, and *Saldula guamensis*). For Palau, a conservative estimate of finding at least 4 island endemics was made, including the three endemic damselflies (*Drepanosticta palauensis*, *Pseudagrion palauense*, and *Teinobasis palauensis*) and the gyrrinid (whirlygig) beetle. The identity of an *Ischnura* found in lentic habitats on Palau remains a mystery, but as it is not a widespread species such as *Ischnura aurora* or *Agriocnemis femina femina* it is likely that it at least is indigenous if not possibly endemic to Palau. The majority of endemism found during the present study was in relatively undisturbed forested watersheds that appeared to have little to no water diversions. Sampling areas around rifles/cascade areas were found to be particularly species rich. Streams above Fena Reservoir in the Naval Magazine such as the diverse Maulap River are currently strictly protected from development and human impacts, but uncontrolled feral animals such as water buffalo and

pigs could disturb the watershed to such an extent to impede water quality. Although feral animals did not appear to be a problem on Babeldaob, logging, increased agricultural development and water withdrawals are all potential future threats to maintaining a highly diverse and unique freshwater aquatic ecosystem on Palau." (Author) March 2010 Guam surveys: *Anax guttatus*, *Hemicordulia mindana*, *Diplacodes bipunctata*, *Orthetrum sabina*, *Pantala flavescens*, *Rhyothemis phyllis*, *Tholymis tillarga*, *Tramea transmarina*, *Agriocnemis* sp. undet., *Agriocnemis femina femina*, *Ischnura aurora*. Aquatic insect taxa observed and collected on Babeldaob Island during March 2010 Palau surveys: *Agriocnemis femina femina*, *Drepanosticta palauensis*, *Ischnura* sp. 1 undet., *Pseudagrion palauense*, *Teinobasis palauensis*, *Anax guttatus*, *Hemicordulia lulico*, *Diplacodes bipunctata*, *Neurothemis terminata*, *Orthetrum sabina*, *Pantala flavescens*, *Rhyothemis phyllis*, *Tholymis tillarga*, *Tramea transmarina*. Aquatic insect taxa observed and collected on Koror and Malakal Islands during March 2010 Palau surveys: *Agriocnemis femina femina*, *Teinobasis palauensis*, *Ischnura* sp. 1 undet., *Anax guttatus*, *Hemicordulia mindana*, *Diplacodes bipunctata*, *Neurothemis terminata*, *Orthetrum sabina*, *Pantala flavescens*, *Rhyothemis phyllis*, *Tholymis tillarga*, *Tramea transmarina*.] Address: Englund, R.A., J. Linsley Gressitt Center for Entomological Research, Bishop Museum, 1525 Bernice Street, Honolulu, Hawaii 96817, USA. E-mail: englund@bishopmuseum.org

13295. Futahashi, R. (2011): A revisional study of Japanese dragonflies based on DNA analysis (1). *Tombo* 53: 67-74. (in Japanese, with English summary) ["Phylogenetic analyses using DNA sequences of dragonflies have been increasing recently. Here I review the recent findings of phylogenetic relationships between each family of Odonata based on DNA analyses by foreign research groups, and introduce the classification of Japanese dragonflies based on my ongoing DNA analyses. Several studies reported that Zygoptera and Anisoptera (including Epiophlebiidae) are monophyletic, and Chlorogomphidae and Macromiidae are accepted at the family level. Corduliidae is confirmed as non-monophyletic clade, and among Japanese Corduliidae species, *Macromidia ishidaei* Asahina, 1964 belongs to a different family. Coenagrionidae is divided into two well-supported subdivisions. The first includes a group of coenagrionids mostly characterized by having an angulate frons (including *Ceriagrion* and *Nehalennia*), and the second division includes typical Coenagrionidae. From my nuclear DNA analysis of all Japanese species, *Rhipidolestes aculeatus* Ris 1912 and *Anotogaster sieboldii* (Selys 1854) were recovered as strongly diphyletic, suggesting that *R. a. yakusimensis* Asahina, 1951 should be accepted at species level, and the Yaeyama group of *A. sieboldii* should be regarded as the distinct species *A. flaveola* Lohmann, 1997. Within subspecies, *Orthetrum japonicum japonicum* (Uhler, 1858) and *O. j. internum* McLachlan, 1894 were recovered as deeply separated lineages. Together with differences in their larval characteristics, these two subspecies are better recog-

nized as distinct species as in Ishida (1996). In contrast, only a few differences were found between the following two combinations of allopatric species; *Planaeschna milnei* (Selys, 1883) and *Planaeschna naica* Ishida, 1994, *Somatochlora japonica* Matsumura, 1911 and *Somatochlora exuberata* Bartenev, 1912, and no differences were found between the allopatric species *Aeshna nigroflava* Martin, 1908 and *Aeshna crenata* Hagen, 1856, suggesting that the two species of each combination should be recognized as the same species. The advantage, points of caution, and usage of DNA analysis are also discussed." (Author)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

13296. Gathman, J.P.; Burton, T.M. (2011): A Great Lakes coastal wetland invertebrate community gradient: Relative influence of flooding regime and vegetation zonation. *Wetlands* 31(2): 329-341. (in English) ["Wetland invertebrate community composition is affected by habitat conditions associated with flooding regimes and vegetation characteristics, yet distinguishing among these influential factors is difficult because they tend to co-vary spatially. We studied a Great Lakes coastal wetland invertebrate community along an elevation gradient as Lake Huron water level rose and fell over a three-year period. This hydrologic variation caused changes in the gradient of flooding conditions, while plant zonation remained relatively unchanged. Multivariate analysis indicated that the invertebrate community varied continuously along the elevation gradient, and that it changed substantially within vegetation zones as water level changed. Variation across the gradient decreased because the high-elevation wet meadow community became more similar to lower-elevation communities as a result of upslope expansion in distributions of many taxa, and substantial increases in dominance of a subset of taxa. Invertebrate density increased dramatically with high-water conditions, and diversity decreased in general. Results suggested that invertebrate community composition was influenced by flooding conditions more than vegetation. These results may have important implications for conservation of high-elevation wetland zones as high-water refuges for wet-meadow invertebrates, and for coastal wetland monitoring schemes based on vegetation zones as habitat for particular invertebrate assemblages. ... Libellulidae (and, to a lesser extent, Aeshnidae) dragonfly nymphs became conspicuously abundant in the Year 3 wet meadow (and June hummock zone; see Table 3), even though water levels were dropping (Gathman 2000). Many of these nymphs were found dead in shallow, warm pools of water in depressions on the recently exposed wet meadow substrate. Stranded aquatic invertebrates are easy prey for birds and terrestrial animals, and may nutritionally supplement terrestrial communities" (Authors)] Address: Gathman, J.P., Dept of Biology, University of Wisconsin River Falls, River Falls, WI 54022, USA. E-mail: joseph.gathman@uwrf.edu

13297. Gniadkowski, J. (2011): Dragonfly (Odonata) in the nearby of Czestochowa. Part V. *Biuletyn Czestochowskiego Koła Entomologicznego* 10/11: 22-25. (in Polish, with English summary) [Poland; 25 Odonata species are documented. The list of records includes *Coenagrion hastulatum* and *Ophiogomphus cecilia*.] Address: Gniadkowski, J., ul. Oskara Lange 7/97, Czestochowa, Poland

13298. Harrison, J.F.; Kaiser, A.; Vanden Brooks, J.M. (2011): Atmospheric oxygen level and the evolution of insect body size. *Proceedings of the Royal Society B* 277(1690): 1937-1946. (in English) ["Insects are small relative to vertebrates, possibly owing to limitations or costs associated with their blind-ended tracheal respiratory system. The giant insects of the late Palaeozoic occurred when atmospheric PO₂ (aPO₂) was hyperoxic, supporting a role for oxygen in the evolution of insect body size. The paucity of the insect fossil record and the complex interactions between atmospheric oxygen level, organisms and their communities makes it impossible to definitively accept or reject the historical oxygen-size link, and multiple alternative hypotheses exist. However, a variety of recent empirical findings support a link between oxygen and insect size, including: (i) most insects develop smaller body sizes in hypoxia, and some develop and evolve larger sizes in hyperoxia; (ii) insects developmentally and evolutionarily reduce their proportional investment in the tracheal system when living in higher aPO₂, suggesting that there are significant costs associated with tracheal system structure and function; and (iii) larger insects invest more of their body in the tracheal system, potentially leading to greater effects of aPO₂ on larger insects. Together, these provide a wealth of plausible mechanisms by which tracheal oxygen delivery may be centrally involved in setting the relatively small size of insects and for hyperoxia-enabled Palaeozoic gigantism." (Authors) References to dragonflies are made.] Address: Harrison, J.F., School Life Sci., Arizona State Univ., Tempe, AZ 85287-4501, USA. E-mail: j.harrison@asu.edu

13299. Hochebner, T. (2011): Buchbesprechung: Libellen im Bezirk Melk. Wolfgang Schweighofer. Herausgegeben vom „Kuratorium zur Herausgabe einer Bezirkskunde für den Bezirk Melk“, Melk, 2011, 207 Seiten. *LANIUS-Information* 20(1/2): 18-19. (in German) [Review of the book. Publisher: Forschungsgemeinschaft LANIUS, Schlossgasse 3, 3620 Spitz an der Donau, Austria. E-mail: office@lanius.at] Address: not stated

13300. Hugo, C.D. (2011): The influence of fire and plantation management on wetlands on the Tsitsikamma plateau. MSc thesis, Nelson Mandela Metropolitan University: X + 81 pp + 2 app. (in English) [South Africa; "Conclusion: Dragonfly abundance of wetlands on the Tsitsikamma Plateau was low but considering the absence of surface water, species richness was still fairly high. Dragonfly abundance is expected to increase when the drought ends, but the pattern of the results are expected to remain the same in wetter conditions. Fire indirectly influences dragonfly species composition and abundance

by altering vegetation structure. Generally, in this study dragonfly abundance and species richness was higher in palustrine wetlands with old vegetation, which had not burnt for at least nine years. Thus, it is important that structural vegetation succession of wetlands can take place. This study found female dragonflies frequented the palustrine wetlands more than males, which suggests the importance of palustrine wetlands as a refuge habitat for female dragonflies, and thus highlights the need for their conservation and further research. The wetland habitats on the plateau likely play a vital role as refuge habitats for female dragonflies, aiding in population dynamics by serving as geneflow corridors and dispersal grounds." (Author)] Address: Hugo, Christine Denise, Botany Dept, Nelson Mandela Metropolitan Univ., P.O. Box 77000, Port Elizabeth 6031, South Africa. E-mail: cd.hugo@gmx.net

13301. Huon, F.; Dieu, E. (2011): Observations de *Coenagrion mercuriale* (Charpentier, 1840) et de *Cordulegaster boltonii* (Donovan, 1807) à Fontenay-le-Fleury (Département des Yvelines). *Martinia* 27(2): 139-140. (in French) [France; records of *C. mercuriale* and *C. boltonii* (30-VI-2010) are documented.] Address: Huon, Florent, 50, avenue de Villepreux, F-78340 Les-Clayes-Sous-Bois, France. E-mail: florent.huon@gmail.com

13302. Labinger, Z.; Gorney, E. (2011): Drawing Inspiration from the Hula Valley. Publisher: Artists for Nature Foundation & Society for the Protection of Nature in Israel: 192 pp. (in Trilingual essays and captions in English, Hebrew, and Arabic) ["The artwork in this book forms a unique portrait of the Hula Valley, an important agricultural region in northern Israel. This area is located at the crossroads of Eurasia and Africa and is situated along the Great Rift Valley. It is an area rich in wetlands, woodlands, open fields and mountains, and is a critical stopover, breeding, and wintering site for more than 300 bird species, 20 of which are globally threatened. An estimated 500 million birds pass through here while migrating, which is why the Hula Valley is currently being proposed as the largest UNESCO World Heritage Transnational Serial Nomination. The Israel Ornithological Center of the Society for the Protection of Nature in Israel (SPNI) teamed up with the International Artists for Nature Foundation (ANF) to produce this book. They brought together 34 artists from around the world to participate in two festivals held during the winter of 2008 and the spring of 2009. The reproductions of their works shows us the Hula Valley in all its splendour." (Publisher) The book includes three water colour pictures from Barry van Dusen and Bruce Pearson.] Address: <http://www.artistsfornature.com>

13303. Martín, R. (2011): *Coenagrion pulchellum* (Van der Linden, 1825) (Insecta, Odonata, Coenagrionidae) en la Península Ibérica. *Boletín de la S.E.A.* 48(1): 493-495. (in Spanish, with English summary) ["A number of damselflies resembling *Coenagrion pulchellum* were

found during a revision of the Odonata collection belonging to the Barcelona Museum of Natural History and after detailed study this initial impression was confirmed. The fact that this species resembles *Coenagrion puella*, and has probably been confused on numerous occasions, is discussed." (Author)] Address: Ricardo Martín, R., Grupo Oxygastra, Institució Catalana d'Història Natural, Carrer del Carme, 47, 08001 Barcelona, Spain. E-mail: info@oxygastra.org

13304. Rannap, R.; Kaart, T.; Briggs, L.; de Vries, W. (2011): Habitat requirements of *Pelobates fuscus* and *Leucorrhinia pectoralis*. Project report "Securing *Leucorrhinia pectoralis* and *Pelobates fuscus* in the northern distribution area in Estonia and Denmark" LIFE08NAT/EE/000257. Tallinn 2011: 23 pp. (in English) ["Discussion and conclusions - *Leucorrhinia pectoralis*: To determine habitat requirements of *L. pectoralis* only data from Estonia was used, because in Denmark just three sites with *L. pectoralis*' larvae were found during the inventory in 2010. This dragonfly species has declined sharply in the westernmost parts of its range and its present distribution is very patchy (Sahlén et al., 2004). Thus, knowledge on habitat demands of *L. pectoralis*, gained from Estonia, would be very useful for active habitat management planning in Denmark and in other Western and Central European countries (e.g. Germany, France, the Netherlands, Belgium, etc.) as well. In Estonia *L. pectoralis* preferred larger natural lakes with extensive shallow littoral zones and large swampy edges of moor vegetation for breeding. At the same time artificial man made ponds with generally small size and steep banks were avoided as reproduction sites for *L. pectoralis*. In many areas in Europe natural lakes surrounded by bogs and swamps have completely vanished or their number has decreased rapidly. If such sites still exist, it would be important to preserve those in a state as close to natural as possible. In the other hand, while planning actions of habitat management for *L. pectoralis* creation of large wetlands and restoration of large permanent depressions with depth variation and extensive littoral zones should be considered. In addition, tense network of natural water bodies (lakes, bogs, beaver floods, river flood plains etc) is essential to harbour a vital population of *L. pectoralis*. Therefore aquatic habitats should be created and restored in clusters. *Leucorrhinia pectoralis* favoured to reproduce in water bodies with peaty sediment and avoided water bodies with mud. The sediment type turned out essential for the species probably due to its influence to the water chemistry and macrophytes' community. Sediment type also indicates the species' preference to natural clean water bodies and avoidance of eutrophicated waters. Thus, when restoring or creating breeding sites for this species, sediment type should be taken into account and agricultural pollution as well as nutrient influx should be prevented. In accordance to earlier studies, breeding site selection of *L. pectoralis* was strongly associated with presence of macrophytes in the water body (Schindler et al. 2003, Sahlén et al., 2004). Less than 1

m tall vegetation cover, as well as presence of 20 Sphagnopsida and Bryopsida mosses associated positively with larval abundance of *L. pectoralis*. Water vegetation has various important functions for adults and larvae, which include concealment from predators (Askew 1982), substrate for egg deposition, larval habitat, as well as for mating and feeding perches (Buchwald 1992, Schindler et al. 2003). Presence of forest and bogs in the close vicinity of breeding site was essential for *L. pectoralis* and the shorter distance to the forest was favoured. Forest provides shelter for the adults. At the same time open areas and buildings had significantly negative influence on breeding site selection. As demonstrated by Chin and Taylor (2009) the dispersal ability in the genus *Leucorrhinia* was limited by open areas, particularly in short distances, whereas forest shelters acted as dispersal routes for the adults. Thus, breeding sites should be created near the woodlands and large open areas as well as urban areas should be avoided." (Authors) <http://www.keskkonnaamet.ee/public/galleries/dragonlife/HabitatrequirementsofP.fuscusandL.pectoralis.pdf> Address: Not stated

13305. Rochlin, I.; Dempsey, M.E.; Iwanejko, T.; Ninivaggi, D.V. (2011): Aquatic insects of New York salt marsh associated with mosquito larval habitat and their potential utility as bioindicators. *Journal of Insect Science* 11(172): 1-17. (in English) ["The aquatic insect fauna of salt marshes is poorly characterized, with the possible exception of biting Diptera. Aquatic insects play a vital role in salt marsh ecology, and have great potential importance as biological indicators for assessing marsh health. In addition, they may be impacted by measures to control mosquitoes such as changes to the marsh habitat, altered hydrology, or the application of pesticides. Given these concerns, the goals of this study were to conduct the first taxonomic survey of salt marsh aquatic insects on Long Island, New York, USA and to evaluate their utility for non-target pesticide impacts and environmental biomonitoring. A total of 18 species from 11 families and five orders were collected repeatedly during the five month study period. Diptera was the most diverse order with nine species from four families, followed by Coleoptera with four species from two families, Heteroptera with three species from three families, then Odonata and the hexapod Collembola with one species each. Water boatmen, *Trichocorixa verticalis* Fieber (Heteroptera: Corixidae) and a shore fly, *Ephydra subopaca* Loew (Diptera: Ephydriidae), were the two most commonly encountered species. An additional six species; *Anurida maritime* Guérin-Méneville (Collembola: Neanuridae), *Mesovelina mulsanti* White (Heteroptera: Mesovelidae), *Enochrus hamiltoni* Horn (Coleoptera: Hydrophilidae), *Tropisternus quadristriatus* Horn (Coleoptera: Hydrophilidae), *Dasyhelea pseudocincta* Waugh & Wirth (Diptera: Ceratopogonidae), and *Brachydeutera argentata* Walker (Diptera: Ephydriidae), were found regularly. Together with the less common *Erythrodiplax berenice* Drury (Odonata: Libellulidae), these nine species were identified as the most

suitable candidates for pesticide and environmental impact monitoring due to abundance, position in the food chain, and extended seasonal occurrence. This study represents a first step towards developing an insect-based index of biological integrity for salt marsh health assessment." (Authors)] Address: Rochlin, I., Division of Vector Control, Suffolk County Dept of Public Works, 335 Yaphank Avenue, Yaphank, NY 11980-9744, USA. E-mail: ilia.rochlin@suffolkcountynyny.gov

13306. Sadeghi, S. (2011): A preliminary study of larval stage of Odonata in Fars province, description of full grown larva of genus *Anax* (Leach, 1815) and an identification key for the larvae. *Iranian Journal of Biology* 23(3): 468-477. (in Farsi, with English summary) ["Faunal study of Odonata of Fars province began for the first time in Iran at the department of biology, Shiraz University in 2002 (1380). According to the accessible references, no study on larval stage of Odonata of Iran was found till the time of this research. A total of 332 larvae, 229 of the Anisoptera and 103 of Zygoptera were collected in a year sampling. All these collected larvae are 14 genera, 9 belong to Anisoptera and 5 to Zygoptera which identified for the first time in Iran. Description of the full-grown larva of a species from genus *Anax* and a provisional key to the families and the last larval instar of the known 14 genera is given." (Author)] Address: Sadeghi S., Biol. Dept., Fac. of Science, Shiraz University, Shiraz, I.R. of Iran

13307. Sadeghi, S. (2011): An introduction to faunal study and checklist improvement of Fars province Odonata. *Journal of taxonomy and biosystematics* 2(5): 49-60. (in Farsi, with English summary) ["Faunal study of Odonata in Fars province began, in 1380 (2002) for the first time at the department of biology, Shiraz University, This article presents a part of the results of this study, which is related to their adult stage. According to accessible references, there was no other detailed study on this group of insects until this project started. In addition to some specimens which had been collected and kept at the Insect Collection of biology department, Shiraz Univ. (CBSU), during the past few years, several new collections of Odonata were also added to this study from different habitats of the province. A total of 650 adults, 264 of the suborder Anisoptera and 386 of the suborder Zygoptera were collected and identified during one-year sampling. Among 22 identified species, 15 species belonged to Anisoptera and 7 to Zygoptera. Nine species were reported from Fars province for the first time. Line drawings, photos and distribution maps of the species were prepared separately, some of them are presented in here as a sample." (Author)] Address: Sadeghi S., Biology Dept., Faculty of Science, Shiraz University, Shiraz, I.R. of Iran. E-mail: ssadeghi@shirazu.ac.ir

13308. van der Poorten, N. (2011): *Palpopleura s. sexmaculata* (Fabricius, 1787) deleted from the list of Odonates of Sri Lanka (Libellulidae). *Agrion* 15(2): 52-53. (in English) [The status of *P. sexmaculata* in Sri Lanka is

discussed in detail. As a consequence, it is deleted from the national checklist of Odonata.] Address: van der Poorten, Nancy, 17 Monkton Avenue, Toronto, Ontario, M8Z 4M9, Canada. E-mail: nmgvdp@gmail.com

13309. Van Ryswy, B. (2011): 2010 Hamilton Odonata Count. *The Wood Duck* 64(8): 172-174. (in English) [The seventh annual Hamilton Odonata Count was held on July 3, 2010; the study area comprises a circle of 15 miles in diameter, centred on the village of Kirkwall in Flamborough, Ontario, Canada. A total of 63 species were recorded bringing the local list to 84 Odonata species. New species for the count were: *Enallagma basidens*, *Boyeria vinosa*, *Gomphus graslinellus* and *Libellula incesta*.] Address: not stated

2012

13310. Bange, A. (2012): Kartierung der Libellenfauna an ausgewählten Gewässern der Insel Wangerooge. *Natur- und Umweltschutz (Zeitschrift Mellumrat)* 11(2): 53-57. (in German, with English summary) [Niedersachsen, Germany; "With a great diversity of small waters Wangerooge has ideal habitats going for relatively many species of dragonflies. During the monitoring at selected waters and random sightings of dragonflies in 2011 a total of 22 species could get confirmed. Of that 18 species are rated as indigenous. Probably because of the bad temporary weather conditions in late summer some of the for-coming dragonfly species might be underrepresented. All in all, 36 species are recorded for Wangerooge up to now together with the first records of *Sympetrum fonscolombii* and *Erythromma viridulum*." (Author)] Address: Bange, A., Lange Str. 16, 59505 Bad Sassendorf, Germany. E-mail: andreas-b.@web.de

13311. Belmar, O.; Velasco, J.; Gutiérrez-Cánovas, C.; Mellado-Díaz, A.; Millán, A.; Wood, P.J. (2012): The influence of natural flow regimes on macroinvertebrate assemblages in a semiarid Mediterranean basin. *Ecology* 6(3): 363-379. (in English) ["The investigation of flow-ecology relationships constitutes the basis for the development of environmental flow criteria. The need to understand hydrology-ecology linkages in natural systems has increased owing to the prospect of climate change and flow regime management, especially in water-scarce areas such as Mediterranean basins. Our research quantified the macroinvertebrate community response at family, genus and species level to natural flow regime dynamics in freshwater streams of a Mediterranean semiarid basin (Segura River, SE Spain) and identified the flow components that influence the composition and richness of biotic assemblages. Flow stability and minimum flows were the principal hydrological drivers of macroinvertebrate assemblages, whereas the magnitude of average and maximum flows had a limited effect. Perennial stable streams were characterized by flow sensitive lotic taxa (Ephemeroptera, Plecoptera and Trichoptera) and intermittent streams by predominately lentic

taxa (Odonata, Coleoptera, Heteroptera and Diptera). Relatively minor biological changes were recorded for intermediate flow regime classes along a gradient of flow stability. Seasonal variation and minimum flows are key hydrological components that need to be considered for river management and environmental flows in the Segura River basin and other Mediterranean basins. The anthropogenic modification of these parameters, due to both human activities and climate change, would probably lead to significant changes in the structure and composition of communities in perennial stable streams. This would be characterized by a reduction of flow sensitive Ephemeroptera, Plecoptera and Trichoptera taxa and an increase in more resilient Odonata, Coleoptera, Heteroptera and Diptera taxa." (Authors) Odonata are treated at genus level: *Anax*, *Boyeria*, *Calopteryx*, *Cercion*, *Ischnura*, *Pyrrhosoma*, *Cordulegaster*, *Gomphus*, *Onychogomphus*, *Libellula*, *Orthetrum*, *Sympetrum*, *Platycnemis*.] Address: Belmar, O., Department of Ecology and Hydrology, University of Murcia, Espinardo Campus, 30100 Murcia, Spain. E-mail: oscarbd@um.es

13312. Belvin, W.K.; Zander, M.E.; David W. Sleight, D.W.; Connell, J.; Holloway, N.; Palmieri, F. (2012): Materials, structures and manufacturing: An integrated approach to develop expandable structures. *American Institute of Aeronautics and Astronautics Paper 2012-1951, NF1676L-13247*: 14 pp. (in English) ["Membrane dominated space structures are lightweight and package efficiently for launch; however, they must be expanded (deployed) in-orbit to achieve the desired geometry. These expandable structural systems include solar sails, solar power arrays, antennas, and numerous other large aperture devices that are used to collect, reflect and/or transmit electromagnetic radiation. In this work, an integrated approach to development of thin-film damage tolerant membranes is explored using advanced manufacturing. Bioinspired hierarchical structures were printed on films using additive manufacturing to achieve improved tear resistance and to facilitate membrane deployment. High precision, robust expandable structures can be realized using materials that are both space durable and processable using additive manufacturing. Test results show this initial work produced higher tear resistance than neat film of equivalent mass. Future research and development opportunities for expandable structural systems designed using an integrated approach to structural design, manufacturing, and materials selection are discussed." (Authors) The paper includes many references to Odonata.] Address: Zander, M.E., Aerospace Engineer, Technische Universität Braunschweig & DLR German Aerospace Center, Institute of Composite Structures, Lilienthalplatz 7, 38108 Braunschweig, Germany

13313. Blackburn, M. (2012): Using aquatic macroinvertebrates as indicators of streamflow duration. *StreamflowdurationindicatorsIDWA2012Final06072012*: 17 pp. (in English) [USA, "The current paper identifies family-level aquatic macroinvertebrate communities that re-

spond to variations in streamflow duration in Idaho and Washington streams. The recommended taxa list will serve to compliment a multimetric assessment method designed to allow field practitioners to classify perennial, intermittent, and ephemeral stream habitats." (Authors) Larvae of Odonata are assessed as indicators as follows: 'Perennial': Gomphidae, Cordulegastridae, Calopterygidae; 'Intermittent': Lestidae; 'Ephemeral': none.] Address: U.S. Environmental Protection Agency, Oregon Operations Office, 805 SW Broadway, Suite 500, Portland, OR 97205, USA.

13314. Bruno, C.G.G. (2012): Assessment of heavy metal contamination in Brazilian savanna's streams using Odonata larvae as bioindicators. MSc. thesis. Federal University of Uberlandia. Uberlandia-MG. 92 pp. (in Portuguese, with English summary) ["The aquatic ecosystems are the main receptors of pollutants and contaminants from industrial and agricultural activities and of the discharge of sewage. Among the various substances potentially harmful, heavy metals are a threat to the aquatic ecosystems and the biota. This research aimed to evaluate the contamination of Cerrado's streams by heavy metals using Odonata's larvae as bioindicators, by analyzing biological parameters and evaluating the concentration of metals in the sediments and in the larvae. Samples were collected between October 2010 and August 2011. For the fauna, the abundance of individuals, richness of taxa and the diversity index of Shannon-Wiener (H') and Pielou's equity index (J) were calculated. The presence of metals in the sediment and in the larvae was measured by atomic absorption spectrometry and atomic emission spectrometry with inductively coupled plasma, respectively. Cluster analysis was performed for the set of streams for the concentrations of Cu, Zn, Ni, Fe and Mn in sediments, and concentrations of Cu, Zn and Ni in the sediment were compared with a table of guide values. Canonical Redundancy Analysis (RDA) was performed to discriminate metals that contributed most to the variance of the biological parameters. Significance of heavy metals on the fauna of Odonata was evaluated by Canonical Correspondence Analysis (CCA). A Principal Component Analysis (PCA) was performed to determine the most important patterns in the concentrations of Cu, Zn, Fe and Mn in the larvae and in the sediments and the bioaccumulation factor (BAF) was calculated to assess the potential for bioaccumulation of metals by the larvae. The Cluster analysis promoted the formation of groups of streams due to the greater or lesser concentration of heavy metals in the sediment which may have been influenced by the presence or absence of riparian vegetation and agricultural activities in the surrounding areas of the streams. The comparison with the table of guide values indicated that the streams which showed the highest concentrations of metals in the sediment were also those who had values above the limits given for at least one of the metals evaluated. The CCA indicated that most taxa of Odonata presented opposite distribution in relation to the vectors of heavy metals, while the family Libellulidae

was abundant in streams subject to greater anthropogenic influence. There was low similarity between the distribution patterns of the PCA diagrams for the sediment and larvae, which indicates the importance of assessments not only in the sediment, but also in the organisms for the achievement of results more efficient about heavy metal contamination. The BAF showed a tendency to bioaccumulation of Zn and Mn by the Gomphidae larvae, indicating that these metals are able to concentrate on its bodies, reflecting the environmental conditions where these organisms live and thus serving as important tools in biomonitoring studies. The results of this study emphasize the potential of the order Odonata for environmental studies, because they demonstrated to be able to reflect the conditions of their environment with respect to the concentration of heavy metals." (Author)] Address: Bruno, Cynthia; no stated

13315. Das, H.; Dutta, A. (2012): Effects of industrial effluents on ecology of a wetland of Nalbari district, Assam with special reference to ichthyofauna. The Ecoscan, Special issue 1: 147-153. (in English) ["Industrial effluents discharge into the water bodies is a major threat to the aquatic life. The wetland near District Industries and Commerce Centre (DIC) of Nalbari district provides a typical example of aquatic pollution due to industrial discharge. A study was undertaken during 2010-2011 to examine selected physico-chemical parameters of this wetland that receives effluents from different categories of small scale industries like aluminum utensil manufacturing industry, flour industry and mustered oil industry located at DIC. The water quality parameters that observed to estimate pollution level were temperature (18-25°C), colour (dark brown to blackish), odour (H₂S like), DO (3.9-4.7 mg/L), FCO₂ (3.6-5.1 mg/L), pH (8.5-9.2), alkalinity (349-410 mg/L), total hardness (69-147 mg/L), chloride (58-67 mg/L). Among these water quality parameters certain parameters like temperature and total hardness were within the acceptable limit. However, others exceeded the acceptable range of sustainable fish growth. Effects of pollutants were studied on certain hardy fishes like *Channa gachua*, *Clarias batrachus* and *Anabas testudineus*. Industrial effluents affect the integument, gills and several organs of such fishes especially liver. Plankton and aquatic insects were also studied to throw some light on the indicator species." (Authors) *Urothemis signata*, *Dysphaea ethela*] Address: Das, H., Dept Zoology, Gauhati Univ., Guwahati - 781 014, India. E-mail: Hiteshdas11@gmail.com

13316. Day, L.; Farrell, D.; Gibert, E.; Günther, A.; Hämläinen, M.; Klimsa, E.; Korshunov, A.; Kosterin, O.; Noppadon, M.N.; Pelegrin, A.; Röder, U.; Ruangrong, R.; Vikhrev, N. (2012): New provincial records of Odonata from Thailand mostly based on photographs. *Agrion* 16(1): 16-25. (in English) [Records from 76 localities are documented.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

13317. Del Arco, A.I.; Ferreira, V.; Graça, M.A.S. (2012): The performance of biological indicators in assessing the ecological state of streams with varying catchment urbanisation levels in Coimbra, Portugal. *Limnetica* 31(1): 141-154. (in English) ["The performance of biological indicators in assessing the ecological state of streams with varying catchment urbanisation levels in Coimbra, Portugal The growth of human populations has resulted in the expansion of metropolitan areas and changes in land use, both of which affect watersheds and streams. The ecological integrity of streams is likely to be negatively affected by urbanisation, compromising freshwater ecosystem services. The aim of this study was to assess how efficient structural and functional indicators are in evaluating the ecological conditions of water in urban stream ecosystems. Two urban streams crossing the city and one stream crossing a suburban area of Coimbra, Portugal were selected. Total impervious area (TIA) was used as an indicator of urbanisation. Physical and chemical parameters of water were measured and analysed within the Water Framework Directive (WFD/2000/60/EC). Benthic macroinvertebrates were used as structural indicators, and the IBMWP biotic index (modified) and the Portuguese IPTIS index were calculated. The decomposition rates of oak (*Quercus robur*) and alder (*Alnus glutinosa*) leaves were used as indicators of functional quality. Biotic indices and litter decomposition rates indicated poor ecological conditions in the urban streams compared to the suburban stream, consistent with the degree of urbanisation. The decrease in ecological quality in urban streams most likely reflected decreases in dissolved oxygen and increases in water temperature and conductivity. We emphasise (a) the need to combine physical and chemical data with biological data and (b) the high performance of a novel functional indicator based on litter breakdown rate as an accurate, efficient and integrative measure of ecological integrity in urban streams." (Authors) The analysis also considers 'Cordulegaster' and 'Onychogomphus'.] Address: Del Arco, Ana Isabel, IMAR-CMA, Dept of Life Sciences, University of Coimbra, P.O. Box 3046, 3001-401Coimbra, Portugal. E-mail: aarco@ujaen.es

13318. Dunbier, J.R.; Wiederman, S.D.; O'Carroll, D.C. (2012): Predictive response facilitation to moving targets in an insect neuron. *Front. Behav. Neurosci.* Conference Abstract: Tenth International Congress of Neuroethology, College Park. Maryland USA, USA, 5 Aug - 10 Aug, 2012. doi: 10.3389/conf.fnbeh.2012.27.00234: (in English) ["Hemicordulia tau, is an efficient aerial insect predator. Much of their airborne behaviour is related to the pursuit of other flying insects, both conspecifics and prey. The dragonflies identify these target animals at distance against visually cluttered, dynamic backgrounds. Additionally this must all be separated from the motion signals generated by the dragonflies' movement through the world. The visual system of the dragonflies possesses numerous specialisations to facilitate these essential behaviors. Small target motion detecting (STMD) neurons have been identified in the lobula of several insect spe-

cies that engage in visual chase behaviors. This class of neurons respond robustly to small, discrete targets moving within a region of the visual field even in the presence of other non-target based motion [Nordström and O'Carroll 2009]. How do STMDs generate robust responses to target motion despite motion of other background features? Previous work from our lab shows that despite STMDs having a short absolute latency of response, response to the continuous motion of a discrete target increases to its maximum over several hundreds of milliseconds [Nordstrom et al 2011]. The dragonfly centrifugal small target motion detector, CSTMD1 is ideal for investigating the mechanisms underlying this response facilitation. We recently showed that disruption of the path into discontinuous paths abolishes facilitation in a manner predicted poorly by parsimonious physiological explanations for such a slow response, leading to the conclusion that facilitation must involve a higher order mechanism that is locally circumscribed [Dunbier et al 2011]. To test this hypothesis we presented CSTMD1 with controlled spatial, temporal and spatio-temporal discontinuities in target trajectories. Spatial displacements reveal the instantaneous extent of facilitatory spread to be limited to less than 21 degrees from the current target location. Temporal discontinuities revealed that the local response remains primed in that region for at least 500msec, longer in some cases. Most interesting of all we found that for a velocity matched spatio-temporal discontinuity (the equivalent of a target disappearing behind an obstruction), facilitation spreads away from the disappearance location to a greater degree than in the purely spatial discontinuities. i.e. responses at more distant locations that were not initially facilitated, become more so after a delay matching the predicted target speed. While our experiments reveal a fascinating, predictive mechanism for boosting the target response at expected future locations, it is not yet clear whether this subserves a boost in local target detectability amidst complex clutter, or a higher order mechanism of attention to a feature of interest (or both). ... References: Dunbier, Wiederman, Shoemaker & O'Carroll "Modelling the temporal response properties of an insect small target motion detector" *ISSNIP*. p.125. 2011. Geurten, Nordström, Sprayberry, Bolzon & O'Carroll. "Neural mechanisms underlying target detection in a dragonfly centrifugal neuron," *J. Exp. Biol.* 210, 3277–3284. 2007. Nordström & O'Carroll. "Feature detection and the hypercomplex property in insects" *Trends Neurosci.* 32, 383–391. 2009. Nordström, Bolzon & O'Carroll. "Spatial facilitation by a high-performance dragonfly target-detecting neuron," *Biol. Lett.* 7, 588-592. 2011. Conference: Tenth International Congress of Neuroethology, College Park. Maryland USA, USA, 5 Aug - 10 Aug, 2012.] Address: Dunbier, J.R., Univ. of Adelaide, School of Medical Sciences, Adelaide, SA 5005, Australia. E-mail: ames.dunbier@adelaide.edu.au

13319. Falico, D.A.; Lopez, J.A.; Antoniazzi, C.E. (2012): Opportunistic predation upon dragonflies by *Pseudis limellum* and *Pseudis paradoxa* (Anura: Hylidae) in the Gran

Chaco region, Argentina. *Herpetology Notes* 5: 215-217. (in English) ["On January the 7th, 2010 we manually captured 19 postmetamorphic *P. paradoxa* individuals (mean snout-vent length= 46.12 ± 2.46 mm) and 14 *P. limellum* individuals (mean snout-vent length = 18.06 ± 1.54 mm). All individuals were euthanized in situ and subsequently deposited in the herpetological reference collection of the National Institute of Limnology (INALI: CONICET-UNL). After dissection, the entire content of the gastrointestinal tract of each individual was analyzed under a microscope. To describe the diet, we calculated the hierarchic index of relative prey importance (IRI%), that combines prey numerosity (N), volume (V) and frequency of occurrence (FO) to obtain a general expression of the importance of each prey item (George and Hadley, 1979): Eighty-nine percent of the *P. paradoxa* (hereafter Pp) individuals and 79% of the *P. limellum* (hereafter Pl) individuals contained dietary remains. We identified 78 prey items (Pp = 41, Pl = 37) classified in 17 categories (Table 1). Odonata was the most important prey in both species. Diet similarity between species was high (Pjk=75.98%). However, post-hoc analysis revealed that odonates consumed by *P. paradoxa* were significantly larger than those consumed by *P. limellum* (Odonata length: unpaired t test, t13 = 5.12, p = 0.0002; Odonata width: unpaired t test, t13 = 10.284, p < 0.0001; Odonata volume: unpaired t test with Welch correction, Welch's approximate t7 = 7.471, p = 0.0001). The high dietary overlap found in our study could potentially be attributed to a high temporary abundance of odonates during the sampling date (authors pers. obs.). Odonates are vulnerable to predation by anurans during oviposition, when reproducing individuals are in direct contact with the water surface, and during emergence, when larvae shed their skin (exuvia) as part of their metamorphosis to the adult stage (Rehfeldt, 1992; Worthen, 2010). The possibility of *P. limellum* and *P. paradoxa* to co-occur with an elevated diet overlap could therefore be facilitated by the temporary abundance of this food resource (i.e. summer dragonfly oviposition and emergence), variation in mean prey item size (larger frogs consumed larger dragonflies, probably a larger proportion of Anisoptera versus Zygoptera), and the high productivity of these wetlands (Seib and Lajmanovich, 2003-2004). For this reason, we proposed that, as *P. paradoxa* and *P. limellum* are generalist predators, they tend to opportunistically exploit temporary abundant prey - such as dragonflies during oviposition or emergence - which causes a temporary rise in 'taxonomic' diet overlap but likely results in minor food competition." (Authors)] Address: Falico, D.A., Instituto Nacional de Limnología (CONICET-UNL). Ciudad Univ., Paraje El Pozo, (3000) Santa Fe, Argentina. E-mail: jalopez@inali.unl.edu.ar

13320. Ferreira, R.B.; Schineider, J.A.P.; Teixeira, R.L. (2012): Diet, fecundity, and use of bromeliads by *Phyllodytes luteolus* (Anura: Hylidae) in southeastern Brazil. *Jour. Herpetology* 46(1): 19-24. (in English) ["This study explores the feeding ecology, habitat use, and fecundity of *Phyllodytes luteolus* inside bromeliads in the restinga

of Regência (sandy coastal plain), Espírito Santo state, southeastern Brazil. Because bromeliads are harvested for commercial use, and frogs may be collected accidentally, the ecology of this frog is of particular interest. We collected 363 individuals of *P. luteolus* (103 tadpoles, 74 juveniles, 64 males, and 122 females) from three species of bromeliads in a 4-km² area bimonthly from February to December of 1998. Ants and termites were the dominant food items in terms of number and mass over time. The percentage of prey items and the size of prey eaten by juveniles differed significantly from those of adults. Dominant prey items were relatively similar across the sampled bromeliad species and locations. *Phyllodytes luteolus* preferred *Vriesea procera*, the most-complex bromeliad in our study site. Half of the individuals were found in bromeliads located in transitional zones. Female *P. luteolus* were slightly larger than the males, which may have determined the strong sex ratio bias toward females. We found females with developed oocytes (range 11–15) in every sampled month, indicating a protracted spawning period. This frog can be considered an active forager and specialist, feeding preferentially on colonial insects. *Phyllodytes luteolus* uses several species of harvested bromeliads and possesses several attributes that could facilitate its success as an invasive species." (Authors) Odonata larvae were found in low numbers.] Address: Ferreira, R.B., Dept Wildland Res.s & Ecol. Center, Utah State Univ., Logan, Utah 84322–5230, USA. E-mail: rodrigoecologia@yahoo.com.br

13321. Fiorenza, T.; Chiandetti, I.; Del Bianco, C.; Maiorano, I.; Nadalon, G.; Uboni, C.; Zandigiacomo, P. (2012): Gli Odonati del Friuli Venezia Giulia: aggiornamento della checklist. *Bollettino Soc. Naturalisti "Silvia Zenari"*, Pordenone 36: 117-131. (in Italian, with English summary) ["The Odonata of the Friuli Venezia Giulia region: an updated checklist. During surveys carried out in 2012 in the context of the Project "Atlas of the Odonata of Friuli Venezia Giulia" (north-eastern Italy) the regional Odonatofauna list has been enriched with seven new species mainly found in mountain and hilly areas. Up to now, the new checklist includes 57 species. The new observed species are *Coenagrion hastulatum* and *Somatochlora arctica*, *S. meridionalis*, *Sympetrum meridionale*, *S. vulgatum*, *S. danae* and *Leucorrhinia dubia*. Notably, no specimens of *Nehalennia speciosa* were found in the Palude di Cima Corso biotope, therefore this species is present in the region (and in Italy) only in the Torbiera di Lazzacco biotope. All collected data will be useful in the development of projects in order to protect important biotopes for the conservation of threatened species." (Authors)] Address: Fiorenza, T., Via Morosina, 17/c, 33100 Udine, Italy. E-mail: tizianofiorenza@libero.it

13322. Gurumayum Shantabala, D.; Goswami, U.C. (2012): Spatial and seasonal distribution of macrobenthic fauna of three rivers of Manipur. *Indian journal of fisheries* 59(1): 37-42. (in English) ["Benthic fauna of three important rivers of Manipur state viz., Khuga, Thoubal and

Imphal were studied during 1999 - 2000. Macroinvertebrate zoobenthos population was low in all the rivers and was found between 85-1,255 μm^{-2} . In Khuga (129-1,255 μm^{-2}) and Thoubal (173-1,100 μm^{-2}) rivers macroinvertebrate benthos population were poor to medium where as in the Imphal River all the three stretches studied showed lowered macroinvertebrate population (85-390 μm^{-2}). During pre-monsoon period there was maximum benthos density in both the stretches in Thoubal, Khuga and Imphal rivers, whereas in the middle stretches of Imphal River, maximum population was observed in post-monsoon. Upper stretch showed richer benthos population both in terms of density and species composition in Khuga and Thoubal rivers. In the Imphal River distinct spatial variation of macroinvertebrate benthos population was lacking, but species composition was richer in lower stretch. Altogether nine macrozoobenthic groups (including Odonata, without any details) were observed during the study and the details are presented in this paper." (Authors)] Address: Goswami, U.C, Department of Zoology, Gauhati University, Guwahati, Assam, India. E-mail : santaguru@rediffmail.com

13323. Hämäläinen, M. (2012): Vanha 1700-luvun sudenkorentohavainto Turusta. [An old dragonfly record from Turku made in 1700's]. *Crenata* 5: 38. (in Finnish) [A record of '*Libellula forcipata*' (probably referring to *Gomphus vulgatissimus*), observed in Turku on 12 June 1781 and 10 June 1782, was published in *Specimen calendarii florae et faunae Aboensis* by C.N. Hellenius and J.G. Justander in 1786. This is the second oldest dragonfly record published from Finland. (Matti Hämäläinen/Asmus Schröter)] Address: Hämäläinen, M., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: libellago@gmail.com

13324. Haslett, J.R. (2012): Development and future of conservation policy initiatives for insects and other invertebrates in Europe. In: New, R.T. (Ed.): *Insect Conservation: Past, Present and Prospects*. Springer Netherlands, Part 4: 317-337. (in English) ["The insect fauna of Europe and indeed the entire invertebrate fauna of the region has been subjected to an immense variety of severe changes of environmental conditions, habitat suitability and other threats to their existence. Most of these animals also remain at the bottom of the league in public profile and conservation status in modern European society and environmental policy." (Author) The paper includes references to Odonata.] Address: not stated

13325. Hazarika, H.; Goswami, M.M. (2012): Feeding behavior of *Diplonychus rusticus* Fabricius (Hemiptera, Belostomatidae) on fish and fish food. 2012 International Conference on Biological and Life Sciences 40: 136-140. (in English) [Gauhati University, Kamrup (Metro), Assam, India; "D. rusticus is one of the common aquatic insects inhabiting the freshwater habitats of Assam, India. An experimental approach has been used to study the predatory efficiency and feeding behaviour of this aquatic bug

in relation to individual density of 7 prey individuals of different size, namely fish species- *Catla catla* and *Puntius* sp., mosquito larvae- *Culex quinquefasciatus* (Diptera), Chironomid larvae- *Tendipes* sp. (Diptera), mayfly- *Baetis* sp. (Ephemeroptera), small aquatic beetle- *Amhiops pedestris* Sharp (Coleoptera) and Damselfly nymph- *Isonychura* sp. (Odonata) by separate feeding in aquaria in laboratory condition. The mean rank of consumption is calculated against each of the prey organism. Of the small size class the most consumed taxa is recorded as living spawn of *Catla catla* followed by the *Baetis* sp. Within the medium size class the most used taxa is the living forms of mosquito larvae which is closely followed by the living spawn of *Catla catla*. The results of the present laboratory experiments indicate the possible use of the aquatic bug as a biological control agent of mosquito vector under agro-climatic conditions of Assam, India. On the other hand, it shows significant negative role in the nurseries and rearing ponds of fish aquaculture system." (Authors)] Address: Hazarika, H., Darrang College, Tezpur, Assam, India. E-mail: hazarika.rabindra@gmail.com

13326. Horvath, J.; Ferenczi, M.; Móra, A.; Vad, C.F.; Ambrus, A.; Forró, L.; Szövényi, G.; Andrikovics, S. (2012): Invertebrate food sources for waterbirds provided by the reconstructed wetland of Nyirkai-Hany, northwestern Hungary. *Hydrobiologia* 697: 59-72. (in English) ["The Nyirkai-Hany wetland reconstruction area in northwestern Hungary is now designated as a Ramsar and a Natura 2000 site. It was created in 2001–2002 by the Fertő-Hanság National Park Directorate to restore a part of the formerly drained large wetland called Hanság and to offer waterbirds a suitable habitat for feeding and breeding. We focused on this aim of the restoration project and studied the temporal and spatial variation in abundance of birds and their invertebrate prey in this newly created wetland. From April 2007 until May 2008, we sampled plankton, nekton and benthos of different habitats monthly and monitored waterbirds weekly on the three different areas of the Nyirkai-Hany. During our investigations, 135 invertebrate and 53 waterbird species were recorded. Benthos and macrophyte decomposition accelerating guilds were the most abundant waterbird guilds—besides the dominant grazing importer material transporter guild, represented primarily by geese—in the Nyirkai-Hany. Zooplankton assemblages primarily consisted of small species not easily used as a food by planktivorous waterbirds. The low density of zoobenthic biomass and the small extent of shallow water mudflats probably accounted for the scarcity of the bioturbating guild group of birds. Nektonic biomass varied greatly among locations having different vegetation types, was greatest in the shallow water areas dominated by *Typha*, *Carex* and *Phragmites* species and lowest at offshore vegetation-free sites. Chironomids, mayflies and odonates were especially abundant and their biomass significantly correlated with several waterbird species, mainly belonging to the macrophyte decomposition accelerating guild (e.g. *Anas platyrhynchos*, *Fulica atra*). This guild itself, which has increa-

sed in abundance in recent years, showed an exceptionally strong correlation with odonate abundance. These results indicate the growing importance of the Nyirkai-Hany wetland area as a foraging site for waterbirds." (Authors) Odonata listed are: *Aeshna mixta*, *Anax* sp., *Brachytron pratense*, *Coenagrion puella*, *C. pulchellum*, *Ischnura elegans*, *Lestidae* sp., *Sympecma fusca*, and *Sympetrum vulgatum*.] Address: Horváth, Z., Department of Systematic Zoology and Ecology, Eötvös Loránd University, Pázmány Péter sétány 1/C, 1117 Budapest, Hungary. E-mail: hhzsofia@gmail.com

13327. Jones, O.M. (2012): The effects of SPINOSAD on *Culex quinquefasciatus* (Diptera: Culicidae) and non-target insect species. MSc thesis. Agricultural and Mechanical College, Department of Entomology, Graduate Faculty of the Louisiana State University: VI + 36. (in English) [USA "Spinosaad is a relatively new insecticide with a unique mode of action that is being valued for control of larval mosquitoes. Whereas a number of toxicological studies have measured effects of spinosaad on various mammals, fish, birds, and terrestrial arthropods, fewer studies have been conducted on the effects of spinosaad on non-target aquatic insect species. Such studies are important as these species might be found in the same environments as mosquito larvae targeted for control. A neighbourhood pond was surveyed to find a representative species of mosquito as well as other common aquatic insects with which to examine susceptibility to spinosaad and non-target effects. The mosquito species chosen was *Culex quinquefasciatus* and the most common non-target taxa were immature stages of a mayfly (*Caenis* spp., Ephemeroptera: Caenidae), a damselfly (*Ischnura* spp., Odonata: Coenagrionidae) and a dragonfly (*Pachydiplax longipennis*, Odonata: Libellulidae). Bioassays of mosquitoes from a reference susceptible strain (Sebring-S) and field-collections of *C. quinquefasciatus* were used to determine susceptibility to spinosaad. In addition, susceptibility was examined in nontarget taxa using spinosaad concentrations corresponding to the LC50 of a field-collected mosquitoes (0.031 ppm) and the labeled rate (1.6 ppm) of Natular®, an EC formulation of spinosaad. Susceptibility to spinosaad did not differ between Sebring-S and field-collected mosquitoes. However, there was a marked difference in susceptibility among non-target taxa. Susceptibility was greatest in *Caenis* spp., followed by *Ischnura* spp., then *P. longipennis*. Results from this study will allow better future management strategies for the use of spinosaad as a mosquito larvicidal agent." (Author)] Address: James Ottea, J., Dept of Entomology, Louisiana State University Agricultural Center, Baton Rouge, LA 70803, USA

13328. Kalninš, M. (2012): The dragonflies (Odonata) species composition changes, spatial distribution and their determining factors in Latvia. PhD thesis. Larvijas Universitate, Riga: 84 pp. (in bilingual in Latvian and English) ["Conclusions: (1.) In line with the latest investigations, there are 59 dragonfly species in Latvia. The

changes in Latvian dragonfly fauna in the last 20 years are related to the extension of southern species areas in the northern direction. In future 5 new dragonfly species may be identified in Latvia – *Lestes viridis*, *Erythromma viridulum*, *Aeshna affinis*, *Orthetrum coerulescens* and *Sympecma fusca*, while the total number of new species in a larger period of time might reach 12 species. The foreseen changes in the dragonfly fauna are related to the distribution of southern species in the northern direction. (2.) The distribution of separate dragonfly species in Latvia is very irregular, as Latvia lays in the periphery of the species' area (*Coenagrion johanssoni*) and due to disjunctive distribution of species habitat (*Gomphus flavipes*, *Aeshna subarctica*) and climate changes (*Anax parthenope*, *Sympetrum fonscolombii*, *Sympetrum pedemontanum*). (3.) The variety of dragonfly species found in raised bogs is increased by the presence of water pools in open landscape (less common are pools in pine groves). Low variety of species is found in wooded mire (wooded [pine groves] mire landscape with mounds and depressions) and open mire (open mire landscape with mounds and depressions, but with no water bodies or woods) habitats. For dragonflies, the most important structures are open water and *Ledum palustre*, *Vaccinium uliginosum*, *Calluna vulgaris* and *Andromeda polifolia* vegetation structures. (4.) In the research of river dragonflies Gomphidae it was found that *Gomphus vulgatissimus* is an ecologically flexible species and the highest density of population can be found in micro habitats with sand and mud (and lower speed of the stream). *Onychogomphus forcipatus*, on the other hand, is less flexible and the highest density of larvae population is found in micro habitats with gravel, pebbles and cobbles (and higher speed of the stream). For *Ophiogomphus cecilia* the density of larvae population is relatively low, but no specific micro habitats were identified in Latvia. (5.) In Latvia, contrary to other European countries, *Nehalennia speciosa* may populate both small and large water bodies, if the vegetation is appropriate for the species. The distribution of the species in Latvia is most likely determined by the climate – the level of moisture and continentality of the climate. Fundamental differences regarding the vegetation populated by the species and the size of populations were not established. (6.) *Aeshna subarctica* in Latvia populates raised bogs with water pools and lakes and lakes with fen and poor fen banks, but, unlike in other European countries, it is not found in peat quarries. The distribution of the species in Latvia is most likely determined by the climate – the level of moisture and continentality of the climate. Fundamental differences regarding the size of the populated water bodies and populations were not established. (7.) *Ophiogomphus cecilia* in Latvia populates similar river habitats as in other places in the species area. Unlike in case of the part of the species area on the south from Latvia, in Latvia the distribution of the species is more determined by the climate – the level of moisture and continentality of the climate. (8.) The population of *Leucorrhinia* family dragonflies in Latvia, in comparison with the population of this species

in other places in Europe, is quite small. *L. albifrons* are more often found in dystrophic (acidic) lakes and also habitats of anthropogenic origin; *L. caudalis* comparatively often can be found in oxbow lakes, which is more characteristic to the periphery of the species area; the number of new localities of *L. pectoralis* has grown considerably, despite the downward tendency in Europe. The habitats suitable for these species are characterized more by the vegetation of the habitat rather than its origin (naturalism)." (Author)] Address: Kalninš, M., Nature Conservation Agency, Baznicas iela 7, LV-2150, Sigulda, Siguldas novads, Latvia. E-mail: martins.kalnins@biology.lv

13329. Kalninš, M. (2012): The ecology and conservation of the Bog Hawker *Aeshna subarctica* Walker, 1908 (Odonata: Aeshnidae) in Latvia. *Latvijas Entomologs* 51: 40-57. (in English) ["*A. subarctica* is a declining and already regionally extinct species in some areas in Europe. Published and all known unpublished data have been used to present and analyse its distribution, population size, habitat selection, and conservation status. The distribution of *A. subarctica* has been mapped using a basic grid of 5x5 km squares in the Baltic grid system. In total, *A. subarctica* has been recorded from 21 squares and 21 localities occurring sparsely or in small concentrations over a large part of the country apart from its western territories. The majority of the recent localities are situated in northern and southern Latvia. The known pattern of the species' distribution partly results from the abundance and density of appropriate habitats and possibly a climatic influence. However, this also may be a consequence of an insufficient and uneven odonatological exploration of the country. *A. subarctica* has mostly been recorded in primary habitats in Latvia, such as raised bogs with bog pools, lakes and lakes within fens and bogs. The flight season of the *A. subarctica* in Latvia ranges mainly from August to September. The conservation measures are suggested." (Authors)] Address: Kalninš, M., Nature Conservation Agency, Baznicas iela 7, LV-2150, Sigulda, Siguldas novads, Latvia. E-mail: martins.kalnins@biology.lv

13330. Karube, H.; Futahashi, R.; Sasamoto, A.; Kawashima, I. (2012): Taxonomic revision of Japanese odonate species, based on nuclear and mitochondrial gene genealogies and morphological comparison with allied species. Part I. *Tombo* 54: 75-106. (in English, with Japanese summary) ["Current taxonomy of Japanese Odonata has been mainly based on the morphological differences in wing venation, male terminalia, and penis (secondary genital organ). We performed nuclear and mitochondrial DNA analyses of all Japanese Odonata species and subspecies, and found that the molecular phylogeny of some taxonomic groups did not agree with the traditional taxonomy. Here we discuss the taxonomy of several Japanese Odonata based on nuclear and mitochondrial DNA analyses including foreign material from neighboring areas along with morphological findings. We propose to revise the following six taxa. (1) Boninagrion

should be regarded as synonymous with *Ischnura*, (2) *Planaeschna naica* Ishida, 1994 should be downgraded to a subspecies of *P. milnei* (Selys, 1883), (3) *Aeshna nigroflava* Martin, 1908 should be a junior synonym of *A. crenata* Hagen, 1856, (4) *Anotogaster* "Yaeyama population" should be regarded as *A. klossi* Fraser, 1919, (5) *Somatochlora japonica* Matsumura, 1911 should be downgraded to a subspecies of *S. exuberata* Barteneff, 1910, and (6) *Orthetrum japonicum internum* McLachlan, 1894 should be regarded as a genuine species." (Authors)] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

13331. Kuc, R.; Kuc, V. (2012): Bat wing air pressures may deflect prey structures to provide echo cues for detecting prey in clutter. *J. Acoust. Soc. Am.* 132(3): 1776-1779. (in English) ["Bats have remarkable echolocation capabilities to detect prey in darkness. While it is clear how bats do this for prey that is isolated, moving, or noisy, their ability to find still and quiet prey within clutter has remained a mystery. A video published by the ChiRoPing group shows the gleaning bat *Micronycteris microtis* capturing a still dragonfly specimen sitting on a leaf surface. While hovering over the dragonfly, the bat's wings exert air forces that cause the dragonfly wings to deflect in synchrony with the bat's wing beats. This paper illustrates that echoes from such deflecting wings vary in both amplitude and time-of-flight, producing robust echo cues that permit prey detection, even when the prey is embedded within clutter. Experiments with a dragonfly specimen mounted on a leaf driven by periodic air puffs produced wing deflections that were sensed with sonar pulses. Results demonstrate that echo variations synchronized with periodic air puffs are easily distinguishable from surrounding clutter, even when clutter produces the first echoes. These results suggest a strategy that bats can employ to detect still and silent prey embedded within cluttered environments." (Authors)] Address: Kuc, R., Dept of Electrical Engineering, Yale Univ., 15 Prospect Street, New Haven, Connecticut 06520-8284, USA. E-mail: roman.kuc@yale.edu

13332. Lin, R.; Buijse, L.; Dimitrov, M.R.; Dohmen, P.; Kosol, S.; Maltby, L.; Roessink, I.; Sinkeldam, J.A.; Smidt, H.; Van Wijngaarden, R.P.A.; Brock, T.C.M. (2012): Effects of the fungicide metiram in outdoor freshwater microcosms: responses of invertebrates, primary producers and microbes. *Ecotoxicology* 21: 1550-1569. (in English) ["The ecological impact of the dithiocarbamate fungicide metiram was studied in outdoor freshwater microcosms, consisting of 14 enclosures placed in an experimental ditch. The microcosms were treated three times (interval 7 days) with the formulated product BAS 222 28F (Poliram). Intended metiram concentrations in the overlying water were 0, 4, 12, 36, 108 and 324 lg a.i./L. Responses of zooplankton, macroinvertebrates, phytoplankton, macrophytes, microbes and community metabolism endpoints were investigated. Dissipation half-life (DT50) of metiram was approximately 1–6 h in the water column of

the microcosm test system and the metabolites formed were not persistent. Multivariate analysis indicated treatment-related effects on the zooplankton (NOECcommunity = 36 lg a.i./L). Consistent treatment-related effects on the phytoplankton and macroinvertebrate communities and on the sediment microbial community could not be demonstrated or were minor. There was no evidence that metiram affected the biomass, abundance or functioning of aquatic hyphomycetes on decomposing alder leaves. The most sensitive populations in the microcosms comprised representatives of Rotifera with a NOEC of 12 lg a.i./L on isolated sampling days and a NOEC of 36 lg a.i./L on consecutive samplings. At the highest treatment-level populations of Copepoda (zooplankton) and the blue-green alga *Anabaena* (phytoplankton) also showed a short-term decline on consecutive sampling days (NOEC = 108 lg a.i./L). Indirect effects in the form of short-term increases in the abundance of a few macroinvertebrate and several phytoplankton taxa were also observed. The overall community and population level no-observed-effect concentration (NOECmicrocosm) was 12–36 lg a.i./L. At higher treatment levels, including the test systems that received the highest dose, ecological recovery of affected measurement endpoints was fast (effect period 8 weeks)." (Authors) Anisoptera, Zygoptera] Address: Lin, R., Alterra, Wageningen University and Research Centre, PO Box 47, 6700 AA, Wageningen, The Netherlands. E-mail: theo.brock@wur.nl

13333. Lobón-Cerviá, J.; Rezende, C.F.; Castellanos, C. (2012): High species diversity and low density typify drift and benthos composition in Neotropical streams. *Fundamental and Applied Limnology* 181(2): 129-142. (in English) [oas 40;" We hypothesized that Neotropical streams might exhibit higher drift and benthos densities than their Palearctic counterparts in order to sustain the high diversity of drift-and benthos-feeding fish species that typify this vast region. We assessed drift and benthos composition in two pristine streams deemed to represent the two less documented Neotropical regions: Rio Amazonas (i.e., Yahuaraca) and Coastal Serra do Mar (i.e., Mato Grosso). Four monthly benthos and drift samples were collected over diel cycles in the rainy and dry seasons. Although the two streams showed remarkably low drift and benthos densities, in Mato Grosso benthos density was markedly higher. The same aquatic families predominate in the drift and benthos of the two streams. High taxonomic richness, low drift density, consistent diel cycles with a peak just after dusk, higher density during the night and temporal changes unrelated to seasonality typify drift composition of the two streams. Although drift densities were lower in Yahuaraca, the dominant families did exhibit drift behaviour, with two drift peaks at night. In Mato Grosso only Baetidae showed such behavioural drift with density peaks at night; other families demonstrated passive drift. Overall, these results refute our hypothesis that Neotropical streams should exhibit higher drift and benthos densities. Actually these pristine streams show among the lowest drift and benthos densi-

ty values worldwide." (Authors) Drifted specimens also contained a few Odonata specimens from several different families.] Address: Lobón-Cerviá, J., Museo Nac. de Ciencias Naturales (CSIC), C/ José Gutiérrez Abascal, 2. Madrid 28006 Spain. E-mail: MCNL178@mncn.csic.es

13334. Maradova, M.; Soldán, T. (2012): Effect of meander restoration on macroinvertebrate biodiversity: the case of the Borová stream (Blanský Les, Czech Republic). *Silva Gabreta* 18(1): 1-21. (in English) ["This study brings a view on the effects of restoration of a formerly channelized small submontane stream situated in the Blanský Les Protected Landscape Area (South Bohemia, Czech Republic) on macroinvertebrate assemblages as an indicator group. The restoration project was carried out during two stages (1998 and 2000). It consisted of excavating a new channel to restore the historic meandering pattern. The evaluation of this project is primarily based on the comparison of composition between pre-restoration (1995) and post-restoration (2000–2003) macroinvertebrate samples focusing on species richness, species composition, and representation of rare Ephemeroptera and Plecoptera species. The analyses showed a substantial increase in species richness that was especially prominent shortly after the restoration intervention. This increase was not only due to the creation of lentic habitats, but was even observed at every single sampling site of the stream. The DCA ordination of species composition of the pre- and post-restoration sites indicated a considerable increase in the between-site diversity. This was apparently caused mainly by the establishing of lentic habitats, whereas diversity of lotic sites showed only a slight increase, which was most prominent during the last year of the sampling period. The shift in the species composition was profound for lotic sites as well. Although the restoration intervention considerably increased species richness and markedly changed species composition, there was no detectable increase of rare or vulnerable Ephemeroptera and Plecoptera species." (Authors) The restoration resulted in a complete loss of all dragonfly species.] Address: Maradova, Monika, Anglo-Czech High School, Trebízského 1010, 37006 České Budejovice, Czech Republic. E-mail: m.maradova@seznam.cz

13335. Marinov, M.; Theischinger, G. (2012): Description of two new aeshnids from Solomon Islands (Anisoptera: Aeshnidae). *International Dragonfly Fund - Report 53*: 1-8. (in English) ["Two new species, *Agyrtacantha browni* and *Gynacantha amphora*, are described, illustrated and compared to closely related congeners. The male holotypes (Kongulae Village, Guadalcanal Island, Solomon Islands, 26 April 2012) are deposited at the Nationaal Natuurhistorische Museum, Leiden, The Netherlands." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz

13336. Maynou i Señé, X. (2012): L'Odonatofauna (Insecta: Odonata) de la conca del riu Flamisell (Pirineus

centrals). *Arxiu - Butlletí de la Institució Catalana d'Història Natural* 76: 105-121. (in Catalanian, with Spanish and English summaries) [Spain; "The basin of the Flamisell river, a tributary of the Noguera Pallaresa river, was surveyed and a preliminary list of the dragonfly species present and of the main types of habitats where they reproduce was obtained. In this study, a total of 37 species were recorded. In the alpine and subalpine glacial lakes area no dragonflies were detected except in some small shallow lakes and ponds, where holarctic species *Enallagma cyathigerum* and *Aeshna juncea* were found. In the lotic habitats, the species related with high fluvial ecological status *Calopteryx virgo meridionalis*, *Boyeria irene*, *Onychogomphus uncatulus* and *Cordulegaster boltonii* were found to be widely distributed. The marginal marshy habitats of the Montcortès carstic lake were identified as a biodiversity hotspot for dragonflies in Catalonia since they support a rich assembly of 25 species. Finally, a monitoring scheme of the dragonfly communities in their characteristic habitats is proposed in order to detect possible impacts of the growing resort and real state development in the Flamisell river basin." (Author)] Address: Maynou i Señé, X., C. del Dr. Salvà, 23. 08224 Terrassa. A/e, Spain. E-mail: xavier.maynou@gmail.com

13337. Mochon, A. (2012): Découverte de la libellule pachydiplax au Québec durant l'inventaire de l'odonatofaune du ruisseau Castagne en Montérégie. *Le Naturaliste canadien* 136(3): 49-59. (in French) [In July and August 2011, *Pachydiplax longipennis* was recorded as the 140th Québec-Odonata species near Saint-Joachim-de-Sheffield, Montérégie, Canada.] Address: Mochon, A. E-mail: mochon.alain@sepaq.com

13338. Morante, T.; Garcia-Arberas, L.; Anton, A.; Rallo, A. (2012): Macroinvertebrate biomass estimates in Cantabrian streams and relationship with brown trout (*Salmo trutta*) populations. *Limnetica* 31(1): 85-94. (in English) ["Macroinvertebrate biomass estimates in Cantabrian streams and relationship with brown trout (*Salmo trutta*) populations In this work, the average biomass of 80 relatively common families of benthic macroinvertebrates in the streams of the Biscay region (Basque Country, northern Iberian Peninsula) was estimated. The macroinvertebrates were collected using a kick net and preserved alive in cool aerated stream water. The fresh weight, dry weight, and ash-free dry weight (AFDW) were obtained for each family. The biomass values obtained were applied to more than a hundred macroinvertebrate samples collected from 1997 to 2006 in 17 stretches of 14 rivers inhabited by brown trout. The total and partial biomass of each sample was estimated. Significant differences in the density ($F = 2.91$; $df = 16, 100$; $P < 0.001$) and biomass ($F = 6.52$; $df = 16, 100$; $P < 0.001$) of the macroinvertebrates occurred among the stations, with up to a 11-fold and 17-fold range, respectively. The brown trout population size was positively correlated to both the macroinvertebrate abundance and biomass. By age classes, this relationship was significant for only the 1+ and 2+ trout.

The AFDW metric is recommended because it represents the real organic biomass value that joins the trophic food chain, avoiding an overestimation of the energy contribution of taxa with shells or cases. The Gammaridae had higher values of AFDW than expected, due to their high content of organic matter. A positive selection of gammarids by the trout was also observed in some cases." (Authors) The analysis includes Odonata without further details.] Address: Morante, T., Dept Zoology and Animal Cell Biology. Faculty of Science and Technology. University of the Basque Country. P.O. BOX 644 4808 Bilbao, Spain. E-mail: morante.tamara@gmail.com

13339. Ocharan, R.; Ocharan, F.J.; Torralba-Burial, A. (2012): Primeras citas de *Anax parthenope* (Selys, 1839) (Odonata: Aeshnidae) en Asturias (N España). *Boln. Asoc. esp. Ent.* 36 (3-4): 465-467. (in Spanish, with English title) [First records of *Anax parthenope* in Asturias (N Spain). A male was recorded near the reservoir of La Furta (Nubledo, Corvera de Asturias, 30TTP6723, 40 m s.n.m.) at 22-VII-1994 (leg. R. Ocharan). A female was recorded near Avilés (30TTP62) at 16-VIII-2006 (leg. A. Vivas).] Address: Ocharan, F.J., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@uniovi.es

13340. Parr, A. (2012): Odonata recording in Suffolk during 2011. *Trans. Suffolk Nat. Soc.* 48: 102-103. (in English) [Records of *Chalcolestes viridis*, *Libellula fulva*, *Platycnemis pennipes*, *Brachytron pratense*, *Coenagrion pulchellum*, *Anax ephippiger*, and *Sympetrum fonscolombii* are discussed.] Address: Parr, A.J., 10 Orchard Way, Barrow, Bury St. Edmunds, Suffolk IP29 5BX, UK. E-mail: Adrian.parr@bbsrc.ac.uk

13341. Peck, S.B. (2012): CDF Checklist of Galapagos Dragonflies and Damselflies - FCD Lista de especies de Libélulas, caballitos del diablo de Galápagos. In: Bunggartz, F., Herrera, H., Jaramillo, P., Tirado, N., Jiménez-Uzcátegui, G., Ruiz, D., Guézou, A. Ziemmeck, F. (eds.). Charles Darwin Foundation Galapagos Species Checklist - Lista de Especies de Galápagos de la Fundación Charles Darwin. Charles Darwin Foundation / Fundación Charles Darwin, Puerto Ayora, Galapagos: <http://checklists.datazone.darwinfoundation.org/terrestrial-invertebrates/odonata/> Last updated 03 Jul 2012.: 2 pp. (in English) [Considering published data until 2001, a total of ten Odonata species from Galapagos archipelago is documented.] Address: not stated

13342. Richman, D.B.; O'Keefe, W. (2012): Life on a high isolated mountain: the arthropod fauna of Mt. Taylor, Cibola county, New Mexico. *Zoological Studies* 51(6): 793-803. (in English) ["The arthropod fauna of Mt. Taylor, New Mexico at 2874-3445 m (9424-11,300 ft) was examined by pitfall trapping, and to a lesser extent by pan trapping and hand collection between 1997 and 2008, with continuous pitfall trapping in 1997-2000. This fauna was characteristically Canadian in nature (as might be

expected as the area covers Canadian and Hudsonian life zones with a tiny area of Arctic-Alpine at the top of the peak's north face; see Price 1997), but also contained unique elements such as a then-undescribed species of trapdoor spider (Araneae: Cyrtacheniidae) from the pitfall traps (described as *Neoapachella rothi* Bond and Opell in 2002) and a still-undescribed jumping spider of the genus *Habronattus* (Araneae: Salticidae). At least 237 species in a minimum of 75 families were collected over the course of the study. As our methods were somewhat limited, we expect many more species to be found in the area covered. Pitfall traps were maintained near the summit until 2000. Dominant arthropods included *Carabus* (*Oreocarabus*) *taedatus agassii* LeConte (Coleoptera: Carabidae), *Anystis* sp. (Acari: Anystidae), and *Pardosa concinna* (Thorell) (Araneae: Lycosidae), among others. The Canadian and Rocky Mountain tiger beetle *Cicindela longilabris* Say (Coleoptera: Carabidae), the alpine dragonfly *Oplonaeschna armata* (Hagen) (Odonata: Aeshnidae), and the short-winged grasshoppers *Chorthippus curtipennis* (Harris) and *Melanoplus magdalenae* Hebard were examples of less-common hand-collected or pan-trapped high-elevation species." (Authors)] Address: Richman, D.B., Department of Entomology, Plant Pathology, and Weed Science, New Mexico State University, Las Cruces, New Mexico 88003, USA. E-mail: rdavid@nmsu.edu

13343. Rolls, R.J.; Boulton, A.J.; Gowns, I.O.; Maxwell, S.E.; Ryder, D.S.; Westhorpe, D.P. (2012): Effects of an experimental environmental flow release on the diet of fish in a regulated coastal Australian river. *Hydrobiologia* 686: 195-212. (in English) ["Environmental flow rules are developed to provide a flow regime necessary to maintain healthy river and floodplain ecosystems in rivers regulated for human uses. However, few studies have experimentally assessed potential ecological mechanisms causing declines in the health and productivity of freshwater fish assemblages in regulated rivers to inform the development of appropriate environmental flows. We tested whether an experimental flow release in a regulated tributary of the Hunter River, Australia, altered the diet of two widely distributed fish species (Australian smelt *Retropinna semoni* and Cox's gudgeon *Gobiomorphus coxii*) compared with data from unregulated reference and regulated control tributaries. Neither species had significant differences in the number of prey taxa ingested, gut fullness or composition of gut contents due to the environmental flow release (EFR). The diet of *R. semoni* did not differ significantly between regulated and unregulated tributaries in either catchment. However, the diet of *G. coxii* differed in only one of the two pairs of rivers consistently across all sample times. Assuming the EFR was sufficient to alter the composition of prey available for consumption by the fish species studied, our findings imply that functional indicators, such as the diet of generalist higher-order consumers, may be more suitable indicators of long-term flow regime change rather than short-term flow events." (Authors) The diet includes specimens

of *Nannophlebia*.] Address: Rolls, R.J., Australian Rivers Institute, Griffith University, Nathan, QLD, 4111, Australia. E-mail: r.rolls@griffith.edu.au

13344. Rybak, J.; Niedzielska, K. (2012): The biological water quality assessment of the Rudna River situated near the post-flotation tailing pond "Żelazny Most" on the basis of communities of benthic invertebrates. *Inżynieria Ekologiczna* 29: 119-129. (in Polish, with English summary) ["As a result of copper ore extraction lots of fine-grained mineral waste, constituting over 90% of extracted ore, appear. It contains traces of heavy metals, biosurfactants and foams applied in the process of extraction and copper enrichment. Waste rock with technological water is delivered and deposited in post-flotation tailing ponds. Such sites are harmful to the environment as dust containing toxic heavy metals is blown away causing water and soil contamination. The influence of such sediments on macroinvertebrates inhabiting the neighbouring river Rudna seems significant, since they are regarded as almost perfect bioindicators and constitute the majority of systems of water quality control. A four study sites of different distance from "Żelazny Most" tailing pond have been selected in order to assess a water quality. A set of different biotic indices based on zoobenthos was applied for the assessment. The water quality was evaluated with following indices: BMWP-PL, ASPT-PL, FBI, EPT, BBI, TBI and CBS which were compared with each other in order to check their usefulness. The water biodiversity was also assessed in the studied area. We calculated a dominance and frequency of families, as well as Hurlbert and Margalef indices. The obtained results suggest the significant influence of the tailing pond on river biocoenosis in the closest areas to "Żelazny Most".(Authors) The analysis includes 'Calopterygidae' and 'Gomphidae'.] Address: Rybak, Justyna, Zakład Biologii i Ekologii, Wydział Inżynierii i Ochrony Środowiska, Politechnika Wroclawska, ul. Wybrzeże Wyspiańskiego 27, 50-370 Wrocław, Poland. E-mail: justyna.rybak@pwr.wroc.pl

13345. Samways, M.J.; Hamer, M.; Veldtman, R. (2012): Development and Future of Insect Conservation in South Africa. In New, T.R. (Ed.): *Insect Conservation: Past, Present and Prospects*, Part 3. Springer Netherlands: 245-278. (in English) ["When considering the history of insect conservation activities in South Africa, it is important to consider its biodiversity value in a global context. The country has been rated as the third most biologically diverse in the world after Indonesia and Brazil. It also has within its borders three or the world's 34 biodiversity hotspots (Mittermeier et al. 2004). In discussions of South Africa's biodiversity, it is mostly the country's flora that is recognized as being of enormous conservation value, followed by the variety of large mammals and rich bird fauna that form the basis of a large ecotourism industry. The contribution of the insect fauna to the country's biodiversity, in terms of both richness and functioning, is less well known among the public, decision makers and even some conservation scientists. Insect con-

ervation can be considered a relatively new and possibly also a neglected discipline in South Africa, but there has certainly been some progress through various activities, at both landscape and species levels. The future of insect conservation in South Africa faces both challenges and opportunities, most of which are shared with other parts of the world with high and irreplaceable biodiversity." (Authors) The paper includes references to Odonata.] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

13346. Silver, C.A.; Vamosi, S.M. (2012): Macroinvertebrate community composition of temporary Prairie wetlands: A preliminary test of the effect of rotational grazing. *Wetlands* 32: 185-197. (in English) ["Over half the temporary wetlands in the prairie pothole region of North America (PPR) have been drained for agricultural purposes and nearly all those remaining have agriculturally impacted margins. Cattle grazing is a common practice in the PPR. Rotational grazing utilizes several pastures, with cattle grazing one pasture while the others are rested. The success of this practice in increasing the suitability of rested wetlands for macroinvertebrates has not been evaluated for temporary wetlands. We repeatedly sampled macroinvertebrate communities in 13 rotationally grazed temporary wetlands. Seven wetlands were in an early grazed pasture (i.e., grazed when wetlands were wet), and six wetlands were in an adjacent late grazed pasture (i.e., grazed when wetlands were dry). The communities were examined from two perspectives, traditional taxonomy and an emerging functional traits perspective. Late grazed wetlands contained more abundant and diverse macroinvertebrate communities than early grazed wetlands. Chironomidae were significantly more abundant in late grazed wetlands. Scrapers were more common in the early grazed wetlands, whereas late grazed wetlands contained more gatherers. Our results suggest that rotational grazing may have a positive influence on macroinvertebrate diversity by allowing some wetlands to escape grazing pressure during the wet season. ... Chironominae dominated late grazed wetlands, whereas early grazed wetlands contained more other dipterans and predaceous Odonata larvae." (Authors)] Address: Silver, Carly, Dept Biol. Sci., Univ. Calgary, T2N 1N4, Calgary, Alberta, Canada. E-mail: carlysilver8@gmail.com

13347. Sims, G.G. (2012): A distribution of dragonflies and damselflies of the State of Wyoming. Last Updated: August 12, 2012: 36 pp. (in English) ["This compilation is an attempt to bring together odonate collection and distribution information from a variety of sources, and present it in a clear and easily-accessible form. The report actually contains neither any new data nor new collection records, but is an effort to consolidate information from various available sources into a concise and useful form." (Author)] Address: Sims, G.G., Route 2, Box 237-3, Mansfield, Missouri 65704-9564, USA. E-mail: georgesims@hotmail.com

13348. Smolinský, R.; Gvoždík, L. (2012): Interactive influence of biotic and abiotic cues on the plasticity of preferred body temperatures in a predator-prey system. *Oecologia* 170(1): 47-55. (in English) ["The ability to modify phenotypes in response to heterogeneity of the thermal environment represents an important component of an ectotherm's non-genetic adaptive capacity. Despite considerable attention being dedicated to the study of thermally-induced developmental plasticity, whether or not interspecific interactions shape the plastic response in both a predator and its prey remains unknown. We tested several predictions about the joint influence of predator/prey scents and thermal conditions on the plasticity of preferred body temperatures (T_p) in both actors of this interaction, using a dragonfly nymphs-newt larvae system. Dragonfly nymphs (*Aeshna cyanea*) and newt eggs (*Ichthyosaura alpestris*) were subjected to fluctuating cold and warm thermal regimes (7–12 and 12–22°C, respectively) and the presence/absence of a predator or prey chemical cues. Preferred body temperatures were measured in an aquatic thermal gradient (5–33°C) over a 24-h period. Newt T_p increased with developmental temperature irrespective of the presence/absence of predator cues. In dragonflies, thermal reaction norms for T_p were affected by the interaction between temperature and prey cues. Specifically, the presence of newt scents in cold regime lowered dragonfly T_p . We concluded that predator-prey interactions influenced thermally-induced plasticity of T_p but not in a reciprocal fashion. The occurrence of frequency-dependent thermal plasticity may have broad implications for predator-prey population dynamics, the evolution of thermal biology traits, and the consequences of sustaining climate change within ecological communities." (Authors) *Aeshna cyanea*] Address: Smolinský, R., Department of Population Biology, Institute of Vertebrate Biology AS CR, Studenec 122, 67502, Konešín, Czech Republic.

13349. Terzani, F.; Rocchi, S.; Cianfa-Nelli, S.; Cianferoni, F.; Fabiano, F.; Mazza, F.; Zinetti, F. (2012): Invertebrati della Riserva naturale biogenetica di Camaldoli. In: A. Bottacci, [Ed.], *La Riserva naturale biogenetica di Camaldoli*, CFS/UTB, Prato: 285-316. (in Italian) [*Calopteryx splendens ancilla*, *Coenagrion puella*, *Enallagma cyathigerum*, *Ischnura elegans*, *Ischnura pumilio*, *Pyrrhosoma nymphula*, *Aeshna cyanea*, *Anax imperator*, and *Libellula depressa* are listed from the Reserve, Tuscany, central Italy.] Address: Terzani, F., Mus. Zool. "La Specola", Univ. Firenze, Via Romana 17, I-50125 Firenze, Italy

13350. Torralba-Burrial, A.; Dominguez Robledo, J.M.; Luque, P. (2012): Primera cita de *Brachytron pratense* (Müller, 1764) (Odonata: Aeshnidae) en Cantabria (N península ibérica). *Boln. Asoc. esp. Ent.* 36 (3-4): 479-482. (in Spanish, with English title) [*B. pratense* was recorded in the marshes of Alday (Camargo, Spain). 30TVP3108, 0-3 m s.n.m.: 23/04/2011, 1 male, 02/05/2011, 2 males.] Address: Torralba Burrial, A., Departa-

mento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoni-otb@hotmail.com

13351. Trockur, B.; Lemke, M.; Germann, A.; Didion, A. (2012): Suche nach der Gemeinen Winterlibelle *Sympetma fusca* (Vander Linden, 1820) abseits der Gewässer – Zwischenbericht 2012 (Odonata: Libellulidae). Abhandlungen der Delattinia 38: 307-312. (in German, with English and French summaries) [Saarland, Germany, 2012; 150 records of *S. fusca* from terrestrial habitats are documented.] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: BerndTrockur@gmx.de

13352. Trockur, B. (2012): Sandgrube Piesbach – Anmerkungen zur Libellenfauna mit besonderer Berücksichtigung des Kleinen Blaupfeiles *Orthetrum coerulescens* (Fabricius, 1798) (Odonata, Libellulidae). Abhandlungen der Delattinia 38: 307-312. (in German, with English and French summaries) ["The dragonfly community of a sand pit near Piesbach (community of Nalbach, Saarland, Germany) has been examined since a few years. There is one of only a few autochthonous localities in the Saarland of *Orthetrum coerulescens* with about 100 exuviae in a small fountain area of 7 m²." (Author)] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: BerndTrockur@gmx.de

13353. Trockur, B. (2012): Erstnachweis der Großen Moosjungfer *Leucorrhinia pectoralis* (Charpentier, 1825) im Saarland (Odonata: Libellulidae). Abhandlungen der Delattinia 38: 255-265. (in German, with English and French summaries) ["In June 2012 *L. pectoralis* was found for the first time in the Saarland, Germany. In a water body with different parts and with strongly fluctuant water-levels near Neunkirchen-Dechen some males were found in five different parts (first 06/08/12). Two males were found nearby the water body in the terrestrial field, one egg-laying female could be observed, and in autumn some larvae could be caught. The records are presumably in relation with other findings in the southwest of Germany, as in the south of Rhineland-Palatinate, and could be due to an approach and expansion in spring of 2012 because of special weather conditions. The locality is suitable for the species, autochthonism is not surely established but possible." (Author)] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: BerndTrockur@gmx.de

13354. Tyrrell, M. (2012): The Impact of spring temperature on emergence patterns in five 'spring' species. *J. Br. Dragonfly Society* 28(2): 102-107. (in English) ["The first emergence dates for five 'spring' species were monitored at a single site over a seven season period. During this time, average spring temperature was also monitored and the two related to determine the impact of average air temperature on the first emergence of each species. It was noted that during warm springs, for example 2007

and 2011, the five species emerged significantly earlier than in an average spring, for example 2010. During a cold spring, for example 2012, first emergence coincided with the dates for average springs. This implies that, for these species, spring air temperature is only a critical factor determining emergence if it is high, in which case day length is not a trigger but sun intensity may be. Cooler temperatures in spring have little or no impact on first emergence compared to an average spring, in which case day length may then be the critical factor determining emergence." (Author)] Address: Tyrrell, M., 8 Warwick Close, Raunds, Northants, NN9 6JH, UK

13355. Van den Broeck, M. (2012): De Interactie tussen Predator en Prooi in een Opwarmend Klimaat: een Ongelijke Strijd? Proefschrift, Master in de Biologie Faculteit Wetenschappen, Departement Biologie, Laboratorium voor Aquatische Ecologie en Evolutiebiologie, K.U.Leuven: 43 pp. (in Dutch, with English summary) ["The effects of global change and consequently changes in temperature, have different impacts on ecosystems around the world, mainly in and between aquatic systems. These consequences are diverse, ranging from changes in life-history traits of populations, to species migrations, including effects in Odonata. This order of insects functions as intermediate predator in aquatic systems where they can reduce the number of zooplankton populations. Both can affect the primary producers (phytoplankton) and consumers in the trophic cascade, whereby influences of global change on these species and their interactions can cause large effects in such aquatic systems, with drastic effects on humans, nature and environment. Using a predator-prey model (the damselfly *Ischnura elegans* as predator and *Daphnia magna* as prey), possible scenarios resulting from climate change were simulated whereat animals from three latitudes, under two temperature conditions were confronted with their predator or prey. Depending on the relative effect of temperature and/or latitude on predator and prey, the ability to find, capture and digest a prey by a predator decreases, increases or remains stable. Also the efficiency of a prey can vary depending on these factors. The predation experiments were always performed with two damselflies and 60 *Daphnia*, 20 individuals of each latitude. The surviving *Daphnia* were screened with allozymes to perform a percentage comparison between the different conditions." (Author)] Address: not stated

13356. Vanappelghem, C.; Haubreux, D.; Hubert, B.; Cheyrezy, T.; Janczak, A.; Lemaire, B.; Pratte, O.; Derolez, B.; Blondel, B. (2012): Liste rouge, rareté, tendances d'évolution et espèces patrimoniales des Odonates du Nord - Pas-de-Calais. *Le Héron* 45(1): 43-58. (in French, with English summary) ["A new IUCN assessment of the regional Odonata is proposed, leading to their classification in IUCN red list categories. This assessment is completed by regional evolution trends and rarity indices for each species. Finally, a list of the heritage species at a regional level is proposed." (Authors)] Address: Vanap-

pelghem, C., 34, rue de bailleul, 62580 Thelus, France.
E-mail: cedvana@free.fr

13357. Xin, Y.; Bu, W.j.; Zhu, L. (2012): Research advances in eco-environment assessment using dragonfly as a bioindicator. *Chinese Journal of Ecology* 31(6): 1585-1590. (in Chinese, with English summary) ["Dragonfly, due to its wide distribution, indepth research and easy to sample, is an ideal bioindicator for eco-environment assessment. In recent decades, more and more related researches are using dragonfly to assess eco-environment. In this review, the related researches were generalized into five types, i. e., general environmental assessment, environment pollution degree assessment, environmental improvement assessment, climate change assessment, and large-scale environmental assessment, and a brief introduction for each type of the researches was given. The current status and deficiency of the researches in China were discussed, and the broad prospects of using dragonfly as a bioindicator for eco-environment assessment were analyzed through the comparison of the superiority of this bioindicator than the others. It was point out that to build up a thoroughly sourced database of dragonfly diversity in China and to develop specific assessment methods could be the most important things to make progress. Using dragonfly as a bioindicator to assess ecological environment would be low-cost, high-efficient, and environmentally friendly, not only important but also necessary to the needs of China today's economic development." (Authors)] Address: Xin, Y., College of Life Sciences, Nankai University, Tianjin 300071, China

13358. Zhang, H.-j. (2012): Investigating Odonata from Damingshan of Guangxi. *Sichuan Journal of Zoology* 31(4): 611-613. (in Chinese, with English summary) [China; 46 Odonata species have been recorded in August 2011; the list also includes *Calopteryx melli*, *Zygonyx takasago*, and *Lamelligomphus tutulus*.] Address: Zhang, Hong-jie, Shaanxi Key Laboratory of Bio-resource Shaanxi University of Technology Hanzhong Shaanxi Province 723000 China

2013

13359. Ábelová, M.; David, S. (2013): The morphometry of male adults of Southern Hawker (*Aeshna cyanea*) (Müller, 1764) Odonata: Aeshnidae) from the Slovak Republic. *MENDELNET 2013* (Proceedings of International PhD Students Conference Mendel University in Brno, Czech Republic, November 20th and 21st, 2013): 686-690. (in English) ["The study elaborates the morphometric analysis of 112 male imago specimens of *A. cyanea* from 8 localities of Slovakia. 12 morphometric signs for imago specimens of Southern Hawker are measured by calliper. The research has confirmed several distortions of normality of data, partly caused by measurement error, e. g. in mm wingspan ($WS = \text{average} \pm SE: 96.66 \pm 3.93$), body length ($BL = \text{average} \pm SE: 64.86 \pm 2.18$). This

morphometric structure is the most problematic to measure, because of curvature caused by placement in test-tubes with alcohol (97%). We researched there exist correlation between morphometric signs wingspan and the length of body. In addition it has been proved that the correlation of signs is not often linearly correlated. The results are also important, because morphometric signs are used in many determination keys of Odonates. In fact Odonata species are bioindicators of pollution and global warming; measured morphometric structures could be used such as means for monitoring of changing environmental variables in future. We have processed so far the largest data set of morphometric data for Slovakia." (Authors)] Address: Ábelová, Monika, Dept Ecology & Environmental Sciences, Fac. of Natural Sciences, Constantine the Philosopher Univ. in Nitra, Tr. A. Hlinku 1, 949 74 Nitra, Slovak Republic. E-mail: monika.abelova@ukf.sk

13360. Akira, T. (2013): Records of aquatic insects Kahokugata, Ishikawa Prefecture in 2012. *Kahokugata Lake Scienc* 16: 1-6. (in Japanese, with English translation of title) [11 common Odonata species are documented.] Address: Akira, T., 923-0911 Ishikawa Komatsu Okawacho 3-71, Japan

13361. Álvarez, M.; Nova, N. (2013): Detección de potenciales poblaciones de *Sympetrum meridionale* (Selys, 1841) en Asturias (norte de la Península Ibérica) (Odonata: Libellulidae). *Fotografía y Biodiversidad*. *BVnews* 31: 100-105. (in Spanish, with English summary) [Records from two localities in Asturias, Spain are presented: (1) 22-IX-2013, in the dunes of Playa de Xagó (Gozón, Asturias, [Latitud: 43.599; Longitud: -5.922]); (2) 29-IX-2013, Cabo de Peñas ([Latitud: 43.653; Longitud: -5.852]) Address: Álvarez, Marián, Experto del Grupo de Odonata de Biodiversidad Virtual – Oviedo (Asturias, España), E-mail: madamcoolpix@gmail.com

13362. Amr, Z.S.; Al Azzam, L.S.; Katbeh-Bader, A.; Eid, E.K. (2013): Odonata of Wadi Al Mujib catchment with notes on the impact of Wadi Al Mujib dam, Jordan (Insecta: Odonata). *Jordan Journal of Biological Sciences* 6(4): 292-299. (in English) ["A total of 14 species pertaining to five families (Platycnemididae, Coenagrionidae, Gomphidae, Aeshnidae and Libellulidae) were identified along eight sites in the Wadi Al Mujib catchment. Collected species varied along the eight sampling sites, ranging from a single species from Al Mujib dam to a maximum of seven species in the waterfalls to the bridge site. In the present study, eight species are considered as new records to the Odonata of the Wadi Al Mujib catchment (*Ischnura elegans*, *I. evansi*, *I. fontaineae*, *I. senegalensis*, *Anax parthenope*, *Orthetrum sabina*, *Sympetrum fonscolombii* and *Zygonyx torridus*). Such changes over the past 35 years reflect the dynamics of dragonflies' spatial movement within their distribution range. Results shown in this study strongly indicates the negative impact of the Wadi Al Mujib dam on the dragonfly fauna, as a single species was recovered from the dam proper. This is mainly due

to the sharp cliffs and water level fluctuation and the limited breeding areas. Few flat areas with scarce vegetation were identified around the dam. Water level fluctuation does not allow steady vegetation growth around the edges of the dam, yet, the abrupt water depth is not suitable for development of the larval stages of dragonflies. Sharp edges are not suitable for breeding and perching of these insects." (Authors)] Address: Amr, Z.S., Dept Biology, Jordan University of Science and Technology, P. O. Box 3030, Irbid, Jordan. E-mail: amrz@just.edu.jo

13363. Anjos-Santos, D.; Pessacq, P. (2013): *Peristicta guarellae* sp. nov. from Brazil (Odonata: Protoneuridae). *International Journal of Odonatology* 16(4): 293-299. (in English, with Spanish summary) ["*Peristicta guarellae* sp. nov. (holotype: Brazil, Paraná State, Exc. 399/col. 3, stream in km 50 of Curitiba-Ponta Grossa route [BR 376], about 25°20'08" S, 49°51'15" W, 21-XI-1971, N. D. Santos leg., deposited in the Collection of "Museu Nacional, Universidade Federal do Rio de Janeiro", Rio de Janeiro, Brazil) is described and illustrated. An identification key for males of *Peristicta* (excluding *P. lizeria* Navás), comparisons and comments on other species of the genus are presented." (Authors)] Address: Anjos-Santos, Danielle, Lab. Investigaciones en Sistemática y Ecología Animal (LIESA), Sarmiento 849, 9200, Esquel, Chubut, Argentina. E-mail: danielleanjos2@yahoo.com.br

13364. Anwer, S.F.; Ashraf, I.; Mehdi, H.; Ahmad, A.; Grafi, H. (2013): On the aerodynamic performance of dragonfly wing section in gliding mode. *Advances in Aerospace Science and Applications* 3(3): 227-234. (in English) ["A comprehensive numerical of fluid dynamic study of a pleated wing section based on the wing of *Aeshna cyanea* has been performed at ultra low Reynolds numbers (RN) corresponding to the gliding flight of these dragonflies. The simulations employ an unstructured triangular mesh based on finite volume discretization. A critical assessment of the computed results was performed. In this work, we investigate the aerodynamic characteristics and spatio-temporal dynamics of a cut section of *Aeshna cyanea*'s wing. Numerical simulations were performed at ultra low RN (100 to 1000) at different angle of attacks ranging from 0° to 15°. The results give a satisfactory measure of confidence in the fidelity of the simulation. The effect of the RN on the gliding ratio is that at Re 1000 and at angle of attack (here after, AOA) 15°. The largest gliding ratios are obtained. Flow invariably for all RN, minimum Drag coefficient is obtained at AOA 15°." (Authors)] Address: Grafi, H., Dept Mechanical Engg, Taibah Univ., P.O. Box. 344, Al Madina Al Munawara, Kingdom of Saudi Arabia

13365. Aristova, D.S.; Bashkuev, A.S.; Golubev, V.K.; Gorochov, A.V.; Karasev, E.V.; Kopylov, D.S.; Ponomarenko, A.G.; Rasnitsyn, A.P.; Rasnitsyn, D.A.; Sinitshenkova, N.D.; Sukatsheva, I.D.; Vassilenko, D.V. (2013): Fossil Insects of the Middle and Upper Permian of European Russia. *Paleontological Journal* 47(7): 641-832.

["Fossil insects (including Odonata) of European Russia from the Urzhumian to Vyatkian stages are reviewed, new taxa are described, and dynamics of insect taxonomic diversity around the Permian–Triassic boundary in light of the Paleozoic–Mesozoic boundary global extinction problem is analyzed. Traces of interactions between arthropods and plants are analyzed. Insectbearing deposits of the Late Paleozoic found in the northern and eastern areas of the East European Platform are unique on the global scale in their completeness and continuity, allowing us to trace especially comprehensively the biotic processes that occurred around the boundary described as the time of the greatest biotic catastrophe of the Phanerozoic. A total of 28 genera and 111 species are newly described. Within the range from the Urzhumian to the Permo–Triassic boundary, 15 representative successive assemblages, including 112 families, are recognized (seven in the area in question and eight in other regions of Asia, Australia, and Africa). New tools are developed for the analysis of the dynamics of diversity. These tools show an approximately equilibrium (slightly positive) dynamics in the Urzhumian and Severodvinian and a drop in diversity during the Vyatkian Age. It is shown that Permian insect assemblages acquired a substantially postPaleozoic pattern much earlier than the end of the Paleozoic. The character of changes that took place in the Induan and Olenekian remains uncertain, but a largescale extinction event did not occur here: most families that have not been recorded at the beginning of the Triassic are recorded again in the Middle and Upper Triassic. Nevertheless, a biotic crisis probably actually took place, but was reduced to reorganization of the biota's structure, which provided enormous growth of biodiversity over subsequent hundreds of millions of years, rather than resulted in catastrophic extinction. This study is intended for entomologists, stratigraphers, and all readers interested in the biotic events that took place around the Permian–Triassic boundary." (Authors)] Address: Vassilenko, D.V., Borissiak Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117997 Russia

13366. Arnold, A. (2013): Fotobelege von Missbildungen an Imagines von Libellen (Odonata) und Ameisenjungfern (Planipennia, Myrmeleonidae). *Mitteilungen Sächsischer Entomologen* 32: 44-45. (in German) [Sachsen, Germany; the authors documents teratological anomalies in wings of *Calopteryx splendens* from the Elbe River near Pölbitz collected in 2011 and from the Mulde River near Laußig from 30.06.2012.] Address: Arnold, A., Zur schönen Aussicht 25, 04435 Schkeuditz, Germany

13367. Babu, R. (2013): New Zygoptera records from Jharkhand state, India. *Notulae Odonatologicae* 8(2): 18-21. (in English) ["The 12 species brought on record are all new for the state. Likewise, the occurrence of the Chlorocyphidae (*Libellago*) and of the genera *Mortonagrion*, *Onychargia*, *Rhodischnura*, and *Prodasineura* is documented here for the first time from the state of Jhar-

khand, which was previously part of Bihar." (Author)] Address: Babu, R., Southern Regional Centre, Zoological Survey of India, 130, Santhome High Road, Chennai-600 028, India. E-mail: baburzsi@gmail.com

13368. Baird, I.R.C. (2013): Emergence behaviour in *Petalura gigantea* (Odonata: Petaluridae): confirmation of upright emergence. *International Journal of Odonatology* 16(3): 213-218. (in English) ["Two distinct emergence styles have been reported in odonates, with both the upright and hanging back emergence reported in the Petaluridae, between and within individual species, including *Petalura gigantea*. This paper reports three additional observations of upright emergence in *P. gigantea*, providing further evidence that this emergence style is the norm for the species." (Author)] Address: Baird, I.R.C., College of Health and Science, University of Western Sydney, Locked Bag 1797, Penrith South, NSW, 1797, Australia

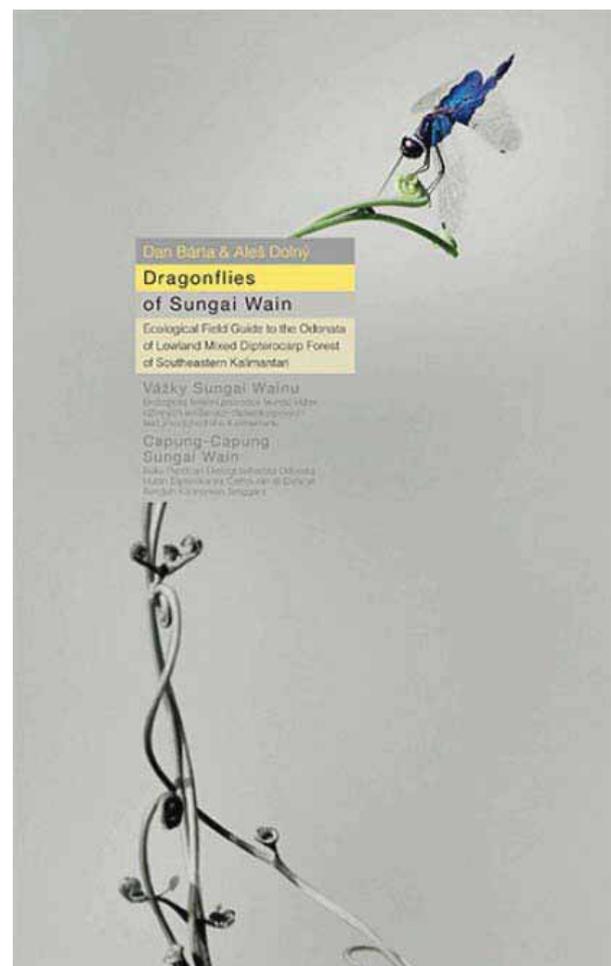
13369. Baliteau, L.; Denise, C.; Dommanget, G. (2013): Contribution à l'inventaire des Odonates du département de l'Aveyron. *Martinia* 29(2): 89-102. (in French, with English summary) ["Odonata survey in the Aveyron department, southern France. This paper deals with the 1022 records of Odonata gathered by the authors in the Aveyron department during their participation to the French Invod and CIUF programs, 2001-2012. 47 species are summarized according to the different natural regions of this department. Wetlands regularly host 34 species on the Causses and 27 species in the Saint-Affricain districts. Six species are very common: *Aeshna cyanea*, *Calopteryx virgo meridionalis*, *Pyrrhosoma nymphula*, *Cordulegaster h. boltonii*, *Libellula depressa* and *Sympetrum striolatum*. Further information about the status and distribution of selected species is included." (Authors)] Address: Baliteau, L., Les Gardies, F-12620 Saint-Beauzély, France. E-mail: baliteaul@yahoo.fr

13370. Behr, H. (2013): Neue Arten auf der Libellen-Checkliste des Stadtgebietes Schwerin, Mecklenburg (Odonata). *Virgo* 16(1): 65-66. (in German) [Mecklenburg-Vorpommern, *Gomphus vulgatissimus*, *Anaciaeschna isoceles*, *Leucorrhinia pectoralis*, *Sympetrum fonscolombii*, *Ischnura pumilio*.] Address: Behr, H., Herrengrabenweg 57, 19061 Schwerin, Germany. E-mail: hauke-behr@web.de

13371. Bernal, A. (2013): Primeras observaciones y aproximación a la distribución de *Trithemis kirbyi* Sélys 1891 para la provincia de Cádiz. *Rev. Soc. Gad. Hist. Nat.* 7: 25-27. (in Spanish, with English summary) [*T. kirbyi* was recorded for the first time in the Cádiz province (Spain) at 7-VI-2009: river of Hozgarganta near Jimena de la frontera (UTM 30S 278931 4035716, 74 m a.s.l.).] Address: Arturo Bernal, C/Juan Ramón Jiménez 28. 11160 - Barbate (Cádiz)

13372. Bárta, D.; Dolný, A. (2013): Dragonflies of Sungai Wain. *Ecological Field Guide to the Odonata of Lowland*

Mixed Dipterocarp Forest of Southeastern Kalimantan. Taita Publishers. 168pp. (In English, Czech and Indonesian) ["Dragonflies of Sungai Wain is clearly a labour of love by the authors, and a successful labour: it is a beautiful book that represents a valuable contribution to our knowledge of the dragonflies of Borneo. Not much is known about the dragonfly fauna of south-eastern Kalimantan and this book will help both visitors to Borneo and local researchers and enthusiasts to identify many of the species that can be found in the lowlands. The reader is given not only information and images of the species themselves, but an insight into how dragonflies are entwined with the habitat in which they are found, and how changes to that habitat affect them, and how they in turn reflect those changes. It is to be hoped that the book will encourage people to visit Sungai Wain, and other locations in Kalimantan, to look for dragonflies, and, most importantly, that it will stimulate local interest in these insects and their role as bio-indicators. 223 colour scans of 82 species, 24 habitat photos, 46 photos of living species." (Publisher)] Address: <http://www.taitapublishers.cz/dragonflies-of-sungai-wain/?id=25>



13373. Böhm, K.; Raab, B.; Grimmer, F.; Müller, K.; Albrecht, H. (2013): Habitatansprüche der Imagines von *Ophiogomphus cecilia* an mittelfränkischen Gewässern (Odonata: Gomphidae). *Libellula* 32(3/4): 97-114. (in German, with English summary) ["Habitat preferences of

perching males of *O. cecilia* in Middle Franconia (Odonata: Gomphidae) – *O. cecilia* is considered to be threatened throughout Europe. Therefore, the species is listed in Annex II and IV of the Habitats Directive of the EU. The objective of this study was to identify the environmental factors which primarily determine the suitability of different river sections as habitats for perching males of *O. cecilia*. The study was carried out at 68 sections of the three rivers Aurach, Bibert and Zenn on a total length of 12 km, which all cross the sandstone basin of Middle Franconia from west to east. Sixty variables, which also include attributes used to monitor *O. cecilia* for Habitats Directive reporting, were sampled and correlated to the abundance of perching imagines. The numbers of males showed significant correlations to shading, structure and dynamics of the water surface and to the land use in the surrounding area. Recommendations for the habitat management of *O. cecilia* are given." (Authors)] Address: Albrecht, H., Lehrstuhl für Renaturierungsökologie, Technische Universität München, Emil-Ramann-Str. 6, 85354 Freising, Germany. E-mail: albrecht@wzw.tum.de

13374. Börzsöny, L. (2013): *Polythore koepcke* spec. nov. from the Sira Mountains in Peru with remarks on related species (Odonata, Zygoptera, Polythoridae). *Spixiana* 36(2): 265-268. (in English, with Spanish summary) ["*Polythore koepcke* spec. nov. is described from the mountains of Cerros del Sira, Huanuco Department, Peru and compared to its nearest relatives. It differs from *Polythore spaeteri* Burmeister & Börzsöny, 2003 in penis structure and in having brownish apical spots not only in forewings, but also in hindwings. Although the type localities of the two species are only some fifty kilometres away from each other, they occur at different elevations, *P. spaeteri* is known from lowland locations at 250-350 m above sea level, but *P. koepcke* from levels at 800 m and above." (Author)] Address: Börzsöny, L., Cserényhegyi u. 30, 8233 Balatonszölös, Hungary. E-mail: borzsony@gmx.de

13375. Braun, K. (2013): Swaziland's Odonata. Damsel-flies and Dragonflies. Swaziland National Trust Commission. www.sntc.org.sz: 83 pp. (in English) [This checklist includes a total of 79 species. Compiled by Kate Braun, July 2013. For details see: <http://www.thekingdomofswaziland.com/downloads/birds/Dragonflies.pdf>.] Address: not stated

13376. Brochard, C.; van der Ploeg, E. (2013): Description of the exuvia and larva of *Pyrhosoma elisabethae* (Odonata: Coenagrionidae). *Libellula* 32(3/4): 159-174. (in English, with German summary) ["During a field trip to the Greek island of Corfu which took place between 6 to 13 May 2012, a total of 348 exuviae and six larvae of *P. elisabethae* were collected for the first time. This quantity of *P. elisabethae* exuviae allows an accurate description of the species. The exuviae of *P. elisabethae* are very similar to the exuviae of *P. nymphula*, the principal differences being in the shape of their labial palps." (Authors)]

Address: Brochard, C., Marsstraat 77, 9742 EL Groningen, the Netherlands. E-mail: info@cbrochard.com

13377. Brockhaus, T. (2013): Odonata records from the polar Ural and the Petchoro-Ilycheski Zapovednik, Komi-Republic, Russian Federation. *Notulae Odonatologicae* 8(2): 21-23. (in English) ["In total, 16 species were observed in summer 2012. *Somatochlora sahlbergi* was encountered in the shrub tundra around Worku-ta. *S. graeseri* and *S. pedemontanum* are new for the Komi-Republic." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

13378. Brockhaus, T. (2013): Die Libellenfauna der Geverschen Platte im Erzgebirge (Insecta: Odonata). *Veröff. Museum für Naturkunde Chemnitz* 36: 5-22. (in German, with English summary) ["The "Geversche Platte" is a forested landscape in the "Erzgebirge" Mountains (Saxony). It covers about 65 km². Dragonfly habitats comprise bogs, rivers and anthropogenic ponds and water reservoirs, especially due to mining. During the past 20 years, 34 dragonfly species have been observed. Important parts of the dragonfly fauna are species which live in bogs, such as *Coenagrion hastulatum*, *Aeshna juncea* and *Somatochlora arctica*, which occur in stable populations. Other remarkable species are *Leucorrhinia pectoralis*, and the rheophile species *Calopteryx virgo* and *Cordulegaster boltonii*. The species communities of several areas, in particular those of protected areas, are described." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

13379. Brunner, H., Holzinger, W.E.; Komposch, B. (2013): Die Östliche Weidenjungfer (*Lestes parvidens*) neu für Kärnten, mit Ergänzungen und Korrekturen zu den »Libellen Kärntens«. *Carinthia II* 203/123: 343-348. (in German, with English summary) ["*Lestes parvidens* is reported from Carinthia (Austria) for the first time. In addition, interesting new records of *Lestes virens* and *Aeshna affinis* are presented, and corrections to the monograph of the Odonata of Carinthia (Holzinger & Komposch 2012) are made." (Authors)] Address: Brunner, Helwig, ÖKOTEAM – Institut für Tierökologie und Naturreisplanung, Bergmannsgasse 22, A-8010 Graz, Austria. E-Mail: brunner@oekoteam.at

13380. Buczyński, P.; Zawal, A.; Stępień, E.; Pešić, V. (2013): *Gomphus pulchellus* Selys recorded on the eastern edge of its distribution area in Montenegro (Anisoptera: Gomphidae). *Odonatologica* 42(4): 293-300. (in English) ["A larva from the Zeta River (Danilovgrad, 12-X-2010) is brought on record, figured and its habitat is described. This is the first record of *G. pulchellus* larva from the Balkans. The eastern records of the species are reviewed and mapped, and the eastern range of *G. pulchellus* is discussed." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka

19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

13381. Campos, A.; Perez, D.; Sanz, G.; Velasco, T.; Santos, E. (2013): Nuevas localidades de *Anax parthenope* (Sélys, 1839) (Odonata, Aeshnidae) en la mitad norte de España. *Boln. Asoc. esp. Ent.* 37(1-2): 95-98. (in Spanish, with English translation of title) [Six new localities of *A. parthenope* are documented and a map of the current knowledge of distribution in NW-Spain is given.] Address: Campos, A., Universidad Europea Miguel de Cervantes, Calle Padre Julio Chevalier, 2, E-47012 Valladolid, Spain. E-mail: fcampos@uemc.es

13382. Chasle, P. (2013): *Coenagrion caerulescens* sur le ruisseau La Canette en Haute-Garonne (Odonata: Coenagrionidae): enjeux patrimoniaux. *Martinia* 29(2): 105-117. (in French, with English summary) ["*C. caerulescens* on the stream La Canette, Haute-Garonne department: conservation issues. *C. caerulescens* has been observed for the first time in the Haute-Garonne department north of Toulouse, in an artificialized area. A one-day survey does not allow us to conclude towards a native population beyond the western limit of its known distribution in France, but indicates an important odonatological diversity. This emphasizes the need of a local monitoring and to determine the ecological interest of the site, and, if appropriate, to initiate conservation measures in this area submitted to a high anthropogenic pressure." (Author)] Address: Chasle, P., 15, rue d'Aubuisson, F-31000 Toulouse, France. E-mail: pierrick.chasle@gmail.com

13383. Chaudhry, M.T.; Ul Mohsin, A.; Bhatti, M.I.; Javed, R.A.; Abbas, G. (2013): First record of *Anaciaeschna jaspidea* and *Epopthalmia vittata vittata* (Odonata: Anisoptera) from Pakistan. *Iranian Journal of Science & Technology* 37A4: 445-448. (in English) [*Anaciaeschna jaspidea* was collected from Gujjo, District Thatta (Sindh) in August 2008. *Epopthalmia vittata* was collected from Java Dam, Rawalpindi and Dhok Tallian Dam near Chakwal. "Individuals of this genus were found maneuvering near the peripheries of small dams. Some taxonomic notes of the said species are provided." (Authors)] Address: Chaudhry, M.T., Agricultural Training Institute Karor Lal Easan, District Layyah, Punjab, Pakistan. E-mail: dtrariq273@yahoo.com

13384. Chen, S.-L.; Yeh, W.-C. (2013): Description of a new species of the genus *Sarasaeschna* Karube & Yeh, with a key to the species of Taiwan (Odonata: Anisoptera: Aeshnidae). *Zootaxa* 3764(1): 92-100. (in English) ["*Sarasaeschna Chiangchilii* sp. nov. collected from Daxi, Taoyuan County in northern Taiwan is described and diagnosed. Judging from male penile structure, this species is considered to belong to the *pryeri*-group of its genus. It is easily distinguished from all known congeners in having peculiar sickle-shaped cerci in male. The habitats of *S. Chiangchilii* are mainly shaded brooks in lowland areas, which are exceptional for its Taiwanese relatives.

Distributional maps and a key are also provided for the four species of Taiwanese *Sarasaeschna*." (Authors)] Address: Yeh, W.-C., Conservation and Research Center, Taipei Zoo, Taipei, Taiwan. E-mail: dwx24@zoo.gov.tw

13385. Córdoba-Aguilar, A.; Munguía-Steyer, R. (2013): The sicker sex: Understanding male biases in parasitic infection, resource allocation and fitness. *PLoS ONE* 8(10): e76246. doi:10.1371/journal.pone.0076246: 15 pp. (in English) ["The "sicker sex" idea summarizes our knowledge of sex biases in parasite burden and immune ability whereby males fare worse than females. The theoretical basis of this is that because males invest more on mating effort than females, the former pay the costs by having a weaker immune system and thus being more susceptible to parasites. Females, conversely, have a greater parental investment. Here we tested the following: a) whether both sexes differ in their ability to defend against parasites using a natural host-parasite system; b) the differences in resource allocation conflict between mating effort and parental investment traits between sexes; and, c) effect of parasitism on survival for both sexes. We used a number of insect damselfly species as study subjects. For (a), we quantified gregarine and mite parasites, and experimentally manipulated gregarine levels in both sexes during adult ontogeny. For (b), first, we manipulated food during adult ontogeny and recorded thoracic fat gain (a proxy of mating effort) and abdominal weight (a proxy of parental investment) in both sexes. Secondly for (b), we manipulated food and gregarine levels in both sexes when adults were about to become sexually mature, and recorded gregarine number. For (c), we infected male and female adults of different ages and measured their survival. Males consistently showed more parasites than females apparently due to an increased resource allocation to fat production in males. Conversely, females invested more on abdominal weight. These differences were independent of how much food/infecting parasites were provided. The cost of this was that males had more parasites and reduced survival than females. Our results provide a resource allocation mechanism for understanding sexual differences in parasite defense as well as survival consequences for each sex." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

13386. Costa, Z.J.; Vonesh, J.R. (2013): Prey subsidy or predator cue? Direct and indirect effects of caged predators on aquatic consumers and resources. *Oecologia* 173(4): 1481-1490. (in English) ["The non-consumptive effects of predators on prey can affect prey phenotypes, potentially having important consequences for communities due to trait-mediated indirect interactions. Predicting non-consumptive effects and their impacts on communities can be difficult because predators can affect resources directly through nutrient cycling and indirectly by altering prey resource use, which can lead to complex in-

teractions among resources and consumers. In this study we examined the effects of caged dragonfly predators on aquatic resources in the presence and absence of two focal herbivores, the tadpoles of Neotropical tree frogs *Agalychnis callidryas* and *Dendropsophus ebraccatus*. We crossed the presence/absence of caged dragonflies with four tadpole treatments: no tadpoles, each tadpole species alone, and both species together to examine interactions among tadpole composition, predator presence, and time on tadpole growth, resources, and zooplankton abundances. Predator effects on growth changed through ontogeny and was species-dependent. Predators initially reduced then dramatically increased *A. callidryas* growth, but had no effect on *D. ebraccatus*. Predators also increased the abundances of both periphyton and phytoplankton. However, there was no evidence of a trait-mediated trophic cascade (i.e., tadpole by predator interaction). Instead, nutrients from prey carcass subsidies likely played an increasingly important role in facilitating resources, and shaping tadpole growth, competitive interactions, and zooplankton abundances through time. In nutrient-poor aquatic systems the release of nutrients via the consumption of terrestrially derived prey items by aquatic predators may have important impacts on food webs by facilitating resources independent of the role of trait-mediated trophic cascades." (Authors)] Address: Costa, Zacharia, Dept of Biology, Virginia Commonwealth University, 1000 W. Cary St., Richmond, VA, 23284-2012, USA. E-mail: zachariacosta@gmail.com

13387. Das, K.S.A.; Subramanian, K.A.; Emiliyamma, K.G.; Palot, M.J.; Nishadh, K.A. (2013): Range extension and larval habitat of *Lyriothemis tricolor* Ris, 1919 (Odonata: Anisoptera: Libellulidae) from southern Western Ghats, India. *Journal of Threatened Taxa* 5(17): 5237-5246. (in English) ["Worldwide many species of odonates are known to use phytotelmata as a breeding habitat. Hitherto, no species are known to breed in phytotelmata in India. However, field studies conducted in the southern Western Ghats revealed that *L. tricolor* uses tree holes as a larval habitat. Here we report the range extension of *L. tricolor* to southern Western Ghats and describe morphology of the larva, exuvia, and adult female. Based on the present study, we describe the larval habitat of *L. tricolor* in the southern Western Ghats. Our findings reveal that *L. tricolor* breeds in the tree holes of evergreen and semi-evergreen forests in the southern Western Ghats." (Authors)] Address: Das, K.S, Centre for Conserv. Ecology, Dept Zoology, M.E.S. Mampad Coll., Malappuram, Kerala 676542, India. E-mail: dasksa@gmail.com

13388. Dau, A.-C.; Martin, P. (2013): Die Salzquellen von Bad Oldesloe- Struktur und Fauna eines Extremlebensraumes. *Deutsche Gesellschaft für Limnologie (DGL). Erweiterte Zusammenfassungen der Jahrestagung 2012 (Koblenz), Hardeggen 2013: 86-90.* (in German) [Schleswig-Holstein, Germany; the species list of the brackwater habitats includes Odonata (*Anax* sp. and *Aeshna* sp.); for more details see Dau 2013: <http://nlbif.eti.uva.nl/ccw/do->

[cuments/Dau,2013.pdf](http://nlbif.eti.uva.nl/ccw/do-)] Address: Dau, Ann-Christin, Christian-Albrechts-Univ. Kiel, Am Botanischen Garten 1-9, 24118 Kiel, Germany. E-mail: ann.christindau@yahoo.de

13389. Daumal, T. (2013): *Hemianax ephippiger*, nouveau pour la Picardie (Odonata: Aeshnidae). *Martinia* 29(2): 119-122. (in French, with English summary) ["The first observation of *H. ephippiger* for the Picardie region (France) has been made on 20-X-2013, in Authie's estuary, Fort Mahon city, Somme department. This data is probably linked with southern winds that have blown for a week over south-western Europe prior to the observation. This is the 61th Odonata species observed in the region." (Author)] Address: Daumal, T., 3 rue de la Clarté, F-60300 Senlis, France. E-mail: thibauddaumal99@yahoo.com

13390. de Souza, M.M.; Souza, B.; de Aguiar Pereira, M.C.S.; Machado, A.B.M. (2013): List of Odonates from Mata do Baú, Barroso, Minas Gerais, Brazil. *Check List* 9(6): 1367-1370. (in English) ["A survey of odonatofauna was carried out in Mata do Baú, a predominantly forested area in Barroso, Minas Gerais, regarded as a priority area for conservation and scientific investigation, as published by Biodiversitas, a Brazilian nongovernmental institution. Sample collection was conducted over twenty-six days from November 2009 to February 2011. Fifty-seven species of Odonata were collected and grouped into 30 genera and nine families. The dominant families were Libellulidae (46.5%), Coenagrionidae (20.6%), and Megapodagrionidae (10.3%). A specimen of *Heteragrion obsoletum* (Selys, 1886) was collected, which to-date is known by a single specimen collected in 1880 and red-listed as endangered. Special attention was given to the presence of five species of the genus *Heteragrion*, strictly limited to lotic forest streams, with two new species'. This genus is especially sensitive to environmental deterioration, indicating that the forest stream's environmental conditions are beneficial to the area and create a baseline for future monitoring of similar environments." (Authors)] Address: de Souza, M.M., Instituto Federal de Educação e Tecnologia do Sul de Minas, Campus Inconfidentes. CEP 37576-000. Inconfidentes, MG, Brazil. E-mail: magalhaescajubi@bol.com.br

13391. De Vocht, A.; Pasmans, R.; Cox, P.; Vanbrabant, B.; Dupont, A.; Hendig, P.; Carlens, H. (2013): Ongewerveleden en vissen in de taplopen van het Kanaal naar Beverlo. *ANTenne* 7(4): 10 -20. (in Dutch) [*Calopteryx splendens*, *Gomphus pulchellus*, *G. vulgatissimus*, *Orthetrum coerulescens*, and *Sympetrum depressiusculum* are reported from a canal situated near Beverlo, Belgium.] Address: De Vocht, A., PXL-BIO Research, PXL, Agoralaan gebouw H, 3590 Diepenbeek, Belgium. E-mail: alain.devocht@pxl.be

13392. Dijkstra, K.-D.B.; Kalkman, V.J.; Dow, R.A.; Stokvis, F.R.; van Tol, J. (2013): Redefining the damselfly families: a comprehensive molecular phylogeny of Zygoptera (Odonata). *Systematic Entomology* 39: 68-96. (in English)

["An extensive molecular phylogenetic reconstruction of the suborder Zygoptera of the Odonata is presented, based on mitochondrial (16S, COI) and nuclear (28S) data of 59% of the 310 genera recognized and all (suspected) families except the monotypic Hemiphlebiidae. A partial reclassification is proposed, incorporating morphological characters. Many traditional families are recovered as monophyletic, but reorganization of the superfamily Coenagrionoidea into three families is proposed: Isostictidae, Platycnemididae and Coenagrionidae. Archboldargia Lieftinck, Hylaeargia Lieftinck, Palaiargia Förster, Papuargia Lieftinck and Onychargia Selys are transferred from Coenagrionidae to Platycnemididae, and Leptocnemis Selys, Oreocnemis Pinhey and Thaumagrion Lieftinck from Platycnemididae to Coenagrionidae. Each geographically well-defined clade of Platycnemididae is recognized as a subfamily, and thus Disparoneurinae (i.e. Old World 'Protoneuridae') is incorporated, Calicnemiinae is restricted, and Allocnemidinae (type genus: Allocnemis Selys) subfam. n., Idiocnemidinae (type genus: Idiocnemis Selys) subfam. n. and Onychargiinae (type genus: Onychargia Selys) subfam. n. and Coperini trib. n. (type genus: Copera Kirby) are described. Half of Coenagrionidae belongs to a well-supported clade incorporating Coenagrion Kirby and the potential subfamilies Agriocnemidinae, Ischnurinae and Pseudagrioninae. The remainder is less well defined, but includes the Pseudostigmatidae and New World Protoneuridae that, with Argiinae and Teinobasinae, may prove valid subfamilies with further evidence. Ninety-two per cent of the genera formerly included in the polyphyletic Amphipterygidae and Megapodagrionidae were studied. Pentaplebiidae, Rimanellidae and Devadattidae fam. n. (type genus: Devadatta Kirby) are separated from Amphipterygidae, and Argiolestidae, Heteragrionidae, Hypolestidae, Philogeniidae, Philosinidae and Thaumtoneuridae from Megapodagrionidae. Eight further groups formerly placed in the latter are identified, but are retained as incertae sedis; the validity of Lestoideidae, Philogangidae and Pseudolestidae is confirmed. For some families (e.g. Calopterygidae, Chlorocyphidae) a further subdivision is possible; Protostictinae subfam. n. (type genus: Protosticta Selys) is introduced in Platystictidae. Numerous new combinations are proposed in the Supporting Information. Many long-established families lack strong morphological apomorphies. In particular, venation is incongruent with molecular results, stressing the need to review fossil Odonata taxonomy: once defined by the reduction of the anal vein, Protoneuridae dissolves completely into six clades from five families." (Authors)] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nrm.nl

13393. Division of Wildlife (2013): Dragonflies and damselflies of Ohio - Field guide. Division of Wildlife Publication 5320 (R812): 76 pp. (in English) ["Ohio is a great state for dragonfly and damselfly diversity. To date, 164 species have been recorded, and like vagrant birds, out-of-range dragonflies can appear far from their normal

haunts. The newest addition to Ohio's Odonata (the order of insects that includes dragonflies and damselflies) were several striped saddlebags, *Tramea calverti*, which were found in late summer of 2006 at Magee Marsh Wildlife Area on western Lake Erie – far from their normal range in the extreme southern U.S. With 7,000 miles of streams and scores of lakes, ponds, and wetlands, Ohio has plenty of good places to look for dragonflies and damselflies. Some of the best spots are listed beginning on page 9. Until recently, learning about dragonflies and damselflies has been difficult for the casual naturalist. The only books available were out-of-date technical manuals. This booklet is one of several new publications that provide an introduction to dragonflies and damselflies. There has been an enormous increase in interest in the Odonata; not surprising, given their beautiful appearance and incredible flying abilities. The Odonata are also excellent indicators of water quality and thus serve as barometers of the health of our streams, lakes, and wetlands." (Editors)] Address: Division of Wildlife, 2045 Morse Rd Service Road, Columbus, OH 43229, USA

13394. Dolný, A. (2013): Population size estimation of *Aeshna caerulea* (Odonata: Aeshnidae) in the Czech part of Úpské rašeliniště bog (Giant Mountains). *Casopis Slezského Zemského Muzea - serie A - vedy prirodni* 62(1): 83-89. (in English) ["*A. caerulea* is present as a post-glacial relict in central European mountains. This species is listed as critically endangered in the Czech Republic (very restricted distribution occurring in two isolated populations) and the European population trend of this species is decreasing. The main objective of the study was to estimate the population size of *A. caerulea* in the Úpa bog National Nature Reserve (Czech Republic) using capture-mark-recapture data. Population estimates of adults using the Schnabel method was 425 (the 95% confidence limits: 248.1 / 992.3), and using the Schumacher-Eschmeyer method was 416 (the 95% confidence limits: 326.8 / 570.4). Imago activity became apparent at the beginning of July. This study has suggested that the possible future threats for the *A. caerulea* in the Czech Republic are drying up, air nitrogen depositions, eutrophication, pollution of water by external sources, and terrestriation, mainly as a result of global warming." (Author)] Address: Dolný, A., Dept of Biology and Ecology/Institute of Environmental Technologies, Faculty of Science, University of Ostrava, Chittussiho 10, CZ-710 00 Ostrava, Czech Republic. E-mail: ales.dolny@osu.cz

13395. Edwards, P.G.; Gaines, K.F.; Bryan, A.L.; Novak, J.M.; Blas, S.A. (2013): Trophic dynamics of U, Ni, Hg and other contaminants of potential concern on the Department of Energy's Savannah River Site. *Environmental Monitoring and Assessment* 186: 481-500. (in English) ["The Department of Energy's Savannah River Site is a former nuclear weapon material production and current research facility located in South Carolina, USA. Wastewater discharges from a fuel and nuclear reactor target manufacturing facility released depleted and natural U,

as well as other metals into the Tims Branch-Steed Pond water system. We investigated the current dynamics of this system for the purposes of environmental monitoring and assessment by examining metal concentrations, bioavailability, and trophic transfer of contaminants in seven ponds. Biofilm, detritus, and Anuran and Anisopteran larvae were collected and analyzed for stable isotopes ($\delta^{15}\text{N}$, $\delta^{13}\text{C}$) and contaminants of potential concern (COPC) with a focus on Ni, U, and Hg, to examine metal mobility. Highest levels of Ni and U were found in biofilms U (147 and 332 mg kg⁻¹ DW, respectively), while highest Hg levels were found in tadpoles (1.1 mg kg⁻¹ DW). We found intraspecific biomagnification of COPCs as expressed through stable isotope analysis. Biofilms were the best indicators for contamination and Anuran larvae with the digestive tract removed were the best indicators of the specific bioavailability of the focal metals. Monitoring data showed that baseline $\delta^{15}\text{N}$ values differed between ponds, but within a pond, values were stable throughout tadpole Gosner stage, strengthening the case to use this species for monitoring purposes. It is likely that there still is risk to ecosystem integrity as COPC metals are being assimilated into lower trophic organisms and even low levels of this mixture has shown to produce deleterious effects to some wildlife species." (Authors)] Address: Gaines, Karen, Department of Biological Sciences, Eastern Illinois University, 600 Lincoln Ave, Charleston, IL, 61920, USA. E-mail: kfgaines@eiu.edu

13396. Ellenrieder, N. von (2013): A revision of *Metaleptobasis* Calvert (Odonata: Coenagrionidae) with seven synonymies and the description of eighteen new species from South America. *Zootaxa* 3738(1): 1-155. (in English, with Spanish summary) ["Examination of over 1,400 specimens of the neotropical genus *Metaleptobasis* Calvert, 1907, including primary types or paratypes of 18 of the 20 currently available species names and large series of specimens including pairs in tandem and copula, allowed me to unequivocally associate older names with species, distinguish between specific and intraspecific variability, associate both sexes for each species, and recognize the existence of female polymorphism. As a result, seven names are found to be junior synonyms: *Metaleptobasis mauritia* Williamson, 1915 junior synonym of *M. bicornis* (Selys, 1877), *M. manicaria* Williamson, 1915 and *M. fernandezi* Rácenis, 1955 junior synonyms of *M. diceras* (Selys, 1877), *M. westfalli* Cumming, 1954 junior synonym of *M. foreli* Ris, 1915, and *M. tetragena* Calvert, 1947, *M. weibezahni* Rácenis, 1955, and *M. incisula* De Marmels, 1989 junior synonyms of *M. brysonima* Williamson, 1915. Lectotypes are designated for *M. amazonica* and *Leptobasis diceras*. Eighteen new species of *Metaleptobasis* are described: *M. brevicauda* (Holotype male, Peru, Huánuco Dep., Shapajilla, jungle, 11 v 1939, F. Woytkowski leg., in UMMZ); *M. falcifera* (Holotype male, Peru, Madre De Dios Dep., Pakitza, Reserved Zone, Manu National Park, T2 to R2 to T1 to base camp, 11°55'48"S, 71°15'18"W, 250 m, 17 ix 1989, J.A. Louton leg., in USNM); *M. furcifera* (Holotype male, Peru, Loreto Dep.,

Iquitos, iii 1936, G.G. Klug leg., in BMNH); *M. gabrielae* (Holotype male, Peru, Loreto Dep., Tamshiyacu-Tahuayo Reserve, forest interior (4°23'40"S, 73°14'56"W), 27 vii 2009, T. Faasen leg., in RMNH); *M. guillermoi* (Holotype male, Peru, Loreto Dep., Yarinacocha, temporary forest stream (8°17'S, 74°37'W, 145 m), 2 vi 1972, D.L. Pearson leg., in FSCA); *M. inermis* (Holotype male, Brazil, Pará State, Jacareacanga, vii 1969, F.R. Barbosa leg., in UMMZ); *M. leniloba* (Holotype male, Peru, Loreto Dep., Pacaya-Samiria National Reserve, Santa Luisa trail (5°15'S, 74°40'W), 10 vi 2008, C. Beatty, A. Cordero & J. Hoffmann leg., in FSCA); *M. longicauda* (Holotype male, Brazil, Mato Grosso State, C. Teles Pires, Alto Tapajos, 1-31 viii 1956, Sick leg., in MNRJ); *M. orthogonia* (Holotype male, Peru, Loreto Dep., San Juan, Río Amazonas, near Iquitos, viii 1939, J. Schunke leg., in FSCA); *M. paludicola* (Holotype male, Peru, Loreto Dep., Tamshiyacu-Tahuayo Reserve, swamp, 4°23'49"S, 73°14'57"W, 27 ii 2009, T. Faasen leg., in RMNH); *M. panguanae* (Holotype male, Peru, Huánuco Dep., Biological Station Panguana, E side Río Yuyapichis, 9°37'S, 74°57'W, 6-17 iv 2003, H.J. & E.-G. Burmeister leg., in ZSM); *M. peltata* (Holotype male, Peru Loreto Dep., Tamshiyacu-Tahuayo Reserve, 4°21'22"S, 73°11'0"W, 19 ii 2010, T. Faasen leg., in RMNH); *M. prostrata* (Holotype male, Peru, Junín Dep., Satipo, v 1945, P. Paprzycki leg., in UMMZ); *M. silvicola* (Holotype male, Peru, Madre de Dios Dep., Explorer's Inn on Río Tambopata, 30 km SW Puerto Maldonado, main trail, 1 viii 1979, M. Perkins & P. Donahue leg., in FSCA); *M. spatulata* (Holotype male, Peru, Huánuco Dep., 10 km N of Cucharas, confluence of Huallaga and Pacay rivers, viii 1954, F. Woytkowski leg., in UMMZ); *M. tridentigera* (Holotype male, Brazil, Rondônia State, Porto Velho, Area Abunan, T11 Aleatorio, 8°46'S, 63°54'W, 86 m, 16 v 2010, Nogueira & Mendes leg., in MZUSP); *M. truncata* (Holotype male, Brazil, Pará State, Jacareacanga, xi 1969, F.R. Barbosa leg., in UMMZ); and *M. turbinata* (Holotype male, Peru, Loreto Dep., Tamshiyacu-Tahuayo Reserve, forest swamp (4°24'18"S, 73°14'38"W), 25 ii 2010, T. Fassen leg., in RMNH). Illustrations, keys, diagnoses, and distribution maps for all 31 currently known species are provided. Phylogenetic relationships within the genus *Metaleptobasis* are analyzed based on 33 adult morphological characters, including the 31 currently described species of *Metaleptobasis* and eleven outgroup taxa of other Coenagrionidae of the subfamily Teinobasinae. The cladistic analysis recovered *Metaleptobasis* as monophyletic, and as sister group of *Aceratobasis* Kennedy, a teinobasine genus some of the species of which possess an articulated spur on base of male cercus. Hypothesized relationships among its species are discussed." (Author)] Address: Ellenrieder, Natalia von, Plant Pest Diagnostic Center, California Dept Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832, USA. E-mail: natalia.ellenrieder@gmail.com

13397. Endersby, I. (2013): Additional distribution records for Victorian dragonflies (Insecta: Odonata). Continued. *Victorian Entomologist* 43(4): 120-125. (in English) [Aus-

tralia, distribution maps of *Coenagrion lyelli*, *Cordulephya pygmaea*, and *Austrothermis nigrescens* are presented.] Address: Endersby, I., 56 Looker Road, Montmorency, Vic. 3094, Australia. E-mail: endersby@mira.net

13398. Endersby, I. (2013): Additional distribution records for Victorian dragonflies (Insecta: Odonata). *Victorian Entomologist* 43(4): 99-105. (in English) ["Distribution maps using point data were published for all of the known species of Odonata from Victoria from all available Museum label data that had been digitised at the time (Endersby 2010). The maps were restricted to specimen data as the identification of species can be checked. Some literature references were included if the specimen data were very sparse. Since then additional collection data have become available and numerous photographs have been published on the internet where identification of the species is unequivocal. Maps incorporating new data have been prepared for 19 species for which the original coverage was sparse and are presented here. Photographs on which some of the new records were based are provided. It is likely that this new information is due to increased search activity over the last few flight seasons rather than showing range extensions. Victoria does not have a strong history of focussed dragonfly sampling. Discussion of distribution extralimital to Victoria is based on the dot point maps in Theischinger & Endersby (2009)."] (Author) *Austrocnemis splendida*, *Austrolestes aridus*, *Austrolestes io*] Address: Endersby, I., 56 Looker Road, Montmorency, Vic. 3094, Australia. E-mail: endersby@mira.net

13399. Eremina, E.E.; Haritonov, A.Yu. (2013): First record of *Sympetrum v. vulgatum* (Linnaeus, 1758) dragonfly imaginal hibernation (Odonata, Libellulidae) in the South Urals, Russia. *Eurasian Entomological Journal* 12(3): 224-226. (in Russian, with English summary) ["In early April 2012 an active adult male *Sympetrum v. vulgatum* was captured in Chelyabinsk city, the Southern Urals, Russia. This is first record of imaginal hibernation of a dragonfly not of genus *Sympecma* in the temperate latitudes of Russia."] (Authors)]

13400. Farkas, A.; Jakab, T.; Müller, O.; Móra, A.; Lajter, I.; Dévai, G. (2013): Sex ratio in Gomphidae (Odonata) at emergence: is there a relationship with water temperature? *International Journal of Odonatology* 16(4): 279-287. (in English) ["Although the sex ratio of Odonata at emergence has received much attention, we are still far from understanding the exact causes of its variability and imbalance. In this paper we studied the sex ratios at emergence in natural populations of two Gomphus species based on samples of exuviae taken from two European lowland rivers. We hypothesized a possible relationship between the water temperature during larval development and the sex ratio at emergence. Sex ratio records exhibited no consistent bias towards one sex but varied between habitats and years in both species. We found correlations between sex ratio and water temperature in the year preceding emergence. Furthermore, the

correlation between sex ratios and water temperature was in opposite directions in the two congeneric species, which may be attributed to differences in their voltinisms. We conclude that the effect of water temperature can be mediated through cohort-splitting; temperature-dependent development of minor cohorts, including unequal proportions of males and females due to the faster development of male larvae, affects the sex ratio at emergence. The supposed effect does not cause a long-term consistent bias, but may explain the year-to-year variations."] (Authors)] Address: Farkas, Anna, Dept Hydrobiology, Centre of Arts, Humanities & Sciences, Fac. Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

13401. Ferrand, M.; Duclose, M. (2013): Première mention d'*Orthetrum albistylum* dans le département de la Seine-Saint-Denis (Odonata: Libellulidae). *Martinia* 29(2): 123-124. (in French) [A male of *O. albistylum* was observed at 2-VII-2012 in the "parc Georges-Valbon" NW of Seine-Saint-Denis, France.] Address: Ferrand, M., Office pour les insectes et leur environnement, BP 30, F-78041 Guyancourt Cedex, France. E-mail: maxime.ferrand@irisectes.org

13402. Ferreras-Romero, M., (2013): Comparative analysis of the conservation state of southern Iberian streams using Odonata as indicators of environmental quality. *Métodos en Ecología y Sistemática* 7(3): 20-36. (in English, with Spanish summary) ["Global ecological conditions existing in streams of the southern Iberian Peninsula are very unequal. A new approach to assess aspects of the ecological integrity of Mediterranean streams by analysing dragonfly communities is presented. The Iberian Stream Odonatological Index (ISOI) operates at the species level. Taxonomic diversity and voltinism are two elements to take consideration to design this index. The results of a first application of this approach are presented in the paper as well. ISOI scores are compared with results obtained by application of a biological index based on whole macro-invertebrates communities (IBMW)."] (Author)] Address: Ferreras-Romero, M., Dept Sistemas Físicos, Químicos y Naturales, Univ. Pablo de Olavide, A-376 km 1, 41013 Sevilla, Spain. E-mail: mferrom@upo.es

13403. Figueiredo, N.; Pires, M.M.; Davanso, R.C.S.; Kotzian, C.B. (2013): Diversidade de larvas de Odonata (Insecta) da Bacia do Rio Ibicuí, Rio Grande do Sul, Brasil. *Ciência e Natura* 35(2): 84-94. (in Portuguese, with English summary) ["An inventory of larval odonates in lotic systems from two courses (slope and lowland) in the Ibicuí River basin, Rio Grande do Sul, Brazil, was carried out in 2009 and 2010. In total, 964 specimens were sampled and classified in 34 genera and seven families. Libellulidae was the richest family with 14 genera and Gomphidae was the most abundant. Three new genera (*Agriogomphus*, *Cacoides* and *Mnesarete*) are new records for Rio Grande do Sul State. The dominant and more

frequent genera were *Progomphus*, *Hetaerina* and *Argia*. There was no significant difference in genus richness between the two courses, but a difference in frequency of occurrence of some genera was recorded. This difference is due to the distinguishing characteristics of the substrate between sections, which promoted a predominance of the genera of the gomphid family, especially in the sandy stretch from the lowland course." (Authors)] Address: Figueiredo, N., Universidade Federal de Santa Maria, UFSM, Santa Maria, RS, Brazil

13404. Fitzgerald, T. (2013): Nonlinear fluid-structure interactions in flapping wing systems. PhD thesis, Faculty of the Graduate School of the University of Maryland, College Park: X + 178 pp. (in English) ["This work relates to fluid-structure interactions in the context of flapping wing systems. System models of flapping flight are explored by using a coupling scheme to provide communication between a fluid model and a structural model describing a flexible wing. The constructed computational models serve as a tool for investigating complex fluid-structure interactions and characterizing them. Primary goals of this work are construction of models to understand nonlinear phenomena associated with the flexible flapping wing systems, and explore means and methods to enhance their performance characteristics. Several system analysis tools are employed to characterize the coupled fluid-structure system dynamics, including proper orthogonal decomposition, dimension calculations, time histories, and frequency spectra. Results obtained from two-dimensional simulations conducted for a combination of a two-link structural system and a fluid system are presented and discussed. Comparisons are made between the use of direct numerical simulation and the unsteady vortex lattice method as the fluid model in this coupled dynamical system. To enable three-dimensional studies, a novel solid model is formulated from continuum mechanics for geometrically exact finite elements. A new partitioned fluid-structure interaction algorithm based on the Generalized- method is formulated and implemented in a large scale fluids solver inside the FLASH framework. Consistent boundary conditions are also formulated by using Lagrangian particles. Several examples demonstrating the effectiveness of the methods and implementation are shown, in particular, for flapping flight at low Reynolds numbers. Unique experiments have also been undertaken to determine the first few natural frequencies and mode shapes associated with hawkmoth wings. The computational framework developed in this dissertation and the research findings can be used as a basis to understand the role of flexibility in flapping wing systems, further explore the complex dynamics of flapping wing systems, and also develop design schemes that might make use of nonlinear phenomena for performance enhancement."(Author)] Address: not stated

13405. Fleck, G.; Legrand, J. (2013): Notes on the genus *Libellulosoma* Martin, 1906, and related genera (Odonata: Anisoptera: Corduliidae). *Zootaxa* 3745(5): 579-586. (in English) ["The holotype of *Libellulosoma minuta*, until

now regarded as the unique specimen of this monotypic genus and considered lost for half a century, was found again in the dragonfly collection of the Muséum National d'Histoire Naturelle in Paris. A second specimen, also from Madagascar (probably East Madagascar) was found in the collection René Martin together with the holotype. A redescription, including the structure of the secondary copulatory apparatus, is provided. The genus *Libellulosoma* is closely related to the genera *Pentathemis* and *Aeschnosoma*, and its membership in the clade *Aeschnosomata* is well supported. Evidence from biogeography, the fossil record, and phylogeny indicates that this group, possible sister group of remaining *Corduliidae* s.s., was probably already present in the Early Cretaceous." (Authors)] Address: Legrand, J., Muséum national d'Histoire naturelle, 45 rue Buffon, 75005 Paris, France

13406. Fronzek, S. (2013): Climate change and the future distribution of *palsa mires*: ensemble modelling, probabilities and uncertainties. *Monographs of the Boreal Environment Research* 44: 35 pp. (in English) ["The heterogeneous environments of *palsa mires* offer distinct ecosystem services that are characterised by a rich species diversity (CAFF 2001). *Palsas* are preferred breeding grounds for bird species and offer resting places for migrating birds (Järvinen and Väisänen 1976, Järvinen 1979). Furthermore, the European distribution of the dragonfly *Somatochlora sahlbergi* is believed to be totally restricted to *palsa mires* (Schröter 2011). Consequently, the value of *palsa mires* for nature conservation has been recognised and they have been listed as one of 65 priority natural habitat types in Annex I of the "Habitats" Directive of the European Union." (Author) For the complete paper see: <https://helda.helsinki.fi/bitstream/handle/10-138/40109/fronzekdissertation.pdf?sequence=1>] Address: Fronzek, S., Univ. of Helsinki, Fac. Biological & Environmental Sci., Dept of Environmental Sciences

13407. Fulan, J.A.; Henry, R. (2013): A comparative study of Odonata (Insecta) in aquatic ecosystems with distinct characteristics. *Ambiência Guarapuava* (PR) 9(3): 589-604. (in English with Portuguese summary) ["The objective of this study was to compare the richness and density of Odonata larvae in four distinct environments: lotic with large pollutant loads, lotic with small pollutant loads, lentic disconnected from a river and lentic connected to a river, as well as to record the physical and chemical parameters of the water in the four environments. We identified (with one exception at the genus level) a total of 1,302 Odonata larvae in the four habitats. The environmental variables measured were: dissolved oxygen, pH, conductivity, suspended matter, air and water temperature, precipitation, depth, and the biomass of the macrophytes. The lentic habitats exhibited a greater Odonata larvae density in relation to the lotic habitats, except during April and December of 2006. The Guareí River, however, presented an elevated conductivity, possibly because of a greater quantity of pollutants it received during the period between June and September of 2006, and it

showed a higher density of Odonata larvae in comparison to the Paranapanema River. The temperature and the dissolved oxygen on the water surface were, respectively, greater and smaller in the lakes in comparison to the rivers. In spite of the Odonata density being higher in the lentic ecosystems in comparison to the lotic, the richness was not altered during the period studied. Nevertheless, the genera composition was distinct, showing that some taxa show a certain preference for certain types of ecosystems like Calopterygidae and Neogomphus, which were shown exclusively in the Paranapanema River." (Authors)] Address: Fulan, J.A., Universidade Federal do Amazonas (UFAM). CEP: 69800-000, Humaitá, AM, Brasil. E-mail: joaofulan@ig.com.br

13408. Gainzarain, J.A.; Ocharan, F.J.; Mezquita, I. (2013): Catalogo de los odonatos (Insecta: Odonata) de Álava (norte de España). Boletín de la Sociedad Entomológica Aragonesa (S.E.A.) 53: 173-185. (in Spanish, with English summary) ["This paper provides new information about the dragonflies recorded in Álava (northern Spain) mainly between the years 2008 and 2012, including the biogeographical characterization and an updated checklist of the order for this province. Data regarding the status of each species are provided. Calopteryx haemorrhoidalis and Gomphus simillimus are reported for the first time from Álava." (Authors)] Address: Ocharan, F.J., Dept Biología de Organismos y Sistemas, Univ. de Oviedo, E-33071 Oviedo, Spain: E-mail: focharan@uniovi.es

13409. Gliwa, B. (2013): First record of Orthetrum albistylum (Odonata: Libellulidae) in Lithuania. Naujos ir retos Lietuvos vabzdziu rusys 25: 5-6. (in English, with Lithuanian summary) ["Jurbarkas district Bank of the river Nemunas 55°05'01.7"N, 22°49'46.4"E. A single male has been observed in the valley of the river Nemunas at a river groyne near Rotuliai, 08 07 2013." (Author)] Address: Gliwa, B., Lithuanian Entomological Society, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: gliwa@sargeliai.org

13410. Gołąb, M.J.; Śniegula, S.; Drobnik, S.M.; Zajac, T. Serrano-Meneses, M.A. (2013): Where do floaters settle? An experimental approach in odonates. Animal Behaviour 86: 1069-1075. (in English) ["Highlights: •We investigated the effect of habitat quality on the settlement of floaters. •Habitat disturbances affect mostly the nonterritorial part of a population. •Vacated high-quality territories are always taken over by new residents. •Nearly half of vacated low-quality territories are not taken over. •Floaters settle in the vicinity of high-quality sites. According to classic ecological models, nonterritorial males should settle in low-quality habitats as a result of losing competition over reproductive sites ('defeated male' hypothesis). Alternatively, according to evolutionary game theory models, nonterritorial males should settle in the vicinity of high-quality sites and 'choose' to delay breeding until these habitats are vacant for them ('male player' hypothesis). However, nonterritorial male spatial distribu-

tion has not been experimentally tested. If the defeated male hypothesis is true (1) deterioration of high-quality sites should increase the number of nonterritorial males in a population and (2) vacated low-quality territories should be taken over by new territorial males. If the male player hypothesis is true, a similar manipulation should (1) decrease the number of nonterritorial males and (2) vacated low-quality territories should not be taken over. We performed two types of field experiment to test these hypotheses: male removal and patch quality manipulation. Our study species was the territorial damselfly Calopteryx splendens; males of this species exhibit both territorial and nonterritorial behaviour. Our results suggest that deterioration of high-quality habitats significantly reduced the number of nonterritorial males. The proportion of take-overs of the high-quality territories was significantly higher than that of low-quality territories. Our study supports the assumptions of the male player hypothesis and indicates that nonterritorial damselflies are more sensitive to habitat quality changes than territorial ones. Because nonterritorial individuals exist in most populations of territorial taxa, a better understanding of their settlement rules may be relevant for population dynamics and modelling." (Authors)] Address: Gołąb, Maria, Institute of Nature Conservation, Polish Academy of Sciences, Kraków, Poland. E-mail: marysiagolab@gmail.com

13411. Gomez-Anaya, J.A.; Novelo-Gutierrez, R.; Ramirez, A. (2013): Temporal variation in Odonata larval assemblage diversity in a lowland stream in western Mexico. Odonatologica 42(4): 309-323. (in English) ["There is limited information on the structure and seasonality of Mexican Odon., in particular for lowland regions. Here, the structure and seasonal changes in the diversity of larval Odon. at El Ticuiz stream (10m asl) are described by conducting seven surveys over the yr. The study reach was impacted by dredging that resulted in the occurrence of lotic and lentic-like environments that promoted the abundant growth of aquatic macrophytes. Overall, Odonata diversity was high and a total of 13 species of Zygoptera and 23 of Anisoptera were recorded. The dominant species were Argia pulla and Telebasis salva, both dominating assemblages during the entire period of study. Two peaks in species richness, spring and autumn, were found suggesting that most spp. have at least 2 generations per year. Potential causes for the high diversity found include the low elevation, low flow, the effects of dredging in habitat availability, and the presence of water hyacinths and Potamogeton sp. Changes in species richness and composition appear to be mostly related to seasonality." (Authors)] Address: Gomez-Anaya, J.A., Instituto de Ecología, A.C., Apartado Postal 63, 91070, Xalapa, Veracruz, Mexico. E-mail: antonio.gomez@inecol.edu.mx

13412. Gonzalez-Tokman, D.M.; Gonzalez-Santoyo, I.; Munguía-Steyer, R.; Cordoba-Aguilar, A. (2013): Effect of juvenile hormone on senescence in males with terminal investment. J. Evol. Biol. 26: 2458-2466. (in English) ["Senescence, a decline in survival and reproductive prospects

with age, iscontrolled by hormones. In insects, juvenile hormone (JH) is involved in senescence with captive individuals, but its effect under natural conditions is unknown. We have addressed this gap by increasing JH levels in young and old wild males of the damselfly *Hetaerina americana*. We assessed survival in males that were treated with a JH analogue (methoprene), which is known to promote sexual activity, and an immune challenge, which is known to promote terminal investment in reproduction in the studied species. We replicated the same procedure in captivity (to control for environmental variation), where males were deprived of any activity or food. We expected old males to show the lowest survival after being treated with JH and immune-challenged, because the effect of terminal investment on senescence would be exacerbated by JH. However, this should be the case for wild animals, but not for captive animals, as the effects of JH and immune challenge should lead to an increase in high energetic-demanding activities only occurring in the wild. Old animals died sooner compared with young animals in both the wild and captivity, confirming that males are subject to senescence. In wild but not captive animals, JH decreased survival in young males and increased it in old males, confirming that JH is sensitive to the environment when shaping animal senescence. Immune challenge had no effect on survival, suggesting no effect of terminal investment on senescence. Additionally, contrary to the expected effects of terminal investment, with an immune challenge, recapture rates increased in young males and decreased in old males. Our results show that male senescence in the wild is mediated by JH and that terminal investment does not cause senescence. One explanation is that animals undergoing senescence and terminal investment modify their feeding behaviour to compensate for their physiological state." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

13413. Grgic, M. (2013): Faunistical and ecological characteristics of dragonflies (Odonata) in different habitat types in the alluvial lowland forest Spacva. MS thesis. Department of Biology, University Josip Juraj Strossmayer in Osijek. 62 pp. (in Croatian, with English summary) [A total of 22 Odonata species were recorded at ten localities in the alluvial lowland forest in the area of Spacva, Croatia, between May and October in 2012. Most abundant species were *Erythromma viridulum*, *Orthetrum albistylum*, *Sympetrum sanguineum* and *Crocothemis erythraea*. The list also includes *Chalcolestes parvidens*, *Epithea bimaculata* and *Somatochlora meridionalis*.] Address: Grgic, Marina, Department of Biology, University Josip Juraj Strossmayer in Osijek, Croatia

13414. Gros, P. (2013): Der Violette Sonnenzeiger *Trithemis annulata* (Beauvois, 1805): Eine sich in Südeuropa ausbreitende afrotropische Libellenart. Salzburger Entomologische Arbeitsgemeinschaft. Haus der Natur. News-

letter 1/2013: 1-3. (in German) [The author reports from a trip (without dates) into the valley of Cavu near Lecci on the island of Corsica, France. Several Odonata species are noted including *Ischnura genei* and *Trithemis annulata*. The later is briefly introduced as a species with current range extension.] Address: Gros, P., Haus der Natur, Museumsplatz 5, A-5020 Salzburg, Austria. E-Mail: patrick.gros@hausdernatur.at

13415. Guillermo-Ferreira, R.; Bispo, P.C. (2013): Description of the larva of *Telebasis griffinii* (Martin, 1896) (Zygoptera: Coenagrionidae). *Odonatologica* 42(4): 403-407. (in English) ["A description and illustrations of the final instar larva are provided based on reared specimens collected in São Paulo State, Brazil. *T. griffinii* can be distinguished from other *Telebasis* species by the 6 palpal setae, 1 premental seta, no setae on antennae, and the shape of the foliaceous and lanceolate caudal lamellae." (Authors)] Address: Guillermo-Ferreira, R., LABIA, Laboratório de Biologia Aquática, Departamento de Ciências Biológicas, Faculdade de Ciências e Letras de Assis, Universidade Estadual Paulista, Av. Dom Antonio 2100, BR-19.806-900 Assis, SP, Brazil

13416. Gustafsson, S.; Österling, M.; Skurdal, J.; Schneider, L.D.; Calles, O. (2013): Macroinvertebrate colonization of a nature-like fishway: The effects of adding habitat heterogeneity. *Ecological Engineering* 61, Part A: 345-353. (in English) ["Nature-like fishways are designed to imitate the characteristics of natural streams, thereby providing both fish passage and habitat for a variety of aquatic organisms. To date, however, the potential for habitat rehabilitation of nature-like fishways has not been fully realized. To develop the concept of how to design a nature-like fishway, a 500-m long nature-like fishway, termed the biocanal, was constructed at the Eldforsen hydroelectric facility, Sweden. It included four habitat types: riffle, pool, floodplain and braided (i.e. with islands), each replicated three times. The riffle sections were considered controls for typical Swedish nature-like fishways. Thus the biocanal had a more varied in-stream environment than those of conventional fishways. To test the prediction that the biocanal had a positive effect on biodiversity, we compared the physical habitat and benthic fauna composition of the more diverse habitat types in the biocanal to the riffle habitats. We also made comparisons between the biocanal and six natural reference streams in the area. After two years, 63% of the benthic fauna families found in the reference streams had colonized the biocanal. Families present in the reference streams, but not in the biocanal, were predominantly slow colonizers or taxa linked to riparian vegetation, which was scarce and in an early successional stage along the biocanal. In the biocanal, pool and floodplain habitats contained the highest number of families, the highest family diversity (Shannon–Weaver) and the highest densities of Ephemeroptera, Plecoptera and Trichoptera. Since these habitats contained more families and had higher diversities than the riffle habitats which are typical of conventional nature-like fishways, we suggest that the construction of bio-

canals indeed possesses the potential for high biodiversity... The Odonata were among the slowest colonizers, and only one out of the seven Odonata families found in the reference streams was found in the biocanal at the end of the study. (Aeshnidae, Calopterygidae, Cordulegastridae, Corduliidae, Gomphidae, Platycnemididae)". (Authors)] Address: Gustafsson, Stina, Department of Biology, Karlstad University, S-651 88 Karlstad, Sweden. E-mail: stina.gustafsson@kau.se

13417. Ha, N.S.; Goo, N.S. (2013): Flapping frequency and resonant frequency of insect wings. 10th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI), Oct. 30 2013-Nov. 2 2013: 29-31. (in English) ["In this study, we experimentally studied the relationship between wingbeat frequency and resonant frequency of 30 individuals of eight insect species from five families: Odonata (*Sympetrum flaveolum*), Lepidoptera (*Pieris rapae*, *Plusia gamma* and *Ochlodes*), Hymenoptera (*Xylocopa pubescens* and *Bombus rupestris*), Hemiptera (*Tibicen linnei*) and Coleoptera (*Allomyrina dichotoma*). We found that wingbeat frequency does not have a strong relation with resonance frequency: in other words, insects have not been evolved sufficiently to flap at their wings' structural resonant frequency. This contradicts the general conclusion of other reports—that insects flap at their wings' resonant frequency to take advantage of passive deformation to save energy." (Authors)] Address: not available.

13418. Hacet, N.; Özkan, N. (2013): Odonata larvae from Kapıdağ Peninsula and Marmara Island in Turkey (Anisoptera: Aeshnidae, Gomphidae, Cordulegastridae, Libellulidae). *Notulae Odonatologicae* 8(2): 23-25. (in English) ["The larvae of 8 species, collected in 2010, are brought on record. Six of them occurred in both places, whereas *Gomphus schneiderii* and *Onychogomphus forcipatus albotibialis* were restricted to the peninsula. The Marmara records are the first odonate records from the island." (Authors)] Address: Hacet, Nurten, Department of Biology, Faculty of Science, Trakya University, TR-22030 Edirne, Turkey. E-mail: nhacet@hotmail.com

13419. Hämäläinen, M. (2013): Synonymic notes on some oriental species of Calopterygidae, Euphaeidae and Chlorocyphidae. *Notulae Odonatologicae* 8(2): 25-29. (in English) ["The following new synonymies are presented: *Echo margarita tripartita* Selys, 1879 (Calopterygidae) is synonym of *E. margarita* Selys, 1853; *Heterophaea ruficollis* (Ris, 1930) (Euphaeidae) is a junior synonym of *H. barbata* (Martin, 1902); *Rhinocypha cognata* Kimmins, 1936 (Chlorocyphidae) is a junior synonym of *R. stygia* Förster, 1897. The lectotype of *E. margarita tripartita* is designated." (Author)] Address: Hämäläinen, M., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: Libellago@gmail.com

13420. Haritonov, A.Yu.; Borisov, S.N. (2013): Distribution and habitat characteristics of *Sympetrum haritonovi*

Borisov, 1983 (Odonata, Libellulidae) in Central Asia mountains Tien-Shan, Pamir-Alai and Kopetdagh. *Eurasian Entomological Journal* 12(3): 213-216. (in Russian, with English summary) ["The locality list of little-known species *Sympetrum haritonovi* in Tien-Shan, Pamir-Alai and Kopetdagh is presented. The species is firstly recorded for Turkmenistan and Kazakhstan. It is ranged in mountain absolute altitudes 800–3550 m with optimum near 1600–2200 m. Habitats for larvae served wetlands drainable with ground water and mountain springs. Large number of adults of the species was recorded in 3360 and 3550 m altitudes of East Pamir on floods of two thermal sources. Five dragonfly species were recorded together with *S. haritonovi*: *Ischnura forcipata*, *I. pumilio*, *Orthetrum anceps*, *O. brunneum* and *Sympetrum flaveolum*." (Authors)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

13421. Haro, R.J.; Bailey, S.W.; Northwick, R.M.; Rolfhus, K.R.; Sandheinrich, M.; Weiner, J. (2013): Burrowing dragonfly larvae as biosentinels of Methylmercury in freshwater food webs. *Environmental Science & Technology* 47(15): 8148-8156. (in English) ["We assessed the utility of larval burrowing dragonflies (*Arigomphus cornutus*, *Dromogomphus spinosus*, *Gomphus adelphus*, *Gomphus exilis*, *Gomphus graslinellus*, *Gomphus lividus*, *Gomphus spicatus*, *Hagenius brevistylus*, *Ophiogomphus colubrinus*, *Progomphus obscurus*) as biosentinels of methylmercury (MeHg) contamination. Gomphids were the most abundant family of dragonflies sampled during 2008-2010 from 17 lakes in four national parks of the northwestern Laurentian Great Lakes region. Ten species of burrowing gomphids were sampled; 13 lakes contained 3 or more species, and 2 species of *Gomphus* co-occurred in 12 lakes. Most of the total Hg (THg) in whole, late-instar larvae was MeHg, with mean percent MeHg exceeding 60% in 16 lakes. Mean MeHg in larvae of a given species varied greatly among lakes, ranging from 4 to 109 ng g⁻¹ dry weight. Methylmercury levels in larvae, however, were much less variable within a given lake and species. The mean concentration of MeHg in burrowing gomphids was positively correlated with mean MeHg concentration in unfiltered lake water. Mean concentrations of THg and MeHg in multispecies assemblages of *Gomphus* were also positively correlated with mean THg in coexisting prey fish and game fishes. We recommend—and provide guidance on—the application of burrowing gomphids as biosentinels of MeHg contamination, which can extend the bioassessment of MeHg to fishless fresh waters." (Authors)] Address: Haro, R.J., River Studies Center, University of Wisconsin-La Crosse, La Crosse, Wisconsin 54601, USA

13422. Herder, J.E.; van Delft, J., Bellemain, E.; Valentini, A. (2013): The use of environmental DNA (eDNA) to monitor biodiversity. *De Levende Natuur* 114(3): 108-113. (in Dutch, with English) ["Analyses of Environmental DNA

is a new approach for monitoring biodiversity. The method is based on the limited persistence of the DNA left behind by species in their environment. This environmental DNA (eDNA) can be detected in water samples, thereby indicating or confirming a species' presence. In this article we present an overview of the various habitats where eDNA has been successfully used for species detection. We show the results of pilot studies carried out in the Netherlands on the freshwater fish *Misgurnus fossilis*, dragonflies *Aeshna viridis* and *Leucorrhinia pectoralis* and the mammals *Neomys fodiens* and *Microtus oeconomus*. We focus on case studies in which eDNA has been used to monitor endangered species. Furthermore, we describe DNA metabarcoding by which a list of species is generated from an environmental sample. Finally, we take a look into the future by suggesting areas where more research is needed. We think that this new tool can give an enormous boost to data collection both in monitoring and biodiversity studies, thereby contributing to the conservation of species." (Authors)] Address: Herder, J.E., Stichting RAVON, Postbus 1413, 6501 BK Nijmegen, The Netherlands. E-mail: j.herder@ravon.nl

13423. Herzog, J.; Martens, A. (2013): Larve von *Aeshna* spec. (Odonata: Aeshnidae) als Beute des Südlichen Wasserschlauchs *Utricularia australis*. *Libellula* 32(3/4): 181-185. (in German, with English summary) ["A second stadium larva of *Aeshna* cf. *cyanea* was recorded in a bladder of *U. australis* sampled from a garden pond in Karlsruhe, Germany, on 16-V-2013. The larva was still alive, parts of the abdomen protruded from the bladder. Furthermore two larvae of *Zygoptera* were found. This is the first record of an anisopteran larva as prey of a carnivorous aquatic plant." (Authors)] Address: Herzog, Juliana, Pädagogische Hochschule Karlsruhe, Institut für Biologie und Schulgartenentwicklung, Bismarckstr. 10, 76133 Karlsruhe, Germany. E-mail: Juliana.Herzog@gmx.de

13424. Hippke, M. (2013): Einige bemerkenswerte faunistische Beobachtungen 2013 aus West-Mecklenburg (Odonata, Lepidoptera, Heteroptera, Orthoptera). *Virgo* 16(1): 63-65. (in German) [Mecklenburg-Vorpommern, Germany; records of the following Odonata species are documented: *Anax parthenope*, *Aeshna affinis*, *Crocothemis erythraea*, *Leucorrhinia caudalis*, *L. pectoralis*, *Lestes barbarus*, *Erythromma viridulum*.] Address: Hippke, M., Wiesenring 29, 19370 Parchim, Germany. E-mail: Mathias-Hippke@web.de

13425. Inoue, K.; Sasamoto, A.; Futahashi, R. (2013): The true status of *Somatochlora taiwana* Inoue & Yokota: A genuine species or a synonym of *S. dido* Needham? (Anisoptera: Corduliidae). *Odonatologica* 42(4): 325-334. (in English) ["The taxonomic status of *S. taiwana*, described from Taiwan, is controversial. It may be a genuine species or a synonym under *S. dido*, a species that occurs in mainland China. Based on morphological and DNA analyses, it is proposed here that *S. taiwana* should be treated as a genuine species." (Authors)] Address:

Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

13426. Ivanova, E.P.; Hasan, J.; Webb, H.K.; Gervinskis, G.; Juodkazis, S.; Truong, V.K.; Wu, A.H.F.; Lamb, R.N.; Baulin, V.A.; Watson, G.S.; Watson, J.A.; Mainwaring, D.E.; Crawford, R.J. (2013): Bactericidal activity of black silicon. *Nature Communications* 4:2838. DOI: 10.1038/ncomms3838: 7 pp. (in English) ["Black silicon is a synthetic nanomaterial that contains high aspect ratio nanoprotusions on its surface, produced through a simple reactive ion etching technique for use in photovoltaic applications. Surfaces with high aspect-ratio nanostructures are also common in the natural world, for example, the wings of the dragonfly *Diplacodes bipunctata*. Here we show that the nanoprotusions on the surfaces of both black silicon and *D. bipunctata* wings form hierarchical structures through the formation of clusters of adjacent nanoprotusions. These structures generate a mechanical bactericidal effect, independent of chemical composition. Both surfaces are highly bactericidal against all tested Gram-negative and Gram-positive bacteria, and endospores, and exhibit estimated average killing rates of up to 4.5×10^5 cells $\text{min}^{-1} \text{cm}^{-2}$. This represents the first reported physical bactericidal activity of black silicon or indeed for any hydrophilic surface. This biomimetic analogue represents an excellent prospect for the development of a new generation of mechano-responsive, antibacterial nanomaterials." (Authors)] Address: Ivanova, Elena, Faculty of Life and Social Sciences, Swinburne University of Technology, Hawthorn, Victoria 3122, Australia. E-mail: eivanova@swin.edu.au

13427. Jaeschke, A.; Bittner, T.; Reineking, B.; Beierkuhnlein, C. (2013): Can they keep up with climate change? – Integrating specific dispersal abilities of protected Odonata in species distribution modelling. *Insect Conservation and Diversity* 6: 93-103. (in English) ["(1.) The effects of climate change on the distribution of species are typically inferred using bioclimatic envelope models, assuming either no or unrestricted dispersal abilities. Information on species-specific dispersal abilities, especially of animals, is rarely incorporated. (2.) We analysed European records of two damselflies and four dragonflies protected by the Habitats Directive of the European Union. In addition to no or unrestricted dispersal scenarios, we considered species-specific dispersal distances based on literature information to improve realism in assessing conservation implications of climate change. The climate model HadCM3 and the emission scenario A2 were applied to project potential changes in occurrence probabilities up to 2035. As modelling algorithms, generalised linear models (GLM) and boosted regression trees (BRT) were used. (3.) The species *Coenagrion ornatum*, *Coenagrion mercuriale* and *Ophiogomphus cecilia* are projected to lose range (up to -68%) when incorporating specific dispersal distances, while they are projected to extend their range (up to +23%) in the unre-

stricted dispersal scenario. Furthermore, suitable climatic conditions tend to decline for *Leucorrhinia albifrons* and *Leucorrhinia caudalis* (up to -73%), whereas *Leucorrhinia pectoralis* is projected to gain distribution area (up to +37%) assuming either species-specific or unrestricted dispersal and subsequently successful breeding. Cross-validated model performance (AUC values) ranges between 0.77 and 0.92. (4.) 4. The integration of species-specific knowledge about dispersal distances in species distribution models promises to improve estimates of potential range changes and their implications for conservation management. Contrasting model results under different dispersal scenarios highlight the importance of research on species' ecology including dispersal distances." (Authors)] Address: Jaeschke, Anja, University of Bayreuth, Universitätsstr. 30, D-95447 Bayreuth, Germany. E-mail: anja.jaeschke@uni-bayreuth.de

13428. Jimenez-Cortes, J.G.; Cordoba-Aguilar, A. (2013): Condition dependence and trade-offs of sexual versus non-sexual traits in an insect. *Journal of ethology* 31(83): 275-284. (in English) ["Sexual traits often communicate male condition and so are known to be highly condition-dependent. Thus, it is expected that, under restricted environments, sexual traits will be more heavily impacted than non-sexual traits, and so a negative covariation will be expected between sexual traits and non-sexual traits as only high-quality males will sustain the costs of producing both trait types. Such covariation will not necessarily appear in non-restricted environments. We tested these predictions using males of the American rubyspot, *Hetaerina americana*. First, fully mature males from different seasons were collected and their sexual [a wing red spot and body size (this corrected for body mass using residuals)], and condition-indicating, non-sexual (phenoloxidase and protein concentration) traits were measured. Second, larvae were reared under different food quantities and the same traits plus another non-sexual trait [pro-phenoloxidase (proPO)], were measured in recently emerged males. Contrary to expected, non-sexual traits showed larger expression variance than sexual traits. We found a significant covariation between body size and proPO for experimental males. Both rich and poor diet groups showed a negative slope for body size and proPO. This supposes a resource allocation trade-off between these two traits for recently emerged animals. On the other hand, the presumed signaling function between sexual traits, such as spot size, and physiological indicators of condition in this species, is not supported." (Authors)] Address: Jimenez-Cortes, J.G., Departamento de Ecología Evolutiva, Instituto de Ecología, Univ. Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510 México, D. F., Mexico

13429. Jones, N.E. (2013): Patterns of benthic invertebrate richness and diversity in the regulated Magpie River and neighbouring natural rivers. *River Research and Applications* 29(9): 1090-1099. (in English) ["Fluctuating flows common in hydropeaking operations present biota with contrasting and challenging environments. Taxa that

require a narrow range of water velocity or are not adapted to withstand sudden changes in discharge will likely be eliminated or competitively disadvantaged under such circumstances, perhaps leading to reduced biodiversity. I investigated the whole river, longitudinal and lateral patterns of benthic invertebrate abundance, Shannon–Wiener diversity, and rarefied taxa density and richness in the hydropeaking Magpie River and 16 neighbouring natural rivers. The Magpie River had greater abundances of benthic invertebrates than natural rivers, particularly near the dam. General differences in benthic community characteristics were largely based on the near absence of Odonata and Plecoptera and an abundance of snails and worms in the Magpie River. Family density, richness and diversity were greater in the regulated Magpie River and unregulated upper Magpie River than found in natural rivers. Longitudinally, family density, diversity and particularly richness increased downstream in the Magpie River. Laterally, diversity did not show any trends with increasing depth along transects, except at near the dam where it decreased sharply with depth, velocity, and an abundance of filter feeding invertebrates. Taxa density did not show any lateral trends in natural rivers, whereas in the Magpie River, it increased with water velocity and depth. The results of this study are contradictory to the general findings of others implying reduced biodiversity below hydropower facilities. Possible explanations are examined and contrasted with other examinations of benthic invertebrate response below hydropeaking dams. General differences in benthic community characteristics were largely based on the near absence of Odonata and Plecoptera and an abundance of snails and worms in the Magpie River. ... Axis 2 eigenvalues were heavily weighted by Odonata, worms and snails. ..." (Author)] Address: Jones, N.E., River and Stream Ecology Lab, Ontario Ministry of Natural Resources, Trent University, 2140 East Bank Drive, Peterborough, Ontario, Canada K9J 7B8. E-mail: nicholas.jones@Ontario.ca

13430. Jones, O.M.; Ottea, J. (2013): The effects of Spinosad on *Culex quinquefasciatus* and three nontarget insect species. *Journal of the American Mosquito Control Association* 29(4): 346-351. (in English) ["Spinosad is a relatively new insecticide with a unique mode of action that is being evaluated for control of larval mosquitoes. Whereas a number of toxicological studies have measured effects of spinosad on various animals, few have been conducted on the effects of spinosad on nontarget, aquatic insect species. Such studies are important as these species might be found in the same environments as mosquito larvae targeted for control. A neighborhood pond was surveyed to find a representative species of mosquito as well as other common aquatic insects with which to examine susceptibility to spinosad and nontarget effects. The mosquito species chosen was *Culex quinquefasciatus* and the most common nontarget taxa were immature stages of a mayfly (*Caenis* sp., Ephemeroptera: Caenidae), a damselfly (*Ischnura* sp., Odonata: Coenagrionidae), and a dragonfly (*Pachydiplax longipennis*).

nis, Odonata: Libellulidae). Bioassays of mosquitoes from a reference susceptible strain (Sebring-S) and field collections of *Cx. quinquefasciatus* were used to determine susceptibility to spinosad. In addition, susceptibility was examined in nontarget taxa using spinosad concentrations corresponding to the LC50 of field-collected mosquitoes (0.031 ppm) and the maximum label rate (1.6 ppm) of spinosad (Natular®EC). Susceptibility to spinosad did not differ between Sebring-S and field-collected mosquitoes. However, there was a marked difference in susceptibility among nontarget taxa. Susceptibility was greatest in *Caenis* sp., followed by *Ischnura* sp., and then *P. longipennis*. (Authors)] Address: James Ottea, J., Dept of Entomology, Louisiana State University Agricultural Center, Baton Rouge, LA 70803, USA

13431. Jovic, M. (2013): A proposal of Serbian names for dragonfly species (Insecta: Odonata) of the Balkan Peninsula, with the checklist of Odonata of Serbia. *Acta entomologica serbica* 18(1/2): 1-10. ["This work presents suggestions for Serbian nomenclature for 92 Odonata species which can be found in the states of the Balkan Peninsula and adjacent territories of Hungary and Romania. Sixty-seven species are chosen in particular because of written notes about their discovery on the territory of Serbia. Comments on the names suggested are made with the previously existing Serbian vernacular names for this group of insects in mind." (Author)] Address: Jovic, M., Natural History Museum in Belgrade, Njegoševa 51, 11000 Belgrade, Serbia. E-mail: milos.jovic@nhmbeo.rs

13432. Juhászová, J. (2013): From symbol to latency (Two forms of spiritual discourse in contemporary Slovak poetry). *Zeitschrift für Slawistik* 58(4): 444-461. (in English) ["Spiritual themes in the 20th century Slovak poetry were influenced first of all by the aesthetic code of symbolism with a small exception in the 1930s when it was influenced by H.Bremond's conception of pure poetry. Only in contemporary spiritual poetry the power of the symbolist code is weakening, and aesthetic impulses of avantguards and poststructuralist tendencies become a more distinctive source of inspiration. Against the background of the interpretation of two poetic texts - M. Rúfus: *Vlastnoručný podpis*, zb. *Vážka*, 1998 [The Handwritten Signature, coll. The Dragonfly], and Erik Jakub Groch: *Sa*, zb. *Druhá naivita*, 2005 [Self, coll. The Second Naïveté], the study focuses on important developmental impulses in literary thought, observing how in a certain period the power of one aesthetic code begins to weaken and leaves a space for a new one to succeed." (Author)] Address: Juhászová, Jana, Department of Slovak Language and Literature, Faculty of Arts and Letters, Catholic University, Hrabovská cesta 1, 03401 Ružomberok, Slovakia

13433. Juhász, P.; Kiss, B.; Olajos, P.; Grigorszky, I. (2013): Cercetările faunistice a nevertebratelor macroscopice acvatice pe teritoriul administrat de către Körös–Maros Nemzeti Park. *Crisicum* 3: 139-154. (in Hungari-

an) [32 localities in the Körös–Maros Nemzeti Park (Hungaria) have been studied for their fauna. The list of 36 Odonata species includes *Lestes dryas*, *L. macrostigma*, *Coenagrion pulchellum interruptum*, *C. scitulum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, and *Leucorrhinia pectoralis*.] Address: Juhász, P., VITUKI Rt., H-1095 Budapest, Kvassay út 1. Hungaria

13434. Kalkman, V.J.; Richards, S.J.; Polhemus, D.A. (2013): Two new species of Pyrrhargiolestes, with a key to the males (Odonata: Argiolestidae). *International Journal of Odonatology* 16(1): 53-65. (in English) ["Two new species belonging to the endemic New Guinea genus *Pyrrhargiolestes* are described from Papua New Guinea: *P. lamington* sp. nov. (holotype: Mount Lamington, Oro Province, dep. in RMNH) and *P. yela* sp. nov. (holotype: Rossel Island, Milne Bay Province, dep. in USNM). The presumed male of *P. alicus* is described for the first time. New records and remarks are provided for *P. angulatus*, *P. kula*, *P. sidonia* and *P. tenuispinus*. A key to the males of all species of *Pyrrhargiolestes*, information on habitat and a map of the known distributions are given." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

13435. Kang, S.R.; King, S.L. (2013): Seasonal comparison of aquatic macroinvertebrate assemblages in a flooded coastal freshwater marsh. *Open Journal of Ecology* 3: 94-101. (in English) [White Lake Wetlands Conservation Area (WLWCA, 29°52'N, 92°31'W) in the Chenier Plain of southwestern Louisiana, USA; "Marsh flooding and drying may be important factors affecting aquatic macroinvertebrate density and distribution in coastal freshwater marshes. Limited availability of water as a result of drying in emergent marsh may decrease density, taxonomic diversity, and taxa richness. The principal objectives of this study are to characterize the seasonal aquatic macroinvertebrate assemblage in a freshwater emergent marsh and compare aquatic macroinvertebrate species composition, density, and taxonomic diversity to that of freshwater marsh ponds. We hypothesize that 1) freshwater emergent marsh has lower seasonal density and taxonomic diversity compared to that of freshwater marsh ponds; and 2) freshwater emergent marsh has lower taxa richness than freshwater marsh ponds. Seasonal aquatic macroinvertebrate density in freshwater emergent marsh ranged from 0 organisms/m² (summer 2009) to 91.1 ± 20.53 organisms/m² (mean ± SE; spring 2009). Density in spring was higher than in all other seasons. Taxonomic diversity did not differ and there were no unique species in the freshwater emergent marsh. Our data only partially support our first hypothesis as aquatic macroinvertebrate density and taxonomic diversity between freshwater emergent marsh and ponds did not differ in spring, fall, and winter but ponds supported higher macroinvertebrate densities than freshwater emergent marsh during summer. However, our data did not support our second

hypothesis as taxa richness between freshwater emergent marsh and ponds did not statistically differ." (Authors) Data on the mean density (ind-m²) in freshwater emergent marsh by season are presented at the genus level for *Coryphaeschna*, *Enallagma*, *Ischnura*, *Erythemis*, and *Pachydiplax*] Address: Kang, S.R., School of Renewable Natural Resources, LSU AgCenter, Baton Rouge, Louisiana 70803-4301, USA. E-mail: skang1@tigers.lsu.edu

13436. Karube, H.; Suda, S., Umeda, T.; Hayashi, H. (2013): Odonata fauna of Izu Archipelago, Japan. *Tombo* 55: 99-114. (in Japanese, with English summary) ["Izu archipelago, situated south of Tokyo, consists of 9 main islands. Here we recorded 23 odonate species in total. Some of the species (*Anaciaeschna martini*, *Anax nigrofasciatus nigrofasciatus*, and *Crocothemis servilia marianae*) were recorded for the first time from the archipelago. All the islands are of volcanic origin, thus fresh water bodies are very limited, and the islands have relatively short geological histories. Therefore the archipelago has a poor odonate fauna without endemic species/subspecies. We confirmed many alien species: some of them are invasive and we consider their predation as the main cause of the extinction of *Deielia phaon*." (Authors)] Address: Karube, H., Kanagawa Prefect. Mus. Nat. Hist., 499 Iryuda, Odawara, Kanagawa, 250, Japan. E-mail: paruki@nh-kanagawa-museum.jp

13437. Kawade, S.T. (2013): Diversity and abundance of damselflies of Saikheda Water Reservoir of Yavatmal district, Maharashtra (India). *Science Park Research Journal* 1(20): 1-5. (in English) ["Saikheda water reservoir of Yavatmal district, Maharashtra (India) were studied for rainy season from June 2013 to September 2013 of two station of Saikheda dam. A total of 10 species belonging to three families of zygoptera were identified." (Author)] Address: Kawade, Sarita, Department of Zoology, S. M. College Pandharkawada, Dt., Yavatmal (M.S), India

13438. Keller, D.; Holderegger, R. (2013): Damselflies use different movement strategies for short- and long-distance dispersal. *Insect Conservation and Diversity* 6(5): 590-597. (in English) ["Dispersal is an important process for any organism, but especially for endangered species in fragmented landscapes. To enhance the dispersal of a certain species, connectivity measures are implemented, which require knowledge on the species' dispersal behaviour and habitat. It is often assumed, that the preferred reproductive habitat of a species is also used as the main dispersal habitat. Although this assumption has often been confirmed, there are also cases where it has been disproved. With a combination of a mark-resight study and genetic analysis conducted in a fragmented agricultural landscape in Switzerland, the dispersal habitats of the threatened damselfly *Coenagrion mercuriale* were analysed for different distance classes. In addition, maximum dispersal distances were estimated. The mark-resight study detected movement over short distances (=500 m) mainly within the reproductive habitat of *C.*

mercuriale (i.e. streams). In contrast, the genetic study detected both short- and long-distance dispersal. Short-distance dispersal occurred along streams, and discontinuity of streams hindered dispersal. Long-distance dispersal was suggested to happen along more or less straight lines and crossing agricultural land. Genetic analysis also showed that populations were well connected and that few individuals dispersed over larger distances (=4500 m). Our study showed that connected reproductive habitat enhanced short-distance dispersal in *C. mercuriale*. Although short-distance dispersal occurred frequently, long-distance dispersal was rare, but important to connect more isolated populations. Therefore, it would be relevant to differentiate between these two dispersal types when planning connectivity measures." (Authors)] Address: Keller, Daniela, WSL Swiss Federal Research Institute, Zürcherstr., 111, 8903 Birmensdorf, Switzerland. E-mail: daniela.keller@wsl.ch

13439. Khelifa, R.; Zebba, R.; Moussaoui, A.; Kahalerras, A.; Bensouilah, S.; Mahdjoub, H. (2013): Niche partitioning in three sympatric congeneric species of dragonfly, *Orthetrum chrysostigma*, *O. coerulescens anceps*, and *O. nitidinerve*: The importance of microhabitat. *Journal of Insect Science* 13(71): 1-17. (in English) ["Habitat heterogeneity has been shown to promote co-existence of closely related species. Based on this concept, a field study was conducted on the niche partitioning of three territorial congeneric species of skimmers (Anisoptera: Libellulidae) in Northeast Algeria during the breeding season of 2011. According to their size, there is a descending hierarchy between *O. nitidinerve*, *O. chrysostigma*, and *O. coerulescens anceps*. After being marked and surveyed, the two latter species had the same breeding behaviour sequence. Knowing that they had almost the same size, such species could not co-occur in the same habitat according to the competitive exclusion principle. The spatial distribution of the three species was investigated at two different microhabitats, and it was found that these two species were actually isolated at this scale. *O. chrysostigma* and *O. nitidinerve* preferred open areas, while *O. c. anceps* occurred in highly vegetated waters. This study highlights the role of microhabitat in community structure as an important niche axis that maintains closely related species in the same habitat." (Authors)] Address: Khelifa, R., Département d'écologie et du génie de l'environnement, Université 08 Mai 1945, Guelma 24000, Algeria. E-mail: rassimkhalifa@gmail.com

13440. Khelifa, R.; Zebba, R.; Kahalerras, A.; Laouar, A.; Mahdjoub, H.; Houhamdi, M. (2013): Description of the final instar exuvia of *Urothemis edwardsii* with reference to its emergence site selection (Odonata: Libellulidae). *Entomologia Generalis* 34(4): 303-312. (in English) ["The last instar exuviae of the critically endangered *U. edwardsii* is described and illustrated based on exuviae collected from Lake Bleu, Numidia (Northeast Algeria). The species is readily distinguishable from other local libellulids by its large size, coloration pattern, and long dorsal

spines. The presence of spiniform setae on dorsal spines 6–8 seems to be a key trait to identify the species. The dragonfly usually emerged on water lilies (*Nymphaea alba*) at about 10 cm above the water surface at water depths ranging from 50–200 cm with a marked preference to stratum between 100 and 150 cm." (Authors)] Address: Khelifa, R., Dépt de Biologie, Faculté des Sci. Biologiques et Agronomiques, Univ. de Tizi Ouzou, Tizi Ouzou 15000, Algeria. E-mail: rassimkhelifa@gmail.com

13441. Kopecky, O. (2013): Predation-induced injuries in wild populations of Alpine Newt . *Pakistan J. Zool.* 45(2): 417-422. (in English) ["Animal species not at the top of the food pyramid, including most amphibians, are exposed to predation. To date, the frequency and types of injuries observed in European newts have not been analyzed. This article presents a study of this phenomenon conducted during 2007–2009 at three localities in the Czech Republic. Of 549 captured individuals, 9.3% had been injured. Wounds were found primarily to the tail (78.4% of injured newts) and to extremities in the form of missing toes (19.6%). Other types of wounds or their combinations occurred only exceptionally. The presence of injuries differed among localities, but was not affected by body length or sex. The complex life cycle and regenerative abilities of newts complicate drawing conclusions as to the ecological background of injury frequency. Therefore, future studies focused on this topic should utilize experimental approaches." (Author) Larvae of the genera *Libellula* and *Aeshna* are discussed in the framework of potential predator of newts.] Address: Kopecký, O., Department of Zoology and Fisheries, Faculty of Agrobiological, Food and Natural Resources, Czech University of Life Sciences Prague, Kamýcká 957, Prague 6 – Suchbátka 165 21, Czech Republic

13442. Korkeamäki, E. (2013): Elinympäristön perustaminen täplälampikorennolle (*Leucorrhinia pectoralis*) [Establishing habitats for Yellow-spotted Whiteface (*Leucorrhinia pectoralis*)]. *Crenata* 6: 22-25. (in Finnish, with English summary) ["This article examines the factors that effect the colonisation of Odonata in new habitats, especially newly formed wetland pools. Wetland pools were dug in Lintulahdet Life project to the shore areas to provide a suitable living environment for dragonflies. The special target species was *Leucorrhinia pectoralis*. The persistence of Odonata populations was studied by monitoring of larvae, exuviae and adults. The monitoring showed that *L. pectoralis* and many other dragonfly species inhabited the newly formed pools. By controlling the shadowing reed beds it was possible to increase the breeding success of Odonata populations." (Author)] Address: Korkeamäki, E., Karkunkatu 18 a 4 b, FIN-48600 Karhula, Finland

13443. Korkeamäki, E. (2013): Siberian Hawker (*Aeshna crenata*) in the Salpausselkä Ridge area. *Kymijoen vesi ja ympäristö ry:n tutkimusraportti no 217/2013*: 11 pp, app.. (in Finnish, with English summary) ["*A. crenata*,

is an impressive, but rare, localized and poorly known species in Europe. A total of 44 small ponds and lakes, situated within the Salpausselkä Ridge, north of Kouvola city in south-eastern Finland, were surveyed for populations of *A. crenata* during the summer period 2011-2012. Adults and exuviae were searched for in sunny weather. Altogether, 29 odonate species recorded in these 44 ponds. *Aeshna crenata* was found in 21 ponds and it seems to have rather specialized habitat requirements in the study area. It occurs mainly in small, circular and oligotrophic ponds with slightly swampy shoreline. These ponds – ‘suppa pits’ – are typical glacial age formations in the Salpausselkä Ridge and influenced by clear groundwater. Sex ratio is also checked with *Aeshna* –exuviae and the majority members were females. Potential threats by the human activity to the populations of *A. crenata* is also discussed." (Author)] Address: Korkeamäki, E., Karkunkatu 18 a 4 b, FIN-48600 Karhula, Finland

13444. Korte, T.; Eberhard, T. (2013): Was lebt im Lämpkes Mühlenbach? Die Entwicklung der wirbellosen Kleintiere (Makrozoobenthos) nach der naturnahen Umgestaltung des Lämpkes Mühlenbaches. *Jahresberichte der Biologischen Station Westliches Ruhrgebiet e. V.* 10 (2013): 29-32. (in German) [Nordrhein-Westfalen, Germany; only *Aeshna cyanea* is listed. In spite the fact the renaturation of the book is assessed as successful, even 17 year after the measurements, no rheophilous Odonata have colonised the brook.] Address: Korte, T., Emschergenossenschaft/Lippeverband, Geschäftsbereich Technische Services, Kooperationslabor mit dem Ruhrverband, Kronprinzenstraße 37, 45128 Essen, Germany. E-Mail: korte.thomas@eglv.de

13445. Kosterin, O.E. (2013): *Somatochlora arctica* (Zett.) Seems to migrate to escape from wildfires (Anisoptera: Corduliidae). *Notulae Odonatologicae* 8(2): 35-36. (in English) ["*S. arctica* is known from the Novosibirsk province, Russia, only by scarce records from small forest lakes in the districts of Bolotnoe and Moshkovo, situated N of Novosibirsk (KOSTERIN et al., 2001, *Sympetrum*, Hyogo 7/8: 24-49). In the Bakchar district (Tomsk prov.), some 200 km N of Novosibirsk, it appears as one of the most abundant dragonfly species (BERNARD & KOSTERIN, 2010, *Odonatologica* 39: 1-28): during 12-22 July 2006 the foraging swarms were found above any dry open area, although the abundance of these drastically decreased after the 14th of July. The breeding sites were not found, they are probably located in the inaccessible mesotrophic fens, overgrown with sedge amidst vast *Sphagnum* bogs. In 2012, five dead *S. arctica* specimens were collected in Novosibirsk Academy Town, ca 30 km S of downtown Novosibirsk (and ca 50 km S of the Moshkovo district border), obviously crashed by traffic while foraging along and above the asphalt-paved roads. In four specimens the wings were clear and in one male moderately smoked (they are frequently smoked in specimens from Tomsk province). During some 30 years of more or less regular observations in Academy Town, the

species has never been encountered there. The environmental conditions prevailing at the time the above specimens were found were exceptional: July had been very hot and smog of various intensities occurred in the province of Novosibirsk almost every day, with the hot air poorly transparent, smelling smoke. The sun could be watched by naked eye: as a red spot with sharp margins against a white sky. This was due to the forest fires, occupying vast areas of Siberia, in particular that part of Tomsk province, situated N of Novosibirsk province, which seemed to be a *S. arctica* paradise (see above). "The summer of 2012 has proved to be the most severe wildfire season Russia has faced in a decade. [...] More than 17,000 wildfires had burnt more than 30 million hectares (74 million acres) through August 2012, according to researchers at the Sukachev Institute of Forest in Russian Academy of Sciences." (<http://www.nasa.gov/misionpages/fires/main/world/20120913-siberia.html>). We assume, *S. arctica* escaped the fires in its native area by long migration. An alternative option would be a mass propagation, triggering the individuals to expand by plain diffusion, resulting in their noticeable numbers far from that area. This seems less likely as it would imply two independent anomalies: fires and mass propagation. High temperatures could favour the propagation, but they could have no effect if taking place after the emergence of the adults, as was the case in the summer of 2012." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

13446. Kulić, L.; Erić, K.; Gajić, M. (2013): *Cordulegaster insignis* Schneider, 1845 (Odonata: Cordulegastridae) the first record from Serbia over a century later. *Bulletin of the Natural History Museum* 6: 65-69. (in English, with Serbian summary) [middle course of the Sokobanjska Moravica, 5-VI-2011, female] Address: Kulić, Lena, Društvo odonatologa Srbije, 11000 Belgrade, Serbia. E-mail: lekilecko@gmail.com

13447. Kulijer, D.; Topić, G. (2013): First record of a Balkan population of *Ceriatrigon tenellum* outside the influence of the Mediterranean climate (Odonata: Coenagrionidae). *Libellula* 32(3/4): 193-204. (in English, with German summary) ["*C. tenellum* is rare in the Balkan Peninsula and has hitherto been known as restricted only to the areas under the influence of the Mediterranean climate. On 21 July 2011 and on 3 June 2012 the species was found at the small Dol Lake in the valley of Pliva River, central Bosnia and Herzegovina. Altogether 14 dragonfly species could be observed at the site. This is the first finding of a population of *C. tenellum* in the Danube catchment and in the area outside the Mediterranean region of the Balkans. All known records from the eastern Adriatic were gathered and the distribution of the species in the Adriatic region is outlined. In Bosnia and Herzegovina *C. tenellum* is found at seven localities. The species prefers habitats with rich and diverse water

vegetation and the presence of flowing water. This finding is discussed in relation to the distribution and the habitats of the species in the East Adriatic and Europe. A short discussion on the threats and the conservation status in the Balkan region is appended." (Authors)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: dejan.kulijer@gmail.com

13448. Kumon, Y.; Otsuka, M. (2013): Development of Sirocco fan featuring dragonfly wing. *Transactions of The Japan Institute of Electronics Packaging* 6(1): 24-31. (in English) ["We have developed high-performance electric fans by applying features of the wings of living creatures. This paper proposes an air purifier sirocco fan blade that mimics the wings of a dragonfly. Air quality has increasingly attracted attention in Japanese homes, and one or more air purifiers are installed in almost 40% of all houses in the country. The purpose of an air purifier is to maintain air cleanness, and it is operated overnight. There is, however, the problem of the loud noise created by the fan, which also makes overnight operation inconvenient. To solve this problem, we adopted the shape of the dragonfly wing in the sirocco fan blade of an air purifier. As a result, a maximum reduction of 2.5 dB was achieved." (Authors)] Address: Kumon, Yui, Development Dept., Health & Environmental Systems Group, Sharp Corporation, 3-1-72, Kitakamei-Cho, Yao-Shi, Osaka 581-8585, Japan

13449. Liang, Z. (2013): Computational analysis of vortex structures in flapping flight. PhD thesis, Wright State University: XVIII + 210 pp. ["Vortex structures and vortical formation in flapping flight are directly related to the force production. To analyze the connection between vortex structures and aerodynamic performance of flapping flight, we have developed highly efficient algorithms for large-scale flow simulations with moving and deforming bodies. To further understand the underlying mechanisms of force generation caused by the coherent structures of the vortex formation, a new analysis method has been developed to measure the influence of Proper Orthogonal Decomposition (POD) modes on aerodynamic forces. It is challenging to finish three-dimensional Direct Numerical Simulations (DNS) of insect flight in a limited amount of time. In the current work, the Modified Strongly Implicit Procedure (MSIP) has been implemented into an existing Computational Fluid Dynamics (CFD) solver, as a smoother for the multigrid method to solve the pressure equation and an iterative method to solve the momentum equation. The new solver is capable of performing a 17-million-mesh simulation within 10 days on a single core of an Intel i5-3570 chip at 3.4GHz, nearly 10 times faster than the traditional Line-SOR solver. Based on this numerical tool, the free flight of a dragonfly for eight-and-a-half wing beats is studied in detail. The results show that the dragonfly has experienced two flight stages during the flight. In a maneuver stage, wing-wake interaction generated by the fore- and hindwings attenuates the total force by 8% (peak value). In contrast, in an escape

stage, the fore- and hindwings collaborate to generate force which is 8% larger than when they flap separately. Especially, the peak force on the forewing is significantly increased by 42% in a downstroke and this enhancement is known to associate with a distorted trailing edge vortex, as demonstrated by a theoretical model based on wake survey methods. The movement of the trailing edge vortex is a response to the motion of the hindwing. When the fore- and hindwings flap closely with only a short distance existing between them, the hindwing exerts a wall effect to the trailing edge vortex. Vortex formation of flapping flight and force generation are considered to be closely linked; however, it is difficult to accurately determine the influence of an individual vortex on the overall aerodynamic performance. Here, as an alternative, we examine the influence of coherent structures, which are thought as special types of vortices in terms of kinetic energy. First, wake structures are decomposed by the POD method and the most energetic vortices are extracted. Then, a pressure corrected POD Reduced-Order Models (ROM) method is used to verify that the POD modes can capture the dynamics of the flows. Finally, the force of POD modes is quantified by a new method, termed the POD mode Force Survey Method (POD-FSM). The process is applied to investigate the flow field generated by a two- or three-dimensional plate undergoing a pitching-plunging motion. Superposition of force of the POD modes shows a good agreement with the DNS result. In addition, it is found that some POD modes have zero lift, and some have zero thrust. These force behaviours are related to symmetry of POD mode. According to the symmetry or antisymmetry about the streamwise line (or the crossflow plane in three-dimension), the POD modes can be qualitatively grouped into two sets. Combining POD modes in the same set can help to decompose the flow into thrust- and lift-producing flows. It is found that the force acting on the plate is a linear combination of the force of the thrust- and lift-producing flows and their interactions. Because two flows have different frequency spectrum, it is possible to perform flow control with respect to frequency to achieve the desired aerodynamic performance." (Author)] Address: not stated.

13450. Lingenfelder, U. (2013): Die Libellen der Queichniederung (Insecta: Odonata). Fauna Flora Rheinland-Pfalz 12(3): 921-998. (in German, with English and French summaries) ["The article gives an overview of the dragonfly fauna of Queichniederung and summarizes the results of the mapping of dragonflies in 2006 within the Natura 2000 sites „Bellheimer Wald mit Queichtal“ and „Offenbacher Wald, Bellheimer Wald und Queichwiesen“ including supplementary examinations. In the alluvium of the river Queich, a total of 51 dragonfly species could be detected between the years 1954 to 2012. During the field-mapping in 2006, the occurrence of species was documented in permanently water-bearing streaming waters, temporary water-bearing irrigation ditches, flood meadows and some standing waters. The focus of the investigation was on the systematic mapping of the dis-

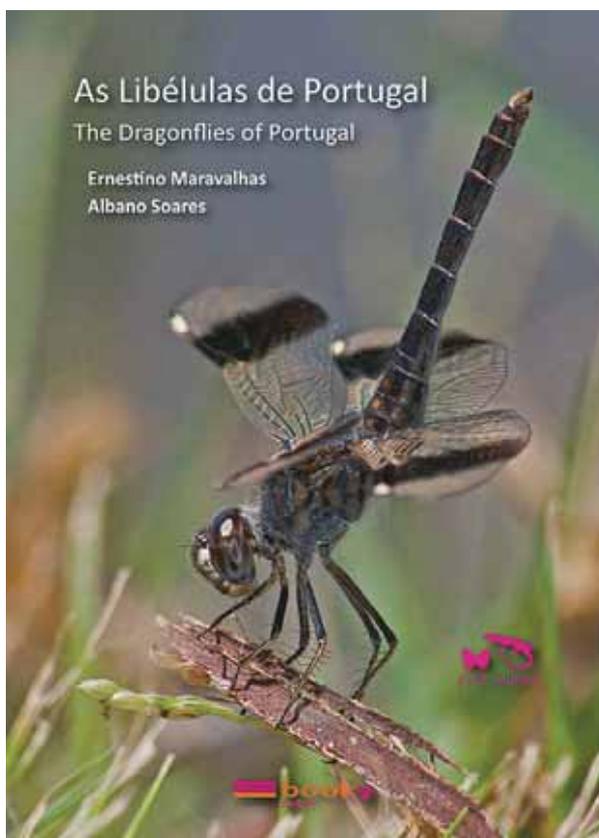
tribution of the Habitats Directive species *Coenagrion mercuriale* and *Ophiogomphus cecilia*. Together with complementary acquisitions from previous years (1999, 2004, 2005) and from the year 2010 there were 33 species detected at 32 studied watersites with a total of 109 sample sites." (Author)] Address: Lingenfelder, U., Seeburgstr. 1, 67716 Heltersberg, Germany. E-Mail: u.lingenfelder@vr-web.de

13451. Lökkös A.; Kondorosy, E.; Cser, B.; Szivák, I. (2013): Contributions to the aquatic macroinvertebrate fauna of the Koppány stream. *Natura Somogyiensis* 23: 153-158. (in Hungarian, with English summary) [The Koppány stream is a lowland stream in southwestern Hungary. The aquatic macroinvertebrate fauna of the Koppány stream is poorly known. During the collections in 2010 71 aquatic macroinvertebrate species were collected. The list of Odonata includes *Platycnemis pennipes*, *Ischnura elegans pontica*, *Calopteryx splendens*, *Anax imperator*, *Sympetrum striolatum*, and *S. vulgatum*.] Address: Lökkös A, Balaton-felvidéki Nemzeti Park Igazgatóság, H-8903 Zalaegerszeg, Pf. 37, Hungary. E-mail: a.lokkos@gmail.com

13452. Loomis, D. (2013): Reproductive success and foraging ecology of the rusty blackbird on the Copper River Delta, Alaska. M.Sc. thesis, Oregon State University: 84 pp. (in English) ["The Rusty Blackbird (*Euphagus carolinus*) has suffered significant population declines across its entire geographic range and the mechanisms associated with this decline are poorly understood. Although much of the Rusty Blackbird breeding habitat in Alaska has remained relatively unaltered by anthropogenic activities, this species continues to decline by an estimated 5% annually. As part of a collaborative effort to obtain data on the reproductive ecology, breeding success, and habitat requirements of this species throughout their range, a total of 42 nests were found and monitored for two consecutive breeding seasons (2009 – 2010) on the Copper River Delta in south-central Alaska. Nests were monitored every 2-4 days to calculate nest success, survival rates, clutch initiation date, clutch size, egg viability, and fledging rates. In 2010, chick provisioning rates, chick diet, and aquatic invertebrate availability in Rusty Blackbird foraging habitats were also investigated. Mean clutch size ranged from 5 to 7 eggs both years (2009 = 5.41 ± 0.15 , 2010 = 5.67 ± 0.13). Daily nest survival rate averaged over both seasons was high, at 0.9913 ± 0.0043 (95% CI 0.9772-0.9967) and most eggs were viable (N = 31 nests), with 0.8922 ± 0.0275 of eggs over both seasons hatching. Approximately 85% of clutches were initiated within a two week period for both years of the study. Clutch-initiation date (CID) was significantly different between years (p -value < 0.0001), with mean CID of 10 May ($\bar{x} = 10.476 \pm 0.95$) in 2010 and May 18 ($\bar{x} = 18.421 \pm 1.13$) in 2009. The mean provisioning rate was 0.84 (± 0.06 ; 95% CI: 0.72 to 0.95) invertebrate food items per chick per hour. Large odonate nymphs, specifically dragonflies, made up the bulk

(97.2%) of the observed food items provisioned to chicks. Weekly pond sampling revealed four taxonomic groups of invertebrates that were of the size observed provisioned to chicks (Coleoptera, Hirudinea, Zygoptera, Anisoptera) and Anisoptera were among the rarest collected (16.2%) of this size. Although the least common large invertebrate collected, Anisoptera nymphs were present in all weekly samples. The week with the most abundant Anisoptera collection coincided with the week of peak hatching during 2010 of the study. Thus, availability of dragonfly nymphs appear to be important to Rusty Blackbird reproductive success on the Copper River Delta and may have contributed to the high nest success observed in this study." (Author)] Address: not stated

13453. Machado, A.B.M. (2013): *Philogenia nemesioi*, a new damselfly from Peru (Odonata, Megapodagrionidae). *Revista Brasileira de Entomologia* 57(4): 365-366. ["*Philogenia nemesioi* sp. nov. is described and illustrated based on one male specimen collected on forests of the eastern slope of the Peruvian Andes at 900 m. It belongs to the cristalina group, but differs from other species of the group by the structure of the anal appendage." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Caixa Postal 486, Belo Horizonte-MG, Brasil. angelo@icb.ufmg.br



13454. Maravalhas, E.; Soares, A. (2013): *As Libélulas de Portugal - The Dragonflies of Portugal*. Booky Publisher, 04.2013: 329 pp. (in bilingual in Portuguese and English) ["This is the first book to cover the dragonflies of

Portugal. It provides a comprehensive identification guide to the 67 recorded species. For each species there is a concise text, a map and photos of living specimens in their natural environment as well as numerous photos of details to aid identification. Illustrated throughout in colour with over 600 high quality photographs. Distribution maps to all species." (Publisher)] Address: not stated

13455. Marinov, M.; Pikacha, P. (2013): On a dragonfly collection from the Solomon Islands with overview of fauna from this Pacific archipelago (Insecta: Odonata). *Faunistic Studies in South-East Asian and Pacific Island Odonata* 4: 1-48. (in English, with Toksave summary) ["Odonata fauna of the Solomon Islands (considered in its political rather than geographical borders) is revised following a recent collecting trip to Guadalcanal Island in April 2012. Some important taxonomic considerations are discussed and a complete literature review is provided for the country with an updated checklist of 64 species that is in accordance with the latest taxonomic studies on the group from that part of the world. The collection reported here was carried out on two and a half effective field days and resulted in a total of 30 taxa. Two of them (*Agyrtacantha browni* and *Gynacantha amphora*) are new to science and already described elsewhere and three others (*Lestes concinnus*, *Lathrecista asiatica festa* and *Rhyothemis resplendens*) are new to the country. A female of *Pseudagrion incisurum* is described for the first time and another female (*Rhinocypha liberata*) will be described later." (Authors)] Address: Pikacha, P., Solomon Islands Community Conservation Partnership, P.O. Box 2378, Honiara, Solomon Islands. E-mail: patrick.pikacha@gmail.com

13456. Márquez-Rodríguez, J.; Ferreras-Romero, M. (2013): Primera cita de *Coenagrion caerulescens* (Fonscolombe, 1838) (Odonata, Coenagrionidae) en la provincia de Sevilla (España). *Boletín de la Asociación española de Entomología* 37(3-4): 359-361. (in Spanish) [First record of *C. caerulescens* in the Seville province (Spain): 20-VII-2013, a las 15:30 h (13:30 GMT), river Salado near the town of Osuna (37°13'N, 05°04'W; 260 m a.s.l.)] Address: Márquez-Rodríguez, J., Departamento de Sistemas Físicos, Químicos y Naturales, Universidad Pablo de Olavide, A-376, km 1, ES-41013 Sevilla, Spain. E-mail: jmarrod1@admon.upo.es

13457. Márquez-Rodríguez, J.; Ferreras-Romero, M. (2013): *Orthetrum nitidinerve* in the southern Iberian Peninsula: Two breeding populations in the Seville Province (Odonata: Libellulidae). *Libellula* 32(3/4): 141-149. (in English, with Spanish and German summaries) ["In late June and early September 2013, more than 170 years after the first record of *O. nitidinerve* in the Iberian Peninsula, the reproduction of this species in Spain was confirmed for the first time by the capture of teneral individuals. The records were taken at two small streams in the Seville province. Phenology observations and reproductive behaviour are commented upon." (Authors)] Ad-

dress: Joaquín Márquez-Rodríguez, J., Departamento de Sistemas Físicos, Químicos y Naturales, Universidad Pablo de Olavide, A-376, km 1, ES-41013 Sevilla. E-mail: jmarrod1@admon.upo.es

13458. Márquez-Rodríguez, J. (2013): Seguimiento en el comportamiento y proceso de colonización atlántica de *Trithemis kirbyi* Selys, 1891 (Odonata: Libellulidae) en la Península Ibérica. *Revista gaditana de Entomología* 4(1): 159-167. (in Spanish, with English summary) ["Since the first observation of the African species *T. kirbyi* in southern Iberian Peninsula, the new records were mainly concentrated in different Spanish provinces of East, due to its rapid expansion through the Mediterranean coast. The biology, behaviour and dispersal capacity in mainland Europe, were almost unknown since its detection in 2007. From spring 2012 through autumn 2013, we have visited several locations in the southwest of Spain and southeastern Portugal, recording their Odonata fauna. Among them, Corumbel (La Palma del Condado - Huelva) was visited in late spring and early autumn, confirming its presence in reservoirs. The existence of favourable environmental characteristics vital to the development of this thermophilic species, and the monitoring of a stable population located in the province of Seville, confirm a flight period of eight months (from mid-April to end of November)."] (Author)] Address: Márquez-Rodríguez, J., Dept de Sistemas Físicos, Químicos y Naturales (Zoología), Universidad Pablo de Olavide, A-376 km 1, 41013 Sevilla, Spain. E-mail: jmarrod1@admon.upo.es

13459. Mary, R. (2013): Ecology and predatory efficiency of aquatic (Odonate) insect over the developmental stages of mosquitoes (Diptera: Culicidae). *Journal of Academia and Industrial Research* 2(7): 429-436. (in English) ["Mosquitoes of the genera *Aedes*, *Anopheles* and *Culex* are considered relatively dangerous among the individuals of family Culicidae, because they cause significant public health threat all over the world. Predatory efficiency of the confirmed predators (Odonata: Aeshnidae) by in vitro experiments on the developmental stages of the mosquitoes namely, *Aedes aegypti*, *Anopheles stephensi* and *Culex quinquefasciatus* with reference to the duration of the prey availability, changes in the relative preference or selectivity of predators over the mosquito larvae at different stages (I, II, III and IV instars larvae and pupae) of development, changes in the relative consumption rate of the predators with reference to the species of mosquitoes, attack rate and success rate of the predators on the larval mosquitoes were investigated. Seasonal (month-wise) dynamics of each of the selected predators in some familiar freshwater bodies in Coimbatore, for two consecutive years i.e. from January 2009 to December 2011, relationship (correlation), if any, between physico-chemical parameters of the water and the abundance of the predators in the water bodies and the range of co-efficient of association, between and among the different species of the predators were also investigated. Relative incidence of larval mosquitoes of genera

Aedes, *Anopheles* and *Culex* in the selected water bodies and the range of co-efficient of association between the predator and prey were also investigated. The results of the predatory capacity of *Anax* nymph on the larvae and pupae of the mosquitoes for 24 h and 1 h of dragonfly showed the highest predation rate against I instar larvae of the mosquito compared to that of the capacity of other predators tested in the present study. Total consumption rate of 7 predatory individuals towards I instar of *C. quinquefasciatus* was 50 out of 700 i.e. 72% was fed in 24 h." (Author)] Address: Mary, Rosaline, Dept. of Zoology, Nirmala College for Women (Autonomous), Coimbatore, India. E-mail: elangorosi@yahoo.in

13460. McCauley, S.J. (2013): Relationship between morphology, dispersal and habitat distribution in three species of *Libellula* (Odonata: Anisoptera). *Aquatic Insects* 34(3-4): 195-204. (in English) ["Morphology is an important determinant of flight performance and can shape species' dispersal behaviour. This study contrasted the morphology of flight-related structures in dragonfly species with different dispersal behaviours to gain insights into the relationship between morphology and dispersal behaviour. Specifically, wing size, wing shape and thorax size were compared in three co-occurring species from different clades within the genus *Libellula* to assess how these morphological traits are related to differences in dispersal behaviour and to how broadly their larvae occur across a habitat gradient. Two species had broad larval habitat distributions as well as high rates and distances of dispersal. These two species had relatively larger wings and thoraces than the third species, which was found only in permanent lakes and had limited dispersal. The hind-wings of more dispersive species also had lower aspect ratios and a relatively wider basal portion of the wing than the less dispersive species. Broad hind-wings may facilitate the use of gliding flight and reduce the energetic costs of dispersal. Determining the morphological traits associated with alternative dispersal behaviours may be a useful tool to assess the differential dispersal capacities of species or populations."] (Author)] Address: McCauley, S.J., Department of Biology, University of Toronto Mississauga, 3359 Mississauga Rd, Mississauga, ON L5L 1C6, Canada

13461. Mediani, M.; Boudot, J.P.; Benazzouz, B.; El Bella, T. (2013): Two dragonfly species (Insecta: Odonata) migrating at Dakhla (region of Oued Ad-Dahab Lagouira, Morocco). *International Journal of Odonatology* 15(4): 293-298. (in English) ["Large numbers of migrating imagoes of *Anax ephippiger* were observed from the end of January to March 2012 at Dakhla Bay, Southern Morocco, in an area where long-lasting fresh and brackish waters are lacking, and thus which is unfavourable for the reproduction of Odonata. This supports well the classical scheme of northward mass migration of the species along the Atlantic coast of Africa, induced by autumnal mass emergences in the Sahel as a result of the summer African monsoon. Small numbers of *Sympetrum fonsco-*

lombii were previously temporarily recorded from the same area in July 2011. They were probably nomadic individuals of which the origin could not be verified, but which could have been involved in long distance vagrancy, typical of the species, due to the scarcity of fresh and brackish water in the area." (Authors)] Address: Mediani, M., Laboratoire de Diversité et Conservation des Systèmes Biologiques, Faculté des Sciences, Département de Biologie, Université Abdelmalek Essaâdi-Tétouan, Morocco. E-mail: mediamed05@yahoo.fr

13462. Molineri, C.; Rodríguez, J.S. (2013): Description of the larva of *Argia jujuya* Ris (Coenagrionidae) with a key to species from the Argentinean Yungas cloud forest. *International Journal of Odonatology* 16(4): 301-307. (in English) ["The previously unknown larva of *Argia jujuya* Ris, 1913 is described, diagnosed and illustrated. Among other characters, the following combination is important to distinguish it from other species in the genus: antennae with six concolorous segments, ligula projected only slightly, row of small premental setae present, abdominal sternum 8 almost entirely covered with spiniform setae, gonapophyses with pointed apices slightly diverging distally, cercus triangular, caudal lamellae subequal in length and triquetral along entire length, with fringe of stout setae along entire dorsal and ventral margins. Larvae were collected in very small and thickly vegetated streams, with low water current. A key for the three species known as larvae in NW Argentina is presented." (Authors)] Address: Molineri, C., Instituto de Biodiversidad Neotropical, CONICET (Argentine Council of Scientific Research), Facultad de Ciencias Naturales e IML, Universidad Nacional de Tucuman, M. Lillo 205, 4000, San Miguel de Tucuman, Argentina. E-mail: carlosmolineri@gmail.com

13463. Moroz, M.D. (2013): Aquatic insects of cross-border water currents between Belarus and Ukraine. *Entomological Review* 93(7): 874-886. (in English) ["224 species of aquatic insects from 9 orders were found in cross-border water currents between Belarus and Ukraine: Collembola—4, Plecoptera—3, Ephemeroptera—25, Odonata—33, Trichoptera—47, Megaloptera—1, Heteroptera—19, Coleoptera—88, Lepidoptera—4 species. The fauna of aquatic insects is rich and includes a number of species rare in Belarus and Europe." (Author) Original Russian Text © M.D. Moroz, 2013, published in *Entomologicheskoe Obozrenie*, 2013, Vol. 92, No. 2, pp. 303–318. *Calopteryx splendens*] Address: Moroz, M.D., Scientific and Practical Center for Biore-sources, Academy of Sciences of Belarus, Minsk, Republic of Belarus. E-mail: mdmoroz@bk.ru

13464. Naraoka, H. (2013): Diurnal activity and reproductive behavior of *Indolestes peregrinus* (Ris, 1916) (Lestidae: Odonata). *Tombo* 55: 91-98. (in Japanese, with English summary) ["The diurnal activity and the reproductive behaviour of *I. peregrinus* are described based on observations at Aomori prefecture, northern Japan, in

2008-2012 and briefly compared with those of other zygopteran species. In their diurnal activity, males were found at a rice field, pond and barrage of the reproductive site between 8:00 am and 5:00 pm above 17-18°C air temperature. They were active in the morning, but in contrast spent most time inactively perched after 11:00 am. They rested on trees at the night. On the other hand, single females, except when in tandem with males, were rarely seen at the reproductive site. Copulation and oviposition were observed between 8:00 am and 6:00 pm on warmer day but was suppressed on cloudy and cooler days. When a pair did not complete oviposition before night fall, they again started to oviposit the next day as the same couple, after resting for the night. The duration of intra-male sperm translocation was significantly and negatively correlated with air temperature. The duration of copulation was significantly and negatively correlated with the time of copulation onset. Copulation was divided into 3 stages. Stage I was characterized by the pumping movement of the male's abdomen with several breaks in copulation. Stage II was, shorter than the other stages, with a few quick pumping. Stage III was divided into two substages III-A and III-B, the former of which are almost inactive, but the latter showed active pumping. The female oviposited on the aerial stems or leaves of emergent plants, but never into the water. She usually did so in tandem linkage with the male, rarely singly." (Author)] Address: Naraoka, H., 36-71 Motoizumi, Fukunoda, Itayanagi-machi, Kita-gun, Aomori, 038-3661, Japan

13465. Neveu, G.; Hubert, A. (2013): Sites d'émergence d'*Oxygastra curtisii* dans le département de la Somme (Odonata: Corduliidae). *Martinia* 29(2): 79-85. (in French, with English summary) ["*O. curtisii* is a species of Western Europe and northern Africa, which is not present in the French departments bordering the northern Channel and the North Sea. In the Somme department, the species was recorded for the first time in 1997 and seems to be permanently established and to extend increasingly in the Somme valley since that time. The first exuviae were observed in 2005 and were discovered around a standing water habitat. Although already known, this is quite atypical but new observations have been made regularly since then. The species does not yet extend to neighbouring departments. However, a first data was reported in the Pas-de-Calais department in 2012." (Author)] Address: Neveu, G., 22 rue de Sailly le sec, F-80800 Sailly Laurette, France. E-mail: gilles.neveu@orange.fr

13466. Ngiam, R.W.N.; Dow, R.A. (2013): The larva of *Leptogomphus risi* Laidlaw from Singapore with a comparison to *Leptogomphus williamsoni* Laidlaw from Sarawak and congeners (Odonata: Anisoptera: Gomphidae). *Nature in Singapore* 6: 307-312. (in English) ["The final instar larva of *Leptogomphus risi* Laidlaw is described and illustrated for the first time based on an exuvia collected from Singapore. A comparison of this larva with known larvae of congeners is discussed, including a first description of the larva of *Leptogomphus williamsoni*

Laidlaw from Sarawak." (Authors)] Address: Ngiam, R.W.N, National Biodiversity Centre, National Parks Board 1 Cluny Road, Singapore 259569, Republic of Singapore. E-mail: ngiamwenjiang@nparks.gov.sg

13467. Novelli, I.A.; Gomides, S.C.; Singer Brugiolo, S.S.; de Sousa, B.A.1 (2013): Alimentary habits of *Hydromedusa maximiliani* (Mikan, 1820) (Testudines, Chelidae) and its relation to prey availability in the environment. *Herpetology Notes* 6: 503-511. (in English) ["*Hydromedusa maximiliani* is endemic to mountainous regions, with distribution in the Atlantic Forest region along mountain ranges in Southeastern and part of northeastern Brazil. This work aimed at studying the feeding habits of a *H. maximiliani* population from Minas Gerais state, Southeastern Brazil. Specimens were captured, marked, measured and submitted to stomach washing. Pitfall traps were used to capture prey in terrestrial environments, and nets were used to collect macroinvertebrates in the aquatic environment. We captured and recaptured a total of 33 individuals. From 16 samples of stomach content, we recorded aquatic insect larvae, crabs, and terrestrial invertebrates. In total, 16 categories of prey items were identified. These belonged to 16 orders and 70 families of Insecta (including Odonata), 3 families of Diplopoda, 2 families of Crustacea, and 13 families of Arachnida. Lepidoptera, Baetidae and Diplopoda reached maximum electivity. The most representative group in the diet was Insecta, especially those with aquatic larval phase. The information obtained in this study about the diet of *H. maximiliani* indicates this vertebrate as a potential predator for regulating the density of benthic macroinvertebrates, and our data corroborate other studies which also showed the importance of *H. maximiliani* as a predator essential to aquatic food web dynamics. These data will be useful in future studies dealing with the bio-monitoring of *H. maximiliani*, and contributing to its preservation as well as to the preservation of habitats where this species lives." (Authors)] Address: Novelli, Iara, Programa de Pós-graduação em Comportamento e Biologia Animal, Dept de Zoologia – ICB, Univ. Federal de Juiz de Fora, Rua José Lourenço Kelmer, s/n - Campus Universitário, Bairro São Pedro - CEP: 36036-900 - Juiz de Fora, Minas Gerais, Brazil. E-mail: iaranovelli27@gmail.com

13468. Novelo-Gutiérrez, R. (2013): Description of the larva of *Argia chelata* Calvert, 1902 (Odonata: Coenagrionidae). *Zootaxa* 3745(4): 479-485. (in English, with Spanish summary) ["The larva of *A. chelata* is described and figured. It falls into the group of *Argia* larvae with a moderately prominent ligula and two palpal seta, but it differs from its closest relatives by having labial palp with 2 setae plus one basal setella; the length of the ligula is 30% of its maximum width; basal tergites (1–5) lacking long, fine setae, mainly on midline; S8–10 mostly dark brown; paraprocts with spiniform setae on basal 0.25 and 0.55 of dorsal and ventral borders, respectively. Larvae were found in 2nd to 4th order shallow streams in cloud forest, crawling among debris, fine sand and mud where the wa-

ter flow is slow or still, close to the shoreline. The larva is compared with *A. lacrimans* (Hagen), *A. pima* Garrison, and *A. tonto* Calvert, species apparently closely related." (Author)] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A.C. Red de Biodiversidad y Sistemática. Carretera Antigua a Coatepec # 351, El Haya, 91070 Xalapa, Veracruz, México. E-mail: rodolfo.novelo@inecol.mx

13469. Novelo-Gutiérrez, R.; Gomez-Anaya, J.A. (2013): Listado preliminar de los odonatos (Insecta: Odonata) del estado de Guanajuato, México. *Dugesiana* 20(2): 85-88. (in Spanish) [Preliminary checklist of Odonata from Guanajuato, México] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A.C. Red de Biodiversidad y Sistemática. Carretera Antigua a Coatepec # 351, El Haya, 91070 Xalapa, Veracruz, México. E-mail: rodolfo.novelo@inecol.mx

13470. Obolewski, K. (2013): Use of macrozoobenthos for biological assessment of water quality in oxbow lakes of varying hydrological connectivity to the main river channel in the example of Łyna River valley. *Ochrona Środowiska* 35(2): 19-26. (in Polish, with English summary) ["This study presents influence of hydrological connectivity between oxbow lakes and the river on water quality determined based on the structure of aquatic invertebrate communities in oxbow lakes. Five oxbow lakes of the Łyna River were investigated, i.e. two lotic, two semilotic and one lentic ecosystem. It was shown that Chaoboridae (Diptera), Oligochaeta and Hydrobiidae (Gastropoda) were the most abundant groups of invertebrates, often accompanied by Chironomidae larvae (Diptera). Ephemeroptera and Trichoptera were the only invertebrate bioindicators observed in the studied water bodies. The EPT% index, determined based on their abundance, as well as EPT:C, determined based on their proportion to Chironomidae, indicated that groups of these organisms sensitive to environmental conditions occurred at low abundance in all hydrological types of oxbow lakes. Family Biotic Index (FBI), Biological Monitoring Working Party index (BMWP-PL) and Average Score per Taxon (ASPT), both adapted to the Polish conditions, revealed low water quality regardless of the degree of hydrological connectivity. This study shows that the structure of invertebrate communities inhabiting oxbow lakes can be a source of valuable monitoring data. BMWP-PL seems to be the most objective among the biotic indices. Hence, it can be applied in biomonitoring research of many types of aquatic ecosystems." (Authors) The list of taxa includes 'Lestidae' and 'Corduliidae'.] Address: Obolewski, K., Akademia Pomorska w Słupsku, Wydział Matematyczno-Przyrodniczy, Zakład Ekologii, ul. Krzysztofa Arciszewskiego 22b, 76-200 Słupsk, Poland. E-mail: obolewsk@apsl.edu.pl

13471. Orlofske, J.M.; Baird, D.J. (2013): The tiny mayfly in the room: implications of size-dependent invertebrate taxonomic identification for biomonitoring data properties. *Aquatic Ecology* 47(4): 481-494. (in English) ["The appropriate level of taxonomic identification, taxonomic suf-

iciency, for biomonitoring purposes continues to be controversial. Taxonomic sufficiency, however, fails to address the bias created by size-dependent taxonomic identification, which can result in coarse-resolution identification for immature specimens lacking distinguishing characteristics. Our study provides a direct test for this potential systematic bias in biomonitoring data by examining two morphological traits: body size and shape of key organisms (Ephemeroptera, Plecoptera, Trichoptera and Odonata) collected from standard aquatic biomonitoring samples. Direct measurement of body size and a geometric morphometric description of body shape provide consistent, quantitative variables to describe the composition of specimens identified at different levels of taxonomic resolution (genus or family). Corroborating our expectations, we observed evidence of systematic size bias in family-level identifications. Specimens that could only reliably be identified to the family level were significantly smaller than specimens identified to the genus level. Qualitative comparisons of shape variation between specimens demonstrated a high degree of variation in specimens identified only at the family level and support the conclusion that specimens identified at the family level possess multiple constituent taxa (genera or species). Thus, size-dependent taxonomy can have negative consequences for the accurate determination of biodiversity and may invalidate common biomonitoring metrics. Improvements to biomonitoring protocols through technological advances, including DNA-based taxonomy to augment specimen identification, should effectively remove the size-bias problem in the long term. In the short-term, recognizing instances of size bias, the degree to which it may impact bioassessment and exploring methods for remediation, including traits-based assessments, can enhance data quality and inferences derived from biomonitoring studies." (Authors)] Address: Orlofske, Jessica M., Canadian Rivers Institute & Dept of Biology, University of New Brunswick, PO Box 4400, 10 Bailey Drive, Fredericton, NB E3B 5A3, Canada. E-mail: j.orlofske@unb.ca

13472. Orr, A.G.; Hämäläinen, M. (2013): Two new species of *Pericnemis* from Borneo with comparative notes on related species (Zygoptera: Coenagrionidae). *Odonatologica* 42(4): 335-345. (in English) ["*Pericnemis triangularis* Laidlaw was described on the basis of a single female from Bettotan in NE Borneo. Specimens from Brunei and neighbouring Sarawak previously referred to this species are reappraised with reference to the type and described as *Pericnemis dowi* sp. n. *P. kiautarum* sp. n. from Sabah, N. Borneo is described and figured based on a single male specimen. The new species are also compared and discussed in relation to *P. stictica*, the other Sundaland species of the genus. Both are distinguished by their male caudal appendages and by the form of a well developed horn on the hindlobe of the pronotum. The form of the appendages suggests a closer relationship between *P. dowi* and *P. kiautarum* than *P. stictica*. Both *P. dowi* and *P. stictica* breed in phytotelmata and it is conjectured that *P. kiautarum* probably does likewise. The potential hazards of describing species

from the female sex only are discussed." (Authors)] Address: Orr, A.G., Griffith School of the Environment, Griffith Univ., Nathan, Q-4111, Australia. E-mail: agorr@bigpond.com

13473. Osozawa, S.; Su, Z.-H.; Oba, Y.; Yagi, T.; Watanabe, Y.; Wakabayashi, J. (2013): Vicariant speciation due to 1.55 Ma isolation of the Ryukyu islands, Japan, based on geological and GenBank data. *Entomological Science* 16(3): 267-277. (in English) ["The Ryukyu island arc, originally a continental margin arc, separated from the Chinese continent by the rifting of the Okinawa trough, a process which began at 1.55 million years ago (Ma) and continues to the present. In addition, the Ryukyu arc was simultaneously divided into the northern Amami-Okinawa and southern Yaeyama islands by the Kerama rift valley, and consequently formed two isolated island units. The Kuroshio warm current began to flow into the Okinawa trough from the Yonaguni Strait, and flow out through the Tsushima and Tokara straits also at 1.55 Ma, and these seaways effectively acted as barriers between the Ryukyu islands and Taiwan, China and Japan. Through this geological process, vicariant speciation generated Ryukyu endemic animal species. We support this hypothesis by drawing linearized maximum likelihood (ML) phylogenetic trees of the species in four endemic insect groups (peacock butterfly, Chinese windmill butterfly, golden-ringed dragonfly - *Anotogaster sieboldii*, window firefly) using GenBank sequence data. We determined the precise branching ages for these phylogenetic trees, and show simultaneous speciation at 1.55 Ma for Amami-Okinawa and Yaeyama units. The Taiwan and Tsushima straits, barriers between Taiwan and China, and Japan and Korea, respectively, did not form sufficient barriers to migration during glacial low stands, and species were intermingled. A marine embayment may have posed as a migration barrier between northern and southern China in the Quaternary or a little earlier. From our study we also estimate the precise molecular evolution rate and justify the molecular clock." (Authors)] Address: Osozawa, S., Department of Earth Sciences, Graduate School of Science, Tohoku University, Sendai 980-8578, Japan. E-mail: osozawa@m.tohoku.ac.jp

13474. Ott, J. (2013): Erstnachweis der Östlichen Moosjungfer – *Leucorrhinia albifrons* (Burmeister, 1839) – in Rheinland-Pfalz (Insecta: Odonata). *Fauna Flora Rheinland-Pfalz* 12(3): 1075-1086. (in German, with English summary) ["*L. albifrons* was discovered for the first time in Rhineland-Palatinate, Germany in the year 2013. A single male was observed over a period of about two hours at an acid water near Kaiserslautern and also pictures for documentation were taken. The total number of dragonfly species for the federal state rises now to 68." (Author)] Address: Ott, J., Friedhofstr. 28, 67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

13475. Ott, J. (2013): Erfassung der Gestreiften Quelljungfer (*Cordulegaster bidentata*) Selys, 1843 im Natur-

park und Biosphärenreservat Pfälzerwald (Insecta: Odonata). Fauna Flora Rheinland-Pfalz 12(3): 1039-1074. (in German, with English summary) ["During a field-study in the nature parc and biosphere reserve (BSR) "Pfälzerwald" taking place in fall 2012 *C. bidentata* was researched in 44 springs and spring brooks. This study is part of a monitoring project of the Forstliche Forschungsanstalt für Waldökologie und Forstwirtschaft (FAWF a forestry research institute) of springs and 30 sites were given from this general project, whereas another 14 were added in order to look in particular for the target species. Between the end of October and beginning of November over ten days the study was carried out in good weather conditions and at eight sites larvae *C. bidentata* were found; also at eight sites larvae of the sister species *C. boltonii* were found, whereas in three sites larvae of both species were present. In four more sites out of these 44, which were presently not occupied by *Cordulegaster* spp., in recent years *C. bidentata* was found and during various investigations in the BSR in six other sites larvae of the species were registered, as well as one adult in another locality. Finally 19 springs or spring brooks settled by this typical forest species – until today believed as very rare in the BSR – are now known and it seems to have a much wider distribution, underlining the value of the BSR for biodiversity protection. It was remarkable, that the larvae of *C. bidentata* occurred also in pretty acid conditions, partly also under a pH of 5, where the species, as well as *C. boltonii*, normally should not be present. Some more populations of *C. bidentata* recently were found in areas bordering north and west of the BSR in Rhineland-Palatinate and consequently the species should be taken from the national red list (listed as "endangered") and also the federal red list ("endangered by extinction"). Nevertheless the species, for which Germany and Rhineland-Palatinate have a high responsibility, faces many threats which certainly impact the populations in a negative way. Here in particular the dense conifer plantations neighbouring their habitats endanger their survival, as well as other impacts from intensive forestry management in the vicinity (e.g. deposition of old branches etc. in the springs, new infrastructures near the springs). In addition, the technical extension of the springs and spring brooks has a negative impact on the species, as well as the high density of wild boars, destroying the habitats and feeding on the larvae. In the medium and long term also climatic changes might be of more importance, in particular longer hot and dry periods in the summer, even if the larvae are somewhat tolerant to dry conditions. Several measurements to protect *C. bidentata* can be proposed, which also will improve the habitat conditions of *C. boltonii*: conversion of the coniferous forest into deciduous forests in the neighborhood of the springs, creation of diverse forest glades with flowering plants as maturation and feeding habitats, strict protection of the springs (no obstructions in the water cycle, no trampling damage etc.)." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

13476. Ott, J. (2013): Die Östliche Moosjungfer – eine für Rheinland-Pfalz neue Libellenart wurde erstmals im Kreis Kaiserslautern gefunden. Heimatjahrbuch 2014: 76-78. (in German) [16-VII-2013, "Oberer Erleentalweiher", near Kaiserslautern, Rheinland-Pfalz, Germany] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

13477. Palacino-Rodríguez, F. (2013): Five new records of dragonflies (Odonata: Anisoptera) from Putumayo Department (Colombia). Boletín del Museo de Entomología de la Universidad del Valle 14(2): 16-21. (in English, with Spanish summary) [Records in April 2013 of *Erythemis vesiculosa*, *Erythrodiplax basalis*, *E. unimaculata*, *E. fusca*, and *E. umbrata* are documented.] Address: Palacino-Rodríguez, F., Grupo de Investigación en Odonatos de Colombia. Laboratorio de Artrópodos, Grupo de Biotecnología, Centro Internacional de Física, Universidad Nacional de Colombia. Departamento de Biología, Facultad de Ciencias, Universidad El Bosque, Bogotá, Colombia. E-mail: odonata17@hotmail.com

13478. Patten, M.A.; Smith-Patten, B.D. (2013): Two new species, *Lestes eurinus* Say and *L. forcipatus* Rambur, for Oklahoma, with comments on other vagrant *Lestes* recorded in the state (Zygoptera: Lestidae). Notulae Odonatologica 8(2): 29-32. (in English) ["Details are provided for the first records of the two species for the state of Oklahoma in central United States. The knowledge is also summarized of other vagrant Lestidae that have been recorded in the state, and *L. congener* is removed from the list of spp. known from Oklahoma." (Authors)] Address: Patten, M.A., Oklahoma Biological Survey, University of Oklahoma, Norman, OK 73019, USA. E-mail: mpatten@ou.edu

13479. Pedrono, M.; Smith, I.I. (2013): Overview of the natural history of Madagascar's endemic tortoises and freshwater turtles: Essential components for effective conservation. Chelonian Research Monographs 6: 59-66. ["Madagascar had seven endemic chelonian species, including six tortoises and one aquatic turtle. The now extinct tortoises species, *Aldabrachelys grandidieri* and *Aldabrachelys abrupta*, as well as the extant species, *Astrochelys yniphora*, *Astrochelys radiata*, *Pyxis planicauda*, and *Pyxis arachnoides*, all occurred in the arid bush and in the mosaic of dry forests and wooded savannahs from south to northwestern regions of the island. The aquatic Madagascar Big-headed Turtle, *Erymnochelys madagascariensis*, occurs in rivers and large lakes in western Madagascar. These species all have delayed maturity offset by a prolonged reproductive lifespan. They also have a moderate annual reproductive output that includes multiple small clutches of eggs within a season, thus their intrinsic population growth rates are low. The last two decades have brought an increased understanding of the demographic vulnerability of Madagascan chelonians to overexploitation. Particularly significant are the drivers of population dynamics relating to adult mortality

and fecundity. The maximum level of harvest that their populations can sustain is low and is already greatly exceeded in most locations. This is the point at which the design of sound conservation strategies is crucial; increased integration of the natural history of Madagascan chelonians in conservation strategies could significantly improve their effectiveness. ... Juvenile *Erymnochelys madagascariensis* have a diet of aquatic or terrestrial invertebrates that have fallen into the water (e.g., molluscs, Coleoptera, Trichoptera larvae, Odonata, and Ephemeroptera)." (Authors)] Address: Pedrono, M., CIRAD, UPR AGIRs, B.P. 853, Antananarivo 101, Madagascar. E-mail: miguel.pedrono@cirad.fr

13480. Petrovičová, K.; David, S. (2013): Ecology and habitat preferences of *Onychogomphus forcipatus* (Linnaeus, 1758) Odonata: Gomphidae) from the Slovak Republic. MENDELNET 2013 (Proceedings of International PhD Students Conference Mendel University in Brno, Czech Republic, November 20th and 21st, 2013): 769-773. (in English) ["*O. forcipatus* is a conspicuous and ecologically interesting dragonfly species with low population density, occurring in lowland and foothill watercourses. In Slovakia, the species is known from 32 localities and 11 orthographic units with a total number of 106 specimens (51 males 3 females 14 Ex 38 L). *O. forcipatus* has a double-peak hyposometric distribution of localities with a height of 100-200 m and 400-500 m.a.s.l.. We assume that the atypical occurrence is linked to the preference of a river bed substrate: lithal (from pebbles to fine gravel) part of the watercourse hyporhithral and psammal/psammopelal (sandy-loamy-alumina substrate) part of the stream epipotamal. *O. forcipatus* occurs in the localities along with 36 dragonfly species with a positive correlation to rheophilous species *Platycnemis pennipes*, *Calopteryx splendens*, *C. virgo*, *Ophiogomphus cecilia* and *Gomphus vulgatissimus*. The significance of substrate, longitudinal zonation of the watercourse, and altitude were tested using Monte Carlo permutation test. After removal of the correlation of factors (inflation factor), the test showed statistically significant correlations for substrate types psammal (positive correlation, $p = 0,002$) and pleisopotamal (negative correlation, $p = 0,001$). Our results are consistent with published data." (Authors)] Address: Petrovičová, Kornelia, Dept of Zoology & Anthropology, Fac. Natural Sciences, Constantine the Philosopher Univ. in Nitra, Tr. A. Hlinku 1, 949 74 Nitra, Slovak Republic. E-mail: kornelia.petrovicova@gmail.com

13481. Pino, P. L., Torralba-Burrial, A.; Martínez Martínez, D.; Serra Sorribes, A. (2013): Primera cita de *Gomphus graslinii* (Rambur, 1844) y confirmación de la reproducción de *Macromia splendens* (Pictet, 1843) (Odonata: Gomphidae, Corduliidae) en Aragón (España). Boletín de la Sociedad Entomológica Aragonesa 53: 327-328. (in Spanish, with English summary) [The first record of *G. graslinii* and new records confirming the reproduction of *Macromia splendens* in Teruel province (new also to Aragon) are reported. A male of *G. graslinii* was found at La Pesquera del Ulldemó (Beceite, Teruel; UTM 31T 265261 4523851, da-

tum ETRS89, 570 m a.s.l.). At the same locality, also three exuviae of *Macromia splendens* were found.] Address: Pino, P.L., Museu de les Terres de l'Ebre, Gran Capità, 34, 43870 Amposta (Tarragona), Spain. E-mail: odonats@yahoo.es

13482. Pires, M.M.; Kotzian, C.B.; Spies, M.R.; Neri, D.B. (2013): Diversity of Odonata (Insecta) larvae in streams and farm ponds of a montane region in southern Brazil. *Biota Neotropica* 13(3): 259-267. (in English, with Portuguese summary) ["This study presents an inventory of the genera of Odonata found in streams and artificial farm ponds in a montane region, with temperate climate, in southern Brazil. Differences in richness of lotic and lentic environments were also investigated. The diversity of odonate families and genera in southernmost Brazil is lower than in warmer, either tropical or subtropical, regions of the country. Nine genera are new records for the region and six genera had their geographical ranges extended to regions with temperate climate of the Neotropics. The overall richness and especially the overall abundance recorded in the studied area are possibly determined by the occurrence of numerous farm ponds because natural standing waters are scarce in the region. The presence of macrophytes in these artificial ponds allowed the establishment of a diversified odonatofauna, typical of lentic environments." (Authors)] Address: Pires, M.M., Programa de Pós-graduação em Biologia, Universidade do Vale do Rio dos Sinos – UNISINOS, 93022-000, São Leopoldo, RS, Brasil, Programa de Pós-graduação em Biologia, Universidade do Vale do Rio dos Sinos – UNISINOS, Av. Unisinos, 950, CEP 93022-000, São Leopoldo, RS, Brasil

13483. Plaksa, S.A.; Yarovenko, Yu.A.; Gadzhiev, A.A. (2013): Status evaluation of corsac fox (*Canidae*, *Vulpes corsac*) population in Dagestan. *Arid Ecosystems* 3(2): 85-91. (in English) [Corsac foxes are feeding on every diet available including Odonata. No details are given.] Address: Plaksa, S.A., Caspian Institute of Biological Resources, Dagestan Research Center, Russian Academy of Sciences, ul. M. Gadzhieva 45, Makhachkala, 367000, Russia. E-mail: splaksa@list.ru

13484. Puchmertlová, M (2013): Vážky (Odonata) soustavy Boleveckých rybníků v Plzni [Dragonflies of Bolevec ponds system at Plzen]. BSc thesis, Fakulta Pedagogická, Katedra Biologie, Západočeská Univerzita v Plzni: V + 73 pp. (in Czech, with English summary) [Bolevec ponds, Plzen, Czech Republic. In 2012, at three localities (Strženska, Nováček and Kamenný ponds), 24 Odonata species were found. The list of species includes *Coenagrion hastulatum* and *Lestes dryas*.] Address: not stated

13485. Rache, L.; Acero, A.; Alfonso, S.; Rincón Silva, J.D. (2013): First record of the genera *Diaphlebia* Selys 1854, *Argyrothemis* Ris 1909 and *Fylgia* Kirby 1889 from Colombia (Odonata: Gomphidae, Libellulidae). Entomo-

tropica 28(2): 95-97. (in Spanish, with English summary) ["The genera *Argyrothemis*, *Diaphlebia* and *Fylgia*, are reported for the first time from Colombia. These genera were collected in the Natural Reserve El Caduceo at San Martín (Meta Dept.). The specimens were collected in floodplain area inside and outside of a primary forest. Thereby the known distribution for this genera is now broader and the number of taxa reported for Colombian odonates." (Authors) *Diaphlebia angustipennis* Selys, 1854: 1 female, COLOMBIA. Departamento del Meta. San Martín. Vereda San Francisco. 03° 40' 168" N 073° 39' 564" W. 370 m; *Argyrothemis argentea* Ris, 1909: 1 female, COLOMBIA. Departamento del Meta. San Martín. Vereda San Francisco. 03° 40' 168" N 073° 39' 56" W. 370 m.a.s.l.; *Fylgia amazonica lychnitina* De Marmels, 1989: 2 males, COLOMBIA. Departamento del Meta. San Martín. Vereda San Francisco. 03° 40' 091" N 073° 39' 277" W. 353 m.a.s.l.] Address: Rache, L., Universidad Nacional de Colombia, Sede Bogotá. Carrera 30 no. 45-03 AA. 7495. Colombia. E-mail: leonardorache@hotmail.com

13486. Rebora, M.; Piersanti, S.; Dell'Otto, A.; Gaino, E. (2013): The gustatory sensilla on the endophytic ovipositor of Odonata. *Arthropod Structure & Development* 42(2): 127-134. (in English) ["The present paper aims at describing the fine structure of coeloconic sensilla located on the cutting valves of the endophytic ovipositor of two Odonata species, *Aeshna cyanea* and *Ischnura elegans*, by carrying out parallel investigations under SEM and TEM. In both species these coeloconic sensilla are innervated by four unbranched neurons forming four outer dendritic segments enveloped by the dendrite sheath. One dendrite terminates at the base of the peg forming a well developed tubular body, while the other three enter the peg after interruption of the dendrite sheath. The cuticle of the peg shows an apical pore and a joint membrane. This last feature, together with the tubular body and the suspension fibers, represent the mechanosensory components of the sensillum while the pore and the dendrites entering the peg allow chemoreception. The ultrastructural organization of these coeloconic sensilla is in agreement with the one reported for insect gustatory sensilla. Our investigation describes for the first time typical insect gustatory sensilla in Odonata. Electrophysiological and behavioral studies are needed to verify the role that these structures can perform in sensing the egg-laying substrata. Highlights: *The presence of chemoreceptors on ovipositor of endophytic Odonata was hypothesized. *No data on these sensilla are available at TEM level. *We investigate coeloconic sensilla on ovipositor of endophytic Odonata under SEM/TEM. *Sensilla show a pore and one of the outer dendritic segments forms a tubular body. *This is the typical morphology of insect gustatory sensilla." (Authors)] Address: Rebora, Manuela, Dipartimento di Biologia Cellulare e Ambientale Università di Perugia, Via Elce di sotto 06121 Perugia, Italy. E-mail: rebora@unipg.it

13487. Redin, A.; Sjöberg, G. (2013): Effects of beaver dams on invertebrate drift in forest streams. *Šumarski list*

11–12: 597-607. (in English, with Bosnian summary) ["We aimed to assess the effects of beaver dams on the invertebrate drift fauna in five central Swedish boreal forest streams. Each stream was sampled once during the autumn, with drift traps placed upstream and downstream of the beaver dams. Drift densities (numbers/100 m³ water) were calculated. The invertebrates were determined, dried and weighed. No significant differences were noted in total drift densities or in the drift densities of pelagic species. The drift densities of benthic species were higher upstream of the dam, mainly because Ephemeroptera were more abundant in the upstream part. No significant difference was observed in diversity or dry weight. The functional feeding group ratio: filtering collectors / gathering collectors was significantly higher downstream of the dam." (Authors) Upstream-number of Odonata was very low. No drifting specimens were observed.] Address: Redin, A., Department of Wildlife, Fish, and Environmental Studies, SLU, SE-90183 Umea, Sweden. E-mail: Andreas.Redin@home.se

13488. Reinhardt, K. (2013): Drei seltene Insekten am südlichen Salzhaff: *Lestes barbarus* (Odonata, Lestidae), *Conocephalus fuscus* (Orthoptera, Tettigoniidae) und *Boloria dia* (Lepidoptera, Nymphalidae). *Entomologische Nachrichten und Berichte* 57(4): 273-274. (in German) [Mecklenburg-Vorpommern, Germany, eastern edge of Boisdorfer Werder; 15.08.2013; *Lestes barbarus*] Address: Reinhardt, K., Evolutionsökologie der Tiere, Universität Tübingen, Auf der Morgenstelle 28, 72076 Tübingen, Germany. E-Mail: k.reinhardt@sheffield.ac.uk

13489. Reinhardt, K. (2013): The Entomological Institute of the Waffen-SS: evidence for offensive biological warfare research in the third Reich. *Endeavour* 37(4): 220-227. (in English) ["In January 1942, Heinrich Himmler, head of the Schutzstaffel (SS) and police in Nazi Germany, ordered the creation of an entomological institute to study the physiology and control of insects that inflict harm to humans. Founded in the grounds of the concentration camp at Dachau, it has been the focus of previous research, notably into the question of whether it was involved in biological warfare research. This article examines research protocols by the appointed leader Eduard May, presented here for the first time, which confirm the existence of an offensive biological warfare research programme in Nazi Germany." (Author) E. May also used Odonata to build his career.] Address: Reinhardt, K., University of Tuebingen, Animal Evolutionary Ecology, Auf der Morgenstelle 28, 72076 Tübingen, Germany. E-mail: k.reinhardt@uni-tuebingen.de

13490. Rodrigues, M.E.; Carriço, C.; Pinto, Z.T.; Mendonça, P.M. & Queiroz, M.M.C. (2013): First record of acari *Arrenurus Dugès*, 1834 as a parasite of Odonata species in Brazil. *Biota Neotropica* 13(4): 365-367. (in English, with Portuguese summary) ["Water mites are common and widespread parasites of some aquatic insects in freshwater habitats. This is the first record of acari *Arrenurus Dugès*, 1834, as a parasite of Odonata in

Brazil. Water mites were sampled from *Miathyria marcella* and *Ischnura fluviatilis*." (Authors)] Address: Rodrigues, M.E., Programa de Pós-graduação em Entomologia e Conservação da Biodiversidade, Universidade Federal da Grande Dourados – UFGD, CEP 79804-970, Dourados, MS, Brasil. E-mail: rodrigues.mbio@gmail.com

13491. Roland, H.-J.; Martens, A. (2013): Transport einer Ameise durch eine Libelle (Hymenoptera: Formicidae; Odonata: Lestidae). *Libellula* 32(3/4): 175-179. (in German, with English summary) ["A series of digital photographs, taken on 25-iv-2013 at a fish pond near Echzell north of Frankfurt am Main, Germany, documented the aerial transport of a worker of *Lasius cf. flavus* by the male of a tandem of *Sympecma fusca*. The ant was fixed to the left hind tibia by its mandibles and traveled a minimum distance of 3 m." (Authors)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: hjroland@gmx.de

13492. Rüppell, G.; Hilfert-Rüppell, D. (2013): Biting in dragonfly fights. *International Journal of Odonatology* 16(3): 229-229. (in English) ["Slow motion films of fight behaviour of five different species of Odonata were analysed. In all cases biting played a major role. The biting duration depended on the duration of a stable connection between the two opponents. Sitting odonates showed much longer biting than those that were flying. In fights of *Anax junius* and *Calopteryx splendens* long biting between males led to serious injuries and death. Two males of *Anax imperator* bit each other by very short strikes during looping flights together, better described as hack-biting. This hack-biting was seen in two other fights: a female of *Libellula quadrimaculata* bit a harassing male on the head, immobilizing him, and during a male–male fight in *C. splendens* flying nearly on the spot. Loops, very brief but relatively stable flight positions, were used for biting in three cases. The significance of biting in inter- and intrasexual competition in Odonata is discussed." (Authors)] Address: Hilfert-Rüppell D., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

13493. Ruiz-Guzmán, G.; Canales-Lazcano, J.; Jiménez-Cortés, J.G.; Contreras-Garduño, J. (2013): Sexual dimorphism in immune response: Testing the hypothesis in an insect species with two male morphs. *Insect Science* 20(5): 620-628. (in English) ["It has been proposed that given that males should invest in sexual traits at the expense of their investment in immune response, females are better immunocompetent than males. Typically, this idea has been tested in monomorphic species, but rarely has been evaluated in polymorphic male species. We used *Paraphlebia zoe*, a damselfly with two male morphs: the black wing (Black-W) morph develop black spots as sexual traits and the hyaline wing morph (Hyaline-W) resembles a female in size and wings colour. We predicted that Black-W should have a lower immune response than Hyaline-W, but that the latter males should not differ from females in this respect. Nitric oxide (NO)

and phenoloxidase (PO) production, as well as haemolymph protein content, were used as immune markers. Body size (wing length) was used as an indicator of the male condition. The results show that, as we predicted, females and Hyaline-W had higher values of NO than Black-W, corresponding to differences in size. However, the opposite was found in relation to PO production. Females had the highest levels of haemolymph protein content, whereas no differences were found between Black-W and Hyaline-W. These results partially support the sexual selection hypothesis and are discussed in the context of the life history of this species. Black-W, Hyaline-W and females could express the immune markers that are prioritized by their particular condition, and probably neither of them could express all immune markers in an elevated manner, as this would result in an excessive accumulation of free radicals." (Authors)] Address: Contreras-Garduño J., Departamento de Biología, División de Ciencias Naturales y Exactas, Universidad de Guanajuato, campus Guanajuato. Noria Alta s/n, Noria Alta, 36050. Guanajuato, Guanajuato, México. E-mail: jcont@ecologia.unam.mx

13494. Rychła, A. (2013): Vorkommen der Arktischen Smaragdlibelle *Somatochlora arctica* (Zetterstedt, 1840) in Hochmooren der polnischen Ostseeküste und in Pommern. *International Dragonfly Fund - Report* 63: 1-31. (in German, with English and Polish summaries) ["The distribution of *S. arctica*, a rare Odonata species in Poland, is insufficiently known. Therefore, in June 2013 seventeen localities in the northwestern potential range of the species in Poland were surveyed for their dragonfly fauna, with special emphasis on (raised) bog habitats and *S. arctica*. A total of 36 Odonata species was recorded including most of the Polish legally protected species. Only three localities (two Sphagnum-covered ditches and one shallow Sphagnum-hollow) resulted in records of *S. arctica*, both larvae and imago. These habitats harboured small larval populations. Most of the imagines were recorded hunting along the edges of clear pine and downy birch woods. LIFE - Natura 2000 measures to consolidate water tables of the studied raised bogs were not specified to conserve the habitats of *S. arctica*. But in general, this will help to save a favourable status of the raised bogs as a total." (Author)] Address: Rychła, Anna, ul. Osiedlowa 12, Płoty, 66-016 Czerwieńsk, Poland. E-mail: rychlan@op.pl

13495. Sanchez Crespo, A.; Torralba-Burrial, A.; (2013): Detección de la libélula amenazada *Oxygastra curtisii* (Dale, 1834) (Odonata: Corduliidae) en la sierra de Guadarrama (Madrid, centro de España). *Boletín de la Asociación española de Entomología* 37(1/2): 89-93. (in Spanish, with English summary) [*O. curtisii* was found at Guadarrama Mountains (Madrid, Central Spain), 30TVL41, 841 m a.s.l., river Guadalix, in June 2012] Address: Sanchez Crespo, A.. E-mail: angel.scespo@telefonica.net

13496. Sánchez-Guillén, R.A.; Muñoz, J.; Rodríguez-Tapia, G.; Feria Arroyo, T.P.; Córdoba-Aguilar, A. (2013):

Climate-induced range shifts and possible hybridisation consequences in insects. *PLoS ONE* 8(11): e80531. doi:10.1371/journal.pone.0080531: 10 pp. (in English) ["Many ectotherms have altered their geographic ranges in response to rising global temperatures. Current range shifts will likely increase the sympatry and hybridisation between recently diverged species. Here we predict future sympatric distributions and risk of hybridisation in seven Mediterranean ischnurid damselfly species (*I. elegans*, *I. fontaineae*, *I. genei*, *I. graellsii*, *I. pumilio*, *I. saharensis* and *I. senegalensis*). We used a maximum entropy modelling technique to predict future potential distribution under four different Global Circulation Models and a realistic emissions scenario of climate change. We carried out a comprehensive data compilation of reproductive isolation (habitat, temporal, sexual, mechanical and gametic) between the seven studied species. Combining the potential distribution and data of reproductive isolation at different instances (habitat, temporal, sexual, mechanical and gametic), we infer the risk of hybridisation in these insects. Our findings showed that all but *I. graellsii* will decrease in distributional extent and all species except *I. senegalensis* are predicted to have northern range shifts. Models of potential distribution predicted an increase of the likely overlapping ranges for 12 species combinations, out of a total of 42 combinations, 10 of which currently overlap. Moreover, the lack of complete reproductive isolation and the patterns of hybridisation detected between closely related ischnurids, could lead to local extinctions of native species if the hybrids or the introgressed colonising species become more successful." (Authors)] Address: Sánchez-Guillén, Rosa, Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, México D.F., Mexico. E-mail: rguillenuvigo@hotmail.com

13497. Sasamoto, A.; Futahashi, R. (2013): Taxonomic revision of the status of *Orthetrum triangulare* and *melania* group (Anisoptera: Libellulidae) based on molecular phylogenetic analyses and morphological comparisons, with a description of three new subspecies of *melania*. *Tombo* 55: 57-82. (in English) ["The taxonomic status of the libellulid dragonflies *Orthetrum triangulare* (Selys, 1878) and allied taxon *O. [triangulare] melania* (Selys, 1883) has been inconclusively resolved until present. In addition, the *melania* group has conspicuous geographical variations in morphology, which have not yet been discussed in detail. We present a taxonomic revision based on the molecular phylogenetic analyses using nuclear ITS1, ITS2, and mitochondrial 16SrRNA and COI genes, as well as external morphology. We confirm that *triangulare* and *melania* are well separated by the both nuclear and mitochondrial gene molecular phylogenies. The external morphologies of these two groups are conspicuously different, indicating that *O. melania* should be regarded as a genuine species. Although the genetic differences between *O. triangulare malaccense* and *O. t. triangulare* were subtle, the morphological differences between these two subspecies could be recognized. Furthermore,

based on molecular phylogenetic analyses and external morphological comparisons, *O. melania* could be separated into four subgroups: (1) mainland Japan (Hokkaido to Kyushu) and northern Ryukyu, (2) continental China, Taiwan, Korean Peninsula, (3) middle Ryukyu (from Tokara Islands to Kumejima Island), and (4) southern Ryukyu (Yaeyama Islands). Therefore we recognize the following four subspecies: *nominotypical melania*, m. *continentale* ssp. nov. (holotype female: Linfan, Zhejiang prov., R. P. china), m. *ryukyense* ssp. nov. (holotype female: Mt. Nago, Nago city, Okinawajima Island, Japan), and m. *yaeyamense* ssp. nov. (holotype female: Otomipass, Taketomi-cho, Iriomotejima Island, Yaeyama Isis., Japan)." (Authors)] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

13498. Schneider, T. (2013): Frühsommer-Beobachtungen an *Cordulegaster helladica buchholzi* und anderen Libellen auf Naxos, Griechenland (Odonata: Cordulegastriidae). *Libellula* 32(3/4): 151-158. (in German, with English summary) ["Early summer observations of *Cordulegaster helladica buchholzi* and other dragonflies on Naxos (Greece) - In June 2013 during a two day trip 17 dragonfly species were recorded from Naxos. *Cordulegaster helladica buchholzi* was found in great numbers exclusively in the upper part of a single river system. This subspecies might be threatened by further water extraction from the brook and by the cutting of the forests along the water courses. *Aeshna affinis* and *Trithemis annulata* are new for the island, increasing the number of known taxa from 19 to 21. *Sympetma fusca* was rediscovered since the report of K.F. Buchholz more than 50 years ago." (Author)] Address: Schneider, T., Arnold-Knoblach-Ring 76, 14109 Berlin/Wannsee, Germany. E-mail: thomas.rs@gmx.de

13499. Seehausen, M. (2013): Die Libellen (Odonata) der Sammlung Gerning. *Libellula* 32(1/2): 45-58. (in German, with English abstract) ["The Odonata of the collection Gerning – The Gerning collection of the Wiesbaden Museum is partly over 250 years old and one of the most important collections of the 18th century. Beside butterflies, beetles and other insects it contains also Odonata. These were revised and catalogued. Altogether 92 individuals in 44 species could be assigned to the collection. Furthermore, there are 25 specimens in 13 species from Java collected by Ernst Albert Fritze, two *Sympetrum vulgatum* from an unknown collector (abbreviation "K") and one unidentified *Aeshnidae* larvae without label in this collection by mistake. In comparison to the 1830 committed catalogue (Gerning n.y.) there are 41 specimens of the Coll. Gerning missing. Two males of *Uracis imbuta* (Burmeister, 1839) from Buenos Aires were certified according to the citation of Rambur (1842). Problems when dealing with historical references and collections are mentioned." (Author)] Address: Seehausen, M., Museum Wiesbaden, Naturhistorische Sammlungen, Friedrich-Ebert-Allee 2, 65185 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

13500. Seehausen, M. (2013): New to the fauna of Hong Kong: *Matrona basilaris* Selys, 1853 (Odonata: Calopterygidae). International Dragonfly Fund - Report 65: 3-5. (in English) ["*Matrona basilaris* was collected between 1878 and 1907 in Hong Kong. The specimens had been deposited in the Übersee-Museum Bremen (Germany)."] (Author)] Address: Seehausen, M., Museum Wiesbaden, Friedrich-Ebert-Allee 2, 65183 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

13501. Shende, V.A.; Patil, K.G. (2013): Diversity of dragonflies (Anisoptera) in Gorewada International Bio-Park, Nagpur, Central India. *Arthropods* 2(4): 200-207. (in English) [34 anisopteran species were recorded. 26 of them are assessed as "common" and 8 as "occasional".] Address: Shende, V.A., Department of Zoology, Institute of Science, R. T. Marg, Nagpur (M.S.), India. E-mail: vi-rushende@gmail.com

13502. Silveira Coimbra, H.S.; Damé Schuch, L.F.; Muller, G.; Lambrech Gonçalves, C.; Zambrano, C.; Bastos Oyarzabal, M.E.; Prestes, L.; Araujo Meireles, M.C. (2013): Research of trematodes digenetics from *Heleobia* spp. (Mollusca: Hydrobiidae) in area of occurrence of equine monocytic ehrlichiosis, in Rio Grande do Sul, Brazil. *Arq. Inst. Biol.*, São Paulo 80(3): 266-272. (in Portuguese, with English summary) ["The equine monocytic ehrlichiosis in the region South of the Rio Grande do Sul has demonstrated to be important in the creations of Crioulo horses. It has been reported as cause of diarrhea in equine not surround and as cause of losses with treatments and death of the animals, being pointed as a limited factor in the range breeding in some regions. The way of transmission for the oral way, intermediated for trematodes in aquatic environments, has been supported. Freshwater snails are involved as intermediate hosts of trematodes and harbor of the *Neorickettsia risticii*. A total of 16,846 *Heleobia* snails had been collected in the cities of Arroio Grande, Rio Grande, Palmares do Sul and Santa Vitoria do Palmar, 92.2% of which had been found in the roots of aquatic plants (*Eichornea* spp.). The frequency of trematodes present in the snails varied of 2.3 to 12.8% in the collected regions. Three types of cercariae were found, morphology type 1, morphology type 2 and morphology type 3, and two morphologic type of metacercariae of the snails. A total of 357 insects of the Odonata order were collected, stages of metacercariae had been found in the tissues of suborder Anisoptera with 5.3% of frequency. More studies are necessary for identification of the joined larval phases, as well as knowing the host definitive and identifying the adult parasite and the relation of its cycle of life with the occurrence of equine monocytic ehrlichiosis." (Authors)] Address: Coimbra, Helen, Faculdade de Veterinária; Universidade Federal de Pelotas (UFPEL) - Pelotas (RS), Brasil. E-mail: coimbrahs@gmail.com

13503. Singh, V.; Banyal, H.S. (2013): Insect fauna of Khajjiar Lake of Chamba district, Himachal Pradesh, In-

dia. *Pakistan J. Zool.* 45(4): 1053-1061. (in English) [The following Odonata species are listed: *Anotogaster basal*, *Anax immaculifrons*, *Orthetrum s. sabina*, *Orthetrum t. triangulare*, *Orthetrum pruinosum neglectum*, *Palpopleuras sexmaculata*, *Crocothemis servilia*, *Trithemis festiva*, *Pseudagrionii* sp., and *Neurobasis c. chinesis*.] Address: Singh, V., Department of Biosciences, Himachal Pradesh University, Shimla-171 005 (HP), India

13504. Smith-Gomez, (2013): Primeros registros de tres especies de Zygoptera (Insecta: Odonata) para el estado de Jalisco, México. *Dugesiana* 20(2): 83-84. (in Spanish) [First records of *Hetaerina vulnerata*, *Apanisagrion lais*, and *Argia plana* from Jalisco, México are presented.] Address: Smith-Gómez, S.A., Lab. de Ento., Centro de Estudios en Zoología, Depto. De Botánica y Zoología, CUCBA, Univ. de Guadalajara, Apdo. Postal 134, CP 45100, Zapopan, Jalisco, México. E-mail: smity456@hotmail.com

13505. Steinhoff, P.O.M.; Do, M.C. (2013): Notes on some *Coelliccia* species from Vietnam (Zygoptera: Platycnemiidae). *Odonatologica* 42(4): 347-357. (in English) ["The original descriptions of *C. acco* Asahina, 1997, *C. kazukoae* Asahina, 1984, *C. montana* Fraser, 1933 and *C. yamasakii* Asahina, 1984 are supplemented and enhanced, and new illustrations of these species are provided. A teneral form of *C. yamasakii* is described and figured. *C. kazukoae* is recorded for the first time from Vietnam." (Authors)] Address: Steinhoff, P., Trelleborger Weg 1, 17493 Greifswald, Germany. E-mail: philipsteinhoff@gmail.com

13506. Stewart, B.A.; Close, P.G.; Cook, P.A.; Davies, P.M. (2013): Upper thermal tolerances of key taxonomic groups of stream invertebrates. *Hydrobiologia* 718: 131-140. (in English) ["Southwestern Australia has already undergone significant climatic warming and drying and water temperatures are increasing particularly in small streams where riparian vegetation has been cleared. The ability to predict how freshwater fauna may respond to these changes requires understanding of their thermal tolerances. A review of relevant literature and laboratory testing of four aquatic species from southwestern Australia were used to compare upper thermal tolerance (UTT) among key taxonomic groups. UTT for selected species determined by LT50 tests were similar to that of species tested elsewhere. Mean UTT, based on relevant literature and LT50 experiments, ranged from 22.3°C for Ephemeroptera to 43.4°C for Coleoptera. Mean UTT for both Coleoptera and Odonata (41.9°C) were significantly higher than those for all the other groups (22.3–31.5°C) with the exception of Planaria. The mean UTT value of 22.3°C for Ephemeroptera was significantly lower than for Decapoda (29.6°C), Trichoptera (30.1°C) and Mollusca (31.5°C). For three insect orders tested, eurytherms had significantly higher UTT values than stenotherms. The variation in UTT among taxa suggests that additional thermal shifts, caused by riparian disturbance and/or climate change, are likely to create novel assemblages due to the replacement of temperature-sensitive taxa by more tolerant taxa. This has im-

plications for the sustainability of regionally important endemic cool water species." (Authors)] Address: Stewart, Barbara, Centre of Excellence in Natural Resource Management, Univ. of Western Australia, Albany, WA 6330, Australia. E-mail: barbara.cook@uwa.edu.au

13507. Striniqi, A.; Misja, K. (2013): An overview of threatened and risked entomofauna of northern Albania. *Journal of environmental research and development* 8(1): 40-49. (in English) [The paper lists three Odonata species together with locality data: *Coenagrion ornatum* (Kukes), *Lestes dryas* (Kukes, Shkoder, Lezhe), and *Gomphus vulgatissimus* (Shkoder, Lezhe).] Address: Striniqi, Ariana, Faculty of Natural Sciences, University of Shkodra "Luigj Gurakuqi"

13508. Svensson, E.I.; Waller, J.T. (2013): Ecology and sexual selection: Evolution of wing pigmentation in calopterygid damselflies in relation to latitude, sexual dimorphism, and speciation. *The American Naturalist* 182(5): E174-E195. (in English) ["Our knowledge about how the environment influences sexual selection regimes and how ecology and sexual selection interact is still limited. We performed an integrative study of wing pigmentation in calopterygid damselflies, combining phylogenetic comparative analyses, field observations and experiments. We investigated the evolutionary consequences of wing pigmentation for sexual dimorphism, speciation, and extinction and addressed the possible thermoregulatory benefits of pigmentation. First, we reconstructed ancestral states of male and female phenotypes and traced the evolutionary change of wing pigmentation. Clear wings are the ancestral state and that pigmentation dimorphism is derived, suggesting that sexual selection results in sexual dimorphism. We further demonstrate that pigmentation elevates speciation and extinction rates. We also document a significant biogeographic association with pigmented species primarily occupying northern temperate regions with cooler climates. Field observations and experiments on two temperate sympatric species suggest a link between pigmentation, thermoregulation, and sexual selection, although body temperature is also affected by other phenotypic traits such as body mass, microhabitat selection, and thermoregulatory behaviors. Taken together, our results suggest an important role for wing pigmentation in sexual selection in males and in speciation. Wing pigmentation might not increase ecological adaptation and species longevity, and its primary function is in sexual signaling and species recognition." (Authors)] Address: Svensson, E.I., Evol. Ecol. Unit, Dept of Biology, Lund Univ., 223 62 Lund, Sweden. E-mail: erik.svensson@biol.lu.se

13509. Swaegers, J.; Mergeay, J.; Therry, L.; Bonte, D.; Larmuseau, M.H.D.; Stoks, R. (2013): Rapid range expansion increases genetic differentiation while causing limited reduction in genetic diversity in a damselfly. *Heredity* 115(4): 422-429. (in English) ["Many ectothermic species are currently expanding their geographic range due to global warming. This can modify the population genetic di-

versity and structure of these species because of genetic drift during the colonization of new areas. Although the genetic signatures of historical range expansions have been investigated in an array of species, the genetic consequences of natural, contemporary range expansions have received little attention, with the only studies available focusing on range expansions along a narrow front. We investigate the genetic consequences of a natural range expansion in the Mediterranean damselfly *Coenagrion scitulum*, which is currently rapidly expanding along a broad front in different directions. We assessed genetic diversity and genetic structure using 12 microsatellite markers in five centrally located populations and five recently established populations at the edge of the geographic distribution. Our results suggest that, although a marginal significant decrease in the allelic richness was found in the edge populations, genetic diversity has been preserved during the range expansion of this species. Nevertheless, edge populations were genetically more differentiated compared with core populations, suggesting genetic drift during the range expansion. The smaller effective population sizes of the edge populations compared with central populations also suggest a contribution of genetic drift after colonization. We argue and document that range expansion along multiple axes of a broad expansion front generates little reduction in genetic diversity, yet stronger differentiation of the edge populations." (Authors)] Address: Swaegers, J., Laboratory of Aquatic Ecology, Evolution and Conservation, Department of Biology, University of Leuven, Leuven, Belgium. E-mail: Janne.Swaegers@bio.kuleuven.be

13510. Tatarinov, A.G.; Kulakova, O.I.; Loskutova, O.A. (2013): Odonata (Dragonflies and damselflies) of the Polar and Subpolar region. *Materials of the Fifth All-Russia Symposium on Amphibiotic and Aquatic Insects / Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences.* – Yaroslavl: Filigran, 2013. – 254 pp: 206-210. (in Russian, with English summary) ["A total of 36 species of Odonata of seven families have been recorded in the Polar and Subpolar Ural Mountains. Three families make up the bulk of taxonomic diversity: *Coenagrionidae* (11 species, 30.5%), *Corduliidae* (seven species, 19.4%), *Libellulidae* (seven species, 19.4%). The families *Calopterygidae*, *Lestidae*, represented by one and two species, respectively, were the least abundant. Species widespread in the study area are indicated; the average timing of the emergence of adults is specified; three types of water bodies inhabited by larvae are recognized; habitat preferences of larvae are analyzed." (Authors)] Address: Tatarinov, A.G., Institute of Biology, Komi Scientific Centre, Ural Branch, Russian Academy of Sciences, ul. Kommunisticheskaya 28, Syktyvkar, Komi Republic, 167982, Russia. E-mail: andreitatarinov@mail.ru

13511. Tatarkiewicz, D. (2013): Analysis of the emergence of the Scarce Chaser *Libellula fulva* O.F. Müller, 1764 (Odonata: Libellulidae). *Aquatic Insects* 34(3-4), (2012): 173-193. (in English) ["*L. fulva* is widespread in Europe and in many regions is relatively common. It is also

abundant in the lake districts of western and northern Poland. Although the species frequently occurs in large numbers its biology is poorly known. Emergence of *L. fulva* was investigated in this study as a contribution to the life history of the species. Studies were carried out in the vicinity of Chojno (52°41' N, 16°12' E) on the edge of the Notecka Forest in 2003 and 2004. The stem habitat of the population is a stream with the adjacent swamps. *L. fulva* belongs to the spring species sensu Corbet (1999). The emergence of the studied population lasted 19 days (between 18 May and 5 June) and 31 days (between 13 May and 12 June) in 2003 and 2004, respectively. It was characterized by synchronous and, especially in the first phase, mass emergence. The high synchronisation is reflected in the fact that 50% of the population had emerged by the seventh (in 2003) and the fifth (in 2004) days of the process. This is vital to the imagines, which mature and return to the water body as soon as possible to reproduce. Timing of the end of emergence depends on atmospheric conditions during its duration and the conditions preceding the start of emergence on a given day. In the daily course there is a tendency for emergence to finish as soon as possible. Extension of the emergence is synonymous with increased mortality in the dragonfly population caused by predators." (Authors)] Address: Tatarkiewicz, D., Dept of Biology and Environmental Protection, University School of Physical Education, Królowej Jadwigi St. 27/39, 61-871 Poznań, Poland. E-mail: dawid.tatarkiewicz@poczta.fm

13512. Theischinger, G.; Richards, S.J. (2013): Three new species of *Teinobasis* Kirby from Papua New Guinea (Zygoptera: Coenagrionidae). *Odonatologica* 42(4): 359-367. (in English) ["*T. chrysea* sp. n. Holotype male: (NTM 1008871), *T. lutea* sp. n. (Holotype male: (NTM 1008876) and *T. macroglossa* sp. n. (Holotype male: (NTM 1008877) are described from temporary bush camps, without permanent place-names, in the Sepik Basin. Characters of the available adults are illustrated, habitat conditions are given and their affinities are discussed." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

13513. Theischinger, G.; Richards, S.J. (2013): Two new species of *Hylaeargia* Lieftinck from New Guinea (Zygoptera: Platynemididae). *International Dragonfly Fund - Report* 64: 1-11. (in English) ["Two species, *Hylaeargia vanmastrigti* sp. n. (holotype male from Star Mountains, Papua Province, Indonesian New Guinea) and *H. lisae* sp. n. (holotype male from Hindenburg Range, Papua New Guinea), are described as new. An illustrated key to the known species of *Hylaeargia* Lieftinck is presented." (Authors)] Address: Theischinger, G., NSW Department of Premier and Cabinet, Office of Environment and Heritage, PO Box 29, Lidcombe NSW 1825 Australia. E-mail: gunther.theischinger@environment.nsw.gov.au

13514. Trapero-Quintana, A.; Lafuente, Y.R. (2013): Diversidad y emergencia de odonatos en los Cantiles, Pro-

vincia Granma, Cuba. *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)* 53: 217-222. (in Spanish, with English summary) ["In this study we show the temporal variation of thirteen odonate species in a lotic habitat at Los Cantiles, Jiguani, Granma province, Cuba. The survey was conducted between August 2010 and June 2011 by means of recollecting exuviae. *Neonuera maria* was the most dominant species while the most diverse family was Libellulidae. There was a heterogeneous distribution of relative abundance in both seasons, mainly characterized by accidental species." (Authors)] Address: Trapero Quintana, A., Departamento de Biología de la Universidad de Oriente, Patricio s/n, Santiago, Cuba, CP 90500, Cuba. E-mail: atrapero@cnt.uo.edu.cu

13515. Tripon, C.; Cupsa, D. (2013): Data on the Odonata fauna of the Natura 2000 site "Lunca Inferioara a Crisului Repede" (ROSCI-0104), Bihor County, NW Romania. *Bihorean Biologist* 7(2): 99-103. (in English) [12 Odonata species have been recorded.] Address: Cupsa, Diana, University of Oradea, Faculty of Sciences, Department of Biology, Universitatii str. 1, 410087 - Oradea, Romania. E-mail: dcupsa@uoradea.ro

13516. Tsai, F.-Y.; Chi, K.-j. (2013): Wing deformation of dragonfly: Aerodynamic effects and flapping. MSc.thesis, Faculty of Science> Institute of Biological Physics, Chung Hsing University, Institute of Biophysics: (in Chinese, with English summary) ["Pterostigma is a darken region at the leading edge of the wings of many insects. It is bilayer in structure, and is thicker and heavier than the other cells of the wing. Previous study shows that a dragonfly wing with pterostigma would increase wing's bending deformation at same vibration frequency and amplitude. In this study, I further examined the mechanical characteristics and consequences of pterostigma of dragonfly wings. Firstly, I controlled the vibration amplitudes of the wing base to explore how they affect wing's bending deformation. Secondly, I applied flow visualization technology to examine the effects of pterostigma, and hence difference in bending deformation, on the flow behaviours around the flapping wings. Because of the limits of our experimental setup, I used lower vibration frequency for wings in lower wind speed to meet similarity of Strouhal number. The results show that, whether the wing had pterostigma, the wing's bending deformation was greater when the amplitude increased; however, the effect is more pronounced in wings with pterostigma. Furthermore, the Y-position of pterostigma (i.e. the amplitude of pterostigma) increased with the amplitude of wing base, indirectly implying that a flapping wing with greater bending deformation would also have higher pterostigma position. Results from the wind tunnel experiments show that removal of pterostigma would change the range and angles of wing's angle of attack. However, the effects of pterostigma on the behaviours of vortices are not conclusive." (Authors)] Address: not stated

13517. Ueda, T.; Hiroshi, J. (2013): The ecological impact of the insecticides fipronil and Imidacloprid on Sym-

petrum frequens in Japan. Tombo 55: 1-12. (in Japanese, with English summary) ["Recently the dramatic decline in population numbers of *Sympetrum frequens* has been manifest and was repeatedly reported on by many mass media in Japan. Here we reviewed the studies related to the problem. It appears that the sharp decline began in the late 1990's and numbers dropped to 1 % or less of previous population size, with regional differences. The major factor in the decline would be the application of insecticides fipronil and imidacloprid to seedling in the nursery box, and the subsequent transplanting of these into paddies. Several laboratory tests and field experiments have revealed that these new type insecticides directly and/or indirectly caused extremely high mortality in larvae of the dragonfly. A simple simulation model that reflects larval mortality caused only by these insecticides predicted well the decline pattern in some districts in Japan. The decrease of planted rice acreage since 1970 and agricultural improvement since 1963 may have caused a long-term decline in the population numbers of *S. frequens*." (Authors)] Address: Ueda, T., Ishikawa Agricultural College, Suematsu, Nonoichi, Ishikawa Pref., 921, Japan. E-mail: ueda@ishikawa-c.ac.jp

13518. Vanappelghem, C.; Houard, X.; Jolivet, S. (2013): Observations de *Chalcolestes parvidens* en Corse (Odonata: Lestidae). *Martinia* 29(2): 139-146. (in French, with English summary) ["Two surveys carried out in Corsica in June 2011 and June/July 2013 have revealed two new localities of *C. parvidens*. Localities where the genus *Chalcolestes* was observed are described. Both the criteria to identify of the females and the habitats of *C. parvidens* are discussed." (Authors)] Address: Vanappelghem, C., Conservatoire d'espaces naturels du Nord et du Pas-de-Calais, 152 boulevard de Paris. F-62190 Lillers, France. E-mail: cedric.vanappelghem@espaces-naturels.fr

13519. Vanappelghem, C.; Quevillart, R. (2013): Emergence d'*Epitheca bimaculata* sur les étangs de la Forge à Glageon (Nord) (Odonata: Corduliidae). *Martinia* 29(2): 125-138. (in French, With English summary) ["The ponds « étangs de la Forge » host the most important population of *Epitheca bimaculata* in the Nord-Pas-de-Calais region (Northern France). Some scheduled works on these ponds have led us to study the population, particularly in comparing the two ponds of the site. The emergence pattern and supports were described in 20 plots where 580 exuviae were collected. The emergences began in early May and ended on 20 May. The EM50, the cumulative emergence median, lasted seven days. We estimated that the emerging population size in 2009 was about 3000 individuals, one of the ponds being more favorable for the species. Over 66 % of the 580 collected exuviae were located more than 5 m from the water. Nearly 90 % of exuviae were found below 50 cm high. The results show that *E. bimaculata* emerges preferentially in the herbaceous layer. Finally, proposals for the conservation of the species on the site and in the area are made, including the treatment of the riparian and the

surrounding vegetation." (Authors)] Address: Vanappelghem, C., Conservatoire d'espaces naturels du Nord et du Pas-de-Calais, 152 boulevard de Paris. F-62190 Lillers, France. E-mail: cedric.vanappelghem@espaces-naturels.fr

13520. Wagh, P.; Kurhade, S. (2013): Odonata of Nandur Madhmeshwar wetland, a proposed RAMSAR site in Maharashtra, India. *Notulae Odonatologicae* 8(2): 32-35. (in English) ["In total, 21 common and widespread species are listed and their local status of abundance is marked. The documented odonate diversity is high as compared to the Ujani and Nathsagar wetlands of Maharashtra. Since the wetland fulfills some important IBA criteria, it is a prime candidate for a Ramsar site in Maharashtra." (Authors)] Address: Wagh, P., Department of Environmental Science, New Arts, Commerce and Science College, Ahmed-nagar-414001, Maharashtra, India. E-mail: prashantsinnarkar@gmail.com

13521. Wasscher, M.T.; Dumont, H.J. (2013): Life and work of Michel Edmond de Selys Longchamps (1813-1900), the founder of Odonatology. *Odonatologica* 42(4): 369-402. (in English) ["The life and times of the great Belgian odonatologist are outlined. The main sources of biographic information are his diaries (1823-1900). In addition to a sketch of his rich life, the information on his family, the castles he lived in, his travels in Europe, his immense natural history collections, on his disciples and on his contacts with contemporary odonatologists is given therein. Selys was a liberal politician, and devoted much of his time and energy to local, provincial and national political levels, as a senator and President of the Belgian Senate. He had a broad interest in natural history that far transcended the study of dragonflies. In odonatology, his work is of a particular importance: he did not only pioneer the field by describing over 700 valid species, but he consequently used wing venation as the backbone of the taxonomical system of the order. In his Last Will, Selys earmarked a large sum of money in order to stimulate the work of various specialists on the description of his large zoological collections." (Authors)] Address: Wasscher, M.T., Minstraat 15 bis, NL-3582 CA Utrecht, The Netherlands. E-mail: marcel.hilair@12move.nl

13522. Watanabe, K.; Kawashima, I.; Sasamoto, A. (2013): Notes on the larva of *Neurothemis ramburii* ramburii (Kaup in Brauer, 1866) obtained from Iriomote-jima Island, Yaeyama Islands, southern Ryukyus, Japan (Anisoptera: Libellulidae). *Tombo* 55: 83-87. (in English) ["The external morphology of the last instar larva of *N. r. ramburii* from Iriomote-jima Island, Yaeyama Islands, southern Ryukyus is described and illustrated based on the exuviae. The external characters are compared with those of the known larvae of *Neurothemis*. In addition, the ecology of the species in southern Ryukyus is briefly noted." (Authors)] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

13523. White, M.R.; Switzer, P.V. (2013): Examining the causes of rarity for the Odonata of Illinois. Transactions of the Illinois State Academy of Science 106: 13-14. (in English) ["Odonata play an important role in habitat management and conservation, but our understanding of the causes of commonness versus rarity in this group is limited. In this study we examined the causes of rarity for the Odonata of Illinois. Using S-ratings for conservation status and published habitat classifications for Illinois odonates, we investigated whether habitat type (lotic versus lentic) or habitat specificity (whether they were limited to a specific type of aquatic habitat) was related to commonness. We found that lotic species and habitat specialists were more likely to be rare than lentic and generalist species. More information, however, is needed on the distributions and natural histories of Illinois odonates if we are to more fully understand the causes of rarity in this important group." (Authors)] Address: White, Miranda, Dept of Biological Sciences, Eastern Illinois University, Charleston, IL 61920, USA

13524. Willis, C.; Samways, M.; Tarboton, W. (2013): Whistle-blowers on wetland quality. Veld & Flora December 2013: 194-196. (in English) ["Dragonflies are charismatic insects whose presence serves as an important indicator of the quality and health of South Africa's freshwater ecosystems." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

13525. Witt, J.W.; Forkner, R.E.; Kraus, R.T. (2013): Habitat heterogeneity and intraguild interactions modify distribution and injury rates in two coexisting genera of damselflies. Freshwater Biology 58(11): 2380-2388. (in English) ["(1) Sublethal effects of predation can affect both population and community structure. Despite this, little is known about how the frequency of injury varies in relation to habitat, aquatic community characteristics or between trophically similar, coexisting taxa. (2) In a tidal freshwater ecosystem, we first examined injuries (lamellar autotomy) of Enallagma and Ischnura damselfly larvae, which have unique behaviours and susceptibilities to predation, as a function of habitat type, body size and overall odonate density. We also examined relative abundance of these genera and potential anisopteran predators as a function of habitat type. (3) The frequency of injury to Enallagma was high when larvae were small and overall odonate density was high. For Ischnura, however, the frequency of injury depended on habitat and was high for small larvae in less disturbed habitats low on the shore. Ischnura were most frequently found in more disturbed habitats high on the shore, whereas Enallagma were more frequently found in less disturbed habitats low on the shore. (4) The relative importance of factors hypothesised to structure odonate communities varied between coexisting Enallagma and Ischnura. Distinctive distributions and patterns of injury for each genus provided new insights on the potential for intraguild inter-

actions to modify habitat associations in tidal freshwater ecosystems." (Authors)] Address: Witt, J.W., U.S. Environmental Protection Agency, Global Change Research Program, U.S. EPA – ORD, Mail Code: 8601P 1200 Pennsylvania Avenue, NW, Washington, DC 20460, USA. E-mail: witt.jonathan@epa.gov

13526. Wünsch, H.-W.; Gospodinova, H.; Heydrich, W. (2013): Beobachtungen zum Fortpflanzungsverhalten von *Sympecma fusca* (Odonata: Lestidae). Libellula 32(3/4): 187-192. (in German, with English summary) ["In the first days of spring 2012, between 23 March and 27 March, we observed some reproductive behavior of approximately 100 individuals of *Sympecma fusca* at different ponds in North Rhine-Westphalia, Germany. A lot of males competing for females impeded many copulations. An example of female refusal behaviour was documented by photos." (Authors)] Address: Wünsch, H.-W., Am Burgberg 11, 50126 Bergheim, Germany. E-mail: willi@waldschrat-online.de

13527. Yoosefi Lafooraki, E.Y.; Rasekhi, F.; Shayanmehr, M. (2013): Introduction of some Odonata species (Insecta) from northern Iran. Taxonomy and biosystematics 5(17): 3-12. (in Persian, with English summary) [Mazandaran province, Iran; **Anax parthenope*, **Calopteryx splendens* intermedia, *Calopteryx splendens orientalis*, **Coenagrion vanbrinckae*, *Crocothemis erythraea*, **Epallage fatime*, **Ischnura pumilio*, **Lestes virens*, **Libellula depressa*, **Orthetrum albistylum*, *Orthetrum sabina*, **Platycnemis dealbata*, *Sympetrum fonscolombei* and *S. striolatum*. Species marked by asterisk were recorded for the first time for Mazandaran fauna] Address: Shayanmehr, M., Dept of Plant Protection, Faculty of Crop Sciences, Sari University of Agricultural Sciences and Natural Resources, Sari, Iran. E-mail: m.shayanmehr@sanru.ac.ir

13528. Zawal, A.; Buczyński, P. (2013): Parasitism of Odonata by *Arrenurus* (Acari: Hydrachnidia) larvae in the Lake Świdwie, nature reserve (NW Poland). Acta Parasitologica 58(4): 486-495. (in English) ["Larvae of a vast majority of water mite species are parasites of aquatic insects. Owing to this, they migrate to new localities, and are able to survive unfavourable environmental conditions. This also concerns species from subgenus *Arrenurus* s. str., parasites of dragonflies. The detailed analysis of this phenomenon, however, has only been possible in the last several years, since the key to the identification of larvae from genus *Arrenurus* Dug. was published. In 2010, the parasitism of *Arrenurus* s. str. larvae on dragonflies in the Lake Świdwie reserve (NW Poland) was analysed. Larvae of 9 species of water mites were recorded on 107 imagines of dragonflies from 8 species. The following were identified as hosts of water mites for the first time: *Anax imperator*, *Libellula quadrimaculata*, and *Leucorrhinia caudalis*. The highest prevalence occurred in the case of: *Erythromma najas* and *Lestes dryas* (100%), *Coenagrion pulchellum* (96.5%), and *C. puella* (80.0%). *Coenagrion pulchellum* was in-

fested by 9 species of parasites, *C. puella* by 6, and *Erythromma najas* and *Lestes dryas* by three species. The highest number of host species occurred in the case of *Arrenurus maculator* (5); followed by *A. cuspidator*, *A. batillifer* cf., *A. bicuspidator*, and *A. tetracyphus* (3 each); *A. papillator*, *A. tricuspikator*, and *A. bruzelii* (2 each), and *A. claviger* (1). Differentiation of preferences of particular parasites towards various parts of the host body was observed, probably related to the coevolution of parasites and hosts, and competition between the host species. The body sizes of the parasites suggest that approximately 50% of body size growth of water mites from subgenus *Arrenurus* s. str. occurs at the stage of parasitic larva." (Authors)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

13529. Zhang, H.-m.; Cai, Q.-h. (2013): Discovery of four new species of the genus *Planaeschna* from Southwestern China (Odonata: Anisoptera: Aeshnidae). *Zootaxa* 3741(2): 254-264. (in English) ["Four new species of the genus *Planaeschna*, *P. robusta* sp. nov. (holotype male; Mt. Emeishan, Emeishan City, Sichuan Province, China, 16. VIII. 2007), *P. maculifrons* sp. nov. (holotype male; Mt. Emeishan, Emeishan City, Sichuan Province, China, 20. VIII. 2007), *P. caudispina* sp. nov. (holotype male; Mt. Qingchengshan, Dujiangyan City, Sichuan Province, China, 30. VIII. 2007) and *P. monticola* sp. nov. (holotype male; Sanjiacun Stream, Fengyi Town, Dali City, Yunnan Province, China, 19. XI. 2012) are described and illustrated and diagnosed from their congeners. All the holotypes have been deposited in the Collection of Aquatic Animals, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan City, Hubei Province, China. Brief notes on the biology of each species are also provided." (Authors)] Address: Cai, Q.-h., State Key Laboratory of Freshwater Ecology and Biotechnology, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan 430072, China. E-mail: qhcai@ihb.ac.cn

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13530. Boonsoong, B.; Chainthong, D. (2014): Description of the final-instar larva of *Heliogomphus selysi* Fraser (Odonata: Gomphidae). *Zootaxa* 3764(4): 482-488. (in English) ["The final instar larva of *H. selysi* Fraser, 1925, is described and illustrated for the first time based on specimens collected in Ratchaburi province, Thailand. Antennae, legs and paraprocts are similar morphologically to *H. kelantanensis* and *H. scorpio* but with a unique combination of dorsal hooks and lateral spines." (Authors)] Address: Boonsoong, B., Animal Systematics and Ecology Speciality Research Unit (ASESRU), Dept of Zoology, Faculty of Science, Kasetsart University, Bangkok, Thailand 10900. E-mail: fscibtb@ku.ac.th

13531. De Marco Jr., P.; Nogueira, D.S.; Costa Correa, C.; Vieira, T.B.; Dias Silva, K.; Pinto, N.S.; Bichsel, D.; Hi-

rota, A.S.V.; Vieira, R.R.S.; Carneiro, F.M.; Bispo de Oliveira, A.A.; Carvalho, P.; Bastos, R.P.; Ilg, C.; Oertli, B. (2014): Patterns in the organization of Cerrado pond biodiversity in Brazilian pasture landscapes. *Hydrobiologia* 723: 87-101. (in English) ["There is a worldwide concern on the loss of pond biodiversity in human dominated landscapes. Nevertheless, agricultural activities appear to increase pond number in the Brazilian Cerrado through damming streams for cattle raising. These man-made ponds may represent important landscape features, but their importance to regional biodiversity has not yet been studied. Here, we evaluated differences in alpha and beta diversity under a multi-taxonomic approach, as well as tested pond size as the main driver of local species richness. We also assessed the importance of environmental heterogeneity through the analysis of the regional species accumulation curves (SAC). The overall result suggests that species turnover was the major component of regional biodiversity for all groups. Major physical and chemical water conditions had no effects on algae, macrophytes, water bugs, and birds species richness. Pond size had a significant effect on Odonata and fish species richness, while water beetles and amphibians were influenced by trophic conditions. Results from regional SAC show variations among different taxonomic groups regarding landscape heterogeneity: only algae, fish, and birds do not reached to an asymptote and had higher z-values. Our results highlight the importance of ponds for biodiversity conservation in increasingly agricultural landscapes in central Brazil." (Authors)] Address: De Marco, P., Laboratório Ecologia Teórica e Síntese, Departamento de Biologia Geral, Universidade Federal de Goiás, BR-74001-970, Goiania, GO, Brazil. E-mail: pdemarco@icb.ufg.br

13532. Degabriele, G. (2014): An overview of the dragonflies and damselflies of the Maltese Islands (Central Mediterranean) (Odonata). *Bulletin of the Entomological Society of Malta* 6 (2013): 5-127. (in English) ["17 species of odonates have been recorded on the Maltese Islands of which *Pantala flavescens* represents a new record. Diagnostic features of the adult and larval stages of these species are described in this work. The work also combines findings from previous literature on Maltese Odonata with information gathered from fieldwork data in order to give an insight on the current situation of the Odonata of the Maltese Islands and serves as an identification guide to both adults and larvae of these insects. The anatomy and physiology of the larval and adult forms of these insects, which are discussed in this work, are adapted to the predatory lifestyle which they lead. The fact that odonate larvae frequent different habitats from adults helps to reduce competition for resources. Adult odonates can be found in a number of local habitats, mostly near freshwater but also brackish water bodies since freshwater is a scarce natural resource on the Maltese Islands. Global warming is affecting the distribution range of odonates in the Mediterranean - while some species may be on the decline, others which can thrive in

hot dry environments are progressively being recorded in the Mediterranean and southern Europe, including the Maltese Islands. Relatively little work on the Odonata of the Maltese Islands has been done previous to the present work. Most of this involves listing of locally recorded species; very little research investigates odonate behaviour and distribution. No information exists as to why species such as *Sympetrum striolatum*, and *Orthetrum cancellatum* have become progressively uncommon in recent years, and therefore more research is required on the matter. Because of limiting water resources, freshwater habitats on the Maltese Islands are quickly drained of water, which may be used for agricultural purposes. This may tend to reduce species richness of local odonates. Biologists are now considering dragonflies as biological indicators of a healthy environment and make recommendations in order to preserve the habitats frequented by these insects." (Author)] Address: Degabriele, G., Dept of Biology, Junior College, Univ. of Malta, Msida MSD 1252, Malta. E-mail: godwin.degabriele@um.edu.mt

13533. Dijkstra, K.-D.B.; Monaghan, M.T.; Pauls, S.U. (2014): Freshwater biodiversity and aquatic insect diversification. *Annual Review of Entomology* 59: 143-163. (in English) ["Inland waters cover less than 1% of Earth's surface but harbor more than 6% of all insect species: Nearly 100,000 species from 12 orders spend one or more life stages in freshwater. Little is known about how this remarkable diversity arose, although allopatric speciation and ecological adaptation are thought to be primary mechanisms. Freshwater habitats are highly susceptible to environmental change and exhibit marked ecological gradients. Standing waters appear to harbor more dispersive species than running waters, but there is little understanding of how this fundamental ecological difference has affected diversification. In contrast to the lack of evolutionary studies, the ecology and habitat preferences of aquatic insects have been intensively studied, in part because of their widespread use as bioindicators. The combination of phylogenetics with the extensive ecological data provides a promising avenue for future research, making aquatic insects highly suitable models for the study of ecological diversification." (Authors) The study includes data on Odonata.] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nbn.nl

13534. Dohrmann, M. (2014): The influence of ignoring secondary structure on divergence time estimates from ribosomal RNA genes. *Molecular Phylogenetics and Evolution* 71: 214-223. (in English) ["Highlights: •Model choice can have an influence on molecular divergence time estimates. •For rDNA paired regions this has only been investigated once. •reinvestigate this issue using empirical data. •Ignoring structure biases age estimates but this is negligible in a Bayesian setting. •The bias is not randomly distributed across nodes. Genes coding for ribosomal RNA molecules (rDNA) are among the most popular markers in molecular phylogenetics and evolu-

tion. However, coevolution of sites that code for pairing regions (stems) in the RNA secondary structure can make it challenging to obtain accurate results from such loci. While the influence of ignoring secondary structure on multiple sequence alignment and tree topology has been investigated in numerous studies, its effect on molecular divergence time estimates is still poorly known. Here, I investigate this issue in Bayesian Markov Chain Monte Carlo (BMCMC) and penalized likelihood (PL) frameworks, using empirical datasets from dragonflies (Odonata: Anisoptera) and glass sponges (Porifera: Hexactinellida). My results indicate that highly biased inferences under substitution models that ignore secondary structure only occur if maximum-likelihood estimates of branch lengths are used as input to PL dating, whereas in a BMCMC framework and in PL dating based on Bayesian consensus branch lengths, the effect is far less severe. I conclude that accounting for coevolution of paired sites in molecular dating studies is not as important as previously suggested, as long as the estimates are based on Bayesian consensus branch lengths instead of ML point estimates. This finding is especially relevant for studies where computational limitations do not allow the use of secondary-structure specific substitution models, or where accurate consensus structures cannot be predicted. I also found that the magnitude and direction (over- vs. underestimating node ages) of bias in age estimates when secondary structure is ignored was not distributed randomly across the nodes of the phylogenies, a phenomenon that requires further investigation." (Author)] Address: Dohrmann, M., Ludwig-Maximilians- Univ. Munich, Dep.t of Earth & Environmental Sciences, Palaeontology & Geobiology, Molecular Geo- & Palaeobiology Lab, Richard-Wagner-Str. 10, 80333 Munich, Germany. E-mail: m.dohrmann@lrz.uni-muenchen.de

13535. Dow, R.A.; Silviu, M.J. (2014): Results of an Odonata survey carried out in the peatlands of Central Kalimantan, Indonesia, in 2012. *Faunistic Studies in South-East Asian and Pacific Island Odonata* 7: 1-37. (in English) ["The results of a survey of Odonata (dragonflies and damselflies) in the peatlands of Central Kalimantan, Indonesia, in 2012 are presented. Fifty four species of Odonata found in the area in June-July 2012 are listed, along with brief notes and the locations in which they were found. Of the species found, twelve had not been recorded in Central Kalimantan previously, and of these at least four are completely new to science. Six species, originally described from Central Kalimantan and not recorded any-where since 1953, were rediscovered. At least sixteen of the species found during the survey are considered to be of conservation concern. The discovery of at least four new species to science in a relatively short survey indicates a high probability of occurrence of many more species that are awaiting discovery, and that many undiscovered species may be lost or highly threatened because of the rapid demise of peat swamp forest habitats. A checklist of the Odonata known from Central Kalimantan is provided in an appendix." (Authors)] Ad-

dress: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

13536. Faithpraise, F.; Chatwin, C.; Obu, J.; Olawale, B.; Young, R.; Birch, P. (2014): Sustainable control of *Anopheles* mosquito population. *Environment, Ecology & Management*, Vol 2014, Article ID 3: 19 pp. (in English) ["Despite the widespread use of insecticides, community engagement programmes and preventive measures mosquito borne diseases are growing and new tools to prevent the spread of disease are urgently needed. An alternative control measure for the eradication of *Anopheles* mosquitoes is suggested by the use of a Sustainable Control Model, which demonstrates the capability of Odonata, a natural beneficial predator, to exercise control over *Anopheles* mosquitoes in less than 140 days." (Authors)] Address: Faithpraise, Fina, Department of Zoology & Environmental Biology, University of Calabar, Nigeria

13537. Froufe, E.; Ferreira, S.; Boudot, J.-P.; Alves, P.C.; Harris, D.J. (2014): Molecular phylogeny of the Western Palearctic *Cordulegaster* taxa (Odonata: Anisoptera: Cordulegasteridae). *Biological Journal of the Linnean Society* 111(1): 49-57. (in English) ["In the present study, we report the first molecular phylogeny for the Western Palearctic *Cordulegaster* genus. We sequenced fragments of both mitochondrial and nuclear genes [cytochrome c oxidase I (COI) and Internal Transcribed Spacer-1 (ITS-1)] from eight species and 13 subspecies, from western, southern and central Europe, Turkey, and Morocco. Our data support the existence of two major groups corresponding to the traditional *boltonii*- and *bidentata*-groups. Both groups are monophyletic based on COI sequences and the distinctiveness of *Cordulegaster princeps*, *Cordulegaster trinacriae*, *Cordulegaster picta* and *Cordulegaster heros* relative to *Cordulegaster boltonii*, and *Cordulegaster helladica* and *Cordulegaster insignis* relative to *Cordulegaster bidentata*, is confirmed. All species are also monophyletic for ITS-1, with the exception of *Cordulegaster helladica buchholzi*, which shares the haplotype with *C. insignis*. Although moderate levels of genetic diversity were found within *C. boltonii*, there was no clear separation among the four subspecies, with the exception of the populations of *Cordulegaster boltonii algerica* from North Africa. Similarly, no genetic differentiation was found between the two subspecies of *C. bidentata*, *Cordulegaster bidentata bidentata* and *Cordulegaster bidentata sicilica*." (Authors)] Address: Froufe, Elsa, CIIMAR, Centro Interdisciplinar de Investigação Marinha e Ambiental, Rua dos Bragas, 289, 4050-123 Porto, Portugal. E-mail: elsafroufe@gmail.com

13538. Grant, M.; Robinson, A.; Fincke, O.M. (2014): Use of stable isotopes to assess the intraspecific foraging niche of males and female colour morphs of the damselfly *Enallagma hageni*. *Ecological Entomology* 39(1): 109-117. (in English) ["(1) For the first time, diet and isotopic niche overlap among males and two female-specific colour

morphs of a damselfly were quantified to test whether sexual conflict could cause intra-sexual diet variation. (2) Relative to the green female morph, blue females, similar in coloration to the blue males, may be more likely overlooked by mate-searching males. If so, blue females should be more likely to forage unmolested at lake shores, where the density of males and prey is high. The blue morph's isotopic niche space should therefore differ from that of green females and be more similar to that of males. (3) Stable isotope analyses of two Michigan populations failed to support these predictions. Despite population differences in $\delta^{13}\text{C}$ and diet, within sites isotopic niches overlapped among males and females, with little difference between the two female colour morphs. (4) Males exhibited the broadest isotopic niche area, which increased across years, whereas that of blue females became more restricted, possibly due to greater sexual harassment in forest feeding sites. (5) There was an unexpectedly high shift in $\delta^{13}\text{C}$ from prey to predator. Future work is merited to determine whether such trophic shifts are characteristic of Odonata, a group of important aquatic and terrestrial predators." (Authors)] Address: Fincke, Ola M., Ecology and Evolutionary Biology Program, Department of Biology, University of Oklahoma, Norman, OK 73019, USA. E-mail: fincke@ou.edu

13539. Groner, M.L.; Rollins-Smith, L.A.; Reinert, L.K.; Hempel, J.; Bier, M.E.; Relyea, R.A. (2014): Interactive effects of competition and predator cues on immune responses of leopard frogs at metamorphosis. *The Journal of Experimental Biology* 217: 351-358. (in English) ["Recent hypotheses suggest that immunosuppression, resulting from altered environmental conditions, may contribute to increased incidence of amphibian disease around the world. Antimicrobial peptides (AMPs) in amphibian skin are an important innate immune defense against fungal, viral and bacterial pathogens. Their release is tightly coupled with release of the stress hormone, norepinephrine. During metamorphosis, AMPs may constitute the primary immune response in the skin of some species because acquired immune functions are temporarily suppressed in order to prevent autoimmunity against new adult antigens. Suppression of AMPs during this transitional stage may impact disease rates. We exposed leopard frog tadpoles (*Lithobates pipiens*) to a factorial combination of competitor (including *Anax junius*) and caged-predator environments and measured their development, growth, and production of hydrophobic skin peptides after metamorphosis. In the absence of predator cues, or if the exposure to predator cues was late in ontogeny, competition caused more than a 250% increase in mass-standardized hydrophobic skin peptides. Predator cues caused a decrease in mass-standardized hydrophobic skin peptides when the exposure was late in ontogeny under low competition, but otherwise had no effect. Liquid chromatography mass spectrometry/mass spectrometry of the skin peptides showed that they may include three previously uncharacterized AMPs in the brevinin and temporin families. Both of these peptide

families have previously been shown to inhibit harmful microbes including *Batrachochytrium dendrobatidis*, the fungal pathogen associated with global amphibian declines. Our study shows that amphibians may be able to adjust their skin peptide defenses in response to stressors that are experienced early in ontogeny and that these effects extend through an important life history transition." (Authors)] Address: Groner, Maya, Univ. of Prince Edward Island, Canada. E-mail: mgroner@upepei.ca

13540. Huang, S.c.; Chiou, T.-h.; Marshall, J.; Reinhard, J. (2014): Spectral sensitivities and color signals in a polymorphic damselfly. *PLoS ONE* 9(1): e87972. doi: 10.1371/journal.pone.0087972: 8 pp. (in English) ["Animal communication relies on conspicuous signals and compatible signal perception abilities. Good signal perception abilities are particularly important for polymorphic animals where mate choice can be a challenge. Behavioral studies suggest that polymorphic damselflies use their varying body colorations and/or color patterns as communication signal for mate choice and to control mating frequencies. However, solid evidence for this hypothesis combining physiological with spectral and behavioral data is scarce. We investigated this question in the Australian common blue tail damselfly, *Ischnura heterosticta*, which has pronounced female-limited polymorphism: andromorphs have a male-like blue coloration and gynomorphs display green/grey colors. We measured body color reflectance and investigated the visual capacities of each morph, showing that *I. heterosticta* have at least three types of photoreceptors sensitive to UV, blue, and green wavelength, and that this visual perception ability enables them to detect the spectral properties of the color signals emitted from the various color morphs in both males and females. We further demonstrate that different color morphs can be discriminated against each other and the vegetation based on color contrast. Finally, these findings were supported by field observations of natural mating pairs showing that mating partners are indeed chosen based on their body coloration. Our study provides the first comprehensive evidence for the function of body coloration on mate choice in polymorphic damselflies." (Authors)] Address: Huang, S.c., Queensland Brain Institute, Univ. Queensland, St Lucia, Queensland, Australia. E-mail: shaochang.huang@uqconnect.edu.au

13541. Ilg, C.; Oertli, B. (2014): How can we conserve cold stenotherm communities in warming Alpine ponds?. *Hydrobiologia* 723: 53-62. (in English) ["Freshwater biodiversity has shown to be highly vulnerable to climate warming, alpine cold stenotherm populations being especially at risk of getting extinct. This paper aims at identifying the environmental factors favouring cold stenotherm species in alpine ponds. This information is required to provide management recommendations for habitats restoration or creation, needed for the mitigation of the effects of climate warming on alpine freshwater biodiversity. Cold stenotherm species richness as well as total (i.e. stenotherm and eurytherm) richness were ana-

lyzed for aquatic plants, Coleoptera and Odonata in 26 subalpine and alpine ponds from Switzerland and were related to environmental factors ecologically relevant for pond biodiversity. Our results confirmed that the set of environmental variables governing pond biodiversity in alpine or subalpine ponds is specific to altitude. Altitude and macrophyte presence were important drivers of cold stenotherm and total species richness, whereas connectivity did not show any significant relation. Therefore, the management of pond biodiversity has to be 'altitude-specific'. Nevertheless, cold stenotherm species from the investigated alpine ponds do not show some specific requirements if compared to the other species inhabiting these ponds. Therefore, both total and cold stenotherm species richness could be favoured by the same management measures." (Authors)] Address: Ilg, Christiane, hepia Geneva Technology, Architecture and Landscape, University of Applied Sciences Western Switzerland, 150 route de Presinge, 1254, Jussy, Geneva, Switzerland. E-mail: christiane.ilg@hesge.ch

13542. Iyengar, V.K.; Castle, T.; Mullen, S.P. (2014): Sympatric sexual signal divergence among North American Calopteryx damselflies is correlated with increased intra- and interspecific male-male aggression. *Behavioral Ecology and Sociobiology* 68(2): 275-282. (in English) ["Divergence of sexual signals in sympatry can arise as a consequence of (1) interspecific competition for resources, (2) selection against maladaptive hybridization, or (3) as a result of selection to reduce the cost of interspecific aggression; termed agonistic character displacement (ACD). Calopterygid damselflies have emerged as a model system for studying the evolution of divergent sexual signals due to the repeated evolution of sympatric species pairs with fully and partially melanized wings. Damselfly wing patterns function during both courtship and territory defense. However, the relative contributions of natural and sexual selection to phenotypic divergence and enhanced isolation in sympatry remain unclear in many cases. Here, we investigated the hypothesis that interference competition, in the form of increased interspecific male-male aggression, drives the evolution of character displacement in sympatry between two species of North American damselflies, *Calopteryx aequabilis* and *C. maculata*, that show no evidence of ecological divergence or ongoing hybridization. In paired behavioral trials, we found that interspecific male aggression related to territory defense varied between site, species, and as a function of the relative abundance of con- vs. hetero-specific males. Specifically, we found that large-spotted *C. aequabilis* males received increased intra- and interspecific aggression but that aggression against large-spotted males declined during the middle of the flight season when both species were equally abundant. Based on these results, we suggest that ACD leads to enhanced species recognition, and may be a common outcome of the antagonism between interspecific male-male competition and the countervailing force of intra-specific sexual selection favoring increased wing melani-

zation among territorial damselfly species." (Authors)] Address: Mullen, S.P., Dept of Biology, Boston University, 5 Cummington Mall, Boston, MA, 02215, USA. E-mail: smullen@bu.edu

13543. Janssens, L.; Stoks, R. (2014): Non-pathogenic aquatic bacteria activate the immune system and increase predation risk in damselfly larvae. *Freshwater Biology* 59(2): 417-426. (in English) [(1) Pathogens can increase vulnerability to predation through their harmful effects on hosts. Recently, it was shown that the mere activation of the immune system by pathogens may increase the host's risk of predation. Here, we test whether exposure to non-pathogenic bacteria also activates the immune system and thereby increases vulnerability to predation. (2) We exposed *Enallagma cyathigerum* damselfly larvae to a non-pathogenic strain of the bacterium *Escherichia coli* and measured immune defence, anti-predator behaviour and survival times in the presence of larval dragonfly predators. To evaluate whether non-pathogenic bacteria also generated energy-based trade-offs leading to other fitness costs, we also quantified growth rate and survival in the absence of predators. (3) Exposure to the non-pathogenic bacterium did not affect survival in the absence of the predator but increased growth rate, possibly a response to reduce exposure time to the bacterium. Larvae exposed to the bacterium activated their immune response as shown by an increase in the activity of phenoloxidase and the number of haemocytes. The bacterium affected anti-predator traits involved in avoiding detection by predators as well as traits involved in escape after detection. Pre-exposed larvae showed higher activity levels and further increased the number of feeding strikes in the presence of predation risk, possibly driven by energetic constraints. Pre-exposed larvae swam less often when attacked, but faster. This impaired anti-predator response came at the ecological cost of increased vulnerability to predation. (4) Our study demonstrated that exposure to non-pathogenic bacteria increases vulnerability to predation, which is a novel type of antagonistic interaction. This highlights the unexplored possibility that non-pathogens may play a role in maintaining variation in immune defence through insidious effects on predator-prey interactions. Since non-pathogenic bacteria can be very abundant, this unexplored ecological cost of immune system activation in terms of increased predation may have major consequences in natural systems and may provide an unexplored new force underlying variation in immune defence." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

13544. Kalita, G.J.; Boruah, B.; Das, G.N. (2014): An observation on odonata (damselflies and dragonflies) fauna of Manchabandha reserve forest, Baripada, Odisha. *Advances in Applied Science Research* 5(1): 77-83. (in English) [India; the area is located at 21°54'21.23"N &

86°45'10.35" E. 48 Odonata species were recorded between September 2012 and October 2013, covering all 3 seasons viz. summer (March to June), monsoon (July to October) and winter (November to February).] Address: Kalita, G.J., Department of Wildlife & Biodiversity Conservation, North Orissa University, India

13545. Kaur Kohli, M.; Schneider, T.; Müller, O.; Ware, J.L. (2014): Counting the spots: a molecular and morphological phylogeny of the spotted darner *Boyeria* (Odonata: Anisoptera: Aeshnidae) with an emphasis on European taxa. *Systematic Entomology* 39: 190-195. (in English) ["*Boyeria irene* and *B. cretensis* are species of spotted dragonflies belonging to the 'darner' family, Aeshnidae. In 1991, Peters classified *Boyeria* from Crete as *B. cretensis*, based on adult morphological characters. In this study, we used molecular evidence to determine if indeed *B. irene* and *B. cretensis* are different species. DNA was sequenced from samples of *B. irene* (from France, Switzerland, Tunisia, Spain and Italy) and *B. cretensis* (from Crete). These species were recovered as two different clades with strong support. We conclude that *B. irene* and *B. cretensis* are different species, with evidence based on molecular and morphological differences. In addition, we present the first phylogenetic hypothesis for *Boyeria* for which we have sequenced all but three species. Lastly, we discuss different scenarios that may have led to the present-day distribution and speciation patterns of Mediterranean *Boyeria*." (Authors)] Address: Kaur Kohli, Manpreet, 195 University Ave, Boyden Hall 431, Rutgers University, Newark, NJ 07102, USA. E-mail: mkk24@njit.edu

13546. Kissling, W.D.; Pattemore, D.E.; Hagen, M. (2014): Challenges and prospects in the telemetry of insects. *Biological Reviews*: (in English) ["Radio telemetry has been widely used to study the space use and movement behaviour of vertebrates, but transmitter sizes have only recently become small enough to allow tracking of insects under natural field conditions. Here, we review the available literature on insect telemetry using active (battery-powered) radio transmitters and compare this technology to harmonic radar and radio frequency identification (RFID) which use passive tags (i.e. without a battery). The first radio telemetry studies with insects were published in the late 1980s, and subsequent studies have addressed aspects of insect ecology, behaviour and evolution. Most insect telemetry studies have focused on habitat use and movement, including quantification of movement paths, home range sizes, habitat selection, and movement distances. Fewer studies have addressed foraging behaviour, activity patterns, migratory strategies, or evolutionary aspects. The majority of radio telemetry studies have been conducted outside the tropics, usually with beetles (Coleoptera) and crickets (Orthoptera), but bees (Hymenoptera), dobsonflies (Megaloptera), and dragonflies (Odonata) have also been radio-tracked. In contrast to the active transmitters used in radio telemetry, the much lower weight of harmonic radar

and RFID tags allows them to be used with a broader range of insect taxa. However, the fixed detection zone of a stationary radar unit (<1 km diameter) and the restricted detection distance of RFID tags (usually <1–5 m) constitute major constraints of these technologies compared to radio telemetry. Most of the active transmitters in radio telemetry have been applied to insects with a body mass exceeding 1g, but smaller species in the range 0.2–0.5 g (e.g. bumblebees and orchid bees) have now also been tracked. Current challenges of radio-tracking insects in the field are related to the constraints of a small transmitter, including short battery life (7–21 days), limited tracking range on the ground (100–500 m), and a transmitter weight that sometimes approaches the weight of a given insect (the ratio of tag mass to body mass varies from 2 to 100%). The attachment of radio transmitters may constrain insect behaviour and incur significant energetic costs, but few studies have addressed this in detail. Future radio telemetry studies should address (i) a larger number of species from different insect families and functional groups, (ii) a better coverage of tropical regions, (iii) intraspecific variability between sexes, ages, castes, and individuals, and (iv) a larger tracking range via aerial surveys with helicopters and aeroplanes equipped with external antennae. Furthermore, field and laboratory studies, including observational and experimental approaches as well as theoretical modelling, could help to clarify the behavioural and energetic consequences of transmitter attachment. Finally, the development of commercially available systems for automated tracking and potential future options of insect telemetry from space will provide exciting new avenues for quantifying movement and space use of insects from local to global spatial scales." (Authors)] Address: Kissling, W.D., Ecoinformatics & Biodiversity, Department of Bioscience, Aarhus University, Aarhus C, Denmark. E-mail: danilkissling@web.de

13547. Koch, K.; Wagner, C.; Sahlén, G. (2014): Farmland versus forest: comparing changes in Odonata species composition in western and eastern Sweden. *Insect Conservation and Diversity* 7(1): 22-31. (in English) ["Despite the loss of natural ecosystems in the developed world during the past millennia, anthropogenic landscapes still sustain much biodiversity. Our question was, whether ten year changes in regional Odonata faunas are comparable between farmland and forested areas, or if the species pool of farmland areas respond in other ways than that of forest. We used data of dragonfly larvae collected from 16 lakes in a farmland area in south-western Sweden in the years 2002 and 2011/12, and compared these to data from 34 lakes in a forest area in south-eastern Sweden in the years 1996 and 2006. The species-richness in the agricultural region increased by 17% but decreased by 13% in the forested region. The changes in occurrence and regional distribution were similar in both areas, affecting 71% and 69% of the species pool. Average extinction rates were comparable between the agricultural and the forested region (38% and

43%) while colonisation rates differed greatly (64% and 114%). The species composition differed between the regions; the forest lakes harboured a 29% larger species pool. It is possible that in the forested region, the regional species pool in areas surrounding the study sites could stabilise the extinction and have a positive effect on changes in species composition. We assume that the different habitat structures of the waters in the agricultural and the forest regions and changes in temperature are the main driving forces behind the shifts. The mean seasonal air temperature has increased by circa 0.5 °C in both regions, when comparing ten-year periods before each sampling year." (Authors)] Address: Koch, Kamilla, Department of Ecology, Johannes Gutenberg-University of Mainz, Becherweg 13, 55128 Mainz, Germany. E-mail: kochka@uni-mainz.de

13548. Kosterin, O.E. (2014): Corrigenda to Cambodian Odonata reports published by O.E. Kosterin between 2010 and 2012. *International Dragonfly Fund - Report 67*: 95-96. (in English) [The correction includes a paragraph missing in Kosterin, O.E. 2012a. Odonata of the Cambodian coastal regions in late rainy season of 2011. *International Dragonfly Fund Report 45*: 1-102, Geographical coordinates for some localities, earlier incorrectly inferred from GoogleEarth, were now verified by GPS, and a misspelling.] Address: Kosterin, O.E., Institute of Cytology & Genetics SB RAS, Acad. Lavrentyev ave. 10, Novosibirsk, 630090, Russia; Novosibirsk State University, Pirogova str. 2, Novosibirsk, 630090, Russia. E-mail: kosterin@bionet.nsc.ru

13549. Kosterin, O.E. (2014): Odonata of the south-west and north-east of Cambodia as studied in early rainy season of 2013. *International Dragonfly Fund - Report 67*: 1-94. (in English) ["Results of an odonatological survey of the coastal SW regions and continental NE regions of Cambodia in May 22 - June 8, 2013 are presented. All Odonata recorded are listed by localities. Of 107 Odonata species encountered, 104 were identified to species level, of which 15 are reported for the first time for Cambodia, namely *Macromidia genialis shanensis* Fraser, 1927 in Koh Kong Province, *Chalibeothemis fluviatilis* Lieftinck, 1933 in Kampong Saom Province and *Ceriagrion azureum* (Selys, 1891), *Prodasineura coerulea* Fraser, 1932, *Protosticta caroli* van Tol, 2008; *Gomphidia abbotti* Williamson, 1907, *Lamelligomphus castor* (Lieftinck, 1941), *Macrogomphus kerri* Fraser, 1922, *Nychogomphus duaricus* (Fraser, 1924), *Orientogomphus minor* (Laidlaw, 1931), *Macromia aculeata* Fraser, 1927, *Macromia chaiyaphumensis* Hämäläinen, 1985, *Macromia cincta* (Rambur, 1842), *Nesoxenia lineata* (Selys, 1879) and *Palpopleura sexmaculata* (Fabricius, 1787) in Ratanakiri Province. Besides, *Ceriagrion indochinense* Asahina, 1967 is confirmed for Cambodia. Cambodian specimens of *Hemicordulia* sp. are reidentified as *Hemicordulia tenera* ssp. The country list now reaches 152 named species. Of them, most interesting are 5 species with generally Malay ranges: *Archibasis viola*, *Aethriamanta gracilis*, *M. cincta*, *C. fluviatilis* and

Nesoxenia lineata. Characters and/or taxonomy are also discussed of *Vestalis gracilis* (Rambur, 1842), *Euphaea masoni* Selys, 1859, *Rhinagrion viridatum* Fraser, 1938, *Aciagrion* spp., *Archibasis* spp., *P. caroli*, *Gynacantha sub-interrupta* Rambur, 1842, *Idionyx thailandica* Hämäläinen, 1985, *Neurothemis fluctuans* (Fabricius, 1793) and *P. sexmaculata*. Notes on habitats and habits of some species are provided. General notes on the areas and their Odonata as well as field impressions are briefly outlined and illustrated by photos." (Author)] Address: Kosterin, O.E., Institute of Cytology & Genetics SB RAS, Acad. Lavrentyev ave. 10, Novosibirsk, 630090, Russia; Novosibirsk State Univ., Pirogova str. 2, Novosibirsk, 630090, Russia. E-mail: kosterin@bionet.nsc.ru

13550. Kutcher, T.E.; Bried, J.T. (2014): Adult Odonata conservatism as an indicator of freshwater wetland condition. *Ecological Indicators* 38(1): 31-39. (in English) ["Highlights: • Coefficients of conservatism can be empirically estimated for adult Odonata. • Adult Odonata conservatism can be used to evaluate freshwater wetland condition. • Adult Odonata respond predictably to both in-wetland and buffer disturbances. • Odonata conservatism did not vary with sampling effort, unit size, or wetland class. There is a growing need to identify effective and efficient biological indicators for wetland assessment, and adult Odonata possess several attributes that make them attractive for this application. We introduce a general indicator of freshwater wetland condition based on objectively estimated adult Odonata species conservatism, or sensitivity to human disturbances. We used an extensive opportunistic survey dataset from Rhode Island (USA) to empirically assign a coefficient of conservatism (CoC) to each of 135 Odonata species, based on their exclusivity to categories of degradation among 510 wetlands; the mean CoC of species observed in the adult stage was applied as an index of wetland integrity. An independent sample of 51 wetlands was also drawn from the opportunistic survey to test the performance of the index relative to human disturbance, as measured by multimetric rapid assessment and surrounding impervious surface area. The index was well predicted by both disturbance measures and showed no evidence of dependence on sampling effort, wetland size, or geomorphic class. Our findings suggest that conservatism of adult Odonata averaged across species may provide a robust indicator of freshwater wetland condition. And because adult Odonata are generally easy to identify, especially relative to larval Odonata, the index could be particularly useful for wetland assessment. Our straightforward empirical approach to CoC estimation could be applied to other existing spatially referenced Odonata datasets or to other species assemblages." (Authors)] Address: Bried, J., Dept of Zoology, Oklahoma State Univ., 501 Life Sciences West, Stillwater, OK 74078, USA

13551. Lee, M. (2014): Dragonfly wings: Special structures for aerial acrobatics. In: Lee, M. (ed): Remarkable natural material surfaces and their engineering potential.

Springer: 65-77. (in English) ["Over history, dragonflies have been found across the globe, allowing a rich multitude of culture and symbolism to be developed around these four-winged creatures. For example, in Native American history, dragonflies were symbols of activity and swiftness and were often associated with horses. In Japanese history, these insects were considered to serve as winged mounts for the Hotoke-Sama, or August Spirits of the Ancestors. Among Buddhists, the Hotoke-Sama were thought to return on August 15th, riding dragonflies into their old homes to be reunited with their families (Mitchell and Lasswell, *A dazzle of dragonflies*. Texas A&M University Press, College Station, 2005). Though such folklore may have diffused over time as scientific research dedicated to dragonflies began, fascination with their flying and maneuvering capabilities has not, perhaps even increasing in recent years. One look at the dragonfly's impressive flying abilities can convince that this attention is well afforded: they can fly sideways, forwards and backwards, hover in midair and reverse directions instantaneously, accelerate rapidly, and fly as fast as 50 km/h (Rajabi et al., *J Bionic Eng* 8:165–173, 2011). Although dragonfly wings account for less than 2 % of the total body mass, they are the main enablers of such diverse flight behavior. The membrane of dragonfly wings is thin, transparent, and film-like, supported by a framework of veins (Sun and Bhushan, *CR Mecanique* 340:3–17, 2012). It is also layered and superhydrophobic (Song et al., *Mat Sci Eng A* 457(1–2):254–260, 2007). Wing corrugation increases strength and stiffness and its ability to absorb stress against bending in the spanwise direction (Sun and Bhushan, *CR Mecanique* 340:3–17, 2012). Wing vein structure is hierarchical, consisting of a sandwich structure on the primary level and a multilayered chitinous shell and protein fibril structure on the secondary level (Chen et al., *J Bionic Eng* 9:185–191, 2012). Finally, micro- and nano-scale ripple morphologies reduce pressure drag during flight (Shelton, *Probing question: how do dimples make golf balls travel farther?* <http://news.psu.edu/story/141235/2007/06/18/research/probing-question-how-do-dimples-make-golf-balls-travel-farther>, 2007), while vein-joints contribute to wing flexibility (Donoughe et al., *J Morphol* 272(12):1409–1421, 2011). All of these properties make dragonfly wings an optimal source of bioinspiration for micro-air-vehicles (MAVs) compared to other animals such as hummingbirds and butterflies. Novel designs of MAVs have already been developed based on research of the dragonfly (Ratti & Vachtsevanos, *J Intell Robot Syst* 65:437–455, 2012)." (Author)] Address: Lee, Michelle, Mechanical Engineering, McCormick School of Engineering at Northwestern University, Evanston, IL, 60208, USA. E-mail: MichelleLee2013@u.northwestern.edu

13552. LeGrand, H.E.; Howard, T.E. (2014): The dragonflies and damselflies of North Carolina. Fifth approximation. <http://ncparks.gov/odes/5th.pdf>: 204 pp. (in English) ["This material is a Fifth Approximation account of the species of dragonflies and damselflies of North Carolina.

It is not considered to be a "publication". It is intended to be a guide or "handbook" for odonate enthusiasts, as there is, as yet, no published book on this group of insects of North Carolina. The bulk of the information is based on data for each species that has been compiled over a several decade period by the late Duncan Cuyler; most of these data are based on specimens. (Cuyler's entire specimen collection is housed at the Florida State Collection of Arthropods/International Odonata Research Institute in Gainesville, FL.) In 2009, the second author (Tom Howard) created the Dragonflies and Damselflies of North Carolina website -- <http://www.dpr.ncparks.gov/odes/a/accounts.php> -- which has an input function that allows biologists to enter their own observational data." (Authors)] Address: LeGrand, H.E., NC Natural Heritage Program 1601 MSC Raleigh, NC 27699-1601, USA. E-mail: harry.legrand@ncdenr.gov

13553. Lian, Y.; Broering, T.; Hord, K.; Prater, R. (2014): The characterization of tandem and corrugated wings. *Progress in Aerospace Sciences* 65(1): 41-69. (in English) ["Dragonfly wings have two distinct features: a tandem configuration and wing corrugation. Both features have been extensively studied with the aim to understand the superior flight performance of dragonflies. In this paper we review recent development of tandem and corrugated wing aerodynamics. With regards to the tandem configuration, this review will focus on wing/wing and wing/vortex interactions at different flapping modes and wing spacing. In addition, the aerodynamics of tandem wings under gusty conditions will be reviewed and compared with isolated wings to demonstrate the gust resistance characteristics of flapping wings. Regarding corrugated wings, we review their structural and aerodynamic characteristics." (Authors)] Address: Lian, Y., Mechanical Engineering Dept, Univ. of Louisville, Louisville, KY 40292, USA. E-mail: yongshenglian@gmail.com

13554. Marquez-Rodríguez, J. (2014): Primera cita de *Orthetrum nitidinerve* (Selys, 1841) (Odonata: Libellulidae) en el Algarve (sur de Portugal). *Arquivos Entomoloxicos* 10: 65-68. (in Spanish, with English summary) ["The first record of *O. nitidinerve* for the Algarve (Southern Portugal) and some considerations of its biology are provided. The species was found in a small river with ecological characteristics similar to the localities where the first breeding populations have been recently detected in Spain." (Author)] Address: Márquez-Rodríguez, J., Departamento de Sistemas Físicos, Químicos y Naturales. Universidad Pablo de Olavide. A-376, km 1. E-41013 Sevilla, Spain. E-mail: jmarrod1@admon.upo.es

13555. Marquez-Rodríguez, J. (2014): Primera cita de *Sympetrum striolatum* (Charpentier, 1840) (Odonata: Libellulidae) en la isla de Capri (Italia). *Arquivos Entomoloxicos* 10: 17-19. (in Spanish, with English summary) [*S. striolatum* is documented on 2-IX-2011 from the island of Capri (Italy). Some considerations of its biology are provided. The species was found in a forest area of

the cliff (33 T 436948 4489077).] Address: Joaquín Márquez-Rodríguez Dept de Sistemas Físicos, Químicos y Naturales. Universidad Pablo de Olavide. A-376, km 1. 41013 Sevilla, Spain. E-mail: jmarrod1@admon.upo.es

13556. Martens, A.; de Santos Loureiro, N.; Hazevoet, C.J. (2014): Dragonflies (Insecta, Odonata) collected in the Cape Verde Islands, 1960-1989, including records of two taxa new to the archipelago. *Zoologia Caboverdiana* 4: 1-7. (in English, with Portuguese summary) ["Dragonflies from the Cape Verde Islands, collected between 1960 and 1989 and kept in institutes in Portugal and Cape Verde, were studied. The Cape Verde collection at the Centro de Zoologia, Instituto de Investigação Científica Tropical, Lisbon, Portugal, includes eight species of dragonflies represented by 279 specimens collected in 1960-61 and 1969-72. The entomological collection at the Instituto Nacional de Investigação e Desenvolvimento Agrário (INIDA), São Jorge dos Orgãos, Republic of Cape Verde, includes four odonate species, represented by 27 specimens, collected in the years 1987 and 1989. *Anax tristis* Hagen and *A. rutherfordi* McLachlan, single male specimens of which were collected in Santo Antão, 27 October 1972, are new taxa for the archipelago. Both are tropical migrants of which the nearest known occurrence in continental Africa is more than 1,000 and 1,500 km, respectively, from the Cape Verde Islands. The two collections contain several specimens from new localities within the archipelago, particularly from the islands of Maio and Fogo. Current knowledge of flight season and island distribution are summarized and updated." (Authors)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

13557. Martínez-Sanz, C.; Puente-García, S.M.; Rebolledo, E.R.; Jiménez-Prado, P. (2014): Macroinvertebrate richness importance in coastal tropical streams of Esmeraldas (Ecuador) and its use and implications in environmental management procedures. *International Journal of Ecology* Volume 2014, Article ID 253134: 11 pp. (in English) ["This study was aimed at determining the performance of some indices and community attributes frequently used to assess river quality and test the role of macroinvertebrate taxa richness as element of bioindication in several coastal tropical streams of western Esmeraldas (Ecuador). In addition, a macroinvertebrate taxon list of this region was provided for the first time. Thirteen sampled points distributed across nine streams were selected for this study and nineteen parameters and attributes of bioindication were tested. The differences between nonimpact and impact places were evaluated mainly using one-way analysis of variance. Jackknife 2 and Clench were used to estimate the regional richness and the quality of the inventory, respectively. Seventy taxa (principally genus and family) of the main groups of macroinvertebrates were collected. Measured richness and family richness were the best metric followed by BiologicalMonitoringWorking Par-

ty/Colombia (BMWP/Col), Odonata richness, Shannon-Weiner, and EPT richness (Ephemeroptera + Plecoptera + Trichoptera) indices. Only a slight right trend (Ephemeroptera, Trichoptera, and Chironomidae attributes) or incorrect performances (Average Score Per Taxon (ASPT) and % EPT) were showed by frequently used metrics. Finally, several recommendations were made about taxonomic level used, the ranks of quality of taxa richness, and the effort-results relationship in the field of bioindication." (Authors)] Address: Martínez-Sanz, C., Faculty of Environmental Science, Pontifical University Catholic of Ecuador in Esmeraldas (PUCESE), C/ Espejo y Santa Cruz S/N, 080150 Esmeraldas, Ecuador. E-mail: cmars@unileon.es

13558. Matlaga, T.H.; Phillips, C.A.; Soucek, D.J. (2014): Insensitivity to road salt: an advantage for the American bullfrog? *Hydrobiologia* 721: 1-8. (in English) ["The health of freshwater ecosystems is negatively affected by a multitude of pollutants. In northern latitudes, road deicing agents enter nearby ponds and waterways elevating chloride concentrations in winter and spring. Few studies have examined how amphibians respond to road salt contamination and no study has focused on the response of an invasive amphibian. We examined the effects of NaCl, the most commonly used deicing agent, on the embryos and tadpoles of the American bullfrog, *Lithobates catesbeianus*, a species that is invasive in many regions around the world. In the first experiment, we exposed *L. catesbeianus* embryos to ecologically relevant levels of chloride for 60 days. The second experiment examined the indirect consequences of chloride contamination by exposing *L. catesbeianus* tadpoles to dragonfly larvae. *Lithobates catesbeianus* did not experience reduced survival, growth, or ability to evade predation in elevated chloride concentrations compared to controls. The lack of a response by *L. catesbeianus* suggests that its population growth will not be negatively impacted by road salt contamination. This result may be good news for *L. catesbeianus*, but raises concern for sympatric amphibians that have to contend with negative impacts of both chloride contamination and non-native *L. catesbeianus*." (Authors)] Address: Matlaga, Tanya, Illinois Natural History Survey, Prairie Res. Inst., Univ. of Illinois, Champaign, IL, 61820, USA. E-mail: matlagat@susqu.edu

13559. Mlynarek, J.J.; Knee, W.; Forbes, M.R. (2014): Explaining susceptibility and resistance to a multi-host parasite. *Evolutionary Biology* 41(1): 115-122. (in English) ["Closely related host species are known to show variation in the level of resistance towards the same or similar parasite species, but this phenomenon is understudied. Such studies are important for understanding the ecological factors that might promote susceptibility or resistance to parasites: in particular, whether one host species is a larger target of selection for the parasite by virtue of being more abundant locally or more regionally widespread than another host species. In this study, we examined the expression of resistance by two closely related species of

damselflies (*Nehalennia irene* and *Nehalennia gracilis*) against an *Arrenurus* water mite species. We show that the host species at each of two isolated sphagnum bogs have statistically indistinguishable levels of prevalence and intensity of infection by mite larvae. Despite having similar measures of parasitism, the regionally less represented species (*N. gracilis*) showed total resistance, whereas the regionally well-represented species (*N. irene*) was completely susceptible. Moreover, the form of resistance expressed by *N. gracilis* was unique, in that the oral glands of the mite were melanised. Also, this mite species was not found outside of isolated bog habitats. These results suggest that there might have been strong historical selection from this mite on the bog specialist, *N. gracilis*, and that this selection may have resulted in resistance evolving to fixation in a series of isolated populations." (Authors)] Address: Mlynarek, Julia, Department of Biology, Carleton University, Nesbitt Building, 1125 Colonel By Drive, Ottawa, ON, K1S 5B6, Canada. E-mail: Juliamlynarek@carleton.ca

13560. Moraes, M.; Ferreira Rezende, C.; Mazzoni, R. (2014): Feeding ecology of stream-dwelling Characidae (Osteichthyes: Characiformes) from the upper Tocantins River, Brazil. *Zoologia* 30(6): 645-651. (in English, with Portuguese summary) ["In this contribution we studied the trophic ecology of four Characidae species from the Cavalo Stream, upper Tocantins River, considering diet overlap and trophic niche breadth. The diet of the four species was composed of adult and immature insects, both autochthonous and allochthonous in origin. Autochthonous items dominated the diet of *Moenkhausia dichroua* (Kner, 1858), *Bryconamericus* sp., and *Creagrutus atrisignum* Myers, 1917. By contrast, allochthonous items were dominant in the diet of *Astyanax bimaculatus* (Linnaeus, 1758). Trophic niche breadth varied among species, with the highest value recorded for *M. dichroua* (0.48), followed by *Bryconamericus* sp. (0.39), *A. bimaculatus* (0.33) and *C. atrisignum* (0.29). Similarity analysis revealed two groups with different patterns of food preference. The first group was composed of insectivorous and the second by omnivorous species. The overlap in food items consumed by the four species studied was high. We suggest that resources are not limited in this stream and that competition might not be regulating these populations. This is one more case corroborating the general pattern registered for Tropical environments, where resource partitioning and specialization are responsible by the organization of fish communities." (Authors) App. 5% of the diet of *Moenkhausia dichroua* are Odonata larvae. In the rest of studied fish species, Odonata play a minor role as prey.] Address: Mazzoni, Rosana, Departamento de Ecologia, Instituto de Biologia Roberto Alcântara Gomes, Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier 524, 20550-013 Rio de Janeiro, RJ, Brazil. E-mail: mazzoni@uerj.br

13561. Nel, A.; Azar, D.; Huang, D.-y. (2014): A new Middle Jurassic Chinese fossil clarifies the systematic compo-

sition of the Heterophlebioptera (Odonata: Trigonoptera). *Alcheringa* 38(1): 130-134. (in English) ["Juraheterophlebia sinica, a new species of damselfly, is described from the Middle Jurassic of China. Its fore- and hind wings in connection to the body allows comparison of the type genera of the families Erichschmidtidae and Juraheterophlebiidae, respectively based on a forewing and a hind wing. Juraheterophlebiidae is a junior synonym of the Erichschmidtidae. The new fossil confirms the previous attributions of Erichschmidtia and Juraheterophlebia to the clade Heterophlebioptera." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

13562. Quin, Y.-H.; Wu, H.-Y.; Ji, X.-Y.; Yu, W.-W.; Du, Y.-Z. (2014): Mitochondrial genome of the stonefly *Kamimuria wangi* (Plecoptera: Perlidae) and phylogenetic position of Plecoptera based on mitogenomes. *PLoS ONE* 9(1): e86328. doi:10.1371/journal.pone.0086328: 9 pp. (in English) ["This study determined the mitochondrial genome sequence of the stonefly, *Kamimuria wangi*. In order to investigate the relatedness of stonefly to other members of Neoptera, a phylogenetic analysis was undertaken based on 13 protein-coding genes of mitochondrial genomes in 13 representative insects. The mitochondrial genome of the stonefly is a circular molecule consisting of 16,179 nucleotides and contains the 37 genes typically found in other insects.... Phylogenetic analysis using maximum likelihood and Bayesian inference of 13 protein-coding genes supported a novel relationship between the Plecoptera and Ephemeroptera. The results contradict the existence of a monophyletic Plecoptera and Plecoptera as sister taxa to Embiidina, and thus requires further analyses with additional mitogenome sampling at the base of the Neoptera." (Authors) *Euphaea formosa* was included as an outgroup.] Address: Quin, Y.-H., School of Horticulture & Plant Protection and Institute of Applied Entomology, Yangzhou University, Yangzhou, Jiangsu, China

13563. Robin, J.; Wezel, A.; Bornette, G.; Arthaud, F.; Angélibert, S.; Rosset, V.; Oertli, B. (2014): Biodiversity in eutrophicated shallow lakes: determination of tipping points and tools for monitoring. *Hydrobiologia* 723: 63-75. (in English) ["Nutrient-rich freshwater ecosystems are generally considered as having low ecological quality and low associated biodiversity. In such systems we analysed the effects of water quality on biodiversity of several species groups, to determine tipping points and tools for monitoring. We investigated the water quality of 99 eutrophic and hypertrophic shallow lakes with extensive fish culture during a 3-year study, through the measures of physico-chemical parameters, phytoplankton biomass and structure. In a second step, we related the water quality with richness of aquatic plants, macroinvertebrates and dragonflies. With concentrations of chlorophyll-a above 30 or 70 µg l⁻¹, shallow lakes are normally classified, respectively, in a poor or bad ecological state. However, our results show that chlorophyll-a concentra-

tions up to 78 µg l⁻¹ could be found together with relatively high species or family richness of aquatic plants, invertebrates and dragonflies. We identified most tipping points with 50–60 µg l⁻¹ of chlorophyll-a, values above which a significant decrease of species diversity was found. For monitoring of these shallow lakes we propose to use chlorophyll-a concentrations in combination with water transparency during spring. These parameters are easily applicable and cheap and they yield a good forecast of the biodiversity for the species groups studied." (Authors)] Address: Robin, J., Lab. Ecol. of Fluvial Hydrosystems, UMR 5023 LEHNA, CNRS Univ. of Lyon, ENTPE, ISARA, Lyon, France. E-mail: jrobin@isara.fr

13564. Sanchez-Guillen, R.A.; Córdoba-Aguilar, A.; Cordero-Rivera, A.; Wellenreuther, M. (2014): Genetic divergence predicts reproductive isolation in damselflies. *Journal of Evolutionary Biology* 27: 76-87. (in English) ["Reproductive isolation is the defining characteristic of a biological species, and a common, but often untested prediction is a positive correlation between reproductive isolation and genetic divergence. Here, we test for this correlation in odonates, an order characterized by strong sexual selection. First, we measure reproductive isolation and genetic divergence in eight damselfly genera (30 species pairs) and test for a positive correlation. Second, we estimate the genetic threshold preventing hybrid formation and empirically test this threshold using wild populations of species within the *Ischnura* genus. Our results indicate a positive and strong correlation between reproductive isolation and genetic distance using both mitochondrial and nuclear genes cytochrome oxidase II (COII: $r = 0.781$ and 18S–28S: $r = 0.658$). Hybridization thresholds range from -0.43 to 1.78% for COII and -0.052–0.71% for 18S–28S, and both F1-hybrids and backcrosses were detected in wild populations of two pairs of *Ischnura* species with overlapping thresholds. Our study suggests that threshold values are suitable to identify species prone to hybridization and that positive isolation–divergence relationships are taxonomically widespread." (Authors)] Address: Sánchez-Guillén, Rosa, Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510 México D.F., Mexico. E-mails: rguillen@uvigo.es

13565. Savard, M. (2014): L'anax précoce au Québec: une libellule migratrice. *Le Naturaliste canadien* 138(1): 20-31. (in French, with English summary) ["The northern limits for Québec of the dispersion and breeding ranges of *Anax junius* were updated during work for the Migratory Dragonfly Partnership. The new limits presented are based on scientific literature and previously unpublished data from the Québec Dragonfly Atlas Initiative. Each year, the first adults arriving from the United States of America are reported from the lowlands of the Outaouais and St. Lawrence rivers in May, and exceptionally in late April. The species is also occasionally reported from the Laurentian and Appalachian foothills, and from inhabited

areas along the shores of the Estuary and the Gulf of the St. Lawrence River between the 47th and 50th parallels north. In the extreme southern part of Québec, the emergence of overwintering populations is occasionally observed in June or early July. In the temperate deciduous region of the province, the emergence of summer populations regularly occurs from mid-August to early October. In the temperate mixed region found in the Témiscouata area, emergences may occur and this might also be the case in the Saguenay–Lac-Saint-Jean area. According to the climate model proposed by Gérardin and McKenney (2001), the northern limit of the breeding range of the common green damer could reach the 49th parallel, following the 15.7°C isotherm for the warmest three summer months. Therefore, it seems unlikely that this species is able to complete its life cycle in boreal regions, such as on Anticosti Island. Climate change could be marked by an earlier arrival of immigrant adults in the spring, and by an increase in the frequency of the emergence of overwintering and summer populations of naiads." (Author)] Address: Michel Savard. E-mail: michel.savard@ssss.gouv.qc.ca

13566. Shantibala, T.; Lokeshwari, R.K.; Debaraj, H. (2014): Nutritional and antinutritional composition of the five species of aquatic edible insects consumed in Manipur, India. *Journal of Insect Science* 14(14): 10 pp. (in English) ["The people living in Manipur have a distinct identity, culture, and food habits. They have a prototype culture of eating insects. In our study, the nutritive contents of five potentially-edible aquatic insects, *Lethocerus indicus* (Lepeletier and Serville) (Hemiptera: Belostomatidae), *Laccotrephes maculatus* (F.), *Hydrophilus olivaceus* (F.) (Coleoptera: Dytiscidae), *Cybister tripunctatus* (Olivier), and *Crocothemis servilia* (Drury) (Odonata: Libellulidae), were analyzed to inform consumers about the nutritional quality of the insects and the suggested quantity of their intake. A good amount of protein content and high gross energy was recorded among the insects. The results showed high levels of sodium, calcium, and magnesium present in the insects, indicating that they are a good source of minerals. Antinutritional properties of these insects were below 0.52%, which is a non-toxic level. Aquatic insects, such as *C. tripunctatus*, also possesses strong antioxidant activity (110 ig/mL). Therefore, these insects can play a major role in food security, health, and environment management. It is essential to cultivate edible insects to maintain their population sustainability." (Authors)] Address: Shantibala, T., Institute of Bioresources and Sustainable Development, Dept of Biotechnology, Government of India, Takyelpat-795001, Manipur, India. E-mail: shantibro@yahoo.co.in

13567. Smith-Herron, A.J.; Cook, T.J. (2014): *Setasedecim fursus* n. gen., n. sp. (Apicomplexa: Actinocephalidae: Acanthosporinae) from *Ischnura ramburii* (Odonata: Zygoptera) in Imperial County, California, U.S.A. *Comparative Parasitology* 81(1): 79-84. (in English) ["*Argia sedula*, *Ischnura ramburii*, *Enallagma basidens*, *E. civile*, and *E. carcunculatum*, were collected from Imperial and San Di-

ego counties in California, U.S.A., and were found to collectively host 4 species of actinocephalid gregarines. *Setasedecim fursus* n. gen., n. sp. (Apicomplexa: Actinocephalidae: Acanthosporinae) is described from the adults of *Ischnura ramburii* from Sunbeam Lake, Imperial County. This genus is distinguished from the existing genera within Acanthosporinae by oocysts bearing a total of 16 spines: 8 equatorial, 2 at each equatorial vertex, terminal spines inserted at each pole, and 1 at each vertex created by polar truncations. The gregarines recovered are referable to the family Actinocephalidae but are taxonomically distinct from its constituent genera. We describe the new taxon and provide new host and locality records for known actinocephalid gregarines." (Authors)] Address: Smith-Herron, Autumn, Institute for the Study of Invasive Species, Sam Houston State University, Huntsville, Texas 77341, USA. E-mail: ajs029@shsu.edu

13568. Smolinský, R.; Gvoždík, L. (2014): Effect of temperature extremes on the spatial dynamics of predator-prey interactions: a case study with dragonfly nymphs and newt larvae. *Journal of Thermal Biology* 39(1): 12-16. (in English) ["Highlights: • We examine predator-prey interactions under extreme temperatures. • Predator activity increases with rising temperature, but prey activity does not. • The co-occurrence of predator and prey increases at high temperatures, but the probability of predation does not. • Diel thermal extremes negatively affect predators through the mismatch between space use and prey capture rate. Theory predicts that predators are more vulnerable to increasing temperature than prey. Despite huge variations in the magnitude and duration of thermally-extreme episodes in nature, most empirical studies on predator-prey interactions consider conditions induced by a climatic shift in mean temperature. We asked whether the increased vulnerability of predators holds under daily thermal extremes occurring during heat waves, using dragonfly nymphs and newt larvae as the predator-prey model system. Direct exposure of predator to prey in heated and non-heated aquaria under semi-natural conditions revealed that predator movements increased with rising temperature, whereas prey activity decreased. In contrast to the theory of predator-prey space use, the spatial co-occurrence of predator and prey individuals increased with temperature, while predation rates diminished. We conclude that daily thermal extremes affect trophic interactions in the same way, i.e. through the increased vulnerability of predators, as do long-term shifts in mean environmental temperature. Our results highlight the importance of behavioural studies for understanding mechanisms mediating the effect of extreme thermal events on species interactions." (Authors)] Address: Gvoždík, L., Institute of Vertebrate Biology AS CR, Kvetná 8, 60365 Brno, Czech Republic. E-mail: gvozdik@brno.cas.cz

13569. St. Clair, C.R.; Fuller, C.A. (2014): Atrazine exposure increases time until cannibalistic response in a dragonfly larva. *Canadian Journal of Zoology* 92(2): 113-117. (in English, with French summary) ["Agricultural

runoff containing herbicide is known to have adverse effects on freshwater organisms. Aquatic insects are particularly susceptible, and herbicide runoff has the potential to affect behaviour in this group. Here we examine the effects of short-term exposure to the herbicide atrazine on cannibalistic behaviour in larvae of *Libellula luctuosa*. Large larvae (> 12 mm length) were exposed to concentrations of 0, 1, 10, or 100 µg/L atrazine for 96 hours. A smaller (< 8 mm) conspecific was then placed with the large larva, and the behavior of the large larvae was observed for 30 minutes. Time until initiation of stalking and time until strike were determined. After the initial 30 minutes, each pair was checked at 2, 4, 6, 24 and 48 hours. Time of consumption and amount consumed were determined. The number of larvae that engaged in cannibalistic activity within the initial 30-minute observation period was significantly higher for controls compared to all experimental treatments. When stalking, striking and consumption times were examined together (a measure of overall response time) concentration had a significant effect, with the 10 µg/L group taking significantly longer to cannibalize than the control group. Cannibalism is a particularly important behaviour in dragonfly larvae populations, and this study confirms that this interaction is altered by exposure to atrazine, with the potential to affect ecological relationships." (Authors)] Address: St. Clair, Coy, Department of Biological Sciences, Murray State University, 2112 Biology Building, Murray KY 42071, USA. E-mail: coyray03@gmail.com

13570. Stoks, R.; Geerts, A.N.; De Meester, L. (2014): Evolutionary and plastic responses of freshwater invertebrates to climate change: realized patterns and future potential. *Evolutionary Applications* 7(1): 42-55. (in English) ["We integrated the evidence for evolutionary and plastic trait changes in situ in response to climate change in freshwater invertebrates (aquatic insects and zooplankton). The synthesis on the trait changes in response to the expected reductions in hydroperiod and increases in salinity indicated little evidence for adaptive, plastic, and genetic trait changes and for local adaptation. With respect to responses to temperature, there are many studies on temporal trait changes in phenology and body size in the wild that are believed to be driven by temperature increases, but there is a general lack of rigorous demonstration whether these trait changes are genetically based, adaptive, and causally driven by climate change. Current proof for genetic trait changes under climate change in freshwater invertebrates stems from a limited set of common garden experiments replicated in time. Experimental thermal evolution experiments and common garden warming experiments associated with space-for-time substitutions along latitudinal gradients indicate that besides genetic changes, also phenotypic plasticity and evolution of plasticity are likely to contribute to the observed phenotypic changes under climate change in aquatic invertebrates. Apart from plastic and genetic thermal adjustments, also genetic photoperiod adjustments are widespread and may even dominate the

observed phenological shifts." (Authors) The publication includes references to Odonata.] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

13571. Therry, L.; Nilsson-Örtman, V.; Bonte, D.; Stoks, R. (2014): Rapid evolution of larval life history, adult immune function and flight muscles in a poleward-moving damselfly. *Journal of Evolutionary Biology* 27: 141-152. (in English) ["Although a growing number of studies have documented the evolution of adult dispersal-related traits at the range edge of poleward-expanding species, we know little about evolutionary changes in immune function or traits expressed by nondispersing larvae. We investigated differentiation in larval (growth and development) and adult traits (immune function and flight-related traits) between replicated core and edge populations of the poleward-moving damselfly *Coenagrion scitulum*. These traits were measured on individuals reared in a common garden experiment at two different food levels, as allocation trade-offs may be easier to detect under energy shortage. Edge individuals had a faster larval life history (growth and development rates), a higher adult immune function and a nearly significant higher relative flight muscle mass. Most of the differentiation between core and edge populations remained and edge populations had a higher relative flight muscle mass when corrected for latitude-specific thermal regimes, and hence could likely be attributed to the range expansion process per se. We here for the first time document a higher immune function in individuals at the expansion front of a poleward-expanding species and documented the rarely investigated evolution of faster life histories during range expansion. The rapid multivariate evolution in these ecological relevant traits between edge and core populations is expected to translate into changed ecological interactions and therefore has the potential to generate novel eco-evolutionary dynamics at the expansion front." (Authors)] Address: Therry, Laboratory of Aquatic Ecology, Evolution and Conservation, KU Leuven, Leuven, Belgium. E-mail: Lieven.therry@bio.kuleuven.be

13572. Van Praeta, N.; De Jonge, M.; Blust, R.; Stoks, R.; Bervoets, L. (2014): Behavioural, physiological and biochemical markers in damselfly larvae (*Ischnura elegans*) to assess effects of accumulated metal mixtures. *Science of The Total Environment* 470-471: 208-215. (in English) ["Highlights: •At which organismal level effects of metal mixtures in nature can best be detected? •Differences in metal accumulation were observed between populations of *Ischnura elegans*. •Relations between the metal load index and both biochemical (GST) and physiological endpoints (energy storage) were observed. •No sublethal endpoint could be used to detect the observed variation among populations. Currently it is not known at which organismal level effects of metal mixtures in nature can best be detected, which is relevant to develop accurate monitoring schemes and quality stand-

ards. The present study investigated relationships between accumulated metals with different levels of biological organisation in the aquatic larval stage of *Ischnura elegans*. Larvae were collected in seven Flemish ponds differing in metal load. In each field-collected larva we quantified concentrations of accumulated metals and a set of biochemical markers (acetylcholinesterase (AChE) and glutathione-S-transferase (GST)), physiological endpoints (energy storage), and behavioural responses (locomotory activity and the feeding rate). Accumulated metal levels and the measured endpoints significantly differed among ponds, however, a large variation in metal load index was observed within individuals of the same population. Only GST and energy availability could be partly predicted by the observed variation in metal load index on individual damselfly level. However, no single endpoint could be used to detect the observed variation in metal load index among populations. In conclusion, the sublethal endpoints cannot be used as reliable biomarkers to monitor the toxicity of accumulated metal mixtures in natural populations of *I. elegans*." (Authors)] Address: Van Praeta, N., Department of Biology, Systemic Physiological and Ecotoxicological Research Group (SPHERE), University of Antwerp, Groenenborgerlaan 171, 2020 Antwerp, Belgium. E-mail: nander.vanpraet@ua.ac.be

13573. Villanueva, R.J.T. (2014): The type repository of *Drepanosticta sugbo* spec. nov. and *Mortonagrion astamii* spec. nov. (Odonata: Zygoptera). International Dragonfly Fund - Report 65: 1-2. (in English) ["*Drepanosticta sugbo* and *Mortonagrion astamii* were described in Philippine Scientist 49: 1-16 and International Dragonfly Fund Report 60: 1-34, respectively. The type repositories which were omitted from the original descriptions, are stated here along with a diagnosis of the species." (Author)] Address: Villanueva, R.J.T., Forestal Healing Homes and Therapeutic Milieu, Forestal Road, Cabantian, Davao City, 8000 Philippines Email: rjtvillanueva@gmail.com

13574. Whatley, M.H.; van Loon, E.E.; van Dam, H.; Vonk, J.A.; van der Geest, H.G.; Admiraal, W. (2014): Macrophyte loss drives decadal change in benthic invertebrates in peatland drainage ditches. *Freshwater Biology* 59(1): 114-126. (in English) ["Agricultural peatlands and their associated drainage systems are often highly managed and exposed to anthropogenic pressures, such as eutrophication and stable water tables, maintained via drainage during periods of high rainfall and inlet of, alkaline-rich, waters during dry periods. These pressures promote peat degradation, resulting in the accumulation of fine-degraded peat particles that dramatically alter aquatic habitats by smothering surfaces and decreasing water quality. Consequential effects on benthic communities are expected but have not been investigated so far. We hypothesised that peat degradation can lead to the decline in submerged macrophytes, which are of critical importance to sustaining biodiversity of benthic invertebrate communities. To investigate this, we analysed de-

cadal (1985–2007) changes in benthic species richness in 29 peat ditches in the Netherlands and, to determine patterns of macroinvertebrate habitat occupancy, carried out a complementary field experiment with submerged artificial macrophytes, natural sediments and emergent bank vegetation. Results from long-term monitoring indicate that chemical conditions in agricultural peat ditches have improved slightly over the last decades; however, there has been a simultaneous decline in benthic invertebrate species richness and densities corresponding to a decline in the numbers of submerged macrophytes. The apparent dependence of macroinvertebrates on macrophytes was reinforced by our field experiment which revealed that invertebrate density was highest in submerged artificial plants, while invertebrate species richness was highest in natural emergent vegetation. Conversely, degraded peat sediments supported extremely few invertebrates. Our results clearly illustrate the strong influence of submerged macrophyte loss on macroinvertebrate assemblages in peatland waters. Furthermore, this suggests that improvements in water quality alone will not benefit invertebrates in the absence of suitable vegetative habitats." (Authors) The study includes *Ischnura elegans*.] Address: Whatley, M.H., Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, P.O. Box 94248, 1090 GE, Amsterdam, The Netherlands. E-mail: m.h.whatley@uva.nl



http://i.dailymail.co.uk/i/pix/2011/02/07/article-1354392-0D1046F0000005DC-613_634x494.jpg

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13575. Jiang, Y.h.; Chen, Xi.p. (1997): General situation on the study of Odonata in Jiangsu province. *Journal of Jiangsu Forestry Science & Technology* 24(4): 48-53. (in Chinese, with English summary) [The authors in a chronological style compile published data on the Odonata fauna of Jiangsu, China. The list of odonate species totals to 72.] Address: Jiang, Y, Lianyungang City Yuntaixiang Diversified Management Office, Jiangsu 222064 PRC

1998

13576. Zhu, H.; Shi, F.; Zhou, S. (1998): An investigation of dragonflies (Odonata) from Huaping, Guangxi. *Guangxi Sciences* 5(2): 142. (in Chinese, with English summary) [14 odonate species are reported from Huaping Natural Reserve, Guangxi Zhuang Autonomous Region, China. *Bayadera melanopteryx*, *Sympetrum baccha*, *S. depressiusculum* and *S. infuscatum* are assessed as new additions to the Odonata fauna of Guanxi. The examined specimens are deposited in the Department of Biology, Shanxi University and the Department of Biology, Guangxi Normal University.] Address: Zhu, H.q. Dept of Biology, Shanxi University, Wuchenglu, Taiyuan, Shanxi, 030006, China

2000

13577. Brunelle, P.M. (2000): Distribution of Damselflies and Dragonflies (Odonata) of Cape Breton Island, Nova Scotia, Canada. *Canadian Heritage, Parks Canada ISBN 0-662-28573-5*: 52 pp. (in English) ["Knowledge of the Odonata on Cape Breton Island (CBI) as of 1999 has been assessed, yielding a list of 85 species, 24 (28% of the island list) of which are additions to the previously published CBI list. Separate lists for the Lowlands, Highlands and countries are presented." (Publisher)] Address: Brunelle, P.-M., 2460 John Street, Halifax, Nova Scotia, B3K 4K7, Canada

13578. Miyashita, M. (2000): Studies on the method for assessment of the habitat of the damselfly, *Mortonagrion Hirosei*. *Proceedings of the Japan Society of Civil Engineers*: 65-73. (in Japanese, with English summary) ["The habitat of *M. Hirosei*, which was designated species by the Environment Agency in 1991, was studied at the site of the Tone Kamome Ohashi bridge project spanning the Tonegawa river. Changes of the water level and the salinity of the habitat of this species were measured with actual survey. The larvae of the damselfly were collected only from pool in a sunken place covered with dead leaves of reeds on the riverside. It was concluded that the mesh figure of a distribution of the damselfly can be used as an excellent tool for environmental impact assessment method." (Author)] Address: not stated

13579. Raab, R. (2000): Die Libellenfauna in den Maßnahmenbereichen Untere Lobau und Orth. Gutachten im Auftrag von Nationalpark Donauauen GmbH, Deutsch-Wagram: 74 pp. (in German) [Austria; a total of 41 species were found. Species conservation measures for *Leucorrhinia pectoralis* and *Ophiogomphus cecilia* are prepared and documented. For more details see: <http://www.donauauen.at/dateien/42428LibellenfaunaimBereichOrthu.U.Lobau.pdf>.] Address: Raab, R., Technisches Büro für Biologie, Anton Brucknergasse 2, 2232 Deutsch-Wagram, Austria. E-mail: E-mail: Rainer.Raab@usa.net

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13581. Miyashita, M.; Someya, T. (2002): Post-assessment of the habitat of the damselfly, *Mortonagrion Hirosei*, at the site of the Tone Kamome Ohashi Bridge. *Environmental Systems Research* 30: 419-428. (in Japanese, with English summary) ["*M. Hirosei*, was designated as an endangered species by the Environment Agency in 1991, because its habitat is vulnerable to the effects of land reclamation and river improvement. Pre- and post-assessments of the habitat of the damselfly were taken at the site of the Tone Kamome Ohashi Bridge project spanning the Tonegawa River, which marks the border between Hasakimachi, Ibaraki Prefecture, and Choshi, Chiba Prefecture. Before the project, the larvae of the damselfly were found abundantly in the reed-covered area of this bridge on the Ibaraki side of the river in October 1998. However, there were no larvae found on this side after the project in December 2001. Also, the adults of the damselfly were not observed in July 2002. The larvae of the damselfly were collected only from the puddle of the depressed ground covered with dead leaves of reed plants. However, the puddles were filled with the alluvial deposits. The level of the habitats of the damselfly after the project was higher than before the project from 20 to 100mm. Because the water supply from the watercourses and springs was decreased remarkably, the habitats of the damselfly were dried and the salinity of the habitats also became high. It was supported that the extinction of the damselfly on the Ibaraki side of the Tone Kamome Ohashi Bridge was caused by the reconstruction of the watercourse, which was extended and changed into boarded." (Author)] Address: Someya, T., 2-4313-9, Ishikavva-cho, Mito City, 310-0904, Japan

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13582. Gerson, U.; Smiley, R.L.; Ochoa, R. (2003): Mites (Acari) for pest control. Blackwell Science Ltd: XV + 539 pp. (in English) [Chapter 7 on Arrenuridae includes several references to Odonata.] Address: Gerson, U., Department of Entomology, Faculty of Agricultural, Food and Environmental Sciences, Hebrew University, Rehovot, Israel

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belle, *Anax parthenope* SELYS, 1839, in der Schweiz nördlich der Alpen (Odonata: Aeshnidae). *Entomologische Nachrichten*, Luzern 50(1): 19-24. ["In 2 in Jan. 2003 constructed ponds, Mauensee, canton Luzern, Switzerland, 44 *A. parthenope* exuviae were found in Aug. This is the first evidence of a second generation of this species in Switzerland N of the Alps. It is probably due to an early immigration from S Europe and to the exceptionally hot weather during May-Aug. The 2 ponds do not have an identical structure; both of them deviate from the usual *A. parthenope* breeding habitat." (Author)] Address: Wüst-Graf, R., Christoph-Schnyderstr. 10, CH-6210 Sursee, Switzerland

2004

13585. Liu, J.; Ren, D.; Dao, C.; Cheng, X.; Li, N.; Liu, Z. (2004): Discovery of hemeroscopid dragonfly from Jiufotang Formation in western Liaoning and its geological implications. *Global Geology* 23(3): 209-212. (in English) ["A new hemeroscopid dragonfly fossil, *Abrohemeroscopus mengi* Ren, Liu et Chen, 2003, found from the upper part of the Jiufotang Formation, Liaoning Province, northeastern China, is similar to the *Hemeroscopus baissicus* Pritykina, 1977, and more primitive phylogenetically than *H. baissicus* in the following characters: *hindwing anal loop is smaller, with only 6-7 cells (plesiomorphy); *Rspl is absent (plesiomorphy); *the hindwing vein CuAa is curved and has five distinct posterior branches (plesiomorphy); *the forewing MP shortened, reaches the posterior wing margin slightly beyond the level of the nodus (plesiomorphy); *pterostigmata more distinctly braced (plesiomorphy); *the hindwing area between MP and CuAa is narrow, with only one row of cells near the discoidal triangle (plesiomorphy). These facts demonstrate that the upper part of the Jiufotang Formation should be early Early Cretaceous in age." (Authors)] Address: Ren, D., College of Life Science, Capital Normal Univ., 105 Xisanhuanbeilu, Haidian District, Beijing 100048 China. E-mail: rendong@mail.cnu.edu.cn

2005

13586. Foote, D. (2005): Inventory of Anchialine Pools in Hawai'i's National Parks. U.S. Department of the Interior. U.S. Geological Survey. USGS FS 2005-3129: 2 pp. (in English) [Verbatim: Surveys Detect Endangered Damselflies: Another candidate endangered species found in anchialine pools is the orange-black damselfly (*Megalagrion xanthomelas*) or pinao'ula (Fig. 4). These damselflies feed on both native and exotic flies, including mosquitoes, which breed in the pools. Pinao'ula breed in both fresh and brackish pools along coastal areas, which are commonly threatened by development. Very few of these habitats are protected; in Hawai'i, only three National Historical Parks contain suitable breeding habitat for pinao'ula, and all three parks are located on the west coast of Hawai'i Island.] Address: Email: davidfoote@usgs.gov

13587. Ueda, K.; Kim, T.; Aoki, T. (2005): A new record of Early Cretaceous fossil dragonfly from Korea. *Bull. Kitakyushu Mus. Nat. Hist. Hum. Hist., Ser. A.* 3: 145-152. (in English) ["Early Cretaceous fossil dragonfly *Hemeroscopus baissicus* Pritykina was discovered from Korea. This is the first record of this species from this area and the description of wings is given." (Authors)] Address: Ueda, K., Kitakyushu Museum of Natural History & Human History, 2-4-1 Higashida, Yahatahigashiku, Kitakyushu 805-0021 Japan

2006

13588. Cailles, C.R. (2006): Phenotypic and genetic effects of Chernobyl-derived radionuclide contamination on the red-eyed damselfly *Erythromma najas* (Odonata, Coenagrionidae). Ph.D. thesis, Faculty of Science and Technology, University of Plymouth: 15 + 307 pp. (in English) ["The 1986 Chernobyl accident released large amounts of radioactive contamination into the surrounding environment. As a result, the Chernobyl region provides a suitable site for investigations into the effects of ionising radiation on non-human biota. Studies of this type are important in order to establish whether or not current anthropocentric radiation protection guidelines are appropriate for the protection of the wider environment. Despite the presence of many freshwater habitats in the region, there have been few studies investigating the effects of radiation on aquatic invertebrates. In the present study, the effects of Chernobyl-derived radionuclide contamination on *E. najas* were investigated. This large scale study involved analysis of 720 *E. najas* specimens obtained from eight lakes in the Chernobyl region ranging in ¹³⁷Cs contamination levels from 37000 kBq m² to 100 kBq m². Estimated external dose rates of ionising radiation ranged from 24 µGyhr⁻¹ to 0.066 µGyhr⁻¹. Fitness of *E. najas* populations was assessed both phenotypically (by the use of fluctuating asymmetry (FA) techniques) and genetically (by the use of inter simple sequence repeat (ISSR) markers and mitochondrial (mt) DNA sequencing techniques). FA was assessed by the analysis of eight bilateral traits and no relationship between FA and dose rates of ionising radiation was found. Analysis of 61 ISSR bands revealed no evidence of elevated mutation rates in contaminated lakes. This finding was supported by the results of the mtDNA sequencing study which involved sequencing of the COI and COII regions of 80 *E. najas* specimens. The sequencing study revealed high levels of gene flow between the Chernobyl lakes and no evidence of either an increased mutation rate in contaminated lakes or a population bottleneck. In summary, these studies have revealed no adverse effects of Chernobyl-derived ionising radiation on *E. najas* populations." (Author)] Address: not stated

13589. Fochetti, R.; Argano, R. (2006): Patterns of benthic invertebrate assemblages in rivers of Central Italy. *Italian Journal of Zoology* 73(2): 145-151. (in English)

["The present paper aims to analyse and compare the benthic composition (including Odonata) of several rivers of Northern, Central Apenninic and Southern Italy. We considered faunistic data from seven Italian streams (Adige, Mignone, Arrone, Fiora, Aniene, Amaseno and Simeto rivers). In particular, we wanted to compare how, using detailed taxonomic data, every single river or stretch of river would conform or differentiate from other rivers (or stretches of river) in respect to their faunistic and structural aspects. We used presence-absence data of taxonomic groups, identified mainly at species level. Similarity indexes, Principal Component Analysis and divisive analysis (DIVA) gave almost overlapping results. Aggregative, ordination and divisive algorithms, in fact, group each of the studied rivers as single independent units, isolated and differentiated from the others. We discuss the results with respect to the main longitudinal zonation theories on running waters." (Authors)] Address: Fochetti, R., Dipartimento di Scienze Ambientali, Univ. della Tuscia, Largo dell'Università snc, 01100 Viterbo, Italy. E-mail: fochetti@unitus.it

2007

13590. Bailowitz, R. (2007): Evening Skimmer (*Tholymis citrina* Hagen) in Arizona. *Argia* 19(3): 28. (in English) [12-VI-2007, Gila River, Duncan, Greenlee County, Arizona, USA] Address: Bailowitz, R., 15444 N. Indian Trail, Tucson, AZ 85750 USA. E-mail: raberg2@q.com

13591. Behrstock, R. A.; Dobbs, M.; Dunkle, S.; Overton, M. (2007): Additional records of Odonata from Tamaulipas, San Luis Potosi, Hidalgo, and Queretaro States, Mexico. *Argia* 19(3): 30-33. (in English) [Records of 24 odonate species (new state records) registered between November 2006 and April 2007 are documented in detail.] Address: Behrstock, R.A., 10359 S. Thicket Pl., Hereford, AZ 85615, USA. E-mail: rbehrstock@cox.net

13592. Chelmick, D. (2007): From a desert across the pond. *Argia* 19(3): 10-11. (in English) [Bristol (UK) is characterised as a dragonfly desert. The author compares observations of dragonflies from Europe (France, UK) with observations in Florida (USA), an oasis of dragonflies.] Address: Chelmick, D.G., 31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, UK. E-mail: dgc@david.chelmick.com

13593. Couteyen, S.; Papazian, M. (2007): Présence d'un *Gynacantha* sur l'île Rodrigues (Odonata, Aeshnidae). *L'Entomologiste* 63(4): 223. (in French) [Mauritius; two larvae of *Gynacantha bispina* cf. were collected at (1) "Cascade Mourouck", 11-III-2004 and (2) "Forêt de la Solitude", 15-III-2004.] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France. E-mail: mpapazian@ecologie.re

13594. Danforth, D.; Bailowitz, R. (2007): *Macrothemis pseudimitans* (White-tailed Sylph), new species for the

U.S. *Argia* 19(3): 29. (in English) [14-IX-2007, stream Black Draw, San Bernardino National Wildlife Refuge, 14 miles east of Douglas, Arizona, USA.] Address: Danforth, D., P.O. Box 232, Bisbee, Az., 85603, USA. E-mail: Dougofbis@yahoo.com

13595. Fenoglio, S.; Bo, T.; Cucco, M.; Malacarne, G. (2007): Response of benthic invertebrate assemblages to varying drought conditions in the Po river (NW Italy). *Italian Journal of Zoology* 74(2): 191-201. (in English) ["In the rivers of northern Italy, the presence of water is typically continuous all year long, although in the last five decades there has been a conspicuous increase in drought periods, mainly caused by human impacts and climate change. The aim of this study was to assess the impact of the length of the drought periods on macroinvertebrate assemblages. We collected invertebrates in four reaches of the Po river, characterised by different periods of absence of surface water. We found significant differences among the stations in invertebrate abundance and taxa richness, with a decrease in the more drought affected stream reaches. Collector-gatherers significantly increased as the drought period lengthened, while the opposite occurred for scrapers and shredders. The areas with a discontinuous presence of water were mainly colonised by small, fastgrowing, plurivoltine organisms. A main result of our study is that only a few taxa appear to be able to survive in reaches with intermittent flow, underlining the great ecological difference between perennial and naturally intermittent streams. Our results suggest that the recent increase of droughts will likely cause an impoverishment of benthic communities in prealpine rivers." (Authors) The list of taxa includes 'Coenagrionidae' and 'Cordulidae'.] Address: Fenoglio, S., University of Piemonte Orientale, Di.S.A.V., Via Bellini 25, I-15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

13596. Gallucci, T. (2007): Observations on the behavior of *Macrothemis inequiunguis* (Jade-striped Sylph). *Argia* 19(3): 14-17. (in English) [Extensive report on behaviour of *M. inequiunguis* near the Big Springs Ranch, north of Leakey, Real County, Texas, UAA, one of the very few localities of this species.] Address: Gallucci, T., Gulf Coast Laboratory for Wildlife Research and Milk River Milm; P.O. Box 6, Camp Verde, Texas 78010-5006, USA. E-mail: milkrivermusic@hotmail.com

13597. Harding, R.W. (2007): *Lanthus vernalis* (Southern Pygmy Clubtail) finally found in Canada. *Argia* 19(3): 27. (in English) [7-VII-2007, Kings County, New Brunswick, Canada] Address: Harding, R.W., PR#3 Montague, Summerville, PE, C0A 1R0, Canada

13598. Keppner, E.; Keppner, L.; Daigle, J.J. (2007): Note on the occurrence of *Nehalennia pallidula* Calvert (Everglades Sprite) in Bay County, Florida. *Argia* 19(3): 28-29. (in English) [Between April and August 2007, several specimens of the rare *N. pallidula* have record-

ed in the northwestern part of Florida, USA.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

13599. Meurgey, F. (2007): 2007 Collecting trip in Guadeloupe - Where have all the seasons gone? *Argia* 19(3): 11-13. (in English) [Extensive report on a dragonfly trip to Guadeloupe in June 2007.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13600. Meurgey, F. (2007): The *Argia concinna* Rambur type locality mystery: Can it be solved? *Argia* 19(3): 13-14. (in English) [The type locality of the species is assumed to be Capesterre, Guadeloupe.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13601. Paulson, D. (2007): Recent decisions of the DSA Checklist Committee. *Argia* 19(3): 8-9. (in English) [*Enallagma cardenium* - Purple Bluet; *Enallagma coecum* - Antillean Bluet; *Enallagma eiseni* - Baja Bluet; *Macrothemis pseudimitans* - White-tailed Sylph; *Sympetrum semicinctum* - Band-winged Meadowhawk.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@pugetsound.edu

13602. Paulson, D. (2007): Book Review: *Dragonflies of the Yungas (Odonata) / Libelulas des las Yungas (Odonata)* by Natalia von Ellenrieder and Rosser W. Garrison. *Argia* 19(3): 34. (in English) [Review of the "Field Guide to the Species from Argentina. *Libelulas de las Yungas (Odonata) Una guía de campo para las especies de Argentina*. Pensoft Series Faunistica 67, ISSN 13120174, Pensoft Publishers, Sofia-Moscow. 168 pp."] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@ups.edu

13603. Scalici, M.; Gibertini, G. (2007): Feeding habits of the crayfish *Austropotamobius pallipes* (Decapoda, Astacidae) in a brook in Latium (central Italy). *Italian Journal of Zoology* 74(2): 157-168. (in English) ["The several studies regarding the feeding habits of freshwater decapods have provided a few detailed descriptions of their natural diets and have seldom analysed variations in their feeding habits due to season, size, age, and changes in their physiological state. This situation led us to analyse the stomach content of different age classes of the crayfish *A. pallipes*, in order to increase the knowledge available on this species' diet. Ingestion index, vacuity frequency, and occurrence frequency were calculated; then, a graphical representation was carried out only for the animal component (mainly insect larvae) observed within the stomach. The results show *A. pallipes* to be an omnivorous and opportunistic

animal. Its diet includes the exploitation of more easily accessible vegetal and detritus resources, which are the main sources of energy and proteins in freshwater ecosystems. Invertebrates are very important for the crayfish diet; in fact, the animal component, and in particular Trichoptera, Diptera, and shellfish, plays a very important role for juveniles and adult females. Feeding strategies might reduce competition between sexes, satisfying their energetic and nutritional needs. The acquired knowledge of the crayfish trophic niche may be used, for example, to improve the diet of animals kept in captivity." (Authors) Odonata were represented in the diet of crayfishes from all sampling sites.] Address: Scalici, M., Dipartimento di Biologia, Università degli Studi "Roma Tre", v.le G. Marconi 446, I-00146 Roma, Italy. Email: scalici@uniroma3.it

13604. Worthen, W.B.; Jones, C.M (2007): Odonata survey of Blue Wall Nature Preserve and Bunched Arrowhead Heritage Trust Preserve, Greenville, County, South Carolina. *Argia* 19(3): 24-25. (in English) [42 odonate species were collected between March 2005 - August 2007 at Bunched Arrowhead Heritage Trust Preserve and 38 species at Bunched Arrowhead Heritage Trust Preserve.] Address: Worthen, W.B., Dept of Biology, Furman University, Greenville, SC29613 USA. E-mail: worthen@furman.edu

2008

13605. Aguillard, D. (2008): The Modoc experience: CalOdes/DSA Blitz IV. *Argia* 20(3): 9. (in English) [8-9-VIII-2008, Modoc County, California, USA. The rare *Ophiogomphus severus* was found at Sand Creek. A total of 47 odonate species were recorded] Address: Aguillard, D., San Diego, California, USA. E-mail: doug@basiclink.com

13606. Babson, J.D. (2008): An interesting record of bird predation on a darner. *Argia* 20(3): 12. (in English) [8-VIII-2007, Cochise County, Arizona, USA. An only double sized Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*) preyed on a four inches long aeshnid dragonfly] Address: Babson, J.D., Vail, Arizona, USA. E-mail: jeff@skylandtours.com

13607. Bailowitz, R.; Danforth, D. (2008): *Libellula pulchella* (Twelve-spotted Skimmer) without black wingtips. *Argia* 20(4): 10-11. (in English) [23-IX-2008, Esterito Marsh, San Carlos, Sonora, Mexico; a specimen of *L. pulchella* resembling *Libellula forensis* was closely studied and compared with *L. forensis*. Special attention must be given to specimens with wingtips without black marking of *L. pulchella* to avoid confusion with *L. forensis*.] Address: Bailowitz, R., 15444 N. Indian Trail, Tucson, AZ 85750 USA. E-mail: raberg2@q.com

13608. Beaton, G.; Dobbs, M. (2008): 2007 summary of odonate research in Georgia. *Argia* 20(1): 28-29.

[New records are: *Calopteryx aequabilis*, *Lestes congener*, *Stenogomphus consanguis*, *Gomphus cavillaris*, *Ophiogomphus incurvatus*, *O. edmundo*, *O. mainensis*, *Progomphus adaptatus*, *Neurocordulia virginienensis*, *Macrodiplax balteata*, *Sympetrum corruptum*, Notable records are *Aphylla williamsoni*, *Gomphus apomyius*, *Cordulegaster obliqua*, *Somatochlora tenebrosa*.]

13609. Beckemeyer, R. (2008): Sedgwick County, Kansas record of *Miathyria marcella* (Hyacinth Glider). *Argia* 20(4): 22. (in English) [26-IX-2008; the tropical species (northwestern record in USA) was found "just a couple of weeks after hurricane Ike's traverse of the central USA".] Address: Beckemeyer, R.J., 957 Perry Ave., Wichita, KS 67203-3141, USA. E-mail: royb@southwind.net

13610. Behrstock, R.A. (2008): First Arizona record of Narrow-striped Forceptail (*Aphylla protracta*). *Argia* 20(3): 21. (in English) [16-VII-2008, Twin Ponds, San Bernardino, NWR, Cochise Co., Arizona, USA] Address: Behrstock, R.A., 10359 S. Thicket Pl., Hereford, AZ 85615, USA. E-mail: rbehrstock@cox.net

13611. Biggs, K. (2008): Book Review: Gossamer Wings, Mysterious Dragonflies. *Argia* 20(3): 29. (in English) [Review of Hilfert-Rüppell, D. & Rüppell, G. (2007): *Juwelenschwingen / Geheimnisvolle Libellen - Gossamer Wings / Mysterious Dragonflies*. Splendens-Verlag, Cremlingen. 168 pp.] Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol CA, 95472, USA. E-mail: bigsnest@sonic.net

13612. Bridgehouse, D.W. (2008): *Tramea lacerata* (Black Saddlebags) — Found in Nova Scotia. *Argia* 20(4): 19. (in English) [28-VII-2008, Halifax County, Nova Scotia, Canada.] Address: Bridgehouse, D.W., 24 Kiel Court, Eastern Passage, NS BSG 1R3, Canada. E-mail: d.bridgehouse@ns.sympatico.ca

13613. Catling, P. (2008): A new northern limit for Citrine Forktail (*Ischnura hastata*), possibly due to climate warming. *Argia* 20(4): 12-17. (in English) [IX-2008, Almonte, Lanark County, Ontario, Canada] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

13614. Catling, P.M.; Kostiuk, B. (2008): Lake Darners and Variable Darners swarming over a herd of Wood Bison and feeding on Horse flies. *Argia* 20(1): 12-14. (in English) [On 28-VII-2007, near Fort Providence (Northwest Territories, Canada) app. 1000 *Aeshna interrupta lineata* and *A. eremita* were observed preying on Tabanidae (Diptera) swarming above a herd of 20 bison. The impact of dragonflies on these Tabanidae and reducing the bites for bison are discussed] Address: Catling, P.M., 170 Stanford Ave., Ottawa, Ontario K2C 0E9, Canada. E-mail: catinggp@agr.gc.ca

- 13615.** Chadwick, W. (2008): Back in the Bronx for 2008. *Argia* 20(4): 17-18. (in English) [New York city, USA; 15 species from 5 localities are listed. The list also includes the migrant *Tramea carolina* and brackish-water dwelling *Erythrodiplax berenice*.] Address: Chadwick, W., Bronxville, New York, USA. E-mail: mrcnaturally@optonline.net
- 13616.** Collins, S. (2008): *Triacanthagyna caribbea* (Caribbean Darner) in Texas: Another U.S. record. *Argia* 20(3): 21. (in English) [13-XI-2007, Santa Ana National Wildlife Refuge, Lower Rio Grande valley, Texas, USA] Address: Collins, S., 7505 Knollwood Rd, Towson, MD 21286, USA. E-mail: dcollins@ufl.edu
- 13617.** Daigle, J.J. (2008): Key West and South Florida survey. *Argia* 20(1): 20-21. (in English) [Report on a survey on Odonata done in the Florida Keys and southern Florida, with localities, but without any dates (probably October 2007)] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com
- 13618.** Daigle, J.J. (2008): Corkscrew crystals!. *Argia* 20(3): 25. (in English) [*Chrysobasis lucifer*, Audunbon Corkscrew Swampy Sanctuary near Immokalee, Florida, USA] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com
- 13619.** Danforth, D.; Bailowitz, R. (2008): Straight-tipped Ringtail (*Erpetogomphus elaps*) found in Arizona. *Argia* 20(4): 22-23. (in English) [17-IX-2008, lower Parker Canyon, Santa Cruz County, Arizona, USA] Address: Danforth, D., P.O. Box 232, Bisbee, Az., 85603, USA. E-mail: Dougofbis@yahoo.com
- 13620.** de Lacour, F. (2008): *Tauriphila argo* (Arch-tipped Glider) — New species for the United States. *Argia* 20(3): 26-27. (in English) [11-VI-2008, Bentsen State Park, Texas, USA] Address: de Lacour. E-mail: thoreyi@warwick.net
- 13621.** De Marmels, J. (2008): Have a look in your kitchen first: A short christmas story from Venezuela. *Argia* 20(1): 23. (in English) [*Protoneura paucinervis* was caught at 23-XII-2007. All published records from this species "are from the Amazon region of Ecuador, Peru and Brazil. This one is the first from Venezuela (El Limón, 430 m a.s.l., Maracay, Aragua State)."] (Author)] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univers. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com
- 13622.** Donnelly, T.W. (2008): Book Review: Field Guide to the Dragonflies and Damselflies of Algonquin Provincial Park and the Surrounding Area. *Argia* 20(4): 25. (in English) [Review of: Jones, C.D.; Kingsley, A.; Burke, P.; Holder, M. (2008): Field Guide to The Dragonflies and Damselflies of Algonquin Provincial Park and the Surrounding Area. The Friends of Algonquin Park. Algonquin Park Field Guide Series 1. 263 pp] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 13623.** Donnelly, T.W. (2008): A hybrid complex in *Enallagma*. *Argia* 20(3): 10-11. (in English) [Hybrids of *Enallagma anna* and *E. civile* as well as *E. carunculatum* and *E. civile* are documented.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu
- 13624.** Dragonfly Society of the Americas (2008): *Argia* 20(1). *Argia* 20(1): 34 pp. (in English) [The following administrative or organisatoric items are issued: In This Issue: 1; 2008 DSA Annual Meeting in Bend, Oregon, 1–3 August Johnson: 6; Plans Underway for the Northeast Regional Meeting of the DSA, in the Northern Adirondacks and St. Lawrence Valley of New York, 26–29 June 2008: 7; Report on NymphFest 2008: 8; Request for Odonata records from the Delmarva Peninsula: 29; Dragonfly "job" announcement: 30; Recent articles and books: 30.] Address: Dragonfly Society of the Americas c/o Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com
- 13625.** Dragonfly Society of the Americas (2008): *Argia* 20(3). *Argia* 20(3): 34 pp. (in English) [The following administrative or organisational issues are reported: In This Issue: 1; The 2008 DSA Annual Meeting: 2; Minutes of the 2008 Annual Meeting of the Dragonfly Society of the Americas: 5; BAO Reminder: 6; Report on the Northeastern DSA Meeting: 7; Recent articles and books: 29; Photo supplement 35.] Address: Dragonfly Society of the Americas c/o Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com
- 13626.** Dragonfly Society of the Americas (2008): *Argia* 20(4). *Argia* 20(4): 30 pp. (in English) [Administrative and organisational issues are: Calendar of Events:1; In This Issue: 1; 2009 DSA Annual Meeting to be Held in Sullivan, Missouri, 19–21 June 2009: 2; Nick and Ailsa Donnelly Fellowship for 2009: 3; 2009 DSA SE Regional Meeting in Galax, Virginia: 4; 2008 Treasurer's Final Report: 4; Renewal reminder: 26; Recent articles and books: 26; Dues renewal form: 28.] Address: Dragonfly Society of the Americas c/o Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com
- 13627.** DuBois, B.; Tennesen, K. (2008): Nymphal habitat of *Somatochlora ensigera* Martin (Plains Emerald). *Argia* 20(1): 9-11. (in English) [16-V-2007, the larval habitat of *S. ensigera* in the Turtle River, near Arvilla, Grand Forks County, North Dakota, USA is described] Address: DuBois, R., Wisconsin Department of Natural

Resources, 1401 Tower Ave., Superior, WI 54880, USA.
E-mail: robert.dubois@Wisconsin.gov

13628. Dunkle, S. (2008): Veracruz, Mexico, Dragonfly migration. *Argia* 20(1): 14. (in English) [19-X-2007, migrating ahead of an approaching cold front, providing a strong tailwind towards the south, thousands of fast speed *Tamea* sp cf. *onusta* were observed flying an attitude of app. 50 m.] Address: Dunkle, S.W.; Biology Dept, Collin County Community College, Spring Creek Campus, Plano, Texas, USA 75074. E-mail: sdunkle@ccc.edu

13629. Dunkle, S.; Tennessen, K.; Donnelly, T.W. (2008): Some tributes to Philip. *Argia* 20(1): 4-5. (in English) [Three tributes following the message of Philip Corbet's passing away on 13th February 2008] Address: Dunkle, S.W.; Biology Dept, Collin County Community College, Spring Creek Campus, Plano, Texas, USA 75074. E-mail: sdunkle@ccc.edu

13630. Ellenrieder, N. von (2008): A natural sticky-trap for Odonates. *Argia* 20(4): 10. (in English) [Argentina, El Rey National Park, end of October 2006; numerous Odonata (in most cases *Telebasis willinki* and *Erythrodiplax media*) were trapped on the surface of foam nests of the Rufous Four-eyed frog (*Pleurodema borellii*).] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Rd, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

13631. Garrison, R.W. (2008): 100 years of the Biologia Centrali-Americana, Neuroptera. *Argia* 20(4): 5-8. (in English) [This reminiscence and sound introduction in a monumental work highlights the pioneer character of Calvert's work] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

13632. Gomez Anaya, M. (2008): Ecología de los ensamblajes de larvas de odonatos (insecta) y su uso potencial como indicadores de calidad ecológica en la Sierra de Coalcomán, Michoacán, México. Tesis, Universidad autónoma del estado de Hidalgo, Instituto de ciencias básicas e ingeniería, área académica de biología, doctorado en recursos bióticos: XXV + 306 pp. (in Spanish, with English summary) [Five Odonata larvae assemblages from Coalcomán Range, Michoacán, México were described and compared: Pinolapa (RP), Chichihua (CH), Ticuiz (TZ), Colorín (CL) and Estanzuela (EZ). The objectives of the study were describe and compare the assemblages and to relate them with some environmental variables judging their utility as conservation indicators. Two sampling trips for each year station were carried out, generally to beginning and final of each station. Simultaneously, the physio-

chemical variables pH, temperature, dissolved oxygen and conductivity were measured. Other variables of the streams like width, depth, current speed and gradient were measured in some additional trips. The streams were sampled in longitudinal sections of approximately 500 m using D-net and Hess sampler. We used a stratified sampling design (shores, rapids and eddies) and inside each stratum sampling was aleatory. The fauna was conserved in alcohol 96% with a replacement before 24 hours. All the larvae were identified to the species level regardless of their development stadium. As descriptive of each assemblage (alpha diversity) different diversity indexes were calculated (Shannon-Weaver H', Berger Parker, Williams's alpha), richness (Margalef), dominance (Simpson D), equitativity (Pielou). To compare and order the diversity of the water bodies the Renyi's index was used. The Bray-curtis' similarity index was used to evaluate the replacement rate (beta diversity) space and temporarily. An estimation of the theoretical richness using non parametric methods (presence/absence: Chao2, Jack2, Bootstrap and Mao Tau; abundance: ACE and Chaol) and parametric methods (Clench and von Bertalanffy) was carried out. Abundance of species was adjusted to the four classic models (stick broken, normal log, log series and geometric); additionally, each assemblage was separated in two groups, core and occasional species, according to Magurran & Henderson (2002). We used Canonical Correlation (CC) and Correspondences Analysis (AC) to explore the possible relationship between the physiochemical and environmental variables with species abundance. Discriminante Analysis (AD) was used to corroborate if the assemblages of Zygoptera, Anisoptera and *Argia* was able to segregate well the streams, the year stations and the strata. Among the results, the water bodies showed important physiochemical differences creating a temporal and geographical mosaic of variation. A total of 75 Odonata species (gamma diversity) were registered of a total of 380 samples. Number of species was higher at Ticuiz (36) and smaller at Colorín (18). These water bodies represented the ends in diversity and conservation in Coalcomán Range. Additionally, Ticuiz represents a mixed environment (lotic - lentic) with a moderate degree of stress being this fact the possible reason of its highest diversity and corroborating the intermediate-disturbance hipótesis. On the other hand, Colorín represents the water body more conserved with a characteristic Odonata assemblage of mountain streams of cloudest forest. According to the richness estimators, the five lists of species are still incomplete, being the most complete those of Estanzuela and Colorín. CC showed that some physiochemical variables could be responsible for the abundance of some species, while the AC indicated that a possible association can exist between the species and the strata, being the shores that support the highest diversity and abundance. AD evidenced that the assemblages of Zygoptera, Anisoptera and *Argia* can segregate well among the water bodies, year stations and strata. Final-

ly, we considered convenient to looking for indicator species of conservation among the *Argia* genus." (Author)] Address: Gomez Anaya, J.A., Instituto de Ecología, A.C. Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: antonio.gomez@inecol.edu.mx

13633. Gregoire, S.; Gregoire, J. (2008): Update on *Celithemis elisa* (Calico Pennant) emergence in New York State. *Argia* 20(1): 14-15. (in English) [USA; in 2007, 6,497 specimens emerged from a 35x40 m study pond. Influence of weather on behaviour and emergence is discussed.] Address: Gregoire, J., Kestrel Haven Avian Migration Observatory, Burdett, NY 14818, USA. E-mail: khmo@empacc.net

13634. Groover, R.S. (2008): Eastern Amberwings (*Perithemis tenera*) non-existent at eutrophic covered ponds? *Argia* 20(1): 15-16. (in English) [Virginia, USA; author discusses the observation that ponds completely covered with *Lemna minor* are not occupied by *P. tenera*] Address: Groover, R.S., Biology, J. Sageant Reynolds Community College, Richmond, VA, USA. E-mail: rgroover@reynolds.edu

13635. Harp, G.L. (2008): New records for Tamaulipas and Colima states in Mexico. *Argia* 20(1): 27-28. (in English) [Previously unrecorded regional records are: *Epithema princeps*, *Celithemis eponina*, *Enallagma signatum*, *Tamea calverti*, *Ischnura posita*, *Hetaerina cruentata*.] Address: Harp, G., Department of Biological Sciences, Arkansas State University, State University, AR 72467, USA. E-mail: glharp@astate.edu

13636. Harp, G.L. (2008): New records for Idaho and Wyoming. *Argia* 20(4): 19-20. (in English) [Several new county records are documented. *Rhionaeschna multicolor* is new to Idaho, USA.] Address: Harp, G., Dept of Biological Sciences, Arkansas State University, State University, AR 72467, USA. E-mail: glharp@astate.edu

13637. Johnson, J. (2008): Beware the spotless *Leucorrhinia hudsonica* (Hudsonian Whiteface). *Argia* 20(4): 9-10. (in English) [Colour variation of *L. hudsonica* (lack of red spots on abdomen) is discussed. The paper also refers to a note on a new state record of *L. proxima* in Oregon, USA.] Address: Johnson, J., 3003 Unander Ave, Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

13638. Manolis, T. (2008): A windy February in Florida. *Argia* 20(1): 21-23. (in English) [Report from a trip between 10-23 February 2008; Florida, USA.] Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

13639. Mauffray, B. (2008): *Dythemis velox* (Swift Setwing) in Indiana. *Argia* 20(3): 26. (in English) [10-VIII-2008, Greene-Sullivan State Forest, Green County, Indiana, USA] Address: Mauffray, B., 4525 N.W.

53rd Lane., Gainesville, FL 32653, USA. E-mail: iori@afn.org

13640. Mead, K. (2008): Book review: Dazzling Dragonflies: A Life Cycle Story (Linda Glaser's Classic Creatures). Millbrook Press. ISBN 978-0-8225-675-30. Paperback, 32 pp. \$22.60. *Argia* 20(1): 31-[The book is directed to children, and Kurt Mead highlights the quality of content and presentation of facts.]

13641. Meurgey, F. (2008): Another case of westward dispersal of African odonates to the West Indies: *Tamea basilaris* Palisot de Beauvois found in Martinique (FWI). *Argia* 20(4): 20-21. (in English) [Records of an obscure *Tamea* sp. on Martinique, finally proved to be *Tamea basilaris*. The origin of this windborne species should be the Afrotropical regions. In October 2008, also several females of *T. basilaris* were observed ovipositing a basin with brackish water.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13642. Meurgey, F. (2008): Migration of *Pantala hymenaea* (Spot-winged Glider) in the French West Indies. *Argia* 20(4): 12. (in English) [08-IX-2008, Le Moule, E Grand-Terre, Guadeloupe; followed by several records more on Guadeloupe and Martinique. The influx is explained (partly) by the tropical storm Omar originating in the Caribbean, and crossing the West Indies in October 2008 while following a SW-NNE direction.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13643. Myrup, A. (2008): *Somatochlora hudsonica* (Hudsonian Emerald) from the Uinta Mountains of northeastern Utah. *Argia* 20(1): 24-26. (in English) [Two records of *S. hudsonica* are documented from July 2004 and 2007; further noteworthy species are *Somatochlora semicircularis*, *Cordulia shurtleffii*, *Leucorrhinia borealis*, *L. hudsonica*, *L. proxima*, *Aeshna juncea*, and *Coenagrion resolutum*.] Address: Myrup, A., 914 South 1635 West, Orem, Utah 84058, USA. E-mail: alanm@provo.edu

13644. Parr, M. (2008): Philip Corbet, specialist on the ecology of dragonflies and mosquitoes, and earnest advocate of a human population policy. *Argia* 20(1): 2-5. (in English) [This is an authoritative obituary written by a companion and friend of Philip Corbet (21.5.1929 - 13.2.2008).] Address: Parr, M.J., Hele Barton, 9c St James's St., South Pethcrton, Somerset, TA13 5BS, UK. E-mail: mima37@tiscali.co.uk

13645. Paulson, D.R. (2008): *Lucifer Damsel* (*Chrysobasis lucifer*) rediscovered during southern Florida expedition. *Argia* 20(1): 17-20. (in English) [9-15-XII-2007, southern Florida, USA. 37 species were recorded, among them *Chrysobasis lucifer*. The latter is briefly

compared to specimens from Costa Rica, and the meaning of the name "lucifer" is explained. This 2007-midwinter fauna is compared to dates from January 2000.] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@pugetsound.edu

13646. Rutherford, R.; O'Brien, M. (2008): A significant new Hine's Emerald (*Somatochlora hineana*) record for Michigan. *Argia* 20(3): 28. (in English) [4-VIII-2008, Hayward Lake, Menominee County, Michigan, USA] Address: O'Brien, M., Insect Division, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079, USA. E-mail: mfobrien@umich.edu

13647. Stanley, S.; Pehek, E. (2008): Odonata of a rare habitat in New York City. *Argia* 20(1): 11-12. (in English) [Public Ocean Breeze Park, New York city, USA; 24 odonate species were recorded in 2007. These are discussed against the background of threat by urbanisation of habitats.] Address: Stanley, Susan, New York City Department of Parks & Recreation, Natural Resources Group, New York, NY, USA

13648. Strausfeld, N.J.; Seyfarth, E.-A. (2008): Johann Flögel (1834–1918) and the birth of comparative insect neuroanatomy and brain nomenclature. *Arthropod Structure & Development* 37: 434-441. (in English) ["Johann H.L. Flögel (1834–1918) was an amateur scientist and self-taught microscopist in Germany who 130 years ago pioneered comparative arthropod neuroanatomy. He was fascinated by innovations in optical instrumentation, and his meticulous studies of the insect supraoesophageal ganglia were the first to use serial sections and photomicrographs to characterize the architecture of circumscribed regions of brain tissue. Flögel recognized the interpretative power resulting from observations across various species, and his comparative study of 1878, in particular, provided a baseline for subsequent workers to evolve a secure nomenclature of insect brain structures. His contributions stand out from contemporary accounts by virtue of their disciplined descriptions and emphasis on identifying comparable elements in different taxa. Here we give a biographical sketch of his life and summarize his remarkable achievements." (Authors) The publication includes a photograph of the brain structure of *Aeshna mixta* from Flögel's original publication from 1878: Flögel, J.H.L., 1878. Ueber den einheitlichen Bau des Gehirns in den verschiedenen Insecten-Ordnungen. *Zeitschrift für wissenschaftliche Zoologie* 30, 556–592.] Address: Strausfeld, N.J., Arizona Research Laboratories, Division of Neurobiology, 611 Gould-Simpson, University of Arizona, Tucson, AZ 85721, USA. E-mail: fly-brain@neurobio.arizona.edu

13649. Tennessen, K. (2008): A tip for pointing out perched Odonates in the field. *Argia* 20(4): 11. (in English) [To ease communication within a group of odon-

tologists in field, a laser pointer is introduced to help pointing out a position of a hidden dragonfly specimen.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

13650. Tennessen, K. (2008): Dragonfly Poetry. *Argia* 20(4): 26-27. (in English) [Seven poems on dragonflies written by a group of Wisconsin poets are presented.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

13651. Trapero-Quintana, A.D. (2008): Anomalous tandem registered in *Telebasis dominicanum* (Selys, 1857) (Zygoptera: Coenagrionidae). *Argia* 20(1): 16. (in English) [8-x11-2007, 5,5km down the main road near North Santiago de Cuba, Cuba. Two males of *T. dominicanum* formed a tandem.] Address: Trapero Quintana, A., Departamento de Biología de la Universidad de Oriente, Patricio s/n, Santiago, Cuba, CP 90500, Cuba. E-mail: atrapero@cnt.uo.edu.cu

2009

13652. Bend, Y.L.; Cong, Q.; Wang, X.j. (2009): Mechanism of hydrophobicity of dragonfly wing surface. *Transactions of the Chinese Society for Agricultural Machinery* 40(9): 205-208. (in Chinese, with English summary) ["By means of scanning electron microscope (SEM), Fourier transform infrared spectroscopy (FT-IR) and optical contact angle measuring instruments, the microstructure, ingredient and hydrophobicity of dragonfly wing surface was investigated. Results show that dragonfly wing surface is covered with large number of papilla, leading to the composite contact between liquid droplet and dragonfly wing surface, which enhances the hydrophobicity of dragonfly wing surface. The waxy layer increases the hydrophobic capacity of dragonfly wing surface. Moreover, the hydrophobic equation of dragonfly wing surface was established through the Cassie model, and the multivariate coupling mechanism of dragonfly wing surface was analyzed. It is the conclusion that the hydrophobicity ascribes to co-coupling of the microstructure and ingredient of dragonfly wing surface." (Authors)] Address: Wan, Yanling, Key Laboratory for Bionic Engineering, Ministry of Education, Jilin University, Changchun 130025, China

13653. Maynou i Señé, X. (2009): Aportació al coneixement de la fauna odonològica del massís de Sant Llorenç del Munt i la serra de l'Obac. *Butlletí de la Institució Catalana d'Historia Natural* 75: 85-98. ["An updated list of 28 species of Odonata recorded in the Sant Llorenç del Munt Massif and Obac Range (Catalonia, Spain) in 2007 and 2008 is provided, with an estimation of the degree of presence of each species. The list of species is compared to existing records, old and recent. The species diversity observed in this study is similar to that in other Catalan nature reserves, although most of the species found here can be considered ecological

generalists. In this survey, data regarding reproduction and phenology are also provided for every species, the most important dragonfly sites are identified and actions for the conservation and improvement of the Odonata community richness are suggested." (Author)] Address: Xavier.maynon@gmail.com

13654. Winkel, S.; Kuprian, M.; Weber, R.; Weber, E.; Mathias, T. (2009): Das NABU-Schutzgebiet „Amphibienparadies Steinau-Marborn“. Erste faunistische Ergebnisse einer Erfolgskontrolle. MKK-Mitteilungsblatt. Zentrum für Regionalgeschichte 34: 9-12. (in German) [Hessen, Germany. 20 odonate species are listed between 2007 and 2009; the list includes *Erythromma najas*, *E. viridulum* and *Sympetrum vulgatum*.] Address: Winkel, Sibylle, Pommernstr. 7, 63069 Offenbach, Germany. E-mail: Si-winkel@t-online.de

2010

13655. Nel, A.; Nel, P.; Petrulevicius, J.F.; Perrichot, V.; Prokop, J.; Azar, D. (2010): The Wagner Parsimony using morphological characters: a new method for palaeosynecological studies. *Ann. soc. entomol. Fr.* (n.s.) 46(1–2): 276-292. (in English, with French summary) ["The limits and difficulties related to the tools currently in use for palaeosynecological comparisons of faunas or floras of different geological periods are discussed. The new method of the Wagner parsimony Applied to Palaeosynecology Using Morphology (WAPUM method), is defined and tested on morphological characters gathered from two insect groups Odonoptera and Thripida. The difficulties related to the monophyly of the taxonomic groups used in the more traditional approaches are no longer a problem when using the WAPUM method. In the WAPUM a character is 'presence versus absence of species bearing a morphological structure'. The results obtained from use of the WAPUM minimize the number of changes among character states. Application of the WAPUM could reveal signals to confirm or object the currently available scenarios for the global changes in the evolution of past diversity and disparity of organisms (major changes or global crises of diversity)." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

13656. Poinar, G. (2010): Palaeoecological perspectives in Dominican amber. *Ann. soc. entomol. Fr.* (n.s.) 46(1–2): 23-52. (in English, with French summary) ["Palaeoecological and palaeobiogeographical aspects of Dominican amber are discussed based on the known insect fauna. Topics covered are examples of speciation, extinctions, longevity as well as associations between insects and plants, insects and vertebrates and various arthropod groups. Examples of camouflage, oviposition and predator-prey associations are presented. Ecological and medical implications from recently discovered vector-parasite associations (malaria, trypano-

nosomiasis and leishmaniasis) are discussed. Paleosymbiotic associations, with examples of phoresis, mutualism, parasitism and pathogens, are examined. Insects in Dominican amber, together with their cohabitants, can assist in determining specific habitats and reconstructing ancient landscapes." (Author) Figure 8 demonstrates *Diceratobasis worki* (Zygoptera: Coenagrionidae) probably bred in tank bromeliads.] Address: Poinar, G. Jr., Dept of Zoology, Oregon State Univ., Corvallis, OR 97331, USA: E-mail: poinarg@science.oregonstate.edu

13657. Rowe, R.J. (2010): *Ischnura aurora* (Brauer 1865) (Zygoptera: Coenagrionidae), an Australo-Pacific species. *New Zealand Journal of Zoology* 37(2): 189-192. (in English) ["There is some confusion over the identity of small forms of *Ischnura* occurring in South and East Asia and the Australo-Pacific region. Here, characters are given that separate *Ischnura aurora* (Brauer 1865) of the Australo-Pacific region from animals from the Asian mainland and nearby islands. Difficulties in attaching a name, or names, to Asian forms are considered. ... As work to progress this problem needs to be done with fresh, and possibly with living, material, this is a problem which can only be solved by persons resident in the area. The name, or names, to be associated with these Asian forms will require examination of the types of *rubilio*, *amelia* and *bhimtalensis*, together perhaps with a sensitive choice of a lectotype for *delicata*." (Author)] Address: Rowe, R.J., School of Marine and Tropical Biology, James Cook University, Townsville, Australia. E-mail: richard.rowe@jcu.edu.au

13658. Schmitt, V. (2010): Inventaire des populations de *Coenagrion mercuriale* (Charpentier, 1840) dans le bassin de la Chiers (Odonata, Zygoptera: Coenagrionidae). *Martinia* 26(3/4): 123-130. (in French, with English summary) ["For the needs of the project Interreg IVa Big Region entitled "Preservation of the remarkable natural elements of the Chiers basin in the Belgian and French Lorraine", it was necessary to know better the localization of the populations of *C. mercuriale* in the Chiers watershed. The method used and the results are both described in this paper." (Author)] Address: Schmitt, Virginie, Conservatoire des Sites Lorrains, 14 rue de l'Eglise, F-57930 Fénétrange, France

13659. Zhang, H.-j.; et al. (not stated) (2010): Distribution and species key of genus *Sympetrum* from China. *Journal of Anhui Agri. Sci.* 38(14): 7386-7388. (in Chinese, with English summary) [28 species of the genus *Sympetrum* are keyed.] Address: Zhang, H.-j., Shaanxi Bioresource Key Laboratory, Shaanxi University of Technology, Hanzhong-723000, Shaanxi, China. E-mail: hjzhang663@sohu.com

2011

13660. Bo, T.; Fenoglio, S. (2011): Impacts of a micro-sewage effluent on the biota of a small Apennine creek.

Journal of Freshwater Ecology 26(4): 537-545. (in English) ["Organic pollution of domestic origin represents the most important cause of water quality deterioration in rural and mountainous areas of the northern Apennines. In this study, the ecological consequences of a small sewage dump in the Caramagna Creek (north-western Italy) were analyzed. The addition of organic matter and nutrients led to a dramatic change in the taxonomic richness and density of the macrobenthic community. Also functional, biological, and ecological composition of the invertebrate assemblages changed downstream of the effluent. Interestingly, benthic chlorophyll a showed only a weak increase in the downstream section, despite the increased levels of nutrients. This work emphasizes the importance of better management of sewage treatment also in remote areas." (Authors) The samplings include *Cordulegaster boltonii* and *Boyeria irene*.] Address: Fenoglio, S., University of Piemonte Orientale, Di.S.A.V., Via Bellini 25, I-15100 Alessandria, Italy. E-mail: fenoglio@unipmn.it

13661. Dow, R.A.; Reels, G.T. (2011): Odonata from a remnant patch of disturbed peat swamp forest on the outskirts of Kuching, west Sarawak. *Agrion* 15(2): 50-51. (in English) ["Before large-scale human alterations began, much of the surroundings of what is now Kuching, the state capital of Sarawak, consisted of various types of swamp forest, including much peat swamp forest. Later, rubber was planted in parts of this swamp forest. M.A. Liefertinck (1953: 236), under the description of *Podolestes harrissoni*, gave an incomplete list of species collected in "an old rubber garden" on the Matang Road outside of Kuching, on September 22, 1950. This list included a number of apparently very scarce species (e.g. *Amphicnemis madelenae*, *Nannophyopsis chalcosoma* and *Pseudagrionoptera diotoma*). Since Liefertinck's day Kuching has expanded considerably and there has been extensive development along the Matang Road, so that most of the peat swamp/old rubber habitat has gone. However, one patch remains, although probably not for much longer. Indeed, it may already have been bulldozed; we last passed the site in July 2010, when building work was occurring immediately adjacent to it. We first visited this site in January 2006, and made return visits in 2008 and 2010. The site is small, consisting of disturbed peat swamp with many old rubber trees that are still being tapped (on his last visit, RAD was ordered out of the site by machete-wielding rubber tappers). This site is at least near to Liefertinck's site, but remarkably we have collected a number of species not found by Liefertinck, illustrating the biodiversity of this kind of habitat in west Sarawak, and the extreme localisation of some species. Most notable of our discoveries at the Matang road was *Pachycypha* sp cf *aurea*. *P. aurea*, a tiny chlorocyphid, was described from the south of Kalimantan, and remains the only named species in the genus, which has not been recorded outside of Kalimantan until now. Despite the small size of the Matang Road site, it was not until May

2010 that we found this minute taxon, along one short section of a tiny stream. Both sexes descended from the canopy only in full sunlight, typically perching high. They were at low densities, and no interactions were observed between the sexes. They typically returned to the canopy almost immediately after the sun became obscured by clouds. A full list of the 26 species we have collected at the site is given below. Most of them were not listed by Liefertinck, but probably a number of these were actually collected by him; six species (at least) collected by Liefertinck were not collected by us. At least two of the species listed here are as yet unnamed; descriptions of both are being prepared by RAD." (Authors)] Address: Dow, R.A., NCB Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

13662. Engelmann, A. (2011): Analyse von Exkrementen gefangener Waschbären (*Procyon lotor* L., 1758) aus dem Müritz-Nationalpark (Mecklenburg-Vorpommern) unter Berücksichtigung individueller Parameter. Diplomarbeit. Ernst-Moritz-Arndt-Universität Greifswald: 109 pp. (in German, with English summary) ["In the current study the diet behaviour of the raccoon (*Procyon lotor* L., 1758) has been investigated in a semi-natural habitat of the North-Eastern Lowland (Müritz National Park, Mecklenburg-West Pomerania) by means of 220 faeces samples collected between 2006 and 2009. Each of the samples could be associated to a day with a single individual raccoon. Thus, it was possible to relate the results of the fecal analysis to other known parameters (sex, age, habitat use). The raccoon's diet, being dominated by invertebrates (biomass = 43,7 %) and plants (biomass = 41,3 %), mainly consisted of earthworms, molluscs, insects, fruit, and nuts. Furthermore, the diet depended on the season of the year and the age, sex and habitat use of the individual." (Author) 26 of the faeces included Odonata.] Address: Engelmann, Anett, Projekt Waschbär, Goldenbaum 38, 17237 Carpin, Germany

13663. Fabbri, R. (2011): Two species of Odonata new to Emilia-Romagna Region, and one confirmed. (*Insecta Odonata*). *Quaderno di studi e notizie di storia naturale della Romagna* 34: 47-50. (in Italian, with English summary) ["*Oxygastra curtisii* and *Trithemis annulata* are reported as new for the dragonfly fauna of Emilia-Romagna. *Coenagrion mercuriale castellanii* is confirmed as present in Romagna in four new localities." (Author)] Address: Fabbri, R., Museo Civico, Sezione Naturalistica, via Vittorio Veneto, 1/a, 48012 Bagnacavallo (RA), Italy. E-mail: eco.fabbri@gmail.com

13664. Hatami, R.; Soofiani, N.M.; Ebrahimi, E.; Hemami, M.R. (2011): Evaluating the aquaculture effluent impact on macroinvertebrate community and water quality using BMWP index. *Journal of Environmental Studies* 37(3): 13-15. (in Farsi) ["We investigated the environmental impact of trout farm discharge on Za-

yandeh-Rud River. Three farms with different production capacities; 250, 25 and 70 tones were assigned to this study. Five sampling sites were designated to each farm. Benthic macroinvertebrates were collected in autumn, winter, and spring using the quantitative techniques. A total of 11 classes, 16 orders and 53 families' of macroinvertebrates were identified. Information on macroinvertebrates of each site was used to calculate the biological monitoring working party (BMWP). BMWP index was significantly ($p < 0.01$) low at farm effluents especially when the production capacity was high. At these locations, abundance of tolerant taxa (e.g. Chironomidae, Simuliidae, Oligochaeta families) increased, but sensitive taxa (Ephemeroptera and Trichoptera) declined in number. The BMWP index values were closely related to production rate and the lowest values (6.03 ± 1.17) was recorded at the farm with the highest production. Although, BMWP index at site 50 m after the outfall showed low or no recovery of water quality and community structure, however, at site 1 km after the outfall BMWP values exhibited a partial downstream spatial recovery of community structure so that no significant difference with upstream site was observed. We concluded that self-purification capacity and the high water flow of the river dilutes effluents so that biotic index showed no alarming condition at the farthest downstream station." (Authors) Gomphidae, Calopterygidae] Address: Hatami, R.; E-mail: rezvan.hatamiut@yahoo.com

13665. Henheik, H. (2011): Zum Vorkommen der Quelljungfer-Arten (*Cordulegaster bidentata*, *C. boltonii*) im näheren Umkreis von Tübingen. *Mercuriale* 11: 1-10. (in German, with English summary) ["In 2001, 100 small brooks in the surroundings of the city of Tübingen (Federal state of Baden-Württemberg, Southwest-Germany) were surveyed for the two *Cordulegaster* species by larval search. While 243 larvae of *C. bidentata* were found in 26 small brooks, only 19 larvae of *C. boltonii* were found in one brook. Larvae of *C. bidentata* were found in altitudes of 320 – 410 m a s l. and in distances of 8 to 1,225 m from the sources." (Author)] Address: Henheik, H., In Angeräcker 1, 72829 Engstingen, Germany. E-mail: hhenheik@googlemail.com

13666. Hunt, P.D. (2011): Odonata of the Lamprey River, NH. <http://www.lampreyriver.org/UploadedFiles/Files/odonatareport2011.pdf>: 18 pp. (in English) [New Hampshire, USA "Extensive surveys for Odonata were conducted along the Lamprey River from Northwood to Durham in 2011 and supplemented with data collected in previous years. A total of 74 species has been reported along the river, 29 of which can be considered specialists of rivers and streams. Overall, the percentage and total number of such species at a site increased from the headwaters (mean of 6.5 river species) through the lower portions (e.g., Lee and Durham, mean of 23 river species). This increase in species richness likely results from the increased size and habi-

at diversity at downstream sites, since only a few species were restricted to upstream areas. No river species of statewide conservation concern were detected along the Lamprey, probably because these species are more typical of larger rivers like the Connecticut and Merrimack. One common river group – the snaketails in the genus *Ophiogomphus* – seemed relatively rare compared to other rivers in New Hampshire. Given available data, the local rarity of *Ophiogomphus* might be related to in-stream conditions or to a general rarity in coastal plain streams. Issues known to affect the Lamprey, and thus potentially its odonate fauna, include sedimentation, temperature, and extremely high or low flows, but more detailed study would be needed to determine if any of these is affecting local species distributions. Overall, the odonate fauna of the Lamprey appears diverse and healthy and is likely to persist in the absence of large-scale perturbations such as extensive losses of riparian buffers, increased pollution, or excessive alteration of substrate conditions." (Authors)] Address: Hunt, Pamela, NH Audubon, Lamprey River, 203 Wadleigh Falls Road, Lee, NH 03861, USA

13667. Kastner, F.; Mückenwarf, M.; Buchwald, R. (2011): Zum Vorkommen der FFH-Libellenart *Aeshna viridis* Eversmann, 1836 (Odonata: Aeshnidae) in Krebscherengraben der Hunte- und Wesermarsch, Niedersachsen. *Drosera* 2010: 103-108. (in German, with English summary) ["On the occurrence of *A. viridis*, species of the European Habitat Directive, in ditches with Water Soldier in the Hunte and Weser river marshes, Lower Saxony, Germany. *A. viridis* is strongly linked to standing waters with dense stands of the Water Soldier (*Stratiotes aloides*), that serves the dragonfly as the only oviposition plant species for the dragonfly. In north-western Germany, *A. viridis* predominantly occurs in the river plains of Aller, Elbe, Weser, and Ems. For this study, we analysed all available inventories (expert reports, student research projects) on the distribution and present habitats of *Aeshna viridis* in the Hunte and Weser river marshes between Oldenburg and Bremen. In 2010, we recorded the occurrence of the endangered dragonfly species in the following locations with marsh ditches: NSG Bornhorster Huntewiesen, Iprump, Huntebrück, Warfleth, and Sandhausen. We consider its presence in these habitats to be autochthonous." (Authors)] Address: Friederike Kastner, Friedericke, AG Vegetationskunde und Naturschutz, IBU, Carl von Ossietzky Universität Oldenburg, 26111 Oldenburg, Germany. E-Mail: Friederike.Kastner@uni-oldenburg.de

13668. Lienenbecker, H. (2011): Libellen im Raum Bielefeld-Gütersloh - Zufallsbeobachtungen eines Botanikers. *Ber. Naturwiss. Verein für Bielefeld u. Umgegend* 50: 160-166. (in German) [Nordrhein-Westfalen, Germany; 10 localities were studied resulting in 30 Odonata species. Of regional interest are *Lestes dryas*, *L. virens*, *Ischnura pumilio*, *Coenagrion pulchellum*, *Erythronma najas*, *E. viridulum*, *Gomphus vulgatissi-*

mus, *G. pulchellus*, *Sympetrum danae*, *S. flaveolum*, *S. vulgatum*, *Crocothemis erythraea*, and *Leucorrhinia dubia*] Address: Lienenbecker, H., Traubenstr. 6b, 33803 Steinhagen, Germany

13669. Mezquita Aranburu, I.; Ocharan, F.J.; Torralba-Burrial, A. (2011): Primera cita de *Orthetrum albistylum* (Sélys, 1848) (Odonata: Libellulidae) para la Península Ibérica. Boln. Asoc. esp. Ent. 35(3-4): 519-523. (in Spanish) [16-VII-2011, male of *O. albistylum* observed at Plaiaundi Ecological Park (Guipúzcoa), Bahía de Txingudi (30TWP978004, 6 m a.s.l, Irún, Guipúzcoa).] Address: Mezquita Aranburu, I., Depto de Entomología de la Sociedad de Ciencias Aranzadi, Paseo de Zorroaga, 11, 20004 Donostia-San Sebastián (Spain). E-mail: mezquitaaranburu@gmail.com

13670. Sänger, H.; Köhler, M. (2011): Natur- und Artenschutz auf Folgeflächen des Uranerzbergbaus. Proceedings des Internationalen Bergbausymposium WIS-SYM2011: 11 pp. (in German) [Halde Beerwalde, Thüringen, Germany; "Mining and extraction of natural resources are related with infringements on nature and landscape. After finalization of mining activities long-term remediation is necessary. Within the law to reclamation activities of the mining areas it is also necessary to take account of the demands of nature conservancy and species protection. The paper offers insights to the manifold possibilities to create significative seminatural biotopes within the Remediation." (Authors) The following Odonata species are listed: *A. cyanea*, *A. grandis*, *A. mixta*, *Anax imperator*, *Coenagrion puella*, *Enallagma cyathigerum*, *Libellula quadrimaculata*, *Sympecma fusca*, *S. danae*, *S. sanguineum*, and *S. vulgatum*.] Address: Sänger, H., BIOS-Büro für Umweltgutachten, Berggasse 6, 08451 Crimmitschau, Deutschland

13671. Schiphouwer, M.E. (2011): What do Ponto-Caspian Gobiidae eat in the Dutch Rhine river system? Reports Environmental Science nr. 372: 35 pp. (in English) ["This research was executed during the first research internship period of the Master of Environmental Science, with the Nature and Water Management specialisation. The internship was supervised by Rob Leuven of the Department of Environmental Sciences at the Radboud University in Nijmegen and Frank Spikmans of the RAVON Foundation in Nijmegen. During this internship I had the opportunity to work with fish, which are of personal interest to me. Introduction of exotic fish can have adverse effects on the native ecosystems in the Netherlands. Because there was not much information available concerning the recently arrived Gobiidae a research subject was born. The research concerns a preliminary investigation on feeding habits of four Gobiidae species in the Dutch Rhine river system, based on stomach contents analysis." (Author) The diet of *Proterorhinus semilunaris* includes Zygoptera.] Address: Schiphouwer, M.E., Department of Environmental Science, Faculty of Science, Radboud University

Nijmegen, Heyendaalseweg 135, 6525 AJ Nijmegen, the Netherlands

13672. Terzani, F. & Fabbri, R. (2011): Odonata from the National Park of Casentine forests, Mount Falterona and Campigna, in Northern Apennines. (Insecta Odonata). Quaderno di studi e notizie di storia naturale della Romagna 34: 21-46. (in Italian) ["19 taxa of Odonata were reported so far by literature from the Casentine Forests National Park. The field researches carried out by the authors in the National Park and close surroundings, with some additional data from other collections, increase the number to 33 taxa, by addition of 14 taxa. 324 records with collection data are listed: 67 are reported from literature and 257 are unpublished records." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

13673. Wildermuth, H. (2011): Ein unbeabsichtigt entstandenes Gewässer im intensiv genutzten Landwirtschaftsland als Libellenhabitat. Mercuriale 11: 43-46. (in German, with English summary) ["The odonate fauna of an ephemeral pond arisen from heavy rainfall in a meadow depression, comprising seven species with *Ischnura pumilio* constituting the most abundant, was compared with a recently created, structurally similar pond that was frequented by 15 species of which *I. pumilio*, *I. elegans* and *Enallagma cyathigerum* were the most common. The importance of accidentally originated temporary pools for the existence of pioneer species such as the regionally rare *I. pumilio* is discussed." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rüti, Switzerland. E-mail: hansruedi@wildermuth.ch

13674. Zhang, H. (2011): Karst Forest Odonata from Southern Guizhou, China. International Dragonfly Fund - Report 37: 1-35. (in English) ["The paper compiles records from four excursions to study the Odonata fauna of southern Guizhou, China. Between 2007 and 2010 in Xiaoqikong Park and Maolan National Nature Reserve, 104 taxa have been recorded. Some interesting species are discussed, compared with sibling taxa, and information on habitats and habits is given." (Author)] Address: Zhang, H., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com

2012

13675. Amaya-Perilla, C.; Palacino-Rodriguez, F. (2012): An Updated list of the dragonflies (Odonata) of Meta department, Colombia, with forty-six new department records. Bulletin of American odonatology 11(2): 29-38. (in English, with Spanish summary) ["As a result of several years of sampling in Meta Department, Colombia, an updated list of dragonflies species is provided, of

which 46 are new department records. A total of 12 families, 60 genera, and 144 species are reported, which represents 85% of the families, 68% of the genera, and 44% of the species recorded from Colombia." (Authors)] Address: Amaya-Perilla, Catalina, School of Biological Sciences, University of Auckland, 3A Symonds Street, Thomas Building 110, Auckland, Grafton 1010, New Zealand. E-mail: c.amaya@ auckland.ac.nz.

13676. Beukema, J.J.; Manger, R. (2012): Threats of drought for dragonflies in dune areas. *Levende Nat.* 113(6): 288-291. (in Dutch, with English summary) ["In dune areas, Odonata mostly depend on small and shallow ponds and pools. For over 10 years, numbers of dragonflies were monitored at ponds in the dunes of the northern part of Holland. At all pools, their abundances were strongly reduced at low water levels after periods of drought. Such declines were more substantial at shallow than at deeper ponds. In ponds that had run dry completely, recovery of numbers took 2 or 3 years in Zygoptera, whereas the larger Anisoptera immigrated more rapidly and reached the usual numbers within the first year. Deepening of shallow pools or digging of new pools resulted in higher abundances, again much faster in Anisoptera than in Zygoptera. To keep dune areas well populated by dragonflies, we advise to maintain sufficient pond depths." (Authors)] Address: Beukema, J.J., Linieweg 19, NL-1783BA Den Helder, The Netherlands

13677. Buczyński, P.; Łabędzki, A. (2012): Landscape park of "Janowskie Forests" as a hotspot of dragonfly (Odonata) Species diversity in Poland. In: Dyguś, K.H. (ed.): *The natural human environment. Dangers, protection, management, education.* Wyższa Szkoła Ekologii i Zarządzania, Warszawa: 151-174. (in English, with Polish summary) ["The "Janowskie Forests" Landscape Park protects a major part of the Janowskie Forests – one of the most environmentally valuable, compact forest complexes in Poland. It constitutes a key fragment of one of hotspots of diversity of dragonflies in Poland. The authors discuss results of long-term studies on the area (1988-1990, 1993-1998). In a relatively small area (approximately 40 000 ha) 58 species of dragonflies were recorded here (79.4% of the national fauna). Such rich species diversity results from a fortunate coincidence. In spite of regular conducting of forest economy measures, natural waters were destroyed to little extent. Particularly peatbogs, streams, and rivers survived in a good state. This is why populations of majority of stenotopes were preserved, as reflected by identification of 10 protected species, two species from the Polish red list of dragonflies, and one species from the European red list of dragonflies. Human economy contributed to increased differentiation of the landscape, and development of numerous anthropogenic waters, particularly fish ponds and sand pits, inhabited by rich communities of dragonflies. The character of the catchment, constituting an efficient forest "biological filter", often determines the habitat features of ponds, similar to

those of dystrophic lakes, or at most moderately eutrophic lakes. The study area can be treated as an object of an unintentional experiment which contributed to enriching the dragonfly fauna, and did not lead to loss of majority of the most valuable primary elements. It provides valuable guidelines for management of other protected areas, and particularly for implementation of active protection measures." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

13678. Deplon, G. (2012): Contribution à l'inventaire des Odonates du Tarn. OPIE Midi-Pyrénées. Rapport de Stage. Août 2012: 42 pp. (in French) [Department Tarn, France. The report focus on the results of mapping activities in July 2012 and presents data on *Macromia splendens*, *Oxygastra curtisii*, *Gomphus graslinii*, *Coenagrion mercuriale* and *C. caerulescens*. In addition, records of *Trithemis annulata*, *Somatochlora metallica*, and *Lestes dryas* are documented.] Address: not stated

13679. He, Q.-j.; Yi, C.-h.; Yang, Y.-m.; Li, X.; Wang, L. (2012): Review on aquatic insect in Yunnan plateau. *Southwest China Journal of Agricultural Sciences* 25(1): 314-317. (in Chinese, with English summary) [The article reviews some regional studies without going into the details. only *Asiagomphus gongshanensis* is mentioned.] Address: He, Q.-j., Yunnan Academy of Forestry, Yunnan Kunming 650204, China. E-mail: heqiuju@163.com

13680. He, Q.-j.; Yi, C.-h.; Yang, Y.-m.; Li, X.; Wang, L. (2012): Faunal analysis of Odonata in Cangshan Erhai National Nature Reserve. *Journal of Northwest Forestry University* 27(3): 131-136. (in Chinese, with English summary) [Based on literature and field data, 65 odonate species were recorded for the nature reserve. The species are listed and classified according to their zoogeographic distribution.] Address: Yi, Chuan-hui, Yunnan Academy of Forestry, Kunming, Yunnan 650201, China. E-mail: ynkcx2007@163.com

13681. Johnson, J.; Valley, S. (2012): Update of The Odonata of Oregon. *Bulletin of American odonatology* 11(2): 39-47. (in English) ["92 species are currently recorded in Oregon. Additional and updated records since Johnson & Valley (2005) are summarized for 28 species and one hybrid with some range maps updated. The current county records and early/late flight dates for all known species in Oregon are presented." (Authors)] Address: Johnson, J., 3003 Unander Ave, Vancouver, WA 98660, USA. E-mail: jtjohnson@comcast.net

13682. Keppner, E.J. (2012): Odonata records from Bay and Washington counties and the St Andrew Bay drainage basin, Florida. *Bulletin of American odonatology* 11(2): 49-67. (in English) ["An annotated list of the

Odonata occurring in Bay and Washington counties and the St. Andrew Bay drainage basin, Florida, is presented based on collections of adults and nymphs from 2003-2012. This survey, combined with reports from the literature, resulted in 114 species of Odonata (36 Zygoptera and 78 Anisoptera) being reported from the survey area with 94 species of odonates reported for Bay County (31 Zygoptera and 63 Anisoptera), 92 for Washington County (28 Zygoptera and 64 Anisoptera), and 99 for the St. Andrew Bay drainage basin (31 Zygoptera and 68 Anisoptera). The Florida Natural Areas Inventory lists 20 of the species reported from the survey area as imperiled and the Florida Fish and Wildlife Conservation Commission lists 13 of those species as Species of Greatest Conservation Need." (Author)] Address: Keppner, E.J., 4406 Garrison Road, Panama City, FL 32404, USA. E-mail: ekeppner@bellsouth.net

13683. Orr, A.G.; Kalkman, V.J.; Richards, S.J. (2012): A review of the New Guinean genus *Paramecocyphus* Lieftinck (Odonata: Platycnemididae), with the description of three new species. *The Australian Entomologist* 39(3): 161-177. (in English) ["The genus *Paramecocyphus* Lieftinck, previously known from two species from northern New Guinea, is redefined on the basis of new material recently collected in the Sepik Basin and Western Province of Papua New Guinea. Three new species are described: *P. spinosus* sp. n. and *P. similis* sp. n. are quite close to the generic type species, *P. erythrostroma* Lieftinck, while *P. eos* sp. n. is more distantly related to known species and probably of basal stock." (Authors)] Address: Orr, B., 26 Currimundi Rd, Caloundra, Q4551, Australia. E-mail: agorr@bigpond.com

13684. Renker, C.; Schleich, S.; Buse, J.; Caspari, A.; Caspari, S.; Fluck, W.; Fritsch, R.; Hauptlorenz, H.; Heller, G.; Hinsberger, R.; Idelberger, S.; Jungmann, C.; Ludewig, H.-H.; Marx, M.; Reder, G.; Roth, N.; Schlotmann, F.; Schmolz, M.; Schwab, G.; Simon, H.; Simon, L.; Wagner, T.; Wedel, J.; Wedel, S.; Weitmann, G.; Weitz, W.; Weitzel, M.; Werle, H.-J.; Werno, A.; Weyrauch, G.; Willigalla, C.; Zühlke, J. (2012): Eine Momentaufnahme aus der Flora und Fauna im Landkreis Birkenfeld - Ergebnisse des 13. GEO-Tags der Artenvielfalt am 04.06.2011. *Mainzer Naturwissenschaftliches Archiv* 49: 165-236. (in German, with English summary) ["In the frame of the 13th "Geo day of biodiversity" on June 4th 2011 the authors explored the fauna and flora of several areas in the rural district of Birkenfeld (Upper Nahe Mts., Rhineland-Palatinate, Germany). The main focus was on the nature reserve "Clay pits Birkenfeld" west of the city of Birkenfeld, the floodplain of the river Nahe next to the airfield Hoppstädten-Weiersbach and the nature reserve "Alter Nahearm", an oxbow lake of the river Nahe southwest of Hoppstädten-Weiersbach. Altogether the authors detected 1,491 animal and plant species within 24 hours. Among them were 450 plant species, 920 invertebrates and 111 vertebrate species. Some of the species were first records within the investigated areas." (Authors) 21

Odonata species were recorded.] Address: Schlotmann, F., Weserstr. 11, D-55296 Harxheim, Germany. Email: frank.schlotmann@gmx.net

13685. Rennie-Lis, C. (2012): The microhabitat preferences of an isolated colony of *Coenagrion mercuriale* in Oxfordshire. M.Sc., Conservation Ecology, School of Life Sciences. Oxford Brookes University: 85 pp. (in English) ["*C. mercuriale* is a rare Odonata species that is only found in the UK in a selection of specialised habitats in the south. It has a declining population and is listed as endangered on the IUCN red list. It is the only species of Odonata currently given Biodiversity Action Plan (BAP) priority status in the UK, due to its limited distribution, both nationally and on a global scale. This project aimed to investigate the ecological requirements for an isolated colony of *C. mercuriale* that was mysteriously discovered in Oxfordshire in the 1990s, so that suitable habitat management activities could be developed. Mark-release-recapture surveys were conducted to enable an accurate population size to be estimated at 280 adult individuals across two sub-sites. Detailed mobility information was also gathered, which showed that dispersal distances were limited to an average of around 28m for the colony, meaning that range expansion is unlikely. Furthermore, behavioural observations uncovered some unusual breeding activity at one of the sub-sites, where there has also been a population decline trend in recent years. This warrants concerns about the viability of this population into the future. Hence, habitat management modifications have been recommended with the aim of preventing further decline." (Author)] Address: not stated

13686. Taylor, J. (2012): Bali jewel-damselfly display. *Agrion* 16(2): 47. (in English) [Verbatim: In 2004, I witnessed the display of a male damselfly around a female which was laying eggs. He circled facing her with his white legs outstretched and smoky wings flashing iridescent colours in the sunlight. It was so attractive I thought it would be good if I could capture it on video. On a visit last December I had the opportunity to do just this. The damselfly, *Rhinocypha fenestrata cornellii*, breeds in fast-flowing water and I found a site on an irrigation conduit near Ubud where there were many males and females active. I noticed that some of the females were laying eggs in objects near the flowing water and, seeing this, I moved a chunk of rotten wood to a place suitable for photography. Females soon arrived to lay eggs in it, and a male saw his chance and began defending the wood against other males. He displayed around the females laying eggs or settling nearby and I saw him fly off with one of them to mate on a fern leaf. In the video the display is shown in real time and slow motion. The video can be seen on YouTube (http://www.youtube.com/watch?feature=player_detailpage&v=h18vryX4Jul) or search for key words: *Rhinocypha*, Bali, & Damselflies.] Address: Jan Taylor [jmtay5@bigpond.net.au]

13687. Ternois, V.; Fradin, E.; Gajdos, A.; Lambert, K.-L. (coord.) (2012): Pré-atlas des Odonates de Champagne-Ardenne. Bilan cartographique des programmes INVOD et CILIF (Synthèse 2011). Société française d'Odonatologie (Champagne-Ardenne): 26 pp. (in French) [France; the Champagne-Ardenne region, four Departments; distribution maps of 65 species are provided. The data are arranged according records prior to 2001 and 2001-2011. A total of 29 178 records from 946 localities are mapped: - Ardennes: 222 loc. / 8 406 records / 61 species; - Aube: 252 loc.s / 9 079 records / 58 species; - Marne : 287 loc. / 8 943 records / 60 species; - Haute-Marne : 185 loc. / 2 750 records / 56 species] Address: Ternois, V., /c CPIE du Pays de Soulaines, Domaine de Saint-Victor, 10200 Soulaines-Dhuys, France. E-mail: cpie.vincent.ternois@wanadoo.fr

13688. Tu, X.-y.; Chen, Y.-s.; Liu, N.; Zhang, Y. (2012): Investigation on diversity of Odonata insect inside and outside an university in Jiangxi. *Guangdong Agricultural Sciences*: 151-153. (in Chinese, with English summary) [*Anax parthenope julius*; *Ictinogomphus rapax*; *Brachythemis contaminata*; *Acisoma panorpoides panorpoides*; *Pseudothemis zonata*; *Agriocnemis femina*; *Ceragrion auranticum*; *Ischnura senegalensis*; *Cercion calamorum dyeri* are listed.] Address: Tu, X.-y., College of Life Sciences, Jiangxi Normal University, Nanchang 330022, China. E-mail: txy1036@163.com

13689. Wang, X.J.; Song, W.; Li, Z.S.; Cong, Q. (2012): Fabrication of superhydrophobic AAO-Ag multilayer mimicking dragonfly wings. *Chin. Sci. Bull.* 57: 4635-4640. (in English) ["Inspired by the co-coupling of the non-smooth structure and the waxy layer inducing the hydrophobicity of dragonfly wing surface, we developed a simple and versatile method to fabricate a superhydrophobic surface with the dragonfly wing structures. In this work, Ag nanorods grew on highly ordered anodic aluminum oxide (AAO) surface via a galvanic reduction approach. Then the AAO-Ag multilayer was fabricated. Furthermore, the surface free energy of AAO-Ag multilayer was reduced by modifying with perfluorodecanethiol. The modified AAO-Ag multilayer was superhydrophobic and the static contact angle reached as high as 168°. X-ray photoelectron spectra (XPS) were used to characterize the chemical structure of the obtained products. The morphologies of AAO-Ag multilayer was similar to microstructure of dragonfly wing surface and presented hierarchical rough structure. The results showed that the co-coupling of the rough structure and low surface free energy induced the superhydrophobic performance of the AAO-Ag multilayer surface." (Authors)] Address: Wang, X., Key Lab. for Bionic Engineering of Ministry of Education, Jilin Uni., Changchun 130025, China

2013

13690. Alexander, A.C.; Luis, A.T.; Culp, J.M.; Baird, D.J.; Cessna, A.J. (2013): Can nutrients mask commu-

nity responses to insecticide mixtures?. *Ecotoxicology* 22: 1085-1100. (in English) ["The ecological effect of simultaneous exposure to two nutrient gradients, three insecticides and different predator intensities was investigated over a 3-week period in 80 outdoor, artificial streams using field-collected benthic invertebrates. The experimental design consisted of a 2 × 5 factorial structure with two nutrient levels (oligotrophic or mesotrophic) and five concentrations of the ternary insecticide mixture consisting of the insecticides (chlorpyrifos, dimethoate and imidacloprid). Equivalent toxic unit doses were summed to create a ternary insecticide dose (e.g., 0.1 + 0.1 + 0.1 = 0.3 TU) resulting in a range of ternary insecticide mixture toxicity (i.e., control groundwater, 0.3, 0.6, 0.9 and 1.2 TU). Two genera of insect predators, *Gomphus* spp. (Odonata) and *Agnetina* spp. (Plecoptera) were also added into each replicate stream, at densities and sizes comparable to those found at our collection site, to evaluate how the contribution of predators may change in nutrient limited (oligotrophic) versus amended (mesotrophic) systems. We describe a causal mechanism whereby the combined action of nutrients and insecticides reshaped aquatic community structure by interacting through multiple pathways. Specifically, mesotrophic conditions reduced the toxic effects of ternary insecticide mixtures for aquatic insects which, in some cases, appeared to increase abundance of aquatic insects. However, higher levels of insecticides in mesotrophic streams negated this effect and were even more toxic; for example, to aquatic insect grazers than the same insecticide doses in oligotrophic treatment levels. Effects of predators were only significant in oligotrophic streams. Evidence is provided as to how nutrient and contaminant interactions can greatly complicate the assessment of community level responses to insecticide mixtures due to direct and indirect effects of the resulting changes in the density of different genera and functional feeding groups within a community." (Authors)] Address: Alexander, Alexa, Department of Biology at the University of New Brunswick, #10 Bailey Drive, P.O. Box 4400, Fredericton, NB, E3B 5A3, Canada. E-mail: alexa.alexander@unb.ca

13691. Amhaeva, L.S.; Kozminov, S.G.; Ketenchiev, H.A. (2013): Preimaginal stages of *Coenagrion puella* L. 1758 (Odonata). *Ecology of animals - The South of Russia: ecology, development* 4: 40-45. (in Russian, with English summary) ["Aim. Ages and stages of *C. puella* with a wide area of distribution throughout Russia were determined in the laboratory. Morphological and morphometric characteristics of larvae instars are described. Location. Zoological laboratory of Kabardino-Balkarian State University (Russia). Methods. Common methods of entomological research were used. In experimental conditions, the development stage (F) of 260 ex. of *C. puella* were studied. Eggs of *C. puella* were taken from natural reservoirs and incubated at 22-24 °C. Larvae were fed once a day by Cladocera,

Copepoda, Ostracoda, Chironomidae, Oligochaeta. Results and conclusions. Larvae of *C. puella* are hatched from eggs after 24–26 days at the temperature 22–24 °C. Time diapason between exuviations is increased with age of larvae: 1–5 stages exuviate by 3–4 days, 6–7 stages by 5–6 days, 8–9 by 6–18 days, 10th by 9–12 days. Morphometric parameters of the larvae are changed with each molting. Main morphological changes indicate a stages of development and are due with change of mask (including its distal margin), lateral lobe, external lamellae (gill plates), antennae and tarsi. The results can be used in ecological monitoring, micropopulation studies. These data can help to determine the variability of dragonflies in mountain ecosystems." (Authors)] Address: Amhaeva, L.Sh., Chechen State University, Sheripov str., 32, Grozny 364907 Russia

13692. Ananian, V.Yu.; Tailly, M. (2013): Additions to the dragonfly (Odonata) fauna of Armenia, with new records of rare or uncommon species. Russian entomological journal 22(4): 249-254. (in Russian, with English summary) ["This review presents the results of the second phase of recent surveys of the dragonfly fauna and its distribution in Armenia, covering the period 2004-2012. Four species *Coenagrion armatum*, *Cordulegaster vanbrinkae*, *Crocothemis servilia* and *Selysiothemis nigra* were recorded for the first time in Armenia. Other annotated records deal with rare or uncommon species with sporadic finds in the country, and with rarities rediscovered since their last accounts half a century ago — *Lestes macrostigma*, *Gomphus schneiderii*, *Onychogomphus assimilis* and *Libellula pontica*. A few scarcely recorded commoner species are discussed as well." (Authors)] Address: Ananian, V.Yu., 179 Bashinjaghian Str., apt. 23, Yerevan 0078, Armenia. E-mail: gomphus@gmx.com

13693. Batty, P. (2013): Site condition monitoring for dragonflies (Odonata) at Claish Moss SSSI. Scottish Natural Heritage Commissioned Report No. 707: IV + 7 pp. (in English) ["Background: Site Condition Monitoring is a six year rolling programme of assessment of the state of notified features on Sites of Special Scientific Interest (SSSI). Two visits were made in 2013 (25 June and 5 August) to assess the condition of dragonflies and damselflies at Claish Moss SSSI, which has a notable assemblage (nine species) of Odonata. Main findings: Ten species of dragonflies were found breeding and a cast skin of the rare *Somatochlora artica* was seen. There was suitable habitat for *Aeshna caerulea*, although this species was not recorded. The site was found to be in favourable condition for Odonata, and the current management should be maintained. It will be helpful to contact surrounding landowners to ensure that some sheltered feeding areas for the northern emerald remain in future management plans for the surrounding forestry plantations." (Author)] Address: Batty, Patricia, Kirnan Farm, Kilmichael Glen, Lochgilphead, Argyll, PA31 8QL, UK

13694. Batzer, D.P.; Ruhí, A. (2013): Is there a core set of organisms that structure macroinvertebrate assemblages in freshwater wetlands? *Freshwater Biology* 58(8): 1647-1659. (in English) ["We analysed taxa lists from 447 individual wetlands from several ecoregions across the world using nestedness and similarity-based multivariate analyses. We examined how similar wetland assemblages are across regions, whether variation in assemblages is ordered (nested) or unpredictable (idiosyncratic), whether individual taxa occur predictably or unpredictably across wetland habitats, and if any of these patterns differed between temporary- and permanent water habitats. We found that macroinvertebrate assemblages were highly nested ($N = 0.947$), but unexpectedly 37 of the 40 most widespread taxa (>10% occurrence) were idiosyncratic. Of the 447 wetlands, we identified 277 that shared more than 40% similarities in assemblages, were mostly nested, and clustered together in ordination space, and thus could be considered a core set of wetlands in terms of assemblage structure. Assemblages in the 170 wetlands outside this core (mostly idiosyncratic) tended to be depauperate sites in arid or high elevation areas, or alternatively taxonomically rich sites supporting numerous lotic or lacustrine organisms. The 'Core' itself split into two main parts, one comprised of wetlands from semi-arid or mild climate areas dominated by strong flying insects, and the second comprised of wetlands from wetter, more northerly areas where non-insects with passive dispersal were very prevalent. Climate and geology appear to be major controls on macroinvertebrate distributions across the set of 447 wetlands. Hydrology (temporary versus permanent) of wetlands was a lesser control on assemblage structure over the set of 447 wetlands. That wetlands are dominated by about 40 widely-occurring macroinvertebrate taxa, and those taxa tend to occur idiosyncratically, suggests that overall assemblages across wetlands may share many similarities, but some of widespread taxa may still be missing from many individual wetlands. Why these otherwise fairly ubiquitous taxa do not occur in specific wetlands may shed important light on how those wetlands are controlled ecologically; in other words, do sites lack specific factors required by these taxa?" (Authors) The analysis of taxa is conducted at family level and includes Libellulidae, Coenagrionidae and Lestidae.] Address: Batzer, D.P., Department of Entomology, University of Georgia, Athens, GA, 30602, USA. E-mail: dbatzer@uga.edu

13695. Bennett, A.M.; Pereira, D.; Murray, D.L. (2013): Investment into defensive traits by anuran prey (*Lithobates pipiens*) is mediated by the starvation-predation risk trade-off. *PLoS ONE* 8(12): e82344. doi:10.1371/journal.pone.0082344: 9 pp. (in English) ["Prey can invest in a variety of defensive traits when balancing risk of predation against that of starvation. What remains unknown is the relative costs of different defensive traits and how prey reconcile investment into these traits when energetically limited. We tested the simple alloca-

tion model of prey defense, which predicts an additive effect of increasing predation risk and resource availability, resulting in the full deployment of defensive traits under conditions of high risk and resource saturation. We collected morphometric, developmental, and behavioural data in an experiment using dragonfly larvae (predator, *Aeshna* sp.) and Northern leopard frog tadpoles (prey) subject to variable levels of food availability and predation risk. Larvae exposed to food restriction showed limited response to predation risk; larvae at food saturation altered behaviour, development, and growth in response to predation risk. Responses to risk varied through time, suggesting ontogeny may affect the deployment of particular defensive traits. The observed negative correlation between body size and activity level for food-restricted prey – and the absence of a similar response among adequately-fed prey – suggests that a trade-off exists between behavioural and growth responses when energy budgets are limited. Our research is the first to demonstrate how investment into these defensive traits is mediated along gradients of both predation risk and resource availability over time. The interactions we demonstrate between resource availability and risk level on deployment of inducible defenses provide evidence that both internal condition and extrinsic risk factors play a critical role in the production of inducible defenses over time." (Authors)] Address: Amanda M. Bennett, Amanda, Environmental & Life Sciences, Trent Univ., Peterborough, Ontario, Canada. E-mail: amandabennett2@trentu.ca

13696. Breithaupt, N. (2013): Zur Häufigkeit der Farbformen von Weibchen der Zarten Rubinjungfer (*Ceragrion tenellum*) im Naturschutzgebiet Mindelsee (Odonata: Coenagrionidae). *Mercuriale* 13: 7-10. (in German, with English summary) [Baden-Württemberg, Germany; "At a calcareous peat bog in the northern borderline of Lake Mindelsee the frequency of the female colour morphs of *C. tenellum* was determined at two dates in August 2011. With a frequency of 64 % *f. typicum* dominated, followed by 34 % of *f. erythrogastrium*. With a frequency of 2 % females of *f. melanogastrium* were rarest at the study site. The results are compared with those in other parts of Germany and shortly discussed." (Author)] Address: Breithaupt, Ninja. E-mail: ninja-b@gmx.de

13697. Brookshire, B.A. (2013): Comparison of Odonata populations in natural and constructed emergent wetlands in the bluegrass region of Kentucky. Eastern Kentucky University Encompass. Honors Theses. Paper 124: III, 33 pp. (in English) ["With the degradation and destruction of many natural wetlands in Kentucky, there are high incentives to look at the remaining natural wetlands and the new artificial wetlands that are beginning to become prevalent among biologists. Wetlands are important to dragonfly populations just as dragonflies are vital to wetland function. In my study I looked at the fluctuation in Odonata populations at ten artificial wet-

lands and ten natural wetlands in the Inner Bluegrass region of Kentucky. In my study the dragonfly populations were monitored based on Shannon and Simpson's diversity, Species richness, and number of individual and species numbers. The wetlands were also compared on a season to season basis and the health of the wetlands were considered using a rapid assessment method. My research found that the artificial wetlands, though they scored low on the rapid assessment method, scored high in all categories except for species richness in the fall season of data collection. This study can be important in discovering the differences between natural and artificial wetlands, since Odonates are such an important biological indicator of wetland health and function. This could be vital in increasing the health of remaining natural wetlands and new artificial wetlands that are being created to supplement the lack of many of Kentucky's natural wetlands." (Author)] Address: Brookshire, Brittany Ann, Eastern Kentucky University, USA. E-mail: BrittanyBrookshi@eku.edu

13698. Bunker, B.; Janovy, J.; Tracey, E.; Barnes, A.; Duba, A.; Shuman, M.; Logan, J.D. (2013): Macroparasite population dynamics among geographical localities and host life cycle stages: Gregarines in *Ischnura verticalis*. *Journal of Parasitology* 99(3): 403-409. (in English) ["Populations of several species of gregarine parasites within a single host species, the damselfly *Ischnura verticalis*, were examined over the course of 1 season at 4 geographic localities separated by a maximum distance of 9.7 km. Gregarines, having a life cycle with both exogenous and endogenous stages, are subject to a wide variety of selective pressures that may drive adaptation. Gregarine species showed some specificity for host life cycle stage; *Steganorhynchus dunwoodyi* and *Hoplorhynchus acanthatholius* were most prevalent in larval hosts, while *Steganorhynchus dunwoodyi*, *Actinocephalus carrillynae* and *Nubenocephalus nebraskensis* were most prevalent in adult hosts. Species prevalence and abundance differed by geographic locality. Gregarine prevalence was significantly higher in adult female damselflies than males at 2 localities; sex differences in prevalence were insignificant for larval damselflies at all 4 localities. In larval hosts, gregarine abundance was independent of age (size). The present study therefore shows that pond characteristics, host life cycle stage, and adult host sex are the main factors that influence the prevalence and abundance of gregarine populations." (Authors)] Address: Logan, J.D., Dept of Mathematics, Univ. of Nebraska Lincoln, Lincoln, NE 68588-0130, USA. E-mail: dlogan@math.unl.edu

13699. Butler, S.G. (2013): Description of the last instar larva of *Orchithemis pulcherrima* Brauer from Sarawak, Malaysia (Anisoptera: Libellulidae). *Odonatologica* 42(3): 247-251. (in English) ["A male larva is described and illustrated. The labium, with its lack of large mental setae, frontal margin and palpal shape, is similar to that

in some *Orthetrum* species. So are also the small eyes, but the rounded shape of the head is not." (Author)] Address: Butler S.G., Red Willow, All Stretton, Shropshire SY6 GHN, UK. E-mail: sgbutler15@btopenworld.com

13700. Claerebout, S. (2013): Première mention en Belgique de *Forcipomyia* (*Pterobosca*) *paludis* (Macfie, 1936), ectoparasite des odonates adultes (Diptera: Ceratopogonidae). Bulletin de la Société royale belge d'Entomologie/Bulletin van de Koninklijke Belgische Vereniging voor Entomologie 149: 201-204. (in French, with English and Dutch summaries) ["On May 29th 2010, *Coenagrion pulchellum* with the ceratopogonid *Forcipomyia* (*Pterobosca*) *paludis* (Macfie, 1936) on its wings was photographed in the old brickyard of Ploegsteert (Comines-Warneton, prov. Hainaut, Belgium). This minute fly is a temporary and exclusive ectoparasite of Odonata imagines. Although no individual has been collected so far, the photographic document is the first evidence of the presence of *F. paludis* in Belgium. The species is already known from thirteen European countries." (Author)] Address: Claerebout, S., Centre Marie-Victorin, Centre de Recherche et d'Éducation pour la Conservation de la Nature, rue des Écoles 21, B-5670 Vierves-sur-Viroin, Belgium. E-mail: stephaneclaerebout@yahoo.fr

13701. Clarke, T. (2013): Mixed pairing between Emerald Damselfly *Lestes sponsa* and Azure Damselfly *Coenagrion puella*. *Atropos* 50: 84-85. (in English) [Verbatim: The image published here was taken on 21 August 2013, just before noon, at Pleasley Pit Nature Reserve, North Derbyshire, during a warm and sunny day. I spotted this mixed pairing between a male *Lestes sponsa* and a male *Coenagrion puella* approximately two metres from the bankside, on dead reed protruding from the water. I have no idea how long the pair had been in tandem and they split up within minutes of my spotting them. Just time for the one photograph!] Address: Clarke, T., 5 Nottingham Drive, Wingerworth, Chesterfield, Derbyshire, S42 6ND, UK

13702. Contreras-Martinez, E. (2013): Diversidad de Entomofauna acuática en tres ríos de la Ecoregión Darién, Choco biogeográfico (Colombia). *Dugesiana* 20(2): 243-250. (in Spanish, with English summary) ["There are few studies on insect diversity from rivers and streams of coastal areas, particularly within the Chocó biogeographic area. In this study we conducted a spatially explicit inventory of insects from three freshwater bodies in the Darien Ecoregion (located in the Colombian Caribbean). To establish the aquatic insect spatial patterns of richness, multiple habitats were sampled at seven stations from three streams located between the flat and mountainous parts. Also some physicochemical parameters were measured and each sampling station was characterized according to the quality of riparian cover and habitat heterogeneity following rapid assessment protocols such as Quality Index of Riparian

forest (QBR) and Fluvial Habitat Index (IHF), respectively. To describe the macroinvertebrate assemblage, Shannon Diversity and Pielou Equity indices, and Jaccard similarity were calculated and a non Parametric Multidimensional Scaling (NMDS) performed; the number of groups used in the clusters and the dendrogram were determined by the k -means partition method (k -Means Partitioning). Clustering patterns were interpreted based on the riparian cover condition and the physicochemical variables. A total of 3399 individuals were collected and identified to family level, most abundant insect families were Leptophlebiidae, Chironomidae and Hydropsychidae. Differences between sampling stations were found where Carolina Middle and High Capurganá sections had the higher richness values with 31 and 30 families respectively. The most diverse station was the medium reach El Regalo and less diverse was the high reach La Carolina, which separated from the other stations by the similarity analysis. The clustering pattern found could partially respond to similarities in riparian coverage, habitat heterogeneity and the particular characteristics provided by these parameters, since they have an indirect effect on other variables such as temperature which has a strong influence on the presence and / or establishment of the insect population. The effect of temperature was related to the function of vegetation cover and the drought period experienced by the region at the time of sampling." (Authors) Taxa are treated at family level and include 'Libellulidae, Megapodagrionidae, Calopterygidae, Coenagrionidae, Gomphidae, and Platystictidae'.] Address: Contreras-Martínez, Eliana, Instituto de Biología; Universidad de Antioquia; Medellín; Colombia. contreras.eliana5@gmail.com

13703. Cook, T.; Smith-Heeron, A.J. (2013): Gregarines infecting *Ischnura* spp. in Texas U.S.A. including description of *Septemlatuspora rasberryi* n. gen. n. sp. (Apicomplexa: Actinocephalidae: Acanthosporinae) and revision of *Steganorhynchus dunwoodyi* (Apicomplexa: Actinocephalidae: Menosporinae). *Journal of Parasitology* 100(1): 99-105. (in English) [*Septemlatuspora rasberryi* is described from adults of *Ischnura ramburii*.] Address: Cook, T., Sam Houston State University, Biological Sciences, Sam Houston State University, USA

13704. Copatti, C.E.; Fagundes, L.S.; Quaini, J.B.; Copatti, B.R. (2013): Diversity of aquatic arthropods on *Eichhornia crassipes* (Mart.) Solms roots before and after removal of substrate in a reservoir in southern Brazil. *Pan-American Journal of Aquatic Sciences* 8(4): 265-275. (in English, with Portuguese summary) ["The objective of this study was to determine the influence of substrate removal on the diversity, composition and trophic structure of aquatic arthropods found on *Eichhornia crassipes* roots. Because many arthropods are intimately associated with their substrate, its removal might result in increased richness and diversity for the aquatic arthropods on *E. crassipes* roots. The study

was performed in the Lajeado da Cruz River in Cruz Alta-RS, where the identification of the aquatic arthropods captured during eight samplings between August 2008 and May 2011 was performed. Four samples were collected prior to removal of the substrate and four were collected afterward. A total of 8,894 exemplars and 55 families of aquatic arthropods were sampled. The families Palaemonidae and Chironomidae were the most abundant. The diversity indices indicated increases in both diversity and richness after substrate removal. Values of the water quality parameters of turbidity, colour, iron and aluminum were found to be outside the norms, which indicated a need for caution with regard to water quality. The removal of the substrate triggered changes in the community and its trophic structure as well as an increase in the diversity of arthropods on the water hyacinth roots. ... In this study, Odonata and Ephemeroptera were more abundant than Coleoptera and Hemiptera (Table I), indicating that the study area was not in an early stage of succession and that the patterns found had been influenced by the existence or removal of water hyacinths in the substrate." (Authors)] Address: Copatti, C.E., Universidade Federal da Bahia, Depto de Zoologia, Instituto de Biologia, 40170-290, Salvador, BA, Brasil. E-mail: carloseduardocopatti@yahoo.com.br

13705. Day, R.S. (2013): Odonata survey of various sites of the Missouri Prairie Foundation Barton, Dade, Polk, St. Clair, and Vernon Counties in Missouri. Missouri Prairie Foundation. <http://www.moprairie.org/wp-content/uploads/2014/05/Odonate-Survey-Report.pdf>: 68 pp. (in English) ["I recorded a total of 35 species of dragonflies and damselflies between June 3 and August 12, 2013. A complete checklist can be found on page 9 of this report. A total of 76 specimens were deposited at the Enns Entomology Museum at the University of Missouri. No Missouri Species of Conservation Concern were found during this survey. I conducted surveys on June 2-4, July 8-11, and August 10-12, 2013. I visited all sites (n=7) on the contract three times, with the exception of Marmaton Wet Prairie. I was unable to survey Marmaton on two occasions (June and August) due to flood conditions. The Marmaton site was very difficult to access because there are no paths or fire breaks to access areas, and the grass was so tall and thick that it made navigating the prairie very difficult. I did, however, document 15 species when I was there in July. I'm confident that had I been able to survey Marmaton the other two times that I would have found more species. During the June survey, I observed an abundance of teneral dragonflies (newly emerged) on most sites. In July, I saw more species flying overall than in June. By August, there were still many dragonflies, but I noticed a decline in numbers from July. The Penn-Sylvania site always had the most activity and abundance. When I was there on July 9, I witnessed a large flock of swallows swooping over the pond and feeding on the dragonflies. Most of the species observed throughout the

entire survey were in the Libellulidae family, a very common pond dragonfly family. The greatest abundance and Odonata activity was near water sources such as the ponds located on the sites. I found nothing that could be considered out of the ordinary. The drainages in the prairies produced very little Odonata activity. It is my opinion based on the plant communities and habitat present, that large shallow water wetlands would produce more activity and abundance, but most species would still be in the Libellulidae family." (Author)] Address: Day, R.S., Daybreak Imagery, 6382 Charleston Road, Alma, IL 62807, 618-547-3522, USA. E-mail: richard@daybreakimagery.com

13706. Dommaget, J.-L. (2013): In memoriam Alain Manach. 1949-2012. *Martinia* 29(2): 77-78. (in French) [obituary] Address: Dommaget, J.-L., 7, rue Lamartine, F-78390 Bois-d'Arcy, France

13707. Duman, M.; Mutlu, C.; Büyük, M.; Karaca, V. (2013): Beneficial insects, spider and polinater species determined in the Karacadag paddy growing areas. *Türk. biyo. мүc. derg.* 4(1): 53-64. (in Turkish, with English summary) [Turkey, provinces of Diyarbakir and Sanliurfa, 2010-2011; only *Coenagrion* sp. is listed.] Address: Büyük, M., Dicle Üniversitesi, Meslek Yüksek Okulu Mühendislik Mimarlık Fakültesi, Diyarbakir Sorumlu yazar, Turkey. E-mail: tulin@ksu.edu.tr

13708. Ebrahimi, A.; Mohammadian, H.; Madjdzadeh, S.M. (2013): The dragonflies of family Libellulidae (Odonata: Anisoptera) of the Khabr National Park (Kerman Province, south-east Iran). *Far Eastern Entomologist* 270: 7-11. (in English, with Russian summary) ["The list of 12 species in five genera of family Libellulidae firstly collected in the Khabr National park in spring and summer is given. The majority of these species are common in Iran and other parts of Kerman province." (Authors) This paper is identical to the manuscript that was - as we know now - simultaneously sent to several journals, and which was published after intensive editing as IDF-Report 69. May be that all data were published in the *Caspian Journal of Environmental Sciences* 7(2) too; some of the data could be fake in the sense that collecting dates resulted from different years but same days and in general are too similar as they could have been collected by chance. (ms)] Address: Ebrahimi, A., Department of Biology, Faculty of Sciences, Shahid Bahonar University, Kerman, Iran. E-mail: krm-brhm5@gmail.com

13709. Eggs, W.; Stephan, U. (2013): In Schächten endende Bäche als Falle für Larven bzw. schlüpfende Imagines von *Cordulegaster boltonii* und *C. bidentata* (Odonata: Cordulegastridae). *Mercuriale* 13: 1-6. (in German, with English summary) [Baden-Württemberg, Germany; "During spring-time in 2012, in the vicinity of Waldsee, a quarter of the city of Freiburg i. Br., gully holes and a shaft were checked in order to release trapped amphibi-

ans. The shaft was fed by a subterranean artificial stream, a branch of a spring brook originating in the Black Forest. In three holes, on an area of 0.5 m, a total of 131 Cordulegaster larvae could be recorded. Both, the risk for larvae being trapped in the subterranean artificial stream and the difficulties for emerged adults to pass the gully grids for the maiden flight are discussed." (Authors)] Address: Eggs, Waltraud, Riesenweg 35, 79110 Freiburg, Germany. E-mail: bwp.eggs@web.de

13710. Environment Canada (2013): Management plan for the Pygmy Snaketail (*Ophiogomphus howei*) in Canada. Species at Risk Act Management Plan Series. Environment Canada, Ottawa: iii + 13 pp. (in English) ["*O. howei* is one of the smallest dragonflies in North America. Adults are black, with brown stripes and yellow markings on their abdomen, green on the thorax, and a transparent yellow-orange tint on the basal side of the wings. Aspects of the Pygmy Snaketail life cycle requirements are poorly understood and habitat requirements for the species are complex. Larvae take up to two years to develop to the adult stage, drifting downstream from where eggs are laid; the majority of their adult life is then spent in the upper canopy of riparian areas. *O. howei*, in Canada, is known from 11 sites in New Brunswick and 1 site in Ontario. Little is known of the species' distribution, abundance, and habitat needs in Canada. There are several knowledge gaps with regards to characterizing threats to this species. Dam construction is a threat of high concern in Ontario. All other threats, in both New Brunswick and Ontario, are either of low concern or the impact is unknown and include; dam construction, pollution, invasive species, residential development, forest harvesting and agriculture land use, wakes from boats, and vehicle traffic on roads. The species was assessed as Special Concern by COSEWIC in 2008, and was listed as Special Concern under Schedule 1 of the Species at Risk Act in 2011. In New Brunswick the species is not listed under provincial legislation. In Ontario it is listed as Endangered under the provincial Endangered Species Act, 2007. The management objective for the Pygmy Snaketail is to maintain the presence of existing populations at all sites where they are currently known to occur and conserve new occurrences that are identified. This will be achieved by implementing conservation measures that are organized under the following three broad strategies: (1.) Population monitoring and surveys of suitable habitat (2.) Maintenance of aquatic habitat quality and quantity (3.) Outreach, education, and stewardship to promote conservation " (Authors)]

13711. Farris, S.M. (2013): Evolution of complex higher brain centers and behaviors: Behavioral correlates of mushroom body elaboration in insects. *Brain, Behavior and Evolution* 82: 9-18. (in English) ["Large, complex higher brain centers have evolved many times independently within the vertebrates, but the selective pressures driving these acquisitions have been difficult to

pinpoint. It is well established that sensory brain centers become larger and more structurally complex to accommodate processing of a particularly important sensory modality. When higher brain centers such as the cerebral cortex become greatly expanded in a particular lineage, it is likely to support the coordination and execution of more complex behaviors, such as those that require flexibility, learning, and social interaction, in response to selective pressures that made these new behaviours advantageous. Vertebrate studies have established a link between complex behaviors, particularly those associated with sociality, and evolutionary expansions of telencephalic higher brain centers. Enlarged higher brain centers have convergently evolved in groups such as the insects, in which multimodal integration and learning and memory centers called the mushroom bodies have become greatly elaborated in at least four independent lineages. Is it possible that similar selective pressures acting on equivalent behavioural outputs drove the evolution of large higher brain centers in all bilaterians? Sociality has greatly impacted brain evolution in vertebrates such as primates, but it has not been a major driver of higher brain center enlargement in insects. However, feeding behaviours requiring flexibility and learning are associated with large higher brain centers in both phyla. Selection for the ability to support behavioral flexibility appears to be a common thread underlying the evolution of large higher brain centers, but the precise nature of these computations and behaviors may vary." (Author) The function of mushroom bodies in Odonata is discussed. Regrettably the studies on sensory systems in Odonata of the Italian working group lead by Elda Gaino and Manuela Rebora are not considered. (Martin Schorr)] Address: Farris, Sarah, 53 Campus Drive, 3139 Life Sciences Building, Morgantown, WV 26506, USA. E-mail: Sarah.Farris@mail.wvu.edu

13712. Festi, A. (2013): Nuova segnalazione di un sito riproduttivo di *Leucorrhinia pectoralis* Charpentier, 1825 (Odonata: Libellulidae) per l'Alto Adige e l'Italia. *Gredleriana* 13: 129-132. (in Italian) [Documentation of records of *L. pectoralis*: 09.-23.06.2013, Bigleidermoos - Torbiera Bigleider near Aldeno, (Prov. Aut. di Bolzano, Italy; WGS 46,37095511,341261).] Address: Festi, A., Via Penegal 7, I-39100 Bolzano, Italy. E-mail: alex.festi@rolmail.net

13713. Fiebig, I.; Lohr, M. (2013): Libellengemeinschaften oligotroph-saurer Sekundärgewässer im Solling, Süd-Niedersachsen (Odonata). *Libellula* 32(3/4): 115-139. (in German, with English summary) ["Odonata communities of oligotrophic-acidic pools in the Solling, Southern Lower Saxony, Germany (Odonata) – In 2011 the Odonata communities of 15 oligotrophic-acidic and two meso- to eutrophic water bodies in the Rutenbruch, Solling, southern part of Lower Saxony were studied by collecting exuviae and recording imagines. The investigated pools were created between 1982 and 2008 in

windthrow areas of spruce forests on former fens. These areas were partly cattle-grazed by Exmoor Ponies since 2010. In total 28 odonate species were found, for 21 of them breeding was confirmed. Many species are characteristic of oligotrophic-acidic waters of moors and bogs or possess their main habitat in these pools within the region, among them *Coenagrion hastulatum*, *Aeshna juncea*, *Leucorrhinia dubia* and *L. rubicunda*. The occurrence of these and further species like *Leucorrhinia pectoralis* is discussed regarding ecological and conservational aspects. Some of the pools were already colonized by typical species of moors and bogs like *Leucorrhinia dubia* and *L. rubicunda* only a few years after their creation. The effects of cattle-grazing on the Odonata must be regarded differently for different life cycle stages. Whereas the habitats of the adults were more suitable, the impact of trampling on the larval habitat of some typical species of bogs and mosses and their populations was adverse. Recommendations on the future grazing-management are given. The pools with the largest populations of species important for conservation should not be grazed simultaneously, but rotational grazing of pastures with intervals of three to five years is suggested." (Authors)] Address: Fiebig, Isabel, Fachgebiet Landschaftsökologie und Naturschutz, An der Wilhelmshöhe 44, 37671 Hötter, Germany. E-mail: isabel.fiebig@hs-owl.de

13714. Fijewski, Z. (2013): The first site of the Pygmy damselfly *Nehalennia speciosa* (Charpentier, 1840) (Odonata: Coenagrionidae) in the Świętokrzyskie mountains. *Kulon* 18: 153-155. (in Polish, with English summary) [June, 2010, transition mire in the Czarna River valley near Sielpia, Poland (51°06'N, 20°21'E)] Address: Fijewski, Z., ul. Brzozowa 1a/36, 26-200 Końskie, Poland

13715. Funk, A.; Gschöpf, C.; Blaschke, A.P.; Weigelhofer, G.; Reckendorfer, W. (2013): Ecological niche models for the evaluation of management options in an urban floodplain—conservation vs. restoration purposes. *Environmental Science & Policy* 34: 79-91. (in English) ["Highlights: *We analysed potential management options for a floodplain of the Danube. *The aim was to integrate restoration and conservation objectives into management. *Therefore the habitat availability for endangered and flagship species was calculated. *The results represent the actual and potential future community of the system. The Lobau, a former dynamic floodplain area of the Danube River situated close to Vienna (Austria), was strongly affected by the river regulation in 1875. The reduced hydrological connectivity changed the conditions in the system which is nowadays groundwater-fed, back-flooded, and characterized by sedimentation and terrestrialisation processes. On one hand, the artificially created habitat types have a high conservation potential; they harbour a rich community whose habitat range has been reduced due to degradation in the cultural landscape. On the other hand, resto-

ration efforts aim to reverse the anthropogenic impact due to damming and to restore the natural status of the wetland with its dynamic hydrological regime and its associated rheophilic community as far as possible. The challenge for floodplain managers is now to develop a compromise solution that integrates restoration and conservation efforts. The potential options range from the conservation of the present status to the restoration of the floodplain towards pristine conditions. We used a logistic regression approach to predict the potential habitat availability for indicator species including highly endangered and flagship species which are used for attracting public support for the conservation/restoration measures. The results represent the actual and potential future community of the system for the management options. Based on the results we make recommendations for the selection of a best compromise for the management of the floodplain with special regard to the legal objectives." (Authors) *Leucorrhinia pectoralis* is assessed as "common" in the Lobau.] Address: Funk, Andrea, WasserCluster Lunz, Dr Carl Kupelwieser Promenade 5, A-3293 Lunz/See, Austria

13716. Gai, K. (2013): Wing damage effect on dragonfly's aerodynamic performance during takeoff. Master of Science in Engineering (MSEgr), Wright State University, Mechanical Engineering: VIII + 56 pp. (in English) ["Insect wing damage resulted from living environment or predation commonly happens in nature. This usually results in deterioration of insect's flight performance and as a consequence, the insect needs adjustment of flapping wings to compensate the effect from the wing loss. In this study, *Erythemis simpliciolis* with and without wing loss is chosen to study the change of aerodynamic performance of flapping wings. Three cases including flight with intact wings (IW), flight with one-sided forewing damage (OFD), and flight with double-side forewing damage (DFD) are determined. An integrated study using high-speed photogrammetry, three-dimensional surface reconstruction, and direct numerical simulation (DNS) are used to quantify wing kinematics and aerodynamics performance. Results have shown that in general, during downstroke of forewings, forewing area loss could reduce insect's lift production; The lift force generated by the outer wings is larger than or equal to that produced by the inner wings during downstroke, but the outer wings' lift production becomes smaller than the inner wings' during upstroke; Span-wise forewing area removal reduces forewing tip vorticity, and it leads to the detachment of the tip vortex ring during upstroke." (Author)] Address: Gai, Kuo, c/o Wright State University, Mechanical Engineering, 3640 Colonel Glenn Hwy, Dayton, OH 45435, USA

13717. Girod, T.E. (2013): Bullfrog (*Lithobates catesbeianus*) diet composition, life history, and time period for larval development in California's north coast. M.Sc. thesis, Biology, Humboldt State University : XI + 94pp. (in English) ["*Lithobates catesbeianus* (American bull-

frogs) are not native to states west of the Rocky Mountains. Since their introduction to California, they have been implicated in the decline of amphibian species. On California's north coast, bullfrogs may be causing local declines of native amphibians through predation, competition, or disease. Knowledge of the diet of introduced bullfrogs can help determine if bullfrogs are directly preying on these amphibians and therefore directly causing decline. Moreover, Humboldt County's coastal areas have a climate that is cooler on average than the American bullfrogs' native climate. Cool, yet stable year-round temperatures may affect larval phenology, knowledge of which is important for timing the larval culling used to manage the species. Bullfrogs and their larvae were captured from five coastal sites in Humboldt County, CA. Sites varied from 2 m to 1400 m in elevation, and from 0.18 km to 27.25 km in straight-line distance from the coast. Frogs were measured for snout-vent length, gender was determined and stomach contents were categorized. For larvae, total length and stage of development (Gosner stage) were recorded. Results showed diet was greatly affected by body size and site location. Native herpetiles made up a very small percentage (7%) of overall bullfrog diet by count, but a larger percentage (32% in adult females to 65% in juveniles) of diet by volume. Most larvae that were captured were large and young tadpoles (i.e., low Gosner stage) were rare. A late stage larva was captured in early spring, suggesting a multi-year development period. This study provides evidence that bullfrogs are directly preying on native herpetiles, and suggests that larval management efforts would best be carried out in late summer, prior to tadpoles metamorphosing or overwintering." (Author) Diet includes Odonata.] Address: not stated

13718. Grönroos, M.; Heino, J.; Siqueira, T.; Landeiro, V.L.; Kotanen, J.; Bini, L.M. (2013): Metacommunity structuring in stream networks: roles of dispersal mode, distance type, and regional environmental context. *Ecology and Evolution* 3(13): 4473-4487. (in English) ["Within a metacommunity, both environmental and spatial processes regulate variation in local community structure. The strength of these processes may vary depending on species traits (e.g., dispersal mode) or the characteristics of the regions studied (e.g., spatial extent, environmental heterogeneity). We studied the metacommunity structuring of three groups of stream macroinvertebrates differing in their overland dispersal mode (passive dispersers with aquatic adults; passive dispersers with terrestrial adults; active dispersers with terrestrial adults). We predicted that environmental structuring should be more important for active dispersers, because of their better ability to track environmental variability, and that spatial structuring should be more important for species with aquatic adults, because of stronger dispersal limitation. We sampled a total of 70 stream riffle sites in three drainage basins. Environmental heterogeneity was unrelated to spatial extent among our study regions, allowing us to examine the effects of these two factors on meta-

community structuring. We used partial redundancy analysis and Moran's eigenvector maps based on overland and watercourse distances to study the relative importance of environmental control and spatial structuring. We found that, compared with environmental control, spatial structuring was generally negligible, and it did not vary according to our predictions. In general, active dispersers with terrestrial adults showed stronger environmental control than the two passively dispersing groups, suggesting that the species dispersing actively are better able to track environmental variability. There were no clear differences in the results based on watercourse and overland distances. The variability in metacommunity structuring among basins was not related to the differences in the environmental heterogeneity and spatial extent. Our study emphasized that (1) environmental control is prevailing in stream metacommunities, (2) dispersal mode may have an important effect on metacommunity structuring, and (3) some factors other than spatial extent or environmental heterogeneity contributed to the differences among the basins." (Authors) The list of taxa only includes a single Odonata species, *Somatochlora metallica*.] Address: Grönroos, Mira, Ecosystem Change Unit, Finnish Environment Institute, Oulu, Finland. E-mail: mira.gronroos@environment.fi

13719. Gutiérrez-Fonseca, P.E.; Rosas, K.G.; Ramírez, A. (2013): Aquatic insects of Puerto Rico: a list of families. *Dugesiana* 20(2): 215-219. (in English, with Spanish summary) ["Studies on aquatic insects in Puerto Rico began early last century. Most taxa have been well documented; however, we lack information on some taxa and there is no single document containing all the scattered information. These are major obstacles for the study of insects on the island. Here we reviewed data collected in published articles, graduate theses, university courses, environmental impact studies and reviewed material deposited in the Museum of Zoology at the University of Puerto Rico. The objective was to compile the first list of aquatic insect families of Puerto Rico. Overall, 61 families belonging to seven insect orders were found. The best known orders were Ephemeroptera, Trichoptera and Odonata. The most diverse orders were Diptera, followed by Coleoptera and Hemiptera. Despite its small size, Puerto Rico is a diverse island compared to the remaining Greater Antilles. This study is the first attempt to develop a list with all information available and contribute to advance our knowledge of aquatic insects. In addition, we hope to aid decision makers and encourage ecological and biogeographical studies on aquatic ecosystems in Puerto Rico." (Authors)] Address: Gutiérrez-Fonseca, P.E., Dept Biol., Univ. of Puerto Rico Rio Piedras, P.O. Box 190341, San Juan, Puerto Rico 00919. E-mail: gutifp@gmail.com

13720. Hamerlík, L.; Svitok, M.; Novikmec, M.; Očadlík, M.; Bitušík, P. (2013): Local, among-site, and regional diversity patterns of benthic macroinvertebrates in high altitude waterbodies: do ponds differ from lakes?. *Hy-*

drobiologia 723: 41-52. (in English) ["In this study we aimed at comparing invertebrate diversity of high altitude lakes and ponds along hierarchical spatial scales. We compared local, among-site, and regional diversity of benthic macroinvertebrates in 25 ponds and 34 lakes in the Tatra Mountains, central Europe. The ponds showed significantly lower local diversity, higher among-site diversity and similar regional diversity than the lakes. The species–area relationships (SAR), habitat heterogeneity, and environmental harshness are assumed as drivers for the local diversity patterns. An ecological threshold separating pond and lake systems emerged at an area of 2 ha, where the SAR pattern changed significantly. Differences in species turnover between these systems were likely driven by greater environmental variability and isolation of the ponds. High altitude ponds neither significantly support greater regional diversity nor higher number of unique taxa than lakes. The higher among-site diversity of ponds relative to lakes highlights the relevance of ponds for regional diversity in mountain areas. ... Except for Plecoptera (7 taxa) and Odonata (*Aeshna cyanea*, *Aeshna juncea*, *Somatochlora* sp.), the rest of higher taxonomic groups recorded were represented by 1–2 species/taxa. Odonata and Chaoboridae (Diptera) only occurred in ponds ..."] (Authors)] Address: Hamerlík, L., Faculty of Science, Matthias Belius University, Tajovského 40, SK–97 401 Banská Bystrica, Slovakia. E-mail: ladislav.hamerlik@umb.sk

13721. Hanlon, S.H.; Re Iyea, R. (2013): Sublethal effects of pesticides on predator–prey interactions in amphibians. *Copeia* 2013(4): 691-698. (in English) ["Increasing evidence suggests that contaminants in the environment can have important consequences on organismal interactions. While we have a good understanding of the lethal effects of contaminants on organisms, we have a weak understanding of how contaminants can affect organisms by altering the interactions that they have with other species in the community. Using tadpoles of two anuran species (Bullfrogs, *Lithobates* [*Rana*] *catesbeianus*; Green Frogs, *L. clamitans*), we investigated the effects of low nominal concentrations (1 and 10 ppb) of two pesticides (malathion and endosulfan) on tadpole activity and survival when exposed to four predator treatments (no predators; water bugs, *Belostoma flumineum*; newts, *Notophthalmus viridescens*; and dragonfly larvae, *Anax junius*). In both anuran species, adding predators reduced tadpole activity and survival, with increasing rates of mortality occurring with water bugs, newts, and dragonflies, respectively. Additionally, the highest concentration of endosulfan caused tadpole mortality after 48 hrs. Most significant, tadpole species also experienced interactive effects of predators and pesticides on survival after 48 hrs. In Bullfrog treatments, all predators reduced the amount of tadpole mortality when exposed to endosulfan. In Green Frogs, additive negative effects occurred, except that newts increased the tadpole mortality when

exposed to endosulfan. Our findings illustrate that pesticide effects on predator–prey interactions are often complex and have the potential to alter aquatic community composition." (Authors)] Address: Hanlon, Shane, Dept Biological Sciences, Univ. of Memphis, Memphis, Tennessee 38152; E-mail: hanloc2107@gmail.com.

13722. Harabiš, F.; Šigut, M.; Dolný, A. (2013): Density-distribution patterns of egg parasitoids in freshwater habitats. *Časopis Slezského zemského muzea - serie A - vědy přírodní* 62(1): 65-72. (in Harabiš, F., Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com) ["Similar in effect to predators, egg parasitoids could have a significant effect on the distribution of host and its' population dynamics. However, knowledge about the biology and ecology of aquatic parasitoids and their effects on the host are very limited. The aim of this study was to determine whether the density of parasitoids is affected by several environmental determinants and if there is a temporal change of density during the season, particularly in relation to the host population dynamics (from order Odonata in this study). In total, 266 individuals of parasitoid wasps (from four families utilizing damselflies as hosts) were identified. The density of parasitoids did not change significantly during the season regardless of the population dynamics of model host *L. sponsa* and other odonates, while there was a significant effect of habitat type on the density of parasitoids. This indicates that eggs of Odonata represent only one of several host taxa. This indicates that egg parasitoids of aquatic invertebrates are host generalists preferring open over afforested habitats." (Authors)] Adress: Harabiš, F., Dept of Ecology, Czech Univ. of Life Sciences Prague, Kamycka 129, 165 21 Praha 6 – Suchbát, Czech Republic. E-mail: harabis.f@gmail.com

13723. Hassall, C.; Keat, S.; Thompson, D.J.; Watts, P.C. (2013): Bergmann's rule is maintained during range expansion in a damselfly. *Global Change Biology* 20(2): 475-482. (in English) ["Climate-induced range shifts result in the movement of a sample of genotypes from source populations to new regions. The phenotypic consequences of those shifts depend upon the sample characteristics of the dispersive genotypes, which may act to either constrain or promote phenotypic divergence, and the degree to which plasticity influences the genotype-environment interaction. We sampled populations of *Erythromma viridulum* from Northern Europe to quantify the phenotypic (latitude-body size relationship based on seven morphological traits) and genetic (variation at microsatellite loci) patterns that occur during a range expansion itself. We find a weak spatial genetic structure that is indicative of high gene flow during a rapid range expansion. Despite the potentially homogenising effect of high gene flow, however, there is extensive phenotypic variation among samples along the invasion route that manifests as a strong, positive

correlation between latitude and body size consistent with Bergmann's rule. This positive correlation cannot be explained by variation in the length of larval development (voltinism). While the adaptive significance of latitudinal variation in body size remains obscure, geographical patterns in body size in odonates are apparently underpinned by phenotypic plasticity and this permits a response to one or more environmental correlates of latitude during a range expansion." (Authors)] Address: Watts, P., Institute of Integrative Biology, Univ. of Liverpool, Liverpool, UK. E-mail: phill@liv.ac.uk

13724. Hayasaka, D.; Suzuki, K.; Korenaga, T.; Saito-Morooka, F.; Nomura, T.; Fukasawa, K.; Sánchez-Bayo, F.; Goka, K. (2013): Effects of two successive annual treatments of two systemic insecticides, imidacloprid and fipronil, on dragonfly nymph communities in experimental paddies. *Journal of the Pesticide Science Society of Japan* 38(2): 101-107. (in Japanese, with English summary) ["The effects of two successive annual treatments of imidacloprid and fipronil on dragonfly nymph communities, which are one of the best-known bioindicators in Japanese agroecosystems, were monitored in experimental paddies. The abundance of dragonfly nymphs was lower in both insecticides-treated fields than it was in the controls, particularly following fipronil treatments. Residues of both insecticides were found in the soil throughout the two years, and imidacloprid persisted in water up to three months following each treatment. A Principal Response Curve analysis (PRC) showed that the second annual treatments caused greater structural changes in dragonfly nymph communities than the initial treatments caused, particularly for fipronil. The community structures continued to change even after the insecticides dissipated from the water. This suggests that ecological impacts, and therefore risks, of imidacloprid and fipronil on dragonfly nymph communities depend more on soil residues than they do on waterborne residues. As expected, susceptibility of dragonfly nymphs to these two insecticides differed among species." (Authors)] Address: Hayasaka, D., National Institute for Environmental Studies, 16-2 Onogawa, Tsukuba, Ibaraki 305-8506, Japan. E-mail: hayasaka@nara.kindai.ac.jp

13725. Heier, L.S.; Nyheim, M.; Skipperud, L.; Meland, S. (2013): Mobility and uptake of antimony, cadmium and cobalt in dragonfly larvae (Odonata, Anisoptera) as a function of road salt concentrations — a tracer experiment. *Urban Environment, Proceedings of the 11th Urban Environment Symposium (UES), held in Karlsruhe, Germany, 16-19 September 2012, ISBN 978-94-007-7755-2: 507-516.* (in English) [Oslo, Norway; "Road run off typically contains a variety of contaminants such as metals and road salt. Odonata larvae are important members in a variety of freshwater ecosystems which may receive road runoff. The objective of the present work was to investigate the uptake and excretion kinetics of cadmium (Cd), cobalt (Co) and antimony (Sb) in

Odonata larvae using radioactive tracer technique, and secondly how addition of road salt would affect the uptake. Larvae were individually exposed in beakers containing sediment spiked with ¹⁰⁹Cd, ⁶⁰Co and ¹²⁵Sb and water with different concentrations of road salt. The results showed that at higher salt concentrations more ¹⁰⁹Cd and ⁶⁰Co were mobilized from the sediments, however, the uptake in the larvae decreased. Antimony-125 was strongly bound in the sediment, and addition of salt did not affect the accumulation in the larvae significantly." (Authors)] Address: Heier, Lene, Department of Plant and Environmental Sciences, Norwegian University of Life Sciences, PO Box 5003, 1432, Ås, Norway. E-mail: lene.sorlie.heier@umb.no

13726. Hinojosa-Garro, D.; Arceo-Gómez, J.; Zambraño, L.; Escalera-Vázquez, L.H. (2013): Fish diet composition in permanent and semi-permanent pools in tropical wetlands of the Yucatan Peninsula. *Neotropical Ichthyology* 11(4): 881-890. (in English, with Spanish summary) [Petenes Biosphere Reserve (PBR), Campeche, southern Mexico; "We compared fish diet composition between permanent (P) and semi-permanent (SP) pools in Petenes Biosphere Reserve (PBR), Campeche. A total of 445 gut contents were examined to determine stomach relative fullness (RF), fish diet as index of niche breadth (INB) and diet overlap. In SP pools, species showed a RF of 1.66 (57.20 % empty stomachs) whereas in P pools, the RF was 2.91 (31.16%). We classified fish diet into six trophic groups: detritivorous, herbivorous-detritivorous, insectivorous, piscivorous, omnivorous and malacophagous. Species in P pools were found to be specialist. Conversely, species present in both habitats shifted to generalist patterns. There was a 54.0% dissimilarity in fish diet composition between pools. From all items identified, detritus (21.33% of the total dissimilarity), aquatic and terrestrial invertebrates (12.31%), fish remains (10.29%), plant remains (7.37%), and crustaceans (2.74%) distinguished diets between pools. Significant diet overlaps (>0.6) and low INB values (<0.3) were observed in P pools, whereas in SP pools, intermediate-low diet overlaps (<0.4) and higher INB values (>0.5) were observed. In SP pools seasonality had a strong effect on fish diet, increasing the frequency of food items such as terrestrial insects, amphipods and arachnids, during the rainy season while P pools showed lower variation. Thus, fish trophic habits appear to be regulated by pools hydrology." (Authors) Odonata had significant higher frequencies in fish of P pools compared to SP pools.] Address: Hinojosa-Garro, D., Laboratorio en Manejo de Vida Silvestre y Colecciones Científicas, Área de Ecología Acuática, CEDESU, Universidad Autónoma de Campeche, San Francisco de Campeche, Campeche, México. E-mail: dhinojos@uacam.mx

13727. Hoess, R. (2013): Fliegender Knäuel aus *Erythromma viridulum* und *Enallagma cyathigerum*. *Mercuriale* 13: 25-28. (in German, with English summary)

[Switzerland; "E. viridulum and E. cyathigerum were observed forming a flying aggregation made of several dozens of specimens close to the water surface. Tandem pairs of E. viridulum probably tried to access the submerged oviposition substrate by using sitting individuals." (Author)] Address: Hoess, R., Normannenstr. 35, CH-3018 Bern, Switzerland. E-mail: r.hoess@1st.ch

13728. Jomoc, D.J.G.; Flores, R.R.C.; Nuñez, O.M.; Villanueva, R.J.T. (2013): Species richness of Odonata in selected wetland areas of Cagayan de Oro and Bukidnon, Philippines. *AAFL Bioflux* 6(6): 560-570. (in English) ["Monitoring the environment through indicator species such as Odonata which has an aquatic larval stage and a terrestrial adult stage allows fast and easy means of evaluating habitat quality. This study aims to examine the species richness of Odonata in nine wetland areas of Bukidnon and Cagayan de Oro City. A survey using random sampling method was conducted from October to December 2012. Thirty-eight species were recorded under 28 genera and 12 families. Nineteen species are endemic. Species richness of the Odonata in relatively undisturbed areas ranges from 17-20 species. A lower species richness of 6-12 species was recorded in urbanized and disturbed areas. A relatively rare taxa, *Rhinagrion reinhardi* was recorded in one of the pristine areas. Further surveys in poorly studied and undisturbed areas may result in a higher species richness of Odonata." (Authors)] Address: Nuneza, Olga, Department of Biological Sciences, Mindanao State University - Iligan Institute of Technology, Iligan City, Philippines; 2 D3C Gahol Apartement, Davao City, Philippines. E-mail: olgamnuneza@yahoo.com

13729. Kadye, W.T.; Chakona, A.; Marufu, L.T.; Samukange, T. (2013): The impact of non-native rainbow trout within Afro-montane streams in eastern Zimbabwe. *Hydrobiologia* 720: 75-88. (in English) ["Non-native trout species have been associated with many negative effects in receiving ecosystems. The first aim of this study was to determine the impact of non-native rainbow trout *Oncorhynchus mykiss* on distribution and abundance of native mountain catfish *Amphilius uranoscopus* within Afro-montane streams in Nyanga Mountains, eastern Zimbabwe. The second aim was to compare macroinvertebrate community responses to the presence of the trout and the catfish. We examined trout impact on catfish's habitat associations, whereas macro-invertebrate composition was compared using open fish and fish enclosure experiments in habitats with and without trout. Trout influenced both the distribution and abundance of the catfish that occupied shallow reaches possibly to avoid predation from trout that occurred in the deeper habitats. Within trout invaded reaches, most macro-invertebrate taxa were more abundant in enclosure than open treatments. By contrast, within trout-free reaches, most macro-invertebrates either did not differ between treatments or were generally more abundant in open than enclosure treat-

ments. This suggests that the macro-invertebrate communities responded differently within invaded and non-invaded reaches. By influencing distribution and abundance of native biota, non-native rainbow trout may have wider ecological effects, such as influencing trophic interrelationships within invaded habitats. ... In general, large-bodied Odonate taxa *Atoconeura* sp. and *Aeshna* sp. were more abundant in Mare River that had no trout compared to Pungwe River that had trout." (Authors)] Address: Kadye, W.T., Department of Ichthyology and Fisheries Science, Rhodes University, PO Box 94, Grahamstown 6140, South Africa. E-mail: kadyew@yahoo.com

13730. Kappes, E.; Kappes, W. (2013): Ein Schlafplatz von Männchen der Großen Pechlibelle *Ischnura elegans* in Mecklenburg-Vorpommern. *Mercuriale* 13: 43-44. (in German, with English summary) [Adult males of *I. elegans* were observed in high density at 11-VII-2009 at a nocturnal resting site in Mecklenburg-Western Pomerania (Germany). On a small area of 4 m² the authors estimated at least 1,000 specimens.] Address: Kappes, E., Eichenweg 27, 22395 Hamburg, Germany. E-mail: eva.wulf.kappes@t-online.de

13731. Karjalainen, S.; Mäkinen, J. (2013): Sudenkorentokatsaus 2012 [Dragonfly review 2012]. *Crenata* 6: 8-10. (in Finnish, with English summary) ["This article presents the most interesting dragonfly (Odonata) records from Finland in 2012. No new additions to the Finnish fauna were found but five new provincial records were made: *Ischnura pumilio* (Varsinais-Suomi), *Coenagrion puella* (Ahvenanmaa), *Libellula depressa* (Keski-Pohjanmaa), *Ophiogomphus cecilia* (Kainuu), *Aeshna viridis* (Ahvenanmaa)." (Authors)] Address: Mäkinen, J., Metsänhoitajankatu 12 B 16, FI-00790 Helsinki, Finland. E-mail: makisenjussi@gmail.com

13732. Karjalainen, S.; Mäkinen, J. (2013): Sudenkorennot toisten sudenkorentojen saaliina: havainnot Suomesta [Dragonflies preying on other dragonflies: records from Finland]. *Crenata* 6: 12-16. (in Finnish, with English summary) ["This article compiles all known Finnish records of adult dragonflies feeding on other dragonflies. The results show that *Aeshna serrata* is the most active predator of other dragonflies. A total of 14 records of *A. serrata* feeding on other dragonflies are known. *A. serrata* is a rare species in Finland but the number of predation records is much higher than in other species. Three cases of cannibalism have been recorded: *Ischnura elegans*, *Aeshna grandis* and *Aeshna serrata*." (Authors)] Address: Mäkinen, J., Metsänhoitajankatu 12 B 16, FI-00790 Helsinki, Finland. E-mail: makisenjussi@gmail.com

13733. Karjalainen, S. (2013): Sudenkorentolajien väliiset parittelut: havainnot Suomesta [Heterospecific copulae: records from Finland]. *Crenata* 6: 20-21. (in Finnish, with English summary) ["This paper lists all known

Finnish records of heterospecific copulation. A total of 14 records are known, twelve of them concern *Calopteryx* species. In addition, a copula between *Aeshna juncea* male and *A. cyanea* female and a copula between *Leucorrhinia albifrons* male and *Sympetrum flavolum* female are described." (Authors)] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail:sk@korento.net

13734. Kerry, L. (2013): On the relationship between the Small Red Damselfly *Ceriagrion tenellum* and the terrestrial mite *Leptus killingtoni*. *J. Br. Dragonfly Society* 29(2): 69-83. (in English) ["Larvae of the terrestrial mite, *Leptus killingtoni* were identified on a population of *Ceriagrion tenellum* on the East Devon Pebblebed Heaths in 2011. An investigation was undertaken on the interaction between these species during the flight period in 2012. In total 567 individuals (382 males and 185 females) were caught and marked and the location of a total of 808 mites were noted (498 on first capture and a further 310 on recaptures). The highest numbers of *L. killingtoni* were seen in the middle and driest period at the end of July. Only 19% of immature *C. tenellum* were found to have mites, whereas 36% of male and 49% of female mature damselflies had mites. Paired females were more likely to be infested than unpaired females and males (whether paired or not). Mites were recorded most often from areas more difficult to groom, with 26.6% recorded on the ventral surface of the thorax (and especially between the legs), 20.9% on the abdomen and 17.3% on the femur. Female melanogastrium were recaptured nearly twice as often as typical, despite similar numbers being marked." (Author)] Address: Kerry, L., Mount Pleasant, Stoneyford, Colaton Raleigh, Sidmouth, Devon. EX10 OHZ, UK

13735. Khelifa, R.; Mahdjoub, H.; Zebba, R.; Kahalerras, A.; Guebailia, A.; Amari, H.; Houhamdi, M. (2013): Aspects of reproductive biology and behaviour of the regional critically endangered *Urothemis edwardsii* (Odonata: Libellulidae) on Lake Bleu (Algeria). *Zoology and Ecology* 23(4): 282-285. (in English, with Lithuanian summary) ["A study on the reproductive biology and behaviour of the regional critically endangered *Urothemis edwardsii* Selys was conducted in the relict sub-population of Lake Bleu (North-east Algeria) during the reproductive season of 2012. The reproductive behaviour was described from the pair formation to the end of oviposition. Copulation duration was 98.55 ± 16.48 s, and the whole oviposition episode lasted 220.89 ± 32.08 s with usually three bouts interrupted by three rest periods. The species displayed a particular oviposition behaviour characterized by an alternation of contact (during the first bout) and non-contact guarding. The induced clutch size was 646.33 ± 173.10 eggs. In the laboratory, eggs showed direct embryonic development and synchronous egg hatching within the modal period of 10 days ranging between nine and 24 days. The overall hatching success was 85.39%, the main

causes of mortality being infertility and unhatchability." (Authors)] Address: Khelifa, R., Faculty of Biological and Agricultural Sciences, Biology Department, University of Tizi Ouzou, Tizi Ouzou 15000, Algeria. E-mail: rassimkhelifa@gmail.com

13736. Knight, K. (2013): Damselfly larvae select quick release lamellae for survival. *J. Exp. Biol.* 217: 159. (in English) ["Adult damselflies are a spectacular vision of summer, streaking through the air above pond surfaces. Yet survival through their earlier aquatic life stages is extremely precarious. Equipped with leaf-like lamellae hinged at the end of the abdomen for propulsion, the structures provide the perfect appendages for passing predators to grab onto. But the larval insects have a self-preservation mechanism that helps them to escape hungry predators: they self amputate – autotomize – trapped lamellae. Jennifer Gleason, Douglas Fudge and Beren Robinson from the University of Guelph, Canada, explain that the ability of a larva to shed its lamellae with ease improves its chances of survival, which might lead larvae that inhabit heavily predated waters to develop relatively fragile lamellar joints to increase their chances of survival (p. 185). To test the theory, the Canadians measured the force required to break damselfly larvae lamellar joints, as well as the size and cuticle thickness of the joint. They discovered that the joints of damselfly larvae from fishless ponds – where carnivorous dragonfly larvae flourish – were much more fragile than the joints of larvae from ponds where there were few dragonfly larvae. 'This suggests that autotomy may evolve in larval damselflies under selection from small grasping predators like larval dragonflies by favouring smaller joint size or reduced cuticle area of lamellae joints', says the team." (Author)] Address: Kathryn Knight. E-mail: kathryn@biologists.com

13737. Knillmann, S.; Stampfli, N.C.; Noskov, Y.A.; Becketov, M.A.; Liess, M. (2013): Elevated temperature prolongs long-term effects of a pesticide on *Daphnia* spp. due to altered competition in zooplankton communities. *Global Change Biology* 19(5): 1598-1609. (in English) [Fifty-five outdoor microcosms were installed at the UFZ-Helmholtz Centre for Environmental Research, Germany (51°21'13N, 12°25'55E). "Considerable research efforts have been made to predict the influences of climate change on species composition in biological communities. However, little is known about how changing environmental conditions and anthropogenic pollution can affect aquatic communities in combination. We investigated the influence of short warming periods on the response of a zooplankton community to the insecticide esfenvalerate at a range of environmentally realistic concentrations (0.03, 0.3 and 3 µg L⁻¹) in 55 outdoor pond microcosms. Warming periods increased the cumulative water temperature, but did not exceed the maximum temperature measured under ambient conditions. Under warming conditions alone the abundance of some zooplankton taxa increased selectively

compared to ambient conditions. This resulted in a shift in the community composition that had not recovered by the end of the experiment, 8 weeks after the last warming period. Regarding the pesticide exposure, short-term effects of esfenvalerate on the community structure and the sensitive taxa *Daphnia* spp. did not differ between the two temperature regimes. In contrast, long-term effects of esfenvalerate on *Daphnia* spp., a taxon that did not benefit from elevated temperatures, were observed twice as long under warming than under ambient conditions. This resulted in long-term effects on *Daphnia* spp. until 4 months after contamination at 3 µg L⁻¹ esfenvalerate. Under both temperature regimes, we identified strength of interspecific competition as the mechanism determining the time until recovery. However, enhanced interspecific competition under warming conditions was prolonged and explained the delayed recovery of *Daphnia* spp. from esfenvalerate. These results show that, for realistic prediction of the combined effects of changing environmental factors and toxicants on sensitive taxa, the impacts of stressors on the biotic interactions within the community need to be considered." (Authors) Odonata are considered at the order level.] Address: Knillmann, Saskia, Department of System Ecotoxicology, UFZ - Helmholtz Centre for Environmental Research, Permoserstr. 15, 04318 Leipzig, Germany. E-mail: saskia.knillmann@ufz.de

13738. Knorp, N. (2013): Limitations on macroinvertebrate populations in South Florida wetlands. MSc. thesis, Florida Atlantic university: 69 pp. (in English) ["It can be difficult to disentangle the factors that determine population success in freshwater systems, particularly for organisms with disturbance-resistant life stages like aquatic invertebrates. Nevertheless, the effects of environmental variation and habitat structure on animal population success in wetlands are important for understanding both trophic interactions and biodiversity. I performed two experiments to determine the factors limiting crayfish (*Procambarus fallax*) and dragonfly (Family: Libellulidae) populations in wetland environments. A simulation of a dry-disturbance and subsequent sunfish (Family: Centrarchidae) re-colonization revealed that crayfish populations are sensitive to sunfish, while dragonfly naiads seemed to be limited by other drying-related factors. A second manipulation revealed that small-bodied fishes and habitat structure (submerged vegetation) shaped dragonfly communities primarily through postcolonization processes." (Author)] Address: Knorp, Natalie. not available

13739. Kovacs, T.; Muranyi, D. (2013): Larval data of *Caliaeschna microstigma* (Schneider, 1845) from the Balkan Peninsula, with contributions to its biology (Odonata: Aeshnidae). *Folia historico naturalia musei Matraensis* 37: 21-28. (in English) ["Based on larvae or exuviae, we present 59 new localities of *C. microstigma* from Albania (17), Bulgaria (6), Croatia (1), Greece (18), Macedonia (2), Montenegro (11), and from the Eu-

ropean part of Turkey (4). Collecting sites are depicted on a map. Summary on the habitat and biology of the species is given, and morphological characters of the larvae are shown on several figures. Due to the different larval cohorts collected, we conclude that the species has semivoltine life cycle." (Authors)] Address: Murányi, D., Hungarian Natural History Museum, Baross u. 13, H-1088 Budapest, Hungary. E-mail: muranyi@zool.nhmus.hu

13740. Krieg-Jacquier, R. (2013): Daniel nous a quittés. *Sympetrum* 17: 3. (in French) [Obituary Daniel Grand.] Address: Krieg-Jacquier, R., 18 rue de la Maçonne F-73000 Barberaz, France. E-mail: regis.krieg.jacquier@gmail.com

13741. Kulijer, D.; Zawal, A.; Baker, R.A. (2013): Further studies on the Odonata from Bosnia & Herzegovina and their mite parasites. *J. Br. Dragonfly Society* 29(2): 97-106. (in English) ["A brief review of the present knowledge of the Odonata from Bosnia and Herzegovina is followed by further work on their mite parasites; in particular their identification, distribution and host records. A total of 301 mites were mounted, counted and identified, most of them to species. *Arrenurus bicuspidator*, *A. bruzelii*, *A. cuspidator*, *A. cuspidifer*, *A. maculator* and *A. papillator* were identified on 13 odonate host species, including three Anisoptera: *Aeshna isosceles*, *Sympetrum flaveolum*, and *Anax imperator*. The Zygoptera were *Ischnura pumilio*, *I. elegans*, *Coenagrion puella*, *C. pulchellum*, *C. scitulum*, *Pyrrhosoma nymphula*, *Enallagma cyathigerum*, *Erythromma najas*, *Lestes dryas* and *Platycnemis pennipes*. Size measurements indicate that larval mites of the same species are much larger on anisopterans than on zygopterans and reasons for this are discussed." (Authors)] Address: Zawal, A., Uniwersytet Szczeciński, Wydział Nauk Przyrodniczych, Katedra Zoologii Bezkręgowców i Limnologii, ul. Wąska 13, PL-71-415 Szczecin, Poland. E-mail: zawal@univ.szczecin.pl

13742. Kumar, M. (2013): Image performance characteristics of bio-inspired image sensor. MSc. thesis, The Graduate Faculty of The University of Akron: XIII + 111 pp. (in English) ["Bio-Inspired imaging has the prospective to enhance machine vision and image performance characteristics. The rationale of this study is to explore the image formation by different insect eyes that will benefit the digital imaging with high resolution while maintaining wide field-of-view, for defense and military applications. In this study, three architectures of different compound eyes, namely, the apposition, the superposition and the neural superposition, were studied. Human eye is polarization insensitive and without usage of an artificial polarization filter, it cannot employ the polarization of light. In contrast, insect vision holds numerous advantages, as their compound eyes provides wide viewing angle, good tracking abilities due to large amount of photoreceptor units and foremost im-

portant can detect the polarized light. It is well known, that polarization of light provides enhanced structural and geometrical information, such as high contrast visualization of the surface contours, curvature of objects, surface structures, and locations of different materials. The five insect species that were considered for this study are *Hemicordulia tau*, *Anoplognathus pallidicollis*, *Heteronympha merope*, *Melanitis leda* and *Phalacrocorax aristoteles*. In this study, several insect eyes architecture, were studied. Then, the imaging design parameters by varying the physical, geometrical, optical parameters of the eye architectures were simulated. Specifically, several physical, optical, geometrical, and imaging design parameters considered for this study, namely, the angular spacing of receptors, the diameter of the photoreceptors, the optical field-of-view, flying speed; the modulation transfer function (MTF), optical-blur filters, image contrast, angular sensitivity, spatial and angular resolution, degree of blurring, signal-to-noise ratio, and motion artifacts, were simulated at varying of those parameters. The outcome of this study is to explore the phenomenology of the image formation by diverse insect eye architectures which may benefit the areas of defense and security, surveillance and navigation, healthcare, and others." (Author)] Address: Kumar, M. c/o The Graduate Faculty of The University of Akron, 302 E Buchtel Ave, Akron, Ohio 44325, USA

13743. Lamond, B. (2013): A Great Blue Skimmer (*Libellula vibrans*) in Flamborough (Hamilton) and a summary of Ontario records. *The Wood Duck* 67(3)2: 38-39. (in English) [6 August 2012 - 8th Concession West, Flamborough, 400m west of Spencer Creek, Hamilton, Ontario, Canada.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

13744. Lamond, B. (2013): Rapids Clubtail (*Gomphus quadricolor*) in the Hamilton Area. *The Wood Duck* 67(1): 9-10;-15. (in English) [30 May 2010 - Grand River at Hardy Road, Brantford, Hamilton, Ontario, Canada.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

13745. Lissak, W. (2013): Erfolgreiches Artenhilfsprojekt für den Kleinen Blaupfeil *Orthetrum coerulescens* im Rahmen des Aktionsplans „Biologische Vielfalt Baden-Württemberg 111 Arten-Korb“. *Mercuriale* 13: 29-36. (in German, with English summary) ["To secure an occurrence of *O. coerulescens* at Eislingen/Fils (Northern Württemberg) a species conservation program was started. The aim of the cooperation between different partners is the coordination and implementation of protection measures. Because *O. coerulescens* is a target species in the so-called "111- species-basket" under the "Action Plan Biodiversity in the German Land of Baden-Württemberg", the project was presented as part of this campaign. Although the habitat of the population is protected and no use or regular water maintenance happens, the population was threatened by shrubs and trees planted at the shoreline of the creek. By clearing

trees and shrubs along the creek and by removing parts of the dense stands of *Typha latifolia* the shadowing of the watercourse channel was reduced and thus the habitat quality could be improved for *O. coerulescens*. A monitoring between 2008 and 2013 showed an increase of the local population of *O. coerulescens*, which was discovered in 2008. Thus the management actions succeeded the measures were accompanied by intensive public relations. It was financed by public funds and by a sponsorship." (Author)] Address: Lissak, W., Schubartstr. 12, 73092 Heiningen, Germany. E-mail: Wolfgang.Lissak @t-online.de

13746. Lösch, B.; Winkler, F.; Haller, R.; Festi, A.; Nösing, T.B. (2013): Libellen (Odonata) im Naturpark Texelgruppe (Südtirol, Italien). *Gredleriana* 13: 99-110. (in German, with English summary) ["Dragonflies were collected in and around the Nature Park Texelgruppe during summer 2011. In 28 investigated habitats a total of 15 species was found (10 species in the Nature park). In the habitats in the Nature park the species assemblage was relatively small and contained mainly mountain species, which was to be expected considering the altitude of the habitats. Most frequent species were *Aeshna juncea* and *Somatochlora alpestris*. The Fagelsee and the moors on the Adelsböden in the Nature park as well as the Kehlthalbach retention basin outside the Nature park proved to be of particular interest." (Authors)] Address: Lösch, Birgit, Gampenstr. 22, I-39011 Lana, Italy. birgit.loesch@hotmail.de

13747. Manenti, R.; Siesa, M.E.; Ficetola, G.F. (2013): Odonata occurrence in caves: active or accidentals? A new case study. *Journal of Cave and Karst Studies* 75(3): 205-209. (in English) ["Caves are environments that host unique faunas and may be important for organisms not exclusively dependent on caves. The occurrence of epigeal taxa in caves is often considered accidental, but their study can provide useful information on cave colonization. Records of Odonata underground are extremely scarce. We have identified larvae of *Cordulegaster bidentata* in two caves, one natural and one artificial, from Lombardy in northwestern Italy. They occurred in pools near the cave entrance that have 84 lux of maximum illuminance, reached in early spring. In both caves we found a high density of larvae, and some of them were at very advanced instars. They had an important role in the cave's trophic web, exerting a high predation pressure on larvae of the salamander *Salamandra salamandra*. The plasticity of some Odonata species may allow them to take advantage of underground springs." (Author)] Address: Manenti, R., Dipartimento di Bioscienze, Università degli Studi di Milano, Via Celoria, 26 20133 Milano, Italy. E-mail: raoul.manenti@unimi.it

13748. Massaro, F.C.; Negreiros, N.F.; Rocha, O. (2013): A search for predators and food selectivity of two native species of *Hydra* (Cnidaria: Hydrozoa) from

Brazil. *Biota Neotropica* 13(2): 35-40. (in English, with Portuguese summary) ["The Hydra is the most common representative of freshwater cnidarians. In general, it is found in freshwaters on every continent, with the exception of Antarctica. The aim of the present study is to gather biological and ecological data on aspects of two species of Hydra native to Brazil: *Hydra viridissima* and *Hydra salmacidis*. Predation and food selectivity experiments were performed to assess the possible predators and the prey preferences, respectively, of the two species. The results indicate that the two species of Hydra were not consumed by any of the predators that were tested, which are typical predators of invertebrates in freshwater: nymphs of Odonata Anisoptera and the phantom midge larvae of *Chaoborus* sp. (Insecta), adults of Copepoda Cyclopoida (Crustacea) and the small fish *Poecilia reticulata*. It was observed that the smaller Hydra, *H. viridissima*, positively selected the nauplii and copepodites of calanoid copepods and small cladocerans and rejected large prey, such as the adults of calanoid copepods and ostracods. The larger *H. salmacidis*, besides the nauplii and copepodites of the calanoid copepods and small cladocerans, also positively selected the large adults of the calanoid copepods. It can be concluded that both *H. viridissima* and *H. salmacidis* are most likely preyed on little or not preyed on at all in many freshwater bodies, as they are top predators in the food chain. At the same time, they are efficient predators, and a positive relationship was observed between the prey size and the Hydra species size. Food selectivity was related to prey size as well as other prey characteristics, such as carapace thickness and swimming efficiency. ... Thus, it can be concluded that Odonata Anisoptera, the phantom midge *Chaoborus* sp., the adults of Copepoda Cyclopoida and the fish *P. reticulata*, which were tested as predators in the present study, do not consume hydras in freshwater." (Authors)] Address: Massaro, Fernanda Cristina, Post Graduate Program in Environmental Engineering Science, São Carlos School of Engineering, University of São Paulo – USP, Av. Trabalhador São-carlense, 400, CP 292, CEP 13560-970, São Carlos, SP, Brazil. E-mail: femassaro@gmail.com

13749. Maxwell, J. (2013): Mixed pairing between Blue-tailed Damselfly *Ischnura elegans* and Emerald Damselfly *Lestes sponsa*. *Atropos* 50: 85-86. (in English) [Verbatim: Loch Bran, halfway along Loch Ness and just south-east of Foyers, is one of the best places in Scotland to find *Somatochlora metallica*. It's a beautiful, small, lily-covered loch set within the forest and accessed along a short path from a handy lay-by. I visited there on 21 July 2013, in search of this new species for me. The weather was perfect and I soon saw several Brilliant Emerald—iridescent beauties dancing along the edge of the sphagnum moss edge of the loch. However, there were many other attractions with various damselflies and darters mating amongst the emergent stalks and *Libellula quadrimaculata* and *Aeshna*

juncea all dominating their territories. Having watched Willow Emerald Damselfly *Lestes viridis* in Suffolk earlier in the year, I was taking a special interest in the pairs of Emerald Damselfly *L. sponsa* mating and was surprised to observe a mixed pairing between a male Blue-tailed Damselfly *Ischnura elegans* and a female Emerald Damselfly. As I remember the pair flew off together before any mating occurred.] Address: Maxwell, J., 7 Lilac Hill, Hamilton, Lanarkshire, ML3 7HG, UK

13750. Meurgey, F. (2013): A catalogue of the West Indian dragonflies (Insecta: Odonata). *Annales de la Société entomologique de France* (N.S.) 49(3): 298-334. (in English, with French summary) ["Compilation and analysis of the existing literature together with the results of our research carried out since 2000 makes possible an updated catalogue of the West Indian Odonata. Such a catalogue has not previously been available, and dispersed and multilingual literature did not facilitate odonatological studies. The odonate fauna of the Caribbean is currently composed of 108 valid species, of which 36 (32%) are endemic to one or a few islands. The most species-rich families are Libellulidae and Coenagrionidae, together comprising 65% of the total fauna." (Author)] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13751. Moore, C. (2013): Three unusual dragonfly sightings in West Cornwall during 2013. *Atropos* 50: 93-94. (in English) [UK; *Anax parthenope* (female). Drift Reservoir, Cornwall, 14 July 2013; *Libellula fulva* (female). Marazion Marsh, Cornwall, 17 July 2013; *Anax ephippiger* (female). Godolphin Woods, 12 August 2013] Address: Moore, Christine, Sallyport House, Church Street, Newlyn, Penzance, Cornwall, TR18 5JY, UK. E-mail: caemoore@aol.com

13752. Moroz, M.D. (2013): [Aquatic insects of Richianka River]. *Herald BSU*. Ser. 2(1): 53-57. (in Russian, with English summary) [Belarus; 17 Odonata taxa are listed including *Brachytron pratense*, *Stylurus flavipes*, and *Gomphus vulgatissimus*. *Calopteryx splendens*, *Calopteryx virgo*, *Lestes sponsa*, *Coenagrion puella*, *Coenagrion pulchellum*, *Ischnura elegans*, *Platycnemis pennipes*, *Gomphus vulgatissimus*, *Srylarus flavipes*, *Brachytron pratense*, *Aeshna grandis*, *Aeshna mixta*, *Cordulia aenea*, *Somatochlora metallica*, *Libellula fulva*] Address: Moroz, M.D., Scientific & Practical Center for Bioresources, Academy of Sciences of Belarus, Minsk, the Republic of Belarus. E-mail: mdmoroz@bk.ru

13753. Moroz, M.D.; Semenchenko, V.P.; Razlutski, V.I. (2013): Aquatic insects (Insecta) of the Gomel region rivers. *Proceedings of the National Academy of Sciences of Belarus, Biological series* 2013(2): 91-97. (in Russian, with English summary) [Belarus; the checklist of taxa includes the following Odonata species: *Calop-*

teryx splendens, *C. virgo*, *Platycnemis pennipes*, *Coenagrion puella*, *C. pulchellum*, *Erythromma najas*, *Gomphus vulgatissimus*, and *Somatochlora metallica*.] Address: Moroz, M.D., Scientific and Practical Center for Bioresources, Academy of Sciences of Belarus, Minsk, the Republic of Belarus. E-mail: mdmoroz@bk.ru

13754. Muranyi, D.; Kovacs, T. (2013): Contribution to the Odonata fauna of Albania and Montenegro. *Folia historico naturalia musei Matraensis* 37: 29-41. (in English) ["Faunistical data of 37 Odonata species collected in Albania since 2007, and 20 species collected in Montenegro during the past ten years are enumerated. *Selysiothemis nigra* is new to the fauna of Albania. Notes and figures are given concerning the taxonomy, distribution, and ecology of 15 taxa." (Authors)] Address: Murányi, D., Hungarian Natural History Museum, Baross u. 13, H-1088 Budapest, Hungary. E-mail: muranyi@zool.nhmus.hu

13755. Nattress, B. (2013): Mixed pairing by Emerald Damselfly *Lestes sponsa*. *Atropos* 50: 83. (in English) [Verbatim: I was interested to read the note in *Atropos* 47 (Pickess, 2012) about pairing by a male Emerald Damselfly *Lestes sponsa* with a female Large Red Damselfly *Pyrrosoma nymphula*. This observation reminded me of a similar incident that I had witnessed back in 2011. On the afternoon of 27 July 2011, whilst on holiday in Dumfries and Galloway, I visited Balloch Wood Ponds, near Creetown. I was strolling around watching the dragonflies and damselflies, when I noticed a male Emerald Damselfly paired with a female Large Red Damselfly. I took a quick photograph for the record. I watched the pair for not much more than a minute before they moved away.] Address: Nattress, B., 25 West Lea Dive, Tingley, Wakefield, West Yorkshire, WF3 1DH, UK

13756. Nava-Bolaños, A.; Sánchez-Guillén, R.A.; Munguía-Steyer, R.; Córdoba-Aguilar, A. (2013): Isometric patterns for male genital allometry in four damselfly species. *Acta ethologica* 17(1): 47-52. (in English) ["Recent studies have found that insect genitalic traits show negative allometry, i.e., are relatively small in relation to body size. One interpretation of this is that males use their genitalia to stimulate females. Thus, given the nature of damselfly copulation in which males physically reach the rival sperm that females have stored from previous matings, male genitalic traits are not expected to show negative allometry. To test this idea, we assessed (a) the rival sperm displacement function by the mating male and (b) allometry of aedeagal length of four damselfly species (*Argia anceps*, *Argia tezpi*, *Argia extranea*, and *Enallagma praevarum*). Sperm displacement was assessed by inspecting whether the aedeagus reached the rival sperm during copulation in mating pairs for the four species. To have a standard for comparing allometric patterns, allometry of aedeagal was compared to that of two non-genital traits, tibial,

and fourth abdominal segment length. In all cases, the aedeagus was found to reach the rival sperm which supports the idea that stimulation is not the mechanism for sperm displacement but physical displacement. Aedeagal length was isometric, and its slope was lower in general compared to that of tibial length and fourth abdominal segment. Given that this isometric pattern is not common for other odonate species, our interpretation of these varying aedeagal scaling patterns in this insect order is that males' and females' sexual interests are in conflict (males are evolving an elongated aedeagus to reach rival sperm while females are evolving unreachable sperm storage organs to prevent displacement of stored sperm). This sexual conflict scenario would favor varying scaling patterns for aedeagal length in odonates. A final interpretation is that the risk of interspecific matings in damselflies, may also explain different species-specific, aedeagal allometries." (Authors)] Address: Córdoba-Aguilar, A., Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, Apdo. P. 69-1, Plaza Juárez, Pachuca, Hidalgo 42001, Mexico E-mail: acordoba@uaeh.reduaeh.mx

13757. Nelson, S. (2013): Sampling guide for the collection of dragonfly larvae and water samples from National Parks for mercury analysis. University of Maine (UMaine)/Mitchell Center & School of Forest Resources Acadia Learning/Schoodic Education Research Center (SERC) Institute National Park Service (NPS) – Air Resources Division (ARD): 16 pp. (in English) ["Scope and Application: Mercury threatens natural resources the National Park Service is charged with protecting. This citizen science project encourages students and visitors in national parks to collect dragonfly larvae for mercury analyses. The study connects people to parks, advances the educational mission, fosters biodiversity discovery opportunities, and provides baseline data to better understand the spatial distribution of mercury contamination in national parks. Mercury (Hg) is a globally distributed contaminant that can harm human and wildlife health. In its toxic methylated form, mercury bioaccumulates (builds-up) in aquatic and terrestrial foodwebs. Effects include reproductive and neurological impairment. Due in part to emissions from coal-burning power plants, even remote national park environments receive mercury deposition from the atmosphere. (See <http://www.nature.nps.gov/air/AQBasics/mercury.cfm> for background on mercury in national parks.) Dragonfly larvae (Odonata: Anisoptera) could serve as indicators of ecosystem health by characterizing the risk and potential toxic effects of mercury. These aquatic macroinvertebrates are long-lived (up to 5 year as larvae) before emerging as adult dragonflies, widespread across the U.S., predatory (i.e., prone to higher concentrations of mercury), important prey for fish species, and they reflect the mercury sensitivity of a specific watershed. Moreover, they are relatively easy to collect! This citizen science project (<http://www.nature.nps.gov/air/Studies/>

airtoxics/dragonfly/index.cfm) expands the geographic scope of research previously conducted by scientists and citizen scientists, and provides data that can be compared across parks. Early data are being used to develop hypotheses regarding whether mercury varies with odonate larval body size or by family; or whether a site's landscape setting drives variability in mercury in odonate larvae. Educational content and lesson plans for use by interpreters, resource managers, or research learning center staff are also available. Ultimately, this project also helps raise awareness about mercury impacts. The citizen science effort to collect dragonfly larvae from national parks for mercury analysis expanded in 2012 to include a total of approximately 14 parks across the following NPS regions: Northeast, Southeast, Midwest, Intermountain, Pacific West, and Alaska. Citizen scientists involved include students ranging from elementary-aged to college, park visitors, and BioBlitz participants. In addition to collecting dragonfly larvae, all parks are collecting a water sample for mercury-relevant water chemistry (i.e., dissolved organic carbon (DOC), pH, sulfate) and a water sample for total mercury. Most parks will sample once per year but a few parks will sample twice per year to help determine if there is seasonal variability. Data results will be available in 2013/2014. The optimal study design is 2.3 sites per park that represent a gradient in mercury-relevant chemistry (as defined above); or a gradient in landscape condition, such as a high and low elevation, amount of wetlands adjacent to or upstream from the site, or forested versus urban landcover. Consider scoping the sampling locations in advance of collecting samples. Does the proposed sampling location retain a healthy population of dragonflies? (A sample size of 15 dragonfly larvae per site is preferred.) Will nearby riparian flora and fauna get trampled? Is the site spacious enough for a group? Safety of the participants involved is extremely important. Riparian edges can be very slippery, as are stream and lake bottoms. High water levels and turbulent flows may cause an individual to lose balance in the water. Be attentive of the possible risks. A park research permit will be needed to conduct this project; the dragonfly and water samples collected for this project will be destroyed through analysis, or discarded after analysis. In addition, in some cases, a state permit may be needed to collect dragonfly larvae. Example text for the permit application can be found in Appendix A of this sampling protocol. The project's fact sheet and other materials will provide further assistance. (See NPS Dragonfly Larvae web page as above and additional documents on Sharepoint <http://sharenr/ard/DragonflyMercuryProject/Forms/AllItems.aspx>.)" (Author)] Address: Nelson, Sarah, Email: sarah.j.nelson@maine.edu

13758. Nowack, M. (2013): Blauegrüne Mosaikjungfer *Aeshna cyanea* auf systematischer Jagd nach Tandems der Weidenjungfer *Lestes viridis*. *Mercuriale* 13: 41-42. (in German, with English summary) ["A systematic hunt of one male of *A. cyanea* after tandems of *Lestes viridis* was observed five times at 18.10.2013 in southwest

Germany. Two of five observed attacks during 30 minutes were successful, but at the end in all cases the prey escaped." (Author)] Address: Nowak, M., Fuchseckstr. 16/1, 73114 Schlat, Germany. E-mail: Nowak-Schlat@t-online.de

13759. Nowack, M. (2013): Kleine Einblicke zum Verhalten der Großen Moosjungfer *Leucorrhinia pectoralis*. *Mercuriale* 13: 37-40. (in German, with English summary) ["In 2012 the behaviour of *L. pectoralis* was studied during 22 visits at one waterbody in the eastern part of the German Land of Baden-Württemberg. One male was observed 11 times in a time span of three weeks. The activity patterns of two males being present simultaneously at the study site differed significantly. One male showed rhythmic movements with its abdomen, which was in a concave position similar to that of some damselflies. When the sun was hidden behind clouds the observed specimens perched at light stems and open soil, where they sometimes got in touch with their wings to the ground. The only female observed, was ovipositing unguarded by a male over the open water surface in a two minutes timespan. All specimens, which were observed reaching or leaving the breeding water, either came from neighbouring trees or left the water towards the trees. The results are shortly discussed." (Author)] Address: Nowak, M., Fuchseckstr. 16/1, 73114 Schlat, Germany. E-mail: Nowak-Schlat@t-online.de

13760. Orr, A.G.; Kalkman, V.J.; Richards, S.J. (2013): Four new species of *Palaiargia* Förster, 1903 (Odonata: Platynemididae) from New Guinea with revised distribution records for the genus. *International Journal of Odonatology* 16(4): 309-325. (in English) ["Four new species of *Palaiargia* from New Guinea, *P. benkeni*, *P. clarillii*, *P. quandt* and *P. tydecksjuerging*, are described and figured. Maps are provided of the known distributions of all species of the genus which occurs in the Moluccas and on the main island of New Guinea. Previous unpublished records are provided for *P. carnifex*, *P. c. ceix*, *P. charmosyna*, *P. ernstmayri*, *P. humida* and *P. stellata*." (Authors)] Address: Orr, A.G., Griffith School of the Environment, Griffith University, Nathan, Q4111, Australia. E-mail: agorr@bigpond.com

13761. Orr, A.G.; Ngiam, R.W.J.; Dow, R.A. (2013): A description of the larva of *Heliaeschna idae* Brauer from Borneo, with a supplementary note on the larva of *H. univervulata* Martin (Odonata: Aeshnidae). *International Journal of Odonatology* 16(3): 231-238. (in English) ["The final instar larva of *H. idae* is described and figured for the first time based on the exuvia from an advanced female larva collected in Sarawak, Borneo (East Malaysia). It is compared with the known larvae of the genus and is concluded to be most closely allied to *H. simplicia* Karsch, with which it shares a unique structure on the anterior margin of the prementum of the labium, along with several other distinctive characters.

The dorsal structure of the head of *H. uninervulata* is re-examined and illustrated. It is shown to bear a prominent convexity and tuft of long setae on the vertex which is similar to a structure previously recorded only in *H. simplicia*, and which is only weakly developed in *H. idae*. The taxonomic implications of these partly conflicting observations are discussed and it is concluded the Oriental members of the genus *Heliaeschna* might be separated into two or three separate genera, which are as yet unnamed." (Authors)] Address: Orr, A.G., Griffith, School of the Environment, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@bigpond.com

13762. Panomwan, Y.; Thanawan, P.-P.; Promm, T.-o, (2013): Aquatic insect communities and water quality in wetland, northern Thailand. *Journal of Applied Sciences in Environmental Sanitation* 8(3): 161-169. (in English) ["Nong Leng Sai wetland is located in Phayao Province, northern Thailand. Agriculture in contiguous lands has caused sedimentation and eutrophication, affecting not only its hydrology but its capacity to sustain a high diversity of aquatic life. The aims of this study were to assess the physicochemical (pH: air and water temperature, dissolved oxygen, conductivity and total dissolved solids) and biological characteristics (aquatic insects) of five sampling sites in the wetland during January to August 2009. Three replicates of samplings by aquatic D-net were used at the sampling sites. A total of 3,724 individuals belonging to seven orders and 26 families were recorded in this study. The hemipterans were the most abundant groups in wetland (8 families) followed by the coleopterans (6 families), the dipterans (3 families), the odonates (3 families), ephemeropterans (3 families), the trichopterans (2 families) and the lepidopteran was least abundant (1 family). The results from CCA indicated that low diversity was probably due to higher conductivity in the month of the dry season." (Authors) Libellulidae, Coenagrionidae, Gomphidae] Address: Promm, Taeng-On, Faculty of Liberal Arts and Science, Kasetsart University, Kamphaeng Saen Campus, Nakhon Pathom 73140, Thailand. E-mail: faastop@ku.ac.th

13763. Peterson, M. (2013): Note on the first record of *Pseudagrion microcephalum* (Rambur) (Odonata: Coenagrionidae) from Victoria, Australia. *Calodema* 285: 1-2. ["*P. microcephalum* was first recorded from Victoria, Australia by René Martin in 1901, based on a specimen collected by Farncombe Lovett Billingham (1859–1937) at Alexandra. The literature is reviewed." (Author) This note is correcting an internet publication: Richter, R. (2013). Discovery of *Pseudagrion microcephalum* (Blue Riverdamsel) in Victoria. Publicly available PDF, privately published electronically on 16 March 2013. 2pp.] Address: Peterson, M., Unit 5/33 Point Walter Road, Bicton, Perth, WA 6157 Australia

13764. Pinto, N.S.; Neto, J.H.; Ribeiro, V.; Rodrigues, A.R.; Brandao, B.R.; Rocha, C.O. (2013): Efeito da Presença de Vizinhos sobre o Comportamento Territo-

rial de *Perithemis mooma* (Kirby) (Anisoptera: Libellulidae). *EntomoBrasilis* 6(2): 104-107. (in Portuguese, with English summary) ["Effect of the presence of neighbours on the behaviour of territorial *Perithemis mooma*: Some territorial species present less aggressive responses in relation to the entering of neighbours than non-neighbours in their territory. This differentiation in responses is known as "Dear Enemy Effect". The objective of this study was evaluate the interaction of *P. mooma* with its neighbours and invaders, testing the occurrence of the "Dear Enemy Effect". This study was conducted in the Campus Samambaia of the Universidade Federal de Goiás (UFG). The intraspecific agonistic interactions of *P. mooma* were observed in 30 individuals, totalling 300 minutes of observation. We verified that the individuals spend more time in fights with invaders. This information corroborates the hypothesis that individuals recognize the neighbours; consequently spend less time the agonistic interactions with them. For the analysis about time and proportion of fight with neighbours more or less distant, we verified that the individuals spend more time in interactions with closer neighbour than further neighbours. Occurred more proportion of fight with invaders from the side of the lesser distant than from the centre (Tukey test; $p = 0.034$). We observed that in *P. mooma* there is a significant effect indicating that males who recognizes themselves as neighbours interact with lesser aggressively than when interact with invaders. Thus, it is possible suggest that there is an effect dear enemy in males *P. mooma*, since there was a significant difference in time, as well as in the intensity of the interaction with neighbours and with invaders." (Authors)] Address: Pinto, N.S., Lab de Ecologia Teórica e Síntese, Depto de Biologia Geral, Univ Federal de Goiás, Goiânia, GO, Brasil

13765. Popova, O.N.; Barkalov, A.V.; Borisov, S.N.; VV Foolov, VV. (2013): Memory of Anatolii Yurievich Haritonov (21.09.1949–04.04.2013). *Eurasian Entomological Journal* 12(3): 205-212. (in Russian) [Obituary with bibliography of A.Yu. Haritonov.] Address: Popova, O.N., Institut Sistematiki i Zkologii Zhivotnykh, 630091 Novosibirsk, Ul. Frunse 11, Russia. E-mail: popova.olga.nik@gmail.com

13766. Popova, O.N.; Kharitonov, A.Yu. (2013): [Mass reproductive migrations of dragonflies genus *Sympetrum* (Odonata, Libellulidae)]. *Zoologicheskii zhurnal* 92: 893-900. ["The results of observing mass flights of some dragonflies of the genus *Sympetrum* forming tandems are presented. These tandems always fly against the wind, some of them landing for oviposition and then joining the flight again. This variant of migration behaviour has been unexplained until now. A hypothesis is proposed according to which synchronous mass flights of dragonfly tandems facilitate the most uniform oviposition in all the suitable biotopes. The general direction of the flight depends on the wind. As the wind direction changes, the flight course of the tandems changes ac-

cordingly, so that the dragonflies cross the same territory several times, which leads to a denser and more uniform distribution of eggs. It is proposed to refer to this variant of flight as reproductive wanderings. Such a dispersal strategy can maintain the most uniform population density and a more stable abundance of some dragonfly species in the territories with unstable humidity." (Authors)] Address: Popova, Olga, Institut Sistematiiki i Zkologii Zhivotnykh, 630091 Novosibirsk, Ul. Frunse 11, Russia. E-mail: popova.olga.nik@gmail.com

13767. Popova, O.N.; Haritonov, A.Yu. (2013): Odonata of the East Vasyugan, West Siberia, Russia. *Eurasian Entomological Journal* 12(3): 217-223. (in Russian, with English summary) ["Results of the studies of abundance of odonate, carried out in July 2012 in the odonatologically weakly explored east part of Vasyugan Plain, are presented. 27 localities are briefly described and the list of 40 species with data on their abundance, occurrence and population density are given. The list was increased to 43 species after including the data of 2006 [Bernard, Kosterin, 2010]." (Authors)] Address: Popova, O.N., Institut Sistematiiki i Zkologii Zhivotnykh, 630091 Novosibirsk, Ul. Frunse 11, Russia. E-mail: popova.olga.nik@gmail.com

13768. Rebor, M.; Dell'Otto, A.; Rybak, J.; Piersanti, S.; Gaino, E.; Hansson, B. (2013): The antennal lobe of *Libellula depressa* (Odonata, Libellulidae). *Zoology* 116 (4): 205-214. (in English) ["Here we describe the antennal lobe of *L. depressa*, identified on the basis of the projections of the afferent sensory neurons stemming from the antennal flagellum sensilla. Immunohistochemical neuropil staining as well as antennal backfills revealed sensory neuron terminal arborizations covering a large portion of the antennal lobe. No clear glomerular structure was identified, thus suggesting an agglomerular antennal lobe condition as previously reported in Palaeoptera. The terminal arbors of backfilled sensory neurons do, however, form spherical knots, probably representing the connections between the few afferent neurons and the antennal lobe interneurons. The reconstruction revealed that the proximal part of the antennal nerve is divided into two branches that innervate two spatially separated areas of the antennal lobe, an anterioventral lobe and a larger posteriodorsal lobe. Our data are consistent with the hypothesis that one tract of the antennal nerve of *L. depressa* contains olfactory sensory neurons projecting into one of the sublobes, while the other tract contains thermo-hygroreceptive neurons projecting into the other sublobe." (Authors)] Address: Rebor, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebora@unipg.it

13769. Roa-Fuentes, C.A.; Prada-Pedrer, S.; Álvarez-Zamora, R.; Rivera Rondón, C.A.; Maldonado-Ocampo, J.A. (2013): Abundancia relativa y dieta de *Grundulus bogotensis* (Characiformes: Characidae) en

el altiplano Cundiboyacense, Colombia. *Universitas Scientiarum* 18(1): 73-82. (in Spanish, with English and Portuguese summaries) ["Relative abundance and diet of *G. bogotensis* in the Cundiboyacense plateau, Colombia. Abstract. To compare the relative abundance of *G. bogotensis* in two river basins and the diet of the populations of three basins in the Cundiboyacense plateau, we sampled 10 localities using electrofishing equipment between March and June 2006. The relative abundance in each locality was expressed as the number of fish caught per hour on a 100m stretch; any significant differences in relative abundance among basins were identified via a Kruskal-Wallis test. To quantify the diet, we used the volumetric method. Similarities between the basins were determined using three multivariate analyzes: nonmetric multidimensional scaling, analysis of similarity and similarity percentages. In the end, we collected a total of 675 individuals during 600 minutes of capture effort. The abundance of this species in the Bogotá river basin was significantly lower compared to that of the Suárez basin. The dietary composition, of autochthonous origin, primarily immature insects (including 'Aeshnidae') and microcrustaceans and the volume of items proved similar between the basins. In conclusion, the dietary analysis indicated a similarity exceeding 60% in the feed resource use for the three basins. The relative abundance of populations of *G. bogotensis* in the Bogotá river basin was lower than in the Suárez river basin, the latter having, possibly, the greatest abundance of this species throughout its range. The data suggests the most favourable conditions for the survival of the species in Lake Tota." (Authors)] Address: Roa-Fuentes, C.A., Laboratorio de Ictiología, Unidad de Ecología y Sistemática -UNESIS-, Departamento de Biología, Facultad de Ciencias, Pontificia Universidad Javeriana, Carrera 7 N° 40-62, Bogotá D.C., Colombia. E-mail: camilo.roa@gmail.com

13770. Robinson, J. (2013): Observations on the predation of *Gyrinus* by *Aeshna grandis* (Odonata: Aeshnidae) and *Triturus cristatus* (Amphibia: Salamandriidae). *Latissimus* 34: 20-21. (in English) [Verbatim: Whilst collecting invertebrate samples from a pond and ditch complex in Lancashire (UK) this summer (12 July 2013) I observed some invertebrate and vertebrate behaviour which I had never seen before. I was taking a break and when I heard distinctly audible splashes in the ditch adjacent to my resting spot. Peeking over the bridge parapet I watched a large brown dragonfly repeatedly diving onto the surface of the ditch causing audible and visible splashes. The action was far too violent to be ovipositing, so I grabbed a pair of binoculars and watched. The dragonfly turned out to be a male *Aeshna grandis* (instantly discounting the ovipositing idea). The dragonfly was actively hunting gyrenids. I watched for a good half hour and the dragonfly took six gyrenids in that time period and "missed" a similar number. It deliberately took individuals that were separate from the main raft. All the texts I've read have suggested that the

volatile chemicals produced by the pygidial glands rendered gyrinids either unpalatable or toxic to predators, however, the *Aeshna* had not apparently read this. It was definitely eating them, not just catching and dropping, if they are that unpalatable and/or toxic, it would have stopped after the first one surely? There were plenty of other prey types available for the *Aeshna* (ciclicids and tabanids were very abundant and not perturbed by any insect repellent my assistant and I cared to apply) I wonder if, on the day in question air temp was ca 30°C, that the volatiles were simply evaporating before they became "effective"? The same ditch had a significant population of Great Crested Newts and later that day I observed an individual taking gyrinids from below, it would rest on a piece of submerged masonry (approx. 200mm) below the surface) until the raft of gyrinids was directly overhead then shoot up, grab one and sink slowly back onto the masonry. The newt showed no sign that the Gyrinids were either unpalatable or toxic as it caught at least nine in the time period that I watched. The only gyrinids I recorded from that ditch were *G. substriatus* Stephens and I have to admit that both the *Aeshna* and GCN caught more than I did! Address: not stated

13771. Rudolf, V.H.W.; Rasmussen, N.L. (2013): Population structure determines functional differences among species and ecosystem processes. *Nature Communications* 4, Article number: 2318 doi:10.1038/ncomms3318: 7 pp. (in English) ["Linking the structure of communities to ecosystem functioning has been a perennial challenge in ecology. Studies on ecosystem function are traditionally focused on changes in species composition. However, this species-centric approach neglects the often dramatic changes in the ecology of organisms during their development, thereby limiting our ability to link the structure of populations and communities to the functioning of natural ecosystems. Here we experimentally demonstrate that the impact of organisms on community structure and ecosystem processes often differ more among developmental stages within a species than between species, contrary to current assumptions. Importantly, we show that functional differences between species vary depending on the specific demographic structure of predators. One important implication is that changes in the demography of populations can strongly alter the functional composition of communities and change ecosystem processes long before any species are extirpated from communities." (Authors) *Anax junius* and *Cybister fimbriolatus* are used as model organisms in mesocosms.] Address: Rudolf, V.H.W., Dept of Ecology and Evolutionary Biology, Rice University, 6100 Main Street-MS 170, Houston, Texas 77005, USA. E-mail: Volker.rudolf@rice.edu

13772. Ryazanova, G.I.; Polygalov, A.S. (2013): Fluctuating asymmetry of wing venation in damselflies *Ischnura elegans* (V.d. Lind.) (Odonata, Coenagrionidae) and prospects of its use as a biological indica-

tor of ecological quality of fresh-water reservoirs. *Moscow University Biological Sciences Bulletin* 68(4): 195-199. (in English) ["Fluctuating asymmetry (FA) of wing venation has been studied in five populations of *I. elegans* for bioindication of the environment in 2010 and 2011. The seasonal and sexual features of FA have been assessed. Different characteristics of FA in the damselfly wings have been found not to correlate with each other. In order to explain differently directed changes in FA of damselflies from the populations studied, which were influenced by temperature-oxygen stress of 2010, the hypothesis of differentiated death of specimens with shaky stability of development has been suggested. Possible use of FA as an instrument of biomonitoring of the ecological quality of water reservoirs has been put into question. Original Russian Text © G.I. Ryazanova, A.S. Polygalov, 2013, published in *Vestnik Moskovskogo Universiteta. Biologiya*, 2013, No. 3, pp. 27-32." (Authors)] Address: Ryazanova, G.I., Biological Faculty, Moscow Lomonosov State University, Moscow, 119992, Russia. E-mail: ryazanovagi@mail.ru

13773. Sánchez-Guillén, R.A.; Córdoba-Aguilar, A.; Cordero-Rivera, A. (2013): An examination of competitive gametic isolation mechanisms between the damselflies *Ischnura graellsii* and *I. elegans*. *International Journal of Odonatology* 16(3): 259-267. (in English) ["Recent findings suggest that postmating prezygotic isolation (i.e. gametic barriers) could be an important factor preventing hybrid formation. Competitive gametic barriers emerge when a female is inseminated by a conspecific and a heterospecific male. We examined whether sperm proportions after double matings and copulation duration impede hybrid formation. For this, we used females of *Ischnura graellsii* that mated with one conspecific and one heterospecific (*I. elegans*) male and vice versa, and calculated paternity of the second male by using RFLPs. Values of paternity (although preliminary because of a small sample size) suggest no bias in paternity towards conspecific males. However, proportion of sperm stored in the bursa and spermatheca of the female was biased towards the conspecific male when the heterospecific male was the first male, while copulation duration did not differ between conspecific and heterospecific males. Our results suggest that the relative sperm volumes may play a role as a gametic barrier in this species. However, cryptic female choice mediated by the preferential use of the conspecific sperm, although not detected, could not be discarded owing to small sample sizes in some cases." (Authors)] Address: Sánchez-Guillén, Rosa, E-mail: rguillenuvigo@hotmail.com

13774. Schiel, F.-J.; Hunger, H. (2013): Weitere Ausbreitung von *Coenagrion scitulum* in der baden-württembergischen Oberrheinebene (Odonata: Coenagrionidae). *Mercuriale* 13: 21-24. (in German, with English summary) ["Two observations of single males of *C. sci-*

tulum in the central part of the eastern upper Rhine valley in the federal state of Baden-Württemberg are recorded. The new sites are situated 56 km resp. 100 km north of the hitherto known closest recording site of the species in Baden-Württemberg. Habitats are described and possible dispersal routes are discussed shortly. Most likely, colonization took place from sites in Alsace or southeastern Palatine where occurrences of the species are known in distances of only 16 to 22 km from the two new sites described in this paper." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

13775. Schilthuizen, M. (2013): Something gone awry: unsolved mysteries in the evolution of asymmetric animal genitalia. *Animal Biology* 63: 1-20. (in English) ["The great diversity in genital shape and function across and within the animal phyla hamper the identification of specific evolutionary trends that stretch beyond the limits of the group under study. Asymmetry might be a trait in genital morphology that could play a unifying role in the evolutionary biology of genitalia. Here, I review the current knowledge on the taxonomic distribution, phylogenetic patterns, genetics, development, and ecology of asymmetric (chiral) genitalia. Asymmetric genitalia (male as well as female) have evolved from bilaterally symmetric ones (and sometimes vice versa), innumerable times in most animal taxa with internal fertilisation, and especially in Platyhelminthes, Arthropoda, Nematoda, and Chordata. In groups with asymmetric genitalia, chiral reversal (where species carry genitalia that are the mirror image of those in other, congeneric, species) is common, but antisymmetry (both mirror images present within a species) is rare. Although indications exist that, at least in insects, asymmetry evolves as a compensatory response to the evolution of male-dominant mating positions, many mysteries remain. Main questions are: (i) is genital asymmetry developmentally linked with other (visceral, external) asymmetries? (ii) is genital asymmetry usually correlated with a change in mating position? (iii) is asymmetry more likely to evolve in response to cryptic female choice or sexually-antagonistic coevolution? (iv) why is antisymmetry so rare and how does chiral reversal evolve? Based on an overview of the taxonomic patterns, I advocate a research program that makes use of the simple, binary nature of left-right asymmetry to test hypotheses for its evolution with experimental and comparative methods. I also provide tables with full or summarised data on (a) genital asymmetry across all animal phyla with internal fertilisation; (b) genera with dextral as well as sinistral species; (c) species with dextral as well as sinistral individuals; (d) genera with symmetric as well as asymmetric species; (e) species with symmetric as well as asymmetric individuals." (Author) The analysis considers Córdoba-Aguilar, A. (2003): A description of male and female genitalia and a reconstruction of copulatory and fertilisation events in

Calopteryx haemorrhoidalis (Vander Linden). *Odonatologica*, 32, 205-214.] Address: Schilthuizen, M., Naturalis Biodiversity Center, Darwinweg 2, 2333 CR Leiden, The Netherlands. E-mail: menno.schilthuizen@naturalis.nl

13776. Schultz, T.D.; Fincke, O.M. (2013): Lost in the crowd or hidden in the grass: signal apparency of female polymorphic damselflies in alternative habitats. *Animal Behaviour* 86(5): 923-931. (in English) ["Highlights: • We quantified apparency of polymorphic female damselflies as mates and prey. • Females matched either the colour of conspecific males or the colour of the visual background. • Cryptic heteromorphs were nearly undetectable to conspecific males or predators in vegetation. • Male-mimicking andromorphs were highly detectable to conspecific males and predators on shore. • We propose that disruptive selection on female colour is driven by sexual conflict and predation. Animals must locate prey and mates in noisy sensory environments. Species that rely on visual cues, and which are prey of visual predators, consequently face trade-offs. Additionally, within species, sexual conflict over mating may impose pressures to avoid both predators and mates. Many studies have attempted to explain female-specific polymorphisms in damselflies, but without considering their actual conspicuousness under natural conditions. Using models of colour perception for damselflies and birds, we assessed the detectability of female coloration to conspecific males and potential predators. Alternative colour morphs reduce female apparency either through signal similarity with conspecific males (i.e. mimicry) or by matching the noise of the visual background. The colours of male-mimicking andromorphs that reduce their apparency among groups of males at breeding sites render them highly detectable to males as well as visual predators in offshore vegetation, where females occur when not reproducing. By presenting tethered female damselflies to free-flying males amidst vegetation, we demonstrated that, among flying females, males were able to detect andromorphs more easily than the more cryptic heteromorphs. Thus, when male density is low, cryptic heteromorphs may experience less harassment than andromorphs, suggesting a scenario of disruptive selection on female coloration driven by males as well as predators. Greater attention is warranted not only to the predation risks of female signals, but also to the effect of variation in the visual environments on encounters between males and unreceptive females." (Authors)] Address: Schultz, T.D., Department of Biology, Denison University, Granville, OH 43023, USA. E-mail: schultz@denison.edu

13777. Seehausen, M. (2013): Libellen in unserer Region - Aufruf zur Mitarbeit. *Ornithologischer Jahresbericht 2012 - Hessische Gesellschaft für Ornithologie und Naturschutz e.V., Arbeitskreis Wiesbaden-Rheingau-Taunus: 5-7.* (in German) [Few information on odonate fauna of the Taunus-Middle rang mountain-region and

the capital of Hessen, Wiesbaden, Germany are known. The author introduces into the regional fauna to foster intensified regional recording of Odonata.] Address: Seehausen, M., Museum Wiesbaden Hessisches Landesmuseum für Kunst und Natur, Friedrich-Ebert-Allee 2, 65185 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

13778. Sharma, I.; Dhanze, R. (2013): Ecology of River Spiti, Lahaul-Spiti (Himachal Pradesh), India. *International Journal of Fisheries and Aquaculture Sciences* 3(2): 131-141. (in English) ["The present study is conducted in view to appraise the ecology of Spiti River in the high altitude cold desert of Spiti valley, which is one of the fragile Himalayan Ecosystem. The diversity of planktonic, macrobenthic fauna along with physico-chemical parameters has been worked out. During monsoon season maximum density, diversity of planktons and diversity of benthic fauna was recorded. The maxima of wealth of biological parameters during monsoon in spiti valley are disparate from the low and mid-hills, where highest is noticed during the winter or summer. Simpson's diversity index was applied for calculation of species richness and species diversity." (Authors) The list of taxa includes "Odonata" found to be more frequent in post-monsoon season compared with pre- and monsoon seasons.] Address: Sharma, I., Zoological Survey of India, High Altitude Regional Centre, Solan, Himachal Pradesh 173211, India. Email: induzsi@gmail.com

13779. Šiliņš, R.; Druvietis, I.; Poppels, A. (2013): Seasonal dynamics of benthic and planktonic communities in shallow lagoon bird lake Engure, Latvia. *Acta Biologica Universitatis Daugavpilis* 13(1): 129-141. (in English) [The list of taxa includes the following Odonata species: *Coenagrion armatum*, *C. hastulatum*, *C. pulchellum*, *Lestes virens*, *L. sponsa*, *Ischnura elegans*, *Aeshna grandis*, *Cordulia aenea*, *Sympetrum danae*.] Address: Druvietis, I., University of Latvia, Faculty of Biology, Chair of Hydrobiology, Kronvalda blvd.4, Riga, Latvia, LV-1586. E-mail: ivarsdru@latnet.lv

13780. Spencer, T. (2013): A further mixed pairing. *Atropos* 50: 83-84. (in English) [Verbatim: On 12 July 2010 at about 13.00hrs, I was taking photographs around a pool in a small field at Pensthorpe, Norfolk, when I noticed a male Emerald Damselfly *Lestes sponsa* coupled with a female Common Blue Damselfly *Enallagma cyathigerum*. Both were clasping the tip of a reed by the water's edge, but while the male's abdomen was curved into one half of the mating 'wheel', that of the female was kept straight. At around the same time that day I also saw and photographed a pairing of two male Emerald Damselfly at the same pool. The upper male's abdomen was semi-arched while that of the lower one was straight, as described for the previous pairing. The notion that male Emerald Damselfly are desperate to mate is perhaps borne out by these observa-

tions: if no females can be found, then anything will do apparently!] Address: Spencer, T., Orchard Cottage, Wood Norton Road, Stibbard, Fakenham, Norfolk, NR21 OEX

13781. Stalder, G. (2013): Aktivitäten der Gemeinen und der Sibirischen Winterlibelle (*Sympecma fusca* und *Sympecma paedisca*) im Spätherbst und Winter in ihrem Winterhabitat 2010-2013. *Mercuriale* 13: 11-20. (in German, with English summary) ["In late autumns 2012 and 2013 as well as in winters 2010/2011 and 2012/2013 the activity patterns of *Sympecma fusca* and in winter 2010/2011 those of *S. paedisca* were observed in the 'Pro Natura' nature protection area at Lengwil near Lake Constance, northeastern Switzerland. During a period of overall six months the hibernation habitats were controlled 39 times and more than 40 specimens were recorded. On cold winter days without closed snow cover specimens of *S. fusca* were observed clinging to upright stems in heights up to few decimetres above the ground as well as clinging to stems lying on the bottom. During upcoming snowfall in midwinter both *S. fusca* and *S. paedisca* moved downwards along the stems resulting in being snowed in. However, this behaviour changed in late March, as several individuals of *S. fusca* could be recorded above a closed snow cover." (Author)] Address: Stalder, G., Hueb 6, CH-8580 Sommeri, Switzerland. E-mail: gesta@gmx.ch

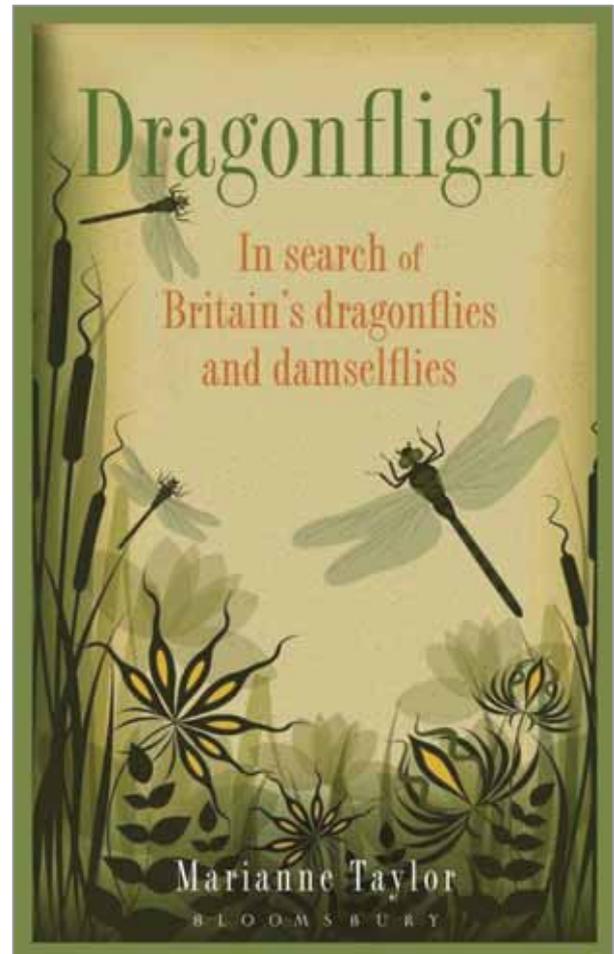
13782. Sumanapala, A.P. (2013): Diversity of Odonata in the Peak Wilderness Sanctuary, Sri Lanka. *Proceedings of International Forestry and Environment Symposium, Sri Lanka*. Published by Department of Forestry and Environmental Science, University of Sri Jayewardenepura 18: 143. (in English) [Verbatim: A preliminary study on the diversity of Odonata was carried out for the first time to assess the diversity of Odonata in the Peak Wilderness Sanctuary (PWS), Sri Lanka. It is a biologically rich area surrounding the Adam's Peak which is located at 6° 48' 33.357" N and 80° 29'58.3182" E. Total area of the sanctuary is about 24,000 ha and the altitude ranges from 50 m to 2238 m. The study was conducted from August 2012 to August 2013. Visual encounter survey method was used for the sampling and it was carried out along the existing paths and streams in the sanctuary covering many different habitats types. Sampling was done in the day time from 0800 h to 1700 h as odonates are most active during the day. 34 species of odonates representing 11 families were recorded during the study while 30 of them were identified to the species level. This represents 28.1% (from 121 species) of the Sri Lankan odonate fauna. 19 of the recorded species (55.9%) belong to Suborder Zygoptera while there remaining 15 (44.1%) belongs to the Suborder Anisoptera. Seven of the identified species are endemic to the country while 13 species are considered to be threatened with extinction at the national level. 10 of the threatened species are known to be Vulnerable while three species are endangered. The

nationally data deficient and globally critically endangered damselfly *Sinhalestes orientalis* (Hagen in Selys, 1862) which has not been recorded for 154 years was also observed during this study. The high species richness of Odonata and the presence of many threatened species and data deficient species indicate that the PWS is an important area for the Odonata thus more comprehensive studies and suitable conservation actions should be made.] Address: Sumanapala, A.P., Young Biologists' Association, Institute of Biology, 120/10, Vidya Mawatha, Colombo 7, Sri Lanka. E-mail: apsumanapala@gmail.com

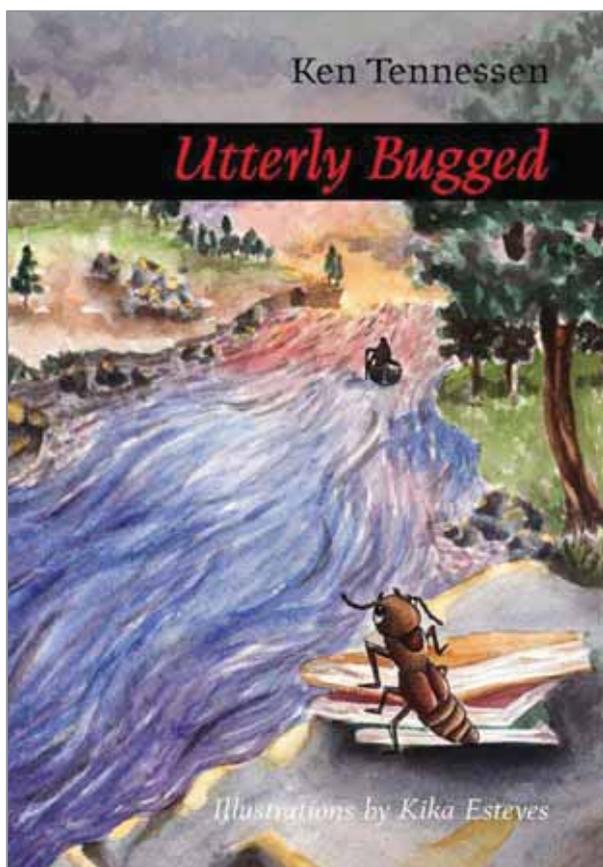
13783. Tajima, Y.; Watanabe, M. (2013): Male secondary genitalia mimic the female egg during oviposition for sperm displacement in the non-territorial damselfly *Ischnura asiatica* (Brauer) (Zygoptera: Coenagrionidae). *Odonatologica* 42(3): 229-236. (in English) ["The male sperm storage organs of *I. asiatica* include the bursa copulatrix and the spermatheca. The spermatheca is joined to the base of the bursa copulatrix by a spermathecal duct. At the tip of the male's secondary genitalia, there is a pair of horns which might be used to remove sperm from the female sperm storage organs. Since each horn of the male genitalia is shorter than the spermathecal duct, the spermatheca might be inaccessible to males. However, sperm reduction occurs both in the bursa copulatrix and in the spermatheca during copulation. This suggests an alternative mechanism by which the 8 can cause a decline in the spermathecal sperm. In order to investigate the mechanism of sperm reduction, an interrupted copulation experiment was conducted in the field. The extent of sperm reduction in the spermatheca was related to the width of the head of the secondary genitalia of the mated male. Females have mechano-receptive sensilla which communicate the presence of an egg to the muscles surrounding the sperm storage organs for fertilization. Therefore, the head of the secondary genitalia might mimic the movement of the egg that stimulates the sensilla to induce spermathecal sperm ejection by the female." (Authors)] Address: Tajima, Y., Graduate School of Life and Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: tj@ies.life.tsukuba.ac.jp

13784. Taylor, M. (2013): *Dragonflight: In Search of Britain's Dragonflies and Damselflies*. A&C Black Publishers: 256 pp. (in English) ["This book is an account of two years spent getting to know Britain's most dazzling and enigmatic insects - the dragonflies and damselflies. The quest to find, photograph, watch and learn about dragons and damsels took the author on a tour of diverse and lovely wetlands up and down Britain, from the rugged wild peat bogs of north-west Scotland to the languid meanders of the Oxfordshire Thames. The account describes close encounters with the dragons and damsels themselves, set against backdrops of rich and vital habitats teeming with a range of other wildlife. It is

also packed with background detail on dragonfly and damselfly natural history, and wetland ecology in general. The text is enlivened with line drawings and a section of colour photographs." (Publisher)] Address: not stated



13785. Tennesen, K. (2013): *Utterly Bugged*. Red Dragonfly Press. ISBN: 978-1-937693-31-2; 180 pp. (in English) ["Unaware that he has been transported back in time, retired entomologist Amos Garruty lands in a biological world unknown to him. Early on he sees peculiar dragonflies cure an injured snake, a superstition long debunked. Things soon take a turn for the worse when he sees a large bony-toothed bird streak through a clearing in the rainforest. He is aware that these flightless giants went extinct millions of years ago. He soon realizes he is alone. During his frantic struggle to return to the present, he is bitten by mosquitoes and unknowingly contracts a bygone virus. His ensuing travels in the United States unleash a hellish trail of infection. As people along his route get sick, it dawns on him that he might be a carrier. He tries to avoid contact, but is unsure what is really happening. Suspecting that authorities are hunting him, he flees to South America. His obsession with the enigmatic origins of insects continues to escalate, leading to a supernatural encounter that shakes him to his core."] Publisher.



13786. Tiple, A.D.; Andrew, R.J.; Subramanian, K.A.; Talmale, S.S. (2013): Odonata of Vidarbha region, Maharashtra state, Central India. *Odonatologica* 42(3): 237-245. (in English) ["A survey of water bodies of the Vidarbha region of central India was conducted during 2006-2012. A total of 82 species were recorded. The study adds 13 new species for the Vidarbha region and 6 species for Maharashtra state. Of the total, 23 species were abundant or very common, 26 were common, 24 rare and 9 very rare. The study shows that ecological disturbances in Vidarbha due to industrial and human activities are a threat to the odonate fauna. *Mortonagrion varralli* and *Copera ciliata*, which were recorded by earlier workers in this region, were not found during this survey. However, protected small and big water bodies used for agriculture and domestic usage provide valuable habitat for Odonata." (Authors)] Address: Talmale, S.S., Zoological Survey of India, Jabalpur-482 002, (MP), India

13787. Trindade, M.E.; Peressin, A.; Cetra, M.; Jucá-Chagas, R. (2013): Variation in the diet of a small characin according to the riparian zone coverage in an Atlantic Forest stream, northeastern Brazil. *Acta Limnologica Brasiliensia* 25(1): 34-41. (in English, with Portuguese summary) ["The diet of *Astyanax vermillion* at forested reach was quite varied when compared to the diet at deforested reach with items such as Hymenoptera (wasp), Ephemeroptera (larvae), Lepidoptera (larvae), Trichoptera (larvae), Araneae, Nematoda, Odonata and Coleoptera, that only occurred at forested

reach." (Authors)] Address: Trindade, Márcia Emília de Jesus, Instituto de Desenvolvimento Sustentável Mamirauá – IDSM, Estrada do Bexiga, 2584, Fonte Boa, CEP 69470-000, Tefé, AM, Brazil. E-mail: mejtrindade@hotmail.com

13788. Trockur, B. (2013): Zum Vorkommen der Gefleckten Smaragdlibelle *Somatochlora flavomaculata* (Vander Linden, 1825) in der Bistaue - ein gutes Beispiel für die Bedeutung der grenzüberschreitenden Zusammenarbeit der Libellenkundler und Freilandökologen (Odonata: Corduliidae). *Abhandlungen der DELATTINIA* 39: 217-226. (in German, with English and French summaries) ["*S. flavomaculata* joins to the dragonfly species with low knowledge and data in the Saarland (Germany) region. Some new records in the valley of the little river „Bist“ (EC Habitats Directive area „Eulenmühle“) gave reason to further examination in July 2013. The species could be recorded as adults (also with copulae) in many parts of the FFIH-area. Reproduction still isn't proved but could be expected. The attention for the species and the region first was called up through contacts and interchange of data by the work to the dragonfly atlas for the SLL+-region (Grande Region) and through a big population some hundreds of meters behind the frontier in Lorraine." (Authors)] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: BerndTrockur@gmx.de

13789. Trockur, B. (2013): Bemerkenswertes und aktuelle Ergänzungen zur Libellenfauna des Saarlandes aus den Jahren 2002 bis 2011 (Insecta: Odonata). *Abhandlungen der DELATTINIA* 39: 79-154. (in German, with English and French summaries) ["In order to have a look over the dragonfly news of the years 2002 - 2011, the database for the Saarland (Germany) has been updated for the fifth time. The knowledge about localities and distribution has highly improved in these 10 years. Some species are new, some have increased in population size or in the amount of localities. Selected species are presented in maps, graphics or detailed text. The listing of the "best" dragonfly localities is updated and enlarged, and dragonfly-hotspots are described. Some localities are described precisely. The migration of the database to the Recorder software is mentioned and the way of data-recording and updating in the last years is described. The features and problems concerning the homogeneity of the database as well as positive and negative trends of some species during the last years are being discussed." (Author)] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: BerndTrockur@gmx.de

13790. Truscott, L. (2013): Mixed pairings: Emerald Damselfly *Lestes sponsa* and Common Darter *Sympetrum striolatum*. *Atropos* 50: 84. (in English) [Verbatim: The notes in *Atropos* 47 (Pickess, 2012) and 48 (Smith, 2013) about mixed pairings of damselflies, especially involving Emerald Damselfly *Lestes sponsa*,

reminded me of an incident observed during a Cornwall Dragonfly Group field meeting at Breney Common, Cornwall, on 12 August 1990. A male Emerald Damselfly was holding a Common Darter *Sympetrum striolatum* (assumed to be a female at the time, but subsequently identified as an immature male) in the tandem position, the latter clinging to emergent vegetation. The pair remained in this position for at least 15 minutes and were left in situ after a few photographs were taken. Although I have since observed mixed pairings of damselfly species, this is the only occasion I have ever seen a damselfly/ dragonfly pairing.] Address: Truscott, L., 59 Cremyll Road, Torpoint, Cornwall, PLU 2DZ

13791. Tyrrell, M. (2013): A review of contact sensing during endophytic oviposition in Odonata. *J. Br. Dragonfly Society* 29(2): 107-113. (in English) ["This paper reviews the morphology and use of the endophytic ovipositor, with particular reference to the styli and their function in aiding the positioning of eggs. Differences in the structure of the styli between anisopteran and zygopteran odonates and between different species of aeshnid are reviewed. It is hypothesised that differences in the structure of the styli are related to differences in the complexity of the preferred oviposition substrate." (Author)] Address: Tyrrell, M., 8 Warwick Close, Raunds, Northants, NN9 6JH, UK

13792. Verberk, W.C.E.P.; Bilton, D.T. (2013): Respiratory control in aquatic insects dictates their vulnerability to global warming. *Biol. Lett.* 9(5): 5 pp. (in English) ["Forecasting species responses to climatic warming requires knowledge of how temperature impacts may be exacerbated by other environmental stressors, hypoxia being a principal example in aquatic systems. Both stressors could interact directly as temperature affects both oxygen bioavailability and ectotherm oxygen demand. Insufficient oxygen has been shown to limit thermal tolerance in several aquatic ectotherms, although, the generality of this mechanism has been challenged for tracheated arthropods. Comparing species pairs spanning four different insect orders, we demonstrate that oxygen can indeed limit thermal tolerance in tracheates. Species that were poor at regulating oxygen uptake were consistently more vulnerable to the synergistic effects of warming and hypoxia, demonstrating the importance of respiratory control in setting thermal tolerance limits." (Authors) The study includes *Cordulegaster boltonii* and *Calopteryx virgo*.] Address: Verberk, W.C.E.P., Dept of Animal Ecology and Ecophysiology, Institute for Water and Wetland Research, Radboud University, Toernooiveld 1, 6525 ED Nijmegen, The Netherlands. E-mail: wilco@aquaticcecolgy.nl

13793. Walker, B. (2013): Some observations on the effect of temperature on dragonfly recording. *J. Br. Dragonfly Society* 29(2): 84-96. (in English) ["The British Trust for Ornithology added odonates to the species that contributors are asked to record from 2011. Rec-

ords for the first two years of dragonfly records from this scheme have been analysed and indicate a marked difference in observations in the spring between 2011 and 2012. Spring 2011 was warmer than the recent average and noticeably warmer than in 2012 and dragonflies were recorded earlier in numbers in 2011 than in 2012. Based on a comparison of the records and the average weekly temperatures a correction factor is proposed to account for reduced dragonfly activity when temperatures are lower and it is suggested that this can explain some fluctuations in the raw data. It is also noted that the reduction in records from their peak can be described by a daily survival rate approach." (Author) *Modell-organisms are *Pyrrhosoma nymphula*, *Ischnura elegans*, *Libellula depressa*, and *Aeshna cyanea*.*] Address: Walker, B., 49 Roman Way, Wantage, Oxon OX12 9YF, UK

13794. Wiederman, S.D.; Dunbier, J.R.; O'Carroll, D.C. (2013): Selective attention in the dragonfly. *Front. Physiol. Conference Abstract: International Conference on Invertebrate Vision.* doi: 10.3389/conf.fphys.2013.25.00003: (in English) [Verbatim: A dragonfly that captures flies amidst swarms of prey and conspecifics must competitively select a single object amongst distracting stimuli. Even though many animals can accomplish this 'attentional' task, little is known about the neuronal mechanisms that permit the selection of one moving feature from competing alternatives [1], which are often moving against complex, textured backgrounds. We recently demonstrated that responses from an identified dragonfly visual neuron, the 'centrifugal small target motion detector' (CSTMD1), perfectly match a model for competitive selection within the limits of neuronal variability ($r^2=0.83$) [2]. Responses to individual targets presented at different locations of the receptive field differ in both magnitude and time course. However, responses to two simultaneous targets exclusively track those for one target alone. In response to a single target, CSTMD1 activity builds slowly over several hundred milliseconds [3,4]. This facilitation could represent a state of 'arousal' (enhanced responses) or the development of a locus of attention in a defined region of space and time (with suppression outside of this locus). In order to test this, we mapped a receptive field by presenting short (100ms) target trajectories on a stimulus monitor. Randomly interspersed with this stimulus, we mapped a 'primed' receptive field, with the same short trajectories following a longer duration priming target. We show that that there is a difference between the control and the primed version, with enhanced activity in an area in front of the current target trajectory. Thus the receptive field is not stationary and must be considered within the context of past stimulation.] Address: Wiederman, S.D., The University of Adelaide, Adelaide Centre for Neuroscience Research, Adelaide, SA, 5005, Australia, steven.wiederman@adelaide.edu.au

13795. Winter, P. (2013): A mixed pairing between Emerald Damselfly *Lestes sponsa* and Large Red Damselfly *Pyrrhosoma nymphula*. *Atropos* 50: 85. (in English)

[Verbatim: On 8 July 2013 I visited the pond on Furzley Common, Hampshire. Along the southern edge of the pond the central, well vegetated, bog island is only two to three metres away. As I scanned through the damselflies along the vegetation edge I came across an unusual tripling where a male *Lestes sponsa* had attached itself to the male of a coupled pair of *Pyrrhosoma nymphula*. I watched them for a couple of minutes and managed to obtain a few record shots. While I was trying to get in a more parallel plane to photograph the insects the male *L. sponsa* detached itself. I noticed that the posterior abdominal segments were 'kinked', presumably arising from the coupling.] Address: Winter, P., 4 Rosebank Close, Rownhams, Southampton, S016 8AU, UK

13796. Wisconsin Dragonfly Society (2013): The Wisconsin Odonata News. February, 2013. The Wisconsin Odonata News 1(1): 12 pp. (in English) [The table of contents of this issue: Officers: 1; A Word from the President: 1; Mission Statement: 2; Note from the Editor: 2; Odonata Record Numbers by Year Chart: 2; Summary of WDS Board Meeting: 3; Eastern Forktail Picture: 3; Spring Meeting, 2013 Information: 4; Wisconsin Dragonfly and Damselfly Field Checklist: 4-6; Map of Odonata Records Submitted 2012 by Cty: 7; Map of Odonata Species by County as of 2012: 8; Great Lakes Odonata Meeting Notes: 9; List of Resources: 9; "On Hold," a poem by Ken Tennesen, 2009: 10; WDS Facebook Group Page: 11; Information on Dragonfly Society of the Americas: 11; Membership form for Wisconsin Dragonfly Society: 11.] Address: DuBois, R., Wisconsin Dept of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

13797. Xiao, L.; Fu, S.; Xue, F.-s. (2013): Characters of insect diapause stage and photoperiod sensitive stage. *Biological Disaster Science* 36(1): 1-8. (in Chinese, with English summary) ["Insects are poikilothermal animal, in order to tide over serious environmental conditions, many insect use diapause characteristics to adapt to environment changes, throughout describing diapause and photoperiod sensitive stage, in order to let people understand clearly about biology characteristics of insect diapause stage and photoperiod sensitive stage." (Authors) The paper includes a reference to Waringer J. (1983): A study on embryonic development and larval growth of *Sympetrum danae* at two artificial ponds in lower Austria (Anisoptera: Libellulidae). *Odonatologica* 12(4): 331-343.] Address: Institute of Entomology, Jiangxi Agriculture University, Nanchang 330045, China. E-mail: xuefangsen@hotmail.com

13798. Zinchenko, T.D.; Golovatyuk, L.V. (2013): Salinity tolerance of macroinvertebrates in stream waters (review). *Arid Ecosystems* 3(3): 113-121. (in English) ["The review of the salinity tolerance of various macrozoobenthos taxa is based on the published data and the results

of our studies. Significant differences in the tolerance of hydrobionts to water salinity in rivers of different arid regions are shown. Leeches, bivalved molluscs, larvae of stoneflies, caddis flies, and mayflies are the most stenohaline species. The taxonomical structure of macrozoobenthos in saline rivers of Lake Elton basin in the arid zone of Russian South is presented." (Authors) *Aeshna* sp. and *Sympetrum sanguinum* are reported from Lake Elton, a salt lake in Volgograd Oblast, Russia, near the border with Kazakhstan. On page 116 a general review on literature data on impact of salinity on Odonata is given.] Address: Zinchenko, T.D., Institute of Ecology of Volga River Basin, Russian Academy of Sciences, ul. Komzina, 10, Togliatti, 445003, Russia. E-mail: tdz@mail333.com

13799. Zuniga, M.; Chara, J.; Giraldo, L.P.; Chara-Serna, A.-M.; Pedraza, G.X. (2013): Composición de la comunidad de macroinvertebrados acuáticos en pequeñas quebradas de la región andina colombiana, con énfasis en la entomofauna. *Dugesiana* 20(2): 263-277. (in Spanish, with English summary) ["The Colombian Andes are irrigated by an extensive network of small streams that originate the most important rivers of the country and contribute fundamental ecosystem services to local rural communities. Despite the importance of these stream ecosystems, little is known about their biological diversity and function. This work evaluated benthic macroinvertebrate composition in 28 first and second order streams located in La Vieja River Basin (Colombia's central Andes). Results evidenced the high abundance and diversity of the regional macroinvertebrate community. A total of 32,319 individuals, distributed in four phyla, eight classes, 18 orders, 73 families and 91 genera, were collected. Arthropoda and Mollusca were the best represented phyla, whereas Insecta, Gastropoda and Bivalvia, were the most important classes. Chironomidae was the dominant taxa in the studied streams. Odonata was also abundant, contrasting with the typical low abundance of this group in higher order systems. The most common genera were Smicridea, Heterelmis, Atrichopogon, Farrodes, Argia and Limnocois, which also presented distribution patterns different than those found in larger streams. Within the Ephemeroptera, the genus *Zelus* (Baetidae) is highlighted as a new distribution record for the Andean region of the Valle del Cauca. Results demonstrate that even though the studied systems are small and immersed in agricultural landscapes, they harbour an important component of the regional and local diversity." (Authors) *Aeshnidae*, *Gomphidae* (*Progomphus*), *Libellulidae* (*Brechmorhoga*, *Cannaphila*, *Dythemis*, *Libellula*, *Macrothemis*, *Micrathyria*, *Orthemis*, *Perithemis*), *Calopterygidae* (*Hetaerina*), *Coenagrionidae* (*Argia*, *Nehalennia*), *Megapodagrionidae*, *Polythoridae*] Address: Zúñiga, María del Carmen, Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria – CIPAV, Carrera 25 No. 6-62, Cali, Colombia. E-mail: maczuniga@gmail.com

13800. Adu, B.W.; Ogunjobi, J. A. (2014): Assessment of dragonflies and damselflies of Owena Forest south-western Nigeria. *International Journal of AgriScience* 4(3): 153-159. (in English) ["The odonate species of Owena forest was surveyed once a month for a period of two years (May, 2008 to April, 2010). Six hours were spent at the forest on every fieldwork. Three study sites were identified at the forest: River Owena at the Dam (ROD), River Owena in Forest (ROF), and Cocoa Research Institute of Nigeria (CRIN) substation along Ondo-Akure road Owena. Only adult dragonflies and damselflies specimens were collected at the study sites. A total of 2016 specimens of Odonata were collected at the forest. *Ceriatagrion glabrum* was found to be widespread at the three study sites. *Palpopleura portia* and *P. lucia* were found to be abundant at ROD and CRIN, while *Mesocnemis singularis* and *Congothemis dubia* were dominant species at ROD and ROF. Data collected from the study sites were subjected to Descriptive statistics, Soerensen's Quotient index (SQ) and Diversity indices (Margalef index, Simpson's dominance index, Shannon Wiener index and Evenness). Based on the diversity indices used, ROF was the richest study site (H': 4.48, Simpson dominance (c): 0.99 and Manglef index (d) 13.53). In terms of species distribution, the study revealed that species of Odonata was well distributed at ROF and ROD. ROF and CRIN are the most similar study sites with SQ of 0.75 followed by ROD and CRIN (SQ: 0.60) while the least similar paired sites are ROF and ROD. All the diversity indices used established that ROF was the richest study site. The results also revealed that Owena forest was rich in Odonata fauna; despite the fact that it is a secondary re-growth forest undergoing some anthropogenic activities." (Authors)] Address: Adu, B.W., Biological Science Department, Ondo State University of Science and Technology, Okitipupa, Nigeria. E-mail: williamsadubabs@yahoo.com

13801. Akhtar, N. (2014): Dragonflies of Manglawar Swat Khyber Pakhtoonkhwa Pakistan. *European Academic Research* 2(1): 172-178. (in English) ["Current study was conducted to explore the dragonflies of Manglawar Swat. This study was conducted in the period from August to December 2013. The collection was made in the timing of 10 AM to 4 PM. In current study 11 species in 5 genera were identified belonging to family libellulidae. These species were *Crocothemis erythraea*, *C. servilia*, *Libellula fulva*, *Trithemis aurora*, *T. festiva*, *T. kirbyi*, *T. pallidinervis*, *Acisoma panorpoides*, *Orthetrum chrysis*, *O. sabina* and *O. taeniolatum*." (Author)] Address: Akhtar, N., Department of Zoology, Abdul Wali Khan University Mardan (Buner Campus) Pakistan

13802. Allen, K.A.; Thompson, D.J. (2014): Population size and survival estimates for the rare damselflies, *Coenagrion mercuriale* and *Ischnura pumilio*. *Insect*

Conservation and Diversity 7(3): 241-251. (in English) ["(1) *C. mercuriale* is rare in the UK and is threatened across Europe. *I. pumilio* is also threatened in the UK. Both species have suffered population declines in recent years and are vulnerable to habitat fragmentation and loss. Yet, reliable population size and survival estimates are scarce in odonate species. This study provides mark-release-recapture estimates of these parameters for UK stronghold populations of both species. (2) Surveys were performed at four locations in southern England between 2001 and 2006. A total of 12 071 adult individuals were marked across nine populations. Mark-release-recapture modelling techniques were used to provide survival and recapture probabilities and population size estimates. (3) This study presents the first Horvitz-Thompson estimates of population size in odonates, which are among the highest reported for damselflies. Maximum estimates for a single site were $63\ 662 \pm 4997$ for *C. mercuriale* and 7453 ± 382 for *I. pumilio*. More males than females were captured at all sites, but calculated estimates indicated a female-biased sex ratio in adult *I. pumilio* at one location. (4) Daily survival probability is among the highest published for damselflies. Male and female survival was equal or very similar in all populations. Further effects of maturity, age, site, and time on survival were identified. (5) Estimated population sizes are much greater than previously thought, suggesting that where habitat is maintained, populations of threatened odonates can be very large. Furthermore, greater proportions of females have been estimated where wider searching techniques were employed. This has implications for future study design if estimates are to be reliably used for conservation management." (Authors)] Address: Allen, Katherine, School of Environmental Sciences, University of Liverpool, Liverpool L69 3GP, UK. E-mail: kaallen@liv.ac.uk

13803. Almeida, M.V.O.; Pinto, A.P.; Carvalho, A.; Takiya, D.M. (2014): When rare is just a matter of sampling: Unexpected dominance of clubtail dragonflies (Odonata, Gomphidae) through different collecting methods at Parque Nacional da Serra do Cipó, Minas Gerais State, Brazil. *Revista Brasileira de Entomologia* 57(4): 417-423. (in English) ["Capture of dragonfly adults during two short expeditions to Parque Nacional da Serra do Cipó, Minas Gerais State, using three distinct collecting methods: aerial nets, Malaise and light sheet traps reported. The results are outstanding due the high number of species of Gomphidae (7 out of 26 Odonata species), including a new species of *Cyanogomphus* Selys, 1873, obtained by two non-traditional collecting methods. Because active collecting with aerial nets is the standard approach for dragonfly inventories, we discuss some aspects of the use of traps, comparing our results with those in the literature, suggesting they should be used as complementary methods in faunistic studies. Furthermore, *Zonophora campanulata annulata* Belle, 1983 is recorded for the first time from Minas Gerais State and taxonomic notes

about *Phyllogomphoides regularis* (Selys, 1873) and *Progomphus complicatus* Selys, 1854 are also given." (Authors)] Address: Oliveira De Almeida, M.V., Laboratório de Biologia e Sistemática de Odonata (LABIOSIS), Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista s/n, São Cristóvão 20940-040 Rio de Janeiro-RJ, Brazil. E-mail: mvoalmeida@gmail.com

13804. Bajwa, Y.; Bode-Oke, A.; Williams, V.; Zhu, R. (2014): Phase relationship as a flight control mechanism in dragonflies. *The Spectra* 2014: 32-40. (in English) ["Dragonflies can be observed utilizing a wide variety of wing kinematics to elegantly control their bodies in flight, due to their four-winged nature. Odonata have the ability to manipulate the phase difference between their fore and hind wings. Scientists in the field postulate that the relationship between relatively in-phase flapping flight results in enhanced lift and thrust. Such flight can be observed during power-intensive maneuvers such as high-speed turns and take-off. Observations and data reveal that the preferred flying mode for dragonflies employs out-of-phase flight. Such a phase relationship may improve aerodynamic efficiency through the minimization of wing-wake interaction for the hind wing. In this paper, we utilized high speed photogrammetry and 3D surface reconstruction techniques to both capture and digitize dragonfly free flight. We attempted to explore the relation of phase difference with force production by damaging the dragonfly wings. The procedure was to perform chord-wise cuts on individual wings to limit the ability of the dragonfly to produce lift. Our observations showed that when damaged, Odonata compensated for lost force production by manipulating phase difference in a manner that increased lift production." (Authors)] Address: Bajwa, Y., School of Engineering and Applied Science, Dept of Mechanical and Aerospace Engineering, University of Virginia, USA

13805. Batty, P. (2014): Species Review 8: *Somatochlora arctica* (Zetterstedt, 1840) (The Northern Emerald). *J. Br. Dragonfly Society* 30(1): 32-53. (in English) ["In the British Isles it is only found in Scotland, where it is widely distributed in the west, and in a very small number of localities in the south of Ireland. The species and its life cycle are described and its conservation is discussed in the light of potential threats and the possible effects of climate change." (Author)] Address: Batty, Patricia, Kirnan Farm, Kilmichael Glen, Lochgilphead, Argyll, PA31 8QL, UK

13806. Bell, N.; Dylmer, E.; Olsen, K. (2014): Status of *Aeshna serrata* in Denmark. *Brachytron* 16(1/2): 38-42. (in English, with Dutch summary) ["*A. serrata* (Hagen, 1856) is known from a relatively wide geographical range, though in Europe it is mainly confined to the Baltic coastal area in Estonia, Finland and Sweden. *A. serrata* is typically found in mesotrophic and eutrophic freshwater or brackish habitats with dense *Phragmites*

and bulrush (Cyperaceae) beds. *A. serrata* was first found in Denmark in 2006 in a typical habitat for *A. serrata* and has since then been found repeatedly at the same locality. There are also single records from other localities in the same region from 2010-2012. The species is rare in Denmark but very likely overlooked. A search for new *A. serrata* habitats in Denmark will without doubt result in new records and a more accurate knowledge of its national distribution." (Author)] Address: Bell, N., Istedgade 6.1, 8700 Horsens, Denmark. E-mail: njohnbell@gmail.com

13807. Blyth, C. (2014): Colonisation of a new pond: new habitat for *Coenagrion hastulatum* (Charpentier) (the Northern Damselfly) and other odonate species at a site in Aberdeenshire. *J. Br. Dragonfly Society* 30(1): 1-8. (in English) ["A new pond was constructed in 2011 for the purpose of providing nearby Odonata populations with a new habitat in which to live. This provided the opportunity to begin a long-term colonisation study, part-funded by a British Dragonfly Society Philip Corbet award. The results of the first survey, in summer 2012, indicate quick colonisation by five of the ten known local species, i.e. *Lestes sponsa*, *Pyrrhosoma nymphula*, *Ischnura elegans*, *Sympetrum danae* and *S. striolatum*. The reasons for this are discussed." (Author)] Address: Blyth, Colette, 17 Sythrum Crescent, Glenrothes, Fife, KY7 5DG, UK

13808. Bomark, E. (2014): The antihistamine hydroxyzine and Odonata. Bioaccumulation and effects on predator-prey interactions between dragonfly and damselfly larvae. B.C. Thesis in Biology 15 ECTS, Dept. of Ecology and Environmental Science (EMG), S-901 87 Umeå, Sweden : 13 pp. (in English) ["Through wastewater entering aquatic environments, aquatic insects are continuously exposed to pharmaceuticals including neurologically active antihistamines. The antihistamine hydroxyzine has previously been found to lower activity in damselflies and to reach 2000 times the concentration of surrounding water in damselfly tissue. The purpose of this short-term exposure study was to investigate if hydroxyzine also bioaccumulates in dragonflies and if dilute hydroxyzine (362 ± 50 , mean ng/l \pm SD) have effects on predator-prey interactions between dragonfly *Aeshna grandis* and damselfly *Coenagrion hastulatum* larvae, i.e. number of attacks and predation success. Predators and prey were captured and exposed during one, three or five days (with controls) before taking part in predation experiments; Dragonflies were put in separate containers with six damselflies, they were video recorded and attacks and predated damselflies noted during four hours. Tissue concentrations of hydroxyzine were analyzed from all dragonflies and a subsample of the damselflies showing a mean bioconcentration factor (BCF) of 27 and 7 respectively, surprisingly much lower than previous research. There was no difference in attack rate or predation efficiency between controls and exposed dragonflies. However, dragonflies exposed for

five days were found to attack more and capture more prey than dragonflies exposed for one day, a change that was not seen in the controls. This confounding factor motivates further studies to clarify if hydroxyzine after a period of exposure can have a sublethal effect altering foraging and/or predator avoidance traits with the net result of increased predation success for dragonflies in the predator-prey interaction between dragonflies and damselflies." (Authors)] Address: Bomark, Elinor, Dept. of Ecology and Environmental Science (EMG), S-901 87 Umeå, Sweden

13809. Boonsoong, B.; Chainthong, D. (2014): Description of the last stadium larva and female of *Microgomphus thailandica* Asahina, 1981 (Odonata: Gomphidae). *Zootaxa* 3811(2): 271-279. (in English) ["The last stadium larva of *M. thailandica* is described, illustrated and compared with the larvae of congeneric species based on reared specimens collected from the Phachi headwater stream, Ratchaburi province, Thailand. The female adult of this species is described for the first time from a reared specimen from the same locality." (Authors)] Address: Boonsoong, B., Animal Systematics and Ecology Speciality Research Unit (ASESRU), Dept of Zoology, Faculty of Science, Kasetsart University, Bangkok, Thailand 10900. E-mail: fscibt@ku.ac.th

13810. Bouwman, J.H. (2014): *Somatochlora arctica* rediscovered on Veluwe after 75 years. *Brachytron* 16(1/2): 48-50. (in Dutch, with English summary) ["On 4 September 2012 two males *S. arctica* were observed near Nunspeet, northern Veluwe, Gelderland. Only one observation on the Veluwe was known, at Deelensche Wasch, Hoge Veluwe, in 1939. Despite searches, no additional observations have been done and exuviae were found. The habitat at this location has been the same for a long time. Because of this it seems likely that a population is present. On the Veluwe only a small number of suitable peat areas are present. Therefore the chances of populations of *S. arctica* being present appear to be limited." (Author)] Address: Bouwman, J.H., Vlinderstichting, Postbus 506, NL-6700 AM Wageningen, The Netherlands. E-mail: jaap.bouwman@vlinderstichting.nl

13811. Brekelmans, F. (2014): *Ophiogomphus cecilia* on the river Dommel. *Brachytron* 16(1/2): 18-28. (in Dutch, with English summary) ["Between 27 July and 5 August 2012 *O. cecilia* was observed for the first time at the river Dommel, near Valkenswaard and Waalre, Noord-Brabant. With the exception of an observation in 1935, these were the first observations of *O. cecilia* in Noord-Brabant. At least two males and two females were found. One female was observed during oviposition. Larvae and exuviae have not been found, but larvae of this species are hard to find and a thorough search for exuvia has not been performed. It is not clear if a population exists in the river Dommel. The nearest known populations of *O. cecilia* are in Noord-Limburg,

at the rivers Roer and Swalm. It is likely that one of these populations is the origin of the individuals observed in Noord-Brabant. The river Dommel appears to hold suitable habitat for *O. cecilia*. The same applies to the rivers Keersop and Tongelreep in the same region of Noord-Brabant. Water quality in the river Dommel is poor, but this does not appear to be an obstacle for establishment of the species, as has been shown in other populations." (Author)] Address: Brekelmans, F., c/o Bureau Waardenburg, Verenigingstraat 32, 3515 GJ Utrecht, The Netherlands. E-mail: Florisbrekelmans@gmail.com

13812. Brocchieri, D.; Castelluccio, P.; Crucitti, P. (2014): Gli Odonati della Riserva Naturale "Macchia di Gattaceca e Macchia del Barco" (Lazio) (Odonata). *Bollettino della Società Entomologica Italiana* 146(1): 31-40. (in Italian, with English summary) [An annotated checklist of Odonata of the "Macchia di Gattaceca and Macchia del Barco" Regional park within the "mentanese - cornicolano archipelago", north east of Rome city area (Central Latium, Italy), collected during the period 2009-2013, is presented. Twenty six species are reported, out of 57 species known for Latium. For each species phenological data together with interesting aspects of species biology are highlighted.] Address: Brocchieri, D., paolo Castelluccio, pierangelo Crucitti, Società Romana di Scienze Naturali, via Fratelli Maristi 43, 00137 Roma, Italia. E-mail: info@srsn.it

13813. Brochard, C.; van der Ploeg, E. (2014): *Boyeria*: the darker the better. Ovipositing behaviour of two European *Boyeria* species. *Brachytron* 16(1/2): 51-56. (in Dutch, with English summary) ["Oviposition of *B. irene* and *B. cretensis* was observed while looking for exuviae in France and Germany and Crete, Greece respectively. For both the oviposition behaviour and habitat preferences for oviposition were found to comply with descriptions in literature. *Boyeria cretensis* was observed while trying to oviposit in the dark shoes of the observers." (Authors)] Address: Brochard, C., Marsstraat 77, 9742EL Groningen, The Netherlands. E-mail: info@cbrochard.com

13814. Brossman, K.; Carlson, B.; Stokes, A.; Langkilde, T.T.L. (2014): Eastern newt (*Notophthalmus viridescens*) larvae alter morphological but not chemical defenses in response to predator cues. *Canadian Journal of Zoology* 92(4): 279-283. (in English) ["Prey traits are often modified in response to exposure to predators, a phenomenon known as predator-induced phenotypic plasticity. Morphological plasticity in response to predator cues is well documented in amphibians; however, predator-induced chemical defenses have received relatively little attention. The Eastern newt, which possesses tetrodotoxin – a toxin for chemical defense, is most vulnerable to predation during its larval stage. We assessed whether exposing Eastern newt larvae to predator scent cues (from dragonfly larvae) would elicit

change in their morphological and chemical defenses. Newt larvae exposed to scent cues of predatory dragonfly larvae exhibited significantly greater tail depths, which should increase survival of attempted predation by allowing them to swim faster, but did not differ in mass, snout-vent length, or tail length. Newt larvae toxin concentrations were not significantly affected by exposure to these predator cues. Larval toxicity may be maternally- or environmentally-derived and inflexible, or induced toxicity may only be detectable later in development. Predator-induced phenotypic plasticity, especially of chemical defenses, warrants greater attention, as potentially important outcomes of species interactions remain unclear." (Authors)] Address: Brossman, Kelly, Dept Biol., Intercollege Graduate Program in Ecology, & Center for Brain, Behavior and Cognition, Pennsylvania State Univ., 208 Mueller Laboratory, University Park, PA 16802, USA. E-mail: khb5021@psu.edu

13815. Brown, D.J.; Nowlin, W.H.; Ozel, E.; Mali, I.; Episcopo, D.; Jones, M.C.; Forstner, M.R.J. (2014): Comparison of short term low, moderate, and high severity fire impacts to aquatic and terrestrial ecosystem components of a southern USA mixed pine/hardwood forest. *Forest Ecology and Management* 312: 179-192. (in English) [Bastrop County, Texas, USA; "Highlights. •Magnitude of fire effects on water quality increased with increasing fire severity. •Most forest structure variables were only significantly impacted by high severity fire. •Terrestrial arthropods were only significantly impacted by high severity fire. Historically fire was an important natural disturbance shaping the structure and composition of pine-dominated forests in the southern United States. Longstanding fire suppression policies have resulted in structural and compositional changes, notably accumulation of heavy fuel loads and reduction in vegetation species diversity. Primary goals of forest management through prescribed burning include fuel load reduction and mimicking ecosystem impacts of historically natural wildfires. In addition to the influences of fire frequency and season, the influence of fire severity on ecosystem responses is currently of interest. In this study we sought to quantify the impacts of low, moderate, and high severity fires, and their interaction with prior forest management practices, to several aquatic and terrestrial ecosystem components of a southern U.S. mixed pine/hardwood forest using a before–after, control-impact (BACI) approach. The ecosystem components we assessed were water quality, community composition of aquatic arthropods (wildfire impacts only), forest structure characteristics, community composition of understory vegetation, and community composition of ground-dwelling arthropods. We found that increasing fire severity increased aquatic nutrient levels and productivity, but the magnitude of effects increased with severity. Low and moderate severity fires had weak effects on forest structure characteristics, community composition of understory vegetation, and community composition of ground-dwelling arthropods in the initial

years following burns. In contrast, high severity fires dramatically reduced fine and large fuel loads, increased diversity of understory vegetation, and influenced community composition of ground-dwelling arthropods. Further, wildfire severity was reduced in areas with a prior moderate severity prescribed burn, but not in areas with a prior low severity prescribed burn. Our results provide quantitative evidence for the role of fire severity as a primary factor influencing responses of ecosystems to fire, and indicate that forest management practices influence the impact of high severity fires on ecosystems. ... Unfortunately, sampling of aquatic arthropods in ponds was initiated after the LOWRX and MODRX fires and most of the sampled ponds were not part of those fire treatments. Thus, we were only able to assess impacts of the HIGHWILD fire on the composition of pond arthropods. We sampled aquatic arthropods seasonally, collecting 7 samples at 8 ponds between August 2010 and January 2013 We identified insects to family, with the exception of Ephemeroptera (mayflies) and Odonata (dragonflies and damselflies), which we identified to order, and we identified other arthropods to class or order ... We did not detect a HIGHWILD fire impact on total number of captured individuals of aquatic arthropods ($F_{1,52} = 0.71$, $P = 0.404$). Likewise, the RDA analysis indicated the HIGHWILD fire had no impact on community composition of aquatic arthropods ($P = 0.949$), with 3.2% of the variation explained by the model. In addition, the RDA biplot confirmed the statistical test, with all aquatic arthropod groups located either near the origin or nearly orthogonal to the treatment burn status predictor." (Authors)] Address: Brown, D.J., Dept of Biology, Texas State University, 601 University Drive, San Marcos, TX 78666, USA. E-mail: djb.ecology@gmail.com

13816. Bush, A.A.; Nipperess, D.A.; Duursma, D.E.; Theischinger, G.; Turak, E.; Hughes, L. (2014): Continental-scale assessment of risk to the Australian Odonata from climate change. *PLoS ONE* 9(2): e88958. doi:10.1371/journal.pone.0088958: 12 pp. (in English) ["Climate change is expected to have substantial impacts on the composition of freshwater communities, and many species are threatened by the loss of climatically suitable habitat. In this study we identify Australian Odonata vulnerable to the effects of climate change on the basis of exposure, sensitivity and pressure to disperse in the future. We used an ensemble of species distribution models to predict the distribution of 270 (85%) species of Australian Odonata, continent-wide at the subcatchment scale, and for both current and future climates using two emissions scenarios each for 2055 and 2085. Exposure was scored according to the departure of temperature, precipitation and hydrology from current conditions. Sensitivity accounted for change in the area and suitability of projected climatic habitat, and pressure to disperse combined measurements of average habitat shifts and the loss experienced with lower dispersal rates. Streams and rivers

important to future conservation efforts were identified based on the sensitivity-weighted sum of habitat suitability for the most vulnerable species. The overall extent of suitable habitat declined for 56–69% of the species modelled by 2085 depending on emissions scenario. The proportion of species at risk across all components (exposure, sensitivity, pressure to disperse) varied between 7 and 17% from 2055 to 2085 and a further 3–17% of species were also projected to be at high risk due to declines that did not require range shifts. If dispersal to Tasmania was limited, many south-eastern species are at significantly increased risk. Conservation efforts will need to focus on creating and preserving freshwater refugia as part of a broader conservation strategy that improves connectivity and promotes adaptive range shifts. The significant predicted shifts in suitable habitat could potentially exceed the dispersal capacity of Odonata and highlights the challenge faced by other freshwater species." (Authors) Figure 4. Predicted suitable habitat in south-eastern Australia under current climate and 2055 and 2085 using emissions scenario RCP8.5 for *Notoaeschna sagittata*, *Coenagrion lyelli* and *Petalura gigantea*.] Address: Bush, A.A., Dept. Biological Sciences, Macquarie Univ., Sydney, New South Wales, Australia. E-mail: alexalbush@gmailcom

13817. Cardoso-Leite, R.; Vilardi, G.C.; Guillermo-Ferreira, R.; Bispo, P.C. (2014): The effect of conspecific density on emergence of *Lestes bipupillatus* Calvert, 1909 (Odonata: Lestidae). *Psyche* Volume 2014, Article ID 650427: 3 pp. (in English) ["Conspecific density may influence on adult recruitment and consequently on population dynamics. Several studies have shown the density dependence of larvae growth rates in Odonata. However, few studies evidenced how conspecific density influence final instar larvae emergence date decisions. Considering that larvae may choose date of emergence, the present study investigated if density affects larvae choice. For this, we reared eight final instar larvae in individual aquaria and other 24 larvae in aquaria with three larvae each. This way, we simulated environments with low and high larval density. We then noted the days that larvae took to emerge and compared between low and high density groups. The results showed that larvae seem to emerge earlier when in high densities (Mann-Whitney, $U=10.000$, $p=0.03$). These results support the hypothesis that damselfly last instar larvae may postpone or hasten emergence in response to the social environment and related constraints." (Authors)] Address: Cardoso-Leite, R., Departamento de Ciências Biológicas, Faculdade de Ciências e Letras de Assis, Universidade Estadual Paulista, Av. Dom Antônio, 2100, 19806-900, Assis, SP, Brazil

13818. Chahl, J.; Mizutani, A. (2014): Dragonfly hover is primarily mediated by vision. *Proc. SPIE 9055, Bioinspiration, Biomimetics, and Bioreplication 2014*, 905516 (March 8, 2014), San Diego, California, USA doi:10.1117/12.2045029; <http://dx.doi.org/10.1117/12.2045029>

(in English) ["The sensory means by which hover is achieved could be inertial, visual or an unexplained sensory modality. Dragonflies in their natural habitat were shown not to maintain a stationary position in wind. Their position fluctuated significantly while returning to the original position. The movement of the dragonfly is correlated with the movement of vertically standing vegetation. This response would be non-causal with wind for an inertial or putative pressure based internal sensory system. It is postulated that with a substrate of moving water, sensitivity to movement on the visual horizon for controlling hover is a robust strategy." (Authors)] Address: Mizutani, Akiko, Odonatrix Pty. Ltd., One Tree Hill SA 5114, Australia

13819. Chen, S.-L.; Yeh, W.-C. (2014): Description of a new species of the genus *Sarasaeschna* Karube & Yeh, with a key to the species of Taiwan (Odonata: Anisoptera: Aeshnidae). *Zootaxa* 3764(1): 92-100. (in English) ["*Sarasaeschna Chiangchilii* sp. nov. collected from Daxi, Taoyuan County in northern Taiwan is described and diagnosed. Judging from male penile structure, this species is considered to belong to the pryeri-group of its genus. It is easily distinguished from all known congeners in having peculiar sickle-shaped cerci in male. The habitats of *S. Chiangchilii* are mainly shaded brooks in lowland areas, which are exceptional for its Taiwanese relatives. Distributional maps and a key are also provided for the four species of Taiwanese *Sarasaeschna*." (Authors)] Address: Chen, S.-L., Conservation and Research Center, Taipei Zoo, Taipei, Taiwan. E-mail: dwx24@zoo.gov.tw

13820. Clayden, M.G.; Kidd, K.A.; Chételat, J.; Hall, B.D.; Garcia, E. (2014): Environmental, geographic and trophic influences on methylmercury concentrations in macroinvertebrates from lakes and wetlands across Canada. *Ecotoxicology* 23(2): 273-284. (in English) ["Macroinvertebrates are a key vector in the transfer of methylmercury (MeHg) to fish. However, the factors that affect MeHg concentrations and bioaccumulation in these organisms are not as well understood as for fish, and studies on a broad geographic scale are lacking. In this study, we gathered published and unpublished MeHg and carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotope data for freshwater macroinvertebrates from 119 lakes and wetlands across seven Canadian provinces, along with selected physical, chemical and biological characteristics of these systems. Overall, water pH was the most important determinant of MeHg concentrations in both predatory and non-predatory invertebrates [$R^2_{adj} = 0.32$, $p < 0.001$; multivariate canonical redundancy analysis (RDA)]. The location of lakes explained additional variation in invertebrate MeHg (partial $R^2 = 0.08$ and 0.06 for latitude and longitude, respectively; RDA), with higher concentrations in more easterly and southerly regions. Both invertebrate foraging behaviour and trophic position (indicated by functional feeding groups and $\delta^{15}N$ values, respectively)

also predicted MeHg concentrations in the organisms. Collectively, results indicate that in addition to their feeding ecology, invertebrates accumulate more MeHg in acidic systems where the supply of MeHg to the food web is typically high. MeHg concentrations in macroinvertebrates may also be influenced by larger-scale geographic differences in atmospheric mercury deposition among regions." (Authors) The supplementary material details the taxa, but in Odonata in most cases only at the order level.] Address: Kidd, Karen, Biology Department, Canadian Rivers Institute, University of New Brunswick, 100 Tucker Park Road, Saint John, NB, E2L 4L5, Canada. E-mail: kiddk@unb.ca

13821. Dayaram, A.; Galatowitsch, M.; Harding, J.S.; Argüello-Astorga, G.R.; Varsani, A. (2014): Novel circular DNA viruses identified in *Procordulia grayi* and *Xanthocnemis zealandica* larvae using metagenomic approaches. *Infection, Genetics and Evolution* 22: 134-141. (in English) ["Highlights: •Identification of 13 novel ssDNA viruses in *P. grayi* and *X. zealandica*. •The 13 novel viral genomes (1628 - 2668 nt) have NAG-TATTAC nonanucleotide motif. •The novel ssDNA viruses have 2 ORFs that are bidirectional or unidirectional. •Reps of novel ssDNA viruses have conserved the RCR & helicase motifs. Recent advances in sequencing and metagenomics have enabled the discovery of many novel single stranded DNA (ssDNA) viruses from various environments. We have previously demonstrated that adult dragonflies, as predatory insects, are useful indicators of ssDNA viruses in terrestrial ecosystems. Here we recover and characterise 13 viral genomes which represent 10 novel and diverse circular replication associated protein (Rep) -encoding single stranded (CRESS) DNA viruses (1628 - 2668 nt) from *P. grayi* and *X. zealandica* dragonfly larvae collected from four high-country lakes in the South Island of New Zealand. The dragonfly larvae associated CRESS DNA viruses have different genome architectures, however, they all encode two major open reading frames (ORFs) which either have bidirectional or unidirectional arrangement. The 13 viral genomes have a conserved NAGTATTAC-nonanucleotide motif and in their predicted Rep proteins we identified the rolling circle replication (RCR) motif 1, 2 and 3, as well as superfamily 3 (SF3) helicase motifs. Maximum likelihood phylogenetic and pairwise identity analysis of the Rep amino acid sequences reveal that the dragonfly larvae novel CRESS DNA viruses share <63% pairwise amino acid identity to the Reps of other CRESS DNA viruses whose complete genomes have been determined and available in public databases and that these viruses are novel. CRESS DNA viruses are circulating in larval dragonfly populations; however, we are unable to ascertain whether these viruses are infecting the larvae directly or are transient within dragonflies via their diet." (Authors)] Address: Varsania, A., School of Biological Sciences, University of Canterbury, Christchurch, 8140, New Zealand. E-mail: arvind.varsani@canterbury.ac.nz

13822. De Knijf, G.; Adriaens, T.; Vermeylen, R.; Van der Schoot, P. (2014): Discovery of a population of *Gomphus flavipes* on the Albert Canal (Belgium), one of the busiest channels in Europe, with an overview of its status in Western and Central-Europe. *Brachytron* 16(1/2): 3-17.["*Gomphus flavipes*, a typical river species, disappeared in many parts of western and central Europe as a result of deterioration of the water quality. Since the beginning of the 1990s *G. flavipes* has been rediscovered in several rivers, first in the Netherlands and Germany. The first observation of *G. flavipes* from Belgium dates from 2000 and originates from the river Meuse, where it forms the border between Belgium and the Netherlands. Several observations were made there, but exuviae have never been found. Although the species has been observed several times since 2002 in the province of Antwerp, these observations were all considered to refer to vagrant individuals from the river Meuse the Netherlands or the river Rhine in Germany. In July 2012 a population of *G. flavipes* was discovered along the Albert Canal in the province of Antwerp, Flanders, Belgium. A freshly emerged individual was found on 28 July 2012 and the following days along the Albert Canal in Broechem. The first exuvium was found on 6 August. The subsequent search (6-12 August 2012) resulted in the discovery of 70 exuviae, all found along the Albert Canal between the sluices of Wijnegem and the bridge over the canal in Grobbendonk, over a distance of 9.5 km. The average density of exuviae found per trajectory with larval skins present was 1.2 (minimum 0.1, maximum 3.3) per 100 meter. Sex-ratio was 1:0.6 in favour of females, which is reported normal in gomphid populations but can also be explained by the late sampling date, as in dragonflies males are mostly the first to emerge. Emergence substratum was highly artificial. Most exuviae were found on the concrete sheet piling of the bank, to a lesser extent also on poles or vertical walls. Based on long-term research in other parts in Europe, we estimated the population along the Albert canal at a minimum of 200 individuals. This discovery of a population of *G. flavipes* in one of the busiest channels in Europe is unique and sheds new light on the potential range of the species in Flanders and suitable habitat in large parts of Europe. *G. flavipes* is also known to reproduce in small irrigation canals (< 5m wide) between the rice paddies in northern Italy, but although also artificial these cannot be compared with the Albert Canal. This local shift in habitat preference from rivers towards canals with concrete banks, is probably a result of the recent range expansion of *G. flavipes* in western Europe." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brusel, Belgium. E-mail: geert.deknijf@inbo.be

13823. Denny, E.G.; Gerst, K.L.; Miller-Rushing, A.J.; Tierney, G.L.; Crimmins, T.M.; Enquist, C.A.F.; Guertin, P.; Rosemartin, A.H.; Schwartz, M.D.; Thomas, K.A.; Weltzin, J.F. (2014): Standardized phenology monitoring methods to track plant and animal activity for science and resource management applications. Interna-

tional Journal of Biometeorology 58: 591-601. (in English) ["Phenology offers critical insights into the responses of species to climate change; shifts in species' phenologies can result in disruptions to the ecosystem processes and services upon which human livelihood depends. To better detect such shifts, scientists need long-term phenological records covering many taxa and across a broad geographic distribution. To date, phenological observation efforts across the USA have been geographically limited and have used different methods, making comparisons across sites and species difficult. To facilitate coordinated cross-site, cross-species, and geographically extensive phenological monitoring across the nation, the USA National Phenology Network has developed in situ monitoring protocols standardized across taxonomic groups and ecosystem types for terrestrial, freshwater, and marine plant and animal taxa. The protocols include elements that allow enhanced detection and description of phenological responses, including assessment of phenological "status", or the ability to track presence-absence of a particular phenophase, as well as standards for documenting the degree to which phenological activity is expressed in terms of intensity or abundance. Data collected by this method can be integrated with historical phenology data sets, enabling the development of databases for spatial and temporal assessment of changes in status and trends of disparate organisms. To build a common, spatially, and temporally extensive multi-taxa phenological data set available for a variety of research and science applications, we encourage scientists, resources managers, and others conducting ecological monitoring or research to consider utilization of these standardized protocols for tracking the seasonal activity of plants and animals." (Authors) Phenophases to be observed in Odonata are: Active adults, Adults feeding, Migrating adults, Mating, Egg laying, Dead adults, Individuals in a net] Address: Denny, Ellen, National Coordinating Office, USA National Phenology Network, 1955 East Sixth Street, Tucson, AZ 85721, USA. E-mail: ellen@usanpn.org

13824. Dow, R.A. (2014): *Telosticta iban* sp. nov. from Sarawak (Odonata: Zygoptera: Platystictidae). *Zootaxa* 3784(1): 74-78. (in English) ["*T. iban* sp. nov. is described from the Lanjak Entimau Wildlife Sanctuary in Sarawak, Malaysian Borneo. Both sexes can be distinguished from all other species of *Telosticta* by the form of the antehumeral markings." (Author)] Address: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

13825. Emerson, Y.S.; Alaban, J. (2014): *Hemidactylus platyurus* (Flat-tailed House Gecko). Predation. *Herpetological Review* 45(1): 129. (in English) [Verbatim: *Hemidactylus platyurus* is a moderate-sized (43–58 mm SVL) gecko with a widespread distribution in Southeast Asia and in the Philippines (Brown and Alcalá 1978.

Philippine Lizards of the family Gekkonidae. Silliman University Press. Dumaguete, Philippines. 146 pp.). This note reports the observed predation of *H. platyurus* by a dragonfly, *Anax* cf. *panybeus* (Odonata: Aeshnidae). At 1330 h on 8 September 2013, JA observed a female *Anax* cf. *panybeus* (60 mm right hindwing length), clutching a still struggling *Hemidactylus platyurus*, land on a branch of a tamarind tree (*Tamarindus indica*) in Pueblo de Panay, Barangay Dinginan, Roxas City, Capiz Province, Panay Island, Philippines (11.548572°N, 122.727822°E, WGS84; elev. 112 m). The dragonfly utilized its anterior legs to hold on to its prey while simultaneously chewing the left eye of the gecko for ca. four minutes. To our knowledge, this is the first recorded incident of a dragonfly preying on a lizard in the Philippines. Photographic vouchers were deposited at the Raffles Museum of Biodiversity Research, National University of Singapore (ZRC[IMG] 2.183a–c). We thank R. J. Villanueva for identification of the dragonfly, Kelvin K. P. Lim for ZRC voucher numbers, and Cameron Siler for comments on this note.] Address: Emerson, Y.S., Philippine Center for Terrestrial and Aquatic Research, 1198 Benavidez St., Unit 1202, Tondo, Manila, Philippines. E-mail: emersonsy@gmail.com

13826. Endersby, I. (2014): Additional distribution records for Victorian dragonflies (Insecta: Odonata). *Victorian Entomologist* 44(2): 34-37. (in English) [Australia; *Nannophya australis*; *Notoaeschna sagittata*] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@pacific.net.au

13827. Endersby, I. (2014): Additional distribution records for Victorian dragonflies (Insecta: Odonata). Continued. *Victorian Entomologist* 44(3): 58-64. (in English) [Australia; *Orthetrum villosovittatum*, *Pantala flavescens*, *Parasynthemis regina*, *Pseudagrion aureofrons*.] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@pacific.net.au

13828. Escoto-Moreno, J.; González-Soriano, E.; Escoto-Rocha, J.; Márquez, J. (2014): Riqueza y distribución de la familia Aeshnidae (Odonata: Anisoptera) en el estado de Aguascalientes, México. *Revista Mexicana de Biodiversidad* 85: 209-217. (in Spanish, with English summary) ["The species richness and geographic distribution of the family Aeshnidae in the state of Aguascalientes is presented. A total of 168 adult individuals from 55 localities were collected during a 12 months period between August 2006 and July 2007. They belong to four genera and seven species (*Aeshna persephone*, *Anax junius*, *Anax walsinghami*, *Remartinia luteipennis*, *Rhionaeschna dugesi*, *Rhionaeschna multicolor*, *Rhionaeschna psilus*). ... Specific richness of the family Aeshnidae in the state of Aguascalientes corresponds to the 11.9% of all Odonata species recorded for the state and 23.3% of the species recorded of this family for México. The species accumulation curve is stabilized, but according to Chao 2, Jackknife 1 and

Jackknife 2 non-parametric estimators, the sampling effort performed estimates between 80.3% and 97.5% of the species of this family that theoretically exist in the state of Aguascalientes. The localities that showed a higher species richness were La Rinconada, stream at Malpaso and Puente La Labor, all belonging to the municipality of Calvillo, and the Estación Biológica Agua Zarca (EBAZ) in the municipality of San José de Gracia. The distribution of the species reflects three regional patterns: Altiplano Mexicano, Sierra Madre Occidental and Neotropical." (Authors)] Address: Escoto-Moreno, J., Laboratorio de Sistemática Animal, Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo. Km 4.5 carretera Pachuca-Tulancingo s/n, Ciudad Universitaria, Col. Carboneras, 42184 Mineral de la Reforma, Hidalgo, México. E-mail: jerjaem2002@yahoo.es

13829. Faithpraise, F.O.; Idung, J.; Usibe, B.; Chatwin, C.R.; Young, R.; Birch, P. (2014): Natural control of the mosquito population via Odonata and Toxorhynchites. *International Journal of Innovative Research in Science* 3(5): 12898-12911. (in English) ["The main impact of mosquito pests is the transmission of many dangerous diseases and death. Hence, the reduction of their population by the use of a natural control method is a primary objective of this research. This mosquito reduction method utilises different species of predators (Odonata) and (Toxorhynchites) to substantially improve the environment. The frequency of capturing the pest mosquitoes by the predators is determined using a Pascal distribution, whilst insect mortality is modelled using a Weibull distribution. The results from the model show that by using insect predators, a significant reduction of the mosquito population is possible in less than eighty days." (Authors)] Address: Faithpraise, Fina, Engineering & Design, (Biomedical Engineering) School of Engineering and Informatics, University of Sussex, Brighton, UK

13830. Feindt, W.; Hadrys, H. (2014): Still a one species genus? Strong genetic diversification in the world's largest living odonate, the Neotropical damselfly *Megaloprepus caerulatus*. *Conserv. Genet.* 15: 469-481. (in English) ["Mesoamerican biodiversity is increasingly threatened by anthropogenic destruction of natural land cover. Habitat degradation and climate change are primary threats to specialized forest odonate species that are important model organisms for forest health and defining conservation units. The extreme niche specialization of *M. caerulatus*, the world's largest extant odonate, makes it well suited as an indicator for changing environmental conditions. *Megaloprepus*, which is considered to be a monospecific genus, is highly dependent on old growth forests whose water filled tree holes are limiting reproductive resources for this species. Here, we focus on the question how historical and recent fragmentation events, strong niche conservatism and ecological conditions have affected population dynamics, viability and the species status in this evolu-

tionarily old genus. Two mitochondrial sequence markers (ND1 and 16S rRNA) and a set of microsatellites were used to analyze population structure and genetic diversity of *M. caerulatus* in the northern part of its distributional range. Results suggested an absence of gene flow and no shared haplotypes among the study populations. Statistical parsimony indicated high substructuring among populations with sequence diversity similar to levels found at the species level compared to other odonates. In sum, the genetic data suggest that *Megaloprepus* may actually consist of more than one species. The taxonomic status of the group should be revised in light of the three distinct genetic clusters found in different forest regions. The results may also allow insights into the impact of recent and historical habitat fragmentation on a strong Neotropical forest restricted insect species." (Authors)] Address: Feindt, Wiebke, ITZ, Ecology & Evolution, University of Veterinary Medicine Hannover, Bünteweg 17d, 30559 Hannover, Germany. E-mail: wiebke.feindt@ecolevol.de

13831. Forbes, M.R.; Mlynarek, J.J. (2014): A hypothesis to explain host species differences in resistance to multi-host parasites. *Ideas in Ecology and Evolution* 7: 17-24. (in English) ["Here, we offer a novel hypothesis to explain why some host species evolve resistance, whereas other related species remain susceptible to a shared parasite species. We first describe instances of single water mite species that are ectoparasitic on different species of host dragonflies, where the mites are killed by resistance mechanisms and have little to no fitness on some host species. This begs the question of why some host species are susceptible, whereas other host species are (nearly) completely resistant. Earlier logic based on parasites exploiting abundant host species at the cost of exploiting rare host species does not explain such instances well. Rather, a hypothesis based on closed populations of some host species being able to evolve parasite recognition is invoked. Parasite recognition is not expected to evolve in host species from more open populations with considerable gene flow across sites, only some sites of which have the parasite species present. The logic of this hypothesis can be explored with simulation models, whereas empirical tests could involve combined approaches using molecular genetics, population genetics, experimental infections and transplantation experiments." (Authors)] Several experiments on Odonata were tested during the present survey] Address: Forbes, M.R., Dept of Biology, Carleton University, 587 Tory Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: mforbes@ccs.carleton.ca

13832. Gallardo, B.; Dolédec, S.; Paillex, A.; Arscott, D.B.; Sheldon, F.; Zilli, F.; Mérigoux, S.; Castella, E.; Comín, F.A. (2014): Response of benthic macroinvertebrates to gradients in hydrological connectivity: a comparison of temperate, subtropical, Mediterranean and semiarid river floodplains. *Freshwater Biology* 59(3):

630-648. (in English) ["(1) Despite a general recognition that benthic macroinvertebrates respond to changes in hydrological connectivity within floodplain ecosystems, no consensus about patterns in community structure and ecosystem processes across large scales and different climates has yet been established. Such knowledge is necessary since anthropogenic activities continue to alter the natural hydrogeomorphology of large floodplains, with most consequences for aquatic communities remaining unknown. (2) Using information from six large rivers located in four different climate regions (humid subtropical, maritime temperate, Mediterranean and dry semi-arid), we compared benthic macroinvertebrate responses along lateral gradients of hydrological connectivity. We tested hypotheses related to differences among climate regions and to similar hydrological constraints within any one climate. The large geographical scale covered by this study provides the first comprehensive comparison of aquatic community patterns across hydrological gradients under different climatic settings. (3) Multivariate ordinations demonstrated a higher overlap of trait community composition (50% variance explained by the first two axes) than taxonomic composition (15%) among floodplains, displaying high interclimate trait stability. The taxonomy-based ordination separated the subtropical floodplain, with an average 86% of non-insect taxa, from the insect-dominated temperate, Mediterranean and semi-arid floodplains (with >50% insect abundance). In the trait-based ordination, large body size (60% of organisms >4 cm) and long lifespan duration (80% of organisms) discriminated the subtropical from the other five studied floodplains. (4) Across a gradient of lateral connectivity, linear mixed effect (LME) models supported seven of 15 hypotheses, which suggests remarkably consistent macroinvertebrate patterns in floodplains regardless of the climate regime. Taxon and trait richness were positively related and peaked at sites of intermediate hydrological connectivity. Our predictions about the feeding guilds of macroinvertebrates (e.g. that shredders and scrapers would be more abundant in connected channels, and predators and deposit feeders at isolated sites) were more strongly supported by the data than those about life history (e.g. plurivoltinism and short lifespan would be better represented in connected channels). This difference was related to the influence of extended periods of hydrological disconnection as disturbance in addition to flooding. (5) Trait stability across hydrological connectivity provides a meaningful ecological context for the comparison of the macroinvertebrate benthos among climatic zones, where taxonomic composition differs strongly. In addition, trait similarities and dissimilarities found in this study suggest that large-scale biogeographical filters do operate on communities, resulting in different trait combinations in temperate and Mediterranean floodplains when compared to semi-arid and subtropical environments. The extent to which global macroecological factors (i.e. climate, dispersal history) and local biotic and abiotic fac-

tors (i.e. drought frequency, habitat structure, water chemistry) contribute to this difference requires further investigation." (Authors) The list of taxa includes Odonata identified at the genus level.] Address: Gallardo, Belinda, Applied and Restoration Ecology Group, Pyrenean Institute of Ecology (IPE-CSIC), Avda. Montanana 1005, 50192 Zaragoza, Spain. E-mail: belinda@ipe.csic.es

13833. Galliani, C.; Scherini, R.; Piglia, A.; Merlini, D. (2014): Odonati d'Italia. Guida al riconoscimento e allo studio di libellule e damigelle. linnea.it / linnea's eBooks. 201 pp (in Italian)



13834. Garrison, R.W. (2014): Review of *Oxystigma* Selys with the synonymy of *Oxystigma williamsoni* Geijskes (Odonata: Heteragrionidae). *Zootaxa* 3780(2): 347-364. (in English) ["*Oxystigma williamsoni* Geijskes, 1976 is synonymized with *Oxystigma petiolatum* (Selys, 1862), based on a reexamination of an extensive series of both taxa identified by D. Geijskes in the RMNH. Illustrations of the variability for both taxa and illustrations, maps, and keys for all species are provided." (Authors)] Address: Garrison, R.W., Plant Pest Diagnostic Branch, California Department of Food and Agriculture, Sacramento, USA. E-mail: rgarrison@cdfa.ca.gov

13835. Gleason, J. E.; Fudge, D.S.; Robinson, B.W. (2014): Eco-mechanics of lamellar autotomy in larval damselflies. *J. Exp. Biol.* 217(2): 185-191. (in English) ["In larval damselflies, the self-amputation (autotomy) of the caudal lamellae permits escape from predatory larval dragonflies. Lamellar joint size declines among populations with increasing risk of dragonfly predation,

but the breaking force required for autotomy and the biomechanical factors that influence breaking force are unknown. If autotomy enhances survival in larval damselflies, then predation by larval dragonflies should select for joints that require less force to break. We test this adaptive hypothesis by evaluating whether breaking force is negatively related to local predation risk from larval dragonflies. We also test a cuticle structure hypothesis, which predicts that breaking force is positively related to joint size and to joint cuticle thickness because of a structural support relationship between joint and lamella. The peak force necessary for lamellar autotomy was assessed on individual larval *Enallagma* damselflies collected from populations that varied in risk of predation. Easier lamellar autotomy occurred in larvae from sites with higher predation risk because damselflies from fishless ponds (where predatory larval dragonflies are likely more abundant) had lower breaking forces than those from ponds with fish (where larval dragonfly predation is likely reduced). Furthermore, breaking force was a positive function of joint size and also of total cuticle cross-sectional area after controlling for joint size. This suggests that autotomy may evolve in larval damselflies under selection from small grasping predators such as larval dragonflies by favouring smaller joint size or reduced cuticle area of lamellar joints." (Authors)] Address: Gleason, J. E., Dept of Integrative Biology, University of Guelph, Guelph, ON, Canada, N1G 2W1. E-mail: jgleason@uoguelph.ca

13836. Gómez-Anaya, J.A.; Novelo-Gutiérrez, R.; Ramírez, A.; Arce-Pérez, R. (2014): Using empirical field data of aquatic insects to infer a cut-off slope value in asymptotic models to assess inventories completeness. *Revista Mexicana de Biodiversidad* 85: 218-227. (in English, with Spanish summary) ["The selection of the most appropriate model is essential to predict the potential species richness of a site or landscape. Species accumulation curves have been used as a basic tool for comparing richness when different sampling protocols have been applied. Among the parameters generated by these models the slope has been cited as an indicator of completeness without regard to a defined cut-off value. In this work, we fit 12 field data sets of aquatic Coleoptera (Hidalgo) and Odonata larvae (Michoacán) to 2 asymptotic models (Clench and Linear Dependence) in order to calculate the slopes at the maximum effort and relate them with efficiency. Then, the theoretical effort needed to achieve the 95% of the lists was calculated for each data set in order to get the theoretical slopes. The average slope value found was 0.01 with a variance of <0.001, so we propose this value as indicative of a list reaching 95% of completeness for data obtained from similar sampling protocols. Additionally, we propose the use of number of rare species as an additional criterion to evaluate the inventories completeness. The effect of different sampling intensity on fitted models and estimation of parameters and the importance of a cut-off slope value in asymptotic mod-

els as a criterion to evaluate completeness of biological inventories are discussed." (Authors)] Address: Novelo-Gutiérrez, R., Department of Environmental Sciences, University of Puerto Rico, P.O. Box 190341, 00919 San Juan, Puerto Rico. E-mail: rodolfo.novelo@inecol.mx

13837. Gonzalez-Santoyo, I.; Gonzalez-Tokman, D.M.; Munguia-Steyer, R.E.; Cordoba-Aguilar, A. (2014): A mismatch between the perceived fighting signal and fighting ability reveals survival and physiological costs for bearers. *PLoS ONE* 9(1): e84571. doi:10.1371/journal.pone.0084571: 12 pp. (in English) ["Signals of fighting indicate an animal's intention to attack and so they serve to prevent costly aggressive encounters. However, according to theory, a signal that is different in design (i.e. a novel signal) but that fails to inform fighting intentions will result in negative fitness consequences for the bearer. In the present study we used males of the territorial damselfly *Hetaerina americana*, which have a red wing spot during territory defense that has evolved as a signal of fighting ability. By producing a novel signal (covering the red spot with blue ink) in territory owners, we investigated: a) the behavioral responses by conspecific males; b) survival cost and c) three physiological mediators of impaired survival: muscular fat reserves, muscle mass and immune ability. We predicted that males with the novel signal would be attacked more often by conspecifics as the former would fail to convey fighting ability and intentions adequately. This will result in lower survival and physiological condition for the novel signal bearers. We found that, compared to control males (males whose red spot was not changed), experimental males had reduced survival, were less able to hold a territory, and had a reduced muscle mass. It seems that spot modified males were not able to effectively communicate their territory tenancy, which may explain why they lost their defended sites. Our results provide support for theoretical models that a novel signal that fails to inform fighting ability may lead to a fitness cost for bearers." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

13838. Gopal, P.K.; Abaji, S.V.; Bhimrao, U.S. (2014): Diversity of damselflies (Zygoptera) in Gorewada International Bio-Park, Nagpur, Central India. *Arthropods* 3(1): 80-87. (in English) ["Gorewada International Bio-Park consists of a lake as a major water source, marshy shore and heterogeneity in vegetation. Its geographical location is 21°11'N 79°2'E. Observations are made through walking line transects along the lake border to determine the diversity of damselfly. Total 21 species of damselflies belonging to nine genera (*Aciagrion*, *Agriocnemis*, *Ceriagrion*, *Enallagma*, *Ischnura*, *Pseudagrion*, *Rhodischnura*, *Copera* and *Lestes*) and three families (*Coenagrionidae*, *Lestidae* and *Platycne-*

mididae) have been recorded. Out of total damselflies examined, 52.38% are common, 19.05% are occasional and 28.57% are rare species. The present study encourages the conservation of a wide range of indigenous damselfly species in this area." (Authors)] Address: Gopal, P.K., Department of Zoology, Institute of Science, R. T. Marg, Nagpur (M.S.) India. E-mail: vi-rushende@gmail.com

13839. Günther, A.; Hilfert-Rüppell, D.; Rüppell, G. (2014): Reproductive behaviour and the system of signalling in *Neurobasis chinensis* (Odonata, Calopterygidae) – a kinematic analysis. *International Journal of Odonatology* 17(1): 31-52. (in English) ["The reproductive behaviour of the damselfly *N. chinensis* was filmed at 300 and 600 frames per second in Thailand in spring 2009. This was subsequently viewed in slow motion for detailed analysis. Altogether we observed 26 matings at two different sites. Besides visual observations of behaviour of male–female encounters at the reproductive sites, we analysed their flight cinematographically by measuring velocity, wing beat frequency, phase relationships of fore- and hind wings, and described the flight paths of different flight manoeuvres. Wing clapping by the perched insects was analysed in detail. Also filmed were alternative reproductive behaviour and avoidance behaviour when attacked by a hunting spider. By analysing the video footage in slow motion, details of male flight with hind wings held motionless, a typical flight-style for this genus, were revealed. The significance of this behaviour in interactions with conspecifics is discussed." (Authors)] Address: Günther, A., TU Bergakademie Freiberg, Institut für Biowissenschaften, Leipziger Str. 29, D-09599 Freiberg, Germany

13840. Guillermo-Ferreira, R.; Therézio, E.M.; Gehlen, M.H.; Bispo, P.C.; Marletta, A. (2014): The role of wing pigmentation, UV and fluorescence as signals in a Neotropical damselfly. *Journal of Insect Behavior* 27(1): 67-80. (in English) ["Pigmentation patterns, ultraviolet reflection and fluorescent emission are often involved in mate recognition and mate quality functions in many animal taxa. We investigated the role of wing ultra-violet reflection, fluorescence emission, and pigmentation on age and sexual signals in the damselfly *Mnesarete pudica*. In this species, wings are sexually dimorphic in colour and exhibit age dependency: males and females show a smoky black colouration when young, turning red in mature males while it turns brown in females. First, we investigated wing UV patterns through reflectance and emission spectra. Second, behavioural experiments were undertaken to show male and female responses to manipulated wing pigmentation and experimentally reduced UV (UV-). Reflectance spectra of the wings of juvenile and mature males and females were used to show the differences between controls and individuals with manipulated colouration used in the behavioural experiment. UV-reduced, females with wings painted red, and control males and females were

tethered and presented to conspecific males and females, and their behavioral responses were recorded. The male red wing pigmentation and females with red wings elicited an aggressive response in territorial males and a sexual response in females. Both males and females showed neutral responses towards individuals with reduced UV. Wing signals of juvenile individuals also provoked neutral responses. These results suggest that UV, together with pigmentation, plays a role during mate recognition in males and females. Other than butterflies and spiders, it seems that fluorescence signals and UV reflectance can also be part of communication in odonates." (Authors)] Address: Guillermo-Ferreira, R., Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil. E-mail: rhainerguillermo@yahoo.com.br

13841. Guimaraes Souto, R.; Corbi, J.J.; Buzá Jacobucci, G. (2014): Environmental diagnosis of organochlorine compounds in sediment and benthic invertebrates of Triangulo Mineiro Watersheds, Minas Gerais, Brazil. *Revista Brasileira de Recursos Hídricos* 19(1): 143-153. (in Portuguese, with English summary) ["This study aimed to assess the levels of organochlorine compounds in sediments of 35 watercourses belonging to the Uberabinha, Araguari and Tijuco watersheds. Samples of benthic invertebrates collected in streams that showed higher concentrations of organochlorines were analyzed. Among the nineteen compounds analyzed, ten were detected in watercourses. The bioaccumulation of organochlorines was not evident in the fauna. However, this does not exclude other possible impacts of these compounds on the fauna. Monitoring measures must be encouraged since sediment is one of the most important compartments in the context of the cycling of matter and energy flow." (Authors) Taxa are treated at family level. Gomphidae are eu-dominant.] Address: Guimarães Souto, R., Ecologia e Conservação de Recursos Naturais — UFU, Campus Umuarama, Uberlândia — MG, Brazil. E-mail: rebioguimaraes@yahoo.com.br

13842. Hämäläinen, M.; Subramanian, K.A. (2014): *Anisopleura lieftincki* Prasad & Ghosh, 1984 – a junior synonym of *A. subplatystyla* Fraser, 1927 (Odonata: Euphaeidae). *Notulae odonatologicae* 8(3): 37-40. (in English) ["*Anisopleura lieftincki* Prasad & Ghosh, 1984 is synonymised with *A. subplatystyla* Fraser, 1927. Distinguishing characters to separate *A. subplatystyla* and *A. comes* Hagen, 1880 are presented." (Authors)]

13843. Hämäläinen, M. (2014): *Atrocalopteryx auco* spec. nov. from Vietnam, with taxonomic notes on its congeners (Odonata: Calopterygidae). *Zootaxa* 3793(5): 561-572. (in English) ["*Atrocalopteryx auco* Hämäläinen, spec. nov. (holotype male, from Vietnam, Lang Son province, Huu Lien, Tan Lai, alt. 260 m, 9 June 2008, deposited at RMNH, Leiden, The Netherlands) is de-

scribed and illustrated for both sexes and compared with other species in the genus. The new combination *Atrocalopteryx laosica* (Fraser, 1933), comb. nov. is made. An annotated list of *Atrocalopteryx* species and keys to both sexes are presented. Male of *A. auco* differs from the other two completely opaque-winged species (*A. atrata* and *A. atrocyana*) by having yellowish crossveins on the under surface of the wings and by having the underside of abdominal segments 8.10 strikingly yellowish. The female of *A. auco* can be easily separated from *A. atrata* and *A. atrocyana* by the presence of whitish pseudopterostigma in both wings. Problems in the definition of the genus *Atrocalopteryx* are discussed." (Author)] Address: Hämäläinen, M., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: libellago@gmail.com

13844. Hahn, A.T.; Rosa, C.A.; Bager, A.; Krause, L. (2014): Dietary variation and overlap in D'Orbigny's slider turtles *Trachemys dorbigni* (Duméril and Bibron 1835) (Testudines: Emydidae). *Journal of Natural History* 48(11-12): 721-728. (in English) ["Although *T. dorbigni* is the most abundant freshwater chelonian species in southern Brazil, little is known about its feeding habits. Our goal was therefore to evaluate this species' dietary composition and niche variation there. For this, we collected road-killed animals ($n = 73$) on a federal highway (BR 392) between 2002 and 2003, and analysed their gut contents. We identified 26 different dietary items, and our results indicated that D'Orbigny's slider is omnivorous in this area. Total food volume, as well as the degree of herbivory and carnivory, were similar between males and females. However dietary composition of plants was different: although both males and females fed on underwater plant matter, only females consumed surface macrophytes. This finding suggested differential microhabitat usage between males and females throughout the swamps." (Authors) Odonata poorly contributed to the diet of the turtles.] Address: Hahn, A.T., aLaboratório de Herpetologia, Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil. E-mail: anehahn@gmail.com

13845. Hart, L.A.; Bowker M.B.; Tarboton W.; Downs C.T. (2014): Species composition, distribution and habitat types of Odonata in the iSimangaliso Wetland Park, KwaZulu-Natal, South Africa and the associated conservation implications. *PLoS ONE* 9(3): e92588. doi: 10.1371/journal.pone.0092588: 11 pp. (in English) ["Maputaland–Pondoland–Albany, South Africa has been identified as a biodiversity hotspot and centre for endemism. Odonata make good indicators of freshwater ecosystem health. Consequently we compiled a list of Odonata species recorded to date in the iSimangaliso Wetland Park. We then detailed important species in terms of endemism, conservation status, and potential as indicator species. Finally, we compared Odonata assemblages of different sites sampled within the park to

illustrate habitat importance. Species identified during two formal surveys and incidental observations made during the study period were combined with an existing database to compile an accurate and up to date species list for the iSimangaliso Wetland Park. Data from this study were then analyzed to determine which water bodies had the most similar species composition. The Dragonfly Biotic Index (DBI) value of each study area was also determined. We recorded 68 odonate species in the iSimangaliso Wetland Park, adding 13 species to the Ezemvelo KwaZulu-Natal Wildlife database for the area. This brings the total number of Odonata species for the iSimangaliso Wetland Park to 86. Eight species are red-listed, 12 are restricted in South Africa to the coastal plains of northern KwaZulu-Natal, and the remainder occurs widely across the southern African savanna. Analyses indicate that species odonate assemblages were most similar in water bodies with comparable habitats. iSimangaliso Wetland Park is identified as an important area for Odonata diversity and endemism, a trend also reflected by the DBI values. Shifts in the existing species assemblages would indicate changes within the ecosystem and thus this species account provides necessary baseline data for the area. Species Conservation efforts should thus target water bodies of varying habitat types to protect greater species diversity." (Authors)] Address: Downs C.T., School of Life Sciences, University of KwaZulu-Natal, Pietermaritzburg, South Africa. E-mail: Downs @ukzn.ac.za

13846. Hassall, C. (2014): The ecology and biodiversity of urban ponds. *Wiley Interdisciplinary Reviews: Water* 1(2): 187-206. (in English) ["Recent research has demonstrated that ponds contribute a great deal to biodiversity at a regional level as networks of habitat patches that also act as 'stepping stones' to facilitate the movement of species through the landscape. Similarly, a great deal of biodiversity persists in urban environments where synanthropic communities are supplemented by species that thrive in disturbed environments. Aquatic urban biodiversity appears to persist despite anthropogenic stressors: an array of anthropogenic pollutants (road salt and heavy metals), invasive species, and active mismanagement—particularly the removal of riparian vegetation. Optimizing urban ponds for different ecosystem services results in conflicting priorities over hydrological, geochemical, ecological, aesthetic, and cultural functions. The socio-ecosystem approach to environmental management opens a path to greater incorporation of biodiversity into town planning and sustainability, while accounting for cultural attitudes to urban ecosystems. I identify a range of research needs: (1) the roles of design and location of urban ponds in influencing biodiversity, (2) the function of urban wetlands for stormwater and pollution management, and (3) public perceptions of urban ecosystems and how those perceptions are influenced by interactions with natural systems. Urban wetlands offer an important opportunity to educate the general public on natural systems and science in general using a resource that is lo-

cated on their doorstep. In the face of increasing pressures on natural systems and increasing extent and intensity of urbanization, a more comprehensive appreciation of the challenges and opportunities provided by urban ponds could play a substantial role in driving sustainable urban development." (Author) The paper only includes a few references to Odonata.] Address: Hassall, C., School of Biology, University of Leeds, Leeds, UK. E-mail: c.hassall@leeds.ac.uk

13847. Ihara, S. (2014): Food habits of the adult Japanese newt *Cynops pyrrhogaster* (Amphibia: Salamandridae) in the sub-alpine Yachidaira High Moor, East—Central Honshu, Japan. *Current Herpetology* 33(1): 38-45. (in English) ["The diet of the adult *Cynops pyrrhogaster* was studied at a small pond on the Yachidaira high moor (1500 m asl) from 2002 to 2004. In total, 160 individuals examined by stomach flushing yielded 1518 prey items, of which most (95.7% of the total numerically) were small arthropods inhabiting the pond or surrounding land. Of these, chironomid larvae and Cladocera numerically represented 34.3% and 34.7%, respectively. By mass, *Rhacophorus arboreus* tadpoles, Odonata adults, Brachycera adults, and conspecific newt eggs comprised 13.7%, 11.5%, 10.7%, and 9.8% of all prey, respectively. The composition of prey items varied seasonally and annually. These results suggest that the food habits of adult *C. pyrrhogaster* in the alpine high moor areas are influenced by yearly and seasonal changes in various small animals in and around the ponds." (Authors)] Address: Ihara, S., Department of Biology, Ohu University, 31-1 Misumido, Tomita, Koriyama, Fukushima 963-8611, Japan. E-mail address: s-ihara@den.ohu-u.ac.jp

13848. Janssens, L.; Van, K.D., Debecker, S.; Bervoets, L.; Stoks, R. (2014): Local adaptation and the potential effects of a contaminant on predator avoidance and antipredator responses under global warming: a space-for-time substitution approach. *Evolutionary Applications* 7(3): 421-430. (in English) ["The ability to deal with temperature-induced changes in interactions with contaminants and predators under global warming is one of the outstanding, applied evolutionary questions. For this, it is crucial to understand how contaminants will affect activity levels, predator avoidance and antipredator responses under global warming and to what extent gradual thermal evolution may mitigate these effects. Using a space-for-time substitution approach, we assessed the potential for gradual thermal evolution shaping activity (mobility and foraging), predator avoidance and antipredator responses when *Ischnura elegans* damselfly larvae were exposed to zinc in a common-garden warming experiment at the mean summer water temperatures of shallow water bodies at southern and northern latitudes (24 and 20°C, respectively). Zinc reduced mobility and foraging, predator avoidance and escape swimming speed. Importantly, high-latitude populations showed stronger zinc-induced reductions in escape swimming speed at both temperatures, and in

activity levels at the high temperature. The latter indicates that local thermal adaptation may strongly change the ecological impact of contaminants under global warming. Our study underscores the critical importance of considering local adaptation along natural gradients when integrating biotic interactions in ecological risk assessment, and the potential of gradual thermal evolution mitigating the effects of warming on the vulnerability to contaminants." (Authors)] Address: Khuong Dinh Van, Institute of Aquaculture, Nha Trang University, Nha Trang, Vietnam. E-mail: khuongaquatic@gmail.com

13849. Janssens, L.; Van, K.D.; Stoks, R. (2014): Extreme temperatures in the adult stage shape delayed effects of larval pesticide stress: a comparison between latitudes. *Aquatic Toxicology* 148: 74-82. (in English) ["Highlights: •Global warming and pesticides are major threats to aquatic biodiversity. •Larval pesticide and adult heat stress reduced fitness traits in a damselfly. •High-latitude damselflies were more sensitive to the pesticide and heat stress. •Both stressors interacted across metamorphosis; similarly across latitudes. •Risk assessment should consider temperature extremes shaping pesticide effects. Global warming and pesticide pollution are major threats for aquatic biodiversity. Yet, how pesticide effects are influenced by the increased frequency of extreme temperatures under global warming and how local thermal adaptation may mitigate these effects is unknown. We therefore investigated the combined impact of larval chlorpyrifos exposure, larval food stress and adult heat exposure on a set of fitness-related traits in replicated low- and high-latitude populations of the damselfly *Ischnura elegans*. Larval pesticide exposure resulted in lighter adults with a higher water content, lower fat content, higher Hsp70 levels and a lower immune function (PO activity). Heat exposure reduced water content, mass, fat content and flying ability. Importantly, both stressors interacted across metamorphosis: adult heat exposure lowered the reduction of fat content, and generated a stronger decrease in PO activity in pesticide-exposed animals. Larval pesticide exposure and larval food stress also reduced the defense response to the adult heat stress in terms of increased Hsp70 levels. In line with strong life history differences in the unstressed control situation, high-latitude animals were less sensitive to food stress (body mass and water content), but more sensitive to pesticide stress (development time and PO activity) and heat exposure (PO activity and Hsp70 levels). While low-latitude adults could better withstand the extreme temperature as suggested by the weaker increase in Hsp70, heat exposure similarly affected the delayed effects of larval pesticide exposure at both latitudes. Our study highlighted two key findings relevant for ecological risk assessment under global warming. Firstly, the delayed effects of larval pesticide exposure on adult damselflies depended upon subsequent adult heat exposure, indicating that larval pesticide stress and adult heat stress interacted across metamorphosis. Secondly,

low- and high-latitude animals responded differently to the imposed stressors, highlighting that intraspecific evolution along natural thermal gradients may shape sensitivity to pesticides." (Authors)] Address: Janssens, Lizanne, Lab.Aquatic Ecology, Evolution and Conservation Sint-Michielsstraat 6 - box 2439, 3000 Leuven, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

13850. Juen, L.; Oliveira-Junior, M.B.; Shimano, Y.; Mendes, T.P.; Cabette, H.S.R. (2014): Composition and richness of Odonata (Insecta) in streams with different levels of conservation in a Cerrado-Amazonian Forest ecotone. *Acta Amazonica* 44(2): 223-234. (in Portuguese, with English summary) ["The removal or substitution of riparian vegetation causes disturbance in physical environment, seasonal water flow and water chemical quality. These modifications can cause decrease in species richness by local extinctions. The aim of this study was to examine the effect of disturbance in the physical environment on the richness and species composition of Odonata adults in streams with different levels of conservation in the river Suiá-Missu basin, Mato Grosso, Brazil. Modifications in the aquatic systems affected the Odonata community, probably because their ecophysiological and behavioral requirements of adults and larvae. Anisoptera species, which require sunny environments because of their body size, had higher species richness in environments with low plant cover. On the other hand, Zygoptera species, which generally inhabit streams with dense vegetation, presented a decrease in richness in disturbed environments, as a result high sunlight radiation and/or variations in temperature. Hence, in both suborders, environmental perturbations do not need to be severe to change species composition, indicating that ecosystem services could be lost, even with only partial alterations in physical environment." (Authors)] Address: Juen, L., Universidade Federal do Pará-UFPA. Laboratório de Ecologia Aquática, Instituto de Ciências Biológicas. Rua Augusto Correia, nº 1, Bairro Guamá, CEP: 66075-110. Belém, Pará, Brasil. E-mail: leandrojuen@ufpa.br

13851. Karjalainen, S. (2014): Luonnonmaatieteellisistä maakunista mahdollisesti hävinneet sudenkorennot [Dragonfly species possibly vanished from biogeographical provinces]. *Crenata* 7: 4-9. (in Finnish) [Based on a reference from 1986 listing Finnish dragonfly species not recorded in Finnish biogeographical provinces after 1960, this article presents in tabular form 18 instances referring to 15 species not recorded in respective Finnish biogeographical provinces for at least 55 years. As state of odonatological research varies widely between the provinces and provinces best explored haven't lost any species yet, it remains unclear if species became rarer or only have been overlooked since (Asmus Schröter).] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail:sk@korento.net

13852. Karjalainen, S. (2014): Sudenkorentokesän 2013 kohokohdat [Odonatological Highlights of summer 2013].

Crenata 7: 10-13. (in Finnish, with English summary) ["The article presents the most interesting dragonfly (Odonata) records from Finland in 2013. *Anax parthenope* was recorded for the first time in Finland on 16th July 2013 in Inkoo. A patrolling male was photographed by Jan Tvrdy. Several records of *Sympetrum fonscolombii* were made between May and September. Before this, only one record has been made in Finland (2011)."] (Author)] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail:sk@korento.net

13853. Karjalainen, S. (2014): Isotyönkorenonn erikoinen muninta [Extraordinary oviposition of *Erythromma najas*]. *Crenata* 7: 43. (in Finnish) [A photo series of 13 pictures shows oviposition of a female *Erythromma najas* which was infested and probably weakened by aquatic mites. During ovipositing the female was aggressively disturbed by a male of *Enallagma cyathigerum*. The attack finally exhausted all of the female's power and it floated away on the water's surface (Asmus Schröter).] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail:sk@korento.net

13854. Karthika, P.; Krishnaveni, N. (2014): Impact assessment of dragonfly diversity in different wetland ecosystems in Coimbatore with special reference to abiotic factors. *International Journal of Advanced Research* 2(2): 639-648. (in English) ["Coimbatore district possess many wetlands, amongst them Singanallur, Sulur, Kumarasamy and Narasampathy were selected for the present study. Physico-chemical parameters of the waters for four selected wetlands were carried out and it revealed that Singanallur and Sulur wetlands were highly polluted as it possessed the ranges beyond the permissible limits of WHO. Since dragonflies are the indicator and flagship species of the wetland ecosystem the diversity of dragonflies were analyzed with special reference to water quality parameters of the selected wetlands. According to the survey, totally 11 species of dragonfly, belonging to two families (Libellulidae and Aeshnidae) were identified. Among the selected four wetlands the diversity of dragonflies was high in Sulur and Singanallur where the pollution level was also high. The present study clearly indicated that the diversity of dragonflies was not dependent upon the water characters but vegetation (aquatic and marginal) could have influenced their abundance in these wetlands." (Authors)] Address: Pushparaj, Pushparaj, Department of Zoology, Avinashilingam Institute for home science and higher education for women, Coimbatore, India

13855. Kim, M.J.; Jung, K.S.; Park, N.S.; Wan, X.; Kim, K.-G.; Jun, J.; Yoon, T.J.; Bae, Y.B.; Lee, S.M.; Kim, I. (2014): Molecular phylogeny of the higher taxa of Odonata (Insecta) inferred from COI, 16S rRNA, 28S rRNA, and EF1-a sequences. *Entomological Research* 44(2): 65-79. (in English) ["In this study, we sequenced both two mitochondrial genes (COI and 16S rRNA) and nuclear genes (28S rRNA and elongation factor-1a) from

71 species of Odonata that represent 7 superfamilies in 3 suborders. Phylogenetic testing for each two concatenated gene sequences based on function (ribosomal vs protein-coding genes) and origin (mitochondrial vs nuclear genes) proved limited resolution. Thus, four concatenated sequences were utilized to test the previous phylogenetic hypotheses of higher taxa of Odonata via Bayesian inference (BI) and maximum likelihood (ML) algorithms, along with the data partition by the BI method. As a result, three slightly different topologies were obtained, but the BI tree without partition was slightly better supported by the topological test. This topology supported the suborders Anisoptera and Zygoptera each being a monophyly, and the close relationship of Anisozygoptera to Anisoptera. All the families represented by multiple taxa in both Anisoptera and Zygoptera were consistently revealed to each be a monophyly with the highest nodal support. Unlike consistent and robust familial relationships in Zygoptera those of Anisoptera were partially unresolved, presenting the following relationships: (((Libellulidae + Corduliidae) + Macromiidae) + Gomphidae + Aeshnidae) + Anisozygoptera) + (((Coenagrionidae + Platycnemididae) + Calopterygidae) + Lestidae). The subfamily Sympetrinae, represented by three genera in the anisopteran family Libellulidae, was not monophyletic, dividing *Crocothemis* and *Deielia* in one group together with other subfamilies and *Sympetrum* in another independent group." (Authors)] Address: Kim, I., Dept Appl. Biol., College of Agriculture & Life Sciences, Chonnam National Univ., Gwangju 500-757, Korea. Email: ikkim81@chonnam.ac.kr

13856. Kittel, R.N.; Engels, W. (2014): Diversity of damselflies (Odonata: Zygoptera) of the state Rio Grande do Sul, Brazil, with four new records for the state. *Notulae odonatologicae* 8(3): 49-55. (in English) ["During a survey of damselflies in the summer 2004/2005 at the Araucaria forest reserve Pr6-Mata in the Serra Geral mountain range, Rio Grande do Sul, Brazil, four species of Zygoptera new to the state were recorded. These are *Heteragrion consors*, *Lestes auritus*, *Mecistogaster ornata*, and *Mnesarete borchgravi*. These records increase the number of damselflies known from Rio Grande do Sul to 49 species." (Authors)] Address: Kittel, Rebecca, Australian Centre for Evolutionary Biology and Biodiversity, and School of Earth and Environmental Sciences, The University of Adelaide, SA 5005, Australia. E-mail: rebecca.kittel@adelaide.edu.au

13857. Koch, K. (2014): Hand feeding: a method to increase the survival rate of *Orthetrum coerulescens* (Odonata: Libellulidae) in outdoor enclosures. *International Journal of Odonatology* 17(1): 1-6. (in English) ["Food intake rate and diet composition have a high impact on all organisms and affect individual fitness, fecundity and mortality. Specimens in enclosures have to be fed in an adequate way and with minimum stress for the specimens. Adult dragonflies are flying hunters. In enclosures, they are usually fed by adding different

kinds of adult dipterans. In this study, I additionally fed specimens of *Orthetrum coerulescens* by hand. Each specimen received one house fly or up to six fruit flies per day. This was less than an adult dragonfly would normally consume; however, this additional hand feeding was enough to significantly increase the survival rate of individuals, especially within the first 12 days of adult life. The maximum life span (subadult and adult) observed was about 60 days, for both hand-fed adults and those that were not hand fed." (Author)] Address: Koch, Kamilla, Department of Ecology, Johannes Gutenberg-University of Mainz, Becherweg 13, 55128 Mainz, Germany

13858. Kohara, Y.; Nishimata, M.; Mori, H.; Yoshimoto, S.; Matsuda, S.; Kuroki, I.; Nakamura, K. (2014): Discovery of *Ceriagrion nipponicum* from Okayama Prefecture, Japan. *Naturalistae* 18: 43-45. (in Japanese, with English summary) ["*C. nipponicum*, was found in Okayama Prefecture, Japan where the species had not been recorded. The damselfly is designated as an endangered species nationwide all over Japan. Two adult males and a female were observed around an artificial pond in Tamano City. A male-female pair laid eggs into plant body of waterweeds. It is considered that *C. nipponicum* has established in the habitat where we observed." (Authors)] Address: Kohara, Y., Dept of Biosphere-Geosphere System Science, Faculty of Informatics, Okayama University of Science, 1-1 Ridai-cho, Kita-ku, Okayama-shi, Okayama-ken 700-0005, Japan.

13859. Kok, J.M.; Chahl, J. (2014): Resonance versus aerodynamics for energy savings in agile natural flyers. *Proc. SPIE* 9055, *Bioinspiration, Biomimetics, and Bioreplication* 2014, 905504 (March 8, 2014), San Diego, California, USA; doi:10.1117/12.2045030. Conference Volume 9055 (in English) ["Insects are the most diverse natural flyers in nature, being able to hover and perform agile manoeuvres. Dragonflies in particular are aggressive flyers, attaining accelerations of up to 4g. Flight in all insects requires demanding aerodynamic and inertial loads be overcome. It has been proposed that resonance is a primary mechanism for reducing energy costs associated with flapping flight, by storing energy in an elastic thorax and releasing it on the following half-stroke. Certainly in insect flight motors dominated by inertial loads, such a mechanism would be extremely beneficial. However in highly manoeuvrable, aerodynamically dominated flyers, such as the dragonfly, the use of elastic storage members requires further investigation. We show that employing resonant mechanisms in a real world configuration produces minimal energy savings that are further reduced by 50 to 133% across the operational flapping frequency band of the dragonfly. Using a simple harmonic oscillator analysis to represent the dynamics of a dragonfly, we further demonstrate a reduction in manoeuvring limits of ~1.5 times for a system employing elastic mechanisms. This is in contrast to the potential power reductions of $\sqrt{2}/2$ from

regulating aerodynamics via active wing articulation. Aerodynamic means of energy storage provides flexibility between an energy efficient hover state and a manoeuvrable state capable of large accelerations. We conclude that active wing articulation is preferable to resonance for aerodynamically dominated natural flyers." (Authors)] Address: Chahl, J., School of Engineering, Univ. South Australia, Mawson Lakes Campus W2-44, Australia. E-mail: Javaan.Chahl@unisa.edu.au

13860. Kolaríkova, K.; Horecký, J.; Liška, M.; Jíchová, M.; Tátosová, J.; Lapšanská, N.; Horická, Z.; Chvojka, P.; Beran, L.; Košel, V.; Matina, J.; Ciamporová-Taoviová, Z.; Krno, I.; Bulánková, E.; Šporka, F.; Kment, P.; Stuchlík, E. (2014): Benthic macroinvertebrates along the Czech part of the Labe and lower section of the Vltava rivers from 1996–2005, with a particular focus on rare and alien species. *Biologia* 69/4: 508-521. (in English) ["In the Czech part of the Labe River and the lower part of the Vltava River, we examined if the benthic macroinvertebrate composition changed from 1996 to 2005 due to expected improvements in water quality resulting from socioeconomic changes in the Czech Republic since the 1990s. Special attention was given to rare and alien species. The four biological metrics used (Number of taxa, BMWP, Number of sensitive taxa, and Number of EPT taxa) demonstrated that there was indeed an improvement in water quality as well as a slight improvement of the Labe microhabitats during the investigated period. An increasing Number of taxa over time was observed at most sites. Two main concurrent ecological processes are recently in progress in the Labe: a recovery of native species and an expansion of alien species, some of which are considered invasive. The caddisfly *Setodes punctatus* and the beetle *Pomatinus substriatus*, considered as regionally extinct in the Czech Republic until 2005, were rediscovered during our investigations. Findings of the crustacean *Hemimysis anomala* (invasive) and the chironomids *Stenochironomus* sp. and *Lipiniella* sp. were the first records of these taxa in the Czech Republic." (Authors)] A total of 17 Odonata species are reported including *Gomphus vulgatissimus*, *Onychogomphus forcipatus*, and *Ophiogomphus cecilia*.] Address: Kolaríkova, Kateřina, Institute for Environmental Studies, Faculty of Science, Charles University in Prague, Benátská 2, CZ-12843 Praha 2, Czech Republic. E-mail: katerina.kolarikova@natur.cuni.cz

13861. Koskinen, J. (2014): Sudenkorentoaineiston tilastollinen testaaminen [Statistical testing of odonotological data]. *Crenata* 7: 40-41. (in Finnish, with English summary) ["The philosophy and basics of statistical testing are explained. Fischer's exact test and FDR adjustment are explained, and the error sources are discussed." (Author)] Address: not stated

13862. Koskinen, J.; Eronen, R.; Latja, P. (2014): Viherukonkorennon *Aeshna viridis* iltaparveilu Polvijär-

vellä heinäkuussa 2013 [Crepuscular swarming behaviour of *Aeshna viridis* at Polvijärvi in July 2013]. *Crenata* 7: 44-45. (in Finnish, with English summary) ["The swarming behaviour of *A. viridis* was observed on 30-vii-2013 from 22.15-23.00 at lake Solanlampi in Polvijärvi municipality (62° 45 N, 29° 20 E) in Northern Karelia region. The sunset was at 22.30. At 22.15 hawkers started to appear on the lake. At 22.30 the lake was crowded with at least hundreds, maybe even thousands of hawkers. All identified individuals were *Aeshna viridis*, the rest showed *viridis*-like jizz and behaviour. The intense swarming started with individuals widely scattered along lake margins but the dragonflies quickly concentrated at a few open spots with less floating vegetation. No aggressive or mating behaviour was observed, the flight style suggested feeding behaviour. The swarming ended abruptly at 22.55 and at 23.00 the lake was practically empty, the dragonflies having left. The weather was calm, half-cloudy, from +22°C (20.00h) to +17°C (23.00h). A video of the swarming behaviour (recorded by Risto Eronen) has been uploaded to YouTube service under the name „Viherukonkorennon (*Aeshna viridis*) iltaparveilu“ <http://www.youtube.com/watch?v=ZrGYQJPw-Jc> (Authors)] Address: not stated

13863. Kosterin, O.E. (2014): Notes on intraspecific variation of some Gomphidae (Odonata) species in Cambodia. *International Dragonfly Fund - Report* 68: 1-16. (in English) ["Specimens of *Burmagomphus asahinai* Kosterin, Makbun and Dawwrueng, 2012 and *Burmagomphus divaricatus* Lieftinck, 1964 from SW and NE Cambodia show differences in the development of the light pattern. One male of the latter species has unusual posterior spinules on posterior hamuli. Two males of *Orientogomphus minor* (Laidlaw, 1931) from the same locality in NE Cambodia have substantial differences in the thoracic and abdominal pattern. NE Cambodian specimens of *Gomphidia abbotti* Williamson, 1907 and *Lamelligomphus castor* (Lieftinck, 1941) have minor differences from data on these species from literature. Caution is necessary when composing and using keys for identification of the mentioned genera of gomphids." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

13864. Lamond, B. (2014): Comet Darners in Ontario in 2012-2013 with a focus on Brantford records. *The Wood Duck* 67(6): 129-131. (in English) [*Anax longipes*, Hamilton, Ontario, Canada.] Address: Lamond, B. E-mail: bill-lamond@hotmail.com

13865. Larson, K. (2014): A survey that established a baseline population data set for Odonata species in Jay Cooke State Park, Carlton County, Minnesota. *Duluth Journal of Undergraduate Research in Science* 2014: 13-16. (in English) ["In an effort to create a baseline population data set of Odonata in Jay Cooke State Park

a survey was conducted from May 29, 2013 to September 26, 2013 by using hand-netting techniques, in the field identification on live specimens, as well as proper treatment, storage and documentation of caught specimens. The purpose of this survey was to create an online accessible data set that can be used in the future for research on topics such as climate change, watershed health and other ecological issues being that Odonata are bioindicators of ecosystem health due to their obligate aquatic nymph forms. Only 3 adult males were collected of each species found to ensure no damage to future populations. Contrasted to population data previously reported there were 11 species added from the 2013 survey to the list of documented species found in Carlton County. These newly documented 11 species were part of the 35 different species caught from a total of 67 specimens collected." (Author)] Address: Larson, Kendra, Swenson College of Science and Engineering, University of Minnesota Duluth, USA. E-mail: Lars4094@d.umn.edu

13866. Letsch, H.; Gottsberger, B.; Ware, J. (2014): Ancient biogeography and evolution of dragonflies (Odonata: Anisoptera). *BioDivEvo2014 - Joint conference — 15th Annual Meeting of the Society of Biological Systematics (GfBS), 22nd International Symposium of the German Botanical Society (DBG), "Biodiversity and Evolutionary Biology" — Dresden · March 24 – 27, 2014, Technische Universität Dresden, Germany.* This meeting is funded by the German Research Foundation. Publisher: Senckenberg Naturhistorische Sammlungen Dresden, Königsbrücker Landstraße 159 · 01109 Dresden · Germany; Editor-in-Chief: Uwe Fritz (Zoology) on behalf of the German Society for Biological Systematics (GfBS), Christoph Neinhuis (Botany) on behalf of Section „Biodiversity and Evolutionary Biology“, the German Botanical Society (DBG); Distributor: Senckenberg Naturhistorische Sammlungen Dresden, Königsbrücker Landstraße 159 · 01109 Dresden · Germany. ISBN 978-3-910006-49-2: 105. (in English) [Verbatim: From Early Triassic to Middle Jurassic, earth land masses were united in the supercontinent Pangaea. The Late Jurassic break-up of Pangaea into Laurasia (later giving rise to North America, Europe, and Asia), and Gondwana, (later South America, Africa, India, Antarctica, and Australia) led to increased diversification and the contemporary vicariant distribution of plants and animals. While the congruence of tetrapod evolution and continental fragmentation has been documented by recent phylogenetic and biogeographical studies, no work has been conducted until now to explicitly reconstruct the phylogenetic relationships and biogeography of insect groups in the context of ancient continental drift in the Mesozoic. In the present study, we want to explore the potential pangaeian appearance of dragonfly families (Odonata: Anisoptera) and their subsequent diversification in concordance to continental schisms. We compiled a comprehensive molecular data set, based on eight ribosomal RNA and protein

coding genes, representing all major dragonfly groups. Based on this data, tree reconstruction was conducted and divergence times of the anisopteran families were estimated. We additionally reconstructed ancestral areas to retrace their historical biogeography. Our phylogenetic reconstruction proposes Aeshnoidea as the first branch in Anisoptera and Petaluroidea as sister group to Cavilabiata, the latter being subdivided into Cordulegastroidea and Libelluloidea. Divergence time estimation clearly shows a pangaeian appearance and early radiation of all anisopteran superfamilies. The reconstruction of ancestral areas suggests North America as the cradle of all Anisoptera and hot spot for the early radiation of Gomphoidea and Petaluroidea. Libelluloidea probably emerged and primary radiated in Eurasia, with subsequent independent dispersal events to the southern continents. Our results suggest a persistent yet tenuous dispersal route between Eurasia and Africa in the Lower Cretaceous.] Address: Ware, Jessica, Department of Biological Sciences, Rutgers University, Newark, NJ, 07102, USA

13867. Li, F.; Kwon, Y.-S.; Bae, M.-J.; Chung, N.; Kwon, T.S.; Park, Y.-S. (2014): Potential impacts of global warming on the diversity and distribution of stream insects in South Korea. *Conservation Biology* 28(2): 498-508. (in English, with Spanish summary) ["Globally, the East Asian monsoon region is one of the richest environments in terms of biodiversity. The region is undergoing rapid human development, yet its river ecosystems have not been well studied. Global warming represents a major challenge to the survival of species in this region and makes it necessary to assess and reduce the potential consequences of warming on species of conservation concern. We projected the effects of global warming on stream insect (Ephemeroptera, Odonata, Plecoptera, and Trichoptera [EOPT]) diversity and predicted the changes of geographical ranges for 121 species throughout South Korea. Plecoptera was the most sensitive (decrease of 71.4% in number of species from the 2000s through the 2080s) order, whereas Odonata benefited (increase of 66.7% in number of species from the 2000s through the 2080s) from the effects of global warming. The impact of global warming on stream insects was predicted to be minimal prior to the 2060s; however, by the 2080s, species extirpation of up to 20% in the highland areas and 2% in the lowland areas were predicted. The projected responses of stream insects under global warming indicated that species occupying specific habitats could undergo major reductions in habitat. Nevertheless, habitat of 33% of EOPT (including two-thirds of Odonata and one-third of Ephemeroptera, Plecoptera, and Trichoptera) was predicted to increase due to global warming. The community compositions predicted by generalized additive models varied over this century, and a large difference in community structure in the highland areas was predicted between the 2000s and the 2080s. However, stream insect communities, espe-

cially Odonata, Plecoptera, and Trichoptera, were predicted to become more homogenous under global warming." (Authors)] Address: Park, Y.-S., Department of Biology, Kyung Hee University, Seoul, Republic of Korea. E-mail: parkys@khu.ac.kr

13868. Li, X.j.; Zhang, Z.-h.; Liang, Y.-h.; Ren, L.-q.; Jie, M.; Yang, Z.-g. (2014): Antifatigue properties of dragonfly *Pantala flavescens* wings. *Microscopy Research and Technique* 77(5): 356-362. (in English) ["The wing of a dragonfly is thin and light, but can bear high frequent alternating stress and present excellent antifatigue properties. The surface morphology and microstructure of the wings of *P. flavescens* were observed using SEM in this study. Based on the biological analysis method, the configuration, morphology, and structure of the vein were studied, and the antifatigue properties of the wings were investigated. The analytical results indicated that the longitudinal veins, cross veins, and membrane of dragonfly wing form an optimized network morphology and spacially truss-like structure which can restrain the formation and propagation of the fatigue cracks. The veins with multilayer structure present high strength, flexibility, and toughness, which are beneficial to bear alternating load during the flight of dragonfly. Through tensile-tensile fatigue failure tests, the results were verified and indicate that the wings of dragonfly *P. flavescens* have excellent antifatigue properties which are the results of the biological coupling and synergistic effect of morphological and structural factors." (Authors)] Address: Zhang, Z.-h., Key Laboratory of Bionic Engineering (Ministry of Education, China), Jilin University, 5988 Renming Street, Changchun 130025, People's Republic of China. E-mail: zhzh@jlu.edu.cn

13869. Liang, B.; Sun, M. (2014): Dynamic flight stability of a hovering model dragonfly. *Journal of Theoretical Biology* 348: 100-112. (in English) ["•Hovering flight of the model dragonfly is inherently unstable. •The instability is caused by the horizontal-velocity/pitch-moment derivative. •Damping force and moment derivatives weaken the instability considerably. •Forewing/hindwing interaction has little effect on the stability properties. •High stroke-plane angles affect how stability derivatives are produced. The longitudinal dynamic flight stability of a model dragonfly at hovering flight is studied, using the method of computational fluid dynamics to compute the stability derivatives and the techniques of eigenvalue and eigenvector analysis for solving the equations of motion. Three natural modes of motion are identified for the hovering flight: one unstable oscillatory mode, one stable fast subsidence mode and one stable slow subsidence mode. The flight is dynamically unstable owing to the unstable oscillatory mode. The instability is caused by a pitch-moment derivative with respect to horizontal velocity. The damping force and moment derivatives (with respect to horizontal and vertical velocities and pitch-rotational velocity, respectively) weaken the instability considerably. The aerodynamic inter-

action between the forewing and the hindwing does not have significant effect on the stability properties. The dragonfly has similar stability derivatives, hence stability properties, to that of a one-wing-pair insect at normal hovering, but there are differences in how the derivatives are produced because of the highly inclined stroke plane of the dragonfly." (Authors)] Address: Sun, M., Ministry-of-Education Key Laboratory of Fluid Mechanics, Beijing University of Aeronautics & Astronautics, Beijing, China. E-mail: m.sun@buaa.edu.cn

13870. Lonkar, S.S.; Kedar, G.T. (2014): Macrozoobenthic diversity of three urban lakes of Nagpur, central India. *International Journal of Advanced Research* 2(4): 1082-1090. (in English) ["The present study was carried at three urban lakes of Nagpur City in Central India from September 2010 to August 2012 confirmed macrozoobenthic diversity of 30 species belonging to 4 different phylum, viz Platyhelminths, Annelida, Arthropoda, Mollusca. The most abundant species are observed in Phylum Arthropoda, Class Insecta as larvae, nymph and naids of the aquatic insects. The presence of species belonging to Phylum Mollusca are also more in number with the occurrence of Gastropoda and Pelecypoda. The occurrence of Phylum Annelida is prominent with class Oligochaeta and Hirudinea. The species belonging to Phylum Platyhelminths of class Turbellaria are least in study. The study suggests that the rich benthic fauna is due to the organic rich habitat in the three urban lakes of city." (Authors) Unspecified dragonfly zygopteran and anisopteran larvae are listed.] Address: Lonkar, S.S., Dept. of Zoology, Institute of Science, Nagpur-10, India

13871. Loureiro, N. (2014): Dragonflies and damselflies (Insecta: Odonata) collected during the Lindberg expedition to the Cape Verde Islands, 1953-54. *Zoologia Caboverdiana* 4(2) (2013): 43-48. (in English, with Portuguese summary) ["In this paper, 47 specimens of Odonata collected by H. Lindberg and his assistant S. Panelius in the Cape Verde Islands in 1953-1954 and identified by K.J. Valle and K.F. Buchholz, are presented. *Agriocnemis exilis*, collected in Boa Vista Island in February 1954, is added to the list of Odonata known from the archipelago. The collection also includes specimens from *Ischnura senegalensis* which was previously recorded in Cape Verde on only two occasions, in 1898 and 2000." (Author)] Address: Loureiro, N., Centre for Environmental Biology – ACD, Lisboa, and Universidade do Algarve, FCT, Campus de Gambelas, 8005-139 Faro, Portugal, E-mail: odonata@nsloureiro.pt

13872. Macias, S.; Dinning, J. (2014): Possible range expansion of *Coenagrion puella* (Azure Damselfly) in North-East Scotland. *J. Br. Dragonfly Society* 30(1): 9-16. (in English) ["The clear fell of a coniferous plantation near the Ley Pond at Crathes Castle, Aberdeenshire, in the winter of 2011/12 was followed by a survey of the Odonata populations at the pond, with the purpose of

understanding the progress of these populations after a significant change to an adjacent habitat. In the second year of the survey, individuals of *C. puella* were found for the first time and this is discussed in terms of range expansion of this species." (Authors)] Address: Macias, Sara, 1 Rangers Office, Crathes Castle, Banchory, AB31 5QJ 243 Gairn Terrace, Aberdeen, AB10 6AY, UK

13873. Mäkinen, J. (2014): Hämeen Sudenkorennot [The dragonflies of Häme]. *Crenata* 7: 14-39. (in Finnish, with English summary) ["Distribution maps are presented for all 51 dragonfly species observed in the provinces of Kanta-Häme and Pajät-Häme (together known as Häme) in South Finland. Records made before 1980 and after that are shown with different map symbols. Contrary to many other areas in Finland the dragonfly fauna of Häme has been intensively studied during the past decades, offering the opportunity to analyse data for possible changes in species abundance. Statistical analyses performed by Janne Koskinen revealed a statistically significant decline of four species whereas seven species show a positive trend. The declining species are *Lestes dryas*, *Coenagrion armatum*, *Gomphus vulgatissimus* and *Leucorrhinia dubia*. Increasing species are *Calopteryx splendens*, *Coenagrion pulchellum*, *Brachytron pratense*, *Epithea bimaculata*, *Somatochlora flavomaculata*, *Libellula depressa* and *Leucorrhinia pectoralis*. Reasons for decline remain unclear. Although *Coenagrion armatum* has declined in many European countries it is still classified as „least concern species“ in Finland. The majority of the increasing species are considered to be „southern species“ and their increase might be a result of a northward shift of their distribution due to climate change. Since 1979 not less than eight species have been found in Häme for the first time, most of which already breed in the area, at least occasionally." (Author)] Address: Mäkinen, J., Metsänhoitajankatu 12 B 16, FI-00790 Helsinki, Finland. E-mail: makisenjussi@gmail.com

13874. Malkmus, R. (2014): Zur Verbreitung von Amphibien, Reptilien und Libellen in den Ostalpen (5. Nachtrag).. *Nachrichten des Naturwissenschaftlichen Museums der Stadt Aschaffenburg* 110: 71-78. (in German, with English summary) [During 14 excursions (2006 - 2013) to eight alpine mountain ranges (Karwendel, Rofan, Dachstein Schladminger Tauern, Wölzer Tauern, Kitzbühler-, Tuxer- und Zillertaler Alpen) in the eastern Austrian Alps data on distribution and biology of amphibians, reptiles and dragonflies were registered. Dragonfly species recorded are: *Aeshna juncea*, *A. cyanea*, *A. caerulea*, *Enallagma cyathigerum*, *Coenagrion puella*, *Enallagma cyathigerum*, *Libellula quadrimaculata*, *Pyrhosoma nymphula*] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

13875. Malkmus, R. (2014): Erstnachweis von *Cordulegaster bidentata* für den Odenwald. *Nachrichten des Naturwissenschaftlichen Museums der Stadt Aschaf-*

fenburg 110: 65-66. (in German, with English summary) [The occurrence of *C. bidentata* in the Odenwald mountains (Bayern, Germany) was registered for the first time: 26-V-2012, Dörnbachs s Breitenbuch (400 m a.s.l.)] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

13876. Malkmus, R. (2014): Verbreitung der Gestreiften Quelljungfer (*Cordulegaster bidentata* Selys 1843) im Spessart. *Nachrichten des Naturwissenschaftlichen Museums der Stadt Aschaffenburg* 110: 57-64. (in German, with English summary) [Bayern, Germany. "The occurrence of *Cordulegaster bidentata* in the Spessart mountains was registered for the first time. The 56 sites were found in little spring brooks on a specific geological formation (diorite, gneiss, quartzite, micashist, "Bröckelschiefer") restricted to the northwestern part of the investigated area. Remarkable is the dominance of *C. bidentata* in this region over *C. boltonii* in this region – a species which is very common along brooks in the sandstone area." (Author)] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

13877. Malkmus, R. (2014): Die Verbreitung der Zweigestreiften Quelljungfer *Cordulegaster boltonii* (Donovan, 1807) im Spessart. *Jahresberichte der Wetterauischen Gesellschaft für die gesamte Naturkunde* 163–164: 1-7. (in German, with English summary) ["The distribution of *C. boltonii* in the Spessart mountains (north western Bavaria) was researched between 2009 and 2012. 680 brooks were investigated, 309 larvae sites of the dragonfly could be registered in permanent Wowing brooks on different geological formations (sandstone, metamorphic rocks, basalt, eolian sand), except of shell-limestone. Except of some brook systems in the western and northern part, *C. boltonii* is not endangered in the investigated area." (Author)] Address: Malkmus, R., Schulstr. 4, D-98759 Wiesthal, Germany

13878. Marinov, M.; Powell, D.; Powell, R. (2014): For the Dragonflies and their homes. Bulgarian Biodiversity Foundation, ISBN: 978-954-9959-62-8 (Bilingual in Bulgarian and English)



13879. McLennan, M.R. (2014): Chimpanzee insectivory in the northern half of Uganda's Rift Valley: do Bulindi chimpanzees conform to a regional pattern?. *Primates* 55: 173-178. (in English) ["Insects are a nutritious food source for many primates. In chimpanzees, insectivory is most prevalent among communities that manufacture tools to harvest social insects, particularly ants and termites. In contrast to other long-term study sites, chimpanzees (*Pan troglodytes schweinfurthii*) in Budongo Forest and Kibale National Park, Uganda, rarely eat insects and have small foraging tool kits, supporting speculation that infrequent insectivory—technically aided or otherwise—characterises chimpanzees in this part of Uganda's Rift Valley. To expand the dataset for this region, insect foraging was investigated at Bulindi (25 km from Budongo) over 19 months during two studies in 2007–2008 and 2012–2013. Systematic faecal analysis demonstrated that insectivory is a habitual foraging activity at this site. Overall levels of insect consumption varied considerably across months but were not predicted by monthly changes in rainfall or fruit intake. Unlike their Budongo and Kibale counterparts, Bulindi chimpanzees often consume ants (principally weaver ants, *Oecophylla longinoda*) and use sticks to dig out stingless bee (*Meliponini*) ground nests. In other respects, however, insectivory at Bulindi conforms to the pattern observed elsewhere in this region: they do not manufacture 'fishing' or 'dipping' tools to harvest termites and aggressive or hard-to-access ants (e.g., army ants, *Dorylus* spp.), despite availability of suitable prey. The Bulindi data lend support to the supposition that chimpanzees in this part of the Rift Valley rarely exploit termites and *Dorylus* ants, apparently lacking the 'cultural knowledge' that would enable them to do so most efficiently (i.e., tool use). The study's findings contribute to current debates about the relative influence of genetics, environment and culture in shaping regional and local variability in *Pan* foraging ecology." (Author) The diet also includes a few Odonata.] Address: McLennan, M.R., Faculty of Humanities and Social Sciences, Anthropology Centre for Conservation, Environment and Development, Oxford Brookes University, Gypsy Lane Campus, Oxford OX3 0BP, UK. E-mail: mmclennan@brookes.ac.uk

13880. Mehdi, H.; Kumar Lakhera, B.; Kamboj, A. (2014): Numerical analysis of steady and unsteady flow for dragonfly wing section in gliding mode. *International Journal of Advanced Mechanical Engineering* 4(4): 365-370. (in English) ["A comprehensive numerical Analysis of Steady and Unsteady flow on the wing of Dragon fly *Aeshna cyanea* has been performed at ultra low Reynolds numbers 100, 200, 500 ,and 1000 with angle of attack 0°,5°,10°,12.5°,15° corresponding to the gliding flight of these dragon flies. The simulations employ an unstructured triangular mesh based on finite volume discretization. A critical assessment of the computed results was performed. The results give a satisfactory measure of confidence in the fidelity of the simulation."

(Authors)] Address: Mehdi, H., Department of Mechanical Engineering, MIT, Meerut, (U.P) 250002, India

13881. Mitra, A.; Dem, C.; Gyeltshen, K.; Dorji, L.; Kumar Puri, N.; Tshering, P.; Wangdi, P.; Acharya, P.; Namgyel, R.; Dorji,S.; Phuntsho, S.; Lhaden (2014): Odonata survey in Central and Western Bhutan covering eight Dzongkhags (Districts): An annotated species list with nine new records. *Journal of Entomology and Zoology Studies* 2(2): 11-15. (in English) ["122 specimens have been collected spreading to 46 species under 32 genera and 11 families from different parts of central and western Bhutan during August 13 to 23, 2013. *Agriocnemis clauseni*, *Ceriagrion* sp., *Himalagrion exclamationis*, *Platylestes praemorsus*, *Perisogomphus stvensi*, *Anax indicus*, *Brachydiplax sobrina*, *Neurothemis intermedia atalanta*, *Tamea basilaris* are the new records for Bhutan. Geographical position and collection details are provided for each species which are supplemented by abdominal length, hind wing length and some other identifying characters for the new records. After the present study a total of 84 species and subspecies of Odonata are known to occur in Bhutan." (Authors)] Address: Mitra, A., School of Life Sciences, Sherubtse College, Kanglung, Bhutan. E-mail: amitonodona@yahoo.com

13882. Monteiro-Júniora, C.S.; Juen, L.; Hamada, N. (2014): Effects of urbanization on stream habitats and associated adult dragonfly and damselfly communities in central Brazilian Amazonia. *Landscape and Urban Planning* 127: 28-40. (in English) ["Highlights: •In Amazonia, most damselfly species appear to favor preserved environments. •Urbanization affects Zygoptera more than Anisoptera. •Even sites with only a little riparian vegetation harbour their own Odonata fauna. •The community of adult dragonflies and damselflies can provide a good measure to classify environments. •Maintaining riparian vegetation is important for conserving aquatic biota. Abstract: Thirty streams, located in Manaus in the central part of Brazilian Amazonia, were examined to evaluate the correlations between environmental integrity and the local communities of adult dragonflies and damselflies. The presence of damselflies would have a positive correlation with environmental integrity, and dragonflies a negative one due to their contrasting ecophysiological requirements. The environmental integrity of each site was estimated based on the Habitat integrity index (HII), which was modified for this study in an urban area. The hypothesis that would be differences in assemblage composition between streams in differently urbanized areas was supported, possibly because most damselfly species are considered to be specialists that are found in pristine habitats, whereas dragonflies seem to be generalists and are likely to be found in disturbed environments. The ordination indicated systematic differences in community composition based on the degree of conservation of the environment, with the communities

found in well-preserved habitats being distinct from those found in intermediate and degraded ones. Differences in the composition of odonate communities reflect differences in the integrity of the environment, but they can also provide a measure of the intensity of impacts, thus contributing to the development of effective conservation strategies. In addition, the HII, which is applied rapidly and easily, provides environmental managers with an objective measure of the degree of alteration of aquatic habitats. Maintenance of forest cover along watercourses is clearly essential for the conservation of hydrological resources and the aquatic organisms that depend on these environments." (Authors)] Address: Monteiro-Júnior, C.S., Laboratório de Ecologia e Conservação, Universidade Federal do Pará, Instituto de Ciências Biológicas, Rua Augusto Correia, No. 1 Bairro Guama, CEP 66.075-110 Belém, Pará, Brazil. E-mail: csmonteirojr@gmail.com

13883. Müller, J. (2014): Rosmarie Steglich - herzliche Glückwünsche zur Vollendung des 70. Lebensjahres. *Entomologische Mitteilungen Sachsen-Anhalt* 22(1): 63-65. (in German) [Sachsen-Anhalt; Germany; the note includes biographic data and an updated list of publications starting 2003.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

13884. Muzon, J.; del Palacio, A.; Ramos, L. (2014): *Ischnura ultima* Ris, 1908 (Odonata: Coenagrionidae): New records from southern South America. *Check List* 10(1): 187-188. (in English) ["*Ischnura ultima* Ris, 1908 is recorded for the first time from Buenos Aires Province, Argentina, 750 km southeast from the southernmost previous known localities (Córdoba Province). This finding supports a stronger biogeographical relationship between the southern hills of Buenos Aires (surrounded by the Pampas lowlands) and the Monte province. In addition, this record supports the odonate endemic areas scheme previously proposed for Argentina." (Authors)] Address: Muzón, J., Instituto de Limnología "Dr. R.A. Ringuelet" (CONICET-CCT La Plata), C.C. 712. 1900. La Plata, Argentina. E-mail: muzon@ilpla.edu.ar

13885. Na, Y.; Sun, C.; Li, T.; Li, Y. (2014): The Insect Oviposition Firstly Discovered on the Middle Jurassic Ginkgoales Leaf from Inner Mongolia, China. *Acta Geologica Sinica - English Edition* 88(1): 18-28. (in English) ["Although the evidence of insect oviposition on plant organs has been reported from the late Paleozoic to the Miocene, record from the middle Jurassic is still blank. This paper reports a significant evidence of insect oviposition on plant leaf from the middle Jurassic for the first time. The ovipositional scar is distributed on the abaxial surface of Sphenobaiera leaf (Ginkgoales) from the middle Jurassic Daohugou Formation of Inner Mongolia, China. A new ichnospecies *Paleoovoidus venustus* sp. nov. is described. The scar is elliptic to oval, ar-

ranged in longitudinal rows between leaf veins with almost regular distance, with its long axis paralleling to the leaf venation. This discovery adds new information to the morphology of insect endophytic oviposition probably produced by Odonata existed in a terrestrial ecosystem ~165 Ma ago. The new materials also provide important data for the study of insect reproductive biology, plant-insect interaction and coevolution, as well as understanding the paleoclimate and palaeoenvironment during that time in northeast China." (Authors)] Address: Sun, C., The Key Laboratory for Evolution of Past Life and Environment in Northeast Asia, Ministry of Education, Jilin University, Jilin, China. E-mail: cls5788@qq.com

13886. Nava-Bolaños, A.; Sánchez-Guillén, R.A.; Munguía-Steyer, R.; Córdoba-Aguilar, A. (2014): Isometric patterns for male genital allometry in four damselfly species. *Acta ethol.* 17: 47-52. (in English) ["Studies have found that insect genitalic traits show negative allometry, i.e., are relatively small in relation to body size. One interpretation of this is that males use their genitalia to stimulate females. Thus, given the nature of damselfly copulation in which males physically reach the rival sperm that females have stored from previous matings, male genitalic traits are not expected to show negative allometry. To test this idea, we assessed (a) the rival sperm displacement function by the mating male and (b) allometry of aedeagal length of four damselfly species (*Argia anceps*, *Argia tezpi*, *Argia extranea*, and *Enallagma praevarum*). Sperm displacement was assessed by inspecting whether the aedeagus reached the rival sperm during copulation in mating pairs for the four species. To have a standard for comparing allometric patterns, allometry of aedeagal was compared to that of two non-genital traits, tibial, and fourth abdominal segment length. In all cases, the aedeagus was found to reach the rival sperm which supports the idea that stimulation is not the mechanism for sperm displacement but physical displacement. Aedeagal length was isometric, and its slope was lower in general compared to that of tibial length and fourth abdominal segment. Given that this isometric pattern is not common for other odonate species, our interpretation of these varying aedeagal scaling patterns in this insect order is that males' and females' sexual interests are in conflict (males are evolving an elongated aedeagus to reach rival sperm while females are evolving unreachable sperm storage organs to prevent displacement of stored sperm). This sexual conflict scenario would favour varying scaling patterns for aedeagal length in odonates. A final interpretation is that the risk of interspecific matings in damselflies, may also explain different species-specific, aedeagal allometries." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

13887. Nel, A.; Azar, D.; Huang, D.-Y. (2014): A new Middle Jurassic Chinese fossil clarifies the systematic composition of the Heterophlebioptera (Odonata: Trigonoptera). *Alcheringa* 38(1): 130-134. (in English) ["Juraheterophlebia sinica, a new species of damselfly, is described from the Middle Jurassic of China. Its fore- and hind wings in connection to the body allows comparison of the type genera of the families Erichschmidtidae and Juraheterophlebiidae, respectively based on a forewing and a hind wing. Juraheterophlebiidae is a junior synonym of the Erichschmidtidae. The new fossil confirms the previous attributions of Erichschmidtia and Juraheterophlebia to the clade Heterophlebioptera." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

13888. Nkalubo, W.; Chapman, L.; Muyodi, F. (2014): Feeding ecology of the intensively fished Nile Perch, *Lates niloticus*, in Lake Victoria, Uganda. *Aquatic Ecosystem Health & Management* 17(1): 62-69. (in English) ["The diet of Nile Perch (8.0–121.0 cm total length [TL]) from the Ugandan waters of Lake Victoria was quantified through stomach content analysis of specimens collected from experimental catches and fish factory samples. A total of 7824 stomachs (5602 from experimental fishing and 2222 from factory samples) were examined, of which 34.8% contained food. Fish from the experimental catches were smaller (8.0–41.6 cm TL) and had a higher diversity of prey dominated by unidentifiable fish prey, haplochromine cichlids, *Rastrineobola argentea*, Odonata and *Caridina nilotica*, while larger fish (30.0–121.0 cm TL) from the factory samples had a predominance of fish remains and haplochromine cichlids. Nile Perch that had a high proportion of fish prey (versus invertebrates) in their stomachs showed a larger size for a given age, and were in a better condition ($K = 1.24$) than those that had primarily invertebrates ($K = 1.10$) in their stomachs. Nile Perch exhibited a much smaller size (15 cm versus 30 cm TL) at shift to piscivory in comparison to Nile Perch examined in earlier studies, when haplochromines were rare in Lake Victoria. The recovery of haplochromine cichlids coincident with declining Nile Perch densities illustrates the importance of developing sustainable management options that can define a proper balance between fishing mortality and Nile Perch predation." (Authors)] Address: Nkalubo, Winnie, National Fisheries Resources Research Institute, P.O. Box 343, Jinja, Uganda

13889. Outomuro, D.; Rodríguez-Martínez, S.; Karlsson, A.; Johansson, F. (2014): Male wing shape differs between condition-dependent alternative reproductive tactics in territorial damselflies. *Animal Behaviour* 91: 1-7. (in English) ["Highlights: •We explored the role of wing morphology in territory-holding potential. •We studied three species of *Calopteryx* damselflies in natural populations. •Wing shape differed between territorial and nonterritorial tactics. •The pattern of variation was

similar in hindwings, but not in forewings. Territorial contests between males without weaponry are based on costly displays and can result in condition-dependent alternative reproductive tactics that maximize male fitness. Physiological and morphological traits such as fat content, body size or the expression of secondary sexual traits have been shown to contribute to male territory-holding potential. When territorial contests are based on flight displays, wing morphology is expected to contribute to the territory-holding potential of a male through its effects on flight performance. We explored whether wing shape contributed to the territory-holding potential of males of three species of *Calopteryx* damselflies. Males of these species show two distinct, condition-dependent behavioural tactics: territorial and nonterritorial. Previous studies have shown that territorial males have higher fitness than nonterritorial males. We used mark-recapture to determine male tactics within the populations and compared wing shape, size and wing coloured spot size (a secondary sexual trait) between tactics. Territorial males of all three species had shorter and slightly broader hindwings than nonterritorial males. In two species, forewings of territorial males were longer and broader than forewings of nonterritorial males. Wing size and wing spot size did not differ between tactics. We suggest that the wing shape of territorial males might confer better flight manoeuvrability, which would be advantageous for territorial contests. Therefore, wing shape is likely to be an important trait contributing to territory-holding potential in condition-dependent alternative reproductive tactics based on flight displays." (Authors)] Address: Outomuro, D., Department of Ecology and Genetics, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, 75236 Uppsala, Sweden. E-mail: outomuro.david@gmail.com

13890. Perveen, F.; Khan, A.; Rauf, S.A. (2014): Check list of first recorded dragonfly (Odonata: Anisoptera) fauna of District Lower Dir, Khyber Pakhtunkhwa, Pakistan. *Arthropods* 3(2): 120-126. (in English) [A collection of 318 dragonflies was made during May-July 2011 from district Lower Dir, Khyber Pakhtunkhwa, Pakistan including 11 species: *Cordulegaster brevistigma*, *Onychogomphus bistrigatus*, *Rhodothemis rufa*; *Orthetrum cancellatum*; *O. pruinatum*, *O. neglectum*; *O. triangulare*; *O. sabina*; *Diplacodes lefebvrei*; *D. trivialis*; *Sympetrum decoloratum*; *Pantala flavescens*.] Address: Perveen, Farzana, Dept of Zoology, Shaheed Benazir Bhutto Univ. (SBBU), Main Campus, Sheringal, Khyber Pakhtunkhwa, Pakistan. E-mail: farzanasan@hotmail.com

13891. Piersanti, S.; Frati, F.; Conti, E.; Gaino, E.; Reborja, M.; Salerno, G. (2014): First evidence of the use of olfaction in Odonata behaviour. *Journal of Insect Physiology* 62(1): 26-31. (in English) ["Highlights: •We tested the attractiveness of prey odour in *Ischnura elegans* by behavioural assays. •We recorded responses to prey odour from single olfactory neurons in *I. elegans*. •The adults of *I. elegans* were attracted by olfac-

tory cues emitted by prey. •Antennal olfactory sensilla of *I. elegans* showed excitatory responses to prey odour. •Antennal olfactory sensilla are involved in Odonata predation. Dragonflies and damselflies are among the most ancient winged insects. Adults belonging to this order are visually oriented and are considered anosmic on the basis of neuroanatomical investigations. As a consequence, the chemical ecology of these predatory insects has long been neglected. Morphological and electrophysiological data demonstrated that dragonfly antennae possess olfactory sensilla. Additionally, a neuroanatomical study revealed the presence of spherical knots in the aglomerular antennal lobe that could allow for the perception of odour. However, the biological role of the antennal olfactory sensilla remains unknown, and no bioassay showing the use of olfaction in Odonata has been performed thus far. Here, we demonstrate through behavioural assays that adults of *Ischnura elegans* are attracted by olfactory cues emitted by prey; furthermore, using electrophysiological single-cell recordings, we prove that the antennal olfactory sensilla of *I. elegans* respond to prey odour. Our results clearly demonstrate the involvement of antennal olfactory sensilla in Odonata predation, thus showing, for the first time, the use of olfaction in Odonata biology. This finding indicates that the nervous system of Odonata is able to receive and process olfactory information, suggesting that the simple organisation of the antennal lobe does not prevent the use of olfaction in insects." (Authors)] Address: Rebora, Manuela, Dipto di Chimica, Biologia e Biotecnologie, Univ. of Perugia, Via Elce di Sotto, 06123 Perugia, Italy. E-mail: rebora@unipg.it

13892. Popova, O.N.; Haritonov, A.Yu (2014): Mass reproductive wanderings of dragonflies of the genus *Sympetrum* (Odonata, Libellulidae). *Entomological Review* 94(1): 21-28. (in English) ["The results of observing mass flights of some dragonflies of the genus *Sympetrum* forming tandems are presented. These tandems always fly against the wind, some of them landing for oviposition and then joining the flight again. This variant of migration behaviour has been unexplained until now. A hypothesis is proposed according to which synchronous mass flights of dragonfly tandems facilitate the most uniform oviposition in all the suitable biotopes. The general direction of the flight depends on the wind. As the wind direction changes, the flight course of the tandems changes accordingly, so that the dragonflies cross the same territory several times, which leads to a denser and more uniform distribution of eggs. It is proposed to refer to this variant of flight as reproductive wanderings. Such a dispersal strategy can maintain the most uniform population density and a more stable abundance of some dragonfly species in the territories with unstable humidity." (Authors)] Address: Popova, Olga, Institute of Systematics and Ecology of Animals, Siberian Branch, Russian Academy of Sciences, Novosibirsk, 630091 Russia. E-mail: popova.olga.nik@gmail.com

13893. Powney, G.D.; Brooks, S.J.; Barwell, L.J.; Bowles, P.; Fitt, R.N.L.; Pavitt, A.; Spriggs, R.A.; Isaac, N.J. (2014): Morphological and geographical traits of the British Odonata. *Biodiversity Data Journal* 2: e1041: 12 pp. (in English) ["Trait data are fundamental for many aspects of ecological research, particularly for modeling species response to environmental change. We synthesised information from the literature (mainly field guides) and direct measurements from museum specimens, providing a comprehensive dataset of 26 attributes, covering the 43 resident species of Odonata in Britain. Traits included in this database range from morphological traits (e.g. body length) to attributes based on the distribution of the species (e.g. climatic restriction). We measured 11 morphometric traits from five adult males and five adult females per species. Using digital callipers, these measurements were taken from dry museum specimens, all of which were wild caught individuals. Repeated measures were also taken to estimate measurement error. The trait data are stored in an online repository (<https://github.com/BiologicalRecordsCentre/Odonatatraits>), alongside R code designed to give an overview of the morphometric data, and to combine the morphometric data to the single value per trait per species data." (Author)] Address: Powney, G.D., Centre for Ecology & Hydrology, Wallingford, UK. E-mail: gary.powney@ceh.ac.uk

13894. Rada, B.; Šantic, M. (2014): Community structure of aquatic insects in the karstic Jadro River in Croatia. *Journal of Insect Science*: Vol. 14 | Article 54 : 10 pp. (in English) ["This study focused on the aquatic insect community in the longitudinal gradient and temporal scales of the Jadro River. The river was sampled for a period of ten years (2000– 2010), four times per year through the various seasons, along the river course. Sampling stations were selected in the upper, middle, and downstream parts of the river. A total of 21,852 specimens of aquatic insects belonging to six orders were obtained. The species determination confirmed 27 different species in the river. The data were analyzed by the multivariate methodologies of correspondence analysis and cluster analysis (unweighted pair group method with arithmetic mean) using the similarity index of Morosita for all ten years. Canonical correspondence analysis was applied to the data to check which of the measured physicochemical variables significantly explained community variation. According to those data, significant variables for the upper station were water temperature and dissolved oxygen, and chlorides was the significant variable for the lower stations." (Authors) *Calopteryx virgo*, *Cordulegaster boltonii*] Address: Rada, B., University of Split, Faculty of Science, Department of Biology, Teslina 12/III, 21000 Split, Croatia, E-mail: radja@pmfst.hr

13895. Rangnekar, P.; Naik, R. (2014): Further additions to the Odonata (Insecta) fauna of Goa, India. *Journal of Threatened Taxa* 6(3): 5585-5589. (in Eng-

lish) [The authors surveyed various habitats (n=41), especially in forested areas, from August 2011 to July 2012 to document the odonate diversity. A total of 74 species were so far known from the State. In the present communication, an additional 13 species are documented: *Gynacantha dravida*, *Gomphidia kodaguensis*, *Merogomphus longistigma*, *Megalogomphus hanynngtoni*, *Onychothemis testacea*, *Urothemis signata*, *Zygonyx iris malabarica*, *Epopthalmia vittata*, *Archibasis oscillans*, *Ceriagrion rubiae*, *Pseudagrion rubriceps*, *Protosticta sanguinostigma*, *Caconeura ramburi*.] Address: Rangnekar, P., Building 4, S-3, Technopark, Chogm Road, Alto-Porvorim, Goa 403001, India. E-mail: para-grangnekar@yahoo.com

13896. Reboredo-Fernández, A.; Prado-Merini, O.; García-Bernadal, T.; Gómez-Couso, H.; Ares-Mazás, E. (2014): Benthic macroinvertebrate communities as aquatic bioindicators of contamination by *Giardia* and *Cryptosporidium*. *Parasitology Research* 113(5): 1625-1628. (in English) ["Benthic macroinvertebrates (community composed mostly by aquatic forms of insects, such as stonefly nymphs, dragonfly nymphs, water bugs or beetle larvae) are often used in biological monitoring programmes to evaluate the ecological status of rivers and thus to indicate the repercussions of anthropogenic activities. The aim of the present study was to evaluate the use of this indicator community to detect human enteroprotzoan parasites that are transmitted via water. In total, 32 samples of macroinvertebrates were collected, with the aid of surber nets of mesh size 500 µm, from nine rivers in Galicia (NW Spain), on different occasions between 2005 and 2009. The samples were homogenised (0.04 M phosphate buffered saline, pH 7.2), sieved (150 and 45 µm mesh), and concentrated (by a diphasic method). Aliquots of the sediments were then analysed by a direct immunofluorescence technique with monoclonal antibodies against *Giardia* and *Cryptosporidium*. *Giardia* cysts were detected in one (3.1 %) of the samples and *Cryptosporidium* oocysts were detected in four (12.5 %) of the samples. This work is the first study carried out to investigate the presence of *Giardia* and *Cryptosporidium* in this benthic community. The results demonstrate that benthic invertebrates could be used as bioindicators of contamination by these waterborne protozoans. Moreover, as this aquatic organisms act as intermittent accumulators and its monitoring enables chronological analysis of perturbations, in both the short- and mid-term, this may represent a suitable alternative or complementary method to the usual techniques of detecting human and animal enteropathogens in water samples." (Authors)] Address: Gómez-Couso, H., Lab. of Parasitology, Dept of Microbiology and Parasitology, Fac. Pharmacy, Univ. of Santiago de Compostela, Campus Vida, 15782, Santiago de Compostela, A Coruña, Spain. E-mail: hipolito.gomez@usc.es

13897. Renner, S.; Perico, E.; Sahlen, G. (2014): Dragonflies (Odonata) in Subtropical Atlantic Forest frag-

ments in Rio Grande do Sul, Brazil. *Scientia Plena* 9(1): 1-8. (in English, with Spanish summary) ["One of the most endangered ecosystems in America is the Atlantic Forest, which demands emergency actions to protect its remnants as well its biodiversity. In this situation the species inventory can develop a management role for the future, determining specific areas that should be preserved as well the species composition and richness can be used as an indicator of a healthy ecosystem. The use of dragonfly species composition has proven its potential indication of quality habitats. The Odonata species actually still poorly known in the Neotropical region and has never been used as a tool to analyze the actual conditions of aquatic environments particularly in the Subtropical Atlantic Forest, which occurs in south of Brazil. A systematic survey was carried out in aquatic systems located at remnants of forest from March 2011 to February 2012. A total of 565 specimens belonging to 34 species, distributed in 5 families were sampled. Libellulidae was dominant, with 14 species, followed by Coenagrionidae, Gomphidae, Lestidae and Aeshnidae. Through inventory survey we deepen the Odonata composition knowledge and performed a statistic analysis." (Authors)] Address: Renner, S., Ecologia e Sensoriamento Remoto, Centro Universitário Univates, 95900-000, Lajeado-RS, Brasil. E-mail: samuelrenner@hotmail.com

13898. Richter, R. (2014): Discovery of the damselfly *Austroagrion cyane* in Victoria. *Victorian Entomologist* 44(2): 38-40. (in English) ["*Austroagrion Tillyard, 1913* is a genus of small damselflies with four species known from Australia (Theischinger & Hawking 2006). *A. watsoni* Lieftinck, 1982 is the most widespread and abundant of these and well known from Victoria. *A. cyane* (Selys, 1876) is fairly common in south-west Western Australia with a few records from south-east South Australia. This article describes the range extension of *A. cyane* further east into south-west Victoria." (Author) 26 – 27 December, 2013, Long Swamp, Bay Coastal Park.] Address: Reiner Richter <http://rnr.id.au>

13899. Roberts, D. (2014): Mosquito larvae change their feeding behavior in response to kairomones from some predators. *Journal of Medical Entomology* 51(2): 368-374. (in English) ["The efficacy of using predators for the biological control of mosquito disease vectors will be reduced if mosquito larvae respond to predator presence. The larvae of two mosquito species were investigated to study whether they responded to predator kairomones by increasing surface filter-feeding, which is a less active and thus less risky feeding strategy than bottom feeding. *Culex quinquefasciatus* Say is normally found in highly polluted water, where it will have little contact with predators. Except for some third instars, its larvae showed no response to four different types of predators. *Culiseta longiareolata* Macquart, living in rain-filled rock pools, is frequently attacked by a range of predators. All instars tested (second, third, and fourth

instars) strongly responded to chemicals from dragonfly nymphs (*Crocothemis erythraea*), damselfly nymphs (*Ischnura evansi*), and the fish *Aphanius dispar* Ruppel. However, they did not respond to final-instar water scorpions (*Nepa cinerea* L.), which would not feed on the mosquito larvae. Second- and third-instar *Cs. longiareolata* produced the same response to chopped up mosquito larvae as they did to dragonfly nymphs, but fourth instars produced a significantly stronger response to dragonfly nymphs—both those unfed and those fed in situ. Thus, *Cs. longiareolata* not only identified different predators and responded accordingly, but also responded to conspecific alarm pheromones. *Cx quinquefasciatus* showed little response to predators or to alarm pheromones from damaged conspecific larvae." (Author)] Address: Roberts, D., Department of Biology, Sultan Qaboos University, PO Box 36, Al-Khod 123, Oman. E-mail: derekmr@squ.edu.om

13900. Rotvit, L.; Jacobsen, D. (2014): Egg development of Plecoptera, Ephemeroptera and Odonata along latitudinal gradients. *Ecological Entomology* 39: 177-185. (in English) [(1) Interest in the effect of temperature on ecophysiological processes is growing. Using published data, a meta-analysis was carried out on the influence of temperature on duration of egg development of the aquatic insect orders Plecoptera, Ephemeroptera and Odonata in relation to latitudinal compensation. The aim was to test the hypotheses on thermal adaptation and countergradient variation. (2) The orders showed considerable differences in the response to temperatures along latitudinal gradients. Duration of egg development in Ephemeroptera and Plecoptera was negatively related to latitude at 15, 20 and 25 °C, and 5, 15, and 20 °C, respectively. This is interpreted as compensation for short summer seasons at high latitudes, a result that is in line with the countergradient variation hypothesis. (3) In contrast, the results for Odonata supported neither the thermal adaptation nor the countergradient variation hypothesis. Odonate eggs from higher latitudes developed more slowly than those from lower latitudes at 20 and 25 °C. It is likely that the high-latitude odonates have more time for eggs to develop, despite the shorter season, because the potential time constraint that lies in producing more generations per year at lower latitudes may override the effect of seasonal constraints at higher latitudes.] Address: Jacobsen, D., Freshwater Biological Laboratory, Dept of Biology, Univ- of Copenhagen, Universitetsparken 4, 2100 Copenhagen, Denmark. E-mail: djacobsen@bio.ku.dk

13901. Schriever, T.A.; Cadotte, M.W.; Williams, D.D. (2014): How hydroperiod and species richness affect the balance of resource flows across aquatic-terrestrial habitats. *Aquatic Science* 76(1): 131-143. (in English) [Queen's Biological Station north of Kingston, Ontario, Canada (44.565977 N, -76.324223 W). "Ecosystem functioning is influenced by the flow of nutrients, detri-

tus, and organisms. Variation in these flows, like that found in temporary ecosystems, affects temporal and spatial patterns of community diversity and secondary production. We evaluated the influence of hydroperiod and ecosystem size on the bi-directional flow of subsidies from intermittent ponds and surrounding forests by quantifying litter deposition and the abundance and biomass of emerging insects and amphibians. In addition, we assessed whether amphibian and insect diversity influenced the magnitude of cross-habitat resource flux. We found substantial spatial and temporal variation in the magnitude, composition, and timing of cross-habitat resource subsidies. Overall, deposition into ponds far exceeded biomass exported via insect and amphibian emergence. We found a negative association between resource flux and the diversity of amphibians and insects. Different species groups contributed to flux patterns unequally, with insects having higher diversity but lower flux compared to amphibians. Organismal flux varied among ponds with amphibians having the highest flux in the shortest hydroperiod pond and insect flux was highest from an intermediate hydroperiod pond. This work reveals how variation in pond size and permanence affects species diversity and ecosystem flows. Species composition played a major role in flux differences across ponds. Further, given the general lack of research and conservation prioritization of temporary ponds, uncovering how these ponds contribute to cross-habitat linkages is necessary to develop fully integrated management strategies." (Authors) Taxa are specified at the family level and include Coenagrionidae, Lestidae, and Libellulidae] Address: Schriever, Tiffany, Department of Zoology, Cordley Hall 3029, Oregon State University, Corvallis, OR 97331-2914, USA. E-mail: tiffany.schriever@gmail.com

13902. Seehausen, M.; Hämäläinen, M.; Wasscher, M.T. (2014): Edmond de Selys Longchamps' odonatological swansong – »Xanthagrion« species from Chatham Island and other notes on Odonata specimens from Hawaii and New Zealand in the Übersee-Museum in Bremen. *Notulae odonatologicae* 8(3): 41-49. (in English) ["A small Odonata collection from Hawaii and New Zealand in the Übersee-Museum Bremen is discussed. This collection is of historical interest, since it includes the last specimens identified by Edmond de Selys Longchamps. On 25 November 1900, just two weeks before his death, Selys produced watercolour drawings of an undescribed »Xanthagrion « species from Chatham Island based on this material." (Authors)]

13903. Skvortsov, V.E.; Snegovaya, N. Yu. (2014): Additions to the knowledge of the Odonata fauna of Azerbaijan, with six new records. *Notulae odonatologicae* 8(3): 67-76. (in English) ["Thirty-two species collected during 2012 from Azerbaijan are listed, three further species were identified from photographs taken in 2008. Of the resulting 35 species, six species were new for the country, the record of *Cordulegaster vanbrinkae*

being the third locality in the world." (Authors)] Address: Snegovaya, Nataly, Zoological Institute NAS of Azerbaijan, proezd 1128, kvartal 504, Baku, AZ 1073, Azerbaijan. E-mail: snegovaya@yahoo.com

13904. Śniegula, S.; Drobniak, S.M.; Gołab, M.J.; Johansson, F. (2014): Photoperiod and variation in life history traits in core and peripheral. *Ecological Entomology* 39: 137-148. (in English) ["(1) In order to predict evolutionary responses to environmental changes one needs to identify the evolutionary potential in terms of genetic variation of traits and of the traits' plasticity. We studied genetic variance in life history traits and their reaction norms in response to manipulated photoperiods in central, northern, and northernmost peripheral populations of *L. sponsa*. After the central-marginal hypothesis, it is predicted that central populations will express the highest genetic variance. (2) Northern and northernmost populations showed the highest development and growth rates. All populations expressed shorter development and accelerated growth when raised in a northern compared with a central latitude photoperiod. The slopes of reaction norms differed between regions resulting in a region-by-photoperiod interaction. (3) There was genetic variation in development time; however, it did not differ across regions. There was no genetic variation in growth rate or in the plasticity of development time and growth rate to photoperiod. (4) Results did not support the central-marginal hypothesis. However, evidence was found that the development time has the potential to evolve at similar rates across study regions. In contrast, the growth rate seems to be genetically constrained for further evolution, probably because of a strong past directional selection on this trait. The presence of low genetic variation in the slope of the reaction norms could be a result of stabilising selection imposed by seasonality." (Authors)] Address: Śniegula, S., Institute of Nature Conservation, Polish Academy of Sciences, al. Mickiewicza 33, 31-120 Kraków, Poland. E-mail: szymon.sniegula@gmail.com

13905. Suhling, F.; Müller, O.; Martens, A. (2014): The dragonfly larvae of Namibia (Odonata). *Libellula Supplement* 13: 5-106. (in English, with German summary) ["We present an illustrated key to the exuviae and final stadium larvae of the dragonflies of Namibia. We have also included some taxa from neighbouring areas, which have not been recorded in Namibia yet. The key is therefore applicable also in southern Angola, most of Botswana and the Northern Cape province of South Africa. It includes identification characters of taxa hitherto undescribed, viz. *Lestes pallidus*, *Pseudagrion deningi*, *P. rufostigma*, *Ictinogomphus dundoensis*, *Crenigomphus cornutus*, *C. kavangoensis*, *C. hartmanni*, *Paragomphus cataractae*, *P. elpidius*, *P. sabcus*, *Mastigomphus dissimilis*, *Anax bangweuluensis*, and *Phylломacromia overlaeti*, and for the first time keys for some widespread African species pairs, such as *Tramea basilaris* and *T. limbata*, and *Zygonyx torridus* and

Z. natalensis. However, the larvae of many species and even four out of 50 genera occurring in Namibia are still unknown. Therefore, this key remains preliminary." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

13906. Suhling, F.; Martens, A. (2014): Distribution maps and checklist of Namibian Odonata. *Libellula Supplement* 13: 107-175. (in English, with German summary) ["This paper presents a checklist of the Odonata of Namibia and provides up-to-date distribution maps of 130 species. Compared with the checklist from 2007, five species have been added to the list, four of them were new for science. Two species were omitted." (Authors)] Address: Suhling, F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

13907. Suhonen, J.; Korkeamäki, E.; Salmela, J.; Kuitunen, M. (2014): Risk of local extinction of Odonata freshwater habitat generalists and specialists. *Conservation Biology* 28(3): 783-789. (in English) ["Understanding the risk of a local extinction in a single population relative to the habitat requirements of a species is important in both theoretical and applied ecology. Local extinction risk depends on several factors, such as habitat requirements, range size of species, and habitat quality. We studied the local extinctions among 31 dragonfly and damselfly species from 1930 to 1975 and from 1995 to 2003 in Central Finland. We tested whether habitat specialists had a higher local extinction rate than generalist species. Approximately 30% of the local dragonfly and damselfly populations were extirpated during the 2 study periods. The size of the geographical range of the species was negatively related to extinction rate of the local populations. In contrast to our prediction, the specialist species had lower local extinction rates than the generalist species, probably because generalist species occurred in both low- and high-quality habitat. Our results are consistent with source-sink theory." (Authors)] Address: Suhonen, J., Section of Ecology, Department of Biology, University of Turku, FI-20014, Turku, Finland. E-mail juksuh@utu.fi

13908. Sushko, G.G. (2014): The zoogeographic composition of the insect fauna (Odonata, Coleoptera, Macrolepidoptera) in the raised bogs of the Belarusian Lakeland. *Entomological Review* 94(1): 40-48. (in English) ["The zoogeographic composition of insects in the raised bogs of the Belarusian Lakeland was investigated. The boundaries of this region coincide with those of the last glaciation and the distribution of raised bogs on the East European Plain. By the example of three model groups (Odonata, Coleoptera, and Macrolepidoptera) it was found that the insect fauna complexes in the bogs of the Belarusian Lakeland had a typical boreal pattern with prevalence of species with Euro-Siberian ranges, and also included large fractions of species

with Circumboreal and Circum-Arctoboreal ranges. The environmental conditions of bogs in the temperate zone of Europe facilitate the southward expansion of many cold-adapted species." (Authors) Original Russian Text © G.G. Sushko, 2013, published in *Entomologicheskoe Obozrenie*, 2013, Vol. 92, No. 3, pp. 493–504.] Address: Sushko, G.G., Vitebsk State University named after P.M. Masherov, Vitebsk, Republic of Belarus. E-mail: gennadis@rambler.ru

13909. Swaegers, J.; Mergeay, J.; Therry, L.; Bonte, D.; Larmuseau, M.H.D.; Stoks, R. (2014): Unravelling the effects of contemporary and historical range expansion on the distribution of genetic diversity in the damselfly *Coenagrion scitulum*. *Journal of evolutionary biology* 27(4): 748-759. (in English) ["Although genetic diversity provides the basic substrate for evolution, there are a limited number of studies that assess the impact of recent climate change on intraspecific genetic variation. This study aims to unravel the degree to which historical and contemporary factors shape genetic diversity and structure across a large part of the range of the range-expanding *C. scitulum*. A total of 525 individuals from 31 populations were genotyped at nine microsatellites, and a subset was sequenced at two mitochondrial genes. We inferred the importance of geography, environmental factors, and recent range expansion on genetic diversity and structure. Genetic diversity decreased going westwards, suggesting a signature of historical post-glacial expansion from east to west and the presence of eastern refugia. Although genetic differentiation decreased going northwards, it increased in the northern edge populations, suggesting a role of contemporary range expansion on the genetic make-up of populations. The phylogeographical context was proven to be essential in understanding and identifying the genetic signatures of local contemporary processes. Within this framework, our results highlight that recent range expansion of a good disperser can decrease genetic diversity and increase genetic differentiation which should be considered when devising suitable conservation strategies." (Authors) Address: Swaegers, J., Laboratory of Aquatic Ecology, Evolution and Conservation, University of Leuven, Deberiotstraat 32, 3000 Leuven, Belgium. E-mail: Janne.Swaegers@bio.kuleuven.be

13910. Tabugo, S.R.M.; Torres, M.A.J.; Gorospe, J.G.; Amparado, R.F.; Demayo, C.G. (2014): Integrative approach in describing *Neurothemis* species using correlation analysis based on distances. *European Journal of Zoological Research* 3(1): 19-31. (in English) ["Describing species variation and delineation are fundamental to biology and much debate exists surrounding on what applied approach is appropriate. Species delineation now used separate elaborate datasets to quantify independently and test species criteria. However, the complexity of the speciation process has ushered the need to infuse studies with new tools and techniques capable of aiding in species delineation. Herewith, an integrative

approach using Correlation Analysis based on Distances was used to circumvent the traditional morphological analysis and provide a novel means of describing closely related complex species (sibling species) diversity using the genus *Neurothemis* as a case study. Correlation Analysis based on distances proved to be useful by looking into the relative contribution of each trait considered to species/group divergence and distinctiveness. Results demonstrate noted differences between female and male morphs. On one hand, females exhibited female-limited polymorphism which was suggested to have possibly evolved throughout sexual selection. On the other hand, polymorphism being limited to males mostly plays a role in male-male competition for access to females. Differences were attributed mainly by external morphological wing characters such as the fore-wing triangle, hind wing triangle, the radial planate, fore-wing subtriangle, number of anal loop 'sole cells', hind wing supertriangle, number of cross veins in the cubital space of the hind wing (behind the median space), wing pigmentation, shape of synthorax, shape of epiproct and shape of left and right cerci. Here, the utilization of a number of characters for species delineation proved to be effective in understanding variation and the nature of the *Neurothemis* species found in Iligan City." (Authors)] Address: Tabugo, Sharon Rose M., Department of Biological Sciences, College of Science and Mathematics, MSU-Iligan Institute of Technology, Iligan City, Philippines

13911. Takahashi, Y.; Nagata, N.; Kawata, M. (2014): Antagonistic selection factors induce a continuous population divergence in a polymorphism. *Heredity* 112(4): 391-398. (in English) ["Understanding the relative importance of selection and stochastic factors in population divergence of adaptive traits is a classical topic in evolutionary biology. However, it is difficult to separate these factors and detect the effects of selection when two or more contrasting selective factors are simultaneously acting on a single locus. In *I. senegalensis*, females exhibit colour dimorphism and morph frequencies change geographically. We here evaluated the role of selection and stochastic factors in population divergence of morph frequencies by comparing the divergences in colour locus and neutral loci. Comparisons between population pairwise F_{ST} for neutral loci and for the colour locus did not detect any stochastic factors affecting colour locus. Although comparison between population divergence in colour and neutral loci using all populations detected only divergent selection, we detected two antagonistic selective factors acting on the colour locus, that is, balancing and divergent selection, when considering geographical distance between populations. Our results suggest that a combination of two antagonistic selective factors, rather than stochastic factors, establishes the geographic cline in morph frequency in this system." (Authors)] Address: Takahashi, Yuma, Division of Ecology and Evolutionary Biology, Graduate School of Life Sciences, Tohoku University,

Aoba, Sendai, Miyagi 890–8578, Japan. E-mail: takahashi.yum@gmail.com

13912. Therry, L.; Lefevre, E.; Bonte, D.; Stoks, R. (2014): Increased activity and growth rate in the non-dispersive aquatic larval stage of a damselfly at an expanding range edge. *Freshwater Biology*: 1266-1277. (in English) ["While evolutionary changes in adult traits during range expansion have been recorded in many species, similar changes in the non-dispersive larval stage have only rarely been documented. Increased activity in the non-dispersive larval stage is an important ecologically relevant trait in aquatic communities that may be expected to evolve in the edge populations (i) as a result of the combination of spatial sorting in dispersal-related adult activity and a coupling between adult and larval behaviour and (ii) to meet higher energy demands to allow higher growth rates and a higher investment in costly dispersal-related traits. We specifically address whether activity is higher in the larval non-dispersive aquatic stage at an expanding range front by comparing larvae of replicated core and edge populations of the *Coenagrion scitulum* in three common garden experiments where larvae were reared from the egg stage. As expected, activity in the non-dispersive larval stage was consistently higher in the edge populations. Although changes in larval activity probably have consequences for ecological interactions, the higher activity was not associated with increased predation rates by dragonfly larvae, potentially because of associated compensatory changes in other antipredator mechanisms. We documented one of the few cases of a positive coupling of activity in the larval and adult stages. Yet, contrary to larval activity, adult activity did not differ between core and edge populations. This indicates that the higher larval activity we documented is not shaped by a coupling with adult activity. Instead, our results are consistent with the hypothesis that a higher energy need in edge populations shaped the higher larval activity. Edge larvae showed a higher growth rate which is expected to evolve at the initial low population densities in newly founded edge populations. Moreover, higher growth rate showed the expected positive covariation with larval activity. Increases in activity in the non-dispersive stage in edge populations at an expansion front should be included in the ongoing debate whether evolutionary changes at invasion fronts are driven by adaptive versus non-adaptive evolution. Moreover, they may have the potential to affect ecological interactions at expanding range fronts" (Authors).] Address: Therry, L., Laboratory of Aquatic Ecology, Evolution and Conservation, K.U. Leuven, Charles Deberiotstraat 32, B-3000 Leuven, Belgium. E-mail: Lieven.Therry@bio.ku-leuven.be

13913. Tsuchiya, K.; Hayashi, F. (2014): Left-handed sperm removal by male *Calopteryx damselflies* (Odonata). *SpringerPlus* 2014, 3:144 doi:10.1186/2193-1801-3-144: 12 pp. (in English) ["Male genitalia in several in-

sect species are asymmetry in right and left shape. However, the function of such asymmetric male genitalia is still unclear. We found that the male genitalia of *Calopteryx cornelia* are morphologically symmetric just after emergence but asymmetric after reproductive maturation. Males remove rival sperm stored in the female bursa copulatrix (single spherical sac) and the following spermatheca (Y-shaped tubular sac) prior to their own ejaculation to prevent sperm competition. Males possess the aedeagus with a recurved head to remove bursal sperm and a pair of spiny lateral processes to remove spermathecal sperm. The right lateral process is less developed than the left, and sperm stored in the right spermathecal tube are rarely removed. Experiments involving surgical cutting of each lateral process demonstrated that only the left process functions in spermathecal sperm removal. Thus, males of *C. cornelia* are left-handed in their sperm removal behaviour at copulation." (Authors)] Address: Tsuchiya, K., Department of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji, Tokyo 192-0397, Japan. E-mail: tsuchiya.suzuki.kaori@gmail.com

13914. Tuomisto, H.; Karjalainen, S. (2014): Suojelus-*Etelä-Pohjanmaalle Suomen sudenkorentoseuran tuella* [Implementation of a bog reserve in Southern Ostrobothnia province]. *Crenata* 7: 42. (in Finnish) [In 2010 the Finnish Dragonfly Society started a fund raising project to buy up a bog to establish a nature reserve especially for dragonflies (see Mäkinen 2010 in OAS 30). In cooperation with The Finnish Association for Nature Conservation (FANC) (Suomen luonnonsuojeluliitto) and a foundation for nature conservation (Luonnonperintösäätiö) in 2014 the project has been implemented successfully and 37 hectares of a bog in Alajärvi municipality are now protected (Asmus Schröter).] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail:sk@korento.net

13915. Vašek, M.; Všetíčková, L.; Roche, K.; Jurajda, P. (2014): Diet of two invading gobiid species (*Proterorhinus semilunaris* and *Neogobius melanostomus*) during the breeding and hatching season: No field evidence of extensive predation on fish eggs and fry. *Limnologica - Ecology and Management of Inland Waters* 46: 31-36. (in English) ["One of the potential impacts of invasive gobies on native fish fauna is predation on eggs and fry. Therefore, the diet composition of two invading gobiid species, the tubenose goby *Proterorhinus semilunaris* and round goby *Neogobius melanostomus*, was examined in the Dyje river system (Danube basin, Central Europe, near Breclav, Czech Republic) during the 2011 reproductive season to ascertain the extent of gobiid predation on heterospecific and conspecific eggs and juveniles. Consumption of fish eggs and juveniles by invading gobies was very low. The diets of both species consisted largely of benthic macroinvertebrates, and particularly insect larvae. These results indicate that invading gobies in the Dyje river system are likely

to impact native fish fauna more through competitive effects than through direct predation on eggs and juveniles." (Authors) Odonata larvae are given as prey item of gobiid species. No quantitative estimates on the preyed larvae were provided] Address: Vašek, M., Institute of Vertebrate Biology, Academy of Sciences of the Czech Republic, v.v.i., Na Sádkách 7, 370 05 České Budějovice, Czech Republic. E-mail: mojmir.vasek@seznam.cz

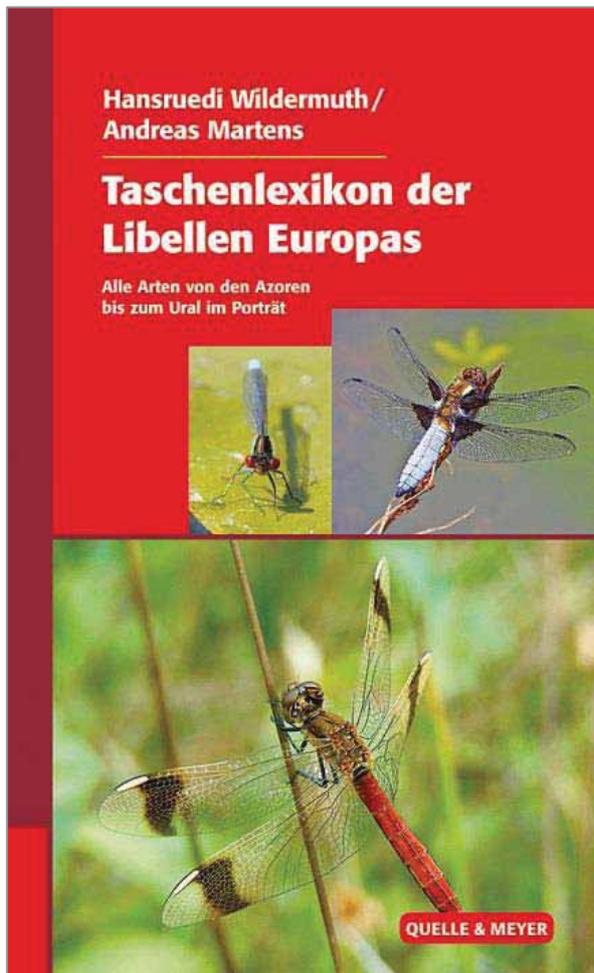
13916. Vivas Santelíz, J.J. (2014): Primer registro de *Rhionaeschna psilus* (Calvert, 1947) (Odonata: Aeshnidae) para el Estado Zulia, Venezuela. *Entomotropica* 29(1): 49-51. (in Spanish, with English summary) ["*R. psilus* is recorded for the first time from Zulia State. The specimens were captured in one of the tributaries of Negro river (500 m) close before to the village of Shirimi, and at the Kunana Lagoon (1110 m a.s.l.) in the Sierra de Perijá National Park. A short description of the external morphology, and data on biological and ethological aspects, as well as a note on general distribution are given." (Author)] Address: Vivas-Santelíz, J.J., Laboratorio de Zoología de Invertebrados, Universidad del Zulia, Facultad Experimental de Ciencias, Departamento de Biología, Venezuela. E-mail: Jonjvs1@gmail.com

13917. Wang, L.; Zhong, Z. (2014): Dynamics of the dragonfly wings raised by blood circulation. *Acta Mechanica* 225(4-5): 1471-1485. (in English) ["We investigate how the blood flow in the veins in the flapping wings of a dragonfly affects their dynamic response. An idealized model of an elastic tube conveying fluid and rotating around a fixed axis is adopted in this study, based on which governing partial differential equations of motion are obtained by invoking the extended Hamilton's principle. Separation of variables techniques and assumed modes method are employed to solve the resulting equations, and the stabilization analysis is performed to assess the stability of the system. In particular, the coupling effects of tube rotation, deformation, and the movement of the fluid inside are evaluated under different flow rates and rotation speeds. This demonstrates that if the blood in the dragonfly wings flows from humeral angle distally to the wing apex, a stabilization effect can be obtained, and the higher the blood flow rate is, the faster the system will be stabilized. Contrary cases are also studied for further validation of the model." (Authors)] Address: Zhong, Z., School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai, 200092, People's Republic of China. E-mail: zhongk@tongji.edu.cn

13918. Warren, R.W.; Hall, D.B.; Greger, P.D. (2014): Radionuclides in bats using a contaminated pond on the Nevada National Security Site, USA. *Journal of Environmental Radioactivity* 129: 86-93. (in English) [Nevada, USA; "Highlights: •Bats uptake radionuclides from a contaminated pond. •Tritium had highest concentrations but ¹³⁷Cs gave highest dose. •Tritium concentra-

tions in bats are approximately one-twentieth of that in the pond. •Population level effects are not expected based on RESRAD-Biota dose estimates. • It may be more appropriate to model the bats as riparian animals in RESRAD-Biota. Perched groundwater percolating through radionuclide contamination in the E Tunnel Complex on the Nevada National Security Site, formerly the Nevada Test Site, emerges and is stored in a series of ponds making it available to wildlife, including bats. Since many bat species using the ponds are considered sensitive or protected/regulated and little information is available on dose to bats from radioactive water sources, bats were sampled to determine if the dose they were receiving exceeded the United States Department of Energy dose limit of 1.0E-3 Gy/day. Radionuclide concentrations in water, sediment, and flying insects were also measured as input parameters to the dose rate model and to examine trophic level relationships. The RESRAD-Biota model was used to calculate dose rates to bats using different screening levels. Efficacy of RESRAD-Biota and suggested improvements are discussed. Dose to bats foraging and drinking at these ponds is well below the dose limit set to protect terrestrial biota populations." (Authors) Seven insect orders were sampled at or near a pond where bats were supposed to hunt for insects. Odonata were represented and obviously contaminated with anthropogen created radionuclides. However, there was not a direct evidence for bats preying on dragonflies, but only the assumption that Odonata may count to the diet of bats. Contamination of the aggregate "flying insects" with ¹³⁷Cs, ^{239/240}Pu, and ²⁴¹Am is documented in table 5: "it is plausible that the insects are the dominant source of americium in bats. Early life stages of certain sampled insects (e.g. of the orders Odonata, Diptera, and Neuroptera) are aquatic with potential to have a high amount of contact with pond sediment. The level of contact with sediment has been shown to be an important factor determining the relative concentrations of actinides in aquatic and emergent insects."] Address: Warren, R.W., National Security Technologies, LLC, 2621 Losee Rd., North Las Vegas, NV 89030-4129, USA. E-mail: warrenrw@nv.doe.gov

13919. Wildermuth, H.; Martens, A. (2014): Taschenlexikon der Libellen Europas. Alle Arten von den Azoren bis zum Ural. Quelle & Meyer Verlag Wiebelsheim. 824 pp. (in German) ["The Taschenlexikon der Libellen Europas contains brilliant and informative photos of dragonfly species both native to Europe and the sporadic invasive species, and portrays their biology in detail. In addition to the explanation of names, the current state of knowledge is summarized for each type in a compact form in this portable book. This pocket guide is aimed at experts that have been observing dragonflies for a longer time and wish to have more information on all species occurring in Europe and their way of life than is available in current identification guides." (Publisher)]



13920. Wildermuth, H. (2014): Perching behaviour in *Lindenia tetraphylla* – a distinctive feature among European Clubtails (Odonata: Gomphidae). *Notulae odontologicae* 8(3): 56-66. (in English) ["Based on photographic documents and compared to the corresponding behavioural elements in all remaining European Gomphidae, the perching behaviour of individuals and copulating pairs of *L. tetraphylla* was studied. *L. tetraphylla* perches preferentially on thin, exposed plant parts using only the middle and hind legs to fix the body. This is in contrast to all other members of the European gomphids, which use all six legs in these situations. The horizontal position and the compact wheel form of the copulating pair constitute a further peculiarity of *L. tetraphylla*. These specific behavioural elements are discussed in respect to their functional and phylogenetic relevance." (Author)] Address: Wildermuth, H., Haltbergstr. 43, 8630 Rütli, Switzerland. E-mail: hansruedi@wildermuth.ch

13921. Williamson, J. (2014): Proposed determination: *Austropetalia tonyana* - Alpine Redspot Dragonfly as a vulnerable species. Fisheries Scientific Committee Ref. No. PD57, File No. FSC14/01: 5 pp. (in English) ["The Fisheries Scientific Committee, established under Part 7A of the Fisheries Management Act 1994 (the Act), is proposing to list *Austropetalia tonyana* - the Alpine Redspot Dragonfly, as a VULNERABLE SPECIES in

Part 1 of Schedule 5 of the Act. The listing of Vulnerable Species is provided for by Part 7A, Division 2 of the Act." (Author)] Address: Williamson, Jane, NSW Dept of Primary Industries – PO Box 1305 CROWS NEST NSW 1585, Australia. Email: fsc@dpi.nsw.gov.au

13922. Worthen, W.B.; Phillips, C.C. (2014): Are community patterns in flight height driven by antagonistic interactions? *International Journal of Odonatology* 17(1): 7-16. (in English) ["Large libellulid dragonflies often fly higher than smaller libellulids. We hypothesized that this size-related pattern in flight height might be caused by aggressive displacement. We tested this hypothesis by using a 30 m "dragonfly zip-line" to reel dead dragonfly decoys of four species of different sizes (*Erythemis simplicicollis*, *Libellula incesta*, *Pachydiplax longipennis*, and *Perithemis tenera*) along a shoreline at four different heights (20, 60, 100, and 140 cm), counting the number of investigations made by large patrolling *Libellula incesta* and *Libellula luctuosa* males. We hypothesized that decoys of smaller species would be investigated and attacked at higher frequency when they were reeled high, in the *Libellula* flight zone, than when they were reeled at their natural low height. This hypothesis was falsified; both *L. incesta* and *L. luctuosa* investigated high-flying decoys significantly less frequently than low-flying decoys. *Perithemis tenera* decoys were investigated less frequently than other decoys by both species, but *L. incesta* investigated *E. simplicicollis*, *P. longipennis*, and *L. luctuosa* decoys with increasing frequency whereas *L. luctuosa* investigated these three species at equal rates. These patterns correlate with the degree of morphological similarity between patrolling species and decoys, consistent with likely patterns of "mistaken identity" by patrolling *L. incesta* and *L. luctuosa* males. We suggest that patrolling males may preferentially investigate other low-flying males in the hopes of finding a mate-guarded female." (Authors)] Address: Worthen, W.B., Dept of Biology, Furman Univ., Greenville, SC 29613, USA. E-mail: wade.worthen@furman.edu

13923. Wouda, H. (2014): Fifteen years of monitoring odonata in the Leemputten and Verbrande bos areas. *Brachytron* 16(1/2): 29-37. (in Dutch, with English summary) ["De Leemputten (Ermelo) and Verbrande bos (Geldersch Landschap & Kasteelen Foundation) together form a single ecological unit. The area is considered one of the most valuable nature conservation areas in the Dutch province of Gelderland in a botanical and faunistic sense. It has a broad diversity of water habitats, offering a home to many species of Odonata. In fifteen years of monitoring, 40 different species were observed. Dragonflies are used as water quality indicator species for the area." (Author)] Address: Wouda, H., Lange Haeg 133, 3853 EG Ermelo, The Netherlands. E-mail: h.wouda5@chello.nl

13924. Xu, Q.; Zhang, H. (2014): Description of the final stadium larva of *Periaeschna zhangzhouensis* Xu,

with discussion of taxonomic characters of the larvae of the genus *Periaeschna* Martin (Odonata: Aeshnidae). *International Journal of Odonatology* 17: 53-58. (in English) ["The final stadium larva of *P. zhangzhouensis* is described and illustrated for the first time. The taxonomic characters of the larvae of the genus *Periaeschna* Martin are discussed and summarized." (Authors)] Address: Xu, Q., State Key Laboratory of Freshwater Ecology and Biotechnology, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan 430072, PR China. E-mail: qhx-363000@gmail.com

13925. Yue, X.D.; Miao, D.Q.; Cao, L.B.; Wu, Q.; Chen, Y.F. (2014): An efficient color quantization based on generic roughness measure. *Pattern Recognition* 47(4): 1777-1789. (in English) ["Author-Highlights: • Propose an efficient two-stage color quantization framework. • Applies the quantization in a precisely compressed colour space. • Propose the generic roughness measure for precise colour space compression. • Propose the algorithms of roughness thresholding and weighted Rough K-means. • Experimental results validate the high efficiency of the proposed method. Colour quantization is a process to compress image colour space while minimizing visual distortion. The quantization based on preclustering has low computational complexity but cannot guarantee quantization precision. The quantization based on postclustering can produce high quality quantization results. However, it has to traverse image pixels iteratively and suffers heavy computational burden. Its computational complexity was not reduced although the revised versions have improved the precision. In the work of colour quantization, balancing quantization quality and quantization complexity is always a challenging point. In this paper, a two-stage quantization framework is proposed to achieve this balance. In the first stage, high-resolution colour space is initially compressed to a condensed colour space by thresholding roughness indexes. Instead of linear compression, we propose generic roughness measure to generate the delicate segmentation of image colour. In this way, it causes less distortion to image. In the second stage, the initially compressed colours are further clustered to a palette using Weighted Rough K-means to obtain final quantization results. Our objective is to design a post-clustering quantization strategy at colour space level rather than pixel level. Applying the quantization in the precisely compressed colour space, the computational cost is greatly reduced; meanwhile, the quantization quality is maintained. The substantial experimental results validate the high efficiency of the proposed quantization method, which produces high quality colour quantization while possessing low computational complexity." (Authors) A picture of *Calopteryx* sp. is used to demonstrate the procedure of measuring.] Address: Yue, X.D., School of Computer Engineering and Science, Shanghai University, Shanghai, 200444, China. E-mail: yswantfly@gmail.com

13926. Zeuss, D.; Brandl, R.; Brändle, M.; Rahbek, C.; Brunzel, S. (2014): Global warming favours light-coloured insects in Europe. *Nature Communications* 5:3874 | DOI: 10.1038/ncomms4874 | www.nature.com/naturecommunications: 9 pp, Suppl. (in English) ["Associations between biological traits of animals and climate are well documented by physiological and local-scale studies. However, whether an ecophysiological phenomenon can affect large-scale biogeographical patterns of insects is largely unknown. Insects absorb energy from the sun to become mobile, and their colouration varies depending on the prevailing climate where they live. Here we show, using data of 473 European butterfly and dragonfly species, that dark-coloured insect species are favoured in cooler climates and light-coloured species in warmer climates. By comparing distribution maps of dragonflies from 1988 and 2006, we provide support for a mechanistic link between climate, functional traits and species that affects geographical distributions even at continental scales. Our results constitute a foundation for better forecasting the effect of climate change on many insect groups." (Authors)] Address: Zeuss, D., Department of Ecology — Animal Ecology, Faculty of Biology, Philipps-Universität Marburg, Karl-von-Frisch-Str. 8, 35043 Marburg, Germany. E-mail: dirk.zeuss@biologie.uni-marburg.de

13927. Zhang, H.-m.; Cai, Q.-h. (2014): Description of *Chlorogomphus auripennis* spec. nov. from Guangdong Province, with new records of Chlorogomphidae from Yunnan Province, China (Odonata: Chlorogomphidae). *Zootaxa* 3790(3): 477-486. (in English) ["A new chlorogomphid, *Chlorogomphus* (*Orogomphus*) *auripennis* spec. nov. (holotype male; Mt Nankunshan, Longmen County, Guangdong Province, China, 20. V. 2008) is described and illustrated. It is the first species belonging to the subgenus *Orogomphus* recorded from mainland China. The holotype will be deposited in the Collection of Aquatic Animals, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan City, Hubei Province, China. *C. auratus* Martin, 1910 and *Chloropetalia selysi* (Fraser, 1929) are recoded from Chinese territory for the first time. The total number of Chlorogomphidae in China reaches 20. Description of the hitherto unknown female of *C. yokoi* Karube, 1995 is provided." (Authors)] Address: Zhang, H., Dept of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com

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1997

13928. Pither, J. (1997): Responses in the habitat occupancy, movement behaviour, and wing morphology of two species of calopterygid damselflies to landscape structure. M.Sc. thesis, Acadia University, Wolfville: 177 pp. (in English) ["I examine the responses of *Calopteryx maculata* and *Calopteryx aequabilis*, to differences in landscape structure. I performed surveys to determine patterns of stream occupancy in relation to habitat characteristics measured at small spatial scales, and the medium-scale characteristic of distance to forest. I show that the relative importance of these habitat characteristics differs among species and between survey years. The changes over time are consistent with weather patterns. I then examine the relative abilities of these two species to move through forest and pasture landscapes. Previous work had suggested that *C. maculata* uses forest as a resource more consistently than *C. aequabilis*. Results from manipulative experiments show that the connectivity of pasture landscapes is higher than forest landscapes for *C. maculata*. There was no detectable difference in connectivities for *C. aequabilis*. These results have implications regarding the relative propensities of individuals to disperse within the structurally different landscapes. I examine the wing morphologies of *C. maculata* and *C. aequabilis* individuals collected from landscapes of differing structure. I show that the fore and hindwings of *C. maculata* individuals are consistent in their asymmetric distributions (left - right) across landscapes. The forewings of *C. aequabilis* individuals inhabiting a highly fragmented landscape exhibited a significantly higher degree of asymmetry, and were significantly shorter overall, than those inhabiting a moderately fragmented landscape. Forewings of female *C. maculata* individuals collected from high connectivity (pasture) landscapes were slightly longer than those from low connectivity (forest) landscapes." (Author)] Address: not stated

1990

13929. Hernández, J.M.R. (1999): Lista preliminar de los odonatos Insecta, Odonata de los cayos Caguanes y

Palma, provincia de Sancti Spiritus. Cocuyo 8: 2-3. (in Spanish) [24 odonate species are listed. They represent app. 30% of the Odonata fauna of Cuba.] Address: Hernández, J.M.R., Apartado Postal 2004, Sancti-Spiritus, Cuba CP 60100

2000

13930. Aranha, J.M.R.; Gomes, J.H.C.; Fogaça, F.N.O. (2000): Feeding of two sympatric species of Characidiinae, *C. lanei* and *C. pterostictum* (Characidiinae) in a coastal stream of Atlantic Forest (Southern Brazil). Brazilian Archives of Biology and Technology 43(5): 527-531. (in English) [The diet of *Characidium lanei* includes Odonata.] Address: Aranha, J.M.R., Depto de Zoologia, SCB, Universidade Federal do Paraná, CP 19020, CEP 81531-990, Curitiba - PR, Brazil

2001

13931. Hernández, J.M.R.; de Armas, L.F. (2001): Distribución geográfica de *Remartinia secreta* y *Crocotemis servilia* en Cuba (Odonata: Aeshnidae, Libellulidae). Cocuyo 10: 12-13. (in Spanish) [New records of *R. secreta* and *C. servilia* for Cuba are presented. The morphology of *C. servilia* is briefly compared with *Erythrodiplax* species.] Address: Hernández, J.M.R., Apartado Postal 2004, Sancti-Spiritus, Cuba CP 60100

13932. Reeves, D.M. (2001): Survey for the Giant Dragonflies, *Petalura gigantea* and *Petalura litorea* and the Swordgrass Brown Butterfly, *Tisiphone abeona morrissi*. Tugon Bypass emir. Impact Statement tech. Pap. 12: 1-9. (in English) ["*P. gigantea* was recorded from a potential breeding site in Queensland in the Stewart Road to Boyd Street section, south-west of the John Flynn Hospital and Medical Centre. This is possibly the first record of this species from the Gold Coast area for nearly 60 years. A specimen in the Queensland Museum was collected at Burleigh Heads in 1933 (Theischinger 1999) (p. 160) and there is a record of another Burleigh Heads specimen collected in 1942 (NSW National Parks and Wildlife Ser-

vice 1999, p. 5). No other sightings were made of *P. litorea*. However, potential breeding sites occur in NSW (Site 2), in Queensland (Sites 1 and 3) and in Commonwealth land (Site 4)." (Author)] Address: Reeves, D.M., 30 Bramston Terrace, Herston, Qld 4006, Australia

2002

13933. Mitra, A. (2002): Dragonfly (Odonata: Insecta) fauna of Trashigang Dzongkhag, eastern Bhutan. In: T. Gyeltshen & [?] Sadruddin, [Eds], Environment and life support systems of the Bhutan Himalaya, Vol. 1, Sherubtse Coll., Kang-lung, Bhutan: 40-70. (in English) ["23 species and sub-species of dragonflies have been recorded for the first time from Trashigang Dzongkhag (district) of which 18 species are new records for the whole of Bhutan. However, a checklist of eight Zygopterans and 15 Anisopterans belonging to ten families along with the field data and identification key has been given. The habitat ecological study reveals that certain species have specific habitat preferences, viz. fast flowing streams, slow-running marshy streams, side pools, irrigation channels and stagnant water-bodies like monsoon ponds. The coloured photographs of some of the species in their natural habitats have been given for their easy field identification." (Author)] Address: Mitra, A., School of Life Sciences, Sherubtse College, Kanglung, Bhutan. E-mail: amitonata@yahoo.com

2004

13934. Rolfes, W. (2004): Flugakrobaten aus der Urzeit. *Ärztliches Journal Reise & Medizin* 38(8): 34-39. (in German) [General account on dragonflies in a medical journal.] Address: not stated

13935. Slotton, D.G.; Ayers, S.M.; Suchanek, T.H.; Weyand, R.D. Liston, A.M. (2004): Mercury bioaccumulation and trophic transfer in the Cache Creek Watershed of California, in relation to diverse aqueous mercury exposure conditions. A component (Component 5B) of the multi-institution Directed Action research project: Assessment of Ecological and Human Health Impacts of Mercury in the San Francisco Bay-Delta Watershed. A CALFED Bay-Delta Program Project. October 1999 – September 2003. Final Report: January 25, 2004: 74 pp. (in English) [USA; "Water and biota were sampled throughout the Cache Creek watershed during a 20 month period between January 2000 and August 2001. A range of mercury (Hg) exposure conditions were investigated in relation to several mining and natural Hg point sources in the watershed. The study was conducted to provide foundational information and baseline monitoring data for future point source remediation efforts and TMDL regulation. Seasonal aqueous sampling was conducted in conjunction with Hg loading studies. Mercury was characterized in adult game fishes and native fishes throughout the watershed. Bioaccumulation of methylmercury

(MeHg) in several taxa of aquatic insect and small fish bioindicators was compared to diverse aqueous Hg exposure conditions and to corresponding fillet muscle Hg in the larger fishes. The Turkey Run/Abbott complex of Hg mines and the Sulfur Creek complex of Hg mines and geothermal springs were confirmed to be dominant point sources of elevated total Hg (THg), MeHg, and MeHg bioaccumulation in the watershed. In the main stem of Cache Creek, fish Hg increased by over 100% downstream of inflows from the primary remedial targets. Fish Hg reached concentrations to over 6.00 ppm in portions of the watershed. Aqueous Hg parameters varied spatially by over three orders of magnitude between control sites and tributaries near point sources. Seasonal order of magnitude shifts were seen, greater for raw THg. Partly due to the large range of concentrations, general correlations were found between the different aqueous Hg parameters. On a same-site basis, strongest correlations were found between raw and filtered fractions of both THg and MeHg and between TSS and THg. While aqueous MeHg was broadly associated with general spatial patterns in aqueous THg (re loading), variable processes of methylation were indicated to play an important role in some MeHg concentrations. On a whole watershed basis, including all individual paired seasonal samplings, aqueous raw and filtered THg and MeHg all showed substantial apparent correlations with aquatic insect and small fish MeHg bioaccumulation. However, the system-wide apparent correlations were found to be driven largely by clusters of high Hg vs low Hg site data. On an individual site basis, most of the apparent correlations broke down, with recent, seasonally averaged aqueous raw MeHg concentration remaining as by far the best predictor of aquatic insect and small fish MeHg. However, the form of the relationship with raw aqueous MeHg, as well as aqueous: biotic bioaccumulation factors (BAFs), varied between main stem and tributary sites. Study results strongly support the development of site-specific relationships for any predictive applications. Aqueous, invertebrate, and small fish MeHg were found to be seasonally dynamic, with different patterns at different sets of sites. This complicated linkages to large fish MeHg, which required the temporal pooling, by site, of aqueous and lower trophic data. Among similar sites, pooled data provided general linkages directly between unfiltered aqueous MeHg and large fish muscle Hg. Wider-ranging linkages were exhibited between MeHg in bioindicator organisms and large fish muscle. Results of this study indicate that the most useful environmental samples for regulatory and remediation monitoring for Hg include unfiltered aqueous MeHg and short-lived, relatively easily obtainable, low trophic level biota, in addition to larger fish of human health concern." (Authors) The analysis includes at family level Calopterygidae, Coenagrionidae, Gomphidae, and Libellulidae. For details see: Coenagrionidae,] Address: Slotton, D.G., University of California at Davis, Dept. of Environmental Science and Policy, One Shields Avenue, Davis, CA 95616. USA. E-mail: dgslopton@ucdavis.edu

13936. Smith, W.A.; Vogt, T.E.; Gaines, K.H. (2004): Checklist of Wisconsin Dragonflies. Updated November 2004. Wisconsin Entomological Society Miscellaneous Publications No. 2 June 1993 (2004): 14 pp. (in English) ["This checklist provides a summary of the 111 dragonfly species found in Wisconsin with an indication of population and legal status, breeding habitat, and estimates of range and flight period based on records maintained by the Natural Heritage Inventory Program of the Wisconsin Department of Natural Resources. Five species reported from Wisconsin, but never substantiated as part of the state's fauna, are listed in addition. In 1975, William Hilsenhoff summarized dragonfly species (Odonata: Anisoptera) known from Wisconsin. There were reports of 90 species at that time, but one was found to be reported in error leaving the state's fauna at 89. To date of the report (2003), an additional 22 species have been reliably reported from the state." (Authors)] Address: Smith, W., Wisconsin Department of Natural Resources, ER-6 101 S Webster Street, Madison, WI 53703, USA. E-mail: WilliamA.Smith@Wisconsin.gov

2006

13937. Bailowitz, R. (2006): *Tramea insularis* in Arizona. *Argia* 18(1): 9. (in English) [Records of *T. insularis* from 2005 in Arizona, USA are compiled; the origin of the specimens may be the result of the hurricane season in the gulf of Mexico during 2005.] Address: Bailowitz, R., 15444 N. Indian Trail, Tucson, AZ 85750 USA. E-mail: raberg2@q.com

13938. Bailowitz, R. (2006): Thornbush Dasher (*Micrathya hagenii*) new for Arizona. *Argia* 18(3): 14. (in English) [19-IX-2005, Carpenter Tank, Buenos Aires National Wildlife Refuge, Pima Co., Arizona, USA] Address: Bailowitz, R., 15444 N. Indian Trail, Tucson, AZ 85750 USA. E-mail: raberg2@q.com

13939. Beaton, G.; Stevenson, D. (2006): Breeding habitat for *Somatochlora filosa* (Fine-Lined Emerald). *Argia* 18(3): 19-20. (in English) [13-VIII-2006, Ft. Stewart, Long County, Georgia, USA] Address: Beaton, G., 320 Willow Glen Drive, Marietta, GA 30068, USA. E-mail: giffbeaton@mindspring.com

13940. Behrstock, R.A (2006): Five new records of Odonata for the State of Tamaulipas, Mexico, including the correction of a previously published *Brechmorhoga*. *Argia* 18(1): 17-19. (in English) [Records of *Apanisagrion lais*, *Erpetogomphus designates*, *Phyllocycla breviphylla*, *Cannaphila insularis* are documented. *Brechmorhoga vivax* turned out to be *B. tepeaca*. Thus, *B. tepeaca* should be added to the Tamaulipas list and *B. vivax* dropped from it.] Address: Behrstock, R.A., 10359 S. Thicket Pl., Hereford, AZ 85615, USA. E-mail: rbehrstock@cox.net

13941. Cashatt, E.D.; Day, R.; Esker, T.L. (2006): A new Anisoptera record for Illinois: *Libellula auripennis* Bur-

meister. *Argia* 18(3): 12. (in English) [Ballard Nature Center, Effingham Co., Illinois, USA, 7-VI-2006] Address: Cashatt, E.D., Zoology Section, Illinois State Museum Research and Collection Center, 1011 East Ash, Springfield, IL 62703, USA. E-mail: cashatt@museum.state.il.us

13942. Dobbs, M.M. (2006): A new spreadwing for Georgia. *Argia* 18(1): 10. (in English) [Records of *Lestes forcipatus* from August 2005 in Walker County, Georgia, USA are documented.] Address: Dobbs, Marion, pond_damsel@comcast.net

13943. Donnelly, N. (2006): Still looking for warthogs. *Argia* 18(1): 23-25. (in English) [Extensive report on an odonatological trip in early 2006 to South Africa.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

13944. Donnelly, N. (2006): Another note on *Stylurus scudderii* oviposition. *Argia* 18(3): 19. (in English) [Nature Reserve La Verendrye, N Ottawa, Canada, 1992; "... *Stylurus scudderii* males were patrolling the stream in their characteristic deliberate manner. I suddenly saw a female (my first!) patrolling near the edge. It was the fattest-bodied gomphid that I think I have ever seen. Think of a flying cigarette, black with bright yellow markings. I followed the female as she flew into a culvert about 50 feet away. I ran up to the road and crossed it to watch the female appear on the other side. Except she did not appear. Baffled, I went back to see if she made a U-turn and headed out the entrance. I still didn't see her. Then I saw her. She was ovipositing near the mid-point of the culvert and continued to do so for a minute or so. The culvert was about 5 feet in diameter (I should have measured it) and the water was about 6 inches deep. I wonder how many dragonflies oviposit in culverts?" (Author)] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

13945. Godwin, J.; Krotzer, S. (2006): "Cave dragonfly" found in Alabama. *Argia* 18(3): 20. (in English) [ISA. Verbatim: On 19 August 2006, while exiting the Keel Sinks entrance to the Tony Sinks cave system located within the Sharp-Bingham Mountain Preserve in Jackson County in extreme northeastern Alabama, one of us (JG) encountered a dragonfly perched on a wall of the entrance pit to the cave system. The phenomenon of odonates utilizing caves as roosts, ostensibly as thermal refugia, has been reported in the literature (for example see Corbet, 1999), but it is apparently a fairly rarely documented event. ... The dragonfly was discovered at about 1600 h, perched on the wall of the pit ca. 5 m below the lip, on the cooler portion of the pit wall, well below the thermocline. Light conditions at the time were subdued but far from approaching darkness. Lethargic and easily captured by hand, the specimen was sent to SK, who identified it as a female *Somatochlora tenebrosa*. This largely crepuscular species would seem to be a likely candidate

to seek out a thermal refuge during the long, hot days of an Alabama summer!] Address: Krotzer, S., 2238 Haysop Church Road, Centreville, AL 35042, USA. E-mail: rskrotze@southernco.com

13946. Gregoire, J.; Gregoire, S. (2006): Breeding population of *Anax longipes* discovered in the Finger Lakes highlands of New York. *Argia* 18(1): 12-13. (in English) [Exuviae of *A. longipes* were found in July and August 2005. *Somatochlora* sp. was caught in a mist net.] Address: Gregoire, J., Kestrel Haven Avian Migration Observatory, Burdett, NY 14818, USA. E-mail: khmo@empacc.net

13947. Gregoire, S.; Gregoire, J. (2006): Update on mass emergence of *Lestes unguiculatus* in central New York. *Argia* 18(1): 14. (in English) [After drying of a pond with app. 75,000 individuals of *L. unguiculatus* in 2004 and emigration of the adult population, in 2005 only one specimen could be seen.] Address: Gregoire, J., Kestrel Haven Avian Migration Observatory, Burdett, NY 14818, USA. E-mail: khmo@empacc.net

13948. Honcu, M.; Roztocil, O. (2006): Important species of dragonflies (Odonata) in the region of česká Lípa (Northern Bohemia, Czech Republic) in 2003-2005. *Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších : seminár usporádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lípe / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 49-63. (in Czech, with English summary) ["Faunistic records of dragonflies made during the excursions of the VIII. allstate meeting of odonatologists in June 2005 in the Žďárské vrchy – hills. In the course of several field trips detected in the visited five faunistic squares No. 6261, 6360, 6361, 6362, 6461 a collection of 26 species of dragonflies, a number which represents about 32,5 % of all the dragonfly species known in the whole Czech Republic. Common species prevail, noteworthy is the detection of following species: *Leucorrhinia pectoralis*, listed in "Natura", found in two places, *Somatochlora arctica*, *Orthetrum albistylum*, *Cordulegaster boltonii*, *Leucorrhinia rubicunda*, *Leucorrhinia dubia*, *Coenagrion hastulatum* a *Lestes dryas*. The date of the meeting was chosen to facilitate the finding of representants of the family *Leucorrhinia* and also of the family *Aeshna* but, unfortunately, the representants of this second family did not appear. In addition to the excursions organised in the course of the meeting Mr. Hesoun detected one exuvium of *Symptetrum fonscolombii* at the borders of the faunistic squares No. 6260 and 6261; the correctness of the determination had been approved by Dr. A. Dolný. The list of detected species is as follows: *Calopteryx virgo*, *Lestes viridis*, *L. sponsa*, *L. dryas*, *Platycnemis pennipes*, *Pyrrhosoma nymphula*, *Erythromma najas*, *Coenagrion hastulatum*, *C. puella*, *Enallagma cyathigerum*, *Ischnura elegans*, *Anax imperator*, *Cordulegaster boltonii*, *Cordulia aenea*, *Soma-**

tochlora metallica, *S. arctica*, *Libellula quadrimaculata*, *L. depressa*, *Orthetrum cancellatum*, *O. albistylum*, *Symptetrum vulgatum*, *S. flaveolum*, *S. danae*, *Leucorrhinia dubia*, *L. rubicunda*, and *L. pectoralis*." (Authors)] Address: Honcu, M., Vlastividné muzeum v České Lípe, náměstí Osvobození 297, 470 01 Česká Lípa, Czech Republic. E-mail: honcu@muzeum.clnet.cz

13949. Kappes, E.; Kappes, W. (2006): First record of *Enallagma eiseni* from the USA. *Argia* 18(3): 7. (in English) [28-VI-1992 Quitobaquito Springs, Organ Pipe Cactus National Monument, Pima Co., Arizona, USA] Address: Kappes, W., Eichenweg 27, 22395 Hamburg, Germany

13950. Krotzer, S. (2006): *Stylurus potulentus*, new for Alabama. *Argia* 18(2): 12. (in English) [26-VI-2006, Majors Creek, Baldwin County, Alabama, USA] Address: Krotzer, S., 2238 Haysop Church Road, Centreville, AL 35042, USA. E-mail: rskrotze@southernco.com

13951. Manolis, T. (2006): A hybrid gomphid (*Ophiogomphus bison* x *morrisoni*) from California. *Argia* 18(3): 9-10. (in English) [Susan River, Susanville, Lassen Co., California, USA, 31-V-2002, male] Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

13952. Manolis, T.; Bruun, R. (2006): A hybrid *Libellula* (*forensis* x *luctuosa*) from northern California. *Argia* 18(3): 8-9. (in English) [Battle Creek Wildlife Area, Shasta Co., California, USA; 29-IV - 1-V-2006.] Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

13953. Manolis, T.; Iliff, M. J.; Erickson, R. A. (2006): First records of *Enallagma eiseni* and *Telebasis incolumis* from northern Baja California. *Argia* 18(3): 4-6. (in English) [*Enallagma eiseni* & *Telebasis incolumis*: 24-VII-2006, Arroyo Santo Domingo, Mexico.] Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

13954. Manolis, T. (2006): *Cordulegaster dorsalis* in southwestern New Mexico: A long-buried first state record. *Argia* 18(3): 13. (in English) [W. Fork Gila River, Catron Co., New Mexico, USA, 14/15-IX-1973] Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

13955. McKenzie, P. M.; Gillespie, R.; Kelley, S. (2006): *Arigomphus maxwelli* Ferguson, 1950 (Bayou Clubtail), a new gomphid for Missouri. *Argia* 18(1): 10-11. (in English) [Three records of *A. maxwelli* from Dunklin, Boone (2005) and Mississippi (2003) counties, Missouri, USA are documented and discussed in detail.] Address: McKenzie, P., U.S. Fish and Wildlife Service, 101 Park DeVille Dr., Suite A, Columbia, MO, 65203-0057, USA. E-mail: paul_mckenzie@fws.gov

13956. Meurgey, F. (2006): *Anax ephippiger* (Burmeister, 1839), a new species for the West Indies. *Argia* 18(1): 21-22. (in English) [A female *A. ephippiger* was caught on

26-I-2006 near Anse-Bertrand (North-West of Grande-Terre, Guadeloupe. The climatic/wind situation is discussed to explain the arrival of this essentially African species in the Caribbean region)] Address: Meurgey, F., Mus. d'Hist. nat. Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13957. Meurgey, F. (2006): Collecting trip in Guadeloupe, French West Indies. *Argia* 18(1): 19-21. (in English) [Extensive report on a three week trip to Guadeloupe between 24 January and 14 February 2006.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13958. Mitra, A.; Phuntsho, P. (2006): A report on the Odonata diversity of Bumdeling Wildlife Sanctuary, Trashigang, Eastern Bhutan. Ministry of Agriculture, Thimphu: 58 pp. (in English) ["Conclusion: The present study reflects the rich entomological diversity of the conservation areas in Bhutan in respect of Odonata. With the nine new records during the present study, 40 species and subspecies of dragonflies are known from Bhutan till date (see checklist). Two of them have been found new to world.. It's a clear indication for the government to start with this type of projects in the field of invertebrates that constitute the lion's share of the living species on earth, With the on going trends of modernization, it's time now for Bhutan to know its actual strength of biodiversity, 10 explore, and to document it for making effective plans to conserve them in situ, before it is too late to start. Nature Conservation Division, should as early as possible set up a museum to preserve the type specimens produced from this kind of studies. However, as far as the Odonata fauna of Bhutan is concerned, the study remains fairly incomplete as the middle and west Bhutan are still unexplored." (Authors) Regrettably, the "grey paper" also includes the detailed descriptions of two new damselfly taxa: *Anisopleura bella* Mitra & Phuntsho 2006 and *Acia-grion olympicum bumdelingsis* Mitra & Phuntsho 2006. It is questionable if these descriptions formally can be accepted as they are not made in any publication available to any taxonomist.] Address: Mitra, A., Department of Zoology, Sherubtse College, KANGLUNG, Bhutan. E-mail: amitodonata@yahoo.com

13959. Mourek, J. (2006): A challenge to the participation on the monitoring of insect species (Insecta) of community interest. *Vážky 2005: sborník referátu VIII. celostátního semináře odonatologu ve Žďárských vrších : seminář uspořádaly ve dnech 23.-26.6.2005 Správa CHKO Žďárské vrchy, ZO CSOP Vlašim a Vlastivedné muzeum a galerie v České Lípě / editor sborníku Lubomír Hanel. -- Vyd. 1. -- Vlašim: ZO CSOP Vlašim, 2006. ISBN 80-86327-52-3: 154-161. (in Czech, with English summary) ["The long term monitoring of species and habitats according to the EU Council Directive 92/43/EEC (On the conservation of natural habitats and of wild fauna and flora) is organized by the Agency for*

Nature Conservation and Landscape Protection of the Czech Republic. This contribution informs about the aims and the system of monitoring of insect species and summarizes the methods of monitoring for particular species. It is also intended as a challenge for the professional as well as non-professional entomologists to participate in the monitoring." (Author)] Address: Mourek, J., Agentura ochrany přírody a krajiny ČR, Kališnická 4-6, 130 23 Praha 3, Czech Republic. E-mail: jan_mourek@nature.cz

13960. Paulson, D. (2006): New common names for three North American odonates. *Argia* 18(3): 23. (in English) [*Epithea costalis* - Slender Baskettail; *Somatochlora elongata* - Ski-tipped Emerald; *Celithemis ornata* - Ornate Pennant] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@pugetsound.edu

13961. Proctor, N.S. (2006): Some Connecticut observations. *Argia* 18(1): 17. (in English) [Observations of Green Heron's preying on *Libellula vibrans* are documented. An additional observation is given on a migratory Solitary Sandpiper (*Tringa solitaria*) who repeatedly plucked out odonate larvae from the muddy edges of a pool. During a ten minute feeding period it consumed 15 larvae.] Address: Proctor, Noble, 43 Church St. Branford, CT 06405, USA

13962. Trybula, J. (2006): *Arigomphus cornutus*, a state record for New York. *Argia* 18(3): 11-12. (in English) [21-VI-2006, Indian Creek Nature Center, Upper & Lower Lakes Wildlife Management Area, Canton, Saint Lawrence Co., New York, USA] Address: Trybula, J., Dept Biology, State Univ. New York at Potsdam, 44 Pierrepont Ave., Potsdam, NY 13676, USA. E-mail: trybulj@potsdam.edu

13963. Tveekrem, J. (2006): *Somatochlora brevicincta* from Minnesota. *Argia* 18(1): 19. (in English) [Lake County, Minnesota, USA, 11-VII-2005] Address: not stated

13964. White, H. (2006): *Enallagma anna* in Pennsylvania. *Argia* 18(2): 13. (in English) [Huntingdon Co, Pennsylvania, USA, no dates] Address: White, III, H.B., Dept of Chemistry and Biochemistry, University of Delaware, Newark, Delaware 19716, USA

13965. White, H. (2006): *Gynacantha nervosa* from Delaware!. *Argia* 18(2): 13. (in English) [27-IX-1975, Newark, New Castle Co., Delaware, USA] Address: White, III, H.B., Dept of Chemistry and Biochemistry, University of Delaware, Newark, Delaware 19716, USA

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13966. Abbott, J.C. (2007): Book Review: *Dragonflies & Damselflies of Georgia and the Southeast*. *Argia* 19(1): 21-22. (in English) [Review of: Beaton, G. (2007): *Drag-*

onflies and Damselflies of Georgia and the Southeast. Wormsloe Foundation Nature Book. University of Georgia Press. ISBN-13: 978-0820327952. 355 pp] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabott@mail.utexas.edu

13967. Connors, R. (2007): *Somatochlora elongata* (Skipped Emerald) and *Enallagma durum* (Big Bluet): Two new species for Tennessee. *Argia* 19(1): 18-19. (in English) [*Somatochlora elongata*: 19-VII-2006, Carter County, Tennessee, USA. *Enallagma durum*: 3-X-2006, Paris Landing State Park, Henry County, Tennessee, USA.] Address: Connors, R., Nashville, Tennessee, USA. E-mail: Rconnorsphoto@aol.com

13968. Cuppen, J.G.M.; Drost, B. (2007): Entomological fauna of the Kempen, Noord-Brabant – report of the 161st summer meeting at Baarschot. *Entomologische Berichten* 67(4): 122-144. (in Dutch, with English summary) ["The 161st summer meeting of the Netherlands Entomological Society took place on 9-11 June 2006. A total of 1408 taxa of eighteen arthropod orders were recorded." The following odonate species are listed: *Calopteryx splendens*, *C. virgo*, *Lestes dryas*, *L. sponsa*, *L. virens*, *L. viridis*, *Ischnura elegans*, *Pyrrhosoma nymphula*, *Enallagma cyathigerum*, *Coenagrion puella*, *Aeshna cyanea*, *Anax imperator*, *Cordulia aenea*, *Somatochlora metallica*, *Libellula depressa*, *L. quadrimaculata*, *Sympetrum danae*, and *Leucorrhinia dubia*.] Address: Cuppen, J.G.M., Buurtmeesterweg 16, 6711 HM Ede, The Netherlands. E-mail: jan.cuppen@wur.nl

13969. Headon, C.M.; Hall, R.J. (2007): A multivariate analysis of factors affecting mercury availability in dragonfly nymphs (Order: Odonata) inhabiting wetland ecosystems. <https://ia601509.us.archive.org/5/items/AMultivariateAnalysisOfFactorsAffectingMercuryAvailabilityInDragonfly/MercuryInDragonflyNymphs.pdf>; 42 pp. (in English) ["Fifteen wetlands were examined to determine the influence of sediment and water chemical parameters on mercury bioavailability in dragonfly nymphs (Order: Odonata; suborder: Anisoptera; Genus: *Cordulia*). Wetland types included mineral poor fens, circumneutral minerotrophic fens and marshes. Mercury concentrations in dragonfly nymphs ranged from 0.041 to 0.402 ug.g-1 dry mass and were significantly ($p < 0.001$) different among the 15 wetlands. Multivariate statistical procedures showed that sediment total sulfur (S) concentration explained the greatest amount of the among wetland variation in Hg concentrations in anisopteran nymphs. With increasing concentrations of total S in the sediments there was a decrease in nymph Hg concentrations. Surface water chemistry appeared not to have a direct effect on Hg bioavailability." (Authors)] Address: not stated

13970. Larsen, R.R. (2007): Notes on the Plateau Spreadwing (*Lestes alacer*) in eastern New Mexico. *Argia* 19(3): 17-18. (in English) [Notes are given on phenol-

ogy, oviposition, feeding of adults (including gleaning of ants), dormitories and regional habitats of larval and imaginal *L. alacer*.] Address: Larsen R.R., Roswell, New Mexico, USA. E-mail: roblrsn@yahoo.com

13971. Lubchansky, J. (2007): First record of *Enallagma basidens* (Double-striped Bluet) in Nevada. *Argia* 19(1): 19. (in English) [19-VI-2006, Floyd Lamb State Park, Clark County, Nevada, USA] Address: Lubchansky, J. E-mail: thelube@verizon.net

13972. Manger, R.; Rocks, J.; Rocks, A.; Knecht, T. (2007): Early or late emerged Ruby whiteface *Leucorrhinia rubicunda* in October? *Brachytron* 10(2): 219-221. (in Dutch, with English summary) [Netherlands; "On October 26, 2006 a young female *L. rubicunda* was found in the Bargerveen peat bog. The observation of a female in autumn is very exceptional as this is a typical spring species and the earliest *Leucorrhinia* in temperate lowlands. A possible explanation could be the extreme hot summer and spring causing an exceptionally high water temperature, resulting in higher food availability and probably faster larval growth. The exceptionally high temperatures in October may have prevented this female to diapause." (Authors)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

13973. Misof, B.; Niehuis, O.; Bischoff, I.; Rickert, A.; Erpenbeck, D.; Staniczek, A. (2007): Towards an 18S phylogeny of hexapods: Accounting for group-specific character covariance in optimized mixed nucleotide/doublet models. *Zoology* 110: 409-429. (in English) ["The phylogenetic diversification of Hexapoda is still not fully understood. Morphological and molecular analyses have resulted in partly contradicting hypotheses. In molecular analyses, 18S sequences are the most frequently employed, but it appears that 18S sequences do not contain enough phylogenetic signals to resolve basal relationships of hexapod lineages. Until recently, character interdependence in these data has never been treated seriously, though possibly accounting for the occurrence of biased results. However, software packages are readily available which can incorporate information on character interdependence within a Bayesian approach. Accounting for character covariation derived from a hexapod consensus secondary structure model and applying mixed DNA/RNA substitution models, our Bayesian analysis of 321 hexapod sequences yielded a partly robust tree that depicts many hexapod relationships congruent with morphological considerations. It appears that the application of mixed DNA/RNA models removes many of the anomalies seen in previous studies. We focus on basal hexapod relationships for which unambiguous results are missing. In particular, the strong support for a "Chiasmomyaria" clade (Ephemeroptera+Neoptera) obtained in Kjer's [2004. Aligned 18S and insect phylogeny. *Syst. Biol.* 53, 1-9] study of 18S sequences could not be confirmed by our analysis. The hexapod tree can be rooted

with monophyletic Entognatha but not with a clade Ellipura (Collembola+Protura). Compared to previously published contributions, accounting for character interdependence in analyses of rRNA data presents an improvement of phylogenetic resolution. We suggest that an integration of explicit clade-specific rRNA structural refinements is not only possible but an important step in the optimization of substitution models dealing with rRNA data." (Authors) The list of species studied includes 42 Odonata species/samples.] Address: Misof, B., Abt. Ent., Zool. Forschungsmus. A. Koenig, Adenauerallee 160, 53113 Bonn, Germany. E-mail: b.misof.zfmk@uni-bonn.de

13974. Muddeman, J. (2007): A new species for the Galapagos Islands: Great Pondhawk (*Erythemis vesiculosa*). *Argia* 19(1): 17-18. (in English) [13-VII-2004 and 24-X-2006, Punta Moreno, W Isabela Island, Ecuador] Address: Muddeman, J. E-mail: john@iberianwildlife.com

13975. Myrup, A.R. (2007): Interesting new state and county Odonata records for Utah. *Argia* 19(1): 14-16. (in English) [Records of the following species are documented in detail: *Perithemis intensa*, *Libellula luctuosa*, *Macromia magnifica*, *Aeshna persephone*, *Telebasis salva*, and *Argia hinei*] Address: Myrup, A., 914 South 1635 West, Orem, Utah 84058, USA. E-mail: alanm@provo.edu

13976. Nichols, W.J.; McAdoo, J.R. (2007): Summer of fun: Odonates on the Oswegatchie River in New York. *Argia* 19(3): 26. (in English) [Note on the Odonata fauna (n = 39) in summer 2007; St. Lawrence County, New York, USA] Address: Nichols, W.J., Northern Illinois University, Dept of Biological Sciences Dekalb, IL 60115, USA. E-mail: wnicols@niu.edu

13977. Sibley, F.C. (2007): Unusual three species pairing. *Argia* 19(4): 19. (in English) [03-IX-2004, Keuka Lake, New York, USA; string of three males composing of *Sympetrum internum*, *S. semicinctus* and *Perithemis tenera*.] Address: Sibley, F.C., The Conservation Agency, 6 Swinburne St. Jamestown, RI 02835, USA. E-mail: fcsibley@empacc.net

13978. Strickland, G.; Strickland, J. (2007): Two new species records for Louisiana. *Argia* 19(4): 18-19. (in English) [Lestes forficula: 8-IX-2007, Barney Farm near the town of Washington in St. Landry Parish, Louisiana, USA; *Erythemis vesiculosa*, 27-X-2007, Cameron Parish, Louisiana, USA.] Address: Strickland, J., 1354 Brookhollow Drive, Baton Rouge, LA 70810, USA. E-mail: gstrick3@cox.net

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13979. Dauphin, D.T. (2008): New U.S. Dragonfly - *Planiplax* sp. (probably *Planiplax sanguiventris*). *Argia* 20(2): 19. (in English) [2-VI-2008, Mission, Hidalgo County, Texas, USA] Address: Dauphin, D., Mission, Texas, USA. E-mail: dauphin@sbcglobal.net

13980. Hämäläinen, M. (2008): Ukonkorennot crenata ja maxima – hieman historiaa [The Mosaic Hawk crenata and maxima – a brief history]. *Crenata* 1: 35-37. (in Finnish) [On the occasion of the publication of the first issue of the new magazine of the Finnish Dragonfly Society the history of knowledge of *Aeshna crenata* (which was eponymous for the magazine) is outlined and illustrated. *Aeshna maxima*, described by Hisinger in 1861 based on a specimen from Lohja (S-Finland) later on turned out to be a synonym of *Aeshna crenata* described by Hagen (1856) on Siberian material. (Asmus Schröter)] Address: Hämäläinen M., Dept Applied Zool., P.O. Box 27, FIN-00014 University of Helsinki, Finland; E-mail: matti.hamalainen@helsinki.fi

13981. Koskinen, J.; Pynnönen, P. (2008): Etelänukonkorento *Aeshna mixta* ensi kertaa lisääntyvänä Suomessa [First confirmed breeding record of the Migrant Hawker *Aeshna mixta* in Finland]. *Crenata* 1: 34. (in Finnish) [The discovery of a freshly emerged female and an exuvia at Laukanlahti (Perniö) in coastal southwest Finland on 11-viii-2008 representing the first reproduction record of *A. mixta* Finland is briefly described and illustrated. (Asmus Schröter)] Address: not stated

13982. Manolis, T.; Klett, S. (2008): *Pachydiplax longipennis* (Blue Dasher) flying with exuvia attached. *Argia* 20(3): 18. (in English) [14-VI-2008, Sonoma State University's Fairfield Osborn Preserve, Sonoma County, California, USA] Address: Manolis, T., 808 El Encino Way, Sacramento, CA, 95864, USA

13983. Meurgey, F.; Gwenael, D.; Thiebaut, B. (2008): 2008 collecting trip in Martinique (French West Indies). *Argia* 20(2): 14-16. (in English) [Detailed report on an odonatological trip from 23 March to 13 April 2008.] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, F-44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

13984. Nirschl, R. (2008): *Brechmorhoga praecox* (Slender Clubskimmer) — A new species for the United States. *Argia* 20(2): 17. (in English) [28-II-2008, Mission, Hidalgo County, Texas, USA] Address: Nirschl, R. E-mail: ricknir@hotmail.com.

13985. Parkko, P.; Metsälä, P. (2008): Täplälampikorennon *Leucorrhinia pectoralis* esiintyminen Kymenlaaksoissa [Occurrence of *Leucorrhinia pectoralis* in Kymenlaakso, SE Finland.]. *Crenata* 1: 30-33. (in Finnish) [Up to 2000 only 20 sites for *L. pectoralis* were known in Kymenlaakso province in south-east Finland. By the end of 2007 already 40 sites were known. The increase is partly due to increased observing activity, but undoubtedly this species is also invading new sites in Kymenlaakso. [Note by abstractor: The same is true also elsewhere in southern Finland]. (Asmus Schröter)] Address: Parkko, P., Hirveläntie 49, FI-45910 Voikkaa, Finland

13986. Abu Hassan, A.; Dieng, H.; Satho, T.; Boots, M.; Al Sariy, J.S.L. (2010): Breeding patterns of the JE vector *Culex gelidus* and its insect predators in rice cultivation areas of northern peninsular Malaysia. *Tropical Biomedicine* 27(3): 404-416. (in English) ["Japanese encephalitis (JE) virus activity is an important cause of viral encephalitis in Southeast Asia. In Malaysia, JEV activity has been first detected in *Culex gelidus* in 1976. Since then, no study has fully addressed the seasonal dynamics of this mosquito. As irrigated rice production expands, the incidence of JEV vectors, particularly *Cx. gelidus* is expected to increase. We surveyed Penang Island to determine the breeding patterns of *Cx. gelidus* and their potential insect predators, in relation to habitat/niche and rice growing period. Six rice fields proper (RFP) and related drainage canals (DC) were visited through three cultivation cycles (CCs) over 17 months. Weekly visits were performed to each of the 36 sites and mosquito larvae and aquatic insects were sampled from RFP and DCs using dippers. *Culex gelidus* was abundant in RFP and almost absent in DCs. Its densities usually were high during the first and 3rd CC and when the RFs were in Fp, Pp and Gp. In DCs, the mosquito was abundant during Mp, e.g., 2nd CC. Predators, especially those belonging to the families Corixidae, Coenagrionidae and Dytiscidae, were more present in RFP. Predator numbers usually were high during the first CC; in some cases predator abundance peaked during other CCs, e.g., corixids and dytiscids. In RFP, neither corixids nor coenagrionids showed any positive correlation with densities of *Cx. gelidus*. However, dytiscids' population peaked when the mosquito densities were on the rise. These observations suggest that *Cx. gelidus* is active during the period of rice cultivation. Operational vector control through bio-control or with insecticides near the end of the rice cultivation season in RFP may prove beneficial in reducing the density of *Cx. gelidus*, but also the amount of bio-agent or insecticide applied on riceland." (Authors)] Address: Abu Hassan, A., School of Biological Sciences, Universiti Sains Malaysia, Penang, Malöaysia. E-mail: aahassan@usm.my

13987. Girgin, S.; Kazancy, N.; Dügel, M. (2010): Relationship between aquatic insects and heavy metals in an urban stream using multivariate techniques. *Int. J. Environ. Sci. Tech.* 7(4): 653-664. (in English) ["In the study, the relationship between some aquatic insect species (Ephemeroptera, Plecoptera, Trichoptera and Odonata) and some heavy metals (cadmium, lead, copper, zinc, nickel, iron and manganese) and boron were assessed using data obtained from the Ankara Stream, which flows through Ankara, the capital city of Turkey and receives high organic and industrial wastes. Sampling was carried out monthly along the Ankara Stream in 1991. Environmental data were used to explain biological variation using multivariate techniques provided by the program canonical correspondence analysis ordination. The ordination method canonical correspondence analysis was ap-

plied to evaluate the relationships between environmental variables and distribution of aquatic insect larvae. Data sets were classified by two way indicator species analysis. In this study, aquatic insecta communities have been shown by canonical correspondence analysis ordination as related to total hardness, pH, cadmium, lead, copper, zinc, nickel, iron, manganese and boron. Cadmium, lead, copper and boron exceeded limits of the United States Environmental Protection Agency criteria for aquatic life. Trichopteran, *Dinarthrum iranicum* was an indicator of two way indicator species analysis and was placed close to the arrow representing copper. Odonate, *Aeshna juncea* was an indicator of two way indicator species analysis in site 10 and was placed close to the arrows representing manganese, lead, and nickel. Trichopteran, *Cheumatopsyche lepida* and odonate, *Platycnemis pennipes* were indicators of two way indicator species analysis for sites 6, 7, 11, 14, 15, 18 and were placed close to the arrows representing cadmium, boron, iron and total hardness." (Author) As *A. juncea* is no stream-dwelling species, the identification of this species and some more from the taxa list in table 2 is questionable. (Martin Schorr)] Address: Girgin, S., Biology Department, Gazi Education Faculty, Gazi University, Teknikokullar, Ankara, Turkey. Email: sonmez.girgin@gmail.com

13988. Grand, D. (2010): *Zygonyx torridus* (Kirby, 1889) sur le rio Cabriel, provinces de Albacete, Cuenca et Valencia (Espagne): distribution et observations biologiques (Odonata, Anisoptera, Libellulidae). *Martinia* 36 (3/4): 78-90. (in French, with English summary) ["Some investigations were conducted from the end of May to the end of September between 2006 and 2010, on a section of 122 km along the rio Cabriel (provinces of Albacete, Cuenca and Valencia). Recently evaluated as « Vulnerable » in Europe, *Z. torridus* is an Afrotropical species with a discontinuous distribution area around the Mediterraneans. Big larval and adult populations are encountered along rio Cabriel. This paper deals with some aspects of its poorly known biology such as emergences, behaviour, distribution and sex-ratio." (Author)] Address: deseased

13989. Ishizawa, N. (2010): Effect of the environmental conditions at rice paddies on the emergence and the oviposition in *Sympetrum frequens* (Selys). *New Entomol.* 59(3/4): 48-52. (in Japanese, with English summary) ["It was cleared that emergence from the rice paddies was affected by the temperature of the water. The number of emergence from the rice paddy at the north side, of which water temperature was higher than that at the south side and being shone by the sun earliest in the morning, counted 232 and outnumbered that of the south (76) and the emergence was skewed to the paddy that was shone earlier by the sun in the morning (the difference was significant, $p < 0.001$). After rice-planting the number of emergence at the rice plant was more than that at other plants near the ridge of rice paddies. The average height of emergence was ca. 8 cm, and that at rice plant was just a little higher than that at other plants

near the ridge, however, the difference was not significant. Also, in the reproductive season the temperatures of the standing water at rice paddies were inclined to be higher at the north side than at the south side, and the number of oviposition pairs was 61, significantly more than that at the south ($p < 0.001$). Oviposition tended to be skewed to the early sunlit rice paddies in the morning. *S. frequens* has a propensity to prefer sunlit paddies at the seasons of emergence and reproduction." (Author)] Address: Ishizawa, N., 1644-15, Yamaguchi, Tokorozawa City, Saitama Pref., Japan. E-mail: greffect708@jcom.home.ne.jp

13990. Wesner, J.S. (2010): Seasonal variation in the trophic structure of a spatial prey subsidy linking aquatic and terrestrial food webs: adult aquatic insects. *Oikos* 119: 170-178. (in English) ["Research over the past decade has established spatial resource subsidies as important determinants of food web dynamics. However, most empirical studies have considered the role of subsidies only in terms of magnitude, ignoring an important property of subsidies that may affect their impact in recipient food webs: the trophic structure of the subsidy relative to in situ resources. This may be especially important when subsidies are composed of organisms, as opposed to nutrient subsidies, because the trophic position of subsidy organisms may differ from in situ prey. I explored the relative magnitude and trophic structure of a cross-habitat prey subsidy, adult aquatic insects (including Odonata), in terrestrial habitats along three streams in the south central United States. Overall, adult aquatic insects contributed more than one-third of potential insect prey abundance and biomass to the terrestrial habitat. This contribution peaked along a permanent spring stream, reaching as high as 94% of abundance and 86% of biomass in winter. Trophic structure of adult aquatic and terrestrial insects differed. Nearly all adult aquatic insects were non-consumers as adults, whereas all but one taxon of terrestrial insects were consumers. Such a difference created a strong relationship between the relative contribution of the prey subsidy and the trophic structure of the prey assemblage: as the proportion of adult aquatic insects increased, the proportion of consumers in the prey assemblage declined. Specific effects varied seasonally and with distance from the stream as the taxonomic composition of the subsidy changed, but general patterns were consistent. These findings show that adult aquatic insect subsidies to riparian food webs not only elevate prey availability, but also alter the trophic structure of the entire winged insect prey assemblage." (Author)] Address: Wesner, J.S., Biol. Station & Dept of Zool. Univ. of Oklahoma, Norman, Oklahoma 73019 USA

2011

13991. Brix, K.V.; DeForest, D.K.; Adams, W.J. (2011): The sensitivity of aquatic insects to divalent metals: A comparative analysis of laboratory and field data. *Science of the Total Environment* 409: 4187-4197. (in English) ["Laboratory studies have traditionally indicated that aquatic insects are relatively insensitive to metals while field studies have suggested them to be among the most sensitive aquatic invertebrate taxa. We reviewed and synthesized available studies in the literature to critically assess why this discrepancy exists. Despite the intense effort to study the effects of metals on aquatic biota over the past several decades, we found studies specific to insects to still be relatively limited. In general, the discrepancy between laboratory and field studies continues with few efforts having been made to elucidate the ecological and physiological mechanisms that underlie the relative sensitivity (or insensitivity) of aquatic insects to metals. However, given the limited data available, it appears that aquatic insects are indeed relatively insensitive to acute metal exposures. In contrast, we suggest that some aquatic insect taxa may be quite sensitive to chronic metal exposure and in some cases may not be protected by existing water quality criteria for metals. The discrepancy between laboratory and field studies with respect to chronic sensitivity appears to largely be driven by the relatively short exposure periods in laboratory studies as compared to field studies. It also appears that, in some cases, the sensitivity of aquatic insects in field studies may be the result of direct effects on primary producers, which lead to indirect effects via the food chain on aquatic insects. Finally, available evidence suggests that diet is an important source of metal accumulation in insects, but to date there have been no conclusive studies evaluating whether dietary metal accumulation causes toxicity. There is a clear need for developing a more mechanistic understanding of aquatic insect sensitivity to metals in long-term laboratory and field studies." (Authors) The review includes references to Odonata.] Address: Brix, K.V. c/o EcoTox 575 Crandon Blvd., #703 Key Biscayne, Florida 33149, USA. E-mail: kbrix@rsmas.miami.edu

13992. Cheicante, R. (2011): *Somatochlora georgiana* (Coppery Emerald) discovered and observed in Maryland. *Argia* 23(2): 12-13. (in English) [First record of *S. georgiana* at 12-VI-2010, Idylwild WMA, near Federalsburg, Maryland, USA. Two additional records from the same year are also documented.] Address: Cheicante, R., Bel Air, Maryland, USA. E-mail: rickcheicante@yahoo.com

13993. Duran, M.; Akyildiz, G.K. (2011): Evaluating benthic macroinvertebrate fauna and water quality of Suleymanli Lake (Buldan-Denizli) in Turkey. *Acta zool. bulg.* 63(2): 169-178. (in English) ["Benthic macroinvertebrate samples were taken seasonally from October 2006 to April 2008 except winter seasons with the aim of evaluate macroinvertebrate fauna and water quality of Suleymanli Lake. In total, 61 benthic macroinvertebrate taxa were found and 40 of them are new records for the lake. Chandler Score and Shannon-Weiner Diversity Index provided more compatible data than Revised Biological

Monitoring Working Party, Extended Trent Biotic Index and Belgian Biotic Index with physical-chemical results. Also, Principle Component Analysis was carried out to establish associations between benthic macroinvertebrates and environment variables. In our study, the lake water quality was determined as moderately polluted. Obtained environmental variables from water samples showed that the temperature, dissolved oxygen, pH, total dissolved solids and electrical conductivity are the most important parameters in explaining the macroinvertebrate community variation in the lake." (Authors) The following Odonata taxa are listed: Gomphus sp., Anax imperator, Cordulia sp., Libellula depressa, Calopteryx sp., Coenagrion ornatum, C. pulchellum, Ischnura elegans, Pyrrhosoma nymphula, and Enallagma cyathigerum.] Address: Duran, M., Pamukkale Univ., Faculty of Arts and Sciences, Dept of Biology, Kinikli, 20070, Denizli, Turkey

13994. Gregoire, S.; Gregoire, J. (2011): Some unusual sightings in the Northeast. *Argia* 23(2): 6. (in English) [USA, New York, Massachusetts; 2010 records of (migratory) *Tamea carolina* and *Anax longipes* are documented.] Address: Gregoire, J., Kestrel Haven Avian Migration Observatory, Burdett, NY 14818, USA. E-mail: khmo@empacc.net

13995. Hummel, S. (2011): *Ischnura perparva* (Western Forktail), new to Iowa. *Argia* 23(2): 7. (in English) [28-VII-2009, Odebolt Creek, Odebolt, Sac Co., Iowa, USA] Address: Hummel, S., P.O. Box 121, Lake View, IA, 51450, USA. E-mail: mshummel@netins.net

13996. Jaun, A. (2011): An Fluss und See: Natur erleben - beobachten - verstehen. Haupt: 232 pp. (in German) [On pages 96-105, dragonflies are introduced.] Address: Haupt Verlag AG, Falkenplatz 14, 3012 Bern, Switzerland

13997. Kazanci, N. (2011): Species records of order Odonata (Insecta) and their habitat quality from Turkey. *Review of Hydrobiology* 4(1): 47-58. (in English, with Turkish summary) [Records of the following taxa are documented: *Calopteryx splendens amasina*, *Epallage fatime*, *Coenagrion puella*, *C. pulchellum*, *Platycnemis pennipes*, *Aeshna affinis*, *Caliaeschna microstigma*, *Onychogomphus forcipatus albotibialis*, *Cordulegaster picta*, *Somatochlora flavomaculata*] Address: Kazanci, Nilgün, Hacettepe University, Science Faculty, Biology Department, Hydrobiology Section, Beytepe, Ankara, Turkey. E-mail: nilgunkazanci@gmail.com]

13998. Kourim, M.L.; Doumandji-Mitiche, B.; Doumandji, S.; Reggani, A. (2011): Biodiversité entomologique dans le parc national de l'Ahaggar (Tamanrasset, Sahara). *Entomologie faunistique – Faunistic Entomology* 2011 (2010) 63(3): 149-155. (in French) [Algeria; the list of species only includes *Orthetrum chrysostigma* and *Trithemis arteriosa*.] Address: Kourim, M.L., Département de Zoologie agricole et forestière, Ecole Nationale Supérieure Agronomique, El-Harrach, Alger, Algeria

13999. McHugh, M. (2011): Two northern range extensions along the eastern border of Kansas. *Argia* 23(2): 15. (in English) [USA, 2010; *Didymops transversa*, *Libellula deplanata*] Address: McHugh, M., Kansas City, USA. E-mail: Emchugh2@kc.rr.com

14000. Naraoka, H. (2011): Diurnal changes of the copulation duration and the ovipositing female number of *Ischnura asiatica* Brauer (Odonata: Coenagrionidae). *Journal of the natural history of Aomori* 16: 1-4. (in Japanese) ["The copulation duration and the oviposition hour were studied in natural population of *I. asiatica* at Aomori-ken northern Japan. The copulation was observed between ca. 5:00h and 16:00h. The total duration of copulation was $192m38s \pm 74m35s$ ($n=59$) in mean and divided into three stages (I: $188m34s \pm 70m41s$, II: $1m35s \pm 39s$, III: $16m05s \pm 4m28s$, $n=47$). The oviposition was observed between ca. 11:00h and 16:30h with a peak from 12:30h to 16:00h. The copulation duration was negatively correlated ($P < 0.001$) with the time of day, stage I being shorter towards the end of the day. The shortening of copulation duration before the oviposition hour is thought as "copulation guarding". But, the shortening after the onset of oviposition may be based on the number of mature eggs of the female and the remaining oviposition hour in the day at the time of copulation." (Author)] Address: Naraoka, H., 36-71, Aza-Motoizumi, Fukunoda, Itayanagicho, Kita-gun, Aomori Prefecture, 038-3661, Japan

14001. Nyheim, M.T. (2011): Biotilgjengelighet og opptak av antimon, kadmium, kobolt og sink i øyenstikkernymfer (Odonata, Anisoptera) som funksjon av økende veisaltkonsentrasjoner - et tracereksperiment. MSc. thesis, Norwegian University of Life Sciences: 73 pp, XII . (in Norwegian, with English summary) ["Because of the long winters in Norway, the amount of road salt needed to keep the roads ice-free is high. A large part of this road salt ends up in ponds close to the roads. High concentration of salt may increase the mobilization of heavy metals in sediments and effect biota living in the ponds. This thesis investigates how road salt in the aqueous phase affects the mobility of Co, Cd, Sb and Zn in sediment and how this affects the accumulation of these metals in nymphs of Odonata. This was done using ^{60}Co , ^{109}Cd , ^{125}Sb and ^{65}Zn and tracer technique in a laboratory experiment. Nymphs of dragonflies (Anisoptera) was exposed to moderate contaminated sediment and water with different salt concentrations (0, 500, 5000 og 10 000 mg NaCl/L). Sequential extraction was used on the sediments to investigate the mobility and bindings of the metals. For ^{60}Co og ^{109}Cd a positive correlation was identified between the salt concentration and activity in the aqueous phase, and between the salt concentration and the fractions that is assumed to be bioavailable in sequential extraction. ^{125}Sb seemed to be tightly bound to the sediment and were not mobilized by road salt in the aqueous phase. Due to low activity of ^{65}Zn in the sediment it was hard to draw any conclusions for this metal. The nymphs accumulated ^{109}Cd , ^{60}Co and

125Sb, while 65Zn showed none accumulation. Based on values of the bioaccumulation factor (BAF), the ranking of the accumulation of the different metals appeared to be as follows: 60Co > 109Cd ~ 125Sb > 65Zn. An increase in salt concentration in the aqueous phase did not lead to an increase in the accumulation of 60Co and 109Cd in the nymphs, rather the opposite trend was observed for these metals. This was not true for 125Sb which had the lowest accumulation in the control group with no added road salt. For 65Zn the activity in the aqueous phase and in the nymphs was so low that it was hard to draw any conclusions from the results. Autoradiography and measurements of nymphs that changed their exo-skeleton showed that the accumulation of either 60Co or 109Cd, or both of these metals, was in both internal organs and tissues and exo-skeleton." (Author)] Address: Nyheim, Mari

14002. Revenga, J.E.; Campbell, L.M.; Kyser, K.; Klassen, K.; Arribère, M.A.; Ribeiro Guevara, S. (2011): Trophodynamics and distribution of silver in a Patagonia Mountain lake. *Chemosphere* 83: 265-270. (in English) ["Silver (Ag) ions are among the most toxic metallic ions to aquatic biota. In southern Argentina, fish from Patagonian lakes have liver Ag concentrations [Ag] among the highest ever reported globally. Silver concentration in phytoplankton from Lake Moreno ($1.82 \pm 3.00 \mu\text{g g}^{-1}$ dry weight, DW) was found to be significantly higher than [Ag] in zooplankton ($0.25 \pm 0.13 \mu\text{g g}^{-1}$). Values in snails and decapods ($0.60 \pm 0.28 \mu\text{g g}^{-1}$ and $0.47 \pm 0.03 \mu\text{g g}^{-1}$ respectively), were higher than in insect larvae ($0.28 \pm 0.39 \mu\text{g g}^{-1}$ for Trichoptera). We examined trophic transfer of Ag in the biota using stable nitrogen and carbon isotopes ratios ($\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ respectively). Silver concentrations in the biota of Lake Moreno were not associated with any particular C source, as assessed by $\delta^{13}\text{C}$. Hepatic [Ag] significantly increased with trophic position, as measured by $\delta^{15}\text{N}$, within the brook trout sample set. Biodilution of Ag was observed between primary producers and small forage fish when whole body [Ag] was analyzed. Nevertheless, when considering whole food web biomagnification and hepatic [Ag] of top predator fish, a significant positive regression was found between [Ag] and trophic position, as measured by $\delta^{15}\text{N}$. The importance of species-specific and tissue-specific considerations to obtain more information on Ag trophodynamics than that usually presented in the literature is shown. To the best of our knowledge, this is the first study in assessing Ag trophodynamics and tissue-specific biomagnification in a whole freshwater food web." (Authors) Only two specimens "Odonata" were analysed containing 0,03 and 0,1 $\mu\text{g g}^{-1}$ Ag concentrations.] Address: Revenga, J.E., Centro Regional Universitario Bariloche (CRUB), Universidad Nacional del Comahue, Quintral 1250, 8400 Bariloche, Argentina. E-mail: jrevenga@bariloche.com.ar

14003. Rueda, J.; Molina, C.; Rueda, Y. (2011): Fallo no crítico en la emergencia de un ejemplar de *Orthetrum trinacria* (Sélys, 1841) (Odonata: Libellulidae). *Boletín de la*

S.E.A. 48(1): 374. (in Spanish, with English summary) ["We report on the sighting of a flying specimen of *O. trinacria* with a non critical failure experienced during wing emergence. It was observed during an attack on a dip-teran which ended on a reed." (Authors)]

14004. Tourenq, C.; Brook, M.; Knuteson, S.; Shuriqi, M.K.; Sawaf, M.; Perry, L. (2011): Hydrogeology of Wadi Wurayah, United Arab Emirates, and its importance for biodiversity and local communities. *Hydrological Sciences Journal* 56(8): 1407-1422. (in English, with French summary) ["Wadi Wurayah, in the Emirate of Fujairah, United Arab Emirates, lies within the Hajar Mountain range by the Gulf of Oman. The climate of the area is influenced by climatic events originating in Africa, Eastern Europe-Siberia, and the Indian and Pacific oceans. Rainfall provides 18.7hm^3 water annually, with an average of 2.24hm^3 as runoff. Recharge from rainfall to the mountain ophiolite complex creates a unique hydrogeological system with permanent freshwater habitats that support a biodiversity unique in the country and the world. The freshwater habitats host, amongst others, two species of amphibians, one fish species and aquatic insect species new to science. Spring waters classified as magnesium bicarbonate, slightly alkaline, with temperatures from 22 to 28°C and an average pH of 8.3, meet physico-chemical standards for drinking and bottled water, but do not meet the bacteriological standards near places frequented by tourists. An active management of the human pressure on the whole wadi ecosystem is urgently needed. ... To date, nine species of Odonata have been observed in Wadi Wurayah, the waterfall pool has one of the only three records of *Tamea basilaris* and the only record of *Crocothemis sanguinolenta* for the whole UAE (Reimer personal comm., Feulner et al. 2007)." (Authors)] Address: Tourenq, C., Emirates Wildlife Society - World Wide Fund for Nature, PO Box 45333, Abu Dhabi, United Arab Emirates. E-mail: ctourenq@ewswwf.ae

14005. Villanueva, R.J.T.; Gapud, V.P.; Lin, C.-P. (2011): *Drepanosticta leonardi* n. sp., (Odonata: Platystictidae), a new damselfly species from Leyte Island, Philippines. *Philipp. Ent.* 25(2): 111-115. (in English) ["One new species of damselfly, *Drepanosticta leonardi* n. sp., is described and illustrated based on specimens from Mt. Pangasugan, in the central part of Leyte Island, Philippines. It belongs to *Drepanosticta belyshevi* group and differs from its congeners based on the combination of characters on its posterior lobe of prothorax and cerci." (Authors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

2012

14006. Andrew, R.J.; Verma, P.; Thaokar, N. (2012): Seasonal variation and mite infestation in the anisopteran dragonflies of Gorewada lake of Nagpur City, India.

Vidyabharati International Interdisciplinary Research Journal 1(1): 1-10. (in English) ["A field study throughout the year (2010-2011) was undertaken at Gorewada lake of Nagpur city (which supplies water to the city) to study the seasonal activity pattern of anisopteran dragonflies. Although a total of 33 anisopterans were detected, we could study the following three parameters- flight period, reproductive behaviour, breeding habitats and mite parasitism of twenty species. The result indicates a distinct variation in the breeding site and flight period of the species observed. Such variation in the choice of breeding habitat allows the species to avoid competitive pressure for breeding and larval microhabitats. Only six species (*Acisoma panorpoides*, *Brachythemis contaminata*, *Crocothemis servilia*, *Diplacodes trivialis*, *Neurothemis t. tulia* and *Trithemis pallidinervis*) were found to be parasitized with mite *Arrenurus* spp. mostly on the ventral region of the thorax and abdomen." (Authors)] Address: Andrew, R.J., Post Graduate Dept of Zoology, Hislop College, Nagpur (M.S.), India

14007. Bates, L.M. (2012): Investigating the bioaccumulation of methylmercury in invertebrates from Saskatchewan prairie pothole wetlands. Ph thesis. The University of Regina, Canada, 3737 Wascana Parkway, Regina, SK S4S 0A2: 113 pp-["Deposition of atmospheric mercury (Hg(II)) to remote areas is an environmental health concern. Mercury is transferred to aquatic habitats from the atmosphere through fallout and precipitation and from surrounding land surfaces in runoff. Once present in a wetland, Hg(II) can be converted by microbial activity to methylmercury (MeHg), which is a harmful neurotoxin that bioaccumulates in foodwebs. Wetlands are important sites of methylation and MeHg concentrations in the water of prairie wetland habitats can be elevated compared to other systems. Within these habitats, invertebrates are an important food resource for many waterfowl species and may act as an indicator for the level of contamination within higher trophic levels. In 2007 and 2008, invertebrates were collected from wetlands on three land use types: agricultural lands, grasslands and organic agricultural lands. Organisms were identified to order (Gastropoda, Corixidae, Odonata, and Dytiscidae / Notonectidae) and categorized into functional feeding groups (FFGs; scraper, omnivore or predator). Samples were analyzed for total Hg, MeHg and stable isotopes of nitrogen ($\delta^{15}N$) and compared among invertebrate taxa and land use types. MeHg concentrations generally increased with trophic level. Gastropoda were significantly lower in MeHg concentrations than the other taxa. The $\delta^{15}N$ values did not correlate well with MeHg levels seen in invertebrate taxa, but did confirm invertebrate trophic levels. In general, MeHg concentrations were higher in invertebrate taxa from organic ponds than those from grassland ponds and lowest in invertebrates from ponds on traditional agricultural lands. Differences in MeHg concentrations with land use effects were apparent for all invertebrate groups collected, with significant differences observed in Corixidae. Changes in MeHg

concentrations in invertebrates in response to land management practices may be used to identify wetland habitats that may favour Hg methylation and may allow for prediction of contamination levels in biota of the prairie pothole region." (Author)] Address: Bates, Lara Michelle

14008. Bühler, W. (2012): Ein zweiter aktueller Fund der Gabel-Azurjungfer (*Coenagrion scitulum*) in Baden-Württemberg. *Mercuriale* 11(2011): 47-48. (in German) [Second record of *C. scitulum* in Baden-Württemberg, Germany; Gottenheim am Tuniberg (Landkreis Breisgau-Hochschwarzwald) 16-VI-2011.] Address: Bühler, W., Birkenweg 18, 79288 Gottenheim, Germany. E-mail: willy.buehler@gmx.de

14009. Craves, J.A. (2012): A preliminary list of the Odonata of Wayne Co.. *Michigan Birds and Natural History* 9(1): 7-16. (in English) ["Wayne Co. is located in southeastern Michigan at ~ lat 42°15'N, long 83°20'W. It covers 622 sq mi (1611 km). Encompassing Detroit and its immediate suburbs, it is heavily urbanized. There are 3 large rivers in county. The Rouge River drains into the Detroit River, which itself forms the eastern boundary of the county. The Huron River drains into Lake Erie near the mouth of the Detroit River. Unfortunately, 84% of historic wetlands in the county have been lost (Wooley 1998), and less than 3% of the original coastal wetlands remain along the Detroit River (Manny et al. 1988). This Odonata list is compiled from the Michigan Odonata Survey (MOS) database at the University of Michigan Museum of Zoology (UMMZ), a literature search, and my own records obtained during summer 2001. The list contains 75 species; 29 Zygoptera (damselflies) and 46 Anisoptera (dragonflies). Specimens are required by the MOS for official placement on the state or a county list. Of the 75 listed species, 19 are represented only by literature or sight records. I've noted these unvouchered species, and they can be considered "unofficial" until a voucher is received by MOS. If my record was the first for Wayne Co. (18 species), it will be noted as a new county record. For 5 of these new records, I did not obtain a voucher specimen. Two published records are not included. *Gompheshna furcillata* (Hagen) was reported by Hagen (1875). With the only confirmed records in the state from the Upper Peninsula and northern Lower Peninsula, this record is probably in error. *Arigomphus submedianus* (Williamson) was reported by Hagen (1885) as *G. submedianus* (*pallidus*). This is the only record for the state and considered questionable (O'Brien 1998). Following the main list are 48 species that have been found in 1 or more of the neighbouring counties which might be expected in Wayne Co. Approximate flight dates for adults have been provided. Depending on the number of specimen records, dates given are for southeast Michigan (Wayne, Monroe, Washtenaw, Oakland, and/or Macomb counties), statewide (Michigan data from O'Brien 2001), or from Ohio (OOS 2000). I provide dates from my own records from Wayne Co. if they represent dates outside others given. The flight date ranges are approximate.

Bear in mind that dragonfly collections are still limited, and many collectors focus their field work in mid-summer; early and late dates for some species are probably not accurately represented. The Ohio Odonata Survey web site (OOS 2000) provides excellent graphs, useful for seeing not only date ranges, but also peak flight dates of adults in that state." (Author)] Address: Craves, Julie A., Rouge River Bird Observatory, Natural Areas Dept., University of Michigan-Dearborn, Dearborn, MI 48128, USA

14010. Dragonfly Society of the Americas (2012): *Argia* 24(2). *Argia* 24(2): 26 pp. (in English) [The following administrative and organisational issues are published: Calendar of Events: 1; DSA 2012 Annual Meeting in South Carolina a Great Success!: 1; DSA 2012 Post-Meeting Trip: 2; Call for Papers for BAO: 4; DSA is on Facebook: 15; MDP has gone digital!: 21; Photos Needed: 22; Annual Meeting 2012 group photo: 22.] Address: Dragonfly Society of the Americas c/o Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

14011. Feulner, G. (2012): Cross Dressing Damsels. *Gazelle* 27(12): 4-5. (in English) ["The landscaped grounds at Emirates Towers have never been a hotbed of biodiversity. The mostly exotic landscape plants and the active grounds crew see to that. But the pond on the Sheikh Zayed Road side supports a population of dozens of Evans' Bluetail damselfly *Ischnura evansi* (*Cyperus alternifolius*, the umbrella sedge), especially at the southern end. When I visited in mid-November, the population had a somewhat peculiar look. In the first place, many of the damsels present were rather pale or had slightly odd colours instead of the customary pale green eyes and thorax. This was probably because they were recently molted from the larval stage, consistent with the large number of small exuviae (the shed larval skins) found on the lower stems of the sedges; I collected some for reference. But in addition, almost all of the individuals had a pale blue band near the end of the abdomen (the "tail"). This is normally characteristic of males, but closer inspection showed that many of these blue-banded individuals were in fact females, and some of them could be found copulating with blue-banded males. Within the genus *Ischnura* (Bluetails), females of many species are known to have several different colour morphs. One of those is a so-called 'androchrome' morph, which mimics male colouration, including the blue band. In *I. evansi* this is apparently not infrequent. The androchrome morph was previously encountered in *I. evansi* at Ruwayyah, among more conventional females (see 'Damsel in Disguise' in the March 2011 *Gazelle*). More recently I found an androchrome female at a 'wild' site, in a small population at a well-vegetated waterfall pool along the mountain front near Juweif, in northern Oman. But why it should predominate in the Emirates Towers population is unknown. In more than an hour of observation I saw only a single drab female and a single orange one – normally

two of the more common colour morphs. The androchrome females also seemed to adopt male-like behaviour by perching in prominent places at the pool for extended periods, even when they were not feeding or ovipositing." (Author)] Address: Feulner, G.R., P.O. Box 31045, Dubai, United Arab Emirates. E-mail: grfeulner@gmail.com

14012. Fröhlich, A.; Hauswirth, L.; Joest, R. (2012): Natur aus zweiter Hand - Steinbruch Lohner Klei. Erfassung der Flora, Libellen, Heuschrecken und Tagfalter im Naturschutzgebiet „Steinbruch Lohner Klei“ 2009 - 2011. *ABU info* 33-35: 21-25. (in German) [Nordrhein-Westfalen, Germany. 13 common Odonata species are checked.] Address: Hauswirth, Luise, Reiterwinkel 11, 59557 Lippstadt, Germany

14013. Kelliher, J.S. (2012): The distribution of heavy metals in known and potential Hine's emerald dragonfly (*Somatochlora hineana*) habitat near the Viburnum Trend mining district of southeast Missouri, USA. U.S. Department of the Interior, Fish and Wildlife Service, Southeast Missouri Lead Mining District, Natural Resource Damage Assessment and Restoration: 22 pp. (in English) ["The Viburnum Trend mining district in southeast Missouri, USA is one of the largest producers of lead in the world. Previous biological surveys in the district have found evidence demonstrating metal exposure of birds, insects, fish and crayfish. This study examined heavy metal concentrations in the sediment and water of freshwater wetlands known to be or potentially occupied by the federally endangered *S. hineana*. Sediment samples were collected from thirteen sites to assess the potential exposure of the dragonfly to mining-derived metals. Water samples were also collected at the sampling sites when sufficient surface water was available for collection. Concentrations of metals (lead, zinc, cadmium, nickel, et al) were analyzed in the surface water and sediment. Mean concentrations of lead in sediments were significantly greater ($P < 0.01$) at sites potentially impacted by mining compared to reference sites. Sediment concentrations of lead exceeded consensus-based threshold effects concentrations at eight of ten sites potentially impacted by mining. Concentrations of dissolved metals in surface water samples did not exceed Aquatic Life Criteria established by the State of Missouri. These findings suggest that metals associated with mining activities in the Viburnum Trend may have the potential to negatively impact Hine's Emerald Dragonfly populations in and around the district." (Author)] Address: Kelliher, J.S. c/o U.S. Department of the Interior, Fish and Wildlife Service, Southeast Missouri Lead Mining District, Natural Resource Damage Assessment and Restoration, 5600 American Blvd. West, Suite 990, Bloomington, MN 55437-1458, USA

14014. King, S.; Flint, O.S. (2012): *Sympetrum ambiguum* (Odonata: Libellulidae) to be removed from the Minnesota list of Odonata. *Argia* 24(1): 2-3. (in English) [R.P. Currie had corrected the identification to a female *Sym-*

petrum obtrusum.] Address: Flint, O.S., Dept of Ent. MRC-169, National Museum of Natural History, Washington, DC, 20013-7012, USA. E-mail: flinto@si.edu

14015. Kohler, N.S. (2012): *Archilestes grandis* (Great Spreadwing) and *Sympetrum rubicundulum* (Ruby Meadowhawk), two new records for Montana. *Argia* 24(1): 15-16. (in English) [USA; *Archilestes grandis*: Little Bighorn River, Big Horn Co., 2-IX-2011; *Sympetrum rubicundulum*: Sallow reservoir north of Forsyth, Rosebud Co., 26-VII-2011] Address: Kohler, N.S. E-mail: nskohler@bresnan.net

14016. Langenbach, A.; Joest, R. (2012): Gläserne Schwingen an der renaturierten Lippe. *ABU info* 33-35: 69. (in German) [Brief report on activities to map the odonate fauna at two localities in the Lippe alluvium in Nordrhein-Westfalen, Germany. A brief focus is set on the representation of *Ophiogomphus cecilia* along the River Lippe between Lippstadt and Lippborg.] Address: Langenbach, Anke, Kölner Grenzweg 23, 59558 Lippstadt, Germany

14017. Leivas, P.T.; Leivas, F.W.T.; Moura, M.O. (2012): Diet and trophic niche of *Lithobates catesbeianus* (Amphibia: Anura). *Zoologia* 29(5): 405-412. (in English) ["*L. catesbeianus* is an invasive anuran introduced in Brazil that is associated with the displacement and the decline of populations of native species worldwide. There is evidence that biological invasions are facilitated by certain attributes of the invading species, for instance niche breadth, and that invasive species have a broader ecological niche with respect to native ones. We designed a study to ascertain the temporal, ontogenetic, and sex differences in the niche dynamics of the American bullfrog. We sampled monthly from June 2008 to May 2009 in the state of Paraná, southern Brazil. For each individual, we gathered biometric and stomach content data. We then estimated the niche breadth of the juveniles and adults, and compared it between the sexes. A total of 104 females and 77 males were sampled. *L. catesbeianus* has a generalist diet, preying upon invertebrates and vertebrates. Even though the diet of the studied population varied seasonally, it did not differ between the sexes nor did it respond to biometric variables. Niche breadth was more restricted in the winter than in the autumn. The trophic niche of juveniles and adults did not overlap much when compared with the trophic niche overlap between males and females. Adult males and females had a considerable niche overlap, but females had a broader trophic niche than males in the winter and in the spring. These niche characteristics point to an opportunistic predation strategy that may have facilitated the process of invasion and establishment of this species in the study area." (Authors) 131 of the 181 stomachs include insects, of which 24 contained Odonata. Obviously, in most cases this must be imagoes while only in one case larvae were involved.] Address: Leivas, P.T., Programa de Pós-Graduação em Ecologia e Conservação, Universidade Federal do Paraná. Caixa postal 19020, 81531-980 Curitiba, Paraná, Brazil. E-mail: ptleivas@yahoo.com.br

14018. Mitra, A.; Choden, K.; Dorji, Y.; Penjor, T.; Dorji, R.; Subedi, K.; Dorji, P. (2012): Odonata of Samdrup Choling Dungkhag in Samdrup Jongkhar, Bhutan. *Bhutan journal of research & development Autumn 2012*: 125-141. (in English) ["Several field visits were undertaken between February and June, 2012, at different Odonata habitats in and around Samdrup Choling Dungkhag under Samdrup Jongkhar Dzongkhag, mainly at Pemathang, Phuntshothang, Martshala and Dewathang. A total of 83 specimens of Odonata were collected comprising of 40 species and subspecies including 19 new records for Bhutan, thereby extending the list of Odonata known from Bhutan to 75. One of the *Coelliccia* species seemed to be new to science and will be confirmed after further study. The present study recorded four species namely, *Coelliccia svihleri*, *Protosticta himalaica*, *Rhinocypha cuneata* and *Chlorogomphus mortoni*, which were designated as 'Data Deficient' during the recent most red list assessment in eastern Himalaya carried out by IUCN. However, the study on the seasonal diversity of Odonata in Samdrup Choling Dungkhag remained incomplete being limited to only five months. 56 of the 75 species and subspecies of Odonata known from Bhutan arc recorded only from Eastern and South-eastern parts. A major portion of Bhutan remains odonatologically unexplored." (Authors)] Address: Mitra, A., Dept Zool., Sherubtse Coll., Kanglung, Bhutan. E-mail: amitodonata@yahoo.com

14019. Myrup, A.R. (2012): A survey of the Odonata fauna of Zion National Park. *Argia* 24(2): 5-10. (in English) [Utah, USA. "During the summer of 2011, 25 species of Odonata were documented from Zion National Park, belonging to seven families and 17 genera. Thirteen of these were previously unrecorded from Zion NP. This brings the Zion National Park list of Odonata to 37 species belonging to seven different families and 23 genera. ... No new additions were added to the Utah State Odonata Checklist. Although many streams in Zion NP were not surveyed, a better understanding of the distribution and habitat preferences of odonates in Taylor Creek, North Creek, Pine Creek, Weeping Rock Stream and the East Fork Virgin River was obtained from this study in Zion National Park. Several of the odonates found in Zion NP have narrow habitat requirements, and it is comforting to know that, at least here, these habitats and the precious water they contain are protected. Due to their natural state and inaccessibility, many of the streams in the Virgin River drainage (165.5 river miles) have been designated as "Wild and Scenic Rivers" by the Omnibus Public Lands Management Act of 2009." (Author)] Address: Myrup, A., 914 South 1635 West, Orem, Utah 84058, USA. E-mail: alanm@provo.edu

14020. Nottage, L.; Nottage, R. (2012): Canada Tips and nearby quarry pools, Blaenavon. *Gwent - Glamorgan Recorders' Newsletter* 7: 7. (in English) [Wales, UK; on 23-VII-2012, the following Odonata were seen: *Cordulegaster boltonii*, *Anax imperator*, *Aeshna juncea*, *Libellula quadrimaculata*, *Sympetrum striolatum*, *S. danae*,

Ischnura pumilio, *Enallagma cyathigerum*, *Pyrrhosoma nymphula* and *Lestes sponsa*.] Address: not stated

14021. Oke, O.A.; Gbadebo, A.M. (2012): Survey and collection of insect species associated with Water Hyacinth on Ogun River, Nigeria. *International Journal of Agriculture and Forestry* 2(2): 6-9. (in English) [Odonata were represented by *Acisoma panorpoides*.] Address: Oke, O.A., Department of Biological Sciences, University of Agriculture, Abeokuta, P. M. B. 2240 Nigeria

14022. Okulewicz, A.; Sitko, J. (2012): Parasitic helminths – probable cause of death of birds. *Helminthologia* 49(4): 241-246. (in English) ["Parasitic helminths were the probable cause of death of 41 passeriform birds (29 adults and 12 juveniles in their first year of life) caught in the net during the spring and autumn ringing (1986 – 2010). The birds (1 Chaffinch *Fringilla coelebs*, 1 House Martin *Delichon urbica*, 2 Blue Tit *Cyanistes caeruleus*, 9 Great Tit *Parus major*, 3 Willow Tit *Poecile palustris*, 1 Great Reed *Acrocephalus arundinaceus*, 1 Chiffchaff *Phylloscopus collybita*, 3 Blackcap *Sylvia atricapilla*, 2 Dunnock *Prunella modularis*, 1 Magpie *Pica pica*, 5 Robin *Erithacus rubecula*, 9 Common Blackbird *Turdus merula* and 3 Song Thrush *T. philomelos*) were caught in the environs of Přešov (Czech Republic). The helminths: trematodes, tapeworms, nematodes and hook worms, were located in the intestine, glandular and muscular stomach, cloaca, rectum, gall bladder, liver, pulmonary cavity, air sac, nasal and orbital cavity and subcutaneous tissue of the hosts. The intensity of invasion with different species of parasites was up to 734 per host. Some parasites *Brachydistomum ventricosum*, *Mosesia sittae*, *Aprocta cylindrica*, *Diplotrina tridens* were acquired at the wintering grounds. All the helminths were heteroxenous, with development cycle involving intermediate hosts (invertebrates) which are part of the birds' diet. ... Trematode *Collyriclum faba* is a parasite of subcutaneous tissue of Passeriformes, its intermediate hosts are snails and water insects (Odonata, Plecoptera, Ephemeroptera, Trichoptera)."] (Authors)] Address: Okulewicz, Anna, Dept of Parasit., Inst. of Genetics & Microbiol., Wrocław Univ., Przybyszewskiego 63/77, 51-148 Wrocław, Poland, E- mail: anna.okulewicz@microb.uni.wroc.pl

14023. Pavlova, M.; Pehlivanov, L.; Kazakov, S.; Varadinova, E.; Vidinova, Y.; Tyufekchieva, V.; Uzunov, Y. (2012): Changes in the aquatic communities in the Rhodopes mountain landslide lakes (South Bulgaria) for the last 40 years. I. Taxonomic composition of macrozoobenthos, zooplankton and fish communities. *Acta zool. bulg.*, Suppl. 4: 187-195. (in English) ["The biodiversity of aquatic communities (macrozoobenthos, zooplankton and fish) in 5 of Smolyanski and 2 of Chairski landslide lakes was studied in spring and summer of 2010. A total of 19 taxa of different taxonomic level of macrozoobenthos and zooplankton were reported for the first time in the studied lakes. The enriched list included 4 new planktonic species (of Rotifera type) and 15 new macrozoobenthic taxa (4 species of Oligochaeta, 2 species of Bivalvia, one ge-

nus of Ephemeroptera, one species of Plecoptera, 4 species, 1 genera and 2 families of the Trichoptera groups). Five fish species were registered belonging to two families in the composition of the ichthyofauna of the studied lakes. The similarities in the species composition of the macrozoobenthos and zooplankton among the lakes and in comparison with previous investigations were assessed. The statistically significant differences found for the macrozoobenthos composition in comparison with the published in 1975 revealed two completely different communities. Moreover, this applied also to the zooplankton community which fundamentally differed from that found in 1975. The large number of taxa reported for the first time was probably due to the long period of time since the last studies (more than 40 years) and the changes in the ecological conditions in the lakes. A more refined examination of the ecosystem functioning could provide more comprehensive data about the processes in these lakes of high conservation value." (Authors) *Pyrrhosoma nymphula* and *Coenagrion pulchellum* are listed in table 3.] Address: Pavlova, Milena, Inst. of Biodiversity & Ecosystem Research, Bulgarian Academy of Sciences, 2 Yurii Gagarin str., 1113 Sofia, Bulgaria. E-mail: mnp.iber@gmail.com

14024. Porst, G.; Naughton, O.; Gill, L.; Johnston, P.; Irvine, K. (2012): Adaptation, phenology and disturbance of macroinvertebrates in temporary water bodies. *Hydrobiologia* 696: 47-62. (in English) ["The temporal transition of species dominance following disturbances is strongly influenced by taxon life histories. In temporary water bodies, seasonal progression can be rapid. The community response of aquatic littoral invertebrate communities to disturbance was measured across four temporary water bodies (turloughs) representing a hydroperiod gradient in the karst landscape of western Ireland. Three distinct turlough wet-phases were identified based on macroinvertebrate taxon richness and community composition: filling, aquatic and drying phase. Invertebrates able to recolonise the turlough environment quickly upon flooding from refugia (e.g. sink-holes or little puddles) or resting stages within the turlough basin demonstrated highest proportion in abundances during the initial filling phase. Over time, the number of actively dispersing invertebrates, generally occupying turloughs only for a part of their life-cycle, increased. Hydroperiod had a significant effect on macroinvertebrate taxon richness, with short hydroperiods supporting low faunal diversity. Influence of hydrological disturbance generally decreased with progression of the annual wet phase, indicated by a decrease in taxon richness variation and an increase of biodiversity with time. Our study highlights the importance of life-cycle strategies of species for the occurrence of fairly predictable and periodically occurring seasonal patterns, and emphasizes the importance of ecological disturbances for colonisation cycles." (Authors) The list of taxa includes *Lestes* sp.] Address: Porst, Gwendolin, Zool. Dept, School of Natural Sciences, Trinity College Dublin, Dublin 2, Ireland. E-mail: porst@igb-berlin.de

- 14025.** Prieto-Lillo, E.; Sanchis, M.J.; Rueda, J.; Molina, C.; Tomero, J.A.; Herrero-Borgoñón, J.J.; Teruel, S. (2012): Primeras citas de *Trithemis kirbyi* (Sélys, 1891) (Odonata: Libellulidae) en la Comunidad Valenciana: confirmación de su rápida expansión hacia el NE de la Península Ibérica. *Boletín de la Sociedad Entomológica Aragonesa* 51: 363-364. (in Spanish, with English summary) ["The presence of *T. kirbyi* in the Valencian Community is reported on the present paper. Its presence is considered associated with the warm fronts series registered in the summer of 2012, a phenomenon that contributes to facilitate its dispersion and enables its current presence in the northern half of the peninsula." (Authors) 11-VIII- 2012, Castellón, UTM: (ETRS89) 30 S 714065; 4422455); 11-IX-2012, Bolbaite (UTM: (ETRS89) 30S 700200, 4326965)] Address: Prieto-Lillo, E., C/ Vall d'Albaida No 44, Puerto de Sagunto, 46520 Valencia, Spain. E-mail: Ezequiel.Prieto@uv.es
- 14026.** Puliafico, K.P.; Jensen, A.M. (2012): 5. Entomology. Qatar Islamic Archaeology and Heritage Project. End of Season Report. *Environmental Studies*. 2011-2012: 31-45. (in English) [*Anax parthenope* is the single odonate species collected from the proposed UNESCO Exclusion and Buffer Zone, Al Zubarah Archaeological Site, Qatar, in March 2012.] Address: Puliafico, K., Entomology Dept, Zoological Museum, The Natural History Museum of Denmark. E-mail: puliafico@gmail.com
- 14027.** Ramos Hernandez, J.M. (2012): The Dragonflies (Insecta: Odonata) of Sierra Las Damas, Sancti Spiritus Province, Cuba. *Argia* 24(2): 18. (in English) [26 odonate species recorded in 2011 are checklisted.] Address: Ramos Hernandez, J.M., C # 9 e/ Algerdo Ferrer y Agramonte, Cabaiguán, Sancti-Spiritus, Cuba 62400
- 14028.** Revenga, J.E.; Campbell, L.M.; Arribére, M.A.; Ribeiro Guevara, S. (2012): Arsenic, cobalt and chromium food web biodilution in a Patagonia mountain lake. *Ecotoxicology and Environmental Safety* 81: 1-10. (in English) ["Mussels, *Diplon chilensis*, from Lake Moreno, a double-basined mountain lake in southern Argentina, is known to have elevated concentrations of chromium (Cr, >25 $\mu\text{g g}^{-1}$ dry weight DW) and arsenic (As, 35 $\mu\text{g g}^{-1}$ DW), attributed to untreated sewage. To further understand the trophodynamics of Cr, As and cobalt (Co), we investigated concentrations and transfer throughout the food web in each basin of Lake Moreno. Each basin differs in morphology in that the gently-sloping Lake Moreno West has more littoral habitat than deeper Lake Moreno East with its higher proportion of pelagic habitat. Despite the morphological differences, both basins share similar water quality parameters and species assemblages. As a result, Lake Moreno provides an exceptional opportunity to compare trophodynamics of elements that enable us to hypothesize pelagic-littoral habitat coupling in response to lake morphology as the underlying factor influencing both Cr pathway and Co and As trophodynamic modelling. Using stable isotopes of nitrogen ($\delta^{15}\text{N}$) and carbon ($\delta^{13}\text{C}$) to characterize metals trophodynamics in each basin, biodilution of As, Cr and Co were indicated by negative regressions. This is confirmed by elevated As, Co and Cr concentrations in phytoplankton (11.3 \pm 5.7, 7.4 \pm 4.9, 44.5 \pm 40.7 $\mu\text{g g}^{-1}$ DW respectively), while zooplankton and biofilm had the next elevated concentrations. Those elevated concentrations are in contrast with lower concentrations in sport fish such as rainbow trout (0.5 \pm 0.5, 0.2 \pm 0.3, 1.8 \pm 1.2 $\mu\text{g g}^{-1}$ DW). Higher concentrations of Cr in fish were associated with higher proportion of benthic/littoral prey items in western basin, and were confirmed by significant correlation with $\delta^{13}\text{C}$ values. Arsenic, Co and Cr concentrations in fish, while elevated, do not pose health risks to human or wildlife consumers. Highlights: *Biodilution of As, Cr and Co is shown in the biota of both basins of Lake Moreno. *Cr pathways differed between basins. *Different proportions of benthic/littoral preys in fish diet explained Cr pathways. *Higher trophic level in the biota from 1 basin obscured metals transfer modeling. *Lake morphology explained differences in both metal pathways and modeling." (Authors) Odonata are treated at the order level.] Address: Revenga, J.E., Centro Regional Universitario Bariloche (CRUB), Universidad Nacional del Comahue, Quintral 1250, 8400 Bariloche, Argentina
- 14029.** Richardson, T.W.; Smith, Z. (2012): Intergeneric copulation between *Sympetrum obtrusum* and *Leucorrhinia hudsonica*. *Argia* 24(1): 16-18. (in English) [6-XIII-2011, Grass Lake, El Dorado County, California, USA; male *Sympetrum obtrusum* and female *Leucorrhinia hudsonica*] Address: Richardson, T.W., Tahoe Institute for Natural Science, P.O. 4289 Truckee, CA 96160, USA. E-mail: will@tinsweb.org
- 14030.** Romero Porrino, R. (2012): Odonatos de Sierra Morena: Algunas citas de interés en el periodo 2010-2011. *Boletín Rola - Boletín de la Red de Observadores de Libélulas en Andalucía* 1: 22-29. (in Spanish, with English summary) [Records of adult dragonflies observed in Sierra Morena (Huelva, Sevilla, Córdoba and Jaén) in 2010-2011 are presented: *Calopteryx xanthostoma*, *Coenagrion scitulum*, *Pyrrhosoma nymphula*, *Aeshna cyanea*, *A. mixta*, *Onychogomphus uncatus*, *Oxygastra curtisii*, *Libellula depressa*, *Trithemis kirbyi*, *Brachythemis impartita*, and *Diplacodes lefebvrei*.] Address: E-mail: dendrominor@yahoo.es
- 14031.** Roobas, B.; Feulner, G. (2012): A Red November Visitor. *Gazelle* 27(12): 5-6. (in English) ["The only dragonfly observed during November's Dubai-Abu Dhabi desert field trip proved to be an interesting one. The two dragonfly species most commonly seen over desert sands in the UAE are the widespread *Pantala flavescens*, a strong flier that has a worldwide distribution, and *Anax ephippiger*, which in our area has an annual swarming period centered on January. Both of these species patrol relatively high above the ground and seldom perch. The dragonfly seen near Endurance Village was, however, a

female *Sympetrum fonscolombii*, a Palaearctic (northern) species, and it was perched on a clump of Desert Knot-grass (*Pennisetum divisum*). The earliest reports of this insect in the UAE and northern Oman were of scattered individuals, all seen in November, suggesting a possible seasonal phenomenon, but later reports by European visitors included spring occurrences as well. Additional local attention confirmed a major influx in November 2009, evidently a migration of sorts, reported in The National newspaper, when hundreds of these insects were reported by numerous observers across the UAE, from Abu Dhabi, Al Ain and Dubai to Kalba on the East Coast. Potential observers should note, however, that *S. fonscolombii* is just one of seven 'red' dragonflies that can all be found in the UAE. All of the others are resident and all but one are much more common – *Pantala flavescens*, *Crocothemis erythraea*, *Trithemis annulata*, *T. arteriosa*, *T. kirbyi* and *C. sanguinolenta*. In most of these species, it is only the male that is red; the female is normally a less conspicuous colour." (Authors)] Address: Feulner, G.R., P.O. Box 31045, Dubai, United Arab Emirates. E-mail: grfeulner@gmail.com

14032. Seehausen, M. (2012): Die Libellen (Insecta: Odonata) der Sammlung KIRSCHBAUM – Revision und kommentierter Katalog. Jahrbücher des Nassauischen Vereins für Naturkunde 133: 25-46. (in German, with English summary) [The Odonata of the Collection KIRSCHBAUM that is stored at the Museum Wiesbaden (Germany) has been revised and catalogued. "Due to the unfortunately common lack of a precise information about the place of collection, an analysis of historical literature had to be conducted. Altogether 479 individuals in 45 species were assigned to the collection." (Author) The collection also includes a specimen of *Cordulegaster (Sonjagaster) helladica* from Mount Taygetes, Greece.] Address: Seehausen, M., Museum Wiesbaden Hessisches Landesmuseum für Kunst und Natur, Friedrich-Ebert-Allee 2, 65185 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

14033. Smith-Patten, B.D.; Patten, M.A. (2012): *Stylurus intricatus* (Brimstone Clubtail), a new old record for Oklahoma. *Argia* 24(3): 10. (in English) [24-26-VIII-1932, Dunlap, Harper County, Oklahoma, USA] Address: Patten, M.A., Oklahoma Biological Survey, University of Oklahoma, Norman, OK 73019, USA. E-mail: mpatten@ou.edu

14034. Stoyanova, T.; Traykov, I.; Yaneva, I.; Bogoev, V. (2012): Accumulation of heavy metals in the macrozoobenthos of the Luda River, Bulgaria. *Biotechnology & Biotechnological Equipment* 26(3): 2981-2986. (in English) ["Heavy metals are among the most common environmental pollutants. Their long-term environmental chronic stress leads to negative impacts on the diversity and abundance of benthic invertebrates. The Luda River, a left tributary to the Struma River, flows through the north-western slopes of Pirin Mountain. An abandoned uranium mine is located in the upper parts of the water-

shed. The aim of this study was to assess the accumulation of heavy metals in the macrozoobenthos of the river. Four sites were sampled for river state assessment and from two of them additional macrozoobenthic samples were collected for heavy metal analysis in October 2011. In the lower reaches, the reduction of potential habitats, due to sand deposition, and the diversion of river waters showed stronger effect on the benthic communities than the abandoned mine. The benthic invertebrates below the mine were characterized with increased contents of Cr, Ni, Co, Zn, Cd, Pb and Cu. The results suggested that the metals accumulated in benthic organisms originate mostly from the water, whereas the accumulated Cd, Cu, Zn and Ni originate from the sediments. Supposedly, there is also biomagnification in the food web." (Authors) The analysis includes data on *Gomphus* sp. and *Aeshna* sp.] Address: Stoyanova, Teodora, Sofia University "St. Kliment Ohridski", Faculty of Biology, Sofia, Bulgaria. E-mail: stoyanova.t.l@gmail.com

14035. Sørensen, U.G.; Bruun Pedersen, H.J. (2012): Eastern Finland. Large carnivores - and all the rest. Privately published: 20 pp. (in English) [In 2012, the authors made a trip to eastern Finland. The following odonate records are documented: 1. *Coenagrion hastulatum*. 29/6 + Lake Ala-Kitka, 3/7 + Siikalahti (Parikalla). 2. *Coenagrion armatum*. 3/7 2 (♂ & ♀) Siikalahti (Parikalla), 3. *Enallagma cyathigerum*. 3/7 + Siikalahti (Parikalla). 4. *Somatochlora metallica*. 2/7 3 Astuvansalmi (Riistina). 5. *S. flavomaculata*. 3/7 1 Siikalahti (Parikalla). 6. *Libellula quadrimaculata*. 29/6 5 Lake Ala-Kitka, 3/7 1 Tantala. 7. *Leucorrhinia caudalis*. 3/7 2 Siikalahti (Parikalla), 8. *L. rubicunda*. 29/6 4 Lake Ala-Kitka, 3/7 3 Siikalahti (Parikalla).] Address: Sørensen, U.G., UG Sørensen Consult, Overgaden Oven Vandet 68, 2, DK-1415 Copenhagen K, Denmark. E-mail: contact@ugsorensen.dk. Web-site: www.ugsorensen.dk.

14036. Tamm, J. (2012): *Cordulegaster bidentata* in Hessen mit besonderer Berücksichtigung ihrer Bindung an den geologischen Untergrund (Odonata: Cordulegastriidae). *Libellula* 31(3/4): 131-154. (in German, with English summary) ["*C. bidentata* in Hesse, Germany, with emphasis on its dependence on geology (Odonata: Cordulegastriidae) – Distribution of *C. bidentata* in various areas of Hesse has been mapped from 2006 to 2011. The species has only been found on hill slopes in large mainly deciduous forests, where it is widely distributed and locally common. It is strictly bound to forest springs and their uppermost outflows. Its presence was found to be clearly correlated with the geological conditions. Palaeozoic sediments (greywacke, argillite slates) are well colonized in general. Bunter sandstone is partly colonized, partly not. Basalt areas are not colonized at all. The occurrence of the species seems to depend mainly on a sufficient quantity of sandy sediments in the springs and upper forest streams, where the larvae exclusively live. These sediments are a result of weathering of the original stone substratum and of water erosion, which al-

so means an effect of slope incline. That makes it understandable that *C. bidentata* settles well on Middle, but not on Lower and Upper Bunter sandstone. Acid water and soil conditions are suspected to exclude this odonate species mainly from larger coniferous forests. *C. bidentata* could be mapped efficiently in both larval and adult stages, but in the latter only, if mapping was exclusively concentrated on this species. It could be found quite easily not only at the springs, but also at the maturation sites, which are situated close to the springs. All these ways of finding the species allow mapping it in large areas quite quickly." (Author)] Address: Tamm, J., Elgershäuser Straße 12, D-34131 Kassel, Germany. E-mail: jochen.tamm@t-online.de

14037. Tennessen, K. (2012): Deformed antenna on *Ophiogomphus carolus* (Riffle Snaketail) nymph. *Argia* 24(2): 17-18. (in English) [North Fork Jump River, Price County, Wisconsin, USA. Deformation in Gomphidae are assessed very rare, and the few available information are discussed.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

14038. Terneus, E.; Hernández, K.; Racines, M.J. (2012): Evaluación ecológica del río Lliquino Través de macroinvertebrados acuáticos, Pastaza, Ecuador. *Revista de Ciencias (Facultad de Ciencias Naturales y Exactas Universidad del Valle)* 16: 31-45. (in Spanish, with English summary) ["Over the last 10 years, the Lliquino river, an affluent of the Pastaza river from the Ecuadorian Amazon basin, has been subjected to anthropological impacts due to colonization and mineral extraction activities. This study sought to measure this aquatic eco-system's ecological health by monitoring its waters using macroinvertebrates as bioindicators of environmental quality for five consecutive years (2008 – 2012). During this period, it was possible to determine that the river's ecological health remains in good condition, despite removal of petroleum material in the zone, which shows that apparently this activity is not as aggressive compared to extraction of minerals or heavy metals. The presence and dominance of some taxa indicators of good environmental conditions such as: Ephemeroptera (*Mayobaetis* sp., *Farodes* sp., *Leptohyphes* sp.), Trichoptera (*Smicridea* sp., *Chimarra* sp.), Plecoptera (*Anacroneria* sp.), and Megaloptera (*Corydalus* sp.). It is noteworthy that some of the taxa recorded in this study are not common in the macroinvertebrate assemble. For this reason, it is necessary to promote the creation of monitoring programs aimed at assessing the ecologic health conditions of these important populations needed to maintain the aquatic life ecosystem." (Authors) The following Odonata taxa are listed: *Limnocois*, *Macrothemis*, *Dythemis*, *Progomphus*, *Agriogomphus*, *Phyllogomphoides*, and *Acanthagrion*.] Address: Terneus, E., Universidad Internacional del Ecuador

14039. von Tschirnhaus, J.; Schulz, U. (2012): The male dimorphic damselfly *Paraphlebia zoe* (Odonata: Megapodagrionidae) in a Mexican cloud forest: site fidelity and

related behavioural aspects. *Mitteilungen der Deutschen Gesellschaft fuer Allgemeine und Angewandte Entomologie* 18: 301. (in German, with English title) ["Odonates have a wide and complex repertoire of territorial and reproductive behaviour. The males of some species even show evidence of correlated dimorphism in their morphology and behaviour. This has been proven for the Neotropical *Paraphlebia quinta* for example, and more recently for *P. zoe*, too. *P. zoe* is endemic to Mexico and occupies specialized habitats such as seepages located in mountain cloud forests. The dimorphic males of *P. zoe* are black-winged (BW) or hyaline-winged (HW). On a small stream within a cloud forest in the Mexican state of Puebla, 410 *P. zoe* adult males (BW and HW) and females were individually marked. The duration for which individuals remained at a given site was determined over a 66-day period and the dispersal distances and directions of marked males leaving the sites of initial observation were studied. Territorial behaviour of the different male phenotypes was observed during surveys. BW males were found to have high site fidelity, holding small territories for at least 66 days. HW males occupied larger areas and were present within these for shorter periods. Females were not found to have site fidelity. Site changes among BW males occurred infrequently and distances were mostly short. BW males generally perched close to the ground and behaved aggressively towards BW males and towards HW males, whereas HW males perched in higher vegetation and only behaved aggressively towards individuals of their own phenotype." (Authors)] Address: Schulz, U., Hochschule für nachhaltige Entwicklung (FH) Eberswalde, FB 2, Fr. Ebert Str. 28, 16225 Eberswalde, Germany

14040. Weissinger, R.H.; Perkins, D.W.; Dinger, E.C. (2012): Biodiversity, water chemistry, physical characteristics, and anthropogenic disturbance gradients of sandstone springs on the Colorado Plateau. *Western North American Naturalist* 72(3): 393-406. (in English, with Spanish summary) [USA; "Springs located on the Colorado Plateau are highly threatened and represent a small percentage of the landscape; yet they are disproportionately important to diverse native flora and fauna. The relationships between anthropogenic disturbance, aquatic macroinvertebrate species composition, and environmental variables at these springs have received little study. We selectively visited 40 sandstone springs in southeastern Utah and southwestern Colorado to span a range of impacts. We classified the springs into impact categories based on a spring impact score, and we measured biodiversity (aquatic macroinvertebrates), water chemistry (nutrients, dissolved O₂, pH, specific conductivity, temperature, turbidity, coliform bacteria [*Escherichia coli*]), physical characters (solar radiation, substrate, vegetation cover, bank stability, discharge), and presence of anthropogenic disturbance. *Escherichia coli* abundance was higher in high impact categories, and turbidity increased with increasing disturbance. No differences in total N, total P, specific conductivity, flow, dissolved O₂, pH, or substrate

were found among the impact categories. Vegetation cover was higher in low impact categories than in moderate and high impact categories, while potential annual and growing-season solar radiation was lower in low impact categories than in high impact categories. Global and subsequent multiple response permutation procedure (MRPP) comparisons suggested strong differences in aquatic macroinvertebrates between low and high impact springs and no difference at moderate impact springs. Mean taxa richness (alpha-diversity), total taxa richness (beta-diversity), and percent of taxa richness composed of shredders peaked at moderate disturbance levels. The percentage of non-insect taxa richness was reduced in high impact categories, and Odonata were higher in low impact categories than in high impact categories. All high impact springs had both livestock use and vehicle use (roads or off-highway vehicles), and our data suggest that disturbances caused by one or both of these uses alter the aquatic macroinvertebrate assemblage. We suggest that disturbance may increase macroinvertebrate richness, where a mix of tolerant and intolerant species co-occur, until macroinvertebrate richness reaches a threshold; after surpassing this threshold, macroinvertebrate diversity decreases." (Authors)] Address: Perkins, D.W., Northern Colorado Plateau Inventory & Monitoring Network, National Park Service, Western State College, Environmental Studies Dept, Gunnison, CO 81231, USA. E-mail: dustin_w_perkins@nps.gov

14041. Wesner, J.; Billman, E.J.; Belk, M.C. (2012): Multiple predators indirectly alter community assembly across ecological boundaries. *Ecology* 93(7): 1674-1682. (in English) ["Models of habitat selection often assume that organisms choose habitats based on their intrinsic quality, regardless of the position of these habitats relative to low-quality habitats in the landscape. We created a habitat matrix in which high-quality (predator-free) aquatic habitat patches were positioned adjacent to (predator-associated) or isolated from (control) patches with single or two species of caged predators. After 16 days of colonization, larval insect abundance was reduced by 50% on average in both the predator and predator associated treatments relative to isolated controls. Effects were largely similar among predator treatments despite variation in number of predator species, predator biomass, and whether predators were native or nonnative. Importantly, the strength of effects did not depend on whether predators were physically present. These results demonstrate that predator cues can cascade with equal strength across ecological boundaries, indirectly altering community assembly via habitat selection in intrinsically high-quality habitats. ... Nonnative brown trout (*Salmo trutta*) and a native dragonfly (*Ophiogomphus severus*) were the predators in this experiment." (Authors)] Address: Wesner, J., Dept Biology, 401 WIDB, Brigham Young Univ., Provo, Utah 84602 USA. E-mail: jeffwesner@gmail.com

14042. Wiles, W.; Bolek, M.G. (2012): Damselflies (Odonata: Zygoptera) as paratenic hosts of *Serpinema* cf. *trispinosum* (Leidy, 1852) (Nematoda: Camallanidae). Pos-

ter: <http://www.matthewbolek.com/Students/Wiles%20and%20Bolek%20RMCP%202012.pdf>: (in English) ["Third-stage juveniles of the nematode *Serpinema* cf. *trispinosum* (Leidy, 1852) were collected from the mid-gut of four species of adult damselflies from Teal Ridge, a non-irrigated restored semi-permanent wetland located in Stillwater, Oklahoma. This is the first record of *Serpinema* juveniles from damselflies. *Serpinema trispinosum*, adults have been reported from 15 species of North and Central American freshwater turtles, whereas microcrustaceans such as copepods serve as intermediate hosts in this nematode's life cycle. Our review of the literature indicates that this nematode has also been reported from a single species of aquatic snail in Canada, a single species of cichlid fish from Mexico and five species of amphibians from North and South America suggesting that a wide range of invertebrates and vertebrates may serve as paratenic hosts in the life cycle of this nematode. Dietary studies of the 15 species of freshwater turtles reported as definitive hosts for *S. trispinosum* indicate that aquatic insects including damselflies are more commonly reported in turtle diet studies than are fish or amphibians. Since larval damselflies predominantly feed on microcrustaceans our discovery of *S. cf. trispinosum* in damselflies may reflect the importance of damselflies as paratenic hosts of turtle parasites in this genus." (Authors)]

14043. Zia, A.; Awan, Z.J.; Astori, Z.H. (2012): Boreal Odonata of Pakistan. Lambert Academic Publishing: 69 pp. (in English) ["In order to study diversity of boreal Odonata in Pakistan two separate studies were carried out during the years 1994 - 1997 & 2006 - 2008. Among these, first study carries data for whole of northern areas, however second study was conducted only in two districts of northern areas with following localities, District Gilgit (Danyore, Sultanabad) and Astor (Yougham, Boomroy, Kharbay, Pakora, Moorgulum, Gorikot). In both of these studies there is a gap of almost a decade. Results of these two independent studies are merged together to study population fluctuation in common collected species (of both studies) with respect to time. As a whole thirty one species were collected from Gilgit-Baltistan. Among these *Orthetrum sabina*, *Pantala flavescens*, *Aeshna juncea* and *Megalestes major* (recorded in both studies) were collected in large numbers in the first study but they were appeared to decrease in next one. This shows a decreasing trend in their population that might be a result of (a) Increased deforestation and urbanization resulting in destruction of their breeding places. (b) A ravaging earthquake was faced in country during the year 2005 that resulted in disappearance of many of the springs and other freshwater spots of the area. Besides this, each study added some new records for the country's Odonata fauna. It highlights the scope to explore more species from the area by undertaking hectic surveys in future. Conservation measures are also needed to conserve some endangered species of the area." (Authors)] Address: Zia, S.A., National Insect Museum, National Agriculture Research Centre, Islamabad – Pakistan. E-mail: saiyedahmed@yahoo.com

14044. Adriaens, T.; Devisscher, S.; Louette, G. (2013): Risk analysis of American bullfrog *Lithobates catesbeianus* (Shaw). Risk analysis report of non-native organisms in Belgium. Rapporten van het Instituut voor Natuur- en Bosonderzoek 2013 (INBO.R.2013.41). Instituut voor Natuur- en Bosonderzoek, Brussel: 57 pp. (in English, with Dutch and French summaries) [The paper includes references to the mutual relationship between larvae of Odonata and bullfrogs.] Address: Adriaens, T., INBO Brussel, Kliniekstr. 25, 1070 Brussel, Belgium. E-mail: tim.adriaens@inbo.be

14045. Afzan Azmi, W.; Jennings, J. (2013): The impact of management practices of exotic willows (*Salix* spp.) on aquatic invertebrate communities in south Australian freshwater streams. *Journal of Sustainability Science and Management* 8(1): 43-52. (in English) ["The impact of willows, their removal and subsequent revegetation on aquatic invertebrate communities were examined in two freshwater streams in the Mount Lofty Ranges, South Australia. We hypothesized that lower abundance, species diversity and changes in functional feeding groups would occur where willows were present and have been removed. Unexpectedly, invertebrate abundance was significantly higher when willows were present in both streams. The introduced hydrobiid snail (*Potamopyrgus antipodarum*) was the most dominant taxon overall and was significantly more abundant under willows in both streams. More than half of total abundance under willows was contributed by scrapers (mostly *P. antipodarum*) as willow roots are presumed to provide a more stable habitat from high currents and have increased food availability compared with other vegetation. Where willows were removed and not revegetated, there were lower invertebrate species numbers and diversity in both streams. The removal of willows influenced not only loss of habitat, but also an increase in light intensity, decline in water quality and food availability. Our findings conclude that the presence of willows also reduces species numbers and diversity. Large scale willows removal may need special management considerations in order to reduce the impact on aquatic invertebrate communities. Similar trends in total abundance were observed in both streams for Trichoptera, Ephemeroptera and Coleoptera. However, fewer Odonata and Hemiptera were recorded in Sixth Creek than Deep Creek, but slightly more bivalves were found in Sixth Creek (1.2%) than in Deep Creek (0.8%)."] (Authors)] Address: Afzan Azmi, Wahizatul, Dept of Biol. Sciences, Faculty of Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia. E-mail: wahizatul@umt.edu.my

14046. Alvial, I.E.; Tapia, D.H.; Castro, M.J.; Duran, B.C.; Verdugo, C.A. (2013): Analysis of benthic macroinvertebrates and biotic indices to evaluate water quality in rivers impacted by mining activities in northern Chile. *Knowledge and Management of Aquatic Ecosystems*

(2012) 407, 01: 16 pp. (in English, with French summary) ["Catchments in the semiarid regions are especially susceptible to environmental perturbation associated with water scarcity, hydrological variations and overuse by anthropogenic activities. Using multivariate analysis to relate environmental and biological data, and diversity and biotic indices (ChBMWP, ChIBF), we analyzed the macroinvertebrate composition of 12 rivers of the semiarid region of northern Chile. A non-metric multidimensional scaling for macroinvertebrate taxa and a principal component analysis for environmental variables strongly separated upstream sites (e.g. Vacas Heladas and Malo Rivers), which presented low pH and high dissolved metal concentrations, from other sites. Effectively, CCA showed that metals and low pH, associated with the altitudinal gradient, determined the distributional patterns of macroinvertebrates in the Elqui catchment. The causes of these particular conditions could be related to geological processes and human impact. The biotic indices applied to the sampling sites corroborated and reflected these characteristics, with La Laguna and Turbio Rivers showing a diverse macroinvertebrate community and moderate to good water quality, and the Claro River showing favourable conditions for the development of aquatic biota, indicating its better quality relative to other stations. To the middle and low part of the basin, a change in the composition of the community was observed, with species that suggest an impact by an increase in organic matter, due to agricultural activities and urban settlements concentrated in this area. Our results suggest that macroinvertebrate taxa in northern Chile may be exceptional species, adapted to unfavourable geochemical conditions, and emphasize the need for protection of the semiarid basins of the region." (Authors) Taxa are treated at the family level. Rare Gomphidae and Aeshnidae were sampled at only one site with alkaline waters and low metal concentrations.] Address: E-mail: ingrid.alvial@ceaza.cl

14047. Andrew N.R.; Hill, S.J.; Binns, M.; Bahar, M.H.; Ridley, E.V.; Jung, M.-p.; Fyfe, C.; Yates, M.; Khusro, M. (2013): Assessing insect responses to climate change: What are we testing for? Where should we be heading? *PeerJ* 1:e11; DOI 10.7717/peerj.11: 19 pp. (in English) ["To understand how researchers are tackling globally important issues, it is crucial to identify whether current research is comprehensive enough to make substantive predictions about general responses. We examined how research on climate change affecting insects is being assessed, what factors are being tested and the localities of studies, from 1703 papers published between 1985 and August 2012. Most published research (64%) is generated from Europe and North America and being dedicated to core data analysis, with 29% of the studies analysed dedicated to Lepidoptera and 22% Diptera: which are well above their contribution to the currently identified insect species richness (estimated at 13% and 17% respectively). Research publications on Coleoptera fall well short of their proportional contribution (19% of publica-

tions but 39% of insect species identified), and to a lesser extent so do Hemiptera, and Hymenoptera. Species specific responses to changes in temperature by assessing distribution/range shifts or changes in abundance were the most commonly used methods of assessing the impact of climate change on insects. Research on insects and climate change to date is dominated by manuscripts assessing butterflies in Europe, insects of economic and/or environmental concern in forestry, agriculture, and model organisms. The research on understanding how insects will respond to a rapidly changing climate is still in its infancy, but the current trends of publications give a good basis for how we are attempting to assess insect responses. In particular, there is a crucial need for broader studies of ecological, behavioural, physiological and life history responses to be addressed across a greater range of geographic locations, particularly Asia, Africa and Australasia, and in areas of high human population growth and habitat modification. It is still too early in our understanding of taxa responses to climate change to know if charismatic taxa, such as butterflies, or disease vectors, including Diptera, can be used as key-stone taxa to generalise other insect responses to climate change. This is critical as the basic biology of most species is still poorly known, and dominant, well studied taxa may show variable responses to climate change across their distribution due to regional biotic and abiotic influences. Indeed identifying if insect responses to climate change can be generalised using phylogeny, functional traits, or functional groups, or will populations and species exhibit idiosyncratic responses, should be a key priority for future research. ... When the number of studies were compared to the identified species richness within each Order, Lepidoptera, Diptera, Orthoptera, Colembola, and Odonata have a proportionally higher percentage of papers assessing their responses to climate change relative to number of species identified, whilst Coleoptera, Hymenoptera, and Hemiptera have a proportionally lower percentage of papers assessing their responses to climate change relative to number of species identified." (Authors)] Address: Andrew, N.R., Centre for Behavioural and Physiological Ecology, Zoology, University of New England, Armidale, Australia. E-mail: nigel.andrew@une.edu.au

14048. Bagheri, Z.; Wiederman, S.D.; Cazzolato, B.S.; Grainger, S.; O'Carroll, D.C. (2013): A biologically inspired facilitation mechanism enhances the detection and pursuit of targets of varying contrast. 4th joint international conference on swarm, evolutionary and memetic computing (SEMCCO) & fuzzy and neural computing (FANCCO), Chennai, India, 19 - 21 December: 9 pp. (in English) ["Many species of flying insects detect and chase prey or conspecifics within a visually cluttered surround, e.g. for predation, territorial or mating behaviour. We modelled such detection and pursuit for small moving targets, and tested it within a closed-loop, virtual reality flight arena. Our model (dragonfly) is inspired directly by electrophysiological recordings from 'small target motion

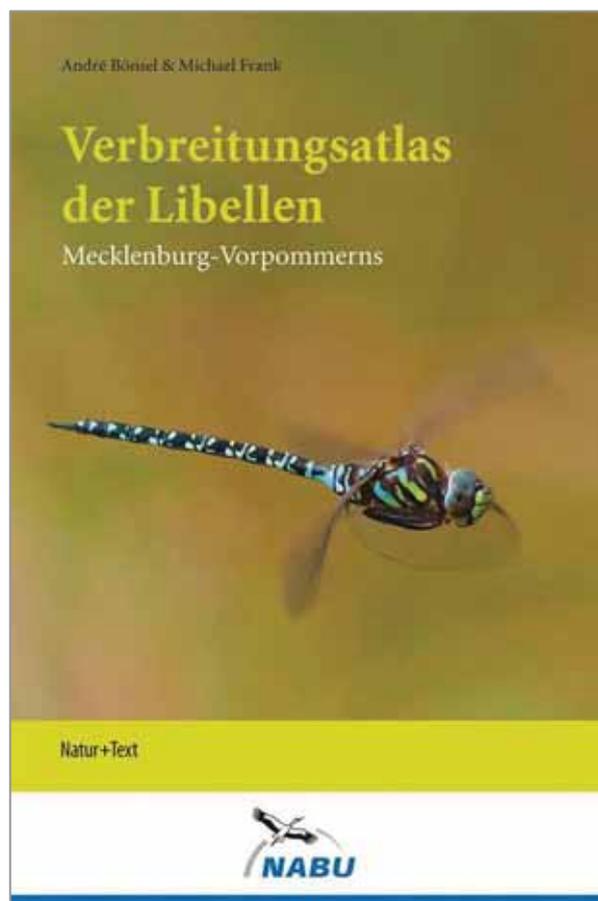
detector' (STMD) neurons in the insect brain that are likely to underlie this behavioural task. The front-end uses a variant of a biologically inspired 'elementary' small target motion detector (ESTMD), elaborated to detect targets in natural scenes of both contrast polarities (i.e. both dark and light targets). We also include an additional model for the recently identified physiological 'facilitation' mechanism believed to form the basis for selective attention in insect STMDs, and quantify the improvement this provides for pursuit success and target discriminability over a range of target contrasts." (Authors)] Address: Bagheri, Zahra, Adelaide Centre for Neuroscience Research, The University of Adelaide, Australia. E-mail: zahra.bagheri@adelaide.edu.au

14049. Belluco, S.; Losasso, C.; Maggioletti, M.; Alonzi, C.C.; Paoletti, M.G.; Ricci, A. (2013): Edible insects in a food safety and nutritional perspective: A critical review. *Comprehensive Reviews in Food Science and Food Safety* 12: 296-313. (in English) ["Increasing world population worsens the serious problem of food security in developing countries. On the other hand in industrialized countries, where the problem of food security is of minor concern, health problems related to food refer to 2 main factors: food safety and environmental sustainability of food production. For these reasons, new ways must be found to increase yields while preserving food quality, natural habitats, and biodiversity. Insects could be of great interest as a possible solution due to their capability to satisfy 2 different requirements: (i) they are an important source of protein and other nutrients; (ii) their use as food has ecological advantages over conventional meat and, in the long run, economic benefits. However, little is known on the food safety side and this can be of critical importance to meet society's approval, especially if people are not accustomed to eating insects. This paper aims to collect information in order to evaluate how insects could be safely used as food and to discuss nutritional data to justify why insect food sources can no longer be neglected. Legislative issues will also be discussed. ... Parasitological hazards: Parasites represent another potential hazard in relation to insect consumption. Their presence has been well documented in a recent review about foodborne intestinal flukes in southeast Asia (Chai and others 2009). The great importance of this work is linked to the geographical area investigated, where there is a long, widespread tradition of insect consumption. Six out of 65 species of intestinal flukes considered in the paper were isolated from insect samples. Among these is *Phanerocephalus bonnei* (Lecithodendriid), 1st described at a human autopsy in 1951 in Jakarta, Indonesia and later found in monkeys in Malaysia and India in 1962. This fluke was then reported in 15 human autopsies in Udornthani Provincial Hospital in northeast Thailand. Subsequently, the same fluke infection was found to have a high prevalence in other countries. Metacercariae were discovered in naiads and adult dragon and damselflies, insects which are commonly eaten in these parts of the world. The same insect can harbor the

fluke, *Prosthodendrium molenkampii* (Lecithodendriid), which characteristically has 12 to 30 vitelline follicles on each anterolateral side. First isolated from 2 human autopsies by Lie Kian Joe in 1951 in Jakarta, Indonesia, this fluke was then found in 14 human autopsies in Udonrathani Provincial Hospital, Thailand. Later, high prevalence was reported in different areas of northeast Thailand. In Laos PDR, a total of 8899 adult specimens were recovered from 52 infected people residing along the Mekong riverside areas of Vientian Municipality, and Savannakhet, Khammoune, and Saravane Provinces. Metacercariae were discovered in naiads and adult Odonata in Thailand. Another member of this genus, *Phaneropsolus spinicirrus*, was described in 1991 as a new species from a human infection case in northeast Thailand." (Authors)] Address: Paoletti, M.G, Biol. Dept., via Bassi 58 b, Padova Univ. 35100-Padova, Italy. E-mail: paoletti@bio.unipd.it

14050. Bergmann, T.; Rach, J.; Damm, S.; DeSalle, R.; Schierwater, B.; Hadrys, H. (2013): The potential of distance-based thresholds and character-based DNA barcoding for defining problematic taxonomic entities by CO1 and ND1. *Molecular Ecology Resources* 13(6): 1069 -1081. (in English) ["The mitochondrial CO1 gene (cytochrome c oxidase I) is a widely accepted metazoan barcode region. In insects, the mitochondrial NADH dehydrogenase subunit 1 (ND1) gene region has proved to be another suitable marker especially for the identification of lower level taxonomic entities such as populations and sister species. To evaluate the potential of distance-based thresholds and character-based DNA barcoding for the identification of problematic species-rich taxa, both markers, CO1 and ND1, were used as test parameters in odonates. We sequenced and compared gene fragments of CO1 and ND1 for 271 odonate individuals representing 51 species, 22 genera and eight families. Our data suggests that (i) the combination of the CO1 and ND1 fragment forms a better identifier than a single region alone; and (ii) the character-based approach provides higher resolution than the distance-based method in Odonata especially in closely related taxonomic entities." (Authors) *Aeshna cyanea*, *A. grandis*, *A. mixta*, *A. rileyi*, *Anaciaeschna triangulifera*, *Anax ephippiger*, *A. imperator*, *A. speratus*, *Brachytron pratense*, *Gynacantha usambarica*, *G. villosa*, *Paragomphus geneii*, *Crocothemis erythraea*, *C. sanguinolenta*, *Nesciothemis farinosum*, *Orthetrum brachiale*, *O. chrysostigma*, *O. coerulescens*, *O. julia falsum*, *O. trinacria*, *Sympetrum sanguineum*, *Trithemis annulata*, *T. arteriosa*, *T. donaldsoni*, *T. furva*, *T. grouti*, *T. hecate*, *T. kirbyi*, *T. morrisoni*, *T. nuptialis*, *T. palustris*, *T. stictica*, *Calopteryx haemorrhoidales*, *C. splendens*, *Platycypha auripes*, *P. caligata*, *Ceriagrion tenellum*, *Enallagma cyathigerum*, *Ischnura graellsii*, *I. senegalensis*, *Leptagrion elongatum*, *Pseudagrion acaciae*, *P. bicoeruleans*, *P. kersteni*, *P. massaicum*, *P. niloticum*, *Teinobasis alluaudi*, *Chlorocnemis abbotti*, *Coryphagrion grandis*, *Mecistogaster asticta*, and *M. martinezi*] Address: Hadrys, Heike, ITZ Ecology & Evolution, TiHo Hannover, Hannover, Germany. E-mail: heike.hadrys@ecolevol.de

14051. Bönsel, A.; Frank, M. (2013): Verbreitungsatlas der Libellen Mecklenburg-Vorpommerns. Natur+Text, Rangsdorf: 256 pp. (in German) [Germany. 63 odonate species are monographically treated. <http://www.naturundtext.de/shop/flora-fauna/verbreitungsatlas-der-libellen-mecklenburg-vorpommerns.html>.] Address: Natur+Text GmbH, Friedensallee 21, 15834 Rangsdorf, Germany. E-mail: shop@naturundtext.de



14052. Bogdan, H. V.; Covaciu-Marcov, S.-D.; Gaceu, O.; Cicort-Lucaciu, A.-S.; Ferenti, S.; Sas-Kovács, I. (2013): How do we share food? Feeding of four amphibian species from an aquatic habitat in south-western Romania. *Animal Biodiversity and Conservation* 36.1: 89-99. (in English, with Spanish summary) [The study area was located near Maru village, in the Tarcu Mountains, in south-western Romania (45° 27' 26.21" N/22° 26' 42.13" E). "The feeding of four amphibian species (*Triturus cristatus*, *Lissotriton vulgaris*, *Bombina variegata*, *Pelophylax ridibundus*) was studied in 2011, in south-western Romania. The diet of the newts was uniform and mostly composed of aquatic preys. The diet of the anurans was more diversified, comprising more prey taxa, mostly terrestrial. The trophic niches of the two newt species overlapped highly but differed from those of the anurans. The trophic niches of the anurans differed from one another. The differences among the four species' diets were determined by the use of different trophic resources, originating from different environments, and by their different sizes. The newts' diet was less diversified because the

aquatic habitat was small and poor in trophic availability. The anurans used the aquatic habitat as a base from where they captured terrestrial preys in the surrounding terrestrial environment." (Authors) The list of prey also includes unspecified Odonata.] Address: Covaciu Marcov, S.-D., Dept. of Biology, Fac. of Sciences, Univ. of Oradea, Universitatii str. 1, Oradea 410087, Romania. E-mail: severcovaciu1@gmail.com

14053. Brinesh, R.; Janardanan, K.P. (2013): The life history of *Pleurogenoides malampuzhensis* sp. nov. (Digenea: Pleurogenidae) from amphibious and aquatic hosts in Kerala, India. *Journal of Helminthology* 88(2): 230-236. (in English) ["The life-cycle stages of *Pleurogenoides malampuzhensis* sp. nov. infecting the Indian bullfrog *Hoplobatrachus tigerinus* (Daudin) and the skipper frog *Euphlyctis cyanophlyctis* (Schneider) occurring in irrigation canals and paddy fields in Malampuzha, which forms part of the district of Palakkad, Kerala, are described. The species is described, its systematic position discussed and compared with the related species, *P. gastroporus* (Luhe, 1901) and *P. orientalis* (Srivastava, 1934). The life-cycle stages, from cercaria to egg-producing adult, were successfully established in the laboratory. Virgulate xiphidiocercariae emerged from the snail *Digoniostoma pulchella* (Benson). Metacercariae are found in muscle tissues of dragonfly nymphs and become infective to the frogs within 22 days. The pre-patent period is 20 days. Growth and development of both metacercariae and adults are described." (Authors)] Address: Brinesh, R., Parasitology laboratory, Dept of Zoology, University of Calicut, Kerala, India

14054. Buczyński, P.; Zawal, A.; Stępień, E., Buczyńska, E.; Pešić, V. (2013): Contribution to the knowledge of dragonflies (Odonata) of Montenegro, with the first record of *Ophiogomphus cecilia* (Fourcroy, 1785). *Annales Universitatis Mariae Curie-Skłodowska (Sectio C)* 63(2): 57-71. (in English, with Polish summary) ["Authors discuss the collection of larvae and imagines of Odonata which was collected during hydrobiological and acarological studies conducted in Montenegro in 2010 and 2012. The material encompasses 28 dragonfly species of which *Ophiogomphus cecilia* has been recorded obolevn this country for the first time. The updated checklist of the dragonflies of Montenegro was also provided." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

14055. Chiandetti, I.; Fiorenza, T.; Zandigiacomo, P. (2013): *Nehalennia speciosa* (Charpentier): una specie a rischio di estinzione sul territorio italiano (Odonata, Coenagrionidae). *Bollettino Soc. Naturalisti "Silvia Zenari", Pordenone* 37/2013: 113-121. (in Italian, with English summary) ["*Nehalennia speciosa*: a species at risk of extinction on the Italian territory. *N. speciosa* is a rare species considered threatened in several European countries. In 2009 in Italy, the species was detected only in four peat bogs of the Tilverinum morainal amphitheatre

and in one swamp in the Carnic area in the Friuli Venezia Giulia region, while the populations of two sites in the Lombardia region are considered extinct. In the period 2010-2013, as part of the Project "Odonata Atlas of Friuli Venezia Giulia", periodic samplings were conducted in the five Friulian sites, where the species had already been found. In the morainal area, adults and exuviae of *N. speciosa* were observed only in the peat bog of Lazzacco (Pagnacco municipality, UD). In the nearby peat bogs of Brazzacco and Chialcinat (Moruzzo municipality, UD), individuals of the species were not detected, while a single adult male was found in 2012 in the peat bog of Modoletto (Pagnacco municipality, UD). In the Carnic area, adults were never detected in the swamp of Cima Corso (Ampezzo municipality, UD). Possible causes for the decline of the species are the progressive burial of some peat bogs, almost completely overgrown with marsh vegetation, and the occurrence of non-native fish fauna. The situation of *N. speciosa* in Italy is very critical, since a viable population is only present in the peat bog of Lazzacco, characterized by a very small area. Therefore, it is urgent to start an environmental restoration program to create or recreate suitable habitats for the reproduction of *N. speciosa*." (Authors)] Address: Chiandetti, I., Via Braide Podé, 8, 33010 Colloredo di Monte Albano (UD), Italy. E-mail: chiandet@gmail.com

14056. Choe, L.-J.; Han, M.-S.; Kim, M.; Choe, K.-J.; Kang, K.-K.; Na, Y.-E., Kim, M.-H. (2013): Characteristics communities structure of benthic macroinvertebrates at irrigation ponds, within paddy field. *Korean Journal of Environmental Agriculture* 32(4): 304-314. (in Korean, with English summary) ["Ecological functions of irrigation ponds were well known fact that important for biodiversity conservation in agricultural ecosystems. However, many irrigation ponds were destructed with changes of agricultural environment. The objective of this study is to appreciate the importance of ecological functions of irrigation pond. Furthermore, it presented to useful information for restorations of irrigation pond from analyses of correlations between benthic macroinvertebrate communities and locational factors of irrigation ponds. Benthic macroinvertebrate sampling was conducted from 2010 to 2012 at 15 study ponds. Comparisons of benthic macroinvertebrates diversity approached species richness and density, and statistical analyses were performed using independent t-test. A total of 131 species / 137,118 individuals of benthic macroinvertebrates were recorded during study period. Dominant taxa of benthic macroinvertebrates included Coleoptera, Hemiptera, and Odonata. Generally, benthic macroinvertebrate diversity in mountain region and existing ponds were showed higher than open field and created ponds, respectively. DCA ordination showed that benthic macroinvertebrate community was most correlated with locational characteristics of irrigation pond, and it correlated with bank type and age of pond. In conclusions, in order to restore ecological irrigation pond, it is necessary to consider environmental factors such as locational characteristics and bank types."

(Authors)] Address: Choe, L.-J., Climate Change & Agroecology Division, Nat. Acad. Agricultural Science, RD A, Suwon, 441-707, Korea. E-mail: wildflower72@korea.kr

14057. Curry, C. (2013): The role of habitat and dispersal in shaping the biodiversity of riverine insect assemblages. Dissertation, University of New Brunswick, Faculty of Science, Department of Biology: XI + 217 pp, app.. (in English) [New Brunswick, Canada. "Given limited resources, biomonitoring programs are touted as a source of biodiversity information for conservation planning in riverine ecosystems. However, the degree to which patterns revealed by biomonitoring are reflected in unsampled mesohabitats and undersampled taxonomic groups has not been fully addressed. Differences in dispersal capacity among taxonomic groups, in particular, may result in divergent patterns of biodiversity at landscape and regional scales. I sought to address the suitability of biological monitoring data in freshwater biodiversity assessment, and to test the prediction that the degree of spatial structuring in aquatic insect assemblages is inversely related to their dispersal capacity. My thesis comprises four articles. The first addresses whether macroinvertebrate biodiversity patterns in riffles, the target mesohabitat of Canada's national aquatic biomonitoring program, are reflective of those in riverine wetlands. The second addresses whether biodiversity in a group of insects that is abundant in biomonitoring samples (Trichoptera) reflects that of an underrepresented group (Odonata). The third tests the above prediction by comparing the degree of spatial structuring in the weakly dispersing Trichoptera and the stronger dispersing Odonata. The final article investigates regional and national aquatic insect biodiversity patterns utilizing the national biomonitoring dataset, and seeks to evaluate the influence of scale on the observation of spatial structuring aquatic insect assemblages. Several key findings emerged from this work: 1) Patterns of invertebrate taxon richness and beta diversity in riffles poorly reflect those in riverine wetlands. 2) Odonata and Trichoptera biodiversity were not always congruent, however, differences in abundance among groups may account for weak correlations. 3) Both Odonata and Trichoptera assemblages demonstrate relatively weak spatial structuring at a landscape (i.e. 5th order catchment) scale. The weak explanatory ability of spatial variables was also apparent at a regional scale, as just one of the Water Survey of Canada sub drainages within the Pacific drainage demonstrated a significant spatial component in aquatic insect assemblage variation. These findings suggest caution in the application of biomonitoring data to conservation planning. Although landscape and regional scale structuring of aquatic insect communities may be weak, it does not preclude the existence of smaller scale spatial structuring driven by local dispersal processes." (Author)] Address: not stated

14058. Davenport, J.M.; Chalcraft, D.R. (2013): Increasing conspecific density weakens the ability of intermediate predators to develop induced morphological defences to top predators. *Freshwater Biology* 59(1): 87-99. (in English) ["(1) Intraguild predation is common in nature, but it is unclear how species that both compete and eat each other can persist together. One possibility is that intermediate predators possess inducible morphological defences that protect them from top predators while not compromising their ability to compete with top predators. (2) The ability of intermediate predators to develop morphological defences may be compromised in environments with a high density of conspecifics because of reduced resource availability and predation risk due to the saturating functional response of top predators. Furthermore, since morphological defences take time to develop, the type and extent of morphological defences may vary during development. (3) We conducted an experiment to measure the phenotypic responses of an intermediate predator (larvae of the salamander *Ambystoma opacum*) to the presence of a caged top predator (larvae of *Anax* spp.) throughout ontological development in environments that differed in the density of conspecifics present. We also assessed how intermediate predators, reared in the different environments, differed in their vulnerability to top predators and ability to deplete their food resources. (4) We found that *Anax* induced morphological defences in *A. opacum*, but the extent of morphological change declined with the density of conspecifics. Moreover, some morphological traits disappeared, while others appeared just prior to *A. opacum* metamorphosis. The change in *A. opacum* phenotype in response to *Anax* made *A. opacum* less vulnerable to predation by *Anax* but had no significant effect on the foraging ability of *A. opacum*. (5) Our study demonstrates that top predators can induce phenotypes in intermediate predators that reduce their vulnerability to top predators while not compromising their ability to feed on a common prey. An increase in intermediate predator density, however, could diminish the ability of intermediate predators to develop the full suite of morphological defences. The inability to develop the full suite of morphological defences may reduce the probability of persistence with top predators." (Authors)] Address: Davenport, J.M., Division of Biological Sciences, University of Montana, Missoula, Montana 59812, USA. E-mail: jon.davenport@mso.umt.edu

14059. Diedericks, G.; Simaika, J.; Roux, F. (2013): A survey of adult Odonata along the Crocodile-Inkomati River main stem from source to ocean. A pilot project to determine the application of the Dragonfly Biotic Index (DBI) as an indicator of river health. Draft: 56 pp. (in English) ["Results: A total of 80 species were recorded along the 29 sampling points on the Crocodile-Inkomati River from an elevation of 2,100 to 20 m a.s.l. This represents 49.4% of all species known to occur in South Africa. Of the 118 species expected to occur, 32.2% were not encountered. A table with the sites visited, the total DBI score (Σ DBI), number of species, and average DBI 17 score per site (ADBI) are included below (Table 3) and the results illustrated graphically (Figure 4). A species accumulation chart, indicating species that were ex-

pected per site compared to those observed are shown in Figure 17. In general, adult Odonata species diversity was low at the headwaters, increasing longitudinally downstream, with several 'spikes', which tend to indicate increases in species diversity. Very low total DBI scores were recorded at the Sterkstroom (660 – 680 m a.s.l.), Kamagugu (560 – 580 m a.s.l.), Tenbosch Weir (120 – 140 m a.s.l.) and Moamba (60 – 80 m a.s.l.) sites. High diversity was recorded at the Montrose (780 – 800 m a.s.l.), Botanical Gardens (600 – 620 m a.s.l.), Crocodile Gorge (380 – 400 m a.s.l.) and Malelane (280 – 300 m a.s.l.) sites. The highest ADBI was recorded at headwater sites Verlorenvlei (2,080 – 2,100 m a.s.l.), Elandshoek (2,020 – 2,040 m a.s.l.) and Valyspruit (1,840 – 1,860 m a.s.l.). Threatened species were recorded in the Crocodile Gorge, Malelane, Crocodile Bridge and the Inkomati River below Lake Chuali." (Authors) For the complete text see http://inkomaticma.co.za/images/Ecstatus_of_the_Crocodile_River_2013_-_Appendix_A.pdf Address: Diedericks, G., Postnet Suite 225, Private Bag X9910, White River, 1240, South Africa. E-mail: gerhardd@mweb.co.za

14060. Dumont, H.J. (2013): Phylogeny of the genus *Ischnura* with emphasis on the old world taxa (Zygoptera: Coenagrionidae). *Odonatologica* 42(4): 301-308. (in English) ["COI and ITS DNA fragments were used to gain insight into the phylogenetic relationships within *Ischnura*. The genus is recovered as monophyletic, and the 24 species-level taxa considered (about one third of the total) suggest the existence of 2 main clades, here called the *I. elegans* and *I. pumilio* groups. Each group has a core number of about 4-5 species, while the placement of most others is not well resolved and will require further study. However, for a number of taxa, their relationship within the species group is clarified. This is true of formerly enigmatic species like *I. aralensis*, but also of *I. fontaineae*, *I. evansi*, and others. *I. aurora* is found to be only distantly related to *I. rubilio* and both certainly deserve full species status and occupy disjunct geographic ranges. *Ischnura nursei* is confirmed as a true *Ischnura*. *I. graellsii* and *I. saharensis*, although closely related to *I. elegans*, appear to be good species." (Author)] Address: Dumont, H.J., Dept of Ecology and Hydrobiology, Jinan University, Guangzhou-510632, China. E-mail: Henri.Dumont@ugent.be

14061. Fontanarrosa, M.S.; Collantes, M.B.; Bachmann, A.O. (2013): Aquatic insect assemblages of man-made permanent ponds, Buenos Aires City, Argentina. *Neotropical Entomology* 42(1): 22-31. (in English) ["Freshwater habitats are important elements within urban green space and they are endangered by various types of human activity. With the aim to increase the knowledge about species biodiversity in urban ecosystems, we characterised the assemblages of aquatic insects in four permanent man-made ponds in Buenos Aires city (Argentina) during a 1-year period. We recorded 32 species with *Sigara* spp. (Hemiptera) as the most abundant. The removal of aquatic vegetation from the studied ponds may have affected both the establishment and perma-

nence of the insect community. Swimmers were the dominant group in the studied sites, followed by burrowers and sprawlers, and only a few strictly climbers were collected. Therefore, all sampled ponds were dominated by collectors (principally gatherers), secondarily by predators and only few shredders were detected, which was much affected by the removal of macrophytes. Non-parametric abundance indexes estimated a number of species very close to the observed number in each site. Conversely, the incidence indexes estimated more species because there were many more taxa present only in one sample than those represented by few individual in a sample. Our data provides some insights on the community of man-made ponds that can improve the management of these aquatic urban habitats. Considering that macrophytes affect animal assemblages due to their role as physical structures that increase the complexity or heterogeneity of habitats, they should not be removed by authorities in order to promote biodiversity." (Authors) Odonata are listed at family level: Libellulidae, Coenagrionidae.] Address: Fontanarrosa, M.S., Lab Limnología, Depto Ecología, Genética y Evolución, FCEN, UBA CONICET, Ciudad Universitaria Pab II, 4° piso, C1428EHA, Buenos Aires, Argentina. E-mail: fontanarrosa@ege.fcen.uba.ar

14062. Fuisz, T.I.; Vas, Z.; Túri, K.; Körösi, A. (2013): Photographic survey of the prey-choice of European Bee-eaters (*Merops apiaster* Linnaeus, 1758) in Hungary at three colonies. *Ornis Hungarica* 21(2): 38-46. (in English, with Hungarian summary) ["Prey choice of European Bee-eaters was monitored via taking pictures of parent birds carrying prey items to their perches in front of the nests between 2011 and 2013 at three colonies in Hungary: at Pócsmegyer, Nagykarácsony and Albertirsa. All the colonies were studied in the breeding season, and prey items were identified from the digital images taken of adults carrying food for their chicks. During the three years 25 days were spent with collecting photographic data, and from the thousands of pictures taken 805 were suitable for analysis. On 775 photographs the prey item was identified at least to order level. Combining data from all the colonies hymenopterans were by far the most often consumed insects (50%), followed by dragonflies (17%), while beetles, orthopterans, lepidopterans and dipterans each contributed approximately 7-9% of the consumed prey. Prey composition showed marked differences between the individual colonies, although the ratio of hymenopterans was everywhere high. Bee-eaters at Pócsmegyer, probably due to the abundance of aquatic habitats nearby on the Danube shore, consumed almost as much dragonflies as hymenopterans, and ate very few orthopterans. While at the Albertirsa colony, surrounded by agricultural fields and meadows in a more arid environment, hymenopterans dominated the prey, and orthopterans were almost as often consumed as dragonflies. Lepidopterans constituted approximately 8% of Bee-eaters' diet in all colonies. From an insect ecological viewpoint, our study provides valuable data on the spe-

cies pool that might be at risk of predation by Bee-eaters, and enables us to roughly estimate the predation pressure on some taxa, and in certain cases even on species by these birds." (Authors)] Address: Fuisz, T.I., Dept Zool., Hungarian Natural History Museum, Budapest, Baross utca 13, 1088 Hungary. E-mail: tibor.i.fuisz@gmail.com

14063. Gándara, J.A.; Garrido, J.F.; Souta, J.V. (2013): *Orthetrum brunneum* (Fonscolombe, 1837), nueva cita para la provincia de Pontevedra (Galicia, NO Península Ibérica) (Odonata - Libellulidae). *Arquivos Entomoloxicos* 8: 287-288. (in Spanish, with English summary) ["After a period of more than 95 years, *O. brunneum* is recorded once again in the province of Pontevedra." (Authors)] Address: Gándara, J.A., Barrio do Souto, 10 B. E-36740 San Salvador de Tebra, Tomino (Pontevedra), Spain. E-mail: lcgandara@yahoo.es

14064. Greenwalt, D.; Labandeira, C. (2013): The amazing fossil insects of the Eocene Kishenehn Formation in northwestern Montana. *Rocks & Minerals* 88(5): 434-441. (in English) [USA "Approximately 46 million years ago, shortly after the green and red mudstones that now form the mountains of Glacier National Park completed their slow slide eastward from Canada, a series of strong earthquakes created a long north-south rift valley along what is now the western border of the park. As the valley filled with run-off from adjacent mountains, Lake Kishenehn, a 100-mile-long lake, was formed. Today, the North and Middle forks of the Flathead River erode their way through the mile-thick sediments of that ancient lake and expose carbon-rich oil shale and siltstone that comprise the steep cliffs on either side of the river. It is within these shales of the Kishenehn Formation that scientists from the Smithsonian Institution are collecting what are arguably some of the most exceptional insect fossils in the world. ... Seven orders of insects (including Odonata [dragonflies], Lepidoptera [butterflies and moths], Dermaptera [earwigs], Isoptera [termites], Collembola [springtails], Psocoptera [bark lice], and Neuroptera [lacewings and others]) account for less than 0.2 percent of all the Kishenehn fossil insects. Several factors may have contributed to this distribution of insect types. Members of the families Lepidoptera, Dermaptera, Isoptera, Psocoptera, and Collembola are not aquatic insects, and their near absence from the sediments of Lake Kishenehn is not unexpected. Perhaps the most important factor involved in the selective preservation of Kishenehn insects is their size. ... Large insects, such as grasshoppers and dragonflies, are too big to be buried by a single layer of sediment and are therefore exposed to predation and other processes that destroy the insect before it can be entombed. The only fossils of dragonflies in the Kishenehn Formation are wing fragments, structures that are very flat and thin that can be embedded within a single layer." (Authors)] Address: Labandeira, C., Curator Paleontomology, Smithsonian Institution, PO Box 37012, MRC 121, Washington, DC 20013-7012, USA. E-mail: labandec@si.edu

14065. Guan, Z.; Dumont, H.J.; Yu, X.; Han, B.-P.; Vierstraete, A. (2013): *Pyrrhosoma* and its relatives: a phylo-

genetic study (Odonata: Zygoptera). *International Journal of Odonatology* 16(3): 247-257. (in English) ["The placement and relationships of the red-and-black zygopteran *Pyrrhosoma*, currently considered to be part of the *Teinobasinae*, has long been uncertain. DNA fragments (COI and ITS) reveal that *Pyrrhosoma* s.s. is restricted to the West Palaearctic, with two morphologically distinct name-bearing clades (*nymphula*, *elisabethae*), and with a morphologically indistinct third clade in the Middle Atlas, Morocco, that might be close to the common ancestor of all three. *Chromagrion*, the closest relative of *Pyrrhosoma*, is found in North America, not in South Asia. Two isolated Chinese taxa (*tinctipenne* and *latiloba*) are morphologically similar to *Pyrrhosoma*, but their molecular distance is so large that a new genus, *Huosoma*, is required to accommodate them. Past climate change is suggested as the driver of the biogeography and evolution of this group of zygopterans. The origin of the Moroccan isolate and of *elisabethae* might predate the glaciations, and be of Pliocene age. The much wider disjunction between the American and South Asian groups and the western group suggests an older, perhaps Miocene age." (Authors)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@ugent.be

14066. Gutiérrez-Fonseca, P.E.; Ramírez, A.; Umaña, G.; Springer, M. (2013): *Macroinvertebrados dulceacuícolas de la Isla del Coco, Costa Rica: especies y comparación con otras islas del Pacífico Tropical Oriental*. *Rev. Biol. Trop. (Int. J. Trop. Biol.)* 61(2): 657-668. (in Spanish, with English summary) ["Freshwater macroinvertebrates from Cocos Island, Costa Rica: species and comparison with other islands of the Eastern Tropical Pacific. Cocos Island is an oceanic island in the Eastern Pacific, at 496km from Cabo Blanco, Costa Rica. This 24km² island is surrounded by a protected marine area of 9640km². It was declared National Park in 1978 and a World Heritage by UNESCO in 1997. Freshwater macroinvertebrate fauna was collected in 20 sites covering three rivers (Genio, Chatam and Sucio) and two creeks (Minuto and an unnamed creek behind the park rangers' house). Tank bromeliads or phytotelmata were also examined for aquatic macroinvertebrates. Physicochemical parameters were determined in 13 study sites. Additionally, a comparison with other islands in the Eastern Tropical Pacific was conducted to determine the most important factors controlling the diversity in Tropical Pacific islands. A total of 455 individuals were collected belonging to 20 taxa (mostly identified to genus level) from 15 families of aquatic insects. Other macroinvertebrates such as Palaemonid shrimps, Hidrachnida and Oligochaeta were also collected. The family Staphylinidae (Coleoptera) was the most abundant, followed by Chironomidae (Diptera). Diptera was the order of insects with the highest taxonomic richness. A relationship between distance and the number of families was observed supporting the premises of the Theory of island Biogeography. This relationship was improved by correcting area by island elevation, indicating that mountainous islands had the rich-

est faunas, potentially due to high cloud interception that feeds freshwater environments favouring the establishment of aquatic fauna. Physicochemical variables were similar in all sites, possibly due to the geology and the absence of significant sources of pollution on the island." (Authors) The following Odonata taxa are listed: *Argia*, *Coenagrionidae*: genus 1 and genus 2, *Tramea calverti*, and *Triacanthagyna caribbea*] Address: Gutiérrez-Fonseca, P.E., Depto Biol., Univ. de Puerto Rico-Río Piedras, San Juan, Puerto Rico, 00931-3360. E-mail: gutifp@gmail.com

14067. Hoving, C.L.; Lee, Y.M.; Badra, P.J.; Klatt, B.J. (2013): Changing climate, changing wildlife a vulnerability assessment of 400 species of greatest conservation need and game species in Michigan. Michigan Department of Natural Resources. Wildlife Division Report No. 3564: 82 pp. (in English) ["Michigan's climate has been warming, and the warming trend is accelerating. The best available science indicates the acceleration is likely to continue, and warming in the next 40 years will be roughly 10 times as fast as the warming over the past 100 years in Michigan. Michigan wildlife face myriad conservation challenges, including land use change and habitat loss, habitat fragmentation, competition from invasive exotic species, altered ecological processes, and a rapidly changing climate. This report focuses on the effect of a rapidly changing climate. In 2010, the Michigan Natural Features Inventory (MNFI) received funding from the Michigan Department of Environmental Quality Coastal Management Program to assess vulnerability of 180 animal and plant species in the coastal zone using the Climate Change Vulnerability Index (CCVI) developed by NatureServe. MNFI assessed a total of 198 species including 131 animal species and 67 plant species. The Michigan Department of Natural Resources (DNR) Wildlife Division used State Wildlife Grants and Pittman-Robertson funds to assess vulnerability of 281 animal species using the same methods. Twelve animal species were assessed by both MNFI and the Michigan DNR. All resident terrestrial game species and all Species of Greatest Conservation Need (SGCN) (with enough life history data) were assessed. Vulnerable species are those expected to experience reductions in range extent or abundance by 2050 due to climate change. The CCVI analysis suggests that 17% of terrestrial game species and 61% of terrestrial and aquatic Species of Greatest Conservation Need (SGCN) are vulnerable. Other conservation threats or programs aside, these species will likely experience range or population reductions due to climate change. Vulnerable species included important game species, such as moose (*Alces americanus*), Vulnerable SGCN include conservation icons, such as the Karner blue butterfly (*Lycaeides melissa samuelis*) and common loon (*Gavia immer*). The full list of species' vulnerabilities is in the Appendices. Other vulnerability analyses suggest that ecological communities in Michigan will change dramatically as species respond individually. Some characteristic northern species, such as spruce, fir, and birch may fade from the landscape. Quak-

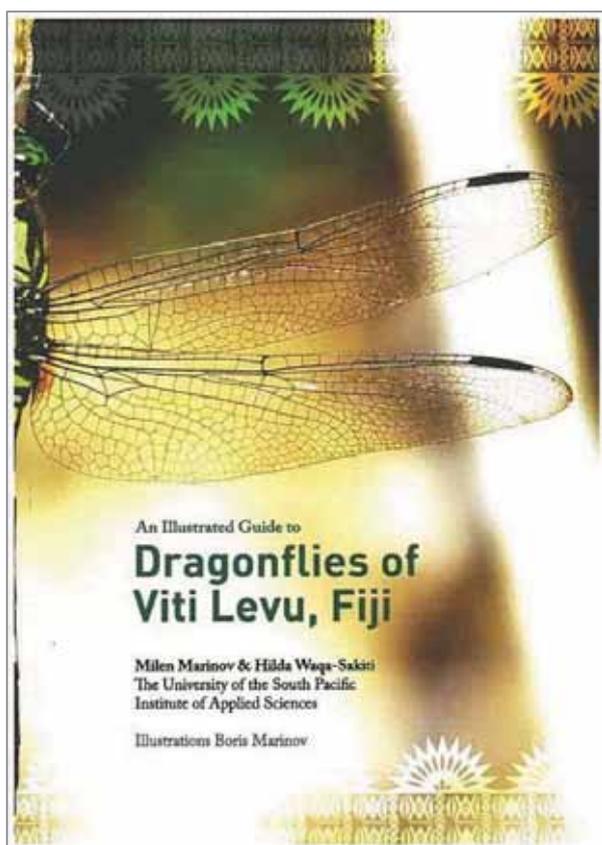
ing aspen (*Populus tremuloides*) is predicted not to regenerate and compete with the same health and vigor in a warmer and drier Michigan. Other species, such as red maple (*Acer rubrum*) and some oaks (*Quercus* spp.) and hickories (*Carya* spp.), are expected to do better in a warming climate. This analysis focuses on vulnerabilities of individual species, independent of changes in habitat or competitive interactions. The CCVI predicts the strength and direction of the influence of a changing climate. Management action (or inaction) can offset or reinforce the climate influence. The CCVI is a useful first step in climate adaptation, but it is only one tool to use to develop climate adaptive management plans for species or habitats. Initial suggestions of management actions are provided to help managers begin thinking about how these adaptive plans can be formulated. However, adaptation (e.g., climate-smart management) will need to be context specific; it will depend on existing management goals, priorities, funds, and local site conditions." (Authors) CCVI tool for these climate vulnerable species included the caveat that the "Species may expand range in assessment area." Populations of these species may decrease globally, but increase in Michigan if their populations shift northward. The only Odonata listed is *Somatochlora hineana*, and it is assessed as "EV – Extremely Vulnerable".] Address: Hoving, C.L., Michigan Dept of Natural Resources, Wildlife Division

14068. Katayama, M. (2013): Differential survival rates of damselfly larvae in the presence of newt and dragonfly predators. *International Journal of Odonatology* 16(2): 177-182. (in English) ["*Paracercion melanotum* has been found to be the most abundant species in damselfly larval communities on Okinawa-zima Island in southwest Japan. To clarify differential susceptibility to predation, a possible factor affecting relative population densities in larval communities, between *P. melanotum* and a less common damselfly species, *Ischnura senegalensis*, laboratory experiments were conducted using three abundant predator species: the sword-tailed newt (*Cynops ensicauda popei*), anisopteran larvae (*Crocothemis servilia servilia*), and a planktivorous fish (*Poecilia reticulata*). *P. melanotum* survived predation by the newt and the dragonfly well compared to *I. senegalensis*. Fishes consumed approximately equal numbers of the two damselfly species. From these results, the newt and the dragonfly were suggested as the most probable predators regulating damselfly larval communities on Okinawa-zima Island. Predators could be a crucial factor determining relative abundance in damselfly larval communities." (Author)] Address: Katayama, M., Dept of Ecology and Environmental Science, Graduate School of Agriculture, University of the Ryukyus, Nishihara, Okinawa, 9030213, Japan. E-mail: motok.k.ryuk@gmail.com

14069. Kriska, G. (2013): Freshwater invertebrates in Central Europe: A field guide. Springer Vienna: 400 pp. (in English) ["This up-to-date guidebook on freshwater invertebrates of the central European region is a richly il-

illustrated work, providing an excellent source of systematic information on freshwater macroinvertebrates. Numerous colour photos and additional vector graphic figures allow readers to identify specific species at a higher taxonomic level (family). The book is supplemented by electronic material including pictures and short video sequences." (Publisher) Odonata are treated on pages 194-209.] Address: Kriska, G., Group for Methodology of Biology Teaching, Biological Institute, Eötvös University, Pázmány sétány 1, Budapest 1117, Hungary

14070. Marinov, M.; Waqa-Sakiti, H. (2013): An Illustrated Guide to Dragonflies of Viti Levu. Fiji. USP Press. 144 pp. (in English) ["An Illustrated Guide to Dragonflies of Viti Levu, Fiji provides a detailed analysis of these fascinating insects, as well as a wonderful introduction to the techniques of identifying them in their natural state." (Publisher) Illustrations from Boris Marinov.] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz; http://uspbookcentre.com/store/merchant.mv?Screen=PROD&Store_Code=UBC&Product_Code=9789820109056&Category_Code=SN



14071. Mellone, U.; López-López P; Limiñana, R.; Urios, V. (2013): Summer pre-breeding movements of Eleonora's Falcon *Falco eleonora* revealed by satellite telemetry: implications for conservation. *Bird Conservation International* 23(4): 487-494. (in English) ["Recent advances in bird tracking technologies are revealing that migratory birds use temporal staging sites other than breeding and wintering areas, and these areas deserve conservation ef-

orts. *F. eleonora* is a long-distance migratory raptor that breeds colonially on islands and is considered a priority species for conservation. Anecdotal observations indicate that during the pre-breeding period, Eleonora's Falcons stay in inland areas far away from the colonies, but, to date there are no detailed data concerning the connectivity between these areas and breeding colonies. Using satellite telemetry, we analysed data from four summering events belonging to three individuals breeding in two colonies in the Western Mediterranean (Spain). All of them made inland movements in areas up to c.400 km distant from the respective breeding colonies, visiting several habitats, from forests to arable lands, probably taking advantage of high densities of insects. Perturbations occurring in these areas could threaten Eleonora's Falcons with serious consequences at the population level. We suggest that conservation measures implemented at breeding and wintering grounds may not suffice and that temporary staging areas should be identified at a larger scale and deserve protection as well. ... It is remarkable that the peak of insect abundance, particularly Coleoptera as well as Odonata, occurs in the inland areas visited by Eleonora's Falcons just during the pre-breeding period (Cano 2001, Belenguer et al. 2004), providing an adequate food supply until the beginning of the autumn migration of passerines that form their main resource during breeding (Walter 1979). It has been reported that Eleonora's Falcons prey particularly upon the Common Cockchafer *Melolontha melolontha* (Cano 2001, Belenguer et al. 2004), an abundant insect that shows demographic explosions in June in some years." (Authors)] Address: Vertebrates Zoology Research Group, CIBIO, University of Alicante, Edificio Ciencias III, Campus San Vicente del Raspeig s/n, Apdo. 99, E-03080, Alicante, Spain

14072. Meyer-Rochow, V.B.; Chakravorty, J. (2013): Notes on entomophagy and entomotherapy generally and information on the situation in India in particular. *Applied Entomology and Zoology* 48(2): 105-112. (in English) ["Indian tribals use insects in a variety of ways. Species containing valuable protein, easily digestible fats, and considerable amounts of vitamins and minerals are consumed; others serve as raw material for folk remedies. Such uses need to be documented, because tribal communities are increasingly discarding their age-old practices. Research into this field can benefit India and the rest of the world in several ways. Traditional communities need to be shown to appreciate the value of their customs and that to look after their environment (lest many of the useful insects will disappear) is not a luxury, but a necessity. Moreover, studying food insects and therapeutically important species can lead to economic spin-offs and would allow countries like India to develop ways to sustainably use this abundant natural resource." (Authors) The publication includes some references to Odonata.] Address: Meyer-Rochow, V.B., School of Engineering and Science, Jacobs University, Research II (Rm. 37), 28759, Bremen, Germany. E-mail: b.meyer-rochow@jacobs-university.de

14073. Mitra, A. (2013): On a small collection of dragonflies from Bhutan with four new records: Range extension of *Pyrrhosoma tinctipenne* (McLachlan, 1894). *Advances in Environment Science*, Oxford Book Company, Jaipur: 8-19. (in English) ["*Pyrrhosoma tinctipenne*, *Periaeschna magdalena*, *Polycanthagyna erythomelas* and *Anisogomphus bivittatus* are recorded for the first time from Bhutan which extends the list of Odonata in Bhutan to 56. Though there is a general relationship between the Himalayan and Japanese fauna (Asahina, 1960), the present findings of *Pyrrhosoma tinctipenne* in Himalayas disproves McLachlan's (1894) deduction about the Chinese fauna that "in several respects the affinities are with Japan rather than with the Himalayas, notwithstanding the nearer proximity of the later". The Himalayan fauna, particularly the Odonata, due to high altitude, insurgency, political instability and lack of funds for research is still partially unexplored (Mitra et al., 2010)."] (Author)] Address: Mitra, A., School of Life Sciences, Sherubtse Coll., Kanglung, Bhutan. E-mail: amitodonata@yahoo.com

14074. Mole, B. (2013): Matter & energy: Material inspired by dragonfly wings bursts bacteria: Prickly synthetic surface could serve as antimicrobial coating on medical implants. *Science News* 184(13): 11. (in English) [Verbatim: Tiny spikes on a silicon surface can stab and kill any bacteria that make contact, researchers report November 26 in *Nature Communications*. Scientists could foil infectious bacteria by using the new surface architecture as a coating on medical devices and food-processing equipment. Microbiologist Elena Ivanova of Swinburne University of Technology in Hawthorn, Australia, and colleagues designed the nanoarchitecture by taking cues from bacteria-free surfaces in nature such as insect wings. Using scanning electron microscopy, the team discovered that dragonfly wings have protrusions, just 240 nanometers tall, which appeared to pop bacterial cells that tried to attach to the wing. By etching light-absorbing black silicon, Ivanova and her team created similar spikes, 500 nanometers tall and just 20 to 80 nanometers thick. When the researchers exposed bacteria or bacterial spores to the silicon surface, they found that it killed microbes quickly. On average, each square centimeter of silicon destroyed around half a million bacterial cells every minute. Black silicon, which engineers typically use in solar panels and light sensors, is cheap and easy to manipulate, Ivanova says. Creating the nanostructured surface takes just five minutes, she says. The researchers believe that nanostructured silicon could coat items such as medical implants to prevent infectious bacteria from hitchhiking into patients. The coating process "seems pretty straightforward and versatile," says nanchemist Thomas Webster of Northeastern University in Boston. Though Webster would like to see more data on the physical forces that actually cause the bacteria to pop, he says modelling the new material from insect wings is a novel approach for finding ways to kill harmful bacteria. "There's a lot of promise for nanoscale features to reduce bacterial growth without antibiotics," he adds.] Address: not stated

14075. Moroz, M.D. (2013): Fauna of aquatic insects of the projected «Vileity» Reserve. *Journal of BSU. Ser. 2.* 2013. No.2: 43-46. (in Russian, with English summary) [In the framework of establishing a transboundary conservation areas, including "Vileity-Adutiskis" (Belarus - Lithuania), 11 Odonata species were recorded: *Calopteryx virgo*, *Lestes dryas*, *L. sponsa*, *Ischnura elegans*, *Aeshna cyanea*, *Cordulia aenea*, *Somatochlora flavomaculata*, *Sympetrum danae*, *S. flaveolum*, *S. sanguineum*, and *S. vulgatum*.] Address: Moroz, M.D., Scientific and Practical Center for Bioresources, Academy of Sciences of Belarus, Minsk, the Republic of Belarus. E-mail: mdmoroz@bk.ru

14076. Müller, J.; Büttstedt, L.; Bock, H.; Steglich, H. (2013): Vorläufige Kurzmitteilung zur Libellenfauna (Odonata) im Projektgebiet südöstlicher Unterharz (MTB 4433 Wippra). *Entomologische Mitteilungen Sachsen-Anhalt* 21(1/2): 54-57. (in German) [Wippra, Sangerhausen, Landkreis Mansfeld-Südharz, Sachsen-Anhalt, Germany. 28 odonate species were found in 1994, 1996-1999 and 2011-2012.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

14077. Negi, R.K.; Rajput, A. (2013): Impact of pulp and paper mill effluents on the diversity of benthic macroinvertebrate fauna of Ganga river at Bijnor, UP, India. *International Journal of Applied and Natural Sciences* 2(5): 91-96. (in English) ["Impact of pulp and paper mill effluents on the diversity of benthic macroinvertebrate in Ganga river at Bijnor, UP, India was investigated from four selected sites July, 2007 to June, 2009. A total of 13 genera of benthic fauna belonging to 6 orders viz. Ephemeroptera (4 genera, 30.7%), Plecoptera (2 genera, 15.3%), Diptera (3 genera, 23%), Odonata (2 genera [*Lestes*, *Macromia*], 15.3%), Leptostraca (1 genus, 7.6%) and Decapoda (1 genus, 7.6%) were recorded where Ephemeroptera was reported as the most abundant order at all the sites. It has been observed that as the site-II is the discharge point of the effluents, minimum diversity was recorded, while site-III has the maximum generic diversity which was 500 mts away from the discharge point which is clearly documenting the harmful effects of industrial effluents on the benthic fauna. Diversity index was also recorded maximum at site-IV with value of H' as 0.557 while it was found to be minimum at site-II as 0.248. Benthic density was reported to be higher during winter months."] (Authors)] Address: Negi, R.K., Dept Zool. & Environ. Sciences, Gurukula Kangri Univ., Haridwar (UK) India 249404. E-Mail: negi_gkv@rediffmail.com

14078. Nummi, P.; Paasivaara, A.; Suhonen, S.; Pöysy, H. (2013): Wetland use by brood-rearing female ducks in a boreal forest landscape: the importance of food and habitat. *Ibis* 155: 68-79. (in English) ["Habitat use by birds may be related to single or interacting effects of habitat characteristics, food resources and predators, but little is known about factors affecting habitat use by wetland species in boreal ecosystems. We surveyed brood-

rearing females and ducklings of four common boreal duck species to assess the effects of habitat structure and food resources on the use of wetlands by brood-rearing ducks. Although wetland use by duck broods was related to habitat structure and food abundance, their relative importance varied among duck species. For the Common Goldeneye *Bucephala clangula*, a diving duck, aquatic invertebrates and large emerging insects were the most important factors associated with wetland use. Common Teal *Anas crecca* broods were observed more often on wetlands with greater Dipteran emergence, whereas in Mallard *Anas platyrhynchos* both habitat structure and large emerging insects were important. The occurrence of Eurasian Wigeon *Anas penelope* broods was related to emerging Diptera and habitat structure but the associations were not strong. The varying habitat and food requirements of common duck species could influence the success of wetland management programmes, and consideration of these factors may be particularly important for initiatives aimed at harvested species or species of conservation concern." (Authors) The paper includes references to Odonata.] Address: Nummi, P., Dept of Forest Sciences, Univ. Helsinki, PO Box 27, Helsinki, FI-00014, Finland. E-mail: petri.nummi@helsinki.fi

14079. Obolewski, K.T.; Strzelczak, A.; Astel, A.M.; Sawczyn, J. (2013): Short-term effects of stream restoration and management on macroinvertebrate communities in lowland streams. *International Journal of Engineering Research and Development* 6(4): 122-131. (in English) ["As a result of hydrotechnical treatments, a 2.5 km long reach of the lowland Kwacza River was elongated to 3.5 km. Restoration triggered off short-term changes in the river ecosystem, which were studied through habitat and invertebrate analysis. Sampling was conducted at 10 sections before and after restoration. Invertebrates quickly colonized various habitats and thus improved biological diversity of the Kwacza River. The only taxon that increased its ecological importance was Gammaridae. In turn, Ephemerellidae concentrated at places with better oxygen conditions. The neural network model revealed that variables directly connected with restoration were not as important as primarily hypothesised." (Authors) taxa are treated at order level. No effect on Odonata could be detected.] Address: K.T. Obolewski, K.T., Dept Ecology, Pomeranian Univ. in Słupsk, Arciszewskiego 22b, 76-200 Słupsk, Poland. E-mail: obolewsk@apsl.edu.pl

14080. Orr, A. (2013): Predation on butterflies and other insects by breeding rainbowbirds ('*Merops ornatus*': Meropidae) in South-East Queensland. *The Australian Entomologist* 40(3): 119-130. (in English) ["The diet of a family of Rainbowbirds ('*Merops ornatus*' Latham) nesting in the Currimundi Environmental Park, southern Queensland, was investigated over approximately four months. Three birds were involved, a breeding pair and a helper male. Insect prey was monitored photographically with 836 items being recorded. The recorded diet of the adults before hatching and that brought to the nestlings

differed considerably, with Hymenoptera being the most important adult prey class for adults, both numerically and in terms of biomass. However, few honeybees ('*Apis mellifera*' Linnaeus) were eaten by adults. Conversely, the most important components of the nestling diet in terms of biomass were cicadas, dragonflies (Anisoptera) and various Diptera. Large numbers of honeybees were also brought to the nestlings during their later development, particularly by the female bird and these comprised almost all the Hymenoptera fed to the nestlings. Lepidoptera, chiefly butterflies of all families, formed a minor but conspicuous part of the diet, particularly of the adults. Relatively fewer were fed to the nestlings, possibly because of the abundance of cicadas and dragonflies in the foraging territory." (Author)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology & Management, Environmental Sciences, Griffith Univ., Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

14081. Röller, O. (2013): Ungewöhnlicher Paarungsversuch zwischen zwei Binsenjungfer-Arten. *Pollichia-Kurier* 29(3): 20-21. (in German) [21-VII-2013, Hanhofen, Rhein-Pfalz-Kreis, Rheinland-Pfalz, Germany; triple connection between a pair of *Lestes barbarus* and *L. dryas*.] Address: Röller, O., POLLICHIA, Bismarckstr. 33, 67433 Neustadt, Germany. E-Mail: roeller@pollichia.de

14082. Saha, N.; Aditya, G.; Saha, G.K. (2013): Prey preferences of aquatic insects: potential implications for the regulation of wetland mosquitoes. *Medical and Veterinary Entomology* 28(1): 1-9. (in English) ["Wetlands are potential sites for mosquito breeding and are thus important in the context of public health. The use of chemical and microbial controls is constrained in wetlands in view of their potential impact on the diverse biota. Biological control using generalist aquatic insects can be effective, provided a preference for mosquito larvae is exhibited. The mosquito prey preferences of water bugs and larvae of odonate species were evaluated using chironomid larvae, fish fingerlings and tadpoles as alternative prey. Manly's selectivity (a_i) values with 95% confidence intervals (CIs) were estimated to judge prey preference patterns. Multivariate analysis of variance (manova) and standardized canonical coefficients were used to test the effects of density on prey selectivity. The a_i values indicated a significant preference ($P < 0.05$) in all of the insect predators tested for mosquito larvae over the alternative prey as a density-dependent function. On a comparative scale, chironomid larvae had the highest impact as alternative prey. In a multiple-prey experiment, predators showed a similar pattern of preference for mosquito larvae over alternative prey, reflecting a significant ($P < 0.05$) niche overlap. The results suggest that, in a laboratory setting, these insect predators can effectively reduce mosquito density in the presence of multiple alternative prey." (Authors)] Address: Saha, Nabaneeta, Department of Zoology, University of Calcutta, 35 Ballygunge Circular Road, Kolkata 700019, India. E-mail: nabaneetasaha@gmail.com

- 14083.** Saputri, D.; Dahelmi, D.; Safitri, E. (2013): Jenis-Jenis Capung (Odonata) di Persawahan Masyarakat Rimbo Tarok Kelurahan Gunung Sarik Kecamatan Kuranji Padang [Types of dragonflies (Odonata) in Rice Field Village Society Tarok Rimbo Sarik Mount Padang Subdistrict Kuranji]. *Jurnal Mahasiswa Pendidikan Biologi Genap 2013-2014* 2(2) [Journal of Biological Education Students Genap 2013-2014]: 6 pp. (in Indonesian, with English summary) [*Orthetrum sabina*, *Crocothemis servilia*, *Pantala flavescens*, and *Agriocnemis femina* were found in the paddy fields of Rimbo Tarok of Gunung Sarik Village of Kuranji District, Padang, Indonesia] Address: not stated
- 14084.** Savchuk, V.; Karolinsky, E.A. (2013): [New records of rare species of dragonflies (Insecta, Odonata) Ukraine [New Records of rare Dragonflies (Insecta, Odonata) in Ukraine]]. *Vestnik zoologii* 47(6): 506. (in Russian) [Ukraine; records of *Chalcolestes viridis*, *Lestes macrostigma*, *Erythromma lindenii*, *Libellula quadrimaculata*, and *Selysiotthemis nigra* are documented.] Address: not stated
- 14085.** Talucdher, A.R.A. (2013): Morphological, mechanical and structural characterization of damselfly wing. Dissertation, North Carolina Agricultural and Technical State University, Greensboro, North Carolina: 115 pp. (in English) ["The damselfly belongs to the same insect family as the dragonfly that inspired the development of Micro Air Vehicles (MAVs). Understanding the morphological, mechanical and structural properties of wings, veins and membranes of fly would provide guidelines to develop efficient MAVs. Lack of test methodologies inhibited the progress. The objective of this research was to develop the above methodologies and then measure the properties of veins, membranes and wings of damselflies. The research yielded four test methodologies: fluorescence spectroscopic analysis to map the morphology of vein; axial nanoindentation test to measure indentation properties; micro tension test to measure tensile properties of microscopic components; and a unique vibration test of wings to measure natural frequency, stiffness and air damping factor. Axial indentation test contrasts the transverse indentation used in the past, whose results were corrupted by surface roughness and flexibility of veins. Veins were found to be made of two layered, elliptical tubular members. The thickness of inner and outer layers was about 8 and 5 μm , respectively and corresponding indentation moduli were 8.42 and 16.00 GPa. The modulus of veins agreed with those of human bones. The tensile modulus and strength of veins ranged from 14 to 17 GPa and 232 to 285 MPa, respectively. The damselfly wing was found to vibrate under bending and torsional deformations, the natural frequency (in air) ranged from 130 to 178 Hz, the wing stiffness ranged from 0.18 to 0.30 N/m with the air damping ratio from 0.67 to 0.79. Pathway to develop a material of matching properties is also presented." (Author)]
- 14086.** Termaat, T.; Kalkman, V. (2013): Verspreidingsonderzoek bijzondere libellen- en vlindersoorten. *Euro-pean invertebrate survey Nederland - nieuwsbrief* 52: 13. (in Dutch) [The authors announce a new internet portal where records for 19 rare Dutch Odonata species can be inserted and displayed. Aim of the portal is to update and to take updated records from these species and the localities where they occur: <http://www.vlinderstichting.nl/steunDVS.php?id=537>] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands. E-mail: tim.termaat@vlinderstichting.nl
- 14087.** Tierno de Figueroa, J.M.; Lopez-Rodríguez; Fenoglio, S.; Sanchez-Castillo, P.; Fochetti, R. (2013): Freshwater biodiversity in the rivers of the Mediterranean Basin. *Hydrobiologia* 719: 137-186. (in English) ["We review the diversity of freshwater organisms in the Mediterranean Basin (hereafter Med), particularly from streams and rivers. We present available information on the richness, endemism, and distribution of each freshwater organism group within the Med, and make a comparison with Palearctic diversity. Approximately 35% of known Palearctic freshwater species and more than 6% of the World's freshwater species are present in the Med. A high degree of endemism is found in the Med freshwater biota. These data, together with the degree to which many freshwater species are threatened, support the inclusion of the Med among World biodiversity hotspots. Nevertheless, knowledge of Med biodiversity is still incomplete, particularly for some taxa. Regarding to the spatial distribution of species within the Med, the richest area is the North, although patterns differ among groups. A comparison of the ecological and biological traits of endemic and non-endemic species of three riverine groups (Ephemeroptera, Plecoptera, and Trichoptera) revealed that endemic species have several strategies and mechanisms to face typical mediterranean-climate conditions, such as drought, when compared to non-endemic species. We briefly analyse the conservation status of the region's biodiversity. Finally, we present some future challenges regarding the knowledge and protection of Med freshwater biodiversity." (Authors) Odonata are treated at pages 156-158.] Address: Tierno de Figueroa, J.M., Departamento de Zoología, Facultad de Ciencias, Universidad de Granada, 18071 Granada, Spain. E-mail: jmtdef@ugr.es
- 14088.** Torralba-Burrial, A. (2013): Las libélulas de Aragón. *Naturaleza Aragonesa* 30: 35-43. (in Spanish) [The paper introduces the regional odonate fauna of the autonomous republic in northeastern Spain.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com
- 14089.** Umar, D.M.; Harding, J.S.; Winterbourn, M.J. (2013): Freshwater invertebrates of the Mambilla Plateau, Nigeria. Gombe State University, Nigerian Montane Forest Project, University of Canterbury: 86 pp. (in English) ["In this book we present an illustrated guide to the most common benthic stream invertebrates found in trop-

ical highland streams on the Mambilla Plateau in Nigeria. They include Crustacea and insects in the orders Ephemeroptera, Plecoptera, Trichoptera, Odonata, Coleoptera, Hemiptera and Diptera. This photographic guide book is an attempt to assist students and researchers in the field to identify some of the common freshwater benthic invertebrates of Mambilla Plateau. It is not a comprehensive guide to all the animals you might collect. Due to the lack of any existing guide for freshwater invertebrates on the Plateau we anticipate that this will become an essential field tool for students and researchers." (Authors) see: <http://www.biol.canterbury.ac.nz/invertebrates/Freshwater-Invertebrates-of-Mambilla.pdf> Address: School of Biological Sciences, University of Canterbury, Private Bag 4800, Christchurch 8140, New Zealand. www.biol.canterbury.ac.nz

14090. Van der Sijde, G. (2013): Urban Dragonflies. *Natura* 110(3): 5. (in Dutch) [Netherlands; on 25 May 2013, the polder gardens beside the residential Rokkeveen Zoetermeer officially were named Dragonfly Capital Reserve.] Address: not stated

14091. Van Dijk, T.C.; Van Staalduinen, M.A.; Van der Sluijs, J.P. (2013): Macro-invertebrate decline in surface water polluted with Imidacloprid. *PLoS ONE* 8(5): e62374. doi:10.1371/journal.pone.0062374: 10 pp. (in English) ["Imidacloprid is one of the most widely used insecticides in the world. Its concentration in surface water exceeds the water quality norms in many parts of the Netherlands. Several studies have demonstrated harmful effects of this neonicotinoid to a wide range of non-target species. Therefore we expected that surface water pollution with imidacloprid would negatively impact aquatic ecosystems. Availability of extensive monitoring data on the abundance of aquatic macro-invertebrate species, and on imidacloprid concentrations in surface water in the Netherlands enabled us to test this hypothesis. Our regression analysis showed a significant negative relationship ($P < 0.001$) between macro-invertebrate abundance and imidacloprid concentration for all species pooled. A significant negative relationship was also found for the orders Amphipoda, Basommatophora, Diptera, Ephemeroptera and Isopoda, and for several species separately. The order Odonata (represented by *Ischnura elegans*, *Erythromma najas* and *E. viridulum*) had a negative relationship very close to the significance threshold of 0.05 ($P = 0.051$). However, in accordance with previous research, a positive relationship was found for the order Actiniedida. We used the monitoring field data to test whether the existing three water quality norms for imidacloprid in the Netherlands are protective in real conditions. Our data show that macrofauna abundance drops sharply between 13 and 67 ng l⁻¹. For aquatic ecosystem protection, two of the norms are not protective at all while the strictest norm of 13 ng l⁻¹ (MTR) seems somewhat protective. In addition to the existing experimental evidence on the negative effects of imidacloprid on invertebrate life, our study, based on data from large-

scale field monitoring during multiple years, shows that serious concern about the far-reaching consequences of the abundant use of imidacloprid for aquatic ecosystems is justified." (Authors)] Address: Van Dijk, T.C., Environmental Sciences, Utrecht University, Utrecht, The Netherlands. E-mail: j.p.vandersluijs@uu.nl

14092. Vanschoenwinkel, B.; Buschke, F.; Brendonck, L. (2013): Disturbance regime alters the impact of dispersal on alpha and beta diversity in a natural metacommunity. *Ecology* 94(11): 2547-2557. (in English) ["Disturbance and dispersal are two fundamental ecological processes that shape diversity patterns, yet their interaction and the underlying mechanisms are still poorly understood and evidence from natural systems is particularly lacking. Using an invertebrate rock pool metacommunity as a natural model system, we studied potential interactive effects of disturbance regime and patch isolation on diversity patterns of species with contrasting dispersal modes (passive vs. active dispersal). Isolation and disturbance regime had negative synergistic effects on alpha diversity; both directly, by excluding late successional species from isolated patches; and indirectly, by modulating establishment success of generalist predators in well connected patches. Unimodal relationships between isolation and alpha diversity, as predicted by mass effects, were only detected for passive dispersers in frequently disturbed patches and not in active dispersers. For passive dispersers, indications for a positive effect of isolation and a negative effect of disturbance on beta diversity were found, presumably due to differences in deterministic succession and stochastic colonization-extinction dynamics among different patch types. Our findings illustrate that interactions between dispersal rates and disturbance regime are important when explaining species diversity patterns in metacommunities and support the idea that diversity in frequently disturbed habitats is more sensitive to effects of dispersal-based processes." (Authors) The list of taxa includes larvae of Libellulidae.] Address: Vanschoenwinkel, B., KU Leuven, Lab. of Aquatic Ecology, Evolution and Conservation, Belgium. E-mail: bram.vanschoenwinkel@bio.kuleuven.be

14093. Vidal-Abarca, M.R.; Sánchez-Montoya, M.M.; Guerrero, C.; Gómez, R.; Arce, M.I.; García-García, V.; Suárez, M.L. (2013): Effects of intermittent stream flow on macroinvertebrate community composition and biological traits in a naturally saline Mediterranean stream. *Journal of Arid Environments* 99: 28-40. (in English) ["Highlights: •We studied the effect of flow intermittence on macroinvertebrate community in a naturally saline stream. •Flow intermittence promoted loss of drought-intolerant macroinvertebrate taxa and led to an increase in flier taxa richness at the intermittent site. •Macroinvertebrate community at the intermittent site was a subset of the community found in perennial sites. •Flow intermittence has important consequences to assess ecological quality. As saline streams are geographically widespread in arid and semiarid regions, flow intermittence frequently occurs as another stressor factor apart from salinity.

Rambla Salada is a temporary naturally saline stream with an intermittent reach upstream. This stream is an ideal scenario to study the effects of intermittent stream flow on macroinvertebrate community composition and biological traits in a naturally saline Mediterranean stream. This study analysed three sites with different hydrological regimes (one intermittent and two perennials). Flow intermittence exerted low pressure on the macroinvertebrate composition and biological traits which led to the loss of drought-intolerant species and taxa rather than acting as a selective force to promote desiccation-resistant taxa. Macroinvertebrate community at the intermittent site was a subset of the community found in perennial sites, and the presence of flier taxa at this site helped avoid flow cessation. These minor changes have consequences to assess the ecological quality of these saline temporary streams in the context of the Water Framework Directive, given the major differences revealed by some indices between the intermittent and perennial sites as the former obtained lower values due to the presence of few desiccation-intolerant species, which significantly increased the value of those biological indices. ... In this sense, Heteroptera, Coleoptera and Diptera are the most diverse groups inhabiting saline streams and on the contrary Ephemeroptera, Trichoptera, Odonata, Crustaceans, Hydrachnidia and Mollusca taxa are scarce (Mellado-Díaz et al., 2008 and Millán et al., 2011)." (Authors)] Address: Vidal-Abarca, Maria, Department of Ecology and Hydrology, Regional Campus of International Excellence "Campus Mare Nostrum", University of Murcia, Campus of Espinardo, 30100 Murcia, Spain. E-mail: charyvag@um.es

14094. Wei, H.H.; New, T.H. (2013): CFD analysis of bio-inspired corrugated aerofoils. Proceedings of ICFD11: Eleventh International Conference of Fluid Dynamics December 19-21, 2013, Alexandria, Egypt : 6 pp. (in English) ["Adapting aerospace solutions engineered by nature to improve technologically advanced products has become increasing popular as researchers attempt to come up with implementations that are simple and robust. Dragonfly wings have corrugated cross-section profiles which instead of hindering flight, actually exhibits superior flight performance by reducing the flow separation bubble even under static flight conditions. A computational fluid dynamics study was conducted to investigate this phenomenon at a Reynolds number of 14 000 by comparing a corrugated aerofoil with the NACA010 aerofoil. The results show a clear reduction of the separation bubble and increased lift for the corrugated aerofoil." (Authors)] Address: Wei, H.H., University of South Africa, Department of Mechanical and Industrial Engineering, Private Bag X6, Florida 1710, South Africa. E-mail: howh@unisa.ac.za

14095. Wiles, C.M. (2013): Parasite community structure in 5 species of damselflies (Odonata: Zygoptera) from Teal ridge, Stillwater Oklahoma. M.Sc. thesis, Oklahoma State University: 114 pp. (in English) ["Few ecological

studies exist on parasite community structure in insects and compared to other invertebrate and vertebrate groups, insects have been largely ignored in studies on parasite community structure. This is surprising because some insects, such as odonates, have become model systems for studies on host parasite interactions, and there is a desperate need for descriptive studies on their parasite community structure. In this study I examined 530 individual damselflies of five species (*Argia apicalis*, *Enallagma civile*, *Ischnura hastata*, *Ischnura verticalis*, and *Lestes disjunctus australis*) for their parasites and report parasite community structure parameters for these hosts. All damselflies were collected from Teal Ridge a semi-permanent wetland located in Stillwater, Oklahoma during the summer and fall of 2010-2012. I report the first record of juvenile *Serpinema cf. trispinosum* nematodes, along with new host records and geographical distribution information for gregarine parasites from Oklahoma damselflies. The parasite compound community of this odonate assemblage consisted of a total of 549 individual parasites, comprised of seven taxa including; five species of gregarines, two species of helminths, and one species of mite. None of the individual parasite species were host specific to a single damselfly species and all parasite species infected at least two species of damselflies. Average parasite species richness was low among the four species of damselflies ranging from a low of $0.2 + 0.4$ (0-2) for *I. hastata* to a high of $0.3 + 0.6$ (0-2) for *E. civile*. There was no relationship in damselfly size and parasite abundance, intensity, or species richness among any of the damselfly species examined. This study indicates that the parasite community structure of damselflies was most similar to Mariluan, 2012 study on the parasite communities of benthic aquatic insects and drastically differed in terms of standard measures of parasite community structure in vertebrate hosts which are much higher in terms of parasite prevalence, mean abundance, mean intensity and species richness." (Author)] Address: Wiles, Crystal Marie

14096. Woodford, D.J.; Barber-James, H.M.; Bellingan, T.A.; Day, J.A.; de Moor, F.C.; Gouws, J.; Weyl, O.L.F. (2013): Immediate impact of piscicide operations on a Cape Floristic Region aquatic insect assemblage: a lesser of two evils? *Journal of Insect Conservation* 17(5): 959-973. (in English) ["The piscicide rotenone is used as a conservation tool to remove alien fishes from rivers, though there is controversy over its effects on aquatic insects. An alien fish removal operation in the Rondegat River, Cape Floristic Region, South Africa, allowed the immediate impact of rotenone on an aquatic insect community in a region with high conservation values to be quantified. The insect community within the treated river was sampled in February 2011 (1 year before rotenone operations), February 2012 (1 week before) and March 2012 (1 week after). Insects were collected using kick sampling across multiple biotopes, together with samples from individual stones. We considered rotenone-precipitated losses to be those taxa captured a week before

treatment but absent after, and assessed the endemism of lost species to determine the conservation impact of the rotenone. Species richness decreased significantly following treatment, even though many rare taxa were not recorded immediately prior to treatment. Of the 85 taxa identified, 18 were lost including five endemic to the mountain range which the river drains. Ephemeroptera were most severely affected, with a significant loss of density on stones post-rotenone and six out of 20 species missing. Since half the missing taxa were recorded upstream of the treatment area, recovery of diversity is likely to be relatively rapid. Given that alien invasive fish negatively affect both fish and aquatic insect communities in South Africa, the long-term positive conservation impact of removing these fish is likely to outweigh the short-term negative effects of the piscicide. ... Odonata, Trichoptera, Coleoptera and Diptera appeared largely unaffected by the rotenone operations." (Authors)] Address: Woodford, D.J., South African Institute for Aquatic Biodiversity, Private Bag 1015, Grahamstown, 6140, South Africa. E-mail: d.woodford@saiab.ac.za

14097. Zschille, J.; Stier, N.; Roth, M.; Mayer, R. (2013): Feeding habits of invasive American mink (*Neovison vison*) in northern Germany — potential implications for fishery and waterfowl. *Acta Theriologica* 59(1): 25-34. (in English) [lowland area "Lewitz", located about 20 km southeast of the city of Schwerin (Mecklenburg-Western Pomerania, northern Germany, 53°26 N, 11°36 E). "In order to collect ecological data of invasive American mink (*Neovison vison*) at a fishpond area in northeastern Germany, we conducted a telemetry study in which 14 mink were radio-tracked. During this project, 2,502 scats from radio-tracked individuals were collected in the period from October 2003 to October 2005. Investigated mink principally prey on fish, small mammals and birds (eggs inclusive), whereas amphibians, reptiles and invertebrates were caught infrequently. Analysing mink scats of different seasons, we found significant seasonal variations of diet composition. In spring, fish, mammals and birds were hunted in similar amounts. During summer, birds made up the main part of the diet followed by mammals. In autumn, the proportion of birds in the mink diet decreased, whereas fish gained in importance. This trend continued during the winter period, when mink preyed almost exclusively on fish. Amphibians, crustaceans, insects, molluscs and reptiles were found only occasionally in scat samples. Among birds, the mink preyed mainly on the Eurasian Coot (*Fulica atra*) followed by the Mallard (*Anas platyrhynchos*). Mammalian prey was clearly dominated by the water vole (*Arvicola terrestris*) and among fish, mink hunted especially perch (*Perca fluviatilis*), roach (*Rutilus rutilus*) and carp (*Cyprinus carpio*). Results clearly demonstrate that mink is an opportunistic predator, which hunts its prey according to availability and vulnerability, respectively. Despite the high portions of fish in their autumn and winter diet, the economic damage caused by mink seems to be negligible. However, high predation rates on birds during the breeding sea-

son indicate a potential negative impact of mink on waterfowl." (Authors) Also larvae of Odonata very scarcely found in the diet of the mink.] Address: Zschille, Jana, Forest Zoology, Institute of Forest Botany and Forest Zoology, Dresden University of Technology, Piennner Str. 7, 01737, Tharandt, Germany. E-mail: zschille@forst.tu-dresden.de

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14098. Abere, S.A.; Ukoima, H.N. (2014): Checklist of urban wildlife species in rivers state: A case study of Obio/Akpor, Port Harcourt and Eleme Local Government Areas of Rivers State. *Caribbean Journal of Science and Technology* 2: 603-610. (in English) [Nigeria; "Trithemis furva, Trithemis kirbyi, Cordulegaster dorsalis, Austroaeschna tasmarica" are listed; a nice set of representatives from three continents in one African region ...] Address: Abere, S.A, Department of Forestry and Environment, Faculty of Agriculture, Rivers State University of Science and Technology, Nkpolu-Oroworukwo, Port Harcourt, Nigeria

14099. Adarsh, C.K.; Aneesh, K.S., Nameer, P.O. (2014): A preliminary checklist of odonates in Kerala Agricultural University (KAU) campus, Thrissur District, Kerala, southern India. *Journal of Threatened Taxa* 6(8): 6127-6137. (in English) [52 odonate species are checked.] Address: Nameer, P.O., Centre for Wildlife Sciences, Coll. Forestry, Kerala Agricultural Univ., Thrissur, Kerala 680656, India. E-mail: nameer.po@kau.in

14100. Al-Shami, S.A.; Siti Nurhanani, H.; Che Salmah, M. R.; Salman, A.; Nur Huda, A.; Abu Hassan, A. (2014): Developmental instability in Odonata larvae in relation to water quality of Serdang River, Kedah, Malaysia. *Life Science Journal* 11(7): 152-159 (in English) ["We examined the fluctuating asymmetry (FA) in larvae of two Odonata genera; *Pseudagrion* sp. and *Onychothemis* sp. living in a relatively polluted river as a tool for water quality assessment. Larval and water samples were collected monthly from January to June 2008. Various water parameters including pH, temperature, velocity, nitrate, phosphate, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solid (TSS), and ammonium-N content were recorded. Composite effect of selected water parameters expressed as Water Quality Index (WQI) was also calculated. FA indices [(FA), absolute asymmetry (AbsFA), composite fluctuating asymmetry (CFA)] of the first and second antennal segments of *Onychothemis* sp. and last tarsal segment of *Pseudagrion* sp. hind legs were calculated. We found that high FA levels in the selected traits for the two Odonata species were associated with deterioration in the water quality (WQI). BOD and pH were positively correlated with high FA indices in the antennal segments of *Onychothemis* sp. The FA levels calculated as FA indices of last tarsal segment of *Pseudagrion* sp. hind legs were positively correlated with ammonium-N, phosphate, and COD. We concluded that selected traits of the odonate

taxa are useful bioindicators as the incidence of fluctuating asymmetry in their larvae was strongly associated with deterioration in the water quality of the river." (Authors)] Address: Al-Shami, S.A., School of Biological Sciences, Universiti Sains Malaysia, Penang 11800, Malaysia. E-mail: alshami200@gmail.com

14101. Amaya-Perilla, C.; Marinov, M.; Holwell, G.; Varsani, A.; Stainton, D.; Kraberger, S.; Dayaram, A.; Curtis, N.; Cruickshank, R.; Paterson, A. (2014): Comparative study of the Chatham Islands Odonata, II: Morphometric and molecular comparison between *Xanthocnemis tuanuii* Rowe, 1981 and *X. zealandica* (McLachlan, 1873) with notes on the taxonomic position of *Xanthocnemis sinclairi* Rowe, 1987 (Zygoptera: Coenagrionidae). International Dragonfly Fund - Report 75: 1-27. (in English) ["We compared Chatham Island endemic species *Xanthocnemis tuanuii* to its congeners from the New Zealand South Island: *X. zealandica* (newly collected specimens) and *X. sinclairi* (type specimens plus newly collected material). Two independent tests were performed - geometric morphometrics and molecular. Both analyses were consistent in supporting the status of *X. tuanuii* as a good species. Species differed statistically in the following morphological traits: head (dorsal view), male appendages (dorsal, lateral, posterior and ventral views), thorax (dorsal view), and penis (dorsal and lateral view). In addition to the original diagnostic features (mainly shape of the male superior appendages), a new morphological character is suggested here which reliably distinguishes the species based on the shape of the inferior appendages. There was no statistical support for the species status of *X. sinclairi*. The only feature reported as diagnostic (lower lobe of male superior appendages) was found to be variable and insufficient to warrant the previously proposed taxonomic rank for *X. sinclairi*. Molecular analysis of specimens showing identical appendages to the *X. sinclairi* holotype grouped them with *X. zealandica* specimens. Therefore *X. sinclairi* is synonymised with *X. zealandica*." (Authors)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz

14102. Andersen, A.N.; Humphrey, C.; Braby, M.F. (2014): Threatened invertebrates in Kakadu National Park. In: Winderlich S & Woinarski J (eds) 2014. Kakadu National Park Landscape Symposia Series. Symposium 7: Conservation of threatened species, 26–27 March 2013, Bowali Visitor Centre, Kakadu National Park. Internal Report 623, June, Supervising Scientist, Darwin: 48-57. (in English) [Kakadu National Park, 171 km E Darwin, Northern Territory, Australia. A total of 78 Odonata species is known from the National Park. *Antipodogomphus dentosus*, *Eurysticta coomalie*, *Hemigomphus magela*, and *Lithosticta macra* are briefly highlighted.] Address: Braby, M.F., Department of Land Resource Management, P.O. Box 496, Palmerston, NT 0831, Australia

14103. Appel, E.; Gorb, S.N. (2014): Comparative func-

tional morphology of vein joints in Odonata. *Zoologica* (Schweizerbart) 159: 104 pp. (in English) ["The authors present a thorough study on the distribution of resilin-bearing wing vein joints in wings of Odonata. 22 species of 20 different families of dragonflies and damselflies, showing various wing morphologies and flight kinematics, are examined and reveal interesting evolutionary trends. Dragonflies and damselflies show an exceptional high lift production and are some of the most maneuverable flying insects. The important role of their corrugated wing profile in increasing lift production has been shown in various studies. As odonate wings lack internal muscles, their aerodynamic performance relies on passive deformations, such as pleat angle widening and camber formation. The rubber-like protein resilin has been shown to play a crucial role in wing joint flexibility. Thus, it may be assumed that the specific distribution of either stiff or flexible, resilin-bearing vein joints may influence the overall wing deformation during flight. Using fluorescence light microscopy and scanning electron microscopy, the dorsal and ventral wing sides of different species are compared with respect to the distribution patterns of four types of vein joints, five types of resilin patches, and joint-associated spines. The results reveal a significant difference between dragonflies and damselflies. Variations of the distribution patterns suggest a classification into five different pattern groups. Their occurrence within the two suborders shows some evolutionary trends and gives insight into the wing functionality. In particular, we discussed how the combination of joint morphology, kinematics, and wing morphology may allow different passive wing deformations during flight. This study, generously illustrated with 53 mostly coloured figures is of great interest to biologists studying insect flight, functional morphology, and evolution of Odonata. Furthermore, the described distribution patterns of different vein joints in combination with wing shape and flight kinematics may possibly inspire their biomimetic imitation in micro air vehicles (MAV)." (Publisher)] Address: Gorb, S.N., Functional Morphology and Biomechanics, Zoological Institute, Christian-Albrecht University of Kiel, 24098 Kiel, Germany. E-mail: sgorb@zoologie.uni-kiel.de

14104. Arbeiter, S.; Schnepel, H.; Uhlenhaut, K.; Bloege, Y.; Schulze, M.; Hahn, S. (2014): Seasonal shift in the diet composition of European Bee-Eaters *Merops apiaster* at the northern edge of distribution. *Ardeola* 61(1): 161-170. (in English, with Spanish summary) ["*M. apiaster* forage almost exclusively on airborne insects caught on the wing. The availability of this food might be temporally limited due to adverse weather conditions, especially at climatically sub-optimal breeding sites. We determined seasonal variation in the diet composition in adult and nestling bee-eaters at the species' northernmost breeding colonies by analysing food remains from pellets and by direct observation. Adult bee-eaters preyed on a wide range of insect species with more than 97% belonging to the taxonomic orders Hymenoptera, Odonata and Coleoptera. We observed consistent seasonal changes in adult

diet composition from the pre-incubation to the late chick rearing period. The dry mass proportion of dragonflies decreased remarkably in the adult diet as chick rearing started, whereas the consumption of small Hymenoptera increased by the end of the chick provisioning period. Additionally, we found differences in the diet composition of adults and nestlings. The higher amount of bumblebees and dragonflies in the nestling diet was temporally associated with a decrease of these components in the adult diet, indicating that breeding birds preferentially feed larger prey items to their offspring than those that they consume themselves." (Authors)] Address: Arbeiter, Susanne, Zool. Institute & Museum, Univ. of Greifswald, Johann-Sebastian-Bach-Str.11/12, 17489 Greifswald, Germany. E-mail: susanne.arbeiter@uni-greifswald.de

14105. Atwood, T.B.; Hammill, E.; Srivastava, D.S.; Richardson, J.S. (2014): Competitive displacement alters top-down effects on carbon dioxide concentrations in a freshwater ecosystem. *Oecologia* 175(1): 353-361. (in English) ["Climate change and invasive species have the potential to alter species diversity, creating novel species interactions. Interspecific competition and facilitation between predators may either enhance or dampen trophic cascades, ultimately influencing total predator effects on communities and biogeochemical cycling of ecosystems. However, previous studies have only investigated the effects of a single predator species on CO₂ flux of aquatic ecosystems. In this study, we measured and compared the individual and joint effects of predatory damselfly larvae (*Mecistogaster modesta*) and diving beetles on total prey biomass, leaf litter processing, and dissolved CO₂ concentrations of experimental bromeliad ecosystems. Damselfly larvae created strong trophic cascades that reduced CO₂ concentrations by ~46 % relative to no-predator treatments. Conversely, the effects of diving beetles on prey biomass, leaf litter processing, and dissolved CO₂ were not statistically different to no-predator treatments. Relative to multiplicative null models, the presence of damselfly larvae and diving beetles together resulted in antagonistic relations that eliminated trophic cascades and top-down influences on CO₂ concentrations. Furthermore, we showed that the antagonistic interactions between predators occurred due to a tactile response that culminated in competitive displacement of damselfly larvae. Our results demonstrate that predator identity and predator-predator interactions can influence CO₂ concentrations of an aquatic ecosystem. We suggest that predator effects on CO₂ fluxes may depend on the particular predator species removed or added to the ecosystem and their interactions with other predators." (Authors)] Address: Atwood, Trisha, Department of Forest and Conservation Sciences, University of British Columbia, Vancouver, BC, V6T 1Z4, Canada. E-mail: tatwood16@gmail.com

14106. Ball, L. (2014): An investigation of Odonate communities within Wadi Sayq, Dhofar province, Oman (Insecta: Odonata). *Check List* 10(4): 857-863. (in Eng-

lish) ["Two research expeditions surveyed Odonata communities within Wadi Sayq, a coastal wadi system 20 km in length, situated in the southwest Jabal Qamar mountain range, Dhofar Province of Oman. Sample collection was undertaken from 2 to 29 February 2012, and from 6 February to 7 March 2013. 897 individuals were recorded belonging to 20 species and *Tholymis tillarga* is new for the Arabian Peninsula. A single record of *Rhyothemis semihyalina* increases significantly the known distribution range of this species in Arabia to the West. Reasons for the observed temporal and spatial variation in community composition are explored and notes on species habitat preferences are included." (Author) *Trithemis arteriosa*; *Orthetrum chrysostigma*; *Ischnura senegalensis*; *Ceragrion glabrum*; *T. annulata*; *Crocothemis erythraea*; *Pantala flavescens*; *Orthetrum ransonnetii*; *Macrodiplax cora*; *Azuragrion nigridorsum*; *Anax ephippiger*; *Tholymis tillarga*; *Nesciothemis farinosa*; *Agriocnemis pygmaea*] Address: Ball, L., University of Exeter, College of Life and Environmental Sciences, Penryn Campus, Treliever Road, Penryn, Cornwall TR10 9FE, UK. E-mail: lawrence.ball1@gmx.com

14107. Ball-Damerow, J.E.; M'Gonigle, L.K.; Resh, V.H. (2014): Changes in occurrence, richness, and biological traits of dragonflies and damselflies (Odonata) in California and Nevada over the past century. *Biodiversity and Conservation* 23(8): 2107-2126. (in English) ["Increases in water demand, urbanization, and severity of drought threaten freshwater ecosystems of the arid western United States. Historical assessments of change in assemblages over time can help determine the effects of these stressors but, to date, are rare. In the present study, we resurveyed 45 sites originally sampled in 1914-1915 for Odonata adults throughout central California and northwestern Nevada, USA. We examined changes in species occurrence rates, taxonomic richness, and biological trait composition in relation to climate changes and human population increases. While species richness at individual sites did not change significantly, we found that odonate assemblages have become more similar across sites. Homogenization is a result of the expansion of highly mobile habitat generalists, and the decline of both habitat specialists and species with an overwintering diapause stage. Using a multi-species mixed-effects model, we found that overall occurrences of Odonata increased with higher minimum temperatures. Habitat specialists and species with a diapause stage, however, occurred less often in warmer regions and more often in areas with higher precipitation. Habitat specialists occurred less often in highly populated sites. Life history traits of Odonata, such as dispersal ability, habitat specialization, and diapause, are useful predictors of species-specific responses to urbanization and climate change in this region." (Authors)] Address: Ball-Damerow, Joan, Dept of Environmental Science, Policy & Management, University of California, Berkeley, 130 Mulford Hall #3114, Berkeley, CA 94720-3114, USA. E-mail: joandamerow@gmail.com

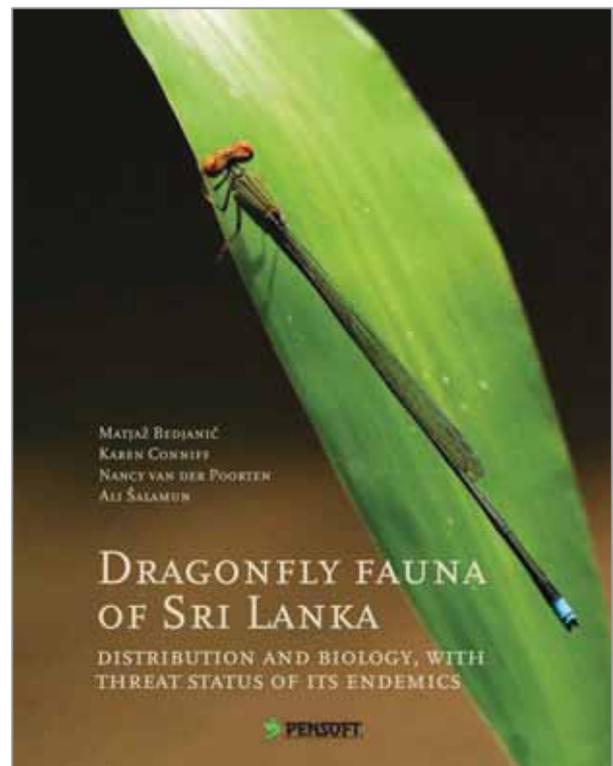
14108. Barry, M.J.; Roberts, D.M. (2014): Indirect interactions limit the efficiency of Odonata as natural control agents for mosquito larvae. *Journal of Insect Behavior* 27(5): 626-638. (in English) ["Odonate nymphs are voracious predators and may be useful natural control agents. However, odonates are normally found in complex guilds with a high degree of conspecific and interspecific predation that may reduce their overall predation efficiency. The present study investigates whether indirect interactions, mediated via chemical predation signals, inhibit the consumption of mosquito larvae by two common odonates: *Crocothemis erythraea* and *Ischnura evansi*. Our results show that the predation rate of *C. erythraea* is reduced by chemical cues from *Anax imperator*, but the response of *I. evansi* to *C. erythraea* was statistically non-significant. This study shows that intra-guild interactions may limit the effectiveness of odonates as predators of mosquitoes." (Authors)] Address: Barry, M.J., Author Affiliations1. Biology Department, Sultan Qaboos University, PO Box 36 AL Khoud, Muscat, 123, Oman. E-mail: mjbarry@squ.edu.om

14109. Baumann, K.; Müller, J. (2014): Die Libellen des Nationalparks Harz. Schriftenreihe aus dem Nationalpark Harz 11. 212 pp. (in German). Herausgeber: Nationalparkverwaltung Harz, Lindenallee 35, 38855 Wernigerode, Germany. www.nationalpark-harz.de



14110. Bedjanic, M.; Conniff, K.; van der Poorten, N.; Šalamun, A. (2014): Dragonfly fauna of Sri Lanka: distribution and biology, with threat status of its endemics. Pensoft Publishers. 321 pp. (in English) ["Dragonflies are

strikingly beautiful insects and small colourful pearls of Sri Lanka's remarkable biodiversity. At present, 124 species are known from the island, of which almost half are endemic. Such an extraordinary level of endemism makes Sri Lankan dragonflies an exceptionally interesting group for studies in biodiversity, zoogeography, phylogeny and ecology. The book "Dragonfly fauna of Sri Lanka: distribution and biology, with threat status of its endemics" is the result of almost 20 years of the authors' work on the subject. With detailed texts and hundreds of colour photographs, maps and charts, it summarizes all the available knowledge on the distribution, taxonomy, biology and disturbing threat status of the dragonflies of Sri Lanka. It aims to raise awareness and promote interest in odonatology among a widespread and diverse community of researchers, nature conservationists and students in Sri Lanka and abroad." (Publisher)] <http://www.pensoft.net/book/12977/dragonfly-fauna-of-sri-lanka-distribution-and-biology-with-threat-status-of-its-endemics>



14111. Bharamal, D.L.; Koli, Y.J.; Korgaonkar, D.S.; Bhawane, G.P. (2014): Odonata fauna of Sindhudurg district, Maharashtra, India. *International Journal of Current Microbiology and Applied Sciences* 3(9): 98-104. (in English) [Records of 23 species are documented.] Address: Bharamal, D.L., Department of Zoology, Shri Panchamkhemraj Mahavidyalaya Savantvadi, MS, India

14112. Bharathi, A.; Roopan, S.M.; Rahuman, A.A.; Rajakumar, G. (2014): Solvatochromic behaviour and larvicidal activity of acridine-3-carboxylates. *Journal of Photochemistry and Photobiology B: Biology* 140: 359-364. (in English) ["Highlights: •Synthesis of acridine-3-carboxylate achieved. •Solvatochromic study was evaluated.

•Larvicidal activity against *A. stephensi* and *H. maculata* were done. A new series of substituted ethyl 10-chloro-4-(3,4-dimethoxyphenyl)-2-hydroxy-12-phenyl-1,4,5,6-tetrahydrobenzo[*a*]acridine-3-carboxylates, 3a–e have been synthesized through NaOH base mediated cyclocondensation of (E)-7-chloro-2-(3,4-dimethoxybenzylidene)-9-phenyl-3,4-dihydroacridin-1(2H)-ones, 1a–e with ethyl acetoacetate. Structures of these synthesized molecules were studied by FT-IR, ¹H NMR, ¹³C NMR and EI-MS. And all the synthesized compounds were evaluated for their UV-absorption studies with various metal solutions. Acridine-3-carboxylate derivatives were tested against fourth instar larvae of *Anopheles stephensi* and *Hippobosca maculata*. Among those compounds, 3b and 3e have good larvicidal activities against both *A. stephensi* and *H. maculata*. Toxicity of compounds, 3b and 3e compounds were evaluated with the reference non-target aquatic species like, *Sphaerodema annulatum* Fabricius (Heteroptera: Belostomatidae) and *Zygomma petiolatum* Rambur (Odonata: Libellulidae) results very low LC50 values reveals that, the synthetic compounds are non toxic." (Authors)] Address: Roopan, S.M., Chemistry Research Laboratory, Organic Chemistry Division, School of Advanced Sciences, VIT University, Vellore 632 014, Tamil Nadu, India. -ail: mohanaroopan.s@gmail.com

14113. Bhatti, A.R.; Zia, A.; Mastoi, M.I.; Amad-ud-Din; Ashfaq, M.; Zahid, R.A.; Ali, M.A. (2014): Fenland naids of Odonata collected from Tehsil Shakargarh, Punjab, Pakistan. *Pakistan Entomologist* 36(1): 35-38. (in English) ["Naiads of Odonata were collected from various marshlands of Tehsil Shakargarh, Punjab. Aquatic spots including seasonal streams, rice fields, temporary ponds, water filled holes of uprooted trees and muddy margins of rivers etc. were visited in five selected localities." (Authors) The following species are documented: *Crocothemis servilia*; *Pantala flavescens*; *Orthetrum glaucum*; *O. sabina*; *Trithemis aurora*; *Ischnura aurora*; *Agriocnemis splendidissima*; *Ceriagrion coromandelianum*; *Rhodischnura nursei*] Address: Bhatti, A.R., National Insect Museum, NARC Islamabad, Pakistan. E-mail: bhatti.nim@gmail.com

14114. Bhuyan, B. (2014): Monsoon prediction: the use of traditional knowledge. *Sai Om Journal of Science, Engineering & Technology* 1(7): 1-6. (in English) ["India is traditionally an agrarian country wherein, the farm sector accounts for 14 percent of the country's nearly \$2 trillion economy, with two-third of it's 1.2 billion populace living in rural areas. Indian agriculture is highly dependent on rain wherein, half of the country lacks irrigation facility. At the same time, almost 75% of the rain in India arrives during the four rainy months of monsoon season. Thus highly dependent on rain, the people in different part of the country from time immemorial have developed various traditional means and ways for the prediction of monsoon rain over the country. These knowledge of monsoon prediction are based on various tacit knowledge such as direction of winds and temperature, shape and type of clouds, various

bio indicators such as flowering of some particular plants, typical behaviour of birds, animals and insects, position of celestial bodies, almanac etc. This particular study has been done to look into many such traditional knowledge of prediction of monsoon based on literature available from different sources. The study reveals that many such indigenous practices prevails in almost every part of the country and people especially, the farmers, rely on these information to large extent and adjust their agricultural activity accordingly. Thus, it is felt that if this indigenous knowledge is combined with the latest space and information technology, the prediction of the various weather and climate related phenomena will be more accurate and efficient. This will in turn help mitigating various climate induced disaster such as flood, drought, famine etc to great extent. Dragonfly flying in a group at three to four meters from the ground level indicates rain in the evening." (Author)] Address: Bhuyan, B., Senior Research Scholar, CSRD / SSS / JNU, New Delhi, India. Email: bibekbhuyan@yahoo.com

14115. Bianchi, R.; Calixto Campos, R.; Xavier-Filho, N.L.; Olifiers, N.; Gompper, M.E.; Mourão, G. (2014): Intraspecific, interspecific, and seasonal differences in the diet of three mid-sized carnivores in a large Neotropical wetland. *Acta Theriologica* 59(1): 13-23. (in English) ["The diet and partitioning of food resources among mid-sized mammalian carnivores is poorly known, especially in the tropics. We evaluated the resource partitioning between *Leopardus pardalis* (ocelot), *Cerdocyon thous* (crab-eating fox), and *Nasua nasua* (brown-nosed coati) in the Pantanal of Brazil. Between December 2005 and February 2008, we collected data necessary to better understand interspecific, intraspecific, and seasonal variability in diet. Food habits were assessed by analysis of feces (n = 293) collected from known individuals (n = 128), and differences in dietary composition were evaluated through nonmetric dimensional scaling using the Jaccard similarity index. The main diet differences were observed between the specialist ocelot and the more generalist crab-eating fox and brown-nosed coati. Crab-eating foxes and brown-nosed coatis preyed on arthropods, fruits, and vertebrates whereas ocelots preyed almost entirely on vertebrates, mainly rodents and snakes. Ocelots' consumption of snakes was the highest ever recorded, as was the extent of carnivory by brown-nosed coatis. For the crab-eating fox and the brown-nosed coati, there were large differences between the use of fruits and animal foods in the wet and dry season. Yet for both species there were no significant differences in the diets of males and females. Despite the conspicuous sexual dimorphism and spatial segregation that are typical of brown-nosed coatis, the results do not support the hypothesis that size dimorphism is primarily an adaptation to reduce intersexual competition for food. Rather, dimorphisms and patterns of space use may be more related to competition among males for access to females." (Authors) The diet of the crab-eating fox also includes some Odonata.] Address: de Cassia Bianchi, Rita, Depto de Biologia Aplicada à Agropecuária, Univde Estadual

Paulista "Júlio de Mesquita Filho", Jaboticabal, 14884-900, SP, Brazil. E-mail: rc_bianchi@yahoo.com.br

14116. Blakely, T.J.; Eikaas, H.S.; Harding, J.S. (2014): The SingScore: a macroinvertebrate biotic index for assessing the health of Singapore's streams and canals. *Raffles Bulletin of Zoology* 62: 540-548. (in English) ["Worldwide, lotic ecosystems have been greatly modified by urbanisation, which has resulted in the impairment of physico-chemical conditions and the degradation of benthic communities. Singapore represents one of the most densely populated and urbanised nations globally, with more than 7,000 people per km². Despite this high degree of urbanisation, relatively large forested areas remain in the Central Catchment Nature Reserve (CCNR) in the centre of the country. Thus, Singapore's lotic systems range from highly-impacted concreted canals in residential and commercial areas, to mildly-impacted, sand-dominated and forested streams within the CCNR. Although the use of macroinvertebrate biotic indices has a long history in freshwater ecology and they are now widely established in monitoring regimes around the world, few biotic indices have been developed for the tropics. This is particularly the case for Southeast Asia. We present the SingScore, a new biotic index developed for measuring the health of Singapore's lotic ecosystems using stream macroinvertebrates. We conducted extensive surveys of the macroinvertebrate communities inhabiting 47 study sites within streams, rivers and canals throughout Singapore's mainland, and measured a suite of physical and chemical parameters at all sites. We collected 59,116 macroinvertebrates, belonging to 74 different taxonomic groups (68 families and 6 higher taxa). Using multivariate ordination techniques and weighted averaging, we assigned tolerance scores (ranging from 1: pollution tolerant; to 10: pollution sensitive) to each of the 74 macroinvertebrate taxa. The SingScore was then calculated by summing the tolerance scores of all taxa present at a site and dividing by the number of taxa present at that site. The SingScore was multiplied by a constant of 20 to give SingScores between 0 and 200. We propose four likely water quality categories for running waters in Singapore: Poor (SingScore < 80), Fair (80–99), Good (100–119) and Excellent (120+). We envisage that the SingScore will enable more accurate monitoring of the health of Singapore's streams, rivers and canals." (Authors) The list of taxa includes Odonata, all at family level.] Address: Blakely, Tanja, Boffa Miskell, PO Box 110, Christchurch 8053, New Zealand

14117. Bode-Oke, A.; Zeyghami, S.; Dong, H. (2014): Effect of shape on wing kinematics control in dragonfly maneuvering flight (Abstract: L6.00007). *Bulletin of the American Physical Society*, 67th Annual Meeting of the APS Division of Fluid Dynamics, Volume 59, Number 18, Sunday–Tuesday, November 23–25, 2014; San Francisco, California: (in English) [Verbatim: Flying insects execute aerial maneuvers through fine modulations in their wing kinematics. It's yet not known that to what extend

the wing kinematics can be controlled and altered by the insect. To investigate the question, we recorded a yaw turn maneuver of a dragonfly in free flight. Our measurements show that this flight consists of two kinematically and dynamically distinct phases; acceleration and deceleration. In a systematic study, we first clipped the left forewing and then the right forewing of the same dragonfly and recorded its yaw turn maneuver. The signatures (in kinematics and dynamics) of the two identified phases stay unchanged by wing damage but the duration of both phases extends. The rotational velocity of the body drops dramatically by wing damage which implies the dragonfly is incapable of controlling the wing kinematics to achieve similar performance as in the intact wing. Our results suggest that the wing kinematics control is tightly influenced by the wing shapes and the aerodynamics of flapping flight.] Address: not stated

14118. Bos, F.; Wasscher, M.; Reinboud, W. (2014): *Veldgids libellen – Europa compleet voor Noordwest-Europa - veldkenmerken - met extra foto's*. KNNV. 260 pp. (in Dutch).



14119. Boshkovikj, V.; Webb, H.K.; Pham, V.T.; Fluke, C.J.; Crawford, R.J.; Ivanova, E.P. (2014): Three-dimensional reconstruction of surface nanoarchitecture from two-dimensional datasets. *AMB Express* 2014, 4:3

doi:10.1186/2191-0855-4-3: 9 pp. (in English) ["The design of biomaterial surfaces relies heavily on the ability to accurately measure and visualize the three-dimensional surface nanoarchitecture of substrata. Here, we present a technique for producing three-dimensional surface models using displacement maps that are based on the data obtained from two-dimensional analyses. This technique is particularly useful when applied to scanning electron micrographs that have been calibrated using atomic force microscopy (AFM) roughness data. The evaluation of four different surface types, including thin titanium films, silicon wafers, polystyrene cell culture dishes and dragonfly wings confirmed that this technique is particularly effective for the visualization of conductive surfaces such as metallic titanium. The technique is particularly useful for visualizing surfaces that cannot be easily analyzed using AFM. The speed and ease with which electron micrographs can be recorded, combined with a relatively simple process for generating displacement maps, make this technique useful for the assessment of the surface topography of biomaterials." (Authors)] Address: Boshkovikj, V., Faculty of Life and Social Sciences, Swinburne University of Technology, PO Box 218, Hawthorn, Victoria 3122, Australia. E-mail: vboshkovikj@swin.edu.au

14120. Bota-Sierra, C.A. (2014): A brief look at the Odonata from the Páramo ecosystems in Colombia, with the descriptions of *Oxyallagma colombianum* sp. nov. and *Rhionaeschna caligo* sp. nov. (Odonata: Coenagrionidae, Aeshnidae, Libellulidae). *Zootaxa* 3856(2): 192-210. (in English, with Spanish summary) ["Here I present the results of field work and collections of Odonata made in several páramos of Colombia between 2007 and 2014. Two undescribed species, in the genera *Oxyallagma* Kennedy, 1920, and *Rhionaeschna* Förster, 1909, respectively, were found, as well as two species not previously recorded from Colombia: *Rhionaeschna peralta* (Ris, 1918) and *Oxyallagma dissidens* (Selys, 1876). Descriptions and diagnoses of the new species, photographs, maps, illustrations, natural history notes, and comments on morphological plasticity are presented." (Author)] Address: Bota-Sierra, C.A., Grupo de Entomología Universidad de Antioquia (GEUA), Medellín - Colombia. AA 1226. E-mail: cornelio-bota@gmail.com

14121. Boulaaba, S.; Zrelli, S.; Boumaiza, M.; Rossaro, B. (2014): Relationships between physical and chemical factors and aquatic macroinvertebrates in perennial streams in the arid northern mountain basin El Batinah, Oman. *Journal of Entomological and Acarological Research* 46: 50-58. (in Arabia, Oman, arid zone, wadi, macroinvertebrates.) ["The relationships between physical properties, water chemistry and aquatic macroinvertebrates were investigated in riffles of four perennial streams in the arid northern Oman. Samples were collected monthly in autumn, winter and spring with a Surber net. Thirty two invertebrate taxa were recorded, most species are widely distributed, but few species with

very restricted distribution were also captured. Diptera followed by Pulmonata, Coleoptera and Odonata were the most represented taxa, Trichoptera and Heteroptera were a significant component only in one station (the Fezeh), where the lowest mean water temperature (23°C) was recorded. In the dry months from May to October, aquatic macroinvertebrates were completely absent. In order to summarise the community response some biotic indices were calculated. The highest diversity was observed in the Fezeh station. A seasonal gradient was also observed, with the highest diversity values in January, April, and December. The low faunal diversity was attributed to the high air and water temperature and the hydrological regime instability. A between station and a between month coinertia analysis was carried out, to analyse the response to spatial and seasonal factors. The first coinertia axis was correlated with altitude and substrate composition, while the second axis was correlated with air and water temperature. The present research emphasizes the urgency for preserving the less disturbed wadis in arid zones, because, despite their species poorness, their uniqueness in faunal composition requires special attention. The presence of few endemic species with very restricted distribution highlights the topicality and the value in investigating these areas, allowing the increase of our knowledge on biodiversity, ecology and biogeography about the benthic macroinvertebrates living in these extreme habitats." (Authors) The list of Odonata comprises of *Anax imperator*, *A. parthenope*, *A. ephippiger*, *Boyeria irene*, *Paragomphus genei*, *Orthetrum sabina*, *Sympetrum fonscolombii*, *Trithemis kirbyi*, and *Macromia splendens*. *B. irene* and *M. splendens* have definitely been misidentified.] Address: Rossaro, B., DeFENS, Dipartimento di Scienze per gli Alimenti, la Nutrizione e l'Ambiente, Università di Milano, Italy. E-mail: bruno.rossaro@unimi.it

14122. Brookshire, B. (2014): Comparison of Odonata populations in natural and constructed emergent wetlands in the Bluegrass region of Kentucky. Poster presentation, Scholarship week. Eastern Kentucky University, April, 14-18 2014: 1 p. (in English) ["Wetlands provide valuable hydrological functions and provide valuable niches for many small species of animals, including dragonflies (Biebighauser 2011). Without wetlands serving as reproductive habitat the dragonfly population would decrease exponentially. Research has shown that in the past forty years Kentucky has lost up to 80% of its own natural wetlands (Brown & Richter 2012). Wetlands provide: •Niches for small mammals, insects, amphibians and birds •Hydrology and flood prevention for surrounding areas •Habitat and resting areas for Migratory Waterfowl. Odonates could be important to discovering many of the variations between natural and artificial wetlands. Dragonflies and Damselflies are sensitive to environmental conditions, therefore they can act as biological indicators. My objective in this research is to measure the Odonata populations at various natural and artificial emergent wetlands and to compare these populations to

biotic and abiotic variables such as hydrology, vegetation types and wetland condition. I believe that if the wetlands being studied prove to be healthy then the dragonfly and damselfly populations at the individual wetlands will be high in species richness and diversity, while the wetlands that are less healthy will have a low species richness and diversity." (Author) For details see: <http://encompass-eku.edu/context/swps/article/1026/type/native/viewcontent>] Address: Brookshire, Brittany, Department of Biological Sciences, Eastern Kentucky University, 521 Lancaster Ave, Richmond, KY 40475, USA

14123. Brown, C. A.; Anang, Y.; Okorie P. N. (2014): Role of the construction industry In promoting mosquito breeding in and around the Accra metropolis, Ghana. *International journal of scientific & technology research* 3(7): 94-100. (in English) ["A wide range of water-holding containers are exploited by mosquito vector as sites for oviposition of eggs and larvae development. The study was aimed at determining the role of the construction industry in promoting mosquito breeding in and around the Accra metropolis, Ghana. A two-month larval survey was carried out at selected construction sites in and around the Accra metropolis. Routine daily larval sampling was done from mosquito breeding sites at the construction sites using the dipper method. Larvae samples were collected from sites such as small pools of water collection and concrete water containers. The larval population was estimated for each breeding site and the physical and chemical characteristics of the breeding sites were recorded. The presence of other aquatic fauna and flora were also noted and recorded. Water samples for a total of 30 different construction sites were sampled. Seventy percent (21/30) of the breeding sites sampled were positive for mosquito larvae. A total of 1475 mosquito larvae comprising of the three main genera: *Culex*, *Aedes* and *Anopheles* were collected. *Culex* species occurred in all the breeding sites and made up 54.1% of the overall sample collection, followed by *Aedes* species (28.1%) and *Anopheles* species (17.8%). A number of other fauna and flora, non-target organisms, were observed both at the sites and in the collected samples. These included Odonata nymphs, Notonectidae, water snail (*Bulinus* species), tadpoles and algae. The results of this study indicate that residential development sites should be strongly considered for inclusion in the local mosquito surveillance and control programs in order to reduce the public health risk related to the construction industry." (Authors).] Address: Brown, C.A., Dept of Medical Lab. Sciences, School of Allied Health Sciences, P. O. Box KB 143, Accra, Ghana. E-mail: cabrown@chs.edu.gh

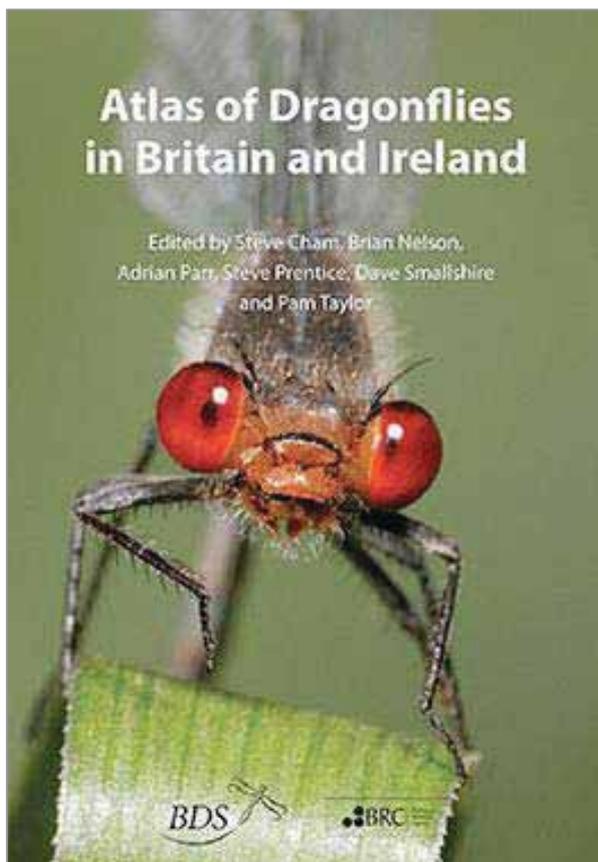
14124. Brule, S.; Touroult, J., Poirier, E.; Dalens, P.-H. (2014): Etude entomologique 2010-2012 – Montagne Pelée (Saül) / Rapport SEAG. Rapport de la Société entomologique Antilles-Guyane (Société entomologique Antilles-Guyane, Parc Amazonien de Guyane): 144 pp.+ appendices. (in French) [The total of 38 odonate species includes two *Argia* nov. spec. (Garrison in prep.) and two

additions to the odonate fauna of French Guiana: *Macromis imitans imitans* and *Epipleoneura fernandezii*. The list of taxa is documented on pages 223-224 of the study.] Address: Société entomologique Antilles-Guyane, 18 Lotissement Amaryllis, 97354 Remire-Montjoly, France. E-mail: stephanebrule973@hotmail.fr

14125. Buczyński, P.; Shapoval, A.P.; Buczyńska, E. (2014): *Pantala flavescens* at the coast of the Baltic Sea (Odonata: Libellulidae). *Odonatologica* 43(1/2): 3-11. (in English) ["A male *P. flavescens* was recorded in a bird net trap on the Courish Spit, Kaliningrad Oblast, western Russia (55°05'N, 20°44'E) on 29-v-2013. This is the northernmost record of this species in Europe and in the whole northern hemisphere. The record is discussed against the background of European records of *P. flavescens*." (Authors)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

14126. Calvao, L.B.; De Marco Júnior, P.; Batista, J.D. (2014): Odonata (Insecta) from Nova Xavantina, Mato Grosso, Central Brazil: Information on species distribution and new records. *Check List* 10(2): 299-307. (in English) ["Currently about 800 odonate species are known to Brazil, but only 29% of the Brazil territory have been surveyed for this group. Here we provide a species list with information on distribution and new records for Odonata in nine streams in Nova Xavantina, Mato Grosso, Central Brazil. We used the scan procedure with a fixed area for three days in each stream between 10:00 and 14:00h. We collected 1038 dragonfly specimens belonging to 67 species, which represents 8% of the known Brazil odonate fauna. Additionally, five new records for the study area are presented." (Authors) *Gynothemis pumila*, *Acanthagrion abunae*, *Oxyagrion sulmatogrossense*, *Telebasis gigantea*, and *Tuberculosbasis inversa*.] Address: Calvão, Lenize, Universidade do Estado de Mato Grosso, Programa de Pós Graduação em Ecologia e Conservação. Cx. P. 08. CEP 78690-000. Nova Xavantina, MT, Brazil. E-mail: lenizecalvao@hotmail.com

Cham, S.; Nelson, B.; Parr, A.; Prentice, S.; Smallshire, D.; Taylor, P. (2014): Atlas of Dragonflies in Britain and Ireland. Field Studies Council for the Biological Records Centre, Centre for Ecology & Hydrology (eds.), with the British Dragonfly Society. 280 pp. (in English) [Produced in partnership with the British Dragonfly Society and DragonflyIreland, this full colour hardback book (approx. 290 pages) represents five years work by volunteers and partner organisations to map the distribution of damselflies and dragonflies throughout Britain and Ireland. As well as summarising the distribution of over 1 million dragonfly records, the Atlas includes: •Species accounts, including maps, for all 56 resident and immigrant species recorded in Britain and Ireland. •Four pages devoted to each resident species. •Sections on habitats, conservation, distribution changes and phenology. •High quality colour photographs of all species and their habitats.



14127. Charest, P.; Savard, M. (2014): Découverte de l'épithète de Brunelle au Québec, une libellule secrète. *Le Naturaliste canadien* 138(2): 16-25. (in French, with English summary) ["The collection of dragonfly exuviae along the Batiscan and Trenche Rivers in the Mauricie region of Québec in 2012 and 2013, lead to the first record of *Neurocordulia michaeli* for the province. This species, which was recently described by Brunelle (2000), has a more northern distribution than *Neurocordulia yamasakanensis*. Both these shadowdragons are more frequent in the temperate zone than the Québec records suggest. The lack of observations is due largely to the secretive and crepuscular nature of the adults, which means that they are less likely to be encountered during standard dragonfly surveys. The results of this study show that the larvae of both species can co-occur along the same stretches of river in the Laurentian foothills. An illustrated species identification key based on the characteristics of their exuviae is provided." (Authors)] Address: Charest, Pierrette. chapie1@globetrotter.net

14128. Chiavacci, S.J.; Bednarz, J.C.; Benson, T.J. (2014): Does flooding influence the types and proportions of prey delivered to nestling Mississippi Kites? *The Condor* 116(2): 215-225. (in English, with Spanish summary) ["Mississippi Kites (*Ictinia mississippiensis*) nesting in the Mississippi Alluvial Valley, USA, have consistently exhibited poor reproductive success, reduced average clutch

sizes, and evidence of food stress during brood-rearing, raising concerns about population viability. Unlike populations elsewhere, kites nesting in the bottomland forests of this region face dynamic, anthropogenically altered hydrologic conditions that may be affecting the availability of important prey. Therefore, we quantified nestling diets and examined factors thought to be directly influencing the types and proportions of prey delivered to kite nestlings. Specifically, we sought to identify variables affecting the delivery of annual cicadas, the dominant prey item fed to kite chicks in numerous systems, as cicada emergence from subterranean burrows is known to be delayed by flooding. Using time-lapse video, we documented nestling diets and evaluated predictors of diet variability in east-central Arkansas, USA. We found that the delivery of cicadas increased with day of year, and was greatest during the driest of 4 study years. In contrast, the delivery of dragonflies, the numerically dominant prey item, declined with day of year, but increased with water level, and was lowest during the driest year. Although water level was not a strong predictor of the delivery of cicadas, interannual variation in the pattern of cicada deliveries suggests that flooding reduced the availability of this prey item to kites. Also, despite diverse nestling diets, the provisioning of dragonflies and a variety of other arthropods suggests that kites responded functionally to an absence of cicadas. The temporal patterns in prey deliveries that we detected imply that kite nestling diets in bottomland forests of the Mississippi Alluvial Valley may be influenced by water-level impacts on arthropod phenology and abundance. ... Nestling diet data recorded in 2004 and 2005 included 7 nests and 2,849 prey deliveries, the majority of which were cicadas (52.1%) and dragonflies (26.1%)." (Authors)] Address: Chiavacci, S.J. Department of Biological Sciences, Arkansas State University, Jonesboro, Arkansas, USA. E-mail: schiavacci@gmail.com

14129. Christudhas, A.; Mathai, M.T. (2014): Genetic variation of a migratory dragonfly characterized with random DNA markers. *Journal of Entomology and Zoology Studies* 2(2): 182-184. (in English) ["Polymorphism among individuals of dragonflies belonging to same genus and species was studied using molecular technique RAPD-PCR analysis. The RAPD banding pattern reflected the genetic diversity among *Pantala flavescens*. Reproducible and distinct polymorphic bands ranging approximately 200 bp to 2500 bp were generated with 5 RAPD primers. Operon c series primers OPC 7 and OPC 10 yielded unique bands of 1000 bp, 650 bp and 1100 bp which can be utilized for developing molecular markers for species identification specific for locations. The scoring pattern generated was utilized to construct the distance matrix using POPGENE 32 v1.31." (Authors)] Address: Christudhas, A. Department of Zoology, Madras Christian College, Tambaram-600059, Chennai, India

14130. Cigognini, R.; Gallesi, M.M.; Mobili, S.; Hardersen, S.; Sacchi, R. (2014): Does character displacement

demonstrate density dependent expression in females? A test on the wing shape of two species of European damselflies. *Evol. Ecol.* 28: 941-956. (in English) ["Character displacement (CD) is the evolutionary process which leads to the divergence in trait expression of closely related species in regions where species co-occur, compared to allopatric populations. In Europe CD has been investigated in males of *Calopteryx splendens* and *C. virgo* and has been related to species recognition. If species recognition is relevant for males, also females should benefit from CD. The most obvious differences between females of these two species are wing profile and colour. We sampled females from allopatric and from sympatric populations with different relative abundances of these species. Wing shape and pigmentation were evaluated for each damselfly. CD was found in wing profile but not in wing transparency. The relative abundance of species significantly affected CD, but with a different pattern in each species. The prediction that wing shape become more different from the allopatric state when the species was relatively rare, but more similar to the allopatric state when the species was common was evident only for *C. splendens*. Wing shape changes might increase differences in flying patterns making males more effective to discriminate between heterospecific females. So, CD we observed may be the result of a selection directed to reduce interspecific reproductive interference." (Authors)] Address: Sacchi, R., Dipartimento di Scienze della Terra e dell'Ambiente, Università degli Studi di Pavia, Via Taramelli 24, 27100 Pavia, Italy. E-mail: roberto.sacchi@unipv.it

14131. Clausnitzer, V. (2014): Report of the IUCN SSC Specialist Groups, Task Forces, Red List Authorities: Dragonfly Specialist Group. *Species 55*: 51-52. (in English) [Verbatim: Our aim is to foster the conservation of dragonflies (Odonata) and their habitats globally; by assessing their threat status according to The IUCN Red List; education of non-specialists (field guides, workshops, publications etc.) and using dragonflies as a flagship species for monitoring water quality. The group currently consists of 44 members from 28 countries. Currently, 2,752 dragonflies are listed on The IUCN Red List, which is nearly half of all known species. In 2013, over 150 new or updated dragonfly assessments were published, while 21 species are flagged as 'out-dated'. Most Australian and North American dragonflies are not on The IUCN Red List, but a comprehensive database and all information for assessing the global threat status is available. We are currently searching for ways to transfer the information without too much doubling up of work. A meeting of the Dragonfly Specialist Group was held in June in parallel with the World Wide Dragonfly Symposium in Germany. The focus was on South America, where we lack assessments and information; hence a sub-group has formed, chaired by Joachim Hoffmann, which is involved in regional assessments. A meeting with a focus on African odonatology was held in November 2013 in Stellenbosch, South Africa, where we discussed all nec-

essary changes, new assessments and updates for the African dragonflies (to be entered in the SIS in 2014). In February 2013, a project on *Amanipodagrion gilliesi* assessed as Critically Endangered on The IUCN Red List, was started in collaboration with the Tanzanian Forest Conservation Group and the Amani Nature Reserve, and funded by the Mohamed bin Zayed Species Conservation Fund. The project aims to raise awareness of the rarity of the dragonfly and on the connection of biodiversity, environmental quality and human well being. Another project funded by the Mohamed bin Zayed Species Conservation Fund, focused on *Xanthocnemis sobrina*, which is endemic to the New Zealand North Island. It is the only representative of its group in the country, assessed as Data Deficient on The IUCN Red List. The project aims to clarify some uncertainties around the taxonomy of the species and to assess its current conservation status. We are aiming to have all dragonflies on The IUCN Red List by 2016. This requires a lot of work, and involves many meetings (especially with regards to the assessment of South America's dragonflies), this will become difficult without external funding. The Powder Blue Damselfly (*Arabicnemis caerulea*) was featured as an Amazing Species on The IUCN Red List website, and *Amanipodagrion gilliesi* will be featured in 'No More Endlings: saving species one story at a time' by Allison Hegan. In South Africa, the recently established Dragonfly Biotic Index (DBI) is becoming popular for environmental impact assessments and habitat monitoring. (Viola Clausnitzer, Chair, Dragonfly Specialist Group)] Address: Clausnitzer, Viola, Heinzstr. 3, 02826 Görlitz, Germany. E-mail: violacl@t-online.de

14132. Coccia, C.; Boyero, L.; Green, A.J. (2014): Can differential predation of native and alien corixids explain the success of *Trichocorixa verticalis verticalis* (Hemiptera, Corixidae) in the Iberian Peninsula? *Hydrobiologia* 734: 115-123. (in English) ["Invasive species represent an increasing fraction of aquatic biota. However, studies on the role and consequences of facilitative interactions among aliens remain scarce. Here, we investigated whether the spread of the alien water boatman *Trichocorixa verticalis verticalis* in the Iberian Peninsula is related to reduced mortality from predation compared with native Corixidae, especially since *Trichocorixa* co-occurs with the invasive fishes *Gambusia holbrooki* and *Fundulus heteroclitus*. All three invaders have a common native range in North America and are widespread in and around Doñana in SW Spain. Using laboratory experiments, we compared the predation rates by the two exotic fish and native Odonata larvae (*Orthetrum*, *Sympetrum*, *Crocothemis*, *Aeshna*) on *Trichocorixa* and the native *Sigara lateralis*. We found no evidence to suggest that *Trichocorixa* suffers lower predation rates. However, when both corixids were mixed together, predation of *Trichocorixa* by Odonata larvae was higher. Odonata larvae were size-limited predators and the proportion of corixids ingested was positively correlated with mask length. Since *Trichocorixa* is smaller than its native com-

petitors, this may explain their higher susceptibility to predation by Odonata. This may be one of various factors explaining why *Trichocorixa* is particularly dominant in saline habitats where Odonata are rare, while it is still scarce in fresh waters." (Authors)] Address: Coccia, Cristina, Wetland Ecology Dept, Estación Biológica de Doñana-CSIC, Seville, Spain. E-mail: coccia@ebd.csic.es

14133. Cockburn, J.J.; Khumalo-Seegelken, B.; Villet, M.H. (2014): IziNambuzane: IsiZulu names for insects. *S. Afr. J. Sci.* 110(9/10), Art. #2013-0292: 13 pp. (in English) ["We provide a tool for communicating about insects in isiZulu to facilitate research and knowledge sharing in the fields of indigenous knowledge, cultural entomology, environmental education and community extension involving isiZulu speakers. A total of 213 different names for 64 insect specimens were encountered among a sample of 67 respondents in 11 communities distributed across the province of KwaZulu-Natal, South Africa. This list includes 93 names that can be considered core isiZulu vocabulary and which are widely used to identify insects that are agriculturally, medically, domestically, culturally or ecologically common or significant. Substantial variation was found regarding the names for particular insects, especially between regions, suggesting dialectal differences between isiZulu speakers. Grammatical and social variation in names was also recorded. This study highlights interdisciplinary teamwork in the field of indigenous knowledge research and the influences affecting the standardisation of South African languages for technical and scientific work. ... In areas north and northeast of the Thukela River and northeast of the Phongolo River, isiZulu speakers call dragonflies (Odonata) *ibhebhamanzi* or *amabhebhamanzi*, but these terms were not reported to the interviewers, apparently because they are considered impolite. ... For example, dragonflies (Odonata: Anisoptera) are most commonly indicated by the stem *-jekamanzi*, but the prefix (and therefore the noun class) of this varies depending on the geographical region in focus. ... It appears that isiZulu names do not go beyond the taxonomic resolution of family-level identification, and are more easily comparable to names accorded the Linnean taxonomic rank of 'order'. For example, *ujekamanzi* corresponds to the order Odonata, *ibhungane / ibhungezi / ibhungayezi* to the Coleoptera (beetles *sensu stricto*), depending on which region the speaker is in, and *umnyovu / umuvi* to the Hymenoptera (wasps, but excluding ants and bees). ... Crane flies, robber flies and antlions were all referred to as *ujekamanzi*, although the reference to water (*-manzi*) in that name clearly aligns it with the biology of the dragonflies and damselflies that it also denotes. However, all of these specimens were large, with elongated abdomens and clear wings, so *ujekamanzi* may be understood to designate a physical form rather than a specific taxon, in analogy to the terms 'pest' and 'bug' and 'germ' in English folk taxonomy, *inunu* in isiZulu or *gogga* in Afrikaans." (Authors)] Address: Villet, M.H., Dept of Zoology and Entomology, Rhodes University, Grahamstown, South Africa. E-mail: M.Villet@ru.ac.za

14134. Cooper, J.A. (2014): A catalogue of the type, figured and cited specimens in the geological collections of the Booth Museum of Natural History, Brighton. <http://www.brighton-hove-rpml.org.uk/SiteCollectionDocuments/Published%20Type%20CatalogueupdatedApril2014.pdf>: 169 pp. (in English) [Odonata are treated on pages 63-70. For the complete paper see: http://www.brighton-hove-rpml.org.uk/SiteCollectionDocuments/Published%20Type%20Catalogue_updatedApril2014.pdf] Address: Cooper, J.A., Booth Museum of Natural History Royal Pavilion & Museums, Brighton & Hove, UK

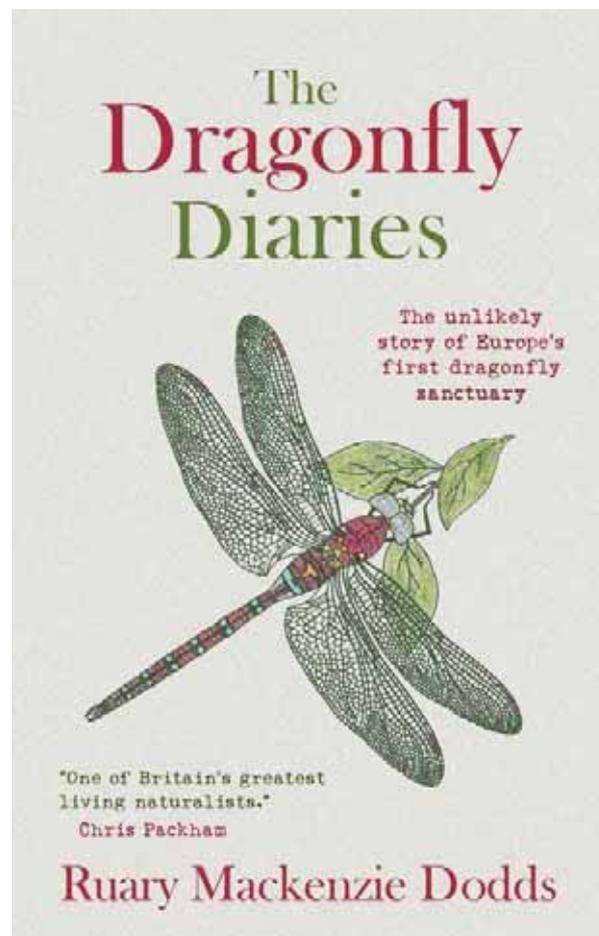
14135. Couto-Mendoza, M.T.; Servia, M.J.; Cobo, F. (2014): Regeneration interferes with fluctuating asymmetry analysis in odonate larvae. *Limnetica* 33(1): 107-120. (in English, with Spanish summary) ["When an odonate larva loses a leg, it has the ability to regenerate it in the next moult. In this study, our goal was to test whether this ability affects fluctuating asymmetry analyses (FA) using *Calopteryx virgo* larvae. We observed that asymmetries in the femur and tibia caused by regeneration in field samples are not always detected as outliers, and therefore they are not automatically eliminated by statistical tests. However, they increased the value of the composite index of asymmetry by approximately 30 % with respect to the sample where all of the cases of regeneration were eliminated. Next, we wanted to test whether costs associated with leg regeneration had an effect on the development of other structures by increasing the level of fluctuating asymmetry in this species. The results confirmed that the value of the composite index of asymmetry calculated using antennal and mask measures was significantly higher for individuals that had a regenerating leg. Thus, prior knowledge of the biology and the physiology of the traits of the species under study should be an essential topic in fluctuating asymmetry studies to guarantee reliable results, as regeneration ability clearly interferes in fluctuating asymmetry analysis in odonate larvae." (Authors)] Address: Couto-Mendoza, Maria, Depto de Zooloxía e Antropoloxía Física, Universidade de Santiago de Compostela. Campus Sur s/n, 15782 Santiago de Compostela, Spain. E-mail: mteresa.couto@usc.es

14136. Dawn, P. (2014): Taxonomic study of Odonata [Insecta] in Kolkata and surroundings, West Bengal, India. *Journal of Entomology and Zoology Studies* 2(3): 147-152. (in English) ["The present study was conducted to study species richness of Odonata (Insecta) in Kolkata and Howrah, West Bengal. Results document eighty Odonate species including four new records viz., *Rhodthemis rufa*, *Trithemis festiva*, *Agriocnemis femina* and *Lestes malabarica*. One species under genus *Agriocnemis* does not fit the records and is awaiting description. The paper also discusses habitat wise species distribution of Odonata within the study area." (Author)] Address: Dawn, P., Zoological Survey of India, M- Block, New Alipore, Kolkata – 700 053, West Bengal, India

14137. Dinh Van, K.; Janssens, L.; Debecker, S.; Stoks, R. (2014): Temperature and latitude-specific individual growth rates shape the vulnerability of damselfly larvae to a widespread pesticide. *Journal of Applied Ecology* 51(4): 919-928. (in English) ["(1) Freshwater ecosystems are especially vulnerable to climate change and pollution. One key challenge for aquatic toxicology is to determine and manage the combined effects of temperature increase and contaminants across species' ranges. (2) We tested how thermal adaptation and life-history evolution along a natural temperature gradient influence the vulnerability of an aquatic insect to a pesticide under global warming. We applied a space-for-time substitution approach to study the effect of warming on the vulnerability of *Ischnura elegans* damselfly larvae to the pesticide chlorpyrifos in a common garden warming experiment (20 and 24°C) with replicated populations from three latitudes spanning >1500 km in Europe. (3) Chlorpyrifos was more toxic to damselfly larvae at the higher temperature: mortality only occurred at 24°C and the reductions in growth rate were stronger at 24°C. This could partly be explained by parallel reductions in food intake but not by the activities of two widespread enzymatic biomarkers, glutathione S-transferase (GST) and acetylcholinesterase (AChE). (4) There was some evidence that the increased toxicity of the high chlorpyrifos concentration at 24°C was stronger in terms of growth reduction in the faster-growing larvae from the low-latitude populations. This is consistent with energy allocation trade-offs between growth rate and pesticide tolerance, but suggests that local thermal adaptation does not play a role in coping with pesticide stress. (5) Synthesis and applications. Damselfly larvae from populations in lower latitudes were more vulnerable to a common pesticide at higher temperatures and pesticide concentrations, whereas evidence for the influence of local thermal adaptation on the vulnerability of larvae was weak. These results emphasize the need for spatially explicit bioassessment and conservation tools. Management practices aimed at mitigating pesticide run-off into aquatic ecosystems are particularly important in agricultural areas at low latitudes." (Authors)] Address: Dinh Van, K., Lab. of Aquatic Ecology, Evolution & Conservation, Univ. of Leuven, Leuven, Belgium. E-mail: Khuong.DinhVan@bio.kuleuven.be

14138. Dodds, R.M. (2014): *The Dragonfly Diaries: The unlikely story of Europe's first dragonfly sanctuary*. Saraband. ISBN-10: 1908643552: 304 pp. (in English) ["Britain is home to some 40 species of dragonfly, and public interest in their plight is high right now thanks to their primeval beauty, aerobic grace and a growing realisation of their importance for water ecosystems. In *The Dragonfly Diaries*, Dodds shares his quirky fascination for these remarkable creatures over the 25 years he has been photographing and working with them. Combining fascinating description of the lives of dragonflies, with a diary chronicling the ups and downs of establishing Britain's first public dragonfly sanctuary, *The Dragonfly Diaries* is a must for nature buffs and for anyone who wants

to be inspired by the resolve and dedication of a man on a mission to save these critically important insects." (Publisher)] Address: not stated



14139. Dolný, A.; Harabiš, F.; Bárta, D.; Lhota, S.; Drozd, P. (2014): Aquatic insects indicate terrestrial habitat degradation: changes in taxonomical structure and functional diversity of dragonflies in tropical rainforest of East Kalimantan. *Tropical Zoology* 25(3): 141-157. (in English) ["Odonata are commonly used as ecological indicators of freshwater ecosystems. Despite earlier studies suggesting that adult odonates may be good indicators for complex changes in a landscape, the utility of odonates as suitable indicators to indicate health of non-aquatic (forest) habitats remains poorly understood. This study analyses the adult dragonfly assemblage pattern against spatial and temporal disturbance characteristics in Indonesia's Sungai Wain Protection Forest. The core of this reserve comprises one of the few remaining fragments of primary rain forest along the East Kalimantan coast, whereas the rest of the reserve is covered by secondary forest, scrub, grassland, and farmland. Adult dragonfly assemblages at individual sampling sites were analysed in relation to (1) their intensity, (2) frequency of human-caused disturbances, and (3) the time since the last such disturbance, while controlling random variables (type of aquatic and terrestrial habitat) were removed. This study tests the effect of these factors on (1) species richness, (2) proportion of Zygoptera, (3) proportion of

forest specialists, and (4) proportion of Borneo's endemics. The human-induced disturbances in the rain forest resulted in pronounced changes in the taxonomical composition and functional diversity of the odonate fauna. Results reported here demonstrate that gradual changes in the odonate assemblages correspond to the degree of anthropogenic influences on forest environments. Adult odonates comprise an appropriately sensitive and versatile indicator group for identifying changes in terrestrial forest environments as well as in freshwater habitats." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

14140. Dolný, A.; Harabiš, F.; Mizicova, H. (2014): Home range, movement, and distribution patterns of the threatened dragonfly *Sympetrum depressiusculum* (Odonata: Libellulidae): A thousand times greater territory to protect? *PLoS ONE* 9(7): e100408. doi:10.1371/journal.pone.0100408: 10 pp. (in English) ["Dragonflies are good indicators of environmental health and biodiversity. Most studies addressing dragonfly ecology have focused on the importance of aquatic habitats, while the value of surrounding terrestrial habitats has often been overlooked. However, species associated with temporary aquatic habitats must persist in terrestrial environments for long periods. Little is known about the importance of terrestrial habitat patches for dragonflies, or about other factors that initiate or influence dispersal behaviour. The aim of this study was to reveal the relationship between population dynamics of the threatened dragonfly species *Sympetrum depressiusculum* at its natal site and its dispersal behaviour or routine movements within its terrestrial home range. We used a mark–release–recapture method (marking 2,881 adults) and exuviae collection with the Jolly–Seber model and generalized linear models to analyse seasonal and spatial patterns of routine movement in a heterogeneous Central European landscape. Our results show that utilisation of terrestrial habitat patches by adult dragonflies is not random and may be relatively long term (approximately 3 mo). Adult dragonflies were present only in areas with dense vegetation that provided sufficient resources; the insects were absent from active agricultural patches ($p = 0.019$). These findings demonstrate that even a species tightly linked to its natal site utilises an area that is several orders of magnitude larger than the natal site. Therefore, negative trends in the occurrence of various dragonfly species may be associated not only with disturbances to their aquatic habitats, but also with changes in the surrounding terrestrial landscape." (Authors)] Address: Dolný, A., Dept of Biology and Ecology/Institute of Environmental Technologies, Faculty of Science, University of Ostrava, Ostrava, Czech Republic. E-mail: ales.dolny@osu.cz

14141. Dorji, T. (2014): New records of dragonflies (Odonata) from Toebirongchhu sub-watershed in Punakha District, Western Bhutan. *Journal of Entomology and*

Zoology Studies 2(4): 51-57. (in English) ["Opportunistic survey of dragonfly diversity and distribution was done in Toebirongchhu sub-watershed within Punakha Dzongkhag, Western Bhutan to give updated list of species within the study area and the Dzongkhag, and update the species list for Bhutan. Total of 24 species belonging to 19 genera and 11 families were recorded of which 22 species are new record for the study area, 20 species for the Punakha Dzongkhag and 1 for Bhutan. The updated list of species for Punakha Dzongkhag is 28 species and for Bhutan is 85 species. Important records are *Anisogomphus caudalis* a Data Deficient species and a new record for Bhutan, *Aristocypha* (*Rhinocypha*) *cuneata*, another Data Deficient species, *Epiophlebia laidlawi* a Near Threatened species and *Anisopleura bella* a recently described species currently recorded only from Bhutan." (Author)] Address: Dorji, T., Department of Forestry, College of Natural Resources, Royal University of Bhutan, Lobesa, Bhutan

14142. Dow, R.A. (2014): *Onychogomphus marijanmatoki*, a new species from Sarawak, Borneo (Odonata: Anisoptera: Gomphidae). *Zootaxa* 3795(2): 181-186. (in English) ["*O. marijanmatoki* is described from a male from Gunung Mulu National Park, Miri Division, Sarawak, Malaysian Borneo. One of only two onychogomphine species known from Borneo, it differs from all others of the group in characters of the genital ligula and terminal appendages." (Author)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

14143. Dow, R.A. (2014): *Amphicnemis triplex* sp. nov. from Central Kalimantan, Indonesia (Odonata: Coenagrionidae). *Odonatologica* 43(1/2): 67-77. (in English) ["*Amphicnemis triplex* sp. nov. is described from locations in Central Kalimantan in Indonesian Borneo. Holotype male, Indonesia, Kalimantan, Kalimantan Tengah, between Buntok and Ampah, black water stream in shallow peat over sand, 29-vi-2012; to be deposited in RMNH. The related species *A. erminea* is discussed." (Author)] Address: Dow, R.A., Naturalis Biodiversity Centre, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

14144. Dow, R.A.; Zia, A.; Naeen, M.; Rafi, M.A. (2014): *Calicnemia fortis* sp. nov. from Pakistan (Odonata: Zygoptera: Platycnemididae). *Zootaxa* 3869(3): 338-342. (in English) ["*Calicnemia fortis* sp. nov. is described from Azad Jammu and Kashmir in Pakistan and compared with other group 2 species of *Calicnemia*." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

14145. Dreyer, J.; Gratton, C. (2014): Habitat linkages in conservation biological control: lessons from the land-water interface. *Biological Control* 75: 68-76. (in English) ["Highlights: • Aquatic-terrestrial and crop-noncrop linkages are conceptually similar. • Exchanges in agroeco-

systems are governed by natural enemy production and dispersal. • Donor habitats on the landscape determine the coverage of dispersal. • Land-cover/use and climate change will impact habitats, natural enemy exchange. Terrestrial landscapes, including those with embedded agroecosystems, are a mosaic of cover types varying in size. Creating or maintaining habitats that support natural enemy populations to combat agricultural pests is the primary method of conservation biological control. Non-crop habitats can be managed in an attempt to maximize the exchange of natural enemies with adjacent agroecosystems with the expectation that they will suppress damaging pest outbreaks. Despite this goal, current habitat management relying on natural enemy spillover into crops has been unreliably effective at reducing pest abundance or increasing crop yield. Furthermore, the expansion and intensification of agriculture and changes in global climate patterns threaten the foundations of conservation biological control in future agroecosystems. However, the aquatic-terrestrial interface offers a natural boundary similar to the one between agroecosystems and their neighbouring non-crop habitats that can provide useful insights to the challenges facing growers. Research of the exchanges between water and land suggests general biological and physical processes that govern the movement of organisms between disparate habitats. We propose that like aquatic insects moving from water to land, natural enemy dispersal from non-crop donor habitats into recipient crop patches on the landscape is a function of (1) the production of natural enemies in the source habitat which establishes the abundance of organisms that can disperse, (2) how and why mobile natural enemies disperse themselves into neighbouring recipient habitats, and (3) the configuration of donor and recipient habitats on the landscape. We suggest that conservation biological control practitioners can focus on these main components of natural enemy production and dispersal to predict the effectiveness of conservation biological control measures and guide their adaptation to future global change." (Authors) The publication includes several references to Odonata.] Address: Dreyer, J., Dept Ent., Univ. of Wisconsin-Madison 444 Russell Laboratories 1630 Linden Drive Madison, WI 53705, USA. E-mail: jamin.dreyer@gmail.com

14146. Egea-Serrano, A.; Hangartner, S.; Laurila, A.; Räsänen, K. (2014): Multifarious selection through environmental change: acidity and predator-mediated adaptive divergence in the moor frog (*Rana arvalis*). *Proc. R. Soc. B* 2014 281, 20133266, published 19 February 2014: 10 pp. (in English) ["Environmental change can simultaneously cause abiotic stress and alter biological communities, yet adaptation of natural populations to co-changing environmental factors is poorly understood. We studied adaptation to acid and predator stress in six moor frog populations along an acidification gradient, where abundance of invertebrate predators increases with increasing acidity of *R. arvalis* breeding ponds. First, we quantified divergence among the populations in anti-

predator traits (behaviour and morphology) at different rearing conditions in the laboratory (factorial combinations of acid or neutral pH and the presence or the absence of a caged predator: *Aeshna* dragonfly larva)). Second, we evaluated relative fitness (survival) of the populations by exposing tadpoles from the different rearing conditions to predation by free-ranging dragonfly larvae. We found that morphological defences (relative tail depth) as well as survival of tadpoles under predation increased with increasing pond acidity (under most experimental conditions). Tail depth and larval size mediated survival differences among populations, but the contribution of trait divergence to survival was strongly dependent on prior rearing conditions. Our results indicate that *R. arvalis* populations are adapted to the elevated predator pressure in acidified ponds and emphasize the importance of multifarious selection via both direct (here: pH) and indirect (here: predators) environmental changes." (Authors)] Address: Räsänen, Katja, Department of Genetics, University of Melbourne, Parkville, Victoria 3010, Australia. E-mail: katja.rasanen@eawag.ch

14147. Ellenrieder, N. von (2014): A synopsis of the Neotropical genus *Nephepeltia* (Odonata: Libellulidae), including description of a new species, synonymies, and a key to males. *Zootaxa* 3796(1): 121-146. (in English, with Spanish summary) ["*Nephepeltia flavipennis* (Holotype: Brazil, Rondônia, Governador Jorge Teixeira Municipality, Fazenda Rancho Grande, 10°31'48" S, 62°48'0"W, 165 m, J. Wiseman leg., in MNRJ) is described from the Amazon region of W Brazil, Ecuador, and N Peru. A lectotype is designated for *N. aequisetis* Calvert, 1909. *Nephepeltia chalconota* is considered to be a junior subjective synonym of *N. flavifrons* Karsch, 1889, and the subdivision of *N. phryne* into two subspecies is found to be unjustifiable. Diagnoses, illustrations, a key to males, and an updated map for all known members of the genus are provided." (Author)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

14148. Emeljanov, A.F. (2014): The evolutionary role and fate of the primary ovipositor in insects. *Entomological Review* 94(3): 367-396. (in English) ["The development of a piercing-sawing ovipositor for introducing eggs into living plant tissues has made its owners independent of the soil characteristics and increased egg protection. This was the most important prerequisite for the appearance of wings and flight which provided the winged insects with tremendous opportunities for finding new niches and led to unparalleled adaptive radiation. The ovipositor has passed several stages of improvement and differentiation. The four principal types of the primary ovipositor are considered: those of Odonata, Diaphanopteroidea (only extinct forms), Cicadina (including Paraneoptera and Hymenoptera), and Orthoptera. A new hypothesis of the gonangulum homologies is put forward, interpreting it as half of sternite IX lateral of the midline

plus the paratergite of the same segment. The constructions of the valvae and different homologies of the third valvae in Polyneoptera and Eumetabola are discussed. The primary ovipositor has been repeatedly (i.e., in many lineages) reduced in the evolution of Pterygota. The main circumstances of these reductions are: (1) subterranean (fossorial) life in narrow cavities; (2) aquatic life of the larvae, mostly linked with submerged oviposition; (3) development and perfection of flight to which the heavy and protruding ovipositor was a hindrance. All the holometabolous insects except Hymenoptera lack the primary ovipositor." (Author)] Address: Emeljanov, A.F., Zoological Institute of the Russian Academy of Sciences, St. Petersburg, 199034 Russia. E-mail: hemipt@zin.ru

14149. Endersby, I. (2014): Additional distribution records for Victorian dragonflies (Insecta: Odonata). Final instalment. *Victorian Entomologist* 44(4): 80-84. (in English) [Australia; *Rhadinosticta simplex*; *Spinaeschna tripunctata*; *Tramea loewii*] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: Endersby@pacific.net.au

14150. Eyidozehi, K.; Narouyi, Y.; Mehraban, A.; Vazirimehr, M.R.; Rigi, K. (2014): Evaluation of aquatic insect fauna such as Heteroptera, Ephemeroptera, Diptera, Trichoptera, Coleoptera, Odonata and so on in east of Golestan province. *Journal of Biodiversity and Environmental Sciences* 5(1): 508-513. (in English) [In 2011 and 2012, several water bodies in cities of the Golestan province, Iran (Khan Bobin, Dalande, Ramiyan, Azadshahr, Nodehkhandoz, Gonbad, Kalale, Minodasht Galikash) were studied. The list of taxa - at family level - includes Libellulidae, Aeshnidae, and Gomphidae.] Address: Rigi, K., Dept of Agronomy, Islamic Azad University, Zahedan Branch, Zahedan, Iran. E-mail: krigi66@yahoo.com

14151. Fauziyah, S.; Alam, C.; Soesilohadi, R.C.H.; Retnoaji, B.; Alam, P. (2014): Morphological and mechanical characterisation of the hindwing nodus from the Libellulidae family of dragonfly (Indonesia). *Arthropod Structure & Development* 43(2): 415-422. (in English) ["Highlights: •We study functional morphology and structure of wing nodi from seven Indonesian Libellulidae species. •Nodal resilin morphology is species dependent. •Dorsal face resilin is inherently smaller than ventral face resilin. •Mechanical properties of resilin in nodus is related to its elongation shape factor. •We propose useful clues in advanced biomimetic jointing technology. In this communication, the morphologies and mechanical characteristics of nodi from the hindwings of seven Indonesian Libellulidae dragonfly species are identified. Geometrical analyses reveal that in all species, the shape of dorsal face resilin is relatively long and thin while ventral face resilin covers a greater surface area than dorsal face resilin, and is shaped like a hook. Finite element analyses reveal that the magnitude of strain energy may differ considerably between species, even though the locations of highest strain energy are usually the same.

Importantly, a correlation is found to exist between the mechanical forces that build up in the resilin, the face under investigation (dorsal or ventral) and the elongational shape factor of the resilin." (Authors)] Address: Alam, P., Laboratory of Paper Coating and Converting, Centre for Functional Materials, Abo Akademi University, Port-haninkatu 3, Turku 20500, Finland. E-mail: parvez.alam@abo.fi

14152. Favretto, M.A.; Orlandin, E.; dos Santos, E.; Piovesan, M. (2014): Insetos aquáticos em um lago artificial no sul do Brasil. *Biota Amazônia* 4(2): 113-116. (in Portuguese, with English summary) ["This study aimed to perform a survey of the aquatic insect in a artificial lake near to urban area at the municipality of Joaçaba, Santa Catarina State, Southern Brazil. Collections were performed in the morning in August, October, November and December, with entomological net. In total 300 specimens divided in five orders were collected. Odonata (n = 99 specimens) was the most abundant order, represented by Coenagrionidae, Lestidae and Aeshnidae. Followed by Hemiptera, represented by Notonectidae, Belostomatidae, Nepidae, Gerridae, Mesovellidae and Corixidae and the Ephemeroptera, with Baetidae. Regarding the functional trophic groups, 85% of the species were predators, 10% were shredders/collectors and 5% were collectors." (Authors)] Address: Orlandin, E., Academico do Curso de Ciências Biológicas, Universidade do Oeste de Santa Catarina, Brasil. E-mail: orlandin@unioeste.com

14153. Ferreira, S.; Velo-Antón, G.; Brochard, C.; Vieira, C.; Alves, P.C.; Thompson, D.J.; Watts, P.C.; Brito, J.C. (2014): A Critically Endangered new dragonfly species from Morocco: *Onychogomphus boudoti* sp. nov. (Odonata: Gomphidae). *Zootaxa* 3856(3): 349-365. (in English, with French summary) ["Both sexes of *Onychogomphus boudoti* sp. nov. Ferreira (Odonata: Anisoptera: Gomphidae) and exuviae are described and illustrated from a single locality in Morocco. This newly discovered species differs markedly from other *Onychogomphus* species by the morphology of the male epiproct and the female vulvar scale. It is genetically distinct in the mitochondrial DNA and the nuclear PRMT gene from all other Western Palaearctic *Onychogomphus* species. The known distribution of the new species is confined to a small stream with unusual habitat characteristics in the vicinity of Khenifra, in the Middle Atlas, where it experiences low population size and limited genetic diversity. We suggest listing this species both locally and globally as "Critically Endangered" [CR (B1, B2 + abiii)] following the IUCN Red List Categories and Criteria." (Authors)] Address: Ferreira, Sónia, CIBIO – Centro de Investigação em Biodiversidade e Recursos Genéticos, InBIO Laboratório Associado, Universidade do Porto, Campus Agrário de Vairão, R. Padre Armando Quintas, 4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

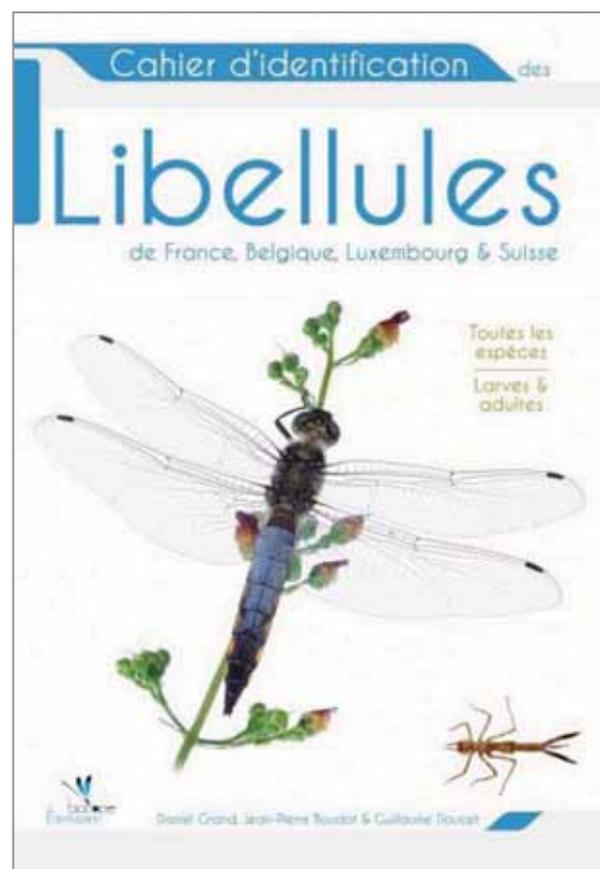
14154. Gaissert, N.; Mugrauer, R.; Mugrauer, G.; Jebens, A.; Jebens, K.; Knubben, E.M. (2014): Inventing a Micro

Aerial Vehicle inspired by the mechanics of dragonfly flight. Towards Autonomous Robotic Systems Lecture Notes in Computer Science 2014: 90-100. (in English) ["Dragonfly flight is unique: Dragonflies can manoeuvre in all directions, glide without having to beat their wings and hover in the air. Their ability to move each of their four wings independently enables them to slow down and turn abruptly, to accelerate swiftly and even to fly backwards. We looked into the mechanics of the dragonfly flight and managed to transfer its flight dynamics into an ultralight flying object: the BionicOpter. With a wingspan of 63 cm and a body length of 44 cm, the model dragonfly weighs just 175 g. A brushless motor actuates the four wings and is used to alter the flapping frequency. Eight servo motors allow the amplitude and the twisting angle of each wing to be changed independently making the BionicOpter almost as agile and fast as its natural role model. Here we present how dragonfly flight dynamics can inspire future design of MAVs." (Authors)] Address: Gaissert, Nina, Bionic Learning Network, Festo AG & Co. KG, Ruitter Str. 82, 73734, Esslingen, Germany. E-mail: niga@de.festo.com

14155. Gerlach, J.; Samways, M.J.; Hochkirch, A.; Seddon, M.; Cardoso, P.; Clausnitzer, V.; Cumberlidge, N.; Daniel, B.A.; Black, S.H.; Ott, J.; Williams, P.H. (2014): Prioritizing non-marine invertebrate taxa for Red Listing. *Journal of Insect Conservation* 18(4): 573-586. (in English) ["The IUCN Red List of threatened species is biased towards vertebrate animals, a major limitation on its utility for overall biodiversity assessment. There is a need to increase the representation of invertebrates (currently 21 % of species assessed on the List; <1 % of all invertebrates). A prioritisation system of terrestrial and freshwater groups is presented here, categorising taxa by species richness, assessment practicality, value for human land use and bioindication, and potential to act as conservation flagships. 25 major taxonomic groupings were identified as priorities, including the Annelida, Arthropoda, Mollusca, and Onychophora. Of these, the high-level taxa that emerge as highest priorities are Odonata, Araneae (spiders), Mantophasmatodea (heelwalkers), Plecoptera (stoneflies), non-marine Mollusca (Bivalvia and Gastropoda), Trichoptera (caddisflies), Coleoptera (beetles), Lepidoptera (moths and butterflies), Oligochaetes (earthworms), Orthoptera (grasshoppers and crickets), Decapoda (crayfish, crabs, shrimps) and Diptera (flies). Of these Red Listing is well advanced for Decapoda, freshwater Mollusca and Odonata. This leaves eight higher taxa with currently a minimum or patchy Red List assessment coverage. We recommend that Red List assessments in future focus on these groups, as well as completion of assessments for terrestrial Molluscs and Odonata. However, we also recommend realism, and as some of groups are very large, it will be necessary to focus on subsets such as certain functionally important or charismatic taxa or on a sampled subset which is representative of a larger taxon." (Authors)] Address: Gerlach, J., Coordinator – Terrestrial and Freshwater Invertebrate

Red List Authority, 133 Cherry Hinton Road, Cambridge, CB1 7BX, UK. E-mail: gerlachs@btinternet.com

14156. Grand, D.; Boudot, J.-P. (2014): Cahier d'identification des Libellules de France, Belgique, Luxembourg et Suisse. éditions Biotope. 176 pp (in French) ["This guide includes everything that is needed to identify dragonflies in the field. All 103 species dragonflies (subspecies included) are illustrated with photographs of males and females, by drawings and a concise distribution map providing an indication of abundance. The habitat is described and possible confusion between very similar species are reported. Flight periods are indicated. The guide includes an identification key to all identifiable larvae in the field. General chapters on the life cycle of dragonflies, their habitats and their anatomy are included to help you find and identify dragonflies in the field. The authors have updated the nomenclature, added three new species for France (*Brachythemis impartita*, *Orthetrum trinacria*, *Lindenia tetraphylla*), and updated the distribution maps." (<http://www.nhbs.com/title/view/199496>)] Adresse: Boudot, J.-P., LIMOS, UMR CNRS 7137, Univ. de Nancy, Faculté des Sciences, B.P. 239, 54506 - Vandoeuvre-lès-Nancy Cedex, France. E-mail: jean-pierre.boudot@limos.uhp-nancy.fr



14157. Gyulavári, H.A.; Therry, L.; Dévai, G.; Stoks, R. (2014): Sexual selection on flight endurance, flight-related morphology and physiology in a scrambling damselfly. *Evolutionary Ecology* 28(4): 639-654. (in English) ["We have limited knowledge on the mechanistic base of

sexual selection, especially in scrambling species. This asks for a functional approach that explores the link between each component of the phenotype-performance-fitness axis and that includes both morphological and physiological traits. We explored the phenotype-performance-fitness axis in the scrambling damselfly *Coenagrion puella* by studying the links between a set of physiological and morphological traits, flight performance (flight speed and flight endurance), and short-term mating success. As expected for scrambling competition, there was sexual selection for increased flight endurance rather than for increased flight speed. For fat content, we could demonstrate the full phenotype-performance-fitness axis, where selection for a higher fat content could be explained by the sexual selection for a higher flight endurance and the positive covariation between fat content and flight endurance. For three other traits (size, relative flight muscle mass and wing loading), however, we detected selection that could not be explained via their effect on flight performance, generating novel testable hypotheses about how the covariation between these traits and mating success is generated. This also urges caution when using morphological traits as proxies for flight speed and flight endurance in phenotypic selection studies." (Authors)] Address: Gyulavári, Hajnalka Anna, Lab. of Aquatic Ecology, Evolution and Conservation, KU Leuven, Univ. of Leuven, Charles Deberiotstraat 32 Bus 2439, 3000, Louvain, Belgium. E-mail: hgyulavari@gmail.com

14158. Hämäläinen, M. (2014): *Indocypha neglecta* sp. nov. from northern Vietnam (Odonata: Chlorocyphidae). *Odonatologica* 43(1/2): 79-90. (in English) ["*Indocypha neglecta* sp. nov. is described and illustrated from both sexes and compared with its congeners. The holotype male was collected at »Tonkin, Montagnes du Haut Song-Chaï« in northern Vietnam in 1895 and is deposited at MNHN, Paris." (Authors)] Address: Hämäläinen, M., Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: matti.hamalainen@helsinki.fi

14159. Harms, T.M.; Kinkead, K.E.; Dinsmore, S.J. (2014): Evaluating the effects of landscape configuration on site occupancy and movement dynamics of odonates in Iowa. *J. Insect. Conserv.* 18: 307-315. (in English) ["Odonates contribute highly to global biodiversity and are considered good indicators of environmental quality, but they are under-studied and quantitative information on their habitat associations is lacking. Our objective was to examine the effects of landscape configuration on site occupancy and movement dynamics of four odonate species in Iowa: *Tramea onusta*, *Epithea princeps*, *Pantala flavescens*, and *Calopteryx maculata*. We conducted standardized visual encounter surveys for odonates at 233 public properties in Iowa from 2007 to 2011 and computed landscape variables within a 200, 600 m, and 1 km radius of each surveyed site. Using a robust design occupancy model in Program MARK, we estimated detection probability and site occupancy, site extinction, and site colonization probabilities for each species. We found

few significant effects of landscape variables on site occupancy, extinction, or colonization, although landscape variables at 600 m were included in the best model for all species. Detection probability (SE) ranged from 0.30 (0.04) for *Pantala flavescens* to 0.49 (0.04) for *Calopteryx maculata*. Our study provides information to aid habitat restoration and management efforts on sites having suitable characteristics in the surrounding landscape and ultimately help conserve odonates." (Authors)] Address: Harms, T.M., Center for Survey Statistics & Methodology, Iowa State University, 208 Office and Laboratory Building, Ames, IA 50011, USA. E-mail: harmsy@iastate.edu

14160. Hecomovich, D. (2014): Species watch: Damselflies & Dragonflies. *Boggs Quarterly* 10(2): 5. (in English) [California, USA; this is a brief note to motivate people to watch the regional Odonata fauna. See: <http://boggs-mountain.net/wp-content/uploads/2014/08/FOBMQuarterly714.pdf>] Address: not stated

14161. Heiser, M.; Dapporto, L.; Schmitt, T. (2014): Coupling impoverishment analysis and partitioning of beta diversity allows a comprehensive description of Odonata biogeography in the Western Mediterranean. *Organisms Diversity & Evolution* 14: 203-214. (in English) ["Islands host a subset of organisms occurring at their sources, and these assemblages are usually dominated by the most generalistic and dispersive species. In this study, we aim to identify which species are missing on islands and which ecological traits are responsible for differential occurrence. Then, we apply this information to beta diversity analyses. As a study group and area, we selected the Odonata in the Western Mediterranean. Based on the presence/absence of 109 species, we applied a series of analyses at both community and individual species level. The islands of the Balearics, Corsica, Sardinia and Malta are highly impoverished, but Sicily is not. Non-parametric multivariate adaptive regression splines predicted the occurrence of individual species on each island. Principal component analysis recognised differences between Zygoptera and Anisoptera, but members of the two suborders have similar occurrences on islands, and island occurrence is determined mostly by species' frequencies at source and by their degree of generalism. Island species predicted correctly to occur on islands showed opposite characteristics to species unpredicted to occur and being present. The similarity pattern highlighted by turnover (Simpson index) is clearer than that obtained by non-partitioned beta diversity (Sørensen index). In fact, indicator value analyses revealed more indicator species for the Simpson compared to Sørensen index, and indicator species from islands where unpredicted to occur by impoverishment analysis. This suggests that island species predicted absent determine most of an island's turnover pattern, thus encompassing fundamental biogeographic information. Due to their absence on nearest sources, they are also at higher risk of extinction, and deserving of special conservation effort." (Authors)] Address: Dapporto, L., Centre for Ecology, En-

vironment and Conservation, Dept of Biological and Medical Sciences, Oxford Brookes University, Headington, Oxford, OX3 0BP, UK. E-mail: leondap@gmail.com

14162. Holuša, O.; Holušová, K. (2014): Could an active public recreation have an impact to populations of some insects in forest ecosystem - case of forest dragonflies. In: Fialová, J. & Pernicová, D. [eds.]. Public recreation and landscape protection – with man hand in hand? Conference proceeding. 5th – 6th May 2014, Křtiny. Department of Landscape Management FFWT, Mendel University in Brno: 75-79. (in English, with Czech summary) ["Among the ways of modern public recreation include horse-riding in the forests or stream climbing in mountain streams and gorges. Both of these activities are often operated outside the marked trails in the forests, trough forest springs or watercourses respectively. There are described cases of this type of recreation in forests in the Moravskoslezské Beskydy Mts. in relation to populations of forest species of dragonflies. Among the right forest species of dragonflies in Central Europe include species of the genus *Cordulegaster*. *C. bidentata* is the most abundant species in the forests of central Europe in the hills and mountains, which inhabits forest springs and streams. In some cases, the paths (trails) routed through these habitats. The case, horse-riding in forests with direct impact to larvae of *C.r bidentata*, has been recorded in the study of bionomics rheobiont dragonfly species. A one-time passage of horses is not destructive, but repeated ride on the same path is dangerous. Repeated passage of horses causes physical destruction of habitat i.e. trampling of sediments in shallow pools, where larvae are concentrated, but also direct trampling of larvae. Negative impact is also the chemical pollution of water excrement that is left in large quantities in the habitats. Threat increases during the emergency of larvae i.e. from May to June, when larvae dwell in bank parts and are sensitive to any interference with the habitat or contact. Repeated recreation outside the marked paths, still on the same trails, is becoming an important negative factor in the threat of forest habitats springs and insect populations." (Authors)] Address: Holuša, O., Mendel University in Brno, Faculty of Forestry and Wood Technology, Department of Forest Protection and Wildlife Management, Zem..d..lská 3, 613 00 Brno, Czech Republic. E-mail: holusao@email.cz

14163. Hudu, F. (2014): What is the phonological word in Dagbani? A positional faithfulness account. *Ghana Journal of Linguistics* 3.1: 1-44. (in Dagbani, nasal place assimilation, vowel harmony, underspecification, positional faithfulness) ["This paper offers a phonological diagnostic for defining the word in Dagbani, a Gur language of Ghana. It shows that a morphological unit that constitutes a complete word blocks contrast-neutralising phonological processes from target segments within its boundaries when triggered across its boundary. In sub-word units, these processes (e.g. nasal place assimilation, vowel harmony, segmental deletion) apply to target sounds

without restrictions. The result is the maintenance of contrast in words and neutralisation of contrast in sub-words. The paper further argues that the asymmetrical application of these rules is an indication of a morphological strength distinction between the word as a strong position where segments are fully specified for phonological features, and the sub-word domain as a non-privileged position where segments may be underspecified for features. A formal analysis of the asymmetry is presented using the theory of positional faithfulness within the framework of Optimality Theory. ... Another such example is the word *sá-á pá?-á* which literally means 'rain's wife' but actually means 'dragonfly'. The point of these comparisons is that, while compounds sometimes convey such non-compositional meanings, complex words are compositional in meaning." (Author)] Address: Hudu, F., Department of Linguistics, School of Languages, University of Ghana, Legon, Accra, Ghana

14164. Ikomi, R.B.; Arimoro, F.O. (2014): Effects of recreational activities on the littoral macroinvertebrates of Ethiopie River, Niger Delta, Nigeria. *Journal of Aquatic Sciences* 29(1): 155-170. (in English) ["Littoral macroinvertebrate assemblages at four stations in Ethiopie River, Nigeria corresponding to different catchment land uses and recreational activities were sampled from October 2011 to May 2012 using kick sampling technique along with physico-chemical water parameters. The waters of Ethiopie River were in general, transparent, acidic with low pH values ranging from 4.6 to 6.4, reasonably well oxygenated (4.4-6.8 mg/L), of low conductivity (<38.0 μScm^{-1}) except in Station 2 where conductivity reached up to 47.2 μScm^{-1} Ephemeroptera, Plecoptera and Trichoptera dominated the headwater stations, whereas Coleoptera, Oligochaeta and Chironomidae dominated recreational sites. Significant relationships were recorded between physico-chemical parameters: conductivity, BOD, temperature, and nutrients and occurrence of specific taxa, mainly *Neoperla*, *Caenis*, *Baetis*, *Enallagma*, *Gyrinus*, *Leptonema*, *Rhematobates* and *Chironomus*. Distribution of organic matter, macrophyte cover, substratum texture, recreational activities and current velocity accounted for variations in species composition, taxonomic richness and total abundance at four stations sampled. Significant changes in macroinvertebrate assemblages were primarily due to changes in water quality. Littoral macroinvertebrate communities proved to be good indicators of water quality and should be used as bioindicators in long-term monitoring of this river." (Authors)] Address: Arimoro, F.O., Applied Hydrobiology Unit, Department of Biological Sciences, Federal University of Technology, P.M.B. 65, Minna, Nigeria. E-mail: fran-sarimoro@yahoo.com

14165. Ishida, S.; Kadoya, T.; Takamura, N. (2014): An integrated indicator of biodiversity in agricultural ponds: Definition and validation. Integrative observations and assessments. *Ecological Research Monographs* 2014: 295-310. (in English) ["One of the promising approaches

to monitoring biodiversity is assessing the status of pressures driving the biodiversity state. To achieve this, we need to identify the principal pressures that cause simultaneous biodiversity loss across taxonomic groups and clarify how multiple pressures act synergistically or at least simultaneously to decrease biodiversity in the focal ecosystem. Here, we introduce a framework for an integrated biodiversity indicator that takes into consideration the estimated relative importance of multiple pressures. The indicator is defined as a function of the pressure(s) and is parameterized to explain a number of individual states of biodiversity. We showed that the framework can be successfully applied to a real ecosystem, a series of 64 agricultural ponds. We focused on macrophytes, Odonata, and benthic macroinvertebrates as the individual states of biodiversity of the ponds and on three types of pressure: eutrophication, habitat destruction, and invasive alien species. We then evaluated the relationships among pressures with direct effects and the individual states of biodiversity and used a hierarchical Bayesian approach to calculate the integrated biodiversity indicator. We found that the integrated indicator could explain the behaviors of several individual states of biodiversity. To demonstrate the applicability of our approach, we adapted the integrated indicator to another dataset of 35 different agricultural ponds in which the integrated indicator was calculated using the relative importance of multiple pressures estimated from the previous 64-pond study. We found that we could successfully extrapolate the integrated indicator to the 35 agricultural ponds. These results demonstrate the advantages of the framework in providing a more practical method for assessing biodiversity in freshwater lentic environments and in quantifying the relative importance of the major threats to biodiversity to prioritize strategies in conservation planning and policy making." (Authors)] Address: Kadoya, T., 4. Center for Environmental Biology and Ecosystem Studies, National Institute for Environmental Studies, Ibaraki, Japan. E-mail: kadoya@nies.go.jp

14166. Ishiyama, N.; Akasaka, T.; Nakamura, F. (2014): Mobility-dependent response of aquatic animal species richness to a wetland network in an agricultural landscape. *Aquatic Sciences* 76: 437-449. (in English) ["Management of wetland connectivity is important for biodiversity conservation. In the modern agricultural landscape, the natural connections between floodplain wetlands have been greatly altered. Agricultural ditches and channelized streams are widely distributed in floodplains, which may contribute to the maintenance of wetland connectivity and biodiversity. To determine how these watercourse networks affect wetland biodiversity, we examined the relationship between the species richness of aquatic animals and wetland connectivity, with a special focus on species mobility. From July to August 2011, fish and aquatic insects were collected from 24 wetlands in northern Japan. To determine the degree of wetland connectivity, we assessed the relative importance of individual wetlands in maintaining the entire wetland network using two connectivity indi-

ces: hydrologic connectivity via watercourses and spatial connectivity defined as Euclidian distances between wetlands using graph theory. We found that only high mobility groups of both taxa could enhance species richness in either a hydrologic (fish) or spatial (insect) wetland network. The species richness of insects with high-flying ability was found to increase as spatial connectivity increased. Furthermore, the species richness of fish with high-swimming ability was positively influenced by hydrologic connectivity, most likely because highly mobile species were able to reach suitable habitats and migrate from source populations in a wetland network owing to their good mobility. Our findings indicate that hydrologic network is important for maintaining biodiversity as well as spatial connectivity. It is important to focus conservation efforts on key wetlands with high hydrologic and spatial connectivity in future wetland management." (Authors) The following odonate species were assessed according to their mobility: *Sympecma paedisca*, *Lestes sponsa*, *Copera annulata*, *Coenagrion ecomutum*, *C. lanceolatum*, *Enallagma boreale circumlatum*, *Erythromma humerale*, *Paracerion hieroglyphicum*, *Somatochlora japonica*, *S. viridiaenea*, *S. alpestris*, *Cordulia amurensis*, *Epithea bimaculata sibirica*, *Libellula quadrimaculata asahinai*, *Orthetrum albistylum speciosum*, *Sympetrum croceolum*, *S. eroticum eroticum*, *S. frequens*, *S. infuscatum*, *Aeshna nigroflava*, *Anax parthenope*, and *Trigomphus melampus*.] Address: Ishiyama, N., Department of Forest Science, Graduate School of Agriculture, Hokkaido University, Kita 9 Nishi 9, Kita-ku, Sapporo 060-8589, Japan. E-mail: night7mare@gmail.com

14167. Jacquemin, S.J.; Pyron, M.; Allen, M.; Etchison, L. (2014): Wabash River Freshwater Drum (*Aplodinotus grunniens*) diet: Effects of body size, sex, and river gradient. *Journal of Fish and Wildlife Management* 5(1): 133-140. (in English) ["The objectives of this study were to describe the diet of freshwater drum (*Aplodinotus grunniens*) in the Wabash River, USA with tests for diet variation with body size, sex, and longitudinal river gradient. We used a multivariate ordination approach (nonmetric multidimensional scaling) to describe drum diet combined with a generalized linear model to test for covariation of diet with body size, sex, and river gradient. *Hydropsychidae* (Trichoptera, caddisfly larvae), *Pleuroceridae* (Gastropoda), and *Heptageniidae* (Ephemeroptera, mayfly larvae) were the most consumed prey items (~75% of overall diet). Among all freshwater drum, *Hydropsychidae*, *Pleuroceridae*, and *Heptageniidae* were present in 69%, 23%, and 38% of stomachs, respectively. Freshwater drum diets were similar along an upstream-downstream river gradient spanning 350 river km, but varied with body size and sex. Small- and medium-sized fish tended to consume more Diptera and annelids compared to the largest individuals which fed on molluscs and crayfish. With control for body size, the diets of male individuals were composed of more Diptera (*Chironomidae*) and annelid prey items compared with female individuals whose diet included more molluscs and crayfish. Overall, we interpret the lack of dietary turnover in freshwater

drum with Wabash River longitudinal gradient as evidence of diet specialization. Alternatively, we propose that a potential dietary - river gradient signal may be diluted as a function of increased freshwater drum longitudinal movements." (Authors) 0.66 % of the diet are Gomphidae, and a few Aeshnidae and Zygoptera.] Address: Jacquemin, S., Dept of Biological Sciences, Wright State University – Lake Campus, Celina, Ohio 45822, USA. E-mail: stephen.jacquemin@wright.edu

14168. Janssens, L.; Stoks, R. (2014): Chronic predation risk reduces escape speed by increasing oxidative damage: A deadly cost of an adaptive antipredator response. *PLoS ONE* 9(6): e101273. doi:10.1371/journal.pone.01-01273: 6 pp. (in English) ["Prey organisms evolved a multitude of plastic responses to avoid being eaten by predators. Besides the evolution of plastic morphological responses to escape predation, prey also evolved a set of physiological stress responses to avoid dying because of chronic predator stress per se due to disruption of cellular homeostasis. As physiological stress theory predicts increased energy consumption and the inhibition of essential nonemergency body functions, we tested whether chronic predation risk may increase oxidative damage thereby generating negative effects on escape performance. Specifically, we evaluated whether predation risk reduces escape swimming speed in damselfly larvae (*Coenagrion puella*) and whether this operates through stress-associated increases in oxidative damage. Counterintuitively and in contrast with many empirical studies, chronic predation risk decreased escape performance. This is however entirely consistent with the expectation of it being a long-term cost of responding to predation risk (e.g. by increasing respiration or upregulating the stress protein levels). The decreased swimming speed could be explained by an increased oxidative damage to proteins, thereby providing one of the poorly studied ecological links between oxidative damage and whole-animal performance. This likely widespread, understudied cost of chronic predation risk may provide an important pathway of non-consumptive predator effects on prey population dynamics. Moreover, it could play an evolutionary role by acting as a selective force causing prey organisms to adjust the magnitude of the physiological stress response and should be considered when evaluating life history trade-offs thought to be mediated by oxidative damage." (Authors)] Address: Janssens, Lizanne, Laboratory of Aquatic Ecology, Evolution and Conservation, University of Leuven, Leuven, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

14169. Jara, F.G. (2014): Trophic ontogenetic shifts of the dragonfly *Rhionaeschna variegata*: the role of larvae as predators and prey in Andean wetland communities. *Annales de Limnologie* 50(2): 173-184. (in English) ["Body size strongly influences the type and strength of species interactions. Animals with complex life cycles, such as dragonflies, usually go through different stages that include a variation in body size and may involve shifts in

their trophic position in the food web. This investigation analyzes the position of the dragonfly *Rhionaeschna variegata*, in the food web according to its body size, in Andean wetland communities of Northwestern Patagonia (Argentina). The phenology of *R. variegata* larvae and their potential intraguild predators were studied in wetlands with different hydroperiods. Under controlled experimental conditions, feeding trials were performed to assess the effect of *R. variegata* on the survivorship of different types of prey. The effects of cannibalism and intraguild predation (IGP) on the survivorship of the small larvae of *R. variegata* were investigated with and without alternative prey as well as different sympatric predators. The phenology of *R. variegata* and intraguild predators differed among wetlands. The feeding trials showed that *R. variegata* has a significant effect on the survivorship of invertebrate and vertebrate prey. Cannibalism increased with body size in odonate larvae. The survivorship of small- and medium-sized larvae was mainly affected by the presence of larger predators such as belostmatids. The field and experimental data show that the effect of IGP and cannibalism is affected by the cohort dynamics of *R. variegata*. Body size in *R. variegata* determines the strength of its interaction with other components of the community." (Author)] Address: Jara, F.G., Laboratorio de Fotobiología, Instituto de Investigaciones en Biodiversidad y Medioambiente (INIBIOM-CONICET), Quintral 1250, San Carlos de Bariloche 8400, Río Negro, Argentina. E-mail: fjara77@hotmail.com

14170. Jocque, M.; Argueta, I. (2014): A new species in the genus *Amphipteryx* Selys, 1853 (Odonata, Amphipterygidae) from Pico Bonito National Park, Honduras. *ZooKeys* 408: 71-80. (in English, with Spanish summary) ["The Mesoamerican damselfly genus *Amphipteryx* includes four species: *A. agrioides* (Mexico), *A. chiapensis* (Mexico), *A. meridionalis* (Honduras) and *A. nataliae* (Verapaz, Guatemala). We describe a fifth species, *Amphipteryx jaroli*, from the cloud forest in Pico Bonito National park, Honduras. Additionally we include an up to date key of all species in the genus for both sexes." (Authors)] Address: Jocque, M., Jessica Ware Lab, Rutgers, the State University of New Jersey, 195 University Ave, Newark, NJ, 07102, USA. E-mail: merlijn.jocque@gmail.com

14171. Jonsson, M.; Fick, J.; Klaminder, J.; Brodin, T. (2014): Antihistamines and aquatic insects: Bioconcentration and impacts on behavior in damselfly larvae (Zygoptera). *Science of the Total Environment* 472: 108-111. (in English) ["Highlights: •Exposure to dilute concentrations of antihistamines altered damselfly behaviour. •Damselfly larvae showed substantial bioconcentration of antihistamines. •Our results highlight the need to study pharmaceutical effects on aquatic insects. •Behavioural assays can be useful for studying non-lethal effects of pharmaceuticals. Because aquatic insects use histamines as neurotransmitters, adverse impacts on aquatic insects living in aquatic environments that receive antihistamines with wastewater effluent are plausible. In this study, we

exposed damselfly larvae to low concentrations of two commonly used antihistamines (Hydroxyzine and Fexofenadine, 360 ± 42 and 2200 ± 43 ng l⁻¹, respectively), and recorded damselfly larvae behaviour before and after exposure. Further, after the second set of behavioural assays was performed, we quantified bioconcentration of the antihistamines in the damselfly bodies. Our results showed significant changes in damselfly behaviour following antihistamine exposure. After Hydroxyzine exposure, the damselfly larvae became less active, and they showed reduced fleeing response (i.e. increased boldness) after being exposed to Fexofenadine, the latter also being significantly different from the non-exposed (control) individuals. Further, we found high levels of bioconcentration in the damselflies; Hydroxyzine showed an average bioconcentration factor (BCF) of 2000. As such, our results indicate that low concentrations of antihistamines can have sub-lethal effects on aquatic insects manifested as behavioural changes, and that bioconcentration of these substances can be high. Therefore, the need to investigate the impact of emergent aquatic contaminants also on aquatic insects, and on behaviours that are of ecological importance, is further highlighted." (Authors)] Address: Jonsson, M., Department of Ecology and Environmental Science, Umeå University, SE 90187, Umeå, Sweden, E-mail: micael.jonsson@emg.umu.se

14172. Kalniņš, M. (2014): *Argiolestes zane* sp. nov. from New Guinea (Odonata: Argiolestidae). *Telnov D.* (ed.) 2014: Biodiversity, Biogeography and Nature Conservation in Wallacea and New Guinea, volume II: 221-224, plates 32-34. (in English) ["*Argiolestes zane* sp. nov. (type locality: Indonesia, West Papua, S Bird's Neck, east from Kaimana, Triton bay, Lobo village environment, deposited LINC) is described. Ecological notes on habitat (forest brooks) of holotype and paratypes localities are given." (Author)] Address: Kalniņš, M., The Entomological Society of Latvia, Dzervenu iela 9-12, Siguldas novads, LV-2150, Sigulda, Latvia. E-mail: martins.kalnins@biology.lv

14173. Karube, H. (2014): Vietnamese Odonata collected in 1992-2003 surveys. V. Gomphidae. *Tombo* 56: 77-90. (in English, with Japanese summary) ["Twenty nine species of gomphid dragonflies were recorded from Vietnam during our survey. *Leptogomphus tamdaoensis* sp. nov., *Leptogomphus inouei* sp. nov., *Ophiogomphus* (*Ophiionurus*) *longijhamulus* sp. nov., *Ophiogomphus* (*Ophiionurus*) *minimus* sp. nov. are described and figured. *Stylurus clathratus* (Needham, 1930), *Leptogomphus perforatus* Ris, 1912, *L. elegans* Lieftinck, 1948, *Burmagomphus arboreus* Lieftinck, 1940, *B. divaricatus* Lieftinck, 1964, *Lamelligomphus formosanus* (Matsumura in Oguma, 1926), *L. castor* (Lieftinck, 1941), *Gomphidictinus perakensis* (Laidlaw, 1902) are all recorded from Vietnam for the first time." (Author)] Address: Karube, H., Kanagawa Prefectural Museum of Natural History, 499 Iryuda, Odawara, Kanagawa, 250-0031 Japan. E-mail: paruki@nh.kanagawa-museum.jp

14174. Karube, H. (2014): Vietnamese Odonata collected in 1992-2003 surveys. IV. Synlestidae. *Tombo* 56: 73-76. (in English, with Japanese summary) ["Three species of the genus *Megalestes* were recorded from Vietnam. These are *M. micans* Needham, 1930, *M. haui* Wilson & Reels, 2003 and *M. australis* sp. nov., which is described and illustrated. The last species is related to *M. kurahashii* Asahina, 1985." (Author)] Address: Karube, H., Kanagawa Prefectural Museum of Natural History, 499 Iryuda, Odawara, Kanagawa, 250-0031 Japan. E-mail: paruki@nh.kanagawa-museum.jp

14175. Karube, H.; Sasamoto, A. (2014): *Borneogomphus teramotoi*, a new genus and species of Gomphid dragonfly from Borneo (Odonata: Gomphidae: Onychogomphinae). *Tombo* 56: 65-72. (in English, with Japanese summary) ["*Borneogomphus teramotoi* gen. and sp. nov. (holotype male: E. Malaysia [Borneo Island], Bundu tuhan, Mt. Kinabalu, Sabah) is described and illustrated base on adults of both sexes and the larval exuvia. This new genus seems to be endemic to Borneo. Based on morphology and DNA analysis, *Borneogomphus* is most closely related to the continental *Phaenandrogomphus*, but it is easily distinguished by several characteristics, especially peculiar male genital structures, wing venation, and well developed valvula vulvae in female. The holotype is deposited in the Kanagawa Prefectural Museum of Natural History." (Authors)] Address: Karube, H., Kanagawa Prefectural Museum of Natural History, 499 Iryuda, Odawara, Kanagawa, 250-0031 Japan. E-mail: paruki@nh.kanagawa-museum.jp

14176. Kaunisto, K. (2014): Host parasite interactions in damselflies. From individuals to populations. Doctoral dissertation (monograph). Department of Biology, Zoological Museum. *Annales Universitatis Turkuensis A II* 291: 24 pp. (in English) ["The main goal of this thesis is to increase understanding on evolutionary and ecological factors that have contributed to differences in parasite numbers in insects. Furthermore, the thesis addresses the effects of parasites on their hosts. The most important findings were: *Coenagrion hastulatum* immune response to artificial pathogen increased with increasing parasite numbers (Article I). Marginal, more isolated *C. hastulatum* populations on the edge of distribution have fewer parasites when compared to distribution's core populations (Article II). *Calopteryx splendens* individuals with higher homozygosity have more parasites, however, the rate of homozygosity did not differ between populations (Article III). Parasite prevalence was affected by whether the host species occurred in allopatric or sympatric population: sympatric *C. splendens* populations with sister species *Calopteryx virgo* harbored more parasites (Article IV). Parasites were associated with the wing spot size, an ornament under sexual selection, and thus may play an important role in character displacement, i.e. the size of the wing spot (Article V). To conclude with, this thesis brings about new information on the parasite infection patterns in insects, proposing several factors to con-

tribute to these patterns, as well as it addresses the effects of parasites on their hosts, from individual to population level." (Author)] Address: Kaunisto, K.M., Section of Ecology, Department of Biology, University of Turku, FI-20014 Turku, Finland. E-mail: kkauni@utu.fi

14177. Khanfsi, T. (2014): Caractérisation des Mantodea dans différents biotopes de la région de Timimoun. Mémoires Ingénieur, Faculté des Sciences de la Nature et de la Vie, Département des Sciences Agronomiques, Université Kasdi Merbah Ouargla UKMO: 80 pp. (in French, with English and Arabian summaries) ["The diversity of Mantis in two natural and cultivated habitats in Timimoun is studied. Four species (*Blepharopsis mendica*, *Sphodromantis viridis*, *Iris oratoria*, *Iris deserti*) are inventoried in the herbaceous layer mainly after 12 months of exploration. The palmgrove has 3 species and Estivo - autumn period is the most conducive to catch. The Sex-ratio indicates a predominance of males, although the medium is moderately diversified (Simpson index $D = 0.65$). Morphological characterization and genitalia is made through a description and measurements. Diet of *Iris oratoria* contains Orthoptera (26.7%), Coleoptera and Odonata with (3.33 % each). *Iris deserti* consumes especially Diptera (33.33 %) and the same percentage of ants, Aranea, Dermaptera, Homoptera and with Collembola (16.6 %). The regime is moderately diversified (2.62 bits in the menu *Iris oratoria*, *Iris deserti* at 1.5 bits and 3.37 bits for *Blepharopsis mendica*). Prey size ranges from 2 to 20 mm. Trophic regime of 3 Mantids is insectivorous and generalist." (Author)] Address: not stated

14178. Kim, D.G.; Kang, H.J.; Baek, M.J.; Lee, C.Y.; Kim, J.G.; Bae, Y.J. (2014): Analyses of benthic macroinvertebrate colonization during the early successional phases of created wetlands in temperate Asia. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 184(1): 35-49. (in English) ["We quantified the colonization rate and pattern of benthic macroinvertebrate communities in 2 created small-sized wetlands (non-planted and planted) and a nearby older man-made wetland in Korea. We sampled benthic macroinvertebrates at monthly intervals and surveyed the vegetation dynamics every 2 months from May 2009 to October 2010. We determined the colonization rate using the newly adopted colonization index (CI), and evaluated the colonization pattern using multivariate analyses, including nonmetric multidimensional scaling (NMS) and indicator species analysis (ISPAN). As predicted, the species richness and diversity of benthic macroinvertebrates increased markedly in early successional phases in the 2 created wetlands, and initial planting accelerated colonization of benthic macroinvertebrate communities; in comparison, the older man-made wetland showed a more gradual increase. The CI (range 100–0) decreased over time in the created wetlands; this decrease was more rapid in the planted wetland than in the non-planted wetland. After 400 Julian days, the benthic macroinvertebrate community in the planted wetland showed 90 % similarity with

that in the older man-made wetland. The NMS results revealed that the colonization pattern of benthic macroinvertebrates differed significantly according to vegetation (non-planted versus planted [$p = 0.000$]), season ($p = 0.001$), and year ($p = 0.014$). The ISPAN results showed that the indicator species in the non-planted and planted wetlands were the burrowing mayfly (*Ephemera orientalis*) and *Ischnura asiatica*, respectively. Our findings demonstrate the validity of using the CI to quantify the colonization rate of benthic macroinvertebrate communities in typical small-sized temperate wetlands." (Authors)] Address: Bae, Y.J., College of Life Sciences & Biotechnology, Korea Univ., 145 Anam-ro, Seongbuk-gu, Seoul 136-713, Korea. E-mail: yjbae@korea.ac.kr

14179. Knorp, N.E.; Dorn, N.J. (2014): Dissimilar numerical responses of macroinvertebrates to disturbance from drying and predatory sunfish. *Freshwater Biology* 59(7): 1378-1388. (in English) ["(1) Disturbances caused by drying can eliminate fully aquatic organisms and alter wetland communities. However, the net effects of pulsed drying followed by re-wetting on populations of benthic macroinvertebrates with greater tolerance to drying have been poorly studied. (2) We quantified the population responses of two large macroinvertebrates, dragonflies (*Libellulidae*) and a crayfish (*Procambarus fallax*), to variable drying history and predatory sunfish (Family: Centrarchidae) in experimental subtropical wetlands. To simulate naturally occurring combinations of drying and sunfish presence, the experimental treatments included a drying and re-wetting sequence that either eliminated sunfish or did not, with a third treatment of continuously flooded conditions with sunfish present. (3) The activity of adult dragonflies was similar over all experimental wetlands, but larval density after 6 months was highest in continuously flooded wetlands (with sunfish) and some species (*Erythemis simplicicollis*, *Celithemis eponina*) were absent from wetlands that experienced drying. There was no evidence that sunfish limited larval density. (4) After 6 months, overall crayfish biomass was greatest in wetlands that had dried and lacked sunfish. Crayfish density was similar in all wetlands, but individual crayfish body mass (g) was greatest in wetlands that lacked sunfish. Because of sunfish predation, few crayfish survived to full juvenile size. In the presence of sunfish, drying did not affect crayfish biomass or individual body mass. (5) The abundance of libellulid dragonfly larvae was indirectly reduced by the drying. In wetlands where submerged vegetation was reduced by drying, we suggest that libellulid populations were limited by a small-bodied fish (*Gambusia holbrooki*). In contrast, survival of juvenile crayfish was directly limited by sunfish, and therefore, crayfish (but not libellulid) populations could be temporarily enhanced by drying events when and where sunfish populations are reduced." (Authors)] Address: Knorp, Natalie, Department of Biological Sciences, Florida Atlantic University, 3200 College Ave., Davie, FL 33314, USA. E-mail: nekknorp42@students.tnitech.edu

- 14180.** Kobayashi, J. (2014): *Neurothemis ramburii* (Kaup in Brauer, 1866) (Libellulidae) with an unusual wing-maculation. Tombo 56: 96. (in Japanese, with English summary) [Japan. "A male of *N. ramburii* with unusual wing-maculation was captured at Iriomote-jima Island, Yaeyama Islands, SW Ryukyus. In each wing, the pigmented area is expanded, so that the hyaline part is narrowed and reduced, and the boundary with the coloured area becomes indistinct." (Author)] Address: not stated
- 14181.** Korbaa, M.; Ferreras-Romero, M.; Bejaoui, M.; Boumaiza, M. (2014): Two species of Odonata newly recorded from Tunisia. *African Entomology* 22(2): 291-296. (in English) ["*Pyrrhosoma nymphula* and *Aeshna cyanea*, whose presence in Tunisia was unknown, have recently been recorded in Khroumirian streams, in the northwest of the country. A new population of *Onychogomphus uncatulus*, a relatively rare species in North Africa (except Morocco), is also reported. Characteristics of their habitat are given." (Authors)] Address: Ferreras-Romero, M., Departamento de Biología Animal (Zoología), Facultad de Ciencias, Universidad de Córdoba, Avda. San Alberto Magno s/n, E-14004 Córdoba, Spain. E-mail: ferreras@teleline.es
- 14182.** Kosterin, O.; Chartier, G. (2014): Two more Odonata species recorded for Cambodia. *Cambodian Journal of Natural History* 2014(1): 8-11. (in English) ["*Heliaeschna simplicia* (Karsch, 1891): A male was found dead inside a house at Rainbow Lodge (11.580°N, 103.127°E) on 12 March 2013, seemingly after being attracted by light. *Epopthalmia vittigera* (Rambur, 1842) ssp. *bellicosa* Lieftinck, 1948: A female was photographed at Rainbow Lodge (11.580 N, 103.127 E) on 14 June 2013 and a male on 18 June 2013. Another female was found dead inside a house at Rainbow Lodge on 23 June 2013. More males were observed at the same place every day until at least 30 June 2013." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru
- 14183.** Kosterin, O.E. (2014): Odonata briefly observed on the islands of Bali and Lombok, Lesser Sundas, Indonesia, in the late February 2014. *International Dragonfly Fund Report* 74: 1-48. (in English) ["In the second half of February 2014, Odonata were searched for nine days on Bali and four days on Lombok, the western Lesser Sundas, Indonesia. One species, *Orthetrum chrysis* has been for the first time recorded for Bali and six species, *Nososticta emphylla*, *Idionyx murcia*, *Brachydiplax chalybea*, *Agrionoptera insignis*, *Neurothemis ramburii*, *Rhyothemis phyllis* have been for the first time recorded for Lombok. The previous literature concerning the two islands is analysed. To the moment, 55 Odonata species (3 unidentified) are known for Bali and 39 for Lombok, although the actual faunas of both islands are supposed to be equally rich, and further studies on Lombok are necessary. Odonata faunas of Bali and Lombok mirror each other in respect of high shares, 29 and 23%, of Odonata species ranging to the west and east of the two islands, respectively. Efficiency of Lombok Strait as a biogeographical boundary was estimated as high as 0.6, so Wallace Line is of importance for Odonata. Some diagnostic characters of *N. emphylla*, *N. ramburii*, *R. phyllis* *phyllis* and *Procordulia sambawana* and a taxonomical situation around *Prodasineura autumnalis* and *P. humeralis*, which is not justified biogeographically, are discussed. Short notes on habitats and assemblages of Odonata are added." (Author)] Address: Kosterin, O.E., Institute of Cytology & Genetics SB RAS, Acad. Lavrentyev ave. 10, Novosibirsk, 630090, Russia; Novosibirsk State University, Pirogova str. 2, Novosibirsk, 630090, Russia. E-mail: kosterin@bionet.nsc.ru
- 14184.** Kulijer, D. (2014): Odonata fauna of karst streams and rivers of South Herzegovina (Bosnia and Herzegovina, West Balkan). *International Dragonfly Fund - Report* 72: 1-50. (in English) ["Results of the odonatological survey in the Neretva River Basin in South Herzegovina karst region of Bosnia and Herzegovina conducted from April to August 2013 are presented. The area had been pre-assessed as insufficiently known in term of its Odonata fauna, but believed to be important habitat for several species of conservation concern, particularly *Coenagrion ornatum*, *Ceriatagrion tenellum*, *Calliaeschna microstigma*, *Lindenia tetraphylla* and *Cordulegaster heros*. Moreover, freshwater habitats of the region are increasingly threatened due to climate change and the habitat destruction due to infrastructure and hydroenergy production projects. The focus of the study was set on the streams and rivers in Neretva, Trebižat, Trebišnjica and Bregava river valleys, Hutovo blato wetland, Mostarsko blato, Dabarsko and Fatnicko polje. The survey resulted in 482 Odonata records of 49 species from 52 surveyed localities. Notable results include new distribution data on species of conservation concern, particularly six new localities of *C. ornatum*, nine of *C. microstigma* and five of *C. heros*. Comments on species of conservation concern and brief description of habitats at all surveyed localities are provided. New data on species of conservation concern are important for better conservation planning of dragonfly species and habitats in Bosnia and Herzegovina." (Author)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. Email: dejan.kulijer@gmail.com
- 14185.** Kutcher, T.E. (2014): Biological indicators for assessing freshwater wetland condition in Rhode Island. *Dissertations and Master's Theses (Campus Access)*. Paper AAI1555662. <http://digitalcommons.uri.edu/dissertations/AAI1555662>: 98 pp. (in English) ["There is a growing need to identify assessment methods that can provide managers and researchers with a relative indication of wetland condition. Biological indicators (bioindicators) are considered to be the most effective and precise indicators of environmental condition. This study focuses on the develop-

ment of bioindicators based on the concept of species conservatism, or intolerance to human disturbance. In theory, the aggregate conservatism of a species assemblage should indicate the environmental quality of a natural area. In the first part of this study, I applied the conservatism concept to adult Odonata composition to create a novel bioindicator for open-canopy wetland systems. I used an extensive existing Odonata dataset to develop a conservatism-based Odonata index of wetland integrity and test it against rapid assessment and landscape-scale reference measures. The Odonata index was well predicted by both reference measures and showed no evidence of dependence on sampling effort, wetland size, or geomorphic class. My findings suggest that conservatism of adult Odonata averaged across species may provide a robust indicator of freshwater wetland integrity that is practical for wetland assessment. The conservatism concept is more typically applied to Floristic Quality Assessment (FQA), using vascular plant species. FQA index variants incorporating species richness, nativeness, and abundance have been empirically tested as indicators of freshwater wetland integrity, but less attention has been given to clarifying the mechanisms controlling FQA functionality; consequently, disagreement remains in identifying the most effective variant. In the second part of this study, I tested commonly-used FQA variants against landscape, rapid, and biological reference measures in open canopy wetlands. FQA variants incorporating species richness did not correlate with any reference measures and were influenced by wetland size and hydrogeomorphic class. In contrast, FQA variants disregarding species richness showed strong, monotonic relationships with all three reference measures, independent of wetland size and class. Incorporating non-native species improved performance over using only native species, and incorporating relative species abundance improved performance further. Non-richness variants responded linearly to individual and aggregate stresses, suggesting broad response to cumulative degradation, or decreasing integrity. These findings support the following recognized theories: aggregate plant species conservatism declines with increased disturbance; plant species richness increases with intermediate disturbance and increasing unit area; non-native species are favoured by human disturbances; and the proportional abundance of species is an important functional component of ecosystem health. This suggests that an abundance-weighted FQA variant incorporating non-native species and disregarding species richness should provide the most highly-relevant and effective FQA measure of ecological integrity for open-canopy vegetated wetlands." (Author)] Address: Kutcher, T.E., Rhode Island Natural History Survey, University of Rhode Island, 200 Ranger Hall, Kingston, RI 02881, USA. E-mail: tomkutcher@my.uri.edu

14186. Laister, G.; Lehmann, G.; Martens, A. (2014): Exotic Odonata in Europe. *Odonatologica* 43(1/2): 125-135. (in English) ["Between 1991 and 2011, more than 1,000 adults of exotic odonate species were recorded from glasshouses of a wholesaler dealer of aquarium

plants near Wels, Austria. Twenty-three species could be identified to species level. All species were accidentally introduced as eggs or larvae. The majority are widely distributed and common southeastern Asian species. About 17 taxa are first recorded from Europe bringing the list of exotic Odonata in Europe to 41 taxa. These odonates are mainly introduced via aquarist trade and many species have emerged from home aquaria and glasshouses. Currently, tropical plants for aquarists are mainly imported to Europe from Singapore, Indonesia and Thailand, which suggests that the exotic Odonata originated in those countries. So far, the introduction of exotic Odonata species into Europe is not ecologically relevant because none of the introduced species have become established in the wild. However, this study will improve understanding of the significance of trading connections in establishing exotic species which could become invasive." (Authors)] Address: Laister, G., Hans-Hofmann-Ring 3, 4470 Enns, Austria. E-mail: glaister@aon.at

14187. Lee, S.-D.; Miller-Rushing, A.J. (2014): Degradation, urbanization, and restoration: A review of the challenges and future of conservation on the Korean Peninsula. *Biological Conservation* 176: 262-276. (in English) ["Highlights: •We review the current state of conservation challenges on the Korean Peninsula. •The peninsula hosts many endemic species and is critical for bird migrations. •Conservation challenges include development, pollution, and deforestation. •Biodiversity on the peninsula is poorly documented. Documentation is improving. •Conservation solutions include habitat restoration and conservation planning. Human history on the Korean Peninsula has left natural resource managers with a number of serious challenges regarding the preservation of biodiversity and ecosystem functions. The Korean Peninsula covers 222,403 km² and contains a mountainous interior, many islands, and biodiversity-rich coastal and marine areas. Biodiversity on the peninsula is not well documented, especially in North Korea, but the peninsula is estimated to host at least 100,000 species, and perhaps manyfold more. Roughly 6% of species identified to date are endemic, and among vertebrate species in South Korea, 29% of mammals, 14% of birds, 23% of freshwater fishes, 48% of reptiles, and 60% of amphibians are estimated to be at risk of extinction or have been extirpated from the peninsula. The situation is likely worse in North Korea. Species still occurring on the Korean Peninsula have survived near total deforestation of the landscape, heavy fishing, pollution, and, in South Korea, a period of rapid urbanization since the end of the Korean War in 1953. Conservation challenges are particularly dire in North Korea, where environmental degradation has impaired the country's ability to sustain agriculture, clean air and water, and other fundamental ecosystem services. Conservation faces significant challenges in South Korea, too, given the country's goal to continue to develop one of the world's most advanced and urbanized economies. Natural resource managers in both North and South Korea are pursuing large-scale restoration of forests, wetlands,

lakes and rivers, and coastlines as a primary conservation strategy. In addition, South Korea is aggressively developing a "green economy" and is hosting international environmental meetings, attempting to take a leadership role as a convener of innovative thinking in conservation. North and South Korea are also implementing more common land protection techniques, such as the creation of national parks and other protected areas. These protected areas include the exceptional case of the 100,000-ha (250 km × 4 km) Demilitarized Zone (DMZ) that forms the border between North and South Korea. The DMZ was not created for conservation reasons, but has provided an important refuge for many species. Other well-known protected areas include Jeju Island and Baekdu Daegan Mountain, both of which host many species important for conservation. Together, these conservation actions show promise and may allow the Korean Peninsula to preserve its biodiversity and regain some of its important ecosystem services. South Korea, in particular, provides an example for attempting to balance economic development and conservation in an area with a long history of human exploitation. North Korea is much farther behind in its conservation efforts, but is now beginning planning for large-scale restoration projects, which if implemented may help reverse its long trend of environmental degradation." (Authors) *Libellula angelina* was selected to demonstrate the situation of a species Critically Endangered globally. It was detected at just 18 localities in 2000, and is threatened by habitat destruction and degradation and predation by non-native species. A second dragonfly listed by IUCN is *Nehalennia speciosa*.] Address: Lee, S.-D., Department of Environmental Science and Engineering, GT5 Research Program, College of Engineering, Ewha Womans University, Seoul 120-750, Republic of Korea. E-mail: lsd@ewha.ac.kr

14188. Manger, R. (2014): *Aeshna serrata* in Denmark. *Brachytron* 16(1/2): 43-47. (in Dutch, with English summary) ["In 2006 the first population of *Aeshna serrata* was discovered in Denmark. This paper describes some observations during a visit to the Danish site at Han Vejle on 29 August 2012. Some behaviour and the location are described. A female *Aeshna serrata* was observed trying to oviposit on a wooden bridge. Other observed species during this visit were *Aeshna grandis*, *Aeshna mixta*, *Sympetrum vulgatum* and *Enallagma cyathigerum*." (Author)] Address: Manger, R., Stoepveldsingel 55, 9403 SM Assen. The Netherlands. E-mail: rmanger@planet.nl

14189. Marino, J.A.; Holland, M.P.; Maher, J.M. (2014): Predators and trematode parasites jointly affect larval anuran functional traits and corticosterone levels. *Oikos* 123(4): 451-460. (in English) ["Non-consumptive predator effects may have dramatic consequences for host-parasite interactions by influencing the ability of prey items to avoid, resist, or tolerate infection. Both predators and parasites can affect host traits, such as growth rates and behaviour, and these effects may in part be mediated through shared physiological pathways (e.g. the glu-

cocorticoid stress hormone, corticosterone [CORT]). Here, we examined the effects of trematode parasites (*Digena*: *Echinostomatidae*) and predator (larval odonate; *Anax* spp.) exposure on larvae of two amphibian species (*Rana sylvatica* and *R. clamitans*) in laboratory experiments. First, we measured behaviour and CORT responses of tadpoles exposed to predator chemical cue in combination with parasite cue or under direct exposure to parasites. We then measured the combined effects of predator cue and parasite infection on survival and traits. Evidence for effects of parasite cue in our study was equivocal, but we found novel interactive effects of parasites and predators on larval frogs. Parasites and predators had antagonistic effects on CORT, behaviour, and morphology, and negative synergistic effects on development. In addition, parasite infection and predator cues additively reduced activity levels of both species and growth in wood frogs. Negative effects of parasite infection on survival and traits were dose-dependent for both species, although wood frogs generally experienced stronger effects of infection than green frogs. Our results emphasize the importance of considering effects of parasites as well as predators, since both can have strong effects on survival and the combination can have both additive and non-additive effects on key traits. These effects likely have important implications for amphibian population dynamics, community structure, and conservation." (Authors)] Address: Marino, J.A. Jr., Dept of Ecology and Evolutionary Biology, Univ. of Michigan, Ann Arbor, MI 48103, USA. E-mail: jamarino@umich.edu

14190. Marinov, M. (2014): An undescribed colour variation of female *Antipodochlora braueri* (Odonata: Corduliidae). *Odonatologica* 43(1/2): 105-114. (in English) ["Four *Antipodochlora braueri* (Selys, 1871) specimens (2 males, 2 females) were collected in the North Island of New Zealand. One female from the Taranaki region had a wing colouration previously unknown. The new colour variation is described here and is compared to what had been so far reported of female *A. braueri*. Important diagnostic features, such as appendages and vulvar scales, are illustrated. The colour variant female is also compared to the female of *Procordulia smithii* because of the similarity of the wing pattern, which had caused confusion in the past. A male collected together with the female had wings more tinged with yellow than other known males." (Author)] Address: Marinov, M., Plant Health & Environment Laboratory, Investigation and Diagnostic Centres and Response, Ministry for Primary Industries, 14 Sir William Pickering Drive, Burnside, PO Box 14018, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz

14191. McCauley, S.J.; Davis, C.J.; Werner, E.E.; Roberson, M.S. (2014): Dispersal, niche breadth, and population extinction/colonization ratios predict range size in North American dragonflies. *Journal of Animal Ecology* 83: 858-865. (in English) ["(1) Species' range sizes are shaped by fundamental differences in species' ecological

and evolutionary characteristics, and understanding the mechanisms determining range size can shed light on the factors responsible for generating and structuring biological diversity. Moreover, because geographic range size is associated with a species' risk of extinction and their ability to respond to global changes in climate and land use, understanding these mechanisms has important conservation implications. (2) Despite hypotheses that dispersal behaviour is a strong determinant of species range areas, few data are available to directly compare the relationship between dispersal behaviour and range size. Here, we overcome this limitation by combining data from a multi-species dispersal experiment with additional species-level trait data that are commonly hypothesized to affect range size (e.g. niche-breadth, local abundance, and body size, etc.). This enables us to examine the relationship between these species-level traits and range size across North America for fifteen dragonfly species. (3) Ten models based on a priori predictions about the relationship between species traits and range size were evaluated and two models were identified as good predictors of species range size. These models indicated that only two species' level traits, dispersal behaviour and niche breadth were strongly related to range size. The evidence from these two models indicated that dragonfly species that disperse more often and further had larger North American ranges. (4) Extinction and colonization dynamics are expected to be a key linkage between dispersal behaviour and range size in dragonflies. To evaluate how extinction and colonization dynamics among dragonflies were related to range size we used an independent data set of extinction and colonization rates for eleven dragonfly species and assessed the relationship between these populations rates and North American range areas for these species. (5) We found a negative relationship between North American range size and species' extinction to colonization ratios. Our results indicate that metapopulation dynamics act to shape the extent of species' continental distributions. These population dynamics are likely to interact with dispersal behaviour, particularly at species range margins, to determine range limits and ultimately species range sizes." (Authors)] Address: McCauley, S.J., Dept of Biology, University of Toronto Mississauga, 3359 Mississauga Road North, Mississauga, ON L5L, Canada. E-mail: shannon.mccauley@utoronto.ca

14192. McCormack, S.; Regan, E. (2014): *Insects of Ireland: An illustrated introduction to Ireland's common insect groups*. The Collins Press: 154 pp. (in English) ["Over 11,000 species of insects occur in Ireland but most are very small and escape notice. Identifying them accurately can be difficult or impossible. This comprehensive compact guide to over 120 of Ireland's most popular insects includes all Irish species of butterflies, bumblebees, dragonflies, ladybirds, grasshoppers and shield bugs. All are illustrated in colour with clear descriptions enabling accurate identification." (Publisher)] Address: not stated

14193. Melfi, J.; Leonardo, A.; Wang, Z.J. (2014): Roll dynamics in a free flying dragonfly (Abstract: F1.00015). *Bulletin of the American Physical Society, 67th Annual Meeting of the APS Division of Fluid Dynamics, Volume 59, Number 18, Sunday–Tuesday, November 23–25, 2014; San Francisco, California: (in English) [Verbatim: Dragonflies are capable of executing fast turning maneuvers. A typical free-flight maneuver includes rotations in all three degrees of freedom; yaw, pitch, and roll. This makes it difficult to identify the key changes to wing kinematics responsible for controlling each degree of freedom. Therefore we focus on a single motion; roll about the body longitudinal axis in a combined experimental and computational study. To induce rolling, a dragonfly is released from a magnetic tether while inverted. Both wing and body kinematics are recorded using multiple high speed cameras. The kinematics are replayed in a computer simulation of the flight, with forces and torques based on quasi-steady aerodynamics. By examining the effect of each kinematic change individually, we determine the key changes a dragonfly uses to both instigate, maintain, and end a rolling motion.]* Address: not stated

14194. Merkel-Wallner, G. (2014): *Insekten im Rainer Wald. Beiträge zur bayerischen Entomofaunistik 13: 1-65.* (in German, with English summary) [This is an overview of the known insects from the "Rainer Wald", a 250-acre hardwood floodplain forest in Danube valley near Straubing, Bavaria, Germany. On pages 8-10, 25 local Odonata species are listed and briefly discussed.] Address: Merkel-Wallner, Gisela, Bühläcker 3, 93444 Bad Krotzing, Germany

14195. Monroe, E.M.; Britten, H.B. (2014): Conservation in Hine's sight: the conservation genetics of the federally endangered Hine's emerald dragonfly, *Somatochlora hineana*. *Journal of Insect Conservation* 18: 353-363. (in English) ["*S. hineana* is distributed in discrete fen and wet meadow habitats over its range from Ontario, Canada, to Missouri, USA. Habitat destruction in the vicinity of Chicago, IL, and other areas lead to its designation as an US federal endangered species in 1995. Our main goal was to delineate the population genetic structure of the species within the northern recovery unit centered on the Door Peninsula in Wisconsin and the southern recovery unit in the Des Plaines River Valley near Chicago, IL. Sites on the Door Peninsula, WI, are in a matrix of agricultural development and second-growth forest and were used as a best available approximation of a pristine system for the dragonfly. We nondestructively sampled 557 adults and larvae from 16 sites in Illinois, Michigan, and Wisconsin from 2008 through 2011 and used ten microsatellite markers to estimate levels of genetic variability, and genetic structure. Mean allelic richness across all sites and years was 5.03 (± 0.64) and expected heterozygosity was 0.52 (± 0.032). Northern and southern recovery units as designated in the original recovery plan were genetically distinct. We delineated two genetic populations in the northern unit and three within the southern

including two disjunct sites." (Authors)] Address: Monroe, Emy, Department of Biology, University of South Dakota, 414 E. Clark St., Vermillion, SD, 57069, USA. E-mail: emymonroe@gmail.com

14196. Mourão, M.A.N.; Peixoto, P.E.C. (2014): Do morphological and physiological characteristics of males of the dragonfly *Macrothemis imitans* determine the winner of territorial contests? *Journal of Insect Science* 14(89): 10 pp. (in English) ["Males of many animal species show intraspecific disputes for mating territories that range from displays without physical contact to physical fights with risk of injury. This variation motivated the proposition of different models that suggest possible rules used by rivals to decide the contest winner. To evaluate those models, it is necessary to identify how males behave during the fight and the individual attributes that determine their fighting ability (resource holding potential). For this, males of *M. imitans* were used to evaluate two hypotheses conditioned on the occurrence of physical contact during the fight: if the contests occur with physical contact, features related to size should determine male resource holding potential, and if males do not exhibit physical contact during the contests, features that confer greater endurance should determine resource holding potential. To assess these hypotheses, we collected males that had ownership of territories (resident males) and males that occupied the territory after we removed the resident males (substitute males). After the capture, the resident and substitute males were transferred to the laboratory for measurements of wing area, dry weight, thoracic muscle mass, and fat content. The results showed that resident males do not differ in any measured trait from substitutes. Because the fights occur with physical contact, it is intriguing that resident males do not possess higher fighting capacity than intruders. Perhaps physical contact does not incur high costs during the fight, and other asymmetries, such as motivation associated with prior residency of the disputed territory, determine the contest winner." (Authors)] Address: Mourao, M.A.N., Programa de Pós-Graduação em Ecologia e Recursos Naturais, Univde Federal do Ceará, Ceará, Brazil. E-mail: marcoantoniomourao@yahoo.com.br

14197. Na, Y.; Sun, C.; Li, T.; Li, Y. (2014): The insect oviposition firstly discovered on the Middle Jurassic Ginkgoales leaf from Inner Mongolia, China. *Acta Geologica Sinica (English Edition)* 88(1): 18-28. (in Chinese, with English summary) ["Although the evidence of insect oviposition on plant organs has been reported from the late Paleozoic to the Miocene, record from the middle Jurassic is still blank. This paper reports a significant evidence of insect oviposition on plant leaf from the middle Jurassic for the first time. The ovipositional scar is distributed on the abaxial surface of *Sphenobaiera* leaf (Ginkgoales) from the middle Jurassic Daohugou Formation of Inner Mongolia, China. A new ichnospecies *Paleoovoidus venustus* sp. nov. is described. The scar is elliptic to oval, arranged in longitudinal rows between leaf veins with al-

most regular distance, with its long axis paralleling to the leaf venation. This discovery adds new information to the morphology of insect endophytic oviposition probably produced by Odonata existed in a terrestrial ecosystem ~165 Ma ago. The new materials also provide important data for the study of insect reproductive biology, plant-insect interaction and coevolution, as well as understanding the paleoclimate and palaeoenvironment during that time in northeast China." (Authors)] Address: Na, Y., Research Center of Paleontology & Stratigraphy of Jilin Univ., 6, Ximinzhong Street, Changchun 130026, China. E-mail: 19591-2281@qq.com

14198. Nai, Y.-S.; Sua, P.-Y.; Hsua, Y.-H.; Chiang, C.-H.; Kim, J.S.; Chen, Y.-W.; Wang, C.-H. (2014): A new spiroplasma isolate from the field cricket (*Gryllus bimaculatus*) in Taiwan. *J. Invertebr. Pathol.* 120: 4-8. (in English) ["We briefly described the morphology and transmission pathway of a *Spiroplasma* sp. isolated from the field cricket, *Gryllus bimaculatus* in Taiwan, followed by the phylogenetic analysis based on the 16S rRNA gene sequence. The cricket spiroplasma infected the hemolymph, gut, muscle tissues and tracheal cells; therefore we suggest that the pathogen invaded tissues and organs from the hemolymph through the tracheal system and the endoplasmic reticular system. Based on 16S rRNA gene sequences and the phylogeny, this spiroplasma was most closely related to *Spiroplasma platyhelix* (Identity= 95%) isolated from the dragonfly *Pachydiplax longipennis* and belongs to the *Ixodetis* clade." (Authors)] Address: Wang, C.-H., Institute of Zoology, College of Life Science, National Taiwan University, No. 1, Sec. 4, Roosevelt Road, Taipei 10617, Taiwan, ROC. E-mail: wangch@ntu.edu.tw

14199. Naidu, V.; Young, J.; Lai, J. (2014): Effect of wing flexibility on phasing of tandem wings in forward flight (Abstract: G30.00006). *Bulletin of the American Physical Society*, 67th Annual Meeting of the APS Division of Fluid Dynamics, Volume 59, Number 18, Sunday–Tuesday, November 23–25, 2014; San Francisco, California: (in English) [Verbatim: The dragonfly with two pairs of wings in tandem uses different phases between the wing pairs to suit the needs of the flight. Previous studies to understand the effect of phasing in forward flight are based on rigid wings. This is in contrast to the highly flexible dragonfly wings, with varying spanwise and chordwise flexibility. Here, we study flexible flapping wing simulations using Fluid Structure Interaction (FSI) in forward flight, at an advance ratio of 0.3 and Reynolds number of approximately 1300. The FSI simulations are carried out for phase 90° (hindwing leading), 0° (in-phase) and 180° (anti-phase). The performance of flexible wings will be compared with that of the rigid wings and the effect of flexibility will be discussed." (Authors)] Address: not stated

14200. Nair, P. (2014): Odonata (Insecta) fauna of Varadour, Kannur, Kerala, Southern India Vinayan. *Bugs R All*, No. 21: 6-10. (in English) ["The study reveals the presence of 44 species of odonates belonging to 31

genera and 7 families. A detailed systematic list is given in Table 1. ... *Merogomphus longistigma* is a rare species found in Western Ghats and the females are not common. It has been recorded from Chinnar, Vythiri Ghat (Wyanad), Travancore and Malabar (Emiliyamma et al., 2007). The present record is the first record from Kannur. *Pseudagrion malabaricum* and *Gynacantha bayadera* are recorded for the first time from Kannur. *G. bayadera* in this study is the second record from Kerala. *Ceriagrion olivaceum*, *Anax guttatus*, *Brachydiplax chalybea* and *Hydrobasileus croceus* has not been recorded from Kannur as per Emiliyamma et al. (2007). So they are new records from Kannur." (Author)] Address: Nair, P., Division of Agriculture, Tagore Vidyaniketan GVHSS, Rabeendrapuram Taliparamba P.O, Kannur, Kerala 670141, India. Email: vinayanpnair@yahoo.co.in

14201. Needham, J.G.; Westfall, M.J.; May, M.L. (2014): *Dragonflies of North America: The Odonata (Anisoptera) Fauna of Canada, the Continental United States, Northern Mexico and the Greater Antilles*. 3rd edition. Scientific Publishers: xiv, 648 pp. (in English) ["A manual for the identification of all the species of dragonflies (Odonata: Anisoptera) known from the United States and Canada, and from the Greater Antilles and the Mexican states bordering the United States, a total of 365 species. Includes keys to adults of both sexes and to last instar larvae, as far as the latter are known. Also includes illustrations of wing venation and larval habitus for all genera, caudal appendages of adult males and subgenital plates of females for most species, and numerous other details of morphology where these are important for identification. Geographic range is indicated, usually at the level of states and provinces. General introduction to morphology and biology." (Publisher)] Address: May, M.L., Dept Entom., New Jersey Agricultural Experiment Station, Cook College, Rutgers Univ., New Brunswick, NJ 08901-8524, USA. E-mail: may@aesop.rutgers.edu

14202. Nel, A.; Fleck, G. (2014): *Dragonflies and damselflies (Insecta: Odonata) from the Late Eocene of the Isle of Wight*. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh* 104(3-4): 283 - 306. (in English) ["The odonatan fauna of the Late Eocene of the Isle of Wight is revised. The following taxa are revised or described: the gomphaeschnids *Oligo-aeschna? anglica* Cockerell & Andrews, 1916 and *Anglogomphaeschna eocenica* gen. et sp. nov.; the aeshnids '*Oplonaeschna*' *vectensis* Cockerell & Andrews, 1916, *Aeschnophlebia andreasi* Nel et al., 2005, *Oligo-aeschna wedmanni* sp. nov., and a '*Gynacanthinae*' species; *Neophya legrandi* sp. nov., first fossil representative of the *Cordulephyidae*; three undescribed '*Corduliidae*'; *Eomacrodiplex incompleta* gen. et sp. nov., first fossil representative of the *Urothemistidae*; the second representative of the Palaeogene family *Bolcathoridae*; a *Thaumatoneuridae* *Dysagrionini* species A; the megapodagrionid *Oligoargiolestes oligocenum* Kennedy, 1925; the two hypolestids *Anglohypolestes fasciata* gen. et sp.

nov. and *Eohypolestes hooleyi* gen. et sp. nov.; the coenagrionid '*Enallagma*' *oligocena* Cockerell & Andrews, 1916, and three other undescribed species; *Angloprotoneura emilielacroixi* gen. et sp. nov., first fossil European representative of the damselfly family *Protoneuridae*; and the lestid *Lestes* aff. *regina* Théobald, 1937. This fauna has strong similarities with the Recent Afrotropical and Indo-Malayan Odonata, suggesting a warm palaeoclimate for the Late Eocene of the Isle of Wight. '*Megalestes*' *anglicus* Cockerell, 1915 is a *Zygoptera* *Lestiformia* or *Coenagrionomorpha* of uncertain affinities." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1-mnhn.fr

14203. Nilsson-Örtman, V.; Stoks, R.; Johansson, F. (2014): *Competitive interactions modify the temperature dependence of damselfly growth rates*. *Ecology* 95: 1394 -1406. (in English) ["Individual growth rates and survival are major determinants of individual fitness, population size structure and community dynamics. The relationships between growth rate, survival and temperature may thus be important for predicting biological responses to climate change. Although it is well known that growth rates and survival are affected by competition and predation in addition to temperature, the combined effect of these factors on growth rates, survival and size structure has rarely been investigated simultaneously in the same ecological system. To address this question, we conducted experiments on the larvae of two species of damselflies and determined the temperature-dependence of growth rates and survival and the resulting cohort size structure under three scenarios of increasing ecological complexity: no competition, intraspecific competition and interspecific competition. In one species, the relationship between growth rate and temperature became steeper in the presence of competitors whereas that of survival remained unchanged. In the other species, the relationship between growth rate and temperature was unaffected by competitive interactions but survival was greatly reduced at high temperatures in the presence of interspecific competitors. We also found that the combined effect of competitive interactions and temperature on cohort size structure differed from the effects of these factors in isolation. Together, these findings suggest that it will be challenging to scale up information from traditional, single-species laboratory studies to the population and community level." (Authors)] Address: Nilsson-Örtman, V., Dept Ecology & Environmental Sci., Umea Univ., 90187 Umea, Sweden. E-mail: viktor.j.nilsson@gmail.com

14204. Norma-Rashid, Y.; Saleeza, S.N.R. (2014): *Ecofriendly control of three common mosquito larvae species by Odonata nymphs*. *Basic and Applied Aspects of Biopesticides 2014*: 235-243. (in English) ["This chapter revealed the efficacy of three predominant dragonfly species found in a natural population where the survey of mosquito population was conducted. Nymphs of dragonflies belonging to family *Libellulidae*, *Neurothemis fluctu-*

ans, *Orthetrum sabina*, and *Orthetrum chrysis*, were used as predators on the IV instar of mosquito larvae, *Aedes albopictus*, *Aedes aegypti*, and *Culex quinquefasciatus*. The daily feeding rates varied among predators and mosquito species. The mean numbers of mosquito larvae consumed by the predators were different between the mosquito species. *Aedes aegypti* was the most preferred prey for *Orthetrum sabina* and *Neurothemis fluctuans*. However, *Orthetrum chrysis* consumed more of *Culex quinquefasciatus* in contrast to other prey species. Feeding activities peaked during light-on in contrast to light-off. The results of variation factors that influenced the predation activities were significant and further discussed in this chapter. The factors that were assessed in the experiments included the water volume, predator species, predator density, and prey density and species. This chapter lends support to the potential use of Odonata species as an eco-friendly method of mosquito population eradication." (Authors)] Address: Y. Norma-Rashid, Y., Institute of Biological Sciences, Faculty of Science, University Malaya, 50603, Kuala Lumpur, Malaysia. E-mail: ynorma@um.edu.my

14205. Novelo-Gutiérrez, R. (2014): Primer registro de *Aphylla tenuis* Selys, 1859 para México, y primer registro del género para el estado de Chiapas (Odonata: Gomphidae) - First record of *Aphylla tenuis* Selys, 1859 for Mexico, and first record of the genus for Chiapas State (Odonata: Gomphidae). *Dugesiana* 21(1): 75. (in Spanish) [México: Chiapas; Municipio Tuxtla Chico, km 20 carretera Tapachula-Cacahoatan, Finca San Jose La Victoria, 14°59'12.49N; 9°9'14.64S; 49 masl, 15-III-1982, R. Novelo Col., 1 male, R. Novelo det. 2005.] Address: Novelo-Gutiérrez, R., Instituto de Ecología, A.C., Red de Biodiversidad y Sistemática. Carretera Antigua a Coatepec # 351, El Haya, 91070 Xalapa, Veracruz, México. E-mail: rodolfo.novelo@inecol.mx

14206. Novelo-Gutiérrez, R.; Sites, R.W.; Vitheepadit, A. (2014): New province record of *Rhinagrion* for Thailand and description of the larva of *R. mima* (Odonata: Zygoptera: Philosinidae). *Zootaxa* 3852(5): 562-568. (in English, with Thai summary) ["The Oriental damselfly genus *Rhinagrion* includes 10 known species, but the larva of only *R. philippinum* has been described in any detail, while the larva of *R. viridatum* has been well-illustrated and features summarized. The larvae of the other eight species were unknown. Here, the larva of *Rhinagrion mima* is described and illustrated by supposition, based upon an F0 larva collected in Phetchabun Province in Thailand. It is compared with the larvae of *R. philippinum* and *R. viridatum*. This represents the first record of the genus for Phetchabun Province." (Authors)] Address: Novelo-Gutiérrez, R., Red de Biodiversidad y Sistemática, Instituto de Ecología, A.C., Carretera antigua a Coatepec 351, El Haya, Xalapa, Veracruz, México. E-mail: rodolfo.novelo@inecol.mx

14207. Nuss, C. (2014): Erste Nachweise der libellenparasitischen Gnitze *Forcipomyia* (*Pterobosca*) *paludis*

(Macfie, 1936) in Rheinland-Pfalz. *Libellen in Hessen* 7: 51-54. (in German) [Rheinland-Pfalz, Germany, NSG „Laubenheimer Ried“ near Mainz (MTB) 6015), 2013. Three Odonata species have been observed infested from *Forcipomyia* (*Pterobosca*) *paludis* (Macfie, 1936): *Sympetrum sanguineum*: 4 Ind. (2.7.), 5 Ind. (4.7.), 1 Ind. (11.7.), 1 Ind. (1.8.), *Aeshna isoceles*: 2 Ind. (2.7.), *Platycnemis pennipes*: 7 Ind. (11.7.)] Address: Nuß, C., 65510 Idstein, Germany. E-mail: christian.nuss@gmx.de

14208. Nyffeler, M.; Pusey, B.J. (2014): Fish predation by semi-aquatic spiders: A global pattern. *PLoS ONE* 9(6): e99459. doi:10.1371/journal.pone.0099459: 21pp. (in English) ["More than 80 incidences of fish predation by semi-aquatic spiders – observed at the fringes of shallow freshwater streams, rivers, lakes, ponds, swamps, and fens – are reviewed. We provide evidence that fish predation by semi-aquatic spiders is geographically widespread, occurring on all continents except Antarctica. Fish predation by spiders appears to be more common in warmer areas between 40°S and 40°N. The fish captured by spiders, usually ranging from 2–6 cm in length, are among the most common fish taxa occurring in their respective geographic area (e.g., mosquitofish [*Gambusia* spp.] in the southeastern USA, fish of the order Characiformes in the Neotropics, killifish [*Aphyosemion* spp.] in Central and West Africa, as well as Australian native fish of the genera *Galaxias*, *Melanotaenia*, and *Pseudomugil*). Naturally occurring fish predation has been witnessed in more than a dozen spider species from the superfamily Lycosoidea (families Pisauridae, Trechaleidae, and Lycosidae), in two species of the superfamily Ctenoidea (family Ctenidae), and in one species of the superfamily Corinnoidea (family Liocranidae). The majority of reports on fish predation by spiders referred to pisaurid spiders of the genera *Dolomedes* and *Nilus* (>75% of observed incidences). There is laboratory evidence that spiders from several more families (e.g., the water spider *Argyroneta aquatica* [Cybaeidae], the intertidal spider *Desis marina* [Desidae], and the 'swimming' huntsman spider *Heteropoda natans* [Sparassidae]) predate fish as well. Our finding of such a large diversity of spider families being engaged in fish predation is novel. Semi-aquatic spiders captured fish whose body length exceeded the spiders' body length (the captured fish being, on average, 2.2 times as long as the spiders). Evidence suggests that fish prey might be an occasional prey item of substantial nutritional importance." (Authors) The publication includes a small compilation of studies with information on estimated fresh weight (g/prey item) and caloric value (kJ/g dry weight) of Odonata used by semi-aquatic spiders: Fresh weight: 0.1–1.5; Caloric value: 21–22.] Address: Nyffeler, M., Section of Conservation Biology, Dept of Environmental Sci., Univ. Basel, Basel, Switzerland. E-mail: martin.nyffeler@unibas.ch

14209. Obata, A.; Shinohara, S.; Akimoto, K.; Suzuki, K.; Seki, M. (2014): Aerodynamic bio-mimetics of gliding dragonflies for Ultra-Light Flying robot. *Robotics* 3(2):

163-180. (in English) ["A detailed investigation including a low-speed flow study is presented on the development of ultra-light dragonfly mimetic flying robots with a focus on the dragonfly's remarkable gliding capability. It is revealed that the dragonfly's corrugated wing structure and cruciform configuration provide superior flying characteristics for fixed wing robots in low Reynolds number flight. It was also found that the dragonfly configuration has additional merit in its compatibility with propellers or high lift devices. This combination with such classic aero-engineering makes possible robots with broader flight envelope than conventional fixed-wing flying robots." (Authors)] Address: Obata, A., Micro Flying Robot Laboratory, Nippon Bunri University, 1727 Itigi Oita City 870-0397, Japan. E-Mail: obata@nbu.ac.jp

14210. O'Connor, J.H. (2014): Manipulation of larval and winter habitat reveals potential effects of urbanization and climate change on Wood Frogs in Connecticut. Master's Theses, University of Connecticut: 69 pp. (in English) ["Runoff from urban development and agricultural activity increases sediment input and water turbidity in many aquatic systems. These factors are known to affect fish and invertebrate communities but effects on amphibians are poorly understood. Runoff can transport nitrogenous compounds, heavy metals, pesticides, and other pollutants in addition to sediment. Our goal was to isolate the effect of sediment input from these other potential aquatic stressors. We manipulated silt addition in mesocosms to determine if sediment input affected survival, growth, or development of larval wood frogs (*Lithobates sylvaticus*). We also crossed our silt addition treatment with a predator (*Libellula cyanea*) presence treatment to assess interactive effects of multiple stressors. We found no effect of silt addition or predator presence on survival. Furthermore, addition of a large amount of silt during the early larval period resulted in earlier metamorphosis ($F_{1,30} = 5.111$, $p = 0.031$) at a larger size ($F_{1,30} = 36.244$, $p < 0.001$), traits generally viewed as positive for population dynamics. Non-lethal predator presence did not affect either mass at or time to metamorphosis. Results suggest that suspended sediment by itself is not directly harmful to wood frogs and potentially may serve as an additional food resource. Manipulating turbidity in mesocosms has advantages over studying turbidity in natural systems because treatments can be controlled and replicated sufficiently. Future research should investigate the relationship between sediment organic content and tadpole growth and survival and the interaction between water turbidity and other wetland stressors." (Author)] Address: O'Connor, J.H., Dept of Natural Resources and the Environment, University of Connecticut, Storrs, CT, USA. E-mail: jason.h.oconnor@uconn.edu

14211. Orlofske, S.A.; Jadin, R.C.; Hoverman, J.T.; Johnson, P.T.J. (2014): Predation and disease: understanding the effects of predators at several trophic levels on pathogen transmission. *Freshwater Biology* 59(5): 1064-1075. (in English) ["Predators can directly and indirectly

influence host-parasite interactions by consuming infected individuals, by removing infectious parasite stages and by changing host traits (e.g. behaviour). Because such effects can affect infection positively or negatively, understanding the net effects of predation on pathogen transmission under natural conditions is important. We conducted a mesocosm experiment to examine the effects of predators on interactions between tadpole hosts (*Pseudacris regilla*) and trematode parasites (*Ribeiroia ondatrae*). We manipulated the presence of (non-lethal, i.e., caged) predators of tadpoles (dragonfly larvae) and (potentially lethal) parasite predators (damselfly larvae) to evaluate their individual and combined effects on host infection. We expected that dragonflies would reduce tadpole activity and thereby increase parasite infection through a reduction in antiparasite behaviour. Because damselflies can consume parasites in the laboratory, we predicted that damselflies would lower infection by consuming parasites before they infected tadpoles. Our goal was to evaluate the net consequences of these predator-mediated effects for host/prey infection. The presence of caged dragonflies reduced tadpole activity, resulting in a ~50% increase in average infection load compared to treatments without predators. In contrast to our prediction that damselflies would reduce infection, damselflies elicited behavioural and morphological changes in hosts similar to dragonflies, with a comparable increase in parasite transmission. Thus, predator-mediated effects were evident predominantly through changes in host/prey behaviour, rather than through changes in the abundance of parasites. The lack of a direct effect of predators on infection (i.e. via consumption of parasites) could be the result of the presence of alternative prey (zooplankton) or a mismatch in timing between visual predators feeding during the day and parasites released from the first intermediate host and infecting amphibians at night. The presence of predators also stimulated morphological defences in their tadpole prey, including increased tail and body depth. Interestingly, we found that parasite infection also induced morphological changes in tadpole tail and body depth, similar to changes produced by (non-lethal) cues from predators. Parasites caused malformations in tadpoles, but there were no effects on tadpole growth or development from either parasites or predators. This research has key implications for linking predation and infectious disease in aquatic ecosystems. Our results emphasise the importance of indirect effects of predators on infection and highlight possible trade-offs in mitigating the concurrent risks of predation and disease. Parasites can also alter host morphology through trait-mediated effects similar to predators, supporting a broader inclusion of parasites in the study of the ecology of natural enemies." (Authors)] Address: Orlofske, Sarah, Dept Biol., Northeastern Illinois University, 5500 North St. Louis Ave., Chicago, IL 60625, USA. E-mail: s.a.orlofske@gmail.com

14212. Orr, A.G.; Richards, S.J. (2014): *Palaiargia trauanae* sp. n. (Odonata: Platynemididae), a new Idiocnemid damselfly from Papua New Guinea. *Australian En-*

tomologist 41(3): 153-159. (in English) ["Palaiargia traunae sp. n. from Trauna Gap near the Baiyer River Sanctuary in Western Highlands Province, Papua New Guinea, is described and its relationships discussed. It represents the 25th species of the genus, which is confined to the island of New Guinea, the Moluccas and some intervening islands." (Authors)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith Univ., Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

14213. Pan, C.-X.; Qi, X.Y.; Zhao, G.; Guo, X.Z. (2014): The test and analysis of nanomechanical properties for dragonfly wing. *Applied Mechanics and Materials* 574: 271-274. (in English) ["Nanomechanical testing system in this paper has been applied to get elastic modulus and hardness of dragonfly wing, and showing their gradient changes along the wing, and also analyzing the mechanical properties in nanodimension. It is significant to make a further research for specific biological functions of dragonfly wing." (Authors)] Address: Pan, Chun-xiang, Flight Vehicle & Dynamic Department, Air Force Aviation Univ., Changchun, Jilin, China. E-mail: dexing789@163.com

14214. Pape-Lange, D. (2014): *Libellen Handbuch: Libellen sicher bestimmen* / Dirk. Verlag Schwarmstedt: Pape-Lange, Dirk. 260 pp. ISBN-10: 3000461752 (in German)



14215. Peng, H.; Tang, J.; Xiao, H.; Bria, A.; Zhou, J.; Butler, V.; Zhou, Z.; Gonzalez-Bellido, P.T.; Oh, S.W.; Chen, J.; Mitra, A.; Tsien, R.W.; Zeng, H.; Ascoli, G.A.; Iannello, G.; Hawrylycz, M.; Myers, E.; Long, F. (2014): Virtual finger boosts three-dimensional imaging and microsurgery as well as terabyte volume image visualization and analysis. *Nature Communications* 5, Article number: 4342 doi:10.1038/ncomms5342: 13 pp. (in English) ["Three-dimensional (3D) bioimaging, visualization and data analysis are in strong need of powerful 3D exploration techniques. We develop virtual finger (VF) to generate 3D curves, points and regions-of-interest in the 3D space of a volumetric image with a single finger operation, such as a computer mouse stroke, or click or zoom from the 2D-projection plane of an image as visualized with a computer. VF provides efficient methods for acquisition, visualization and analysis of 3D images for round-

worm, fruitfly, dragonfly, mouse, rat and human. Specifically, VF enables instant 3D optical zoom-in imaging, 3D free-form optical microsurgery, and 3D visualization and annotation of terabytes of whole-brain image volumes. VF also leads to orders of magnitude better efficiency of automated 3D reconstruction of neurons and similar biostructures over our previous systems. We use VF to generate from images of 1,107 *Drosophila* GAL4 lines a projectome of a *Drosophila* brain." (Authors) The article includes impressive images of a dragonfly thoracic ganglion neuron.] Address: Peng, H., Janelia Farm Research Campus, Howard Hughes Medical Inst., Ashburn, Virginia 20147, USA. E-mail: hanchuanp@alleninstitute.org

14216. Piersanti, S.; Frati, F.; Conti, E.; Rebora, M.; Salerno, G (2014): The sense of smell in Odonata: An electrophysiological screening. *J. Insect Physiol.* 70: 49-58. (in English) ["Volatile chemicals mediate a great range of intra- and interspecific signalling and information in insects. Olfaction has been widely investigated mostly in Neoptera while the knowledge of this sense in most basal insects such as Paleoptera (Odonata and Ephemeroptera) is still poor. In the present study we show the results of an electrophysiological screening on two model species, *Libellula depressa* and *Ischnura elegans*, representatives of the two Odonata suborders Anisoptera and Zygoptera, with the aim to deep the knowledge on the sense of smell of this insect order. The antennal olfactory sensory neurons (OSNs) of these two species responded to the same 22 compounds (out of 48 chemicals belonging to different functional groups) encompassing mostly amines, carboxylic acids or aldehydes and belonging to green leaf volatiles, vertebrate related volatiles and volatiles emitted by standing waters bacteria. The properties of Odonata OSNs are very similar to those of ionotropic receptors (IRs) expressing OSNs in other insects." (Authors)] Address: Rebora, Manuela, Dipto di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: rebora@unipg.it

14217. Quisil, J.C.; Nuñez, O.M.; Villanueva, R.T. (2014): Impact of mine tailings on the species diversity of Odonata fauna in Surigao del Sur, Philippines. *Journal of Biodiversity and Environmental Sciences* 5(1): 465-476. (in English) ["Odonata is very sensitive to changes in habitat, making it a reliable bio-indicator of environmental health. This study was conducted to assess the impact of mine tailings on the species diversity of Odonata in Surigao del Sur, Philippines. Eight sampling sites were surveyed comprising four sites with mine tailings and four sites without mine tailings. Opportunistic sampling using sweep nets was conducted on August 24-27, 2013 and October 26-29, 2013. Eighteen species were documented belonging to sixteen genera and six families. Over-all endemism was low at 22%. Seven species were recorded under sub-order Zygoptera, and eleven under sub-order Anisoptera. Species diversity and evenness were significantly different between areas with mine tailings and those without. Sites without mine tailings had higher

abundance, species richness, and endemism than sites with mine tailings. Results indicate that mine tailings adversely affect species diversity of Odonata." (Authors)] Address: Nuneza, Olga, Dept of Biological Sciences, Mindanao State Univ. - Iligan Institute of Technology, Iligan City, Philippines. E-mail: olgamnuneza@yahoo.com

14218. Raju, S.A. (2014): Diversity, distribution and abundance of damselfly (Zygoptera) of Dhimbe Lake Ambe-gaon tehsil, Pune, (Maharashtra: India). *Int. J. of Life Sciences* 2(2): 173-178. (in Odonata, Damselflies, Dhibhe, Abundance) ["Out of total 16 species/taxa *Pseudagrion rubriceps*, *Ceragrion coromandelianum*, were abundant or very common, *Ischnura senegalensis*, *Disparoneura quadrimaculata* were common, *Pseudagrion decorum* and *Pseudagrion microcephalum* rare and *Lestes umbrinus*, *Rhodischnura nursei* very rare in observation." (Author)] Address: Raju, S.A., Shri J.J.T. University, Vidyanagari, Churu-Bishau Road, Dist. Jhunjhunu, Rajasthan-333001, India. E-mail: amolsonawane7139@gmail.com

14219. Ramsey, A. (2014): Odonata to joy. *OneVoice* March 2014: 8. (in English) [Nevada, USA; Verbatim: Back in late September of last year, NNSS scientists guided visiting dragonfly specialists Neil McDonal and Bruce Lund on a one-day trip to the site to collect samples of the elaborately coloured insect. In total, the group visited sites in five regions of the NNSS. Bad weather, however, proved to be an obstacle. "Only four specimens were captured due to cold windy weather," said National Security Technolgtes biologist Paul Greger. "Fortunately, we were able to collect one new species for the site, the black fronted fork-tail. [*Ischnura denticollis*]" Working under the National Wildlife Refuge System, McDonal and Lund recently completed a regional study of Odonata - a division of carnivorous insect that includes the dragonfly and the smaller damselfly. They are seeking to build up on their research by sampling in areas that are farther north from their original southern Nevada study area. McDonal and Lund were able to identify nine Odonata species from an existing NNSS collection of Odonata archived in the 1990s. Additional field work is planned for 2014.] Address: not stated

14220. Ratna, O.P. (2014): Morphological characters and dietary diversity of Great Crested Canopy Lizard (*Bronchocela jubata* Dumeril & Bribon, 1837) along Opak riverside in Daerah Istimewa Yogyakarta. *Fakultas Biologo, Universitas Gadjah Mada, Yogyakarta*: 46 pp. (in Indonesian, with English summary) ["Java is one of the biggest island in Indonesia and divided into east, middle, and west regions. Each of them differ in landscapes, climates, and any other enviromental conditions. Those can lead to variation of animal characters on each regions. Biodiversity in Yogyakarta are very high. It is supported by various of ecosystems within the province. One of the riparian ecosystem in Yogyakarta is Opak River. It becomes a water source for animals live along the riverside, include for the herpetofauna *Bronchocela jubata*.

This insectivorous lizard has an important role in food chain within riparian ecosystem. This research was conducted to find out the morphological characters and dietary diversity of *B. jubata* at Opak riverside. VES (Visual Encounter Surveys) method was used for sampling. Then 60 morphological characters of each specimens were observed and measured. Specimens were identified based on Book of Identification and paratype specimens from Lembaga Ilmu Pengetahuan Indonesia (LIPI). All data were analyzed with NTSYSpc 2.1 to understand the similarity value of each individual. The ventriculus of each individual were preserved and then dissected. Food substances within ventriculus were observed using stereo microscope. The results showed that specimens of *B. jubata* at Opak riverside had more similarity with West Java specimens than with Sulawesi specimens. Similarity value of Opak specimens and paratype specimens from West Java was 62%. Whereas similarity of Opak specimens and paratype specimens from Sulawesi was just 54%. Specimens *B. jubata* at Opak riverside have observation of ventriculus contents showed that *B. jubata* mostly preyed on Insects from Order Hymenoptera, Lepidoptera, Odonata, Hemiptera, Orthoptera, and Coleoptera. Conclusion of this research, *B. jubata* at Opak riverside were similar with paratype specimens from West Java. *B. jubata*'s prey consist of 6 orders of insect, most of them were members of Order Odonata and Orthoptera." (Author)] Address: not stated

14221. Ratti, J.; Vachtsevanos, G.J. (2014): Inventing a biologically inspired, energy-efficient Micro Aerial Vehicle. In: Kimon P. Valavanis, & George J. Vachtsevanos (eds.): *Handbook of Unmanned Aerial Vehicles*. Springer: 1385-1413. (in English) ["In recent years, research efforts have focused on the design, development, and deployment of unmanned systems for a variety of applications ranging from intelligence and surveillance to border patrol, rescue operations, etc. Micro aerial vehicles are viewed as potential targets that can provide agility and accurate small area coverage while being costeffective and can be easily launched by a single operator. The small size of MAVs allows such flight operations within confined space but the control effectors must provide sufficient maneuverability, while maintaining stability, with only limited sensing capability onboard the platform. To meet these challenges, researchers have long been attracted by the amazing attributes of biological systems, such as those exhibited by birds and insects. Birds can fly in dense flocks, executing rapid maneuvers with g-loads far in excess of modern fighter aircrafts, and yet never collide with each other, despite the absence of air traffic controllers. This chapter introduces a novel framework for the design and control of a micro air vehicle. The vehicle's conceptual design is based on biologically inspired principles and emulates a dragonfly (Odonata-Anisoptera). A sophisticated multilayered hybrid and linear/non-linear controller to achieve extended flight times and improved agility compared to other rotary and flapping wing MAV designs. The chapter addresses the design and control fea-

tures of the proposed QV design and gives an overview on the developmental efforts towards the prototyping of the flyer. The potential applications for such a high-endurance vehicle are numerous, including airdeployable mass surveillance in cluster and swarm formations. The disposability of the vehicle would help in battlefield deployment as well, where such a, MAV would be made available to soldiers for proximity sensing and threat level assessment. Other applications would include search and rescue operations and civilian law enforcement." (Authors)] Address: Ratti, J., Robotics & Intelligent Machines, TechJect Inc., Atlanta, GA, USA. E-mail: jayantratti@gatech.edu

14222. Reborá, M.; Gaino, E.; Piersanti, S. (2014): The epipharyngeal sensilla of the damselfly *Ischnura elegans* (Odonata, Coenagrionidae). *Micron* 66: 31-36. (in English) ["Highlights: •No ultrastructural investigation has been performed so far on Odonata epipharynx. •We investigated the sensilla on the labrum of damselfly adults (*Ischnura elegans*). •On its ventral side the epipharynx shows sensilla (articulated hairs and small pegs). •The hairs, with a socket and a tubular body, have the structure of mechanoreceptors. •The pegs, with a tiny apical pore, have features typical of contact chemoreceptors. The knowledge on Odonata adult mouthparts sensilla is scanty and, notwithstanding the epipharynx in the labrum is considered an organ of taste, no ultrastructural investigation has been performed so far on this structure in Odonata. The labrum of the adult of *I. elegans* shows on its ventral side the epipharynx with sensilla represented by articulated hairs and by small pegs located at the apex of slightly raised domes. Under scanning and transmission electron microscope, the articulated hairs, with a well developed socket and tubular body, have the typical structure of bristles, the most common type of insect mechanoreceptors, usually responding to direct touch; the pegs, showing an apical pore together with a variable number of sensory neurons (from two to five), the outer dendritic segments of which show a dendrite sheath stopping along their length, have features typical of contact chemoreceptors." (Authors)] Address: Reborá, Manuela, Dipto Biol. Cellulare e Ambientale, Univ. Perugia, 06123 Perugia, Italy. E-mail: reborá@unipg.it

14223. Rodríguez, J.S.; Gómez, D.; Molineri, C. (2014): Nuevos registros de Odonata y Ephemeroptera para el noroeste de Argentina. *Revista de la Sociedad Entomológica* 73(1-2): 85-88. (in Spanish, with English summary) ["We provide new records for 14 species of Odonata and two species of Ephemeroptera including two new records for Argentina: *Nephepeltia leonardina* (Anisoptera: Libellulidae) and *Alloretochus peruanicus* (Ephemeroptera: Caenidae). The distributions of *Aphylla theodorina* and *Caenis tenella* (Caenidae) are extended to the Yungas (both previously known for the NE of Argentina). New records are also included for: *Neoneura confundens*, *Anax amazili*, *Brachymesia furcata*, *Erythemis plebeja*, *Erythrodiplax melanorubra*, *E. nigricans*, *Macrothemis imitans imitans*, *M. musiva*, *Miathyria marcella* and *Micrathyria hesperis*,

Progomphus complicatus and *P. joergenseni*." (Authors)] Address: Rodríguez, J.S., Instituto de Biodiversidad Neotropical CONICET-UNT, Horco Molle, s/n, (4107), San M. de Tucumán. E-mail: josephum@hotmail.com

14224. Roh, C.; Gharib, M. (2014): Modulation of a flow field by dragonfly nymph valve kinematics (Abstract: R7.00003). *Bulletin of the American Physical Society*, 67th Annual Meeting of the APS Division of Fluid Dynamics, Volume 59, Number 18, Sunday–Tuesday, November 23–25, 2014; San Francisco, California: (in English) [Verbatim: Previously, we visualized a respiratory jet and a propulsive jet of a dragonfly nymph using laser induced fluorescence. A more quantitative measurement of the dragonfly nymph's underwater breathing was investigated using digital particle image velocimetry. Simultaneously, dragonfly's anal valve kinematics were recorded using high-speed videography. The result shows an active usage of the valve during exhalation and inhalation to modulate the flow field. Calculating a Lagrangian particle path by time integration of the velocity field showed that the exhaled fluid is not inhaled back. This result suggests that the anal valve modulation of the flow field prevents the rebreathing of the exhaled jet.] Address: not stated

14225. Rong, L.; Latychevskaia, T.; Wang, D.; Zhou, X.; Huang, H.; Li, Z.; Wang, Y. (2014): Terahertz in-line digital holography of dragonfly hindwing: amplitude and phase reconstruction at enhanced resolution by extrapolation. *Optics Express* 22(14): 17236-17245. (in English) ["We report here on terahertz (THz) digital holography on a biological specimen. A continuous-wave (CW) THz in-line holographic setup was built based on a 2.52 THz CO₂ pumped THz laser and a pyroelectric array detector. We introduced novel statistical method of obtaining true intensity values for the pyroelectric array detector's pixels. Absorption and phase-shifting images of a dragonfly's hindwing were reconstructed simultaneously from single in-line hologram. Furthermore, we applied phase retrieval routines to eliminate twin image and enhanced the resolution of the reconstructions by hologram extrapolation beyond the detector area. The finest observed features are 35 μm width cross veins." (Authors)] Address: Latychevskaia, Tatiana, Physics Institute University of Zürich, Winterthurerstr. 190, 8057 Zürich, Switzerland. E-mail: tatiana@physik.uzh.ch

14226. Ruokonen, T.J.; Karjalainen, J.; Hämäläinen, H. (2014): Effects of an invasive crayfish on the littoral macroinvertebrates of large boreal lakes are habitat specific. *Freshwater Biology* 59(1): 12-25. (in English) ["(1) Invasive crayfish are widely acknowledged to have negative effects on benthic food webs in lakes, but few studies have investigated such effects at wider spatial scales and in varying habitats under natural conditions. (2) We examined the effects of introduced signal crayfish (*Pacifastacus leniusculus*) on the macroinvertebrate assemblages of different habitats in two large boreal lakes. We evaluated whether the density, taxon richness and

species composition are altered by the non-native crayfish and whether the responses are similar for stony and vegetated habitats and across a depth gradient. We also studied the influence of crayfish on periphyton biomass at stony sites, as a potential link to changes in macroinvertebrate communities. (3) In both lakes, macroinvertebrate density was similar between crayfish and non-crayfish sites across the habitats and depths studied. However, macroinvertebrate taxon richness was significantly lower, and community composition was altered in the presence of crayfish at stony sites. No similar pattern was detected at vegetated sites or in deeper sublittoral areas. The amount of periphyton was similar regardless of the presence of crayfish, and no clear direct or indirect crayfish–periphyton interaction was detected. (4) Our results suggest that introduced signal crayfish can have negative effects on the littoral macroinvertebrates of large boreal lakes, but that these effects are habitat specific. Our findings highlight how the evaluation of possible effects of invasive species needs to be carried out comprehensively across different habitats and spatial scales if conclusions are to be robust." (Authors) The paper includes references to *Somatochlora metallica* and *Corduliidae* sp.] Address: Ruokonen, T.J., Dept of Biological and Environmental Science, University of Jyväskylä, Survantie 9, P.O. Box 35, FI-40014 Jyväskylä, Finland. E-mail: timo.j.ruokonen@jyu.fi

14227. Šácha, D. (2014): Results of a survey of dragonflies (Insecta: Odonata) of Popradské rašelinisko fen. *Folia faunistica Slovaca* 19(1): 33-36. (in Slovak, with English summary) ["There were 19 species of dragonflies discovered during the research conducted at Popradské rašelinisko fen in 2013. Three species are protected (*Sympetma fusca*, *Anax imperator*, *Sympetrum pedemontanum*), 8 are listed in the national Red List (*S. fusca*, *Lestes virens*, *Ischnura pumilio*, *Aeshna juncea*, *Orthetrum brunneum*, *Crocothemis erythraea*, *S. danae* and *S. pedemontanum*). In the case of *S. fusca*, *Lestes dryas* and *L. virens* these are the first published records from this site. List of species is thus extended up to 23 species of dragonflies (plus 2 species with questionable data), which ranks the site among the most important wetlands in the region of Podtatranská kotlina valley. Occurrence of 8 previously published species was not observed. Among them *Coenagrion armatum*, which likely is only an irregular element of Slovak dragonfly fauna." (Author)] Address: Šácha, D., Podtatranského 31, SK – 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@vazky.sk

14228. Šácha, D.; Racko, L. (2014): Results of the faunistic research of dragonflies at Šujské rašelinisko in 2013 (Insecta: Odonata). *Folia faunistica Slovaca* 19(1): 27-31. (in Slovak, with English summary) ["During an inventory of dragonflies of Šujské rašelinisko in 2013, 20 species were discovered. Occurrence of the species of the Community interest *Coenagrion ornatum* is confirmed, as well as four species of national importance (*Anax impera-*

tor, *Aeshna isocetes*, *Orthetrum coerulescens*, *Sympetrum pedemontanum*) and nine species included in the national Red List (*Ischnura pumilio*, *Coenagrion ornatum*, *A. isocetes*, *A. juncea*, *O. coerulescens*, *O. brunneum*, *S. pedemontanum*, *S. danae*, *Leucorrhinia rubicunda*). From a faunistic viewpoint, the most interesting are reports of *L. rubicunda* and *A. isocetes*, whereby the site is a new one for them in Slovakia." (Authors)] Address: Šácha, D., Podtatranského 31, SK – 031 01 Liptovský Mikuláš, Slovakia. E-mail: dusan.sacha@vazky.sk

14229. Sadeghi, S.; Dumont, H.J. (2014): Variation in the shape of the wings and taxonomy of Eurasian populations of the *Calopteryx splendens* complex (Odonata: Calopterygidae). *Eur. J. Entomol.* 111(4): 575-583. (in English) ["We used geometric morphometrics to determine variation in the morphology of the forewings of individuals in 20 populations of *Calopteryx splendens* s.l. in Eurasia and related these to the circum-specific taxonomy of this taxon. We found differences in shape, with the largest and smallest centroid size of the wings in adjacent northern (*orientalis*) and western (*intermedia*) populations in Iran, respectively, so isolation and relationship are not necessarily determined by distance, but often associated with the stream basin inhabited. The variation in wing shape, however, was much greater. with Populations at the eastern edge of the range (Tajikistan, Kyrgyzstan and East Kazakhstan) uniquely different. Oddly, no taxonomic name is associated with them, although they may be among the oldest representatives of the *splendens* complex. The European and Asian populations are in two separate clades. One of these includes insects with no to a medium-sized wing spot, which does not reach the tip of the wing (*waterstoni*-group), while the other includes insects with very broad wing spots, or, when short, it extends to the very tip of the wings and most females are androchrome (*ancilla* or *intermedia* group). Turkmenistan and northern Iranian population form a separate line inside this clade, which we equate with *Calopteryx orientalis*. South Albanian and Greek populations are in a separate branch corresponding to ssp. *balcanica*; two populations from Ireland and Italy form a branch that has no equivalent in traditional taxonomy, while *Calopteryx xanthostoma* was not identified by its wing shape. Understanding this multitude of phenotypes and the enormous amount of variation within certain populations but not in others becomes easy if one assumes there were two probable late Pleistocene waves of migration, the first of insects lacking spots that migrated east and westwards from the South Black Sea basin, the second, perhaps from the west Caspian, composed of heavily spotted insects with androchromic females. The hybridization between these two waves resulted in the current plethora of colour forms and accounts for why similar phenotypes may turn up independently in widely distant locations." (Authors)] Address: Sadeghi, S., Dept of Biology, Faculty of Sciences, Shiraz University, Shiraz, Iran. E-mail: ssadeghi@shirazu.ac.ir; hsabersadeghi@gmail.com

14230. Salur, A.; Basgöz, N.; Telli, M.A. (2014): Faunistic study on Odonata (Insecta) of Gölbel Lake, Northern Turkey. *Munis Entomology & Zoology* 9(2): 950-951. (in English) [Gölbel Lake, Osmancik district, Çorum Province, Turkey, 41°06' 164" N 34° 55' 837" E, 1360 m a.s.l. 17 odonate species - all new for the district - were caught in June - August 2010 and in July 2011: *Lestes sponsa*, *L. barbarus*, *Sympecma fusca*, *Coenagrion puella*, *Enallagma cyathigerum*, *Ischnura elegans ebneri*, *Pyrrhosoma nymphula*, *Anax imperator*, *Cordulia aenea*, *Crocothemis erythraea*, *Leucorrhinia pectoralis*, *Libellula depressa*, *L. quadrimaculata*, *Orthetrum brunneum*, *O. albistylum*, *Sympetrum fonscolombii*, and *S. sanguineum*.] Address: Salur, A., Hitit University Arts and Sciences Faculty Dept of Biology, 19030, Corum, Turkey. E-mails: alisalur@gmail.com

14231. Sánchez-Guillén, R.A.; Córdoba-Aguilar, A.; Cordero-Rivera, A.; Wellenreuther, M. (2014): Rapid evolution of prezygotic barriers in non-territorial damselflies. *Biological Journal of the Linnean Society* 113(2): 485-496. (in English) ["A central question in evolutionary biology concerns the accumulation of reproductive barriers during speciation. However, separating the reproductive barriers that have led to speciation from those that have secondarily accumulated (i.e. after initial divergence) is a widely recognized problem. Ideal candidate species for overcoming this problem are young species, where time for additional barriers to accrue has been limited. In the present study, we add to previous studies investigating the strength of reproductive barriers between the parapatric damselflies *Ischnura elegans* and *I. graellsii* by quantifying seven prezygotic barriers between the allopatric pairs of *I. elegans* and *I. genei*, as well as *I. graellsii* and *I. genei*. Specifically, we measured four premating (temporal, sexual, mechanical I, and mechanical II) and three postmating (oviposition success, fecundity, and fertility) barriers using experimental approaches and, for first time, we investigated the mechanisms causing mechanical isolation, which is the strongest reproductive barrier in ischnurans. The findings of the present study support the notion that premating barriers are generally strong and contribute significantly to total reproductive isolation in young lineages (65–98%), although they never solely lead to complete isolation. Asymmetry was generally stronger in premating than in postmating barriers, and was driven mostly through asymmetry in mechanical isolation, which is caused by morphological divergence of secondary sexual appendages. We found that barriers act multiplicatively in all species combinations tested, with the exception of sexual isolation, which was not detected. Our results are consistent with a recent allopatric speciation scenario driven by differences in male anal appendages, either impeding copulation or affecting female preferences. Taken together, the results from this and previous studies in diverse odonate genera suggest that premating barriers have evolved rapidly in ischnuran damselflies and, although reproductive isolation in ischnurans is more commonly the result of several barriers acting together, morphological divergence of second-

ary sexual appendages appears to be a common factor facilitating premating isolation in this group." (Authors)] Address: Sánchez-Guillén, Rosa, Depto de Ecología e Biología Animal, E. U. E. T. Forestal, Universidade de Vigo, Pontevedra, Spain. E-mail: rguillen@uvigo.es

14232. Sánchez-Guillén, R.A.; Muñoz, J.; Hafernik, J.; Tierney, M.; Rodríguez-Tapia, G.; Córdoba-Aguilar, A. (2014): Hybridization rate and climate change: are endangered species at risk? *Journal of Insect Conservation* 18: 295-305. (in English) ["Many species are altering their geographic range due to climate change creating new sympatric populations of otherwise allopatric populations. We investigated whether climate change will affect the distribution and thus the pattern of hybridization between two pairs of closely related damselfly species [*Ischnura damula* and *I. demorsa*, and *I. denticollis* and *I. gemina* (this, an endangered species)]. Thus, we estimated the strength of pre and postmating reproductive barriers between both pairs of species, and we predicted future potential distribution under four different Global Circulation Models and a realistic emissions scenario of climate change by using maximum entropy modelling technique. Our results showed that reproductive isolation (RI) is complete in *I. damula* × *I. demorsa* individuals: F1 (first generation) hybrids are produced but do not reach sexual maturation. However, RI in *I. denticollis* × *I. gemina* hybrids is high but incomplete and unidirectional: only *I. gemina* females produced F1 hybrids which mate with males and females of *I. denticollis* and between them producing BC1 (backcrosses) and F2 (second generation) viable hybrids. Maximum entropy models revealed a northern and westward shift and a general reduction of the potential geographic ranges. Based on the pattern of hybridization, for *I. damula* and *I. demorsa* there is a current threat as well as a rapid displacement and/or extinction of *I. gemina* by *I. denticollis*. However, the current pattern of extinction may not continue due to the contraction in ranges of the four species." (Authors)] Address: Sánchez-Guillén, Rosa, Departamento de Ecología e Biología Animal, E. U. E. T. Forestal, Universidade de Vigo, Pontevedra, Spain. E-mail: rguillen@uvigo.es

14233. Sanogo, S.; Kabre, J.; Ceccji, P. (2014): Spatial-temporal dynamics of population structure for macro invertebrates families in a continuum dam - effluent - river in irrigated system. *Volta Basin (Burkina Faso)*. *International Journal of Agricultural Policy and Research* 2(5): 203-214. (in English) ["A monthly sampling of benthic macro invertebrates was carried out at the hydro-agricultural dam of Boura in the Volta watershed basin (Burkina) during the period of February through July 2012 in order to describe the structuring of insect succession along with changes occurring in habitats of this irrigated dam farming system. The samples of insects were collected from 6 stations located inside the littoral (Station I), the sublittoral (Station II), the sewage channel or effluent (Stations III, IV, V) and the Mouhoun River (Station VI). The sampling method employed is a conventional method by the European Union

named "Directive Cadre sur l'Eau (DCE)" recommended for the survey of benthic macro invertebrates. The survey reveals a community composed majorly of insects (more than 75%) variously distributed. On one hand at the shoreline and the coastal- adjoining zone in the dam, 23 families of macro invertebrates were identified; mostly belonging to the shoreline except for 10 families identified as endemic to the adjoining zone of the coastline. These two zones of the dam shelter the same malacological fauna consisting of the Unionidae, Lymneidae, Ampullariidae, Planorbidae, Valvatidae and Bulinidae families. The survey reveals otherwise that the differences between the Shannon biological diversity indices for these two zones were more pronounced during the month of July, the rainy period in the basin. On the other hand, concerning the dam-effluent-river continuum, a total of 35 families are sampled: 27 from dam water and stations near the irrigated zones; and 32 from the station of the sewage channel far from the irrigated zone and the river. The identification of individuals belonging to the family of the Baetidae and the Ephemereididae (order of Ephemeroptera) in the river water highlights a subsequent reconstruction of the biodiversity in the river as the presence of both families is an indicator of fertile water. Further analysis on the spatial and temporal distribution involved 17 families out of the 35 sampled not common to all habitats. This lead to the conclusion that changes in natural habitats dictate the clustering patterns of macro invertebrates populations during the year long." (Authors) Taxa - including Gomphidae, Libellulidae and Coenagrionidae - are treated at family level.] Address: Kabre, A., Lab. de Recherche et de Formation en Peche et Faune (LaRFPF/ IDR), Université de Bobo-Dioulasso, BP. 1091 Bobo 01, Burkina Faso. E-mail: ankab226@yahoo.fr

14234. Sato, M.; Nishijima, S.; Miyashita, T. (2014): Differences in refuge function for prey and tolerance to crayfish among macrophyte species. *Limnology* 15: 27-35. ["The invasive crayfish *Procambarus clarkii* is an omnivore and an ecosystem engineer whose feeding mechanism has reduced the abundance of many native invertebrates and macrophytes. Since macrophytes provide refuges for aquatic insects, macrophyte depletion by crayfish might have indirect negative effects on animal prey in aquatic habitats. We postulated that the prey refuges provided by macrophytes and macrophyte tolerance to crayfish cutting and feeding vary among macrophyte species. We conducted two experiments to (1) investigate differences in macrophyte refuge function for dragonfly larvae against crayfish, and (2) test the tolerance to crayfish cutting and feeding among macrophyte species. *Elodea nuttallii* (submerged plant), *Potamogeton crispus* (submerged plant), and *Carex idzuroei* (emergent plant) had greater refuge effects than *Trapa japonica* (floating-leaved plant), an effect that might result from the larger total cover of *E. nuttallii*, *P. crispus*, and *C. idzuroei*, and the hardness of *C. idzuroei* leaves. Tolerance to crayfish cutting and feeding was greater in *C. idzuroei* than in the other species. As the macro-invertebrate as-

semblages in submerged vegetation are more abundant and species-rich than those in emergent and floating-leaf vegetation, conservation of *E. nuttallii* and *P. crispus* should be prioritized for restoring native aquatic animals in ecosystems invaded by the introduced crayfish. We examined four macrophyte treatments (*E. nuttallii*, *P. crispus*, *T. japonica*, and *C. idzuroei*) and a control (no macrophyte), and measured the predation rates of red swamp crayfish (*Procambarus clarkii*) on a native dragonfly (*Sympetrum baccha matutinum*) in each treatment. Crayfish were collected from Iwata, in Shizuoka Prefecture, while dragonfly larvae were collected from Kashiwa, in Chiba Prefecture. Results: Crayfish predation on dragonfly larvae: In the treatment without crayfish, 97 of 100 dragonfly larvae survived ($n = 2$, ten containers) the entire experiment: the *E. nuttallii*, *P. crispus*, and no macrophyte treatments each had one dead larva. Multiple regression analysis showed that the interaction between macrophyte treatment and day (day represents repeated measures), and day itself were significant for the number of dragonfly larvae, although the number of dragonfly larvae did not differ significantly among macrophyte treatments. This means that the time-related effect of crayfish on the number of dragonfly larvae differed among macrophyte treatments. The rate of decrease in dragonfly larvae was greater in the *T. japonica* and no macrophyte treatments than in the others. The *E. nuttallii* treatment had a greater rate of decrease in dragonflies compared to that of *C. idzuroei*. Logistic regression analysis demonstrated that the interaction between macrophyte species and mass, and mass itself were significant for the survival of dragonfly larvae, whereas macrophyte species was not significant. The significance of the interaction term indicates that the slopes of the relationship between dragonfly larvae survival and macrophyte mass differed among macrophyte species within the given range of macrophyte mass. Post hoc comparisons showed that the slope in the presence of *E. nuttallii*, *P. crispus*, and *C. idzuroei* was significantly greater than that in the presence of *T. japonica*. However, there were no other significant pairwise differences." (Authors)] Address: Miyashita, T., Laboratory of Biodiversity Science, School of Agriculture and Life Sciences, University of Tokyo, Yayoi, Tokyo 113-8656, Japan. E-mail: tmiya@es.a.u-tokyo.ac.jp

14235. Savard, M.; Mochon, A. (2014): L'aeschna majestueuse, une libellule en situation précaire au Québec. *Le Naturaliste canadien* Volume 138(2): 8-15. (in French, with English summary) ["According to historical data from entomological collections, the swamp damer (*Epiaeschna heros*) was more frequent in Québec in the past. The specimen caught on June 24, 2013 at Lac-Brome, in the Montérégie region, was the first individual of this species to be record in the province for 25 years. In Québec, human activity has resulted in the loss and perturbation of the forest-shaded temporary pools and fluvial swamps favoured by this species, which means that the swamp damer is now rare and potentially vulnerable in the province." (Authors)] Address: Mochon, A. mochon.alain@sepaq.com

14236. Schneider, T.; Schneider, E.; Schneider, J.; Müller, O. (2014): Rediscovery of *Cordulegaster vanbrinkae* in Iran (Odonata: Cordulegastridae). *Odonatologica* 43(1/2): 25-34. (in English) ["In July 2013, a total of 14 males of *C. vanbrinkae* was observed in the Hyrcanian Forest, Alborz Mountains, north-western Iran, not far from the type locality. This is only the second record of this poorly known species from Iran. Seven male specimens were collected. The variation of abdominal colour patterns and other morphological characters are shown. Notes on the biology of this species and a description of the biotope of a recently discovered population in Armenia are given." (Authors)] Address: Schneider, T., Arnold-Knoblauch-Ring 76, 14109 Berlin, Germany. E-mail: thomas.rs@gmx.de

14237. Seehausen, M. (2014): Forgotten duplicates from the Odonata collection of Edmond de Selys Longchamps rediscovered at the Übersee-Museum Bremen (Germany). *International Dragonfly Fund - Report 70*: 1-15. (in English) ["A selection of duplicates from the collection of Michel Edmond de Selys Longchamps was found at the Übersee-Museum Bremen/Germany (UMB). Selys determined a lot of Odonata in the UMB collection and sent 80 European and 76 exotic species to Bremen on 23 April, 1875. According to the labels 121 specimens could be assigned to this shipment and eleven specimens must have been sent to UMB in later years. This collection includes two paralectotypes (*Progomphus gracilis* Hagen in Selys, 1853; *Palaemnema nathalia* Selys, 1886) and seven syntypes (*Rhinocypha trifasciata* Selys, 1853; *Dysphaea dimidiata limbata* Selys, 1859; *Argia sordida* Hagen in Selys, 1865; *Oxyagrion dissidens* Selys, 1876; *Oxyagrion haematinum* Selys, 1876; *Oxyagrion pavidum* Hagen in Selys, 1876; *Telagrion longum* Selys, 1876). In addition, a male specimen of *Euphaea tricolor subcostalis* Selys, 1873 might also belong to the original syntype series. Altogether three specimens with labelled nomina nuda (*Diplax catharina* Selys, *Diplax fausta* Selys, *Dythemis bilineata* Hagen) and two labelled with manuscript names (*Diplax marcellina* Selys, *Perithemis ovata* Bates) are in this collection." (Author)] Address: Seehausen, M., Museum Wiesbaden, Natural History State Collection, Friedrich-Ebert-Allee 2, 65185 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

14238. Siesa, M.E.; Padoa-Schioppa, E.; Ott, J.; De Bernardi, F.; Ficetola, G.F. (2014): Assessing the consequences of biological invasions on species with complex life cycles: Impact of the alien crayfish *Procambarus clarkii* on Odonata. *Ecological Indicators* 46: 70-77. (in English) ["Highlights: •Invasive species can have complex consequences on species with complex life cycle. •We assessed the impact of *P. clarkii* on the richness of odonate life history stages. •The richness of adult odonates did not reveal any impact of the crayfish. •The richness of larvae and exuviae was negatively affected by the crayfish. •Aquatic life stages are better indicators of the crayfish impact, compared to adults. Abstract: The

temporal dimension is a key parameter when analysing the impact of invasive alien species. Studies on early invasion stages allow a better understanding of how ongoing processes modify native communities, helping to plan effective management actions. *P. clarkii* is an invasive crayfish influencing multiple features of invaded wetlands, but unravelling its impact on organisms with complex life cycles is difficult. We monitored 107 wetlands in Northern Italy, and evaluated the relationships between *P. clarkii* and the richness of three life history stages of odonates: adults, larvae and exuviae. We measured environmental features of each wetland and the natural vegetation in the surrounding landscape. We used an information-theoretic approach to relate species richness of the three life history stages of odonates to: wetland features, features of the surrounding landscape; crayfish presence. We used a spatially explicit technique (Moran Eigenvector Mapping) allowing the integration of spatial autocorrelation into analyses. Wetland and landscape features explained a significant amount of community richness. Wetland hydroperiod, canopy cover and stream velocity were the variables most strongly related to odonate richness. Furthermore, we observed significant relationships between *P. clarkii* and the richness of odonate communities, but the effect of the crayfish on the three odonate stages was different. Species richness measured using both larvae and exuviae was negatively related to the crayfish presence, while negative effects on adults were not evident. Furthermore, negative relationships were observed for Anisoptera but not for Zygoptera. A significant effect of eigenvectors representing spatial configuration suggests an important role of dispersal-related mechanisms in maintaining species richness in invaded wetlands, where fitness is likely lower. Larvae and exuviae may be more helpful for the assessment of the impact of invasive species at early stages of the invasions, while adults may better describe the long term consequences of the invasion at the landscape scale. Considering multiple life-history stages improves our understanding of the impact of biological invasions in freshwaters." (Authors)] Address: Ficetola, G.F., Dipartimento di Scienze dell'Ambiente e del Territorio, Università degli Studi di Milano-Bicocca, Piazza della Scienza 1, 20126 Milan, Italy. E-mail: francesco.ficetola@gmail.com

14239. Sindaco, R.; Grieco, C.; Riservato, E.; Rege, G. (2014): Le libellule (Insecta: Odonata) dell'Anfiteatro Morenico di Ivrea (Piemonte). *Rivista piemontese di Storia Naturale* 35: 109-138. (in Italian, with English summary) ["The dragonfly fauna of the moraine amphitheater of Ivrea (Piedmont, NW Italy), an area rich in lentic habitats, including some of the larger lakes of Piedmont, is described. With 48 species, this is one of the most important dragonfly areas of NW Italy. Among the most relevant species in regional scale, the occurrence of *Coenagrion pulchellum*, *Brachytron pratense*, *Onychogomphus uncatus*, *Cordulia aenea*, *Oxygastra curtisii* and *Sympetrum vulgatum* is highlighted. Three species previously recorded for the study area have not been

confirmed during the study (*Symplocma paedisca*, *Erythromma najas*, *Anax ephippiger*)." (Authors)] Address: Sindaco, R., c/o Museo Civico di Storia Naturale, via San Francesco di Sales 88, I-10022 Carmagnola, Italy

14240. Skoglund, L. (2014): Artsamhällen av trollsländor (Odonata) i norrländska tjärnar: identifiering av möjliga indikatorarter för artmångfald. Independent thesis Basic level (degree of Bachelor), Halmstad University, School of Business and Engineering (SET): 18 pp. (in Swedish, with English summary) ["A field study of dragonfly larvae was performed in 20 lakes situated in boreal forest in northern Sweden (in the southeast of Norrbotten county), accompanied by the study of several habitat variables within the locales; fish presence, composition of water vegetation, forestry and the distribution of Sphagnum moss. None of these variables had a proven effect on the species composition of Odonata. This may be due to the fact that species occurring in the north part of the country are generally more tolerant to environmental variables compared to species with a more southern focus of distribution. A shorter growth season implies prolonged life cycles and should in all probability bring about a greater need for habitat tolerance. When a species occurrence is not strictly random the species richness within a region increases/decreases as a result of the presence/absence of specific species which are sensitive to particular variables in their surroundings (deconstructive approach to species richness). Indicator species (indicating general species richness) were distinguished by implementing an analysis of nestedness and the result was compared to a similar study conducted for central Sweden (Sahlén & Ekstubbé, 2001). *E. najas* and *L. quadrimaculata* came forth as suitable indicator species for northern boreal freshwater habitats in this study. In the north they displayed specialist tendencies and were highly selective in their choice of habitats. The same species appears in a very different ecological context when localized to southern Sweden where they are considered trivial species. In addition, temporal follow-ups (repeated stocktakings) of the species composition of small freshwater habitats in this region, and the establishment of accompanying nestedness matrices will allow for the detection of ecological shifts within particular species. These would indicate ongoing restructuring of the Odonate communities and yield information about the impact of climate change." (Author)] Address: Skoglund, Linda c/o Sahlén, G., Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, S-752 36 Uppsala, Sweden. E-mail: goran.sahlen@set.hh.se

14241. Śniegula, S.; Drobniak, S.M.; Gołą, M.J.; Johansson, F. (2014): Photoperiod and variation in life history traits in core and peripheral populations in the damselfly *Lestes sponsa*. *Ecological Entomology* 39: 137-148. (in English) ["(1.) In order to predict evolutionary responses to environmental changes one needs to identify the evolutionary potential in terms of genetic variation of traits and of the traits' plasticity. We studied genetic variance in life his-

tory traits and their reaction norms in response to manipulated photoperiods in central, northern, and northernmost peripheral populations of *Lestes sponsa*. After the central-marginal hypothesis, it is predicted that central populations will express the highest genetic variance. (2.) Northern and northernmost populations showed the highest development and growth rates. All populations expressed shorter development and accelerated growth when raised in a northern compared with a central latitude photoperiod. The slopes of reaction norms differed between regions resulting in a region-by-photoperiod interaction. (3.) There was genetic variation in development time; however, it did not differ across regions. There was no genetic variation in growth rate or in the plasticity of development time and growth rate to photoperiod. (4.) Results did not support the central-marginal hypothesis. However, evidence was found that the development time has the potential to evolve at similar rates across study regions. In contrast, the growth rate seems to be genetically constrained for further evolution, probably because of a strong past directional selection on this trait. The presence of low genetic variation in the slope of the reaction norms could be a result of stabilising selection imposed by seasonality." (Authors)] Address: Śniegula, S., Dept Ecosystem Conservation, Inst. of Nature Conservation, Polish Academy of Sci., Kraków, Poland. E-mail: szymon.sniegula@gmail.com

14242. Su, R.S.-C.; Kim, Y.; Liu, J.C. (2014): Resilin: Protein-based elastomeric biomaterials. *Acta Biomaterialia* 10: 1601-1611. (in English) ["Resilin is an elastomeric protein found in insect cuticles and is remarkable for its high strain, low stiffness, and high resilience. Since the first resilin sequence was identified in *Drosophila melanogaster* (fruit fly), researchers have utilized molecular cloning techniques to construct resilin-based proteins for a number of different applications. In addition to exhibiting the superior mechanical properties of resilin, resilin-based proteins are autofluorescent, display self-assembly properties, and undergo phase transitions in response to temperature. These properties have potential application in designing biosensors or environmentally responsive materials for use in tissue engineering or drug delivery. Furthermore, the capability of resilin-based biomaterials has been expanded by designing proteins that include both resilin-based sequences and bioactive domains such as cell-adhesion or matrix metalloproteinase sequences. These new materials maintain the superior mechanical and physical properties of resilin and also have the added benefit of controlling cell response. Because the mechanical and biological properties can be tuned through protein engineering, a wide range of properties can be achieved for tissue engineering applications including muscles, vocal folds, cardiovascular tissues, and cartilage." (Authors) The review includes references to Odonata.] Address: Liu, Julie, School of Chemical Engineering, Purdue University, West Lafayette, IN 47907-2100, USA. E-mail: julieliu@purdue.edu

14243. Sun, J.; Ling, M.; Pan, C.; Chen, D.; Tong, J.; Li, X. (2014): Biomimetic structure design of dragonfly wing

vention using topology optimization method. *Journal of Mechanics in Medicine and Biology* 14, 1450078, DOI: 10.1142/S021951941450078X: 17 pp. (in English) ["Scientists have carried out research for various biomimetic applications based on the dragonfly wings because of the superb flying skills and lightsome posture. The wings of dragonflies are mainly composed of veins and membranes, which give rise to the special characteristics of their wings that make dragonflies being supremely versatile, maneuverable fliers. Mimicking the dragonfly wing motion is of great technological interest from application's point of view. However, the major challenge is the biomimetic fabrication to replicate the wing motion due to the very complex nature of the wing venation of dragonfly wings. In this regard, the topology optimization method (TOM) is useful to simplify object's structure while retaining its mechanical properties. In this paper, TOM is employed to simplify and optimize the venation structure of *Pantala flavescens* wing that is captured by a 3D scanner and numerical reconfiguration. Combined with the material parameters obtained from nanoindentation testing, the quantitative models are established based on a finite element (FE) analysis and discussed in static range. The quantitative models are then compared with the square frame, staggered grid frame and hexagonal frame to examine the potentials of the biomimetic structure design for the fabrication of greenhouse roof." (Authors)] Address: Sun, J., Key Laboratory of Bionic Engineering (Ministry of Education, China), Jilin University, Changchun 130022, P. R. China

14244. Susheela, P.; Radha, R.; Ezhili, N. (2014): Diversity and distribution of aquatic insect population in Singanalur lake, Coimbatore, Tamil Nadu, India. *Journal of international academic research for multidisciplinary* 2(5): 141-147. (in Aquatic Insects, Biological Indicators, Environmental Assessment, Ecological Roles, Ecosystem) ["This study deals with diversity and distribution of aquatic insects from three stations in the Singanalur lake of Coimbatore district for a period of four months from December 2013 to March 2014 from the three sampling sites of the lake. The aquatic insects were sampled systematically and randomly in station-wise habitats, using standard protocols. The insects belonging to the orders Hemiptera, Coleoptera, Diptera, Odonata, Trichoptera, and Ephemeroptera were collected from December 2013 to March 2014 from the sampling sites. Hemiptera ranked first with the large population of individuals and percentage (1555 and 48.5%). The orders followed by Hemiptera were Coleoptera (631, 19.6%) Diptera (505, 15.7%), Odonata (333, 10.3%), Trichoptera (119, 3.7%), Ephemeroptera (61, 1.9 %)."] (Authors)] Address: Susheela, P., Dept. Zoology, PSGR Krishnammal College for Women, Coimbatore, Tamil Nadu, India

14245. Sviderskii, V.L.; Plotnikova, S.I.; Gorelkin, V.S.; Severina, I.Yu.; Isavnina, I.L. (2014): Functional role of dragonfly legs before and after wing formation: Rearrangement of coordinatory relationships. *Neuroscience and Behavioral Physiology* 44(7): 804-809. (in English)

["We report here our studies of the characteristics of the structural-functional organization of the leg apparatus of the dragonfly *Aeshna grandis*, in larvae of the final instar, whose legs have a locomotor function, and in adult winged individuals (imagoes), whose legs have lost their locomotor function and are used mainly as traps to catch prey in the air. Neither the shape nor the proportions of individual leg segments in imagoes were significantly different from those in larvae, and all changes in the functional role of the legs in imagoes occur as a result of changes in the mechanisms controlling the functioning of the leg muscles and the corresponding rearrangements in coordinatory relationships. These rearrangements, as evidenced by the data reported here, affect the mechanisms generating motor commands, the appearance of a tight correlation in the operation of the wing muscles and the leg apparatus, and various others. These mechanisms are discussed." (Authors) Address: Sviderskii, V.L., Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, 44 M. Torez Prospekt, 194223, St. Petersburg, Russia. E-mail: vlsvider@iephb.ru

14246. Tajima, Y.; Watanabe, M. (2014): Counter-adaptation in response to sperm removal by stimulating the sensory system in female *Ischnura asiatica* (Odonata: Coenagrionidae). *Odonatologica* 43(1/2): 115-124. (in English) ["The male *Ischnura asiatica* (Brauer, 1865) has a pair of horns on its penis head. Because each horn is shorter than the spermathecal duct, the spermatheca is inaccessible to the male. Thus, males can not directly displace spermathecal sperm using the horns. Nevertheless during copulation displacement of sperm from the spermatheca does occur. By stimulating vaginal sensilla that communicate the presence of an egg to the muscles surrounding the sperm storage organs, sperm ejection can be induced as fertilization is anticipated by the female. Males with a large penis head might be better adapted to stimulate the sensilla and displace more sperm than those with a small penis head. From the viewpoint of females, on the other hand, there are costs if complete sperm displacement occurs. Decreasing the number of sensilla might make it difficult for the male's stimulation to displace spermathecal sperm, especially where a population includes males with a large penis head. To test this hypothesis, the width of the penis head and the number of sensilla were measured in several local populations, with different body sizes, distributed in mainland Japan. The number of sensilla decreased with the width of the penis head. Therefore, a low number of sensilla in the females might be a counter-adaptation against the male sensory stimulation." (Authors)] Address: Watanabe, M., Graduate School of Life & Environ. Sci., Univ. Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

14247. Takahashi, Y.; Kagawa, K.; Svensson, E.I.; Kawata, M. (2014): Evolution of increased phenotypic diversity enhances population performance by reducing sexual harassment in damselflies. *Nature communications* | 5: 4468 | DOI: 10.1038/ncomms5468: 7 pp. (in English)

["The effect of evolutionary changes in traits and phenotypic/genetic diversity on ecological dynamics has received much theoretical attention; however, the mechanisms and ecological consequences are usually unknown. Female-limited colour polymorphism in damselflies is a counter-adaptation to male mating harassment, and thus, is expected to alter population dynamics through relaxing sexual conflict. Here we show the side effect of the evolution of female morph diversity on population performance (for example, population productivity and sustainability) in damselflies. Our theoretical model incorporating key features of the sexual interaction predicts that the evolution of increased phenotypic diversity will reduce overall fitness costs to females from sexual conflict, which in turn will increase productivity, density and stability of a population. Field data and mesocosm experiments support these model predictions. Our study suggests that increased phenotypic diversity can enhance population performance that can potentially reduce extinction rates and thereby influence macroevolutionary processes." (Authors)] Address: Takahashi, Y., Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Sendai, Miyagi 980-8578, Japan. E-mail: takahashi.yum@gmail.com

14248. Takhelmayum, K.; Gupta, S. (2014): Odonata larvae of Keibul Lamjao National Park, Manipur, north-eastern India. *Journal of Threatened Taxa* 6(6): 5858-5863. (in English) [Larvae of 15 Odonata taxa were collected during 2009–2011. The list of taxa includes *Aeshna juncea* and *Leucorrhinia* sp., both taxa nearly impossible to occur in this region.] Address: Takhelmayum, Kiranbala, Dept Ecol. & Environ. Sci., Assam University, Silchar, Assam 788011, India. E-mail: kirantakhelmayum@yahoo.com

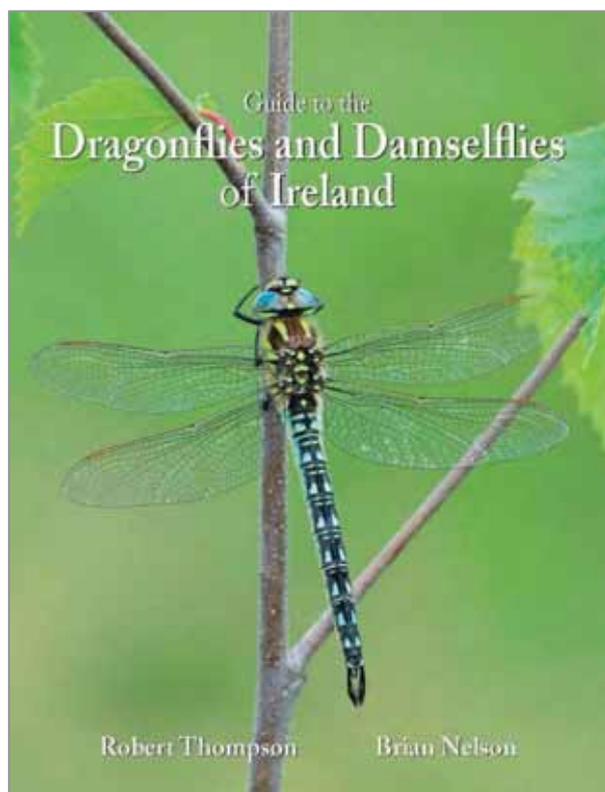
14249. Theischinger, G.; Richards, S.J. (2014): *Palaeosynthemis nigrostigma* sp. nov., a new dragonfly from Papua New Guinea (Anisoptera: Synthemistidae). *International Dragonfly Fund - Report 71*: 1-7. (in English) ["A new species of the synthemistid genus *Palaeosynthemis* is described from the Trauna River valley in Western Highlands Province, Papua New Guinea. The new species is most similar to *P. cyrene* from which it can be distinguished, among other characters, by the coloration of the pterostigma (jet-black in the new species vs brownish yellow in *P. cyrene*) and of the wing bases (not darkened vs strongly darkened). The new species also differs from *P. cyrene* in having a narrow, almost parallel-sided yellow lateral synthoracic stripe and a well-defined yellow marking along most of the ventral margin of the metepimeron. In *P. cyrene* the lateral synthoracic stripe is markedly wider and tapered, and the yellow element along the ventral margin of the metepimeron is absent. Characters of the adult male are illustrated and the affinities of the species are discussed." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

14250. Theischinger, G.; Richards, S.J. (2014): *Drepanosticta elaphos* sp. nov. and *Drepanosticta pterophora* sp. nov. from Papua New Guinea (Odonata: Platystictidae). *Odonatologica* 43(1/2): 91-103. (in English) ["Two species of *Drepanosticta* Laidlaw from Papua New Guinea are described as new. They are: *Drepanosticta elaphos* sp. nov. (holotype male: Papua New Guinea) and *D. pterophora* sp. nov. (holotype male: Papua New Guinea), both from the upper Sepik Basin. Characters of the adults are illustrated, habitat notes are provided and their affinities are discussed." (Author)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

14251. Theischinger G.; Richards, S.J. (2014): *Drepanosticta machadoi* spec. nov. from New Guinea (Odonata: Platystictidae). *Zootaxa* 3866(1): 145-150. (in English) ["*Drepanosticta machadoi* sp. nov. (Holotype male: Dablin Creek, Hindenburg Range) from Papua New Guinea is described. The new species is a predominantly black damselfly, the male with four pale/bright pattern elements on each side of the synthorax, dorsum of segments 9 and 10 largely bright blue, and a uniquely shaped posterior lobe of the pronotum which is a wide-angled fork with rather straight, narrow finger-like prongs. It is referred to the *Drepanosticta conica* group of species and a key to the males of the *D. conica* group is provided." (Authors)] Address: Theischinger G., Office of Environment and Heritage New South Wales, PO Box 29, Lidcombe, NSW 1825, Australia. E-mail: gunther.theischinger@environment.nsw.gov.au

14252. Therry, L.; Gyulavári, H.A.; Schillewaert, S.; Bonte, D.; Stoks, R. (2014): Integrating large-scale geographic patterns in flight morphology, flight characteristics and sexual selection in a range-expanding damselfly. *Ecography* 37: 1012-1021. (in English) ["While geographic trait variation along environmental clines is widespread, associated patterns in sexual selection remain largely unexplored. Geographic patterns in sexual selection may be expected if 1) phenotypes vary geographically and sexual selection is dependent on the local phenotypes in the population, and if 2) sexual selection is influenced by geographically structured environmental conditions. We quantified geographic variation in flight-related traits and flight performance in mated and unmated males and tested for geographic variation in sexual selection on these traits in the poleward range-expanding damselfly *Coenagrion scitulum* across a set of eleven core and edge populations ordered along thermal gradients in the larval and in the adult stage. We found little support for trait differentiation between core and edge populations, instead we found considerable geographic trait variation along the larval and adult thermal gradients. As expected under time constraints, body mass decreased with shorter larval growth seasons. Lower temperatures during the adult flight period were associated with a higher body mass, a higher flight speed and a higher fat content; these traits likely evolved to buffer flight ability at subop-

timal temperatures and to optimize starvation resistance. Across the large geographic scale, we found a consistent higher flight duration in mated males. Instead, sexual selection for higher fat content was stronger in populations with lower adult flight temperatures and sexual selection for lower body mass acted only in edge populations. Our results indicate sexual selection on flight performance to be consistent over a large geographic scale and this despite the clear geographic patterns in sexual selection on the underlying morphological traits. Our results highlight that to fully understand the fitness implications of geographically changing trait patterns, researchers should consider the entire phenotype–performance–fitness axis and incorporate effects of geographically structured life-stage specific environmental conditions on this axis." (Authors)] Address: Therry, L., Laboratory of Aquatic Ecology, Evolution and Conservation, KU Leuven, Leuven, Belgium. E-mail: lieven.therry@bio.kuleuven.be



14253. Thompson, R.; Nelson, B.; Lewington, R. (2014): Guide to the dragonflies and damselflies of Ireland. Blackstaff Press: 136 pp. ISBN: 9781909751149 (in English) ["Fully illustrated with lavish close-up photography and detailed artwork, this is a field guide to the Irish dragonflies and damselflies designed primarily for naturalists, photographers and others who want to improve their field identification skills. The aim is to provide the reader with a quick reference guide to the adults of all the resident and migrant species which have been recorded in Ireland since 1980. There are brief texts on aspects such as behaviour, ecology and distribution, and descriptions which highlight the key diagnostic features of each species and the average flight period. The artworks by

Richard Lewington on each species page illustrate mature males (occasionally teneral males) and females (not exactly to scale). The adult length and wingspan indicates the average size of the insect from the head to the tip of the abdomen and the typical wingspan." (Publisher)]

14254. Tiple, A.D.; Gathalkar, G.B.; Talma, S.S. (2014): New record of dragonfly *Ictinogomphus angulosus* (Selys, 1854) from state Maharashtra, India. *Ambient Science* 1(2): 3 pp. (in English) [6-X-2013, Futala Lake, of Nagpur city, Maharashtra, India. 21.15°45'75"N, 79.04°25'76"E] Address: Tiple, A.D., Dept of Zoology, Vidyabharti College, Seloo, Wardha 442104, Maharashtra, India. E-mail: ashishdtiple@yahoo.co.in

14255. Touchon, J.C.; Wojdak, J.M. (2014): Plastic hatching timing by Red-eyed treefrog Embryos Interacts with larval predator identity and sublethal predation to affect prey morphology but not performance. *PLoS ONE* 9(6): e100623. doi:10.1371/journal.pone.0100623: 9 pp. (in English) ["Many animals respond to predation risk by altering their morphology, behavior, or life-history. We know a great deal about the cues prey respond to and the changes to prey that can be induced by predation risk, but less is known about how plastic responses to predators may be affected by separate plastic responses occurring earlier in life, particularly during the embryonic period. Embryos of a broad array of taxa can respond to egg- or larval-stage risks by altering hatching timing, which may alter the way organisms respond to future predators. Using the red-eyed treefrog (*Agalychnis callidryas*), a model for understanding the effects of plasticity across life-stages, we assessed how the combined effects of induced variation in the timing of embryo hatching and variation in the larval predator community impacted tadpole morphology, pigmentation and swimming performance. We found that *A. callidryas* tadpoles developed deeper tail muscles and fins and darker pigmentation in response to fish predators, either when alone or in diverse community with other predators. Tadpoles altered morphology much less so to dragonfly naiads (*Pantala flavescens*) or water bugs. Interestingly, morphological responses to predators were also affected by induced differences in hatching age, with early and late-hatched tadpoles exhibiting different allometric relationships between tail height and body length in different predator environments. Beyond induced morphological changes, fish predators often damaged tadpoles' tails without killing them (i.e., sublethal predation), but these tadpoles swam equally quickly to those with fully intact tails. This was due to the fact that tadpoles with more damaged tails increased tail beats to achieve equal swimming speed. This study demonstrates that plastic phenotypic responses to predation risk can be influenced by a complex combination of responses to both the embryo and larval environments, but also that prey performance can be highly resilient to sublethal predation." (Authors)] Address: Wojdak, J.M., Department of Biology, Radford

University, P.O. Box 6931, Radford, VA, 24142, USA. E-mail: jmwojdak@radford.edu

14256. Umezu, S.; Tanabe, N.; Hashimoto, H. (2014): Fabrication of comb shape of leading edge wing of dragonfly. *Key Engineering Materials* 625: 182-186. (in English) ["Research on Micro air vehicle (MAV) has been carried out by many researchers to gather information in environmental monitoring, security and so on. When the earthquake, fire, smoke take place, it is difficult for human beings to investigate the detail because of dangerous condition. However, MAV has possibility to investigate the detail because MAV can fly freely around. Recently, dragonfly is highly focused by many researchers because dragonfly has high flight performances those are high efficiency flight, unintended acceleration, rapid turn and hovering. In general, these characteristics have root that wing is corrugation shape. We focus on microstructures on wing and its aerodynamic characteristics because there are many unique microstructures. We focused on micro spikes on dragonfly wing. Over three thousands of spikes exist on two sides of wing. The length and shape of spikes are 10 to 100 micron meters and oblique circular cone. It is important to clear the aerodynamic effect of the oblique circular cone. Artificial wing was fabricated by following processes. We fabricated micro spikes utilizing electro polishing. Fabricated micro spikes were set on plate utilizing micro spot bonding. We investigated the flow around the artificial wing and found that the flow around wing was controlled by micro spikes on wing. In this paper, we focused on comb shape of leading edge of wing. Comb shape is fabricated utilizing micro-EDM. We investigate flow characteristics of comb shape." (Authors)] Address: Umezu, S., 11-1-13, Okubo, Shinjuku, Tokyo 169-8555, Japan. E-mail: aumeshin@waseda.jp

14257. Van, K.D.; Janssens, L.; Debecker, S.; Stoks, R. (2014): Warming increases chlorpyrifos effects on predator but not anti-predator behaviours. *Aquatic Toxicology* 152: 215-221. (in English) ["Highlights: •Pesticide effects on predator and antipredator traits may depend on temperature. •We tested for temperature-sensitivity to chlorpyrifos in damselfly larvae. •Chlorpyrifos reduced key predator behaviours stronger at the higher temperature. •Chlorpyrifos reduced escape speed to the same extent at the high temperature. •Temperature dependence of the pesticide effects was similar at different latitudes. Abstract: Recent insights indicate that negative effects of pesticides on aquatic biota occur at concentrations that current legislation considers environmentally protective. We here address two, potentially interacting, mechanisms that may contribute to the underestimation of the impact of sublethal pesticide effects in single species tests at room temperature: the impairment of predator and antipredator behaviours and the stronger impact of organophosphate pesticides at higher temperatures. To address these issues we assessed the effects of chlorpyrifos on the predator and antipredator behaviours of larvae of the damselfly *Ischnura elegans*, important in-

termediate predators in aquatic food webs, in a common-garden warming experiment with replicated low- and high-latitude populations along the latitudinal gradient of this species in Europe. Chlorpyrifos reduced the levels of predator behavioural endpoints, and this reduction was stronger at the higher temperature for head orientations and feeding strikes. Chlorpyrifos also impaired two key antipredator behavioural endpoints, activity reductions in response to predator cues were smaller in the presence of chlorpyrifos, and chlorpyrifos caused a lower escape swimming speed; these effects were independent of temperature. This suggests chlorpyrifos may impact food web interactions by changing predator-prey interactions both with higher (predators) and lower trophic levels (food). Given that only the interaction with the lower trophic level was more impaired at higher temperatures, the overall pesticide-induced changes in food web dynamics may be strongly temperature-dependent. These findings were consistent in damselflies from low- and high-latitude populations, illustrating that thermal adaptation will not mitigate the increased toxicity of pesticides at higher temperatures. Our study not only underscores the relevance of including temperature and prey-predator interactions in ecological risk assessment but also their potential interplay and thereby highlights the complexity of contaminant effects on predator-prey interactions being differentially temperature-dependent pending on the trophic level." (Authors)] Address: Stoks, R., Lab. Aquatische Ecol., K.U.Leuven, De Beriotstraat 32, 3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

14258. Van Buskirk, J.; Krügel, A.; Kunz, J.; Miss, F.; Stamm, A. (2014): The rate of degradation of chemical cues indicating predation risk: An experiment and review. *Ethology* 120(9): 942-949. (in English) ["Many prey taxa use kairomones or alarm pheromones to assess the risk of predation in aquatic environments, and the rate at which these cues attenuate determines how precisely they indicate the local density of predators. We estimated the rate of degradation of chemical cues generated by *Aeshna* dragonfly larvae feeding on *Rana temporaria* tadpoles. The half-life of the cue was 35 h and was not influenced by whether it was aged in pond water or tap water or whether other tadpoles were present in the container in which cue-aging occurred. A review of other published estimates of predator cue half-life revealed values of 0.2–126 h, and variation among studies was unrelated to the type of aging water, the venue in which water was aged or prey behaviour observed (laboratory, field), or the type of behaviour that was recorded. We conclude that factors affecting the persistence of predator cues remain uncertain in spite of their importance for understanding the evolution of induced defenses." (Authors)] Address: Josh Van Buskirk, Inst. Evolutionary Biology & Environmental Studies, University of Zürich, 8057 Zürich, Switzerland. E-mail: josh.vanbuskirk@ieu.uzh.ch

14259. Van Praet, N.; De Bruyn, L.; De Jonge, M.; Vanhaecke, L.; Stoks, R.; Bervoets, L. (2014): Can dam-

selfly larvae (*Ischnura elegans*) be used as bioindicators of sublethal effects of environmental contamination?. *Aquatic Toxicology* 154: 270-277. (in English) ["The present study measured various pesticides and trace metals, together with sublethal effect biomarkers (lipid, protein and glycogen levels, acetylcholinesterase (AChE) and glutathione-S-transferase (GST) activities) in damselfly larvae (*Ischnura elegans*) at sixteen sampling sites in Flanders (Belgium). Four pesticides (chloridazon, dichlorvos, terbutylazine, metolachlor), some of them hardly measurable in surface water, and all trace metals were above the limit of quantification in damselfly tissue. A principal component analysis (PCA) on the accumulated pollutant concentrations returned five pollutant axes explaining 85.8% of the total variation. Based on these PCA-axes a hierarchical cluster analysis revealed that the 16 sampled ponds could be classified in 7 groups. Increasing dichlorvos levels in the animals resulted in a lower body mass. Body mass was negatively correlated with GST and AChE activities, lipid and glycogen levels. The present findings provide evidence of toxicity-induced sublethal stress of dichlorvos accumulation in natural populations of *I. elegans*." (Authors)] Address: De Jonge, M., Department of Biology, Systemic Physiological and Ecotoxicological Research (SPHERE), University of Antwerp, Groenenborgerlaan 171, 2020 Antwerp, Belgium. E-mail: maarten.dejonge@uantwerpen.be

14260. Varghese, A.P.; Nikesh, P.R.; Mathew, J. (2014): Odonata (Insecta) diversity of Salim Ali Bird Sanctuary and its adjacent areas in Thattakkad, Kerala, India. *Journal of Threatened Taxa* 6(6): 5887-5893. (in English) ["The study results in the identification of 82 species of Odonata out of which 51 species belong to dragonflies and 31 belong to damselflies. Twenty-one species are endemic to the Western Ghats (Images 1-21). The occurrence of IUCN categorized near threatened species like *Megalogomphus hanningtoni* (Fraser, 1923) and vulnerable species like *Platysticta deccanensis* Laidlaw, 1915 and *Protosticta sanguinostigma* Fraser, 1922 were remarkable. The area was found to be rich in odonate diversity. More studies are needed to understand the population dynamics and seasonal patterns of Odonata in this particular geographical area." (Authors)] Address: Varghese, A.P., Mar Athanasius College, Kothamangalam College P.O., Ernakulam, Kerala, 686666, India. E-mail: abypvarghese@yahoo.com

14261. Vassilenko, D.V. (2014): The first damselfly (Insecta: Odonata, Hemiphlebiidae) recorded from the Turonian of Israel. *Far Eastern Entomologist* 278: 1-7. (in English) ["The damselfly *Pantelusa krassilovi* Vassilenko, gen. et sp. n. of the family Hemiphlebiidae is described from the Turonian of Israel (Gerofit locality, Ora Formation) from a single fossil wing. It is the first odonate known from this locality. The new genus is considered close to Cretaceous representatives of the family, especially the genus *Electrohemiphlebia* Lak et al., 2009, known from the Albian amber of France. The possibility is discussed that

some endophytic ovipositions known from Gerofit belong to similar small damselflies." (Author)] Address: Vassilenko, D.V., A.A. Borissak Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya str., 123, Moscow 117997, Russia. E-mail: lab@palaeoentomolog.ru

14262. Vezhnavets, V.V.; Baichorov, V.M.; Moroz, M.D. (2014): 7. Macrozoobenthos community. *Zoology and Ecology* 24(2): 128-134. (in English, with Lithuanian summary) ["Quantitative and qualitative parameters of the macrozoobenthos community in Lake Drukšiai were analyzed. We compared our data obtained in 2011–2012 with those of earlier investigations. The comparison of the current situation with the situations before the launch of the Ignalina Nuclear Power Plant (INPP) and during the initial period of its operation shows that stenothermic coldwater species of relict crustaceans and some species of chironomids have disappeared from the bottom fauna. In general, quantitative indices of zoobenthos development have increased in comparison with those recorded in the initial INPP operation period and are characterized by the dominance of oligochaetes in the profundal." (Authors) 11 Odonata taxa are listed but not further discussed.] Address: Vezhnavets, V.V., Laboratory of Hydrobiology, The Scientific and Practical Center for Biore-sources of National Academy of Sciences of Belarus, Akademicheskaya Street 27, BY-220072 Minsk

14263. Vilenica, M.; Dijkstra, K.D.B. (2014): The dragonfly (Insecta, Odonata) fauna of the Banovina region, Croatia. *Natura Croatica* 23(1): 45-66. (in English, with Croatian summary) ["In all, 32 dragonfly species were recorded between August 2010 and September 2011 at 21 localities in the Banovina region of Croatia, almost half of the total number known in Croatia. The most abundant species was *Platycnemis pennipes* while the rarest was *Coenagrion ornatum*. Ten of the recorded species are at a certain level of conservation concern and thus it is important to protect their habitats in region." (Authors)] Address: Vilenica, Marina, Faculty of Teacher Education, University of Zagreb, Department in Petrinja, Trg Matice hrvatske 12, 44250 Petrinja, Croatia

14264. Weerakkodi, W.G.I.S.; Amarasinghe, L.D. (2014): Rice field and marshland inhabiting mosquitoes and some physico-chemical and biological parameters affecting their abundance. *Proceedings of the 33th annual sessions of the institute of biology*, 27th September 2013. Abstract number 1-11: (in English) [Verbatim: Mosquito larval survey was carried out in rice fields and marshlands in Kelaniya area, Gampaha District, Sri Lanka from March to July 2012 to determine the variation of mosquito larval density and diversity. Further, the study investigated the physico-chemical and biological parameters associated with mosquito larval density in the two habitats. Larval sampling and recording of physico-chemical and biological parameters was carried out biweekly within the study period in five sampling sites per habitat within an extent of 20 km² in Kelaniya area. Larval samples

were identified up to the species level using keys in the laboratory using 4th instars and adult mosquitoes. Morphological identification of 1071 mosquito larvae collected from rice fields and 576 mosquito larvae collected from marshlands (150 scoops per habitat) revealed 08 species of mosquitoes of 04 genera in rice fields and 08 species of 03 genera from marshlands. Both habitats were dominated by Genus *Culex* (97.5% in rice fields and 95.4% in marshlands). *Culex tritaeniorhynchus* and *Culex gelidus* were represented the majority of samples. Mosquito larval density in rice field and marshland habitats in Kelaniya area was not significantly different ($P > 0.05$). Rice fields are the most diverse habitats from two selected habitat types in Kelaniya area (Shannon wiener diversity index/ $H^1 = 1.35$ in rice fields and $H^1 = 1.25$ in marshlands). However, they were mainly associated with high Total Dissolved Solid (>10.00 mg/L), 6-8 pH level, low Dissolved Oxygen (5.0-6.0 mg/L), < 5.0 mg/L nitrate and less than 1.0mg/L phosphate levels. They can tolerate a range of BOD levels in water. Further their habitats were positively associated with Chironomid larvae, phytoplanktons of Family Zygnemataceae, Clamydomonadeceae and Family Oscillatoriaceae and zooplanktons of Family Acanthocystis and Daphniidae, whereas negatively associated with larvae of Family Libellulidae of Order Odonata. Fourteen families of phytoplankton and 16 families of zooplankton were recorded associating mosquito larvae from rice fields and marshlands.] Address: Amarasinghe, L.D.D, Department of Zoology, University of Kelaniya, Sri Lanka. E-mail: deepika@kln.ac.lk

14265. Weihrauch, F. (2014): Editorial. *Odonatologica* 43(1/2). *Odonatologica* 43(1/2): 1. (in English) [Verbatim: Nothing in life is as certain as change. However *Odonatologica* has seemed to defy this rule, as it has persisted practically unchanged for an extraordinary 42 years under the editorship of Professor Bastiaan Kiauta. This remarkable feat of endurance must be ranked a signal success in the history of our science. I am not entirely sure why Bastiaan chose me to become his successor. I have to admit that I have been quite reluctant for almost two years to accede to his proposal because I was and still am well aware that the footprints he has left, highly visible in the recent past, are impossible to emulate no matter how hard I try. On the other hand, I have served with enthusiasm as editor of the German journal *Libellula* for almost a decade. As a passionate producer of dragonfly journals, this was an offer I simply could not refuse and I suppose Bastiaan knew that. However, in undertaking this task, I look back at Bastiaan's life's work with immense respect and admiration, and with some trepidation promise to do my best to repay his confidence in me. Too many names have been involved in the production of *Odonatologica* during the past 42 years to list them all here – they include associate editors and members of the editorial board, S.I.O. officers, peer reviewers, authors, and many, many more. An appraisal of most names can be found in Bastiaan's Editorial in *Odonatologica* 42 (4) and, because they established the foundation

on which I can build today, my sincere thanks go out to all of them. I would particularly like to single out two individuals from the S.I.O. board of trustees for special gratitude. They are Kiyoshi Inoue, President of the S.I.O, and Marianne Kiauta, the guardian angel of *Odonatologica*, who both in my eyes not only carry the banner of *Odonatologica*'s past success, but who have also welcomed me into my new role with a warmth and friendliness that was both irresistible and touching. I look forward to a fruitful collaboration with all members of the odonatological society in the near and more distant future, and hope to receive many manuscripts, so that *Odonatologica* may remain as it always has been – a seminal and attractive journal for everyone interested in dragonfly research.]" Address: Weihrauch, F., Jägerstr. 21A, D-85283 Wolnzach, Germany. E-mail: Florian.Weihrauch@t-online.de

14266. Westermann, E. (2014): Erfolgreiche Entwicklung der Großen Heidelibelle (*Sympetrum striolatum*) im Oberen Hotzenwald (Hochschwarzwald) auf 900 m Meereshöhe. *Naturschutz am südlichen Oberrhein* 7: 226-227. (in German, with English summary) [Germany. "In 2012 at least 15 Common Darters emerged successfully at the Hierholzer Weiher (community of Dachsberg, district of Waldshut) at 900 m a.s.l. This species was probably not present at this location from 2003 to 2005 and in 2013. So far reproduction has not been recorded above 800 m in Baden-Württemberg." (Author)] Address: Westermann, Elisabeth, Buchenweg 2, 79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

14267. Westermann, K.; Westermann, E. (2014): Die Libellenfauna des Klosterweihers im südlichen Hochschwarzwald. *Naturschutz am südlichen Oberrhein* 7: 228-234. (in German, with English summary) [Baden-Württemberg, Germany. "From 2000 to 2003 and in particular from 2011 to 2013 the dragonflies around the Klosterweiher (community of Dachsberg, district of Waldshut) were recorded over 34 days. In 1953 this pond, which is located at 944 m above sea level, was formed over moorland and currently has a size of almost three hectares. Over the last decades a wide siltation zone with reed and moor areas has developed which has been protected since 2005 by the „Friedrich-August-Grube“ nature reserve. The part open to the public is intensively used for bathing. On an easily accessible part, which is also very attractive for dragonflies, exuviae were collected and imagoes were recorded. From a total of 20 species recorded, at least 16, possibly 17, developed successfully almost every year. Outstanding species were the moor dragonflies *Coenagrion hastulatum*, *Aeshna juncea* and *Aeshna subarctica*. However, from the latter, only one exuvia has been found so far. The Klosterweiher was shown to be highest known emergence site in the Black Forest for *Lestes viridis* and *Platycnemis pennipes*. The habitats of the dragonflies in the siltation zone can only be secured in the medium term by regular management measurements." (Authors)] Address: Westermann, K., Buchenweg 2, 79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

14268. Westermann, K.; Westermann, E. (2014): Zur Emergenz großer Populationen des Spitzenflecks (*Libellula fulva*) und des Frühen Schilfjägers (*Brachytron pratense*) im kühlen Frühjahr 2005 an einem kleinen Quellgewässer der Rheinniederung. *Naturschutz am südlichen Oberrhein* 7: 210-218. (in German, with English summary) [Baden-Württemberg, Germany. "During the cool and rainy spring of 2005 I investigated daily the emergence of huge populations of *L. fulva* and *B. pratense* in a small, largely reed-covered spring water body in the Rhine plain of the northern part of the district of Emmendingen. the emergence period lasted for approximately five weeks with a peak period of 12 and 14 days, respectively. A synchronization of the metamorphosis was not detectable in either species. Seven days after the first emergence of a *Brachytron* male the first territorial flight was observed. the corresponding time period in *L. fulva* was 20 days and therefore three times longer. the recordable losses were small in both species although the weather was unfavourable. At the same water body *Cordulia aenea* and *Somatochlora flavomaculata* also emerged in significant numbers. Among the four species significant differences in the selection of places for emergence were noted. *L. fulva* was by far the most frequent species with a minimum of 485 freshly emerged adults. For this species further data regarding selected substrate for emergence, weather impact, mechanisms for prevention of losses and inhomogeneity of the time course of emergence between the sexes were recorded." (Authors)] Address: Westermann, K., Buchenweg 2, 79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

14269. Westermann, K.; Westermann, E. (2014): Eine autochthone Population der Speer-Azurjungfer (*Coenagrion hastulatum*) in Moorgewässern des Oberen Hotzenwalds – Erste Nachweise für den südlichen Hochschwarzwald. *Naturschutz am südlichen Oberrhein* 7: 219-225. (in German, with English summary) [Baden-Württemberg, Germany. "In 2012 and 2013 local populations of *C. hastulatum* were recorded for the first time in the upper Hotzenwald (district of Waldshut). Currently, autochthonous local populations exist in the siltation zone of the Klosterweiher (community of Dachsberg), and in the moor ponds of the Föhrenmoos (community of Ibach). Due to progressive siltation a population decrease is expected in both water bodies. Possible protection measures for the permanent conservation of a self-sustaining regional population are discussed." (Authors)] Address: Westermann, K., Buchenweg 2, 79365 Rheinhausen, Germany. E-mail: fosor@t-online.de

14270. Wlasichuk, C. (2014): The impacts of cattle grazing on stream ecosystems in Grasslands National Park of Canada, Saskatchewan. M.Sc. thesis, Department of Entomology, University of Manitoba, Winnipeg: XIII + 177 pp. (in English) ["Cattle are responsible for the deterioration of aquatic and riparian ecosystems throughout the North American prairies. Marked preference for riparian areas has resulted in vegetation loss, stream bank de-

stabilization, changes in sediment particle size, and increased nutrient loads in the streams. A grazing experiment in Grasslands National Park of Canada manipulated the density of cattle to represent a range of grazing intensities (from no grazing to very heavy grazing, 70% forage utilization). This experiment provided the opportunity to study how streams in the semi-arid mixed-grass prairie environment respond to a range of grazing pressure. Nine experimental pastures located on previously ungrazed land within the park boundary and four located within the adjacent community pastures were created, each subjected to a specified grazing treatment. Sampling occurred in the autumn from 2007 to 2009 and included the measurement of 33 physical, chemical, and biological habitat metrics and the characterization of the aquatic invertebrate community. Linear regressions were performed to determine if the habitat variables had a significant relationship to grazing intensity ($P < 0.05$). Of the habitat variables, two sediment particle size categories were significantly related to grazing intensity: per cent of fine gravel (4-8 mm diameter) ($P = 0.003$) and per cent of medium gravel (8-16 mm diameter) ($P = 0.007$). The only other habitat variable with a significant linear relationship to grazing intensity was the concentration of suspended carbon in the stream water ($P = 0.050$). Three invertebrate community metrics were focused on for their expected response to changes associated with cattle impacts: iii per cent Chironomidae (%Chiron), per cent Ephemeroptera, Odonata, and Trichoptera (%EOT), and taxa richness. There was a significant non-linear relationship between %Chiron ($P = 0.005$) and grazing intensity, no linear or non-linear relationship between %EOT and grazing intensity, and a non-linear trend between richness and grazing intensity ($P = 0.083$). A Reference Condition Approach was used to test for the effects of grazing on the invertebrate community. Multiple regression was used to create a model predicting the invertebrate community from habitat metrics. Of the three community metrics, only richness resulted in a model with acceptable predictive ability. The predicted richness values for each test site were calculated and their residuals were determined and compared to the distribution of residuals observed in the reference sites. Using this technique, I determined that 73.3% of the sites subjected to grazing deviated significantly for the reference condition and were therefore deemed to be impacted. There was no significant relationship between the test site residuals and grazing intensity. The macroinvertebrate community in this semi-arid environment is already under a lot of stress, the addition of cattle to the environment, even at low intensities, pushed the community beyond the reference condition." (Author)] Address: Wlasichuk, Cynthia. University of Manitoba, Canada

14271. Wojdak, J.M.; Touchon, J. C.; Hite, J.L.; Meyer, B.; Vonesh, J.R. (2014): Consequences of induced hatching plasticity depend on predator community. *Oecologia* 175(4): 1267-1276. (in English) ["Many prey species face trade-offs in the timing of life history switch points like

hatching and metamorphosis. Costs associated with transitioning early depend on the biotic and abiotic conditions found in the subsequent life stage. The red-eyed treefrog, *Agalychnis callidryas*, faces risks from predators in multiple, successive life stages, and can hatch early in response to mortality threats at the egg stage. Here we tested how the consequences of life history plasticity, specifically early hatching in response to terrestrial egg predators, depend on the assemblage of aquatic larval predators. We predicted that diverse predator assemblages would impose lower total predation pressure than the most effective single predator species and might thereby reduce the costs of hatching early. We then conducted a mesocosm experiment where we crossed hatchling phenotype (early vs. normal hatching) with five larval-predator environments (no predators, either waterbugs, dragonflies (*Pantala flavescens*), or mosquitofish singly, or all three predator species together). The consequences of hatching early varied across predator treatments, and tended to disappear through time in some predation treatments, notably the waterbug and diverse predator assemblages. We demonstrate that the fitness costs of life history plasticity in an early life stage depend critically on the predator community composition in the next stage." (Authors)] Address: Wojdak, J.M., Department of Biology, Radford University, P.O. Box 6931, Radford, VA, 24142, USA. E-mail: jmwojdak@radford.edu

14272. Xu, M.; Cerreta, A.L.; Schultz, T.D.; Fincke, O.M. (2014): Selective use of multiple cues by males reflects a decision rule for sex discrimination in a sexually mimetic damselfly. *Animal Behaviour* 92: 9-18. (in English) ["Discriminating between the sexes when one sex resembles the members of the other sex may be challenging. When sexual mimicry imposes costs on signal receivers, receivers can minimize confusion by using nonmimetic cues that differ between the models and the mimics. We tested this hypothesis in a female-specific polymorphic damselfly *Enallagma hageni*, whose blue coloration of andromorphic females resembles that of males, whereas the heteromorphic females have a distinctive green colour. Both female morphs share an abdominal pattern that differs from the males'. We predicted that males selectively use both colour (the mimetic cue) and pattern (the nonmimetic cue) in sex recognition: they use the nonmimetic cue only when the encountered individual has the mimetic colour. We modified the abdominal pattern of males, andromorphs and heteromorphs to resemble that of the opposite sex, and recorded males' reactions to pattern-altered and control individuals both in an arena and in the field. Our results supported our hypothesis. We then derived and tested potential male decision rules based on the two visual cues for sex recognition. We presented focal males with unnatural, orange females possessing either a male or female abdominal pattern, and recorded the reactions of mate-searching males to individuals with a novel pink-painted phenotype. Males reacted sexually to orange- and pink-painted individuals regardless of the abdominal pattern. Collectively, our re-

sults support a male discrimination rule of 'if not blue, then female', providing insights into the origin of phenotypic novelty in colour-polymorphic species." (Authors)] Address: Xu, Mingzi, Ecology and Evolutionary Biology Program, Department of Biology, University of Oklahoma, Norman, OK, USA. E-mail: xumingzi@ou.edu

14273. Yakubovich, V.S. (2014): The fauna of dragonflies (Odonata) of the lower reaches of Ussiri River, Khabarovskii Krai. A.I. Kurentsov's Annual Memorial Meetings 25: 41-48. (in Russian, with English summary) ["A list of 33 species of dragonflies in seven families collected in the lower reaches of Ussiri River in 2006-2007 is given. *Sympetrum kunckeli* is firstly recorded for Khabarovskii krai." (Authors)] Address: Yakubovich, V.S. , Far Eastern Medical University, Khabarovsk, Russia

14274. Yang, G.-h.; Hämäläinen, M.; Zhang, H.-m. (2014): Description of *Atrocalopteryx fasciata* spec. nov. from Yunnan, China (Odonata: Calopterygidae). *Zootaxa* 3779(3): 389-393. (in English) ["*Atrocalopteryx fasciata* Yang, Hämäläinen & Zhang, spec. nov. (holotype male, from China, Yunnan, Dehong, Yingjiang, deposited at Odonata Collection of College of Agriculture and Life Sciences, Dali University, Dali, Yunnan, China) is described and illustrated from the male sex. It is compared with *Atrocalopteryx laosica* (Fraser, 1933)." (Authors)] Address: Hämäläinen, M., Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: matti.hamalainen@helsinki.fi

14275. Yong, H.S.; Lim, P.-E.; Tan, J.; Ng, Y.F.; Eamsobhana, P.; Suana, I.W. (2014): Molecular phylogeny of Orthetrum dragonflies reveals cryptic species of *Orthetrum prunosum*. *Scientific Reports* 4, Article number: 5553 doi:10.1038/srep05553: 9 pp, appendix. (in English) [The genus *Orthetrum* includes "species pairs whose members are not easily separated from each other by morphological characters. In the present study, the DNA nucleotide sequences of mitochondrial and nuclear genes were employed to elucidate the phylogeny and systematics of *Orthetrum* dragonflies. Phylogenetic analyses could not resolve the various subfamilies of the family Libellulidae unequivocally. The nuclear 28S rRNA gene is highly conserved and could not resolve congeneric species of *Orthetrum*. Individual mitochondrial genes (COI, COII, and 16S rRNA) and combination of these genes as well as the nuclear ITS1&2 genes clearly differentiate morphologically similar species, such as the reddish species pairs *O. chrysis* and *O. testaceum*, and the bluish-coloured species *O. glaucum* and *O. luzonicum*. This study also reveals distinct genetic lineages between *O. prunosum schneideri* (occurring in Malaysia) and *O. prunosum neglectum* (occurring north of Peninsular Malaysia from India to Japan), indicating these taxa are cryptic species." (Authors)] Address: Lim, P.-E., Institute of Ocean and Earth Sciences, University of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: phaikem@um.edu.my

14276. Yoshimura, M.; Akama, A. (2014): Radioactive contamination of aquatic insects in a stream impacted by the Fukushima nuclear power plant accident. *Hydrobiologia* 722: 19-30. (in English) ["The Fukushima Daiichi Nuclear Power Plant accident emitted radioactive substances into the environment, contaminating a diverse range of organisms. Stream algae, litter, sand substrate, aquatic insects and fishes are among the organisms that have been impacted. Radioactive Cs contaminations in the litter and sand substrate were elevated where the atmospheric dose rate in the air was high. Radioactive Cs contaminations in algae and aquatic insects varied irregularly; nevertheless, radioactive Cs contaminations in aquatic insects in pools were consistently higher than those in stream riffles. Contamination by the radioactive Cs differed by species, location and stream velocity. This study was undertaken in a limited number of samples and sites, with more extensive studies planned to fully determine the impact of radionuclides on aquatic ecosystems. ... Small sample sizes for the Perlidae, Heptageniidae, Stenopsychidae and Hydropsychidae in the pool and for the Chloroperlidae, Ephemeridae and Gomphidae (*Davidius nanus*) in the riffle made statistical analysis difficult, but there was trend toward lower radioactive Cs values in the riffle compared to those in the pool. The radioactive Cs values of the sand substrate in the riffle were 30 ± 4.12 Bq/kg for ^{134}Cs and 58 ± 12.9 Bq/kg for ^{137}Cs . The radioactive Cs values of the sand substrate in the pool were 14 ± 2.98 Bq/kg for ^{134}Cs and 25 ± 3.08 Bq/kg for ^{137}Cs ." (Authors)] Address: Yoshimura Mayumi, Kansai Research Center, Forestry and Forest Products Research Institute, Nagaikyutaro 68, Momoyama, Fushimi, Kyoto, 612-0855, Japan. E-mail: yoshi887@ffpri.affrc.go.jp

14277. Zhang, H.-m.; Hämäläinen, M.; Cai, Q.-h. (2014): *Anisopleura pelecypora* sp. nov. from south-western Yunnan, China (Odonata: Euphaeidae). *Odonatologica* 43(1/2): 43-50. (in English) ["*Anisopleura pelecypora* sp. nov. (holotype male from Ximeng Wa, Yunnan, China) is described and illustrated for the male sex. A comparison with its congeners is provided." (Authors)] Address: Zhang, H.-m., State Key Laboratory of Freshwater Ecology and Biotechnology, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan 430072, China. E-mail: zhanghaomiao6988@gmail.com

14278. Zhang, H.-m.; Cai, Q.-h. (2014): *Aeshna shennong* sp. nov., a new species from Hubei Province, China (Odonata: Anisoptera: Aeshnidae). *Zootaxa* 3795(4): 489-493. (in English) ["*Aeshna shennong* sp. nov. (holotype male: Dajihu national wetland park in Shennongjia National Nature Reserve, Shennongjia City, Hubei Province, China, 28. VIII. 2013) is described, illustrated and compared with its most similar congener, *A. petalura* Martin, 1908. The holotype will be deposited in the Collection of Aquatic Animals, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan City, Hubei Province, China. New distribution records of *A. petalura* from main-

land China are also provided." (Authors)] Address: Zhang, H., Dept of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com



Édouard Manet (1832-1883) (For more details see: <http://gallica.bnf.fr/ark:/12148/btv1b8610830q/f15.image> and <http://www.sothebys.com/en/auctions/ecatalogue/2010/rimbaud-verlaine-mallarm-and-their-friends-books-manuscripts-and-photographs-from-the-poetical-collection-of-eric-and-marie-hlne-b-pf1040/lot.14.html>)

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1997

14279. Herzig, A. (1997): Rote Liste gefährdeter Tiere und Pflanzen des Burgenlandes. Biologische Forschung Burgenland- Bericht 87: 3-33. (in German) [The regional Red List of threatened Odonata of the Federal State Burgenland (Austria) is presented at page 18.] Address: unknown

14280. May, M.L. (1997): The status of some species of *Enallagma* (Odonata: Zygoptera: Coenagrionidae). Ent. news. 108(2): 77-91. [I have investigated the identity and generic placement of five little known species of coenagrionid damselflies usually assigned to *Enallagma*. Of these, *E. camerunense* is shown not to belong to *Enallagma* but probably to be an aberrant *Pseudagrion*. *E. kauderni*, commonly regarded as a subspecies of *E. nigridorsum*, appears to be as well-differentiated from the latter as either is from *E. vansomereni*. so I consider *E. kauderni* to be a full species. Examination of the type of *E. melanotum* demonstrated it to be identical with *Agrion* (now *Cercion*) *sexlineatum*. *E. pseudelongatum* has been incorrectly placed as a synonym of *E. elongatum* in recent catalogs, probably owing to misinterpretation of Eraser's (1947) comparison of these distinct species. Finally, *E. strouhali* is apparently identical with the earlier described *E. risi*; I also discuss the possible relations of these taxa to *E. cyathigerum* and *E. boreale*.] (Author)]

2000

14281. Eda, S. (2000): Two records of *Epiophlebia superstes* m Nagano Prefecture. Tombo 42: 42. (in Japanese, with English title and captions) [Japan; 01-7-19999, Misato (imago); 14-11-1999, Matsumoto (larva)] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

14282. Eda, S. (2000): A hybrid male supposed between *Sympetrum e. eroticum* and *S. baccha matutinum*. Tombo 42: 30. (in Japanese, with English title and captions) [29-VIII-1999] Address: Eda, S., 3-4-25 Sawamura, Matsumoto, Nagano 390-0877, Japan. E-mail: SND 02767@nifty.com

14283. Futahashi, R. (2000): Successive invasion and colonization of Odonate species into reclaimed land Koshino-kata, Shmminato City, Toyama Prefecture (Addition II). Tombo 42: 68. (in Japanese, with English summary) [Three Odonate species, *Polycanthagyna melamctera*, *Aeschnophlebia anisoptera* and *Sympetrum speciosum speciosum* were newly added to the fauna of the reclaimed land Koshino-kata, Shinminato City, Toyama Prefecture, Central Honshu, Japan. A total of 41 odonate species belonging to 6 families have been recorded from this land since 1988. ... *Anax nigrofasciatus nigrofasciatus* and *Epithea marginata* were recorded from the land for the first time.] (Author)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14284. Futahashi, R.; Araki, Y. (2000): Records of inter-specific hybrid between *Sympetrum kunckeli* and *S. e. eroticum*. Tombo 42: 67. (in Japanese, with English summary) [Two males (6-VIII-1998, 8- X-1998) of the supposed hybridisation between *Sympetrum kunckeli* and *Sympetrum eroticum eroticum* were captured from Toyama Prefecture.] Address: Futahashi, R., Fujiwara Lab., Univ. Tokyo, Biosci. Bldg 501, Kashiwa, Chiba, 377-8562, Japan

14285. Matsuda, I. (2000): *Anax guttatus* collected again in Sakai City, Osaka Prefecture, in 1999. Tombo 42: 72. (in Japanese, with English summary) [Five mature males of *Anax guttatus* were captured by "Tombo-turi" (Catching dragonflies by threads and small stones) at Oizumi-Ryokuchi Park in Sakai City, Osaka Prefecture on July 11, August 7, 8, 13 and September 18, 1999. It is very interesting that this migrating species were caught both before and just after typhoon has come.] (Author)] Address: Matsuda, I., 583 -087, 6 -11 Osaka Habikino Momoyamada 1-chome, Japan

14286. Matsuki, K.; Saito, Y. (2000): Description of the larva of *Mnais mneme* (Ris, 1916; (Calopterygidae) from Hong Kong. Tombo 42: 43-45. (in Japanese, with English summary) [The ultimate instar larva of *Mnais mneme* was

described based on the exuviae obtained from Hong Kong. It can be distinguished from the larvae of *M. pruinosa costalis* and *M. andersoni tenuis* in the following characteristics. The ratios of width to length of the median cleft of prementum are about 1 : 2.5 in *mname*, about 1 : 3.4 in *andersoni tenuis* and about 1 : 5.8 in *pruinosa costalis*." (Author)] Address: Matsuki, K., 1575-14 Hasama-cho, Funabashi City, Chiba Pref., 274-0822, Japan

14287. Sasamoto, A. (2000): An endoparasite from *Psolodesmus kuroi* Oguma [sic]. Tombo 42: 48. (in Japanese, with English title) [*Psolodesmus mandarinus* McLachlan 1870 (syn: *Psolodesmus kuroi* Matsumura, 1913); Nematoda, Phasmidia.] Address: Sasamoto, A., 190-4 Yakuoji Tawaramoto, Shiki-gun, Nara prefecture, 636-0341, Japan. E-mail: akssmt@sea.plala.or.jp

14288. Wada, S. (2000): Observation on a Y-shaped triple connection of *Lestes temporalis* Selys. Tombo 42: 61-62. (in Japanese, with English summary) ["A Y-shaped triple connection, two males simultaneously in tandem with a female of *L. temporalis* was observed from its formation to separation at Sano-cho, Fukui-shi, Fukui Pref. on September 25, 1999 and some pictures of this unusual connection including pre-formation were taken during the observation. At that time, more than 30 tandems of the species were observed and there was no single female excepting one caught in a web, so a single male had no chance but to snatch a female in tandem. Moreover, the tandem interrupted by the single male was being caught in a tree and could not shake off the interrupting male easily. And the superior appendages of a male of the species is relatively longer than those of other species, and the period of the species in tandem is longer than other species, which seem to make it easier for the species to form this kind of unusual connection." (Author)] Address: Wada, S., 3-8-18 Nishikida, Fukui 918-8004, Japan

14289. Wada, S. (2000): New records of *Davidius moiwanus tarui* Asahina et Inoue from Fukui Prefecture. Tombo 42: 69-70. (in Japanese, with English summary) ["Some adults and larvae and exuviae of *Davidius moiwanus tarui* were collected at Shinjo, Mihama-cho, Fukui Pref. mainly in the spring of 1999. These are the first records of the species from Fukui Pref., Japan. Average lengths of the collected males' abdomen and hind wing are 31.68mm and 23.50mm respectively, and the females' are 27.86mm and 24.86mm respectively. These individuals seem to come close to those of the Hira Mountains rather than the Noto Peninsula judging from the size of them." (Author)] Address: Wada, S., 3-8-18 Nishikida, Fukui 918-8004, Japan

14290. Wada, S. (2000): A record of a teneral female of *Anax guttatus* in Fukui Prefecture. Tombo 42: 71. (in Japanese, with English summary) ["A female of *Anax guttatus* just after emergence was collected at Hananao-naka 2-chome, Fukui-shi, Fukui Pref., central Japan on October 22, 1999. In the last year 1998, exceedingly many adults

of the species were observed all over Fukui Pref., but in this year no adults observed except for the teneral female in the prefecture." (Author)] Address: Wada, S., 3-8-18 Nishikida, Fukui 918-8004, Japan

14291. Yokota, H.; Watanabe, Y. (2000): Larval breeding record of *Stylurus annulatus* (Djakonov). Tombo 42: 49-53. (in Japanese, with English summary) ["In September 1996, a female *S. annulatus* was caught at the shore of Lake Biwa, Shiga Prefecture. The eggs had brandy glass shaped process which adhere to settle, and the first instar larvae had two rows of spine like structures which disappear in the second instar. These features are common to the other two Japanese *Stylurus* species. The eggs hatched in two weeks and the larvae were bred in the laboratory. Rapid growing group hibernated in the fifth instar, and four males and four females emerged in July and August 1997. Slow growing group larvae hibernated in the third or fourth instar, and again in the final instar in the next winter. Four males and two females emerged in May and June, 1998 from the latter group." (Authors)] Address: Watanabe, Yoko, 4-14, Nishida-cho, Nishinomiya City, Hyogo Pref., 662-0034, Japan

14292. Yokoyama, T (2000): Larval growth of *Leucorrhinia intermedia ijimai* Asahina. Tombo 42: 55-59. (in Japanese, with English summary) [Larval growth of *L. intermedia ijimai* is studied using outdoor samples and indoor breeding. There are 13 stages in their larval period and which is considered to be 2 to 3 years.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

14293. Yokoyama, T (2000): A record of *Boyeria maclachlani* in Southern Hokkaido. Tombo 42: 59. (in Japanese, with English summary) [A male larvae of *B. maclachlani* discovered from Samegawa River, Oshima Peninsula, Southern Hokkaido, Japan, closes a gap in the known distribution of the species.] Address: Yokoyama, T., 1-15-303, Higashi 22chome, Kita 19jo, Higashi-ku, Sapporo City, 065, Japan

2002

14294. Futahashi, R.; Araki, Y. (2002): The Odonata fauna of Takamagahara High Moor, Oyama, Toyama Prefecture including the first record of *Sympetrum danae* from Toyama Prefecture. *Aeschna* 39: 19-24. (in Japanese, with English summary) ["*S. danae* was found at five places at Takamagahara High Moor, Oyama, Toyama Prefecture, central Honshu, Japan. This is the first record of the species from Toyama Prefecture and the habitat is situated at 2,130 meters above sea level, which is the highest record in Japan. Including this species, 16 species of 5 families have been recorded from this high moor. The following 4 species recorded here had rarely or never been known from such highland; *Lestes temporalis*, *Anotogaster sieboldii*, *Crocothemis servillia mariannae* and *Sympetrum parvulum*. And some noteworthy observations, including three patterns of unusual connections (male-male, triple

and triple males) of *Leucorrhinia dubia orientalis* and an infrequent behaviour of *Aeshna nigroflava* seemingly ovipositing in tandem, were described. (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14295. Kita, H.; Futahashi, R. (2002): [The collecting records of *Anax nigrofasciatus nigrofasciatus* at Enshu-hama, Hamamatsu, Shizuoka Prefecture]. *Suruga no Konchu* 199: 5579. (in Japanese) [Records from 2000 and 2001 are briefly documented.] Address: Kita, H., Takiyama 6-2-15-308, Higashikunime City, Tokyo, 203-0033, Japan (probably not the actual address)

2004

14296. Futahashi, R.; Futahashi, H. (2004): Record of the type 0 triple-connection of *Anax nigrofasciatus nigrofasciatus* Oguma, 1915. *Aeschna* 41: 37-38. (in Japanese, with English summary) ["We observed the type 0 triple-connection of *Anax nigrofasciatus nigrofasciatus*. At first, a second male of *Anax nigrofasciatus nigrofasciatus* connected with a female copulating with the first male. They were flying a few minutes and fell on the ground, making a mass resulting in type 0 triple-connection. Then, the second male separated, leaving the female copulated with the first male only by his copulatory organs." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14297. Futahashi R., Hayashi F. (2004): Distribution patterns of two damselfly species, *Mnais costalis* and *M. strigata*, in the Bôshô Peninsula, Chiba Prefecture. *Tombo* 47: 41-46. (in Japanese, with English summary) ["A total of 106 *Mnais* damselflies collected from the Bôshô Peninsula, Chiba Prefecture, central Japan, were classified into *M. strigata* Selys, 1853 (48 males, 9 females), *M. costalis* Selys, 1869 (40 males, 8 females), and their hybrid Fr1 (1 female) based on DNA sequences of a nuclear ribosomal internal transcribed spacer I (ITS I). The peculiar form *edai Asahina*, 1976 known from this peninsula was identified as one wing-colour form of *M. strigata*. The two species were distributed parapatrically with a narrow contact zone: i. e., *M. strigata* was restricted to the southern mountainous area of the Bôshô Peninsula, while *M. costalis* was distributed in the northern area of the Kanto plain. The two species were quite similar in their external morphology, excluding some different relationships between head width and forewing length and between pterostigma length and width. (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14298. Hayashi, F.; Dobata, S.; Futahashi, R. (2004): A new approach to resolve the taxonomic and ecological problems of Japanese *Mnais* damselflies (Odonata: Calopterygidae) (1) General remarks. *Aeschna* 41: 1-14. (in

Japanese, with English summary) ["Several hypotheses coexist about taxonomy of Japanese *Mnais* damselflies (Odonata: Calopterygidae), having some discrepancies on their distributional ranges and ecological consideration. Recent phylogenetic studies based on sequences of the nuclear ribosomal DNA (ITS1 region) suggested that they consist of two closely related species, *M. costalis* and *M. strigata*, with sympatric distributions in a wide range of western Japan. These two species are usually distinguished by wing length:head width ratio and pterostigma length: width ratio of adult males, and also by the caudal gill shape of larvae (Havashi et al., 2004a, b). On the other hand, the sequences of the mitochondrial DNA (COI region) suggested that introgressive hybridization had occurred between the two species because of interspecific similarity (often identical) in mtDNA haplotypes at the same localities (Ilayashi et al., unpublished data). In the present paper, based on this new taxonomic hypothesis, were compared some other morphological characters between the two species, and reviewed their ecological knowledge from literature. The marking pattern on the metapoststemum, that had been used previously to distinguish some populations, varied individually. Both species included individuals with yellow-striped and unstriped metapoststemum, and therefore, this was not a species-specific character. Wing colour patterns also varied among individuals and were polymorphic. The pattern could be divided into three wing morphs; uncoloured (entirely hyaline), partially-coloured (coloured with orange to dark brown at about apical 3/4 area, but hyaline at the basal 1/4), and entirely-coloured (coloured with pale orange nearly all area). All morphs were found in male *M. costalis*, while the entirely-coloured wing morph was rarely found in male *M. strigata*. Females of *M. costalis* consisted, of the two wing morphs, uncoloured and entirely-coloured, but all females of *M. strigata* had uncoloured wings. Males with partially-colored wings are known to territorial fighters and those with uncoloured or entirely-coloured wings are non-territorial sneakers. Males with the latter two wing morphs may mimic females for sneaky copulation around the territorial males. Interspecific combinations of the wing colour morphs differed geographically. Two wing morphs, uncoloured and partially-coloured, were seen in males of both species when living allopatrically. In their sympatric ranges, however, males had completely reciprocal morphs (only partially-coloured wings in *M. costalis* and only uncoloured wings in *M. strigata*) in a part of western Japan, but all morphs coexisted in another part of western Japan. This pattern suggests that a reproductive character displacement occurs between the two species, as already pointed out by Suzuki (1984c). In general, the wing colour and its pattern may be important signals for damselflies to recognize mates by their large compound eyes. If hybrids are at a selective disadvantage, mating between the two species under speciation leads to wasted reproductive effort and, to avoid it, the character displacement is predicted to occur. If speciation goes further and they are completely isolated reproductively, coexistence of interspecifically similar morphs will be allowed. In the future, the mechanisms of

reproductive isolation and differences in the degree of isolation in local populations must be examined experimentally between these two closely related damselflies." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14299. Tsuji, I.; Tosaka, H.; Suda, S.; Futahashi, R. (2004): Records of andromorphic type of *Anax nigrofasciatus nigrofasciatus* Oguma, 1915. *Aeschna* 41: 33-35. (in Japanese, with English summary) ["We found three females of andromorphic type of *Anax nigrofasciatus nigrofasciatus* in the Kanto District in 2003 and 2004. This type was recorded in Taiwan and Nepal but rarely recorded in Japan." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

2005

14300. Artemiadou, V.; Lazaridou, M. (2005): Evaluation score and interpretation index for the ecological quality of running waters in central and northern Hellas. *Environmental Monitoring and Assessment* 110(1-3): 1-40. (in English) ["The present study aims at creating an evaluation system for the quality of running waters, based on the analysis of benthic macroinvertebrate records from Hellenic rivers (473 samples from 8 river basins). The proposed evaluation system (Hellenic Evaluation Score and its Interpretation Index) may be used for waters sampled with the cost effective semi-quantitative sampling method of "3 min kick-sweep" and requires benthic macroinvertebrates to be identified to the taxonomic level of family. Though resulting from a modification of the Spanish score BMWP, it differs from it in the following characteristics: a) it includes the relative abundance of benthic macroinvertebrates and b) it takes into consideration the habitat diversity of the studied site, classifying it as "poor" or "rich", based on some parameters of the System B of the Water Framework Directive (2000/60/EU). Its interpretation is also based on a five-scaled classification system, consistent with the provisions of the same Directive." (Authors) Odonata are considered at the family level.] Address: Artemiadou, Vassilia, Laboratory of Zoology, Department of Zoology, School of Biology, Faculty of Science, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece. E-mail: luteus@bio.auth.gr

14301. Futahashi, R.; Futahashi, H. (2005): An observation of the egg-laying behavior of *Aeschnophlebia anisoptera* on the tree. *Aeschna* 42: 20. (in Japanese, with English summary) [11-VII-2002; "We observed the egg-laying behaviour of *Aeschnophlebia anisoptera* for a few minutes on the branches about 6 m above ground." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14302. Futahashi, R.; Futahashi, H. (2005): The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2004. *Bull. Toyama Sci. Mus.* 28: 97-107. (in Japanese, with English summary) [We reported our collect and photograph data of odonate species from Toyama Prefecture in 2004. *Lyriothemis pachygastra* was newly recorded at eastern area Of Toyama Prefecture. The migratory species *Sympetrum fonscolombii* was recorded at three sites in Toyama Prefecture. Three hybrids were also recorded in this report.] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14303. Hayashi, F.; Dobata, S.; Futahashi, R. (2005): A new approach to resolve the taxonomic and ecological problems of Japanese Mnais damselflies (Odonata: Calopterygidae) (2). References and examined specimens. *Aeschna* 42: 1-18. (in Japanese, with English summary) ["The present paper shows references of Japanese Mnais damselflies and the specimens of Mnais examined in our previous paper Hayashi et al. (2004c). *Mnais strigata* Selys, 1853 in Hayashi et al. (2004a, b, c) and Futahashi and Hayashi (2004) was changed to *M. pruinosa* Selys, 1853 by Hämäläinen and van Tol (2004); so that, we used the name *M. pruinosa* in this paper." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14304. Landmann, A.; Lehmann, G.; Mungenast, F.; Sonntag, H. (2005): *Die Libellen Tirols*. Berenkamp. ISBN 3-85093-185-4: 324 pp. (in German) [For a detailed review (in German) see: http://www.landesmuseum.at/pdf_fr-ei_remote/BEF_6_0175-0176.pdf]

14305. Terzani, F.; Marconi, A.; Carletti, B. (2005): Odonati della Somalia raccolti dal 1971 al 1986 e depositati nel Museo Zoologico dell'Università di Firenze (Odonata). *Atti del Museo di Storia Naturale della Maremma* 21: 39-48. (in Italian, with English summary) ["A collection of 109 specimens of Odonata from Somaliland has been studied; twenty-nine species are listed; new for Somaliland result *Hemistigma albipuncta*, *Orthetrum guineense* and *Trithemis pluvialis*. An updated list of the dragonflies of Somaliland is provided." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

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14306. Aydin, G. (2006): Evaluation of insects as bio-indicators for sustainable land use in Çukurova delta. PhD thesis, Inst. Natural and Applied Sciences, Dept Plant Protection, University Çukurova: XXXVI + 269 pp. (in Turkish, with English summary) ["In this research was conducted to use insects as indicator for habitat description, environmental impacts and different human activities within the Çukurova Delta between 2003 and 2004. Hence sand

dune (Km), salt marsh (TB) and salt meadow (TÇ) , forest with *Pinus* sp. (Or), afforestation area with *Eucalyptus* sp. (A), aquatic (S) and beach (Ky) biotopes were evaluated in Çukurova Delta. Natural, semi-natural and unnatural habitats were chosen as 3 different human activity levels under each biotope and sampling methods were used in all sampling areas according to habitat properties. The data included 709 species and 86958 individuals of beetles collected during two years using pitfall trap, sweep, insect net and light trap sampling methods. Indicator species analysis produced to find indicator species for habitat description. In this respect some insect species *Platynemesis dealbata*, *Trithemis arterosia*, *Ischnura elegans ebneri*, *Lestes barbarus*, *Trithemis annulata* and *Orthetrum sabina* were most abundant in aquatic biotope, *Megacephala euphratica euphratica* was most abundant in salt marsh biotope, *Siagona europaea*, *Scarites planus*, *S. subcylindricus*, *Acinopus megacephalus* and *Idaea aversata* were most abundant in salt meadow biotope, *Pimelia bajula solieri* was most abundant in afforestation biotope, *Zophosis dilatata* was most abundant in sand dune biotope and *Lophyridia concolor* was most abundance in beach biotope showed a significant indicator level for habitat description. The analyses of Binomial (present-absent) and Guassian were used by generalized linear modelling produced to find indicator species for human activities. In this respect; 20 species from Coleoptera, 1 species from Hymenoptera, 5 species from Lepidoptera and 4 species from Odonata showed a significant indicator level for human activities such as cattle and sheep/goat grazing (Km, TB, TÇ, A), agriculture land (TB, TÇ, S), tourism (OR, A, Ky), garbage dump (TÇ), cutting and burning plant (Km)." (Author)] Address: Univerxity of Cukurova, Inst. Natural & Applied Scioences, dept Plant Protection, Turkey

14307. Futahashi, R.; Futahashi, H. (2006): The Odonate fauna of the Noto Peninsula, Hokuriku District, Honshu (2). *Tombo* 48: 18-20. (in Japanese, with English summary) ["Recent collections of the following three noteworthy species in the Noto Peninsula (Ishikawa Pref., Hokuriku District, Central Honshu, Japan) were reported: *Paracercion sexlineatum*, *Sympecma paedisca*, and *Sympetrum maculatum*. Two migratory species, *Sympetrum fonscolombii* and *Trapezostigma virginia*, and a supposed hybrid between *Anax nigrofasciatus nigrofasciatus* and, *Anax parthenope julius* are newly recorded from this peninsula." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14308. Futahashi, R.; Futahashi, H. (2006): The Dragonflies and Damselflies of Toyama Prefecture, Central Honshu, Japan in 2005. *Bull. Toyama Sci. Mus.* 29: 137-145. (in Japanese, with English summary) ["We reported our collect and photograph data of odonate species from Toyama Prefecture in 2005. The following three species in this report were sharply decreased and not recorded in

2004; *Sympecma paedisca*, *Asiagomphus pryeri*, *Stylogomphus suzukii*. *Lyriothemis pachygastra* was newly distributed in this area in the last few years. Six migratory species, *Anax guttatus*, *Sympetrum cordulegaster*, *Sympetrum depressiusculum*, *Sympetrum fonscolombii*, *Sympetrum vulgatum imitans* and *Trapezostigma virginia*, and some males of hybrids between *Anax n. nigrofasciatus* and *Anax parthenope julius* were recorded in this report." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14309. McKenzie, P.M. (2006): Using the National Wetland Inventory as a tool to locate fens and other rare Missouri wetland natural communities. *Missouriensis* 26 (2005): 36-40. (in English) ["In 1999, Linden Trial discovered the federally listed endangered Hine's emerald dragonfly (*Somatochlora hineana* Williamson) at Grasshopper Hollow in Reynolds County, Missouri. Since then, Missouri fens have received significant attention from odonatologists searching for this dragonfly. Subsequent surveys conducted for the Hine's emerald between 2001 and 2005 led to the discovery of 25 additional sites scattered across the Missouri Ozarks in 10 different counties." (Author)] Address: McKenzie, P.M., U.S. Fish and Wildlife Service, 101 Park DeVillie Dr.; Suite A, Columbia, MO 65203-0057, USA

14310. Torralba Burrial, A.; Ocharan, F.J. (2006): Confirmación de la presencia de *Coenagrion mercuriale* (Charpentier, 1825) e *Ischnura elegans* (Van der Linden, 1820) en la provincia de Zaragoza (NE España). *Boletín de la Sociedad Entomológica Aragonesa* 39: 284. (in Spanish, with English summary) ["Confirmation of *C.mercuriale* (Belmonte de Calatayud, Rio Perejiles, 07-VII-2002; Cetina, rio Jalon, 05-VII-2002; Codos, rio Grio, 07-VII-2002; Magallon, rio Huecha, 05-VII-2002) and *Ischnura elegans* (Fayon, embalse de Ribarroja, 21-VII-2004) presence in Zaragoza province (NE Spain).] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

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14311. Futahashi, R.; Futahashi, H. (2007): The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2006. *Bull. Toyama Sci. Mus.* 30: 127-137. (in Japanese, with English summary) ["We reported our collect and photograph data of odonate species from Toyama Prefecture in 2006. The following nine species in this report were sharply decreased and very rare in this area; *Paracercion melanotum*, *Sympecma paedisca*, *Gynacantha japonica*, *Aeschnophlebia anisoptera*, *Asiagomphus pryeri*, *Stylogomphus suzukii*, *Nihonogomphus viridis*, *Somatochlora clavata*. Three migratory species, *Sympetrum cordulegaster*, *Sympetrum depressiusculum*, *Sympetrum fonscolombii*, and *Trapezostigma virginia*, and some males of hybrids between *Anax n. nigrofasciatus*

and *Anax parthenope julius* were recorded in this report." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14312. Levasseur, M. (2007): Odonates nouveaux pour l'île d'Anjouan, description d'une nouvelle sous-espèce de *Paragomphus genei* (Selys, 1841) (Archipel des Comores). *Martinia* 23(4): 115-126. (in French, with English summary) ["The author reports observations of 16 species essentially taken on a few day's trip on Anjouan island, including 12 not previously mentioned, 2 of them being new for the Comoros Archipelago. Illustrated description of *Paragomphus genei ndzuaniensis* ssp. nov. is provided. On the basis of texts and IRSN and MNHN specimen genitalia observation, the synonymy of two (*P. madegassus* and *P. z-viridum*) of the four Malgassian *Paragomphus* yet described, including *P. genei*, is proposed. An updated table is provided, listing the 41 species known from Comoro islands." (Author)] Address: Levasseur, M., 11 rue du Pont Colbert, F-78000 Versailles, France. E-mail: levasseur@magic.fr

14313. Terzani, F.; Cianferoni, F. (2007): Ricerche odonologiche in Toscana. X. Odonati del Mugello (Odonata). *Onychium* 5: 1-25. (in Italian, with English summary) ["Thirty species collected in the Sieve River basin (Mugello, sensu MASCAGNI et al., 1997) are listed and annotated. *Calopteryx virgo meridionalis*, *Pyrrhosoma nymphula*, *Coenagrion mercuriale castellani*, *Erythromma lindenii*, *Ischnura elegans*, *Aeshna cyanea*, *Anax imperator*, *Onychogomphus uncatus*, *Cordulegaster boltonii*, *Orthetrum cancellatum*, *Sympetrum fonscolombii* and *S. sanguineum* are cited for the first time in this geographic area. *Aeshna mixta* is confirmed." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14314. Zheng, J.-h.; Zhang, R.-j. (2007): Predation of Dragonfly, *Pantala flavescens* Fabricius, on the alates of the Red Imported Fire Ant, *Solenopsis invicta* Buren. *Acta Scientiarum Naturalium Universitatis Sunyatseni* 46(2): 120-122. (in Chinese, with English summary) ["The predation of *P. flavescens* on the alates of red imported fire ant, *Solenopsis invicta*, was studied in Zhuhai, Guangdong Province. A swarm of dragonflies hover over the mound of the fire ant when mating flight is taking place. The dragonflies capture the alates flying off the tip of the vegetation, eat the abdomen of alates, and throw away the left. About 85.66% of alates were killed by the dragonflies during mating flying at a height level about 5m from the ground. The predation of dragonfly is related with the weather, particularly with temperature and relative humidity of soil." (Authors)] Address: Zheng, Ji-huan, Inst. of Entomology, State Key Laboratory for Biocontrol, Sun Yat-sen Univ., Guangzhou 510275, China. E-mail: lsszry@sysu.edu.cn

14315. Alonso Naveiro, M.; Torralba Burrial, A. (2008): Confirmación de *Lestes sponsa* (Odonata: Lestidae) en la provincia de Teruel (España). *Boletín Sociedad Entomológica Aragonesa* 43: 424. (in Spanish, with English summary) [A reproductive population of *L. sponsa* is reported for first time in Teruel, Spain (29-VII-2008, Balsa del Cangrejero; 30TXL5842, 1148 m a.s.l.).] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniob@hotmail.com

14316. Futahashi, R.; Futahashi, H.; Wada, S. (2008): The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2007. *Bull. Toyama Sci. Mus.* 31: 141-156. (in Japanese, with English summary) ["We reported our collect and photograph data of odonate species from Toyama Prefecture in 2007. Eighty seven species from 11 families were recorded in Toyama Prefecture, and we found 77 species of them in 2007, except for the following 10 species (the last collection year in parenthesis) ; *Paracercion melanotum* (2006), *Anax guttatus* (2005), *Gomphus postocularis* (1972), *Nihonogomphus viridis* (2006), *Onychogomphus viridicostus* (1959), *Sympetrum danae* (2001), *Sympetrum fonscolombii* (2006), *Sympetrum striolatum imitoides* (2004), *Sympetrum vulgatum imitans* (2005), and *Trapezostigma virginia* (2006). The migratory species, *Tholymis tillarga* was first recorded in 2007, and two migratory species, *Sympetrum cordulegaster* and *Sympetrum depressiusculum* were also recorded in this report." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14317. Shiha, M.S.; Ihsan, S.E.; Ramadan, A.M. (2008): A taxonomic study of the sub-order Zygoptera (Insecta: Odonata) on the Syrian coast « I ». *Tishreen University Journal for Research and Scientific Studies - Biological Sciences Series* 30(3): 189-209. [Based on 550 Zygoptera specimens collected from 22 locations on the Syrian coast during 2006 - 2007, the following taxa are discussed in detail: *Calopteryx splendens intermedia*, *C. hyalina*, *Epallage fatime*, *Sympecma fusca*, *Lestes viridis parvidens*, *Platycnemis dealbata*, *Ischnura elegans ebneri*, *Erythromma lindenii zernyi*, *Coenagrion scitulum*, *C. puella syriaca*, *Ceriagrion tenellum georgifreyi*, *Erythromma viridulum orientale*, *Enallagma cyathigerum* and *Pseudagrion syriacum*. Three species (*Lestes viridis parvidens*, *E. lindenii zernyi* and *C. scitulum*) are considered as first records in Syria.] Address: Ramadan, A.M., Plant Protection Department, Faculty of Agriculture, Tishreen University, Lattakia, Syria

14318. Torralba Burrial, A.; Alonso Naveiro, M. (2008): Primera cita de *Libellula quadrimaculata* (Odonata: Libellulidae) en la provincia de Teruel (España). *Boletín Sociedad Entomológica Aragonesa* 43: 420. (in Spanish, with

English summary) [First record to *L. quadrimaculata* for Teruel province, Spain, based only on one male, is given. 28-VII-2008, río Jiloca, Villafranca del Campo (30TXL39 0052, 972 m a.s.l., Teruel)] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniofb@hotmail.com

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14319. Baldi, A.; Hardersen, S. (2009): Gli odonati della Riserva naturale "Agoraie di Sopra e Moggetto" (Liguria, Genova) (Odonata). *Bollettino dell'Associazione Romana di Entomologia* 64: 59-67. (in Italian, with English summary) [Italy; "In the years 2001 and 2008 the dragonfly fauna of the Natural Reserve "Agoraie di Sopra e Moggetto" was investigated and a total of 15 species were recorded. The most important result of the survey was the discovery of a population of *Aeshna juncea*, new to the Liguria region and the southernmost known site of this species for Italy. Another species found for the first time in the Liguria region is *Libellula quadrimaculata*. The most numerous dragonfly species in the Reserve were *Lestes dryas* and *Sympetrum flaveolum*." (Authors)] Address: Baldi, A., MiPAAF, Corpo Forestale dello Stato, Comando Stazione Forestale S. Stefano d'Aveto, via degli Abeti, 3 I-16049 S. Stefano d'Aveto (Genova), Italy. E-mail: andrea-baldi70@gmail.com

14320. Chen, X.; Feng, Y.; Chen, Z. (2009): Common edible insects and their utilization in China. *Entomological Research* 39: 299-303. (in English) ["This paper reviews the common edible insects and their use in China. One-hundred and seventy-eight insect species from 96 genera, 53 families and 11 orders are commonly eaten in China. Preparation of edible insects includes frying, braising, stewing, stewing after frying, boiling and roasting. The insect forms eaten range from eggs to adults; however, in restaurants most are larvae and pupae. More than 50 species have been analyzed for their nutritive elements and nutritional value and these data are reviewed here. Insect health foods sold in the Chinese market are also briefly discussed. Six to seven species of dragonfly larvae of Odonata are edible. The common species are *Crocothemis servilia*, *Gomphus cuneatus* and *Lestes praemorsa*. The nutritive elements of three species have been analyzed (Feng et al. 2001b). Naiad is the common stage for eating." (Authors)] Address: Chen, X., The Research Institute of Resource Insects, Chinese Academy of Forestry, Kunming 650224, China. Email: cafcxm@tom.com

14321. Futahashi, R.; Futahashi, H. (2009): The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2008. *Bull. Toyama Sci. Mus.* 32: 143-154. (in Japanese, with English summary) ["We reported our collect and photograph data of odonate species from Toyama Prefecture in 2008. Eighty seven species from 11 families were recorded in Toyama Prefecture, and we found 75 species of them in 2008, except for the following

12 species (the last collection year in parenthesis); *Paracercion melanotum* (2006), *Anax guttatus* (2005), *Gomphus postocularis* (1972), *Nihonogomphus viridis* (2006), *Onychogomphus viridicostus* (1959), *Leucorrhinia dubia orientalis* (2007), *Sympetrum danae* (2001), *S. depressiusculum* (2007), *S. fonscolombii* (2006), *S. striolatum imitoides* (2004), *S. vulgatum imitans* (2005), and *Tholymis tillarga* (2007). The migratory species, *S. cordulegaster* (Selys, 1883), was also recorded in this report." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14322. Futahashi, R.; Futahashi, H. (2009): The first record of *Sinogomphus flavolimbatus* (Matsumura in Oguma, 1926) from Toyama Prefecture, Honshu, Japan. *Tombo* 52: 14. (in Japanese, with English summary) [male, Suwara in Toyama-shi, Toyama Prefecture, Honshu, 19-VII-2009.] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14323. Hecht, V.L. (2009): Libellenkartierung am Stiefelweiher (Brühl-Badorf). *Praktikumsbericht. Kölner Zoo and Bürgerinitiative 50tausendbaeume*: 22 pp. (in German) [Between 06.07.-14.08.2009, 18 odonate species have been recorded from Brühl, Nordrhein-Westfalen, Germany. For details see: http://www.bi-50tausendbaeume.de/tl_files/media/pdf/Praktikumsbericht.pdf] Address: not stated

14324. Legakis, A.; Maragou, P. (eds) (2009): The Greek Red Data Book of Threatened Animals. Hellenic Zoological Society, Athens. 525 pp: 468-473. (in Greek with English summaries for the species) [Red List of Greek threatened animals includes *Somatochlora borisi*, *Pyrrhosoma elisabethae*, *Ceriagrion georgi-freyi*, *Boyeria cretensis*, and *Sonjagaster helladica*.] Address: not stated

14325. Pizzo, L. (2009): Contributo alla conoscenza degli odonati del Veneto: Le libellule del quartier del Piave (Treviso, Italia nord-orientale) (Odonata). *Boll. Mus. civ. St. nat. Venezia* 59 (2008): 31-43. (in Italian, with English summary) [21 odonate species were recorded between 2005-2007 at "Palù del Quartier del Piave" and "Fontane Bianche di Sernaglia" (Treviso). Regional important populations are that of *Calopteryx virgo virgo* and *Somatochlora flavomaculata*. *Onychogomphus forcipatus forcipatus* is new for Veneto; *Ischnura pumilio* and *Somatochlora metallica* are recorded for the first time in the province of Treviso; the presence of *Chalcolestes viridis* is confirmed.] Address: Pizzo, L., Via Righe 3, I-30010 Campolongo Maggiore (VE), Italia. E-mail: leonardo.pizzo@gmail.com

- 14326.** Bußmann, M. (2010): Ein neues Vorkommen der Gemeinen Winterlibelle (*Sympecma fusca* VANDER LINDEN, 1820) im mittleren Ruhrtal (Ennepe-Ruhr-Kreis, NRW). *Natur und Heimat* 70(1/2): 1-6. (in German) [Dumberger Au, river Ruhr near Hattingen, TK25 4508, Essen), Nordrhein-Westfalen, Germany] Address: Bußmann, M., Amselstr. 18, 58285 Gevelsberg, Germany. E-mail: m.bussmann@macrkischcr-krcis.de
- 14327.** Campbell, W.B.; Novelo-Gutiérrez, R.; Gómez-Anaya, J.A. (2010): Distributions of odonate richness and diversity with elevation depend on windward or leeward aspect: implications for research and conservation planning. *Insect Conservation and Diversity* 3(4): 302-312. (in English) ["(1.) Assessing species richness (SR) and diversity along environmental gradients is important to see whether abiotic differences alter patterns of species distribution and composition. (2.) We examined distributions of odonate SR, average taxonomic distinctness (ATD) and functional diversity (FD) (using the Shannon Index on proportions of plant-dependent and non-dependent species) with elevation and slope provided from an exploratory survey along a transect in the Sierra de Coalcomán Mountains, Michoacán State, Mexico. Adults were collected along both sides of a 500 m stream segment for 6 h day⁻¹ site⁻¹ in each of eight sites, and these species lists were complemented by collecting mature larvae. (3.) Species richness and FD declined with elevation among windward sites, while ATD increased. Among leeward sites, SR peaked at mid-elevation, and there was no trend for FD or ATD with elevation. Leeward sites were similar in species composition, whereas windward sites were dissimilar. Slope was correlated with elevation among windward sites, and influenced most variables, but not among leeward sites. FD was negatively correlated with ATD among sites along both aspects. Mean values of SR, ATD and FD between aspects were similar. (4.) The Energy-Richness Hypothesis best explained the species distributions along the windward aspect. Local abiotic influences appeared more important in community assembly among windward sites. Among leeward sites, the potential for Mid-Domain and Rapoport Effects suggest interspecies interactions control community assembly; providing greater potential for expansion of species elevational ranges, and an increase in range expansion of alien and non-endemic species along this aspect." (Authors)] Address: Campbell, B., c/o Silvia López Ortiz, Colegio de Postgraduados, Campus Veracruz, Apartado, Postal 421, Veracruz, Veracruz, Mexico, C.P. 91700. E-mail: bruce_campbell3@hotmail.com
- 14328.** Chovanec, A.; Schindler, M.; Wimmer, R. (2010): Nachweise der Vogel-Azurjungfer (*Coenagrion ornatum* SELYS, 1850) im Weinviertel, Niederösterreich (Odonata: Coenagrionidae). *Beiträge zur Entomofaunistik* 11: 85-88. (in German) [Mai/June 2010, near Stützenhofen (16°36'37"O/48°44'30"N) and near Herrnbaumgarten (16°41'01"O/48°41'49"N), Niederösterreich, Austria] Address: Chovanec, A., Krottenbachgasse 68, 2345 Brunn am Gebirge, Austria. E-Mail: andreas.chovanec@umweltbundesamt.at
- 14329.** Futahashi, R.; Futahashi, H.; Shinbori, O. (2010): The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2009. *Bull. Toyama Sci. Mus.* 33: 129-145. (in Japanese, with English summary) ["Here we report our collection and photograph data of odonate species from Toyama Prefecture in 2009. In 2009, we found 76 species from 11 families, and a hybrid between *Anax nigrofasciatus nigrofasciatus* and *A. parthenope julius*. We newly found *Sinogomphus flavolimbatus* at Suwara, Toyama-shi in 2009, which is the first record from Toyama Prefecture. In total, eighty-eight species have been recorded in Toyama Prefecture. Among them, the following 12 species were not found in 2009 (the last collection year in parenthesis); *Paracercion melanotum* (2006), *Anax guttatus* (2005), *Aeschnophlebia anisoptera* (2008), *Gomphus postocularis* (1972), *Nihonogomphus viridis* (2006), *Onychogomphus viridicostus* (1959), *Sympetrum danae* (2001), *S. fonscolombii* (2006), *S. striolatum imitoides* (2004), *S. vulgatum imitans* (2005), *Trapezostigma virginia* (2008) and *Tholymis tillarga* (2007)." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp
- 14330.** Niesel, J. (2010): Invertebrate occurrence in relation to water permanence and fish in shallow wetlands at Öland, Sweden. MSc. thesis, Dept of Biology and Environmental Science, Senior Lecturer in Biology Univ. of Kalmar: 18 pp. (in English) ["Activity traps were used to study the effects of water permanence and fish predation on the ratio of invertebrate predator and prey species and overall invertebrate abundance in June 2002 in eight shallow calcareous lakes and two small ephemeral water bodies at Öland, southeastern Sweden. The invertebrate predator prey ratio was expected to decrease with decreasing water permanence since invertebrate predators are highly sensitive to drying. Fish was not expected to affect the ratio, since fish selectively feed on large prey species with no care taken to whether the prey is an invertebrate predator or not. The total abundance of invertebrates was expected to decrease both with decreasing water permanence and presence of fish because of drying mortality and selective predation by fish on large invertebrates. Parametric analyses of covariance (ANCOVA) on the lake data revealed no significant effect of fish or maximum depth (used as a measure of permanence) on the ratio of invertebrate predators and prey in the studied wetlands. Fish significantly negatively affected the invertebrate abundance and the mean abundance was twice as high in fishless wetlands as in wetlands with fish. The significant fish effect is however dependent on only one value and is therefore no longer significant when the interaction variable is excluded in the analysis. Maximum depth did

not significantly affect the abundance even if the relationship was close to significant. Since both maximum depth and the interaction variable were close to significant, increased replication of fishless wetlands might produce significant effects of these variables on the invertebrate abundance. Although tench (*Tinca tinca*) is an effective benthic forager, the overall invertebrate abundance was not more affected in the one local with tench than it was in the other wetlands with northern pike (*Esox lucius*). This indicates that one cause of the decrease in waterfowl density and diversity observed during the 20th century might be found in the benthic invertebrate community (e.g. chironomids and others)." (Author) The list of taxa includes Lestidae indet., Aeshnidae indet., and Libellulidae indet.] Address: not stated

14331. Popova, O.N. (2010): The dragonfly larvae population (Odonata) in a temporal water pond. Eurasian Entomological Journal 9(2): 239-248. (in Russian, with English summary) ["The structure and seasonal dynamics of the Odonata population of a temporary pond in Baraba forest-steppe (SW Siberia, Russia) are presented. Despite the extreme instability and poor conditions prevailing in the pond, the population is taxonomically rich (21 species), composed of a large number of individuals, resulting in high odonate biomass compared to that of the other aquatic insects. The adaptations for survival in temporary ponds for Odonata are discussed." (Author)] Address: Popova, O.N., Inst. Anim. Syst. & Ecol. Russ. Acad. Sei, Frunze 11, RUS-630091 Novosibirsk

14332. Qin, C.-H.; Yao, L.; Chen, C.; Zhang, C.-C.; Li, J.-H. (2010): Insect community structures and dynamics analysis in different aquatic vegetable areas in Wuhan. Chinese Bulletin of Entomology 47(1): 76-81. (in Chinese, with English summary) ["The insect community structure in different types of aquatic vegetables in Wuhan (Hubei province, China) were investigated with visual method and net method from May to October of 2008. The results showed that there were 9 169 individuals belonging to 11 orders, 48 families, 104 species. *Rhopalosiphum nymphaeae* (L.), *Prodenia litura* (Fabricius), *Saccharosyne procerus* (Matsumura), *Scirpophage praelata* (Scopoli) and *Galerucella birmanica* (Jacoby) were the main pests, and Odonata (*Agriocnemis femina*, *Crocothemis servilia*, *Ischnura senegalensis*, *Acisoma panorpoides*) and Coccinellidae were the primary natural enemies. The analyses on community structure indicated that the diversity index of insect community were remarkably different in different vegetations, which was the highest in water dropwort, and was the lowest in lotus. Insect community structure on water dropwort was the most stable, and water chestnut was at the second place. The diversity index of insect community in lotus was high in middle period, but low in early and late periods, whereas that in water bamboo was low in middle period, but high in early and late periods." (Authors)] Address: Qin, C.-H., College of Plant Science and Technology, Huazhong Agricultural University, Wuhan 430070, China

14333. Rowan, B. (2010): Nine years on: Revisiting the pond communities of the Lizard Peninsula, UK. The Plymouth Student Scientist 3(2): 40-59. (in English) ["Ponds contribute in various amounts to freshwater biodiversity and in some regions can be of considerably high biodiversity value compared to other freshwaters. The ecology of pond communities has been studied by numerous authors, yet many of these studies represent only a snapshot in time. This study explored the macroinvertebrate communities of a selection of ponds on the Lizard Peninsula, UK and revisited these ponds after a nine year period, examining changes in composition, environmental variables structuring the communities and their conservation value. Ponds in both years formed distinct groups, based on community similarities. In both years area was an important environmental variable structuring the communities and in the first year visited water chemistry and number of plant species also contributed. Between the two years the number of macroinvertebrate species remained similar, 72 in 2000 and 74 in 2009, but the identity of the species within the pond communities differed. The conservation value of the pond communities between the two years did not significantly differ. With regards to conserving these Lizard ponds, turnover in ponds has not affected their biodiversity value and management should allow for such processes to take place." (Author) *Lestes sponsa* is the single odonate species mentioned.] Address: Rowan, B., School of Marine Science & Engineering, University of Plymouth, Drake Circus, Plymouth, PL4 8AA, UK

14334. Ugai, S.; Futahashi, R.; Kimura, K. (2010): The first migrate record of *Tramea loewii* Kaup in Brauer, 1866 from Japan. Gekkan-Mushi 475: 32-33. (in Japanese) [23-VI-1999] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14335. Wiedergrün, M. (2010): Kartierung der Amphibien und Libellen im Bereich des Kotzenbrühls. Seminararbeit. Bernhard-Strigel-Gymnasium Memmingen: 23 pp, Karte. (in German) [Baden-Württemberg, Germany. *Calopteryx splendens*, *Aeshna cyanea*, *Sympetrum vulgatum*, *Libellula quadrimaculata*, *Coenagrion puella*, *Pyrrhosoma nymphula*] Address: not stated

2011

14336. Angeles Alvarez, M.; Torralba-Burrial, A. (2011): Confirmación de la presencia de la libélula amenazada *Oxygastra curtisii* (Dale, 1834) (Odonata: Corduliidae) en Asturias (N España). Boln. Asoc. esp. Ent. 35(3-4): 483-486. (in Spanish) [Confirmation of the presence of the threatened dragonfly *Oxygastra curtisii* (Dale, 1834) (Odonata: Corduliidae) in Asturias (N Spain): 25-VI-2011: Nalón River, Oviedo, 30TTN702979, 143 m a.s.l. and Ribera de Arriba, 30TTN688982, 135 m a.s.l. A female was photographed at 19-VIII-2011 at Oviedo, 30TTP627018, 110 m a.s.l.] Address: Torralba Burrial, A., Depto de Biología de

Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

14337. Anonymus (2011): New North American dragonfly named. *Argia* 23 (3): 13. (in English) [Cordulegaster saracenia = Sarracenia Spiketail] Address: not stated

14338. Buckland-Nicks, A.H. (2011): Mercury bioaccumulation in dragonflies (Odonata: Anisoptera) from two lakes in Kejimikujik National Park Nova Scotia. Bachelor of Science thesis, Acadia University: xi, 105 pp. (in English) ["Mercury biomagnification is a concern due to neurotoxic effects in higher trophic organisms. Dragonflies (Odonata: Anisoptera) are vectors for MeHg in aquatic and terrestrial food chains. Dragonfly naiads, adults, and exuviae were collected from two lakes in Kejimikujik National Park, Nova Scotia. Samples were dried, digested, and analyzed for methylmercury (MeHg), divalent mercury (Hg(II)), and total mercury (THg) using gas chromatography-atomic fluorescence spectroscopy (AFS). Big Dam West lake dragonfly samples had greater MeHg, Hg(II), and THg than Big Dam East; reflecting higher water mercury concentrations and indicating potential as biomonitors. MeHg concentrations in naiads (n=64) ranged widely (mean: $0.2337 \pm 0.1129 \mu\text{g g}^{-1}$) and %MeHg was high (mean: $92\% \pm 4\%$). Adults (n=28) had similar dry weight MeHg but higher wet weight MeHg and THg, and lower %MeHg than naiads. Exuviae (n=32) had 50-fold lower MeHg than naiads and adults but nearly equal Hg(II). Emerging adults had similar MeHg to naiads and mature adults; however, they had between 1.5 and 3-fold higher Hg(II). Bioaccumulation patterns of Hg(II) in dragonfly life stages may provide information on MeHg detoxification. MeHg and THg increased with naiad age and weight, with a large increase in variation. Oldest and heaviest naiads had both the lowest and highest MeHg. Hg(II) had an opposite pattern to MeHg, with concentrations and variation decreasing with age and weight. Results indicate that dragonflies may have mechanisms of MeHg detoxification; however, they still have a high potential for transferring substantial amounts of MeHg to aquatic and terrestrial food chains." (Author)] Address: Buckland-Nicks, Amy, Department of Earth and Environmental Science, Acadia University, Wolfville, NS, USA. E-mail: a.bucklan@gmail.com

14339. Cardoso, P. (2011): Habitats Directive species lists: urgent need of revision. *Insect Conservation and Diversity* 5(2): 169-174. (in English) ["(1.) The European Habitats Directive is the main legislative work regarding Europe's nature conservation policy. It lists the protected habitats and species in the European Union. The species lists include 122 arthropods. (2.) The current lists of arthropods (Annexes II and IV) present, possibly among other, five obvious biases: taxonomic, geographic, range, size and aesthetic biases. Species of selected taxa (Lepidoptera, Coleoptera, Odonata and Orthoptera), from Northern or Central Europe, relatively widespread, of a large body size and attractive are favoured over species of other taxa,

from southern and Mediterranean Europe, endemic or relatively small or inconspicuous. Such biases are obstacles to the effective protection of the European fauna. (3.) Two main strategies should be followed to avoid these problems and therefore increase the effectiveness of conservation policies: (i) the adoption of objective and transparent criteria for the listing of protected species, and (ii) implement regular updates and amendments to the lists based on such criteria." (Author)] Address: Cardoso, P., Smithsonian Institution, National Museum of Natural History, Washington DC, USA

14340. Corso, A. (2011): Migrating dragonflies as a food source for breeding Eleonora's Falcons and migrating raptors. *British Birds* 104: 670-675. (in English) ["In July 2009, during the boat trip from Lampedusa to Lampione (Italy, Mediterranean Sea), we encountered many migrant dragonflies at sea, mostly *Anax ephippiger* and *Sympetrum fonscolombii*. As we approached Lampione we realised that several Eleonora's Falcons *Falco eleonora*, which breed on the island, were actively hunting the dragonflies, which they caught readily in flight. Similar behaviour has previously been documented at other Sicilian sites, including Lampedusa, the Eolie Archipelago and Pantelleria (Lo Cascio 1999; pers. obs.). Lampione is a small islet (700 m x 180 m) and, compared with larger islands, attracts relatively few passerines during migration. At times when avian prey is scarce or absent, it seems likely that migrating dragonflies constitute an important food source for Eleonora's Falcons during the breeding season." (Author)] Address: Corso, A., Via Camastra, 10 - 96100 Siracusa, Sicily, Italy. E-mail: voloerrante@yahoo.it

14341. Do, M.C.; Bui, H.M.; Nguyen, V.K. (2011): Dragonflies of Phu Quoc Island, South Vietnam. *Agrion* 15(2): 54-57. (in English) ["Conclusion: The research updated five species of dragonflies for the Phu Quoc fauna, three of which are new records for Vietnam (*Amphicnemis gracilis*, *Coeliccia yamasakii* and *Lestes elatus*). The species named as "*Coeliccia yamasakii*" and *Elattoneura* sp. in Bui (2008) are probably undescribed species. *Lestes elatus* is a new record for the Vietnam fauna and it is considered misidentified by Bui (2008) as *Platylestes heterostylus*. Further study of dragonflies on the island is needed to understand fully the fauna of the area." (Authors)] Address: Do, M.C., Hom thu so 16, Buu Dien 10210, 35 Thai Thinh, Hanoi, Vietnam. E-mail: docuong@gmail.com

14342. Farkas, A.; Jakab, T. (2011): Data on the dragonfly (Odonata) fauna of the floodplain area Borsodi-Tisza-hullámter (NE-Hungary). *Studia odonotol. hung.* 13: 89-96. (in Hungarian, with English summary) ["The paper presents faunistical data on dragonflies (larvae, exuviae and adults) (*Stylurus flavipes*, *Gomphus vulgatissimus*) collected along the impounded reach of the River Tisza in the floodplain area Borsodi-Tisza-hullámter (a geographical microregion inside the mesoregion Közép-Tisza-vidék, NE-Hungary). Firstly the authors present the methods em-

ployed in the collection of the specimens and in data processing, and introduce the literature considered in the identification of species and in reporting faunistic data. Thereafter they provide a detailed survey of the faunistic results from the sampling sites and finally summarize and evaluate the data on the dragonfly fauna. Collections were made in 1 year (2009), with the participation of 1 specialists on 31 days and 6 localities altogether, in 3 cells (DT 87, DT 88, DT 89) of the 10×10 km UTM grid map. In the report information on 3311 specimens (with undetermined sex) is given in detail (3289 exuviae; further 10 larvae and 12 adults collected as dead specimens), representing altogether 202 faunistic data (10 larvae, 180 exuviae, 12 adults). In this study 2 species (2 Anisoptera) were recorded in the area out of which 1 belongs to the less frequent and 1 to the rare class of country-wide occurrence frequency." (Authors)] Address: Farkas, Anna, Department of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

14343. Farkas, A.; Jakab, T.; Devai, G. (2011): Emergence behaviour of riverine dragonfly (Odonata: Gomphidae) larvae along the Tisza river system based on exuviae surveys. *Acta Biol. Debr. Oecol. Hung.* 26: 53-66. (in Hungarian, with English summary) ["Emergence behaviour of riverine gomphid larvae, i.e. emergence distance, selection of emergence support and mortality during emergence are discussed. The study was based on the systematic collections of exuviae at reaches of the rivers Tisza and Szamos with different characteristics. Notes were made about the chosen emergence structure and the distance from the water line. In addition, mortality events were also recorded at the river reach at Tiszafüred characterized by the highest abundance of gomphids. Based on our results the larvae of the studied species differ significantly in their distance travelled from the water line to the emergence site. It was confirmed, that among the studied gomphid species the larvae of the earliest emerging *G. vulgatissimus* move away the farthest from the water line. According to our data, the distance crawled by the larvae to the emergence site correlates positively with the water level and negatively with the water temperature. At a given river reach the ratios of supports chosen by the larvae were similar in the different species, while in the same species it varied in higher degree between the studied river reaches. Thus, support-selection for emergence was primarily dependent on the frequency of structures and the distance crawled from the water line. At Tiszafüred bird predation on the abundant *G. flavipes* caused significant mortality. In contrast, in the case of *G. vulgatissimus*, emerging in small numbers, mortality was found to be negligible." (Authors)] Address: Farkas, Anna, Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

14344. Futahashi, R.; Futahashi, H.; Shinbori, O. (2011):

The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2010. *Bull. Toyama Sci. Mus.* 34: 159-175. (in Japanese, with English summary) ["Here we report our collection and photograph data of odonate species from Toyama Prefecture in 2010. In 2010, we found 75 species from 11 families, and hybrids between *Anax nigrofasciatus nigrofasciatus* and *A. parthenope julius*, and between *Sympetrum eroticum eroticum* and *Sympetrum kunckeli*. The following 13 species were not found in 2010 (the last collection year in parenthesis); *Paracerion melanotum* (2006), *Sympecma paedisca* (2009), *Anax guttatus* (2005), *Aeschnophlebia anisoptera* (2008), *Gomphus postocularis* (1972), *Nihonogomphus viridis* (2006), *Onychogomphus viridicostus* (1959), *Sympetrum danae* (2001), *S. depressiusculum* (2009), *S. fonscolombii* (2006), *S. striolatum imitoides* (2004), *S. vulgatum imitans* (2005), and *Tholymis tillarga* (2007)." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14345. Khelifa, R.; Youcefi, A.; Kahlerras, A.; Alfarhan, A.; Al-Rasheid, K.A.S.; Samraoui, B. (2011): L'odonatofaune (Insecta: Odonata) du bassin de la Seybouse en Algérie: intérêt pour la biodiversité du Maghreb. *Revue d'écologie* 66(1): 55-66. (in French, with English summary) ["An odonatological survey of the wadi Seybouse watershed, Northeastern Algeria, was carried out over a period of two years. Thirty five species were recorded in this previously uncharted region, including *Calopteryx exul* and *Trithemis kirbyi*. The former species, a Maghrebian endemic, has been rediscovered in Algeria after more than a century of apparent absence and the species, classified as "Endangered" in the IUCN Mediterranean Red List, is represented in Algeria by only the Seybouse population. An efficient conservation plan is needed to prevent the extinction of this emblematic species. *T. kirbyi*, a desert species, has considerably extended its range northward. Anthropogenic impacts were noted for the majority of sampled stations and this pressure does not bode well for the conservation of the biodiversity of wadi Seybouse. The distribution and status of each recorded species were also discussed." (Authors)] Address: Khelifa, R., Dépt d'écologie et du génie de l'environnement, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre et de l'Univers, Université 08 Mai 1945, Guelma 24000, Algeria

14346. Kitayama T.; Futahashi, R. (2011): The first record of an interspecific hybrid between *Anax nigrofasciatus nigrofasciatus* Oguma, 1915 and *Anax parthenope julius* Brauer, 1865 from Okayama Prefecture, Honshu, Japan. *Tombo* 53: 119-120. (in Japanese, with English summary) ["A male of interspecific hybrid between *Anax nigrofasciatus nigrofasciatus* Oguma, 1915 and *Anax parthenope julius* Brauer, 1865 was recorded at 2-VIII-2009 in Tomiliara. Kitaku. Okayama-shi, Okayama Prefecture. Honshu, Japan. This is the first record from Okayama Prefecture. This specimen has intermediate characteristics between *A. n.* and *A. p.j.* and mixed nuclear DNA sequences of these

two species. Notably, this specimen caught a female of *A. p.j.* but failed to mate." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14347. Li, S.-y. (2011): Preliminary report on national edible insect resources in Pu'er Yunnan. *Southwest China Journal of Agricultural Sciences* 24(03): 1195-1202. (in Chinese, with English summary) [China; 152 insects have been selected as edible, among them *Crocothemis servilia*, *Pantala flavescens*, *Sinictinogomphus clavatus*, *Letes praemorsus*.] Address: Li, Sun-yang, Simao Teachers College, Yunnan Puer 665000, China

14348. Olberg, R.M. (2011): Visual control of prey-capture flight in dragonflies. *Current Opinion in Neurobiology* 22: 1-5. (in English) ["Interacting with a moving object poses a computational problem for an animal's nervous system. This problem has been elegantly solved by the dragonfly, a formidable visual predator on flying insects. The dragonfly computes an interception flight trajectory and steers to maintain it during its prey-pursuit flight. This review summarizes current knowledge about pursuit behavior and neurons thought to control interception in the dragonfly. When understood, this system has the potential for explaining how a small group of neurons can control complex interactions with moving objects." (Authors)] Address: Olberg, R.M., Dept of Biological Sciences, Union College, 807 Union Street, Schenectady, NY 12308, USA. E-mail: olbergr@union.edu

14349. Orłowski, G.; Karg, J. (2011): Diet of nestling Barn Swallows *Hirundo rustica* in rural areas of Poland. *Cent. Eur. J. Biol.* 6(6): 1023-1035. (in English) [In 3 of 3,152 cases *Calopteryx* sp. was prey of the Barn Swallows.] Address: Orłowski, G., Institute of Agricultural and Forest Environment, Polish Academy of Sciences, 60-809 Poznan, Poland. E-mail: orlog@poczta.onet.pl

14350. Pham, T.T. (2011): A real-time neural signal processing system for dragonflies. MSc. thesis, Dept Electrical & Computer Engineering, University of Arizona: 93 pp. (in English) ["This thesis focuses on hybrid bio-robotics (robots incorporating living animals as sensors) and visual electrophysiology in insects. The motivation of this study is solving a current problem of perception in neuromorphic systems. When imitating biological sensors, we have not completely understood the early processing of the input to reproduce artificially. Building hybrid systems with both artificial and real biological components is a promising solution. In hybrid bio-robots using a dragonfly as a living sensor, the early processing of visual information is performed fully in the brain of the dragonfly. The only significant remaining tasks are recording neural signals and processing, along with interpreting neural information in software and/or hardware for a robot platform. Based on existing works which focused on recording neural signals,

this thesis adds a software application of neural information processing to make a visual processing module for dragonfly hybrid bio-robots. After a neural signal is recorded in real-time, spikes of this signal can be detected either promptly by a hardware module using a simple threshold-based detection method or more accurately by a software module using an energy-based detection algorithm. Features of spikes are then extracted using a wavelet decomposition method. Finally, the system matches spikes with templates to find relevant neurons. The output of the whole visual processing module will be used to control other parts of a dragonfly hybrid bio-robot." (Authors)] Address: Pham, Thuy T., Dept of Electrical and Computer Engineering and Department of Neuroscience, University of Arizona, AZ USA 85716

14351. Szalay, P.E. (2011): Book review [BROOKS, S. (edit.) 2010: Field guide to the dragonflies and damselflies of Great Britain and Ireland. 4th revised edition. – British Wildlife Publishing, Gillingham, 160 pp. *Studia odonatol. hung.* 12: 93-95. (in Hungarian) [book review] Address: Szalay, P.E., Dept of Hydrobiology, Centre of Arts, Humanities & Sciences, Faculty of Science and Technology, Univ. of Debrecen, Egyetem tér 1, 4032 Debrecen, Hungary

14352. Szalay, P.É.; Gyulavári, H.A.; Szabó, L.J.; Miskolczi, M.; Cserhádi, C.S.; Dévai, G (2011): Comparative morphometric analysis of male adults of small red-eyed damselfly (*Erythromma viridulum* CHARPENTIER, 1840) collected from four North-East Hungarian populations. *Studia odonatol. hung.* 12: 5-32. (in Hungarian, with English summary) ["Our objective was to develop a reference baseline for this species of discussed taxonomical status relying on populations from the Pannonian Ecoregion, in order to provide a starting point for later comparisons. Specimens were collected at four NE-Hungarian water bodies representing different types. For each population 16 body marks and 9 wing marks in 15 male adults were analysed, respectively. The mean, minimum, maximum and deviation values; the difference between the minimum and maximum values relative to the mean, as well as the coefficients of variation were calculated. The position of the populations was described via principal component analysis and cluster analysis supported by KRUSKAL&WALLIS and MANN&WHITNEY tests. The strength of correlation between the marks was evaluated via linear regression analysis. Our results suggest that on the basis of all marks and wing marks the population from Kati-ér is the most distinct, whilst individuals from Bodzási-nyágyödrök or Tisza-hullámtér differ most considerably from the other three populations on the basis of body marks." (Authors)] Address: Szalay, P.E., Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, Univ. of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

14353. Terzani, F.; Fabbri, R. (2011): *Odonata del Parco Nazionale delle Foreste Casentinesi, Monte Falterona e Campigna (Appennino Settentrionale)*. *Quaderno di studi*

e notizie di storia naturale della Romagna 34: 21-46. (in Italian, with English summary) [Italy; "19 taxa of Odonata were reported so far by literature from the Casentine Forests National Park. The field researches carried out by the authors in the National Park and close surroundings, with some additional data from other collections, increase the number to 33 taxa, by addition of 14 taxa. 324 records with collection data are listed: 67 are reported from literature and 257 are unpublished records." (Authors)] Address: Terzani, F., Mus. Stor. Nat. "La Specola", Univ. Firenze, via Romana 17, I-50125 Firenze, Italy

14354. Trapero Quintana, A.D.; Reyes-Tur, B.; Cuellar Araújo, N. (2011): Esfuerzo de muestreo necesario para estimar la riqueza específica máxima en tres comunidades de Odonata en Cuba empleando exuvias. *Boletín de la SEA* 49: 285-290. (in Spanish, with English summary) ["Sampling effort needed to estimate maximum species richness of three Odonata communities in Cuba using exuviae. - Difficulty in recording all species in a given area is common in biodiversity inventories. The aim of this study is to estimate the minimum sampling effort needed to record the maximum richness of odonates in three freshwater habitats of Santiago de Cuba when only exuviae are sampled. Odonate exuviae were collected weekly in an 8 m² area in each locality during one year. With this methodology, for the three communities, 30 samples were needed to obtain maximum species richness, according to von Bertalanffy's model." (Authors)] Address: Trapero Quintana, A., Departamento de Biología de la Universidad de Oriente, Patricio s/n, Santiago, Cuba, CP 90500, Cuba. E-mail: atrapero@cnt.uo.edu.cu

14355. Vajda, C.; Szabó, L.J.; Miskolczi, M.; Devai, G. (2011): The morphometry of adult Southern Emerald Damselfly [*Lestes barbarus* (FABRICIUS, 1798)] based on the study of a population in North-East Hungary. *Studia odonotol. hung.* 13: 5-25. (in Hungarian, with English summary) ["There is very few data in the literature about the morphometry of dragonfly species including *Lestes barbarus*. Our work aimed at increasing the amount of data concerning this species, exploring the variation in the focal marks and comparing the sexes. The study is based on the body- and wing-marks of 15 male and 15 female adults from the marsh Fancsikai-mocsár, North-East Hungary. We measured the following parameters: total body length, total abdomen length, five marks on the head, two on the legs, 12 on the anal appendages of the males and seven on the abdominal tip of the females. We measured the area of the wings and the distance between eight selected points on them. The cross-veins in three rows of cells and the cells in eight rows of cells were counted as well. We used not only the mean, SD, maximum and minimum values to the comparison, but the coefficient of variation and the difference between the minimum and maximum values relative to the mean values. Furthermore we used SHAPIRO & WILK, Student-t and MANN & WHITNEY tests, principal component analysis, canonical discriminant analysis and linear regression between selected

marks. We found that total body length and total abdomen length of the males were significantly larger than the females', although females were significantly larger in the marks of head, legs and in wing-size. In case of the body-marks, variance was more significant in the abdominal tip. Considering the wings, larger differences were found in the number of cross-veins and cells. Principal component analysis showed a slight overlap in the convex hull of the body-marks and the wing-sizes of the two sexes, while discriminant analysis showed a full separation in both cases. Linear regression showed highly significant correlation for 20 mark-pairs but found no significant correlation in 68 cases. The total body length showed the maximal number of highly significant correlations, while the most numerous correlations with the different marks were at the head's marks." (Authors)] Address: Vajda, C.S., Department of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

14356. Wutai, Y.; Peng, J.; Yang, X. (2011): A preliminary study of Hengshui Lake Odonata fauna and diversity. *Modern Rural Science and Technology* 2011(Section 04): 63-64. (in Chinese) [Hebei, China; the following odonate species had been recorded in summer 2010: *Anax parthenope*, *Pantala flavescens*, *Deilelia phaon*, *Crocothemis servilia*, *Brachythemis contaminata*, *Rhyothemis fuliginosa*, *Sympetrum hypomelas*, *Orthetrum albistylum*, *O. melania*, *Ischnura elegans*, and *Copera annulata*.] Address: Wutai, Y., Hebei Hengshui College of Life Science, China

2012

14357. Anonymus (2012): Gayle Thomas Strickland — Obituary. *Argia* 24(4): 9. (in English) [6-X-1931 - 13-X-2012] Address: not stated

14358. Bot, S. (2012): Observation of *Gomphus vulgatissimus* along the Drentsch Aa in June 2011. *Brachytron* 15(1): 53-55. (in Dutch, with English summary) ["On 4 June, 2011, two individuals of *Gomphus vulgatissimus* were observed in National Park the Drentsche Aa (Drenthe). A male was captured and photographed. This observation constitutes the northernmost sighting in the Netherlands. There is one historical record of an earlier sighting at the same location. The species is expanding its range in the Netherlands, so the sighting was not unexpected. It remains unknown whether the individuals were casual vagrants, or whether they originated from a local population. As additional observations have been done in June 2012, it is to be expected that the Drenthse Aa area holds a population." (Author)] Address: Bot, S., Postbus 41139, 9701 CC Groningen, The Netherlands. E-mail: sanderbot@yahoo.co.uk

14359. Brees, A.; Johnson, A.; Drey, K. (2012): *Ophiogomphus westfalli* (Westfall's Snaketail), a new species for Iowa. *Argia* 24(4): 17-19. (in English) [16-VI-2010, Boone River, Boone Forks Wildlife Area, Hamilton County, Iowa,

USA] Address: Brees, A., 6759 NW 6th Drives, Des Moines, Iowa, 5023, USA. E-mail: abrees@hotmail.com

14360. Brochard, C.; van der Ploeg, E. (2012): Something completely different... Epallage fatime. *Brachytron* 15(1): 58-63. (in Dutch, with English summary) ["Epallage fatime can be found in south-eastern Europe, where it lives in rocky streams and rivers. The adult male is blue in coloration, the female black with blue dots and a black, yellow-striped thorax. The larvae are unique within the European dragonfly-fauna. Instead of leaf-like procts, it has balloon-shaped appendages. For respiration, the gills on the underside of the abdomen are more important than the procts, which occurs rarely in dragonflies around the world. The body of the larva is flattened. It lives underneath rocks in fast-flowing waters and is incredibly difficult to find." (Authors)] Address: Brochard, C., Marsstraat 77, 9742EL Groningen, The Netherlands. E-mail: info@cbrochard.com

14361. Broek, van den, T.G.Y. (2012): A design that did not make it: *Aeshna cyanea* on a banknote. *Brachytron* 15(1): 64-67. (in Dutch, with English summary) ["In the 1980s in preparation of the introduction of a new series of Dutch guilder banknotes, a design of a 100 guilder bill was made with a Southern Hawker (*Aeshna cyanea*) as its theme. *A. cyanea* at that time stood a chance of becoming the best-known dragonfly in the Netherlands. This design was not used but was displayed to the public for the first time in the Money Museum in Utrecht in 2009. The banknote was designed by Rob Schröder. It also shows a Northern Pike (*Esox Lucius*) and fragment of a poem by the Dutch poet Leo Vroman." (Author)] Address: van den Broek, T., Van Humboldtstraat 119, 3514 GN Utrecht, The Netherlands. E-mail: bombina@anajatim.demon.nl

14362. Buczynski, P. (2012): Dragonflies (Odonata) of the left-bank Bug River valley between Włodawa and Kodeń (middle-eastern Poland). *Zeszyty naukowe uniwersytetu Szczecińskiego NR 728 Acta Biologica* 19: 47-69. (in English, with Polish summary) ["The presented paper analyses the occurrence of dragonflies in the left-bank (Polish) part of the Bug River valley between Włodawa and Kodeń (65 km of the river course, 51°32'–51°55' N, 23°31'–23°38' E). In total, 40 species were recorded. The key sites for dragonflies were oxbow lakes, the Bug River and its tributaries. Species diversity was found to be relatively low due to a lack of peatlands and dystrophic waters, as well as strong eutrophication of small water bodies. The effects of strong water pollution in the Bug River were evident. The species composition of dragonflies was typical, but densities of Gomphidae (particularly *Ophiogomphus cecilia*) suggested an adverse state of the environment. This is caused by surface runoffs of agricultural wastewater in Poland, but also by strongly polluted rivers in the territory of Ukraine. The study includes a review of earlier research conducted in the upper course Bug River valley. Considering both the old and new data, 54 dragonfly species were recorded in the Middle Bug River valley between

Golêbie and Kodeń (246 km of the river course at the border of Poland with Ukraine and Belarus). It is an area of high importance for the protection of dragonflies in terms of species diversity and species assemblages." (Author)] Address: Buczynski, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

14363. Dragonfly Society of the Americas (2012): *Argia* 24(4). *Argia* 24(4): 29 pp. (in English) [Second Notice 2013 DSA Annual Meeting: 1; Calendar of Events: 1; Don't Forget to Renew Your Membership! :3; 2013 Southeast DSA Regional Meeting: 3; Boreal or Bust—the 2012 Joint NE DSA and Great Lakes Odonata Meetings: 4; Request for Specimens: 5; The 2012 Annual Dragonfly Festival at Bitter Lake NWR: 6; Final 2012 Treasurer's Report: 7; Photos Needed for *Argia*: 9; DSA is on Facebook: 9; The Nick and Ailsa Donnelly Fellowship: 21; *Argia* is Going All-Digital!: 27; Some Possible Mis-Uses of GPS: 28; New Book Announcements: 28; Advice Column: 29.] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

14364. Eggers, J.T. (2012): Effects of substrate on habitat selection by libellulid dragonflies. Ms. thesis, Northern Illinois University: 88 pp. (in English) ["Habitat selection is a complex process with both biotic and abiotic factors acting to influence the habitat a species occupies. Larvae of the odonate family Libellulidae are predominantly benthic, although some species are frequently associated with vegetation rooted in the sediments. The purpose of this study was to investigate how sediment type influences habitat selection in larvae of four libellulid species: *Pachydiplax longipennis*, *Libellula quadrimaculata*, *Tamea lacerata*, and *Libellula luctuosa*. Another aim was to investigate the influences of vegetation, prey availability, and predators on habitat selection. Both laboratory and field data were utilized in this study. The laboratory research consisted of eight experiments. Experiments 1–4 were designed to determine if sediment type was a factor in habitat selection in the presence and absence of different vegetation types. Experiment 5 and 6 examined the influence of prey availability and hunger with respect to sediment and vegetation. To determine if characteristics of a habitat alter the larva's response to a predator, Experiment 7 was designed to expose larvae to different combinations of sediment and vegetation with and without a predator present. Experiment 8 examined influences of sediment type in early instar larvae habitat selection. Field data was obtained via dragonfly larval sampling from May to October 2011. In laboratory experiments, libellulid larvae discriminated among sediment despite influences from other factors such as vegetative structure, prey availability, and predator presence. Whether the simulated vegetation was with screening or plants, larvae were found significantly more often with vegetation than bare soil with the exception of *L. quadrimaculata*. With the addition of a predator, all species of larvae were observed closer to the predator cage when on the previously established "preferred" soil

type than when on the other sediments. With the addition of prey, there was no difference in habitat selection between starved and fed individuals except in the case of *P. longipennis*. The most distinct similarity in the results for all four species was a significant avoidance of sand. Field data showed that the four species in this study demonstrated non-random association with substrate. The larvae species studied were found most often in natural sites that reflected the established "preferred" substrate from lab experiments, except in the case of *T. lacerata* larvae. For *T. lacerata*, substrate composition may be less important in habitat selection than other factors." (Author)] Address: Eggers, Jennifer Terese,

14365. Farkas, A.; Móra, A.; Devai, G. (2012): Mortality during emergence in *Gomphus flavipes* and *G. vulgatissimus* (Odonata: Gomphidae) along the Danube. *Acta Biol. Debr. Oecol. Hung.* 28: 65-82. (in Hungarian, with English summary) ["The mortality during emergence of the two closely related Hungarian Gomphus species was studied along the branches of the River Danube surrounding the island Szentendrei-sziget. Exuviae, dead and damaged specimens as well as dragonfly wings left behind by birds were collected daily to quantify the rates and the causes of mortality. The mortality rate remarkably differed between the species, such as the factors contributing to mortality. Total mortality during emergence proved to be relatively low in both species, but it was nearly two times higher (6.37%) in *G. flavipes* than in *G. vulgatissimus* (3.4%). In *G. vulgatissimus* mortality was mainly attributed to predation (1.36%) and natural physical factors (1.36%), particularly weather conditions. Whereas, in *G. flavipes* predation and artificial waves (generated by watercrafts) accounted for the major part of mortality (3.44% and 2.16% respectively). Our results suggest that the differences between the two species in mortality are in relation with the population size and the emergence strategy. Although the artificial waving influenced a small proportion of *G. flavipes* population, it should be considered as an important factor in point of view of nature protection." (Authors)] Address: Farkas, Anna, Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

14366. Fontana-Bria, L.; Frago, E.; Selfa, J. (2012): Nuevas citas de *Onychogomphus costae* Sélys, 1885 (Odonata: Gomphidae) del este de la Península Ibérica. *Boletín de la S.E.A.* 50(1): 573-574. (in Spanish, with English summary) ["New records of *O. costae* from València province (eastern Spain) are reported, which corroborate its presence in this region but warn of the need for its protection." (Authors)] Address: Frago, E., Laboratory of Entomology, Wageningen University, Droevendaalsesteeg 1, Building 107, 6708 PB Wageningen, The Netherlands. E-mail: enric.frago@wur.nl

14367. Futahashi, R.; Yamanaka, T.; Uemura, Y.; Hisamatsu, M. (2012): Collection and photographic data on

dragonflies and damselflies from Ibaraki Prefecture. *Bulletin of Ibaraki Nature Museum* 15: 13-38. (in Japanese, with English summary) ["Ninety-one odonate species have so far been reported in Ibaraki Prefecture. Here we give a comprehensive list of Odonata collected from Ibaraki Prefecture based on the collections of Ibaraki Nature Museum and the authors' private collections, which consist of 87 species and one hybrid species. We also mention the following four species which are not included in these collections: *Stylurus oculatus*, *Sympetrum uniforme*, *Libellula angelina*, and *Tholymis tillarga*. The former three species may have become extinct in Ibaraki Prefecture, and the last species seems to be a species migrating from a southern area." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14368. Futahashi, R.; Futahashi, H.; Shinbori, O. Kawamura H. (2012): The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2011. *Bull. Toyama Sci. Mus.* 36: 27-53. (in Japanese, with English summary) ["Here we report our collection and photograph data of odonate species from Toyama Prefecture in 2011. In 2011, we found 76 species from 11 families, and hybrids between *Anax nigrofasciatus nigrofasciatus* and *A. parthenope julius*, and between *Sympetrum eroticum eroticum* and *Sympetrum kunckeli*. The following 12 species were not found in 2011 (the last collection year in parenthesis); *Paracercion melanotum* (2006), *Sympecma paedisca* (2009), *Anax guttatus* (2005), *Gomphus postocularis* (1972), *Sinogomphus flavolimbatus* (2010), *Nihonogomphus viridis* (2006), *Onychogomphus viridicostus* (1959), *S. danae* (2001), *S. fonscolombii* (2006), *S. striolatum imitoides* (2004), *S. vulgatum imitans* (2005), *Trapezostigma virginia* (2010) and *Tholymis tillarga* (2007). (Authors)] Address: Futahashi, R., Nat. Inst. of Advanced Industrial Science & Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14369. Futahashi, R. (2012): *Sympetrum fonscolombii* (Selys, 1840) and the interspecific hybrid between *Anax nigrofasciatus nigrofasciatus* Oguma, 1915 and *Anax parthenope julius* Brauer, 1865 taken in Tsukuba, Ibaraki Prefecture. *Aeschna* 48: 45-46. (in Japanese, with English summary) ["A male of *S. fonscolombii*, and a male of interspecific hybrid between *Anax nigrofasciatus nigrofasciatus* and *Anax parthenope julius* captured in Tsukuba, Ibaraki Prefecture, Japan is reported. This is the first record of *S. fonscolombii* in Ibaraki Prefecture. The hybrid specimen had intermediate characteristics between *A. n. n.* and *A. p. j.*, and was confirmed by nuclear DNA analysis." (Author)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14370. Geraeds, R.; Muusse, T.O.V. (2012): The rediscovery of *Coenagrion mercuriale* in the Dutch province of

Limburg. *Brachytron* 15(1): 25-3. (in Dutch, with English summary) ["*C. mercuriale* has always been rare in the Netherlands. Only two reliable sightings are known: in 1903 and 1926. However, on the 1st of June 2011, four or five male Southern damselflies were found in the Beesels Broek in the Dutch province of Limburg. In the following days. Southern damselflies were seen almost daily up and until the 13th of June; after the 13th none were spotted. Only males were seen, maximally five animals at a time. All animals were seen along a small part of the Huilbeek brook and a small seepage stream. Both streams do not look wry suitable for the species. There is a lack of submerged vegetation that is suitable as larval habitat. Besides that, the Huilbeek brook is densely grown with *Phragmites australis*. Because of this, and the short 13-day period (early in the flight period that animals were seen), it is possible that there is no population present in this area of the Beesels Broek. It is most likely that the damselflies are vagrants from a nearby (undiscovered) population." (Authors)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

14371. Geraeds, R. (2012): Habitat of larvae of *Gomphus vulgatissimus* in some streams in the Dutch province of Limburg. *Brachytron* 15(1): 3-15. (in Dutch, with English summary) ["The locations and timing of emergence of Gomphidae in the river Rur have been thoroughly investigated in recent years. It is assumed that gomphid dragonflies generally emerge close to their larval habitat. Since surveys of actual larval habitats in the Netherlands have been very rare, four transects of the Rur were checked for the presence of larvae of Common Clubtail (*Gomphus vulgatissimus*) during the years 2006-2009. The aim of this study was to discover what type of substrate the larvae prefer, and if the places where the dragonflies emerge are indeed situated close to the actual larval habitats. The larvae were caught with a hand brailer, which is normally used for fish and amphibian surveys. For each of the larvae caught, the type of substrate in which it was caught and its distance to the river bank were noted. Most of the 615 larvae were found within one metre distance of the river bank, and almost 50% even within 0,5 metre from the bank. The largest distance from the bank at which larvae were caught was 5 metres. Most larvae were found in mixed substrates, dominated by a combination of silt and detritus. Only a few larvae were found in substrates dominated only by silt, detritus, sand or gravel. Because the river Rur is too deep to investigate the whole streambed, it was not certain if the results were a good representation of the actual situation. Therefore, in 2009 and 2010 three smaller streams were investigated, using the same method as in 2006-2009. During this period, 51, 108 and 62 larvae were caught in the rivers Swalm, Vlootbeek and Worm respectively. These results were similar to the situation in the river Rur. In the three streams most larvae (53% to 63%) were caught within 0,5 metre from the bank as well. Same as in the Rur most larvae were found in mixed substrates, which were dominated by a combination of silt and detritus. In substrates that consisted of just

one type, almost no larvae were caught. Most likely, the preference for locations near the river banks is a result of the greater diversity in types of substrate. Further up the streambed, the streaming velocity is too high for sedimentation of silt and detritus. Therefore, the diversity of types of substrate is much higher along the banks. The majority of larvae of *Gomphus vulgatissimus* were found close to the banks, and it is most likely that they emerge near the larval habitat." (Author)] Address: Geraeds, R.P.G., Bergstraat 70, NL-6131 AW Sittard, The Netherlands

14372. Hatfield, J.K. (2012): New records for Taylor Co., Texas. *Argia* 24(4): 11. (in English) [19 species are added to the regional list from surveys on 17-IV-2012 and 31-VII-2012; most interesting are *Phyllogomphoides albrighti* and *Erythemis plebeja*.] Address: Hatfield, J.K., Lubbock, Texas, USA. E-mail: dragonflywatcher1029@yahoo.com

14373. Hatfield, J.K. (2012): Pale-faced Clubskimmer (*Brechmorhoga mendax*) in the Texas Panhandle. *Argia* 24(4): 11. (in English) [Spring 2012, Llano Estacado Audubon Society Trail off Buffalo Springs Lake, Lubbock Co., Texas, USA] Address: Hatfield, J.K., Lubbock, Texas, USA. E-mail: dragonflywatcher1029@yahoo.com

14374. Hoppenbrouwers, P. (2012): Observation of solitary oviposition by *Anax parthenope* in the Millingerwaard, The Netherlands. *Brachytron* 15(1): 31-35. (in Dutch, with English summary) ["Solitary oviposition of *Anax parthenope* was observed on 12th July 2006 in the Millingerwaard, near Millingen aan de Rijn in the province of Gelderland. This happened in a relatively small pond, circa 100 by 20m and with a maximum depth of 1,5m. This is the first documented observation of oviposition of *Anax parthenope* in the Netherlands. Oviposition and reproduction in The Netherlands are discussed, as well as identification, habitat preference and the occurrence of the species in Northwestern Europe." (Author)] Address: Hoppenbrouwers, P., Wijnbesstraat 69, 6543 TK Nijmegen, The Netherlands. E-mail: peter.hoppenbrouwers@planet.nl

14375. Joger, U.; Dujsebayaeva, T.; Belyalov, O.V.; Chikin, Y.; Guicking, D.; Grachev, Y.A.; Kadyrbekov, R.; Miaud, C. (2012): Fauna of the Aralkum. In: Breckle, S.W., W. Wucherer, L.A. Dimeyeva & N.P. Ogar (eds.): *Aralkum - a man-made desert. The desiccated floor of the Aral Sea (Central Asia)*. *Ecological Studies* 218: 199-269. (in English) ["The fauna of the Aralkum has been studied only partly. But the lists of mammals of the Kazakhstan part of the Aral Sea region, the migratory breeding bird species and rare winter visitors, the resident breeding bird species, passage visitors (birds), vagrant birds, reptiles collected around Aral Sea in 2002-2004, and taxonomical diversity of insect orders and other groups are documented. The ecological disaster of the Aral Sea reduced the faunistic diversity of the area in a selective manner. Aquatic and semiaquatic animal species such as fish-eating birds, waterfowl, Amphibia, water snakes and aquatic insects suffered dramatic reductions in numbers. Some freshwater

species and species of riverine forest died out or left the area completely. On the other hand, desert species and certain eurybionts were able to extend their ranges into the Aralkum. Further monitoring of the fauna of the Aralkum is strongly recommended to document the very active migrations to and invasions of the dynamic new ecosystems." (Author) In table 11.13 *Ischnura aralensis*, *Calopteryx virgo*, *Anax imperator*, *Orthetrum sabina*, and *Selysiothemis nigra* are classified as "Rare insect species of the Aral Sea".] Address: Joger, U., Staatliches Naturhistorisches Museum, Pockelsstr. 10, 38106 Braunschweig, Germany. E-mail: ulrich.joger@snhm.niedersachsen.de

14376. Kis, O.; Vajda, C.; K'zér, K.; Szabó, L.J.; Miskolczi, M.; Cserhatis, C.; Gyulavari, H.A.; Devai, G. (2012): Morphometric study of an adult Dark Emerald Damselfly [*Letes macrostigma* (Eversmann, 1836)] population from a Hungarian alkaline pond. *Studia odonotol. hung.* 14: 81-102. (in Hungarian, with English summary) ["Although exact information about different species are necessary for ecological and hydrobiological researches we found very few about the *L. macrostigma*. So our aim was to provide more information concerning this species. Furthermore we explored the variation of the examined body and wing traits and compared the sexes. The study is based on male and female adults collected from a Hungarian alkaline pond (Kelemen-szék) in the area between the rivers Danube and Tisa. Our results showed that males had larger body than females however this difference was not significant. Females nevertheless had significantly bigger head and wings. The multivariate analysis could not divide the sexes clearly based on body traits, but based on the wing measurements. Interestingly the traits of the head was correlated mostly with other traits." (Authors)] Address: Devai, G., Department of Ecology, Kossuth L. University, H-4010 Debrecen, P.O. Box 71, Hungary

14377. Konischuk, V.V.; Mosyakin, S.L.; Tsarenko, P.M.; Kondratyuk, S.J.; Borysova, O.; Virchenko, V.; Prydyuk, M.P.; Fitsaylo, T.; Havrys, G.G.; Tytar, V.M.; Shupova, T.V. (2012): [Red book of Kyiv region]. *Agroecological Magazine* • 3 • 2012: 46-58. (in Ukrainian) [The Red List considers *Coenagrion armatum*, *Sympecma paedisca*, *Aeshna viridis*, *Leucorrhinia caudalis*, *L. pectoralis*, *Anax parthenope*, *Stylurus flavipes*.] Address: Tytar, V.M., Institut Zoology II, Schmalhausen NAS of Ukraine, Kiev

14378. Konovalova, Y.; Buy, D.D. (2012): List of dragonfly species (Insecta: Odonata) from Pereyaslav-Khmel'nitsky District of Kyiv Region. *The Kharkov Entomol. Soc. Gaz.* 20(1): 15-22. (in Ukrainian, with Russian and English summaries) ["Updated list of dragonfly species from Pereyaslav-Khmel'nitsky District of Kiev Region (Ukraine) is compiled based on both the original and literature data. It includes 32 species. *Gomphus flavipes*, *Anax imperator*, *Aeshna viridis*, and *Leucorrhinia pectoralis* are currently recognized as threatened species. *Gomphus vulgatissimus* and *Crocothemis erythraea* are reported from the district for the first time." (Author)] Address: Buy, D.D., Kiev

National University, ul. Vladimirska, 64, Kiev, 01033, Ukraine. E-mail: -exploder_@ukr.net

14379. Missouri Department of Natural Resources (2012): Biological Assessment Study Report: Logan Creek, Reynolds County. September 2011 – March 2012. Prepared for: Missouri Department of Natural Resources, Division of Environmental Quality, Water Protection Program, Water Pollution Control Branch. Prepared by: Missouri Department of Natural Resources, Field Services Division, Environmental Services Program, Water Quality Monitoring Section: 32 pp. (in English) ["Conclusions: Based on this study, there may be a conclusion drawn that Logan Creek is not biologically sustainable to benthic macroinvertebrates. The lack of fully supporting MSCI scores is most likely the result of metals impairment, particularly lead, from mine discharge." (Authors) Two samples at two stations resulted in the following Odonata taxa: Station #1: (1) *Argia*, *Basiaeschna janata*, *Enallagma*, *Gomphidae*, *Hagenius brevistylus*, *Macromia*, *Stylogomphus albistylus*; (2) *Argia*, *Calopteryx*, *Enallagma*, *Gomphidae*, *Hagenius brevistylus*, *Helocordulia*, *Libellula*, *Macromia*. Station #2: (1) *Argia*, *Calopteryx*, *Enallagma*, *Gomphidae*, *Hagenius brevistylus*, *Macromia*, *Stylogomphus albistylus*; (2) *Argia*, *Calopteryx*, *Enallagma*, *Gomphidae*, *Hagenius brevistylus*, *Hetaerina*, *Libellula*, *Macromia*] Address: Dept of Natural Resources, Field Services Division, Environ. Services Program, Water Quality Monitoring Section

14380. Padelford, L.; Padelford, B.; Schmid, R. (2012): First report of Black Meadowhawk (*Sympetrum danae*) from Nebraska. *Argia* 24(4): 13. (in English) [21-IX-2012, Fontenelle Forest, Bellvue, Sarpy County, Nebraska, Texa; 22-IX-2012, Heron Haven, Omaha, Douglas Co., Nebraska, USA.] Address: Padelford, Loren, 1405 Little John Rd, Bellevue, Nebraska, 68005, USA. E-mail: lpdfrd@cox.net

14381. Patten, M.A.; Smith-Patten, B.D. (2012): First record of the Atlantic Bluet (*Enallagma doubledayi*) for Oklahoma. *Argia* 24(4): 16-17. (in English) [2-IX-2012, McGee Creek Wildlife Management Area, Atoka Co., Oklahoma, USA] Address: Patten, M.A., Oklahoma Biological Survey, University of Oklahoma, Norman, OK 73019, USA. E-mail: mpatten@ou.edu

14382. Paulson, D.; Smallshire, D. (2012): Mass movement of Spot-winged Gliders (*Pantala hymenaea*) in Panama. *Argia* 24(4): 22-23. (in English) [01-IX-2012, Canal Area, Panama (9.08°N 79.65°W)] Address: Paulson, D.R., Slater Museum, Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@pugetsound.edu

14383. Prieto-Lillo, E.; Selfa, J. (2012): Ejemplar teratológico de *Gomphus simillimus* (Sélys, 1840) (Odonata: Gomphidae). *Boletín de la S.E.A.* 50(1): 543-544. (in Spanish, with English summary) [Iberian Peninsula, Valencia, Spain; "A teratological specimen of *G. simillimus*, with a malformation in the apical area of the right hindwing and a

significant reduction in the left mesothoracic leg, is described." (Authors)] Address: Selfa, J., Lab. d'Investigació d'Entomologia, Dept. de Zoologia, Fac. de Ciències Biològiques, Univ. de València, c/ Dr. Moliner 50, 46100 Burjassot, València, Spain. E-mail: jesus.selfa@uv.es

14384. Prieto-Lillo, E.; Selfa, J. (2012): Un caso de teratología abdominal en *Anax parthenope* (Sélys, 1839) (Odonata: Aeshnidae). *Boletín de la S.E.A.* 50(1): 539-540. (in Iberian Peninsula, Valencia) [Iberian Peninsula, Valencia, Spain; "A teratology involving the abdomen in a specimen of *A. parthenope*, with reproductive implications, is described." (Authors)] Address: Selfa, J., Lab. d'Investigació d'Entomologia, Dept. de Zoologia, Fac. de Ciències Biològiques, Univ. de València, c/ Dr. Moliner 50, 46100 Burjassot, València, Spain. E-mail: jesus.selfa@uv.es

14385. Seidler, R. (2012): Striped Saddlebags (*Tramea calverti*) - First Louisiana record. *Argia* 24(4): 22. (in English) [8-X-2012, Red River National Wildlife refuge, Bayou Pierre Unit, Yates Tract, Louisiana, USA] Address: Seidler, Rosemary, Shreveport, Louisiana, USA: E-mail: rseidler@centenary.edu

14386. Torralba-Burrial, A.; Domínguez Robledo, J.M.; Luque, P. (2012): Primera cita de *Brachytron pratense* (Müller, 1764) (Odonata: Aeshnidae) en Cantabria (N península ibérica). *Boletín de la Asociación española de Entomología* 36: 479-482. (in Spanish, with English caption) [*B. pratense* was found at Marismas de Alday (Cantabria, Spain): 30TVP3108, 0-3m a.s.l.; 23/04/2011, 1 male, 02/05/2011, 2males.] Address: Torralba Burrial, A., Depto de Biología de Organismos y Sistemas, Univ. de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

14387. Van Wouwen, N. (2012): "Five undescribed species in ten days time" An interview with Dr. Rosser W. Garrison. *Brachytron* 15(1): 56-57. (in Dutch, with English summary) [On 9 July 2011, a WDA symposium was held in Leiden, the Netherlands, in lieu of the larger WDA symposium which had been planned for 2011 in Japan and which had been postponed because of the earthquake damage there. *Brachytron* grabbed the occasion and managed to secure an interview with Dr. Rosser W. Garrison, who with his wife Dr. Natalia von Ellenrieder are considered the authorities on the Odonata of Central and South America." (Author)] Address: Nick van Wouwen via redactie@brachytron.nl

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14388. Acquah-Lampsey, D.; Kyerematen, R.; Oduro Owusu, E. (2013): Dragonflies (Odonata: Anisoptera) as tools for habitat quality assessment and monitoring. *Journal of Agriculture and Biodiversity Research* 2(8): 178-182. (in English) ["Dragonflies have been recommended for habitat quality assessment and monitoring. The University of Ghana, Legon Campus dragonfly fauna was assessed and their conservation status evaluated. The water bodies present were assessed and found to serve as

breeding sites of the dragonflies. 26 dragonfly species belonging to three families were recorded making up 23.6% of the country's total dragonfly fauna. Based on these, management strategies were recommended for the area." (Authors)] Address: Acquah-Lampsey, D., Dept of Animal Biology & Conservation Sci., P.O. Box LG67, Univ. Ghana, Legon, Ghana. E-mail: dacquahlampsey@gmail.com;

14389. Adriaens, D.; Adriaens, T.; De Knijf, G.; Hendrickx, F.; Maes, D.; Van Landuyt, W.; Vermeersch, G.; Louette, G. (2013): Soorten en biotopen in Oost-Vlaanderen: prioriteit en symbolwaarde voor het natuurbeleid. *Rapporten van het Instituut voor Natuur- en Bosonderzoek 2013* (1040772). Instituut voor Natuur- en Bosonderzoek, Brussel: 387 pp. (in Dutch, with English summary) ["Many species and biotopes are struggling to survive in the Flemish region of Belgium, an area that is highly impacted by human presence. Nature policy tries to halt the current biodiversity crisis by implementing both area and species based conservation measures. Area based conservation measures aim to guarantee a minimum level of quality that serves a broad spectrum of species and biotopes. This is achieved by creating a broad network of areas and managing them in favour of biodiversity. However, for several nature values these area based measures do comply only partially or not at all with their ecological requirements. They also need habitat features that lie outside protected areas. In this case, additional and specific measures are needed to protect particular species and biotopes from disappearing. While the Flemish regional government mainly adopts an area based approach by setting apart nature reserves, the provincial governments (5 in Flemish region) rather focus on conserving biodiversity outside the network of nature reserves. For the latter, an extensive set of measures is required, tailored to the specific needs of species and biotopes. As they are applied outside protected areas, public support is a critical success factor. Indeed, not only provincial and local authorities have their role to play, but also individual citizens can contribute to the conservation of biodiversity. Both financial and logistic means to stop the biodiversity crisis are limited, however. Therefore, priorities have to be set: for which species and biotopes are conservation measures most urgent. It is obvious that provinces with a large share of the distribution or population of threatened nature values, bear a large responsibility for the conservation at the regional, national and even European level. With the finalisation of this report, each province in Flanders now has a list of species for which they contribute most to their conservation. These lists share a common methodology. Hence, they ensure that if the appropriate measures are applied, each province contributes to the maximal extent to the halt of biodiversity loss. In addition, and for the first time, this report also makes a prioritisation of the biotopes (in fact these are spatial units with specific environmental characteristics and a corresponding set of species) in the province of Eastern Flanders, based on area covering inventories in Flanders (Biological Valuation Map). The adopted methodology can easily be applied to make a list of the most

important biotopes in each of the other provinces of Flanders too. In this report, 155 species are listed as important biodiversity values for which the province of Eastern Flanders can further elaborate its biodiversity policy. Species were selected among 10 taxonomical groups. About one third of the species are present with more than a third of their Flemish distribution or population within the boundaries of the province of Eastern Flanders, or at least their share is higher as expected compared with the other provinces. Moreover, these species are among the most threatened in Flanders and are thus considered to take the most advantage of conservation measures. They are called priority species for the province. The other two thirds of the 155 species can be seen as symbol species for several other reasons. For example, they are explicitly protected by European legislation or are currently facing a steep decrease in numbers, extent or area of occupancy. Other species especially take advantage of the efforts to connect the actual nature reserves by creating stepping stones and corridors in the intervening landscape, a task for which the provincial government is qualified. Also species with most of their distribution or population size within the provincial territory are listed as symbol species. Analogously, about 20 biotopes with high importance within the province of Eastern Flanders were selected. They cover a broad spectrum: from mud flats and salt marshes, over creeks, wetlands, grasslands and tall herbs, to shrub and woodlands. Small landscape elements like rows of trees or shrub, embankments, fortresses and bunkers are considered as well. The choice of species and biotopes is consolidated by recent, objective and trustworthy data. The ecology, distribution, threats and conservation measures are described for each of the biodiversity values. The degree to which the distribution or population is spatially covered by nature reserves or areas with nature oriented management is determined too and can be used as an extra criterium to decide upon the sense of urgency for conservation action. The compilation of a list of species and biotopes of high conservation priority at the provincial level is an essential step in the design of a strategic policy that aims to spend the available funds as efficiently as possible for the conservation of biodiversity." (Authors) The following odonate species are treated in detail: *Cordulegaster boltonii*, *Coenagrion pulchellum*, *Aeshna isoceles*, *Libellula fulva*, *Leucorrhinia pectoralis*, *Calopteryx virgo*, and *Somatochlora flavomaculata*] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

14390. Andrew, R.J.; Thaokar, N.; Verma, P. (2013): Odonate diversity at Wena Dam of Nagpur district (Ms), India. *International Journal of Scientific Research* 2(10): 1-3. (in English) [52 Odonata species were recorded at the Wena Dam of Nagpur district during the post monsoon period of 2012.] Address: Andrew, R., Post Graduate Dept of Zool., Hislop College, Nagpur-440001, India

14391. Baa-Poku, J.; Asante, F.; Amakye, J.S. (2013): Impact of urban effluents on the macroinvertebrates of a

creek in Accra, Ghana. *West African Journal of Applied Ecology* 21(1): 97-109. (in English) ["Five study stations were selected along the reaches of the creek. Water and benthic samples were collected and analyzed between September 2005 and February 2006. The study showed that the effluent discharges caused a significant increase in BOD, COD and NH₃ at the stations that received the effluents. The high levels of total and faecal coliforms at the midstream sections of the creek (626.0 x 10⁴ cfu/100 ml and 75.30 x 10⁴ cfu/100 ml, respectively) indicated increased pollution levels compared to the reference stations (446.0 x 10³ cfu/100 ml and 133.0 x 10³ cfu/100 ml). The Nima Creek showed characteristics of a disturbed urban creek. A total of 19 macroinvertebrate taxa, comprising a total of 11,613 individuals, were collected. Estimated Shannon-Weiner Diversity Index (H') was low at the midstream section of the creek, H' = 1.14, where the effluents were concentrated than at the upstream H' = 1.44 or downstream H' = 1.38 sections of the creek. Chironomina and Physa were the most abundant taxa within the creek, dominated by the genus *Chironomus*, which is known to be tolerant to pollution, which confirmed the polluted state of the creek. Rigorous and regular assessment and monitoring of effluents from waste treatment plants and other sources that discharge into the creek, with the aim of complying with the Environmental Protection Agency (EPA) guidelines are some of the mitigative measures suggested to protect life in the creek." (Authors) Odonata are represented by "Libellulidae" and *Phaon iridipennis*.] Address: Baa-Poku, J., P.O. Box Os 943 Osu, Accra, Ghana. E-mail: baapoku@hotmail.com

14392. Baird, I.R.C.; Burgin, S. (2013): An emergence study of *Petalura gigantea* (Odonata: Petaluridae). *International Journal of Odonatology* 16(3): 193-211. (in English) ["Emergence studies in Odonata provide information on the behaviour, ecology and fundamental demographic parameters in population studies. This paper reports on a study of sex ratio at emergence, pattern and duration of the emergence season, and potential cohort splitting in *Petalura gigantea*. Sex ratio at emergence varied among years, habitat patches and swamp types. Across all collections, sex ratio varied significantly from a 1:1 ratio, with a bias towards females. The duration of the emergence season varied between sites and years, from at least 45 to at least 70 days, potentially commencing by late October and extending into early January and possibly beyond. Although some evidence suggested cohort splitting, it was not confirmed. Observations of spatially and temporally aggregated emergence clusters are consistent with observed oviposition patterns of individual females, suggesting cohort emergence. Observations of mortalities at emergence and of emergence location are provided; the latter should assist researchers and resource managers in identifying breeding sites in heterogeneous swamp vegetation." (Authors)] Address: Burgin, Shelly, Institute of Sustainable Development, Architecture, Bond University, Gold Coast, Queensland, 4229, Australia

14393. Brown, J.R.; Müller, T.; Kerby, J.L. (2013): The interactive effect of an emerging infectious disease and an emerging contaminant on Woodhouse's toad (*Anaxyrus woodhousii*) tadpoles. *Environmental Toxicology and Chemistry* 32(9): 2003-2008. (in English) ["Two factors influencing amphibian population declines are infectious diseases and exposure to anthropogenic contaminants. We examined an emerging fungal pathogen, *Batrachochytrium dendrobatidis* (Bd), and its interaction with an emerging contaminant, the antimicrobial triclosan. We first conducted, a two x two x four factorial study to examine the interactive impacts of dragonfly predator cues, Bd, and triclosan (0, 10, 100, 1000µg/L) on Woodhouse's toad tadpoles. We measured the lethal and sub-lethal impacts of these stressors on tadpoles over four weeks. All tadpoles in the 100 and 1000µg/L concentrations of triclosan died within 24h of exposure, but tadpoles in the low concentration (10µg/L) survived. Tadpoles exposed to only Bd (no triclosan) exhibited a low survival rate (67.5%) while those exposed to both 10µg/L triclosan and Bd exhibited a high survival rate (91.1%) implying that triclosan inhibits Bd on tadpoles. Bd and predator cue exposure individually increased the developmental rate of the surviving tadpoles but this effect was absent when these factors were combined with triclosan. In a follow-up study we found Bd growth in culture was significantly inhibited at 10µg/L concentration of triclosan and completely inhibited at 100µg/L. These findings suggest that interactions among multiple stressors can be complex and require examination in conjunction with one another to evaluate actual impacts to aquatic fauna."(Authors)] Address: Brown, Jennifer, Dept of Biology, University of South Dakota, Vermillion, SD, USA. E-mail: raejenn@gmail.com

14394. Combes, S.A.; Salcedo, M.K.; Iwasaki, J.M.; Pandit, M.M. (2013): Capture success and efficiency of dragonflies pursuing different types of prey. *Integrative and Comparative Biology* 56(5): 787-798. (in English) ["The dynamics of predator-prey interactions vary enormously, due both to the heterogeneity of natural environments and to wide variability in the sensorimotor systems of predator and prey. In addition, most predators pursue a range of different types of prey, and most organisms are preyed upon by a variety of predators. We do not yet know whether predators employ a general kinematic and behavioural strategy, or whether they tailor their pursuits to each type of prey; nor do we know how widely prey differ in their survival strategies and sensorimotor capabilities. To gain insight into these questions, we compared aerial predation in 4 species of libellid dragonflies pursuing 4 types of dipteran prey, spanning a range of sizes. We quantified the proportion of predation attempts that were successful (capture success), as well as the total time spent and the distance flown in pursuit of prey (capture efficiency). Our results show that dragonfly prey-capture success and efficiency both decrease with increasing size of prey, and that average prey velocity generally increases with size. However, it is not clear that the greater distances and times required for capturing larger prey are due solely to the

flight performance (e.g., speed or evasiveness) of the prey, as predicted. Dragonflies initiated pursuits of large prey when they were located farther away, on average, as compared to small prey, and the total distance flown in pursuit was correlated with initial distance to the prey. The greater initial distances observed during pursuits of larger prey may arise from constraints on dragonflies' visual perception; dragonflies typically pursued prey subtending a visual angle of 1°, and rarely pursued prey at visual angles greater than 3°. Thus, dragonflies may be unable to perceive large prey flying very close to their perch (subtending a visual angle greater than 3–4°) as a distinct target. In comparing the performance of different dragonfly species that co-occur in the same habitat, we found significant differences that are not explained by body size, suggesting that some dragonflies may be specialized for pursuing particular types of prey. Our results underscore the importance of performing comparative studies of predator-prey interactions with freely behaving subjects in natural settings, to provide insight into how the behaviour of both participants influences the dynamics of the interaction. In addition, it is clear that gaining a full understanding of predator-prey interactions requires detailed knowledge not only of locomotory mechanics and behaviour, but also of the sensory capabilities and constraints of both predator and prey." (Authors)] Address: Combes, Stacey, Dept of Organismic and Evolutionary Biology, Harvard University, Concord Field Station, 100 Old Causeway Road, Bedford, MA 01730, USA. E-mail: scombes@oeb.harvard.edu

14395. Courte, C. (2013): Vague migratoire exceptionnelle de *Leucorrhinia pectoralis* (Charpentier, 1825) [Odonata: Libellulidae] en 2012 dans le nord de la France. Point sur la Lorraine et mise à jour cartographique. *Bulletin société Lorraine d'entomologie* 14: 5-10. (in French) [Records between 2009 and 20012 of *L. pectoralis* in the northeastern départements of France are document and mapped.] Address: Courte, C., Chargé de mission scientifique 54/55, Conservatoire d'Espaces Naturels de Lorraine, 7 bis route de Pont-a-Mousson, 54 470 Thiaucourt, France. E-mail: c.courte@cren-lorraine.fr

14396. Cowan, E.M.; Cowan, P.J. (2013): The dragonflies and damselflies of a wadi pool near Nizwa, northern Oman. *Tribulus* 21: 14-23. (in English) ["10 Odonata species observed and photographed with evidence of breeding for one identified damselfly species and 5 dragonfly species. Another damselfly assumed to be *Ischnura evansi* also observed ovipositing. Photographs and notes on the behaviour of each species in the systematic list." (Authors) *Ischnura evansi*, *Pseudagrion decorum*, *Anax imperator*, *Paragomphus sinaiticus*, *Orthetrum chryso stigma*, *O. sabina*, *Crocothemis erythraea*, *Trithemis annulata*, *T. arteriosa*, *T. kirbyi*] Address: Cowan, P.J., Dept of Biological Sciences and Chemistry, Univ. of Nizwa, Sultanate of Oman. E-mail: desertmammal@yahoo.com

14397. Curry, B. (2013): More Citrine Forktails in the Hamilton Study Area. *The Wood Duck* 67(4): 82, 87. (in

English) [*Ischnura hastata*, Kerncliff Park quarry, Burlington, Ontario, Canada, 9 August 2013] Address: Curry, B. c/o Hamilton Naturalists' Club, P. O. Box 89052, Hamilton, Ontario, L8S 4R5, Canada. E-mail: info@hamiltonnature.org

14398. Degabriele, G. (2013): An overview of the dragonflies and damselflies of the Maltese Islands (Central Mediterranean) (Odonata). *Bulletin of the entomological society of Malta* 6: 5-127. (in English) ["Seventeen species of odonates have been recorded on the Maltese Islands of which *Pantala flavescens* represents a new record. Diagnostic features of the adult and larval stages of these species are described in this work. The work also combines findings from previous literature on Maltese Odonata with information gathered from fieldwork data in order to give an insight on the current situation of the Odonata of the Maltese Islands and serves as an identification guide to both adults and larvae of these insects. The anatomy and physiology of the larval and adult forms of these insects, which are discussed in this work, are adapted to the predatory lifestyle which they lead. The fact that odonate larvae frequent different habitats from adults helps to reduce competition for resources. Adult odonates can be found in a number of local habitats, mostly near freshwater but also brackish water bodies since freshwater is a scarce natural resource on the Maltese Islands. Global warming is affecting the distribution range of odonates in the Mediterranean - while some species may be on the decline, others which can thrive in hot dry environments are progressively being recorded in the Mediterranean and southern Europe, including the Maltese Islands. Relatively little work on the Odonata of the Maltese Islands has been done previous to the present work. Most of this involves listing of locally recorded species; very little research investigates odonate behaviour and distribution. No information exists as to why species such as *Sympetrum striolatum*, and *Orthetrum cancellatum* have become progressively uncommon in recent years, and therefore more research is required on the matter. Because of limiting water resources, freshwater habitats on the Maltese Islands are quickly drained of water, which may be used for agricultural purposes. This may tend to reduce species richness of local odonates. Biologists are now considering dragonflies as biological indicators of a healthy environment and make recommendations in order to preserve the habitats frequented by these insects." (Author)] Address: Degabriele, G., Dept of Biology, Junior College, Univ. of Malta, Msida MSD 1252, Malta. E-mail: godwin.degabriele@um.edu.mt

14399. Dijkstra, K.-D.B.; Kalkman, V.J. (2013): The "African" genus *Argiagrion* is a Brazilian *Leptagrion* species and the "Philippine" *Moroagrion* a European *Pyrrhosoma* (Odonata: Coenagrionidae). *International Journal of Odonatology* 16(2): 189-191. (in English) ["*Argiagrion leoninum*, known only from the female holotype alleged to be West African, is shown to be a junior synonym of the Brazilian species *Leptagrion macrurum*. *Moroagrion danielli*, known only from the male holotype thought to be from the

Philippines, is a junior synonym of the European *Pyrrhosoma nymphula*. *Argiagrion* and *Moroagrion* were both monotypic genera and become junior synonyms of *Leptagrion* and *Pyrrhosoma* respectively." (Authors)] Address: Dijkstra, K.D., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, NL-2300 RA, Leiden, The Netherlands. E-mail: dijkstra@nrm.nl

14400. Dorrington, G.E. (2013): On flying insect size and Phanerozoic atmospheric oxygen. *Proceedings of the National Academy of Sciences* 109(50): E3393-E3393. (in English) ["In a recent article in PNAS, Clapham & Karr (Clapham ME, Karr JA (2012) Environmental and biotic controls on the evolutionary history of insect body size. *Proc Natl Acad Sci USA* 109(27):10927-10930) related the maximum wing length (MWL) of different Odonoptera and Orthoptera species to Phanerozoic atmospheric oxygen partial pressure (pO_2) as predicted by the GEOCARBSULF model (2). They argued that the MWL data assigned to 10-Myr periods is well correlated with elevated Paleozoic pO_2 levels, but that the correlation weakens and is ultimately decoupled during the Mesozoic and Cenozoic. To explain the correlation, they assumed that maximum insect size is constrained by a tracheal oxygen supply limit. To explain the decoupling, they referred to the notion that insect size increase results in reduction of flight maneuverability and increased aerial predation by birds (among others), i.e., a selective pressure against size increase also operates. This convenient mixed hypothesis deserves scrutiny. ... Third, in the absence of aerial predation, the emergence of the gigantic Meganisoptera during the Carboniferous and Permian does not necessarily require elevated pO_2 levels when it is assumed that these ancient Odonoptera were weak fliers with relatively low specific maximum power outputs compared with extant Anisoptera (Odonata). Fourth, extant Anisoptera are capable of lifting loads exceeding their own weight during hover (4), indicating substantial power reserves. Large extant aeshnids have also been recorded flying at more than 2,500 m altitude above sea level (5). Therefore, at low altitude, extant Anisoptera must have wide oxygen supply margins when operating in their usual aerobic flight modes. Following Clapham & Karr, the hypothetical removal of aerial predation would result in evolving size increase. However, at the present pO_2 level, scale-up by one order of magnitude would be permissible before the tracheal surface area constrains maximum feasible size. Fifth, there is no evidence that the evasive maneuver capability of extant Anisoptera reduces as body size increases. Territorial dogfights among conspecific males tend to select larger individuals with good maneuverability and higher maximum flight speeds. Finally, the MWL history presented (Clapham & Karr) is reproduced in Fig. 1 with an important difference: two anisopteran species, *Petalura ingentissima* and *Tetracanthagyna plagiata*, have been included. There is no evidence that these large extant species evolved during any relaxation of aerial predation over the past 10 Myr. A more credible proposition is that the fossil record represented in Fig. 1 is incomplete.

The correlation reported by Clapham & Karr would then be premature." (Author)] Address: Dorrington, G.E., School of Aerospace, Mechanical and Manufacturing Engineering, RMIT University, Bundoora, VIC 3083, Australia. E-mail: graham.dorrington@rmit.edu.au

14401. Edia, E.O.; Bony, K.Y.; Konan, K.F.; Ouattara, A.; Gourène, G. (2013): Distribution of aquatic insects among four costal river habitats (Côte d'Ivoire, West-Africa). *Bulletin of Environment, Pharmacology and Life Sciences* 2(8): 68-77. (in English) ["We analysed aquatic insect distribution among four coastal river habitats of southeast Ivory Coast. In each river, two sites were sampled: one upstream and one downstream. In the eight sites, aquatic insects were randomly sampled eight times (i.e. four during the rainy season and four during the dry season) between July 2003 and March 2005. The basic criteria for classifying sampling sites by both the Principal Component Analysis and the hierarchical cluster analysis are mainly the nature of the waterbed substrate and the mineralization of the water. Overall, 115 taxa belonging to 51 families and ten orders were recorded. The richest taxon diversity was observed for Diptera and Ephemeroptera. The Indval method revealed that the most mineralized sites were characterised mostly by dipterans. However, the indicator taxa of weakly mineralized sites are mainly ephemeropterans. Taxa such as *Laccophilus* sp., *Ablabesmyia* sp., *Ceratopogon* sp., *Cryptochironomus* sp., *Labioabaetis gambiae*, *Procloeon sylvicola* and *Nanocladius* sp. were generalist in respect to the substrate nature. *Riolus* sp. *Perla* sp., *Choroterpes* sp., *Cloeon* sp. and *Ephoron* sp. were specialists of sandy substrate. *Compsoneria njalensis* was characteristic habitats whose bottom is muddy." (Authors) The checklist includes 15 Odonata species, among them *Phaon iridipennis*, *Lestinogomphus angustus* and *Phyllogomphus aethiops*.] Address: Edia O Edia, Lab. d'Environnement et de Biologie Aquatique, U.F.R.-S.G.E., Univ. Nangui Abrogoua, 02 BP, 801 Abidjan 02, Côte d'Ivoire. E-mail: square_edia@ymail.com

14402. Farkas, A.; Polyák, L.; Móra, A.; Lengyel, S. (2013): The Odonata fauna of the Sajó river. *Acta Biol. Debr. Oecol. Hung.* 31: 27-39. (in Hungarian, with English summary) ["This paper presents the Odonata fauna of the Sajó River based on larval and exuvial data from literature as well as own collections. Up to date the occurrence of 10 dragonfly species have been reported from the river. During our investigations in 2011-2012 altogether nine species were found. Among these species the protected *Coenagrion ornatum* was collected from the river for the first time. The four riverine dragonfly species (*Gomphus flavipes*, *G. vulgatissimus*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*) and two Zygoptera species (*Calopteryx splendens*, *Platynemis pennipes*) form stable populations along a great section of the river. The most important results are the new localities of the riverine dragonflies, all of which are threatened and protected in Hungary. It is most likely that their recent distribution in the river is attributed to the positive changes in water quality since

the 1990's." (Authors)] Address: Farkas, Anna, Dept Hydrobiology, Centre of Arts, Humanities and Sciences, Fac. of Science & Technology, Univ. of Debrecen, Egyetem tér 1, 4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

14403. Feulner, G.R.; Judas, J. (2013): First UAE records of two Odonata: the dragonfly *Urothemis thomasi* and the damselfly *Ischnura nursei*. *Tribulus* 21: 4-13. (in English) ["*Urothemis thomasi* and *Ischnura nursei* (also known as *Rhodischnura nursei*) were recorded from the United Arab Emirates for the first time in June 2013. The nature of the sites and the observed behaviour of each species are briefly described. The two species were found in very different habitats and their main populations are centered in opposite directions from the East Coast of the UAE, the nearest records being more than 300 kilometres away. Alternative explanations for their newly discovered contemporaneous presence in the UAE are discussed, viz., gradual and previously unnoticed range expansion versus recent (and perhaps episodic) immigration in response to favourable conditions created by regional climatic phenomena." (Authors)] Address: Gary R. Feulner, G.R., c/o Chadbourne & Parke, PO Box 23927, Dubai, United Arab Emirates. E-mail: grfeulner@gmail.com

14404. Futahashi, R.; Futahashi, H.; Shinbori, O.; Kawamura, H. (2013): The dragonflies and damselflies of Toyama Prefecture, Central Honshu, Japan in 2012. *Bull. Toyama Sci. Mus.* 37: 127-147. (in Japanese, with English summary) ["Here we report our collection and photograph data of odonate species from Toyama Prefecture in 2012. In 2012, we found 75 species from 12 families, and a hybrid between *Anax parthenope* and *A. nigrofasciatus*. The following 13 species were not found in 2012 (the last collection year in parenthesis); *Paracercion melanotum* (2006), *Anax guttatus* (2005), *Melligomphus viridicostus* (1959), *Nihonogomphus viridis* (2006), *Sinogomphus flavolimbatus* (2010), *Shaogomphus postocularis* (1972), *Leucorrhinia dubia* (2011), *Sympetrum danae* (2001), *S. depressiusculum* (2011), *S. striolatum* (2004), *S. vulgatum* (2005), *Tramea virginia* (2010) and *Tholymis tillarga* (2007). (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14405. Henn, M.J. (2013): Effects of artificial light on the drift on macroinvertebrates in urban central Texas streams. M.S. thesis. Texas State University San Marcos, Dept. of Biology: 28 pp. (in English) ["Since the majority of organisms operate on a circadian rhythm, light pollution in urban areas can possibly influence the aquatic community by affecting the drift of macroinvertebrates. The objective of this study is to examine if artificial night lights reduce drifting macroinvertebrates in the Edwards Plateau, by quantifying macroinvertebrate drift under ambient night light conditions and under extreme artificial lighting. This study was conducted in five streams (two large streams and three smaller streams) within urbanized areas of Central Texas.

Drifting macroinvertebrates were sampled using drift nets under two treatments: ambient lighting (control) and extreme artificial lighting. Among all streams, both taxon diversity and richness of drifting insects was similar between treatments, but average abundance of drifting insects was 37% less in artificial lighting treatment than under the control treatment. Treatment effects were more evident in larger streams than smaller streams. Average abundance of drifting insects was 40% less in artificial lighting treatment with larger streams with notable decreases in Simuliidae (58% less than the control), Baetidae (51% less), and Coenagrionidae (50% less). Reduced drift by artificial light conditions found in this study suggests the potential of artificial lighting disrupting dynamics of macroinvertebrate drift. Results of this experiment support a growing body of knowledge on how urbanized systems will influence stream communities and provide evidence to support various management strategies to minimize the effects of artificial lights on aquatic communities." (Author)] Address: Henn, Monika, Dept of Biology/Aquatic Station, Texas State University, San Marcos, TX, USA

14406. Ivanova, E.P.; Nguyen, S.H.; Webb, H.K.; Hasan, J.; Truong, V.K.; Lamb, R.N.; Duan, X.; Tobin, M.J.; Mahon, P.J.; Crawford, R.J. (2013): Molecular organization of the nanoscale surface structures of the dragonfly *Hemianax papuensis* wing epicuticle. PLoS ONE 8(7): e67893. doi:10.1371/journal.pone.0067893: 8 pp. (in English) ["The molecular organization of the epicuticle (the outermost layer) of insect wings is vital in the formation of the nanoscale surface patterns that are responsible for bestowing remarkable functional properties. Using a combination of spectroscopic and chromatographic techniques, including Synchrotron-sourced Fourier-transform infrared microspectroscopy (FTIR), x-ray photoelectron spectroscopy (XPS) depth profiling and gas chromatography-mass spectrometry (GCMS), we have identified the chemical components that constitute the nanoscale structures on the surface of the wings of *H. papuensis*. The major components were identified to be fatty acids, predominantly hexadecanoic acid and octadecanoic acid, and n-alkanes with even numbered carbon chains ranging from C14 to C30. The data obtained from XPS depth profiling, in conjunction with that obtained from GCMS analyses, enabled the location of particular classes of compounds to different regions within the epicuticle. Hexadecanoic acid was found to be a major component of the outer region of the epicuticle, which forms the surface nanostructures, and was also detected in deeper layers along with octadecanoic acid. Aliphatic compounds were detected throughout the epicuticle, and these appeared to form a third discrete layer that was separate from both the inner and outer epicuticles, which has never previously been reported." (Authors)] Address: Ivanova, Elena, Faculty of Life and Social Sciences, Swinburne University of Technology, Hawthorn, Victoria, Australia. E-mail: eivanova@swin.edu.au

14407. Janssens, L.; Stoks, R. (2013): Fitness effects of Chlorpyrifos in the damselfly *Enallagma cyathigerum*

strongly depend upon temperature and food level and can bridge metamorphosis. PLoS ONE 8(6): e68107. doi:10.1371/journal.pone.0068107: 7 pp. (in English) ["Interactions between pollutants and suboptimal environmental conditions can have severe consequences for the toxicity of pollutants, yet are still poorly understood. To identify patterns across environmental conditions and across fitness-related variables we exposed *Enallagma cyathigerum* damselfly larvae to the pesticide chlorpyrifos at two food levels or at two temperatures and quantified four fitness-related variables (larval survival, development time, mass at emergence and adult cold resistance). Food level and temperature did not affect survival in the absence of the pesticide, yet the pesticide reduced survival only at the high temperature. Animals reacted to the pesticide by accelerating their development but only at the high food level and at the low temperature; at the low food level, however, pesticide exposure resulted in a slower development. Chlorpyrifos exposure resulted in smaller adults except in animals reared at the high food level. Animals reared at the low food level and at the low temperature had a higher cold resistance which was not affected by the pesticide. In summary our study highlight that combined effects of exposure to chlorpyrifos and the two environmental conditions (i) were mostly interactive and sometimes even reversed in comparison with the effect of the environmental condition in isolation, (ii) strongly differed depending on the fitness-related variable under study, (iii) were not always predictable based on the effect of the environmental condition in isolation, and (iv) bridged metamorphosis depending on which environmental condition was combined with the pesticide thereby potentially carrying over from aquatic to terrestrial ecosystems. These findings are relevant when extrapolating results of laboratory tests done under ideal environmental conditions to natural communities." (Authors)] Address: Janssens, Lizanne, Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

14408. Jara, F.G.; Úbeda, C.A.; Perotti, M.G (2013): Predatory insects in lentic freshwater habitats from northwest Patagonia: richness and phenology. Journal of Natural History, 47(43-44): 2749-2768. (in English) ["The main purpose of this work was to study the richness, phenology and abundance of predatory insects throughout the hydroperiod and how they relate to the environmental parameters in lentic bodies of water in northwest Patagonia. Nineteen fishless wetlands and three wetlands with fish were studied, which are located in the surroundings of the Nahuel Huapi National Park. Biotic and abiotic variables were measured during the hydroperiod of each wetland. The dip-netting sampling technique was used to determine the richness of predatory insects and to study the phenology of the dominant species in four wetlands. Species richness in temporary wetlands ranged from one to nine species per wetland and does not differ from that observed in the permanent environments with or without fish predators. Maximum insect richness was recorded in late spring

and was associated with the maximum depth of the wetland and its structural complexity as well as with the duration of the hydroperiod." (Authors) *Cyanallagma interruptum*, *Rhionaeschna variegata*, *Erythrodiplax connata*, *Negomphus* sp., *Rialla villosa*] Address: Jara, F.G., Laboratorio de Fotobiología, INIBIOMA (CONICET-Universidad Nacional del Comahue), Bariloche, Argentina. E-mail: fjara77@hotmail.com

14409. Kastner, F.; Buchwald, R. (2013): Zum Vorkommen der FFH-Libellenarten *Coenagrion mercuriale* Charpentier, 1840 und *Coenagrion ornatum* Selys 1850 (Odonata: Coenagrionidae) im Kreis Minden-Lübbecke (Nordrhein-Westfalen). *Drosera* 2011(2013): 111-118. (in German, with English summary) ["On the occurrence of the dragonfly *Coenagrion mercuriale* Charpentier, 1840 and *Coenagrion ornatum* Selys 1850 (Odonata: Coenagrionidae), species of the European Habitat Directive, in the county Minden-Lübbecke (North Rhine-Westphalia). – *C. mercuriale* predominantly occurs in the river plains of Ems, Lippe, Hunte, and Weser in North Rhine-Westphalia. *C. ornatum* was only found in the river plains of Hunte and Weser in the county Minden-Lübbecke in North Rhine-Westphalia. The *C. mercuriale* and *C. ornatum* occur in sunny and warm, permanently flowing ditches with rich aquatic vegetation, usually with *Berula erecta*. For this study we accounted in 2011 the distribution of these two rare and endangered species in the county Minden-Lübbecke (NRW). We consider the presence of *C. mercuriale* in the three ditch systems Tiefenriede, Ilwede with Barlage and Mehner Bruch and of *C. ornatum* in the ditch systems Ilwede with Barlage and Mehner Bruch as autochthonous. *C. mercuriale* was mapped in 38 ditch sections with more than 1400 individuals and *C. ornatum* in seven ditch sections with eleven individuals." (Authors)] Address: Kastner, Friederike, AG Vegetationskunde und Naturschutz, IBU, Carl von Ossietzky Universität, 26111 Oldenburg, Germany. E-Mail: friederike.kastner@uni-oldenburg.de

14410. Khelifa, R.; Zebba, R.; Amari, H.; Mellal, M.K. (2013): Does wind affect emergence site selection in Odonata? *African Entomology* 21(2): 383-387. (in English) ["This study at *Erythromma lindenii* was undertaken in a 0.4 ha pond at 3 km northwest from El Fedjoudj province, Guelma, Algeria (36°31'54.30"N 7°22'48.08"E). There was a significant difference in exuvia height between males and females but no differences between sexes were noted in either their choice of support height or the density of the vegetation in which they emerged. Females climbed higher than males probably because females had significantly larger head width. This differential vertical stratification of exuviae between sexes has not been investigated in previous studies. However, it might also be related to differential maiden flight between sexes, i.e. females might climb higher to take a longer flight while males climb lower heights and fly shorter distance. This assumption requires an independent study that takes into account both the exuvia height and maiden flight distance

for each sex. Exuvia height, for both sexes, was highly positively correlated with support height. Mean and maximum wind speed were significantly negatively correlated to exuvia height and support height. However, mean and maximum wind speed were positively related to vegetation density where exuviae were found. That is, when wind speed was high larvae tended to choose lower heights, lower supports, and highly vegetated areas in order to emerge successfully without any damage. Another alternative explanation is that wind might not have behavioural effects in habitat choice but at higher wind speed the exuviae get blown off the plants if they are higher. Indeed, low vegetated sites and upper parts of emergent plants were subject to higher turbulences in windy conditions. In addition, mean and maximum wind speed were not significantly correlated to daily emerging population size. Neither the mean height of exuviae above water nor the mean height of the chosen support were significantly correlated with the daily emerging population size." (Author)] Address: Khelifa, R., Dépt de Biologie, Fac. des Sciences Biologiques et Agronomiques, Université de Tizi Ouzou, Tizi Ouzou 15000, Algeria. E-mail: rassimkhelifa@gmail.com

14411. Kis, O.; Vajda, C.S.; Gyulavári, H.A.; Szabó, L.J.; Miskolczi, M., Devai, G. (2013): Morphological characterisation of an adult population of Eastern Willow Spreading (*Chalcolestes parvidens*, Artobolevsky, 1929) from NE-Hungary. *Studia odonotol. hung.* 15: 49-72. (in Hungarian, with English summary) ["The taxonomical status of *C. parvidens* is widely controversial in Europe. The taxa *C. parvidens* were described as a subspecies of *Chalcolestes viridis*. Recently some authors consider it as a species by the results of phenotypic features and electrophoretic analysis. We found very few information on the taxa *C. parvidens*, so our aim was to provide a comprehensive morphometric characterization of the taxa based on a NE-Hungarian adult population. In this study we measured body, thorax side and wing traits. The data were processed by descriptive statistics and multivariate analysis. In case of selected traits we examined the correlation between them by linear regression analyses. Our results showed that males had significantly larger body than females. Females nevertheless had significantly wider head and longer wings. The multivariate analysis divided the sexes clearly based on the body and wing measurements. However in case of the thorax side measurements the sexes could not be separated clearly." (Authors)] Address: Kis, O., Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, Univ. of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

14412. Küry, D., Krieg, R. (2013): Aktionsplan Westliche Keiljungfer in der Region Basel (*Gomphus pulchellus* [Selys, 1840]). Im Auftrag: Kanton Basel-Stadt: 33 pp. (in German) [On the basis of local and regional studies on habitat selection, a species action plan for the conservation of *Gomphus pulchellus* in (NW-) Switzerland is presented.] Address: Küry, D., Life Science AG, Greifengasse 7, 4058 Basel, Switzerland

14413. Lencioni, F.A.A. (2013): Diagnoses and discussion of the group 1 and 2 Brazilian species of Heteragrion, with descriptions of four new species (Odonata: Megapodagrionidae). *Zootaxa* 3685(1): 1-80. (in English, with Spanish summary) ["Heteragrion is the most speciose and complex genus of Neotropical Megapodagrionidae, with 47 species and one subspecies, and many of them are poorly defined. To improve the knowledge of the Brazilian species of the genus, 179 specimens of 13 of the 17 described species were examined. Four new species are described in tribute to the 40th anniversary of the rock band Queen: *Heteragrion freddiemercuryi* (Holotype: Peruíbe (24° 22' 48" S & 47° 04' 40" W—10 m), São Paulo State—09-III-2000); *H. brianmayi* (Holotype and allotype: Parque Estadual da Serra do Mar—Núcleo Caraguatatuba, Caraguatatuba (23° 35' 36" S & 45° 25' 07" W—61 m), São Paulo State—05-II-2000 and 10-III-2002); *H. rogerytaylori* (Holotype and allotype: Fazenda Trabiju, Pindamonhangaba (22° 50' 40" S & 45° 31' 01" W—651 m), São Paulo State—26-III-1999); and *H. johndeaconi* (Holotype and allotype: Alto Paraíso de Goiás (14° 10' 55" S & 47° 38' 36" W—1198 m), Goiás State—18-VI-2008 and 17-VI-2008), holotypes, allotypes and most paratypes deposited in FAAL. Diagnostic illustrations of all species studied are provided. Color photographs of live individuals of *H. brianmayi*, *H. aurantiacum*, *H. consors*, *H. mantiqueirae*, *H. tiradentense* and *H. triangulare* are also presented." (Author)] Address: Lencioni, R. Rua Anibal, 216 Jardim Coleginho, Vila Zeze, Jacafei Sao Paulo, Brazil. E-mail: odonata@zygoptera.bio.br

14414. Loureiro, N.; Brochard, C.; Correia, A.; van der Ploeg, E. (2013): *Orthetrum trinacria exuviae* (Odonata: Libellulidae) from Santiago Island, Cape Verde: morphology, sexual size dimorphism and diagnostic features. *Boletín de la Sociedad Entomológica Aragonesa* 52: 281-284. (in English, with Spanish and Portuguese summaries) ["Successful breeding of *O. trinacria* was for the first time confirmed for Santiago Island, Republic of Cape Verde, based on exuviae found in eight localities visited during a field survey carried out in August and September 2012. The relevant diagnostic features listed in the literature for the *O. trinacria exuviae* were assessed. We concluded that one of the diagnostic features, the epiproct length to basal width ratio, was not fulfilled in 97.8% of the 46 exuviae collected by us. Besides that, studied *O. trinacria exuviae* had an average of 26.0 mm of total length and did not evidence sexual size dimorphism." (Authors)] Address: Centre for Environmental Biology - ACD. Lisboa, Portugal. E-mail: odonata@nsloureiro.pt

14415. Marinov, M. (2013): Contribution to the Odonata the Kingdom of Tonga. *Faunistic Studies in South-East Asian and Pacific Island Odonata* 1: 1-18. (in English) ["New data on the Odonata fauna of the Kingdom of Tonga is provided following research carried out on Tongatapu and 'Eua islands in July 2012. New localities for Tongatapu Island are put on record and previous studies are compared with new phenological data from a period during

which field surveys are rarely conducted on Pacific islands. Although Odonata have been collected before from 'Eua Island, the data presented here is the first published so far. 'Eua Island is assessed as a very important venue for further research on Odonata. Overall the Kingdom of Tonga is very depauperate in water resources with lotic biotopes very restricted in area and found on 'Eua Island, and possibly on Tofua and Late islands, which are both volcanic. This study on the Odonata of 'Eua resulted in records of eight taxa, including with *Teinobasis* sp. nov., which will be described elsewhere. Morphological variation in *Pseudagrion microcephalum stainbergerorum* and *Tramea transmarina* are discussed in the context of their subspecific affiliation. Diagnostic features for easier differentiation are proposed for the first of these taxa; the validation of commonly used diagnostic traits is discussed for the second." (Author)] Address: Marinov, M., Plant Health & Environment Lab., Investigation & Diagnostic Centres & Response, Ministry for Primary Industries, 14 Sir William Pickering Drive, Burnside, PO Box 14018, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz

14416. Ottonello, D.; Oneto, F. (2013): Libellule di Liguria (Odonata). *Annali del Museo Civico di Storia Naturale "G. Doria"* 105: 297-425. (in Italian, with English summary) ["Dragonflies from Liguria (Odonata). This paper updates the knowledge about dragonflies observed within the administrative boundaries of Liguria (North-west of Italy) to nearly seventy years since the last paper at regional scale (Capra 1945). The study was carried out through the collection of new data and through a revision of bibliography and museological collections. A geographic database was compiled with approximately 3,000 records, representing a relevant sampling effort with about one record every two square kilometers. Of these, 500 are published and 2,500 are unpublished data, the latter mainly collected in the last seven years (88%). A total of 57 species, 23 Zygoptera and 34 Anisoptera, are recorded for the study area, representing the 61% of the Italian odonotofauna. Four species are recorded as new for Liguria: *Coenagrion pulchellum*, *Ophiogomphus cecilia*, *Libellula fulva* and *Trithemis annulata*. Conversely, five historically-recorded species were not found during the last years: *Coenagrion mercuriale*, *Erythromma najas*, *Sympetrum vulgatum*, *Somatochlora flavomaculata* and *S. meridionalis*. The Ligurian odonotofauna is mainly composed by Palearctic species (84%), followed by Holarctic (7%), Afro-european (5%) and Afro-tropical (4%) species. Specimens were observed in flight from the sea level up to 1700 m a.s.l., with a higher number of species present at elevation of up to 1000 m, and only six species reaching the highest altitude. The flight season is mainly concentrated in the summer with the following number of species observed for each month: January (0), February (1), March (0), April (7), May (25), June (43), July (47), August (45), September (27), October (10), November (4), December (0). The most important areas, for biogeographical reasons or for highest number of species, are located in the "Genoese Apennine" (Aveto valley,

Roccagrande and Orba valley), in the Po valley encompassing the provinces of Genoa and Savona (Stura valley and Erro valley), in the Bormida valley and in the western area (River Centa basin, high Tanaro valley and Roja valley)." (Authors)] Address: Ottonello, D., Università Cà Foscari Venezia, Dipartimento di Scienze Ambientali, Informatica e Statistica, Dorsoduro 2137, 30123 Venezia, Italy. E-mail: dario.ottonello@studionatura.net

14417. Post, M. (2013): Auch 2012: Veränderungen der Libellenfauna im Raum Neustadt. *Pollichia-Kurier* 29(1): 23-24. (in German) [The author briefly reports on records in 2012 from the southwestern region in Rheinland-Pfalz, Germany. Records of the following species are briefly discussed: *Leucorrhinia caudalis*, *L. pectoralis*, *L. rubicunda*, *Erythromma lindenii*, *Coenagrion scitulum*, *Sympetrum meridionale*, *Gomphus vulgatissimus*, *Ophiogomphus cecilia*, *Aeshna cyanea*, and *Lestes virens*] Address: Post, M. E-mail: libellen-nw@web.de

14418. Rivers-Moore, N.A.; Fowles, B.; Karssing, R.J. (2013): Impacts of trout on aquatic macroinvertebrates in three Drakensberg rivers in KwaZulu-Natal, South Africa. *African Journal of Aquatic Science* 38(1): 93-99. (in English) ["Global literature suggests that trout, when introduced as alien species into local streams, have had deleterious impacts on aquatic community structure and function. Prior to defining management actions regarding trout in the rivers of the Ukhahlamba-Drakensberg Park (UDP), data are required on their impacts on local aquatic communities. In February 2007, aquatic macroinvertebrate communities were sampled at three locations in streams in the UDP. Paired sites were separated by waterfalls, with no trout occurring upstream but occurring at low densities downstream. Differences in aquatic macroinvertebrate communities between upstream and downstream sites were apparent but, within the constraints of this study, such differences could not be directly attributed to trout predation. Further studies are recommended in order to provide additional information on seasonal variation in these patterns, as well as on density-dependent effects of trout on aquatic macroinvertebrate communities." (Authors) The list of taxa includes *Aeshna* sp.] Address: Rivers-Moore, N.A., Aquatic Ecologist (Pr. Sci. Nat.), P.O. Box 152, Hilton, 3245, South Africa. E-mail: blackfly1@vodamail.co.za

14419. Sakamaki, Y. (2013): Chapter 23: A review of insect fauna reports for the Islands in Kagoshima Prefecture. In: Kawai, K., Terada, R. and Kuwahara, S. (eds): *The Islands of Kagoshima*. Kagoshima University Research Center for the Pacific Islands, 15 March 2013: 146-149. (in English) [Verbatim: 4. Characteristics of insect fauna in Amami Islands: Since Amami-Oshima Is. with Kakeromajima Is. has high mountains inland area and many mountain streams, they have diverse dragonfly faunas. *Asiagomphus amamiensis amamiensis* (Asahina), *Planaeschna ishigakiana nagaminei* Asahina, and *Coeliccia ryu-*

kyuensis amamii Asahina are known as endemic subspecies, and the islands are the northern limit of *Matrona basilaris japonica* Förster, and *Rhipidolestes amamiensis* Ishida.] Address: not stated

14420. Sanderson, H.; Compennolle, R. van; Dyer, S.D.; Price, B.B.; Nielsen, A.M.; Selby, M.; Ferrer, D.; Stanton, K. (2013): Occurrence and risk screening of alcohol ethoxylate surfactants in three U.S. river sediments associated with wastewater treatment plants. *Science of the Total Environment* 463–464: 600-610. (in English) ["Alcohol ethoxylates (AE) are high production volume (HPV) chemicals globally used in detergent and personal care products and are truly a work-horse for the household and personal care industries. Commercial AE generally consist of a mixture of several homologues of varying carbon chain length and degree of ethoxylation. Homologues that are not ethoxylated are also known as aliphatic alcohols or simply fatty alcohols (FA). This group of homologues represents a special interest in the context of environmental risk, as these are also abundant and ubiquitous naturally occurring compounds (e.g. animal fats and in human feces). Hence, in a risk assessment one needs to distinguish between the natural (background) concentrations and the added contribution from anthropogenic activities. We conducted a weight-of-evidence risk assessment in three streams, documenting the exposure and predicted risk, and compared these to the habitat and in situ biota. We found that the parameters (e.g., habitat quality and total perturbations hereunder total suspended solids (TSS) and other abiotic and biotic stressors) contributed to the abundance of biota rather than the predicted risk from AE and FA. Moreover, the documented natural *de novo* synthesis and rapid degradation of FA highlight the need to carefully consider the procedures for environmental risk assessment of naturally occurring compounds such as FA, e.g. in line with the added risk concept known from metal risk assessment. ... At the species level, twelve species were found only upstream, with a total abundance of 71 animals from all three locations. Of these 71 animals across all streams, only one species, *Boyeria vinosa* ... were found only to be present upstream in more than one stream. In the Bryan upstream location, twenty six *B. vinosa* were identified and one *B. vinosa* was identified in the Wilmington upstream location, suggesting that this was the most sensitive species overall on a qualitative basis." (Authors)] Address: Stanton, K., American Cleaning Institute, 1331 L Street, NW, Suite 650, Washington, District of Columbia 20005, USA. E-mail: kstanton@cleaninginstitute.org

14421. Schneider, T.; Schneider, E. (2013): Beobachtungen zur Gefährdung der Fließgewässer und ihrer Libellen in der türkischen Schwarzmeerregion (Odonata). *Libellula* 32(1/2) 2013: 75-90. (in German, with English summary) ["Observations on the threat to running waters and their Odonata fauna in the Turkish Black Sea Region – In August 2012 a total of 24 species were recorded from the Black Sea region east of Trabzon. New observations of

Cordulegaster insignis mzymtae are reported. The frequent occurrence of *Onychogomphus assimilis* on the little rivulet Kaçkal in the Artvin province not far from the Georgian border is described. Special threats to the regionally restricted populations of *Calopteryx splendens waterstoni* and other rheophilic species by excessive ongoing barrage construction are highlighted. A note on the altitudinal occurrence of *Coenagrion ponticum* and *C. puella* is made." (Authors)] Address: Schneider, T., Arnold-Knoblach-Ring 76, 14109 Berlin/Wannsee, Germany. E-mail: thomas.rs@gmx.de

14422. Sims, G. (2013): A distribution of dragonflies and damselflies (Odonata) of Louisiana. *Midsouth Entomologist* 6: 25-87. (in English) ["This compilation is an attempt to bring together Louisiana (USA) odonate collection and distribution information from a variety of sources, and present it in a clear and easily-accessible form. The report actually contains neither any new data nor new collection records, but is an effort to consolidate information from various available sources into a concise and useful form. Every care has been taken to insure the accuracy of the information, and any errors, omissions, or oversights are completely the fault of the author."(Author)] Address: Sims, G., Route 2, Box 237-3, Mansfield, Missouri 65704-9564, USA. E-mail: georgesims@hotmail.com

14423. Szalay, P.E.; Szeghalmy, S.Z.; Kis, O.; Miskolczi, M.; Szabo, L.; Fazekas, A.; Devai, G. (2013): Basic data to the morphologic analysis of an adult Banded Demoiselle [*Calopteryx splendens* (Harris, 1782)] population from Konyári Kálló (NE-Hungary). *Studia odonotol. hung.* 15: 9-26. (in Hungarian, with English summary) ["The Carpathian Basin is considered as a coincident zone from the point of view of the occurrence of various faunal elements. As a result, the classification of some dragonfly species or subspecies is sometimes questionable. Based on faunistic literature, the *Calopteryx splendens splendens* has been registered in the Hungarian dragonfly fauna up till now. In the course of our morphometric examinations however the subspecific taxonomical position of the Hungarian *C. splendens* has become doubtful. Our aim is to provide data for the taxonomical revision of the Hungarian *C. splendens* based on morphometric analyses. Our examinations of body and wing traits were performed on male and female adults from the small water course Konyári-Kálló near the settlement Hosszúpályi (NE-Hungary). In this paper the mean, minimum, maximum values, standard deviation and variation coefficients of our morphometric results are presented." (Authors)] Address: Szalay, P.E., Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Fac. of Science and Technology, Univ. of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

14424. Terzani, F.; Cianferoni, F.; Rocchi, S. (2013): Aggiornamento e sintesi delle conoscenze odonologiche dell'Arcipelago Toscano (Insecta Odonata). *Quaderno di studi e notizie di storia naturale della Romagna* 37: 175-196. (in Italian, with English summary) ["An annotated

checklist of the Odonata of Tuscan Archipelago (Italy), reporting both data from literature and new, unpublished records. The updated Odonata fauna of Tuscan Archipelago currently comprises 25 species." (Authors)] Address: Terzani, F., Mus. Stor. Nat. "La Specola", Univ. Firenze, via Romana 17, 1-50125 Firenze, Italy

14425. Tomljanovic, T.; Piria, M.; Šprem, N.; Matulic, D.; Zanella, D. (2013): Finding of sterlet (*Accipenser ruthenus*) in the Sava river near Zagreb. VI International Conference "Water & Fish". Conference Proceedings, Faculty of Agriculture, Belgrade-Zemun, Serbia, June, 12 – 14. 2013: 326-330. (in English, with Croatian abstract) [Anisoptera contributed to the diet of sterlet.] Address: Tomljanovic, Tea, Univ. of Zagreb, Faculty of Agriculture, Dept of Fisheries, Beekeeping, Game Management and Special Zoology, Svetošimunska 25, 10 000 Zagreb, Croatia

14426. Vajda, C.S.; Szabo, L.; Miskolczi, M.; Cserhati, C.S.; Devai, G. (2013): The morphometry of north-east Hungarian adult population of the Emerald damselfly [*Lestes sponsa* (Hansemann, 1823)]. *Studia odonotol. hung.* 15: 27-47. (in Hungarian, with English summary) ["Dragonflies are good indicators for many purposes however we found only few detailed information concerning their morphometrics. Our aim was to provide more information about *L. sponsa*, explore the variation of the examined traits and test them along with sex comparisons. We studied body and wing traits of male and female adults of *L. sponsa* collected in a population of Great Hungarian Plain (NE-Hungary). According to our results males had significantly larger body and abdomen than females. On the other hand females had significantly larger head, leg and wing than males. The variation was larger in traits of abdominal end and structural traits of wing than other body and wing traits. The PCA and DA confirmed a difference in sexes. The linear regression analyses showed the most correlations in case of the length of the body and the width of the head." (Authors)] Address: Vajda, C.S., Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Fac. of Science and Technology, Univ. of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

14427. Van Ryswyk, B. (2013): 2013 Hamilton Odonata Count. *The Wood Duck* 67(3): 57-58;-63. (in English) [Hamilton, Ontario, Canada; the tenth annual Hamilton Odonata Count was held on July 6th 2013. Records of 54 odonate species are checklisted and commented.] Address: Van Ryswyk, Brenda c/o Hamilton Naturalists' Club, P. O. Box 89052, Hamilton, Ontario, L8S 4R5, Canada. E-mail: info@hamiltonnature.org

14428. Viski, V.B.; Jakab, T.; Miskolczi, M.; Vincze, A.; Grigorszky, I.; Szabo, L.J.; Devai, G. (2013): Data on the dragonfly (Odonata) fauna of the lowland water course Konyári-Kálló (Ne Hungaria). *Studia odonotol. hung.* 15: 121-135. (in Hungarian, with English summary) [34 Odonata species are documented from the small lowland water course Konyári-Kálló in the geographical macroregion

Tiszai-Alföld, over the administrative area of the county Szabolcs-Szatmár-Bereg and Hajdú-Bihar in NE-Hungary. Data were sampled in 2008-2009 and 2011-2012 at 8 localities.] Address: Viski, V.B., Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

14429. Wachowicz-Olszak, M.; Michonski, G. (2013): Dragonflies (Odonata) of the Staw Goslicki pond in the forest of Puszcza Wkrzanska (nw Poland). *Acta biologica* 20: 71-80. (in English, with Polish summary) ["Five research sites were established over the area of the studied water body, where both adults and larvae were collected. In total, 350 individuals were collected, which belonged to 17 dragonfly species; 297 adult specimens (45 females and 252 males) and 53 larvae were collected. The odonatofauna was mostly composed of eurytopic species. The most frequent species (75–100% frequency) included *Cordulia aenea*, *Coenagrion puella* and *Libellula quadrimaculata*. The following species belonged to the second frequency class (50–74%): *Enallagma cyathigerum*, *Erythromma najas*, *Ischnura elegans*, *Pyrrhosoma nymphula*, *Aeshna cyanea* and *Sympetrum sanguineum*. The third frequency class (25–49%) included *Coenagrion pulchellum*, *C. hastulatum*, *Lestes dyras* and *L. sponsa*." (Authors)] Address: Wachowicz-Olszak, M., Department of invertebrate Zoology & Limnology, University of Szczecin, Waska 13, 71-415, Szczecin, Poland. E-mail: gmichonski@gmail.com

14430. Wujek, D.E. (2013): Epizootic diatoms on the cerci of Ephemeroptera (Caenidae) naiads. *The Great Lakes Entomologist* 46(1-2): 116-119. (in English) ["Using scanning electron microscopy, epizootic diatoms were observed growing on the cerci of *Caenis amica* Hagen naiads (Ephemeroptera, Caenidae). *Meridion circulare* (Greville) C. Agardh was the most abundant, followed by *Synedra rumpens* Kützing, then *Cocconeis pediculus* Ehrenberg. Other diatom species observed from substrates in Cedar Creek, Isabella Co., Michigan were not observed on the cerci. No diatoms were observed on Ephemeroptera naiads. Epizootic algae are not infrequent on the surfaces of most active animals. The association between slugs and epizootic algae was one of the first to be described showing this unusual and interesting association since such relationships were described (Kuhn in Welcher 1864). Freshwater epizootic algae have been described from a variety of hosts. These include protists (Wiley et al. 1970, Pérez-Martinez et al. 2001); invertebrate animals such as Cladocera (Gaiser and Bachmann 1993, Barea-Arco et al. 2001), Rotifera (Wujek 2006); insects including Trichoptera (Bergey and Resh 1994, Sheath et al. 1995), Diptera (Sheath et al. 1996), and Odonata (Wujek pers. observ.); Crustacea together with Copepods (Russell and Norris 1971) and crayfish (Fuelling et al. 2010)."] (Author)] Address: Wujek, D.E., Dept Biol., Central Michigan Univ., Mt. Pleasant, MI 48859, USA. E-mail: wujek1de@cmich.edu

14431. Yoshida, K.; Hoshikawa, K.; Wada, T.; Yusa, Y.

(2013): Patterns of density dependence in growth, reproduction and survival in the invasive freshwater snail *Pomacea canaliculata* in Japanese rice fields. *Freshwater Biology* 58(10): 2065-2073. (in English) ["Patterns of density dependence in growth, reproduction and survival are important for predicting the population dynamics of a species. The patterns may change with environmental factors, such as the harshness of winter, but very little is known about such patterns and their mechanisms in unmanipulated natural populations of invasive animal species. We studied the extent of density dependence in the growth, reproduction and survival of an invasive freshwater snail, *Pomacea canaliculata*, in rice fields in Nara (cold district) and Kumamoto (warm district), Japan, over 2- and 1-year periods, respectively. In both areas, growth was negatively density dependent within the same generation, and the density of snails in the parental generation negatively affected the growth of offspring. The number of eggs per unit area was independent of adult density, suggesting eggs per adult female were few at high densities. Survival over the cold winter of 2005–2006 was independent of density in Nara. However, survival over the warm winter of 2006–2007 in both Nara and Kumamoto was negatively density dependent. Irrespective of the various negative density-dependent patterns, population density tended to show positive correlations with the density of the previous generation. This appears to reflect the substantial capacity of this snail to resist extremely low densities due to the various negative density-dependent patterns rather than indicating susceptibility to extinction at low densities... Few predators of the apple snail are found in Japanese rice fields (Yusa, Sugiura & Wada, 2006; Yamanishi et al., 2012), and we rarely observed predators of the snail in our study fields, with the exception of some dragonfly larvae (mainly *Pantala flavescens*) after the mid-term .."] (Authors)] Address: Yusa, Yoichi, Faculty of Science, Nara Women's University, Kitaouya-nishi, Nara 630-8506, Japan. E-mail: yusa@cc.nara-wu.ac.jp

14432. Zhang, P. (2013): Ecological photograph handbook of insects in Wulingshan. Northeast Forestry University Press. Harbin: 418 pp. (in Chinese, with Latin names) [Chongqing (national central city), China. The following species are pictured: *Orthetrum melania*, *O. albistylum*, *Sympetrum eroticum*, *Gomphidia confluens*, *Anax nigrofasciatus*, *Ischnura asiatica*, *Aciagrion olympicum*, *Platycnemis foliacea*, *Matrona basilaris nigripes*] Address: not stated

14433. Zimmermann, P.; Hafner, A.; Zimmermann, A. (2013): Die Fang- und Heuschrecken der Naturschutzgebiete im Enzkreis und im Stadtkreis Pforzheim. *Naturschutz und Landschaftspflege Baden-Württemberg* 76: 41-72. (in German) [Baden-Württemberg, Germany. On page 43, a picture is shown of a larva of *Tettigonia viridissima* preying on *Crocothemis erythraea*.] Address: Zimmermann, P., Referat 56 – Naturschutz und Landschaftspflege des Regierungspräsidiums Karlsruhe, Germany. E-mail: peter.zimmermann@rpk.bwl.de

14434. Abelova, M.; David, S. (2014): Morphometry of *Aeshna cyanea* (Müller, 1764) (Odonata: Aeshnidae) exuviae from the territory of Slovakia. *Entomofauna carpathica* 26(1): 1-11. (in Slovakian, with English summary) ["The study elaborates the morphometric analysis of 87 exuviae specimens of *A. cyanea* from 6 localities of Slovakia. Measured and statistically evaluated are 6 morphometric signs for exuviae of *A. cyanea*. We confirmed several distortions of normality of data, partly caused by measurement error. The exuviae of females are larger in measured signs except the length of the thigh (femura) than males. It has been proved that the dependence of signs is often not linearly correlated. The results are also important, because morphometric signs are used in the designation keys and in the research of development stages of larvae and exuviae. We have processed so far the largest data set of morphometric data for Slovakia." (Authors)] Address: Ábelová, Monika, Dept Ecol. & Environ. Sci., Fac. Nat. Sci., Constantine the Philosopher Univ. in Nitra, Tr. A. Hlinku 1, 949 74 Nitra, Slovak Republic. E-mail: monika.abelova@ukf.sk

14435. Alikaj, M.; Hasani, L. (2014): Taxonomic data about Odonata order representatives in the habitats of Viroi lake in the region Gjirokastra. *AKTET. Journal of Institute Alb-Shkenca* 3(1): 64-67. (in Albanian, with English summary) [In summer 2005 and 2008, 10 odonate species have been recorded at Viroi Lake and Gjirokastra district, Albania.] Address: Alikaj, Marsela, Departamenti i Biologjisë, Universiteti "Eqrem Çabej", Gjirokastrë, Shqipëri, Albania. E-mail: alikajmarsela@yahoo.com

14436. Altamiranda-Saavedra, M.; Palacino-Rodríguez, F.; Lobo-Hernández, M. (2014): Daily abundance at the breeding site and reproductive behavior of *Polythore gigantea* (Odonata: Polythoridae). *Odonatologica* 43(3/4): 169-182. (in English) ["Daily abundance at the breeding site and reproductive behavior of *P. gigantea* are described in different localities of Antioquia, Colombia. Observations were done between March and June 2009 from 08:00 to 16:00 h. The highest reproductive activity (i.e. maximal abundance of individuals at the breeding site) was observed between 11:06 and 12:12 h. Oviposition lasted 10 min on average. During courtship, the male exhibited rhythmical movements by opening and closing the wings rapidly, getting closer to the female and holding her in tandem. During oviposition, the female inserts the eggs inside wet trunks and little twigs in the surrounding vegetation under the close surveillance of the male. Males exhibit territorial behavior and conspecific aggression to defend the territory. Factors such as vegetation cover, might influence the time of the day in which oviposition occurs. This study provides, for the first time, information on the reproductive behavior of *P. gigantea*." (Authors)] Address: Altamiranda-Saavedra, M., Grupo Microbiología Molecular, Univ. de Antioquia, Apdo. Postal 1226, Calle 67 No. 53-108, off. 5-430, Medellín, Colombia. E-mail: maltamiranda2@gmamil.com

14437. Amri, N.; Jamili, S.; Abdolbaghian, S. (2014): Diversity of macrobenthos communities and their relationships with environmental factors in Jajroud River, Iran. *Resources and Environment* 4(2): 95-103. (in English) ["This paper evaluates the diversity of common groups of macrobenthos include: Diptera, Ephemeroptera, Odonata, Plecoptera, and Gastropoda and their relationships with environmental variables in the Jajroud river northeast of Tehran province (capital of Iran). The work has been extended out over a period of 12 months through three stations. Macrobenthos sampling has been carried out monthly with three replications in each station. Water temperature, dissolved oxygen, pH, BOD, phosphate and nitrate concentrations were within ranges usually capable of backing up a diverse biota. The other components such as water depth, water width, water flow and contamination were as well taken. The methodologies applied by a number of research groups were generally similar, making it possible to compare outcomes between different areas. Three metrics were utilized to show the diversity: Margalef richness, Shannon-Weaver's diversity index (.) and evenness index (E). From 108 Surber samples, 29 families, 39 genus and 92 species were identified (42% Ephemeroptera, 38% Diptera, 18% Plecoptera, 1.2% Gastropoda and 0.8% Odonata (*Argia adamsi*; *Aeshna affinis* [sic]) of the total fauna population). Chironomidae, Baetidae and Perlodidae were the most dominant families. The biodiversity of the community of the upper reaches of the river (ST1) was the highest that of the lower reaches (ST2) was the lowest that of (ST3) ranked in the middle. In this work, the presence of pollution-tolerant families in (ST3) indicates that this site is ecologically unhealthy. The diversity of Gastropoda and Chironomidae were significantly affected by pollution (positively) and water depth; whereas the diversity of Ephemeroptera by the dissolved oxygen and water temperature respectively. Besides the diversity of Odonata was affected by stream width. The outcome of a One-Way ANOVA for three metrics indicates the P - value and F-critical 3.1 and 5.1 respectively." (Authors)] Address: Amri, Niusha, Science & Research Branch of Islamic Azad Univ., Tehran, Iran. E-mail: niushaamri@gmail.com

14438. Andersen, E. (2014): *Aeshna viridis* distribution and habitat choices in South and Central Sweden and the possibility to use a database as a tool in monitoring a threatened species. B.Sc. thesis, Halmstad University, School of Business and Engineering (SET), Biological and Environmental Systems (BLESS), Ecology and Environmental Science: 15 pp-["*Aeshna viridis*, a dragonfly generally considered to be a specialist as it in most cases chooses *Stratiotes aloides* as its habitat, have suffered badly from habitat loss and fragmentations throughout Europe under the last century as the human demand of land use have grown. It's thereby considered near threatened on EU red list and is included in the Habitat Directive. This means that it is protected by EU law as all EU Member States is committed to protect, monitor and report back to EU the status of the species. Several European countries

have designed protection plans for *S. aloides* to improve the preservation of *A. viridis*. My study in South and Central Sweden shows that the strong connection between *A. viridis* and *S. aloides* may not be consistent all over the distribution range of *A. viridis*, as my survey showed that larvae occur among other water plants when *S. aloides* is not present. Another aim in this study was to evaluate the possibility to use occurrence data on *A. viridis* and *S. aloides* from the Species Observations System to monitor *A. viridis* distribution and dispersal. My study implies uncertainties of how well the datasets reflects reality and more research is necessary before clarifying if datasets could be a possible tool in conservation management of *A. viridis*." (Author)] Address: Andersen, Emelie, Halmstad University, School of Business and Engineering (SET), Biological and Environmental Systems (BLESS), Ecology and Environmental Science), Sweden

14439. Ayme-Southgate, A.; Crowe, M.; Southgate, R. (2014): The NH2-terminal Ig domains of insect projectin could serve as elastic elements. *Proteomics and Genomics Research* 1(1): 21-33. (in English) ["The connecting C-filaments of insect indirect flight muscles have been proposed as one of the elements providing muscle elasticity for the asynchronous muscle physiology of derived insects. Two large modular proteins, kettin/Sallimus and projectin make up these filaments, and for both proteins the N-terminal sequences span the extensible I-band and are proposed as the elastic segments. The C-filaments have not been studied in insects, such as dragonflies (*Pachydiplax longipennis*), crickets, and Lepidoptera with muscles which are largely synchronous in physiology and display different levels of muscle stiffness. In this paper we focus our efforts on the projectin protein of several insects with synchronous flight muscles; namely dragonfly, cricket, and moth. We provide evidence for the localization of projectin over the sarcomere I-Z-I region that is consistent with the existence of C-filaments in synchronous flight muscles. Additionally, we determine the sequences for the NH2-terminal region of projectin in these insects and describe the presence of alternative splice variants. Using predictors of intrinsically disordered regions, we identify possible unfolded segments, especially around the short linker sequences found between the NH2 Ig domains. We propose a possible picture of projectin NH2-terminal region organized as different segments contributing elastic responses to stretch by either unfolding of highly disordered sequences (PEVK) or reorientation of domains by bending or twisting of disordered linkers between the Ig domains." (Authors)] Address: Ayme-Southgate, Agnes, Dept Biol., College of Charleston, Charleston SC, 29401, USA. E-mail: southgatea@cofc.edu

14440. Babu, R.; Nandy, S. (2014): Eight new records of dragonflies from Jharkhand State, India (Odonata: Aeshnidae, Gomphidae, Libellulidae). *Notulae odonatologicae* 8(4): 91-93. (in English) ["A field survey carried out in 2008–2010 and examination of the collection of the National Zoological Collection, Zoological Survey of India (ZSI),

Kolkata recorded eight Anisoptera species new for the state of Jharkhand. These are *Anaciaeschna jaspidea*, *Gynacantha dravida*, *Hemianax ephippiger*, *Orthetrum glaucum*, *O. luzonicum*., *Tramea limbata similata*, *T. virginia*, and a yet unidentified species of *Anisogomphus* Selys, 1858. These records increase the number of odonate taxa known from Jharkhand State to 73." (Authors)] Address: Babu, R. Southern Regional Centre, ZSI, Chennai-600 028, India. E-mail: baburzi@gmail.com

14441. Baird, R.C. (2014): Larval burrow morphology and groundwater dependence in a mire-dwelling dragonfly, *Petalura gigantea* (Odonata: Petaluridae). *International Journal of Odonatology* 17(2/3): 101-121. (in English) ["Most species of petalurid dragonflies have a fossorial larval stage, which is unique in the Odonata. Larvae typically excavate burrows in soft peaty soils in mires, seepages or along stream margins, which are occupied by a single larva throughout the long larval stage. This paper reports on a study of burrow morphology in *Petalura gigantea*, with the objectives of describing their burrows, documenting any variability in burrow morphology across the hydrogeomorphic range of habitats used by the species, identifying factors contributing to any such variability, resolving questions in relation to the single previous illustration of a burrow system and identifying the level of groundwater dependence of larvae. The species was found to be an obligate, groundwater dependent, mire-dwelling species with well-maintained and sometimes complex burrows. Burrow complexity and morphological variation are inferred to be a response by larvae to the hydrogeomorphic characteristics of the habitat and substrate attributes. All burrows were occupied by a single larva, consistent with previous observations of other fossorial petalurids, but in contrast to the previous description of a *P. gigantea* burrow complex occupied by multiple larvae. The functional role of identified burrow features is discussed. Although the fossorial larval habit confers ecological benefits, the species' groundwater dependence and restriction to mire habitats places it at increased risk in the event of any reduction in groundwater availability, more intense fire regimes, and the potential compounding effects of rapid climate change." (Author)] Address: Baird, R.C., College of Health and Science, University of Western Sydney, Penrith South DC, NSW 1797, Australia

14442. Baird, R.C. (2014): Mate guarding and other aspects of reproductive behaviour in *Petalura gigantea* (Odonata: Petaluridae). *International Journal of Odonatology* 17(4): 223-236. (in English) ["Territorial behaviour and mate guarding are important components of mating systems in various insect groups, including the Odonata. This paper reports observations of male territorial behaviour associated with potential ovipositing sites, and postcopulatory, non-contact mate guarding in *Petalura gigantea*. This is the first unambiguous and detailed report of mate guarding in the Petaluridae. Additional observations of previously undocumented aspects of reproductive behaviour are also reported. These observations are compared

with other petalurids." (Authors)] Address: Baird, R.C., College of Health and Science, University of Western Sydney, Penrith South DC, NSW 1797, Australia

14443. Ball-Damerow, J.E.; M'Gonigle, L.K.; Resh, V.H. (2014): Local and regional factors influencing assemblages of dragonflies and damselflies (Odonata) in California and Nevada. *Journal of Insect Conservation* 18: 1027-1036. (in English) ["Studies of landscape effects on assemblages and distribution of insects are relatively uncommon, largely because of the lack of occurrence data that span broad spatial or temporal scales. Here, we provide a multi-species analysis using generalized linear mixed models to examine the effects of local and regional variables on richness and occurrence rates of Odonata species at 81 sites throughout central California and north-western Nevada, USA. These study sites were located across a range of ecoregions, including the Sierra Nevada Forests, California Mediterranean, Great Basin Shrub Steppe, and Northern Coastal California Forests. Dynamic regional variables in this study, degree-days and precipitation, influenced the richness of dragonflies, but not the less-mobile damselflies. In contrast, local habitat type influenced the richness of damselflies, but not dragonflies. Overall species occurrence was higher during site visits with higher degree-days, especially for highly mobile groups including dragonflies and migratory species. Dragonflies were also positively associated with total precipitation, but migratory species were not. Probability of presence across species was lower in highly urban sites, particularly for habitat specialists. Further, habitat specialists had lower rates of occurrence overall, suggesting that widespread generalist species may increasingly dominate Odonata assemblages. Our study indicates that Odonata in this semi-arid region are responsive to a combination of local and regional environmental variables." (Authors)] Address: Ball-Damerow, Joan, Dept of Environ. Sci., Policy & Management, Univ. of California, Berkeley, 130 Mulford Hall #3114, Berkeley, CA 94720-3114, USA. E-mail: joan-damerow@gmail.com

14444. Barry, M.J. (2014): Fluoxetine inhibits predator avoidance behavior in tadpoles. *Toxicological & Environmental Chemistry* 96(4): 641-649. (in English) ["Fluoxetine is a selective serotonin re-uptake inhibitor used to treat anxiety and depression in humans. It has been detected as a contaminant in the surface waters in many countries. The effects of fluoxetine (0, 0.03, 0.3, and 3 µg L⁻¹) on the swimming and behavioural responses of *Bufo arabicus* tadpoles to alarm chemicals from predatory dragonfly larvae (*Anax imperator*) were measured. Fluoxetine significantly reduced swimming speed at 0.3 and 3 µg L⁻¹ in the absence of predator alarm chemicals but had no effect in their presence. Tadpoles exposed to predator alarm chemicals avoided open water and preferred to hide. Exposure to fluoxetine at 3 µg L⁻¹ completely eliminated this predator avoidance response, making the tadpoles more vulnerable to predation." (Author)] Address: Barry, M.J., Biology Dep.t, Sultan Qaboos University, Muscat, Oman

14445. Bashar, K.; Reza, M.S.; Razzak, M.A.; Rahman, K.M.Z.; Goda, P.; Howlader, A.J. (2014): Faunistic study of Odonata (dragonfly & damselfly) in some selected regions of Bangladesh. *Journal of Entomology and Zoology Studies* 2(4): 1-6. (in English) ["A study was conducted to investigate the species diversity of Odonata in five selected areas of Bangladesh viz. Dhaka, Moulvibazar, Bandarban, Chuadanga and Khulna during July' 2009 to June' 2010. A total of 3350 individuals belonging to 48 species under 8 families were observed during the study period. Among them 25 species were dragonflies under the families; Libellulidae (22), Aeshnidae (2) and Gomphidae (1), whereas the remaining 23 species were damselflies under five families; Coenagrionidae (16), Platycnemididae (4), Calopterygidae (1), Lestidae (1), Protoneuridae (1). The highest and lowest number of species was observed in Dhaka (31) and Bandarban (23), respectively. Libellulidae was the dominant family whereas few species were found under the family Gomphidae, Lestidae, Calopterygidae and Protoneuridae. Species composition was highest in the family Libellulidae (45.8%) followed by the family Coenagrionidae (33.3%). Post-monsoon represented by 45 species was the optimum season for Odonata. The present surveillance yielded one new species of Dragonfly, *Gynacantha dravida* and five Damselfly species: *Aciagrion pallidum*, *Ceriagrion praetermissum*, *Lestes elatus*, *Copea chantaburii* and *C. ciliata* in the perspective of Bangladesh. The above results indicate that study of Odonate species in other regions of the country would provide insight in updating the checklist of Odonate species in the country, and know their ecology, and their relative importance for the successful conservation strategy and impact of climate change on this group of insects." (Authors)] Address: Bashar, K., Department of Zoology, Jahangirnagar University, Savar, Dhaka-1342, Bangladesh

14446. Bistula-Prószyński, G. (2014): Dragonflies Odonata, of the Nature Reserve Siedleckie. In: Sposób cytowania: Górski P. 2014. Kleszcze rezerwatu Stawy Siedleckie. [W:] + M. Falkowski, K. Nowicka-Falkowska, M. Omelaniuk (red.). Bogactwo przyrodnicze rezerwatu Stawy Siedleckie. Monografia Przyrodnicza. s. 57, Siedlce: 73-76. (in Polish, with English summary) [Poland; 21 odonate species are checked. Records of *Orthetrum albistylum*, *Coenagrion lunulatum* and *Sympetma paedisca* are noteworthy.] Address: Bistula-Prószyński, G., Polskie Towarzystwo Entomologiczne; E-mail: grzegorz.bp@wp.pl

14447. Bogunski, G. (2014): Ergänzungen zur Checkliste der Libellen, Heuschrecken und Schmetterlinge im Gebiet „Kalksteinbrüche im Wildenfelder Zwischengebirge“ (EBG Nr. 35 sowie FFH Nr. 276) für den Zeitraum von 2009 bis 2013. *Mitteilungen Sächsischer Entomologen* 33(109): 130-135. (in German) [Sachsen, Germany (MTB 5341,2). A checklist of Odonata recorded between 2009 and 2013 totals to 26 species. *Sympetrum pedemontanum* and *Leucorrhinia dubia* only were observed prior this time period.] Address: Bogunski, G., Gartenstr. 10, D-08141 Reinsdorf, Germany

14448. Bora, A.; Meitei, L.R. (2014): Odonates (Dragonflies and Damselflies) of Indian Council of Agricultural Research (ICAR), Research Complex for NEH Region Campus, Umiam, Meghalaya, India. *Journal of Entomology and Zoology Studies* 2(6): 16-21. (in English) ["A total of 33 species of Odonates were recorded from the study area from March to August, 2014. The family Libellulidae with 21 species was the most dominant among the Anisoptera followed by Gomphidae (2 sp.) and Aeshnidae (1 sp.). Among the Zygoptera, the 9 species recorded belong to the family Coenagrionidae. As the area houses 33 species of Odonates including 24 species of Anisoptera and 9 species of Zygoptera, it can be presumed to have a good diversity which may be attributed to the grasslands, shrubs and small water bodies inside the campus." (Authors)] Address: Bora, A., Research Scholar, Division of Animal Production, ICAR, RC for NEH Region Umiam-793003, Meghalaya, India

14449. Borisov, S.N.; Kosterin, O.E.; (2014): Dragonflies and damselflies (Odonata) of north-eastern Kazakhstan. *Eurasian entomological journal* 13(4): 339-345. (in English, with Russian summary) ["Earlier north-eastern Kazakhstan was practically not studied with respect to Odonata. Here we report 39 species found in 14 localities, including such species rare in northern Kazakhstan as *Coenagrion johanssoni*, *Ischnura pumilio*, *Nehalennia speciosa*, *Anax imperator*, *Anax parthenope* and *Macromia amphigena fraenata*. The record of *Sympetma fusca* appeared the northernmost in Asia and that of *C. johanssoni* the southernmost in Kazakhstan. The known distribution of close species *Stylurus flavipes* and *S. ubadschii* in Kazakhstan and presence of *M. a. fraenata* in the Irtysh River basin are considered. The recorded individuals of *Anax parthenope* and *Sympetrum fonscolombii* probably arrived from the south. *N. speciosa* was found in rather an unusual habitat." (Authors)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

14450. Borisov, S.N. (2014): Dragonflies (Odonata) of thermal springs in Barguzinskaya depression of Baikalian rift zone, Russia. *Euroasian Entomological Journal* 13(2): 121-132. (in Russian, with English summary) ["At seven thermal springs and associated thermal water bodies of the Barguzin Depression (the North-East Baikal Region), 16 species of Odonata have been recorded: *Lestes dryas*, *L. sponsa*, *Sympetma paedisca*, *Coenagrion johanssoni*, *C. glaciale*, *Enallagma cyathigerum*, *Aeshna crenata*, *Ae. juncea*, *Somatochlora graeseri*, *Leucorrhinia dubia orientalis*, *Libellula quadrimaculata*, *Orthetrum albistylum*, *Sympetrum danae*, *S. flaveolum*, *S. pedemontanum*, *S. vulgatum*. The larvae of some of them were found in water with the temperature range of 25–34.5 °C. *Orthetrum albistylum* is known from 17 thermal springs of the Baikal Rift Zone, these localities are situated 1300 km apart of the main range." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of

Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

14451. Borisov, S.N. (2014): Distribution and ecology of *Ischnura forcipata* Morton, 1907 (Odonata, Coenagrionidae) in Tien-Shan and Pamir-Alai. *Eurasian Entomologische Nachrichten und Berichtsomologischer journal* 13(4): 323-328. (in Russian, with English summary) ["Distribution and ecology of *I. forcipata* in Tien-Shan and Pamir-Alai are studied. Normally, species development is bivoltine in foothill planes, and three generations possible in warm years." (Author)] Address: Borisov, S.N., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze Str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

14452. Borisov, S.N.; Kosterin, O.E.; Haritonov, A.Yu. (2014): On the fauna of Odonata of Chukotka and other northern regions of the Holarctic. *Eurasian entomological journal* 13(4): 315-320. (in English, with Russian summary) [Russia; "On the occasion of new data on Odonata from Chukotka (Chukotka Autonomous Okrug), the knowledge of Odonata fauna of this region is summarised. At present 17 species have been reported for Chukotka, of which *Aeshna caerulea*, *Cordulia aenea* and *Somatochlora exuberata* for the first time in this paper. The fauna of Odonata of Chukotka is compared to those of the territories of Yakutia, North America and Europe north of 62° N, and also to that of Kamchatka (containing 32, 34, 53, and 24 species, respectively). Species richness was found to strongly depend on climate mildness." (Authors)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

14453. Boudot, J.-P. (2014): A brief observation of egg laying in *Lindenia tetraphylla* (Odonata: Gomphidae) on Kriti (Crete), Greece. *Notulae odonatologicae* 8(4): 94-96. (in English) ["Brief sightings of an ovipositing *L. tetraphylla* above submerged mats of hydrophytes on a lake shore are reported." (Author)] Address: Boudot, J.P., Immeuble Orphée, Apt 703, Cidex 62, 78 rue de la Justice, Ludres, France. E-mail: jean-pierre.boudot@univ-lorraine.fr

14454. Brockhaus, T. (2014): Mark-recapture studies on co-occurring *Sympetma fusca* (VANDER LINDEN, 1820) and *S. paedisca* (BRAUER, 1877) (Odonata: Zygoptera: Lestidae). *Polish Journal of Entomology* 83: 225-234. (in English) ["Maturation cohorts and reproductive cohorts of the two *Sympetma* species were studied in Chomutov (Czech Republic) from 2010 to 2013. During individual mark-recapture studies, a total of 705 winter damselflies were recorded, 473 of which were individually marked (375 *S. fusca*, 98 *S. paedisca*). The recapture rates in the maturation habitat and in the reproductive habitat were low. The population estimate using CHAPMAN's method for low recapture rates could not be carried out separately for the two species owing to the low recapture rate of *S.*

paedisca. The proportion of females was greater in the maturation habitat and significantly lower than that of males in the reproductive habitat. The reproductive habitat was predominantly inhabited by territorial males. All the females observed there were engaged in reproductive activities. There was a close correlation between the male density along the shoreline and reproductive activities. *S. paedisca* was less abundant than *S. fusca*. No differences between the two species were observed in reproductive behaviour. However, *S. paedisca* appeared to disperse continuously away from the maturation habitat. Perhaps this species prefers more open areas as maturation and wintering habitats. *S. fusca* was observed here until October." (Author)] Address: Brockhaus, T., An der Morgensonne 5, 09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

14455. Brooks, S.; Cham, S.; Lewington, R. (2014): Field Guide to the Dragonflies and Damselflies of Great Britain and Ireland. British Wildlife Publishing. Revised 2014 edition: 192 pp. (in English) [xyxyxyxyxyxy] Address: British Wildlief Publishing, Lower Barn Rooks Farm, Rotherwick, Hook Hampshire RG27 9BG, UK. www.britishwildlife.com

14456. Buckland-Nicks, A.; Hillier, K.N.; Avery, T.S.; O'Driscoll, N.J. (2014): Mercury bioaccumulation in dragonflies (Odonata: Anisoptera): Examination of life stages and body regions. *Environmental Toxicology and Chemistry* 33(9): 2047-2054. (in English) ["Dragonflies (Odonata: Anisoptera) are an important component of both aquatic and terrestrial food webs and are vectors for methylmercury (MeHg) biomagnification. Variations in mercury content with life stage and body regions may affect the relative transfer of mercury to aquatic or terrestrial food webs; however, there has been little research on this subject. Also, little is known about mercury bioaccumulation in different body regions of dragonflies. To address these knowledge gaps, dragonfly naiads, adults, and exuviae were collected at 2 lakes in Kejimikujik National Park, Nova Scotia, Canada, and mercury concentrations in different life stages and body regions were quantified. Mean whole body concentrations of MeHg were substantial in naiads (232 ± 112 ng g⁻¹ dry wt, n = 66), emerging adults (236 ± 50 ng g⁻¹ dry wt, n = 10), and mature adults (231 ± 74 ng g⁻¹ dry wt, n = 20). Mean MeHg concentrations in exuviae (5.6 ± 4.3 ng g⁻¹, n = 32) were 40-fold lower than in naiads and adults. Emerging adults had 2-fold to 2.5-fold higher Hg(II) concentrations than naiads, mature adults, and exuviae. In body regions of both naiads and adults, some abdomens contained significantly higher concentrations of Hg(II) than heads or thoraces, and this trend was consistent across families. Across families, Aeshnidae had significantly higher concentrations of MeHg and total Hg than Gomphidae and Libellulidae, but not higher than Corduliidae. The Hg(II) concentrations were lower in Aeshnidae and Libellulidae than in Gomphidae and Corduliidae. Shedding of exuviae presents a possible mechanism for mercury detoxification, but mercury concentrations and

burdens in exuviae are low in comparison with naiads and adults. Dragonfly adults retain a high potential for transferring substantial amounts of MeHg to their predators." (Authors)] Address: Buckland-Nicks, Amy, Dept of Earth and Environmental Science, Acadia University, Wolfville, NS, USA. E-mail: a.bucklan@gmail.com

14457. Bush, A.; Hermoso, V.; Linke, S.; Nipperess, D.; Turak, E.; Hughes, L. (2014): Freshwater conservation planning under climate change: demonstrating proactive approaches for Australian Odonata. *Journal of Applied Ecology* 51(5): 1273-1281. (in English) ["(1) Climate change represents a major challenge for conservation in the future and undermines protection within reserve boundaries. Freshwater biodiversity is still under-represented within reserves world-wide, and connectivity among reserves will become increasingly crucial if species are to persist under climate change. (2) We tested the likely benefits of including predicted species distributions in systematic reserve design for rivers under climate change and the impact of varying connectivity requirements on future representation. We used the modelled distribution of 126 east Australian Odonata to identify reserve networks using data for current or future (2055 and 2085) distributions either by filling gaps additively, or as separate targets in a single solution. We then assessed the potential improvements to species representation in the future using different types of connectivity penalties that emphasized either longitudinal riverine connections or connections to all neighbouring subcatchments. (3) Solutions that did not include future distributions in the planning stages were 16 to 30% less likely to protect the same species by 2055 and 2085, respectively. Inclusion of species' future distributions in the design phase leads to short-term increases in cost, but in the longer term fewer additional areas are required to meet targets and this strategy is likely to be significantly more efficient than implementing systematic design in stages. In addition, solely targeting riverine connectivity was significantly less likely to protect current species in the future than if cross-catchment connections were included. (4) Synthesis and applications. Where protected areas can be expanded to assist species adaptation to climate change, significant gains in efficiency are possible if longer term goals are considered when selecting sites. Furthermore, to improve the representation of species under future climates, reserve selection should consider inter-catchment connectivity, although the nature of optimal solutions will depend heavily on the range of taxa included, their dispersal capacity, and the availability of climatic refugia." (Authors)] Address: Bush, A., Dept of Biological Sciences, Macquarie Univ., Sydney, NSW, Australia. E-mail: alexalbush@gmail.com

14458. Bush, A.A.; Nipperess, D.A.; Theischinger, G.; Turak, E.; Hughes, L. (2014): Testing for taxonomic bias in the future diversity of Australian Odonata. *Diversity and Distributions* 20(9): 1016-1028. (in English) ["Aim: Invertebrates are often overlooked in assessments of climate change impacts. Odonata are a significant component of

freshwater macroinvertebrate diversity and are likely to be highly responsive to a changing climate. We investigate whether climate change could lead to significant alteration of continental patterns of diversity and whether vulnerable species are taxonomically clustered. Location: Australia. Methods: Habitat suitability of 270 odonate species was modelled, and a simplified phylogeny was developed based on taxonomic relationships and expert opinion. These maps were then combined to compare species richness, endemism, taxonomic diversity (TD) and taxonomic endemism (TE) under climate change scenarios, and estimate turnover in species composition. Based on the concentration of vulnerable species in regions associated with Gondwanan relicts, we tested the possibility that a focus on species loss would underestimate loss of evolutionary diversity. Results: Species richness of Australian Odonata is concentrated in the Wet Tropics, central-north Australia and south-east Queensland. Several additional regions support endemic assemblages, including the Victorian alpine region, the Pilbara and far south-western Australia. Major shifts in composition are expected across most of the east coast in response to climate change, and Tasmania has the potential to become a major refuge for mainland species. For many regions, the loss of TD is greater than expected based on the changes in species richness, and the loss of suitable habitat was unevenly distributed among families. However, the potential loss of evolutionary diversity among vulnerable species was not significantly different from random. Main conclusions: The major shifts in the distribution of Australian odonate diversity predicted to occur under climate change imply major challenges for conservation of freshwater biodiversity overall. Although major evolutionary losses may be avoided, climate change is still a serious threat to Australia's Odonata and poses an even greater threat to Australian freshwater biodiversity as a whole." (Authors)] Address: Bush, A., Dept. Biol. Sci., Macquarie Univ., Sydney, New South Wales, Australia. E-mail: alexalbush@gmail.com

14459. Campos, F., Velasco, T.; Santos, E.; Sanz, G.; Casanueva, P. (2014): Distribución de *Coenagrion mercuriale* (Charpentier, 1840) (Odonata, Coenagrionidae) en el norte de la provincia de Valladolid, España. Boln. Asoc. esp. Ent. 38 (3-4): 279-293. (in Spanish, with English summary) ["This paper analyzes the distribution of *C. mercuriale* in the northern half of the province of Valladolid and the variation of dorsal drawing design of the second abdominal segment (S2) among males of the nearby populations. The species was detected in 61 different locations, the streams being the most numerous (86.9 % of cases), followed by rivers (4.9%), ponds (3.3%), channels (1.6%), upwellings (1.6%) and wells (1.6%). Three designs of the dorsal drawing were found, one of them in 13.7% of males and the another two in 43.7% and 42.6% of males. Since in the study area there are large populations found in small streams that dry up in summer, a better management of the flow in these natural channels as a measure of conservation of the species is suggested." (Authors)] Address: Campos, A., Universidad Europea Miguel de Cervantes,

Calle Padre Julio Chevalier, 2, E-47012 Valladolid, Spain. E-mail: fcampos@uemc.es

14460. Chahl, J.; Mizutani, A. (2014): Dragonfly hover is primarily mediated by vision. Proc. SPIE 9055, Bioinspiration, Biomimetics, and Bioreplication 2014, 905516 (8 March 2014); doi: 10.1117/12.2045029: 5 pp. (in English) ["The sensory means by which hover is achieved could be inertial, visual or an unexplained sensory modality. Dragonflies in their natural habitat were shown not to maintain a stationary position in wind. Their position fluctuated significantly while returning to the original position. The movement of the dragonfly is correlated with the movement of vertically standing vegetation. This response would be non-causal with wind for an inertial or putative pressure based internal sensory system. It is postulated that with a substrate of moving water, sensitivity to movement on the visual horizon for controlling hover is a robust strategy." (Authors) *Hemianax papuensis*] Address: Chahl, J., Univ. South Australia, Defence Science and Technology Organisation, Australia. E-mail: javaan.chahl@unisa.edu.au,

14461. Chand, S. (2014): Pyrethroid pesticides induced impairments in midgut histo-architecture of naiad of *Trithemis aurora* (Burm.) dragonfly (Odonata: Libellulidae). Advances in BioResearch 5(2): 130-137. (in English) ["The midgut of last instar naiad of *T. aurora* was exposed to LC50 concentrations 2.69 x 10⁻⁵ and 2.50 x 10⁻³ ppm of cypermethrin and deltamethrin pesticides respectively for 40 hrs, exhibited positive histo-pathological derangements in various midgut tissues. High accumulation of cell contents was seen at apical ends of epithelial cells. The displacement of nuclei was observed and nuclear membrane was found damaged. The circular muscles become contracted and longitudinal muscle bundles remained damaged under cypermethrin constrain. The deltamethrin reacted with epithelial folds, separating their latero-apical ends for more pesticidal activity. The intercellular boundaries of epithelial cells were perfectly damaged at the basal portion of epithelial folds. The peritrophic membrane was damaged. The circular and longitudinal muscles were affected by the pesticide." (Author)] Address: Chand, S., P G Department of Zoology, R.P.G. College Jamuhai, Jaunpur - 222 002, India

14462. Chang, Y.-H.; Ku, C.-R.; Yeh, N. (2014): Solar powered artificial floating island for landscape ecology and water quality improvement. Ecological Engineering 69: 8-16. (in English) ["This study uses solar artificial floating islands (SAFI) for water purification and biological conservation. The site of experiment is set up on a lake shore on a university campus, where the eutrophic contents of lake and sewage from the student dormitory are used for result assessment. The study demonstrates that the SAFI is able to reduce the EC of the eutrophic contents by 30% and enhance dissolved oxygen (DO) by 2.8 times. The SAFI is also able to reduce electric conductivity of dormitory sewage by 34% and increase dissolved oxygen by 982 times. After the improvement, the oxidation–reduction property is

above +100 mV and the oxidation activities in samples are vigorous. The habitation of *Ischnura senegalensis*, *Leucauge magnifica* Yaginuma, and *Duttaphrynus melanostictus* can be observed in the SAFI enhanced water area, while the area without the influence of the SAFI lacks dissolved oxygen and water plants, which results in the common Culicidae, *Hirudo nipponica* Whitman, and Chironomida in rotten water. This research shows that the SAFI has determinant influence on the ecology and water quality improvement." (Authors)] Address: Chang, Y.-H., Department of Landscape and Architecture, MingDao University, Chanhua, No. 369, Wen-Hua Road, Peetow ChanHua 52345, Taiwan. E-mail: f89622050@ntu.edu.tw

14463. Chauhan, P.; Hansson, B.; Kraaijeveld, K.; de Knijff, P.; Svensson, E.I.; Wellenreuther, M. (2014): De novo transcriptome of *Ischnura elegans* provides insights into sensory biology, colour and vision genes. *BMC Genomics* 2014, 15:808 doi:10.1186/1471-2164-15-808: 14 pp. (in English) ["Background: There is growing interest in odonates as model organisms in ecology and evolutionary biology but the development of genomic resources has been slow. So far only one draft genome (*Ladona fulva*) and one transcriptome assembly (*Enallagma hageni*) have been published. Odonates have some of the most advanced visual systems among insects and several species are colour polymorphic, and genomic and transcriptomic data would allow studying the genomic architecture of these interesting traits and make detailed comparative studies between related species possible. Here, we present a comprehensive de novo transcriptome assembly for *I. elegans* built from short-read RNA-seq data. The transcriptome analysis in this paper provides a first step towards identifying genes and pathways underlying the visual and colour systems in this insect group. Results: Illumina RNA sequencing performed on tissues from the head, thorax and abdomen generated 428,744,100 paired-ends reads amounting to 110 Gb of sequence data, which was assembled de novo with Trinity. A transcriptome was produced after filtering and quality checking yielding a final set of 60,232 high quality transcripts for analysis. CEGMA software identified 247 out of 248 ultra-conserved core proteins as 'complete' in the transcriptome assembly, yielding a completeness of 99.6%. BLASTX and InterProScan annotated 55% of the assembled transcripts and showed that the three tissue types differed both qualitatively and quantitatively in *I. elegans*. Differential expression identified 8,625 transcripts to be differentially expressed in head, thorax and abdomen. Targeted analyses of vision and colour functional pathways identified the presence of four different opsin types and three pigmentation pathways. We also identified transcripts involved in temperature sensitivity, thermoregulation and olfaction. All these traits and their associated transcripts are of considerable ecological and evolutionary interest for this and other insect orders. Conclusions: Our work presents a comprehensive transcriptome resource for the ancient insect order Odonata and provides insight into their biology and physiology. The transcriptomic resource can

provide a foundation for future investigations into this diverse group, including the evolution of colour, vision, olfaction and thermal adaptation." (Authors)] Address: Chauhan, P., Dept of Biology, Lund University, Sölvegatan 37, SE-22362 Lund, Sweden. Email: pallavi.chauhan@biol.lu.se

14464. Collins, S.D. (2014): Fine-scale modeling of riverine Odonata distributions in the northerneast United States. Ph.D, Biology, Graduate Faculty of Texas Tech University: X + 207 pp. (in English) ["The distributions of riverine Odonata was modeled at the scale of individual river segments across the northeastern United States, a 784,982 km² region spanning from Ohio, West Virginia, and Virginia northeast to Maine. The species distribution modeling approach was reviewed with respect to Odonata, and several modeling techniques were compared. Species locality data assigned only to U.S. county is prevalent in invertebrate databases, and it was found that using these data for modeling tends to overpredict the geographic distributions of species. Several techniques to compensate for geographic sampling bias, which is also a characteristic of these largely opportunisticly collected databases, were compared, though the optimum method (thinning data, biased background sampling, or no treatment) depended on the dataset. Watersheds and riparian zones are ecologically relevant for riverine organisms, and models with catchment- and local-scale predictors outperformed models based only on climate. This fine-scale modeling approach is appropriate for the conservation of freshwater diversity, because individual river segments containing suitable species habitat can be identified and prioritized. Climate change is expected to reduce the available habitat for riverine Odonata within the northeastern U.S., though some rivers may serve as climatic refugia, and conservation of these rivers and their watersheds is essential." (Author)] Address: not stated

14465. Cooper, A. (2014): Dragonflies of the Colorado Front Range: A Photographic Guide Perfect Paperback. Boulder County Nature Association: 111 pp. (in English) ["Dragonflies -- they are dainty but deadly as they dart over ponds and clearings on the hunt for prey. How can they fail to catch the eye with such shimmering rainbow colours? Use this friendly photographic guide to identify and learn more about your striking and impressive insect neighbours. Showcasing 45 dragonflies and 28 damselflies, the guide covers the most common species found in the region, from the northern Colorado border south to Walsenburg. Accompanying more than 90 brilliant photographs are descriptions of habitat, appearance, length, behaviour, similar species, flight time and interesting facts for each species. Introductory material includes tips on watching, identifying and photographing these tiny jewels. This field guide is excellent for beginners and naturalists who would like to identify and enjoy dragonflies." (Publisher)] Address: Boulder County Nature Association, P.O. Box 493, Boulder, CO 80306, USA. <http://bcna.org/index.html>

14466. Corser, J.F.; White, E.L.; Schlesinger, M.D. (2014): Odonata origins, biogeography, and diversification in an Eastern North American hotspot: multiple pathways to high temperate forest insect diversity. *Insect Conservation and Diversity* 7(5): 393-404. (in English) ["We assessed the origins and historical biogeography of a rich regional odonate fauna in New York State (NYS), North-eastern United States. We computed North American (NA) range centres and NYS range margins and reviewed the taxonomic literature to provide a useful phylogenetic framework for the fauna. We analysed results from a newly completed Odonata atlas using generalised linear anova models to assess the effects of species' origins and zoogeographic affinities on relative frequency and extinction risk metrics. Phylogenetic reconstruction based on taxonomic nomenclature revealed different patterns of diversification. Zygoptera in NYS is mainly of Neotropical origin ~ 60 Ma displaying a pattern of tropical conservatism, but with a burst recent of Plio–Pleistocene speciation in certain groups. Alternatively, Anisoptera contains crown group endemic taxa and other very old lineages from the Mesozoic era before the breakup of Pangaea, highlighting the evolutionary significance of the Appalachian Mountains as an important global centre of temperate forest freshwater diversity. These high regional levels of odonate diversity have been brought about by at least three different mechanisms: dependence on forests, predominance of non-ecological speciation mechanisms, and niche conservatism across hundreds of millions of generations. NYS lies at a crossroads of both ancient and more recent Odonata evolution comprising separate boreal, temperate, and tropical faunas. Those species encountered less frequently and having higher overall extinction risk metrics generally tended to be the boreal species on the rear edge of their range, a widespread phenomenon for the insects of many regions generally attributed to ongoing climate change." (Authors)] Address: Corser, J.D., New York Natural Heritage Program, SUNY College of Environmental Science and Forestry, 625 Broadway, 5th Floor, Albany, NY 12233, USA. E-mail: jdcorser@gw.dec.state.ny.us

14467. Costa, R.N.; Nomura, F. (2014): Assessment risk and limited behavioral plasticity in tadpoles of *Rhinella ornata* (Anura, Bufonidae). *Iheringia* 104(2): 162-167. (in Portuguese, with English summary) ["Anuran tadpoles are important elements of trophic networks in aquatic environments, being food resource for many types of predators. Thus, the tadpoles exhibit a great variety of defense mechanisms that may be morphological, behavioral and/or physiological. The unpalatability, produced by the accumulation of toxic substances in the skin, is a common mechanism in many frog lineages. However, some predators are not affected by these toxic substances, which may favor the development of alternative mechanisms of defense against predation. In this context, our objective was evaluate if the unpalatable tadpoles of *R. ornata* (Spix, 1824) may present behavioral mechanisms of defense against predation in the presence of predators that are not

affected by toxic substances on its skin. To test our hypothesis, we used two kinds of predators: an aquatic Heteroptera of the genus *Belostoma* and a dragonfly larva of the genus *Aeshna*. The tadpoles were located in aquariums with visual and chemical clues of predators (direct risk experiment), only chemical clues (indirect risk experiment) and by the complete absence of predator signals (control). In both cases, the swimming behavior was observed for 5 minutes. During the experiments there was no alteration in swimming behavior of tadpoles." (Authors)] Address: Costa, R.N., Univ. Federal de Goiás (UFG), Depto Ecologia, Inst. de Ciências Biológicas, Lab. de Herpetologia e Comportamento Animal, Campus Samambaia (Campus II). Av. Esperança, Caixa Postal 131, 74001-970, Goiânia, Goiás, Brasil. E-mail: renan.nunes.costa@gmail.com

14468. Culler, L.E.; McPeck, M.A.; Ayres, M.P. (2014): Predation risk shapes thermal physiology of a predaceous damselfly. *Oecologia* 176(3): 653-660. (in English) ["Predation risk has strong effects on organismal physiology that can cascade to impact ecosystem structure and function. Physiological processes in general are sensitive to temperature. Thus, the temperature at which predators and prey interact may shape physiological response to predation risk. We measured and evaluated how temperature and predation risk affected growth rates of predaceous damselfly nymphs (*Enallagma vesperum*, Odonata: Coenagrionidae). First, we conducted growth trials at five temperatures crossed with two levels of predation risk (fish predator present versus absent) and measured growth rates, consumption rates, assimilation efficiencies, and production efficiencies of 107 individual damselflies. Second, we used a model to evaluate if and how component physiological responses to predation risk affected growth rates across temperatures. In the absence of mortality threat, growth rates of damselflies increased with warming until about 23.5 °C and then began to decline, a typical unimodal response to changes in temperature. Under predation risk, growth rates were lower and the shape of the thermal response was less apparent. Higher metabolic and survival costs induced by predation risk were only partially offset by changes in consumption rates and assimilation efficiencies and the magnitude of non-consumptive effects varied as a function of temperature. Furthermore, we documented that thermal physiology was mediated by predation risk, a known driver of organismal physiology that occurs in the context of species interactions. A general understanding of climatic impacts on ectothermic populations requires consideration of the community context of thermal physiology, including non-consumptive effects of predators." (Authors)] Address: Culler, Lauren, Department of Biological Sciences, Dartmouth College, 78 College Street, Hanover, NH, 03755-3563, USA. E-mail: le-culler@gmail.com

14469. da Silva-Mendez, D.; Lorenzo-Carballa, M.O.; Cordero-Rivera, A.; Watts, P.C. (2014): Microsatellite loci for two threatened dragonfly (Odonata: Anisoptera) spe-

cies: *Oxygastra curtisii* (Dale, 1834) and *Macromia splendens* (Pictet, 1843). *Conservation Genet. Resour.* 5(4): 1171-1174. (in English) ["Twenty one polymorphic microsatellite loci were isolated from two species of dragonfly (Odonata: Anisoptera), *Macromia splendens* (n = 8 loci) and *Oxygastra curtisii* (n = 13 loci). Both species have their main distribution areas in southwestern Europe, with records in the north of Africa in the case of *O. curtisii*. *M. splendens* is listed as vulnerable by IUCN, while *O. curtisii* is regarded as near threatened. Genetic diversity was assessed in samples from the Iberian Peninsula representing two populations for each species. Number of alleles per locus ranged from 5 to 11 (*O. curtisii*) and between 4 and 16 (*M. splendens*), while mean expected heterozygosity varied between 0.118–0.745 (*O. curtisii*) and 0.130–0.849 (*M. splendens*). Five loci (four for *O. curtisii* and one for *M. splendens*) showed significant deviations ($P < 0.05$) from expected Hardy–Weinberg equilibrium conditions, with the locus from *M. splendens* experiencing null alleles. These loci are currently being used to assess spatial genetic structure in these protected species." (Authors)] Address: Silva-Méndez, G., Evolutionary Ecology and Conservation Group, Department of Ecology and Animal Biology, Universidad de Vigo, EUE Forestal, Campus Universitario A Xunqueira s/n, 36005 Pontevedra, Spain. E-mail: genarodasilva@uvigo.es

14470. Dawn, P.; Chandra, K. (2014): Dragonflies and damselflies (Insecta: Odonata) of Chhattisgarh, India. *Check List* 10(5): 1104-1109. (in English) ["The present study on the Odonata (Insecta) of Chhattisgarh, India, documents eighty-five species including thirteen new records to the state. *Cyclogomphus heterostylus*, *Macrogomphus seductus* and *Zygonyx iris iris* are recorded for the first time from central India. The paper discusses the geographical and habitat-wise distribution of Odonata of Chhattisgarh." (Authors) New regional records are also: *Anaciaeschna jaspidea*, *Cyclogomphus ypsilon*, *Microgomphus torquatus*, *Tramea limbata*, *Neurobasis chinensis*, *Vestalis apicalis*, *Rhinocypha bisignata*, *Ceragrion rubiae*, *Lestes praemorsus*, and *Copera vittata*.] Address: Dawn, P., Zoological Survey of India, Prani Vigyan Bhavan, M-Block, New Alipore, Kolkata, 700053, West Bengal, India. E-mail: prosenjit.dawn@gmail.com

14471. Dijkstra, K.-D.; Clausnitzer, V. (2014): The dragonflies and damselflies of eastern Africa: Handbook for all Odonata from Sudan to Zimbabwe. *Studies in Afrotropical Zoology* 298: 264 pp. (in English) ["Few animal groups can represent the greatest (insects) and most threatened (freshwater) biodiversity on earth as well as dragonflies, perhaps the best-known and most colourful of all aquatic insects. Fifteen years in development, *The Dragonflies and Damselflies of eastern Africa* is the first handbook of its extent and detail on tropical Odonata. Extending from Sudan and Somalia to Zambia and Mozambique, including the entire eastern half of the Congo Basin, the book covers a third of Africa, about ten million square kilometres, an area comparable to China or the United States,

but treats almost two-thirds of the continent's species. More than 500 species are illustrated with 1120 original drawings and over 360 colour photographs portraying 320 species. Identification keys to adult males of all species set a new standard for recognising 'the birdwatcher's insects' in Africa, detailed genus descriptions provide the most comprehensive account of their ecology and taxonomy so far, and all species have been furnished with a vernacular English name for the first time. Verified checklists are presented for Democratic Republic of Congo, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Somalia, South Sudan, Sudan, Tanzania, Uganda, Zambia and Zimbabwe." (Publisher)] Address: <http://www.africamuseum.be/research/publications/rmca/search/pubdetail?pubid=1737>; KMZA, Leuvensesteenweg 13, 3080 Teruren - Belgium

14472. Dolný, A.; Waldhauser, M.; Kvitá, L.; Kocourková, L. (2014): New records of lilypad whiteface *Leucorrhinia caudalis* (Odonata: Libellulidae) in the Czech Republic. *Acta Mus. Siles. Sci. Natur.* 63: 185-192. (in English) ["*L. caudalis* had been thought to be extinct in the Czech Republic for the last fifty years, until an accidental discovery of adult males in 2012. In 2014, larvae of *L. caudalis* were recorded from water reservoirs in the Ěeská Lípa region, northern Bohemia, for the first time. Thus, it is the first breeding site of *L. caudalis* in the Czech Republic. A male *L. caudalis* was also repeatedly recorded in Havířov-Dolní Suchá in the north-eastern Czech Republic." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

14473. Dong, C.X. (2014): Dragonflies of Nankunshan, China. China Forestry Publishing House: 195 pp. (in Chinese, English foreword, Latin names) [Nankunshan, Guangdong, China. 155 odonate species are introduced by app. 200 exquisite photographs.]

14474. Dow, R.A. (2014): A review of the genus *Bornargiolestes* Kimmins, 1936 (Odonata: Zygoptera) with a description of two new species from Sarawak, Malaysia. *Journal of Threatened Taxa* 6(5): 5700-5711. (in English, with Bahasa Melayu summary) ["The poorly known genus *Bornargiolestes* is reviewed and a fresh diagnosis is provided. Two new species, *Bornargiolestes fuscus* and *Bornargiolestes reelsi* are described. Illustrations, distribution maps and a key to the males of the genus are given." (Author)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

14475. Dow, R.A.; Ngiam, R.W.J. (2014): Odonata from logged and unlogged forest in the Ulu Balui and Ulu Baleh, Kapit Division, Sarawak, in June and September 2013. *International Dragonfly Fund - Report* 73: 1-48. (in English) ["The results of two expeditions into the Ulu Baleh and Ulu Balui areas of the interior of Sarawak are presented, including data from forest that was pristine at the time of sampling but that was subsequently logged. A total of 74

species are recorded, notably including *Coeliccia campioni*, *Coeliccia* new species borneensis-group, *Pericnemis* spp., *Heliogomphus blandulus*, *Leptogomphus pendleburyi*, *Chlorogomphus ?manau* and *Procordulia ?new species*. A discussion of the results and potential differences in the odonate fauna of comparable logged and unlogged forest sites is given." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

14476. Drake, D.L.; Anderson, T.L.; Smith, L.M.; Lohraff, K.M.; Semlitsch, R.D. (2014): Predation of eggs and recently hatched larvae of endemic Ringed Salamanders (*Ambystoma annulatum*) by native and introduced aquatic predators. *Herpetologica* 70(4): 378-387. (in English) ["Predation is a key determinant of pond community structure, yet not all predators are equally effective and not all life stages of potential prey are similarly susceptible. Understanding the effects of native and introduced species is essential to informing management strategies, especially for endemic and species of conservation concern. We examined the effects of five common predators (three native: Central Newts [*Notophthalmus viridescens louisianensis*], aeshnid dragonfly naiads [Aeshnidae], and Southern Leopard Frog tadpoles [*Lithobates sphenoccephalus*]; and two introduced: Fathead Minnows [*Pimephales promelas*] and Mosquitofish [*Gambusia affinis*]) on survival of eggs and recently hatched larvae of Ringed Salamanders (*Ambystoma annulatum*). We also examined the effect of supplemental food or cover availability on survival at each stage. Predators primarily showed a binary response to eggs, consuming all or none of them. Supplemental food did not influence whether eggs or larvae were consumed. Larvae were consumed by all predator species although the effect varied. The presence of cover did not reduce the impacts of the other predators on larval survival. Overall, the two introduced fish species had a greater impact on survival of the early stages of Ringed Salamanders than did the native predators. Further inquiries into the susceptibility of different life stages and survival will improve conservation strategies for rare and endemic species such as Ringed Salamanders." (Authors)] Address: Drake, Dana, Division of Biological Sciences, University of Missouri, 105 Tucker Hall, Columbia, Missouri 65211, USA. E-mail, drake.dana.l@gmail.com

14477. Dumont, H.J. (2014): Odonata from the Tibesti Mountains and the Ounianga Lakes in Chad, with notes on *Hemianax ephippiger* accumulating in the desert. *Odonatologica* 43(1/2): 13-24. (in English) ["Fourteen species of Odonata were collected in Ounianga and Tibesti (Chad, Africa) in March 2014. Among them, only one zygopteran (*Ischnura saharensis*, with a Saharan distribution), one gomphid (the eremian *Paragomphus sinaiticus*), and two aeshnids (*Anax imperator* and *Hemianax ephippiger*) were present. The latter species was not only the most common dragonfly, but also the most abundant insect seen in the desert. It is likely that it was in a phase of accumulating individuals, possibly as a prelude to another

massive trans-Sahara and even trans-Mediterranean migration, for which the species is well-known. The 10 libellulids recorded were almost all Afrotropical species, but several expand to the Maghreb and even Mediterranean Europe. Only *Orthetrum* cf. *hintzi* is a tropical African species that had never been recorded from the desert before." (Author)] Address: Dumont, H.J., Univ. Gent, Inst. Animal Ecology, K.L. Ledeganckstraat 35, B-9000 Gent, Belgium. E-mail: Henri.Dumont@ugent.be

14478. Dziekonska-Rynko, J.; Rokicki, J.; Mierzejewska, K. (2014): In vitro infection experiments with eggs of the nematode *Contraecaecum rudolphii* Hartwich, 1964 (sensu lato) targeting aquatic insect larvae (Odonata: Coenagrionidae and Libellulidae; Trichoptera: Integripalpia) as possible intermediate hosts. *Oceanological and Hydrobiological Studies* 43(2): 165-169. (in English) ["The availability of aquatic insects (Odonata: Coenagrionidae, Libellulidae and Trichoptera: Integripalpia) as potential intermediate hosts for the nematode *Contraecaecum rudolphii* Hartwich, 1964 sensu lato was studied under laboratory conditions. The infective material consisted of nematode eggs, newly hatched larvae, as well as in vitro infected cyclopoid copepods. High prevalence and intensity of infection associated with a low mortality of aquatic insect larvae suggests that they may serve as intermediate hosts for *C. rudolphii* and constitute a major reservoir of *C. rudolphii* larvae in aquatic habitats." (Authors)] Address: Jerzy Rokicki, J. Department of Zoology, Faculty of Biology and Biotechnology, University of Warmia and Mazury, ul. Oczapowskiego 5, 10-957, Olsztyn, Poland. E-mail: rokicki@univ.gda.pl

14479. Ebrahimi, A.; Mohammadian, H.; Madjzadeh, S. M. (2014): A note on libellulid dragonflies (Odonata: Libellulidae) of Khabr National Park (Kerman Province, South-East Iran). *International Dragonfly Fund - Report* 69: 1-9. (in English) ["In spring and summer 2008, the Odonata fauna of the Khabr National Park (Iran) was studied for the first time. Here, we present records of the representatives of family Libellulidae only. A total of twelve libellulid Odonata were found. Most of them are common species in Iran and other parts of Kerman province. Scarce Iranian species are *Trithemis arteriosa* and *Zygonyx torridus*." (Authors)] Address: Ebrahimi, A., Dept. of Biology, Faculty of Sciences, Shahid Bahonar University, Kerman, Iran. E-mail: krmbhrm5@gmail.com

14480. Eck, A.; Byrne, A.; Popescu, V.D.; Harper, E.B.; Patrick, D.A. (2014): Effects of water temperature on larval amphibian predator-prey dynamics. *Herpetological Conservation and Biology* 9(2): 302-308. (in English) ["Predation represents an important driver of species persistence and community structure. Climate change can influence predation through changes in the distribution and abundance of predatory species. Furthermore, predator-prey dynamics may be influenced by climate-induced shifts in the behaviour of predators and/or prey. Our research employed a model system consisting of larval amphibians

(*Lithobates clamitans*) as prey, and three species of predatory dragonfly larvae, *Ladona julia*, *Aeshna interrupta*, and *Didymops transversa*. Our goal was to assess whether simulated climate-induced changes in predator assemblages and abiotic conditions may influence predator-prey dynamics. The study was conducted in replicated aquatic microcosms, with water temperature manipulated across a range of temperatures. Predation studies involved a single dragonfly of a focal species and 10 larval *L. clamitans*. Our best-fitting model included dragonfly species, water temperature, and the interaction between the two factors. Survival of anuran larvae decreased for both *Aeshna interrupta* and *Didymops transversa*, but remained constant with increasing water temperature for *Ladona julia*. Our study demonstrates the potential for climate-induced changes in the composition of predator species to interact with altered abiotic conditions in shaping predator-prey dynamics." (Authors)] Address: Patrick, D.A., Paul Smith's College, School of Natural Resources, Management, and Ecology, Routes 86 & 30, Paul Smiths, New York 12945, USA. E-mail: dpatrick@paulsmiths.edu

14481. Edgehouse, M.; Brown, C.P. (2014): Predatory luring behavior of odonates. *J. Insect Sci.* 14(146): 3 pp. (in English) ["To date, there has been zero evidence that odonates employ luring as a means of prey acquisition. However, in this study, we show that *Aeshna palmata* larvae use abdominal movements to lure larval *Argia vivida*, subsequently consuming the lured organism. We also present findings of a similar behavior from larval *Ar. vivida* in an attempt to lure larval *A. palmata* within striking distance." (Authors)] Address: Edgehouse, M., Dept of Natural Sciences and Mathematics, Lewis-Clark State College, 500 8th Avenue, Lewiston, ID 83501, USA. E-mail: mjedgehouse@lsc.edu

14482. Escoto-Moreno, J.A.; Márquez, J.; Novelo-Gutiérrez, R. (2014): Los odonatos (Insecta: Odonata) del estado de Hidalgo, México: situación actual y perspectivas. *Revista Mexicana de Biodiversidad* 85: 1043-1053. (in Spanish, with English summary) ["The odonates (Insecta: Odonata) from Hidalgo state, Mexico: present situation and perspectives: An historical analysis on the number of odonate species recorded for Hidalgo State is made. Moreover, collections were made in 2011 year, in 8 localities with cloud forest, during the dry and rainy seasons, twice each, complemented with occasional collections in other 8 localities with other type of forests along 2012-2013 years. Twenty-two new records of species are provided, increasing the total number of odonates for Hidalgo to 129 species. A map of the historical collection sites, as well as those places with a high potential species richness, was generated using geographic information system (GIS), indicating also the areas with high potential for new records for future studies in the state. For Mexico, Hidalgo occupies the fifth place in odonate diversity per km² and the sixth one in odonate species richness, representing more than 1/3 of the species known for the country, and more than 1/2 and 3/4 of the genera and families recorded

for Mexico, respectively. Finally, comments are made on the high odonate diversity and its probable cause." (Authors)] Address: Novelo-Gutiérrez, R., Red de Biodiversidad y Sistemática, Instituto de Ecología, A. C. Carretera antigua a Coatepec 351, El Haya, 91070 Xalapa, Veracruz, México. E-mail: rodolfo.novelo@inecol.mx

14483. Faasen, T. (2014): *Phoenicagrion trilobum*, a new species of damselfly from Peru (Odonata: Coenagrionidae). *International Journal of Odonatology* 17(2-3): 63-72. (in English) ["Three species of *Phoenicagrion* are known from the north-eastern Amazonian part of Peru: *P. flammeum*, *P. paulsoni*, and a third undescribed species. In 2009 and 2010 several specimens of this third species were collected in Loreto, making it possible to describe this species, here named *Phoenicagrion trilobum* (holotype male: Peru, Loreto department, Tahuayo River, 18 km E of the Amazon River, 4°24'18" S, 73°14'38" W, in RMNH collection)." (Author)] Address: Faasen, T., Ecologica, Rondven 22, 6026PX Maarheeze, the Netherlands

14484. Farkas, A.; Danyik, T.; Mora, A. (2014): Contribution to the Odonata fauna of the rivers in the Körös-Maros National Park, Hungary, with special emphasis on Gomphidae. Part I. *Acta Biol. Debr. Oecol. Hung.* 32: 31-49. (in English, with Hungarian summary) ["In 2013 systematic collections of Gomphidae exuviae were carried out at 37 sampling sites along the Hungarian sections of the Fehér-Körös, Fekete-Körös, Kettos-Körös and Maros rivers. The sampling sites were visited four times, taking into account the phenology of gomphid species. Besides Gomphidae, exuviae of other species were also collected with faunistic aims. In addition, observational data on adult specimens were occasionally recorded. Collections resulted in the occurrence of 5640 exuviae (from which 5291 were exuviae of Gomphidae) and 112 adults were observed. Altogether 17 species were found, for which detailed records are given. The most important result is the co-occurrence of the four Hungarian gomphid species along all studied rivers. The distributional areas of *Onychogomphus forcipatus* and *Ophiogomphus cecilia* were remarkably expanded by our results. The composition of the Gomphidae assemblages varied widely among rivers and within a given river as well, according to habitat characteristics. In conclusion, stable and viable populations of Gomphidae exist along the studied rivers (Fehér-Körös may be an exception) with great significance in terms of nature conservation. Accordingly, either these populations or rivers deserve strict protection." (Authors)] Address: Farkas, Anna, Department of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

14485. Farkas, A.; Méro, T.O.; Móra, A.; Dévai, G. (2014): Urban dragonflies: Data on the Odonata fauna of the Danube at Budapest. *Acta Biol. Debr. Oecol. Hung.* 32: 23-29. (in English, with Hungarian summary) ["Although the Danube is the largest river in Hungary, its Odonata fauna is

scarcely known, especially that of the river section in Budapest. In this paper new data on the Odonata fauna of the latter Danube section are presented. In 2013 the collections of exuviae and observations on adults were made at five sites along the Danube in Budapest. During this work 414 exuviae (including dead larvae found in early phases of emergence) were collected and 36 mature adults were observed. Altogether seven species were recorded, among them the rare and vulnerable *Ophiogomphus cecilia* and *Onychogomphus forcipatus*. Except for *Gomphus vulgatissimus*, all species found are new for the fauna of the main branch of the Danube in Budapest. The composition of Odonata assemblage may indicate the improving water quality state of the river." (Authors)] Address: Farkas, Anna, Department of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

14486. Ferreira, S.; Lorenzo-Carballa, M.O.; Torres-Cambas, Y.; Cordero-Rivera, A.; Thompson, D.J.; Watts, P.C. (2014): New EPIC nuclear DNA sequence markers to improve the resolution of phylogeographic studies of coenagrionids and other odonates. *International Journal of Odonatology* 17(2-3): 135-147. (in English) ["While phylogeographic data provide valuable information to inform conservation plans, there are comparatively few Odonata phylogeographic studies. This lack of research is partially due to a lack of independent DNA markers with appropriate levels of polymorphism that PCR-amplify in a range of species. We followed an exon-primed, intron-crossing (EPIC) PCR strategy to develop five new, polymorphic nuclear DNA sequence loci (six distinct DNA fragments) for *Coenagrion mercuriale*. These markers were: cell division cycle 5 protein (CDC5), arginine methyltransferase (PRMT), acetylglucosaminyl-transferase (AgT), myosin light chain (MLC) and phosphoglucose isomerase (PGI). Between three and five of these new markers could be PCR-amplified in five other species from the genus *Coenagrion*; one locus (PRMT) can be used in 26 other species of odonates that we examined, including three species of Anisoptera belonging to the genus *Onychogomphus*. These new nuclear genetic markers will be useful for phylogeographic studies in a range of odonate species, but also for phylogenetic studies, providing a particularly useful complement to the existing mitochondrial and nuclear loci." (Authors)] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate em Biodiversidade e Recursos Genéticos, Univ. do Porto, Campus Agrário de Vairao, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

14487. Ferreras-Romero, M.; Marquez-Rodriguez, J. (2014): Odonatos asociados a cursos estacionales de Sierra Morena (sur de España). *Boln. Asoc. esp. Ent.* 38(1-2): 173-184. (in Spanish, with English summary) ["The Odonata fauna existing in two seasonal streams of the Sierra Morena Mountains (Spain) is shown and discussed. Two thirds of the 21 species recorded were anisopteran.

Presence in such watercourses of *Onychogomphus forcipatus*, *Oxygastra curtisii*, *Libellula depressa* and *Orthetrum brunneum* is noteworthy. Abundant exclusively autumnal reproductive activity of *Chalcolestes viridis*, *Aeshna mixta* and *Sympetrum striolatum* was recorded." (Author)] Address: Marquez-Rodriguez, J., Departamento de Sistemas Físicos, Químicos y Naturales. Universidad Pablo de Olavide. A-376 km 1. 41013 Sevilla, Spain. E-mail: jmarrod1@admon.upo.es

14488. Ferriz, R.A.; Iwaszkiw, J.M. (2014): Alimentación de *Gymnotus omarorum* (Gymnotiformes: Gymnotidae) en Laguna Blanca (Parque Nacional Río Pilcomayo), Formosa, Argentina. *Rev. Mus. Argentino Cienc. Nat.*, n.s. 16(2): 115-122. (in Spanish, with English summary) [La Laguna Blanca, Parque Nacional Río Pilcomayo, provincia de Formosa (25° 09' 56,80" S - 58° 14' 21,28" W), Argentina. "Diet of the electric knife-fishes, *G. omarorum*, is described in Laguna Blanca Río Pilcomayo National Park, Formosa province. Samples were collected monthly from September 2012 to July 2013. For the analysis of stomach contents, frequency methods, volume fraction, percentage and numerical abundance index (AI) were used. Preys ingested generally belong to invertebrates (including Odonata) and fish that live under the floating plants. The specimens of smaller sizes to 200 mm total length (TL) had a carnivorous diet with greater specialization, while in larger sizes from 201 mm TL, was carnivorous diet of the generalist type. Increased consumption of fish and decapods with increasing LT was observed. Insects in general and in particular Odonata nymphs, dominate in small and medium sizes. Significant differences were observed in the diet of this species throughout the period considered, correlating the same with changes in biomass of floating plants. The results allow characterizing the diet of *G. omarorum* as a generalist." (Authors)] Address: Ferriz, R.A., División Ictiología, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN-CONICET), Av. ángel Gallardo 470, C1405DJH, Ciudad Autónoma de Buenos Aires, Argentina. E-mail: rferriz@macn.gov.ar

14489. Fuller, C. (2014): The effects of atrazine and predation risk on larval dragonflies *Ladona deplanata* (Odonata: Libellulidae). Thesis, Murray State University: 67 pp. (in English) ["Ecologists have recognized that the effects of anthropogenic stressors on organism life history may be magnified when combined with natural forms of stress. However, very few studies examine the effects on physiological traits in addition to traditional life history traits. Here, I review the usage, environmental concentrations and effects of atrazine, a common herbicide in aquatic systems. Then I present my study on the interactive effects of atrazine, and predation risk on growth, mass, immune function, and energy storage in the larval dragonfly *L. deplanata*. Using aquatic mesocosms to simulate natural conditions, I used a repeated measures design assessing sublethal atrazine exposure and non-consumptive predator stress on these traits over a 45-day period during the larval stage. I predicted that combining these stressors would

have additive negative effects on immunity and growth. I found that predation risk and atrazine caused significant changes to immunity over time, the strength of which was dependent on the specific immune parameter measured. Predation risk increased immune function, which was partially explained by mass gain but not skeletal growth, whereas sublethal atrazine caused little immunosuppression. The results of this study indicate that atrazine interacts with predation risk over time to cause significant changes to immune function but not growth and mass gain in *L. deplanata*. Together, these stressors may be altering the ability of larvae to survive to metamorphosis, which may profoundly affect population and community dynamics." (Author)] Address: Fuller, Claire, A., Dept of Biology, Murray State University, Murray, KY 42071, USA. E-mail: claire.fuller@murraystate.edu

14490. Furness, A.N.; Soluk, D.A. (2014): Why shouldn't the dragonfly cross the road? Factors that influence dragonfly vulnerability to vehicular collisions. 99th ESA Annual Meeting (August 10 -- 15, 2014): (in English) [Verbatim: Roadway impacts on mammals, amphibians, and reptiles and how to mitigate for them has been widely examined; however, the impacts roadways have on insects has rarely been addressed. Roadways are known to act as barriers to wildlife movement either by eliciting behavioral avoidance or causing direct mortality. This is of special concern for endangered species such as the Hine's emerald dragonfly (*Somatochlora hineana*), large numbers of which die along roadways in some parts of its range. One of the simplest ways to reduce mortality is to reduce vehicle speed and likelihood of fatal collisions; however, virtually nothing is known about the relationship between vehicle speed and mortality in insects. We conducted a controlled experimental evaluation comparing the rates of dragonfly-vehicle collisions at 24 kph (15 mph), 40 kph (25 mph), 56 kph (35 mph), 72 kph (45 mph), and 88 kph (55 mph) on roadways in northern Door County, Wisconsin. Our study evaluated the influence of motor vehicle speed, flight height, and flight behavior on mortality rate of adult dragonflies in ten identified genera. Results/Conclusions: Our results indicate that vehicle speed was the most significant predictor ($p < 0.0001$) of encounter result. There was a strong non-linear structure to the relationship between vehicle speed and mortality, suggesting that reducing vehicle speed is most important at higher speeds and would have fewer benefits at lower speeds. Flight height was not a strong predictor of encounter result ($p = 0.72$); however, results show a significant difference ($p < 0.0001$) between the encounter results of straight-flying dragonflies (e.g. *Somatochlora*, *Anax*) and all others, with straight fliers most vulnerable and agile fliers (e.g. *Pantala*, *Tramea*) least vulnerable. For dragonflies in general, decreasing the speed limit from 88 kph (55 mph) to 72 kph (45 mph) has the potential to reduce the probability of hit by 17%. For *S. hineana*, this speed reduction could decrease their probability of hit from 65% to 27%. Although many wetland insects have short-lived adults, some especially sensitive groups have adults that forage, reproduce, and disperse

over an extended period of time. Speed reduction in areas where these sensitive species interact with motor vehicles may be an essential tool in their conservation and may help reduce the overall impact of roadways on wetland ecosystems.] Address: Furness, Amber, Biology, University of South Dakota, Vermillion, SD, USA

14491. Futahashi, R. (2014): The adult flight season with the first and last appearance dates of Japanese dragonflies. *Aeschna* 50: 145-181. (in Japanese, with English summary) ["I summarize adult flight season of Japanese dragonflies based on literatures and personal communications. I also listed up the first and last appearance dates especially in the following well-investigated prefectures: Hokkaido, Aomori, Tochigi, Toyama, Shiga, Mie, Nara, Tokushima, Ehime, Kochi, and Oita." (Author)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14492. Futahashi, R.; Futahashi, H.; Shinbori, O.; Kawamura, H. (2014): The Dragonflies and Damselflies of Toyama Prefecture, Central Honshu, Japan in 2013. *Bull. Toyama Sci. Mus.* 38: 143-163. (in Japanese, with English summary) ["Here we report our collection and photograph data of odonate species from Toyama Prefecture in 2013. In 2013, we found 76 species from 12 families. The following 12 species were not found in 2013 (the last collection year in parenthesis); *Sympecma paedisca* (2012), *Paracercion melanotum* (2006), *Aeschnophlebia anisoptera* (2011), *Anax guttatus* (2005), *Meligomphus viridicostus* (1959), *Nihonogomphus viridis* (2006), *Shaogomphus postocularis* (1972), *Sympetrum danae* (2001), *S. depressiusculum* (2011), *S. vulgatum* (2005), *Tramea virginia* (2010) and *Tholymis tillarga* (2007)." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14493. Gambale, P.G.; Batista, V.G.; Oda, F.H.; Campos, R.M.; Takemoto, R.M.; Bastos, R.P. (2014): Anuran larvae as prey and hosts of invertebrates in Neotropical aquatic habitats. *Revista Chilena de Historia Natural* 87(31): 5 pp. (in English) ["Background: Biotic processes, such as predation and parasitism events, are crucial for answering questions in ecology and evolution. Here, we report predation and ectoparasitism events of invertebrates upon tadpoles in aquatic habitats of southern Brazil. Findings: Four lentic water bodies were sampled twice a month (December 2012 to March 2013). Those water bodies were located in the Diamante do Norte, County, state of Paraná, southern Brazil. The tadpoles, *Dendropsophus minutus*, *Hypsiboas raniceps*, *Scinax fuscovarius*, *Physalaemus cuvieri* and *Elachistocleis bicolor* were observed being predated by six different invertebrate predators. However, *Leptodactylus fuscus* and *Pseudis* sp. were also recorded on the same water bodies and were not observed being preyed or parasitized. The most abundant predator in our sampling areas was the diving beetle larvae. We observed

a static and escape behaviour of tadpoles when in close proximity to predators and constant movements in *E. bicolor* tadpoles, which can be advantageous for invertebrate predators. Parasitism events included *D. minutus*, *S. fuscovarius*, and *E. bicolor* tadpoles that were infected by a single leech. The ectoparasites anchor the posterior sucker on the host tadpole during the blood feeding. Conclusions: Even isolated reports of ecological interactions are important for understanding ecological communities and the impacts of parasites and predators on tadpoles' populations. Additionally, these interactions can help to understand the ecology behaviour of the organisms." (Authors) In one case *Coryphaeschna* sp. was found to prey on *Elachistocleis bicolor*.] Address: Gambale, Priscilla, Depto de Biol., Univ. Estadual de Maringá, Programa de Pós-Graduação em Ecologia de Ambientes Aquáticos Continentais, Nupélia - Núcleo de Pesquisas em Limnologia, Ictiologia e Aqüicultura - Bloco G-90, Av. Colombo, 5790, CEP 87020-900 Maringá, PR Brazil. Email: priscilagambale@gmail.com

14494. Garrison, R.W. (2014): Review: Pfau, Hans Klaus, 2011, Functional Morphology and Evolution of the Male Secondary Copulatory Apparatus of the Anisoptera (Insecta: Odonata). *Zoologica* 156: 103 pages, 65 figures; ISBN 978-3-510-55043-2. Paperback. Price: 118.00 € (US\$147.57). Available from: Schweizerbart Science Publishers (Nägele u. Obermiller), Johannesstr. 3 A, 70176 Stuttgart, Germany. www.schweizerbart.de. Pan-Pacific Entomologist 90(4): 32-33. (in English) [review] Address: Garrison, R.W., Plant Pest Diagnostics Branch, California Department of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA

14495. Graf, R. (2014): Rohrkolbenanbau - eine Chance für die Artenvielfalt?. *Orn. Beob.* 111(2): 93-106. (in German, with English summary) ["Cattail *Typha* sp. is a productive marsh plant which has been traditionally used for various purposes. Recently, additional usages of this plant have been developed, particularly regarding energy recovery. Therefore, a 1-hectare Cattail trial plot was established adjacent to a nature reserve in Central Switzerland (Wauwilermoos, Canton of Lucerne) in 2007. The plot is flooded every year to a height of 20-60 cm from April to the end of August and drained over winter. Since Cattail fields are morphologically very similar to natural marshes, a two-year monitoring programme was started to investigate how such fields were used by water and swamp-dwelling bird species. Supplementary data were drawn from the national wetland breeding bird census as well as the rare breeding and visiting bird census of the Swiss Ornithological Institute. It was shown that various bird species benefitted during migration time, primarily smaller herons, Common Teal, Garganey and rail species. Marked differences were observed in the species spectrum between the first and second year of the study, as Cattail had grown ample rapidly and the vegetation thus changed. The Cattail field was used by 11 marsh and water bird species, for eight of them (Mallard, Little Grebe, Spotted

Crake, Common Moorhen, Coot, Reed Warbler, Marsh Warbler and Reed Bunting) "Probable Breeding" was noted. Surveys on further organism groups revealed positive effects for dragonflies, water frogs and the Grass Snake. Cattail can be cultivated on sites which are prone to re-wetting (mostly former moorland) where it is an interesting crop to grow as it combines characteristics of high-quality biodiversity promoting areas with those of agricultural production." (Author) Also Odonata were monitored. 31 species were recorded between 2007 and 2008, including regionally rare species as *Anax ephippiger* and *Orthetrum albistylum*.] Address: Graf, R., Schweizerische Vogelwarte, Seerose 1, 6204 Sempach, Switzerland. E-Mail: roman.graf@vogelwarte.ch

14496. Grand, D.; Marinov, M.; Cook, C.; Jourdan, H.; Rouys, S.; Theuerkauf, J. (2014): Identification key to adult Odonata of New Caledonia and Wallis and Futuna. *Odonatologica* 43(3/4): 247-277. (in English) ["We present a dichotomous key to identify adults of all presently described Odonata of New Caledonia including the Loyalty Islands (Melanesia) and Wallis and Futuna (Western Polynesia). The key covers a total of 58 species of which approximately 50 % are regionally endemic, while others are more widespread species inhabiting neighbouring archipelagos such as Vanuatu and Fiji, and even more distant regions." (Authors)] Address: Marinov, M., Plant Health & Environment Laboratory, Investigation and Diagnostic Centres and Response, Ministry for Primary Industries, 14 Sir William Pickering Drive, Burnside, PO Box 14018, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz

14497. Green, D.J. (2014): Dispersal, population genetics and taxonomy of selected aquatic macroinvertebrates in ephemeral river systems. M.Sc. thesis, School of Biological Sciences, Faculty of Science and Engineering, Flinders University, Adelaide, South Australia: 182 pp. (in English) ["One of the challenges to the study macroinvertebrates has always been identification. We looked at two morphologically very similar damselflies, *Ischnura heterosticta* and *Austroagrion watsoni* to investigate the benefit of genetic techniques in species identification (chapter 5). The mitochondrial sequence showed the rate of incorrect morphological identification at approximately 50%. This highlights both the need for accurate identification as well as the power of genetic techniques for identifying morphologically similar species." (Author)] Address: not stated

14498. Greenwalt, D.E.; Bechly, G. (2014): A re-description of the fossil damselfly *Eolestes syntheticus* Cockerell, 1940 (Odonata: Zygoptera: Eolestidae n. fam.) with description of new taxa from the Eocene of North America. *Zootaxa* 3887(2): 138-156. (in English) ["The enigmatic species *Eolestes syntheticus* Cockerell, 1940, from the Early Eocene of North America, previously attributed to the lestoid family Synlestidae, is re-examined in light of the discovery of new material from the Middle Eocene

Kishenehn Formation in northwestern Montana. E. syntheticus and a new species, *Eolestes ramosus* sp. n., are attributed to a new family Eolestidae fam. n. In addition, a new genus and species very closely related to Lestidae but assigned to family unknown, *Lutetialestes uniformis* sp. n., is described from the Kishenehn Formation." (Authors)] Address: Bechly, G., Staatliches Museum für Naturkunde, Abt. Paläontologie, Rosenstein 1, 70191 Stuttgart, Germany. E-mail: guenter.bechly@smns-bw.de

14499. Guillermo-Ferreira, R.; Neiss, U.G.; Hamada, N.; Bispo, P.C. (2014): Behavior of the Amazonian damselfly *Chalcopteryx scintillans* McLachlan (Zygoptera: Polythoridae) and comments on its morphological distinction from *C. rutilans* (Rambur). *International Journal of Odonatology* 17(4): 251-258. (in English) ["Polythorid damselflies are Neotropical stream dwellers, whose behaviour has rarely been recorded. Here we describe the territorial and courtship behaviour of *Chalcopteryx scintillans* McLachlan, an Amazonian damselfly with shiny copper-coloured hind wings. Territorial behaviour consists of aerial contests, when males engage in threat displays and mutual pursuits in ascending and rocking flights. During courtship, males hold their coppery hind wings still while hovering with their forewings, showing the hind wings to females, which hover in front of the male in response. After copulation, the male exhibits the courtship flight again by hovering over the oviposition resource (i.e. fallen tree trunk) on the stream. The females oviposit on the trunk while the males guard them by perching near and hovering around them constantly. We also present behavioural notes on reproductive and oviposition behaviour, and comments on the differentiation between *C. scintillans* and *C. rutilans* (Rambur)."] (Authors)] Address: Guillermo-Ferreira, R., Fac. de Ciências Biológicas e Ambientais, Univ. Federal da Grande Dourados/UFGD, Dourados, Mato Grosso do Sul, Brazil. E-mail: rhainerguillermo@gmail.com

14500. Hall, A.M.; McCauley, S.J.; Fortin, M.-J. (2014): Recreational boating, landscape configuration, and local habitat structure as drivers of odonate community composition in an island setting. *Insect Conservation and Diversity* 8(1): 31-42. (in English) ["1. Anthropogenic impacts to aquatic and terrestrial ecosystems are ubiquitous. Among these, local impacts to freshwater coastal wetlands from recreational boating are potentially severe. We determine the relative contribution of natural factors (local habitat structure and landscape configuration) and estimated impact from anthropogenic factors (i.e. pressure from recreational boating) to odonate community composition. 2. Odonate adults and exuviae were sampled from 17 islands within the 30 000 islands of the Georgian Bay Region of Lake Huron (Ontario, Canada). These islands experience a gradient of boating pressure from four marinas. The magnitude of impacts due to anthropogenic factors was estimated by marina dock space, proximity to marked boating channels, and proximity to a major highway. 3. Redundancy analyses and variance partitioning were utilised to quantify the relative influence of local habitat structure,

landscape configuration, and anthropogenic pressures on the distribution of 18 odonate species. 4. Our results show that local habitat structure, landscape configuration, and boating pressures influence odonate community composition. Overall variance in the species composition explained was 36.5% for adults (25.3% landscape configuration and habitat structure, 6.0% boating pressure, 5.2% shared) and 21.9% for exuviae (13.2% landscape configuration and habitat structure, 6.9% boating pressure, 1.8% shared). We found that communities of adults and larvae (sampled as exuviae) are influenced by different factors. 5. Overall, we find evidence that odonate community composition is affected by boating pressures. This stresses the need to consider not only global-scale human disturbances in conservation planning but also localised effects which differentially impact major life stages." (Authors)] Address: Hall, A.M., Dept of Ecology and Evolutionary Biology, University of Toronto, 25 Harbord St, Toronto, ON, Canada M5S3G5. E-mail: aarohall@gmail.com

14501. Henn, M.; Nichols, H.; Zhang, Y.; Bonner, T.H. (2014): Effect of artificial light on the drift of aquatic insects in urban central Texas streams. *Journal of Freshwater Ecology* 29(3): 307-318. (in English) ["Light pollution can reduce night time drift of larval aquatic insects in urban streams by disrupting their circadian rhythms. Previous studies on larval insect drift show that disruption in drift leads to changes in reproduction as well as intraspecific and interspecific interactions. The purpose of this study was to conduct a preliminary investigation into the effects of extreme artificial light on insect drift in urbanized, high clarity spring systems of the karst Edwards Plateau, TX. We quantified taxa richness, diversity, and abundance in aquatic insect night time drift under two treatments (ambient night time light and artificial light addition) and among five streams using a paired design. Richness and diversity of drifting aquatic insects were similar between treatments but abundance was 37% less in the light addition treatment than that of the control. Effects of light addition on mean abundance was more notable in large streams with a 58% decrease in Simuliidae (compared to that of the control) and 51% decrease in Baetidae. Reduced drift from light addition suggests the potential of artificial lighting disrupting insect drift and consequently community structure. Results of this experiment support a growing body of knowledge on how urbanized systems influence stream communities." (Authors) Coenagrionidae] Address: Henn, Monika, Dept of Biology/Aquatic Station, Texas State University, San Marcos, TX, USA

14502. Henry, J.R.; Harrison, J.F. (2014): Body size effects on the oxygen-sensitivity of dragonfly flight. *Journal of Experimental Biology* 217: 3447-3456. (in English) ["One hypothesis for the small size of insects relative to vertebrates, and the existence of giant fossil insects, is that atmospheric oxygen levels constrain insect body sizes because oxygen delivery is more challenging in larger insects. This study tested this hypothesis in dragonflies by measuring the oxygen sensitivity of flight metabolic

rates and behavior during hovering for 11 species of dragonflies (*Aeshna multicolor*, *Anax junius*, *Libellula comanche*, *L. luctuosa*, *L. saturata*, *Macrodiplax balteata*, *Pachydiplax longipennis*, *Pantala flavescens*, *P. hymenaea*, *Tramea lacerrata*, *T. onusta*) that ranged in mass by an order of magnitude. We measured flight times and flight metabolic rates in seven oxygen concentrations ranging from 30% to 2.5% to assess the sensitivity of their flight to atmospheric oxygen. We also assessed the oxygen sensitivity of flight in low-density air (nitrogen replaced with helium) in order to increase the metabolic demands of hovering flight. Lowered atmospheric densities did induce higher flight metabolic rates. Flight behavior was more sensitive to decreasing oxygen levels than flight metabolic rate. The oxygen sensitivity of flight metabolic rates and behaviors were not correlated with body size, indicating that larger insects are able to maintain an oxygen supply-to-demand balance even during flight." (Authors)] Address: Henry, Joanna, Arizona State Univ., PO Box 874701, Tempe, AZ 85287, USA. E-mail: joanna.henry@asu.edu

14503. Honcu, M. (2014): Records of the dragonfly *Leucorrhinia caudalis* (Charpentier, 1840), (Odonata, Libellulidae) of Česká Lípa Region (Czech Republik). *Bezdez* 23: 213-232. (in Czech, with English and German summaries) ["This paper discusses the records of *L. caudalis* in the water reservoirs at the airport near the former military training area Ralsko, Česká Lípa region. One male was detected on 20 May 2012 [...]. This record represents the fourth known locality in the Czech Republic and was made 50 years after the first detection of this species in Czech Republic. At present it represents the single recent locality in the Czech Republic because it repeatedly had not been detected in its historic localities. Therefore, in the Red list of Invertebrates of the Czech Republic by Farkac, Král & Škorpík (2005) it was considered as extinct. By further investigations it was proved that the population of *L. caudalis* in this locality is viable and evidently increases in number. The locality is endangered by old environmental burdens, succession, overgrowing and overshadowing, and, last not least, by different activities of sporting character which newly are spreading out in the surroundings of the former Hradcany airport. For the protection of this species and of the whole biocenosis the State Nature Protection Board is preparing a protection of the area with the water reservoirs by adding it to the already existing Nature Reserve Hradcanské rybníky (Ponds of Hradcany)." (Author)] Address: Honcu, M., Vlastivedné muzeum a galerie v České Lípě, náměstí Osvobození 297, 470 01 Česká Lípa; e-mail: honcu@muzeumcl.cz

14504. Hong, Z.-C. (2014): A fauna investigation of Odonata in the Jinpo mountains of Chongqing. *Journal of Southwest University (Natural Science Edition)* 36(7): 33-38. (in Chinese, with English summary) [Between 2009 and 2013, in Chongqing Jinpo National Nature Reserve (Nanchuan, Chongqing, China), 50 odonate species, belonging to 27 families have been recorded. Six species are new additions to the regional fauna. 40% (n=20) are

Palaearctic-Oriental, 34 % (n=17) species are Oriental, and 24% (N=13) are cosmopolitan distributed species.] Address: Hong, Z.-c., The Natural History Museum of Chongqing. Chongqing 400700, China

14505. Huang, S.-c. (2014): Colour vision of *Ischnura heterosticta* (Insecta: Odonata): Role in sexual selection, communication and visual plasticity. PhD Thesis, Queensland Brain Institute, University of Queensland. doi:10.142-64/uql.2014.469. 202 pp. (in English) ["Sensory systems are important for any life task of an animal. Vision, and colour vision in particular, is essential for visual-based insects, such as Odonata (damselflies and dragonflies), many of which display colour patterns on their bodies. Numerous behavioural studies suggest that the diverse colour patterns function as a means for intersexual, intrasexual, interspecific, or intraspecific recognition and play a role in sexual selection, particularly in ischnuran damselflies that have sex-limited polymorphism. However, to date there are no comprehensive studies linking behavioural to electrophysiological evidence to support the role of colour patterns and colour vision in mate choice in this group of insects. In my Ph.D. thesis, I investigated the function of body colouration and colour vision in sexual selection and communication of the Australian polymorphic damselfly, *Ischnura heterosticta*, and examined the mechanisms underlying its colour vision and colour discrimination ability. In an observational study (Chapter 2), I surveyed *I. heterosticta* reproductive behaviours and daily activity patterns in the field, providing the first detailed account of their colour morphs and behavioural biology. Andromorph females are blue like males, and gynomorph females have colour morphs in green, intermediate, and grey. Mating pairs, usually with gynomorphs, are formed after dawn and mating can last up to 3-4 hours. Oviposition occurs in the days after mating, and ovipositing females are subjected to aggressive male harassment, which varies with female colouration. These data provided the biological foundation regarding colour-based sexual selection in *I. heterosticta* investigated in the following chapters. In the next set of experiments (Chapter 3), I discovered a unique irreversible ontogenetic colour change in females of *I. heterosticta*: blue andromorphs are sexually immature individuals that emerge from nymphs. After 4 to 7 days, they turn into green-grey gynomorphs to signal their sexual maturity and advertise readiness to mate. Gynomorphs are the preferred mating partners, which suggests that blue andromorphs avoid unnecessary long mating during sexual immaturity through their male-mimicking colouration. This discovery provided the first indication that colour plays a key role in mate choice and that female polymorphism in *I. heterosticta* may be maintained via colour signals. In the next study (Chapter 4), I tested whether and how male mating preference was associated with colour cues by manipulating female body colours artificially. The outcomes strongly suggest that female body colouration is the key visual signal for mate choice in *I. heterosticta*. Males always preferred gynomorph females irrespective of female ratio or prior mating experience. Only under low

ambient light males of *I. heterosticta* occasionally misidentified blue andromorphs as mating partners, likely as consequence of the insufficient light. This finding provided the behavioural indication that ischnuran damselflies rely on colour vision for mate recognition. The next study (Chapter 5) examined the morphological structure of the compound eyes of *I. heterosticta* using histological approaches. The diameter of an ommatidium is about 10 μm , and its length can be up to 400 μm depending on the area of the retina. Several retinula cells were identified distributed along the ommatidium. This provided essential background information on the visual anatomy in this species, and the anatomical indication that *I. heterosticta* may have colour vision, which was investigated in the next chapter. I used electrophysiological approaches (Chapter 6) to investigate the spectral sensitivities of the visual system of *I. heterosticta*. The results showed that they have trichromatic vision, being able to detect UV, blue and green light. Contrast calculations confirmed that their colour discrimination ability enables them to distinguish the spectral differences of individual female morphs. These results were congruent with the behavioural findings from previous chapters, showing that *I. heterosticta* use colour signals for mate choice in context of sexual selection. The final study (Chapter 7) examined the molecular basis of colour vision in *I. heterosticta*, and investigated whether it is plastic and dependent on light experience. I identified three types of opsin genes in *I. heterosticta*, corresponding to three wavelengths of light (UV, blue and green), confirming that this species is trichromatic. I found that during development opsins are differentially expressed in nymphs (aquatic) and adults (terrestrial/aerial), and opsin expression also changes when individuals are reared or kept under different ambient light conditions. These findings were further supported by electrophysiological experiments, showing an equivalent change in response. This demonstrates that colour vision in *I. heterosticta* is plastic and that ambient light induces visual plasticity. This plasticity facilitates adaptation to the changing visual environments during development, and ensures that adults can detect the crucial colour cues that are key for mate choice and reproduction. This thesis is the first comprehensive study examining the functional role of colour vision and body colouration in a polymorphic ischnuran damselfly. This body of work also contributes important new insights into the mechanisms underlying sexual selection, evolution and maintenance of female-limited polymorphism in *I. heterosticta*." (Author)] Address: Huang; S.-C., Queensland Brain Institute, University of Queensland, Brisbane QLD 4072, Australia. E-mail: shaochang.huang@uqconnect.edu.au

14506. Hupaló, K.; Tończyk, G. (2014): New Data on the Range Extension of *Trithemis arteriosa* (Burmeister, 1839) (Odonata) in Turkey. *Acta zool. bulg.* 66(4): 581-582. (in English) ["*T. arteriosa* is one of the most widespread and abundant dragonfly species in Africa, which dominates in open and temporary freshwater habitats. This species is known for its migratory abilities and has expanded its

range to Madagascar and Eurasia, reaching to southern Anatolia. Since the first record of *T. arteriosa* in Turkey in 1988, the species has been recorded in other locations reaching as far as Gözcü in the west. This paper provides new data on the range extension of *T. arteriosa* in Belek area, which confirm its further expansion towards north-western part of the Mediterranean coast." (Authors)] Address: Hupaló, K., Department of Invertebrate Zoology and Hydrobiology, University of Lodz, 90-237, Banacha 12/16, 90-237 Lodz, Poland. E-mail: hrupeq@gazeta.pl

14507. Ichikawa, Y.; Watanabe, M. (2014): Changes in the number of eggs loaded in *Pantala flavescens* females with age from mass flights (Odonata: Libellulidae). *Zoological Science* 31(11): 721-724. (in English) ["The wandering glider dragonfly *Pantala flavescens* migrates to Japan every spring, where the population increases until autumn, in which mass flights often occur, followed by death in the winter. There have been no reports to date on the maturation process of this species throughout its lifespan in Japan. We collected females from mass flights when the flight height was low, and classified them into seven age stages by examining their wing condition. Very few females of the older stage were collected from the mass flights. The wing condition corresponded with the change in body color and with the egg production process in the ovaries. While pre-reproductive-stage females did not release eggs when treated with our artificial oviposition technique, each reproductive-stage female released about 640 eggs. Nearly all eggs released were fertilized. The ovaries developed with the stage, and reproductive-stage females had about 1100 ovarioles. The estimated maximum fecundity was about 29,000 eggs. The lifetime number of eggs laid of *P. flavescens* should be revealed by dissection." (Authors)] Address: Watanabe, M., College of Biol. Sci., Univ. of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

14508. Inamuro, T.; Minami, K.; Suzuki, K. (2014): Free flight simulations of a dragonfly-like flapping wing-body model by the immersed boundary-lattice Boltzmann method (Abstract: L6.00010). *Bulletin of the American Physical Society*, 67th Annual Meeting of the APS Division of Fluid Dynamics, Volume 59, Number 18, Sunday–Tuesday, November 23–25, 2014; San Francisco, California: (in English) [Verbatim: Free flights of the dragonfly-like flapping wing-body model are numerically investigated by using the immersed boundary-lattice Boltzmann method (IB-LBM). First, we simulate free flights of the model without the pitching rotation for various values of the phase lag angle ϕ between the forewing and the hindwing motions. We find that the wing-body model goes forward in spite of ϕ , and the model with $\phi = 0^\circ$ and 90° goes upward against gravity. The model with $\phi = 180^\circ$ goes almost horizontally, and the model with $\phi = 270^\circ$ goes downward. Secondly, we simulate free flights with the pitching rotation for various values of the phase lag angle ϕ . It is found that in spite of ϕ the wing-body model turns gradually in the nose-up direction and goes back and down as the pitching angle

Oc increases. That is, the wing-body model cannot make a stable forward flight without control. Finally, we show a way to control the pitching motion by changing the lead-lag angle $\gamma(t)$. We propose a simple proportional controller of $\gamma(t)$ which makes stable flights within $Oc = \pm 5^\circ$ and works well even for a large disturbance.] Address: not stated

14509. Jäckel, K.; Prinzhorn, S.; Falk, J., Deichmann, A.; Willigalla, C.; Koch, K. (2014): Nächtliche Ruheplätze der Odonata, insbesondere der Arten *Ischnura elegans* und *Coenagrion pulchellum* (Odonata). *Libellula* 33(1/2): 113-126. (in German, with English summary) ["Roosting habitats of Odonata, in particular of *Ischnura elegans* and *Coenagrion pulchellum* (Odonata) – Odonates use different habitats for maturing, mating, foraging, and roosting. There is not much knowledge about the odonates' choice of habitat for roosting at night. In our study we investigated two potential nocturnal roosting sites. We investigated whether individuals were clustering for roosting and whether there existed any preferences in the choice of the roosting site depending on the odonates' gender. Locations of our study were an assemblage of artificial ponds at the Johannes Gutenberg-University Mainz and a lake in the nature reserve "Eich-Gimbsheimer Altrhein", situated between Mainz and Worms. The investigation took place in June and July 2013. In the night, we found remarkably less species of Anisoptera and Zygoptera than during the day. Compared to Anisoptera, Zygoptera preferred to roost in lower positions. At both studied sites we mainly found a lot of individuals of *Ischnura elegans* and *Coenagrion pulchellum*. Both species favoured roosting on the top of the substratum at the waters' edge and on a marsh area next to the water. It seemed that male and female odonates did not choose the roosting position on the substratum in an obviously different way. 34-40 % of the odonate species found roosted in clusters. In both species the sex ratio within the roosting aggregations was biased towards males. Among separately roosting individuals of *C. pulchellum* we found a larger number of males, whereas for *I. elegans* the sex ratio was balanced." (Authors)] Address: Willigalla Ökologische Gutachten, Am Großen Sand 22, 55124 Mainz, Germany. E-mail: info@willigalla.de

14510. Janssens, L.; Stoks, R. (2014): Reinforcing effects of non-pathogenic bacteria and predation risk: from physiology to life history. *Oecologia* 176(2): 323-332. (in English) ["The important ecological role of predation risk in shaping populations, communities and ecosystems is becoming increasingly clear. In this context, synergistic effects between predation risk and other natural stressors on prey organisms are gaining attention. Although non-pathogenic bacteria can be widespread in aquatic ecosystems, their role in mediating effects of predation risk has been ignored. We here address the hypothesis that non-pathogenic bacteria may reinforce the negative effects of predation risk in larvae of the damselfly *Coenagrion puella*. We found synergistic effects for all three life history variables studied: mortality increased, growth reductions

were magnified and bacterial load was higher when both non-lethal stressors were combined. The combined exposure to the bacterium and predation risk considerably impaired the two key antipredator mechanisms of the damselfly larvae: they no longer reduced their food intake under predation risk and showed a synergistic reduction in escape swimming speed. The reinforcing negative effects on the fitness-related traits could be explained by the observed synergistic effects on food intake, swimming muscle mass, immune function and oxidative damage. These are likely widespread consequences of energetic constraints and increased metabolic rates associated with the fight-or-flight response. We therefore hypothesize that the here documented synergistic interactions with non-pathogenic bacteria may be widespread. Our results highlight the ignored ecological role of non-pathogenic bacteria in reinforcing the negative effects of predation risk on prey organisms." (Authors)] Address: Janssens, Lizanne, Laboratory of Aquatic Ecology, Evolution and Conservation, University of Leuven, Charles Deberiotstraat 32, 3000, Louvain, Belgium. E-mail: lizanne.janssens@bio.kuleuven.be

14511. Jarzembowski, P.; Matraj, M. (2014): First records of the protected dragonfly (Odonata) – *Sympecma paedisca* (Brauer, 1877) in the Lower Silesia. *Wiad. entomol.* 33(1): 68-69. (in Odonata, *Sympecma paedisca*, faunistics, Lower Silesia, protected species) [Poland: 51°32'17" N 17°31'25"E, 6 VIII 2007, 51°31'09" N 17°06'58"E, 5 VIII 2007, 51°28'09" N, 17°08'20"E, 15 VIII 2007.] Address: not stated

14512. Kalkman, V.J.; Orr, A.G. (2014): Distribution and identification of *Rhodothemis* in the eastern part of the Indo-Australian Archipelago (Odonata: Libellulidae). *Faunistic Studies in South-East Asian and Pacific Island Odonata* 8: 1-9. (in English) ["The small libellulid genus *Rhodothemis* is restricted to Asia and Australia. Two of the four included species were described relatively recently by Lohmann (1984) but much previously documented material was never re-identified and the distribution of the species in the Indo-Australian Archipelago remained poorly known. All material available in the Naturalis Biodiversity Center (RMNH) from the eastern part of the Indo-Australian Archipelago was studied and is here brought on record. Key characters are illustrated and SEM images of the genital ligula are presented." (Authors)] Address: Kalkman, V.J., European Invertebrate Survey - Nederland, p/a Nationaal Natuurhistorisch Museum - naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: kalkman@naturalis.nl

14513. Karolinskiy, E.A. (2014): Dragonflies (Insecta: Odonata) of the National Nature Park "Dvorichanskyi". *The Journal of V.N. Karazin Kharkiv National University. Series: biology* Issue 19, 11097, 2014: 26-29. (in Russian, with Ukrainian and English summaries) [23 odonate species were recorded at the National Nature Park "Dvorichanskyi" (Ukraine) during 2009–2013.] Address: Karolinskiy,

E.A., Kharkiv National University, VN Karazin, Kharkov, Ukraine. E-mail: kharkov.but@gmail.com

14514. Karube, H.; Sano, S.; Nagasaki, K.; Nagasaki, M.; Futahashi, R. (2014): Distributional expansion of alien species *Ceriagrion auranticum ryukyuanum* in southern Kanto region and trial of extermination. *Aeschna* 50: 139-143. (in Japanese, with English summary) ["*Ceriagrion auranticum ryukyuanum* is recently recorded in southern Kanto region and the distribution is expanded around Yokohama area. We reviewed recent record in Japan and judged by molecular study, some of Yokohama population doesn't belong to Japanese population. It suggested that the introduction of some of Yokohama population was accompanied by water plant from foreign countries. Trial of eradication program is effective in low density management of this alien species." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

14515. Kawamura, Y.; Naka, H.; Sunami, Y.; Hashimoto, H. (2014): Effects of micro spike structure on flow around plate. The 3rd International Conference on Design Engineering and Science, ICDES 2014 Pilsen, Czech Republic, September 1-3, 2014: 96-100. (in English) ["In recent years, biomimetics has been attracting attention. Biomimetics is research method to apply function principle of organism. Surface microstructure plays an effective role also in either case. On the other hand, dragonfly which is kind of flight insect has some microstructure on their wings. It is thought that these microstructure effective in flight of dragonfly. Among them, surface micro spikes are very unique structure. Therefore, in this study experiment and CFD analysis was performed, with the aim to clarify the effect of this microstructure. And we compared the result of CFD analysis with the experimental result to examine mechanism of them. As a result, we confirmed that the drag coefficient was reduced because the generation of a vortex on the plate behind was suppressed by the microspikes." (Authors) The spines on dragonfly wings reduce the drag coefficient by reducing the effects of vortex.] Address: Sunami, Y., Dept of Mechanical Engineering, Tokai Univ., 4-1-1, Kitakaname, Hiratsuka City, Kanagawa Prefecture 259-1292, Japan. E-mail: sunami@tokai-u.jp

14516. Kiany, M.; Sadeghi, S. (2014): A preliminary study on Odonata fauna of Yazd province. The 17th National & 5th International Iranian Biology Conference, At Shahid Bahonar University of Kerman, Kerman, Iran. 2 pp. (in Farsi and English summaries) [*Platycnemis dealbata*, *Ischnura intermedia*, *Paragomphus lineatus* and *Onychogomphus lefebvrei*. *Crocothemis erythraea*, *Orthetrum chrysostigma* and *Trithemis festiva* are reported from Yazd, Mehriz and Taft regions in Yazd province (Iran). *Ischnura intermedia* is a new addition to the Iranian odonate fauna.] Address: Kiany, M., Biology Department, Shiraz University, Shiraz, Iran, E-mail: mohsen.kiany1@gmail.com

14517. Kijowski, A.M. (2014): Habitat use and movement patterns in larvae of the endangered Hine's emerald dragonfly (*Somatochlora hineana*, Williamson). M.Sc. thesis, University of South Dakota: 66 pp. (in English) ["Aquatic invertebrates living within wetlands must be able to respond to annual, seasonal, or even daily environmental fluctuations. In the spring, aquatic invertebrates may move to exploit available newly flooded areas. If such movement occurs, they must be able to follow the retreating water or have some other mechanism to avoid desiccation. The larvae of *Somatochlora hineana* live in flowing channels in seasonally flooded wetlands; however, it is unclear whether they use the wetland more extensively. To investigate the potential seasonal and yearly changes in *S. hineana* distribution and abundance in response to environmental variation, data from field studies from 2011-2012 were analyzed. There were 210 *S. hineana* larvae collected from the Mud Lake North Wildlife Refuge Area in Door County, Wisconsin from within and outside of crayfish burrows during the spring and summer. The mean densities of *S. hineana* larvae outside of burrows varied between May and June 2012, but did not vary across a habitat gradient. There were no significant changes in mean *S. hineana* densities in burrow and benthic samples between June 2011 and June 2012. In order to gain a better understanding of how *S. hineana* respond to environmental variation, their movement patterns in response to fluctuating water levels, position within the habitat, and increased habitat connectivity were also examined. Larvae were collected and tagged in a series of marking studies in 2011 and 2012 at the Mud Lake North Wildlife Refuge. The average total distance (\pm sd) moved by *S. hineana* larvae for both summers was 1.15 ± 2.20 m/day with the longest net displacement being 11m/day. Larvae were observed moving between off-channel and within channel habitats, and were also caught in drift nets during periods of inundation, indicating increased habitat connectivity plays a role in the movement of these larvae." (Author)] Address: Kijowski, Ashley M. c/o Daniel Soluk, Professor, Biology, College of Arts & Sciences, UCL Churchill-Haines Labs 170C, USA. Email: Daniel.Soluk@usd.edu

14518. Kim, D.G.; Lee, C.Y.; Choi, L.J.; Kang, H.J.; Baek, M.J.; Kim, J.G.; Bae, Y.J. (2014): Drought effects on the colonization of benthic macroinvertebrate communities in the early successional phases in experimental mesocosm wetlands. *Journal of Freshwater Ecology* 29(4): 507-524. (in English) ["We investigated the drought effects on the colonization rate and pattern of benthic macroinvertebrate communities in newly created mesocosm wetlands in the central Korean Peninsula, from June 2011 to June 2013. The comparison was made between the initial colonization after mesocosm construction (pre-drought) and the recolonization after a drought event (post-drought) with a drought period of 50 days between them. In addition, we categorized communities according to their biological traits in relation to drought. Our results showed that aquatic vegetation abundance and covering degree were higher in post-

drought than in pre-drought, thereby influencing rapid colonization. Drought-resistant benthic macroinvertebrates colonized rapidly in post-drought; consequently, the colonization speed was 2.5-fold higher in post-drought than in pre-drought. We classified the benthic macroinvertebrate taxa into three groups: (1) a resistant group which generally emerged after the initial colonization period (e.g., Mollusca, Turbellaria, and Oligochaeta); (2) a sensitive group with diverse life history strategies and biological traits such as active migration or population decline after drought disturbance (e.g., Diptera: Chironominae, Odonata: Orthetrum, Coleoptera: Agabus and Rhantus); and (3) a seasonal group, which emerged only during certain periods and were not markedly influenced by drought (e.g., Ephemeroptera: Cloeon, Diptera: Culicidae, Odonata: Zygoptera and Pantala). Our findings elucidated the effects of drought on benthic macroinvertebrate communities in wetlands by using a mesocosm experiment." (Authors)] Address: Dept of Life Science, Graduate School, College of Life Sciences and Biotechnology, Korea Univ., Seoul 136-713, Korea

14519. Kiss, O.; Elek, Z.; Moskát, C. (2014): High breeding performance of European Rollers *Coracias garrulus* in heterogeneous farmland habitat in southern Hungary. *Bird Study* 61(4): 496-505. (in English) ["Capsule: Rollers showed slightly higher breeding performance in farmland mosaics than in natural grasslands in southern Hungary, where both habitats were supplied with nest-boxes. Aim: To establish which factors affect Rollers' breeding success in agricultural and their more traditional grassland habitats. Methods: Rollers' reproductive success in farmland mosaics and grassland habitats were compared. Laying date, clutch size, feeding rate, as well as prey abundance and diversity, as estimated by sweep netting and pitfall trapping, were evaluated. Their effects on breeding performance were analysed by generalized linear models. Results: In the agricultural habitat Rollers showed an even higher reproductive output than in their traditional habitat of natural grassland. Prey composition showed differences between the two habitats, with the lower abundance of orthopterans in farmland mosaics being substituted by the higher abundance of coleopterans and the diversity of arthropods (Orthoptera, Coleoptera, Heteroptera, Arachnida, Hymenoptera, Lepidoptera, Diptera, Homoptera, Mantidae, Myrmeleonidae and Odonata). Conclusion: Rollers can reproduce well where good quality resources are available, even outside of their typical habitat, where nest-box erection schemes may benefit this threatened species." (Authors)] Address: Kiss, O. Department of Ecology, Univ. of Szeged, Közép fasor 52., Szeged, Hungary

14520. Klonowska-Olejnik, M.; Buczynski, P. (2014): Disjunctive population of *Cordulegaster bidentata* SÉLYS, 1843 (Odonata: Cordulegastridae) in the Wisnickie Foot-hills (Southern Poland). *Wiad. entomol.* 33(1): 5-14. (in Polish, with English summary) ["The new site of *C. bidentata* in Kieblo Brzezinskie near Bochnia (49°56'N, 20°30'E, UTM: DA63) is given. In the years 2011-2012 numerous larvae were found and imagines were observed.

The site has a disjunctive character and is one of the lowest located autochthonic occurrence sites in Poland (260-270 m a.s.l.)." (Authors)] Address: Klonowska-Olejnik, Małgorzata, 1 Friedleina 33/19, 30-009 Kraków, Poland. E-mail: uxklonow@cyf-kr.edu.pl

14521. Koch, L.; Schuster, J. D.; Kordges, T.; Bußmann, M.; Kronshage, A. (2014): Vorkommen der beiden Quelljungfer-Arten *Cordulegaster bidentata* und *Cordulegaster boltonii* (Odonata: Cordulegastridae) im Ennepe-Ruhr-Kreis (NRW). *Jahresberichte des Naturwissenschaftlichen Vereins Wuppertal* 63: 145-182. (in German, with English summary) ["For the Ennepe-Ruhr district (North Rhine-Westphalia, Germany) the known habitats of *Cordulegaster bidentata* and *C. boltonii* are described. The observations are dated in the period from 1991 up to 2014. The occurrence in the surroundings of fourteen different brooks shows that the two species colonize the Ennepe-Ruhr area from the north (Herdecke) to the south (Ennepetal)." (Authors)] Address: Koch, L., Heinrich-Heine-Str. 5, 58256 Ennepetal, Germany. E-Mail: l-koch@t-online.de

14522. Kofler, I.M. (2014): Phenotypic plasticity of *Rana dalmatina* larvae: ontogenetic variation in anti-predator responses. MSc. thesis, Zoologie, Universität Wien: 37 pp. (in English, with German summary) ["Although anuran larvae are well studied model organisms for phenotypic plasticity in general, little is known about ontogenetic variation in predator induced plastic responses. To conduct an exploratory study on this topic, we performed an outdoor mesocosm experiment, confronting *Rana dalmatina* tadpoles with the presence of dragonfly predators (Aeshnidae) at five different times in their ontogenetic development. The tadpoles which experienced predator presence for the first time one week after the beginning of the experiment (approximately 9-10 days after hatching) showed the strongest plastic morphological responses, as well as retarded growth and delayed time of metamorphosis. The morphological responses were mainly deeper tail fins and a changed body-to-tail-length ratio. As the treatment which experienced predator contact in the second week of the experiment significantly differed from all other treatments and no linear relationship between time spent with predator and plastic responses was found, we can assume that developmental windows and developmental constraints are underlying our findings." (Author)] Address: not stated

14523. Koparde, P.; Mhaske, P.; Patwardhan, A. (2014): New records of dragonflies & damselflies (Insecta: Odonata) from Western Ghats of Maharashtra, India. *Journal of threatened taxa* 6(5): 5744-5754. (in English) ["Odonates were surveyed across 10 localities from Western Ghats of Maharashtra State, India during 2011-2013. We recorded 64 species belonging to 40 genera and 12 families. Seven species are new records for the region, and four out of them (*Heliogomphus promelas*, *Onychogomphus nilgiriensis*, *Protosticta hearseyi*, *Euphaea fraseri*) are new records for Maharashtra State. In this paper, we discuss these species records and their micro-habitats,

and update previous knowledge on distribution of odonates." (Authors)] Address: Koparde, P., Department of Biodiversity, MES's Abasaheb Garware College, Karve Road, Pune, Maharashtra 411004, India

14524. Kosterin, O.E. (2014): Odonata briefly observed on the islands of Bali and Lombok, Lesser Sundas, Indonesia, in the late February 2014. International Dragonfly Fund - Report 74: 1-48. (in English) ["In the second half of February 2014, Odonata were searched for nine days on Bali and four days on Lombok, the western Lesser Sundas, Indonesia. One species, *Orthetrum chrysis* has been for the first time recorded for Bali and six species, *Nososticta emphylla*, *Idionyx murcia*, *Brachydiplax chalybea*, *Agrionoptera insignis*, *Neurothemis ramburii*, *Rhyothemis phyllis* have been for the first time recorded for Lombok. The previous literature concerning the two islands is analysed. To the moment, 55 Odonata species (3 unidentified) are known for Bali and 39 for Lombok, although the actual faunas of both islands are supposed to be equally rich, and further studies on Lombok are necessary. Odonata faunas of Bali and Lombok mirror each other in respect of high shares, 29 and 23%, of Odonata species ranging to the west and east of the two islands, respectively. Efficiency of Lombok Strait as a biogeographical boundary was estimated as high as 0.6, so Wallace Line is of importance for Odonata. Some diagnostic characters of *N. emphylla*, *N. ramburii*, *R. phyllis phyllis* and *Procordulia sambawana* and a taxonomical situation around *Prodasi-neura autumnalis* and *P. humeralis*, which is not justified biogeographically, are discussed. Short notes on habitats and assemblages of Odonata are added." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

14525. Kurita, T.; Aoyama, H.; Saitoh, S.; Shinzato, N.; Sawada, K.; Kuriwada, T.; Hironaka, K.; Inomata, N.; Yamahira, K.; Toda, M. (2014): Isolation and validation of eight microsatellite loci in *Ischnura senegalensis* by pyrosequencing a bead-enriched library. Applied Entomology and Zoology 49: 623-626. (in English) ["Eight microsatellite markers for the population genetics and evolutionary ecology of *I. senegalensis*, which shows body colour polymorphism in females, were developed using a streptavidin-bead enrichment library and pyrosequence by a next generation sequencer. The number of alleles per locus and effective number of alleles ranged from 3 to 11 and from 1.24 to 5.51, respectively. Observed and expected heterozygosities were 0.18–0.75 and 0.19–0.77, respectively. No linkage disequilibrium between loci was detected. One locus, *IsenAC75*, deviated significantly from the Hardy–Weinberg equilibrium, and the locus and additional two loci, *IsenAC40* and *IsenAC8*, were suspected for the presence of null alleles. Altogether, these eight microsatellite loci are considered to be useful for population genetic analyses because of the high polymorphic status and independency." (Authors)] Address: Kurita,

T., Natural History Museum and Institute, Chiba, 955-2 Aoba-cho, Chuo-ku, Chiba, 260-8682, Japan. E-mail: momofu_monticola@hotmail.co.jp

14526. Laltanpuii; Kumar, N.S.; Mathai, M.T. (2014): Molecular and phylogenetic analysis of the genus *Orthetrum* (Odonata: Anisoptera: Libellulidae) using mitochondrial CO1 gene. Science Vision 14(3): 152-157. (in English) ["Molecular phylogenetic relationships among members of the genus *Orthetrum* were examined using 403 bp of mitochondrial COI. The support for monophyly of the *Orthetrum* was found in some studies with unresolved complexity. The *O. sabina*, *O. serapia* and *O. trinacria* formed a separate and distinct group from the morphological analysis. We analysed the COI sequences of 22 species of *Orthetrum* using MEGA6. The p-distance between the members and the rate of transitional and transversal substitution was generated. The analysis indicated that the *Orthetrum* are monophyletic and *O. sabina* and *O. trinacria* formed a distinct and a separate group." (Authors)] Four of the five data sets and allegedly obtained from German specimens (*O. trinacria*, *O. julia falsum*, *O. chryso-stigma*, *O. brachiale*; genbank association no.: KC912286, KC912281, KC912262, KC912258) refer to African species which never have been found in Germany.] Address: Laltanpuii, Dept Zool., Madras Christian Coll., Tambaram, Chennai 600 059, India. E-mail: laltetei@yahoo.co.in

14527. Lin, S.-c.; Chen, Y.-f.; Shieh, S.-h.; Yang, P.-s. (2014): A revision of the status of *Psolodesmus mandarinus* based on molecular and morphological evidence (Odonata: Calopterygidae). Odonatologica 43(1/2): 51-66. (in English) ["To investigate the relationships between the three recognized taxa in the genus *Psolodesmus*, traditionally ranked as subspecies of *Psolodesmus mandarinus*: *mandarinus*, *dorothea* and *kuroiwa*, the nuclear internal transcribed spacers and ribosomal 5.8S gene, mitochondrial cytochrome c oxidase subunit I gene, and wing pterostigma data were analyzed. Both molecular and morphological evidence suggest the presence of two distinct species, viz. *P. mandarinus* in Taiwan and *P. kuroiwa* in the Japanese Yaeyama Islands. Based on our results we continue the traditional practice of dividing the Taiwanese populations of *P. mandarinus* into two geographical subspecies, *P. m. mandarinus* in northern Taiwan and *P. m. dorothea* in central and southern Taiwan." (Authors)] Address: Yang, P.-s., Dept of Entomology, National Taiwan Univ., Taipei 106, Taiwan. E-mail: psyang@ntu.edu.tw

14528. Lorenzo-Carballa, M.O.; Thompson, D.J.; Cordeiro-Rivera, A.; Watts, P.C. (2014): Next generation sequencing yields the complete mitochondrial genome of the scarce blue-tailed damselfly, *Ischnura pumilio*. Mitochondrial DNA 25(4): 247-248. (in English) ["We report the entire mitochondrial genome of *I. pumilio*, using next-generation sequencing on genomic DNA. A de novo assembly provided a single contiguous sequence of 15,250 bp that contained the A+T-rich region and all standard coding regions; gene configuration is similar to other odonates and

comprises 13 protein-coding genes, two rRNA genes (12 S and 16 S rRNA) and 22 tRNA genes. We found a unique intergenic spacer in *I. pumilio* and confirm that the intergenic spacer s5 likely represents a synapomorphy between Anisoptera and Zygoptera. This is the first mitogenome sequence obtained for a member of the Coenagrionidae and demonstrates how next-generation sequencing technology can obtain mtDNA genome sequences without prior sample processing or primer design." (Authors)] Address: Watts, P.C., Dept of Evolution, Ecology and Behaviour, Institute of Integrative Biology, University of Liverpool, BioSciences Building, Crown Street, Liverpool L69 7ZB, UK. E-mail: phill@liv.ac.uk

14529. Lorenzo-Carballa, M.O.; Watts, P.C.; Cordero-Rivera, A. (2014): Hybridization between *Calopteryx splendens* and *C. haemorrhoidalis* confirmed by morphological and genetic analyses. *International Journal of Odonatology* 17(2-3): 149-160. (in English) ["Hybridization between *C. haemorrhoidalis* and any of its congeners has not been reported until now. We observed spontaneous matings between male *C. splendens* and female *C. haemorrhoidalis* at a locality in Central Italy, together with some putative hybrid individuals that had a mixed phenotype. Here, we report the morphological and molecular characterization of five suspected hybrids collected from this population during 2001 (n = 1), 2012 (n = 2) and 2013 (n = 2). A discriminant analysis based on 13 morphological variables correctly separated both parental species (with 100% assignment success) and classified the hybrid from 2001 as *splendens* phenotype and those from 2012 and 2013 as *haemorrhoidalis*. Genotype data (microsatellite loci) was used to confirm the hybrid origin of these specimens, although there were differences between the individual from 2001 and those from 2012 and 2013; the 2001 individual had alleles that were present in both parent species, suggesting it is an F1 hybrid, but the individuals collected in 2012 and 2013 had private alleles at eight (out of 12) loci and only a small portion of the genome in common with *C. splendens*, which suggests that introgression is occurring in this population. Similarities in mitochondrial DNA sequences indicate that the 2001 hybrid and the 2012–2013 hybrids have *splendens* and *haemorrhoidalis* maternal origins respectively, which, in contrast with behavioural observations, indicates that interspecific matings in both directions are possible. This is the first demonstration that *C. haemorrhoidalis* can hybridize with other congeners to produce viable offspring." (Authors)] Address: Lorenzo-Carballa, Olalla, Grupo de Ecología Evolutiva e da Conservación, Depto de Ecología e Biología Animal, Univ. de Vigo, EUE Forestal, Campus Universitario A Xunqueira s/n, 36005, Pontevedra, Spain.

14530. Machado, A.B.M.; de Souza, M.M. (2014): A remarkable new species of Heteragrion from Brazil (Odonata: Megapodagrionidae). *International Journal of Odonatology* 17(2/3): 95-99. (in English) ["A new species, *Heteragrion cyane* sp. nov., is described and illustrated based on one male collected in the State of Minas Gerais,

Brazil. The new species is remarkable for its blue color, a rare character within the species of group A Heteragrion." (Authors)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

14531. Mahdjoub, H.; Khelifa, R.; Zebbsa, R.; Mellal, M.K.; Bouslama, Z.; Houhamdi, M. (2014): Aspects of reproductive biology and ecology of *Coenagrion mercuriale* at its southern range margin. *International Journal of Odonatology* 17(4): 173-180. (in English) ["*Coenagrion mercuriale* is a threatened damselfly in most parts of its geographic distribution. It is listed as endangered in North Africa, where no data on its biology or ecology are available. This study aims to illustrate the reproductive behaviour and habitat preferences of adults in a population located in north-east Algeria, representing the southern limit of the species distribution. After emergence, adults spent 3 to 4 days away from the water to mature. Young mature individuals returned to the stream to mate, sometimes not far from their emergence site. The mean duration of copulation and oviposition were 20.08 ± 8.79 min (\pm SD) and 52.66 ± 12.17 min (\pm SD), respectively, separated by a short post-copulatory rest of 4.60 ± 2.02 min (\pm SD). Copulation duration was positively correlated with male body length while resting duration was positively related to copulation duration. Single males and breeding pairs preferred the same habitats, characterized by relatively dense and high in-channel bank vegetation, and a quite large stream bed, with a substrate which mainly consisted of clay and silt. A comparison of the reproductive behaviour and habitat preferences with a population located in the northern limit of the distribution range is presented and discussed." (Authors)] Address: Mahdjoub, H., Laboratory of Ecology of Terrestrial and Aquatic Systems, Faculty of Sciences, Department of Biology, Badji Mokhtar University, Annaba 23000, Algeria

14532. Majumder, J.; Bhattacharjee, P.P.; Agarwala, B.K. (2014): Dragonflies and damselflies (Insecta: Odonata) of Tripura, northeastern India with a pictorial catalogue. *Journal of Threatened Taxa* 6(14): 6683-6702. (in English) ["A survey of Odonata was conducted in four reserve forests, three wildlife sanctuaries and three unclassified natural areas of Tripura, northeastern India from 2008 to 2012, from May to August. A total of 53 species belonging to 37 genera under nine families of Odonata were recorded in five years from 1370 points by direct search. This included 25 species, 16 genera and five families reported as new records for the state. A list of the species, number of specimens examined, their habitats, local and IUCN status, and worldwide distribution are provided. A pictorial catalogue of adults of the recorded species is also provided." (Authors)] Address: Agarwala, B.K., Ecology and Biodiversity Laboratories, Dept of Zoology, Tripura Univ., Suryamaninagar, Tripura 799022, India. E-mail: bagarwala00@gmail.com

14533. Malinowska, A.H.; van Strien, A.J.; Verboom, J.;

14534. Malinowska, A.H.; van Strien, A.J.; Verboom, J.; WallisdeVries, M.F.; Opdam, P. (2014): No evidence of the effect of extreme weather events on annual occurrence of four groups of ectothermic species. *PLoS ONE* 9(10): e110219. doi:10.1371/journal.pone.0110219: 10 pp. (in English) ["Weather extremes may have strong effects on biodiversity, as known from theoretical and modelling studies. Predicted negative effects of increased weather variation are found only for a few species, mostly plants and birds in empirical studies. Therefore, we investigated correlations between weather variability and patterns in occupancy, local colonisations and local extinctions (metapopulation metrics) across four groups of ectotherms: Odonata, Orthoptera, Lepidoptera, and Reptilia. We analysed data of 134 species on a 1×1 km-grid base, collected in the last 20 years from the Netherlands, combining standardised data and opportunistic data. We applied dynamic site-occupancy models and used the results as input for analyses of (i) trends in distribution patterns, (ii) the effect of temperature on colonisation and persistence probability, and (iii) the effect of years with extreme weather on all the three metapopulation metrics. All groups, except butterflies, showed more positive than negative trends in metapopulation metrics. We did not find evidence that the probability of colonisation or persistence increases with temperature nor that extreme weather events are reflected in higher extinction risks. We could not prove that weather extremes have visible and consistent negative effects on ectothermic species in temperate northern hemisphere. These findings do not confirm the general prediction that increased weather variability imperils biodiversity. We conclude that weather extremes might not be ecologically relevant for the majority of species. Populations might be buffered against weather variation (e.g. by habitat heterogeneity), or other factors might be masking the effects (e.g. availability and quality of habitat). Consequently, we postulate that weather extremes have less, or different, impact in real world metapopulations than theory and models suggest." (Authors)] Address: Malinowska, Agnieszka, Spatial Planning Group, Wageningen Univ., Wageningen, the Netherlands. E-mail: agnieszka.malinowska@wur.nl

14535. Manwar, N.A.; Rathod, P.P.; Raja, I.A. (2014): Diversity and abundance of dragonflies and damselflies of Chatri Lake region, in Pohara – Malkhed Reserve Forest, Amravati, Maharashtra (India). *PARIPEX - Indian Journal of Research* 3(6): 208-210. (in English) ["The present work is aimed to study diversity and abundance of Odonata of Pohara range in Pohara – Malkhed Reserve Forest, Maharashtra. This study has been carried out for one year from June 2012 to May 2013. ... Species richness (S), Relative abundance (P), Species diversity, and Evenness (E) were studied." (Authors) 37 species were observed.] Address: Manwar, N.A., Shri Shivaji College of Arts, Commerce and Science, Akola - 444001, India

14536. Márquez-Rodríguez, J. (2014): Contribución al conocimiento de la odonatofauna costera en la isla de Menorca. *Nova Acta Científica Compostelana (Biología)* 21:

7-10. (in Spanish) [Contribution to the knowledge of the coastal Odonata fauna from the island of Menorca (Spain): Records of the following odonate species are documented: *Ceriatrigon tenellum*, *Erythromma lindenii*, *Ischnura elegans*, *Aeshna isosceles*, *Anax parthenope*, *Orthemtrum coerulescens*, *Crocothemis erythraea*, *Sympetrum meridionale*, and *S. striolatum*.] Address: Márquez-Rodríguez, J., Depto de Sistemas Físicos, Químicos y Naturales, Universidad Pablo de Olavide, de Sevilla. 41013, Sevilla, Spain. E-mail: jmarrod1@admon.upo.es

14537. Mediani, M.; Boudot, J.-P.; Chevalier, F.; Qninba, A.; Rodrigues, J.C. (2014): Nouvelles données sur les Odonates dans le Grand Sud marocain, avec *Ischnura saharensis*, *Anax parthenope*, *Crocothemis erythraea* et *Trithemis annulata* nouveaux pour le Sahara Atlantique (Odonata: Coenagrionidae, Aeshnidae, Libellulidae). *Martinia* 30(1): 11-22. (in French, with English summary) ["The Odonata fauna known from the Oued Ed Dahab-Lagouira administrative region is relatively poor compared to neighbouring regions. Apparently, species of this group are present all year round on some aquatic sites, which are however rare in the Moroccan Atlantic Sahara. To improve the knowledge of the Odonata fauna in this desert area, we visited most natural, semi-natural and artificial aquatic habitats present in the region. We will try first to characterize the migration of *Hemianax ephippiger* in January-February 2013 and 2014 and emphasize reproduction indices for this species in 2012 in some artificial habitats. The occurrence of *Sympetrum fonscolombii* at the Imlily Sebkhha and its breeding in market gardening farms are also emphasized. Four additional new species were added to the region, namely *Anax parthenope*, *Ischnura saharensis*, *Crocothemis erythraea* and *Trithemis annulata*." (Authors)] Address: Mediani, M., Dépt de Biologie, Laboratoire "Écologie, Biodiversité et Environnement", Faculté des Sciences, Université Abdelmalek Essaâdi, Tétouan, Maroc. E-mail: mediamed05@yahoo.fr

14538. Mehdi, H.; Anwer, S.F.; Ahmad, A. (2014): Vibration analysis of dragonfly wing section in gliding mode at low Reynolds numbers. *International journal of research in aeronautical and mechanical engineering* 2(12): 11-23. (in English) ["The dragonfly wings are highly corrugated, due to light in weight and good corrugation it increases the aerodynamic performance and strength of the wing. When the wings interact with the air, it is subjected to aerodynamic forces acting on the surface of the wing and the inertial force due to the acceleration or deceleration of the wing mass. The interaction between these inertial and aerodynamic forces resulted in wing deformation. We are interesting to calculate deformation and natural frequency of the dragon fly wing at different Reynolds number and different angle of attack. A dragonfly insect has been chosen because MAVs (Micro air Vehicles) and Dragonfly works almost same Reynolds Number i.e. Re- 102 to 104. In this work, Numerical study of Vibration Analysis for a Pleated Insect 2D Airfoil at Ultra Low Reynolds Numbers is carried out in gliding mode. The dynamics of a pleated insect wing

subjected to aerodynamic loading is studied for different Reynolds Number ranging from 100 to 1000 at different angle of attack ranging from 00 to 150 by using ANSYS-14 multi physics solver. The result from the CFD solver will be fed in the form of lift and drag forces are then fed into the ANSYS Workbench solver and vibration analysis is performed." (Authors)] Address: Mehdi, H., MED, Meerut Institute of Technology, Meerut (U.P), 250002/ INDIA

14539. Meng, L.-b.; Ang, H.-s.; Xiao, T.-h. (2014): Analysis of aerodynamic characteristics of flexible wing of dragonfly based on CFD/CSD method. *Journal of Aerospace Power* 29(9): 2063-2069. (in Chinese, with English summary) ["A methodology of fluid-structure bi-directional interaction based on computational fluid dynamics/computational structure dynamics (CFD/CSD) was presented. The donor-receptor relationship between two sets of grid system was identified by alternating digital tree (ADT). The local interpolation methods were used for data exchange between these two sets of grids. Flow with moving boundaries was dealt with by Delaunay graph mapping method. The code for nonlinear structural finite element and information transfer was developed and used to connect with the code of flow solver 3D2 MUFS developed in the Micro Air Vehicle Center of Nanjing University of Aeronautics and Astronautics (NUAA). It was applied to the aerodynamic computation of dragonfly flapping flight with flexible wing. Results show that the time-averaged vertical force coefficient of the dragonfly wing increases from 0.31 to 0.53, and the time-averaged thrust coefficient increases from 0.07 to 0.13 by flexible deformation. This confirms that the flexible deformation can improve the aerodynamic performance of flapping wing." (Authors)] Address: Meng, L.-b., College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics, China

14540. Muraviev, I.V.; Artemyeva, E.A. (2014): Some additions and comments to breeding biology of Blackheaded Wagtail *Motacilla feldegg* Michahhelles, 1830 (Passeriformes, Motacillidae, Motacillinae) in European Russia. *Advances in Bioscience and Bioengineering* 2(1): 1-15. (in English) [The stomach of a male specimen sampled at 09.06.2011 included 13.7% Coenagrionidae (no metric is given, probably relative relation of taxa in the diet.)] Address: Artemyeva, E.A., Ulyanovsk State Pedagogical Univ. of I.N. Ulyanov, the Centenary of V.I. Lenin's Birth sq., 4, Ulyanovsk, 432700, Russia

14541. Nagel, L.; Mlynarek, J.J.; Forbes, M.R. (2014): Comparing natural parasitism and resistance with proxies of host immune response in lepid damselflies. *Ecological Parasitology and Immunology* 3 (2014), Article ID 235884, doi:10.4303/epi/235884: 7 pp. (in English) ["Commonly used proxies for measuring immune responses in invertebrates include the amount of melanin deposited on nylon inserts and assays of activity of the enzyme phenoloxidase (PO) in the haemolymph. We used these proxies to estimate immunity in unparasitized individuals from four Lepid damselfly species (*L. disjunctus*, *L. congener*, *L.*

rectangularis, *L. forcipatus*) from populations with different levels of water mite parasitism. Levels of parasitism and resistance by hosts were population level estimates from published papers. These parasitism levels were not correlated positively with immune response measured by proxies in the current study. The species with the strongest melanization response to the inserts and the highest PO levels was the one that currently experienced no mite parasitism. The species with the weakest response to the inserts and the lowest PO levels had low current levels of parasitism. The two species that are heavily parasitized had an intermediate response. Natural resistance levels were also not correlated with the response measured by proxies, but the species with a strong response had high levels of resistance in the past. This finding is supported by earlier work done with Lepidoptera in which the most well-defended species currently experience no natural parasitism." (Authors)] Address: Nagel, Laura, Department of Biology, Queen's University, Kingston, ON, Canada K7L 3N6. E-mail: nagell@queensu.ca

14542. Naidu, V.; Young, J.; Lai, J. (2014): Effect of wing flexibility on dragonfly hover flight. 19th Australasian Fluid Mechanics Conference, Melbourne, Australia, 8-11 December 2014: 4 pp. (in English) ["The role of wing flexibility in tandem wings during the hover flight at phase 180. was investigated using Fluid Structure Interaction (FSI) simulations. The wing shapes were that of the dragonfly species *Aeshna juncea* and the flexible wing models displayed wing stiffnesses as found in the real wings. Wing flexibility enhanced the lift generated by both the tandem wings, with the forewing and the hindwing generating 10% and 17% more lift respectively, as compared to the rigid wings." (Authors)] Address: Naidu, V., School of Engineering and Information Technology, University of New South Wales, ADFA, ACT 2600, Australia

14543. Naka, H.; Sunami, Y.; Hashimoto, H. (2014): Development of the artificial wing suitable for flapping Micro Air Vehicle based on dragonfly wing. The 3rd International Conference on Design Engineering and Science, ICDES 2014 Pilsen, Czech Republic, September 1-3, 2014: 78-83. (in English) ["The dragonfly wing is passively deformed under flapping and has the strength to withstand high flapping frequency simultaneously. These characteristics of deformation and vibration of the wing is important for dragonfly flight. However, the effect of those on dragonfly flight has not been well understood. The purpose of this study is to develop an artificial wing suitable for flapping Micro Air Vehicle on the basis of the dragonfly wing. Therefore, natural frequency and deformation of the dragonfly wing are measured, and the artificial wing is fabricated on the basis of result of that. From the results of measurement, the dragonfly wing has the high natural frequency of 120 Hz. Although base-side of the wing is hardly deformed, the tip-side of the wing is greatly deformed because of the torsional deformation from the nodus of dragonfly wing. Then, the deformable artificial wing which can deform in the same manner of dragonfly wings was fabricated, and

aerodynamic force and power consumption under flapping was measured. As a result, the power efficiency of aerodynamic force using the deformable artificial wing is 5 times greater than the power efficiency using an undeformable wing." (Authors)] Address: Sunami, Y., Department of Mechanical Engineering, Tokai University, 4-1-1, Kitakaname, Hiratsuka City, Kanagawa Prefecture 259-1292, Japan. E-mail: sunami@tokai-u.jp

14544. Nasiruddin, M.; Azadi, M.A.; Reza, M.S. (2014): Abundance and diversity of aquatic insects in two water bodies of Chittagong university campus. *Bangladesh J. Zool.* 42(1): 19-33. (in English) ["Abundance and diversity of aquatic insects was studied in two water bodies, (a pond and a lake) of Chittagong University campus during October 2009 to September 2010. A total of 4406 insects belonging to 32 genera, under 20 families and 6 orders were recorded. In both the water bodies, the representatives of the orders Hemiptera and Odonata (identified using a North American key) were the most abundant groups. During the study period highest abundance of the total insects was recorded in November 2009 and the lowest in July 2010. Abundance of insects was comparatively higher in the pond habitat than in the lake. The Quotient of Similarity (QS) of the insects between the two water bodies was found to be the highest in October 2009 and lowest in July 2010. Species diversity, species richness and species evenness values of the lake were higher than that of the pond. *Hydrophilus* sp. and *Sphaerodema* sp. were the most dominant insects in the pond, while *Chironomus* sp. and *Gerris* sp. in the lake." (Authors)] Address: Nasiruddin, Munira, Dept of Zoology, University of Chittagong, Chittagong 4331, Bangladesh. E-mail: maazadi@yahoo.com

14545. Nelson, M. (2014): Surveying Odonata: are current monitoring methods up to the task? *J. Br. Dragonfly Society* 30(1): 17-31. (in English) ["Surveying odonates has focused historically on adult populations which are visible and amenable to standard types of surveying but recent work has suggested this may be giving a biased result, with consequent impact on conservation decision making and management. This study attempts to investigate whether there is a difference in results of larval and adult surveys and whether any difference found is specific to type of habitat or particular species." (Author)] Address: Nelson, M., 19 Sumner Street, Atherton, Greater Manchester, M46 0DJ, UK

14546. Nelson, S.J.; Chen, C.; Kahl, J.S.; Krabbenhoft, D.P. (2014): Validating landscape models for mercury in northeast lakes using dragonfly nymphs as mercury bio-sentinels. University of Maine Office of Research and Sponsored Programs: Grant Reports. Paper 52. <http://digitalcommons.library.umaine.edu/orspreports/52>: 32 pp. (in English) ["Mercury (Hg) is a toxic pollutant that is widespread in northeastern US ecosystems. Resource managers' efforts to develop fish consumption advisories for humans and to focus conservation efforts for fish-eating wildlife are hampered by significant variability in fish Hg

concentrations from site to site - often in neighbouring lakes. Watershed characteristics that vary across the Northeast such as forest type and wetlands are important predictors of methylation. Although data syntheses leading to hotspot maps (e.g., Evers et al. 2007) and sensitivity modelling have been conducted (Krabbenhoft et al. 2011), we still lack studies that use sentinel biota and have statistically rigorous sampling designs across the broad region. Fish Hg concentrations are most often used as biological indicators of Hg sensitivity in lakes; however, fish may move between waterbodies and interpretation can be confounded by size, species, diet, gender, and age. This project sampled lake water and a biosentinel, dragonfly larvae, in a statistical sample of 74 lakes that are part of US EPA long-term monitoring across the region to (1) test models for prediction of Hg and MeHg in water, and (2) determine the efficacy of this bio-sentinel in predicting sensitivity to Hg across the region. In the Upper Midwest, MeHg in dragonfly larvae was significantly, positively correlated with THg in perch (Knights et al. 2005) and researchers concluded that dragonfly larvae were promising bio-sentinels in that region (Haro et al. 2013). We hypothesized that dragonfly larvae are good indicators of Hg spatial patterns because they are widespread in fresh waters across this region, long-lived (1-5 years or more), exhibit site fidelity, are carnivorous, contain almost all of their Hg as MeHg, and have relatively high Hg concentrations. The project leveraged ongoing research at a statistical sample of 74 lakes across New England states and New York, sampled annually by cooperators in the US Environmental Protection Agency (EPA) Long-Term Monitoring (LTM) Network." (Authors)] Address: Nelson, Sarah, Senator George J. Mitchell Center for Sustainability Solutions, School of Forest Resources, Ecology & Environmental Sciences Program, and Maine RiSE (Research in Science Education) Center, USA. E-mail: sarah.j.nelson@maine.edu

14547. Neves, M.; Morais, C.S.; Garda, A.A. (2014): Sexual dimorphism and diet of *Pseudis tocantins* (Anura, Hylidae, Pseudidae). *South American Journal of Herpetology* 9(3): 177-182. (in English) ["The genus *Pseudis* (Hylidae) includes aquatic frogs distributed throughout South America east of the Andes. Few papers have been published on the ecology of these species, despite the great interest their gigantic larvae raise among herpetologists. *Pseudis tocantins* has a widespread distribution along the Tocantins-Araguaia hydrographic basin in Brazil and virtually nothing has been published about its natural history and ecology. The present work aimed to evaluate, based on 159 specimens from 13 populations, sexual dimorphism in size and shape and diet composition of *P. tocantins* along most of its known distribution. Females were significantly larger than males and body shape differed significantly between sexes, with tibia length and tympanum diameter as the variables contributing the most to this difference. We found 13 prey categories in frog's stomachs, with Araneae, Odonata, and Orthoptera being the most important items, respectively. Aquatic animals were also part of the species diet (even though less representative than

non-aquatic prey), showing that *P. tocantins* feeds on both above water and subaquatic prey." (Authors)] Address: Neves, M., Departamento de Biologia Animal, Universidade Federal de Viçosa. Avenida Peter Henry Rolfs s/n, CEP 36571 -000, Viçosa, MG, Brazil. E-mail: pseudis@gmail.com

14548. New, T.R.; Samways, M.J. (2014): Insect conservation in the southern temperate zones: an overview. *Australian Journal of Entomology* 53(1): 26-31. (in English) ["Insect conservation in the southern hemisphere lags substantially behind developments in parts of Europe and North America, where the relatively small faunas are better documented, and where a historical culture of natural history has enabled conservation needs to be assessed and addressed by many sympathetic supporters. We contrast this scenario with the much more embryonic knowledge and capability available in Australia, southern Africa, southern South America and New Zealand, all regions with large and incompletely documented insect faunas, but an equivalent array of threats to their survival. While a few individual 'flagship species' (mainly within Lepidoptera, Orthoptera and Coleoptera) have been critical in promoting wider interests, in general insects do not signify highly on regional conservation agendas. We offer a perspective of the major needs to counter this... Dragonflies are also relatively well studied. They have been surveyed comprehensively through the Odonata Database of Africa and the World Conservation Union's (IUCN) Species Survival Commission's Africa Freshwater Assessment (Clausnitzer et al. 2012). A comprehensive assessment of Argentinian dragonflies has begun, as part of an initiative to increase awareness of insect conservation in the country, discussed in detail at the 2012 meeting of the Entomological Society of Argentina." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

14549. Nguyen, S.H.; Webb, H.K.; Hasan, J.; Tobin, M.J.; Mainwaring, D.E.; Mahon, P.J.; Marchant, R.; Crawford, R.J.; Ivanova, E.P. (2014): Wing wettability of Odonata species as a function of quantity of epicuticular waxes. *Vibrational Spectroscopy* 75: 173-177. (in English) ["Dragonflies have gained much attention due to their sophisticated wing surface structure, and their associated superhydrophobic, self-cleaning and bactericidal properties. In this work, we compared and contrasted the chemical composition and surface morphology of the wing membranes of four species of dragonfly and damselfly from the Odonata family collected in 1970s (*Diplacodes melanopsis* and *Xanthagrion erythroneurum*) and 2011 (*Diplacodes bipunctata*, and *Ischnura heterosticta*). .. Fourier-transform infrared spectroscopy data obtained from the Australian Synchrotron were used to classify the fundamental components of all four of the insect species' wings. The spectra of all species were dominated by C-H stretching, Amide I and Amide II and O-H stretch absorbance indicating similar membrane composition of chitin,

protein and wax in all four species. Although the samples were collected 40 years apart, there was no evidence of degradation during this time. Despite the overall similarities in spectral profile, species-specific differences were observed, most notably the intensity of the vCH₂ peaks, which in part reflect the amount of waxes present on the wings, appeared different between species. The surface topography also contained minor differences in their pillar diameter and spatial distribution. It is postulated that the differences in surface wettability of the wings could be attributed to these minor differences in surface chemistry and surface topography. For example, *X. erythroneurum* presented the highest water contact angle (WCA) of 160° whilst the *D. melanopsis* wings exhibited the lowest WCA (138°). And the wettability of their wings was found to directly correlate with the intensity of hydrocarbon peaks found in their respective IR spectrum." (Authors)] Address: Ivanova, Elena, Faculty of Science, Engineering, & Technology, Swinburne Univ. of Technology, PO Box 218, Hawthorn, VIC 3122, Australia. E-mail: eivanova@swin.edu.au

14550. Nielsen, E.R.; Manger, R.; Martens, A. (2014): First records of *Forcipomyia paludis* (Diptera: Ceratopogonidae), a midge parasitising dragonfly adults (Odonata: Libellulidae), for the Balearic Islands, Spain. *Notulae odonatologicae* 8(4): 83-85. (in English) ["Photographs of odonates parasitised by *Forcipomyia* (*Pterobosca*) *paludis* taken 2007 and 2014 in the Parc Natural de s'Albufera de Mallorca, Spain, document the first records of this ceratopogonid for the Balearic Islands." (Authors)] Address: Nielsen, E.R., Møllevvej 15B, Fovslet, 6580 Vamdrup, Denmark. E-mail: e_refling@yahoo.com

14551. Nobre, C.E.; Carvalho, A.L. (2014): Odonata of Itatira, a Brazilian semi-arid area in the state of Ceará. *International Journal of Odonatology* 17(2-3): 73-80. (in English) ["The present study provides the first odonate survey for the Brazilian Caatinga, including species habitat information. Specimens were collected during five days in both dry and rainy seasons of 2011 in the municipality of Itatira, state of Ceará, located in the semi-arid region of northeastern Brazil. Adult individuals of 37 species were documented, the highest richness value thus far recorded for the region. Individuals of the majority of the species were recovered from small, temporary water bodies. In general, the local odonate community is composed of species with wide continental distributions, with the exception of *Macrothemis lutea*, *M. griseofrons* and *Erythrodiplax leticia*, which are restricted to northeastern Brazil. New occurrences and expanded distribution ranges of species are discussed." (Authors)] Address: Carvalho, A.L., Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), Caixa Postal 68044, BR-21944-970 Rio de Janeiro, RJ, Brazil. E-mail: alagoc@acd.ufrj.br

14552. Novelo-Gutiérrez, R. (2014): The larva of *Aphylla protracta* (Hagen, 1859), and a redescription of the larva of *A. angustifolia* Garrison, 1986 (Odonata: Gomphidae).

Zootaxa 3884(4): 387-393. (in English, with Spanish summary) ["The larva of *Aphylla protracta* is described and figured. It is characterized by 3rd antennomere subcylindrical, flattened on ventral surface, 4.2 times longer than its widest part. Abdomen with dorsal protuberances well developed on S2–4, reduced on S5, vestigial or absent on S6–9; lateral spines lacking entirely, tergites 5–8 with minute reddish setae, tergite 9 with abundant, small, reddish setae on most of its surface and the whole posterior margin; S10 cylindrical, very long, five times longer than its base, much longer than S6+7+8+9. Also, a redescription and figures of *A. angustifolia* are provided, and a comparison of both species is made. Mainly differences between both species were found in abdominal dorsal protuberances and the presence/absence of small setae on abdominal tergites." (Author)] Address: Novelo-Gutiérrez, R., Depto de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

14553. Olberg, R.M ; Gonzalez-Bellido, P.; Wardill, T. (2014): The neuronal control of flying prey interception in dragonflies. Final rept. 15 May 2010-14 May 2014: 18 pp. (in English) ["Eight pairs of large descending visual neurons (TSDNs) control dragonfly prey interception flights. We investigated both the sensory inputs and the motor outputs of this group of neurons. A detailed map was obtained of the position and direction of target movement that excites each of the TSDNs. This study also revealed the anatomy of the TSDN output terminals, providing information about the likely pattern of connectivity from individual TSDNs to the neural circuitry controlling each of the wings. Angular speed is also encoded by the TSDNs. This speed sensitivity increases the gain of the system as the dragonfly approaches its prey. Distance appears not to be encoded by the TSDNs when the head is fixed. However binocular inputs are required for maximal responses. The functional implication of the binocular inputs is not yet known. Intracellular electrical stimulation of individual TSDNs confirmed their role in adjusting wing position and angle. TSDN activity rotates the head as well in the direction opposite the preferred target direction. Two TSDNs also move the legs and mouthparts." (Authors)] Address: Olberg, R.M., Department of Biological Sciences, Union College, 807 Union Street, Schenectady, NY 12308, USA. E-mail: olberg@union.edu

14554. Olomukoro, J.O.; Dirisu, A.-R. (2014): Status and the diversity of macrobenthos of Udu - Ghievwen wetlands in the Niger delta, Nigeria. Journal of natural science research 4(18): 6 pp. (in English) ["A survey on the status and diversity of benthic fauna community of Udu – Ughievwen wetlands was carried out for a period of six months. Benthic samples were collected using the Ekman Grab made by Hydrobios. Water Hyacinth (*Eichornia crassipes*) was also sampled for benthic organisms. A total of twelve taxonomic groups were recorded in this study and they include; Ephemeroptera (37.63%), Diptera (20.45%),

Decapoda (14.39%), Odonata (6.48%), Annelida (5.97%), Coleopterans (4.21%) and Trichoptera (3.87%). Others were; Mollusca (3.45%), Amphibian (2.85%), Hemiptera (2.27%) and Arachnida (0.42%). The highest number of individuals was collected from Ohwawha (171) and least at Ofri (60). Shannon – Weiner diversity (H) was highest at Ujevuu and least at Ofri sampling stations respectively. The suitability and diversity of the macrohabitats in the various study sites have favoured the abundance of benthic macroinvertebrates particularly the Decapoda, Ephemeroptera, and Diptera in these water bodies. The dominance of Ephemeroptera in most of the sites indicates a healthy nature or sound environmental quality of the entire Udu – Ughievwen wetlands. The study revealed that wetlands are populated by a rather different assortment of macroinvertebrates." (Authors) Taxa are detailed at genus level, but obviously were identified using a key from North America.] Address: Olomukoro, J.O., Dept of Animal & Environmental Biology, Faculty of Life Sciences, University of Benin, Benin City, P.M.B. 1154, Nigeria

14555. Ott, J. (2014): Der Kalikokrebs (*Orconectes immunitus*) (Hagen, 1870) – ein noch wenig beachtetes Neozoon (AIS) mit erheblichem Gefährdungspotenzial für die aquatischen Lebensgemeinschaften der Rheinaue (Crustacea: Decapoda: Cambaridae. Fauna Flora in Rheinland-Pfalz 12(4): 1403-1416. (in German, with English summary) ["The author reports on a big population of the calico crayfish, an invasive species in Germany, in a secondary water body and gives some information on its negative effects on the aquatic biocoenosis (amphibians, dragonflies). As a consequence of its high dispersal potential this species will certainly increase the negative effects on the aquatic biocoenosis in the future. Furthermore the consequences for nature conservation and water management concepts are discussed." (Author) Passing notes on *Anax imperator* and *Ischnura elegans* are included.] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

14556. Ott, J. (2014): Zur Ansiedlung der Großen Moosjungfer – *Leucorrhinia pectoralis* (Charpentier, 1825) – in der Pfalz (Insecta: Odonata). Fauna Flora in Rheinland-Pfalz 12(4): 1417-1424. (in German, with English summary) ["The successful establishment of *L. pectoralis*, which after a long absence was found again in several waters in Rhineland-Palatinate in 2012, is reported. The species was found now autochthonous at least in one water in the Palatinate and also it occurred in several other bodies of water. This species, being listed on the annexes II and IV of the European habitats directive, has now to be monitored according to EC law." (Author)] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

14557. Outomuro, D.; Söderquist, L.; Rodríguez-Martínez, S.; Johansson, F. (2014): A preliminary study on female-limited colour polymorphism in *Lestes sponsa*. International Journal of Odonatology 17(2-3): 89-93. (in English)

["Female-limited colour polymorphisms are widespread in Odonata, usually showing an androchrome and one or more gynochromes. Androchromes have been hypothesized to function as male mimics with a consequent decrease of male harassment, although males may also learn to recognize the different female colour morphs. In the Eurasian damselfly *Lestes sponsa*, the occurrence of two female colour morphs (androchrome and gynochrome) has been known since the beginning of the twentieth century, although this has been generally overlooked. In this work, we studied a Swedish population of *L. sponsa* by counting the number of females of each morph during nine consecutive days, as well as the number of tandems. Androchromes showed blue pruinescence at similar body parts as males, although more limited at the tip of the abdomen. Moreover, androchromes also showed bright blue coloured eyes as males. We found no indication that androchromes might be a result of age changes in female coloration. The androchrome morph accounted for 19% of the female population. Androchromes did not form tandems at a lower frequency than expected in the population, given the frequency of presence of each morph. Therefore our results suggest that either androchromes in this species do not function as male mimics, or that the population has reached equilibrium with equal fitness for each morph. Other aspects of male harassment and learned mate-recognition, as well as female morph behaviour, would shed light on the evolutionary and ecological significance of female morphs in this species." (Authors)] Address: Outomuro, D., Dept of Ecology and Genetics, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, 75236, Uppsala, Sweden. E-mail: outomuro.david@gmail.com

14558. Pal, P.; Roy, S. (2014): Edible insects: Future of human food - a review. *International Letters of Natural Sciences* 21: 1-11. (in English) ["The practice of eating insects is known as entomophagy. ... People throughout the world have been eating insects as a regular part of their diets for millennia. As people in rural areas suffer from under nutrition, especially protein-energy malnutrition (PEM) in Africa, Latin America and Asia, alternative nutritional food sources are needed. From ants to beetle larvae – eaten by tribes in Africa and Australia as part of their subsistence diets – to the popular, crispy-fried locusts and beetles enjoyed in Thailand, it is estimated that insect-eating is practised regularly by at least 2 billion people worldwide. More than 1900 insect species have been documented in literature as edible, most of them in tropical countries. The most commonly eaten insect groups are beetles, caterpillars, bees, wasps, ants, grasshoppers, locusts, crickets, cicadas, leaf and plant hoppers, scale insects and true bugs, termites, dragonflies and flies. The purpose of the present review is to determine the status of present research in the context of the potentiality of insects as alternative food source to cope up with the emerging problem of global food crisis. .. Dragonflies including *Anax guttatus* and *Trithemis arteriosa* are collected in paddy fields in the DRC (Malaisse, 1997), the Philippines, north and northeast

Thailand (Pemberton, 1995), and China (Feng et al., 2001). Nymphs are often stir-fried or boiled before eating." (Authors)] Address: Pal, P., Department of Zoology, Scottish Church College, 1 & 3 Urquhart Square, Kolkata - 700006, India. E-mail: parthapal_iicb@yahoo.co.in

14559. Palacino-Rodríguez, F.; González-Soriano, E.; Sarmiento, C.E. (2014): Phylogenetic signal of subsets of morphological characters: a case study in the genus *Erythemis* (Anisoptera: Libellulidae). *Caldasia* 36(1): 85-106. (in English, with Spanish summary) ["*Erythemis* Hagen, 1861 shows a considerable variation in genitalic characters, body coloration and wing venation. Since it is known that these traits are affected by different kinds of selection that probably blur their phylogenetic signal, we chose the genus *Erythemis* as a model taxon to analyze and compare the phylogenetic signal of these and other morphologic characters. A cladistic analysis was performed using ten species of the genus plus another seventeen species of Libellulidae as outgroup. Characters were defined following standard criteria and were managed using the software DELTA. Tree search was performed with the software NONA. Partitioned and combined analyses were conducted. Character tracking of characters with $ri=100$ was used to identify synapomorphies. In agreement with the literature, color characters provided strong phylogenetic signal, meanwhile, genitalia characters offered no synapomorphies. We did not find any character that could support the monophyly of *Erythemis*. The only clade that has strong support from the morphologic set of characters is (*E. vesiculosa*, (*E. simplicicollis*, *E. collocata*)). Contrary to the results found in other Odonata, wing characters offered synapomorphies for some *Erythemis* clades." (Authors)] Address: Palacino-Rodríguez, F., Laboratorio de Artrópodos del Centro Internacional de Física, Univ. Nacional de Colombia. Depto de Biología / Universidad El Bosque, Bogotá D.C., Colombia. odonata17@hotmail.com

14560. Palacio, A. del; Muzon, J. (2014): Description of the final instar larva of *Limnethron antarcticum* Förster and notes on its female (Anisoptera: Aeshnidae). *Zootaxa* 3884(1): 89-94. (in English) ["The final instar larva of *L. antarcticum* is described and illustrated for the first time based on one specimen collected in Misiones Province, Argentina. It is compared with *L. debile* (Karsch). Color pattern and ovipositor morphology of the female imago are described." (Authors)] Address: del Palacio, A., Instituto de Limnología "Dr. Raúl A. Ringuelet" (CCT-La Plata), CC 712 – 1900 La Plata, Argentina. E-mail: adelpalacio@ilpla.edu.ar

14561. Peels, F. (2014): The occurrence of *Ischnura senegalensis* in the Canary Islands, Spain (Odonata: Coenagrionidae). *Notulae odonatologicae* 8(4): 105-111. (in English) ["The occurrence of *I. senegalensis* in the Canary Islands is reported. In May 2014 a breeding population was observed in southern Tenerife, Spain, at a freshwater reservoir near Las Galletas. Characters are provided for discriminating between the two known *Ischnura* species

on the islands, *I. senegalensis* and *I. saharensis*, from photographs." (Author)] Address: Peels, F., Via Caffarini 41, 53100 Siena, Italy. E-mail: info@dragonflypix.com

14562. Perroy, R.L.; Belby, C.S.; Mertens, C.J. (2014): Mapping and modeling three dimensional lead contamination in the wetland sediments of a former trap-shooting range. *Science of The Total Environment* 487: 72-81. (in English) ["Highlights: •We mapped 3D Lead contamination in the wetland sediments at a former shooting range. •X-ray fluorescence & imaging allow rapid and inexpensive quantification of contamination. •Highest Pb contamination levels were typically found 10-30 cm below sediment surface. •We report high-resolution volumetric contamination estimates at various action levels. •Our mapping and modelling techniques can be readily applied to other contaminated sites. Abstract: Legacy lead (Pb) contamination from sport shooting activities is a well-known hazard. Assessing the risk this contamination presents to the environment and public health requires a detailed understanding of its spatial distribution, yet our knowledge in this area is limited, especially for wetland shooting ranges. In this study, we analyzed 1351 sediment samples from 456 surficial (0–5 cm) locations and 38 sediment cores (0.3 to 0.9 m) to quantify the three dimensional spatial distribution of Pb contamination in an urban wetland at the site of a former trap shooting range located in southwestern Wisconsin, USA. Non-destructive X-ray images of the sediment cores were used to quantify Pb shot abundance and burial depth. Surficial and core sediment samples were processed and analyzed for total Pb content via X-ray fluorescence (XRF) analysis. X-ray and XRF results were interpolated to create a three-dimensional model of Pb shot density and sediment concentration across the study area. Over 31,000 m³ of sediment surpassed the US Environmental Protection Agency's contamination threshold of 400 mg/kg Pb, with a maximum calibrated value of 26,700 mg/kg Pb occurring near the center of the expected shot fallout zone. Shot densities of > 50,000 pellets/m² were found in the shot fallout zone, primarily 10–30 cm below the sediment surface. X-ray image analysis and XRF analysis of sediment cores provide an accurate and inexpensive technique for rapidly mapping Pb contamination associated with gun clubs and hunting; these findings will benefit environmental contamination studies and remediation efforts at active and abandoned shooting ranges worldwide. ... Supernumerary antenna malformations in Corduliidae (dragonfly) specimens 135 collected within the LRM shot fallout zone were also observed prior to 136 this study, and hypothesized to be linked to high Pb exposure (R. Haro, UW - La Crosse Biology Department, pers. com)."] (Authors)] Address: Perroy, R.L., Dept of Geogr. & Environ.I Sci., Univ. of Hawaii at Hilo, 200W. Kawili Street, Hilo, HI 96720-4091, USA. E-mail: rperroy@hawaii.edu

14563. Pessacq, P. (2014): Synopsis of *Epipleoneura* (Zygoptera, Coenagrionidae, "Protoneuridae"), with emphasis on its Brazilian species. *Zootaxa* 3872(3): 201-234.

(in English) ["A revision of the known species of *Epipleoneura* is presented. Material of all Brazilian species was examined. Two new species are described: *E. otto* (Holotype: Brazil, Goiás State, São Bartolomeu river) and *E. susanae* (Holotype: Brazil, Mato Grosso State, São Lorenzo river), and the male of *E. humeralis* and the female of *E. kaxuriana* are described for the first time. With the exception of *E. protostictoides*, diagnoses, morphological characterizations, and illustrations of all species including known females are presented. The genital ligula of 25 species is described or redescribed. Morphological intraspecific variation is presented for *E. machadoi*, *E. metallica*, and *E. venezuelensis*." (Author)] Address: Pessacq, P., Laboratorio de Investigaciones en Ecología y Sistemática Animal (LIESA), Universidad Nacional de la Patagonia San Juan Bosco, Sarmiento 849, 9200 Esquel, Chubut, Argentina. E-mail: pablopessacq@yahoo.com.ar

14564. Petzold, F.; Fritzlar, F. (2014): Basiserfassungen zur Libellenfauna – Landesweites Probestellennetz für ein Libellenmonitoring in Thüringen. *Landschaftspflege und Naturschutz in Thüringen* 51(1): 3-11. (in German, with English summary) ["The state of Thuringia (Germany) built up a large stock of dragonfly-data set in cooperation with the voluntary working group which explore Thuringian dragonflies. This set of data is to be supplemented by an equably distributed and standardized state wide grid of study areas. The aim of this new established monitoring program is to get more precise information about the change of dragonfly inventory in future. The project concentrates on dragonfly habitats with local importance. Between 2010 and 2012, 44 large scale maps in five rural districts get researched. In the analysed 220 water bodies 51 dragonfly species were recorded - 78 percent of the state wide known species. 15 of this species are recorded at the Thuringian Red List. *Coenagrion mercuriale*, *Leucorrhinia pectoralis*, *Sympetrum meridionale*, and *Sympetrum pedemontanum* are endangered or extreme rare. To protect the dragonfly biodiversity, the most valuable water bodies have to be conserved and deficits of the water body conditions have to be eliminated." (Authors)] Address: Petzold, F., Pappelallee 73, 10437 Berlin, Germany. E-mail: falk_petzold@web.de

14565. Pham, T.T.; Higgins, C.M. (2014): A visual motion detecting module for dragonfly-controlled robots. *Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE*, 26-30 Aug. 2014: 1666-1669. (in English) ["When imitating biological sensors, we have not completely understood the early processing of the input to reproduce artificially. Building hybrid systems with both artificial and real biological components is a promising solution. For example, when a dragonfly is used as a living sensor, the early processing of visual information is performed fully in the brain of the dragonfly. The only significant remaining tasks are recording and processing neural signals in software and/or hardware. Based on existing works which focused on record-

ing neural signals, this paper proposes a software application of neural information processing to design a visual processing module for dragonfly hybrid bio-robots. After a neural signal is recorded in real-time, the action potentials can be detected and matched with predefined templates to detect when and which descending neurons fire. The output of the proposed system will be used to control other parts of the robot platform."(Authors) For details see: http://thehigginslab.webhost.uits.arizona.edu/pubs/2011-_thuy_pham_thesis.pdf Address: Pham, Thuy T. ; Dept of Electrical and Computer Engineering and Department of Neuroscience, University of Arizona, AZ USA 85716

14566. Pierce, F. (2014): Southern Riffle Damner *Notoaeschna sagittata* (Odonata) in the Bend of Islands, Victoria. *The Victorian Naturalist* 131(5): 177-179. (in English) ["*N. sagittata* has been recorded in the Yarra Catchment, 30 km north-east of Melbourne, a significant extension of the documented range. Teneral adults of both sexes were recorded at least 1.8 km from the riparian habitat of the Yarra." (Author)] Address: Pierce, F., PO Box 121, Kangaroo Ground, Victoria 3097, Australia. E-mail: jmandfp@bigpond.com

14567. Pospekhova, N.A.; Regel, K.V.; Gulyaev, V.D. (2014): Ultrastructural study of protective envelopes in *Dioecocestus asper* (Cestoda: Dioecocestidae) megalocercus. *Parazitologiya* 48(2): 89-96. (in English, with Russian summary) ["The megalocercus of *Dioecocestus asper* (Mehlis 1831) from the haemocoel of dragonfly larvae possesses two envelopes: outer (exocyst) and inner (endocyst) ones. The exocyst contains the large endocyst and larval strobila with scolex attached to the latter. Outer and inner surfaces of these envelopes are organized as the tegument and have some structural differences. The exocyst is covered with slender microvilli. Its outer tegument contains numerous mitochondria; the inner one is filled with lipid droplets released into the exocyst's cavity. The well-developed protonephridial (excretory) system consisting of flame cells, collecting ducts and canals is the unique feature of the exocyst, noted for the first time. Thick (more, than 50 microm) distal cytoplasm of the outer tegument of the endocyst is the place of accumulation of uniform globules looking like a hyaloid layer. This outer layer together with underlying fibrous layer (up to 20 microm), apparently, protect the scolex and larval strobila during the transfer through feather clump in the stomach of grebes, definitive hosts of *D. asper*. Muscle cells of both envelopes retain their synthetic activity even in the fully developed metacestode. Probably, they are the main structural element, which produces fibers of the extracellular matrix and maintains the integrity of protective envelopes of the megalocercus." (Authors) The original material was obtained by dissection of dragonfly larvae of the genus *Aeshna* from lakes of the Upper Kolyma basin.] Address: Pospekhova, Natalia, Institute of Biological Problems of the North FEB RAS Magadan, 685000, Russia. E-mail: posna@ibpn.ru

14568. Post, M. (2014): Die Libellenfauna im Raum Neustadt 2013. *Pollichia-Kurier* 30(1): 20-22. (in German) [The

author summarizes the regional Odonata records in the Neustadt-region (Rheinland-Pfalz, Germany) for the year 2013. Due to a long and cold winter the phenology of many species was shifted. Interesting is that the so-called climate change winners were not harmed by this winter, and partly even expanded their local/regional range due to optimal habitat availability. The situation for some formerly very frequent species as *Lestes sponsa* and *Sympetrum vulgatum* seems to be dramatic. *S. flaveolum* and *S. depressiusculum* are believed to be abandoned the site because they have not been observed in the past years. *Ophiogomphus cecilia* was observed latest on 3-XI-2013] Address: Post, M. E-mail: libellen-nw@web.de

14569. Rasmussen, N.L.; Van Allen, B.G.; Rudolf, V.H.W. (2014): Linking phenological shifts to species interactions through size-mediated priority effects. *Journal of Animal Ecology* 83(5): 1206-1215. (in English) ["(1.) Inter-annual variation in seasonal weather patterns causes shifts in the relative timing of phenological events of species within communities, but we currently lack a mechanistic understanding of how these phenological shifts affect species interactions. Identifying these mechanisms is critical to predicting how inter-annual variation affects populations and communities. (2.) Species' phenologies, particularly the timing of offspring arrival, play an important role in the annual cycles of community assembly. We hypothesize that shifts in relative arrival of offspring can alter interspecific interactions through a mechanism called size-mediated priority effects (SMPE), in which individuals that arrive earlier can grow to achieve a body size advantage over those that arrive later. (3.) In this study, we used an experimental approach to isolate and quantify the importance of SMPE for species interactions. Specifically, we simulated shifts in relative arrival of the nymphs of two dragonfly species (*Pantala flavescens*, *Tamea carolina*) to determine the consequences for their interactions as intraguild predators. (4.) We found that shifts in relative arrival altered not only predation strength but also the nature of predator-prey interactions. When arrival differences were great, SMPE allowed the early arriver to prey intensely upon the late arriver, causing exclusion of the late arriver from nearly all habitats. As arrival differences decreased, the early arriver's size advantage also decreased. When arrival differences were smallest, there was mutual predation, and the two species coexisted in similar abundances across habitats. Importantly, we also found a nonlinear scaling relationship between shifts in relative arrival and predation strength. Specifically, small shifts in relative arrival caused large changes in predation strength while subsequent changes had relatively minor effects. (5.) These results demonstrate that SMPE can alter not only the outcome of interactions but also the demographic rates of species and the structure of communities. Elucidating the mechanisms that link phenological shifts to species interactions is crucial for understanding the dynamics of seasonal communities as well as for predicting the effects of climate change on these communities." (Authors)] Address: Rudolf, V., Dept of Biology, University of

Virginia, 243, Gilmer Hall, Charlottesville, VA 22904, USA.
E-mail: vrudolf@virginia.edu

14570. Reinhardt, K. (2014): Buchbesprechung: Bönsel, A. & Frank, M. (2013): Verbreitungsatlas der Libellen Mecklenburg-Vorpommerns. Natur + Text, Rangsdorf, ISBN 978-3-942062-12-1. Enomologische Nachrichten und Berichte 58(1/2): 40. (in German) [review] Address: Reinhardt, K., Dept Animal and Plant Sciences, Univ. of Sheffield, Sheffield S10 2TN, UK. E-mail: K.Reinhardt@sheffield.ac.uk

14571. Riservato, E.; Fabbri, R.; Festi, A.; Grieco, C.; Hardersen, S.; Landi, F.; Utzeri, C.; Rondinini, C.; Battistoni A.; Teofili C. (com.) (2014): Lista Rossa IUCN delle libellule Italiane. Comitato Italiano IUCN e Ministero dell'Ambiente e della Tutela del Territorio e del Mare, Roma: 39 pp. (in Italian, with English summary) ["The main objectives of this research are: 1) the creation of an expert network for the evaluation of the extinction risk of dragonflies and damselflies in Italy; 2) the evaluation of the extinction risk for all Italian dragonflies and damselflies; 3) the creation of a baseline for future evaluations of the trends in biodiversity conservation in Italy. The assessments of extinction risk are based on the IUCN Red List Categories and Criteria and the most up-to-date guidelines. The assessments have been carried out in a workshop involving experts covering different taxa and regions in Italy, and have been evaluated according to the IUCN standards. All dragonflies and damselflies native or possibly native to Italy have been included in the evaluation. In all cases the entire national population has been evaluated, including large and small islands where necessary. Of the 93 species assessed, one has become Regionally Extinct in recent times. Threatened species total 10, corresponding to 10.9% of the species assessed. Ca. 72% of the species are not currently threatened with extinction. Overall the populations of Italian dragonflies and damselflies are declining, as species in decline outnumber species in expansion by 5 to 1. The main threats are habitat loss and pollution. Threatened species, as well as species experiencing population declines, concentrate in natural freshwater wetlands. The Red List is a fundamental tool for the identification of conservation priorities, but it is not a list of priorities on its own. Other elements instrumental to priority setting include the cost of action, the probability of success, and the proportion of the global population of each species living in Italy, which determines the national responsibility in the long term conservation of that species." (Authors)] Address: Riservato, Elisa, Dipartimento di Biologia Animale, Università di Pavia, Piazza Botta 9, 27100 Pavia, Italy. E-mail: elisa.riservato@unipv.it

14572. Riservato, E.; Christille, C.; Marguerettaz, F.; Vanacore Falco, I. (2014): Odonatofauna della Valle d'Aosta (Insecta: Odonata). Rev. Valdôtaine Hist. Nat. 68: 55-90. (in Italian, with English summary) ["The dragonfly fauna of Aosta Valley (NW Italy) was object of a three years study, aimed to increase the knowledge on the distribution of species in the Region. With 44 species, Aosta Valley hosts

46% of Italian species, 4 new species were added to the regional checklist (*Erythromma viridulum*, *Coenagrion hastulatum*, *Orthetrum albostylum* and *O. coerulescens*) and 5 species previously recorded for the area have not been confirmed during the study (*Lestes dryas*, *Sympecma fusca*, *Ceriagrion tenellum*, *Sympetrum fonscolombii* and *Sympetrum pedemontanum*). This paper updates the regional checklist (with maps) and a critical list of species is presented." (Authors)] Address: Riservato, Elisa, Società Italiana per lo Studio e la Conservazione delle Libellule Italiane – ODONATA.IT (Onlus), Via San Francesco di Sales, 88, 10022 Carmagnola (TO), Italy

14573. Roberts, D. (2014): Rapid habituation by mosquito larvae to predator kairomones. *Journal of Vector Ecology* 39(2): 355-360. (in English) ["Larvae of some species of mosquitoes have been shown to respond to water-borne kairomones from predators by reducing bottom-feeding and replacing it with surface filter-feeding, which uses less movement and is thus less likely to attract a predator. However, if no predator attack takes place, then it would be more efficient to use a risk allocation strategy of habituating their response depending on the predator and the overall risk. The larvae of *Culiseta longiareolata* Macquart live in temporary rain-filled pools, where they are exposed to a high level of predation. Within one hour, they responded to kairomones from dragonfly or damselfly nymphs, or to the fish *Aphanius*, by significantly reducing bottom-feeding activity. Continued exposure to the predator kairomones resulted in habituation of their response to damselflies, a slower habituation to fish, but no habituation to dragonflies even after 30 h. In contrast, the larvae of *Culex quinquefasciatus* Say normally live in highly polluted and thus anaerobic water, where the predation risk will be much lower. They also showed a significant reduction in bottom-feeding after 1 h of exposure to predator kairomones but had completely habituated this response within 6 h of continuous exposure. Some species of mosquito larvae can thus show a very rapid habituation to predator kairomones, while others only habituate slowly depending on the predator and overall predation risk." (Authors)] Address: Roberts, D., Biology Dept, Sultan Qaboos Univ., PO Box 36, Al-Khod 123, Oman. E-mail: derekmr@squ.edu.om

14574. Rodriguez, J.S.; Molineri, C. (2014): Description of the final instar larva of *Rhionaeschna vigintipunctata* (Ris, 1918) (Odonata: Aeshnidae). *Zootaxa* 3884(3): 267-274. (in English, with Spanish summary) ["The final instar larva of *Rhionaeschna vigintipunctata* (Ris) (Odonata, Aeshnidae) is described for the first time. The description is based on a series of mature female larvae collected in Tucumán (NW Argentina) and reared to imago. It shares the U-shaped distal excision of epiproct with other larvae of the *Marmaraeschna* group (only *R. pallipes* and *R. brevicercia* known from this stage); but the minute tubercle at each side of the cleft of ligula is absent. Other characters unique to *R. vigintipunctata* include: open ligula (vs. closed in other "*Marmaraeschna*"), and mandibular formula. A table to distinguish the larvae of the three species

of "Marmaraeschna" and biological and distributional data of *R. vigintipunctata* are included." (Authors)] Address: Rodríguez, J.S., Instituto de Biodiversidad Neotropical, CONICET (Argentine Council of Scientific Research), Facultad de Ciencias Naturales e IML, Universidad Nacional de Tucumán, M. Lillo 205, 4000, San Miguel de Tucumán, Argentina. E-mail: josephum@hotmail.com

14575. Roland, H.-J.; Stübing, S. (2014): *Sympetrum meridionale* in Deutschland – langfristige Bestandsentwicklung und aktuelle Vorkommen (Odonata: Libellulidae). *Libellula* 33(1/2): 75-98. (in German, with English summary) ["Long-term development and current occurrence of *Sympetrum meridionale* in Germany (Odonata: Libellulidae) – Based on ca 700 field records and data from the literature, the occurrence and distribution of *Sympetrum meridionale* in Germany is compiled and analyzed over four periods between 1890 and 2013. While the species was only sporadically and locally recorded until the turn of the millennium, it clearly dispersed to east and north thereafter. Up to 2013 it was found in all federal states of Germany except Schleswig-Holstein and the city states Bremen and Berlin. In 7 of 13 federal states the species was only observed from 2006 onwards. Presumably the species dispersed northwards along the Rhine valley and immigrated from France, Belgium and the Netherlands to North Rhine-Westphalia. For records in eastern Germany, there are no distinct explanations so far. Both, immigration from Hungary and also from the west seems possible. As invasions in single years could not be ascertained, slow dispersal in Germany with temporary reproduction seems more likely. Perennial colonization was only found in a few regions. Presumably, this dispersal cannot only be explained by improved identification methods and increased attention to this species. For reproduction *S. meridionale* needs shallow water bodies with low water-level for oviposition and flooding during the subsequent months until emergence in the following year. Despite creation of numerous ponds as a result of conservation measures, shallow water bodies with periodically oscillating water levels are still rare, but increasing in number. The continuous high number of annual summer days since the year 2000 may support the dispersal trend." (Authors)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: hjroland@gmx.de

14576. Roland, H.-J.; Hein, A.T.; Martens, A.; Wildermuth, H. (2014): *Sympetrum meridionale* mit Milbenbefall an den Flügeln: Analyse der Funde im Jahr 2013 in Deutschland (Acari: Hydrachnidia; Odonata: Libellulidae). *Libellula* 33(1/2): 99-108. (in German, with English summary) ["Water mites on the wings of *Sympetrum meridionale*: an analysis of the 2013 records in Germany (Acari: Hydrachnidia; Odonata: Libellulidae) – During an extensive survey of *Sympetrum meridionale* in Germany parasitism of this species by the water mite *Arrenurus papillator* was recorded on the basis of photographic documents. The localities of parasitised dragonfly imagines were distributed north to Lower Saxony and Brandenburg and included all federal states with records of *S. meridionale*. Most records

originated from Hesse and Rhineland-Palatinate, both states featured the greatest density of locations and highest number of individuals per locality. A total of 29 parasitised dragonflies were found, 28 thereof bore 1-4 mites on the wings, thus the rate of parasitism and parasite load were low. In addition and for the first time recorded, on one young male at least two mite larvae were attached on the ventral side of the thorax. As *S. meridionale* emerged in 2013 at several German localities the mites presumably originated from there." (Authors)] Address: Roland, H.-J., Im Mühlahl 35, 61203 Reichelsheim, Germany. E-mail: hjroland@gmx.de

14577. Rosset, V.; Angélibert, S.; Arthaud, F.; Bornette, G.; Robin, J.; Wezel, A.; Vallod, D.; Oertli, B. (2014): Is eutrophication really a major impairment for small waterbody biodiversity? *Journal of Applied Ecology* 51(2): 415-425. (in English) [Switzerland; "(1) Eutrophication remains a major stress for freshwater biodiversity. Its deleterious consequences on biodiversity are well-documented for large waterbodies. However, the impact of eutrophication may differ in smaller waterbodies, such as ponds and small lakes, which generally support naturally high levels of nutrients in lowlands. Furthermore, this response could depend on the scale considered, from local (individual waterbody, alpha diversity) to regional (the network of waterbodies, gamma diversity). It is also unclear if the richness of threatened species responds in the same way as the richness of the whole assemblage. (2) The present study investigates local- and regional-scale consequences of eutrophication on taxonomic richness (all taxa) and conservation value (threatened taxa) in temperate lowland small waterbodies. Five taxonomic groups were investigated: macrophytes, gastropods, water beetles, adult dragonflies and amphibians, in a set of natural waterbodies and a set of enriched waterbodies covering a large nutrient gradient from mesotrophic to hypertrophic conditions. (3) Globally, our study did not reveal consistent, systematic responses to eutrophication. For macrophytes, the richness and conservation value suffered from eutrophication at both local and regional scales. In contrast, for amphibians and gastropods, eutrophication did not impair biodiversity at the local nor the regional scale. Dragonflies and water beetles showed intermediate situations, with an impairment by eutrophication varying according to the type of waterbodies considered. At the regional scale, each trophic status, even the nutrient-richest, brought an original contribution to biodiversity. (4) Synthesis and applications. The management of eutrophication for small lowland waterbodies has to be considered differently than for lakes. For an individual waterbody (the local scale), nutrient enrichment is not necessarily a major impairment and its impact depends on the taxonomic group considered. Conversely, at the landscape scale, eutrophication is a major pressure on small waterbody biodiversity, especially because nutrient-rich small waterbodies are dominant in the landscape. Therefore, conservation efforts should integrate the notion of pond regional networks or "pondscapes", where the regional biodiversity is supported by a mosaic of trophic conditions, and promote the presence of less-rich

waterbodies." (Authors)] Address: Rosset, Veronique, Univ. of Applied Sciences Western Switzerland, hepia Geneva Technology, Architecture & Landscape, Jussy, Geneva, Switzerland. E-mails: veronique@rosset.org

14578. Saha, P.D.; Gaikwad, S.M. (2014): Diversity and abundance of Odonata in parks and gardens of Pune city. *Journal of Entomology and Zoology Studies* 2(5): 308-316. (in English) [Poona(h), Maharashtra, India. "Man-made Parks and gardens play a vital role in maintaining urban insect diversity besides controlling pollution. The objective of this study was to find out the diversity and abundance of Odonates and to evaluate the importance of human-managed urban parks and gardens in supporting Odonata diversity. Thirty big and small parks and gardens of Pune city were surveyed during 2012-2013 at regular intervals to record the diversity of Odonates. A total of 1113 individuals were recorded comprising of 33 species under 6 families. The diversity and abundance of species depends on a number of factors like presence or absence of water bodies, size of the water bodies, level of human disturbances, shade cover, presence of emergent aquatic reeds, degree of pollution and garden management practice." (Authors)] Address: Saha, P.D., Zoological Survey of India, Western Regional Centre, Vidya Nagar, Akurdi, Pune-411044 (Maharashtra), India

14579. Sajan, S.K.; Patel, J.R.; Bakshi, M.K.; Singh, A.K.; Kazmi, S.E.H.; Mishra, A.K.; Anand, P. (2014): Diversity and abundance of Odonata in Palamau Tiger Reserve, Jharkhand, India. *Advances in Applied Science Research* 5(6): 126-131. (in English) ["The Odonata survey on diversity and abundance of Palamau Tiger Reserve was carried out for the first time to give a preliminary checklist of species within the reserve. Total 30 species of Odonata were recorded at seven different ranges of which 20 species from Anisoptera and 10 species from Zygoptera. 54% species was recorded from Libellulidae family (16) followed by 13% Coenagrionidae (4), 10% from Calopterygidae (3), 7% from both Gomphidae and Aeshnidae and 9% from other families respectively. The Shannon index shows that Kutku and Baresanar ranges have maximum diversity, whereas Chhipadohar West and Betla having least diverse area. Jaccard index indicate the similarities between Baresanar and Kutku, Betla and Chhipadohar East, Garu East and Garu West respectively. Earlier 17 species recorded from this region by Zoological Survey of India. Out of four species *Rhyothemis flavescens*, *Trithemis pallidinervis*, *Potamarcha congener* and *Lestes viridula* have been not sighted this time. Current survey deals with 13 new record for this reserve." (Authors)] Address: Sajan, S.K., Wild India, Behind Junior DAV School, Gandhi Nagar, Kanke Road, Ranchi, Jharkhand, India

14580. Sathe, T.V.; Shinde, K. (2014): Biodiversity, abundance and prey status of odonates from paddy ecosystems of Kolhapur district, India. *Agriculture* 4(9): 4-6. (in English) ["In Kolhapur region paddy is widely cultivated. However, expected yield of the crop has not achieved so

far because of damage caused by insect pests to the crops. Odonata are predatory insects and good biocontrol agents of paddy insect pests and mosquitoes. Therefore, biodiversity, abundance and prey status of Odonata have been studied in paddy ecosystem of Kolhapur. A total of 36 species of odonates have been reported from paddy ecosystem." (Authors)] Address: Sathe, T.V., Department of Zoology, Shivaji University, Kolhapur 416 004, India

14581. Schmidt, E. (2014): Später Fund der Südlichen Heidelibelle *Sympetrum meridionale* (Selys, 1841) im Münsterland (20.11.2013) (Odonata, Libellulidae). *Entomologische Nachrichten und Berichte* 58(1/2): 81-82. (in German) [Streckteich, Teichgut Hausdülmen, Dülmen, Westmünsterland, Nordrhein-Westfalen, Germany; 20-XI-2013] Address: Schmidt, E., Coesfelder Str. 230, D-48249 Dülmen, Germany

14582. Seehausen, M.; Schardt, L. (2014): A small saline spring-fed pond as habitat for *Aeshna cyanea* and *Pyrrhosoma nymphula* (Odonata: Aeshnidae, Coenagrionidae). *Notul. Odonat.* 8(4): 101-104. (in English) ["Reproduction of *Aeshna cyanea* and *Pyrrhosoma nymphula* in a small saline spring-fed pond near the village Eltville (Hessen, Germany; 50.056971N, 08.084431E) is documented. The maximum conductivity within larval habitat was 12,400 $\mu\text{S}/\text{cm}$ [25°C] and the salinity was 7.8 PSU. These and other values such as chloride, sodium, potassium and calcium are considerably higher than in habitats previously reported for these two species." (Authors)] Address: Seehausen, M., Museum Wiesbaden, Friedrich-Ebert-Allee 2, 65185 Wiesbaden. E-mail: malte.seehausen@museum-wiesbaden.de

14583. Shiffer, C.N.; White, H.B. (2014): Dragonfly and damselfly colonization and recolonization of a large, semi-permanent Pennsylvania pond. *Northeastern Naturalist* 21(4): 630-651. (in English) ["Odonata at Ten Acre Pond in central Pennsylvania have been monitored on a yearly, monthly, and often weekly basis for over half a century, making the Odonata fauna of the pond the most thoroughly documented of any habitat in the United States. Here we summarize the yearly and seasonal distribution of all species reported from 1955 through 2011. Of the 938 Odonata surveys at this semi-permanent pond, 60% are since 1994 when observations were last summarized. Of the 86 species observed at least once, 14 appeared since 1994. Several species that were rare or absent before 1980 have established transient populations, and a few with southern affinities have become well established. The pond's water levels often fluctuate dramatically from year to year and through the year. For populations of "resident" species, recolonization from other local populations occurs efficiently after periods of drought." (Authors)] Address: White, H.B., Dept of Chemistry & Biochemistry, Univ. of Delaware, Newark, DE 19716, USA. E-mail: halwhite@udel.edu

14584. Soniyagandhi, M.; Kumar, K. (2014): Impact of ag-

rochemicals on Odonata in rice (*Oryza sativa* L.) ecosystem. *JBiopest* 7(1): 52-56. (in English) ["Two supervised field experiments were conducted during kharif, 2012 and rabi, 2012-13 to study the impact of agrochemicals on the population of Odonata in rice at Pandit Jawaharlal Nehru College of Agriculture and Research Institute (PAJANCOA & RI), Karaikal, U.T. of Puduchery, India. The experiment was laid out in a randomized block design with eight treatments and three replications. It includes sole application of herbicide (Butachlor @ 2.5 litres/ha), fertilizers (NPK applied @ 50% N + 10% P + 10% K), insecticide (Chlorpyrifos @ 0.02 per cent seedling dip and foliar spray @ 1250 ml/ha), herbicide + fertilizer, herbicide + insecticide, fertilizer + insecticide, herbicide + fertilizer + insecticide and untreated check. In this experiment eight species of Odonata viz., *Agriocnemis pygmaea*, *Ceriatagrion coromandelianum*, *Ischnura aurora*, *Lestes elatus*, *Diplacodes trivialis*, *Orthetrum sabina*, *Pantala flavescens* and *Rhyothemis variegata* were identified during the crop growth period. The population of Odonata was recorded from 1st week to 12th week after transplanting. During kharif, the overall mean population of Odonata ranged from 0.19 to 0.65 /sweeping. It was found that the per cent reduction was higher in the treatment with herbicide + insecticide (70.7%) compared to the untreated check. During rabi, the overall mean population of Odonata ranged from 0.19 to 0.56/sweeping. A higher per cent reduction was observed in the treatment with herbicide + insecticide (6.07%) as in the kharif. It was concluded from both field experiments a higher population of Odonata was observed in the untreated check followed by the treatment with fertilizer alone while a low population was observed in the herbicide + insecticide treatment followed by insecticide alone." (Authors)] Address: Kumar, K., Department of Agricultural Entomology and Nematology, Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Karaikal-609 603. U. T. of Puduchery, India. E-mail: kumarkaliaperumal@yahoo.co.in

14585. Stille, M.; Stille, B.; Schröter, A. (2014): *Lindenia tetrphylla* – new for the island of Kérkira (Corfu), Greece (Odonata: Gomphidae). *Notulae odonatologicae* 8(4): 86-90. (in English) ["*L. tetrphylla* is reported from Kérkira (Corfu), Greece, for the first time on the basis of photographic records. On the 28-vi-2014 five adult males were found by the shore of an artificial water reservoir. Given the known habitat preferences of *L. tetrphylla* and the ecological conditions of the reservoir it is supposed that the species may be indigenous on the island." (Authors)] Address: Stille, Marie, Kokkini, Kefalovrisso 1410, 49100 Corfu, Greece. E-mail: stille.corfu@gmail.com

14586. Svitra, G.; Gliwa, B. (2014): Data on 23 rare species of dragonflies (Odonata) recorded in Lithuania in 2009–2014. New and rare for Lithuania insect species records and descriptions 26: 5-18. (in English) ["This article presents new data on 23 species of dragonflies registered in 33 administrative districts and municipalities of Lithuania in 2009–2014. Six species (*Leucorrhinia albifrons*, *L.*

caudalis, *L. pectoralis*, *Ophiogomphus cecilia*, *Aeshna viridis*, *Sympetma paedisca*) are protected in the European Union according to the Habitats Directive. .. Additionally, the following species are protected in Lithuania: *Coenagrion johanssoni*, *Ischnura pumilio*, *Nehalennia speciosa*, *Anax parthenope*, *Aeshna crenata*, *Gomphus flavipes*, *Cordulegaster boltonii*, *Sympetrum pedemontanum*. The other species we report on are either very rare or in some cases appeared in Lithuania only recently due to changes in their distribution area. Data on distribution of rare and endangered dragonfly species are crucial for protection of their habitats." (Authors)] Address: Lithuanian Entomological Society, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mails: giedsvis@gmail.com, berndgliwa@yahoo.de.

14587. Swaegers, J.; Janssens, S.B.; Ferreira, S.; Watts, P.C.; Mergeay, J.; McPeck, M.A.; Stoks, R. (2014): Ecological and evolutionary drivers of range size in *Coenagrion* damselflies. *Journal of evolutionary biology* 27(11): 2386-2395. (in English) ["Geographic range size is a key ecological and evolutionary characteristic of a species, yet the causal basis of variation in range size among species remains largely unresolved. One major reason for this is that several ecological and evolutionary traits may jointly shape species' differences in range size. We here present an integrated study of the contribution of ecological (dispersal capacity, body size and latitudinal position) and macroevolutionary (species' age) traits in shaping variation in species' range size in *Coenagrion* damselflies. We reconstructed the phylogenetic tree of this genus to account for evolutionary history when assessing the contribution of the ecological traits and to evaluate the role of the macroevolutionary trait (species' age). The genus invaded the Nearctic twice independently from the Palearctic, yet this was not associated with the evolution of larger range sizes or dispersal capacity. Body size and species' age did not explain variation in range size. There is higher flight ability (as measured by wing aspect ratio) at higher latitudes. Species with a larger wing aspect ratio had a larger range size, also after correcting for phylogeny, suggesting a role for dispersal capacity in shaping the species' ranges. More northern species had a larger species' range, consistent with Rapoport's rule, possibly related to niche width. Our results underscore the importance of integrating macroecology and macroevolution when explaining range size variation among species." (Authors)] *Coenagrion angulatum* (Canada), *C. armatum* (Russia), *C. caerulescens* (Morocco, Spain), *C. glaciale* (Russia), *C. hastulatum* (Italy, Sweden), *C. hylas* (Russia), *C. interrogatum* (Alaska, Canada), *C. johanssoni* (Finland, Russia), *C. lanceolatum* (Russia), *C. lunulatum* (Sweden, Russia), *C. mercuriale* (Italy, Spain), *C. ornatum* (Slovenia), *C. puella* (Croatia, Spain), *C. pulchellum* (Bosnia, Macedonia, Russia), *C. resolutum* (Alaska, Canada), *C. scitulum* (Italy, Morocco, Portugal, Spain), *Ischnura elegans*, *Paracercion melanotum* and *Enallagma cyathigerum*] Address: Swaegers, J., Deberiotstraat 32, 3000 Leuven, Belgium. E-mail: Janne.Swaegers@bio.kuleuven.be

- 14588.** Takashima, K.; Nakamura, K. (2014): Geographical variation in egg diapause in *Sympetrum frequens*. *International Journal of Odonatology* 17(2-3): 81-87. (in English) ["The effects of photoperiod and temperature on the termination of egg diapause were examined in *Sympetrum frequens*. Eggs were obtained from adult females collected from three locations in Japan and incubated under short- or long-day photoperiods at a constant temperature of 25, 20, or 15°C. Egg diapause was eventually terminated in all treatments. Because differences in the average developmental time were small among the temperature treatments, it was concluded that the rate of diapause development is more rapid at lower temperatures, as in other Odonata species. A clear geographic trend was not found in the egg period, which may reflect the life cycle of *S. frequens*: the timing of reproduction is the same or even earlier in higher than in lower latitudes. Relatively large variations in embryonic period were found among populations and even within a population at 15°C, suggesting that the rate of diapause development is also variable. The results also suggested that a short photoperiod might prevent *S. frequens* eggs from hatching before the onset of winter." (Authors)] Address: Nakamura, K., Department of Biosphere-Geosphere Science, Faculty of Biosphere-Geosphere Science, Okayama University of Science, Okayama 700-0005, Japan
- 14589.** Tamm, J. (2014): Libellenfunde im späten Frühjahr auf Zypern (Odonata). *Libellula* 33(3/4): 177-188. (in German, with English summary) ["Late spring observations of Odonata from Cyprus – From 3 to 17 May 2013, 18 Odonata species were recorded in southwestern Cyprus. The record of *Anax immaculifrons* is of special interest. Observations on habitat choice, diurnal activities, and other behavioural patterns of several species are noted." (Author)] Address: Tamm, J., Elgershäuser Straße 12, 34131 Kassel, Germany. E-mail: jochen.tamm@t-online.de
- 14590.** Tanahashi, M.; Futahashi, R. (2014): The first record of *Ischnura senegalensis* from Akusekijima Island, Tokara Islands. *Aeschna* 50: 135-136. (in Japanese, with English summary) [Japan, 3. VIII. 2013.] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp
- 14591.** Tarng, W.; Lu, N.-Y.; Shih, Y.-S.; Liou, H.-H. (2014): Design of a virtual ecological pond for motion-sensing game-based learning. *International Journal of Computer Science & Information Technology (IJCSIT)* 6(2): 21-39. (in English) ["The campus ecological pond is an effective tool to assist science teaching since it allows students to obtain knowledge of aquatic biology in freshwater environments by practical observation. In this study, a virtual campus ecological pond was developed for applications in science education in elementary schools. The system integrates real ecological situations of aquatic environments into learning activities to enhance the learning interest and motivation of students. They can observe the features of aquatic plants and aquatic animals (including dragonflies) on mobile devices and understand the relation between food chain and ecological balance in aquatic ecosystems by role playing and game missions. The virtual ecological pond can save the cost and manpower needed for building and maintaining a real ecological pond, and it can also solve the problems of insufficient species and difficulty to observe under water. Thus, it is a useful assistant tool for teaching aquatic ecology in elementary schools." (Authors)] Address: Tarng, W., Graduate Institute of e-Learning Technology, National Hsinchu University of Education, Taiwan
- 14592.** Theischinger, G.; Richards, S.J. (2014): A new species of *Lanthanusa* Ris from north-eastern Papua New Guinea (Odonata: Libellulidae). *International Journal of Odonatology* 17(2-3): 127-133. (in English) ["A new species (*Lanthanusa cochlear* nov. spec.) of the endemic New Guinean genus *Lanthanusa* is described from the Trauna River Valley in Western Highlands Province, Papua New Guinea. Characters of the male are illustrated and affinities of the new species are discussed. Some characters of the type species of *Lanthanusa*, *L. cyclopica*, are reassessed and a revised key to the genus is presented." (Authors)] Address: Theischinger, G., Water Science, Office of Environment and Heritage, NSW, Dept of Planning & Environment, PO Box 29, Lidcombe, NSW 1825, Australia. E-mail: gunther.theischinger@environment.nsw.gov.au
- 14593.** Theischinger, G.; Richards, S.J. (2014): The species of *Microtrigonia* Förster (Anisoptera, Libellulidae). *International Dragonfly Fund - Report 76*: 1-12. (in English) ["Several errors and misinterpretations in available keys, diagnoses and descriptions of species in the libellulid genus *Microtrigonia* Förster are corrected. *M. marsupialis* Förster is known only from the holotype male, *M. petaurina* Lieftinck only from the holotype female, and the only species for which both sexes are known is *M. gomphoides* Lieftinck. A species recently collected in Papua New Guinea, *Microtrigonia curvata* sp. nov. (Holotype male from Yukfon Creek, Hindenburg Range), is described, illustrated and discussed." (Authors)] Address: Theischinger, G., NSW Dept of Planning and Environment, Office of Environment and Heritage, PO Box 29, Lidcombe NSW 1825 Australia. E-mail: gunther.theischinger@environment.nsw.gov.au
- 14594.** Theunert, R. (2014): Buchbesprechung: Wildermuth, H. & Martens, A. (2014): Taschenlexikon der Libellen Europas. Alle Arten von den Azoren bis zum Ural im Porträt. Verlag Quelle & Meyer. Wiebelsheim. 824 S. ISBN 978-3-494-01558-3. 69: (in German) [review] Address: not stated
- 14595.** Tyagi, B.K. (2014): Extended distribution and variation in morphological features of *Disparoneura* (*Chloroneura*) *quadrimaculata* (Rambur, 1842) (Odonata: Zygoptera; Protoneuridae) in the Mt. Abu ranges of Southern Rajasthan, India. *Halteres* 5: 69-72. (in English) ["*D. quadrimaculata*, earlier documented to be endemically present in

the mountain ranges of the Western Ghats in southwestern states and the Satpura mountain ranges in Central India, has recently been recorded for the first time near the Nakki Lake in Mount Abu (Alt. 1220 m m.s.l.) range of the Aravalli Hills in south-western Rajasthan, India." (Author)] Address: Tyagi, B.K., Centre for Research in Medical Entomology (ICMR), 4-Sarojini Street, Chinna Chokkikulam, Madurai 625002, T.N., India. E-mail: abktyagi@gmail.com

14596. Ulikowski, D.; Piotrowska, I.; Chybowski, L.; Krzywosz, T.; Traczuk, P. (2014): Interaction between juvenile narrow-claw crayfish, *Astacus leptodactylus* (Eschscholtz), and common water frog, *Rana esculenta* (L.), tadpoles or common blue damselfly, *Enallagma cyathigerum* (Charpentier), larvae during rearing under controlled conditions. *Arch. Pol. Fish.* 22: 257-264. (in English) ["Interactions were studied among juvenile *A. leptodactylus*, *R. esculenta* tadpoles and *E. cyathigerum*, larvae during rearing under controlled conditions. Interactions among the species studied had a positive impact on the survival of the crayfish, but the differences were not statistically significant ($P > 0.5$). The juvenile crayfish attacked and consumed the frog tadpoles and damselflies, but the juvenile crayfish very rarely fell prey to them. Only in the initial stage of life and during molting did larval damselflies prey upon juvenile crayfish. After 30 days of the experiment the interaction between crayfish-tadpoles and crayfish-larval damselflies was not noted to have had a statistically significant ($P < 0.05$) impact on crayfish growth. Juvenile crayfish aggression toward tadpoles and larval damselflies was often offset by the loss of even both chelipeds. In the crayfish-larval damselfly interaction the loss of both chelipeds was three-fold more common than it was in the crayfish-tadpole interaction; however, these differences were not statistically significant ($P > 0.5$). The effect of intraspecific interaction (crayfish-crayfish) was more a threat in terms of mortality from cannibalism than were interspecific interactions (crayfish-tadpole and crayfish-larval damselfly)." (Authors)] Address: Ulikowski, D., Department of Lake Fisheries, Inland Fisheries Institute in Olsztyn, Poland, ul. Rajska 2, 11-500 Gizycko, Poland. E-mail: ulikowski@infish.com.pl

14597. Varshini, R.A.; Kanagappan, M. (2014): Effect of quantity of water on the feeding efficiency of dragonfly nymph - *Bradinopyga geminata* (Rambur). *Journal of Entomology and Zoology Studies* 2(6): 249-252. (in English) ["Vector-borne diseases such as malaria, filariasis, Japanese encephalitis, dengue and many other arboviral diseases are emerging and resurging as serious public health problems. Chemical pesticides and insecticides failed to give sustained control. Among various predators of mosquito larvae, dragonfly nymphs are efficient, found naturally, safe for human beings, and are also economical in their application. Many factors that affect the feeding efficiency of dragonfly nymphs were studied in the present experiment and one among them was the quantity of water, which negatively correlated (-0.96304) with the feed-

ing efficiency of odonate larvae *B. geminata*. The maximum prey consumption 33.37 was recorded when the quantity of water was 100 ml and minimum predation 12.33 was recorded when it was 500 ml." (Authors)] Address: Kanagappan, M., Department of Zoology and Research Centre, Scott Christian College (Autonomous), Nagercoil, 629003, India

14598. Villanueva, R.J.T.; Cahilog, H. (2014): Odonata Fauna of Balut and Sarangani islands, Davao Occidental Province, Philippines. *International Dragonfly Fund - Report 66: 1-23.* (in English) ["Balut and Sarangani islands are two small landmasses situated off the coast of Davao Occidental, Mindanao Island. Despite recent increase on odonatological data from various islands in the Philippines, these two remote islands have never been explored. Hence, a short survey was conducted on first week of April and November 7 - November 14, 2010 on all freshwater systems in these two islands. Twenty-five species under seven families and 21 genera were found representing the first Odonata record for the two islands." (Authors)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

14599. Wang, J.Z.; Melfi, J.; Leonardo, A. (2014): How do dragonflies recover from falling upside down?. *Bulletin of the American Physical Society, 67th Annual Meeting of the APS Division of Fluid Dynamics, Volume 59, Number 20, Sunday-Tuesday, November 23-25, 2014; San Francisco, California: 1 p.* (in English) [Verbatim: We release dragonflies from a magnetic tether so that they fall from an initially upside down orientation. To recover, the dragonflies roll their body 180 degrees every time. This set up offers an effective method for eliciting a stereotypical turn so that we can collect a large amount of data on the same turn. From the wing and body kinematics, we can tease out the strategy dragonflies use to roll their body. We record these flights with three zoomed in high-speed video cameras. By filming at 4000 to 8000fps, we measure the wing twist along each of the four wings as a part of the 3D wing kinematics. The shape of the wing twist depends on the interaction between the aerodynamic torque and the torque exerted by muscles, therefore providing clues on which of their four wings actively participate in creating the turn. By applying dynamic calculations to the measured kinematics, we further deduce the amount of torques dragonflies exert in order to turn.] Address: Wang, Z. Jane, Theoretical and Applied Mechanics, Cornell University, Ithaca, New York 14853, USA. E-mail: z.jane.wang@cornell.edu

14600. Wang, X.; Zhang, Z.; Li, Q.; Wang, Q.; Yan, X. (2014): An information acquisition method based on dragonfly vision mechanism for observed target displacement measurement. *Sensor Letters* 12(2): 352-357. (in English) ["In recent years, river surface optical imaging velocimetry method has been developed as a feasible means for non-

contact river flow measurement during extreme flow conditions. However, due to the complex and variable physical and chemical properties of observed targets (i.e., flow tracers), and the various light disturbances, this kind of method is difficult to acquire the optical information of the observed targets precisely, which will induce failure in the following reconstruction of flow field as well as the river discharge measurement. To solve these problems, this paper presents a novel information acquisition method for observed target displacement measurement, which is inspired by dragonfly vision mechanism. It first designs a three-channel CMOS synchronous polarization imaging system to capture the polarization images of the river surface in three directions synchronously. Then, Stokes vectors are selected to compute the polarization degree image. Experimental results show that this method can improve the acquisition accuracy of the observed targets and provide a solid basis for the large-scale particle image velocimetry system." (Authors)] Address: Wang, X., College of Computer & Information, Hohai University, Nanjing, China

14601. Ware, J.L.; Beatty, C.D.; Sánchez Herrera, M.; Valley, S.; Johnson, J.; Kerst, C.; May, M.L.; Theischinger, G. (2014): The petaltail dragonflies (Odonata: Petaluridae): Mesozoic habitat specialists that survive to the modern day. *Journal of Biogeography* 41(7): 1291-1300. (in English) ["Dragonflies are an ancient group of organisms, appearing in the fossil record for the last 325 million years; however, individual dragonfly species—like other arthropod species—are thought to persist only for ~10 million years. Here we report results suggesting that the species of one family—Petaluridae—are very much older. The eleven extant petalurids are found in Australia, New Zealand, Chile, Japan and North America. Through a Bayesian molecular phylogeny and BEAST relaxed molecular clock, we show that the petalurids originated ~160 million years ago, and that many of these species have persisted as independent lineages for ~70 million years. Analysis with LaGrange suggests that these species distributed along the coast of the supercontinent Pangaea, arriving at their current locations through continental drift. These long species 'lifespans' are surprising, especially for a group of habitat specialists with long development times (petalurid larvae live exclusively in fen habitats, and take several years to reach adulthood). As such these dragonflies challenge our understanding of the factors that drive extinction." (Authors)] Address: Ware, Jessica, Department of Biology, 415 Boyden Hall, Rutgers University, Newark, NJ, 07102, USA. E-mail: jware42@andromeda.rutgers

14602. Willet, J. (2014): Site condition monitoring for Odonata on seven SSSIs. Scottish Natural Heritage Commissioned Report No. 753: 57 pp. (in English) ["Background: This contract was to carry out Site Condition Monitoring (SCM) of Odonata assemblages at seven designated sites in Scotland. Abernethy SSSI had an additional survey as part of another contract for the northern damselfly, *Coenagrion hastulatum*, which is another notified feature; the results from both surveys have been included

in this report. This contract repeated the various SCM undertaken for Odonata on these sites in 2002, 2003 and 2005. Main findings: - Abernethy: four visits, 11 species recorded, proof of breeding for 10. - Coille Dalavil: two visits, 10 species recorded, proof of breeding for six. - Coille Mhor: two visits, eight species recorded, proof of breeding for four. - Coulin: two visits, 10 species recorded, proof of breeding for seven. - Glen Affric: three visits, 12 species recorded, proof of breeding for 10. - Loch Bran: two visits, nine species recorded, proof of breeding for seven. - Loch Maree: two visits, 11 species recorded, all breeding. - All sites are in favourable-maintained condition." (Author)] Address: Tonhasca, Athayde, Scottish Natural Heritage, Redgorton, PERTH, PH1 3EW, UK. E-mail: athayde.tonhasca@snh.gov.uk

14603. Willigalla, C.; Jäckel, K.; Ackermann, J.; Koch, K. (2014): Veränderung der Libellenfauna (Odonata) der Stadt Mainz. *Mainzer naturwissenschaftliches Archiv* 51: 289-307. (in German, with English summary) ["From 2008 to 2013 the monitoring of dragon- and damselflies continued at 13 selected water sites within the urban area of Mainz. In total 44 species could be found, that is 66 % of the 67 species which currently exist in Rhineland-Palatinate. *Chalcolestes viridis*, *Coenagrion puella* and *Sympetrum striolatum* had a high consistency of 90 % within the study area, *S. sanguineum* even of 100 %. Compared to the study during the previous period from 2006 and 2007 the fauna of odonates in the urban area of Mainz enriched by four new species: *Coenagrion scitulum*, *Erythromma lindenii*, *Lestes virens* and *Brachytron pratense*. Moreover, some guests have been observed, namely *E. najas*, *Anax parthenope* and *Leucorrhinia pectoralis*. However, *Orthetrum brunneum* and *Ophiogomphus cecilia* were not sighted in the period of time from 2008 to 2013. The increase in the number of species in Mainz might probably be explained with the current climate-induced range shifts taking place in the dragonfly fauna. It is remarkable, however, that both higher species richness and higher consistencies could be found, despite the lower number of water bodies studied. In cases of good area knowledge it might thus be enough to monitor only selected reference waters to determine early population fluctuations." (Authors)] Address: Willigalla, C., Willigalla – Ökologische Gutachten, Am großen Sand 22, 55124 Mainz, Germany. E-mail: christoph@willigalla.de

14604. Yan, J.-Z.; Zheng, M.Z.; Li, Z.P.; Li, Q.S. (2014): Chapter 3: Mechatronics, Robotics and Control: Effects of Phase Relation between Forewing and Hindwing on Aerodynamic Performance in Dragonfly Flight. *Applied Mechanics and Materials* 709: 245-251. (in English) ["Dragonflies possess one of the most maneuverable flights among various insects. As the bionic Micro Air vehicles (MAVs) with the flight capabilities like dragonflies have been widely applied, detailed studies of dragonfly flight become critical and necessary for improvement and accomplishment of MAVs design. The phase relation between the forewings and hindwings is the most distinct feature of

dragonfly flight and it plays an important role in the aerodynamic performance. In this paper, both tethered and quasi-free flapping flight of the dragonfly *Pantala flavescens* was filmed using a high-speed camera in indoor laboratory. Dragonflies tend to flap in-phase when an additional force is expected, while out-of-phase flapping is conducive to the stability and control of flight. In the takeoff maneuver, the large- and small-amplitude wingbeat alternated. Dragonflies obtain a high acceleration rapidly by the suddenly enlarged wingbeat amplitude which increases by 42%, and maintain the velocity and make ready for following acceleration by the small-amplitude but high-frequency wingbeat with amplitude decreases by 51% and frequency increases by 30% relatively." (Authors)] Address: Yan, J.-Z., National Key Laboratory of Science & Technology on Aero-Engine Aero-thermodynamics, Collaborative Innovation Center of Advanced Aero-Engine. School of Energy & Power Engineering, Beihang University, Beijing, China. E-mail: ayjz8993@sina.com

14605. Yoshioka, A.; Miyazaki, Y.; Sekizaki, Y.; Suda, S.; Kadoya, T.; Washitani, I. (2014): A "lost biodiversity" approach to revealing major anthropogenic threats to regional freshwater ecosystems. *Ecological Indicators* 36: 348-355. (in English) ["We proposed a method for evaluating the quantitative contributions of hypothesized focal pressures to biodiversity loss from freshwater ecosystems at regional or local scales. The method, called the "lost biodiversity approach" (abbreviated as "LBA") focuses on local biodiversity losses caused by focal pressures. Lost biodiversity is explicitly estimated by statistically modelling the relationships between factors or focal pressures and "differential biodiversity," defined as the difference between local biodiversity at a sampled site and regional species pool(s). We applied LBA to two cases in Japan: (1) the damselfly fauna of 56 agricultural ponds in a rural region sharing the same regional species pool and (2) freshwater fish fauna in the 13 largest river systems in Hokkaido, which includes multiple species pools. In the former, where nestedness of sampled damselfly assemblages was detected, and thus the difference between local species richness and species pool size was used as a simple indicator of differential biodiversity, biodiversity lost to invasive alien species was successfully quantified. In the latter case, where no nestedness of fish assemblages was detected, and differential biodiversity was analyzed based on an index weighting rare species, biodiversity lost to dams and eutrophication were quantified. The advantages of LBA supported by the case studies were its (1) feasibility, using species snapshot presence-absence data, (2) ability to quantify a baseline for each local community when focal pressures were removed, and (3) ability to evaluate impacts of focal pressures even if each local community belonged to a different species pool. This method will be effective in biodiversity hotspot areas." (Authors)] Address: Akira Yoshioka, A., Graduate School of Agricultural and Life-Sciences, The University of Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan. E-mail: ayoshioka@08.alumni.u-tokyo.ac.jp

14606. Yu, X.; Bu, W. (2014): Notes on the retractability of gill tufts in *Pseudolestes mirabilis* (Zygoptera: Pseudolestidae). *International Journal of Odonatology* 17(2/3): 123-126. (in English) ["A detailed observation of living larva of *P. mirabilis* was conducted, with a focus on the gill tufts, which were confirmed to be retractable. Photographs of the larva in life and video records are provided to demonstrate this finding." (Authors)] Address: Bu, W.j., College of Life Sciences, Nankai University, Tianjin, China. E-mail: wenjunbu@nankai.edu.cn

14607. Zamorova, M.A.; Zamorov, V.V. (2014): Feeding of common bream *Abramis brama* in the Danube Lakes Yalpug and Kugurluy. *The Journal of V.N.Karazin Kharkiv National University. Series: biology* 20(1100): 138-145. (in Ukrainian, with Russian and English summaries) [In the Danube lakes Yalpug and Kugurluy (Ukraine), organisms from 26 taxa have been found in the diet of *A. brama*. With reference to the weight of diet, larvae of Chironomidae and Odonata, Oligochaeta and dreysena *Dreissena polymorpha* were most important.] Address: Zamorova, M.A., Odessa Il Mechnikov National University, Odessa, Ukraine. E-mail: hydrobiologia@mail.ru

14608. Zhang, H.-j. (2014): A new species of *Nychogomphus* (Anisoptera: Gomphidae) from Yunnan Province, China. *International Journal of Odonatology* 17(2-3): 59-62. (in English) ["*Nychogomphus yangi* sp. nov. is described from Yunnan, China (holotype male: Xishangbanna, Yunnan Province, China; deposited at the Shaanxi Bioresource Key Laboratory, Hanzhong, Shaanxi, China). The new species is described and illustrated and compared with its closest congener *Nychogomphus lui*." (Author)] Address: Zhang, H.-j., Shaanxi Bioresource Key Laboratory, Shaanxi University of Technology, Hanzhong 723000, Shaanxi, PR China

14609. Zhang, H.-m.; Vogt, T.E.; Cai, Q.-h. (2014): *Somatochlora shennong* sp. nov. from Hubei, China (Odonata: Corduliidae). *Zootaxa* 3878(5): 479-484. (in English) ["*S. shennong* sp. nov. (holotype male, Dajiuhu National Wetland Park in Shennongjia National Nature Reserve, Hubei Province, China, 9 August 2012) is described, illustrated, and compared with the related species *S. dido* Needham and *S. taiwana* Inoue & Yokota." (Authors)] Address: Cai, Q.-h., State Key Laboratory of Freshwater Ecology & Biotechnology, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan 430072, China. E-mail: qhcai@ihb.ac.cn

14610. Zhao, H.; Zhong, Z.; Yin, Y. (2014): Functional analysis of the micro/nanostructures of dragonfly wing veins. *Society of Engineering Science 51st Annual Technical Meeting*. 1-3 October 2014, Purdue University, West Lafayette, Indiana, USA: 1 p. (in English) [Verbatim: This article studies the internal micro/nanostructures and reveals the relations between the structures and functions of dragonfly wing veins. Through SEM, we take the microscopic photos of the cross-sections of dragonfly wing veins. From these photos, we obtain the following results:

(a) The micro/nanostructures vary along the axis of the vein, i.e., different cross-sections have different micro/nanostructures. (b) For a given cross-section, the micro/nanostructures are of multilevels and multiscales. (c) At large scale, the structures of the veins are of diversities and disorders. The larger is the size scale. The more complicated are the structures, and the higher are the diversities and disorders. At small scale, the structures of the veins are of unifications and orders. The smaller is the size scale, the simpler is the structures, and the higher are the unifications and orders. (d) At the micro scale, we may induce unified assembling mode for the vein's structures, i.e., "nanofibers/nanolayers (or nanobunches)". (e) Both the mechanical functions and biological functions of the micro/nanostructures of the veins are optimized synthetically.] Address: Zhao, H.-x., Tongji University, China. E-mail: zhx@tongji.edu.cn

2015

14611. Andrew, R.J.; Verma, P.; Thaokar, N. (2015): A parasitic association of Odonata (Insecta) with *Arrenurus Dugés, 1834* (Arachnida: Hydrachnida: Arrenuridae) water mites. *Journal of Threatened Taxa* 7(1): 6821-6825. (in English) ["The parasitic association between water mites (*Arrenurus* spp.) and Odonata is virtually ubiquitous wherever habitats suitable for both taxa exist. Yet, very little is known about this association within and among the odonate species of India. Here, we present a report on this parasitic relationship in the population of odonates of Wena Dam of Central India observed during the years 2011 and 2012. Of the 376 odonates collected for observation, 35(9.3%) individuals belonging to seven species (*Acisoma panorpoides*, *Brachydiplax sobrina*, *Ceriatrion coromandelianum*, *Crocothemis servilia*, *Diplacodes trivialis*, *Neurothemis tullia tullia*, *Trithemis pallidinervis*) were found to be parasitized by the *Arrenurus* spp. mites. The mites were found attached to the undersurface of the thorax and abdomen. In all the cases, the thorax was found infested while only in seven individuals the abdomen as well as the thorax was found infested with mites. A maximum number of mites on an individual dragonfly was in *C. servilia* (293) followed by *T. pallidinervis* (134) while the highest parasitic load per individual host species was found in *T. pallidinervis* (70.25%) followed by *C. servilia* (32.6%). The average parasitic load per individual female and male was 39.77 and 8.9, respectively." (Authors)] Address: Andrew, R.J., Post Graduate Department of Zoology, Hislop College, Nagpur, Maharashtra 440001, India. E-mail: rajandrew@yahoo.com

14612. Andrew, R.J.; Foerster, S. (2015): Egg shell ultrastructure of the dragonfly, *Micrathyrina dictynna* Ris (Anisoptera: Libellulidae). *Zoologischer Anzeiger - A Journal of Comparative Zoology* 254: 15-17. (in English) ["A highly specialized form of egg deposition occurs in *M. dictynna*, which attaches egg-masses onto the underside of leaves high above shallow streams in Central American rainfor-

ests. Here, we describe the ultrastructure of the egg chorion of *M. dictynna* to reveal structural adaptations related to this unusual form of oviposition. We find that the egg chorion is generally divided into a thin, sticky exochorion and a tough, hard, smooth endochorion. The exochorion of eggs collected from the peripheral region of egg masses, however, shows a separation into outer and inner exochorionic layers. The space formed between these layers develops numerous pillars. In eggs collected from the area between the periphery and central region of an egg mass, the exochorion exhibits irregular interconnected patches of elevated areas containing very fine superficial linear reticulations. We propose that the exochorion of peripheral eggs is functionally modified to form a plastron that regulates respiration and restricts water loss of eggs in the inner layers of the egg mass." (Authors)] Address: Foerster, S., Dept of Biology, Barnard College, Columbia Univ., New York, NY 10027, USA. E-mail: sf2041@columbia.edu

14613. Bello-Bedoy, R.; González-Santoyo, I.; Serrano-Meneses, M.A.; Vrech, D.; Rivas, M.; Munguía-Steyer, R.; Córdoba-Aguilar, A. (2015): Is allometry of sexual traits adaptive? A field test with territorial damselflies. *Biological Journal of the Linnean Society* 114(2): 327-334. (in English) ["Recent studies have linked static allometry of sexual traits to selective advantages, in terms of sexual selection. An underlying, yet untested, assumption is that the allometry of sexual traits confers higher mating success and/or survival. Here, we investigated whether the allometry of two sexual traits is related to male mating success and survival in two species of damselflies: wing size in *Paraphlebia zoe* and the red-pigmented wing spot in *Hetaerina americana*. We used large field-based data sets of marked-recaptured animals, in which we recorded male mating success and survival. Both sexual traits exhibited hyperallometric patterns; however, allometry was not linked to either mating success or survival. These results indicate that, at least during the period of sexual competition, allometry does not seem to be adaptive. Although our results may only apply to our damselfly study subjects (which nevertheless would require further tests in different seasons and/or study sites), our findings should encourage researchers to evaluate at least whether the assumed adaptiveness of sexual trait allometry holds for their study animals." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

14614. Bennett, D.M.; Dudley, T.L.; Cooper, S.D.; Sweet, S.S. (2015): Ecology of the invasive New Zealand mud snail, *Potamopyrgus antipodarum* (Hydrobiidae), in a mediterranean-climate stream system. *Hydrobiologia* 746: 375-399. (in English) ["The New Zealand mud snail, *Potamopyrgus antipodarum*, is a widely distributed non-native species of management concern on four continents. In a southern California stream, *P. antipodarum* abundance, which ranged from ca. <10 to nearly 150,000 snails

m², was related to discharge and temperature patterns. Laboratory experiments indicated that *P. antipodarum* (1) survivorship decreased from 13 to 27°C, but its growth rate was higher at 13 and 20°C than 27°C; (2) grazing rates were similar to those of native algiivores in short-term trials; (3) grazing impact was greater than that of a native hydrobiid snail in longer-term trials; (4) ingested different diatom sizes than some other grazers; (5) reduced the abundances of medium-sized and large diatoms, and several filamentous cyanobacteria and chlorophytes, while increasing the relative abundances of tough filamentous chlorophytes (e.g., *Cladophora*); (6) impact on other grazing invertebrates was species specific, ranging from competition to facilitation; (7) reduced the survivorship of *Anaxyrus boreas* tadpoles; and (8) was consumed by non-native *Procambarus clarkii* and naiads of *Aeshna* and *Argia*. Ecological effects of introduced *P. antipodarum* are subtle, occurring primarily at transitory high densities, but flow regulation may enhance their effects by eliminating high flows that reduce their population sizes." (Authors)] Address: Bennett, Danuta, Marine Science Institute, University of California, Santa Barbara, CA, 93106, USA. E-mail: danutabennett@gmail.com

14615. Chang, Y.-H.; Wu, B.-Y.; Lai, C.-F. (2015): A study of the ecological benefits of the green energy landscape fountain. *Ecological Engineering* 75: 128-136. (in English) ["The overdevelopment of the environment in modern times has caused damage to our natural habitat and water resources. The survival of many species has been impacted. The main goal of this study is to explore the effects of green energy landscape fountain (GLF) on ecological preservation. The study site is located on the shore of an open water area within the campus of Mingdao University. The study site consists of three water tanks, buried inland, 1.5 m away from the shoreline. An ecological comparison study was performed on the quality of water between the three tanks of water. GLF is a floating island sized 60 cm × 60 cm made of PVC pipes with electricity supplied by solar panels. Changes in numbers of species were documented over a period of one year spanning 4 seasons in 3 different bodies of water. The results showed that the water with GLF installed had more species of organisms. 10 different species of organisms such as *Tetragnatha maxillosa*, *Polyrhachis dives*, *Araneus inustus*, *Ischnura senegalensis*, *Diaea subdola* were found in the water with GLF installed. 7 species often used as benchmark indicators of water pollution were found in water without GLF installed. The findings demonstrate the benefits of GLF on improving species diversity and the quality of water. This study also provides information which can be applied on landscape architecture, architecture and ecology design and engineering in the future." (Authors)] Address: Chang, Y.-H., Dept Landscape Architecture & Environmental Planning, Mingdao Univ., No. 369, Wen-Hua Rd., Peetow, Changhua 52345, Taiwan. E-mail: f89622050@ntu.edu.tw

14616. Chessman, B.C. (2015): Relationships between lotic macroinvertebrate traits and responses to extreme

drought. *Freshwater Biology* 60: 50-63. (in English) ["(1.) The prospect of increasing drought intensity in many river basins under climate change threatens the persistence of vulnerable freshwater species. Understanding how the traits of each species affect its resistance and resilience to drought may help to identify those species at most risk and elucidate the mechanisms by which impacts occur. (2.) I analysed macroinvertebrate monitoring data collected from rivers across Australia's Murray–Darling Basin (>106 km²) during the middle and later stages of the recent decade-long Millennium Drought and the initial post-drought period. I tested the ability of eight traits, expressing aspects of life history, diet and environmental tolerance, to explain changes in the broad-scale prevalence (the proportion of sites with observed presence) of macroinvertebrate families during and after the drought. (3.) The rate of basin-scale change in the riverine macroinvertebrate assemblage was least in the final stages of the drought. Immediately after the drought, the assemblage did not shift back towards its mid-drought state but instead moved further away. Eleven families that had a statistically significant fall in prevalence during the drought did not increase afterwards. (4.) Negative responses to drought were associated with slower maturation, absence of atmospheric respiration, high rheophily and low thermophily. Positive responses to cessation of drought were associated with having a holometabolous life cycle, greater requirements for dissolved oxygen, high rheophily and low thermophily. (5.) Because several traits were related to drought vulnerability, management to mitigate the adverse ecological effects of future droughts should consider a number of mechanisms by which drought has an effect. These include a loss of flowing water that supports rheophilous species, inadequate duration of wetting for species with a long aquatic phase, and effects of high temperature and hypoxia on species requiring cool conditions and well-aerated water. (6.) A revival of research on the life histories of freshwater invertebrate species and more information on oxygen requirements and temperature and desiccation tolerance are needed to improve our ability to predict the effects of drought." (Author) Taxa are treated at family level and include Odonata.] Address: Chessman, B.C., Centre for Ecosystem Science, School Biological, Earth & Environmental Sciences, Univ. of New South Wales, Kensington, NSW 2052, Australia. E-mail: b.chessman@unsw.edu.au

14617. Dayaram, A.; Potter, K.A.; Pailles, R.; Marinov, M.; Rosenstein, D.D.; Varsani, A. (2015): Identification of diverse circular single-stranded DNA viruses in adult dragonflies and damselflies (Insecta: Odonata) of Arizona and Oklahoma, USA. *Infection, Genetics and Evolution* 30: 278-287. (in English) ["Highlights: •Discovered 24 distinct circular single-stranded DNA viral genomes from odonates. •First report of a ssDNA mycovirus in the New World. •High diversity among detected viruses. Abstract: Next generation sequencing and metagenomic approaches are commonly used for the identification of circular replication associated protein (Rep)-encoding single stranded (CRESS) DNA viruses circulating in various environments.

These approaches have enabled the discovery of some CRESS DNA viruses associated with insects. In this study we identified and recovered 31 viral genomes which represent 24 distinct CRESS DNA viruses from seven dragonfly species (*Rhionaeschna multicolor*, *Erythemis simplicicollis*, *Erythrodiplax fusca*, *Libellula quadrimaculata*, *Libellula saturata*, *Pachydiplax longipennis*, and *Pantala hymenaea*) and two damselfly species (*Ischnura posita*, *Ischnura ramburii*) sampled in various locations in the states of Arizona and Oklahoma of the United States of America (USA). We also identified *Sclerotinia sclerotiorum* hypovirulence-associated DNA virus-1 (SsHADV-1) in *P. hymenaea*, *E. simplicicollis* and *I. ramburii* sampled in Oklahoma, which is the first report of SsHADV-1 in the New World. The genome architectures of the CRESS DNA viruses recovered vary, but they all have at least two major open reading frames (ORFs) that have either a bidirectional or unidirectional arrangement. Four of the viral genomes recovered, in addition to the three isolates of SsHADV-1, show similarities to viruses of the proposed gemycircularvirus group. Analysis of the Rep encoded by the remaining 24 viral genomes reveals that these are highly diverse and allude to the fact that they represent novel CRESS DNA viruses." (Authors)] Address: Varsani, A., School of Biological Sciences and Biomolecular Interaction Centre, Univ. of Canterbury, Christchurch 8140, New Zealand. E-mail: arvind.varsani@canterbury.ac.nz

14618. Dow, R.A.; Ngiam, R.W.; Ahmad, R. (2015): Odonata of Maludam National Park, Sarawak, Malaysia. *Journal of threatened taxa* 7(1): 6764-6773. (in English, with summary in Bahasa Melayu) ["This paper presents records of Odonata collected in July 2012 in Maludam National Park, Sarawak, Malaysia. A total of 48 species from nine families were collected. Three species were new to science, one of which has already been described as *Prodasineura yulan* Dow & Ngiam, which may be endemic to Maludam. In addition, Maludam is only the second locality recorded in Sarawak for four poorly known species: *Pachycypha aurea*, *Macrogomphus decemlineatus*, *Brachygonia ophelia* and *Brachygonia puella*. Two of these species, *Macrogomphus decemlineatus* and *Brachygonia ophelia*, are recorded for the first time in Sarawak in more than 100 years." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

14619. Dow, R.A.; Choong, C.Y. (2015): *Mortonagrion megabinlyog* spec. nov. from Brunei (Odonata: Zygoptera: Coenagrionidae). *Zootaxa* 3914(1): 89-93. (in English) ["*M. megabinlyog* spec. nov. is described from a location in Brunei on the island of Borneo. Additional illustrations of its sister species *M. astamii* are provided." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

14620. Dow, R.A.; Luke, S.H. (2015): *Phaenandrogomphus safei*, a new species from Sabah, northern Borneo (Odonata: Anisoptera: Gomphidae). *Zootaxa* 3905(1):

145-150. (in English) ["*Phaenandrogomphus safei* is described from a male from the Kalabakan Forest Reserve, Sabah, Malaysian Borneo. It is the first species of *Phaenandrogomphus* to be recorded from Borneo. *Onychogomphus treadawayi*, known from Busuanga Island in the Palawan region of the Philippines, is transferred to *Phaenandrogomphus*." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

14621. Dutra, S.; De Marco, P. (2015): Bionomic differences in odonates and their influence on the efficiency of indicator species of environmental quality. *Ecological Indicators* 49(1): 132-142. (in English) ["Highlights: •Those traits vary between the Neotropical Odonata (Zygoptera and Anisoptera). •Many small size, shade-seek species are associated to Zygoptera suborder. •Zygoptera species shows narrow ecological requirements. •They were associated to different shading, depth, and environmental integrity levels. The influence of environmental changes on organisms depends on their bionomic characteristics, such as mobility, body size, and resource use. Thermoregulatory and dispersal abilities may directly affect the use of odonates as bioindicators since organisms with low dispersal ability can track fine-scale environmental variations and are usually resource specialists. We investigated the utility of Anisoptera and Zygoptera as bioindicators testing possible relationships to their bionomic characteristics. We assessed the variation in species richness, composition, and indicator values in Cerrado areas by quantitative sampling of adult odonates in streams surrounded by different vegetation types, ordered by the degree of vegetation cover. Species composition was efficient in discriminating impacts affecting riparian vegetation, with low richness of rare and specialist species in impacted areas. Damselflies had more narrow requirements, associated to different shading, depth, and environmental integrity levels. No relation between body-size and species indicator value was observed. Despite this, the main use of those species as indicators, especially the Zygoptera, may be related to environmental disturbance created by changes on vegetation cover suggesting their potential use in the analysis of the environmental quality of riparian areas." (Authors)] Address: De Marco, P., Universidade Federal de Goiás, Campus Samambaia, Instituto de Ciências Biológicas, Departamento de Biologia Geral, Laboratório de Ecologia Teórica e Síntese, 74001-970, Goiânia GO, Caixa Postal: 2424, Brazil. E-mail: pdemarco@icb.ufg.br

14622. Ellenrieder, N. von; Hauser, M.; Gaimari, S.D.; Pham, T.H. (2015): First records of *Macromia katae* (Macromiidae) and *Indothemis carnatica* (Libellulidae) from Vietnam (Insecta: Odonata). *Check List* 11(1) (Art. 1514): 1-13. (in English) ["In the course of two field trips to Northern Vietnam during March 2012 and June 2014 the Odonata of three National Parks (Cuc Phuong, Tam Dao, and Ba Be) and one Biodiversity Station (Melinh) were sampled. A total of 90 species of odonates in 60 genera and 15 families was recorded, including two new records for Vietnam:

M. katae and *I. carnatica*. Diagnostic illustrations for these two species are provided, as well as the listing of the species recorded from the surveyed areas." (Authors) *Zygonyx asahinai*, *Ophiogomphus sinicus*, *Mortonagrion aborense* (Laidlaw 1914), and *Paracercion calamorum* are discussed in more detail.] Address: Ellenrieder, Natalie von, Plant Pest Diagnostics Center, California Dept of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail: natalia.ellenrieder@gmail.com

14623. Garrison, R.W.; Dijkstra, K.-D., Hämäläinen, M.; Villanueva, R.J.T. (2015): *Mitragomphus ganzanus* Needham, 1944, a geographically misplaced dragonfly, is a junior synonym of *Gomphidia kirschii* Selys, 1878 (Odonata: Gomphidae). *Zootaxa* 3911(2): 280-286. (in English) ["Based on comparison of specimens and descriptions, *Mitragomphus ganzanus* Needham, 1944, described from Braganza [Bragança], Pará State, Brazil, and known only from the holotype, is found to be a junior synonym of *Gomphidia kirschii* Selys, 1878, a species from the Philippines. The monotypic genus *Mitragomphus* Needham, 1944, is synonymized with the genus *Gomphidia* Selys, 1854." (Authors)] Address: Garrison, R.W., Associate Insect Biosystematist, Plant Pest Diagnostics, California Dept of Food & Agriculture, 3294 Meadowview Road, Sacramento, CA 95832-1448, USA. E-mail rgarrison@cdfa.ca.gov

14624. Hammill, E.; Atwood, T.B.; Corvalan, P.; Srivastava, D.S. (2015): Behavioural responses to predation may explain shifts in community structure. *Freshwater Biology* 60: 125-135. (in English) ["(1.) Predators exert a strong selective force on the ecosystems in which they exist, thereby altering the structure of ecological communities and leading to the evolution of prey defences. However, how interspecific differences in defence ability affect habitat partitioning amongst competing prey species remains unresolved. (2.) We examined how prey defences affect species distribution in a natural ecosystem: the aquatic food web within Neotropical bromeliads. We first related differences in prey (mosquito) density to the presence and absence of predatory damselfly larvae. We then quantified behavioural responses to predators in the two most abundant mosquito species, and the effects of these behaviours on predator consumption rates. (3.) In the absence of damselflies, *Wyeomyia* was the most abundant mosquito genus in natural bromeliads. However, *Wyeomyia* numbers were reduced in the presence of damselflies. Numbers of the genus *Culex* increased with bromeliad size irrespective of the presence of damselflies. As a result of the differing effects of plant size and damselflies on the two genera of mosquito larvae, *Culex* were more numerous in large bromeliads containing damselflies. (4.) The most abundant *Culex* species, *Culex jenningsi*, had two kinds of behavioural defences: reduced movement and increased time at the water surface. These defences reduced damselfly attack rate on *C. jenningsi*, but not handling time. Consequently, consumption rate was reduced at all but the highest prey densities, altering the damselfly's functional response. Inducible defences were not

seen in the most abundant *Wyeomyia* species, *Wyeomyia abebela*, and pre-exposure to predation risk did not reduce predation on this species. (5.) Inducible behavioural defences, and the associated reductions in predation rate, evidently allow *C. jenningsi* to coexist with predators at a higher density than *W. abebela*. As predation risk is non-randomly distributed amongst bromeliads, divergence between mosquito species in their response to predation may contribute to the coexistence of a number of mosquito species across the landscape." (Authors)] Address: Hammill, E., School of the Environment, University of Technology Sydney, cnr Harris and Thomas St, Ultimo, NSW, 2007, Australia. E-mail: edd_hammill@hotmail.com

14625. Huang, Q.; Gao, J.; Cai, Y.; Yin, H.; Gao, Y.; Zhao, J.; Liu, L.; Huang, J. (2015): Development and application of benthic macroinvertebrate-based multimetric indices for the assessment of streams and rivers in the Taihu Basin, China. *Ecological Indicators* 48(1): 649-659. (in English) ["Highlights: •Multimetric indices (MMIs) based on benthic macroinvertebrates were developed and applied in the Taihu Basin. •We developed two MMIs for two specific aquatic ecoregions in the Basin. •The MMIs were robust and sensitive to anthropogenic ecological impairment. •The general ecological status of the Taihu Basin was lower than "good" status. The development of biological indicators for assessing ecological conditions in streams and rivers is urgently needed in China, particularly in heavily impacted regions. The aim of this study was to develop and apply benthic macroinvertebrate-based multimetric indices (MMIs) for the assessment of streams and rivers in the western hill and eastern plain aquatic ecoregions of the Taihu Basin. MMIs were based on samples collected from October 16 to November 8 2012 at 120 sites in streams and rivers. Least disturbed sites defined the reference conditions. Chemical water quality, physical habitat, and land use were used as criteria to identify reference sites in the basin. Metrics related to benthic macroinvertebrate richness, composition, diversity and evenness, pollution tolerance, and functional feeding groups were screened by range, sensitivity, responsiveness, and redundancy tests. Total number of taxa; percentage of Ephemeroptera, Trichoptera and Odonata (% ETO); Berger-Parker's index (BP); Biotic index (BI); and percentage of filterers-collectors (% FC) were used to construct the MMI for the western hill aquatic ecoregion (MMIW). Total number of taxa, percentage of Crustacea and Odonata (% CO), BP, BI, and % FC were used to construct the MMI for the eastern plain aquatic ecoregion (MMIE). The MMI scores were obtained by combining the rating categories (excellent, good, fair, poor, and very poor). The MMIs were tested using a separate subset of the data, and the results indicated that the newly developed MMIs were robust in terms of percentage of sites correctly classified, coefficient of variation, box-separation ratios, and separation powers. The ecological status was then evaluated based on the MMI scores. The results indicated that the general ecological status of streams and rivers in the Taihu Basin was rated lower than "good", the western hill aquatic ecoregion

was rated "fair" and the eastern plain aquatic ecoregion was rated "poor". Moreover, the MMIs showed a significant negative response to an increasing gradient of disturbance. Therefore, these preliminary MMIs can be used as assessment tools in ecological biomonitoring and management of the Taihu Basin." (Authors)] Address: Gao, J., State Key Laboratory of Lake Science and Environment, Nanjing Institute of Geography & Limnology, Chinese Academy of Sciences, 73 East Beijing Road, Nanjing 210008, PR China. E-mail: gaojunf@niglas.ac.cn

14626. Kahilainen, A. (2015): Interactions and patterns between species diversity and genetic diversity. *Jyväskylä studies in biological and environmental science* 295: 68 pp. (in English) ["The similarities in the theories of community ecology and population genetics suggest that species diversity within and between communities and genetic diversity within and between populations are driven by the same four general mechanisms: (1) drift, (2) dispersal, (3) selection, and (4) the formation of new variants (i.e. speciation and mutation). Since, for both species diversity and genetic diversity, the relative significances of each of the first three mechanisms are very much influenced by characteristics of the environment, correlations between species diversity and genetic diversity, i.e. species-genetic diversity correlations (SGDCs), are expected. Considering that practical conservation most often focuses on species diversity (or surrogates thereof), SGDCs could provide information on how conservation and management decisions influence genetic diversities of populations, and thus also their viabilities. Furthermore, teasing apart the drivers of the SGDCs can offer mechanistic explanations for diversity and therefore suggest a process-based approach to conservation. I studied the generalizability of SGDC and the role of environmental characteristics by means of a literary review and empirical studies on natural dragonfly and damselfly communities. I then conducted individual-based simulations to assess how inbreeding depression due to loss of genetic diversity can influence extinction rates in neutral multispecies metacommunities. My results suggest that SGDCs are highly variable in natural systems and that interactions between ecologically similar species can influence their genetic structures. Therefore, the results question the utility of using species diversity or genetic structures of ecologically similar species as surrogates for genetic diversity of species of conservation concern. Furthermore, my results suggest that if intraspecific genetic diversity is not explicitly considered, the extinction rates in multispecies metacommunities might be underestimated." (Author) *Calopteryx splendens*, *C. virgo*] Address: Kahilainen, A., University of Jyväskylä, Department of Biological and Environmental Science, P.O. Box 35, FI-40014 University of Jyväskylä, Finland

14627. McBurnie, G.; Davis, J.; Thompson, R.M.; Nano, C.; Brim-Box, J. (2015): The impacts of an invasive herbivore (*Camelus dromedaries*) on arid zone freshwater pools: An experimental investigation of the effects of dung

on macroinvertebrate colonisation. *Journal of Arid Environments* 113: 69-76. (in English) ["Highlights: •Macroinvertebrate abundance was higher in the control mesocosms. •Pollution tolerant taxa such as mosquito larvae were common in treatment mesocosms. •Sensitive fauna, such as larval dragonflies were more common in the controls. Aquatic ecosystems in arid environments provide important refugia and 'stepping-stones' of connectivity for aquatic fauna. Aquatic ecosystems in central Australia are vulnerable to degradation due to the impacts of invasive herbivores such as camels, which degrade small desert waterbodies through drinking, trampling, and fouling with dung. In this study we assessed the impacts of camel dung on the water quality and macroinvertebrate colonization and community composition of small arid zone freshwater pools using experimental mesocosms. Camel dung (2 kg) was added to half the mesocosms (the treatment), the remaining mesocosms (without camel dung) acted as the controls. All mesocosms were sampled weekly for water quality, nutrients, chlorophyll a and macroinvertebrate richness and abundance, over an eight week period during summer. Macroinvertebrate abundance was higher in the control mesocosms in comparison to the treatment mesocosms. Pollution tolerant taxa such as mosquito larvae were common in treatment mesocosms, while sensitive fauna, such as larval mayflies and dragonflies were more common in the controls. The latter are predators and appeared to have a major influence on community composition. Our results reinforce the need for active management of invasive herbivores to protect aquatic biodiversity and to manage potential disease-vector species in central Australia waterbodies." (Authors)] Address: McBurnie, Glenis, Northern Territory Department of Land Resource Management, P.O. Box 1120, Alice Springs NT 0870, Australia. E-mail: glenismcb@gmail.com

14628. Monteiro Júnior, C.; Juen, L.; Hamada, N. (2015): Analysis of urban impacts on aquatic habitats in the central Amazon basin: Adult odonates as bioindicators of environmental quality. *Ecological Indicators* 48: 303-311. (in English) ["Thirty streams were surveyed in urban and natural settings in the municipality of Manaus in the central Amazon basin (Brazil) with the objective of identifying the species of adult odonates that can be used as bioindicators of environmental quality. The data collected were used to test the hypothesis that species in the suborder Zygoptera are indicators of better-preserved environments due to their smaller body sizes and reduced tolerances to habitat modification, whereas species in the suborder Anisoptera were presumed to be indicators of impacted habitats with no vegetation. The habitats were classified as preserved, intermediate, and degraded, based on their environmental characteristics. A total of 908 specimens were collected, representing 60 species. The results of the indicator value (IndVal) identified 13 species as indicators of environmental quality, of which nine were typical of preserved habitats, two of intermediate habitats, and four of modified habitats (intermediate or degraded).

Odonate species richness declined with increasing urbanization, a pattern also presented by the zygopterans, although anisopteran species richness was higher in intermediate habitats. Zygopteran species showed high fidelity/specificity for preserved habitats, although a small number of the species of this suborder showed a similar relationship with intermediate or degraded habitats, whereas anisopterans were associated only with disturbed habitats (intermediate and degraded). Overall, the results indicate that the diagnosis of the adult odonate community can provide a rapid and effective tool for evaluation of environmental quality. As many species are stenotopic, they can be used as indicators of good habitat quality, whereas some of the more eurytopic species can indicate disturbed habitats." (Authors)] Address: Monteiro Júnior, C., Laboratório de Ecologia e Conservação, Instituto de Ciências Biológicas, Univ. Federal do Pará, Rua Augusto Correia, N° 1 Bairro Guamá, CEP 66.075-110 Belém, Pará, Brazil. E-mail: csmonteirojr@gmail.com

14629. Nel, A.; Fleck, G.; Garcia, G.; Gomez, B.; Ferchaud, P.; Valentin, X. (2015): New dragonflies from the lower Cenomanian of France enlighten the timing of the odonatan turnover at the Early – Late Cretaceous boundary. *Cretaceous Research* 52: 108-117. (in English) ["Three early Cenomanian Odonata are described from France (Jaunay-Clan locality, Vienne), i.e. the aeshnoid *Galloliupanshania incompleta* gen. et sp. nov. in the Liupanshaniidae, the libelluloid *Gallophlebia magnifica* gen. et sp. nov. in the new family Gallophlebiidae closely related to the Early Cretaceous Araripephlebiidae, and *Gallostenophlebia incompleta* gen. et sp. nov., as the youngest record of the clade Stenophlebioptera: Stenophlebiidae. *Gallophlebia* is a new case showing the high diversification of the libelluloid clade during the Cretaceous, while *Gallostenophlebia* corresponds to one of the last "survivors" of the odonatan ancient lineages in relation to the faunistic turnover around the Early-Late Cretaceous boundary." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

14630. Nie, Z.; Tian, S.; Tian, Y.; Tang, Z.; Tao, Y.; Die, Q.; Fang, Y.; He, J.; Wang, Q.; Huang, Q. (2015): The distribution and biomagnification of higher brominated BDEs in terrestrial organisms affected by a typical e-waste burning site in South China. *Chemosphere* 118: 301-308. (in English) ["Highlights: •The terrestrial ecosystem at the e-waste site has been contaminated by PBDEs. •Deca-BDE is found in the highest concentration among 21 kinds PBDEs in all samples. •Higher brominated congeners were the dominant congeners, especially BDE-209. •Eleven PBDE congeners were biomagnified in the examined food chain. •The feeding habit of terrestrial species may be affect PBDE accumulation. Soil, vegetation, and several terrestrial species including turtledove, chicken, goose, grasshopper, dragonfly, butterfly and ant, were collected from an area surrounding a typical e-waste burning site in South China. The samples were examined to investigate the lev-

els, congener profiles, and biomagnification extent of polybrominated diphenyl ethers (PBDEs) that may be present in the environment as a result of the e-waste, which was processed in a crude recycling style. Elevated levels of S21PBDEs were found in the biota (101–4725 ng g⁻¹ lipid weight (lw)), vegetation leaf (82.9–319 ng g⁻¹ dry weight (dw)) and soil samples (5.2–22 110 ng g⁻¹ dw), indicating that PBDE contamination in the samples collected from the e-waste burning site may pose risks to the local terrestrial ecosystem and local populations. Higher BDE congeners, especially deca-BDE (BDE-209) were the dominant homologs in organisms and nonbiological matrices, followed by nona-BDE and octa-BDE. Biomagnification factors (BMFs) were calculated as the ratio of the lipid-normalized concentration in the predator to that in the prey. The highest BMF (3.4) was determined for BDE-153 in the grasshopper/turtledove food chain. Other higher brominated congeners, such as BDE-202, -203, -154, -183 and -209, were also biomagnified in the terrestrial food chain with BMFs of 1.7–3.3. BDE-47, -100, and -99 were not biomagnified in the examined food chains (BMFs < 1), which suggests that bioaccumulation and biotransformation of PBDEs in terrestrial ecosystems could be distinguished from those in aquatic ecosystems." (Authors)] Address: Huang, Q., MOE Key Lab. of Regional Energy & Environmental Systems Optimization, Resources & Environmental Research Acad., North China Electric Power Univ., Beijing 102206, China. E-mail: huangqf@craes.org.cn

14631. Razeng, E.; Watson, D.M. (2015): Nutritional composition of the preferred prey of insectivorous birds: popularity reflects quality. *Journal of Avian Biology* 46: 89-96. (in English) ["Food availability is emerging as a key determinant of avian occurrence and habitat use in a variety of systems, but insectivores have received less attention than other groups and the potential influence of nutritional quality has rarely been considered. Rather than a uniform food source, arthropods vary greatly in terms of nutritional composition, but does this variation translate into differential consumption? Building on previous work that demonstrated clear preference for some arthropod groups by 13 species of ground-foraging insectivores, we compare the nutritional composition of these arthropod groups with other groups commonly encountered but seldom consumed in the same habitat types. Using samples of arthropods collected from a eucalypt woodland in southern Australia, we found the high frequency prey groups (Coleoptera, Lepidoptera, Orthoptera and Araneae) consistently contained higher fractions of crude protein and total fat than the low frequency groups (Diptera, Hymenoptera and Odonata). Even more clear-cut differences were noted in terms of micronutrients; high frequency prey containing significantly greater concentrations of seven elements than low frequency prey and significantly greater amounts per individual arthropod for all eleven elements measured. These results indicate that the nutritional quality plays an important role in prey selection in insectivores and suggests that micronutrients may be more important determi-

nants of prey choice than previously recognized. Integrating these findings with previous work suggesting food limitation may constrain distribution patterns of birds in fragmented landscapes, we contend that variation in nutritional quality helps explain observed patterns in insectivore diets and occurrence. In addition to explaining why smaller and more disturbed habitats are unable to support resident insectivore populations, this bottom-up mechanism may underlie the disproportionate sensitivity of insectivores to land-use intensification." (Authors)] Address: Watson, D.M., Inst. Land, Water & Society, Charles Sturt Univ., Albury 2640, Australia. E-mail: dwatson@csu.edu.au

14632. Saha, P.D.; Gaikwad, S.M. (2015): Odonata assemblage at a small marshy land in Khadki (Pune city) – An assessment. *Journal of Entomology and Zoology Studies* 3(1): 53-64. (in English) ["A total of 17 species of Odonata belonging to 11 genera under 4 families and spread over 2 suborders have been collected from a very small area of 350 m² in Khadki of Pune city during a study conducted from April 2012 to January 2014. Though the post-monsoon abundance of Odonata was high but Odonata diversity was greater in pre-monsoon period when the food and nutrition were abundant. In the present study it is found that Libellulidae is the richest family with maximum number of species (10 species) which is followed by family Coenagrionidae (4 species), Platycnemidae (2 species) and Aeshnidae (1 species). The area therefore can be considered as a species rich diversity site in a purely urban backdrop." (Authors)] Address: Saha, P.D., Zool. Survey of India, Western Regional Centre, Vidya Nagar, Akurdi, Pune-411044 (Maharashtra), India

14633. Sasamoto, A. (2015): *Anigosomphus* [sic] *yanagisawai* sp. nov., a new gomphid dragonfly from northern Thailand (Odonata: Anisoptera: Gomphidae). *Zootaxa* 3904 (3): 421-426. (in English) ["*A. yanagisawai* sp. nov. (holotype male and paratype specimens) from N. Thailand (Doi Inthanon, ca. 1,400 m a.s.l., Ban Luang, Chiang Mai Prov.), is described and illustrated. This species can apparently be distinguished from the other species of this genus by the morphology of the anal appendages, especially the straight cerci closely disposed to each other and bearing a very strong outer branch." (Author)] Address: Sasamoto, A., Oh 531-3, Tawaramoto-cho, Shiki-gun, Nara pref. 6360345, Japan. E-mail: akssmt@sea.plala.or.jp

14634. Vanacker, M.; Wezel, A.; Payet, V.; Robin, J. (2015): Determining tipping points in aquatic ecosystems: The case of biodiversity and chlorophyll a relations in fish pond systems. *Ecological Indicators* 52: 184-193. (in English) ["Highlights: •We compare different statistical methods and diversity indices to determine tipping points. •We compare tipping points in different taxonomic groups. •SEGMENTED and Jackknife first order are the most adequate method and diversity index to determine tipping points. •Aquatic vascular plants are the best taxonomic group to respond to eutrophic changes. Abstract: The management of biodiversity in aquatic ecosystems requires knowing the

state of water quality linked to regime shifts in various taxonomic groups. We examine this question by studying the fish ponds in the Dombes region, France. These waterbodies are characterized by a high diversity of species. High levels of nutrients due to certain fish farming practices may cause significant eutrophication leading to loss in biodiversity and a shift from high coverage of aquatic vegetation to phytoplankton dominance may also be observed. The aim of this study is to assess tipping points, thresholds for effect, along a gradient of chlorophyll a in different taxonomic groups: aquatic vascular plants, phytoplankton, dragonflies and aquatic macro-invertebrates. Tipping points are analyzed with three different statistical methods: a method which evaluates tipping points with a difference in the mean (TMEAN), a second method which evaluates tipping point by comparing the mean and linear regressions before and after the tipping point (FSTAT) and third a method which evaluates linear regressions with a pivotal tipping point (SEGMENTED). We also compare tipping points for the different taxonomic groups using five different diversity indices: Observed richness, Jackknife first order, Fisher's alpha, Simpson index and Evenness. Our results show that there is an important variation in tipping points following the three statistical methods, but the SEGMENTED is the best method for evaluating tipping points. We observe a high difference of tipping point values for the different taxonomic groups depending on the diversity indices used. Jackknife first order has a better performance to evaluate a eutrophic change according to the diversity than the other indices. In all taxonomic groups, aquatic vascular plants are the most impacted by the chlorophyll a and almost all their tipping points are observed around 60 µg/L chlorophyll a concentrations. No significant relationship is found between chlorophyll a and phytoplankton diversity, while the two other groups, dragonflies and macro-invertebrates, are both impacted by the chlorophyll a but their relevant tipping points are situated in higher values than aquatic vascular plants." (Authors)] Address: Vanacker, Marie, Dept of Agroecology and Environment, ISARA Lyon (Member of the Univ. of Lyon), 23 rue Jean Baldassini, 69364 Lyon, France. E-mail: mvanacker39@gmail.com

14635. Verma, P.; Andrew, R.J.; Khrabvu, K. (2015): Histology of the post ovarian genital complex of the dragonfly *Pantala flavescens* (Fabricius, 1798) (Odonata: Libellulidae). *International Journal of Research Studies in Biosciences* 3(1): 82-89. (in English) ["In *P. flavescens*, the post ovarian genital complex (POGC) consists of a pair of long thin spermatheca with bulbous tips, a small, spherical dorsal bursa copulatrix and a large ventrally placed vagina. The wall of the POGC is basically composed of an outer muscle layer, middle epithelial layer resting on a basement membrane and an internal layer of cuticle. It is externally covered in muscle bands. The internal lining of ST is annulated with cuticular rings and is formed of 3-4 layers of cuticle consecutively undergoing sclerotization. The bursa copulatrix is small and spherical with a thick layer of folded cuticular intima. The fertilization pore is in the form of a valve covered with cuticular spines. The bursa communis

is a tunnel like structure formed by three plates, a median-dorsal plate and paired lateral plates. The vagina is divided into anterior and posterior regions- the anterior region bears large number of small flat finger-like processes or stubs while the posterior region is a long, large, laterally folded, sac like structure which tapers into the female gonopore." (Authors)] Address: Verma, P., Centre for Sericulture & Biological Pest Management Research RTM Nagpur Univ. Nagpur, India. E-mail: payalrverma@gmail.com

14636. Weterings, R.; Umponstira, C.; Buckley, H.L. (2015): Predation rates of mixed instar Odonata naiads feeding on *Aedes aegypti* and *Armigeres moulti* (Diptera: Culicidae) larvae. *Journal of Asia-Pacific Entomology* 18(1): 1-8. (in English) ["Highlights: •Predation rates were negatively related to predator densities. •Predation rates were positively related to prey densities. •Predation rates were much lower and realistic compared to previously recorded rates. •Predation rates based on large Odonata naiads overestimate actual predation. In Thailand several important diseases are transmitted by mosquitoes. Many vector control programs focus on the reduction of these medically important mosquitoes through the application of pesticides, bed-nets and the introduction of biological control agents. Odonates naiads are important, naturally occurring predators of vector mosquitoes. To estimate the predation rates of odonate species in Thailand, we conducted an experiment in which the predation rates were compared across a range of predator and prey densities. We used seven different predator species from different instars that represented the composition of naiads in our study area. Body sizes ranged between 2.6 mm and 15.9 mm. Two different prey species were used, larvae of the mosquito *Armigeres moulti* Edwards, 1914 and *Aedes aegypti* L. 1762. Predation rates showed a positive non-linear relationship with prey densities and a negative non-linear relationship with predator densities. The mean (\pm SE) predation rates per predator were 6.2 (\pm 0.8) individuals per 24 h for dragonfly naiads and 5.1 (\pm 0.7) for damselfly naiads. Predation rates were very low compared to previously recorded rates. However, unlike previous research we did not focus on single species in a late stage of development, but on multiple species in all stages that resembled the natural Odonata community composition." (Authors)] Address: Weterings, R., Cat Drop Foundation, Boorn 45, 9204 AZ, Drachten, The Netherlands

14637. Xu, M.; Fincke, O.M. (2015): Ultraviolet wing signal affects territorial contest outcome in a sexually dimorphic damselfly. *Animal Behaviour* 101: 67-74. (in English) ["Highlights: •We investigated the role of sex-specific UV-reflective wing ornamentation in *Megaloprepus caerulatus*. •Contest duration and dynamics of males were consistent with opponent-only assessment of wing band size. •UV reflectance of male wing band serves as a 'biological billboard' for body size. •UV reflectance of female white tips did not affect sex recognition. •First direct evidence that UV reflectance of wing ornament affects contest outcome in invertebrates. Ultraviolet (UV) reflectance and UV

vision are both common among animals and are known to function in mate choice and male–male competition among numerous vertebrates. In comparison, examples of functional UV reflectance among invertebrates are scarce. In a territorial damselfly (*Megaloprepus caerulatus*), data from natural territorial contests indicated that males assessed the male wing band of rivals. We investigated the functions of (1) UV reflectance of the male-specific white wing band in territorial contests by staging contests between size- and age-matched, control and UV-reduced males, and (2) UV reflectance of the female-specific wing tip in sex recognition by presenting control and UV-reduced females to territorial males. Results showed that males whose UV reflectance of the white wing bands was reduced were more likely to lose contests. This effect dissipated late in the reproductive season, when breeding sites typically decrease in value. UV reflectance of the female wing tips did not affect male sex recognition, nor did it affect the detectability of a female at a male territory. Our study provides the first direct evidence from invertebrates, and one of the few among all animals, that UV reflectance of wing ornamentation affects the outcome of male contests in the field." (Author)] Address: Xu, Mingzi, Department of Neurobiology and Behavior, Cornell University, Ithaca, NY 14853, USA.



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1997

14638. Verbeek, P.J.M.; Hermans, J.T. (1997): Libellen in en landbouwgebied (Relatienota Gebied Lilbosch) - Dragonflies of the Lilbosch area. *Natuurhistorisch Maandblad* 86(4): 93-97. (in Dutch, with English Summary) ["In the agricultural area around Lilbosch Abbey (The Netherlands) many ponds were created with a view to increasing the natural value of the area- Creation and management of the ponds were based on knowledge of the ecology of the local fauna, with particular regard for dragonflies. The ponds have been constructed with very gentle slopes (1:5) and they are not too deep (max. 1 meter below ground level). In dry summers the water level is about one meter below ground level. Unlike the usual situation, the ponds are not fenced in with barbed wire, so cattle are able to approach them. The grazing impact is very low (one cow or horse on two or three ha) and there are at least six ponds within the area where the cattle arc grazing, which seems to have a very positive effect on the dragonfly fauna. The article discusses the effects of this management and compares the dragonfly fauna of ponds with relative steep slopes and those with gentle slopes. In the few years since the ponds were created and the extensive grazing management implemented, the number of dragonfly species has increased spectacularly. Twenty-nine species were recorded, which means that this has become one of the better dragonfly areas in the Netherlands. At least twenty species have colonized this area. The article also discusses the various dragonfly species recorded and their future in this area." (Authors)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands. E-mail: j.hermans@triangel-linne.nl

1998

14639. Danielsson, I. (1998): Mechanism of sperm competition in insects. *Ann. Zool. Fennici* 35: 241-257. (in English) ["Sperm competition has been demonstrated in a variety of insects and is in addition to ecological resource distribution and sex ratios, generally believed to

play a major role in the evolution of insect reproductive strategies and mating systems. In this paper. I review the main theories and some of the empirical evidence regarding sperm competition in insects. Sperm utilization is shaped by selection on both males and females, sometimes in opposite directions. Here I focus mainly on adaptive mechanisms for sperm priority and paternity assurance, and consequences of such adaptations for females. I also evaluate the importance of the conflicts between the sexes for the evolution of mating behaviour from existing theory and available empirical evidence. Some urgent research areas for future workers are suggested. An explanation for the large intraspecific variation in last male sperm priority is still lacking. To this end. we need detailed studies of the mechanisms of sperm usage within the female, and to what extent females influence postcopulatory fertilization processes." (Author) The paper includes many references to Odonata.] Address: Danielsson, I., Animal Ecology, Dept of Zoology, Göteborg University, Box 463, SE-405 30 Göteborg, Sweden

1999

14640. Futahashi, R. (1999): [The collecting record of *Sympetrum depressiusculum* at Enshu-hama, Hamamatsu, Shizuoka Prefecture]. *Suruga no Konchu* 188: 5270-5271. (in Japanese) [14-XI-1998.] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryo-futahashi@aist.go.jp

2000

14641. Little, B. (2000): *Companion Planting*. New Holland Publishers Ltd: 96 pp. (in English) ["In an age of increasing hostility towards chemical control of the food we eat, "Companion Planting" is the ideal guide to working with nature, to produce healthy and bountiful crops. There is something fascinating about companion planting - it is immensely enjoyable to be able to outwit one's enemies with simple, tried-and-tested methods. More and more gardeners are recognising the good sense of

working with nature instead of trying to club it into submission. Entertaining and often anecdotal, the snippets of wisdom in this book are arranged alphabetically, allowing the reader to easily search for a particular plant or garden pest. In many cases the author offers a method for encouraging a healthy crop or discouraging a nuisance to the gardener. Her summary of good and bad garden companions is a useful quick reference tool for gardeners planting beds or containers of vegetables and herbs." (Publisher) The book includes two notes on damselflies and dragonflies as companions in gardening and pest control.] Address: not stated

14642. Ramírez, A. (2000): 4.1.2 Dragonflies and damselflies of Costarican cloud forests. In: N. M. Nadkarni and N. T. Wheelwright (Eds.): *Monteverde: ecology and conservation of a tropical cloud forest*, Oxford Univ. Press, Athens GA.: 97-[Verbatim: Dragonflies and damselflies (order Odonata) are the best known of aquatic insects due to their large size, brilliant colours, and conspicuous flight. Dragonflies perch with their wings outstretched; damselflies rest with their wings held together above the body. Adults and nymphs are voracious predators of smaller insects. Nymphs are aquatic and live in Standing or running water. Fourteen families and 280 species of Odonata are recorded from Costa Rica (Paulson 1982), although the actual number is higher. Odonate diversity is greatest in the lowlands and decreases with altitude. Seventy species have been collected from areas above 1200 m, which represents 25% of the species in the country. Of these, only 13 species are restricted to altitudes above 1200 m. However, cloud forests have not been well collected. Biogeography of the cloud forest fauna indicates 41% of the species are of South American origin, 28% are Central American (including endemics), and 7% are North American. The rest are widespread species whose origins are unclear. Some odonate genera contain discrete lowland and highland species. One highland species, *Sympetrum nigrocreatum*, is probably derived from the widespread mid-elevation species *S. illotum*. *Philogenia peacocki* has only been found in cloud forests, whereas *P. carrilliea* is more commonly found at lower altitudes. In the same stream, *P. peacocki* has been found inhabiting the upper parts but is replaced by *P. carrilliea* at lower altitudes, with some overlap of the two species around 1200 m. Some cloud forest species occur at intermediate altitudes (800-1500 m). For example, *Heteragrion majus*, a characteristic inhabitant of streams in cloud forests, is also present at lower altitudes (down to 800 m) in streams that share characteristics with cloud forest streams such as high humidity, steep slopes, and low temperature (17—20°C). Of the species recorded from cloud forests, 60% have nymphs that live in open areas of lakes, marshes, and ponds; 38% inhabit shaded streams; and 2% live in specialized habitats such as bromeliads and tree holes. These proportions depend on the availability of the habitats. In general, open habitats have been better studied than forest streams (Paulson 1982). Nymphs are adapted to live in specific habitats, for exam-

ple, accumulations of dead leaves in riffles. The most limiting factor is the availability of habitat suitable for nymph development. Most species tolerate only narrow ranges of conditions such as temperature, oxygen level, forest cover, types of aquatic vegetation and water pollution. They are good biological indicators and their Conservation depends on habitat preservation. Few species are well adapted to highly disturbed habitats.] Address: Ramirez, A., Univ. Georgia, Inst. Ecol., Athens, GA 30602, USA. E-mail: aramirez@arches.uga.edu

2002

14643. Hollows, J.W.; Townsend, C.R.; Collier, K.J. (2002): Diet of the crayfish *Paraneohpops zealandicus* in bush and pasture streams: insights from stable isotopes and stomach analysis. *New Zealand Journal of Marine and Freshwater Research* 36: 129-142. (in English) ["*P. zealandicus* stomachs from streams in both native bush (mainly tree leaves and dicotyledonous seeds) and exotic pasture settings (mainly grass stems and monocotyledonous seeds) were dominated by allochthonous material. More detritus occurred in stomachs in autumn-winter than in spring-summer, but quantities were similar in crayfish from native bush and pasture streams. The stomachs of larger crayfish contained a significantly greater proportion of detritus than smaller individuals. Aquatic invertebrates were the second most abundant dietary category by volume, with highest values in winter, but there were no significant differences between land uses or crayfish size classes. A wide range of invertebrates was eaten by crayfish, with mayfly nymphs, chironomid larvae, and snails predominating. The latter were numerically more prominent in crayfish from bush than pasture streams. Terrestrial invertebrates were recorded from 4% of stomachs, but there were no significant differences in relation to land use, season, or crayfish size class. Despite aquatic invertebrates making up <4% of stomach volumes on average, stable isotope analysis indicated a greater importance for invertebrate prey in terms of assimilation and incorporation into crayfish biomass. Allochthonous detritus and moss appeared to be unimportant. Whereas the results of stomach analysis provided some evidence of an ontogenetic shift, with detritus assuming greater importance in larger crayfish, this pattern was not supported by isotope analysis because invertebrate prey appeared more important to the diet than detritus. An unidentified carbon source, depleted in ^{13}C and perhaps of microfloral origin, seems to be an important energy source for crayfish in both stream types." (Authors) The diet included one unidentified dragonfly (larva?).] Address: Hollows, J.W., Fish & Game Otago, P.O. Box 76, Dunedin, New Zealand. E-mail: j.hollows@fishgame

2003

14644. Bagli, L.; Gentilini, G. (2003): New fossil dragonflies from the Upper Miocene of Monte Castellaro, Pe-

saro, Marches, Central Italy (Insecta Odonata Libellulidae). Quaderno di studi e notizie di storia naturale della Romagna 18: 37-50. (in Italian, with English summary) ["Three new species of dragonflies (Odonata Libellulidae) are described and two forewing bases of an unnamed species of *Libellula*, are examined from the Upper Miocene of Monte Castellaro, Pesaro. Holotypes: *Libellula adriatica* n.sp., partly related to extant *Libellula semifasciata* (Burmeister, 1839) but differing in the two brown crossbands on the wing membrane and the seven crossveins below the pterostigma; *Celithemis zavattinii* n. sp., partly related to fossil species *Celithemis cantalensis* (Nel, Arillo & Martinez-Delclos, 1996) and extant *Celithemis ornata* (Rambur, 1842) and *Celithemis martha* (Williamson, 1922), but quite different in the colour pattern of the wing, in the shape of the discoidal triangle and in the number of antenodal and postnodal crossveins; *Sympetrum marinum* n.sp., partly allied to recent species *Sympetrum vicinum* (Hagen, 1861) and *Sympetrum pedemontanum* (Allioni, 1776), but differing especially in the brown crossband of the wing." (Authors)] Address: Bagli, L., Museo del Territorio di Riccione via Lazio, 10, I-47838 Riccione (RN), Italy. E-mail: bagliloris@libero.it

2004

14645. Catling, P.; Cannings, R.; Brunelle, P.M. (2004): An annotated checklist of the Odonata of Canada. 33 pp. (in English) ["This list of the 208 species of Canadian Odonata is current as of December 2004. It uses the scientific nomenclature and English names of the North American list sponsored by the Dragonfly Society of the Americas (Paulson & Dunkle 1999, updates and revisions to September 2004). Most French names come from Pilon & Lagacé (1998), which includes only those species known in the province of Québec as of the date of that publication. We encourage the development of appropriate French names for the whole Canadian fauna. Following the List of Species is a table of species occurrence by province and territory with rankings indicating national and provincial conservation status. Also included are recent additions to the Canadian fauna, taxonomic notes and an extensive list of references that provides the basis for decisions on occurrence and status. It is our intention to keep this list up-to-date. We welcome new information and any suggestions for changes or improvements." (Authors) For details see: https://www.researchgate.net/publication/252055281_An_Annotated_Checklist_of_the_Odonata_of_Canada; http://odonatacentral.org/views/static/dsa/2005_canada_checklist_corrections.pdf

14646. Terzani, F. (2004): Odonati del Molise (Italia Meridionale): nuovi dati (Odonata). *Onychium* 1: 1-7. (in Italian, with English summary) [Dragonflies from Molise (Southern Italy): new data (Odonata). - Twelve species collected in Molise are listed, four of which are new for the region: *Pyrrhosoma nymphula*, *Cordulegaster trinarciæ*, *Libellula depressa* and *Orthetrum cancellatum*.]

Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14647. Terzani, F.; Fabiano, F. (2004): Descrizione di due aggressioni di *Pararge aegeria* (Linneo, 1758) contro *Calopteryx haemorrhoidalis* (Vander Linden, 1825) (Lepidoptera Satyridae e Odonata Calopterygidae). *Onychium* 1: 33-35. (in Italian, with English summary) [Two attacks of *P. aegeria* against *C. h. haemorrhoidalis* are described. Such attacks are explained as a defence of the territory of the butterfly.] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2005

14648. Bordoni, A. (2005): In ricordo di Italo Bucciarelli (1933-2004). *Onychium* 2: 1-5. (in Italian, with English summary) [Obituary, Venetian entomologist Italo Bucciarelli (1933-2004).] Address: Bordoni, A., Museo di Storia Naturale dell'Università di Firenze, Sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: arnaldo.bordoni@libero.it

14649. De Meester, L.; Declerck, S.; Stoks, R.; Louette, G.; van de Meutter, F.; de Bie, T.; Michels, E.; Brendonck, L. (2005): Ponds and pools as model systems in conservation biology, ecology and evolutionary biology. *Aquatic Conserv: Mar. Freshw. Ecosyst.* 15: 715-725. (in English) ["(1.) Ponds and pools, broadly defined in this paper to include all small and shallow standing waters that permanently or temporarily contain water, are numerous, diverse and important from a conservation point of view. We here argue that ponds and pools offer powerful potential for studies in ecology, evolutionary biology and conservation biology. (2.) An outline is given of the characteristics of ponds and pools that make them good model systems for large-scale surveys and hypothesis testing through experimental manipulation. Such studies will not only increase understanding of community and genetic structure, as well as of patterns of biodiversity, in small aquatic habitats themselves, but may also contribute significantly to testing general theory. (3.) These merits are illustrated by the recent progress on the understanding of the relative importance of local versus regional factors in structuring populations and communities, as well as of the impact of hydroperiod on community and ecosystem functioning." (Authors) The paper includes references to Odonata.] Address: De Meester, L., Laboratory of Aquatic Ecology, Katholieke Universiteit Leuven, Charles de Bériotstraat 32, 3000 Leuven, Belgium. E-mail: luc.demeester@bio.kuleuven.be

14650. Giannini, N.P.; Kalko, E.V. (2005): The guild structure of animalivorous leaf-nosed bats of Barro Colorado Island, Panama, revisited. *Acta Chiropterologica*

7(1): 131-146. (in English) ["We examined data sets on dietary composition of a rich (15 species) assemblage of animal-eating Neotropical leaf-nosed bats (Phyllostomidae: Phyllostominae) that occur syntopically on Barro Colorado Island, Panama. Our aim was to test previously postulated trophic structure of phyllostomines in the light of alternative analytical techniques and new data. The trophic structure of this assemblage, according to new results from Correspondence Analysis, has two main trends of variation: a gradient of increased carnivory (axis 1) and a gradient involving plant and arthropod consumption (axis 2). This rejects previous hypotheses of this guild in which the structure was described as a complex of many independent discrete resources. Although all data sets agree that coleopterans as a group are an important food item for most species, Phyllostominae bats are not typically durophagous; i.e., they lack cranial and dental adaptations for rapid processing of hard-shelled arthropods as found in other bat families. Furthermore, insectivory varies inversely with body size, and is gradually replaced by carnivory in association with increasing mass and limited dental modifications. Together with CA results, this suggests that carnivory is an extreme of animalivory rather than a qualitatively distinct feeding habit among Phyllostominae bats. This conclusion fits biomechanical data that indicate that carnivorous bats are bigger and only modestly modified versions of soft-insect specialists." (Authors) The diet of *Micronycteris hirsuta* and *M. microtis* included a few Odonata.] Address: Giannini, N.P., Dept of Mammalogy, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024-5192, USA. E-mail: norberto@amnh.org

14651. Terzani, F. (2005): Ricerche odonatologiche in Toscana. IX. Nuovi dati sull'Arcipelago Toscano (Odonata). *Onychium*, Firenze 2: 6-8. (in Italian, with English summary) ["Odonatological research in Tuscany. IX. New data for the Tuscan Archipelago (Odonata). - Eleven species collected on various islands of the Tuscan Archipelago are listed. Of these species, three are new for Capraia Island (*Aeshna cyanea*, *Sympetrum meridionale*, *S. sanguineum*, one for Pianosa Island (*S. fonscolombii*), one for Elba Island (*S. fonscolombii*), one for Giglio Island (*Chalcolestes viridis*) and one for the Tuscan Archipelago (*S. sanguineum*)." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14652. Torralba Burrial, A.; Ocharan, F.J. (2005): Deformidad abdominal en *Coenagrion mercuriale* (Charpentier, 1825) (Odonata: Coenagrionidae). *Boletín de la SEA* 36: 369-370. (in Spanish) [Aguilar del Alfambra (Teruel, NE Spain) 28.VII.2004. A teratological abnormality of a male *C. mercuriale* is documented.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniob@hotmail.com

14653. Abbott, J. (2007): *Argia* 19(4). *Argia* 19(4): 1-24. (in English) [Calendar of Upcoming Events: 1; 2008 DSA SE Regional Meeting: 2; 2007 Treasurer's Final Report: 2; Northeastern NymphFest 2008 in Athol, Massachusetts: 2; Northeast Regional Meeting of the DSA, in the Northern Adirondacks and St. Lawrence Valley of New York, 26-29 June 2008: 3; BAO Manuscript Acceptance: 23] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

14654. Abbott, J.C. (2007): Book Review: *Dragons in the Ponds* by Robert H. Armstrong, John Hudson, and Marge Hermans. *Argia* 19(4): 23. (in English) [review of a book directed to introduce children into dragonflying.] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., University of Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

14655. Abbott, J.C. (2007): New and interesting Odonate discoveries. *Argia* 19(2): 25. (in English) [*Anax amazili*, 8-vi-2007, Captiva Island, Lee County, Florida, USA; *Argia oenea*, 22-v-2007, Fresno Canyon, near La Luz, Otero County, New Mexico, USA] Address: Abbott, J.C., Patterson Labs 219, School of Bio. Sci., Univ. Texas, Austin TX 78712, USA. E-mail: jcabbott@mail.utexas.edu

14656. Anonymous (2007): *Libellula*. *Argia* 19(4): 21. (in English) [Reprint of an old poem first published in the *Entomological News* in 1910.] Address: Tennesen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

14657. Avise, J.C. (2007): Turquoise-tipped Darner (*Rhionaeschna psilus*) in California. *Argia* 19(3): 33. (in English) [16-ix-2007, Huntington Beach, Orange County, California, USA] Address: Avise, J.C., Ecology and Evolutionary Biology, University of California, Irvine, CA, 92697, USA. E-mail: javise@uci.edu

14658. Ayres, C.; González, I.; Lorenzo, O.; Cordero, A. (2007): Nuevas citas de *Trithemis annulata* (Palisot de Beauvois, 1807) (Odonata: Libellulidae) en Galicia. *Boln. S.E.A.* 41: 402. (in Spanish) [E Rosal (29T, 0517526X, 463339Y), 19-vii-2005; Cerquido (29T, 0531025X, 4660862Y), Porriño (Pontevedra), x-2005; Con, Villagarcía (Pontevedra) (29T, 0522950, 4717970), summer 2006.] Address: Cordero Rivera, A., Depto de Ecología e Bioloxía Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

14659. Biggs, K.; Johnson, P.; Roberson, D. (2007): CalOdes/DSA Ode Blitz III: The Owens Valley: Mono and Inyo Counties 10-13 August. *Argia* 19(4): 3-6. (in English)

[Report on a regional faunistic study on Odonata in California, USA.] Address: Biggs, Kathy, 308 Bloomfield Road, Sebastopol CA, 95472, USA. E-mail: bigsnest@sonic.net

14660. Bledsoe, R. (2007): First record of Baja Blueth (Enallagma eiseni) in California. *Argia* 19(2): 23-24. (in English) [17-vi-2007, Tia Juana Valley Regional Park near San Diego, California, USA] Address: Bledsoe, R. E-mail: rbledsoe@yahoo.com

14661. Bridgehouse, D.W. (2007): Significant range extension and County record for *Erythrodiplax berenice* (Seaside Dragonlet) in Nova Scotia. *Argia* 19(4): 13-14. (in English) [Addition to the known records in Nova Scotia, Canada: 2-viii-2007, saltmarsh in the vicinity of Voglers Cove, Lunenburg County, 44.156°N 64.5307°W] Address: Bridgehouse, D.W., 24 Kiel Court, Eastern Passage, NS BSG 1R3, Canada. E-mail: d.bridgehouse@ns.sympatico.ca

14662. Daigle, J.J. (2007): Springtime in Tallahassee, Florida 2007. *Argia* 19(2): 5-6. (in English) [Notes on some records in spring of 2007 in Florida, USA] Address: Daigle, J., 2166 Kimberley Lane, Tallahassee, FL 32311, USA. E-mail: jdaigle@nettally.com

14663. Danforth, D.; Bailowitz, R. (2007): A new dragonfly species for Arizona. *Argia* 19(4): 16. (in English) [19-xi-2007, Cebadilla Pond, Tucson, Arizona, USA, *Micrathyrina aequalis*] Address: Bailowitz, R., 15444 N. Indian Trail, Tucson, AZ 85750 USA. E-mail: raberg2@q.com

14664. De Marmels, J. (2007): How and when did the Vagrant Emperor, *Hemianax ephippiger* (Burmeister, 1839) arrive in the Caribbean?. *Argia* 19(2): 16. (in English) [The author reports on gigantic swarms of the African Desert Locust *Schistocera gregaria* crossed the Atlantic, probably helped by storm winds following a hurricane and arriving on Caribbean islands. Such storms also could explain the arrival of *Anax ephippiger* in the Caribbean region.] Address: De Marmels, J., Inst. Zool. Agricola, Fac. Agronomia, Univ. Central de Venezuela, Apdo. 4579, Maracay 2101, Edo. Aragua, Venezuela. E-mail: demarmjc@hotmail.com

14665. Dolný, A.; Matějka, P. (2007): A contribution to population biology of *Libellula fulva* (Odonata: Libellulidae) on coal sludge sedimentation pond (Karviná – Czech Republic). *Ekológia (Bratislava)* 26(4): 341-351. (in English) ["The basic ecological characteristics of the only known population of *Libellula fulva* Müller in the Czech Republic (estimate of population size, territoriality, time of occurrence, mating season etc.) including the description of the habitat and overall dragonfly assemblage in the researched locality are reported. In 2002, we marked 76 males, total number of recaptures was 31. In 2003, we marked 114 males, there was a total 50 recaptures. The estimate of the Schnabel population density of adult males

in the 2002 was 123 specimens (the 95% confidence limits: 88–178). The estimate of the male population size in 2003 was 188 specimens (the 95% confidence interval: 145–271). In 2002 imago activity lasted 70 days, in 2003 only 41 days. In 2002, imago activity became apparent at the end of April; the first immature imago was discovered on 27-IV-2002. The maximum discovered life span of adult specimens we identified to be 16 days in 2002. In 2003 it was 26 days. Immature adults were recorded no later than in the first two weeks of imago occurrence. Interspecific territoriality was observed mainly in relation to *Orthetrum coerulescens*. We recorded 33 species of the dragonflies in the researched locality (12 species of Zygoptera, 21 species of Anisoptera). The only known area with the autochthonous occurrence of *Libellula fulva* in the Czech Republic is the Karviná-Doly – Mokroš locality, where *L. fulva*, curiously, evolves in a rather extreme environment i.e. a dam, which until recently was used for the sedimentation of coal sludge. Furthermore, this species was considered missing or rather extinct from 1913 to 1999 in the whole of the Czech Republic." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Slezská Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

14666. Donnelly, T.W. (2007): Book Review: Damsellies of North America. A Color Supplement by Michael L. May and Sidney W. Dunkle. *Argia* 19(4): 23. (in English) [Detailed review with focus on the problems of true documenting colours of specimens and variability of morphs.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

14667. Donnelly, T.W. (2007): Book Review: Dragonflies of North America, A Color and Learn Book With Activities, by Kathy Biggs and Tim Manolis. *Argia* 19(2): 31. (in English) [Review of a children book on dragonflies.] Address: Donnelly, T., 2091 Partridge Lane, Binghamton, NY 13903, USA. E-mail: tdonnel@binghamton.edu

14668. DuBois, B. (2007): GLOM 2007 visits northeastern Illinois. *Argia* 19(4): 17-18. (in English) [Report from the 7th Annual Great Lakes Odonata Meeting held at 8-10 June 2007 at the Visitor Center, Volo Bog State Natural Area, Lake County, Illinois, USA.] Address: DuBois, R., Wisconsin Department of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

14669. Gallucci, T. (2007): Red Wasp (*Polistes carolina*) predation on Pale-faced Clubskimmer (*Brechmorhoga mendax*). *Argia* 19(2): 20-21. (in English) [Leakey, Real County, Texas, USA, 23-vi-2007] Address: Gallucci, T., Gulf Coast Laboratory for Wildlife Research and Milk River Film, P.O. Box 6, Camp Verde, Texas 78010-5006, USA. E-mail: hurricanenet@hotmail.com

14670. Gallucci, T.; Freeman, B. (2007): Notes on avian predators of Odonata. *Argia* 19(2): 21-23. (in English)

[The authors document photographs of avian predators on Odonata found online or by personal observation.] Address: Gallucci, T., Gulf Coast Laboratory for Wildlife Research and Milk River Film, P.O. Box 6, Camp Verde, Texas 78010-5006, USA. E-mail: hurricanenet@hotmail.com

14671. Groover, R. (2007): Dragonfly vivarium construction plans. *Argia* 19(2): 29. (in English) [Construction plan for an outdoor dragonfly vivarium.] Address: Groover, R., J. Sargeant Reynolds Community College, USA. E-mail: rgroover@reynolds.edu

14672. Hatfield, J.K. (2007): The dragonflies and damselflies of the Llano Estacado: In search of more new species records on the Texas Panhandle South Plains. *Argia* 19(4): 10-11. (in English) [Additions to the regional list of species from the Lubbock County Texas, USA are given. Special emphasis is given to *Rhionaeschna psi-lus*.] Address: Hatfield, J.K., Lubbock, Texas, USA. E-mail: dragonflywatcher1029@yahoo.com

14673. Huang, J.-P. (2007): Multiple invasions and late Pleistocene demographic expansion of the Formosan damselfly, *Euphaea formosa* from Taiwan. M.Sc. thesis, Department of Life Science, Tunghai University: 42 pp. (in English, with Chinese summary) ["We used an endemic Formosan damselfly, *Euphaea formosa* (Insecta: Odonata: Euphaeidae) in Taiwan to investigate the pattern of contemporary population genetic structure using both mitochondrial cytochrome oxidase II (COII) and nuclear internal transcribed spacer (ITS) genes, and to discuss geohistorical events and life history characteristics that may have contributed to the observed patterns. Our results suggested that there was substantial gene flow among populations. Two distinct haplotype clades, one western restricted and one widespread clade, were identified based on COII phylogeny. The COII western clade, which showed a significant isolation by distance pattern, may colonize Taiwan due greatly to recent glacial events. Historical demography estimated using Bayesian skyline plot (BSP) and mismatch distribution showed a pattern of recent population expansion. Significant negative Tajima's D and Fu's FS values coupled with star-like networks of COII widespread clade and ITS also indicate population expansion. We conclude that the colonization and demographic expansion of damselfly populations were likely the result of increased available habitats during late Pleistocene." (Author)] Address: not stated

14674. Johnson, J. (2007): Love bites. *Argia* 19(4): 21. (in English) [Gold Lake, Cascade Mountains, Lane County, Arizona, USA; story on an attempt of a male *Argia vivida* to copulate with a female *Octogomphus specularis*.] Address: Johnson, J., 3003 Unander Ave, Vancouver, WA 98660, USA. E-mail: jt_johnson@comcast.net

14675. Keppner, E.J.; Keppner, L.A. (2007): Odonata survey of Bay County, Florida. *Argia* 19(4): 15-16. (in

English) [USA; checklist of 77 species studied between iv-2003 and ix-2007.] Address: Keppner, E.J., 4406 Garrison Road, Panama City, FL 32404, USA. E-mail: ekeppner@bellsouth.net

14676. Kerst, C. (2007): Memories of Monty. *Argia* 19(4): 19-20. (in English) [Some personal notes on the times at Purdue University as responsible in B.E. Montgomery's lab to rear odonate larvae.] Address: Kery, Cary. E-mail: cary_k@comcast.net

14677. Klymko, J. (2007): *Celithemis martha* (Martha's Pennant): a new species for New Brunswick. *Argia* 19(4): 11. (in English) [9-viii-2006, 45.2815°N 066.2445°W, Canada] Address: Klymko, J. E-mail: jklymko@gmail.com

14678. Lethaby, N. (2007): The discovery of the Exclamation Damsel (*Zoniagrion exclamationis*) south on the central California coast to Santa Barbara County. *Argia* 19(4): 12. (in English) [USA; records of the species along the Californian coast are documented.] Address: Lethaby, N., 6807 Sweetwater Way, Goleta, CA 93117, USA. E-mail: nlethaby@ti.com

14679. Martin, K. (2007): Photo documentation of *Stylurus spiniceps* (Arrow Clubtail) nymphal eclosure. *Argia* 19(4): 22. (in English) [5-vii-2007, Connecticut River, northern Massachusetts, USA, detailed documentation of the emergence of *S. spiniceps*.] Address: Martin, Kirsten, Antioch University New England, Keene, NH, USA. E-mail: Kirsten_Martin@antiochne.edu

14680. Meurgey, F. (2007): New and interesting records from Martinique (French West Indies). *Argia* 19(2): 27-28. (in English) [*Lestes tenuatus*, 17-iv-2007, southern part of Martinique; *Triacanthagyna caribbea*, ?2007, La Pagerie, Trois-Ilets, Martinique; *Tramea calverti*, iv-2007, L'Anse Mitan, Martinique] Address: Meurgey, F., Muséum d'Histoire naturelle de Nantes, 12, rue Voltaire, 44000 Nantes, France. E-mail: Francois.Meurgey@mairie-nantes.fr

14681. Michalski, J. (2007): To Nick Donnelly on the occasion of his 75th birthday. *Argia* 19(4): 6-9. (in English) [Biographic notes to one of the most influencing American odonatologists of the 20th and beginning 21st century.] Address: Michalski, J., 1223 Mount Kemble Av., Morristown New Jersey 07960, USA. E-mail: huonia@aol.com

14682. Roberson, D. (2007): Saving (my) private clubtail. *Argia* 19(2): 7. (in English) [Nice story on tracking the very rare *Gomphus kurilis* at San Antonio River, Monterey County, California, USA at 29-iv-2007. The title photo of *Argia* 19(2)-issue demonstrates the threat of this outstanding dragonfly by a bullfrog ...] Address: Roberson, D., 282 Grove Acre Ave., Pacific Grove, CA 93950, USA. E-mail: creagrus@montereybay.com

14683. Sibley, F.C. (2007): Zebra mussels and lake odonates. *Argia* 19(2): 15-16. (in English) [28-vi-2007, Keuka

Lake, Yates Country, New York, USA. Exuviae of *Epi-theca princeps* and *E. cynosura* were infested by mus-sels] Address: Sibley, F.C., The Conservation Agency, 6 Swinburne St. Jamestown, RI 02835, USA. E-mail: fcsibley@empacc.net

14684. Soler, E.; Arlés, M. (2007): Nuevos registros de *Zygonyx torridus* (Kirby, 1889) para la Península Ibérica (Odonata, Libellulidae). *Boln. S.E.A.* 41: 376. (in Spanish) [Río Quesa-Escalona, Quesa (Valencia), Spain, 200 m asl 30SXJ9433, 13-VII-2006] Address: Soler, Ester, Universitat de València. Institut Cavanilles de Biodiversitat i Biologia Evolutiva (ICBiBE). Apartat de correus 2085, 46071. València, Spain. E-mail: esther.soler@uv.es

14685. Tennessen, K. (2007): Maiden flight. *Argia* 19(1): 15. (in English) [poem] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennes-sen@centurytel.net

14686. Tennessen, K. (2007): Rearing and photographing *Orthemis* (Tropical King Skimmers). *Argia* 19(2): 30. (in English) [The note introduces some technical notes of preserving specimens of *Orthemis* urgently needed to separate *O. ferruginea* and *O. discolor* by morphological features.] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennes-sen@centurytel.net

14687. Terzani, F. (2007): Ricerche odonatologiche in Toscana. XI. La *Boyeria irene* (Fonscolombe, 1838) (Odonata, Aeshnidae). *Onychium* 5: 26-28. (in Italian, with English summary) [New records of *B. irene* are presented and its distribution in Tuscany, Italy is mapped.] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14688. Young, S. (2007): Odes on bank notes. *Argia* 19(2): 28. (in English) [Documentation of the Norwegian 50 Fenti Kroner banknote, probably the only one of official currency with a dragonfly figured. There are also some fantasy banknotes from the "Territory of West Junee" (<http://www.mujand.com/territory-of-west-junee.html>).] Address: Young, S., Austin, Texa, USA. E-mail: birding-biker@austin.rr.com

2008

14689. Bartolozzi, L.; Cianferoni, F.; Fabiano, F.; Mazza, G.; Rocchi, S.; Terzani, F.; Zinetti, F. (2008): Osservazioni sulla entomofauna della Piana Fiorentina. In: *Un Piano per la Piana*. Atli del Convegno, 9 maggio 2008, Polo Scientifico e Tecnológico di Sesto Fiorentino: 14 pp. (in Italian) [records of *Ischnura pumilio*, *Coenagrion scitulum*, *Brachytron pratense* and *Trithemis annulata* are documented. For details see: <http://www2.msn.unifi.it/upload/sub/specola/IMG/Piano%20per%20la%20piana/06.pdf>] Address: Bartolozzi, L., Museo di Storia Naturale, Sezione di Zoologia "La Specola", Università degli Studi di Firenze, via Romana, 17-50125 Firenze, Italy. E-mail: luca.baitolozzi@umfi.it

14690. Collober, O. (2008): Odonates. La virgule - Bulletin de liaison sur les insectes et autres invertébrés du Poitou-Charentes 1: 11-12. (in French) [The following papers are published: Une liste régionale des Odonates menacés; Poursuite de l'inventaire régional des Odonates!; L'Anax napolitain [Anax parthenope], reproducteur en Deux-Sèvres. For details see: http://www.poitou-charentes-nature.asso.fr/IMG/pdf_virgule_pcn_1.pdf] Address: Poitou-Charentes - Nature, 14 rue Jean Moulin, 86240 Fontaine le Comte, France. www.poitou-charentes-nature.asso.fr

14691. Ferreira, S.; Soares, A.; Grosso-Silva, J.M. (2008): Dragonfly (Insecta, Odonata) records from three northern Portugal localities. *Boletim de la S.E.A.* 42(1): 445-446. (in Spanish, with English summary) ["The known distribution of 21 Odonata species is increased in continental Portugal. Nine species are recorded for the first time from the Natura 2000 site "Valongo", including a new population of *Oxygastra curtisii*. The known distribution of *Anax parthenope* is significantly increased towards the north-west of Iberia." (Authors)] Address: José Manuel Grosso-Silva, J.M., CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairão, 4485-661 Vairão; Portugal. E-mail: jmgrossosilva@yahoo.com

14692. Marconi, A.; Terzani, F. (2008): Odonati raccolti nella République Démocratique du Congo da M. Spadone (Odonata). *Onychium* 6: 48-53. (in Italian, with English and French summaries) ["Dragonflies collected in the République Démocratique du Congo by M. Spadone (Odonata). Of the 14 species collected in the Bas-Congo Province (République Démocratique du Congo) six are new for this state: *Sapho orichalcea*, *Elattoneura centrafricanam*, *Pseudagrion epiphonematicum*, *Gynacantha vesiculata*, *Lokia corydoni* and *Orthetrum c. chrysostigma*." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14693. Terzani, F.; Marconi, A. (2008): Odonati della "Réserve Naturelle de Tchimpounga" (République du Congo) (Odonata). *Onychium* 6: 43-47. (in Italian, with English and French summaries) ["Of the 16 species collected in the Tchimpounga Natural Reserve (Republic of Congo) two are new records for the Republic of Congo [(*Aethiothemis palustris* Martin, 1912 and *Lokia erythromelas* (Ris, 1909))." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14694. Terzani, F.; Zinetti, B. (2008): Odonati raccolti in alcune aree protette della Provincia di Arezzo (Toscana) (Odonata). *Onychium* 6: 25-42. (in Italian, with English summary) ["Odonata collected in some Natural Reserves of Arezzo Province (Tuscany). Collecting in the Tuscan Natural Reserves in the Province of Arezzo (Central Italy) has yielded 37 species of dragonflies the most interesting of which are *Sympetma fusca*, 1820), *Coenagrion mercuriale castellani*, *Coenagrion scitulum*, *Ischnura pumilio*, *Oxygastra curtisii* and *Sympetrum depressiusculum*. Also included is general information on the Reserves." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14695. Wilson, K.D.P. (2008): Crepuscular activity in *Orientogomphus minor* (Laidlaw) comb. nov. from Thailand and clarification of the taxonomic status of closely related species. *Echo* 5: 15-21. (in English) ["9-11th April I explored the Khao Phanom Bencha Forest National Park, Krabi, Thailand. All Thai specimens, formally attributed to *circularis* or *Onychogomphus* sp., belong to *Orientogomphus minor*. *Orientogomphus circularis* is a distinct and relatively large species from north Burma. *O. minor* is a small species ranging throughout Thailand to Peninsular Malaysia (abd. 35.0-36.5, hw 25.0-27.0). *Orientogomphus naninus* is of similar size to *circularis* but is not its junior synonym and neither is it a synonym of *minor*; it is another distinct species from northern Vietnam. A map showing the distribution of all specimens collected belonging to the genus *Orientogomphus* is provided." (Author)] Address: Wilson, K.D.P., 18 Chatsworth Rd, Brighton, E Sussex, BN1 5DB, UK. E-mail: wilsonkd@ntlworld.com

2009

14696. Huang, D.-Y.; Nel, A. (2009): First fossil record of a Lindeniidae from the Miocene Shanwang Formation of China (Odonata, Anisoptera). *Bulletin de la Société entomologique de France* 114(4): 441-443. (in English, with French summary) ["The first Chinese and fifth fossil Lindeniidae is described but not named from the Miocene Shanwang Formation of Linqu City, Shandong Province. Except for an Early Cretaceous taxon from Brazil, all the representatives of this family are from the Oligocene-Miocene of the Palaearctic region." (Authors)] Address: Huang, D.-Y., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, P.R. China. E-mail: huangdiyong@sina.com

14697. Jones, R.W. (2009): The impact on biodiversity, and integrated control, of water hyacinth, *Eichhornia crassipes* (Martius) Solms-Laubach (Pontederiaceae) on the Lake Nsezi – Nseleni River System. M.Sc. Thesis, Department of Zoology and Entomology Rhodes University: 115 pp. (in English) ["Water hyacinth, a free floating

aquatic plant was discovered by C. von Martius in 1823 in Brazil. It is believed to have been introduced into South Africa, as an ornamental plant, in 1908 to the Cape Province and Natal. Since its introduction, water hyacinth has spread throughout South Africa to the detriment of all aquatic systems that it has been introduced to directly or indirectly. The weed was first positively identified on the Nseleni and Mposa rivers on the Nseleni Nature Reserve which is a protected area near Richards Bay in KwaZulu-Natal in 1982 and formed a 100% cover of the river by 1983. An integrated management plan was implemented in 1995 and resulted in a reduction of the weed from a 100% cover to less than 20% cover in 5 years. The keys to success of the water hyacinth integrated management plan, presented here, were finding the source of the weed, mapping the extent of the water hyacinth infestation, identifying sources of nutrient pollution, appointing a champion to drive the programme, dividing the river into management units, consultation with interested and affected parties, judicious use of herbicides and biological control and a commitment to follow-up. This study further showed that water hyacinth on the Nseleni and Mposa river systems had a negative impact on the biodiversity of the protected area and the control of water hyacinth resulted in the recovery of the benthic invertebrate, amphibian, reptile, fish and avian fauna. The implementation of this integrated management plan was very cost-effective and serves as a model approach to the control of water hyacinth in both South Africa and the rest of the world." (Author) Odonata are treated at the family level.] Address: Jones, R.W., Dept of Zoology & Entomology Rhodes University, P.O.Box 94, Grahamstown 6140. USA

14698. Keppner, E.J.; Keppner, L.A. (2009): A beginners guide to the dragonflies and damselflies from Bay and surrounding counties, Florida. Lake Sands District, Boy Scouts of America (ed.): II + 18 pp. (in English) [For details see: <http://lakesandsdistrict.org/docs/Animals/Begin%20Guide%20for%20Boy%20Scouts%208-09.pdf>] Address: Keppner, Lisa, Garrison Road, Panama City, FL 32404 USA. E-mail: lkeppner@bellsouth.net

14699. Marconi, A.; Terzani, F. (2009): Dragonflies from Kenya deposited in the Natural History Museum of Florence University, Zoological Section "La Specola" (Odonata). *Onychium* 7: 36-43. (in Italian, with English summary) [A collection of 134 specimens of Odonata from Kenya has been revised; 3 family, 19 genera and 28 species are listed. Morphological details of *Ceriagrion moorei*, *Gynacantha usambarica*, *Orthetrum brachiale*, *O. caffrum*, *O. julia falsum*, *Tramea basilaris* and *Tritthemis wernerii* are figured.] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14700. Ramadan, A.M.; Ihsan, S.E.; Shiha, M.S. (2009): A taxonomic study of the species belonging to Aeshnidae

and Gomphidae Families (Anisoptera: Odonata) on the Syrian coast. *Tishreen University Journal for Research and Scientific Studies - Biological Sciences Series* 31(1): 148-165. (in Arabian, with English summary) [103 specimens of Aeshnidae and Gomphidae "were collected from 11 sites on the Syrian coast during 2006– 2007. Morphological and taxonomical aspects of collected specimens have been studied. Identification keys of genera, and species were obtained according to the most important taxonomic features: ...Gomphus davidi, Onychogomphus macrodon, O. lefebvrei, Paragomphus sinaiticus, Anax imperator, A. parthenope, A. immaculifrons, Hemianax ephippiger, Anaciaeschna isosceles, Aeshna mixta and Caliaeschna microstigma. ... O. macrodon, Paragomphus sinaiticus, A. parthenope, A. immaculifrons, Anaciaeschna isosceles, Aeshna mixta are recorded for the first time in Syria." (Authors)] Address: Ramadan, A.M., Plant Protection Dept, Fac. Agriculture, Tishreen Univ., Lattakia, Syria

14701. Roble, S.M.; Carle, F.L.; Flint, O.S. (2009): Dragonflies and damselflies (Odonata) of the Laurel Fork recreation area, George Washington National Forest, Highland County, Virginia: Possible evidence for climate change. In: S. M. Roble and J. C. Mitchell (eds.). 2009. *A Lifetime of Contributions to Myriapodology and the Natural History of Virginia: A Festschrift in Honor of Richard L. Hoffman's 80th Birthday*. Virginia Museum of Natural History Special Publication No. 16, Martinsville, VA: 365-399. (in English) ["The Odonata fauna of the Laurel Fork Recreation Area in the George Washington National Forest, Highland County, Virginia, was sampled on more than 50 dates between 1971 and 2008. A diverse fauna of 66 species (43 dragonflies, 23 damselflies) was documented in the study area, including four species not recorded elsewhere in Virginia and four others that have been recorded from only one other site in the state (two from nearby sites in the same county). Most of the species are confirmed or suspected to breed in the study area at beaver ponds, seepage habitats, headwater streams, or the mainstem of Laurel Fork. Twenty-one species were documented by the collection or observation of only 1-2 adults during the entire study, suggesting that they may have been migrants, strays, immigrants, or rare and declining species. Approximately a quarter of the species recorded in the study area are at or near their southern range limits, and a third of the Laurel Fork fauna is included on the Virginia Division of Natural Heritage program's current list of state-rare species. Collecting occurred primarily during two periods, the first from 1971-1982 and the second from 1992-2003. Five boreal species were only collected during the first period and 12 austral species were only collected during the second period, suggesting a change in community structure that is concordant with climate warming. Record early or late flight dates for Virginia populations were documented for 24 species. The Laurel Fork Recreation Area is a regionally significant site for the protection of biodiversity." (Authors)] Address: Roble, S.M., Virginia Dept of Conservation and Recreation Division of Natural Heritage 217 Governor Street Richmond, Virginia 23219

14702. Terzani, F. (2009): Monitoraggio dell entomofauna di una pozza astatica in provincia di Firenze, 2: odonati (Odonata: Lestidae, Coenagrionidae, Aeshnidae, Libellulidae). *Onychium* 7: 17-19. (in Italian, with English summary) [*Lestes barbarus*, *Chalcolestes viridis*, *Ischnura elegans*, *Coenagrion puella*, *Anax imperator*, *Sympetrum sanguineum*, *S. striolatum*, and *S. meridionale* are listed from an astatic pool (Il Ferrone, Impruneta) in the province of Firenze, Italy. A figure of an unusual abdominal pattern in male *Coenagrion puella* is included.] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

14703. Terzani, F. (2009): Odonati raccolti nell'Alto Appennino reggiano, parmense e massese (Emilia-Romagna, Toscana) (Odonata). *Onychium* 7: 29-35. (in Italian, with English summary) [Twenty one taxa collected at 18 localities in the High Apennines of the provinces of Parma, Reggio Emilia and Massa-Carrara (Emilia-Romagna, Tuscany, Italy) are listed. *Calopteryx virgo virgo*, *C. virgo meridionalis*, *Lestes dryas*, *Enallagma cyathigerum*, *Coenagrion puella*, *Pyrrhosoma nymphula*, *Platycnemis pennipes*, *Aeshna isosceles*, *A. cyanea*, *Anax imperator*, *A. parthenope*, *Onychogomphus forcipatus unguiculatus*, *Libellula quadrimaculata*, *L. depressa*, *Sympetrum sanguineum*, *S. fonscolombii* and *S. meridionale* are cited for the first time in this geographic area. *Cordulia aenea* is confirmed.] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2010

14704. Gainzarain, J.A. (2010): Primera cita de *Aeshna juncea* (Linnaeus, 1758) (Odonata, Aeshnidae) para Cantabria (norte de España). *Boletín de la S.E.A.* 46(1): 448. (in Spanish) [A record of *A. juncea* is documented: 14-viii-2009, 1280 m asl, Cantabria (municipio de Arredondo; 30TVN4687)] Address: Gainzarain, J.A., Instituto Alavés de la Naturaleza Apdo. de correos 2092 01080 Vitoria-Gasteiz, Spain. E-mail: j.a.gainzarain@euskalnet.net

14705. Hermans, J.H. (2010): The dragonfly fauna of southern Limburg. *Natuurhistorisch Maandblad* 99(9): 189-200. (in Dutch, with English summary) ["The article presents an overview of our present knowledge about the dragonflies of the southern part of the province of Limburg. 55 species of dragonflies were observed between 1990 and 2007. Dragonflies of oligotrophic waters (moorland pools or bogs) such as *Ceriagrion tenellum*, *Leucorrhinia rubicunda*, *Aeshna juncea* or *Somatochlora arctica* are restricted to the area around the villages of Brunssum and Schinveld. Species such as *Ischnura elegans*, *Coenagrion puella*, *Aeshna cyanea* and *Libellula depressa*, which show no preference for a particular type

of water, are widespread and abundant in Southern Limburg. Species which prefer running waters are found in the valleys of the river Meuse and the larger brooks, such as Geul and Gulp. Some dragonfly habitats, such as pools and limestone quarries, are discussed separately. Several pools in the Mergelland (the southwestern part of Southern Limburg) have disappeared and many are in a deplorable state due to lack of maintenance. The most common species breeding in such pools are Blue Hawker, Common Bluetail and Broad-bodied Chaser. Limestone quarries are of great importance for dragonflies. The sheltered situation and the continuing limestone extraction provide a special and warm habitat. Most of the dragonfly species recorded there, like *Ischnura pumilio*, *Orthetrum brunneum* and *O. coerulescens* need the dynamic environment found in these quarries." (Author)] Address: Hermans, J.T.; Hertestraat 21, NL-6067 ER Linne, The Netherlands

14706. Hoang, T.H.; Locke, K.; Dang, K.C.; De Pauw, N.; Goethals, P.L.M. (2010): Communities in the Du River Basin in Northern Vietnam. *Journal of Freshwater Ecology* 25(4): 637-647. (in English) ["... subtropical northern Vietnam. 70 taxa were identified, which were dominated by aquatic insects, with Diptera, Hemiptera, Ephemeroptera, and Odonata being the orders with the highest diversities ..." (Authors)] Address: Goethals, P.L.M., Laboratory of Environmental Toxicology and Aquatic Ecology, Ghent University, J. Plaieastraat 22, 9000 Gent, Belgium

14707. Kiselyova, G.A.; Prokopov, G.A.; Razumeiko, V.N. (2010): The condition of macrozoobenthos of the mountain streams of Crimea. *Science. Rec. Ternopil. nat. ped. the University. Ser. Bull.* 2(43): 245-248. (in Russian) [The list of taxa includes *Calopteryx splendens taurica*, *Onychogomphus forcipatus*, *Gomphus vulgatis-simus*, and *Platycnemis pennipes*] Address: Kiselyova, G.A., Tavrida National V.I. Vernadsky University, Simferopol', Ukraine

14708. Kuznetsova, V.G.; Grozeva, S. (2010): Achiasmatic meiosis: a review. *Vestnik VOGiS (The Herald of Vavilov Society for Geneticists and Breeding Scientists)* 14(1): 79-88. (in Russian, with English summary) ["Literature data on achiasmatic meiosis are reviewed. Protozoan, plant, and invertebrate taxa in which meiosis has been found are listed. Independent and repeated origin of achiasmatic meiosis in the evolution of living organisms is shown. However in some groups this pattern is a good taxonomic marker allowing us to establish relationships and recognize monophyletic groups. Association of achiasmatic meiosis with heterogametic sex, presence of the synaptonemal complex in the majority of cases and its role as a structure providing for correct segregation of homologous chromosomes in the meiotic anaphase in the absence of chiasmata and crossing over, diversity of types of achiasmatic meiosis, and its evolutionary significance are discussed." (Authors) The paper

includes a passing reference to Odonata.] Address: Kuznetsova, V.G., Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia. E-mail: karyo@zin.ru

14709. Terzani, F.; Cianferoni, F.; Mazza, G.; Zinetti, F. (2010): Ricerche odonatologiche in Toscana. XII. Lago di Montieri, provincia di Grosseto (Odonata) - Odonatological research in Tuscany. XII. Montieri lake, Grosseto province (Odonata). *Onychium* 8: 3-5. (in Italian, with English summary) [Between 2003-2007, 10 odonate species of dragonflies have been collected in the Montieri lake, Italy. The records include a tandem between a male *Lestes parvidens* and female *L. viridis*.] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2011

14710. Akamatsu, F.; Toda, H. (2011): Aquatic subsidies transport anthropogenic nitrogen to riparian spiders. *Environmental Pollution* 159(5): 1390-1397. (in English) ["Research highlights: * d15N of aquatic insects increases downstream with anthropogenic nitrogen inputs. * d15N of riparian spiders increases with a high dietary proportion of aquatic insects and smaller spider body size. * The aquatic subsidies transport anthropogenic nitrogen to smaller riparian spiders downstream. Stable nitrogen isotopic composition (d15N) of aquatic biota increases with anthropogenic N inputs such as sewage and livestock waste downstream. Increase in d15N of riparian spiders downstream may reflect the anthropogenic pollution exposure through predation on aquatic insects. A two-source mixing model based on stable carbon isotopic composition showed the greatest dependence on aquatic insects (84%) by horizontal web-building spiders, followed by intermediate (48%) and low (31%) dependence by cursorial and vertical web-building spiders, respectively. The spider body size was negatively correlated with the dietary proportion of aquatic insects and spider d15N. The aquatic subsidies transported anthropogenic N to smaller riparian spiders downstream. This transport of anthropogenic N was regulated by spider's guild designation and body size. Smaller spiders assimilate anthropogenic nitrogen through the predation on aquatic subsidies." (Authors) The diet includes *Sympetrum frequens*, *S. infuscatum*, *S. pedemontanum*.] Address: Akamatsu, F., Department of Environmental Sciences, Shinshu University, 3-1-1 Asahi, Matsumoto, Nagano 390-8621, Japan

14711. Akkermans, R.W.; Geraeds, R.P.G. ; Schaik, V.A. van (2011): The expansion of the Broad Scarlet in the Dutch province of Limburg. *Natuurhistorisch Maandblad* 100(7): 113-118. (in Dutch, with English summary) ["Although the first Broad scarlet (*Crocothemis erythraea*) in Limburg was seen as early as 1968, it took until 1995 before the second specimen was spotted in the province. In that year, a number of specimens were

observed at several locations. The site with the largest number of observations at the time was the Doort nature reserve near Echt in the central part of Limburg. From 1995 to 2006, the Broad scarlet expanded its range over the whole of the province, although the rate of expansion was low in the first few years, with rising numbers of observations in a few 1x1 kilometre grid squares. From 1998 to 2002, the species expanded to other grid squares from a few core areas where it was seen every year. Between 2003 and 2005, numbers of the Broad scarlet grew slowly and the species spread across further grid squares. But in 2006, the number of observations exploded and there was a major expansion in terms of grid squares. Since that year, the Broad scarlet has colonised the whole province of Limburg and is now a rather common species. The whole colonisation process took about 12 years. Although there have been rumours about the species producing two generations a year, there is still no proof of this. The existence of two peaks in the flight period diagram suggests a second generation, but further investigation is required." (Authors)] Address: van Schalk, V.A., St. Luciaweg 20, 6075 EK Herkenbosch, the Netherlands

14712. Cannings, R. (2011): Hanging from a Leaf. In: Li, J.L. & M.T. Barbour (eds.); B. Boonsoong (ill.): Wading for bugs. Exploring streams with the experts. Oregon State University Press. ISBN 978-0-87071-608-9. 176 pp: 103-107. (in English) ["In Wading for Bugs, nearly two dozen aquatic biologists share their memorable encounters with stream insects. The contributors, based primarily in North America, work in diverse environments – from arctic to desert, from mountain streams to river valleys. They represent a wide range of expertise as authors of standard field texts, leaders in biomonitoring and assessment programs, directors of major laboratories, and specialists in aquatic ecology and taxonomy. The writings in Wading for Bugs allow readers to experience – through the eyes of the scientists – what it's like to study stream insects and to make discoveries that could help develop biological indicators for stream health. General summaries introduce each insect order. Elegant insect drawings accompany each story, along with morphological, life history, and habitat information for each species or family. Wading for Bugs will appeal to general readers as well as students, naturalists, and outdoor enthusiasts curious about streams and the insects that live in them." (Publisher) In chapter 18, Rob Cannings contributes his story on *Stylurus olivaceus*.] Address: <http://osupress.oregon-state.edu/book/wading-for-bugs>

14713. Couteyen, S.; Papazian, M. (2011): Contribution à la connaissance des Odonates de l'île de la Réunion 10. *Zyxomma petiolatum* Rambur, 1842, une espèce nouvelle pour l'île (Odonata Libellulidae). *L'entomologiste* 67(1): 21-23. (in French, with English summary) ["*Zyxomma petiolatum*, a Libellulidae known from Asia, Australia and some islands of the Indian Ocean, has been found in la Réunion Island. The monitoring of the

dragonfly fauna allows us to specify that this species has recently settled in the island." (Authors) Étang Gol, Saint-Louis, La Reunion, 24-x-2010.] Address: Couteyen, S., 188 chemin Nid Joli, F-97430 Le Tampon, La Réunion, France. E-mail: couteyensf@vanadoo.fr

14714. Evans, M.V. (2011): The relative strength of top-down and bottom-up trophic dynamics in the context of habitat isolation. Senior Honors Thesis. Washington University in St. Louis, Environmental Studies Program: 31 pp. (in English) ["Habitat isolation is rapidly increasing, due, in part, to habitat fragmentation. While isolation's effects on species richness, genetic diversity, predator:prey ratios, etc. have been well studied, little is known about isolation's effect on trophic dynamics. Isolation can potentially alter both top-down and bottom-up dynamics through its effects on local processes, such as predation and herbivory, that influence trophic dynamics. In order to investigate the impact of isolation on trophic dynamics, I conducted an experiment in aquatic mesocosms manipulating isolation and bottom-up and top-down dynamics, through the addition of nutrients and fish, respectively. The strengths of topdown and bottom-up dynamics were differentially affected by isolation. Generally, isolation weakened top-down processes relative to bottom-up processes, which were not significantly altered by isolation. I found predator communities to consist of less efficient predators at high isolation, while herbivore community composition was relatively unaffected by isolation. This suggests that a possible mechanism behind the differential shift in trophic dynamics over isolation may be a change in predator community composition. My experiment illustrated that isolation could indirectly affect communities through its effects on trophic dynamics and suggests further that top-down and bottom-up dynamics do not respond equally to isolation." (Author) Taxa - including Odonata - are treated at the order level.] Address: not stated

14715. Geraeds, R.; Hermans, J.; Ramaker, A. (2011): De Gaffelwaterjuffer opnieuw in Limburg gevonden - Dainty bluet rediscovered in Limburg. *Natuurhistorisch Maandblad* 100(3): 41-45. (in Dutch, with English summary) ["The Netherlands; "*Coenagrion scitulum*, which has a Holomediterranean distribution, is slowly expanding its range northward. This damselfly was first found in the Netherlands in 2003, near the village of Tegelen in the province of Limburg. Since no other specimens could be traced in this area, this is likely to have been a migrating individual from a nearby population. The next Dutch reports of the species came from the coastal region in the province of Zeeland, where the species has been spotted each year since 2007. On 21 May 2010, the Dainty bluet was rediscovered in Limburg, this time in the southern part of the province. The specimen was a freshly emerged male. During the following days, Dainty bluets were seen in large numbers, including tandems and emerging damselflies, at a pond in a meadow, making it clear that this pond hosts a population. The discovery of this population

fits in with the increase of the Dainty bluet in Northwestern Europe. In France, the species is expanding northward, and recently populations were discovered in Belgium, Germany and Luxembourg. The Dainty bluet prefers sunny still waters with rich aquatic vegetation such as water-milfoils (*Myriophyllum*) and hornworts (*Ceratophyllum*). Most water bodies where it occurs are sheltered by relatively high vegetations, such as those consisting of Common reed (*Phragmites australis*) and Broadleaf cattail (*Typha latifolia*). The submersed vegetation in the pond in Southern Limburg is dominated by Rigid hornwort (*Ceratophyllum demersum*), while other species include Floating pondweed (*Potamogeton natans*), Sago pondweed (*P. pectinatus*), Common duckweed (*Lemna minor*) and Greater duckweed (*Spirodela polyrhiza*). The pond is sheltered by a hedgerow." (Authors)] Address: Geraeds, R.P.G., Bergstraat 70, 6131 AW Sittard, The Netherlands

14716. Guillermo-Ferreira, R.; Vilela, D.S. (2011): Female courtship in *Mnesarete lencionii*? *Agrion* 16(1): 14. (in English) [Verbatim: During our field research at the Ecological Reserve of the "Clube de Caça e Pesca Itororó de Uberlândia", Uberlândia, State of Minas Gerais, Brazil (15°57'S, 48°12'W; altitude 863 m; 640 ha), we collected and observed specimens of the rare *Mnesarete lencionii* Garrison, 2006. The males we observed had the blue-grey-black colouration pattern and hyaline wings described by Garrison (2006). However, although females presented the body colour described, their wings were not hyaline but had a reddish-brown spot at the base and ivory pterostigma. At first glance, we thought *M. lencionii* females were *Hetaerina* males. Only after capturing them we noticed they were females, identified later as *M. lencionii*. Thus, in our curiosity, we made some behavioural observations. The observations presented here are from three males and seven females. Males always remained perched, paying no attention to females around. Females displayed a curious behaviour. They approached the male and perched in front of him and started to make short hovering flights and then returned to the male's perch. Such behaviour may be considered a visual signal for intersexual communication (Corbet 1999) or even a display used to invite males to mate (Abbott 2005). Considering that red spots are used in sexual attraction and courtship by male calopterygids (reviewed by Cordoba-Aguilar & Cordero-Rivera 2005), we wonder if a red spot on a female wing, combined with hovering flights, can eventually have a role in female courtship and male mate choice. We also observed females fighting each other near the male. Apparently, this population had a female biased sex ratio. This fact should indeed promote female-female competition for males. Since this species is rare and we have seen only ten individuals in three years, we provide this note as a suggestion for further studies if someone finds a better population to investigate.] Address: Guillermo-Ferreira, R., Departamento de Biologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil. E-mail: rhainerguillermo@yahoo.com.br

14717. Hutchings, G.; Halstead, D. (2011): Dragonflies and damselflies in the hand: An identification guide to boreal forest odonates in Saskatchewan and adjacent regions. *Nature Saskatchewan Special Publication* 29: 158 pp. (in English) ["These aims are ably met in an attractive package that includes about 200 photographic images and over 40 pages of drawings and keys. The clearly written text uses the necessary minimum of technical terms, all well-explained when introduced and included in a glossary. The book's scope is an ecological region, the western boreal forest, rather than a geopolitical entity such as Saskatchewan; it thus covers a broad swath of some of the less populous portions of the three Prairie Provinces. A map clearly outlines the main ecozones within this region. There are no individual distribution maps, but notes in the species accounts give a sense of any trend to north or south, east or west. The region is home to 13 damselfly and 36 dragonfly species (collectively, odonates), plus a number of what the authors call "fringe species" – mostly insects with more southerly or easterly ranges that peter out at the edge of the boreal forest. The total of 49 regular species is roughly half the Manitoba provincial list, and includes one western dragonfly (the Pale Snaketail) that has yet to be recorded in Manitoba. Introductory sections inform us about the life cycle of odonates, their roles as both predators and prey in the boreal ecosystem, and their adaptation to a harsh regime of long winters and brief summers. General tips on observation, identification, and photography are provided. Five landscape photographs show examples of boreal wetland types, and there is a representative photo of exuviae, the larval casings that remain after metamorphosis. The identification to species of such remains is a challenge beyond the book's scope. Each species account has three sections: a description to help with identification details, a brief statement of the preferred habitat, and notes on similar species, relative rarity or abundance, distribution, or behaviour. Illustrations typically show hand-held specimens, carefully posed with key identifying features in sharp focus against an unobtrusive background. There are also many photographs of unrestrained insects, plus closeups or crops of key anatomical details. The latter are mostly grouped on separate pages, with clear cross-referencing from the species accounts. A three-page bibliography provides guidance for further reading, and there is a helpful seasonal key to flight periods. For anyone spending time north of the Winnipeg River or aspen parkland regions, this book will be an excellent field companion. For anyone whose focus is a little farther south, or who simply can't resist good nature books with Manitoba content, it will be a valuable addition to the bookshelf. It is good to see *Nature Saskatchewan's* long tradition of natural history publication progressing so well into the 21st century." (review: Peter Taylor; <http://www.naturemanitoba.ca/sites/default/files/NMNews-NovDec-2011-web2.pdf>)] Address: Available from *Nature Saskatchewan*: email info@naturesask.ca, call (306) 780-9273 or mail 206 - 1860 Lorne St., Regina, SK S4P 2L7, Canada

14718. Ige, O.; Adeyemi, C.; Ogunfolakan, A.; Ayansola, A.; Olayemi, A.; Taiwo, Y.; Olayiwola, M.; Oyelade, J. (2011): An Inventory of the geological, biological and cultural resources on Ufe-Oke Hill, Idanre, southwestern Nigeria. *Natural Resources* 2: 180-190. (in English) ["Idanre, which represents a unique topographical landscape within southwestern Nigeria, is being proposed to the United Nations Educational Scientific and Cultural Organization (UNESCO) for designation as a world heritage site. In line with this, we conducted a survey to document the rich geological, biological and cultural resources contained within the Ufe-Oke section of Idanre Hills. Our geological inventory revealed two major rock types, older porphyritic granite and fine grained granite, in addition to other minerals. We identified insects belonging to 174 species while fishes from 4 species were collected. Mammals belonging to 13 species were identified through trapping, sightings and signs, although an even greater variety was inferred from interviews with hunters and visits to local fetish markets. Patterns concerning how these biological taxa are distributed altitudinally along Ufe-Oke Hill are discussed. In addition, in the quarters within Ufe-Oke representing the ancient city of Idanre, we characterized about 200 pieces of anthropological material, which included pottery shards, beads, chinaware, brass bangles and ancient metal coins. We also identified various other major features of archeological interest. Finally we offer recommendations, in the light of our findings, concerning how the variety of resources catalogued in this study can be effectively harnessed while sustaining at the same time the environmental integrity of this site, which offers the greatest opportunities and potential for tourism." (Authors) Insects including Odonata are treated at the order level.] Address: Ige, O., Natural History Museum, Obafemi Awolowo University, Ile Ife, Nigeria. Email: oige@oauife.edu.ng

14719. Kazanci, N. (2011): Characteristics of Odonata (Insecta) fauna of Köyceğiz-Dalyan Special Environmental Protected Area (SEPA) and its conservation. *Review of Hydrobiology* 4(2): 87-97. (in English, with Turkish summary) [The Odonata fauna of Köyceğiz-Dalyan SEPA (Mugla province, Turkey) comprises 28 species. From the conservation point of view, *Calopteryx splendens intermedia*, *Caliaeschna microstigma*, *Gomphus flavipes lineatus*, *Anax immaculifrons* and *Lindenia tetraphylla* are most interesting.] Address: Kazanci, Nilgün, Hacettepe University, Science Faculty, Biology Department, Hydrobiology Section, Beytepe, Ankara, Turkey. E-mail: nilgunkazanci@gmail.com]

14720. Labandeira, C. (2011): Silurian to Triassic plant and hexapod clades and their associations: new data, a review, and interpretations. *Arthropod Systematics & Phylogeny* 64(1): 53-94. (in English) ["A preliminary evaluation of hexapod herbivore damage from selected compression and permineralized biotas from the 220 million-year Late Silurian to Late Triassic interval has revealed many previously unknown patterns of hexapod herbivore

use of vascular plants as well as detritivore and predator associations. Data was collected from 48 distinctive hexapod herbivore damage types (DTs) from 21 mostly compression biotas, but with special emphasis on the Rlyinyne Chert (Early Devonian, ~ 408 Ma), Calhoun Coal (Late Pennsylvanian, ~ 303 Ma) and Molteno Formation (Late Triassic, ~ 226 Ma). These data indicate a two-phase herbivore colonization of land; later expansion of hexapod functional feeding groups (FFGs) initially in the Late Pennsylvanian wetland environments of equatorial Euramerica, and subsequently in Early Permian fluvial systems in the rest of Euramerica, Gondwana, and Cathaysia; the devastating end-Permian extinction; and subsequent rebound of those same FFGs during the ensuing Triassic. Modern-aspect herbivore, detritivore, and predator FFGs are present in Late Pennsylvanian canopied forests, and the full spectrum of all terrestrial FFGs are in place during the Late Triassic. Freshwater FFGs are delayed when compared to the terrestrial record, originating during the Permian, experiencing expansion during the Triassic, and reaching modern levels of all major trophic types during the Late Jurassic. A major conclusion is the omnipresence of convergence in FFGs throughout this interval and the spatiotemporally changing and ephemeral nature of plant hosts and their hexapod herbivore taxa." (Author) The paper includes many references to Odonata.] Address: Labandeira, C., Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0121 and Dept of Entomology, Univ. Maryland, College Park, Maryland 20742 USA. E-mail: labandec@si.edu

14721. Lacey, P. (2011): Dragonfly season. *Nature Manitoba News* 3(5): 4-5. (in English) [Popular account of an unnamed locality at the Seine River, Manitoba, Canada.] Address: not stated

14722. Lee, Y.H. (2011): Speciation with gene flow in island damselflies. M.Sc. thesis, Department of Life Sciences, Tokai University: 67 pp. (in English, with Chinese summary) ["Geographic isolation has been proposed as a major force in speciation. Allopatric mode of speciation emphasizes the prominent role of physical barriers and restriction of gene flow on population divergence. Under allopatric model, gene flow is considered as an impediment for speciation. The question of how much historical gene flow has occurred in diverged natural populations and species is largely unknown. In this study, we investigated the level of historical gene flow during the speciating process of two sibling species pairs of *Euphaea* damselflies, *E. formosa* + *E. yayeyamana* and *E. decorata* + *E. ornata*, using two mitochondrial and ten nuclear loci. The reconstructed species phylogeny based on *cox2* and *arr* genes indicated that *E. formosa* + *E. yayeyamana*, and *E. decorata* + *E. ornata*, are both valid sister species pairs. The results of multilocus analyses rejected the strict isolation model in *E. formosa* and *E. yayeyamana*, and *E. decorata* and *E. ornata*. Moderate to large

two directional gene flows were detected between *E. formosa* and *E. yayeyamana*, but there is little evidence of gene flow between *E. decorata* and *E. ornata*. The divergence time of *E. decorata* and *E. ornata* was estimated at approximately 0.511 Mya, which was more recent than the split of *E. formosa* and *E. yayeyamana* (1.145 Mya). We concluded that the model of speciation with gene flow best describe the observed sequence variation in *E. formosa* and *E. yayeyamana*, whereas the model of allopatric speciation without gene flow is more appropriate for *E. decorata* and *E. ornata*." (Author)] Address: Lee, Y.H; E-mail: sr74425@hotmail.com

14723. Maravalhas, E.; Pereira, P.; Soares, A.; Peixoto, M. (2011): Notes on the distribution and biology of the Splendid Cruiser - *Macromia splendens* (Pictet, 1843) in northern Portugal (Odonata: Macromididae). *Boletín de la S.E.A.* 48(1): 439-440. (in Spanish, with English summary) [*M. splendens* is considered by many odonatologists among rarest and most threatened European dragonflies. During the last few years, the authors have carried out field work to detect this species in continental Portugal, from the northern border to the river Mondego: the results are presented here." (Author)] Address: Maravalhas, E., TAGIS – Centro de Conservação das Borboletas de Portugal Museu Nacional de História Natural, Rua da Escola Politécnica, 58, 1250-102 Lisboa, Portugal. E-mail: emsmaravalhas@gmail.com

14724. Maravalhas, E.; Soares, A. (2011): Notes on the distribution and biology of the Hairy Hawker - *Brachytron pratense* (Muller, 1764) - in Portugal (Odonata: Aeshnidae). *Boletín de la S.E.A.* 48(1): 452-454. (in Odonata, Aeshnidae, *Brachytron pratense*, chorology, biology, conservation, Portugal) ["*B. pratense* is ... extremely rare in the Iberian Peninsula, where it has a scattered distribution and is seldom seen. During the years 2008 to 2010 the authors carried out research on the distribution of the species in several coastal districts of western Portugal, and found new populations in areas never reported previously. Our observations allow us to make a first approach on the biology and conservation of the species in continental Portugal." (Authors)] Address: Maravalhas, E., TAGIS – Centro de Conservação das Borboletas de Portugal Museu Nacional de História Natural, Rua da Escola Politécnica, 58, 1250-102 Lisboa, Portugal. E-mail: emsmaravalhas@gmail.com

14725. Neves dos Santos, A.F.G.; Neves dos Santos, L.; Araújo, F.G. (2011): Feeding morphology of the Neotropical piscivorous fish *Cichla kelberi* (Perciformes: Cichlidae) introduced into an oligotrophic Brazilian reservoir. *Rev. Biol. Trop. (Int. J. Trop. Biol.)* 59(3): 1245-1255. (in English, with Spanish summary) [Based on the study of 254 stomachs, nearly 50% of number of prey items belonged to Odonata.] Address: Araújo, F.G., Departamento de Biologia, Universidade Federal Rural do Rio de Janeiro, Antiga BR 465, Km 47, Seropédica, Brasil. E-mail: gerson@ufrj.br

14726. Papazian, M. (2011): La sinuosité de la nervure costale de l'aile antérieure chez les Palpopleurinae (Odonata, Anisoptera, Libellulidae). *Bulletin de la Société entomologique de France* 116(4): 389-395. (in French, with English summary) ["The undulation of the costal vein of the forewing in Palpopleurinae (Odonata, Anisoptera, Libellulidae). The undulation of the costal vein of the forewing is present in Diastatops, Palpopleura and Zenithoptera. The existence of this hollow is closely related with the shape of the eyes. The very forward positioning of the wings on these perching insects may have a physiologico-behavioral origin." (Author).] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillois, F-13012 Marseille, France. E-mail: mpapazian@ecologie.re

14727. Peralta-Maravera, I.; Lopez-Rodriguez, J.; Fenoglio, S.; Bo, T.; Luzon-Ortega, J.M.; Tierno de Figuero, J.M. (2011): Macroinvertebrate colonization of two different tree species leaf packs (native vs. introduced) in a Mediterranean stream. *Journal of Freshwater Ecology* 26(4): 495-505. (in English) ["Allochthonous leaf litter from riparian vegetation represents the main energy source in small lotic systems, where canopy limits autochthonous primary production. In this study, leaf packs of two tree species (the native *Salix neotrichia* and the introduced *Populus x canadensis*) were positioned in the Fardes Stream (southern Spain) to analyze the macroinvertebrate colonization. On two dates, leaf packs were removed, and colonizing macroinvertebrates were collected and identified; at the same time, Surber samples were collected to characterize the riverbed macroinvertebrate coenosis. Leaf packs attracted rich and varied communities of benthic macroinvertebrates, with an increase of the abundance of most taxa over time. No significant differences were found between the colonizing communities of the two leaf types. Some macroinvertebrate species showed a preference for leaf packs, probably due to trophic or hydrologic factors. Considering functional feeding groups, increases in shredders and scrapers and decreases in predators and filterers were detected over time, while collector-gatherers almost did not change in abundance." (Authors) Taxa, including Odonata, are treated at the family level.] Address: Peralta-Maravera, I., Depto de Biología Animal, Facultad de Ciencias, Univ. de Granada, Campus Fuentenueva s/n, 18071, Granada, Spain. E-mail: manujlr@ugr.es

14728. Pezzi, G. (2011): The entomofauna in the Special Protection Area (ZPS, Zona di Protezione Speciale) "Bacini ex zuccherificio di Mezzano", Ravenna. 3rd part: Odonata, Blattaria, Mantodea, Orthoptera, Dermaptera, Coleoptera Lucanoidea and Scarabaeoidea. (Insecta Odonata, Blattaria, Mantodea, Orthoptera, Dermaptera, Coleoptera Lucanoidea, Coleoptera Scarabaeoidea). *Quaderno di Studi e Notizie di Storia Naturale della Romagna* 34: 11-19. (in Italian, with English summary) [Italy; the following odonate species are checklisted: *Sympecma fusca*, *Chalcolestes viridis*, *Lestes barbarus*, *L. virens vestalis*,

Platycnemis pennipes, *Ischnura elegans*, *Coenagrion scitulum*, *Erythromma viridulum*, *Aeshna affinis*, *A. mixta*, *Anax imperator*, *A. parthenope*, *Libellula quadrimaculata*, *Orthetrum albistylum*, *O. brunneum*, *O. cancellatum*, *Crocothemis erythraea*, *Sympetrum depressiusculum*, *S. fonscolombii*, *S. meridionale*, *S. sanguineum*, *S. striolatum*, *Selysiothemis nigra*.] Address: Pezzi, G., via Pirandello, 12 C, 48012 Villanova di Bagnacavallo (RA), Italy. E-mail: pzzgrg@libero.it

14729. Rocha, J.R.M. da; Almeida, J.R. de; Lins, G.A.; Durval, A. (2011): Insects as indicators of environmental changing and pollution: A review of appropriate species and their monitoring. *Holos environment* 10(2): 250-262. (in Portuguese, with English summary) ["Responses of some species to disturbances can be used as a parameter of analysis about levels of change in the environmental services. These species can be used as environmental bioindicators. Class Insecta has many appropriate species. This paper aims an analysis of bioindicator species of the impact caused by intensive agriculture, deforestation, reforestation and pollution of aquatic and terrestrial environments." (Authors) The paper includes passing references to Odonata.] Address: Rocha, J.R.M. da, Universidade Federal de Mato Grosso - UFMT. Rua. Bento Alexandre dos Santos, 717 Centro. CEP 78.280-000, Mirassol D'Oeste, MT, Brasil

14730. Sharapova, T.A. (2011): Zooperiphiton of lakes in the Tobol-Ihimsk forest-steppe area (Tiumen district). *Vestnik ekologii* 12: 119-123. (in Russian, with English summary) ["The article quotes data on development of lake zooperiphyton under different water mineralization, demonstrating reduction of species composition, biomass, diversity of dominants, change of main dominating groups under increasing of salinity in the lakes." (Authors) The single odonate species mentioned is *Erythromma najas*.] Address: not stated

2012

14731. Bryan, A.L.; Hopkins, W.A.; Parikh, J.H.; Jackson, B.P.; Unrine, J.M. (2012): Coal fly ash basins as an attractive nuisance to birds: Parental provisioning exposes nestlings to harmful trace elements. *Environmental Pollution* 161: 170-177. (in English) ["Birds attracted to nest around coal ash settling basins may expose their young to contaminants by provisioning them with contaminated food. Diet and tissues of Common Grackle (*Quiscalus quiscula*) nestlings were analyzed for trace elements to determine if nestlings were accumulating elements via dietary exposure and if feather growth limits elemental accumulation in other tissues. Arsenic, cadmium, and selenium concentrations in ash basin diets were 5× higher than reference diets. Arsenic, cadmium, and selenium concentrations were elevated in feather, liver, and carcass, but only liver Se concentrations approached levels of concern. Approximately 15% of the total body burden of Se, As, and Cd was sequestered in

feathers of older (>5 days) nestlings, whereas only 1% of the total body burden of Sr was sequestered in feathers. Feather concentrations of only three elements (As, Se, and Sr) were correlated with liver concentrations, indicating their value as non-lethal indicators of exposure. Highlights: * We examined elemental uptake by grackle nestlings associated with coal ash basins. *Diet of ash basin nestlings had higher levels of Se, As, and Cd than control nestlings. *Se, As, Cd, and Sr concentrations of ash basin nestling tissues were elevated. *Only Se in nestling liver approached published levels of concern. *Nestling feathers sequestered >15% of the total body burden of Se, As, and Cd." (Authors) The paper includes a passing reference to Odonata as diet of the nestlings] Address: Bryan Jr., A.L., Savannah River Ecology Laboratory, P.O. Drawer E, Aiken, SC 29803, USA. E-mail: lbryan@srel.edu

14732. Buczyński, P. (2012): Dragonflies (Odonata). In: R. Kornijów & P. Buczyński, [Eds], *Lake Skomielno (Łęczna-Włodawa Lakeland, Eastern Poland). Environment monograph*. Mantis, Olsztyn: 238-256. (in Bilingual Polish and English) [Lake Skomielno (retention reservoir of the Wieprz-Krzna Canal system) is situated in the Podlasie-Polesie region, Poland. Its Odonata fauna and that of the adjoining habitats (36 species) is described, the odonate communities and their composition are thoroughly analysed and discussed. None of the recorded species is redlisted in Poland, but *Aeshna viridis* and *Leucorrhinia caudalis* are of particular conservation interest.] Address: Buczyński, P., Maria Curie-Skłodowska University in Lublin, Dept of Zoology, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

14733. Garrison, M. (2012): Strange Bedfellows. *Argia* 24(3): 31. (in English) [Salt Fork, Vermilion River, S Homer, Illinois, USA; *Argia apicalis* tried to copulate with *Progomphus obscurus*.] Address: Garrison, Marla. mgarrison@mchenry.edu

14734. Harms, T.M.; Rasmussen, R.D.; Kinkead, K.E.; Bergthold, C.L.; Frese, P.; Dinsmore, S.J. (2012): New additions to Iowa Odonata. *Argia* 24(3): 30-31. (in English) [*Ladona deplanata*:16-v-2011, 6-iv-2012, Eldon Wildlife Management Area, Davis County; 25-iv-2012, Donnellson Unit of Shimek State Forest in Lee County; 26-iv-2012, Big Hollow Creek Recreation Area in Des Moines County. *Celithemis fasciata*: 23-vi-2011, Eldon Wildlife Management Area in Davis County; 21-vi-2012, Fox River Wildlife Management Area in Van Buren County. *Didymops transversa*: 5-v-2012, 10-v-2012, Lacey-Keosauqua State Park in Van Buren County. *Libellula semifasciata*; 2008, Horseshoe Bend Division of Port Louisa National Wildlife Refuge in Louisa County. *Ophiogomphus westfalli*: OdonataCentral record #321975.] Address: Harms, T.M., Center for Survey Statistics and Methodology, Iowa State University, 208 Office and Laboratory Building, Ames, IA 50011, USA. E-mail: harmsy@iastate.edu

- 14735.** Heck, B. (2012): Ouachita Spiketail (*Cordulegaster talaria*), new for Oklahoma. *Argia* 24(3): 9-10. (in English) [USA; 18-iv-2011, U.S. Forest Service (FS) Road, about 19.3 km northwest of Broken Bow in McCurtain County, Oklahoma, and 2.9 km south of the intersection of FS roads 53000 and 53420, near the Cedar Creek crossing.] Address: Heck, B., Broken Bow, Oklahoma, USA. E-mail: baheck@pine-net.com
- 14736.** Kucharzyk, R. (2012): Some problems of the dialectal vocabulary – the polish folk names of dragonflies. *Studia z Filologii Polskiej i Słowiańskiej* 47: 69-85. (in Polish, with English summary) ["This paper deals with the polish folk names of a dragonfly – an insect belonging to the order Odonata. Over 90 Polish dialectal names were gathered and analyzed here. The motivation of these names has been discussed in this paper. Moreover, the information about the geographical occurrence of these lexemes is given here. This paper deals with the polish folk names of a dragonfly – an insect belonging to the order Odonata. Over 90 Polish dialectal names were gathered and analyzed here. The motivation of these names has been discussed in this paper. Moreover, the information about the geographical occurrence of these lexemes is given here." (Authors)] Address: not stated
- 14737.** Lhuman, E. (2012): First report of Blue-faced Meadowhawk (*Sympetrum ambiguum*) for Wisconsin. *Argia* 24(3): 23. (in English) [5-vii-2012, near Milwaukee, Wisconsin, USA] Address: Lhuman, Ellen. E-mail: manateemother@aol.com
- 14738.** Marinov, M. (2012): Description of female *Hemicordulia hilaris* Lieftinck, 1975 (Anisoptera: Corduliidae) with brief notes on the biogeography of the genus. *Records of the Auckland Museum* 48: 97-105. (in English) ["Three *Hemicordulia* specimens in the Auckland Museum, collected from the Cook Islands and Fiji, were compared with recently sampled material from Fiji, Tonga and New Caledonia. They were determined to be conspecific with *H. hilaris*, originally described from New Caledonia and confirmed for other parts of the Pacific – Fiji, Samoa and Tonga. The female of *H. hilaris* is described here for the first time and morphological features that separate the species from other congeners are discussed." (Author)] Address: Marinov, M., 7/160 Rossall Str., Merivale 8014, Christchurch, New Zealand. E-mail: milen.marinov@mpi.govt.nz
- 14739.** Masly, J.P. (2012): 170 Years of "Lock-and-Key": Genital morphology and reproductive isolation. *International Journal of Evolutionary Biology* Volume 2012, Article ID 247352, doi:10.1155/2012/247352: 10 pp. (in English) ["The divergent genital morphology observed among closely related animal species has long been posited as a mechanism of reproductive isolation. Despite the intuitive appeal that rapidly evolving genitalia might cause speciation, evidence for its importance—or even its potential—in reproductive isolation is mixed. Most tests of genital structural isolation between species often fail to find convincing evidence that differences in morphology prevent copulation or insemination between species. However, recent work suggests that differences in genital morphology might contribute to reproductive isolation in less obvious ways through interactions with sensory mechanisms that result in lowered reproductive fitness in heterospecific matings. In this paper, I present a brief history of the "lock-and-key" hypothesis, summarize the evidence for the involvement of genital morphology in different mechanisms of reproductive isolation, discuss progress in identifying the molecular and genetic bases of species differences in genital morphology, and discuss prospects for future work on the role of genitalia in speciation." (Author) The review includes references to Odonata.] Address: Masly, J.P., Department of Zoology, Univ. Oklahoma, 730 Van Vleet Oval, Norman, OK 73019, USA. E-mail: masly@ou.edu
- 14740.** Nagy, Z.; Vajda, C.; Szabó, L.J.; Miskolczi, M.; Devai, G. (2012): The morphometry of male and female adults of the scarce emerald damselfly (*Lestes dryas* Kirby, 1890). *Studia odonatol. hung.* 14: 5-25. (in Hungarian, with English summary) ["We found very few detailed information about the morphometry of *Lestes dryas* on world-wide and on Hungarian basis too. Here we would like to provide more information concerning this species furthermore explore the variation of the examined traits and compare the two sexes by traits. The study based on body and wing traits of male and female adults which were collected in populations of north-eastern Hungary. According to our results males had significantly larger body than females, however other traits (measures on the head, leg and wings) seemed to be smaller. The traits of the anal appendages had a greater variation, than other body traits. The sizes of the wings had smaller variation than the number of cross veins and the cells. The principal component analysis could divide the sexes based on the body traits, but in the case of the wing traits the convex hulls overlapped in a small compass. The discriminant analysis split the two sexes based on both trait groups. According to the linear regression analysis the total body length showed the maximal number of correlations in both sexes." (Authors)] Address: Nagy, Zuzsza, Debreceni Egyetem, Tudományegyetemi Karok, Természettudományi és Technológiai Kar, Hidrobiológiai Tanszék, 4032 Debrecen, Egyetem tér 1, Hungary.
- 14741.** Oldenettel, J.R. (2012): Feeding swarm of Common Green Darners (*Anax junius*). *Argia* 24(3): 16. (in English) [Verbatim: One late afternoon in the fall of 2011, I stopped by the North Roosevelt trap, a popular birding spot in east central New Mexico (aka the "Melrose Trap", 10 miles west of Melrose in Roosevelt County). The trap is a stand of several large cottonwoods among a stand of poplar trees (some 60-70 ft. high) totalling about 2 acres. There is a single 14 ft. diameter pump-fed cattle tank as the only source of standing water. There are usually several (<10) dragonflies hanging

around the tank; Flame Skimmer (*Libellula saturata*), Roseate Skimmer (*Orthemis ferruginea*), Common Green Darner (*Anax junius*), Twelve-spotted Skimmer (*Libellula pulchella*), and Blue-faced Darner (*Coryphaeschna adnexa*) have been seen at various times. There was an emergence of a late ants in progress throughout the area, but I am not sure of the species. Around the open areas of the trap, I observed hundreds of dragonflies (my estimate of the total at the time was about 2000). All identified individuals were Common Green Darners, and I didn't see any individuals that I thought were a different species. A flying ant would not get far off the ground before a dragonfly had scooped it up. Since there are no large bodies of water in the area, I'm guessing these must have comprised a long-distance migrating swarm, something I have never encountered before. I appear to have left this out of my birding notes, so I have no precise date.] Address: Oldenettel, J.R., Socorro, New Mexico, USA. E-mail: Borealowl@aol.com

14742. Oriti, R.; Oriti, B. (2012): Spot-winged glider (*Pantala hymenaea*) migration. *Argia* 24(3): 18. (in English) ["Beginning on about 25 July 2012, Inyo County, California, experienced a large migration of *P. hymenaea*. They were seen everywhere, even by casual observers. At some of our favourite dragonfly sites we saw them in amazing numbers. At one site we saw them hang perching in the willows by the several hundreds over a distance of a couple of hundred yards. Great swarms were also seen flying, and it was impossible to estimate their total number. I would conservatively guess that there were tens of thousands flying over the County. This amazing migration lasted about seven days. A few *Pantala flavescens* were seen among them." (Authors)] Address: Ron & Barbara Oriti, 3620 Brookside Dr., Bishop, California, 93514, USA. E-mail: Meteoriti@aol.com

14743. Schorr, M. (2012): *Libellula virgo* Linnaeus, 1758 auf Grönland - Eine Neubewertung der Beobachtung von Fabricius (1780). *International Dragonfly Fund - Report* 52: 1-44. (in German, with English summary) ["The record of '*Libellula virgo*' in south-western Greenland by O. Fabricius in the 1770ies is reassessed. It is inferred that the specimen was most probably a female *Calopteryx maculata*. Morphological characteristics presented by Fabricius are compared with those of similar species from continental North America that might have reached Greenland. Origin and transportation of the specimen by accidental wind drift are discussed in some detail." (Author)] Address: Schorr, M., ÖSTLAP, Schulstr. 7B, 54314 Zerf, Germany. E-mail: oestlap@online.de

14744. Villanueva, R.J.T.; Seidenschwarz, F. (2012): An annotated checklist of the dragonflies of Cebu Island, the Philippines with notes on conservation. *Philippine Scientist* 49: 1-16. (in English) ["New records and an updated checklist of the dragonflies of Cebu Island are provided. *Drepanosticta sugbo* spec. nov. is described from Kawasan Falls, Badian. Eighteen species are recorded from

Cebu for the first time, which increases the number of known species in the island to 53. *Aethriamanta subsignata* is reported as new to the Philippines. The additions increase the number of formally described species known from the Philippines to 268. Three species, which are endemic to Cebu, are at a very high risk of going extinct within the next decade. The threats to the Cebu dragonfly fauna are briefly discussed and three sites are recommended for immediate conservation measures." (Author)] Address: Villanueva, R.J.T., D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines. E-mail: rjtvillanueva@gmail.com

2013

14745. Anbalagan, V.; Paulraj, M.G.; Ignacimuthu, S. (2013): Odonata diversity (Insecta: Arthropoda) in rice and vegetable fields in a north-eastern district of Tamil Nadu, India. *Journal of Research in Biology* 3(4): 977-983. (in English) ["Odonata diversity in vegetable fields (brinjal and okra) and rice fields was studied from January 2005 to December 2008 in Tiruvallur district of Tamil Nadu. Totally 23 species of Anisoptera and 12 species of Zygoptera were recorded and all these species were grouped into eight families. In vegetable fields 31 species of Odonata were recorded under 22 genera. In rice fields the species richness (21 species) and total genera (16) were less than vegetable fields during the entire study period. *Libellulidae* was the large family in both vegetable and rice fields which comprised maximum number of species. *Pantala flavescens*, a migratory species, was the most dominant in numbers throughout the year. Diversity indices clearly showed that Odonata diversity was higher in vegetable fields than in rice fields." (Authors)] Address: Ignacimuthu, S., Entomology Research Institute, Loyola College, Chennai-34, India

14746. Berzi-Nagy, L.; Fazekas, A.; Jakab, T.; Szabo, L.J.; Devai, G. (2013): Morphometric data of exuviae in six River Clubtail [*Gomphus flavipes flavipes* (Charpentier, 1825)] populations from the River Tisza. *Studia odonatol. hung.* 15: 73-91. (in Hungarian, with English summary) ["Collecting and measuring exuviae is a useful tool considering protected riverine dragonfly species. In this paper we compared six populations of *G. flavipes* from the whole Hungarian section of the River Tisza relying on morphological traits. The population at Tuzsér in the upper section of the river showed prominent differences from the other five populations." (Authors)] Address: Berzi-Nagy, L., Dept Hydrobiology, Centre of Arts, Humanities & Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

14747. Bransky, J.W.; Dorn, N.J. (2013): Prey use of wetland benthivorous sunfishes: ontogenetic, interspecific and seasonal variation. *Environmental Biology of Fishes* 96(12): 1329-1340. (in English) ["The intensity of

competitive interactions between fishes is partly determined by prey use and ontogenetic niche shifts. In a wetland where distinct habitat shifts are missing we compared prey use of three generalist benthivorous sunfishes to look for evidence of ontogenetic, interspecific, and "seasonal" variation in prey composition. Diet analysis revealed evidence of diet ontogeny in warmouth (*Lepomis gulosus*, 30–152 mm standard length, SL), but not in bluespotted sunfish (*Enneacanthus gloriosus*, 30–47 mm SL) or dollar sunfish (*Lepomis marginatus*, 30–60 mm SL). Bluespotted and dollar sunfishes consumed small dipteran and amphipod prey and had similar diets in both seasons suggesting a potential for strong interspecific competition. In the dry season, warmouth shifted from using smaller insect prey to larger decapod and fish prey with increasing size. This shift to prey types that were little used by the other species reduced dietary niche overlap with the other sunfishes. After drought and re-flooding (in the wet season), decapods and small fish were less abundant in the wetland and the warmouth ontogenetic shift was less distinct. When matched for gape width, prey composition differed between warmouth and both dollar and bluespotted sunfishes in the wet season, suggesting differences in sunfish foraging modes, but prey use differences were less clear in the dry season when prey were abundant. Both warmouth ontogenetic diet shifts and seasonal variation in prey use (probably mediated by prey abundance) had strong influences on diet overlap and therefore the potential for intra- and interspecific competition between sunfishes in this wetland ecosystem." (Authors) The diet includes Odonata.] Address: Bransky, J.W., Department of Biological Sciences, Florida Atlantic University, 3200 College Avenue, Davie, FL, 33314, USA. E-mail: jacobbransky@gmail.com

14748. Costes, A.; Delpon, G.; Calvignac, R.; Alquier, D.; Haber, E.; Danflous, S.; Polisset, P.; Pélozuelo, L. (2013): Etat des lieux des connaissances des populations de quatre odonates d'intérêt patrimonial en Midi-Pyrénées: la Cordulie splendide *Macromia splendens*, la Cordulie à corps fin *Oxygastra curtisii*, le Gomphe de Graslin *Gomphus graslinii* et l'Agrion bleuissant *Coenagrion caerulescens*. 4èmes rencontres naturalistes de Midi-Pyrénées – Albi: 63-66. (in French) [Midi-Pyrénées, France; detailed distribution maps of *Macromia splendens*, *Oxygastra curtisii*, *Gomphus graslinii*, and *Coenagrion caerulescens* are presented.] Address: not stated

14749. Crotti, M. (2013): Digenetic Trematodes: an existence as parasites. Brief general overview. *Microbiologia medica* 28(2): 97-101. (in English) ["Digenea is a wide and diverse group of trematodes, whose members are able to parasitize all classes of vertebrates, and several groups of invertebrates. While the usual life-cycle involves three hosts, a great number of species has evolved to increase or to reduce the number of hosts during development, in order to be more successful in their

ecological niche. Differently from other trematodes, digenetic flukes can infect humans, and this process can cause severe diseases like schistosomiasis, which infects around 200 million people worldwide. Finally, digenetic trematodes are not only a threat to humans' health, but also to the economy, causing millions of dollars losses in activities such as aquaculture and animal husbandry. ... Some members of the *Halipegus* genus have been observed to infect four hosts during their development. Zelmer, et al. (45) have described the complex development of *Halipegus occidualis*. This species is a parasite of green frogs, and it is found in North America. The eggs are expelled by frogs and are ingested by snails. Once the cercaria leaves the mollusc, it penetrates the secondary intermediate host, a crustacean (ostracods). The crustaceans are a food source for dragonfly larvae, the third intermediate host. However, Zelmer, et al (45) found out that the insect larva is not a physiological requirement for the further development of the trematode, but instead is an ecological necessity in order for the trematode to reach the definitive host (green frogs do not feed on ostracods, but do feed on dragonfly larvae). [Zelmer DA, Wetzel EJ, Esch GW. The role of habitat in structuring *Halipegus occidualis* metapopulations in the green frog. *Journal of Parasitology*. 1999; 85: 19-24.]" (Author)] Address: Crotti, M. Faculty of Zoology, University of Derby, Derby - East Midlands, U. K. E-mail: mariocche@hotmail.it

14750. Datry, T.; Larned, S.T.; Fritz, K.M.; Bogan, M.T.; Wood, P.J.; Meyer, E.I.; Santos, A.N. (2013): Broad-scale patterns of invertebrate richness and community composition in temporary rivers: effects of flow intermittence. *Ecography* 37(1): 94-104. (in English) ["Temporary rivers are increasingly common freshwater ecosystems, but there have been no global syntheses of their community patterns. In this study, we examined the responses of aquatic invertebrate communities to flow intermittence in 14 rivers from multiple biogeographic regions covering a wide range of flow intermittence and spatial arrangements of perennial and temporary reaches. Hydrological data were used to describe flow intermittence (FI, the proportion of the year without surface water) gradients. Linear mixed-effects models were used to examine the relationships between FI and community structure and composition. We also tested if communities at the most temporary sites were nested subsets of communities at the least temporary and perennial sites. Taxon richness decreased as FI increased and invertebrate communities became dominated by ubiquitous taxa. The number of resilient taxa (with high dispersal capacities) decreased with increased FI, whereas the number of resistant taxa (with adaptations to desiccation) was not related to FI. Riverspecific and river-averaged model comparisons indicated most FI-community relationships did not differ statistically among rivers. Community nestedness along FI gradients was detected in most rivers and there was little or no influence of the spatial arrangement of perennial and temporary reaches.

These results indicate that FI is a primary driver of aquatic communities in temporary rivers, regardless of the biogeographic species pool. Community responses are largely due to resilience rather than resistance mechanisms. However, contrary to our expectations, resilience was not strongly influenced by spatial fragmentation patterns, suggesting that colonist sources other than adjacent perennial reaches were important." (Authors) The paper includes a reference to Odonata.] Address: Datry, T., Inst. national de Recherche en Sciences et Technologies pour l'Environnement et l'Agriculture, CS 70077 Lyon, France. E-mail: thibault.datry@irstea.fr

14751. Duborget, R. (2013): Observation probable de *Brachythemis impartita* en Haute-Corse (Odonata: Libellulidae). *Martinia* 29(2): 103-104. (in French) [Water reservoir of Teppe Rosse (42,10741°N, 9,46223°E), Corsica, France, 12-viii-2013.] Address: Duborget, R., 9 avenue du général de Gaulle, F-20250 Corte, France. E-mail: robin.duborget@gmail.com

14752. Gilbreath, T.M.; Kweka, E.J.; Afrane, Y.A.; Githeko, A.K.; Yan, G. (2013): Evaluating larval mosquito resource partitioning in western Kenya using stable isotopes of carbon and nitrogen. *Parasites & Vectors* 12;6:353. doi: 10.1186/1756-3305-6-353.: 17 pp. (in English) ["Background: In sub-Saharan Africa, malaria, transmitted by the *Anopheles* mosquito, remains one of the foremost public health concerns. *Anopheles gambiae*, the primary malaria vector in sub-Saharan Africa, is typically associated with ephemeral, sunlit habitats; however, *An. gambiae* larvae often share these habitats with other anophelines along with other disease-transmitting and benign mosquito species. Resource limitations within habitats can constrain larval density and development, and this drives competitive interactions among and between species. Methods: We used naturally occurring stable isotope ratios of carbon and nitrogen to identify resource partitioning among co-occurring larval species in microcosms and natural habitats in western Kenya. We used two and three source mixing models to estimate resource utilization (i.e. bacteria, algae, organic matter) by larvae. Results: Laboratory experiments revealed larval $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ composition to reflect the food sources they were reared on. Resource partitioning was demonstrated between *An. gambiae* and *Culex quinquefasciatus* larvae sharing the same microcosms. Differences in larval $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ content was also evident in natural habitats, and *Anopheles* species were consistently more enriched in $\delta^{13}\text{C}$ when compared to culicine larvae. Conclusions: These observations demonstrate inter-specific resource partitioning between *Cx. quinquefasciatus* and *An. gambiae* larvae in natural habitats in western Kenya. This information may be translated into opportunities for targeted larval control efforts by limiting specific larval food resources, or through bio-control utilizing competitors at the same trophic level. ... Dragonfly nymphs had an isotopic composition indicative of a pri-

marily anopheline diet. Although this result should be interpreted somewhat carefully since only three food sources were taken into account (*Cx. quinquefasciatus*, *An. gambiae* and *An. funestus*), studies suggest that culicine larvae may have a competitive advantage over anophelines when dragonfly nymphs are present in the habitat [2,31]. Our group reported a 70% reduction of *An. gambiae* s.s. larvae exposed to dragonfly nymphs, and used PCR to confirm the presence of *An. gambiae* DNA in the nymph gut content [21]. There may be other significant contributors to the nymph diet, but these resources would presumably occupy the same trophic level of the anophelines. Microcosm experiments with known predators and prey may help to evaluate the role of trophic structure in determining mosquito species success and habitat productivity." (Authors)] Address: Gilbreath, T.M., Ecology and Evolutionary Biology, Univ. of California, Irvine, CA 92697, USA. E-mail: tmgilbreathiii@gmail.com

14753. Lafontaine, R.-M.; Delsinne, T.; Devillers, P. (2013): Évolution des populations de libellules de la région de Bruxelles-Capitale – Leurs récentes augmentations – importance de la gestion des étangs. *Les Naturalistes belges* 94: 33-70. (in French, with English summary) ["The dragonfly fauna of the Brussels-Capital Region consists of 56 species. Species richness has considerably varied over time. There was a constant impoverishment of the fauna over the course of the XXth century. At the turn of the Millennium, there were only 27 species of dragonflies and damselflies in Brussels. At the beginning of the XXIst century, the trend reversed. A total of 43 species have been observed in the Region since 2000. We describe this recent evolution, and the reasons that may explain this gratifying return of many species, on the basis of our observations combined with those recorded on observations.be and the databases of the Institut Bruxellois pour la Gestion de l'Environnement (IBGE). A few sites of occurrence of particularly significant assemblages of Odonata are discussed in more detail. Measures needed for the conservation of dragonflies are presented, in particular those related to the management of water bodies and their margins." (Authors)] Address: Lafontaine, R.-M., Institut Royal des Sciences Naturelles de Belgique (IRSNB), unité Biologie de la Conservation, Rue Vautier 29, 1000 Bruxelles, Belgium. E-mail: Rene-Marie.Lafontaine@sciencesnaturelles.be

14754. Leandri, F. (2013): Riproduzione di *Oxygastra curtisii* (Dale, 1834) (Insecta, Odonata), presso il Lago Moro, Darfo Boario Terme (BS). - Breeding site of *Oxygastra curtisii* (Dale, 1834) (Insecta, Odonata), in the Lago Moro, Darfo Boario Terme (BS). *Natura Bresciana - Ann. Mus. Civ. Sc. Nat.*, Brescia 38: 127-129. (in Italian, with English summary) [Lago Moro in the Italian Alps (Darfo Boario Terme, Brescia province, Lombardy, Italy), (45.9798°N 10.1602°E), 25.VI.2013] Address: Leandri, F., Vicolo chiuso 2/a, 26037 San Giovanni in Croce (Cremona), Italy. E-mail: faustoleandri@hotmail.com

14755. Martini, A.; Resende, D.M.C.; Ribeiro Silva, L.; Duarte, M.A. (2013): Distribuição espacial e temporal da fauna de invertebrados bentônicos na APA do município de Coqueiral, MG, com ênfase em Odonata. *Revista Brasileira de Zoociências* 15(1-3): 183-194. (in Portuguese, with English summary) ["Spatial and temporal distribution of benthic invertebrates fauna in APA of the municipality Coqueiral, MG, with emphasis on Odonata. The benthic invertebrates are a diverse group of organisms that inhabit both lentic and lotic environments and have an important role in the aquatic ecosystem dynamics, and its use for the evaluation of impacts on aquatic environments, widely recommended. Among the benthic invertebrates, highlight the Odonata use for verification of environmental quality. The present study had as objective to know the spatial and temporal distribution of benthic invertebrates fauna in the stream of Ermo, in the APA of the municipality - Coqueiral, MG, with emphasis on Odonata, and infer on the local environmental conditions. Samples were collected during the rainy season (February, 2007) and dry (August, 2007) at seven sites along the stream. First were measured and recorded abiotic variables: water temperature with a thermometer, depth using a graduated ruler and the dissolved oxygen content with oximeter. Later sediments were collected for analysis of benthic invertebrates, using a Surber sampler. For Anisoptera were identified: *Dythemis*, *Nanothemis*, *Octogomphus* and *Progomphus* and for Zygoptera: *Argia*. The Jaccard analysis results showed a higher similarity between points 2 and 3 grouped due to the similarities of physic-chemical parameters, mainly temperature and dissolved oxygen recorded in the stream and a separation of the points 5 and 7. Studies about Odonata fauna are needed due to the great potential bioindicator that these organisms have, mainly because of its wide distribution." (Authors)] Address: Giuntini Martini, A., Faculdade de Tecnologia de Jundiaí – FATEC-JD, Brazil. E-mail: andre.gmartini@gmail.com

14756. Nilsson-Örtman, V.; Johansson, F. (2013): Observations récentes de *Leucorrhinia dubia* dans les Pyrénées-Orientales (Odonata: Libellulidae). *Martinia* 29(2): 87-88. (in French) [France, 02-vi-2010, lac de Pradeille and peat bog Racou.] Address: Johansson, F., Department of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

14757. Nilsson-Örtman, V.; Stoks, R.; De Block, M.; Johansson, F. (2013): Latitudinal patterns of phenology and age-specific thermal performance across six Coenagrion damselfly species. *Ecological Monographs* 83: 491-510. (in English) ["Using a combination of computer simulations and laboratory experiments we test if the thermal sensitivity of growth rates change during ontogeny in damselfly larvae and if these changes can be predicted based on the natural progression of average temperature or thermal variability in the field. The laboratory experiment included replicated species from Southern,

Central and Northern Europe. Although annual fluctuations in temperature represent a key characteristic of temperate environments, few studies of thermal performance have considered the ecological importance of the studied traits within a seasonal context. Instead, thermal performance is assumed to remain constant throughout ontogeny and reflect selection acting over the whole life cycle. The laboratory experiment revealed considerable variation among species in the strength and direction of ontogenetic performance shifts. In four species from Southern and Central Europe, reaction norms were steepest during early ontogeny, becoming less steep during later ontogenetic stages (indicative of low-temperature acclimation). In one Northern European species, the slope of reaction norms did not change during ontogeny. In the other North European species, reaction norms became steeper during ontogeny (indicative of high-temperature acclimation). We had expected high-latitude species to show strong low-temperature acclimation responses, because they have a short flight season and inhabit a strongly seasonal environment. Instead, we found the reversed pattern: low-latitude species displayed strong low-temperature acclimation responses and high-latitude species displayed weak, or even reversed, acclimation responses to low temperatures. These findings suggest that low-temperature acclimation may be less beneficial and possibly more costly in habitats with rapid seasonal transitions in average temperature. We conclude that thermal performance traits are more dynamic than typically assumed and caution against using results from single ontogenetic stages to predict species' responses to changing environmental conditions." (Authors)] Address: Nilsson-Örtman, V., Umeå University, Dept. of Ecology and Environmental Science, Sweden. E-mail: viktor.j.nilsson@gmail.com

14758. Ott, J. (2013): „Libellula“ – ein Umweltbildungszentrum entsteht im Moosalbtal. *Heimatjahrbuch Kaiserslautern 2014*: 79-81. (in German) [Report on the current status of the Center for environmental education near Trippstadt, Rheinland-Pfalz, Germany] Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: L.U.P.O.GmbH@t-online.de

14759. Ruskova, T. (2013): Untersuchung der Biodiversität der Odonata an Stillgewässern in der Südpfalz. MSc. thesis, University of Ostrava, Faculty of Science, Biology / Systematic Biology and Ecology: (in Czech, with English summary) ["This thesis is focused on the effects of the parasitoids on reproductive lifestyle strategy of the damselfly of Lestidae family. Thesis describes the influence of parasitoidism on the unusual underwater egg-laying strategy in damselfly species. Theoretical part of the thesis is concerned on the issues of literature focused on dragonflies' mating, male's guarding for females, underwater oviposition, parasitoids, water parasitoids and the host-parasitoid interactions. The dates have been taken since 2010 to 2012 on the locality of botanical garden and arboretum of Štramberk (49° 35'

19.57°N 18° 7' 29.68"E) and the locality of the slate quarry ?Na Peklách? on Štramberk (49°34'52.093"N 18°6'52.509"E). The research has been taken at the same time and was focused on the endophytical under-ater egg-laying. Eggs have been tested for presence of parasitoids and for total eggs mortality in relation to water surface. Eggs were always laid on the leafless plants with a circular diameter and with their roofs under the water surface. Plants containing eggs there were *Equisetum variegatum* (Equisetaceae), *Schoenoplectus lacustris* (Cyperaceae) and *Juncus effusus* (Juncaceae). In three years of research, 8674 eggs were checked under a microscope. The rate of parasitoidism on eggs was 13,05 % above the water surface and 6,56% under it. The eggs' mortality was 18,86 % above the water surface and 21,4 % under it. Total rate of mortality is higher under the water surface then above it, which can be explained by many factors." (Author)] Address: Ruskova, Tereza, Department of Biology and Ecology / Institute of Environmental Technologies, Faculty of Sciences, Univ. Ostrava, Chittussiho 10, CZ-710 00 Slezská Ostrava, Czech Republic. E-mail: P11104@student.osu.cz

14760. Shoemaker, P.A.; Wiederman, S.D.; O'Carroll, D.C. (2013): Can a competitive neural network explain selective attention in insect target tracking neurons?. *Neural Engineering (NER)*, 2013 6th International IEEE/EMBS Conference, San Diego, CA, USA, 6-8 Nov. 2013. doi: 10.1109/NER.2013.6696081. URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6696081&isnumber=6695843>: 903-906. (in English) ["Small target motion detecting (STMD) neurons in the dragonfly brain (*Hemicordulia tau*) are neural correlates of a highly-specialized and ethologically-significant feature detection function, and the recent discovery of selective attention in STMDs has clear implications for the ability of dragonflies to track and pursue one target from among several. We used a biophysically-plausible neural network model, based on competitive units fed by NMDA-type synaptic inputs and including lateral feedback inhibition, to model these attentional effects in numerical simulations. With appropriate forward gain, the model displays a winner-takes-all behavior that partially captures the selective attention documented in electrophysiological recordings from STMDs. It cannot, however, explain the full range of results that have now been observed in wide-field STMDs, in particular a bias toward attention to targets dependent on their traversal of continuous trajectories." (Authors)] Address: Shoemaker, P.A., Tanner Research, Inc., Monrovia, CA, 91016 USA. E-mail: pat.shoemaker@tanner.com

14761. Torralba-Burrial, A.; Armendariz, C.; Nores, C. (2013): Distribución y tamaño poblacional de la libélula amenazada *Oxygastra curtisii* (Odonata: Corduliidae) en Navarra (N Península Ibérica). *XXX Jornadas de la Asociación española de Entomología (AeE)*: 43. (in Spanish) [*O. curtisii* was studied between late June and August 2012 at 24 localities the Bidasona River; the species was

recorded along 12 stretches of the river.] Address: Torralba Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antonioib@hotmail.com

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14762. Alcorlo, P.; Jimenez, S.; Baltanas, A.; Rico, E. (2014): Assessing the patterns of the invertebrate community in the marshes of Donana National Park (SW Spain) in relation to environmental factors. *Limnetica* 33(1): 189-204. (in English, with Spanish summary) ["The marshes of Donana (SW, Spain) are some of the largest and best preserved Mediterranean marsh areas represented in Western Europe. They are considered a hotspot of biodiversity, and as such receive protected-area status under two different systems of protected-area management. The importance of submerged macrophytes in the functioning of marsh ecosystems has been addressed in several studies. However, most of the animal biodiversity studies have been developed for vertebrates. Thus, the aims of this study are i) to assess the composition of the invertebrate community in the marsh of Donana (zooplankton and zoobenthos) in a set of sites representing the different habitats of the marsh in both clear and turbid water states; ii) to compare diversity among patches in different states (clear vs turbid water); and iii) to address the main environmental factors that have influenced their community structure and diversity. A total of 102 taxa were recorded. The highest abundance values were attained by cladocerans and ostracods, both microcrustaceans, and by dipteran insects. It was possible to distinguish different marsh environments characterised by patches of clear water, where the macrophyte beds contribute to an increase of the structural heterogeneity of the marsh, providing the invertebrates with shelter and food resources and subsequently influencing different invertebrate assemblages. Conductivity, soluble reactive phosphorus (SRP) and chlorophyll-a concentration were the environmental variables that influenced the presence of turbid patches, which showed lower macrophyte cover, diversity and richness values than those seen in the clear water patches. The relationship between diversity (H') and richness (S), suggested that processes related to species migration (i.e., hydrologic connection with other water bodies, flood duration, and dissemination of propagules) are the main constraints influencing the invertebrate community structure in the Donana marshes." (Authors). The list of taxa includes *Enallagma cyathigerum*, *Ischnura graellsii*, *Lestes viridis*, *L. sponsa*, *Aeshna cyanea*, *Anax parthenope*, *Sympetrum fonscolombii*, *S. meridionale*, and *Crocothemis erythraea*.] Address: Alcorlo, Paloma, Dept. Ecol., Univ. Autonoma de Madrid, c/ Darwin no 2, 28049 Madrid, Spain. E-mail: paloma.alcorlo@uam.es

14763. Artemieva, E.A.; Muraviev, I.V. (2014): Breeding biology of Blackheaded Wagtail *Motacilla feldegg* Michahelles, 1830 (Passeriformes, Motacillidae, Motacillinae) in South of Russia. *International Journal of Biology* 6(2):

21-29. (in English) ["Species-specific features of black-headed wagtail *Motacilla feldegg* Michahelles, 1830 (Passeriformes, Motacillidae, Motacillinae) breeding biology were identified in south of Russia. A tendency to current species range shift is traced. Critical estimation of literary information about some peculiarities of reproduction and ecology of black-headed wagtail is carrying out on boundary XIX-XXI centuries, estimation of contemporary quantity, limited factories and regularities of species distribution on research territory of European part of Russia are given. Distribution and quantity *M. feldegg* are irregular in this region and determine by presence of nesting biotopes and potential forage reserve. General character of distribution of this species estimates as a local and not numerous that gives foundation to include *M. feldegg* to some region Red Data Books of Russia and neighbouring countries." (Authors) Male diet included 11.3% Coenagrionidae, while female diet didn't include any dragonflies.] Address: Artemieva, E.A., Ulyanovsk State Pedagogical University of I. N. Ulyanov, the Centenary of V.I. Lenin's Birth sq., 4, Ulyanovsk, 432700, Russia. E-mail: hart5590@gmail.com; pliska58@mail.ru

14764. Barndt, D. (2014): Beitrag zur Kenntnis der Arthropodenfauna der nährstoffarmen Torfmoosmoore Keilsee und Himmelreichsee (Land Brandenburg). *Märkische Entomologische Nachrichten* 16(2): 93-137. (in German, with English summary) [Germany; only four species are listed: *Aeshna juncea*, *A. subarctica elisabethae*, *Leucorrhinia albifrons* and *L. dubia*.] Address: Barndt, D., Bahnhofstr. 40, 12207 Berlin-Lichterfelde, Germany. E-mail: dr.barndt@kabelmail.de

14765. Barwell, L.J.; Azaele, S.; Kunin, W.E.; Nick, J.B. (2014): Can coarse-grain patterns in insect atlas data predict local occupancy? *Diversity and Distributions* 20(8): 895-907. (in English) ["Aim: Species atlases provide an economical way to collect data with national coverage, but are typically too coarse-grained to monitor fine-grain patterns in rarity, distribution and abundance. We test the performance of ten downscaling models in extrapolating occupancy across two orders of magnitude. To provide a greater challenge to downscaling models, we extend previous downscaling tests with plants to highly mobile insect taxa (Odonata) with a life history that is tied to freshwater bodies for reproduction. We investigate the species-level correlates of predictive accuracy for the best performing model to understand whether traits driving spatial structure can cause interspecific variation in downscaling success. Location: Mainland Britain. Methods: Occupancy data for 38 British Odonata species were extracted from the Dragonfly Recording Network (DRN). Occupancy at grains . 100 km² was used as training data to parameterize ten downscaling models. Predicted occupancy at the 25, 4 and 1 km² grains was compared to observed data at corresponding grains. Model predictive error was evaluated across species and grains. Main conclusions: The Hui model gave the most

accurate downscaling predictions across 114 species: grain combinations and the best predictions for 14 of the 38 species, despite being the only model using information at a single spatial grain. The occupancy.area relationship was sigmoidal in shape for most species. Species' distribution type and dispersal ability explained over half of the variation in downscaling predictive error at the species level. Species with a climatic range limit in Britain were poorly predicted compared with other distribution types, and high dispersal ability was associated with relatively poor downscaling predictions. Our results suggest that downscaling models, using widely available coarse-grain atlas data, provide reasonable estimates of finegrain occupancy, even for insect taxa with strong spatial structure. Linking species-level traits with predictive accuracy reveals general principles about when downscaling will be successful." (Authors)] Address: Barwell, Louise, NERC, Centre for Ecology and Hydrology, Maclean Building, Benson Lane, Crowmarsh Gifford, Wallingford, Oxfordshire, OX10 8BB, UK. E-mail: loubar@nerc.ac.uk

14766. Bateman, A.W.; Vos, M.; Anholt, B.R. (2014): When to defend: Antipredator defenses and the predation sequence. *The American Naturalist* 183(6): 847-855. (in English) ["Some authors have suggested that prey species stand to benefit most by defending as early as possible during predator-prey encounters, but species in nature employ antipredator defenses at various stages of interactions with their predators. Whether it is generally most advantageous to defend early or late during such encounters is an open theoretical question. We model conditions under which a prey species might evolve early or late defenses in response to predation. Adapting a two-prey, one-predator Rosenzweig-MacArthur system of differential equations, we analyse the effects of modified antipredator defenses (and their associated costs) on the ability of a new prey type to invade the one-prey, one-predator limiting system at equilibrium. We show that the outcome, in terms of invasion potential, is crucially dependent on the ratio of the prey's proportional population growth rate to the cost of predator encounters." (Author) The paper includes references to Odonata.] Address: Anholt, B.R., Dept Biology, University of Victoria, PO Box 3020, Victoria, BC, V8W 3N5, Canada. E-mail: banholt@uvic.ca

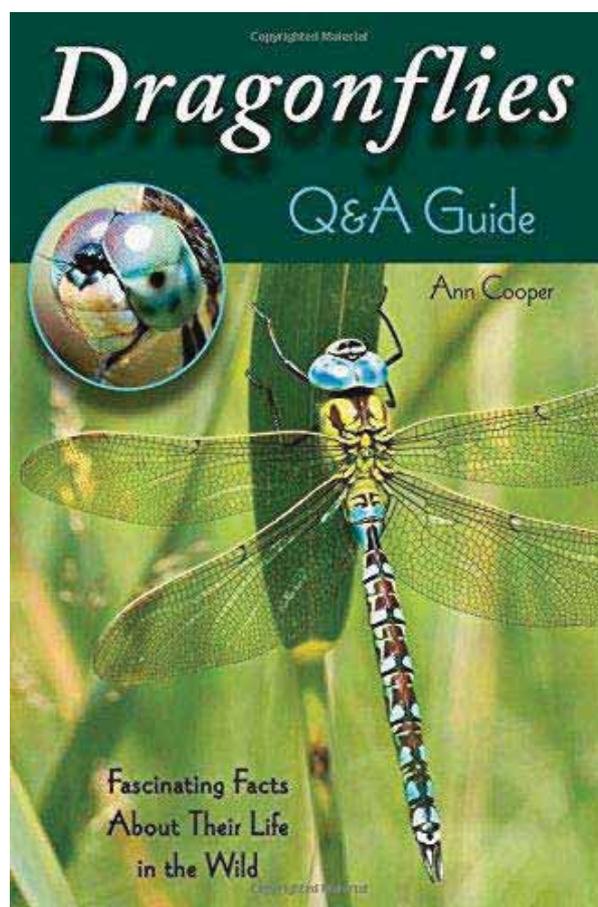
14767. Bennett, A.M.; Murray, D.L. (2014): Maternal body condition influences magnitude of anti-predator response in offspring. *Proc. R. Soc. B* 281 no. 1794 20141806: 6 pp. (in English) ["Organisms exhibit plasticity in response to their environment, but there is large variation even within populations in the expression and magnitude of response. Maternal influence alters offspring survival through size advantages in growth and development. However, the relationship between maternal influence and variation in plasticity in response to predation risk is unknown. We hypothesized that variation in the magnitude of plastic responses between families is at least partly due to maternal

provisioning and examined the relationship between maternal condition, egg provisioning and magnitude of plastic response to perceived predation risk (by dragonfly larvae: *Aeshna* spp.) in northern leopard frogs (*Lithobates pipiens*). Females in better body condition tended to lay more (clutch size) larger (egg diameter) eggs. Tadpoles responded to predation risk by increasing relative tail depth (morphology) and decreasing activity (behaviour). We found a positive relationship between morphological effect size and maternal condition, but no relationship between behavioural effect size and maternal condition. These novel findings suggest that limitations imposed by maternal condition can constrain phenotypic variation, ultimately influencing the capacity of populations to respond to environmental change." (Authors)] Address: Bennett, Amanda, Environmental and Life Sciences, Trent University, 1600 West Bank Drive, Peterborough, Ontario, Canada K9L 7B8. E-mail: amandabennett2@trentu.ca

14768. Borisov, S.N. (2014): Uses of traps on mountain pass Chokpak (Western Tien-Shan) for the number of migrating dragonflies (Insecta, Odonata). *Ornithological news of Kazakhstan and Middle Asia* 3: 167-171. (in Russian, with English summary) ["On the Chokpak pass in Western Tien-Shan (N 42°31' E 70°367) in the fall seasons of the 2008-10-th years using ornithological traps of Rybachinskii type the study of migratory dragonflies was conducted. The species of dragonflies caught in the traps were characterized by two different migration strategies. The first group consisted of the species with seasonal vertical migrations (*Sympetrum arenicolor*, *S. striolatum pallidum*, *S. meridionale*, *Aeshna mixta*), the second - of the species with translatitudinal migrations (*S. fonscolombii*, *Anax parthenope*, *A. ephippiger*). It was established that intensity of migration increased with the arrival of cold air fronts. Maximum of three thousand specimens fell in one trap per day. Visible flights of dragonflies near the surface of land were observed exclusively in the opposite south-west wind. It is assumed that the main migrations occur with the favourable wind at great heights and are not available to watch." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

14769. Buczyński, P.; Buczyńska, E. (2014): *Aeshna affinis* Vanderl. and *Crocothemis erythraea* (Brullé) (Odonata, Aeshnidae, Libellulidae) recorded near Suwałki (north-east Poland). *Wiad. Entomol.* 33(4): 280-281. (in Polish, with English title) [Poland; *Aeshna affinis*: Żywa Woda-Stara Wieś (54°10'40" N, 22°51'0" E, UTM: FF20), 27-vii-2013. *C. erythraea*: Stańczyki (54°17'46" N, 22°39'23" E, FF01), 27-vii-2013, Żywa Woda-Stara Wieś (54°10'45" N, 22°51'07" E), 27-vii-2013.] Address: Buczyński, P., Maria Curie-Skłodowska University in Lublin, Department of Zoology, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

14770. Childress, J.M. (2014): Dragonflies and damselflies of Albemarle County, Virginia (Odonata). *Banisteria* 43: 28-39. (in English) ["The Odonata fauna of Albemarle County, Virginia has been poorly documented, with approximately 20 species on record before this study. My observations from 2006 to 2014, along with historical and other recent records, now bring the total species count for the county to 95. This total includes 64 species of dragonflies, which represents 46% of the 138 species known to occur in Virginia, and 31 species of damselflies, which represents 55% of the 56 species known to occur in Virginia. Also recorded here are the observed date ranges for adults of each species and some observational notes." (Author)] Address: Childress, J.M., 4146 Blufton Mill Road Free Union, Virginia 22940, USA



14771. Cooper, A. (2014): *Dragonflies: Fascinating facts about their life in the wild. Q&A Guide*, Stackpole Books: 112 pp. (in English) ["Got a question about dragonflies? This book has answers. *Dragonflies: A Q & A Guide* is a lively, illustrated guide for anyone looking to learn more about dragonflies and their lives in the wild. Easy-to-read format for readers looking to dip in or read straight through. Hundreds of questions posed and answered about the dragonfly's anatomy, history, and life cycle. Dozens of stunning colour photos of dragonflies in their habitats. Special sections on record-breaking dragonflies and the relationship between dragonflies and humans." (Publisher)]

14772. Cornejo, A. (2014): Estructura de la comunidad de macroinvertebrados dulceacuícolas en el área de concesión minera Cerro Petaquilla, Colón, Panamá. *Scientia (Panamá)* 24(2): 15-35. (in Spanish, with English summary) ["Aiming to characterize the structures of aquatic macroinvertebrate's community in Cerro Petaquilla Mining Project, we established 17 sampling stations, divided in two areas: Buffer Area (AA) and Direct Impact Area (AID), which were evaluated in September, 2007. We did three comparisons: between area, between stations and between microhabitats (backwaters and streams). We collected 8254 individuals from 119 taxa, showing a clear dominance by the groups of aquatic insects from Ephemeroptera group, following by Coleoptera, Trichoptera, Diptera, and, in a lower grade, Odonata. The genera *Thraulodes*, *Farrodes* and *Leptohyphes* represent the 31.34% from all reported individuals. The richness and abundance were higher in AA than AID, but these were non-significance differences. Conversely, the taxonomic richness and abundance were significantly varied between sampling stations and were lower in AA-01, AID-01 and AID-08. The taxonomic richness and abundance were significant varied between the evaluated microhabitat, being higher in streams than backwater. The sampling correctly represents the richness from the area, because all identified taxa are the 83% of the true richness from the area. The macroinvertebrate community was composed of organisms considered natural water indicators of good status. However, we show a negative impact from the mining activities on the pluvial ecosystem, caused by the removal of vegetation cover, which caused the increase of sedimentation levels and affect the macroinvertebrate's community structure in sampling stations AA-01, AID-01 and AID-08." (Author) Odonata are treated at genus level.] Address: Cornejo, A., Colección Zoológica Dr. Eustorgio Méndez, Instituto Conmemorativo Gorgas de Estudios de la Salud, Brazil. E-mail: acornejo@gorgas.gob.pa.

14773. Cunha, R.; Fulan, J.A.; Rodrigues dos Santos, L. (2014): Influence of physical and chemical characteristics of water on spatial distribution of Odonata larvae associated with *Eichhornia crassipes* (Mart.) Solms in Uruapiara River, Madeira Basin, State of Amazonas, Brazil. *Estud Biol.* 2014 36(86): 36-42. (in Portuguese, with English summary) ["The objective of this study was to identify the odonates associated with *Eichhornia crassipes*, as well as investigate the main environmental variables that affect its spatial distribution in Uruapiara River, Amazonas, Brazil. The macrophytes were sampled in a hollow square with total area of 0.120m². The removal of the larvae was performed with washing plant with carbonated water. We evaluated the following variables: temperatures of the air and water, dissolved oxygen, pH, turbidity, total phosphorus and total nitrogen. We identified total of 73 larvae distributed in the families Libellulidae (64) and Coenagrionidae (9). Libellulidae was represented by *Erythemis*, *Micrathyria*, *Tauriphila* and *Nephepeltia* and Coenagrionidae by *Acanthagrion*

and *Oxyagrion*. A canonical correspondence analysis (CCA) showed that *Tauriphila* and *Coenagrionidae* were positively affected by the concentration of dissolved oxygen. *Nephepeltia* and *Oxyagrion* were negatively affected by increasing the dissolved oxygen. The study revealed that dissolved oxygen was the most significant factor in the distribution of larvae of Odonata in Uruapiara River." (Authors)] Address: Cunha, Rita de Cássia da, Especialista em Biologia da Conservação, Universidade Federal do Amazonas (UFAM), Manaus, AM - Brasil. E-mail: cassiafloresta@hotmail.com

14774. Czerniawska-Kusza, I.; Brożonowicz, A. (2014): Zoobenthos in post-exploitation reservoirs of marls and limestone in Opole Silesia. *Pol. J. Natur. Sc.* 29(4): 307-318. (in English) ["Large layers of carbonate rocks in Opole region for years serve as an exploitation material for the cement-lime industry. The mining results in numerous post-exploitation reservoirs, which biocenosis is poorly known. The objective of the study was to determine the effect of the environmental features on the distribution of macroinvertebrates and the community structure, and to present the significance of these water bodies for regional biodiversity. The research was carried out between June and November 2010 at eight reservoirs. Altogether 66 taxa were found, although only from 12 to 38 were recorded in particular reservoirs. The widespread and abundant were dipterans Chironomidae, dragonflies *Ischnura* sp. and *Coenagrion* sp., and mayflies *Caenis* sp. and *Cloeon* sp., especially numerous in charales meadows. Based on faunistic similarity, three groups of reservoirs were distinguished, which differed in size, character of a littoral zone and origin of waters (underground vs surface)." (Authors)] Address: Czerniawska-Kusza, Izabela, Department of Land Protection, University of Opole, Oleska 22, PL-45-052 Opole Poland. E-mail: Izabela.Kusza@uni.opole.pl

14775. Dao, P.-g. (2014): The design and application of Odonata teaching modules. Dissertation, Institute of Entomology, National Taiwan University: (in Chinese, with English summary) ["This study mainly focuses on the application of dragonfly resource to the nature, living technology and environmental education, and discuss the affection of the five contents of environmental education on Fifth grade students. The objects of this study are two elementary schools in Taoyuan county of Taiwan, which are located in the country yard and city separately. The teaching model is classified into three subjects: biology of dragonfly, digital learning, dragonfly conservation, and the total number of courses are up to ten. The researchers coordinate with class teacher to evaluate the results of the study, and the results confirm with the assessment criteria of teaching model. We deliver the questionnaires, the application of dragonfly resource to the nature, living technology and environmental education, before and after the teaching course to test the affection of teaching model on the kids. There are five lines of conclusions of this study. First, both school kids are highly interested

and study effectively in the dragonfly teaching course model. Second, the dragonfly teaching course model can improve the five contents of environmental education in both schools. We also suggest that the framework of course design should be planned according to the profession of teacher, student interest and local insect materials. The teaching model could be expanded to other schools, and also adjusted by the class time and content." (Author)] Address: not stated

14776. Deliry, C.; Groupe Sympetrum (2014): *Nouvel Atlas des Libellules de l'Isère*. <http://libellulme.eklablog.com/nouvel-atlas-des-libellules-de-l-isere-2014-a115142710>: 104 pp. (in French) [77 odonate species are known to occur in the French Département Isère. The regional species are mapped and briefly discussed. For details see: <http://www.sympetrum.fr/Atlas38.pdf>] Address: G.R.P.L.S. c/o C. Deliry, 182 rue de la Forge, F-38200 Villette de Vienne, France. E-mail: president@sympetrum.org

14777. Döler, H.-P. (2014): *Nachweis von Leucorrhinia albifrons (Odonata: Libellulidae) in Ostwürttemberg*. *Mercuriale* 14: 27-32. (in German, with English summary) ["On 10-VI-2014 and 11-VI-2014 a male of *L. albifrons* was observed at an extensively used fish pond, called Croßtiefweiher (MTB 6927, 470 m above sea level), located in eastern Württemberg (Germany, county of Ostalb). The Observation represents the second record of this species in Württemberg. Locality, habitat and the accompanying dragonfly fauna are briefly described and the possible origin of *L. albifrons* is discussed." (Author)] Address: Döler, H.-P., Drei-Kreuz-Str. 22, 78597, Germany. E-mail: lrndorf.hp.doeter@t-online.de

14778. Dolný, A.; Helebrandová, J.; Rusková, T.; Šigut, M.; Harabiš, F. (2014): *Ecological aspects of underwater oviposition in Lestes sponsa (Odonata: Lestidae)*. *Odonatologica* 43(3/4): 183-197. (in English) ["Underwater oviposition is a special subtype of endophytic oviposition and constitutes the predominant mode for certain species of Calopterygidae and Coenagrionidae. Very little is known about underwater oviposition in Lestidae and other dragonfly groups (e.g., Anisoptera). In July 2009, we recorded this specific behaviour in a population of *Lestes sponsa* in the Czech Republic (Moravia, Štřamberk). We subsequently studied the frequency of this phenomenon at regional (16 sites surveyed in an area of ca 1,260 km²) and local (proportions of eggs laid beneath and above the water's surface at three locations) levels. We examined further key environmental factors influencing underwater oviposition and certain ecological parameters (depth and time) of this behaviour in *L. sponsa*. The frequency of underwater oviposition on the regional scale was relatively low (< 20 %), but the frequency of this behaviour on a local scale was sometimes high. At those sites where underwater oviposition occurred, 4,759 (62 %) out of a total of 7,699 eggs were laid underwater. The main factors affecting underwater oviposition were transparency of the water column and type of

submerged vegetation. Ovipositing pairs spent on average 338 seconds under the water at an average depth of 20 cm. Further research should focus on the benefits of this specific oviposition tactic and especially egg mortality during overwintering." (Authors)] Address: Dolný, A., Department of Biology and Ecology/ Institute of Environmental Technologies, Faculty of Natural Sciences, University of Ostrava, Chittussiho 10, CZ-71000 Slezská Ostrava, Czech Republic. E-mail: ales.dolny@osu.cz

14779. Engler, J.O. (2014): *Zoogeographic notes on Orthetrum trinacria with special emphasis on its recent discovery on Corsica, France (Odonata: Libellulidae)*. *Libellula* 33(1/2): 21-26. (in German, with English summary) ["Following its first Corsican record in 2012, a male of *Orthetrum trinacria* was recorded on the small Lavezzi islands, south of Corsica, in September 2013. The record of this species in an area lacking in any possible breeding habitat highlights its high mobility and will be discussed in the context of its colonization of the Mediterranean in the past decades." (Author)] Address: Engler, J.O., Zoologisches Forschungsmuseum Alexander König, Adenauerallee 160, 53113 Bonn, Germany. E-mail: j.engler.zfmk@uni-bonn.de

14780. Esfandiari, M.; Sadeghi, S.; Khadempour, A. (2014): *First record of Odonata nymphs from Karun River, south-west Iran*. *Iranian Journal of Animal Biosystematics* 10(2): 205-208. (in English) [Karun River, Ahvaz, SW Iran, during 2009–2011 40 nymphs of *Ischnura elegans*, *Lindenia tetraphylla*, *Anax parthenope*, *Crocothemis servilia*, and *Brachythemis fuscopalliat*a were recorded. All these species are new additions to the checklist of Odonata for Khuzestan province.] Address: Esfandiari, M., Department of Plant Protection, College of Agriculture, Shahid Chamran University of Ahvaz, Ahvaz, Iran. E-mail: apameini@yahoo.com

14781. Folorunso, L A; Falaye, A E; Ajani, E K. (2014): *Predatory size of dragonfly (Palpopleura lucia (Drury, 1773) nymphs on guppy (Poecilia reticulata (Peters, 1859))*. *Journal of Fisheries and Aquatic Science* 9(6): 483-486. (in English) ["Attainment of adulthood by a young fish is a function of environment, competition, starvation, cannibalism and predation amongst other factors. Predators do not exhibit predatory qualities from birth, it has to grow over time before the qualities are expressed. Thus, the aim of this study was to determine minimum size of dragonfly (*Palpopleura lucia* (Drury, 1773)) nymphs (Naiads) that can predate on guppy (*Poecilia reticulata*) (Peters, 1859)) with a view to understanding predation in aquaculture. Guppies of 5-12 mm total length were introduced to naiads of varying lengths ranging from 2.00-10.00 mm over a 48 h period. Results obtained showed that naiads >6.00 mm were able to predate on guppies while those <5.5 mm co-habited with guppies without predation. This study thus concludes that aquaculture management practices can be geared towards eliminating naiads >6.00 mm, this will hopefully

assist farmers to optimize human and material resources expended in the control of naiads in aquaculture." (Authors)] Address: Folorunso, L.A., Samaru College of Agriculture, Division of Agricultural Colleges, Ahmadu Bello University, P.M.B 1058, Zaria, Nigeria

14782. Frank, M. (2014): Beitrag zur aktuellen Zusammensetzung der Libellenfauna (Odonata) im NSG Gramboweer Moor (Nordwest-Mecklenburg). *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 17(1): 4-23. (in German) [Landkreis Nordwest-Mecklenburg, Mecklenburg-Vorpommern, Germany; between 2011-2014, an intensive study of the dragonfly fauna of a high bog was conducted. To study the species turn over, the data are compared with observations dating back to 1966, and covering a time period of near 50 years of continuous monitoring of the local odonate fauna. The balance of losses (n=5) and new arrivals (n=4) is quite square.] Address: Frank, M., Zur Traubenmühle 5A, 55268 Nieder-Olm, Germany. E-mail: mikel.frank@gmx.de

14783. Frank, M. (2014): Ein neues, großes bodenständiges Vorkommen der Grünen Mosaikjungfer (*Aeshna viridis* Eversmann, Odonata: Aeshnidae) an den Schönberger Torfstichen (Nordwestmecklenburg). *Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg* 17(1): 42-45. (in German) [In August 2014, near the town of Schönberg, NW-Mecklenburg-Vorpommern, Germany, a population of *A. viridis* was discovered.] Address: Frank, M., Zur Traubenmühle 5A, 55268 Nieder-Olm, Germany. E-mail: mikel.frank@gmx.de

14784. Frank, M. (2014): Spätsommerbeobachtungen von Libellen auf Kos, Griechenland, mit vier Erstnachweisen (Odonata). *Libellula* 33(3/4): 211-216. (in German, with English summary) ["Late summer observations of dragonflies on the island of Kos, Greece, with four new records (Odonata) – From the end of August to the beginning of September 2014 during a stay on the island of Kos 13 dragonfly species were recorded. *Erythromma viridulum*, *Aeshna mixta*, *Anax imperator*, and *Orthetrum chrysostigma* were recorded for the first time on the island, increasing the number of odonate taxa known from Kos to 29." (Author)] Address: Frank, M., Zur Traubenmühle 5A, 55268 Nieder-Olm, Germany. E-mail: mikel.frank@gmx.de

14785. Futahashi, R. (2014): A revisional study of Japanese dragonflies based on DNA analysis (2). *Tombo* 56: 57-59. (in Japanese, with English summary) ["The recent revisions on the phylogenetic relationships of Odonata at family and superfamily ranks are reported. Several topics in Japanese dragonflies, mainly on the genera *Rhipidolestes* and *Macromidia*, are also provided." (Authors)] Address: Futahashi, R., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan. E-mail: ryofutahashi@aist.go.jp

14786. Gaurav, S.; Jain, K.K. (2014): Numerical investigation of fluid flow and aerodynamic performance of a dragonfly wing section for Micro Air Vehicles (MAVs) applications. *International Journal of Innovation and Scientific Research* 9(2): 285-292. (in English) ["A comprehensive numerical simulation of fluid dynamics based study of a pleated wing section based on the wing of *Aeshna cyanea* has been performed at ultra-low Reynolds number corresponding to the gliding flight of these dragonflies in order to explore the potential applications of pleated airfoils for micro air vehicle applications. The simulation employs an unstructured triangular mesh based on finite volume discretization done in the ANSYS-14.0 using WorkBench14.0. Whenever, dragonfly wing interacts with the fluid (air taken), several forces and vibrations results out. These forces and vibrations cause certain changes over the dimensional structure over the wing and also influence the flows characteristics. A critical assessment of the computed results was performed. In this work, various flow patterns and aerodynamic performance of pleated airfoil has been obtained at ultra-low Reynolds numbers (2000-3000) at different angle of attacks (AOA) ranging from 0° to 15°. Also there effects on coefficient of Lift and Drag have been analysed. The simulations demonstrate that pleated airfoil produces higher lift and moderate drag that lead to an aerodynamic performance and hence pleated airfoil is an excellent choice for a fixed wing micro-air vehicle application." (Authors)] Address: Jain, K.K., Department of Mechanical Engineering, Sri Ram Institute of Technology, Jabalpur, Madhya Pradesh, India

14787. Goertzen, D.; Suhling, F. (2014): Central European cities maintain substantial dragonfly species richness – a chance for biodiversity conservation?. *Insect Conservation and Diversity* 8(3): 238-246. (in English) ["(1.) This study investigates whether cities have the potential of hosting high species diversity of dragonflies (Odonata), a target group in freshwater conservation. (2.) We reviewed the dragonfly fauna of 30 cities in Central Europe and analysed their species richness compared to the regional species pools in the hinterlands, i.e. estimated the amount of regional diversity represented in cities. In particular, we examined the occurrence of species of conservation concern at the European scale. (3.) Results revealed that 92.6% of all 81 Central European dragonfly species occurred in cities, as well as 85.7% of 14 species of conservation concern. As expected, assemblages of city species were subsets of the regional species pool and city species richness increased with regional species numbers. Some cities hosted the complete regional species pool. (4.) Ten species of conservation concern established autochthonous populations and six of them, such as *Aeshna viridis* and *Ophiogomphus cecilia*, were abundant at least in single cities. (5.) We conclude that there is good potential for cities to host high dragonfly diversity and even to promote species of conservation concern. To exploit this potential we recommend city planners to focus on the

needs of regionally characteristic species." (Authors)] Address: Goertzen, Diana, Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c, 38106 Braunschweig, Germany. E-mail: d.goertzen@tu-bs.de

14788. Graf, J.F. (2014): Die Libellenfauna der Kykladeninsel Andros (Odonata). *Libellula* 33(1/2): 27-56. (in German, with English summary) ["The Odonate Fauna of the Cycladic Island of Andros – Data on adult dragonflies from the Cycladic island of Andros were collected between 2006 and 2013. On 289 visits 22 species were identified and 717 individual records were made at 48 different sites. Out of the 18 species already described from this island, all except *Lestes macrostigma* and *Coenagrion scitulum* could be observed again. Six additional species, *Sympecma fusca*, *Aeshna mixta*, *Anax parthenope*, *Anax ephippiger*, *Sympetrum fonscolombii*, and *Trithemis annulata* were observed for the first time on Andros. Altogether, 24 species have now been recorded for Andros, the highest number of all Cycladic islands." (Author)] Address: Graf, J.F., Villa Faros, GR-84503 Batsi, Andros, Greece & Bündtenweg 36, CH-4102 Binningen, Switzerland

14789. Grgić, M.; Bogdanović, T.; Dragičević, P.; Romanjek, K. (2014): The fauna of dragonflies (Odonata) in the Spačva forest. *Prirodoslovje* 14(1-2): 105-116. (in Croatian, with English summary) [Between May and October 2012, at ten localities in the Spačva alluvial lowland forest (Croatia) 881 odonate individuals were recorded totalling to 22 species. Species of faunistic interest are *Chalcolestes parvidens*, *Epitheca bimaculata*, *Somatochlora meridionalis*, and *Anax ephippiger*.] Address: Grgic, Marina, Javna ustanova za upravljanje zaštićenim prirodnim vrijednostima, Vukovarsko-srijemske županije, Trg Josipa Runjanina 1, Vinkovci, Croatia. E-mail: marina.grgic123@gmail.com

14790. Hassall, C. (2014): Continental variation in wing pigmentation in *Calopteryx* damselflies is related to the presence of heterospecifics. *PeerJ* 2:e438; DOI 10.7717/peerj.438: 15 pp. (in English) ["Wing pigmentation in *Calopteryx* damselflies, caused by the deposition of melanin, is energetically expensive to produce and enhances predation risk. However, patterns of melanisation are used in species identification, greater pigmentation is an accurate signal of male immune function in at least some species, and there may be a role for pigment in thermoregulation. This study tested two potential hypotheses to explain the presence of, and variation in, this pigmentation based on these three potential benefits using 907 male specimens of *Calopteryx maculata* collected from 49 sites (34 discrete populations) across the geographical range of the species in North America: (i) pigmentation varies with the presence of the closely related species, *Calopteryx aequabilis*, and (ii) pigment increases at higher latitudes as would be expected if it enhances thermoregulatory capacity. No gradual latitudinal

pattern was observed, as might be expected if pigmentation was involved in thermoregulation. However, strong variation was observed between populations that were sympatric or allopatric with *C. aequabilis*. This variation was characterised by dark wings through allopatry in the south of the range and then a step change to much lighter wings at the southern border of sympatry. Pigmentation then increased further north into the sympatric zone, finally returning to allopatry levels at the northern range margin. These patterns are qualitatively similar to variation in pigmentation in *C. aequabilis*, meaning that the data are consistent with what would be expected from convergent character displacement. Overall, the results corroborate recent research that has suggested sexual selection as a primary driver behind the evolution of wing pigmentation in this group." (Author)] Address: Hassall, C., School of Biology, Univ. of Leeds, Leeds, UK12.06.2014. E-mail: c.hassall@leeds.ac.uk

14791. Hill, M.J.; Wood, P.J. (2014): The macroinvertebrate biodiversity and conservation value of garden and field ponds along a rural-urban gradient. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 185: 107-119. (in English) ["The biodiversity and conservation value of semi-natural and field ponds in rural locations are widely acknowledged to be high compared to other freshwater habitats. However, the wider value of urban ponds, and especially garden ponds, has been largely neglected in comparison. This study examines the biodiversity and conservation value of aquatic macroinvertebrates in ponds along an urban-rural continuum over three seasons. Macroinvertebrate faunal richness and diversity of garden ponds (in both urban and sub-urban locations) was markedly lower than that associated with field ponds. The fauna recorded in garden ponds were largely a subset of the taxa recorded in the wider landscape. A total of 146 taxa were recorded from the 26 ponds examined (135 taxa from field ponds and 44 taxa from garden ponds); although only 10 taxa were unique to garden ponds. Garden ponds were frequently managed (macrophytes removed or sediment dredged) and contained artificial fountains or flowing water features which allowed a number of flowing water (lotic) taxa to colonise and persist. Despite the relatively limited faunal diversity and reduced conservation value of garden ponds they have the potential to serve as refugia for some taxa, especially Odonata with highly mobile adults. At the landscape scale, garden ponds provide a diverse and abundant range of freshwater habitats that could play an important role in conserving urban-macroinvertebrate biodiversity. However, for this to be achieved there is a need to provide guidance to home-owners on how this potentially valuable resource can help support freshwater biodiversity." (Authors) Anisoptera: 5 taxa and Zygoptera: 7 taxa; only *Ischnura elegans* is detailed..] Address: Hill, M.J., Centre for Hydrological and Ecosystem Science, Department of Geography, Loughborough University, Loughborough, Leicestershire, LE11 3TU, UK. E-mail: m.j.hill@lboro.ac.uk

- 14792.** Holuša, O.; Holušová, K. (2014): The first finding of *Cordulegaster bidentata* (Odonata: Cordulegastridae) in the Cerová vrchovina Hills in Slovakia. *Acta Mus. Beskid.* 6: 77-82. (in Czech, with English summary) ["In May 2014, totally 8 larvae of *C. bidentata* were found at 2 localities in the surroundings of Cerovo village – local part Obručná in the Cerová vrchovina Hills in the southern Slovakia. The finding of larvae of several instars shows the permanent occurrence of species in the Cerová vrchovina Hills. Species occurrence in Slovakia and its area in central Europe are discussed." (Authors)] Address: Holusa, O., Ústav ochrany lesů a myslivosti, Lesnická a dřevařská fakulta, Mendelova Univerzita v Brně, Zemědělská 3, CZ-613 00 Brno, Czech Republic. E-mail: holusao@email.cz
- 14793.** Hu, Z.; Deng, X.-Y. (2014): Aerodynamic interaction between forewing and hindwing of a hovering dragonfly. *Acta Mechanica Sinica* 30(6): 787-799. (in English) ["The phase change between the forewing and hindwing is a distinct feature that sets dragonfly apart from other insects. In this paper, we investigated the aerodynamic effects of varying forewing-hindwing phase difference with a 60° inclined stroke plane during hovering flight. Force measurements on a pair of mechanical wing models showed that in-phase flight enhanced the forewing lift by 17% and the hindwing lift was reduced at most phase differences. The total lift of both wings was also reduced at most phase differences and only increased at a phase range around in-phase. The results may explain the commonly observed behaviour of the dragonfly where 0° is employed in acceleration. We further investigated the wing-wing interaction mechanism using the digital particle image velocimetry (PIV) system, and found that the forewing generated a downwash flow which is responsible for the lift reduction on the hindwing. On the other hand, an upwash flow resulted from the leading edge vortex of the hindwing helps to enhance lift on the forewing. The results suggest that the dragonflies alter the phase differences to control timing of the occurrence of flow interactions to achieve certain aerodynamic effects." (Authors)] Address: Deng, X.-Y., School of Mechanical Engineering, Purdue University, 585 Purdue Mall, West Lafayette, IN, 47906, USA. E-mail: xdeng@purdue.edu
- 14794.** Hupało, K.; Rachalewski, M.; Rachalewska, D.; Tończyk, G. (2014): Gregarine parasitism in two damselfly hosts: Comparison between species, sexes, and sites (Odonata: Calopterygidae). *Odonatologica* 43(3/4): 199-211. (in English) ["We compared gregarine parasitism in imagines of *Calopteryx splendens* (Harris, 1780) and *C. virgo* (Linnaeus, 1758) collected at two sites with sympatric populations in the Spała Landscape Park, Łódź Province, Poland, in July 2012. Gregarine prevalence, intensity, wing load, and aggregation were compared between host species, sexes and sites. Among 140 individuals of both species collected from both sites, 81 (57.8 %) hosted gregarines. The distribution of the parasites was aggregated ($k = 1.0064$) and the highest intensity reached 40 parasites in a single host. There was no difference in gregarine prevalence between species. However, prevalence was different between sexes in both species. Females of *C. splendens* were more often parasitised at site 1, whereas in *C. virgo* males the prevalence was significantly higher at site 2. Secondly, the intensity of parasite infestation and aggregation rate was higher in *C. splendens* at both sampling sites, but we found no differences between sexes except at site 2 where males of *C. splendens* exhibited higher intensity. Thirdly, we found that the parasitism did not affect the damselflies' wing load. Our study revealed differences in patterns of gregarine infection between species, sexes and sampling sites, which confirm that this system of parasitism is complex and influenced by many factors such as physiology and behaviour of the host, environmental conditions or availability of gregarine infectious stages." (Authors)] Address: Hupało, K., Dept of Invertebrate Zoology and Hydrobiology, University of Łódź, 12/16 Banacha, 90-237 Łódź, Poland. E-mail: hrupeq@gazeta.pl
- 14795.** Ikemeyer, D.; Schneider, T. (2014): *Sympetrum vulgatum decoloratum* und weitere Libellenarten in Quellgebieten des Taurusgebirges (Odonata). *Libellula* 33(3/4): 163-176. (in German, with English summary) ["*Sympetrum vulgatum decoloratum* and other Odonata species in headwaters of the Taurus Mountains – From 17 to 24 August 2013 we visited several dragonfly biotopes in the Taurus Mountains in Turkey, situated in the border zone of the provinces Antalya and Konya between the cities of Gündoğmuş, Tapkent, and Sarıveiler. Most of the habitats were headwater and spring meadows in regions from 1,600 m up to 2,000 m above sea level, but also rivulets and ditches were inspected for dragonflies. *Sympetrum vulgatum decoloratum* (Selys, 1884) was found mainly at headwater regions in good numbers. These habitats were above the treeline and surrounded by bulrushes and/or reed. The depth of the water was mainly less than 50 cm. In total 19 Odonata species were found in this region. The most common co-occurring indigenous species are *Ischnura pumilio*, *Lestes barbarus*, *Orthetrum brunneum*, and *Sympetrum flaveolum*, and further on, less common species are *Sympetrum fonscolombii* and *Sympetrum striolatum*. *Sympetrum haritonovi* Borisov, 1983, was not found. All headwater regions are potentially threatened by road building, water engineering and agricultural use. In worst cases the anthropogenic impacts caused the total loss of habitats for Odonata species." (Authors)] Address: Ikemeyer, D., Billerbecker Str. 6, 48329 Havixbeck, Germany. E-mail: dkjikemeyer@t-online.de
- 14796.** Iorio, E. (2014): Confirmation de l'autochtonie de *Somatochlora metallica* en Basse-Normandie (Odonata: Corduliidae). *Martinia* 30(2): 65-72. (in French, with English summary) ["An exuvia of *Somatochlora metallica* has been found on the edge of the Ermitage western pond at Champsecret (Orne department, France). This discovery

confirms the autochthony of this species in Basse-Normandie region. The territorial behaviour of several males observed in the same place at various occasions supports a true settlement of the species instead of an occasional reproduction. A description of the concerned pond is given. The main biotic and abiotic particularities which most probably condition the settlement and a successful larval cycle of this species in Basse-Normandie region are hypothesized. (Author)] Address: Iorio, E., chargé d'études au Groupe d'étude des Invertébrés Armoricaïns (GRETIA) - Antenne Pays-de-la-Loire – 5 rue Général Leclerc – 44390 Nort-sur-Erdre, France. E-mail: e.iorio@gretia.org

14797. Jenkins, D.; Mizell, R.; Vanbloem, S.; Whitmore, S.; Wiscovitch, L.; Zaleski, K.; Goenaga, R. (2014): An analysis of arthropod interceptions by APHIS-PPQ and customs and border patrol in Puerto Rico. *American Entomologist* 60(1): 44-57. (in English) ["Interpretive Summary: We analyzed arthropod interceptions made by regulatory agencies on traffic coming into and leaving Puerto Rico with the intention of finding patterns that may help predict potential invaders and sources of invasions. The majority (77%) of the arthropods intercepted entering Puerto Rico were intercepted in freight or luggage originating within the Caribbean. We found that the insect order Hemiptera (including scales and mealybugs) were the most frequently intercepted group of arthropods. The order Hemiptera also includes many potential agriculture and environmental pests. A survey of 18 exotic arthropods present in both Puerto Rico and Florida found that the vast majority (89%) are reported from Florida prior to being reported in Puerto Rico. This is likely due to the fact that there are no regulatory barriers between the mainland US and Puerto Rico. Finally, we highlight several exotic arthropods that have recently established in Puerto Rico and discuss what we can learn from these invaders. This work analyzes the patterns of arthropod interceptions by regulatory agencies in the Caribbean, discusses past invasions and their impact, and highlights the weaknesses of the current system of pest-detection. This work will be used to inform future monitoring and detection practices. Technical Abstract: USDA Animal Plant Health Inspection Service Plant Protection and Quarantine (APHIS-PPQ) and Customs and Border Patrol (CBP) inspect traffic entering the United States for arthropods that pose a threat to national agriculture and/or ecosystems. We analyzed interceptions made by these agencies in Puerto Rico and the U.S. Virgin Islands between October 2006 and December 2009 for patterns with regard to the frequency of interceptions, origins of interceptions, and the taxa intercepted. 6952 arthropods were intercepted in freight or luggage entering Puerto Rico and the U.S. Virgin Islands from foreign countries and 9840 arthropods were intercepted from freight or luggage leaving Puerto Rico or the U.S. Virgin Islands destined for mainland U.S. The majority (77%) of the arthropods intercepted entering Puerto Rico were intercepted in freight or luggage originating within the Caribbean. The majority of intercepted arthropods were in the

order Hemiptera (52% of all interceptions), followed by Diptera (16%), Coleoptera (10%), Lepidoptera (8%), Thysanoptera (5%), Acari (4%), and Hymenoptera (2%). The remaining orders (Psocoptera, Collembola, Thysanoptera, Orthoptera, Neuroptera, Isoptera, and Odonata) each comprised less than 1%. The proportions of arthropod orders intercepted from foreign countries were different from the proportions of orders intercepted from Puerto Rico and the US Virgin Islands. Intercepted arthropods from foreign countries were more equitably spread among orders, whereas 89% of the arthropods intercepted from Puerto Rico and the US Virgin Islands were in the orders Hemiptera and Diptera. Hemiptera made up the majority of interceptions in traffic entering Puerto Rico and leaving Puerto Rico. However, the Hemiptera made up 28% of the interceptions from foreign countries, but 69% of the interceptions made from Puerto Rico and the US Virgin Islands. Only 7 of 28 exotic arthropods recently established in Puerto Rico were intercepted during this study and these were intercepted at relatively low frequency (between 3 and 132 interceptions; mean of 35 interceptions). We present data suggesting that most exotic arthropods that occur in both Puerto Rico and Florida established in Florida first, likely due to less stringent or non-existent import inspections for traffic coming into Puerto Rico from the U.S. Finally, we highlight several exotic arthropods that have recently established in Puerto Rico and discuss what we can learn from these invaders." (Authors)] Address: Jenkins, D.A., Tropical Crops and Germplasm Research, 2200 Pedro A. Campos Ave., Suite 201 Mayaguez, PR, 00680. E-mail: David.Jenkins@ars.usda.gov

14798. Jo, H.; Gim, J.-A.; Jeong, K.-S.; Kim, H.-S.; Joo, G.-J. (2014): Application of DNA barcoding for identification of freshwater carnivorous fish diets: Is number of prey items dependent on size class for *Micropterus salmoides*?. *Ecology and Evolution* 4(2): 219-229. (in English) ["Understanding predator-prey interactions is a major challenge in ecological studies. In particular, the accurate identification of prey is a fundamental requirement in elucidating food-web structure. This study took a molecular approach in determining the species identity of consumed prey items of a freshwater carnivorous fish (largemouth bass, *Micropterus salmoides*), according to their size class. Thirty randomly selected gut samples were categorized into three size classes, based on the total length of the bass. Using the universal primer for the mtDNA cytochrome oxidase I (COI) region, polymerase chain reaction (PCR) amplification was performed on unidentified gut contents and then sequenced after cloning. Two gut samples were completely empty, and DNA materials from 27 of 28 gut samples were successfully amplified by PCR (success rate: 96.4%). Sequence database navigation yielded a total of 308 clones, containing DNA from 26 prey items. They comprised four phyla, including seven classes, 12 orders, and 12 families based on BLAST and BOLD database searches. The results indicate that largemouth bass show selective preferences in prey item consumption as they mature. These results

corroborate a hypothesis, presence of ontogenetic diet shift, derived through other methodological approaches. Despite the practical limitations inherent in DNA barcoding analysis, high-resolution (i.e., species level) identification was possible, and the predation patterns of predators of different sizes were identifiable. The utilization of this method is strongly recommended for determining specific predator–prey relationships in complex freshwater ecosystems." (Authors) Odonata taxa identified in the diet of *M. salmoides*, based on sequence variation in the cytochrome oxidase I region using stomach contents are *Paracercion* sp., *P. calamorum*, and *P. hieroglyphicum*] Address: Joo, G.-J., Dept Biol. Sciences, Pusan National University, Jang-Jeon Dong, Gum-Jeong Gu, Busan 609-735, South Korea. E-mail: gjjoo@pusan.ac.kr

14799. Joshi, S.; Kunte, K. (2014): Dragonflies and damselflies (Insecta: Odonata) of Nagaland, with an addition to the Indian odonate fauna. *Journal of threatened taxa* 6(11): 6458-6472. (in English) ["We surveyed odonates in the districts of Kohima, Peren and Wokha in the state of Nagaland, northeastern India, during April and May 2012 and May 2013. We recorded 69 species, including 43 additions to the known odonates of Nagaland, and one addition - *Calicnemia erythromelas* Selys, 1891 - to the Indian odonate fauna. The known odonate fauna of Nagaland now consists of 90 species in 53 genera and 14 families. We also describe for the first time the female of *Coeliccia schmidti*, and partially, a heterochromatic form of the female *Ischnura mildredae*." (Authors)] Address: Joshi, S., Indian Foundation for Butterflies. C-703, Alpine Pyramid, Rajiv Gandhi Nagar, Bengaluru, Karnataka 560092, India. E-mail: shantanu@ifoundbutterflies.org

14800. Kiauta, B. (2014): In memoriam Gerhard Jurzitza (1929–2014). *Odonatologica* 43(3/4): 137-142. (in English) ["Mainly personal recollections of a friendship with Gerhard Jurzitza, Professor Emeritus of the University of Karlsruhe, Germany, that lasted more than half a century." (Author)] Address: Kiauta, B., P.O. Box 124, 5854 ZJ Bergen / Lb, The Netherlands. E-mail: mbkiauta@gmail.com

14801. Kitt, M.; Dietze, R. (2014): Zweifleck und Zierliche Moosjungfer im Bienwald. *POLLICHIA-Kurier* 30 (2) – 2014: 17-18. (in German) [*Epithea bimaculata*, 29-iv-2013, Steinfelder Panzergraben, Landkreis Südliche Weinstraße, Rheinland-Pfalz, Germany. *Leucorrhinia caudalis*: 18-vi-2014, „Lettenloch“, clay pit, south of Büchelberg, Landkreis Germersheim, Rheinland-Pfalz, Germany] Address: Kitt, M., Raiffeisenstr. 39, D-76872 Minfeld, Germany, E-mail: MKitt@tonline.de

14802. Knapp, U.; Martens, A. (2014): *Enallagma cyathigerum* als Beute einer Imago des Sandlaufkäfers *Cicindela hybrida* (Odonata: Aeshnidae; Coleoptera: Carabidae). *Libellula* 33(3/4): 149-152. (in German, with English summary) ["Predation of *Enallagma cyathigerum* by

an adult *Cicindela hybrida* (Odonata: Aeshnidae; Coleoptera: Carabidae) – On 26 July 2014 near Nuremberg, Bavaria, Germany, an adult *C. hybrida* was observed capturing a mature male *E. cyathigerum* and photographed devouring the prey. In contrast to *Cicindela* larvae adult beetles have not been recorded as predators of Odonata until now." (Authors)] Address: Knapp, U., Sportplatzstr. 27 A, 90765 Fürth, Germany. E-mail: knappfoto@email.de

14803. Kok, J.M.; Chahl, J.S. (2014): Systems-level analysis of resonant mechanisms for flapping-wing flyers. *Journal of Aircraft* 51(6): 1833-1841. (in English) ["This paper explores the energetics, efficiency, and performance of flapping-wing actuation. The system-level consequences of energy-saving resonant mechanisms across the full flight envelope of hover, maneuver, and glide of flapping-wing systems is analyzed. A review of the extent to which resonant mechanisms are employed in a dragonfly and how useful they are to a maneuvering flapping-wing micro air vehicle system shows that the value of resonance is limited. It is shown that employing resonant elastic mechanisms in real-world configurations on an aerodynamically efficient flyer could produce insignificant energy savings. This number is further reduced by at least 14% across the operational flapping frequency band of a dragonfly, suggesting that resonance is not the major driver for aerodynamically efficient flyers such as the dragonfly. Using a simple harmonic oscillator as a simplified model, a significant reduction of approximately two to three times in maneuvering limits is demonstrated for a system employing elastic elements. In systems with elastic storage, aeroelastic instabilities leading to reductions in maximum glide speed are possible, especially for aerodynamically dominated systems. It is concluded that the system-level cost of implementing resonant mechanisms indicates against resonance in hover being a primary factor in the design of a dragonfly or dragonfly-inspired aircraft." (Authors)] Address: Kok, J.M., School of Engineering, University of South Australia, Mawson Lakes, South Australia, 5095, Australia

14804. Kosterin, O.E.; Constant, J.; Wilson, K.D.P. (2014): Neotype of *Pseudagrion approximans* Selys, 1876 designated to resolve a nomenclatorial confusion in the genus *Aciagrion* [sic] Selys, 1891 (Odonata: Coenagrionidae). *International Journal of Odonatology* 17(2-3): 161-172. (in English) ["To resolve a prevailing nomenclatorial confusion present in the genus *Aciagrion*, *A. tillyardi* Laidlaw, 1919 is placed in synonymy of *A. approximans* (Selys, 1876). The neotype of "Pseudagrion approximans", a male specimen from Khasi Hills preserved in Coll. Selys Longchamps at RBINS, is designated to replace the lost holotype, which was an incomplete specimen of unknown provenance. Secondary sources suggest that Selys Longchamps himself had compared the present neotype specimen with the holotype." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy

of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

14805. Kundu, M.; Sharma, D.; Brahma, S.; Pramanik, S.; Saha, G.K.; Aditya, G. (2014): Insect predators of mosquitoes of rice fields: portrayal of indirect interactions with alternative prey. *Journal of Entomology and Zoology Studies* 2(5): 97-103. (in English) ["The present commentary highlights the likelihood of indirect interactions in rice fields and allied wetlands using the water bugs, odonate larvae and dytiscid beetles as insect predators of mosquito. The biomass and linkage density of the species were used as input to construct the network and estimate the opportunity of intraguild predation (IGP) and apparent competition (AC). It was evident that IGP increased as a function of insect predator body weight ($r = + 0.907$; $P < 0.05$), while an increase in prey biomass decreased its involvement in AC ($r = - 0.864$; $P < 0.05$). The interaction between mosquito prey and the predators appears to be affected by the biomass and composition of the species assemblage. Assuming chances of IGP and AC, positive preference for mosquito by the insect predators seems to be an important criterion for effective biological control." (Authors) Larvae of *Brachydiplax* sp., *Pantala* sp., *Sympetrum* sp., *Macromia* sp., and *Ceriagrion* sp. were collected and included into the analysis.] Address: Aditya, G., Dept of Zoology, The University of Burdwan, Golapbag, Burdwan 713104, India

14806. Kyerematen, R.; Owusu, E.H.; Acquah-Lampsey, D.; Anderson, R.S.; Ntiamao-Baidu, Y. (2014): Species composition and diversity of insects of the Kogyae Strict Nature Reserve in Ghana. *Open Journal of Ecology* 4: 1061-1079. (in English) ["Kogyae Strict Nature Reserve, the only one in Ghana, was established to promote scientific research, particularly on how nature revitalizes itself after major disasters, and also to check the southward drift of the savannah grassland. This study presents the first comprehensive inventory of species composition and diversity of insects of the Reserve. Insects were surveyed between September 2011 and June 2012 to capture the end of the rainy season, the dry season and the peak of the wet season. Samples were taken from two sites within the Reserve, Dagomba and Oku using various sampling techniques including pitfall traps, malaise traps and sweep nets. Insect communities were characterized in terms of, 1) species richness estimators, 2) species richness, 3) Shannon-Weiner Index of Diversity, 4) Pielou's evenness and 5) Bray-Curtis similarity. A total of 8147 individuals representing 135 families from 21 orders were recorded. This included 107 species of butterflies from 9 families and 20 species of dragonflies from 3 families. Oku recorded the highest species numbers ($S = 63$) and richness ($d = 12.16$) with a high evenness of species ($J = 0.9377$) during the peak of the wet season; and the lowest species numbers ($S = 58$) and Margalef's index of ($d = 10.14$) in January. The highest Shannon diversity index of ($H = 3.927$) was recorded at

Dagomba in January. ... A total of 268 odonates belonging to three families and 20 species were recorded from KSNR, comprising of 16 species from the family Libellulidae, three species from the family Coenagrionidae and one species from the family Calopterygidae. 198 individuals belonging to 17 species were recorded at Dagomba whilst 70 species belonging to 11 species were recorded at Oku. Dagomba (ED2) recorded the highest abundance ($N = 82$) as well as species numbers ($S = 14$) of dragonflies during the January sampling corroborated by the highest Shannon Weiner H' of 2.41, while the lowest species numbers ($S = 6$) and richness ($d = 1.6$) were recorded at Oku (EO3) during the June sampling. Dagomba (ED1) had a relatively low evenness during the September sampling (Table 3)." (Authors) The samples of Odonata are not identified at species level.] Address: Kyerematen, Rosina, Department of Animal Biology and Conservation Science, Univ. of Ghana, Legon, Ghana. E-mail: rkyerematen@ug.edu.gh,

14807. Laaß, M.; Hoff, C. (2014): The earliest evidence of damselfly-like endophytic oviposition in the fossil record. *Lethaia* 48(1): 115-124. (in English) ["The reproductive strategy of insects of inserting eggs into plant tissue (endophytic oviposition) is known from the Late Carboniferous onwards. The earliest known ovipositional scars are large, that is up to 38 mm long, and irregular both in size and in shape, and they are not arranged in a regular pattern. Oviposition patterns resembling those of present-day Odonata are first reported from the Late Palaeozoic. These egg cavities are generally of smaller size and have a regular oval shape. They are usually arranged in longitudinal rows or in a zigzag configuration. The most likely tracemakers were gracile damselfly-like insects such as the Archizygoptera, a group closely related to modern Zygoptera. In this paper, the earliest evidence of endophytic oviposition resembling the 'Coenagrionid Type' of Odonatoptera is described. It derives from the Wettin member of the Siebigerode Formation of the Saale-Basin in Central Germany (Upper Carboniferous, Gzhelian) and consists of about 49 elliptical scars with lengths of about 2 mm, probably deposited on a leaf of *Cordaites*. The arrangement of the scars in short transverse rows, their regular size and elliptical shape suggest that the tracemaker was probably a member of the extinct odonatopteran suborder Archizygoptera. If so, the tracefossil described here would be the earliest evidence for this endophytic oviposition in an ancestral group of modern Zygoptera." (Authors)] Address: Laaß, M., Institut für Geowissenschaften, Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany. E-mail: michael.laass@gmx.de

14808. Lima, S.L.; Blackwell, B.F.; DeVault, T.L.; Fernández-Juricic, E. (2014): Animal reactions to oncoming vehicles: a conceptual review. *Biological Reviews* 90(1): 60-76. (in English) ["Animal-vehicle collisions (AVCs) are a substantial problem in a human-dominated world, but little is

known about what goes wrong, from the animal's perspective, when a collision occurs with an automobile, boat, or aircraft. Our goal is to provide insight into reactions of animals to oncoming vehicles when collisions might be imminent. Avoiding a collision requires successful vehicle detection, threat assessment, and evasive behaviour; failures can occur at any of these stages. Vehicle detection seems fairly straightforward in many cases, but depends critically on the sensory capabilities of a given species. Sensory mechanisms for detection of collisions (looming detectors) may be overwhelmed by vehicle speed. Distractions are a likely problem in vehicle detection, but have not been clearly demonstrated in any system beyond human pedestrians. Many animals likely perceive moving vehicles as non-threatening, and may generally be habituated to their presence. Slow or minimal threat assessment is thus a likely failure point in many AVCs, but this is not uniformly evident. Animals generally initiate evasive behaviour when a collision appears imminent, usually employing some aspect of native antipredator behaviour. Across taxa, animals exhibit a variety of behaviours when confronted with oncoming vehicles. Among marine mammals, right whales *Eubalaena* spp., manatees *Trichechus* spp., and dugongs *Dugong dugon* are fairly unresponsive to approaching vehicles, suggesting a problem in threat assessment. Others, such as dolphins *Delphinidae*, assess vehicle approach at distance. Little work has been conducted on the behavioural aspects of AVCs involving large mammals and automobiles, despite their prevalence. Available observations suggest that birds do not usually treat flying aircraft as a major threat, often allowing close approach before taking evasive action, as they might in response to natural predators. Inappropriate antipredator behaviour (often involving immobility) is a major source of AVCs in amphibians and terrestrial reptiles. Much behavioural work on AVCs remains to be done across a wide variety of taxa. Such work should provide broad phylogenetic generalizations regarding AVCs and insights into managing AVCs. Soluk, Zercher & Worthington (2011) suggest that the relatively low population size and long adult lifespan of dragonflies (Odonata, Anisoptera) makes them one of the few nonvertebrate groups likely to be impacted by direct AVC mortality. Further, species flight behaviour near roads is a critical metric of potential mortality. At high traffic-volume sites, near wetlands in Illinois USA dragonfly mortality was high although fewer animals attempted to cross (Soluk et al., 2011). Most importantly, the significance of AVC mortality to dragonflies is more pronounced when considering that 63% of species found in the United States are species of conservation concern and, worldwide, 15% of Odonata species are threatened with extinction (Soluk et al., 2011)." (Authors)] Address: Fernández-Juricic, E., Dept Biol. Scien., Purdue Univ., West Lafayette, IN 47907, USA. E-mail: efernan@purdue.edu

14809. Lojewski, J. (2014): The role of landmarks in territory maintenance by the Black Saddlebags dragonfly,

Tramea lacerata. M.Sc. theses, Graduate School, Eastern Illinois University, Charleston, Illinois: 73 pp. (in English) ["Territoriality can reduce competition for resources, but territorial defense can be costly. Therefore any behaviour that reduces territorial costs may increase the net benefit of territoriality. Some species will align their territory boundaries with conspicuous landmarks that may serve to reduce defense costs. Dragonflies, including *T. lacerata*, defend territories at breeding sites, keeping rival males away to allow themselves access to females. We used three treatments to investigate whether *T. lacerata* used landmarks: constraining landmarks (an object that provided a physical barrier to flight), non-constraining landmarks (an object of the same dimensions and construction that did not impede flight), and a control without landmarks. We observed patrolling male black saddlebags and recorded the locations of turns at their territory boundary and interactions with other dragonflies. When either type of landmark was present, individuals placed their boundary at the landmark far more often than any other location. In addition, individuals that used landmarks had a significantly narrower range of turn locations than those that did not. Unlike other studies the use of a landmark did not seem to reduce defense costs, and interestingly not all individuals used landmarks when they were provided. The lack of an observed reduction in defensive costs could be due to the collection of data during territory maintenance rather than territory establishment, when the costs may have been higher, or landmarks may be important as part of a spatial reference system that aids male dragonflies in efficiently searching for females." (Author)] Address: Lojewski, J., Department of Biological Sciences, Eastern Illinois University, Charleston, IL, 61920, USA

14810. Lucas, G.R.; Michell, P.; Williams, N. (2014): Low cost quarry management producing high gain biodiversity: Using GIS to quantify effective quarry management regimes. In: Hunger, E., Brown, T. J. and Lucas, G. (Eds.): Proceedings of the 17th Extractive Industry Geology Conference, EIG Conferences Ltd. 202 pp: 135-146. (in English) ["A large scale biodiversity study of Cefn Mawr quarry, Mold, North Wales provided a scientific database for the operator. The project aimed to develop a set of 'biodiversity indicators' that would inform sustainable mineral operations at mineral extraction sites whilst simultaneously protecting ecological and landscape interests. The results helped fashion the production of the corporate guideline 'Promotion of biodiversity at the mineral extraction sites of HeidelbergCement'. Cefn Mawr quarry is a Carboniferous limestone quarry providing feedstock for the nearby Padeswood Hanson Cement plant. At the time of the survey it was operated by Castle Cement. A range of ecological surveys were carried out over a six month period (covering late spring, summer and early autumn 2008). They included a JNCC Phase 1 Habitat survey, butterfly and dragonfly surveys and an assessment of water bodies for amphibians. Any habitats not categorised by the JNCC Phase 1 Habitat survey

were described as 'Partial Living Spaces' and were incorporated within the GIS model and used to assess the biodiversity of the site. They added significantly to the biodiversity count and biodiversity indicators. The authors argue that Partial Living Spaces should become part of biodiversity audits at mineral extraction sites because of their contribution to the quantification of biodiversity. Data recorded were analysed within ESRI ArcGIS. The analysis considered the range of habitats and levels of floral diversity found within different zones (operational, restoration and buffer) of the quarry. Wildlife was found to be thriving in the most disturbed parts of the quarry with evidence of a range of species found in the operational zone. Around 300 species of flora were identified on the site. The density of flora (species per hectare) found in the operational and restoration zones of the quarry, together were greater than that in the buffer zone. The buffer zone was considered to be an analogue for the surrounding upland countryside. Statutorily-protected and 'Nationally Scarce' species were also present. The analysis demonstrated that a continuous cycle of disturbance is a key factor in increasing the levels of biodiversity within the quarry. The GIS proved to be an effective tool in recording and analysing the variety of habitats and their species. The quarry had not employed any sophisticated or costly procedures to foster biodiversity. Restoration had been conducted using low cost in-house techniques that had been designed to be cost effective and promote biodiversity. The GIS demonstrated that these techniques had been successful. A number of management approaches were suggested to enhance the biodiversity and are now employed by the quarry as part of the Quarry Biodiversity Management Plan." (Authors) Dragonflies were studied, but no results are presented.] Address: Lucas, G.R., Edge Hill University, Department of Geography and Geology, St Helens Road, Ormskirk, Lancashire L39 4QP, UK. E-mail: Lucasg@edgehill.ac.uk

14811. Mapi-ot, E.P.; Enguito, M.R.C. (2014): Species richness of adult Odonata in Labo River, Ozamiz City. *Journal of Multidisciplinary Studies* 3(1): 86-99. (in English) [Mindanao, Philippines; "Labo River is one of the water systems in Ozamiz City that provides the water needs of the population. Human-related modifications of this water channel have altered the water quality that supports life forms. Invertebrates are important indicators of ecosystem health. Odonata are well-known invertebrates and are of great ecological importance. Fieldwork was conducted from October 2013 to February 2014 in three sampling sites to determine the species richness of Odonata in Labo River, Ozamiz City. Opportunistic sampling method with the use of sweep nets was employed. 21 species were collected of which four are endemic. Of the total species, thirteen are anisopterans and eight are zygopterans that were categorized into three families: Libellulidae, Platycnemididae, Protoneuridae and Coenagrionidae. The low species richness and the presence of indicator species of environmental disturbance suggest that the sites sampled

are already disturbed. Additional sampling should be conducted in Labo River to have a complete database of Odonata." (Authors)] Address: Mapi-ot, Emmarie, Dept Biological Sciences, Mindanao State Univ. - Iligan Institute of Technology, Iligan City, Philippines; 2 D3C Gahol Apartment, Lopez Jaena St., Davao City, Philippines. E-mail: efmapiot@yahoo.com

14812. Marina, C.F.; Bond, J.G.; Muñoz, j.; Valle, j.; Novelo-Gutiérrez, R.; Williams, T. (2014): Efficacy and non-target impact of spinosad, Bti and temephos larvicides for control of Anopheles spp. in an endemic malaria region of southern Mexico. *Parasites & Vectors* 2014, 7:55 doi:10.1186/1756-3305-7-55 : (in English) ["Background: The larvicidal efficacy of the naturally derived insecticide spinosad, for control of immature stages of Anopheles albimanus and associated culicids, was compared to that of synthetic and biological larvicides. Effects on non-target insects were also determined. Methods: A field trial was performed in replicated temporary pools during the rainy season, in southern Mexico. Pools were treated with 10 ppm a.i. spinosad (Tracer 480SC), Bti granules applied at 2 kg/ha (VectoBac WDG, ABG-6511), and 100 ml/ha temephos (50 EC), or an untreated control. Numbers of immature mosquitoes, and aquatic insects in pools were monitored for 20 weeks. Results: Samples of immature mosquitoes comprised approximately 10% An. albimanus, 70% Culex spp. (mostly Cx. melanoconion and Cx. coronator) and 20% Uranotaenia lowii. The most effective larvicides were spinosad and temephos that eliminated An. albimanus in 16 out of 20 post-treatment samples, or 9 weeks of continuous control of immature stages, respectively. These larvicides resulted in 15 and 5 weeks of elimination of Culex spp., respectively, or 20 and 4 weeks of continuous elimination of U. lowii, respectively. Bti treatment provided little consistent control. Aquatic insects were recorded comprising 3 orders, 20 families, 40 genera and 44 species. Shannon diversity index values (H') for aquatic insects were highest in the control (0.997) and Bti (0.974) treatments, intermediate in the spinosad treatment (0.638) and lowest in the temephos treatment (0.520). Severely affected non-target insects in the spinosad and temephos treated pools were predatory Coleoptera, Hemiptera and Odonata, which in the case of spinosad was likely due to the high concentration applied. Bti had little effect on aquatic insects. Conclusions: The spinosad treatment retained larvicidal activity for markedly longer than expected. Spinosad is likely to be an effective tool for control of anopheline and other pool-breeding mosquitoes in tropical regions. Non-target effects of spinosad on aquatic insects merit further study, but were likely related to the concentration of the product used. ... The most severely affected insect species in the spinosad-treated pools were the diving beetle Laccophilus fasciatus (Coleoptera: Dytiscidae), the backswimmer Buena margaritacea (Hemiptera: Notonectidae) and nymphs of the dragonfly Anax amazili (Odonata: Aeshnidae)." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de

Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

14813. Martens, A.; Schröter, A.; Wildermuth, H. (2014): Deutschsprachige Namen für Libellen des Mittelmeerraumes (Odonata). *Libellula* 33(3/4): 233-244. (in German, with English summary) ["German vernacular names for several species of Mediterranean dragonflies (Odonata) – German vernacular names are available for nearly all western Palaearctic odonate species. The meaning of these names, beginning from Schiemenz (1953), was mainly explained by Wildermuth & Martens (2014). The German translation of Dijkstra & Lewington (2014) expanded the geographical scope to North Africa and Turkey, thus several new names are needed which are presented and explained here." (Authors)] Address: Martens, A., Institut für Biologie und Schulgartenentwicklung, Pädagogische Hochschule Karlsruhe, Bismarckstraße 10, 76133 Karlsruhe, Germany. E-mail: martens@ph-karlsruhe.de

14814. Martínez-Darve Sanz, P.; Cano-Villegas, F.J. (2014): Primera cita de *Pantala flavescens* (Fabricius, 1798) (Odonata, Libellulidae) para las Islas Canarias y España (Gran Canaria) (in Spanish, with English summary). First Record of *Pantala flavescens* (Fabricius, 1798) (Odonata, Libellulidae) for the Canary Islands and Spain (Gran Canaria). *Boln. Asoc. esp. Ent.* 38(3-4): 337-340. (in Spanish) [One male, 20-i-2013, Gran Canaria (28R DR47); at the same place one male (probably the one from 20th January) was observed until 26th January. At 27-i-2013, and additional one was observed in a ravine in the south of Gran Canaria (28R DR57).] Address: Cano Villegas, F.J., C/Montemayor, 4 1º-2; 14003-Córdoba, Spain. E-mail: ficanovi2@hotmail.com

14815. Martynov, V.V. (2014): New Record of *Lindenia tetraphylla* (Odonata, Gomphidae) in Ukraine. *Vestnik zoologii* 48(5): 476. (in English) ["1 male was revealed in the "Kam'yani Mohyly" Nature Reserve (Donetsk Region, Volodarsk District, 47°31'43" N, 37°07'76" E) 09.07.2014 in the bed of a dried-up stream at the bottom of steppe gully, about 300 m away from the River Karatysh." (Author)] Address: Martynov, V.V., Donetsk National University, Donetsk, Ukraine

14816. McLoughlin, S.; Martin, S.K.; Beattie, R. (2014): The record of Australian Jurassic plant-arthropod interactions. *Gondwana Research* 27(3): 940-959. (in English) ["Highlights: • Australian Jurassic plants reveal damage referable to seven arthropod feeding strategies. • Damage occurs on numerous ferns and gymnosperms but is prominent on pteridosperms. • Australian Jurassic plants reveal modest physical defences against arthropod herbivory. • Orthoptera, Coleoptera, Hemiptera and Odonata are candidates for the majority of plant damage.

Abstract: A survey of Australian Jurassic plant fossil assemblages reveals examples of foliar and wood damage generated by terrestrial arthropods attributed to leaf-margin feeding, surface feeding, lamina hole feeding, galling, piercing-and-sucking, leaf-mining, boring and oviposition. These types of damage are spread across a wide range of fern and gymnosperm taxa, but are particularly well represented on derived gymnosperm clades, such as Pentoxylales and Bennettitales. Several Australian Jurassic plants show morphological adaptations in the form of minute marginal and apical spines on leaves and bracts, and scales on rachises that likely represent physical defences against arthropod herbivory. Only two entomofaunal assemblages are presently known from the Australian Jurassic but these reveal a moderate range of taxa, particularly among the Orthoptera, Coleoptera, Hemiptera and Odonata, all of which are candidates for the dominant feeding traits evidenced by the fossil leaf and axis damage. The survey reveals that plant-arthropod interactions in the Jurassic at middle to high southern latitudes of southeastern Gondwana incorporated a similar diversity of feeding strategies to those represented in coeval communities from other provinces. Further, the range of arthropod damage types is similar between Late Triassic and Jurassic assemblages from Gondwana despite substantial differences in the major plant taxa, implying that terrestrial invertebrate herbivores were able to successfully transfer to alternative plant hosts during the floristic turnovers at the Triassic–Jurassic transition." (Authors)] Address: McLoughlin, S., Dept Paleobiology, Swedish Museum of Natural History, S-104 05 Stockholm, Sweden. E-mail: steve.mcloughlin@nrm.se

14817. Meng, L.-b.; Song, A.; Tian, X. (2014): Analysis of aerodynamic characteristics of flexible wing of dragonfly based on CFD/CSD method. *Journal of Aerospace* 29(9): 2063-2069. (in Chinese, with English summary) ["A methodology of fluid-structure bi-directional interaction based on computational fluid dynamics/computational structure dynamics (CFD/CSD) was presented. The donor-receptor relationship between two sets of grid system was identified by alternating digital tree (ADT). The local interpolation methods were used for data exchange between these two sets of grids. Flow with moving boundaries was dealt with by Delaunay graph mapping method. The code for nonlinear structural finite element and information transfer was developed and used to connect with the code of flow solver 3D2MUFS developed in the Micro Air Vehicle Center of Nanjing University of Aeronautics and Astronautics (NUAA). It was applied to the aerodynamic computation of dragonfly flapping flight with flexible wing. Results show that the time-averaged vertical force coefficient of the dragonfly wing increases from 0.31 to 0.53, and the time-averaged thrust coefficient increases from 0.07 to 0.13 by flexible deformation. This confirms that the flexible deformation can improve the aerodynamic performance of flapping wing." (Authors)] Address: Meng, L.-b., College of Aerospace

Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China

14818. Moratin, R. (2014): La Liste rouge des Odonates menacés en Alsace. IMAGO, ODONAT. Document numérique.. Association pour l'étude et la protection des Invertébrés en Alsace (IMAGO) & Office des données naturalistes d'Alsace (ODONAT): 14 pp. (in French) [France. Critically endangered: 4, endangered: 5, vulnerable: 11.] Address: Association pour l'étude et la protection des invertébrés en Alsace, 8 rue Adèle Riton, 67000 Strasbourg, France. <http://association.imago.free.fr/>

14819. Nair, M.V.; Subramanian, K.A. (2014): A new species of *Agriocnemis* Selys, 1869 (Zygoptera: Coenagrionidae) from Eastern India with redescription of *Agriocnemis keralensis* Peter, 1981. *Rec. zool. Surv. India* 114(4): 669-679. (in English) [*Agriocnemis kalinga* sp. nov. is described from Odisha. The status of *Agriocnemis keralensis* Peters, 1981 is discussed. Based on recent field studies, *A. keralensis* is redescribed. A revised key to *Agriocnemis* of India is also provided.] Address: Nair, M.V., Nandankanan Zoological Park, Barang-754005, Odisha, Zoological Survey of India, Kolkata-70053, West Bengal, India. E-mail: manojnair74@gmail.com

14820. Noble, A.; Hassall, C. (2014): Poor ecological quality of urban ponds in northern England: causes and consequences. *Urban Ecosystems* 18(2): 649-662. (in English) ["The value of ponds in urban areas historically has been overlooked. While some recent studies have described considerable biodiversity in urban areas, it is unclear as to how far this extends to different urban habitats. The aims of this study were to determine the condition of 21 urban ponds in Bradford (northern England) and to quantify the connectivity of wetlands in the district. The study showed that macroinvertebrate (including Odonata) and plant biodiversity was substantially lower than would be expected based on pristine reference sites. Of the 21 ponds surveyed, 15 were found to be classified as having very poor ecological quality, with 5 being classed as poor and just 1 was classed as moderate. The number of aquatic plant species found in the ponds ranged from 0 to 6 and the number of macroinvertebrate families found ranged from 4 to 13. It was suspected that the aquatic plant diversity was low due to management techniques such as the removal of emergent vegetation. The average distance to a wetland was found to be higher in urban areas (533 m) compared to rural areas (448 m) although this difference was small, which indicates that the low diversity found in urban ponds is likely due to habitat variables." (Authors)] Address: Hassall, C., School of Biology, Univ. Leeds, Leeds, LS2 3JT, UK. E-mail: c.hassall@leeds.ac.uk

14821. O'Brien, M.F. (2014): Great Lakes Odonata Bibliography. Michigan Odonata Survey – Technical Note No. 4. January, 2014.: 11 pp. (in English) ["The Great

Lakes Region includes the states and Canadian provinces that drain into the Great Lakes. For this bibliography, The Great Lakes – Superior, Michigan, Huron, Erie, and Ontario comprise a large area of freshwater unrivalled by anywhere else. The Odonata fauna has been studied in the region for over 150 years, and the body of literature is substantial enough to warrant its own bibliography. I purposely left out papers that dealt specifically with faunas not influenced by the Great Lakes, such as SE Pennsylvania and SE New York." (Author)] Address: O'Brien, M.F., Museum of Zoology, University of Michigan, 1109 Geddes Avenue, Ann Arbor, MI 48109, USA. E-mail: mfobrien@umich.edu

14822. O'Carroll, D.C.; Wiederman, S.D. (2014): Contrast sensitivity and the detection of moving patterns and features. *Phil. Trans. R. Soc. B* 19 February 2014 vol. 369 no. 1636 20130043: 9 pp. (in English) ["Theories based on optimal sampling by the retina have been widely applied to visual ecology at the level of the optics of the eye, supported by visual behaviour. This leads to speculation about the additional processing that must lie in between—in the brain itself. But fewer studies have adopted a quantitative approach to evaluating the detectability of specific features in these neural pathways. We briefly review this approach with a focus on contrast sensitivity of two parallel pathways for motion processing in insects, one used for analysis of wide-field optic flow, the other for detection of small features. We further use a combination of optical modelling of image blur and physiological recording from both photoreceptors and higher-order small target motion detector neurons sensitive to small targets to show that such neurons operate right at the limits imposed by the optics of the eye and the noise level of single photoreceptors. Despite this, and the limitation of only being able to use information from adjacent receptors to detect target motion, they achieve a contrast sensitivity that rivals that of wide-field motion sensitive pathways in either insects or vertebrates—among the highest in absolute terms seen in any animal." (Authors)] Address: O'Carroll, D.C., Adelaide Centre for Neuroscience Research, School of Medical Sciences, The University of Adelaide, Adelaide, South Australia 5000, Australia. E-mail: david.ocarroll@adelaide.edu.au

14823. Outomuro, D.; Cordero Rivera, A.; Nava-Bolanos, A., Cordoba-Aguilar, A. (2014): Does allometry of a sexually selected ornamental trait vary with sexual selection intensity? A multi-species test in damselflies. *Ecological Entomology* 39(3): 399-403. (in English) ["Ornaments may show hyperallometry in certain taxa, i.e. large individuals have proportionally larger ornaments than small ones. One hypothesis suggests that higher sexual selection intensity leads to steeper hyperallometric patterns. This study tested whether an ornamental trait subject to both intra- and intersexual selection showed steeper allometric slopes than when subject solely to intrasexual selection. The study employed the sexually se-

lected male wing pigmentation of 14 calopterygid species (*Hetaerina americana*, *H. cruentata*, *H. occisa*, *H. titia*, *H. vulnerata*, *Calopteryx aquabilis*, *C. haemorrhoidalis*, *C. maculata*, *C. splendens*, *C. virgo*, *Mnesarete pudica*, *Neurobasis chinensis*, *Sapho bicolor*) that differ in sexual selection intensity (intrasexual selection versus intra- and intersexual selection). Hyperallometry was not a uniform pattern in the study species. Furthermore, the allometric slopes did not differ between sexual selection intensities. The allometry of ornamental traits is therefore highly variable even among related species. Other selection pressures – probably species-specific and at a local scale – acting on wing pigmentation might explain the diversity of allometric patterns." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, México D.F. 04510, México. E-mail: acordoba@ecologia.unam.mx

14824. Pagliai, F.; Bruni, G. (2014): Segnalazioni di *Cordulia aenea* (Linnaeus, 1758) in Toscana, (Odonata: Corduliidae). *Onychium* 10(2013): 189-190. (in Italian, with English summary) [Fucecchio, prov. Firenze, Italy, 43°47' 54,564" N 10°45' 50,605" E, 2-V-2011, 1 male, 28-IV-2013, 1 male] Address: Pagliai, F., via del Ferrale, 14/4, I-50142 Firenze (Italia), fpagliai@tiscalinet.it; Giacomo Bruni, Dipartimento di Biologia, Università degli Studi di Firenze, via Romana, 17, I-50125 Firenze, Italia. E-mail: giacomo.b90@gmail.com

14825. Petrischak, H. (2014): Exkursion zu Kuckucksbienen, Mosaikjungfern und moosbewachsenen Felsen Deutsch-luxemburgische Naturparadiese. *Biol. Unserer Zeit* 1/2014 (44): 62-69. (in German, with English summary) ["Excursion to the border area of Luxembourg and Germany. The gravel ponds in the alluvial plain of the Moselle in the border area of Luxembourg and the Saarland serve as a significant breeding habitat and stopover site of water birds. Many thermophilic species of dragonflies can also be watched in the "Haff Réimech" nature reserve in Luxembourg. Some wild bees typical of floodplains have found compensatory habitats on sandy slopes. Further north, on both sides of the Sûre, there is a landscape rich in woodlands with deep chasms and great sandstone rock formations (Lower Jurassic) in the border area of Luxembourg and Rhineland-Palatinate. A cool and humid microclimate deep in the valleys and chasms promotes plant species of the Atlantic climate region. Especially Luxembourg's Little Switzerland is characterized by a great species-richness of mosses." (Author) On page 65-66, the Odonata are introduced, basically on publications of Bernd Trockur.] Address: Petrischak, H., Stiftung Forum für Verantwortung, Pestelstr. 2, 66119 Saarbrücken, Germany. E-mail: petrischak@forum-fuer-verantwortung.de

14826. Pilon, N.; Penati, F. (2014): Contributo alla conoscenza della Odonatofauna della provincia di Sondrio

(Italia, Lombardia). I. Segnalazioni faunistiche. *Il Naturalista Valtellinese* 24(2013): 67-76. (in Italian, with English summary) ["Contribution to the knowledge of the Odonata of the Province of Sondrio (Italy, Lombardy). I. Faunistic records. The odonatofauna of the Province of Sondrio is still poorly known. In summer 2013, seven suitable habitats were surveyed to collect new and reliable data. 13 species have been recorded." (Authors) The records include *Somatochlora arctica*, *S. alpestris*, and *Sympetrum depressiusculum*.] Address: Penati, F., ELITRON, Via Capri 11/3, I-20153, Milano. E-mail: nicola@elitron.mi.it 2Via dei Sedini 47/a, I-23017, Morbegno (SO), Italy. E-mail: fabio_penati@alice.it

14827. Pix, A. (2014): Helikomerie bei Odonata – eine ungewöhnliche Exuvie von *Aeshna juncea* (Odonata: Aeshnidae). *Libellula* 33(1/2): 67-73. (in German, with English summary) ["Helicomerism in Odonata – an unusual exuvia of *Aeshna juncea* (Odonata: Aeshnidae) – An exuvia of a female *Aeshna juncea*, collected on 20-vii-1988 at a boggy pond in the Solling area, Germany, showed fusing of its fifth and sixth abdominal segments by a twice twisting intersegmental membrane. Helicomerism is a category of aberrant segmentation in arthropods and annelids known from the field as well as experimental research in developmental biology. It leads to twisted forms of the segmentation. In Odonata this phenomenon is described for the first time." (Author)] Address: Andreas Pix, A., Mönchehofstr. 1, 34127 Kassel, Germany. E-mail: andreas.pix@t-online.de

14828. Power, A.; Gilbert, F. (2014): Dragonflies and damselflies of the St Katherine Protectorate. *Egyptian Journal of Biology* 16: 95-100. (in English) ["The indigenous Bedouin tribes of South Sinai (Egypt) irrigate small gardens for agricultural purposes and this has been shown to boost the biodiversity of plants, birds and insects, including dragonflies (Odonata). The gardens offer water-related resources normally in short supply in arid regions. There is very little information available on the dragonflies and damselflies of the Sinai. We assess the importance of Bedouin gardens to Odonata by recording them in the gardens and in unmanaged habitat in the St Katherine Protectorate. The gardens are widely utilised by Odonata: ten species were recorded in total, all observed in the gardens at least once." (Authors)] Address: Power, A., School of Life Sciences, Univ. Nottingham, Nottingham NG7 2RD, UK. E-mail: powera2@tcd.ie

14829. Preston, D.L.; Boland, C.E.; Hoverman, J.T.; Johnson, P.T.J. (2014): Natural enemy ecology: comparing the effects of predation risk, infection risk and disease on host behaviour. *Functional Ecology* 28(6): 1472-1481. (in English) ["(1) Growing interest in unifying the field of natural enemy ecology has revealed similarities between predation and parasitism. In parallel with predation, parasite infection – and even the threat of infection – can alter host traits and indirectly affect community interactions. Nonetheless, few studies have considered multiple

mechanisms of natural enemy-induced behavioural alteration in parallel (e.g. effects before and after enemy contact) or the factors that drive variation in behavioural responses. (2) We first evaluated how the threat of infection by a virulent trematode (*Ribeiroia ondatrae*) compared to the well studied risk of predation in triggering inducible defences in amphibian hosts, prior to direct contact with either enemy. We then evaluated five separate factors that influenced the magnitude of parasite-induced behavioural changes after successful transmission. (3) In both the laboratory and an outdoor mesocosm experiment, we found no evidence that tadpoles of two species (*Pseudacris regilla* and *Anaxyrus boreas*) altered their activity levels in response to chemical cues from uninfected host snails, trematode-infected snails, or from conspecifics actively becoming infected. In contrast, tadpoles sharply reduced their activity in response to lethal predation risks posed by caged dragonfly larvae. (4) After infection, however, *Ribeiroia* caused strong decreases in host activity and escape distance that correlated positively with infection intensity and negatively with host size and developmental stage. Five days after infection with a one-time pulse exposure, hosts recovered to near-normal activity levels. Hosts exposed to a chronic daily exposure of equal intensity, however, continued to decrease activity. Unlike *Ribeiroia*, two less virulent trematodes had no detectable effects on host behaviour. (5) Our results highlight key distinctions between predation and parasitism. The contrasting effects prior to enemy contact may stem from the fact that unlike predation, the consequences of macroparasite infection are intensity-dependent and unpredictable. In contrast, the strong changes in host behaviour after infection are more similar to non-consumptive predator effects in terms of their potential influences on host fitness and community interactions." (Authors)] Address: Preston, D.L., Department of Ecology and Evolutionary Biology, University of Colorado, Boulder, Colorado, USA. E-mail: daniel.preston@colorado.edu

14830. Rattu, A.; Leo, P.; Moratin, R.; Hardersen, S. (2014): *Diplacodes lefebvrui* in Sardinia, a new species for the Italian fauna (Odonata: Libellulidae). *Fragmenta entomologica* 46(1-2): 121-124. (in English) ["*Diplacodes lefebvrui* (Rambur, 1842) is a libellulid dragonfly, which is common and widespread in Africa and across the Indian Ocean. While this species is fairly common in the south and east of the Mediterranean, its European range is confined to Cyprus, the island of Rhodes and the south of the Iberian Peninsula. Here we report the first record of *D. lefebvrui* for Italy, which was captured near Cagliari (Sardinia) on 11.IX.2013. In October 2014, a population of the same species was observed at a small wetland on the island "Isola di San Pietro" (Sardinia). Here the observed sex ratio of *D. lefebvrui* was strongly biased in favour of females and only a single male was observed." (Authors)] Address: Rattu, A., Via del Pozzetto 1, I-09126 Cagliari, Italy - andrearattu@virgilio.it

14831. Rudolf, V.H.W.; Rasmussen, N.L.; Dibble, C.J.; Van Allen, B.G. (2014): Resolving the roles of body size and species identity in driving functional diversity. *Proc. R. Soc. B* 22 April 2014 vol. 281 no. 1781: 21 pp. (in English) ["Efforts to characterize food webs have generated two influential approaches that reduce the complexity of natural communities. The traditional approach groups individuals based on their species identity, while recently developed approaches group individuals based on their body size. While each approach has provided important insights, they have largely been used in parallel in different systems. Consequently, it remains unclear how body size and species identity interact, hampering our ability to develop a more holistic framework that integrates both approaches. We address this conceptual gap by developing a framework which describes how both approaches are related to each other, revealing that both approaches share common but untested assumptions about how variation across size classes or species influences differences in ecological interactions among consumers. Using freshwater mesocosms with dragonfly larvae (*Erythemis simplicicollis*, *Plathemis lydia*, *Pachydiplax longipennis*) as predators, we then experimentally demonstrate that while body size strongly determined how predators affected communities, these size effects were species specific and frequently nonlinear, violating a key assumption underlying both size- and species-based approaches. Consequently, neither purely species- nor size-based approaches were adequate to predict functional differences among predators. Instead, functional differences emerged from the synergistic effects of body size and species identity. This clearly demonstrates the need to integrate size- and species-based approaches to predict functional diversity within communities." (Authors)] Address: Rudolf, V.H.W., Dept of Ecology and Evolutionary Biology, Rice Univ., Houston, TX 77005, USA. E-mail: volker.rudolf@rice.edu

14832. Ruppell, G.; Hilfert-Ruppell, D. (2014): Slow-motion analysis of female refusal behaviour in dragonflies. *International Journal of Odonatology* 17(4): 199-215. (in English) ["By means of slow-motion film analysis we found new female refusal behaviour patterns against male harassment in a variety of Odonata species. Often, females could escape simply by flying faster than males. Due to the morphological preconditions, there were differences in the two suborders. In Anisoptera, several behavioural specialities were analysed: (a) females of *Aeshna cyanea*, which oviposit solitarily and endophytically, clung to the substrate with great force when being pulled away by attacking males. (b) *Anax imperator* females showed a very fast, characteristic bending of the abdomen causing sudden U-turns for escape. (c) Solitary *Libellula quadrimaculata* females flew loops to escape pursuing males or to shake them off. They either used the impact of the crashing male for the turning moment or they generated it themselves by an abrupt change of the wing beat direction. In Zygoptera we in-

vestigated different *Calopteryx* species, which all oviposit alone. Fleeing was most common but wing clapping, not cooperating to build a tandem, tandem separation, fast diving for submerged oviposition and threatening and attacking the male were also documented. Fast water current prevented submerged oviposition by *Calopteryx xanthostoma* and increased refusal behaviour by females." (Authors)] Address: Hilfert-Rüppell D., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

14833. Sajan, S.K.; Mohapatra, P.P. (2014): New record of Lesser Blue Wing *Rhyothemis triangularis* Kirby, 1889 (Odonata: Libellulidae) from Odisha, India. *Journal of the Bombay Natural history Society* 111(1): 60. (in English) ["*R. triangularis* was sighted on April 07, 2012, from Odisha during an Odonata survey in Kotagarh Wildlife Sanctuary. The species was found in the core area of the Sanctuary in Balliguda forest division near Dupi waterhole (19.89° N; 83.66° E). The terrain is flat with mixed forest." (Authors)] Address: Sajan, S.K., P.G. Dept of Wildlife and Biodiversity Conservation, North Orissa University, Sri Ram Chandra Vihar, Takatpur 757 003, Odisha, India. E-mail: sksajan.sajan@gmail.com

14834. Salindra, H.G.; Dayananda, K.; Kitching, R.L. (2014): Ovo-viviparity in the Odonata? The case of *Heliocypha perforata* (Zygoptera: Chlorocyphidae). *International Journal of Odonatology* 17(4): 181-185. (in English) ["In this paper we record a likely instance of ovo-viviparity in a chlorocyphid damselfly from south-western China. If confirmed, this will be the first record of live birthing in the Odonata: indeed in any member of the Palaeoptera. The widespread Asian damselfly *Heliocypha perforata* (Percheron, 1835) is proposed to be, at least facultatively, viviparous. A female was observed and filmed appearing to deposit pro-larvae directly onto the exposed surface of a half-submerged branch in a small stream in Xishuangbanna Autonomous Dai Prefecture, Yunnan, China. The species is known to deposit eggs in bark crevices close to water but no previous case of actual live births is known." (Authors)] Address: Kitching, R.L., Environmental Futures Research Institute, Griffith University, Nathan, Queensland 4111, Australia

14835. Samweel, N.; Nazir, T. (2014): Diversity of aquatic insects and function of fluvial ecosystem of Song River of Rajaji National Park, India. *Global Journal of Science Frontier Research: H - Environment & Earth Science* 14(1): 11 pp. (in English) [The density (ind. per m²) of Odonata inhabiting the river Song during September 2001-August 2002 is 19 specimens (2,92% of all specimens sampled).] Address: Samweel, N., Department of Forestry Dolphin P.G. Institute of Biomedical and Natural Sciences Manduwala Dehradun Uttarakhand, India. E-mail: nusrat_samweel@rediffmail.com

14836. Schlemmer Brasil, L.; Batista, J.D.; Giehl, N.F.; Valadão, M.B.X.; Oliveira dos Santos, J.; Dias-Silva, K.

(2014): Environmental integrity and damselfly species composition in Amazonian streams at the "arc of deforestation" region, Mato Grosso, Brazil. *Acta Limnologica Brasiliensia* 26(3): 278-287. (in English, with Portuguese summary) ["Aims: Investigated how the loss of environmental integrity affects damselfly species composition in nine sites with different levels of environmental integrity in a Cerrado-Amazon transition region known as "arc of deforestation" in Mato Grosso State Brazil. We also tested the influence of environmental variables on species composition. Methods: We collected in transects of 100 m and used ordination (PCoA) and simple linear regression. Results: Species composition was strongly influenced by the environmental quality of sites, and the best model to explain species composition included variables related to channel morphology. Conclusions: These results are connected to the environmental homogenization and loss of environmental integrity as a result of extensive agricultural practices which alter stream communities of dragonflies in this region." (Authors)] Address: Schlemmer Brasil, L., Programa de Pós Graduação em Ecologia e Conservação, Univ. do Estado de Mato Grosso – UNEMAT, CEP 78690-000, Nova Xavantina, MT, Brazil. E-mail: brasil_bilogia@hotmail.com

14837. Schmitz, M. (2014): Besonders frühe Emergenz von *Aeshna subarctica elisabethae* (Odonata: Aeshnidae). *Libellula* 33(1/2): 63-66. (in German, with English summary) ["Early emergence of *Aeshna subarctica elisabethae* (Odonata: Aeshnidae) – The very early emergence of a female *Aeshna subarctica elisabethae* on 23-v-2009 in the Hahnenmoor, Lower Saxony, is described. This record constitutes the earliest ever documented emergence of the species in Europe. It is assumed that the larva had reached an advanced growth stage in the preceding year, but did not manage to leave the water, thus enabling it to emerge very early the following spring, which was extraordinarily warm and sunny." (Authors)] Address: Schmitz, M., Birkenhang 37, 42555 Velbert-Langenberg, Germany. E-mail: mich.schmitz@gmx.de

14838. Schroth, K. (2014): Morphologische Schlupfhilfen bei Libellenlarven (Odonata). *Libellula* 33(1/2): 1-20. (in German, with English summary) ["Morphological emergence assistances in dragonfly larvae – Dragonfly larvae have a cuticular suture that opens during eclosing as well as during emerging. It is located dorsally at the posterior of the thorax and extends from the wing sheaths base over the prothorax up to the forehead and then runs sideways to the eyes. This suture is very stable and the larva requires some force to open it. Therefore, dragonfly larvae in many cases have morphological emergence and ecdysial assistances to control these in tearing the suture at a certain location in order to reduce the effort and to open it like a zipper. Among the various species this opening assistance is differently formed. The morphological emergence assistances seem to be divided into three basic variants: a) Damselflies have a mark right above the wing sheaths base with a notch

(emergence mark), which is a tear-point where the thoracic suture may crack safely with less effort. At this incipient crack the overlying suture, which usually is folded like a zipper, then tears. b) Dragonflies with a short abdomen have a kind of flap (emergence flap) which can break during emergence through the underlying thorax which is folded in the shape of a peak. In all exuviae this emergence flap can be observed because the skin structures are altered there (Schroth 2012a, 2013). c) In aeshnids there is still most need for further study, because they are rarely found in large numbers as mature larvae and examination under the microscope is difficult because of their large size. This study aims to clarify if the shape of emergence marks in Zygoptera is typical for different species and families, and if they can be used for species determination especially in damselfly larvae. Therefore, 15 species of Zygoptera occurring in the district of Nuremberg (Middle Franconia) have been studied and compared." (Author)] Address: Schroth, K., Wilhelm-Aschka-Str. 3, 91224 Pommelsbrunn-Hohenstadt, Germany. E-mail: schroth.karlheinz@t-online.de

14839. Seehausen, M. (2014): Exotische Libellen (Odonata) in der Sammlung des Niedersächsischen Landesmuseums Hannover. *Naturhistorica* 156: 29-39. (in German, with English summary) ["The exotic dragonflies and damselflies of the collection at the Lower Saxony State Museum Hanover (NLMH) were determined and catalogued. The 98 specimens in 51 species originate from North and South [America, Africa and Asia. Some specimens were collected by famous pioneers of systematic zoological research in Africa during the 19th Century. Furthermore two specimens of *Chlorogomphus magmficus* are notable: This species - only known from Java and Sumatra - is very rare to find in collections and also photos and figures from free available sources are scarce. Another nice species is one of the largest dragonflies worldwide: *Anotogaster sieboldii* - known for example from China, Japan and Taiwan. Also noteworthy is the exceptionally large number of *Hetaerina* sp. from South America. Unfortunately labels of many specimens are missing, so they are not suitable for scientific examinations." (Author)] Address: Seehausen, M., Museum Wiesbaden Hessisches Landesmuseum für Kunst und Natur, Friedrich-Ebert-Allee 2, 65185 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

14840. Seehausen, M. (2014): *Orthetrum sabina* über den Aquaristikhandel nach Deutschland importiert (Odonata: Libellulidae). *Libellula* 33(1/2): 109-112. (in German, with English summary) ["*Orthetrum sabina* introduced to Germany via aquarium trade (Odonata: Libellulidae) – On 10-iii-2014 a dragonfly larva has been found in a home aquarium in Uedem (North Rhine-Westphalia). It was transferred to the author and emerged on 15-iii-2014, the imago has been identified as a female *O. sabina*. This is the first record for Germany." (Author)] Address: Seehausen, M., Museum Wiesbaden Hessisches Landesmuseum für Kunst und Natur, Friedrich-

Ebert-Allee 2, 65185 Wiesbaden, Germany. E-mail: malte.seehausen@museum-wiesbaden.de

14841. Soedijo, S. (2014): The performance of natural enemy of rice pest in the rice field of farmers field school of integrated pest control in south Borneo. *International Journal of Science and Research* 3(4): 461-465. (in English) ["Research was conducted by considering about the performance of natural enemy of rice pest in the rice field of alumni and non-alumni Farmers Field School of Integrated Pest Control (SLPHT – Sekolah Lapangan Pengendalian Hama Terpadu) in South Borneo. It starts from January to September 2013. Some research locations are included such as Pasar Kamis Village in Banjar District, Guntung Payung Village in Banjarbaru District, and Sungai Rangas in Banjar District." (Author) The list of taxa includes *Agriocnemis fermina* and *Acisoma panorpoides*.] Address: Soedijo, S., Lambung Mangkurat University, Faculty of Agriculture, Achmad Yani Road, South Kalimantan, Indonesia

14842. Stavenga, D.G. (2014): Thin film and multilayer optics cause structural colors of many insects and birds. *Materials Today: Proceedings*. Volume 1, Supplement, 2014: 109-121. (in English) ["Structural effects contribute to the coloration of many animals. Whereas extremely complex structures have evolved, often coloration is due to the most simple structure, namely a thin film. Here we present a number of examples where thin film optics plays a prominent role, namely in insect wings and bird feathers. Most butterfly wing scales have a lower lamina that prominently determines the colour. Damselfly wings (*Hetaerina americana*) with protrusions have reduced thin film reflections. A limited stack of multilayers features also distinct thin film properties, as is shown for feather barbules of the bird of paradise, Lawes' parotia. A simple method to derive the thickness of the wing structures is described." (Authors)] Address: Stavenga, D.G., Computational Physics, Zernike Institute for Advanced Materials, University of Groningen, NL-9747 AG Groningen, the Netherlands. E-mail: d.g.stavenga@rug.nl

14843. Sutton, P.G. (2014): Recent developments regarding the entomological fauna of Corfu (Kerkira). *Antenna* 39(1): 3-14. (in English) [Verbatim: In 2009, following the discovery of a new species of dragonfly for the island, *Selysiothemis nigra*, it was reported that Corfu held a total of 40 species (Sutton, 2009a) and the following comparison was made: Corfu has, by far, the richest odonatan fauna of all the Ionian islands. Only *Coenagrion scitulum* is missing from the Corfu list. In comparison, Kefallonia and Lefkada have 20 species of Odonata, and Zakynthos has 14 species. This situation has now changed, and three new species have been added to the Corfu list: *Coenagrion scitulum*, *Erythromma lindenii*, and *Lindenia tetraphylla*. The former two species, *C. scitulum* and *E. lindenii*, were discovered ... during a survey of Corfu for the exuviae of endemic Odonata species in Greece, in May 2012 (Brochard &

van der Ploeg, 2013a). *C. scitulum* was found at two separate locations: one at a reservoir in the extreme south of the island near Kavos, and the other in the vicinity of some small lakes near Poulades in the Rop a Valley. *E. lindenii* was discovered at the same reservoir as *C. scitulum*, near Kavos. The presence of *S. nigra*, which had been found previously in 2007 (Sutton, loc. cit.) was confirmed by the observation of four larvae and a substantial number (163) of exuviae, but no imagines from this emergence were observed. The paper goes on to describe some of the less frequently seen Odonata of Corfu, providing records for *Gomphus schneiderii*, *Onychogomphus forcipatus*, and *Somatochlora meridionalis*. Of particular importance was the record for *Pyrrhosoma elisabethae*, and the authors state that in spite of their best efforts, this species could only be found at a single site two kilometres south-east of Sidari (Brochard & van der Ploeg, 2013b), with "other locations on Corfu formerly known to hold *P. elisabethae* now so heavily polluted by sewage that it seems improbable that they still hold populations of this species." In the same year *P. elisabethae* had been observed at two different localities on the island, one of which was a well-vegetated spring-fed stream near Dassia to the north of Corfu town (Sutton, 2012a) and at a second site near Vatos, where the source of the three imagines observed was assumed to be the Ropa River and its small tributaries. Sadly, a return visit in October 2013, and a subsequent visit in May 2014, found that the Dassia site had also become heavily polluted with all manner of waste materials including motor vehicle oil containers, and the species could not be refound. For this to have happened, so soon after its discovery at this site was gravely disappointing, but reflects the fact that Greece has yet to recover from a financial situation that has led to the pollution of the countryside with rubbish that the local infrastructure cannot apparently afford to collect. If ever there was a species in desperate need of a champion, it is the Greek Red Damselfly, which is in danger of disappearing without trace before those charged with the stewardship of Corfu's natural riches can come up with an effective strategy to save it from extinction. Brochard & van der Ploeg recorded 30 of the 43 species now known to occur on Corfu, but interestingly, did not report the presence of *Somatochlora flavomaculata*. This species was added to the list by Hämäläinen (1983) when it was described as a species new to Greece, and appears to have been recorded on only three occasions with Hämäläinen's record from Perama in 1981, ... Vatos in 1994 (Lopau, 1999), and ... Lake Korission in 1998 (Butler, 1999). In May 2012, I had the good fortune to share an encounter of an emergence of this species with Bosse and Marie Stille, confirming that it is still present in the vicinity of Vatos. The third species new to the island, *L. tetraphylla*, was reported for the first time when five adult males were found at the Kavos reservoir on 28-vi-2014 (Stille et al. 2014). The authors consider the ecological conditions of the reservoir to be sufficiently favourable to suggest that this species may, in

accordance with observations elsewhere in the Mediterranean, be indigenous to the island.] Address: Sutton, P.G., 2 Fir Tree Close, Flitwick, Beds. MK45 1NZ, UK. E-mail: petersutton@freeuk.com

14844. Tarasova, O.G.; Karygina, N.V. (2014): Zoobenthos of the native riverbed of the Volga River in the conditions of the present oil pollution. Bulletin ASTU. Ser. : Fisheries. 2014(3): 71-77. (in Russian, with English summary) ["The species composition, quantitative indicators of the zoobenthos of the native riverbed of the Volga River were determined. The percentage ratio of number and biomass of the main groups of the benthos has been calculated. Malacostracans (class Crustacea) were the dominant group of zoobenthos, insects (class Insecta) were subdominant. The greatest quantitative indicators were conditioned by the active development of crustaceans and molluscs in 2011 and 2013. The analysis of oil products content in the water and bottom sediments of the studied watercourse has been done. The increase of the concentrations of petroleum hydrocarbons by the average annual values occurred simultaneously with the increase in the number of organisms of benthic fauna. The picture of the spatial distribution was characterized by coincidence of the areas with the elevated levels of petroleum hydrocarbons and quantitative characteristics of the benthos (near villages Zamyany, Nikolskoe). To estimate the intensity of the transition of oil products from the water column into the bottom sediments, using the calculated coefficient of the bottom accumulation, revealed its increase in 2012, which led to the reduction of density and biomass of zoobenthos. The presence of petroleum hydrocarbons in water, in conditions of intensive accumulation of these substances in the bottom sediments, does not have impact on the benthos. Pollution of bottom sediment positively correlates with the number of benthic organisms, and this link is weakened in case of difficult transition of toxins into soils. As a result of the statistical analysis, the presence of relations of different force and direction has been identified after the modernization of data between the investigated parameters. As a result of the researches, it is established that the influence of oil pollution of the water environment on the species composition and quantitative characteristics of the zoobenthos in the conditions of weakening the accumulation of oil products in soils can be negative. Petroleum hydrocarbons can contribute to the growth of benthic organisms in conditions of the moderate pollution of the bottom sediments." (Authors) The list of taxa includes *Orthetrum cancellatum*.] Address: Karygina, Natalia, Caspian Research Institute of Fishery; Senior Researcher of the Laboratory of Water Problems and Toxicology, 414056, Astrakhan, Russia. E-mail: kaspjiinfo@mail.ru.

14845. Tennessen, K.J. (2014): A hybrid male in the Genus *Ophiogomphus* (Odonata: Gomphidae). Insecta Mundi 0367: 1-6. (in English) ["A gomphid male from west-central Wisconsin (Eau Claire County, North Fork Eau Claire River, 11 June 1994, K. J. Tennessen leg) with characters

that are intermediate between *Ophiogomphus carolus* and *O. rupinsulensis* is described and illustrated. The specimen appears to be a hybrid based on intermediate character states of 1) colour pattern (slightly closer to *O. carolus*), 2) hamule morphology (shaped slightly more like those of *O. carolus*), and 3) anal appendage morphology (slightly more like those of *O. rupinsulensis*). (Author)] Address: Tennessen, K., 125 N. Oxford St, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

14846. Thierry, L.; Zawal, A.; Bonte, D.; Stoks, R. (2014): What factors shape female phenotypes of a poleward-moving damselfly at the edge of its range?. *Biological Journal of the Linnean Society* 112: 556-568. (in English) ["Individuals at the expansion front during a climate-driven range expansion are expected to differ phenotypically from those individuals in core populations. Little information is known about the joint, potentially opposing, effects of stressful conditions at the range edge versus evolutionary changes that take place during range expansion in shaping the phenotypes at the range front. We investigated the effect of range expansion on immune function, body condition and flight-related morphology (flight muscle ratio, wing loading, and wing aspect ratio) of field-collected females of the poleward-moving damselfly *Coenagrion scitulum*. Individuals at the expansion front had a lower body condition, which indicated more stressful conditions at the range edge. Despite the counteracting effect of the shorter growth season, the higher flight muscle ratios at the expansion front indicated a strong selection for dispersal ability during range expansion. The current study suggests that models need to incorporate the interplay of stressful conditions and evolutionary processes at the expansion front to arrive at robust predictions of future species distributions under global warming." (Authors)] Address: Thierry, L., Laboratory of Aquatic Ecology, Evolution and Conservation, KU Leuven, Deberiotstraat 32, 3000 Leuven, Belgium. E-mail: Lieven.thierry@bio.kuleuven.be

14847. Tirado Bernat, M. (2014): Primera cita de *Brachytron pratense* (Odonata: Aeshnidae) a la Comunitat Valenciana. *Nemus* 4: 161-163. (in Spanish, with Catalan and English summaries) [Spain, Prat de Cabanes-Torreblanca (40° 14' N, 000° 12' E), 10-IV- 2010.] Address: Bernat, M.T., Gran Avinguda Jaume I 158. 1560 Benicàssim. Castellón, Spain. E-mail: tiradobernat@gmail.com

14848. Torralba-Burrial, A.; Armendariz, C.; Rabina, E.; Llamas, A.; Nores, C. (2014): Confirmación de la reproducción de *Gomphus graslinii* (Rambur, 1844) (Odonata: Gomphidae) y odonatofauna fluvial de los Prepirineos del este de Navarra (N Península Ibérica). *Munibe Ciencias Naturales* 62: 7-23. (in Spanish, with English and Catalan summaries) ["*G. graslinii* is a threatened species included in the Spanish Checklist of Endangered Species and in the Habitats Directive of the European Union. Its Iberian distribution is very fragmented, with scarce populations and records published from the northeastern

quadrant, including two records of adult specimens in Navarra. We searched for this species in 23 reaches of Pre-Pyrenean rivers from Eastern Navarra, and provide date on its reproduction in two reaches of Salazar River. Moreover, other 24 dragonfly species have been found, including *Gomphus simillimus* and *Coenagrion caeruleum*, both considered as Vulnerable in the Atlas and Red Book of the Invertebrates of Spain." (Authors)] Address: Torralba-Burrial, A., Departamento de Biología de Organismos y Sistemas, Universidad de Oviedo, E-33071 Oviedo, Spain. E-mail: antoniotb@hotmail.com

14849. Toubal, O.; Boussehaba, A.; Toubal, A.; Samraoui, B. (2014): Biodiversité méditerranéenne et changements globaux : cas du complexe de zones humides de Guerbès-Senhadja (Algérie). *Physio-Géo* 8: 273-295. (in French, with English summary) ["The Guerbès-Senhadja wetland complex is located in north-eastern Algeria, in water-stressed North Africa, one of the most vulnerable regions to climate change (M. HULME et al., 2001). Although identified as one of the hotspots of biodiversity, and granted a formal protection as a Ramsar site, the ecocomplexe has undergone over the last two decades, fast changes in land use that has left many of its natural habitats heavily impacted and degraded, posing a tough challenge to the sustainable use of its natural resources. As climate change will affect the hydrology of wetlands mostly through changes in precipitation and temperature regimes, we attempted first to investigate warming trend and changes in rainfall patterns in the studied area by comparing these two factors over two periods: 1923-1938 and 1987-2007. Our results are in line with some predictive climatic scenarios which expect temperatures to change in North Africa between 0.2 °C and 0.5 °C per decade (M. HULME et al., 2001). Using remote sensing, we drew up a map of land use and vegetation cover across the studied area as a first step to establish the status of the various ecosystems and to use the map as a tool to assess local ecosystems' resilience to change and to mitigate adverse anthropogenic effects. We also identified factors which are fast eroding the ecological integrity of the study area: human encroachment (urban expansion, fragmentation, etc.), sand quarries, overgrazing, hydrological changes, fires and pollution. We noted that while soil erosion is increasing at low to medium altitudes, wind erosion is gradually silting up the area, including dunary marshes and ponds, thus limiting the carrying capacity of habitats and reducing their biodiversity. The draining of marshes is altering their hydrological functions and is inducing the loss of indigenous and hygrophilous plants, replaced by pyrophilous ones. The dam, located upstream of the study area, is also increasing water pollution by reducing the water flow. In order to stem the increasing erosion of local biodiversity and sustain wetlands resilience (K.L. ERWIN, 2009), steps are urgently needed to provide capacity building to local managers, increase connectivity, maintain hydrology, reduce pollution and control invasive species. The phytoecological diagnostic associated to vegetation and

land use maps can be of tremendous help to the management of the area, its conservation and to the sustainable use of its natural resources in the context of global changes." (Authors) *Acisoma panorpoides* is figured.] Address: Samraoui, B., Laboratoire de recherche et de conservation des zones humides, Université de Guelma, GUELMA, ALGÉRIE et Center of Excellence for Research in Biodiversity, King Saud University, Riyadh, Saudi Arabia. E-mail: samraoui@yahoo.fr

14850. Tschirnhaus, M. von; Borkenstein, A.; Jödicke, r. (2014): *Lestes dryas* (Odonata: Lestidae) und kommensalische Fliegen (Diptera: Chloropidae), mit einer Übersicht über Kleptoparasitismus bei Halmfliegen. *Mercuriale* 14: 1-12. (in German, with English summary) ["A female *Lestes dryas* caught a planthopper and devoured it within ca 9 min. Ca 2 min after initiation of the feeding process the first individuals of *Conioscinella frontella* arrived and partly succeeded in sucking on the planthopper. For the first time we thus report on kleptoparasitic frit flies (Chloropidae) visiting the prey of a member of Odonata. In addition, a planthopper (Auchenorrhyncha) as prey organism of chloropids is reported for the first time as well. The poor knowledge on this apparently old phylogenetic relation „predator-prey-commensalism" is summarized and compared with that of the sister group, namely freeloader flies (Milichiidae). Arthropods with a repellent odor and disgusting taste, if squeezed or preorally digested by predators, are pre-dominantly used by female flies of certain species as a welcome food. It is unknown if this uncommon food promotes egg ripening or an own defense strategy. A rendezvous strategy may play a role as well. Though all recorded predators are robust arthropods, they scarcely struggle against the troublesome kleptoparasites." (Authors)] Address: Tschirnhaus, M. von, Fakultät Biologie, Universität Bielefeld, Postfach 100117, 33619 Bielefeld m.tschirnhaus@uni-bielefeld.de

14851. Umbers, K.D.L.; Fabricant, S.A.; Gawryszewski, F.M.; Seago, A.E., Herberstein, M.E. (2014): Reversible colour change in arthropoda. *Biological Reviews* 89(4): 820-848. (in English) ["The mechanisms and functions of reversible colour change in arthropods are highly diverse despite, or perhaps due to, the presence of an exoskeleton. Physiological colour changes, which have been recorded in 90 arthropod species, are rapid and are the result of changes in the positioning of microstructures or pigments, or in the refractive index of layers in the integument. By contrast, morphological colour changes, documented in 31 species, involve the anabolism or catabolism of components (e.g. pigments) directly related to the observable colour. In this review we highlight the diversity of mechanisms by which reversible colour change occurs and the evolutionary context and diversity of arthropod taxa in which it has been observed. Further, we discuss the functions of reversible colour change so far proposed, review the limited behavioural and ecological data, and argue that the field requires phylogenetically controlled approaches to understanding the evolution of

reversible colour change. Finally, we encourage biologists to explore new model systems for colour change and to engage scientists from other disciplines; continued cross-disciplinary collaboration is the most promising approach to this nexus of biology, physics, and chemistry." (Authors) References to Odonata are documented in Table 1] Address: kate_umbers@uow.edu.au

14852. Vamosi, J.C.; Armbruster, W.S.; Renner, S.S. (2014): Evolutionary ecology of specialization: insights from phylogenetic analysis. *Proc. R. Soc. B* 281: 20142004. <http://dx.doi.org/10.1098/rspb.2014.2004>: 7 pp. (in English) ["In this Special feature, we assemble studies that illustrate phylogenetic approaches to studying salient questions regarding the effect of specialization on lineage diversification. The studies use an array of techniques involving a wide-ranging collection of biological systems (plants, butterflies, fish and amphibians are all represented). Their results reveal that macroevolutionary examination of specialization provides insight into the patterns of trade-offs in specialized systems; in particular, the genetic mechanisms of trade-offs appear to extend to very different aspects of life history in different groups. In turn, because a species may be a specialist from one perspective and a generalist in others, these trade-offs influence whether we perceive specialization to have effects on the evolutionary success of a lineage when we examine specialization only along a single axis. Finally, how geographical range influences speciation and extinction of specialist lineages remains a question offering much potential for further insight." (Authors) The paper includes a reference to Odonata.] Address: Vamosi, J.C., Dept of Biological Sciences, Univ. Calgary, Calgary, Alberta, Canada T2L 0Z3. E-mail: jvamosi@ucalgary.ca

14853. Vieira Damaceno, I.; Buys, S.C.; Carriço da Silva, C.; Ferreira Martins, R. (2014): Inventory of Odonata (Insecta) along the margins of the river Dois de Setembro, municipality of Ecoporanga, northwest of Espírito Santo State. *A. Bol. Mus. Biol. Mello Leitão* (N. sér.) 33: 25-33. (in Portuguese, with English summary) ["An inventory of Odonata collected at the margins of the river Dois de Setembro (municipality of Ecoporanga, northwest of Espírito Santo State) is provided. The fieldwork was carried out from June 2011 to February 2012, in five sites along the margins of the river, including environments with distinct antropization degrees. The specimens were collected with insect aerial nets. A total of 421 specimens were collected, representing 19 species and 15 morphotypes. The species more frequently found are *Erythrodiplax basalis*; *Erythrodiplax umbrata*; *Hetaerina auripennis*; *Perithemis lais*. The occurrence of the following species is recorded for the first time from the State of Espírito Santo: *Acanthagrion cuyabae*; *Enallagma novaehispaniae*; *Lestes forficula*. A population of the endangered species *Leptagrion capixabae* was found." (Authors)] Address: Vieira Damaceno, I., Programa de Iniciação Científica, Escola São Francisco de Assis (ESFA), Santa Teresa, ES, Brazil. E-mail: ivanivida@gmail.com

14854. Walia, G.; Chabal, S. (2014): Distribution of constitutive heterochromatin and nucleolar organizer regions in two species of family Gomphidae (Odonata: Anisoptera). *The Nucleus* 57(3): 223-227. (in English) ["Spermatogonial and primary spermatocyte chromosomes of *Paragomphus lineatus* and *Nepogomphus modestus* have been described on the basis of C-banding and NOR staining. Both the species possess $2n$ (males) =23, n (male) =12 without m chromosomes with XO(male)/XX(female) type sex determining mechanism. The sex chromosome is the largest element in the whole complement in *P. lineatus* but it is medium sized in *N. modestus*. In *P. lineatus*, all the autosomal bivalents possess terminal C-bands while X chromosome is C-positive throughout the length but lightly stained in the centre. Similarly, terminal NOR bands are present on all the autosomal bivalents and X chromosome shows terminal NOR bands with large interstitial band. In *N. modestus*, all the autosomal bivalents except one bivalent possess terminal C-bands while X chromosome represents large C-positive region on one end and small C-negative region on the other end. NOR staining shows terminal / non terminal NOR bands on some autosomal bivalents while X chromosome possesses dark NOR band only on one end." (Authors)] Address: Kaur Walia, Gurinder, Department of Zoology and Environmental Sciences, Punjabi University, Patiala, 147002, India. E-mail: gurinderkaur_walia@yahoo.co.in

14855. Wezel, A.; Oertli, B.; Rosset, V.; Arthaud, F.; Leroy, B.; Smith, R.; Angélibert, S.; Bornette, G.; Vallod, D.; Robin, J. (2014): Biodiversity patterns of nutrient-rich fish ponds and implications for conservation. *Limnology* 15(3): 213-223. (in English) ["Nutrient-rich water bodies are usually expected to host low species richness at the local scale (water body). Nevertheless, they can support a diverse and sometimes unique biodiversity when diversity is considered at a regional scale. This discrepancy between the two scales is well documented for natural water bodies, but little is known about biodiversity of artificial water bodies, like fish ponds. We hypothesise that nutrient-rich water bodies can collectively host high species richness at the regional scale. Thus, these are important ecosystems for the regional conservation of biodiversity. We investigated 84 fish ponds in the Dombes region, France, with five taxonomic groups: macrophytes, phytoplankton, macroinvertebrates, dragonflies, and amphibians. Species richness patterns were determined for a. (single pond), β . (between ponds), and γ . (regional pond network) levels. For most studied species groups, richness per fish pond and at the regional level proved to be relatively high in comparison with natural ponds in other landscapes. Contribution of α -diversity to regional diversity was highest for dragonflies with 41 %, and lowest for amphibians and macrophytes with 16 and 18 %, respectively. For macroinvertebrate families and phytoplankton genera it was intermediate. Contribution of β -diversity to regional diversity was similar for all species groups with 22–25 %. Furthermore, some ponds hosted a large number of less frequent species and some endangered species, indicating that the

conservation of biodiversity of fish ponds must be established at a regional scale." (Authors)] Address: Wezel, A., Department of Agroecology and Environment, ISARA Lyon, 23 rue Jean Baldassini, 69364, Lyon Cedex 07, France. E-mail: wezel@isara.fr

14856. Wijayathilaka, N.; Abayalath, N.; Bandara, C. (2014): Observation of the Vagrant Emperor (*Anax ephippiger*, Odonata, Aeshnidae) in Sri Lanka after 38 years. *Ceylon Journal of Science* 43(2): 83-84. (in English) ["*A. ephippiger* is a widespread dragonfly species whose range extends from Sri Lanka and India through Africa to the Mediterranean region and Europe. However, the species is previously known only from two sightings in Sri Lanka. Thirty-eight years after the last sighting of the species, the authors photographed a male *A. ephippiger* on 3rd of November, 2008 around 4.00 pm." (Authors)] Address: Wijayathilaka, Nayana, Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka

14857. Wünsch, H.-W.; Gospodinova, H. (2014): *Anax imperator* stürzt nach einer Attacke aufs Wasser und schwimmt ans Ufer (Odonata: Aeshnidae). *Libellula* 33(1/2): 57-62. (in German, with English summary) ["*Anax imperator* falls after being attacked on the water surface and swims to the shore (Odonata: Aeshnidae) – On 2 September 2013 at a pond near Kerpen, Erftkreis, North Rhine-Westphalia, Germany, we observed an attack on a female of *Anax imperator* after its oviposition by a male of *Aeshna mixta*. After the subsequent crash onto the water surface the female of *A. imperator* could save itself swimming over a distance of about five meters in safety to a tree. The observation was partially documented by photos." (Authors)] Address: Gospodinova, H., Am Burgberg 11, 50126 Bergheim, Germany. E-mail: willi@waldschrat-online.de

14858. Wünsch, H.-W.; Gospodinova, H. (2014): Beobachtungen zum Beutefangverhalten von *Brachytron pratense* unter Zuhilfenahme eines Spinnennetzes (Odonata: Aeshnidae, Corduliidae; Araneidae). *Mercuriale* 14: 61-64. (in German, with English summary) ["On the observation of *B. pratense* preying *Cordulia aenea* with the aid of a spider's web. (Odonata: Aeshnidae, Corduliidae; Araneidae). In the morning of 8 June 2013 we observed an attack of a male of *B. pratense* against a male of *Cordulia aenea*. Thereby *B. pratense* utilized apparently a web of an araneid to complete its attack. This predation was documented by photos." (Authors)] Address: Wünsch, H.-W., Am Burgberg 11, 50126 Bergheim, Germany. E-mail: willi@waldschrat-online.de

14859. Wünsch, H.-W.; Gospodinova, H. (2014): Sitzende Eiablage von *Sympetrum striolatum* bei spätherbstlicher Kälte (Odonata: Libellulidae). *Mercuriale* 14: 39-42. (in German, with English summary) ["Perching oviposition in *S. striolatum* at low temperature in late autumn (Odonata: Libellulidae) - On 04-xi-2013 an unguarded female of

S. striolatum perched on a reed near water level and oviposited with immersed vulvar scale and whirring wings. This unusual behaviour we had repeatedly observed before but documented it by photos for the first time. We interpret perching oviposition in this species as a reaction on low temperatures in late autumn, probably in relation to growing exhaustion." (Authors)] Address: Wünsch, H.-W., Am Burgberg 11, 50126 Bergheim, Germany. E-mail: willi@waldschrat-online.de

14860. Yeoman, K. (2014): Effect of dragonfly nymph presence and conspecific larvae density on oviposition response of the invasive Asian Tiger Mosquito (*Aedes albopictus*). MSc. thesis, Faculty of The Graduate School, The University of North Carolina at Greensboro: 63 pp. (in English) ["Oviposition site selection is a critical fitness enhancing decision for container breeding insects. Predators have typically been shown to repel gravid females whereas conspecifics have been shown to be attractive at low-intermediate densities but repellent at high densities resulting in hump-shaped relations. The interaction of these two factors has, unfortunately, rarely been studied. In this study, I addressed this question by testing the effect of dragonfly nymphs as larval predators, conspecifics, and their combination on the oviposition response of *Aedes albopictus* mosquitoes. I expected a negative effect of predators, a hump-shaped effect of conspecifics, and a rightward shift in the peak of the hump in the presence of larval predators. I used three levels (0, 1, 3) of caged Odonata nymphs and a range of predetermined conspecific larvae numbers (0, 10, 50, 100, 300, 500). I used two experimental designs: (1) Six 3-by-6 oviposition traps grids each containing all 18 predator-by-larvae combinations; (2) Three transects containing 12 pairs of oviposition traps with both cups containing a similar number of larvae, but one containing a given level (0, 1, 3) of caged nymphs. In the latter, I also cultured a sample of the water medium to evaluate bacterial concentration. Hump-shaped relations of egg number with conspecifics was observed at the grid design for the one nymph level and for the transect design at nymph level zero. The effect predator level on oviposition response was either non-significant or, unexpectedly positive. Due to increased larval mortality in the predator cups, I could not evaluate the third hypothesis concerning the combined effect of conspecifics and predators. Bacterial concentration was negatively associated with number of eggs laid. The absence or positive effect of dragonfly nymphs on *Ae. albopictus* oviposition response is encouraging in terms of its usage as a biocontrol agent for container breeding mosquitoes which in combination with low-intermediate levels of conspecifics could be attractive to gravid female mosquitoes. Their offspring, in turn, will be decimated by the control agent." (Author)] Address: not stated

14861. Zessin, W. (2014): Buchbesprechung: BAUMANN, K. & J. MÜLLER (2014): Die Libellen des Nationalparks Harz. Schriftenreihe aus dem Nationalpark

Harz – Band 11, Nationalpark Harz. Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 17(1): 79-[Review of a book on the regional odonate fauna of the Harz region, Sachsen-Anhalt and Niedersachsen, Germany] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

14862. Zessin, W. (2014): Buchbesprechung: BÖNSEL, A. & M. FRANK (2013): Verbreitungsatlas der Libellen Mecklenburg-Vorpommerns. Natur + Text, Rangsdorf. Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 17(1): 78. (in German) [Review of the distribution atlas of the Odonata of Mecklenburg-Vorpommern, Germany.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

14863. Zessin, W. (2014): Libellenkundliche (Odonata) Untersuchung am renaturierten Kraaker Mühlbach und Kraaker Kiesgruben-Waldsee, Landkreis Ludwigslust-Parchim, Mecklenburg. Virgo, Mitteilungsblatt des Entomologischen Vereins Mecklenburg 17(1): 53-55. (in German) [Germany; 31 odonate species were recorded between 2009 and 2014. The species are checklisted.] Address: Zessin, W., Lange Str. 9, D-19230 Jasnitz, Germany. E-mail: zessin@zoo-schwerin.de

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14864. Abbingh, G.J.R. (2015): Ruby Whiteface *Leucorhinia rubicunda* as a prey of a Tiger Beetle larva (*Cicindela* sp.). *Brachytron* 17(1): 44-46. (in Dutch, with English summary) ["On May 30, 2008 a male *L. rubicunda* was found with its abdomen in a small burrow in the Fochteloërveen peat bog. It had been caught by a larva of a tiger beetle (*Cicindela* sp.) that had pulled the abdomen of the dragonfly into its burrow and sucked its prey empty." (Author)] Address: Abbingh, G., Lange Hout 6, 9408 DB Assen, The Netherlands. E-mail: g.abbingh@home.nl

14865. Abbott, J.C. (2015): *Dragonflies of Texas: A Field Guide*. The University of Texas Press: 466 pp. (in English) ["Including nearly half of all dragonfly species found in North America, here is the definitive field guide to the dragonflies of Texas, which will be a valuable resource for naturalists throughout the region. Texas hosts 160 species of dragonflies, nearly half of the 327 species known in North America, making the state a particularly good place to observe dragonflies in their natural habitats. *Dragonflies of Texas* is the definitive field guide to these insects. It covers all 160 species with in situ photographs and detailed anatomical images as needed. Each species is given a two-page spread that includes photographs of both sexes and known variations when possible, key features, a distribution map, identification, discussion of similar species, status in Texas, habitat, seasonality, and general comments. Many of the groups

also have comparative plates that show anatomically distinctive characteristics. In addition to the species accounts, John Abbott discusses dragonfly anatomy, life history, conservation, names, and photography. He also provides information on species that may eventually be discovered in Texas, state and global conservation rankings, seasonality of all species in chronological order, and additional resources and publications on the identification of dragonflies. 470 pages, colour photos, distribution maps." (Publisher) - See more at: <http://utpress.utexas.edu/index.php/books/abbott-dragonflies#sthash.RsVpP80q.dpuf> Address: <http://utpress.utexas.edu/index.php/books/abbott-dragonflies>

14866. Adriaens, T.; De Knijf, G. (2015): A first report of introduced non-native damselfly species (Zygoptera, Coenagrionidae) for Belgium. *Belg. J. Zool.* 145(1): 76-80. (in English) ["One *Ischnura senegalensis* individual emerged from a small home aquarium (28 litre, 28 °C) in Buggenhout (East Flanders) on 19 March 2013. This animal died five days later. The aquarium was used for rearing Betta fish and contained some waterplants. ... Two *Pseudagrion microcephalum* larvae were observed in an aquarium (240 litre, 25 °C) of a private house in Opitter (Limburg, Flanders) from November 2011. The aquarium was designed to represent an Asian freshwater habitat. The materials for aquascaping had been ordered online ..."] (Authors)] Address: Adriaens, T., Research Institute for Nature and Forest (INBO), Kliniekstraat 25, B-1070 Brussels, Belgium. E-mail: im.adriaens@inbo.be

14867. Aulio, K. (2015): Kokemäenjoki River Delta, western Finland – Natural treasury in an exceptionally rapidly changing aquatic environment. *International Letters of Natural Sciences* 32: 36-53. (in English) ["The catchment of the River Kokemäenjoki covers ca. 27 100 square kilometers in western Finland, and the length of the river is ca 120 km. The river discharges into the Bothnian Bay, the northern section of the Baltic Sea. The delta is changing and prograding towards the sea exceptionally rapidly. The pace of the growth of the deltaic formations, as well as the major zones of the macrophytic vegetation is nowadays some 30–40 meters a year. This makes the delta the most rapidly changing aquatic and littoral ecosystem in the Northern Europe. The Kokemäenjoki River delta is often characterized as a biological hotspot, and major sections of the estuary are included in several leading international nature conservation programmes, i.e. The Natura 2000 network of the European Union, the intergovernmental The Ramsar Convention on Wetlands, as well as in the IBA, Important Bird Area programme established by the BirdLife International organization. The diversities of both flora and fauna are very high – at least as regards the northern location of the estuary. ... Of the invertebrates, the species composition of dragonflies (Odonata) is best known. There are 25 species of the 55 dragonfly taxa found in Finland. ... The present paper summarizes the data presented in various reports, mainly in Finnish, and majority of them in hardly

accessible depositories." (Author)] Address: Aulio, K., Lankakatu 3 D 16, FI-20660 Littoinen, Finland. E-mail: kai.aulio@gmail.com

14868. Balk, A.; Cassée, E. (2015): Photographic report of a cannibalistic Great emperor (*Anax imperator*). *Brachytron* 17(1): 40-43. (in Dutch, with English summary) ["On June 11th 2014 the authors observed cannibalism among two adult females of *A. imperator* in the 'Amsterdamse Waterleidingduinen' (the Netherlands). We provide a photographic report of this event. Great Emperor normally preys on flying insects smaller than themselves. Cannibalism is unusual for animals the same size since it involves a risk to the predator. One theory suggests that miscommunication between two conspecifics can lead to cannibalism. This way, the female could have mistaken the other individual for a male with mating intentions. This observation confirms opportunistic feeding habits of the species." (Authors)] Address: Balk, Anne, Kievitstraat 36, 2025 ZJ Haarlem, The Netherlands. E-mail: anne.balk@hotmail.com

14869. Barling, N.; Martill, D.M.; Heads, S.W.; Gallien, F. (2015): High fidelity preservation of fossil insects from the Crato Formation (Lower Cretaceous) of Brazil. *Cretaceous Research* 52, Part B: 605-622. (in English) ["Fossil insects from the Lower Cretaceous (Aptian) Crato Formation of north-east Brazil are preserved as goethite replacements in laminated limestones of lacustrine-lagoonal origin. They display remarkable degrees of morphological detail down to the macromolecular level in some examples. We document the fidelity of preservation and reveal an astonishing variety of morphological detail comparable in some instances with that found in amber inclusions." (Authors) Photomicrographs of Crato Formation insects with colour patterns and structural iridescence preserved include the damselfly *Parahemiphysalia mickoleiti* (SMNS66558) showing structural iridescence.] Address: Barling, N., School of Earth and Environmental Sciences, University of Portsmouth, Burnaby Building, Burnaby Road, Portsmouth PO1 3QL, UK. E-mail: nathan.barling@port.ac.uk

14870. Barnard, A.; Fincke, O.; Shields, M.; Xu, M. (2015): Melanic individuals in color polymorphic *Enallagma* damselflies result from phenotypic, not genetic, variation. *International Journal of Odonatology* 18(1): 3-14. (in English) ["Genetically determined colour polymorphisms have a long history in the study of evolutionary change acting on populations. The Odonata exhibit relatively high levels of sex-specific colour polymorphisms in mature adults. In *Ischnura* and *Coenagrion*, female-specific polymorphisms are known to be controlled by Mendelian genes. Nearly half of *Enallagma* species have polymorphic females, but the inheritance of any has yet to be determined. Our aims here were to determine: (1) the inheritance of the colour polymorphism in *E. hageni*; and (2) inherent reproductive characteristics of blue female andromorphs and green heteromorphs reared under

controlled conditions as teneral. Maternal morphs, which developed normal coloration in field enclosures within a week, did not differ in copulation time or clutch size, and their offspring did not differ in sex ratio or survivorship to emergence. Surprisingly, no laboratory-reared offspring developed normal mature coloration. Rather, the initially pale parts of the thorax and abdomen, that normally would turn either blue or green, became melanised. Black novel phenotypes also developed in adults of *E. civile*, *E. anna*, *E. carunculatum*, and *E. annexum* that as larvae or teneral adults were reared to sexual maturity under greenhouse conditions that differed from the laboratory conditions used to rear *E. hageni*. We hypothesize that the phenotypic plasticity in body coloration documented in *Enallagma* results from the quality of UV radiation experienced as a sexually immature adult, which is known to affect melanization in other insects. These examples in *Enallagma* offer insights into the origin of colour novelty in Odonata." (Authors)] Address: Finke, O.M., Dept Zool., Univ. Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: fincke@ou.edu

14871. Bedê, L.C.; Machado, A.B.M.; Piper, W.; de Souza, M.M. (2015): Odonata of the Serra de São José – Brazil's first Wildlife Reserve aimed at the conservation of dragonflies. *Notulae odonatologicae* 8(5): 117-127. (in English) ["Surveys of the odonate fauna of the Serra de São José were carried out between 1996 and 2012, resulting in records of 128 species, including 49 Zygoptera and 79 Anisoptera, grouped in 10 families and 53 genera, with seven new species records for the state of Minas Gerais. The high species richness can be attributed to the existence of a varied set of natural and artificial freshwater biotopes, placed in distinct physiographic contexts along a contact zone between Brazil's Atlantic Forest and Cerrado hotspots. This area figures as a priority site for biodiversity conservation in the State of Minas Gerais, and in 2004 became Brazil's first protected area dedicated to the conservation of odonates and their freshwater habitats." (Authors)] Address: Bedê, L.C., Instituto Terra Brasilis, Rua Bueno Brandão 405, 31010-060 Belo Horizonte, MG, Brazil. E-mail: luciobede@terrabrasilis.org.br

14872. Bennett, D.M.; Dudley, T.L.; Cooper, S.D.; Sweet, S.S. (2015): Ecology of the invasive New Zealand mud snail, *Potamopyrgus antipodarum* (Hydrobiidae), in a Mediterranean-climate stream system. *Hydrobiologia* 746: 375-399. (in English) ["*P. antipodarum*, is a widely distributed non-native species of management concern on four continents. In a southern California stream, *P. antipodarum* abundance, which ranged from ca. <10 to nearly 150,000 snails m², was related to discharge and temperature patterns. Laboratory experiments indicated that *P. antipodarum* (1) survivorship decreased from 13 to 27°C, but its growth rate was higher at 13 and 20°C than 27°C; (2) grazing rates were similar to those of native algivores in short-term trials; (3) grazing impact was

greater than that of a native hydrobiid snail in longer-term trials; (4) ingested different diatom sizes than some other grazers; (5) reduced the abundances of medium-sized and large diatoms, and several filamentous cyanobacteria and chlorophytes, while increasing the relative abundances of tough filamentous chlorophytes (e.g., *Cladophora*); (6) impact on other grazing invertebrates was species specific, ranging from competition to facilitation; (7) reduced the survivorship of *Anaxyrus boreas* tadpoles; and (8) was consumed by non-native *Procambarus clarkii* and naiads of *Aeshna* and *Argia*. Ecological effects of introduced *P. antipodarum* are subtle, occurring primarily at transitory high densities, but flow regulation may enhance their effects by eliminating high flows that reduce their population sizes. Large crayfish (*Procambarus clarkii*[10 cm) had the highest predation rates on New Zealand mud snails followed by medium *Procambarus* (5–10 cm), the dragonfly *Aeshna walkeri*, and small *Procambarus* (5 cm) (Fig. 13). The damselfly *Argia vivida* also had predator impact indices significantly different from zero, but other taxa only consumed mud snails sporadically (*Protochauliodes*, *Cordulegaster dorsalis*, *Octogomphus specularis*, *Notonecta hoffmanni*, *Drunella* sp., *Paltothemis lineatipes*) or not at all (*Rhyacophila* sp., *Isoperla* sp., *Lepidostoma* sp. *Gumaga nigricula*." (Authors)] Address: Bennett, Danuta, Marine Science Institute, University of California, Santa Barbara, CA, 93106, USA. E-mail: danutabennett@gmail.com

14873. Birdwatch (2015): International partnership aids wildlife conservation in Iraq. *World Birdwatch* 37(1): 3. (in English) ["Now that mobile phones are widespread, a citizen science project to study butterfly and dragonfly distribution was launched last autumn. Enthusiastically received, photos of these two insect groups are now being sent for identification from all over Iraq." (Author)] Address: not stated

14874. Booth, A.J.; Moss, S.; Weyl, O.L.F. (2015): Effect of rotenone on gill-respiring and plastron-respiring insects. *African Journal of Aquatic Science* 40(1): 95-100. (in English) ["Rotenone, a commonly-used piscicide, interferes with the cellular respiration of aquatic vertebrates and invertebrates by preventing the uptake of oxygen. While dose-response relationships have been developed for fish, there are limited comparative data available on aquatic insects that respire either with tracheal gills or with a plastron – a thin layer of air trapped by hairs on the exterior of the body. This study assesses the temperature-dependent toxicity of rotenone to gill-respiring aquatic insects, family Coenagrionidae, and plastron-respiring aquatic insects, family Corixidae, at concentrations that are lethal to Mozambique tilapia *Oreochromis mossambicus*. Both groups of insects were found to be differentially susceptible to rotenone, with survival decreasing as functions of both increased concentration and temperature. The dose-response relationship of Mozambique tilapia was found to be similar to that of other fishes, with 100% mortality achieved at 0.025 mg l⁻¹ at both 20°C and 28°C.

At this concentration, mortality in gill-respiring insects after 48h was 10% at 20°C and 28% at 28°C, which was higher than that of plastron-respiring insects, being 2% and 7% at the same temperatures. At higher concentrations (0.05–0.10 mg l⁻¹), however, mortality of both gill. (>50%) and plastron-respiring (>10%) insects became substantial." (Authors)] Address: Booth, A.J., Dept Ichthyology & Fisheries Science, Rhodes Univ., Grahamstown, South Africa. E-mail: t.booth@ru.ac.za

14875. Brochard, C.; van der Ploeg, E. (2015): The Desert Darter (*Sympetrum sinaiticum*): a mysterious species. *Brachytron* 17(1): 47-54. (in Dutch, with English summary) ["*S. sinaiticum* was described as a new species in 1977. Almost 20 years later, the larva was described, based on several exuviae. The living larvae had never been caught until 2014. During our travel through Spain in June 2014, we managed to catch several larvae in different stages of development. We photographed the larvae for the first time in history. Even in the field they are easily identified, because of the absence of dorsal spines and the presence of long lateral spines on segment 9 and shorter lateral spines on segment 8." (Author)] Address: Brochard, C., Marsstraat 77, 9742EL Groningen, The Netherlands. E-mail: info@cbrochard.com

14876. Bucciarelli, G.M.; Kats, L.B. (2015): Effects of newt chemical cues on the distribution and foraging behavior of stream macroinvertebrates. *Hydrobiologia* 749: 69-91. (in English) ["Many amphibians possess noxious or toxic substances for self defense. These compounds have been characterized largely as chemical defenses, but may promote ecological and evolutionary processes. The California newt, *Taricha torosa*, possesses a potent neurotoxin, tetrodotoxin (TTX), which serves as a chemical defense, chemical cue to conspecifics, and selection pressure that has selected for evolved resistance in a predator. However, the potential effects of TTX upon the broader community and on behaviour, in general, have been overlooked. Field assays conducted during the newt breeding season indicate that the macroinvertebrate community responds to adult newt chemical cues by altering foraging behaviour. In these assays, significantly fewer macroinvertebrates were found in experimental areas with enclosed newts relative to enclosures with a non-predatory amphibian. Laboratory bioassays showed that dragonfly nymphs (*Anax junius*) reduced predatory behaviour and moved less in the presence of adult newt chemical cues. When exposed to TTX, nymph mean angular velocities were reduced four fold and mean velocity magnitude was reduced threefold relative to controls. Overall, these results support the hypothesis that chemical stimuli from predators, and TTX specifically, can shape species interactions at lower trophic levels and potentially affect community organization." (Authors)] Address: Bucciarelli, G. M., Dept Ecol. & Evol. Biol., Univ. California, Los Angeles, Los Angeles, CA, 90095, USA. E-mail: garyb@ucla.edu

14877. Buczyński, P.; Górka, M.; Buczyńska, E. (2015): Has *Aeshna viridis* Eversmann, 1836 (Odonata: Aeshnidae) really disappeared from southern Poland (East-Central Europe)? *Polish Journal of Entomology* 84(1): 33-47. (in English) ["50-100 years ago the southern boundary of the distribution area of *A. viridis* ran through southern Poland. However, no records of this species from this area have been reported since then. The species is therefore considered as having retreated northwards. The present research disclosed three new sites of *A. viridis* on the edge of or just beyond its historical distribution area: one in south-western Poland (Trestno: 51°04'N, 17°08'E) and two in the south-east of the country (Kraciczyn: 49°46'N, 22°38'E, Bolestraszyce: 49°49'N, 22°51'E). All the sites were anthropogenic. This demonstrates the survival of a number of populations and the formation of new ones in water bodies formed de novo or to which *Stratiotes aloides* was introduced artificially. This suggests that the conservation of *A. viridis* is possible in this region." (Authors)] Address: Buczyński, P., Maria Curie-Skłodowska University in Lublin, Dept of Zoology, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

14878. Buggenum, H.J.M. van; Geraeds, R.P.G. (2015): An ecological analyses of the Middelsgraaf brook (NL), a canalized low land stream, based on the presence of dragonflies. *Brachytron* 17(1): 3-15. (in Dutch, with English summary) ["The presence and distribution of the Odonata along the Middelsgraaf, a small canalized lowland stream in the Dutch province of Limburg, was studied during the period 2008-2012. Based on the occurrence and abundance of dragonflies along 24 transects of 250 meters each (e.g. wide spread, presence of larvae or exuviae or numbers of adults) we determined 20 species as resident and 10 species as nonresident (wanderers/migrants). Recently a method was developed to use the habitat preferences of the macrofauna species for the characterisation of streams, lakes and other water bodies. Since the regional water authority Roer and Overmaas monitored both water quality and macro-fauna of the Middelsgraaf brook, we were able to compare the results of three different approaches. In our situation it turned out that the stocktaking of the adult dragonflies indicates more or less the same habitat characteristics and water quality as the whole macro-fauna community. Furthermore the indications for the water quality are the same as the ones that are actually measured. So monitoring dragonflies is a simple method that can be used, for example, to characterize water bodies and to investigate habitat differences between brooks, local situations and external aspects that have an influence on the occurrence of dragonflies." (Authors)] Address: Geraeds, R., Rijksweg Noord 280, 6136 AH Sittard, The Netherlands. E-mail: rob.geraeds@kpnplanet.nl

14879. Chapman, J.W.; Reynolds, D.R.; Kenneth Wilson, K. (2015): Long-range seasonal migration in insects: mechanisms, evolutionary drivers and ecological

consequences. *Ecology Letters* 18(3): 287-302. (in English) ["Myriad tiny insect species take to the air to engage in windborne migration, but entomology also has its 'charismatic megafauna' of butterflies, large moths, dragonflies and locusts. The spectacular migrations of large day-flying insects have long fascinated humankind, and since the advent of radar entomology much has been revealed about high-altitude night-time insect migrations. Over the last decade, there have been significant advances in insect migration research, which we review here. In particular, we highlight: (1) notable improvements in our understanding of lepidopteran navigation strategies, including the hitherto unsuspected capabilities of high-altitude migrants to select favourable winds and orientate adaptively, (2) progress in unravelling the neuronal mechanisms underlying sun compass orientation and in identifying the genetic complex underpinning key traits associated with migration behaviour and performance in the monarch butterfly, and (3) improvements in our knowledge of the multifaceted interactions between disease agents and insect migrants, in terms of direct effects on migration success and pathogen spread, and indirect effects on the evolution of migratory systems. We conclude by highlighting the progress that can be made through inter-phyla comparisons, and identify future research areas that will enhance our understanding of insect migration strategies within an eco-evolutionary perspective." (Authors) The publication includes references to *Pantala flavescens*.] Address: Chapman, J.W., AgroEcology Department, Rothamsted Research, Harpenden, Hertfordshire, AL5 2JQ, UK. E-mail: jason.chapman@rothamsted.ac.uk

14880. Córdoba-Aguilar, A.; González-Tokman, D.; Nava-Bolaños, A.; Cuevas-Yáñez, K.; Rivas, M.; Nava-Sánchez, A. (2015): Female choice in damselflies and dragonflies. In: Peretti, A.V. & A. Aisenberg (eds.): *Cryptic female choice in arthropods. Patterns, mechanisms and prospects*. Springer: 239-253. (in English) ["Odonates have been frequently labeled as a taxa where males control female's mating and fertilization decisions. Contrary to this position, in our contribution, we review instances where females can actually show choice of mates. Previous to mating, possible selected male traits are wing pigmentation, ability to defend oviposition sites, body color, and temperature. Females may assess male stimulation during copulation, responding via sperm ejection of previous males' sperm. Benefits females may derive from choosing males that can affect offspring are as follows: an increased ability to withstand pathogen infections (for both male and female offspring) or ability to stimulate, attractiveness, and fighting ability (for male offspring only). Finally, we discuss that even for traits that clearly seem to control female reproductive decisions, i.e., abdominal claspers, there is no conclusive evidence that shows that they have evolved and are maintained via male-male competition. Our review thus emphasizes that we are far from admitting that females have little or no reproductive control in this taxa." (Authors)] Address:

Córdoba-Aguilar, A., Depto de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

14881. Csabai, Z.; Boda, P.; Boda, R.; Bódis, E.; Danyik, T.; Deák, C.; Farkas, A.; Kálmán, Z.; Lökkös, A.; Málnás, K.; Mauchart, P.; Móra, A. (2015): Aquatic macroinvertebrate fauna of the Kis-Sárrét nature protection area with first records of five species from Hungary. *Acta Biol. Debr. Oecol. Hung.* 33: 9-70. (in English, with Hungarian summary) ["The Kis-Sárrét is one of the most diversified and most precious protected areas of the Körös-Maros National Park, but so far, our knowledge about its aquatic macroinvertebrate fauna was far from exhaustive, and only 163 species have been known. In this study, our aim was to explore the aquatic macroinvertebrate fauna in detail and to compile the annotated checklist of aquatic macroinvertebrates of the area. Thorough faunistical samplings were made in three consecutive years (2012-2014) in three seasons (spring, summer and autumn) in each year at a total of 151 sampling points. Altogether 33 892 individuals belonging to 441 species (... 30 Odonata, ...) were identified. The relatively high numbers of species were impressive in themselves, but the composition was much more surprising. Nearly a quarter of the species (110 of 441, 24.9%) could be highlighted in various aspects. Five species were found in Hungary for the first time..., nine species are protected or IUCN red listed (... *Aeshna isosceles*, *Libellula fulva*, *Leucorrhinia pectoralis*, ...), further 94 species are rare or extremely rare in Hungary (e.g. ... *Erythromma lindenii*, ...), or their occurrences in a lowland area are surprising The faunal composition is an interesting mixture of typical marshland species, acidophil bog-dwelling elements and characteristic species of unique slow-flowing, densely vegetated lowland streams." (Authors)] Address: Csabai, Z., University of Pécs, Faculty of Sciences, Institute of Biology, Department of Hydrobiology, Ifjúság útja 6, H-7624 Pécs, Hungary. E-mail: csabai@gamma.ttk.pte.hu

14882. Cucco, M. (2015): Nuova segnalazione di *Leucorrhinia dubia* (Vander Linden, 1825) nelle Alpi Graie (Insecta, Odonata). *Rivista piemontese di Storia naturale* 36: 77-87. (in Italian, with English summary) ["The presence of *L. dubia* at Lac Falin near Usseglio is described herein. This rare dragonfly, though being rarely found in Ossola and Aosta Valley, was never previously detected in the Western Alps of Piedmont. The habitat is a peat-bog with abundant *Sphagnum*, located at 1691 m a.s.l." (Author)] Address: Cucco, M., Università del Piemonte Orientale, DISIT, viale Michel 11 - 15121 Alessandria. Italy. E-mail: cucco@unipmn.it

14883. De Marco Júnior, P.; Batista, J.D.; Cabette, H.S. R. (2015): Community assembly of adult odonates in tropical streams: An ecophysiological hypothesis. *PLoS ONE* 10(4): e0123023. doi:10.1371/journal.pone.0123023:

17 pp. (in English) ["Community assembly theory is founded on the premise that the relative importance of local environmental processes and dispersal shapes the compositional structure of metacommunities. The species sorting model predicts that assemblages are dominated by the environmental filtering of species that are readily able to disperse to suitable sites. We propose an ecophysiological hypothesis (EH) for the mechanism underlying the organization of species-sorting odonate metacommunities based on the interplay of thermoregulation, body size and the degree of sunlight availability in small-to-medium tropical streams. Due to thermoregulatory restrictions, the EH predicts (i) that larger species are disfavoured in small streams and (ii) that streams exhibit a nested compositional pattern characterized by species' size distribution. To test the EH, we evaluate the longitudinal distribution of adult Odonata at 19 sites in 1st- to 6th-order streams in the Tropical Cerrado of Brazil. With increasing channel width, the total abundance and species richness of Anisoptera increased, while the abundance of Zygoptera decreased. The first axis of an ordination analysis of the species abundance data was directly related to channel width. Mean and maximum thorax size are positively correlated to channel width, but no relationship was found for the minimum thorax size, suggesting that there is no lower size constraint on the occurrence of these species. Additionally, a nested compositional pattern related to body size was observed. Our results support the EH and its use as an ecological assembly rule based on abiotic factors. Forest cover functions as a filter to determine which species successfully colonize a given site within a metacommunity. As a consequence, the EH also indicates higher threats for small-bodied zygopterans in relation to the loss of riparian forests in tropical streams." (Authors)] Address: De Marco Júnior, P., Laboratório de Teoria, Metacomunidades e Ecologia de Paisagens, Departamento de Ecologia, ICB, Universidade Federal de Goiás, Goiânia, GO, Brazil. E-mail: pdemarco@pq.cnpq.br

14884. Dickinson, M.H. (2015): Motor control: How dragonflies catch their prey. *Current Biology* 25(6): R232-R234. (in English) ["Detailed measurements of head and body motion have revealed previously unknown complexity in the predatory behaviour of dragonflies. The new evidence suggests that the brains of these agile predators compute internal models of their own actions and those of their prey." (Author)] Address: Dickinson, M.H., Division of Biology and Bioengineering, California Institute of Technology, Pasadena, CA 91125, USA. E-mail: flyman@caltech.edu

14885. Dida, G.O.; Gelder, F.B.; Anyona, D.N.; Abuom, P.O.; Onyuka, J.O.; Matano, A.-S.; Adoka, S.O.; Kanangire, C.K.; Owuor, P.O.; Ouma, C.; Ofulla, A.V.O. (2015): Presence and distribution of mosquito larvae predators and factors influencing their abundance along the Mara River, Kenya and Tanzania. *SpringerPlus* (2015) 4:136: 14 pp. (in English) ["Among all the malaria controlling

measures, biological control of mosquito larvae may be the cheapest and easiest to implement. This study investigated baseline predation of immature mosquitoes by macroinvertebrate predators along the Mara River, determined the diversity of predators and mosquito larvae habitats and the range of their adaptive capacity to water physico-chemical parameters. Between July and August 2011, sampling sites (n=39) along the Mara River were selected and investigated for the presence of macroinvertebrate predators and mosquito larvae. The selected sampling sites were geocoded and each dipped 20 times using standard mosquito larvae dipper to sample mosquito larvae, while a D-frame dip net was used to capture the macroinvertebrate predators. Water physico-chemical parameters (dissolved oxygen, temperature, pH, conductivity, salinity and turbidity) were taken in situ at access points, while hardness and alkalinity were measured titrimetrically. The influence of macroinvertebrate predator occurrence was correlated with mosquito larvae and water quality parameters using Generalized Linear Model (GLM). Predators (n=297) belonging to 3 orders of Hemiptera (54.2%), Odonata (22.9%) and Coleoptera (22.9%), and mosquito larvae (n=4001) belonging to 10 species, which included *An. gambiae* s.l (44.9%), *Culex* spp. (34.8%) and *An. coustani* complex (13.8%), *An. maculipalpis* (3.6%), *An. phaorensis* (1.2%), *An. funestus* group (0.5%), *An. azaniae* (0.4%), *An. hamoni* (0.3%), *An. christyi* (0.3%), *An. ardensis* (0.08%), *An. faini* (0.07%), *An. sergentii* (0.05%) and 0.05% of *Aedes* mosquito larvae which were not identified to species level, due to lack of an appropriate key, were captured from different habitats along the Mara river. It was established that invasion of habitats by the macroinvertebrate predators were partially driven by the presence of mosquito larvae ($p < 0.001$), and the prevailing water physico-chemical parameters (DO, temperature, and turbidity, $p < 0.001$). Understanding abiotic and biotic factors which favour mosquitoes and macroinvertebrate co-occurrence may contribute to the control of malaria." (Authors)] Address: Dida, G.O., School of Public Health and Community Development, Maseno University, Kisumu, Kenya. E-mail: gdidah@gmail.com

14886. Dow, R.A.; Reels, G.T.; Ngiam, R.W.J. (2015): Odonata collected at Usun Apau National Park, Miri Division, Sarawak, Malaysia in April and May 2012. *International Dragonfly Fund - Report 79: 1-17.* (in English) ["Results of a collecting expedition to the remote Usun Apau plateau in Sarawak are presented. Interesting records include *Telosticta kajang* (previously only known from the holotype), *Coeliccia* new species, *Amphicnemis* new species." (Authors)] Address: Dow, R.A., Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA Leiden, The Netherlands Email: Rory.dow230@yahoo.co.uk

14887. Drury, J.P.; Grether, G.F. (2015): Interspecific aggression, not interspecific mating, drives character displacement in the wing coloration of male rubyspot damselflies (*Hetaerina*). *Proc. R. Soc. B* 281: 20141737.

<http://dx.doi.org/10.1098/rspb.2014.1737>: 8 pp. (in English) ["Traits that mediate intraspecific social interactions may overlap in closely related sympatric species, resulting in costly between-species interactions. Such interactions have principally interested investigators studying the evolution of reproductive isolation via reproductive character displacement (RCD) or reinforcement, yet in addition to reproductive interference, interspecific trait overlap can lead to costly between-species aggression. Previous research on rubyspot damselflies (*Hetaerina* spp.) demonstrated that sympatric shifts in male wing colour patterns and competitor recognition reduce interspecific aggression, supporting the hypothesis that agonistic character displacement (ACD) drove trait shifts. However, a recent theoretical model shows that RCD overshadows ACD if the same male trait is used for both female mate recognition and male competitor recognition. To determine whether female mate recognition is based on male wing coloration in *Hetaerina*, we conducted a phenotype manipulation experiment. Compared to control males, male *H. americana* with wings manipulated to resemble a sympatric congener (*H. titia*) suffered no reduction in mating success. Thus, female mate recognition is not based on species differences in male wing coloration. Experimental males did, however, experience higher interspecific fighting rates and reduced survival compared to controls. These results greatly strengthen the case for ACD and highlight the mechanistic distinction between ACD and RCD." (Authors)] Address: Drury, J.P., Dept of Ecology and Evolutionary Biology, University of California, 612 Charles E. Young Dr. S., Los Angeles, CA 90095, USA. E-mail: druryj@ucla.edu

14888. Elo, M.; Penttinen, J.; Kotiaho, J.S. (2015): The effect of peatland drainage and restoration on Odonata species richness and abundance. *BMC Ecology* (2015) 15:11: 8 pp. (in English) ["Restoration aims at reversing the trend of habitat degradation, the major threat to biodiversity. In Finland, over the half of the original peatland area has been drained and during recent years restoration of some of the drained peatlands have been accomplished. Short-term effects of the restoration on peatland hydrology, chemistry and vegetation are promising but little is known how other species groups in addition to vascular plants and bryophytes respond to restoration efforts. We studied how abundance and species richness of Odonata respond to restoration by sampling larvae in three sites (restored, drained, pristine) in 12 different study areas. We sampled Odonata larvae before restoration ($n = 12$), during the first ($n = 10$) and the third ($n = 7$) year after restoration and used generalized linear mixed models to analyse the effect of restoration. Before restoration drained sites had lower abundance and species richness than drained sites. During the third year after restoration both abundance and species richness had risen in restored sites. Adults of pre-selected indicator species were detected more often in restored sites than in drained sites. Our results show that Odonatas suffer

from drainage but seem to benefit from peatland restoration and are able to colonize newly formed water pools relatively rapidly." (Authors) For details of the LIFE-project see: <http://www.metsa.fi/sivustot/metsa/en/Projects/LifeNatureProjects/BorealPeatlandLife/Sivut/BorealPeatlandLife.aspx>] Address: Elo, Merja, Dept of Biological and Environmental Science, P.O. Box 35, FI-40014 University of Jyväskylä, Finland

14889. Escoto-Moreno, J.A.; Novelo-Gutiérrez, R.; Sigala-Rodríguez, J.; Escoto-Rocha, J.; Carrillo-Lara, D.E.; Reynoso-Velasco, D. (2015): First records of Odonata from Zacatecas State, Mexico. *Notulae odonologicae* 8(5): 151-155. (in English) ["During June, July, and August 2013 a total of 29 species belonging to 16 genera and six families were collected in the hitherto unexplored state of Zacatecas, Mexico. Lestidae, Calopterygidae, Coenagrionidae, Gomphidae, and Libellulidae as well as 28 species and 15 genera are reported for the first time for Zacatecas State." (Authors)] Address: Escoto-Moreno, J.A, Laboratorio de Sistemática Animal, Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, km 4.5 carretera Pachuca-Tulancingo s/n, Ciudad Universitaria, Col. Carboneras, 42184 Mineral de la Reforma, Hidalgo, México. E-mail: jerjaem2002@yahoo.es

14890. Farkas, A.; Móra, A. (2015): Contribution to the Odonata fauna of running and standing waters on the flood-plain of the Danube between Ács (1778 rkm) and Dunaföldvár (1560 rkm). *Acta Biol. Debr. Oecol. Hung.* 33: 125-134. (in English, with Hungarian summary) ["In 2013 faunistical studies on odonates were carried out in the Natura 2000 area of the flood-plain of the Danube located in the Danube-Ipoly National Park, with the main subject to detect species of community interest according to the Habitats Directive of the European Union. During our work a total of 26 small watercourses and 13 standing waters were visited usually at one occasion in spring. The study was mainly based on the collections of larvae; in addition, exuviae were also searched for and adults were occasionally recorded. Dragonflies were found at 16 small watercourses and 11 standing waters. A total of 353 larvae and 26 exuviae were collected and 23 specimens were observed as adults, representing altogether 22 species. Our study resulted in many new localities for the majority of the species, since these water bodies received little attention up to date. Five protected species were found (*Aeshna isosceles*, *Coenagrion ornatum*, *Gomphus vulgatissimus*, *Libellula fulva*, *Orthemtrum brunneum*), out of them *C. ornatum* is also a species of community interest. This species was first recorded from two watercourses, among them from Sződrákosi-patak in high numbers. Since the populations of *C. ornatum* is decreasing in Hungary and Europe, those habitats where it occurs in high density, such as the Sződrákosi-patak, are of great conservation value." (Authors)] Address: Farkas, Anna, Tornóc u. 27, H-1141 Budapest, Hungary. E-mail: flavipes@gmail.com

14891. Filippov, A.E.; Popov, V.L.; Gorb, S.N. (2015): The functional significance of density and distribution of outgrowths on co-opted contact pairs in biological arresting systems. *Phil. Trans. R. Soc. B* 5 February 2015 vol. 370 no. 1661 20140032: 7 pp. (in English) ["Microstructures responsible for temporary arresting of contacting surfaces are widely distributed on surfaces in different organisms. Recent morphological studies show that these structures have different density of outgrowths and not ideal distribution pattern on both complementary parts of the contact. One can suggest that this difference is optimized by natural selection to get stronger mechanical arrest within the system. In this paper, we simulate such a system numerically, both in the frames of continuous contact and discrete dynamical models to prove this hypothesis and elucidate other aspects of optimization of such mechanical adhesive systems." (Authors)] Address: Gorb, S.N., Functional Morphology and Biomechanics, Zoological Institute, Christian-Albrecht University of Kiel, 24098 Kiel, Germany. E-mail: sgorb@zoologie.uni-kiel.de

14892. Fincke, O.M. (2015): Trade-offs in female signal apparency to males offer alternative anti-harassment strategies for color polymorphic females. *Journal of Evolutionary Biology* 28(4): 931-943. (in English) ["Colour polymorphisms are known to influence receiver behaviour, but how they affect a receiver's ability to detect and recognize individuals in nature is usually unknown. I hypothesized that polymorphic female damselflies represent an evolutionary stable strategy, maintained by trade-offs between the relative apparency of morphs to male receivers. Using field experiments on *Enallagma hageni* and focal studies of *E. hageni* and *E. boreale*, I tested for the first time the predictions that 1) green heteromorphs and blue andromorphs gain differential protection from sexual harassment via background crypsis and sexual mimicry respectively, and 2) female morphs behaviourally optimize their signal apparency to mate-searching males. First, based on male reactions elicited by females, against a high contrast background the two morphs did not differ in being detected by males and once detected, did not differ in being recognized (eliciting sexual reactions). However, on green ferns, heteromorphs were detected less often (elicited only fly-bys) than andromorphs but once detected, the morphs did not differ in being recognized. In contrast, when perched on a dowel with two male signal distractors, andromorphs were detected less often and once detected, were recognized less often than heteromorphs. Second, in fields where females foraged, andromorphs perched higher on vegetation than heteromorphs, and were more often in the vicinity of males. Neither harassment rates nor evasive behaviours differed between morphs. Males aggregated in high density near shore where solitary females were rare. Equilibrium frequencies of these and other colour morphs should reflect the relative ease with which receivers detect and recognize them in the context where they are encountered." (Author)] Address: Fincke, Ola, Ecology and Evolutionary Biology

Graduate Program, Dept of Biology, University of Oklahoma Norman, OK, USA. E-mail: fincke@ou.edu

14893. Fu, J.J.; Hefler, Cs.; Qiu, H.H.; Shyy, W. (2015): Effects of aspect ratio on flapping wing aerodynamics in animal flight. *Acta Mechanica Sinica* 30(6): 776-786. (in English) ["Morphology as well as kinematics is a critical determinant of performance in flapping flight. To understand the effects of the structural traits on aerodynamics of bio-flyers, three rectangular wings with aspect ratios $AR = 1, 2$ and 4 performing hovering-like sinusoidal kinematics at wingtip based Reynolds number of 5300 are experimentally investigated. Flow structures on sectional cuts along the wing span are compared. Stronger K-H instability is found on the leading edge vortex of wings with higher aspect ratios. Vortex bursting only appears on the outer spanwise locations of high-aspect-ratio wings. The vortex bursting on high aspect-ratio wings is perhaps one of the reasons why bio-flyers normally have low-aspect-ratio wings. Quantitative analysis exhibits larger dimensionless circulation of the leading edge vortex (LEV) over higher aspect ratio wings except when vortex bursting happens. The average dimensionless circulation of $AR1$ and $AR2$ along the span almost equals the dimensionless circulation at the 50% span. The flow structure and the circulation analysis show that the sinusoidal kinematics suppresses breakdown of the LEV compared with simplified flapping kinematics used in similar studies. The Re effect results on $AR4$ show that in the current Reynolds number range, the overall flow structure is not sensitive to Reynolds number." (Authors) The paper includes references to Odonata.] Address: Fu, J., Dept of Mechanical and Aerospace Engineering, The Hong Kong University of Science & Technology, Clear Water Bay, Kowloon, Hong Kong SAR, China. E-mail: meqiu@ust.hk

14894. Futahashi, R.; Kawahara-Miki, R.; Kinoshita, M.; Yoshitake, K.; Yajima, S.; Arikawa, K.; Fukatsu, T. (2015): Extraordinary diversity of visual opsin genes in dragonflies. *PNAS* 112(11): E1247-E1256. (in English) ["Dragonflies are colourful and large-eyed animals strongly dependent on colour vision. Here we report an extraordinary large number of opsin genes in dragonflies and their characteristic spatiotemporal expression patterns. Exhaustive transcriptomic and genomic surveys of three dragonflies of the family Libellulidae (*Sympetrum frequens*, *Orthetrum albistylum*, and *Libellula fulva*) consistently identified 20 opsin genes, consisting of 4 nonvisual opsin genes and 16 visual opsin genes of 1 UV, 5 short-wavelength (SW), and 10 long-wavelength (LW) type. Comprehensive transcriptomic survey of the other dragonflies representing an additional 10 families also identified as many as 15–33 opsin genes. Molecular phylogenetic analysis revealed dynamic duplications and losses of the opsin genes in the course of evolution. In contrast to many SW and LW genes expressed in adults, only one SW gene and several LW genes were expressed in larvae, reflecting less visual dependence and LW-skewed light conditions for their life-

style under water. In this context, notably, the sand-burrowing or pit-dwelling species tended to lack SW gene expression in larvae. In adult visual organs: (i) many SW genes and a few LW genes were expressed in the dorsal region of compound eyes, presumably for processing SW-skewed light from the sky; (ii) a few SW genes and many LW genes were expressed in the ventral region of compound eyes, probably for perceiving terrestrial objects; and (iii) expression of a specific LW gene was associated with ocelli. Our findings suggest that the stage- and region-specific expressions of the diverse opsin genes underlie the behaviour, ecology, and adaptation of dragonflies." (Authors)] Address: Futahashi, R., Bioproduction Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Ibaraki 305-8566, Japan. E-mail: ryo-futahashi@aist.go.jp

14895. Gassmann, D. (2015): Odonata recorded from northeastern Papua New Guinea including the Bismarck Archipelago in May to July 1997. *Faunistic Studies in South-East Asian and Pacific Island Odonata* 10: 1-46. (in English) ["64 (sub)species from 10 families of Odonata were recorded throughout five provinces of Papua New Guinea, including the Bismarck islands of New Britain and New Ireland, from mid-May to early July 1997. The field trip led to the description of two new damselfly species (Gassmann, 1999; Gassmann, 2011) and one possibly new damsel- and dragonfly taxon, respectively. For several taxa, considerable range expansions are provided. *Agriocnemis aderces*, *Hemicordulia hilbrandi*, *Nososticta callisphaena*, *N. plagioxantha* and *Tanymecosticta fissicollis* are recorded for Papua New Guinea for the first time. *Brachydiplax duivenbodei* is a new record for New Britain. *Agriocnemis femina*, *Mortonagrion martini*, *N. africana*, *Rhyothemis resplendens*, *Xiphiagrion cyanomelas*, *Brachydiplax duivenbodei* and possibly *Brachydiplax denticauda* are recorded from New Ireland for the first time." (Author)] Address: Gassmann, D., Zoologisches Forschungsmuseum Alexander König, Arachnida Section, Adenauerallee 160, 53113 Bonn, Germany. E-mail: d.gassmann@zfmk.de

14896. Gómez-Tolosa, M.; Mendoza-Cuenca, L.F.; Rioja-Paradela, T.M.; Espinoza-Medinilla, E.E.; Alonso-Eguía-Lis, P.E.; Rivera-Velázquez, G.; Penagos-García, F.E.; Pérez-Munguía, R.M.; Ortega-Salase, H.; Gómez-Cristiani, M.; Gómez-Gutiérrez, R.B. (2015): Odonata (Insecta) de tres cuencas en la costa de Chiapas: lista de especies y registro nuevo. *Revista Mexicana de Biodiversidad* 86: 1-7. (in Spanish, with English summary) ["512 adults of the Odonata order, which correspond to 41 species were collected. These are grouped in 24 genera belonging to the families Calopterygidae, Coenagrionidae and Libellulidae. The percentage of individuals collected was 58.54% for the suborder Zygoptera and 41.46% for the suborder Anisoptera. Expected species accumulation curves ranged from 75.6% in September to 95.2% in January. *Brachymesia herbida* constitutes

the first record for Chiapas (Mexico). The dominant species was *Argia pulla*, which was collected at all sites. Using the Morisita-Horn similarity index, species were grouped and related to the characteristics of the environment in the subregions: high, medium and low." (Authors)] Address: Gómez-Tolosa, María de Lourdes, Instituto de Ciencias Biológicas, Universidad de Ciencias y Artes de Chiapas, Libramiento Norte-Poniente 1150, 29039 Tuxtla Gutiérrez, Chiapas, México. E-mail: maugomeztolosa@hotmail.com

14897. Gosden, T.P.; Waller, J.T.; Svensson, E.I. (2015): Asymmetric isolating barriers between different microclimatic environments caused by low immigrant survival. *Proceedings of the Royal Society of London B: Biological Sciences* 282 Issue: 1802: 7 pp. (in English) ["Spatially variable selection has the potential to result in local adaptation unless counteracted by gene flow. Therefore, barriers to gene flow will help facilitate divergence between populations that differ in local selection pressures. We performed spatially and temporally replicated reciprocal field transplant experiments between inland and coastal habitats using males of *Enallagma cyathigerum* as our study organism. Males from coastal populations had lower local survival rates than resident males at inland sites, whereas we detected no differences between immigrant and resident males at coastal sites, suggesting asymmetric local adaptation in a source-sink system. There were no intrinsic differences in longevity between males from the different environments suggesting that the observed differences in male survival are environment-dependent and probably caused by local adaptation. Furthermore, the coastal environment was found to be warmer and drier than the inland environment, further suggesting local adaptation to microclimatic factors has led to differential survival of resident and immigrant males. Our results suggest that low survival of immigrant males mediates isolation between closely located populations inhabiting different microclimatic environments." (Authors)] Address: Gosden, T., School of Biological Sciences, The University of Queensland, St Lucia, Queensland 4072, Australia

14898. Guillermo-Ferreira, R.; Gorb, S.N.; Appel, E.; Kovalev, A.; Bispo, P.C. (2015): Variable assessment of wing colouration in aerial contests of the red-winged damselfly *Mnesarete pudica* (Zygoptera, Calopterygidae). *The Science of Nature* (2015) 102:13: 10 pp. (in English) ["Wing pigmentation is a trait that predicts the outcome of male contests in some damselflies. Thus, it is reasonable to suppose that males would have the ability to assess wing pigmentation and adjust investment in a fight according to the costs that the rival may potentially impose. Males of the damselfly *Mnesarete pudica* exhibit red-coloured wings and complex courtship behaviour and engage in striking male-male fights. In this study, we investigated male assessment behaviour during aerial contests. Theory suggests that the relationship between

male resource-holding potential (RHP) and contest duration describes the kind of assessment adopted by males: self-assessment, opponent-only assessment or mutual assessment. A recent theory also suggests that weak and strong males exhibit variations in the assessment strategies adopted. We estimated male RHP through male body size and wing colouration (i.e. pigmentation, wing reflectance spectra and transmission spectra) and studied the relationship between male RHP and contest duration from videodocumented behavioural observations of naturally occurring individual contests in the field. The results showed that males with more opaque wings and larger red spots were more likely to win contests. The relationships between RHP and contest durations partly supported the self-assessment and the mutual assessment models. We then experimentally augmented the pigmented area of the wings, in order to evaluate whether strong and weak males assess rivals' RHP through wing pigmentation. Our experimental manipulation, however, clearly demonstrated that strong males assess rivals' wing pigmentation. We finally suggest that there is a variation in the assessment strategy adopted by males." (Authors)] Address: Guillermo-Ferreira, R., Dept of Biological and Environmental Sciences, Federal University of Grande Dourados (UFGD), Rod. Dourados - Itahum, Km 12, Dourados, Mato Grosso do Sul 79 804-970, Brazil. E-mail: rhainerguillermo@gmail.com

14899. Günther, A. (2015): Signalling with clear wings during territorial behaviour and courtship of *Chlorocypha cancellata* (Odonata, Chlorocyphidae). *International Journal of Odonatology* 18(1): 45-54. (in English) ["The reproductive behaviour of the damselfly *Chlorocypha cancellata* (Chlorocyphidae) was filmed at 600 frames per second. Different flight styles including straight, forward flight, threat and courtship display were analysed with respect to changes in wing beat frequency and phase relationships of fore and hind wings. The analysis revealed significant differences in the flight style between non-escalated and escalated threat display as well as changes in the wing beat frequency of a male during courtship dependant on the behaviour of the female. This is the first evidence suggesting that odonate species with clear wings can use specialized flight modes for intraspecific signalling." (Authors)] Address: Günther, A., Naturschutzinstitut Freiberg, Waisenhausstr. 10, 09599 Freiberg, Germany. E-mail: a.guenther@abo.freiepresse.de

14900. Haber, W.A.; Wagner, D.L.; de la Rosa, C. (2015): A new species of *Erythrodiplax* breeding in bromeliads in Costa Rica (Odonata: Libellulidae). *Zootaxa* 3947(3): 386-396. (in English, with Spanish summary) ["We describe a new species, *Erythrodiplax laselva* (Libellulidae), that breeds in bromeliads and *Cochlostema* (Commelinaceae) in the eastern lowlands of Costa Rica. The closest known relative is thought to be *E. castanea*, widespread in Central and South America, and not *E. bromeliicola*, which is known to breed in bromeliads in Cuba and Jamaica. The male, female, genitalia, and

larva are described and illustrated." (Authors)] Address: Haber, W.A., Apdo. 50-5655, Monteverde, Costa Rica. E-mail: bill.haber01@gmail.com

14901. Hadjoudj, S.; Khelifa, R.; Guebailia, A.; Amari, H.; Hadjadj, S.; Zebba, R.; Houhamdie, M.; Moulai, R. (2015): Emergence ecology of *Orthetrum cancellatum*: temporal pattern and microhabitat selection (Odonata: Libellulidae). *Annales de la Société entomologique de France (NS)* 50(3-4): 343-349. (in English, with French summary) ["Knowledge of both phenology and habitat selection are important assets for conservation and management purposes. Generally, aquatic insect species have an optimal season and larval microhabitat in which their survival and reproductive success are high. In odonates, emergence is usually a seasonal-restricted process during which the insect has to find a good timing and a convenient microhabitat to carry out the final ecdysis out of the water. We investigated temporal emergence pattern and microhabitat choice in *Orthetrum cancellatum* in northeast Algeria, which represents the southern limit of its distribution range. The emergence season lasted 56 days starting from 30.IV and ended on 25.VI, showing a peak on 19.V. The time by which 50% of the annual population has emerged (EM50) was 20 days and the sex ratio was slightly male-biased, with 51.53%. Final instar larvae chose areas with relatively dense vegetation, and this selection was positively dependent on the mean vegetation height and not on sex or body size. Height selection was positively dependent only on the support height that the larva chose. We suggest that larvae consider both predation risks and mainly local microclimate to select their emergence site." (Authors)] Address: Hadjoudj, S., Department of Biological Sciences of the Environment, Faculty of Natural and Life Sciences, University of Abderrahmane Mira, Béjaia 06000, Algeria

14902. Halder, U.; Dey, B. (2015): Biomimetic algorithms for coordinated motion: Theory and implementation. *International Conference on Robotics and Automation (ICRA 2015)* (arXiv:1503.04894v1 [cs.RO]): 18 pp. (in English) ["Drawing inspiration from flight behaviour in biological settings (e.g. territorial battles in dragonflies, and flocking in starlings), this paper demonstrates two strategies for coverage and flocking. Using earlier theoretical studies on mutual motion camouflage, an appropriate steering control law for area coverage has been implemented in a laboratory test-bed equipped with wheeled mobile robots and a Vicon high speed motion capture system. The same test-bed is also used to demonstrate another strategy (based on local information), termed topological velocity alignment, which serves to make agents move in the same direction. The present work illustrates the applicability of biological inspiration in the design of multi-agent robotic collectives." (Authors)] Address: Halder, U., Department of Electrical and Computer Engineering, University of Maryland, College Park, MD, USA. E-mail: udit@umd.edu

14903. Hämäläinen, M. (2015): Catalogue of individuals commemorated in the scientific names of extant dragonflies, including lists of all available eponymous species-group and genus-group names. International Dragonfly Fund - Report 80: 1-168. (in English) ["A catalogue of 1257 persons commemorated in the scientific names of extant dragonflies (Odonata) is presented together with brief personal information on each entry, typically the full name and year of birth and death (in case of a deceased person). Each individual has a list of the available species, subspecies, genus or subgenus names erected in his or her honour. A total of 1928 available eponymous species-group and 54 genus-group names are listed. These figures include also synonyms and homonyms. It was calculated that of the ca 8400 available species-group names in extant Odonata, ca 23 % are eponyms. Of the 933 new species-group names introduced from 1 January 1995 to 10 March 2015, as many as 42.9 % are eponyms." (Author)] Address: Hämäläinen, M., Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA Leiden, the Netherlands. E-mail: matti.hamalainen@helsinki.fi; libelago@gmail.com

14904. Harabiš, F.; Dolný, A.; Helebrandová, J.; Rusková, T. (2015): Do egg parasitoids increase the tendency of *Lestes sponsa* (Odonata: Lestidae) to oviposit underwater? Eur. J. Entomol. 112(1): 63-68. (in English) ["The selection of oviposition sites by insects can significantly affect egg mortality. Spreadwing damselflies (Odonata: Lestidae) predominantly lay their eggs in parts of plants growing above the surface of water and only occasionally also those parts growing underwater. Factors affecting the choice of oviposition site and decision to lay underwater are still poorly understood. We examined whether localities with different risk of egg parasitism, different oviposition strategies (above or below the water surface) and the depth at which the eggs were laid, affected the total number of eggs laid, the proportion parasitized and egg mortality. In general, a significantly higher proportion of the eggs laid above the surface of water were parasitized but spreadwing damselflies showed significant preference for laying eggs underwater at both of the sites studied. This preference, however, had a different effect on the overall mortality of eggs at the two sites studied. Hence underwater oviposition by damselflies may be seen as a conditional anti-predator strategy, occurring only if the benefits exceed potential risks. Underwater oviposition may provide additional benefits other than protection against egg parasitism." (Authors)] Address: Harabiš, F., Dept of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com

14905. Harabiš, F.M.; Dolný, A. (2015): Necessity for the conservation of drainage systems as last refugia for threatened damselfly species, *Coenagrion ornatum*. Insect Conservation and Diversity 8(2): 143-151. (in Eng-

lish) ["(1.) Small streams and rivulets in agricultural landscapes are among the most threatened habitats throughout Europe. Many species occurring primarily within these habitats are listed in the EC Habitats and Species Directive. One example is *C. ornatum*, which was rediscovered during the last decade in the Elbe Valley (Czech Republic) after more than 40 years. The occurrence of this species, however, was observed only at highly altered sites. Several management attempts, unfortunately, had led to the local extinction instead of strengthening of existing populations, precisely because they ignored the habitat preferences of the target species. (2.) This study analysed the effects of several physiochemical and environmental characteristics of 30 ditch segments in relation to the presence and abundance of *C. ornatum*. (3.) The occurrence of *C. ornatum* was found to be positively correlated with the diversity of macrophyte vegetation and negatively with shading. Populations of *C. ornatum* occurred mostly in smaller, well-warmed sections of channel, while the species clearly avoided those sections with gravel or concrete substrates. (4.) The results indicate that under certain circumstances, the ongoing utilisation of channels particularly for drainage accords with the objectives of protecting this species and could substitute for routine conservation management activities. Supplementary effective management should focus on removing overgrowing vegetation, eliminating such negative interventions to the channel as strengthening the stream bed, and encouraging the development of rich vegetation along the watercourses (e.g. by establishing buffers or overflows)." (Authors)] Address: Harabiš, F., Dept of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com

14906. Hava, J. (2015): Contribution to the dragonflies (Odonata) of „Údolí Únitického Potoka Nature Reserve“ and Únitice ponds. Elateridium 9: 111-117. (in Czech, with English summary) [Between 2007 and 2010, eleven odonate species were recorded in Údolí Únitického Potoka Nature Reserve and the nearby Únitice ponds, Czech Republic. Most of species are ubiquitous, but also include *Gomphus vulgatissimus* and *Sympetrum flaveolum*.] Address: Háva, J., Katedra ochrany lesa a entomologie, Fakulta lesnická a dřevařská, Česká zemědělská univerzita, Kamýcká 1176, CZ-165 21, Praha 6 – Suchbátka, Czech Republic. E-mail: jh.dermestidae@volny.cz

14907. Hayden, M.T.; Reeves, M.R.; Holyoak, M.; Perdue, M.; King, A.L.; Tobin, S.C. (2015): Thrice as easy to catch! Copper and temperature modulate predator-prey interactions in larval dragonflies and anurans. Ecosphere 6(4):art56. <http://dx.doi.org/10.1890/ES14-00461.1>: 17 pp. ["Amphibians are important indicators of environmental health, and their populations are in worldwide decline. The causes of these declines are diverse and not well understood. In some cases multiple stressors and complex causal mechanisms have been identified. Experimental

studies have shown that contaminants can cause the failure of *Lithobates sylvaticus* tadpoles to initiate predator avoidance behaviours, potentially leading to increased tadpole capture and injury. Copper is a contaminant known to negatively affect amphibians and other aquatic organisms at sub-lethal levels. Mining waste, certain pesticides, vehicle exhaust and brake pad dust are sources of copper, which can enter hydrologic systems through runoff. Additionally, temperature is known to influence predator-prey interactions of ectotherms and is predicted to rise in some areas as climate changes. We examined how copper and temperature affected behaviour and predation dynamics between an odonate predator (*Aeshna sitchensis*) and larval *L. sylvaticus* prey. We found that sublethal concentrations of copper near the analytical detection limits for this element (1.85 µg Cu/L) significantly reduced tadpole and odonate activity. Above-average temperatures (22°C) significantly increased tadpole activity and decreased dragonfly activity, compared with ambient-temperature treatments (17°C). These behavioural responses culminated in an approximately three-fold increase in the number of dragonfly attacks on tadpoles in the elevated-temperature, copper-exposed treatments. We suggest that increased concentrations of dissolved copper and elevated water temperatures are harmful to amphibian prey through maladaptive behavioural responses in the presence of predators." (Authors)] Address: Hayden, Mairin, Dept of Environmental Science, Alaska Pacific University, 4101 University Drive, Anchorage, Alaska 99508 USA. E-mail: hayden.tess@gmail.com

14908. Hilfert-Rüppell, D. (2015): High frequency and counterstroking: *Calopteryx splendens* female threatening flight. *International Journal of Odonatology* 18(1): 55-64. (in English) ["A hitherto unknown flight pattern of female *Calopteryx splendens* is described. On a day with heavy winds, when no damselfly could fly in open space of the river, I observed and filmed four to six females foraging in a small bay sheltered by bank vegetation. Females fought for perches and showed a threatening flight with counterstroking and high frequency wing-beating. In all other female flight modes the fore and hind wings were beaten nearly in parallel with a much lower beat frequency. As the newly observed flight mode resembles the courting flight mode of males of *C. splendens* the female's threatening flight is compared with it. At landings of both sexes the wings were beaten in a counterstroking mode for one to seven beats, as well. The possible development of female's threatening flight from wing beating during landing of *C. splendens* is discussed. The relevance of these findings is to extend the knowledge about the variety of flight modes in *Calopteryx* females." (Author)] Address: Hilfert-Rüppell D., Zool. Inst. TU Braunschweig, Fasanenstr. 3, D-38092 Braunschweig, Germany. E-mail: d.hilfert@tu-bs.de

14909. Hou, D.; Yin, Y.; Zhao, H.; Zhong, Z. (2015): Effects of blood in veins of dragonfly wing on the vibration characteristics. *Computers in Biology and Medicine* 58:

14-19. (in English) ["Highlights: •The microstructures of dragonfly wing are observed by the SEM. •Accurate three-dimensional FE model of the dragonfly forewing is developed. •The blood in veins is considered in the analysis of the mass, moments of inertia and natural frequency/mode. •We report the influence of the blood on the vibration characteristics of the wing for the first time. How the blood in veins of dragonfly wing affects its vibration characteristics is investigated. Based on the experimental results of the wing's morphology and microstructures, including the veins, the membranes and the pterostigma, accurate three-dimensional finite element models of the dragonfly forewing are developed. Considering the blood in veins, the total mass, mass distribution and the moments of inertia of the wing are studied. The natural frequencies/modal shapes are analyzed when the veins are filled with and without blood, respectively. The based natural frequency of the model with blood (189 Hz) is much closer to the experimental result. Relative to bending modal shapes, the torsional ones are affected more significantly by the blood. The results in this article reveal the multi-functions of the blood in dragonfly wings and have important implications for the bionic design of flapping-wing micro air vehicles." (Authors)] Address: Zhong, Z., School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai 200092, P. R. China. E-mail: zhongk@tongji.edu.cn

14910. Inomata, N.; Hironaka, K.; Sawada, K.; Kuriwada, T.; Yamahira, K. (2015): Discrepancy in the degree of population differentiation between color-morph frequencies and neutral genetic loci in the damselfly *Ischnura senegalensis* in Okinawa Island, Japan. *Genetica* 143(3): 271-277. (in English) ["Evaluation of relative contribution of natural selection and stochastic processes to population differentiation has been of great interest in evolutionary biology. In a damselfly, *Ischnura senegalensis*, females show colour dimorphism (gynochrome vs. androchrome), and colour-morph frequencies are known to greatly vary among local populations within Okinawa Island, a small island of Ryukyu Archipelago, Japan. In this study, to examine the effects of natural selection and stochastic processes on the within-island variation in colour-morph frequencies, we compared the degree of population differentiation at the colour-morph locus with that at a mitochondrial DNA region and ten nuclear microsatellite loci. F_{ST} values at the neutral loci were close to zero, indicating presence of sufficient gene flow (dispersal of adult individuals) between the local populations. In contrast, F_{ST} values at the colour-morph locus were significantly different from zero. These results suggest that variation in female colour-morph frequencies observed among local populations in Okinawa Island has been caused by divergent selection acting on the phenotype and/or genes tightly linked with the color locus." (Authors)] Address: Inomata, N., Department of Environmental Science, International College of Arts and Sciences, Fukuoka Women's University, 1-1-1 Kasumigaoka, Higashi-ku, Fukuoka, 813-8529, Japan. E-mail: inomata@fwu.ac.jp

14911. Irusta, J.B.; Lencioni, F.A.A. (2015): First record of Pseudostigmatidae (Insecta: Odonata) in the North-east Region of Brazil. Check List 11(2) (Article 1565): 3 pp-["We record the first occurrence of Mecistogaster amalia (Burmeister, 1839) for the state of Rio Grande do Norte, Brazil, which is the first record of this genus and family for the whole Northeast Region of Brazil. This record is based on four collected samples and extends by more than 1,500 km to the north, the area known of distribution of this species." (Authors)] Address: Irusta, J.B., Irusta Consultoria, R. Marabá, 350, D-14. Parnamirim, RN, CEP 59161-230, Brazil. E-mail: jb.irusta@gmail.com

14912. Jisha Krishnan, E. K.; Sebastian, C.D. (2015): Genetic and phylogenetic assessment of sexually dimorphic species, *Diplacodes trivalis* (Odonata: Libellulidae) using Cytochrome Oxidase I Gene. Int. J. Pure App. Biosci. 3(2): 317-320. (in English) ["Sexual dimorphism is a characteristic phenomenon exhibited by Libellulidae and Aeshnidae family of Odonates. *Diplacodes trivalis* is a sexually dimorphic Libellulidae species and the present study was carried out to check whether any genetic change had occurred in both the sexes and how it is phylogenetically related with other Odonate members. DNA barcoding using CO I gene offers the opportunity for a standard system of species identification based on the analysis of small fragment of DNA. The PCR amplification of partial cytochrome oxidase I gene of *Diplacodes trivalis* yielded a product of 466bp length (GenBank Accession: KP 835512). The length and nucleotide sequence of DNA and was found to be similar in both sexes. BLASTn program showed 99% sequence similarity to the same species reported from Mizoram, Tamil Nadu and Japan. The result indicated that this sexually dimorphic species does not have any genetic changes with respect to their morphological differentiation." (Authors)] Address: Sebastian, C.D., Molecular Biology Laboratory, Department of Zoology, Univ. of Calicut, Kerala 673b 635 India. E-mail: drcdsebastian@gmail.com

14913. Jisha Krishnan, E.K.; Sebastian, C.D. (2015): Genetic variation and phylogeny assessment of *Aciagrion occidentale* (Odonata: Coenagrionidae) using Mitochondrial Cytochrome Oxidase Subunit I gene. International Journal of Science and Research 4(4): 1121-1123. (in English) ["*A. occidentale* is a migratory species widely distributed in montane and submontane areas in open grass besides weedy ponds and herbage. Here we used the COI barcode locus (522bp) to clarify the specific taxonomic status of *A. occidentale*. Molecular data suggests that this species is having 99% sequence similarity to *Aciagrion borneense* found in Netherland [sic!] and confirmed that both are sharing same genus. The N-J tree constructed with BLASTn result depicted that *A. occidentale* is phylogenetically very close to damselflies. Anisopterans and zygopterans are sharing some common characters and the results confirm that Zygoptera is a paraphyletic group derived from the monophyletic groups of Anisoptera and Anisozygoptera." (Authors)]

Address: Sebastian, C.D., Molecular Biology Laboratory, Department of Zoology, University of Calicut, Kerala 673 635 India. E-mail: drcdsebastian@gmail.com

14914. Karjalainen, S. (2015): Kirja-Arvostelu: Brochard, C., Groenendijk, D., van der Ploeg, E. & Termaat, T. 2012. Fotogids Larvenhuidjes van Libellen. KNNV Uitgeverij, 320 pp. Brochard, C. & van der Ploeg. 2014. Fotogids Larven van Libellen. KNNV Uitgeverij, 236 pp. *Crenata* 8: 46. (in Finnish) [Book reviews] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail: sk@korento.net

14915. Karjalainen, S. (2015): Sudenkorentokesän 2014 kohokohdat. *Crenata* 8: 10-13. (in Finnish, with English summary) ["Dragonfly highlights in 2014. Interesting dragonfly (Odonata) records from Finland in 2014. Two species were recorded for the first time in the country: *Anax ephippiger* was found in Paimio on 24th May 2014 and *Gomphus flavipes* in Savitaipale on 6th September 2014. In addition, eight new provincial records were made including a northern find of *Aeshna viridis* from Ii in the province of Ostrobothnia borealis." (Author)] Address: Karjalainen, S., Tyrskykuja 3 B 15, FIN-02320 Espoo, Finland. E-mail: sk@korento.net

14916. Kaur Walia, G.; Kaur, H.; Kaur, J. (2015): Karyomorphological variations in the chromosome complement of *Orthetrum taeniolatum* of family Libellulidae (Odonata: Anisoptera). *Cytologia* 80(1): 95-99. ["*O. taeniolatum*, collected from the Patnitop area of Jammu and Kashmir, has been cytogenetically studied. The species possesses diploid chromosome number $2n=21m$ with X0 type sex determining mechanism. During the course of meiosis, two autosomal bivalents are distinctly large as compared to the remaining autosomal bivalents. The X chromosome also shows the phenomenon of precocious segregation. The reduction in chromosome number from the type number ($2n=25m$) is due to the fusion of two autosomal pairs, which is very common in case of holokinetic chromosomes. This type of karyomorphological variations in the species has been observed for the first time." (Authors)] Address: Kaur Walia, Gurinder, Dept of Zoology and Environmental Sciences, Punjabi University

14917. Keränen, I. (2015): The extent and causes of interspecific reproductive interactions in damselflies. *Jyväskylä studies in biological and environmental science* 304: 42 pp. (in English) ["As species do not live in isolation from each other, they are faced with an elementary choice when searching for a mating partner: a choice between conand heterospecific individuals. Despite the remarkable research effort on hybridization and its avoidance, there are still some less well covered areas, e.g. what is the role of males in hybridization, what patterns are found in sympatric wild populations, what role do alternative reproductive tactics (ARTs) have on the likelihood of heterospecific matings, and what are the true costs of heterospecific interactions. In this thesis I first quantify

the frequency of hybridization, backcrossing and heterospecific matings in sympatric wild populations of *Calopteryx splendens* and *C. virgo* damselflies in Finland. The possible influence of population densities, relative abundances of the species, and operational sex ratios on the frequency of heterospecific matings is also investigated. The second aim is to investigate how the intensity of territorial competition influences males' reproductive response to a heterospecific female. Finally, I dissect the importance of male ARTs on hybridization propensity and I attempt to quantify the reproductive costs that males' hybridization propensity inflicts among the tactics. The results imply a major role for *C. splendens* males in heterospecific reproductive interactions between the study species. Especially territorial males seem to be prone to hybridization, and the prevalence of hybridization is increased with a high availability of *C. virgo* females. Hybridization seems to be costly because there was high discordance between heterospecific mating frequency and observed numbers of hybrids. However, heterospecific courtship did not reduce conspecific mating success. The results also show that *C. splendens* males are able to adjust their level of heterospecific courtship according to the competitive environment as well as to the ART it follows. My thesis is a step towards understanding the causes of species reproductive interactions in wild populations." (Author)] Address: Keränen, I., Department of Biol. & Environmental Science, University of Jyväskylä, Jyväskylä, Finland. E-mail: inka.m.keranen@jyu.fi

14918. Kietzka, G.J.; Pryke, J.S.; Samways, M.J. (2015): Landscape ecological networks are successful in supporting a diverse dragonfly assemblage. *Insect Conservation and Diversity* 8(3): 229-237. (in English) [(1.) Ecological networks (ENs) are able to mitigate the negative effects of commercial forestry on terrestrial biodiversity, yet this remains untested for the aquatic fauna. Understanding the anthropogenic and natural variables that drive dragonfly diversity at the landscape and habitat scales, allows the design and implementation of ENs that minimise biodiversity loss across production landscapes. (2.) Here, we determine the relative contribution of anthropogenic disturbances and natural environmental variables to dragonfly assemblages within ENs. Sixty sites, of various freshwater body types, were sampled for adult dragonflies across ENs in a commercial forestry landscape. (3.) Overall, species richness was significantly influenced by river width, water turbidity, water depth and the presence of invasive plants. Nevertheless, overall species composition was influenced by water body type, flow rate and substrate type. Further differences were found when analyses were conducted separately for Anisoptera and Zygoptera. (4.) Counter-intuitively, anthropogenic disturbances had less effect on dragonfly species richness and composition than did natural environmental variables, emphasising the importance of conserving natural heterogeneity. Overall, dragonfly diversity can be successfully conserved in ENs

provided that conservation planning incorporates appropriate local scale variables. These results also suggest that impacts on water quality and dragonfly diversity are minimised by well-designed ENs within this production landscape." (Authors)] Address: Kietzka, Gabriella, Department of Conservation Ecology and Entomology, Stellenbosch University, Matieland, South Africa

14919. Kiran, C.G.; Kalesh, S.; Krushnamegh Kunte (2015): A new species of damselfly, *Protosticta ponmudiensis* (Odonata: Zygoptera: Platystictidae) from Ponmudi Hills in the Western Ghats of India. *Journal of Threatened Taxa* 7(5): 7146-7151. (in English) ["The genus *Protosticta* Selys, 1885 has 10 species reported from the Indian region, of which seven are known from the Western Ghats. Here we report a new species, *Protosticta ponmudiensis* from the Ponmudi Hills, Thiruvananthapuram District, Kerala, in the Agasthyamalai region of the southern Western Ghats. The species is distinguished from other *Protosticta* based on its large size, bright green eyes, the broad dorsal stripe on the base of segment 7, and very distinct anal appendages." (Authors)] Address: Kiran, C.G., Travancore Natural History Society, MBRRA-65, Jyothis, Mathrubhumi Rd, Vanchiyoor, Thiruvananthapuram, Kerala 695035, India. E-mail: cgkiran@gmail.com

14920. Koch, K. (2015): Influence of temperature and photoperiod on embryonic development in the dragonfly *Sympetrum striolatum* (Odonata: Libellulidae). *Physiological Entomology* 40(1): 90-101. (in English) ["Temperature and photoperiod play major roles in insect ecology. Many insect species have fixed degree-days for embryogenesis, with minimum and maximum temperature thresholds for egg and larval development and hatching. Often, photoperiodic changes trigger the transfer into the next life-cycle stadium. However, it is not known whether this distinct pattern also exist in a species with a high level of phenotypic plasticity in life-history traits. In the present study, eggs of *S. striolatum* are reared under different constant and fluctuating temperatures and photoperiodic conditions in several laboratory and field experiments. In general, and as expected, higher temperatures cause faster egg development. However, no general temperature or light-days for eyespot development and hatching are found. The minimum temperature thresholds are distinguished for survival (2°C), embryogenesis (6°C) and larval hatching (above 6°C). Low winter temperatures synchronize hatching. Above 36°C, no eyespots are visible and no larvae hatch. In laboratory experiments, light is neither necessary for eyespot development, nor for hatching. By contrast to the laboratory experiments, the field experiment show that naturally changing temperature and photoperiod play a significant role in the seasonal regulation of embryonic development. The post-eyespot development is more variable and influenced by temperature and photoperiod than the pre-eyespot development. This developmental plasticity at the end of the embryogenesis might be a general

pattern in the Libellulidae, helping them to cope with variation in environmental conditions." (Author)] Address: Koch, Kamilla, Dept of Ecology, Johannes Gutenberg-University Mainz, Becherweg 13, 55128 Mainz, Germany. E-mail: kochka@uni-mainz.de

14921. Koike, M.; Kamoshita, A.; Komatsuda, Y.; Sato, H.; Naganuma, M.; Takatsuto, S. (2015): Development of a new teaching tool aided by ICT for pupils to form a basic concept of insect morphology. *Journal of Science Education in Japan* 39(1): 19-31. (in Japanese, with English summary) ["In this study a new teaching tool aided by ICT was developed for pupils to form a basic concept of insect morphology in elementary school. This tool consists of eighteen panels of heads, thoraxes and abdomens for six kinds of insects (dragonfly, butterfly, fly, honeybee, cicada, mosquito), which are familiar drawings shown in third-grade science textbooks in elementary school. Like a slot machine, three drawings of the head, thorax and abdomen of a given insect must be put together on a PC. This tool was tested for third grade pupils (experimental group) in science class of a public elementary school. Pupils of the same grade (control group) took a conventional lesson in science class. Analyses of answers from questionnaires administered to pupils of both groups showed the following three points: 1) Pupils of the experimental group had much better understanding of the insect morphology when compared with those of the control group. 2) Our teaching tool promoted the learning motivation of the pupils. 3) Pupils of the experimental group pointed out both personal learning and repeated learning as reasons for their better understanding of the learning content in science class. It is thus suggested that our teaching tool is useful for pupils to form a basic concept of insect morphology in elementary school." (Authors)] Address: Koike, M., Faculty of Child Science & Education, Teikyo University of Science, Japan. E-mail: m-koike@ntu.ac.jp

14922. Kosterin, O.E. (2015): *Risiphlebia guentheri* sp. nov. (Odonata, Libellulidae) from southeastern Indochina. *Zootaxa* 3964(1): 138-145. (in English) ["*Risiphlebia guentheri* sp. nov. (holotype: Cambodia, Mondul-kiri Province, Dak Dam village environs, a tall grass forest swamp, 12°25' N 107°19' E, ~780 m a.s.l., 16 June 2014, RMNH), the second species in its genus, is described from Central Plateau of the Annamese Mountains. The new species is most probably separated from *R. dohrni* by a 1000-km gap of the range of the genus in Thailand and most of Cambodia." (Authors)] Address: Kosterin, O.E., Institute of Cytology & Genetics SB RAS, Acad. Lavrentyev ave. 10, Novosibirsk, 630090, Russia. E-mail: kosterin@bionet.nsc.ru

14923. Kosterin, O.E. (2015): Taxonomical notes on *Indolestes Fraser, 1922* (Lestidae, Zygoptera). 1. *Indolestes gracilis expressor* ssp. nov. from eastern Cambodia. *International Dragonfly Fund Report* 81: 1-11. (in English) ["*Indolestes gracilis expressor* ssp. nov. is described by

a male from Cambodia, Mondul-kiri Province, the river upstream of Buu Sraa Waterfall 12°34' N 107°25' E. Another male presumably belonging to this subspecies was illustrated from southern Laos in literature. The new subspecies is characterised by more inflated apical part of the cercus than in earlier known subspecies and is thought to range in plateaux of eastern Cambodia and southern Laos, although very rare." (Author)] Address: Kosterin, O.E., Institute of Cytology & Genetics SB RAS, Acad. Lavrentyev Ave. 10, Novosibirsk, 630090, Russia. E-mail: kosterin@bionet.nsc.ru

14924. Kosterin, O.E.; Poggi, R. (2015): Taxonomical notes on *Indolestes Fraser, 1922* (Lestidae, Zygoptera). 2. *Indolestes birmanus* (Selys, 1891) is bona species. *International Dragonfly Fund Report* 81: 13-20. (in English) ["The holotype of *Lestes birmana* Selys, 1891 (currently *Indolestes birmanus* (Selys, 1891)), housed in Museo Civico di Storia Naturale di Genova, is examined and depicted for the first time. Its cerci are not attenuated apically, hence this taxon cannot be a subspecies of *Indolestes gracilis* (Hagen in Selys, 1862)." (Authors)] Address: Poggi, R., Museo Civico di Storia Naturale 'Giacomino Doria', Via Brigata Liguria 9, 16121 Genova, Italy. E-mail: rpoggi@comune.genova.it

14925. Kulkarni, M.R.; Padhye, S.; Vanjare, A.I.; Jakhalekar, S.S.; Shinde, Y.S.; Paripatyadar, S.V.; Sheth, S.D.; Kulkarni, S.; Phuge, S.K.; Bhakare, K. Kulkarni, K.; Pai, K.; Ghate, H.V. (2015): Documenting the fauna of a small temporary pond from Pune, Maharashtra, India. *Journal of Threatened Taxa* 7(6): 7196-7210. (in English) ["Most of the limnological studies in India have focussed on a few taxa of large, permanent water bodies, and pond ecosystems, and related temporary water bodies are neglected. We present here a faunal inventory, with representative photographs, for a single, small temporary pond, reporting over 125 species of strictly aquatic fauna and 25 species of associated fauna, even though we did not identify some groups such as Protozoa, Dip-tera and nymphs of Odonata, etc. The identified species belong to seven taxa of vertebrates and invertebrates together. Arthropoda and Rotifera were the most species rich groups, observed with 83 and 45 representatives, respectively. Coleoptera were the most numerous in terms of species number. Such a small water body holds some endemics as well as otherwise very rare animals and so deserves better attention. We also highlight the potential and importance of such habitats for research and conservation." (Authors). 12 Odonata species are listed.] Address: Ghate, H.V., Dept of Zoology, Modern College, Shivajinagar, Pune, Maharashtra 411005, India. E-mail: hemantghate@gmail.com

14926. Lakew, A.; Moog, O. (2015): A multimetric index based on benthic macroinvertebrates for assessing the ecological status of streams and rivers in central and southeast highlands of Ethiopia. *Hydrobiologia* 751: 229-242. (in English) ["This study presents the development of

a multimetric index using benthic macroinvertebrates (BMI) to assess the ecological health of highland rivers in Ethiopia. BMI were collected from 22 reference and 82 impaired sites determined based on hydro-morphological, land use, and physical and chemical criteria. Of 75 potential metrics tested to integrate the multimetric index, only nine core metrics were selected based on their abilities to distinguish reference and impaired sites, strength of correlation with pertinent environmental parameters, and their independence from other metrics. The metrics retained in the multimetric index were total number of taxa, EPT-BH > 1sp (Ephemeroptera, Plecoptera, and Trichoptera taxa where Baetidae and Hydropsychidae taxa are considered if they consist more than one taxon), % Oligochaeta and Red Chironomidae, % COPTE (Coleoptera, Odonata, Plecoptera, Trichoptera, and Ephemeroptera), % EPT-BCH (EPT without Baetidae, Caenidae, and Hydropsychidae), ASPT-SASS (Average South African Scoring System Per Taxa), FBI (Family Biotic Index), % shredders, and % collector gathering. The final index derived from these metrics was divided into five river quality class (high, good, moderate, poor, and bad). A validation procedure showed that the index is stable along different hydrological conditions and sensitive to the current range of anthropogenic disturbances in Ethiopian highland rivers." (Authors)] Address: Lakew, A., National Fishery & Aquatic Life Research Centre, Ethiopian Inst. of Agricultural Research (EIAR), P. O. Box 64, Sebeta, Ethiopia. aschalewlh@yahoo.com

14927. Le Rouzic, A.; Hansen, T.F.; Gosden, T.P.; Svensson, E.I. (2015): Evolutionary time-series analysis reveals the signature of frequency-dependent selection on a female mating polymorphism. *The American Naturalist* 185(6): E182-E196. (in English) ["A major challenge in evolutionary biology is understanding how stochastic and deterministic factors interact and influence macroevolutionary dynamics in natural populations. One classical approach is to record frequency changes of heritable and visible genetic polymorphisms over multiple generations. Here, we combined this approach with a maximum likelihood-based population-genetic model with the aim of understanding and quantifying the evolutionary processes operating on a female mating polymorphism in the blue-tailed damselfly *Ischnura elegans*. Previous studies on this colour polymorphic species have suggested that males form a search image for females, which leads to excessive mating harassment of common female morphs. We analyzed a large temporally and spatially replicated data set of between-generation morph frequency changes in *I. elegans*. Morph frequencies were more stable than expected from genetic drift alone, suggesting the presence of selection toward a stable equilibrium that prevents local loss or fixation of morphs. This can be interpreted as the signature of negative frequency-dependent selection maintaining the phenotypic stasis and genetic diversity in these populations. Our novel analytical approach allows the estimation of the strength of frequency-dependent selection from the morph frequency fluctuations around their

inferred long-term equilibria. This approach can be extended and applied to other polymorphic organisms for which time-series data across multiple generations are available." (Authors)] Address: Le Rouzic, A., Laboratoire Évolution, Génomes, et Spéciation, CNRS-LEGS-UPR9034, CNRS-Institut Diversité, Écologie, et Évolution du Vivant-FR3284, Université Paris-Sud, Avenue de la Terrasse, Bâtiment 13, 91198 Gif-sur-Yvette, France. E-mail: lerouzic@legs.cnrs-gif.fr.

14928. Leur, L. van (2015): Observation of a Bog Hawker (*Aeshna subarctica*) in the Kampina nature reserve (The Netherlands). *Brachytron* 17(1): 24-25. (in Dutch, with English summary) ["On August 28, 2013 *A. subarctica* was photographed during a search for *A. juncea* at the Zandberg Fens in the Kampina nature reserve (the Netherlands). The only other record of this species in the southern Dutch province of Noord-Brabant dates back to 1925. It is not unlikely that there be undiscovered populations of Bog Hawkers. Therefore a search for this species near fens with Sphagnum vegetation in the months August-September is recommended." (Author)] Address: Leux, Lex van, Hinthamerstraat 146-a, 5211 MT 's-Hertogenbosch, The Netherlands

14929. Lojewski, J.A.; Switzer, P.V. (2015): The role of landmarks in territory maintenance by the black saddlebags dragonfly, *Tamea lacerata*. *Behavioral Ecology and Sociobiology* 69(3): 347-355. (in English) ["Territoriality can reduce competition for resources, but territorial defense can be costly; therefore, any behaviour that reduces territorial costs may increase the net benefit of territoriality. Some species will align their territory boundaries with conspicuous landmarks that may serve to reduce defense costs. Dragonflies, including *T. lacerata*, defend territories at breeding sites, keeping rival males away to allow themselves access to females. We used three treatments to investigate whether *T. lacerata* used landmarks: constraining landmarks (an object that provided a physical barrier to flight), non-constraining landmarks (an object of the same dimensions and construction that did not impede flight), and a control without landmarks. We observed patrolling male black saddlebags and recorded the locations of turns at their territory boundary and interactions with other dragonflies. When either type of landmark was present, individuals placed their boundary at the landmark far more often than any other location. In addition, individuals that used landmarks had a significantly narrower range of turn locations than those that did not. Unlike other studies, the use of a landmark did not seem to reduce defense costs, and interestingly not all individuals used landmarks when they were provided. We hypothesize that in this species, landmarks may only reduce costs during territory establishment, rather than during territory maintenance. Alternatively, landmarks may serve as part of a spatial reference system that aids male dragonflies in efficiently searching for females, and thus may be more important in increasing benefits rather than decreasing the costs of ter-

itoriality." (Authors)] Address: Switzer, P.V., Dept Biol. Sciences, Eastern Illinois Univ., Charleston, IL, 61920, USA. E-mail: pvswitzer@eiu.edu

14930. Mahdjoub, H.; Khelifa, R.; Zebba, R.; Bouslama, Z.; Houhamdi, M. (2015): Bivoltinism in *Coenagrion mercuriale* (Zygoptera: Odonata) in the southern margin of its distribution range: emergence pattern and larval growth. *African Entomology* 23(1): 59-67. (in English) ["Voltinism is an important life history trait that varies with the environment. In temperate zones, insect populations take a substantially longer time to reach the adult stage in the northern compared to the southern regions. In this study, emergence pattern and larval growth of the threatened *C. mercuriale* were investigated in a population located in the southern limit of its distribution range in order to determine its life history strategies in a hot climate and compare them to those displayed in northern populations. There was no apparent winter diapause. The species produced two generations in a year, with the first generation emerging in mid spring and the second in late summer. The emergence pattern of the first generation was typical of a summer species and lasted 48 days. All larvae emerged by the end of May. Due to some environmental perturbations, the emergence pattern of the second generation was not surveyed, but there was evidence that the emergence season was short (21 days). Larval structure prior to the second emergence of the year showed that only 25% of the population was in the final instar, which explains the shorter emergence season. We assume that the first eggs laid in the spring hatch and grow rapidly to reach the final instar in late summer as a consequence of higher temperatures and potential high food availability. There was a significant seasonal decline in body size in both males and females. The second generation had a significantly smaller body size, presumably due to the short growth season and/or higher growth rate." (Authors)] Address: Khelifa, R., Lab. Ecol. of Terrestrial & Aquatic Systems, Fac. of Sciences, Dept Biol., Badji Mokhtar Univ., Annaba 23000, Algeria. E-mail: rassimkhelifa@gmail.com

14931. Mäkinen, J. (2015): Tundrakiiltokorento (*Somatochlora sahlbergi*) Kilpisjärvellä. *Crenata* 8: 14-17. (in Finnish, with English summary) ["*S. sahlbergi* is one of the rarest dragonfly species in the Europe. Only a few breeding localities are known from Finland, Sweden and Norway. This article describes a new breeding locality from Finland. In summer 2014 a total of 36 exuviae, two adult males and one female were found from four adjacent lakes in Laasavaara, a fjell close to the Lake Kilpisjärvi in the municipality of Enontekiö." (Author) 68.93157418 20.93276232 (WGS84), 620 m asl; 68.93379619 20.93345142 (WGS84), 645 m.asl.] Address: Mäkinen, J., Metsänhoitajankatu 12 B 16, FI-00790 Helsinki, Finland. E-mail: makisenjussi@gmail.com

14932. Márquez-Rodríguez, J.; Vega-Maqueda, M.A.; Ramos-Terrón, S.; Feria-Zamorano, C.; Ferreras-Romero, M. (2015): Nuevos datos sobre la distribución de

Orthetrum trinacria (Selys, 1841) (Odonata: Libellulidae) en el sur de la Península Ibérica. *Arquivos entomológicos* 13: 325-327. (in Spanish, with English summary) [New data on the distribution of *O. trinacria* in the southern Iberian Peninsula are reported, being proved the reproduction of this species in Andalusia by the finding of an exuvia and teneral adults.] Address: Márquez-Rodríguez, J., Departamento de Sistemas Físicos, Químicos y Naturales, Universidad Pablo de Olavide, de Sevilla. A-376 km 1. E-41013 Sevilla, Spain. E-mail: jmarrod1@upo.es

14933. Mastrantuono, L.; Pilotto, F.; Rossopinti, A.; Bazzanti, M.; Solimini, A.G. (2015): Response of littoral macroinvertebrates to morphological disturbances in Mediterranean lakes: the case of Lake Piediluco (central Italy). *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 186(4): 297-310. (in English) ["The assessment of the impacts of human morphological alterations on lake ecological condition based on littoral benthic fauna is still in its infancy, especially in the Mediterranean area of Europe. Lake Piediluco is a riverine lake, sited in Central Italy, whose water level is strictly regulated for hydroelectric reasons and hence can be classified as a Heavily Modified Water Body (HMWB) according to the E.U. Water Framework Directive (WFD). Here, we aim at comparing the invertebrate assemblages among sites with a different degree of morphological alterations by identifying potential indicator species and metrics sensitive to morphological alterations, and by comparing the fauna composition collected using two sampling procedures (composite vs habitat-specific samples) with different processing times. Our results show that the invertebrate assemblages of Lake Piediluco differed according to the three types of shoreline alteration (natural, soft- and hard-altered sites) and this was more evident when we analyzed the habitat-specific samples. Several taxa, diversity and metrics based on the number of Ephemeroptera, Trichoptera, Odonata and Mollusca taxa (ETO and ETOM) are found to be sensitive to shoreline alterations and are candidates for inclusion in assessment metrics for WFD compliant monitoring of the ecological status of this lake. While habitat-specific sampling provided a more detailed picture of the assemblages, composite samples provided consistent results and could be used when processing cost is an issue." (Authors) Several odonate taxa are used to measure impacts.] Address: Mastrantuono, Luciana, Dept. of Environmental Biology, Sapienza University of Rome. Piazzale Aldo Moro 5. 00185 Roma. Italy. E-mail: luciana.mastrantuono@uniroma1.it

14934. McCauley, S.; Hammond, J.I.; Frances, D.N.; Mabry, K.E. (2015): Effects of experimental warming on survival, phenology, and morphology of an aquatic insect (Odonata). *Ecological Entomology* 40(3): 211-220. (in English) ["(1.) Organisms can respond to changing climatic conditions in multiple ways including changes in phenology, body size or morphology, and range shifts. Understanding how developmental temperatures affect

insect life-history timing and morphology is crucial because body size and morphology affect multiple aspects of life history, including dispersal ability, whereas phenology can shape population performance and community interactions. (2.) It was experimentally assessed how developmental temperatures experienced by aquatic larvae affected survival, phenology, and adult morphology of dragonflies [*Pachydiplax longipennis* (Burmeister)]. Larvae were reared under three environmental temperatures: ambient, +2.5, and +5°C, corresponding to temperature projections for our study area 50 and 100 years in the future, respectively. Experimental temperature treatments tracked naturally-occurring variation. (3.) Clear effects of temperature were found in the rearing environment on survival and phenology: dragonflies reared at the highest temperatures had the lowest survival rates and emerged from the larval stage approximately 3 weeks earlier than animals reared at ambient temperatures. There was no effect of rearing temperature on overall body size. Although neither the relative wing nor thorax size was affected by warming, a non-significant trend towards an interaction between sex and warming in relative thorax size suggests that males may be more sensitive to warming than females, a pattern that should be investigated further. (4.) Warming strongly affected survival in the larval stage and the phenology of adult emergence. Understanding how warming in the developmental environment affects later life-history stages is critical to interpreting the consequences of warming for organismal performance." (Authors)] Address: McCauley, S.J., Department of Biology, Univ. of Toronto Mississauga, 3359 N. Mississauga Rd., Mississauga, ON L5L 1C6, Canada. E-mail: shannon.mccauley@utoronto.ca

14935. Mendes, T.P.; Cabette, H.S.R.; Juen, L. (2015): Setting boundaries: Environmental and spatial effects on Odonata larvae distribution (Insecta). *Anais da Academia Brasileira de Ciências* 87(1): 239-248. (in English, with Portuguese summary) ["Environmental characteristics and spatial distances between sites have been used to explain species distribution in the environment, through Neutral (space) and Niche theory (environment) predictions. We evaluated the effects of spatial and environmental factors on Odonata larvae distribution along the Suiá-Missú River Basin, state of Mato Grosso. We tested the hypotheses that (1) the environment is the main factor structuring the community due to its ecophysiological requirements; and (2) the pattern, if present, is clearer for Zygoptera. Samples were made in 12 sites on the Suiá-Missú River Basin in three seasons (2007/2008), with a total of 1.382 Odonata larvae, comprising 10 families, 51 genera and 100 morphospecies. The Anisoptera were more abundant than Zygoptera, comprising 81% of all specimens. The environment affected Zygoptera ($R=0.291$; $p=0.007$) and was the main factor structuring the assembly. Thus, Niche theory was confirmed. The absence of this effect on Anisoptera may be due to the ecophysiological adaptations that enable it

to occupy different habitats. Zygoptera larvae are indicators of changes in habitat structure. The effects of environmental variables on larvae ecology emphasize the strong relationship between these organisms and environmental integrity." (Authors)] Address: Mendes, T.P., Programa de Pós-graduação em Ecologia Aquática e Pesca, Instituto de Ciências Biológicas, Universidade Federal do Pará, Rua Augusto Correia, 1, Bairro Guamá, 66075-110 Belém, PA, Brazil

14936. Mihalicz, J.E. (2015): An observation of the overwintering aquatic insects in a Prairie pond in Saskatchewan, Canada. *University of Saskatchewan Undergraduate Research* 1(2): 99-105. (in English) ["In temperate regions freshwater insects annually face the challenge of surviving the winter months or otherwise perishing. Ice formation presents a substantial danger to all life stages, from the eggs to adults. Accordingly, some species have adapted to overwinter within ice and emerge during the spring thaw. The diversity of aquatic species encased in the ice and frozen sediment of a prairie pond in Saskatchewan, Canada and their survival rate upon thawing was assessed in the winter of 2013. A total of 164 specimens were retrieved from the ice and sediment, 73 of which survived after thawing. Survival rate was greatest for *Cymatia americana* (Corixidae, Hemiptera) at 79.6%. Corixids were found in distinct clusters encased in pond ice, a phenomenon not well documented in previous literature. A higher rate of survival was expected among the chironomids, although the value falls within ranges observed in previous studies. Additionally, members of other taxa including Notonectidae (Hemiptera), Haliplidae (Coleoptera), Ceratopogonidae (Diptera), and Coenagrionidae (Odonata) were recovered; however, these specimens exhibited much lower rates of survival. ... All damselfly naiads were found deep within the ice, near the bottom of the sample approximately 24 cm from the surface. These were identified as two possible genera (*Enallagma* and *Coenagrion*) but similarities between them made exact identification difficult." (Author)] Address: Mihalicz, J.E., Department of Biology, College of Arts and Science, University of Saskatchewan, Saskatoon, SK, Canada. E-mail: jem539@mail.usask.ca

14937. Mikolajewski, D.J.; De Block, M.; Stoks, R. (2015): The interplay of adult and larval time constraints shape species differences in larval life history. *Ecology* 96(4): 1128-1138. (in English) ["In animals with a complex life cycle, larval life history plasticity is likely shaped by the interplay of selective factors in both larval and adult stages. A wide interspecific variation in responses to larval time constraints imposed by seasonality has been documented. Few studies have addressed differences among closely related species in the evolutionary trajectories of age and size at metamorphosis and their link with larval growth rate under time constraints. None have considered how species-specific length of the reproductive season affects larval developmental responses to time constraints. We tested *Coenagrion hastulatum*, *C. mercuriale*, *C. ornatum*,

and *C. puella*, whether species with a longer reproductive season, facing a smaller threat of missing out on reproduction, react less to larval time constraints and pre-winter food shortage by accelerating development rate and growth rate, and therefore pay less physiological costs. All species increased development and growth rates under larval time constraints. The magnitude of this increase negatively correlated across species with the length of the reproductive period. Under larval time constraints, only the species exhibiting the longest reproductive season suffered a delayed emergence and a reduced investment in energy storage, yet it also showed an increased immune function. Under a longer reproductive season, evolution may favour compensation for larval constraints after metamorphosis. Growth rate was accelerated after pre-winter food shortage to same extent across species; also effects on age and mass at emergence did not differ among species. Time constraints associated with the length of the reproductive season may predictably contribute to species differences in their response to time constraints imposed in the larval stage. Our study adds empirical proof that the interplay of selective factors in the larval and adult stage may determine life history plasticity with regards to larval time constraints." (Authors)] Address: Mikolajewski, D.J., Freie Universität Berlin, Institut für Biologie, Germany. E-mail: d.mikolajewski@gmx.de

14938. Mlynarek, J.J.; Iserbyt, A.; Nagel, L.; Forbes, M.R. (2015): Differential water mite parasitism, phenoloxidase activity, and resistance to mites are unrelated across pairs of related damselfly species. *PLoS ONE* 10(2): e0115539. doi:10.1371/journal.pone.0115539: 13 pp. (in English) ["Related host species often demonstrate differences in prevalence and/or intensity of infection by particular parasite species, as well as different levels of resistance to those parasites. The mechanisms underlying this interspecific variation in parasitism and resistance expression are not well understood. Surprisingly, few researchers have assessed relations between actual levels of parasitism and resistance to parasites seen in nature across multiple host species. The main goal of this study was to determine whether interspecific variation in resistance against ectoparasitic larval water mites either was predictive of interspecific variation in parasitism for ten closely related species of damselflies (grouped into five "species pairs"), or was predicted by interspecific variation in a commonly used measure of innate immunity (total Phenoloxidase or potential PO activity). Two of five species pairs had interspecific differences in proportions of individuals resisting larval *Arrenurus* water mites, only one of five species pairs had species differences in prevalence of larval *Arrenurus* water mites, and another two of five species pairs showed species differences in mean PO activity. Within the two species pairs where species differed in proportion of individuals resisting mites the species with the higher proportion did not have correspondingly higher PO activity levels. Furthermore, the proportion of individuals resisting mites mirrored prevalence of parasitism in only one

species pair. There was no interspecific variation in median intensity of mite infestation within any species pair. We conclude that a species' relative ability to resist particular parasites does not explain interspecific variation in parasitism within species pairs and that neither resistance nor parasitism is reflected by interspecific variation in total PO or potential PO activity." (Authors)] Address: Mlynarek, Julia, Biology Dept, Carleton Univ., Ottawa, ON, Canada. E-mail: Julia.mlynarek@carleton.ca

14939. Modak, B.K. (2015): Cephaline gregarines of Purulia district, West Bengal, India. *Proc. Zool. Soc.* 68(1): 20-29. (in English) ["On way of survey in the Jhalda block of Purulia district, altogether 44 insect species belonging to 3 orders have been examined. of these 14 species of insects have been found with cephaline gregarine infection. It is revealed that, most of the recorded cephaline gregarine parasites belonged to Gregarina, Hirmocystis, Stylocephalus, Quadruspinospora, Phleobum, Retractocephalus, Odonaticola, Pileocephalus, Steinina and Laterospora genera. Though infestation is species specific, occurrence of two species of gregarines in the same host at the same time is well documented." (Authors) Ten Odonata species are checklisted as host of cephaline gregarines and regionally occurring. Special emphasis is given to *Bradinopyga geminata* and *Pantala flavescens* as host of the genus *Odonaticola*.] Address: Modak, B.K., Department of Zoology, Sidho-Kanho-Birsha University, Purulia District, Purulia 723101, West Bengal, India. E-mail: bkmodak09@gmail.com

14940. Mossman, H.L.; Panter, C.J.; Dolman, P.M. (2015): Modelling biodiversity distribution in agricultural landscapes to support ecological network planning. *Landscape and Urban Planning* 141: 59-67. (in English) ["Highlights: • We used ad-hoc biological data to model landscape-scale wetland species richness. • Models were used to assess and improve a proposed ecological connectivity network. • Our evidence-based network was shorter and connected areas of higher richness. • Our results challenge previous assumptions of important network elements. • Odonata were poor proxies for other groups of wetland species. Strategic approaches to biodiversity conservation increasingly emphasise the restoration of ecological connectivity at landscape scales. However, understanding where these connecting elements should be placed in the landscape is critical if they are to provide both value for money and for biodiversity. For such planning to be effective, it is necessary to have information of the distributions of multiple taxa, however, this is of poor quality for many taxa. We show that sparse, non-systematically collected biological records can be modelled using readily available environmental variables to meaningfully predict potential biodiversity richness, including rare and threatened species, across a landscape. Using a large database of ad-hoc biological records (50 501 records of 502 species) we modelled the richness of wetland biodiversity across the Fens, a formerly extensive wetland, now agricultural landscape in

eastern England. We used these models to predict those parts of the agricultural ditch network of greatest potential conservation value and compared this to current strategic network planning. Odonata distribution differed to that of other groups, indicating that single taxon groups may not be effective proxies for other priority biodiversity. Our results challenged previous assumptions that river channels should comprise the main connecting elements in the Fens region. Rather, areas of high ditch density close to a main river are likely to be of greater value and should be targeted for enhancement. This approach can be adopted elsewhere in order to improve the evidence-base for strategic networks plans, increasing their value for money." (Authors)] Address: Mossman, Hannah, Division of Biology and Conservation Ecology, School of Science and the Environment, Manchester Metropolitan University, Chester St, Manchester, M1 5GD, UK. E-mail: h.mossman@mmu.ac.uk

14941. Mutlu, O.; Ulak, G.; Kokturk, S.; Celikyurt, I.K.; Akar, F.; Erden, F. (2015): Effects of homeopathic Anax imperator on behavioural and pain models in mice. *Homeopathy* 104(1): 15-23. (in English) ["Background: Homeopathy is a medical theory and practice that asserts that disease can be cured by remedies that produce symptoms in a healthy person similar to those suffered by a patient with a malady. Methods: The aim of this study was to investigate effects of homeopathic Anax imperator (dragonfly) (Anax-i 30c and Anax-i 200c) in the forced swim test (FST), elevated plus-maze (EPM) test, hot plate (HP) test and open field test and examined NPY1 receptor expression, in naive mice. Results: In the FST, treatment with Anax-i 30c or Anax-i 200c significantly diminished immobility time while in EPM test, Anax-i 200c increased the percentage of time spent in open arms as well as the percentage of open arm/total arms. In the HP test, Anax-i 30c or Anax-i 200c decreased the total time mice spent licking their hind paws while in open field test, treatment with Anax-i 200c increased the total distance and speed mice travelled compared to the control group. Three weeks of daily injections with Anax-i 30c or Anax-i 200c caused significant weight loss in mice. Anax-i 30c or Anax-i 200c treatment significantly decreased NPY1 receptor expression, and Anax-i 30c also decreased NPY2 receptor expression. Conclusion: These results suggest that the homeopathic Anax-i exerts antidepressant, anxiolytic and analgesic-like effects and causes hyperlocomotion and weight loss." (Authors)] Address: Mutlu, O., Department of Pharmacology, Faculty of Medicine, Kocaeli University, 41380 Kocaeli, Turkey. E-mail: oguzmutlu80@hotmail.com.

14942. Mutonkole Senga, P.; Tshitenge Mbuebue, J.-M.; Masamba, Lulendo, N. (2015): Benthic macroinvertebrates as indicators of water quality: A case-study of urban Funa stream (in Kinshasa, Democratic Republic of Congo). *Open Journal of Water Pollution and Treatment* 2(1): 8-24. (in English) ["Macroinvertebrates ability to indicate various types of anthropogenic stressors is widely

recognized as an integral component of freshwater bio-monitoring. In case of pollution, biodiversity of the aquatic community can be affected and the species composition changes from natural species to tolerant species. In this study, macroinvertebrates were sampled using Surber sampler at 5 locations from October 2007 to September 2008 to determine the environmental quality of Funa water body and to analyze fauna structure assemblages. Water physical chemical data were explored using multivariate analysis of Canonical Component to detect environmental trends. Ten biodiversity indices: specific richness S, abundance A, Shannon-Weiner diversity H', maximum diversity Hmax, evenness J', McNaughton ID, Redundancy R, Capacit'e Biogenique Secondaire (Cb2), Indice Biologique Global Normalis'e (IBGN) and Biologic Monitoring Working Party (BMWP) were used for biological assessment of water quality. Forty-seven species were collected from 3624 specimen dominated by Odonata, Achaeta and Diptera. Four taxa displayed higher relative abundances: Glossiphonidae (20 %), Chironomidae (9 %), Lumbriculidae (9 %) and Hirudidae (8 %). DIMO model splits up sites into two groups in function of H', Hmax, and J'. In addition, rank-frequency diagrams characterized stage 1 and middle between stages 1 and 2 structured curves. In overall, indices showed low values, which expressed the inhospitable character of habitat structure. However, BMWP and IBGN scores of water quality worsened from upstream to downstream." (Authors)] Address: Mutonkole Senga, P., Dept of environment, Univ. of Kinshasa, Democratic Republic of Congo. E-mail: patrick.mutonkole@gmail.com

14943. Nair, M.V.; Subramanian, K.A. (2015): A new species of *Agriocnemis* Selys, 1869 (Zygoptera: Coenagrionidae) from eastern India with description of *Agriocnemis keralensis* Peters, 1981. *Rec. zool. Survey. India* 114(4) (2014): 669-679. (in English) [*Agriocnemis kalinga* sp. nov. "is described from Odisha and the status of *Agriocnemis keralensis* Peters, 1981 is discussed. Based on recent field studies, *A. keralensis* is redescribed. A revised key to *Agriocnemis* of India is also provided." (Authors)] Address: Nair, M.J., Nandankanan Zoological Park, Barang-754005, Odisha, India. E-mail: manojnair74@gmail.com

14944. Naka, H.; Hashimoto, H. (2015): Effects of deformation and vibration characteristics of wings on flapping flight. *Mechanical Engineering Journal* 2(1) paper no. 14-00262: 11 pp. (in English) ["The dragonfly wing is passively deformed under flapping and has the strength to withstand high flapping frequency simultaneously. These characteristics of deformation and vibration of the wing are important for flapping flight. However, the effect of these characteristics on flapping flight has not been well understood. The purpose of this study is to investigate deformation and vibration characteristics of the dragonfly wing, and then to develop an artificial wing suitable for flapping flight on the basis of the dragonfly wing. In this study, natural frequency and deformation of the dragonfly wing are measured, and the artificial wing is fabricated on the basis

of the results. From the measured results, the dragonfly wing has the high natural frequency of about 120 Hz, and thereby, it does not resonate with flapping. Although base-side of the wing is hardly deformed, the tip-side of the wing is greatly deformed because of the torsional deformation from the nodus of dragonfly wing. On the basis of characteristics of the dragonfly wing, the deformable artificial wing that can deform in the same manner of dragonfly wings was fabricated. Then, aerodynamic force and power consumption under flapping when using the deformable artificial wing was measured. As a result, the power efficiency of aerodynamic force using the deformable artificial wing is five times greater than the power efficiency using a non-deformable wing." (Authors)] Address: Naka, H., Graduate School of Engineering, Tokai University. E-mail: naka@fuji.tokai-u.jp

14945. Nakamura, K.; Takashima, K. (2015): Geographical variation in diapause development in eggs of *Symptetrum frequens* (Odonata: Libellulidae). *Applied Entomology and Zoology* 50: 263-270. (in English) ["Geographical differences causing variations in the egg period and the effects of environmental factors on diapause development were examined in *S. frequens*, a univoltine species with an obligatory egg diapause for overwintering. Eggs were obtained from females collected from 11 localities in Japan and incubated under six different combinations of photoperiod and temperature. No clear geographical trends were found in the average egg period under any experimental treatment. Average hatch period (i.e., period from the date when 10 % of the eggs were hatched to the date when 90 % of the eggs were hatched) did not display any geographical trend at 25 and 20 °C. However, at 15 °C, a significant negative correlation was observed between the hatch period and the latitude of the collection site. Similarly, a significant correlation was also detected between the coefficient of variation in the egg period and the average annual temperature near the collection site, but only at 15 °C. Because each egg batch was divided into six groups which were then incubated under different experimental conditions, it was possible to discern that the rate of diapause development at 15 °C varies among eggs from southern populations. The large variations in the egg period in the southern populations at 15 °C were considered to be a risk-spreading strategy: a certain proportion of the eggs were able to maintain diapause until winter, even if the adults laid the eggs early in the season. These differences in the rate of diapause development within a population may be an adaptation to the unpredictable length of the summer–autumn period." (Authors)] Address: Nakamura, K., Dept of Biosphere–Geosphere System Science, Fac. Informatics, Okayama Univ. Science, Okayama, 700-0005, Japan. E-mail: nakamura@big.ous.ac.jp

14946. Narzari, S.; Sarmah, J. (2015): A study on the prevalence of entomophagy among the Bodos of Assam. *Journal of Entomology and Zoology Studies* 3(2): 315-320. (in English) ["Entomophagy is a common practice

among rural and urban Bodos - a major tribe of Assam, India. A survey was conducted in the remote rural areas of Assam from June, 2013 to May, 2014. The insects collected from various habitats were preserved by following standard methods. An inventory on the knowledge on the wild edible insects of the Bodos of the studied areas is presented here. The study revealed that a total of 25 species of insects, belonging to eight orders and fourteen families are consumed as food by the Bodos. Out of them ten species belong to order Orthoptera, five to the Hymenoptera, three to Coleoptera, two each to Odonata and Hemiptera and one each to Araneae, Lepidoptera and Isoptera. The ethnozoological knowledge of this tribe ranges from edible to medicinal use. This study aims to make a comprehensive list of edible insects consumed by the Bodos of Assam." (Authors)] Address: Narzari, Silistina, Dept of Biotechnology, Bodoland Univ., Kokrajhar, -783 370, Assam, India

14947. Nixon, M.R.; Orr, A.G.; Vukusic, P. (2015): Wrinkles enhance the diffuse reflection from the dragonfly *Rhyothemis resplendens*. *J. R. Soc. Interface* 6 February 2015 vol. 12 no. 103 20140749: 7 pp. (in English) ["The dorsal surfaces of the hindwings of *Rhyothemis resplendens* reflect a deep blue from the multilayer structure in its wing membrane. The layers within this structure are not flat, but distinctly 'wrinkled', with a thickness of several hundred nanometres and interwrinkle crest distances of 5 µm and greater. A comparison between the backscattered light from *R. resplendens* and a similar, but un-'wrinkled' multilayer in *Matronoides cyaneipennis* shows that the angle over which incident light is backscattered is increased by the wrinkling in the *R. resplendens* structure. Whereas the reflection from the flat multilayer of *M. cyaneipennis* is effectively specular, the reflection from the wrinkled *R. resplendens* multilayer spans 1.47 steradians (equivalent to ±40° for all azimuthal angles). This property enhances the visibility of the static wing over a broader angle range than is normally associated with a smooth multilayer, thereby markedly increasing its conspicuousness." (Authors)] Address: Nixon, M.R., School of Physics, Univ. of Exeter, Exeter EX4 4QL, UK, E-mail: m.r.nixon@exeter.ac.uk

14948. Ohba, S. (2015): Odonates in an artificial pond in front of the Faculty of Education, Nagasaki University. *Bulletin of Faculty of Education, Nagasaki University* 1: 43-49. (in Japanese, with English summary) [Between April and October 2014, ten odonate species were found in and around an artificial near the Faculty of Education, Nagasaki University. Of these, *Ceriagrion nipponicum*, *Anaciaeschna martini*, *Anax nigrofasciatus*, and *Libellula quadrimaculata* are redlisted for the Nagasaki Prefecture Japan.] Address: Ohba, S., Biological Laboratory, Faculty of Education, Nagasaki University, Japan

14949. Orr, A.G.; Kalkman, V.J. (2015): *Nannophlebia leoboppi* sp. nov., a new dragonfly species from New Guinea (Odonata: Anisoptera: Libellulidae). *Zootaxa*

3964(3): 391-395. (in English) ["*Nannophlebia leoboppi* sp. nov. is described and figured based on a male specimen collected in the Star Mountains of Central New Guinea. This relatively large representative of its genus is compared with its probable nearest relative, *N. antiantha* Lieftinck, 1963, which is also partially figured. The new species brings the total number of *Nannophlebia* species to 25." (Authors)] Address: Orr, A.G., Environmental Futures Research Institute, Griffith University, Nathan, Qld 4111, Australia. E-mail: agorr@bigpond.com

14950. Ortiz, C.; Weiss-Penzias, P.S.; Fork, S.; Flegal, A.R. (2015): Total and monomethyl mercury in terrestrial arthropods from the central California coast. *Bulletin of Environmental Contamination and Toxicology* 94(4): 425-430. (in English) ["The aim of this project was to obtain a baseline understanding and investigate the concentration of mercury (Hg) in the tissue of terrestrial arthropods. The 4-month sampling campaign took place around Monterey Bay, California. Total mercury (HgT) concentrations ($x \pm SD$, dry weight) for the captured specimens ranged from 22 to 188 ng g⁻¹ in the Jerusalem crickets (Orthoptera: Stenopelmatidae); 65–233 ng g⁻¹ in the camel crickets (Orthoptera: Rhaphidophoridae); 25–227 ng g⁻¹ in the pill bugs (Isopoda: Armadillidiidae); 19–563 ng g⁻¹ in the ground beetles (Coleoptera: Carabidae); 140–441 ng g⁻¹ in *Sympetrum corruptum*; 607–657 ng g⁻¹ in *Cordulegaster dorsalis*; and 81–1,249 ng g⁻¹ in the wolf spiders (Araneae: Lycosidae). A subset of samples analyzed for monomethyl mercury (MMHg) suggest detrital pill bugs have a higher MMHg/HgT ratio than predatory ground beetles." (Authors)] Address: Cruz Ortiz Jr., C., Institute of Marine Science, University of California - Santa Cruz, 1156 High Street, Santa Cruz, CA, 95064, USA

14951. Outomuro, D.; Johansson, F. (2015): Bird predation selects for wing shape and coloration in a damselfly. *Journal of Evolutionary Biology* 28(4): 791-788. (in English) ["Wing shape is related to flight performance, which is expected to be under selection for improving flight behaviours such as predator avoidance. Moreover, wing conspicuousness, usually involved in sexual selection processes, is also relevant in terms of predation risk. In this study, we examined how predation by a passerine bird, the white wagtail *Motacilla alba*, selects wing shape and wing colour patch size in males of *Calopteryx splendens*. The wing colour patch is intra- and intersexually selected in the study species. In a field study, we compared wings of live damselflies to wings of predated damselflies which are always discarded after predation. Based on aerodynamic theory and a previous study on wing shape of territorial tactics in damselflies, we predicted an overall short and broad wing, with a concave front margin shape to be selected by predation. This shape would be expected to improve escaping ability. Moreover, we predicted that wing patch size should be negatively selected by predation. We found that selection operated differently on fore- and

hindwings. In contrast to our predictions, predation favoured a slender general forewing shape. However, the predicted wing shape was favoured in hindwings. We also found selection favouring a narrower wing colour patch. Our results suggest different roles of fore- and hindwings in flight, as previously suggested for *Calopteryx* damselflies and shown for butterflies and moths. Forewings would be more involved in sustained flight and hindwings in flight manoeuvrability. Our results differ somehow from a recently published work in the same study system, but using another population, suggesting that selection can fluctuate across space, despite the simplicity of this predator-prey system." (Authors)] Address: Johansson, F., Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

14952. Pettavino, M. (2015): Gli Odonati del Parco Naturale Alpi Marittime (Piemonte, Italia). *Rivista piemontese di Storia naturale* 36: 67-76. (in Italian, with English summary) ["Three years of field researches in the Alpi Marittime Natural Park (NW Italy) allowed to identify fifteen species of dragonflies. The reproduction in the area was verified for *Aeshna juncea*, *Enallagma cyathigerum*, *Libellula depressa*, *L. quadrimaculata*, *Somatochlora alpestris* and *Cordulegaster bidentata*. The last two species have a great conservation value in the context of the regional and national fauna." (Author)] Address: Pettavino, M. c/o Museo Civico di Storia Naturale, Parco Cascina Vigna, via S.Francesco di Sales 188, 10022 Carmagnola (TO), Italy. E-mail: massimo.pettavino@gmail.com

14953. Phan, Q.T.; Sasamoto, A.; Hayashi, F. (2015): Description of two new species of the genus *Devadatta* from northern Vietnam and central Laos (Odonata: Devadattidae). *Zootaxa* 3941(3): 414-420. (in English) ["Two new species of the genus *Devadatta* Kirby, 1890, *D. kompleri* sp. nov. from northern Vietnam (holotype: male, Mu Cang Chai district, Yen Bai Province) and *D. yokoi* sp. nov. from central Laos (holotype: male, Vang Vieng, Vientiane Province) are described. These new species are allied to *D. ducatrix* Lieftinck, 1969, but are distinguished by specific characteristics of their wings and anal appendages. The other Indochinese species are also briefly discussed." (Authors)] Address: Phan, Q.T., Department of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji, Tokyo 192-0397, Japan. E-mail: pqtoan84@gmail.com

14954. Ramaker, D.; Travnik, A. (2015): Discovery of a population of *Sympetrum depressiusculum* in the National Park Weerribben and Wieden (The Netherlands). *Brachytron* 17(1): 16-23. (in Dutch, with English summary) ["On 7 August 2013, five teneral females of *S. depressiusculum* were discovered in the Dutch Weerribben & Wieden National Park. Over the following days, various adults and a copula were found as well. The species was found in several places in the National Park. In 2014,

the species was again found in several locations, and reproduction could be proved by the presence of 10 exuviae. The local water control measures and types of vegetation seem favourable for *S. depressiusculum* in Western Europe." (Authors)] Address: Ramaker, D.; Viaductstraat 6, 9725BG Groningen, The Netherlands. E-mail: dolf@goyatlah.nl

14955. Richards, S.J.; Theischinger, G. (2015): Chapter 5 Odonata (Dragonflies & Damselflies). In: Richards, S.J. and N. Whitmore (editors) 2015. A rapid biodiversity assessment of Papua New Guinea's Hindenburg Wall region. Wildlife Conservation Society Papua New Guinea Program. Goroka, PNG: 75-83. (in English) ["We report the results of a survey of Odonata at two broad elevations (~285-910 m asl and 1,770-1,850 m asl) on the southern slopes of the Hindenburg Range in western Papua New Guinea (PNG). Fifty-three species were encountered, including 28 species of Zygoptera and 25 species of Anisoptera. Between 13 and 16 of these species (up to 30%) appear to be new to science. Diversity at the lower, foothill sites was much higher (40 species) than at the montane location, which totalled just 14 species despite higher search effort. However the fauna at the montane site was remarkable for the high proportion of species that are new to science (six of 14 species or 43%). Most of the new species documented during this survey are associated with clear, flowing streams in forest. We present the first comprehensive list of odonate species from the upper Ok Tedi area but note that this is based on just 3 weeks of sampling and that the total diversity of this important indicator group is certainly much higher in this topographically diverse part of Papua New Guinea." (Authors)] Address: Richards, S.J., Vertebrates Dept, South Australian Mus., North Terrace, Adelaide, S.A. 5000, Australia. E-mail: richards.steve@saugov.sa.gov.au

14956. Riehl, V. (2015): Morphological characterization of exuvia from co-emerging riverine dragonflies using geometric morphometrics. 14th Annual UW-System Symposium for Undergraduate Research & Creative Activity, 3. Poster Session I, April 24th 2015: 89. (in English) [Verbatim: Among many evolutionary pressures, the physical environment plays a significant role in the refining organism morphology. The purpose of this study is to determine whether geometric morphometrics can be used to differentiate or characterize shape variation among species and sexes of co-emerging riverine dragonflies, including two rare species in New Brunswick, Canada: *Ophiogomphus howei* and *Gomphus ventricosus*. Exuvia from 26 locations along the St. John and Miramichi Rivers were collected in June 2013. Exuvia were identified to species and landmarks were digitized on digital micrographs of the dorsal and ventral surfaces. A multivariate analysis of variance was used to test for differences in body shape between species and sexes within a species. We expect to find significant levels of variation among species in support of taxonomic diagnosis, but fewer differences between sexes with a species. A detailed analysis of shape

will help to confirm the presence of rare and protected species at these sites. Furthermore, this analysis provides a necessary first step toward the examination of phenotypic variation of these species based on differences in habitat hydrology.] Address: Riehl, Valerie, University of Wisconsin-Parkside

14957. Rolfhus, K.R.; Wiener, J.G.; Haro, R.J.; Sandheinrich, M.B.; Bailey, S.W.; Seitz, B.R. (2015): Mercury in streams at Grand Portage National Monument (Minnesota, USA): Assessment of ecosystem sensitivity and ecological risk. *Science of The Total Environment* 514: 192-201. (in English) ["Highlights: •GRPO is an ecosystem that is sensitive to mercury contamination. •MeHg values in GRPO streams and food webs are elevated relative to the region. •Mercury enrichment may be due in part to historic local trading activity. •GRPO fish pose a dietary risk to sensitive piscivores, but not to humans. Abstract: Mercury (Hg) in water, sediment, soils, seston, and biota were quantified for three streams in the Grand Portage National Monument (GRPO) in far northeastern Minnesota to assess ecosystem contamination and the potential for harmful exposure of piscivorous fish, wildlife, and humans to methylmercury (MeHg). Concentrations of total Hg in water, sediment, and soil were typical of those in forest ecosystems within the region, whereas MeHg concentrations and percent MeHg in these ecosystem components were markedly higher than values reported elsewhere in the western Great Lakes Region. Soils and sediment were Hg-enriched, containing approximately 4-fold more total Hg per unit of organic matter. We hypothesized that localized Hg enrichment was due in part to anthropogenic pollution associated with historic fur-trading activity. Bottom-up forcing of bioaccumulation was evidenced by MeHg concentrations in larval dragonflies, which were near the maxima for dragonflies sampled concurrently from five other national park units in the region. Despite its semi-remote location, GRPO is a Hg-sensitive landscape in which MeHg is produced and bioaccumulated in aquatic food webs to concentrations that pose ecological risks to MeHg-sensitive piscivores, including predatory fish, belted kingfisher, and mink. ... Larvae of the families Aeshnidae and Corduliidae were the most widely distributed dragonflies collected at GRPO, inhabiting all four stream sites and accounting for 64% of the 201 larvae sampled and analyzed (Table 4). Larvae from three other dragonfly families, including 22 cordulegastrids, 1 gomphid, and 50 libellulids, were found at one or two of the four sites. Mean concentrations of MeHg in larval dragonflies from the four stream sites ranged from 118 to 190 ng/g dry weight in aeshnids and from 136 to 185 ng/g in corduliids. Methylmercury accounted for more than 90% of the total Hg in dragonfly larvae for most taxa and stream sites. For example, mean %MeHg in larvae from the four stream sites ranged from 91% to 97% in corduliids and from 81% to 94% in aeshnids." (Authors)] Address: Rolfhus, K.R., University of Wisconsin-La Crosse, River Studies Center, 1725 State Street, La Crosse, WI 54601, USA. E-mail: krolfhus@uwlax.edu

14958. Rosenthal, E. (2015): Seasonal variation in the shape of *Hetaerina americana*. Thesis - Honors College, Biology, Baylor University: (in English) ["The ability to fly strongly contributes to the success of insects. The adaptive nature of wing size and shape dictates much of the organism's success flying, both short-term (food and mate acquisition) and long-term (persistence of the species in the environment). Members of Order Odonata are among the most efficient and iconic fliers in the animal kingdom, and wing shape is among many factors contributing to their flight success. The quantitative science of morphometrics is the study and analysis of shape. My study takes a morphometric approach to investigate variation in wing shape for *Hetaerina americana*, a common species of damselfly in North America. Specifically, I focus on variation in wing shape between damselflies emerging in mid-spring after a winter-long larval development versus those emerging in late summer after a warmer, summer-long larval development. Analyses revealed that for both fore wings and hind wings winter developer wing shapes differ significantly from summer developer wing shapes. Fore wings vary in shape more distinctly by season than do hind wings. Summer developer fore wings are broader than those of winter developers, and summer developer hind wings are narrower. This variation in wing shape may be a consequence of seasonal circumstances (shorter, warmer development with a higher larval metabolic rate), or reveal an adaptive strategy for flight in air of varying temperatures. This latter strategy would indicate a genetic plasticity capable of producing wing shapes adaptive to seasonal variation." (Author)] Address: not stated

14959. Rychła, A. (2015): Die Niederschlesische Heide (Bory Dolnośląskie): ein Refugium für seltene Moorbibellen im Südwesten Polens? International Dragonfly Fund Report 83: 1-18. (in German, with English and Polish summaries) ["In 2014, Odonata species were investigated in selected habitats, especially in peat bogs, in the western part of the Lower Silesian Wilderness on the German-Polish border. Of particular interest were regionally rare and species protected by Polish law. A total of 39 dragonfly species were observed and for 26 the development was confirmed. There were four legally protected species: *Ophiogomphus cecilia*, *Aeshna subarctica*, *Leucorrhinia albifrons* and *L. pectoralis*, and one endangered species *Orthetrum coerulescens* – category NT in the area. Furthermore, first records for 14 species within the investigated UTM squares are provided. Further, for *O. coerulescens* and *Leucorrhinia rubicunda* historical observations from the field have been updated. The results show a significant dragonfly diversity in the studied areas. Especially valuable are the first records of *A. subarctica* in the field, however, they still require a confirmation of autochthony." (Author)] Address: Rychła, Anna, ul. Osiedlowa 12, Płoty, 66-016 Czerwieńsk, Poland. E-mail: an.rychla@gmail.com

14960. Samraoui, B.; Alfarhan, A.H. (2015): Odonata in streams on Mount Edough, Algeria, and in Kroumiria, Tunisia. *African Entomology* 23(1): 172-179. (in English) ["A survey of Odonata in streams on Mount Edough, Algeria, and in Kroumiria, Tunisia, indicated strong faunistic similarities between these two areas, characterized by the presence of lotic dragonfly species with protracted larval development such as *Aeshna cyanea*, *Boyeria irene* and *Onychogomphus uncatatus*. Climatic oscillations and marine transgressions have isolated these mountains and their North African populations in the past geological times, which have led to distinct adaptations and stenotopy in various zoological and botanical groups. These mountain forests are also a refuge for aestivating Odonata with postponed reproductive maturation like *Lestes numidicus*, a species new for Tunisia, *L. barbarus*, *Sympetma fusca*, *Aeshna mixta*, *Sympetrum meridionale* and *S. striolatum*. In the light of increasing human encroachment, urgent conservation efforts are needed to ensure the perpetuity of these unique habitats in North Africa and their biota." (Authors)] Address: Samraoui, B., Laboratoire de Recherche des Zones Humides, Univ. d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@yahoo.fr

14961. Sánchez Herrera, M.; Kuhn, W.R.; Lorenzo-Carballa, M.O.; Harding, K.M.; Ankrom, N.; Sherratt, T.N.; Hoffmann, J.; Van Gossum, H.; Ware, J.L.; Cordero-Rivera, A.; Beatty, C.D. (2015): Mixed Signals? Morphological and molecular evidence suggest a color polymorphism in some Neotropical Polythore damselflies. *PLoS ONE* 10(4): e0125074. doi:10.1371/journal.pone.0125074: 24 pp. (in English) ["The study of colour polymorphisms (CP) has provided profound insights into the maintenance of genetic variation in natural populations. We here offer the first evidence for an elaborate wing polymorphism in the Neotropical damselfly genus *Polythore*, which consists of 21 described species, distributed along the eastern slopes of the Andes in South America. These damselflies display highly complex wing colours and patterning, incorporating black, white, yellow, and orange in multiple wing bands. Wing colours, along with some components of the male genitalia, have been the primary characters used in species description; few other morphological traits vary within the group, and so there are few useful diagnostic characters. Previous research has indicated the possibility of a cryptic species existing in *P. procera* in Colombia, despite there being no significant differences in wing colour and pattern between the populations of the two putative species. Here we analyse the complexity and diversity of wing colour patterns of individuals from five described *Polythore* species in the Central Amazon Basin of Peru using a novel suite of morphological analyses to quantify wing colour and pattern: geometric morphometrics, chromaticity analysis, and Gabor wavelet transformation. We then test whether these colour patterns are good predictors of species by recovering the phylogenetic relationships among the 5

species using the barcode gene (COI). Our results suggest that, while highly distinct and discrete wing patterns exist in Polythore, these "wingforms" do not represent monophyletic clades in the recovered topology. The wingforms identified as *P. victoria* and *P. ornata* are both involved in a polymorphism with *P. neopicta*; also, cryptic speciation may have taking place among individuals with the *P. victoria* wingform. Only *P. aurora* and *P. spateri* represent monophyletic species with a single wingform in our molecular phylogeny. We discuss the implications of this polymorphism, and the potential evolutionary mechanisms that could maintain it." (Authors)] Address: Sherratt, T.N., Dept Biology, Carleton University, 1125 Colonel By Drive, Ottawa ON, K1S 5B6, Canada. E-mail: sherratt@ccs.carleton.ca

14962. Schneider, T.; Dumont, H.J. (2015): Odonata records from southern Iran. *Notulae odonatologicae* 8(5): 137-146. (in English) ["Between 28 May and 06 June 2014, Odonata were collected from the southern Iranian provinces of Kerman, Hormozgan, and Fars. In total, 41 odonate taxa were found, nine of which are of Oriental origin. *Enallagma cyathigerum risi* is a new record for Iran. For others, such as *Ischnura nursei* and *Coenagrion vanbrinkae*, limited information is available. Only a few records of *Onychogomphus assimilis* are known, and *Lestes concinnus* had not been seen for more than 60 years in Iran; for *Pseudagrion laidlawi* and *P. decorum*, we report the first breeding populations in Iran." (Authors)] Address: Schneider, T., Arnold-Knoblauch-Ring 76, 14109 Berlin-Wannsee, Germany. E-mail: thomas.rs@gmx.de

14963. Shiffer, N.C.; Leppo, B.; White, H.B. (2015): Odonata of Beaver Dam, Huntingdon County, Pennsylvania: A record of faunal succession in a changing habitat. *Argia* 27(1): 12-23. (in English) ["Beaver Dam pond, created in the 1930s by damming Shaver Creek, was destroyed by floods in the mid-1960s and early 1970s, leaving a large wet meadow surrounded by forest and fed by Shaver Creek and numerous springs and seep tributaries. The Odonata fauna of this habitat in central Pennsylvania was first sampled in 1954 and has been revisited over 600 times since, mostly in the past three decades. The habitat succession has resulted in faunal changes. Aside from supporting populations of several Odonata species of conservation interest, it is remarkable in that *Enallagma anna*, a damselfly with western affinities, colonized the site in 2006, the only known location for the species in Pennsylvania and south and east of southeastern Michigan and southern Ontario. We report the yearly and seasonal distribution of the 99 species documented at Beaver Dam and associated stream and wetlands through early 2011." (Authors)] Address: Shiffer, N.C., 234 S. Gill Street, State College, Pennsylvania, 16801, USA. E-mail: tomboshif@yahoo.com

14964. Shiffer, N.C.; Leppo, B.; White, H.B. (2015): Odonata of Black Moshannon State Park, Centre County, Pennsylvania. *Argia* 26(4): 7-15. (in English) ["Black

Moshannon State Park includes a variety of freshwater wetlands that support a diversity of Odonata. It is situated 1900 feet (580 m) above sea level in central Pennsylvania. Since 1943, 96 species of Odonata have been observed within the park. We document the fauna that includes a number of species of state and regional conservation concern." (Authors)] Address: Shiffer, N.C., 234 S. Gill Street, State College, Pennsylvania, 16801, USA. E-mail: tomboshif@yahoo.com

14965. Sivaperuman, C. (2015): Odonata of Andaman and Nicobar Islands, India. *Aquatic Ecosystem: Biodiversity, Ecology and Conservation*: 153-162. (in English) ["This study was conducted in Andaman and Nicobar Islands from 2008 through 2013 to assess the status and distribution of odonate fauna. The Andaman and Nicobar archipelago consist of 572 islands, extending over 800 km. These islands can be broadly divided into two groups, namely, the Andamans and the Nicobars. The following areas were covered during the study period, namely, Great Nicobar Island, Ritchie's archipelago and North Andaman. The Andaman and Nicobar Islands support unique assemblages of Odonata comprising many species. Further studies are required to better understand the population ecology, habitat destruction and other anthropogenic disturbances to conserve the unique population." (Author)] Address: Sivaperuman, C., Andaman and Nicobar Regional Centre, Zoological Survey of India, Port Blair, 744 102, Andaman and Nicobar Islands, India. E-mail: c_sivaperuman@yahoo.co.in

14966. Sondermann, M.; Gies, M.; Hering, D.; Schröder, M.; Feld, C.K. (2015): Modelling the effect of in-stream and terrestrial barriers on the dispersal of aquatic insect species: a case study from a Central European mountain catchment. *Fundamental and Applied Limnology / Archiv für Hydrobiologie* 186(1-2): 99-115. (in English) ["Worldwide, lotic ecosystems are heavily impacted by anthropogenic disturbance, leading to a significant decline in freshwater biodiversity. In recent years, increasing efforts have been directed towards the restoration and revitalization of disturbed streams and rivers to reverse this trend. Although it is widely acknowledged that species dispersal is the key to the recolonization of restored streams and rivers and ultimately to their ecological recovery, dispersal often remains unaddressed in restoration ecology. In this study, we present an approach to predict larval (aquatic) and adult (terrestrial) dispersal ranges of three lotic insect species (*Hydropsyche dinarica* [Trichoptera], *Calopteryx virgo* [Odonata] and *Dinocras cephalotes* [Plecoptera]) within one life cycle. The actual species' distributions (presence / absence) were obtained from a total of 1,198 sites evenly distributed within the Ruhr catchment, North Rhine-Westphalia, Germany. The predictions for aquatic and terrestrial dispersal were made for two scenarios: with and without dispersal barriers included in the predictive modelling. In-stream dispersal barriers included weirs, dams, culverts and impounded water bodies, whereas terrestrial barriers

were related to the stream corridor (degraded riparian vegetation) and different forms of land use (urban land use, coniferous and deciduous or mixed forest, open land, road infrastructure). We applied a least-cost modelling approach and combined each species' life-cycle-specific dispersal capabilities and the corresponding dispersal barrier's "friction" costs in a grid-based GIS model. Among the three model species, *H. dinarica* was the best disperser and was predicted to be able to reach between 81% (without barriers) and 67% (with barriers) of all river sections in the model catchment within one life cycle. Aerial (terrestrial) dispersal was by far the most important dispersal mechanism. For validation purposes, we conducted a logistic regression analysis to identify sample sites with environmentally suitable habitats. Within these sites that are not considered constrained by habitat limitations, the comparison of actual and predicted absences revealed a better match, if barriers were included in the dispersal models. At the same time the mismatch of actual absences and predicted presences decreased. Our results suggest that dispersal models can contribute to a better assessment of the potential recolonization of rivers. Yet, the dispersal of lotic insects may be considerably overestimated if dispersal barriers remain unaddressed." (Authors)] Address: Sondermann, M., Centre of Water & Environmental Research. Univ. of Duisburg-Essen, Universitätsstr. 5, 45141 Essen, Germany. E-mail: martin.sondermann@uni-due.de

14967. Steinhoff, P.O.M. (2015): Results of Odonata larval rearing in the Gunung Mulu National Park, Sarawak, Malaysia from April to August 2014. International Dragonfly Fund - Report 78: 1-11. (in English) ["Records of larval rearing in the Gunung Mulu National Park, Sarawak, Malaysia carried out in 2014 are presented. In total, larvae of 27 species were collected. Larvae of eleven species (22 individuals) were successfully reared out, one individual is currently still being reared. An additional three species were collected right after emergence, with the adult still sitting on its exuvia. Most notable are the samples of *Orthetrum borneense*, *Leptogomphus cf. pendleburyi*, *Coeliccia cf. nemoricola* 1, *Coeliccia cf. nemoricola* 2, *Heliocypha biseriata* and *Elatoneura analis* whose final instar larvae are undescribed." (Author)] Address: Steinhoff, P.O.M., Department of General and Systematic Zoology, University of Greifswald, Anklamer Str. 20, 17489 Greifswald, Germany. E-mail: philipsteinhoff@gmail.com

14968. Stip, A.; den Ouden, G.T.; Slagboom, R. (2015): 2015. Dragonflies in the Alblasserwaard. *Brachytron* 17(1): 26-39. (in Dutch, with English summary) ["This paper presents the dragonfly fauna of the Alblasserwaard, an open and wet fen-meadow area in the west of the Netherlands, enclosed by rivers. Between 2000 and 2012 35 species in all were recorded, of which 31 annually. Most of the observed species are quite common and widely distributed. Some bottlenecks and opportunities

for Odonata fauna in this region are discussed." (Authors) *Brachytron pratense*, *Anaciaeschna isocetes*, *Stylurus flavipes*, *Libellula fulva*, *Coenagrion puella*, *C. pulchellum*, *Ischnura pumilio*, *Gomphus pulchellus*, *Sympetrum fonscolombii*, *Pyrrhosoma nymphula*, and *Cordulia aenea* are discussed in detail.] Address: Stip, Anthonie, Driestweg 5, 6721 NG Bennekom, The Netherlands. E-mail: anthonie.stip@vlinderstichting.nl

14969. Stretton, T. (2015): Look out for Common Club-tail. Montgomeryshire Wildlife Trust March 2015: 5 pp. (in English) ["*Gomphus vulgatissimus* is an uncommon dragonfly In Montgomeryshire, it is found in the River Severn between Newtown and the English border, as well as the lower reaches of the Vyrnwy. *G. vulgatissimus* is a difficult species to study, due to its unusual life cycle and little work has been done in Montgomeryshire to assess the population status of the species. Records of the species in the area are few and consequently we have little idea how they are doing or where the best areas are. We need your help to change this!" (Author)] Address: Stretton, Tammy. E-mail: tammy@montwt.co.uk

14970. Szewo, J.; Nel, A. (2015): The Cretaceous insects: A promising state of the art. *Cretaceous Research* 52, Part B: 628-630. (in English) [A short review of the state of the art of research on insects from the Cretaceous period is given. The recent achievements and priorities for future efforts are indicated. Two references on Odonata are included.] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

14971. Terzani, F. (2015): Ricerche odonatologiche in Toscana. XIII. *Cordulegaster boltonii* (Donovan, 1807): nuovi dati (Odonata: Cordulegastridae). *Onychium* 11: 67-71. (in Italian, with English summary) [Studies on the Odonata of Tuscany. XIII. *Cordulegaster boltonii* (Donovan, 1807): new records (Odonata: Cordulegastridae). - New records on the distribution of *C. boltonii* in Tuscany and neighbouring regions are given.] Address: Terzani, F., Museo di Storia Naturale dell'Università degli Studi di Firenze, sezione di Zoologia "La Specola", via Romana 17, 50125 Firenze, Italia. E-mail: libellula.ter@gmail.com

14972. Terzani, F. (2015): Salvatore Carfi, ricordo di un amico (1939-2014). *Onychium* 11: 172-174. (in Italian) [Obituary] Address: Terzani, F., Museo di Storia Naturale dell'Università degli Studi di Firenze, sezione di Zoologia "La Specola", via Romana 17, 50125 Firenze, Italia. E-mail: libellula.ter@gmail.com

14973. Thamarai Selvi, V.P.; Merlin Dayana, L. (2015): Biodiversity of insects in sugarcane field at a Vadipatti, Tamil Nadu, India. *International Research Journal of Environment Sciences* 484: 74-79. (in English) ["Sugarcane is highly important cash crop and sugar production in the country mostly depends on this crop. Sugarcane is known to be attacked by about 200 species of insects

and non insects in India. The light trap collection yielded seven orders namely Odonata, Orthoptera, Hemiptera, Homoptera, Coleoptera, Lepidoptera, and Hymenoptera. Homoptera was the prominent order with 6 species. Insignificant values are observed with the help of Correlation and Regression. Coleoptera was the richer in terms of number of individuals (102) and Odonata was least recorded with less number of individuals (33). The present study reveals that the most of the light trap collected insects were pest of sugarcane agroecosystem. Many predators and parasite of the orders Odonata, Orthoptera, Hemiptera, Homoptera, Coleoptera, Lepidoptera and Hymenoptera were also found in sugarcane field at A.Vadipatti, Periyakulam Taluk, Theni District. Even though, many insects are found in the sugarcane agro ecosystem, many insects were found to be the pest of sugarcane crop. Odonata was the moderate order with 4 species. It contributes 33 insects that amount to 6.76% in the total entomofauna. The 6th fortnight collection yielded the maximum number of individuals that 8 during the second half of January 2013 with an average minimum temperature 27.5°C. This period experienced an average rainfall 1.4mm the Odonata population declined during first half of November 2012 with least number of individuals 3. This decline in Odonata population conceded with soar temperature maximum 29°C." (Authors)] Address: J.A. Autonomous College for Women, Periyakulam, Theni District, INDIA

14974. Theischinger, G.; Richards, S.J. (2015): A new species of *Microtrigonia* Förster (Anisoptera, Libellulidae) from Papua New Guinea. *International Dragonfly Fund - Report 77*: 1-6. (in English) ["A new species recently collected in Papua New Guinea, *Microtrigonia sinuosa* sp. nov. (Holotype male from upper Sepik Basin), is described, illustrated and discussed. A revised key to the genus is presented." (Authors)] Address: Theischinger, G., NSW Dept of Planning & Environment, Office of Environment & Heritage, PO Box 29, Lidcombe NSW 1825 Australia. E-mail: gunther.theischinger@environment.nsw.gov.au

14975. Therry, L.; Bonte, D.; Stoks, R. (2015): Higher investment in flight morphology does not trade off with fecundity estimates in a poleward range-expanding damselfly. *Ecological Entomology* 40: 133-142. (in English) ["(1.) Evolutionary increases in dispersal-related traits are frequently documented during range expansions. Investment in flight-related traits is energetically costly and a trade-off with fecundity may be expected during range expansion. (2.) However, in contrast to wing-dimorphic species, this trade-off is not general in wing-monomorphic species. In the absence of a dispersal--fecundity trade-off, an increased investment in clutch size at the expansion front is expected possibly at a cost of reduced offspring size. (3.) The study evaluated investment in female flight morphology and fecundity-related traits (clutch size, hatchling size) and potential trade-offs among these traits in replicated populations of the poleward range-expanding damselfly *Coenagrion scitulum*.

(4.) Females at the expansion front had a higher relative thorax length, indicating an increased investment in flight; this can be explained by spatial sorting of dispersal ability or in situ natural selection at the expansion front. Edge females produced larger hatchlings, however, this pattern was totally driven by the population-specific thermal larval regimes and could not be attributed to the range expansion per se. By contrast, clutch sizes did not differ between core and edge populations. There was no signal of a dispersal--fecundity trade-off either for a trade-off between clutch size and hatchling size. (5.) These results indicate that evolution of a higher dispersal ability at the expansion front of *C. scitulum* does not trade off with investment in fecundity, hence a dispersal--fecundity trade-off is unlikely to slow down range expansion of this species." (Authors)] Address: Therry, L., Laboratory of Aquatic Ecology, Evolution & Conservation, KU Leuven, Leuven, Belgium. E-mail: Lieven.therry@bio.ku-leuven.be

14976. Thoma, M.; Althaus, S. (2015): Beobachtungen von Libellen (Odonata) auf dem Col de Bretolet (VS). *Entomo Helvetica* 8: 97-109. (in German, with English and French summaries) ["Dragonfly observations (Odonata) on the Col de Bretolet (Canton of Valais, Switzerland). - We present observations of dragonflies gathered between 2011 and 2014 at the bird ringing station of the Swiss Ornithological Institute on the Col de Bretolet, an alpine pass situated in southwestern Switzerland (canton of Valais, 1920 m a. s. l., 46 ° 08' 34" N 06 ° 47' 45" E). During this period, eight species were recorded. Historical observations include another three species. Only two species, *Aeshna cyanea* and *A. juncea*, successfully completed their life cycles on the pass. *Pyrrhosoma nymphula*, *Anax imperator*, *A. parthenope*, *Cordulegaster bidentata*, *Somatochlora alpestris*, *Sympetrum meridionale*, *S. pedemontanum*, *S. striolatum* and *S. vulgatum* are considered «visitors». For several species the observations at Col de Bretolet represent the upper limit of their known altitudinal range in Switzerland. The records of *A. parthenope* are the highest for the country and the observation from October 18, 2014 is the latest seasonal occurrence of this species in Central Europe. Several species of the genus *Sympetrum* were involved in mass flights. We also present information suggesting directional migrations in autumn for *A. parthenope* and some species of *Sympetrum*." (Authors)] Address: Thoma, M., Naturhistorisches Museum der Bürgergemeinde Bern, Bernastr. 15, CH-3005 Bern, Switzerland. E-mail: thoemi@bluemail.ch

14977. Thornton, J.L.; Switzer, P.V. (2015): Factors affecting the spatial distribution of oviposition sites for tandem Black Saddlebags Dragonflies (Odonata: Libellulidae). *Journal of Insect Science* 15: 5pp. (in English) ["Oviposition site location may be affected by (1) factors influencing the costs and benefits to the offspring (e.g., resource availability, competition, predation risk) and (2) factors influencing the costs and benefits to the female (e.g., predation risk or mate harassment). In cases in

which both the male and female are involved in locating a site, costs and benefits may differ for each parent and the resulting oviposition site location may represent the outcome of selection pressures on one or both of them. We studied oviposition behaviour in *Tramea lacerata*, a species in which the male and female typically remain together (i.e., in tandem) while travelling among potential oviposition locations. Oviposition sites tended to be away from pond shoreline at the outer edge of the vegetation on the water's surface. We found that tandems distributed their oviposition locations widely around the pond, and interactions with other dragonflies (typically other *T. lacerata*, either territorial males or tandems) led to a larger distance between consecutive oviposition locations. Interestingly, for 10% of the tandems, the female became separated from the male and oviposited solitarily multiple times. These solitary females spent significantly less time and travelled significantly smaller distances between successive oviposition sites than when in tandem. Our results indicate that while some aspects of oviposition behaviour and site selection may be consistent between the male and female (e.g., the characteristics that make a site suitable), other aspects, such as the distribution of sites, may be a result of a differing benefits and costs for the two sexes, perhaps as a consequence of potential sperm competition." (Authors)] Address: Switzer, P.V., Department of Biological Sciences, Eastern Illinois University, Charleston, IL, USA. E-mail: pvswitzer@eiu.edu

14978. Tiple, A.D.; Koparde, P. (2015): Odonata of Maharashtra, India with notes on species distribution. *J. Insect Sci.* (2015) 15(1): 47; DOI: 10.1093/jisesa/iev028: 10 pp. (in English) ["Maharashtra, the third largest state of India, harbours a variety of land-use and occupies six biogeographic provinces. We carried out Odonata surveys in Maharashtra during 2006–2014. Compilation of all these studies along with other authenticated records resulted in a checklist of 134 species of Odonata belonging to 70 genera representing 11 families. The highest numbers of species were recorded from the Libellulidae (48 species) and Gomphidae (22 species) families. A previous study had reported 99 species of Odonata from the Maharashtra state considering records from early 1900's to 2012. Our observations across the state add 33 species to this list. Maharashtra forms a unique source of Odonata diversity and our observations support the importance of this region in providing valuable habitats for Odonata. Here, we discuss several of the new records, how global surveys might help fill the local gap in species distributions, how secondary data deposited through crowd-sourcing can help and what it offers to conservation." (Authors)] Address: Tiple, A.D., Department of Zoology, Vidhyabharti College, Seloo, Wardha, Maharashtra, India. E-mail: ashishdtiple@yahoo.co.in

14979. Trueman, J.W.H.; Yeates, D.K. (2015): Can whole-drawer images measure up? A reply to Johnson

et al. (2013). *ZooKeys* 500: 141-149. (in English) ["Johnson et al. (2013) found that morphometric measurements of dragonfly wings taken from actual specimens and measurements taken from whole-drawer images of those specimens were equally accurate. We do not believe that their conclusions are justified by their data and analysis. Our reasons are, first, that their study was constrained in ways that restrict the generalisability of their results, but second, and of far greater significance, their statistical approach was entirely unsuited to their data and their results misled them to erroneous conclusions. We offer an alternative analysis of their data as published. Our reanalysis demonstrates, contra Johnson et al., that measurements from scanned images are not a reliable substitute for direct measurement." (Authors)] Address: Yeates, D.K., The Australian National Insect Collection, CSIRO National Research Collections Australia, PO Box 1700 Canberra ACT 2601, Australia. da-vid.yeates@csiro.au

14980. Tüzün, N.; Debecker, S.; Op de Beeck, L.; Stoks, R. (2015): Urbanisation shapes behavioural responses to a pesticide. *Aquatic Toxicology* 163: 81-88. (in English) ["Highlights: •We tested for effects of urbanisation on vulnerability to chlorpyrifos in *Coenagrion puella*. •Behavioural responses to chlorpyrifos differed between urban and rural populations. •Exposed rural larvae decreased activity and feeding at 20 °C and 24 °C. •Exposed urban larvae increased activity and only reduced feeding at 24 °C. •Results suggest local adaptation to higher pesticide levels in urban populations. The degree of urbanisation is rapidly increasing worldwide. Due to anthropogenic impact, urban populations are exposed to higher levels of contaminants and higher temperatures. Despite this, urbanisation is a largely overlooked spatial component in ecotoxicology. We tested in a common garden rearing experiment whether replicated urban and rural populations of *C. puella* differ in their vulnerability to sublethal levels of a widespread pesticide, chlorpyrifos, in terms of ecologically relevant behaviours (exploration behaviour, activity, boldness and food intake), and to what extent these patterns are affected by temperature (20 and 24 °C). Except boldness, all behaviours were affected by previous pesticide exposure. While the pesticide did not affect exploration behaviour at 20 °C, it was associated with increased exploration at 24 °C, which may reflect an increased toxicity of chlorpyrifos at higher temperatures. Importantly, rural and urban larvae showed consistently different, sometimes even opposite behavioural responses to pesticide exposure. When exposed to the pesticide, rural larvae decreased activity and food intake at both temperatures; urban larvae instead increased activity at both temperatures and only reduced food intake at the high temperature. This suggests that urban larvae were less affected by the pesticide, which would be consistent with a scenario of local adaptation to higher contaminant levels. Our results highlight that urbanisation may be an important factor to arrive at a spatially explicit

ecological risk assessment, and may be an ignored reason why studies on the same species may generate widely different vulnerabilities to pesticides." (Authors)] Address: Tüzün, N., Laboratory of Aquatic Ecology, Evolution & Conservation, Univ. Leuven, Charles Deberiotstraat 32, B-3000 Leuven, Belgium. nedim.tuzun@bio.kuleuven.be

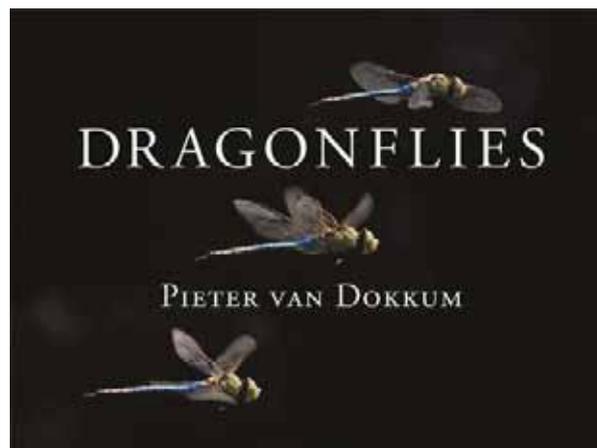
14981. Uboni, C.; Nadalon, G.; Schröter, A. (2015): Evidence of breeding of *Selysiotthemis nigra* in the regions of Friuli Venezia Giulia and Veneto, northeastern Italy (Odonata: Libellulidae. *Notulae odonatologicae* 8(5): 128-136. (in English) ["*Exuviae* of *S. nigra* collected at two artificial lakes in the regions of Friuli Venezia Giulia and Veneto on the northern Adriatic coast in Italy represent the northernmost evidence of breeding of the species worldwide. Basic information on the larval habitat is given and the recent apparent range expansion is outlined and discussed." (Authors)] Address: Uboni, Costanza, Via B. Colleoni n15, Trieste, 34144, Italy. E-mail: costanza.uboni@gmail.com

14982. Udagedara, U.S.C.; Kularatne, H. (2015): A new record of *Indolestes divisus* (Hagen, 1862) from Kegalle District, Sri Lanka (Odonata: Lestidae). *Notulae odonatologicae* 8(5): 147-150. (in English) ["The rare *I. divisus* endemic to Sri Lanka is reported from Kegalle District for the first time. On 27-iv-2014 and 01-v-2014, respectively, one male and one female were observed and photographed approximately 25 km southwest of Kandy, near Aranayake, at Welimanna village (7°09'30"N, 80°27'18"E). Increasing usage of agricultural pesticides, habitat destruction and water pollution pose potential threats for this newly discovered small population." (Authors)] Address: Udagedara, U.S.C., National Cleaner Production Centre, 251/30, Kirula Road, Narahenpita 10100, Colombo 05, Sri Lanka. E-mail: susanthauoc@gmail.com

14983. Ujszegi, J.; Gál, Z.; Mikó, Z.; Hettyey, A. (2015): No observable effect of a glyphosate-based herbicide on two top predators of temporal water bodies. *Environmental Toxicology and Chemistry* 34(2): 307-313. (in English) ["The application of pesticides has been implied to be involved in the world-wide decline of biodiversity, but little is known about the influence of these chemicals on key predators of temporary wetlands. We examined the direct impacts of a frequently applied glyphosate-based herbicide on larval *Aeshna cyanea* and adult male *Lissotriton vulgaris* (Amphibia), two top predators of Central European ephemeral ponds. We measured effects of herbicide-exposure on survival, behaviour, body mass change and predatory activity in an outdoors mesocosm experiment lasting 17 days. We observed no significant effects of exposure on either trait in either predator species. Our results suggest that the herbicide has no immediate effect at environmentally relevant concentrations on the studied predators and these can fulfill their top-down regulatory role also in contaminated ecosystems." (Authors)] Ad-

dress: Ujszegi, J., Lendület Evolutionary Ecology Research Group, Plant Protection Institute, Centre for Agricultural Research, Hungarian Acad. of Sciences, Budapest, Hungary. E-mail: ujszegi.janos@gmail.com

14984. Van Dokkum, P. (2015): *Dragonflies: Magnificent creatures of water, air, and land*. Yale University Press: 176 pp. (in English) [This is a coffee table book with only few interesting photographs. Experienced dragonfly watchers and photographers may be a little bit surprised reading the partly enthusiastic reviews of this book. (Martin Schorr)]



14985. Virani, R.; Kawade, S. (2015): Odonate diversity of some of the wetlands of Yavatmal district, Maharashtra. *Review of research* 4(6): 1-5. (in English) [Odonate fauna were surveyed from three wetlands of Yavatmal district, Maharashtra, India from July 2013 to May 2014. 38 species are checklisted.] Address: Virani, R., Dept of Zoology, S. M. Collage Pandharkawade, Dt Yvatmal, India

14986. Whatley, M.H.; van Loon, E.E.; Cerli, C.; Vonk, A.; van der Geest, H.G.; Admiraal, W. (2014): Linkages between benthic microbial and freshwater insect communities in degraded peatland ditches. *Ecological Indicators* 46: 415-424. (in English) ["Many wetlands are heavily modified and identifying the environmental drivers of indicator groups like aquatic insects is complicated by multiple stressors and co-varying environmental factors. Yet, incorporating data from other biological groups, such as microbial communities, potentially reveals which environmental factors are underpinning insect community composition. In the present study we investigated the application of benthic microbial community composition, as determined by phospholipid fatty acid (PLFA) analysis, alongside aquatic insect data in 25 peatland ditches in the province of North Holland, The Netherlands. We applied clustering and principal component analysis to a matrix of 26 PLFAs to group ditches by the microbial community. Generalized linear models were used to examine correlations between microbial PLFAs, insects, vegetation (emergent and submerged) and abiotic factors. The ratio of heterotrophic (e.g. sulphate re-

ducing bacteria) to autotrophic (e.g. algae and cyanobacteria) derived PLFAs could be estimated as the ratio between saturated and branched to monounsaturated and polyunsaturated fatty acids (SB/MP). SB/MP was correlated with insect community composition, differences in water chemistry (in particular bicarbonate, sulphate and nutrients) and vegetation cover in the ditches. Moreover, ditches distinguished by their microbial communities differed in the number of insects they supported with differences most pronounced for Odonata, Trichoptera and Chironomus larvae. This study demonstrates that integrating microbial and aquatic insect community data provides insight into key environmental drivers in modified aquatic ecosystems and may facilitate the development of remediation strategies for degraded wetlands. Linkages between benthic microbial and freshwater insect communities in degraded peatland ditches." (Authors) Address: Whatley, M.H., Aquatic Ecology & Ecotoxicology, Institute for Biodiversity and Ecosystem Dynamics (IBED), University of Amsterdam, Sciencepark 904, NL-1098 XH Amsterdam, The Netherlands. E-mail: merrin.whatley@gmail.com

14987. Wiles, C.M.; Bolek, M.G. (2015): Damselflies (Zygoptera) as paratenic hosts for *Serpinema trispinosum* and its report from turtle hosts from Oklahoma, USA. *Folia Parasitologica* 62: 019, 2015, 8 pp (in English) ["Third-stage larvae of the nematode *Serpinema trispinosum* (Leidy, 1852) were collected from the midgut of four of five species of adult damselflies (Zygoptera) from a non-irrigated restored semipermanent wetland located in Stillwater, Oklahoma, USA. Of the four infected damselfly species, prevalence and mean abundance was highest for the southern spreadwing, *Lestes disjunctus australis* (10%, 0.2 ± 0.8) and lowest for the familiar bluet, *Enallagma civile* (Hagen) (2.5%, 0.04 ± 0.3); whereas mean intensities were lowest for the citrine forktail, *Ischnura hastata* (1.5 ± 0.5) and the eastern forktail, *Ischnura verticalis* (1.0 ± 0). This is the first record of larvae of *S. trispinosum* from damselflies. *Serpinema trispinosum* adults have been reported from 18 species of North and Central American freshwater turtles, whereas microcrustaceans such as copepods serve as intermediate hosts and snails, fish and amphibians serve as paratenic hosts in this nematode's life cycle. However, dietary studies of the 18 species of freshwater turtles reported as definitive hosts for *S. trispinosum* indicate that aquatic insects including damselflies are more commonly reported in turtle diets than are fish or amphibians. Additionally, unlike snails and amphibians, larval damselflies predominantly feed on microcrustaceans, and our observation of *S. trispinosum* infecting damselflies may reflect the importance of these insects as paratenic hosts. In the present study, we provide new host information and measurements for third-stage larvae of *S. trispinosum* from damselfly hosts along with measurements for adult male and female *S. trispinosum* from turtle hosts from Oklahoma, USA." (Authors)] Address: Bolek, M.G., Dept of Zoology, Oklahoma State Univ., 501

Life Sciences West, Stillwater Oklahoma, 74078, USA. Phone: (+1) 405 744 9675; Fax: (+1) 405 744 7824; E-mail: bolekm@okstate.edu

14988. Worthen, W.B.; Horacek, H.J. (2015): The distribution of dragonfly larvae in a South Carolina stream: Relationships with sediment type, body size, and the presence of other larvae. *J. Insect Sci.* 15(31): DOI: 10.1093/jisesa/iev013: 7 pp. (in English) ["Dragonfly larvae were sampled in Little Creek, Greenville, SC. The distributions of five common species were described relative to sediment type, body size, and the presence of other larvae. In total, 337 quadrats (1m by 0.5 m) were sampled by kick seine. For each quadrat, the substrate was classified as sand, sand-cobble mix, cobble, coarse, or rock, and water depth and distance from bank were measured. Larvae were identified to species, and the lengths of the body, head, and metafemur were measured. Species were distributed differently across sediment types: *Progomphus obscurus*, were common in sand; *Cordulegaster maculata*, preferred a sand-cobble mix; *Ophiogomphus mainensis*, preferred cobble and coarse sediments; *Boyeria vinosa*, preferred coarse sediments; and *Stylogomphus albistylus*, preferred coarse and rock sediments. *P. obscurus* and *C. maculata* co-occurred more frequently than expected by chance, as did *O. mainensis*, *B. vinosa*, and *S. albistylus*. Mean size varied among species, and species preferences contributed to differences in mean size across sediment types. There were significant negative associations among larval size classes: small larvae (<12 mm) occurred less frequently with large larvae (>15 mm) than expected by chance, and large larvae were alone in quadrats more frequently than other size classes. Species may select habitats at a large scale based on sediment type and their functional morphology, but small scale distributions are consistent with competitive displacement or intraguild predation." (Authors)] Address: Worthen, W.B., Biology Department, Furman University, Greenville, SC 29613, USA. E-mail: wade.worthen@furman.edu

14989. Xie, C.-M.; Huang, W.-X. (2015): Vortex interactions between forewing and hindwing of dragonfly in hovering flight. *Theoretical & Applied Mechanics Letters* 5(1): 49 -54. (in English) ["Two tandem flapping wings in viscous flow were modelled by using the immersed boundary method for exploration of the aerodynamics of dragonfly in hovering flight. Interaction between the forewing and the hindwing, and its effect on the lift forces, were examined by varying the phase difference of the wing motions and the inter-distance of the two wings. Two vortex interaction modes were identified at different phase differences and inter-distances, which give rise to significant variations of the lift forces. The first interaction mode increases the lift of the forewing and the second one enhances the lift of the hindwing. The two modes occur at different time during a flapping period and have different influence on the lift of wings as the phase difference varies." (Authors)] Address: Xie, C.-M., Sino-French

Engineer School, Beijing University of Aeronautics and Astronautics, Beijing 100191, China

14990. Xu, Q.-H. (2015): Description of the final stadium larva of *Heliocypha perforata perforata* (Percheron), with discussion of the taxonomic characters of the larvae of the genus *Heliocypha* Fraser (Odonata: Zygoptera: Chlorocyphidae). *Zootaxa* 3926(1): 137-141. (in English) ["The final stadium larva of *Heliocypha perforata perforata* is described and illustrated for the first time. It is characterized by having a row of filiform setae present laterally on distal half of prementum, 6-7 setae on the outer side of palpal lobe, very long lateral gills and distinct abdominal colour pattern. The taxonomic characters of the larvae of the genus *Heliocypha* are discussed and summarized. *Heliocypha* larvae share a high similarity with *Rhinocypha* in general appearance and cannot be clearly distinguished from the latter in structure." (Author)] Address: Xu, Q.-H., Department of Garden and Horticulture, Zhangzhou City University, Zhangzhou, Fujian 363000, PR China. E-mail: qihanxu@aliyun.com

14991. Yeh, W.-C.; Lee, I.-L.; Wong, K.-C. (2015): Description of *Sarasaeschna kaoi* sp. nov. in Taiwan, with notes on the proposed differentiating characters of the pyanan-group (Odonata, Aeshnidae). *Zootaxa* 3926(1): 122-128. (in English) ["*Sarasaeschna kaoi* sp. nov. collected from Yuli, Hualien County in eastern Taiwan, is easily distinguished from all known congeners by its male having short and straight cerci. Judging from male penile structure, it is considered to belong to the pyanan-group of species and resembles in general appearance the Chinese *S. zhuae* described from Fujian. The only known habitat of *S. kaoi* is a muddy and grassy swamp in natural evergreen forest. The diagnostic characters of the pyanan-group proposed by Karube & Yeh are also discussed." (Authors)] Address: Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute (TFRI), No.53, Nanhai Rd., Zhongzheng Dist., Taipei City 10066, Taiwan. E-mail: wcyeh@tfri.gov.tw

14992. Zheng, D.; Zhang, H.; Zhang, Q.; Li, S.; Wang, H.; Fang, Y.; Liu, Q.; Jarzembowski, E.A.; Yan, E.; Wang, B. (2015): The discovery of an Early Cretaceous dragonfly *Hemeroscopus baissicus* Pritykina, 1977 (Hemeroscopidae) in Jiuquan, Northwest China, and its stratigraphic implications. *Cretaceous Research* 52, Part B: 316-322. (in English) ["The Early Cretaceous dragonfly *Hemeroscopus baissicus* Pritykina is reported for the first time from the Jiuquan Basin, Gansu Province, Northwest China based on adult wings. These wings are different from those from other localities in two aspects: the oblique crossvein 'O' is 3 or 4 cells distal of the subnodus; the wing size is much smaller (30–42 mm in length for forewings). These differences are considered to be intraspecific variations, based on which diagnoses of the genus *Hemeroscopus* and the family Hemeroscopidae are revised. The discovery of *H. baissicus* in Jiuquan suggests that the Zhonggou Forma-

tion may be correlated with the Fuxin Formation in Liaoning Province, the Lushangfen Formation in western Beijing, and the Dongmyeong Formation in southern Korea. A possible migration path of the dragonfly is indicated that it initially appeared in Transbaikalia in the Aptian, migrated southwestwards to Mongolia in the Aptian or early Albian, and then southwestwards to northwest China, southeastwards to northeast China, and southern Korea in the early Albian." (Authors)] Address: Zheng, H., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing 210008, China. E-mail: hc Zhang@nigpas.ac.cn

14993. Zhu, G.-p.; Yu, X.; Bu, W.j. (2015): Ecology and conservation of *Pseudolestes mirabilis* (Odonata: Zygoptera), a damselfly endemic to Hainan Island of China. *Entomological Science* 18(1): 123-129. (in English) ["Although some efforts have addressed oriental dragonfly conservation, knowledge on the ecology and geographic distribution of such dragonflies remains scant. *P. mirabilis* is endemic to Hainan Island of China. This damselfly was recommended by the International Union for the Conservation of Nature to be of priority for further study and conservation. In this work, we use ecological niche modelling techniques to estimate the dimensions of the realized niches of this damselfly and to predict its potential distribution. Our findings suggest that the phoenix damselfly possessed a small climate space characterized by low temperature and high precipitation. Highly suitable areas are mainly distributed in the low-altitude regions of southern central tree-covered mountains in Hainan. Caution is warranted when considering the potential habitat loss attributed to human activity and climate change." (Authors)] Address: Bu, W.j., College of Life Sciences, Nankai University, Tianjin, China. E-mail: wenjunbu@nankai.edu.cn



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Last words ...

Going on with a project or task, requires a minimum of feedback. Compiling and preparing the abstracts of OAS requires on an average of 15 minutes per abstract. That is a lot of time considering that in the meantime nearly 16000 abstracts have been arranged. There have been less than the ever same 5-10 people – and I am more than thankful for their encouragement to go on with abstracting! – giving this feedback. More, it was and is frustrating to see that those responsible of WDA never engaged in this journal, even didn't inform the members via a simple e-mail when a new issue was ready, in spite we several times asked them to do so. In the beginning of OAS, Jill Silsby and the board of WDA supported the editors of OAS, but the new generations of boards obviously forgot, OAS was a journal of WDA too.

A journal without feedback is probably without benefit for the majority of readers, and will have to be ceased. And I do so with this double issue. This must not be the final end. But, any restart will depend on private priorities. Hope, there will be a few odonatologists missing OAS...

I am very thankful to Jill and Philip Corbet for all the encouragements without we never would have started the journal. I am thankful to Martin Lindeboom and Klaus Reinhardt for all the years of assistance, and especially to Milen Marinov. Thanks to Pawel Buczynski, who checked the spelling of Slavic languages. And thanks to all who provided papers to be considered as abstract.

Martin Schorr

14994. Hutchinson, J.M.C. (1998): Factors influencing the surface fauna of inland blue holes on South Andros, Bahamas. *Cave and Karst Science* 25(2): 83-92. (in English) ["We surveyed the macrofauna (particularly insects, molluscs and birds) of the surface waters of a series of inland, mostly anchialine, blue holes (flooded caves and associated lakes). The number of species was small, but the fauna varied considerably between holes. The following factors are evaluated as causes of these patterns: isolation and past inundation of Andros island, difficulty of dispersal between holes, topography (size of hole, water depth, whether ringed by cliffs), the surrounding vegetation, water quality (salinity, aeration, nutrients), tidal influence, human disturbance and pollution. Conservation issues are discussed, but generally the surface fauna is shared with far more extensive habitats on Andros. The same conclusion is drawn about the fauna of two subaerial caves associated with blue holes. A special study was made of Odonata. Around most holes we searched for exuviae, in some holes we found live nymphs, and we also noted whether adults were ovipositing. From this evidence at least seven species were breeding in blue holes: *Ischnura ramburi*, *Neoerythromma cultellatum*, *Anax junius*, *Brachymesia furcata*, *Erythrodiplax berenice*, *Macrodiplax balteata*, *Tramea onusta*. Table 1 shows the strong effect of salinity on diversity. *E. berenice* could breed even in the most saline holes, but the next two most tolerant species were not found breeding in salinities over 9.8 ppt. No dragonflies were observed around Swimming Hole and Co-op Hole despite each being visited twice in suitable conditions. The probable reason is that both lack shallows. The richest blue hole was Battle Hole (12 species), the least saline of the fracture-line holes, with extensive shallows, much algae and extensive overhanging vegetation. In comparison, several of the quarries filled with shallow fresh or weakly brackish water had 14 or

15 species frequenting them. In total we observed 26 species on South Andros, with indications of breeding for 16." (Author)] Address: Hutchinson, J.M.C., School of Biological Sciences, University of Bristol, Woodland Road, Bristol, BS8 1UG, UK. E-mail: John.Hutchinson@bristol.ac.uk

2000

14995. Davies, N.M.; Norris, R.N.; Thoms, M.C. (2000): Prediction and assessment of local stream habitat features using large-scale catchment characteristics. *Freshwater Biology* 45: 343-369. (in English) ["(1.) Knowledge of what a habitat should be like, in the absence of the effects of human activities, is fundamental to local stream habitat assessment. It has been suggested that stream habitats are influenced by large-scale catchment features. This study aimed to identify these relationships so that local-scale habitat features could be predicted from larger-scale characteristics. (2.) Fifty-one reference sites from the Upper Murrumbidgee River catchment, south-eastern Australia, were classified on the basis of the local features of their stream habitat. Large-scale variables, namely catchment area, stream length, relief ratio, alkalinity, percentage of volcanic rocks, percentage of metasediments, dominant geology and dominant soil type, provided sufficient information for classifying 69% of reference sites into appropriate reference site groups. (3.) A model created using these large-scale catchment variables was able to predict the local habitat features that were expected (E) to occur at a site in the absence of the effects of human activities. These were compared with observed (O) local habitat features to provide an observed-to-expected (O/E) ratio, an assessment score of the habitat at a site. The departure of this ratio from 1 enables identification of those sites that may be impacted. A list of habitat features that are expected at a site can provide targets for habitat restoration or enhancement. (4.) For impacted sites, when habitat assessment from the habitat predictive model was compared with biological assessment from the Australian River Assessment System (AUSRIVAS) predictive model, it was possible to identify whether habitat degradation or water quality degradation was the cause of biological impairment. Such assessment may make it possible to identify rehabilitation goals relevant to the biota." (Authors) Taxa are treated at family level, including Coenagrionidae and Gomphidae.] Address: Davies, N.M., Coop. Research Centre for Freshwater Ecology, Univ.Canberra, ACT 2601, Australia

14996. Thapa, V.K. (2000): Appendix to Order Odonata. An inventory of Nepal's insects, Vol. III. IUCN Nepal, Kathmandu. xi + 475 pp: 465-471. (in English) [Nepal; 63 species are checklisted with brief information on localities.] Address: IUCN Nepal, P.O. Box 3923, Kathmandu, Nepal

2001

14997. Purse, B.V. (2001): The ecology and conservation of the Southern Damselfly (*Coenagrion mercuriale*). PhD Thesis, University of Liverpool: 336 pp. (in English) ["This thesis presents an autecological study of *C. mercuriale*), a

rare insect that is on the northern edge of its range in Britain. The primary aims of this study were to examine habitat use (at both broad and small scales) and to investigate other aspects of development and behaviour in *C. mercuriale* with a view to devising appropriate management practices for the species. *Coenagrion mercuriale* was found to be restricted in its national and global distribution and was estimated to have undergone more than a 30% decline in its British distribution since 1985. It is a stenotopic species being highly sensitive to a number of habitat factors at both broad and small scales of habitat use. A requirement for a thermally advantageous microclimate was reflected in broad scale habitat use (e.g. use of shallow, sun-exposed, permanently flowing waterbodies indicated by perennial, herbaceous, aquatic vegetation) and in habitat use for oviposition and emergence by *C. mercuriale*. This species was found to have a semi-voltine life cycle in Britain, with a shorter larval growth period and flight period than in mainland European populations. Seasonal regulation is probably achieved in Britain by a facultative autumn diapause in the penultimate larval instar. In field experiments, mature adults of *C. mercuriale* exhibited a relatively low rate of emigration and travelled relatively short distances over non-habitat. However, examination of the distances between extant sites suggest that such rates of dispersal may be sufficient to promote founding and persistence of local populations within four large clusters of populations in Britain. Weather conditions, namely temperature were found to effect daily emergence, activity (including reproductive activity) and mature adult survival. Thus, in common with other thermophilic insects, *C. mercuriale* was found to be limited by temperature in many respects on the edge of its range. The requirement for a thermally advantageous microclimate restricts this species to an early successional stage in both its biotopes and a range of management practices are suggested for maintenance of such stages on *C. mercuriale* sites in Britain. Since rates of dispersal seemed highly dependent on landscape structure, management to facilitate movement between sites across non-habitat was also suggested." (Author)] Address: Purse, Beth, Population and Evolutionary Biology Research Group, Nicholson Building, Univ. Liverpool, School of Biological Sciences, Liverpool, L69 3GS, UK. E-mail: beth.purse@bbsrc.ac.uk

14998. U.S. Fish and Wildlife Service; Zercher, D. (2001): Hine's Emerald Dragonfly recovery plan. Fort Snelling, MN: 120 pp. (in English) ["Current Status: Hine's Emerald Dragonfly (*Somatochlora hineana*), was listed as endangered in January 1995. Extant *S. hineana* populations are currently known to persist in Illinois, Wisconsin, Michigan, and Missouri. The Illinois population is the most genetically diverse, and the Wisconsin populations are the largest and presumably most secure. Information on the status of the Michigan and Missouri populations is limited because of their recent discoveries. Historically known from Ohio and Indiana, it is thought to be extirpated from these states. Habitat Requirements and Limiting Factors: *S. hineana* occupies marshes and sedge meadows fed by calcareous groundwater seepage and underlain by dolomite bedrock. In general, these

areas are characterized by the presence of slowly flowing water and nearby or adjacent forest edges. Known occupied habitats are currently restricted to the lower Des Plaines River valley, in Illinois; northeastern Door County and Cedarburg Bog, Wisconsin; areas of the Hiawatha National Forest, in the Upper Peninsula of Michigan, three areas in the Lower Peninsula of Michigan, and at three fens in Missouri. Loss of this already rare and restricted habitat to agriculture, commercial and industrial development is the primary cause of the species' decline. Loss of remaining habitat from the same pressures, combined with successional change in the existing habitats and disruption of ecological and hydrological processes, are threats to surviving populations. Recovery Objectives: The objective of this recovery plan is to restore *S. hineana* to viable populations so that it may be removed from the Federal list of Endangered and Threatened Wildlife and Plants. Recovery Criteria: Each of the two Recovery Units contains a minimum of three populations composed of at least three subpopulations. Each subpopulation contains a minimum of 500 reproductive adults for 10 consecutive years. Within each subpopulation, there are at least two breeding habitat areas, each fed by separate seeps and/or springs. For each population, the habitat supporting at least three subpopulations should be legally or formally protected and managed for *S. hineana*, using long-term protection mechanisms such as watershed protection, deed restrictions, land acquisition, or nature preserve dedication. In addition, mechanisms protecting the up gradient groundwater watershed should also be in place." (Authors)] Address: U.S. Fish & Wildlife Reference Service, 5430 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814, USA

2002

14999. Domek, P.; Joniak, T. (2002): Seasonal changes of macrobenthos under physiological and chemical water conditions in humic lakes. *Materialy 9 Ogólnopolskich Warsztatów Bentologicznych*. - [Abstracts of the 9th Polish Workshop of Benthology]. Mikolaj: 5. (in Bilingual in Polish and English) [Verbatim: The investigation on taxonomic content, density and dominance structure of benthos organisms was carried out in spring and autumn in 1999-2000. Three humic lakes of Drawieński National Park were researched; littoral as well as profundal zone were taken into account. Physico-chemical properties of the lake water were evaluated on the basis of field as well as laboratory analyses. Amount of humic substances (HS) dissolved in the water made it possible to classify Glodne Lake III (GL III) as a polihumic lake, Glodne Lake IV (GL IV) as a mesohumic, and Piaseczno Male Lake (PML) as an oligohumic lake (Eloranta 1999). HS influence the water colour, limit the range of euphotic layer, lower the pH and fix numerous organic as well as inorganic compounds into complexes that are difficult to decomposition. Concentrations of the dissolved reactive phosphorus (DRP) that is easily assimilated by the organisms, were in comparison to the amount of total phosphorus lower than usually associated with this type of lakes. Average annual concentrations of the DRP totaled not more than 0.01

mg P l⁻¹; moreover, in PML the amount was average by a half lower than in other lakes. Concentrations of phosphorus undergo seasonal changes, especially in spring and autumn which is the time of lake water mixing. The modification of settlement conditions caused by the presence of HS, formed living conditions of benthos organisms the lakes. 28 taxons belonging to 10 systematic groups were found. PML and GL IV turned out to be the most rich in fauna (respectively 19 and 18 taxons). In the third of the investigated lakes 12 taxons of macrozoobenthos were found. In GL IV the number of taxons was much higher in autumn than in spring, and in the other lakes their number was similar regardless to the seasonal changes. The most qualitatively differentiated groups were Odonata: *Cordulia aenea*, *Enallagma cyathigerum*, *Ischnura elegans*, *Leucorrhinia* sp., *Pyrrhosoma nymphula* and *Somatochlora metallica*. Of all the other groups of insects only Ephemeroptera, Hirudinea and Coleoptera were represented by more than one taxon. In GL III the most numerous were Diptera (37%) and Ephemeroptera (33%), and the contribution of organisms of other groups, with the exception of Trichoptera, totaled less than 10%. In GL IV the dominance of Diptera was marked even more clearly (54%), and the second numerous were Hydracarina (22%). In PML Diptera constituted a large majority (80%) of macrozoobenthos and contribution of other groups, with the exception of Ephemeroptera, was minimal. Concentration of macrozoobenthos in littoral zone was mostly higher than in profundal and totaled from 2070 ind. m² in spring to 2438 ind. m² in autumn in GL IV, and in PML from 1426 ind. m² in spring to 2714 ind. m² in autumn. In profundal zone of GL III macrozoobenthos was not found. Altogether, in profundal zone 3 of all the 28 taxons were found.] Address: not stated

2003

15000. Goodwin, W.; Goodwin, V. (2003): First field guide to dragonflies of South Africa. SASOL First Field Guides. Random House Struik: 56 pp. (in English) ["This field guide introduces the little-known world of the colourful dragonflies and damselflies of southern Africa. The introduction explores dragonfly characteristics and biology, and offers useful advice for collectors. The author describes 35 species, their physical appearance, habits and habitat; and each account is accompanied by a drawing of the creature's genital appendage (its diagnostic feature), a colour photograph and distribution map." (Publisher)] Address: not stated

15001. Mitra, T.R. (2003): Fauna of Sikkim: Insecta, Odonata. State fauna Ser. Zoological Survey of India 9 (Sikkim 2): 125-164. (in English) [A monograph, covering 65 species, with synonymy, localities, descriptions and keys.] Address: Mitra, T.R., Zoological Survey of India, M-Block, New Alipore, Calcutta-700 053, India

15002. Theischinger, G.; Fleck, G. (2003): A new character useful for taxonomy and phylogeny of Anisoptera (Odonata). *Bulletin de la Société entomologique de France* 108(4): 409-412. (in English, with French summary) ["The

presence/absence of a well-defined, narrow, largely parallel sided, medio-basal groove of variable length on the ventral face of the prementum is introduced as a useful character for the separation of the larvae of corduliid/corduliine s. l. from libellulid/libelluline s. l. genera. It is pointed out that this groove is also present in some members of all epiproctophoran families. The distribution of the character in Libelluloidea, and its potential for rapid biological assessments and phylogenetic studies are discussed. It is suggested that the absence of the groove/suture is apomorphic. A table showing the hitherto established presence of the groove/suture in the corduliid genera of the World is presented." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

2004

15003. Bromham, L.; Woolfit, M. (2004): Explosive radiations and the reliability of molecular clocks: Island endemic radiations as a test case. *Syst. Biol.* 53(5): 758-766. (in English) ["The reliability of molecular clocks has been questioned for several key evolutionary radiations on the basis that the clock might run fast in explosive radiations. Molecular date estimates for the radiations of metazoan phyla (the Cambrian explosion) and modern orders of mammals and birds are in many cases twice as old as the palaeontological evidence would suggest. Could some aspect of explosive radiations speed the molecular clock, making molecular date estimates too old? Here we use 19 independent instances of recent explosive radiations of island endemic taxa as a model system for testing the proposed influence of rapid adaptive radiation on the rate of molecular evolution. These radiations are often characterized by many of the potential mechanisms for fast rates in explosive radiations — such as small population size, elevated speciation rate, rapid rate of morphological change, release from previous ecological constraints, and adaptation to new niches — and represent a wide variety of species, islands, and genes. However, we find no evidence of a consistent increase in rates in island taxa compared to their mainland relatives, and therefore find no support for the hypothesis that the molecular clock runs fast in explosive radiations." (Authors) The study includes data on the genus *Megalagrion*.] Address: Bromham, Lindell, Centre for the Study of Evolution, School of Life Sciences, University of Sussex, Falmer, Brighton, BN1 9QG, UK. E-mail: lindell@sussex.ac.uk

15004. Kumar, A.; Sharma, G. (2004): Some selected fauna of Gobind Pashu Vihar. *Odonata. Zoological Survey of India* 18(90): 5-8. (in English) [Records of 12 odonate species are based on the collection of Odonata from the Wildlife Sanctuary in the Northern Regional Station of Zoological Survey of India at Dehra Dun.] Address: Kumar, A., Northern Regional Stn., Zool. Surv. India, Dehra Dun-248195, India

15005. Mitra, T.R. (2005): *Calicnemia miniata doonensis* Sangal and Tyagi a synonym of *Calicnemia carminea pyrrosoma* Lieftinck (Insecta: Odonata: Plalycnemididae). *Records of the Zoological Survey of India* 104(3-4): 161-162. (in English) ["Taxonomic status of *Calicnemia miniata doonensis* Sangal & Tyagi has been discussed; and contended that *C. m. doonensis* Sangal & Tyagi is the junior synonym of *C. carminea pyrrosoma* Lieftinck." (Author)] Address: Mitra, A., Northern Regional Station, Zooll. Survey of India, 218 Kaulagarh Roads, Dehra Dun - 248195, India

15006. Nel, A.; Petrulevicius, J.F.; Gentilini, G.; Martinez-Delclos, W. (2005): Un nouvel Odonate du Miocene d'Italie (Odonata). *Bulletin de la Société entomologique de France* 110(2): 188. (in French) ["Gen. et sp. A" in Nel, A.; Petrulevicius, J.F.; Gentilini, G.; Martínez-Delclòs, X. (2005): Phylogenetic analysis of the Cenozoic family Sieblosiidae (Insecta: Odonata), with description of new taxa from Russia, Italy and France. *Geobios* 38(2): 219-233, is named: *Italolestes stroppai* n. sp.] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

15007. Rouquette, J.R. (2005): Conservation requirements of the Southern Damselfly in chalkstream and fen habitats. *Science Report SC000017/SR*. Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, BS32 4UD: V, 160 pp. (in English) ["Background: This report presents the findings of a PhD study investigating the ecology and conservation requirements of *C. mercuriale* in chalkstream and fen habitats in the UK. *C. mercuriale* is a species of conservation concern. Its status in Europe is considered to be 'very vulnerable' and it is threatened over much of its range. It is listed on the EC Habitats and Species Directive and is the only species of dragonfly or damselfly currently given priority status in the UK Biodiversity Action Plan. Further research into the damselfly's ecological requirements was identified as a key requirement in the Species Action Plan, published in 1995. Since that time, a number of studies have been undertaken, including a doctoral thesis on the ecology of the species in heathland streams (Purse 2001, and published as R&D Technical Report W1-021/TR). However, little work has been carried out on *C. mercuriale* in chalkstream and fen habitats in the UK and so important gaps remain in our knowledge of this species. Main objectives: The primary aim of this study was to examine the ecology and habitat requirements of this species in its chalkstream and fen habitats. It is hoped that the study will provide a basis for further conservation efforts, by guiding habitat management plans, informing conservation strategies and suggesting targets for surveillance and monitoring programmes. Fieldwork was performed primarily in the Itchen and Test Valleys in Hampshire (southern England), but also in fen habitat in Oxfordshire and Anglesey. Results: A large multi-site mark-release-recapture study revealed that *C. mercuriale* was extremely sedentary, with dispersal only occurring between adjoining

sites. The median net lifetime movement was 31.9 m and lifetime movements of greater than 500 m were rare. Factors affecting movement are examined and evidence of inverse density dependent movement is provided. It is argued that this latter finding, together with the short distances moved, has profound consequences for the population dynamics and conservation of this species. Adult *C. mercuriale* density and movement were analysed in relation to habitat variables and local population size. Mean adjacent population density was the single most important factor determining density. However, the species was also shown to be associated with a number of habitat features, the most important of which were: a channel substrate consisting primarily of silt, wide underwater ledges (berms), in-channel Conservation requirements of *C. mercuriale* in chalkstream and fen habitats emergent dicots, and bankside monocots. The presence of trees was negatively associated with damselfly density. *C. mercuriale* larvae were found to occur more often and in greater abundance at sites that contained abundant emergent dicots, particularly in smaller, more marginal channels with slow flow. They were rarely found in areas with much tree cover and were more abundant in locations where the banksides were open to grazing and with gentle or stepped bank profiles. *Apium nodiflorum* (fool's water-cress) and *Rorippa nasturtiumaquaticum* (water-cress) were found to be particularly important. Furthermore, they were associated with certain macroinvertebrate taxa that were indicative of well-vegetated, moderate to slow flowing waterbodies, with a predominantly silty substrate. Habitat requirements of adults and larvae have been found to be similar, although larvae were found in greatest abundance in habitats that were slightly further along the successional sequence than those favoured by adults. The nighttime roosting location of adult *C. mercuriale* has also been examined and it has been established that adults are strongly associated with two tussock-forming monocots, *Juncus inflexus* (hard rush) and *Deschampsia cespitosa* (tufted hair grass). Differences in the abundance of these plants have been shown to result in large differences in the number of *C. mercuriale* roosting in different parts of the study site. Conclusions and recommendations: It is concluded that loss of habitat, alterations to management on remaining sites and fragmentation of a once continuous network of sites, are likely to have been the driving forces behind the decline of this species, and that these remain the greatest threats to its continued existence. It is argued that successful conservation of *C. mercuriale* will involve active management of existing sites, together with the creation (or recreation) of a series of new sites to reconnect populations. Recommendations regarding the monitoring, conservation and management of *C. mercuriale* are presented and include: • New habitat should be created within 500 m to 1 km of existing sites, to create a series of 'stepping-stones' that would rejoin existing populations. • Sluice gates should be installed at some sites to enable proper control over water flow. New ditches created should be shallow and slow flowing throughout, or have ample shallow margins. Bank profiles should be shallow or stepped. • Ditch management operations should be carried out every few years on existing

sites to prevent excessive siltation and vegetation choking the channels. Work should be performed on short sections of ditch on rotation or on one side of the channel only. In all deeper channels shallow berms should be created during dredging work. • Banksides should be lightly grazed by cattle right to the water's edge. Extensive shading should be avoided." (Author)] Address: Rouquette, J.R., University of Liverpool, Liverpool, L69 3BX, UK

15008. Terzani, F.; Marconi, A. (2005): Odonati del Trentino-Alto Adige e del Cadore (Italia settentrionale) (Odonata). *Onychium* 3: 1-10. (in Italian, with English summary) [Dragonflies from Trentino-Alto Adige and Cadore (Northern Italy). A total of 575 specimens belonging to 18 genera and 32 species was collected in 53 stations of Trentino-Alto Adige and Cadore. *Erythromma viridulum* is new for Cadore.] Address: Terzani, F., Museo di Storia Naturale dell'Università di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2006

15009. Garzon Sanabria, C. (2006): Caracterización de la fauna de Odonata (Insecta) en el área metropolitana de Bucaramanga/Santander. Tesis de Pregrado. Universidad Industrial de Santander. Bucaramanga: 41 pp. (in Spanish, with English summary) ["Characterization of the fauna of Odonata (Insecta), in the metropolitan area of Bucaramanga-Santander. - Naiad and adult specimens of the Order Odonata were collected during August 2005 to March 2006 taking into account the climatic regime. As a result, a total of 700 specimens distributed in seven families, 27 genera and 52 species were obtained, representing 22% of the Odonata fauna recorded for the country. *Anax amazili* is reported for Colombia for the first time. Correlation found between species collected as naiads and as adults per sampling site was not complete. Shannon Weiner's Indices of diversity (Fairness), Margalefs species richness, Berger Parker Dominancy, and Jaccard's similarity coefficient were calculated in order to determine a possible relationship between the dragonfly community and the ecological state of the ecosystems. A test of correlation of Mantle cloth between the composition of species in each station and the distance in Kilometers among them, was made. The communities of dragonflies were found to respond to conditions particular to each station, which could be attributed to the present fragmentation effects in the study area, and to the intraspecific competition (for territory, mate, food) characteristic of this order." (Author)] Address: Garzon Sanabria, Carolina, Laboratorio de Zoología y Ecología Acuática (LAZOEA), Universidad de los Andes, Apartado 4976, Bogotá D.C., Colombia. lc.garzon88@uniandes.edu.co

15010. Marconia, A.; Terzani, F. (2006): Odonati della Sierra Leone (Odonata). *Onychium* 4: 1-22. (in Italian, with English summary) ["The purpose of this study has been to analyze odonatological material belonging to the "La Specola" Zoological Museum in Florence which was not included in Carfi & D'Andrea (1994). This material amounts

to nearly 300 specimens belonging to 35 genera and 74 species pertaining to 9 families. New to Sierra Leone are *Pseudagrion kersteni*, *Heliaeschna fuliginosa*, *Ictinogomphus ferox*, *Phyllomacromia* cf. *lamottei*, *Trithemis aconita* and *Trithemis hecate* and *Palpopleura jucunda*. A female gomphid specimen has been described but cannot be ascribed to any known genus or species." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

15011. Rowshan Akhter, U.S. (2006): The life history of *Ceriagrion coromandelianum* (Fabricius) (Odonata: Coenagrionidae). *Bangladesh J. Zool.* 34(1): 117-126. (in English) ["Mating, oviposition, eggs, different larval instars and duration of the larval period of *Ceriagrion coromandelianum* (Fabricius) collected from Ramna Lake, Dhaka city, Bangladesh, are described." (Author)] Address: Rowshan Akhter, U.S., Department of Zoology, Eden Girls College, Dhaka-1000, Bangladesh

2007

15012. Contreras-Gardun o, J.; Buzatto, B.A.; Abundis, L.; Nájera-Cordero, K.; Córdoba-Aguilar, A. (2007): Wing Colour Properties do not Reflect Male Condition in the American Rubyspot (*Hetaerina americana*). *Ethology* 113: 944-952. (in English) ["Adult males of *H. americana* dispute riverine territories where females arrive to mate. On the wing basis, these males bear a red pigmentation spot whose area correlates with territorial disputes and mating rate: males with larger spots are more successful. This is explained by the fact that spot size correlates with fat muscular reserves which fuel flight during territorial intrusions. To further our understanding of sexual selection acting on the spot, here we have examined possible differences in three spot colour properties (red chroma, hue and brightness) in three distinct adult male ages [young, middle-aged (when males are more likely to defend a territory) and old], social status (territorial and non-territorial in middle-aged males), and under two potentially, energetically and costly situations: when faced with an immune challenge [comparing a nylonimplanted male group vs. a non-implanted male group in two ages, teneral (previous to colour formation) and middle-aged] and low diet levels (comparing a male set of middle-aged animals that received food ad libitum vs. a male set that received no food). Our results indicate no change in colour properties across any of these comparisons. Taken together, these and previous results suggest that only spot size but not the spot characteristics we measured here, is sexually selected in males of this species at least in terms of pre-copulatory male-male competition. That some of these colour properties have been related to male condition in other calopterygid damselflies cannot be generalized to the *H. americana*." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

15013. Lahiri, A.R.; Sandhu, R.; Walia, G.K. (2007): *Gynacantha pallampurica* sp. nov. from Northern Himachal Pradesh, India (Odonata: Aeshnidae). *Rec. Zool. Surv. India* 107(3): 45-49. (in English) ["*Gynacantha palolampurica* sp. nov. is described from northern Himachal Pradesh together with illustration and comparative notes (*C. dravida*). Holotype male, Andretta (Pallampur, Himachal Pradesh), 29.ix.2004, coll. G. Walia "in the vicinity of a montane stream surrounded by a thick vegetation" (ZSI Regd. No. 39581H I 3); Allotype female, same data as the Holotype (ZSI Regd. No. 39601H 13) (tip of right forewing lost); Paratype male, same data as the Holotype (ZSI Regd. No. 3959/H 13); Paratype male, same data as the Holotype (ZSI Regd. No. 3961/H13); Paratype male, same data as the Holotype (ZSI Regd. No. 3962/H13) (tip of abdomen lost). The Types have been deposited in the National Zoological Collection." (Authors)] Address: Walia, G.K., Zoology Department, Punjabi University, Patiala-147 002, India

15014. Muddeman, J.L. (2007): Primera cita de *Boyeria irene* (Fonscolombe, 1838) (Odonata: Aeshnidae) en Madrid. *Boln. S.E.A.* 41: 382. (in Spanish) [5-IX-2007 fui al Río Cofio, near Valdemaqueda, Madrid (30TUK899828), Spain. The note also includes a record of a road kill of *B. irene*.] Address: Muddeman, J.L., C/ Alcocer 1-1°C, 28214 Fresnedillas de la Oliva, Madrid, Spain. E-mail: john@iberian-wildlife.com

2008

15015. Couvreur, J.M.; Dufrière, M.; Goffart, P.; Vandevyvre, X.; Etienne, F.; Testaert, D. (2008): Nouvelles estimations des effectifs de l'Agrión de Mercure (*Coenagrion mercuriale*, Zygoptera- Coenagrionidae) dans la plaine du Biran (commune de Beauraing, Belgique) avec une analyse des principaux facteurs écologiques expliquant son abondance. *Bulletin S.R.B. E. / K.B.V.E.* 144: 101-115. (in habitat managing, shrub cover, bank's height, vegetation cover, watercourse's width) ["In this paper we made new estimations of the population of *C. mercuriale* in the Biran's plain (Beauraing - Belgium). A series of ecological factors were also analysed to determine which ones could best explain the differences in abundance, in order to give practical information for managing the watercourses and their surroundings. The results show that though the observed correlation between pH and the abundance of *C. mercuriale* need further investigations, other correlations with physical factors such the degree of shadowing of the watercourse, the banks' height, the watercourse's width and the percentage cover by waterplants revealed themselves to be important to explain the distribution of the species on the site and to give important cues to manage and restore the habitat." (Authors)] Address: Couvreur, J.M., Service Public Wallon (SPW) – Départ. de l'Etude du Milieu naturel et agricole (DEMna), Av. Maréchal Juin 23, B-5030 Gembloux, Belgique. E-mail: jeanmarc.couvreur@spw.wallonie.be

15016. Terzani, F.; Carletti, B. (2008): Odonatofauna Toscana: il punto sulle attuali conoscenze della distribuzione regionale (Italia Centrale) (Odonata). *Onychium* 6: 2-24. (in Italian, with English summary) ["The oro-hydrographic position of Tuscan dragonflies preserved in both public and private collections are reported together with their flight period and the number of taxa found at altitude intervals of 200 m." (Authors)] Address: Terzani, F., Museo di Storia Naturale dell'Universita di Firenze, sezione di Zoologia "La Specola", Via Romana 17, I-50125 Firenze, Italy. E-mail: agrion@katamail.com

2009

15017. Gillies, C.L.; Hose, G.C.; Turak, E. (2009): What do qualitative rapid assessment collections of macroinvertebrates represent? A comparison with extensive quantitative sampling. *Environ. Monit. Assess.* 99: 99-112. (in English) ["It is a fundamental tenet of Rapid Biological Assessments (RBA) that the samples collected reflect the community from which they are drawn. As with any biological sampling, RBA collections are subject to sampling error resulting in the omission of some taxa. The aim of this study is to compare the composition of RBA samples with an estimate of community structure based on extensive quantitative sampling. We used logistic regression to explore the relationships between the frequency of a taxon being collected in an RBA sample and its biological and ecological traits, namely its abundance, distribution, body size and habit. RBA samples and quantitative estimates of community structure were made in riffles in the Kangaroo and Nepean Rivers, New South Wales, Australia. Single RBA samples may collect up to 63% of the taxa that are collected by extensive quantitative sampling at a site. The frequency of a taxon being recorded in an RBA sample was significantly and positively related to all traits tested indicating a bias in the collection methods towards large, abundant and widely distributed taxa. Accordingly, taxa missed by RBA sampling were generally small, narrowly distributed or rare. These findings enhance our understanding of what RBA samples represent, and the bias and source of errors associated with RBA sampling. This study also quantifies the utility of RBA methods for biodiversity assessment." (Authors) Taxa - including Odonata - are treated at family level.] Address: Hose, G.C., Depart. Biological Sciences, Macquarie University, Sydney, NSW 2109, Australia. E-mail: ghose@els.mq.edu.au

15018. Hassall, C. (2009): Dragonfly and man. *Antenna* 33(2): 98-99. (in English) [Verbatim: It is impossible to ignore the presence of a group of organisms so biologically fascinating and aesthetically striking as the dragonflies and damselflies. This has resulted in their inclusion within the folklore of cultures wherever they occur, although different traditions are divided over whether they represent good or evil. In the East dragonflies are revered as beautiful, noble creatures. So strong is this sentiment that the dragonfly became a national symbol of Japan. After a 7th century Japanese emperor observed a dragonfly killing a gadfly by which he had just been bitten, a haiku was written which renamed

central Japan Akitsu-shima ("Land of the Dragonflies") in honour of the creature. Dragonflies feature widely in eastern medicine, art, poetry (particularly haiku) and even cuisine, where they traditionally feature as a staple part of the Balinese diet when other food sources are rare. The West, on the other hand, has been far more suspicious of the dragonfly. This is immediately evident in some of the colloquial names for the insects: "horse stinger" (UK and Australia), "devil's darned needle" (USA), "troll's spindle" (Sweden) and "eye poker" (Norway). The various legends which give rise to these monikers involve a range of fallacious "old wives tales". The Native Americans are alone among western peoples in considering the dragonfly to be a positive entity, associating it with renewal, swiftness and purity of water. Interestingly, this final belief in the dragonfly as an indicator of water quality has been confirmed and exploited by modern environmental science. Studies of mankind's effects on freshwaters have revealed that the dragonfly and damselflies are particularly sensitive to these impacts, making them ideal "ecological indicators". Indeed, the monitoring of river quality in Europe involves a survey of the invertebrate communities, including a range of dragonfly species, inhabiting those bodies of water in order to make inferences about the state of the river. For all the distrust of dragonflies in the west, there is no doubt that they perform valuable ecological services. Among other tasks in the ecosystem, dragonflies consume vectors of disease, such as mosquitoes, as well as preying on biting and stinging insects, throughout both the aquatic and terrestrial stages of their life cycles. They, in turn, provide a major food source for fish, thus forming a link between the smaller invertebrates in aquatic systems and the larger vertebrate predators. The ancient nature of the order Odonata (which comprises dragonflies and damselflies) is remarkable compared to other orders of animals. The earliest fossil Odonata have been found in sediments from the Lower Permian which date back 250 million years. This is 10-15 million years before the first dinosaur and considerably older than the oldest representative of the primate order (in which *Homo sapiens* is found), which has only recently been pushed back to 85 million years ago. It has been proposed that groups of organisms such as the Odonata that have such extensive and ostensibly stable evolutionary histories should be resilient to modern global change. Evolutionary time can be likened to a hurdles race: the Odonata have persisted through many trials and tribulations, including four major extinction events (one of which claimed the dinosaurs) and countless less severe oscillations of climate and geology. Each of these represents a hurdle over which an organism must leap to survive. However, clearing each hurdle requires certain adaptations and those adaptations will be inherited by successive generations of that species, enabling it to clear similar hurdles in the future. By this reasoning, the modern Odonata should possess a battery of adaptations that leaves them prepared for almost anything Nature could throw at them. Unfortunately it is at this point where the tale becomes less positive for, although the Odonata are extremely flexible in terms of adapting to changes in environmental conditions, there is

evidence that the modern phase of climate change is unprecedented in their evolutionary history. This, therefore, represents a new hurdle which some or all of the Odonata may fail to clear. Added to this is the synergistic impact of other detrimental, anthropogenic factors such as the pollution of water bodies, the draining of marshes and fens and even the well-intentioned (though ultimately destructive) "amelioration" of water bodies through dredging and introduction of damaging plant and fish species. Thus, while humans have a tendency to view dragonflies in a negative light, it is in fact the dragonflies that suffer from their interaction with man. With popular naturalism beginning to show a greater appreciation for the invertebrate world as well as the more traditional cute and cuddly vertebrates, we can only hope that the public will be inspired to help in the conservation of these creatures. For surely there can be few groups of organisms more appropriate as flagship species for the conservation of our wetlands than the dragonflies.] Address: Hassall, C., School of Biology, University of Leeds, Leeds, LS2 3JT, UK. E-mail: c.hassall@leeds.ac.uk

15019. Hu, Z.; McCauley, R.; Schaeffer, S.; Deng, X. (2009): Aerodynamics of dragonfly flight and robotic design. 2009 IEEE International Conference on Robotics and Automation, Kobe International Conference Center, Kobe, Japan, May 12-17, 2009: 3061-3066. (in English) ["A pair of dynamically scaled robotic dragonfly model wings was developed to investigate the aerodynamic effect of wing-wing interaction in dragonfly flight. Instantaneous aerodynamic forces were measured while forewing-hindwing phase difference (γ) was systematically varied. Experimental results showed that, i) for hovering flight, $\gamma = 0^\circ$ enhanced the lift force on both forewing and hindwing; $\gamma = 180^\circ$ reduced the total lift force, but was beneficial for vibration suppression and body posture stabilization. In nature, 0° is employed by dragonflies in acceleration mode while 180° is usually in hovering mode. ii) For forward flight, wing-wing interaction enhances forewing lift while reduced hindwing lift at all phase differences. Furthermore, the total lift was slightly reduced for $\gamma = 0^\circ$ to 90° and significantly reduced by 18% when $\gamma = 270^\circ$. The results consist well with the fact that, dragonflies usually employ 50° to 100° for forward flight, but seldom employ 270° . PIV results are shown for wing-wing interaction analysis." (Authors)] Address: Deng, X., Mechanical Engineering Department, University of Delaware, Newark, DE 19716 USA. E-mail: Deng@udel.edu

15020. Machado, A.B.M. (2009): *Palaemnema brasiliensis* spec. nov., first Platystictidae record from Brazil (Zygoptera). *Odonatologica* 38(3): 255-260. (in English) ["The new species is described and illustrated based on male specimens collected in the State of Amapá. Holotype male: Brazil: Amapá, Serra do Navio, I-1957. It is close to *P. edmondi* Calvert and *P. brevigioni* Machet." (Author)] Address: Machado, A.B.M., Departamento de Zoologia, Inst. Cienc. Biol., Universidade Federal de Minas Gerais, Caixa Postal 486, 31270-901 Belo Horizonte, Minas Gerais, Brazil. E-mail: angelo@icb.ufmg.br

15021. Norma-Rashid, Y. (2009): Odonata diversity with one new record for Malaysia in the Kenaboi Forest Reserve, Negeri Sembilan, Malaysia. *Malaysian Journal of Science* 28(4): 65-72. (in English, with Malaysian abstract) ["87 species of Odonata were recorded from the Kaneboi Forest Reserve, Negeri Sembilan. Twelve family groups out of 14 available for the Peninsular were represented. The major highlight is the discovery of the *Gynacantha dravida* belonging to the Family Aeshnidae as a new record for Malaysia. The distribution of species among 3 categories of habitat structure mainly, stagnant waters in ponds, slow to moderate water flow in lowland streams and fast flowing waters in rocky montane areas of waterfall indicated preferred habitat in most species. A number of elusive species were discovered, these are illustrated with diagnostic features described and portrayed. Sensitive species that warrant attention, indicative of atypical habitat requirement are also discussed." (Authors)] Address: Norma-Rashid, Y., Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: ynorma@um.edu.my

15022. Trapero-Quintana, A.; Naranjo López, C. (2009): Clave para la identificación de especies de Odonata en estado larval de Cuba. *Boletín de la Sociedad Entomológica Aragonesa* 44: 459-467. ["A set of 24 illustrated dichotomous keys is given for the taxonomical identification of the last instar larvae of 77 species of Odonata reported for the Cuban archipelago. The keys allow the identification of the larvae at the taxonomic levels of suborder, family, genus and species. There are eight species which last instar larva is yet to be described." (Authors)] Address: Trapero-Quintana, A., Universidad de Oriente. Patricio Lumumba s/n, Santiago de Cuba, 90500, Cuba. E-mail: atrapero@cnt.uo.edu.cu

2010

15023. Barbarin, J.-P. (2010): Recherche d'espèces patrimoniales Odonates - site Natura 2000 Val d'Allier FR-8301038 « Val d'Allier Pont-du-château-Jumeaux Alagnon », Année 2010. Société d'histoire Naturelle Alcide-D'Orbigny, 57 rue de Gergovie, F-63170 Aubière, France: 20 pp. (in French) [Puy-de-Dôme, France; with focus on *Coenagrion mercuriale* and *Oxygastra curtisii* and considering *Ophiogomphus cecilia* and *Leucorrhinia pectoralis*, the results of mapping scheme in 2010 are presented.] Address: Barbarin, J.-P., Société d'histoire Naturelle Alcide-D'Orbigny, 57 rue de Gergovie, F-63170 Aubière, France. www.shnao.net

15024. Corazza, C.; Pantaleoni, A.; Sangiorgi, A.; Lefosse, S. (2010): Indagini sull'ecosistema del Po di Primaro, con particolare riferimento ai macroinvertebrati acquatici (Rete Natura 2000, ZPS IT 4060017, Ferrara, Emilia-Romagna, Italia). *Quaderno di Studi e Notizie di Storia Naturale della Romagna* 31: 11-30. (in Italian, with English summary) [Studies on the freshwater ecosystem of the Po of Primaro

river, with particular reference to the benthos macroinvertebrates (Natura 2000 network, SPA IT4060017, Ferrara, Emilia-Romagna, Italy. The hyper eutrophicated river only harbours common odonate taxa: *Ischnura elegans*, *Crocothemis erythraea*, *Sympetrum* sp.]. Address: Corazza, Carla, Stazione di Ecologia, Museo di Storia Naturale, via De Pisis, 24, 44121 Ferrara, Italy. E-mail: c.corazza@comune.fe.it

15025. Dolný, A.; Mižicová, H. (2010): Habitat requirements and significance of artificial habitats of critically endangered dragonfly *Sympetrum depressiusculum*. *Cas. Sleš. Muz. Opava (A)*, 59: 113-119. (in English, with Czech summary) ["*S. depressiusculum* is currently endangered throughout Europe. This dragonfly, originally from central Siberia, inhabits a close range of natural habitats in Europe, which is even more reduced by inappropriate interventions into the hydrological regime of rivers and lakes. As a result of the anthropogenic changes in aquatic habitats, the species abandons quickly and irreversibly its natural habitats, especially alluvial areas of lakes and unregulated rivers. Recently, however, the species has appeared in artificial habitats, where under suitable conditions numerous populations can be formed. One of the most significant alternative habitats for *S. depressiusculum* are fish breeding ponds. These ponds obviously meet the habitat requirements of the species, because several cases of occurrence have been recorded in these artificial habitats in Central Europe. This paper is primarily focused on the occurrence of the species in fish breeding ponds in the North Moravia region in the Czech Republic. It analyses the factors that influence the occurrence of the species in artificial habitats (fish breeding ponds) in relation to its habitat requirements." (Authors)] Address: Dolný, A., Katedra biologie a ekologie, Přírodovědecká fakulta Ostravské univerzity, Bráfova 7, 701 03, Ostrava 1, Czech Republic. E-mail: Alnes.Dolny@osu.cz

15026. Gligorovic, B.; Pesic, V.; Zekovic, A. (2010): Check List of the Dragonflies of the Skadar lake district. *Scripta Scientiarum Naturalium* 1: 101-106. (in English) [The Lake Skadar's drainage basin is situated between 18 41' and 19 47' East longitude and 42 58' and 40 10' North latitude. Located in a karst terrain in the outer part of the southeastern Dinaric Alps, Lake Skadar is the largest of the Balkan lakes. 49 odonate species are listed.] Address: Gligorovic, B., Department of Biology, Faculty of Sciences, University of Montenegro, Cetinjski put b.b., 81000 Podgorica, Montenegro, E-mail: bogic1@cg.yu

15027. González-Santoyo, I.; Córdoba-Aguilar, A.; González-Tokman, D.M.; Lanz-Mendoza, H. (2010): Phenoloxidase activity and melanization do not always covary with sexual trait expression in *Hetaerina* damselflies (Insecta: Calopterygidae). *Behaviour* 147: 1285-1307. (in English) ["Sexual selection theory indicates that males use sexual traits to signal immune ability, a hypothesis known as the immunocompetence principle. A positive relationship between sexual traits and immune ability is not always present. Here we illustrate this pattern by using five damselfly

species in the genus *Hetaerina*. Previous studies have documented a positive correlation between sexual trait expression (wing spot size) and immune ability in members of this genus. These studies have also documented that there are fitness and energetic costs of producing and bearing wing pigmentation. First we used five *Hetaerina* species to investigate the correlation between spot size and phenoloxidase (PO) activity (a key insect immune component) in two contrasting seasons. Second, we experimentally challenged males of two *Hetaerina* species and correlated spot size with PO activity and melanization ability. Results indicate either a positive relationship, a negative relationship or, more commonly, no relationship at all between immune components and wing pigmentation. Season did not predict any of these relationships or expression of spot size and PO activity. These results, although limited to two immune components, indicate that the relationship between sexual trait expression and immunity is not always consistent." (Authors)] Address: Córdoba-Aguilar, A., Depto de Ecología Evolutiva, Instituto de Ecología, Univ. Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

15028. Iserbyt, A.; Bots, J.; Van Gossum, H.; Jordaens, K. (2010): Did historical events shape current geographic variation in morph frequencies of a polymorphic damselfly? *Journal of Zoology* 282: 256-265. (in English) ["In several animal species, discrete, heritable phenotypic morphs occur in one sex only. This phenomenon is commonly observed in damselfly species where the coexistence of different female colour morphs is often explained in the context of sexual conflict. However, theories based on sexual conflict alone appear to be insufficient for explaining the inter-population variation in morph frequencies. A case in point is the widespread North American damselfly *Nehalennia irene*, in which one female morph occurs predominantly in populations in Western Canada, while another morph is more common in Eastern Canada. Given its large distribution range, historical events may be of particular relevance in explaining the observed spatial variation in morph frequencies in this species. In order to relate the distribution of female morph frequencies with the population genetic structure, we studied sequence variation in five mtDNA gene fragments. Moreover, we compared the population genetic structure of *N. irene* with its sister species *Nehalennia gracilis*, which lacks female polymorphism. Remarkably, our results indicate that the overall genetic variability is three times lower in *N. irene* than in *N. gracilis*, which might be related to the availability of the species' preferred habitat. Furthermore, haplotype and nucleotide diversity of *N. irene* differed considerably among sampled sites and appears to be related to the spatial distribution in female morph frequencies. In addition to previously studied selective agents, we suggest that the species' evolutionary history, such as random genetic drift during recolonization, may also be important in explaining the current geographical distribution of female morph frequencies." (Authors)] Address: Iserbyt, A., Evolutionary Ecology Group, University of Antwerp, Antwerp, Belgium. E-mail: arne.iserbyt@ua.ac.be

15029. Sharma, G. (2010): Fauna of Ranthambhore National Park. 5. Insecta: Odonata. Conservation Area Series 43: 67-74. (in English) [In January 2000, ten common Indian odonate species were recorded in Ranthambore National Park, Swaimadhopur, Rajasthan.] Address: Sharma, G., Desert Regional Centre, Zoological Survey of India, Jodhpur, India

15030. Stauer, M. (2010): Die Verbreitung der Asiatischen Keiljungfer (*Gomphus flavipes*) an Thaya und March. Endbericht. Im Auftrag des WWF Österreich Wien, November 2010: 21 pp. (in German, with English summary) ["The occurrence of the River Clubtail (*Gomphus flavipes*) at the Morava and Dyje — *G. flavipes* is Europe-wide endangered and in Austria critically endangered. It occurs in Austria mainly in the floodplains of Morava and Dyje. Within this research the occurrence of *G. flavipes* at these two lowland rivers along the Austrian-Czech-Slovakian border area was investigated. Main emphasis was to provide evidence of breeding and to assess conservation status of the population on the basis of exuviae. The species is indigenous at the entire section of the Dyje from km 15-0 and at the Morava from km 69-12. Highest amounts of emergences were found at the upper Morava (Hohenau to Sierndorf). This part of population has an excellent conservation status. Part populations at the middle Morava (Jedenspeigen to Zwerndorf) are in good and the ones of Dyje and lower Morava (Zwerndorf to Marchegg) in moderate to poor condition. Additionally exuviae of *Ophiogomphus cecilia* and *G. vulgatissimus* were registered. The conservation status of *O. cecilia*, which is listed in Annex II and IV of the Habitats Directive, was found to be good at the Dyje, the upper and the middle part of the Morava but only moderate to bad at the lower Morava. Within this study there are no evidences from km 17 downstream. Only few *G. vulgatissimus* were recorded, due to the earlier emergence and main flight period of this species." (Authors) (https://www.bmlfuw.gv.at/dam/jcr:f0a2bf7f-979b-4d62-b317-161d774515ed/Keiljungfer_Endbericht.pdf)] Address: Stauer, Martina, Dept für Biodiversität der Tiere, Fakultät für Lebenswissenschaften, Univ. Wien, Rennweg 14, A-1030 Wien, Austria. E-mail: m_stauer@web.de

15031. Strobbe, F.; McPeck, M.A.; De Block, M.; Stoks, R. (2010): Survival selection imposed by predation on a physiological trait underlying escape speed. *Functional Ecology* 24: 1306-1312. (in English) ["(1.) In contrast to other phenotypic traits, selection on physiological traits remains largely undocumented. We have evaluated survival selection imposed by predation by dragonflies on the activity of arginine kinase (Ak), a key enzyme delivering energy for escape performance in invertebrates. (2.) To accomplish this, we conducted a semi-natural field enclosure experiment in which we manipulated predation by large dragonfly predators, and quantified escape swimming speed and Ak in the prey, the damselfly *Enallagma vesperum*. To avoid confounding selection on Ak with selection on other swimming speed-related variables, we also scored all morphological and behavioural traits thought to underlie swimming speed in these

damselflies. (3.) Dragonfly predators imposed considerable mortality and selected for faster swimming speed and higher activity levels of Ak. Furthermore, higher Ak levels contributed to higher swimming speeds, confirming the mechanistic role of Ak for escape performance. Although morphological (size of the caudal lamellae which generate thrust) and behavioural (number of beats made by the abdomen during swimming and the start angle of the C-start) variables contribute to increasing swimming speed, we detected no selection on these variables. This may be due to functional redundancy. (4.) Taken together, our results indicated selection on Ak and suggested that selection on physiological traits may be as strong as selection on morphology and life history traits." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

2011

15032. Kato, K.; Watanabe, M. (2011): Foraging flights of *Sympetrum infuscatum* (Selys) adults inhabiting cedar forest gaps of Satoyama (Odonata: Libellulidae). *Japanese journal of entomology* N.S. 14(3): 177-186. (in Japanese) ["After emergence, adults of *S. infuscatum* moves from rice paddy fields to cedar forests of Satoyama in Japan. They stay in the forest gaps throughout their lives, with intermittent visits to rice paddy fields to oviposit there. The forest gaps are used not for mating but for foraging, resting and roosting. They adopt sit-and-wait tactics for foraging to flying small insects such as Diptera and Hymenoptera. The foraging flights of sexually mature adults were observed from late August to early September. The height of perching site was about 2 m in the forest gaps. Each observation was continued until the adult dragonfly left the gap. The foraging flight occurred with a diurnal rhythm, peaking around noon. Females showed 36 foraging flights on average per hour, while males 24 per hour. The number of daily foraging flights was significantly higher in females than in males. About 34% and 33% of flights in females and males, respectively, were successful to capture the target prey. The daily number of captured prey insects was 102 per female and 64 per male. Since the average dry weight of a prey insect flying in forest gaps was 0.17 mg, the daily food intake of a female and a male was calculated 17 mg and 11 mg, respectively, both of which were similar to the amount of food intake estimated in laboratory-reared adults." (Authors)] Address: Watanabe, M., Dept Biology, Faculty of Education, Mie Univ., Tsu, Mie 514-8507, Japan. E-mail: watanabe@edu.mie-u.ac.jp

15033. Ngiam, R.W.J. (2011): Dragonflies of our parks and gardens (in Singapore). National Biodiversity Centre, National Parks Board, Singapore. ISBN: 9789810885212: 110 pp. (in English) ["Dragonflies of Our Parks and Gardens provides an overview of studies of dragonflies done in Singapore, where there are now thought to be 124 species, which

is followed by an illustrated chapter on the anatomy, physiology and ecological roles of dragonflies. A section is given to discussion of each of six public parks and the nature reserves in Singapore and their roles as home for dragonflies. Dragonfly conservation pre-requisites, the need for public partnership, the ongoing National Parks Dragonfly Project, and how individuals can foster dragonflies are all discussed in this stimulating and colourful book. With glossary, distribution, sketchmap, checklist for six public parks, and reading list." (Author)] Address: Ngiam, R.W.J., National Biodiversity Centre, National Parks Board, 1 Cluny Road, Singapore 259569, Republic of Singapore. E-mail: yanrobin@hotmail.com

15034. Olcott (2011): Final report for the the West Virginia dragonfly and damselfly atlas. Prepared for: West Virginia Division of Natural Resources, Wildlife Resources Section 324 Forth Avenue, South Charleston, WV 25303: 29 pp + 3 app.. (in English) ["The Atlas was successful in expanding knowledge of odonates in West Virginia. A total of 4628 specimens were collected that included representatives from all families known to occur in the state. Five state records and 655 county records were documented. Distribution for most species was expanded, some quite significantly. All 55 of West Virginia's counties were surveyed, with an average of 12 sites visited in each county. State ranks were revised with 73 species warranting a change in their status based on data collected during the Atlas. Results for species distribution in West Virginia (Appendix 1) are based on 1994 and earlier for historical records and 1995 -2010 for recent records." (Author) For details see: <http://www.wvdnr.gov/publications/PDFFiles/OdonateAtlasReportweb.pdf>] Address: Olcott, Susan, West Virginia Division of Natural Resources, Wildlife Resources Section, District 1, 1110 Railroad Street, PO Box 99, Farmington, WV 26571, USA

15035. Papazian, M. (2011): Compte rendu d'expéditions sur le mont Nimba (Afrique occidentale): additif à la faune odonatologique et description de la femelle de *Paragomphus kiautai* Legrand, 1992 (Odonata). Bulletin de la Société entomologique de France 116(2): 169-176. (in French, with English summary) ["A survey was made on the mount Nimba, at the request of the Société des Mines de Fer de Guinée (SMFG) for Guinea, and Arcilor Mittal for Liberia, to realise faunistic inventories, contribution for biological impact inquiries conducted, at the present time, by these two organizations. Odonata were the subject of a special attention. Their collect, at 8 stations located on the slopes of the mountain, allowed to find 42 species among the 127 ones listed by LEGRAND (2003) and to discover five species new for the local fauna: *Heliaeschna fuliginosa* Karsch, 1893, *Heliaeschna ugandica* McLachlan, 1896, *Sleuthemis diploides* Fraser, 1951, *Tramea basilaris* (Palisot de Beauvois, 1805) and *Oxythemis phoenicosceles* Ris, 1909. The capture of a female of *Paragomphus kiautai* Legrand, 1992, allowed its description." (Author)] Address: Papazian, M., Le Constellation Bât. A, 72 avenue des Caillols, F-13012 Marseille, France. E-mail: mpapazian@ecologie.re

15036. Trapero-Quintana, A.; Reyes-Tur, B.; Cuellar Araújo, N. (2011): Esfuerzo de muestreo necesario para estimar la riqueza específica máxima en tres comunidades de Odonata en Cuba empleando exuvias. Boletín de la S.E.A. 49(2): 285-290. (in Spanish, with English summary) [Sampling effort needed to estimate maximum species richness of three Odonata communities in Cuba using exuviae. Difficulty in recording all species in a given area is common in biodiversity inventories. The aim of this study is to estimate the minimum sampling effort needed to record the maximum richness of odonates in three freshwater habitats of Santiago de Cuba when only exuviae are sampled. Odonate exuviae were collected weekly in an 8 m² area in each locality during one year. With this methodology, for the three communities, 30 samples were needed to obtain maximum species richness, according to von Bertalanffy's model." (Authors)] Address: Trapero-Quintana, A., Universidad de Oriente. Departamento de Biología. Patricio Lumumba s/n 90500. Santiago de Cuba. Cuba. E-mail: atrapero@cnt.uo.edu.cu

2012

15037. Alberts, J.M. (2012): Aquatic-to-terrestrial contaminant flux in the Scioto River basin, Ohio, USA. Master of Science in the Graduate School of The Ohio State University: 155 pp. (in English) ["Aquatic emergent insects provide important prey subsidies to riparian consumers. These aquatic-to-terrestrial feeding relationships provide a pathway through which aquatic contaminants are "reterrestrialized" into riparian food webs. However, influences of land use and land cover (LULC) on the magnitude of aquatic-to-terrestrial contaminant transfers remain largely unexplored. To that end, I investigated aquatic-to-terrestrial contaminant fluxes at 11 study reaches in the Olentangy and Scioto Rivers (OH, USA), representing urban, agricultural, and mixed land uses. At nine study reaches, I collected benthic sediment, aquatic emergent insects (including Coenagrionidae and Aeshnidae), ants (*Formica subsericea*), spiders of the family Tetragnathidae, riparian vegetation, and periphyton. At eight of these reaches, as well as additional four reaches where I erected nest-boxes, I sampled riparian swallows including: bank (*Riparia riparia*), northern rough-winged (*Stelgidopteryx serripennis*), tree (*Tachycineta bicolor*), and cliff (*Petrochelidon pyrrhonota*) swallows. Subsequently, all biological samples were analyzed for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$. Sediment, ants, spiders, and swallows were tested for a suite of toxic elements including arsenic (As), selenium (Se), lead (Pb), and mercury (Hg). Two-source ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) mixing models indicated that Tetragnathidae were highly reliant on aquatic insects ($x = 76.9\%$, $SD = 8.9\%$), whereas ant dependence was less but with greater variability ($x = 27.8\%$, $SD = 25.1\%$). Characteristics of shoreline habitat including standing dead trees and % overhanging vegetation explained 70 and 42% of the variation in the contribution of aquatic prey to *F. subsericea* and Tetragnathidae, respectively. Spider density was positively related to land-cover characteristics associated with urbanization (% impervious

surfaces, % invasive shrubs, population density) and near-shore habitat. Shoreline habitat also was strongly related to the overall flux (i.e., contaminant load assimilated into consumer tissue) of Se ($R^2 = 0.58$) and As ($R^2 = 0.51$) to the tetragnathid spider assemblage, and Pb flux to spiders was higher in urban and agricultural reaches than in mixed reaches ($F = 6.10$, $P = 0.025$). *F. subsericea* density exhibited a positive relationship with urbanization ($R^2 = 0.83$). As and Se flux to *F. subsericea* assemblages was positively related to urbanization ($R^2 = 0.70$) as well as shoreline habitat, and Pb flux was higher in urban reaches than other land use types ($F = 8.68$, $P = 0.017$). For swallows, Hg concentrations were significantly higher at rural reaches than at urban reaches ($t = -2.96$, $P = 0.003$, $df = 24$), and Hg concentrations in swallows were positively related to Hg concentrations in sediment ($R^2 = 0.23$, $P = 0.030$), though no relationships were evident for Se in swallows. We found that swallow Hg concentrations were significantly higher in rural than urban reaches ($t = -2.96$, $P = 0.003$, $df = 24$), and marginally so for Se ($t = -1.54$, $P = 0.068$, $df = 24$). To an extent, these relationships appear to be mediated by swallow reliance on aquatic emergent insect prey. For example, swallows that exhibited a higher proportion of aquatic prey in their diet and fed at a higher trophic level also exhibited elevated Se levels. I also found that both Se and Hg concentrations in adult swallows were significantly higher than those observed in juveniles (Se: $t = -3.47$, $P = 0.013$, $df = 4$; Hg: $t = -4.35$, $P = 0.006$, $df = 4$). Collectively, my results indicate that LULC mediates aquatic contaminant flux to terrestrial consumers via regulation of aquatic resource utilization. For riparian arthropods, differences in density associated with landscape variability can result in a significant discrepancy between the magnitude of contaminant export by aquatic emergent insects and the realized contaminant flux to riparian food webs. At a broader spatial scale, riparian swallows may represent a useful assessment tool for contaminant exposure in linked aquatic-terrestrial systems." (Author)] Address: Alberts, J.M., Dept of Biological Sciences, 614 Rieveschl Hall, University of Cincinnati, Cincinnati, OH, 45221, USA. E-mail: albertjy@mail.uc.edu

15038. Almeida, D.; Almodovar, A.; Nicola, G.G.; Elvira, B.; Grossman, G.D. (2012): Trophic plasticity of invasive juvenile largemouth bass *Micropterus salmoides* in Iberian streams. *Fisheries Research* 113: 153-158. (in English) ["Biological invasions are a major factor for biodiversity loss, particularly in freshwater environments. Largemouth bass *Micropterus salmoides* is native to North America and is invasive on the Iberian Peninsula, primarily to provide angling opportunities in reservoirs. However, this species is a threat to the endemic Iberian fauna via predation and competition. Currently, there is little information on largemouth bass in European streams. Thus, we assessed the trophic plasticity and body condition of young largemouth bass in both invasive (the regulated Bullaque River) and native (Murray Creek) streams. Abundance of juvenile largemouth bass, percentage of full stomachs and body condition were higher in Bullaque River. Largemouth bass preyed on benthic invertebrates much more heavily in the Bullaque River, whereas

fishes were the most important prey in Murray Creek. Prey richness, diet diversity and trophic niche breadth were higher in the Bullaque River population. Largemouth bass preferred water-column fishes as prey and avoided consuming benthic fishes in Murray Creek, whereas water-column fishes were avoided in Bullaque River. These results demonstrate that largemouth bass display substantial trophic plasticity which possibly facilitates its success as invasive species. Regulated Iberian streams may provide both suitable food and habitat resources with minimal predation pressure, and hence may serve as recruitment sources for this invasive fish." (Authors) In Bullaque river, Odonata nymphs are the most important diet of *M. salmoides*.] Address: Almeida, D., Dept Zoology & Physical Anthropology, Complutense University of Madrid, E-28040 Madrid, Spain. E-mail: dalmeidareal@yahoo.es

15039. Bell, H.J.; Syed, N.I. (2012): Control of breathing in invertebrate model systems. *Comprehensive Physiology* 2: 1745-1766. (in English) ["The invertebrates have adopted a myriad of breathing strategies to facilitate the extraction of adequate quantities of oxygen from their surrounding environments. Their respiratory structures can take a wide variety of forms, including integumentary surfaces, lungs, gills, tracheal systems, and even parallel combinations of these same gas exchange structures. Like their vertebrate counterparts, the invertebrates have evolved elaborate control strategies to regulate their breathing activity. Our goal in this article is to present the reader with a description of what is known regarding the control of breathing in some of the specific invertebrate species that have been used as model systems to study different mechanistic aspects of the control of breathing. We will examine how several species have been used to study fundamental principles of respiratory rhythm generation, central and peripheral chemosensory modulation of breathing, and plasticity in the control of breathing. We will also present the reader with an overview of some of the behavioural and neuronal adaptability that has been extensively documented in these animals. By presenting explicit invertebrate species as model organisms, we will illustrate mechanistic principles that form the neuronal foundation of respiratory control, and moreover appear likely to be conserved across not only invertebrates, but vertebrate species as well. The central origin of breathing rhythm has been studied in a variety of insect species including ... dragonflies such as *Anax imperator*." (Authors)] Address: Bell, H.J., Division of Pulmonary & Critical Care, Department of Medicine, Penn State Univ., Hershey, Pennsylvania. USA. E-mail: harold.bell@gmail.com

15040. Florencio, M.; Díaz-Paniagua, C. (2012): Presencia de *Lestes macrostigma* (Eversmann, 1836) (Odonata: Libellulidae) en las lagunas temporales del Parque Nacional de Doñana (suroeste de España). *Boletín de la S.E.A.* 50(1): 579-581. (in Spanish, with English summary) [Adults of the vulnerable species *L. macrostigma* have been detected as frequent and abundant in temporary ponds of the Doñana National Park. Since this is a species typical of temporary

waters, it should be prospected mainly in years with average or high rainfall, at the beginning of the drying phase of these aquatic habitats. Additionally, we confirm the presence of another vulnerable species, *Coenagrion scitulum* in the same area." (Authors)] Address: Florencio, Margarita

15041. Gainzarain, J.A. (2012): Fauna de odonatos (Insecta: Odonata) del Parque Natural de Izki (Álava, norte de España). *Boletín de la SEA* 50: 267-276. (in Spanish, with English summary) ["The odonate fauna of the Izki natural park in Álava (Basque Country, Spain) was studied during the year 2010. A total of 37 species (19 Zygoptera and 18 Anisoptera) were recorded in systematic surveys covering all the wetlands and most rivers of the park. Among the habitats in the study area, rivers and peat bogs host an odonate fauna much poorer than that of ponds and pools. These lentic sites maintain a species richness which increases with their total area and tends to be greater at sites that have water all year round. The conservation status of the odonate community at Izki seems to be good, and its diversity is similar to that of the best Iberian localities, especially in the case of the little pond of Las Rozas, with 33 species in just 2,5 ha." (Author)] Address: Gainzarain, J.A., C/ Xabier 17 3º C 01010 Vitoria-Gasteiz, Spain. E-mail. j.gainzarain@gmail.com

15042. Heeffer, J. (2012): Libellen in de Kaaistoep in 2011. *Natuurstudie in De Kaaistoep, Verslag 2011*, 17e onderzoeksjaar. *Natuurmuseum Brabant*: 39-42. (in Dutch) [In 2011, 27 odonate species have been recorded in Kaaistoep, near Tilburg, the Netherlands. In addition, the fluctuation of *Lestes sponsa* and *L. virens* between 1998 and 2011 is documented.] Address: Heeffer, J., Kaar 4, 5133 AZ Riel, The Netherlands

15043. Johnson, J.; Valley, S. (2012): Update of the Odonata of Oregon. *Bulletin of American Odonatology* 11(2): 39-47. (in English) ["92 species are currently recorded in Oregon, USA. Additional and updated records since Johnson & Valley (2005) are summarized for 28 species and one hybrid with some range maps updated. The current county records and early/late flight dates for all known species in Oregon are presented." (Authors)] Address: Johnson, J., 3003 Unander Ave, Vancouver, WA 98660, USA. E-mail: jt_johnson@comcast.net

15044. Kiany, M.; Sadeghi, S. (2012): Destroy and pollution of environment of Nahr-e Azam river in Shiraz and endangered Odonata. Abstracts of the 17th National & 5th International Iranian Biology Conference: (in English) [Verbatim: Nahr-e Azam river is one of the most important aquatic ecosystems and water sources of Shiraz using for irrigation of main part of gardens. Main source of this permanent small river is Jooshak spring which its natural and beautiful ecosystem is destroying to make an artificial promenade. Passage of river water had changed and water of spring polluted in short distance with sewage of Ghasre-Ghomshah town. In addition, along the river various pollutants such as sewage, industrial chemicals and polymer wastes

enter to the river water body. Odonata are one of important inhabitant insects in this area that are very sensitive to the polluted environment. Predatory and biological control role of this group on population of other unfavourable insects is especially important. Faunistic studies of this area from five years ago up to now shows richness of Odonata fauna in this environment with around 22 species (about a quarter of total number of odonates of Iran). On the other hand, we found that sudden disappearance of some species in recent years is due to increasing pollution and destroying. If these ruinous actions continue as before, we will lose noteworthy valuable species of this region that some recorded in IUCN red list as endangered species.] Address: Kiany, M., Biol. Dept, Shiraz Univ., Shiraz, Iran. E-mail: mohsen.kiany1@gmail.com

15045. Kiany, M.; Sadeghi, S. (2012): A preliminary study on Odonata fauna of Yazd province. Abstracts of the 17th National & 5th International Iranian Biology Conference: (in English) [Verbatim: Although Yazd province has located in central desert of Iran with arid climate, it contains some specific species of Odonata. In this primary study we surveyed, for the first time, Yazd, Mehriz and Taft regions in Yazd province (Iran) to measure Odonata fauna of central desert of Iran. Eight species, from four different families were recorded from this province. One of the species is new for Iranian fauna and is reported for the first time (shown with asterisk below). Freshwater sources for water-dependent insects in these arid regions are prepared by Karizes and the water almost flows a long distance through concrete canals. Adaptation of species with this condition seems to be really interesting. The specimens consist of: *Platycnemis dealbata*, **Ischnura intermedia*, *Paragomphus lineatus* and *Onychogomphus lefebvrei*, *Crocothemis erythraea*, *Orthetrum chrysostigma* and *Trithemis festiva*.] Address: Kiany, M., Biology Department, Shiraz University, Shiraz, Iran. E-mail: mohsen.kiany1@gmail.com

15046. Li, Y.-j.; Nel, A.; Ren, d.; Zhang, B.-l.; Pang, H. (2012): New discoveries of Neogene hawker dragonflies (Insecta, Odonata, Aeshnidae) from Shandong province in China. *Zoosystema* 33(4): 577-590. (in English, with French summary) ["*Epiaeschna matutina* (Zhang, 1989) is re-described and species diagnosis is amended. Two new species, *Aeshna shanwangensis* n. sp. and *Aeshna forficatum* n. sp., are described from the Middle Miocene deposit of Shanwang Formation, Shandong Province, East China. Comparison with other related fossil and recent species is provided." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrns1.mnhn.fr

15047. Murria, E.; Jarne, M. (2012): Nuevo registro de *Cordulegaster bidentata* Sélys, 1843 en el Parque Nacional de Ordesa y Monte Perdido (Huesca) (Odonata: Cordulegasteridae). *Boletín de la S.E.A.* 50(1): 262. (in Spanish, with English summary) [Spain. "A new record - 09-VIII-2011 - is provided of *Cordulegaster bidentata* from the Ordesa and

Monte Perdido National Park (Huesca, Spain), 62 years after its first and last record in this area of the Pyrenees." (Authors)] Address: Murria, e., C/ Felix Rodriguez de la Fuente, 1 22623 Aineto (Huesca), Spain. E-mail: entomomurria@hotmail.com

15048. Noorhidayah-Mamat; Norma-Rashid, Y.; Zulqarnain, M. (2012): Diversity and habitat preferences of dragonflies (Order: Odonata) in Selangor, Peninsular Malaysia. *Wulfenia* 19(11): 20 pp. (in English) ["A rich collection of 1298 individuals belonging to 54 species from 9 families of Odonata were successfully collected in Selangor. Anisopterans (701 individuals) were found to be more abundant than Zygopterans (597 individuals). Libellulidae (Suborder: Anisoptera) was the most abundant family of odonates in Selangor with 49.11% recorded. Frequency distribution of species showed that *Euphaea ochracea* was the most abundant followed by *Neurobasis chinensis* and *Neurothemis fluctuans*. Preference habitat of odonates was tropical lowland rainforest (TLR) area where high species diversity was found compared to the open areas (OP). This was supported by the higher richness index (R) value in the TLR of 7.26 compared to the OP with 4.46. Similarly, diversity indices (H') and evenness indices (R) showed higher values in TLR with 3.22 and 0.8 than in the OP with 2.83 and 0.7." (Authors)] Address: Noorhidayah-Mamat, Inst. of Biological Science, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: nhidayahm@siswa.um.edu.my

15049. Ramos Hernández, J.M.; Rodríguez Toledo, Y.F. (2012): Nueva localidad para el endemismo de Cuba central: *Microneura caligata* Hagen in Selys, 1886 (Odonata: Protoneuridae). *Boletín de la SEA* 50: 408. (in Spanish, with English summary) [vi/vii-2010, Cayaján River (Planta Cantú, Sancti Spiritus, Cuba), 21° 53' N 79° 24' 0; 200 m s.n.m.] Address: Hernández, J.M.R., Apartado Postal 2004, Sancti-Spiritus, Cuba CP 60100

15050. Sabari, S,M Rasheed, K.A. (2012): Entomofaunal visitors of Asian Sacred Lotus (*Nelumbo nucifera*) during the pre summer season from Palakkad district. *Millennium Zoology* 13(1): 18-23. (in English) ["Ambalakulam" (Lat.: 10.727570, Lon.: 76.651380), Kannadi panchayath, Palakkad district, Kerala, India. During December 2011- May 2012, the following odonate species were reported: *Urothemis signata*, *Diplacodes trivialis*, *Brachythemis contaminata*, *Crocothemis servilia*, *Aethriamanta brevipennis*, *Rhyothemis variegata* and *Ceriagrion coromandelianum*.] Address: Sabari, S., Post Graduate and Research Department of Zoology, Govt. Victoria College, Palakkad, Kerala, India

15051. Tiple, A.D. (2012): Dragonflies and Damselflies (Insecta—Odonata) from Nagpur city environs in Vidharba, together with other records from Maharashtra, India. *Colemania* 27: 1-12. (in English) ["A total of 72 species of odonates belonging to 45 genera of 2 Suborders and 9 families were recorded. Among them, previously unrecorded 10 species were included in the checklist of Nagpur city and

one species (*Ictinogomphus distinctus*) were included in the checklist of Maharashtra State. Family Libellulidae (35 species) with five new records (*Diplacodes lefebvrii*, *Indothemis carnatica*, *Neurothemis intermedia*, *Trithemis kirbyi*, *Urothemis signata*), 17 species from Family Coenagrionidae with one new record (*Pseudagrion spencei*). In family Aeshnidae six species were recorded. Family Gomphidae only four species with two new records (*Anormogomphus heteropterus*, *Ictinogomphus distinctus*). Macromiidae two species were recorded with new species (*Macromia flavicincta*). Two species were recorded from Protoneuridae with one new species (*Prodasineura verticalis*), Two species were recorded from family Platycenemidae. From Family Lestidae two species were recorded, one species recorded in Chlorocyphidae. Of the total 72 species 27 were abundant or very common, 12 were common, 17 rare and 4 very rarely in occurrence." (Author)] Address: Tiple, A.D., Dept of Zoology, Vidyabharti College, Seloo, Wardha 442104, Maharashtra, India. E-mail: ashishdtiple@yahoo.co.in

15052. Van Schandevyl, D. (2012): Observations of Odonata in a nature reserve along the river Dender (Belgium - East-Flanders) in 1996-2007. *Brachytron* 15(1): 43-52. (in Dutch, with English summary) ["The article gives a summary of dragonfly observations in the Wellemersen, a nature reserve of about 100 hectares situated on the left bank of the river Dender near Denderleeuw, in the province of Eastern Flanders (Belgium). The importance of this site as a 'trap area' for dragonflies was first discovered by H. Dumont who published an extended species list in 1971. The area is delimited by linear elements such as railroads and a motorroad which might serve as artificial pathways for dragonfly distribution. The data were collected in the period 1996-2007 and have been published in a comprehensive report with detailed descriptions of the status, observations and distribution (including maps) of each species. In this article, a short description is given of some specific (but mostly artificial) dragonfly biotopes, like old sandpits, large ponds, former bomb holes, fishing ponds and flooded meadows. Most of the 1840 data records were collected by sight. The area was subdivided into 184 separate inventory units to provide detailed location data. All dubious observations were carefully checked. A total of 34 species were found, of which 23 can be considered as autochthonous. All belong to the Red List category 'Not threatened'. Nine species are dwellers. Distribution and abundance are discussed. More than 55% of the records originate from 6 species: *Ischnura elegans*, *Aeshna cyanea*, *Coenagrion puella*, *Sympetrum sanguineum*, *Anax imperator* and *S. striolatum*. The least abundant are *Aeshna grandis*, *Cordulia aenea*, *Crocothemis erythraea*, *Enallagma cyathigerum*, *Erythromma lindennii* and *Lestes sponsa*. The most widespread species within the study area (in more than 50% of the total of 184 inventory blocks) are *Ischnura elegans* and *S. sanguineum*, followed by *A. cyanea*, *S. striolatum* and *A. mixta*. Within the Flemish context, the Wellemersen can be considered as a fairly rich dragonfly area. A comparison with Dumont's list shows that two species, *Brachytron pratense* and *Aeshna isocetes*, have not been observed again and have most

probably disappeared from the area. On the other hand, new permanent inhabitants are *Erythromma viridulum*, *Crocothemis erythraea* and *Cordulia aenea*. The last two were only occasionally seen during the former period." (Author)] Address: Van Schandevyl, D., Paardekastanje 36, 9470 Denderleeuw, The Netherlands. E-mail: danny.van-schandevijl@telenet.be

15053. Wasserman, R.J.; LL Pereira-da-Conceicao, L.L.; Strydom, N.A.; Weyl, O.L.F. (2012): Diet of *Anguilla mossambica* (Anguillidae) eiders of the Sundays River, Eastern Cape, South Africa. *African Journal of Aquatic Science* 37(3): 347-349. (in English) [Dominant Diptera and a few Zygoptera were found as diet of *A. mossambica*.] Address: Wasserman, R.J., Dept of Zoology & Entomology, Rhodes University, PO Box 94, Grahamstown, 6140, South Africa

15054. Weber, J.S. (2012): The distribution of heavy metals in known and potential Hine's emerald dragonfly (*Somatochlora hineana*) habitat near the Viburnum Trend mining district of southeast Missouri, USA. Prepared by: J.S. Weber, U.S. Department of the Interior, Fish and Wildlife Service, Southeast Missouri Lead Mining District, Natural Resource Damage Assessment and Restoration: 23 pp. (in English) ["The Viburnum Trend mining district in southeast Missouri, USA is one of the largest producers of lead in the world. Previous biological surveys in the district have found evidence demonstrating metal exposure of birds, insects, fish and crayfish. This study examined heavy metal concentrations in the sediment and water of freshwater wetlands known to be or potentially occupied by the federally endangered *Somatochlora hineana*. Sediment samples were collected from thirteen sites to assess the potential exposure of the dragonfly to mining-derived metals. Water samples were also collected at the sampling sites when sufficient surface water was available for collection. Concentrations of metals (lead, zinc, cadmium, nickel, et al.) were analyzed in the surface water and sediment. Mean concentrations of lead in sediments were significantly greater ($P < 0.01$) at sites potentially impacted by mining compared to reference sites. Sediment concentrations of lead exceeded consensus-based threshold effects concentrations at eight of ten sites potentially impacted by mining. Concentrations of dissolved metals in surface water samples did not exceed Aquatic Life Criteria established by the State of Missouri. These findings suggest that metals associated with mining activities in the Viburnum Trend may have the potential to negatively impact *S. hineana* populations in and around the district." (Author) <http://dnr.mo.gov/env/hwp/docs/Final-HEDReport2011-01-04.pdf>] Address: Weber, J., Environmental Contaminants Specialist, U.S. Fish & Wildlife Service, 101 Park DeVillie Dr. Suite A, Columbia, MO 65203, 573-234-2132 x177, USA. E-mail: John_S_Weber@fws.gov

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15055. Alberts, J.M.; Sullivan, M.P.; Kautza, A. (2013): Riparian swallows as integrators of landscape change in a multiuse river system: Implications for aquatic-to-terrestrial

transfers of contaminants. *Science of the Total Environment* 463-464: 42-50. (in English) ["Recent research has highlighted the transfer of contaminants from aquatic to terrestrial ecosystems via predation of aquatic emergent insects by riparian consumers. The influence of adjacent land use and land cover (LULC) on aquatic-to-terrestrial contaminant transfer, however, has received limited attention. From 2010 to 2012, at 11 river reaches in the Scioto River basin (OH, USA), we investigated the relationships between LULC and selenium (Se) and mercury (Hg) concentrations in four species of riparian swallows. Hg concentrations in swallows were significantly higher at rural reaches than at urban reaches ($t = -3.58$, $P < 0.001$, $df = 30$), whereas Se concentrations were positively associated with adjacent land cover characterized by mature tree cover ($R^2 = 0.49$, $P = 0.006$). To an extent, these relationships appear to be mediated by swallow reliance on aquatic emergent insects. For example, tree swallows (*Tachycineta bicolor*) at urban reaches exhibited a higher proportion of aquatic prey in their diet, fed at a higher trophic level, and exhibited elevated Se levels. We also found that both Se and Hg concentrations in adult swallows were significantly higher than those observed in nestlings at both urban and rural reaches (Se: $t = -2.83$, $P = 0.033$, $df = 3$; Hg: $t = -3.22$, $P = 0.024$, $df = 3$). Collectively, our results indicate that riparian swallows integrate contaminant exposure in linked aquatic-terrestrial systems and that LULC may strongly regulate aquatic contaminant flux to terrestrial consumers." (Authors) Coenagrionidae made up nearly 30% of all aquatic individuals collected, whereas Aeshnidae represented the largest-bodied prey item.] Address: Alberts, J.M., Dept of Biol.Sci., Univ. Cincinnati, 2600 Clifton Ave., Cincinnati, OH 45221, USA. E-mail: albertjy@mail.uc.edu

15056. Berzi-Nagy, L.; Farkas, A.; Jakab, T.; Szabo, L.J.; Devai, G. (2013): Morphometric data of exuviae in six river clubtail [*Gomphus flavipes flavipes*. (Charpentier, 1825)] populations from the River Tisza. *Studia odonotol. hung.* 15: 73-91. (in Hungarian, with English summary) ["In this paper we compared six populations of *G. flavipes* from the whole Hungarian section of the River Tisza relying on morphological traits. The population at Tuzsér in the upper section of the river showed prominent differences from the other five populations." (Authors).] Address: Berzi-Nagy, L., Dept of Hydrobiology, Centre of Arts, Humanities & Sciences, Faculty of Science & Technology, Univ. of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

15057. Bridgehouse, D.W.; Edsall, J. (2013): Blue Dasher (*Pachydiplax longipennis*) new to Nova Scotia. *Argia* 25(4): 7. (in English) ["An individual female *Pachydiplax longipennis* was first observed and photographed by Jim Edsall on 21 July 2013 in his backyard at Maynard's Lake in Dartmouth, Halifax County, Nova Scotia. No other individuals were observed in the area." (Author)] Address: Bridgehouse, D.W., 24 Kiel Court, Eastern Passage, NS BSG 1R3, Canada. E-mail: d.bridgehouse@ns.sympatico.ca

15058. Brockhaus, T. (2013): Anatoli Yurewitsch Haritonov 21.09.1949- 04.04.2013. *Entomologische Nachrichten und Berichte* 57(3): 176-183. (in German) [obituary and bibliography] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

15059. Cordero-Rivera, A. (2013): Demographics and adult activity of *Hemiphysalis mirabilis*: a short-lived species with a huge population size (Odonata: Hemiphysalidae). <http://natureglenelg.org.au/wp-content/uploads/2014/02/Behaviour-and-ecology-of-Hemiphysalis-mirabilis-by-Adolfo-Cordero-Rivera-2014.pdf>: 38 pp. (in English) ["Conclusions: The observations and analyses presented here (which have to be treated as preliminary) indicate that this species has a copulatory behaviour similar to other Zygoptera, and sperm removal is likely to be performed by males. The specimens that were collected and preserved in ethanol, will be dissected in the next months, and hopefully a detailed description of sperm competition will be possible. *H. mirabilis* males perform an elaborated courtship display, which uses in part its well-known flicking behaviour. This was an unexpected result, and suggests that precopulatory sexual selection might be intense in this species. I was able to observe and describe reproductive behaviour (goal 1 of this work), but I could not observe oviposition, neither elicit egg-laying on humid filter paper and plant tissue. Therefore, the second goal of the study, to develop methods for captive breeding, could not be achieved. Nevertheless, I dissected eggs from two mature females and preserved them in a buffer for transmission electron microscopy. Their study will be done during 2014. The dense vegetation of Long Swamp was too thick for behavioural observations. If females lay eggs at the base of the reeds, this is unlikely to be observed. Even mating pairs were very difficult to detect among the vegetation. Furthermore, individuals in copula were never seen flying, which also difficult detection. The fact that no focal female attempted oviposition suggests that this behaviour might take place during the night. Nevertheless, five females were maintained over night with humid filter paper, and did not lay eggs. The structure of the vegetation at Ming Ming Swamp is more favourable for behavioural observations. *H. mirabilis* was very common when I visited the swamp, and I think that detailed observations at that place would be fruitful to detect oviposition. My mark-recapture experiment, with all the limitations inherent to a study made by only one worker, yielded surprisingly high population density estimates, which are concordant with field observations. Davies (1985) estimated a density of 100 animals per 10 m², which is three times my estimates, but at particular times I observed similar densities. The population of *H. mirabilis* at Long Swamp is therefore huge, very likely more than one million specimens per season. Its has also been found in large numbers in several swamps in Grampians National Park (Reiner Ritcher, pers. comm). I therefore agree with the opinion of other researchers, which suggested that this species should no longer be regarded as critically endangered (Trueman et al. 1992; Watson 1995)."]

Address: Adolfo Cordero Rivera, Evolutionary and Conservation Ecology Group, University of Vigo, EUE Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: adolfo.cordero@uvigo.es

15060. Cothran, R.D.; Brown, J.M.; Relyea, R.A. (2013): Proximity to agriculture is correlated with pesticide tolerance: evidence for the evolution of amphibian resistance to modern pesticides. *Evolutionary Applications* 6(5): 832-841. (in English) ["Anthropogenic environmental change is a powerful and ubiquitous evolutionary force, so it is critical that we determine the extent to which organisms can evolve in response to anthropogenic environmental change and whether these evolutionary responses have associated costs. This issue is particularly relevant for species of conservation concern including many amphibians, which are experiencing global declines from many causes including widespread exposure to agrochemicals. We used a laboratory toxicity experiment to assess variation in sensitivity to two pesticides among wood frog (*Lithobates sylvaticus*) populations and a mesocosm experiment to ascertain whether resistance to pesticides is associated with decreased performance when animals experience competition and fear of predation. We discovered that wood frog populations closer to agriculture were more resistant to a common insecticide (chlorpyrifos), but not to a common herbicide (Roundup). We also found no evidence that this resistance carried a performance cost when facing competition and the fear of predation. To our knowledge, this is the first study demonstrating that organophosphate insecticide (the most commonly applied class of insecticides in the world) resistance increases with agricultural land use in an amphibian, which is consistent with an evolutionary response to agrochemicals. ... For mesocosms assigned the predator treatment, we added a single larval dragonfly (*Anax junius*) to the predator cage and fed each predator three times a week using approximately 300 mg of wood frog tadpoles from a mixture of the nine populations." (Authors)] Address: Cothran, R.D., Department of Biological Sciences, University of Pittsburgh, 4249 Fifth Ave., Pittsburgh, PA 15260, USA. E-mail: rdc28@pitt.edu

15061. Engel, M.S.; Davis, S.R.; Prokop, J. (2013): Insect wings: The evolutionary development of nature's first flyers. Minelli, A., G. Boxshall & G. Fusco (2013): *Arthropod Biology and Evolution*: 269-298. (in English) ["Powered flight is one of the more spectacular evolutionary novelties to have come about during the 4-billion-year history of life on Earth. Flight bestows upon the flyer another dimension in which to experience life. Suddenly, new avenues are available for dispersal, escape and avoidance, locating a suitable mate, and reaching once unobtainable resources. Moreover, wings can be so much more than merely a means to fly. Properly adapted the wings themselves may play a role in courtship, camouflage and mimicry, thermoregulation, and protection and defence. Despite the profound significance of flight, it is a challenging feat to achieve and control. Powered flight has evolved independently at least four times, three of which occur among the Amniota, while the last is

far flung across the branches of the animal tree of life. It is this last lineage that was also the first to evolve this singularly successful means of locomotion, rivalling in numbers of species all other forms of life combined." (Authors) The paper includes many references to Odonata.] Address: Engel, M.S., Division of Entomology, Natural History Museum, and Department of Ecology and Evolutionary Biology, University of Kansas, 1501 Crestline Drive—Suite 140, Lawrence, Kansas, 66045, USA. E-mail: msengel@ku.edu

15062. Escoto-Moreno, J.A.; Márquez, J. (2013): Analysis of the geographical distribution of *Paraphlebia zoe* Selys in Hagen, 1861 (Odonata: Megapodagrionidae). *Entomological News* 122(5) (2011): 416-423. (in English) ["*P. zoe*, an endemic Mexican species included in the IUCN Red List of threatened species, is recorded for the first time in Querétaro state. Based on recent collections in mountain cloud forests during the dry and rainy seasons, we added three new records for Hidalgo. There were compiled 16 historical records of the species, that permitted us to generate a range map for *P. zoe* showing that most records are from the southern region of the Sierra Madre Oriental with some records from the Mexican Gulf provinces. This distributional pattern also occurs in several species of Staphylinidae, Passalidae and Scarabaeidae." (Authors)] Address: Márquez, J., Laboratorio de Sistemática Animal, Centro de Investigaciones Biológicas, Univ. Autónoma del Estado de Hidalgo, km 4.5 carretera Pachuca-Tulancingo s/n, Ciudad Universitaria, Col. Carboneras, 42184 Mineral de la Reforma, Hidalgo, México. E-mail: jmarquez@uaeh.edu.mx

15063. Ferronato, B.; Piña, C.I.; Molina, F.C.; Espinosa, R.A.; Morales, V.R. (2013): Feeding habits of Amazonian freshwater turtles (Podocnemididae and Chelidae) from Peru. *Chelonian Conservation and Biology* 12(1): 119-126. (in English) ["We describe here the feeding habits of the Yellow-spotted River turtle (*Podocnemis unifilis*) (n = 20), Geoffroy's side-necked turtle (*Phrynops geoffroanus*) (n = 10), and Gibba turtle (*Mesoclemmys gibba*) (n = 4) from central Peru, Pasco Department, and evaluate food overlaps among them. *Podocnemis unifilis* showed a generalist feeding habit, ingesting animal and plant matter, but tending to be herbivorous, because plant matter made up 62.9% of the volume vs. 3.9% for animal material. The most important items in *P. unifilis* diet were seeds from the Fabaceae (Leguminosae) family and bark. *Podocnemis geoffroanus* and *M. gibba* also had generalist feeding habits. The most important items for *P. geoffroanus* were insects, especially Libellulidae larvae, and plant material. *Mesoclemmys gibba* ingested insects, fish, crustaceans, unidentified plant matter, bark, leaves, stem, and algae, with plant matter being more representative by frequency and volume. Low dietary overlap was observed between *P. unifilis* and *P. geoffroanus*, and both species appeared to overlap with *M. gibba*. To our knowledge, this is the first quantitative dietary study of Peruvian freshwater turtles, and the first diet analysis of wild *M. gibba* in the Amazon basin." (Authors) Libellulidae larvae was the most frequent item (80% of the stomach contents), which represented 37.5% of the volume, therefore,

the most important item in *P. geoffroanus* diet. *P. unifilis* and *M. gibba* also preyed on Odonata, but they only play a very limited role as food for these turtle species.] Address: Ferronato, B., Institute for Applied Ecology, University of Canberra, ACT 2601, Australia. E-mail: brunoferronato@hotmail.com

15064. Iqbal, M.A.; Rizvi, S.A.; Ahmed, Z.; Akhter, M.A. (2013): A list of dragonflies (Anisoptera: Odonata) with new records from Pakistan. *International Journal of Biology and Biotechnology* 10(1): 83-90. (in English) [Sixteen odonates dragonflies were collected from different localities of Sindh Province, Pakistan, between 2006-2010.] Address: Iqbal, M.A. (Karachi Univ. (Pakistan). Dept. of Zoology); Rizvi, S.A. (Karachi Univ. (Pakistan). Dept. of Zoology); Ahmed, Z. (Federal Urdu Univ. of Arts, Science and Technology, Karachi (Pakistan). Dept. of Zoology); Akhter, M.A.

15065. Kalnins, M. (2013): The dragonfly (Odonata) fauna of strict nature reserve Moricsala, Latvia. *Acta Biol. Univ. Daugavp.* 13(2): 55-58. (in English) ["The current paper summarizes available information on dragonflies of the strict nature reserve Moricsala. Of 59 dragonfly species of nine families recorded in Latvia, 22 species also occur in Moricsala. Estimated number of dragonfly species for strict nature reserve Moricsala is at least 31 to 33 species." (Author)] Address: Kalniņš, M., JSC "Latvian State Forests", Kristapa iela 30, Riga, LV-1046, Latvia. E-mail: martins.kalnins@biol.gov.lv

15066. Klecka, J.; Boukal, D.S. (2013): Foraging and vulnerability traits modify predator-prey body mass allometry: freshwater macroinvertebrates as a case study. *Journal of Animal Ecology* 82(5): 1031-1041. (in English) ["Predation is often size selective, but the role of other traits of the prey and predators in their interactions is little known. This hinders our understanding of the causal links between trophic interactions and the structure of animal communities. Better knowledge of trophic traits underlying predator-prey interactions is also needed to improve models attempting to predict food web structure and dynamics from known species traits. We carried out laboratory experiments with common freshwater macroinvertebrate predators (diving beetles, dragonfly and damselfly larvae and water bugs) and their prey to assess how body size and traits related to foraging (microhabitat use, feeding mode and foraging mode) and to prey vulnerability (microhabitat use, activity and escape behaviour) affect predation strength. The underlying predator-prey body mass allometry characterizing mean prey size and total predation pressure was modified by feeding mode of the predators (suctorial or chewing). Suctorial predators fed upon larger prey and had ~3 times higher mass-specific predation rate than chewing predators of the same size and may thus have stronger effect on prey abundance. Strength of individual trophic links, measured as mortality of the focal prey caused by the focal predator, was determined jointly by the predator and prey body mass and their foraging and vulnerability traits. In addition to the feeding mode, interactions between prey escape behaviour (slow or fast), prey

activity (sedentary or active) and predator foraging mode (searching or ambush) strongly affected prey mortality. Searching predators was ineffective in capturing fast-escape prey in comparison with the remaining predator–prey combinations, while ambush predators caused higher mortality than searching predators and the difference was larger in active prey. Our results imply that the inclusion of the commonly available qualitative data on foraging traits of predators and vulnerability traits of prey could substantially increase biological realism of food web descriptions." (Authors)] Address: Klecka, J., Dept of Ecosystems Biology, Faculty of Science, University of South Bohemia, České Budejovice, Czech Republic. E-mail: kleckj01@prf.jcu.cz

15067. Leelahakriengkrai, P. (2013): Diversity of freshwater benthos in the ecotourism area at Chiang Dao District in Chiang Mai Province, Thailand. *Biodiversity Journal* 4(3): 399-406. (in English) ["The diversity of benthic diatoms and aquatic insects in the ecotourism areas of Mea Lu and Tong Ta Streams at Chiang Dao District in Chiang Mai Province in the north of Thailand were investigated during the months of July and September 2012 and January 2013, from the upper, middle and lower parts of each stream. A total of 53 taxa of benthic diatoms and 46 families of aquatic insects were found. 47 and 31 taxa of benthic diatoms were found from the Mea Lu and Tong Ta Streams, respectively. 38 and 28 families of aquatic insects were found from the Mea Lu and Tong Ta Streams, respectively. The diversity index of benthic diatoms ranged from 1.17 to 2.66, while the aquatic insects ranged from 0 to 2.14. In the upstream sites of this study, a high abundance of benthic diatoms, such as *Navicula cryptotenella*, *Planothidium rostratum* and *Planothidium lanceolatum*, and aquatic insects, such as *Caenidae* and *Elmidae*, were found. At the downstream sites, a high abundance of benthic diatoms, such as *Nitzschia palea* and *Mayamaea atomus* and aquatic insects, such as *Corixidae*, *Baetidae*, *Chironomidae*, *Simuliidae* and *Hydropsychidae*, were found." (Author) Odonata are treated at family level.] Address: Pongpan Leelahakriengkrai, Biol. Sect., Dept of Science, Fa. Science & Technology, Chiang Mai Rajabhat University, Thailand. E-mail: bank_2525@hotmail.com

15068. Mochon, A. (2013): Capture of the *Rhionaeschna mutata* (Odonata: Aeshnidae) in Quebec, a new provincial record. *Argia* 25(1): 6. (in English) [*Rhionaeschna mutata*, 30-VI-2012, Lac des Atocas, National Park Mont-Saint-Bruno, Canada] Address: Mochon, A. E-mail: mochon.alain@sepaq.com

15069. Neff, B.D.; Svensson, E.I. (2013): Polyandry and alternative mating tactics. *Phil. Trans. R. Soc. B* 368: 20120045: 11 pp. (in English) ["Many species in the animal kingdom are characterized by alternative mating tactics (AMTs) within a sex. In males, such tactics include mate guarding versus sneaking behaviours, or territorial versus female mimicry. Although AMTs can occur in either sex, they have been most commonly described in males. This sex bias may, in part, reflect the increased opportunity for sexual selection that typically exists in males, which can result in a

higher probability that AMTs evolve in that sex. Consequently, females and polyandry can play a pivotal role in governing the reproductive success associated with male AMTs and in the evolutionary dynamics of the tactics. In this review, we discuss polyandry and the evolution of AMTs. First, we define AMTs and review game theoretical and quantitative genetic approaches used to model their evolution. Second, we review several examples of AMTs, highlighting the roles that genes and environment play in phenotype expression and development of the tactics, as well as empirical approaches to differentiating among the mechanisms. Third, ecological and genetic constraints to the evolution of AMTs are discussed. Fourth, we speculate on why female AMTs are less reported on in the literature than male tactics. Fifth, we examine the effects of AMTs on breeding outcomes and female fitness, and as a source, and possibly also a consequence, of sexual conflict. We conclude by suggesting a new model for the evolution of AMTs that incorporates both environmental and genetic effects, and discuss some future avenues of research." (Authors) The ontogeny of colour development in *Ischnura elegans* is illustrated.] Address: Neff, B.D., Department of Biology, Western University, 1151 Richmond Street, London, Ontario, Canada N6P 0A7. E-mail: bneff@uwo.ca

15070. Oke, O.A.; Akegbejo-Samson, Y.; Omopariola, C.A. (2013): Effect of physico-chemical characteristics of water of River Ogun on the distribution and abundance of aquatic insects. *Journal of Natural Science, Engineering and Technology* 11(1)(2012): 52-61. (in English) ["This study was carried out to determine the abundance, composition, distribution of aquatic insects and physico – chemical factors of Ogun River. The aquatic insects were collected using sweep and pond net (0.5mm) from two study sites during February and middle April, 2012. The water samples and insects were collected once in a week. Insects were sampled using standard entomological methods, while water samples was analysed using standard Winkler's titrimetric and APHA methods to determine the chemical properties. Water analyses were conducted in the laboratory of Ogun State Water Corporation, Abeokuta, Ogun State. While insects identifications were done in the laboratory in the Entomology Laboratory of the College of Natural Sciences, Federal University of Agriculture, Abeokuta, Nigeria. Results show that five orders and thirteen families were found with the highest number of aquatic insects from the order Odonata. The most abundant family were *Coenagrionidae* and *Libellulidae* respectively. Physico – chemical values, water temperature, pH, Dissolved Oxygen (DO), Conductivity and Nutrient were measured. Only conductivity had the greater value among the water quality parameters." (Authors) *Trithemis arteriosa*, *Umma longistima*, *Phaon iridipennis*, *Urothemis assignata* and *Pseudagrion whellani* (= *hamoni*) are listed.] Address: Oke, O.A., Department of Biological Sciences, Federal University of Agriculture, Abeokuta, Nigeria. E-mail: olubodeoke@yahoo.com

15071. Oligier, A.I. (2013): To the question of the distribution of dragonflies (Insecta: Odonata) in ecological niches. The

Kharkov Entomol. Soc. Gaz. 21(1): 37-42. (in Russian, with Ukrainian and English summaries) ["Distribution of 34 species of dragonflies on steppe areas of Donetsk region and 38 species on the forest-steppe area (Seversky Donets River floodplain) in ecological niches in 1971–1974 years is shown." (Author)] Address: Oliger A.I., State Nature Reserve 'Prisursky', pos. Lesnoy 9, Cheboksary, Chuvashia, 428034, Russia. E-mail: oliger169@gmail.com

15072. Quisil, S.J.C.; Arreza, J.D.E.; Nuñez, O.M.; Vilanueva, R.T.J. (2013): Species richness of Odonata in Lanuza and San Agustin, Surigao del Sur, Philippines. *AES Bioflux* 5(3): 245-260. (in English) ["The Odonata spends its time in water and on land during its life cycle making this invertebrate an important link between aquatic and terrestrial ecosystems. To determine the species richness of Odonata in Lanuza and San Agustin, Surigao del Sur, assessment was conducted in 18 sampling sites in August to October 2012. Forty-nine species were documented where 26 species are under the suborder Zygoptera and 23 under suborder Anisoptera. Himatagan River of Lanuza, Surigao del Sur was found to be the most species-rich. Three species which are indicators of environmental disturbance were found to be abundant in eight sampling sites. These are the highly disturbed sites being in the vicinity of agroecosystems such as rice paddies, eggplant farms and root crop fields. Twenty-three Philippine endemic species were documented. Two species are new Mindanao record and one is endemic to the Philippines. More species are expected to be documented with intensive surveys especially in pristine habitats." (Authors)] Address: Quisil, S.J.C., Dept of Biological Sciences, Mindanao State Univ. - Iligan Institute of Technology, Iligan City, Philippines; 2 D3C Gahol Apartment, Davao City, Philippines. E-mail: samljzq@yahoo.com

15073. Rastegar, J.; Havaskary, M.; Khodaparast, S.; Rafeii, A. (2013): A contribution to the knowledge of Odonata (Insecta) from West Azarbaijan province, northwestern Iran. *Entomofauna* 34: 369-376. (in English, with German summary) [25 species recorded between 2007 and 2009 are documented.] Address: Rastegar, J., Dept of Entomology, Garmsar Branch, Islamic Azad University, Semnan, Iran. E-mail: jinoos.rastegar@yahoo.com

15074. Reyes-Morales, F. (2013): Macroinvertebrados acuáticos de los cuerpos lénticos de la Región Maya, Guatemala. *Revista Científica del Instituto de Investigaciones Químicas y Biológicas, Facultad de Ciencias Químicas y Farmacia, Universidad de San Carlos de Guatemala* 23(1): 7-16. (in Spanish, with English summary) ["The composition of aquatic macroinvertebrate community has been used to determine the ecological status of lentic ecosystems in many water quality studies. In this study, the community structure of the aquatic macroinvertebrates was surveyed in seven lentic bodies (Yaxhá, Sacnab, Petenchel, Quexil, Salpetén, Macanche y Sacpuy) located in the Mayan region in northern Guatemala. At each sampling site a maximum of six sampling stations were set and macroinvertebrate samples were collected with an Ekman dredge. In addition,

measurements of the following physicochemical variables were taken: dissolved oxygen, temperature, pH, salinity, conductivity, total dissolved solids, nutrients, sulfate and depth. A total species richness of 38 taxa was found, Odonata, Coleoptera, Trichoptera and Ephemeroptera were the most diverse orders. Species diversity was high in places where there is no anthropogenic influence and tended to decrease as some human disturbance was observed. The distribution of aquatic macroinvertebrates was influenced by the type of substrate and physicochemical changes."] Address: Reyes-Morales, Fátima, Dirección General de Investigación (DIGI), Facultad de Ciencias Químicas y Farmacia, Univ. de San Carlos de Guatemala, Guatemala, Guatemala. E-mail: fatimarys3@gmail.com

15075. Riens, J.R.; Schwarz, M.S.; Mustafa, F.; Hoback, W.W. (2013): Aquatic macroinvertebrate communities and water quality at buffered and non-buffered wetland sites on federal waterfowl production areas in the Rainwater Basin, Nebraska. *Wetlands* 33(6): 1025-1036. (in English) ["Nebraska's Rainwater Basin has an abundance of natural wetlands and is a focal point in the annual migration corridor used by millions of waterfowl and shorebirds. However, these wetlands are in a landscape dominated by agriculture and as a result, siltation and poor water quality are continual problems. We evaluated twelve wetland sites on federally managed Waterfowl Protection Areas from 2007 – 2009 for water quality, sediment quality, and macroinvertebrate diversity. Six of the sites received agricultural runoff directly via culverts and drainage ditches (non-buffered sites) and six sites were protected from agricultural runoff by a vegetated buffer (buffered sites). Mean total number of aquatic macroinvertebrates were significantly greater ($p < 0.001$) for buffered sites (230 ± 744 standard error) than non-buffered sites (97 ± 724). Water from non-buffered sites had significantly greater turbidity, conductivity, and concentrations of chlorophyll a and atrazine than buffered sites in addition to consistently greater annual averages of total nitrogen and total phosphorus. Furthermore, sediments from non-buffered sites had significantly greater cadmium, potassium, sodium and zinc than buffered sites. Use of vegetative buffers to intercept direct row-crop runoff can improve water quality and aquatic macroinvertebrate diversity and abundance in Rainwater Basin wetlands." (Authors) Taxa - including Odonata - are treated at the family level.] Address: Riens, J.R., US Fish & Wildlife Service, 1936 California Ave., Klamath Falls, OR, 97601, USA. E-mail: john_riens@fws.gov

15076. Satake, K.; Ueno, R. (2013): Distribution of freshwater macroinvertebrates in streams with dams and associated reservoirs on a subtropical oceanic island off southern Japan. *Limnology* 14(2): 211-221. (in English) ["The conservation of endemic fauna in freshwater ecosystems is a topical issue on small oceanic islands. Because these endemics have limited distributions, they are more vulnerable to extinction. This study is the first to clarify the distribution of freshwater macroinvertebrates including endemic and alien species in streams with dams and associated reservoirs on the Ogasawara Islands in the northwestern Pacific

Ocean. In 2007, we conducted a field survey in streams and reservoirs of the Yatsuse River system and collected 22 taxonomic groups from 13 stations. Hierarchical cluster analysis and non-metric multi-dimensional scaling (NMDS) were performed for the presence/absence data of the macroinvertebrates, and the results indicated that (1) most of endemic species were present in inlet streams of dam reservoirs, (2) these endemic species were absent in the bottom sediments of the reservoirs because of oxygen depletion and (3) dams may be barriers to the migration of some species of amphidromous crustaceans. Because human modifications, such as dams and associated reservoirs, on a small oceanic island can rapidly result in fragmentation or loss of freshwater habitats of endemic species, the remaining habitat of these species, such as headwater streams, must be protected and preserved to avoid species extinction." (Authors) The list of taxa includes *Pantala flavescens* and *Ischnura senegalensis*, sampled in the littoral zone of Station 8 and 11.]Address: Satake, K., National Institute for Environmental Studies, 16-2 Onogawa, Tsukuba, Ibaraki, 305-8506, Japan. E-mail: satanii@nies.go.jp

15077. Sharma, A.K.; Bisen, U.K. (2013): Taxonomic documentation of insect pest fauna of vegetable ecosystem collected in light trap. *International Journal of Environmental Science: Development and Monitoring* 4(3): 4-11. (in English) ["The present study was conducted under the study of scope of light trap as IPM technology in Vegetable ecosystem. Information on insect pest fauna of vegetable ecosystem collected in Balaghat region of M.P. The data of trap catch during the year 2006 (Kharif season) was classified on taxonomic basis, economic aspect (crop pest) and bio control significance (parasite and predators) a total of 56 species were recorded in Kharif cropping season of vegetable cropping area. These insect pest belongs to 8 orders and 34 families .Lepidoptera was the largest order with 23 species .Other orders were Hemiptera (14species), Coleoptera (11 species) and Orthoptera (4 species). Odonata, Hymenoptera, Isopteran and Dictioptera were the other order of minor significance. Based on economic importance this collection was represented by 39 species of harmful insects (as crop pest) 17 species of predatory insects (useful as bio-control agents). Category of harmful insect pests includes the major and minor pest species of vegetables, major polyphagous pests, pests of Paddy, Pulses, Cereals, Oilseeds and other crops .The present study reviles that documented information on these species gives broader scope of using light trap as Integrated Pest Management tool against these insect pests of vegetables and other crops. The trap catch data also provide voluble information on bio control agents (predatory) active in vegetable ecosystem." (Authors)] Address: Sharma, A.K., Department of Entomology, JNKVV, Jabalpur (M.P.), India

15078. Sharma, G. (2013): Faunal exploration of Kumbhalgarh Wildlife Sanctuary, Rajasthan. 3. Insecta: Odonata. *Conservation Area Series* 47: 31-42. (in English) [A total of 17 species belonging to 13 genera under 4 families and 2 suborders of order Odonata are first time reported from

Kumbhalgarh Wildlife Sanctuary, Rajasthan, India.] Address: Sharma, G., Desert Regional Centre, Zoological Survey of India, Jodhpur, India

15079. Stevove, B.; Kovac, V. (2013): Do invasive bighead goby *Neogobius kessleri* and round goby *N. melanostomus* (Teleostei, Gobiidae) compete for food? *Knowledge and Management of Aquatic Ecosystems* (2013) 410, 08: 15 pp. (in English, with French summary) ["Bighead goby (*Neogobius kessleri*) and round goby (*Neogobius melanostomus*) have been invading new non-native areas about two decades successfully. In this study, diet spectrum, seasonal variation, feeding strategy and diet overlap between these two invasive species were assessed. Materials were collected from the Danube at Bratislava by fishing rods and/or electrofishing. The diet spectrum of both species was diverse: a total of 46 food types in bighead goby and 51 food types in round goby were observed. *Dikerogammarus* sp., chironomid larvae and *Corophium* sp. were the most predominant food types in bighead goby, whereas in round goby, chironomid larvae, *Corophium* sp., bryozoans and Cladocera predominated. The diet varied over seasons. In the Slovak part of the Danube, bighead goby and round goby have adapted to local food resources, consuming diverse food from small to large items, both with soft and/or hard body. This enhances the capability of these invasive species to spread successfully. It appears that even if both exploit similar food resources, their proportional content differs. Further differences between these gobies were also found in their food behaviour and feeding strategy. Both species tend to be specialists where possible, but round goby demonstrates higher flexibility towards general feeding strategy." (Authors) In case of *N. kessleri*, a few Coenagrionidae and Gomphidae contributed to diet, in case of *N. melanostomus* no Odonata were found as diet.] Address: Števo, B., Department of Ecology, Faculty of Natural Sciences, Comenius University, Mlynská dolina, 842 15 Bratislava, Slovakia. E-mail: manonik@gmail.com

15080. Tanneberger, F.; Bellebaum, J.; Helmecke, A.; Minets, M. (2013): Nesting and foraging characteristics of Aquatic Warblers *Acrocephalus paludicola* in the fast declining Pomeranian population (NE Germany/ NW Poland). *Acta Ornithologica* 48(1): 109-118. (in English) ["Limited food availability could be a cause for the strong decline of the small and isolated Aquatic Warbler population in Pomerania (NE Germany/NW Poland). In this paper, we describe nesting site conditions, nest placement and female foraging behaviour as well as food supply in vegetation types prevailing in Pomeranian breeding areas. Female Aquatic Warblers in Pomerania appeared to select 'managed' sites (where land use maintains suitable conditions for Aquatic Warbler) for nesting, and preferred vertical structures (ditches and edges within 'managed' sites) for foraging. They flew longer distances for provisioning their nestlings than in the core population (E Poland, Belarus) whereas the total distance travelled per 30 minutes was similar. In 'managed' sites, the total invertebrate biomass was larger than in 'unmanaged' sites in early June when

early broods are raised. Pomeranian Aquatic Warblers are able to exploit relatively rich food sources in 'managed' meadows and in vertical structures and may thus balance the higher efforts of flights longer than in Eastern Poland and Belarus. To increase the availability of suitable Aquatic Warbler nesting and foraging sites in Pomerania, management by mowing should be continued. It might yield the best results when providing a mosaic of 'managed' and 'unmanaged' patches." (Authors) No taxonomic details on the diet of *A. paludicola* is given. Biomass of food resources is calculated in the case of Odonata as follows: mean Zygoptera fresh weight 11 mg; mean Anisoptera fresh weight 56 mg.] Address: Tanneberger, Franziska, Institute of Botany & Landscape Ecology, Greifswald Univ., Grimmer Str. 88, 17489 Greifswald, Germany. E-mail: tanne@uni-greifswald.de

15081. van Strien, A.J.; van Swaay, C.A.M.; Termaat, T. (2013): Opportunistic citizen science data of animal species produce reliable estimates of distribution trends if analysed with occupancy models. *Journal of Applied Ecology* 50(6): 1450-1458. (in English) ["(1.) Many publications documenting large-scale trends in the distribution of species make use of opportunistic citizen data, i.e. observations of species collected without standardized field protocol and without explicit sampling design. It is a challenge to achieve reliable estimates of distribution trends from them, because opportunistic citizen science data may suffer from changes in field efforts over time (observation bias), from incomplete and selective recording by observers (reporting bias) and from geographical bias. These, in addition to detection bias, may lead to spurious trends. (2.) We investigated whether occupancy models can correct for the observation, reporting and detection biases in opportunistic data. Occupancy models use detection/non-detection data and yield estimates of the percentage of occupied sites (occupancy) per year. These models take the imperfect detection of species into account. By correcting for detection bias, they may simultaneously correct for observation and reporting bias as well. We compared trends in occupancy (or distribution) of butterfly and dragonfly species derived from opportunistic data with those derived from standardized monitoring data. All data came from the same grid squares and years, in order to avoid any geographical bias in this comparison. (3.) Distribution trends in opportunistic and monitoring data were well-matched. Strong trends observed in monitoring data were rarely missed in opportunistic data. (4.) Synthesis and applications. Opportunistic data can be used for monitoring purposes if occupancy models are used for analysis. Occupancy models are able to control for the common biases encountered with opportunistic data, enabling species trends to be monitored for species groups and regions where it is not feasible to collect standardized data on a large-scale. Opportunistic data may thus become an important source of information to track distribution trends in many groups of species." (Authors) The study bases on the data of National Database Flora and Fauna and Dutch Dragonfly and Butterfly Monitoring Schemes.] Address: van Strien, A.J., Statistics Netherlands, P.O. Box 24500, 2490 HA The Hague, The Netherlands. E-mail: asin@cbs.nl

15082. Vittoz, P.; Cherix, D.; Gonseth, Y.; Lubini, V.; Maggini, R.; Zbinden, N.; Zumbach, S. (2013): Climate change impacts on biodiversity in Switzerland: A review. *Journal for Nature Conservation* 21(3): 154-162. (in English) ["A noticeable increase in mean temperature has already been observed in Switzerland and summer temperatures up to 4.8 K warmer are expected by 2090. This article reviews the observed impacts of climate change on biodiversity and considers some perspectives for the future at the national level. The following impacts are already evident for all considered taxonomic groups: elevation shifts of distribution towards mountain summits, spread of thermophilous species, colonisation by new species from warmer areas and phenological shifts. Additionally, in the driest areas, increasing droughts are affecting tree survival and fish species are suffering from warm temperatures in lowland regions. These observations are coherent with model projections, and future changes will probably follow the current trends. These changes will likely cause extinctions for alpine species (competition, loss of habitat) and lowland species (temperature or drought stress). In the very urbanised Swiss landscape, the high fragmentation of the natural ecosystems will hinder the dispersal of many species towards mountains. Moreover, disruptions in species interactions caused by individual migration rates or phenological shifts are likely to have consequences for biodiversity. Conversely, the inertia of the ecosystems (species longevity, restricted dispersal) and the local persistence of populations will probably result in lower extinction rates than expected with some models, at least in 21st century. It is thus very difficult to estimate the impact of climate change in terms of species extinctions. A greater recognition by society of the intrinsic value of biodiversity and of its importance for our existence will be essential to put in place effective mitigation measures and to safeguard a maximum number of native species." (Authors) The paper includes a discussion section with Odonata.] Address: Vittoz, P., Dept of Ecology & Evolution, Univ. of Lausanne, Bâtiment Biophore, 1015 Lausanne, Switzerland

15083. Wezel, A.; Chazoule, C.; Vallod, D. (2013): Using biodiversity to valorise local food products: the case of fish ponds in a cultural landscape, their biodiversity, and carp production. *Aquaculture International* 21(6): 1395-1408. (in English) ["Today, we need to produce sufficient food and simultaneously conserve biodiversity. But, could biodiversity associated with certain food production practices also be used in marketing products? We analyse this possibility for creating a food quality label for carp raised in the Dombes territory, a cultural landscape of fish ponds in France. The biodiversity of 99 fish ponds was studied in the Dombes territory by analysing aquatic vegetation, dragonflies, amphibians, macroinvertebrates, habitats around ponds, and water quality. In addition, a survey with 200 questionnaires and interviews was conducted with consumers to investigate fish and carp consumption and knowledge about quality labels and biodiversity. Findings reveal that fish production practices conserve remarkable species diversity, particularly for aquatic vegetation, dragonflies and amphibians, and habi-

tats around the ponds. This relatively high level of biodiversity is found in spite of having very nutrient-rich fish pond systems, systems for which normally a low level of biodiversity is expected. Nevertheless, currently this biodiversity cannot be valorised for setting up a quality label for locally produced carp. Firstly, few consumers have adequate knowledge about carp and are interested in eating it. Secondly, most of them have less knowledge about the quality label which wanted to be established for carp from the Dombes. Thirdly, only less than one-third of the consumer is familiar with the term "biodiversity". Fourthly, the stakeholder network of the supply chain is presently not able to communicate the message of biodiversity as they themselves lack a sufficient knowledge about biodiversity of their systems. ... In total, 31 dragonfly species were observed. The mean per pond was 13 and a range from 6 to 22. Two endangered dragonfly species were observed, *Leucorrhinia pectoralis* (EU Habitat Directive and French red list of threatened species) and *Aeshna isocetes* (French red list of endangered species) (Leclerc et al. 2010). Compared with other wetland areas, for example, the Saone floodplain (Oertli 1995) or the ponds from Switzerland (Oertli et al. 2002), the species richness of the Dombes ponds is high and benefits most likely from the dense network of ponds." (Authors)] Address: Wezel, A., Dept of Agroecology and Environment, ISARA Lyon, 23 rue Jean Baldassini, 69364, Lyon cedex 07, France. E-mail: wezel@isara.fr

15084. Wyss, L.A.; Dugger, B.D.; Herlihy, A.T.; Gerth, W.J.; Li, J.L. (2013): Effects of grass seed agriculture on aquatic invertebrate communities inhabiting seasonal wetlands of the southern Willamette Valley, Oregon. *Wetlands* 33(5): 921-937. (in English) ["Wetland loss throughout the United States has contributed substantially to landscape fragmentation and loss in biodiversity. In Oregon's Willamette Valley, only 1 % of native-wet prairie habitat still exists, though seasonal wetlands are still common. These hydrogeomorphic Flats wetlands predominately occur on privately owned and actively farmed lands. We studied these wetlands in spring of 2009 and 2010 in order to quantify and compare aquatic invertebrate communities in two agricultural land-use groups (annual and perennial-grass-seed fields) with native-wet prairie habitat. Community composition in native-prairie, including higher taxa richness and greater diversity, differed from farmed wetlands. Invertebrate densities did not differ among land-uses. However, biomass in perennial-grass wetlands was greater than in annual-grass wetlands both years, and during 2009, it was more than in native-prairie. Lower turbidity, lower conductivity levels, and greater availability of rooted vegetation in native-prairie habitat were conditions associated with differences in invertebrate composition among land-uses. Though invertebrate communities in farmed wetlands differed from native-prairie, the importance of these seasonal wetlands in an altered and fragmented Willamette Valley landscape speaks to their potential contribution for the region's biodiversity and to their inclusion for management of agricultural lands." (Authors) 'Lestidae', 'Libellulidae'] Address: Wyss, L.A., Department of Fisheries and Wildlife, Oregon State University, 104 Nash

Hall, Corvallis, OR, 97331, USA. E-mail: lwyss@cala-pooia.org

2014

15085. Alho, J.M.A.G. (2014): Valorization of natural resources through ecotourism in a rural area of low density - Conception of a dragonflies and damselflies route. M.Sc. thesis; Universidade de Évora, Escola de Ciências et tecnologia, Departamento de biologia, Universidade de Lisboa, Instituto Superior de Agronomia: XI + 182 pp. (in Portuguese, with English summary) ["This dissertation aims to study the development of ecotourism and environmental education activities in a rural area of low density, leading to the valorization of its natural and cultural resources and rural patrimony. The geographical area, Querença (Portugal), is a territory rich in natural, cultural and tourist resources and presents a wide diversity of native species, result of its privileged location between the Barrocal and Sierra, and a vast rural material and immaterial patrimony. The organization of various programs of ecotourism, scientific tourism, environmental education activities and the conception of a route for dragonflies and damselflies observation and photography on an Odonata hotspot in the Barrocal Algarvio, "Paisagem Protegida Local da Fonte da Benémola" consist on the strategy to add value to this rural area. Ecotourism is an important socio-economic asset, consisting of a way to sustain the conservation of nature and driving force in the local development of rural areas." (Author)] Address: Alho, Joana Marta Augusto Guerreiro

15086. Almeida, M.C. (2014): Diversity and vulnerability of aquatic insects in productive landscapes. Tese (Doutorado) – Programa de Pós-Graduação em Ciências Ambientais, Universidade Federal de Goiás, Goiânia: 156 pp. (in Portuguese, with English summary) ["Loss and habitat fragmentation at the landscape scale, the land use and local integrity of habitats (e.g. riparian forests), associated with the social structure of rural lands are factors that can determine the loss of species. These could be greater where of landscapes is homogenized by the same type of land use, such as in agricultural areas. This has important consequences and could be determine that Conservation Biology practices are not based only on Protected Areas. These approaches applied to aquatic insects occurring in Cerrado of Goiás state show that endangered species of Odonata, distributed in the central and south region presented a historical habitat loss of 76%. Regional assessment according to the criteria of the IUCN, a total of 34.8% of species would be in some category of threat, these 71.5% were Critically Endangered, 22,8% Endangered and 4.9% would be vulnerable. Local environmental variables, spatial structure of habitat and matrix in buffers of 250 meters and habitat spatial structure and matrix in the landscapes of 25 by 25 km explained the local richness of Odonata adults in streams. Richness decreases with increase in pasture in the 250 meters buffers and crop in the landscape and increases with the opening canopy. For Ephemeroptera, Plecoptera and Trichoptera (EPT) immature, richness increases with increasing riparian forest

250 meters buffers, with the opening of canopy and the average conductivity of the water. When we consider the habitat integrity (riparian) associated with the structure of rural property around protected areas, the integrity of riparian vegetation as measured by NDVI was lower in the Buffer Zone of sustainable protect areas associated with small farms. The area of the property dedicated to the cultivation and cattle size has direct impacts to lower NDVI values." (Author)] Address: not stated

15087. Andersson, J. (2014): Aquatic insect community structure in urban ponds: effects of environmental variables. M.Sc. thesis, Biology Education Centre and Department of Ecology and Genetics, Uppsala University: 42 pp. (in English) ["I sampled aquatic insects in 26 ponds of varying types in the urban landscape of the city of Stockholm and related insect community structure to environmental variables. I also related environmental factors to species richness, diversity and abundance of the sampled aquatic insects. A Redundancy Analysis (RDA) showed that the most important variables in explaining insect community structure was the remoteness to developed area and the amount of emergent vegetation in the ponds. Species richness increased with distance from developed area, diversity was related to floating vegetation and abundance of insects increased with distance from developed area and with higher amount of forestation and vegetation. The results of my study shows that urbanization effects divide the insect community into clusters of species that are tolerant or intolerant to effects of urbanisation. *Leucorrhinia pectoralis* was found in five (19,2%) of the ponds. My result suggested two important factors that should be considered when planning urban ponds. First, it is important to re-create varying types of ponds and include green buffer areas and second, plant colonisation should be facilitated to better mimic the natural states of ponds." (Author).] Address: Andersson, J. c/o Dept of Ecology and Environmental Science, Animal Ecology Group, Umea University, 90187 Umea, Sweden. E-mail: frank.johansson@eg.umu.se

15088. Ankalgi, S.; Jadesh, M (2014): Diversity of dragonflies and damselflies (Odonata) from Ankalga village (Gulbarga district), Karnataka, India. *International Journal of Recent Scientific Research* 5(10): 1851-1853. (in English) ["The objectives of the present study were to explore the Diversity and abundance of Odonata of Ankalga vilage, near back waters of benethora reservoir, Gulbarga District, Karnataka. Odonata fauna of present study was investigated in monsoon season from July 2013 to October 2013, total 14 species belonging to four families of dragonflies and damselflies were recorded, in which the most abundant family was Libellulidae followed by Coenagrionidae, Gomphidae and Platycnemididae. Libellulidae family represents 10 species, Coenagrionidae represents 2 species, Gomphidae represents 1 species, while Platycnemididae also represents with 1 species. We also calculated the Species diversity (H) and Evenes (E) which is 2.371 and 0.901 respectively. From above study we conclude that he present study area is rich in Odonata fauna in monsoon

season." (Authors)] Address: Ankalgi, Sulochana, Dept of Zoology Gulbarga University, Gulbarga, Karnataka, India

15089. Batabyal, A.; Gosavi, S.M.; Gramapurohit, N.P. (2014): Determining sensitive stages for learning to detect predators in larval bronzed frogs: Importance of alarm cues in learning. *Journal of Biosciences* 39(4): 701-710. (in English) ["Successful survival and reproduction of prey organisms depend on their ability to detect their potential predators accurately and respond effectively with suitable defences. Predator detection can be innate or can be acquired through learning. We studied prey-predator interactions in the larval bronzed frogs (*Sylvirana temporalis*), which have the innate ability to detect certain predators. We conducted a series of experiments to determine if the larval *S. temporalis* rely solely on innate predator (*Bradinopyga geminata*) detection mechanisms or can also learn to use more specific cues such as conspecific alarm cues for the purpose. The results of our study clearly indicate that larval *S. temporalis* use both innate and learned mechanisms for predator detection. Predator-naive tadpoles could detect kairomones alone as a potential threat and responded by reducing activity, suggesting an innate predator detection mechanism. Surprisingly, predator-naive tadpoles failed to detect conspecific alarm cues as a potential threat, but learned to do so through experience. After acquiring the ability to detect conspecific alarm cues, they could associate novel predator cues with conspecific alarm cues. Further, post feeding stages of larval *S. temporalis* are sensitive for learning to detect conspecific alarm cues to label novel predators." (Authors)] Address: Batabyal, Anuradha, Dept of Zoology, University of Pune, Pune, 411 007, India

15090. Boer, E.P. de; Hijum, E. van; Brochard, C.; Seijen, R.B van (2014): *Libellenrijk Fryslân: mei ljochtsjende wjukken oer it wetter*. *FaunaX*: 352 pp. (in Dutch) [Includes 64 species recorded from Friesland (North Netherlands), with distribution maps and colour photos of adults, larvae and habitats.] Address: E-mail: tineke@faunax.nl.

15091. Bond, J.G.; Mauricio Casas-Martínez, M.; Quiroz-Martínez, H.; Novelo-Gutiérrez, R.; Marina, C.-F.; Ulloa, A.; Orozco-Bonilla, A.; Muñoz, M.; Williams, T. (2014): Diversity of mosquitoes and the aquatic insects associated with their oviposition sites along the Pacific coast of Mexico . *Parasites & Vectors* 2014, 7:41 doi:10.1186/1756-3305-7-41 : 31 pp. (in English) ["Background: The abundance, richness and diversity of mosquitoes and aquatic insects associated with their oviposition sites were surveyed along eight states of the Pacific coast of Mexico. Diversity was estimated using the Shannon index (H'), similarity measures and cluster analysis. Methods: Oviposition sites were sampled during 2–3 months per year, over a three year period. Field: collected larvae and pupae were reared and identified to species following adult emergence. Aquatic insects present at oviposition sites were also collected, counted and identified to species or genus. Results: In total, 15 genera and 74 species of mosquitoes were identified: *Anopheles pseudopunctipennis*, *An. albimanus* and *Aedes aegypti* were the most

abundant and widely distributed species, representing 47% of total mosquito individuals sampled. New species records for certain states are reported. Anopheline diversity was lowest in Sinaloa state ($H' = 0.54$) and highest in Chiapas ($H' = 1.61$) and Michoacán ($H' = 1.56$), whereas culicid diversity was lowest in Michoacán ($H' = 1.93$), Colima ($H' = 1.95$), Sinaloa ($H' = 1.99$) and Jalisco ($H' = 2.01$) and highest in Chiapas ($H' = 2.66$). In total, 10 orders, 57 families, 166 genera and 248 species of aquatic insects were identified in samples. Aquatic insect diversity was highest in Chiapas, Oaxaca and Michoacán ($H' = 3.60-3.75$). Mosquito larval/pupal abundance was not correlated with that of predatory Coleoptera and Hemiptera. Conclusion: This represents the first update on the diversity and geographic distribution of the mosquitoes and aquatic insects of Mexico in over five decades. This information has been cataloged in Mexico's National Biodiversity Information System (SNIB-CONABIO) for public inspection." (Authors) The paper includes references to Odonata.] Address: Novelo-Gutiérrez, R., Depto de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Aparatdo Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.edu.mx

15092. Bota-Sierra, C.A. (2014): Nine new records of Odonata for Colombia from the Orinoco Basin (Lestidae, Calopterygidae, Heteragrionidae, Coenagrionidae, Libellulidae). *Notulae odonatologicae* 8(4): 97-100. (in Odonata, new records, Meta department, Colombia) ["Twelve species new for Meta department, Colombia, are listed, among which nine represent new records for Colombia. These are *Telebasis rubricauda*, *Lestes helix*, *L. jerrilli*, *L. minutus*, *Heteragrion bariai*, *Oxystigma cyanofrons*, *Misagría parana*, *Perithemis thais*, and *Zenithoptera lanei*." (Author)] Address: Bota-Sierra, C.A., Grupo de Entomología Universidad de Antioquia (GEUA), Medellín AA 1226, Colombia. E-mail: corneliobota@gmail.com

15093. Brockhaus, T. (2014): *Ophiogomphus cecilia* (Fourcroy, 1758) - nun auch an der Chemnitz! (Odonata: Gomphidae). *Mitteilungen Sächsischer Entomologen* 33(110): 153-154. (in German) [19-VII-2014, River Chemnitz, Göritz-hain, Sachsen, Germany] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

15094. Cannings, R.A. (2014): The dragonflies and damselflies (Odonata) of Canadian grasslands. In: *Arthropods of Canadian Grasslands (Volume 3): Biodiversity and Systematics Part 1*. Edited by H. A. Cárcamo and D. J. Giberon. *Biological Survey of Canada*: 231-269. (in English, with French summary) ["211 odonate species are known from Canada. Grasslands across the country support about 59% of the national fauna. A checklist and systematic overview of 124 species in nine families are presented. Species totals in these families are as follows: Calopterygidae, 2; Lestidae, 7; Coenagrionidae, 31; Aeshnidae, 16; Gomphidae, 15; Cordulegastridae, 1; Macromiidae, 2; Corduliidae, 13; and Libellulidae, 37. The geographical ranges of the species are defined and summarized; according to the definitions

herein, 20 species have boreal ranges, 17 are transition species, 12 are Cordilleran, 1 is Pacific coastal, 10 are western, 4 are more or less restricted to the Great Plains, 16 have southern ranges, 38 are considered eastern, and 6 are widespread species. A summary of studies on grassland Odonata and recommendations for inventory and taxonomic research are provided. The geographical scope of the Canadian grassland fauna is described briefly with respect to lotic and lentic habitats in grasslands of the Cordillera, the Great Plains, and southern Ontario." (Author)] Address: Cannings, R.A., Royal British Columbia Museum, 675 Belleville Street, Victoria, British Columbia, V8W 9W2, Canada. E-mail: rcannings@royalbcmuseum.bc.ca

15095. Cerny, M.; Waldhauser, M.; Vintr, L. (2014): First documented record of *Gomphus pulchellus* in the Czech Republic (Odonata: Gomphidae). *Libellula* 33(3/4): 189-194. (in English, with German and Czech summaries) ["One male of *G. pulchellus* was recorded and photographically documented on 08-vi-2014 near the township Lány, ca 40 km west of Prague." (Authors)] Address: Cerny, M., Department of Ecology, Charles University in Prague, Viničná 7, Prague, 128 44, Czech Republic. E-mail: cerny@natur.cuni.cz

15096. Chakravorty, P.P.; Sinha, M.; and Chakraborty, S.K. (2014): Impact of industrial effluent on water quality and benthic macro invertebrate diversity in fresh water ponds in Midnapore district of west Bengal, India. *Journal of Entomology and Zoology Studies* 2(3): 93-101. (in English) ["A study on the impact of industrial effluent discharge on the distribution and biodiversity of benthic macro-invertebrates and water quality of a fresh water pond, in Gokulpur, West Bengal, India near Tata metaliks (a metal refinery) was carried out during April 2009-March 2010. Two ponds were chosen for this study of which one was used as control. Comparing the physico-chemical parameters in two ponds it was seen that pond G had higher hardness, total suspended solid, pH, phosphate, hydrogen sulphide, cyanide, heavy metals like lead, cadmium and mercury. The total no of macro-benthic taxa and their overall richness indices and diversity indices were higher at pond in Santipukur, (44 taxa) than pond in Gokulpur (22 taxa). The pond S was dominated by Ephemeroptera, Hemiptera where as other order found in small quantities included Coleoptera, Diptera, Molluscs, Crustacea and Odonata (*Urothermis signata*, *Anax* sp., *Enallagma* sp., *Pseudagrion* sp., *Ischnura* sp., *Caliagrion* sp.) On the other hand pond G was mainly dominated by tolerant Diptera and Hemiptera. The relationship between physicochemical parameter and macrobenthic data were investigated by Pearson correlation analysis. This statistical analysis showed that richness and diversity indices in pond G were mainly influenced by water hardness, total suspended solid, phosphate, hydrogen sulphide, lead and cyanide. It was also seen that a lot of species that were present in pond S were absent in pond G. CCA ordination biplot showed the presence of benthic macro-invertebrates in pond G was due to their strong and positive correlation with environmental variables." (Authors)] Address:

Chakravorty, Partha Pratim, Partha Pratim Chakravorty, PG Department of Zoology, Raja, N.L. Khan Women's College, Midnapore, W. Bengal, India

15097. Choong, C.Y. (2014): Odonata (Insecta) fauna of Krau Wildlife Reserve, Pahang, Malaysia. *Journal of Wildlife and Parks* 28: 73-80. (in English) ["Records of Odonata collected at sites in Krau Wildlife Reserve, Pahang, in October 2007 and August-September 2013 are presented. A total of 85 species from 14 families were collected. Of these 72 species are the new records for Krau Wildlife Reserve. A new species of *Prodasineura* was collected, and yet to be named. These records are combined with existing records from Krau Wildlife Reserve in literature to produce the checklist of the Odonata known to the reserve. At present 102 species from 14 families are known from Krau Wildlife Reserve." (Author)] Address: Choong, C.Y., Centre for Insect Systematics, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor. E-mail: cychoong@ukm.edu.my

15098. Conniff, K. (2014): Dragonflies of Godavari. *International Centre for Integrated Mountain Development* 30: 40 pp. (in English) ["This is a basic photo guide to identify dragonflies found at ICIMOD Knowledge Park and in the vicinity of Godavari - some are found on the small pond near the Kunda, others in a jungle area beside ICIMOD. Many do not have common names thus the scientific names are given for all." (Author)] Address: Karen Conniff c/o International Centre for Integrated Mountain Development, GPO Box 3226, Kathmandu, Nepal. E-mail: karoconniff@gmail.com

15099. Daigle, J.J. (2014): Two new Heteropodagrion species from Ecuador (Odonata: Megapodagrionidae). *Odonatologica* 43(1/2): 35-42. (in English) ["Heteropodagrion nigripes sp. nov. is described and illustrated (holotype male: Ecuador, Morona Santiago Province, 07-xi-1997). It can be distinguished by the black legs and stout white cercus. *Heteropodagrion varipes* sp. nov. is described and illustrated (holotype male: Ecuador, Morona Santiago Province, 18-ix-2005). The bicolored legs and middorsal cercus tooth separates it from other Heteropodagrion species. Both holotypes are deposited in the Florida State Collection of Arthropods, Gainesville, Florida, USA." (Author)] Address: Daigle, J.J., 2067 Little River Lane, Tallahassee, Florida 32311, USA. E-mail: jdaigle@nettally.com

15100. Dallai, R. (2014): Overview on spermatogenesis and sperm structure of Hexapoda. *Arthropod Structure & Development* 43: 257-290. (in English) ["The main characteristics of the sperm structure of Hexapoda are reported in the review. Data are dealing with the process of spermatogenesis, including the aberrant models giving rise to a reduced number of sperm cells. The sperm heteromorphism and the giant sperm exceeding the usual sperm size for length and width are considered. The characteristics of several components of a typical insect sperm are described: the plasma membrane and its glycocalyx, the nucleus, the centriole region and the centriole adjunct, the accessory

bodies, the mitochondrial derivatives and the flagellar axoneme. Finally, a detailed description of the main sperm features of each hexapodan group is given with emphasis on the flagellar components considered to have great importance in phylogenetic considerations. This study may be also useful to those requiring an introduction to hexapod reproduction. ... 9.3. The Paleoptera: The two groups Odonata and Ephemeroptera exhibit a quite different sperm structure. The former shares many of the sperm characters present in the neopteran insects: a bi-layered acrosome (Fig. 2B), elongated nucleus, a centriole with microtubular triplets, expanded centriole adjunct material, a coiled flagellum with a 9 + 9+2 axoneme provided with accessory tubules with 16 protofilaments in their tubular wall, two mitochondrial derivatives and two accessory bodies (Fig. 11D) (Jamieson et al., 1999; Dallai et al., 2006). (Fig. 11: "Sperm tail of the dragonfly *Calopteryx* sp. (Odonata) with accessory bodies (ab), mitochondria (m) and accessory tubules with 16 protofilaments.") The sperm of Ephemeroptera, instead, show many autapomorphies: a mono-layered acrosome (Fig. 2C), a cylindrical nucleus, a centriole with triplets giving rise to a 9 + 9+0 flagellar axoneme, absence of central tubules and with large central sheath (Fig. 11C). Axonemal doublets have only inner dynein arms and accessory tubules show 13 protofilaments (Fig. 11C). A single mitochondrion and two crystalline accessory bodies are present (Jamieson, 1987; Dallai et al., 2006). These sperm are motile and, in Cloeon at least, mature sperm give rise to bundles (Lupetti et al., 2011). In the family Leptophlebiidae, as may be expected when the axoneme loses some key elements (here the central tubules and outer dynein arms) sperm are aflagellate and immotile (Gaino and Mazzini, 1991; Dallai et al., 2006; Brito et al., 2011). The two groups Ephemeroptera and Odonata, from a spermatological perspective, appear to be less similar than a common origin would suggest, in fact supporting the Metapterygota (Odonata + Neoptera) (Staniczek, 2000)." (Author)] Address: Dallai, R., Dept of Life Sciences, Univ. Siena, Via Aldo Moro 2, 53100 Siena, Italy. E-mail: dallai@unisi.it

15101. Damerow, J.F. (2014): Diversity and distribution of California dragonflies and other aquatic taxa over the past century. Ph.D., University of California, Berkeley: 155 pp. (in English) ["Climate and land-use change have altered and continue to affect the diversity, composition, and distribution of freshwater organisms throughout the world. This is particularly true in arid and semi-arid regions, where aquatic organisms may experience more pronounced reductions in available habitat with declines in precipitation, increases in water demand, and habitat degradation through human land-use. However, documentation of changes in taxonomic assemblages over long-time periods has been rare because of the difficulty in obtaining historical occurrence data. This dissertation used data from previously published literature, a resurvey study, museum specimens, and enthusiast sightings to document changes in the occurrence rates and distribution of freshwater organisms throughout California over the past century. Summary information regarding

freshwater taxa known to occur in California did not previously exist in a central publication. I therefore conducted a review of several primary groups of stream organisms found in the Mediterranean region of California and statewide. For this work, I gathered data from a variety of literature sources and museum specimens to summarize species composition and endemism in the region, and to identify data gaps and conservation priorities for the examined groups. The remainder of this dissertation focuses largely on changes in Odonata species diversity, composition, and occurrence rates over time in California. This charismatic group was ideal for study of change over time because of their relatively low diversity, well-known taxonomy, and the existence of sufficient historical and current specimen records and more recent enthusiast sightings of odonates. I conducted a resurvey of sites originally sampled for Odonata by Clarence H. Kennedy 1914-1915. This work involved surveys of odonates at 81 sites throughout central California and northwestern Nevada, 45 of which were directly comparable to Kennedy's original sites. I found that while site-level species richness has not changed significantly, assemblages have become more homogeneous across sites. Habitat generalists have generally expanded in the extent of their distribution while habitat specialists have declined. In examining current local and regional factors influencing the occurrence of Odonata species in this region, I found that species occurrence was higher during site visits with higher degree-days, especially for highly mobile groups, including dragonflies and migratory species. The probability of presence across species was lower in highly urban sites, particularly for habitat specialists. Overall, both regional and local factors influenced the occurrence of odonates in the study with implications for conservation. A large component of this dissertation included development and analysis of a database of over 33,000 Odonata occurrence records throughout California over the past century. This database included specimen records from museums in California and large odonate collections elsewhere, as well as statewide enthusiast sightings from recent years. I noted that these unstandardized data contain biases with regards to uneven sampling effort, which must be addressed in analysis. Subsequent analyses of occurrence records before and after 1975 indicated that Odonata distribution may have generally shifted northwards with temperature warming and to lower minimum elevations in response to increased summer water-availability in low-elevation agricultural regions. Similar to results from the resurvey study, the museum specimen data indicated that highly mobile migratory species have increased while habitat specialists have declined. I concluded that a combination of sampling biases, species traits, and climate that have influenced the probability of detection of Odonata species over the last century." (Author)]

Address: Damerow, Joan Elizabeth,

15102. Darwall, W.; Carrizo, S.; Numa, C.; Barrios, V.; Freyhof, J.; Smith, K. (2014): Freshwater Key Biodiversity Areas in the Mediterranean Basin Hotspot. Informing species conservation and development planning in freshwater ecosystems. Cambridge, UK and Malaga, Spain: IUCN: x +

86 pp. (in English, with French, Spanish, Arabian, Croatian and Turkish summaries) ["Executive summary: The Mediterranean Basin Biodiversity Hotspot is well known for its globally important biodiversity. The freshwater biodiversity in the Hotspot, not previously widely recognized for its importance, is confirmed here to be unusually diverse and highly threatened, with many species endemic to individual rivers, streams, springs, wetlands and lakes across the region. Key Biodiversity Areas (KBAs) are areas contributing significantly to the global persistence of biodiversity. Based on published information on species conservation status and distributions (source IUCN Red List of Threatened Species) [KBA trigger species are i) freshwater fishes; ii) freshwater molluscs; iii) Odonata and iv) aquatic plants.], 90% of the 3,894 river/lake sub-catchments considered were found likely to meet the criteria qualifying them as Freshwater KBAs. The primary threats to freshwater species across the hotspot are increasing severity of droughts, hydrological alterations following construction of dams, over-abstraction of surface and ground waters, water pollution and invasive species. The impacts of these types of threat tend to spread rapidly throughout catchments such that localized conservation actions restricted to limited parts of a catchment will often fail to address these threats. For this reason the appropriate management unit for most freshwater KBAs is a sub-catchment, or a group of connected sub-catchments. The main criteria employed for a sub-catchment to qualify as a 'proposed KBA' were the presence of threatened or restricted range species, or an ecoregion-restricted community of species. Subsequent evaluation of these proposed KBAs for the three sub-regions of the Hotspot eligible for CEPF funding was conducted through three workshops involving 39 stakeholders in the Balkans (Jahorina, Bosnia and Herzegovina), Turkey and Levant (Azraq, Jordan), and northern Africa (Marrakesh, Morocco). One hundred and sixty-seven freshwater KBAs, covering a total area of 302,557 km² were confirmed as valid freshwater KBAs. Of these, 40 KBAs also meet the criteria qualifying them as Alliance for Zero Extinction (AZE) sites where immediate conservation actions are required if a species present in the KBA is not to become globally extinct in the near future. All proposed and validated KBAs are now publicly available for viewing on the World Biodiversity DataBase website (www.birdlife.org/datazone/freshwater). The current level of inclusion of validated freshwater KBAs within existing protected areas or other KBAs was found to be extremely low. Seventy-five per cent of the total area of these KBAs was found to lie outside the boundaries of any pre-existing protected areas or other KBAs, including 15 freshwater KBAs for which there is no overlap at all. Through this project freshwater KBAs have now been identified, mapped and validated throughout much of the Mediterranean Hotspot. It is now important to raise awareness of their status as validated freshwater KBAs and to develop plans for appropriate conservation actions at these sites. One hundred and eighty-eight potential Site Champions have been identified by stakeholders as individuals/organizations best placed to raise awareness of the existence of the KBAs and the issues faced with respect to threats to biodiversity, and to help

implement the required actions to safeguard these globally important sites. Specific recommendations for conservation actions are mainly focused on improving management of the hydrology of these KBAs, many of which are currently or potentially impacted by over-abstraction and diversion of water, construction of dams, and drought. KBAs need to be managed to ensure Environmental Flows are sufficient to support these fragile freshwater ecosystems and they should be implemented as part of catchment-wide Integrated River Basin Management planning which takes account of the wide range of uses of water across all sectors. There are also important knowledge gaps in site and basin-specific species distributions of many threatened species, and many countries do not yet have baseline inventories of their inland water ecosystems and species assemblages. It is very possible that many new KBAs will be discovered if these biodiversity inventories progress. In conclusion, the Mediterranean Basin Hotspot is found to be globally important for its freshwater biodiversity. This biodiversity is highly threatened largely due to the conflicting demands upon a diminishing supply of fresh water which is further exacerbated by the increased severity of drought across the region. Unless the recommendations given above are followed and Site Champions are mobilized to raise awareness of these globally important freshwater KBAs, species will almost certainly be lost in the very near future. Solutions are available but the willingness to adopt them has to be encouraged. Freshwater species are most often out of sight and out of mind so raising awareness of their presence, the threats they face, and the necessary conservation actions are fundamental to the persistence of freshwater biodiversity in the Mediterranean Hotspot." (Authors) The following odonate trigger species were selected: Turkey and Levant: none; Balkans: *Coenagrion intermedium*, *Ceragrion georgifreyi*, *Pyrrhosoma elisabethae*, *Boyeria cretensis*; North Africa: *Calopteryx exul*, *Cordulegaster princeps*; Gomphus lucasii] Address: Available from: IUCN Centre for Mediterranean Cooperation, C/ Marie Curie 22, 29590 Campanillas, Malaga, Spain. www.iucn.org/mediterranean; www.iucn.org/publications

15103. Dunk, K. von der; Kraus, M. (2014): Grundlegende Untersuchungen zur vielfältigen Insektenfauna im Tiergarten Nürnberg unter besonderer Betonung der Hymenoptera. Beiträge zur bayerischen Entomofaunistik 13: 67-207. (in German, with English summary) [Nürnberg, Bayern, Germany; on pages 188f, 14 (common) odonate species are listed.] Address: not available

15104. Elias, J.D.; Ijumba, J.N.; Mgaya, Y.N.; Mambo, F.A. (2014): Study on freshwater macroinvertebrates of some Tanzanian rivers as a basis for developing biomonitoring index for assessing pollution in tropical African regions. Journal of Ecosystems Volume 2014, Article ID 985389, <http://dx.doi.org/10.1155/2014/985389>: 8 pp. (in English) ["Macroinvertebrates and physico-chemical parameters were assessed at 15 sites along five rivers in Kilimanjaro region, Tanzania, with the aim of understanding their eco-

logical status and set a base to the development of a biological index for tropical regions. Investigated rivers occur within Pangani basin include Karanga, Rau, Lumbanga, Sere, and Umbwe. Sampling sites were categorized according to the level of water and habitat quality as follows: reference or least impacted (4 sites), moderately impacted (5 sites) and highly impacted (6 sites) sites. A total of 12,527 macroinvertebrates belonging to 13 orders and 48 families were recorded. The highest total abundance of 4,110 individuals per m² was found in Karanga river, while Umbwe River had the lowest with 1,203 individuals per m². Chironomidae was the most abundant family (2,588 individuals per m²) and the least were Hydridae and Thiaridae, each having 5 individuals per m². High numbers of taxa were noted among the Orders: Ephemeroptera (8), Odonata (8), Diptera (7) and Trichoptera (6). In conclusion, orders with greater diversity of macroinvertebrate families offer a wide range of tolerance to pollution, thus can potentially be used to develop a biomonitoring index for evaluating pollution in Tropical African rivers." (Authors)] Address: Elias, J.D., The Nelson Mandela African Institute of Science and Technology (NM-AIST), School of Materials, Energy, Water and Environmental Sciences (MEWES), Dept of Water & Environmental Science & Engineering (WESE), P. O. Box 447, Arusha, Tanzania. E-mail address: eliasj@nm-aist.ac.tz

15105. Ellenrieder, N. von; Hauser, M.; Kinnee, S.; O'Hara, J.E.; Stireman III, J.O.; Cerretti, P.; Wood, D.M. (2014): First record of a parasitoid tachinid fly (Diptera: Tachinidae) on a dragonfly (Odonata: Calopterygidae). *Studia dipterologica* 21(2): 335-341. (in English, with German summary) ["During a biodiversity survey in the forest of central Guyana, an adult male of the damselfly *Hetaerina caja dominula* Hagen in Selys was found parasitized by a tachinid larva. This constitutes the first record of a parasitoid on an adult odonate, and of an odonate as host of a tachinid larva. CO1 DNA sequencing of the larva placed it closest to the tachinid genera *Actinodoria* Townsend, *Euhaldaya* Walton, and *Cryptomeigenia* Brauer & Bergenstamm in the tribe *Blondeliini* (subfamily *Exoristinae*). Pictures are provided of the third instar fly larva protruding from the host, of its posterior spiracles, and of the first and second instar cephaloskeletons." (Authors)] Address: Ellenrieder, Natalia von, California State Collection of Arthropods, CDFA, 3294 Meadowview Road, Sacramento, CA 95832. Email: natalia.ellenrieder@gmail.com

15106. Endersby, I. (2014): Additional distribution records for Victorian dragonflies (Insecta: Odonata). *Continued. Victorian Entomologist* 44(1): 8-15. (in English) [*Dendroaeschna conspersa*, *Diphlebia nymphoides*, *Hemiphlebia mirabilis*, *Nannophlebia risi*] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@pacific.net.au

15107. Fauziyah, S.; Alam, C.; Soesilohadi, R.C.H.; Retnoaji, B.; Alam, P. (2014): Morphological and mechanical characterisation of the hindwing nodus from the Libellulidae family of dragonfly (Indonesia). *Arthropod Structure &*

Development 43(5): 415-422. (in English) ["In this communication, the morphologies and mechanical characteristics of nodi from the hindwings of seven Indonesian Libellulidae dragonfly species are identified (*Acisoma panorpoides* ascalophoides, *Brachythemis contaminata*, *Crocothemis servilia*, *Potamarcha congener*, *Pantala flavescens*, *Orthetrum sabina*, *Neurothemis ramburii*). Geometrical analyses reveal that in all species, the shape of dorsal face resilin is relatively long and thin while ventral face resilin covers a greater surface area than dorsal face resilin, and is shaped like a hook. Finite element analyses reveal that the magnitude of strain energy may differ considerably between species, even though the locations of highest strain energy are usually the same. Importantly, a correlation is found to exist between the mechanical forces that build up in the resilin, the face under investigation (dorsal or ventral) and the elongational shape factor of the resilin." (Authors)] Address: Alam, P., Laboratory of Paper Coating and Converting, Centre for Functional Materials, Abo Akademi Univ., Porthaninkatu 3, Turku 20500, Finland. E-mail: parvez.alam@abo.fi

15108. Furlan, N.E (2014): Life histories, diets, and secondary production of Odonata along a temperature gradient on the Copper River Delta, Alaska. MSc thesis, Loyola University Chicago: 79 pp. (in English) ["Dragonflies (Odonata: Epiprocta) and damselflies (Odonata: Zygoptera) are a conspicuous aspect of the biota in ponds on southcentral Alaska's Copper River Delta (CRD). Odonate densities, secondary production, and diets were assessed in sixteen ponds classified by delta region (east vs. west) and landscape type (outwash plain (OP) vs uplifted marsh (UM)). *Enallagma boreale* comprised 48.5% of collected odonates. *Leucorrhinia hudsonica* and *Aeshna juncea* comprised 36.6% and 10.4% of collected odonates, respectively. *L. hudsonica* densities and secondary production were significantly higher ($p < 0.001$) in west UM ponds than in other pond types. Ostracods (Ostracoda) and water boatmen (Corixidae) dominated west OP *A. juncea* diets. Midge larvae (Chironomidae) dominated *A. juncea* diets in remaining pond types, occurring in 68% of foreguts. 27% of *A. juncea* foreguts demonstrated intraguild predation, and 6% of foreguts demonstrated cannibalism. Foreguts containing threespine stickleback (*Gasterosteus aculeatus*) revealed *A. juncea*'s apex predator role in CRD ponds." (Authors)] Address: not stated

15109. Gauci, C. (2014): A review of the Odonata of the Maltese Islands. J. Br. Dragonfly Society 30(2): 79-109. (in English) ["This paper is the result of five years of detailed observations of Odonata at several sites in the Maltese Islands. It updates the status and relative abundance of the various species. There is currently only one zygopteran *Ischnura genei* established on the Islands. *Calopteryx virgo* is considered a vagrant, while the occurrence of *C. haemorrhoidalis* is considered to be highly doubtful. There are nine species of anisopterans which are established in the Islands, these being *Anax imperator*, *A. parthenope*, *Orthetrum cancellatum*, *O. coerulescens*, *O. trinacria*, *Sympetrum fonscolombii*, *Crocothemis erythraea*, *Trithemis annu-*

lata and *Selysiothemis nigra*. Three more: *Orthetrum nitidissime*, *O. chrysostigma* and *Pantala flavescens*, have recently been added to the Islands' list, while two - *Orthetrum brunneum* and *Sympetrum striolatum* - which were formerly considered common, are now very rare. *Anax ephippiger* is a fairly regular migrant, appearing in considerable numbers in some years. *Aeshna mixta* is rare but might be on the verge of establishing itself on the Islands, following a recent spate of records, including ovipositing females. Various inaccuracies and conflicting statements appearing in previous contributions are corrected. Observations on behaviour are included where these are of special interest as well as where they are in contradiction of what has been stated in the literature." (Author)] Address: Gauci, C., 28. Triq il-Kissier, Mosta, Malta

15110. Ghahari, H.; Thipaksorn, A. (2014): A preliminary checklist of Odonata (Insecta from the Arasbaran Biosphere Reserve and vicinity, northwestern Iran. The Journal of Tropical Asian Entomology 3(1): 48-54. (in English) [Geotag: Iran, Arasbaran (East Azarbaijan province, northwestern Iran) [38°40' to 39°08'N; 46°39' to 47°02'E]; a total of 26 odonate species were collected and identified.] Address: Ghahari, H., Department of Entomology, Science and Research Branch, Islamic Azad University, Tehran, Iran

15111. Golfieri, B. (2014): Valutazione dello stato morfologico ed ecologico di corsi d'acqua alpini: utilizzo e confronto dell'indice di qualità morfologica (IQM) e di un indice basato sugli odonati. Tesi di dottorato, Dipartimento di Scienze Storiche, Geografiche e dell'Antichità, University of Padona: (in Italian, with English summary) ["This thesis deals with the assessment of morphological and ecological conditions of six Italian alpine rivers. Odonata were chosen as bioindicators to assess the ecological status of river corridors while the assessment of the morphological status of the study cases was performed by using the Morphological Quality Index (MQI) Dragonflies demonstrated to be an effective bioindicator. The results also indicated a significant correlation between MQI and OQI and demonstrated the importance of river processes as drivers for the maintenance of a high diversity of habitats and species within the river corridor." (Authors) http://gesta.scuoladottorato.it/joomla/images/ALLEGATI/archivio/2012/canazei-2012/Golfieri_paper.pdf] Address: not stated

15112. Hoess, R.; Wermeille, E. (2014): Erstmaliger Nachweis der Entwicklung von *Gomphus vulgatissimus* auf über 1.000 m. Mercuriale 14: 33-38. (in German, with English and French summaries) ["First record of a successful development of *Gomphus vulgatissimus* at above 1,000 m above sea level. In 2013 and 2014 two exuviae of *Gomphus vulgatissimus* were found at Lac des Taillères, a small lake in the Swiss Jura mountains at 1,036 m above sea level, proving the development of the species above 1,000 m asl. Adults have been witnessed at the lake and its surroundings since 2008. The climatic conditions and records of high altitudinal reproduction are discussed." (Authors)] Address:

Wermeille, E., Route de Clêmesin 8, CH-2057 Villiers, Switzerland. E-mail: ewermeille@vtx.ch

15113. Hrivniak, H.; Manko, P. (2014): Contribution to the knowledge of ecologically significant aquatic insect species of the Topľa river. *Acta Universitatis Prešovensis - Folia Oecologica* 6(2): 9-15. (in Slovakian, with English summary) ["A survey of aquatic macroinvertebrates as available food resources of the Brown trout in the Topľa river (Slovakia) was implemented. This report shows information about occurrence of some endangered and vulnerable species in this river: *Oligoneuriella rhenana* (Ephemeroptera; Oligoneuriidae) (EN), *Taeniopteryx schoenemundi* (Plecoptera; Taeniopterygidae) (EN), *Onychogomphus forcipatus* (Odonata; Gomphidae) (VU), *Atherix ibis* (Diptera; Athericidae) (VU), with the short autecological characteristics. These findings indicate that Topľa river catchment represents a remarkable area in terms of nature conservation, which should be given more attention, particularly in the context of recent ecological negative impacts to the habitats (removal of riparian vegetation, river banks and riverbed disturbances). The occurrence of several rare and endangered species found by this low-intensity and small scale research can also serve as a motivation for further faunistic studies in this area." (Authors)] Address: Hrivniak, H., A. Sviatanka 24, SK - 085 01 Bardejov, Slovakia. e-mail: lubos.hrivniak@gmail.com

15114. Jana, D.; Chakraborty, S.K.; Tamili, D. (2014): Diversity of dragonflies (Insecta: Odonata) in contrasting coastal environment of Midnapore (East), West Bengal, India. *Journal of Radix International Educational and Research Consortium* 3(4): 1-11. (in English) [13 odonates species were sampled from November 2007 to October 2010.] Address: Jana, D., Vidyasagar University Paschim Medinipur, India

15115. Karaouzas, I.; Dimitriou, E.; Lampou, A.; Colombari, E. (2014): Seasonal and spatial patterns of macroinvertebrate assemblages and environmental conditions in Mediterranean temporary ponds in Greece. *Limnology* 16: 41-53. (in English) ["Mediterranean temporary ponds in Greece have been neglected, and only recently has attention been drawn to their protection and conservation. In this study, the macroinvertebrate fauna of the Mediterranean temporary ponds of western Crete was examined for the first time. In particular, the seasonal and spatial patterns of macroinvertebrate communities were assessed along with the spatio-temporal variation of their environmental conditions and hydroperiod variation. Benthic fauna and abiotic (physicochemical, hydroperiod) data were monitored for 3 years (2006–2008). A total of 63 macroinvertebrate taxa belonging to 33 families were recorded, with *Plea minutissima*, *Berosus affinis*, *Pericoma* sp., *Culex* sp., Chironomidae and Cyprididae being the most abundant. Nutrient pollution was significant in the ponds situated near agricultural areas and could thus explain the poor species richness. NMDS showed a clear spatial and temporal distinction between

lowland and upland sites. Heteroptera species were exclusively encountered in spring, while Coleoptera larvae and adults were present in all seasons, with adults being more abundant during winter. Ordination analysis revealed significant seasonal and inter-annual differences in macroinvertebrate assemblage structure, as confirmed by ANOSIM ($R = 0.965$, $p = 0.001$). Species richness was relatively lower compared to temporary ponds from other regions because of their isolated character, unpredictable hydroperiod and degraded water quality. This study highlights that these fragile ecosystems sustain a unique invertebrate fauna able to endure pond drying by several survival traits and therefore their conservation and protection is necessary." (Authors) Taxa - including Odonata - are treated at the family level.] Address: Karaouzas, I., Hellenic Centre for Marine Research, Institute of Marine Biological Resources and Inland Waters, 46.7 km Athens-Sounio Av., 19013, Anavissos, Attica, Greece. E-mail: ikarz@hcmr.gr

15116. Kever, D.; Schott, O.; Goffart, P. (2014): Les odonates des Hautes-Fagnes: effets positifs du récent projet LIFE de restauration des tourbières. *Les Naturalistes Belges* 95(3-4): 33-70. (in French, with English summary) ["Odonata in the "Hautes-Fagnes" plateau: positive effects of peat bogs restoration of the recent Life project": The interest of the "Hautes-Fagnes" high-plateau for dragonflies is known since a long time. After a period of degradation of the peatlands during the last century, the plateau has been the subject of a large scale LIFE project to restore moors and peat bogs between 2007 and 2012 resulting in the creation of countless numbers of new and potentially attractive habitats for dragonflies. The long-term evolution of dragonflies' communities in the "Hautes-Fagnes" is presented here and is put in perspective. The standardized monitoring of dragonflies set up after the LIFE project shows a significant positive effect, both quantitatively and qualitatively, of the restoration work on the area's dragonfly fauna. In particular, all bog species, several of which are regionally rare and endangered, reacted positively, even the most demanding ones." (Authors) The following species are detailed: *Aeshna juncea*, *A. subarctica elisabethae*, *Coenagrion hastulatum*, *Leucorrhinia dubia*, *L. pectoralis*, *L. rubicunda*, *Orthetrum coerulescens*, *Somatochlora arctica* and *Sympetrum danae*.] Address: Kever, D., Service Public de Wallonie (SPW) - Direction Générale Opérationnelle de l'Agriculture, des Ressources Naturelles et de l'Environnement (DG03) - Département de l'Etude du Milieu Naturel et Agricole (DEMNA) - Direction de la Nature et de l'Eau (DNE), Avenue Marechal Juin, 23, B-5030 Gembloux, Belgium. E-mail: david.kever@spw.wallonie.be

15117. Khazan, E.S. (2014): Tests of biological corridor efficacy for conservation of a Neotropical giant damselfly. *Biological Conservation* 177: 117-125. (in English) ["Deforestation and forest fragmentation are important drivers of global biodiversity loss and negatively impact ecosystem health and landscape continuity. One approach to reducing these impacts is the establishment of biological corridors. Studies on corridor efficacy have been limited to a small

subset of taxa; while important, these data can rarely be extrapolated to other systems. I tested whether *Megaloprepus caerulatus*, a giant tree-hole breeding damselfly adapted to mature Neotropical forests, can and does disperse from mature forest to fragments that are components of an established corridor. I monitored presence of *M. caerulatus* in four secondary forest fragments of the San Juan-La Selva biological corridor network and in the contiguous La Selva forest. I compared densities of adult *M. caerulatus* and larval presence in artificial and natural breeding sites over the course of one year. None of the artificial holes in fragments were colonized by *M. caerulatus* whereas at La Selva 25% of artificial holes and 63% of natural tree holes were colonized. I tested *M. caerulatus*'s ability to fly over pasture between fragments with a dispersal challenge experiment. Although the damselfly successfully crossed gaps of 25 m, it had difficulty traversing gaps as narrow as 50–100 m. Based on analysis of 360 photos taken from each release distance, the forest edge was less distinguishable from distances P50 m. These results suggest limited conservation utility of existing biological corridor networks for *M. caerulatus*." (Author)] Address: Khazan, Emily, Dept of Biology, University of Oklahoma, 730 Van Vleet Oval, Room 314, Norman, OK 73019, USA. E-mail: ekhazan@gmail.com

15118. Kiauta, B. (2014): Sketches for the dragonfly fauna (Insecta: Odonata) of the metropolis of Ljubljana, Slovenia. *Natura Sloveniae* 16(1): 15-40. (in Slovene, with English summary) ["An annotated list of 49 species, recorded within the boundaries of the Municipality of Ljubljana, is presented, along with brief comments on selected taxa. A comprehensive regional bibliography, covering the 1763-2010 period, is appended. Biogeographically, the fauna has a northern Mediterranean character, marked by the occurrence of *Calopteryx virgo padana*, *Cordulegaster heros* and *Somatochlora meridionalis*. The increase of biodiversity from the urbanized city centre (13 species), towards the suburbs (38 species) and the adjacent rural neighbourhood (49 species) is emphasized. The ecological features of the odonate assemblage of the Ljubljana city centre are compared with those in the centres of Klagenfurt (Austria: 21 species) and Trieste (Italy: 8 species). Some pending problems in the field of species-, habitat- and biodiversity conservation in selected localities are outlined, with particular reference to the recreational boating on the Ljubljanica river, inadequate management of the Tivoli pond and to the impoundment and regulation of the Gradašica and Glinšica streams." (Author)] Address: Kiauta, B., Callunastr. 6, 5853 GA Siebengewald, The Netherlands. E-mail: mbkiauta@gmail.com

15119. Krajewski, L.; Jarzombkowski, F.; Kotowska, D. (2014): Yellow-spotted Whiteface *Leucorrhinia pectoralis* (Charpentier 1825) in Gorbacz Nature Reserve (Knyszyn Forest, NE Poland). *Przegląd Przyrodniczy* 25(3): 62-65. (in Polish, with English summary) ["In the middle of June 2014, some territorial males of *L. pectoralis* were observed in the part of "Gorbacz" bog (Knyszyn Forest), where active protection measures had been undertaken. Despite of the recent researches (including dragonflies), the species has not

been reported from the "Gorbacz" nature reserve. *Leucorrhinia pectoralis* population inhabits flooded ditches, wide and sunny after wood clearing. The ditches were blocked up using wooden dams and are being overgrown now by peat mosses, forming floating mats and habitat suitable for dragonflies." (Authors)] Address: Krajewski, L., Zakład Ochrony Przyrody i Krajobrazu Wiejskiego, Instytut Technologiczno-Przyrodniczy, Falenty Al. Hrabka 3, 05-090 Raszyn, Poland. E-mail: lukkrajewski@wp.pl

15120. Krech, M.; Hampel, J. (2014): Reproduktionsnachweise der Flussjungferarten *Gomphus vulgatissimus* (Linnaeus, 1758) und *Gomphus pulchellus* (Selys, 1840) an Abgrabungsgewässern im Stadtgebiet von Erfurt / Thüringen (Insecta: Odonata: Gomphidae). *Thüringer faunistische Abhandlungen* 19: 51-56. (in German, with English summary) ["The paper presents recent observations on the reproduction of *Gomphus vulgatissimus* and *Gomphus pulchellus*. Exuviae of both species have been collected at a complex of gravel and clay pits located in the northern district of the provincial capital Erfurt/Thuringia, Germany. This is the first record of *G. vulgatissimus* for the central Thüringer Becken and the catchment area of the Gera. Moreover records for colonization of a standing water body by *G. vulgatissimus* are scarce in Thuringia. Gravel pits located in catchment areas with a broad hydromorphological variability and poor trophic burden may support the spread of clubtail species in Thuringia." (Authors)] Address: Krech, M., Auf der Großen Mühle 7, 99098 Erfurt, Germany

15121. Lingenfelter, A.R.; Geluso, K.; Nenneman, M.P.; Peterson, B.C.; Kerby, J.L. (2014): Distribution, diet, and prevalence of amphibian chytrid fungus in non-native American Bullfrogs (*Lithobates catesbeianus*) at the Valentine National Wildlife Refuge, Nebraska, USA. *Journal of North American Herpetology* 2014(1): 81-86. (in English) [30% of studied stomachs (100% = 27) included items of Odonata.] Address: Geluso, K., Dept Biol., Univ. Nebraska at Kearney, Kearney, Nebraska 68849, USA. E-mail: gelusok1@unk.edu

15122. Malikova, E. (2014): The first data on the odonate fauna (Insecta, Odonata) of Zeyskii Nature Reserve (Amurskaya Oblast, Russia). *Amurian zoological journal*. 6(3): 256-259. (in Russian, with English summary) ["15 species of Odonata are reported for the territory of Zeyskii State Nature. The most interesting record is that of *Somatochlora alpestris*, the threatened boreal-alpine species." (Author)] Address: Malikova, Elena, Blagoveshchensk State Pedagogical University, Lenina str., 104, Blagoveshchensk, 675004, Russia. E-mail: e_malikova@inbox.ru

15123. Md Rawi, C.S.; Al-Shami, S.A.; Madrus, M.R.; Ahmad, A.H. (2014): Biological and ecological diversity of aquatic macroinvertebrates in response to hydrological and physicochemical parameters in tropical forest streams of Gunung Tebu, Malaysia: implications for ecohydrological assessment. *Ecohydrology* 7(2): 496-507. (in English) ["In

this study, we have investigated the effects of some hydrological and physicochemical parameters such as water quality, velocity, water depth, river width, water pH, water temperature, ammonia-N, biochemical oxygen demand (BOD), chemical oxygen demand (COD) and dissolved oxygen (DO) on diversity of aquatic macroinvertebrates in forest streams of Gunung Tebu (GT), Malaysia. The results of canonical correspondence analysis identified three groups of the aquatic macroinvertebrates according to their relationships with hydrological and physicochemical parameters. The stream velocity, water quality (i.e. DO, BOD and ammonia-N) in addition to canopy cover, total habitat score and substrate quality were the determinant factors controlling the diversity pattern of the aquatic macroinvertebrates in GT streams. Alteration in the hydrological and physicochemical parameters showed to influence the ecological diversity of the aquatic macroinvertebrates in GT streams. The predators were found to be highly associated with the elevated concentrations of BOD and COD. Shredders were positively correlated with pH, stream velocity, DO and habitat quality indicators (total habitat score, embeddedness, epifaunal and canopy cover). However, the collector-gatherers correlated negatively with all of these parameters. It was concluded that stream velocity, substrate structure and water quality were strong attributes for variation in aquatic macroinvertebrate assemblage structure in tropical forest streams of GT." (Authors) Odonata are treated at genus level.] Address: Salman Abdo Al-Shami, School of Biological Sciences, Universiti Sains Malaysia (USM), 11800 Penang, Malaysia. E-mail: alshami200@gmail.com; salsami@usm.my

15124. Mey, W. (2014): Ophiogomphus cecilia in Nähe des Lockwitzbaches im Dresdener Osten. Mitteilungen Sächsischer Entomologen 33(111): Titelseite. (in German) [09.09.2014, garden pond, Lockwitzbach, Dresden, Sachsen, Germany] Address: not stated

15125. Misof, B.; Liu, S.; Meusemann, K.; Peters, R.S.; Donath, A.; Mayer, C.; Frandsen, P.B.; Ware, J.; Flouri, T.; Beutel, R.G.; Niehuis, O.; Petersen, M.; Izquierdo-Carrasco, F.; Wappler, T.; Rust, J.; Aberer, A.J.; Aspöck, U.; Aspöck, H.; Bartel, D.; Blanke, A.; Berger, S.; Böhm, A.; Buckley, T.R.; Calcott, B.; Chen, J.; Friedrich, F.; Fukui, M.; Fujita, M.; Greve, C.; Grobe, P.; Gu, S.; Huang, Y.; Jermini, L.S.; Kawahara, A.Y.; Krogmann, L.; Kubiak, M.; Lanfear, R.; Letsch, H.; Li, Y.; Li, Z.; Li, J.; Lu, H.; Machida, R.; Mashimo, Y.; Kapli, P.; McKenna, D.D.; Meng, G.; Nakagaki, Y.; Navarrete-Heredia, J.L.; Ott, M.; Ou, Y.; Pass, G.; Podsiadlowski, L.; Pohl, H.; von Reumont, B.M.; Schütte, K.; Sekiya, K.; Shimizu, S.; Slipinski, A.; Stamatakis, A.; Song, W.; Su, X.; Szucsich, N.U.; Tan, M.; Tan, X.; Tang, M.; Tang, J.; Timelthaler, G.; Tomizuka, S.; Trautwein, M.; Tong, X.; Uchifune, T.; Walz, M.G.; Wiegmann, B.M.; Wilbrandt, J.; Wipfler, B.; Wong, T.K.F.; Wu, Q.; Wu, G.; Xie, Y.; Yang, S.; Yang, Q.; Yeates, D.K.; Yoshizawa, K.; Zhang, Q.; Zhang, R.; Zhang, W.; Zhang, Y.; Zhao, J.; Zhou, C.; Zhou, L.; Ziesmann, T.; Zou, S.; Li, Y.; Xu, X.; Zhang, Y.; Yang, H.; Wang,

J.; Wang, J.; Kjer, K.M.; Zhou, X. (2014): Phylogenomics resolves the timing and pattern of insect evolution. *Science* 346(6210): 763-767. (in English) ["Insects are the most speciose group of animals, but the phylogenetic relationships of many major lineages remain unresolved. We inferred the phylogeny of insects from 1478 protein-coding genes. Phylogenomic analyses of nucleotide and amino acid sequences, with site-specific nucleotide or domain-specific amino acid substitution models, produced statistically robust and congruent results resolving previously controversial phylogenetic relationships. We dated the origin of insects to the Early Ordovician [~479 million years ago (Ma)], of insect flight to the Early Devonian (~406 Ma), of major extant lineages to the Mississippian (~345 Ma), and the major diversification of holometabolous insects to the Early Cretaceous. Our phylogenomic study provides a comprehensive reliable scaffold for future comparative analyses of evolutionary innovations among insects." (Authors)] Address: Misof, B., Abteilung für Entomologie, Zoologisches Forschungsmuseum Alexander Koenig, Adenauerallee 160, D-53113 Bonn, Germany. E-mail: b.misof.zfmk@uni-bonn.de

15126. Mochon, A. (2014): Découverte de l'aeschne des nénuphars au lac des Atocas: une première au Québec. *Bulletin de conservation* 2013 | 2014: 18-20. (in French) [Rhionaeschna mutata, 30-VI-2012, Lac des Atocas, National Park Mont-Saint-Bruno, Canada] Address: Mochon, A. E-mail: mochon.alain@sepaq.com

15127. Nakanishi, K.; Nishida, T.; Kon, M.; Sawada, H. (2014): Effects of environmental factors on the species composition of aquatic insects in irrigation ponds. *Entomological Science* 17(2): 251-261. (in English) ["Although irrigation ponds contribute to the conservation of aquatic biodiversity, they have experienced declines in recent years. We therefore examined the relationships between various environmental factors and the community composition of aquatic insects, specifically insect predators, in irrigation ponds to gain knowledge that would aid in the conservation and restoration of biodiversity. We selected Odonata, Hemiptera and Coleoptera as target taxonomic groups and conducted censuses of these groups in 21 ponds in Shiga, central Japan. In total, we collected 30 and 10 species (or species groups) of Odonata and Hemiptera, respectively, and 17 species of Coleoptera. A partial canonical correspondence analysis revealed that the following four environmental factors significantly affected the species composition of aquatic insect communities: the number of emergent plant species, percent concrete revetment, presence of litter and peripheral length. Among these variables, the number of emergent plant species was the most potent factor, perhaps because emergent plants serve as sites for oviposition and emergence, and provide refugia for aquatic insects (odonate nymphs in particular). In contrast, some species specifically inhabited sites poor in emergent plants. This study shows that reductions in concrete revetments are necessary for the conservation of biodiversity. This

would lead to increases in the number of aquatic plant species, which provide habitats and oviposition sites for many aquatic insects. Furthermore, to enrich the local biodiversity of aquatic insects, groups of irrigation ponds with different environments are needed." (Authors)] Address: Nakanishi, K., School of Environmental Science, The University of Shiga Prefecture, Hikone, Shiga 522-8533, Japan. Email: k_mw_newt@hotmail.com

15128. Nakanishi, K.; Nishida, T.; Kon̄, M.; Sawada, H. (2014): Effects of environmental factors on the species composition of aquatic insects in irrigation ponds. *Entomological Science* 17(2): 251-261. (in English) ["Although irrigation ponds contribute to the conservation of aquatic biodiversity, they have experienced declines in recent years. We therefore examined the relationships between various environmental factors and the community composition of aquatic insects, specifically insect predators, in irrigation ponds to gain knowledge that would aid in the conservation and restoration of biodiversity. We selected Odonata, Hemiptera and Coleoptera as target taxonomic groups and conducted censuses of these groups in 21 ponds in Shiga, central Japan. In total, we collected 30 and 10 species (or species groups) of Odonata and Hemiptera, respectively, and 17 species of Coleoptera. A partial canonical correspondence analysis revealed that the following four environmental factors significantly affected the species composition of aquatic insect communities: the number of emergent plant species, percent concrete revetment, presence of litter and peripheral length. Among these variables, the number of emergent plant species was the most potent factor, perhaps because emergent plants serve as sites for oviposition and emergence, and provide refugia for aquatic insects (odonate nymphs in particular). In contrast, some species specifically inhabited sites poor in emergent plants. This study shows that reductions in concrete revetments are necessary for the conservation of biodiversity. This would lead to increases in the number of aquatic plant species, which provide habitats and oviposition sites for many aquatic insects. Furthermore, to enrich the local biodiversity of aquatic insects, groups of irrigation ponds with different environments are needed." (Authors)] Address: Nakanishi, K., School of Environmental Science, The University of Shiga Prefecture, Hikone, Shiga 522-8533, Japan. E-mail: k_mw_newt@hotmail.com

15129. Ohtaka, A.; Uenishi, M.; Wulandari, L.; Liwat, Y.; Ardianor, Gumiri, S.; Nagasaka, M.; Fukuhara, H. (2014): Structure and abundance of "interrhizon" invertebrates in an oxbow lake in the peat swamp area of Central Kalimantan, Indonesia. *Limnology* 15: 191-197. (in English) ["The faunal composition of "interrhizon" invertebrate communities associated with submerged parts of three kinds of macrophytes, *Eichhornia crassipes*, *Gramineae* spp. and *Polygonum tomentosum*, were studied in an oxbow lake, Lake Tundai, with acidic water (pH 3.9–4.4) in the peat swamp area of Central Kalimantan. The pH, turbidity, and chlorophyll-a concentration in the surface waters tended to be higher in macrophyte stands than in open waters near the

stands. Thirty-one taxa belonging to three groups of invertebrates, Arachnida, Insecta (including "Coenagrionidae" and "Libellulidae"), especially chironomids, and Isopoda, were found from the root systems, of which insects were the most abundant in every macrophyte stand. The interrhizon invertebrates accounted for 0.16–8.7 g wet wt m² among three vegetational stands. The diversity and abundance of interrhizon invertebrates are low in Lake Tundai; this could be due to low pH and/or low productivity in the lake water." (Authors)] Address: Ohtaka, A., Faculty of Education, Hirosaki University, Hirosaki, Aomori 036-8560, Japan. E-mail: ohtaka@cc.hirosaki-u.ac.jp

15130. Oliver-Morales, C.; Abarca-García, C.A.; Pozos-Zepeda, L.F. (2014): The differential use of habitat between sexes in a *Ischnura* sp. (Odonata: Coenagrionidae) in the Ciénaga of Almoloya del Río, Estado de México. *Entomología Mexicana* 1: 447-451. (in Spanish, with English summary) ["Field observations about the use of habitat allow us to understand the importance of biotic and abiotic interactions. The main objective of this work was describing quantitatively the differences in the use of habitat between males and females of a species of odonates of *Ischnura* spp. Genus. The work has done in a swamp of Almoloya del Río - Lerma, Estado de México. The fieldwork was made in two sites at the same period of time, in the grassland and in the edge of the pond. Our observations revealed higher quantity of females (88.43 % of females and 11% of males) in grassland than into the swamp (25.86 % of females and 74.13% of males). In overall our results shows that the females of *Ischnura* sp. prefers the grassland zones and on contrary, males prefers the pond. We proposed that males occupied pond area, because in these sites they establish territories in where competed for access to a coupled. If this is true, then the use of habitat could be an important selection pressure to establish the degree of competition for access to a partner." (Authors)] Address: Oliver-Morales, Celia, Depto de Ciencias Ambientales, Universidad Autónoma Metropolitana-Unidad Lerma. Avenida Hidalgo Poniente 46, Colonia La Estación, Lerma de Villada, CP. 52006, Estado de México. E-mail: c.oliver@correo.ler.uam.mx

15131. Orlofske, J.M.; Baird, D.J. (2014): A geometric morphometric approach to establish body-shape trait criteria for aquatic insects. *Freshwater Science* 33(3): 978-994. (in English) ["Body shapes of aquatic insect larvae reflect phenotypic responses to complex environmental conditions and can be used to infer habitat properties and indicate natural and anthropogenic perturbations in river ecosystems. Investigation of relationships between body shape and physical-habitat characteristics has been restricted by a lack of an objective schema for quantitative characterization of body-shape variation. We present a functional ecological framework for body-shape classification based on defined criteria. We applied a geometric morphometric (GM) approach to the general classification of body shape in 4 morphologically diverse orders, Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and Odonata (O) collected from 3 sites with contrasting hydrological and hydraulic characteristics.

We describe a robust classification of body shapes for E, P, and O, which possess a compartmentalized body plan, and suggest a preliminary classification for T. We compared GM body shapes with body-shape trait states available in trait databases and found discordance between the 2 classifications. We explored the value of GM body shapes to describe taxon shape structure of reference sites and to detect variation reflecting physical properties of the sites. GM body-shape classes can augment the trait states already available and enhance inference regarding habitat status. Patterns in the shape strategies of aquatic insects, particularly EPO taxa, can be used to extrapolate shape information for other taxonomic groups. GM provides a stable shape classification that can contribute to the description of different ecological strategies of aquatic insects. Expanding the scope of shape information available for many taxonomic groups can improve our understanding of how organism phenotype relates to environmental conditions and supports traits-based assessment. A geometric morphometric approach to establish body-shape trait criteria for aquatic insects." (Authors)] Address: Orlofske, Jessica, Canadian Rivers Inst., Dept Biology, P.O. Box 4400, 10 Bailey Drive, Univ. of New Brunswick, Fredericton, New Brunswick, Canada E3B 5A3. E-mail: j.orlofske@unb.ca

15132. Palacino-Rodríguez, F.; Contreras-Sánchez, N.A. (2014): Does experimental marking of wings influence resighting success in *Mesamphiagrion laterale* and *Erythrodiplax umbrata*? (Odonata: Coenagrionidae, Libellulidae). *Odonatologica* 43(3/4): 237-246. (in English) ["To investigate if experimental marking affects the probability of resighting, 1,610 individuals of *Mesamphiagrion laterale* (Selys, 1876) and 630 individuals of *Erythrodiplax umbrata* (Linnaeus, 1758) were marked at two sites in Colombia and analysed with respect to marking variables as follows: marking colour used, which wing was marked, and a combination, i.e. the interaction, of these two. The colour and the marked wing were varied, using a different wing each time, and red, black, blue, or green colour. The information was analyzed using contingency tables (Chi-square test) to compare the probability of resighting for individuals within a population marked with a specific colour or on a specific wing to the probability of resighting for all other individuals in the population. In *E. umbrata* the resighting probability ranged as follows: 90.1 to 95.7 % (marking colour type), 90.4 to 95.2 % (wing used), and 87.5 to 97.8 % (wing-colour combination). In the case of *M. laterale*, the resighting probability ranged as follows: 57.2 to 65.0 % (marking colour type), 58.8 to 65.6 % (wing used), and 51.0 to 82.0 % (wing-colour combination). The colour, wing, or combination of wing-colour used for marking didn't have an effect on the resighting probability, suggesting that the method and its variations are adequate to be used in mark-release-recapture studies on odonates. Recommendations are given on what has to be avoided to eliminate potential effects during the marking procedure." (Authors)] Address: Palacino-Rodríguez, F., Grupo de Investigación en Odonatos de Colombia, Laboratorio de Artrópodos-Biotecnología. Centro Internacional de Física (CIF), Universidad Nacional de Colombia, Bogotá D.C., Colombia. E-mail: odonata17@hotmail.com

15133. Paulson, D.R.; de Haseth, C.; Debrot, A.O. (2014): Odonata of Curaçao, southern Caribbean, with an update to the fauna of the ABC islands. *International Journal of Odonatology* 17(4): 237-249. (in English) ["A three-year field study (January 2011–December 2013) of the Odonata of Curaçao, supported by photos and exuvial collections, recorded a total of 21 species from the island, almost doubling its previously known fauna. The lists of Odonata known from Aruba and Bonaire were also updated by specimen and photo records, and 24 species are now known from these three islands. During the period of the study, odonates decreased in abundance and diversity in Curaçao, apparently because heavy rains just before the study began led to colonization of the island by several nonresident species that subsequently declined and disappeared as wetlands diminished during a period with normal rainfall." (Authors)] Address: Paulson, D.R., Slater Mus., Univ. of Puget Sound, Tacoma, WA 98416, USA. E-mail: dpaulson@pugetsound.edu

15134. Pinach, J.M.E.; Martínez, C.D.; Pérez, I.S. (2014): Contribución al conocimiento de la odonatofauna (Insecta: Odonata) en la Serranía baja el complejo lagunar de Ballesteros y el del río Moscas (Serranía media) de cuenca (este de España). *Boletín de la Sociedad Entomológica Aragonesa* 55: 169-184. (in Spanish, with English summary) ["Contribution to the knowledge of the dragonflies (Insecta: Odonata) in the Serranía baja and the lagoon complexes of Ballesteros and river Moscas (Serranía media), Cuenca (eastern Spain). This work reports on the distribution of dragonflies (Odonata, Insecta) in Cuenca (eastern Spain), specifically in the Serranía baja and in the lagoon complex of Ballesteros and river Moscas (Serranía media). We provide information for 45 species. Eight have been found for the first time in this area: *Lestes virens*, *Coenagrion puella*, *Ischnura elegans*, *Ceriagrion tenellum*, *Aeshna mixta*, *Gomphus graslinii*, *Crocothemis erythraea* and *Sympetrum sanguineum*. Four species (*Lestes viridis*, *Gomphus simillimus*, *Onychogomphus forcipatus* and *Sympetrum striolatum*) are included that have not been found in this area since the 1950s (Benítez, 1950, quoted by Anselin & Martín, 1986). A new record for *Sympetrum meridionale* is provided, this specie is not cited in this area since the early twentieth century (McLachlan, 1902b)." (Authors)] Address: Pinach, J.M.E., Agente Medioambiental. Servicios Periféricos de la Consejería de Agricultura en Cuenca. Junta de Comunidades de Castilla-La Mancha, Spain. E-mail: jjeva-nach@hotmail.com

15135. Popova, O.N.; Haritonov, A.Yu (2014): Disclosure of biotopical groups in the population of the dragonfly *Coenagrion armatum* (Charpentier, 1840). *Contemporary Problems of Ecology* 7(2): 175-181. (in English) ["The spatial temporal distributions of *C. armatum* in Lake Fadikha with edging overgrowth in the Barabinsk forest steppe are described. It is discovered that the local population of this species is divided into two biotopical groups. The specimens of one group develop in the water area and do not migrate to the shore after metamorphosis; in the other, dragonflies develop in the reeds and migrate to the shore for additional

feeding after metamorphosis." (Authors)] Address: Popova, Olga, Institute of Systematics and Ecology of Animals, Siberian Branch, Russian Academy of Sciences, ul. Frunze 11, Novosibirsk, 630091 Russia. E-mail: popova.olga.nik@gmail.com

15136. Preston, D.; Forstner, M.R.J. (2014): Aggregation status and cue type modify tadpole response to chemical cues. *Journal of Fish and Wildlife Management* 6(1): 199-207. (in English) ["Many anuran larvae exhibit an antipredator response to chemical cues released by potential predators. The genus *Bufo* is no exception, as many bufonids exhibit an antipredator response (e.g. reduction in activity) to the presence (recent and current) of predators. Using a mesocosm experiment in a field laboratory setting, we tested solo and groups of *Bufo* (*Incilius*) *nebulifer* tadpoles for an antipredator response to chemical cues produced by 1) the presence of anisopteran nymphs (kairomone cue) (*Anax junius*), and 2) the predation of conspecifics by anisopteran nymphs (a combination of diet and alarm cues, which we termed predation cue). We quantified the magnitude of the response by calculating response strength. We analyzed data with a blocked ANOVA followed by a Tukey's honestly significant difference analysis. We found that chemical cue type (kairomone vs predation) enhanced response strength, but aggregation status (solo vs group) did not. However, solo and groups of tadpoles reduced their activity in response to predation cues, whereas only solo tadpoles reduced their activity in response to kairomone cues, a heretofore unobserved phenomenon. Our results suggest that *B. nebulifer* tadpoles modulate their response to specific types of chemical cues depending on their aggregation status. As reduced activity comes at a cost to resource acquisition and growth, aggregation status may indirectly affect the life history of *B. nebulifer*." (Authors)] Address: Preston, D.B., Dept of Biology, Texas State University, San Marcos, TX, USA. E-mail: dpresto1@uno.edu

15137. Rivas, M.; Córdoba -Aguilar, A. (2014): Relation between wing spot and the thermoregulation for two species of genera *Hetaerina* (Odonata: Calopterygidae). *Entomología Mexicana* 1: 470-475. (in Spanish, with English summary) ["The pigmentation of odonate wing spot has been recently linked with thermoregulation function. For this reason, we explored some relationship between proportion and allometry of the wing spot with altitude in a gradient of 1912 m in the states of Mexico and Guerrero using *Hetaerina vulnerata* and *H. americana*. Proportion of wing spot was higher at high altitudes than low altitudes although allometry was not related. *H. americana* individuals showed differences in internal temperature regulation, which could explain the differences related to such altitudinal gradient." (Authors)] Address: Rivas, M., Lab. de Ecología de la Conducta de Artrópodos (LECA), Instituto de Ecología, UNAM. Av. Universidad #3000 col. UNAM CU, Coyoacán, CP: 45510, México DF. E-mail: miguelrivassoto@gmail.com

15138. Rongo, T.; Dyer, C. (2014): Using local knowledge to understand climate variability in the Cook Islands. Government of the Cook Islands. 55 pp: (in English) [The Maori name of dragonfly is *Karakara vai*.] Address: Rongo, T., Office of the Prime Minister, Private Bag, Avarua, Rarotonga, Cook Islands. E-mail: teina.rongo@cookislands.gov.ck

15139. Rowland, A. (2014): A comparative survey of Ackland's Moor and Widow's Tenement pond. *Journal of the Lundy Field Society* 4: 19-38. (in English) ["Ackland's Moor and Widow's Tenement ponds have not previously been surveyed in any detail and are typical of the two types of pond on Lundy – flooded quarry and naturally filled weedy. Their historical context is evaluated and suggestions for their longevity proposed. Their biodiversity is summarised and the differences and similarities compared. Biotic and abiotic measurements were made and comparison is made with previous surveys undertaken at various levels of complexity since 1953. The surveys also record the biodiversity before and after the drought of 2011 when both ponds were dry. Data for both ponds in all four seasons of the year during the period 2009 to 2013 are presented and are found to match closely Lundy ponds which have benefited from recent, regular and in depth surveys." (Author) *Enallagma cyathigerum*, *Sympetrum striolatum*, *Ischnura elegans*] Address: Rowland, A., Mole Cottage, Chapel Close, Woodford, Morwenstow, Cornwall, EX23 9JR, UK. E-mail: morwenstow@btinternet.com

15140. Ryazanova, G.I. (2014): Seasonal variation of wing venation in dragonfly populations (Odonata). *Eurasian Journal of Entomology* 13(4): 334-338. (in Russian, with English summary) ["The variability of the number of wing cells has been studied in four populations of the damselfly *Ischnura elegans*. The dynamics of this characteristic has been described within one season and between seasons. The number of cells of the wing at the beginning of the season of imago flight significantly higher than at its end. The number of cells of the wings of different populations may differ significantly even at the same time. However, inter-seasonal changes in the number of wing cells in the different populations have different directions and scales, not allowing the use of particular wing venation as a sustainable comparative population characteristics. Similar variability of wing venation in the season found in species *Coenagrion puella* and *C. hastulatum*. We discuss a latitude spread of the described phenomenon for dragonflies." (Author)] Address: Ryazanova, G.I., Biological Faculty of Moscow State M.V. Lomonosov University, Moscow 119991 Russia. E-mail: RyazanovaGI@mail.ru

15141. Sawada, K.; Yamahira, K.; Kuriwada, T. (2014): Interpopulation variation in female color-type frequency of *Ischnura senegalensis* in Okinawa Island, Japan (Odonata: Coenagrionidae). *Odonatologica* 43(3/4): 227-235. (in English) ["*I. senegalensis* has two female colour-types: gynochromes, which are brown, and androchromes, which are green and similar in appearance to conspecific males. *Ischnura senegalensis* females from Okinawa Island, a

small island in the Ryukyu Archipelago, Japan, show colour-type frequencies that vary greatly, even among adjacent local populations. For example, androchrome frequencies were very low (0–4.3 %) in northern populations of the island. However, in the southern populations androchrome frequencies were high and ranged widely (0–67.2 %). Periodical surveys from 2011 to 2013 of two adjacent southern populations revealed that the frequency of colour-type remained constant over time. To our knowledge, this is the first study of temporally stable and extremely high interpopulation variation in female colour-type frequency in Odonata. We discuss possible reasons for the evolution of such high interpopulation variation in colour-type frequency." (Authors)] Address: Sawada, K., Fukuoka High School, 1-29-1, Katakasu, Hakata-ku, Fukuoka, Japan. E-mail: kouji.senegalensis@gmail.com

15142. Schlüter, R.; Kaiser, M.; Schiffgens, T.; Werking-Radtke, J. (2014): Wie geht es der Natur? Zustand des europäischen Naturerbes in NRW. *Natur in NRW* 2/2014: 13-18. (in German) [Nordrhein-Westfalen, Germany; the favourable conservation status of *Coenagrion mercuriale*, *C. ornatum*, *Stylurus flavipes*, *Ophiogomphus cecilia*, *Leucorrhinia caudalis*, and *L. pectoralis* is documented. Only *C. mercuriale* and *S. flavipes* are in good conservation status.] Address: Schlüter, R., Landesamt für Natur, Umwelt und Verbraucherschutz NRW (LANUV), Abteilung Naturschutz, Landschaftspflege, Jagdkunde, Fischereiökologie, Leibnizstraße 10, 45659 Recklinghausen, Germany. E-Mail: ralf.schlueter@lanuv.nrw.de

15143. Seidel, M.; Borkowski, M. (2014): Die Libellen der Naturschutzgebiete «Töpchiner Seen» und »Mühlenfließ-Sägebach«. *JahreBuch 2014*: 46-49. (in German) [Landkreis: Dahme-Spreewald, Brandenburg, Germany; in June 2012, 20 odonate species were recorded. The list of species includes *Ischnura pumilio*, *Coenagrion pulchellum*, *Somatochlora flavomaculata* and *Leucorrhinia pectoralis*.] Address: not stated

15144. Siesa, M.E. (2014): L'atlante delle libellule. Parco delle Groane. Quaderni del Parco Delle Groane: 166 pp. (in Italian) [Italia, region Lombardia; 38 odonate species are detailed giving information on regional distribution, phenology, habitat, morphology and sibling species.] Address: Publisher: Centro parco Polveriera, Via della Polveriera 2, 20020 Solaro (MI), Italy. www.parcogroane.it

15145. Silva, D.T.; Silva, L.L.; Amaral, L.P.; Pinheiro, C.G.; Pires, M.M.; Schindler, B.; Garlet, Q.I.; Benovit, S.C.; Baldisserotto, B.; Longhi, S.J.; Kotzian, C.B.; Heinzmann, B.M. (2014): Larvicidal activity of Brazilian plant essential oils against coenagrionidae larvae. *Journal of Economic Entomology* 107(4): 1713-1720. (in English, with Spanish summary) ["Odonate larvae can be serious pests that attack fish larvae, postlarvae, and fingerlings in fish culture tanks, causing significant loss in the supply and production of juveniles. This study reports a screen of the essential oils (EOs) of *Nectandra megapotamica* (Sprengel) Mez,

Nectandra grandiflora Nees, *Hesperozygis ringens* (Benth) Epling, *Ocimum gratissimum* L., *Aloysia gratissima* (Gillies & Hooker) Troncoso, and *Lippia sidoides* Chamisso against Coenagrionidae larvae. In addition, the most effective EO and its 50% lethal concentration (LC50) and chemical analysis are described. The larvae of *Acanthagrion Selys*, *Homeoura Kennedy*, *Ischnura Charpentier*, and *Oxyagrion Selys* were used to assess the EO effects. EO obtained from *H. ringens*, *O. gratissimum*, and *L. sidoides* showed the highest larvicidal effects at 19 h of treatment. The major constituents of the EO of *H. ringens* include pulegone and limonene, while eugenol and -ocimene predominate in the EO of *O. gratissimum*, and carvacrol and -cymene were the major compounds of the EO of *L. sidoides*. Leaf EOs from *H. ringens*, *O. gratissimum*, and *L. sidoides* showed activity against Coenagrionidae larvae at similar concentrations with LC50s of 62.92, 75.05, and 51.65 l liter⁻¹, respectively, and these were considered the most promising treatments." (Authors)] Address: Heinzmann, Berta, Department of Industrial Pharmacy, Federal University of Santa Maria, Av. Roraima 1000, Santa Maria, RS, Brazil. E-mail: berta.heinzmann@gmail.com

15146. Skolka, M. (2014): *Selysiothemis nigra* (Odonata) - new species for Danube delta. Popa, L. O., C. Adam, G. Chisamera, E. Iorgu, D. Murariu, O. P. Popa (eds) 2014. International Zoological Congress of "Grigore Antipa" Museum - Book of abstracts. "Grigore Antipa" National Museum of Natural History, Bucharest, Romania: 121. (in English) [Romania; Verbatim: In the spring of 2014, during a monitoring survey of the sandy habitats in *Selysiothemis nigra*, is a IUCN Red List Least Concern species. This species is present in Central Asia, Middle East and Mediterranean area. In the past, this species was probably spread all around the Tethys Sea. In the Mediterranean area, the distribution of *Selysiothemis nigra*, is very scattered. It is mentioned from small areas in all Mediterranean basin: Portugal, Spain – mainland and eastern part, Balearic Islands, Sicily, Malta, Sardinia, parts of Italy, Adriatic coast of Croatia and Slovenia, Greece, Cyprus, Crete. In the Black Sea area, this species is present in the southern part of Bulgaria, Crimean region and Odessa area. Also, this species is present in mainland Russia, near Ural Mountains. For the Black Sea area, *Selysiothemis nigra* is a new species. It was mentioned only in 2002 for Bulgaria and Ukraine. In Romania, this species was mentioned only in 2013, by a British bird-watcher from Danube Delta, on his blog. This year, many specimens, all females, were observed in sandy habitats dominated by *Leymus sabulosus* and *Crambe maritima* among other dragonflies as *Aeshna isosceles*, *Anax parthenope*, *Anax imperator*, *Orthetrum cancellatum*, *Crocothemis erythraea*, *Ischnura elegans*, *Sympetrum vulgatum*, *S. sanguineum*, *Lestes macrostigma*, *Erythromma najas*, *E. viridulum*, *E. lindenii* and *Coenagrion* sp. The presence of a high number of specimens of *Selysiothemis nigra* on the sandbelt that isolate the paramarine lakes from the Black Sea, and the mentions of this species from Ukraine and Bulgaria suggest that this species extended their range northwards in the last decade. In this case, we are in front of a

new example of climate changes induced regional evolutions.] Address: Skolka, M., "Ovidius" University of Constanta. Natural Sciences Department. 1 Aleea Universitatii. corp B. Constanta 900470. Romania E-mail: mskolka@gmail.com

15147. Stadler, G. (2014): Ein außergewöhnlich warmer Winter 2013/2014 mit den beiden Winterlibellen *Sympecma fusca* und *S. paedisca*. *Mercuriale* 14: 43-60. (in German, with English summary) ["Residence and activity patterns during hibernation of 27 adults of *Sympecma fusca* were observed and controlled 62 times from late autumn, 2013, until late winter, 2014. Whereas autumn temperatures were near average, the winter was characterised by exceptionally high temperatures. The study was carried out in the nature reserve "Lengwiler Weiher" in the vicinity of the southern shore of Lake Constance, Switzerland. Five specimens of *S. fusca* were captured, marked and released in November, 2013. Three out of these five individuals could be recorded several times until mid-March, 2014. On 23 February 2014, a remarkable observation was done: under cloudy conditions a specimen undertook a short flight although the current temperature was only 6.6° C. After midday the same day an individual could be observed feeding. Furthermore, in the end of February, 2014, few specimens of *S. paedisca* could be recorded, partly in the same habitat." (Author)] Address: Stadler, G., Hueb 6, CH-8580 Sommeri, Switzerland. E-mail: gesta@gmx.ch

15148. Stanford-Camargo, S.G.; Medina-Ortiz, G.R.; Ibarra-González, M.P.; Cruz-Miranda, S.G. (2014): Nails of Odonata in three freshwater bodies of Parque Estatal Sierra de Guadalupe, Ecatepec, Estado de Mexico, Mexico. *Entomología Mexicana* 1: 145-149. (in Spanish, with English summary) [In December 2011, odonate larvae (n = 1574) were sampled, and dominance of the eight taxa (*Anax*, *Archilestes*, *Enallagma*, *Hesperagrion*, *Ischnura*, *Libellula*, *Rhionaeschna*, *Sympetrum*) was studied. Dominant genus was *Sympetrum* with app. 75%, followed by *Enallagma* with 11%.] Address: Stanford-Camargo, S.G., Facultad de Estudios Superiores Iztacala UNAM. Colección de artrópodos. Av. de los Barrios No. 1, Los Reyes Iztacala, Tlalnepantla, Estado de México. C.P. 54090. E-mail: sstanford@campus.iztacala.unam.mx1

15149. Tajima, Y.; Watanabe, M. (2014): Seasonal variation of genital morphology and sperm removal in *Ischnura asiatica* (Odonata: Coenagrionidae). *Odonatologica* 43(3/4): 213-226. (in English) ["During copulation, *Ischnura asiatica* (Brauer, 1865) males remove the sperm of the females' previous mates from the spermatheca by stimulating vaginal sensilla thereby inducing sperm ejection. Because a wider penis head stimulates the vaginal sensilla more intensely, larger males with wider penis heads can remove much more sperm from the spermatheca. There are two distinct body sizes for spring (large) and summer (small) generations of *I. asiatica*. In the present study we show that in spring, males have wider penis heads and females have a higher number of vaginal sensilla as compared to summer

adults, suggesting that mating males remove more spermathecal sperm in spring than in summer. However, interrupted copulation experiments showed that females of the spring generation had a higher number of spermatozoa in both sperm storage organs than those of the summer generation. Solitary females of the spring generation also had higher numbers of spermatozoa stored than those of the summer generation, suggesting that spring females might have larger sperm storage organs than summer females. Although the removal rate of bursal sperm was almost the same between generations, the removal rate of spermathecal sperm in the summer generation was slightly higher than that in the spring generation. Consequently, spermatozoa derived from previously mated males have a higher probability of remaining in the sperm storage organs in spring than in summer-generation females. The size of sperm storage organs in females might be critical to understanding sperm displacement. This aspect of female anatomy has not been previously considered in studies of sperm competition in odonates." (Authors)] Address: Watanabe, M., Graduate School of Life and Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan. E-mail: watanabe@kankyo.envr.tsukuba.ac.jp

15150. Thanaee, I. (2014): Use of benthic macroinvertebrates for biological monitoring. *SDU Research Journal Sciences and Technology* 7(1): 125-137. (in Thai, with English summary) [This publication reviews research studies conducting to apply macroinvertebrates for biological monitoring in freshwater in Thailand.] Address: Thanaee, Isara., Dept of Biology, Fac. Science Mahasarakham Univ., Thailand

15151. Theischinger, G.; Endersby, I. (2014): Australian dragonfly (Odonata) larvae: Descriptive history and identification. *Memoirs of Museum Victoria* 72: 73-120. (in English) ["To improve the reliability of identification for Australian larval Odonata, morphological and geographic information is summarised for all species. All known references that contain information on characters useful for identification of larvae are presented in an annotated checklist. For polytypic genera information is provided to clarify whether each species can already, or cannot yet, be distinguished on morphological characters, and whether and under which conditions geographic locality is sufficient to make a diagnosis. For each species the year of original description and of first description of the larva, level of confidence in current identifications, and supportive information, are included in tabular form. Habitus illustrations of generally final instar larvae or exuviae for more than 70% of the Australian dragonfly genera are presented." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

15152. Vilariño, V.S.; Flechoso del Cueto, M.F.; Baños, I.R. (2014): Ampliación de la distribución conocida de odonatos amenazados en Castilla y León (España). *Boletín de la Sociedad Entomológica Aragonesa* 55: 279-287. (in Spanish, with English summary) ["Improvement of known geographical distribution of threatened Odonata in Castilla y León

(Spain) Abstract: This paper presents the results of field surveys carried out during the summer of 2014 in the largest riverbeds of Castilla y León, aimed at detecting Odonata. We describe new records of riverine Anisoptera species for this region, which are included in the Red List of Threatened Invertebrates of Spain. Specifically, the first records of *Macromia splendens* in Alberche and Tormes rivers, *Oxygastra curtisii* in Tormes, Manzanas, Negro and Alagon rivers, *Gomphus graslinii* in Alagon and Alberche rivers, *Gomphus simillimus* in Esla, Duero, Tormes and Alberche rivers and *Gomphus vulgatissimus* in the Duero river are provided. The presence of *M. splendens* populations, which located at higher altitudes than were previously considered for this species are described as well. Evidence of reproduction in this species has been recorded at an altitude of 1167 masl in the Alberche river." (Authors)] Address: Víctor Salvador Vilariño, V.S., C/ San Francisco nº 57 5ªA. 09400 Aranda de Duero (Burgos), Spain. E-mail: visalvia@yahoo.es

15153. Wang, J.-F.; Chen, M.-Y.; Chaw, S.-M.; Morii, Y.; Yoshimura, M.; Sota, T.; Lin, C.-P. (2014): Complete mitochondrial genome of an enigmatic dragonfly, *Epiophlebia superstes* (Odonata, Epiophlebiidae). *Mitochondrial DNA* 26(5): 718-719. (in English) ["This study reported the 15,435 bp-long complete mitochondrial genome of the relict *Epiophlebia superstes* (Odonata, Epiophlebiidae), an enigmatic dragonfly of the paraphyletic 'Anisozygoptera' possessing characteristics similar to members of both extant odonate suborders, the Zygoptera and the Anisoptera. This mitogenome comprises the common set of 37 genes and an A_pT-rich control region, and has a gene arrangement identical to those of all available odonates. The genome contains three non-coding inter-genic spacers (s1-s3), which occurs in all of other known odonates, but it lacks the inter-genic spacer s5 typically found in the Anisoptera. This result suggests that *E. superstes* possesses a mitogenomic organization more closely related to that of the Zygoptera than that of the Anisoptera." (Authors)] Address: Chung-Ping Lin, Department of Life Science, Tunghai University, Taichung 40704, Taiwan. Tel: 886 4 23590121 ext. 32412. Fax: 886 4 23590296. E-mail: treehops@thu.edu.tw

15154. Xu, Q.-h. (2014): The resources of odonates from Zhangzhou, Fujian of China. *Wuyi Science Journal* 30: 63-73. (in English) ["A total of 124 species of odonates, belonging to 78 genera and 17 families, are reported from Zhangzhou Fujian of China. Among them, 7 genera and 19 species are newly recorded from Fujian." (Author)] Address: Xu, Q.-h., Department of Garden and Horticulture, Zhangzhou City University, Zhangzhou Fujian 363000, China. E-mail: qihanxu@aliyun.com

15155. Zaika, V.V. (2014): The Dragonfly Banded Darter, *Sympetrum pedemontanum* (Muller, 1766) (Odonata, Libellulidae) in Tuva. *Eurasian entomological journal* 13(4): 321-322. (in Russian, with English summary) [A map with the records of this rare species in Tuva, Russia is presented together with locality details.] Address: Zaika, V.V., Laboratory

of Biodiversity and Geoecology, Tuvan Institute for Exploration of Natural Resources of SB RAS, Internationalnaya Str. 117 A, Kyzyl 667007 Russia. E-mail: odonta@mail.ru.

15156. Zurbrigg, E.; Brodo, I.; Cipriani, J.; Hanrahan, C., Maccenzie, A. (2014): The Ottawa Field-Naturalists' Club Awards for 2013, presented April 2014. *The Canadian Field-Naturalist* 128: 432-434. (in English) [Verbatim: Mary Stuart Education Award: Angelika Skevington The Mary Stuart Education Award is given in recognition of outstanding achievements in the field of natural history education in the Ottawa Region. Angela Skevington is the recipient of this award for 2013. Angela is a primary school teacher who is passionate about natural history education. For over 15 years she has taught a variety of grades in different schools, sharing her dedication to good environmental stewardship and her knowledge and wonder of nature with her students every day, every year. Currently Angela teaches a combined Grade 4/5 class at Huntley Centennial Public School in the village of Carp near Ottawa. Wherever she works, Angela has championed such environmental programs as EarthCare Canada and more recently Ontario EcoSchools. Last year her school was recognized with a silver level EcoSchool certification. This achievement required years of diligent effort on Angela's part to engage students and the school community in activities across the 6 areas of environmental practice rated by the EcoSchool Program, including waste minimization and energy conservation. Each school year, she instigates a student-led club (previously called an EarthCare Club, currently dubbed The Dragonflies) that undertakes environmental projects, such as a periodic audit of their school's energy and waste practices. If the audit indicates that there is a problem, such as improper waste disposal, then The Dragonflies club delivers classroom presentations to fellow students demonstrating the proper practice, such as how to separate garbage for recycling. The students in The Dragonflies club also put on plays at school assemblies to demonstrate proper energy and waste practices. Last year, Angela piloted "litterless lunches" with her class. The Dragonflies promoted the idea and this year the whole school is litter-free at lunch. There are many more examples. Through this hands-on practice, students learn how to be active environmental stewards. For the past 3 years, Angela has participated in Ottawa's Clean up the Capital Day. She enlisted classes that were interested in being involved, applied through the City of Ottawa to get materials (bags, gloves) and then they cleaned up the school grounds. On Earth Day, Angela has conducted student plays at the school assemblies featuring pollution, anti-littering, proper recycling. She also encourages the students to create and perform skits, songs and presentations. She does this every year to promote celebration of the natural environment and good environmental stewardship. Field trips and nature appreciation are important parts of Angela's teaching. Habitat is part of the Grade 4 curriculum. She has successfully applied through Ducks Unlimited Canada's Project Webfoot for funding for field trips to a local wetland (such as the Bill Mason Outdoor Education Centre). They have also had field trips to the Bonnechere Caves. In

addition to all of this, Angela leads informal lunchtime field trips for interested students to a nearby natural area, to learn about and develop an appreciation for nature. One day they may focus on birds, the next day on insects, and the third on plants. She applied for and received funding to organize a field trip for The Dragonflies club for a day to learn about bird banding at Innis Point Bird Observatory. The children were excited to each hold a chickadee or nut-hatch. On breaks they played nature games in the field, and went on a nature hike. Angela teams up with her husband Jeff Skevington to help him lead "kid friendly" field trips for The Ottawa Field-Naturalists' Club as well as for other nature clubs in the Ottawa Valley. Angela assisted Jeff and colleagues in hosting a well-attended Bug Day held at the Fletcher Wildlife Garden last year. Angela's efforts are recognized and appreciated, as evidenced by fellow teacher Donna Christie who said: "I feel honoured to work with Angela and know that she has made a positive impact on her students and our school She is a scientifically-oriented, dedicated, hard-working educator." The OFNC is delighted to present the Mary Stuart Education Award for 2013 to Angela in recognition of her success in raising awareness of environmental stewardship and respect for nature at her school and more broadly.] Address: not stated

2015

15157. Achterkamp, B.; van de Hatert, R.J.W. (2015): Common dragonflies as indicators for water habitats: a start on a practical approach. *Brachytron* 17(2): 87-99. (in Dutch, with English summary) ["Dragonflies are widely used as indicator species for water and habitat quality, especially rare species with very specific habitat requirements. However, in many waters only common species occur that have less strict habitat requirements. Nevertheless, even from these common species, indications can be derived about water and habitat quality. During research for water boards in the Netherlands, the authors have developed a system of ecological groups. The groups were developed on the basis of the larval habitat (mainly based on literature) and behaviour of the adults (mainly based on field experience). Each group is indicative for the habitat quality in a certain zone, or of a certain aspect like oxygen concentration. The 'riparian' group consists of species that prefer riparian vegetation with emergent plants in combination with submerged and float-ingleaved plants. The 'water' group seeks the open water surface without emergent vegetation; submerged and float-ingleaved plants can be present and improve habitat quality. The 'shallow' group is comprised of species that can reproduce in eutrophic waters only when there is a broad zone of shallow water with a open vegetation structure that quickly heats in the sun. The groups 'oxygen' and 'pioneer' are self-explanatory. The groups have been developed for relatively eutrophic, stagnant or slow flowing waters in the eastern and southern part of the Netherlands. Comparable classifications in international literature show that the groups are wider applicable. Of course, such grouping always has to be adapted to regional dragonfly faunas, other water types or specific ecological questions. We hope that

these groups will inspire other observers to look closer at the relations between dragonflies and their (micro-) habitat." (Authors)] Address: Achterkamp, B., Bureau Waardenburg, postbus 365, 4100 AJ Culemborg, The Netherlands. E-mail: b.achterkamp@buwa.nl

15158. Achterkamp, B.; van de Haterd, R.J.W. (2015): Common dragonflies as indicators for water habitats: a start on a practical approach. *Brachytron* 17(2): 87-99. (in Dutch, with English summary) ["Dragonflies are widely used as indicator species for water and habitat quality, especially rare species with very specific habitat requirements. However, in many waters only common species occur that have less strict habitat requirements. Nevertheless, even from these common species, indications can be derived about water and habitat quality. During research for water boards in the Netherlands, the authors have developed a system of ecological groups. The groups were developed on the basis of the larval habitat (mainly based on literature) and behaviour of the adults (mainly based on field experience). Each group is indicative for the habitat quality in a certain zone, or of a certain aspect like oxygen concentration. The 'riparian' group consists of species that prefer riparian vegetation with emergent plants in combination with submerged and float-ingleaved plants. The 'water' group seeks the open water surface without emergent vegetation; submerged and float-ingleaved plants can be present and improve habitat quality. The 'shallow' group is comprised of species that can reproduce in eutrophic waters only when there is a broad zone of shallow water with a open vegetation structure that quickly heats in the sun. The groups 'oxygen' and 'pioneer' are self-explanatory. The groups have been developed for relatively eutrophic, stagnant or slow flowing waters in the eastern and southern part of the Netherlands. Comparable classifications in international literature show that the groups are wider applicable. Of course, such grouping always has to be adapted to regional dragonfly faunas, other water types or specific ecological questions. We hope that these groups will inspire other observers to look closer at the relations between dragonflies and their (micro-) habitat." (Authors)] Address: Achterkamp, B., Bureau Waardenburg, postbus 365, 4100 AJ Culemborg, The Netherlands. E-mail: b.achterkamp@buwa.nl

15159. Adame-Marino, V.; Cupul-Magaña, F.G. (2015): Odonatos (Insecta: Odonata) de Puerto Vallarta, Jalisco, México / Dragonflies and damselflies (Insecta: Odonata) from Puerto Vallarta, Jalisco, Mexico. *Dugesiana* 22(1): 51-53. (in Spanish) [The new state records of *Gynacantha mexicana*, *Leptobasis vacillans* and *Triacanthagyna septima* are documented in detail.] Address: Adame-Marino, Viridiana, Centro Universitario de la Costa, Universidad de Guadalajara. Av. Universidad 203, Delegación Ixtapa, C.P. 48280, Puerto Vallarta, Jalisco, México. viritoti@gmail.com

15160. Adarsh, C.K.; Arunraj, R.; Nameer, P.O. (2015): Odonata (Insecta) diversity of Chinnar Wildlife Sanctuary, the southern Western Ghats, India. *Journal of Threatened Taxa* 7(2): 6910-6919. (in English) ["We report 48 species

of odonates, which include 31 species of Anisoptera and 17 species of Zygoptera. Among the dragonflies, the family Libellulidae dominated with 25 species, while Coenagrionidae with seven species was the dominant family among the damselflies. The odonate diversity of Chinnar WS accounted for 31.16 % of the odonates in Kerala and 27.58% of the odonates of the Western Ghats. Chinnar also recorded two species of odonates that are endemic to the Western Ghats, which are, the Pied Reed Tail *Protosticta gravelyi* and the Travancore Bamboo Tail *Esmes mudiensis*." (Authors)] Address: Adarsh, C.K., Centre for Wildlife Studies, College of Forestry, Kerala Agricultural Univ., KAU (PO), Thrissur, Kerala 680656, India. E-mail: adarshckcof09@gmail.com

15161. Adu, B.W.; Ogbogu, S.S.; Kemabonta, K.A. (2015): Dragonflies and damselflies (Insecta: Odonata) as tools for habitat quality assessment and monitoring. *FUTA Journal of Research in Sciences* 11(1): 36-45. (in English) ["Odonata of Obafemi Awolowo University Ile-Ife, Nigeria were assessed for the purpose of determining the habitat quality of Odonata community in the campus. Adult Odonata were sampled at four study sites at the campus. The study sites are Opa Reservoir spillway stream: OR, Health Sciences: HS, Biological Garden: BG, and Staff Quarters: SQ. A total of 195 individuals comprising of 36 species in six families (Aeshnidae, Libellulidae, Calopterygidae, Chlorocyphidae, Coenagrionidae and Platycnemididae) were sampled at the campus (Identification by K.D Dijkstra). Similarity test on the odonate community structure at the four study sites was conducted using Soerensen's quotient. OR/BG and OR/SQ were similar, while the other paired study sites (BG/SQ, OR/HS, HS/BG and HS/SQ) were dissimilar. Diversity indices results have Shannon Wiener (H') value ranging between 2.20 - 3.05, Simpson value ranging between 0.86 - 0.95 and Margalef value ranging between 3.39 - 5.8 for the four sites. BG was the richest study site with the highest values (Shannon Wiener: 3.05, Simpson: 0.95 Margalef: 5.8 and evenness was 0.92), followed by OR (Shannon Wiener: 2.96, Simpson: 0.94 Margalef: 5.41 and evenness was 0.81). The forest environments of Obafemi Awolowo University appeared been depleted yet possessed the habitat quality that sustained some species of Odonata. Nevertheless BG and OR have proven to possess the best community structure for the existence of Odonata fauna in the campus." (Authors)] Address: Adu, B.W., Dept Biol. Sci., Ondo State University of Science & Technology, Okitipupa, Ondo State Nigeria. E-mail: williamsadubabs@yahoo.com

15162. Adu, B.W.; Akindede, E.O.; Obadofin, A.A. (2015): Composition and distribution of dragonflies and damselflies (Insecta: Odonata) in Iloyin Forest, Akure, Southwestern Nigeria. *Ethiopian Journal of Environmental Studies and Management* 8(5): 517-529. (in English) ["Odonate fauna of Iloyin Forest was studied from October to December 2009 to have an overview of the species composition and distribution with the threat of deforestation in the area. Adult species were collected once a week using a sweep net throughout the period of the study from three study sites (denoted

as I, II and III) with varying levels of anthropogenic disturbance. A total of 76 species belonging to eight families were recorded in the forest. The two most abundant families in the forest were the Libellulidae and Coenagrionidae. *Palpolpeura portia*, *P. lucia* and *Congothemis dubia* were the dominant species of Libellulidae, while *Pseudagrion kersteni* was the dominant coenagrionid. Some species of Odonata usually associated with shaded forests were encountered in two of the study sites. The highest diversity and evenness indices were recorded at Site I, followed by Site II and the least recorded at Site III. Although shade-loving species recorded in the study area was an indication of its richness in forest Odonata, some may have however become locally endangered or extinct as a result of deforestation. A check in the rate of deforestation could preserve the few forest (endangered) species and restore the locally extinct ones that changed habitats." (Authors)] Address: Adu, B.W., Department of Biological Sciences, Ondo State University of Science and Technology, Okitipupa, Ondo State, Nigeria. E-mail: williamsadubabs@yahoo.com

15163. Alekseevich, A.A. (2015): Rare zoological finds in the Sokolii Hills (to the data investigations of 2014 year). *Regional development: an electronic scientific journal* (ISSN 2410-1672) 2(6): 9 pp. (in Russian, with English summary) [A female *Anax imperator* was recorded on June 24, 2014 at the shoreline of the Saratov Reservoir, Sokolii and Sorochinskies Hills, Samara region, Russia. <http://regrazvitiye.ru/ekologiya-i-bezopasnost-zhiznedeyatelnosti-26110/>] Address: Alekseevich, G.A., Samara State University of Economics, Russia. E-mail: ecology@samsu.ru

15164. Ali, W.K.; Khidhir, A.-Q.S. (2015): Morphological study of the *Sympetrum arenicolor* Jödicke, 1994 (Odonata: Libellulidae) collected in Kurdistan Région-Iraq. *Entomology, Ornithology & Herpetology* 4: 168. doi:10.4172/2161-0983.1000168: 6 pp. (in English) ["This study includes a morphological study of the *S. arenicolor*. The specimens were collected in some localities of Kurdistan region-Iraq from the period of March until November 2014. The adults described in detail, important body parts such as antenna, rostrum, male and female genitalia were illustrated. Localities and date of collecting were mentioned." (Authors)] Address: Ali, W.K., Salahaddin University-Ebil, College of Education-Biology Dept, Iraq

15165. Alvarez-Covelli, C.; Alvarez-Covelli, M.A.; Palacino-Rodríguez, F. (2015): Abdomen or wings? Comparing two body places for marking in *Mesamphiagrion laterale* (Odonata: Coenagrionidae). *Odonatologica* 44(3): 343-348. (in English) ["To assess a marking technique that avoids alteration of wing aspect and thereby reduces the effect of marking on the organisms' behaviour, adult individuals of *Mesamphiagrion laterale* (Selys, 1876) were marked on two body regions and their probability of resighting (PR) was estimated. Marks were placed as irregular spots of turquoise, magenta, lime, and orange colour. The PR of wing-marked individuals and abdomen-marked individuals was compared. A total PR of 80% was detected. PR was higher

when the marks were placed on the abdomen (PR=0.72) than on the wings (PR=0.62), but no significance was found between these recapture rates ($\chi^2=0.413$). This exercise should be implemented in other odonate species to see the widespread nature of our results." (Authors)] Address: Álvarez-Covelli, Catalina, Grupo de Investigación en Odonatos de Colombia (GINOCO), Grupo de Investigación en Biología (GRIB), Departamento de Biología Universidad El Bosque, Avenida carrera 9 No. 131 A-02, Bogotá D.C., Colombia. E-mail: catalinaalvarezcovelli@gmail.com

15166. Ameka, C.M. (2015): Effects of insect growth regulator pyriproxyfen on dragonfly nymphs as predators of anopheles mosquitoes at Mahanga, Vihiga County, Kenya. M.Sc. thesis, Agricultural Entomology, School of Pure and Applied Sciences of Kenyatta University: XII + 56 pp. (in English) ["Malaria in sub-Saharan Africa is transmitted mainly by *Anopheles gambiae* Complex mosquitoes. One way of controlling these vectors is by targeting their aquatic stages, which is anticipated to cause significant reduction in adult vectors, hence in malaria transmission. Use of insect growth regulator, Pyriproxyfen, is one potential way of controlling malaria vectors. This study set out to determine the nymphocidal activity of Pyriproxyfen on non-target aquatic dragonfly nymphs during its application to control malaria vectors in western Kenya highlands. In this study, validation of dragonfly nymphs as predators of malaria vectors was done and impact of Pyriproxyfen on these nymphs was determined in Mahanga Village of Vihiga County in western Kenya highlands. One hundred dragonfly nymphs were exposed to third instar larvae of *A. gambiae* to determine their predation efficiency by counting the number of larvae remaining after predation. Eighty 5th instar dragonfly nymphs were exposed to Pyriproxyfen (Sumilarv0.5 G) at concentrations of 0.01ppm, 0.05ppm, 0.1ppm, and filtered tap water as control. The experiment was replicated four times and repeated in ten rounds in the laboratory. Observations were made at 24 hour intervals and data collected on mortality of dragonfly nymphs. One gram of Pyriproxyfen was applied in the 10 randomly selected mosquito breeding habitats at Mahanga once every month. Control experiments in *An. gambiae* breeding habitats were done at Muluhoro study site located 10Km away from Mahanga to avoid contamination by Pyriproxyfen (Sumilarv 0.5G). Percentage predation of 95% was obtained in 24 hours of exposure of *An. gambiae* larvae indicating that the dragonfly nymphs are efficient predators of *A. gambiae*. The insect growth regulator Pyriproxyfen (Sumilarv 0.5G) had nymphocidal activity on the dragonfly nymphs at a concentration of 0.05ppm and 0.1ppm in laboratory assays. Abundance of dragonfly nymphs in *An. gambiae* breeding habitat was determined by comparing the abundance of dragonfly nymphs in the intervention sites at Mahanga and non intervention site at Muluhoro. The results indicated that the dragonfly nymphs were present in both sites over the 11month period. Analysis using Generalized Estimation Equations (GEE) showed that the abundance of dragonfly nymphs was significantly different ($p<0.01$) and there was insignificant nymphocidal activity of Pyriproxyfen (Sumilarv 0.5G) on the dragonfly

nymphs in both the intervention and non intervention ($p>0.05$). The findings of this study have shown that Pyriproxyfen (Sumilarv 0.5G) had insignificant nymphocidal activity on dragonfly nymph when used as a larvicide at lower concentrations of 0.05ppm ($p>0.05$). The study recommends that dragonfly nymphs should be included in mosquito control programs as they are predators of mosquito larvae. Additionally, Pyriproxyfen should not be used at higher dosages of more than 0.05ppm as it affects non target dragonfly nymphs." (Author) <http://etd-library.ku.ac.ke/handle/123456789/14269?show=full>] Address: not stated

15167. Anankware, P.J.; Fening, K.O.; Osekre, E.; Obeng-Ofori, D. (2015): Insects as food and feed: A review. International Journal of Agricultural Research and Review 3(1): 143-151. (in English) ["This research reviews the contribution of insects to man in his zeal to improve and widen his sources of food, feed and nutrition. It critically looks at major edible insects and how flies and other insects can contribute to the growing demand for cheap protein in the food and feed industry. Priority is also given to nutrition and some rearing models that have been developed and how these can be improved to domesticate these insects into mini-live-stock." (Authors) It is said 29 odonate species being human food, but no details are given.] Address: Anankware, P.J., Department of Crop and Soil Science, Faculty of Agriculture, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. E-mail: anankware@yahoo.com

15168. Andrew, R.J. (2015): Observations on a gynochromatic (?) male of the dragonfly, *Rhodothemis rufa* (Rambur, 1842) (Odonata: Libellulidae). Journal of Threatened Taxa 7(3): 7007-7010. (in English) ["*R. rufa* exhibits a conspicuous sexual dimorphism in its body colour. The mature male is characterized by the homogenous striking brilliant red body while the mature female is dull brown with a prominent mid-dorsal light yellow streak running from the top of the head through the thorax and down to the fifth segment of the abdomen. The sexes can easily be identified from quite a long distance. On 7 November 2012, we observed the unusual sight of a female *R. rufa* chasing another female and forming a tandem link which was followed by copulation. This peculiar reproductive behaviour instigated us to net the specimen. On inspection we found that although it appeared a female, it had well developed external male genitalia in the form of the secondary copulatory apparatus on the venter of the second and third abdomen, a pair of coxites on the ninth abdominal tergum and an additional infra anal appendage at the terminal tip of the abdomen. The testes contained a large number of lobules filled with mature spermatozoa, and the vasa differentia also contained mature sperms. The sperm sac was filled with sperms embedded in seminal fluid. Observations indicate that this could be a rare case of a gynochromatic male of *R. rufa* which has retained the colour patterning of the female even after sexual maturity and concomitantly exhibiting active sexual behaviour, although the case of it being a subadult male which has yet to attain its typical red coloration cannot be ruled

out." (Author)] Address: Andrew, R.J., Post Graduate Department of Zoology, Hislop College, Nagpur, Maharashtra 440001, India. E-mail: rajuandrew@yahoo.com

15169. Appel, E.; Heepe, L.; Lin, C.-P.; Gorb, S.N. (2015): Ultrastructure of dragonfly wing veins: composite structure of fibrous material supplemented by resilin. *Journal of Anatomy* 227(4): 561-582. (in English) ["Dragonflies count among the most skilful of the flying insects. Their exceptional aerodynamic performance has been the subject of various studies. Morphological and kinematic investigations have showed that dragonfly wings, though being rather stiff, are able to undergo passive deformation during flight, thereby improving the aerodynamic performance. Resilin, a rubber-like protein, has been suggested to be a key component in insect wing flexibility and deformation in response to aerodynamic loads, and has been reported in various arthropod locomotor systems. It has already been found in wing vein joints, connecting longitudinal veins to cross veins, and was shown to endow the dragonfly wing with chordwise flexibility, thereby most likely influencing the dragonfly's flight performance. The present study revealed that resilin is not only present in wing vein joints, but also in the internal cuticle layers of veins in wings of *Sympetrum vulgatum* (SV) and *Matrona basilaris basilaris* (MBB). Combined with other structural features of wing veins, such as number and thickness of cuticle layers, material composition, and cross-sectional shape, resilin most probably has an effect on the vein's material properties and the degree of elastic deformations. In order to elucidate the wing vein ultrastructure and the exact localisation of resilin in the internal layers of the vein cuticle, the approaches of bright-field light microscopy, wide-field fluorescence microscopy, confocal laser-scanning microscopy, scanning electron microscopy and transmission electron microscopy were combined. Wing veins were shown to consist of up to six different cuticle layers and a single row of underlying epidermal cells. In wing veins of MBB, the latter are densely packed with light-scattering spheres, previously shown to produce structural colours in the form of quasicrystalline arrays. Longitudinal and cross veins differ significantly in relative thickness of exo- and endocuticle, with cross veins showing a much thicker exocuticle. The presence of resilin in the unsclerotised endocuticle suggests its contribution to an increased energy storage and material flexibility, thus to the prevention of vein damage. This is especially important in the highly stressed longitudinal veins, which have much lower possibility to yield to applied loads with the aid of vein joints, as the cross veins do. These results may be relevant not only for biologists, but may also contribute to optimise the design of micro-air vehicles." (Authors)] Address: Appel, Esther, Functional Morphology and Biomechanics, Zoological Institute, Kiel University, Am Botanischen Garten 1-9, D-24098 Kiel, Germany. E-mail: eappel@zoologie.uni-kiel.de

15170. Arambourou, H.; Stoks, R. (2015): Combined effects of larval exposure to a heat wave and chlorpyrifos in northern and southern populations of the damselfly

Ischnura elegans. *Chemosphere* 128: 148-154. (in English) ["Highlights: •Damselfly larvae were sequentially exposed to a heat wave and chlorpyrifos. •Surprisingly, the heat wave positively affected fat storage and immune function. •Chlorpyrifos had strong negative effects on survival, growth and fat storage. •The AChE inhibition by chlorpyrifos was magnified by the heat wave. •Delayed effects of heat waves may make damselflies more vulnerable to pesticides. Abstract: Heat waves are generally associated with an increased energy consumption and could thus increase the vulnerability to subsequent pesticide exposure. We investigated the combined effect of a heat wave and subsequent exposure to the pesticide chlorpyrifos in *Ischnura elegans* damselfly larvae. To assess local thermal adaptation to heat waves, we applied these combined stressors on replicated low- and high-latitude populations in Europe. Unexpectedly, we observed positive sublethal effects of the heat wave: fat content and phenoloxidase activity increased. Chlorpyrifos had strong negative effects on survival, growth rate, and fat content, while phenoloxidase activity increased; these effects between latitudes were found similar. We found little indication of a higher ability to withstand a heat wave in southern larvae. We did detect a synergistic negative effect on AChE activity. This result highlights the importance of considering delayed effects of extreme temperature events when assessing the impact of pesticides under climate change." (Authors)] Address: Arambourou, H el ene, CEREMA DTer IdF, D epartement Ville durable, 12 rue Teisserenc de Bort, 78197 Trappes-en-Yvelines, France. E-mail: helene.arambourou@irstea.fr

15171. Arambourou, H.; Stoks, R. (2015): Warmer winters modulate life history and energy storage but do not affect sensitivity to a widespread pesticide in an aquatic insect. *Aquatic Toxicology* 167: 38-45. (in English) ["Highlights: • Damselfly larvae were sequentially exposed to winter warming and chlorpyrifos. • Low and high-latitude European populations of a damselfly were studied. • Damselfly larvae, especially from low latitude, benefited from winter warming. • Chlorpyrifos exposure negatively affected life-history and biochemical markers. • Pesticide effects were not magnified by winter warming. Despite the increased attention for the effects of pesticides under global warming no studies tested how winter warming affects subsequent sensitivity to pesticides. Winter warming is expected to cause delayed negative effects when it increases metabolic rates and thereby depletes energy reserves. Using a common-garden experiment, we investigated the combined effect of a 4 °C increase in winter temperature and subsequent exposure to chlorpyrifos in the aquatic larvae of replicated low- and high-latitude European populations of the damselfly *Ischnura elegans*. The warmer winter (8 °C) resulted in a higher winter survival and higher growth rates compared to the cold winter (4 °C) commonly experienced by European high-latitude populations. Low-latitude populations were better at coping with the warmer winter, indicating thermal adaptation to the local winter temperatures. Subsequent chlorpyrifos exposure at 20 °C induced strong negative effects on survival, growth rate, lipid content and acetylcholinesterase activity

while phenoloxidase activity increased. These pesticide effects were not affected by winter warming. Our results suggest that for species where winter warming has positive effects on life history, no delayed effects on the sensitivity to subsequent pesticide exposure should be expected." (Authors)] Address: Laboratory of Ecotoxicology, IRSTEA Lyon-Villeurbanne, MAEP research Unit, CS, 5 rue de la Doua, F-69626, Villeurbanne, 70077, France

15172. Archana, A.; Sharad, S.; Pratibha, A. (2015): Seasonal biological water quality assessment of River Kshipra using benthic macro-invertebrates. *International Journal of Research - Granthaalayah* 3(9): 7 pp. (in English) [India "The water quality of River Kshipra in stretch of 195 km was studied for water quality status using benthic macro invertebrates for all three seasons' monsoon, winter and summer. The River water quality is subject to severe domestic and industrial pollution at compete stretch of River. In the present investigation a total of 13 Orders of macrobenthic fauna i.e. Ephemeroptera, Trichoptera, Placoptera, Coleoptera, Hemiptera, Odonata, Crustacea, Diptera, Pulmonata, Operculata, Pulmonata, Oligochaeta and Hirudinea belong to 3 Phylum's Arthropoda, Mollusca and Annelida were reported. Arthropoda was the most dominant group in all seasons. On seasonal comparison of benthic fauna is observe that abundance were decreasing order were, Winter > Monsoon > summer. To monitor the water quality samples from two years (2010-12) from different stations were collected monthly. The works highlighted the condition of the River water in various seasons with respect of the seasonal abundance of the benthic macro-invertebrates organisms mentioned above. Odonata- The presence of these animals indicates input of little organic pollution in the slow moving or standing clean waters. They can be observed around water bodies, nymph of dragons is robust while damsel is slender with distinct head, thorax and abdomen. Order Odonata represented by Family Coenagriidae, Corduliidae and Gomphidae. The seasonal percentage dominance of order Odonata in monsoon (5.37%), followed by (2.70%) in winter and in summer completely absent. This observation clearly indicate highly polluted status in summer because Odonata nymph were found in only fresh water there is abundance of oxygen and unpolluted water. Lonkar and Kedar, (2014) also reported similar observations." (Authors)] Address: Archana, A., School of studies in Zoology and Biotechnology, Vikram University, Ujjain (M.P.), India

15173. Arimoro, F.O.; Odume, O.F.; Uhunoma, S.I.; Edegbene, A.O. (2015): Anthropogenic impact on water chemistry and benthic macroinvertebrate associated changes in a southern Nigeria stream. *Environmental Monitoring and Assessment* 187: 1-14. (in English) ["The Ogba River in southern Nigeria is an important water resource for its riparian communities. This study evaluates impact of anthropogenic influences on the Ogba River using water chemistry and macroinvertebrate data sets obtained over a period of 6 months between January and June 2012. Four stations, stations 1-4, characterised by various human activities were chosen along the river. Organic wastes from domestic

and industrial sources were the major point sources of pollutants. Station 2 where the municipal wastewater drains into the river had elevated values of flow velocity, BOD5, sulphate, phosphate, nitrate and sodium. Based on the canonical correspondence analysis (CCA), 5-day biochemical oxygen demand (BOD5), sulphate, nitrate and phosphate were the main factors that help to shape the macroinvertebrate assemblage structure of the Ogba River. Macroinvertebrates clustered strongly by stations than by seasons indicating that water quality differences between the stations were responsible for the observed differences in the biotic assemblage. The preponderance of naidid oligochaetes, baetid nymphs and certain tolerant dipteran taxa including chironomids and ceratopogonids at all four stations was an indication that the entire water body was stressed. The odonates were the single most abundant taxa; their dominance could be attributed to the vegetative nature of the stream, favouring odonate colonisation. Overall, the responses of macroinvertebrates to stress were reflected by the different assemblage structures recorded at the four study stations. Substrate and microhabitat obliteration and poor water quality appeared to be the factors responsible for the observed assemblage structure in the Ogba River." (Authors)] Address: Arimoro, F.O., Applied Hydrobiology Unit, Department of Biological Sciences, Federal University of Technology, P.M.B 65, Minna, Nigeria. E-mail: f.arimoro@futminna.edu.ng

15174. Arunachalam, A. (2015): Impact of sago factory effluent on biochemical constituents in different tissues of male larvae of dragonfly *Bradinopyga geminata*. *International Journal of Advanced Research* 3(5): 453-461. (in English) ["The antepenultimate larvae of dragonfly were treated in sublethal concentrations of sago factory effluent. Under effluent stress, biochemical constituents like total free amino acids, total proteins, total free sugars, glycogen content, reducing sugars, total lipids, triacylglycerol and cholesterol were found to decrease in the haemolymph, fat body and testis thus showing physio-metabolic dysfunction in the larvae. It is implied that the metabolic stress caused by the effluent could alter the reproductive process in the male dragonflies." (Author)] Address: Arunachalam, A., Department of Zoology, Vivekanandha College of Arts and Sciences for Women (Autonomous), Elayampalayam, Tiruchengode - 637 205, Tamilnadu, India

15175. Asiain, J., Marquez, J.; Irmeler, U. (2015): New national and state records of Neotropical Staphylinidae (Insecta: Coleoptera). *Zootaxa* 3974: 76-92. (in English) ["The distributional patterns of the studied species are commented and the congruence with species of different families of Coleoptera and Odonata (considering taxa at the family level, without any details and basing on personal communication of J. A. Escoto-Moreno) previously analyzed is discussed. Finally, we conclude that some of these patterns can be proposed as hypothesis of primary biogeographic homology." (Authors)] Address: Asiain, Julieta, Laboratorio de Sistemática Animal, Centro de Investigaciones Biológicas, UAEH, Km 4.5, carretera Pachuca-Tulancingo

s/n, Ciudad del Conocimiento, Col. Carboneras, CP 42184, Mineral de la Reforma, Hidalgo, México. E-mail: asia-nae@yahoo.com

15176. Assandri, G. (2015): L'odonatofauna (Insecta Odonata) delle basse Valli di Susa, Sangone e di Lanzo (Torino, Italia). *Memorie della Società Entomologica Italiana* 92(1-2): 39-75. (in Italian, with English summary) ["The objective of this paper is to fill the knowledge gaps on Odonate fauna of the low Susa, Sangone and Lanzo valleys (Turin, NW Italy), an area for which there was limited prior knowledge. The available information (153 records) have been reviewed and updated at the same time through an in-depth exploration of the territory (between 2009 and 2013), which involved 137 field surveys on 34 sampling sites of diverse nature (28 lentic and 6 lotic), which produced further 913 records. Overall in the study area were found a total of 45 species, with reproduction ascertained for 37 of them. The occurrence of 3 species recorded in the past was not confirmed and 8 are new (compared to the 2007 regional atlas). Some rich and diverse communities were found and also some species considered rare in north-Western Italy (*Boyeria irene*, *Onychogomphus uncatatus*, *Cordulegaster bidentata* and *Somatochlora flavomaculata*). Statistically, in the non protected sites there are no less species than those of protected sites (Regional Parks and SPAs). This underline an inadequacy of protected areas network in order to pursue the conservation of this taxon in the studied region, already subjected to a strong anthropogenic pressures that is threatening some sites of great value. It is finally given a qualitative and quantitative indication of the species' flight periods." (Author)] Address: Assandri, G., Dipartimento di Scienze della Terra e dell'Ambiente, Univ. di Pavia, Via Ferrata 9, 27100 Pavia, Italia. E-mail: giacomo.assandri@gmail.com

15177. Ball, O.-P.; Pohe, S.R.; Winterbourn, M.J. (2015): Littoral macroinvertebrate communities of dune lakes in the far north of New Zealand. *New Zealand Journal of Marine and Freshwater Research* 49(2): 192-204. (in English) ["The littoral macroinvertebrate faunas of 17 dune lakes on the Aupouri Peninsula in northern New Zealand were examined. Land cover of individual catchments was principally sand dunes and scrub, plantation forest, pasture, or a mixture of plantation forest and pasture. Sampling was concentrated in the sedge beds, submerged macrophytes and surface sediment layers of the littoral zone. Sixty-eight invertebrate taxa were recorded, 11–30 per lake. Relative abundance of major faunal groups differed considerably among lakes but a core group of common species was found in three quarters of them. Neither community composition, nor various measures of species richness were related significantly to catchment land cover classes. A feature of the lake fauna was the occurrence of three introduced species of Gastropoda and eight self-introduced insect species, including five dragonflies. One of the latter, *Hemicordulia australiae*, was found in all lakes and made up 3% of all invertebrates collected." (Authors)] Address: Ball, O.-P., Environmental Sciences Department, NorthTec, Whangarei, New Zealand

15178. Baran, A. (2015): Blending Traditional Fish Culture with Non-Traditional Species and Methods at Genoa NFH. 145th Annual Meeting of the American Fisheries Society, August 16-20th August: (in English) [Verbatim: Genoa NFH was established over 80 years ago by the Upper Mississippi River Fish and Wildlife Act. The mission of the hatchery has changed from providing sport fish for area waters to a conservation hatchery concerned with recovery of endangered aquatic species. The hatchery works with over 35 aquatic species including fish, freshwater mussels, salamanders and now an endangered dragonfly. These programs have required different approaches to methods and equipment used in fish culture. Genoa has constructed several mobile rearing units, one for the mussel program, two for the sturgeon program and will begin construction in 2015 on a unit for the Hine's Emerald Dragonfly (*Somatochlora hineana*). These mobile units allow the station to work in the native environments of the different species, using source water from the natal rivers of lake sturgeon or the nutrient rich water of the Mississippi River for the mussels. The design of the mobile units also allows the hatchery to bring wild species on station without compromising the disease status by using UV disinfection on both the incoming and effluent water. These units can be deployed at the hatchery to quarantine potential mussel host fish, future brood fish as well as the new dragonfly species.] Address: Baran, Angela, DOI USFWS Genoa National Fish Hatchery, Genoa, WI, USA

15179. Barry, M.J. (2015): Effects of resource distribution on the cost of predator avoidance behaviour in tadpoles. *Hydrobiologia* 758: 99-105. (in English) ["Tadpoles reduce activity and increase hiding in the presence of dragonfly larvae. Several studies demonstrate that tadpoles showing this behaviour have slower growth, however, other studies have found no effect or even positive growth in tadpoles exposed to predators. A recent study demonstrated that swimming is an energetically expensive activity for *Bufo arabicus* tadpoles. Therefore, if food resources are abundant close to refuges, reduced activity may be an advantage and could offset the cost of reduced foraging. I tested this hypothesis by growing *B. arabicus* tadpoles with food provided either near or away from shelters, in the presence or absence of caged dragonfly larvae (*Anax imperator*). In the presence of dragonfly larvae, tadpoles provided with food close to shelters were significantly larger than those with food further away. Control tadpoles under both food treatments were intermediate in size, although not statistically different from the predator + near food tadpoles. The results indicate that access to resources is the main determinant of growth in *B. arabicus* tadpoles and that the energetic cost of swimming is a secondary factor." (Author)] Address: Barry, M.J., Biol. Dept, Sultan Qaboos Univ., PO Box 36, Al Khoud, Muscat, 123, Sultanate of Oman. E-mail: mjbarry@squ.edu.om

15180. Baruah, C.; Saikia, P.K (2015): Abundance and Diversity of Odonates in Different Habitats of Barpeta District, Assam, India. *International Research Journal of Biological Sciences* 4(9): 17-27. (in English) ["A total of 45 species of Odonata including 29 species under 3 families of Anisoptera

and 16 species under 3 families of Zygoptera were recorded in four different types of habitats in Barpeta district of Assam during two years (2012 and 2013) of survey. 38 species were recorded from habitats near ponds and rivers, 39 from near beels and 41 species were recorded from open tracts of land. 7 species were recorded from three different types of habitats; 3 species were recorded from two types and 4 species were recorded from two habitat types. 32 species were recorded in all the four habitat types. The most abundant Anisopteran species in ponds was *Diplacodes trivalis*; in beels and rivers it was *Rhyothemis variegata variegata*, and *Pantala flavescens* was most abundant in open tracts. Among the Zygopteran species the most abundant was *Ceragrion coromandelianum* in all the habitats. Shannon-Weiner index (H') was 3.323 in ponds, followed by 3.310 in open tracts of land, 3.243 in rivers and 3.305 in Beels or lakes. Margalef's richness (DMg) index was found to be 6.47 in open tracts; 6.36 in river banks 6.12 in beels and 5.65 in ponds. The Jaccard's similarity index (C_j) was 0.88 between beel and river and 0.80 between pond and open tracts." (Authors)] Address: Baruah C., Dept of Zoology, M.C. College, Barpeta, 781301, Assam, India

15181. Baruah, C.; Saikia, P.K. (2015): New records of Odonata from Barpeta district, Assam, India. *Journal of Global Biosciences* 4(9): 3335-3343. (in English) ["In a study conducted in the Barpeta district of Assam, India, a total of 47 species of Odonata species were recorded. ... Five species of odonates including *Ictinogomphus angulosus*, *Stylogomphus inglisi*, *Bradinopyga geminate*, *Acia-grion hisopa* and *Mortonagrion aborense* were recorded for the first time from this region." (Authors)] Address: Baruah, C., M. C. College, Barpeta, Assam 781301, India

15182. Basumatary, P.; Adhikary, D.; Daimary, M.; Basumatary, N.; Daimary, A. (2015): A preliminary study on the diversity of Odonata in Bodoland University and its vicinity, Assam, India. *International Journal of Scientific and Research Publications* 5(6): 1-8. (in English) [34 odonate species (26 Anisoptera, 8 Zygoptera) were recorded between May 2013 and November 2014.] Address: Basumatary, Paris, Department of Zoology, Bodoland University, Kokrajhar, Kokrajhar-783370, BTC, Assam, India. E-mail: parishbasumatary@gmail.com

15183. Bazzanti, M. (2015): Pond macroinvertebrates of the Presidential Estate of Castelporziano (Rome): a review of ecological aspects and selecting indicator taxa for conservation. *Rendiconti Lincei* 26, Supplement 3: 337-343. (in English) ["Macroinvertebrates of 49 (27 temporary and 22 permanent) ponds located in the Presidential Estate of Castelporziano (Rome) were studied from 1989 to 2004 to investigate their community ecology and to provide a first estimation of their conservation value. More than 300 taxa (about 70 % identified to species) were collected. The main environmental factors influencing the number of species in the study ponds were hydroperiod length, depth, surface area, dissolved oxygen concentration and macrophyte spe-

cies richness and abundances. Permanent biotopes generally hosted higher number of taxa than temporary ones. Some taxa were exclusive or more abundant in a pond type. Functional organization (functional feeding groups, habits and resistance to desiccation) of the community appeared similar in the two pond types but differed among mesohabitats. Up to date, about 62 % of the taxa collected have an unknown status with respect to their distribution in Italy (common, rare, threatened and vulnerable). We identified 50 target species with peculiar ecological requirements and/or geographical distribution to promote effective practical basis for pond conservation in Italy. The distribution of rare, vulnerable or threatened species within the ponds studied suggests that the two pond types and all mesohabitats therein should be considered for the sampling procedure to obtain a correct evaluation of pond conservation." (Author) 19 odonate species had been recorded, but no species details are given.] Address: Bazzanti, M., Department of Environmental Biology, "Sapienza" University of Rome, Viale dell'Università 32, 00185, Rome, Italy. E-mail: marcello.bazzanti@uniroma1.it

15184. Beard, J.L. (2015): Perch selection by male dragonflies (Odonata, Anisoptera) related to competitive ability and species composition. Ph.D. thesis, Department of Biological Sciences, Old Dominion University, Norfolk: XII, 67 pp. (in English) ["Males of many species of dragonflies (Odonata, Anisoptera) establish territories in aquatic habitats where they compete with other males for access to food and females. Territorial males typically perch on emergent vegetation and chase rival males who intrude into their territories. This dissertation research examined the role of male size in perch height selection, position on the perch, and competitive ability. Four hypotheses were tested: 1) Dragonfly species would vary by size and that territorial species would show sexual size dimorphism (SSD), 2) Perch height selection would be related to dragonfly size, 3) Position on the perch would be related to male size, with larger males selecting perch tops and smaller inferior competitors choosing the sides of perches, and 4) Intraspecific competition would be more important than interspecific competition. Research was conducted at four lakes in southeastern Virginia from 2011-2014. For size measurements, male and female dragonflies (*Brachymeria grandidens*, *Celithemis epina*, *Erythrodiplax simplicicollis*, *Libellula incesta*, *L. needhami*, *L. vibrans*, *Pachydiplax longipennis*, *Plathemis lydia*, *Perithemis tenera*) were captured and measured for total body length, abdomen length, cerci length, forewing length and width, hindwing length and width and fresh mass. For perching experiments, alternating short (30cm above waterline) and tall (90cm above waterline) bamboo perches were placed in two rows, 0.5m and 2.0m from the shore. Any dragonflies that alighted on perches were recorded for species, gender, perch position and length of occupancy. Any interactions with conspecific or heterospecific dragonflies were recorded. Results showed that dragonfly males varied significantly among species in all parameters measured, and SSD was found for some parameters for some of the species. In particular, females of several species had

greater forewing and hindwing widths than males, perhaps related to selection for energy conservation in females. There was no association between dragonfly size and perch height selection. Four species frequently perched on the sides rather than the tops of perches, and these species tended to be poor competitors who lost more contests than they won. The number of intraspecific and interspecific contests did not differ for any species. Neither dragonfly size nor residency on a perch influenced contest outcomes. Overall, these results revealed that dragonfly community interactions were dynamic and did not follow simple rules." (Author)] Address: Beard, Jessica, Dept of Biological Sciences, Old Dominion University, Norfolk, VA 23529, USA

15185. Beatty, C.D.; Andrés, J.A.; Sherratt, T.N. (2015): Conspicuous coloration in males of the damselfly *Nehalennia irene* (Zygoptera: Coenagrionidae): Do males signal their unprofitability to other males? *PLoS One*. 2015 Nov 20;10(11):e0142684. doi: 10.1371/journal.pone.0142684. eCollection 2015.: 13 pp. (in English) ["In damselflies, sexual colour dimorphism is commonly explained as a consequence of selection on traits that increase male attractiveness to females. However, while many species in the Coenagrionidae are sexually dimorphic, the males do not engage in displays, and male competition for mates resembles a "scramble". An alternative explanation for the sexual differences in coloration within these species is that sexual dimorphism has evolved as a sex-related warning signal, with males signalling their unprofitability as mates to other males, thereby avoiding harassment from conspecifics. We evaluated an underlying assumption of the theory that male-male harassment rate is influenced by colour by comparing harassment of males of the species *Nehalennia irene* that had been painted to make them appear: (i) similar to an unaltered male (blue), (ii) different from a male (orange) and (iii) more similar to a female (black). When caged together we found that blue-painted males experienced significantly lower harassment than black-painted males. When unpainted males were caged with each type of painted male we found that blue-painted males and the unpainted males housed in the same cages experienced lower rates of harassment than males housed in cages where some males were painted black, suggesting that a single, reliable signal of unprofitability may benefit the individuals that carry it. While our results do not in themselves demonstrate that sexual colour dimorphism originally evolved as an intraspecific warning signal, they do show that harassment is influenced by coloration, and that such selection could conceivably maintain male coloration as a warning signal." (Authors)] Address: Beatty, C.D., Dept of Biology, Santa Clara University, 500 El Camino Real, Santa Clara, CA, 95053-0268, USA. E-mail: cbeatty@scu.edu

15186. Bellenguier, L.; Delpon, G. (2015): Sur la détection de *Somatochlora arctica* et l'estimation de ses populations: l'exemple de la tourbière de la Pignole dans le Cantal (Odonata: Corduliidae). *Martinia* 31(1): 35-46. (in French, with English summary) ["Surveys conducted in 2013 on the Pignole peat bog (Cantal department, France) proved the

settlement of a strong population of *Somatochlora arctica*. The well-known species discretion was confirmed, emphasising the need to collect and number the exuviae during the emergence period. The ratio of the number of exuviae found to the number of imagoes observed on the wing and at emergence was ca 18. This estimate is expected to vary with space and should be refined by similar numerations in other localities. The discretion of this species raises the question of its detectability and of the changes in the numbers of its records over time. It appears that the species was obviously largely overlooked before 1980 due to too rare field works and that only intensive field surveys during the last three decades allowed to assess correctly its genuine status in the region." (Authors)] Address: Bellenguier, L., 1123 Avenue Joseph Claussat 63400 Chamalières, France. E-mail: l.belenguier@gmail.com

15187. Bellstedt, R.; Petzold, F.; Schuster, C. (2015): Der Kleine Blaupfeil *Orthetrum coerulescens* im Thüringer Wald (Insecta: Odonata). *Mitteilungen des Thüringer Entomologenverbandes* 22(1): 16-17. (in German) [9-vi-2014 and 02-vii-2014, near Tambach-Dietharz, Landkreis Gotha, Thüringen, Germany.] Address: Ronald Bellstedt, R., Brühl 2, 99867 Gotha, Germany

15188. Bennett, A.M.; Murray, D.L. (2015): Carryover effects of phenotypic plasticity: Embryonic environment and larval response to predation risk in wood (*Lithobates sylvaticus*) and Northern leopard (*Lithobates pipiens*) frogs. *Canadian Journal of Zoology* 93(11): 867-877. (in English) ["Limitations of phenotypic plasticity affect the success of individuals and populations in changing environments. We assessed the plasticity-history limitation on predator-induced defenses in anurans (wood frogs: *Lithobates sylvaticus* (LeConte, 1825); Northern leopard frogs: *L. pipiens* (Schreber, 1782)), predicting that plastic responses to predation risk by dragonfly larvae (*Aeshna* spp.) in the embryonic environment would limit the defensive response to predators in the larval environment. Predator-conditioned wood frog embryos increased relative tail depth in response to those same cues as larvae, whereas predator-naïve tadpoles did not. However, no carryover effect was noted in the behavioural response of wood frog tadpoles to predation risk. Predator-naïve Northern leopard frog tadpoles increased relative tail depth in response to predation risk in the larval environment. Predator-conditioned leopard frog embryos hatched with, and maintained, a marginal increase in tail depth as larvae in the absence of predation risk. Predator-conditioned leopard frog embryos exposed to predation risk as larvae showed no morphological response. While we find no strong support for the plasticity-history limitation per se, carryover effects across embryonic and larval life-history stages were noted in both wood and leopard frogs, suggesting that predation risk early in ontogeny can influence the outcome of future interactions with predators." (Authors)] Address: Bennett, Amanda, Environmental and Life Sciences, Environmental Science Building, Suite A211, Trent University, 1600 West Bank Drive, Peterborough, ON K9J 7B8, Canada. E-mail: amandabennett2@trentu.ca

15189. Bernard, B.; Daraz, B. (2015): *Cordulegaster heros* and *Somatochlora meridionalis* in Ukraine: solving the zoogeographical puzzle at their northern range limits (Odonata: Cordulegastridae, Corduliidae). *Odonatologica* 44(3): 255-278. (in Dragonfly, Anisoptera, Balkan fauna, Eastern Europe, zoogeography, habitat selection) ["The first records of *C. heros* and *S. meridionalis* in Ukraine completed their distribution picture, thereby allowing the zoogeography of Balkan Odonata species at their northern range limit in Eastern Europe to be better understood. Five localities of *C. heros* in the Khotyn and Chernivtsi Uplands showed the eastern colonisation route to have proceeded north through the eastern Subcarpathians and adjacent hilly areas in Romania and southern Ukraine. A habitat and zoogeographical analysis mostly solved the *Cordulegaster*-puzzle in Ukraine and drew a picture of a northern *C. boltonii*-zone divided from a southern *C. heros*-zone by the extensive Podolian Upland. The population of *S. meridionalis* found in the extreme southwestern Ukraine completed the northernmost range limit in Eastern Europe between the known Slovakian and Romanian localities. It occurs in the Transcarpathian Lowland, i.e., the northernmost part of the Great Hungarian Plain in the direct foreground of the Carpathian foothills. Thus, it perfectly follows the species distribution pattern largely based on an extensive border zone of great basins and low foothills of the adjacent mountain ranges of the Carpathians and Alps. The situation and habitat of Ukrainian and eastern Slovakian localities suggest the Tisa River system as the main colonisation route of *S. meridionalis* for Central and Eastern Europe. Clear differences in the population sizes between streams suggested the optimal, acceptable, and marginal habitats of *C. heros*, which differed in the grain size of the bottom sediments, the stream morphology, and water current. *Somatochlora meridionalis* occurred in a several-metre-broad slow flowing and largely shaded canal-like river where specific habitat conditions were responsible for the concentration of species activity near the levee and pipe culvert." (Authors)] Address: Bernard, R., Department of Nature Education and Conservation, Adam Mickiewicz University, Umultowska 89, PL-61-614 Poznań, Poland. E-mail: rbernard@amu.edu.pl

15190. Berquier, C. (2015): Étude écologique et patrimoniale du peuplement des odonates de Corse appliquée à la conservation des espèces et des zones humides à enjeux. Ph.D thesis, Université de Corse -Pascal Paoli, Ecole Doctorale "Environnement et société" UMR CNRS 6134 (SPE): 310 pp. (in French, with English summary) ["Corsica is home to a great diversity of wetland subject to anthropogenic pressures and threats which have continued to grow and diversify in recent decades. The conservation of these environments with high heritage value and of the original Odonata community that develops in it, today represents significant environmental and societal challenges in order to preserve essential ecological services provided by these key elements of aquatic and terrestrial ecosystems. The applied research project developed as part of this thesis is focused on improving the knowledge available on the Corsi-

can dragonfly's community, to propose concrete conservation and management measures for this group and its main insular natural habitats. In this objective, the first part of this work has sought to fill principal knowledge gaps identified by previous studies on the situation of listed species, including by greatly intensifying exploration effort at the regional level. The special features, distribution, habitat requirements and ecological of many dragonflies growing in Corsica have been described with great precision. The information available on some taxa with high heritage value increased as illustrated by the comprehensive definition of eco-bio-geographical situation of *Chalcolestes parvidens*. The second part of this work has sought to evaluate and compare the effectiveness of the main sampling methods commonly used for the study of dragonfly's populations. In this context, the information collected on the spatial organization and dynamics of the populations studied were especially used to propose appropriate methods for evaluation and monitoring the species to high conservation issue to main managers of natural areas of the island (County Councils, PNRC, municipalities ...), including the emblematic and threatened *Lestes macrostigma*. The third part of this work is devoted to the development of tools for monitoring the quality of the main Odonata habitats. It lead to the development of a new biological index adapted to assess the ecological status of Corsican rivers: "Odonata Community Index - Corsica '(OCIC). This innovative tool, based on the study of characteristics of Odonata community of watercourses, was particularly effective during its confrontation with other biological indicators currently used on the island. The OCIC index today appear clearly as an alternative solution to improve the efficiency of the ecological quality assessment system of the Corsican rivers, given the representativeness vulnerabilities which have been highlighted by the tests performed. The final part of this thesis, based on heritage and environmental assessments of the insular dragonfly's community made with all the information produced, ended with the development and the proposal of several regional conservation devices whose implementation is encouraged by the state services: a first regional actions plan, a first red list of threatened species and an updated list of species determinative for natural areas of ecological, flora and fauna interest. These important features are intended to contribute to improve the overall state of conservation of Corsican dragonflies and main wetlands that support them. They should enable the implementation of truly operational management actions and ensure better consideration of the main regional conservation and valuation issues identified. In the end, the thesis work that increased more than triple the previously available data on dragonflies of Corsica, will provide a new framework to develop the insular odonatology." (Author)] Address: Berquier, C., Office de l'Environnement de la Corse, Observatoire – Conservatoire des Insectes de Corse, Lieu-dit "Lergie", RN 200, F-20250 Corte, France. E-mail: cyril.berquier@oec.fr

15191. Bhadra, C.M.; Truong, V.K.; Pham, V.T.H.; Al Kobaisi, M.; Seniutinas, G.; Wang, J.Y.; Juodkazis, S.; Craw-

ford, R.J.; Ivanova, E.P. (2015): Antibacterial titanium nano-patterned arrays inspired by dragonfly wings. *Scientific Reports* | 5:16817 | DOI: 10.1038/srep16817: 12 pp. (in English) ["Titanium and its alloys remain the most popular choice as a medical implant material because of its desirable properties. The successful osseointegration of titanium implants is, however, adversely affected by the presence of bacterial biofilms that can form on the surface, and hence methods for preventing the formation of surface biofilms have been the subject of intensive research over the past few years. In this study, we report the response of bacteria and primary human fibroblasts to the antibacterial nanoarrays fabricated on titanium surfaces using a simple hydrothermal etching process. These fabricated titanium surfaces were shown to possess selective bactericidal activity, eliminating almost 50% of *Pseudomonas aeruginosa* cells and about 20% of the *Staphylococcus aureus* cells coming into contact with the surface. These nano-patterned surfaces were also shown to enhance the aligned attachment behaviour and proliferation of primary human fibroblasts over 10 days of growth. These antibacterial surfaces, which are capable of exhibiting differential responses to bacterial and eukaryotic cells, represent surfaces that have excellent prospects for biomedical applications." (Authors)] Address: Bhadra, C.M., School of Science, Faculty of Science, Engineering and Technology, Swinburne University of Technology, PO Box 218, Hawthorn, Victoria, 3122 Australia

15192. Bhowmik, A.K.; Schäfer, R.B. (2015): Large scale relationship between aquatic insect traits and climate. *PLoS ONE* 10(6): e0130025. doi:10.1371/journal.pone.0130025: 21 pp. (in English) ["Climate is the predominant environmental driver of freshwater assemblage pattern on large spatial scales, and traits of freshwater organisms have shown considerable potential to identify impacts of climate change. Although several studies suggest traits that may indicate vulnerability to climate change, the empirical relationship between freshwater assemblage trait composition and climate has been rarely examined on large scales. We compared the responses of the assumed climate-associated traits from six grouping features to 35 bioclimatic indices (~18 km resolution) for five insect orders (Diptera, Ephemeroptera, Odonata, Plecoptera and Trichoptera), evaluated their potential for changing distribution pattern under future climate change and identified the most influential bioclimatic indices. The data comprised 782 species and 395 genera sampled in 4,752 stream sites during 2006 and 2007 in Germany (~357,000 km² spatial extent). We quantified the variability and spatial autocorrelation in the traits and orders that are associated with the combined and individual bioclimatic indices. Traits of temperature preference grouping feature that are the products of several other underlying climate-associated traits, and the insect order Ephemeroptera exhibited the strongest response to the bioclimatic indices as well as the highest potential for changing distribution pattern. Regarding individual traits, insects in general and ephemeropterans preferring very cold temperature showed the highest response, and the insects preferring cold and trichopterans preferring moderate temperature showed the

highest potential for changing distribution. We showed that the seasonal radiation and moisture are the most influential bioclimatic aspects, and thus changes in these aspects may affect the most responsive traits and orders and drive a change in their spatial distribution pattern. Our findings support the development of trait-based metrics to predict and detect climate-related changes of freshwater assemblages." (Authors)] Address: Bhowmik, A.K., Quantitative Landscape Ecology, Institute for Environmental Sciences, University of Koblenz-Landau, Landau, Germany. E-mail: bhowmik@uni-landau.de

15193. Blanke, A.; Büsse, S.; Machida, R. (2015): Coding characters from different life stages for phylogenetic reconstruction: a case study on dragonfly adults and larvae, including a description of the larval head anatomy of *Epiophlebia superstes* (Odonata: Epiophlebiidae). *Zoological Journal of the Linnean Society* 174: 718-732. (in English) ["The exclusive use of characters coding for specific life stages may bias tree reconstruction. If characters from several life stages are coded, the type of coding becomes important. Here, we simulate the influence on tree reconstruction of morphological characters of Odonata larvae incorporated into a data matrix based on the adult body under different coding schemes. For testing purposes, our analysis is focused on a well-supported hypothesis: the relationships of the suborders Zygoptera, 'Anisozygoptera', and Anisoptera. We studied the cephalic morphology of *Epiophlebia*, a key taxon among Odonata, and compared it with representatives of Zygoptera and Anisoptera in order to complement the data matrix. Odonate larvae are characterized by a peculiar morphology, such as the specific head form, mouthpart configuration, ridge configuration, cephalic musculature, and leg and gill morphology. Four coding strategies were used to incorporate the larval data: artificial coding (AC), treating larvae as independent terminal taxa; non-multistate coding (NMC), preferring the adult life stage; multistate coding (MC); and coding larval and adult characters separately (SC) within the same taxon. As expected, larvae are 'monophyletic' in the AC strategy, but with anisopteran and zygopteran larvae as sister groups. Excluding larvae in the NMC approach leads to strong support for both monophyletic Odonata and Epirocta, whereas MC erodes phylogenetic signal completely. This is an obvious result of the larval morphology leading to many multistate characters. SC results in the strongest support for Odonata, and Epirocta receives the same support as with NMC. Our results show the deleterious effects of larval morphology on tree reconstruction when multistate coding is applied. Coding larval characters separately is still the best approach in a phylogenetic framework." (Authors)] Address: Büsse, S., 1University Museum of Zoology, Dept of Zoology, University of Cambridge, Downing Street, CB2 3EJ Cambridge, UK

15194. Blust, M.; Pfeiffer, B. (2015): The Odonata of Vermont. *Bulletin of American Odonatology* 11(3-4): 69-119. (in English) ["Here we present the status and distribution of 142 species of Odonata from Vermont, compiled from historical records and a recent surge of field work. This marks the first

such compilation for the state. We include descriptions of Vermont's biophysical regions, a history of odonatology in the state and species accounts that feature distribution, conservation rankings and flight periods. In 13 of Vermont's 14 counties we have documented a minimum of 76 odonate species." (Authors)] Address: Blust, M., Dept. of Biology, Green Mountain College, Poultney, VT 05764, USA. E-mail: blustm@greenmtn.edu

15195. Boda, R.; Bereczki, C.; Pernecker, B.; Mauchart, P.; Csabai, Z.; (2015): Emergence behaviour of the red listed Balkan Goldenring (*Cordulegaster heros* Theischinger, 1979) in Hungarian upstreams: vegetation structure affects the last steps of the larvae. *J. Insect Conserv.* 19(3): 547-557. (in English) ["In odonates, the emergence behaviour and finding suitable substrates for successful molting may influence the next generation and ultimately can determine the survival of the entire population. Understanding emergence behaviour of endangered species and those granted special conservation status is particularly important. Despite this, little is known about the life history and emergence behaviour of *C. heros*, a characteristic inhabitant of headwater streams. We hypothesised that the taxonomic composition and structure of the vegetation significantly affect the travel distance to the emergence site and the substrate choice. Two stream sections with different riparian zone vegetation were surveyed for exuviae in the emergence periods in two consecutive years, supported with detailed vegetation mapping. Significant differences were found between the vegetation characteristics at the two sites and differences were also found between emergences in edge zones within a site, indicating that the importance of vegetation structure operates within the scale of sites as well as between sites. At the site with more diverse vegetation, smaller horizontal but higher vertical travel distances and more varied emergence substrate choice were found. Habitat composition and complexity appears to determine the emergence behaviour of *C. heros*, so for the successful conservation of this species we recommend choosing appropriate forest management regimes and even maintaining riparian forests in near-pristine condition." (Authors)] Address: Csabai, Z., University of Pécs, Faculty of Sciences, Institute of Biology, Department of Hydrobiology, Ifjúság útja 6, H-7624 Pécs, Hungary. E-mail: csabai@gamma.ttk.pte.hu

15196. Boda, R.; Bereczki, C.; Pernecker, B.; Mauchart, P.; Csabai, Z.; (2015): Life history and multiscale habitat preferences of the red-listed Balkan Goldenring, *Cordulegaster heros* Theischinger, 1979 (Insecta, Odonata), in South-Hungarian headwaters: does the species have mesohabitat-mediated microdistribution?. *Hydrobiologia* 760: 121-132. (in English) ["Life cycle and microdistribution patterns of *Cordulegaster heros*, a charismatic species for nature conservation, are poorly known. Life history characteristics and multiscale habitat preferences of the larvae were followed for one year in monthly intervals by systematic samplings in eight headwaters, which resulted in data on 2562 individuals. We hypothesized that meso- and microhabitat complexity play an important role in forming the population

structure and microdistribution of the species. Based on the distribution of the consecutive larval instars, duration of later stages and time of molt and emergence, the larval development of *C. heros* in the Mecsek Mountains lasts for at least three, but with a maximum of four years. All three levels of the multi-habitat structure [habitat (sites), and meso. (riffle/pool sequence) and microhabitats (biotic and different particle-sized abiotic types)] have significant effects on the spatial distribution of the larvae. Densities and population structures vary among the sites, but mesohabitat type and microhabitat diversity (heterogeneity within a pool or riffle) govern the microdistribution. *C. heros* prefers pools with small or medium microhabitat heterogeneity and higher proportion of small particle-sized substrates, especially in younger stages. Older larvae are less sensitive for these effects." (Author)] Address: Csabai, Z., Dept of Hydrobiology, Faculty of Science, University of Pécs, Ifjúság útja 6, Pécs, 7624, Hungary. e-mail: csabai@gamma.ttk.pte.hu

15197. Bode-Oke, A.; Zeyghami, S.; Dong, H. (2015): L27.00007: Kinematics and aerodynamics of backward flying dragonflies. *Bulletin of the American Physical Society* 60(21): 1 p. (in English) [Verbatim: Highly maneuverable insects such as dragonflies have a wide range of flight capabilities; precise hovering, fast body reorientations, sideways flight and backward takeoff are only a few to mention. In this research, we closely examined the kinematics as well as aerodynamics of backward takeoff in dragonflies and compared them to those of forward takeoff. High speed videography and accurate 3D surface reconstruction techniques were employed to extract details of the wing and body motions as well as deformations during both flight modes. While the velocities of both forward and backward flights were similar, the body orientation as well as the wing kinematics showed large differences. Our results indicate that by tilting the stroke plane angle of the wings as well as changing the orientation of the body relative to the flight path, dragonflies control the direction of the flight like a helicopter. In addition, our detailed analysis of the flow in these flights shows important differences in the wake capture phenomena among these flight modes.]

15198. Borisov, S.N. (2015): Dragonflies (Odonata) of thermal springs in Central Asia. *Entomological Review* 95(9): 1203-1211. (in English) ["Sixteen species of dragonflies were recorded in 12 thermal springs of Central Asia. Of these, *Ischnura forcipata*, *I. pumilio*, *Orthetrum anceps*, *O. brunneum*, and *Sympetrum haritonovi* were widely distributed in hydrothermal waters. In the high mountains of Pamir, dragonflies can develop only in hot springs. The maximum altitude recorded for the habitat of *O. brunneum* was 3950 m a.s.l." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

15199. Borisov, S.N. (2015): Migrations of dragonflies (Odonata) in Central Asia: a review. Part 1. Latitudinal migrations. *Eurasian Entomological Journal* 14(3): 241-256.

(in Russian, with English summary) ["In the first part of the message the review of researches latitudinal migrations of dragonflies in Central Asia is resulted. They are established at 4 species. At *S. fonscolombii*, *P. flavescens* and *A. ephippiger* migratory strategy similar. In the spring of a dragonfly arrive for a reproduction on territory of Central Asia from more southern sites of an area. In the autumn their descendants migrate on the south. Strategy *A. p. parthenope* remains not clear. Existence in populations of this species of two various on life cycles of seasonal cohorts — migrating and resident is supposed. During the spring period of any congestions of migrating dragonflies it is noted. Mass autumn migrations in a southern direction are established on pass Chokpak in Western Tian-Shan (42°31' N, 70°36' E). It is supposed that the basic flights occur here to a fair wind at the big heights. Intensity of migrations increases with arrival of cold air fronts." (Author)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

15200. Borisov, S.N. (2015): Dragonflies (Odonata) of Sangtuda thermal spring, Central Tajikistan. *Eurasian entomological journal* 14(4): 342-345. (in Russian, with English summary) ["Seven dragonfly species, *Ischnura evansi*, *I. forcipata*, *I. pumilio*, *Ophiogomphus reductus*, *Cordulegaster coronata*, *Orthetrum anceps* and *O. brunneum* are recorded from Sangtuda thermal spring in Central Tajikistan (38°03'40"N, 69°06'08"E)." (Authors)] Address: Borisov, S., Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunse str. 11, Novosibirsk 630091 Russia. E-mail: borisov-s-n@yandex.ru

15201. Bota-Sierra, A.; Moreno-Arias, C.; Faasen, T. (2015): Preliminary list of Odonata from the Colombian Amazon, with descriptions of *Inpabasis nigradorsum* sp. nov. & *Diaphlebia richteri* sp. nov. (Coenagrionidae & Gomphidae). *International Journal of Odonatology* 18(3): 249-268. (in English) ["The Colombian Amazon is one of the most biodiverse and unexplored regions in the world. Inventories and deeper research are needed for most of its biota, including for dragonflies. This work reports the results of a trip to the Amazon region in order to collect Odonata. It includes revision of CBUCES, CEUA and ICN entomological collections and a literature survey of Colombian Amazon Odonata. Two undescribed species in the genera *Diaphlebia* and *Inpabasis* were found. Five genera and 21 species are recorded for the first time in Colombia. Accounts for undescribed species, new records for the country, natural history notes and a discussed list of Colombian Amazon Odonata are provided." (Authors)] Address: Bota-Sierra, C., Grupo de Entomología Universidad de Antioquia (GEUA), Universidad de Antioquia, Medellín, Colombia. E-mail: corneliobota@gmail.com

15202. Bots, J.; Iserbyt, A.; Van Gossum, H.; Hammers, M.; Sherratt, T.N. (2015): Frequency-dependent selection on female morphs driven by premating interactions with males. *The American Naturalist* 185(6): 141-150. (in English)

["Species showing colour polymorphisms —the presence of two or more genetically determined colour morphs within a single population— are excellent systems for studying the selective forces driving the maintenance of genetic diversity. Despite a shortage of empirical evidence, it is often suggested that negative frequency-dependent mate preference by males (or diet choice by predators) results in fitness benefits for the rare female morph (or prey type). Moreover, most studies have focused on the male (or predator) behaviour in these systems and largely overlooked the importance of female (or prey) resistance behaviour. Here, we provide the first explicit test of the role of frequency-dependent and frequency-independent intersexual interactions in female polymorphic damselflies. We identify the stage of the mating sequence when frequency-dependent selection is likely to act by comparing indexes of male mate preference when the female has little (females presented on sticks), moderate (females in cages), and high (females free to fly in the field) ability to avoid male mating attempts. Frequency-dependent male preferences were found only in those experiments where females had little ability to resist male harassment, indicating that premating interactions most likely drive negative frequency-dependent selection in this system. In addition, by separating frequency-dependent male mating preference from the baseline frequency-independent component, we reconcile the seemingly contradictory results of previous studies and highlight the roles of both forms of selection in maintaining the polymorphism at a given equilibrium. We conclude that considering interactions among all players —here, males and females— is crucial to fully understanding the mechanisms underlying the maintenance of genetic polymorphisms in the wild." (Authors)] Address: Iserbyt, A., Evolutionary Ecology Group, University of Antwerp, Antwerp, Belgium. E-mail: ame.iserbyt@uantwerpen.be

15203. Bouchelouche, D.; Kherbouche-Abrous, O.; Mebarki, M.; Arab, A.; Samraoui, B. (2015): The Odonata of Wadi Isser (Kabylia, Algeria): status and environmental determinants of their distribution. *Revue d'écologie* 70(3): 248-260. (in English, with French summary) ["An odonatological study was carried out during six successive months, from May to October 2013, at Wadi Isser located in the practically unexplored Central North of Algeria. A total of 19 species of Odonata were recorded during the monthly sampling of six stations. Noteworthy was the record of *Lestes numidicus* and *Platycnemis subdilatata*, both Maghrebian endemics. Our results extend considerably towards the west the known distribution of *L. numidicus*, a data deficient (DD) species on the Mediterranean IUCN Red-List. In the light of the present study, no changes in the IUCN Red List classification is proposed with the exception of *L. numidicus* which should be classified as Near-Threatened (NT), pending further investigations. Results also suggest that the variation of the species richness along Wadi Isser may be related to environmental factors. Species richness was positively associated to the density of the riverine vegetation. In contrast, species richness could also be negatively correlated to pollution, an important and recurrent factor of the

erosion of biodiversity of Maghrebian watercourses." (Authors)] Address: Samraoui, B., Laboratoire de Recherche des Zones Humides, Université d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@yahoo.fr

15204. Bried, J.T.; Dillon, A.M.; Hager, B.J.; Patten, M.A.; Luttbeg, B. (2015): Criteria to infer local species residency in standardized adult dragonfly surveys. *Freshwater Science* 34(3): 1105-1113. (in English) ["For dragonflies, the final exuviae are the most identifiable nymphal stage, can substitute for lethal processing of live animals, and definitively indicate life-cycle completion or reproductive success. However, dragonfly exuviae are difficult to find and identify relative to adults, and species richness in exuvial surveys is generally biased low. We tested readily acquired information in adult surveys as indicators of exuviae presence and, therefore, species residency. Repeated concurrent surveys of adults and exuviae were completed at 32 wetlands in New York and 30 wetlands in Oklahoma, USA. We modelled the occurrence of exuviae as logit-linear functions of adult abundance, detection frequency (across surveys), teneral frequency, and frequency of breeding behaviour while controlling for imperfect detectability. Exuviae occupancy probabilities suggested several reliable indicators of species residency: 1) finding adults on =4 surveys, 2) finding tenerals on =2 surveys, and 3) counting >20 adults on =1 surveys (with caveats). The odds of exuviae occurrence when these conditions were met were ~9 to 18× greater than when no adults were detected. Species residency may be accurately inferred during adult surveys, potentially improving freshwater applications and conservation via dragonflies." (Authors)] Address: Dillon, Amanda, Albany Pine Bush Preserve Commission, Albany, New York 12205 USA. E-mail: adillon@albanypinebush.org

15205. Bried, J.T.; McIntyre, N.E.; Dzialowski, A.R.; Davis, C.A. (2015): Resident-immigrant dichotomy matters for classifying wetland site groups and metacommunities. *Freshwater Biology* 60(11): 2248-2260. (in English) ["(1.) The fact that species have resident (autochthonous) or immigrant (allochthonous) status at any given locality may have strong implications for ecological analysis. (2.) We used wetlands and adult odonates as a model system to evaluate the resident-immigrant dichotomy for two modes of community analysis: (1) grouping sites based on species compositional variation and (2) identifying metacommunity structure. We tested a hypothesis of gradient-structured (non-random) resident occurrence versus unstructured (random) immigrant occurrence in the metacommunity context and predicted the resident occurrence would more effectively partition community variation and produce stronger site groupings than total (resident + immigrant) occurrence. (3.) Site group classification after fractioning out resident occurrence consistently and in some cases dramatically outperformed total occurrence. Resident damselflies produced the strongest classifications, which we attribute to greater dispersal limitation, environmental sorting or both. (4.) As predicted only the resident occurrence led to identifiable metacommunity structures, primarily Clementsian-style

turnover. This suggests the resident occurrence is gradient-driven with species responding similarly to abiotic filters, whereas immigrant occurrence is more opportunistic and random. (5.) The resident-immigrant dichotomy appears to have strong influence on quantitative classification of sites and metacommunities, and species composition of resident adult damselflies is potentially useful for differentiating and indicating site groups of non-forested freshwater wetlands." (Authors)] Address: Bried, J.T., Department of Integrative Biology, Oklahoma State University, 501 Life Sciences West, Stillwater, OK 74078, USA. E-mail: bried@ok-state.edu

15206. Bried, T.J.; Samways, M.J. (2015): A review of odonatology in freshwater applied ecology and conservation science. *Freshwater Science* 34(3): 1023-1031. (in English) ["The academic study of dragonflies and damselflies (odonatology) is well established, but relatively limited attention has been given to odonates in the context of applied ecology and conservation science. We used the Web of Science™ and Odonatological Abstract Service (ISSN 1438-0269) to capture trends in primary literature, characterize study features (habitats, life stages, etc.), identify research themes, and suggest future directions for odonatology in freshwater applied ecology and conservation science. We found no papers in this area prior to 1980, and 411 papers from 1980 through 2013. Nearly 75% of these papers were recent (since 2005) and >40% were very recent (since 2010). We identified several broad and overlapping research themes: 1) model taxa, 2) tools and indicators, 3) odonate-centered work, and 4) methodological issues and improvements (field sampling, data modeling/simulation, conservation/landscape-scale genetics). We found more reliance on fieldbased observational approaches than experiments and model-driven exercises, although the number of papers using model-driven exercises is rapidly increasing. We found a strong focus on adult stages, odonate assemblages, the Odonata as a whole, and studies of particular species. We identified research priorities in areas such as ecological valuation and management, monitoring and assessment, climate change and landscape planning, concordance with other taxa, effects of urbanization, data modeling/simulation, and rare-species ecology and conservation. To help establish an identity and facilitate communication, we suggest naming this diverse realm "applied odonatology". We think applied odonatology has a good future for a range of topics from conservation genetics and population ecology to assessments of anthropogenic impacts and the conservation of biodiversity." (Authors)] Address: Bried, T.J., Department of Integrative Biology, Oklahoma State University, Stillwater, Oklahoma 74078 USA

15207. Brockhaus, T. (2015): Die Libellenfauna des Himalaya mit besonderer Berücksichtigung der Arten des Bergregenwaldes (Insecta: Odonata). *Hartmann & Weipert: Biodiversität und Naturlandschaft im Himalaya V. - Erfurt 2015*: 287-320. (in German, with English summary) ["The Dragonflies of the Himalayas with special emphasis on the species of mountainous rain forests (Insecta: Odonata):

The area of reference includes the North West Himalayas (India with the states of Jammu & Kashmir, Himachal Pradesh, Uttarakhand), the Central Himalayas (Nepal, India, Darjeeling in the state West Bengal and the state of Sikkim) and Eastern Himalayas (Bhutan, India, state of Arunachal Pradesh). and also the southeastern Himalayan foothills with the Indian states of Meghalaya and Nagaland. After a comprehensive review of the checklist in Brockhaus (2009) from the Himalayas and its peripheral regions 331 species of dragonflies are known. For some species are represented maps, based on my own observations and from the literature. Most species are part of the Oriental Sino-Indian faunal region. In the mountainous rain forests of the Himalayas habitat specialists of mountain streams and rivers live. They include also the endemic species in the Himalayas *Epiophlebia laidlawi*, *Davidius abberans* and *Neallogaster ornatus*. The inhabited areas differs between 400 to 4050 m above sea level. The endemic species can only above 1300 m above sea level be found. A comparison of the similarity of the faunas of the regions shows that the similarity decreases from east to west. One reason for this is the proportion of Palaearctic species in the fauna of Northwestern Himalayas. For the species of the Palaearctic respectively Holarctic region *Symplocma paedisca*, *Aeshna juncea*, *A. mixta* and *Anax parthenope* distribution maps are presented for the Himalayan area. The phylogeography and its relevance to an update of the IUCN Red List of Threatened Species are discussed. The states of the Himalayan region are worldwide exemplary in the designation of protected areas like National parks. Large protected areas are the most effective means to maintain the habitats of the treated species. Currently we still know so little about their really distribution and ecological needs." (Author)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

15208. Brockhaus, T. (2015): Funde von *Crocothemis erythraea* (Brullé, 1832) und *Orthetrum albistylum* (Selys, 1848) im Norden Polens. *Odonatrix* 11(2): 59-60. (in German, with English and Polish summaries) [5-VIII-2015; *C. erythraea*, Bialogarda (54°39'46"N, 17°37'37"E); *O. albistylum*: Jezioro Czarnogłowie (Bory Tucholskie: 53°47'39"N, 17°44'03"E)] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

15209. Brockhaus, T.; Roland, H.-J.; Benken, T.; Conze, K.-J.; Günther, A.; Leipelt, K.G.; Lohr, M.; Martens, A.; Mauersberger, R.; Ott, J.; Suhling, F.; Weihrauch, F.; Willigalla, C. (2015): Atlas der Libellen Deutschlands (Odonata). *Libellula Supplement* 14: 1-394. (in German, with English summary) ["Atlas of Odonata of Germany – For the first time, we present a complete overview about the distribution of all dragonfly species occurring in Germany. The atlas is based on a data collection compiled during 2007-2012, which was organized by the atlas-working-group of Gesellschaft deutschsprachiger Odonatologen. The database comprises more than 1.16 million point locality data sets delivered by more than 2,900 persons from all 16 federal states.

Whereas few data date back as far as the year 1800 most are more recent; most recent data are from 2011, for some species with current drastic distribution changes from 2013. While only 1 % of the records are from the first 150 years, more than 63 % are from later than 1995. Since 1995 data were recorded for 79 of the 81 species occurring in Germany, while *Coenagrion hylas* and *Onychogomphus unca* were only observed in Germany before 1995 and are now considered as extinct. The atlas comprises distribution maps for all of the 81 dragonfly species. Each map grid square represents a so called Messtischblatt (MTB) with an area of ca 130 km². For each species the distribution situation is depicted for three time periods: before 1980, 1980-1995, and after 1995. The atlas also includes species monographs where the vertical and horizontal distributions in Germany (according to the database) as well as habitat, life cycle, population trends, and threats are described. Finally, an overview about records of exotic dragonflies recorded in Germany is presented. Basing on this atlas the Red List of Odonata of Germany is presented not in this article but in this issue as well as an extensive presentation of fossil odonate records from Germany.] Address: Brockhaus, T., An der Morgensonne 5, D-09387 Jahnsdorf, Germany. E-mail: T.Brockhaus@t-online.de

15210. Brodin, T.; Piovano, S.; Fick, J.; Klaminder, J.; Heynen, M.; Jonsson, M. (2015): Ecological effects of pharmaceuticals in aquatic systems—impacts through behavioural alterations. *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 369: 20130580: 10 pp. (in English) ["The study of animal behaviour is important for both ecology and ecotoxicology, yet research in these two fields is currently developing independently. Here, we synthesize the available knowledge on drug-induced behavioural alterations in fish, discuss potential ecological consequences and report results from an experiment in which we quantify both uptake and behavioural impact of a psychiatric drug on a predatory fish (*Perca fluviatilis*) and its invertebrate prey (*Coenagrion hastulatum*). We show that perch became more active while damselfly behaviour was unaffected, illustrating that behavioural effects of pharmaceuticals can differ between species. Furthermore, we demonstrate that prey consumption can be an important exposure route as on average 46% of the pharmaceutical in ingested prey accumulated in the predator. This suggests that investigations of exposure through bioconcentration, where trophic interactions and subsequent bioaccumulation of exposed individuals are ignored, underestimate exposure. Wildlife may therefore be exposed to higher levels of behaviourally altering pharmaceuticals than predictions based on commonly used exposure assays and pharmaceutical concentrations found in environmental monitoring programmes." (Authors)] Address: Brodin, T., Dept of Ecology and Environmental Science, Umea University, 90187 Umea, Sweden. E-mail: tomas.brodin@emg.umu.se

15211. Buczek, K. (2015): Human impact on the evolution of a landslide lake. Case Study: Lake Pucółowski Stawek in the Gorce Mts. *Prace Geograficzne* 142: 41-56. (in Polish,

with English summary) ["The paper presents the results of a study of the human impact on the evolution of a landslide lake. An example of a landslide lake subjected to strong anthropogenic influence is that of the Pucółowski Stawek Lake in the Gorce Mts. Historical data analysis, interviews with local inhabitants, and several surveys of the lake area and shoreline at various moments of its history have enabled us to reconstruct the lake's evolution since the early 20th century. Research has shown that since the first field description in 1932, the lake did not become overgrown (as it is very common for this type of lake), until the late 1980s. The reason for its preservation has been human activity. The subsequent acceleration of the overgrowing of the Pucółowski Stawek Lake has been connected with the cessation of mowing, grazing and peat extraction in the lake basin. This has led to the full disappearance of this water body and the reservoir to fen type peat bog. In December 2011, the owners of the lake deepened the lake basin and removed organic sediments at the same time. This led to lake reactivation, although with a changed shoreline. The area of the lake basin decreased about 22% compared with its size in 1968. The same is true of the shoreline development factor which is now 1.08 compared with 1.23 in 1968. Dynamic plant succession has been observed since 2012 in the Pucółowski Stawek Lake, and the lake area has decreased about 27% compared with its size in 2012. The consequences of the action which led to the deepening of the lake significantly affected the fauna and flora of the reservoir, causing improvement in amphibians' habitat conditions. Human activity in this area has led to water reservoir reactivation, giving it unique landscape value as well as increasing its biodiversity by restoring adequate habitat conditions." (Authors) The publication includes a passing reference to *Leucorrhinia dubia*.] Address: Buczek, K., Uniwersytet Jagielloński, Instytut Geografii i Gospodarki Przestrzennej, Gronostajowa 7, 30-387 Kraków, Poland. E-mail: buczek@iop.krakow.pl

15212. Buczyński, P. (2015): Polish and dedicated to Poland odonatalogical papers. 13. The year 2014 and the supplement for the year 2013. *Odonatrix* 11(1): 38-42. (in Polish, with English summary) ["The author presents a list of Polish and dedicated to Poland odonatalogical papers published in the year 2014. During that time, 36 papers of various kinds were published, and one M.Sc. thesis was written. Four papers published in the year 2013 are given too." (Author)] Address: Buczyński, P., Dept of Zool., Maria Curie-Skłodowska University, Akademicka 19, PL-20-033 Lublin, Poland. E-mail: pawbucz@gmail.com

15213. Buczyński, P. (2015): Dragonflies (Odonata) of anthropogenic waters in middle-eastern Poland. Olsztyn 2015: 272 pp. (in English, with Polish summary) ["The aim of this work is an analysis of the occurrence of dragonflies (Odonata) in the anthropogenic water bodies, on example of a selected, contiguous geographic region. The author discusses data collected in middle-eastern Poland in the years of 1992–2013 (mainly 2001–2011). The research encompasses 327 anthropogenic sites and, for comparison, 630 water

bodies of natural origin. They presented a whole spectrum of essential habitats of the dragonflies in the region. 66 species of dragonflies were found: 64 in anthropogenic and 65 in natural waters. The occurrence of the species in both types of waters was analyzed, and based upon that analysis a division into 5 groups was introduced: anthropophiles of 1st degree, anthropophiles of 2nd degree, anthropotolerant species, anthropoxenes, and anthropophobes. The fauna of the dragonflies of selected types of anthropogenic waters and the most important environmental factors shaping them were discussed. The importance of anthropogenic waters for the protection of the dragonfly species, their assemblages typical of natural waters and the general richness of species were assessed. Also described were the perspectives for their active protection. The role of the anthropogenic waters in the expansion of the thermophilous species was assessed. The results collected were subject to a critical discussion in comparison to the data in literature, with special emphasis being placed on data from middle and middle-eastern Europe." (Author)] Address: Publisher: Wydawnictwo Mantis, ul. Słowicza 11, 11-041 Olsztyn, Poland. E-mail: andrzej.jadwiszczak@wydawnictwo-mantis.eu

15214. Büsse, S.; Helmker, B.; Hörschemeyer, T. (2015): The thorax morphology of *Epiophlebia* (Insecta: Odonata) nymphs – including remarks on ontogenesis and evolution. *Sci Rep.* 2015; 5: 12835: 14 pp. (in English) ["The species of *Epiophlebia* are unique among the recent Odonata in showing a mixture of morphological characters of dragonflies (Anisoptera) and damselflies (Zygoptera). The status of the four described extant species of *Epiophlebia* is disputable from a genetic as well as from a morphological point of view. Here we present an analysis of the thoracic musculature of different nymphal instars of *Epiophlebia laidlawi* and *Epiophlebia superstes* to elucidate their morphology and ontogenetic development. In total, 75 muscles have been identified in the thorax of *Epiophlebia*. This represents the highest number of thoracic muscles ever found in any odonate. It includes six muscles that are reported for the first time for Odonata, and three of these are even new for Pterygota. In total, our results indicate that *Epiophlebia* has the most ancestral thoracic morphology among Odonata." (Authors)] Address: Hörschemeyer, T., J.-F.-Blumenbach Institute for Zoology & Anthropology, Department Morphology, Systematics & Evolutionary Biology Georg-August-University Göttingen, Berliner Str. 28, 37073 Göttingen, Germany. E-mail: thoerns@gwdg.de

15215. Cabrera-Guzmán, E.; Crossland, M.R.; Shine, R. (2015): Invasive cane toads as prey for native arthropod predators in tropical Australia. *Herpetological Monographs* 29(1): 28-39. (in english) ["The successful spread of invasive Cane Toads (*Rhinella marina*) across tropical Australia has been attributed to a lack of biotic resistance, based upon the inability of most anuran-eating vertebrate predators to tolerate the powerful chemical defenses of the toads. However, despite their high species richness, invertebrates have been much less studied than vertebrates as predators of Cane Toads. Our field and laboratory studies show that

toads are killed and consumed by a phylogenetically diverse array of arthropod taxa. No arthropod predators consumed toad eggs in our laboratory experiments, but fishing spiders, water beetles, water scorpions, and dragonfly nymphs killed toad tadpoles, and ants and fishing spiders killed metamorph toads. Published accounts report predation on toads by crustaceans and hemipterans also. In our experiments, no predators showed any overt ill effects from consuming toad tissue. Dragonfly nymphs (*Pantala flavescens*) and fishing spiders (*Dolomedes facetus*) selectively took Cane Toad tadpoles at higher rates than some simultaneously offered native frog tadpoles. In combination with published data, our experiments suggest that the tadpoles and metamorphs of Cane Toads face high predation rates from the diverse and abundant invertebrate fauna of aquatic and riparian habitats in tropical Australia. The invasion of Cane Toads can potentially have positive effects on populations of many native animal species." (Authors)] Address: Cabrera-Guzmán, Elisa, School of Biological Sciences A08, University of Sydney, NSW 2006, Australia. E-mail, elicabguz@ebd.csic.es

15216. Callahan, M.S.; McPeck, M.A. (2015): Multi-locus phylogeny and divergence time estimates of *Enallagma* damselflies (Odonata: Coenagrionidae). *Molecular Phylogenetics and Evolution* 94: 182-195. (in English) ["Highlights: • *Enallagma* damselflies show complex diversification across North America and Eurasia. • Four subclades radiated in the Pleistocene to produce 28 extant species. • Both speciation and extinction rates increased over the last 1.5 million years. Abstract: Reconstructing evolutionary patterns of species and populations provides a framework for asking questions about the impacts of climate change. Here we use a multilocus dataset to estimate gene trees under maximum likelihood and Bayesian models to obtain a robust estimate of relationships for a genus of North American damselflies, *Enallagma*. Using a relaxed molecular clock, we estimate the divergence times for this group. Furthermore, to account for the fact that gene tree analyses can overestimate ages of population divergences, we use a multi-population coalescent model to gain a more accurate estimate of divergence times. We also infer diversification rates using a method that allows for variation in diversification rate through time and among lineages. Our results reveal a complex evolutionary history of *Enallagma*, in which divergence events both predate and occur during Pleistocene climate fluctuations. There is also evidence of diversification rate heterogeneity across the tree. These divergence time estimates provide a foundation for addressing the relative significance of historical climatic events in the diversification of this genus." (Authors)] Address: Callahan, Melissa, Department of Biological Sciences, Dartmouth College, 78 College Street, Hanover, NH 03755, USA. E-mail: callahan.ms@gmail.com

15217. Cao, L.; Fu, X.; Wu, K. (2015): Development of 10 microsatellite markers from *Pantala flavescens* and their applicability in studying genetics diversity. *Molecular Biology Reports* 42(8): 1275-1279. (in English) ["*P. flavescens* is

one of the most common species among migration dragonflies. It is often encountered in large swarms during migration or directed dispersal flights. For a better understanding of its gene flow, genetic structure and migration patterns throughout the world, 10 polymorphic microsatellite markers were isolated in this study. We respectively collected 32 *P. flavescens* from three places (Hunan, Liaoning and Heilongjiang) and 20 *P. flavescens* from Beijing. Partial genomic libraries containing microsatellite sequences were constructed with magnetic-bead enrichment method. By screening, sequence analysis, PCR amplification and so on, ten 10 polymorphic microsatellite markers were isolated. In order to assess their applicability, genetic diversity of these novel markers was tested in 96 individuals from three populations in China (Hunan, Liaoning and Heilongjiang). These markers were highly polymorphic, with 3–12 alleles per markers. The observed (H_o) and expected (H_e) heterozygosities ranged 0.321–0.667 and from 0.531 to 0.948 respectively. The genetic difference between Hunan and Liaoning is 0.429, while the genetic difference between Liaoning and Heilongjiang is 0.0508. These microsatellite markers for *P. flavescens* were developed for the first time, and will be a powerful tool for studying population genetic diversity and dispersal behaviour of *P. flavescens* in China and worldwide." (Authors)] Address: Cao, L., Institute of Plant Protection, Chinese Academy of Agricultural Sciences, No. 2, Yuanmingyuan West Road, Haidian District, Beijing, China. E-mail: clzclz1011@163.com

15218. Carle, F.L.; Kjer, K.M.; May, M.L. (2015): A molecular phylogeny and classification of Anisoptera (Odonata). *Arthropod systematics & phylogeny* 73(2): 281-301. (in English) ["A phylogeny of Anisoptera employing 510 representatives of 184 genera (of ca. 380) in 11 families is presented based on an analysis of over 10,000 nucleotides from portions of the large and small subunit nuclear and mitochondrial ribosomal RNA's, the mitochondrial protein coding genes COI and COII, and portions of the nuclear protein coding genes EF-1 α and Histone H3. Ribosomal sequences were structurally aligned and sequences carefully checked to eliminate alignment errors, contamination, misidentification and paralogous gene amplicons. Both the RAXML and Bayesian topology based on consolidation of data at the generic level is ((Austropetaliidae, Aeshnidae), ((Gomphidae, Petaluridae), ((Chlorogomphidae, (Neopetaliidae, Cordulegastridae))), (Synthemistidae, (Macromiidae, (Corduliidae, Libellulidae)))))). As the positions of Petaluridae, Chlorogomphidae, Neopetaliidae, and Cordulegastridae are weakly supported, possible alternative hypotheses are discussed. New taxonomic groups established include: in Gomphidae, Stylogomphini trib.n. and Davidioidini trib.n., and in Libellulidae, Dythemistinae subfam.n. including Dythemistini trib.n., Pachydiplactini trib.n. and Elgini trib.n. New taxonomic arrangements include: placement of Hemigomphini in Ictinogomphinae, and provisional expansion of Synthemistidae to include Gomphomacromiinae and a number of genera formerly placed in several small subfamilies of Corduliidae. Idomacromiinae is

placed sister to remaining Synthemistidae s.l. based on molecular analysis of *Idomacromia* Karsch and *Oxygastra* Selys. Hemicorduliidae and Macrodiplactidae are nested well within Corduliidae and Libellulidae, respectively, and therefore are not accorded family rank. Eleven monophyletic subdivisions of Libellulidae are tentatively recognized as subfamilies: Dythemistinae subfam.n.; Sympetrinae (including Leucorrhiniini and Rhythemistini); Macrodiplactinae; Brachydiplactinae; Tetrathemistinae; Trameinae; Zyxomatinae; Palpopleurinae; Diastatopidinae; Pantalinae (including Trithemistini and Onychothemistini); and Libellulinae. Zygonychini is paraphyletic to and therefore included within Onychothemistini." (Authors)] Address: Carle, F.L., Rutgers, State University of New Jersey, Department of Entomology, 96 Lipman Drive, New Brunswick, New Jersey, 18901, USA. E-mail: Carle@AESOP.Rutgers.edu

15219. Catania, S.V.L.; McCauley, S.J. (2015): Evaluating the use of coded-wire tags in individually marking Odonata larvae. *The Canadian Entomologist* 148(3): 371-374. (in English) ["We tested a potential new tool for marking Odonata larvae internally, evaluating the retention rates of injected coded-wire tags (CWT) and the effects of these tags on larval performance. Two species of dragonfly larvae (*Epitheca canis* and *Leucorrhinia intacta*) were injected with CWT. Tag loss rates were assayed over experimental periods of 22 and 60 days, respectively for the two species. To assess whether tagging had negative effects on larvae, mortality, and growth of tagged larvae were compared to untagged larvae held in the same conditions. Tag retention rates were high (92–100%) and CWT were easily retrieved from preserved larvae via dissection, permitting most tagged larvae to be individually identified. There was 100% survival in larvae injected with CWT and tags do not appear to impair growth. The high retention and retrieval rates of this marking approach combined with no increase in mortality associated with tagging suggest that CWT are a useful means of individually labelling a large number of Odonata larvae in a time-efficient manner." (Authors)] Address: Catania, S.V.L., .Dept of Biology, University of Toronto Mississauga, Mississauga, Ontario, Canada L5L 1C6

15220. Catil, J.-M. (coord.) (2015): Atlas commenté des libellules du Gers. Centre Permanent d'Initiatives pour l'Environnement Pays Gersois – L'Isle-de-Noé: 80 pp. (in French) [accessible sur www.cpie32.org.] Address: CPIE Pays Gersois, Catil, J.-M., Au Château, 32300 L'Isle-de-Noé, France. E-mail: gestion@cpie32.org

15221. Cech, M.; Cech, P. (2015): Non-fish prey in the diet of an exclusive fish-eater: the Common Kingfisher *Alcedo atthis*. *Bird Study* 62: 457-465. (in English) ["Capsule: Non-fish prey constitutes an important component of the diet of many fish-eating birds. Aims: In the present study, the role of non-fish prey in the diet of *A. atthis* was evaluated. Methods: The species and size spectrum of prey in the diet was studied at 15 nest sites on 6 trout streams, 1 river and 1 reservoir in the Czech Republic, using the analysis of the nest sediment. Results: 16 933 individual prey items were

identified (99.93% fish and 0.07% non-fish prey). ... The remains of non-fish prey were detected in only 5 of 30 nest sediments. The non-fish prey were mostly composed of large aquatic insect larvae: dragonflies *Anax* sp. and *Aeshna* sp., *Gomphus vulgatissimus* and Great Diving Beetle *Dytiscus marginalis*. Kingfishers also took Spiny-cheek Crayfish *Orconectes limosus*, Newt *Triturus* sp. and a Lizard *Lacerta* sp. The estimated sizes of the non-fish prey ranged from 30 to 90 mm. Conclusion: The catch of non-fish prey appears to be accidental, and is more likely a result of target misinterpretation (fish-like body and fish-like movement) than a Kingfisher regularly switching to prey other than fish. The unique finding of a Lizard is the first record of an amniotic vertebrate in the diet of Common Kingfisher." (Authors)] Address: Cech, M., Biology Centre of the Czech Academy of Sciences, Institute of Hydrobiol., Na Sádkách 7, 370 05 České Budejovice, Czech Republic

15222. Chama, L.; Siachoono, S. (2015): Effectiveness of birds, butterflies, dragonflies, damselflies and invertebrates as indicators of freshwater ecological integrity. *Geophysical Research Abstracts* 17, EGU2015-13383, 2015, EGU General Assembly 2015: (in English) [Verbatim: Human activities such as mining and agriculture are among the major threats to biodiversity globally. Discharges from these activities have been shown to negatively affect ecological processes, leading to ecosystem degradation and species loss across biomes. Freshwater systems have been shown to be particularly vulnerable, as discharges tend to spread rapidly here than in other ecosystems. Hence, there is need to routinely monitor the quality of these systems if impacts of discharges from human activities are to be minimised. Besides the use of conventional laboratory techniques, several studies have recently shown that organisms such as birds, butterflies, dragonflies, damselflies and invertebrates are also good indicators of ecological integrity and should therefore be used as alternatives to monitoring the quality of various ecosystems. However, most of these studies have only studied one or two of these organisms against ecosystem health, and it remains unclear whether all of them respond similarly to changes in different drivers of environmental change. We investigated the response of the diversity of birds, butterflies, dragonflies, damselflies and invertebrates to changing water quality along the Kafue River in Zambia. Sampling was done at 13 different sampling points stretching over a distance of 60km along the river. At each point, both the diversity of each organism and the water quality were assessed. Water quality was determined by testing its temperature, pH, redox, electrical conductivity, turbidity and copper parameters. We then tested how the diversity of each organism responded to changes in these water parameters. All water parameters varied significantly across sampling points. The diversity of birds and damselflies remained unaffected by any of the water parameters used. However, the diversity of butterflies reduced with increasing pH, turbidity and copper, albeit it remained unaffected by other water parameters. The diversity of dragonflies reduced with increasing redox, electrical conductivity and turbidity, but remained unaffected by other water parameters.

The diversity of invertebrates reduced with increasing redox and copper, but remained unaffected by other water parameters. Generally, these results suggest that these organisms, especially butterflies, dragonflies and invertebrates can indeed be used as indicators of changing water quality and ecological integrity in particular. However, their use is limited to specific, rather than, all water parameters. Therefore, the decision as to which organisms to use should largely depend on which water quality parameters are to be tested.] Address: Chama, L., Department of Zoology and Aquatic Sciences, School of Natural Resources, Copperbelt University, Jambo Drive, Kitwe, Zambia

15223. Chandler, H.C.; Haas, C.A.; Gorman, T.A. (2015): The effects of habitat structure on winter aquatic invertebrate and amphibian communities in pine flatwoods wetlands. *Wetlands* 35: 1201-1211. (in English) ["Natural disturbances play a critical role in structuring many ecosystems. In the southeastern United States, fire suppression and exclusion have removed the natural disturbance regime from many ecosystems, including ephemeral wetlands embedded within longleaf pine forests. We sampled aquatic invertebrate and amphibian communities in 21 pine flatwoods wetlands in northwest Florida from 2012 to 2014. Our objectives were to quantify amphibian and invertebrate community structure, identify differences in amphibian communities across an environmental gradient, and identify how invertebrate communities responded to wetland habitat characteristics. Amphibian communities were more diverse in wetlands with longer hydroperiods but were similar across wetlands with different vegetation structures. To examine the effects of wetland characteristics on aquatic invertebrate communities, we created a set of a priori models relating the abundance of isopods, chironomids, and damselflies to wetland characteristics. The best-approximating models indicated that isopods and damselflies were more abundant in wetlands that were not fire-suppressed. Similarly, total invertebrate abundance was higher in sections of wetlands with low canopy cover when compared to sections of the same wetlands with high canopy cover. Restoration of vegetation structure in wetlands that have experienced long-term fire suppression and wetlands that support longer hydroperiods should be a management priority." (Authors) Aeshnidae and Libellulidae] Address: Chandler, H., Department of Fish and Wildlife Conservation, Virginia Tech, 310 West Campus Drive, MC 0321, Blacksburg, VA 24061, USA. E-mail: houstonc@vt.edu

15224. Charjan, A.P.; Virani, R.S.; Thakare, V.G. (2015): Diversity of dragonflies (Insecta: Odonata) in some parts of Murtizapur Taluka of Akola district, Maharashtra. *Biological Forum* 7(1): 1499-1501. (in English) [19 libellulid including one gomphid Odonata species are checklisted.] Address: Charjan, A.P., Dr. R. G. Rathod Arts and Science College, Murtizapur, Akola, (MS), India

15225. Charjan, A.P. (2015): Diversity of dragonflies (Insecta: Odonata) in some parts of Murtizapur Taluka of Akola district, Maharashtra. *Biological Forum – An International*

Journal 7(1): 1499-1501. (in English) ["Diversity of adult insect Odonata in some part of Murtizapur taluka of Akola district was done for a period of near about one year. In our study 19 species of dragonflies belonging of 2 families and 12 genera were recorded. Under order Odonata and suborder Anisoptera 17 species belonging to family Libellulidae and only 1 species belonging to Gomphidae family were recorded. Odonates can help control small insects like mosquitoes and hence their conservation is of importance." (Authors)] Address: Principal, R. G. Rathod Arts and Science College, Murtizapur, District-Akola, India

15226. Chaudhry, M.T.; Mohsin, A.U.; Javed, R.A.; Zia, A.; Bodlah, I. (2015): New records of *Rhodothemis rufa* (Rambur, 1842) and *Lamelligomphus biforceps* (Selys 1878) (Odonata: Anisoptera)

15227. from Pakistan with redescription of *L. biforceps* (Selys 1878). *Iranian Journal of Science & Technology* 39A3: 305-309. (in English) ["The current status and distribution of the dragonflies (Anisoptera) of Pakistan were studied during 2005-2009. Two dragonfly species were identified for the first time from Pakistan. Among these, *Rhodothemis rufa* and *Lamelligomphus biforceps* are reported for the first time from Pakistan and re-described owing to having minor taxonomic differences from that of Fraser's description. Some notes on the colour, literature records and geographical distributions are summarized." (Authors)] Address: Chaudhry, M.T., Agricultural Training Institute, Karor, District Layyah, Pakistan. E-mail: drtariq273@yahoo.com

15228. Chauhan, A.; Verma S.C.; Thakur, M. (2015): Bio-assessment of water quality of mountainous streams under different land uses in Solan district of Himachal Pradesh, India. *International Journal of Bio-resource and Stress Management* 6(1): 161-166. (in Water quality, land uses, seasons, aquatic insects) ["Investigations were carried out in the Environmental Biology Laboratory of Department of Environmental Science, Dr Y S Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, India during 2011–2012. Aquatic insects fauna were sampled from mountainous streams of Kandaghat block situated in Solan district under different land uses (agriculture, forest and urban) seasons (rainy, winter and summer). The sampled aquatic insects were identified upto family level by using aquatic insect identification keys with help of stereoscopic binocular microscope. A total of 80 individuals m² and 59 individuals m² of aquatic insects were recorded under agriculture and urban land uses, respectively. Among all the land uses, forest land use recorded highest aquatic insects (107 m²). Maximum aquatic insects (123 m²) was during summer season with simpson's biodiversity index of 0.01, whereas agriculture land use (0.11) was highest under different land uses. Maximum diversity of insects indicated less disturbance of the streams. EPT (Ephemeroptera, Plecoptera and Coleoptera) index for agriculture, urban and forest land uses was 3.46, 3.70 and 3.56, respectively. Percentage of individuals of Trichoptera in water bodies under agriculture, Urban and Forest land use were 12.60, 10.98

and 10.16%, respectively. Hemiptera were maximum (7.31%) under forest land use and minimum in Urban land use (2.03%), whereas order Odonata were maximum under Forest land use (9.31%) followed by urban (5.69%) and agriculture land use (4.47%). This indicated that aquatic insect fauna showed variation in distribution and abundance as well as biotic indices in mountainous streams under different land uses thereby reflecting good water quality." (Authors)] Address: Chauhan, A., Dept. of Environmental Science, Dr Y S Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, 173 230, India. E-mail: aakriti.chauhan89@gmail.com

15229. Chen, M.-Y.; Chaw, S.-M.; Wang, J.-F., Villanueva, R.J., Nuñez, O.M., Lin, C.-P. (2015): Mitochondrial genome of a flashwing demoiselle, *Vestalis melania* from the Philippine Archipelago. *Mitogenome Announcement* 26(5): 720-721. (in English) ["This study determined the first complete mitochondrial genome of a demoiselle, *V. melania* using long-range PCR and a primer walking approach. This mitogenome is 16,685 bp long and contains the entire set of 37 genes and an A β T-rich control region typically found in insects. Presently, this mitogenome is the largest mitogenome of all available odonates, mainly because of its long A β T-rich region (2036 bp). The gene arrangement of the *V. melania* mitogenome is identical to that of other known odonates. The intergenic spacer s5 shared by the Anisoptera is absent in *V. melania*, which supports the view that the absence of the s5 spacer is a synapomorphy of the Zygoptera." (Authors)] Address: Lin, Chung-Ping Lin, Dept of Life Science, Tunghai University, Taichung 40704, Taiwan. E-mail: treehops@thu.edu.tw

15230. Chen, Y.H.; Skote, M. (2015): Study of lift enhancing mechanisms via comparison of two distinct flapping patterns in the dragonfly *Sympetrum flaveolum*. *Phys. Fluids* 27, 033604 (2015); <http://dx.doi.org/10.1063/1.4916204>: 24 pp. (in English) ["The computational fluid dynamic model of a live-sized dragonfly (*Sympetrum flaveolum*) hindwing is simulated according to the in-flight flapping motions measured in kinematic experiments. The flapping motion of the simulated wing is accomplished by dynamically re-gridding the wing-fluid mesh according to the established kinematic model for each flapping pattern. Comparisons between two distinct flapping patterns (double figure-eight and simple figure-eight) are studied via analysis of the aerodynamic forces and flow field structures. The result shows that additional lift is generated during supination and upstroke for the double figure-eight pattern, while maximum thrust is generated during pronation for the simple figure-eight pattern. In addition, through our comparisons of the different kinematics, we are able to reveal the mechanism behind the leading edge vortex stabilization prior to supination and the kinematic movement responsible for additional lift generation during supination. By increasing the translational deceleration during stroke-end rotations in the double figure-eight flapping pattern, a trailing edge vortex is formed which is stronger as compared to the single figure-eight flapping pattern, thus enhancing the lift." (Authors)] Address: Skote, M.,

School of Mechanical and Aerospace Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798. E-mail: mskote@ntu.edu.sg

15231. Cherry, R.; Tootoonchi, M.; Bhadha, J.; Lang, T.; Karounos, M.; Daroub, S. (2015): Effect of flood depth on Rice Water Weevil (Coleoptera: Curculionidae) populations in Florida rice fields. *Journal of Entomological Science* 50(4): 311-317. (in English) ["The rice water weevil, *Lissorhoptrus oryzophilus* Kuschel, is an important pest of rice (*Oryza sativa* L.) grown in Florida. Reports on the effect of flood depth on rice water weevil populations have been inconsistent. Our objective was to determine if flood depth has any significant effect on rice water weevil populations and other arthropods in rice grown in Florida. Sampling was conducted using adult foliar damage scars, core samples for larvae, and sweep nets for arthropods above the water. Results showed that shallow flooding reduced rice water weevil populations in Florida. Sweep net data showed that flood depth had little, if any, effect on populations of damselflies (Odonata), leafhoppers (Cicadellidae), spiders (Arachnida), or stink bugs (*Oebalus* spp.)." (Authors)] Address: Cherry, R., Everglades Research and Education Center, 3200 E. Palm Beach Rd., Belle Glade, Florida 33430 USA. E-mail: rcherry@ufl.edu

15232. Chovanec, A.; Schindler, M.; Waringer, J.; Wimmer, R. (2015): The dragonfly association index (Insecta: Odonata) - a tool for the type-specific assessment of lowland rivers. *River Research and Applications* 31(5): 627-638. (in English) ["Species traits of 57 Odonata species occurring in the Austrian bioregion Eastern Ridges and Lowlands (ecoregion Hungarian Lowlands; Illies, 1978) were defined by factor loadings of 12 habitat parameters: stream sections crenon, rhithron and potamon; flow velocity; standing water; temporary water; size of water body; open water; open banks; submerged macrophytes; reed; and riparian trees. On the basis of the species-specific configurations of these habitat parameters, cluster analysis revealed seven dragonfly associations with different habitat needs: association of open waters, association of sparsely vegetated banks, association of reed and riparian trees, association of reed and submerged macrophytes, association of temporary waters, rhithron association and potamon association. Correlations between the associations' habitat requirements and the habitat parameters of the seven (near-)natural river types, which are present in this bioregion were performed to define river type-specific association compositions. From these results, a dragonfly association index was created to assess the ecological status of these rivers within the five-tiered system of the European Union Water Framework Directive, emphasizing hydro-morphological aspects by comparing the type-specific reference situation with the actual status quo of dragonfly colonization. The method was applied at different rivers, particularly for the purpose of evaluating restoration measures." (Authors)] Address: Chovanec, A., Federal Environment Agency Vienna, Dept of Surface Waters, Spittelauer Lände 5, A-1090 Vienna, Austria. E-mail: andreas.chovanec@umweltbundesamt.at

15233. Chovanec, A.; Waringer, J.; Wimmer, R.; Schindler, M. (2015): The Dragonfly Association Index (Insecta: Odonata) - A tool for the type-specific assessment of lowland rivers. *River Research and Applications* 31(5): 627-638. (in English) ["Species traits of 57 Odonata species occurring in the Austrian bioregion Eastern Ridges and Lowlands (ecoregion Hungarian Lowlands; Illies, 1978) were defined by factor loadings of 12 habitat parameters: stream sections crenon, rhithron and potamon; flow velocity; standing water; temporary water; size of water body; open water; open banks; submerged macrophytes; reed; and riparian trees. On the basis of the species-specific configurations of these habitat parameters, cluster analysis revealed seven dragonfly associations with different habitat needs: association of open waters, association of sparsely vegetated banks, association of reed and riparian trees, association of reed and submerged macrophytes, association of temporary waters, rhithron association and potamon association. Correlations between the associations' habitat requirements and the habitat parameters of the seven (near-)natural river types, which are present in this bioregion were performed to define river type-specific association compositions. From these results, a dragonfly association index was created to assess the ecological status of these rivers within the five-tiered system of the European Union Water Framework Directive, emphasizing hydro-morphological aspects by comparing the type-specific reference situation with the actual status quo of dragonfly colonization. The method was applied at different rivers, particularly for the purpose of evaluating restoration measures." (Authors)] Address: Chovanec, A., Umweltbundesamt, Abt. Oberflächengewässer, Spittelauer Lände 5, A-1090 Wien, Austria

15234. Collins, S.D.; McIntyre, N.E. (2015): Modeling the distribution of odonates: a review. *Freshwater Science* 34(3): 1144-1158. (in English) ["Species distribution models (SDMs) can be used to answer a variety of questions about Odonata (dragonflies and damselflies) distributions because locality data for species are readily available. We provide an overview of SDMs and review 30 studies that have used SDMs to examine factors governing odonate distributions in current and projected future scenarios. These studies had objectives that included predicting the potential geographical distribution of a species based on scattered records, quantifying hotspots for biodiversity and identifying reserve gaps, assessing species' environmental requirements and limitations, quantifying dispersal abilities of species with different life histories, studying niche conservatism among sympatric species, modeling the effect of forecasted climate change on species distributions, and examining the efficacy of different modelling approaches. We point out limitations in the use of SDMs for these purposes, including effects of limited taxonomic coverage and limited spatial resolution at fine scales. We also highlight potential future areas where use of SDMs can advance our knowledge of odonate-environment interactions." (Authors)] Address: Collins, S.D., Department of Biological Sciences, Box 43131, Texas Tech University, Lubbock, Texas 79409-3131 USA. E-mail: stevendouglascollins@gmail.com

15235. Córdoba-Aguilar, A.; Vrech, D.E.; Rivas, M.; Nava-Bolaños, A.; González-Tokman, D.; González-Soriano, E. (2015): Allometry of male grasping apparatus in odonates does not suggest physical coercion of females. *Journal of Insect Behavior* 28(1): 15-25. (in English) ["Male abdominal grasping apparatus that are used to secure a female prior, during and after mating, are widespread in arthropods. The scarce evidence regarding its selective regime suggests that they are male adaptations to circumvent female mating decisions, as predicted by the sexual conflict hypothesis. A recent discussion regarding this way of selection suggests that, similar to weapons and traits that have to do with physical endurance, grasping apparatus should show hyperallometry (proportionally larger compared to body size) as an indication of selection towards increased size. We have tested this idea by measuring the length, width and area of the grasping apparatus of five dragonfly species (*Anax junius*, *Rhionaeschna multicolor*, *Dythemis nigrescens*, *D. sterilis* and *Phyllogomphoides pacificus*). We used two proxies of body size (wing and body length). Our measures did not indicate any pattern of hyperallometry. Thus, the grasping apparatus in these animals does not seem to be positively selected for increased size as would be expected if they were forcing females to mate. Given this, we discuss three other explanations for the maintenance of the grasping apparatus in odonates: 1) a firm grip that secures the tandem and mating position; 2) courtship devices subject to female choice; and, 3) isolation structures that mechanically prevent interspecific matings. The first hypothesis, however, could not explain the highly elaborated and species specific morphology of grasping apparatus in these animals. Support for the second hypothesis comes from the fact that odonate females have mechanoreceptor sensilla embedded in their mesostigmal plates (the place grabbed by the grasping apparatus). For the third hypothesis, coevolutionary patterns in morphology in the grasping apparatus and mesostigmal plates in some Zygoptera can also be used as support." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

15236. Córdoba-Aguilar, A.; Munguía-Steyer, R. (2015): To be or not to be? Mating success and survival trade offs when switching between alternative reproductive tactics. *Journal of Evolutionary Biology* 28(11): 2119-2124. (in English) ["Hormones underlie the decision of assuming a territorial or a nonterritorial role, with territorial individuals usually having higher hormonal levels than nonterritorial individuals. Since a territorial status is linked to higher mating opportunities, it is unclear why animals do not keep high hormonal levels and one explanation is that this would imply survival costs. We have tested this using males of the territorial damselfly *Argia emma* in the field. We increased juvenile hormone levels using methoprene in both territorial and nonterritorial males and predicted: a) that males will keep (the case of territorial males) or become (the case of nonterritorial males) territorial after hormonal increase, and b)

there will be an increase in mating success for nonterritorial males only and an impaired survival for both male tactics. Hormonally-treated males remained or became territorial but had their survival impaired compared to control groups. Also, hormonally-treated, ex-nonterritorial males increased their mating success compared to the other control, nonterritorial males. The reduced survival can be explained proximally by the energy devoted either to the enhanced aggression showed during territory defense or immune function (as detected previously in damselflies). Although nonterritorial males may increase their mating success by switching to a territorial tactic, they are possibly unable to do it naturally as juvenile hormone is dietary dependent and usually nonterritorial animals are in poorer condition than territorial animals." (Authors)] Address: Córdoba-Aguilar, A., Depto de Ecología Evolutiva, Instituto de Ecología, Univ. Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

15237. Corser, J.D.; White, E.L.; Schlesinger, M.D. (2015): Adult activity and temperature preference drives region-wide damselfly (Zygoptera) distributions under a warming climate. *Biology Letters* 2015 11 20150001; DOI: 10.1098/rsbl.2015.0001. Published 15 April 2015 : 5 pp. (in English) ["We analysed a recently completed statewide odonate Atlas using multivariate linear models. Within a phylogenetically explicit framework, we developed a suite of data-derived traits to assess the mechanistic distributional drivers of 59 species of damselflies in New York State (NYS). We found that length of the flight season (adult breeding activity period) mediated by thermal preference drives regional distributions at broad (105 km²) scales. Species that had longer adult flight periods, in conjunction with longer growing seasons, had significantly wider distributions. These intrinsic traits shape species' responses to changing climates and the mechanisms behind such range shifts are fitness-based metapopulation processes that adjust phenology to the prevailing habitat and climate regime through a photoperiod filter." (Authors)] Address: Jeffrey D. Corser, E-mail: jdcorser@esf.edu

15238. Courville, A. (2015): Organic carbon transport by aquatic insect emergence from permanent and temporary ponds. Departmental Honors in the Department of Environmental Sciences, Texas Christian University, Fort Worth, Texas: (in English) ["Small man-made ponds are the numerically dominant water body in the Great Plains, and they have been hypothesized to be sources of organic carbon (i.e. energy) to surrounding terrestrial food chains. Aquatic insects that live as immature forms in ponds emerge from the ponds as adults and transfer organic carbon from ponds to terrestrial ecosystems (i.e. carbon flux). Terrestrial predators such as birds and bats consume these insects. Pond permanence and the presence of fish are the primary factors controlling insect community structure and carbon flux. Permanent ponds contain fish, whose predation suppresses large aquatic insects and thereby reduces emergence and carbon flux. Temporary ponds that dry and refill

periodically do not contain fish and have larger insect species and higher levels of emergence and carbon flux. The objective of my study was to assess how the flux of carbon from a permanent pond compares to a temporary pond after refilling and to evaluate the taxa-specific carbon flux in permanent and temporary ponds. I examined insect emergence in five permanent ponds with fish and in five temporary ponds that had dried and been refilled at the Eagle Mountain Fish Hatchery in Fort Worth, TX. I monitored the emergence of insects using floating insect emergence traps over a 10-week period. I captured over 48,000 insects, which were preserved in alcohol, counted and measured for body size. Insects were dried and weighed to determine biomass and carbon flux. Carbon flux from temporary ponds started within a week of pond refilling in the form of small midges, and increased throughout the 10-week period as increasingly larger taxa such as mayflies, damselflies, and dragonflies began to emerge. I found that it took two weeks after refilling for temporary ponds to have higher carbon flux than permanent ponds." (Authors)] Address: not stated

15239. Cowan, E.M.; Cowan, P.J. (2015): Odonata (Insecta) at a wadi Pool near Nizwa, northern Oman. *Journal of Threatened Taxa* 7(9): 7538-7546. (in English) ["Fourteen damselfly and dragonfly species were recorded in 68 visits to a wadi pool in northern Oman, March 2012 to June 2014. All identifications were based on photographs. Apparently the pool has a core community of eight resident species (*Ischnura evansi*, *Pseudagrion decorum*, *Anax imperator*, *Orthetrum chrysostigma*, *O. sabina*, *Crocothemis erythraea*, *Trithemis annulata*, *T. kirbyi*). *Paragomphus sinaiticus*, globally Near Threatened, was regularly recorded." (Authors)] Address: Cowan, Elaine, School of Education, Univ. Aberdeen, Scotland, UK. E-mail: desertlarksgirl@hotmail.com

15240. Cuevas, M.D. (2015): The potential and promotion of entotourism in Gunung Ledang, Johor, Malaysia. Masters thesis, Universiti Tun Hussein Onn Malaysia: xx, 106 pp. (in English) ["This research tries to provide the scientific evidence that insect (including Odonata) tourism or entotourism has potential and is viable. This is achieved through two methods – field observation and data collection, and through questionnaire surveys on tourist perceptions on insects and entotourism. Gunung Ledang was chosen as the research site for several reasons including the easy access to tourist respondents. Surveys showed that tourists are interested in insect. Supported by field observations and data collection, insects have potential to be excellent nature tourism product. Closer examination pointed out that insect groups that are reliable and visible are ants, butterflies, termites, dragonflies, moths, beetles, cicadas and damselflies. Field trials indicated that these insects were viable attractions as they are readily visible, safe, easily recognizable, with some having linkage to local culture. Regardless of the different environmental ambience, time of observation (except early mornings) and seasons, insect were always present. The tendency is there however, that particular environment such as water body (pool/waterfall) would attract certain insects such as odonates. Further surveys on tourists'

perception indicated that they supported entotourism and were willing to participate in one. As Gunung Ledang is a national and state park under the jurisdiction of the Perbadanan Taman Negara Johor (PTNJ), their staff would likely be the candidates as entotourism operators. Thus, this research also gauged the present level of understanding and knowledge on insects by PTNJ staff, supplemented by a training course. Statistically, there is significant increase in the understanding and knowledge of insects after the training. A small booklet was developed based on collections of insects from Gunung Ledang and used during the training. Although, much of the research is about evaluating the potential and viability of insects as tourism product, to diversify tourism products, in line with the Malaysia Government's agenda, it also pointed out the need to conserve Gunung Ledang (watershed with high ecological values and with cultural heritage)." (Authors)] Address: not stated

15241. Cuevas-Yáñez, K.; Rivas, M.; Muñoz, J.; Córdoba-Aguilar, A. (2015): Conservation status assessment of *Paraphlebia* damselflies in Mexico. *Insect Conservation and Diversity* 8: 517-524. (in English) ["(1.) We assessed the conservation status of the three Mexican *Paraphlebia* damselflies based on the criterion B of the Red List of the International Union for Conservation of Nature's (IUCN): *P. hyalina*, *P. quinta*, and *P. zoe*. According to this List, *P. hyalina* has not been evaluated, *P. quinta* appears as least concern, and *P. zoe* appears as Vulnerable. Geographical records were taken from literature, enquiries to specialists and field visits. We also projected the future potential geographical range area. (2.) We generated species distribution models (SDM) for *P. quinta* and *P. zoe* (as there were not enough records for *P. hyalina*) as a surrogate of the extension of occurrence (EOO) and also calculated the area of occupancy. Future distributions were projected for years 2020, 2050, and, 2080 based on predicted changes in climatic conditions. (3.) Species distribution models predicted current EOO areas for *P. quinta* and *P. zoe* as 18 860 and 16 440 km², respectively, and around 50% of their distribution coincides with agricultural, pasture or urban sites. (4.) Our SDM results indicate that IUCN-based conservation status of the three species should be changed as follows: *P. quinta* and *P. zoe* moved to endangered category, and *P. hyalina* to data-deficient category based on the reduced EOO areas and the historical loss of habitat. (5.) For *P. quinta*, future climatic projections suggest an initial reduction (2020) followed by an expansion (2050 and 2080) in suitable areas, whereas for *P. zoe* there will be a decrease in predicted area for the three time periods. Preserving areas that provide shade, high humidity and perching sites seems to be a key for *Paraphlebia* species survival." (Authors)] Address: Córdoba-Aguilar, A., Depto de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

15242. Curry, C.J.; Baird, D.J. (2015): Habitat type and dispersal ability influence spatial structuring of larval Odonata and Trichoptera assemblages. *Freshwater Biology* 60(10):

2142-2155. (in English) ["(1.) Freshwater invertebrate assemblages are believed to be structured by both local and larger scale processes (i.e. dispersal). In rivers, the extent to which dispersal processes influence local assemblage composition may depend on both the taxon and habitat in question. Poor dispersers should display greater spatial structuring than strong dispersers. Likewise, assemblages in poorly connected habitats should experience greater dispersal limitation, and therefore greater spatial structuring. (2.) We sought to test these hypotheses using two contrasting orders of aquatic insect, Odonata and Trichoptera. Odonata are believed to have greater dispersal capacity than Trichoptera. In river ecosystems, these orders inhabit both main channel habitats and more poorly connected riverine wetlands. Multi-habitat surveys of larval Trichoptera and Odonata assemblages were conducted at 34 sites in three 5th-order New Brunswick rivers. The degree of spatial and environmental structuring in assemblages was assessed using redundancy analysis-based variance partitioning. We also assessed the performance of different model-based spatial predictors (asymmetric eigenvector maps, AEMs and principal coordinates of neighbourhood matrices, PCNMs). (3.) For main channel areas, variance explained purely by environmental variables was greater for Odonata, while the purely spatial component of variance was greater for Trichoptera, regardless of the class of spatial descriptor. In riverine wetlands, both the purely environmental and purely spatial components of variance explained were similar or were greater for Trichoptera than for Odonata. (4.) The component of variance explained by spatial variables was greater in riverine wetlands than main channel areas for both Odonata and Trichoptera for most spatial descriptors, suggesting that taxa inhabiting riverine wetlands may experience greater dispersal limitation. However, the magnitude of this difference was relatively small in most cases. Eigenvector-based spatial descriptors (PCNMs, AEMs, netPCNMs) explained more variance than traditional spatial descriptors. For Trichoptera, network-based predictors (AEMs, netPCNMs) explained more variance than PCNMs in main channel areas. (5.) Our results suggest that dispersal ability and habitat type can influence the degree of spatial structuring in aquatic insect assemblages. However, these patterns must be investigated across a wider range of insect groups and at larger spatial scales. Our results also suggest that biomonitoring programs should consider assemblage spatial structure in building reference condition models and that aquatic conservation planners must consider the type and spatial arrangement of habitats in reserve design. Eigenvector-based spatial descriptors hold promise for interpreting biodiversity patterns in freshwater invertebrates, but more work is required to relate patterns to actual dispersal behaviour." (Authors)] Address: Curry, C.J., Canadian Rivers Institute and Department of Biology, University of New Brunswick. P.O. Box 4400 Fredericton, New Brunswick, Canada E3B 5A3. E-mail: colin.curry@unb.ca

15243. David, S.; Ábelová, M. (2015): Vázky (Odonata) chrániého areálu Arboretum Mlyňany. *Folia faunistica*

Slovaca 20(2): 135-139. (in Slovakian, with English summary) ["Garden ponds are part of the area Mlynany Arboretum. In 2009 and 2011 a total of 277 specimens of dragonflies belonging to 11 species were collected in the 7 garden ponds. Four eudominant (*Ischnura elegans*, *Chalcolestes viridis*, *Sympetrum sanguineum* and *Coenagrion puella*), one dominant (*Erythromma viridulum*), four subdominant (*Somatochlora metallica*, *Anax imperator*, *Platycnemis pennipes*, *Ischnura pumilio*), one recedent (*Aeshna cyanea*) and subrecedent (*Libellula depressa*) could be distinguished. Dragonfly fauna of the studied garden ponds belong to the initial (pioneer) species colonizing the small man-made garden ponds. There were six autochthonous (*Platycnemis pennipes*, *Ischnura elegans*, *I. pumilio*, *Coenagrion puella*, *Erythromma viridulum* and *Anax imperator*) and one probably autochthonous (*Sympetrum sanguineum*) species found. All observed species we could associate with garden ponds." (Authors)] Address: David, S., ÚKE SAV, Akademická 2, SK-94901 Nitra, Slovakia. E-mail: stanislav.david@savba.sk

15244. De Knijf, G.; Demolder, H. (2015): Some dragonfly records from Albania, with *Cordulegaster heros* and *Somatochlora metallica* new for the country (Odonata: Cordulegasteridae, Corduliidae). *Libellula* 34(3/4): 181-185. (in English, with German summary) ["A total of 13 Odonata species were recorded during a short visit to Albania. Two species, *Cordulegaster heros* and *Somatochlora metallica*, are recorded for the first time for this country. One male of *C. heros* was observed on 21-vii-2015 on a small stream before ending up in the Mati River south of Klos. *Somatochlora metallica* was found on 24-vii-2015 at the glacial lake Buni Jezerce in the Prokletije Mountains in northern Albania, nearly at the border with Montenegro." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstr. 25, 1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

15245. De Knijf, G.; Maes, D.; Onkelinx, T.; De Bruyn, L.; Piesschaert, F.; Pollet, M.; Truyens, P.; Van Calster, H.; Westra, T.; Quataert, P. (2015): Monitoringsprotocol Libellen. Rapporten van het Instituut voor Natuur- en Bosonderzoek 2015. (INBO.R.2015.7886774). Instituut voor Natuur- en Bosonderzoek, Brussel: 36 pp. (in Dutch, with English summary) ["This report describes the protocol for the dragonfly monitoring network in Flanders (Belgium). We list the species that need to be monitored and the methods to do so. Three easily observed species of dragonfly (*Calopteryx virgo*, *Coenagrion pulchellum* and *Aeshna isocetes*) are counted using dragonfly-transects. We explain how the sampling frame was compiled and how we applied a GRTS sampling procedure to determine the monitoring localities in the network. All populations will be counted from the following five rare species: *Coenagrion hastulatum*, *C. lunulatum*, *Somatochlora arctica*, *Leucorrhinia pectoralis* and *Sympetrum depressiusculum*. Adults of these species will be counted around the breeding locality. The two gomphid species (*Gomphus vulgatissimus* and *G. flavipes*) will be monitored by counting the exuviae along transects by the watercourse. Per species, we give the full list of monitoring sites,

the frequency with and the period in which they need to be monitored. For the rare species and the two gomphids, we further list the localities where the species has been observed but without indications of local reproduction. Finally, we refer to the data portal in which the collected records will be stored for analysis." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

15246. De Knijf, G. (2015): *Pantala flavescens* – a new species for the fauna of Bulgaria (Odonata: Libellulidae). *Notulae odonatologicae* 8(6): 191-196. (in English) ["A male of *P. flavescens* was observed on 30 July 2012 in the Western Rhodope Mountains in the southwest of Bulgaria. This species is new for the Bulgarian fauna. The observation was made along a stream, away from suitable breeding habitat. Therefore, we consider our observation to be of a vagrant individual." (Author)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstraat 25, B-1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

15247. De Knijf, G.; Maes, D.; Onkelinx, T.; De Bruyn, L.; Piesschaert, F.; Pollet, M.; Truyens, P.; Van Calster, H.; Westra, T.; Quataert, P. (2015): Monitoringsprotocol Libellen. Rapporten van het Instituut voor Natuur- en Bosonderzoek 2015 (INBO.R.2015.7886774). Instituut voor Natuur- en Bosonderzoek, Brussel: 36 pp. (in Dutch, with English summary) ["This report describes the protocol for the dragonfly monitoring network in Flanders (Belgium). We list the species that need to be monitored and the methods to do so. Three easily observed species of dragonfly (*Calopteryx virgo*, *Coenagrion pulchellum* and *Aeshna isocetes*) are counted using dragonfly-transects. We explain how the sampling frame was compiled and how we applied a GRTS sampling procedure to determine the monitoring localities in the network. All populations will be counted from the following five rare species: *Coenagrion hastulatum*, *Coenagrion lunulatum*, *Somatochlora arctica*, *Leucorrhinia pectoralis* and *Sympetrum depressiusculum*. Adults of these species will be counted around the breeding locality. The two gomphid species (*Gomphus vulgatissimus* and *G. flavipes*) will be monitored by counting the exuviae along transects by the watercourse. Per species, we give the full list of monitoring sites, the frequency with and the period in which they need to be monitored. For the rare species and the two gomphids, we further list the localities where the species has been observed but without indications of local reproduction. Finally, we refer to the data portal in which the collected records will be stored for analysis." (Authors)] Address: Knijf, G. de, Instituut voor Natuurbehoud, Kliniekstr. 25, 1070 Brussel, Belgium. E-mail: geert.deknijf@inbo.be

15248. De Marco, P.; Corrêa Nóbrega, C.; de Souza, R.A.; Neiss, U.G. (2015): Modeling the distribution of a rare Amazonian odonate in relation to future deforestation. *Freshwater Science* 34(3): 1123-1132. (in English) ["The advance of the deforestation frontier in the Amazon forest, the largest tropical forest and one of the richest ecosystems in the world, has threatened several plant and animal species. A

lack of good biogeographical information of their distributions and a shortage of basic knowledge on their ecology hinder the proper evaluation of the vulnerability of those species. We used species distribution modelling techniques to fill these gaps and to estimate the vulnerability of a forest-dwelling odonate endemic from the Amazon, *Diastatops nigra*. We used the MaxEnt algorithm and compared the efficiency of this method in relation to the type of environmental data set (climate-only and climate+hydrographic environmental variables). We also estimated the decrease in extension of occurrence of *D. nigra* in relation to a recently developed model for future deforestation also produced with the MaxEnt approach. Predicted suitable areas were isolated patches in the central Amazon and many peripheral areas. In general, those areas had stable climates with low seasonality in rainfall. The Amazon deforestation frontier is expanding mainly from the south. The core area of *D. nigra* distribution is in the central Amazon, so in the short-term projection, the main threat for this species was not the deforestation itself. However, deforestation may extirpate some peripheral populations of this species and increase isolation among those patches of suitable areas. We suggest the use of this model for prioritizing future odonate inventories targeting the other species of the group." (Authors)] Address: De Marco, P., Laboratório de Ecologia Teórica e Síntese, Instituto de Ciências Biológicas, Universidade Federal de Goiás Goiânia, Goiás, Brazil

15249. Debecker, S.; Sommaruga, R.; Maes, T.; Stoks, R. (2015): Larval UV exposure impairs adult immune function through a trade-off with larval investment in cuticular melanin. *Functional Ecology* 29(1): 1292-1299. (in English) ["Despite the strong impact of ultraviolet (UV) radiation on invertebrates, it is unknown whether it affects immune function across metamorphosis. More generally, the mechanisms on how larval stressors bridge metamorphosis and shape adult fitness in animals with a complex life cycle remain poorly understood. We studied whether cuticular melanin content is upregulated under UV exposure in the larval stage of the damselfly *Coenagrion puella* and whether this is traded off across metamorphosis against a key component of the invertebrate immune response, the melanotic encapsulation response, in the adult stage. Larvae exposed to UV increased the melanin content in their exoskeleton and metamorphosed later and at a smaller mass than animals reared without UV. Across metamorphosis, this was associated with a reduced melanotic encapsulation response, thereby constituting the first proof for a UV driven impaired immune response in an invertebrate. The demonstrated costs of UV exposure in terms of age and mass at metamorphosis and reduced adult immune response likely translate into reduced adult fitness. Path analysis indicated that the immunosuppressive property of larval UV exposure was not mediated by age and mass at metamorphosis, but instead that the adult immune response was traded off against larval cuticular melanin investment. Melanin-based trade-off across metamorphosis provide a new pathway by which effects of larval stressors are carried over to the adult stage and thereby advances our understanding of the still

largely enigmatic mechanisms of carryover effects of larval stressors across metamorphosis. Given the mechanistic base, this carryover effect of larval UV exposure on adult immune function is expected to be general and may constitute a widespread and important cost of UV exposure in invertebrates." (Authors)] Address: Debecker, Sara, Laboratory of Aquatic Ecology, Evolution and Conservation, University of Leuven, Charles Deberiotstraat 32 bus 2439, 3000 Leuven, Belgium

15250. Denhoff, L.A. (2015): Microhabitat occupancy, distribution, and selection by *Cordulegaster diastatops* (Selys, 1854) (Odonata: Cordulegastridae) in seeps and springs of Madison County, New York. M.Sc. thesis, Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry: 67 pp. (in English) ["Suitable microhabitat availability for dragonfly larvae within a lotic environment influences the distribution and abundance of individuals, yet few studies have addressed this. The objective of this study was to determine how nine microhabitat variables influenced *Cordulegaster diastatops* occupancy within two field sites, as well as to determine if larval dragonflies have the ability to select a characteristic of their microhabitat. Microhabitat variables differed between Nelson Swamp Unique Area (NSUA) and Tioughnioga Wildlife Management Area (TWMA), as well as between occupied and unoccupied sites within NSUA only. NSUA appears to be more suitable for *C. diastatops* than TWMA. Relatively shallow water depth, low water temperature, and slow water velocity along with a substrate that larvae can burrow in are associated with larval presence. In a sediment choice experiment larvae demonstrated the ability to select a substrate type, and most larvae exhibited a preference for fine sand over mixed gravel." (Author)] Address: not stated

15251. Derso, S.; Beyene, A.; Getachew, M.; Ambelu, A. (2015): Ecological status of hot springs in eastern Amhara region: Macroinvertebrates diversity. *American Scientific Research Journal for Engineering, Technology, and Sciences* 14(2): 1-22. (in English) [Ethiopia, "Springs are the places where ground water is discharged at specific locations. They vary dramatically as to the type of water they discharge. Hot springs is having the temperature of the water lies significantly above the mean of annual air temperature of that region. Temperature is one of the most important factors that govern species abundance and distribution. The objective of this study is to examine the relationship between biological parameters (macroinvertebrate diversity) with physicochemical water and habitat quality of hot springs in Easter Amhara Region. A cross-sectional study of physical, chemical and biological components of the hot springs was carried out to assess their ecological status. Samples were collected from March to May 2013. Biological samples were collected to provide a qualitative description of the community composition at each sampling site. Water samples were collected for analysis of selected physicochemical parameters following water quality assessment protocols. A total of 1095 macroinvertebrates classified into

10 orders and 31 families of macroinvertebrates were collected from the 12 sampling sites. The most abundant orders were Diptera 49.90%, Odonata 15.53%, Coleoptera 12.97%, and Ephemeroptera 9.5% represented by 14 families. Macroinvertebrate taxa were absent at B1 and H1 sites with the temperature of 72 °C and 70 °C respectively. However, in this study, the macroinvertebrate taxa (Chironomidae and Hydrobiidae) were found within a temperature of 52 °C at S1 and H1 sites. The results are also revealed that as the temperature gradient declines, the macroinvertebrate diversity flourished. Due to this fact, both macroinvertebrate diversity and family biotic index were negatively correlated with temperature and the correlations were significant. Human disturbance and habitat conditions varied considerably among sites in the study area. Although human disturbance and water pollution are among the factors influencing ecological quality, the strong correlations between water temperature and species diversity suggest that temperature is the major environmental gradient affecting aquatic biodiversity in hot springs." (Authors)] Address: Derso, S., Environmental Health Research Team, Ethiopian Public Health Institute, P.O. Box 1242, Addis Ababa, Ethiopia. E-mail: sisayd@ephi.gov.et

15252. Dijk, B.; Laurila, A.; Orizaola, G.; Johansson, F. (2015): Is one defence enough? Disentangling the relative importance of morphological and behavioural predator-induced defences. *Behavioral Ecology and Sociobiology* 70(2): 237-246. (in English) ["Many organisms show predator-induced behavioural and morphological phenotypic plasticity. These defence mechanisms are often expressed simultaneously. To estimate the relative importance of these two defences, we conducted a laboratory experiment using tadpoles of the common frog (*Rana temporaria*) as prey and *Aeshna* dragonfly larvae as predators. We first raised tadpoles in the presence and absence of caged predators to induce differences in defensive morphology, and then conducted free ranging predator trials in environments that were either with or without the presence of predation cues to induce differences in defensive behaviour. This 2 × 2 design allowed us to separate the effects of inducible morphology from inducible behaviour. Caged predators induced deeper bodies and tailfins and reduced activity levels in tadpoles. The time to first capture was shortest in tadpoles without morphological or behavioural defences. Tadpoles with a behavioural defence had a significantly longer time to first capture. Tadpoles with only antipredator morphology tended to have a longer time to first capture as compared to those without any induced defences. This treatment also had a higher number of injured tadpoles as compared to other treatments, suggesting that inducible morphology facilitates predator escape due to the 'lure effect'. However, tadpoles with both behavioural and morphological defences did not have a longer time to first capture as compared to tadpoles with only morphological or behavioural induced defences. Our results suggest that both behavioural and morphological antipredator responses contribute to reduced capture efficiency by predators, but their simultaneous expression did not have any additive effect to the time

of first capture and survival, and that the morphology response is most effective when tadpoles are active." (Authors)] Address: Johansson, F., Dept of Ecology & Environmental Science, Animal Ecology Group, Umea Univ., 90187 Umea, Sweden. E-mail: frank.johansson @eg.umu.se

15253. Dimapinto, F.A.; Nuneza, O.M.; Villanueva, J.T. (2015): Species diversity of adult Odonata in selected areas of Lanao Del Sur, Philippines. *Journal of Biodiversity and Environmental Sciences* 7(4): 200-210. (in English) ["Field work in selected areas in Lanao del Sur was conducted to determine the Odonato fauna present in the area. Adult Odonata samples were collected using sweep netting and handpicking methods from four sampling sites. Biodiversity indices, similarity index, and canonical correspondence analysis were determined using Paleontological Statistics Software Package (PAST) version 2.17c. Twenty-one species (10 damselflies and 11 dragonflies) were documented with relatively low endemism of 42.86%. High relative abundance of 37.28% was observed in site 4. Sites 1 and 3 were observed to have high species diversity while sites 2 and 4 had moderate species diversity. There was a more or less even species distribution in the areas sampled. Dominance of *Pseudagrion pilidorsum pilidorsum* was recorded in Marawi City. Canonical correspondence analysis showed that environmental factors such as elevation, air temperature and relative humidity affect the abundance of species. It appears that human-induced activities limit the occurrence and abundance of the Odonata, especially the endemic species." (Authors)] Address: Nuñez, Olga, Department of Biological Sciences, Mindanao State University-Iligan Institute of Technology, Iligan City, Philippines. E-mail: olgamnuneza@yahoo.com

15254. Domeneghetti, D.; Mondini, S.; Carchini, G. (2015): Odonata species richness in the Castelporziano presidential estate, present and past. *Rendiconti Lincei* 26, Supplement 3: 367-377. (in English) ["The Castelporziano estate, a former game reserve along the Tyrrhenian coast near Rome, is a conserved patch of pristine woodland, in which several species of the Odonates breed in numerous small ponds and a few rivulets. The odonate species of Castelporziano have been recorded since the 1930s, with an in-depth survey carried out in 1997–1998. The present, additional survey on the odonate species of Castelporziano aims at contributing to long-term ecological research, by assessing variations in odonate fauna up to the present, and linking them to environmental changes. The presence of adult Odonata species was assessed in the field by two observers at 20 water bodies (ponds and other sites) from mid-March to early November 2012. The presence of shade, riparian and submerged vegetation, fish and the number of drying-up events during the past decade were also recorded. Results showed a small reduction in the number of odonate species for the entire estate, with several qualitative changes in comparison with previous data. On the contrary, a site-specific analysis of changes from 1997–1998 to 2012 revealed a significant considerable reduction in the average number of species. This was linked to a decrease in

riparian and submerged vegetation. Drying-up events did not appear to be a crucial factor, and fish and shade were essentially unchanged. In conclusion, the Castelporziano water environment seems to have deteriorated, probably as a consequence of the trampling by wild ungulates in woodland ponds." (Authors)] Address: Domeneghetti, D., Department of Biology, University of Rome "Tor Vergata", Via della Ricerca Scientifica, snc, 00133, Rome, Italy. E-mail: dario.eco.domeneghetti@gmail.com

15255. Dorji, T. (2015): New distribution records of *Epiphlebia laidlawi* Tillyard, 1921 (Insecta: Odonata) in Bhutan. *Journal of Threatened Taxa* 7(10): 7668-7675. (in English) ["An opportunistic survey for *E. laidlawi* larvae was carried out within five districts in Western and Central Bhutan from 2012 to 2014. The study recorded a total of 21 individuals from five districts and also recorded F0, F3 and F8 instars larvae for the first time in Bhutan. The study adds December and February as possible months to record F0 instars within its range. The record of *E. laidlawi* from Bumthang District extends its range to the eastern most part of the Himalayas, and it also extends its range from Chhukha District to its southern most range within Bhutan. A record from Punakha District fills the gap between the previous and current record of *E. laidlawi* from Wangchhu basin in Western Bhutan and Drangmechhu basin spanning central and eastern Bhutan with Punatshangchhu basin in between. The record from Trongsa District emphasises the importance of the study area as *E. laidlawi*'s habitat. The extent range of *E. laidlawi* within Bhutan is now extended to six districts, viz., Haa, Thimphu, Chhukha, Punakha, Trongsa and Bumthang." (Author)] Address: Dorji, T., College of Natural Resources, Royal University of Bhutan, Lobesa, Punakha, 14001, Bhutan. E-mail: tdorji1.cnr@rub.edu.bt

15256. Dow, R.A.; Ngiam, R.W.J. (2015): Odonata from two areas in the Upper Baram in Sarawak: Sungai Sii and Ulu Moh. *International Dragonfly Fund - Report 84*: 1-31. (in English) ["Records of Odonata from two areas in the upper Baram area in Sarawak's Miri Division are presented. 65 species are recorded from the Sungai Sii area and 63 from the Ulu Moh area. Notable records include *Telosticta ulubaram*, *Coeliccia southwelli*, *Leptogomphus* new species, *Macromia corycia* and *Tamea* cf. *virginia*. *Rhythemis regia* is recorded from Sarawak for the first time." (Authors)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow@virgin.net

15257. Drury, J.P.; Anderson, C.N.; Grether, G.F. (2015): Seasonal polyphenism in wing coloration affects species recognition in rubyspot damselflies (*Hetaerina* spp.). *Journal of Evolutionary Biology* 28(8): 1439-1452. (in English) ["Understanding how phenotypic plasticity evolves and in turn affects the course of evolution is a major challenge in modern biology. By definition, biological species are reproductively isolated, but many animals fail to distinguish between conspecifics and closely related heterospecifics. In some cases, phenotypic plasticity may interfere with spe-

cies recognition. Here, we document a seasonal polyphenism in the degree of dark wing pigmentation in smoky rubyspot damselflies (*Hetaerina titia*)—a shift so pronounced that it led early researchers to classify different forms of *H. titia* as separate species. We further show how the seasonal colour shift impacts species recognition with the sympatric congener *H. occisa*. Interspecific aggression (territorial fights) and reproductive interference (mating attempts) are much more frequent early in the year, when *H. titia* more closely resembles *H. occisa*, compared to later in the year when the dark-phase of *H. titia* predominates. Using wing colour manipulations of tethered damselflies, we show that the seasonal changes in interspecific interactions are caused not only by the seasonal colour shift but also by shifts in discriminatory behaviour in both species. We also experimentally tested and rejected the hypothesis that learning underlies the behavioural shifts in *H. occisa*. An alternative hypothesis, which remains to be tested, is that the seasonal polyphenism in *H. titia* wing coloration has resulted in the evolution of a corresponding seasonal polyphenism in species recognition in *H. occisa*. This study illustrates one of the many possible ways that plasticity in species recognition cues may influence the evolution of interspecific interactions." (Authors)] Address: Drury, J.P., Department of Ecology and Evolutionary Biology, University of California, 612 Charles E. Young Dr. S., Los Angeles, CA 90095, USA. E-mail: druryj@ucla.edu

15258. DuBois, R. (2015): Detection probabilities and sampling rates for Anisoptera exuviae along river banks: influences of bank vegetation type, prior precipitation, and exuviae size. *International Journal of Odonatology* 18(3): 205-215. (in English) ["Exuviae collections have considerable value in population studies of Odonata, but methods for standardizing collections or estimating densities and detection probabilities have been little studied. I measured sampling rates for Anisoptera exuviae and used a maximum likelihood, four-pass, depletion population estimator to standardize collections and to estimate exuvial densities and detection probabilities along 10 riverbank stations in Wisconsin. First-pass sampling rates averaged slower than the overall average for experienced collectors (0.53 m min⁻¹ compared to 0.90 m min⁻¹) because more exuviae were present on the first pass, increasing picking and handling time. Neither bank vegetation type (grassy versus forested) nor amount of prior precipitation affected sampling rate. Exuviae detection probabilities for a single pass ranged from 0.49 to 0.75, and averaged 0.64. The mean cumulative probability of detection increased to 0.87 after two passes, 0.95 after three passes, and 0.98 after four passes. A strong negative relationship existed between detectability and the amount of prior precipitation. Bank vegetation type did not affect detection probability. Smaller exuviae had an 8% lower probability of detection than larger exuviae. If four sampling passes are cost-prohibitive for some exuviae studies, making just two passes may provide an adequate estimate of sampling efficiency. The assumption that exhaustive collecting efforts will find all or most of the exuviae

along vegetated natural banks is unfounded." (Author)] Address: DuBois, R., Department of Natural Resources, Bureau of Natural Heritage Conservation, 1701 N. 4th St., Superior, WI 54880, USA

15259. DuBois, R.B.; Tennessen, K.T. (How did E. M. (2015): Walker measure the length of the labium of nymphs of *Aeshna* and *Rhionaeschna* (Odonata: Aeshnidae)?): The Great Lakes Entomologist 48(1-2). 79: 92. (in English) ["The exhaustive studies of nymphs of *Aeshna* Fabricius and *Rhionaeschna* Förster by E. M. Walker (1912-1958) have long guided the taxonomy of these groups and formed the basis for keys still in use today. However, uncertainty about how he measured the length of the labium, including the varied terminology he used over the duration of his career concerning this structure, has led to confusion about application of his taxonomic recommendations. We recalculated ratios of the maximum width/length $W(\max)/L$ by measuring the illustration dimensions of folded labia and prementums in publications throughout his career and compared these data with the ratios he stated in those publications and with ratios derived from measurements of specimens in our collections. Our results show that from 1912 to 1941, Walker restricted length measurement to the prementum proper (which he called the "mentum of the labium"), exclusive of the ventrally visible portion of the postmental hinge. However, in 1941 he reported ratios from length measurements done two ways, excluding the postmental hinge in his description of the nymph of *A. verticalis* Hagen, but including the hinge in his description of the nymph of *A. septentrionalis* Burmeister (Whitehouse 1941). In Walker's most recent and influential work (1958), he included the postmental hinge in labium length measurements of nine species, but restricted length measurements to the prementum for five others. He was consistent with the use of terms, using both "folded labium" by which he meant the prementum plus the postmental hinge, and "prementum" by which he meant only that structure. However, Walker's descriptions of the labium in his latest work are buried in long, frequently punctuated sentences that for most species include the terms "folded labium" and "prementum" in the same sentence, so careful reading is required to know which term is intended in the width/length ratio. Width/length ratios we each calculated independently were invariably similar for a given species and were usually similar to Walker's stated ratio for that species. These similarities affirm our conclusion that while labium measurements must be done with care, they are closely repeatable among workers and will consistently lead to correct determinations in properly designed couplets of dichotomous keys to these genera. We recommend measuring the length of the prementum proper in future studies of these genera when labium ratios are calculated because we found less variability in those cases than when the measurements included the postmental hinge. An approximate conversion between the two methods of calculating $W(\max)/L$ ratios can be made as follows: ratio calculated when the length of the prementum excluding the postmental hinge is used $\times 0.88$ is approximately equal to the ratio when the postmental hinge is included for

species of *Aeshna* and *Rhionaeschna* in North America." (Authors)] Address: DuBois, R., Wisconsin Department of Natural Resources, 1401 Tower Ave., Superior, WI 54880, USA. E-mail: robert.dubois@Wisconsin.gov

15260. Durand, E.; Rigaux, J. (2015): Further additions to the knowledge of the odonate fauna of Armenia, with first record of *Pantala flavescens* (Odonata: Libellulidae). *Notulae odonatologicae* 8(6): 184-190. (in English) ["As result of two targeted surveys of the Armenian odonate fauna in August 2010 and June 2014 a male *Pantala flavescens* was recorded photographically on the shore of Lake Sevan in the Gegharkunik district, representing the first record for Armenia. *Leucorrhinia pectoralis* was rediscovered at Javakheti-Shirak volcanic plateau (Armenian highland) 75 years after the species was first reported for Armenia. Data on the first evidenced reproduction of *Coenagrion armatum* were also collected." (Authors)] Address: Durand, E., Château Vilain RN7 13410 Lambesc, France. E-mail: mr.oizo3@gmx.fr

15261. Ebert, M.; Kölbl-Ebert, M.; Lane, J.A. (2015): Fauna and predator-prey relationships of Ettliling, an Actinopterygian fish-dominated Konservat-Lagerstätte from the Late Jurassic of southern Germany. *PLoS ONE* 10(1): e0116140. doi:10.1371/journal.pone.0116140: 33 pp. (in English) ["The newly recognized Konservat-Lagerstätte of Ettliling (Bavaria), field site of the Jura Museum Eichstätt (JME), is unique among Late Jurassic plattenkalk basins (Solnhofen region) in its abundant, extremely well preserved fossil vertebrates, almost exclusively fishes. We report actinopterygians (ginglymodins, pycnodontiforms, halecomorphs, aspidorynchiforms, "pholidophoriforms," teleosts); turtles; and non-vertebrates (echinoderms, arthropods, brachiopods, mollusks, jellyfish, sponges, biomats, plants) in a current faunal list. Ettliling has yielded several new fish species (*Bavarichthys incognitus*; *Orthogonikleithrus hoelli*; *Aspidorhynchus sanzenbacheri*; *Macrosemimimus fegerti*). Upper and lower Ettliling strata differ in faunal content, with the lower dominated by the small teleost *Orthogonikleithrus hoelli* (absent from the upper layers, where other prey fishes, *Leptolepides* sp. and *Tharsis* sp., occur instead). Pharyngeal and stomach contents of Ettliling fishes provide direct evidence that *Orthogonikleithrus hoelli* was a primary food source during early Ettliling times. Scarcity of ammonites and absence of vampyromorph coleoids at Ettliling differ markedly from the situation at other nearby localities in the region (e.g., Eichstätt, Painten, Schamhaupten, the Mörsheim beds), where they are more common. Although the exact biochronological age of Ettliling remains uncertain (lack of suitable index fossils), many Ettliling fishes occur in other plattenkalk basins of Germany (e.g., Kelheim) and France (Cerin) dated as Late Kimmeridgian to Early Tithonian (eigeltlingense horizon), suggesting a comparable geologic age. The Ettliling deposits represent an independent basin within the larger Upper Jurassic "Solnhofen Archipelago", a shallow subtropical sea containing scattered islands, sponge-microbial and coral reefs, sandbars, and deeper basins on a vast carbonate platform along the northern margin of the Tethys Ocean." (Authors) The paper in-

cludes a few references to Odonata.] Address: Lane, Jennifer, Div. Paleontology, American Museum of Natural History, New York, New York, USA. E-mail: jlane@amnh.org

15262. El Haissoufi, M.; De Knijf, G.; van't Bosch, J.; Benas, N.; Millán Sánchez, A. (2015): Contribution to the knowledge of the Moroccan Odonata, with first records of *Orthetrum sabina*, and an overview of first and last dates for all species. *Odonatologica* 44(3): 225-254. (in English) ["Several field surveys between 2007 and 2014 were undertaken in Morocco. Altogether 54 species were observed during our studies, representing 86 % of the odonate fauna of the country. *Orthetrum sabina* is new for Morocco, increasing the number of species to 63. The species was found at Oued Ez-Zahar near Akhfenir, about 1 700 km off its nearest known locality at Ouargla in Algeria. Two small populations of *Erythromma viridulum* were found for the first time in the Rif, bridging the gap between populations in the Middle Atlas and the Iberian Peninsula. The third observation of *Sympetrum sinaiticum* for Morocco was recorded and we were able to significantly increase the known number of localities of the threatened Moroccan endemic *Cordulegaster princeps*. We further can show that several species (e.g., *Boyeria irene*, *Pyrrhosoma nymphula*) are more widely distributed than believed and occur also at low altitudes in the country. On the other hand, *Calopteryx exul*, *Calopteryx virgo meridionalis*, *Lestes dryas*, *Coenagrion mercuriale*, *Aeshna isoceles* and *Libellula quadrimaculata* are very rare in Morocco and their populations should be monitored to assess their potential decline. Finally, for all Moroccan dragonfly species the first and last observation dates are listed. For 17 of them we provide the earliest observation date and for seven species we prolong the observation period." (Authors)] Address: El Haissoufi, M., Lab. of Ecology, Biodiversity and Environment "LEBE", Dept of Biology, Fac. Sciences, Univ. of Abdelmalek Essâadi, Tétouan, Morocco. E-mail: med.elhaissoufi@gmail.com

15263. El Haissoufi, M.; de Knijf, G.; van't Bosch, J.; Benas, N.; Sánchez, A.M. (2015): Contribution to the knowledge of the Moroccan Odonata, with first records of *Orthetrum sabina*, and an overview of first and last dates for all species. *Odonatologica* 44(3): 225-254. (in English) ["Several field surveys between 2007 and 2014 were undertaken in Morocco. Altogether 54 species were observed during our studies, representing 86 % of the odonate fauna of the country. *Orthetrum sabina* is new for Morocco, increasing the number of species to 63. The species was found at Oued Ez-Zahar near Akhfenir, about 1 700 km off its nearest known locality at Ouargla in Algeria. Two small populations of *Erythromma viridulum* were found for the first time in the Rif, bridging the gap between populations in the Middle Atlas and the Iberian Peninsula. The third observation of *Sympetrum sinaiticum* for Morocco was recorded and we were able to significantly increase the known number of localities of the threatened Moroccan endemic *Cordulegaster princeps*. We further can show that several species (e.g., *Boyeria irene*, *Pyrrhosoma nymphula*) are more

widely distributed than believed and occur also at low altitudes in the country. On the other hand, *Calopteryx exul*, *Calopteryx virgo meridionalis*, *Lestes dryas*, *Coenagrion mercuriale*, *Aeshna isoceles* and *Libellula quadrimaculata* are very rare in Morocco and their populations should be monitored to assess their potential decline. Finally, for all Moroccan dragonfly species the first and last observation dates are listed. For 17 of them we provide the earliest observation date and for seven species we prolong the observation period." (Authors)] Address: El Haissoufi, M., Laboratory of Ecology, Biodiversity and Environment "LEBE", Department of Biology, Faculty of Sciences, University of Abdelmalek Essâadi, Tétouan, Morocco. E-mail: med.elhaissoufi@gmail.com

15264. Elfaki, E.A. (2015): Investigation of Odonata diversity in different localities in Sudan. *Sudan Journal of Science* 7(2): 46-52. (in English) ["The Odonata and their habitats are a part of the world's natural heritage and this insect order encompasses, worldwide. This study aimed to survey the Odonata species in different sites in Sudan to update data of Odonata in Sudan. A total of 184 individuals were observed from April 2012 to December 2013 and nineteen species of adult Odonata were collected and classified from 6 localities: Kassala, New Halfa, Dinder National Park, El Sabaloka Game Reserve, El Musawwarat and Om Dawwanban. Family Libellulidae showed highest diversity among the other families followed by family Coenagrionidae. Furthermore *Brachythemis leucosticte*, *Pantala flavescens* and *Trithemis annulata* from family Libellulidae present in all study area. With regards *Tramea limbata* was a new country record from Om Dawwanban area." (Author)] Address: Elfaki, E.A., Dept of Zoology, Faculty of Science, Univ. of Khartoum P.O. Box 321, Postal Code 11115, Sudan. E-mail: remma94@gmail.com

15265. Endersby, I.; Fliedner, H. (2015): The naming of Australia's dragonflies. Busybird Publishing, PO Box 855, Eltham Victoria, Australia 3095: VII + 278 pp. (in English) [Review of Albert Orr [agorr@bigpond.com]: "Formal zoological nomenclature follows the binomial system of genus and species originally established by the Swedish biologist Carl Linné, or Linnaeus, in his *Systemae Naturae* of 1758. In principle any animal can be uniquely identified in this way, with the genus invariably being a noun, and the species an adjective or another noun which qualifies the genus. The language chosen for this nomenclature was Latin, at that time the universal language of science, understood by all educated people. Equally important was Classical Greek in its Latinised form. With changing educational practices, knowledge of even basic Latin has become comparatively rare, knowledge of Greek even more so, hence the scientific names of animals and plants learned by modern biology students have become totally divorced from any meaning, especially among native English speakers and speakers of non-European languages. Whereas Linnaeus' contemporaries would have recognised the gods, demi-gods and heroes of Classical mythology and literature, the modern Lep-

idopterist who cares to read Homer's *The Iliad* or *The Odyssey*, finds a *dramatis personae* consisting entirely of familiar Swallowtail and Morpho butterflies. In recent times there has been a virtual plethora of books attempting to explain the meanings of Latin and Greek-based Latin names. Many, such as *Latin for Bird Lovers* (Lederer & Burr, 2014) or *The Naming of the Shrew* (Wright, 2014), attempt to entertain as much as to instruct, producing a final result which is somewhat frothy and short on detail. Fortunately odonatologists have been rather better served by scholarly articles explaining the meanings and origins of dragonfly and damselfly scientific names (e.g. Fliedner 1997, 2006, Endersby 2012) and now these two authors have joined forces to produce 'The Naming of Australian Dragonflies'. This volume, a substantial tome of xiii +278 pages in octavo format, gives us the most comprehensive account we might wish for on the origins and meanings of every available species-group or genus-group name for Australia's dragonflies. These include not only the ca 324 accepted species names and 106 genus names, as well as species such as *Rhinocypha tinctoria* and *Neurobasis australis* which are not reliably recorded from Australia and are retained in faunal lists out of sheer obstinacy, but also all available synonyms and homonyms, of which there are more than a few. The book begins with a brief account of the history of the naming of the Australian Odonata, a brief introduction to Latin and Greek prefixes and suffixes and the declensions of the latter and a general discussion of where names come from (people, places, appearance; including colour, pattern, size etc.). There is a detailed tabular breakdown by taxon author of eponyms (named after people, real or legendary) and toponyms (named after a place). The most valuable part of this chapter is the grammatical section. With the odd lapsus (e.g. the topographic suffix, -ensis should be declined: -ensis, -ensis, -ense) this section provides an admirable introduction to the Latin grammar and Greek orthography and the rules for transliteration from Greek to Roman script that are needed to understand how names are formed and modified under gender agreement requirements. I certainly learned a great deal from reading it and while readers unfamiliar with Latin or Greek might find it heavy going, a little effort taken to master these basic rules and to learn the Greek alphabet will be repaid with interest by affording a full understanding of the detailed etymologies which come later. The next chapter provides engaging and interesting biographies of the 41 individuals who have authored or co-authored an Australian dragonfly genus or species name. These are admirable in their detail, and are generally accompanied by a thumbnail black and white portrait, allowing us to put a face to the name, and serve the very useful purpose of demystifying nomenclature. These names were bestowed by flesh and blood human beings who lived on average a respectable 71.5 ± 11 years, apart from the six who are still with us. Indeed even in cases where I have been long acquainted with the individuals concerned I learned several diverting facts. Quite a few of my own cohort can empathise directly with Günther Theischinger whose first class education led initially to employment on the railways. The next and largest

chapter deals with the individual etymologies of every available species-group or genus-group name ever given to an Australian dragonfly. It is well researched, erudite and complete. Where necessary, extracts from original descriptions in their original language are included (with English translations for non-English texts). For those of us attempting to construct generic names of odonates, this section has much information of relevance far beyond the Australian fauna. It has been a custom among odonatologists to use Greek roots when naming genera and Latin for species-group names. Generally Latin is fairly accessible using a good dictionary, but Greek is a completely different proposition. Even with the fattest Lexicon available a lot of background knowledge is needed to tease out the component roots and it is not difficult to completely misunderstand them. The etymologies in this book do the work for us. Anyone studying dragonfly nomenclature working in any region will find their knowledge vastly expanded and deepened by studying these examples. Of course as earlier authors rarely explained their sources there remain unresolved mysteries and educated guesses. Why did Fabricius write *Aeshna*, not *Aeschna* for example? The authors' explanation that this might have come from him adopting an English style of spelling is the most convincing argument I have heard yet. I was particularly taken by the conjectured meaning for *Aethriamanta* – loving the bright sky. I disagree that *Rhythymis Braganza* should be regarded as *incertae sedis* (see p. 11, 123, 268) but rather agree with Hämäläinen (2015) that it was named after a Brazilian monarch as a result of a comedy of errors. This however is the only point of difference I can find in the entire book. Some names simply defy decoding – the meanings of both generic and specific names of the common and widespread *Tholymis tillarga* remain unknown. The book includes an extensive main bibliography of 274 entries, in addition to subsidiary reference lists totalling about 150 items in earlier sections. It is rounded off by five appendices, the first three giving comprehensive statistics on authorship and details of the categorisation of names. The most valuable are Appendix four, which establishes the gender of all generic names and Appendix five which gives the rules for transliteration from Greek to the Roman alphabet. I thought I knew these rules, but in fact several important gaps in my knowledge were exposed and have now been filled. In summary, to anyone with a special interest in zoological etymology or anyone actively involved in zoological nomenclature (i.e. naming new species) I cannot recommend this book too highly. It is well researched, erudite and thorough, with a relevance well beyond Australian shores. Both authors are to be warmly congratulated for having produced such an impressive, informative and useful piece of scholarship."] Address: Endersby, I., 56 Looker Rd, Montgomery, Victoria 3094, Australia. E-mail: endersby@pacific.net.au

15266. Farkas, A.; Mero, T.O.; Mora, A. (2015): Contribution to the Odonata fauna of the Lake Velencei. *Acta Biol. Debr. Oecol. Hung.* 33: 111-123. (in Hungarian, with English summary) ["Faunistical study on odonates was carried out in the Natura 2000 area of Lake Velencei, with a main focus

on the species of community interest. In 2013 at 58 sampling sites 2270 individuals (133 larvae, 638 exuviae and 1499 adults) representing 24 species were collected or observed. The number of species per sampling site ranged from one to 15, with a mean of six species. Six species (*Anax parthenope*, *Cordulia aenea*, *Somatochlora flavomaculata*, *Libellula fulva*, *Orthetrum albistylum*, *Sympetrum fonscolombii*) were first recorded from the territory of the lake. Surprisingly, two of them (*A. parthenope*, *C. aenea*) were among the most frequent species as well. During our study one Natura 2000 species, *Leucorrhinia pectoralis* was found, which is strictly protected in Hungary. Though a low number of adults of this species were observed, the presence of a breeding population was proved by the occurrence of larvae, which were first collected from the lake. Further three species (*Aeshna isosceles*, *S. flavomaculata*, *L. fulva*) are protected in Hungary, among them *A. isosceles* was frequent. Conservation of the mosaic habitats of the Natura 2000 area is essential to preserve the populations of the protected species, especially that of *L. pectoralis*." (Authors)] Address: Farkas, Anna, Dept of Hydrobiology, Centre of Arts, Humanities and Sciences, Faculty of Science and Technology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary. E-mail: flavipes@gmail.com

15267. Ferreira, S.; Martínez-Freiría, F.; Boudot, J.-P.; El Haissoufi, M.; Bennis, N.; Alves, P.C.; Watts, P.C.; Thompson, D.J.; Brito, J.C. (2015): Local extinctions and range contraction of the endangered *Coenagrion mercuriale* in North Africa. *International Journal of Odonatology* 18(2): 137-152. (in English) ["Freshwater biodiversity is currently threatened worldwide. In North Africa, 24.4% of Odonata are regionally threatened with extinction. In this region, freshwater resources are particularly scarce and an increasing shortage of water is expected. To better understand the current threats to the endangered North African damselfly *Coenagrion mercuriale* we updated information on extinct and extant populations in North Africa and characterized these localities with regard to their topography, climate and anthropogenic use (anthrome). The *C. mercuriale* populations are being lost and this damselfly is experiencing range contraction. In Morocco nearly 45% of the populations have become extinct in recent decades and in Tunisia a single extant population remains. This species, which occupied predominantly areas of high value for human settlement, is now mainly restricted to high altitude areas. Nevertheless, the extant populations remain under threat of extinction due to increasing demand for water, changes in agricultural practices and land conversion." (Authors)] Address: Ferreira, Sónia, CIBIO/UP - Centre de Investigate em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairao, P-4485-661 Vairão, Portugal. E-mail: hiporame@gmail.com

15268. Flechoso, M.F.; Morales, J.; Lizana, M.; González, I. (2015): Taking advantage of the massive emergence of the odonate *Sympetrum flaveolum* as a trophic resource for *Zootoca vivipara*. *Bol. Asoc. Herpetol. Esp.* 26(1): 23-26. (in English) ["In the present work our observations were made

in the municipality of Cervera de Pisuerga (Palencia, North Spain) around two small ponds located in the Natural Park of Fuentes Carrionas-Fuente Cobre, (1660 masl). The UTM grid (Datum ETRS89) is 30T UN66. The habitat was a bog without medium-tall shrubs and abundant clumps of sphagnum (peat moss), grasses and *Erica tetralix*. Most specimens were found at a distance of less than 10 m from water surface. In August 2014, we observed several adult specimens of *Z. vivipara* of which at least two (a male and a female) were feeding on teneral of *S. flaveolum*. At the same time, a massive emergence of teneral resting on the surrounding vegetation was taking place. This predatory behaviour was observed over approximately 2 h. The fact that *Z. vivipara* predate on this Odonata is interesting since predation on dragonfly imagoes by this species of lizard was not previously reported." (Authors)] Address: Departamento de Biología Animal y Ecología. Universidad de Salamanca. Campus Miguel de Unamuno. 37007 Salamanca. Spain. E-mail: fabioflechoso@hotmail.com

15269. Frati, F.; Piersanti, S.; Conti, E.; Reborá, M.; Salerno, G. (2015): Scent of a dragonfly: Sex recognition in a polymorphic coenagrionid. *PLoS ONE* 10(8): e0136697. doi:10.1371/journal.pone.0136697: 14 pp. (in English) ["In polymorphic damselflies discrimination of females from males is complex owing to the presence of androchrome and gynochrome females. To date there is no evidence that damselflies use sensory modalities other than vision (and tactile stimuli) in mate searching and sex recognition. The results of the present behavioural and electrophysiological investigations on *Ischnura elegans*, a polymorphic damselfly, support our hypothesis that chemical cues could be involved in Odonata sex recognition. The bioassays demonstrate that males in laboratory prefer female to male odour, while no significant difference was present in male behaviour between stimuli from males and control. The bioassays suggest also some ability of males to distinguish between the two female morphs using chemical stimuli. The ability of male antennae to perceive odours from females has been confirmed by electrophysiological recordings. These findings are important not only to get insight into the chemical ecology of Odonata, and to shed light into the problem of olfaction in Paleoptera, but could be useful to clarify the controversial aspects of the mating behaviour of polymorphic coenagrionids. Behavioural studies in the field are necessary to investigate further these aspects." (Authors)] Address: Reborá, Manuela, Dipartimento di Biologia Cellulare e Ambientale, Università di Perugia, 06123 Perugia, Italy. E-mail: reborá@unipg.it

15270. Fredregill, C.L.; Mottl, G.C.; Dennett, J.A.; Bueno Jr., R.; Debboun, M. (2015): Efficacy of two Larvasonic™ units against *Culex* larvae and effects on common aquatic nontarget organisms in Harris County, Texas. *Journal of the American Mosquito Control Association* 31(4): 366-370. (in English) ["The Larvasonic™ Field Arm Mobile Wetlands Unit and SD-Mini were tested for efficacy against *Culex* larvae, and effects on aquatic nontarget organisms (NTO). The Field Arm provided 84.61% to 100% control of caged

Culex larvae out to 0.91-m distance in shallow ditches and 60.45% control of Culex larvae at 0.61-m without any effects to caged NTO. Slow ditch treatment achieved 77.35% control compared to fast treatment (20.42%), whereas 77.65% control was obtained along edges of a neglected swimming pool, compared to near the middle (23.97%). In bucket tests, the SD-Mini provided >97% control of Culex and 85.35% reduction of immature giant water bugs, which decreased slightly (83.45%) over the monitoring period, which was not significantly different from cannibalistic damselflies (62.80%), with reduction of both being significantly higher than other NTO tested. There was a small (0.37%) reduction of dragonflies (naiads), due to cannibalism. Both Larvasonic units could effectively augment conventional larvicide operations in smaller areas without causing resistance within mosquito populations or harming NTO when used properly." (Authors)] Address: Fredregill, C.L., Harris County Public Health & Environmental Services, Mosquito Control Division, 3330 Old Spanish Trail, Building D, Houston, TX 77021

15271. Frobel, K.; Schlumprecht, H. (2015): Untersuchungen zur Substrat- und Habitatwahl von *Cordulegaster bidentata* im Landkreis Nürnberger Land (Odonata: Cordulegasteridae). *Libellula* 34(1/2): 3-26. (in German, with English summary) ["Investigations regarding substrate and habitat choice of *Cordulegaster bidentata* in the Nürnberger Land district, Bavaria (Odonata: Cordulegasteridae) – In a survey of 486 forest streams within an area of 400 km² in the east of the rural district "Nürnberger Land", Bavaria, larvae and / or imagines of *C. bidentata* were recorded at 148 single springs. The occurrence of *C. bidentata* concentrated in the beech forests at the spring rich slopes of the Frankonian Alb ("Albtrauf") on calciferous springs in White Jurassic or in a transitional layer between White Jurassic and Dogger ("Ornatenton"). The district turned out to be one of the most important areas of *C. bidentata* within Bavaria. Semiquantitative surveys (mainly in potholes) from all springs revealed only one very large occurrence, five large occurrences, five of middle scale, and many low (n = 47) to very low (n = 55) scaled occurrences of larvae. A statistical analysis of substrate and habitat factors as well as the calculation of probability of occurrence at colonized springs reveals the relative importance of habitat factors. Thus, *C. bidentata* prefers springs with high coverage of the curled hook-moss *Palustricola commutata* or other mosses, chalky detritus (spherical chalk concretions) and deadwood. Furthermore, springs with sinter and small deadwood are preferred as well as springs with little human impact, complex spring systems with several neighbouring springs and springs with moderate flow velocity and medium flow rate. Rivulet stretches of 200 to 300 m are significantly preferred whereas stretches shorter than 50 m are avoided. Deadwood plays an essential role in larval occurrence by building stepping structures causing the formation of potholes with detritus coverage and reducing flow velocity within the rivulets. Only about half of the springs located in forests within the survey area are in semi-natural conditions. Only a very small part of the springs is located in strictly protected areas. High land use

pressure and frequent drying processes caused by climate change severely endanger near-natural springs nowadays and in the near future. Hence, it is strongly recommended to keep *C. bidentata* under its current red list status." (Authors)] Address: Frobel, F., BUND Naturschutz in Bayern e.V., Bauernfeindstr. 23, 90471 Nürnberg, Germany. E-mail: kai.frobel@bund-naturschutz.de

15272. Furness, A.N.; Soluk, D.A. (2015): The potential of diversion structures to reduce roadway mortality of the endangered Hine's emerald dragonfly (*Somatochlora hineana*). *Journal of Insect Conservation* 19(3): 449-455. (in English) ["Roadways near wetlands and ponds inflict high roadkill rates on a wide variety of taxa. For threatened or endangered species that typically do not have large adult populations, fast reproduction rates, and/or rapid recolonization rates, such mortality is likely to have significant population consequences. Thus, exploring ways to reduce roadkill rates will have considerable conservation benefits. In this study, we evaluate whether a diversion structure can be used to modify flight behaviour of the endangered *S. hineana* in ways that would reduce roadway mortality. Flight behaviour of adult *S. hineana* was observed with and without two 3 m high nets spaced at 6 and 12 m to simulate a small and a larger roadway. The netting significantly deterred ($p < 0.0001$) *S. hineana* adults from crossing the simulated roadway. Flight height was also influenced significantly ($p = 0.0025$) with flight heights over the 6 m net spacing being higher than those over the 12 m spacing. This study suggests that the use of diversion netting in areas where sensitive dragonfly species interact with motor vehicles might aid in reducing roadway mortality and might help reduce the overall impact of roadways on wetland ecosystems." (Authors)] Address: Soluk, D.A., Dept of Biology, University of South Dakota, 414 E. Clark Street, Vermillion, SD, 57069, USA. E-mail: daniel.soluk@usd.edu

15273. Gallesi, M.M.; Sacchi, R.; Hardersen, S.; (2015): Does wing shape of andromorph females of *Calopteryx splendens* (Harris, 1780) resemble that of males? *International Journal of Odonatology* 18(4): 305-315. (in English) ["Female limited polymorphism consists in the coexistence of two or more female morphs in the same population and is widespread among odonates. Generally, one female morph, the andromorph, resembles males in colour or, sometimes, also in morphology and behaviour, while one or more other morphs, gynomorphs, differ from males. This phenomenon is probably promoted by advantages to females which arise from reduced sexual harassment. Andromorph females of *C. splendens* keep wing spots, like males (although these ornaments do not match exactly male wing spot colour), while gynomorphs have hyaline wings. Males and gynomorphs show a marked sexual dimorphism in wing shape, and this determines flight patterns which differ between sexes. If andromorphs mimic male wing spots to avoid harassment, they may also benefit from mimicking the male flight morphology, and consequently the male flight pattern. In this case wing shape of andromorph and gyno-

morph females would differ, as the wing shape of andromorphs resembles that of males. In this study we compared the wing morphology of males and of the two female morphs of *C. splendens* using geometric morphometrics. Our results revealed that andromorphs and gynomorphs of this species share the same wing shape, size, and static allometry, and this suggests that flight patterns should also be shared by the two morphs. Thus, females might avoid male harassment by mimicking exclusively male wing pigmentation (male mimicry hypothesis), or confound males through an uncommon appearance (learned mate recognition hypothesis)." (Authors)] Address: Gallesi, M.M., Dipto di Scienze della Terra e dell'Ambiente, Univ. di Pavia, Pavia, Italy

15274. Gallesi, M.M.; Mobili, S.; Cigognini, R.; Hardersen, S.; Sacchi, R. (2015): Sexual dimorphism in wings and wing bands of *Sympetrum pedemontanum* (Müller in Allioni 1776). *Zoomorphology* 134(4): 531-540. (in English) [Italy "Sexual dimorphism is common in animals and derives from two mechanisms: sexual selection and sexual niche divergence. These mechanisms may work together as determinants of wing shape in pigmented wings of Odonata. On the one hand, sexual selection by females tends to enlarge the wing areas of males that host pigments; on the other hand, sex-specific flight behaviours, due to differential niche selection, may promote sexual dimorphism. Both sexes of *S. pedemontanum* have ornamented wings with bands, but their function is poorly understood. Therefore, we studied shape and size of wings and wing bands of *S. pedemontanum* using geometric morphometrics to quantify the extent of sexual dimorphism. We also investigated whether sexual dimorphism in wing shape derives from the effect of sexual selection on wing ornamentation or from sexual niche separation. We found sexual dimorphism in wing shape and in the shapes of the bands, but the absence and misdirection of sexual size dimorphism and wing shape dimorphism of bands do not support the hypothesis that wings and wing bands in *S. pedemontanum* are subjected to sexual selection. Instead, the pattern of sexual dimorphism in wing shape seems more likely to be caused by sex-specific flight requirements." (Authors)] Address: Gallesi, M.M., Dipto di Scienze della Terra e dell'Ambiente, Univ. di Pavia, Taramelli 24, 27100 Pavia, Italy. E-mail: marco.gallesi@unipv.it

15275. Ganguly, P.; Datta, D. (2015): Notes on a dragonfly (Insects) killing plant, *Plumbago zeylanica*. *Journal of Environment and Sociobiology* 12(2): 231-232. (in English) ["On the occasion of a field study on dragonflies, near and around Rahara, Kolkata, we came across a peculiar plant species, commonly known as Ceylon leadwort, doctorbush or wild leadwort (*Plumbago zeylanica*) which was found to be responsible for the death of numerous dragonflies." (Authors)] Address: Ganguly, P., Ramakrishna Mission Vivekananda Centenary College, Department of Zoology, Kolkata, 700 118, India

15276. Garrison, R.W.; Cordero-Rivera, A.; Zhang, H. (2015): Odonata collected in Hainan and Guangdong Provinces, China in 2014. *Faunistic Studies in Southeast Asian*

and Pacific Island Odonata 12: 1-62. (in English) ["A three week trip to Hainan and Guangdong provinces was conducted between 26 May and 11 June 2014, sampling odonates within the vicinity of Diaoluoshan National Nature Reserve, Shuimanxing Village (both Hainan Province) and Nankunshan Nature Reserve (Guangdong Province). Additionally, Cordero and Zhang collected at Shuimanxing Village between 13 and 23 June. A total of 103 species in 78 genera were found for Hainan Province and 51 species in 42 genera in Guangdong Province. Lists of all species by locality, photographs of live specimens, are presented to facilitate identification to other collectors." (Authors)] Address: Garrison, R.W., Plant Pest Diagnostics Branch, California Dept Food & Agriculture, 3294 Meadowview Rd, Sacramento, CA95832-1448, USA. E-mail: rgarrison@cdfa.ca.gov

15277. Garrouste, R.; Nel, A. (2015): New Eocene damselflies and first Cenozoic damsel-dragonfly of the isophlebiopteran lineage (Insecta: Odonata). *Zootaxa* 4028(3): 354-366. (in English) ["The study of a new specimen of *Petrolestes hendersoni* from the Eocene Green Formation allows a more precise description of the enigmatic damselfly and the diagnosis of the *Petrolestini*. *Petrolestes messelensis* sp. nov. is described from the Eocene Messel Formation in Germany, extending the distribution of the *Petrolestini* to the European Eocene. The new damsel-dragonfly family *Pseudostenolestidae* is described for the new genus and species *Pseudostenolestes bechlyi*, from the Eocene Messel Formation. It is the first Cenozoic representative of the Mesozoic clade *Isophlebioptera*." (Authors)] Address: Garrouste, R., Institut de Systématique, Évolution, Biodiversité, ISYEB - UMR 7205 – CNRS, MNHN, UPMC, EPHE, Muséum national d'Histoire naturelle, Sorbonne Universités, 57 rue Cuvier, CP 50, Entomologie, F-75005, Paris, France. E-mail: garroust@mnhn.fr

15278. Gassmann, D. (2015): Libellen und Vulkane - entomologische Forschungen in Papua-Neuguinea. *Koenigiana* 9(1): 43-54. (in German) [Narrative on a study of Odonata in Papua-New Guinea] Address: Gassmann, D., Zoologisches Forschungsmuseum Alexander Koenig, Arachnida Section, Adenauerallee 160, 53113 Bonn, Germany. E-mail: d.gassmann@zfmk.de

15279. Gazzola, A.; Brandalise, F.; Rubolini, D.; Rossi, P.; Galeotti, P. (2015): Fear is the mother of invention: anuran embryos exposed to predator cues alter life-history traits, post-hatching behaviour, and neuronal activity patterns. *Journal of Experimental Biology* 218: 3919-3930. (in English) ["Neurophysiological modifications associated to phenotypic plasticity in response to predators are largely unexplored, and there is a gap of knowledge on how the information encoded in predator cues is processed by prey sensory systems. To explore these issues, we exposed *Rana dalmatina* embryos to dragonfly chemical cues (kairomones) up to hatching. At different times after hatching (up to 40 days), we recorded morphology and antipredator behaviour of control and embryonic-treated tadpoles as well as their neural olfactory responses, by recording the activity

of their mitral neurons before and after exposure to a kairomone solution. Embryonic-treated embryos hatched later and originated smaller hatchlings than control siblings. In addition, embryonic-treated tadpoles showed a stronger antipredator response than controls at 10 (but not at 30) days post-hatching, though the intensity of the contextual response to the kairomone stimulus did not differ between the two groups. Baseline neuronal activity at 30 days post-hatching, as assessed by the frequency of spontaneous excitatory postsynaptic events and by the firing rate of mitral cells, was higher among embryonic-treated tadpoles compared to controls. At the same time, neuronal activity showed a stronger increase among embryonic-treated tadpoles than among controls after a local kairomone perfusion. Hence, a different contextual plasticity between treatments at the neuronal level was not mirrored by the antipredator behavioural response. In conclusion, our experiments demonstrate ontogenetic plasticity in tadpole neuronal activity after embryonic exposure to predator cues, corroborating the evidence that early-life experience can contribute to shaping the phenotype at later life stages." (Authors)] Address: Gazzola, A., Laboratorio di Eco-Etologia, Dip. di Scienze della Terra e dell'Ambiente, Via Ferrata 9, 27100 Pavia, Italy. E-mail: galeozot@unipv.it

15280. Geisinger, C.; Koch, K. (2015): Vergleich der Libellenfauna (Odonata) im Naturschutzgebiet Laubenheimer-Bodenheimer Ried in Mainz von 2006 bis 2014. *Mainzer naturwissenschaftliches Archiv* 52: 167-177. (in German, with English summary) [Rheinland-Pfalz, Germany "The odonate fauna in Mainz has been well studied in recent years. Particularly the nature reserve Laubenheimer-Bodenheimer Ried has turned out to have the highest species number. In 2007 and 2010 two new waters were created in the nature reserve area. The dragonfly fauna of these two waters has been mapped extensively in 2011 and 2014. In this study the current species composition of the area was compared with older data of the area (2006-2007, 2008-2013). The new natural protective waters appear to be the preferred emergence habitats for Odonata. In 2014 98.3% of all damselfly exuviae and 92.6% of all dragonfly exuviae were found at the new waters. At the older and well structured clay mining waters relatively few exuviae were found." (Authors)] Address: Geisinger, Christina, Berliner Str. 27, 55131 Mainz, Germany. E-Mail: ChrGeisinger@aol.com

15281. Gober, C. (2015): Dragonfly succession in ponds following disturbance by drying and refilling. Departmental Honors in the Department of Environmental Sciences, Texas Christian University, Fort Worth, Texas: (in English) ["Disturbance is an environmental factor that determines ecological community structure. For insect communities in small ponds, the primary disturbance factor is pond drying. Larval insects cannot survive pond drying, but they recolonize ponds after ponds refill. Little is known about dragonfly recolonization rates once ponds refill after a drying event. The purpose of this study was to determine recolonization rates for two dragonfly families after pond refilling. Over the summer of 2014, 10 experimental ponds were studied at

the Eagle Mountain Hatchery in Fort Worth, Texas. Five of the 10 experimental ponds were drained and dried for one month to simulate a natural drying disturbance. The other five ponds were not dried and contained fish. Dip net samples were collected every one to two weeks over a 10-week period. The dragonflies from each sample were identified and counted in order to track temporal changes within the dragonfly community. This study suggests that there are significant differences in recolonization rates for different families of dragonflies." (Author)] Address: not stated

15282. Grether, G.F.; Drury, J.P.; Berlin, E.; Anderson, C.N. (2015): The role of wing coloration in sex recognition and competitor recognition in rubyspot damselflies (*Hetaerina* spp.). *Ethology* 121(7): 674-685. (in English) ["The decision rules that animals use for distinguishing between conspecifics of different age and sex classes are relevant for understanding how closely related species interact in sympatry. In rubyspot damselflies (*Hetaerina* spp.), the red wing coloration of mature males is hypothesized to be a key trait for sex recognition and competitor recognition within species and the proximate trigger for interspecific male-male aggression. We tested this hypothesis by manipulating the wing coloration of tethered conspecific intruders and measuring the responses of territory holders of three species in the field. As predicted, covering the red spots of mature males with black ink nearly eliminated territorial responses, and in some cases, territorial holders clasped the blackened males as if they were females. Adding red spots to female wings triggered territorial responses and nearly eliminated sexual responses. Immature males with artificial red spots were attacked at the same rate as mature male intruders, and much more frequently than were immature male controls. The results varied somewhat by species. In *H. titia*, the only species of *Hetaerina* with substantial black wing pigmentation, the effects of blackening the red spots of intruders varied both geographically and seasonally. But even when blackening the red spots of male intruders did not reduce the aggressive response of *H. titia* territory holders, adding artificial red spots to female wings elicited aggressive responses and nearly eliminated sexual responses. The results of this study further strengthen the evidence that interspecific aggression in *Hetaerina* results from overlap in territorial signals and that the derived black wing pigmentation of *H. titia* reduces interspecific aggression." (Authors)] Address: Grether, G.F., Department of Ecology and Evolutionary Biology, 621 Charles E. Young Drive South, University of California, Los Angeles, CA 90095-1606, USA. E-mail: ggrether@ucla.edu

15283. Grutters, B.M.C.; Pollux, B.J.A.; Verberk, W.C.E.P.; Bakker, E.S. (2015): Native and non-native plants provide similar refuge to invertebrate prey, but less than artificial plants. *PLoS ONE* 10(4): e0124455. doi:10.1371/journal.pone.0124455: 18 pp. (in English) ["Non-native species introductions are widespread and can affect ecosystem functioning by altering the structure of food webs. Invading plants often modify habitat structure, which may affect the suitability of vegetation as refuge and could thus impact

predator-prey dynamics. Yet little is known about how the replacement of native by non-native vegetation affects predator-prey dynamics. We hypothesize that plant refuge provisioning depends on (1) the plant's native status, (2) plant structural complexity and morphology, (3) predator identity, and (4) prey identity, as well as that (5) structurally similar living and artificial plants provide similar refuge. We used aquatic communities as a model system and compared the refuge provided by plants to macroinvertebrates (*Daphnia pulex*, *Gammarus pulex* and damselfly larvae) in three short-term laboratory predation experiments. Plant refuge provisioning differed between plant species, but was generally similar for native (*Myriophyllum spicatum*, *Ceratophyllum demersum*, *Potamogeton perfoliatus*) and non-native plants (*Vallisneria spiralis*, *Myriophyllum heterophyllum*, *Cabomba caroliniana*). However, plant refuge provisioning to macroinvertebrate prey depended primarily on predator (mirror carp: *Cyprinus carpio carpio* and dragonfly larvae: *Anax imperator*) and prey identity, while the effects of plant structural complexity were only minor. Contrary to living plants, artificial plant analogues did improve prey survival, particularly with increasing structural complexity and shoot density. As such, plant rigidity, which was high for artificial plants and one of the living plant species evaluated in this study (*Ceratophyllum demersum*), may interact with structural complexity to play a key role in refuge provisioning to specific prey (*Gammarus pulex*). Our results demonstrate that replacement of native by structurally similar non-native vegetation is unlikely to greatly affect predator-prey dynamics. We propose that modification of predator-prey interactions through plant invasions only occurs when invading plants radically differ in growth form, density and rigidity compared to native plants." (Authors)] Address: Grutters, B., Department of Aquatic Ecology, Netherlands Institute of Ecology (NIOO-KNAW), Wageningen, The Netherlands. E-mail: b.grutters@nioo.knaw.nl

15284. Guillermo-Ferreira, R.; Bispo, P.C.; Appel, E.; Kovalev, A.; Gorb, S.N. (2015): Mechanism of the wing colouration in the dragonfly *Zenithoptera lanei* (Odonata: Libellulidae) and its role in intraspecific communication. *Journal of Insect Physiology* 81: 129-136. (in English) ["Highlights: • We studied the morphological mechanisms of colouration in a libellulid dragonfly. • Wax crystals form a composite structure that enhances colour. • Multi-layered structure of the pigmented cuticle results in iridescence. • Resulting colour is a cue for rival recognition in territorial fights. • Wax and pigment may impose physiological costs and be condition dependent. Abstract: Zenithoptera dragonflies are known for their remarkable bluish colouration on their wings and unique male behaviour of folding and unfolding their wings while perching. However, nothing is known about the optical properties of such colouration and its structural and functional background. In this paper, we aimed to study the relationship between the wing membrane ultrastructure, surface microstructure and colour spectra of male wings in *Zenithoptera lanei* and test the hypothesis that colouration functions as a signal in territorial fights between males. The results show that the specific wing colouration derives from

interference in alternating layers of melanized and un-melanized cuticle in the wing membrane, combined with diffuse scattering in two different layers of wax crystals on the dorsal wing surface, one lower layer of long filaments, and one upper layer of leaf-shaped crystals. The results also show that the thicker wax coverage of the dorsal surface of the wings results in increased brightness and reduced chroma. In the field experiments, we have demonstrated that there is a reduction of aggressive reactions of rivals towards individuals with experimentally reduced amount of blue wing colouration." (Authors)] Address: Guillermo-Ferreira, R., Department of Hydrobiology, Federal University of São Carlos, Rod. Washington Luis, km 235, São Carlos, São Paulo, Brazil. E-mail: rhainerguillermo@gmail.com

15285. Gutiérrez, Y.; Freitas, H.L.; Oliveira, E.E. (2015): *Acanthagrion viridescens* (Odonata: Coenagrionidae): description of the final larval stadium and biological notes. *Zootaxa* 4057(1): 125-134. (in English) ["The development of the nymphal stages of *A. viridescens* Leonard was examined under laboratory conditions. Based on specimens collected in Minas Gerais state (Brazilian Southeastern Region), we described and illustrated the last instar nymph and illustrated the egg and other nymphal stages. The nymphs of *A. viridescens* went through 11 instars, each of them with an average duration of approximately 13 days. The combinations of the following characteristics distinguish the last instar nymph of *A. viridescens* from congeners: prementum with 2+1 setae in each side; labial palp with six apical denticles; mandibular formula L 1+2 3 4 5 y a, R 1+2 3 4 5 y- a b; presence of trifold spine in the ventral distal region of the tibia and in the tarsi; format of the male and female gonapophyses; and the distinctive pattern of the tracheae in the caudal gills. This also represents the first record of this species from southeastern Brazil." (Authors)] Address: Gutiérrez, Y., Depto de Entomologia, Univ. Federal de Viçosa, MG, Brasil. E-mail: gutierrez.yeisson@gmail.com

15286. Gvoždík, L.; Smolinský, R. (2015): Body size, swimming speed, or thermal sensitivity? Predator-imposed selection on amphibian larvae. *BMC Evolutionary Biology* 2015, 15:238 doi:10.1186/s12862-015-0522-y: 9 pp. (in English) ["Background: Many animals rely on their escape performance during predator encounters. Because of its dependence on body size and temperature, escape velocity is fully characterized by three measures, absolute value, size-corrected value, and its response to temperature (thermal sensitivity). The primary target of the selection imposed by predators is poorly understood. We examined predator (dragonfly larva [*Aeshna cyanea*])-imposed selection on prey (newt larvae) body size and characteristics of escape velocity using replicated and controlled predation experiments under seminatural conditions. Specifically, because these species experience a wide range of temperatures throughout their larval phases, we predict that larvae achieving high swimming velocities across temperatures will have a selective advantage over more thermally sensitive individuals. Results: Nonzero selection differentials indicated that predators selected for prey body size and both

absolute and size-corrected maximum swimming velocity. Comparison of selection differentials with control confirmed selection only on body size, i.e., dragonfly larvae preferably preyed on small newt larvae. Maximum swimming velocity and its thermal sensitivity showed low group repeatability, which contributed to non-detectable selection on both characteristics of escape performance. Conclusions: In the newt-dragonfly larvae interaction, body size plays a more important role than maximum values and thermal sensitivity of swimming velocity during predator escape. This corroborates the general importance of body size in predator-prey interactions. The absence of an appropriate control in predation experiments may lead to potentially misleading conclusions about the primary target of predator-imposed selection. Insights from predation experiments contribute to our understanding of the link between performance and fitness, and further improve mechanistic models of predator-prey interactions and food web dynamics." (Authors) The electronic version of this article is the complete one and can be found online at: <http://www.biomedcentral.com/1471-2148/15/238> Address: Gvoždík, L., Institute of Vertebrate Biology AS CR, Kvetná 8, Brno, 60365, Czech Republic. E-mail: gvozdik@brno.cas.cz

15287. Hämäläinen, M. (2015): Who were they? Authors of the scientific names of Finnish dragonflies and persons immortalized in these names. *Crenata* 8: 18-37. (in Finnish, with English summary) ["Including migrants and occasional vagrants, a total of 62 species of dragonflies have thus far been recorded in Finland. In total 24 authors were involved in the naming of these 62 species, namely: Friedrich Brauer, Hermann Burmeister, Toussaint de Charpentier, Edward Donovan, Eduard Eversmann, J.C. Fabricius, A.F. de Fourcroy, H.A. Hagen, J.A.W. Hansemann, Moses Harris, W.F. Kirby, P.A. Latreille, W.E. Leach, Carolus Linnaeus, O.F. Müller, P.S. Pallas, Edmond de Selys Longchamps, Hans Strøm, J.H. Sulzer, Filip Trybom, P.L. Vander Linden, Edmund M. Walker, H.D.J. Wallengren and J.W. Zetterstedt. Among the species epithets used there are three eponyms honouring Thomas Bolton, C.H. Johanson and John Sahlberg, respectively. For each of these 27 individuals a separate brief biography is presented with special emphasis on their odonatological activities. In addition 6 other authors of subspecies or genus names and one person on whose name an eponymous subspecies name was based are briefly listed. The article includes portraits of some of the above individuals and dragonfly illustrations extracted from old books and other sources." (Autor)] Address: Hämäläinen, M., Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: libellago@gmail.com

15288. Hämäläinen, M.; Kompier, T. (2015): *Bayadera hatvan* sp. nov. from northern Vietnam (Odonata: Euphaeidae). *Tombo*, 57: 15-19. (in English) ["*Bayadera hatvan* sp. nov. (holotype male from Vietnam, Yen Bai province) is described and illustrated for both sexes. A comparison with the superficially similar *B. indica* (Selys, 1853) is provided. This brings the total number of species known in the genus to 17." (Authors)] Address: Kompier, T., Schoutenstraat 69,

2596 SK, Den Haag, the Netherlands. Email: kompiertokyo@yahoo.com

15289. Hämäläinen, M.; Dow, R.; Stokvis, F.R. (2015): Revision of the Sundaland species of the genus *Dysphaea* Selys, 1853 using molecular and morphological methods, with notes on allied species (Odonata: Euphaeidae). *Zootaxa* 3949(4): 451-490. (in English) ["The Sundaland species of the genus *Dysphaea* were studied using molecular and morphological methods. Four species are recognized: *D. dimidiata* Selys, *D. lugens* Selys, *D. ulu* spec. nov. (holotype male, from Borneo, Sarawak, Miri division, Upper Baram, Sungai Pejelai, Ulu Moh, 24 viii 2014; deposited in RMNH) and *D. vanida* spec. nov. (holotype male, from Thailand, Ranong province, Khlong Nakha, Khlong Bang Man, 12.13 v 1999; deposited in RMNH). The four species are described and illustrated for both sexes, with keys provided. The type specimens of the four *Dysphaea* taxa named by E. de Selys Longchamps, i.e. *dimidiata*, *limbata*, *semilimbata* and *lugens*, were studied and their taxonomic status is discussed. Lectotypes are designated for *D. dimidiata* and *D. limbata*. *D. dimidiata* is recorded from Palawan (the Philippines) for the first time. A molecular analysis using three markers (COI, 16S and 28S) is presented. This includes specimens of three Sundaland species of the genus (*D. lugens* missing) and two congeners from other regions (*D. basitincta* and *D. gloriosa*). Notes and photographs of the male holotype of *D. walli* Fraser (from Maymyo, Burma) are provided." (Authors)] Address: Hämäläinen, M., Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: Libellago@gmail.com

15290. Halali, S.; Halali, D.; Rangnekar, P. (2015): Range extension of *Microgomphus souteri* Fraser, 1924 (Insecta: Odonata: Gomphidae) to northern Western Ghats, India. *Journal of Threatened Taxa* 7(8): 7480-7483. (in English) ["During opportunistic surveys conducted at Collem (Goa), a specimen of male *M. souteri* was collected on 14th September 2013. Another male specimen was collected on 28th June 2014. *M. souteri* is recorded for the first time in northern Western Ghats and is a new record for Goa. Type specimen was described from Coorg (Karnataka) and was later recorded from Kerala. The discovery of this species in Goa has expanded its range to the north of the Western Ghats. With this discovery currently 88 species of Odonata are now known from the state.] Address: Halali, S., Dept of Zoology and Wildlife Biology, A.V.C College (Autonomous), Mannampandal, Mayiladuthurai, Tamil Nadu 609305, India. E-mail: sridharhalali@gmail.com

15291. Hamzaoui, D.; Hafiane, M.; Mebarki, M.; Arab, A.; Alfarhan, A.H.; Samraoui, B. (2015): The Gomphidae of Algeria and the Maghreb: status, ecology and conservation (Insecta: Odonata). *International Journal of Odonatology* 18(3): 175-191. (in English) ["A survey of the Gomphidae of Algeria and the Maghreb was carried out during the period 2013–2014. Sampling of eight main wadis across northern Algeria was undertaken and adults and exuviae were recorded. The survey yielded six species of Gomphidae.

Among these, we report on the rediscovery of the Critically Endangered *Lindenia tetraphylla* in Algeria, recorded in the nineteenth century and deemed to have been extinct after an absence of more than a century and a half. An exuvia was collected at Wadi Saoura, which constitutes the first proof of the breeding of this species in Algeria and the third record for North Africa. We also recorded a pale form of *Onychogomphus uncutus*, morphologically distinct from typical Moroccan and European phenotypes, suggesting some degree of subspeciation and inviting further taxonomical investigations of the genus *Onychogomphus* in North Africa. Due to increasing water demand, Gomphidae and their habitats are under great pressure in the Maghreb. Specific threats and conservation measures are discussed." (Authors)] Address: Samraoui, B., Laboratoire de Recherche des Zones Humides, Université d'Annaba, 4 rue Hassi-Beida, Annaba, Algeria. E-mail: bsamraoui@yahoo.fr

15292. Harabis, F.; Dolny, A. (2015): Odonates need natural disturbances: how human-induced dynamics affect the diversity of dragonfly assemblages. *Freshwater Science* 34(3): 1050-1057. (in English) ["The still-growing effect of human activities on aquatic habitats has led to proportionately increasing need for restoration activities. Paradoxically, restoration actions can constitute a major threat to freshwater assemblages if they do not respect the specific nature of the target biotopes. We investigated the dynamics of dragonfly assemblages in 20 mine-subsidence pools (habitats with very high and very unpredictable dynamics). We used multivariate methods and diversity indices to compare species richness and species composition of assemblages before and after reclamation actions. During the 10 y of the study, we recorded 10 cases in which aquatic habitats disappeared completely and 6 cases of recovery and successful recolonization of aquatic pools. Disturbances caused by reclamation actions led to significant reduction of diversity and to extirpation of sensitive dragonfly species. Moreover, unlike natural disturbances, disturbances caused by reclamation activity do not support the occurrence of species associated with early successional stages. Major interventions in freshwater habitats can cause alterations that often paradoxically may result in local extinction of sensitive species rather than strengthening of existing populations." (Authors)] Address: Harabiš, F., Dept of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com

15293. Harabis, F.; Dolny, A.; Helebrandova, J.; Ruskova, T. (2015): Do egg parasitoids increase the tendency of *Lestes sponsa* (Odonata: Lestidae) to oviposit underwater? *Eur. J. Entomol.* 112(1): 63-68. (in English) ["The selection of oviposition sites by insects can significantly affect egg mortality. Spreadwing damselflies (Odonata: Lestidae) predominantly lay their eggs in parts of plants growing above the surface of water and only occasionally also those parts growing underwater. Factors affecting the choice of oviposition site and decision to lay underwater are still poorly understood. We examined whether localities with different risk

of egg parasitism, different oviposition strategies (above or below the water surface) and the depth at which the eggs were laid, affected the total number of eggs laid, the proportion parasitized and egg mortality. In general, a significantly higher proportion of the eggs laid above the surface of water were parasitized but spreadwing damselflies showed significant preference for laying eggs underwater at both of the sites studied. This preference, however, had a different effect on the overall mortality of eggs at the two sites studied. Hence underwater oviposition by damselflies may be seen as a conditional anti-predator strategy, occurring only if the benefits exceed potential risks. Underwater oviposition may provide additional benefits other than protection against egg parasitism." (Authors)] Address: Harabis, F., Dept of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com

15294. Harinath, P.; Suryanarayana, K.; Venkata Ramana, S.P. (2015): Diversity and abundance of odonates (dragonflies & damselflies) at Sri Lankamalleswara reserve forest in the Eastern Ghats of southern Andhra Pradesh. *Species* 12(34): 52-66. (in English) [A total number of 33 species of Odonates were recorded from the study area during March 2013 to August 2014.] Address: Harinath, P., Research Scholar, Department of Zoology - School of life Sciences - Yogi Vemana University Kadapa – 516 003 - Andhra Pradesh, India. E-mail: haributterfly.yvu@gmail.com

15295. Hassall, C. (2015): Strong longitudinal variation in wing aspect ratio of a damselfly, *Calopteryx maculata* (Odonata: Zygoptera). *PeerJ* 3:e1219; DOI 10.7717/peerj.1219: 17 pp. (in English) ["Geographical patterns in body size have been described across a wide range of species, leading to the development of a series of fundamental biological rules. However, shape variables are less well-described despite having substantial consequences for organismal performance. Wing aspect ratio (AR) has been proposed as a key shape parameter that determines function in flying animals, with high AR corresponding to longer, thinner wings that promote high manoeuvrability, low speed flight, and low AR corresponding to shorter, broader wings that promote high efficiency long distance flight. From this principle it might be predicted that populations at range edges would exhibit low AR wings. I test this hypothesis using the riverine damselfly, *Calopteryx maculata*, sampled from 34 sites across its range margin in North America. Nine hundred and seven male specimens were captured from across the 34 sites (mean=26.7±2.9 SE per site), dissected and measured to quantify the area and length of all four wings. Geometric morphometrics were employed to investigate geographical variation in wing shape. The majority of variation in wing shape involved changes in wing aspect ratio, confirmed independently by geometric morphometrics and wing measurements. There was a weak positive relationship between wing aspect ratio and temperature, in line with work on other insects. However, there was a strong longitudinal pattern in which western populations exhibited lower wing aspect ratio. This longitudinal pattern may be related

to increasing variability in precipitation from east to west in North America. I discuss my findings in light of research of the functional ecology of wing shape across vertebrate and invertebrate taxa." (Author)] Address: Hassall, C., School of Biol., Univ. of Leeds, Leeds, UK. E-mail: c.hassall@leeds.ac.uk

15296. Hassall, C. (2015): Odonata as candidate macroecological barometers for global climate change. *Freshwater Science* 34(3): 1040-1049. (in English) ["Many investigators have described a footprint of global environmental change in macroecological trends across multiple taxa. However, little comparative analysis has been done to evaluate whether some taxa are responding more than others. I tested 2 hypotheses: 1) taxa vary strongly in terms of range shifts and phenological advances in their responses to changing climate, and 2) taxa that shift ranges also advance phenology. I used an initial database of >4 million recorded sightings of UK animal species from 24 orders and found descriptions of range shifts for 612 species and phenological trends for 923 species. I compared the 2 responses for 464 species and found wide variation in the extent to which taxa are responding. Vertebrate taxa were the least well recorded and showed weak or nonsignificant responses. Invertebrates were well recorded and responded strongly in range and phenology, but evidence of an association between range shifts and phenological advances was equivocal. My results show that different taxa are exhibiting different responses to the same environmental change, and that mechanistic and traits-based studies may reveal the causes of that variation. Spatial responses may be constrained by mode of dispersal, and insects and arachnids typically respond strongly, whereas terrestrial vertebrates do not. Phenological responses are complex and may involve species-specific physiological relationships between development and seasonal cues. Use of a model taxon could increase efficiency of monitoring regimes by simplifying monitoring targets and techniques. Potential exists for =1 taxa to be indicators of climate change, whereby the responses of one or a group of species could be used to infer changes at a broader taxonomic scale. I highlight Odonata as a taxon that responds strongly in multiple modalities, is charismatic enough to appeal to citizen scientists, and is an emerging physiological and genetic model." (Author)] Address: Hassall, C., School of Biol., Univ. of Leeds, Woodhouse Lane, Leeds LS2 9JT UK. E-mail: c.hassall@leeds.ac.uk

15297. Hassall, C.; Sherratt, T.N.; Watts, P.C.; Thompson, D.J. (2015): Live fast, die old: no evidence of reproductive senescence or costs of mating in a damselfly (Odonata: Zygoptera). *Journal of Animal Ecology* 84(6): 1542-1554. (in English) ["(1.) Recent examples of actuarial senescence in wild insect populations have challenged the long-held assumption that the brevity of wild insect life spans precludes senescence. (2.) We investigate age-related patterns in mating behaviour in adults of a short-lived damselfly, *Coenagrion puella* and the implications of this mating. Using capture histories for 1033 individuals over two field seasons, we conduct both pooled and stratified analyses of variations in breeding activity. (3.) Pooled analyses suggest that there is strong age-related variation in the probability of

being present at the mating rendezvous. However, no age-related variation was observed in the probability of mating. Stratified approaches confirmed a general pattern of age-related declines in survival probability, but provided only equivocal evidence of an effect of age on transition between temporary breeding states. Mating males and females showed greater survival than non-mating individuals, possibly as a consequence of higher body condition. Older males that were not currently breeding were less likely to commence breeding on the next day, but showed no patterns in breeding cessation. Overall, transitions between both breeding states declined with age, suggesting that males that breed tend to continue breeding while those that do not breed continue to be unsuccessful. Female mating rates were consistently high across all ages with no age-related decline apparent. (4.) While previous research has demonstrated actuarial senescence in this population, as does this study, we find little evidence of either age-related declines in reproductive behaviour or breeding-related declines in survival, which might indicate functional senescence or costs of mating, respectively. Indeed, the greater survival in mating individuals of both sexes suggests that variations in individual quality may mediate both reproductive success and longevity. (5.) Contrary to recent studies, we found no compelling evidence for reproductive senescence or a cost of mating in an important and well-studied model odonate. The possible link between condition and ageing suggests that individual quality needs to be taken into account when studying senescence. We recommend the use of multistrata models for the future investigation of these phenomena." (Authors)] Address: Hassall, C., Dept Ecol., Univ. Oulu, PO Box 3000, Oulu 90014, Finland. E-mail: c.hassall@leeds.ac.uk

15298. Hassall, C.; Anderson, S. (2015): Stormwater ponds can contain comparable biodiversity to unmanaged wetlands in urban areas. *Hydrobiologia* 745: 137-149. (in English) ["Urban freshwaters provide a range of ecosystem services, including stormwater management, water treatment, biodiversity, and aesthetics. Management of freshwaters should aim to maximise as many of these services as possible, but managers are often focused on individual services. To test for the biodiversity value of stormwater management ponds (SMPs) in Ottawa, Canada, 20 SMPs were surveyed for macroinvertebrates using standardised sampling techniques. These were compared against 10 wetlands that were not managed for stormwater control (a combination of ornamental lakes, natural lakes, and nature reserves) in and around the same urban area (a total of 30 ponds). Natural wetlands and SMPs were very different in their water chemistry, which was correlated with the proportion of urban land use within 1 km of the site, with higher conductivity in SMPs with increasing urban land cover ($P = 0.046$). Despite this, natural wetlands and the richest SMPs contained similar levels of biodiversity and similar macroinvertebrate community structure. This study highlights that stormwater management can occur alongside biodiversity enhancement in urban areas, but correlations between urban land use, water chemistry, and the structure of biological communities suggests that run-off from urban areas is

likely a major factor in structuring biological communities in built-up regions." (Authors) Taxa including Odonata are treated at family level.] Address: Hassall, C., School of Biology, University of Leeds, Leeds, LS2 3JT, UK. E-mail: c.hassall@leeds.ac.uk

15299. Hedrick, T.; Combes, S.A.; Miller, L.A. (2015): Recent developments in the study of insect flight. *Canadian Journal of Zoology* 93(12): 925-943. (in English) ["Here we review recent contributions to the study of insect flight, in particular those brought about by advances in experimental techniques. We focus particularly on the following areas: wing flexibility and deformation, the physiology and biophysics of asynchronous insect flight muscle, the aerodynamics of flight, and stability and maneuverability. This recent research reveals the importance of wing flexibility to insect flight, provides a detailed model of how asynchronous flight muscle functions and how it may have evolved, synthesizes many recent studies of insect flight aerodynamics into a broad-reaching summary of unsteady flight aerodynamics insects, and highlights new insights into the sources of flight stability in insects. The focus on experimental techniques and recently developed apparatus shows how these advancements have occurred and point the way towards future experiments." (Authors) The publication includes references to dragonflies.] Address: Hedrick, T., Department of Biology, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA. E-mail: thedrick@bio.unc.edu

15300. Heintzman, L.J.; Anderson, T.A.; Carr, D.L.; McIntyre, N.E. (2015): Local and landscape influences on PAH contamination in urban stormwater. *Landscape and Urban Planning* 142: 29-37. (in English) ["Highlights: •We assessed polycyclic aromatic hydrocarbons in urban stormwater and odonates. •Contamination (amounts and agents) differed between water and odonate tissues. •Local factors were more important than landscape factors on PAH levels. •PAHs did not accumulate along a stormwater gradient. Abstract: Polycyclic aromatic hydrocarbons (PAHs) are toxic organic pollutants produced from combustion. Associated with urban runoff, they have been detected worldwide in urban wetlands. Because PAHs and their associated metabolites are often carcinogenic, mutagenic, and teratogenic, they can pose significant risks to wetland-dependent organisms. We investigated the occurrence of 16 PAHs within water samples and tissues of *Enallagma civile* from seven urban wetlands (known regionally as playas) along a constructed stormwater gradient in Lubbock, Texas. PAH detections from water samples were highly variable across sites and dates, with naphthalene and pyrene occurring most often. PAH detections in adult damselflies were also variable but significantly different from corresponding water samples (suggesting bioaccumulation rather than passive chemical exposure), with naphthalene and fluoranthene occurring most often. The number of specific PAH detections was significantly associated with percent impervious surface within 300 m of a playa, but not with position along the stormwater gradient or number of drainage inflows. Therefore, for the urban playas and odonates of Lubbock, local

factors were more important in determining PAH contamination than were landscape-level factors. PAH contamination can be reduced in future urban landscape planning and design by minimizing the amount of impervious surface around stormwater retention ponds, even if they are linked along a hydrologic gradient." (Authors)] Address: Heintzman, L.J., Department of Biological Sciences, Texas Tech University, Mailstop 43131, Lubbock, TX 79409-3131, United States. E-mail: lucas.heintzman@ttu.edu

15301. Hernández Rodríguez (2015): Utility of morphometric standardized variables of wing for automated identification of Cuban species and genus of Libellulidae (Insecta: Odonata). *Revista Cubana de Ciencias Biológicas* 4(2): 78-89. (in Spanish, with English summary) ["The classification of the Cuban Odonata is difficult by the complexity of wing venation. These appendixes have become in very useful tools in studies of geometric morphometrics. For this reason the objective of this work is the evaluation of the potential of wing shape differences for numeric classification and as a basis for an automated identification system for genera and species of the family Libellulidae in Cuba. Landmarks were placed in the fore and hind wings. The landmarks configurations were standardized using Procrustes registration. For the taxonomy analysis three shape variables and six lineal, were used for discriminants analysis and classification and regression tree analysis (CART). The discriminant analyses get a 100% of correct discrimination for both wings in 12 species and 8 genera. The trees CART showed groups mixed in the terminal nodes for both wings, however, for the genera the classification tree showed high purity. The results obtained in this study may be used for creation of automatic classification program for the Libellulidae genera correctly classified with analyzed variables." (Author)] Address: Hernández Rodríguez, Majela, Facultad de Biología, Universidad de La Habana, Cuba. E-mail: majela@fbio.uh.cu

15302. Hernández Rodríguez, M.; Ávila, D.D. (2015): Diferencias interespecíficas y geográficas en los niveles de asimetría fluctuante en las alas de *Erythrodiplax umbrata*, *Macrothemis celeno* y *Pantala flavescens* (Odonata: Libellulidae). *Poeyana* 501: 8-19. (in Spanish, with English summary) ["Interspecific and geographic differences in fluctuating asymmetry level. Odonata show fluctuating asymmetry like the majority of insects. The distribution of the Cuban dragonflies varies among country regions. However, it remains unknown if this regional variation is reflected in the morphological characteristics of species with wide distribution, mainly over sensitive morphological indexes like the levels of corporal asymmetry. For this reason the objective of this work is the identification of interespecific differences in the levels of fluctuating asymmetry in wings of Cuban dragonflies and their comparison between two country regions. Digital pictures of *Macrothemis celeno*, *Erythrodiplax umbrata* and *Pantala flavescens* (120) were taken. The landmarks were placed in fore and hind wings of both sides of the body, using the program tpsDig. Procrustes superimposition methods, shape principal components analysis,

analysis of euclidean distances matrix and Thin Plate Spline were used for shape analysis. Centroid size, distances between centroids (the differences among species and regions they were proven by Montecarlo analysis), and lineal distances were employed to measure the degree of asymmetry. The Montecarlo test revealed significant differences between *E. umbrata* and *P. flavescens* for the hind wings and between the populations of *E. umbrata* and *M. celeno* of the western and eastern regions. The sum of lineal distances, used as a measure of asymmetry, showed differences in fore wings of *E. umbrata* among both regions of the country, but not among species. The differences found in the levels of asymmetry among species and regions they could be cause of uncertainty in the development, environmental stress and to be reflected directly in processes like the couple's selection, the agility of the flight and the maneuverability, for that to describe this characteristic in the Cuban dragonflies could supplement the studies of ecology, reproductive biology and behaviour carried out until the moment." (Authors)] Address: Hernández Rodríguez, Majela, Facultad de Biología, Universidad de La Habana, calle 25 e/ I y J, Vedado, Plaza de la Revolución, Cuba. E-mail: majela@fbio.uh.cu

15303. Hettyey, A.; Tóth, Z.; Thonhauser, K.E.; Frommen, J.G.; Penn, D.J.; Van Buskirk, J. (2015): The relative importance of prey-borne and predator-borne chemical cues for inducible antipredator responses in tadpoles. *Oecologia* 179(3): 699-710. (in English) ["Chemical cues that evoke anti-predator developmental changes have received considerable attention, but it is not known to what extent prey use information from the smell of predators and from cues released through digestion. We conducted an experiment to determine the importance of various types of cues for the adjustment of anti-predator defences. We exposed tadpoles (*Rana temporaria*) to water originating from predators (caged larvae, *Aeshna cyanea*) that were fed different types and quantities of prey outside of tadpole-rearing containers. Variation among treatments in the magnitude of morphological and behavioural responses was highly consistent. Our results demonstrate that tadpoles can assess the threat posed by predators through digestion-released, prey-borne cues and continually released predator-borne cues. These cues may play an important role in the fine-tuning of anti-predator responses and significantly affect the outcome of interactions between predators and prey in aquatic ecosystems. There has been much confusion regards terminology used in the literature, and therefore we also propose a more precise and consistent binomial nomenclature based on the timing of chemical cue release (stress-, attack-, capture-, digestion- or continually released cues) and the origin of cues (prey-borne or predator-borne cues). We hope that this new nomenclature will improve comparisons among studies on this topic." (Authors)] Address: Hettyey, A., Dept of Integrative Biology and Evolution, Konrad Lorenz Institute of Ethology, University of Veterinary Medicine Vienna, Vienna, Austria. E-mail: hettyey.attila@agrar.mta.hu

15304. Hill, M.J.; Mathers, K.L.; Wood, P.J. (2015): The aquatic macroinvertebrate biodiversity of urban ponds in a

medium-sized European town (Loughborough, UK). *Hydrobiologia* 760: 225-238. (in English) ["Urbanisation is one of the greatest threats to freshwater biodiversity, with the area of land covered by towns and cities predicted to increase significantly in the future. Ponds are common features in the urban landscape and have been created for a variety of reasons ranging from ornamental/amenity purposes through to the detention of urban runoff and pollution. This paper aims to quantify the aquatic macroinvertebrate biodiversity associated with garden, ornamental and other urban ponds in Leicestershire, UK. We examined the macroinvertebrate biodiversity of 41 urban ponds (13 garden, 12 park and 16 other urban ponds) within the town of Loughborough, UK. Park ponds supported greater macroinvertebrate richness than garden or other urban ponds. Garden ponds were the most taxon poor. Pond size was strongly correlated with macroinvertebrate diversity. Collectively, urban ponds were found to be physically and biologically heterogeneous and were characterised by high community dissimilarity. Urban ponds provide a diverse range of habitats for a mixture of common and rare aquatic macroinvertebrate taxa and represent a valuable biodiversity resource within anthropogenically dominated landscapes. Recognition of the significant contribution of ponds to urban freshwater biodiversity is important for future aquatic conservation within anthropogenically dominated landscapes." (Authors) *Anax imperator*, *Aeshna mixta*, *Coenagrion puella*.] Address: Hill, M.J., Dept of Geography, Centre for Hydrological and Ecosystem Science, Loughborough University, Loughborough, Leicestershire LE11 3TU, UK. E-mail: m.j.hill@lboro.ac.uk

15305. Hiroshi, J.; Uéda, T. (2015): Can the use of more selective insecticides promote the conservation of *Symptetrum frequens* in Japanese rice paddy fields (Odonata: Libellulidae)? *Odonatologica* 44(1/2): 63-80. (in English) ["The effect of two relatively selective nursery-box-applied insecticides on *S. frequens* larvae and adults as substitutes for the commonly used insecticides, imidacloprid and fipronil, was examined using an experimental micro-paddy lysimeter (MPL) system. Fifty hatched larvae were placed on the soil surface of separate MPLs that had been treated with imidacloprid, fipronil, dinotefuran, and cartap hydrochloride, as well as an untreated control MPL. At 30 days after transplantation, the complete absence of *S. frequens* larvae and exuviae in the imidacloprid and fipronil-treated MPLs was remarkable. In the control, cartap- and dinotefuran-treated MPLs, the mean number of larvae was 31.0 ± 6.0 , 27.0 ± 6.0 , and 6.3 ± 1.5 , respectively. No *S. frequens* adults were observed later in the imidacloprid- and fipronil-treated MPLs. The rate of emergence did not differ significantly among the control, cartap- and dinotefuran-treated MPLs. However, the mean head width of *S. frequens* in the dinotefuran-treated MPL was significantly narrower than that of *S. frequens* in the control and cartap-treated MPLs. The mean EM50 in the cartap-treated MPL was significantly longer than that in the control- and dinotefuran-treated MPLs. The findings showed that the ecological impact of cartap on *S. frequens* was slightly less than the application of fipronil, imidacloprid and dinotefuran to rice paddy fields." (Authors)]

Address: Hiroshi, J., School of Food, Agricultural & Environmental Sciences, Miyagi Univ., 2-2-1 Hatatate, Taihaku-ku, Sendai, Miyagi 982-0215, Japan. E-mail: jinguji@myu.ac.jp

15306. Hoess, R. (2015): Faunenwandel der Libellen (Odonata) am Moossee (BE) während der letzten 140 Jahre unter dem Einfluss anthropogener Eingriffe. *Entomo Helvetica* 8: 29-39. (in German, with English and French summaries) ["Faunal evolution of dragonflies (Odonata) at Lake Moossee (BE) during the last 140 years under the influence of human activity. - The dragonfly fauna of Lake Moossee and its tributaries has been studied for the past 140 years. During this time, the habitats available to dragonflies have undergone dramatic changes due to three subsequent lowerings of water table between 1780 and 1920, peat digging, canalization of running waters and drainage of the surrounding countryside as well as the establishment of a golf course with newly created standing and running waters in 2003. Seventeen of 53 identified dragonfly species are red listed. *Coenagrion ornatum*, which was common at Lake Moossee before the last land improvement, is presently extinct in Switzerland." (Author)] Address: Hoess, R., Normanenstr. 35, 3018 Bern, Switzerland. E-mail: r.hoess@1st.ch

15307. Holusa, O. (2015): Description of the female of *Cordulegaster vanbrinkae* (Lohmann, 1993) (Odonata: Anisoptera: Cordulegastridae). *Zootaxa* 3949(2): 229-238. (in English) ["The female of *C. vanbrinkae* is described and illustrated, basing on four specimens collected in Gilan and Mazandaran Provinces, northern Iran. Their characters and variability are shown and compared with females of *Cordulegaster picta* and *C. heros*." (Author)] Address: Holusa, O., Dept of Forest Protection & Wildlife Management, Fac. Forestry & Wood Technology, Mendel Univ. in Brno, Zemidilská 3, 613 00 Brno, Czech Republic. E-mail: holusao@email.cz

15308. Holuša, O.; Dalecky, V.; Namin, J.I. (2015): Habitat choice of *Cordulegaster vanbrinkae* in Iran (Odonata: Cordulegastridae). *Odonatologica* 44(1/2): 11-20. (in English) ["The occurrence of *C. vanbrinkae* was studied in Gilan and Mazandaran provinces in northern Iran in July 2014. Ten localities demonstrated the occurrence of *C. vanbrinkae* at elevations from 169 to 1,424 m a.s.l. Larvae were found at seven localities and oviposition was observed at two localities. A total of 65 males, five females, 95 larvae, and 32 exuviae were found. Habitats were classified into the following types: a) narrow, shallow streams in forests at middle and higher altitudes; b) boulder-stepped shaded forest streams; c) deep cut forest streams with gravel banks, drying to intermittent pools; and d) broader sunlit rivers." (Authors)] Address: Holusa, O., Dept of Forest Protection & Wildlife Management, Fac. Forestry & Wood Technology, Mendel Univ. in Brno, Zemidilská 3, 613 00 Brno, Czech Republic. E-mail: holusao@email.cz

15309. Holzinger, W.E.; Chovanec, A.; Waringer, J.A. (2015): Odonata (Insecta). Checklisten der Fauna Österreichs No. 8: 27-48. (in German, with English summary) ["This checklist summarizes our present knowledge of the

Austrian Odonata species inventory. The Austrian fauna is diverse, combining Alpine and Mediterranean elements. Currently, 78 Odonata species are known from Austria. The paper provides updates on distribution and contains introductory chapters dealing with Odonata biology and bioindication, a brief history on Odonata research, and extensive references." (Authors)] Address: Holzinger, W.E., Ökoteam – Institut für Tierökologie und Naturraumplanung, Bergmannsgasse 22, A-8010 Graz, Austria. E-Mail: holzinger@oeko-team.at

15310. Hoppenbrouwers, P. (2015): Reproduction of *Aeshna affinis* in the Gelderse Poort in 2010, the Netherlands. *Brachytron* 17(2): 111-115. (in Dutch, with English summary) ["Reproduction of *A. affinis* was established in the Gelderse Poort in 2010. Eight larval skins were found at small shallow waters formed by clay extraction from what is now a wetlands area, and which dry up during the summer. This is probably the third documented place of reproduction in the Netherlands." (Author)] Address: E-mail: peter.hoppenbrouwers@planet.nl

15311. Huang, D.; Azar, D.; Cai, C.; Nel, A. (2015): New damselfly genera in the Cretaceous Burmese amber attributable to the Platystictidae and Platycnemididae Disparoneurinae (Odonata: Zygoptera). *Cretaceous Research* 56: 237-243. (in English) ["Two new damselfly genera and species *Mesosticta burmatica* and *Cretadisparoneura hongii*, are described from the mid Cretaceous Burmese amber. They are respectively tentatively attributed to the Platystictidae and to the Platycnemididae: Disparoneurinae. These discoveries confirm that the Zygoptera of the coenagrionomorphan clade with shortened median posterior and cubitus anterior were already rather diverse during the Early Cretaceous." (Authors)] Address: Nel, A., Lab. Ent. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

15312. Husain, A. (2015): Odonate fauna of Rajasthan, India with links to Arabia and Himalaya. *Aquatic Ecosystem: Biodiversity, Ecology and Conservation*: 117-151. (in English) ["The present paper deals with the update on odonate fauna of Rajasthan, based on earlier records. All together, there are 53 species belonging 34 genera, 8 families under 2 suborders with 15 species common to Arabia and 51 to Himalaya which confirms the linkage of Rajasthan and Thar Desert to Sahara Desert and Palaearctic Region. A list of 20 more species, recently recorded from southern part of the state, has also been added." (Author)] Address: Husain, A., 41, Hari Vihar, Vijay Park, Dehra Dun, 248 001, Uttarakhand, India. E-mail: drakhlaqhusain@gmail.com

15313. Hyytiäinen, A. (2015): Kymmenen vuotta sudenko-
rentojen lajihavainnointia Lohjan Santojalla (2005–2014) [Ten years of dragonfly observation at Lohja]. *Crenata* 8: 4-9. (in Finnish) [Detailed information on a ten-year survey of the Odonata fauna of a small area at the city of Lohja (SW Finland) is provided. The four observation sites within the study area were composed of a section of the waterside of

Lohjanjärvi lake, an artificial pond at a former sand pit, a mire and a logging site. During the period 2005-2014 a total of 32 species were recorded, corresponding to more than half of the Finnish odonate species. Of particular note were *Sympecma paedisca*, *Coenagrion armatum*, *C. johanssoni*, *Epithea bimaculata*, *Cordulegaster boltonii*, *Leucorrhinia albifrons* and *L. pectoralis*. [A. Schröter]]

15314. Ichikawa, Y.; Watanabe, M. (2015): The daily food intake of *Pantala flavescens* females from foraging swarms estimated by the faeces excreted (Odonata: Libellulidae). *Odonatologica* 44(3): 375-389. (in English) ["*P. flavescens* migrates to Japan every spring, where the population rapidly increases until autumn. Adults often form swarms above open grasslands for foraging. Little has been reported on the daily food intake in *P. flavescens*, probably due to the difficulty of observing foraging behaviour. We captured females from foraging swarms and kept them alive in the laboratory, and the faeces excreted were collected each 24-hour-period after capture. Faeces excreted within 24 hours after capture were typically dark brown, formed in oval pellets, including a lot of fragments of cuticle, which must have been derived from the prey. The total dry weight of faeces was 8.00 mg on average. The size of the subsequent faeces decreased, and the colour changed to reddish brown and detectable cuticle fragments were no longer present, suggesting that most of the indigestible parts had been excreted within 24 hours after feeding. When a female was handfed a single sheep blowfly, 4.51 mg of faeces were excreted within 24 hours after feeding, while a starved female excreted 2.23 mg. The daily food intake of a female was estimated to be about 14 mg, corresponding to about 185 small prey insects. Therefore, the mass flight of *P. flavescens* might affect populations of small insects in the open landscape in Japan." (Authors)] Address: Watanabe, M., Dept of Biology, Faculty of Education, Mie Univ., Tsu, Mie 514-8507, Japan. E-mail: watanabe@edu.mie-u.ac.jp

15315. Ihechiluru, N.B.; Henry, A.N.; Taiwo, I.E. (2015): Heavy metal bioaccumulation and oxidative stress in *Austroaeschna inermis* (Dragon fly) of the Lagos Urban ecosystem. *J. Environ. Chem. Ecotoxicol.* 7(1): 11-19. (in English) ["Urban ecosystems are often characterized by the receipt of pollutants, especially heavy metals from diverse anthropogenic activities. To better understand the distribution of heavy metals (Cd, Cu, Pb, Mn and Zn), *A. inermis* from five different sites (Unilag, Mile 12, Olushosun Dump site, Imoshe and Badagry) in Lagos, sediments from the respective sites were assessed. This was followed by assessment of lipid peroxidation product; Malondialdehyde (MDA) and antioxidative stress enzymes; superoxide dismutase (SOD), catalase (CAT), glutathione S-transferase (GST) and reduced glutathione (GSH) in *A. inermis*. The results indicate widespread heavy metal distribution with Mn and Zn having the highest concentrations of 13.369 ± 0.800 mg/kg and 21.473 ± 2.001 mg/kg in sediment samples from Mile 12 and Olushosun Dump site respectively. Only Cd was bioaccumulated at two sites (Unilag and Badagry) with biota to soil

accumulation factor (BSAF) of approximately 2. The oxidative stress biomarkers assessment in the insects did not indicate any trend to link heavy metal concentrations with respective sites. However there was strong ($r = 0.5 < 0.7$) to very strong ($r = 0.7$) positive correlation between Pb concentrations in *A. inermis* and most biomarkers. All enzymes and MDA showed negative correlation with the other heavy metals with values mostly between strong ($r = -0.5 < -0.7$) to very strong ($r = -0.7$) negative. The findings from this study reaffirms the ubiquity of heavy metals in the City of Lagos and the relevance of the insects as pollution indicators were discussed." (Authors) Of course, *Austroaeschna inermis* is no resident in Nigeria, Africa.] Address: Henry, A.N., Dept of Zoology, University of Lagos, Akoka-Yaba, Lagos State, Nigeria. Email: amaezenh@gmail.com

15316. Ikemeyer, D.; Schneider, E.; Schneider, J.; Schneider, T. (2015): Records of Odonata in North- and North-East Iran including *Sympecma gobica* (Forster, 1900) as a new species for Iran. *Entomologische Zeitschrift* 125(3): 147-152. (in English, with German summary) ["During two field trips (15.–22. July 2013 and 12.–25. July 2014) to the North and North-East provinces of Iran: Gilān, Māzandarān, Golestān, North Chorāsān und Razavi Chorāsān a total of 37 Odonata species could be recorded. *Sympecma gobica* is new for Iran, and now extends its known range significantly to the West. The two most spectacular dragonfly species of the Hyrcanian Forest have recently been described *Aeshna vercanica* and *Cordulegaster vanbrinkae*, which could both be observed again and new insights into their behaviour could be added. *Sympetrum arenicolor* was found in North-Chorāsān, so far only known from a specimen not precisely located and dated in Iran. *Calopteryx orientalis* was frequently observed on shaded running waters in the entire visited region. All females in the provinces Gilān, Māzandarān and Golestān were androchromic. However, in North Chorāsān also heterochrome females were found among the majority of androchromic females. Further east all females were heterochrome and no homochrome (androchromic) females could be detected." (Authors)] Address: Ikemeyer, D., Billerbecker Str. 6, 48329 Havixbeck, Germany. E-Mail: DKJlkemeyer@t-online.de

15317. Ilvonen, J.J.; Kaunisto, K.M.; Suhonen, J. (2015): Are genders equally parasitized in damselflies and dragonflies? *Oikos* 125(3): 315-325. (in English) ["Parasitism plays an essential part in ecology and evolution of host species and understanding the reasons for differential parasitism within and among hosts species is therefore important. Among the very important factors potentially affecting parasitism is the gender of the host. Here, we studied whether either females or males are more likely to harbour parasites among Odonatan insects, by relying on an extensive literature review and new field data. We collected data on numerous dragonfly and damselfly species and their ectoparasites (water mites) and endoparasites (gregarines) to examine the generality of similarities and differences in prevalence, intensity and maximum number of parasites of male and female hosts. We found three main results. Firstly, most of the

odonate host species showed no differences between genders in either gregarine or water mite prevalence and intensity. The only exception was female damselflies' higher gregarine prevalence and intensity compared to conspecific males. These inequalities in gregarine parasitism may be due to behavioural and physiological differences between conspecific males and females. In comparison, there were no differences in dragonflies between genders in water mite or gregarine prevalence and intensity. Secondly, damselflies had higher prevalence and intensity levels of both gregarine and water mite parasites compared to dragonflies. Finally, we found a strong species level pattern between female and male parasitism: a certain level of gregarine or water mite parasitism in one sex was matched with a similar parasitism level for the other. This indicates similar exposure and susceptibility to parasites on both genders. Even though significant differences of parasite levels between the genders were observed within certain host species, our results strongly suggest that on a general level a more parasitized sex does not exist in the order, Odonata." (Authors) *Anax junius*, *Brachymesia gravida*, *Calopteryx maculata*, *Calopteryx splendens*, *Calopteryx virgo*, *Celithemis eponina*, *Coenagrion armatum*, *Coenagrion hastulatum*, *Coenagrion johanssoni*, *Coenagrion pulchellum*, *Dythemis fugax*, *Enallagma boreale*, *Enallagma c. cyathigerum*, *Erythemis simplicicollis*, *Erythromma najas*, *Lestes sponsa*, *Libellula luctuosa*, *Nehalennia irene*, *Pachydiplax longipennis*, *Pantala flavescens*, *Perithemis tenera*, *Platycnemis pennipes*, *Sympetrum danae*, *Sympetrum flaveolum*] Address: Ilvonen, J.J., Dept of Biology, Univ. of Turku, FI-20014 Turku, Finland. E-mail: jjilvo@utu.fi

15318. Iversen, L.L.; Rannap, R.; Briggs, L.; Sand-Jensen, K. (2015): Variable history of land use reduces the relationship to specific habitat requirements of a threatened aquatic insect. *Population Ecology* 58(1): 155-164. (in English) ["The hutchinsonian realized niche of a species is the most common tool for selecting the actions needed when restoring habitats and establishing conservation areas of species. However, defining the realized niche of a species is problematic due to variation across spatial and temporal scales. In this study we tested the hypothesis that habitat parameters defining the realized niche of a species can be derived from a regional study and that national changes in land use influence the perception of the realized niche across different landscapes. We described the realized habitat niche of the threatened dragonfly *Leucorrhinia pectoralis*, in four Estonian landscapes which all have undergone more than 20 years of habitat degradations. We recorded the presence/absence of *L. pectoralis* and measured 7 habitat variables for 140 lakes and ponds located in one restored and three un-restored landscapes. Lake size and proportion of short riparian vegetation were significantly positive parameters determining the presence of *L. pectoralis* across landscape types. The species was much more habitat specific in the restored landscape, with larger influence of other habitat parameters. Our data suggest that the realized niche of the species in the un-restored landscapes was constrained by the present-day habitats. The study demonstrate that if a

species realized niche is derived from local distribution patterns without incorporating landscape history it can lead to an erroneous niche definition. We show that landscape restoration can provide knowledge on a species' habitat dependencies before habitat degradation has occurred, provided that restoration mitigation reflects the former landscape characteristics." (Authors)] Address: Iversen, L.L., Freshwater Biological Laboratory, Biological Institute, University of Copenhagen, Universitetsparken 4, 2100 Copenhagen, Denmark. E-mail: lliversen@bio.ku.dk

15319. Jaggwe, A. (2015): Effects of environmental variables on four aquatic insect taxa among smaller water bodies of different ages on farmland. A pilot study. M.Sc. thesis, Halmstad University, School of Business, Engineering and Science, Biological and Environmental Systems (BLESS): 22 pp. (in English) ["High anthropogenic modification like infrastructural development, drainage, eutrophication, dumping garbage, is a threat to biodiversity of smaller water bodies in agricultural landscapes. However, smaller water bodies have historically been constructed for drainage, waste treatment and other purposes. Further, new small water bodies are now being constructed in agricultural areas in Sweden, mainly to remove nutrients and to improve landscape biodiversity. This creates two different age classes (old and new) of smaller water body habitats. I sampled aquatic insects in 27 smaller water bodies of varying types and ages in Halmstad region and related insect biodiversity, species richness, composition structure to environmental variables. I partitioned the region into two locations (Northern and Southern) for easy data comparison and due to difference in topography. The data was analysed using a Canonical Correspondence (CCA) and regression analysis. The CCA results show a difference in the species composition between old and new sites. The most important variables in explaining species assemblage structure was age of the aquatic water bodies. The species richness decreased with increase in nutrient concentration (total phosphorus) according to regression analysis. Species composition and diversity were related to Vegetation and tree cover in and around the water body. The results of my study shows that the older the water bodies the better for specific species like *Aeshna cyanea* and the new water bodies tolerate more specimens. My results suggest that, as there is need to facilitate plant growing, protecting vegetation and trees to better mimic natural conditions of water bodies, creating new water bodies while protecting aged water bodies is important for conservation of biodiversity." (Author)] Address: not stated

15320. Jamwal, D.; Verma, P.; Thaokar, N.; Andrew, R.J. (2015): Seasonal variation in the odonates dragonflies of Gandhi Sagar lake of Nagpur city, India. *International Journal of Pharmacology & Biological Sciences* 9(1): 49-53. (in English) ["Gandhi Sagar Lake is one of the most polluted water body of Nagpur city and is located in the centre of thickly populated residential area. Odonates are directly affected by water pollution since the major period of their life cycle as nymphs is spent in water. Although odonates are

categorized as "moderately intolerant organisms" in a water body, no attempts have been undertaken to study the species specific intolerance level in Odonata. The following presentation describes the observation of the seasonal variation of odonates breeding in the polluted water of Gandhi sagar lake. The following eleven odonates were observed breeding in the Gandhi sagar lake: *Anax guttatus*, *Ictinogomphus rapax*, *Brachythemis contaminata*, *Bradinopyga geminata*, *Crocothemis servilia servilia*, *Diplacodes trivialis*, *Orthetrum s. sabina*, *Pantala flavescens*, *Ceriagrion coromandelianum*, *Ischnura aurora* and *I. senegalensis*. These odonates species appear to be robust and opportunistic species and can be categorised as "fairly tolerant organisms". (Authors)] Address: Andrew, R.J., Post Graduate Department of Zoology, Hislop College, Nagpur, Maharashtra 440001, India. E-mail: rajuandrew@yahoo.com

15321. Janekova, K.; David, S.; Petrovičová, K. (2015): Contribution to the knowledge of dragonflies (Odonata) of the Orava river basin. *Folia faunistica Slovaca* 20(2): 145-155. (in Slovak, with English summary) ["The Orava River basin covers a total area of 1 633 km², there are a lot of marsh habitats, mainly two major types of peatlands – bogs and fens. The authors put together a faunistic overview of the dragonfly data, which were obtained between 2010 and 2014. A total of 36 dragonfly species were identified from 16 investigated localities, detailed records are given. There are 30 species recorded as autochthonous. There are many endangered and protected species, for instance *Sympetma fusca*, *Coenagrion hastulatum*, *Somatochlora arctica*, *Leucorrhinia caudalis*, *L. dubia*, *L. pectoralis*, *L. rubicunda*, there are species of European importance as well. The area is characterized by a sphagnophilous dragonfly fauna, also the complex of small water bodies, the sand and gravel pits, ditches and marshes drainage channels are of a great importance too." (Authors)] Address: Janeková, Katarina, Department of Ecology and Environmentalistics, FNS Constantine the Philosopher University in Nitra, Tr. A. Hlinku 1, SK-949 74 Nitra, Slovakia

15322. Jansen, E.; Sardar, F. (2015): Determination of the Southern Darter (*Sympetrum meridionale*) Selys, 1841. *Brachytron* 17(2): 65-75. (in Dutch, with English summary) ["The increased occurrence of *Sympetrum meridionale* in Belgium and the Netherlands renders the identification of *Sympetrum* species more difficult than before. We summarized and verified all known identification characteristics distinguishing *S. meridionale* from its look-alikes *S. vulgatum* and *S. striolatum* on museum specimens and photographs. Moreover, we identified and tested a novel characteristic which allows the separation between these species: *S. meridionale* has pale-colored veins at its wing-base which are absent in *S. vulgatum* and *S. striolatum*. Separating *S. meridionale* from *S. vulgatum* and *S. striolatum* remains tricky despite this new characteristic as exceptions to the rules do occur. Therefore we emphasize that for a reliable identification looking at a combination of characteristics remains necessary." (Authors)] Address: Esther Jansen & Fazal Sardar. E-mail: info@macromia.nl

15323. Janssens, L.; Van Dievel, M.; Stoks, R. (2015): Warming reinforces nonconsumptive predator effects on prey growth, physiology, and body stoichiometry. *Ecology* 96(12): 3270-3280. (in English) ["While nonconsumptive effects of predators may strongly affect prey populations, little is known how future warming will modulate these effects. Such information would be especially relevant with regard to prey physiology and resulting changes in prey stoichiometry. We investigated in *Enallagma cyathigerum* damselfly larvae the effects of a 4°C warming (20°C vs. 24°C) and predation risk on growth rate, physiology and body stoichiometry, for the first time including all key mechanisms suggested by the general stress paradigm (GSP) on how stressors shape changes in body stoichiometry. Growth rate and energy storage were higher at 24°C. Based on thermodynamic principles and the growth rate hypothesis, we could demonstrate predictable reductions in body C:P under warming and link these to the increase in P-rich RNA; the associated warming-induced decrease in C:N may be explained by the increased synthesis of N-rich proteins. Yet, under predation risk, growth rate instead decreased with warming and the warming-induced decreases in C:N and C:P disappeared. As predicted by the GSP, larvae increased body C:N and C:P at 24°C under predation risk. Notably, we did not detect the assumed GSP-mechanisms driving these changes: despite an increased metabolic rate there was neither an increase of C-rich biomolecules (instead fat and sugar contents decreased under predation risk), nor a decrease of N-rich proteins. We hypothesize that the higher C:N and N:P under predation risk are caused by a higher investment in morphological defense. This may also explain the stronger predator-induced increase in C:N under warming. The expected higher C:P under predation risk was only present under warming and matched the observed growth reduction and associated reduction in P-rich RNA. Our integrated mechanistic approach unraveled novel pathways of how warming and predation risk shape body stoichiometry. Key findings that (1) warming effects on elemental stoichiometry were predictable and only present in the absence of predation risk and that (2) warming reinforced the predator-induced effects on C:N:P, are pivotal in understanding how nonconsumptive predator effects under global warming will shape prey populations." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

15324. Jisha Krishnan, E. K.; Sebastian, C.D. (2015): A preliminary check list of Odonates from Calicut university campus, Calicut, Kerala, South India. *Journal of Entomology and Zoology Studies* 3(2): 260-263. (in English) [27 odonate species are listed.] Address: Sebastian, C.D., Molecular Biology Laboratory, Department of Zoology, University of Calicut, Kerala 673b 635 India. E-mail: drcdsebastian@gmail.com

15325. Jisha Krishnan, E.K.; Sebastian, C.D. (2015): Analysis of evolutionary divergence of *Neurothemis tullia* (Odonata: Libellulidae) using cytochrome oxidase subunit I gene.

International Journal of Advanced Life Sciences 8(2): 110-114. (in English) [*N. tullia* is an andromorphic libellulidae member commonly found in ponds, marshes, paddy fields, swamps and tanks. Since this species exhibits female polymorphism and sexual dimorphism, the present study analyzed the nucleotide sequence of mitochondrial cytochrome oxidase I (COI) gene to predict any genetic changes that had occurred in this highly conserved region. Results showed that male, female and andromorphic female members showed the same 351 bp length COI gene (GenBank Accession: KP 835513). Phylogenetic tree constructed by the neighbour joining method showed that it is having a sister clade relationship of the same species found in Mizoram with a maximum bootstrap value of 100. Even though sexual dimorphism in the body colouration, body patterns, wing spot, etc may cause misidentification, the present DNA sequence analysis leads to the absolute identification of this species. The male, female and andromorphic female have same base pair length DNA, which confirmed them to belong to the same species. Phylogenetic tree depicted that different species of *Neurothemis* have a sequence divergence in the range of 1-12% and all showed a monophyletic ancestry representing splitting from a single clade and thereby confirmed genus level taxonomy. The study concludes that a vicariance may be the probable reason for the splitting up of this genus into different geographical areas and caused the reproductive isolation of the same genus which in turn leads to the formation of different species." (Authors)] Address: Sebastian, C.D., Molecular Biology Lab., Dept of Zoology, Univ. of Calicut, Kerala 673 635 India. E-mail: drcdsebastian@gmail.com

15326. Johnston, P.R.; Mikolajewski, D.J.; Rolff, J. (2015): Identification of viruses associated with larvae of *Leucorhinia dubia*, and *Coenagrion puella* from RNA sequencing data. *International Journal of Odonatology* 18(1): 81-88. (in English) ["Odonata are hosts to a variety of parasites and pathogens. However, very few studies have investigated which viruses infect dragonflies and damselflies. Here, based on next generation RNA sequencing of RNA from *Leucorhinia dubia* and *Coenagrion puella* larvae, data on putative viruses present in odonates are reported. In both species around 20 different putative viruses, often belonging to genera known from other insect species, were found. The annotated genome structure of one novel putative iflavirus in *C. puella* and new putative iflavirus, dicistrovirus and posa-lika viruses in *L. dubia* are described. The influence of these viruses on host fitness and their modes of transmission remain to be determined." (Authors)] Address: Mikolajewski, D.J., Freie Univ. Berlin, Inst. Biol., Evolutionsbiologie, Königin-Luise-Str. 1-3, 14195 Berlin, Germany. E-mail: d.mikolajewski@fu-berlin.de

15327. Jones, B.R.; Jordan, S. (2015): Genetic consequences of Pleistocene sea-level change on Hawaiian Megalagrion damselflies. *Journal of Heredity* 106(5): 618-627. (in English) ["The Hawaiian Islands have long been an important laboratory for evolutionary research because their geological histories offer many natural experiments. For ex-

ample, the Maui Nui complex, 4 islands that have been repeatedly connected and separated by fluctuating sea levels, lie near Hawaii Island, which has never been connected to another island. Here, we examine the genetic consequences of fluctuating island areas and connectivity using microsatellite analysis of 2 widespread, endemic Hawaiian damselflies. We screened 152 *Megalagrion xanthomelas* individuals from 5 islands at 14 loci and 34 *Megalagrion pacificum* from 3 islands at 11 loci to explore dispersal patterns and genetic diversity. Our data suggest that Pleistocene fluctuations in sea level alternated between creating land bridges that facilitated gene flow between once and future islands, and ocean channels that inhibited dispersal. Furthermore, interglacial periods of high sea stands likely reduced suitable habitat availability, causing the loss of genetic diversity on Maui Nui due to bottlenecks and founder events. Finally, we propose that gene flow from Molokai to Lanai may be enhanced by assisted dispersal from the trade winds that are channeled between volcanoes on western Maui and eastern Molokai. Our results emphasize the importance of variable microevolutionary processes in Hawaiian biogeography." (Authors)] Address: Jordan, S., Department of Biology, Bucknell University, Lewisburg, PA 17837, USA. E-mail: steve.jordan@bucknell.edu

15328. Jones, B.R.; Jordan, S. (2015): Genetic consequences of Pleistocene sea-level change on Hawaiian Megalagrion damselflies. *Journal of Heredity* 106(5): 618-627. (in English) ["The Hawaiian Islands have long been an important laboratory for evolutionary research because their geological histories offer many natural experiments. For example, the Maui Nui complex, 4 islands that have been repeatedly connected and separated by fluctuating sea levels, lie near Hawaii Island, which has never been connected to another island. Here, we examine the genetic consequences of fluctuating island areas and connectivity using microsatellite analysis of 2 widespread, endemic Hawaiian damselflies. We screened 152 *Megalagrion xanthomelas* individuals from 5 islands at 14 loci and 34 *Megalagrion pacificum* from 3 islands at 11 loci to explore dispersal patterns and genetic diversity. Our data suggest that Pleistocene fluctuations in sea level alternated between creating land bridges that facilitated gene flow between once and future islands, and ocean channels that inhibited dispersal. Furthermore, interglacial periods of high sea stands likely reduced suitable habitat availability, causing the loss of genetic diversity on Maui Nui due to bottlenecks and founder events. Finally, we propose that gene flow from Molokai to Lanai may be enhanced by assisted dispersal from the trade winds that are channeled between volcanoes on western Maui and eastern Molokai. Our results emphasize the importance of variable microevolutionary processes in Hawaiian biogeography." (Authors)] Address: Jordan, S., Department of Biology, Bucknell University, Lewisburg, PA 17837, USA. E-mail: steve.jordan@bucknell.edu

15329. Kanaujia, A.; Kumar, A.; Kushwaha, S.; Kumar, A. (2015): Diversity of odonates (dragonflies and damselflies) and lepidopteron (butterflies) fauna of Nawabganj Bird

sanctuary, Unnao district, Uttar Pradesh, India. *Advances in BioResearch* 6(2): 72-78. (in English) ["Study was done in Nawabganj Bird Sanctuary during January 2013 to January 2014. This Sanctuary has an area of 224.60 hectares and geographically located at 26° 34' N and 80° 40' E. The study reveals 18 species of odonates belonging to 15 genera and 5 families, which include Libellulidae (9 species), Aeshnidae (3 species), Coenagrionidae (3 species), Gomphidae (2 species) and Platycnemididae (1 species). Out of total 18 *Lathrecista asiatica* and *Ischnura aurora* were abundant or very common species and *Anax guttatus* and *Bradinopyga geminata* were rare in observation." (Authors)] Address: Kanaujia, A., Biodiversity & Wildlife Conservation Lab, Department of Zoology, University of Lucknow, Lucknow- 226007, Uttar Pradesh, India. E-mail: adesh.science@gmail.com

15330. Karadimas, D. (2015): The Nina-Nina, the Devil and Oruro: The origins of a diabolical figure. *Indiana* 32: 23-45. (in English, with Spanish summary) ["The Diablada festivities, which take place in Oruro mining town in Bolivia, stage 'devils' that come out of the underworld through galleries and mines that communicate with the surface. The captions that accompany the worship of the Virgin of the Mine (Virgen de la Mina) on this occasion show a hero whose nickname in Quechua likewise designates a parasitic wasp, nina nina. In the world of the Andes, this wasp was associated with bad omens and to the devil by the Indian scholar Guaman Poma de Ayala in the 17th century. The contribution refers to these identifications to propose a new approach to the origin of the Diablada festivities suggesting that in the iconographic features of the devil could be recognized the features of the gods of the mountains worshiped by present and pre-Hispanic Andean populations. ... Dragonflies can thus also be designated with the term aya wantu and are also drawn on some pre-Hispanic pottery next to pompilid wasps, such as this Inca-style aribalo preserved in the Rafael Larco Museum where the dragonflies, recognizable thanks to their outstretched wings, are placed next to insects which until now had been interpreted as butterflies, although the drawing and the colours of their wings (orange, or smoky surrounded by black) are typical of pompilid wasps" (Author) The paper includes a further figure "Inca aribalo on which there are flies, dragonflies and pompilid wasps (Ethnologisches Museum, Berlin, V A 49836." with dragonflies pictured.] Address: Karadimas, D., CNRS – Laboratoire d'Anthropologie sociale, France

15331. Karlsson, T. (2015): Östergötlands Trollsländor. Entomologiska Föreningen Östergötland: 160 pp. (in Swedish, with English summary) ["Östergötlands Trollsländor is a compilation of the results of a survey of dragonflies in the Swedish county Östergötland during 2008-2012, together with older records. The survey was performed by the Entomological Society in Östergötland, and this society is also the publisher of the book. Östergötlands Trollsländor is the first regional atlas of dragonflies in Sweden. It presents all 52 species noted for Östergötland with pictures and a distribution map. For threatened and rare species pictures of the

habitat is also presented. In addition, the book makes comprehensive comparisons between Östergötland and ten other regions in Europe (Sweden, Latvia, Polen, Germany, Great Britain and France) to show what distinguishes the dragonfly fauna in Östergötland." (Author) Address: E-mail: tommy_karlsson715@hotmail.com

15332. Kaunisto, K.M.; Kaunisto, P.; Vahtera, V.; Suhonen, J. (2015): Populations of the damselfly *Coenagrion hastulatum* at the edge of the species range have fewer gregarine and water mite parasites. *Freshwater biology* 60(4): 794-801. (in English) ["(1.) The metapopulation theory predicts that the more distant a host population is from other populations, the more challenged will be a parasite to colonise it. We studied parasite prevalence of two parasite taxa across the geographical range of their host in Finland, from more dense host population structure in the south of Finland, towards the northern edge of the host distribution characterised by more isolated populations. (2.) We found that prevalence of both water mites and gregarines decreased with increasing latitude towards the distribution edge with more isolated population structure of the host damselfly, *Coenagrion hastulatum*. Furthermore, the prevalences of the two parasite groups were positively correlated. (3.) The results are discussed in the context of three non-mutually exclusive hypotheses, explaining why host species have fewer parasites at the edge of their geographic range: (i) unsuitable host hypothesis, (ii) physiological barrier hypothesis and (iii) metapopulation hypothesis." (Authors)] Address: Kaunisto, K., Zoological Museum, Dept of Biology, FI-20014 University of Turku, Finland. E-mail: kari.kaunisto@utu.fi

15333. Kawsar Khan, M. (2015): *Gynacantha subinterrupta* Rambur, 1842: an addition to the odonates (Insecta: Odonata: Aeshnidae) of Bangladesh. *Journal of Threatened Taxa* 7(10): 7704-7705. (in English) ["Two males were collected on 25 October 2014 from Tilagor Eco Park (24°05'49.0"N & 91°05'14.2"E). The dragonflies were perching in the shade of the bush while they were photographed and later captured using an insect sweeping net. The specimens are deposited in the Department of Biochemistry and Molecular Biology, Shahjalal University of Science and Technology, Sylhet (BMBZO-ODO-002 and BMBZO-ODO-003)." (Author)] Address: Kawsar Khan, M., Dept of Biochemistry and Molecular Biology, Shahjalal University of Science and Technology, Bangladesh. E-mail: kawsarkhanbmb@sust.edu

15334. Ke, Y.-H.; Ju, Y.-M. (2015): Two rare ophiocordycipitaceous fungi newly recorded in Taiwan. *Botanical Studies* 2015, 56:30 doi:10.1186/s40529-015-0110-x: 6 pp. (in English) ["Background: Ophiocordycipitaceae is a highly diverse fungal family parasitizing a wide range of arthropods and hypogeous fungi. We collected two ophiocordycipitaceous species previously unknown in Taiwan: one emerged from hypogeous fruiting bodies of an *Elaphomyces* fungus and the other was associated with dragonflies (*Planaeschna* sp.). Results: Based on gross morphology, microscopic fea-

tures, ITS sequences, and hosts, the two ophiocordycipitaceous fungi were identified as *Tolypocladium japonicum* and *Ophiocordyceps odonatae*. We isolated axenic cultures of these two fungi, and their anamorphs were obtained. The simplicillium-like anamorph of *T. japonicum* is described herein for the first time. The anamorph of *O. odonatae* produce conidia holoblastically in sympodial sequence and is assignable to *Hymenostilbe*. A dichotomous key to the species of Ophiocordycipitaceae reported in Taiwan is provided. Conclusion: A thorough literature study indicates that the two fungi reported herein have rarely been collected. Our identifications of *T. japonicum* and *O. odonatae* agree well with descriptions in the literature and are highly supported by DNA sequence analysis." (Authors)] Address: Ke, Y.-H., Insti. of Plant & Microbial Biology, Academia Sinica, Taipei, Taiwan. E-mail: yumingju@gate.sinica.edu.tw

15335. Khan, M.K. (2015): Dragonflies and damselflies (Insecta: Odonata) of the northeastern region of Bangladesh with five new additions to the Odonata fauna of Bangladesh. *Journal of Threatened Taxa* 7(11): 7795-7804. (in English) ["Odonata were surveyed in one reserve forest, two national parks, one Eco Park, one lake and one University campus in the northeastern region of Bangladesh from March 2014 to March 2015. A total of 64 species of Odonata belonging to 41 genera under seven families were recorded. Among them 45 species and 19 genera were new records for the study area. Two species of Anisoptera, i.e., *Anax indicus* and *Gynacantha khasiac*, and three species of Zygoptera i.e., *Matrona nigripectus*, *Agriocnemis kalinga*, and *Prodasi-neura laidlawii* were recorded for the first time from Bangladesh." (Author)] Address: Khan, M.K., Dept Biochem. & Molecular Biol., School of Life Sciences, Shahjalal Univ. of Science & Technology, Sylhet 3114, Bangladesh. E-mail: kawsarkhan-bmb@sust.edu

15336. Khelifa, R. (2015): Does water intake after oviposition indicate the end of oviposition and egg depletion in Odonata females? *International Journal of Odonatology* 18(3): 225-231. (in English) ["Oviposition in odonate females is usually considered finished when the female leaves the oviposition site. However, considering that many species lay their eggs within a set of bouts it is difficult to distinguish between the end of the oviposition bout and the end of the oviposition episode because the females can change the oviposition site from one bout to another. In this study, post-oviposition drinking is suggested as behavioural indicator not only for the end of an oviposition episode but also for egg depletion in females, as investigated in 11 species from five families. This behaviour comprises water intake that the female performs at the end of oviposition by dipping the mouthparts in the water a few times before leaving the oviposition site. The role of downward bending of the abdomen displayed during water intake is also discussed." (Authors) *Coenagrion caerulescens*, *Erythromma lindenii*, *Ischnura graellsii*, *Platycnemis subdilatata*, *Sympetma fusca*, *Calopteryx haemorrhoidalis*, *Crocothemis erythraea* *Orthetrum chrysostigma*, *O. coerulescens*, *O. nitidinerve*, *Sympetrum fonscolombii*.] Address: Khelifa, R., Institute of Evolutionary

Biology and Environmental Studies, University of Zürich, Zürich, Switzerland. E-mail: rassimkhelifa@gmail.com

15337. Khelifa, R.; Guebailia, A.; Mahdjoub, H.; Aouaouche, M.S.; Houhamdi, M. (2015): Aspects of life history of *Platycnemis subdilatata* (Zygoptera: Platycnemididae) in Northeast Algeria. *International Journal of Odonatology* 18(4): 317-327. (in English) ["The determination of seasonal regulation is important to understand how species have adapted to their local environmental conditions. In this study, we investigate the life history of a North African endemic damselfly, *Platycnemis subdilatata*, in a northeast Algerian population. We combined field and laboratory investigations to assess the embryonic development, larval growth, emergence pattern and adult flight season. The embryonic development was direct and asynchronous, with 50% of all eggs hatching after three weeks of egg laying and a hatching period ranging from 13 to 51 days. Hatching success was 48.8%, and the causes of hatching failure were infertility and unhatchability. Larval population structure was quite asynchronous during the winter and less so before emergence. The occurrence of larval diapause is improbable due to the increase of the proportion of the last larval stadium in late winter. Emergence was asynchronous with half of the larval population (EM50) emerging after 44 days within an emergence season of 122 days. Sex ratio at emergence was slightly female biased (50.6%). The flight season lasted 133 days starting from early May. The species reached its sexual maturity after six and seven days of emergence in male and female, respectively. Lifespan was not significantly different between sexes with a mean of 7.75 ± 6.45 days (\pm SD). Our results suggest that the species is univoltine with a typical summer species life history." (Authors)] Address: Khelifa, R., Dept of Biology, Faculty of Biological and Agricultural Sciences, University of Tizi Ouzou, Tiz, Algeria. E-mail: rassimkhelifa@gmail.com

15338. Kirti, J.; Kaur, S.; Singh, A. (2015): Studies on male genitalia of some species of family Libellulidae (Anisoptera: Odonata) from north-west India. *International Journal of Advanced Research* 3(7): 1-9. (in English) ["The secondary male genitalic attributes of five species i.e. *Sympetrum haematoneura*, *Urothemis signata signata*, *Palpopleura sexmaculata sexmaculata*, *Zygonyx torridus isis* and *Libellula quadrimaculata* have been studied and illustrated in this manuscript. The significance of various genitalic attributes of all the species has also been highlighted." (Authors)] Address: Kirti, J., Dept of Zoology and Environmental Sciences, Punjabi University, Patiala-147002, India

15339. Klecka, J. (2015): Aquatic insects of a lowland rainforest in Papua New Guinea: assemblage structure in relation to habitat type. *Biologia* 70(12): 1621-1630. (in English) ["Papua New Guinea is one of the most valuable tropical regions but ecological research of its freshwater invertebrates has been lacking. The goal of this paper is to evaluate the species richness, diversity and structure of aquatic insect assemblages in different habitats in the Wanang River catchment in a well-preserved lowland rainforest. Assemblage structure was studied on two spatial scales - in

different habitats (river, streams and stagnant pools) and in three mesohabitats in the river (slow and fast sections and submerged wood). The results show that headwater streams had the highest morphospecies diversity, while the river had the highest insect abundance. Slow and fast sections of the river differed both in terms of insect abundance and diversity. Furthermore, a number of unique wood-associated species was found on submerged wood. The most notable feature of the assemblage structure was scarcity of shredders and dominance of predators. However, predatory beetles, bugs and dragonfly larvae exhibited contrasting habitat preferences. This study shows that Papua New Guinean lowland rainforests host diverse and distinctly structured freshwater insect assemblages." (Author) Taxa - including Odonata - are treated at the family level.] Address: Klecka, J., Laboratory of Integrative Ecology, Institute of Entomology, Biology Centre of the Academy of Sciences of the Czech Republic v.v.i., Branišovská 31, 37005 České Budějovice, Czech Republic

15340. Knorp, N.E.; Dorn, N.J. (2016): Mosquitofish predation and aquatic vegetation determine emergence patterns of dragonfly assemblages. *Freshwater Science* 35(1): 114-125 (in English) ["Both site-selective oviposition and interactions following colonization can play a role in structuring communities, but the relative importance of each has not been well studied for many animals. We manipulated the presence of a small-bodied fish predator (Eastern Mosquitofish, *Gambusia holbrooki*) and submerged aquatic vegetation (SAV; *Utricularia* spp.) in 24 mesocosms (n = 6 replicates, 4 treatments) to determine the effects of predators and habitat structure on dragonfly oviposition and naiad success. Adults did not avoid ovipositing in mesocosms with mosquitofish predators, but some species did select for or against SAV. No dragonfly naiads emerged from mesocosms with mosquitofish that lacked SAV. In treatments with SAV, total emergence was almost 3× higher in mesocosms without mosquitofish than mesocosms with mosquitofish. Oviposition patterns generally could not account for emergence patterns in the mesocosms, suggesting that libellulid dragonfly production can be severely limited by postcolonization interactions with mosquitofish. The dominant species emerging from the 3 treatments with naiad success varied consistently, a result suggesting that emerging assemblage composition was altered primarily by tolerances to mosquitofish/interspecific interactions. In mesocosms with SAV, the emerging assemblages were more species rich and more similar in the absence than in the presence of mosquitofish. We suggest that stochastic postcolonization egg or early-naiad survival may account for some assemblage variation in the presence of an efficient stage-specific predator like mosquitofish. This assemblage of libellulids appears to be filtered primarily according to vulnerability to fish predators, with SAV serving to reduce intensity of postcolonization interactions." (Authors) *Pantala flavescens*, *Tamea carolina*, *Tamea abdominalis*, *Celithemis eponina*, *Pachydiplax longipennis*, *Libellula needhami*, *Erythemis simplicicollis*.] Address: Knorp, Natalie, School of Environmental Studies,

Tennessee Tech University, Cookeville, Tennessee 38505 USA. E-mail: neknorp42@students.tntech.edu

15341. Koch, C. (2015): Lifetime egg production of captive libellulids (Odonata). *International Journal of Odonatology* 18(3): 193-204. (in English) ["The estimation of lifetime egg production (LEP) is a central question in ecology, since the number of eggs produced determines the potential size of the following generation. In this study, I tried to obtain a rough estimation of the LEPs in libellulids in outdoor cages. The main questions were: (1) does hand feeding influence females' life history traits; (2) how long is the maturation period and the lifespan; (3) does the quality/quantity of eggs vary with female age or size; and (4) how many eggs do females lay in their lifetime? I installed two outdoor cages and kept individually marked specimens of *Orthetrum coerulescens* and *Sympetrum striolatum* under semi-natural circumstances. *Orthetrum coerulescens* had a longer life span in hand-fed specimens compared to not hand-fed. The maturation period, number of clutches, clutch size, egg circumference, and LEP did not differ between hand-fed and not hand-fed specimens. The median maturation period was shorter in *O. coerulescens* (24 days hand-fed; 20 days not hand-fed) than in *S. striolatum* (47 days, all hand-fed). The mortality during the maturation period was high in both studied species (*O. coerulescens* 81.48%, *S. striolatum* 89.16%). *Orthetrum coerulescens* had a shorter median life span than *S. striolatum*. The quality/quantity of eggs did not correlate with females' age and size. *Orthetrum coerulescens* had a mean calculated lifetime egg production of 3081 eggs per specimen and *S. striolatum* 1041 eggs per specimen. The data pertain to outdoor cage experiments (a reduced spectrum of prey, no long flights possible, no predators present). Nevertheless, they may provide a very rough estimation of LEP for two libellulid species." (Author)] Address: Koch, Kamilla, Department of Ecology, Johannes Gutenberg-University of Mainz, Becherweg 13, 55128 Mainz, Germany

15342. Kok, J.M.; Chahl, J.S. (2015): Effects of uneven stroking on the aerodynamic efficiency of a dragonfly-inspired wing-actuation system. *AIAC16: 16th Australian International Aerospace Congress*. Barton, ACT: Engineers Australia, 2015: 310-317. (in English) ["In this paper, we investigate the effects of using an uneven upstroke to downstroke motion on the aerodynamic efficiency of a dragonfly inspired flapping wing system. Our results show that for a system without elasticity, the highest aerodynamic efficiencies ($L/P = 0.185$) were observed using near symmetrical upstrokes to downstroke profiles ($\xi = 0.52$), but with an optimized pitching profile ($\alpha_{\text{pitch}} = 8\pi/12$, $\alpha_0 = 4\pi/12$). We then modeled the system with elasticity. In systems with low elasticity ($\lambda < 1.0$), the benefits of uneven stroking were minimal with percentage improvements in aerodynamic efficiency with the use of uneven stroking of less than 2%. However, in systems dominated by elastic forces ($\lambda < 2.0$), the improvements in aerodynamic efficiency can be as high as 35%." (Authors)] Address: Kok, J.M.,

School of Engineering, University of South Australia, Mawson Lakes, South Australia, 5095, Australia

15343. Koli, V.K.; Bhatnagar, C.; Shekhawat, D.S. (2015): Diversity and species composition of odonates in southern Rajasthan, India. *Proceedings of the Zoological Society* 68(2): 202-211. (in English) ["The study was conducted in south Rajasthan to explore diversity and species composition of Odonata from January 2013 to June 2013. Odonates were sampled from 13 localities i.e., Pichola lake, Udaisagar lake, Badi lake, Ghasa lake, Menar lake, Badwai lake, Rup sagar lake, Roli todgarh Wildlife Sanctuary, Sitamata Wildlife Sanctuary, Karmoi river stream in Sitamata WLS, College campus, Rajsmand lake and Meja dam. During the study period, a total of 1,290 individuals from 8 families and 54 species were recorded. 4 families and 28 species were related to Anisoptera, while 4 families and 26 species belonged to Zygoptera. Suborder Zygoptera were represented by the families Chlorocyphidae, Coenagrionidae, Lestidae and Platycnemididae, and suborder Anisoptera by the Aeshnidae, Gomphidae, Libellulidae and Macromiidae. Libellulidae was the largest family with 24 species, while the most dominant species was *Brachythemis contaminata* (21.80 %). *Orthetrum chrysis* and *Lestes* sp. were found randomly distributed in the study area, while other were aggregated and showed habitat preference." (Authors)] Address: Koli, V.K., Wildlife Research Lab., Dept of Zool., Univ. Coll. of Science, Mohanlal Sukhadia Univ., Udaipur, 313001, Rajasthan, India. E-mail: vijaykoli87@yahoo.in

15344. Kolozsvári, I.; Szabo, L.J.; Dévai, G. (2015): Dragonfly assemblages in the upper parts of the River Tisza: A comparison of larval and exuvial data in three channel types. *Acta Zoologica Academiae Scientiarum Hungaricae* 61(2): 189-204. (in english) ["We studied dragonfly assemblages in the Ukrainian section of the River Tisza, which still shows several natural (unregulated) properties. In 2010 and 2011 larvae and exuviae were collected in the vicinity of the villages Vilok, Nove Szelo, Tiszobikeny and of the towns Vinohragyiv and Huszt. We collected our samples from 8 sites in the main channel, 2 sites in side channels and 3 sites in two dead channels. We collected 255 larvae and 1587 exuviae [*Gomphus vulgatissimus*, *Stylurus flavipes*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*, *Soma-tochlora metallica*, *Calopteryx splendens*, *Platycnemis pennipes*, and *Sympecma fusca*]. We compared the species composition of dragonflies in the three habitats. In the case of larvae in the main channel *G. vulgatissimus* (48.0%), *C. splendens* (29.6%) and *O. forcipatus* (20.8%) dominated, while in the oxbow channels *C. splendens* (49.5%) and *P. pennipes* (23.7%) were found most frequently. In the side channels *G. vulgatissimus*, *O. forcipatus* and *C. splendens* were the most frequent species. *S. flavipes* appeared only in the main and side channels, while *S. metallica* and *S. fusca* were only detected in the oxbow channels." (Authors)] Address: Kolozsvári, I., Ferenc Rákóczi II. Transcarpathian Hungarian Institute, István Fodor Research Institute Kos-suth square 6, Beregove 90202, Ukraine. E-mail: kolozsva-ros@gmail.com

15345. Kompier, T. (2015): A Guide to the Dragonflies and Damselflies of the Serra dos Orgaos, South-Eastern Brazil / *Guia dos Anisoptera e Zygoptera da Serra dos Órgãos, Sudeste do Brasil*. Regua publications: xx, 379 pp. (Bilingual in English and Portuguese) ["First comprehensive field guide to the Odonata of the Reserva Ecologica de Guapiacu and the Serra dos Órgãos in south-eastern Brazil. With over 560 stunning colour photos and 125 additional illustrations of all 204 known from this incredible biodiversity hotspot. Featuring illustrations of both males and females and with additional illustrations of different stages of maturity of many. Texts with full descriptions, identification features, behaviour, flight periods, abundance and notes on status and nomenclature." (Author)] Address: <http://regua.org/publications/new-regua-publication-dragonflies-damselflies-of-the-serra-dos-orgaos-2/>

15346. Kondo, T.; Palacino-Rodríguez, F.; Pena-Cuellar, R.D. (2015): Report of *Erpetogomphus sabaleticus* Williamson, 1918 (Odonata: Gomphidae) feeding on *Diaphorina citri* Kuwayama (Hemiptera: Liviidae). *Boletín del Museo de Entomología de la Universidad del Valle* 16(1): 17-26. (in English) ["*E. sabaleticus* is for the first time reported preying on *D. citri*. A compiled list of more than 63 species distributed in seven orders and seventeen families of arthropod (insects and spiders) natural enemies of *D. citri* is provided." (Authors)] Address: Palacino-Rodríguez, F., Grupo de Investigación en Odonatos de Colombia, Laboratorio de Artrópodos, Centro Internacional de Física, Univ. Nacional, sede Bogotá / Depto de Biología, Univ. El Bosque, Bogotá, Colombia. E-mail: odonata17@hotmail.com

15347. Koparde, P.; Mhaske, P.; Patwardhan, A. (2015): Habitat correlates of Odonata species diversity in the northern Western Ghats, India. *Odonatologica* 44(1/2): 21-43. (in English) ["Sixty-two localities from Sahyadri Tiger Reserve, Maharashtra State, India, were surveyed for habitat correlates of Odonata diversity. Proximate habitat variables (canopy cover, area of water spread on transect, and altitude) and broad scale environmental variables derived from climate database were used. Seventy species were recorded during the survey. *Vestalis apicalis* was found to be the most abundant species. Multiple regression analysis failed to resolve relationship among variables. Proximate habitat variables, except altitude, showed slightly higher contribution in shaping species richness and diversity than broadscale habitat variables. Canonical correspondence analysis based on species abundance data and multiple variables suggested that canopy cover and area of water on the transect are driving species assemblages. Almost all of the Western Ghats endemics recorded during the survey were found to be associated with high canopy forests and streams, suggesting the critical habitat requirement of these species. The study provides baseline and local habitat association data on Odonata, which can be used as evidence in the conservation of the Sahyadri Tiger Reserve corridor which is under threat of forest felling." (Authors)] Address: Koparde, P., Sálím Ali Centre for

Ornithology & Natural History, Anaikatty (Post), Coimbatore-641108, Tamil Nadu, India. E-mail: pankajkoparde@gmail.com

15348. Koskinen, J. (2015): Dragonfly communities of North Karelian forest lakes and ponds. M.Sc. Thesis, Department of Biology, University of Eastern Finland: 67 pp., 6 Appendices (in English, with Finnish summary) ["The goal of this thesis is to survey the dragonfly communities of small Southern Boreal forest ponds. Different dragonfly species exhibit different survival strategies against fish predation and the risk of drought and seasonal change. They also differ in the length of larval period. This should lead to different dragonfly community structures in ponds that are fishless compared to ponds that contain fish, and in ponds that are permanent or ephemeral. The heterogeneity and diversity of vegetation is known to be important for dragonfly diversity. The effects of fish predation on dragonfly community structures, abundance and species composition have been studied earlier, but much remains to be studied. Study sites, permanent, semipermanent and ephemeral ponds, both fish-inhabited and fishless, were selected by consulting of Greater Crested Newt (*Triturus cristatus*) research team. Study material was collected from forested ponds in Joensuu and Tohmajärvi municipalities in North Karelia, Eastern Finland. The larvae and exuviae data was collected during summer 2013. Specimens were identified in laboratory and finally used as community data. Environmental variables, such as architectural diversity of vegetation, were also measured. General dragonfly diversity index (Shannon's) and number of species was higher in ponds that contained fish than in ponds that did not. Area of the sampling sites did not correlate significantly with the number of individuals or species. The diversity of vegetational architecture also had a correlation with species richness and odonate Shannon's diversity. The community structures differed clearly between fishless and fish-inhabited ponds. The presence of fish, the ephemerality-permanence of the ponds and the vegetational diversity were all found to explain community structures. The presence of *Sphagnum* spp. peat mosses, and dwarf shrubs were also a frequent factor in community structures. Decoupling the presence of fish from other biotic and abiotic factors in research done in situ remains problematic."] (Author) Address: not stated

15349. Kosterin, O.E. (2015): *Onychargia priydak* sp. nov. (Odonata, Platycnemididae) from eastern Cambodia. *International Journal of Odonatology* 18(2): 157-168. (in English) ["*Onychargia priydak* sp. nov. is described from eastern Cambodia. The new species co-occurs with the widespread *Onychargia atrocyana* Selys, 1865 in the same region. Its males differ from those of *O. atrocyana* by a larger paraproct, which are longer than the cerci, and a bright white pruinescence on thorax, femora and the two first abdominal segments. This is the second species in the genus *Onychargia* Selys, 1865. *Onychargia vittigera* Selys, 1865 is synonymised with *O. atrocyana*; *Onychargia indica* Sahni, 1964 does not belong in the genus *Onychargia*."] (Author) Address: Kosterin, O.E., Institute of Cytology and

Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

15350. Kosterin, O.E. (2015): Dry season Odonata of the Cardamonean coast (Cambodia and Thailand) revisited in 2015. IDF-Report 89: 1-36. (in English) ["The Cardamom foothills were re-assessed for Odonata in the late dry season of 2015 within E Thailand and SW Cambodia. In the narrow coastal strip of Trat Province of Thailand bordering to Cambodia, 44 species (1 unidentified) were recorded, of which 15, namely *Agriocnemis nana*, *Archibasis viola*, *Ischnura senegalensis*, *Pseudagrion microcephalum*, *P. williamsoni*, *Acisoma panorpoides*, *Brachythemis contaminata*, *Brachydiplax farinosa*, *Hydrobasileus croceus*, *Macrodiplax cora*, *Rhyothemis plutonia*, *R. variegata*, *Tholymis tillarga* and *Trithemis pallidinervis* were recorded for Trat Province for the first time. That increased the number of species recorded for the province to 61. Preliminary checklists of Odonata of Ream Peninsula (that is of Ream National Park) and of Koh Rong Island were compiled, mostly on the data of this trip, to count 45 species (2 unidentified) and 17 species, respectively. As many as 36 species were recorded at the village of O'Som, Pursat Province. *Copera marginipes* is added to species recorded from Bokor Hill Station. Superficially similar males of *Pseudagrion australasiae* and *P. microcephalum* were observed in the same locality in Ream National Park."] (Author) Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

15351. Kosterin, O.E. (2015): Odonata registered on a short excursion to Kyshtovka District, Novosibirsk Province, Russia. IDF-Report 86: 29-46. (in English) ["During a four-day trip to Kyshotovka District, the most northwestern district of Novosibirsk Province, 21 species of Odonata were recorded. Two significant findings were made: that of *Coenagrion ecomutum* is most northern in West Siberia, and that of *Lestes macrostigma* is perhaps the northernmost in its range. The latter species was found over small, shallow, freshwater pools along a roadside. The diversity of this species' habitats in Siberia in comparison to its uniform habitats at brackish water in Western Europe is discussed."] (Author) Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

15352. Kosterin, O.E.; Karube, H.; Futahashi, R. (2015): Two new subspecies of *Hemicordulia tenera* Lieftinck, 1930 (Corduliidae) from Cambodia and Thailand. *International Dragonfly Fund - Report* 82: 1-19. (in English) ["*Hemicordulia tenera donnellyi* ssp. nov. (holotype P: Chiang Mai Prov., Kunklang: highway 1009, Restaurant; 16°32.0' N 98°31.3' E, 1000 m, 22 v 1996, FSCA) and *H. t. vikhrevi* ssp. nov. (holotype P: Cambodia, Koh Kong Province, ~13 km ENE of Koh Kong, 'Hemicordulia brook', 11°39'55" N, 103°05'34" E, 315 m, 04 xii 2010, RMNH) are described from North

Thailand and South-West Cambodia, respectively. The nominotypical *H. tenera tenera* Lieftinck, 1930 is distributed in the Malay Peninsula, Borneo, Java and Sumatra. Although these three subspecies are genetically very close, they are distinguishable by the relative length and shape of the caudal appendages." (Authors)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

15353. Kosterin, O.E. (2015): *Ischnura foylei* sp. nov. (Odonata, Coenagrionidae) from the highlands of Sumatra. *Zootaxa* 4032(2): 179-189. (in English) ["*Ischnura foylei* sp. nov. is described from Indonesia, Sumatra, Jambi Province, Danau Gunung Tujuh (or Danau Sakti), a lake situated in an extinct volcanic crater, 1°41'15"S, 101°25'28"S, 1995 m a.s.l. Structurally it is close to *I. senegalensis* but larger and with differently shaped cerci in males and a more trilobate posterior lobe of the prothorax; males and androchromatic females have a unique colour pattern." (Author)] Address: Kosterin, O.E., Inst. Cytology & Genetics, Siberian Branch, Russian Acad. Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

15354. Kosterin, O.E. (2015): *Prodasineura hoffmanni* sp. nov. (Odonata, Platycnemididae, Disparoneurinae) from eastern Cambodia. *Zootaxa* 4027(4): 565-577. (in English) ["*Prodasineura hoffmanni* sp. nov. is described from Annamense Mountains in eastern Cambodia (holotype: Cambodia, Mondulkiri Province, 4.2 km SE of Dak Dam village, 12°23'10-18" N 107°19'22-30" E, 877-878 m asl, 14. VI. 2014, RMNH). The species has a blue pattern, and the male is characterised by medium-broad blue stripes on synthorax and blue colour at the end of the abdomen confined to a tiny spot on S9, dorsum of S10 and cerci. A female of *P. doisuthepensis* Hoess, 2007 is described. Based on original descriptions, the following synonymy is proposed: *Prodasineura fujianensis* Xu, 2006 = *Prodasineura huai* Zhou et Zhou, 2007, syn. n.] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, RUS-630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

15355. Kosterin, O.E. (2015): On the Odonata of North Kazakhstan Province. I. First data on Petropavlovsk. IDF-Report 86: 1-28. (in English) ["The fauna of Odonata of the environs of Petropavlovsk, North Kazakhstan, was for the first time examined on two short trips in late June and mid August 2015. Thirty five species were revealed. *Coenagrion ecornutum* was recorded in Kazakhstan for the first time, *Gomphus vulgatissimus* the second time and *Stylurus flavipes* the third time. Range expansion of *C. ecornutum* is discussed. Comparison is attempted of the known local Odonata faunas of the environs of Petropavlovsk, Omsk and Novosibirsk cities residing at the same latitude in the West Siberian Lowland. The Petropavlovsk fauna is very close to that of Omsk. The earlier published Kazakh records of *G. vulgatissimus* and *S. flavipes* are clarified and corrected. Breeding of *Aeshna viridis* in Ishim River (lacking

water soldier) is supposed." (Author)] Address: Kosterin, O.E., Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Lavrentiev Ave 10, 630090 Novosibirsk, Russia. E-mail: kosterin@bionet.nsc.ru

15356. Kümmerlen, M.; Schmalz, B.; Cai, Q.; Haase, P.; Fohrer, N.; Jahnig, S.J. (2015): An attack on two fronts: predicting how changes in land use and climate affect the distribution of stream macroinvertebrates. *Freshwater Biology* 60(7): 1443-1458. (in English) ["1. Global environmental change entails not only climatic alterations, but also changes in land use. Freshwater ecosystems are particularly sensitive to both of these changes, and their sustainable management requires better information on likely responses. 2. To examine the effects of climate and land use on the freshwater community, the distributions of stream macroinvertebrates of the Changjiang catchment in southeast China were modelled. The present distributions of 72 taxa were predicted using environmental variables generated by regional climate, land-use and hydrological models. 3. Hydrological predictors, sensitive to both climate and land use, were the most relevant predictors in the species distribution models (SDMs), followed by land use. 4. The stream macroinvertebrates' distributions were then projected for the period 2021 to 2050 using three different future scenarios: (i) climate change, (ii) land-use change and (iii) climate and land-use change combined. 5. Land-use change was predicted to have the strongest negative impact on the community, with reductions in local richness (20%), predicted diversity (0.3%) and range size (25%) and a general shift towards higher altitudes (+12%). The climate-change scenario had a negative effect on predicted diversity (0.1%) and resulted in a moderate altitudinal shift (+3%) along with increased richness (+15%) and range size (+19%). In the combined scenario, climate and land-use changes counterbalanced each other to a certain degree, but had an overall detrimental effect. 6. The results underscore the high relevance of land-use change in future distribution predictions, exemplify the possible effect of interactions between land use and climate on hydrology and indicate how such responses can vary among freshwater taxa. The model also allows the detection of key environmental variables, the identification of vulnerable species and the definition of their potential distributions. This information is essential to establishing effective management and conservation strategies and gives a more comprehensive insight into the possible effects of global environmental change on freshwater ecosystems." (Authors)] Address: Kümmerlen, M., Dept of River Ecology and Conservation, Senckenberg Research Institute and Natural History Museum Frankfurt, Clamecystr. 12, 63571 Gelnhausen, Germany. E-mail: mathias.kuemmerlen@senckenberg.de

15357. Kulijer, D. (2015): *Sympetrum flaveolum* in the Dinaric Alps (Odonata: Libellulidae). *Libellula* 34(1/2): 91-101. (in English, with German summary) ["An overview is given on distribution, habitat and flight season of *S. flaveolum* in Bosnia and Herzegovina, and the status of this species in the Dinaric Alps is discussed. It was found to be common

and widespread in Bosnia and Herzegovina. In the data set consulted, *S. flaveolum* was present in 93 localities and it is thus concluded that the species is quite common. Continuity and abundance of observations, including much evidence of reproduction, indicate the presence of permanent populations in the Dinaric Alps in Bosnia and Herzegovina." (Author)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: dejan.kulijer@gmail.com

15358. Kulijer, D. (2015): *Sympetrum flaveolum* in the Dinaric Alps (Odonata: Libellulidae). *Libellula* 34(1/2): 91-101. (in English, with German summary) ["An overview is given on distribution, habitat and flight season of *S. flaveolum* in Bosnia and Herzegovina, and the status of this species in the Dinaric Alps is discussed. It was found to be common and widespread in Bosnia and Herzegovina. In the data set consulted, *S. flaveolum* was present in 93 localities and it is thus concluded that the species is quite common. Continuity and abundance of observations, including much evidence of reproduction, indicate the presence of permanent populations in the Dinaric Alps in Bosnia and Herzegovina." (Author)] Address: Kulijer, D., National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: dejan.kulijer@gmail.com

15359. Kunz, B. (2015): Paarungsaktivitäten mit Dreifach- und Vierfachverbindungen bei *Gomphus vulgatissimus* (Odonata: Gomphidae). *Libellula* 34(1/2): 73-83. (in German, with English summary) [Baden-Württemberg; "On 14 May 2011, at a still water beside the river Jagst near Eberbach, Germany (49°17'35"N, 09°49'59"E), individuals of *G. vulgatissimus* were observed and photographically documented constituting triple and quadruple connections that consisted of two and three males and one female, respectively. The quadruple connection lasted for nearly ten seconds. During five minutes, individuals of both sexes, but mainly males, flew confusingly fast to and fro by a newly created water body with almost clear banks, forming tandems, copulation wheels, triple and quadruple connections in wild disorder. This unusual behaviour ended as suddenly as it had started and might have been triggered by an upcoming thunderstorm. Triple and quadruple connections of *G. vulgatissimus* are reported for the first time." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellenbernd@gmail.com

15360. Kunz, B. (2015): Ist der Waschbär *Procyon lotor* eine Gefahr für *Cordulegaster boltonii*? (Mammalia: Procyonidae; Odonata: Cordulegasteridae). *Libellula* 34(3/4): 203-207. (in German, with English summary) ["First indication of the raccoon as a predator on larvae of *Cordulegaster boltonii* was found at a stream in NE Baden-Württemberg, Germany. In typical microhabitats, like accumulations of sand or detritus in shallow and calm waters, no larvae of *C. boltonii* could be found, but there were footprints of raccoons. The search for larvae at locations with steep banks and deep water (> 40 cm), where raccoons may not search for food, was successful. The larvae of *C. boltonii* obviously use

a broader range of microhabitats than previously thought." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellenbernd@gmail.com

15361. Kunz, B. (2015): Foraging behaviour of *Ischnura genei* in the early morning (Odonata: Coenagrionidae). *Libellula* 34(3/4): 187-194. (in English, with Italian and German summaries) ["In August 2013, at two different locations in Sardinia, individuals of *Ischnura genei* were observed and photographically documented flying at sunrise close above the water surface and picking up prey items. The prey consisted mainly of emerging Ephemeroptera (*Caenis* sp.) and *Culicomorpha* (Diptera)." (Author)] Address: Kunz, B., Hauptstr. 111, D-74595 Langenburg, Germany. E-mail: libellenbernd@gmail.com

15362. Kunz, B. (2015): First record of *Ischnura nursei* Morton, 1907 from Oman (Odonata: Coenagrionidae). *Libellula* 34(1/2): 117-124. (in English, with German summary) ["One female specimen, labeled as "*Ischnura spec.*", was found within the Odonata collection of the Museum für Naturkunde Berlin (MfN). It was collected incidentally on 18-xii-2003 around 60 km southeast of Muscat, Oman. A compilation of available records of this species published within the last six years indicates roughly homogeneous distribution between southeastern Iran and Bangladesh." (Author)] Address: Kunz, B., Hauptstr. 111, 74595 Langenburg, Germany. E-mail: libellenkunz@gmail.com

15363. Lakhari, A.; Panhwar, W.A.; Panhwar, F.A. (2015): Studies on the taxonomy of *Crocothemis servilia servilia* (Drury, 1773) (Odonata: Libellulidae). *Arquivos Entomológicos* 14: 105-106: 105-106. (in English, with Spanish summary) [Description of a common Pakistanian Odonata species.] Address: Lakhari, A., National College of Science, Sindh, Pakistan. E-mail: amjadlakhari2@hotmail.com

15364. Lambret, P.; Besnard, A.; Matushkina, N. (2015): Plant preference during oviposition in the endangered dragonfly *Lestes macrostigma* (Odonata: Zygoptera) and consequences for its conservation. *J. Insect Conserv.* 19(4): 741-752. (in English) [Marais du Vigueirat, Camargue (Southern France); "Biotic and abiotic features impact the breeding success of animals and thereby induce selection pressures for habitat selection. Little is known about the plant selection by predatory insects which lay their eggs within plants. In previous work, we have highlighted that during oviposition males of *Lestes macrostigma*—an endangered dragonfly species—prefer to land on *Bolboschoenus maritimus* and dead shoots of *Juncus maritimus* but disfavour living shoots in that species, and that females seem to prefer dead material during substrate examination. In this study we assessed behavioural preference in females during substrate examination, substrates suitability for oviposition, the effort females had to make to lay their eggs and their resulting oviposition rate. We show *L. macrostigma* has a preference for *B. maritimus* and, albeit to a lesser extent, for dead substrates. No clear trend appeared regarding substrate suitability. Females had to

make a greater effort to lay an egg within living shoots of *J. maritimus*. By contrast, this effort was less in *B. maritimus* and dead shoots of *J. maritimus* and the oviposition rates were higher for these two types of substrate. We hypothesize that these preferences are relevant in the selection of oviposition substrates which are more likely to be flooded earlier by rainfall, reducing risk of egg desiccation and increasing hatching success. With regard to conservation, *B. maritimus* and *J. maritimus* should be encouraged by wildlife managers especially in habitat restoration programs which aim to increase the number of suitable breeding sites for the species." (Authors)] Address: Lambret, P., Tour du Valat Research Centre, Le Sambuc, 13200 Arles, France. E-mail: lambret@tourduvalat.org

15365. Lambret, P.; Besnard, A.; Matushkina, N. (2015): Initial preference for plant species and state during oviposition site selection by an odonate. *Entomological Science* 18: 377-382. (in English) [National Natural Reserve of the Marais du Vigueirat, Camargue (southern France), at the Baisse des Marcells; "Endophytic egg-laying odonates use an ovipositor to insert their eggs inside plant tissues. Before egg deposition, oviposition site selection consists of two crucial steps: (i) the initial choice, typically decided in species that oviposit in tandem within vertical substrates by the male when landing and then by the female by staying on the substrate or flying to another; and (ii) the insertion site choice, made by the female who uses her ovipositor to palpate the substrate. Some odonates prefer to deposit their eggs within specific plant species. Some are able to discriminate between living and dead substrates during the initial choice. However, the extent to which odonates discriminate among distinct plant species during the initial choice is unknown. We studied the initial site preference in *L. macrostigma* to determine whether the males and/or females show a distinct preference among five types of shoots when landing on or when palpating the substrate, respectively. Male *L. macrostigma* preferred to land on *Bolboschoenus maritimus* and dead *Juncus* spp. When focusing on *J. maritimus*, females preferentially palpated the substrate when the male landed on dead shoots. We suggest that the male preference for these substrates is consistent with that of the female during insertion site choice but also during egg deposition. Such behaviour should reduce the duration of oviposition, with benefits of reducing the predation risk and increasing available time for foraging. The advantage in preferring these substrates should be linked to a selection pressure acting on egg development and/or survival." (Authors)] Address: Lambret, P., Tour du Valat Research Centre, Le Sambuc, 13200 Arles, France. E-mail: lambret@tourduvalat.org

15366. Le Rouzic, A.; Hansen, T.F.; Gosden, T.P.; Svensson, E.I. (2015): Evolutionary time-series analysis reveals the signature of frequency-dependent selection on a female mating polymorphism. *The American Naturalist* 185(6): E182-E196. (in English) ["A major challenge in evolutionary biology is understanding how stochastic and deterministic factors interact and influence macroevolutionary dynamics

in natural populations. One classical approach is to record frequency changes of heritable and visible genetic polymorphisms over multiple generations. Here, we combined this approach with a maximum likelihood-based population-genetic model with the aim of understanding and quantifying the evolutionary processes operating on a female mating polymorphism in *Ischnura elegans*. Previous studies on this colour-polymorphic species have suggested that males form a search image for females, which leads to excessive mating harassment of common female morphs. We analyzed a large temporally and spatially replicated data set of between-generation morph frequency changes in *I. elegans*. Morph frequencies were more stable than expected from genetic drift alone, suggesting the presence of selection toward a stable equilibrium that prevents local loss or fixation of morphs. This can be interpreted as the signature of negative frequency-dependent selection maintaining the phenotypic stasis and genetic diversity in these populations. Our novel analytical approach allows the estimation of the strength of frequency-dependent selection from the morph frequency fluctuations around their inferred long-term equilibria. This approach can be extended and applied to other polymorphic organisms for which time-series data across multiple generations are available." (Authors)] Address: Le Rouzic, A., Laboratoire Évolution, Génomes, et Spéciation, CNRS-LEGS-UPR9034, CNRS-Institut Diversité, Écologie, et Évolution du Vivant-FR3284, Université Paris-Sud, Avenue de la Terrasse, Bâtiment 13, 91198 Gif-sur-Yvette, France. E-mail: lerouzic@legs.cnrs-gif.fr.

15367. Leon, E.J.; Olguín, P.F.; Beltzer, A.H. (2015): Aportes al conocimiento de la dieta del mirasol chico (*Ixobrychus involucris*) (Aves: Ardeidae) en el valle de inundación del río Paraná Medio, Argentina. *Revista FABICIB* 19: 65-74. (in Spanish, with English summary) ["Contributions to the knowledge of the diet of Least Bittern (*Ixobrychus involucris*) (Aves: Ardeidae) flooding in the valley of the middle Paraná river, Argentina. The first input on the diet of *Ixobrychus involucris* in the valley of the Middle Paraná River flood, Argentina are presented. Stomach contents of 13 individuals captured with mist nets and washings were analyzed performed stomach. The trophic diversity stomach ranged between 0.22 and 2.89. The cumulative trophic diversity was 1.58. The trophic spectrum showed Insecta as the most important entity (Odonata, Coleoptera, Hemiptera and Orthoptera). The IR showed: Insects = 10450; Fish and Arachnids = 140. To prey size 55% were insects, the class interval comprising 31-40 mm. In terms of niche breadth: Spring = 0.10, Summer = 0.19, = 0.17 Autumn and Winter = 0.14. Feed efficiency corresponded to: Spring = 88.9; Summer = 91.45; Autumn and Winter = 91.04 = 88.92. For food selectivity, the calculation was not significant. The daily rhythm of feeding activity can display a bimodal pattern with two peaks of activity." (Authors)] Address: Leon, E.J., Facultad de Ciencia y Tecnología, UADER, CP 3100, Paraná - Argentina. E-mail: evelinaleon903@hotmail.com

15368. Lorenzo-Carballa, M.O.; Ferreira, S.; Sims, A.M.; Thompson, D.J.; Watts, P.C.; Cher, Y.; Damoy, V.; Evrard,

A.; Gelez, W.; Vanappelghem, C. (2015): Impact of landscape on spatial genetic structure and diversity of *Coenagrion mercuriale* (Zygoptera: Coenagrionidae) in northern France. *Freshwater Science* 34(3): 1065-1078. (in English) ["Loss and fragmentation of habitat is a current main cause of biodiversity loss in freshwater habitats. Odonates (dragonflies and damselflies) depend on these habitats to complete their development. Fragmentation may be a particular threat for odonates because it generates a network of small habitat patches within which populations could suffer from isolation and loss of genetic diversity. The southern damselfly *Coenagrion mercuriale* is categorized on the IUCN red list as Near Threatened, largely because of population fragmentation and demographic declines associated with changes in land use. Small populations at the margin of this species' range are of particular concern because they would be prone to detrimental effects of habitat fragmentation if this species were a poor disperser. We sampled *C. mercuriale* in 16 habitat patches (localities) at 4 main sites in the department of Pas-de-Calais in northwestern France to quantify factors that affect dispersal and genetic diversity. Specimens were genotyped at 12 microsatellite loci to quantify genetic diversity, genetic differentiation, and the potential effect of landscape variables on genetic differentiation, and to detect any potential source-sink structure. Habitat separation had a limiting effect on dispersal by *C. mercuriale*, resulting in 3 main genetic clusters and weak divergence at the main site of Vallée de la Course. Genetic differentiation was low in each main site, implying that the localities within sites were connected at scales of up to ~2 km, albeit with some evidence for isolation at the more isolated localities. Given the degree of isolation of some areas and a lack of apparent genetic mixing in the intervening populations, any movement among the most distantly separated sites must have occurred some time ago. We identified barriers to dispersal, such as woodland, but detecting an unambiguous effect of certain variables, such as urbanization, was difficult because many landscape features were highly correlated." (Authors)] Address: Lorenzo-Carballa, Olalla, Institute of Integrative Biology, Biosciences Building, Crown Street, University of Liverpool, Liverpool L69 7ZB UK. E-mail: m.o.lorenzo-carballa@liverpool.ac.uk

15369. Louboutin, B.; Nicolas, M.; Gautier, C. (2015): Redécouverte d'*Ischnura graellsii* en France (Odonata : Coenagrionidae). *Martinia* 31(2): 91-102. (in French, with English summary) ["*Ischnura graellsii* was rediscovered in July 2015, in abundance at two man-made ponds located in the township of Sainte-Léocadie (Pyrénées-Orientales department), in the French Cerdanya. This is for this species, of which the identity had been suspected basing on pictures made in 2013 and 2014, the first observation after the previous quotation by Morton in the Pyrénées-Atlantiques department in 1913. Among the Odonata present on the site, several species, including *Erythromma viridulum* reached here their highest altitude in France (1260 m a.s.l.). In this paper are presented the context of this finding, the features of the site, the odonatological assemblage and the distribution of both *I. elegans* and *I. graellsii* from either side

of the eastern Pyrenees. This French population represents clearly an extension of the nearby Spanish Catalan populations in our country. It is doubtful they can extend more north beyond the special Cerdanyan climate." (Authors)] Address: Louboutin, B., Office pour les insectes et leur environnement (Opie), antenne Languedoc-Roussillon, Centre de Biologie pour la gestion des Populations, Campus International de Baillarguet CS 30 016, F-34988 Montferrier-sur-Lez Cedex, France. E-mail: bastien.louboutin@insectes.org

15370. Luiz, L.F.; Contrera, F.A.L.; Neckel-Oliveira, S. (2015): Diet and tadpole transportation in the poison dart frog *Ameerega trivittata* (Anura, Dendrobatidae). *The Herpetological Journal* 25(3): 187-190. (in English) ["Diet and transportation of tadpoles by *Ameerega trivittata* was studied in the eastern Amazon basin. A total of 56 specimens (48 males and 8 females) were sampled, 44 out of which had quantifiable stomach contents. Forty males were recorded to carry between 1 and 18 tadpoles. Forty pools were measured and sampled for tadpoles and odonate naiads, a putative tadpole predator. Myrmicine ants predominated in the diet of males, putatively leading to higher concentrations of alkaloids beneficial during tadpole transport. No relationship was found between male size and the number or size of tadpoles transported, and between pool size and tadpole abundance. The number of tadpoles in the pools was negatively related to the abundance of odonate naiads." (Authors)] Address: Luiz, L.F., Universidade Federal do Amazonas (UFAM), Instituto de Ciências Biológicas, Departamento de Biologia, Laboratório de Evolução e Genética Animal, Av. General Rodrigo Octávio Jordão Ramos, 3000, CEP 69077-000 Manaus, AM, Brasil

15371. Machado, A.B.M. (2015): *Perilestes eustaquioi* sp. nov. and new distributional records of Perilestidae (Odonata) in Brazil. *Zoologia (Curitiba)* 32(5): 428-430. (in English) ["*Perilestes eustaquioi* sp. nov. (holotype male deposited in ABMM collection) from the state of Bahia (municipality of Una), northeastern Brazil, is described and illustrated based on one male specimen. It differs from the other species of the genus mainly by the larger size of the anteclypeus in relations to the postclypeus. Together with *P. fragilis* Hagen in Selys, 1862 from the state of Sergipe and *P. solutus* Williamson & Williamson, 1924 from the state of Ceará, these are the first records of Perilestidae from northeastern Brazil." (Author)] Address: Machado, A.B.M.D., Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais. Caixa Postal 486, 31270-901 Belo Horizonte, MG, Brazil. Email: angelo@icb.ufmg.br

15372. Maneechan, W.; Promm, T.O. (2015): Diversity and distribution of aquatic insects in streams of the Mae Klong watershed, western Thailand. *Psyche* Volume 2015 (2015), Article ID 912451: 7 pp. (in English) ["The distribution and diversity of aquatic insects and water quality variables were studied among three streams of the Mae Klong Watershed. In each stream, two sites were sampled. Aquatic insects and water quality variables were randomly sampled seven

times in February, May, September, and December 2010 and in January, April, and May 2011. Overall, 11,153 individuals belonging to 64 families and nine orders were examined. Among the aquatic insects collected from the three streams, the order Trichoptera was most diverse in number of individuals, followed by Ephemeroptera, Hemiptera, Odonata (11.3%), Coleoptera, Diptera, Plecoptera, Megaloptera, and Lepidoptera. The highest Shannon index of diversity of 2.934 and 3.2 was recorded in Huai Kayeng stream and the lowest was in Huai Pakkok stream (2.68 and 2.62). The high diversity of insect fauna in streams is an indication of larger microhabitat diversity and better water quality conditions prevailing in the streams. The evenness value was recorded as high in most sites. The high species diversity and evenness in almost all sites indicated good water quality." (Authors) Taxa are treated at family level.] Address: Maneechan, W., Faculty of Liberal Arts and Science, Kasetsart University, Kamphaeng Saen Campus, Nakhon Pathom 73140, Thailand

15373. Manu, M.; Szekeley, L.; Oromulu, L.V.; Barbuceanu, D.; Honciuc, V.; Maican, S.; Fiera, C.; Purice, D.; Ion, M. (2015): Bucharest. In: J.G. Kelcey (ed.): *Vertebrates and Invertebrates of European Cities: Selected Non-Avian Fauna*. Springer New York: 257-322. (in English) ["Eight invertebrate 'groups' were investigated having a total of 503 species, which can be divided into two major categories: above ground and below ground. The above-ground groups are the Coleoptera (beetles), Lepidoptera (butterflies and moths), Odonata (dragonflies and damselflies), Orthoptera (grasshoppers and crickets) and Thysanoptera (thrips). The below-ground groups are the Acari—Mesostigmata (soil mites), Acari—Oribatida (beetle mites), Collembola (springtails) and Myriapoda—Diplopoda (millipedes) and Myriapoda—Chilopoda (centipedes) The study revealed different structural complexities of the invertebrate populations (including non-native species) in relation to three groups of factors, namely the habitat and ecological requirements of the species, the characteristic features of the urban environment (including pollution, soil types and the species composition and structure of the vegetation) and the morphology and dynamics of some of the invertebrate groups. Zoological surveys of Bucharest indicate that the city has a rich and interesting invertebrate fauna. There are some scientific studies concerning the impact of pollution on biodiversity in urban habitats and the legal framework to protect green spaces that are generally often neglected. Plans for the expansion and management of urban areas should be based on scientifically comprehensive, interdisciplinary research projects, which will, amongst other benefits, provide a complete inventory of the invertebrate species, which are an excellent group of biological indicators." (Authors)] Address: Manu, Minodora, Department of Ecology, Taxonomy and Nature Conservation, Institute of Biology, Romanian Academy, Spl. Independentei 296, Sector 6, 060031, Bucharest, Romania. E-mail: minodora_stanescu@yahoo.com

15374. Marchant, R.; Grant, T. (2015): The productivity of the macroinvertebrate prey of the platypus in the upper

Shoalhaven River, New South Wales. *Marine and Freshwater Research* 66(12): 1128-1137. (in English) ["The platypus, *Ornithorhynchus anatinus*, feeds almost exclusively on benthic macroinvertebrates, yet no attempt has been made to link its energy demands with the productivity of its benthic macroinvertebrate prey. In the upper Shoalhaven River, NSW, we estimated macroinvertebrate production (in 2009 and 2011) from benthic samples and recorded platypus diet (2009 only) from cheek pouch samples. Ephemeroptera, Trichoptera and Chironomidae were the most numerous of 6 major groups in both the cheek pouches and the benthic samples. Three other groups (Odonata, Coleoptera, Sphaeriidae) were much less abundant in the benthos, but Odonata were common in the cheek pouches. In both years the Ephemeroptera, Trichoptera and Chironomidae had levels of production that were an order of magnitude higher than those of the three other groups. Total macroinvertebrate production for the six groups varied from 7.8 (in 2009) to 13.1 (in 2011) g DW m⁻²y⁻¹. Previous estimates of field metabolic demand (FMD) of the platypus enabled calculation of the number that could be supported by a given level of production. The observed levels of production were sufficient to support 13-27 platypuses in 2009 and 22-45 in 2011 along a 1.5km reach of the river." (Authors)] Address: Marchant, R., Department of Entomology, Museum Victoria, GPO Box 666, Melbourne, Vic. 3001, Australia. E-mail: rmarch@museum.vic.gov.au

15375. Marinov, M.; Schmaedick, M.; Polhemus, D.; Stirnemann, R.L.; Enoka, F.; Fa'aumu, P.S.; Uili, M. (2015): Faunistic and taxonomic investigations on the Odonata fauna of the Samoan archipelago with particular focus on taxonomic ambiguities in the "Ischnurine complex". *International Dragonfly Fund Report* 91: 1-56. (in English, with Samoan summary) ["New faunistic data is provided on the Odonata inhabiting the three main islands within the Samoan archipelago, namely Savai'i, Upolu and Tutuila as well as the smaller islands of Aunu'u and the Manu'a group. The specimens collected or observed in the field were compared to samples from other nearby Pacific island groups such as Fiji and Tonga. This study makes important contributions towards resolving taxonomic issues regarding the *Ischnura* species described as endemic to Samoa and their relations to other *Coenagrionidae* genera. New diagnostic features for distinguishing between females of the endemic genera *Amorphostigma* and *Pacificagrion*, subspecies separation in the Pacific *Tramea transmarina* and distinguishing between Samoan *Hemicordulia* species are suggested. *Anaciaeschna melanostoma* is proposed as junior synonym of *A. jaspidea*. A possible new subspecies of *Lathrecista asiatica*, confined to the Samoan archipelago, is discussed. The validity of *Agriocnemis interrupta* as a separate species from *A. exsudans* is questioned. Pacific *Pseudagrion* is believed to be represented within the region by one species only, with separate subspecies in Fiji, Tonga and Samoa, although more specimens from Fiji are required to resolve this issue." (Authors)] Address: Marinov, M., Investigation and Diagnostic Centres and Response, Operations Branch, Ministry for Primary Industries, 231 Morrin Rd,

Auckland 1072 New Zealand. E-mail: Milen.Marinov@mpi.govt.nz

15376. Marinov, M. (2015): The seven "oddities" of Pacific Odonata biogeography. *Faunistic studies in South-east Asia and Pacific island Odonata* 11: 1-58. (in English) ["The existing literature on the Odonata inhabiting the three large divisions of the Pacific Ocean (Micronesia, Melanesia, Polynesia) is revised taking into consideration earlier discussions on the species origin, historical faunistic records, various palaeogeographical models proposed for the area, general data on the biology and ecology of this insect order. Special emphasis is paid on the incomplete data set for the region and inconsistency of the exploration of this vast area. The taxonomy and fauna of the Pacific Odonata is far from complete which makes it very difficult to provide any plausible hypothesis on the biogeographical pattern that we observe today. The widely accepted view of long distance dispersal from a centre of origin as the only possible means for species to occupy remote oceanic island archipelagos is critically reviewed. There are seven phenomena in the current Odonata distribution that cannot be explained only by random gene transfer mediated by wind dispersal. Those are called "oddities", however, they are believed to be regularities of past geological events and modern day human associated activities within the Pacific. The rationale for each of them is explained in details and illustrated with distribution maps following the current taxonomy of the group. A new approach is suggested to tackle the question of the origin of the Pacific Odonata by relating the higher taxa distribution to the geological events and palaeontology of the families. It is not intended to be a new hypothesis yet before more systematic studies of the taxonomy and fauna of the group. Therefore, it is believed that the new method suggested here will increase the attention of the scientific community and will boost studies on this insect order within the Pacific Ocean. Discussion on its applicability is provided with attention to details that are difficult to be explained with the Pacific Odonata palaeontology as we know it for the moment." (Author)] Address: Marinov, M., Plant Health & Environment Lab., Investigation & Diagnostic Centres & Response, Ministry for Primary Industries, 231 Morrin Rd, Auckland, New Zealand. E-mail: milen.marinov@mpi.govt.nz

15377. Markovic, V., Tomovic, J.; Atanackovic, A.; Kracun, M.; Ilic, M.; Nikolic, V.; Paunovic, M. (2015): Macroinvertebrate communities along the Velika Morava River. *Turkish Journal of Zoology* 39: 210-224. (in English) [Serbia; only five Odonata species have been recorded: *Gomphus vulgatissimus*, *Calopteryx splendens*, *Platycnemis pennipes*, *Ophiogomphus cecilia* and *Onychogomphus forcipatus*.] Address: Markovic, Vanja, Institute for Biological Research "Sinisa Stankovic", University of Belgrade, Belgrade, Serbia. E-mail: vanjam@ibiss.bg.ac.rs

15378. Márquez-Rodríguez, J. (2015): Observaciones odonológicas en un río extremo-acidófilo (Andalucía, Sur de España). *Arquivos Entomológicos* 14: 63-66. (in Spanish, with English summary) ["Odonatological observations

from a highly acidophilous river (Andalusia, southern Spain). The first records of *Trithemis kirbyi* Selys, 1891 (Odonata: Libellulidae) in the river Tinto and its associated odonofauna are reported. The new records of this species in the province of Huelva are of faunistic interest, especially by the current lack of records and the selection of extreme acidic waters as a new territorial habitat." (Author)] Address: Márquez-Rodríguez, J., Depto de Sistemas Físicos, Químicos y Naturales. Universidad Pablo de Olavide. A-376, km 1. E-41013 Sevilla, Spain. E-mail: jmarrod1@upo.es

15379. Marrón, G.; Carmona, R.; Hernández-Álvarez, A. (2015): Primeros registros de *Erythemis vesiculosa* (Fabricius, 1775; Odonata: Libellulidae) y de *Ischnura barberi* Currie, 1903 (Odonata: Coenagrionidae) para Baja California Sur, México. *Acta Zoológica Mexicana* (n.s.) 31(3): 502-505. (in Spanish, with English summary) ["We report the first records of two species of Odonata for Baja California Sur. An individual of *E. vesiculosa* was in the southern part of the state at San Pedro del Palmar, an oasis near Todos Santos, 1 October 2014, and a couple of *I. barberi* were in the northern part of the state at the Guerrero Negro sewage ponds 21 October 2014; both were photographed. These observations increase to 57 the number of species of the order Odonata recorded in Baja California Sur." (Authors)] Address: Marrón, G., Depto de Biología Marina. Univ. Autónoma de Baja California Sur. A.P. 19-B. La Paz, Baja California Sur, 23080 México. E-mail: atakamara@gmail.com

15380. Martens, A. (2015): Alternative oviposition tactics in *Zygonyx torridus* (Kirby) (Odonata: Libellulidae): modes and sequential flexibility. *International Journal of Odonatology* 18(1): 71-80. (in English) ["*Zygonyx torridus* inhabits waterfalls, rapids and riffle sections. Males patrol over these sites. After copulation the partners perform an extensive search while flying in tandem over a wide range. Behavioural studies in Mauritius 1997 and 2014 showed that there is considerable plasticity in oviposition behaviour. Three main modes could be distinguished: (A) egg-laying in tandem during flight; (B) the female placing the eggs while dipping in flight without physical contact with the male; and (C) the female placing the eggs when settled without physical contact with the male. On several occasions two modes, and in a single case all three types, were observed within one oviposition sequence. In odonates, such a high degree of plasticity in reproductive behaviour was not reported previously." (Author)] Address: Martens, A., Pädagogische Hochschule Karlsruhe, Postfach 111062, D-76060 Karlsruhe, Germany. E-mail: andreas.martens@ph-karlsruhe.de

15381. Martín, M.; Maynou, X. (2015): Evaluación del estado de amenaza de los odonatos (Insecta: Odonata) de Cataluña (España). *Boletín de la Sociedad Entomológica Aragonesa* 56: 161-172. (in Spanish, with English summary) ["An assessment of the threat status of the dragonflies (Insecta: Odonata) of Catalonia (Spain). We assessed the degree of threat or vulnerability of the 70 dragonfly and damselfly taxa recorded from Catalonia to date by analyzing more than 30,000 observational records from the *Oxygastra*

GEOC (Catalan Odonata Study Group) database that include information on distribution, abundances and breeding habitats. We used two independent methods of assessment: IUCN and IVOC (Vulnerability Index of the Odonata of Catalonia, based on Abellán et al. (2005)). For the first one we considered mainly the criteria related to size and fragmentation of the distribution areas of taxa and the possible evolution of the conservation status of their characteristic habitats. For the second, we took into account the six parameters included in the Vulnerability Index calculation, i.e. overall distribution of the taxon, degree of endemism, rarity, persistence, and rarity and threat to their reproductive habitats. Both methods showed some discrepancies in the assessment of the degree of threat for the different taxa due to differences in the criteria used, underlining their complementarity and reinforcing the assessment. Combining the results obtained by both methodologies resulted in a list of nine species threatened or highly vulnerable: *Coenagrion hastulatum*, *Aeshna isocetes*, *Gomphus graslinii*, *Onychogomphus costae*, *Cordulia aenea*, *Macromia splendens*, *Orthetrum nitidinerve*, *Sympetrum pedemontanum* and *Leucorhinia dubia*." (Authors)] Address: Martín, R., Martí Julià, 19-23, CP-08911 Badalona, Spain. E-mail: ricardo.martin@cllienciats.cat

15382. Martynov, V.V.; Nikulina, T.V.; Shokhin, I.V. (2015): New records of *Selysiothemis nigra* (Vander Linden, 1825) (Odonata: Libellulidae) in the Sea of Azov region. *Caucasian Entomological Bulletin* 11(2): 263-265. (in Russian, with English summary) ["A substantial increase of dragonfly fauna in the Sea of Azov region (Priazovye) by species with "southern" ranges was observed during the XXI century. These species are *Lindenia tetraphylla*, *Crocothemis erythraea*, *Sympetrum fonscolombii*, *Hemianax ephippiger*. *S. nigra* is recorded from Donetsk Region and Krasnodar Region for the first time. This record significantly expands the range of the species in Europe. The relationship between change in the regional entomofauna and increasing of average temperatures is not supported. Legitimacy of using of insect localities which directly or indirectly related to human activities in the zoogeographical zonation is discussed." (Authors)] Address: Martynov, V.V., Public Institution Donetsk Botanical Garden, Illicha Av., 110, Donetsk 83059, Ukraine. E-mail: martynov.scarab@yandex.ru

15383. Matheson, T.; Ball, O.; Pohe, S. (2015): *Tamea loewii* (Odonata: Libellulidae) on the move. *The Weta* 50(1): 10-17. (in English) ["*T. loewii* has recently become established in New Zealand, with a known distribution on the Aupouri Peninsula north of Kaitiaki. To determine whether the species has spread further south, the littoral zones of eleven central Northland lakes from Ahipara to Waipu were sampled. Searches for exuviae and adults of *T. loewii* were also conducted at each lake. Larval *T. loewii* were only found at the Uretiti sand pit lake near Ruakaka, south of Whangarei. Many exuviae and adults in flight were also observed at the lake, indicating the species is established there. This represents a substantial range expansion and is

the southernmost record of *T. loewii* to date." (Authors)] Address: Ball, O., NorthTec, Department of Applied and Environmental Sciences, Whangarei, New Zealand. E-mail: oball@northtec.co.nz

15384. Matsunami, M.; Kitano, J.; Kishida, O.; Michimae, H.; Miura, T.; Nishimura, K. (2015): Transcriptome analysis of predator- and prey-induced phenotypic plasticity in the Hokkaido salamander (*Hynobius retardatus*). *Molecular Ecology* 24(12): 3064-3076. (in English) ["Predator- and prey-induced phenotypic plasticity is widely observed among amphibian species. Although ecological factors inducing diverse phenotypic responses have been extensively characterized, we know little about the molecular bases of variation in phenotypic plasticity. Larvae of the Hokkaido salamander, *Hynobius retardatus*, exhibit two distinct morphs; the presence of their prey, *Rana pirica* tadpoles, induces a broad-headed attack morph, and the presence of predatory dragonfly nymphs (*Aeshna nigroflava*) [= *Aeshna crenata* Hagen, 1856] "induces a defense morph with enlarged external gills and a high tail. To compare the genes involved in predator- and prey-induced phenotypic plasticity, we carried out a de novo transcriptome analysis of Hokkaido salamander larvae exposed to either prey or predator individuals. First, we found that the number of genes involved in the expression of the defense morph was approximately five times the number involved in the expression of the attack morph. This result is consistent with the fact that the predator-induced plasticity involves more drastic morphological changes than the prey-induced plasticity. Second, we found that particular sets of genes were up-regulated during the induction of both the attack and defense morphs, but others were specific to the expression of one or the other morph. Because both shared and unique molecular mechanisms were used in the expression of each morph, the evolution of a new plastic phenotype might involve both the co-option of pre-existing molecular mechanisms and the acquisition of novel regulatory mechanisms." (Authors)] Address: Matsunami, M., Laboratory of Ecological Genetics, Graduate School of Environmental Science, Hokkaido University, Sapporo, Japan. E-mail: mmatsunami@ees.hokudai.ac.jp

15385. Maurel, J.-P. (2015): Contribution à l'étude des libellules de Midi-Pyrénées. *Carnets natures* 2: 23-39. (in French, with English summary) [France; between 2004 and 2008, a total of 359 Odonata specimens were identified, representing 45 different species. The list of species includes *Calopteryx splendens*, *Trithemis annulata*, *Oxygastra curtisii*, and *Coenagrion mercuriale*.] Address: Maurel, J.-P., 12 rue Willy Brandt, F-31520 Ramonville-Saint-Agne, France. E-mail: jeanphilippe.maurel@free.fr

15386. Mehdi, H.; Anwer, S.F.; Ahmad, A. (2015): Fluid structure interaction of flow around a pleated insect 2D airfoil at ultra low reynolds numbers. *International Journal of Research in Aeronautical and Mechanical Engineering* 3(3): 19-37. (in English) ["In this work, Numerical study of

Fluid Structure Interaction of uniform flow past a two dimensional pleated airfoil is carried out. When the wing interact with the air, it is subjected to both aerodynamic forces acting on the surface of the wing and the inertial force due to the acceleration or deceleration of the wing mass. The interaction between these inertial and aerodynamic forces resulted in wing deformation. The dynamics of a pleated insect wing subjected to aerodynamic loading is studied. The vortex induced vibration and forced vibration of a pleated flexible insect wing subjected to aerodynamic load is studied by using ANSYS-14 multi physics solver. The insect wing is of dragonfly (*Aeshna cyanea*) wing cross section. In the first phase of the work, fluid flow simulation at Reynolds Number-100, 200, 500, and 1000 will be performed with angle of attack 0° to 15° . The result from the CFD solver will be fed in the form of lift and drag forces are then fed into the ANSYS Workbench solver and one way Fluid Structure Interaction analysis is performed." (Authors)] Address: Mehdi, H., MED, Meerut Institute of Technology, Meerut (U.P), 250002, India. E-mail: husainmehdi4u@gmail.com

15387. Melfi, J.; Wang, Z.J. (2015): L27.00005: Uncontrolled stability in freely flying insects. *Bulletin of the American Physical Society* 60(21): 1 p. (in English) [Verbatim: One of the key flight modes of a flying insect is longitudinal flight, traveling along a localized two-dimensional plane from one location to another. Past work on this topic has shown that flying insects, unless stabilized by some external stimulus, are typically unstable to a well studied pitching instability. In our work, we examine this instability in a computational study to understand whether it is possible for either evolution or an aero-vehicle designer to stabilize longitudinal flight through changes to insect morphology, kinematics, or aerodynamic quantities. A quasi-steady wingbeat averaged flapping flight model is used to describe the insect. From this model, a number of non-dimensional parameters are identified. The effect of these parameters was then quantified using linear stability analysis, applied to various translational states of the insect. Based on our understanding of these parameters, we demonstrate how to find an intrinsically stable flapping flight sequence for a dragonfly-like flapping flier in an instantaneous flapping flight model.] Address: Wang, Z. Jane, Theoretical and Applied Mechanics, Cornell Univ., Ithaca, NY 14853, USA. E-mail: jane.wang@cornell.edu

15388. Merzendorfer, H. (2015): Dragonfly hunting is based on predictive models. *J. Exp. Biol.* 218: 1278-1279. (in English) ["Mischiati, M., Lin, H.-T., Herold, P., Imler, E., Olberg, R. & Leonardo, A. (2015). Internal models direct dragonfly interception steering. *Nature* 517, 333-338." Verbatim: Goalkeepers doubtless need excellent responses to prevent the opposition from scoring that goal. However, exceptional responses are not enough. To reach and catch the ball at the right moment, the goalkeeper has to predict where the ball will end up and calculate where their movements will take them to capture the ball. This type of control has been found only in vertebrates so far. However, a recent study published in *Nature* by a team of researchers led by

Anthony Leonardo from the Howard Hughes Medical Institute, USA, has demonstrated that dragonflies that are in pursuit rely on internal models that predict the effects of movements of their own body and their target, like the goalkeeper catching the ball. Dragonflies are brilliant aeronauts that can hover, fly at high speed and perform agile manoeuvres to defend their territory, mate on the wing or chase prey. Their vision is also excellent: with their large eyes they can see in almost any direction. Usually they lurk on plants where they wait for prey insects to fly over. Once the prey is in focus, the dragonfly rapidly lifts off and manoeuvres to approach the prey at an angle from below, so that it can trap the victim with its capture legs. To analyse this type of hunt in more detail, the team filmed dragonflies in slow motion during pursuits. It became obvious that the dragonflies did not rely exclusively on their reactions, because they did not always respond to unexpected changes in the prey motion. Rather, they tried to align their elongated body with the flight path of their prey to approach and strike from below, minimizing the chances of being discovered. To do so, the head of the dragonfly moves independently from the body, so that the eyes can continuously focus on the prey while the body is aligned with the prey's flight path. The scientists then dissected the head movements in more detail. They set up a flight arena, which allowed them to record the paths of dragonflies and prey with high accuracy using high-speed cameras. They also placed micro-reflective markers on the head and body of the dragonflies to record the relative movements. Based on these data, they then calculated the angular position of the prey image on the dragonfly's eye. What they found was quite surprising, as the head motions turned out to compensate precisely for drift of the prey image on the eye that resulted from the dragonfly's own body movements and the anticipated motion of the prey. The high synchrony and precision of the timing of these head movements suggest that dragonflies use internal calculations to generate models that predict how body and prey movements will influence the position of the image on the dragonfly's eye, and how the head must then be moved to cancel out these effects: classical sensory feedback. This predictive system largely compensates for the dragonfly's own body movements and thus relieves the visual system to detect sudden prey manoeuvres, to which the dragonfly can respond by reactive control. Leonardo and his team have shown for the first time that invertebrates use internal models to predict the effects of their own body movements when targeting prey. The fact that all of the experiments were done under laboratory conditions where the prey's movements are more restricted may suggest that this predictive steering control could be dominated by reactive mechanisms in the wild, thus explaining why it had been overlooked for so long.] Address: Merzendorfer, H., Univ. Osnabrück, Germany. E-mail: merzendorfer@chemie-bio.uni-siegen.de

15389. Meyer, M.D.; Davis, C.A.; Dvoretz, D. (2015): Response of wetland invertebrate communities to local and landscape factors in North Central Oklahoma. *Wetlands* 35(3): 533-546. (in English) ["Invertebrates play an important role influencing wetland functions. Specifically, they

provide important food for many waterbirds and other wetland species. To better understand the role environmental factors play in influencing invertebrates, we examined the influence of local and landscape factors on invertebrate communities inhabiting depressional wetlands in Oklahoma. We sampled invertebrates from 58 wetlands during 2009 and 2010. Diversity and taxa richness increased as the season progressed and with vegetation complexity and cover. Diversity and richness decreased as water quality was impacted by nutrient and sediment loading. Local variables occurred more consistently in taxa models than landscape variables. Important local variables included wetland hydrology, vegetation complexity, and water quality, while important landscape variables included density and type of wetlands surrounding wetlands. Land-use practice was the least important landscape variable, but is an important variable due to potential relationships with local variables such as water quality. Low variation (12–26 %) explained by the pCCA suggests other variables may be influencing invertebrate communities, but an alternative explanation is that invertebrates are insensitive to environmental variation. These findings can guide both local management of wetlands and conservation strategies at the watershed or regional scale to benefit not only invertebrates but other wetland dependent species. ... Individual taxa analyses were conducted on taxa occurring in at least 20 % of the samples during both years. These taxa included "Enallagma"... For three taxa (*Callibaetis*, *Enallagma*, and *Ostracoda*), the negative binomial component of the model for sampling date was positive and the binomial component was negative indicating that as the season progressed, biomass of these taxa increased and the probability of the taxa being absent from wetlands decreased. In the models for *Cladocera* and *Enallagma*, the negative binomial for BVEG1 was significantly positive indicating that biomass of these taxa increased as vegetation complexity and submergent cover increased. ... *Enallagma* was less likely to occur at wetlands affected by poor water quality.... *Enallagma* biomass decreased with the amount of rangeland surrounding the wetland. ... *Enallagma*, *Anax*, *Berosus* larvae, *Callibaetis*, and *Physa* were associated with wetlands that contained high vegetation complexity and low turbidity and were located in landscapes characterized by a high occurrence of semi-permanent wetlands." (Authors.) Address: Davies, C.A., Department of Natural Resource Ecology and Management, Oklahoma State University, 008C Agricultural Hall, Stillwater, OK 74078, USA. E-mail: craig.a.davis@okstate.edu

15390. Michels, J.; Gorb, S.N.; Reinhardt, K. (2015): Reduction of female copulatory damage by resilin represents evidence for tolerance in sexual conflict. *J. R. Soc. Interface* 12(104): 7 pp. (in English) ["Intergenomic evolutionary conflicts increase biological diversity. In sexual conflict, female defence against males is generally assumed to be resistance, which, however, often leads to trait exaggeration but not diversification. Here, we address whether tolerance, a female defence mechanism known from interspecific conflicts, exists in sexual conflict. We examined the traumatic

insemination of female bed bugs via cuticle penetration by males, a textbook example of sexual conflict. Confocal laser scanning microscopy revealed large proportions of the soft and elastic protein resilin in the cuticle of the spermatheca, the female defence organ. Reduced tissue damage and haemolymph loss were identified as adaptive female benefits from resilin. These did not arise from resistance because microindentation showed that the penetration force necessary to breach the cuticle was significantly lower at the resilin-rich spermatheca than at other cuticle sites. Furthermore, a male survival analysis indicated that the spermatheca did not impose antagonistic selection on males. Our findings suggest that the specific spermatheca material composition evolved to tolerate the traumatic cuticle penetration. They demonstrate the importance of tolerance in sexual conflict and genitalia evolution, extend fundamental coevolution and speciation models and contribute to explaining the evolution of complexity. We propose that tolerance can drive trait diversity." (Authors) The paper includes references to Odonata.] Address: Michels, J., Department of Functional Morphology and Biomechanics, Institute of Zoology, Christian-Albrechts-Universität zu Kiel, Am Botanischen Garten 1 – 9, 24118 Kiel, Germany

15391. Michimae, H.; Tezuka, A.; Emura, T.; Kishida, O. (2015): Environment-dependent trade-offs and phenotypic plasticity in metamorphic timing. *Evolutionary Ecology Research* 16: 617-629. (in English) ["Background: Fitness trade-offs of plastic traits between alternative environments are a prerequisite for the evolution of phenotypic plasticity; however, the costs associated with plastic traits have yet to be determined. Most empirical studies have assessed the costs of plastic traits by investigating just two environments (to elicit plasticity), and only one or two environments to evaluate the consequences of plasticity. In contrast, in nature, organisms are constantly subjected to multiple environments, and the expression and magnitude of the costs of plastic traits are occasionally context-dependent. Objective: Analyse the costs of plastic traits across multiple environments. Methods: We determined the benefits and costs of two plastic responses (predator- and prey-induced morphologies) of larvae of the salamander *Hynobius retardatus* to larval survival, time to metamorphosis, and body size at metamorphosis in three different environments [using tadpoles of an anuran frog as prey, larvae of a predatory dragonfly (*Aeshna nigroflava* = *A. crenata*), or no change agent (conspecific larvae only)]. Results: The benefits of the alternative phenotypes were evident in the two inducing environments, but the costs were greater or more easily detected in crossover environments. The trade-offs appeared in combinations in the crossover environments, and thus were context-dependent. Conclusions: The cross-environmental costs of plastic traits are necessary for the evolution of phenotypic plasticity. Our findings highlight the importance of measuring the costs and benefits of plastic traits across multiple environments." (Authors)] Address: Michimae, H., School of Pharmacy, Department of Clinical Medicine (Biostatistics), Kitasato University, Tokyo, Japan, E-mail: michimaeh@pharm.kitasato-u.ac.jp

15392. Mikolajewski, D.J.; Rösen, L.; Mauersberger, R.; Johansson, F.; Rolff, J. (2015): Relaxed predation results in reduced phenotypic integration in a suite of dragonflies. *Journal of Evolutionary Biology* 28(7): 1354-1363. (in English) ["While changes in magnitude of single traits responding to selective agents have been studied intensively, little is known about selection shaping networks of traits and their patterns of co-variation. However, this is central for our understanding of phenotypic evolution since traits are embedded in a multivariate environment with selection affecting a multitude of traits simultaneously rather than individually. Here, we investigate inter- and intraspecific patterns of trait integration (trait correlations) in the larval abdomen of dragonflies as a response to a change in predator selection. Species of the dragonfly genus *Leucorrhinia* underwent a larval habitat shift from predatory fish to predatory dragonfly dominated lakes with an associated relaxation in selection pressure from fish predation. Our results indicate that the habitat-shift induced relaxed selection pressure caused phenotypic integration of abdominal traits to be reduced. Intraspecific findings matched patterns comparing species from both habitats with higher abdominal integration in response to predatory fish. This higher integration is probably a result of faster burst swimming speed. The abdomen holds the necessary morphological machinery to successfully evade predatory fish via burst swimming. Hence, abdominal traits have to function in a tight coordinated manner, since maladaptive variation and consequently non-optimal burst swimming would cause increased mortality. In predatory dragonfly dominated lakes no such strong link between burst swimming and mortality is present. Our findings highlight the importance of studying multivariate trait relationships as a response to selection for understanding patterns of phenotypic diversification." (Authors)] Address: Mikolajewski, D.J., Freie Universität Berlin, Institut für Biologie, Evolutionsbiologie, Königin-Luise-Str. 1-3, 14195 Berlin, Germany. E-mail: d.mikolajewski@fu-berlin.de

15393. Mikolajewski, D.J.; Conrad, A.; Joop, G. (2015): Behaviour and body size: plasticity and genotypic diversity in larval *Ischnura elegans* as a response to predators (Odonata: Coenagrionidae). *International Journal of Odonatology* 18(1): 31-44. (in English) ["Phenotypic plasticity represents an adaptive tool in organisms including odonates to cope with heterogeneous environmental conditions. However, while some odonate species can occupy various changing habitats, other species are adapted to a narrow range of environmental conditions. Commonly, behavioural modifications are applied to avoid detection and encounters with predators. But reduced behavioural activity results in decelerated growth and reduced body size, a key fitness attribute in odonates. Using larval *Ischnura elegans* we quantified predator induced plastic behavioural reaction norms in order to manifest variance, and by this evolvability of larval behavioural plasticity. In addition we test for potentially underlying genetic correlations of behavioural traits with body size. Our results show that there is large genotypic variance in plastic reaction norms. Furthermore, no present genetic

constraints between behaviour and body size were detected, suggesting potential for independent optimisation of behaviour and body size across environments. Our data indicate that independent phenotypic plasticity in behaviour and body size might enable species to occupy a wide range of environmental conditions." (Authors)] Address: Mikolajewski, D.J., Freie Universität Berlin, Institut für Biologie, Evolutionsbiologie, Königin-Luise-Str. 1-3, 14195 Berlin, Germany. E-mail: d.mikolajewski@fu-berlin.de

15394. Milaczewska, E. (2015): 11th National Symposium of the Odonatological Section of Polish Entomological Society – Dubiecko, June 19–22, 2014. *Odonatrix* 11(1): 31-37. (in Polish, with English summary) ["The author reports the symposium, which took place in June 2014 in Dubiecko, in the Carpathian Foreland (south-eastern Poland). Symposium consisted of a scientific session, during which presented several speeches were presented, as well as a field session. Field trips were primarily aimed at recognizing the habitats of the representative of alpine biome – *Corulegaster bidentata*. We also visited typical of the River San valley water bodies in the gravel pit, where we had a chance to observe *Orthetrum albistylum* and *Crocothemis erythraea* among others." (Author)] Address: Milaczewska, Ewa, ul. Cichociemnych 3/13, 03-984 Warszawa, Poland. E-mail: ewa.milaczewska@gmail.com

15395. Minnick, M.D.; Gousse, A.D.; Kleiman, R.N (2015): Resonant cantilever wings for monolithic MAVs. *International Journal of Micro Air Vehicles* 7(4)(2015): 419-430. (in English) ["In this paper we present the concept, fabrication, and testing of resonant cantilever wings for monolithic micro aerial vehicles (MAVs). Combining new analytical and computational fluid dynamic work to determine the resonant mode, forces, and power of resonating curved cantilevers, we present a framework to calculate and optimize robot designs for certain figures of merit (i.e., greatest excess power, smallest size, and fastest time for a swarm to search a volume). The optimization results reveal promising designs on scales ranging from fruit flies to dragonflies with the optimal MAV having a maximum continuous travel speed of 2 m/s, 10 mm wing length, and 9 mg total mass. We then fabricate curved cantilever wings to test the theoretical model, which confirm the resonant frequency, resonant mode shape, power dissipated, and net force generated. This work is the first demonstration of asymmetric force from a symmetric flapping cycle and of the feasibility of curved cantilever wings for completely monolithic MAVs." (Authors)] Address: Minnick, M.D., McMaster University, 1280 Main St. W., Hamilton, ON, Canada. E-mail: minnick@mcmaster.ca

15396. Mitchell, A. (2015): Collecting in collections: a PCR strategy and primer set for DNA barcoding of decades-old dried museum specimens. *Molecular Ecology Resources* 15(5): 1102-1111. (in English) ["Natural history museums are vastly underutilized as a source of material for DNA analysis because of perceptions about the limitations of DNA degradation in older specimens. Despite very few exceptions, most DNA barcoding projects, which aim to obtain

sequence data from all species, generally use specimens collected specifically for that purpose, instead of the wealth of identified material in museums, constrained by the lack of suitable PCR methods. Any techniques that extend the utility of museum specimens for DNA analysis therefore are highly valuable. This study first tested the effects of specimen age and PCR amplicon size on PCR success rates in pinned insect specimens, then developed a PCR primer set and amplification strategy allowing greatly increased utilization of older museum specimens for DNA barcoding. PCR success rates compare favourably with the few published studies utilizing similar aged specimens, and this new strategy has the advantage of being easily automated for high-throughput laboratory workflows. The strategy uses hemi-nested, degenerate, M13-tailed PCR primers to amplify two overlapping amplicons, using two PCRs per amplicon (i.e. four PCRs per DNA sample). Initial PCR products are reamplified using an internal primer and a M13 primer. Together the two PCR amplicons yield 559 bp of the COI gene from Coleoptera, Lepidoptera, Diptera, Hemiptera, Odonata and presumably also other insects. BARCODE standard-compliant data were recovered from 67% (56 of 84) of specimens up to 25 years old, and 51% (102 of 197) of specimens up to 55 years old. Given the time, cost and specialist expertise required for fieldwork and identification, 'collecting in collections' is a viable alternative allowing researchers to capitalize on the knowledge captured by curation work in decades past." (Authors)] Address: Mitchell, A., Australian Museum Research Institute, Australian Museum, 6 College Street, Sydney, NSW, 2010, Australia

15397. Mitchell, A. (2015): Collecting in collections: a PCR strategy and primer set for DNA barcoding of decades-old dried museum specimens. *Molecular Ecology Resources* 15(5): 1102-1111. (in English) ["Natural history museums are vastly underutilized as a source of material for DNA analysis because of perceptions about the limitations of DNA degradation in older specimens. Despite very few exceptions, most DNA barcoding projects, which aim to obtain sequence data from all species, generally use specimens collected specifically for that purpose, instead of the wealth of identified material in museums, constrained by the lack of suitable PCR methods. Any techniques that extend the utility of museum specimens for DNA analysis therefore are highly valuable. This study first tested the effects of specimen age and PCR amplicon size on PCR success rates in pinned insect specimens, then developed a PCR primer set and amplification strategy allowing greatly increased utilization of older museum specimens for DNA barcoding. PCR success rates compare favourably with the few published studies utilizing similar aged specimens, and this new strategy has the advantage of being easily automated for high-throughput laboratory workflows. The strategy uses hemi-nested, degenerate, M13-tailed PCR primers to amplify two overlapping amplicons, using two PCRs per amplicon (i.e. four PCRs per DNA sample). Initial PCR products are reamplified using an internal primer and a M13 primer. Together the two PCR amplicons yield 559 bp of the COI gene from Coleoptera, Lepidoptera, Diptera, Hemiptera, Odonata and

presumably also other insects. BARCODE standard-compliant data were recovered from 67% (56 of 84) of specimens up to 25 years old, and 51% (102 of 197) of specimens up to 55 years old. Given the time, cost and specialist expertise required for fieldwork and identification, 'collecting in collections' is a viable alternative allowing researchers to capitalize on the knowledge captured by curation work in decades past." (Author)] Address: Mitchell, A., Australian Museum Research Institute, Australian Museum, Sydney, NSW, Australia. E-mail: Andrew.Mitchell@austmus.gov.au

15398. Mitra, B.; Ghosh, J.; Chakraborti, U.; Biswas, O.; Roy, S.; Roy, A.B. (2015): Entomofaunal diversity of Bhibhuti Bhusan Wildlife Sanctuary, West Bengal. *Journal of Global Biosciences* 4(7): 2795-2807. (in English) ["Bhibhuti Bhusan Wild Life Sanctuary is a protected area of West Bengal, having an area of approximately 0.64 square kilometer. A total of 241 species of 197 genera under 49 families belonging to seven orders (Collembola, Odonata, Hemiptera, Coleoptera, Diptera, Lepidoptera and Hymenoptera) are reported in this present communication. Of these, Lepidoptera shares maximum species (79) followed by Hemiptera (45), Coleoptera (33), Diptera (31), Odonata (27), Collembola (16) and Hymenoptera (10 species)." (Authors)] Address: Mitra, B., Zoological survey of India, M Block, New Alipore, Kolkata-53, India

15399. Mlynarek, J.J. (2015): Testing the enemy release hypothesis in a native insect species with an expanding range. *PeerJ* 3:e1415 <https://dx.doi.org/10.7717/peerj.1415>: 12 pp. (in English) ["The enemy release hypothesis (ERH) predicts that the spread of (invasive) species will be facilitated by release from their enemies as they occupy new areas. However, the ERH is rarely tested on native (non-invasive, long established) species with expanding or shifting ranges. I tested the ERH for *Enallagma clausum* whose range has recently expanded in western Canada, with respect to its water mite and gregarine parasites. Parasitism levels (prevalence and intensity) were also compared between *E. clausum* and a closely related species, *Enallagma boreale*, which has long been established in the study region and whose range is not shifting. A total of 1,150 damselflies were collected at three 'old' sites for *E. clausum* in Saskatchewan, and three 'new' sites in Alberta. A little more than a quarter of the damselflies collected were parasitized with, on average, 18 water mite individuals, and 20% were parasitized by, on average, 10 gregarine individuals. I assessed whether the differences between levels of infection (prevalence and intensity) were due to site type or host species. The ERH was not supported: *Enallagma clausum* has higher or the same levels of parasitism in new sites than old sites. However, *E. boreale* seems to be benefitting from the recent range expansion of a native, closely related species through ecological release from its parasites because the parasites may be choosing to infest the novel, potentially naïve, host instead of the well-established host." (Author)] Address: Mlynarek, Julia, Biology Department, University of Biology, Fredericton, New Brunswick, Canada

15400. Mlynarek, J.J.; Knee, W.; Smith, B.; Forbes, M.R. (2015): Regionally widespread parasitic water mites have relatively broad host species ranges. *Canadian Journal of Zoology* 93(10): 741-746. (in English) ["Certain parasite species have free-living stages so habitat range may influence host range. We tested whether regional occurrence and habitat use of parasitic water mites was related to their host species range. We collected 7445 *Arrenurus* mites from 7107 coenagrionid damselflies, representing 11 host species from 13 sites in southeastern Ontario and southwestern Quebec. Because larval water mite larvae are difficult to identify morphologically to species we chose to amplify the barcode fragment of cytochrome oxidase subunit 1 to explore host ranges. Fifteen Operational Taxonomic Units or clades were identified based on the amplification from 217 larval mites. The *Arrenurus* clades that were present in both bog and marsh habitats had a broader host species range than clades found only in marshes (the comparison with one clade found only in bogs lacked statistical power). As predicted, host species range increased with the regional occurrence of an *Arrenurus* clade. Additionally, the most commonly barcoded species also have high host species ranges. This result could be because species with broader host ranges are more common and were more likely to be sampled and barcoded (an explanation we favour), or due to sampling bias. Although this is the first study exploring whether habitat range affects host range, further investigation is needed to tease apart which habitat factors influence host species ranges the most." (Authors)] Address: Mlynarek, Julia, Department of Biology, Carleton University, Nesbitt Building, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: Julia.mlynarek@unb.ca

15401. Mlynarek, J.J.; Knee, W.; Forbes, M.R. (2015): Host phenology, geographic range size and regional occurrence explain interspecific variation in damselfly–water mite associations. *Ecography* 38(7): 670-680. (in English) ["In this study, we tested which host species' characteristics explain the nature and level of parasitism for host damselfly (*Coenagrionidae*)–water mite (*Arrenuridae*) parasite associations. Prevalence and intensity of mite parasites, and mite species richness were examined in relation to geographic range size, regional occurrence, relative local abundance, phenology and body size of host damselfly species. A total of 7107 damselfly individuals were collected representing 16 species from 13 sites in southeastern Ontario and southwestern Quebec, Canada. Using comparative methods, differences in prevalence and intensity of parasitism could be predicted by a host species' geographic range and phenology. Barcoding based on Cytochrome Oxidase I revealed 15 operational taxonomic units (OTUs) for mite species. The number of mite OTUs known to infest a given host species was explained by a host species' regional occurrence. Our findings demonstrate the need to measure factors at several ecological scales in order to understand the breadth of evolutionary interactions with host–parasite associations and the selective 'milieu' for particular species of both hosts and parasites." (Authors)] Address: Mlynarek, Julia, Dept of Biology, Carleton Univ., Nesbitt Building, 1125

Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: julia.mlynarek@carleton.ca

15402. Mochon, A. (2015): Les libellules du lac des Atocas au parc national du Mont-Saint-Bruno : découverte d'une population de l'aeschne des nénuphars au Québec. *Le Naturaliste canadien* 139(2): 20-34. (in French, with English summary) ["An in-depth survey of Odonata was conducted in 2012 and 2013 at the lac des Atocas, a protected wetland within the Mont-Saint-Bruno National Park, located in the temperate deciduous bioclimatic zone of southern Québec, Canada. This small body of water, with peaty banks, covers an area of approximately 0.68 ha, and was used by 53 species of odonates, including more than 40 that live and complete their life cycle there. One of the highlights of the present study was the discovery of a population of *Rhionaeschna mutata*, which is a first for the province of Québec, and represents a northern extension of its known range. In addition, several of the other specimens identified were of species rarely reported in the province, and *Gomphaeschna furcillata* and *Libellula incesta* were new additions to the list for the Montérégie region. Finally, observations of exuviae and adults extended the known spring and fall flight periods for a dozen species" (Author)] Address: Mochon, A.; E-mail: mochon.alain@sepaq.com

15403. Moerland, A.; Wouter %A de Baerdemaeker, André %A Boesveld, Arno %A Grutters, Mark A. J. %A van de Poel, J.L. (2015): Rotterdam. In: J.G. Kelcey (ed.): *Vertebrates and Invertebrates of European Cities: Selected Non-Avian Fauna*. Springer New York: 453-494. (in English) ["Rotterdam is located on the west coast of continental Europe (51°55'51" N, 4°8'45" E). It is the second largest city in The Netherlands and occupies almost 320 km², of which a little less than 115 km² is water. Rotterdam has a maritime temperate climate with a mild winter, a mean annual precipitation of 815 mm and a mean annual temperature of 10 °C. The average wind speed is 5 m/s. The dominant soil types are sand, sea clay and peat. This chapter is based on records of invertebrates that occurred within the boundaries of Rotterdam from 1 January 1980 until now. The chapter describes the Decapoda (in particular, the crayfish and crab families), 23 species; Diptera, Stratiomyidae (soldierflies), 17 species; Diptera, Syrphidae (hoverflies), 120 species; Heteroptera 'aquatica' (bugs—aquatic families), 31 species; Hymenoptera, Apidae s.l. (bees), 94 species; Lepidoptera (butterflies and moths), 35 and 1034 species, respectively; Mollusca (terrestrial and non-marine aquatic molluscs), 68 and 49 species; Odonata (dragonflies and damselflies), a total of 36 taxa; Orthoptera (grasshoppers and crickets), a total of 24 taxa. The figures include migrants, non-native species and vagrants. The species-richness of these groups of invertebrates is discussed and related to factors such as geomorphological features, geographical position and land use." (Authors)] Address: Moerland, W., Urban Ecology Research Unit, Natural History Museum Rotterdam, Westzeedijk 345, 3015 AA, Rotterdam, The Netherlands. E-mail: moerland@bureaustadsnatuur.nl

15404. Mohammed, N.E.M. (2015): Dragonfly nymphs as active predators of Cyclops and mosquito larvae. B.Sc (Hons.) (Zoology), Medical Entomology and vector control, University of Khartoum: XII + 68 pp. (in English, with Arab summary) [Sudan; "The aim of this study is to determine, the efficiency of Odonata full-grown nymphs, represented by certain species as active predators of Cyclops, the intermediate host of *Dracunculus medinensis*. Prey-organisms also used included beside Cyclops the 1st instar Culicine and Anopheline mosquito larvae. Five laboratory experiments were carried out and several variables were investigated. e. g. predation efficiency among full-grown nymphs of *Crocothemis erythraea*, *Aeshna rileyi*) and *Ischnura segenalensis* and predation capacity of members of these families. To test this variable, 50 and then 100 specimens of *Mesocyclops aspericornis* and one full-grown nymph were used in each experiment. Experiments were repeated five times, Relative vulnerability of *Mesocyclops aspericornis* versus Anopheline or Culicine larvae (1st stage), was determined using *I. segenalensis* nymph, twenty-five organisms of each prey animal were used. Variables also included presence or absence of substrata and colour of background. To test these twenty-five *Mesocyclops aspericornis* with one full-grown nymph of *I. segenalensis* were used in each experiment. All experiments were carried out (at room temperature), experiments were conducted using small "Talis" dishes and depth of water was 5cm and surface diameter of water was 16.1cm. Numbers of prey-organisms were recorded after 24hrs. Wild Odonata nymphs and Cyclops were used. Results of predation capacity revealed that the average percent of Cyclops eaten by full-grown nymphs of *Coenagrionidae* was greater (46.4%) than *Libellulidae* (30.6%) and *Aeshnidae* (28.6%). This means that *I. segenalensis* nymph is the most voracious compared to the other two species). Results of vulnerability tests showed that the mean percent of 1st stage Culicine iv larvae consumed by *I. segenalensis* (53.97%) was greater than that of Cyclops (33.94%) and for *Anopheles* larvae consumed the percentage was (64.63%) and for Cyclops (33.66) this means that Culicine and Anopheline larvae were more vulnerable to predation than Cyclops; however Anopheline larvae were more vulnerable than Culicine ones. Similarly experiments on substrata showed that the mean percent of Cyclops eaten from water without plant substrata (42.47%) was greater than that eaten with floating plant substrata (19.68%). This means that presence of substrata did not enhance predation by *I. segenalensis*. As for colours result obtained showed that the mean percent of Cyclops which were eaten by *I. segenalensis* nymphs was greater in white colour background (63.51%) compared to other background colours: red (22.37%), blue (26.62%), green (29.61%) and black (22.01 %) and the differences between white colour and other colours were highly significant, ($P=0.01$) on the other hand no significant difference was detected among other four colours. This means that White colour of background did enhance predation." (Author)] Address: not stated

15405. Moldowan, P.D.; Keevil, M.G.; Mills, P.B.; Brooks, R.J.; Litzgus, J.D. (2015): Diet and feeding behaviour of

Snapping Turtles (*Chelydra serpentina*) and Midland Painted Turtles (*Chrysemys picta marginata*) in Algonquin Provincial Park, Ontario. *The Canadian Field-Naturalist* 129(4): 403-408. (in English) ["We compare diet and feeding behaviour of Snapping Turtles (*Chelydra serpentina*) and Midland Painted Turtles (*Chrysemys picta marginata*) in Algonquin Provincial Park, Ontario, Canada. We observed young *Chelydra* and *Chrysemys* turtles feeding on insect and amphibian larvae in ephemeral ponds, adult *Chrysemys* terrestrially foraging on odonate larvae, and adult *Chelydra* consuming aquatic vegetation and seeds. These and other observations highlight the importance of seasonally available habitat and food for juvenile turtles. We also discuss the evidence for, and importance of, turtles as seed-dispersal agents for aquatic vegetation. Illustrative video recordings accompany our dietary observations.... On 22 May 2011, an adult female *Chrysemys* was seen climbing onto Sphagnum bog mats to catch emergent dragonfly larvae that were preparing to metamorphose (Video 4, Supplementary Material: <https://www.youtube.com/watch?v=Z7LNdafj1HQ&feature=youtu.be>). The turtle appeared to search actively for terrestrial prey and to identify visually motionless dragonfly larvae. This turtle plucked dragonfly larvae from low-lying stems of bog vegetation and carried her prey back to water before feeding. Freshwater turtles have a soft, flattened eye lens that permits emmetropic (normal-sighted) vision and comparable focus in air and water ..., perhaps allowing efficient foraging in both media." (Authors)] Address: Litzgus, J.D., Dept Biology, Laurentian Univ., 935 Ramsey Lake Road, Sudbury, Ontario P3E 2C6 Canada. E-mail: jlitzgus@laurentian.ca

15406. Monroe, E.M.; Britten, H.B. (2015): Single-sample estimation of effective population size in several populations of the endangered Hine's emerald dragonfly. *Freshwater Science* 34(3): 1058-1064. (in English) ["*Somatochlora hineana* is the only odonate on the US Endangered Species list. It prefers discrete fen-and-wet-meadow habitat from Ontario, Canada, to Missouri, USA. This habitat has been destroyed across much of *S. hineana*'s range. Its conservation genetics were assessed by microsatellite analysis in a previous study. We applied 2 common single-sample estimators to the same data set to estimate effective population size (N_e), or effective number of breeders, in 5 populations (separated into adult and naiad stage classes) across the species' range in 2008 and 2010–2011. Populations of the species in the Upper Peninsula of Michigan, the Door Peninsula of Wisconsin, and along the Des Plaines River Valley in Illinois are made up of individuals collected from multiple sites, but the other 2 populations, at Cedarburg Bog, Wisconsin, and along the Lower Wisconsin River, consist of samples from single habitats disjunct from other known sites. N_e for *S. hineana* were similar to those for other endangered insects and ranged from 22 adults in the Des Plaines River Valley population in 2010 to 200 adults in the Door Peninsula population in 2010 based on approximate Bayesian estimation in ONeSAMP and from 8 naiads in the Door Peninsula population to 419 adults in the Des Plaines River Valley population based on the linkage disequilibrium

method in NeEstimator. These Ne values confirm the endangered status of this species and indicate that efforts to maintain current habitats and connectivity to suitable habitat are essential to maintaining genetic diversity." (Authors)] Address: Monroe, Emy, Whitney Genetics Lab, US Fish and Wildlife Service, 555 Lester Avenue, Onalaska, Wisconsin 54650 USA. E-mail: emy_monroe@fws.gov

15407. Mora, A.; Farkas, A. (2015): First records of *Erythromma lindenii* (Selys, 1840) from Hungary (Odonata: Coenagrionidae). *Notulae odonologicae* 8(6): 169-175. (in English) ["The first records of *E. lindenii* from Hungary are presented. In 2014 larvae, exuviae, and adults of *E. lindenii* were collected along running waters in the Kis-Sárrét area, located in the southeastern part of the country. The current knowledge of *E. lindenii* in Hungary is summarized and notes on the habitat of the species are provided." (Authors)] Address: Móra, A., MTA Centre for Ecological Research, Balaton Limnological Institute, Klebelsberg Kuno 3, 8237 Tihany, Hungary. E-mail: mora.arnold@okologia.mta.hu

15408. Mori, T.; Yanagisawa, Y.; Kitani, Y.; Sugiyama, M.; Kishida, O.; Nishimura, K. (2015): Gene expression profiles in *Rana pirica* tadpoles following exposure to a predation threat. *BMC Genomics* 2015, 16:258 doi:10.1186/s12864-015-1389-4: 17 pp. (in English) ["Background: *Rana pirica* tadpoles show morphological changes in response to a predation threat: larvae *Aeshna nigroflava* (= *A. crenata*) induce heightened tail depth, whereas larval salamander *Hynobius retardatus* induce a bulgy morphology with heightened tail depth. Although both predators induce similar tail morphologies, it is possible that there are functional differences between these tail morphs. Results; Here, we performed a discriminant microarray analysis using *Xenopus laevis* genome arrays to compare tail tissues of control and predator-exposed tadpoles. We identified 9 genes showing large-scale changes in their expression profile: ELAV-like1, methyltransferase like 7A, dolichyl-phosphate mannosyltransferase, laminin subunit beta-1, gremlin 1, BCL6 corepressor-like 1, and three genes of unknown identity. A further 80 genes showed greater than 5 fold differences in expression after exposure to dragonfly larvae and 81 genes showed altered expression after exposure to larval salamanders. Predation-threat responsive genes were identified by selecting genes that reverted to control levels of expression following removal of the predator. Thirteen genes were induced specifically by dragonfly larvae, nine others were salamander-specific, and sixteen were induced by both. Functional analyses indicated that some of the genes induced by dragonfly larvae caused an increase in laminins necessary for cell adhesion in the extracellular matrix. The higher expression of gremlin 1 and HIF1a genes after exposure to dragonfly larvae indicated an in vivo hypoxic reaction, while down-regulation of syndecan-2 may indicate impairment of angiogenesis. Exposure to larval salamanders caused down-regulation of XCIRP-1, which is known to inhibit expression of adhesion molecules; the tadpoles showed reduced expression of ca(E)-catenin, small muscle

protein, dystrophin, and myosin light chain genes. Conclusion: The connective tissue of tadpoles exposed to larval salamanders may be looser. The differences in gene expression profiles induced by the two predators suggest that there are functional differences between the altered tail tissues of the two groups of tadpoles." (Authors)] Address: Mori, T., Dept of Marine Science & Resources, Nihon Univ. College of Bioresource Sciences, Kameino 1866, Fujisawa 252-0880, Japan. E-mail: mori.tsukasa@nihon-u.ac.jp

15409. Mougnot, T.; Bouttier, E. (2015): Bilan provisoire Inventaire des odonates Printemps-été 2015. Atlas de la Biodiversité à Melesse. Bretagne vivante: 7 pp. (in French) [For a full version of the publication see: [http://www.melesse.fr/content/download/16077/145570/file/Inventaire%20participatif%20Volet%20odonate1-EB %20\(2\).pdf](http://www.melesse.fr/content/download/16077/145570/file/Inventaire%20participatif%20Volet%20odonate1-EB%20(2).pdf)] Address: not stated

15410. Müller, J.; Steglich, R. (2015): Beitrag zur Libellenfauna (Odonata) im Genthiner Land und Baruther Urstromtal. In: Entomologen-Vereinigung Sachsen-Anhalt e.v. (Hrsg.): Entomofaunistische Untersuchungen im Genthiner Land: 43-48. (in German) [Sachsen-Anhalt, Germany; between 2012 and 2014, 22 odonate species were recorded.] Address: Müller, J., Frankefelde 3, 39116 Magdeburg, Germany. E-mail: FaunOek.JMueller@t-online.de

15411. Murányi, D.; Katona, G.; Fekete, J.; Kovács, T. (2015): Review and contribution to the Odonata of Salaj county, Romania. *Studia Universitatis "Vasile Goldis", Seria Stiintele Vietii* 25(4): 250-253. (in English) [An annotated list of 17 Odonata species from Sălaj county, Romania, collected in 2014 and 2015 are given. *Calopteryx virgo*, *Lestes viridis*, *Coenagrion pulchellum*, *Ischnura pumilio*, *I. elegans pontica*, *Aeshna affinis*, *A. cyanea*, *Cordulegaster heros*, *Somatochlora meridionalis*, *Libellula depressa*, *Orthetrum coerulescens* and *O. brunneum* are new records for the area.] Address: Murányi, D., Dept of Civil & Environmental Engineering, Ehime Univ., Matsuyama and Department of Zoology, Hungarian Natural History Museum, Budapest

15412. Murugan, K.; Dinesh, D.; Kumar, P.J.; Panneerselvam, C.; Subramaniam, J.; Madhiyazhagan, P.; Suresh, U.; Nicoletti, M.; Alarfaj, A.A.; Munusamy, M.A.; Higuruchi, A.; Mehlhorn, H.; Benelli, G. (2015): *Datura metel*-synthesized silver nanoparticles magnify predation of dragonfly nymphs against the malaria vector *Anopheles stephensi*. *Parasitology Research* 114(12): 4645-4654. (in English) ["Malaria is a life-threatening disease caused by parasites transmitted to people and animals through the bites of infected mosquitoes. The employ of synthetic insecticides to control *Anopheles* populations leads to high operational costs, non-target effects, and induced resistance. Recently, plant-borne compounds have been proposed for efficient and rapid extracellular synthesis of mosquitocidal nanoparticles. However, their impact against predators of mosquito larvae has been poorly studied. In this study, we synthesized silver nanoparticles (AgNPs) using the *Datura*

metel leaf extract as reducing and stabilizing agent. The biosynthesis of AgNPs was confirmed analyzing the excitation of surface plasmon resonance using ultraviolet–visible (UV–vis) spectroscopy. Scanning electron microscopy (SEM) showed the clustered and irregular shapes of AgNPs, with a mean size of 40–60 nm. The presence of silver was determined by energy-dispersive X-ray (EDX) spectroscopy. Fourier transform infrared (FTIR) spectroscopy analysis investigated the identity of secondary metabolites, which may be acting as AgNP capping agents. In laboratory, LC50 of *D. metel* extract against *Anopheles stephensi* ranged from 34.693 ppm (I instar larvae) to 81.500 ppm (pupae). LC50 of AgNP ranged from 2.969 ppm (I instar larvae) to 6.755 ppm (pupae). Under standard laboratory conditions, the predation efficiency of *Anax immaculifrons* nymphs after 24 h was 75.5 % (II instar larvae) and 53.5 % (III instar larvae). In AgNP-contaminated environment, predation rates were boosted to 95.5 and 78 %, respectively. Our results documented that *D. metel*-synthesized AgNP might be employed at rather low doses to reduce larval populations of malaria vectors, without detrimental effects on behavioral traits of young instars of the dragonfly *Anax immaculifrons*." (Authors)] Address: Murugan, K., Division of Entomology, Dept Zoology, School of Life Sciences, Bharathiar Univ., Coimbatore, 641046, Tamil Nadu, India

15413. Muthukumaravel, K.; Bose Raja, R.; Amsath, A.; Prabakaran, S.; Chezhian, Y. (2015): Seasonal variation of dragonflies diversity in muthupet mangrove forest Tamil Nadu India. *International Journal of Pure and Applied Zoology* 382): 188-192. (in English) [In 2014, *Rhyothemis variegata*, *Anax guttatus*, *Pantala flavescens*, *Brachythemis contaminata*, *Orthetrum sabina*, *Diplacodes trivialis*, *Crocothemis servilia* and *Tamea basilaris* were sampled.] Address: Muthukumaravel, K., Department of Zoology, Khadir Mohideen College, Adirampattinam-614 701, Tamil Nadu, India. E-mail: kumar_phd_2003@yahoo.co.in,

15414. Mutlu, O.; Ulak, G.; Kokturk, S.; Celikyurt, I.K.; Tanyeri, P.; Akar, F.; Erden, F. (2015): Effects of a dragonfly (*Anax i.*) homeopathic remedy on learning, memory and cell morphology in mice. *Homeopathy* 105(1): 96-101. (in English) ["Highlights: •*Anax i.* impair learning acquisition. •*Anax i.* chronically impair reference memory. •*Anax i.* improved disturbed cell morphology. Background: Homeopathy is a form of alternative medicine in which uses highly diluted preparations that are believed to cause healthy people to exhibit symptoms similar to those exhibited by patients. The aim of this study was to investigate the effects of dragonfly (*Anax imperator*, *Anax i.*) on learning and memory in naive mice using the Morris water maze (MWM) test; moreover, the effects of dragonfly on MK-801-induced cognitive dysfunction were evaluated. Methods: Male balb-c mice were treated with dragonfly (30C and 200C) or MK-801 (0.2 mg/kg) alone or concurrently (n = 10). Dragonfly (D) and MK-801 were administered subchronically for 6 days intraperitoneally 60 min and 30 min, respectively, before the daily performance of the MWM test. Results: This study revealed that in the familiarization session and first session of

the MWM test, *Anax i.* D30 significantly decreased escape latency compared to the control group, although MK-801, D30 and D200 significantly increased escape latency at the end of five acquisition sessions. *Anax i.* combined with dizocilpine maleate (MK-801) also significantly decreased escape latency in the familiarization session and first session of the MWM test, although this combination increased escape latency compared to the MK-801 alone group at the end of the test. Time spent in escape platform's quadrant in the probe trial significantly decreased while mean distance to platform significantly increased in MK-801, D30 and D200 groups. In the MWM test, *Anax i.* combined with MK-801 significantly decreased speed of the animals compared to the MK-801 alone group. General cell morphology was disturbed in the MK-801 group while D30 and D200 seemed to improve cell damage in the MK-801 group. Conclusions: These results suggest that the homeopathic *Anax i.* can impair learning acquisition and reference memory, and it has beneficial effects on disturbed cell morphology." (Authors)] Address: Mutlu, O., Dept of Pharmacology, Medical Faculty, Kocaeli Univ., 41380, Kocaeli, Turkey. E-mail: oguzmutlu80@hotmail.com

15415. Nair, G.A.; Morse, J.C.; Marshall, S.A. (2015): Aquatic insects and their societal benefits and risks. *Journal of Entomology and Zoology Studies* 3(3): 171-177. (in English) ["Information on the aquatic insects and their benefits and risks to the society are scanty among the general public, students and the scientific community, when compared with the same on the land forms. In this article, an attempt is made to overcome this deficiency. A brief description is furnished along with the representative photographs of eleven orders of aquatic insects (including Odonata). Detailed information is presented on the beneficial role of aquatic insects in food webs, biomonitoring, fishing and control of noxious weeds. The harmful impacts caused by these animals to the society and the ecosystem by way of general nuisance, transmission of diseases and destruction of crops, are described. The importance of the need for a new generation of aquatic entomologists, is stressed." (Authors)] Address: Nair, G.A., Environmental Resources Research Centre (ERRC), P.B. 1230, Peroorkada, Thiruvananthapuram-695005 Kerala State, India. E-mail: trivandrum46@gmail.com

15416. Natsumeda, T.; Takamura, N.; Nakagawa, M.; Kadono, Y.; Tanaka, T.; Mitsuhashi, H. (2015): Environmental and biotic characteristics to discriminate farm ponds with and without exotic largemouth bass and bluegill in western Japan. *Limnology* 16(3): 139-148. (in English) ["We compared the environmental and biotic characteristics of farm ponds with and without the invasive fish, largemouth bass (*Micropterus salmoides*), and bluegill (*Lepomis macrochirus*), with varying degrees of aquatic vegetation cover in western Japan. Redundancy analysis (RDA) revealed that aquatic vegetation cover and pond area were significant environmental variables in explaining the variance in aquatic organisms. Aquatic vegetation cover predominantly affected Odonata and Hemiptera larvae, and the native cyprinid, *Hemigrammocypripis rasborella*, while the pond area

mainly affected the two exotic fishes (largemouth bass and bluegill), Viviparidae, Oligochaeta, Ephemeroptera, and chironomid larvae. In the RDA biplot for aquatic organisms, the RDA1 axis appeared to separate the exotic fish group (bluegill, largemouth bass, Gammaridae, Oligochaeta, Viviparidae, Ephemeroptera, Trichoptera, and chironomid larvae) from the native fish group (*H. rasborella*, *Oryzias latipes*, *Rhinogobius* sp., Odonata, shrimps, and Hemiptera larvae). The best path model results indicated that the presence of piscivorous largemouth bass had a significantly negative effect on native fish numbers; largemouth bass also had a positive indirect effect on benthic organism numbers. Our data suggest that the depletion of native fishes via top-down effects by exotic largemouth bass may indirectly increase the number of benthic organisms as a result of trophic-cascading effects." (Authors)] Address: Natsumeda, T., Global Environmental Forum, Tsukuba, Ibaraki, 305-8506, Japan. E-mail: natsumed@mx.ibaraki.ac.jp

15417. Nel, A.; Huang, D. (2015): A new genus and species of damsel-dragonfly (Odonata: Stenophlebiidae) from the Lower Cretaceous of Inner Mongolia, China. *Cretaceous Research* 56: 421-425. (in English) ["A taxon of the Stenophlebiidae, *Yixianstenophlebia magnifica* gen. et sp. nov., is described from the Lower Cretaceous Yixian Formation at Liutiaogou, Ningcheng County, Inner Mongolia of China. Its closest relative is the Late Jurassic European genus *Stenophlebia*. This new discovery is helpful to understand the Jehol Biota assemblage at Liutiaogou Locality. It also confirms that the Stenophlebiidae was a very diverse and widespread family during the Early Cretaceous. The causes of its extinction in the Late Cretaceous remain enigmatic." (Authors)] Address: Nel, A., Lab. Ent.. Mus. Natn. Hist. Nat., 45 rue Buffon, F-75005 Paris, France. E-mail: anel@cimrs1.mnhn.fr

15418. Nel, A.; Huang, D.Y. (2015): A new family of 'libelluloid' dragonflies from the Middle Jurassic of Daohugou, northeastern China (Odonata: Anisoptera: Cavilabiata). *Alcheringa* 39: 525-529. (in English) ["A new well-preserved Middle Jurassic fossil of Cavilabiata is described and attributed to a new family (Daohugoulibellulidae), genus and species (*Daohugoulibellula lini*), from the Daohugou beds of China. Together with examples of *Juralibellulidae* from the same outcrop, they represent the oldest records of the Cavilabiata. The potential closest relative of the new family could be the Late Jurassic *Nannogomphidae*, suggesting a significant diversity of Cavilabiata during the Middle Jurassic." (Authors)] Address: Huang, D., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, PR China. E-mail: dyhuang@nigpas.ac.cn

15419. New, T.R. (2015): Vincent Kalkman and Albert Orr: Field guide to the damselflies of New Guinea. *Journal of Insect Conservation* 19(1): 181-182. (in English) ["This field guide, published as a supplement to the Dutch dragonfly journal *Brachytron*, is a welcome and unusual production.

Superbly illustrated by nearly 300 meticulous colour paintings and about 250 line drawings by Dr. Orr, and augmented by a series of colour photographs of living damselflies by Stephen Richards, it brings together the highly scattered information on the damselflies of this large and complex island to form a concise, informative and accessible account. 'Field guides' are perhaps an unusual theme for review in this Journal, but two innovative features vastly enhance the values of this one and deserve consideration for much wider adoption. First, more than 500 copies (of a print run of 1200) are being donated to universities throughout New Guinea, for easy access and use by students within the region (with the hope expressed that they will rapidly become dog-eared through use!). Second, the book is bilingual, with the entire text in both English and Bahasa Indonesian. ...] Address: New, T.R., Dept of Zoology, La Trobe University, Victoria, 3086, Australia. E-mail: T.New@latrobe.edu.au

15420. Newell Wohner, P.J.; Cooper, R.J.; Greenberg, R.S.; Schweitzer, S.H. (2015): Weather affects diet composition of rusty blackbirds wintering in suburban landscapes. *The Journal of Wildlife Management* 80(1): 91-100. (in English) ["The rusty blackbird (*Euphagus carolinus*) is a species of conservation concern throughout its range and the cause of the species' population decline is unknown. We studied diet composition of rusty blackbirds with stable isotope mixing models in suburban landscapes in the southeastern United States. We captured blackbirds in Georgia and South Carolina from 2009 to 2012, and estimated proportions of earthworm, other animals, pecan, and acorn incorporated into individual diets. On the Piedmont Plateau, terrestrial and aquatic earthworms constituted the largest proportion incorporated into the diet ($39\% \pm 2.9$; mean \pm SD by site and year) and animals other than earthworms (mostly larval invertebrates Odonata and Diptera) constituted $27\% \pm 12.9$. In contrast, on the Coastal Plain, which featured milder winters than the Piedmont, earthworms constituted a lower proportion ($19\% \pm 1.2$) of incorporated food items and animals other than earthworms comprised $62\% \pm 3.3\%$ of the diet. Increased incorporation of earthworms in the diet was related to increased upcoming precipitation and daily maximum temperature. Rusty blackbirds incorporated more tree mast into their diet on the Piedmont Plateau than the Coastal Plain. Increased incorporation of tree mast was related to advancing cold temperature. Mast, including crushed pecans (*Carya illinoensis*) and pre-opened small-seeded red oak (*Quercus* spp.) acorns, is a high-lipid dietary component of blackbirds wintering in colder climates, and is incorporated prior to extreme cold weather. Therefore, planting mast trees, especially lipid-rich pecan, could be used to augment resources in known rusty blackbird wintering hotspots. Maintaining shallowly flooded wetlands with a fluctuating water regime and residential lawns with abundant red oak (*Quercus* spp.) leaf litter would promote acorn and invertebrate resources including earthworms." (Authors)] Address: Newell Wohner, Patti, Warnell School of Forestry and Natural Resources, Univ. of Georgia, Athens, GA 30602, USA. E-mail: pjwohner@gmail.com

15421. Nicholson, D.B.; Mayhew, P.J.; Ross, A.J. (2015): Changes to the fossil record of insects through fifteen years of discovery. *PLoS ONE* 10(7): e0128554. doi:10.1371/journal.pone.0128554: 61 pp. (in English) ["The first and last occurrences of hexapod families (including Odonata) in the fossil record are compiled from publications up to end-2009. The major features of these data are compared with those of previous datasets (1993 and 1994). About a third of families (>400) are new to the fossil record since 1994, over half of the earlier, existing families have experienced changes in their known stratigraphic range and only about ten percent have unchanged ranges. Despite these significant additions to knowledge, the broad pattern of described richness through time remains similar, with described richness increasing steadily through geological history and a shift in dominant taxa, from Palaeoptera and Polyneoptera to Para-neoptera and Holometabola, after the Palaeozoic. However, after detrending, described richness is not well correlated with the earlier datasets, indicating significant changes in shorter-term patterns. There is reduced Palaeozoic richness, peaking at a different time, and a less pronounced Permian decline. A pronounced Triassic peak and decline is shown, and the plateau from the mid Early Cretaceous to the end of the period remains, albeit at substantially higher richness compared to earlier datasets. Origination and extinction rates are broadly similar to before, with a broad decline in both through time but episodic peaks, including end-Permian turnover. Origination more consistently exceeds extinction compared to previous datasets and exceptions are mainly in the Palaeozoic. These changes suggest that some inferences about causal mechanisms in insect macroevolution are likely to differ as well." (Authors)] Address: Nicholson, D.B., Department of Biology, University of York, York, UK. E-mail: david.nicholson@nhm.ac.uk

15422. Nilsson-Örtman, V.; Rogell, B.; Stoks, R.; Johansson, F. (2015): Ontogenetic changes in genetic variances of age-dependent plasticity along a latitudinal gradient. *Heredity* 115(4): 366-378. (in English) ["The expression of phenotypic plasticity may differ among life stages of the same organism. Age-dependent plasticity can be important for adaptation to heterogeneous environments, but this has only recently been recognized. Whether age-dependent plasticity is a common outcome of local adaptation and whether populations harbour genetic variation in this respect remains largely unknown. To answer these questions, we estimated levels of additive genetic variation in age-dependent plasticity in six species of damselflies sampled from 18 populations along a latitudinal gradient spanning 3600km. We reared full sib larvae at three temperatures and estimated genetic variances in the height and slope of thermal reaction norms of body size at three points in time during ontogeny using random regression. Our data show that most populations harbour genetic variation in growth rate (reaction norm height) in all ontogenetic stages, but only some populations and ontogenetic stages were found to harbour genetic variation in thermal plasticity (reaction norm slope). Genetic variances in reaction norm height differed among species, while genetic variances in reaction norm

slope differed among populations. The slope of the ontogenetic trend in genetic variances of both reaction norm height and slope increased with latitude. We propose that differences in genetic variances reflect temporal and spatial variation in the strength and direction of natural selection on growth trajectories and age-dependent plasticity. Selection on age-dependent plasticity may depend on the interaction between temperature seasonality and time constraints associated with variation in life history traits such as generation length." (Authors) *Coenagrion armatum*, *C. johanssoni*, *C. puella*, *C. pulchellum*, *C. mercuriale*, *C. scitulum*] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

15423. Novelo-Gutiérrez, R.; Gómez-Anaya, J.A.; Smith-Gómez, S.A. (2015): Description of the larva of *Epigomphus crepidus* Kennedy, 1936 (Odonata: Gomphidae). *Zootaxa* 4027(4): 587-592. (in English, with Spanish summary) ["The larva of *E. crepidus* is described and figured and compared with other described congeners. It is characterized by 3rd antennomere spindle-shaped, flattened dorso-ventrally, twice longer than its widest part; ventral pad of hypopharynx pentagonal; prementum subrectangular, with lateral margins slightly convex on apical 0.60; ligula very poorly developed, with a ventral row of nine short, truncate teeth on middle, and dorsal rows of short, stout piliform setae. Abdomen lacking dorsal protuberances, lateral spines on S7-9 divergent; sternites 3-8 divided into five plates, sternites 2 and 9 divided into three plates; male epiproct with a pair of dorsal tubercles rounded apically and divergent at basal 0.30. It differs from other species mainly in 3rd antennomere, sides of prementum and serrations on lateral margins of S7-9." (Authors)] Address: Novelo-Gutiérrez, R., Departamento de Entomología, Instituto de Ecología A.C., Km 2.5. antigua carretera a Coatepec, Apartado Postal 63, 91000 Xalapa, Veracruz, Mexico. E-mail: rodolfo.novelo@inecol.mx

15424. Novikmec, M.; Veselska, M.; Bitušik, P.; Hamerlík, L.; Matúšová, Z.; Klementová, B.R.; Svitok, M. (2015): Checklist of benthic macroinvertebrates of high altitude ponds of the Tatra Mountains (Central Europe) with new records of two species for Slovakia. *Check List* 11(1) (Art. 1522): 1-12. (in English) [The following Odonata taxa are listed: *Platycnemis pennipes*, *Pyrrhosoma nymphula*, *Coenagrionidae* spp. juv., *Aeshna cyanea*, *A. juncea*, *Aeshna* spp. juv., *Somatochlora metallica*, *Somatochlora* sp. and *Sympetrum danae*.] Address: Novikmec, M., Fac. Ecology & Environmental Sciences, Technical Univ. in Zvolen, T. G. Masaryka 24, SK-960 53 Zvolen, Slovakia. E-mail: novikmec@tuzvo.sk

15425. Novikmec, M.; Hamerlík, L.; Svitok, M.; Matúšová, Z.; Bitušik, P. (2015): Remarkable faunistic records of aquatic insects from streams of the Kremnické vrchy Mountains, Slovakia. *Lauterbornia* 79: 51-57. (in English, with German summary) [Kremnické vrchy Mts. are a volcanic mountain range located in the middle of Slovakia (the West Carpathians, 48°41' N, 18°55' E) and belong to the catchment of Hron river, a tributary of the Danube. The sampling

was carried out at 15 localities in May, August and October 2013. The rare and red-listed species *Cordulegaster bidentata* was recorded at two sampling points.] Address: Novikmec, M., Department of Biology and General Ecology, Faculty of Ecology and Environmental Sciences, Technical University in Zvolen, T. G. Masaryka 24, SK-960 53 Zvolen, Slovakia. E-mail: novikmec@tuzvo.sk

15426. Nowak, A. (2015): Application of Voronoi diagrams in contemporary architecture and town planning. *Challenges of Modern Technology* 6(2): 30-34. (in English) ["Modern design methods rely increasingly on understanding the nature of processes and principles of self-organization of biological structures and their representation using mathematical models that may apply in technology, including architecture. As a result, bionic design elements play a more meaningful role in shaping contemporary architecture and urban planning. The development of computer technology has made it possible to create more complex and complicated structures and surfaces inspired by natural forms. The inspiration for the discretization of the surface, using the Voronoi diagram, as seen in the honeycomb structure or the dragonfly wing, is increasingly applied in shaping the elevation of contemporary buildings. As a mathematical problem, the division of space fascinates scientists as well as architects. Consequently, architects use the spatial Voronoi cells also in shaping the structural forms. Today Voronoi diagrams are an important source of inspiration for architects and urban planners as a surface discretization method and a way of creating structural elements or spatial forms and as flooring patterns in urban projects. The use of mathematical models represent the structure and organization of the forms found in nature, which is increasingly used in the multidisciplinary architectural design. The design of the structures and elements both in architecture and urban planning using methods of computational geometry makes new opportunities for architectural and urban projects as seen by the Voronoi tessellation." (Author)] Address: Nowak, Anna, Warsaw University of Technology, Faculty of Architecture, Department of Structural Design, Construction and Technical Infrastructure, Koszykowa 55, 00-659 Warsaw, Poland. E-mail: anna.patrycja.nowak@gmail.com

15427. Nowlin, K.; Boseman, A.; Covell, A.; LaJeunesse, D. (2015): Adhesion-dependent rupturing of *Saccharomyces cerevisiae* on biological antimicrobial nanostructured surfaces. *Journal of The Royal Society Interface* 12(102): 12 pp. (in English) ["Recent studies have shown that some nanostructured surfaces (NSS), many of which are derived from surfaces found on insect cuticles, rupture and kill adhered prokaryotic microbes. Most important, the nanoscale topography is directly responsible for this effect. Although parameters such as cell adhesion and cell wall rigidity have been suggested to play significant roles in this process, there is little experimental evidence regarding the underlying mechanisms involving NSS-induced microbial rupture. In this work, we report the NSS-induced rupturing of a eukaryotic microorganism, *Saccharomyces cerevisiae*. We

show that the amount of NSS-induced rupture of *S. cerevisiae* is dependent on both the adhesive qualities of the yeast cell and the nanostructure geometry of the NSS. Thus, we are providing the first empirical evidence that these parameters play a direct role in the rupturing of microbes on NSS. Our observations of this phenomenon with *S. cerevisiae*, particularly the morphological changes, are strikingly similar to that reported for bacteria despite the differences in the yeast cell wall structure. Consequently, NSS provide a novel approach for the control of microbial growth and development of broad-spectrum microbicidal surfaces. ... The wings of ... *Progomphus obscurus* were all collected from Greensboro, NC, USA." (Authors)] Address: Nowlin, Kyle, Department of Nanoscience, Joint School of Nanoscience and Nanoengineering, University of North Carolina Greensboro, 2907 East Lee Street, Greensboro, NC 27455, USA. E-mail: drlajeun@uncg.edu

15428. Okoro, O.J. (2015): Ecology of aquatic insects in Opi lake, Enugu state, Nigeria. M.Sc. Thesis, Department of Zoology and Environmental Biology, Faculty of Biological Sciences, University of Nigeria Nsukka: 110 pp. (in English) ["The ecology of aquatic insects of Opi Lake was carried out to determine their composition, abundance and diversity from February to July, 2014. Adult insects of different species were collected from the water surface using a dip-net with Nytex® netting of 500µm mesh. In addition, adult Insects and nymphs were collected from the vegetation around the lake using a sweep net with mesh size of 250µm, while bottom dwellers were sampled using a scoop net. The lake was divided into three sampling stations as a result of the nature and amount of the vegetation, and the type of substratum found in each location. Station 1 had vegetation, shade and detritus, Station 2 had no shade, very little detritus and vegetation, while Station 3 had shade, detritus with no vegetation. The physico-chemical parameters and heavy metals concentrations of the lake were determined while the climatic data of the area was collected from the Center for Space Science University of Nigeria Nsukka. A total number of 1,042 insects representing 30 species, belonging to 26 families and 8 orders were recorded. Odonata had the highest mean abundance (44.52%) in all the stations, followed by Hemiptera (23.32%) which was the most diverse group. Hemiptera had the highest number of families (8 out of the 26 families collected). Other insect orders collected with their abundance include: Coleoptera (12.28%), Orthoptera (10.29%), Hymenoptera (5.09%), Diptera (3.36%), Trichoptera (1.06%) and Lepidoptera (0.01%). Station 1 recorded the maximum number (46.35%) of aquatic insects throughout the sampling season. However, stations 2 and 3 recorded 28.98% and 24.66% of aquatic insects respectively. The abundance of insects was maximum in the month of July (20.44%) and minimum in April (8.16%). The abundance and distribution of insect species varied and were not constant from one month to another during the period of study, due to biotic and abiotic factors. There was high species diversity of aquatic insects in the different strata of the lake, indicating

the rich and diverse group of insects in the study area. Dissolved Oxygen had an inverse relationship with Orthoptera ($r = -0.63$, $p < 0.01$) and Hymenoptera ($r = -0.54$, $p < 0.05$). Diptera also had negative relationship with depth ($r = -0.48$, $p < 0.05$). There was positive correlation between Hemiptera and Copper ($r = 0.78$, $p < 0.01$), while Iron also correlated positively with Coleoptera ($r = 0.47$, $p < 0.05$) and Lepidoptera ($r = 0.59$, $p < 0.05$). Among the insects and zooplankton, Odonata had positive correlations with Rotifera ($r = 0.502$, $p < 0.05$), Cyclops ($r = 0.541$, $p < 0.05$), Bosmina ($r = 0.53$, $p < 0.05$) and Daphnia ($r = 0.595$, $p < 0.01$). Orthoptera also showed positive relationship with Fish egg ($r = 0.684$, $p < 0.01$). Also, with phytoplankton, Odonata had positive relationship with Chlorophyceae ($r = 0.505$, $p < 0.05$) and Xanthophyceae ($r = 0.499$, $p < 0.05$). Orthoptera correlated positively with Cryptophyceae ($r = 0.491$, $p < 0.05$) and Xanthophyceae ($r = 0.487$, $p < 0.05$). This therefore, adds to the fact that undisturbed habitat quality is more suitable for insects to breed and multiply under the natural ecosystem with abundant food supply." (Author)] Address: not stated

15429. Okuyama, H.; Samejima, Y.; Tsubaki, Y. (2015): Smaller damselflies have better flight performance at lower body temperature: implications for microhabitat segregation of sympatric *Mnais* damselflies. *International Journal of Odonatology* 18(3): 217-224. (in English) ["In many cases where two closely related species coexist, ecological interaction or reproductive interference drive species to diversify in their body size and/or other signal traits, often concurrently with microhabitat segregation. However, it is usually unclear how character diversification is associated with microhabitat segregation. We performed laboratory experiments using males of two damselfly species (*Mnais costalis* and *Mnais pruinosa*) collected from a syntopic site in Shiga Prefecture, Japan. We analyzed the effects of body temperature and body size on three indices of flight performance: wing-beat frequency and flight speed as measures of thrust production, and minimum body temperature for flight (MBTF). The results showed that the MBTF was correlated with body size: the smaller species (*M. pruinosa*) flew better than the larger species (*M. costalis*) in a cool environment. The initial flight speed was positively correlated with body temperature, but negatively correlated with body size. The wing-beat frequency was also positively correlated with body temperature, but negatively correlated with body size. The combined effects of body size and body temperature on wing-beat frequency meant that overall, there was no significant difference in initial flight speed. We suggest that the effect that body size and temperature have on flight performance explains the previously documented microhabitat segregation occurring between these two species, with the larger *M. costalis* preferring sunny environments and *M. pruinosa* preferring shady environments."] Address: Okuyama, H., Center for Ecological Research, Kyoto Univ., Hirano, Otsu, Shiga, Japan. Email: g0980134@yahoo.co.jp

15430. Oliveira-Junior, J.M.B.; Shimano, Y.; Gardner, T.A., Hughes, R.M.; de Marco Júnior, P.; Juen, L. (2015): Neotropical dragonflies (Insecta: Odonata) as indicators of ecological

condition of small streams in the eastern Amazon. *Austral Ecology* 40(6): 733-744. (in English) ["Sensitive and cost-effective indicators of aquatic ecosystem condition in Amazon streams are necessary to assess the effects of anthropogenic disturbances on those systems in a viable and ecologically meaningful manner. We conducted the present study in the municipality of Paragominas, state of Pará, northern Brazil, where we sampled adult dragonflies in 50 100-m-long wadeable stream sites in 2011. We collected 1769 specimens represented by 11 families, 41 genera and 97 species. The suborder Zygoptera contributed 961 individuals and Anisoptera 808. Among the 97 recorded species, nine were classified as useful indicators of ecological condition, with four species being associated with more degraded streams (three Anisoptera, one Zygoptera) and five with more preserved streams (all were Zygoptera). Anisoptera tend to provide more useful indicators of more degraded environments because they have more efficient homeostatic mechanisms and are more mobile, enabling them to tolerate a wider range of environmental conditions. By contrast, Zygoptera tend to provide a more useful role as indicators of more preserved environments and high levels of environmental heterogeneity because of their smaller body sizes and home ranges and greater ecophysiological restrictions. We conclude from our assessment of this low-order Amazonian stream system that (i) the occurrence of specific odonate species is strongly associated with the configuration of riparian vegetation, (ii) agricultural activities appear to be the main factor determining changes in the composition of odonate assemblages and (iii) these insects can act as useful indicators of the ecological consequences of riparian habitat loss and disturbance. Because generalist species invade moderately degraded areas, those areas may have high species richness but host few species of Zygoptera. Therefore, preserving dense riparian vegetation is necessary to maintain aquatic ecological condition, and that condition can be rehabilitated by planting new trees. Both require enforcing existing environmental regulations, various types of incentives and educating local communities." (Authors)] Address: Oliveira-Junior, J.M.B. de, Programa de Pós-Graduação em Ecologia e Conservação, Universidade do Estado de Mato Grosso, Nova Xavantina, Mato Grosso, Brazil. E-mail: josemaxoliveira@gmail.com

15431. Orr, A.G.; Dow, R.A. (2015): Description of the final stadium larvae of *Onychargia atrocyana* Selys, 1865 from Sarawak, identified using DNA barcoding (Odonata: Zygoptera: Platycnemididae), with an overview of larval characters in the Platycnemididae. *Zootaxa* 4040(3): 384-392. (in English) ["The final stadium larva of *O. atrocyana* is described and illustrated based on two female specimens collected at Gunung Mulu National Park, Sarawak, East Malaysia. The larvae were identified by matching the mitochondrial marker COI with that of known adult specimens from Gunung Mulu, Bintulu and Kuching in Sarawak and from Pahang state in West Malaysia. The specimens presented close matches with all adults in this gene. As *O. atrocyana* is a taxonomically isolated species with no close congeners in Borneo the determination is beyond doubt. *O. atrocyana* is the only member of the Onychargiinae for which the larva

is known. It is compared with the known larvae of other platycnemidid subfamilies, and the possible significance of larval morphology in higher classification of the group is discussed." (Authors)] Address: Orr, A.G., Environmental Futures Research Institute, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

15432. Orr, A.G.; Günther, A. (2015): Reported ovo-viviparity in *Heliocypha perforata* (Odonata: Chlorocyphidae) – re-assessment of the evidence, based partly on examination of the female reproductive system and mature eggs. *International Journal of Odonatology* 18(2): 169-174. (in English) ["*Heliocypha perforata* (sensu lato) is a common stream-dwelling damselfly widespread in mainland tropical Asia. Recently a report has been published suggesting possible ovo-viviparity in this species, based on the interpretation of evidence from a short video sequence. This video is re-evaluated. The internal and external anatomy of the *H. perforata* female reproductive system, including mature eggs, is examined and illustrated, to the extent that this information casts light on the observations. Three competing hypotheses are considered: (1) a prolarva or larva was expressed from the female's oviduct, due to abnormal retention of the fertilized egg in the oviduct for several days; (2) an egg, deep in the oviposition substrate, previously laid and near hatching, was disturbed by the female's probing ovipositor and the prolarva hatched, becoming briefly caught in the valves of the ovipositor; and (3) a small unidentified aquatic insect, probably of a different species and different order, was disturbed and similarly briefly caught in the valves. Based on the size and colour of the object relative to that of a mature egg and the likelihood of the event, hypothesis 3 is favoured." (Authors)] Address: Orr, A.G., Cooperative Research Centre for Tropical Rainforest Ecology and Management, Environmental Sciences, Griffith University, Nathan, Q 4111, Australia. E-mail: agorr@universal.net.au

15433. Orr, A.G.; Dow, R.A. (2015): Description of two final stadium platystictid larvae from Borneo, including that of *Drepanosticta ?attala* Lieftinck, identified using DNA barcoding (Odonata: Zygoptera: Platystictidae). *Zootaxa* 3985(4): 565-574. (in English) ["The final stadium larva of *Drepanosticta ?attala*, is described and illustrated based on a single male specimen collected at Kuala Belalong Field Studies Centre, Brunei. The larva was identified by matching the mitochondrial marker COI with that of known adult specimens. The larva presented a good match with both *D. attala* and *D. barbatula* Lieftinck in this gene, but as adults of only the former species had been collected at the locality, it is presumed more likely to be that species. Another, unidentified platystictid larva, Platystictidae A, collected at the same general locality is also described. The two larvae show significant differences from each other and from *D. sundana* Krüger, the only other Oriental region member of the family for which larval morphology is known. The three species are also compared with the larvae of the Neotropical genus *Palaemnema*, which they closely resemble, despite being currently placed in different subfamilies. Based on this known material, Oriental and Neotropical forms differ

significantly in details of mandibular morphology, especially the armature of the molar field." (Authors)] Address: Orr, A.G., Environmental Futures Research Institute, Griffith Univ. Nathan, Queensland 4111, Australia. E-mail: agorr@universal.net.au

15434. Ortega-Salas, H.; Gonzalez-Soriano, E. (2015): A new species of *Libellula* Linnaeus, 1758, from the Cuatro Ciénegas basin, Coahuila, México (Anisoptera: Libellulidae). *Zootaxa* 4028(4): 589-594. (in English, with Spanish summary) ["A new species of *Libellula* is described from specimens collected in the most interesting area of Cuatro Ciénegas, Coahuila, México. *Libellula coahuiltecana* sp. nov. is similar in colour and morphology to *L. needhami* Westfall with which it co-occurs locally. It differs from the latter by having conspicuous orange spots on base of wings and nodal area, and costal, subcostal, and wing tip areas slightly infumated with the same colour. Other differences exist in the morphology of the secondary genitalia of males and the shape of the vulvar plate of female." (Authors)] Address: Gonzalez-Soriano, E., Depto Zoología, Inst. Biol., Universidad Autónoma, Apartado Postal 70-153, 04510 Mexico, D.F., Mexico. E-mail: esoriano@mail.ibiologia.unam.mx

15435. Ortiz-Sandoval, J.J.; Konrad Górski, K.; Alonso González-Díaz, A.; Evelyn Habit, E. (2015): Trophic scaling of *Percichthys trucha* (Percichthyidae) in monospecific and multispecific lakes in western Patagonia. *Limnologia - Ecology and Management of Inland Waters* 53: 50-59. (in English) ["*Percichthys trucha* (Cuvier and Valenciennes, 1833) is a freshwater fish, endemic to southern South America and widely distributed in both, eastern and western sides of the Andes. *Percichthys trucha* has been described as top native predator in lacustrine ecosystems, experimenting diet shifting during their life history development. Salmonid invasions have impacted their natural ecology through trophic niche interference and predation over alternative high quality prey. This study focuses on populations of *P. trucha* in western Patagonia, where its trophic ecology have been less understood. We hypothesised a diet shift between juveniles and adults from lower-trophic position prey toward higher-trophic position prey. Fish were collected from 7 lakes belonging to Puelo and Baker river basins, covering a high diversity of environmental conditions. Stomach content and $\delta^{15}N$ stable isotope ratio of muscle tissues of 313 individuals were analysed. Results indicate significant differences in diet between juveniles and adults, shifting from planktonic/benthic preys towards benthic/piscivory, and concomitantly enrichment in heavier nitrogen isotope suggest trophic scaling. No trophic scaling was observed in populations inhabiting lakes with any other fish species present, essentially due to lack of *Galaxias* sp. as available prey and absence of cannibalism. Despite the fact that *P. trucha* and *Galaxias* sp. co-occur in studied river basins, no salmonid-free lakes harbouring this two native species were found, making it difficult to elucidate exact effects of salmonids on trophic scaling of *P. trucha*. Consumption of aquatic Odonata nymphs, however, arises as one of potential key mechanism for resilience of native food webs to

salmonid invasion." (Authors)] Address: Habit, Evelyn, Facultad de Ciencias Ambientales y Centro EULA, Universidad de Concepción, Concepción, Chile. E-mail: ehabit@udec.cl

15436. Osozawa, S.; Wakabayashi, J. (2015): Killer typhoons began to impact the Japanese Islands from ca. 1.55 Ma, based on phylogeography of *Chlorogomphus* (Gliding Dragonfly). *J. Earth Sci. Climat. Change* 2015, S3 <http://dx.doi.org/10.4172/2157-7617.S3-003>: 5 pp. (in English) ["*Chlorogomphus* is characterized by swarming behaviour, and strong gliding and flying. Therefore this dragonfly is expected to be easily carried by typhoon winds. This dragonfly immigrated and colonized the Pacific coast of southern Japan main islands from the Ryukyu islands. In this study, we demonstrate that the Japan mainland population is phylogenetically common to the northern Ryukyu population, but distinct from the southern Ryukyu and Taiwan populations. The East China Sea was formed between the Ryukyu island arc and Asian mainland by the rifting of the Okinawa trough that started at 1.55 Ma. Prior to this time typhoons lost strength when heading overland over the Ryukyu continental arc and continental China, but since then have maintained their strength northward because they were over water (the newly opened Okinawa trough). *Chlorogomphus* is interpreted to have speciated on each island, but it also migrated northward as a result of typhoons that carried it further than it could normally fly. The present paper shows that such typhoons that now ravage Japan may have been generated since 1.55 Ma and will continue to be dangerous, because the opening of the Okinawa trough is an ongoing process. This phenomenon is unrelated to global warming." (Authors)] Address: Osozawa, S., Department of Earth Sciences, Graduate School of Science, Tohoku University, Sendai 980-8578, Japan. E-mail: osozawa@m.tohoku.ac.jp

15437. Ott, J.; Conze, K.-J.; Günther, A.; Lohr, M.; Mauersberger, R.; Roland, H.-J.; Suhling, F. (2015): Rote Liste und Gesamtartenliste der Libellen Deutschlands mit Analyse der Verantwortlichkeit, dritte Fassung, Stand Anfang 2012 (Odonata). *Libellula Supplement* 14: 395-422. (in German, with English summary) ["Red List and checklist of Odonata of Germany, with analysis of the responsibility, version 3, early 2012 – We updated the Red List of Odonata of Germany by applying the criteria developed by the German Federal Agency for Nature Conservation, which deviate from those suggested in the IUCN Red List guidelines. The following criteria were used to assess the species: current state (in the case of dragonflies grid frequencies since 1995 are used), long-term population trend (a guess of population trends since ca 1840), short-term trend (changes in the grid frequencies 1995-2009) and existence of potential risk factors. In Germany so far 81 species of Odonata were recorded in the wild of which 79 species are considered to be established. These have been assessed against the Red List criteria. 30 species were classified into one of the Red List categories and five species into the category "near threatened". *Onychogomphus uncatatus* and *Coenagrion hyalas* are considered as "extinct" in Germany. Since 1998,

when the last Red List was published, *Boyeria irene* was newly found for Germany. Furthermore, the national responsibility for the conservation of odonate species was assessed based on the share Germany has of the total population size of the species. According to this, Germany is responsible to a great extent for conservation of *Cordulegaster bidentata* and *Aeshna cyanea*. There is also a notable responsibility for isolated outposts of *Sympecma paedisca*, *Nehalennia speciosa*, *Coenagrion armatum*, *C. ornatum*, *Aeshna caerulea*, and *Somatochlora alpestris*." (Authors)] Address: Ott, J., L.U.P.O. GmbH, Friedhofstraße 28, 67705 Trippstadt, Germany. E-mail: ott@lupogmbh.de

15438. Outomuro, D.; Johansson, F. (2015): Bird predation selects for wing shape and coloration in a damselfly. *Journal of Evolutionary Biology* 28(4): 791-799. (in English) ["Wing shape is related to flight performance, which is expected to be under selection for improving flight behaviours such as predator avoidance. Moreover, wing conspicuousness, usually involved in sexual selection processes, is also relevant in terms of predation risk. In this study, we examined how predation by a passerine bird, the white wagtail *Motacilla alba*, selects wing shape and wing colour patch size in males of the banded demoiselle *Calopteryx splendens*. The wing colour patch is intra- and intersexually selected in the study species. In a field study, we compared wings of live damselflies to wings of predated damselflies which are always discarded after predation. Based on aerodynamic theory and a previous study on wing shape of territorial tactics in damselflies, we predicted an overall short and broad wing, with a concave front margin shape to be selected by predation. This shape would be expected to improve escaping ability. Moreover, we predicted that wing patch size should be negatively selected by predation. We found that selection operated differently on fore- and hindwings. In contrast to our predictions, predation favoured a slender general forewing shape. However, the predicted wing shape was favoured in hindwings. We also found selection favouring a narrower wing colour patch. Our results suggest different roles of fore- and hindwings in flight, as previously suggested for *Calopteryx* damselflies and shown for butterflies and moths. Forewings would be more involved in sustained flight and hindwings in flight manoeuvrability. Our results differ somehow from a recently published work in the same study system, but using another population, suggesting that selection can fluctuate across space, despite the simplicity of this predator-prey system." (Authors)] Address: Outomuro, D., Dept of Ecology and Genetics, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, Uppsala, Sweden. E-mail: outomuro.david@gmail.com

15439. Palacino Rodríguez, F.; Sarmiento, C.E.; González-Soriano, E. (2015): Morphological variability and evaluation of taxonomic characters in the genus *Erythemis* Hagen, 1861 (Odonata: Libellulidae: Sympetrinae). *Insecta Mundi* 428: 1-68. (in English) ["*Erythemis* is a Neotropical genus with ten species in which morphological characters vary widely. The aim of this paper is to study the taxonomic diversity of the genus *Erythemis* and to test the diagnostic value of morphological characters used to discriminate species. The diagnostic value

of the morphometric characters is tested using discriminant function analysis, principal component analysis, and graphical exploration of the data. A total of 134 characters were studied; of those, 53 are recoded and 81 are proposed in this work. Discrete characters such as colour, genitalia, ventral teeth of male cercus, extension of dark basal area in hind wing, and morphometric characters of abdominal carinae and antenodal wing venation are the most useful for species determination. In contrast, abdomen length/HW length ratio, vulvar lamina length, and spines of femoral structure are highly variable. A lectotype is designated for *Diplax credula* Hagen, 1861. Taxonomic keys for males and females are included, and variation in several characters is presented." (Authors)] Address: Fredy Palacino Rodríguez, F., Lab. de Sistemática y Biología Comparada de Insectos, Lab. de Artrópodos del Centro Internacional de Física, Univ. Nacional de Colombia, Grupo de Investigación en Biología (GRIB), Grupo de Investigación de Odonatos de Colombia (GINOCO), Universidad El Bosque, Bogotá, Colombia

15440. Patten, M.A.; Bried, J.T.; Smith-Patten, B.D. (2015): Survey data matter: predicted niche of adult vs breeding Odonata. *Freshwater Science* 34(3): 1114-1122. (in English) ["Assessing and categorizing habitat needs or population trends of organisms with complex life histories, such as Odonata, is challenging. All Odonata have aquatic nymphs and terrestrial adults. As a consequence, their use as indicators of ecosystem health or as umbrella species in conservation plans may be misleading if data from a particular life stage does not reflect actual residency at a freshwater site. We explored this question with an extensive data set for Odonata from Oklahoma, USA, to determine if ecological niches modelled from records of adults (i.e., lacking any evidence of breeding) differed from niches modelled for records indicating breeding (tandem pairs, ovipositing females, larvae, teneral [recently emerged adults], or exuviae [shed exoskeletons of larvae]) at surveyed sites. We predicted that models would be comparable if adult presence strongly indicates local breeding but would be dissimilar if adults occupy many more sites than those at which the species breeds. Our results supported the latter prediction. Adult models were broader geographically and had a wider, more equitable (higher evenness) balance of contributing environmental variables (niche dimensions) than did models for breeders, which tended to be more ecologically specialized. These findings suggest that surveys of adult Odonata, which are relatively easy to obtain because of organized efforts to encourage observations by citizen scientists, can paint a misleadingly broad picture of a species' ecological niche. We recommend that evidence of breeding, especially presence of teneral or exuviae, be used to outline ecological requirements when questions of conservation or population monitoring arise." (Authors)] Address: Patten, M.A., Oklahoma Biological Survey, University of Oklahoma, Norman, Oklahoma 73019 USA. E-mail: mpatten@ou.edu

15441. Pauley, L.R.; Earl, J.; Semlitsch, R.D. (2015): Ecological effects and human use of commercial mosquito insecticides in aquatic communities. *Journal of Herpetology* 49(1):

28-35. (in English) ["In the case of contaminants that are commercially available and introduced by humans, understanding where and how often a product is used is critical in assessing its ecological impact. By contextualizing a product's ecotoxicological impact with details regarding its application, we can provide a more complete characterization of the product's environmental risk than is possible with ecotoxicological data alone. We conducted an ecotoxicology experiment to examine the interaction between predator-induced stress and one of three common mosquito insecticide formulations (Mosquito Dunks, Mosquito Bits, and Mosquito Torpedoes) on the performance of Gray Treefrog (*Hyla versicolor*) tadpoles and changes in aquatic communities in pond mesocosms. Then, to describe the extent to which each product was applied in the region surrounding our study area, we conducted a survey of mosquito insecticide practices by individuals who owned or managed property within U.S. Environmental Protection Agency region seven. When applied in the presence of predators, Mosquito Torpedo use resulted in the lowest tadpole survival rates. Mosquito Dunks also reduced tadpole survival when applied in the context of predators ($P = 0.06$), and Mosquito Bits had no effect on tadpole survival. Of land managers who applied a mosquito insecticide, 5% used Mosquito Bits, 5% used Mosquito Torpedoes, and 81% used Mosquito Dunks. Despite the fact that Mosquito Torpedoes appear to have more severe negative effects on tadpole survival than do Mosquito Dunks, the widespread use of Mosquito Dunks by individuals in our survey leads us to recommend that future research efforts be directed toward Mosquito Dunks. ... We used a factorial combination of a predatory insect treatment (with or without dragonfly larvae) crossed with an insecticide treatment (no insecticide, Mosquito Dunks, Mosquito Bits, and Mosquito Torpedoes; see below complete description of insecticide products), with three replications. For the dragonfly predator treatment, one *Anax junius* (green damer) and six *Pachydiplax longipennis* (blue dasher) late-instar larvae were added to each mesocosm on 22 May 2010. These predator densities reflect natural densities in central Missouri (JEE and RDS, unpubl. data)." (Authors)] Address: Pauley, L.R., Division of Biological Sciences, University of Missouri, Columbia, Missouri 65211 USA. E-mail: lrpauley@gmail.com

15442. Perello, M.M.; Simon, T.P.; Thompson, H.A.; Kane, D.D. (2015): Feeding ecology of the invasive round goby, *Neogobius melamostomus* (Pallas, 1814), based on laboratory size preference and field diet in different habitats in the western basin of Lake Erie. *Aquatic Invasions* 10(4): 463-474. (in English) ["The round goby, *Neogobius melanostomus*, is an invasive benthic fish species in the Laurentian Great Lakes that is threatening native fish populations through competition, predation, and trophic dynamic change. This study examined the trophic dynamic plasticity of round goby along a depth gradient based on laboratory and field observations to determine prey species consumed and mussel prey size selection. Prey size selection in the laboratory was assessed by presenting individual round goby with quagga mussels (*Dreissena rostriformis bugensis*) of various class sizes (i.e., 6.0-9.9 mm, 10.0-12.9 mm,

13.0-15.9 mm and 16.0-18.9 mm in length). Round goby exhibited a selection preference for small sized quagga mussels, although in individual trial events, mussels were consumed from all four size classes. Prey species consumed from shallow and deep sites in the western basin of Lake Erie were assessed using individual gut contents to calculate measures of prey importance, diversity, and dominance. Based on the Index of Relative Importance (IRI), Cladocera was found to be the most consumed prey item for both males and females and between study sites. Both sexes consumed a variety of prey items although females exhibited greater prey dominance or reliance on one prey item. Round goby individuals at the shallow, natural shoreline site had the highest trophic diversity, while individuals at the deep site exhibited the highest prey dominance. Diet of round goby in the western basin of Lake Erie are mainly dominated by just a few prey items." (Authors) Odonata play a minor role as diet of the round goby.] Address: Perello, Melanie, FT. Stone Laboratory, Ohio State University, Put-in-Bay, OH 45456. USA. E-mail: mmpello@plymouth.edu

15443. Pfitzner, W.P.; Beck, M.; Weitzel, T.; Becker, N. (2015): The role of mosquitoes in the diet of adult dragon- and damselflies (Odonata). *Journal of the American Mosquito Control Association* 31(2): 187-189. (in English) ["The flood plains of the Upper Rhine Valley provide excellent conditions for the proliferation of mosquitoes as well as for the development of dragon and damselflies. It could be assumed that mosquitoes belong to the diet of the Odonata and that the latter could be harmed by the reduction of the mosquito population with the purpose of diminishing the massive nuisance for the people living there. A total of 41 adult Odonata were examined by immunoblot for remnants of mosquitoes in their guts. A rabbit antiserum against *Aedes vexans* proteins was used for the immunoblot. Only 3 *Aeshna cyanea* and 1 *Platycnemis pennipes* could be shown to have fed on mosquitoes. In specimens of the genus *Sympetrum* no mosquitoes were detected. It seems very doubtful that mosquitoes are an essential part of the Odonata diet." (Authors)] Address: German Mosquito Control Association (KABS), Georg-Peter-Suess-Str. 3, 67346 Speyer, Germany.

15444. Piché, C.; Hutchinson, R. (2015): Les libellules (Odonata) de Gatineau, Québec, d'hier à aujourd'hui. *Le Naturaliste canadien* 140(1): 12-25. (in French, with English summary) ["Gatineau is the fourth largest city in Québec (Canada). It is situated in the southwestern part of the province, on the northern bank of the Ottawa River. At least 87 species of dragonfly have been recorded in Gatineau, and surveys conducted in the city in 2012 and 2013 documented the frequency, relative abundance and breeding of 82 of these. A comparison with historical data for the period from 1886 to 1935, showed that at least 90 % of the species recorded have maintained their presence in the city since the beginning of the 20th century. However, 8 species associated with streams, rivers or temporary wetlands, may have declined or disappeared. By contrast, at least 7 generalist species associated with still water bodies, are expanding in Gatineau. With the exception of one species

from the family Coenagrionidae, these are all from the family Libellulidae. These changes in the dragonfly community are likely due to urban sprawl. Dragonflies, which are useful bio-indicators of environmental changes occurring in wetlands, can be easily observed and monitored through citizen science projects." (Authors)] Address: Caroline Piché. E-mail: piche.boyer@gmail.com

15445. Piersanti, S.; Rebor, M.; Salerno, G.; Cordero-Rivera, A.; Frati, F. (2015): A method for rearing a large number of damselflies (*Ischnura elegans*, Coenagrionidae) in the laboratory. *International Journal of Odonatology* 18(2): 125-136. (in English) ["Odonata are important study organisms in many areas of biology. Laboratory experiments with these insects have a great potential for answering evolutionary, ecological and physiological questions. Laboratory studies require insect rearing, because it can provide large sample sizes of specimens that are available throughout the year. These insects are reared under known conditions, and their use does not affect natural populations. The present paper describes a protocol to obtain at least three generations per year of *Ischnura elegans* in laboratory conditions, with hundreds of insects for each generation. Together with the protocol description, data from three annual laboratory populations obtained in Italy from summer 2011 to summer 2013 using this protocol are reported." (Authors)] Address: Rebor, Manuela, Dipto Biol. Cellulare e Ambientale, Univ. di Perugia, 06123 Perugia, Italy. E-mail: rebor@unipg.it

15446. Pilotto, F.; Bazzanti, M.; Di Vito, V.; Frosali, D.; Livretti, F.; Mastrantuono, L.; Pusch, M.T.; Sena, F.; Solimini, A.G. (2015): Relative impacts of morphological alteration to shorelines and eutrophication on littoral macroinvertebrates in Mediterranean lakes. *Freshwater Science* 34(2): 410-422. (in English) ["Development of effective methods for assessing the ecological status of lakes based on littoral benthic fauna has been hampered by the lack of quantitative data on the relative impacts of key pressures on the benthic community. We used variance partitioning at 126 sites belonging to 14 natural Mediterranean lakes to analyze the pure and shared effects of eutrophication, morphological alterations, microhabitat type, lake morphometry and geographic position on the littoral macroinvertebrate community. The spatial arrangement of the sampling sites was responsible for 9.1% of the total variance in littoral benthic community composition, lake morphometry accounted for 4.3% of variation, and microhabitat type accounted for 3.9%. Communities appeared to be affected primarily by morphological alterations to lake shorelines, and their impact was 2.5 times as important as that of eutrophication. The structure of littoral benthic communities was governed by processes acting at several spatial scales from region to lake scale. Thus, several pressures and the various spatial scales at which these act should be taken into account when implementing methods of assessing lake ecological condition based on littoral benthic invertebrates. Region-specific methods for subalpine and volcanic lakes might enhance the validity of assessment of results of morphological alterations and improve management of those water resources." (Authors)]

Ischnura elegans was used as indicator for 'Unmodified sites with macrophytes', and *Sympetrum fonscolombii* for 'Hard altered sites'.] Address: Pilotto, Francesca, Dept of Public Health and Infectious Diseases, Sapienza University of Rome, Piazzale Aldo Moro 5, 00185 Roma, Italy

15447. Pospekhova, N.A.; Regel, K.V. (2015): Morphology and ultrastructure of two schistostomoid cysticercoids (Cestoda: Cyclophyllidea) from the haemocoel of the dragonfly larvae. *Parazitologija* 49(5): 339-351. (in English, with Russian summary) ["Two cysticercoids, belonging to ascocercus type, namely euascocercus and multicercus, were found in haemocoel of dragonfly larvae of the genus *Aeshna* from the lakes of the Magadan Province. The cysticercoid of *Schistostoma* *srivastavae* Raush, 1970 (euascocercus) is formed of the outer (exocyst) and inner (endocyst) envelopes, containing the scolex and larval strobila. The outer and inner surfaces of the exocyst are represented by the tegument covered with microvilli. The microvilli of the outer tegument are restricted by the surface layer, consisting of granular and fibrillar material, and possess different structures at different stages of post-embryonic development. The multicercus of *Mircia* *shigini* (Konyaev et Gulyaev, 2006) is able to multiply asexually by the endogenous budding. The daughters' individuals are formed in the envelope of the multicercus that represents the tegument bearing microvilli. These microvilli are also restricted by the surface layer. The morphology and development of each individual cysticercoid of the multicercus is similar to those of euascocercus. The production of a great amount of cysticercoids, and the presence of the surface layer resembling the laminated layer of *Echinococcus*, relates multicercus to hydatid cysts." (Authors)] Address: Pospekhova, Natalia, Institute of Biological Problems of the North FEB RAS, Magadan, 685000, Russia. E-mail: posna@ibpn.ru

15448. Powney, G.D.; Cham, S.S.; Smallshire, D.; Isaac, N.J.B. (2015): Trait correlates of distribution trends in the Odonata of Britain and Ireland: Southern species benefit from climate warming. *PeerJ PrePrints* 2:e648v1 <http://dx.doi.org/10.7287/peerj.preprints.648v1>: 14 pp. (in English) ["A major challenge in ecology is understanding what enables certain species to persist, while others decline, in response to environmental change. Trait-based comparative analyses are useful in this regard as they can help identify the key drivers of decline, and highlight traits that promote resistance to change. Despite their popularity trait-based comparative analyses tend to focus on explaining variation in range shift and extinction risk, seldom being applied to actual measures of species decline. Furthermore they have tended to be taxonomically restricted to birds, mammals, plants and butterflies. Here we utilise a novel approach to estimate trends for the Odonata in Britain and Ireland, and examine trait correlates of these trends using a recently available trait dataset. We found the dragonfly fauna in Britain and Ireland has undergone considerable change between 1980 and 2012, with 33 and 39% of species showing significant declines and increases respectively. Distribution type was the key trait associated with

these trends, where southern species showed significantly higher trends than widespread and northern species. We believe this reflects the impact of climate change as the increased ambient temperature in Britain and Ireland better suits species that are adapted to warmer conditions. We conclude that northern species are particularly vulnerable to climate change due to the combined pressures of a decline in climate suitability, and competition from species that were previously limited by lower thermal tolerance.... Species that showed the greatest declines included: *Aeshna juncea* and *Sympetrum danae*, while *Anax imperator* and *Aeshna mixta* showed the greatest increases." (Authors)] Address: Powney, G.D., Biological Records Centre, NERC Centre for Ecology & Hydrology, Wallingford, UK. E-mail: gary.powney@ceh.ac.uk

15449. Preston, D.B.; Forstner, M.R.J. (2015): Houston Toad (*Bufo* (*Anaxyrus*) *houstonensis*) tadpoles decrease their activity in response to chemical cues produced from the predation of conspecifics and congeneric (*Bufo* (*Incilius*) *nebulifer*) tadpoles. *Journal of Herpetology* 49(2): 170-175. (in English, with Spanish summary) ["Anurans have been shown to reduce their activity in the presence of predation-related chemical cues. We exposed tadpoles of the federally endangered Houston Toad, *Bufo* (*Anaxyrus*) *houstonensis*, to three chemical cues: A no-predation cue produced by the presence of only predatory anisopteran nymphs (*Anax junius*), a conspecific-predation cue produced from the consumption of conspecific tadpoles by *A. junius* nymphs, and a heterospecific-predation cue produced from the consumption of coastal plain toad (*Bufo* (*Incilius*) *nebulifer*) tadpoles by *A. junius* larvae. We measured tadpole activity levels before and after exposure to the cues. Tadpole activity was not influenced by the no-predation cue, but it decreased significantly during exposure to either predation cue. The reduction in activity did not differ significantly between predation cue treatments. These data suggest that: 1) *B. houstonensis* tadpoles will respond to predation, but not the presence of a predator alone. 2) There may be a chemical homology between the predation cues. 3) When developing with *B. nebulifer* tadpoles, *B. houstonensis* may experience negative long-term life historical effects." (Authors)] Address: Preston, D.B., Dept of Biology, Texas State Univ., San Marcos, TX, USA. E-mail: dpresto1@uno.edu

15450. Prommi, T.; Payakka, A. (2015): Aquatic insect biodiversity and water quality parameters of streams in northern Thailand. *Sains Malaysiana* 44(5): 707-717. (in English) ["Biodiversity of aquatic insect and physicochemical water quality parameters in Mae Tao and Mae Ku watersheds were assessed bi-monthly from February 2011 to February 2012. A total of 59 families representing 9 orders were recorded. At order level, Trichoptera was found at the highest frequency in total abundance (45.75%) followed by Ephemeroptera (18.06%), Hemiptera (13.45%), Odonata (9.62%), Diptera (8.17%), Coleoptera (4.6%), Megaloptera (0.17%), Lepidoptera (0.11%) and Plecoptera (0.07%). The family Hydropsychidae was the most prominent and the most abundant aquatic insect taxa followed by Chironomidae.

Water temperature, dissolved oxygen and ammonia-nitrogen were similar at all sampling stations. Significant variations in pH, electrical conductivity, total dissolved solids, sulfate, nitrate-nitrogen and alkalinity were found at all sampling stations. Taxa richness and diversity index significantly correlated with dissolved oxygen, sulfate, nitrate-nitrogen and ammonia-nitrogen ($p < 0.05$, $p < 0.01$). Physicochemical data and biological data showed that mostly the surface water quality in Mae Tao and Mae Ku watersheds were within Type III of The Surface Water Standard for Agriculture and Water Quality for Protection of Aquatic Resources in Thailand." (Authors) Taxa are treated at family level.] Address: Prommi, T., Faculty of Liberal Arts and Science, Kasetsart University, Kamphaeng Saen Campus, Nakhon Pathom Province, 73140, Thailand. E-mail: faastop@ku.ac.th

15451. Pryke, J.S.; Samways, M.J.; De Saedeleer, K. (2015): An ecological network is as good as a major protected area for conserving dragonflies. *Biological Conservation* 191: 537-545. (in English) ["Highlights: •We compared wallows, ponds and marshes in ecological networks and protected area. •Ecological networks shared 3/4 of dragonfly species with the protected area. •Equal numbers of rarest species occurred in both landscapes. •Proximity of plantation trees had only a minor effect. •Ecological networks are as effective as the protected area for aquatic conservation. Abstract: Freshwaters are highly threatened ecosystems, with agro-forestry being a major threat to sub-tropical wetlands. In the Maputaland–Pondoland–Albany global biodiversity hotspot of South Africa, large-scale ecological networks (ENs) of remnant vegetation have been set aside with the aim of mitigating the adverse effects of plantation forestry. However, the effectiveness of these ENs for maintaining freshwater biodiversity, especially that of still waters, is poorly known. In response, we compare mud wallows of large mammals, ponds and small marshes in an EN with those in an adjacent World Heritage Site protected area (PA) as reference. For this comparison we used dragonfly adults in view of their effectiveness as bioindicators. A total of 47 species was recorded at 105 sites. The EN shared 74% of its species with the PA. However, equal numbers of range restricted species were recorded from the EN and the PA. Five species were recorded as particular to the EN and seven to the PA, probably due to habitat heterogeneity across this type of landscape. Pond size, habitat heterogeneity, elevation and dissolved oxygen were important determinants for species richness and diversity. Proximity of plantation trees had only a minor effect, and then only on species composition. Mud wallows were the poorest habitat in terms of dragonfly diversity, owing to the intense disturbance. Wallows, ponds and marshes were largely complementary in their species composition. Overall, the freshwater system in the EN was a good surrogate for that in the PA, indicating the effectiveness of these ENs for maintaining the dragonfly assemblage." (Authors)] Address: Samways, M.J., Dept Entomol. & Nematol., Univ. Stellenbosch, Private Bag X1, ZA-7602, Matieland, South Africa. E-mail: samways@sun.ac.za

15452. Pynnönen, P. (2015): [Identification of *Sympetrum striolatum* and *S. vulgatum*]. *Crenata* 8: 38-43. (in Finnish, with English summary) ["This article describes features to separate Finnish individuals of *S. striolatum* (*nigrescens*) and the Moustached Darer, *S. vulgatum* at the imago stage. In Finland probably all the *striolatum* individuals are darker and therefore separable from the nominate southern form. Most of the Finnish individuals of *striolatum* have dark roundish diffuse spot on the sides of frons, different from how it is typically described in the literature. Only a very small percentage of Finnish individuals lack this spot. The only pale individual I have seen in Finland (Helsinki 24.10.2011) is shown in the photo together with a typical dark Finnish *striolatum* male and a *vulgatum* male." (Authors)] Address: not stated

15453. Rache Rodríguez L. (2015): Primer registro del género *Aeschnosoma* Selys, 1871 (Odonata: Corduliidae) para Colombia. *Entomotropica* 30(23): 224-226. (in Spanish, with English summary) ["The genus *Aeschnosoma* is reported here for the first time from Colombia based on larvae in the aquatic Invertebrates collection of the Biology Department of the Universidad Nacional de Colombia, Bogotá. They were collected in the Meta Department and identified as *Aeschnosoma forcipula* Selys, 1871." (Author)] Address: Rache Rodríguez L., Universidad Nacional de Colombia Sede Bogotá. Carrera 30 no. 45-03 AA. 7495. Bogotá D.C., Colombia. E-mail: leonardorache@hotmail.com

15454. Radhakrishore, S.R.K.; Khaidem, A.; Gojendro, S.O.; Khamba, S.K. (2015): Protein and carbohydrate contents of certain edible insects in Manipur. *Indian Journal of Entomology* 77(3): 235-239. (in English) ["Fifteen species of edible insects representing ten families were analyzed for protein and carbohydrate contents. These include Hemiptera, Coleoptera, Odonata, Orthoptera, Lepidoptera and Hymenoptera. Protein content was observed to vary from a low of 105.6mg/g to a high of 314.2mg/g. The highest level of total protein was found in *Philosomia ricini* (314.2 mg/g) and the lowest in *Bombyx mori* (105.6 mg/g). *Lethocerus indicus*, a common insect in Manipur was found to contain a protein content of 172 mg/g. Carbohydrate content ranged from 3.68mg/g to 78.68mg/g. The highest carbohydrate content was found in *Vespa basalis* and the least in *Brachytripes portentosus*. Most of these edible insects were found to have more protein content than the conventional animal protein but very less carbohydrate. These insects play a major role in providing an easy source of protein to the people of Manipur." (Authors)] Address: Radhakrishore, S.R.K., Department of Zoology, Manipur College, Imphal, Manipur

15455. Raekauskaite, D.; Gliwa, B. (2015): First record of *Crocothemis erythraea* (Odonata: Libellulidae) in Lithuania. *Naujos ir retos Lietuvos vabzdžių rūšys* 26(5): 5-6. (in English) [Single male, 18-07-2014, dry forest Kliošiai, near Klaipėda and Emperor-Wilhelm-Canal, 55°38'28" N, 21°10'37" E] Address: Raekauskaite, Dalia, Upelio 6, LT-93267 Klaipėda, Lithuania, E-mail: dalyte7@gmail.com

15456. Ragaei, M.; Sabry, A.H. (2015): Role of color Interference on the insect's cuticle coloration. *International Journal of Science and Research* 4(6): 2306-2314. (in English) ["Interference colours result from the reflection of light from a series of neighbouring interfaces that are separated by distances comparable with a quarter of the wavelength of light. Interference colours are common in some adults of Lepidoptera insects. The integument layers producing interference are formed by modifications of the scales. Each of the blue scales of the *Morpho rhetenor* butterfly, for instance, consists of a flat basal plate carrying a large number of near-parallel vertically aligned ridges that run parallel with the length of the scale. Within each ridge are series of horizontal layers, separated by air spaces. Collectively, the horizontal layers in each adjacent ridge form a series of reflecting surfaces, which are spaced such that a blue colour is produced by interference. Interference colours in other insects are produced by reflection at the interfaces of layers in the cuticle which differ in refractive index. The refractive indices of the alternating layers in the pupa of the danaid butterfly, *Euploea mulciber*, are 1.58 and 1.37. In jewel beetles, *Chrysochroa fulgidissima* (Buprestidae) and tiger beetles, *Cicindela japonica* (Cicindellidae), these layers are in the exocuticle, but in tortoise beetles (Cassidinae) and some butterfly pupae they are in the endocuticle. Interference is responsible for the iridescence of the membranous wings of many different insects, particularly Odonata." (Authors)] Address: Ragaei, M., Pests and Plant Protection Dep. National research Centre, Cairo, Egypt

15457. Rajabi, H.; Ghoroubi, N.; Darvizeh, A.; Dirks, J.H.; Appel, E.; Gorb, S.N. (2015): A comparative study of the effects of vein-joints on the mechanical behaviour of insect wings: I. Single joints. *Bioinspiration & Biomimetics* 10(5) 056003. doi:10.1088/1748-3190/10/5/056003: (in English) ["The flight performance of insects is strongly affected by the deformation of the wing during a stroke cycle. Many insects therefore use both active and passive mechanisms to control the deformation of their wings in flight. Several studies have focused on the wing kinematics, and plenty is known about the mechanism of their passive deformability. However, given the small size of the vein-joints, accurate direct mechanical experiments are almost impossible to perform. We therefore developed numerical models to perform a comparative and comprehensive investigation of the mechanical behaviour of the vein-joints under external loading conditions. The results illustrate the effect of the geometry and the presence of the rubberlike protein resilin on the flexibility of the joints. Our simulations further show the contribution of the spikes to the anisotropic flexural stiffness in the dorsal and ventral directions. In addition, our results show that the cross veins, only in one joint type, help to transfer the stress to the thicker longitudinal veins. The deformation pattern and the stress distribution in each vein-joint are discussed in detail. This study provides a strong background for further realistic modelling of the dragonfly wing deformation." (Authors)] Address: Rajabi, H., Institute of Zoology, Functional Morphology and Biomechanics, Kiel University, Kiel, Germany. E-mail: hrajabi@zoologie.uni-kiel.de

15458. Rajkov, S.; Vinko, D.; Arandelovic, A. (2015): Faunistic results from the 2nd Balkan Odonatological Meeting – BOOM 2012, Serbia. *Natura Sloveniae* 17(2): 67-76. (in English, with Slovenian summary) ["As a part of the Balkan odonatological cooperation, the 2nd Balkan Odonatological Meeting (BOOM 2012) was held in Vojvodina (Serbia). Altogether, between 7. and 12. 8. 2012, 24 localities were surveyed and 34 dragonfly species found. This represents more than half of the hitherto recorded dragonfly species for the country. Significant results include the second record and a new locality of *Aeshna grandis* for Serbia and the first confirmation of successful reproduction of *Anax ephippiger* in the country. New data on several species with a comparably low number of previously published records for Vojvodina, i.e. *Somatochlora meridionalis*, *Cordulia aenea*, *Gomphus flavipes*, *Sympetrum flaveolum*, *Sympetrum vulgatum* and *Lestes dryas*, is also presented and briefly discussed.] Address: Rajkov, S., Bulevar Oslobođenja 115/73, 21101 Novi Sad, Serbia; E-mail: rajkovs@gmail.com

15459. Ramírez-Delgado, J.; López-García, K.; Lara, C.; Serrano-Meneses, M.A. (2015): Wing pigmentation in males of a territorial damselfly: Alternative reproductive tactics, allometry and mating success. *Journal of Insect Behavior* 28(5): 569-581. (in English) ["Alternative reproductive tactics (ARTs) evolve to maximise fitness by favouring alternative phenotypes when high variance in relative fitness occurs amongst individuals. In the damselfly *Hetaerina vulnerata* males occur as either territorial or nonterritorial, depending on whether males acquire and defend an area to which females are attracted for copulation. Territorial males are usually larger, more pigmented and more successful in obtaining copulations than nonterritorial males. Several studies further suggest that territorial males are in overall better condition than nonterritorial ones. Other studies have investigated whether wing pigmentation, a sexual trait in damselflies, scales hyperallometrically with body size, and asked whether this pattern is related to fitness—nonetheless, a clear answer to this question remains elusive. Here we investigate whether i) territorial and nonterritorial males differed in body size and wing pigmentation; ii) body size, wing pigmentation and/or male status (male ART) predicted male mating success; and iii) the allometry of wing pigmentation in territorial and nonterritorial males, and amongst mated and unmated males. We first found that territorial and nonterritorial males did not differ in body size. Second, contrary to what occurs in other damselflies, territorial and nonterritorial males exhibited similar amounts of wing pigmentation. Third, only territory tenure, but not body size or wing pigmentation, predicted male mating success. Finally, with the exception of the relationship exhibited by mated males, which exhibited isometry, wing pigmentation was hyperallometric in all groups of males tested. The latter result suggests that hyperallometry of the sexual trait in this damselfly may not be selectively advantageous." (Authors)] Address: Serrano-Meneses, M.A., Laboratorio de Biología Evolutiva, Centro Tlaxcala de Biología de la Conducta, Universidad Autónoma de Tlaxcala, Carretera Tlaxcala-Puebla Km. 1.5, 90062, Tlaxcala, Mexico. E-mail: serrano.meneses@bath.edu

15460. Randrianandrasana, M.; Berenbaum, M.R. (2015): Edible non-crustacean arthropods in rural communities of Madagascar. *Journal of Ethnobiology* 35(2): 354-383. (in English) ["Entomophagy, the practice of eating insects, is not new in many countries, including Madagascar, where insects have long been part of culinary traditions. Promoting this practice would help in enhancing food security as insects are nutritious and affordable for the majority of the population. Because eating insects is also associated with rural life, we conducted a survey in rural communities of Madagascar from April to June 2013. Diversity of edible, non-crustacean arthropods was assessed for each site using the number of times names of arthropods consumed were mentioned by each household. Approximately 65 morpho-species from seven orders of insects, including Hemiptera, Coleoptera, Lepidoptera, Orthoptera, Hymenoptera, Odonata, and Mantodea, and two orders of arachnids, including Araneae and Ixodida, were recorded as the most frequently consumed arthropods during the survey. Preference rankings differed among sites, possibly depending on the availability of the edible species; information on seasonal availability was also recorded from the informants. When comparing factors influencing food security in rural areas, most of the edible species were found between October and March, a time associated with the lean season and elevated food prices. This pattern demonstrates the importance of entomophagy in food security as Malagasy farmers rely heavily on their subsistence crops for their living. Rearing selected edible insects at a marketable level, combined with other insect-based activities such as sericulture, would further improve food security. Promoting the importance of ethnoentomology would be ultimately leading to more effective sustainability of edible insects and conservation of forests in Madagascar." (Authors)] Address: Randrianandrasana, M., Department of Entomology, 320 Morrill Hall, University of Illinois at Urbana-Champaign (UIUC), 505 S. Goodwin Avenue, IL 61801, USA. E-mail: mrandri2@illinois.edu

15461. Rathod, D.M.; Parasharya, B.M. (2015): Feeding potential of adult dragonflies, *Pantala flavescens* (Fabricius), *Brachythemis contaminata* Fabricius and *Bradinopyga geminata* Rambur (Anisoptera: Libellulidae) on insect pests under laboratory condition. *Journal of Biological Control* 29(2): 85-88. (in English) ["Feeding potential of three dragonfly species was worked out on the basis of numerical value and fresh prey weight under laboratory condition at Anand (Gujarat) during 2013. Adult dragonflies, viz., *Pantala flavescens*, *Brachythemis contaminata* and *Bradinopyga geminata* were used as predator and *Nilaparvata lugens*, *Aphis craccivora* and *Aedes* sp. were used as prey. Daily biomass consumption of *P. flavescens*, *B. contaminata* and *B. geminata* were 224.51 mg, 149.35 mg and 169.34 mg respectively. The prey numbers consumed by each dragonfly species were significantly different. However, irrespective of prey species biomass consumption was the same. Feeding potential of the dragonflies was positively correlated with their body weight. Feeding potential of females of *P. flavescens* and *B. contaminata* was slightly

higher than their respective males." (Authors)] Address: Rathod, D.M., AINP on Agricultural Ornithology, Anand Agricultural University, Anand-388 110, Gujarat, India

15462. Rathod, P.P.; Manwar, N.A.; Raja, I.A. (2015): Visual deception in oviposition site selection in female dragonfly *Bradinopyga geminata* (Rambur) Libellulidae: Anisoptera. *International Journal of Advanced Research* 3(5): 562-565. (in English) ["Vision is the most developed sense in dragonfly, uses for habitat selection and mate recognition. The present investigation explains the role of visual sense in selection of oviposition site in dragonfly. This study was reported in female of *Bradinopyga geminata* which observed to be deceived by the shining black surfaces as water bodies and selected them as its ovipositing site. In our study on reproductive behaviour, we observed ovipositing *B. geminata* females, instead of water body, selected dark brown shining colored flag base, the moving shiny black wheels of heavy vehicles and the front screen glass of a car as its oviposition site and deposited the eggs. Thus it is found that the female of dragonfly *B. geminata* very much depends on its visual sense in selection of its oviposition site and capable of misguided in this regard." (Authors)] Address: Raja, I.A., Department of Zoology, Shri Shivaji College of Arts, Commerce and Science, Akola -444001, India

15463. Reborá, M.; Piersanti, S.; Salerno, G.; Gorb, S. (2015): The antenna of a burrowing dragonfly larva, *Onychogomphus forcipatus* (Anisoptera, Gomphidae). *Arthropod Structure & Development* 44(6, Part A): 595-603. (in English) ["Highlights: •The larva of the dragonfly *Onychogomphus forcipatus* has a burrowing lifestyle. •This is the first ultrastructural investigation (SEM, TEM) on its antennal sensilla. •Numerous mechanoreceptors and one possible chemoreceptor are described. •The mechanoreceptors are mostly filiform hairs presumably for current detection. •This is the first report of an antennal gland in palaeopteran insects. Abstract: The larva of *O. forcipatus* has a burrowing lifestyle and antennae composed of four short and broad segments (scape, pedicel and a two-segmented flagellum). The present ultrastructural investigation revealed that different sensilla and one gland are located on the antenna. There is a great diversity of mechanoreceptors of different kinds. In particular club-shaped sensilla, sensilla chaetica, and tree-like sensilla show the typical structure of bristles, the most common type of mechanoreceptors, usually responding to direct touch, while numerous long thin thorny trichoid sensilla show a morphology recalling the structure of filiform hair mechanoreceptors. The latter ones are presumably important in larval Odonata for current detection and rheotactic orientation, especially in a burrowing species. On the smooth apical cuticle of the second flagellar segment, three structures are visible: (1) a small ellipsoidal pit hosting a convoluted peg, the morphology of which resembles that of a typical chemoreceptor (even if pores are lacking), (2) a couple of small pits (not investigated under TEM), and (3) one wide depression with spherical structures, the internal morphology of which lets us assume that it is a gland with unknown function. This is the first report of an antennal gland in palaeopteran insects." (Authors)]

Address: Reborá, Manuela, Dipartimento di Chimica, Biologia e Biotecnologie, University of Perugia, 06121, Italy. E-mail: manuela.reborá@unipg.it

15464. Reels, G.; Zhang, H.-m. (2015): A field guide to the dragonflies of Hainan. 463 pp. (in bilingual in Chinese and English) [The diverse freshwater habitats nurture more than 165 species of dragonflies. Among them, 22 are endemic to the island. This book displays the species commonly found on the island and enables us to take a glimpse at the fascinating behaviour of such ancient insects.] Address: Reels, G., 31 St Anne's Close, Winchester SO22 4LQ, UK. E-mail: gtreels@gmail.com

15465. Renner, S.; Périco, E.; Sahlén, G.; Martins dos Santos, D.; Consatti, G. (2015): Dragonflies (Odonata) from the Taquari River valley region, Rio Grande do Sul, Brazil. *Check List* 11(5): 1740: 6 pp. (in English) ["A survey of Odonata was carried out in the central region of the state of Rio Grande do Sul: the Taquari River valley. This region was originally covered by deciduous and Semi-deciduous Atlantic Forest, which today only exist in a highly fragmented environment mainly due to agricultural activities. Our survey was conducted in 12 municipalities from this region, between March 2011 and April 2013. Aiming a general overview of the species composition, our sampling sites included lakes, bogs, small streams and river sections, all inside or surrounded by small forest fragments or forest areas. Fifty species of Odonata were collected comprising 29 genera and seven families. The dominant families were Libellulidae (40%) and Coenagrionidae (36%), while Aeshnidae, Gomphidae and Lestidae each only comprise 6% of the total number of species. The findings revealed the presence of a highly diverse odonate assemblage, mainly represented by generalist species in human disturbed fragments and a few forest specialist species in the best preserved remnants only." (Authors)] Address: Renner, S., Centro Universitário Univates, Setor de Evolução e Ecologia, Rua Avelino Tallini, 171, CEP 95900-000, Lajeado, RS, Brazil. E-mail: samuelrenner@hotmail.com

15466. Richards, D.R.; Warren, P.H.; Moggridge, H.L.; Maltby, L. (2015): Spatial variation in the impact of dragonflies and debris on recreational ecosystem services in a floodplain wetland. *Ecosystem Services* 15: 113-121. (in English) [Highlights: •We model spatial variation in recreational experiences using three steps. •The net quality of recreational experiences varies at a fine spatial scale. •The noticeability of habitat components strongly impacted visitor experiences. •Noticeability is important in the analyses of recreational ecosystem services. Abstract: Recreation is an important ecosystem service. The interaction between people and habitat components is rarely considered in the analyses of recreational experiences, making it difficult to predict what people will experience. In this study we develop a modelling framework that describes three stages of interaction between people and habitats. This framework considers: (1) the distribution of habitat components in the environment, (2) the proportion of the available components that

visitors notice, and (3) the net impact of multiple components on the quality of the recreational experience. The model was applied to a case study river floodplain, and was used to estimate visitor exposure to a combination of positive habitat components (dragonflies) and negative components (debris). The model provided an index of net impacts on experience quality that showed spatial variation across the floodplain, and this analysis highlighted areas that would deliver more positive experiences to visitors. The results of a sensitivity analysis indicated that neglecting the noticeability (observation rate) of habitat components resulted in different predictions. It is therefore important that the noticeability of habitat components is considered during analyses of recreational experiences, and recreational ecosystem service valuations." (Authors)] Address: Richards, D.R., Dept of Animal & Plant Sciences, Univ. Sheffield, Sheffield, UK. E-mail address: d.r.richards@nus.edu.sg

15467. Richards, S.J.; Theischinger, G.; Tamarua, W. (2015): Chapter 3: Dragonflies and damselflies (Odonata) of Manus and Mussau Islands. In: Whitmore N. (editor) 2015. A rapid biodiversity survey of Papua New Guinea's Manus and Mussau Islands. Wildlife Conservation Society Papua New Guinea Program. Goroka, PNG: 27-30. (in English) ["A total of 21 species of Odonata were documented from Manus and Mussau Islands, comprising 9 damselflies and 12 dragonflies. Nineteen of the 21 species were found on Manus and 12 were found on Mussau. One damselfly species in the genus *Drepanosticta* (family Platystictidae) from Manus Island is new to science. No species listed by the IUCN as Data Deficient, or in any threatened category, was detected. The odonate fauna of both Manus and Mussau islands is dominated by widespread species, a feature common to remote oceanic islands. However two species of damselflies, the recently described *Nososticta manuscola* Theischinger and Richards (in press) and the new *Drepanosticta* reported for the first time here, appear to be endemic to Manus Island. Management of the forests in central Manus to ensure long-term persistence of the clear streams and riparian vegetation inhabited by the two endemic species is a high conservation priority. Surveys of the interior of Mussau Island should also be conducted to determine whether additional, and potentially new and endemic, species occur there away from the coastal fringe." (Authors)] Address: Richards, S.J., Vertebrates Dept, South Aust. Museum, North Terrace, Adelaide, S.A. 5000, Australia. E-mail: richards.steve@saugov.sa.gov.au

15468. Rieger, E. (2015): Beobachtungen zur Libellenfauna (Odonata) der Jahre 2005 bis 2014 im Lausitzer Bergland. *Mitteilungen Sächsischer Entomologen* 34(112): 13-20, 32. (in German) [The study between 2005 and 2014 of four localities in Sachsen (Germany) resulted in 14 odonate species.] Address: Rieger, Elisabeth, Grenzstr. 35, 01904 Steingwolmsdorf, Germany

15469. Roh, C.; Rosakis, A.; Morteza Gharib, M. (2015): G27.00009 : Jet vectoring through nozzle asymmetry. *Bulletin of the American Physical Society* 60(21): 1 p. (in English) [Verbatim: Previously, we explored the functionality of

a tri-leaflet anal valve of a dragonfly larva. We saw that the dragonfly larva is capable of controlling the three leaflets independently to asymmetrically open the nozzle. Such control resulted in vectoring of the jet in various directions. To further understand the effect of asymmetric nozzle orifice, we tested jet flow through circular asymmetric nozzles. We report the relationship between nozzle asymmetry and redirecting of the jet at various Reynolds numbers.] Address: not stated

15470. Rohmare, V.B.; Rathod, D.M.; Dholu, S.G.; Parasharya, B.M.; Talmale, S.S. (2015): An inventory of odonates of central Gujarat, India. *Journal of Threatened Taxa* 7(11): 7805-7811. (in English) ["An inventory of Odonata was carried out in six districts of central Gujarat from 2012 to 2014. A total of 42 species belonging to 27 genera, under seven families and two suborders were recorded. A total of 16 species of Zygoptera and 26 species of Anisoptera were recorded. Anand District was surveyed intensively and as a result a maximum of 35 species was recorded (Dragonfly 22 and Damselfly 13), whereas less intensively surveyed districts, i.e., Panchmahal (17) and Dahod (16) had comparatively low species richness. Twenty-two species are being reported for the first time from central Gujarat, raising the total list of odonates to 48. Six species reported in an earlier survey were not encountered during this study. Seven species namely, *Copera marginipes*, *Pseudagrion microcephalum*, *Anaciaeschna jaspidea*, *Anax immaculifrons*, *Epophthalmia vittata*, *Brachydiplax sobrina*, *Tramea basilaris burmeisteri* are being recorded for the first time from Gujarat State. Hence, now the checklist of the odonates of Gujarat is raised to 65 species." (Authors)] Address: Rohmare, V.B., At PO Pohegaon, Kopargaon Taluka, Ahmednagar, Maharashtra 423605, India. E-mail: rohmarevb@gmail.com

15471. Román-Heracleo, J.; González-Valencia, L.; López-Medina, G.E. (2015): Primer registro del género *Palaemnema* Selys, 1860 (Odonata: Platystictidae) para el estado de Durango, México. *Dugesiana* 22(1): 17-18. (in Spanish, with English summary) [2012-2014, 34 larvae of the genus *Palaemnema* were sampled along the river Piaxtla, near San Dimas, state of Durango, Mexico] Address: Román-Heracleo, J., CTA, Consultoría y Tecnología Ambiental México S.A. de C.V. Av. Insurgentes Sur 1763, piso 5. Col. Guadalupe Inn. C.P. 01020, Delegación Álvaro Obregón, México. D.F. E-mail: romanjareth@gmail.com

15472. Sadeghi, S.; Bakhshi, Y.; Dumont, H. (2015): Wing shape variation among central Asian populations of *Calopteryx splendens*. *Taxonomy and Biosystematics* 7(23): 13-26. (in Persian, with English summary) ["We applied geometric morphometric techniques to explore the morphological variation of forewings between 10 Asian *Calopteryx splendens* populations including Azerbaijan, Russia, Turkey, Uzbekistan, Iran, Turkmenistan, Tajikistan, Kazakhstan, and Kyrgyzstan countries. We focused on the study of the phenetic relationships among the populations in central Asia. The results showed that the northern and western populations of Iran had the largest and smallest centroid

size of the wings, respectively. In addition, differences among wing shape of the 10 studied populations of *C. splendens* were significant. Our results indicated that Tajikistan population has quite distinct divergence and also Turkmenistan and northern part of Iran populations both were very close each other and located in a separate clade. The Azerbaijan, Russia, Turkey, Uzbekistan, west Iran, Kazakhstan and Kyrgyzstan populations were revealed to be more interrelated to each other, although Kazakhstan and Kyrgyzstan populations seems to be more closer than the other." (Authors)] Address: Sadeghi, S., Dept of Biology, Faculty of Sciences, Shiraz University, Shiraz, Iran. E-mail: ssadeghi@shirazu.ac.ir

15473. Salunkhe, R.C.; Dhotre, D.P.; Salunke, B.K.; Patil, V.S.; Mahale, V.A.R.J.; Patole, M.S.; Narkhede, K.P.; Shouche, Y.S. (2015): Distribution and molecular characterization of *Wolbachia* endosymbionts in Odonata (Insecta) from central India by multigene approach. *Current Science* 108(5): 971-978. (in English) ["*Wolbachia* are maternally inherited bacterial endosymbionts of arthropods distributed among a wide range of hosts. It is now well known that they induce reproductive manipulations in their arthropod hosts by various phenotypic effects. The objective of the present study was to investigate *Wolbachia* infection among the insect order Odonata comprising 16 species from 5 families. Fifteen odonate species representing five families were found to harbour *Wolbachia* with the overall infection rate of 70%, out of which fourteen species are reported for the first time. According to multilocus sequence typing (MLST) data and phylogenetic analysis, all odonate *Wolbachia* species belong to supergroup F, except *Trithemis pallindinervis*, which belongs to supergroup B. MLST data reveal 20 new, highly similar STs (99.32 ± 0.34). We found a high rate of *Wolbachia* infection in Odonata of India, which indicates importance of this association. The characterization of these *Wolbachia* strains promises to lead to a deeper insight into this interaction, which is essential for further studies based on their phenotypic effects. The study suggests that all the characterized *Wolbachia* STs are totally new and arise as a result of point mutation." (Authors) *Anax guttatus*, *Epophthalmia vittata*, *Ictinogomphus rapax*, *Acisoma panerpoides panerpoides*, *Brachythemis contaminata*, *Crocothemis servilia*, *Diplocodes trivialis*, *Neurothemis tulia*, *Orthetrum sabina*, *Orthetrum glaucum*, *Pantala flavescens*, *Rhyothemis variegeta*, *Trithemis pallindinervis*, *Aciaagrion pallidum*, *Ceriagrion coromandelianum*, *Ischnura senegalensis*] Address: Shouche, Y.S., National Centre for Cell Science, University of Pune Campus, Ganeshkhind, Pune 411 007, India. E-mail: yogesh@nccs.res.in

15474. Sampath, P., Liao, H., Curtis, Z., Li, S., and Deloria, C. (2015): Modeling fen hydrology to inform recovery of the endangered Hine's Emerald Dragonfly. *J. Hydrol. Eng.*, 10.1061/(ASCE)HE.1943-5584.0001314 , 05015029: 12 pp. (in English) ["It is generally recognized that fens and the rare species they support can only be effectively managed and protected by treating them as part of a larger, connected groundwater system. However, this underlying groundwater

system is often not well understood. In this research, a geographic information system (GIS)-enabled, hierarchical modelling approach was applied to simulate the multiscale groundwater flow systems for several critical habitat units of the endangered *S. hineana* in Michigan. In particular, models for six habitat units were developed and calibrated to static water level measurements. Reverse particle tracking was used to trace source water and delineate the groundwater contribution areas for the habitat units. The results reveal that the units obtain water from regional groundwater mounds through direct or cascading connections. The travel time for groundwater from the mounds to reach the habitat units varied between 25 days and almost 11 years. These findings suggest that the current approach to fen conservation must be reassessed, from the protection of individual fens to conservation of the broad recharge areas and the multiple fens they support." (Authors)] Address: Sampath, P., Dept. Civil & Environmental Engineering, Michigan State Univ., 428 S. Shaw Ln., Room 3546, East Lansing, MI 48824-1226, USA. E-mail: sampath3@msu.edu

15475. Sánchez-Guillén, R.A.; Cordero-Rivera, A. (2015): Confirmation of the presence of *Ischnura senegalensis* (Rambur, 1842) on the Canary Islands. *Animal Biodiversity and Conservation* 38(1): 71-76. (in Spanish, with English summary) ["The presence of one or two species of damselflies of the genus *Ischnura* in the Canary Islands has been a matter of debate in the recent years. The first published records listed *I. senegalensis* as the only zygopteran inhabiting the archipelago, but this proved to be wrong, and until recently, all specimens of *Ischnura* captured in the islands were unanimously regarded as belonging to *I. saharensis*. Recent photographic evidence, however, is compatible with the presence of *I. senegalensis*. In this study, we give morphological and genetic evidence of the presence of *I. senegalensis* in the Canary Islands, and we discuss the importance of voucher specimens to correctly identify very similar species." (Authors)] Address: Cordero Rivera, A., Depto de Ecología e Biología Animal, Univ. de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

15476. Santana, H.S.; Silva, L.C.F.; Pereira, C.L.; Simião-Ferreira, J.; Angelini, R. (2015): The rainy season increases the abundance and richness of the aquatic insect community in a Neotropical reservoir. *Brazilian Journal of Biology* 75(1): 144-151. (in English, with Portuguese summary) ["Alterations in aquatic systems and changes in water levels, whether due to rains or dam-mediated control can cause changes in community structure, forcing the community to readjust to the new environment. This study tested the hypothesis that there is an increase in the richness and abundance of aquatic insects during the rainy season in the Serra da Mesa Reservoir, with the premise that increasing the reservoir level provides greater external material input and habitat diversity, and, therefore, conditions that promote colonization by more species. We used the paired t test to test the differences in richness, beta diversity, and abundance, and a Non-metric Multidimensional Scaling (NMDS)

was performed to identify patterns in the community under study. Additionally, Pearson correlations were analyzed between the richness, abundance, and beta diversity and the level of the reservoir. We collected 35,028 aquatic insect larvae (9,513 in dry period and 25,515 in the rainy season), predominantly of the Chironomidae family, followed by orders Ephemeroptera, Trichoptera, and Odonata. Among the 33 families collected, only 12 occurred in the dry season, while all occurred in the rainy season. These families are common in lentic environments, and the dominance of Chironomidae was associated with its fast colonization, their behavior of living at high densities and the great tolerance to low levels of oxygen in the environment. The hypothesis was confirmed, as the richness, beta diversity, and abundance were positively affected by the increase in water levels due to the rainy season, which most likely led to greater external material input, greater heterogeneity of habitat, and better conditions for colonization by several families." (Authors)] Address: Santana, H.S., Programa de Pós-graduação em Ecologia de Ambientes Aquáticos Continentais, Universidade Estadual de Maringá – UEM, Av. Colombo, 5790, CEP 87020-900, Jd. Universitário, Maringá, PR, Brazil. E-mail: herick.bio@gmail.com

15477. Savard, M. (2015): Découverte du gomphe fléché dans les Appalaches québécoises. *Le Naturaliste canadien* 140(1): 26-31. (in French, with English summary) ["*Stylurus spiniceps* is considered as a discrete species of dragonfly, associated with the St. Lawrence River and its major tributaries. The discovery of populations in the Montérégie and Estrie Regions confirms its presence in the Appalachians natural province in Québec. The absence of records in the lowlands surrounding the island of Montréal and Saint-Pierre lake could indicate a degradation of the aquatic and forest environment in the downstream portion of the Appalachian and Laurentian watersheds. A set of 8 riverine species of Gomphids can serve as biological indicators applied to the hydrographic system of the St. Lawrence." (Author)] Address: Savard, M.; E-mail: michel.savard@ssss.gouv.qc.ca

15478. Schiel, F.-J.; Buchwald, R. (2015): Contrasting life-history patterns between vernal pond specialists and hydroperiod generalists in *Lestes* damselflies (Odonata: Lestidae). *Odonatologica* 44(3): 349-374. (in English) ["The aim of our study was to identify life-history mechanisms enabling typical inhabitants of vernal ponds to complete their larval development under the time constrained conditions of their temporary larval habitats. For that reason we compared both hatching phenology and larval development of vernal pond specialists *Lestes barbarus*, *L. dryas*, and *L. macrostigma* with those of the closely related hydroperiod generalists *L. sponsa*, *L. virens*, and *L. viridis* under seminatural conditions. As hypothesized, we found vernal pond specialists of the genus *Lestes* to cope with the short water coverage of their typical larval habitats by the following developmental traits: a) an early hatching date in *L. dryas* and *L. barbarus*, b) large second-stadium larvae, which have to grow less and with fewer larval stadia than the hydroperiod generalists *L. dryas* and *L. macrostigma*, c) a short larval development time in *L.*

macrostigma and d) higher growth rates in *L. dryas* and *L. barbarus* than in the other species. Degree day sums in vernal pond specialists were significantly lower than in their less specialized counterparts. This means, that they would have grown faster than hydroperiod generalists, if thermal conditions during larval development were identical in all species. Due to these developmental adaptations, larvae of *L. dryas* and *L. barbarus* emerged significantly earlier in the course of year than both *L. macrostigma* and the three hydroperiod generalists. Unexpectedly, none of the three studied vernal pond specialists has evolved all of these particular adaptations. This may be because of the close ecological relationship within the genus *Lestes*, and the studied species being generally characterized by univoltine life cycles and fast larval development, which enables all of the European species to reproduce in temporary ponds." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, D-77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

15479. Schiel, F.-J.; Buchwald, R. (2015): Hatching phenology of Odonata species inhabiting temporary and permanent water bodies (Odonata: Lestidae, Aeshnidae, Libellulidae). *International Journal of Odonatology* 18(2): 105-123. (in English) ["The hatching phenology of 15 Odonata species was studied under seminatural conditions to find out how the hatching modes of typical species of summer dry temporary waters (vernal ponds) differ from those of species inhabiting both permanent and temporary waters. We attempt to answer the following questions. (1) Do vernal pond species hatch earlier in the year than congeneric permanent water species? (2) Can hatching in vernal pond species be delayed under unsuitable environmental conditions, like drought? (3) Can eggs of vernal pond species survive for more than one year? Larvae of vernal pond species, *Aeshna affinis*, *Lestes barbarus*, *L. dryas* and *Sympetrum flaveolum*, hatched significantly earlier than their permanent water counterparts *A. mixta*, *L. sponsa*, *L. virens*, *L. viridis*, *S. danae*, *S. depressiusculum*, *S. meridionale*, *S. sanguineum*, *S. striolatum* and *S. vulgatum*. Only one vernal pond species, *L. macrostigma*, did not show this early hatching. In both vernal pond and permanent water species hatching succession of different clutches of each species varied, which may reflect genotypic differences. In both vernal pond species and permanent water species hatching was delayed when eggs were kept on moist filter paper – simulating drought – instead of being put into water. The hatching success of two vernal pond species and of four out of five studied permanent water species was reduced significantly by keeping eggs on moist filter paper. Survival of eggs for more than one year could not be proved under temperature conditions resembling those in nature." (Authors)] Address: Schiel, F.-J., Inst. Naturschutz und Landschaftsanalyse, Turenenweg 9, 77880 Sasbach, Germany. E-mail: Franz-Josef.Schiel@INULA.de

15480. Schmidt, E. (2015): Die Odonatenfauna eines Kiefernheide-Weiher im Teichgut Hausdülmen (Dülmen, Westmünsterland, NRW). *Libellula* 34(1/2): 59-72. (in German, with English summary) ["The dragonfly fauna of a pine

heath pond at a fish farm in North Rhine-Westphalia – 200 excursions between 1991–2014 are the base of an investigation of the dragonfly fauna of a pine heath pond in the cretaceous Haltern sands, north Westphalia, near a fish pond farm. The pond is surrounded by pine wood, has a dark, acid bogwater, at the bank with a drying out belt of *Juncus effusus* and mosses between the reeds. Formerly there had been *J. bulbosus* mats in front of this belt, which usually dried up in summer. After damming the outflow ditch the water level of the pond became permanent, but the floating vegetation (*J. bulbosus* mats) decreased. 31 species of Odonata had been found (in the neighbouring fish farm additional 13 species). *Leucorrhinia dubia* was the only bog species, confined to floating *Sphagnum* mats and therefore only in single specimens, lost since 2006. Also the four species with preference to heath ponds (*Aeshna juncea*, *Sympetrum danae*, *L. rubicunda*, also *Sympecma fusca*.) became suboptimal, but steadily breeding; for *S. fusca* the pond was a regional breeding centre, and favoured f.i. the (temporary) breeding at the carp breeding ponds. As usual three ubiquitous (*Lestes sponsa*, *Enallagma cyathigerum*, *Libellula quadrimaculata*) are breeding at least in middle density. Eight ubiquitous had been usually breeding, ten species had been more or less usually guests from the fish pond farm and its creeks. Four species with bog preference (*L. virens*, *Ceriatagrion tenellum*, *L. pectoralis*, *Orthetrum coerulescens*) had been only rare guests. A speciality was *S. depressiusculum*. This species in this Atlantic region of Germany is confined to the special conditions of carp breeding ponds. It has a strong preference to low reeds for hunting, resting, and precopulation. This is given by the *Juncus effusus*-belt of the heath pond. So the species came to the belt usually in middle density with reproduction activities, but successful (emergence) only in some years. Thus the investigation shows a remarkable dragonfly exchange between the pineheath pond and the fish pond farm." (Author)] Address: Schmidt, E.G., Coesfelder Str. 230, 48249 Dülmen, Germany

15481. Schneider, T.; Schneider, E.; Schneider, J.; Vierstraete, A.; Dumont, H.J. (2015): *Aeshna vercanica* sp. nov. from Iran with a new insight into the *Aeshna cyanea*-group (Odonata: Aeshnidae). *Odonatologica* 44(1/2): 81-106. (in English) ["*Aeshna vercanica* sp. nov. is described and illustrated. The male holotype and four male paratypes were collected on 15-vii-2013 in the Hyrcanian forest of the Alborz Mountains, Mazandaran province, northwestern Iran. A specimen collected on 29-vi-2002 in the Talysh Hills, Lankoran area, Azerbaijan, also belongs to the new species. In July 2014 the species, including females, was recorded again at the type locality and additionally ca 400 km further east in Golestan province. Males are similar to *Aeshna cyanea* in the structure of genitalia and terminalia but differ in head morphology, pterostigma length, colour pattern, and behaviour. Females have small abdominal blue or turquoise postero-median dorsal spots which are absent on S9 and S10, thin green antehumeral stripes, a less robust appearance than females of *A. cyanea*, and are more slender and longer. The range of *A. vercanica* sp. nov. covers the Hyrcanian forest along the southern margin of the Caspian

Sea. Analysis of the barcoding COI sequence of DNA confirmed that *A. vercanica* sp. nov. is separated from *A. cyanea* by a genetic distance of more than 4 %. The ITS gave a similar result. A haplotype map could not derive *A. vercanica* sp. nov. directly from *A. cyanea*. They are thus related but different species, and we suggest the common ancestor lived in pre-Pleistocene times. Analysis of *A. cyanea* specimens from across its range revealed two infraspecific clades. The western one extends from the Maghreb to Central Europe; the eastern one from the Caucasus to Eastern Europe, a common scenario for post-glacial invaders. A molecular comparison of the species pair *A. juncea* and *A. subarctica* showed these to be even more closely related than *A. cyanea* and *A. vercanica* sp. nov." (Authors)] Address: Schneider, T., Arnold-Knoblauch-Ring 76, 14109 Berlin, Germany. E-mail: thomas.rs@gmx.de

15482. Schneider, T.; Ikemeyer, D.; Dumont, H.J. (2015): New records of dragonflies (Odonata) from Belutschistan-e-Sistan province in Iran. *Zoology in the Middle East* 61(3): 288-290. (in English) [Data of the following species are presented: *Trithemis pallidinerve*, *Brachythemis contaminata*, *Platynemis dealbata*, *Ischnura evansi*, *I. nursei*, *I. pumilio*, *I. rubilio*, *Pseudagrion decorum*, *Diplacodes lefebvrei* and *Selysiothemis nigra*] Address: Schneider, T., Arnold-Knoblauch-Ring 76, 14109 Berlin, Germany. E-mail: thomas.rs@gmx.de

15483. Schröter, A.; Seehausen, M.; Kunz, B.; Günther, A.; Schneider, T.; Jödicke, R. (2015): Update of the Odonata fauna of Georgia, southern Caucasus ecoregion. *Odonatologica* 44(3): 279-342. (in English) ["A total of 63 odonate taxa were recorded in Georgia during nationwide surveys in June–July 2014, and June and July–August 2015, corresponding to at least 85 % of the country's Odonata fauna. For the majority of species information from Georgia is provided in English language for the first time. *Selysiothemis nigra* is a new addition to the country's list. The occurrence of *Chalcolestes parvidens* is confirmed and previous records from Georgia listed as *Lestes viridis* are doubted and believed to pertain to *parvidens*. The second and third records only for *L. macrostigma* are presented. Individuals intermediate between *Enallagma cyathigerum* and *E. c. risi* are reported from Georgia for the first time. As to Georgian *Lestes virens*, the infraspecific taxonomy is critically discussed, with special reference to Central Asian forms described as ssp. *marikovskii*. It is recommended to avoid any further splitting into inadequately defined subspecies, as the variability of eastern forms from Central Europe towards Central Asia can be better described as clinal variation within the ssp. *vestalis*. In consequence, the name *marikovskii* is regarded as a junior synonym of *vestalis*: *Lestes virens vestalis* Rambur, 1842 = *L. virens marikovskii* Belyshev, 1961, syn. nov. The diversity of taxa within the *Calopteryx splendens* complex in the Caucasus region is considered to comprise in fact three subspecies in Georgia: ssp. *intermedia*, ssp. *tschaldirica*, and ssp. *mingrelica*. Despite of transition zones and hybridisation each subspecies represents in toto a spatially clearly delimited unit. In ssp.

intermedia androchrome females frequently occurred in the Kakheti region in the east of Georgia. The distinct female colour form 'feminalis' of *Calopteryx virgo* is illustrated for the first time and the availability of the name *Calopteryx virgo* var. *feminalis* Bartenev, 1910 is critically discussed. For a number of species the first information from Georgia is provided since their discovery over a century ago, such as *Coenagrion armatum*, *Aeshna serrata*, and *Onychogomphus assimilis*; for *Coenagrion lunulatum* and *C. scitulum* the first data since over 75 years are presented. *Coenagrion ponticum* was recorded throughout the country and at least at two sites found to reproduce syntopically with *C. puella*. New information is provided for the little known *Coenagrion vanbrinkae*, including a formerly unknown pink colour morph of reproductive females. The infraspecific taxonomy of *Ischnura elegans* is critically discussed, with special reference to the taxa *pontica* Schmidt, 1938 and *ebneri* Schmidt, 1938. In addition, new records of *Pyrrhosoma nymphula* and *Coenagrion pulchellum*, both being rare in the Caucasus region, are given. The presence of distinct *Gomphus schneiderii* in Georgia is confirmed as well as the continuous presence of *Gomphus ubadschii* at the Rioni River over 80 years after its description under the homonym »*Gomphus flavipes* var. *lineatus* var. n.«. *Onychogomphus assimilis* and *O. flexuosus* were found to be abundant in the eastern half of the country suggesting that Georgia is an important global stronghold for both threatened species. Males of *Caliaeschna microstigma* exhibited a distinctive tendency for reduced ante-humeral stripes, leaving only a small bluish patch at the posterior part in some males. Vital populations of *Libellula pontica*, endemic to the East Mediterranean, were found and the species is assumed to be well established in the Kakheti region in the East of the country." (Authors)] Address: Schröter, A., Rasenweg 10, 37130 Gleichen, Germany. E-mail: notulae@osmylus.com

15484. Schütte, C.; Müller, O. (2015): Dorsolateral cuticular outgrowths in second stadium larvae of *Gomphus flavipes* (Odonata: Gomphidae). *International Journal of Odonatology* 18(1): 65-69. (in English) ["Second and third stadium larvae of *Gomphus flavipes* have dorsolateral cuticular outgrowths in the form of small basal tubercles bearing fan-shaped setae. These sensilla are aligned in two rows on each side of the thorax and abdomen. European species of *Gomphus*, *Onychogomphus* and *Ophiogomphus* that we examined lack these structures, having instead, at most, short hairlike setae in double rows. The fan-shaped setae of *G. flavipes* are present only in second and third stadia, apparently being lost later in larval development. We speculate that this loss might be due to changes in microhabitat or might be some kind of phylogenetic constraint." (Authors)] Address: Schütte, C., Bindestr. 16, D-38162 Weddel, Germany. E-mail: c.schuette@lk-wf.de

15485. Segev, O.; Rodríguez, A.; Hauswaldt, S.; Hagemann, K.; Vences, M. (2015): Flatworms (*Schmidtea nova*) prey upon embryos of the common frog (*Rana temporaria*) and induce minor developmental acceleration. *Amphibia-Reptilia* 36(2): 155-163. (in English) ["Amphibians vary in

the degree of pre-metamorphic developmental plasticity in response to risk of predation. Changes in hatching time and development rate can increase egg or tadpole survival respectively by shortening the duration of the more vulnerable stages. The intensity of predator induced developmental response and its direction, i.e. delayed, accelerated, or none, varies considerably between amphibian and predator species. We surveyed freshly deposited clutches of the European common frog *Rana temporaria* in a population in Braunschweig, Germany and found that 62% (N = 20) of the clutches contained planarians (*Schmidtea nova*), with an average of 3.94 ± 0.79 and a maximum of 13 planarians per clutch. A laboratory predation experiment confirmed that this planaria preys on *R. temporaria* eggs and early embryos. We further exposed freshly laid egg masses to either free, caged, or no planarians treatments using floating containers within a breeding pond where the two species co-occur. After 10 days exposure, embryos showed developmental stages 14-25 along the Gosner scale with statistically significant positive effects of both predator treatments. The observed effect was rather slight as predator-exposed individuals showed an increase by a single Gosner stage relative to those raised without planarians. The detected trend suggests that direct and indirect cues from flatworms, rarely considered as anuran predators, might induce a developmental response in *R. temporaria* early developmental stages." (Authors) The paper includes many references to Odonata.] Address: 1Institute of Evolution, University of Haifa, Mt. Carmel, Haifa 31905, Israel; 2Zoologisches Institut, Technische Universität Braunschweig, Mendelssohnstr. 4, D-38106 Braunschweig, Germany

15486. Seifert, N.; Koschkar, S.; Schmitz-Ornés, A. (2015): Diet of Baillon's Crakes *Zapornia pusilla*: Assessing differences in prey availability and consumption during the breeding season in the Senegal River Delta, West Africa. *Acta Ornithologica* 50(1): 69-84. (in English) ["The Baillon's Crake *Zapornia* (*Porzana*) *pusilla* is considered as one of the least known Rallidae species of the Palaearctic. Very little information exists about its ecological requirements and knowledge on diet refers to very few observations. Based on the analysis of faecal samples (N = 59) from two study sites in Djoudj National Park (NW Senegal), we describe the major diet components and examine how seasonal and environmental factors influence its dietary composition. All faeces contained remains of invertebrates. Coleopterans were the most frequent prey items with an occurrence in 95% of the samples. Other important food items were: Odonata (82%), Araneae (78%), Nematocera (59%), and Brachycera (44%). Remains of gecko skin were the only evidence for vertebrate prey. 75% of the faeces contained plant matter, especially seeds of *Eleocharis mutata* which constituted in some individuals > 90% of the sample content. Generalized linear models (GLMs) were used to assess whether occurrence of prey items was an effect of selection or environmental variation, considering both consumed items as well as prey availability. Sweep netting was used to provide an estimate of relative abundance of poten-

tial invertebrate prey. Despite pronounced seasonal changes in temperature and humidity, models revealed a lower influence of meteorological variables on prey composition and availability. Rather we found water level, date and site having the highest impact in the models. In contrast to decreasing diversity of available food items in the course of the season, diversity in the faeces remained constant indicating Baillon's Crakes prey less selectively when resources diminish. Furthermore, diversity of Baillon's Crakes' diet was lower at higher water levels, suggesting stronger selectivity when prey abundances are high as implied by positive relationships of several invertebrate groups with water level. Despite the rapidly declining water levels and decreasing abundances of e.g. Nematocera, Odonata and Mollusca in the course of the season, we found no clear shift from aquatic to a more terrestrial dominated composition of taxa in the birds' diet. This might be due to the selection of profitable prey such as araneans or molluscs but could also be explained by better accessibility due to physical changes in the habitats e.g. in the case of consumed Odonata and Saltatoria. High disintegration of invertebrates in the faeces rendered quantification of prey items impossible. Biomass estimates could support the assessment of specialization of the Baillon's Crakes as well as the detection of seasonal succession of the wetlands' biotic communities." (Authors)] Address: Seifert, Nina, Zoological Institute and Museum, Vogelwarte Hiddensee, Ernst Moritz Arndt University Greifswald, Soldmannstr. 23, 17489 Greifswald, Germany. E-mail: nam.seifert@googlemail.com

15487. Selvi, K.; Kaya, H.; Akbulut, M.; Öztekin, A.; Çakır, F. (2015): Metal accumulation and biomarker responses of Odonata larvae, *Ischnura elegans* (Vander Linden, 1820) exposed in a lead-zinc mining area in Turkey. 7th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA 2015) September 17-20, 2015, Kavala, Greece: 614-623. (in English) ["This study was conducted in September 2014 to determine the effects of metal accumulation on the Odonata larvae. Polluted area in the lower part of the mine founded on Umurbey Stream (Çanakkale, Turkey) and unpolluted area in the upper part of it are defined as the sampling stations. In this study, GSH (Glutathione), TBARS levels and Na⁺, K⁺ -ATPase activity were measured after the determination of metal accumulation (Cd, Cu, Fe, Pb, Zn) in the water and in larval *Ischnura elegans*. There was a decrease in Na⁺, K⁺ -ATPase activity; although the increase in GSH and TBARS levels in organisms sampled from polluted area. These results indicate that; metal accumulation caused to oxidative stress in Odonata larvae *I. elegans* and this organism reacted by running the compensate mechanisms for it." (Authors)] Address: Selvi, K., Yenice Technical Vocational College, Çanakkale Onsekiz Mart University, Çanakkale, Turkey. E-mail: kahramanselvi@comu.edu.tr

15488. Seyab, M.; Azhar Mehmood, S.; Khan, S.; Jan, A.; Haroon (2015): Exploring the dragonfly fauna of Tehsil Tangi district Charsadda, Khyber Pakhtunkhwa, Pakistan. *Journal*

of Entomology and Zoology Studies 3(4): 186-188. (in English) [188 specimens of eleven common dragonfly species (*Orthetrum cancellatum*, *O. glaucum*, *O. chrysis*, *O. pruinosum neglectum*, *O. sabina*, *Pantala flavescens*, *Trithemis festiva*, *Tramea basilaris*, *Crocothemis servilia*, *Acisoma panorpoides panorpoides*, *Ictinogomphus ferox*) are documented. Measurements of wings and abdomen are presented.] Address: Haroon, Dept of Zoology Shaheed, Benazir Bhutto Univ., Main Campus, Sheringal, Dir Upper, Khyber Pakhtunkhwa, Islamic Republic of Pakistan.

15489. Shaffery, H.M.; Relyea, R.A. (2015): Predator-induced defenses in five species of larval *Ambystoma*. *Copeia* 103(3): 552-562. (in English) ["While predator-induced plasticity has been demonstrated in a wide range of organisms, relatively few data exist to compare differences among species. In studies of predator-induced plasticity in amphibians, larval anurans have been widely examined, but there are fewer data for larval salamanders. We sought to examine morphological and behavioural defenses in larvae of five species of *Ambystoma* salamanders. We raised five species of larval mole salamanders (*A. barbouri*, *A. gracile*, *A. laterale*, *A. maculatum*, *A. tigrinum*) in separate lab experiments and exposed them to predator cues from larval dragonflies (*Anax junius*). Salamanders did not vary in their refuge use during the experiment, but *A. gracile*, *A. laterale*, and *A. tigrinum* reduced their activity in the presence of predators early in development. Dragonfly (*Anax junius*) cues induced relatively few morphological changes across species: *A. barbouri* developed relatively large heads and deep tails, *A. gracile* and *A. laterale* developed relatively shorter heads, and *A. maculatum* developed relatively wider heads and shorter tails. Our results suggest that behavioural and morphological defenses in *Ambystoma* are highly variable among species and they appear to be less plastic than tadpoles and other salamander species." (Authors)] Address: Shaffery, Heather, Department of Biological Sciences, 4249 Fifth Ave., Univ. Pittsburgh, Pittsburgh, Pennsylvania 15260, USA. E-mail: hshaffery@gmail.com

15490. Sharkey, C.R.; Partridge, J.C.; Roberts, N.W. (2015): Polarization sensitivity as a visual contrast enhancer in the Emperor dragonfly larva, *Anax imperator* (Leach, 1815). *Journal of Experimental Biology* 218: 3399-3405. (in English) ["Polarization sensitivity (PS) is a common feature of invertebrate visual systems. In insects, PS is well known for its use in several different visually guided behaviours, particularly navigation and habitat search. Adult dragonflies use the polarization of light to find water but a role for PS in aquatic dragonfly larvae, a stage that inhabits a very different photic environment to the adults, has not been investigated. The optomotor response of the larvae of the Emperor dragonfly, *Anax imperator*, was used to determine whether these larvae use PS to enhance visual contrast underwater. Two different light scattering conditions were used to surround the larval animals: a naturalistic horizontally polarized light field and non-naturalistic weakly polarized light field. In both cases these scattering light fields obscured moving intensity stimuli that provoke an optokinetic response in the

larvae. Animals were shown to track the movement of a square-wave grating more closely when it was viewed through the horizontally polarized light field, equivalent to a similar increase in tracking ability observed in response to an 8% increase in the intensity contrast of the stimuli. Our results suggest that larval PS enhances the intensity contrast of a visual scene under partially polarized lighting conditions that occur naturally in freshwater environments." (Authors)] Address: Sharkey, C.R., School of Biological Sciences, Bristol Life Sciences Building, Tyndall Avenue, University of Bristol, Bristol, BS8 1TQ, UK . E-mail: camilla.sharkey@bristol.ac.uk

15491. Sigutova, H.; Sigut, M.; Dolny, A. (2015): Intensive fish ponds as ecological traps for dragonflies: an imminent threat to the endangered species *Sympetrum depressiusculum* (Odonata: Libellulidae). *Journal of Insect Conservation* 19: 961-974. (in English) ["The concept of ecological traps, in which animals settle in low-quality habitats, is well-established. Dragonflies are a good model for investigating the effects of ecological traps because their habitat selection process can be directly observed. Unfortunately, most such studies focus on oviposition on artificial materials, such as car surfaces, gravestones, and plastic foils, which results in complete mortality of the clutch. It remains unclear to what extent intensive fish ponds, ubiquitous in the European agricultural landscape, act as ecological traps for some dragonfly species and how they influence their vulnerability. We investigated the effects of putative ecological traps on the threatened dragonfly *S. depressiusculum* and the common closely related species *S. sanguineum* in a Central European agricultural landscape. Observations of adult behaviour were used to parameterize GLMs examining the attractiveness of five fish ponds (three fish breeding and two intensive) to each species. We also counted exuviae at each pond as a measure of each species' survival. We used GLMMs to determine which factors affected selection of oviposition sites and the environmental factors resulting in ecological traps for each species. All five ponds were attractive to ovipositing pairs of both species, although they were largely unsuitable for subsequent development (four for *S. depressiusculum* and two for *S. sanguineum*). Our results provide evidence that intensive fish ponds act as ecological traps for both species. We believe that cutting of the vegetation surrounding trap habitats could be an effective way to decrease their attractiveness to a wide range of dragonfly species." (Authors)] Address: Šigutová, Hana, Department of Biology and Ecology/Institute of Environmental Technologies, Faculty of Science, University of Ostrava, Chittussiho 10, 710 00 Ostrava, Czech Republic, E-mail: sigutova.hanka@gmail.com

15492. Simaika, J.P.; Samways, M.J. (2015): Predicted range shifts of dragonflies over a wide elevation gradient in the southern hemisphere. *Freshwater Science* 34(83): 1133-1143. (in English) ["Human-induced climate change is among the greatest threats to biodiversity, especially when coupled with habitat destruction. For an already water-stressed country like South Africa, changes in temperature

and precipitation regimes, coupled with increasing water demands, are likely to lead to losses in biodiversity. Dragonflies are a well-studied surrogate taxon for aspects of freshwater biodiversity. We created species distribution models for 14 dragonfly species, and predicted the changes in species richness, extent of occurrence, and habitat suitability for the years 2050 and 2080 in South Africa, a poorly studied area for range-change predictions for insects. Model predictions for 2 different emissions scenarios suggest that at least 2 species will be lost from the area by 2050, and 3 by 2080. All are widespread Afrotropical species, but with narrow elevation ranges in South Africa. Only 1 species is predicted to benefit greatly from climate change. The remaining species are predicted to persist with reduced extents of occurrences at higher elevations. Most species we studied (12 of 14) thrive in artificial environments. Therefore, to a certain extent, loss in connectivity is unlikely to play a role for these species. However, the 2 stream specialists that occur in the area are particularly vulnerable because of loss of habitat. Species that currently occur farther north in southern Africa and South Africa also are likely to move southward in the future. Thus, species richness may not necessarily decrease, but replacement of species within communities will be significant." (Authors)] Address: Simaika, J.P., Department of Conservation Ecology and Entomology and Centre for Invasion Biology, University of Stellenbosch, Private Bag X1, Matieland 7602 South Africa. E-mail: simaikaj@sun.ac.za

15493. Singh, U.R.; Shaikh, N. (2015): Odonata diversity of Lake Bhoirwadi, Dombivli. In: Panse, C. S., & Kayande, M. S. (Eds.) (2015). Wetlands: Present Status, Ecology and Conservation. UGC Sponsored National Conference on Wetlands: Present Status, Ecology and Conservation. Mumbai: Maharshi Dayanand College: 1 p. (in English) [Verbatim: Odonates life history being closely related to aquatic habitats and their sensitivity to environmental changes, makes them good indicator of wetland environmental status. Bhoirwadi Lake, located in the city Dombivli of district Thane Maharashtra, is subjected to various anthropogenic activities, thereby disturbing its ecology. To know the Odonata diversity of Bhoirwadi Lake, the present study was undertaken for the period of one year from April 2014 to March 2015. A total of 15 Odonata species were recorded belonging to two sub orders namely Anisoptera (dragonflies – 12 species) and Zygoptera (damselflies – 3 species). Of the 15 species, 10 species were found throughout the year.] Address: Singh Ugeshkumari R, K.I.H.E. Society's Maharashtra College, 246-A, JBB Marg, Mumbai-40000, India. E-mail: ugeshs@gmail.com

15494. Skvortsov, V.E.; Snegovaya, N.Y. (2015): Two new species of *Cordulegaster* Leach, 1815 from Azerbaijan (Odonata, Cordulegastridae). International Dragonfly Fund - Report 85: 1-22. (in English) ["Two new *Cordulegaster* species are described and illustrated by drawings, photographs and SEM images. The first one, *C. plagionyx* sp. nov., was discovered in NW Azerbaijan in a low-mountain forest landscape; the second, *C. nachitschevanica* sp. nov., occurs in the subalpine zone of Nakhichevan AR, south of

the main territory of Azerbaijan. Both new taxa look generally similar to *C. insignis* Schneider, 1845; however, each of them reveals unique features and distinctive combinations of characters that set them apart from other species of the genus. Both new species exhibits new types of sex dimorphism previously unknown in *Cordulegaster*. Some traits related to the structure of male appendages and important details of colouration prevent both *C. plagionyx* sp. nov. and *C. nachitschevanica* sp. nov., from being reliably classified under any of two widely accepted groups of species within the genus *Cordulegaster*: the *boltonii*-group and the *bidentata*-group." (Authors)] Address: Skvortsov, V.E., Evolution Department, Faculty of Biology, M.V. Lomonosov Moscow State University, Moscow, 119992, GSP-1, Russia. E-mail: west-urnus@yandex.ru

15495. Skvortsov, V.E.; Snegovaya, N.Yu (2015): A second addition to the Odonata fauna of Azerbaijan. International Dragonfly Fund Report 87: 1-38. (in Odonata, fauna, new records, Azerbaijan, *Caliaeschna microstigma*, *Cordulegaster vanbrinkae*, *Coenagrion puella*-complex, *Coenagrion ornatum*, *Coenagrion vanbrinkae*) ["The article contains new faunistic data on 53 Odonata species based on material collected by the authors in Azerbaijan between 2013–2014 and added by revising an old collection made by A.V. Bogachev in the 1930–1940s. Of these, 13 species are new for the country: *Lestes dryas*, *L. sponsa*, *L. virens*, *Coenagrion hastulatum*, *C. lunulatum*, *C. ornatum*, *C. pulchellum*, *Aeshna affinis*, *Brachytron pratense*, *Cordulegaster picta*, *Somatochlora flavomaculata*, *Sympetrum flavolum*, *S. vulgatum*. The new locality of *Cordulegaster picta* is the easternmost for the species. Two new populations of a very rare species *Cordulegaster vanbrinkae* (discovered in the country in 2011) are found. *Somatochlora flavomaculata* and *Brachytron pratense* are generally very rare in the entire Caucasus. *Pantala flavescens* has been rediscovered in the country 100 years after the first record. A large population of *Caliaeschna microstigma*, a species very rare in Azerbaijan, has been found in the northern part of the country; it represents a peculiar dark morph whose features are described in detail. Particularly discussed are the variability of *Coenagrion puella* complex in Azerbaijan and diagnostic features of two other *Coenagrion* species closely related to each other, *C. ornatum* and *C. vanbrinkae*." (Authors)] Address: Skvortsov, V.E., Evolution Department, Faculty of Biology, M.V. Lomonosov Moscow State University, Moscow, 119992, GSP-1, Russia. E-mail: west-urnus@yandex.ru

15496. Slagboom, R.; Stip, A. (2015): The Southern Darter (*Sympetrum meridionale*) in the Netherlands in 2013 and 2014. *Brachytron* 17(2): 76-86. (in Dutch, with English summary) ["In 2013, the species was observed with at least 187 individuals at 61 locations, mainly in the southern parts of the Netherlands. At several locations copulations and oviposition was observed. In 2014, the species occurred with at least 121 individuals at 31 locations. Incidentally, there was evidence for local reproduction. We discuss possibilities for the origin of the 2013-invasion and finally address

several factors possibly contributing to the successful reproduction of *S. meridionale* in the Netherlands." (Authors)] Address: Richard Slagboom. E-mail: r.slagboom@kpnmail.nl

15497. Smith-Herron, A.J. (2015): *Hoplorhynchus aster* n. sp. (Apicomplexa: Actinocephalidae: Menosporinae) and *Anguilloforma marcelyni* gen. et n. sp. (Apicomplexa: Actinocephalidae: Acanthosporinae) Infecting *Ischnura ramburii* and *Enallagma civile* (Zygoptera: Coenagrionidae) from Texas, U.S.A. *Comparative Parasitology* 82(2): 211-218. (in English) ["*Hoplorhynchus aster* n. sp. (Apicomplexa: Eugregarinida: Actinocephalidae: Menosporinae) and *Anguilloforma marcelyni* (Actinocephalidae: Acanthosporinae) are described from adults of *Ischnura ramburii* and *Enallagma civile*, respectively, from south and west Texas, USA. *H. aster* is the eleventh species described in the genus, and only the second reported from North America. It is distinguished from *H. acanthatholius* by the number of digitations surrounding the epimerite disk (8 in *H. acanthatholius* vs. 14–18 in *H. aster*). *Anguilloforma marcelyni* gen. et n. sp. is distinguished from existing genera within Acanthosporinae by oocysts bearing a total of 14 spines (6 equatorial, 1 at each equatorial vertex, and 4 terminal spines inserted at each pole, 1 at each vertex created by polar truncations); mature trophozoites long and slender; and epimerite a simple, striated cup." (Author)] Address: Smith-Herron, Autumn J., Texas Invasive Species Institute, Sam Houston State Univ., Huntsville, Texas 77341, USA. E-mail: smith-herron@shsu.edu

15498. Sniegula, S.; Golab, M.J.; Johansson, F. (2015): Time constraint effects on phenology and life history synchrony in a damselfly along a latitudinal gradient. *Oikos* 125: 414-423. (in English) ["In organisms with complex life cycles living in seasonal environments, the synchronisation of phenological events is important from the ecological and evolutionary perspectives. Life history transitions should be synchronised to a greater degree at northern latitudes. We quantified hatching and emergence timing and synchrony in the obligate univoltine damselfly *Lestes sponsa* along a latitudinal gradient covering its entire north-south range in Europe. In our first experiment, populations from different latitudes were grown in separate climate chambers simulating temperature and photoperiod conditions occurring at their sites of origin. Northern populations expressed early and high synchronous hatching and emergence, central populations intermediate, and southern populations late and low synchronous hatching and emergence. This pattern was expressed at both population and full-sibling family levels, indicating stronger selection for timing and synchronisation in the north compared to the south. In our second experiment, populations from all latitudes were reared in conditions simulating an average temperature and photoperiod over the latitudinal gradient. Interestingly, the pattern of timing and synchronisation was reversed with respect to latitude when compared to the pattern shown in the first experiment, indicating the importance of environmental factors in shaping phenological events. Our results indicate strong selection for timing and synchronisation of life history events at northern latitudes, caused by time constraints.

Our results also show that it is important to use as natural conditions as possible in experiments on life history shifts in organisms with complex life cycles in order to achieve a correct understanding of these shifts." (Authors)] Address: Śniegula, S., Dept Ecosystem Conservation, Inst. Nature Conservation, Polish Academy of Sciences, al. Mickiewicza 33, PL-31-120 Kraków, Poland. E-mail: szymon.sniegula@gmail.com

15499. Soares, J.A.C.; Batista-Silva, V.F.; Boneto, D.D.; Bailly, D.; Abelha, M.C.F.; Oliveira, I.A. (2015): Assemblage of immature Odonata (Insecta, Anisoptera) in streams of the Mato Grosso do Sul State: spatial and temporal implications. *Iheringia Série Zoologia* 105(3): 325-332. (in English, with Portuguese summary) ["This study investigated the spatial and temporal distribution of Odonata, Anisoptera assemblages in two streams of the Iguatemi River basin, Água Boa and Perobão, which are under strong anthropogenic pressure. Samplings were carried out in both streams during the rainy (March to December 2008) and dry (June and September 2008) periods. The Mantel test was used to check the influence of spatial autocorrelation on the Odonata composition. Spatial and temporal variations in the composition were summarized by the Principal Coordinates Analysis (PCoA), using Mantel test residuals. Odonata assemblages were further evaluated for abundance, richness, diversity and evenness. The most representative genera in each stream and hydrological period were identified by the Indicator Value Method. The spatial-temporal variations in the attributes of the assemblages were assessed using two-factor analysis of variance. We collected 500 immature individuals of 23 genera and three families. Only the composition and abundance showed significant spatial differences, with the highest mean abundance found in the Perobão Stream. As for the temporal variation, abundance, richness and diversity were significantly higher in the dry period for the two streams. Miathyria and Zenithoptera, were the indicator genera of the Água Boa Stream and *Erythrodiplax*, *Libellula*, *Macrothemis*, *Progomphus* and *Tramea*, were the indicator genera of the Perobão Stream. The Odonata fauna was mainly influenced by the temporal dynamics of the rainfall regime, and the composition responded only to spatial variations represented by the streams." (Authors)] Address: Batista-SilvaValéria, Universidade Estadual de Mato Grosso do Sul, BR 163, km 20.2, 79980-000 Mundo Novo, MS, Brazil. E-mail: vfb_silva@uems.br

15500. Soinski, M. (2015): Erster Entwicklungsnachweis von *Zygonyx torridus* für Sizilien (Odonata: Libellulidae). *Libellula* 34(1/2): 85-89. (in German, with English and Italian summaries) ["On 31-vii-2014, three exuviae were collected at the Belice River near Selinunte, Sicily. Based on these records as well as several sightings of adults, *Z. torridus* should be regarded as a species to be established in Sicily" (Author)] Address: Soinski, M., Grundstraße 33, 44149 Dortmund, Germany. E-mail: michaelsoinski@web.de

15501. Souza, A.M.; Fogaça, F.N.O.; Cunico, A.M.; Higuti, J. (2015): Does the habitat structure control the distribution

and diversity of the Odonatofauna? *Brazilian Journal of Biology* 75(3): 598-606. (in English, with Portuguese summary) ["The statement that the habitat complexity and structure govern the abundance and diversity of biological communities has been widely investigated. In this context, we assumed the hypothesis of habitat heterogeneity, that is, the higher habitat complexity leads to greater diversity of Odonata. In addition, we analyzed the influence of habitat structure on the distribution of this community, and evaluated the effects of abiotic variables. Odonata larvae were collected with sieves and by electrofishing in ten Neotropical streams belonging to the Pirapó River basin. Forty species of Odonata were registered, which were distributed in eight families, Libellulidae stood out with the highest richness. The high gamma diversity and distribution of Odonata were associated with habitat heterogeneity in these streams. However, the abiotic variables also seem to affect the distribution of Odonata species, in view of the impact of the land use in the vicinity of streams." (Authors)] Address: Souza, A.M., Programa de Pós-Graduação em Ecologia de Ambientes Aquáticos Continentais, Núcleo de Pesquisas em Limnologia, Ictiologia e Aqüicultura, Universidade Estadual de Maringá – UEM, Avenida Colombo, 5790, CEP 87020-900, Maringá, PR, Brazil

15502. Staats, E.G. (2015): Emergent non-consumptive predator effects alter habitat colonization by dipteran prey. MSc thesis, Virginia Commonwealth University, Richmond, Virginia: IV + 22 pp. (in English) ["When ovipositing, prey organisms avoid habitat patches containing predator cues because predators consume, and negatively affect the fitness of their prey. Richness of predator species often enhances the strength of consumptive predator effects, but little is known about how multiple predators combined affect prey non-consumptively. We quantified dipteran colonization in aquatic mesocosms in response to varied predator richness. Multiple predator species combined reduced oviposition by *Culex* mosquitoes, chironomid midges, and the general colonizing dipteran community more than predicted by the effects of the independent predator species. Previous research which quantifies effects of multiple predators on prey as prey abundance, but does not measure consumption by predators, may be underestimating or overestimating the strength of effect by assuming equal colonization. Our findings enhance understanding of the ways predators influence abundances and distributions of their prey, and yields insight into the ways predators may non-consumptively affect prey by changing prey behaviour. Oviposition by the dipteran community was reduced 37% by *Celithemis eponina* ($Z = 3.037$, $df = 18$, $P = 0.0024$), 31% by *Enallagma* spp. ($Z = 2.570$, $df = 18$, $P = 0.0102$), and 27% by crayfish ($Z = -2.189$, $df = 18$, $P = 0.0286$), relative to the predator-free control." (Author)] Address: Staats, E.G. E-mail: staatseg@vcu.edu

15503. Stastný, K.; Cervený, J.; Rezac, M.; Kurka, A.; Veselý, P.; Kadlec, T.; Konvicka, M.; Uricková, L.; Harabiš, F.; Marhoul, P. (2015): Prague. In: J.G. Kelcey (ed.): *Vertebrates and invertebrates of European cities: Selected non-*

avian fauna. Springer New York: 379-451. (in English) ["Prague, which is the capital of the Czech Republic, occupies 496 km² and has a population of 1.2 million people. This chapter describes six of the major invertebrate groups that occur in the city: Arachnida (spiders and related species)—504 species or 58 % of the national species; Coleoptera—Carabidae (ground beetles)—362 species found between 1790 and 2013 or 70 % of the national list of ground beetles; Lepidoptera (diurnal butterflies)—119 species or c. 74 % of the 161 species recorded in the country; Mollusca (molluscs)—146 species or 65 % of the national species; Odonata (dragonflies and damselflies) 41 species or > 50 % of the national species; and Orthoptera (grasshoppers and crickets)—44 species or 53 % of the national species. Prague is one of the European cities where mollusc fauna has been studied in detail. Altogether, 146 species of gastropods and bivalves were recorded here, which is 60 % of the Czech Republic's mollusc fauna. This surprisingly high species diversity reflects the geological and geomorphological diversity of the city that is crucial for molluscs. The gradient from eusynanthropic species over common assemblages of catholic species to the scattered network of nature reserves inhabited by rare and protected species is described. The highest concentration of non-native mollusc species in the Czech Republic was recorded only in Prague." (Authors)] Address: Harabiš, F., Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 21, Czech Republic. E-mail: harabis@fzp.czu.cz

15504. Steinhoff, P.O.M.; Uhl, G. (2015): Taxonomy and nomenclature of some mainland SE-Asian *Coelicia* species (Odonata, Platycnemididae) using micro-CT analysis. *Zootaxa* 4059(2): 257-276. (in English) ["The taxonomic status of some mainland Southeast Asian *Coelicia* species is evaluated. The following synonymies are presented: *C. acco* is a junior synonym of *C. pyriformis*; *C. tomokunii* that of *C. scutellum*; *C. onoi* that of *C. cyanomelas*. *C. scutellum hainanense* is promoted to species level, *C. hainanense*. Redescriptions of the holotype of *C. pyriformis* and of the lectotypes of *C. scutellum* and *C. hainanense* are presented with illustrations. The male genital ligulae were examined by means of non-destructive X-ray micro-computed tomography (micro-CT) and subsequent 3D-reconstruction. The advantage of virtual types generated by micro-CT analysis, particularly for the examination of internal structures, is discussed." (Authors)] Address: Steinhoff, P.O.M., Department of General and Systematic Zoology, Zoological Institute and Museum, Ernst Moritz Arndt University of Greifswald, Anklamer Str. 20, D-17489 Greifswald, Germany. E-mail: philipsteinhoff@gmail.com

15505. Stigge, H.A.; Bolek, M.G. (2015): The alteration of life history traits and increased success of *Halipegus eccentricus* through the use of a paratenic host: A comparative study. *Journal of Parasitology* 101(6): 658-665. (in English) [Oklahoma, USA; "Complex life cycles are a hallmark characteristic of many parasites; however, little is known about the process by which life cycles become more complex

through the addition of hosts. Paratenic hosts are present in the life cycles of several phylogenetically distinct groups of helminths; this suggests that they may play a key role during this process. This study examined the development of metacercariae of *Halipegus eccentricus* within intermediate microcrustacean and odonate (*Ischnura* sp.) paratenic hosts. Then a comparative approach was used to evaluate how life history traits of *H. eccentricus* within the anuran definitive hosts differ between metacercariae of the same age that developed within an intermediate ostracod host or a paratenic odonate host. The results of this study indicate that metacercariae of *H. eccentricus* do not grow at the same rate in different intermediate hosts, and significant differences exist in growth within intermediate and paratenic hosts. Individuals from odonate paratenic hosts always had larger bodies and suckers than those of metacercariae of the same age that develop within microcrustacean intermediate hosts. Furthermore, metacercariae from odonates were more successful in establishing and migrating in definitive anuran hosts. Last, individuals from paratenic hosts began reproducing earlier within anuran definitive hosts than age-matched worms that develop within the intermediate hosts. Collectively these results suggest that the variation in body and sucker sizes within odonate and microcrustacean hosts may carry over to the definitive host and in the case of *H. eccentricus* using the paratenic host increases transmission and alters other life history traits within definitive hosts. These results indicate that using a paratenic host can affect the success of parasites in subsequent hosts, and therefore these hosts may provide benefits other than just increasing transmission by bridging an ecological gap." (Authors)] Address: Stigge, Heather, Department of Integrative Biology, Oklahoma State University, Stillwater, Oklahoma, 74078, USA. E-mail: heather.stigge@okstate.edu

15506. Stoks, R.; Debecker, S.; Dinh Van, K.; Janssens, L. (2015): Integrating ecology and evolution in aquatic toxicology: insights from damselflies. *Freshwater Science* 34(3): 1032-1039. (in English) ["Current legislation and ecological risk assessment fails to protect aquatic biodiversity at low levels of contaminants. We addressed 3 topics embedded in general stress ecology and evolutionary ecology that are relevant to arrive at a better evaluation of the risk of low contaminant levels in aquatic systems: 1) delayed effects of contaminants, 2) interactions between contaminants and biotic interactors, and 3) vulnerability to contaminants under global warming. We developed these topics by capitalizing on the key insights obtained using damselflies as model organisms. First, delayed contaminant effects on important fitness-related effects exist during the larval stage and after metamorphosis in the adult stage. Second, synergistic interactions of contaminants with bacteria and predation risk have been demonstrated, and we present advances in the mechanistic understanding of these synergisms with biotic interactors. Third, we illustrate the strength of assessing the effect of contaminants under global warming using a space-for-time substitution approach and the need to consider temperature extremes. These studies using damselflies as model organisms highlight the relevance of considering

contaminant effects after the exposure period and in the presence of natural stressors, such as predation risk and higher temperatures. They further highlight the need for spatially explicit risk-assessment and conservation tools. These insights are relevant for most aquatic taxa. Indeed most aquatic taxa have a complex life cycle, are strongly affected by predation risk and by warming, and show latitudinal gradients. Better integration of these topics in ecological risk assessment will be a major challenge for both scientists and policy makers, but of crucial importance to preserve aquatic biodiversity." (Authors)] Address: Stoks, R., Laboratorium voor Aquatische Ecologie, K.U.Leuven, De Beriotstraat 32, B-3000 Leuven, Belgium. E-mail: robby.stoks@bio.kuleuven.ac.be

15507. Suhling, F.; Suhling, I.; Richter, O. (2015): Temperature response of growth of larval dragonflies – an overview. *International Journal of Odonatology* 18(1): 15-20. (in English) ["We review the knowledge about the thermal reaction norms of larval growth in Odonata with a focus on the temperature response function. We re-analyze literature data and present our own results on growth rates of larvae of 14 species of Libellulidae reared at different temperatures. Temperature response curves (TRC) were fitted in order to estimate two relevant components of the thermal reaction, namely the optimum temperature for growth (T_{opt}) and the increase of growth rate with temperature (Q_{10}). We also examined what is known about the thermal minimum (T_{min}) and the thermal maximum (T_{max}) for growth to delimit the thermal ranges of odonates. All information indicates that larval growth is generally warm adapted, with species-specific variation of T_{opt} of 21–31°C, T_{min} of 8–12°C, and T_{max} of up to 44°C (the latter being the upper lethal limit, the true T_{max} for growth remains unknown). The values of Q_{10} distinguish some more specialized species, mostly with high T_{opt} and of tropical origin, and others being more thermal generalists, often being temperate species and/or from lotic habitats. We examine some biotic and abiotic factors affecting the temperature response of growth and we discuss the temperature response in the light of global warming." (Authors)] Address: Suhling F., Inst. Geoökologie, TU Braunschweig, Langer Kamp 19c, D-38102 Braunschweig, Germany. E-mail: f.suhling@tu-bs.de

15508. Swaegers, J.; Mergeay, J.; St-Martin, A.; De Knijf, G.; Larmuseau, M.; Stoks, R. (2015): Genetic signature of the colonisation dynamics along a coastal expansion front in the damselfly *Coenagrion scitulum*. *Ecological Entomology* 40(4): 353-361. (in English) ["1. Many insects are expanding their distribution range polewards as a result of climate change, which has been shown to be associated with founder effects leading to a reduction in genetic diversity and an increase in genetic differentiation. These spatial genetic patterns may arise from colonisation from a broad expansion front or a limited neighbourhood after a stepping stone model of dispersal. The temporal persistence of such founder effects are poorly understood, mainly because studies looking at the fine-scale initial temporal dynamics of the genetic signature of a range expansion are rare. 2. Us-

ing microsatellite markers, we performed a detailed spatio-temporal genetic analysis of the range expanding damselfly *Coenagrion scitulum* (Rambur) along a coastal axis during the first years after colonisation. 3. A decrease was in (private) allelic richness when going northwards along the coastline, which is consistent with a scenario of cumulative founder events. In spite of the spatiotemporal dynamics in the observation records of the species along the coastline, the spatial genetic data indicated a major contribution from the broad expansion front during the colonisation of the coastline rather than a stepping-stone colonisation process. 4. The fine-scale temporal dynamics of the range expansion indicated the absence of persistent founder effects and instead showed considerable temporal instability in genetic indices at the more northern edge populations. This may be explained by genetic immigration and admixture from the broad expansion front in this active disperser." (Authors)] Address: Swaegers, J., Deberiotstr. 32, 3000 Leuven, Belgium. E-mail: Janne.Swaegers@bio.kuleuven.be

15509. Swaegers, J.; Mergeay, J.; Van Geystelen, A.; Thery, L.; Larmuseau, M.; Stoks, R. (2015): Neutral and adaptive genomic signatures of rapid poleward range expansion. *Molecular Ecology* 24(24): 6163-6176. (in English) ["Many species are expanding their range polewards and this has been associated with rapid phenotypic change. Yet, it is unclear to what extent this reflects rapid genetic adaptation or neutral processes associated with range expansion, or selection linked to the new thermal conditions encountered. To disentangle these alternatives, we studied the genomic signature of range expansion in the damselfly *Coenagrion scitulum* using 4950 newly developed genomic SNPs and linked this to the rapidly evolved phenotypic differences between core and (newly established) edge populations. Most edge populations were genetically clearly differentiated from the core populations and all were differentiated from each other indicating independent range expansion events. In addition, evidence for genetic drift in the edge populations, and strong evidence for adaptive genetic variation in association with the range expansion was detected. We identified one SNP under consistent selection in four of the five edge populations and showed that the allele increasing in frequency is associated with increased flight performance. This indicates collateral, non-neutral evolutionary changes in independent edge populations driven by the range expansion process. We also detected a genomic signature of adaptation to the newly encountered thermal regimes, reflecting a pattern of countergradient variation. The latter signature was identified at a single SNP as well as in a set of covarying SNPs using a polygenic multilocus approach to detect selection. Overall, this study highlights how a strategic geographic sampling design and the integration of genomic, phenotypic and environmental data can identify and disentangle the neutral and adaptive processes that are simultaneously operating during range expansions." (Authors)] Address: Swaegers, J., Laboratory of Aquatic Ecology, Evolution and Conservation, University of Leuven, Deberiotstraat 32, 3000, Leuven, Belgium

15510. Tabugo, S. R.; Casas, P.A.; Pareño, M.T.; Peñaredondo, M.A. (2015): Fluctuating asymmetry and developmental instability in the wings of *Neurothemis terminata* as bioindicator of stress. *Advances in Environmental Biology* 9(19): 10-17. (in English) [Background: Fluctuating asymmetry (FA) is a measure of differences between the right and the left half of bilaterally symmetrical organisms and is a useful trait to monitor developmental instability and ecological stress. Dragonflies are often used for biomonitoring purposes. In this study, analysis was done on eurytopic species *Neurothemis terminata*, since they are widely distributed and adapted to different environment. Analysis was based on the Procrustes method and makes comparison of FA indices of homologous points. Using landmark method for shape asymmetry, anatomical landmarks were used and analyzed using Symmetry and Asymmetry in Geometric Data (SAGE) program. Twenty-nine landmarks on the forewing and thirty five landmarks on the hind wing were tested for samples for all populations. Objective: This study assessed developmental stability in three populations of *Neurothemis terminata* using FA analysis on wings from different barangays (Tibanga, Tominobo and Tipanoy) in Iligan City, Mindanao, Philippines. Results: Procrustes ANOVA results showed variation and significant evidence of FA for all populations with relatively high FA for Tibanga population and no indication of Directional asymmetry (DA). Possible explanation for significant FA for populations mean varying level of stress as experienced by populations, suggesting that there is a significant variation between the left and right side of each individual induced by the genes and the environment. Conclusion: Significant FA and increase FA present inability of species to buffer stress in its developmental pathways hence, would mean developmental instability and have implications on species fitness, adaptation, quality of individuals and the level of endogenous and exogenous stress experienced by individuals or populations during development.] Address: Tabugo, Sharon, Dept Biol. Sciences, Mindanao State Univ. - Iligan Institute of Techonlogy, Iligan City, Philippines. E-mail: sharonrose0297@gmail.com

15511. Tajima, Y. (2015): Evolution of sperm displacement mechanism and genital morphology in the damselfly, *Ischnura asiatica*. Dissertation, Graduate School of Life and Environmental Sciences, the University of Tsukuba, Japan: 32 pp. (in English) ["In most species of Odonata, males physically displace rivals' sperm stored in the female sperm storage organs. During copulation, appendages on the male secondary genitalia enter the female sperm storage organs, and trap and remove sperm masses from previous matings. Considerable variations of male and female genitalia among species has been clarified, indicating that males of some species are able to displace all sperm in female sperm storage organs, while males of other species displace not all sperm stored in female sperm storage organs. The *Ischnura asiatica* male has a pair of appendages at the tip of his genitalia that are shorter than the length of the narrow duct from the bursa copulatrix to the spermatheca in the female. Although the males remove bursal sperm during the copulation, the males have no appendages that can remove

spermathecal sperm directly. However, reduction of the number of spermatozoa occurs both in the bursa copulatrix and in the spermatheca during copulation. An alternative mechanism for the reduction of the spermathecal sperm by the male was previously suggested. Females have mechano-receptive sensilla that communicate the presence of an egg to the muscles covering the sperm storage organs for the purpose of fertilization. Then, it is hypothesized that the penis head might mimic the movement of the egg, thus stimulating the sensilla to induce spermathecal sperm ejection by the female. In the present study, in order to clarify the mechanism of sperm removal by stimulating females' sensory system, an interrupted copulation experiment was conducted in the fields in order to examine the relationship between sperm reduction and the morphology of the male's genitalia. The extent of sperm reduction in the spermatheca increased with the width of the penis head. Thus, the hypothesis of the indirect sperm removal mechanism by stimulating females' sensory system was supported. The females might suffer costs such as a loss of genetic variety of their offspring when the sperm displacement is complete. Thus, a counter-adaptation might have evolved in the females to prevent complete sperm displacement. In order to clarify females' adaptation for spermathecal sperm removal, the inter-population and seasonal variation of morphological factors affecting sperm removal, such as the width of the penis head and the number of vaginal sensilla, were examined, and counter-adaptations with which to prevent sperm ejection such as a decrease in the number of vaginal sensilla and an increase in the size of the spermatheca were found in females. Thus, the genital morphology of females and the indirect sperm removal mechanism that makes use of females' sensory system in the reproductive organs were shaped by sexual conflict. Proposing this co-evolutionary scenario for male-female genitalia in *I. asiatica* made it possible to reveal the role of females in genital coevolution." (Author)] Address: not stated

15512. Takahashi, Y. (2015): Mechanisms and tests for geographic clines in genetic polymorphisms. *Population Ecology* 57(2): 355-362. (in English) ["A continuous spatial gradient in visible traits, which is called a cline, is a natural model system for quantifying the effects of selection and stochastic factors and their relative importance. Geographic clines in phenotypic traits also provide key insights into the evolutionary forces that lead to allopatric speciation in nature. Thus, the underlying mechanisms for establishing clines and their evolutionary consequences remain key topics in evolutionary biology. However, few experimental studies have confirmed the underlying mechanisms of geographic clines in morph/allele frequencies, probably because of the lack of understanding of the theoretical basis of geographic clines in polymorphisms and/or suitable comprehensive tests. Thus, I present a general review of the underlying mechanisms for establishing geographic clines in polymorphisms. I also provide a case study using the female dimorphic damselfly *Ischnura senegalensis* to illustrate a strategy that confirms the underlying mechanisms of geographic clines in morph frequencies. This review may

help to address geographic clines in other polymorphic systems, as well as contribute to a comprehensive understanding of geographic clines in quantitative traits, and thus, their evolutionary consequences in nature." (Author)] Address: Takahashi, Y., Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Sendai, Miyagi, 980-8578, Japan. E-mail: takahashi.yum@gmail.com

15513. Takahashi, Y. (2015): Mechanisms and tests for geographic clines in genetic polymorphisms. *Population Ecology* 57(2): 355-362. (in English) ["A continuous spatial gradient in visible traits, which is called a cline, is a natural model system for quantifying the effects of selection and stochastic factors and their relative importance. Geographic clines in phenotypic traits also provide key insights into the evolutionary forces that lead to allopatric speciation in nature. Thus, the underlying mechanisms for establishing clines and their evolutionary consequences remain key topics in evolutionary biology. However, few experimental studies have confirmed the underlying mechanisms of geographic clines in morph/allele frequencies, probably because of the lack of understanding of the theoretical basis of geographic clines in polymorphisms and/or suitable comprehensive tests. Thus, I present a general review of the underlying mechanisms for establishing geographic clines in polymorphisms. I also provide a case study using the female dimorphic damselfly *Ischnura senegalensis* to illustrate a strategy that confirms the underlying mechanisms of geographic clines in morph frequencies. This review may help to address geographic clines in other polymorphic systems, as well as contribute to a comprehensive understanding of geographic clines in quantitative traits, and thus, their evolutionary consequences in nature." (Authors)] Address: Takahashi, Y., Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Sendai, Miyagi, 980-8578, Japan. E-mail: takahashi.yum@gmail.com

15514. Tamm, J. (2015): Zur Verbreitung und Ökologie von *Cordulegaster bidentata* in Nordhessen mit besonderer Berücksichtigung ihrer Vorkommen auf Buntsandstein (Odonata: Cordulegastridae). *Libellula* 34(1/2): 27-58. (in German, with English summary) ["On distribution and ecology of *Cordulegaster bidentata* in Northern Hesse, Germany, with emphasis on its occurrence on Bunter Sandstone (Odonata: Cordulegastridae) – The distribution of *C. bidentata* (imagines) has been mapped in eight mountain areas of northern Hesse and in parts of the Rhön Mountains in Thüringen, Germany. It is evident that the species occurs very patchily within some of the geological formations studied. *C. bidentata* was rare in the Bunter sandstone areas mainly mapped, but quite common in adjacent Bunter sandstone areas mapped in former studies. Analysis shows that the species' rarity mainly is the result of both the most important natural habitat structures and man-made impact. The main factors are insufficient slope inclines and long stream drainages, and on the other hand, coniferous plantations and ponds dammed close to the springs. But it was remarkable that even habitats suitable for *C. bidentata* were in many cases not populated by the species. This suggests

that the subpopulations recently may live too far from each other to be able to regenerate locally extinct subpopulations from outside. The species is also distributed patchily on palaeozoic greywacke and limestone. Here again both natural and man-made factors are responsible. *C. bidentata* has not been found in the high Rhön and Rothaar mountains. This suggests that there are climate effects as well, like rainy cool summers or freezing of spring outflows in times of severe frost without snow cover. At least in Hesse, *C. bidentata* should be classified as "highly endangered species" because of its regional rarity and several negative impacts which are strong and increasing." (Author)] Address: Tamm, J., Elgershäuser Str. 12, 34131 Kassel, Germany. E-mail: jochen.tamm@t-online.de

15515. Tarboton, W.; Tarboton, M. (2015): A Guide to the Dragonflies & Damselflies of South Africa. Penguin Random House South Africa: 216 pp. (in English) ["This field guide to all the Odonata of South Africa – a total of 162 species – addresses a growing area of interest and fills the gap left by two previous books on the topic, now both out of print. A detailed introduction covers behaviour, life cycles, biology and breeding; and the species entries focus on identification and distribution, with all species photographed from scans of actual insects, beautifully presented in full colour. Comprehensive and fully up to date, this extraordinary study of dragonflies and damselflies of the region will be snapped up by anyone with an interest in the insect life of the region." (Authors)]

15516. Tennessen, K.J. (2015): Four new species of Calvertagrion St. Quentin from South America (Odonata: Coenagrionidae). *Odonatologica* 44(3): 397-430. (in English) ["Four new species of Calvertagrion are described from the upper Amazon region of South America east of the Andes foothills, namely *C. albatum* sp. nov. (holotype ♂, Madre de Dios Department, Peru), *C. charis* sp. nov. (holotype male, Loreto Dept, Peru), *C. declivatum* sp. nov. (holotype male, Santa Cruz Department, Bolivia), and *C. mauffrayi* sp. nov. (holotype ♂, Orellana Province, Ecuador). These additions bring the total number of species in the genus to five. Differences in thoracic and abdominal colour pattern, morphology of the pronotum and male appendages are presented as characters in a key separating the known species. The male genital ligula is remarkably uniform within the genus, which is unusual within coenagrionid genera with multiple species." (Author)] Address: Tennessen, K.J., P.O. Box 585, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

15517. Termaat, T.; van Grunsven, R.A.H.; Plate, C.L.; van Strien, A.J. (2015): Strong recovery of dragonflies in recent decades in The Netherlands. *Freshwater Science* 34(3): 1094-1104. (in English) ["Many dragonfly species in The Netherlands declined in the 20th century because of acidification, eutrophication, and desiccation of lotic and lentic habitats and canalization of streams and rivers. These pressures peaked in the 1970s, when 26 of 65 native species had an unfavourable conservation status on the 1997 Dutch Red List. Since the 1980s, environmental regulations have led to improved water quality, and many habitat restoration

projects have been carried out. We used standardized monitoring data (1999-2013) and unstandardized observations (1991-2013) to investigate how dragonflies have changed in the last 20 y on a national scale. We compared trends of dragonfly species from different habitat types and with southern vs northern distribution in Europe. Dragonflies recovered strongly in The Netherlands in a period of ~20 y, probably because of recent habitat improvements. Lotic species have benefitted more than lentic species, and southern species have more positive trends than northern species, suggesting that climate change has contributed to the recovery. Dragonflies were resilient and able to quickly recover when their habitats were restored. Recovery has led to a better conservation status for many species. Unstandardized data delivered results consistent with those from monitoring data and had greater statistical power to detect trends because many more unstandardized data than standardized data were available. Thus, when the goal is to provide a general overview of changes in dragonflies, unstandardized data can outperform standardized abundance data. However, abundance data may deliver complementary information for individual species. Our results support the suitability of dragonflies as indicators of freshwater habitat condition, but they recover more strongly in The Netherlands than many other insects, possibly because of their higher dispersal abilities or different habitat requirements." (Authors)] Address: Termaat, T., Rijnsteeg 8-10a, 6708 PP Wageningen, The Netherlands. E-mail: tim.termaat@vlinderstichting.nl

15518. Theischinger, G.; Richards, S.J. (2015): The genus *Nososticta* Hagen (Odonata: Platynemididae) from the Papuan region with descriptions of ten new species group taxa. *Odonatologica* 44(1/2): 153-224. (in English) ["The males and, when available, females of ten new species and subspecies of *Nososticta* are described from the Papuan region. They are: *Nososticta caerulea* sp. nov. (♂ holotype: Papua New Guinea, Upper Sepik Basin, 09-vi-2010, ♀ described), *Nososticta finisterrae satisbona* ssp. nov. (♂ holotype: Papua New Guinea, Goodenough Island, 26-X-1953), *Nososticta interrupta* sp. nov. (♂ holotype: Indonesia, Papua Province, Kabupaten Asmat, Vriendschap R., 21-25-vii-2009), *Nososticta kaizei* sp. nov. (♂ holotype: Indonesia, Papua Province, Yapen Island, Ambaidiru village, 15-vii-2006, female described), *Nososticta azurosignata* sp. nov. (♂ holotype: Papua New Guinea, Survey Site 2, Sepik Basin, 25-ii-2010), *Nososticta longicauda* (male holotype: Papua New Guinea, Darai Plateau, 24-vii-2003), *Nososticta manuscola* sp. nov. (♂ holotype: Papua New Guinea, Manus Island, 23-ix-2011, female described), *Nososticta parafonticola* sp. nov. (♂ holotype: Papua New Guinea, Upper Sepik Basin, 10-ii-xii-2009, female described), *Nososticta tricolorata* sp. nov. (♂ holotype: Papua New Guinea, Upper Sepik Basin, 01-xii-2009) and *N. truncata* sp. nov. (♂ holotype: Papua New Guinea, Ivimka camp, Lakekamu, 15-xi-1996). In addition females of *N. africana* Schmidt, 1944, *N. aurantiaca* (Lieftinck, 1938) and *N. hiroakii* Sasamoto, 2007 are described and the morphology and variability of a number of additional species is discussed. Diagnostic charac-

ters of the available genders are illustrated, habitat conditions are given and their affinities are discussed. Live photos of selected species are presented. Keys to the males of all *Nososticta* species known from New Guinea and the Solomon Islands, and to the described females from this region are included. *Nososticta lorentzi* Lieftinck, 1938 is considered a synonym of *N. nigrifrons* (Ris, 1913) (syn. nov.)." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

15519. Theischinger, G.; Gassmann, D.; Richards, S.J. (2015): *Macrocnemis gracilis*, a new genus and species of Idiocnemidinae (Zygoptera: Platycnemididae) from Papua New Guinea. *Zootaxa* 3990(3): 429-436. (in English) ["A new genus and species belonging to the damselfly subfamily Idiocnemidinae from Papua New Guinea, *Macrocnemis gracilis* gen. nov. sp. nov. is described and illustrated. It is the largest known member of the Papuan idiocnemidine radiation, and its affinities to existing genera remain unclear. The new taxon is currently known with certainty only from small streams flowing through mid-montane rainforest in the Hindenburg Range of Papua New Guinea's rugged central cordillera." (Authors)] Address: Theischinger G., 2A Hammerley Road, Grays Point, NSW 2232, Australia. E-mail: Gunther.Theischinger@environment.nsw.gov.au

15520. Therry, L., Bonte, D., Stoks, R. (2015): Higher investment in flight morphology does not trade off with fecundity estimates in a poleward range-expanding damselfly. *Ecological Entomology* 40(2): 133-142. (in English) ["(1.) Evolutionary increases in dispersal-related traits are frequently documented during range expansions. Investment in flight-related traits is energetically costly and a trade-off with fecundity may be expected during range expansion. (2.) However, in contrast to wing-dimorphic species, this trade-off is not general in wing-monomorphic species. In the absence of a dispersal-fecundity trade-off, an increased investment in clutch size at the expansion front is expected possibly at a cost of reduced offspring size. (3.) The study evaluated investment in female flight morphology and fecundity-related traits (clutch size, hatchling size) and potential trade-offs among these traits in replicated populations of the poleward range-expanding damselfly *Coenagrion scitulum*. (4.) Females at the expansion front had a higher relative thorax length, indicating an increased investment in flight; this can be explained by spatial sorting of dispersal ability or in situ natural selection at the expansion front. Edge females produced larger hatchlings, however, this pattern was totally driven by the population-specific thermal larval regimes and could not be attributed to the range expansion per se. By contrast, clutch sizes did not differ between core and edge populations. There was no signal of a dispersal-fecundity trade-off either for a trade-off between clutch size and hatchling size. (5.) These results indicate that evolution of a higher dispersal ability at the expansion front of *C. scitulum* does not trade off with investment in fecundity, hence a dispersal-fecundity trade-off is unlikely to

slow down range expansion of this species." (Authors)] Address: Therry, L., Laboratory of Aquatic Ecology, Evolution and Conservation, KU Leuven, Deberiotstraat 32, 3000 Leuven, Belgium. E-mail: Lieven.Therry@bio.kuleuven.be

15521. Tichanek, F.; Tropek, R. (2015): Conservation value of post-mining headwaters: drainage channels at a lignite spoil heap harbour threatened stream dragonflies. *Journal of Insect Conservation* 19: 975-985. (in English) ["Headwaters and small streams are crucial components of riverine systems, harbouring many highly specialized and unique invertebrate species. Unfortunately, the overwhelming majority of the Central European lowland headwaters are channelized, eutrophicated and/or polluted, and many related species have become critically endangered. Artificial streams established to drain some post-mining sites supplement a network of headwaters and generally do not suffer from agricultural pollution. Nevertheless, the biodiversity and conservation potential of the streams at post-mining sites has never been evaluated. We studied the biodiversity of Odonata at 53 sections (30 m) of an extraordinarily dense system of drainage ditches at a large lignite spoil heap in the Czech Republic. We recorded 22 dragonfly species, of which eight are threatened according to the national Red List. Moreover, four of them are closely associated with the endangered environment of small streams. Overall diversity was generally low at very tiny and/or narrowed streams and was also strongly reduced by high water velocity, high bankside inclination and dominance of expansive common reeds. Sufficient cover of rather shallow sediment layers strongly supports the studied diversity indicators. We thus conclude that post-mining streams in drainage ditches could have a strong potential to offer secondary habitats for threatened headwater biodiversity. However, intermittent reed suppression and the establishment of gently sloping banks and a structured stream bottom are necessary measures for maximizing post-mining stream conservation." (Authors)] Address: Tichanek, F., Faculty of Science, Univ. of South Bohemia, Branisovska 1760, 370 05, Ceske Budejovice, Czech Republic. E-mail: f.tichanek@gmail.com

15522. Tobin, M.J.; Puskar, L.; Nguyen, S.H.; Hasan, J.; Webb, H.K.; Hirschmugl, C.J.; Nasse, M.J.; Gervinskas, G.; Juodkazis, S.; Watson, G.S.; Watson, J.A.; Mainwaring, D.E.; Mahon, P.J.; Marchant, R.; Crawford, R.J.; Ivanovac, E.P. (2015): Fourier transform infrared spectroscopy and imaging of dragonfly, damselfly and cicada wing membranes. *Spectroscopy Europe* 27(4): 15-18. (in English) ["Conclusion: Insect wings possess some remarkable properties, enabling them to thrive in challenging environments. Often, a combination of nano- and micro-structured topography, with chemical heterogeneity on the micron scale, provides these structures with efficient superhydrophobic, self-cleaning and antibacterial capabilities. Their complex surfaces are providing inspiration for the design of novel coatings and surface structures that can mimic these beneficial properties. High spatial resolution FT-IR spectroscopy and imaging, when combined with other techniques such as SEM and GC-MS, provide unique insights into the complex

chemical patterning that contributes to this functionality. Further developments in FT-IR imaging, such as 3D infrared tomography and scanning near-field nano spectroscopy have the potential to add a further dimension to the chemical and physical information that is enabling us to obtain a greater understanding of these natural surfaces. These techniques can also continue to be applied to the study of manmade material surfaces that attempt to emulate the properties of their biological templates." (Authors) *Diplacodes bipunctata*, *Ischnura heterosticta*] Address: Tobin, M., Infrared Microspectroscopy Beamline, Australian Synchrotron, 800 Blackburn Road, Clayton, Victoria, 3168, Australia

15523. Tong, J.; Chang, Z.; Yang, X.; Zhang, J.; Liu, X.; Chetwynd, D.G.; Chen, D.; Sun, J. (2015): Nanoindentation mechanical properties and structural biomimetic models of three species of insects wings. *Journal of Wuhan University of Technology-Mater. Sci. Ed.* 30(4): 831-839. (in English) ["Mimicking insect flights were used to design and develop new engineering materials. Although extensive research was done to study various aspects of flying insects. Because the detailed mechanics and underlying principles involved in insect flights remain largely unknown. A systematic study was carried on insect flights by using a combination of several advanced techniques to develop new models for the simulation and analysis of the wing membrane and veins of three types of insect wings, namely dragonfly (*Pantala flavescens* Fabricius), honeybee (*Apis cerana cerana* Fabricius) and fly (*Sarcophaga carnaria* Linnaeus). In order to gain insights into the flight mechanics of insects, reverse engineering methods were used to establish three-dimensional geometrical models of the membranous wings, so we can make a comparative analysis. Then nano-mechanical test of the three insect wing membranes was performed to provide experimental parameter values for mechanical models in terms of nano-hardness and elastic modulus. Finally, a computational model was established by using the finite element analysis (ANSYS) to analyze and compare the wings under a variety of simplified load regimes that are concentrated force, uniform line-load and a torque. This work opened up the possibility towards developing an engineering basis for the biomimetic design of thin solid films and 2D advanced engineering composite materials." (Authors)] Address: Jin Tong, J., The Key Laboratory of Engineering Bionics (Ministry of Education, China) and the College of Biological and Agricultural Engineering, Jilin University, Changchun, 130022, China. E-mail: jtong@jlu.edu.cn

15524. Torres-Cambas, Y.; Lorenzo-Carballa, M.O.; Ferreira, S.; Cordero-Rivera, A. (2015): *Hypolestes hatuey* sp. nov.: a new species of the enigmatic genus *Hypolestes* (Odonata, Hypolestidae) from Hispaniola. *Zootaxa* 4000(2): 207-226. (in English) ["Both sexes of *Hypolestes hatuey* Torres-Cambas, sp. nov. (Odonata: Zygoptera: Hypolestidae) from Hispaniola are described and illustrated here. This newly described species differs from *H. trinitatis* and *H. clara*, the other two species within the genus, by the morphology of the genital ligula and male cerci. Females of *H.*

hatuey sp. nov. differ from *H. clara* by the shape of the female antehumeral stripe and wing venation. Morphological distinctiveness in males is supported by genetic differences in the 16S mitochondrial gene. Following the categories and criteria of the IUCN Red List of Threatened Species, we suggest this species should be listed as Data Deficient (DD), given that available data on its distribution are too limited to assess its risk of extinction." (Authors)] Address: Torres-Cambas, Y., Depto Biol., Fac. Cien. Nat., Univ. de Oriente. Patricio Lumumba s/n, Santiago de Cuba, Cuba. E-mail: ytorres@cnt.uo.edu.cu, yusdiel.torres@gmail.com

15525. Torres-Cambas, Y.; Trapero-Quintana, A.D.; Lorenzo-Carballa, M.O.; Newell, D.; Suriel, C.; Cordero-Rivera, A. (2015): An update on the distribution of threatened odonate species from the Greater Antilles. *International Journal of Odonatology* 18(2): 89-104. (in English) ["The Antilles harbour several island endemic odonate species, including some palaeoendemics, within a relatively small and anthropized area. Such attributes give this archipelago a special significance for the conservation of Odonata in the Neotropics. However, despite the importance of these islands, inadequately surveyed regions persist, mainly in the Greater Antilles, and there is not enough information to set IUCN threat categories for eight species supposed to be at risk, which are currently classified as data deficient (DD). To update the distribution of endangered (EN), vulnerable (VU) and DD species, we conducted a series of field surveys in Dominican Republic, Jamaica and Cuba, and compiled data from literature, museum collections as well as personal communications. We sampled a total of 37 species, including *Microneura caligata*, *Phyllestes ethelae* and *Hypolestes clara* (EN); *H. trinitatis* (VU); and *Diceratobasis macrogaster*, *Neoneura maria* and *Protoneura capillaris* (DD). We provide new locality records for *M. caligata*, *N. carnatica* (DD), *N. maria* (DD), *P. capillaris*, *H. clara*, *H. trinitatis* and *Erythrodiplax bromeliicola* (DD). According to our results, we suggest changing the category of *D. macrogaster*, *D. melanogaster*, *N. carnatica*, *N. maria* and *P. capillaris* to VU." (Authors)] Address: Torres-Cambas, Y., Depto de Biología, Facultad de Ciencias Naturales, Universidad de Oriente, Patricio Lumumba s/n CP 90500, Santiago de Cuba, Cuba. E-mail: ytorres@cnt.uo.edu.cu

15526. Torres-Pachón, M.; Realpe-Rebolledo, E. (2015): Listado preliminar de los odonatos (Insecta: Odonata) del bosque alto andino del Santuario de Fauna y Flora Iguaque, Boyaca, Colombia - Preliminary checklist of the odonats (Insecta: Odonata) of the High Andean Forest of the Santuario de Fauna y Flora Iguaque, Boyaca, Colombia. *Dugesiana* 22(2): 133-136. (in Spanish) [*Rhionaeschna marchali*, *Hetaerina proxima*, *Lestes apollinaris*, *Ischnura chingaza*, *Mesamphiagrion laterale*, *M. ovigerum*, *Oxiagrion miniopsis*] Address: Torres-Pachón, Mónica, Programa de Doctorado en Ciencias. Red de Biodiversidad y Sistemática. Instituto de Ecología, A.C. (INECOL), Apartado 91070, Xalapa. Mexico. E-mail: monibiolo@gmail.com

15527. Toth, Z. (2015): Context-dependent plastic response during egg-laying in a widespread newt species. *PLoS ONE*

10(8): e0136044. doi:10.1371/journal.pone.0136044: 18 pp. (in English) ["Previous research on predator-induced phenotypic plasticity mostly focused on responses in morphology, developmental time and/or behaviour during early life stages, but the potential significance of anticipatory parental responses has been investigated less often. In this study I examined behavioural and maternal responses of gravid female smooth newts, *Lissotriton vulgaris*, in the presence of chemical cues originating from invertebrate predators, *Acilius sulcatus* water beetles and *Aeshna cyanea* dragonfly larvae. More specifically, I tested the extent of oviposition preference, plasticity in egg-wrapping behaviour and plasticity in egg size when females had the possibility to lay eggs at oviposition sites with and without predator cues during overnight trials. I found that individuals did not avoid laying eggs in the environment with predator cues; however, individuals that deposited eggs into both environments adjusted the size of the laid eggs to the perceived environment. Females deposited larger eggs earlier in the season but egg size decreased with time in the absence of predator cues, whereas individuals laid eggs of average size throughout the investigated reproductive period when such cues were present. Also, egg size was found to be positively related to hatching success. Individuals did not adjust their wrapping behaviour to the presence of predator cues, but females differed in the extent of egg-wrapping between ponds. Females' body mass and tail depth were also different between ponds, whereas their body size was positively associated with egg size. According to these results, female smooth newts have the potential to exhibit activational plasticity and invest differently into eggs depending on temporal and environmental factors. Such an anticipatory response may contribute to the success of this caudate species under a wide range of predator regimes at its natural breeding habitats." (Author)] Address: Toth, Z., Lendület Evolutionary Ecology Research Group, Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Budapest, Hungary. E-mail: toth.zoltan@agrar.mta.hu

15528. Touchon, J.C.; Vonesh, J.R. (2015): Variation in abundance and efficacy of tadpole predators in a Neotropical pond community. *Journal of Herpetology* 50(1): 113-119. (in English, with Spanish summary) ["Variation in predation risk plays an important role in shaping prey behaviour, morphology, life history, population dynamics, and community structure in freshwater systems. Anuran larvae are important prey in freshwater communities and spatiotemporal variation in risk can arise from changes in the number and identity of predators; however, our understanding of variation in abundance, identity, and foraging rates for natural predator assemblages in tropical pond communities is limited. We surveyed ponds near Gamboa, Panama in 2004 and 2010 to estimate variation in predator communities of tadpoles over space and time. We also conducted short-term predation trials with the 10 most common predators using hatchling tadpoles of two widespread Neotropical frog species, Red-Eyed Treefrogs (*Agalychnis callidryas*) and Pantless Treefrogs (*Dendropsophus ebraccatus*). Predator abundance varied nearly threefold across ponds within a single year and as much as 19-fold within a pond across

years. Dominant taxa also varied, with backswimmers (Notonectidae), poeciliid fish, or libellulid dragonfly naiads being the most common depending upon pond and year. Predation trials revealed that prey-specific predation rates differed among predator taxa. Some presumed predators did not consume hatchlings, whereas others consumed >90% of prey. The smaller *D. ebraccatus* hatchlings generally experienced higher predation rates; however, large invertebrate predators like aeshnid dragonfly naiads, giant water bugs, and fishing spiders consumed more *A. callidryas*. These results suggest that strong but variable larval-stage risk may be an important selective factor shaping tadpole communities and phenotypes in Neotropical ponds." (Authors)] Address: Touchon, J.C., Vassar College, Department of Biology, 124 Raymond Avenue, Poughkeepsie, New York 12604-0731 USA. E-mail: jutouchon@vassar.edu

15529. Trockur, B.; Lingenfelder, U. (2015): Die FFH-Libellenarten im Saarland (Insecta: Odonata). *Abh. DELATTINIA* 40: 77-136. (in German, with English and French summaries) ["There are four dragonfly species in the Saarland listed in annex II and/or IV of the EU Habitats Directive. An overall view for each of the species is given concerning distribution and status, based on new data from the years 2012 until 2014. Changes in population size and threatening factors for the species and their occurrence are discussed. The situation for *Coenagrion mercuriale* is critical. Actually only three populations are known, all with low abundances. Both populations in the floodplain of the river Blies are severely threatened by intensive use and inappropriate measures of preservation applied. The third population of the species near Heinitz seems to be stable, but the core of the population depends on right preservation and is therefore indirectly and latently endangered. *Ophiogomphus cecilia* occurs especially in the southeast of the Saarland and clearly shows positive trends. The river Blies is the most important locality for recording. It contains in the meantime a stable population. But the situation at other actual or former localities is not clear. The number of localities of *Leucorrhinia caudalis* is more or less almost constantly increasing in the last years, and thus a positive trend can be attested. The species has an abundant and stable population near Heinitz with increasing abundance, while all other localities in the Saarland show instable conditions in population size. Trends are even negative in some places. *Leucorrhinia pectoralis* has been recorded only twice in the Saarland in 2012 and 2014 and is of unclear status here. Conservation measures for *C. mercuriale* are absolutely required at present to preserve, protect and/or support the populations, and they would be for *Leucorrhinia caudalis* at least in some localities helpful. Species specific requirements on the habitat have to be respected for *O. cecilia* also because of actual or potential threats not only in the areas of the Habitats Directive." (Authors)] Address: Trockur, B., Brückenstr. 25, 66636 Tholey-Hasborn, Germany. E-mail: Bernd@Trockur.de

15530. Troyer, R.R.; Turner, A.M. (2015): Chemosensory perception of predators by larval amphibians depends on water quality. *PLoS ONE* 10(6): e0131516. doi:10.1371/

journal.pone.0131516: 10 pp. (in English) ["The acquisition of sensory information by animals is central to species interactions. In aquatic environments, most taxa use chemical cues to assess predation risk and other key ecological factors. A number of laboratory studies suggest that anthropogenic pollutants can disrupt chemoreception, even when at low, non-toxic concentrations, but there are few tests of whether real-world variation in water quality affects chemoreception. Here we investigate whether chemosensory perception of predators (*Anax* sp.) by the gray treefrog, *Hyla versicolor*, depends on water quality. We evaluated the anti-predator response of anuran tadpoles housed in water collected from three sites that represent strong contrasts in the concentration and types of dissolved solids: de-chlorinated tap water, water from an impaired stream, and treated wastewater effluent. Behavioural assays were conducted in laboratory aquaria. Chemical cues associated with predation were generated by feeding tadpoles to dragonfly predators held in containers, and then transferring aliquots of water from dragonfly containers to experimental aquaria. Tadpoles housed in tap water responded to predator cues with an activity reduction of 49%. Tadpoles housed in stream water and wastewater effluent responded to predator cues by reducing activity by 29% and 24% respectively. The results of factorial ANOVA support the hypothesis that the response to predator cues depended on water type. These results show that alteration of the chemical environment can mediate chemical perception of predators in aquatic ecosystems. Because most aquatic species rely on chemoreception to gather information on the location of food and predators, any impairment of sensory perception likely has important ecological consequences." (Authors)] Address: Turner, A.M., Department of Biology, Clarion University, Clarion, PA, USA. E-mail: aturner@clarion.edu

15531. Valdivia, F.G.A. (2015): Territoriality of Zenithoptera lanei (Anisoptera: Libellulidae) in an area of Brazilian savana. Master's Dissertation, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Univ. Sao Paulo: V + 53 pp. (in Portuguese, with English summary) ["Animal behaviour associated with morphological characteristics supplies evidence for a better understanding of how sexual behaviour has evolved, and how organisms can maximize their reproductive success. Factors such as size, fat reserves and other sexual characters such as coloration are essential to individual better performance in relation to conspecifics. These factors can bring information of the male quality to other conspecifics and females. This quality keeps relation with the physical condition (energy reserves) that they have which is required to succeed in breeding, as reproduction is one of the most expensive activity in energy cost in relation to other activities. The reproductive behaviour is related to the individual fat reserves that influences, among other factors, in the condition that they adopt and to the duration in time of the related interactions to reproduction. Therefore, individuals with more developed characteristics or with better physical conditions will have an advantage in the reproduction comparing with other individuals of the community. The dragonfly Zenithoptera lanei is a Neotropical species

present in Brazil, only studied so far by Guillermo-Ferreira in 2015, when structures that conform this pruinosity and his function in the intraspecific communication were described. In this study, describe the sexual behaviour of *Z. lanei*. Was hypothesized that in this species males present territorial behaviour, and that the coloration of wings, body size and the energy reserves (fat) may play an important role in territorial condition and reproductive success. Thus, males with higher quantity of energy and larger size should win more disputes, defend territories and, therefore, maintain the territorial condition. In addition, was also assessed whether this condition of territoriality may influence the duration of the copulation and oviposition by females. The results showed that males are territorial, and its territoriality keeps relation with size and the physical condition. In other words, males with larger body and higher energy reserves have won more disputes and maintained a territory. Although males were territorial, there was no difference between the duration of reproductive interactions, winning males and losers, thus indicating that the reproductive interactions are not influenced by the condition of territoriality of the male." (Author)] Address: Fernando, F.G.A., Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto

15532. van der Vliet, R.E.; van den Broeke, M.A. (2015): *Gomphus flavipes* on IJsselooig in lake Ketelmeer. *Brachytron* 17(2): 107-110. (in Dutch, with English summary) ["In 2009, at least 10 exuviae and also a freshly emerged individual of *G. flavipes* were seen and photographed on the island IJsselooig in Ketelmeer in the province of Flevoland. This observation concerns the northernmost place in the Netherlands where exuviae and freshly emerged individuals of the species have been found. Lake Ketelmeer is an extension of the river IJssel where reproduction of *G. flavipes* has been established since 2006. In view of the number of exuviae found on IJsselooig, it is likely that the observations of exuviae and the freshly emerged individual is the result of local reproduction rather than larval drift. The observation indicates that observers should be aware of the occurrence of the species in the province of Flevoland where it has been observed only three times until now." (Authors)] Address: van der Vliet, R.E., Tauw bv, Postbus 3015, 3502 GA Utrecht, The Netherlands. roland.vandervliet@tauw.nl

15533. Van Schandevyl, D.; Vercruyssen, W. (2015): Yellow-spotted Emerald (*Somatochlora flavomaculata*) looking for new reproduction sites. *Brachytron* 17(2): 100-106. (in Dutch, with English summary) ["*S. flavomaculata* is a rare species in Belgium. Its distribution is restricted to swampy areas in the eastern part of Flanders and the southernmost part of Wallonia. Sightings of vagrant individuals are exceptional. This article describes the discovery (2013-2014) of the species in East Flanders. Until recently the species was unknown from the western part of Flanders. At the two newly discovered localities (the Wellemers in Denderleeuw and the Damvallei, east of Ghent), a small population may be present. In the Netherlands the range of the Yellow-spotted Emerald has greatly increased in the last ten years

and a number of new populations were discovered. Similarly, an expansion of *S. flavomaculata* can be expected in Belgium." (Authors)] Address: Danny Van Schandevyl. E-mail: danny.van.schandevyl@telenet.be

15534. Vannini, L.; Bowen, J.H.; Reed, T.W.; Willis, J.H. (2015): The CPCFC cuticular protein family: anatomical and cuticular locations in *Anopheles gambiae* and distribution throughout Pancrustacea. *Insect Biochemistry and Molecular Biology* 65: 57-67. (in English) ["Highlights: •New cuticular protein family described, characterized by a 16 amino acid motif ending C-X(5)-C. •In *Anopheles gambiae*, transcripts localized primarily in epidermis underlying hard cuticle. •Proteins localized primarily in endocuticle. •Family members identified in 14 orders of Hexapoda and 4 classes of Crustacea. Abstract: Arthropod cuticles have, in addition to chitin, many structural proteins belonging to diverse families. Information is sparse about how these different cuticular proteins contribute to the cuticle. Most cuticular proteins lack cysteine with the exception of two families (CPAP1 and CPAP3), recently described, and the one other that we now report on that has a motif of 16 amino acids first identified in a protein, Bc-NCP1, from the cuticle of nymphs of the cockroach, *Blaberus craniifer* (Jensen et al., 1997). This motif turns out to be present as two or three copies in one or two proteins in species from many orders of Hexapoda. We have named the family of cuticular proteins with this motif CPCFC, based on its unique feature of having two cysteines interrupted by five amino acids (C-X(5)-C). Analysis of the single member of the family in *Anopheles gambiae* (*AgamCPCFC1*) revealed that its mRNA is most abundant immediately following ecdysis in larvae, pupae and adults. The mRNA is localized primarily in epidermis that secretes hard cuticle, sclerites, setae, head capsules, appendages and spermatheca. EM immunolocalization revealed the presence of the protein, generally in endocuticle of legs and antennae. A phylogenetic analysis found proteins bearing this motif in 14 orders of Hexapoda, but not in some species for which there are complete genomic data. Proteins were much longer in Coleoptera and Diptera than in other orders. In contrast to the 1 and occasionally 2 copies in other species, a dragonfly, *Ladona fulva*, has at least 14 genes coding for family members. CPCFC proteins were present in four classes of Crustacea with 5 repeats in one species, and motifs that ended C-X(7)-C in Malacostraca. They were not detected, except as obvious contaminants, in any other arthropod subphyla or in any other phylum. The conservation of CPCFC proteins throughout the Pancrustacea and the small number of copies in individual species indicate that, when present, these proteins are serving important functions worthy of further study." (Authors)] Address: Willis, Judith, Department of Cellular Biology, University of Georgia, Athens, GA, USA. E-mail: jhwillis@uga.edu

15535. Varshini, R.A.; Kanagappan, M. (2015): Effect of space on the feeding efficiency of dragonfly nymph *Bradinopyga geminata*. *European Journal of Biotechnology and Bioscience* 3(12): 6-10. (in English) ["Among various predators of mosquito larvae, dragonfly nymphs are efficient,

found naturally, safe for human beings, and are also economical in their application. There are many physical, chemical and biological factors like prey species, prey size, prey stage, predator species, predator size, predator stage, aquatic vegetation, quality and quantity of water, illumination, and space affect the feeding efficiency of dragonfly nymphs. These factors serve as a basis for the richness or otherwise biological productivity of any aquatic environment. The present study shows negative correlation where with the increasing space of the basins the feeding efficiency of the nymph decreased. The maximum prey consumption 34.91 ± 3.96 was recorded when the circumference of the basin was 4 cm and the water level was 3 cm height and minimum predation 16 ± 2.72 was recorded when the circumference of the basin was 64 cm and the water level was 3 cm height." (Authors)] Address: Kanagappan, M., Dept of Zoology and Research Centre, Scott Christian College (Autonomous), Nagercoil, 629003, India

15536. Venkatesh, A.; Tyagi, B.K. (2015): *Bradinopyga geminata* (Anisoptera: Libellulidae) as a predator of *Aedes aegypti* immatures (Diptera: Culicidae). *International Journal of Mosquito Research* 2(2): 98-105. (in English) ["Predatory potential of 12th instar larvae of *Bradinopyga geminata* on *Aedes* mosquito immatures was observed, by exposing two different prey-predator combinations (Prey: Predator; 200:1 and 1000:5). One and five 12th instar larvae of *B. geminata* were provided with 200 (SET A) and 1000 (SET B) I, II, III & IV instars of *Aedes aegypti* larvae as prey, for a period of 24 hr in plastic containers containing 1 and 5 litres of water respectively. The number of *Ae. aegypti* larvae consumed by *B. geminata* larvae were noted through one day, at an interval of 3 hours. To maintain the prey density, same number of larvae was replenished. In the daily feeding rate experiment the consumption showed a peak during the 9th hour, irrespective of the instar stages. Predation rate of *B. geminata* was more for I instar. The predatory impact values for I instar in both Set A and B were 4.12 ± 0.05 and 3.6 ± 0.02 respectively, and were significant ($P < 0.01$). The comparative clearance rate for Set A and B was highly significant for the first instar ($P < 0.01$). This study revealed that *B. geminata* larvae is an efficient predator of mosquito larvae. The rate of consumption was dependent on the size of the prey and the density of the predator. The predatory impact of *B. geminata* was more for the first instar *Ae. aegypti*, owing to its size and energy requirements. To conclude, *B. geminata* is an efficient bio-control agent for container breeding *Ae. aegypti* and can be an effective tool in the integrated vector control programme." (Authors)] Address: Tyagi, B.K., Centre for Research in Medical Entomology (Indian Council of Medical Research) 4, Sarojini Street, Chinna Chokkikulam Madurai – 625002. India. E-mail: abktyagi@gmail.com

15537. Venn, S.; Schulman, H.; Törrönen, S.; Salla, A.; Pajunen, T.; Kerppola, S.; Paukkunen, J.; Nieminen, M.; Vilisics, F.; Karjalainen, S (2015): Helsinki. In: J.G. Kelcey (ed.): *Vertebrates and invertebrates of European cities: Selected non-avian fauna*. Springer New York: 323-377. (in

English) ["Helsinki is located on a peninsula projecting into the Baltic Sea from the south coast of Finland. The country lies in the Boreal region, which is typified by the mixed coniferous forests, although Helsinki itself is located in a narrow strip of the hemiboreal zone, which also has noble deciduous forest, similar to those of the temperate region. The region is also characterized by a variety of wetland habitats. Descriptions are provided of the following invertebrate taxa: Arachnida, Carabidae, Syrphidae, Apidae sensu lato, Formicidae, Isopoda, Lepidoptera and Odonata, as well as some of the habitats they occupy. The information provided is rather patchy, as the amount of data varies considerably between different taxa and habitats. The urban region contains some sites that are valuable for invertebrate diversity, regardless of their location. The characteristic features of the urban environment, such as mild climate and longer growing season, may be beneficial for some taxa." (Authors)] Address: Karjalainen, S., Neidonpuistontie 6 D 8, FI-02400, Kirkkonummi, Finland. E-mail: sk@korento.net

15538. Vieira, V.; Cordero-Rivera, A. (2015): First record of *Pantala flavescens* from the Azores (Odonata: Libellulidae). *Odonatologica* 44(1/2): 1-9. (in English) ["A male of *P. flavescens* was collected on São Miguel island, Azores, on 02-xi-2014. This specimen constitutes both the first record of the species in the Azores and its northernmost record in Macaronesia. The distribution of the species in the Macaronesian islands and the possible origin of the Azorean specimen is briefly discussed." (Authors)] Address: Vieira, V., Departamento de Biologia, Universidade dos Açores, Rua de S. Gonçalo, Apartado 1422, PT-9501-801 Ponta Delgada, Açores, Portugal. E-mail: vvieira@uac.pt

15539. Ward, T.A.; Rezadad, M.; Fearday, C.J.; Viyapuri, R. (2015): A review of biomimetic air vehicle research: 1984-2014. *International Journal of Micro Air Vehicles* 7(3): 375-394. (in English) ["Biomimetic air vehicles (BAV) are a class of unmanned aircraft that mimic the flapping wing kinematics of flying organisms (e.g. birds, bats, and insects [including dragonflies]). Research into BAV has rapidly expanded over the last 30 years. In this paper, we present a comprehensive bibliometric review of engineering and biology journal articles that were published on this subject between 1984 and 2014. These articles are organized into five topical categories: aerodynamics, guidance and control, mechanisms, structures and materials, and system design. All of the articles are compartmented into one of these categories based on their primary focus. Several aspects of these articles are examined: publication year, number of citations, journal, authoring organization and country, non-academic funding sources, and the flying organism focused upon for bio-mimicry. This review provides useful information on the state of the art of BAV research and insight on potential future directions. Our intention is that this will serve as a resource for those already engaged in BAV research and enable insight that promotes further research interest." (Authors)] Address: Ward, T.A., Department of Mechanical Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: DrTomWard@um.edu.my

15540. Wasscher, M. (2015): Edmond de Selys Longchamps and the study of dragonflies in the Netherlands. *Brachytron* 17(2): 116-125. (in Dutch, with English summary) ["The importance of Selys for the Dutch study of dragonflies is described, using articles, his published diaries and his scientific correspondence present in RBINS (Brussels) and Naturalis (Leiden). Selys visited the RMNH collection (now NCB Naturalis) in Leiden six times and the collection of Natura Artis Magistra in Amsterdam five times. For the RMNH he carried out identifications, they exchanged dragonflies and with some curators he conducted a regular correspondence. The summarizing catalogue which Selys made in 1879 of the RMNH dragonfly collection has unfortunately not yet been found. Selys had a warm friendship with Adrien Maurissen from Maastricht, for whom he wrote a necrology, and with Herman Albarda from Friesland, after whom he named *Sieboldius albardae*. The three publications concerning dragonflies in the Netherlands which appeared in 1852, 1866, and 1889 are clearly influenced by Selys. With that and his regular contact with the RMNH Selys has sown the seeds for the current flourishing study of dragonflies in the Netherlands.] Address: Wasscher, M., Minstraat 15bis, NL-3582 CA Utrecht, The Netherlands, E-mail: marcel.hilair@12move.nl

15541. Watanabe, M. (2015): Larval community dynamics in an artificial habitat created for conservation of a local population of the endangered brackish water damselfly *Mortonagrion hirosei* (Odonata: Coenagrionidae). *Odonatologica* 44(1/2): 45-62. (in English) ["Brackish water ecosystems in estuaries are highly threatened due to land development, the improvement of embankments, and reclamation. Several threatened species of dragonflies and damselflies inhabit these ecosystems. The brackish water damselfly, *M. hirosei*, has been an important focus of conservation studies. Here, we describe a conservation project for *M. hirosei* begun in 2003, and review the data collected in order to quantify details of the species' life cycle, especially larvae and larval environment. An artificially established reed community was created as a habitat for this damselfly, and water depth, salinity, and water temperature in the reed bed were continuously monitored thereafter. Because this damselfly is univoltine, the number and distribution of the odonate larvae in the experimental habitat in May, or presence of last-instar larvae of *M. hirosei*, were considered suitable indices of colonisation success. Since many odonate adults, including *M. hirosei*, visited the habitat in the first year and laid eggs, high larval diversity was found in the second year. Although the salinity of water in the reed bed varied because cyclical tidal fluctuations, the saline water gradually excluded odonate larvae that inhabit freshwater only. However, *M. hirosei* survived, and the larval population increased year by year. Consequently, the odonate larval diversity in the artificial habitat decreased, while the population of *M. hirosei* was maintained." (Author)] Address: Watanabe, M., Dept Biol., Fac. Education, Mie Univ., Tsu, Mie 514-8507, Japan. E-mail: watanabe@edu.mie-u.ac.jp

15542. Wei, S.-z.; Yang, R.-g.; Lu, C.-w. (2015): Study on emergence of *Asiagomphus hainanensi*. *Modern Agricultural Science and Technology* 640(02): 265-266. (in Chinese, with English summary) [China; The emergence process (metamorphosis to imago) of a reared specimen lasted about 82 minutes and is described in detail.] Address: Wei, S.-z., School of Chemistry and Bioengineering, Tech. Univ., Yizhou Guangxi, 546300, China

15543. Wesner, J.S.; Meyers, P.; Billman, E.J.; Belk, M.C. (2015): Habitat selection and consumption across a landscape of multiple predators. *Ecology and Evolution* 5(1): 121-129. (in English) ["Predator community composition can alter habitat quality for prey by changing the strength and direction of consumptive effects. Whether predator community composition also alters prey density via nonconsumptive effects during habitat selection is not well known, but is important for understanding how changes to predator communities will alter prey populations. We tested the hypothesis that predator community composition (presence of caged trout, caged dragonflies [*Ophiogomphus severus*], or caged trout + dragonflies) alters colonization of aquatic mesocosms by ovipositing aquatic insects. In a previous experiment in this system, we found a spatial contagion effect, in which insects avoided pools with predators, but only when predator-free pools were isolated (~5 m away from predator pools). Here, we removed the isolated predator-free pools, allowing us to test whether insects would make fine-scale (~1 m) oviposition decisions in the absence of preferred isolated pools. We also estimated consumptive effects by allowing predators to feed on colonists for 5 days following colonization. All insects collected after 21 days were dipterans, dominated by Chironomidae. Total colonization, measured as the number of developing larvae after 21 days, was not affected by either predator presence or composition. Consumption was significant in the trout only treatment, reducing larval insect density by $46 \pm 37\%$ (mean \pm SE). No other predator treatment significantly reduced prey density, although the proportion of chironomid larvae in protective cases increased in response to direct predation from dragonflies, indicating an antipredatory behavioural response. Taken together, these results reveal that predator community composition altered larval survival and behaviour, but colonizing females either did not or could not assess these risks across small scales during oviposition." (Authors)] Address: Wesner, J.S., Department of Biology, University of South Dakota, Vermillion, SD 57069, USA. E-mail: jeff.wesner@usd.edu

15544. White, E.L.; Hunt, P.D.; Schlesinger, M.D.; Corser, J.D.; deMaynadier, P.G. (2015): Prioritizing Odonata for conservation action in the northeastern USA. *Freshwater Science* 34(3): 1079-1093. (in English) ["Odonata are valuable biological indicators of freshwater ecosystem integrity and climate change, and the northeastern USA (Virginia to Maine) is a hotspot of odonate diversity and a region of historical and growing threats to freshwater ecosystems. This duality highlights the urgency of developing a comprehensive conservation assessment of the region's 228 resident

odonate species. We offer a prioritization framework modified from NatureServe's method for assessing conservation status ranks by assigning a single regional vulnerability metric (R-rank) reflecting each species' degree of relative extinction risk in the northeastern USA. We calculated the R-rank based on 3 rarity factors (range extent, area of occupancy, and habitat specificity), 1 threat factor (vulnerability of occupied habitats), and 1 trend factor (relative change in range size). We combine this R-rank with the degree of endemism (% of the species' USA and Canadian range that falls within the region) as a proxy for regional responsibility, thereby deriving a list of species of combined vulnerability and regional management responsibility. Overall, 18% of the region's odonate fauna is imperiled (R1 and R2), and peatlands, low-gradient streams and seeps, high-gradient headwaters, and larger rivers that harbour a disproportionate number of these species should be considered as priority habitat types for conservation. We anticipate that our analysis might serve as a model for guiding and standardizing conservation assessments at multiple scales for Odonata and other diverse taxa that have not yet received attention to prioritization." (Authors)] Address: White, E.L., New York Natural Heritage Program, State Univ. of New York College of Environmental Science and Forestry, 625 Broadway 5th Floor, Albany, New York 12233-4757 USA

15545. Wildermuth, H.; Roland, H.-J.; Hein, A.T. (2015): Landmilben als Libellenparasiten – bisher bekanntes Wirtsspektrum in Europa (Acari: Prostigmata; Odonata). *Libellula* 34(1/2): 103-115. (in German, with English summary) ["Terrestrial mites as parasites of dragonflies – updated host spectrum in Europe (Acari: Prostigmata; Odonata) – In contrast to aquatic mites as parasites of Odonata few studies of terrestrial mites exist. In order to obtain more information on their distribution and their relation to their odonate hosts, an appeal to odonatologists was made via various photo- and dragonfly platforms on the internet to submit photos of odonates infested by mites. Besides a great amount of images with aquatic mites, 24 photo documents with terrestrial mites came in. Among the host species five have been unknown up to now: *Calopteryx xanthostoma*, *Libellula quadrimaculata*, *Leucorrhinia dubia*, *Sympetrum flaveolum*, and *S. sanguineum*. The parasite load was 1.7 mites per host individual on average. Most mite larvae clung to the host's legs, some also to the abdomen and the thorax, only one to the head. The records of the terrestrial mites originated from eleven localities, most of them from Germany, two from Georgia and one from France. All hitherto published records of terrestrial mites on Odonata are summarized and reviewed. The host spectrum, the distribution in Europe, the prevalence and parasite load as well as the problem of parasitization and/or phoresy of terrestrial mites on Odonata are discussed." (Authors)] Address: Hein, A.T., Ackerstr. 109, 13355 Berlin, Germany. E-mail: post@libellenwissen.de

15546. Williams, A.T. (2015): The dragonflies of Reigersbroek and Schrevenhofsbroekje. The effect of nature development on dragonfly fauna. *Natuurhistorisch maandblad*

104(6): 103-109. (in Dutch, with English summary) ["The natural landscape of Reigersbroek and Schrevenhofsbroekje in the province of Limburg is being redeveloped in order to restore its original marshy character. Topsoil removal, the scattering of wet heathland vegetation clippings and the raising of water levels have created different habitats for dragonflies. This restoration work has led to various inventories being carried out of the flora and fauna in the area, and by extension the monitoring of the dragonfly population. The restoration work has resulted in sparsely-planted shallow pools and ponds in Reigersbroek, which is still in a pioneer phase, and two large ponds with structure-rich banks in Schrevenhofsbroekje. The habitats in Reigersbroek currently appear to attract predominantly pioneer species such as *Ischnura pumilio* and *Sympetrum fonscolombii*, but are also visited by fenland dragonflies and vagrants from southern regions such as *Anax parthenope*. A number of ditches in the area have been colonised by *Orthetrum coerulescens* and *Sympetrum pedemontanum*. Given the growth in species and populations since the beginning of the restoration work, it is expected that the variety and quantities of species will continue to develop as the area evolves into a mature, contiguous wetland reserve with management focused on the on the preservation of present populations.] Address: Williams, A.T., Julianastraat 5, 6067 EV Linne, The Netherlands

15547. Willkommen, J.; Michels, J.; Gorb, S.N. (2015): Functional morphology of the male caudal appendages of the damselfly *Ischnura elegans* (Zygoptera: Coenagrionidae). *Arthropod Structure & Development* 44(4): 289-300. (in English) ["Highlights: The clasping of the dragonfly *Ischnura elegans* represents an energy-efficient process. •The closing of the male claspers is a mainly passive process. •Surface microstructures and the female thoracic morphology secure the clamping. Odonata are usually regarded as one of the most ancient extant lineages of winged insects. Their copulatory apparatus and mating behaviour are unique among insects. Male damselflies use their caudal appendages to clasp the female's prothorax during both copulation and egg-laying and have a secondary copulatory apparatus for sperm transfer. Knowledge of the functional morphology of the male caudal appendages is the basis for understanding the evolution of these structures in Odonata and respective organs in other insects. However, it is still not exactly known how the zygopteran claspers work. In this study, we applied micro-computed tomography and a variety of microscopy techniques to examine the morphology, surface microstructure, cuticle material composition and muscle topography of the male caudal appendages of *Ischnura elegans*. The results indicate that the closing of the paraproctal claspers is mainly passive. This indirect closing mechanism is very likely supported by high proportions of the elastic protein resilin present in the cuticle of the paraproctal bases. In addition, the prothoracic morphology of the female plays an important role in the indirect closing of the male claspers. Our data indicate that both structures – the male claspers and the female prothoracic hump – function together like a snap-fastener." (Authors)] Address:

Willkommen, Jana, Zoological Institute, Department of Functional Morphology and Biomechanics, Christian-Albrechts-Universität zu Kiel, Am Botanischen Garten 1–9, D-24118 Kiel, Germany. E-mail: jwillkommen@zoologie.uni-kiel.de

15548. Worthen, W.B.; Turner, L.H. (2015): The effects of odonate species abundance and diversity on parasitism by water mites (*Arrenurus* spp.): testing the dilution effect. *International Journal of Odonatology* 18(3): 233-248. (in English) ["Water mites (*Arrenurus* spp.) parasitize adult dragonflies. We collected dragonflies weekly at 11 waterbodies in Greenville Co. and Pickens Co., SC, USA, to: (1) compare parasitism prevalence across species, sites, and sampling periods; (2) test the hypothesis that prevalence correlates with host abundance; (3) test the hypothesis that prevalence is inversely related to host diversity (the "dilution effect"); and (4) test the hypothesis that prevalence and intensity vary with ecological conditions. Parasitism prevalence varied among well-sampled ($N > 30$) hosts; *Perithemis tenera*, *Plathemis lydia*, and *Celithemis ornata* had no mites, whereas prevalence exceeded 20% for *Argia fumipennis*, *Celithemis elisa*, and *C. fasciata*. Differences among species, however, varied across sites and through time, suggesting patchy or species-specific relationships not captured by our diffuse analysis at the generic level. Prevalence was positively correlated with species abundance and host site occupancy, as expected for generalist parasites. There was no evidence of a dilution effect: there were no significant negative relationships between prevalence and three measures of species richness (observed richness, extrapolated Sest, or CHAO2 estimated richness), considering all odonate species, parasitized species, or only species in the parasitized families Libellulidae or Coenagrionidae. Odonate communities in more pristine sites had higher mean prevalence (18.4 ± 6.0) and median intensity (4.5) than those in disturbed sites (13.1 ± 7.0 ; 3.0), but only intensities were marginally significantly different. Parasitism by *Arrenurus* spp. met the criteria for a dilution effect, but did not exhibit this effect as a diffuse community-level response." (Authors)] Address: Worthen, W.B., Biology Department, Furman University, Greenville, SC, USA. E-mail: wade.worthen@furman.edu

15549. Yeh, W.-C.; Kiyoshi, T.; Wang, M. (2015): *Sarasaeschna gaofengensis* sp. nov. (Odonata, Aeshnidae), a new dragonfly species described from Yunnan, China. *Bull. Natl. Mus. Nat. Sei., Ser. A*, 41(3): 163-169. (in English) ["*Sarasaeschna gaofengensis* Yeh and Kiyoshi sp. nov. (holotype male, Gaofeng, Yunnan, China) is characterized by razor-like male cerci and widely divaricated epiproct with attenuated apical forks. It possesses a vesica spermalis with flagella adjoining ventral margin of its apical segment and is considered to belong to the *Sarasaeschna pryeri*-group. In the *pryeri*-group, *S. gaofengensis* shares the razor-like male cerci with *S. tsaopiensis* Yeh and Chen described from Taiwan, to which it is believed to be closely related." (Authors)] Address: Yeh, W.-C., Division of Forest Protection, Taiwan Forestry Research Institute No. 53, Nanhai Rd.,

Zhongzheng Dist., Taipei City 10066, Taiwan. E-mail: wcyeh@tfri.gov.tw

15550. Yokoi, N. (2015): *Hemicordulia teramotoi* sp. nov. (Odonata, Corduliidae) from southern Laos. Tombo 57: 21-26. ["*Hemicordulia teramotoi* sp. nov. (holotype male deposited in the National Museum of Nature and Science, Tokyo) from southern Laos (Pak Son, 1311 m alt., Boloven Plateau, Champasak Province) is described and compared with other species from Southeast Asia. *H. teramotoi* is very similar to *H. edai* but can be distinguished by the shape of male caudal appendages or female cerci." (Author)] Address: Yokoi, N., 2-37-11, Kaisei, Koriyama, Fukushima, 963-8851 Japan Email: yokoi@orange.plala.or.jp

15551. Younes, A.; El-Sherif, H.; Gawish, F.; Mahmoud, M. (2015): Potential of *Hemianax ephippiger* (Odonata-Aeshnidae) nymph as predator of *Fasciola* intermediate host, *Lymnaea natalensis*. Asian Pacific Journal of Tropical Biomedicine 5(8): 671-675. (in English) ["Objective: To evaluate the predatory capacity of the Odonata, *Hemianax ephippiger* nymph as a biocontrol agent for the freshwater snail *Lymnaea natalensis*, intermediate host of *Fasciola gigantica*. Methods: Observations on the searching, attacking and devouring of the snails with a series of laboratory-based predation experiments, whose aims were to determine daily predation rate, differential predation on small-, medium- and large-sized snails were carried out. Results: Laboratory evaluation revealed that, the Odonata nymph could kill and consume all three sizes of snails. Searching and handling time of the predator differed depending on snail size and predator vulnerability. The predation rate varied also with respect to snail size and density. Conclusions: Our observations suggested that the predator *Hemianax ephippiger* may be a suitable bio-control agent of *Lymnaea natalensis* snail population." (Authors)] Address: Younes, A., Department of Entomology, Faculty of Science, Cairo University, Giza, Egypt. E-mail: alyyounes@hotmail.com

15552. Yu, X. (2015): First record of *Ceriagrion fallax* Ris (Odonata: Coenagrionidae) preying on small web-building spiders (Arachnida: Tetragnathidae). International Journal of Odonatology 18(2): 153-156. (in English) ["In montane forest of south-western Yunnan, China, a female of *Ceriagrion fallax* was observed and photographed preying on a small web-building spider of the genus *Leucauge*. This is the first record of plucking an orb-weaver spider by a representative of the genus *Ceriagrion*. A brief discussion on the evolution of spider feeding behaviour in odonates is provided." (Author)] Address: Yu, X., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, PR China. E-mail: lannysummer@163.com

15553. Yu, X.; Xue, J.; Hämäläinen, M.; Liu, Y.; Bu, W. (2015): A revised classification of the genus *Matrona* Selys, 1853 using molecular and morphological methods (Odonata: Calopterygidae). Zoological Journal of the Linnean Society 174: 473-486. (in English) ["An extensive re-

view of the genus *Matrona* is presented based on mitochondrial (COI) and nuclear (ITS) sequences from 150 samples which cover all the known taxa of this genus. The separation of two main clades (oreades group: *M. oreades*, *M. corephaea* and *M. taoi*; basilaris group: *M. basilaris*, *M. nigripectus*, *M. cyanoptera*, *M. japonica* and *M. annina*) is strongly supported. The classification of all traditional recognized species is confirmed. The Hainan population separates very well from mainland *M. basilaris* populations, which is also confirmed by geometric morphometric analysis of wing shape. Given the implications of the molecular analysis the genus *Matrona* is grouped into two subgenera: subgen. *Matrona* (type species *M. basilaris*) and *Divortia* subgen. nov. (type species *M. oreades*). A new species, *M. (M.) mazu* sp. nov., from Hainan is described. Brief taxonomic notes on the nine recognized species of the genus are given. Lectotype designations of *M. basilaris* and *M. nigripectus* are published." (Authors)] Address: Yu, X., Institute of Entomology, College of Life Sciences, Nankai Univ., Tianjin 300071, China. E-mail: lanny@nankai.edu.cn

15554. Yu, X.; Chen, J. (2015): A brief primary faunistic note to the Odonata of Mt Dabieshan in center of eastern China. IDF-Report 88: 1-38. (in English) ["From 2011 to 2014, a series of surveys were conducted in Mt Dabieshan range to explore the diversity of Odonata. Totally, 55 species were recorded. The checklist also includes seldom recorded species as *Nihonogomphus bequaerti* and *Coenagrion aculeatum*." (Authors)] Address: Yu, X., Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, 300071, China. E-mail: lannysummer@163.com

15555. Yuen, E.Y.L.; Dudgeon, D. (2015): Dietary dependence of predatory arthropods on volant aquatic insects in tropical stream riparia. Biotropica 48(2): 218-228. (in English) ["The dietary dependence on volant aquatic insects of eight species of predatory arthropods from three different orders was determined by stable isotope analyses in combination with three-source, two-isotope (C and N) Bayesian mixing models. The predators were collected from riparian zones along three streams in tropical Hong Kong during both the wet and dry seasons. Dietary importance of aquatic insects varied according to predator hunting modes, and showed a consistent pattern across all sites during the wet season. The web-building tetragnathid spider (*Orsinome diporusa*) had the greatest reliance (~40–55%) on this water-to-land subsidy, followed by two species of damselflies (40–50%) (*Rhinocypha perforata*, *Euphaea decorata*), three cursorial spiders (*Lycosidae*, *Pisauridae*, and *Sparassidae*: 32–51%) and two neustic Gerrids (17–36%). Such reliance also varied according to the microhabitat preferences of different cursorial spiders. Four species of predators (Gerrids and cursorial spiders) that were active year-round showed generally consistent reliance on aquatic insects between seasons, which probably reflected the observed lack of seasonal variability in the relative proportions of aquatic and terrestrial prey. There was a marked overlap in isotopic signatures of aquatic and terrestrial prey at all sites which, com-

bined with the absence of data on the extent to which isotopic fractionations may vary among individual species of prey and predators, contributes some uncertainty to the estimates of dietary compositions derived by mixing models. The findings of the present study are thus likely to be indicative rather than definitive. (Authors)] Address: Dudgeon, D., Department of Ecology & Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong, China. E-mail: ddudgeon@hkucc.hku.hk]

15556. Yuto, C.M.M.; Nuneza, O.M.; Villanueva, J.T. (2015): Species diversity of the odonatofauna of Mts. Pinukis and Gimamaw, Zamboanga del Sur, Philippines. *Journal of Biodiversity and Environmental Sciences* 7(4): 135-146. (in English) ["Odonata is highly sensitive to various changes in the environment which makes it an excellent bioindicator of environmental health. This study was conducted to assess the species richness of Odonata in Mts. Pinukis and Gimamaw, Zamboanga del Sur, Philippines. Eleven sampling sites were surveyed comprising six sites in Mt. Pinukis and five sites in Mt. Gimamaw. Opportunistic sampling using sweep nets was conducted for a total of 192 man-hours. Biodiversity indices, cluster analysis, and detrended correspondence analysis were determined using Paleontological Statistics Software Package (PAST) version 2.17b. Thirty-five species were recorded belonging to 25 genera and 10 families with relatively low endemism of 40%. There was a more or less even species distribution. High relative abundance of 18.83% was observed in site 1. Site11 was observed to have the most number of endemic species. High species diversity was recorded in both Mts. Pinukis and Gimamaw. Detrended correspondence analysis showed that vegetation structure greatly influences habitat preferences of Odonata. It appears that human-induced disturbances limit the occurrence and abundance of the Odonata, especially the endemic species." (Authors)] Address: Nuñez, Olga, Department of Biological Sciences, Mindanao State University-Iligan Institute of Technology, Iligan City, Philippines. E-mail: olgamnuneza@yahoo.com

15557. Zebsa, R.; Khelifa, R.; Kahalerras, A. (2015): Emergence pattern, microhabitat choice, and population structure of the Maghribian endemic *Gomphus lucasii* Selys, 1849 (Odonata: Gomphidae) in northeastern Algeria. *Aquatic Insects* 36(3-4) (2014): 245-255. (in English) ["Emergence of *Gomphus lucasii* Selys, 1849, an unstudied Maghreb endemic, was synchronised by overwintering in the final stadium in the Seybouse River in northeastern Algeria. Regular collections revealed that half of the annual population emerged during 10 days, showing a typical 'spring species' emergence pattern. Sex ratio was slightly male biased (51%). Males and females did not differ in vertical stratification. Emergence support choice was not random, but rather depended on support height, body size, and daily population density. Mortality was caused mainly by ants, although deformity of teneral and bird predation were also important factors. *Gomphus lucasii* has been assessed as vulnerable (International Union for Conservation of Nature (IUCN) Red List), and the information provided in our

study will be helpful in future conservation efforts." (Authors)] Address: Zebsa, R., Département d'écologie et du génie de l'environnement, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre et de l'Univers, Université 08 Mai 1945, Guelma 24000, Algérie

15558. Zebsa, R.; Khelifa, R.; Kahalerras, A. (2015): Adult movement pattern and habitat preferences of the Maghribian endemic *Gomphus lucasii* (Odonata: Gomphidae). *J. Insect Sci.* (2015) 15(1): 151; DOI: 10.1093/jisesa/iev128: 8 pp. (in English) ["The Algerian Cudtail (*Gomphus lucasii* Selys) (Odonata: Gomphidae) is a river-dwelling dragonfly and one of the least known gomphid in the Palearctic. A survey of the movement patterns and habitat requirements of adults was conducted in the largest currently known population, located in the Seybouse River (Northeast Algeria). Daily mark-release-resighting surveys along a 2.5 km stretch of the watercourse and within plots in terrestrial habitats were carried out; a total of 1,316 individuals were marked. The resighting rate along the watercourse was 8.13% and did not significantly vary with sex and age. Adult spatial distribution differed according to sex and age. Mature females were significantly further from the water than males. Mature males were observed not only along the watercourse but also far from the water, up to 450m where reproductive pairs in copula were recorded. Preferred maturation and foraging sites were open grasslands and dense wheat fields. Philopatry to reproductive sites had a mean of 1.11%, while philopatry to emergence site was lower (0.4%) and noted only in males. The mean distance of natal dispersal (from emergence to reproductive areas) was 596.564.94 m. The mean dispersal distance from one reproductive site to another was 180.976238.54 m. Both mature males and females preferred fast flowing water, but females were observed to oviposit in relatively small watercourses." (Authors)] Address: Khelifa, R., Institute of Evolutionary Biology and Environmental Studies, University of Zurich, Winterthurerstr. 190, CH-8057 Zürich, Switzerland. E-mail: rassimkhelifa@gmail.com

15559. Zeiri, A.; Nel, A.M Garrouste, R. (2015): A new libelluloid family from the Eocene Green River Formation (Colorado, USA) (Odonata, Anisoptera). *Zootaxa* 4032(3): 290-296. (in English) ["The new family Urolibellulidae is proposed for the new genus and species *Urolibellula eocenica*, based on a fossil dragonfly from the Eocene Green River Formation (USA). This new taxon is considered as the sister group of the extant Libellulidae. As the oldest libellulid dragonfly is dated from the Turonian, the Urolibellulidae should also be at least Late Cretaceous." (Authors)] Address: Zeiri, Asma, Department of Biology, Faculty of Sciences, University of Carthage, 7021, Zarzouna, Bizerte, Tunisia. E-mail: asma_zairi@yahoo.fr

15560. Zhang, H.-m.; Kosterin, O.E.; Cai, Q.-h. (2015): New species and records of *Burmagomphus Williamson*, 1907 (Odonata, Gomphidae) from China. *Zootaxa* 3999: 62-78. (in English) ["Four new species of *Burmagomphus Williamson*, 1907 are described from Southwestern China:

B. apricus sp. nov. from Xishuangbanna National Nature Reserve, Menglun Town, Xishuangbanna Dai Autonomous Prefecture, Yunnan Province; *B. magnus* sp. nov. from Huayudong, Nanxi Town, Hekou County, Hani-Yi Autonomous Prefecture of Honghe, Yunnan Province, *B. dentatus* sp. nov. from Zhangjiang River in Xiaoqikong scenic spot, altitude 400 m, Libo County, Guizhou Province, and *B. latescens* sp. nov. from Sifangjing, Mengding Town, Gengma County, Lincang City, Yunnan Province. New records of *Burmagomphus* spp. in China are provided, with *B. asahinai* and *B. williamsoni* *williamsoni* for the first time reported from China. A revised checklist of *Burmagomphus* spp. of China is provided which includes 14 species. A doubtful record of *B. arboreus* and relations of the newly described species are discussed. All types are deposited in the Collection of Aquatic Animals, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan City, Hubei Province, China." (Authors)] Address: Zhang, H., State Key Laboratory of Freshwater Ecology and Biotechnology, Institute of Hydrobiology, Chinese Acad. of Sciences, Wuhan 430072, China. E-mail: zhanghaomiao6988@gmail.com

15561. Zhang, H.-m.; Hämäläinen, M.; Cai, Q.-h. (2015): Description of *Echo candens* sp. nov. from western Yunnan, China (Odonata: Calopterygidae). *Odonatologica* 44(1/2): 107-116. (in English) ["A new calopterygid damselfly species *Echo candens* sp. nov. (holotype ♂ from Dehong, Yunnan, China) is described and illustrated for the male sex. The supposed female of this species is shown in a field photograph, taken in Kachin State in Burma. The new species is compared with known species in genus *Echo* and a key to males of all species is provided." (Authors)] Address: Zhang, H., Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510642, China. E-mail: zhanghaomiao6988@gmail.com

15562. Zhang, Z.-q. (2015): Defragmentation of journals enhances access and collaboration: commentary on the occasion of *Zootaxa* 4,000. *Zootaxa* 4000(5): 596-600. (in English) [*Zootaxa* editor Dennis Paulson excepted 26 papers on Odonata in 2014.] Address: Zhang, Z.-q., Landcare Research, Private Bag 92170, Auckland, New Zealand; ZhangZ@landcareresearch.co.nz

15563. Zia, A. (2015): First record of genus *Protosticta* Selys, 1885 (Odonata: Zygoptera: Platystictidae) for Pakistan. *Pakistan J. Zool.* 47(3): 864-866. (in English) ["A new record to the Zygoptera fauna of Pakistan has been added by reporting *Protosticta hearseyi* from two different localities of the country. The genus also is a new record for Pakistan. *P. hearseyi* is a data deficient threatened species known earlier only from India. Detailed distribution and habitat description is provided to fill ecological information of the species. Diagnostic characters are also provided to facilitate identification for future taxonomists based on published description." (Author) Chachal village (33°49'N, 73°29'E; 441m), 10,12-vii-2005; Lehtarar (33°43'N, 73°27'E; 484m), 15-vii-

2005.] Address: Zia, S.A., National Insect Museum, National Agriculture Research Centre, Islamabad – Pakistan. E-mail: saiyedahmed@yahoo.com

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15564. Akram, W.; Ali-Khan, H.A. (2016): Odonate nymphs: Generalist predators and their potential in the management of dengue mosquito, *Aedes aegypti* (Diptera: Culicidae). *Journal of Arthropod-Borne Diseases* 10(2): 253-258. (in English) ["Background: Dengue is amongst the most serious mosquito-borne infectious disease with hot spots in tropical and subtropical parts of the world. Unfortunately, no licensed vaccine for the disease is currently available in medicine markets. The only option available is the management of dengue vector mosquito, *Aedes aegypti* (Diptera: Culicidae). Method: Predatory potential of five odonate nymphs namely *Anax parthenope*, *Bradinopyga geminate*, *Ischnura forcipata*, *Rhinocypha quadrimaculata*, and *Orthetrum sabina* were evaluated against the 4th instar larvae of the dengue vector mosquito, *Aedes aegypti*, under laboratory conditions. The consumption of the mosquito larvae was evaluated at three water volume levels viz., 1 liter, 2 liter and 3 liter. Results: The number of *Ae. aegypti* larvae consumed varied significantly among the five species, and at different levels of water volume ($P < 0.01$). However, the interaction between odonate nymphs and the water volumes was statistically non-significant ($P > 0.05$). *Ischnura forcipata* consumed the highest number of *Ae. aegypti* larvae ($n=56$) followed by *A. parthenope* ($n=47$) and *B. geminate* ($n=46$). The number of larvae consumed was decreased with increasing search area or water volume, and the highest predation was observed at 1-liter water volume. Conclusion: The odonate nymphs could be a good source of biological agents for the management of the mosquitoes at larval stages." (Authors)] Address: Akram, W., Department of Entomology, University of Agriculture, Faisalabad, Pakistan. E-mail: azhar_naturalist@yahoo.com

15565. Allen, A.M.; Singh, N.J. (2016): Linking movement ecology with wildlife management and conservation. *Front. Ecol. Evol.* 3:155.doi: 10.3389/fevo.2015.00155: 13 pp. (in English) ["A common challenge in species conservation and management is how to incorporate species movements into management objectives. There often is a lack of knowledge of where, when, and why species move. The field of movement ecology has grown rapidly in the last decade and is now providing the knowledge needed to incorporate movements of species into management planning. This knowledge can also be used to develop management strategies that are flexible in time and space and may improve the effectiveness of management actions. Therefore, wildlife management and conservation may benefit by strengthening the link with movement ecology. We present a framework that illustrates how animal movement can be used to enhance conservation planning and identify management actions that are complementary to existing strategies. The framework contains five steps that identify (1) the

movement attributes of a species, (2) their impacts on ecosystems, (3) how this knowledge can be used to guide the scale and type of management, (4) the implementation, and (5) the evaluation of management actions. We discuss these five steps in detail, highlighting why the step is important and how the information can be obtained. We illustrate the framework through a case study of managing a highly mobile species, the Atlantic salmon (*Salmo salar*), a harvested species of conservation concern. We believe that the movement-management framework provides an important, and timely, link between movement ecology and wildlife management and conservation, and highlights the potential for complementary, dynamic solutions for managing wildlife." (Authors) References to Odonata a made.] Address: Allen, A.M., Dept Wildlife, Fish & Environmental Studies, Swedish Univ. of Agricultural Sciences, Umeå, Sweden

15566. Ansaloni, I.; Prevedelli, D.; Ruocco, M.; Simonini, R. (2016): Checklist of benthic macroinvertebrates of the Lago Pratignano (northern Apennines, Italy): an extremely rich ecosystem. Check List 12(1) (Article 1821): 8 pp. (in English) ["A checklist of the macroinvertebrates fauna of the Lago Pratignano is presented here. The Lago Pratignano is a small, natural water body of the high (1,307 m above sea level) Northern Apennines, Italy. It represents an important site for the conservation of endangered flora and amphibians, and its importance for the conservation of the macroinvertebrate fauna is highlighted. The 82 taxa recorded make it an extremely rich habitat. The most represented group was Diptera, with 31 taxa, followed by Coleoptera, with nine, and Oligochaeta and Arachnida, each with eight taxa. Other groups are present in lower numbers. Despite the scant attention to the study of the macroinvertebrates of small lentic habitats in the Northern Apennines, their importance for the conservation of the invertebrate fauna and the high contribution they give to the biodiversity is highlighted here." (Authors) Five odonate species - *Chalcolestes viridis*, *Coenagrion puella*, *Anax imperator*, *Libellula depressa*, and *L. quadrimaculata* - are listed.] Address: Ruocco, M., Univ. of Modena and Reggio Emilia, Dept of Life Sciences, via Campi 213/d, 41125 Modena (MO), Italy. E-mail: matteo.ruocco@unimore.it

15567. Arbeiter, S.; Schulze, M.; Tamm, P.; Hahn, S. (2016): Strong cascading effect of weather conditions on prey availability and annual breeding performance in European bee-eaters *Merops apiaster*. Journal of Ornithology 157(1): 155-163. (in English, with German summary) ["Aerial insectivorous birds depend highly on favourable weather conditions for successful foraging because flight activity of insects is constrained by daily weather. Thus, the variation in weather conditions during reproduction, mediated by prey limitations, should be mirrored in annual reproduction performance, and finally in annual breeding success. We analysed the effect of local weather conditions on the availability of airborne insects and on the variation in brood size and nestling condition of European bee-eaters *Merops apiaster* at the northern edge of their range where years with adverse weather frequently occur. The availability of large flying insects, the common prey of bee-eaters, increased with

air temperatures and duration of daily sunshine. As predicted, local weather conditions affected reproductive performance with annual breeding success (mean 3.7 nestlings per breeding pair, range 1.7–4.9 nestlings) being up to 32 % higher in extraordinary dry and hot summers. Additionally, a nestling's body condition (residual mass) was also affected by sunshine duration during their growth period and internally was co-affected by the number of siblings and the individual rank within the sibling hierarchy. Thus, a prolonged duration of daily sunshine causes a cascade from higher insect flight activity, and, thus, higher food availability for chick-rearing bee-eaters, which finally translates into better chick body conditions and higher annual breeding success. Consequently reproduction and population development of European bee-eaters might be especially susceptible to regional changes in weather and climatic conditions."(Authors) The paper includes references to Odonata.] Address: Arbeiter, Susanne, Zool. Inst. & Museum, Univ. Greifswald, Johann-Sebastian-Bach-Str.11/12, 17489, Greifswald, Germany. E-mail: susanne.arbeiter@uni-greifswald.de

15568. Aschonitis, V.G.; Feld, C.K.; Castaldelli, G.; Turin, P.; Visonà, E.; Fano, E.A. (2016): Environmental stressor gradients hierarchically regulate macrozoobenthic community turnover in lotic systems of Northern Italy. Hydrobiologia 765: 131-147. (in English) ["Environmental stressors present a hierarchical influence on freshwater organisms. This study investigates the hierarchy of environmental stressor gradients, which regulate the composition of instream macroinvertebrate communities of northern Italy (Po Valley and the south-eastern Alps). Species and environmental data were derived from 585 monitoring sites. Environmental parameters were split into three groups, describing (i) ecoregional, (ii) hydromorphological, and (iii) water quality attributes. Partial Redundancy Analysis (partial RDA) was used to hierarchically rank the group effects, which were expressed as unique (group specific) and joint effects (of two groups together). Overall, ecoregion explained more variance (30.2%) than hydromorphology (24.8%) and water quality (22.3%). Unique effects were generally low, but ecoregional unique effects were twice as high as those of the other groups. The analysis of single environmental variables highlighted significant effects of anthropogenic impact related to the substrate size composition, riparian vegetation, flow conditions, and *Escherichia coli* (surrogate descriptor of organic fecal pollution). Such stressor hierarchies can support biodiversity conservation plans, while the high joint effects of stressor groups suggested the need for combined management activities, addressing the respective stressors and stressor groups in concert. Management measures addressing only one stressor group isolated from others are likely to be less effective, or even ineffective." (Authors) Taxa including Odonata are treated at genus level.] Address: Aschonitis, V.G., Department of Life Sciences and Biotechnology, University of Ferrara, Ferrara, Italy. E-mail: schvls@unife.it

15569. Berquier, C.; Antoine Orsini, A.; Ferrat, L.; Andrei-Ruiz, M.-C. (2016): Odonata Community Index – Corsica"

(OCIC): A new biological index based on adult odonate populations for assessment of the ecological status of watercourses in Corsica. *Ecological Indicators* 66: 163-172. (in English) ["Corsica is a French island in the western Mediterranean with numerous distinct geomorphological, landscape, and biological characteristics. These specific attributes, mostly related to insularity, are hardly taken into account by the biological indices currently recommended in the framework of the European Union Water Framework Directive "WFD" for assessing the ecological status of watercourses. Thus, this work has focused on developing an innovative biological index adapted to the specific context of territories such as Corsica, based on the Odonata group. In this context, imago sampling of Odonata was performed at 40 representative stations to assess the 33 major permanent rivers of the island. In parallel, various biological, hydrological, and physicochemical parameters affecting the ecological status of these organisms were recorded. The data collected on nearly 30 species of Odonata allowed for the accurate description of the typical populations of Corsican watercourses, highlighting this group's potential as a biological indicator. An indicator value was assigned to the 12 species identified as the most representative of these environments. The results were used to develop 5 biological indices based on simple statistical descriptors. The index that was found to be the best for assessing the ecological status of the watercourses, as indicated by correlation tests, was named "Odonata Community Index – Corsica" (OCIC), and was finally confronted with the 5 biological indices recommended by the WFD and currently used in Corsica. The results of this study confirm the significant potential of the OCIC index compared to other "official" indicators, that are limited in they do not accurately assess all territories. The results of our tests indicate that this new index using Odonata group appears to be a credible method that could potentially improve the evaluation system currently used for monitoring the ecological quality of watercourses in Corsica." (Authors)] Address: Berquier, C., Office de l'Environnement de la Corse, Observatoire – Conservatoire des Insectes de Corse, Lieu-dit "Lergie", RN 200, F-20250 Corte, France. E-mail: cyril.berquier@oec.fr

15570. Blecher, M. (2016): Hebrew names for insects toward environmental education and nature conservation: dragonflies and damselflies as a case study. *Negev, Dead Sea and Arava Studies* 7(3): 58-65. (in Hebrew, with English summary) ["The issue of the report is interdisciplinary: linking biological knowledge and environmental education, connecting zoological taxonomy with the Hebrew language. The necessity of Hebrew names for Israeli dragonflies and damselflies is explained and discussed, and the practice of creating those names is analyzed. The vernacular names were proposed for the taxonomical insect order (Odonata) comprehensively. A methodical consistent approach, as the base for suggesting the names, is briefly described. The complete and clarified names proposal (the first for an arthropods group of the country) was submitted to the Academy of the Hebrew Language. After lengthy process of detailed discussions in the Zoological Terminology Committee,

the Hebrew common names of dragonflies and damselflies have been approved by the Plenary Session of the Academy. The accepted names should be an important tool in education for biodiversity conservation and in promotion for fresh-water habitats protection. Additionally, an up-dated Odonata faunistic list of Israel is given. The list is a concise literature summary for practical conservation purposes." (Authors)] Address: Blecher, M., Israel Nature and Parks Authority - En Gedi Nature Reserve. E-mail: m.blecher@npa.org.il

15571. Boonsoong, B. (2016): Phoretic associations between *Nanocladius asiaticus* (Diptera, Chironomidae) and its hosts *Gestroiella* (Heteroptera, Naucoridae) and *Euphaea masoni* (Odonata, Euphaeidae) in streams in Western Thailand. *Annales de Limnologie - International Journal of Limnology* 52: 163-169. ["Phoretic associations between larvae of *Nanocladius* (Plecopteracoluthus) *asiaticus* (Diptera, Chironomidae) and two species in the genus *Gestroiella* (Heteroptera, Naucoridae) were studied in Kanchanaburi and Ratchaburi Provinces (Western Thailand). *Gestroiella siamensis* was used by chironomid larvae as a host more frequently than was *Gestroiella limnocoroides*. Moreover, *N. asiaticus* larvae were associated symphoretically with nymphs of *Euphaea masoni*. This is the first report of a symphoretic association involving *E. masoni*. Approximately 44% of the population of naucorids harboured symphoretic chironomids, whereas only 13% of damselfly nymphs were hosts of the chironomid larvae. Most of the brachypterous male (59%) naucorids hosted chironomid larvae. The attachment site of the chironomids was frequently along the mesofemur and mesosternum of the naucorid hosts. The chironomids were attached to the ventral sides of abdominal segments of *E. masoni* nymphs. There was a positive correlation in body length between chironomids and naucorids ($r=0.389$, $P<0.01$). There are many benefits of symphoresis in the Chironomidae, such as improved feeding opportunities, increased mobility, suitable pupation sites and decreased predation risks." (Author)] Address: Boonsoong, B., Department of Zoology, Faculty of Science, Kasetsart University, Animal Systematics and Ecology Speciality Research Unit (ASESRU), Bangkok 10900, Thailand. E-mail: fscibtb@ku.ac.th

15572. Braun, A.P.; Phelps, Q.E. (2016): Channel Catfish habitat use and diet in the Middle Mississippi River. *The American Midland Naturalist* 175(1): 47-54. (in English) [Overall, vegetation, fish, and Cambaridae (freshwater crayfishes) made up the highest mean proportion of stomach contents by weight (27.5%, 20.6%, and 19.9% respectively). Trichoptera constituted the next highest proportion (4.6%), while Collembola, Coleoptera, Odonata, and Bivalvia were minor proportions "River modifications have had detrimental effects on biota that depend on river systems; therefore, information is needed to understand these effects and direct management efforts. Channel catfish (*Ictalurus punctatus*) are important recreationally, commercially, and ecologically in the Middle Mississippi River (MMR), but few studies have examined their habitat requirements, and food

habits have not been evaluated in the MMR. Information about habitat use and food habits could help direct management efforts for channel catfish. To more thoroughly understand the synergistic relation between channel catfish and the associated habitat, we used data from the United States Army Corps of Engineer's Long-Term Resource Monitoring Program to evaluate channel catfish use of large-scale river features (i.e., macrohabitats) and more fine scale mesohabitats (i.e., substrate type, depth, and velocity). Stomach contents from channel catfish were identified and quantified to determine the relative importance of specific prey items in diets. Channel catfish presence was positively affected by current but negatively affected by depth. Off-channel habitats appeared more suitable for channel catfish. In terms of food habits, Cambaridae, fish, and vegetation were most frequently found in the diet, but a variety of other food items were consumed. Conserving premodification habitat characteristics, such as open side channels, shallow sandbars, and seasonally inundated floodplains, as well as habitats with high forage productivity, should help to sustain a stable population of channel catfish in the MMR. Future studies could examine the tenets of the optimal foraging theory within these habitats to determine the mechanisms regulating channel catfish habitat use and prey selection." (Authors)] Address: Braun, A.P., Big Rivers and Wetlands Field Station, Missouri Department of Conservation, 3815 E. Jackson Boulevard, Jackson 63755, USA

15573. Brown, A.L.; Robinson, B.W. (2016): Variation in behavioural plasticity regulates consistent individual differences in *Enallagma* damselfly larvae. *Animal Behaviour* 112: 63-73. (in English) ["Highlights: •Larvae of different *Enallagma* species experience constant or variable predation risk. •Larvae predictably vary in plastic behaviour in response to fish predator cues. •More plasticity is associated with reduced variation in plasticity among individuals. •Less variation in plasticity enhances consistent individual differences in behaviour. •Variation in behavioural plasticity and in mean behaviour regulates behaviour types. Plastic behavioural responses by individuals to different conditions and consistent individual differences in mean behaviour across situations both contribute to variation in a population. The relationship between behavioural plasticity and consistent individual differences is not clearly understood but may help predict personality variation in animals. High variation in mean behaviour and low variation in individual plastic responses will tend to maintain the rank order of individuals across situations and so permit consistent individual differences. Conversely, low variation in mean behaviour and high variation in plastic responses, by changing the rank orders of individuals, will erode consistent individual differences. Thus, selection that reduces variation in individual plastic responses should increase the opportunity for consistent individual differences in a population. We tested for relationships between heterogeneous predation regimes, the mean and variance of behavioural plasticity and consistent individual differences among three species groups of larval damselflies. Larvae of *Enallagma signatum*

probably face consistent predation from fish over successive generations, whereas *Enallagma ebrium/hageni* and *Enallagma annexum/boreale* face a changing predation regime over generations either from fish or larval dragonflies. The behavioural reaction norms of larvae in repeated exposure trials to cues from a predatory fish, dragonfly larvae or no predator differed between species groups. *Enallagma ebrium/hageni* expressed the most consistent plastic response to predator cues, less variability in plasticity and greater consistent individual differences across cues compared to more variable plastic responses and low consistent individual differences in *E. signatum*. Selection on behavioural plasticity may enhance consistent individual differences in *E. ebrium/hageni* whereas relaxing selection on plasticity may reduce consistent individual differences in *E. signatum*. More generally, selection on plastic behaviour may enhance behavioural types while selection on mean behaviour may reduce behavioural types in animal populations." (Authors)] Address: Robinson, Beren, Department of Integrative Biology, University of Guelph, Guelph, ON, N1G 2W1, Canada. E-mail: berenrob@uoguelph.ca

15574. Bruni, G.; Ricciardi, G.; Vannini, A. (2016): Effectiveness of artificial amphibian breeding sites against non-native species in a public protected area in Tuscany, Italy. *Conservation Evidence* (2016) 13, 12-16: 12-13. (in English) ["The spread of non-native invasive species is among the factors thought to be responsible for the recent global declines in amphibian populations. In a Protected Natural Area of Local Interest in Tuscany, Italy, we tested approaches for preserving the local amphibian populations threatened by the presence of the red swamp crayfish *Procambarus clarkii*. The construction of artificial breeding ponds, with suitable vertical barriers, was initially effective in preventing the spread of the red swamp crayfish and created a source site for amphibians, in particular newt species. Unfortunately, five years after construction, the breeding sites were colonized by fish and crayfish, possibly due to the actions of members of the public.... In addition to the target species, many aquatic insects, such as dragonflies and damselflies (Odonata) (e.g. *Anax imperator*, *Crocothemis erythraea*, *Libellula quadrimaculata*) successfully colonized the reconstructed habitats." (Authors)] Address: Bruni, G., 1 Centro Iniziativa Ambiente Sestese, Circolo Legambiente, via Scardassieri 47/A, 50019 Sesto Fiorentino, Italy. E-mail: giacomo.b90@gmail.com

15575. Callahan, M.S.; McPeck, M.A. (2016): Multi-locus phylogeny and divergence time estimates of *Enallagma* damselflies (Odonata: Coenagrionidae). *Molecular Phylogenetics and Evolution* 94, Part A: 182-195. (in English) ["Highlights: •*Enallagma* damselflies show complex diversification across North America and Eurasia. •Four subclades radiated in the Pleistocene to produce 28 extant species. •Both speciation and extinction rates increased over the last 1.5 million years. Reconstructing evolutionary patterns of species and populations provides a framework for asking questions about the impacts of climate change. Here we

use a multilocus dataset to estimate gene trees under maximum likelihood and Bayesian models to obtain a robust estimate of relationships for a genus of North American damselflies, *Enallagma*. Using a relaxed molecular clock, we estimate the divergence times for this group. Furthermore, to account for the fact that gene tree analyses can overestimate ages of population divergences, we use a multi-population coalescent model to gain a more accurate estimate of divergence times. We also infer diversification rates using a method that allows for variation in diversification rate through time and among lineages. Our results reveal a complex evolutionary history of *Enallagma*, in which divergence events both predate and occur during Pleistocene climate fluctuations. There is also evidence of diversification rate heterogeneity across the tree. These divergence time estimates provide a foundation for addressing the relative significance of historical climatic events in the diversification of this genus." (Authors)] Address: Callahan, Melissa, Department of Biological Sciences, Dartmouth College, 78 College Street, Hanover, NH 03755, USA. E-mail: callahan.ms@gmail.com

15576. Campos, F.; Velasco, T.; Sanz, G.; Casanueva, P.; Albuquerque, M.T.D.; Antunes, M.H.R. (2016): *Ischnura graellsii* (Insecta: Odonata): a water pollution biovulnerable indicator-probability mapping using spatial uncertainty. *River Research and Applications* 32: 483-489. (in English) ["Monitoring changes of anthropogenic impacts from a broad scope of species in biodiversity research require practical, easy-to-use and efficient assessment as well as monitoring methods. Odonates are a valuable tool for assessing freshwater systems' quality and have been used as bioindicators of environmental variety. The Águeda watershed, located in the central west of the Iberian Peninsula, shows an exponential increase in the last 60 years of natural resource exploitation coupled with alterations in consumer habits, causing significant environmental changes and deferred direct effects on the natural habitats. Fourteen river sites, selected a priori, were sampled. Adult odonates were collected using standardized methods. Selected environmental variables and water quality parameters were evaluated in situ. Precipitation and altitude were the most important physical, environmental variables in explaining the assemblage structure. Meaningful abiotic-biotic as well as biotic-biotic relationships were set up. Furthermore, situations in the urbanized watershed area showed to be highly impacted and closely related with damselfly *Ischnura graellsii*, which should be targeted as a possible vulnerability indicator for polluted fresh waters. A probability map for *Ischnura graellsii* distribution was performed using indicator kriging with external drift and spatial uncertainty obtain through the calculation of two categorical maps (binary), corresponding to the mean (0.485) and the trimmed mean by discharging the 10% lower distribution tail (0.533). The subsequent overlapping of both categorical maps (binary) allowed the definition of the higher spatial uncertainty map for surface water contamination." (Authors)] Address: Albuquerque, M.T.D., Department of Civil Engineering, Polytechnic Institute of Castelo Branco, Avenida Pedro Álvares

Cabral, no 12, 6000-084 Castelo Branco, Portugal. E-mail: teresal@ipcb.pt

15577. Casillas-Barragán, I.; Costa-Pereira, P.; Cardoso Peixoto, P.E. (2016): Perceived predation risk decreases movement and increases aggregation of Amazon milk frog (*Anura*, *Hylidae*) tadpoles throughout ontogeny. *Hydrobiologia* 765: 379-386. (in English) ["In order to maximize escaping success, prey may change their predator avoidance behaviours according to their susceptibility. Morphological development during ontogeny may lead to different susceptibility to predators. Consequently, prey may exhibit different predator avoidance strategies according to the ontogenetic state. In this study, we used tadpoles of the Amazon milk frog *Trachycephalus resinifictrix* to evaluate how variation in the ability to actively escape owed to the mobility acquired through ontogeny affects the adoption of predator avoidance strategies. We sampled tadpoles (N = 384) in temporary ponds and divided them in four consecutive developmental stages according to body size and mobility capacity. Subsequently, we measured their movement and spatial distribution when subjected to chemical cues of predators or control solutions. We found that they spent less time moving and increased spatial aggregation after receiving solutions with predator cues, independent of their developmental stage. These results indicate that the variation in escape capacity through larval ontogeny does not determine their antipredator strategy. Since tadpoles of *T. resinifictrix* typically grow in environments with reduced space for active escaping, such as tree holes and bromeliads, it may be that the ability to flee from predators is absent, even when this behaviour increases the survival chances." (Authors) The publication includes references to Odonata.] Address: Casillas-Barragán, Isabel, Department of Physiology, São Paulo University, São Paulo, Brazil. E-mail: isabelcasillasbarragan@gmail.com

15578. Chainthong, D.; Boonsoong, B. (2016): Description of two final stadium *Onychogomphus* larvae from Thailand (Odonata: Gomphidae). *Zootaxa* 4066(5): 561-570. (in English) ["The final stadium larvae of *Onychogomphus castor* Lieftinck and *O. duaricus* Fraser are described and illustrated for the first time based on reared specimens from Thailand. The taxonomic characteristics of the larvae of the genus *Onychogomphus* are discussed and summarized. The larva of *O. castor* differs from other Southeast Asian species in having distinct mid-dorsal spines on S2-9, divergent wing pads reaching S5, and lateral spines on S6-9. The larva of *O. duaricus* has a weakly swollen third antennal segment, with short blunt mid-dorsal spines on S2-9, divergent wing sheaths reaching the middle of S4, and lateral spines present on S7-9." (Authors)] Address: Chainthong, D., Animal Systematics and Ecology Speciality Research Unit (ASESRU), Dept of Zoology, Faculty of Science, Kasetsart University, Bangkok 10900, Thailand. E-mail: fscibtb@ku.ac.th

15579. Chakraborty, K.; Moitra, M.N.; Sanyal, A.K.; Rath, P.C. (2016): Important natural enemies of paddy insect

pests in the upper gangetic plains of west Bengal, India. International Journal of Plant, Animal and Environmental Sciences 6(1): 35-40. (in English) ["Survey was conducted at six districts of northern parts of Bengal to investigate the occurrence of natural enemies of insect pests of paddy. A total of 49 predators and 7 parasitoid species were recorded. Spiders appeared to be the most abundant among the predators followed by coleopterans. Greater abundances of enemies of pests were noticed at IPM and SRI fields." (Authors) The following odonate taxa are listed: *Agrionemis femina*, *A.pygmaea*, *Ischnura aurora aurora*, *Ischnura senegalensis*, and *Ceriagrion* sp.] Address: Moitra, M.N., P. D. Women's College, Jalpaiguri-735101, W.B., India, E-mail: manab.moitra@gmail.com

15580. Chandra, G.; Mondal, B.; Bandyopadhyay, S.; Ghosh, A. (2016): Sex-specific functional responses of dragonfly naiads *Rhodothemis rufa* on *Culex quinquefasciatus* larvae in laboratory bioassay. International Journal of Pest Management 62(2): 135-139. (in English) ["Laboratory bioassay was conducted to establish the biocontrol potentiality of naiads (aquatic nymphal stage) of *Rhodothemis rufa* (Rambur, 1842) against larvae of *Culex quinquefasciatus*, a common vector of filariasis in Tropical countries. From the study, it was noticed that in laboratory condition, the rate of predation of males of *R. rufa* was higher than that of females of almost same size and same species. The results of the present study revealed that both sexes displayed a density-dependent decelerating type-II functional response as the logistic regression estimated a significant negative linear parameter (P1 value of -0.330 and -0.151 for males and females, respectively). Attack rate was almost similar for both sexes (0.082); however, handling time is less in males (0.62 min) than in females (0.852 min). The predator species usually coexist in the same aquatic habitat to that of mosquito larvae and can be effectively used in field condition to reduce the larval densities of mosquitoes in temporary or permanent aquatic water bodies." (Authors)] Address: Chandra, G., Mosquito and Microbiology Research Unit, Dept of Zoology, Univ. of Burdwan, Golapbag, Burdwan, India

15581. Chen, Y.H.; Skote, M. (2016): Gliding performance of 3-D corrugated dragonfly wing with spanwise variation. Journal of Fluids and Structures 62: 1-13. (in English) ["Computational fluid dynamics (CFD) analyses are conducted to evaluate the gliding performance of a three-dimensional (3-D) corrugated wing while considering variations in the corrugation pattern across the wing span. Comparisons with the smoothly profiled counterpart assess the overall effect of wing corrugation on the gliding performance of the 3-D dragonfly wing, with primary focus on the effect of three-dimensionality as compared to the 2-D model. Earlier simulations of both 2-D and 3-D gliding corrugated wings showed oscillations on lift and drag, while in nature, such force fluctuation would be undesirable and unrealistic. In contrast, no non-realistic fluctuations are present in this simulation. The feature included here, which has been neglected in the earlier studies, namely the variation of leading edge orientation along the wing span, is the crucial detail for

preventing such non-realistic oscillations. Furthermore, strong spanwise flow occurs in the 3-D corrugated wing used in this study, which earlier models have been incapable to capture." (Authors)] Address: Skote, M., School of Mechanical and Aerospace Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798, Singapore. E-mail: mskote@ntu.edu.sg

15582. Choi, Y.-S.; Kwon, I.-K.; Yoo, J.-C. (2016): Nestling diet of three sympatric egret species: Rice fields support breeding egret populations in Korea. Ornithological Science 15(1): 55-62. (in English) ["The diets of the Intermediate Egret *Egretta intermedia*, Little Egret *E. garzetta*, and Cattle Egret *Bubulcus ibis* were examined by analyzing nestling regurgitations collected during the breeding season in 2005 at a colony in Asan, South Korea. Intermediate Egret nestlings mainly fed on insects (86.7% of total prey items), but fish were the most important group by biomass (64.3% of total biomass). Little Egret nestlings fed mainly on insects and fishes (43.4% and 33.2% of total items, respectively), and fish contributed 64.2% to the total biomass consumed. Cattle Egret chicks were mainly fed invertebrate prey (96.5% of total items), such as insects and spiders, which comprised just 64.3% of the total biomass of their diet. Loaches and aquatic insect larvae (mainly Odonata and Coleoptera) comprised a large proportion of the nestling diet of the three egret species. This suggests that all species forage primarily in rice fields, which represented the most extensive habitat surrounding the breeding colony." (Authors)] Address: Choi, Yu-Seong, Department of Ecology & Evolution Division, National Institute of Ecology, Geumgang-ro 1210, Maseomyeon, Seocheon 33657, Choongnam, Republic of Korea. E-mail: yschoi3@hanmail.net

15583. Cooper, I.A.; Brown, J.M.; Getty, T. (2016): A role for ecology in the evolution of colour variation and sexual dimorphism in Hawaiian damselflies. Journal of Evolutionary Biology 29(2): 418-427. (in English) ["Variation in traits that are sexually dimorphic is usually attributed to sexual selection, in part because the influence of ecological differences between sexes can be difficult to identify. Sex-limited dimorphisms, however, provide an opportunity to test ecological selection disentangled from reproductive differences between the sexes. Here, we test the hypothesis that ecological differences play a role in the evolution of body colour variation within and between sexes in a radiation of endemic Hawaiian damselflies. We analyzed 17 *Megalagrion* damselflies species in a phylogenetic linear regression, including three newly-discovered cases of species with female-limited dimorphism. We find that rapid colour evolution during the radiation has resulted in no phylogenetic signal for most colour and habitat traits. However, a single ecological variable, exposure to solar radiation (as measured by canopy cover) significantly predicts body colour variation within sexes (female-limited dimorphism), between sexes (sexual dimorphism), and among populations and species. Surprisingly, the degree of sexual dimorphism in body colour is also positively correlated with the degree of habitat differences between sexes. Specifically, redder colouration

is associated with more exposure to solar radiation, both within and between species. We discuss potential functions of the pigmentation, including antioxidant properties that would explain the association with light (specifically UV) exposure, and consider alternative mechanisms that may drive these patterns of sexual dimorphism and colour variation." (Authors)] Address: Cooper, Idelle, Biology Dept, James Madison University, Harrisonburg, VA 22807, USA. E-mail: cooperia@jmu.edu

15584. Cooper, I.A.; Brown, J.M.; Getty, T. (2016): A role for ecology in the evolution of colour variation and sexual dimorphism in Hawaiian damselflies. *Journal of Evolutionary Biology* 29(2): 418-427. (in English) ["Variation in traits that are sexually dimorphic is usually attributed to sexual selection, in part because the influence of ecological differences between sexes can be difficult to identify. Sex-limited dimorphisms, however, provide an opportunity to test ecological selection disentangled from reproductive differences between the sexes. Here, we test the hypothesis that ecological differences play a role in the evolution of body colour variation within and between sexes in a radiation of endemic Hawaiian damselflies. We analysed 17 Megalagrion damselflies species in a phylogenetic linear regression, including three newly discovered cases of species with female-limited dimorphism. We find that rapid colour evolution during the radiation has resulted in no phylogenetic signal for most colour and habitat traits. However, a single ecological variable, exposure to solar radiation (as measured by canopy cover) significantly predicts body colour variation within sexes (female-limited dimorphism), between sexes (sexual dimorphism), and among populations and species. Surprisingly, the degree of sexual dimorphism in body colour is also positively correlated with the degree of habitat differences between sexes. Specifically, redder colouration is associated with more exposure to solar radiation, both within and between species. We discuss potential functions of the pigmentation, including antioxidant properties that would explain the association with light (specifically UV) exposure, and consider alternative mechanisms that may drive these patterns of sexual dimorphism and colour variation." (Authors)] Address: Cooper, I.A., Biology Department, James Madison University, Harrisonburg, VA 22807, USA. E-mail: cooperia@jmu.edu

15585. Cordero-Rivera, A. (2016): Demographics and adult activity of *Hemiphlebia mirabilis*: a short-lived species with a huge population size (Odonata: Hemiphlebiidae). *Insect Conservation and Diversity* 9: 108-117. (in English) ["(1.) Rare species are expected to be more susceptible to extinction, particularly if rarity can be used to describe several characteristics for a particular species. *Hemiphlebia mirabilis*, an endemic damselfly known from a few sites in the South of Australia and Tasmania, has been considered at risk of imminent global extinction, given its small population size, its localised distribution, and the fact that it is a 'living fossil', described as the oldest extant damselfly. (2.) One population found in a protected wetland in Victoria, was studied by behavioural observations of marked animals,

during Nov-Dec 2013. Results indicate that *H. mirabilis* is a short-lived species, with a mature lifespan of about 1 week in males and 4 days in females. (3.) Population size estimates and field observations indicate that this population is huge, likely over one million individuals per generation. Adults show little mobility and fly for short distances, being inactive most of the time, particularly at temperatures below 17 °C or over 35 °C. (4.) The low mobility and cryptic coloration, and the inaccessibility of its preferred habitat might explain why huge populations like the one studied here have remained unnoticed until recently. Nevertheless, both sexes show frequent abdominal flicking displays, and fast rotations over the perching support, both behaviours apparently unique to this species, making them highly conspicuous to human observers. It is concluded that *H. mirabilis* should not be regarded as critically endangered." (Authors)] Address: Cordero Rivera, A., Depto de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

15586. Cordero-Rivera, A. (2016): Sperm removal during copulation confirmed in the oldest extant damselfly, *Hemiphlebia mirabilis*. *PeerJ Preprints* 4:e1810v1 <https://doi.org/10.7287/peerj.preprints.1810v1>: (in English) ["Post-copulatory sexual selection may favour mechanisms to reduce sperm competition, like physical sperm removal by males. To investigate the origin of sperm removal, I studied the reproductive behaviour and mechanisms of sperm competition in the only living member of the oldest damselfly family, *Hemiphlebia mirabilis*, one species that was considered extinct in the 1980s. This species displays scramble competition behaviour, whose males search for females with short flights and both sexes exhibit a conspicuous "abdominal flicking". This behaviour is used by males during an elaborate precopulatory courtship, unique among the Odonata. Females use a similar display to reject male attempts to form tandem, but eventually signal receptivity by a particular body position. Males immobilise females during courtship using their legs, which, contrarily to other damselflies, never autotomize. Copulation is short (range 4.1-18.7 min), and has two stages. In the first stage, males remove part of the stored sperm, and inseminate during the second stage, at the end of mating. The examination of genitalia indicates that males have two horns covered by back-oriented spines, which match the size and form of female genitalia. The volume of sperm in females after copulation was 2.8 times larger than the volume stored in females whose copulation was interrupted at the end of stage I, indicative of a significant sperm removal. These results point out that sperm removal is an old character in the evolution of odonates, probably dating back to the Permian." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

15587. Cordero-Rivera, A.; Encalada, A.C.; Sánchez-Guillén, R.A.; Santolamazza-Carbone, S.; von Ellenrieder,

N. (2016): The status of *Rhionaeschna galapagoensis* (Currie, 1901) with notes on its biology and a description of its ultimate instar larva (Odonata, Aeshnidae). *Animal Biodiversity and Conservation* 39(1): 45-63. (in English, with Spanish summary) ["A morphological, molecular, and behavioural characterization of *R. galapagoensis* is presented, based on a series of specimens and observations from San Cristóbal Island, Galápagos, including both adults and larvae. Several of the characters proposed earlier to distinguish between the adults of this species and its closest relative, *R. elsia*, are found to be variable, but the presence of a black band over the fronto-clypeal suture is confirmed as a good diagnostic character. The ultimate instar larvae of *R. galapagoensis* is described for the first time, and diagnosed from its closest relatives by a combination of characters, including the acute angle between the prothoracic apophyses, absence of lateral spines on abdominal segment 6, and length of cerci relative to paraprocts. Molecular analysis confirmed that *R. galapagoensis* and *R. elsia* are sister species, and showed that their genetic distance is the closest among the analyzed species, which is to be expected given the young age of the Galápagos Islands. The larvae of *R. galapagoensis* were very common and widespread in the mountain streams and a pond in the southwest of San Cristóbal. Swarms of tens of individuals formed at sunrise in the coastal vegetation, together with adults of *Tramea cf. cophysa*, feeding on small flying insects. Males showed patrolling behaviour on small sections of the streams and at a pond. Only one copulation was observed, lasting 10 minutes. Females oviposited alone on floating vegetation in running and standing waters. Our observations corroborate that *R. galapagoensis* and *R. elsia* are two parapatric species, morphologically and genetically close. In San Cristóbal, *R. galapagoensis* had large populations, apparently not threatened." (Authors)] Address: Cordero Rivera, A., Departamento de Ecología e Biología Animal, Universidade de Vigo, E.U.E.T. Forestal, Campus Universitario, 36005 Pontevedra, Spain. E-mail: acordero@uvigo.es

15588. Cormont, A.; Siepel, H.; Clement, J.; Melman, T.C.P.; WallisDeVries, M.F.; van Turnhout, C.A.M.; Sparrus, L.B.; Reemer, M.; Biesmeijer, J.C.; Berendse, F.; de Snoo, G.R. (2016): Landscape complexity and farmland biodiversity: Evaluating the CAP target on natural elements. *Journal for Nature Conservation* 30(1): 19-26. (in English) ["Increasing pressures on natural areas and limited conservation budgets require, particularly in rural landscapes in the Western world, an immediate answer to the question how much natural area is required to provide a sustainable future for wild plant and animal species on farmland. The European Union proposed in its Common Agricultural Policy that 3–7% of EU farmland should be managed as ecological focus area (EFA) in order to halt biodiversity loss. For the first time, we empirically assessed the implications of this policy by evaluating the effects of the density of natural elements in agricultural landscapes on multi-taxon species richness, including vascular plants, breeding birds, butterflies, hoverflies, dragonflies, and grasshoppers for an entire European country. We found that species richness increased either as

linear or as a logarithmic function of the proportion of natural elements in the landscape, but not with a sigmoid function as predicted by the 'intermediate landscape complexity' hypothesis. Even landscapes with 3–7% of natural elements harboured generally 37–75% of maximum species richness, indicating good potential of implementing the CAP target to preserve farmland biodiversity. However, differences between the 3 and 7% limits were considerable for butterflies, birds, and hoverflies. Also, the shape of the species richness response was shown to differ between landscape types for butterflies. Thus, it may be necessary to develop tailor-made guidelines at regional levels." (Authors)] Address: Cormont, A., Alterra, Wageningen University & Research Centre, P.O. Box 47, 6700 AA Wageningen, The Netherlands. E-mail: anouk.cormont@wur.nl

15589. Craves, J.A.; O'Brien, D.S. (2016): *Macromia alleghaniensis* (Odonata: Macromiidae): New for Michigan, with clarifications of northern records. *The Great Lakes Entomologist* 48(3-4): 186-190. (in English) ["An *M. alleghaniensis* collected in Cass County, Michigan on 18 June 2014, represents the first record of the species for the state, as well as the northernmost unequivocal record in North America. Other records north of 40° latitude are clarified and discussed." (Authors)]

15590. Dayaram, A.; Galatowitsch, J.L.; Argüello-Astorga, G.R.; van Bysterveldt, K.; Kraberger, S.; Stainton, D.; Harding, J.S.; Roumagnac, P.; Martin, D.P.; Lefeuvre, P.; Varsani, A. (2016): Diverse circular replication-associated protein encoding viruses circulating in invertebrates within a lake ecosystem. *Infection, Genetics and Evolution* 39: 304-316. (in English) ["Highlights: •Sampled molluscs, insect larvae, water and benthic sediments for CRESS DNA viruses. •Recover 169 circular molecules (160 CRESS DNA molecules, nine circular molecules). •Identification of a new RNA–DNA hybrid virus. •Strong association between viral sequences between water and browser organisms. •Strong association between viral sequences between sediments and undefended prey species. Abstract: Over the last five years next-generation sequencing has become a cost effective and efficient method for identifying known and unknown microorganisms. Access to this technique has dramatically changed the field of virology, enabling a wide range of environmental viral metagenome studies to be undertaken of organisms and environmental samples from polar to tropical regions. These studies have led to the discovery of hundreds of highly divergent single stranded DNA (ssDNA) virus-like sequences encoding replication-associated proteins. Yet, few studies have explored how viruses might be shared in an ecosystem through feeding relationships. Here we identify 169 circular molecules (160 CRESS DNA molecules, nine circular molecules) recovered from a New Zealand freshwater lake, that we have tentatively classified into 51 putatively novel species and five previously described species (*DflaCV-3*, -5, -6, -8, -10). The CRESS DNA viruses identified in this study were recovered from molluscs (*Echydrella menzeisii*, *Musculium novaezelandiae*, *Potamopyrgus antipodarum* and *Physella acuta*) and

insect larvae (*Procordulia grayi*, *Xanthocnemis zealandica*, and *Chironomus zealandicus*) collected from Lake Sarah, as well as from the lake water and benthic sediments. Extensive diversity was observed across most CRESS DNA molecules recovered. The putative capsid protein of one viral species was found to be most similar to those of members of the Tombusviridae family, thus expanding the number of known RNA–DNA hybrid viruses in nature. We noted a strong association between the CRESS DNA viruses and circular molecules identified in the water and browser organisms (*C. zealandicus*, *P. antipodarum* and *P. acuta*), and between water sediments and undefended prey species (*C. zealandicus*). However, we were unable to find any significant correlation of viral assemblages to the potential feeding relationships of the host aquatic invertebrates." (Authors)] Address: Varsania, A., School of Biological Sciences, University of Canterbury, Christchurch 8140, New Zealand

15591. Deng, Z.; Chen, F.; Yang, Q.; Bian, H.; Du, G.; Yong, J.; Shan, C.; Hou, X. (2016): Dragonfly-eye-inspired artificial compound eyes with sophisticated imaging. *Advanced Functional Materials* 26(12): 1995-2001. (in English) ["The natural compound eye is a striking imaging device with a wealth of fascinating optical features such as a wide field of view (FOV), low aberration, and high sensitivity. Dragonflies in particular possess large, sophisticated compound eyes that exhibit high resolving power and information-processing capacity. Here, a large-scale artificial compound eye inspired by the unique designs of natural counterparts is presented. The artificial compound eye is created by a high-efficiency strategy that combines single-pulse femtosecond laser wet etching with thermal embossing. These eyes have a macrobase diameter of 5 mm and ~30 000 close-packed ommatidia with an average diameter of 24.5 µm. Moreover, the optical properties of the artificial compound eyes are investigated; the results confirm that the eye demonstrates advanced imaging quality, an exceptionally wide FOV of up to 140°, and low aberration." (Authors)] Address: Yang, Q., State Key Lab. Manufacturing System Engineering & Key Lab. of Photonics Technology for Information of Shaanxi Province, School of Electronics and Information Engineering, Xi'an Jiaotong University, Xi'an, P. R. China. E-mail: yangqing@mail.xjtu.edu.cn

15592. Di Domenico, M.; Dijkstra, K.-D.B.; Carchini, G. (2016): Redescription of the larva of *Gynacantha cylindrata* Karsch (Insecta: Odonata: Aeshnidae). *Zootaxa* 4078(1): 78-83. (in English) ["The ultimate stadium larva of *G. cylindrata* is described and illustrated based on fifteen male and female exuviae from Bundibugyo, Uganda. The larva resembles those of the few described African species of the genus but shows a denser coverage of spine-like setae on body surface and abundance of hair-like setae on mouthparts. The female gonapophyses appear to be the longest described in the genus up to now and similar to those of *G. villosa*, a species included in the same group of African species." (Authors)] Address: Di Domenico, M., via XXIV Maggio, 28, I – 53100, Siena, Italy. E-mail: didomenicomarco67@gmail.com

15593. Dickens, C.W.S.; Graham, P.M. (2016): The South African Scoring System (SASS) Version 5 Rapid Bioassessment Method for Rivers. *African Journal of Aquatic Science* 27: 1-10. (in English) ["The assessment of biota in rivers is a widely recognized means of determining the condition or 'health' of rivers. Benthic macroinvertebrates, in particular, are recognized as valuable organisms for bioassessments, due largely to their visibility to the naked eye, ease of identification, rapid life cycle often based on the seasons and their largely sedentary habits. Numerous bioassessment techniques have been developed over the last three decades, varying in complexity and region of implementation. South Africa has an exemplary history in this field, culminating in the refinement of invertebrate and other techniques and their application in a National River Health Programme. The method presented here is a refinement of the highly successful SASS (South African Scoring System) method developed by Chutter (1994), which forms the backbone of this programme. This paper takes the method to a level where it can, and has been, accredited to ISO standards. The principal changes made include the tighter definition of the technique and the sampling and analytical methods, as well as the introduction of quality control procedures. Some changes have also been made to the list of invertebrates used in this method. Field trials were conducted to test the variability of the method. Of the various indices available to the method, the ASPT is the most consistent over all biotopes (lowest CV%). On the other hand, of the biotopes examined the Gravel/Sand/Mud (GSM) combination is the most variable with respect to the SASS Score and number of taxa encountered. The spatial variability on a reach of river with similar water quality characteristics was found to be statistically negligible. However, one generally finds that statistically significant differences occur between the SASS Scores and the number of taxa counted by different operators. The ASPT, on the other hand, is a more consistent and repeatable measure of river health assessment and, within a given reach of river and considering all biotopes, the differences in results produced by different operators were statistically negligible. The results highlight the need for appropriate competency-based training and consistent application of the method." (Authors) Taxa including Odonata are treated at family level.] Address: Dickens, C.W.S., Hydrobiology, Umgeni Water, P O Box 9, Pietermaritzburg, 3200, South Africa. E-mail: chris.dickens@umgeni.co.za

15594. Dorrington, G.E. (2016): Heavily loaded flight and limits to the maximum size of dragonflies (Anisoptera) and griffenflies (Meganisoptera). *Lethaia* 49(2): 261-274. (in English) ["An original hypothesis is presented that the maximum mass and size of living anisopteran dragonflies are constrained by a physiological performance limit: the wing muscle power required to permit reproductively successful males to carry heavier females in the so-called 'wheel position' in flight. It is proposed that the same limit cannot have applied to all fossil Odonatoptera. As the physiology of the giant Carboniferous griffenfly *Namurotypus sippeli* precludes flight in the wheel position, it did not need to carry any substantial load aside from exogenous aerial prey. Based

on its thorax dimensions, it is argued that *Namurotypus* flew with a relatively low maximum specific muscle power output in comparison with living Anisoptera. The extinction of some families of large Mesozoic Odonoptera may have been exacerbated by competition with smaller (stem-) Anisoptera that evolved higher specific power outputs and superior flight performance similar to living Anisoptera. To investigate the credibility of this flight-performance size-limit hypothesis and its consequences, an analysis of the scaling of the required flight power and available muscle power is presented using allometric relations. It is found that for living Anisoptera and fossil Odonoptera, there are different limiting sizes, above which the required specific flight power would exceed the available muscle specific power. These limits are directly related to maximum load-carrying capacity and the atmospheric air density at the habitual altitude. It is suggested that the largest living species of Petaluridae, *Petalura ingentissima*, is close to the proposed Anisoptera size limit at current near-sea-level air density conditions." (Author)] Address: Dorrington, G.E., School of Aerospace, Mechanical and Manufacturing Engineering, PO Box 71, Bundoora, VIC, 3083, Australia

15595. Dow, R.A. (2016): A remarkable new species of *Coeliccia* from the Tuyen Lam Lake area, Lam Dong, southern Vietnam (Odonata: Zygoptera: Platynemididae). *Zootaxa* 4103(5): 481-486. (in English) ["*Coeliccia suoitia* sp. nov. (holotype male, from Suoi Tia, Tuyen Lam Lake, Da Lat, Lam Dong Province, Vietnam, deposited in RMNH) is described from males from southern Vietnam. It is a distinctive species that possess highly unusual characters in the thorax and anal appendages that make its ultimate generic placement questionable. Relationships between *Coeliccia* Kirby, *Asthenocnemis* Lieftinck and *Indocnemis* Laidlaw, and within *Coeliccia*, are briefly discussed." (Author)] Address: Dow, R.A., 6 Bramley Avenue, Coulsdon, Surrey, CR5 2DP, UK. E-mail: rory.dow230@yahoo.co.uk

15596. Dow, R.A. (2016): Odonata collected at the Samunsam Wildlife Sanctuary, Kuching Division, Sarawak, Malaysia in August 2015. *Faunistic Studies in SE Asian and Pacific Island Odonata* 14: 1-12. (in English) ["Results of a collecting trip to the Samunsam Wildlife Sanctuary in western Sarawak are presented. Several species are reported from Sarawak for the first time: *Elattonera* *coomansi*, *Mortonagrion* cf. *aborensis*, *Macrogomphus* *phalantus* and *Pomothemis* *starrei*. Other notable records include *Coeliccia* species, *Prodasiptera* cf. *interrupta* and *Raphismitia* *bspina*." (Author)] Address: Dow, R.A., Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands. E-mail: rory.dow230@yahoo.co.uk

15597. Dow, R.A.; Affendy, A.; Rahman, H. (2016): *Telosticta fugispinosa* sp. nov. from Sabah (Odonata: Zygoptera: Platystictidae). *Zootaxa* 4103(4): 390-395. (in English) ["*Telosticta fugispinosa* sp. nov. (holotype ♂, from Borneo, Sabah, West Coast division, Crocker Range National Park, Inobong, Kimamabang waterfall stream system, 21 ix 2012, deposited in RMNH) is described from Kinabalu Na-

tional Park and Crocker Range National Park in Sabah, Malaysian Borneo. It is distinguished from all other species of *Telosticta* by the form of the male anal appendages." (Authors)] Address: Affendy, A., Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia

15598. Emiliyamma, K.G.; Palot, M.J. (2016): Range extension of *Lestes nodalis* Selys, 1891 (Odonata: Zygoptera: Lestidae) in southern India. *Journal of Threatened Taxa* 8(2): 8528-8530. (in English) ["Here we report the range extension of *L. nodalis*, a northeastern and eastern Indian species to Kerala, southern India for the first time. Additional taxonomic and natural history notes are also given for the species.... Material examined: WGRC/ZSI/IR-INV-4197, 1 male, 21.ii.2011, Narayankulam, Kozhikode District, coll. Md. Jafer Palot; WGRC/ZSI/IR-INV-4198, 1 female, 25.ii.2011, Narayankulam, Kozhikode District, coll. Dhanya Balan; WGRC/ZSI/IR-INV-4199, 1 male, 13.i.2012, Easthill, Kozhikode District, coll. K.G. Emiliyamma." (Authors)] Address: Emiliyamma, K.G., Western Ghats Regional Centre, Zoological Survey of India, Jafer Khan Colony, Kozhikode, Kerala 673006, India. E-mail: kgemily@gmail.com

15599. Espanha, J.; de Vasconcelos, M.F.; Eterovick, P.C. (2016): The role of tadpole coloration against visually oriented predators. *Behavioral Ecology and Sociobiology* 70(2): 255-267. (in English) ["An animal's vulnerability to predators can be influenced by its behaviour, morphology, body size, coloration, habitat preferences, and palatability. We tested whether the coloration of *Bokermannohyla saxicola* and *Scinax machadoi* tadpoles affects their survival when exposed to local visually oriented predators at a site in southeastern Brazil. We tested three aquatic invertebrates (*Aeshnidae*, *Belostoma* sp., *Lethocerus* sp.) and birds as tadpole predators. We predicted that predation rates would differ depending on the substrate where the tadpoles positioned themselves (light or dark), hypothesizing that each tadpole would use preferentially a background that conferred camouflage and that predation levels would be lower on such backgrounds compared to others. *B. saxicola* had higher survivorship than *S. machadoi* on light backgrounds at some instances, in accordance with its crypsis hypothesis. However, *B. saxicola* tadpoles did not use light backgrounds more often than dark ones. *S. machadoi* coloration looked disruptive on both light and dark backgrounds, and tadpoles showed no preference or differences in survival rates between these backgrounds. Predation rates did not differ between the two species in a way that could confirm a previous hypothesis of aposematic/mimetic coloration for *S. machadoi* tadpoles. Our results show that colorations that appear to function to impair visual detection may play this role at some circumstances but not others. Tadpole colorations may have evolved in another context, in which avoiding visual detection by predators was a stronger selective pressure. In a context with lower predation pressure from visually oriented predators, the expected background choice behaviour for increased camouflage

may not be strongly selected for." (Authors)] Address: Eterovick, Paula, Programa de Pós Graduação em Biologia de Vertebrados, Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, 30535-610, Brazil. E-mail: pcterovick@gmail.com

15600. Fauziyah, S.; Soesilohadi, R.C.H.; Retnoaji, B.; Alam, P. (2016): Dragonfly wing venous cross-joints inspire the design of higher-performance bolted timber truss joints. *Composites Part B: Engineering* 87: 274-280. (in English) ["This communication concerns the design and development of high performance biomimetic timber joints as inspired by the venous cross-joints of dragonfly wings. A special cross-joint configuration in *Crocothemis servilia* is identified. Between the veins of this cross-joint is a resilin envelope. Finite element modelling reveals that the presence of this resilin envelope reduces the levels of localised stress in the jointing region. By gaining an understanding of the structure and function of this dragonfly wing joint, dragonfly-joint inspired timber trusses are developed by integrating low-modulus adhesives around bolted connectors. We find that not only are the properties of strength, stiffness, toughness and deformability of bolted truss joints vastly improved on applying dragonfly-mimicking technology, but that the fatigue resistance is also enhanced. This preliminary work is an important step forward in the design and development of high-performance biomimetic joints for timber construction." (Authors)] Address: Alam, P., Laboratory of Paper Coating and Converting, Centre for Functional Materials, Abo Akademi University, Porthaninkatu 3, 20500 Turku, Finland. E-mail: parvez.alam@abo.fi

15601. Fazlullah; Saeed, M.; Zia, A.; Farid, A.; Khan, M.S.; Badshah, T.; Zada, N. (2016): Libellulidae (Anisoptera) of upper Swat, Khyber Pakhtunkhwa Pakistan. *Journal of Entomology and Zoology Studies* 4(1): 227-228. (in English) ["A study was carried out during year 2013 to study insects belonging to Libellulidae. Sampling of ten locations was undertaken and adults were collected. The study yielded 15 species belonging to 11 genera of family Libellulidae. The species were *Acisoma panorpoides panorpoides*, *Crocothemis servilia*, *Hydrobasileus croceus*, *Orthetrum anceps*, *Orthetrum pruinosum neglectum*, *Orthetrum sabina*, *Sympetrum meridionale*, *Orthetrum triangulare*, *Pantala flavescens*, *Palpopleura sexmaculata*, *Potamarcha obscura*, *Tholymis tillarga*, *Zygonyx torridus*, *Trithemis festiva* and *Sympetrum orientale*." (Authors)] Address: Fazlullah, Department of Agricultural Sciences, University of Haripur, KP, Pakistan

15602. Finley, M.L.D.; Kidd, K.A.; Curry, R.A.; Lescord, G.L.; Clayden, M.G.; O'Driscoll, N.J. (2016): A comparison of mercury biomagnification through lacustrine food webs supporting Brook Trout (*Salvelinus fontinalis*) and other salmonid fishes. *Frontiers in Environmental Science* 4 (Article23): 13 pp. (in English) ["Methylmercury (MeHg) bioaccumulation in lower-trophic-level organisms and its subsequent biomagnification through food webs differs in magnitude among lakes and results in intraspecific variability of

MeHg in top predator fishes. Understanding these differences is critical given the reproductive and neurotoxic effects of MeHg on fishes and their predators, including humans. In this study we characterized the food webs of five lakes in New Brunswick, Canada, supporting Brook Trout (*Salvelinus fontinalis*) using measures of relative trophic position ($\delta^{15}\text{N}$) and carbon sources ($\delta^{13}\text{C}$), determined the concentrations of MeHg in invertebrates and total Hg (THg) in fishes, and quantified MeHg biomagnification from primary to tertiary consumers. Methyl Hg and THg concentrations were highest in biota from lakes with lower pH. The trophic magnification slopes (TMS; $\log \text{Hg}$ vs. $\delta^{15}\text{N}$) varied significantly among lakes (0.13–0.20; ANCOVA, $p = 0.031$). When combined with data from other salmonid lakes in temperate and Arctic Canada ($n = 36$), among-system variability in TMS was best, but weakly, positively predicted by aqueous total phosphorous ($p = 0.028, 0.109$). These results suggest that lake productivity directly or indirectly influences the biomagnification of MeHg through diverse food webs supporting salmonids." (Authors)] Address: Kidd, Karen, Biology Department and Canadian Rivers Institute, University of New Brunswick, Saint John, NB, Canada. E-mail: kiddk@unb.ca

15603. Freeland-Riggert, B.T.; Cairns, S.H.; Poulton, B.C.; Riggert, C.M. (2016): Differences found in the macroinvertebrate community composition in the presence or absence of the invasive alien crayfish, *Orconectes hylas*. *PLoS ONE* 11(3): e0150199. doi:10.1371/journal.pone.0150199: 27 pp. (in English) ["Introductions of alien species into aquatic ecosystems have been well documented, including invasions of crayfish species; however, little is known about the effects of these introductions on macroinvertebrate communities. The woodland crayfish (*Orconectes hylas* (Faxon)) has been introduced into the St. Francis River watershed in southeast Missouri and has displaced populations of native crayfish. The effects of *O. hylas* on macroinvertebrate community composition were investigated in a fourth-order Ozark stream at two locations, one with the presence of *O. hylas* and one without. Significant differences between sites and across four sampling periods and two habitats were found in five categories of benthic macroinvertebrate metrics: species richness, percent/composition, dominance/diversity, functional feeding groups, and biotic indices. In most seasons and habitat combinations, the invaded site had significantly higher relative abundance of riffle beetles (Coleoptera: Elmidae), and significantly lower Missouri biotic index values, total taxa richness, and both richness and relative abundance of midges (Diptera: Chironomidae). Overall study results indicate that some macroinvertebrate community differences due to the *O. hylas* invasion were not consistent between seasons and habitats, suggesting that further research on spatial and temporal habitat use and feeding ecology of Ozark crayfish species is needed to improve our understanding of the effects of these invasions on aquatic communities." (Authors)] Address: Freeland-Riggert, B.T., Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, Missouri, USA. E-mail: Brandye.Freeland-Riggert@dnr.mo.gov

15604. Fujimoto, M.S.; Suvorov, A.; Jensen, N.O.; Clement, M.J.; Bybee, S.M. (2016): Detecting false positive sequence homology: a machine learning approach. *BMC Bioinformatics* (2016) 17:101. DOI 10.1186/s12859-016-0955-3: 11 pp. (in English) ["Background: Accurate detection of homologous relationships of biological sequences (DNA or amino acid) amongst organisms is an important and often difficult task that is essential to various evolutionary studies, ranging from building phylogenies to predicting functional gene annotations. There are many existing heuristic tools, most commonly based on bidirectional BLAST searches that are used to identify homologous genes and combine them into two fundamentally distinct classes: orthologs and paralogs. Due to only using heuristic filtering based on significance score cutoffs and having no cluster post-processing tools available, these methods can often produce multiple clusters constituting unrelated (non-homologous) sequences. Therefore sequencing data extracted from incomplete genome/transcriptome assemblies originated from low coverage sequencing or produced by de novo processes without a reference genome are susceptible to high false positive rates of homology detection. Results: In this paper we develop biologically informative features that can be extracted from multiple sequence alignments of putative homologous genes (orthologs and paralogs) and further utilized in context of guided experimentation to verify false positive outcomes. We demonstrate that our machine learning method trained on both known homology clusters obtained from OrthoDB and randomly generated sequence alignments (non-homologs), successfully determines apparent false positives inferred by heuristic algorithms especially among proteomes recovered from low-coverage RNA-seq data. Almost ~42 % and ~25 % of predicted putative homologies by InParanoid and HaMStR respectively were classified as false positives on experimental data set (For the experimental data set (OD_S) we used 18 Odonata (dragonflies and damselflies) and 2 Ephemeroptera (mayflies) species.). Conclusions: Our process increases the quality of output from other clustering algorithms by providing a novel post-processing method that is both fast and efficient at removing low quality clusters of putative homologous genes recovered by heuristic-based approaches." (Authors)] Address: Suvorov, A., Department of Biology, Brigham Young University, Provo, Utah 84602, USA. E-mail: antony.suvorov@byu.edu

15605. Golfieri, B.; Hardersen, S.; Maiolini, B.; Surian, N. (2016): Odonates as indicators of the ecological integrity of the river corridor: Development and application of the Odonate River Index (ORI) in northern Italy. *Ecological Indicators* 61(2): 234-247. (in English) ["The assessment of the ecological conditions of rivers is crucial for their appropriate management and restoration. Bioindicators commonly used to evaluate the river status (i.e. diatoms, aquatic macrophytes, benthic macroinvertebrates and fish) detect alterations of water quality, but are not particularly sensitive to hydromorphological degradation, which is another relevant pressure in river systems. Furthermore, those bioindicators are usually applied only to flowing channels. We developed

a new multimetric index, the Odonate River Index (ORI), to assess the conditions of the whole corridor in alluvial rivers. The ORI is a development of an evaluation system proposed in Austria, and based on the Odonate Habitat Index (OHI). Odonates were chosen as bioindicators for the ecological integrity of the river corridor, since this taxon provides information on the conditions of their aquatic breeding sites, as well as on the surrounding terrestrial areas, due to its amphibiotic life cycle. We used a case study of 18 reaches from six Italian Alpine rivers, characterized by different morphological conditions and level of human impact. Within each study reach, we selected four sites, both lotic and lentic sites. Dragonfly surveys consisted in field observation of adults, and collection of larvae and exuviae. To define the best sampling strategy, we compared the results of the ORI metrics obtained varying the input data by combining different sampling methods: the best compromise between effort and exhaustiveness was obtained coupling the observation of adults with the collection of exuviae. We found the ORI to be a robust and reliable tool to assess the status of the river corridor in a wide range of environmental conditions and river morphology, being particularly suitable to detect hydromorphological degradation and alterations of the structure of aquatic and riparian vegetation. We identified two limiting factors for the applicability of this index: low water temperatures of the main channel (i.e. mean annual value below 10 °C) and river reaches with no or scarce aquatic and riparian vegetation. In addition to the assessment of river conditions, the ORI could also be applied for monitoring the effects of river restoration actions." (Authors)] Address: Golfieri, B., Department of Geosciences, Univ. Padova, Via Gradenigo 6, 35131 Padova, Italy. E-mail: bruno.golfieri@unipd.it

15606. Hämäläinen, M. (2016): Description of *Heliocypha vantoli* spec. nov. from Siberut in the Mentawai Islands (Odonata: Chlorocyphidae). *Zootaxa* 4079(4): 495-500. (in English) ["*Heliocypha vantoli* Hämäläinen, spec. nov. [holotype ♂ from Indonesia, Mentawai Islands (off Sumatra), Siberut Island, 29-31 January 2013, deposited at RMNH, Leiden, The Netherlands] is described and illustrated for both sexes and compared with the *Heliocypha* species found in Sumatra and adjacent small islands. Notes on the Odonata fauna of the Mentawai Islands are also provided. *Euphaea aspasia* Selys, 1853 (Euphaeidae) is recorded as new to these islands; differences in the colour pattern of the Siberut and mainland Sumatran specimens are briefly discussed." (Author)] Address: Hämäläinen, M., Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: matti.hamalainen@helsinki.fi

15607. Hämäläinen, M. (2016): Catalogue of individuals commemorated in the scientific names of extant dragonflies, including lists of all available eponymous speciesgroup and genusgroup names – Revised edition. IDF-Report 92: 1-132. (in English) ["A catalogue of 1290 persons commemorated in the scientific names of extant dragonflies (Odonata) is presented together with brief biographical information for each entry, typically the full name and year of birth and death (in case of a deceased person). For each

individual a list is given of all available species, subspecies, genus or subgenus names erected in his or her honour. In total 2021 available names which qualify as eponyms are listed. These comprise 1966 speciesgroup and 55 genusgroup names including synonyms and homonyms. It is calculated that of the ca 8550 available speciesgroup names in extant Odonata, ca 23 % are eponyms. Of the 1065 new speciesgroup names introduced between 1 January 1995 and 31 December 2015, 435 (40.8 %) are eponyms." (Author)] Address: Hämäläinen, M., Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: libellago@gmail.com

15608. Harabis, F. (2016): High diversity of odonates in post-mining areas: Meta-analysis uncovers potential pitfalls associated with the formation and management of valuable habitats. *Ecological Engineering* 90: 438-446. (in English) ["A growing number of studies indicate high conservation potential of freshwater habitats occurring in post-mining areas. The overall diversity of these habitats depends on many factors, however, even a high diversity may diminish significantly over time. Therefore, it is difficult to identify and understand the importance of key habitat properties for diversity. Here I present analysis of three studies comparing the diversity of dragonflies and damselflies (Odonata). Each study was performed in different coal mining basins within the Czech Republic (a total of 94 sites). In this analysis, I used generalized linear mixed models and several multivariate methods to analyze the effects of a number of environmental characteristics such as depth, bottom substrate or bank slope, reflecting not only the current quality but also the succession and formation of individual pools. The occurrence of overall 14 nationally red listed species indicates the high conservation value of these habitats, while the 40 species found indicate that these areas contribute significantly to regional diversity. Species richness of individual pools was associated with habitat type (spoil heap vs. mine subsidence) and with several habitat variables, in particular the character of vegetation around aquatic habitats. In conclusion, the results indicate that diversity and species composition are significantly influenced by factors reflecting the formation and subsequent succession of pools. Effective conservation management should concentrate primarily on modifying pools' initial properties such as bottom substrate. Subsequent management should then sustain landscape dynamics, which means in particular to sustain minor disturbances that subsequently affect vegetation succession and prevent excessive overgrowing of expansive vegetation, as doing so is promoting the habitat heterogeneity which is essential to high biodiversity in these areas." (Author)] Address: Harabiš, F., Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, CZ-165 21 Prague 6, Czech Republic. E-mail: harabis.f@gmail.com

15609. Hasenbein, S.; Lawler, S.P.; Geist, J.; Connon, R.E. (2016): A long-term assessment of pesticide mixture effects on aquatic invertebrate communities. *Environmental Toxi-*

cology and Chemistry 35(1): 218-232. (in English) ["To understand the potential effects of pesticide mixtures on aquatic ecosystems, studies that incorporate increased ecological relevance are crucial. Using outdoor mesocosms, the authors examined long-term effects on aquatic invertebrate communities of tertiary mixtures of commonly used pesticides: 2 pyrethroids (permethrin, I-cyhalothrin) and an organophosphate (chlorpyrifos). Application scenarios were based on environmentally relevant concentrations and stepwise increases of lethal concentrations from 10% (LC10) to 50% (LC50) based on laboratory tests on *Hyalella azteca* and *Chironomus dilutus*; repeated applications were meant to generally reflect runoff events in a multiple-grower or homeowner watershed. Pyrethroids rapidly dissipated from the water column, whereas chlorpyrifos was detectable even 6wk after application. Twelve of 15 macroinvertebrate and 10 of 16 zooplankton taxa responded to contaminant exposures. The most sensitive taxa were the snail *Radix* sp., the amphipod *H. azteca*, the water flea *Daphnia magna*, and copepods. Environmentally relevant concentrations had acute effects on *D. magna* and *H. azteca* (occurring 24 h after application), whereas lag times were more pronounced in *Radix* sp. snails and copepods, indicating chronic sublethal responses. Greatest effects on zooplankton communities were observed in environmentally relevant concentration treatments. The results indicate that insecticide mixtures continue to impact natural systems over multiple weeks, even when no longer detectable in water and bound to particles. Combinations of indirect and direct effects caused consequences across multiple trophic levels. ... Summed over the present study period, Zygoptera represented the largest portion of macroinvertebrate abundance (20.9%), followed by the pulmonate snail *Radix* sp. (14.8%) and the amphipod *H. azteca* (13.2%). ... Between the 2 Odonata suborders, the chemical exposure had a greater effect on Anisoptera (positive trend) than Zygoptera. ... Zygoptera was the third most sensitive taxon and displayed a decreased abundance in LC-Chiro in week 2. ... Anisoptera abundance did not significantly deviate from the control over the course of the present study period but displayed a positive trend in all treatments from week 2 to week 5. This trend was not visible in the Odonata abundance, possibly because Anisoptera and Zygoptera responded in opposite directions. ... Zygoptera was the only taxon for which a decrease in emergence was detected." (Authors)] Address: Hasenbein, Simone, Dept of Anatomy, Physiology & Cell Biology, School of Veterinary Medicine, Univ. of California, Davis, California, USA. E-mail: shasenbein@ucdavis.edu

15610. Haug, J.T.; Haug, C.; Garwood, R.J. (2016): Evolution of insect wings and development – new details from Palaeozoic nymphs. *Biological Reviews* 91(1): 53-69. (in English) ["The nymphal stages of Palaeozoic insects differ significantly in morphology from those of their modern counterparts. Morphological details for some previously reported species have recently been called into question. Palaeozoic insect nymphs are important, however – their study could

provide key insights into the evolution of wings, and complete metamorphosis. Here we review past work on these topics and juvenile insects in the fossil record, and then present both novel and previously described nymphs, documented using new imaging methods. Our results demonstrate that some Carboniferous nymphs – those of Palaeodictyopteroidea – possessed movable wing pads and appear to have been able to perform simple flapping flight. It remains unclear whether this feature is ancestral for Pterygota or an autapomorphy of Palaeodictyopteroidea. Further characters of nymphal development which were probably in the ground pattern of Pterygota can be reconstructed. Wing development was very gradual (archimeta-boly). Wing pads did not protrude from the tergum posterolaterally as in most modern nymphs, but laterally, and had well-developed venation. The modern orientation of wing pads and the delay of wing development into later developmental stages (condensation) appears to have evolved several times independently within Pterygota: in Ephemeroptera, Odonoptera, Eumetabola, and probably several times within Polyneoptera. Selective pressure appears to have favoured a more pronounced metamorphosis between the last nymphal and adult stage, ultimately reducing exploitation competition between the two. We caution, however, that the results presented herein remain preliminary, and the reconstructed evolutionary scenario contains gaps and uncertainties. Additional comparative data need to be collected. The present study is thus seen as a starting point for this enterprise." (Authors)] Address: Haug, J.T., Functional Morphology, Department of Biology II, GeoBio-Center, LMU Munich, Planegg-Martinsried, Germany. E-mail: joachim.haug@palaeo-evo-devo.info

15611. Hill, M.J.; Sayer, C.D.; Wood, P.J. (2016): When is the best time to sample aquatic macroinvertebrates in ponds for biodiversity assessment? *Environmental Monitoring and Assessment* 188:194: 11 pp. (in English) ["Ponds are sites of high biodiversity and conservation value, yet there is little or no statutory monitoring of them across most of Europe. There are clear and standardised protocols for sampling aquatic macroinvertebrate communities in ponds, but the most suitable time(s) to undertake the survey(s) remains poorly specified. This paper examined the aquatic macroinvertebrate communities from 95 ponds within different land use types over three seasons (spring, summer and autumn) to determine the most appropriate time to undertake sampling to characterise biodiversity. The combined samples from all three seasons provided the most comprehensive record of the aquatic macroinvertebrate taxa recorded within ponds (alpha and gamma diversity). Samples collected during the autumn survey yielded significantly greater macroinvertebrate richness (76 % of the total diversity) than either spring or summer surveys. Macroinvertebrate diversity was greatest during autumn in meadow and agricultural ponds, but taxon richness among forest and urban ponds did not differ significantly temporally. The autumn survey provided the highest measures of richness for Coleoptera, Hemiptera and Odonata. However, richness of the aquatic insect order Trichoptera was highest in spring and

lowest in autumn. The results illustrate that multiple surveys, covering more than one season, provide the most comprehensive representation of macroinvertebrate biodiversity. When sampling can only be undertaken on one occasion, the most appropriate time to undertake surveys to characterise the macroinvertebrate community biodiversity is during autumn, although this may need to be modified if other floral and faunal groups need to be incorporated into the sampling programme." (Authors)] Address: Hill, M.J., Centre for Hydrological and Ecosystem Science, Department of Geography, Loughborough University, Loughborough LE11 3TU Leicestershire, UK. E-mail: M.J.Hill@lboro.ac.uk

15612. Holzinger, W.E. (2016): In memoriam Wilfried Stark (1947–2015). *Entomologica Austriaca* 23: 197–201. (in German) [Austria, obituary; 7. Dezember 1947 - 25. September 2015] Address: Holzinger, W., Ökoteam - Institut für Tierökologie und Naturraumplanung, Bergmannsgasse 22, 8010 Graz, Austria. E-Mail: holzinger@oekoteam.at

15613. Hossie, T.J.; Murray, D.L. (2016): Spatial arrangement of prey affects the shape of ratio-dependent functional response in strongly antagonistic predators. *Ecology* 97(4): 834–841. (in English) ["Predators play a key role in shaping natural ecosystems, and understanding the factors that influence a predator's kill rate is central to predicting predator-prey dynamics. While prey density has a well-established effect on predation, it is increasingly apparent that predator density also can critically influence predator kill rates. The effects of both prey and predator density on the functional response will, however, be determined in part by their distribution on the landscape. To examine this complex relationship we experimentally manipulated prey density, predator density, and prey distribution using a tadpole (prey) - dragonfly nymph (predator) system. Predation was strongly ratio-dependent irrespective of prey distribution, but the shape of the functional response changed from hyperbolic to sigmoidal when prey were clumped in space. This sigmoidal functional response reflected a relatively strong negative effect of predator interference on kill rates at low prey: predator ratios when prey were clumped. Prey aggregation also appeared to promote stabilizing density-dependent intra-guild predation in our system. We conclude that systems with highly antagonistic predators and patchily distributed prey are more likely to experience stable dynamics, and that our understanding of the functional response will be improved by research that examines directly the mechanisms generating interference." (Authors)] Address: Hossie, T., Department of Biology, Trent University, Peterborough, Ontario, Canada. E-mail: thossie@trentu.ca

15614. Ilvonen, J.J.; Kaunisto, K.M.; Suhonen, J. (2016): Are sexes equally parasitized in damselflies and dragonflies? *Oikos* 125: 315–325. (in English) ["Parasitism plays an essential part in ecology and evolution of host species and understanding the reasons for differential parasitism within and among hosts species is therefore important. Among the very important factors potentially affecting parasitism is the gender of the host. Here, we studied whether either females

or males are more likely to harbour parasites among odonatan insects, by relying on an extensive literature review and new field data. We collected data on numerous dragonfly and damselfly species and their ectoparasites (water mites) and endoparasites (gregarines) to examine the generality of similarities and differences in prevalence, intensity and maximum number of parasites of male and female hosts. We found three main results. Firstly, most of the odonate host species showed no differences between sexes in either gregarine or water mite prevalence and intensity. The only exception was female damselflies' higher gregarine prevalence and intensity compared to conspecific males. These inequalities in gregarine parasitism may be due to behavioural and physiological differences between conspecific males and females. In comparison, there were no differences in dragonflies between sexes in water mite or gregarine prevalence and intensity. Secondly, damselflies had higher prevalence and intensity levels of both gregarine and water mite parasites compared to dragonflies. Finally, we found a strong species level pattern between female and male parasitism: a certain level of gregarine or water mite parasitism in one sex was matched with a similar parasitism level for the other. This indicates similar exposure and susceptibility to parasites on both sexes. Even though significant differences of parasite levels between the sexes were observed within certain host species, our results strongly suggest that on a general level a more parasitized sex does not exist in the order, Odonata." (Authors)] Address: Ilvonen, J.J., Dept Biology, Univ. of Turku, 20014 Turku, Finland. E-mail: jjilvo@utu.fi

15615. Jakob, C.; Poulin, B. (2016): Indirect effects of mosquito control using Bti on dragonflies and damselflies (Odonata) in the Camargue. *Insect Conservation and Diversity* 9: 161-169. (in English) ["(1.) *Bacillus thuringiensis* var. *israelensis* (Bti) has become the most commonly used larvicide to control mosquitoes worldwide. Bti is considered non-toxic to most organisms, except some Diptera such as chironomids, which are a major prey in wetland food webs. (2.) Although Odonata are important predators of mosquitoes and chironomids at the larval and adult stages, no study has ever considered the potential indirect effects of Bti on Odonata abundance through trophic interactions. We addressed this topic in the Camargue where 2500 of the 25 000 ha of mosquito larval biotopes are Bti-sprayed (aqueous solution of VectoBac 12AS at 2.5 L ha⁻¹) whenever mosquito larvae appear in water bodies (i.e. 30–50 aerial treatments overall annually). (3.) Adult Odonata were surveyed along a 100-m line transect in spring, summer and autumn at three control and three treated sites over a 5-year period. (4.) Mean number of species (9.9 vs. 5.2) and of individuals (100 vs. 50) detected per year were significantly higher in control areas compared to Bti-sprayed areas. Bti treatment contributed to 87.3% of the explained variance in Odonata richness, compared to 2.9% for site, 6.8% for year and 3.0% for salinity effects. (5.) These results are coherent with other studies carried out in the same area and time period highlighting a lower abundance of chironomids, and a lower intake of odonates by breeding birds in treated areas.

(6.) We conclude that mosquito control using Bti should be acknowledged as a potential threat to Odonata." (Authors)] Address: Poulin, Brigitte, Tour du Valat, Le Sambuc, 13200 Arles, France. E-mail: poulin@tourduvalat.org

15616. Jeremiason, J.D.; Reiser, T.K.; Weitz, R.A.; Berndt, M.E.; Aiken, G.R. (2016): Aeshnid dragonfly larvae as bio-indicators of methylmercury contamination in aquatic systems impacted by elevated sulfate loading. *Ecotoxicology* 25(3): 456-468. (in English) ["Methylmercury (MeHg) levels in dragonfly larvae and water were measured over two years in aquatic systems impacted to varying degrees by sulfate releases related to iron mining activity. This study examined the impact of elevated sulfate loads on MeHg concentrations and tested the use of MeHg in dragonfly larvae as an indicator of MeHg levels in a range of aquatic systems including 16 river/stream sites and two lakes. MeHg concentrations in aeshnid dragonfly larvae were positively correlated ($R^2 = 0.46$, $p < 0.01$) to peak MeHg concentrations in the dissolved phase for the combined years of 2012 and 2013. This relation was strong in 2012 ($R^2 = 0.85$, $p < 0.01$), but showed no correlation in 2013 ($R^2 = 0.02$, $p > 0.05$). MeHg in dragonfly larvae were not elevated at the highest sulfate sites, but rather the reverse was generally observed. Record rainfall events in 2012 and above average rainfall in 2013 likely delivered the majority of Hg and MeHg to these systems via interflow and activated groundwater flow through reduced sediments. As a result, the impacts of elevated sulfate releases due to mining activities were not apparent in these systems where little of the sulfate is reduced. Lower bioaccumulation factors for MeHg in aeshnid dragonfly larvae were observed with increasing dissolved organic carbon (DOC) concentrations. This finding is consistent with previous studies showing that MeHg in high DOC systems is less bioavailable; an equilibrium model shows that more MeHg being associated with DOC rather than algae at the base of the food chain readily explains the lower bioaccumulation factors." (Authors)] Address: Jeremiason, J.D., Gustavus Adolphus College, St Peter, MN 56082, USA. E-mail: jjeremia@gustavus.edu

15617. Jisha Krishnan, E. K.; Sebastian, C. D. (2016): Analysis of phylogenetic status of different *Neurothemis* (Odonata:libellulidae) species using Cytochrome Oxidase I gene sequence. *Global Journal For Research Analysis* 5(3): 85-87. (in English) ["Here we have analysed the phylogenetic relationships of three different species of *Neurothemis* (*tullia*, *intermedia*, *fulvia*) by the partial sequencing of mitochondrial cytochrome oxidase subunit I (COI) gene. Phylogenetic tree constructed by Neighbour joining method proved that *Neurothemis tullia* and *Neurothemis intermedia* are taxonomically more closer and they together formed a single clade in the tree. *Neurothemis fulvia* is sister to this clade but it represents the most diverged species in terms of branch length and nucleotide substitution. Comparison with the retrieved sequences confirmed that it strictly belong to Libellulidae family. The tree also depicted that *Neurothemis* genus is more close to *Orthetrum sabina* than *Diplacodes trivialis*. Hence the study concluded that DNA

barcoding is an invaluable tool for confirming the species identification and to assess the proper phylogenetic relationships." (Authors)] Address: Sebastian, C. D., Molecular Biology Lab., Dept of Zoology, Univ. Calicut, Kerala, India

15618. Jones, D.K.; Hua, J.; Relyea, R.A. (2016): Effects of endosulfan in freshwater pond communities. *Freshwater Science* 35(1): 152-163. (in English) ["Pesticide use has led to ubiquitous contamination of natural habitats that can cause direct and indirect effects on nontarget organisms. Laboratory toxicity tests are valuable for evaluating the direct lethal effects of pesticides, but whether species differences in sensitivity identified from such tests are representative of more natural conditions is unknown. Studies of pesticide effects on communities are needed to understand the indirect effects of pesticides, but many such studies are focused on simplified communities and overlook the contribution of higher trophic levels (i.e., lethal predators), which can have interactive effects with pesticides and may play a large role in influencing community dynamics in contaminated habitats. Much of the research investigating pesticides in communities has focused on organophosphates, carbamates, and pyrethroids, whereas organochlorines are understudied, despite the fact that they can be highly toxic and persist in the environment. We investigated the effect of the organochlorine insecticide endosulfan on aquatic food webs composed of 3 tadpole species, vertebrate and invertebrate predators, zooplankton, and algae. We manipulated endosulfan concentrations (0, 0.2, 3.1, and 27.3 µg/L) and free-ranging predators (adult red-spotted newts [*Notophthalmus viridescens*] and dragonfly larvae [*Anax junius*]). Endosulfan caused direct lethal effects on tadpoles, red-spotted newts, and copepods. Patterns of species sensitivity were consistent with past laboratory experiments. Free-ranging predators caused additive, negative effects on tadpole survival, and affected anuran time to and size at metamorphosis. Our study demonstrated that endosulfan can initiate a wide range of direct and indirect effects on nontarget organisms and interacts additively with lethal predators." (Authors).] Address: Jones, D.K., Dept of Biological Sciences, Rensselaer Polytechnic Institute, Troy, New York 12180 USA. E-mail: jonesd11@rpi.edu

15619. Jun, Y.-C.; Kim, N.-Y.; Kim, S.-H.; Park, Y.-S.; Kong, D.-S.; Hwang, S.-J. (2016): Spatial distribution of benthic macroinvertebrate assemblages in relation to environmental variables in Korean nationwide streams. *Water* 2016, 8(1), 27; doi:10.3390/w8010027: 20 pp. (in English) ["Conserving and enhancing freshwater biodiversity are global issues to ensure ecosystem integrity and sustainability. To meet this, it is critical to understand how the biological assemblages are determined by environmental gradients in different spatial scales. Nevertheless, information on their large-scale environmental relationships remains scarce in Korea. We aimed to understand nationwide spatial distribution patterns of benthic macroinvertebrates and important environmental factors affecting their distribution in 388 streams and rivers across Korea. A total of 340 taxa, be-

longing to 113 families in 23 orders of five phyla, were identified. Assemblage composition in most Korean streams included a few predominant colonizers and a majority of rare taxa. Cluster analysis based on benthic macroinvertebrates classified a total of 720 sampling sites into five clusters according to the pollution levels from fast-flowing less polluted streams with low electrical conductivity to moderately or severely polluted streams with high electrical conductivity and slow water velocity. Canonical correspondence analysis revealed that altitude, water velocity and streambed composition were the most important determinants, rather than watershed and water chemistry variables, for explaining the variation in macroinvertebrate assemblage patterns. The results provide basic information for establishing the conservation and restoration strategies of macroinvertebrate biodiversity against anthropogenic disturbances and developing more confident bio-assessment tools for diagnosing stream ecosystem integrity." (Authors) Odonata are treated at the order level.] Address: Hwang, S.-J., Department of Environmental Health Science, Konkuk University, Seoul 143-701, Korea

15620. Kalkman, V.J.; Gyeltshen, T. (2016): Records of dragonflies from western Bhutan collected in October 2015. IDF-Report 94: 1-15. (in English) ["Distribution data of dragonflies and damselflies from western Bhutan collected during a trip from 10 October 2015 to 22 October 2015 are presented. In total 53 species were recorded of which eleven are new to the country (*Aciagrion pallidum*, *Anisopleura lestoides*, *Megalestes irma*, *Gynacantha incisura*, *Gynacantha khasiaca*, *Gynacanthaeschna sikkima*, *Lamelligomphus risi*, *Somatochlora daviesi*, *Crocothemis erythraea*, *Sympetrum fonscolombii*, *Tholymis tillarga*). Another three species, one *Megalestes* and two *Cephaloeschna*, were not identified to species level but are also addition to the list of species recorded from Bhutan." (Authors)] Address: Gyeltshen, T., School of Life Sciences, Sherubtse College, Kanglung, Bhutan. E-mail: thinleytshen@gmail.com

15621. Kassner, Z.; Dafni, E.; Ribak, G. (2016): Kinematic compensation for wing loss in flying damselflies. *Journal of Insect Physiology* 85(1): 1-9. (in English) ["Highlights: •*Ischnura elegans* can fly using only three of their wings. •We compare the wingbeat kinematics of four-winged flight with three-winged flight. •In three-winged flight the insects increased wingbeat frequency. •The increase was sufficient to explain compensation for loss in total wing area. •The flapping of the remaining wings changed to allow steady flight. Abstract: Flying insects can tolerate substantial wing wear before their ability to fly is entirely compromised. In order to keep flying with damaged wings, the entire flight apparatus needs to adjust its action to compensate for the reduced aerodynamic force and to balance the asymmetries in area and shape of the damaged wings. While several studies have shown that damaged wings change their flapping kinematics in response to partial loss of wing area, it is unclear how, in insects with four separate wings, the remaining three wings compensate for the loss of a fourth

wing. We used high-speed video of flying *I. elegans* to identify the wingbeat kinematics of the two wing pairs and compared it to the flapping kinematics after one of the hindwings was artificially removed. The insects remained capable of flying and precise maneuvering using only three wings. To compensate for the reduction in lift, they increased flapping frequency by $18\% \pm 15.4\%$ on average. To achieve steady straight flight, the remaining intact hindwing reduced its flapping amplitude while the forewings changed their stroke plane angle so that the forewing of the manipulated side flapped at a shallower stroke plane angle. In addition, the angular position of the stroke reversal points became asymmetrical. When the wingbeat amplitude and frequency of the three wings were used as input in a simple aerodynamic model, the estimation of total aerodynamic force was not significantly different (paired t-test, $p=0.73$) from the force produced by the four wings during normal flight. Thus, the removal of one wing resulted in adjustments of the motions of the remaining three wings, exemplifying the precision and plasticity of coordination between the operational wings. Such coordination is vital for precise maneuvering during normal flight but it also provides the means to maintain flight when some of the wings are severely damaged." (Authors)] Address: Kassner, Z., Dept Zoology, Fac. Life Sciences, Tel Aviv University, 6997801, Israel

15622. Kastner, F.; Buchwald, R.; Kömer, F.; Marxmeier, U.; Steffens, P.; Winkler, C.-; Jödicke, K.; Mauschering, I. (2016): Wiederansiedlungen als Maßnahmen des Artenschutzes. Die Grüne Mosaikjungfer (*Aeshna viridis*, Odonata) in Niedersachsen und Schleswig-Holstein – ein Beitrag zum Habitatverbund. *Naturschutz und Landschaftsplanung* 48(3): 87-96. (in German, with English summary) ["Reintroduction as a method of species conservation for the Green Hawker (*Aeshna viridis*) – Contribution to habitat networking in Lower Saxony and Schleswig-Holstein - Habitat loss results in a continuous species decline. Options to stop the decline include the improvement of habitat quality or habitat connectivity and in this context also the reintroduction of species to their former range. This paper presents three species conservation projects in Northern Germany aiming to reintroduce and stabilize the rare and protected dragonfly species Green Hawker (*Aeshna viridis*). The dragonfly *A. viridis* is strongly associated with the Water Soldier (*Stratiotes aloides*) as highly specified plant species for oviposition. In two of the projects *S. aloides* was reintroduced in ponds and ditches in order to establish suitable habitats for *A. viridis*. The results showed that the reintroduction of *S. aloides* can be successfully implemented but does not always succeed. Beside the plants the dragonfly species could also be reintroduced indirectly, either as egg or larvae, by transferring it together with the plants. In the third project larvae of *A. viridis* were reintroduced in a second phase after an efficient resettlement of *S. aloides* some years earlier, since the dragonfly had not been successfully transferred together with the plant." (Authors)] Address: Kastner, Friederike, AG Vegetationskunde und Naturschutz, IBU, Carl von Ossietzky Universität Oldenburg, 26111 Oldenburg, Germany. E-Mail: Friederike.Kastner@uni-oldenburg.de

15623. Kautza, A.R.; Sullivan, S.M.P. (2016): The energetic contributions of aquatic primary producers to terrestrial food webs in a mid-size river system. *Ecology* 97(3): 694-705. (in English) ["Rivers are increasingly recognized as providing nutritional subsidies (i.e., energy and nutrients) to adjacent terrestrial food webs via depredation of aquatic organisms (e.g., emergent aquatic insects, crayfish, fish) by terrestrial consumers. However, because these prey organisms assimilate energy from both aquatic (e.g., benthic algae, phytoplankton, aquatic macrophytes) and terrestrial (e.g., riparian leaf detritus) primary producers, river subsidies to terrestrial consumers represent a combination of aquatically- and terrestrially-derived energy. To date, the explicit contribution of energy derived from aquatic primary producers to terrestrial consumers has not been fully explored yet might be expected to be quantitatively important to terrestrial food webs. At 12 reaches along a 185-km segment of the 6th-order Scioto River system (Ohio, USA), we quantified the relative contribution of energy derived from aquatic primary producers to a suite of terrestrial riparian consumers that integrate the adjacent landscape across multiple spatial scales through their foraging activities (tetragnathid spiders, rove beetles, adult coenagrionid damselflies, riparian swallows, and raccoons). We used naturally-abundant stable isotopes (^{13}C and ^{15}N) of periphyton, phytoplankton, macrophytes, and terrestrial vegetation to evaluate the energetic contribution of aquatic primary producers to terrestrial food webs. Shoreline tetragnathid spiders were most reliant on aquatic primary producers (50%), followed by wider-ranging raccoons (48%), damselflies (44%), and riparian swallows (41%). Of the primary producers, phytoplankton (19%) provisioned the greatest nutritional contribution to terrestrial consumers (considered collectively), followed by periphyton (14%) and macrophytes (11%). Our findings provide empirical evidence that aquatic primary producers of large streams and rivers can be a critical nutritional resource for terrestrial food webs. We also show that aquatically-derived nutrition contributes to both shoreline and broader-ranging terrestrial consumers and thus may be an important landscape-scale energetic linkage between rivers and upland habitats." (Authors)] Address: Kautza, A.R., Univ. of Minnesota Fisheries, Wildlife, & Conservation Biology, USA. E-mail: arkautza@umn.edu

15624. Kohli, M.K.; Ware, J.L.; Bechly, G. (2016): How to date a dragonfly: Fossil calibrations for odonates. *Palaeontologia Electronica* 19.1.1FC: 14 pp. (in English) ["Molecular data along with fossils are being used increasingly to recover time-calibrated phylogenetic trees. Recently there have been manuscripts that have used divergence dating to understand evolutionary history of certain clades within Odonata (dragonflies and damselflies), yet the number of such articles is still low. We examined the Odonata fossil record and made a list of fossils that can be used for divergence time analysis. In this manuscript we provide a detailed review of the known crown group fossils for the order Odonata and nine nodes within this clade: Zygoptera, Epiprocta, Anisoptera, Aeshnidae, Gomphidae, Cavilabiata, Macromiidae, Corduliidae, and Libellulidae." (Authors)] Address: Bechly, G., Dept of Paleontology,

State Museum of Natural History, Rosenstein 1, 70191 Stuttgart, Germany. E-mail: guenter.bechly@smns-bw.de

15625. Kosterin, O.E.; Yokoi, N. (2016): *Asiagomphus reinhardti* sp. nov. (Odonata, Gomphidae) from eastern Cambodia and southern Laos. *Zootaxa* 4103(1): 35-42. (in English) ["*Asiagomphus reinhardti* sp. nov. is described by two males from Annamense Mountains in eastern Cambodia (holotype: Cambodia, Mondulkiri Province, the left tributary of the main river downstream from Buu Sraa Waterfall, 12°34'01"–19° N 107°24'50"–25°03" E, ca 450 m a.s.l., 15 vi 2014, RMNH) and southern Laos. The species is characterised by a large caudal lobe on S10 in males and a blunt medial lateroventral projection at cercus." (Authors)] Address: Yokoi, N., 32-37-11, Kaisei, Koriyama, Fukushima, 963-8851 Japan. E-mail: yokoi@orange.plala.or.jp

15626. Kubohara, T.; Ii, H. (2016): Cu, Co and Ni Contamination index for river using river insects and river plants. *International Journal of GEOMATE* 11(26): 2651-2658. (in English) ["Useful species as an index of metal contamination needs a high metal concentration in a contaminated area and low metal concentration in a non-contaminated area. Moreover, it needs a high metal concentration factor. Metal concentrations of moss were high in the Cu mine area (31 to 21,000 and 2 to 200 mg/kg-dry for Cu and Co) and were low in the other areas (2 to 87 and 2 to 33 mg/kg-dry for Cu and Co). Ni concentrations of caddice-worm were high in the serpentinite area (9 to 590 mg/kg-dry) and were low in the other areas (2 to 74 mg/kg-dry). Moss had the highest concentration factor (160,000, 4,600 and 59,000 for Cu, Co and Ni) among river plants. Therefore, it was clarified that moss was useful species for an index of Cu, Co and Ni contamination among river plants based upon its metal concentration and concentration factor. In river insects, metal concentrations of crane fly larva were high in the Cu mine area (50 to 1,400 and 1 to 82 mg/kg-dry for Cu and Co) and were low in the other areas (11 to 130 and 0.7 to 10 mg/kg-dry for Cu and Co). Crane fly larva had the highest concentration factor for Cu (46,000) and also kept high concentration factor for Co (2,700) among river insects. Ni concentrations of caddice-worm were high in the serpentinite area (52 to 220 mg/kg-dry) and were low in the other areas (0.3 to 20 mg/kg-dry). Caddice-worm had the highest Ni concentration factor (22,000) among river insects. Therefore, it was clarified that crane fly larva was useful species for an index of Cu and Co contamination and caddice-worm was useful species for an index of Ni contamination based upon their metal concentrations and concentration factors." (Authors)] Address: Kubohara, T., Graduate School of Systems Engineering, Wakayama University, Japan

15627. Lacerda dos Santos, N.C.; Soares de Santana, H.; Dias, R.M.; Ferreira Borges, H.L.; Ferreira de Melo, V.; Severi, W.; Gomes, L.C.; Agostinho, A.A. (2016): Distribution of benthic macroinvertebrates in a tropical reservoir cascade. *Hydrobiologia* 765: 265-275. (in English) ["The functioning of systems arranged in cascades of reservoirs can be explained by the Cascading Reservoir Continuum

Concept, providing a theoretical framework for addressing ecological processes. In this context, this study tested the following hypotheses: (i) the benthic macroinvertebrate assemblage shows a nested distribution along a reservoir cascade; and (ii) local factors explain the structure of the benthic assemblage in every reservoir along the cascade. Macroinvertebrates play essential role in aquatic systems, especially due to recycling and, in reservoirs, as important links in every food chain. Sampling was conducted quarterly between October 2006 and September 2010 in six reservoirs located in the São Francisco River, Brazil. The benthic macroinvertebrate assemblage showed nested distribution in the reservoirs, indicating that a loss of species occurs along the cascade. Each reservoir presented a different set of variables that explained the distribution of macroinvertebrates, showing the importance of local factors determining the composition and distribution of benthic assemblages in the reservoirs. Therefore, there is a clear interaction between the position of a reservoir along a cascade and the macroinvertebrate assemblages, which indicate the importance of considering this pattern during the decision-making process of constructing new dams on rivers already regulated." (Authors) The list of taxa includes 'Coenagrionidae' and 'Gomphidae'.] Address: Lacerda dos Santos, Natália Carneiro Núcleo de Pesquisas em Limnologia, Ictiologia e Aquicultura – Programa de Pós-graduação em Ecologia de Ambientes Aquáticos Continentais, Univ. Estadual de Maringá, Av. Colombo, 5790, Maringá, PR, CEP 87020-900, Brazil. E-mail: natalia.ictio@gmail.com

15628. Lee, H.-J.; Johansson, F. (2016): Compensating for a bad start: compensatory growth across life stages in an organism with a complex life cycle. *Canadian Journal of Zoology* 94(1): 41-47. (in English) ["Organisms with a complex life cycle are characterized by a life history shift through metamorphosis, and include organisms such as insects and amphibians. They must optimize their use of resources and behaviour across different life stages in order to maximize their fitness. An interesting question with regard to such life history shifts is whether growth in the juvenile stage can be compensated for in the adult stage. Here we ask whether damselflies are able to compensate for depressed growth during the juvenile aquatic stage in their terrestrial adult stage. Damselflies emerge at a fixed adult body size, but feed during the adult stage and are thus able to gain mass as adults. We performed a mark recapture study in order to answer whether individuals that emerge from metamorphosis with a low mass are able to compensate by subsequent mass gain during the adult stage. Results showed that compensatory mass gain occurred in the adult stage such that small individuals gained more mass than large individuals. We also found that females gained more mass than males. However, individuals that emerged at a low mass still had lower mass as mature adults than individuals that emerged at a high mass, suggesting that compensation was not complete. This suggests that larval ecology and adult fitness are tightly linked and future research should focus more on elucidating the nature of this relationship." (Authors) *Lestes sponsa*] Address: Johansson, F., Department of Ecology

and Genetics, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, 752 36 Uppsala, Sweden. E-mail: frank.johansson@ebc.uu.se

15629. Letsch, H.; Gottsberger, B.; Ware, J.L. (2016): Not going with the flow: a comprehensive time-calibrated phylogeny of dragonflies (Anisoptera: Odonata: Insecta) provides evidence for the role of lentic habitats on diversification. *Molecular Ecology* 25(6): 1340-1353. (in English) ["Ecological diversification of aquatic insects has long been suspected to have been driven by differences in freshwater habitats, which can be classified into flowing (lotic) waters, and standing (lentic) waters. The contrasting characteristics of lotic and lentic freshwater systems imply different ecological constraints on their inhabitants. The ephemeral and discontinuous character of most lentic water bodies may encourage dispersal by lentic species in turn reducing geographical isolation among populations. Hence, speciation probability would be lower in lentic species. Here, we assess the impact of habitat use on diversification patterns in dragonflies (Anisoptera: Odonata). Based on eight nuclear and mitochondrial genes, we inferred species diversification with a model-based evolutionary framework, to account for rate variation through time and among lineages, and to estimate the impact of larval habitat on the potentially non-random diversification among anisopteran groups. Ancestral state reconstruction revealed lotic fresh water systems as their original primary habitat, while lentic waters have been colonised independently in Aeshnidae, Corduliidae and Libellulidae. Furthermore, our results indicate a positive correlation of speciation and lentic habitat colonisation by dragonflies: speciation rates increased in lentic Aeshnidae and Libellulidae, whereas they remain mostly uniform among lotic groups. This contradicts the hypothesis of inherently lower speciation in lentic groups and suggests species with larger ranges are more likely to diversify, perhaps due to higher probability of larger areas being dissected by geographical barriers. Furthermore, larger range sizes may comprise more habitat types, which could also promote speciation by providing additional niches, allowing the coexistence of emerging species." (Authors)] Address: Letsch, H., Dept Botanik & Biodiversitätsforschung, Univ. Wien, Rennweg 14, 1030 Vienna, Austria. E-mail: harald.letsch@univie.ac.at

15630. Lima, F.P.; Nobile, A.B.; Freitas-Souza, D.; Carvalho, E.D.; Vidotto-Magnoni, A.P. (2016): Feeding ecology of *Rhinodoras dorbignyi* (Kner, 1855) (Siluriformes: Doradidae) in the Paranapanema River, SP, Brazil. *Biotemas* 29(1): 67-73. (in English, with Portuguese summary) ["Studies describing the diet of fish are important to determine trophic chain relationships, habitat occupation, trophic niches, and to define food habits of species. To describe the diet of *Rhinodoras dorbignyi*, six collections were made bi-monthly in the upper Paranapanema River, SP, from April 2010 to February 2011. Of the 63 samples collected, 30 had stomach content. The diet of this species was determined using two methods: (i) alimentary index (AI%) and (ii) graphical analysis of feeding strategy. Based on the results, *R. dorbignyi* is an insectivorous species and autochthonous

items play an important role in the diet of this species." (Author) *Odonata* only marginally contribute to the diet of *R. dorbignyi*.] Address: Felipe Pontieri de Lima, F., Univ. Estadual Paulista, Instituto de Biociências Departamento de Morfologia, Laboratório de Biologia e Ecologia de Peixes Distrito de Rubião Júnior, s/n, CEP 18.618-970, Botucatu – SP, Brazil. E-mail: fpl.limao@hotmail.com

15631. Macedo, D.R.; Hughes, R.M.; Ferreira, W.R.; Firmiano, K.R.; R.O. Silva, D.R.O.; Ligeiro, R.; Kaufmann, P.R.; Callisto, M. (2016): Development of a benthic macroinvertebrate multimetric index (MMI) for Neotropical Savanna headwater streams. *Ecological Indicators* 64: 132-141. (in English) ["Highlights: •We tested four macroinvertebrate multimetric indices (MMIs) for the Cerrado biome. •We used a statistical criterion for identifying least- and most-disturbed sites. •The best-performing MMI had landscape-adjusted and PCA-selected metrics. •Our MMI is sensitive to anthropogenic pressures at local- and catchment-scales. Abstract: Assessing the ecological impacts of anthropogenic pressures is a key task in environmental management. Multimetric indices (MMIs), based on aquatic assemblage responses to anthropogenic pressures, have been used increasingly throughout the world. The MMI approach is a low-cost, rapid field method that produces an aquatic condition index that responds precisely to anthropogenic pressures, making it useful for conservation and environmental management. We developed four candidate MMIs based on benthic macroinvertebrate assemblages sampled at 40 randomly selected sites to assess the environmental condition of streams upstream of a hydroelectric power plant in the Brazilian Neotropical Savanna biome. Those MMIs were built from landscape-adjusted and unadjusted biological metrics as well as two alternative ways of choosing metrics. The alternative MMIs performances were tested by comparing their precision to distinguish least-disturbed areas, responsiveness to discriminate least- and most-disturbed areas, and sensitivity to anthropogenic pressures at catchment and local scales. The best performing MMI had landscape-adjusted metrics and was produced through use of principal component analysis for metric selection. It included 4 metrics: Ephemeroptera richness, average tolerance score per taxon, percentage of predator individuals, and percentage of Odonata individuals adjusted by elevation. This index discriminated well the anthropogenic pressures at local- and catchment-scales, and at both scales simultaneously, as indicated by an integrated disturbance index. Our methodological development included statistical criteria for identifying least- and most-disturbed sites, calibrating for natural landscape variability, and use of non-redundant metrics. Therefore, we expect it will provide a model for environmental assessment of water resources elsewhere in Brazil and in other nations." (Authors)] Address: Macedo, D.R., Depto de Geografia, Instituto de Geociências, Univ. Federal de Minas Gerais, Av. Antônio Carlos 6627, CEP 31270-901, Belo Horizonte, MG, Brazil. E-mail: rodriguesmacedo@gmail.com

15632. Mainwaring, D.E.; Nguyen, S.H.; Webb, H.K.; Jakubov, T.; Tobin, M.; Lamb, R.; Wu, A.H.; Marchant, R.; Craw-

ford R.J.; Ivanova, E.P. (2016): The nature of inherent bactericidal activity: insights from the nanotopology of three species of dragonfly. *Nanoscale* 8: 6527-6534. (in English) ["While insect wings are widely recognised as multi-functional, recent work showed that this extends to extensive bactericidal activity brought about by cell deformation and lysis on the wing nanotopology. We now quantitatively show that subtle changes to this topography result in substantial changes in bactericidal activity able span an order of magnitude. Notably, the chemical composition of the lipid nanopillars was seen by XPS and synchrotron FTIR microspectroscopy to be similar across these activity differences. Modelling the interaction between bacterial cells and the wing surface lipids of 3 species of dragonflies (*Hemianax papuensis*, *Austroaeschna multipunctata*, *Diplacodes bipunctata*), that inhabit similar environments but with distinctly different behavioural repertoires, provided the relationship between surface structure and antibacterial functionality. In doing so, these principal behavioural patterns correlated with the demands for antimicrobial efficiency dictated by differences in their foraging strategies. This work now reveals a new feature in the design elegance of natural multi-functional surfaces as well providing insights into bactericidal mechanism underlying inherently antimicrobial materials, while suggesting that nanotopology is related to evolutionary development of a species through the demands of its behavioural repertoire. The underlying relationship between the processes of wetting, adhesion and capillarity of the lipid nanopillars and bactericidal efficiency suggests new prospects for purely mechano-responsive antibacterial surfaces." (Authors)] Address: Mainwaring, D.E., Faculty of Science, Engineering and Technology, Swinburne Univ. of Technology, PO Box 218, Hawthorn, Victoria 3122, Australia. E-mail: eivanova@swin.edu

15633. Mair, L.; Ruete, A. (2016): Explaining spatial variation in the recording effort of citizen science data across multiple taxa. *PLoS ONE* 11(1): e0147796. doi:10.1371/journal.pone.0147796: 13 pp. (in English) ["The collation of citizen science data in open-access biodiversity databases makes temporally and spatially extensive species' observation data available to a wide range of users. Such data are an invaluable resource but contain inherent limitations, such as sampling bias in favour of recorder distribution, lack of survey effort assessment, and lack of coverage of the distribution of all organisms. Any technical assessment, monitoring program or scientific research applying citizen science data should therefore include an evaluation of the uncertainty of its results. We use 'ignorance' scores, i.e. spatially explicit indices of sampling bias across a study region, to further understand spatial patterns of observation behaviour for 13 reference taxonomic groups. The data is based on voluntary observations made in Sweden between 2000 and 2014. We compared the effect of six geographical variables (elevation, steepness, population density, log population density, road density and footpath density) on the ignorance scores of each group. We found substantial variation among taxonomic groups in the relative importance of different geographic variables for explaining ignorance scores.

In general, road access and logged population density were consistently important variables explaining bias in sampling effort, indicating that access at a landscape-scale facilitates voluntary reporting by citizen scientists. Also, small increases in population density can produce a substantial reduction in ignorance score. However the between-taxa variation in the importance of geographic variables for explaining ignorance scores demonstrated that different taxa suffer from different spatial biases. We suggest that conservationists and researchers should use ignorance scores to acknowledge uncertainty in their analyses and conclusions, because they may simultaneously include many correlated variables that are difficult to disentangle." (Authors) The data set includes Odonata.] Address: Mair, Louise, Species Information Centre, Swedish University of Agricultural Sciences (SLU), P.O. 7007, 750 07 Uppsala, Sweden. E-mail: louise.mair@slu.se

15634. Marinov, M.; Amaya-Perilla, C.; Holwell, G.I.; Varsani, A.; Van Bysterveldt, K.; Kraberger, S.; Stainton, D.; Dayaram, A.; Curtis, N.; Cruickshank, R.H.; Paterson, A. (2016): Geometric morphometrics and molecular systematics of *Xanthocnemis sobrina* (McLachlan, 1873) (Odonata: Coenagrionidae) and comparison to its congeners. *Zootaxa* 4078(1): 84-120. (in English) ["The taxonomy of the damselfly genus *Xanthocnemis* is revised, with particular focus on populations inhabiting the North Island of New Zealand. Earlier studies revealed two species: *X. sobrina*, restricted to cool, shaded streams in kauri forests and other forested areas, and *X. zealandica*, a common species throughout New Zealand except the Chatham and subantarctic islands. A field study encompassing aquatic habitats throughout the whole North Island was carried out to establish the relationship between morphological variation (body size and various morphological traits over the entire body) observed by previous researchers with ecological conditions and/or geographical location. The main aim was to propose reliable diagnostic features that could be used in future studies. Morphological and molecular variation was assessed. Morphological examination included assigning landmarks for all body parts corresponding to the external morphological features that are usually used in Odonata taxonomy. Molecular analysis targeted fragments of the 28S and 16S rRNA genes. Congruence was sought between both types of data, statistical support for two morphological types previously described as different species and a maximum likelihood phylogenetic tree in conjunction with a pairwise genetic distance matrix constructed from the DNA sequences obtained from the sampled specimens. Geometric morphometrics revealed statistically significant differentiation between specimens identified as *X. zealandica* and *X. sobrina* for four traits: (1) dorsal view of the head for both sexes as well as male appendages from (2) dorsal, (3) ventral and (4) lateral views. Wings appeared different when analysed for males only. Molecular analysis, however, grouped all specimens into a single undifferentiated cluster with very low mean pairwise distance (<0.01) between them showing almost no variation at the molecular level among the sampled populations on the North Island. Therefore, an additional

analysis of the mitochondrial cytochrome c-oxidase I gene was carried out comparing randomly selected North Island specimens to *Xanthocnemis* specimens targeted in other molecular studies (Nolan et al. 2007, Amaya-Perilla et al. 2014). The analysis of the COI gene confirmed that all North and South Island isolates of *Xanthocnemis* cluster together in a well-supported clade with pairwise identity >96% and ~93% pairwise identity with *X. tuanuii* sequences obtained from the Chatham Island specimens. A careful investigation of the thin plate spline deformations generated for the geometric morphometric landmarks showed that the significant variations in the appendages of the *Xanthocnemis* specimens appeared to be the result of size, rather than shape, differences. Therefore, *X. sobrina* is proposed as a synonym of *X. zealandica*. Recently Amaya-Perilla et al. (2014) synonymised *X. sinclairi* with *X. zealandica* and confirmed the status of the Chatham Island *X. tuanuii* as a distinct species. It is therefore proposed that the genus *Xanthocnemis* consists of two species only: *zealandica* occurring all over the North, South and Stewart Islands, and *tuanuii*, endemic to Chatham and Pitt islands. Considering several statistical tests involving body measurements and ecological variables recorded during the field study, as well as various discussion points from similar studies of other species of Odonata, two alternative hypotheses are proposed for future testing. The first hypothesis synonymises *X. sobrina* with *X. zealandica* and suggests a possible explanation for the evolution of the two morphological traits that have previously been considered diagnostic for these species. The second hypothesis suggests that as typical *X. sobrina* were not sampled during this study this could represent a species that is now extinct, unless future studies prove it otherwise." (Authors)] Address: Marinov, M., Investigation and Diagnostic Centres and Response, Operations Branch, Ministry for Primary Industries, 231 Morrin Rd, Auckland 1072 New Zealand. E-mail: Milen.Marinov@mpi.govt.nz

15635. Martínez, A.; Larrañaga, A.; Miguélez, A.; Yvon-Durocher, G.; Pozo, J. (2016): Land use change affects macroinvertebrate community size spectrum in streams: the case of *Pinus radiata* plantations. *Freshwater Biology* 61: 69-79. (in English) ["(1.) In low-order forested streams, catchment-scale land-use modifications to vegetation can affect energy inputs into streams and trophic interactions within these donor-controlled food webs. (2.) We examined the effects of *Pinus radiata* plantations on the intercept and slope of the size spectrum (the relationship between log-mass and log-density) of macroinvertebrate communities in low-order forested streams. We compared three streams draining pine plantations with three draining native deciduous forests, all without significant differences in water physicochemical characteristics. (3.) While size spectrum intercept was similar between the two stream types, the slope of the size spectrum was shallower in pine than in deciduous streams based on a decline in the density of the smaller individuals. (4.) The shredder feeding guild showed the largest changes, with a significant reduction in their total density and, specifically, in the density of the smaller individuals from the deciduous to the pine streams. This alteration is

explained by the change in very specialist shredders, such as plecopterans and trichopterans, but not in those with highly mobile crustaceans or more generalist dipterans. (5.) The effect detected for shredders might have scaled up to higher trophic levels as the density of invertebrate predators (small and big) was lower in streams under pine, suggesting a response to prey limitation. 6. These results indicate that the change of in-stream resource quality arising from the replacement of deciduous vegetation by pine plantations can trigger size-specific responses of macroinvertebrates and target specialised feeding guilds such as shredders, and can elicit a bottom-up reaction in the organisation of food webs." (Authors) Boyeria, Calopteryx and Gomphus settled only in deciduous streams, while Cordulegaster inhabitate deciduous as pine streams as well.] Address: Martínez, A., Laboratory of Stream Ecology, Department of Plant Biology and Ecology, University of the Basque Country, P.O. Box 644, 48080 Bilbao, Spain. E-mail: aingeru.martinez@ehu.es

15636. Melfi, J.; Leonardo, A.; Wang, J. (2016): Recovery methods of the dragonfly from irregular initial conditions. *Bulletin of the American Physical Society*. Abstract: R41.00013: (in English) [Verbatim: We release dragonflies from a magnetic tether in a wide range of initial orientations, which results in them utilizing multiple methods to regain their typical flight orientation. Special focus is placed on dropping them while upside down, as the recovery method used is a purely rolling motion. Filming this stereotypical motion with a trio of high speed cameras at 4000 fps, we capture detailed body and wing kinematics data to determine how the dragonfly generates this motion. By replaying the flights within a computer simulation, we can isolate the significant changes to wing kinematics, and find that it is an asymmetry in the wing pitch which generates the roll. Further investigation demonstrates that this choice is highly dependent upon the state of the dragonfly, and as such our results indicate the dragonfly both tracks its current state, and changes its mid-flight control mechanisms accordingly.] Address: Wang, Z. Jane, Theoretical and Applied Mechanics, Cornell University, Ithaca, New York 14853, USA. E-mail: z.jane.wang@cornell.edu

15637. Meurgey, F. (2016): The genus *Brechmorhoga* Kirby, 1894, in the West Indies, with a proposed new status for *Brechmorhoga archboldi* (Donnelly) (Odonata; Libellulidae). *Zootaxa* 4079(1): 53-64. (in English) ["A revision of the species of *Brechmorhoga* from the Lesser Antilles includes *Brechmorhoga archboldi* (Donnelly, 1970) and *Brechmorhoga praecox grenadensis* Kirby, 1894. New distribution records are provided. *Brechmorhoga archboldi* is synonymized with *B. praecox grenadensis*. Figures, morphological characters of both sexes and the description of the female of *B. p. grenadensis* are given." (Author)] Address: Meurgey, F., Muséum d'Histoire Naturelle 12, rue Voltaire, 44000 Nantes, France. E-mail: francois.meurgey@mairie-nantes.fr

15638. Meurgey, F. (2016): *Macrothemis meurgeyi* Daigle, 2007, from Guadeloupe is a junior synonym of *Macrothemis*

celeno (Selys in Sagra, 1857) (Odonata; Libellulidae). *Zootaxa* 4072(3): 387-390. (in English) ["The assignment of *Macrothemis meurgeyi* to *M. celeno* is deduced from the study of supplementary material from Guadeloupe, where it represents a smaller and darker island form of the latter species. Upon examination of specimens identified as *M. meurgeyi* from Guadeloupe, the records for Goyaud (1994) and Meurgey & Picard (2011) should now be changed to *M. celeno*. *Macrothemis* is represented in the West Indies by only two species, *Macrothemis inequiunguis* Calvert, 1895, in Cuba (Peters 1988) and *Macrothemis celeno* occurring from Cuba to Puerto Rico and again on Guadeloupe. During intensive surveys on other Lesser Antillean islands, i.e., Dominica, Martinique, St Lucia, St Vincent and Grenada, I failed to find members of this genus." (Author)] Address: Meurgey, F., Société d'Histoire Naturelle L'Herminier - Muséum d'Histoire Naturelle 12, rue Voltaire, 44000 Nantes – France. E-mail: francois.meurgey@mairie-nantes.fr

15639. Miyazaki, Y.; Teramura, A.; Senou, H. (2016): Biodiversity data mining from Argus-eyed citizens: the first illegal introduction record of *Lepomis macrochirus macrochirus* Rafinesque, 1819 in Japan based on Twitter information. *ZooKeys* 569: 123-133. (in English) ["An apparent illegal introduction of *Lepomis macrochirus macrochirus* from Yokohama City, Kanagawa Prefecture, Japan, is reported based on a juvenile specimen and a photograph of two adults collected on 14 June 2015 and deposited in the Kanagawa Prefectural Museum of Natural History. The specimens and photographs were initially reported on the internet-based social networking site, Twitter. Two specimens of *Carassius auratus*, including an aquarium form, were also reported at the same locality and date, suggesting that the illegal introductions originated from an aquarium release. Our report demonstrates an example of web data mining in the discipline of Citizen Science." (Authors) The study includes records of larvae of *Sympetrum* sp.] Address: Miyazaki, Y., Kanagawa Prefectural Museum of Natural History, 499 Iryuda, Odawara-shi, Kanagawa 250-0031, Japan. E-mail: miyazaki@nh.kanagawa-museum.jp

15640. Moskowit, D.P. (2016): The life history, behavior and conservation of the Tiger Spiketail dragonfly (*Cordulegaster erronea* Hagen) in New Jersey. Ph.D. thesis, Graduate School - New Brunswick, Rutgers, The State University of New Jersey: VIII + 128 pp. (in English) ["This dissertation explores the life history and behaviour of *C. erronea* and provides recommendations for the conservation of the species. Like most species in the genus *Cordulegaster* and the family *Cordulegastridae*, the Tiger Spiketail is geographically restricted, patchily distributed with its range, and a habitat specialist in habitats susceptible to disturbance. Most *Cordulegastridae* species are also of conservation concern and *C. erronea* is no exception. However, many aspects of the life history of *C. erronea* and many other *Cordulegastridae* are poorly understood, complicating conservation strategies. In this dissertation, I report the results of my research on *C. erronea* in New Jersey. The research to investigate life history and behaviour included: larval and

exuvial sampling; radio-telemetry studies; marking-resighting studies; habitat analyses; observations of ovipositing females and patrolling males, and the presentation of models and insects to patrolling males. The research reports: the first use of radio-telemetry for the species; the first observations of mating; the first comprehensive report and analysis of larval site emergence site selection; the triggering mechanisms for male recognition of females; adult and larval habitat use, and many other life history and behavioural aspects of the species. The dissertation also provides recommendations for conservation strategies that maybe useful for protecting the Tiger Spiketail and other *Cordulegastridae* species." (Author)] Address: not stated

15641. Munguía-Steyer, R.; Córdoba-Aguilar, A.; Maya-García, J.S. (2016): Rubyspot territorial damselflies behave as "Nasty Neighbors". *Journal of Insect Behavior* 29(2): 143-152. (in English) ["Two mutually-excluding hypotheses explain the intensity of aggression between neighbours and their non-neighbours in territorial animals. On one hand, the "dear enemy" hypothesis predicts that territorial animals should be more tolerant towards their neighbours than towards non-neighbours. Conversely, the "nasty neighbor" hypothesis predicts increased aggression towards neighbours than non-neighbours. These different situations depend on who is more likely to be a real competitor, either a neighbour or a non-neighbour, and the intensity of resource competition. Male damselfly of *Hetaerina vulnerata* defend riverine, mating territories that is the main way to have access to females. These territories are not fixed and so males continuously defend them especially against neighbours. Given this, we tested whether the nasty neighbour principle operates in this species. We monitored a population during an entire mating season, and recorded duration of aggressive behaviours. As a key prediction of the nasty neighbour hypothesis, we expected that such behaviours last for longer when encountering a conspecific neighbour than a conspecific non-neighbour. We also predicted that such duration should be date-dependent as territorial competition could increase in the middle of the season when male density is at its highest. Our results corroborated that aggressive behaviours lasted longer against a neighbour male than a non-neighbour male but there was not effect of date. Thus, neighbours may pose a greater risk and may be a strong selective force than non-neighbours in terms of resource competition. Since neighbour males are continuously trying to widen their territory boundaries (a situation that has been also found in other study systems), an owner male may not even need to recognize his neighbours to fight back." (Authors)] Address: Córdoba-Aguilar, A., Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Ciudad Universitaria, 04510, México, D. F., México. E-mail: acordoba@ecologia.unam.mx

15642. Mutlu, O.; Gumuslu, E.; Kokturk, S.; Ulak, G.; Akar, F.; Erden, F.; Kaya, H.; Tanyeri, P. (2016): Effects of chronic administration of adipokinetic and hypertrehalosemic hormone on animal behavior, BDNF, and CREB expression in

the hippocampus and neurogenesis in mice. *Fundamental & Clinical Pharmacology* 30(1): 4-13. (in English) ["Neurosecretory cells in corpus cardiacum of insects synthesize a set of hormones that are called adipokinetic, hypertrehalosaemic or hyperprolinaemic, depending on insect in question. This study investigated effects of chronic administration of *Anax imperator* adipokinetic hormone (Ani-AKH), *Libellula auripennis* adipokinetic hormone (Lia-AKH), and *Phormia-Terra* hypertrehalosaemic hormone (Pht-HrTH) on depression, anxiety, analgesy, locomotion in forced swimming (FST), elevated plus-maze (EPM), hot plate, and locomotor activity tests. Ani-AKH (1 and 2 mg/kg), Lia-AKH (1 and 2 mg/kg), and Pht-HrTH (1 and 2 mg/kg) had antidepressant effects in forced swimming test. Lia-AKH (2 mg/kg) and Pht-HrTH (1 and 2 mg/kg) had anxiolytic effects when given chronically in elevated plus-maze test. Ani-AKH (1 and 2 mg/kg) and Pht-HrTH (2 mg/kg) had antinociceptive effects in hot plate test in male balb-c mice. Ani-AKH (2 mg/kg), Lia-AKH (1 and 2 mg/kg), and Pht-HrTH had locomotion-enhancing effects in locomotor activity test in male balb-c mice. Drug treatment significantly increased brain-derived neurotrophic factor (BDNF) and cyclic adenosine monophosphate (cAMP) response element binding protein (CREB) gene expression levels compared to control levels. Pht-HrTH and Ani-AKH groups had significantly increased numbers of BrdU-labeled cells, while neurodegeneration was lower in the Pht-HrTH group. Our study showed that AKH/RPCH family peptides may be used in treatment of psychiatric illness such as depression and anxiety, in treatment of pain and in diseases related to locomotion system. AKH/RPCH family peptides increase neurotrophic factors in brain and have potential proliferative and neuroprotective effects in hippocampal neurogenesis and neurodegeneration." (Authors)] Address: Mutlu, O., Department of Pharmacology, Faculty of Medicine, Kocaeli University, Kocaeli, Turkey. E-mail: oguzmutlu80@hotmail.com

15643. Naka, H.; Hashimoto, H. (2016): The effect of passive deformation of dragonfly wing on aerodynamic characteristics. *Transactions of the JSME* 82(833): 14 pp. (in Japanese, with English summary) ["Dragonflies can perform both of gliding and flapping flight and have high maneuverability in spite of small-size. The aim of this study is to develop Micro Air Vehicle (MAV) based on the flight of dragonfly. The characteristics of wings are very important for development of MAV. Dragonfly wing is easy to be passively deformed in the tip side from the nodus in flapping flight, and thereby, aerodynamic force is generated effectively. In this study, the effect of passive deformation of wing on aerodynamic force was investigated using fluid-structure interaction analysis to develop the artificial wing suitable for dragonfly-like MAV. In this study, aerodynamic characteristics of wings in the gliding flight and aerodynamic force generated in flapping flight are numerically analyzed. In this analysis, nodus wing models, which can deform passively, and rigid wing model, which cannot deform, are used. Nodus wing model imitates the nodus structure; the tip side of this model is free to rotate around leading edge. As a result of gliding flight, the lift coefficient of the nodus wing was lower in low-

angle of attack and was higher in high-angle of attack, compared to rigid wing. Moreover, the more flexible wings are, the more change. The gliding flight is low-angle of attack usually. Therefore, flexible wing is less suitable for the gliding flight than inflexible wing. As a result of flapping flight, the nodus wing made drag force generated during down stroke lower compared with the rigid wing. However, thrust forces generated during up stroke in both wings were the same. Therefore, flexible wings are more suitable for the flapping flight than inflexible wing. The wings of dragonfly-like MAV need to appropriate level of flexibility to upgrade the performance in both case of gliding and flapping flight." (Authors)] Address: Naka, H., Graduate School of Science and Technology, Tokai Univ. 4-1-1 Kitakaname, Hiratsuka-shi, Kanagawa 259-1292, Japan. E-mail: hiromu@keyaki.cc.u-tokai.ac.jp

15644. Nayak, A.K.; Roy, U.S. (2016): An observation on the Odonata fauna of the Asansol-Durgapur Industrial Area, Burdwan, West Bengal, India. *Journal of Threatened Taxa* 8(2): 8503-8517. (in English) ["The present investigation was undertaken as a pilot study to examine the diversity, occurrence and distribution pattern of Odonata from the selected study sites of the Asansol-Durgapur industrial area of Burdwan District of West Bengal, India from January 2012 to December 2015. A combination of direct search and opportunistic sighting methods were applied to record 57 different Odonata species (38 dragonflies and 19 damselflies). Among the dragonflies the most diverse family was Libellulidae represented by 36 species while among damselflies Coenagrionidae was the most diverse family represented by 16 species. In spite of the Asansol-Durgapur region being an industrial urban area, the present study revealed a handsome diversity of odonates. A suitable geographic location, favourable climatic conditions, heterogeneous habitat types that included ponds, wetlands, riverbeds, grasslands and agricultural lands along with the presence of appropriate vegetation provided a comfortable shelter for Odonata species to flourish in this ecoregion. All the odonates noted in the present study belong to the Least Concerned category as designated by IUCN." (Authors)] Address: Nayak, A.K., Searsole Junior Basic School, Searsole Rajbari, Burdwan, West Bengal 713358, India. E-mail: amamayak.stat@gmail.com,

15645. Neiss, U.G.; Hamada, N. (2016): Larva of *Palaemnema brasiliensis* Machado (Odonata: Platystictidae), from Amazonas, Brazil. *Zootaxa* 4078(1): 70-77. (in English) ["The larva of *P. brasiliensis* is described and illustrated based on last-instar larvae and exuviae of reared larvae collected in a blackwater stream in Barcelos and Presidente Figueiredo municipalities, Amazonas state, Brazil. The larva of *P. brasiliensis* can be distinguished from the two South American species of the genus with described larvae (*P. clementia* and *P. mutans*), mainly by presence of a single obtuse cusp on the labial palp, the presence and configuration of setae in the caudal lamellae, and the proportional length of terminal filaments of the caudal lamellae. The family is recorded here for the first time in Brazilian state

of Amazonas." (Authors)] Address: Neiss, U.G., Instituto de Criminalística, Depto de Polícia Técnica-Científica, Manaus, Amazonas, Brazil. E-mail: ulisses.neiss@gmail.com

15646. Niederer, W. (2016): Libellen (Insecta: Odonata) im Natura-2000-Gebiet Fohramoos (Vorarlberg, Österreich). *inatura – Forschung online* Nr. 26: 5 pp. (in German, with English summary) ["The Odonata of the Natura 2000 site Fohramoos (Vorarlberg, Austria), a bog habitat mosaic at the altitude of 1150m, were studied during the years 2013 und 2014. The investigation focused on the habitats covered by the Habitats Directive. A total number of 17 species was recorded, 11 species were found on active raised bogs. Aspects of nature conversation are discussed." (Authors)] Address: Walter Niederer, W., Im Wiesle 12, A-6974 Gaißau, Austria. E-Mail: walter.niederer@rheindelta.org

15647. Nikam, K.N., More, S.V. (2016): Diversity of Insects from Jangamhatti area, Chandgad, Kolhapur district of Maharashtra. *Biolife*4(1): 209-212. (in English) [The collections in 2014 to 2015 also include *Pseudagrion decorum* and *Crocothemis servillia*.] Address: Nikam, K.N., Department of Zoology, R.B. Madkholkar Mahavidyalaya, Chandgad, Maharashtra, India. Email: kedarinikam@gmail.com

15648. Nobre, C.E.B. (2016): *Erythrodiplax leticia*: Description of the female and updated geographic distribution (Odonata: Libellulidae). *Zootaxa* 4067(4): 469-472. (in English, with Spanish summary) ["The female of *E. leticia* is described and illustrated. The geographic distribution of the species is updated, and notes on its natural history are provided." (Author)] Address: Nobre, C.E.B., Centro de Conservação e Manejo de Fauna da Caatinga (CEMAFAUNA), Campus Ciências Agrárias, BR 407, Km 12, lote 543. Cep. 56.300-000, Petrolina, Pernambuco, Brazil. E-mail: celnobre@gmail.com

15649. Orr, A.G.; Richards, S.J. (2016): Three new species of *Papuagrion* Ris, 1913 (Odonata: Coenagrionidae) from the Hindenburg Wall region of western Papua New Guinea. *Zootaxa* 4072(3): 319-332. (in English) ["Three distinctive new species of *Papuagrion* Ris, 1913 are described from a high altitude area (1,770–1,820 m a.s.l.) at the base of the Hindenburg Wall, Western Province, Papua New Guinea. These are *P. chrysosoma* sp. nov., *P. marijanmatoki* sp. nov. and *P. tydecksjueringi* sp. nov.; all type material is deposited in the South Australian Museum (SAMA). These were the only species of the genus collected at higher altitudes in the Ok Tedi headwaters, and none of them were encountered at lower altitudes (300–900 m) despite intensive searches there. The new species described here bring to 26 the number of *Papuagrion* species known from the New Guinea region." (Authors)] Address: Orr, A.G., Environmental Futures Research Institute, Griffith University, Nathan, Qld 4111, Australia. E-mail: agorr@bigpond.com

15650. Ott, J. (2016): Libelle des Jahres 2016: Gemeine Binsenjungfer. *DATZ* 2/2016: 10. (in German) [Introductory note to the German "dragonfly of the year" (*Lestes sponsa*).]

Address: Ott, J., Friedhofstr. 28, D-67705 Trippstadt, Germany. E-mail: ott@lupogmbh.de

15651. Phan, Q.T.; Dinh, T.P.A. (2016): Odonata from the Cham Islands, off central Vietnam, collected in September 2015. *Faunistic Studies in Southeast Asian and Pacific Island Odonata* 13: 1-22. (in English) ["The first known Odonata records from the Cham Islands, off Quang Nam Province, central Vietnam are presented based on a brief collecting period in late September 2015. A total of 25 odonate species (8 Zygoptera and 17 Anisoptera) were recorded. Illustrations of the detailed structures of some species are provided." (Authors)] Address: Phan, Q.T., Department of Biology, Tokyo Metropolitan University, Minamiosawa 1-1, Hachioji, Tokyo 192-0397, Japan. E-mail: pqtoan84@gmail.com

15652. Piersanti, S.; Frati, F.; Rebor, M.; Salerno, G. (2016): Carbon dioxide detection in adult Odonata. *Zoology* 119(2): 137-142. (in English) ["Highlights: •Single-cell recordings from antennal sensory neurons of *Ischnura elegans* are shown. •Olfactory sensory neurons strongly inhibited by CO₂ were identified in this species. •These neurons responding to CO₂ are also excited by amines and inhibited by acids. •Further investigations are needed to assign a biological role to these Odonata sensory neurons. The present paper shows, by means of single-cell recordings, responses of antennal sensory neurons of the damselfly *Ischnura elegans* when stimulated by air streams at different CO₂ concentrations. Unlike most insects, but similarly to termites, centipedes and ticks, Odonata possess sensory neurons strongly inhibited by CO₂, with the magnitude of the off-response depending upon the CO₂ concentration. The Odonata antennal sensory neurons responding to CO₂ are also sensitive to airborne odors; in particular, the impulse frequency is increased by isoamylamine and decreased by heptanoic and pentanoic acid. Further behavioural investigations are necessary to assign a biological role to carbon dioxide detection in Odonata." (Authors)] Address: Piersanti, Silvana, Dipartimento di Chimica, Biologia e Biotecnologie, Univ. degli Studi di Perugia, Via Elce di Sotto, 06123 Perugia, Italy. E-mail: silvana.piersanti@unipg.it

15653. Pinto, A.P. (2016): The dragonfly's face of the multidimensional Dr. Angelo Barbosa Monteiro Machado: a short bio-bibliography. *Zootaxa* 4078(1): 8-27. (in English) ["In this special issue celebrating the Brazilian researcher Dr. Angelo Barbosa Monteiro Machado's 80th birthday, I present a very short biographical overview focused on his prolific career as odonatologist. The doctor, professor, children's book writer, conservationist, comedian, neuroanatomist, and eventually odonatologist Professor Angelo has published more than 110 papers, of which 79 are on dragonflies. He erected 97 new names, an impressive number for a small and relatively well-known order of insects. Here are presented annotated checklists of his publications on dragonflies (from 1953 to September of 2015), and nomina, as well as few comments of his impact on Neotropical odonatology as a whole." (Authors)] Address: Pinto, A.P.,

Laboratório de Biologia e Sistemática de Odonata (LABIOSIS), Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista s/nº, São Cristóvão 20940-040, Rio de Janeiro, RJ, Brazil. E-mail: odonata_angelo@hotmail.com

15654. Pinto, A.P.; Almeida, M.V.O. (2016): A taxonomic synopsis of South American Cyanogomphini Carle with description of *Cyanogomphus angelomachadoi* sp. nov. from the Cerrado of Brazil (Odonata: Gomphidae). *Zootaxa* 4078(1): 38-69. (in English) ["A synopsis of Cyanogomphini Carle, 1986 (sensu Belle 1996), including all species currently under the genera *Cyanogomphus* Selys, 1873, and *Tibiagomphus* Belle, 1992, is provided. *Cyanogomphus angelomachadoi* sp. nov. (Holotype male deposited in DZRJ: Brazil, Minas Gerais State, Jaboticatubas municipality, Parque Nacional da Serra do Cipó, collecting site Corrego das Pedras 19.22.17S, 43.36.03W, 76 m a.s.l., 12.XII.2011, A.P.M. Santos & D.M. Takiya leg.) is described and illustrated based on four males and two females from Minas Gerais and Sao Paulo States, southeastern Brazil. The new species is most similar to *C. waltheri* Selys, 1873, from which it can be distinguished by its smaller size; larger pale areas on mesepisternum; pale dorsal surface of metathoracic tibia; larger distal concavity on epiproct, with latero-distal projection, in lateral view forefinger-shaped; and occurrence in Cerrado province. Five species are recognized in Cyanogomphini, and for each one a synonymy, diagnoses, identification key and maps of distribution are presented. The status of sibling taxa *Tibiagomphus uncatus* (Fraser, 1947) and *T. noval* (Rodrigues Capitulo, 1985), as well as the *Agriogomphus*-complex of genera are also discussed." (Authors)] Address: Pinto, A.P., Laboratorio de Biologia e Sistemática de Odonata (LABIOSIS), Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista s/no, Sao Cristovao 20940-040, Rio de Janeiro, RJ, Brazil. E-mail: odonata_angelo@hotmail.com

15655. Piria, M.; Jakšić, G.; Jakovlic, I.; Treer, T. (2016): Dietary habits of invasive Ponto-Caspian gobies in the Croatian part of the Danube River basin and their potential impact on benthic fish communities. *Science of The Total Environment* 540: 386-395. (in English) ["Highlights: •Dietary habits and impacts of invasive P-C gobies on other fish were studied. •Monkey and round goby preferred Trichoptera, Megaloptera and Coleoptera. •Bighead goby preferred Trichoptera, Gammarus and Pisces. •No negative impacts of the most abundant, monkey goby, on native fish populations. •Round goby negatively impacts native zingel, and bighead goby - chub populations. Abstract: Invasive Ponto-Caspian (P-C1) gobies have recently caused dramatic changes in fish assemblage structures throughout the Danube basin. While their presence in the Croatian part of the basin has been noted and distribution studied, their dietary habits and impacts on native fish communities have, until now, been unknown. In 2011, 17 locations in the Sava River Basin were sampled for fish and 15 for benthic invertebrates. Fish population monitoring data, available for nine

seasons (2003–2006 and 2010–2014) and 12 locations, were used to analyse the impacts of P-C gobies on benthic fish abundance. Gut content analysis indicates that the monkey goby *Neogobius fluviatilis* diet is very diverse, but dominated by Trichoptera, Chironomidae, Bivalvia and Odonata. The diet overlaps considerably with the round goby *Neogobius melanostomus* diet, although Gastropoda are dominant in the latter's diet. Small fish and *Gammarus* sp. dominate the bighead goby *Ponticola kessleri* diet. Comparison of gut content with the prey available in the environment indicates that monkey and round gobies exhibit preference for Trichoptera, Megaloptera and Coleoptera, and bighead goby for Trichoptera, *Gammarus* sp. and Pisces. P-C gobies in the Sava River are spreading upstream, towards the reaches with lower fish diversity. Analyses indicate potentially positive impacts of P-C gobies' presence on some fish populations: round and bighead goby on Balkan golden loach *Sabanejewia balcanica* and monkey goby on common carp *Cyprinus carpio*, crucian carp *Carassius carassius*, burbot *Lota lota* and Balkan loach *Cobitis elongata*. However, there are also indications that bighead and round goby could adversely impact the native chub *Squalius cephalus* and zingel *Zingel zingel* populations, respectively. As P-C gobies are still in the expansionary period of invasion and the ecosystem still adapting to new circumstances, continued monitoring of fish population dynamics in the Sava basin is needed to determine the outcome and impacts of this invasion." (Authors)] Address: Piria, Marina Piria, University of Zagreb, Faculty of Agriculture, Department of Fisheries, Beekeeping, Game management and Special Zoology, Svetošimunska 25, 10000 Zagreb, Croatia. E-mail: mpiria@agr.hr

15656. Polo-Cavia, N.; Burraco, P.; Gomez-Mestre, I. (2016): Low levels of chemical anthropogenic pollution may threaten amphibians by impairing predator recognition. *Aquatic Toxicology* 172: 30-35. (in English) ["Highlights: •Humic acid and ammonium nitrate impair responses of tadpoles to predator cues. •Even low concentrations of pollutants increase predation risk of tadpoles. •Sublethal pollution may contribute to amphibian declines by disrupting predator recognition. Abstract: Recent studies suggest that direct mortality and physiological effects caused by pollutants are major contributing factors to global amphibian decline. However, even sublethal concentrations of pollutants could be harmful if they combined with other factors to cause high mortality in amphibians. Here we show that sublethal concentrations of pollutants can disrupt the ability of amphibian larvae to recognize predators, hence increasing their risk of predation. This effect is indeed much more important since very low amounts of pollutants are ubiquitous, and environmental efforts are mostly directed towards preventing lethal spills. We analyzed the effects of two common contaminants (humic acid and ammonium nitrate) on the ability of tadpoles of the western spadefoot toad (*Pelobates cultripes*) to recognize chemical cues from a common predator, nymphs of the dragonfly *Anax imperator*. We compared the swimming activity of tadpoles in the presence and absence of water-borne chemical cues from dragonflies at

different concentrations of humic acid and ammonium nitrate. Tadpoles reduced swimming activity in response to predator cues in the absence of pollutants, whereas they remained unresponsive to these cues when either humic acid or ammonium nitrate was added to the water, even at low concentrations. Moreover, changes in tadpole activity associated with the pollutants themselves were non-significant, indicating no toxic effect. Alteration of the natural chemical environment of aquatic systems by pollutants may be an important contributing cause for declines in amphibian populations, even at sublethal concentrations." (Authors.) Address: Polo-Cavia, Nuria, Department of Biology, Universidad Autónoma de Madrid, 28049 Madrid, Spain. E-mail: nuria.polo@uam.es

15657. Popova, O.N.; Haritonov, A.Yu.; Erdakov, L.N. (2016): Cyclicity of long-term population dynamics in damselflies of the genus *Coenagrion* (Odonata, Zygoptera) in the Lake Chany basin. *Russian Journal of Ecology* 47(1): 74-81. (in English) ["The cyclicity of population dynamics of abundance has been analyzed in sympatric adult populations of three odonate species monitored for long time (1980–2010) in the Lake Chany basin (Western Siberia). The spectra of odonate population dynamics have been constructed for the first time and shown to be species-specific: each species has its own population cycles, and if the cycles are similar, interspecific differences manifest themselves in the relative power of these cycles. These differences provide for separation of species in time, reducing the stress of competition between them. The population rhythms of all studied species show synchronicity with natural rhythms that are important to them, such as fluctuations of climatic parameters (2–3 year cycles) and hydrological parameters of Lake Chany (2–4-year cycles)."] (Authors)] Address: Popova, Olga, Institute of Systematics and Ecology of Animals, Siberian Branch, Russian Academy of Sciences, ul. Frunze 11, Novosibirsk, 630091, Russia. E-mail: popova-2012@yandex.ru

15658. Rajabi, H.; Rezasefat, M.; Darvizeh, A.; Dirks, J.-H.; Eshghi, S.; Shafiei, A.; Mirzababaie Mostofi, T.; Gorb, S.N. (2016): A comparative study of the effects of constructional elements on the mechanical behaviour of dragonfly wings. *Applied Physics A* 122:19: 13 pp. (in English) ["Although wings of insects show a large variation in morphology, they are all made from a network of irregular veins interconnected through membranous areas. Depending on their shape, size, and position, wing veins are usually divided into three different groups: longitudinal veins, cross-veins and ambient veins. The veins together with the membrane and some other elements such as spines, nodus and pterostigma can be considered as the wing's "constructional elements". In spite of rather extensive literature on dragonfly wing structure, the role of each of these elements in determining the wing's function remains mostly unknown. As this question is difficult to answer in vivo using biomechanical experiments on actual wings, this study was undertaken to reveal the effects of the constructional elements on the me-

chanical behaviour of dragonfly wings by applying numerical simulations. An image processing technique was used to develop 12 finite element models of the insect wings with different constructional elements. The mechanical behaviour of these models was then simulated under normal and shear stresses due to tension, bending and torsion. A free vibration analysis was also performed to determine the resonant frequencies and the mode shapes of the models. For the first time, a quantitative comparison was carried out between the mechanical effects selectively caused by different elements. Our results suggest that the complex interactions of veins, membranes and corrugations may considerably affect the dynamic deformation of the insect wings during flight." (Authors) Orthetrum sabina] Address: Rajabi, H., Functional Morphology and Biomechanics. Institute of Zoology, Kiel University, Kiel. Germany. E-mail: harajabi@hotmail.com

15659. Rajabi, H.; Ghoroubi, N.; Darvizeh, A.; Appel, E.; Gorb, S.N. (2016): Effects of multiple vein microjoints on the mechanical behaviour of dragonfly wings: numerical modelling. *R. Soc. open sci.* 3: 150610. <http://dx.doi.org/10.1098/rsos.150610>: 16 pp. (in English) ["Dragonfly wings are known as biological composites with high morphological complexity. They mainly consist of a network of rigid veins and flexible membranes, and enable insects to perform various flight manoeuvres. Although several studies have been done on the aerodynamic performance of Odonata wings and the mechanisms involved in their deformations, little is known about the influence of vein joints on the passive deformability of the wings in flight. In this article, we present the first three-dimensional finite-element models of five different vein joint combinations observed in Odonata wings. The results from the analysis of the models subjected to uniform pressures on their dorsal and ventral surfaces indicate the influence of spike-associated vein joints on the dorso-ventral asymmetry of wing deformation. Our study also supports the idea that a single vein joint may result in different angular deformations when it is surrounded by different joint types. The developed numerical models also enabled us to simulate the camber formation and stress distribution in the models. The computational data further provide deeper insights into the functional role of resilin patches and spikes in vein joint structures. This study might help to more realistically model the complex structure of insect wings in order to design more efficient bioinspired micro-air vehicles in future." (Authors)] Address: Gorb, S.N., Functional Morphology and Biomechanics, Zoological Institute, Christian-Albrecht University of Kiel, 24098 Kiel, Germany. E-mail: sgorb@zoologie.uni-kiel.de

15660. Rajabi, H.; Shafiei, A.; Darvizeh, A.; Dirks, J.-H.; Appel, E.; Gorb, S.N. (2016): Effect of microstructure on the mechanical and damping behaviour of dragonfly wing veins. *Royal Society Open Science* 3: 160006. <http://dx.doi.org/10.1098/rsos.160006>: 12 pp. (in English) ["Insect wing veins are biological composites of chitin and protein arranged in a complex lamellar configuration. Although these hierarchical structures are found in many 'venous wings' of insects, very

little is known about their physical and mechanical characteristics. For the first time, we carried out a systematic comparative study to gain a better understanding of the influence of microstructure on the mechanical characteristics and damping behaviour of the veins. Morphological data have been used to develop a series of three-dimensional numerical models with different material properties and geometries. Finite-element analysis has been employed to simulate the mechanical response of the models under different loading conditions. The modelling strategy used in this study enabled us to determine the effects selectively induced by resilin, friction between layers, shape of the cross section, material composition and layered structure on the stiffness and damping characteristics of wing veins. Numerical simulations suggest that although the presence of the resilin-dominated endocuticle layer results in a much higher flexibility of wing veins, the dumbbell-shaped cross section increases their bending rigidity. Our study further shows that the rubber-like cuticle, friction between layers and material gradient-based design contribute to the higher damping capacity of veins. The results of this study can serve as a reference for the design of novel bioinspired composite structures." (Authors) *Sympetrum vulgatum*, *Matrona basilaris basilaris*] Address: Rajabi, H., Functional Morphology & Biomechanics, Zoological Institute, Christian-Albrecht Univ. Kiel, 24098 Kiel, Germany. E-mail: hrajabi@zoologie.uni-kiel.de

15661. Razeng, E.; Moran-Ordóñez, A.; Brim Box, J.; Thompson, R.; Davies, J.; Sunnucks, P. (2016): A potential role for overland dispersal in shaping aquatic invertebrate communities in arid regions. *Freshwater Biology* 61: 745-757. (in English) [Australia, "(1.) Traditionally, dispersal of aquatic invertebrates has been thought to be very closely associated with river network structure, despite many species being capable of active or passive dispersal across the terrestrial matrix. However, recent studies of both population genetics and community structure from dryland regions indicate that aquatic species commonly disperse across catchments, implying that movement away from streams is more common than originally thought. This study investigated how aquatic invertebrate metacommunity structure in central Australia is influenced by interactions between species' dispersal traits, dispersal routes and local environmental conditions. (2.) We sampled community composition in 16 perennial and long-term inundated freshwater habitats in central Australia. Aquatic invertebrate taxa were allocated to one of four dispersal trait groups: obligate aquatic, passive aerial, weak flying and strong flying. We then used Mantel tests to examine correlations between trait group community dissimilarities, and four isolation models representing (i) local environmental conditions, (ii) geographical distances, (iii) landscape resistances restricted to river networks and (iv) landscape resistances incorporating overland dispersal 'conduits'. (3.) We found that the community composition of aquatic invertebrates in three of four dispersal trait groups, and all traits combined, was influenced primarily by topographic connectivity via overland dispersal conduits. (4.) Our results suggest that rainfall events and their effect on the landscape as a whole, rather than river flow during these

events, shape aquatic invertebrate metacommunity structure in central Australia. This study provides further support for the importance of overland dispersal conduits to aquatic invertebrates, particularly in arid environments with irregular rainfall." (Authors) Taxa include the "strong flyers" Odonata and are treated at family level.] Address: Razeng, Emma, School of Biological Sciences, Monash University, Clayton, Vic., Australia

15662. Richter, R. (2016): First confirmed *Austroepigomphus* adults observed in Victoria. *Victorian Entomologist* 46(1): 20-22. (in English) [*A. praeruptus* ♂ at Seven Creeks, Miepoll, Vic., 9-Jan-2016 36.6065°S, 145.4788°E (WGS84).] Address: Reiner Richter odonata@mr.id.au

15663. Rodrigues, M.E.; Roque, F.; Ochoa Quintero, J.M.; Penad, J.C.; Caribé de Sousa, D.; De Marco Junior, P. (2016): Nonlinear responses in damselfly community along a gradient of habitat loss in a savanna landscape. *Biological Conservation* 194: 113-120. (in English) ["Highlights: •We evaluated thresholds for damselflies in riparian zones in a savanna landscape. •We sampled 98 streams located in the Pantanal plateau, Brazil. •We used Threshold Indicator Taxa Analysis — TITAN and segmented regression analysis. •We found weak evidence of a threshold between 40 and 60% native vegetation loss. •Maintaining habitat loss above the "zone of increasing risk of impact" should be priority for conservation planners. Abstract: Riparian zones are among the most threatened natural ecosystems, being greatly affected by land use changes across the world. Working in a savanna landscape in the Central-West region of Brazil, we assessed the responses of damselfly communities to changes on native vegetation extent in riparian zones. We sampled damselflies around 98 streams in a continuous gradient of native vegetation loss (0 to 100%). We used the Threshold Indicator Taxa Analysis (TITAN) to test whether the damselfly community showed nonlinear responses related to native vegetation loss within buffers of 250 m radius. We collected 1245 individuals of damselflies, representing 31 species. The TITAN identified 16 species with a significant response: 11 species with negative indicators (Z⁻) and five as positive indicators (Z⁺) in relation to native vegetation loss. Six species showed evidence of nonlinear response (Z⁻), at sites with native vegetation loss between 40% and 60%. We also used segmented regression analysis with species richness, which showed weak evidence of a threshold located at 54% of native vegetation loss. Differently of previous studies with other taxonomic groups in forested environments, our results indicate that the variability around the threshold is higher. Under a precaution perspective and given current levels of vegetation loss around streams where the risk of losing species is higher, we reinforce the importance of appropriate landscape management strategies. In order to effectively conserve biodiversity in aquatic-and-terrestrial environments, the native vegetation loss within pastures and agriculture landscapes, should be above the "zone of increasing risk of impact" level. According to the current Brazilian Forest Act, riparian forest of at least 30 m wide must

be preserved along both sides of each watercourse. In our study 30 m vegetation wide represents only 10% of the 250 m buffer area. It implies that the current Brazilian Forest Act does not preserve the Cerrado's riparian vegetation and its associated aquatic biodiversity, since the amount of native vegetation loss is below the "zone of increasing risk of impact" we detected for damselflies in evaluated landscapes." (Authors)] Address: Rodrigues, M.E., Departamento de Biologia, CCBS, Cidade Universitária, Caixa Postal 549, Campo Grande, Mato Grosso do Sul CEP: 79 070 900, Brazil. E-mail: rodrigues.mbio@gmail.com

15664. Rojas, D.; Rojas, M.A. (2016): Presencia de *Symptetrum sinaiticum* (Dumont, 1977) (Odonata, Libellulidae) en Cádiz (Andalucía, España). *Revista gaditana de Entomología* 7: 181-183. (in Spanish, with English summary) [8-XI-2015; a female *S. sinaiticum* is recorded from El Bosque, sierra de Grazalema, Cadiz (UTM 10 km 30STF77)] Address: Rojas, D., 11380, Tarifa, Cádiz, Spain: E-mail: danielrojas92@hotmail.es

15665. Rosewarne, P.J.; Mortimer, R.J.G.; Newton, R.J.; Grocock, C.; Wing, C.D.; Dunn, A.M. (2016): Feeding behaviour, predatory functional responses and trophic interactions of the invasive Chinese mitten crab (*Eriocheir sinensis*) and signal crayfish (*Pacifastacus leniusculus*). *Freshwater Biology* 61(4): 426-443. (in English) ["(1.) Freshwaters are subject to particularly high rates of species introductions; hence, invaders increasingly co-occur and may interact to enhance impacts on ecosystem structure and function. As trophic interactions are a key mechanism by which invaders influence communities, we used a combination of approaches to investigate the feeding preferences and community impacts of two globally invasive large benthic decapods that co-occur in freshwaters: the signal crayfish (*Pacifastacus leniusculus*) and Chinese mitten crab (*Eriocheir sinensis*). (2.) In laboratory preference tests, both consumed similar food items, including chironomids, isopods and the eggs of two coarse fish species. In a comparison of predatory functional responses with a native crayfish (*Austropotamobius pallipes*), juvenile *E. sinensis* had a greater predatory intensity than the native *A. pallipes* on the keystone shredder *Gammarus pulex*, and also displayed a greater preference than *P. leniusculus* for this prey item. (3.) In outdoor mesocosms ($n = 16$) used to investigate community impacts, the abundance of amphipods, isopods, chironomids and gastropods declined in the presence of decapods, and a decapod >gastropod >periphyton trophic cascade was detected when both species were present. *Eriocheir sinensis* affected a wider range of animal taxa than *P. leniusculus*. (4.) Stable-isotope and gut-content analysis of wild-caught adult specimens of both invaders revealed a wide and overlapping range of diet items including macrophytes, algae, terrestrial detritus, macroinvertebrates and fish. Both decapods were similarly enriched in ^{15}N and occupied the same trophic level as Ephemeroptera, Odonata and Notonecta. *Eriocheir sinensis* $\delta^{13}\text{C}$ values were closely aligned with macrophytes indicating a reliance on energy from this basal resource, supported by evidence of

direct consumption from gut contents. *Pacifastacus leniusculus* $\delta^{13}\text{C}$ values were intermediate between those of terrestrial leaf litter and macrophytes, suggesting reliance on both allochthonous and autochthonous energy pathways. (5.) Our results suggest that *E. sinensis* is likely to exert a greater per capita impact on the macroinvertebrate communities in invaded systems than *P. leniusculus*, with potential indirect effects on productivity and energy flow through the community." (Authors)] Address: Dunn, Alison, School of Biology, Faculty of Biological Sciences, University of Leeds, Leeds LS2 9JT, U.K. E-mail: a.dunn@leeds.ac.uk

15666. Sahlen, G.; Suhling, F.; Martens, A.; Gorb, S., Fincke, O. (2016): For consistency's sake? A reply to Bybee et al. *Systematic Entomology* 41: 307-308. (in English) [Discussion of the termini larva, nymph and naiad.] Address: Sahlen, G., Ecology and Environmental Science, Halmstad University, Halmstad, Sweden

15667. Sanchez, S.; Wilson, D.E. (2016): Food items of *Macrotus waterhousii* (Chiroptera: Phyllostomidae) in central Mexico. *Therya* 7(1): 161-177. (in English, with Spanish summary) ["*Macrotus waterhousii* is a phyllostomid bat whose diet is poorly known, particularly in semiarid and temperate central Mexico. In this work additional information is reported from food remains discarded by this bat, including taxonomic composition, frequencies and size range of consumed insects; the assessment of a prediction on prey hardness of food insects, at the ordinal level; relative energy reward of insect prey in the sample; a comparison of the composition of the food sample from the arid study locality against one from a subtropical-temperate site; and brief comments on the known ecological importance of particular prey in the arid site. A sample of insect food remains discarded by *Macrotus waterhousii bulleri*, was recovered from under a roost in semiarid northern Querétaro, Mexico. The taxonomic identity, estimated relative abundance, size, hardness, and ecological relations of prey species in the sample were studied and results were compared with reference to feeding ecology. A comparison of the data with available information on food taken by *Macrotus waterhousii mexicanus* in temperate-subtropical central Mexico was made. Information on the importance of the most relevant identified insects was extracted from literature and analyzed. In Querétaro, Lepidoptera, Hymenoptera, and Coleoptera were frequent; moths dominated but, as a single species, the (winged) ant, *Atta mexicana* was most frequent. Nocturnal insects were frequent; diurnal ones may have been gleaned at night. A sample from Estado de México featured Orthoptera, Coleoptera, and Lepidoptera. Wingspan range of frequent prey in Querétaro was 25-80 mm, but moths over 70 mm were over one fifth of the sample. Prey hardness estimation was similar to that for *Macrotus californicus*. Some insects identified are of ecologic and agricultural relevance. Insects known to be seasonally abundant in the environment were also abundant in the sample, presumably captured according to that availability. However this bat, aside from eating insects of moderate size in proportion to its jaw size, is also capable of capturing

large moths and these may represent a significant energy intake. Most insects are nocturnal species. The taxonomic composition of the food samples from both areas suggests that *M. waterhousii* (sensu lato) may be mostly an opportunistic predator. Local insect fauna composition and dynamics may be hypothesized to influence food taken by *M. waterhousii*. Several insect species consumed by this bat in semiarid Querétaro have crucial roles in the ecology of arid land vegetation, as well as some economic importance for agriculture as pests." (Authors) Odonata *Anax* sp., *Erpetogomphus* sp., *Paltothemis* sp.) account less than 1% of diet items.]Address: Sánchez, S., Las Flores, San Lorenzo Tepaltitlán 50018, Estado de México, México. E-mail: teofenango@yahoo.com

15668. Scales, J.A.; Butler, M.A. (2016): The relationship between microhabitat use, allometry, and functional variation in the eyes of Hawaiian *Megalagrion* damselflies. *Functional Ecology* 30(3): 356-368. (in English) ["(1.) The evolution of visual systems is guided by the interaction of visual requirements imposed by habitat light heterogeneity, eye size, and physical limitations imposed by the resolution-sensitivity tradeoff. The physical constraints related to eye surface area result in a tradeoff between resolution, the ability of the eye to detect detail, and sensitivity, the ability to capture photons, so that both cannot be simultaneously maximized without increases to eye size. How this constraint interacts with ecology and whether it allows the fine tuning of the visual system to smaller scale habitat heterogeneity remains an understudied question in visual ecology. (2.) Here we use closely related species of damselflies in the Hawaiian genus *Megalagrion* which differ in ecology to test whether variation about the resolution-sensitivity tradeoff is the evolutionary result of scaling or differences in microhabitat use. We use regression analyses and phylogenetic comparative methods to examine the effects of size and microhabitat use on traits related to light sensitivity and visual resolution. (3.) We find that eye size is tightly associated with body size in these damselflies, but morphological traits related to light sensitivity and resolution are associated with microhabitat type. Furthermore, size and morphology relationships vary across microhabitats, and resolution tends to be more conserved than variation in light sensitivity. (4.) Additionally, smaller species in visually challenging microhabitats have more regionalized eyes than species with larger eyes in open, well-lit areas. Thus, regionalization of the eye allows a decoupling of size and morphology/performance so that even small insect species can exploit visually challenging habitats. (5.) These results suggest that variation in visual performance results from changes in eye geometry as well as size. These morphological changes are likely adaptive to differences in microhabitat indicating that variation in microhabitat use, even at small scales, can play an important role in the evolution of visual systems." (Authors)] Address: Scales, J.A., Department of Biology, University of Hawaii at Manoa, Honolulu, HI, USA. E-mail: jscales@usf.edu

15669. Schädel, M.; Bechly, G. (2016): First record of Anisoptera (Insecta: Odonata) from mid-Cretaceous Burmese amber. *Zootaxa* 4103(6): 537-549. (in English) ["The fossil

dragonfly *Burmaliindenia imperfecta* gen. et sp. nov. is described from mid-Cretaceous Burmese amber as the first record of the odonate suborder Anisoptera for this locality and one of the few records from amber in general. The inclusion comprises two fragments of the two hind wings of a dragonfly. The fossil can be attributed to a new genus and species of the family Gomphidae, presumably in the subfamily Lindeniinae, and features a strange teratological phenomenon in its wing venation." (Authors)] Address: Schädel, M., Department of Evolutionary Biology of Invertebrates, University of Tübingen, Auf der Morgenstelle 28E, 72076 Tübingen, Germany. E-mail: mario.schaedel@student.uni-tuebingen.de

15670. Schneider, T.; Ikemeyer, D.; Ferreira, S.; Müller, O. (2016): Rediscovery and redescription of *Coenagrion persicum* (Lohmann 1993) with description of the female, and some notes on habitat selection (Odonata: Coenagrionidae). *Zootaxa* 4103(6): 561-573. (in English) ["*Coenagrion persicum* was described by Heinrich Lohmann in 1993 on the basis of a single male and two larvae captured in 1937 by E.W. Kaiser in Lorestan Province (W-Iran). In June 2015 two of the authors (TS and DI) rediscovered individual-rich populations of this species in two Iranian provinces (Lorestan and Esfahan). We could confirm the structural differences of the male appendages between *C. persicum* and *C. pulchellum* based on a larger number of specimens than in the original description. The structural differences from *C. pulchellum* in females and their phenotypic variation pattern is described. *Coenagrion persicum* and *C. pulchellum* are also genetically distinct regarding two nDNA gene fragments: arginine methyltransferase (PRMT) and phosphoglucose isomerase (PGI). In contrast with *C. pulchellum*, *C. persicum* prefers small springs and running waters with rich herbal vegetation. Our faunistic data indicate that the species is present in the mountains between 1800 m and 2300 m a.s.l.. The species seems to be restricted to W-Iran, where it co-occurs with other rheophilic species." (Authors)] Address: Schneider, T., Arnold-Knoblach-Ring 76, 14109 Berlin-Wannsee, Germany. E-mail: thomas.rs@gmx.de

15671. Seguin, C.; Kreder, M. (2016): Amélioration des connaissances de l'Agrion à lunules sur le territoire du Parc Naturel Régional des Volcans d'Auvergne - Année 3: Capacité de déplacement & Stratégie de préservation. SMP-NRVA: 45 pp. + 8pp app.. (in French, with English summary) ["Irish Damselfly (*Coenagrion lunulatum*) is a rare and endangered dragonfly found only in the French Massif Central and especially in the Volcans d'Auvergne Natural Regional Park (PNRVA). After two years of studies about inventory and larval habitat characterisation, 2015 is about moving capacities of this species. On the one hand, Mark-Release-Recapture method enables to understand the population dynamic of the species. On the other hand, recapture shows that *C. lunulatum* can moving punctually on distance longer than 4km. With the current knowledge about the species' ecology, the potential distribution of *C. lunulatum* on the PNRVA has been modelled. This map shows

some population cores well connected, and two isolated areas, in the North and in the South of PNRVA territory, due to small populations, relief, and woodland. Now, it must allow to define priority area where actions will be suggest to preserve this dragonfly." (Authors)] Address: not stated.

15672. Segura-Trujillo, C.A.; Lidicker, W.Z.; Álvarez-Castañeda, S.T. (2016): New perspectives on trophic guilds of arthropodivorous bats in North and Central America. *Journal of Mammalogy* 97(2): 644-654. (in English, with Spanish summary) ["Trophic guilds are useful concepts for advancing our knowledge of trophic structure of communities, dynamics of species interactions, redundancy in ecosystem services, resilience to disturbances, response to climate change, conservation strategies, etc. For insectivorous bats, current literature suggests 8 trophic-related guilds. These include 3 guilds based on the openness of foraging areas, 3 based on the style of feeding, and 2 recently proposed subguilds among gleaners. Some gleaners are "passive," using densely cluttered vegetation in which echolocation is ineffective, and others are "actively" gleaning, using echolocation to procure prey. None of these guilds is based on the actual diets of bats. We analyzed 33 reports of diet composition representing 51 species of arthropod-feeding bats inhabiting North and Central America. We wanted to determine if the classical guild structure was concordant with the actual diets of bats and to compare guild structure in the Nearctic with that in the Neotropics. Discriminant function and principle component analyses generated 5 groups of genera based on the proportion of various arthropod taxa (mainly orders) in their diets. These groups were very different from classical guilds and showed almost no overlap among bat genera between the 2 continental regions. A similar analysis based on prey flying ability and hardness of their exoskeletons suggested 4 guilds that were more consistent with classical guild concepts, had higher rates of unambiguous guild assignment, and also showed major continental differences. Our results suggest a new arrangement of 4 guilds for arthropod-feeding bats in North and Central America that are based primarily on 2 features of their prey. New molecular techniques should allow us to build on this arrangement by significantly improving the taxonomic level of prey identification." (Authors) The paper includes references to Odonata.] Address: Álvarez-Castañeda, S.T., Centro de Investigaciones Biológicas del Noroeste, Instituto Politécnico Nacional 195, Playa Palo de Santa Rita Sur, La Paz 23096, Baja California Sur, México. E-mail: sticul@cibnor.mx

15673. Shaffery, H.M.; Relyea, R.A. (2016): Dissecting the smell of fear from conspecific and heterospecific prey: investigating the processes that induce anti-predator defenses. *Oecologia* 180(1): 55-65. (in English) ["Prey use chemical cues from predation events to obtain information about predation risk to alter their phenotypes. Though we know how many prey respond to predators, we still have a poor understanding of the processes and chemical cues involved during a predation event. We examined how gray treefrog tadpoles (*Hyla versicolor*) altered their behaviour and morphology when raised with cues from different

stages of predator (*Anax junius*) attack, predators fed different amounts of prey, and predators consuming different combinations of treefrog tadpoles or snails (*Helisoma trivolvis*). We found that starved predators and predators fed snails induced no defensive responses whereas tadpoles exposed to a predator consuming gray treefrogs induced greater hiding, lower activity, and relatively deeper tails. We also found that the tadpoles did not respond to crushed, chewed, or digested conspecifics, but they did respond to consumed (i.e., chewed plus digested) conspecifics. When we increased the treefrog biomass consumed by predators, tadpoles frequently increased their defenses when only tadpoles were consumed and always increased their defenses when the total diet biomass was held constant via the inclusion of snails. When predators experienced temporal variation in diet composition, including cues from snails to cause additional digestive cues or chemical noise, there was no effect on tadpole phenotypes. Our results suggest that amphibian prey rely on cues from both chewing and digestion of conspecifics and that the presence of cues from digested heterospecifics play little or no role in adding chemical noise or increased digestive enzymes and by-products that could potentially interfere with induced defenses." (Authors)] Address: Relyea, R.A., Dept of Biological Sciences, Rensselaer Polytechnic Institute, Troy, NY, 12180, USA. E-mail: relyea@rpi.edu

15674. Shao, M.-W.; Kong, L.-C.; Jiang, D.-H.; Zhang, Y.-L. (2016): Phytotoxic and antimicrobial metabolites from *Paraphaeosphaeria* sp. QTYC11 isolated from the gut of *Pantala flavescens* larvae. *Records of Natural Products* 10(3): 326-331. (in English) ["A new lunatoic acid C (1) along with eight known compounds were isolated from *Paraphaeosphaeria* sp. QTYC11 residing in the gut of *P. flavescens* larvae. They were determined on the basis of extensive spectroscopic analysis and by comparison of the corresponding data reported previously. Compounds 1 showed good phytotoxic activities, extremely potent antifungal activities and good antibacterial activities respectively." (Authors)] Address: Zhang, Ying-Lao, College of Chemistry and Life Science, Zhejiang Normal University, Jinhua 321004, PR China. E-mail: ylzhang@zjnu.cn;

15675. Shyy, W.; Kang, C.-k.; Chirarattananon, P.; Ravi, S.; Liu, H. (2016): Aerodynamics, sensing and control of insect-scale flapping-wing flight. *Proc. R. Soc. A* 472: 20150712. <http://dx.doi.org/10.1098/rspa.2015.0712>: 37 pp. (in English) ["There are nearly a million known species of flying insects and 13000 species of flying warm-blooded vertebrates, including mammals, birds and bats. While in flight, their wings not only move forward relative to the air, they also flap up and down, plunge and sweep, so that both lift and thrust can be generated and balanced, accommodate uncertain surrounding environment, with superior flight stability and dynamics with highly varied speeds and missions. As the size of a flyer is reduced, the wing-to-body mass ratio tends to decrease as well. Furthermore, these flyers use integrated system consisting of wings to generate aerodynamic forces, muscles to move the wings, and sensing and

control systems to guide and manoeuvre. In this article, recent advances in insect-scale flapping-wing aerodynamics, flexible wing structures, unsteady flight environment, sensing, stability and control are reviewed with perspective offered. In particular, the special features of the low Reynolds number flyers associated with small sizes, thin and light structures, slow flight with comparable wind gust speeds, bioinspired fabrication of wing structures, neuron-based sensing and adaptive control are highlighted." (Authors) The paper includes many references to Odonata.] Address: Shyy, W., Department of Mechanical and Aerospace Engineering, Hong Kong University of Science and Technology, ClearWater Bay, Hong Kong. E-mail: weishyy@ust.hk

15676. Siepielski, A.M.; Fallon, E.; Boersma, K. (2016): Predator olfactory cues generate a foraging–predation trade-off through prey apprehension. *R. Soc. open sci.* 3: 150537. <http://dx.doi.org/10.1098/rsos.150537>: 7 pp. (in English) ["Most animals are faced with the challenge of securing food under the risk of predation. This frequently generates a trade off whereby animals respond to predator cues with reduced movement to avoid predation at the direct cost of reduced foraging success. However, predators may also cause prey to be apprehensive in their foraging activities, which would generate an indirect 'apprehension cost'. Apprehension arises when a forager redirects attention from foraging tasks to predator detection and incurs a cost from such multi-tasking, because the forager ends up making more mistakes in its foraging tasks as a result. Here, we test this apprehension cost hypothesis and show that damselflies (*Ischnura cervula*) miss a greater proportion of their prey during foraging bouts in response to both olfactory cues produced by conspecifics that have only viewed a fish predator and olfactory cues produced directly by fish (*Gambusia affinis*). This reduced feeding efficiency is in addition to the stereotypical antipredator response of reduced activity, which we also observed. These results show that costs associated with anti-predator responses not only arise through behavioural alterations that reduce the risk of predation, but also from the indirect costs of apprehension and multi-tasking that can reduce feeding efficiency under the threat of predation." (Authors)] Address: Siepielski, A.M., Department of Biological Sciences, Program in Ecology and Evolutionary Biology, University of Arkansas, Fayetteville, AR 72701, USA. E-mail: amsiepie@uark.edu

15677. Siregar, A.Z. (2016): Diversity and status conservation of Odonata in Green Campus University of North Sumatera, Medan-Indonesia. *Jurnal Pertanian Tropik* 3(1): 25-30. (in Indonesian, with English summary) [31 odonate species are recorded at nine sampling sites] Address: Siregar, Ameilia Zuliyanti, Program Studi Agroekoteknologi Fakultas Pertanian USU Medan –Indonesia 20155. E-mail: zuliyanti@yahoo.com, azsyanti@gmail.com

15678. Sivasankaran, P.N.; Ward, T.A. (2016): Spatial network analysis to construct simplified wing structural models for Biomimetic Micro Air Vehicles. *Aerospace Science and*

Technology 49: 259-268. (in English) ["A procedure for designing a simplified, dragonfly-like wing model that is suitable for use in a Biomimetic Micro Air Vehicle (BMAV) is presented. BMAV are a relatively new class of micro-scaled unmanned air systems that mimic the flapping wing propulsion system of flying biological organisms (like insects). Many insects (e.g. dragonflies) have complex wing vein and membrane patterns that are too small to fabricate using many types of machine cutting tools (e.g. micro laser cutting). Structural dynamic modification using the spatial network analysis approach is used to create a simplified model. Our objective was to minimize the wing vein patterns so that they were within our fabrication tolerances. Simulations were performed for both the detailed and simplified models. The natural frequency and corresponding mode shapes, modal assurance criterion (MAC) and static bend-twist coupling results were very similar. This analysis shows that a simplified model can be designed and fabricated to closely biomimic a real dragonfly wing." (Authors)] Address: Ward, T.A., Department of Mechanical Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: DrTomWard@um.edu.my

15679. Sniegula, S.; Golab, M.J.; Drobniak, S.M.; Johansson, F. (2016): Seasonal time constraints reduce genetic variation in life-history traits along a latitudinal gradient. *Journal of Animal Ecology* 85(1): 187-198. (in English) ["(1.) Time constraints cause strong selection on life-history traits, because populations need to complete their life cycles within a shorter time. We therefore expect lower genetic variation in these traits in high- than in low-latitude populations, since the former are more time-constrained. (2.) The aim was to estimate life-history traits and their genetic variation in an obligately univoltine *Lestes sponsa* along a latitudinal gradient of 2730 km. (3.) Populations were grown in the laboratory at temperatures and photoperiods simulating those at their place of origin. In a complementary experiment, individuals from the same families were grown in constant temperature and photoperiod that mimicked average conditions across the latitude. (4.) Development time and size was faster and smaller, respectively, and growth rate was higher at northern latitudes. Additive genetic variance was very low for life-history traits, and estimates for egg development time and larval growth rate showed significant decreases towards northern latitudes. The expression of genetic effects in life-history traits differed considerably when individuals were grown in constant rather than simulated and naturally variable conditions. (5.) Our results support strong selection by time constraints. They also highlight the importance of growing organisms in their native environment for correct estimates of genetic variance at their place of origin. Our results also suggest that the evolutionary potential of life-history traits is very low at northern compared to southern latitudes, but that changes in climate could alter this pattern." (Author)] Address: Sniegula, S., Dept Ecosystem Conservation, Inst. Nature Conservation, Polish Academy of Sciences, al. Mickiewicza 33, PL-31-120 Kraków, Poland. E-mail: szymon.sniegula@gmail.com

15680. Steinhoff, P.O.M.; Butler, S.G.; Dow, R.A. (2016): Description of the final instar larva of *Orthetrum borneense* Kimmins, 1936 (Odonata, Libellulidae), using rearing and molecular methods. *Zootaxa* 4083(1): 99-108. (in English) ["The final instar larva of *O. borneense*, is described and figured for the first time based on exuviae from three male and six female larvae collected in Sarawak, Borneo (East Malaysia). It is compared with an early instar larva, which was matched to the adult *O. borneense* by DNA barcoding, and the known larvae of other species of this genus that occur in the region." (Authors)] Address: Steinhoff, P.O.M., Department of General and Systematic Zoology, University of Greifswald, Anklamer Str. 20, 17489 Greifswald, Germany. E-mail: philipsteinhoff@gmail.com

15681. Sugiura, S. (2016): Impacts of introduced species on the biota of an oceanic archipelago: the relative importance of competitive and trophic interactions. *Ecological Research* 31(2): 155-164. (in English) ["Introduced species negatively impact native species through competitive and trophic interactions, particularly on oceanic islands that have never been connected to any continental landmass. However, there are few studies on the relative importance of competitive interactions (resource competition with introduced species) and trophic interactions (predation or herbivory by introduced species) with respect to the negative impacts on native organisms on oceanic islands. A literature review on introduced and native species of the oceanic Ogasawara (Bonin) Islands in the western Pacific Ocean indicated that many native species (e.g., bees, beetles, damselflies, butterflies, land snails, birds, and plants) have been negatively impacted by introduced predators and herbivores (e.g., lizards, rats, flatworms, and goats). Several native plants and bees have been negatively affected by introduced competitors. However, the native species that have competed with introduced species have also suffered from either intense herbivory or predation by other introduced species. Thus, introduced predators and herbivores have had greater impacts on native species than introduced competitors in the Ogasawara Islands." (Author) The publication includes references to Odonata.] Address: Sugiura, S., Graduate School of Agricultural Science, Kobe Univ., Rokkodai, Nada, Kobe 657-8501, Japan. E-mail: sugiura.shinji@gmail.com

15682. Tennessen, K. (2016): *Psaironeura angeloi*, a new species of damselfly (Zygoptera: Coenagrionidae) from Central and South America. *Zootaxa* 4078(1): 28-37. (in English) ["*Psaironeura angeloi* sp. nov. (Holotype male deposited in FSCA: Ecuador, Esmeraldas Province, small stream 5.6 km NW of Lita, 00.893°N 78.510°W, 4.II.1997, KJT leg.) is described and illustrated based on specimens from Ecuador, Panama, Costa Rica, and Nicaragua, bringing the total number of species in the genus to five. The new species is closely related to *P. remissa* (Calvert), a Mexican/northern Central American species with broad, foliate male cerci, but is distinct in that the long flagella of the genital ligula lack a small sharp spine unique to *P. remissa*, labrum and clypeus are orangered, and the back of the head is mostly pale in both males and females. In life, the eyes of

the new species are bright red in males versus green and black in *P. remissa*." (Author)] Address: Tennessen, K., Florida State Collection of Arthropods, PO Box 585, Wautoma, WI 54982, USA. E-mail: ktennessen@centurytel.net

15683. Troast, D.; Suhling, F.; Jinguji, H.; Sahlén, G.; Ware, J. (2016): A global population genetic study of *Pantala flavescens*. *PLoS ONE* 11(3): e0148949. doi:10.1371/journal.pone.0148949: 13 pp. (in English) ["Among terrestrial arthropods, the dragonfly species *Pantala flavescens* is remarkable due to their nearly global distribution and extensive migratory ranges; the largest of any known insect. Capable of migrating across oceans, the potential for high rates of gene flow among geographically distant populations is significant. It has been hypothesized that *P. flavescens* may be a global panmictic population but no sufficient genetic evidence has been collected thus far. Through a population genetic analysis of *P. flavescens* samples from North America, South America, and Asia, the current study aimed to examine the extent at which gene flow is occurring on a global scale and discusses the implications of the genetic patterns we uncovered on population structure and genetic diversity of the species. This was accomplished using PCR-amplified cytochrome oxidase one (CO1) mitochondrial DNA data to reconstruct phylogenetic trees, a haplotype network, and perform molecular variance analyses. Our results suggested high rates of gene flow are occurring among all included geographic regions; providing the first significant evidence that *Pantala flavescens* should be considered a global panmictic population." (Authors)] Address: Troast, D., Dept of Biology, Rutgers University, Newark, New Jersey, USA. E-mail: danieltroast@gmail.com

15684. Valente-Neto, F.; Roque, F.; Rodrigues, M.E.; Juen, L.; Swan, C.M. (2016): Toward a practical use of Neotropical odonates as bioindicators: Testing congruence across taxonomic resolution and life stages. *Ecological Indicators* 61(2): 952-959. (in English) ["Highlights: •We assessed environmental factors driving larvae and adults of odonates. •We evaluated the congruency between and within life-history stages. •Larvae vs. adult and adult genera vs. species were congruent. •Environmental variables were important to explain the congruence pattern. •For operational reasons, adult genera are recommended in biomonitoring programs. Abstract: Odonates are suggested as bioindicators of human impact. However, their complex life cycles add additional challenges in the practical use as bioindicators, because the level of taxonomic identification could be dependent on life-history stage and, during their ontogeny, dramatic changes occur in their niche (ontogenetic niche shifts). Considering that larvae and adults have different biological characteristics, which could interfere in their performance as bioindicators, we first sought to understand how similar or different environmental factors affect larval and adult life stages in the Odonata. Second, we assessed the level of congruence between (larvae and adult) and within (adult genera and species) life-history stages, considering the taxonomic and numerical resolution. We sampled larvae and adults in 44 streams distributed along a riverine

network in southwest Brazil. Larvae samples constituted 20 sampling units of 1 m length each, using the kick sampling method; adults were collected for 1 h at each site with a hand net along a 100-m transect parallel to the stream/river banks. The influence of environmental factors on larvae and adult was assessed by redundancy analysis coupled with forward selection. The congruence level between response matrices was determined by Procrustes analysis. Our results revealed that a set of environmental variables explained a portion of larvae and adults distribution and some environmental factors affect both between (larvae and adults) and within (adult genera and species) life-history stages. Larvae and adult were about 54% congruent, regardless of taxonomic level of adults. Abundance of adult genera and species were 94% congruent, but numerical resolution (abundance vs. incidence) decreased the congruency by 10%. Environmental variables could influence larvae and adults individually or via carry-over effects, i.e., larval environmental conditions that could affect adult fitness components or vice versa. In addition, some odonate behaviours, such as female selection of more appropriate habitats for laying their eggs, could also help us to explain our results, because it could determine larvae distribution. In a biomonitoring perspective, considering the cost-benefit of taxonomic level and sampling of larvae and adults, our results suggest that abundance of adult genera could be used in biomonitoring programs since they capture, respectively, 94% and 54% of the information carried by adult species and larvae." (Authors)] Address: Valente-Neto, F., Programa de Pós-Graduação em Ecologia e Conservação, Universidade Federal de Mato Grosso do Sul, CP 549, CEP 79070-900 Campo Grande, Mato Grosso do Sul, Brazil. E-mail: fvalenteneto@gmail.com

15685. Van Dinh, K.; Janssens, L.; Therry, L.; Gyulavári, H.A.; Bervoets, L.; Stoks, R. (2016): Rapid evolution of increased vulnerability to an insecticide at the expansion front in a poleward moving damselfly. *Evolutionary Applications* 9(3): 450-461. (in English) ["Many species are too slow to track their poleward moving climate niche under global warming. Pesticide exposure may contribute to this by reducing population growth and impairing flight ability. Moreover, edge populations at the moving range front may be more vulnerable to pesticides because of the rapid evolution of traits to enhance their rate of spread that shunt energy away from detoxification and repair. We exposed replicated edge and core populations of the poleward moving damselfly *Coenagrion scitulum* to the pesticide esfenvalerate at low and high densities. Exposure to esfenvalerate had strong negative effects on survival, growth rate and development time in the larval stage and negatively affected flight-related adult traits (mass at emergence, flight muscle mass and fat content) across metamorphosis. Pesticide effects did not differ between edge and core populations, except that at the high concentration the pesticide-induced mortality was 17% stronger in edge populations. Pesticide exposure may therefore slow down the range expansion by lowering population growth rates, especially because edge populations suffered a higher mortality, and by

negatively affecting dispersal ability by impairing flight-related traits. These results emphasize the need for direct conservation efforts toward leading-edge populations for facilitating future range shifts under global warming." (Authors)] Address: Van Dinh, K., Institute of Aquaculture, Nha Trang University, Nha Trang, Vietnam. E-mail: khuongaquatic@gmail.com

15686. Vilela, D.S.; Ferreira, R.G.; Del-Claro, K. (2016): The Odonata community of a Brazilian vereda: seasonal patterns, species diversity and rarity in a palm swamp environment. *Biosci. J., Uberlândia* 32(2): 486-495. (in English, with Spanish summary) ["Studies concerning the occurrence of species and seasonality are of great importance for both the elucidation of species distribution and conservation of natural habitats. We performed a survey of Odonata species and studied their seasonality in an endemic endangered palm swamp (i.e. Veredas) environment of the Ecological Reserve of Clube de Caça e Pesca Itororó de Uberlândia, Southeastern Brazil. Between July 2010 and June 2011, we recorded 31 species of five different families and 21 genera. The community was strongly seasonal, since 24 species occurred in the wet season, while ten occurred in both dry and wet season, and only two species occurred only in the dry season. All Anisoptera species preferred lentic habitats, whereas seven of the 18 Zygoptera species preferred lentic habitats and 11 species preferred lotic sites. The five Calopterygidae and Protoneuridae species preferred lotic habitats. The study site exhibits a great diversity of dragonflies and damselflies, which are important elements of the trophic chain in the Cerrado aquatic and neighbouring land environments. This justifies the development of conservation actions in palm swamp areas, which are poorly known and threatened by the constant advance of urban, monoculture and pasture areas in Cerrado." (Authors)] Address: Vilela, D.S., Graduate Program in Entomology, University of São Paulo, FFCLRP, Ribeirão Preto, SP, Brazil. E-mail: deeogoo@gmail.com

15687. Villalobos-Jimenez, G.; Dunn, A.M.; Hassall, C. (2016): Dragonflies and damselflies (Odonata) in urban ecosystems: A review. *Eur. J. Entomol.* 113: 217-232. (in English) ["The expansion of urban areas is one of the most significant anthropogenic impacts on the natural landscape. Due to their sensitivity to stressors in both aquatic and terrestrial habitats, dragonflies and damselflies (the Odonata) may provide insights into the effects of urbanisation on biodiversity. However, while knowledge about the impacts of urbanisation on odonates is growing, there has not been a comprehensive review of this body of literature until now. This is the first systematic literature review conducted to evaluate both the quantity and topics of research conducted on odonates in urban ecosystems. From this research, 79 peer-reviewed papers were identified, the vast majority (89.87%) of which related to studies of changing patterns of biodiversity in urban odonate communities. From the papers regarding biodiversity changes, 31 were performed in an urban-rural gradient and 21 of these reported lower diversity towards built up city cores. Twelve of the cases of

biodiversity loss were directly related to the concentrations of pollutants in the water. Other studies found higher concentrations of pollutants in odonates from built-up catchments and suggested that odonates such as *Aeshna juncea* and *Platycnemis pennipes* may be candidate indicators for particular contaminants. We conclude by identifying current research needs, which include the need for more studies regarding behavioural ecology and life-history traits in response to urbanisation, and a need to investigate the mechanisms behind diversity trends beyond pollution." (Authors)] Address: Hassall, C., School of Biology, University of Leeds, Woodhouse Lane, LS2 9JT, Leeds, UK. E-mail: c.hassall@leeds.ac.uk

15688. Vinatier, F.; Lagacherie, P.; Voltz, M.; Petit, S.; Lavigne, C.; Brunet, Y.; Lescourret, F. (2016): An unified framework to integrate biotic, abiotic processes and human activities in spatially explicit models of agricultural landscapes. *Front. Environ. Sci.*, 02 February 2016 | <http://dx.doi.org/10.3389/fenvs.2016.00006> : 7 pp. (in English) ["Recent concern over possible ways to sustain ecosystem services has triggered important research worldwide on ecosystem processes at the landscape scale. Understanding this complexity of landscape functioning calls for coupled and spatially-explicit modelling approaches. However, disciplinary boundaries have limited the number of multi-process studies at the landscape scale, and current progress in coupling processes at this scale often reveals strong imbalance between biotic and abiotic processes, depending on the core discipline of the modellers. We propose a spatially-explicit, unified conceptual framework that allows researchers from different fields to develop a shared view of agricultural landscapes. In particular, we distinguish landscape elements that are mobile in space and represent biotic or abiotic objects (for example water, fauna or flora populations), and elements that are immobile and represent fixed landscape elements with a given geometry (for example ditch section or plot). The shared representation of these elements allows setting common objects and spatio-temporal process boundaries that may otherwise differ between disciplines. We present guidelines and an assessment of the applicability of this framework to a virtual landscape system with realistic properties. This framework allows the complex system to be represented with a limited set of concepts but leaves the possibility to include current modelling strategies specific to biotic or abiotic disciplines. Future operational challenges include model design, space and time discretization, and the availability of both landscape modelling platforms and data." (Authors) The model is based on *Bufo bufo* and *Calopteryx virgo*.] Address: Vinatier, Fabrice, INRA, UMR1221 LISAH (INRA – IRD – SUPAGRO), Montpellier, France

15689. Wellenreuther, M.; Sánchez-Guillén, R.A. (2016): Non-adaptive radiation in damselflies. *Evolutionary Applications* 9(1): 103-118. (in English) ["Adaptive radiations have long served as living libraries to study the build-up of species richness, however, they do not provide good models for radiations that exhibit negligible adaptive disparity. Here we

review work on damselflies to argue that non-adaptive mechanisms were predominant in the radiation of this group and have driven species divergence through sexual selection arising from male–female mating interactions. Three damselfly genera (*Calopteryx*, *Enallagma* and *Ischnura*) are highlighted and the extent of (i) adaptive ecological divergence in niche use and (ii) non-adaptive differentiation in characters associated with reproduction (e.g. sexual morphology and behaviours) evaluated. We demonstrate that species diversification in the genus *Calopteryx* is caused by non-adaptive divergence in colouration and behaviour affecting premating isolation, and structural differentiation in reproductive morphology affecting postmating isolation. Similarly, the vast majority of diversification events in the sister genera *Enallagma* and *Ischnura* are entirely driven by differentiation in genital structures used in species recognition. The finding that closely related species can show negligible ecological differences yet are completely reproductively isolated suggests that the evolution of reproductive isolation can be uncoupled from niche-based divergent natural selection, challenging traditional niche models of species coexistence." (Authors)] Address: Wellenreuther, Maren, Evolutionary Ecology, Biology Department, Lund University, Sweden. Email: maren.wellenreuther@biol.lu.se

15690. Wiwatanaratnabutra, I.; Zhang, C. (2016): *Wolbachia* infections in mosquitoes and their predators inhabiting rice field communities in Thailand and China. *Acta Tropica* 159: 153-160. (in English) ["*Wolbachia* are inherited, endocyttoplasmic bacteria that infect a wide range of arthropods. Here is the first systematic report on the study of *Wolbachia* infection in mosquitoes and their predators from both Thailand and China. In Thailand, 632 mosquito specimens (20 spp.) and 424 insect predators (23 spp.) were collected from the rice agroecosystem, mostly from the Central region, followed by the Northeast, the North and the South and were inhabiting rice fields, wetlands and ditches. In China, 928 mosquitoes (15 spp.) and 149 insect predators (16 spp.) were collected from rice fields along the Weishan Lake in Shandong province. Specimens were classified in the orders Diptera, Coleoptera, Odonata and Hemiptera. Using *wsp*, *ftsZ*, 16S rRNA and *groE* gene amplifications, *Wolbachia* were detected in 12 mosquito spp. and 6 predator spp. from Thailand and 11 mosquito spp. and 5 predator spp. from China. The relative *Wolbachia* densities of these species were determined using quantitative real-time PCR. The mosquito, *Aedes albopictus*, and the predator, *Agriocnemis femina*, had the highest bacterial densities. These results imply that *Wolbachia* of supergroup B are distributed throughout these insects, probably via horizontal transmission in rice agroecosystems." (Authors)] Address: Department of Plant Production Technology, Faculty of Agricultural Technology, King Mongkut's Institute of Technology Ladkrabang, Chalokkrung Rd Ladkrabang, Bangkok 10520, Thailand. E-mail: itsanun.wi@kmitl.ac.th

15691. Worthen, W.B.; Hart, T.M. (2016): Resistance to *Arrenurus* spp. parasitism in odonates: Patterns across species and comparisons between a resistant and susceptible

host. *Journal of Insect Science* 16(1)(37): 6 pp. (in English) ["Some adult odonates resist parasitism by larval water mites (*Arrenurus* spp.) with melanotic encapsulation, in which the mite's styletome is clogged and the mite starves. In summer 2014, we counted the engorged and resisted mites on 2,729 adult odonates sampled by aerial net at 11 water bodies in Greenville Co. and Pickens Co., SC, and tested the hypothesis that the frequency and intensity of resistance correlates with parasite prevalence (the percentage of parasitized hosts). Resistance prevalence (the percentage of parasitized hosts that resisted at least one mite) varied significantly among host species, exceeding 60% for *Argia fumipennis* and *Celithemis fasciata* but less than 20% for other species. However, neither resistance prevalence nor mean resistance intensity (mean percentage of resisted mites on resisting hosts) correlated with parasite prevalence. We described potential effects of parasitism on host development of *A. fumipennis* and *Pachydiplax longipennis* by comparing the percent asymmetry of forewing lengths between parasitized and unparasitized individuals. There was no significant difference in asymmetry for either males or females of *A. fumipennis*, or males of *Pa. longipennis* (females were not sampled). We also evaluated differences in melanotic encapsulation between *A. fumipennis*, which readily encapsulates mites in nature, and *Pa. longipennis*. We inserted a 2.0-mm piece of sterile monofilament line into the thorax of captured individuals for 24h and compared mean gray value scores of inserted and emergent ends using Image-J software. There was no difference in melanotic encapsulation between species." (Authors)] Address: Hart, T.M., Biology Department, Furman University, Greenville, SC 29613, USA. E-mail: Thomasmhart0@gmail.com

15692. Xu, Q.; Lin, W.; Zhuang, F.; Shen, C.; Lin, X. (2016): Acute toxicity of three pesticides to *Orthetrum* larvae. *Chinese Agricultural Science Bulletin* 32(2): 73-76. (in Chinese, with English summary) ["To select efficient and safe pesticides and control dragonfly larvae in fishing ponds, acute toxicity tests of three pesticides (trichlorfon, bifenthrin and clothianidin) to last-stadium larvae of *Orthetrum* were performed respectively. The results showed that LC50 (96 h) values of trichlorfon, bifenthrin and clothianidin to last-stadium larvae of *Orthetrum* were 0.2506, 0.0012 and 0.0517 mg a.i./L, respectively. Comparing LC50 (96 h) values of the three pesticides to the last-stadium larvae of *Orthetrum*, freshwater fishes and the tadpole of *Rana grylio*, and the aquatic ecological characteristics of the three pesticides, clothianidin was recommended as the suitable pesticide for controlling dragonfly larvae in fishing ponds." (Authors)] Address: Xu, Qihan, Zhangzhou City University, Zhangzhou Fujian 363000, China. E-mail: qihanxu@aliyun.com

15693. Xu, Q.-h. (2016): Description of the final stadium larva of *Macromia calliope* Ris, 1916 (Odonata: Anisoptera: Macromiidae). *Zootaxa* 4067(5): 594-598. (in English) ["The final stadium larva of *M. calliope* is described and illustrated for the first time and diagnosed against other larvae of Chinese *Macromia* species on the basis of published descrip-

tions. Among the fourteen known Chinese *Macromia* larvae, that of *M. calliope* can be separated from those of non-calliope-group species by having distinctive diamond-shaped black spots located at the outside of the base of the wing sheaths. And in five Chinese calliope-group species, the larva of *M. calliope* can be separated from that of *M. flavocolorata* by apical border of prementum not obviously projecting forwards; from that of *M. septima* by dorsal hook on S3 thinnest and tallest of all; from that of *M. chui* by a relatively smaller body; from that of *M. urania* by nine premental setae on each side of interior prementum, five longer ones accompanied medially by four shorter ones; and finally, from those of all other Chinese *Macromia* species by several distinctive large V-shaped black markings on mid-dorsum of distal abdominal segments." (Authors)] Address: Xu, Q.-h., Department of Garden and Horticulture, Zhangzhou City University, Zhangzhou, Fujian 363000, PR China. E-mail: qihanxu@aliyun.com

15694. Yapac, L.A.; Villanueva, R.J.T.; Nuñez, O.M. (2016): Species richness of Odonata in the agricultural area of Sultan Naga Dimaporo, Lanao del Norte, Philippines. *Bulletin of Environment, Pharmacology and Life Sciences* 5(3): 60-67. (in English) ["This study was conducted to determine the species richness of Odonata in the agricultural areas of Sultan Naga Dimaporo, Lanao del Norte. Eight sampling sites were assessed comprising heavily disturbed and slightly disturbed agricultural areas. Sampling was done by sweep netting. Thirteen species composed of 10 Anisoptera and three Zygoptera were documented belonging to 10 genera and three families. Only two endemic species were found (*Diplacina bolivari*, *Coeliccia dinoceras*). *Orthetrum sabina sabina*, an Oriental species, was the most abundant species found in all areas. The agroforestry sites which are slightly disturbed areas had higher species richness, abundance, endemism, and diversity. Results indicate that agricultural land use has adverse impact on species richness of Odonata." (Authors)] Address: Nuñez, Olga, Department of Biological Sciences, College of Science and Mathematics, Mindanao State University-Iligan Institute of Technology, Iligan City, 9200 Philippines. E-mail: olgamnuneza@yahoo.com

15695. Yeates, D.K.; Meusemann, K.; Trautwein, M.; Wiegmann, B.; Zwick, A. (2016): Power, resolution and bias: recent advances in insect phylogeny driven by the genomic revolution. *Current Opinion in Insect Science* 13: 16-23. (in English) ["Our understanding on the phylogenetic relationships of insects has been revolutionised in the last decade by the proliferation of next generation sequencing technologies (NGS). NGS has allowed insect systematists to assemble very large molecular datasets that include both model and non-model organisms. Such datasets often include a large proportion of the total number of protein coding sequences available for phylogenetic comparison. We review some early entomological phylogenomic studies that employ a range of different data sampling protocols and analyses strategies, illustrating a fundamental renaissance

in our understanding of insect evolution all driven by the genomic revolution. The analysis of phylogenomic datasets is challenging because of their size and complexity, and it is obvious that the increasing size alone does not ensure that phylogenetic signal overcomes systematic biases in the data. Biases can be due to various factors such as the method of data generation and assembly, or intrinsic biological feature of the data per se, such as similarities due to saturation or compositional heterogeneity. Such biases often cause violations in the underlying assumptions of phylogenetic models. We review some of the bioinformatics tools available and being developed to detect and minimise systematic biases in phylogenomic datasets. Phylogenomic-scale data coupled with sophisticated analyses will revolutionise our understanding of insect functional genomics. This will illuminate the relationship between the vast range of insect phenotypic diversity and underlying genetic diversity. In combination with rapidly developing methods to estimate divergence times, these analyses will also provide a compelling view of the rates and patterns of lineagenesis (birth of lineages) over the half billion years of insect evolution." (Authors) The publication includes references to Odonata.] Address: Yeates, D.K., Australian National Insect Collection, CSIRO National Research Collections Australia, Canberra, ACT 2601, Australia. E-mail: david.yeates@csiro.au

15696. Yu, P.; Cheng, X.; Ma, Y.; Yu, D.; Zhang, J. (2016): The complete mitochondrial genome of *Brachythemis contaminata* (Odonata: Libellulidae). *Mitochondrial DNA* 27(3): 2272-2273. (in English) ["In this study, we reported the complete mitochondrial genome of the dragonfly *Brachythemis contaminata* (Odonata: Libellulidae). The entire circular genome is 15,056 bp in length and represents the smallest in presently known odonatan mitogenomes. The DNA molecule contains 13 protein-coding genes, 2 rRNA genes, 22 tRNA genes and a non-coding control region of 323 bp. There were a total of 137 bp short intergenic spacers and 89 bp overlaps in the genome. The gene arrangement is similar to other dragonflies. The base composition of the genome is A (40.2%), T (32.8%), C (15.6%) and G (11.4%) with an AT content of 73.0%. Four start codons (ATA, ATT, ATC and ATG) and two stop codons (TAG and TAA/TA) were found in 13 protein-coding genes. The length of 22 tRNA genes ranged from 63 (trnP) to 72 bp (trnK)."] (Authors)] Address: Zhang, J., Institute of Ecology, Zhejiang Normal University, Jinhua 321004, Zhejiang Province, P. R. China. E-mail: zhang3599533@163.com

15697. Yuto, C.M.M.; Lumogdang, L.; Tabugo, S.R.M. (2016): Fluctuating asymmetry as an indicator of ecological stress in *Rhinocypha colorata* (Odonata: Chlorocyphidae) in Iligan city, Mindanao, Philippines. *Entomology and Applied Science Letters* 3(1): 13-20. (in English) ["Odonata species are known to be successful biological indicators because they are particularly sensitive to human disturbances due to their habitat selection which makes them vulnerable to changes. A useful trait to monitor developmental instability (DI) and ecological stress is fluctuating asymmetry (FA),

which is a measure of the differences between the left and right side of bilateral symmetrical organisms. It refers to a slight number and nondirectional deviations from strict bilateral symmetry of biological objects that occur as a result of stochastic microscopic processes. In this study, fore-wing variation of *Rhinocypha colorata*, a Philippine endemic species was investigated. It assessed developmental stability via fluctuating asymmetry in the fore-wings of *R. colorata*, in three populations from three areas: Buruun, Dituclalan, Dalipuga, Iligan City, Mindanao, Philippines. Analysis was based on Procrustes method that makes comparison of FA indices of homologous points. Using landmark method for shape asymmetry, anatomical landmarks were used and analyzed using Symmetry and Asymmetry in Geometric Data (SAGE) program. Twenty landmarks on the fore-wings were tested on samples for all populations. Results obtained showed variation and significantly high FA for all populations with relatively higher FA for Dalipuga. Principal component analysis (PCA) showed that barangay Dalipuga exhibited more variations (74.93%) than that of Dituclalan (72.19%) and Buru-un (67.97%). Possible reasons behind high FA values were anthropogenic activities in the area. FA has been considered as a good indicator of DI and thus acts as a biomarker for environmental stress. Hence, results may reflect inability of the organism to cope with stressing factors and any perturbations during development. Here-with, understanding the relationship between the species and its environment would help determine the health of a given ecosystem. Nonetheless, Odonata, as bioindicator species, can play an important role for biomonitoring purposes." (Authors)] Address: Tabugo, Sharon, Department of Biological Sciences, Mindanao State University-Iligan Institute of Technology, Iligan City, Philippines. E-mail:sharonrose0297@gmail.com

15698. Zaliyati, A.M.; Shariff, S.M. (2016): Diversity of dragonfly communities at two habitats in Negeri Sembilan. *Regional conference on science, technology and social sciences (RCSTSS 2014)*: 557-564. (in English) ["Kuala Pilah and Batu kikir are located in Negeri Sembilan, Malaysia. The changes of flora and fauna community have always been related with the anthropogenic activities. This study was conducted in order to determine the species diversity of dragonfly within two different habitats in Negeri Sembilan. The sampling was carried out from August 2013 to October 2013 at two habitats comprising of UiTM Forest Reserve (Kuala Pilah) and Kampung Lonek Paddy Field (Batu Kikir). A total of 164 individuals of dragonflies were collected, which comprise of 14 species. For Kuala Pilah, a total of 11 species with 62 individuals were collected while for Batu kikir, a total of 9 species with 102 individuals were collected. Family Libellulidae was the dominant family that indicates 99 % of the total collected followed by one percent of total collected by Family Gomphidae. The highest total number of dragonfly individuals was shown by *Potamarcha congener* with 52 individuals that indicate 32 % of total collected while the least number of individuals was shown by the species of *Orthetrum chrysis*, *Tholymis tillarga*, and *Ictinogomphus decoratus* with one individual that indicate only one

percent, respectively. Thus, there was high species diversity ($H' = 1.9$), high species richness ($R = 2.423$), and high species evenness of dragonfly ($E = 0.792$) in UiTM Forest Reserve as compared to Kampung Lonek Paddy Field." (Authors)] Address: Zaliyati, Amira Md, Faculty of Applied Sciences, Universiti Teknologi MARA, Kuala Pilah, Negeri Sembilan, Malaysia. E-mail: amamira3@gmail.com

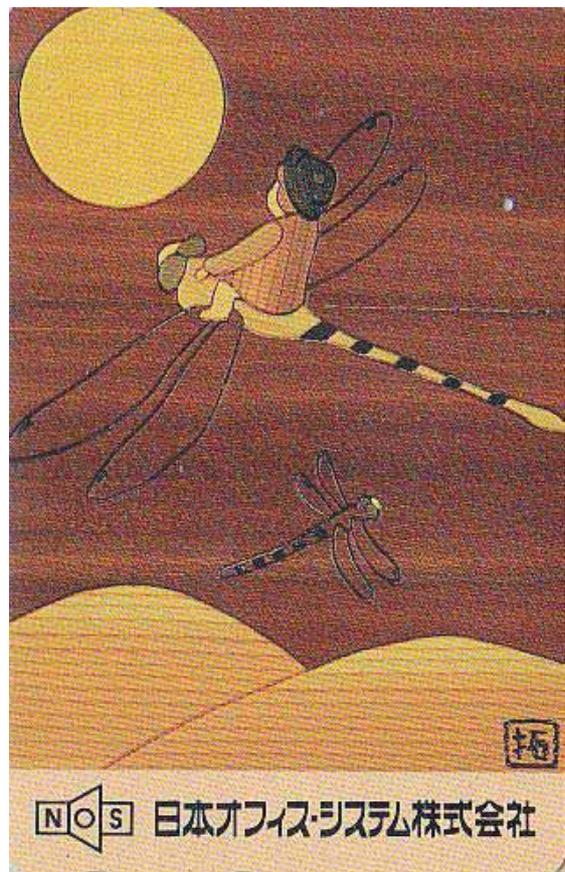
15699. Zhang, H.-M.; 1, Yang, G.-H.; Cai, Q.-H. (2016): A new species of Lamelligomphus Fraser, 1922 (Odonata: Gomphidae) from southern Yunnan, China. *Zootaxa* 4098(3): 571-581. (in English) ["Lamelligomphus annakarlorum sp. nov. is described based on specimens collected from southern Yunnan Province, China (holotype male: Xishuangbanna National Nature Reserve, 21°57'59"N, 101°12'37"E, Xishuangbanna Dai Autonomous Prefecture, Yunnan Province, China). All type specimens of the new species have been deposited in the Collection of Aquatic Animals, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan City, Hubei Province, China. It is compared with Lamelligomphus camelus (Martin, 1904), which shares some similar characters." (Authors)] Address: Zhang, H., State Key Laboratory of Freshwater Ecology & Biotechnology, Institute of Hydrobiology, Chinese Acad. of Sciences, Wuhan 430072, China. E-mail: zhanghaomiao6988@gmail.com

15700. Zheng, D.; Nel, A.; Wang, B.; Jarzembowski, E.; Chang, S.-C.; Zhang, H. (2016): The first Early Cretaceous damsel-dragonfly (Odonata: Stenophlebiidae: Stenophlebia) from western Liaoning, China. *Cretaceous Research* 61: 124-128. (in English) ["A well-preserved forewing of the damsel-dragonfly *Stenophlebia liaoningensis* sp. nov. is described from the Lower Cretaceous Yixian Formation in the Huangbanjigou Village, western Liaoning, China. This is the first discovery of the genus *Stenophlebia* in China, although it was widely distributed in Europe during the Late Jurassic. The discovery adds to the biodiversity of Stenophlebiidae in the Chinese Cretaceous, and provides insight on the evolution of this extinct family." (Authors)] Address: Zhang, D., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing 210008, China. E-mail: dranzheng@gmail.com

15701. Zheng, D.; Zhang, Q.; Chang, S.-C.; Wang, B. (2016): A new damselfly (Odonata: Zygoptera: Platystictidae) from mid-Cretaceous Burmese amber. *Cretaceous Research* 63: 142-147. (in English) ["The genus *Mesosticta* Huang, Azar, Cai et Nel, 2015 was established based on the wing bases of two damselflies from mid-Cretaceous Burmese amber. Here we describe a new well-preserved platystictid damselfly, *Mesosticta electronica* sp. nov., with complete forewings and hindwings. The diagnosis of *Mesosticta* is revised and augmented in this paper. *Mesosticta electronica* sp. nov. differs from *Mesosticta burmatica* Huang, Azar, Cai et Nel, 2015 in having the arculus slightly distal of Ax2, a free subdiscoidal cell, the hindwing AA ending on the middle area of the posterior side of the discoidal cell, and the base of RP2 being three or four cells distal of

the subnodus. The new discovery adds to the diversity of damselflies in mid-Cretaceous Burmese amber and puts the origin of Platystictidae to at least the mid-Cretaceous." (Authors)] Address: Zheng, D., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing 210008, China. E-mail: dranzheng@gmail.com

15702. Zheng, D.; Nel, A.; Wang, B.; Jarzembowski, E.; Chang, S.-C.; Zhang, H. (2016): The discovery of the hindwing of the Early Cretaceous dragonfly *Sinaktastia tangi* Lin, Nel & Huang, 2010 (Odonata, Aktassiidae) in northeastern China. *Cretaceous Research* 61: 86-90. (in English) ["A well-preserved female hindwing of the petalurid dragonfly *Sinaktastia tangi* Lin, Nel & Huang, 2010 is described from the Lower Cretaceous Yixian Formation of Inner Mongolia, China. The discovery of this hindwing allows to complete the description of this Chinese Cretaceous taxon, provides distinctive features from other Aktassiidae, and indicates a comparatively wide distribution of this dragonfly in northeast China." (Authors)] Address: Zheng, D., State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing 210008, China



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